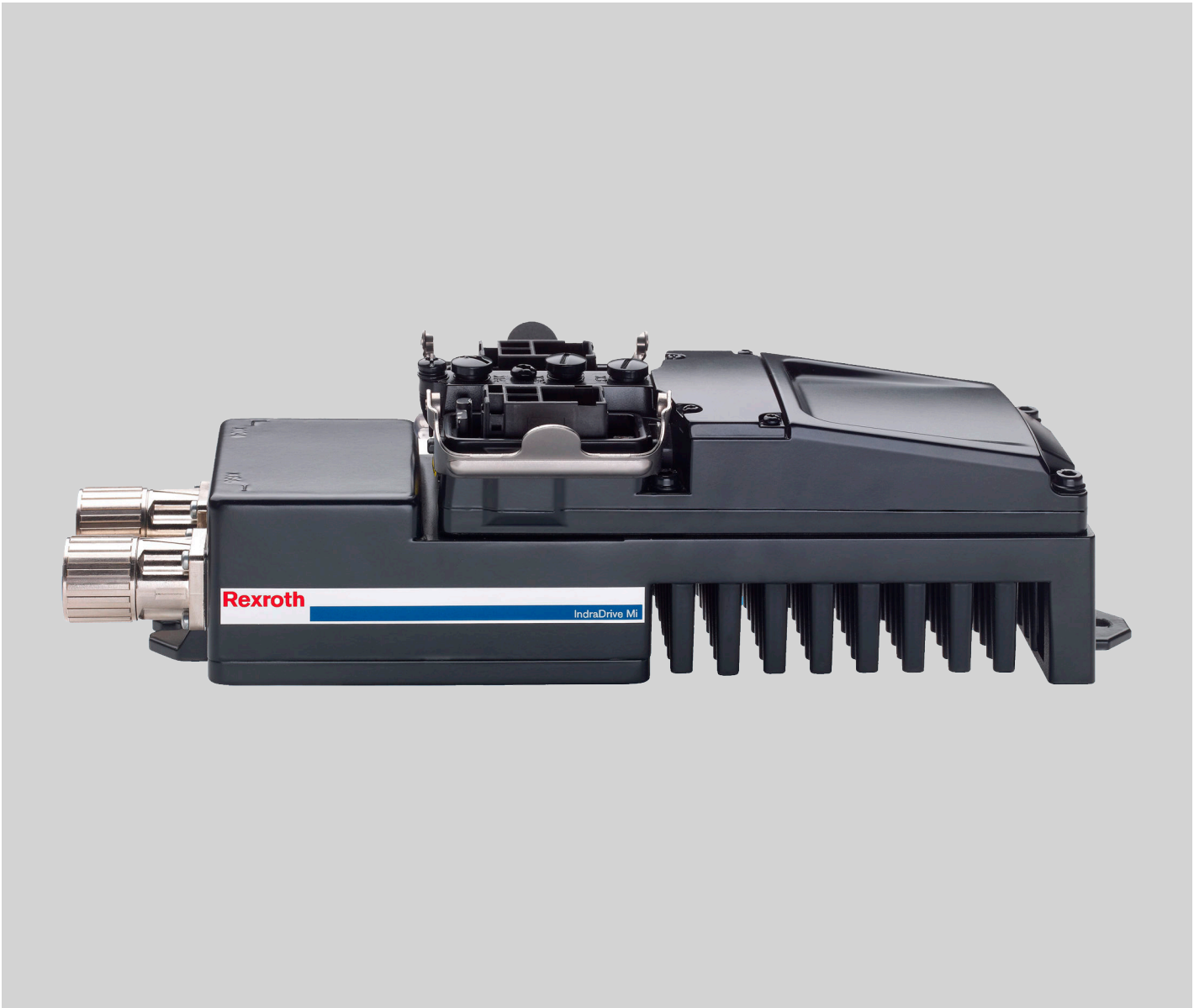
rexroth
A Bosch Company

IndraDrive Mi

KMS02 Near Motor Servo Drive

Instruction Manual
R911335789

Edition 02



Title

IndraDrive Mi

KMS02 Near Motor Servo Drive

Type of Documentation

Instruction Manual

Document Typecode

DOK-INDRV*-KMS02*UL***-IN02-EN-P

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Record of Revision

Edition	Release Date	Notes
DOK-INDRV*-KMS02*UL***-IN01-EN-P	2012-03	First edition
DOK-INDRV*-KMS02*UL***-IN02-EN-P	2021-04	Corrected edition

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

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^2 (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^2 (16 AWG)	10 mm^2 (8 AWG)	2 × 1.5 mm^2 (16 AWG)
2.5 mm^2 (14 AWG)		2 × 2.5 mm^2 (14 AWG)
4 mm^2 (12 AWG)		2 × 4 mm^2 (12 AWG)
6 mm^2 (10 AWG)		2 × 6 mm^2 (10 AWG)
10 mm^2 (8 AWG)		-
16 mm^2 (6 AWG)	16 mm^2 (6 AWG)	-
25 mm^2 (4 AWG)		-
35 mm^2 (2 AWG)		-
50 mm^2 (1/0 AWG)	25 mm^2 (4 AWG)	-
70 mm^2 (2/0 AWG)	35 mm^2 (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 Mi 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 Data

☞ A KMS02 near motor servo drive may only be operated in conjunction with drive components (inverters, converters, supply units) from Rexroth.

UL ratings and dimensions

Description	Symbol	Unit	KMS02.1B-A018-P-D7-ET-NNN-NN-NN
Listing in accordance with UL standard			UL 508C
Listing in accordance with CSA standard			C22.2 No. 274-13
UL-Files			E134201
Ambient temperature range for operation with nominal data	T_{a_work}	°C	0...40
Degree of protection according to IEC60529			IP65
Ambient conditions acc. to UL50/50E			4X Indoor Use Only
Mass	m	kg	2.50
Control voltage data			
Control voltage input[1)]	U_{N3}	V	DC 30...42
Rated power consumption control voltage input at U_{N3}[2)]	P_{N3}	W	17.5
Power section data			
Short circuit current rating[6)]	SCCR	A rms	42000
Rated input voltage, power[3)]	U_{LN_nenn}	V	DC 540...750
Rated input current	I_{LN}	A	7.3
Maximum through current		A	Bypass max. 25
Output voltage	U_{out}	V	3 x AC 0...530
Output current	I_{out}	A	5.85
			Latest amendment: 2018-02-22*

Description	Symbol	Unit	KMS02.1B-A018-P-D7-ET-NNN-NN-NN
Output frequency range[4)]	f_{out}	Hz	0...800
Power dissipation at continuous current and continuous DC bus power respectively[5)]	P_{Diss_cont}	W	50
			Latest amendment: 2018-02-22*

1) Observe supply voltage for motor holding brake;
For the 24V supply of the devices of the IndraDrive Mi range, use a power supply unit or a control-power transformer with protection by PELV according to IEC 60204-1 (section 6.4). In the scope of CSA/UL, the data of the control-power transformer are limited to:
- Max. output voltage: 42.4 V_{peak} or 30 V_{ac}
- Max. output power: 10000 VA

2) See information on "Rated power consumption control voltage input at U_{N3}"

3) Supplied by drive components (inverters, converters, supply units) from Rexroth

4) Depending on switching frequency which was set in parameter P-0-0001

5) Plus dissipation of braking resistor and control section

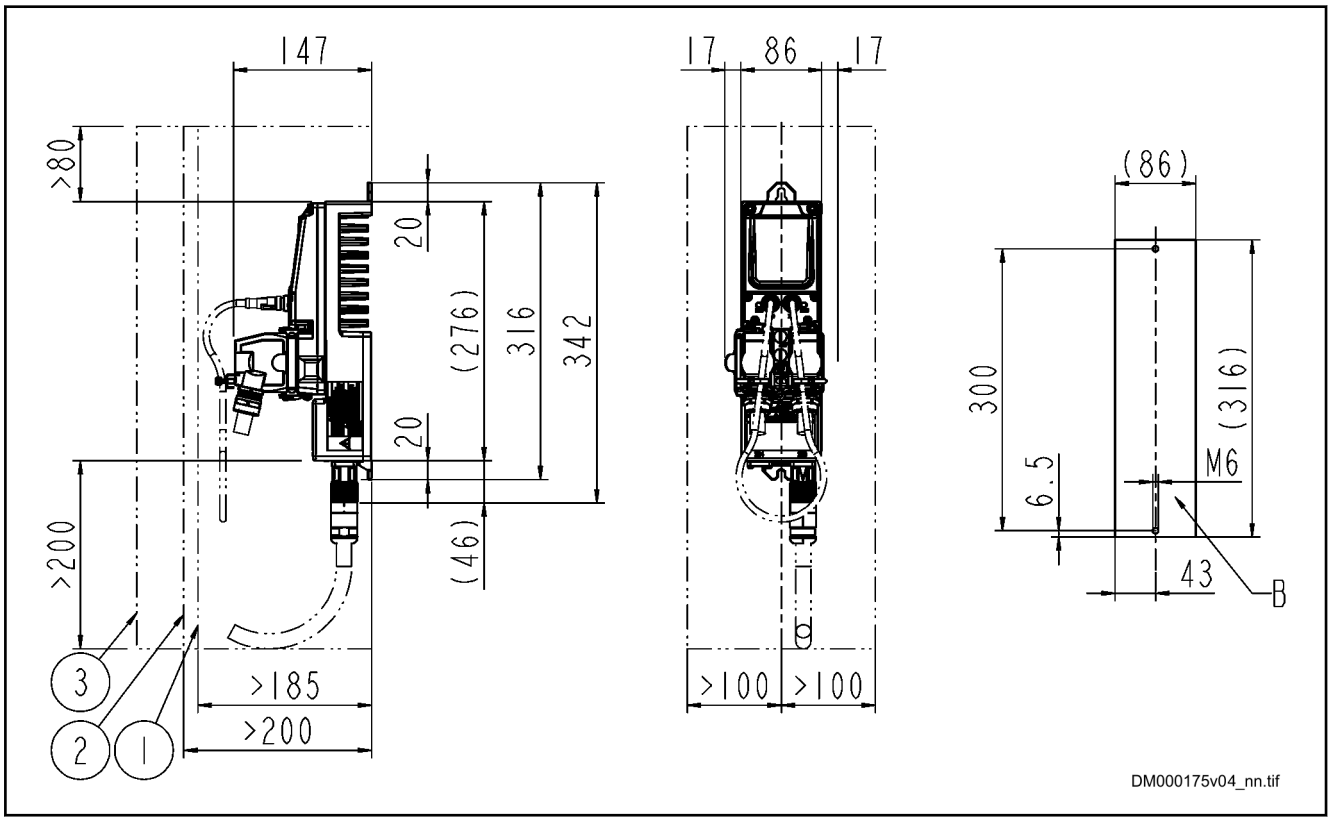
6) When protected by fuses type FWP-30A14F manufactured by Eaton/Bussmann

Tab. 2-1: KMS - UL ratings and dimensions

Rated power consumption control voltage input at U_{N3}

Plus motor holding brake, plus power consumption of externally connected inputs/outputs, plus safety option

2.2 Dimensions



A Minimum mounting clearance
B Boring dimensions

Fig. 2-1: Dimensions

2.3 China RoHS 2

www.boschrexroth.com.cn/zh/cn/home_2/china_rohs2

3 Documentations

3.1 Drive systems, system components

Title Rexroth IndraDrive …	Type of documentation	Document typecode[1)] DOK-INDRV*-…	Material number R911…
Mi Drive Systems with KCU02, KSM02, KMS02/03, KMV03, KNK03	Project Planning Manual	KCU02+KSM02-PRxx-EN-P	335703
KSM02 Motor-Integrated Servo Drives Operation in Potentially Explosive Atmospheres ATEX Directive 2014/34/EU	Operating Instructions	KSM*EXGIIK3-ITxx-EN-P	379011
Drive Systems with HMV01/02 HMS01/02, HMD01, HCS02/03	Project Planning Manual	SYSTEM*****-PRxx-EN-P	309636
Cs Drive Systems with HCS01	Project Planning Manual	HCS01******-PRxx-EN-P	322210
Supply Units, Power Sections HMV, HMS, HMD, HCS02, HCS03	Project Planning Manual	HMV-S-D+HCS-PRxx-EN-P	318790
Drive Controllers Control Sections CSB01, CSH01, CDB01	Project Planning Manual	CSH********-PRxx-EN-P	295012
Drive Controllers Control Sections CSE02, CSB02, CDB02, CSH02	Project Planning Manual	Cxx02******-PRxx-EN-P	338962
Additional Components and Accessories	Project Planning Manual	ADDCOMP****-PRxx-EN-P	306140

1) In the document 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 – overview

Title	Type of documentation	Document typecode[1)]	Material number R911…
Automation Terminals of the Rexroth Inline Product Range	Application Manual	DOK-CONTRL-ILSYSINS***-AWxx-EN-P	317021

1) In the document typecodes, "xx" is a placeholder for the current edition of the documentation (e.g.: AW01 is the first edition of an Application Manual)

Tab. 3-2: Documentations – overview

3.2 Motors

Title Rexroth IndraDyn …	Type of documentation	Document typecode[1)] DOK-MOTOR*-…	Material number R911…
A Asynchronous Motors MAD / MAF	Project Planning Manual	MAD/MAF****-PRxx-EN-P	295781
H Synchronous Kit Spindle Motors	Project Planning Manual	MBS-H******-PRxx-EN-P	297895
L Synchronous Linear Motors	Project Planning Manual	MLF********-PRxx-EN-P	293635
S Synchronous Servo Motors MSK	Project Planning Manual	MSK********-PRxx-EN-P	296289
T Synchronous Torque Motors	Project Planning Manual	MBT********-PRxx-EN-P	298798

1) In the document 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. 3-3: Documentations – overview

3.3 Cables

Title	Type of documentation	Document typecode[1)] DOK-…	Material number R911…
Rexroth Connection Cables IndraDrive and IndraDyn	Selection Data	CONNEC-CABLE*INDRV-CAxx-EN-P	322949

1) In the document typecodes, "xx" is a placeholder for the current edition of the documentation (e.g.: CA02 is the second edition of the "Selection Data" documentation)

Tab. 3-4: Documentations – overview

3.4 Firmware

Title	Type of documentation	Document typecode[1)] DOK-INDRV*-…	Material number R911…
IndraDrive MPx-21 Functions	Application Manual	MP*-21VRS**-APxx-EN-P	385758
IndraDrive MPx-20 Functions	Application Manual	MP*-20VRS**-APxx-EN-P	345608
IndraDrive MPx-20 Version Notes	Release Notes	MP*-20VRS**-RNxx-EN-P	345606
IndraDrive Power Supply Basic PSB-21 Functions	Application Manual	PSB-21VRS**-APxx-EN-P	385754
IndraDrive Power Supply Basic PSB-21 Version Notes	Release Notes	PSB-21VRS**-RNxx-EN-P	385752

Title	Type of documentation	Document typecode[1)] DOK-INDRV*-…	Material number R911…
IndraDrive Power Supply Basic PSB-20 Functions	Application Manual	PSB-20VRS**-APxx-EN-P	345610
Rexroth IndraDrive Power Supply Basic PSB-19 Functions	Application Manual	PSB-19VRS**-APxx-EN-P	345602
Rexroth IndraDrive MPx-18 Functions	Application Manual	MP*-18VRS**-APxx-EN-P	338673
Rexroth IndraDrive MPx-18 Version Notes	Release Notes	MP*-18VRS**-RNxx-EN-P	338658
Rexroth IndraDrive MPx-17 Functions	Application Manual	MP*-17VRS**-APxx-EN-P	331236
Rexroth IndraDrive MPx-17 Version Notes	Release Notes	MP*-17VRS**-RNxx-EN-P	331588
IndraDrive MPx-16 to MPx-21 and PSB Parameters	Reference Book	GEN1-PARA**-RExx-EN-P	328651
IndraDrive MPx-16 to MPx-21 and PSB Diagnostics	Reference Book	GEN1-DIAG**-RExx-EN-P	326738
Rexroth IndraDrive Integrated Safety Technology "Safe Torque Off" (as of MPx-16)	Application Manual	SI3-**VRS**-APxx-EN-P	332634
IndraDrive Integrated Safety Technology "Safe Motion" (as of MPx-18)	Application Manual	SI3*SMO-VRS-APxx-EN-P	338920
Rexroth IndraDrive Rexroth IndraMotion MLD Libraries as of MPx-17	Reference Book	MLD-SYSLIB2-RExx-EN-P	332627
IndraDrive Rexroth IndraMotion MLD Libraries as of MPx-18	Reference Book	MLD-SYSLIB3-RExx-EN-P	338916

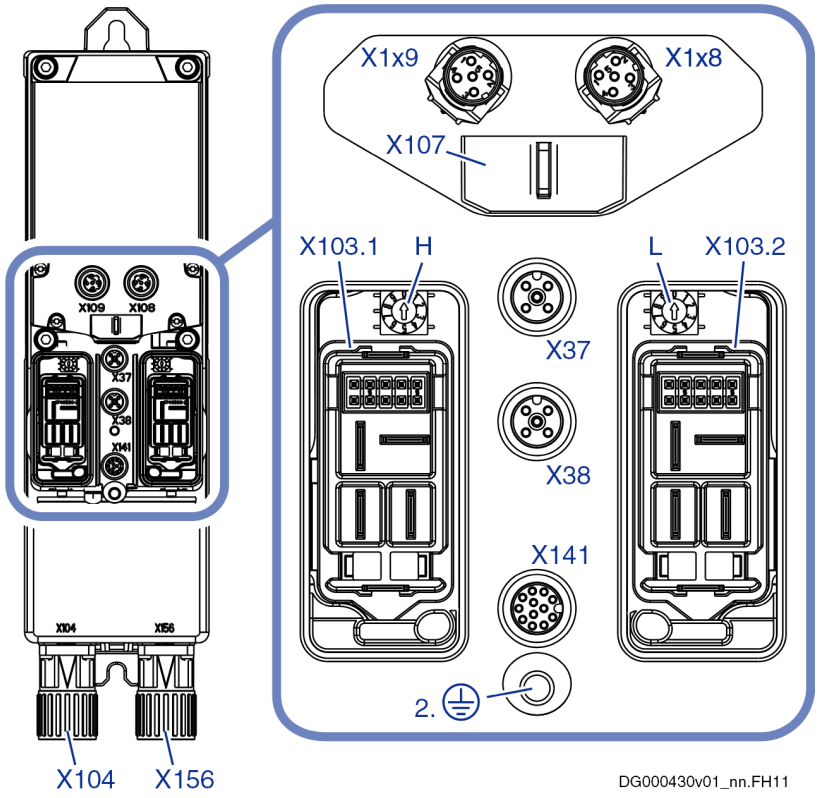
Title	Type of documentation	Document typecode[1)] DOK-INDRV*-…	Material number R911…
Rexroth IndraDrive Rexroth IndraMotion MLD as of MPx-17	Application Manual	MLD2-**VRS*-APxx-EN-P	334351
IndraDrive IndraMotion MLD as of MPx-18	Application Manual	MLD3-**VRS*-APxx-EN-P	338914

1) In the document typecodes, "xx" is a placeholder for the current edition of the documentation (e.g.: RE02 is the second edition of a Reference Book)

Tab. 3-5: Documentations – firmware

4 Instructions for use

4.1 Connection

Figure	Element	Significance
	H	Address selector switch (10×)
	L	Address selector switch (1×)
	X37 X38	Digital inputs/outputs
	X103.1 X103.2	Hybrid cable
	X104	Motor encoder Does not exist at KMS02.1B-xxxx-x-xx-xx-**ENA**-xx-xx-xx KMS02.1B-xxxx-x-xx-xx-xxx-xx-**WN/WT/WE**-xx: Angular connector
	X107	Programming module
	X1x8 X1x9	Communication (optional) • X108, X109: Communication output coupling • X118, X119: External communication
	X141	Safety technology (optional)
	X156	Motor KMS02.1B-xxxx-x-xx-xx-**ENA**-xx-xx-xx: Motor, motor encoder KMS02.1B-xxxx-x-xx-xx-xxx-xx-**WN/WT/WE**-xx: Angular connector
	2nd ⏚	Second connection point of equipment grounding conductor

Tab. 4-1: KMS02 connection points

⚠ WARNING **Lethal electric shock by live parts with more than 50 V!**

Before working on live parts: De-energize installation and secure power switch against unintentional or unauthorized re-energization.

Wait at least **30 minutes** after switching off the supply voltages to allow **discharging**.

Check whether voltage has fallen below 50 V before touching live parts!

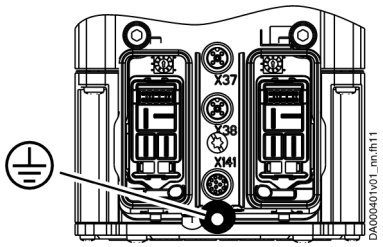
☞ At the **first** KSM/KMS, always plug the hybrid cable RKH in connection point **X103.1**.

Always terminate the unassigned connection at the **last** KSM/KMS with an **RHS terminal connector**.

Connection point	Cables
X37, X38	RKS0010
X103.1, X103.2	RKHxxxx
X104	RKG4201
X108, X109:	RKB0043, RKB0044
X141	RKB0033
X156	RKL4305

Tab. 4-2: Cables

Second equipment grounding conductor connection point at housing

View	Connection	Signal name	Function
	⏚	Equipment grounding conductor	Second equipment grounding conductor connection point Is used to connect KSM02/KMS02 to a grounded part of the installation, e.g. the machine base
Thread M5 (for ring cable lug)	**Unit**	**min.**	**max.**
Tightening torque	Nm	2.6	3.1
Cable cross section stranded wire	mm^2	2.5	4
Connection cable	AWG	14	12

Tab. 4-3: Second connection point of equipment grounding conductor, properties

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.

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:	**+49 9352 40 5060**
Fax:	**+49 9352 18 4941**
E-mail:	service.svc@boschrexroth.de
Internet:	http://www.boschrexroth.com

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)

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Notes

Notes

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