

Draft sensor KMB series 30

RE 95170

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► Sensor for draft measurement

Features

- Draft sensor according to Category 3 rear three-point attachment (ISO 730-1)
- Sensor element with magnetoelastic measuring principle
- Integrated electronics
- Output signal ratiometric and proportional to draft
- Zero point and sensitivity are calibrated

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Ordering code

01	02	03	04	05	06	07
KMB					/ 30	-

Type

01	Draft measurement pin	KMB
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Load range

02	±25 kN	025
	±40 kN	040
	±50 kN	050
	±60 kN	060
	±90 kN	090
	±110 kN	110
	±150 kN	150
	±160 kN	160

Supply voltage

03	5 ±0.5 V	05
	8 to 10 V	10

Cable version

04	Cable without protective sleeve	1
	Cable with spiral protective sleeve	2
	Cable with metal protective sleeve	3
	Cable with plastic protective sleeve	4

Connector

05	AMP connector; 3-pin	A
	DEUTSCH connector; 3-pin	B

Series

06		30
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Cable length

07	800 mm	08
	965 mm	09
	1000 mm	10
	1500 mm	15
	1600 mm	16
	1800 mm	18
	2700 mm	27

Available variants

Type	Material number
KMB 025 05 1 A / 30 - 15	R917007592
KMB 025 05 4 A / 30 - 08	R917008079
KMB 025 05 4 A / 30 - 15	R917008045
KMB 025 10 1 A / 30 - 15	R917000161
KMB 025 10 4 A / 30 - 08	R917000177
KMB 025 10 4 A / 30 - 10	R917000158
KMB 025 10 4 A / 30 - 15	R917000175
KMB 040 05 1 A / 30 - 15	R917008099
KMB 040 05 3 A / 30 - 15	R917008667
KMB 040 05 4 A / 30 - 18	R917008003
KMB 040 10 1 A / 30 - 15	R917000153
KMB 040 10 2 A / 30 - 27	R917000160
KMB 040 10 3 A / 30 - 15	R917000155
KMB 040 10 3 A / 30 - 15	R917001320
KMB 040 10 4 A / 30 - 08	R917000167
KMB 040 10 4 A / 30 - 16	R917000159
KMB 040 10 4 A / 30 - 18	R917000180
KMB 050 10 2 A / 30 - 08	R917000157
KMB 050 10 2 A / 30 - 08	R917000176
KMB 060 05 1 A / 30 - 15	R917008098
KMB 060 05 3 A / 30 - 15	R917008077
KMB 060 10 1 A / 30 - 15	R917000154
KMB 060 10 1 A / 30 - 15	R917000170
KMB 060 10 2 A / 30 - 27	R917000164
KMB 060 05 3 A / 30 - 15	R917008077
KMB 060 10 3 A / 30 - 15	R917000156
KMB 060 05 4 A / 30 - 18	R917008060
KMB 060 10 4 A / 30 - 08	R917000166
KMB 060 10 4 A / 30 - 15	R917000173
KMB 060 10 4 A / 30 - 16	R917000165
KMB 060 10 4 A / 30 - 18	R917000181
KMB 090 10 1 A / 30 - 15	R917000168
KMB 090 10 1 A / 30 - 15	R917000171
KMB 090 10 2 A / 30 - 27	R917001969
KMB 090 05 3 A / 30 - 15	R917008078
KMB 090 10 3 A / 30 - 15	R917000163
KMB 090 05 4 A / 30 - 18	R917008061
KMB 090 10 4 A / 30 - 15	R917000172
KMB 090 10 4 A / 30 - 18	R917000275
KMB 110 05 1 A / 30 - 15	R917005142
KMB 110 10 1 A / 30 - 15	R917000179
KMB 110 10 2 A / 30 - 08	R917000162
KMB 150 10 2 A / 30 - 08	R917000174
KMB 160 10 1 B / 30 - 09	R917003021

Description

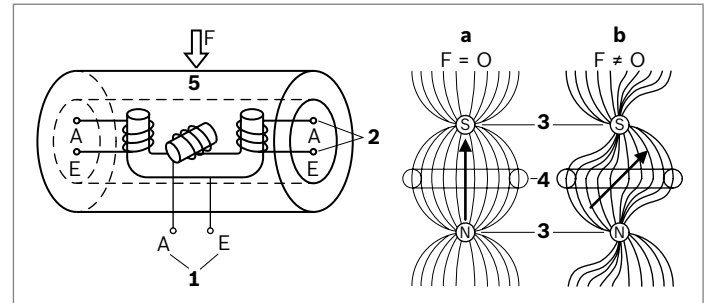
The draft sensor is designed as a bearing bolt. Shearing stress occurs at the bearing position, which is evaluated as a magnetoelastic effect.

In unloaded condition a symmetrical magnetic field is formed by the primary coil between the poles. If pulling or pressure drafts are induced, then the magnetic properties of the original isotropic material is altered. As a consequence, the magnetic field is rendered asymmetrical. This in turn induces a magnetic potential difference between the secondary poles. This causes a magnetic flux through the secondary circuit so that a voltage is induced in the secondary coils.

This voltage is proportional to the acting draft. It is amplified and rectified in an integrated evaluation circuit.

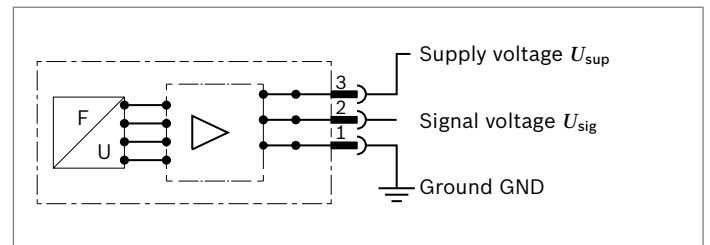
The sensor supplies a ratiometric voltage (25% to 75% of supply voltage). It is available with various measurement ranges and cable versions. This sensor is a typical part of an electro-hydraulic hitch control (EHC).

▼ Function principle



- 1 Primary coil
- 2 Secondary coil
- 3 Primary pole surface
- 4 Secondary pole surface
- 5 Steel sleeve
- a Symmetrical magnetic field
- b Asymmetrical magnetic field

▼ Block circuit diagram

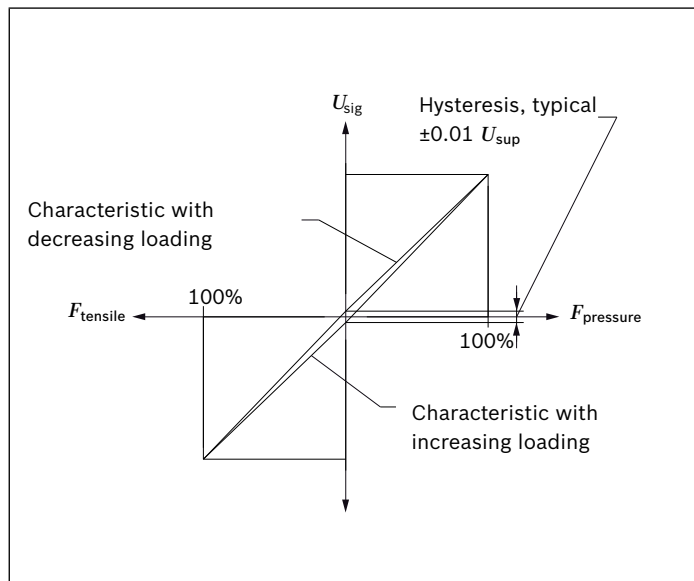


Technical data

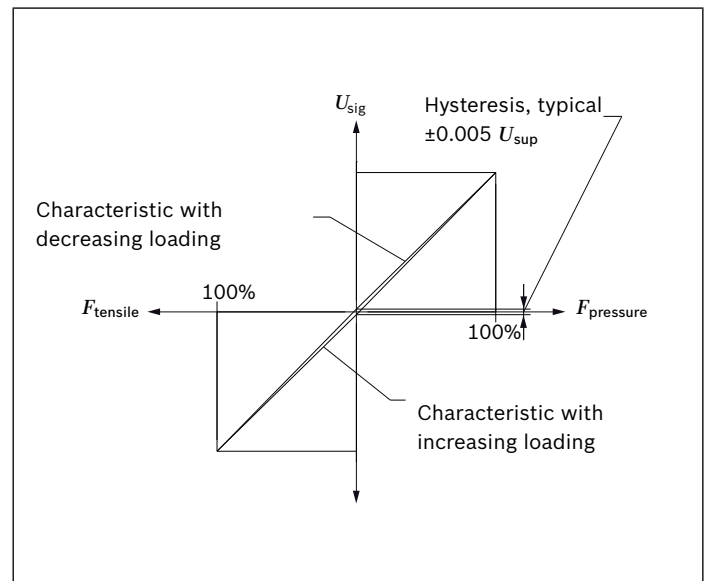
Type	025	040	050	060	090	110	150
Load range F	±25 kN	±40 kN	±50 kN	±60 kN	±90 kN	±110 kN	±150 kN
Standard overload range	±80 kN			±160 kN		±220 kN	
Electrically measurable overload	+1.2 F_{pressure} to -1.5 F_{tensile}						
Supply voltage U_{sup}	8 to 12 V regulated voltage (no direct supply out of vehicle power (battery)) or 5 ±0.5 V						
Supply current I_{sup}	< 100 mA at 8 to 12 V; < 50 mA at 5 ±0.5 V						
Signal voltage U_{sig}	25% to 75% U_{sup} at 8 to 12 V; 15% to 85% U_{sup} at 5 ±0.5 V						
Load resistance	≥ 10 kΩ						
Characteristic	1			2			
Hysteresis	±0.01 U_{sup}			±0.005 U_{sup}			
Temperature coefficient of zero point	< ±0.25% U_{sup} / 10 °C			< ±0.5% U_{sup} / 10 °C			
Temperature coefficient of sensitivity	< 1% / 10 °C			< 1.25% / 10 °C			
Operating temperature range	-35 °C to +85 °C						
Storage temperature range	-40 °C to +125 °C (permanent); +130 °C (max. 2 h)						
Type of protection with installed mating connector	AMP	IP67 and IP69K					
	DEUTSCH	IP66K					
Vibration load	24 g						
Mating connector	3-pin connector with single-wire seal						
Electromagnetic compatibility EMC according to ISO 11452-5 2002-04 1 MHz to 2 GHz	150 V/m ≤ ±0.5% U_{sup}						

Characteristics

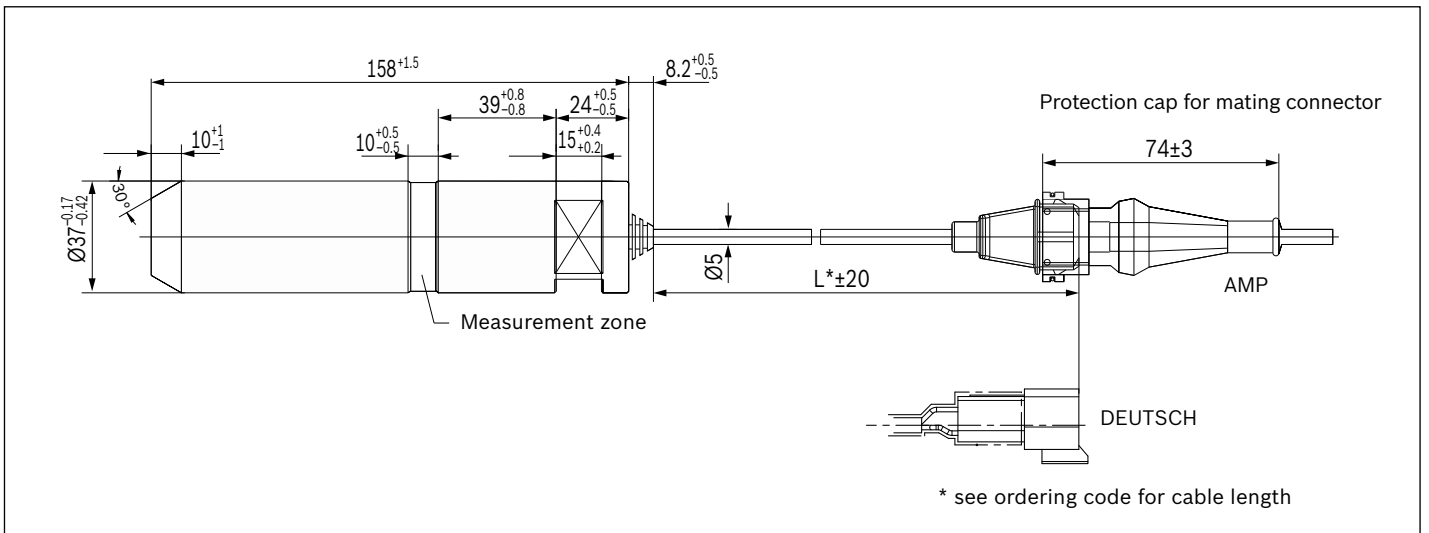
▼ Characteristic 1 (load range up to 50 kN)



▼ Characteristic 2 (load range up to 60 kN)



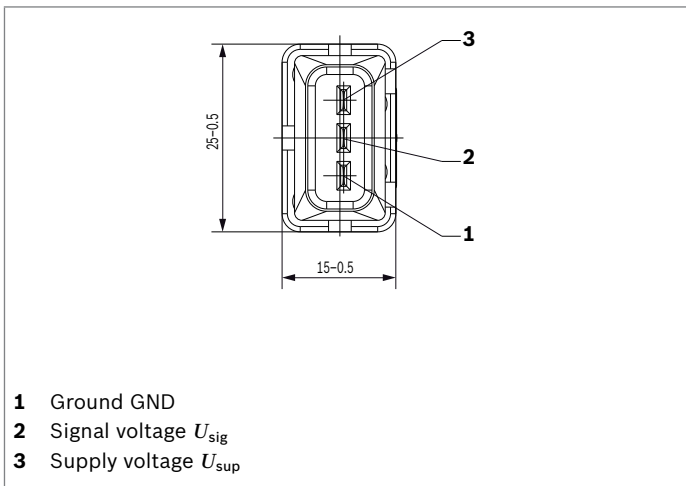
Dimensions



Connector

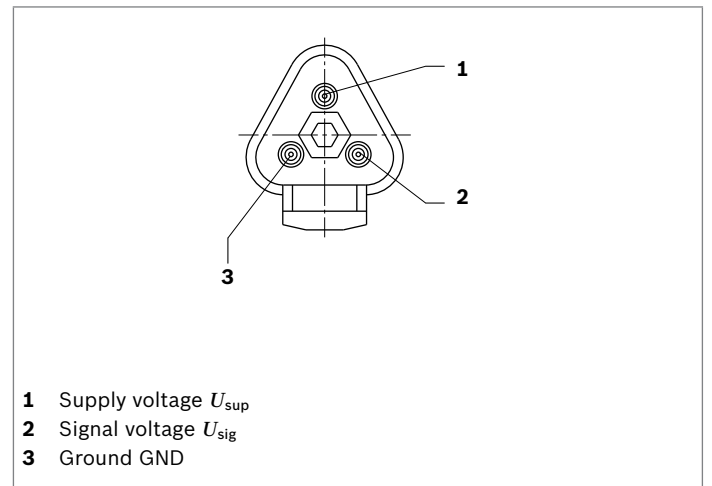
AMP

▼ Pin assignment



DEUTSCH

▼ Pin assignment



▼ Mating connector¹⁾

Designation	Number	Material number
Housing	1	1928402579 ²⁾
Protection cap	1	1280703022 ²⁾
Contacts	3	929939 ³⁾
Single-wire seal	3	828 905-1 ³⁾ for FLK cable type
(wire size:	3	828 904-1 ³⁾ for FLKr, FLX cable
0.5 to 1.0 mm ²)		

▼ Mating connector¹⁾

Designation	Material number
Plug connector	DEUTSCH DT 04-3P ⁴⁾
Wedge-lock	DEUTSCH W 3P ⁴⁾
Contacts	DEUTSCH 0460-202-16141 ⁴⁾

1) The mating connector is not included in the scope of supply.

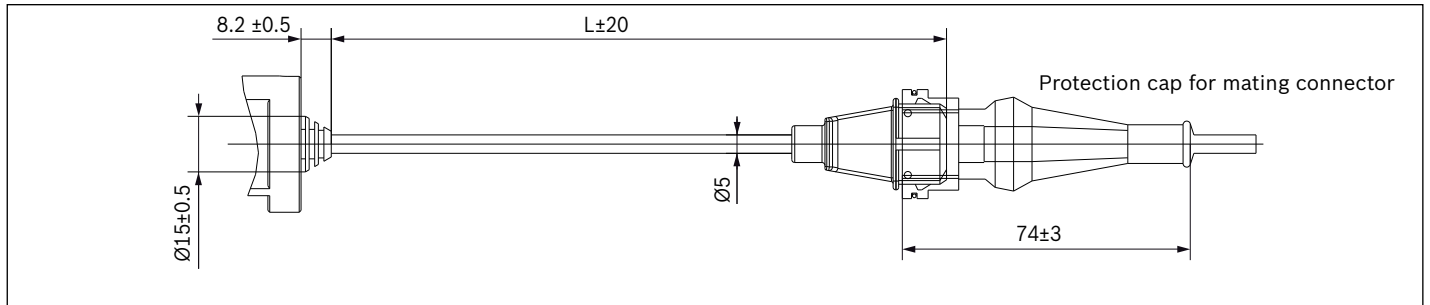
2) Available from Bosch

3) Available from AMP

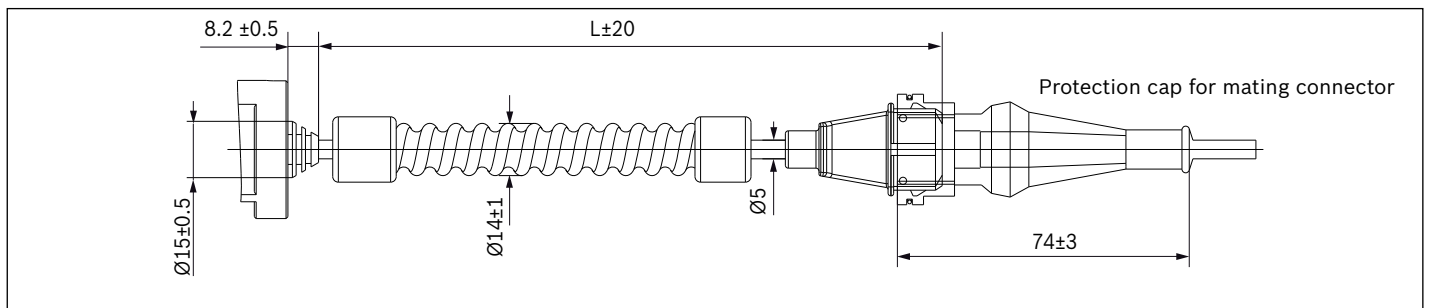
4) Available from DEUTSCH

Cable versions

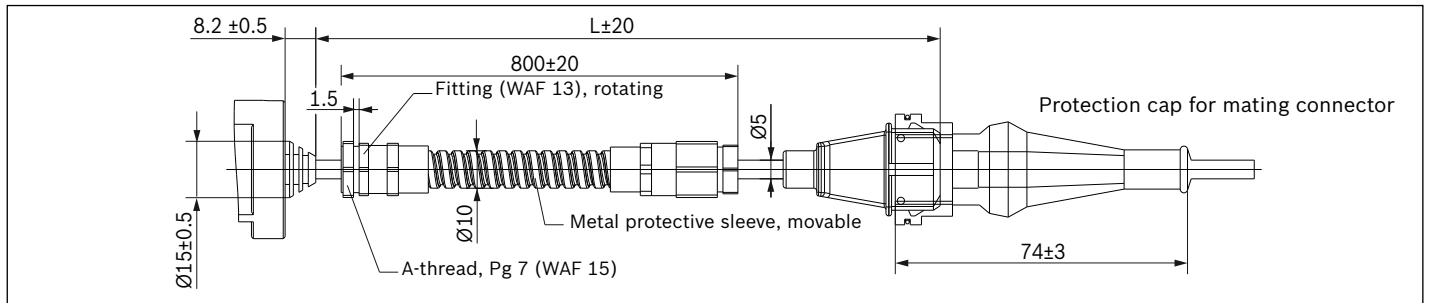
▼ Cable without protective sleeve



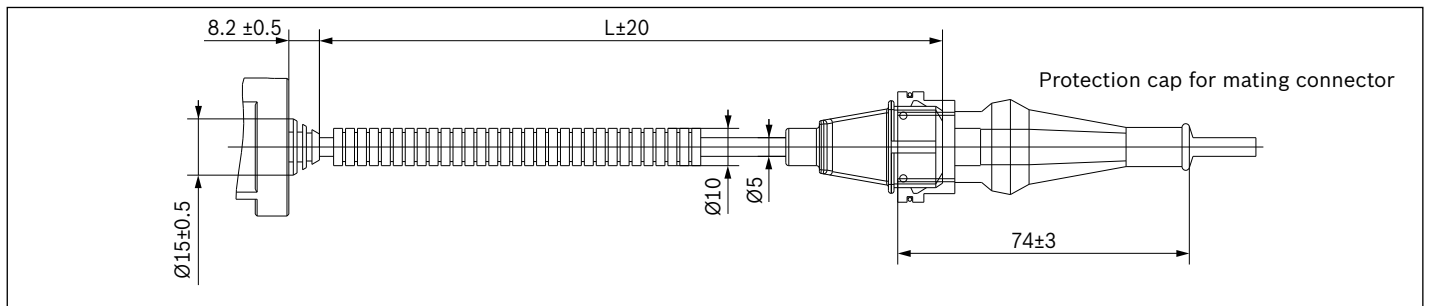
▼ Cable with spiral protective sleeve



▼ Cable with metal protective sleeve

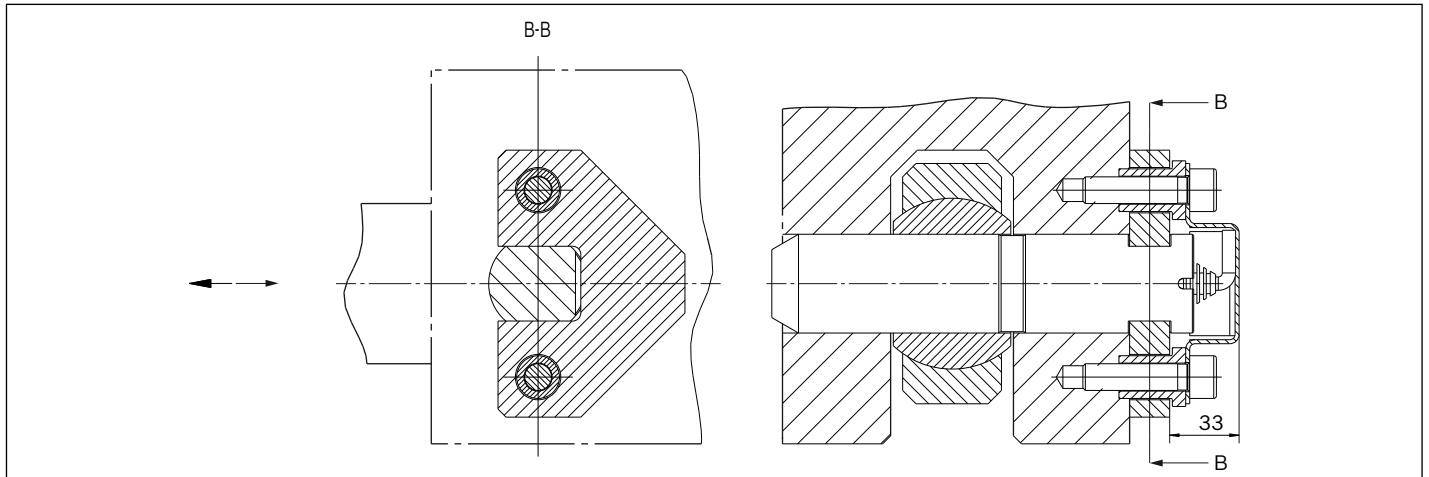


▼ Cable with plastic protective sleeve



Installation instructions

- ▶ See installation drawing Y 830 304 223 to avoid measuring uncertainties
- ▶ Defined draft application, e.g., ball bushing
- ▶ Floating mount in radial direction with key plate



Safety instructions

General instructions

- ▶ The proposed circuits do not imply any technical liability for the system on the part of Bosch Rexroth.
- ▶ It is not permissible to open the KMB draft sensor or to modify or repair the KMB draft sensor. Modifications or repairs to the wiring could result in dangerous malfunctions.
- ▶ System developments, installation and commissioning of electronic systems for controlling hydraulic drives must only be carried out by trained and experienced specialists who are sufficiently familiar with both the components used and with the complete system.
- ▶ While commissioning the KMB draft sensor, the machine may pose unforeseen dangers. Before commissioning the system, you must therefore ensure that the vehicle and the hydraulic system are in a safe condition.
- ▶ Make sure that nobody is in the machine's danger zone.
- ▶ No defective or incorrectly functioning components may be used. If the KMB draft sensor should fail or demonstrate faulty operation, it must be replaced.

Notes on the installation point and position

- ▶ Do not install the KMB draft sensor close to parts that generate considerable heat (e.g. exhaust).
- ▶ A sufficiently large distance to radio systems must be maintained.
- ▶ The connector of the KMB draft sensor is to be unplugged during electrical welding and painting operations.
- ▶ Cables/wires must be sealed individually to prevent water from entering the device.

Notes on transport and storage

- ▶ If it is dropped, the KMB draft sensor must not be used any longer as invisible damage could have a negative impact on reliability.

Notes on wiring and circuitry

- ▶ Lines to the draft sensors are so short as possible and be shielded. The shielding must be connected to the electronics on one side or to the machine or vehicle ground via a low-resistance connection.
- ▶ The product should only be plugged and unplugged when it is in a de-energized state.
- ▶ Lines from the KMB draft sensor to the electronics must not be routed close to other power-conducting lines in the machine or vehicle.
- ▶ The KMB draft sensor and the connection line should be supported mechanically near the installation location.

- ▶ If possible, lines should be routed in the vehicle interior. If the lines are routed outside the vehicle, make sure that they are securely fixed.
- ▶ Lines must not be kinked or twisted, must not rub against edges and must not be routed through sharp-edged ducts without protection.
- ▶ Lines are to be routed with sufficient distance from hot or moving vehicle parts.
- ▶ The sensor lines are sensitive to radiation interference. For this reason, the following measures should be taken when operating the sensor:
 - Sensor lines should be attached as far away as possible from large electric machines.
 - If the signal requirements are satisfied, it is possible to extend the sensor cable.

Intended use

- ▶ The KMB draft sensor is designed for use in mobile working machines provided no limitations/restrictions are made to certain application areas in this data sheet.
- ▶ Operation of the KMB draft sensor must generally occur within the operating ranges specified and released in this data sheet, particularly with regard to voltage, temperature, vibration, shock and other described environmental influences.
- ▶ Use outside of the specified and released boundary conditions may result in danger to life and/or cause damage to components which could result in consequential damage to the mobile working machine.

Improper use

- ▶ Any use of the KMB draft sensor other than that described in chapter "Intended use" is considered to be improper.
- ▶ Use in explosive areas is not permissible.
- ▶ Damages which result from improper use and/or from unauthorized, unintended interventions in the device not described in this data sheet render all warranty and liability claims with respect to the manufacturer void.

Use in safety-related functions

- ▶ The customer is responsible for performing a risk analysis of the mobile working machine and determining the possible safety-related functions.
- ▶ In safety-related applications, the customer is responsible for taking suitable measures for ensuring safety (sensor redundancy, plausibility check, emergency switch, etc.).
- ▶ Product data that is necessary to assess the safety of the machine can be provided on request or are listed in this data sheet.

Further information

- ▶ Further information about the KMB draft sensor can be found at www.boschrexroth.com/mobile-electronics.
- ▶ The KMB draft sensor must be disposed according to the national regulations of your country.