KUHSE
Powerful Solutions

User Manual
Art. No. 2KNGKN0000

KUHSE Network Gateway
KNG – KEA Network Gateway

1. Table of contents

2. Version information

Version	Date	Comment	Abbreviation
0.0	28/11/2008	Draft	MA
0.1	01/12/2008	First issue	MA
0.2	04/12/2008	Counters for "Created Work" inserted	Hen

3. Introduction

3.1. Remarks about the following documentation

The information symbol highlights important remarks about operation or commissioning and connection, which must be adhered to.

The caution symbol makes you aware of dangers that could lead to destruction of the device, or equipment and devices connected to it. The remarks must be adhered to and the relevant precautions must be taken.

3.2. Safety notices

- **Installation and commissioning may only be carried out by personnel with sufficient qualifications.**
- **Usable specifications (in particular, the VDE specifications) must be adhered to.**
- **Before commissioning, refer to the remarks in these instructions.**

3.3. General device description

The KNG (KUHSE Network Gateway) is a multi-interface converter for various data couplings.

In the variant as a KEA network gateway, the KNG enables network access to the data of a KEA 10x control via an Ethernet LAN. The Simple Network Management Protocol (SNMP) is used for communication.
Connection to the KEA takes place via the CAN bus (CAN0).

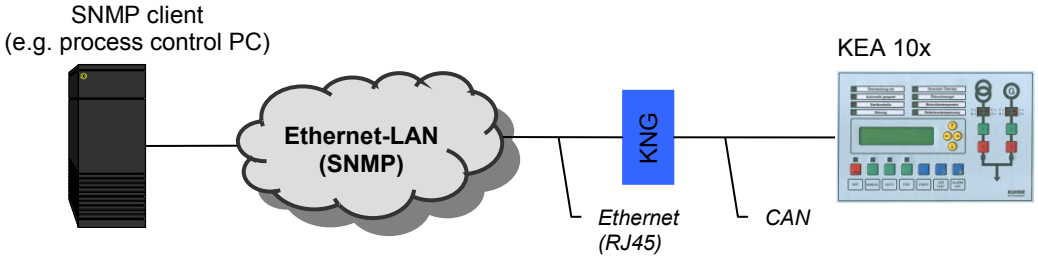

Diagram 1: Figure showing KNG use

4. Device installation and connection

4.1. Overview of the connections and displays

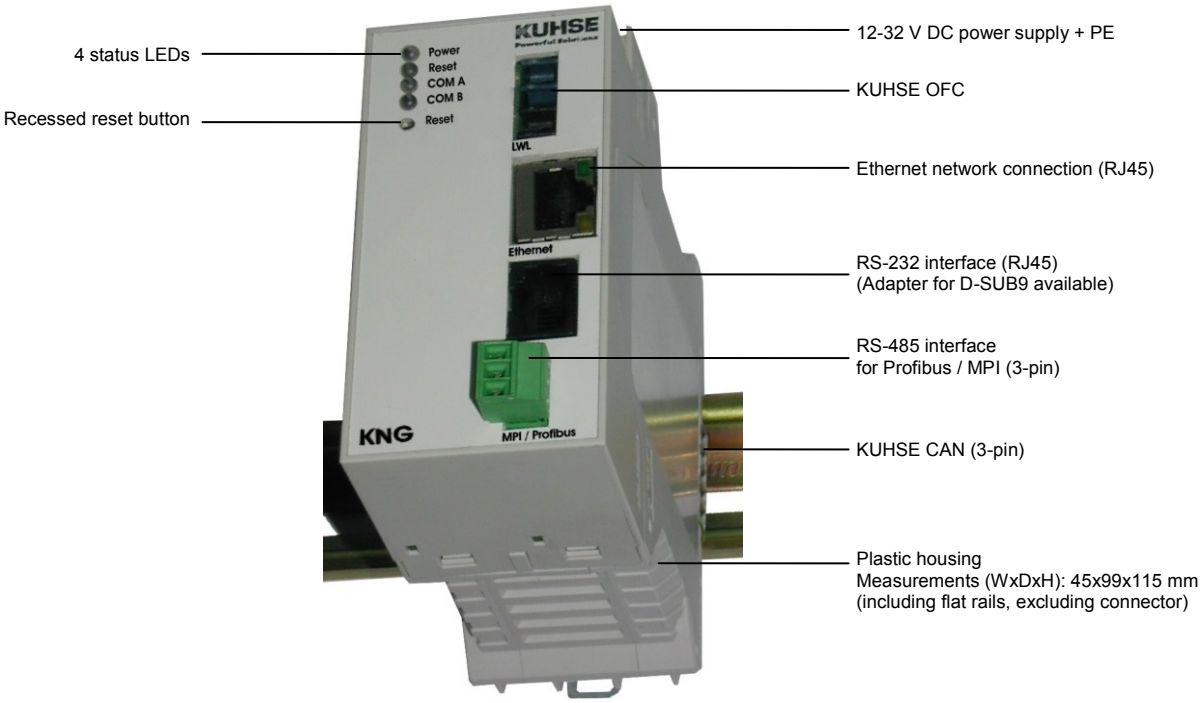

Diagram 2: Overview of the displays and connections

4.2. Power supply and earthing

Terminal	Connection
+ (1)	Power supply (12-32 V DC)
- (2)	Ground
(3)	Not connected
PE (4)	Functional earth

Table 1: Connections, power supply and earthing

To ensure interference resistance for the KNG, the device must be connected with the protective earth (PE).

4.3. Ethernet interface

The KNG is equipped with a normal RJ45 Ethernet connection. This can be used to connect the KNG to a network using a patch cable (not included).

4.4. Serial interfaces

4.4.1. Optical fibre conductor interface

The KNG is equipped with a KUHSE OFC (optical fibre conductor) interface, which is used for data coupling with KUHSE devices.

4.4.2. RS-232 interface

The RS-232 interface of the KNG is designed as an RJ45 connection. The maximum cable length is 15 metres.

Pin	Connection (signal)
1	Not connected
2	DCD
3	DTR
4	Ground (signal ground)
5	RXD
6	TXD
7	Connected internally (connection identification)
8	

Table 2: RS-232 interface connections

An adapter cable on the D-SUB9 connector is available for the RS-232 interface. This is included with all device variants that require this connection.

Pin	Connection (signal)
1	DCD
2	TXD
3	RXD
4	DTR
5	Ground (signal ground)
6	Not connected
7	Connected internally via KNG
8	
9	Not connected

Table 3: Configuring adapter cable RS-232 on D-SUB9

4.4.3. RS-485 interface

The serial RS-485 interface of the KNG is designed as a three-pin connector. In the corresponding device variants, it serves as a Profibus or an MPI interface. The RS-485 bus must be terminated on both sides. The resistor to bus termination (220 ohm) is integrated into the KNG and is active by default. The maximum bus length is 30 metres.

Terminal		Connection (signal)
B	(1)	Signal line B (TX/RX-)
A	(2)	Signal line A (TX/RX+)
PE	(3)	Functional earth (screen)

Table 4: RS-485 interface connections

4.5. CAN bus

A bus connection for the CAN bus is provided on the underside of the housing. This bus can be used to connect individual modules or external devices to the KNG for data coupling purposes.

The CAN bus must be connected using the provided bus connector for corresponding device variants. The CAN bus must be terminated on both sides. The resistor to bus termination (120 ohm) is integrated into the KNG and is active by default. The maximum bus length is 30 metres.

Pin	Connection (signal)
1	Ground (ground, optional)
2	+5V DC (optional)
L (3)	CAN bus low
H (4)	CAN bus high
PE (5)	Protective earth (CAN bus screen)

Table 5: Configuring bus connection (CAN bus ()

Diagram 3: KNG bus connection with connector

4.6. Connecting the KEA network gateway

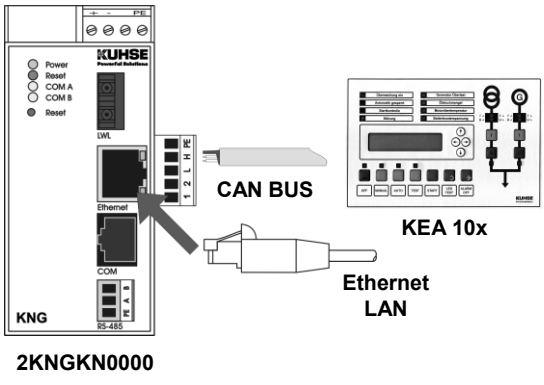

Diagram 4: Connecting the KEA network gateway

As shown in the diagram, the KEA network gateway (2KNGKN0000) is connected to the KEA 10x with a shielded two-wire cable via the CAN bus. The CAN connection to the KNG is located on the underside of the device and is lead through on the right hand side. On the KEA, the CAN0 connection is used on the underside of the device.
The connection to the Ethernet LAN takes place using a standard CAT-5/-7 patch cable (not included). This is connected to the Ethernet connector.

5. Operating modes and displays

5.1. Starting process

In the first ten seconds after connecting the power supply or after a reset, a start program (boot loader) runs in the KNG. The KNG performs internal tests and loads the actual operating program (known as the firmware). While the boot loader is active, the COM A LED flashes. After the ten seconds is over, the firmware is executed automatically. If no firmware is installed in the device, the boot loader remains active even after the ten seconds. Basic parameters can be set or the firmware can be updated using the boot loader.

5.2. Device status

The status of the device is shown using four LEDs on the housing cover. The green power LED lights up when the internal operating voltage (5V / 3.3V) is available. The red reset LED shows the reset status while the device is being restarted. The yellow communication LEDs (COM A + B) show the status of individual interfaces or data connections depending on the device variant. In addition, the COM A LED flashing shows the boot loader status.

5.2.1. Boot loader status

If the boot loader of the KNG is active, the communication LED COM A shows the boot loader status, regardless of which device variant exists:

LED	Behaviour	Meaning	Frequency
COM A	On/off	Transitional phase If the device remains in this status for longer than 4 seconds, a device error exists. In this case, please contact Kuhse.	n/a
	Flashing	Boot loader is active, waiting time is elapsing.	10 Hz
	Flashing	Boot loader is in device test mode.	100 Hz

Table 6: Boot loader status (COM A LED)

5.2.2. Communication status (KEA network gateway)

In the KNG variant as a KEA network gateway, the communication LEDs show the following status:

LED	Behaviour	Meaning	Frequency
COM A	On	Communication with KEA is running without errors	n/a
	Flashing	Errors in communication with KEA, For example, parametrisation or CAN bus errors	100 Hz
	Off	Device error, please contact Kuhse	n/a
COM B	Off	Normal operating status	n/a
	On, flashing	Device error, please contact Kuhse	n/a

Table 7: Status of communication LEDs

5.3. Device reset

If the KNG is in an unclear operating status, it can be reset using a narrow, pointed object to press the reset button. During the reset process, the red reset LED lights up for confirmation.

6. "KNG Tool" service program

The "KNG Tool" service program is required for parametrisation of the KNG and for updating the firmware. The software runs on all Microsoft Windows operating systems. The connection to the device takes place via a network or directly via a crossover patch cable between the PC and the KNG. Therefore, a network-compatible PC is required. The network connection of the PC must be configured for dynamic address assignment (DHCP) or have a fixed IP address that is suitable for the network. After calling the KNG tool, the program lists all accessible devices.

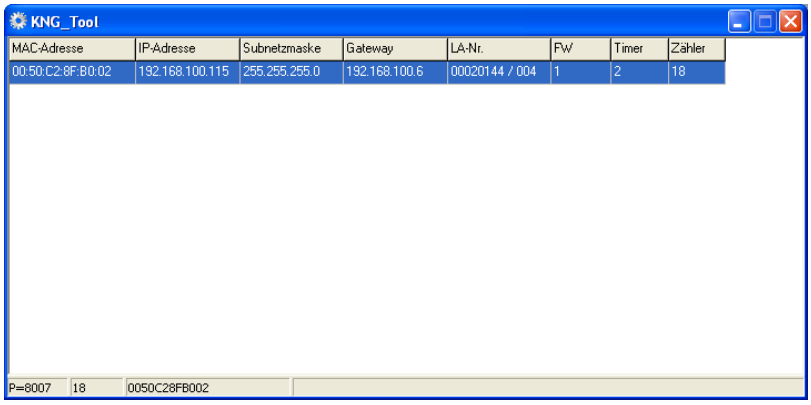

Diagram 5: "KNG Tool" service program

The device with which the program is to communicate must first be selected from the list. The corresponding MAC address is then displayed in the lower status bar. All functions are available via the context menu (right mouse button).

6.1. Parametrisation

The options for parametrisation differ depending on the device variant that exists. For more information, see the "Parametrisation" chapter.

6.2. Firmware update

The update to the firmware is started via the "Firmware Update" context menu entry. A dialogue follows in which the firmware file that is to be loaded is selected. The update progress is then shown. After the operation is complete, a result dialogue window is displayed.

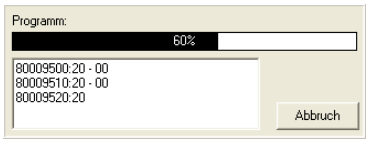

Diagram 6: Firmware update status

To ensure that the KNG uses the new firmware, a reset is required.

6.3. Security

The KNG can be protected against unauthorised accesses by setting a user-defined password. The protection comprises both the parametrisation and the firmware. This cannot be updated without entering the password after setting up password protection.

To set up password protection, select the "Change Password" context menu entry. Several dialogues appear. First, the current password and then the new password twice are requested; this is to identify and catch possible typing errors. A blank input field always means "No password". At the end, a result dialogue displays whether the password change was successful or not.

The KNG is delivered without a password set up. We strongly recommend that you set up a password when commissioning. KUHSE does not take responsibility for damage caused by inadequate security.

A forgotten password can only be reset by KUHSE. In this case, the KNG must be sent in or a service technician must be requested.

7. Parametrisation

In the KNG, the CAN interface must be parametrised according to the KEA that is connected so that a data connection can be set up. In the condition as supplied to the customer, the KNG is parametrised as follows:

Parameter		Condition as supplied to customer	Permitted values
CAN	Connected device	KEA 10x	KEA 10x
	Machine number (KEA)	1	1..31

Table 8: KNG parametrisation

The specified parameters can be changed using the KNG Tool according to the specified limits. The "CAN Bus Settings" context menu is available for this. The value itself can then be entered in a corresponding dialogue window. Successful parametrisation is confirmed by a response.

The KNG must be reset (for example, using the reset button) for changed parametrisation to take effect.

8. Data point list (Ethernet/SNMP)

8.1. Error or status messages from the KEA

OID	Value	Type	Valence / Dimension
1.3.6.1.4.1.30877.2.1.2.1.0	Alarm 1	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.2.0	Alarm 2	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.3.0	Alarm 3	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.4.0	Alarm 4	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.5.0	Alarm 5	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.6.0	Alarm 6	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.7.0	Alarm 7	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.8.0	Alarm 8	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.9.0	Alarm 9	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.10.0	Alarm 10	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.11.0	Alarm 11	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.12.0	Alarm 12	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.13.0	Alarm 13	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.14.0	Alarm 14	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.15.0	Alarm 15	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.16.0	Alarm 16	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.17.0	Alarm 17	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.18.0	Alarm 18	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.19.0	Alarm 19	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.20.0	Batt. Undervoltage	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.21.0	Motor does not shut down	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.22.0	Aborted start	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.23.0	Overspeed	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.24.0	Power controller fault	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.25.0	Feedback	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.26.0	Synchronisation fault	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.27.0	Mains off fault	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.28.0	Generator off fault	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.29.0	Mains switch case	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.30.0	Generator switch case	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.31.0	Mains phase sequence	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.32.0	Generator phase sequence	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.33.0	Mains overcurrent 1	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.34.0	Mains overcurrent 2	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.35.0	Mains unbalanced load	Boolean *[1]	-
1.3.6.1.4.1.30877.2.1.2.36.0	Mains thermal overload	Boolean *[1]	-

OID	Value	Type	Valence / Dimension
1.3.6.1.4.1.30877.2.1.2.37.0	Generator overcurrent 1	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.38.0	Generator overcurrent 2	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.39.0	Generator unbalanced load	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.40.0	Generator thermal overload	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.41.0	Mains undervoltage	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.42.0	Mains overvoltage	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.43.0	Mains underfrequency	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.44.0	Mains overfrequency	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.45.0	Generator undervoltage	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.46.0	Generator overvoltage	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.47.0	Generator underfrequency	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.48.0	Generator overfrequency	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.65.0	Cos phi regulator fault	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.66.0	Collective fault warning	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.67.0	Collective fault shutdown	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.68.0	Collective fault all alarms	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.73.0	Unit available	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.74.0	Unit running	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.75.0	Mains switch is on	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.76.0	Generator switch is on	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.77.0	Operating mode off	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.78.0	Manual operating mode	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.79.0	Automatic operating mode	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.80.0	Test operating mode	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.81.0	Mains failure	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.82.0	Peak load (PL) requirement	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.83.0	Remote start	Boolean *1	-
1.3.6.1.4.1.30877.2.1.2.84.0	Emergency stop pressed	Boolean *1	-

***1) The values specified as boolean values are transferred as an integer value with the possible values 0 and 1.**

8.2. Analogue values from the KEA

OID	Value	Type	Valence / Dimension	
1.3.6.1.4.1.30877.2.1.3.1.0	Mains voltage L1	Integer	1	V
1.3.6.1.4.1.30877.2.1.3.2.0	Mains voltage L2	Integer	1	V
1.3.6.1.4.1.30877.2.1.3.3.0	Mains voltage L3	Integer	1	V
1.3.6.1.4.1.30877.2.1.3.4.0	Mains frequency	Integer	0.01	Hz
1.3.6.1.4.1.30877.2.1.3.5.0	Mains power L1	Integer	1	A
1.3.6.1.4.1.30877.2.1.3.6.0	Mains power L2	Integer	1	A
1.3.6.1.4.1.30877.2.1.3.7.0	Mains power L3	Integer	1	A
1.3.6.1.4.1.30877.2.1.3.8.0	Actual mains power	Integer	1	kW
1.3.6.1.4.1.30877.2.1.3.9.0	Generator voltage L1	Integer	1	V
1.3.6.1.4.1.30877.2.1.3.10.0	Generator voltage L2	Integer	1	V
1.3.6.1.4.1.30877.2.1.3.11.0	Generator voltage L3	Integer	1	V
1.3.6.1.4.1.30877.2.1.3.12.0	Generator frequency	Integer	0.01	Hz
1.3.6.1.4.1.30877.2.1.3.13.0	Generator power L1	Integer	1	A
1.3.6.1.4.1.30877.2.1.3.14.0	Generator power L2	Integer	1	A
1.3.6.1.4.1.30877.2.1.3.15.0	Generator power L3	Integer	1	A
1.3.6.1.4.1.30877.2.1.3.16.0	Actual generator power	Integer	1	kW
1.3.6.1.4.1.30877.2.1.3.17.0	Battery voltage	Integer	0.1	V
1.3.6.1.4.1.30877.2.1.3.18.0	Speed	Integer	1	rpm
1.3.6.1.4.1.30877.2.1.3.19.0	Analogue value 1	Integer		*2
1.3.6.1.4.1.30877.2.1.3.20.0	Analogue value 2	Integer		*2
1.3.6.1.4.1.30877.2.1.3.21.0	Analogue value 3	Integer		*2
1.3.6.1.4.1.30877.2.1.3.22.0	Analogue value 4	Integer		*2
1.3.6.1.4.1.30877.2.1.3.23.0	Cos phi mains L1	Integer	0.01	
1.3.6.1.4.1.30877.2.1.3.24.0	Cos phi mains L2	Integer	0.01	
1.3.6.1.4.1.30877.2.1.3.25.0	Cos phi mains L3	Integer	0.01	
1.3.6.1.4.1.30877.2.1.3.26.0	Apparent mains power	Integer	1	kVA
1.3.6.1.4.1.30877.2.1.3.27.0	Cos phi generator L1	Integer	0.01	
1.3.6.1.4.1.30877.2.1.3.28.0	Cos phi generator L2	Integer	0.01	
1.3.6.1.4.1.30877.2.1.3.29.0	Cos phi generator L3	Integer	0.01	
1.3.6.1.4.1.30877.2.1.3.30.0	Apparent generator power	Integer	1	kVA
1.3.6.1.4.1.30877.2.1.3.31.0	Mains load	Integer	1	%
1.3.6.1.4.1.30877.2.1.3.32.0	Generator load	Integer	1	%
1.3.6.1.4.1.30877.2.1.3.33.0	Actual user power	Integer	1	kW
1.3.6.1.4.1.30877.2.1.3.34.0	Apparent user power	Integer	1	kVA

***2) Analogue values 1-4 are transferred without a decimal point for temperatures (1 °C); for oil pressure,**
the are transferred with a decimal point (0.1 bar).

8.3. Counter values from the KEA

OID	Value	Type	Valence / Dimension
1.3.6.1.4.1.30877.2.1.4.1.0	Operating hours	Integer	1 h
1.3.6.1.4.1.30877.2.1.4.2.0	Start counter	Integer	1
1.3.6.1.4.1.30877.2.1.4.3.0	Created work (as of KEA v18)	Integer	1 kWh

8.4. Communication status from the KNG

OID	Value	Type	Valence / Dimension
1.3.6.1.4.1.30877.2.1.1.1.0	CAN to KEA fault	Boolean	[1/0]

9. Technical data

9.1. Housing

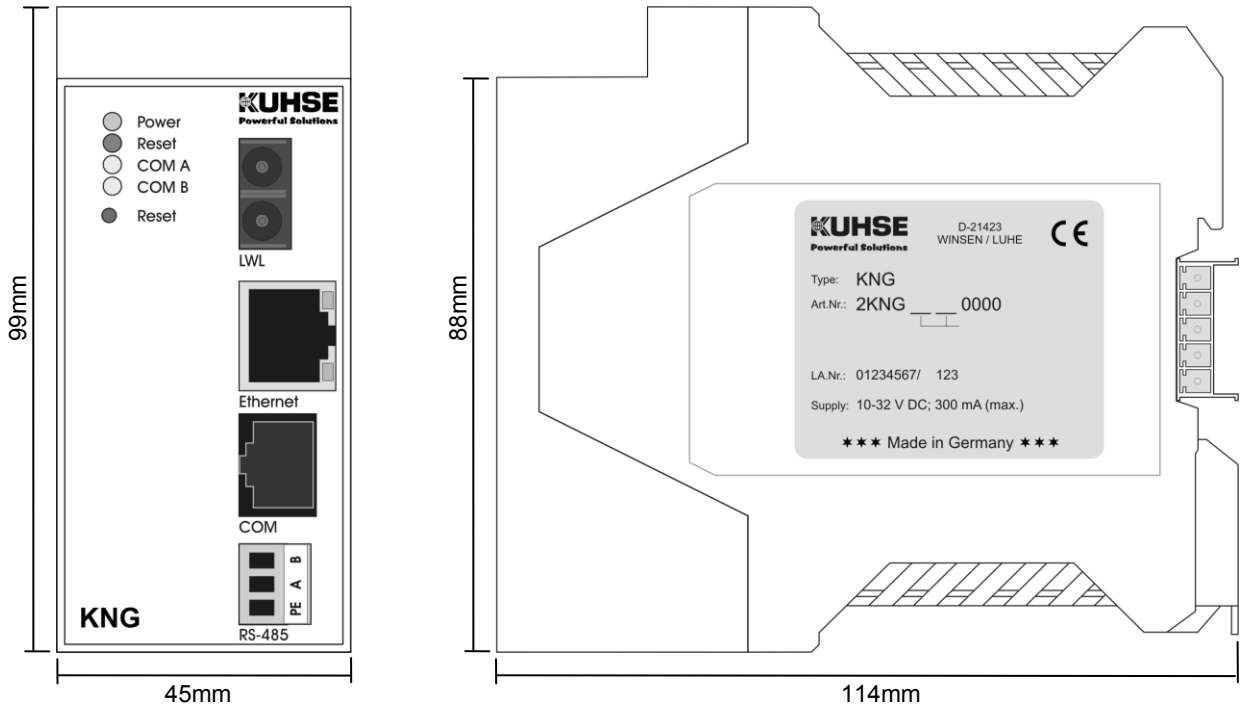

Diagram 7: KNG housing with measurements

Parameter		Unit
Width (without connector and cable)	45	mm
Width (with bus connector)	52	mm
Depth (without connector and cable)	99	mm
Height (without connector and cable)	114	mm
Weight	300	g

Table 9: Measurements and weight

The KNG is intended to be mounted on a 35 mm DIN rail (EN50022). For ease of assembly, free space of at least 10 mm must be provided for below the device. When considering the height specification, bear in mind that certain connectors and cables will stick out. Therefore, a corresponding amount of free space must be left above the device.

9.2. Nominal/threshold values

Parameter	Symbol	Conditions	min	type	max	Unit
Power supply						
Voltage	U_{cc}		10	24	32	V_{DC}
Power input	I_{cc}	U_{cc} =24V	80	100	120	mA
		U_{cc} =12V	160	200	240	mA
Power consumption	P				3	W
Environment values						
Temperature	T_A		-10		55	°C
Humidity		Non-condensing				%
Storage temperature	T_S		-20		70	°C

Table 10: Nominal/threshold values