

ComFu® 300 Wireless Set



ZigBee™ Alliance
Wireless Control That Simply Works

Latest Product Information:
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Warranty

Defects occurring within 3 years from delivery date shall be remedied free of charge at our plant (carriage and insurance paid by sender). Sensors, fittings, and accessories: 1 year.
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Return of Products

Please contact our Service Team before returning a defective device. Ship the cleaned device to the address you have been given. If the device has been in contact with process fluids, it must be decontaminated/disinfected before shipment. In that case, please attach a corresponding certificate, for the health and safety of our service personnel.

Disposal

Please observe the applicable local or national regulations concerning the disposal of "waste electrical and electronic equipment".

Trademarks

The following trademarks are used in this manual without further marking:

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Documentation

The ComFu 300 wireless set is operated and configured from the Protos 3400 measuring system, equipped with FIU 3400-141 module. The instruction manual for the FIU 3400-141 is included with the module or provided as PDF file on the included CD-ROM.

A "Network Planning" document is available on request.

All documents are provided for download at www.knick.de.

ComFu 300 Wireless Set (ComFu 300C, ComFu 300E)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

ComFu 300C

Note:

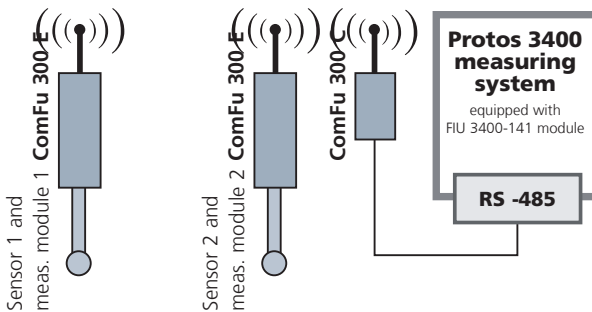
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Radio Transmission with ComFu



ZigBee™ Alliance
Wireless Control That Simply Works

"ComFu" is a ZigBee wireless set for wireless data transmission between sensors and the measuring system. "ComFu" consists of the ComFu E end device on the sensor (up to 2 units) and the ComFu C wireless coordinator on the analyzer.



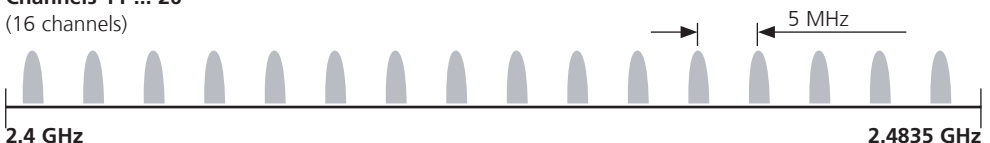
Transmission Method: ZigBee

ZigBee is a radio transmission standard for current-saving monitoring, sensor, and control applications. The "ComFu" ZigBee wireless set has a 400 m range in free field.

The ZigBee "Coordinator" automatically searches for free channels. The data is securely encrypted using AES 128 bit key and is transmitted with CRC telegram protection.

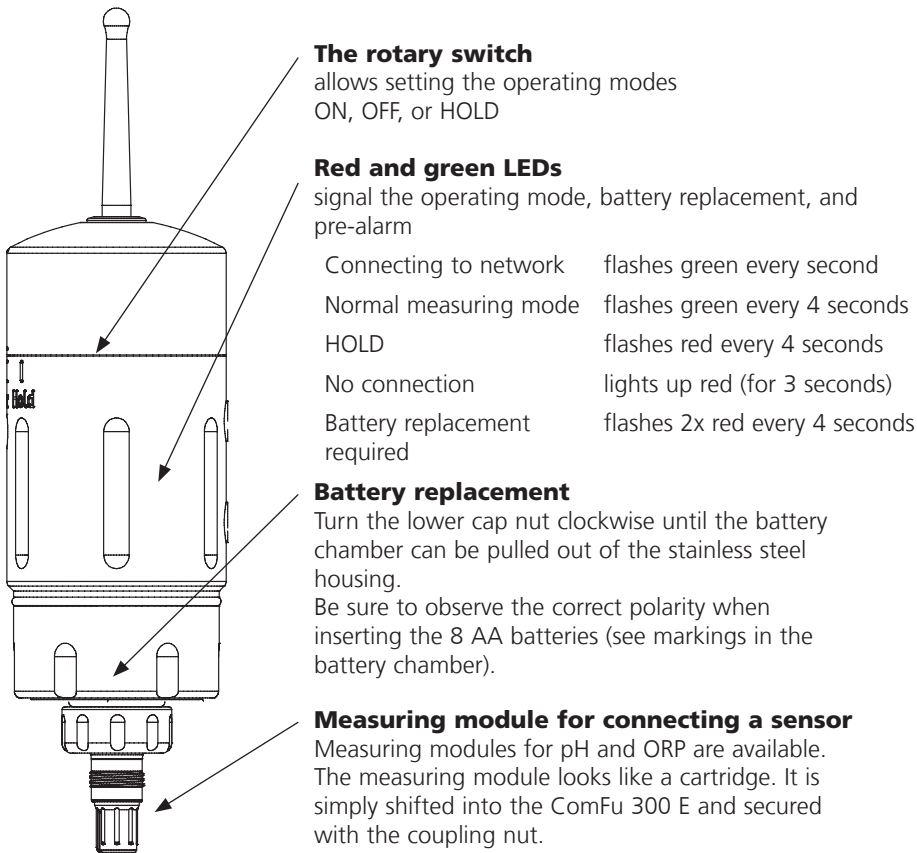
The ZigBee modules on the sensors communicate interval-controlled. Therefore they always operate for a short time only. One battery set allows an operating time > 1 year (depending on measuring rate and outer temperature). The "ComFu" ZigBee wireless set uses the 2.4 GHz frequency band. Here, 16 channels with a maximum data rate of 250 kbits/sec are available:

Channels 11 ... 26
(16 channels)



ComFu 300 E Sensor End Device

The ComFu 300 E (end device) is a radio sensing element with automatic sensor recognition. Measured values and sensor data are transmitted to the ComFu 300 C wireless coordinator by radio, which is connected to the Protos 3400 measuring system. ComFu 300 E is configured through the Protos 3400 measuring system. The rotary switch on the ComFu 300 E allows setting the operating modes ON, OFF, or HOLD. Measured values and status messages are transmitted cyclically, the transmission interval for the measured values can be freely configured.



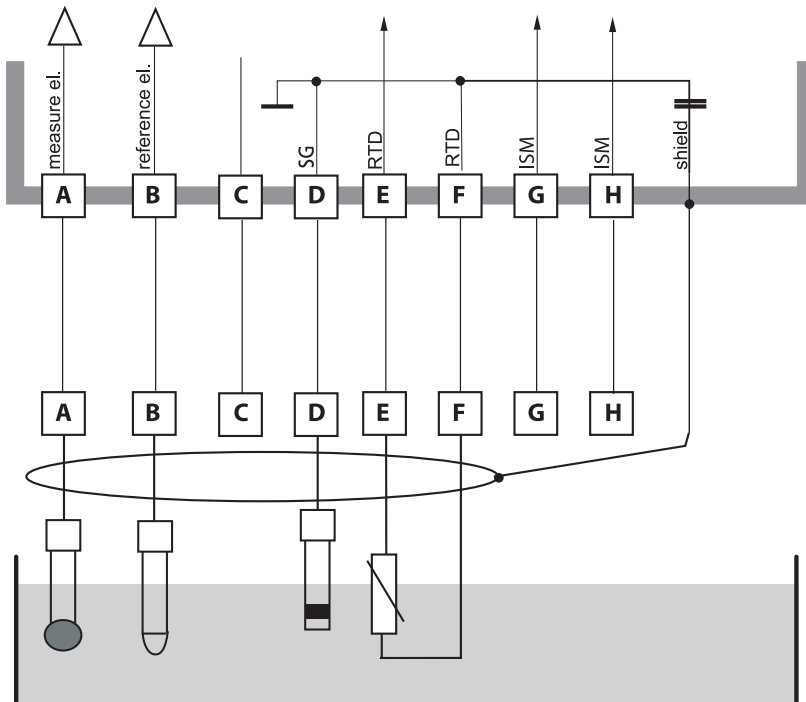
ComFu 300 E: Connection

ComFu 300 E is designed for operation with pH sensors with integrated temperature detector and VP cap. For connecting the sensor, Knick provides special cables with VP connectors on both cable ends. These cables are available in two versions – for sensors with and without solution ground. With the suitable cable type, correct connection of the sensor is automatically ensured.

Wiring example:

Measuring electrode via VP cable at pH 900 module
pH measurement with Sensocheck of glass electrode

pH 900 Module



Wireless Coordinator: ComFu 300 C

Transceiver module at the analyzer

ComFu 300 C (coordinator) is a transceiver module with RS-485 interface to the Protos 3400 measuring system (equipped with FIU 3400-141 module).

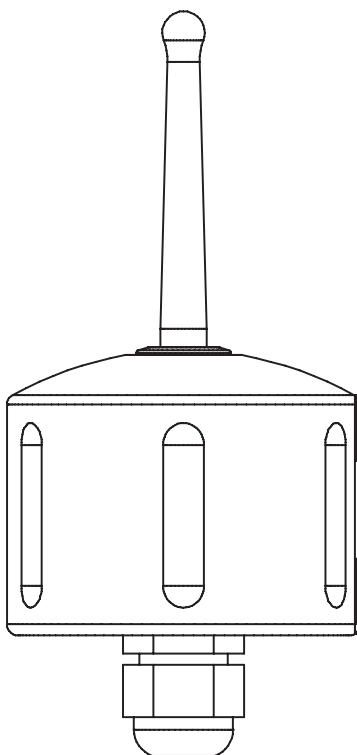
It is operated and configured from the Protos measuring system – see instruction manual for FIU 3400-141 module on included CD-ROM (or in the download area of our website www.knick.de).

ComFu 300 C establishes and controls a radio network.

It can communicate bidirectionally with up to two ComFu 300 E units.

The ComFu 300 C receives its power from the FIU 3400-141 module.

Failure or disruption of the data transmission is immediately recognized by the ComFu 300 C and signaled to the Protos measuring system.



ComFu 300 C can be installed in an optimal position.

The Protos 3400 measuring system with display and keypad should be installed at a location which is easy to access for the operator.

The antenna should be positioned so that a line of sight between the ComFu 300 E end device and the ComFu 300 C wireless coordinator is maintained. Obstacles in this line reduce the maximum range or even make wireless data communication impossible.

A "Network Planning" document is available on request.

RS-485 connection

for communication with control unit.

For connecting the RS-485 cable, please refer to the instruction manual of the Protos 3400 FIU 3400-141 module on the included CD-ROM (or to www.knick.de).

Configuring the FIU 3400-141 Module

Specifying the "Radio" mode


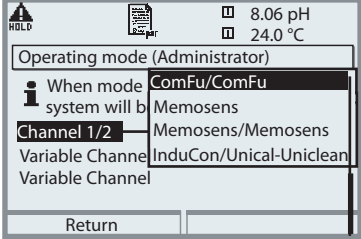


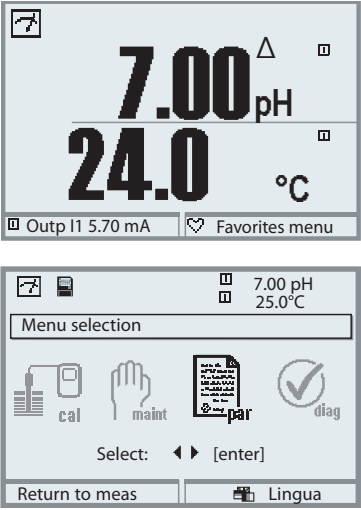
Note: "HOLD" mode active.

Menu	Display	Parameter setting
		Access parameter setting From the measuring mode: Press menu key to select menu. Select parameter setting using arrow keys, press enter to confirm. Passcode 1989 (To change passcode: Parameter setting/System control/Passcode entry)
		HOLD During parameter setting the analyzer is in "HOLD" mode. Current outputs and relay contacts behave as configured.
		Select "FIU 3400-141" module. Press enter to confirm.
		Select "Operating mode" using arrow keys, press enter to confirm.

Specifying the Radio ("ComFu") Mode

Configuring the operating mode.


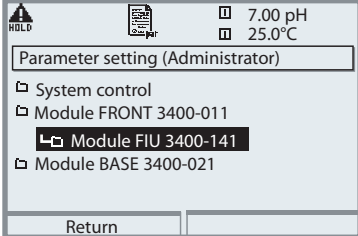
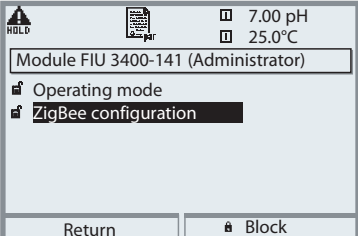
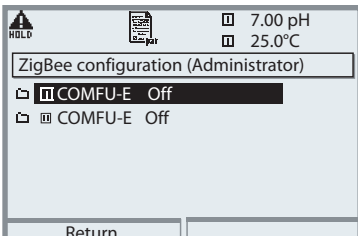
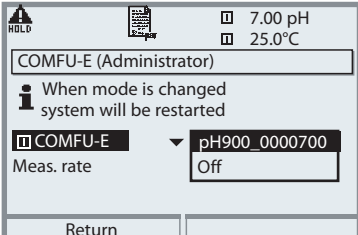
Note: HOLD mode active.

Menu	Display	Parameter setting
		<p>Select operating mode</p> <p>Select Radio ("ComFu") mode using arrow keys, press enter to confirm. When the operating mode is changed (or selected for the first time), parameter setting must be exited so that the system can be re-initialized.</p> <div>Caution! Press meas to exit parameter setting.</div>
		<p>Measuring mode</p> <p>The display shows the measured value (as selected in System control).</p> <p>Open parameter setting once more</p> <p>From the measuring mode: Press menu key to select menu. Select parameter setting using arrow keys, press enter to confirm.</p>

Specifying the Radio ("ComFu") Mode

Configuring the operating mode.

Note: HOLD mode active.

Menu	Display	Parameter setting
		Select "FIU 3400-141" module. Press enter to confirm.
		Select "ZigBee configuration" using arrow keys, press enter to confirm.
		The ComFu 300 C connected to the FIU 3400-141 module allows com- munication over 2 radio channels. The respective end device is selected in the menu: ComFu 300 E, channel <input type="checkbox"/> or <input type="checkbox"/> .
		The sensor connected to the ComFu 300 E determines the measured variables that are available for further processing. The display shows the device type and serial number of the measuring module.

Order Code

Item	Model designation / Version	Order number
Radio component: Coordinator	ComFu 300 C	300C
Radio component: End Device	ComFu 300 E	300E
Measuring module	pH 900-02	PH900-02
VP8-ST cable for sensors without solution ground VP cable connector on both ends	Length: 3 m	ZU0761
	Length: 5 m	ZU0762
	Length: 10 m	ZU0763
VP8-ST cable for sensors with solution ground VP cable connector on both ends	Length: 3 m	ZU0710
	Length: 5 m	ZU0711
	Length: 10 m	ZU0712

Specifications

Radio path, general	Zigbee wireless standard, based on IEEE 802.15.4
Carrier frequency	2.4 GHz
Modulation	D- QPSK / DSSS
Spreading code	32-bit
Data rate	250 kbits/s
Channel access	CSMA/CA method / superframe structure
Security	Symmetric encryption using the AES algorithm with a key length of 128 bits
Addressing	IEEE 64-bit addressing
Monitoring	Energy measurements in a selected channel providing conclusions as to the quality of the air interface
ComFu 300 E end device	End device on the sensor for wireless communication with PROTOs 3400 process analysis system using the ComFu 300 C coordinator
Device type	RFD acc. to IEEE 802.15.4
Output power	Approx. 8 dBm
Radio range	Approx. 400 m in free field
Antenna	Lambda/2, dipole
Input sensitivity	Approx. -98 dBm
Connecting to network	Automatic
Data transmission	Cyclic transmission of measured values and status information with two-way acknowledgement
Sensing element	Integrated measuring module for pH
Sensor connection	VP plug for connecting a sensor via VP cable
Specifications	See specifications of pH 900-02 module
Power supply	8 AA batteries
Battery life	> 1 year (with a measuring interval \geq 10 seconds)
Control elements	Rotary switch with 3 positions: OFF/MEASURE/HOLD
Operating indicator	LED, red/green
	Green flashing: Measurement okay
	Red flashing: Error message

Specifications

Diagnostics functions	Automatic monitoring of battery voltage with low-battery warning Monitoring of the radio path quality
Data retention	Configuration data > 10 years (EEPROM)
EMC	
Sensing element	EN 61326-1 (General Requirements)
Emitted interference	Class B (residential area)
Immunity to interference	Industry EN 61326-2-3 (Particular Requirements for Transmitters)
Radio path	EN 301489-1/-17
Nominal operating conditions	
Ambient temperature	-20 ... +65 °C
Transport/Storage temperature	-20 ... +70 °C
Relative humidity	10 ... 95% not condensing
Housing	Stainless steel housing made of 1.4305
Fastening	Wall/pipe mounting
Ingress protection	IP 66
Dimensions	H 220 mm; D 119 mm (incl. wall holder)
Weight	Approx. 1.3 kg
ComFu 300 C coordinator	
Coordinator for wireless connection of the PROTOS 3400 process analysis system with the ComFu 300 E end device on the sensor	
Device type	RFD acc. to IEEE 802.15.4
Output power	Approx. 8 dBm
Radio range	Approx. 400 m in free field
Antenna	Lambda/2, dipole
Input sensitivity	Approx. -98 dBm
Connecting to network	Automatic
Data transmission	Cyclic transmission of measured values and status information with two-way acknowledgement
Connection to Protos	
Fixed cable, 4-wire, shielded, length: 5 m	
Interface	RS 485
Transfer rate	9600 Bd
Power supply	3.0 ... 3.7 V / 60 mA
Data retention	Configuration data > 10 years (EEPROM)

Specifications

EMC	
Sensing element	EN 61326-1 (General Requirements)
Emitted interference	Class B (residential area)
Immunity to interference	Industry EN 61326-2-3 (Particular Requirements for Transmitters)
Radio path	EN 301489-1/-17
Nominal operating conditions	
Ambient temperature	-20 ... +65 °C
Transport/Storage temperature	-20 ... +70 °C
Relative humidity	10 ... 95% not condensing
Housing	
Fastening	Stainless steel housing made of 1.4305 Wall/pipe mounting
Ingress protection	IP 66 (with pressure compensation)
Dimensions	H 152 mm; D 76 mm (incl. wall holder)
Weight	Approx. 500 g

Specifications of Measuring Module

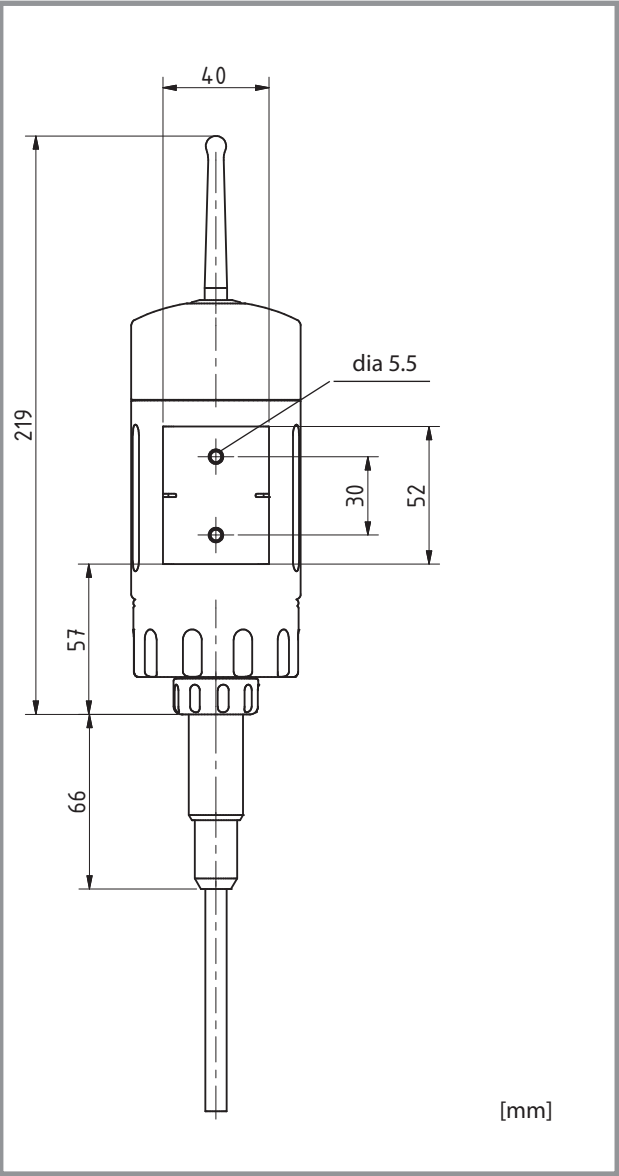
pH 900-02 measuring module		
Inputs	pH/ORP/temp, simultaneous	
pH input		
Measuring range	-800 ... +800 mV	(pH: -2 ... +16)
Resolution	0.05 mV	(pH 0.001)
Permissible cable capacitance	< 2 nF	
Glass electrode input ^{1, 4)}	Input resistance	> 1 x 10 ¹² ohms
	Input current	< 1 x 10 ⁻¹² A ²⁾
	Impedance range	0,5 ... 1000 Mohms
Reference electrode input ^{1, 4)}	Input resistance	> 0.5 x 10 ⁹ ohms
	Input current	< 2 x 10 ⁻⁹ A ²⁾
	Impedance range	0,5 ... 200 kohm
Meas. error ^{1,2,3)}	< 0,5 mV	TC < 0.05 mV/K
ORP input		
Measuring range	ORP -1500 ... +1500 mV	
Max. input voltage	± 1500 mV (VpH + ORP)	
Resolution	1 mV	
Meas. error ^{1,2,3)}	< 0,5 mV	TC < 0.05 mV/K
ISM interface		
	For controlling a 1-wire EEPROM in the sensor (DS2433)	
Data	Reading and writing according to IEEE 1451.4 (TEDS)	
Data retention	Parameters and calibration data > 10 years	
Power supply		
	3 V ±10 % / max. 1 mA	
Nominal operating conditions		
Ambient temperature	-20 ... +65 °C	
Transport/Storage temperature	-20 ... +70 °C	
Relative humidity	10 ... 95% not condensing	
Sensor connection	VP cable, max. 20 m	
EMC		
	EN 61326	
Emitted interference	Class B (residential area)	
Immunity to interference	Industry	

Specifications of Measuring Module

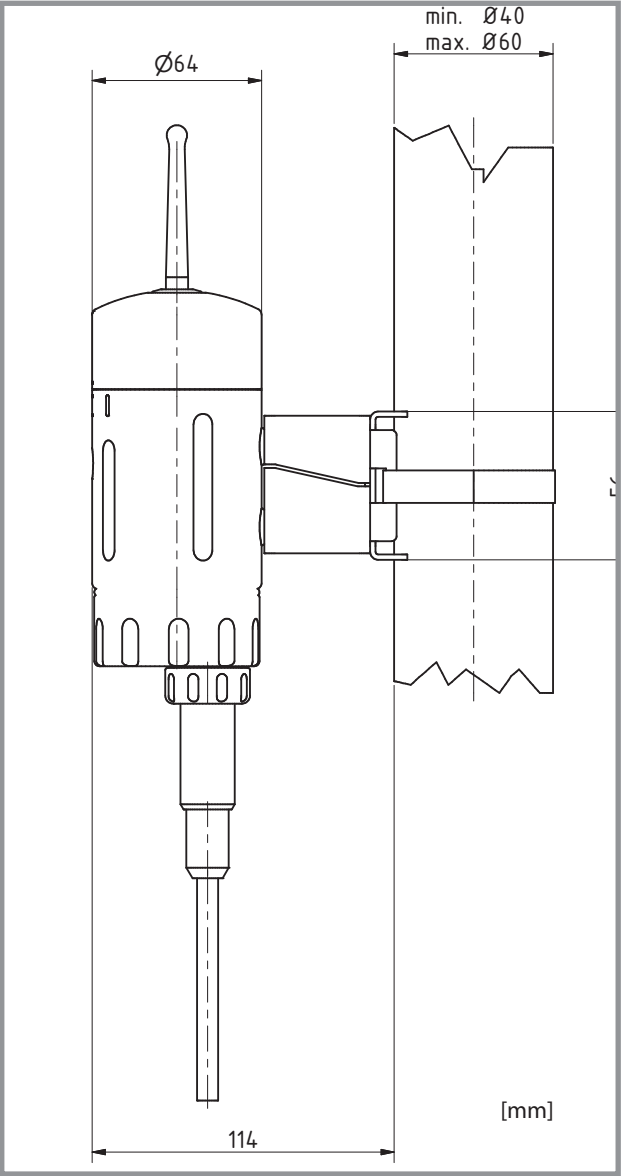
Sensor connection	VP plug (8 pins)	
VP assignment	A	Glass electrode
	B	Reference electrode
	C	n.c.
	D	SG
	E	RTD
	F	RTD (GND)
	G	ISM data
	H	ISM (ISMGND)

- 1) According to IEC 746 Part 1, at normal operating conditions
 - 2) At 20°C, doubles every 10 K
 - 3) Plus sensor error
 - 4) At room temperature
-

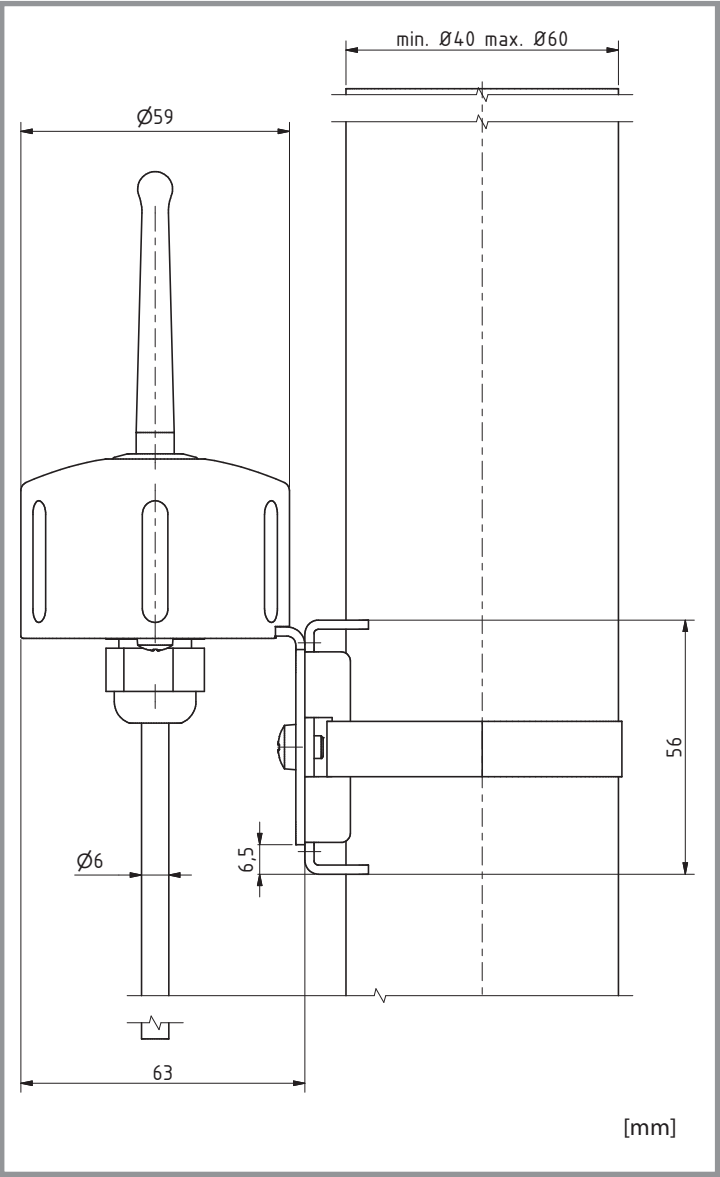
Dimensions ComFu 300 E



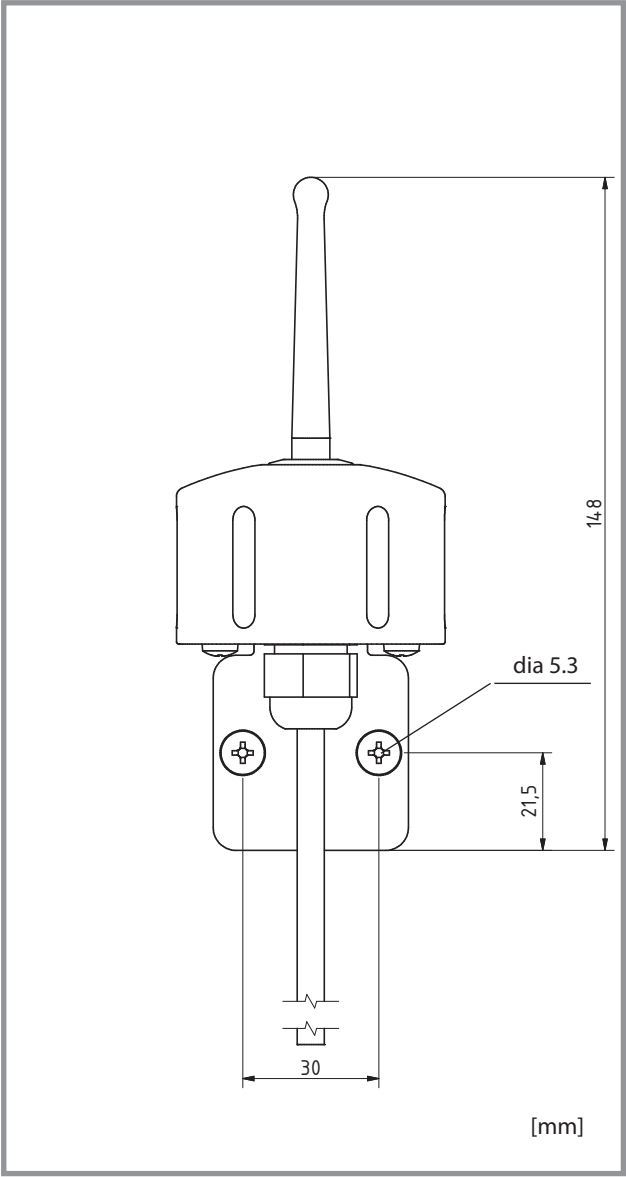
Dimensions ComFu 300 E



Dimensions ComFu 300 C



Dimensions ComFu 300 C



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EC Declaration of Conformity

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EG-Konformitätserklärung EC Declaration of Conformity Déclaration de Conformité CE

Dokument-Nr. / Document No. /
No. document

EG90209A

Aufbewahrung / Keeping / Garde en dépôt
Jürgen Cammin (KB)

Wir, die / We, / Nous,

Knick Elektronische Messgeräte GmbH & Co. KG
Beuckestr. 22, D-14163 Berlin

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Produktbezeichnung /
Product identification /
Désignation du produit

Funk-Set ComFu
(Coordinator ComFu 300C, End-Device ComFu 300E)

auf welche(s) sich diese Erklärung bezieht, mit allen wesentlichen Anforderungen der folgenden Richtlinien des Rates übereinstimmen:
to which this declaration relates is/are in conformity with all essential requirements of the Council Directives relating to:
auquel/auxquels se réfère cette déclaration est/sont conforme(s) aux exigences essentielles de la Directives du Conseil relatives à: *)

EMV-Richtlinie / EMC directive /
Directive CEM

2004/108/EG

Norm / Standard / Norme

DIN EN 61326-1 / VDE 0843 Teil 20-1: 2006-10
DIN EN 61326-2-3 / VDE 0843 Teil 20-2-3: 2007-05

R&TTE-Richtlinie/ R&TTE directive /
Directive R&TTE

99/5/EG

Jahr der Anbringung der CE-Kennzeichnung /
Year in which the CE marking was affixed /
L'année d'apposition du marquage CE **2009**

Harmonisierte Normen / Harmonised
Standards / Normes harmonisées

EN 300328 V1.7.1: 2006-10
EN 301489-1 V1.6.1: 2005-09
EN 301489-17 V1.2.1: 2002-08
EN 50371: 2002
EN 60950: 2006

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The safety instructions contained in the documentation accompanying the product have to be observed. If the apparatus is modified without having obtained manufacturer's prior consent and/or the safety instructions are not followed, this declaration becomes void. /
Il est impératif de respecter les instructions de sécurité dans la documentation fournie avec le produit.. En cas de modification de l'appareil sans l'accord du fabricant et/ou en cas de non-respect des instructions de sécurité, cette déclaration perd sa vigueur.

Ausstellungsort, -datum /
Place and date of issue /
Lieu et date d'émission

Berlin, 09.02.2009

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