Special documentation

Special documentation for BLE communication specifications, models PEW-1000 and PEW-1200

EN

Pressure sensor with wireless transmission, models PEW-1000 and PEW-1200

WIKA

Part of your business

Prior to starting any work, read the operating instructions!
Keep for later use!

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Contents

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Supplementary documentation:
- This special documentation for BLE communication specifications applies in conjunction with the operating instructions “Pressure sensor with wireless transmission, models PEW-1000 and PEW-1200” (article number 14471927).

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1. Object

This document describes the protocol specification for the Bluetooth® communication with the Pressure sensor with wireless transmission, models PEW-1000 and PEW-1200.

1.1 Abbreviations, definitions

BLE	Bluetooth Low Energy
R	Read
W	Write
N	Notify
GATT	Generic Attribute Profile
ATT	Attribute Protocol
GAP	Generic Access Profile
UUID	Universal Unique Identifier

1.2 Description

This technical guide gives a description of the Bluetooth®-specific protocol developed for the Pressure sensor with wireless transmission PEW-1000 and PEW-1200.
The models PEW-1000 and PEW-1200 are an electronic battery powered pressure sensor. It integrates radio modules for Bluetooth® communication with a dedicated “myWIKA wireless device” mobile application available on PlayStore (Android) and App store (iOS) and – in case of the model PEW-1000 - also LoRaWAN® communication version 1.0.3.

2. Conventions

Multi-octet fields are encoded following a “big endian” convention, also known as “network order”. That order of octet’s transmission is the same as the left-to-right reading order.
Bits are numbered from left-to-right, starting 7, with bit 7 representing respectively the most significant octet (MSB).

Example

Bytes	0								1								2		
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	...
Value	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^7	2^6	...

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3. Principle

3.1 General architecture

Bluetooth® Low Enegry connection is available in 2 modes:

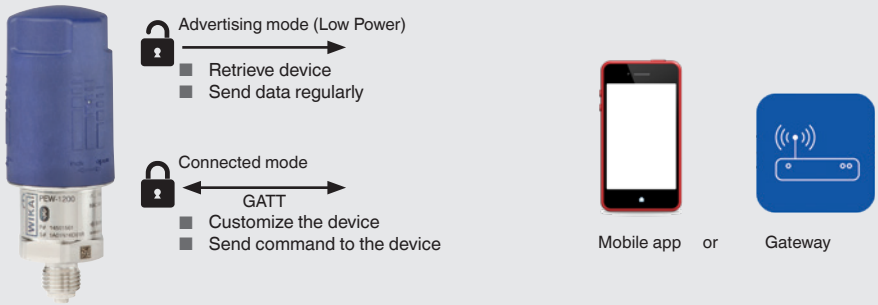
Advertising mode

- Retrieve a device
- Connect the device to an entity
- Send data at regular time

Connected mode

- Customize the device
- Send command

Global view of Bluetooth® connection



Device is compatible with Bluetooth® Low Energy 4.0 and newer version.
GATT access is secured through Passkey Entry paring method.
Code is delivered separately to the device (→ please refer to the “Quick Start Guide” provided with the device) and also printed on the holder of the housing (housing has to be removed to read it).

3.2 Advertising mode

Two data structures will be used, one for the serial number and the other for the sensor data. The following Data Type defined by the Bluetooth® SIG will be used for these structures:

- Complete Local Name (AD Type 0x09): Will be used to enclose the WIKA serial number
- Manufacturer Specific Data (AD Type 0xFF): Will be used to enclose the sensor data

Each Advertising Data structure respond to a TLV (Tag, Length, Value) format:

Advertising data structure		
Length	AD Type	AD Data

Each advertising frame will consist of the two data structure of 31 bytes:

AD Structure for sensor data			AD Structure for WIKA serial number		
Length	AD Type	AD Data	Length	AD Type	AD Data

3.2.1 Coding of device name

The WIKA device name (11 ASCII byte) will be set as it is retrieved from the sensor:

AD Structure for WIKA device name		
Length=0x0C	AD Type=0x09	WIKA device name (MTP Address 0x2A in first to address 0x34 in last)

Default: Device Name = WIKA serial number

3.2.2 Coding of advertising message

Sensor data i. e. pressure and temperature will be coded:

AD Structure for WIKA sensor data			
Function: hide data deactivated	Length=0x11	AD Type=0xFF	ID, pressure, temperature and transmission counter in TULIP format
Function: hide data activated	Length=0x03	AD Type=0xFF	ID only; no measurement data transmitted

Payload details when data are transmitted in advertising messages (default):

Byte	Size (bytes)	Field	Note
0-1	2	Bluetooth® SIG company ID	0x0989 : WIKA manufacturer ID (LSB first)
2	1	Product ID	11 = BLE + LPWAN version 12 = BLE only version
3	1	Ongoing Alarm	Bit 0 = 1: A board alarm is ongoing Bit 1 = 1: A sensor failure alarm is ongoing Bit 2 = 1: An applicative alarm is ongoing Bit [7..3] : RFU (read as 0)
4	1	Update counter	Incremented by one on each change on measure or alarm status

Byte	Size (bytes)	Field	Note
5	1	Channel A - Unity	7 = bar 237 = Mpa 6 = psi
6-9	4	Channel A - Pressure	Pressure coded in the sensor unity 32 bits float value (LSB first)
10	1	Chanel B unity	32 = °C
11-14	4	Channel B - Temperature	Temperature coded in °C 32 bits float value (LSB first)
15	1	Battery capacity	% of remaining capacity

Payload details when data is hidden from advertising messages:

Byte	Size (bytes)	Field	Note
0-1	2	Bluetooth® SIG company ID	0x0989 : WIKA manufacturer ID (LSB first)
2	1	Product ID	11 = BLE + LPWAN version 12 = BLE only version

Example

89-09-0B-00-04-07-B4-76-5B-3D-20-6C-2E-B8-41-64

Signification	
89-09	Bluetooth® SIG company ID: 09-89 – WIKA (LSB first)
0B	Product ID: 11dez = BLE + LPWAN version
00	Ongoing alarm: No active alarm
04	Update counter: 4 times measurement was performed
07	Channel A – Unity: 7dez = bar
B4-76-5B-3D	Channel A - Pressure = 0,05358 bar (Float little endian) 1)
20	Chanel B unity: 32dez = °C
6C-2E-B8-41	Channel B - Temperature 23,02266 °C (Float little endian) 1)
64	Battery capacity: 100dez = 100 % remaining

1) Attention: Data in channel A and B has a high number of digits (Float32). Please refer to product datasheet for actual accuracy values!

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3.3 Connected mode

3.3.1 GATT general description

To establish a 2-way communication by Bluetooth® a connection based on the GATT (Generic Attribute Profile) protocol is required. For general information about GATT please refer to www.bluetooth.com.

The PEW device provides four SIG-adopted devices and three custom services:

Custom services

- Configuration service, including alarm configuration (alarm description see 4.2)
- Product service
- Data logging service

SIG-adopted services

- Generic access
- Device information
- Battery service

3.3.2 PEW services

In the following services, the “R”, “W” and “N” letters in the “Actions” column refers to “Read”, “Write” and “Notify”.
The “Notify” action permits to update the data automatically without activating the “Read” function each time data is updated.
In the “Unit” field, “Product unit” refers to the sensor unit.

3.3.2.1 Configuration service

	UUID	Description
Configuration service	f13a0000164c469787e9edf95fd0653f	Provided services see below

3.3.2.1.1 Common configuration

For read and write characteristic referring to the configuration, an additional command needs to be applied to modify it. For example for transmission period:

- Connect to the device
- Read characteristic : Measuring Period No alarm
  Value = 10 → measuring period is set to 10 s
- Write characteristic : Measuring Period No alarm
  Value = 20 (uint 32) → measuring period is set to 20 s
- Write characteristic : Command Status
  Value (byte array) = 01
- Read characteristic : Command Status
  Value (byte array) = 80 → command apply successfully

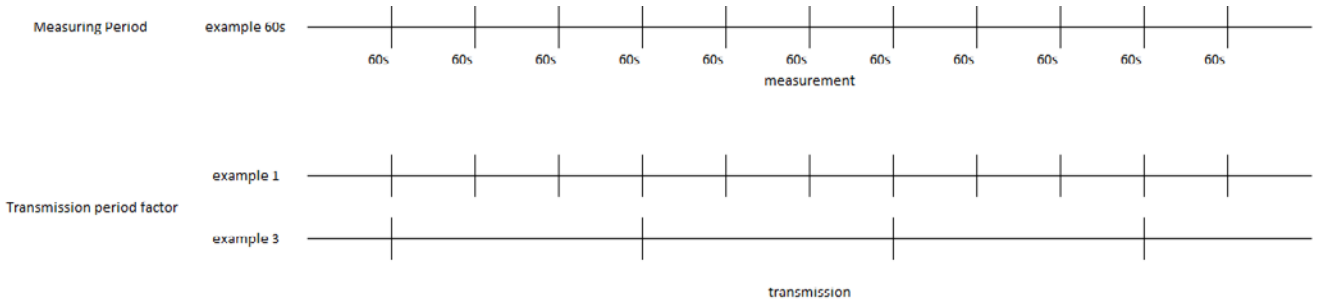
If you disconnect and connect again to the device, measuring period no alarm is set to 20 s.

Configuration service characteristics	UUID	Format	Length [Bytes]	Unit	Type	Description	Default [Hex] [Dez]
ID configuration	f13a1001164c469787e9edf95fd0653f	uint	1	-	R	Configuration identifier – will be generated, when a new configuration is created	0x00 0
Measuring period alarm	f13a1002164c469787e9edf95fd0653f	uint	4	s	R/W	Measuring period of sensor values, when at least one alarm is activated. Range of values: 10 … 604,800	0x3C 00 00 00 60
Measuring period no alarm	f13a1003164c469787e9edf95fd0653f	Uint	4	s	R/W	Measuring period of sensor values, when no alarm is activated. Range of values: 10…604,800	0x3C 00 00 00 60
Transmission period alarm LPWAN	f13a1004164c469787e9edf95fd0653f	Uint	2	s	R/W	Transmission period – send values when at least one alarm is activated. Attention: Multiple of measuring period alarm Time[s]=Transmission period alarm [1)] Measuring period alarm Range of values: Min = 1x… 65.535x	0x 1E 00 30 Calc. example of the default value: Publication period alarm = 30*60=1,800 s
Transmission period no alarm LPWAN	f13a1005164c469787e9edf95fd0653f	Uint	2	s	R/W	Transmission period – send values when no alarm is activated. Attention: Multiple of measuring period no alarm Time[s]=transmission period no alarm [1)] Measuring period alarm Range of values: Min = 1x… 65.535x	0x 1E 00 30 Calc. example Default value: Publication period no alarm = 30*60=1,800 s

Configuration service characteristics	UUID	Format	Length [Bytes]	Unit	Type	Description	Default [Hex] [Dez]
Command status	f13a1006164c469787e9edf95fd0653f	Uint	1	-	R/W/N	1 = Apply configuration 2 = Force LoRaWAN® join (not for PEW-1200!) 3 = Force LoRaWAN® data transmission (not for PEW-1200!) 4 = Restore default factory setting 5 = Force measure refresh 6 = Reset energy counter Return: 0x80 : Success 0x81 : Error unknown command 0x82 Error device not ready: LoRa® transmission asked but join not finished yet 0x83 : Error invalid config 0x84 : Error save config	0x80 128
Hide advertised data	f13a1008164c469787e9edf95fd0653f	bool	1	-	R/W	0 = Advertising contains measurement data 1 = Advertising message contains no measurement data	0x 00 0
Device name	f13a1009164c469787e9edf95fd0653f	UTF8	1 … 11	-	R/W	Device name, Default = serial number Can be changed by user 1 … 11 bytes	Device's WIKA serial no: 0x XX XX XX XX XX XX XX XX XX XX XX
Bluetooth® security key	f13a100a164c469787e9edf95fd0653f	UTF8	6	-	R/W	6 digits key: Default: Preconfigured @ WIKA Customer changeable	Preconfigured key by WIKA: 0x XX XX XX XX XX XX XXXXXX

1) Table: Configuration service – common configuration: Convention: little endian

For the LoRaWAN® sensor PEW-1000 an increased transmission period factor will increase the battery life as the LoRaWAN® protocol transmission has a significant impact on the overall power consumption.
For Bluetooth® only sensor, model PEW-1200, an extension of the transmission period has only negligible impact on the battery life. It is recommended to keep the transmission period factor for Bluetooth® only transmission at “1”.



3.3.2.1.2 Pressure alarms

For description of alarm types see operating instructions.

Configuration service characteristics	UUID	Format	Length [Bytes]	Unit	Type	Description	Default [Hex] [Dez]
Pressure activation state	f13a3000164c469787e9edf95fd0653f	bool	1	-	R/W	Activation / Deactivation of the channel pressure and alarms. Value will be still provided. 1=True=Activated 0=False=Deactivated	0x01 1
Pressure alarm configuration	f13a3001164c469787e9edf95fd0653f	uint	1	-	R/W	Bit numbering Enable / Disable Alarms: Low threshold : b0 High Threshold: b1 Low slope: b2 High slope: b3 Delayed Low threshold: b4 Delayed High threshold: b5 Bit = 1 → Enabled	0x00 0
Pressure low alarm threshold	f13a3002164c469787e9edf95fd0653f	float	4	Product unit	R/W	Low threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries and it's unit. Low threshold cannot be superior to high tresholdd	Default value: threshold set to lower end of measuring range Code example threshold: 0x CD CC 4C BE -0.2 (float - little endian)
Pressure high alarm threshold	f13a3003164c469787e9edf95fd0653f	float	4	Product unit	R/W	High threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries and it's unit.	Default value: threshold set to upper end of measuring range Example: 0x CD CC 4C 3E 0.2 (float - little endian)

Configuration service characteristics	UUID	Format	Length [Bytes]	Unit	Type	Description	Default [Hex] [Dez]
Pressure falling alarm	f13a3004164c469787e9edf95fd0653f	float	4	Product unit / minute	R/W	Slope value when the alarm will be activated. Its boundaries depend on the sensor's boundaries. This value shall be superior or equal to 0	Default value: an alarm is set, when the gradient of falling pressure is above 5 % of the measuring range Example: 0…10 bar sensor 0x 00 00 00 3f 0.5 bar (=5 % of 10 bar)
Pressure rising alarm	f13a3005164c469787e9edf95fd0653f	float	4	Product unit / minute	R/W	Slope value when the alarm will be activated. Its boundaries depend on the sensor's boundaries. This value shall be superior or equal to 0	Default value: an alarm is set, when the gradient of rising pressure is above 5 % of the measuring range Example: 0 … 10 bar sensor 0x 00 00 00 3f 0.5 bar (=5 % of 10 bar)
Pressure delayed low alarm value	f13a3006164c469787e9edf95fd0653f	float	4	Product unit	R/W	Delayed Low threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries	Default value: threshold set to lower end of measuring range, delay 300 s (see below) Example: -0.2 … 0.2 bar sensor 0x CD CC 4C BE -0.2 (bar)
Pressure delayed low alarm period value	f13a3007164c469787e9edf95fd0653f	uint	2	s	R/W	Delay value in seconds for delayed pressure low alarm Range of values: 0 … 65,535	0x2C 01 300 s

Configuration service characteristics	UUID	Format	Length [Bytes]	Unit	Type	Description	Default [Hex] [Dez]
Pressure delayed high alarm value	f13a3008164c469787e9edf95fd0653f	float	4	Product unit	R/W	Delayed high threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries.	Default value: threshold set to upper end of measuring range, delay 300 s (see below) Example: -0.2 … 0.2 bar sensor: 0x CD CC 4C 3E +0.2 (bar)
Pressure delayed high alarm period value	f13a3009164c469787e9edf95fd0653f	uint	2	s	R/W	Delay value in seconds for delayed high alarm Range of values: 0 … 65,535	0x2C 01 300 s
Pressure measure offset	f13a300a164c469787e9edf95fd0653f	float	4	Product unit	R/W	Offset added to the sensor value. Added automatically in the sensor value characteristic. Range: max. 15 % of the sensor span	0x00 00 00 00 0.0 bar
Pressure deadband	f13a300b164c469787e9edf95fd0653f	float	4	Product unit	R/W	Hysteresis value for the threshold alarms - see alarm descriptions in the operating instructions This value shall be superior or equal to 0	Default value: 5 % of the measuring range Example: 0….10 bar sensor: 0x 00 00 00 3f 0,5 bar

3.3.2.1.3 Temperature alarms

Configuration service characteristics	UUID	Format	Length [Bytes]	Unit	Type	Description	Default [Hex] [Dez]
Temperature activation state	f13a2000164c469787e9edf95fd0653f	bool	1	-	R/W	Activation/Deactivation of the channel pressure and alarms. Value will be still provided. 1 = True = Activated 0 = False = Deactivated	0x01 1
Temperature alarm configuration	f13a2001164c469787e9edf95fd0653f	uint	1	-	R/W	Bit numbering Enable/Disable Alarms: Low threshold : b0 High Threshold: b1 Low slope: b2 High slope: b3 Delayed Low threshold: b4 Delayed High threshold: b5 Bit = 1 → Enabled	0x00 0
Temperature low alarm threshold	f13a2002164c469787e9edf95fd0653f	float	4	Product unit	R/W	Low threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries and it's unit. Low threshold cannot be superior to high threshold	0x EE FC 9F C1 -20 (°C)
Temperature high alarm threshold	f13a2003164c469787e9edf95fd0653f	float	4	Product unit	R/W	High threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries and it's unit.	0xD7 03 A0 42 +80 (°C)
Temperature falling alarm	f13a2004164c469787e9edf95fd0653f	float	4	Product unit / minute	R/W	Slope value when the alarm will be activated. Its boundaries depend on the sensor's boundaries. This value shall be superior or equal to 0	0x 00 00 F8 40 7.75 (°C)
Temperature rising alarm	f13a2005164c469787e9edf95fd0653f	float	4	Product unit / minute	R/W	Slope value when the alarm will be activated. Its boundaries depend on the sensor's boundaries. This value shall be superior or equal to 0	0x 00 00 F8 40 7.75 (°C)
Temperature delayed low alarm value	f13a2006164c469787e9edf95fd0653f	float	4	Product unit	R/W	Delayed Low threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries	0x EE FC 9F C1 -20 (°C)

Configuration service characteristics	UUID	For-mat	Length [Bytes]	Unit	Type	Description	Default [Hex] [Dez]
Temperature delayed low alarm period value	f13a2007164c469787e9edf95fd0653f	uint	2	s	R/W	Delay value in seconds for delayed pressure low alarm Range of values: 0 … 65,535	0 x 2C 01 300
Temperature delayed high alarm value	f13a2008164c469787e9edf95fd0653f	float	4	Product unit	R/W	Delayed High threshold value when the alarm will be activated. Its boundaries depend on the sensor's boundaries.	0xD7 03 A0 42 +80 (°C)
Temperature delayed high alarm period value	f13a2009164c469787e9edf95fd0653f	uint	2	s	R/W	Delay value in seconds for delayed high alarm Range of values: 0 … 65,535	0 x 2C 01 300
Temperature measure offset	f13a200a164c469787e9edf95fd0653f	float	4	Product unit	R/W	Offset added to the sensor value. Added automatically in the sensor value characteristic. Range: max. 3 % of the sensor span	0x00 00 00 00 0.0 °C
Temperature deadband	f13a200b164c469787e9edf95fd0653f	float	4	Product unit	R/W	Hysteresis value for the threshold alarms - see alarm descriptions in the operating instructions This value shall be superior or equal to 0	0x00 00 F8 40 7.75 (°C)

3.3.2.1.4 Sensor failure alarm and board alarm

For details refer to the operating instructions.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 2	Bit 1	Bit 0 (1= activated)
Sensor failure alarm		Temp Out of limit	Pressure Out of limit	Internal Communication Problem	Sensor busy alarm	Sensor memory integrity alarm	Sensor ALU (Arithmetic logical Unit) saturation
Board alarm						Threshold voltage Alarm Battery voltage below 2.5 V	Duty cycle alarm (only applicable to LoRa® communication) Note: it is not a persistent alarm but just an information of lost of message(s) due to duty cycle restriction.

Product Status Service

		UUID	Description
Product Service	Status	b75c00003bbc4fb7a7ea37ba44f4c0b0	Provided services see below

3.3.2.1.5 General product characteristics

	UUID	Format	Bytes number	Actions	Description	Example
MAC address	b75c10013bbc4fb7a7ea37ba44f4c0b0	6 bytes	6	R	Device Bluetooth® MAC address	0X DO B3 OF 62 E6 46 DO-B3-OF-62-E6-46
DevEUI	b75c10033bbc4fb7a7ea37ba44f4c0b0	unsigned integer	8	R	Device LoRaWAN® MAC address	0x 70 00 00 00 00 00 00 00 70-00-00-00-00-00-00-00
Sensor failure alarm	b75c10043bbc4fb7a7ea37ba44f4c0b0	unsigned integer	1	RN	Alarms sent by the sensor, described below Bit = 1 → Turned on	0x 00 00
Board alarm	b75c10053bbc4fb7a7ea37ba44f4c0b0	unsigned integer	1	RN	Alarms sent by the board, described below Bit = 1 →Turned on	0x 00 00
Vbat	b75c10063bbc4fb7a7ea37ba44f4c0b0	unsigned integer	2	R	Battery voltage, in milliVolt	0x FC 0C 3324mv
Join status	b75c10073bbc4fb7a7ea37ba44f4c0b0	bool	1	RN	Inform if the LoRaWAN® network has been joined. (only applicable for PEW-1000)	0x 01 01 = product join the network
Pressure type	b75c10083bbc4fb7a7ea37ba44f4c0b0	unsigned integer	1	R	1 = Absolute 2 = Gauge / relative	0x 02 02 = relative
AppEUI	b75c10093bbc4fb7a7ea37ba44f4c0b0	8 bytes	8	R	LoRaWAN® application identifier (only applicable for PEW-1000)	0x 70-00-00-00-00-00-00-02 70-00-00-00-00-00-00-02
LoRaWAN® specifications	b75c100a3bbc4fb7a7ea37ba44f4c0b0	unsigned integer	2	R	LoRaWAN® specifications version (only applicable for PEW-1000)	0x 31 2E 30 2E 33 1.0.3

3.3.2.1.6 Pressure

	UUID	Format	Bytes number	Unit	Actions	Description	Example
Pressure value	b75c30003bbc4fb7a7ea37ba44f4c0b0	float	4	Product unit	RN	Pressure value	0x A0-3C-2C-3D 0.0422
Pressure alarm status	b75c30013bbc4fb7a7ea37ba44f4c0b0	unsigned integer	1	Bit field.	RN	Describe which alarms are activated: ■ Low threshold : b0 ■ High Threshold: b1 ■ Low slope: b2 ■ High slope: b3 ■ Delayed Low threshold: b4 ■ Delayed High threshold: b5 Bit = 1 → Activated Default = 0	0x 01 0000 0001 = low threshold activated
Pressure threshold	b75c30023bbc4fb7a7ea37ba44f4c0b0	float	4	Product unit	RN	In case of rising or falling threshold alarm: Pressure sensor value when alarm condition is raised	0x 31-08-2C-3D 0.042 alarm ongoing, value is stored
Pressure delayed threshold	b75c30033bbc4fb7a7ea37ba44f4c0b0	float	4	Product unit	RN	In case of delayed rising or falling threshold alarm: Pressure sensor value when alarm condition is raised	0x 00-00-00-00 No alarm ongoing, value of pressure not stored
Pressure slope value	b75c30043bbc4fb7a7ea37ba44f4c0b0	float	4	Product unit / minute	RN	In case of rising or falling slope alarm: Computed slope value when alarm condition is raised.	0x 00-00-00-00 No alarm ongoing, value of pressure not stored
Pressure minimum range	b75c30053bbc4fb7a7ea37ba44f4c0b0	float	4	Product unit	R	Sensor value low boundary	0x 00 00 00 00 0 bar
Pressure maximum range	b75c30063bbc4fb7a7ea37ba44f4c0b0	float	4	Product unit	R	Sensor value high boundary	0x 00-00-00-00 10 bar
Pressure unit	b75c30073bbc4fb7a7ea37ba44f4c0b0	unsigned integer	1	Enumeration	R	7 = bar 237 = Mpa 6 = psi	0x07 7 = bar

3.3.2.1.7 Temperature

	UUID	Format	Bytes number	Unit	Actions	Description	Example
Temperature value	b75c20003bbc4fb7a7ea37ba44f-4c0b0	float	4	Product unit	RN	Pressure value	0x A4-B2-BA-41 Value = 23.33723
Temperature alarm status	b75c20013bbc4fb7a7ea37ba44f-4c0b0	unsigned integer	1	Bit field	RN	Describe which alarms are activated: ■ Low threshold : b0 ■ High Threshold: b1 ■ Low slope: b2 ■ High slope: b3 ■ Delayed Low threshold: b4 ■ Delayed High threshold: b5 Bit = 1 → Activated	0x02 0000 0010 = hight threshold actived
Temperature Threshold	b75c20023bbc4fb7a7ea37ba44f-4c0b0	float	4	Product unit	RN	In case of rising or falling threshold alarm: Temperature sensor value when alarm condition is raised	0x A4-B2-BA-41 Value = 23.33723
Temperature delayed threshold	b75c20033bbc4fb7a7ea37ba44f-4c0b0	float	4	Product unit	RN	In case of delayed rising or falling threshold alarm: Temperature sensor value when alarm condition is raised	0x 00-00-00-00 No alarm ongoing, value of temperature not stored
Temperature slope value	b75c20043bbc4fb7a7ea37ba44f-4c0b0	float	4	Product unit / minute	RN	In case of rising or falling slope alarm: Computed slope value when alarm condition is raised	0x 00-00-00-00 No alarm ongoing, value of temperature not stored
Temperature minimum range	b75c20053bbc4fb7a7ea37ba44f-4c0b0	float	4	Product unit	R	Sensor value low boundary	0x 00 00 34 c2 Value = -45
Temperature maximum range	b75c20063bbc4fb7a7ea37ba44f-4c0b0	float	4	Product unit	R	Sensor value high boundary	Value = 110
Temperature unit	b75c20073bbc4fb7a7ea37ba44f-4c0b0	unsigned integer	1	Enumeration	R	32 = °C	0x20 Value = 32

3.3.2.1.8 Alarm data logging

After an alarm occurs a data logging can be started to log data on the sensor at the specified alarm sampling rate.
The data logging automatically starts once an alarm is active.

	UUID	Format	Bytes number	Unit	Actions	Description
Data logging Service	0a40000098fe43598ec97cce2662d06f					General service ID
Command	0a40000198fe43598ec97cce2662d06f	unsigned integer	256	N/A	RWN	Characteristic to send commands and read the data logging

1 – Request data logging information

Writing 0x00 command in the characteristic will request the data logging information table.

Request

Byte	Size (bytes)	Field	Note
0	1	Command	0x00: Get data logging information

Answer

Byte	Size (bytes)	Field	Note
0	1	Response	0x80 : Get data logging information table
1	1	Last packet	While cleared, the 0x00 command need to be sent to get the whole table of information. When set to 1, the packet contains the last information table element
2	1	Payload length	The length of the whole payload excluding command field, last packet field and payload length field
3	1	Alarm x ID	An arbitrary generated alarm ID unique for each alarm
4-5	2	Alarm x Start index	The start index into the data table for this alarm (index starting at 0) TBV
6-7	2	Alarm x End index	The end index into the data table for this alarm (index starting at 0)
8-11	4	Alarm x code	The alarm type according alarm status encoding in product status service with Byte[8] = Unused Byte[9] = Sensor failure alarm (see 3.3.2.1.4) Byte[10] = Temperature alarm status (see 3.3.2.1.3) Byte[11] = Pressure alarm status (see 3.3.2.1.2)

The Alarm x ID + Alarm x Start index + Alarm x End index + Alarm x code are repeated for the total number of alarms with x = 1 to x = number of alarms

Note

- This command will open a data logging retrieve session if not opened.
- While the session is open, new data cannot be logged.
- If all the data logging data and data logging information has been retrieved, the retrieve session is automatically closed.

Example

- Command = 00
- Response = 80 01 12 00 00 00 00 04 00 00 00 01 01 00 00 00 00 04 00 00 10 00
- Interpretation:
  80 get data logging info
  01 = last packet remaining
  12 packet length
  00 Alarm ID
  00 00 Start index
  00 04 End index
  00 00 00 01 Alarm code pressure low treshold
  01 Alarm ID
  00 00 Start index
  00 04 End index
  00 00 10 00 Alarm code temperature delayed Low threshold

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2 – Request data logging data

Writing 0x01 command in the characteristic will request the data logging data table.

Request

Byte	Size (bytes)	Field	Note
0	1	Command	0x01: Get data logging data table

Answer

Byte	Size (bytes)	Field	Note
0	1	Response	0x81 : Get data logging data table
1	1	Last packet	While cleared, the 0x01 command need to be sent to get the whole table of data. When set to 1, the packet contains the last information table element
2	1	Payload length	The length of the whole payload excluding command field, last packet field and payload length field
3 - …	1	Data of data logging	Organized into n couples of 4 bytes for pressure followed by 4 bytes for temperature. Float values in sensor unity encoded MSB first (with n = 1 to n = 256)

Note

- This command will open a data logging retrieve session if not opened.
- While the session is open, new data cannot be logged.
- Request has to be repeated until Last packet = “1”
- If all the data logging data and data logging information has been retrieved, the retrieve session is automatically closed

Example

- Command = 01
- Response = 81 00 20 B9 1D 49 52 41 B2 1F 34 B9 9D 49 52 41 B2 63 04 B9 D1 B7 17 41 B2 45 F4 38 51 B7 17 41 B2 49 94
- Interpretation:
  81 get data logging data table
  00 = one packet remaining
  B91D4952 = -0.00015 bars
  41b21f34 = 22.2652 °C
  B9 9D 49 52 = -0.0003
  ….
- Command = 01
- Response = 81 01 08 B9 51 B7 17 41 B1 CF 48
- Interpretation:
  81 get data logging data table
  01 = last packet remaining
  08 = packet length
  B9 51 B7 17 = -0.0002 bar
  41 B1 CF 48 = 22.2262 °C

3 – Close data logging session

Writing 0x02 command in the characteristic will close the data logging retrieve information session.

Byte	Size (bytes)	Field	Note
0	1	Command	0x02: Close data logging session

Answer

Byte	Size (bytes)	Field	Note
0	1	Response	0x82: Get data logging information

Example

Command = 02
Response = 82

Note

- A time out of 30 s is initiated at each request reception. Delay between two requests must be under this duration else session will be closed and all data discarded.
- If 0x02 command is not sent, session will be closed after 30 s. All data are cleared
- Maximum number of data stored is 256 measures per channel

3.3.2.2 Others services (SIG-adopted)

3.3.2.2.1 GAP service (SIG-adopted, required)

	UUID	Format	Bytes number	Unit	Actions	Description	Example
Generic access (GAP)	00001800000010008000000805F9B34FB					General service ID	
Device name	00002A000000100080000000805F9B34FB	UTF8	1 * length	Default = serial number Can be changed by user (max 11 bytes)	R	Bluetooth® device name, same for the advertising frame	0x 77 69 6B 61 Value = WIKA
Appearance	00002A010000100080000000805F9B34FB	unsigned integer	2	N/A	R	Internal parameters required for Bluetooth® communication	X
Peripheral preferred connection Parameters	00002A040000100080000000805F9B34FB	Internal	TBD	N/A	R	Internal parameters required for Bluetooth® communication	X
Central adress resolution	00002AA600001000800000805F9B34FB	Internal	TBD	N/A	R	Internal parameters required for Bluetooth® communication	X

3.3.2.2.2 Battery service (SIG-adopted)

	UUID	Format	Bytes number	Unit	Actions	Description	Example
Battery service	0000180F00001000800000805F9B34FB					General service ID	
Battery level	00002A190000100080000000805F9B34FB	unsigned integer	1	%	RN		0x14 Value = 20 %

3.3.2.2.3 Device information service (SIG-adopted)

	UUID	Format	Bytes number	Unit	Actions	Description	Example
Device information service	0000180A0000100080000805F9B34FB					General service ID	
Manufacturer name string	00002A2900001000800000805F9B34FB	UTF8	1 * length Max. length = 15 bytes	N/A	R	“WIKA”	0x 57 49 4B 41 Value = WIKA
Model number string	00002A2400001000800000805F9B34FB	UTF8	1 * length Max. length = 25 bytes	N/A	R	Part number of internal sensor module	0x50 45 57 Value = PEW
Firmware revision string	00002A2600001000800000805F9B34FB	UTF8	1 * length Max. length = 6 bytes	N/A	R	RF firmware version from RF board (Universal firmware version)	0x31 2E 30 2E 30 Value = 1.0.0
Hardware revision string	00002A2700001000800000805F9B34FB	UTF8	1 * length Max. length = 6 bytes	N/A	R	RF board	0x31 2E 30 2E 37 Value = 1.0.7
Serial number string	00002A2500001000800000805F9B34FB	UTF8	1 * length Max. length = 11 bytes	N/A	R	Serial number of internal sensor module	0x 31 41 32 42 33 43 34 44 35 45 36 1 Value = A2B3C4D5E6

For the development of mobile and PC applications, the UUIDs for the custom-made services can be found in a JSON File: “Bluetooth®_service_UUIDs.json” on the product website.

3.4 Pair with PEW device

To pair with PEW device, a 6-digits passkey has to be entered.
Six consecutively tries to enter passkey are authorized.
Each time we pair successfully to the device, tries counter will be set back to 0.
Passkey can be read and modified through Bluetooth® connection and with configuration file.

Power cycle (disconnect – re-connect battery) → will reset counter to “0”.

If no re-connection can be done because key is lost → get in contact with technical support

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