

KMK 119

SMART BLUETOOTH
OPTICAL PROBE

AUTO PROTOCOL
DETECTION



REDZ KMK119 optical probe is designed in IEC 62056-21 standard and it is compatible with all brands and types of IEC meters. The probe has wireless Bluetooth connection thus it can easily be used with any Android or Windows based device with Bluetooth connectivity support. This is a smart Bluetooth optical probe that can detect IEC62056-21 or DLMS / COSEM protocol and makes baud changeovers automatically. Thus it is possible to use with software that works with existing cable versions of probes and there will be no additional need for integration.

It also supports different operating modes such as command mode and firmware can be changed easily over Bluetooth.

BLUETOOTH OPTICAL PROBE

SMART WIRELESS AUTO

PROTOCOLS DETECTION PROBE

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MECHANICAL SPECIFICATIONS

Diameter:	32 mm	Body and Back Cover Material:	ABS
Width:	~ 36 mm		
Height:	~ 55 mm	Transparent Parts:	Transparent Poly Carbonate
Depth:	~ 42 mm		
Magnetic Force:	N38	Weight:	~ 100 gr

PROBE SPECIFICATIONS

Standard:	IEC 62056-21 (former IEC 1107)	Operating Voltage:	3,3 V (Rechargeable battery powered through micro USB)
Data Communication Speed:	Max 38400 baud	Wavelength:	~ 900 nm
		Receiver Sensitivity:	Programmatically changeable on Command Mode

BLUETOOTH SPECIFICATIONS

Standard:	Ver. 2.0 + EDR compliant, Max. 4 dBm (Class2)	LEDs	VIN Good, Charge, BT Power, BT Link, TX, RX, IEC Auto, DLMS Auto, Mode 3, Mode 4
Operating Modes:	<ul style="list-style-type: none"> IEC 62056-21 Auto Detection, DLMS/Cosem Auto Detection, 9600 baud 8N1 fixed, Command mode, etc. Operating modes can be changed instantly by easily upload firmware over Bluetooth connection 	Battery:	1200 mAh rechargeable battery powered. Battery can be charged over Micro USB connector
Operating Hours:	> 22 hours (more than 5500 nonstop readings)	Operating Distance:	Max 15 meters

OVERVIEW



1 Power Button: Push to open and push to close

2 Charge LED Group: When connected to charge and Voltage is ok for probe, «VIN» LED will be ON. «CHARGE» LED will also be ON during charge and OFF once battery is fully charged.

3 BT Activity LED Group: Those LEDs show the activity during Bluetooth communication. When the Bluetooth Module is Powered the «BT POW» LED will be ON. This LED is usually ON when the device is ON and will be OFF when the device is OFF. When the battery is low (device needs to be charged), the same LED will light red.

«BT LINK» will be on when a client is connected to probe. For example if the virtual COM port in PC is opened by the meter reading software, this LED will be ON.

«TX» and «RX» LEDs will flash during sending data to meter and receiving data from meter.

4 Speed LED Group: This group shows the operating modes of probe. There are 4 operating modes of probe.

- Mode 1: 300-7E1 IEC auto Mode C.
- Mode 2: 300-7E1 IEC start and change to DLMS/COSEM
- Mode 3: fixed 9600-8N1 communication
- Mode 4: Custom command mode. In this mode the device will work transparently and gets some commands from user. Device comes in this mode as default.

The upmost LED will turn ON when the probe is working in Mode 1 and lowermost LED will turn on when the probe works in Mode 4. The other LEDs will turn ON in turn when Mode 2 or Mode 3 is active.



5 Micro USB Connector: Any micro USB cell phone charger can be used to charge KMK119. This port also behaves like Virtual COM Port (VCOM) in supported models when connected to a USB Host device and can be used just like a cable version of probe.

6 8 Switches: Switches are used to select the working mode of Probe. It is described as printing as well.

Switch 1	Switch 2	Mode
OFF	OFF	Mode 1
ON	OFF	Mode 2
OFF	ON	Mode 3
ON	ON	Mode 4

Switch change will be applied on next power ON of the device. So in order to change working mode, user has to turn off the probe first.

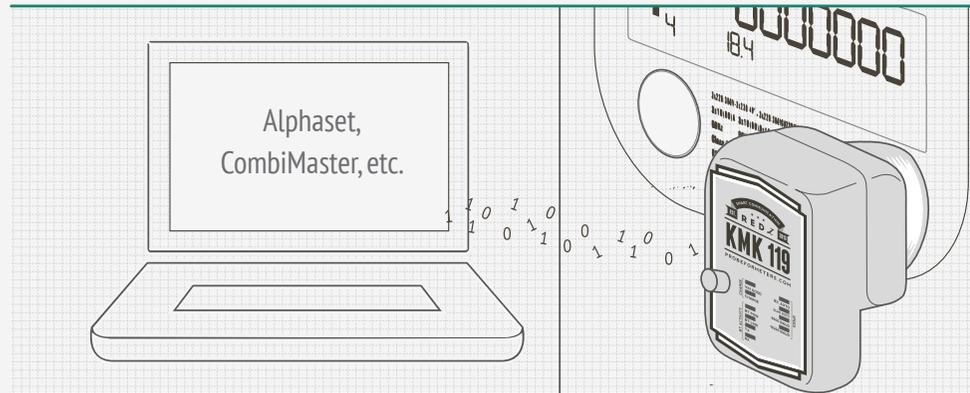
7 PIN: Standard PIN code «1234» for pairing Bluetooth device with PC, HHU, Tablet or Cell Phone.

WORKING MODES

MODE 1: 300-7E1 IEC AUTO MODE C.

In this mode the probe can automatically detect IEC 62056-21 Mode C (formerly known as IEC1107) protocol and make necessary baud change overs automatically.

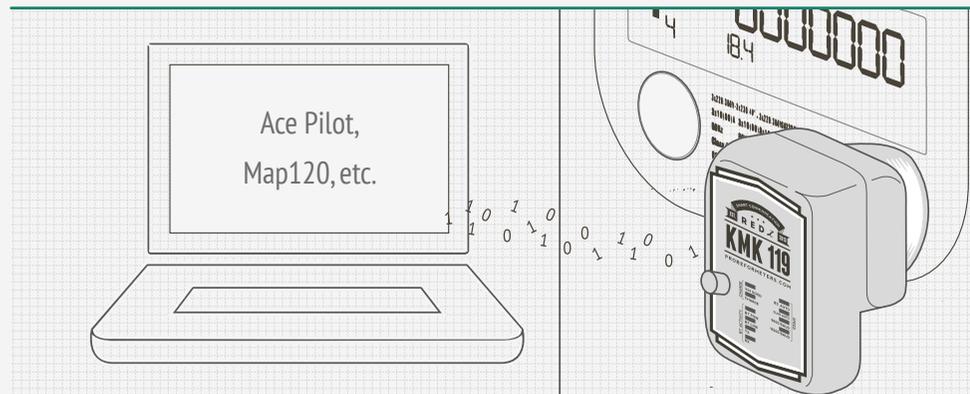
This mode is designed so that any software that can read IEC62056-21 meters with cable version of optical probe can instantly use Bluetooth version of probe. After pairing the probe the already available software can instantly use this mode to read meters such as Elster, EMH, L&Gyr etc.



MODE 2: 300-7E1 IEC START AND CHANGE TO DLMS/COSEM

In this mode the probe can automatically detect IEC 62056-21 Mode C (formerly known as IEC1107) opening on DLMS/COSEM protocol make necessary baud and data type change overs automatically.

This mode is designed so that any software that can read DLMS/COSEM meters with IEC opening mode with cable version of optical probe can instantly use Bluetooth version of probe. After pairing the probe the already available software can instantly use this mode to read meters such as Itron, L&Gyr etc.



MODE 3: FIXED 9600-8N1 COMMUNICATION

This is fixed speed and data type communication mode. This can be used in IEC870-5-102 standard or in any standard that is necessary to communicate in this data type and baud rate.

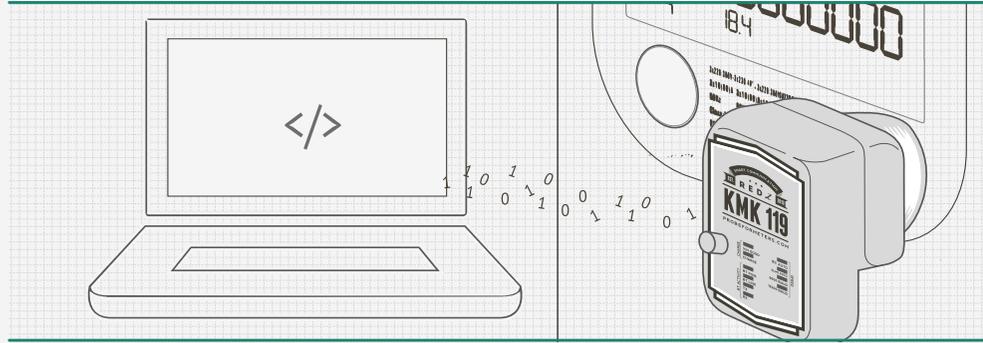
MODE 4: CUSTOM COMMAND MODE

In this mode the device will work transparently and can be managed by special commands. Command mode is the best solution if the user is capable of editing or developing their own meter reading software so that user can use Bluetooth Probe for communication.

The C# code example for sending command is as follows:

```
////=====
//Initialize Probe at baudrate 300
buffer = new byte[] { 0xFE,0xFE,0x42,0x4C,
0x55,0x45,0x30,0x38,0x4E,0x31,0x30,0xFF };
this.comport.Write(buffer,0,buffer.Length);
Thread.Sleep(50);
////=====
```

This command will change baud rate or data type.



Second char from last can vary so that user can send different commands to probe:

Data Type Settings Commands:

- 0x30 : 300 baud
- 0x31 : 600 baud
- 0x32 : 1200 baud
- 0x33: 2400 baud
- 0x34: 4800 baud
- 0x35: 9600 baud
- 0x36:19200 baud
- 0x37: 28800 baud (Available with v3 and later designs)
- 0x38: 38400 baud (Available with v3 and later designs)
- 0x40: 7E1 data type
- 0x41: 8N1 data type
- 0x42: 8E1 data type
- 0x43: 8O1 data type
- 0x50: Break State: Enter (Available with v3 and later designs)
- 0x51: Break State: Exit (Available with v3 and later designs)

Other Commands:

0xA0: Firmware Version Query

The firmware version information will be sent and data will be terminated with 0x00 character.

0xA1: Battery Voltage Query (mV)

Battery voltage information will be sent and data will be terminated with 0x00 character.

0xA2: Close Sleep Timer (10 seconds)

If there is no connection with the Bluetooth probe for more than 10 seconds, the port goes into sleep mode and power saving mode will be on. When the Bluetooth connection is turned on, the sleep mode will be off and the port will work as usual and user operation is not affected by this process.

Confirmation information will be sent and data will be terminated with 0x00 character.

0xC2: Shut Down The Probe

Using this command, the power can be turned off as if the optical probe was closed by the power button.

0xC3: Auto Shutdown Timer Setting

A time interval between 0 to 254 seconds should be set (in HEX format). If there is no communication with the probe after that time interval, the device will be turned off (probe shuts down). This can prevent the probes to be left forgotten with power on for long time and consume battery.

The default value is 254 seconds. This feature can be disabled by setting value 255.

After sending the command, confirmation information will be sent and data will be terminated with character 0x00. Then the time interval must be set. The next confirmation information will be terminated with character 0x00 again.

0xD0: Probe Reading Sensitivity Setting

If user gets some meaningless or corrupted data while reading the meter, it is possible to change the reading accuracy of the probe and make special setting based on meter type to prevent reflections or light interferences.

A value between 0 to 255 should be set (in HEX format). As this value increases, sensitivity of the probe decreases and light reception capacity falls. The default value is 49 (0x31).

After sending the command, confirmation information will be sent and data will be terminated with character 0x00. Then the sensitivity value must be set. The next confirmation information will be terminated with character 0x00 again.

The user can transmit any data and command to the optical probe without any restrictions and can use the optical probe at any desired data type and communication speed at any time. The commands transmitted to the optical probe and the data transmitted to the meter is always separated.

0xE0: Save Settings (available with v3 designs and later)

It is possible to save settings for following data Sleep Timer, Auto Power seconds, Reading Sensitivity, Baud Rate and Data type. After sending the command, confirmation information will be sent and data will be terminated with character 0x00. All listed values are saved as it is set and next time the device restarted they will be used based on saved values.

0xE1: Restore Factory Defaults (available with v3 designs and later)

Command sets values as follows and saves them

- Sleep Timer: ON
- Auto Power Down Seconds : 254
- Reading Sensitivity: 49
- Baud Rate: 300
- Data Type: 7E1

After sending the command, confirmation information will be sent and data will be terminated with character 0x00.

BATTERY STATUS

The probe gives a low battery warning via LEDs to warn the low battery status and remind user to recharge. When battery is low, «BT POW» LED turns into RED and remains until it's charged enough.

FIRMWARE UPGRADE

The probe has capability to upgrade firmware. This way the user can get latest updates of probe operation and also user may also ask for changes. Here are some examples:

- Firmware upgrade for specific meter model and protocol
- Firmware upgrade to disable switches and work only in command mode
- Firmware upgrade to put any feature that user needs

Firmware upgrade procedure need specific firmware prepared by our company and the firmware upgrade software abcZ software also developed by our company.

In order to use the software the specific firmware must be selected. After selecting the firmware path by clicking «Select Path» button the firmware can be loaded to probe. The probe has protection time window 10 seconds after the powered up so the process must be started within 10 seconds after probe powered up.

User should select correct COM port and click “LOAD FW” button using abcZ Software. The software will Show the percentage of process visually in terms of number of sent data packages and that process can also be monitored by LEDs (work mode LEDs) on probe. Also power LED will blink RED during operation. (once %25 of process finished LED1 will be on and continue with LED2, 3 and finish with LED4 after %100 finished). The process will take less than a minute and the probe will restart itself. Device should not be powered off during update process.

If somehow the firmware upgrade process is interrupted and upload file has failed, the probe will lose firmware and stay in bootloader mode. In that case user can try upgrading the firmware again and this time should mark the «Forced FW Load» check box.

