



OP-730 Bluetooth Optical Probe User Manual

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1 How to use the device

1.1 Bluetooth Optical Probe

The OP-730 is a device for communication between measurement devices with IEC62056-21 (mode C, E), IEC62056-31, DLMS standards for optical port, such as power meter, gas corrector, computer, handheld, tablet and other Bluetooth-enabled devices. It is also possible to communicate in transparent mode.

The Bluetooth of OP-730 is compatible with the BLUETOOTH 3.0 + EDR standard. All process steps of the optical port, such as pair, the connection to the meter, and the battery charge of the device are visible from the device LEDs.

The battery has a capacity of 650mAh and is Lithium-Ion type. Battery lifetime is about 17 hours in continues working for each charge. The OP-730 also has a Type C USB port for connecting to the devices to send and receive settings, upgrading firmware, and battery charging.

Charging the device through both the adapter and the PC via a USB Type C cable is possible.

The OP-730 comes equipped with an auto power off program to save battery power, and possibility to change the frame and baud rate to send optical data via sending settings.

1.2 Electrical Specifications

- IEC 62056-21 standard for optical port
- Bluetooth with BLUETOOTH 3.0 + EDR standard
- Possibility to connecting with measurement devices according to IEC62056-21 (Mode C, E), IEC62056-31, DLMS, TRANSPARENT standards
- 10 m unobstructed Bluetooth connection
- Communication speed (baud rate) from 300 to 19200 bps
- 3 LEDs for displaying battery charge
- LED to display pair status, send and receive data
- Lithium Ion 3.7V, 650mAh battery
- The on/off switch
- With USB Type C port for charging and communicating

1.3 Mechanical Specification

- Weight: 87 gr
- Dimension: 32x64.5mm
- Magnet power: 38Nm
- Body Material: Aluminum
- Filter to prevent ambient light



1.3.1 USB Connector



This connector is embedded to charge the battery. The LED1-LED3 is flashing three times by connecting the USB cable and depending on the amount of charge, the corresponding LED is flashing:

- LED1: charge rate 0-33%
- LED2: charge rate 34-66%
- LED3: charge rate 67-100%

This port is also used to communicate with the PC to send the settings and upgrade the firmware. If a USB port is connected to a PC or any device that has an operating system, a virtual COM port will be created in the system that will be used to communicate.

1.3.2 Battery LEDs (CHARGE)



These LEDs represent the amount of battery charge by:

- Blinking LED1: Battery charge is less than 10%
- LED 1 ON: Battery charge is 10-33%
- LED 2 ON: Battery charge is 34-66%
- LED 3 ON: Battery charge is 67-100%

1.3.3 STATUS LED

This LED represents the status of Bluetooth. If the OP-730 is paired with the device and Bluetooth is ready to send and receive data, the LED will be in green; otherwise, it will be in orange as normal.



Upon sending and receiving of the data from the OP-730 and the meter, this LED fits the sending and receiving of the data in the orange and green color flashing light.

1.3.4 POWER Button

The function of this button is to turn the OP-730 on and off. By pressing it, the OP-730 will turn on and by pressing again; the OP-730 will turn off.

1.4 Software Specifications

1.4.1 Connecting to meter

The OP-730 is capable of connecting with all devices in IEC62056-21 in modes C and E, and IEC62056-31 standards, and automatically modifies the baud rate during the connection. It is also able to communicate in the DLMS mode in 2400, 4800, 9600, 19200-baud rates without any modifying.

1.4.2 Settings

To send the settings to the OP-730, first connect the USB port to a computer. After creating a virtual COM port on it, the following table commands can be sent through a COM port connection software.

The USB port settings are as follows:

Baud rate = 115200

Parity = None

Stop Bit = 1

Number of Bits = 8

Command Type	Possible options	Command	Answer
Read Serial	10 bytes digits or letters	AT+ SERIAL?<CR><LF>	<CR><LF>+SERIAL=2790219901<CR><LF>
Read Password	4 bytes digits or letters	AT+ PASSWORD?<CR><LF>	<CR><LF>+PASSWORD=1234<CR><LF>
Set Password	4 bytes digits or letters	AT+PASSWORD=1234<CR><LF>	<CR><LF>OK<CR><LF>
Read Bluetooth Name	10 bytes digits or letters	AT+NAME?<CR><LF>	<CR><LF>+NAME=OP730<CR><LF>
Set Bluetooth Name	10 bytes digits or letters	AT+NAME=OP-	<CR><LF>OK<CR><LF>

		730<CR><LF>	>
Read Software Version		AT+VERSIONS?<CR><LF>	<CR><LF>+VERSIONS=v1.13190619<CR><LF>
Read Hardware Version		AT+VERSIONH?<CR><LF>	<CR><LF>+VERSIONH=SAA-0267-01-9703-03<CR><LF>
Read Optical Port Frame	Note*	AT+FRAME?<CR><LF>	<CR><LF>+FRAME=300,7,E,1<CR><LF>
Set Optical Port Frame	Note*	AT+FMETER=9600,8,N,1<CR><LF>	<CR><LF>OK<CR><LF>
Read Working Mode	TRANSPARENT , IEC	AT+MODE?<CR><LF>	<CR><LF>+MODE=IEC<CR><LF>
Set Working Mode	TRANSPARENT , IEC	AT+MODE=IEC<CR><LF>	<CR><LF>OK<CR><LF>
Read Automatic Power Off Time (Minute)	1 to 10	AT+AUTOTIME?<CR><LF>	<CR><LF>+AUTOTIME=1<CR><LF>
Set Automatic Power Off Time (Minute)	1 to 10	AT+AUTOTIME=3<CR><LF>	<CR><LF>OK<CR><LF>

Note*:

Set up and read the optical port frame as follows:

- Baud rate, Number of Bit, Parity, Stop bit

The value of each parameters is as follows:

- Baud rate: 300, 1200, 2400, 4800, 9600, 19200
- Number of Bit: 7, 8
- Parity: N (none), E (even), O (odd)

According to the above description, if we want to connect with the meter with baud rate: 4800 and number of bit: eight and parity: E with the last 1 bit, the command format will be as follows:

- AT+FMETER=4800,8,N,1<CR><LF>

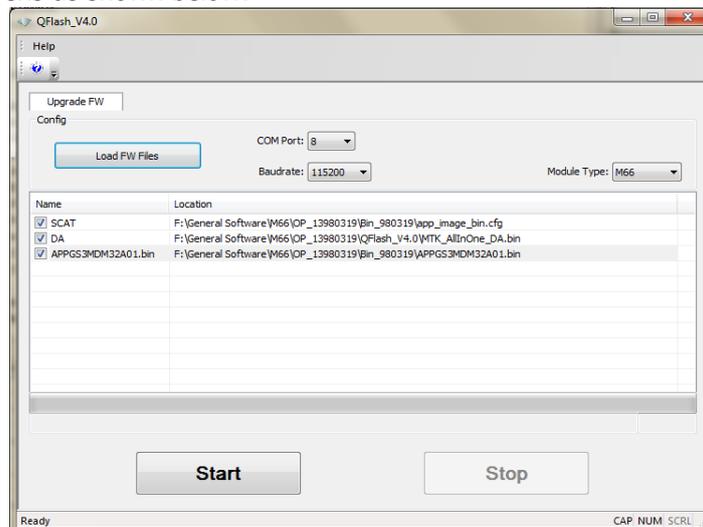
Note:

For meters that comply with IEC 62056-21 standard, the command should be:

- AT+FMETER=300,7,E,1<CR><LF>

1.4.3 Upgrading Firmware

To upgrade the OP-730 firmware, the "QFlash_V4.0" program is used. After executing the EXE, the window will open as shown below:



Select the source file from the desired path by selecting the "Load FW Files" button (this file will be sent for each upgrade from the German Metering GmbH).

By connecting a USB cable to the OP-730 and connecting it to the PC, a virtual COM port will be created. Select this COM port number to upgrade the firmware in QFlash_V4.0 program. In addition, the Baud rate must be "115200" and the Module Type is "M66".

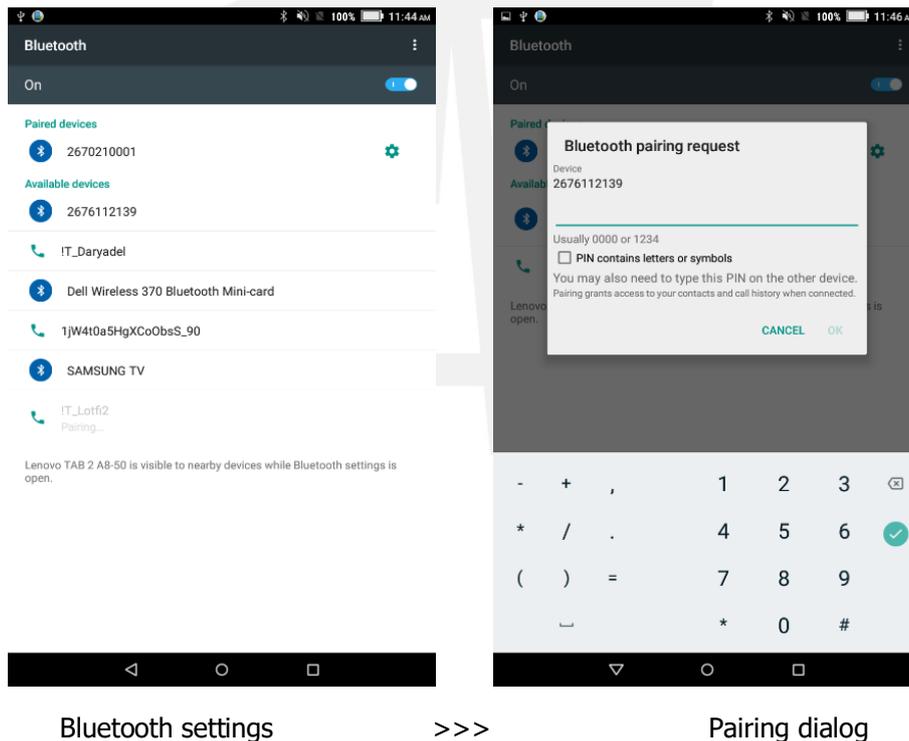
After completing the settings, first turn off the OP-730 and then press the "Start" button, and then turn on the OP-730 and wait until the Progress bar is full. After completing of file uploading, the "PASS, FW upgrade success" is displayed below the progress bar.

2 How to pair with Android device

First, turn on the Bluetooth of android device, then turn on the OP-730, enter the Bluetooth settings of the android device, and pair the OP-730 with it. Notice that device name and pair code is:

- Device Name: Serial Number
- Code: 0 (zero number)

After pairing, there is no need to re-pair (even after turning device on and off).



3 How to pair with IOS device

Turn on the OP-730 and follow steps below:

Step 1: On your IOS device, go to Settings > Bluetooth and turn on Bluetooth. Stay on this screen until you see the OP-730 serial number as device name.

Step 2: Tap on found serial number.



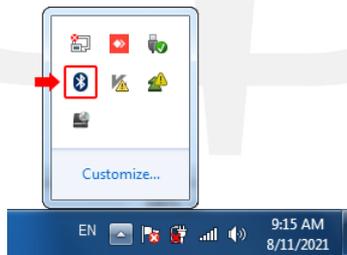
Step 3: You might need to enter the PIN. The OP-730 pin code is "0" (zero).

After pairing, there is no need to re-pair (even after turning device on and off).

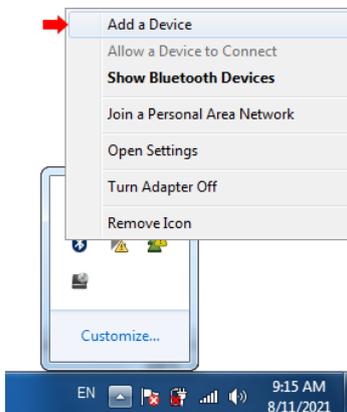
4 How to connect in Windows 7

The OP-730 is Bluetooth-enabled, and other device should be Bluetooth-enabled too. To connect the OP-730 with Windows 7 via Bluetooth follow steps bellow:

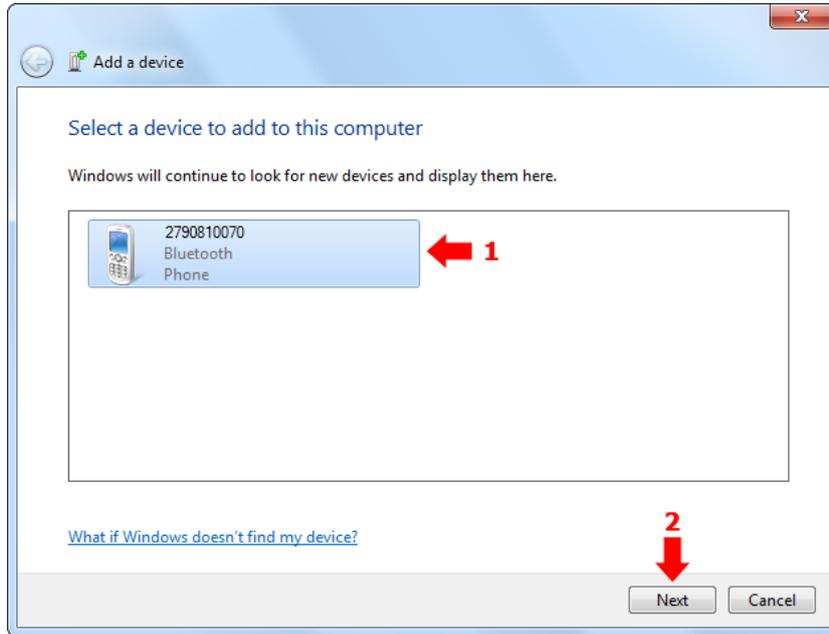
Step 1: If the Bluetooth icon is not located on the right side of the taskbar, click on the "Show hidden icons" button located on the right side of the taskbar to find the "Bluetooth Devices" icon:



Step 2: Click on Bluetooth icon and then click on "Add a Device":



Step 3: Windows searches for the near Bluetooth devices, and if the OP-730 is turned on, it will be displayed, select it and click on "Next":



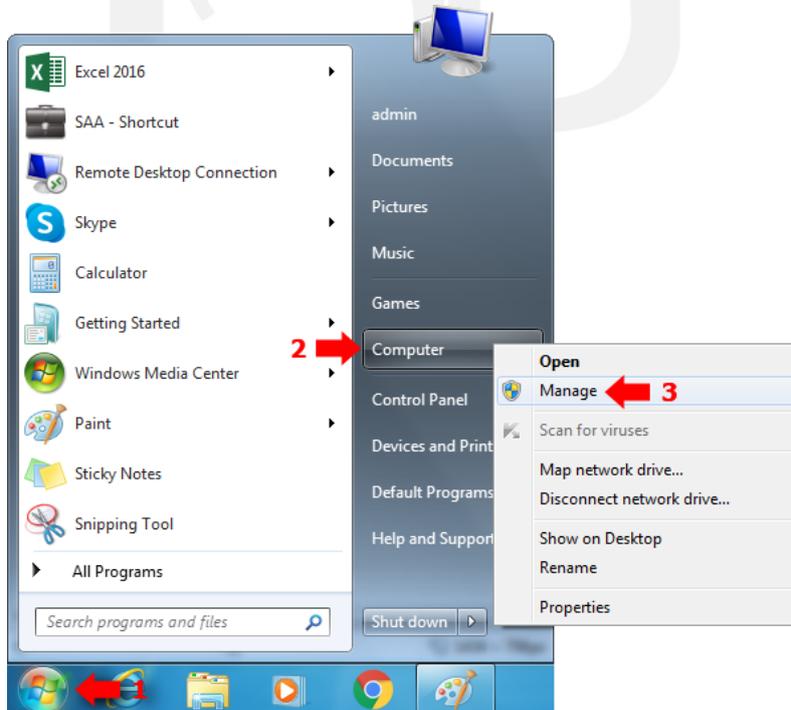
Step 4: You need to confirm the device code, select "Yes" and click on "Next":



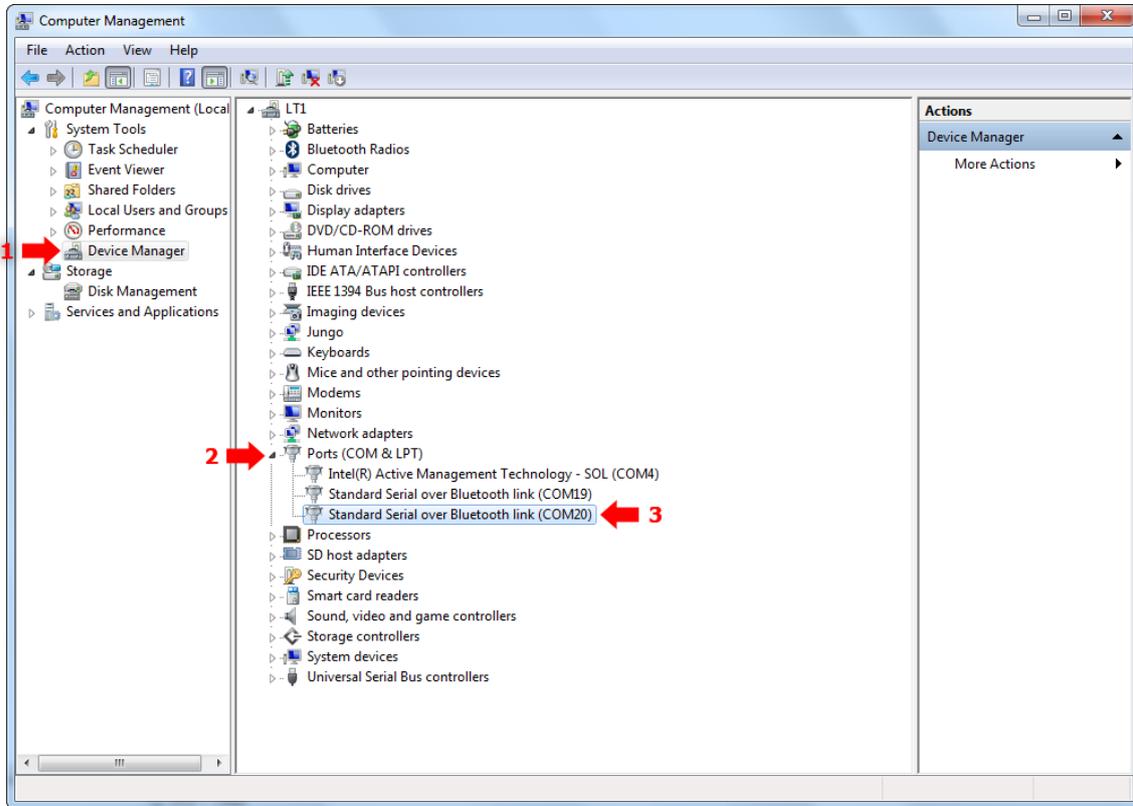
Step 5: When the following message appears, the OP-730 connected to the computer correctly and ready to send and receive data, click on "Close":



Step 6: After connecting, a COM port for the OP-730 is created on the computer, to know its port number, click on windows logo in taskbar, right-click on the "Computer" in start menu and select the "Manage" (your account should be administrator):



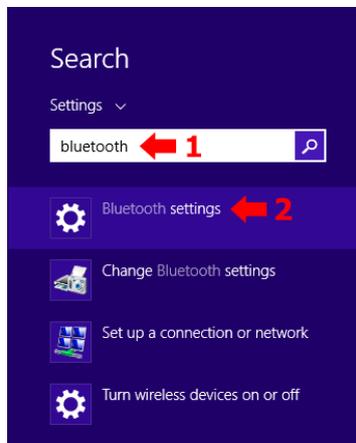
Step 7: Click on "Device Manager" and expand "Ports (COM & LPT)". The created COM Port for the OP-730 is displayed in this section, it's also the last one with 'Standard Serial over Bluetooth link' name (to send and receive data in program; we have to set this port number in it):



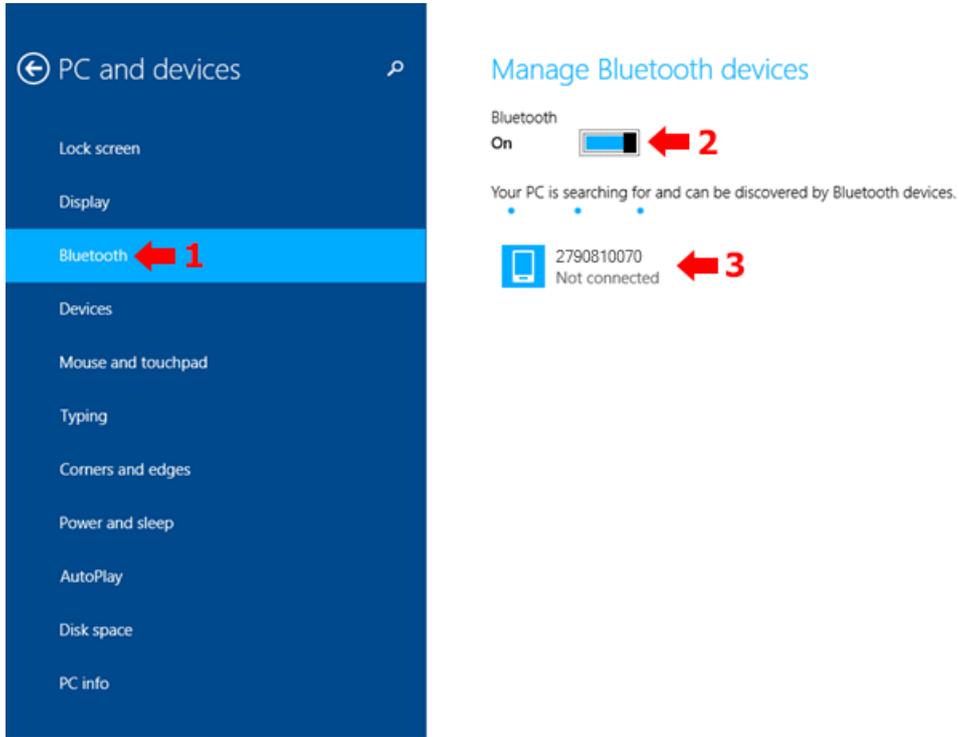
5 How to connect in Windows 8.1

The OP-730 is Bluetooth-enabled, and other device should be Bluetooth-enabled too. To connect OP-730 to your Computer/Laptop follow steps below:

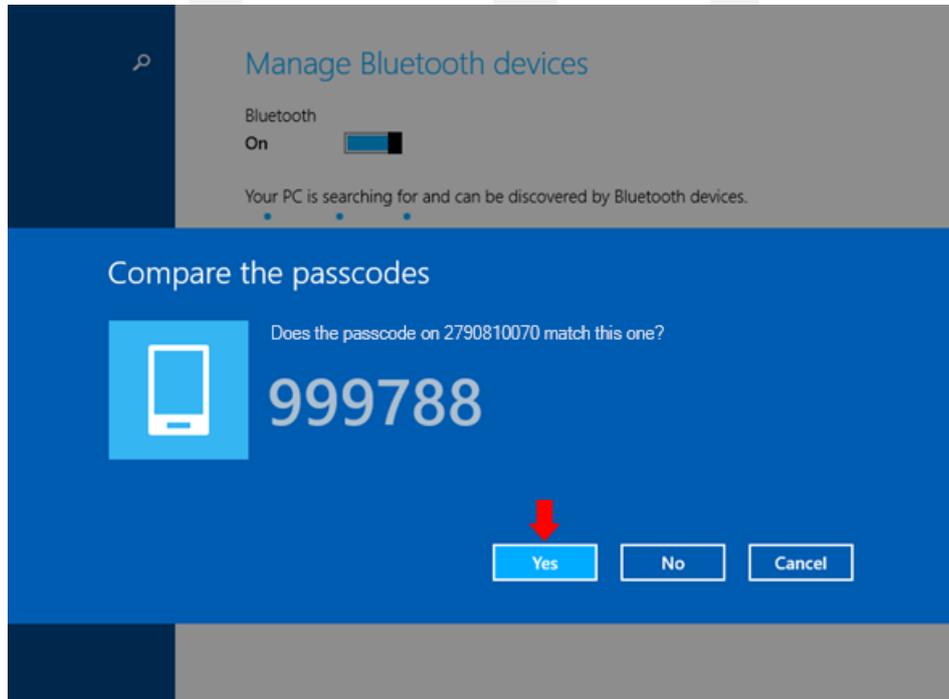
Step 1: Open settings and search "bluetooth" to find bluetooth settings and click on "Bluetooth settings":



Step 2: In Bluetooth settings make sure it is turned on and wait to find your OP-730, then click on your OP-730 serial number:



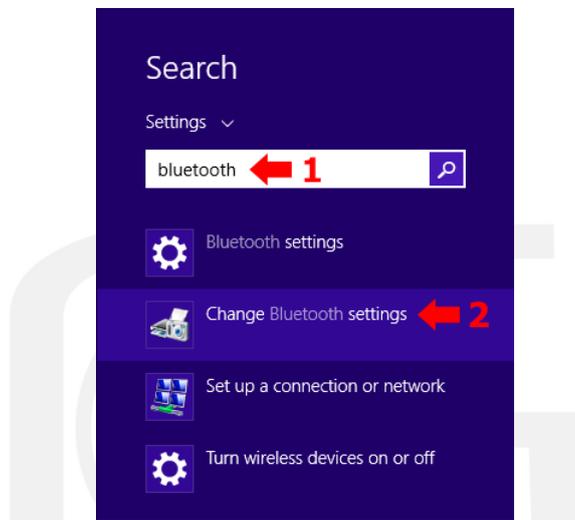
Step 3: Windows tries to connect, you need to confirm the device code, Click on "Yes":



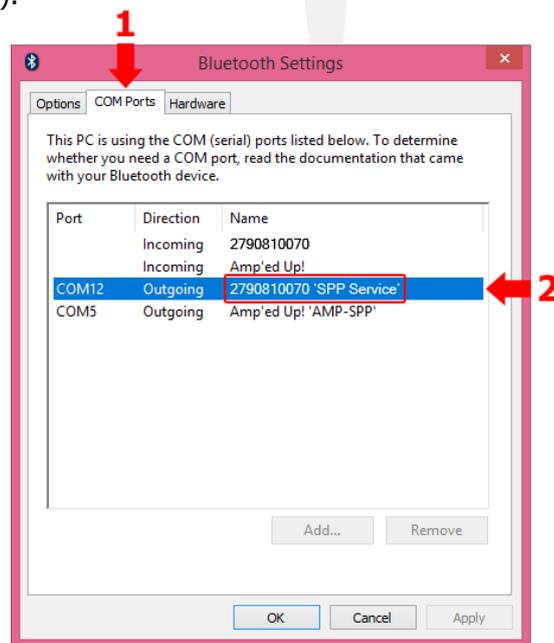
Step 4: Your OP-730 is connected to the computer correctly and ready to send and receive data:



Step 5: After connecting, a COM port for the OP-730 is created on the computer, to know its port number, open settings and search "bluetooth" and click on "Change bluetooth settings":



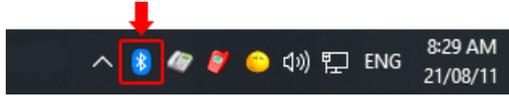
Step 6: Click on "COM Ports" tab and find your OP-730 serial number with outgoing direction, you can see 'SPP Service' after serial number (to send and receive data in program; we have to set this port number in it):



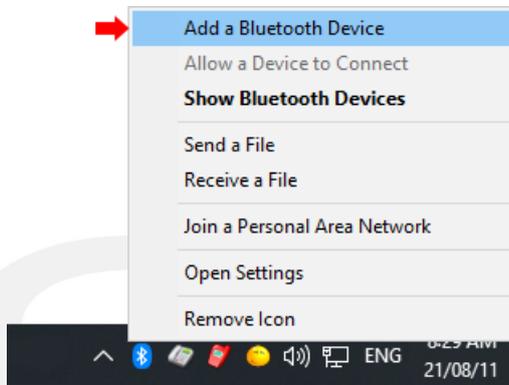
6 How to connect in Windows 10

The OP-730 is Bluetooth-enabled, and other device should be Bluetooth-enabled too. To connect OP-730 to your Computer/Laptop follow steps below:

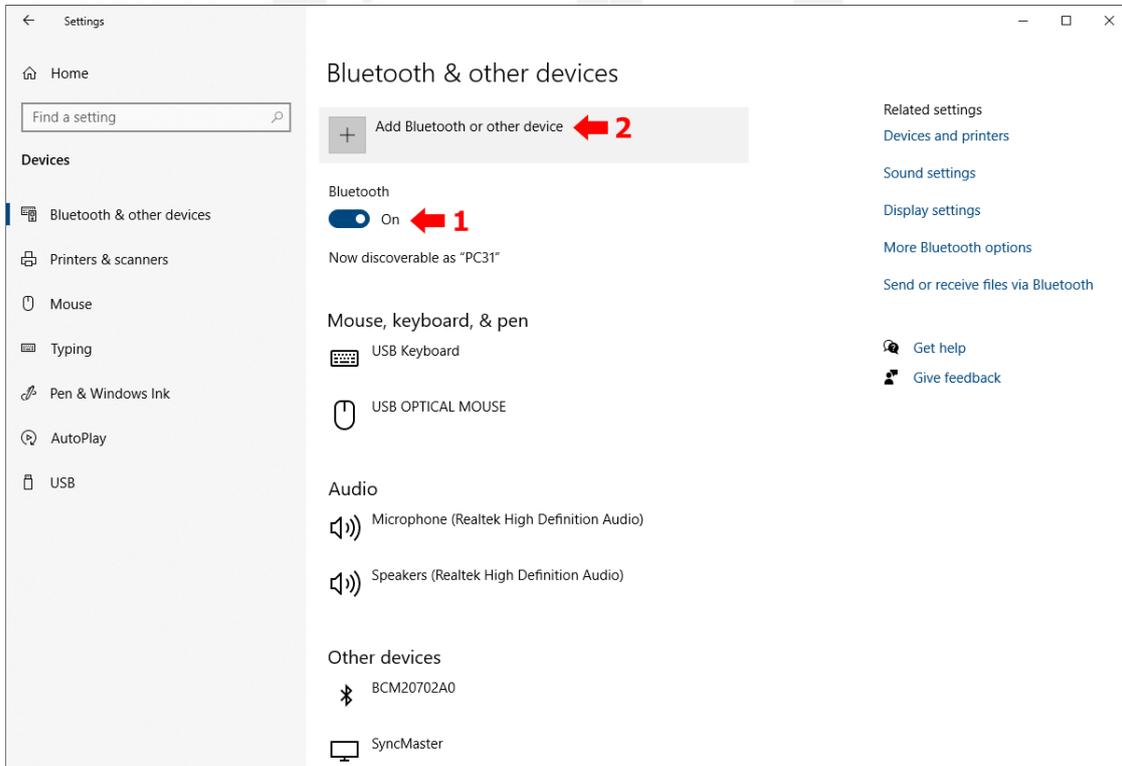
Step 1: If the Bluetooth icon is not located on the right side of the taskbar, click on the "Show hidden icons" button located on the right side of the taskbar to find the "Bluetooth Devices" icon:



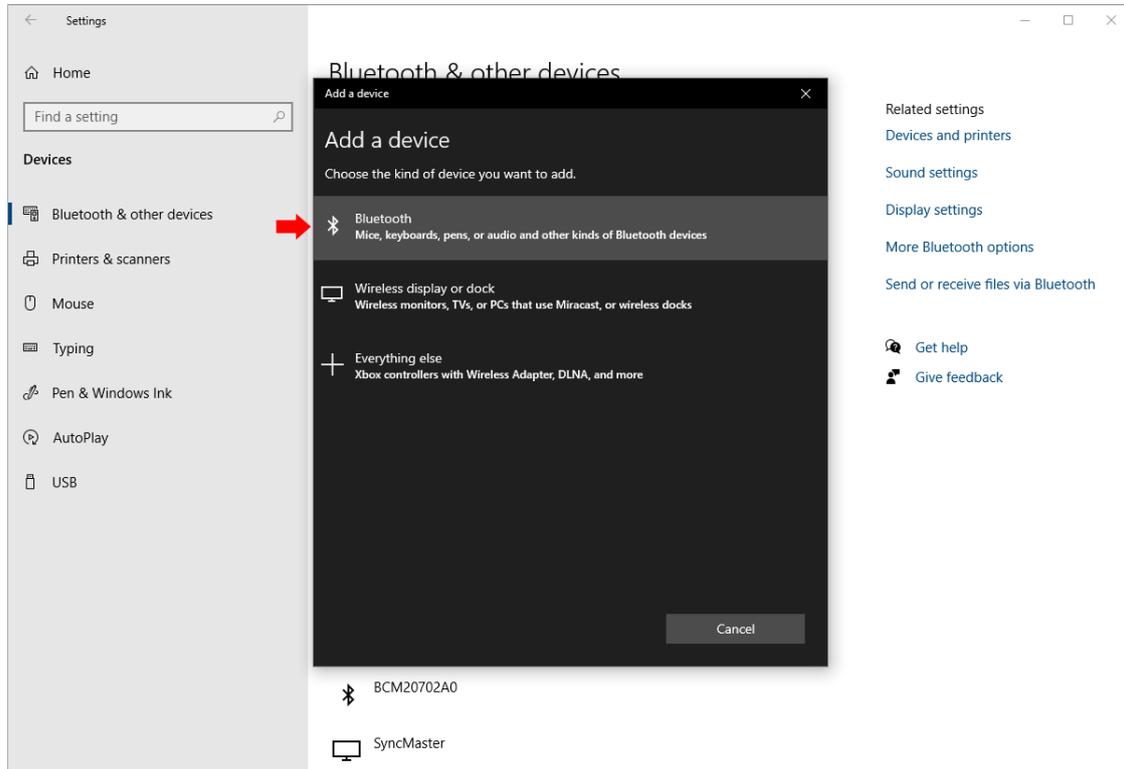
Step 2: Click on Bluetooth icon and then click on "Add a Bluetooth Device":



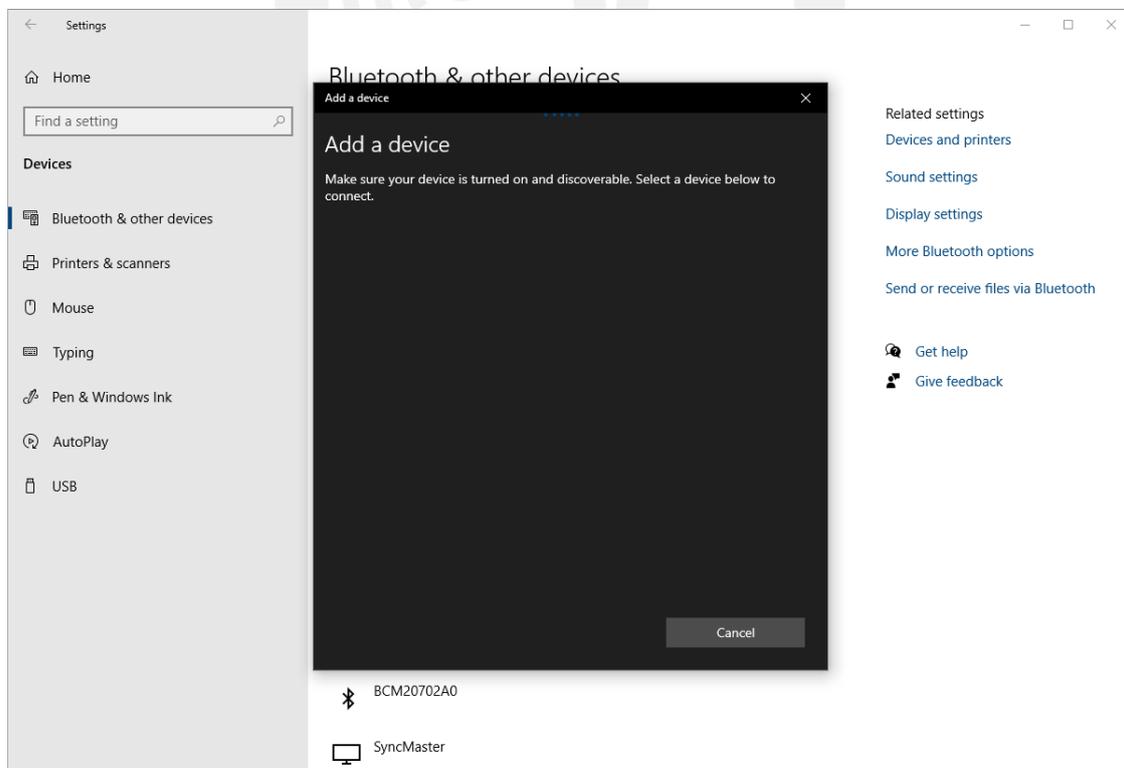
Step 3: Make sure your device bluetooth is on and click on "Add Bluetooth or other device":



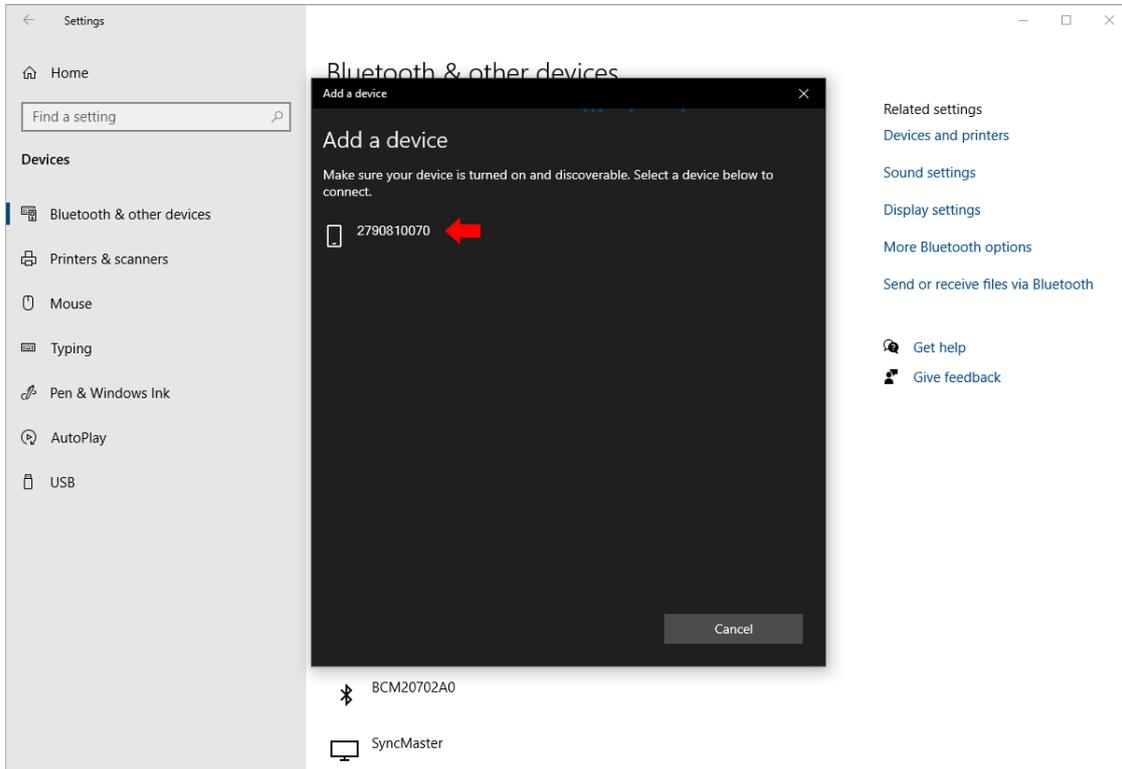
Step 4: In New form click on "Bluetooth":



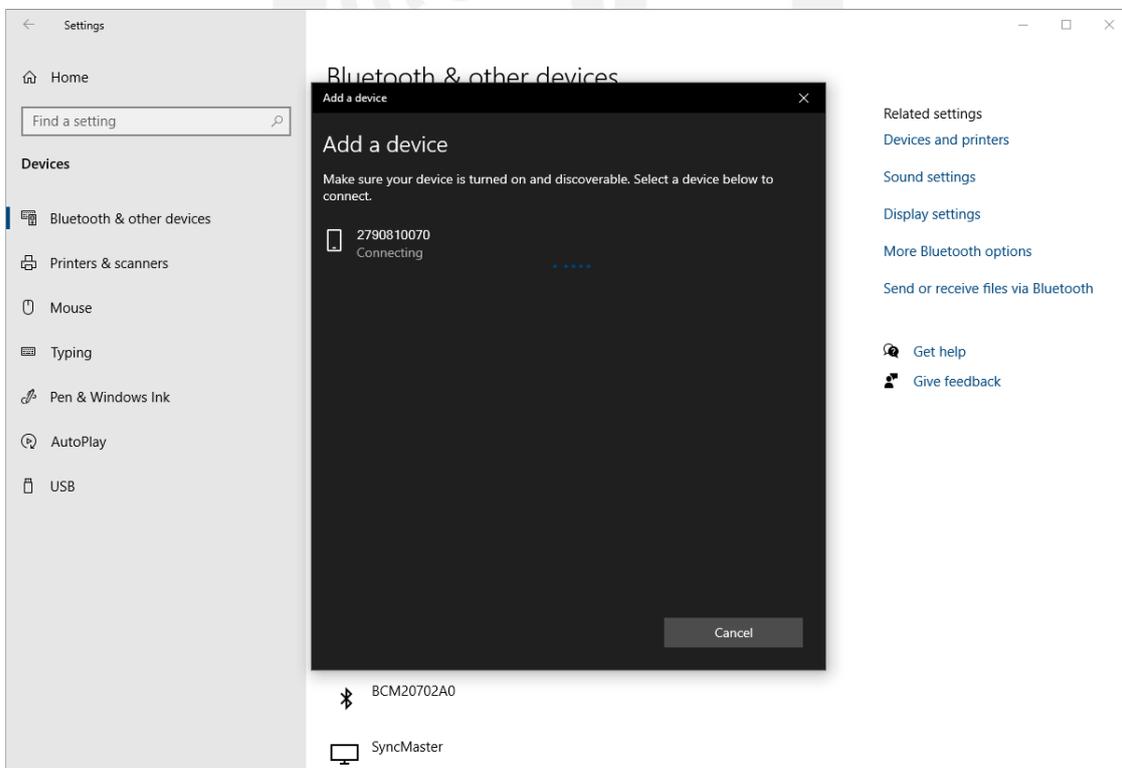
Step 5: Windows scans to find near bluetooth devices:



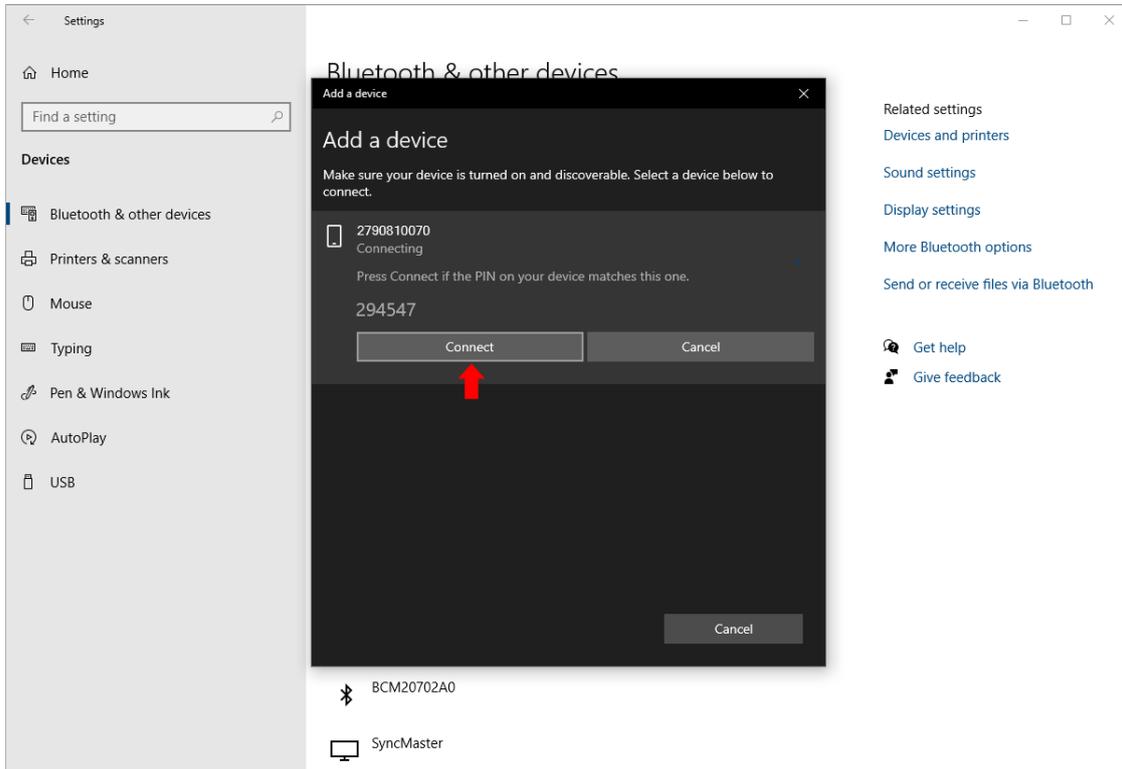
Step 6: Click on found OP-730 serial number:



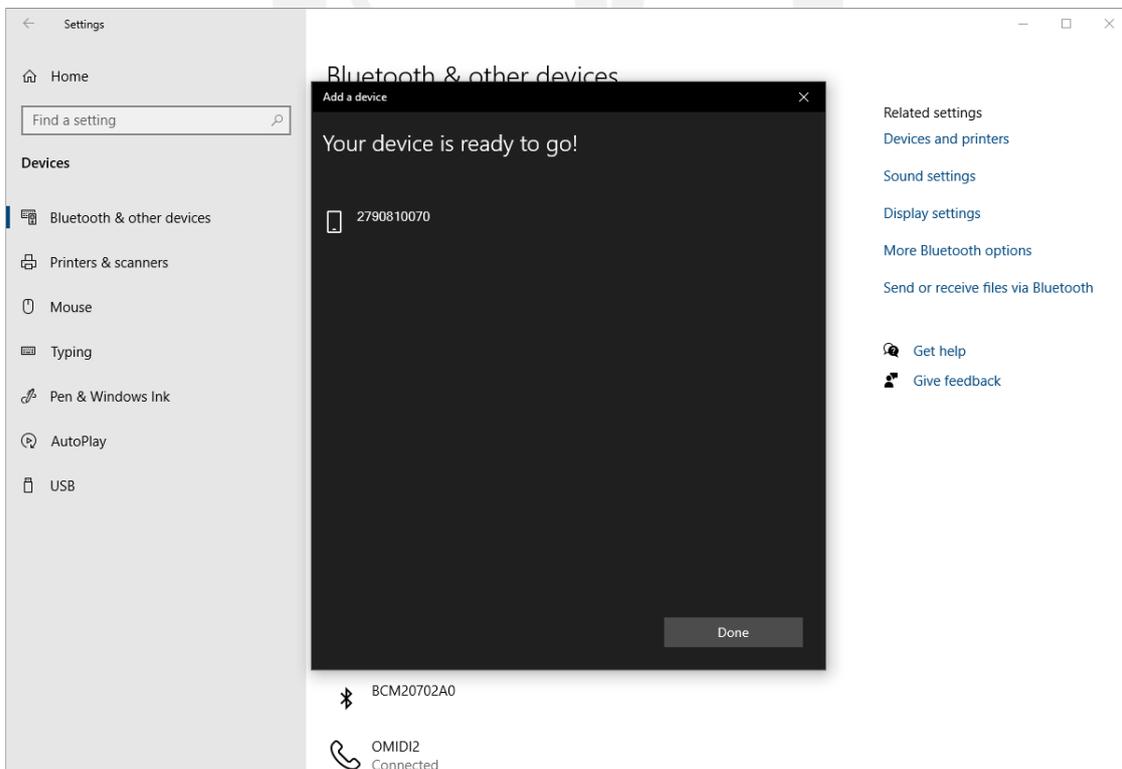
Step 7: Windows tries to connect:



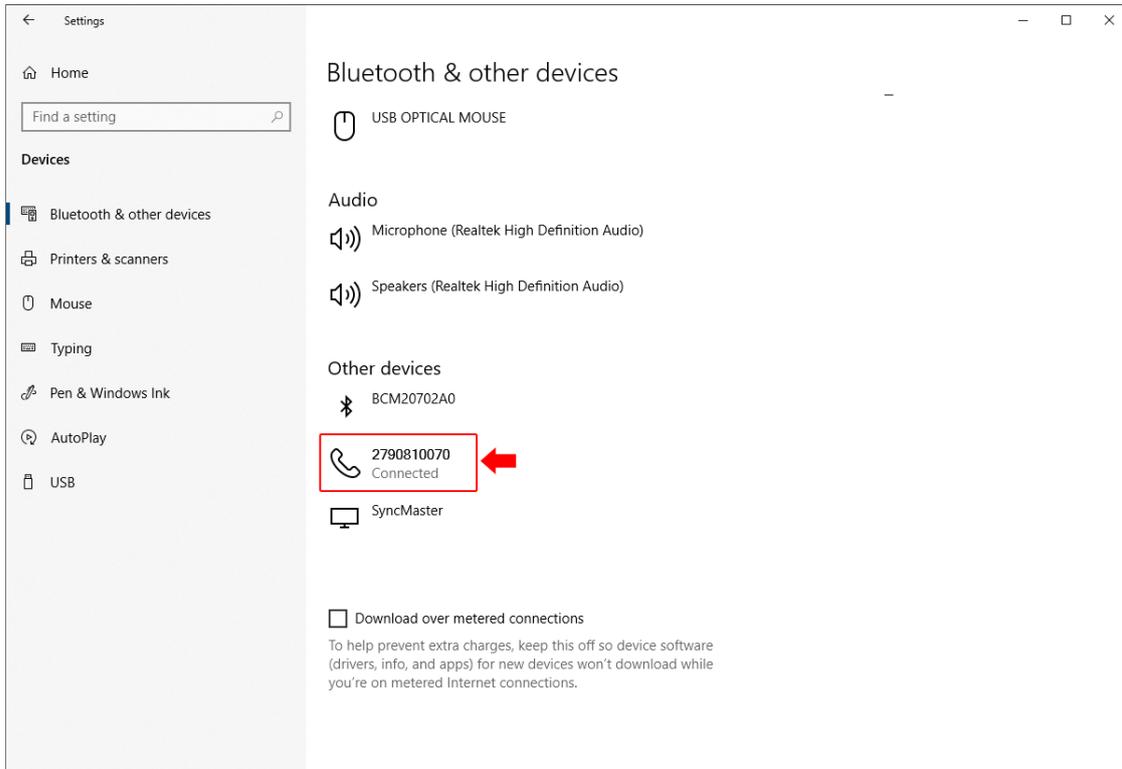
Step 8: You need to confirm the device code, click on "Connect":



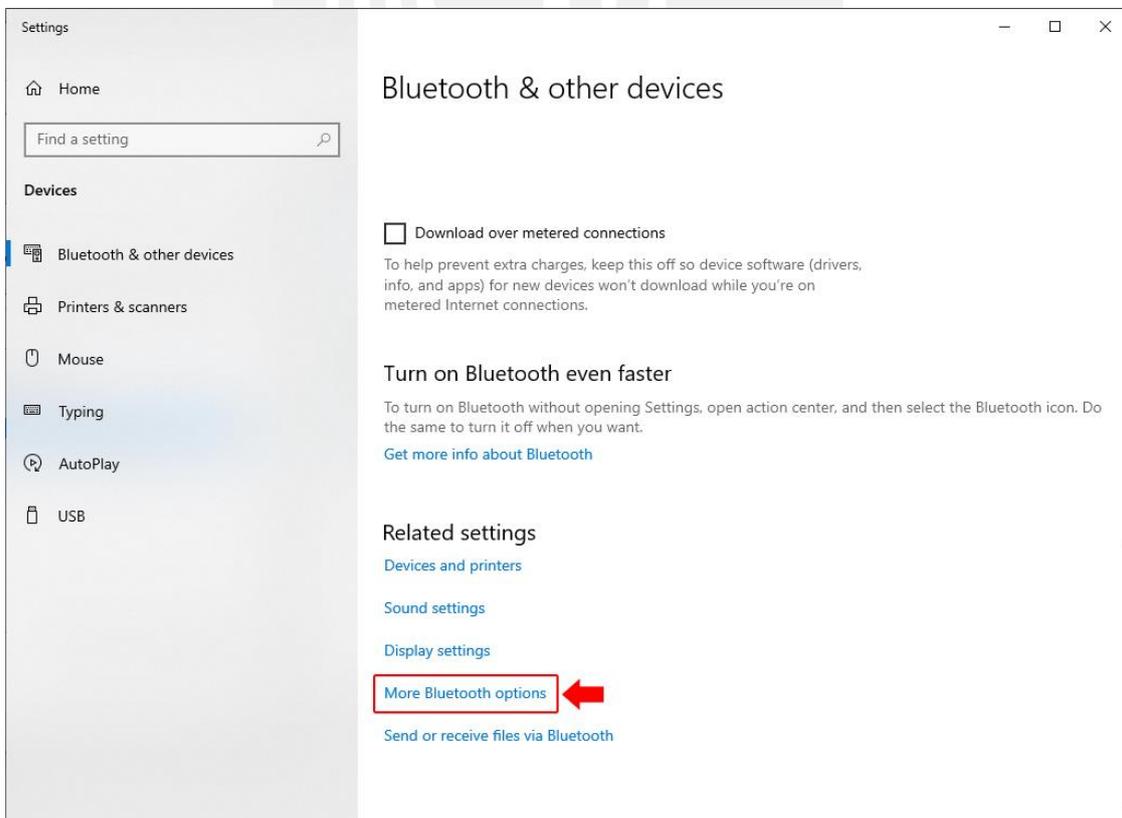
Step 9: Your OP-730 is connected to the computer correctly and ready to send and receive data. Click on "Done":



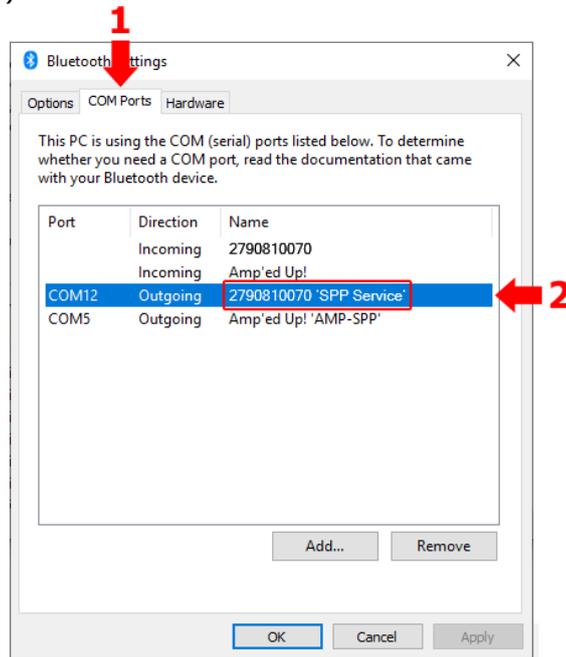
Step 10: Your OP-730 added to paired devices:



Step 11: After connecting, a COM port for the OP-730 is created on the computer, to know its port number, scroll down to the end of the form and click on "More Bluetooth options":



Step 12: Click on "COM Ports" tab and find your OP-730 serial number with outgoing direction, you can see 'SPP Service' after serial number (to send and receive data in program; we have to set this port number in it):



7 How to connect in Linux

To connect OP-730 with your Linux device flow steps below:

Step 1: Install BlueZ packages by using any of the following commands that matches your Linux distribution:

```

-----Ubuntu / Debian-----
$ sudo apt-get -y install bluetooth bluez bluez-tools rfkill

-----Fedora-----
$ sudo dnf -y install bluez bluez-tools

-----Arch Linux / Manjaro-----
$ sudo pacman -S bluez bluez-utils
  
```

This installation provides the *bluetoothctl* utility.

Step 2: You need to add your account to the lp group if you wish to connect to a bluetooth tether:

```

sudo usermod -aG lp $USER
newgrp lp
  
```

Step 3: Start and enable the Bluetooth:

```

$ systemctl is-enabled bluetooth.service
enabled
  
```

Use this command to check it out:

```

$ systemctl status bluetooth.service
  
```

Step 4: Ensure Bluetooth is not disabled:

```
$ rfkill
ID TYPE          DEVICE                SOFT    HARD
 0 bluetooth    tpacpi_bluetooth_sw  blocked unblocked
 1 wlan         phy0                  unblocked unblocked
```

If it is blocked, unblock it by using the command below:

```
$ rfkill unblock bluetooth
```

Confirm it is unblocked:

```
$ rfkill
ID TYPE          DEVICE                SOFT    HARD
 0 bluetooth    tpacpi_bluetooth_sw  unblocked unblocked
 1 wlan         phy0                  unblocked unblocked
 2 bluetooth    hci0                  unblocked unblocked
```

Step 5: Use bluetoothctl to connect to OP-730. Start the bluetoothctl interactive command:

```
$ bluetoothctl
Agent registered
```

Use this command to check it out:

```
$ bluetoothctl show
```

Step 6: Turn on your bluetooth adapter:

```
[bluetooth]# agent KeyboardOnly
Agent is already registered

[bluetooth]# default-agent
Default agent request successful

[bluetooth]# power on
Changing power on succeeded
```

Step 7: Turn OP-730 on and do a scan to detect it:

```
# scan on
Discovery started
[CHG] Controller 20:79:18:5E:4B:64 Discovering: yes
[NEW] Device 5C:FB:7C:A4:17:C6 OP-730
```

To stop scanning use this command:

```
# scan off
```

Step 8: To pair with OP-730 use command "*pair <Bluetooth address>*". You may need to confirm it.

```
[bluetooth]# pair 5C:FB:7C:A4:13:C6
Attempting to pair with 5C:FB:7C:A4:17:C6
[CHG] Device 5C:FB:7C:A4:13:C6 Connected: yes
Pairing successful

# trust 5C:FB:7C:A4:17:C6
[CHG] Device 5C:FB:7C:A4:17:C6 Trusted: yes
Changing 5C:FB:7C:A4:17:C6 trust succeeded
```

Use this command to check it out:

```
# paired-devices
Device 5C:FB:7C:A4:17:C6 OP-730

# devices
Device 5C:FB:7C:A4:17:C6 OP-730
```

Step 9: Connect to OP-730 after pairing:

```
[bluetooth]# connect 5C:FB:7C:A4:17:C6
Attempting to connect to 5C:FB:7C:A4:17:C6
[CHG] Device 5C:FB:7C:A4:17:C6 Connected: yes
Connection successful
```

Use this command to check it out:

```
[OP-730]# info
Device 5C:FB:7C:A4:17:C6 (public)
Name: OP-730
Alias: OP-730
```

8 Preparing for reading meter

After turning on the Bluetooth of your device, please wait for the device to connect with the OP-730. After successful connecting, the STATUS LED indicator changes from the orange color to green. Place it on the meter you can read the meter data using the reading application in your device now.

Note: When OP-730 is turned on, wait for 6 seconds until the OP-730 is ready for operation.