# Universal Analog Input Module

# AI20




Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900

Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900
โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

# list of contents






Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900

Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900
โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

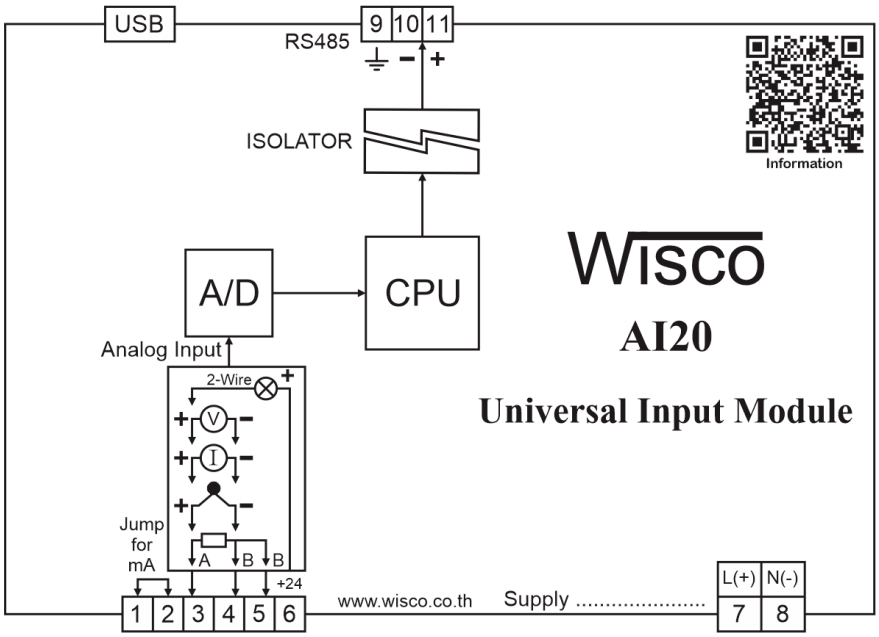
# Universal Analog Input Module

# AI20


- Programmable Input Type
- 1 Analog Input Channel
- RS-485 Isolated

**Analog Input Module AI20** is device that compatible with various type of Analog Input. Analog Input can be program using computer programing to receive Sensor such as Thermocouple, RTD, and Voltage etc.

AI20 Communicate Thru RS-485 serial port which is compatible with PC, PLC, and touch screen display using Modbus protocol either ASCII or RTU.



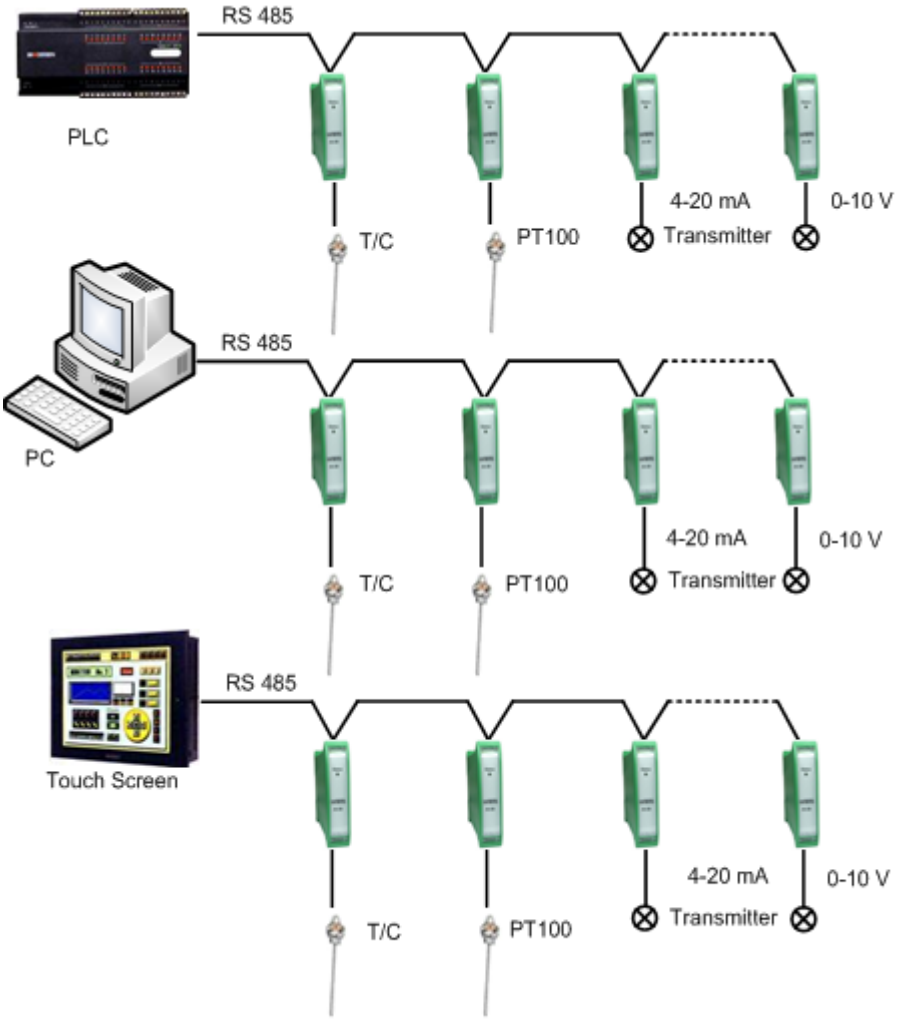



Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900

Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

## I. Example of connection


Connectivity via USB port and RS485.



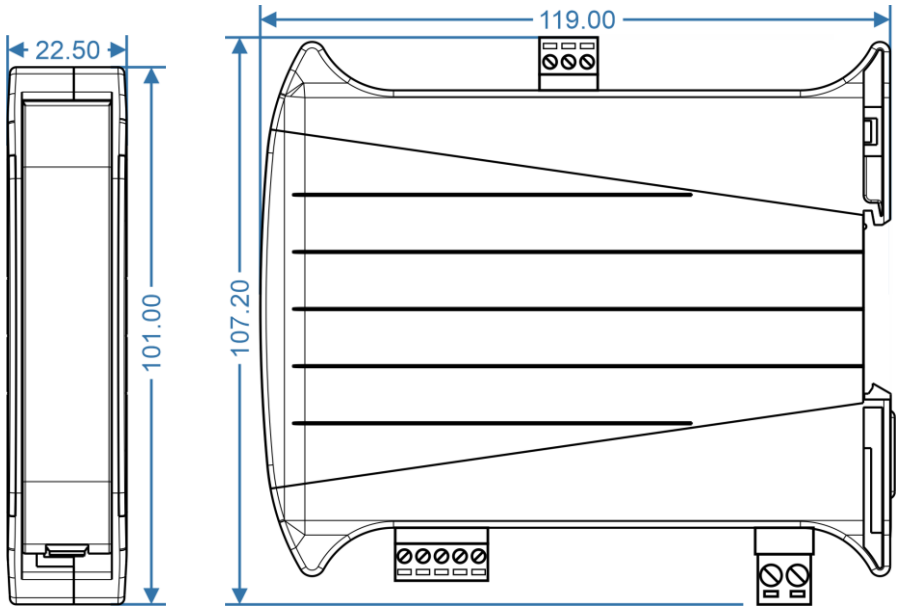



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

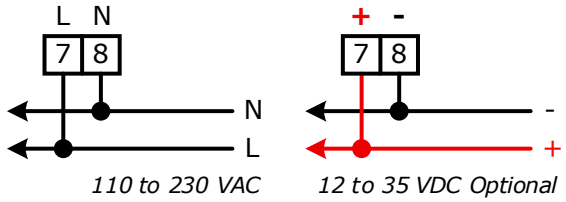
## II. How to connect use

**Dimension** (Unit: mm.)

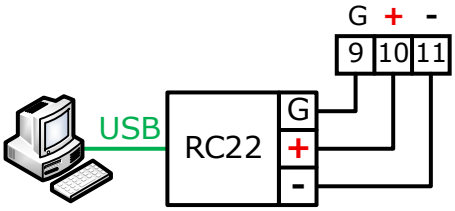



**Wiring**

**Supply**

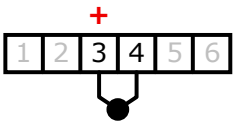



**RS485**

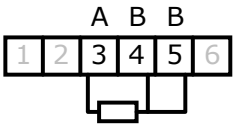



**Analog Input**

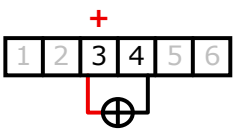
*Thermocouple*



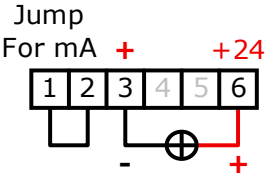

*RTD*



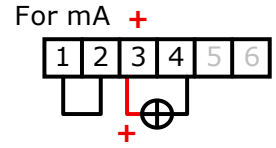

*Voltage*




*Current (2-Wire)*




*Current (4-Wire)*






Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900

Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

## III. Connecting to a computer

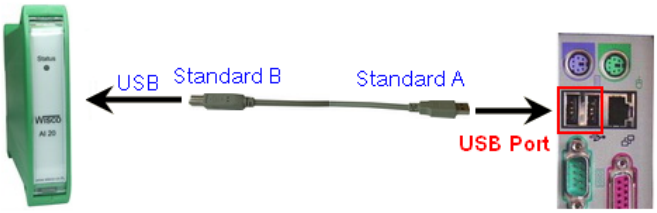
Before AI20 can be used, it needs to be configured first. Using software to configure various settings. such as Input Type, Name, Unit, Max/Min Input, Max/Min Scaling And setting serial parameters, etc. After that, AI20 was put into use.

Connecting AI20 to a computer. It can be connected via USB port or RS485 To configure the AI20.

### Connecting via USB port

USB cables come with two types of connectors Standard A and Standard B. Connect the Standard B connector to the USB port of the AI20 and connect the Standard A connector to the USB port of your computer. (USB ports can be located on the back or front of the computer.)

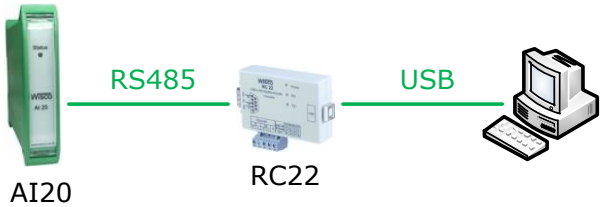

USB cable and USB port of the computer.




Connecting the AI20 to the computer via the USB port.

### Connection via RS485

Connecting the AI20 to a computer requires an RS232 or USB converter to transform the signal into an RS485 signal for configuration purposes. For the connection to be established, the serial parameters between the program and the AI20 must be specified correctly. such as Baud Rate, Data Bit, Stop Bit, Parity Bit and Station number. If the settings don't match, a connection will not be possible.



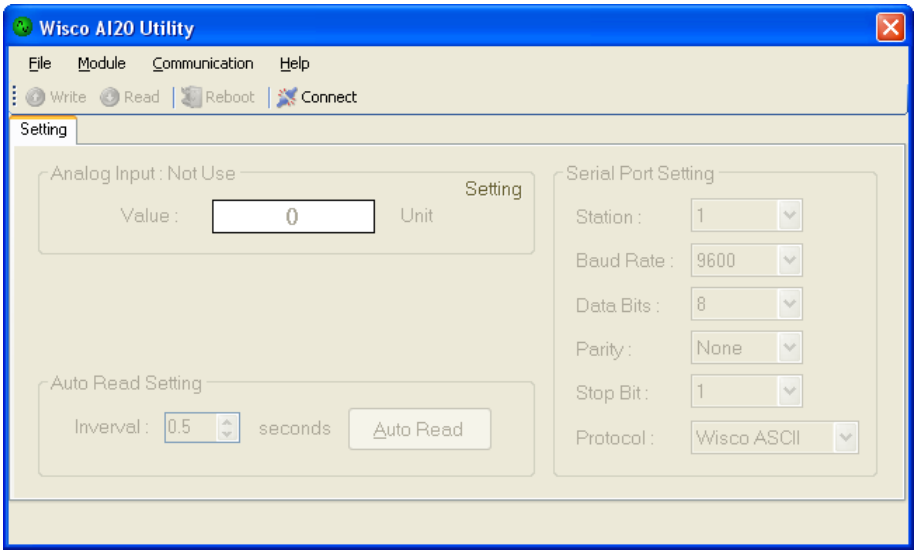

Connecting the AI20 to a computer via RS485.



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

# Wisco AI20 Utility




**Wisco AI20 Utility** Used for reading and setting values for the AI20 and for displaying the current measurement reading. By connecting via USB port and RS485 connection.



Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

# 1. Things to know before using the program Wisco AI20 Utility

The Wisco AI20 Utility program can only connect to the AI20 using the Wisco ASCII Protocol. If connecting via USB port or RS485 and specifying the Modbus ASCII or Modbus RTU protocol (not Wisco ASCII), the program must connect to the AI20 via the USB port.

**Usage USB Port**

- ❖ Before connecting via the USB port, ensure the AI20 is powered on and connect the USB cable between the AI20 and the computer.
- ❖ When using a USB port for the first time, you must install the USB driver first. See section **1.1** for details.

**Usage Serial Port**

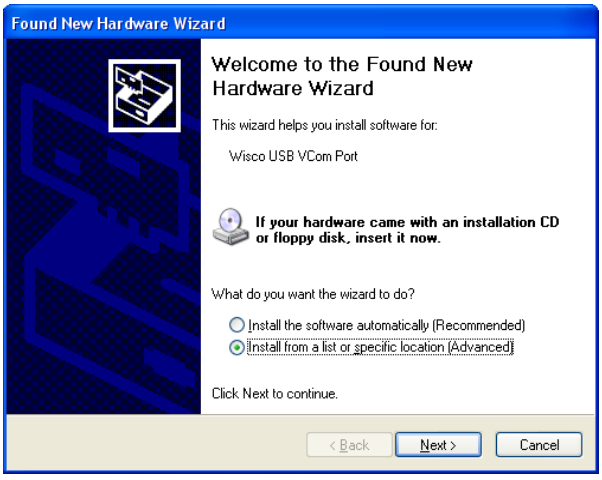
Connecting via RS485 requires connection configuration. such as Station, Baud Rate, Data Bits, Parity and Stop Bit Ensure that the AI20 and the program are synchronized. (if the settings do not match, the connection cannot be established.)

## 1.1 Installation instructions Driver USB

The USB driver for the module can be found on the CD that came with the module or on the company's website. www.wisco.co.th/main/downloads The driver installation process is as follows:

**For computers running Windows XP.**

- ❖ Insert the CD into the CD/DVD-ROM drive.
- ❖ Power the module.
- ❖ Connect the USB cable between the module and the computer.
- ❖ Please wait a moment the "Found New Hardware Wizard" window will appear.

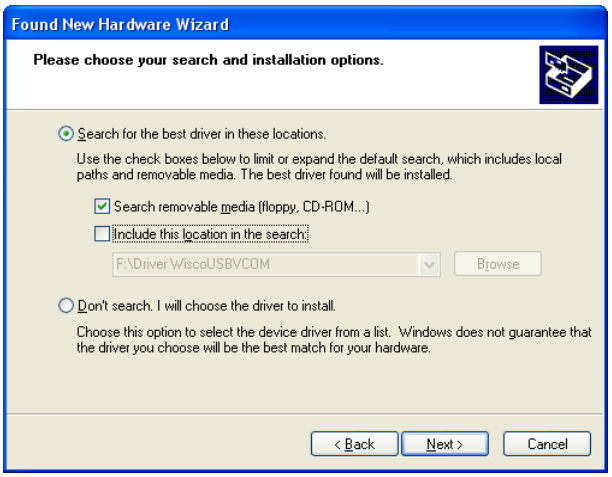



- ❖ Choose ◉ Install from a list or specific location (Advanced) And press the button Next >.



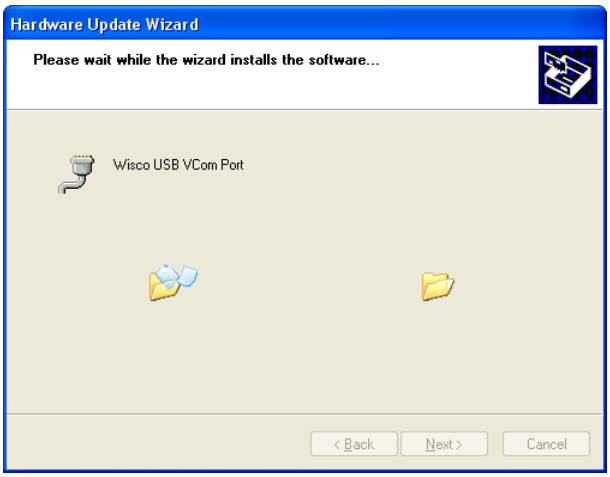
บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

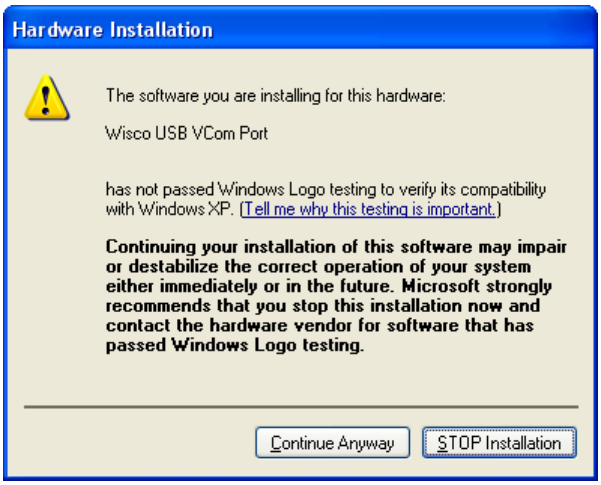



❖ Choose Search removable media (floppy, CD-ROM...) And press the button Next >.

❖ Please wait a moment while Windows searches for the driver on the CD.



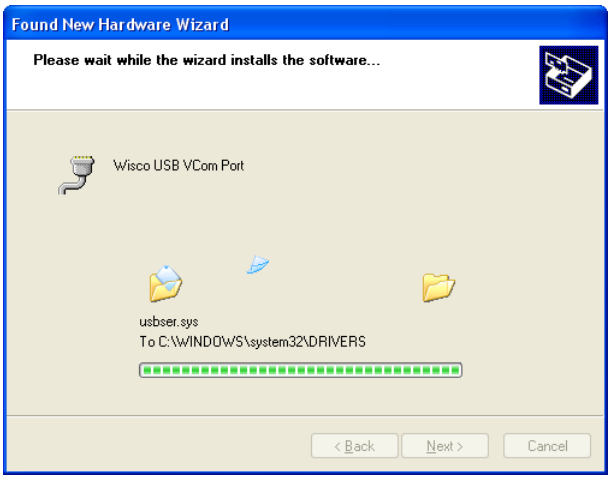

❖ If the "Hardware Installation" window appears, click the button Continue Anyway.



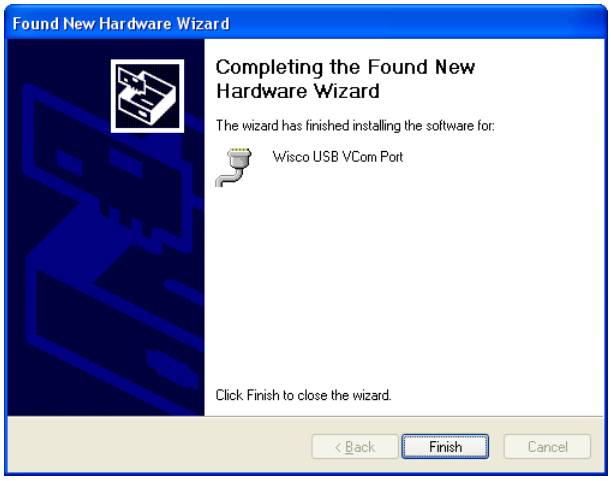



Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

❖ Windows will load the USB driver onto the computer.




❖ Wait a moment, a "Completing the Found New Hardware Wizard" window will appear Click the button Finish. Wisco USB VCom Port Driver Installation Complete.



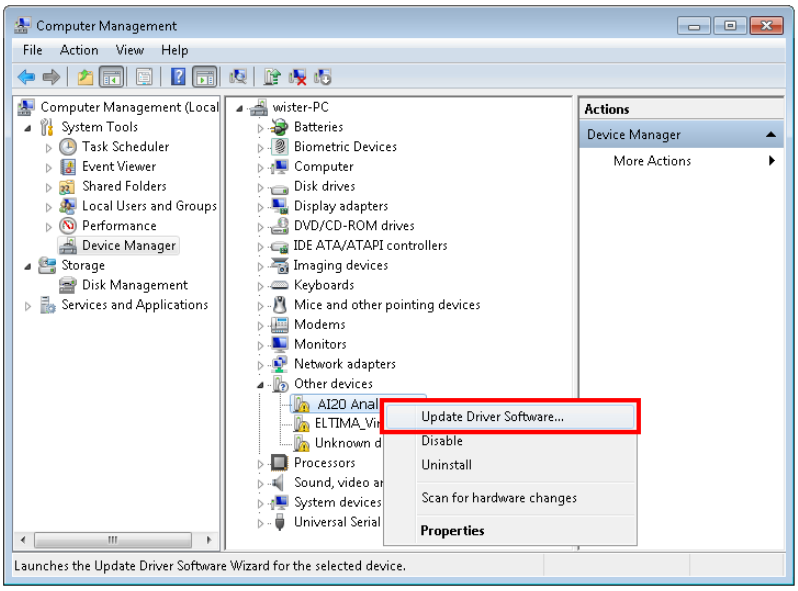



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

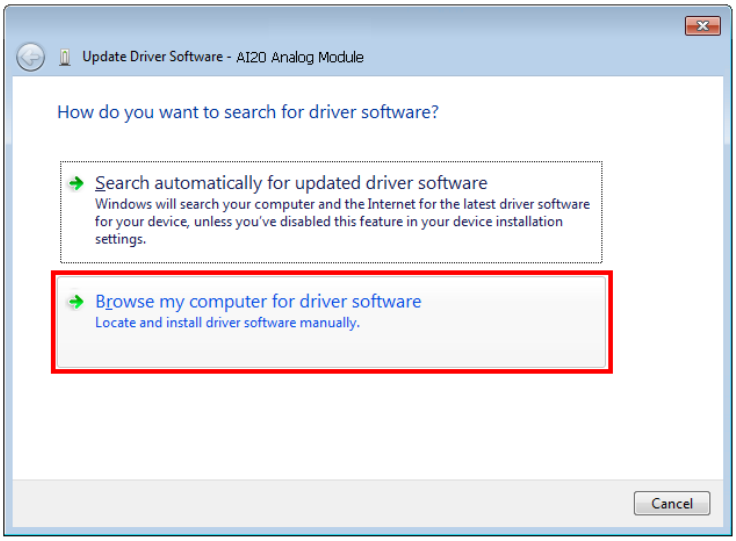
โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

**For computers running Windows 7 and Windows 8**

- ❖ Insert the CD into the CD/DVD-ROM drive.
- ❖ Power the module.
- ❖ Connect the USB cable between the module and the computer.
- ❖ Click on Start -> Control Panel -> System -> Device Manager Or right-click on My Computer And choose a topic Manage Then select a topic. Device Manager (for Windows 8 Choose Start -> Setting -> Control Panel -> System -> Device Manager).



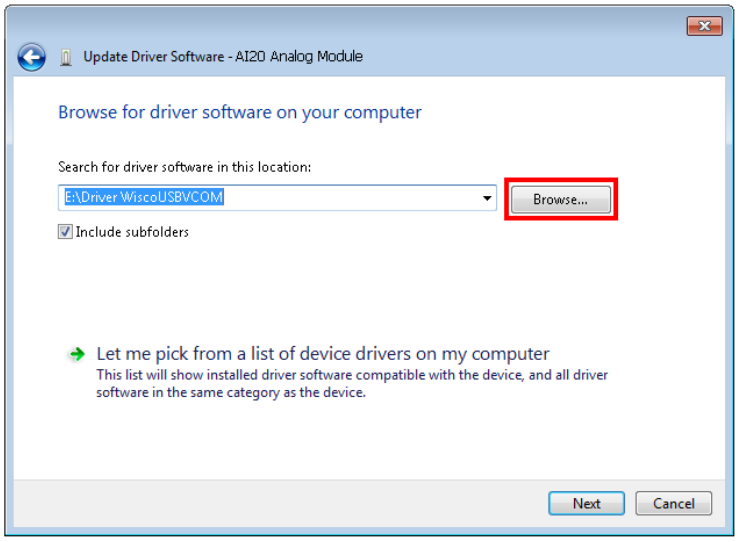

- ❖ Right-click on AI20 Analog Module and choose Update Driver Software…

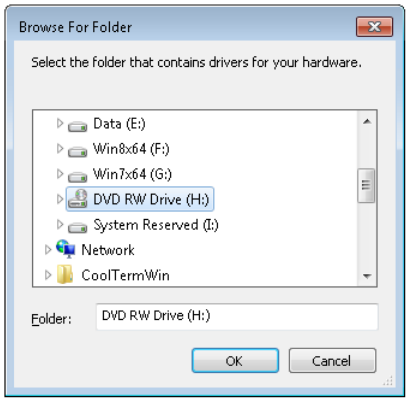



- ❖ Choose a topic "Browse my computer for driver software".

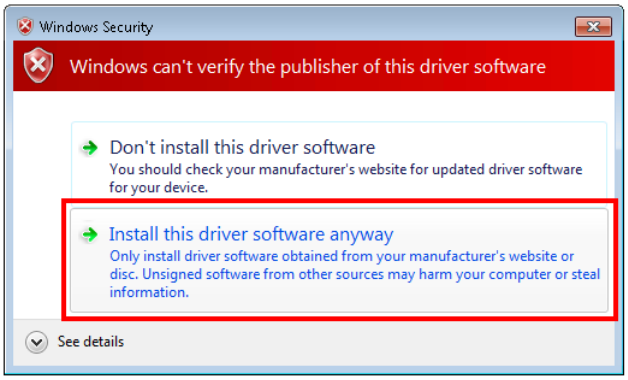


Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

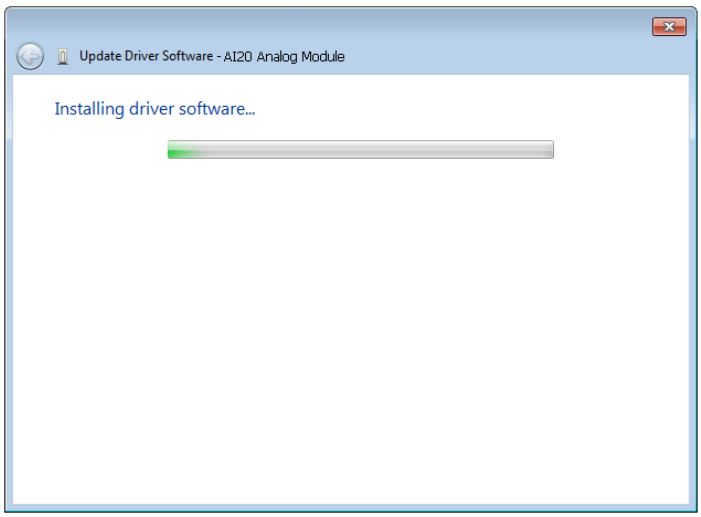



❖ Then press the button Browse... and choose "Driver WiscoUSBVCOM" Then press the button Next.




❖ In the event that a window is displayed "Windows Security" Please click to select Install this driver software anyway.



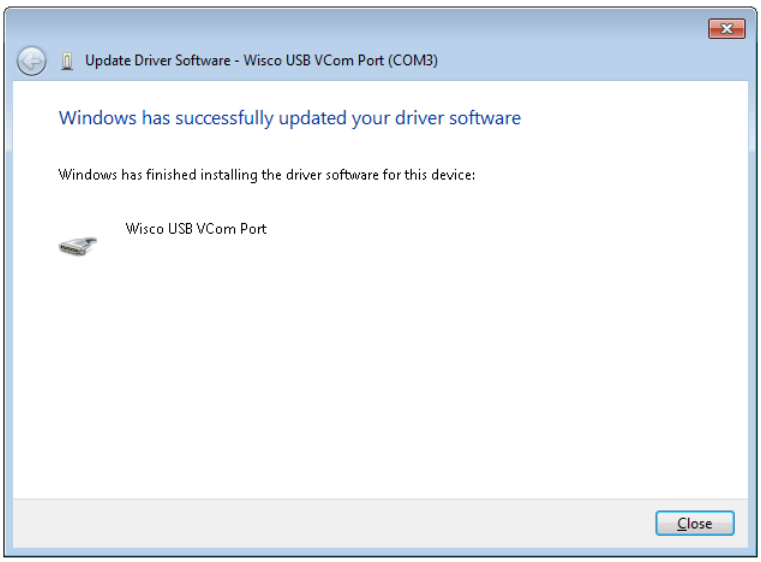

❖ Windows will load the USB driver onto the computer.



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

❖ Please wait, a window will appear. "Completing the Found New Hardware Wizard" Come up and press the button Finish Installation complete Driver Wisco USB VCom Port.




## 1.2 How to install the program Wisco AI20 Utility

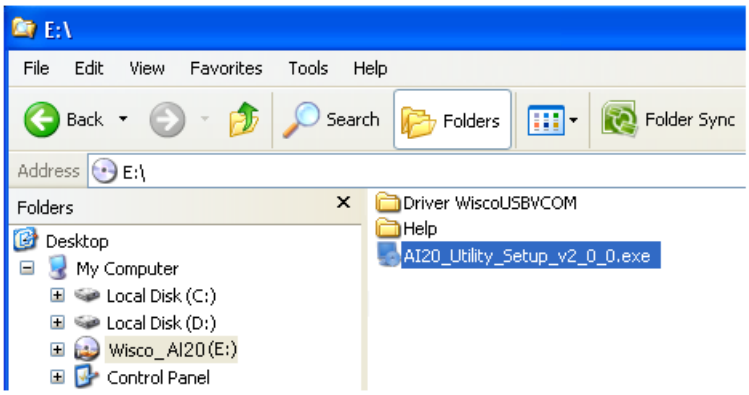
Program Wisco AI20 Utility It can be found from 2 sources as follows:

❖ The company's website www.wisco.co.th/main/downloads (AI20_Utility_Setup_v2_0_0.exe)

❖ The installation process for the AI20 is as follows: as shown on the CD included with the device.

➢ Insert the CD into the CD/DVD-ROM drive.

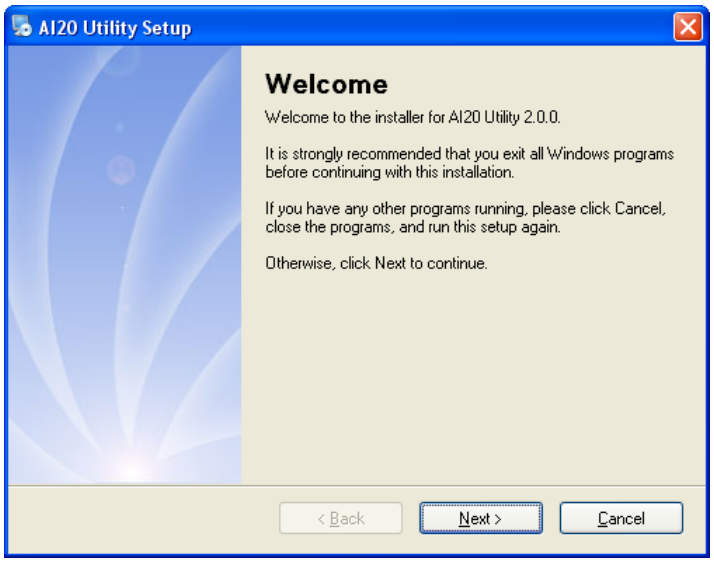
➢ Open the file name AI20_Utility_Setup_v2_0_0.exe




➢ A program installation window will appear Wisco AI20 Utility V2.0.0 Come up.



Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th




➢ Click the button Next > Continue until the installation is complete

Installed programs are usually found in the Program Files folder, as follows:

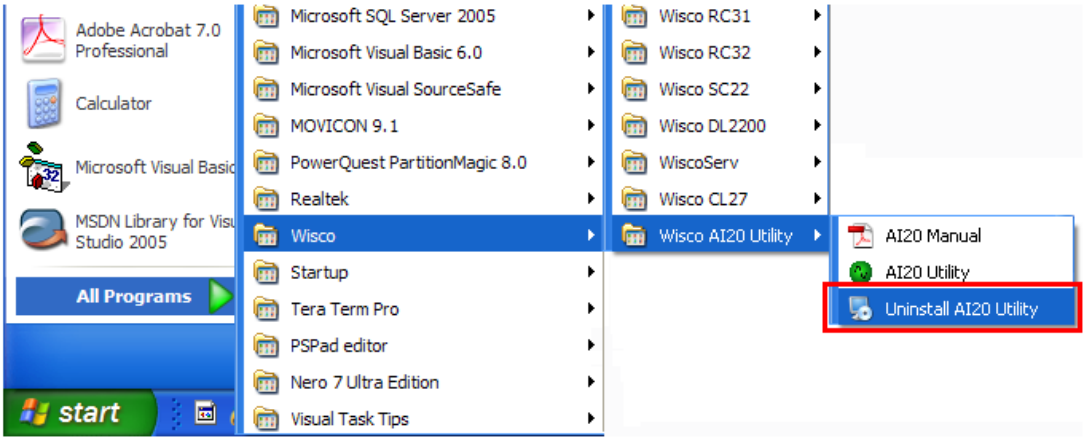
| [Windows Drive] > Program Files > Wisco > Wisco Utility > AI20 Utility 2.0.0 |
|---|

The shortcut to open the Wisco AI20 Utility program is located in the Programs Group as follows:

| Start > All Programs > Wisco > Wisco AI20 > AI20 Utility 2.0.0 |
|---|

## 1.3 How to uninstall a program Wisco AI20 Utility

Choose start -> All Programs -> Wisco -> Wisco AI20 Utility -> Uninstall AI20 Utility.

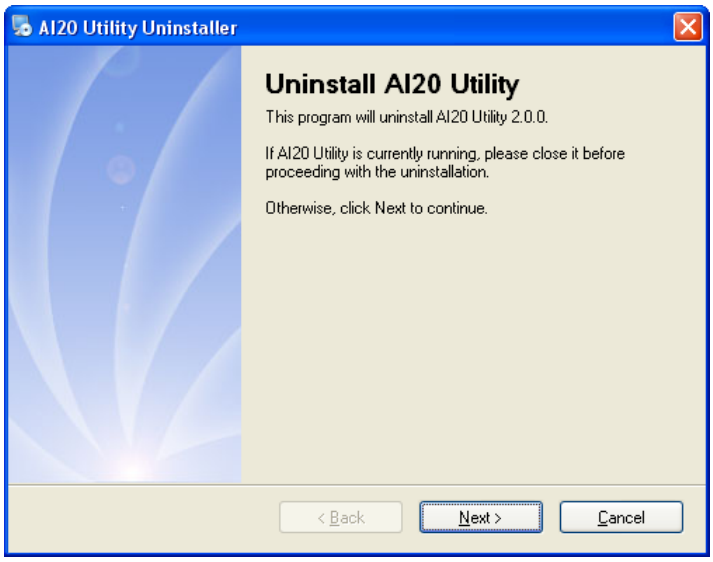



➢ A window will appear prompting you to confirm the program's removal and logout. Click the button Next >.



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

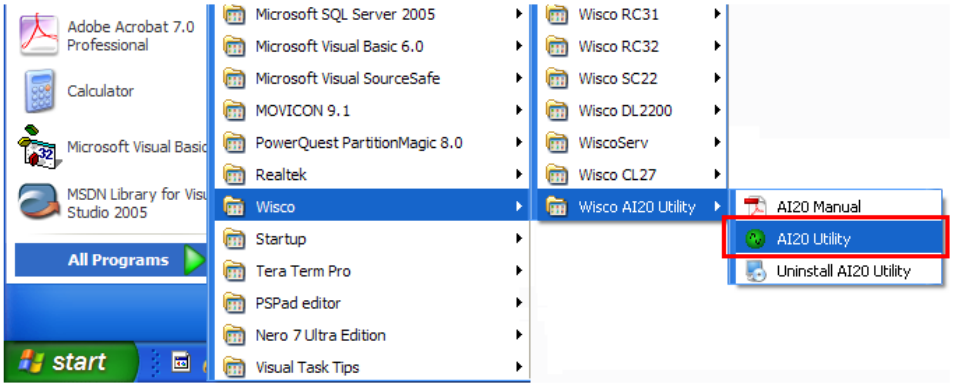
โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

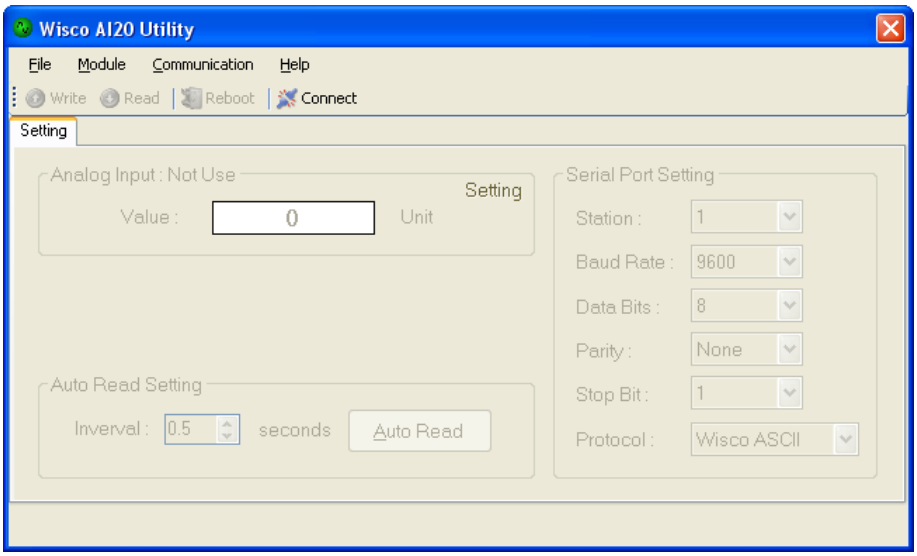



➢ Please wait while Windows removes the program from the system

## 1.4 How to activate the program Wisco AI20 Utility

Open the program by selecting Start -> All Programs -> Wisco -> Wisco AI20 Utility -> AI20 Utility. The Wisco AI20 Utility program window will then appear.





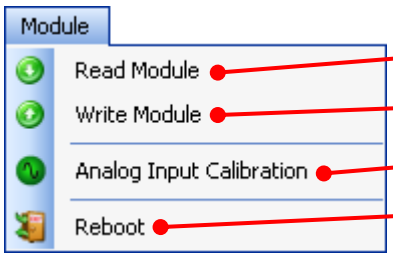

Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

## 2. Usage Menu

### 2.1 Menu File


Close the program.

### 2.2 Menu Module




Read the configuration values saved in AI20.

Send the configuration values to be saved in AI20.

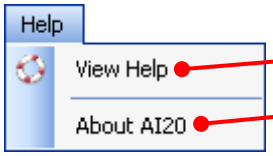
Correct the inaccuracies in the analog input.

Reset AI20.

### 2.3 Menu Communication


Configure communication between the Wisco AI20 Utility program and the AI20 module.

### 2.4 Menu Help




Open the program's user manual file.

Display the software and product version, serial number, and company contact information.



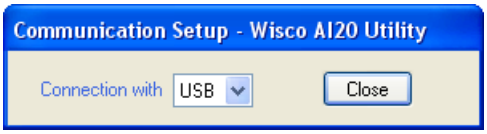
บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

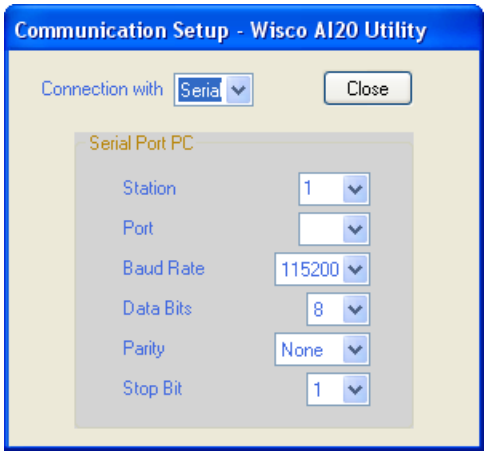
โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

## 3. The connection between programs Wisco AI20 Utility with AI20

The Wisco AI20 Utility program can connect to the AI20 via a USB port or RS485 (Wisco ASCII) connection.

Communication between the Wisco AI20 Utility and the AI20 program can be configured by selecting the Communication -> Setup menu. A "Communication Setup" window will appear.

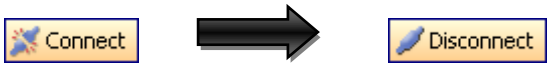



Various settings can be configured, details of which are as follows:

- **Connection with** Define the connection format with the module. (USB or Serial) If the program is configured to connect to the module via serial, the settings must be configured in "Serial Port PC" The program and the module must be synchronized for a connection to be established. (If the settings are unknown, connect via USB.)
- **Station** Assign a serial number. (0 - 254)
- **Port** Specify the port to use for connection.
- **Baud Rate** Set the communication speed. (4800, 9600, 19200, 57600, 115200)
- **Data Bits** Specify the length of the data. (8, 7)
- **Parity** Specify the Parity. (None, Odd, Even)
- **Stop Bit** Specify the number of bits. Stop (1, 2)

**Instructing the program to connect to AI20**

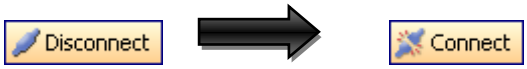



Click the button 

Once connected to the module, the button will change its status to 

.

**Instructing the program to disconnect from AI20**




Click the button 

Once the connection to the module is disconnected, the button will change its status to 

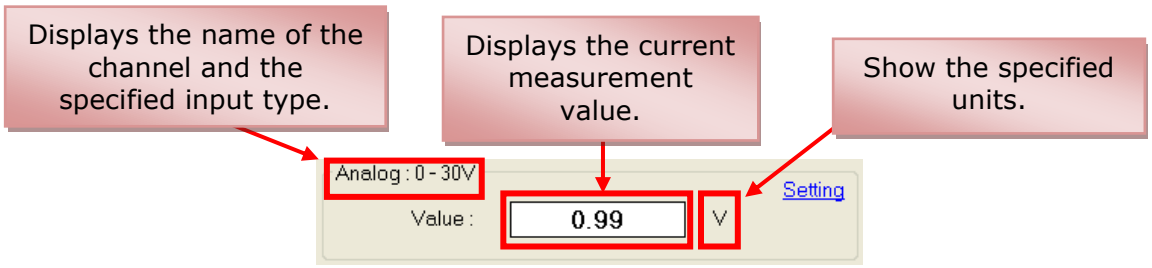
.



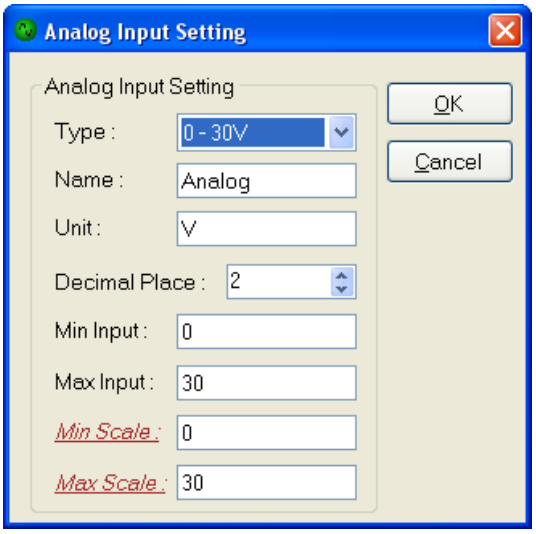
Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

# 4. Reading and setting values for AI20

## 4.1 Analog Input Setting




Analog Input is used to specify the desired input, Name the channel, Specify unit, Specify the number of decimal places and set the display value. By clicking on Settings, you will find the following details.




- **Type** Select the type of analog input you want to use.
- **Name** Set the name of the Analog Input channel (11 characters).
- **Unit** Define the unit of signal to be used (9 characters).
- **Decimal Place** Specify the number of decimal places you want to display (0 - 4 positions).
- **Min Input** Set the maximum value of the input received.
- **Max Input** Set the minimum value of the incoming input.
- **Min Scale** Set the maximum value you want to display.
- **Max Scale** Set the minimum value you want to display.

  **Example** The module will calibrate the received input values to match the predefined display scale, for example.

  Input Type 4-20 mA set Max Scale = 100 and Min Scale = 0

  when Input = 20 mA It will display as 100.

  and Input = 4 mA It will display as 0.
- **Button** OK Used to confirm settings.
- **Button** Cancel Used to cancel the setting.

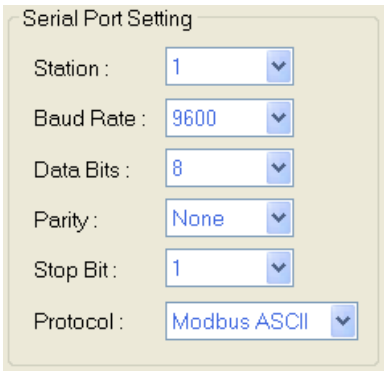


บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

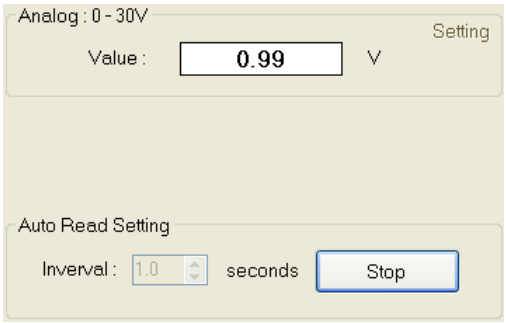
### 4.2 Serial Port Setting

Configure the connection settings for AI20 when connecting via RS485 as follows:




- ❖ **Station** Assign a serial number. (1 - 254)
- ❖ **Baud Rate** Specify the communication speed. (4800, 9600, 19200, 57600, 115200)
- ❖ **Data Bit** Specify the length of the data. (8,7)
- ❖ **Parity** Specify Parity Bit (None, Odd, Even)
- ❖ **Stop Bit** Specify the number of stop bits. (1,2)
- ❖ **Protocol** Define the format of communication. (Wisco ASCII, MODBUS ASCII, MODBUS RTU)

### 4.3 Auto Read Setting



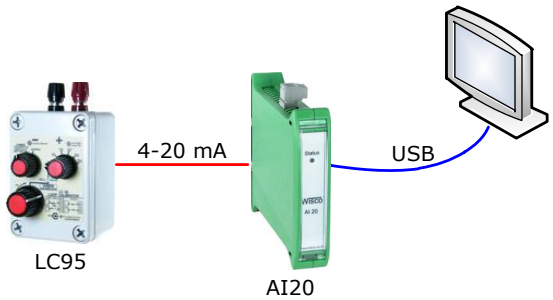

The program will only be able to read the measurement values when it connects to the AI20. By setting the display time for the measurement value in the Interval field (seconds), Then press the button Auto Read To take the current measurement, and to stop the measurement by pressing the button Stop .

## 5. Correction of errors

When AI20 reads the measurement values, an error occurs. Input errors can be corrected as follows:

The correction of errors involves the related values of Span and Zero, as follows:

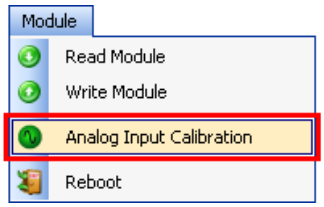
- ❖ *Span* This adjusts the scale value of the Max Input.
- ❖ *Zero* This adjusts the scale value of the Min Input.



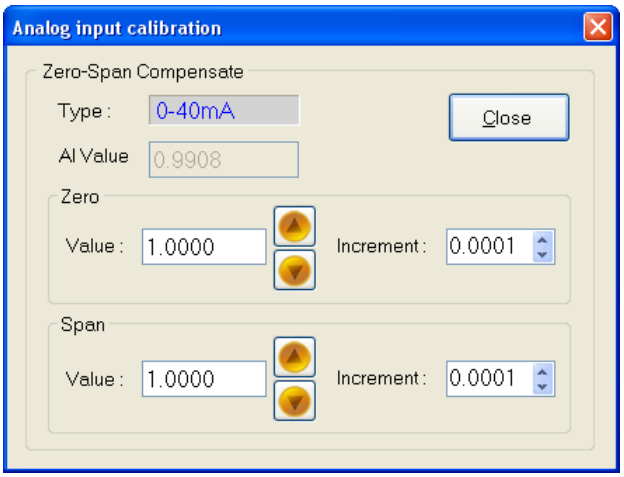

The image shows an example of correcting input type 4 - 20 mA error using a calibration device that can provide a standard signal.



Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th




The input calibration window can be opened by selecting Module from the menu and then choosing Analog Input Calibration, as follows:




- **Type** Show the types of Analog Input.
- **AI Value** This displays the measured value of the analog input. When the Span and Zero values change, the analog input value will also change.
- **Zero** Used for adjusting the minimum value. The value can be increased or decreased. By pressing the button Or press the key ↑ (Increase value) And press the button Or press the key ↓ (Reduce the cost) Or the value can be set using the numeric keypad from 0 to 9.
- **Span** Used to adjust the maximum value. The value can be increased or decreased by pressing the button Or press the key ↑ (Increase value) And press the button Or press the key ↓ (Reduce the cost) Or the value can be set using the numeric keypad from 0 to 9.



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

## 6. Communicating with the module using MODBUS (ASCII) Protocol

The AI20 can also use the MODBUS (Floating point) protocol for communication, with the following command format: (CHAR = Character; 1 CHAR It consists of: 8 Data Bits, 1 Start Bit, and 1 Stop Bit)

| ADDR | FUNCTION | DATA | ERROR CHECK | EOF | READY TO REC RESP |
|---|---|---|---|---|---|
| 2-CHAR<br>16-BITS | 2-CHAR<br>16-BITS | N x 4-CHAR<br>N x 16-BITS | 2-CHAR<br>16-BITS | CR | LF |

Displays data format in MODBUS ASCII Protocol.

by ADDR: Device address.
FUNCTION: Function.
DATA: Contact information.
ERROR CHECK: Checksum data.
EOF: CR
READY TO REC RESP: LF

*** The information used to contact the AI20 module will be in floating-point format. (floating point) In MODBUS, floating-point data must be sent two words at a time. (4 byte) For the data to be accurate, the input and output data must be correlated.

The AI20 module supports the following basic MODBUS functions:
READ INPUT REGISTERS (CODE 04)

The address reference on the module is as follows:

| Function Code | Reference | Address |
|---|---|---|
| 04 | EEPROM | 3xxxx |

Where xxxx refers to the registers mapped according to Table 1.
The table shows the relationship between an address and the registers in use.

| Address | Data Type | Description |
|---|---|---|
| 30001 - 30002 | Floating Point | Analog Input |
| 30011 | Int | Analog Input |
| 30021 - 30022 | Long Int | Analog Input |

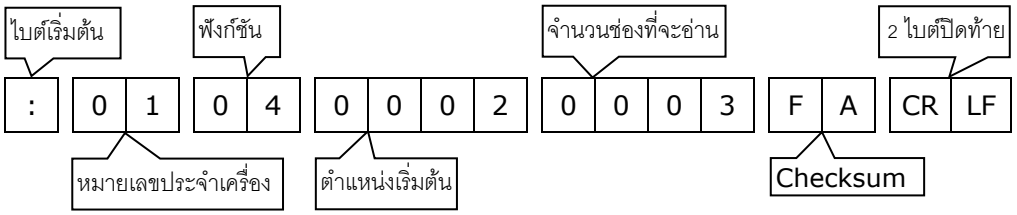
*** Further details about Modbus can be found in the 'Modbus Reference Guide' or at http://www.modbus.org/specs.php



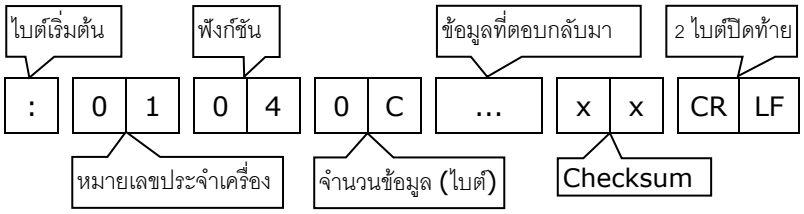
Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

**Example of MODBUS (ASCII) PROTOCOL functions.**

*Function Code 04*




*Response*




## 7. Way of thinking CHECK SUM for MODBUS (ASCII) Protocol

The MODBUS protocol uses CHECK SUM to verify the integrity of data sent to each command. Calculating CHECK SUM involves adding all the data together. (Add only numerical data.) We add them one byte at a time, discarding any value exceeding one byte. Next, the resulting 1 byte is used to perform 1's complement and 2's complement calculations.

**Example** ‘: 0F 04 0001 0023 [CR] [LF]’

| | HEXADECIMAL | BINARY |
|---|---|---|
| Initial byte. | 0FH | 0000 1111 |
| | 04H | 0000 0100 |
| | 00H | 0000 0000 |
| | + 01H | + 0000 0001 |
| | 00H | 0000 0000 |
| Last byte. | 23H | 0010 0011 |
| Result. | 37H | 0011 0111 |
| Consider only 1 byte. (8 bits) | 37H | 0011 0111 |
| Perform 1's complement. (invert) | C8H | 1100 1000 |
| Perform 2' complement. | C8H + 1 | 1100 1000 + 1 |
| The resulting checksum value. | C9H | 1100 1001 |

The information to be sent is therefore: ‘: 0F 04 0001 0023 C9 [CR] [LF]’



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

## 8. Details and examples of the command Wisco Protocol

( | | = 1 byte, | ... | = n bytes, | CR | = Carriage Return )

**Commands used to read analog input values**

It starts with "RAI" and ends with "[CR]", for example: To read the analog input from unit number 01, the following command will be given: "#01RAI [CR]"

| # | 0 | 1 | R | A | I | CR |
|---|---|---|---|---|---|---|

The module will respond with "AI>" Followed by the measured value as a decimal number, with each cell separated by a comma and ending with "[CR]", as in this example: "AI>12.1 [CR]"

| A | I | > | 1 | 2 | . | 1 | CR |
|---|---|---|---|---|---|---|---|



Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900

Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

# Appendix

| T.1 | Displays the type code of the analog input value. | | | | |
|---|---|---|---|---|---|
| **Code** | **Input Type** | | **Measuring Range** | **Resolution** | **Accuracy (%FS)** ( Temp. 25 °C ) |
| 0 | **Not Use** | | — | — | — |
| 1 | Thermocouple | **R** | 0 – 1700 °C | 1 °C | ±0.2% (3.4 °C) |
| 2 | | **S** | 0 – 1700 °C | 1 °C | ±0.2% (3.4 °C) |
| 3 | | **K** | (-)250.0 – 1300.0 °C | 0.1 °C | ±0.2% (2.6 °C) |
| 4 | | **E** | 0.0 – 1000.0 °C | 0.1 °C | ±0.2% (2.0 °C) |
| 5 | | **J** | (-)200.0 – 700.0 °C | 0.1 °C | ±0.2% (1.4 °C) |
| 6 | | **T** | (-)250.0 – 400.0 °C | 0.1 °C | ±0.2% (0.8 °C) |
| 7 | | **B** | 600 – 1800 °C | 1 °C | ±0.2% (3.6 °C) |
| 20 | R.T.D | **Cu10** | 0 – 150 °C | 1 °C | ±0.1% (1.5 °C) |
| 21 | | **Pt100** | (-)200.0 – 800.0 °C | 0.1 °C | ±0.1% (0.8 °C) |
| 22 | | **Pt1000** | (-)200.0 – 800.0 °C | 0.1 °C | ±0.1% (0.8 °C) |
| 30 | R (Ohm) | **600 Ω** | 0.00 – 600.00 Ω | 0.01 Ω | ±0.01% (0.06 Ω) |
| 31 | | **1200 Ω** | 0.0 – 1200.0 Ω | 0.1 Ω | ±0.02% (0.24 Ω) |
| 32 | | **4000 Ω** | 0.0 – 4000.0 Ω | 0.1 Ω | ±0.02% (0.8 Ω) |
| 40 | Voltage(mV) | **0 – 80** | 0.000 – 80.000 mV | 1 µV | ±0.1% (8 µV) |
| 41 | | **0 - 150** | 0.00 – 150.00 mV | 10 µV | ±0.02% (30 µV) |
| 42 | Voltage (V) | **0 – 1** | 0.0000 – 1.0000 V | 100 µV | ±0.05% (500 µV) |
| 43 | | **0 – 5** | 0.000 – 5.000 V | 1 mV | ±0.04% (2 mV) |
| 44 | | **0 - 10** | 0.000 – 10.000 V | 1 mV | ±0.04% (2 mV) |
| 45 | | **0 – 15** | 0.000 – 15.000 V | 1 mV | ±0.02% (3 mV) |
| 46 | | **0 – 30** | 0.00 – 30.00 V | 10 mV | ±0.033% (10 mV) |
| 60 | Current(mA) | **4 – 20** | 4.000 – 20.000 mA | 1 µA | ±0.01% (5 µA) |
| 61 | | **0 – 20** | 0.000 – 20.000 mA | 1 µA | ±0.01% (5 µA) |
| 62 | | **0 – 40** | 0.000 – 40.000 mA | 1 µA | ±0.05% (0.0 A) |



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

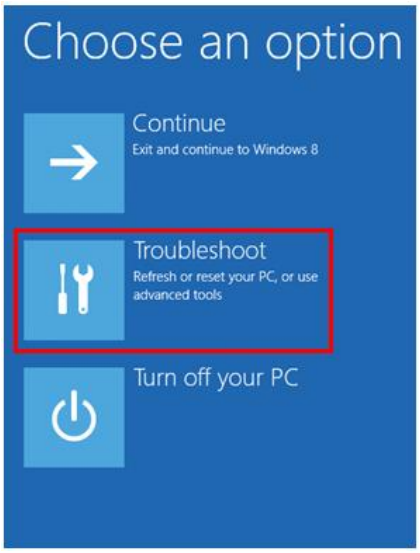
โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th

## A. How to fix the problem when the USB driver fails to install. (Windows 8, 8.1)

If the USB driver cannot be installed (for Windows 8 or Windows 8.1), disable the driver signature. Follow these steps:

1) Open the Charm Bar -> Settings -> Power, and hold down the Shift key on your keyboard. Then click Restart. Release the Shift key when the "Choose an Option" window appears.

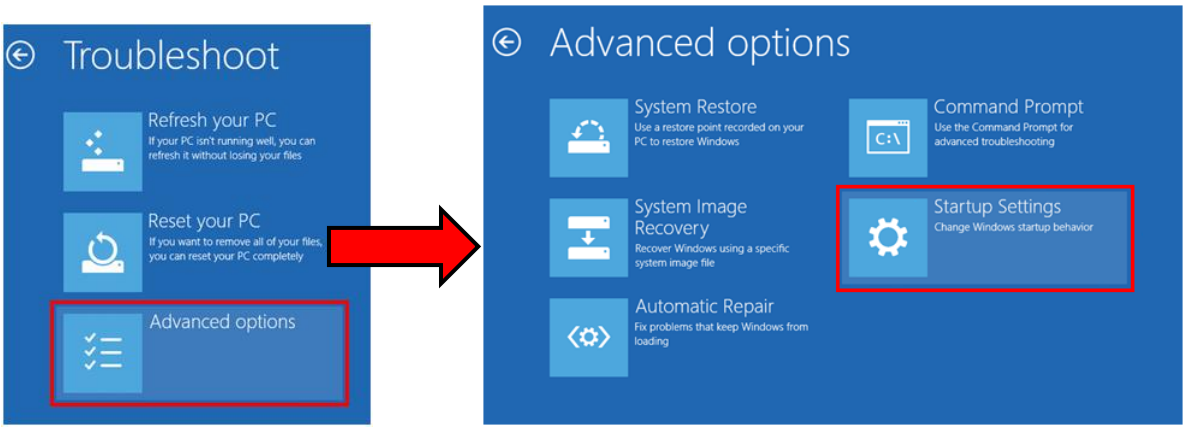

2) In the "Choose an Option" window, click on "Troubleshoot".



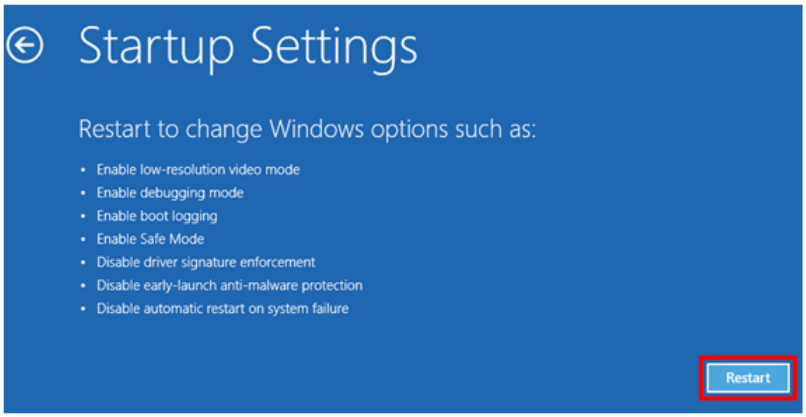


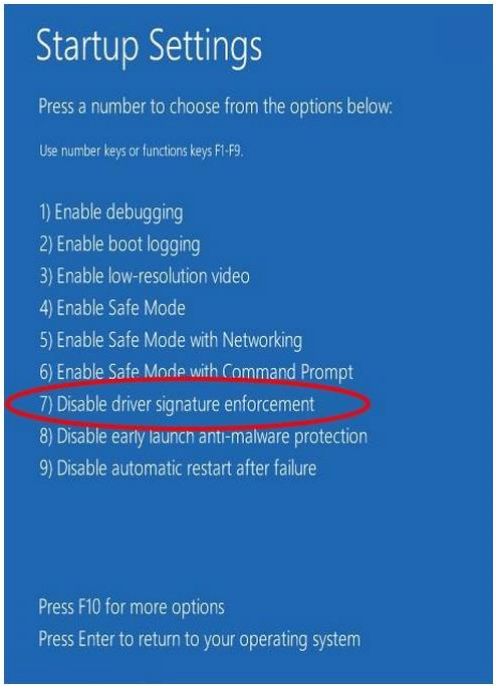

Wisnu and Supak Co., Ltd 102/111-112 Tessabansongkroh Rd., Ladyao, Jatujak, Bangkok 10900
Tel (662)591-1916, (662)954-3280-1, Fax (662)580-4427, www.wisco.co.th, E-mail info@wisco.co.th

3) Click on "Advance Option," and in the "Advance Option" window, click on "Startup Settings."




4) Then press the button Restart.




5) After restarting, in the "Startup Settings" window, press F7 or the number 7 key on your keyboard to select option 7, "Disable driver signature enforcement".
6) The computer will restart. After that, install the USB driver again.

**Edit: 02/04/2026**



บริษัท วิศณุและสุภัค จำกัด 102/111-112 หมู่บ้านสินพัฒนาธานี ถนนเทศบาลสงเคราะห์ แขวงลาดยาว เขตจตุจักร กรุงเทพฯ 10900

โทร. (02)591-1916, (02)954-3280-1, แฟกซ์ (02)580-4427, www.wisco.co.th, อีเมล์ info@wisco.co.th