

cMT-G03 with OPC UA Server



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cMT-G03 with OPC UA Server

Introduction: To implement IIoT connectivity without changing existing HMI and controller hardware, as well as HMI and controller programs, Weintek has released two Gateway protocol converters, which are cMT-G03 (Serial bridge) and cMT-G04 (Ethernet bridge), to retrofit customers' systems. This document discusses how to utilize cMT-G03 to build the OPC UA server for the serial- based communication machine and allows OPC UA client to access data.

cMT-G03 is equipped with two serial ports to act as a serial bridge. To bridge a cMT-G03 to the device, users need to connect the existing HMI to serial COM1 (IN) of cMT-G03 and connect the existing controller to serial COM2 (OUT) of cMT-G03. This architecture can ensure the communication between the HMI and the controller is not affected. The Ethernet port of cMT-G03 is communication port used for IIoT communication.

Equipment & software:

1. HMI
2. Hitachi P1 VFD
3. cMT-G03

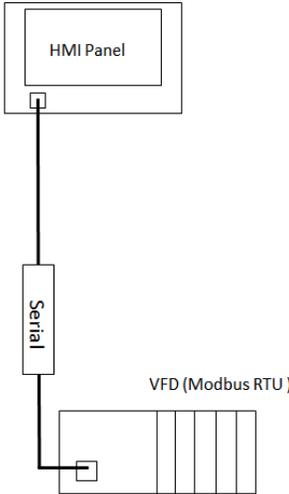
Note: Easybuilder pro version 6.01.02 and greater supports cMT-G03.

cMT-G03 with OPC UA Server

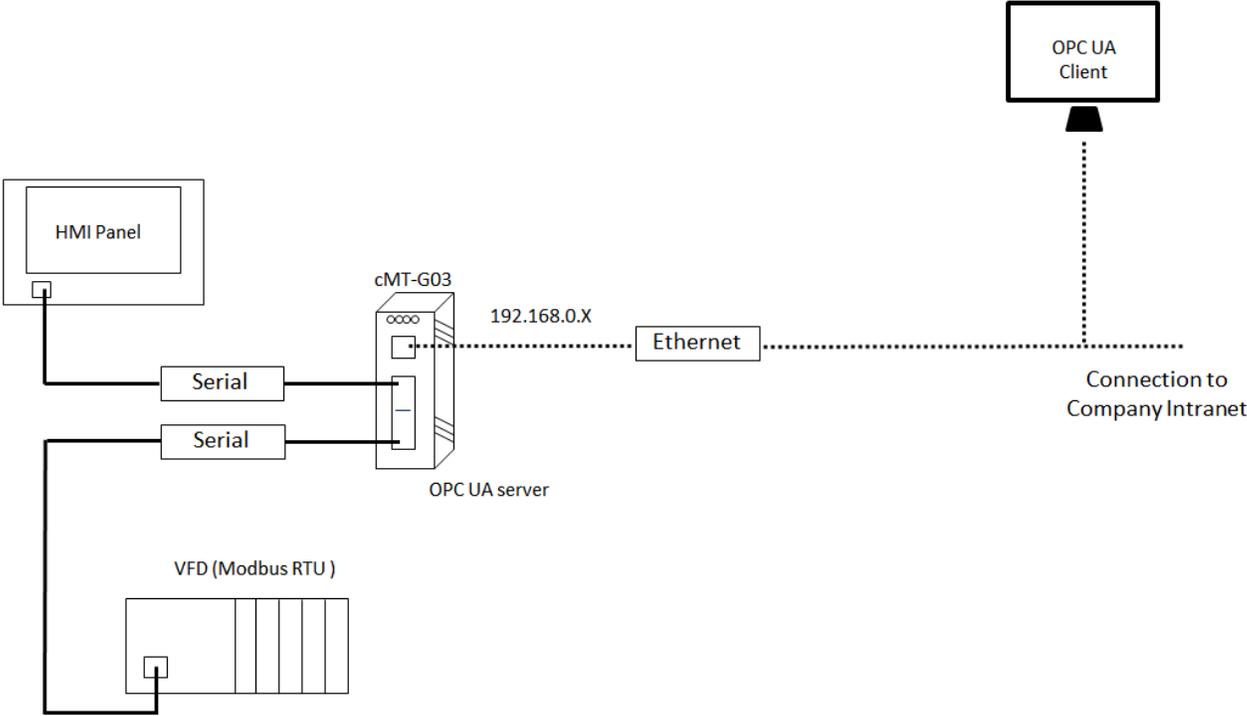
Wiring diagram:

Before configuration-

The HMI communicates with the VFD via Modbus RTU protocol.



After configuration-

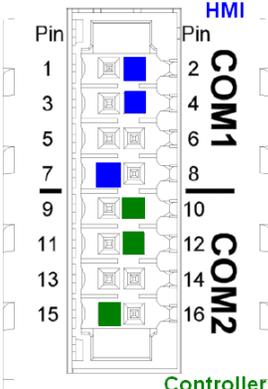


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Hardware configuration:

Serial ports of cMT-G03 -

In this demonstration, RS-485 2W is used in the serial communication between the HMI and the VFD.

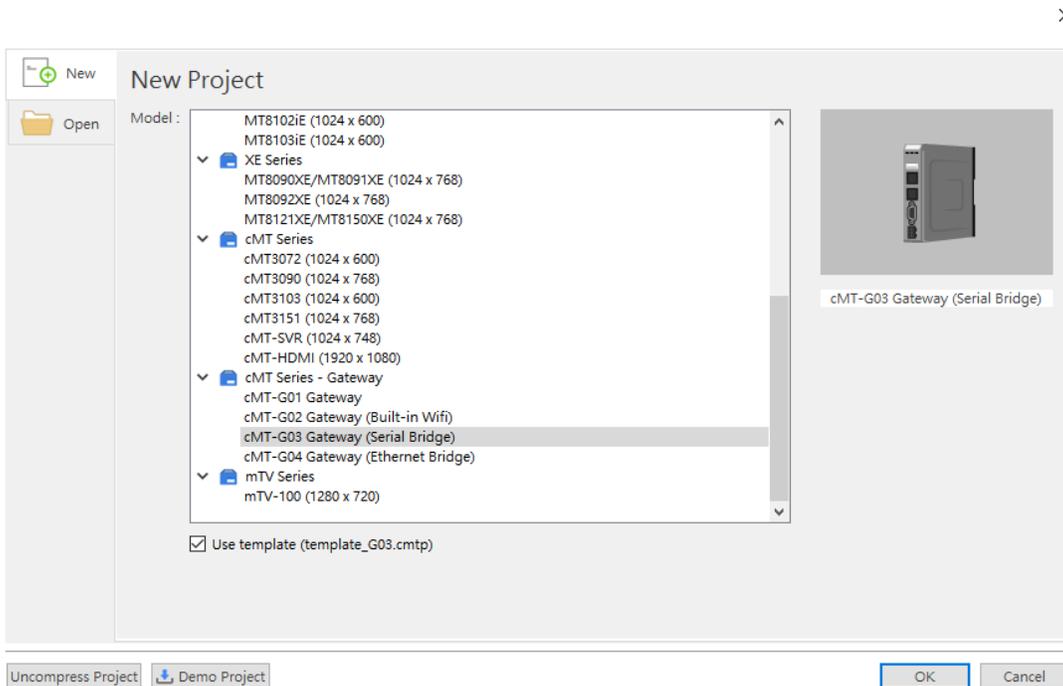


**COM1 [RS232-2W;RS-485-2W/4W],
COM2 [RS232-2W;RS-485-2W/4W]**

PIN#	COM1 [RS232] 2W	COM2 [RS232] 2W	PIN#	COM1 [RS485]		COM2 [RS485]	
				4W	2W	4W	2W
1	RXD1		2	Rx1-	Data1-		
3	TXD1		4	Rx1+	Data1		
5	FG		6	Tx1-			
7	GND		8	Tx1+			
9		RXD2	10			Rx2-	Data2-
11		TXD2	12			Rx2+	Data2+
13		FG	14			Tx2-	
15		GND	16			Tx2+	

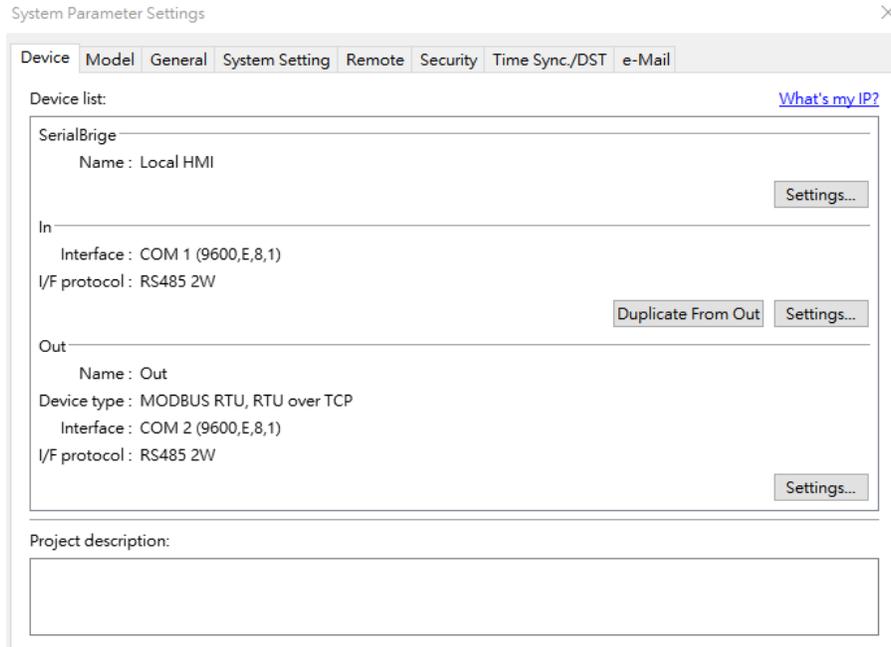
Software configuration:

Launch Easybuilder pro and select the cMT-G03 Gateway(Serial Bridge).



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The popup window will be displayed as shown, the window will prompt you to configure the communication parameters of the IN(HMI) and Out(PLC).



Click on [Settings] within [Out].

[Name]: Enter a name of the controller and HMI.

[Device type]: Select this driver “Modbus RTU, RTU over TCP” for the communication of the VFD.

[I/F]: Select **RS-485 2W**.

[COM]: The settings are the same as the parameters that I set up on the VFD.

Click [OK] to exit.

cMT-G03 with OPC UA Server

Device Settings

Name : Hitachi VFD with Profbox HMI

Device

Location : Local Settings...

* Select Local for a device connected to this HMI, or Remote for a device connected through another HMI.

Device type : MODBUS RTU, RTU over TCP

Device ID : 4, V, 3.40, MODBUS_RTU.e30

I/F : RS-485 2W [Open Device Connection Guide...](#)

* Support off-line simulation on HMI (use LB-12358)

* Support communications between HMI and device in pass-through mode

* Set LW-9903 to 2 to enhance the speed of download/upload device program in pass-through mode

COM : COM2 (9600,N,8,1) Settings...

Device default station no. : 1

Default station no. use station no. variable

Use broadcast command

[How to designate the station no. in object's address?...](#)

Interval of block pack (words) : 5 Address Range Limit...

Max. read-command size (words) : 120 Data Conversion...

Max. write-command size (words) : 120

OK Cancel

Click on [Settings] within [Serial Bridge] and enter a name on the popup window.

Click on [Duplicate From Out] to the communication parameters of the HMI.

System Parameter Settings

Device Model General System Setting Remote Security Time Sync./DST e-Mail

Device list: [What's my IP?](#)

SerialBrige

Name : Weintek cMT-G03

Settings...

In

Interface : COM 1 (9600,N,8,1)

I/F protocol : RS485 2W

Duplicate From Out Settings...

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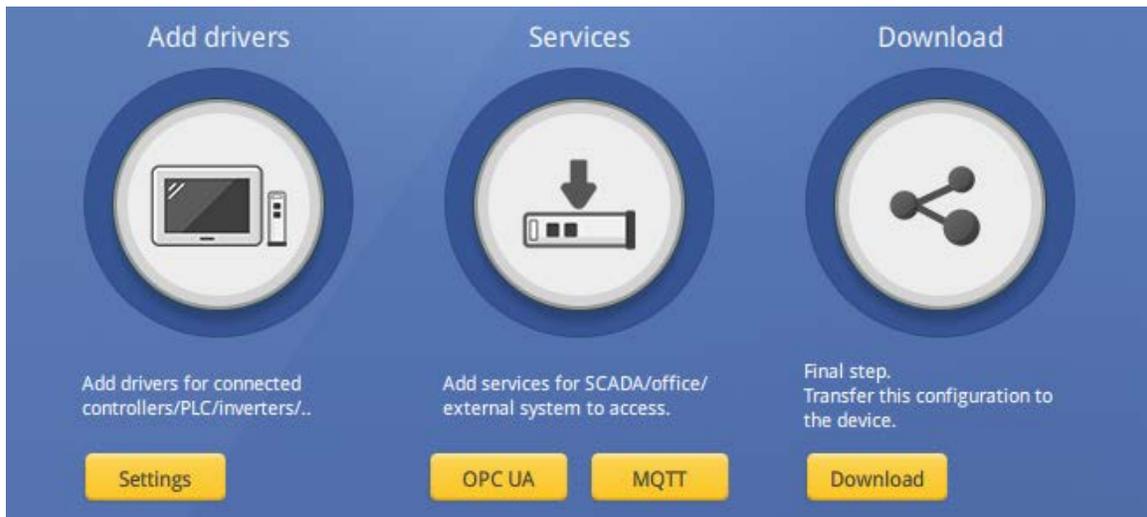
Click [OK] to close [System Parameter Settings].

You can see the three main steps on the main screen to complete this project.

Step 1. Add a driver into Device List in the project. **(This step is completed)**

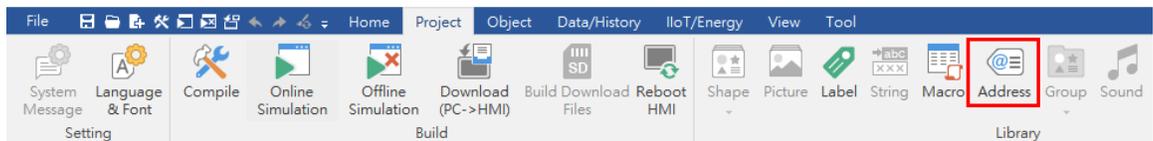
Step 2. Enable OPC UA Server and designate PLC addresses .

Step 3. Download this project to cMT-G03.



Before starting Step 2., I suggest defining the tags in **Address Tag Library**. It not only avoids accidental reuse of addresses but also improves project readability. Let me show you how to build and use **Address Tag Library**.

Click [Project] » [Address] on the toolbar and the [Address Tag Library] dialog box appears.



Click [New] button to add a tag.

cMT-G03 with OPC UA Server

No.	Tag name	PLC name	Address	T. Conversion	Data format
1	UAC command execution result : succeeds	Local HMI	PLW_BH-895100	B.	
2	UAC command execution result : invalid command	Local HMI	PLW_BH-895101	B.	
3	UAC command execution result : account exists	Local HMI	PLW_BH-895102	B.	
4	UAC command execution result : account not exists	Local HMI	PLW_BH-895103	B.	
5	UAC command execution result : password error	Local HMI	PLW_BH-895104	B.	
6	UAC command execution result : deny command	Local HMI	PLW_BH-895105	B.	
7	UAC command execution result : invalid name	Local HMI	PLW_BH-895106	B.	
8	UAC command execution result : invalid password	Local HMI	PLW_BH-895107	B.	
9	UAC command execution result : invalid import data	Local HMI	PLW_BH-895108	B.	
10	UAC command execution result : out of validity range	Local HMI	PLW_BH-895109	B.	
11	UAC privilege (Class A)	Local HMI	PLW_BH-895300	B.	
12	UAC privilege (Class B)	Local HMI	PLW_BH-895301	B.	
13	UAC privilege (Class C)	Local HMI	PLW_BH-895302	B.	
14	UAC privilege (Class D)	Local HMI	PLW_BH-895303	B.	
15	UAC privilege (Class E)	Local HMI	PLW_BH-895304	B.	
16	UAC privilege (Class F)	Local HMI	PLW_BH-895305	B.	
17	UAC privilege (Class G)	Local HMI	PLW_BH-895306	B.	
18	UAC privilege (Class H)	Local HMI	PLW_BH-895307	B.	
19	UAC privilege (Class I)	Local HMI	PLW_BH-895308	B.	
20	UAC privilege (Class J)	Local HMI	PLW_BH-895309	B.	
21	UAC privilege (Class K)	Local HMI	PLW_BH-895310	B.	
22	UAC privilege (Class L)	Local HMI	PLW_BH-895311	B.	
23	UAC command	Local HMI	PLW-8950	W. Disable	Undesignated
24	UAC command execution result	Local HMI	PLW-8951	W. Disable	Undesignated

[Name]: Enter a name according to the VFD reference manual.

[Address type] and [Address]: Enter **Modbus function code** and a **Modbus register**.

[Conversion/ Calculation]: Scale the value of the Modbus register. This tool can adjust the number of digits via **macro subroutine**.

Address Tags

Comment :

Name : Main speed (Hz)

Address

Device : Hitachi VFD with Profxxx HMI

Address mode : Bit Word

Address type : 4x Original format : 16-bit Unsigned

Address : 11001

Address format : DDDDD [range : 1 ~ 65535]

Conversion/Calculation (use macro subroutine)

Enable

Data format : 16-bit Unsigned

Read conversion : main_speed

Write conversion : None (Only data type conversion)

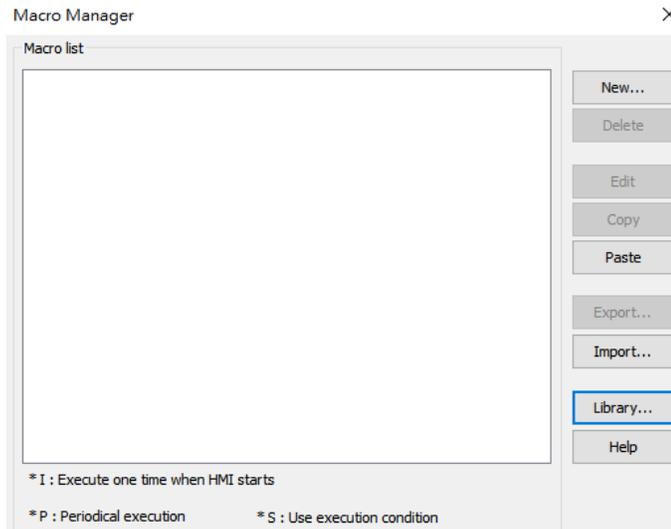
Array

OK Cancel

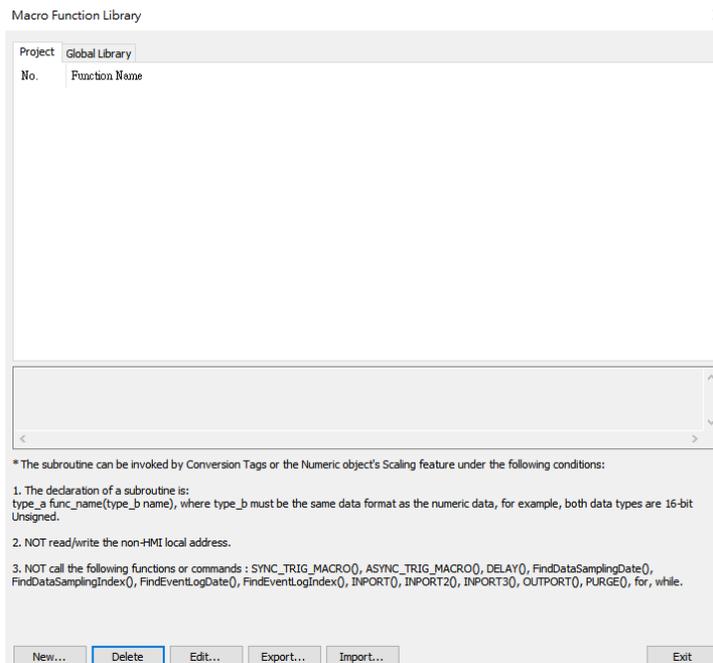
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Macro subroutine configuration -

Creating a macro subroutine to convert read data, go to [Project] » [Macro] on the toolbar. This window will be displayed as shown. Click on [Library].



Click on [New] to create a macro function.

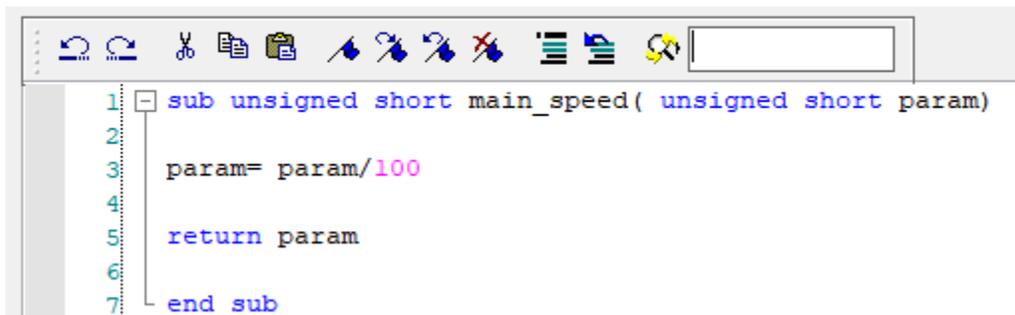


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To adjust the number of the digits for Main speed command according to the VFD reference manual, write the following scripts on [Function Editor]. Click on [Compile] and [Save].

Register No. (Decimal)	Function Name	Monitor Content and Setting Item	Data Resolution/Unit
11001	Main speed command (monitor +setting)	0 - 59000	0.01HZ

Function Editor



```
1 sub unsigned short main_speed( unsigned short param)
2
3   param= param/100
4
5   return param
6
7 end sub
```

For more information, please refer the sections of Easybuilder pro user manual.

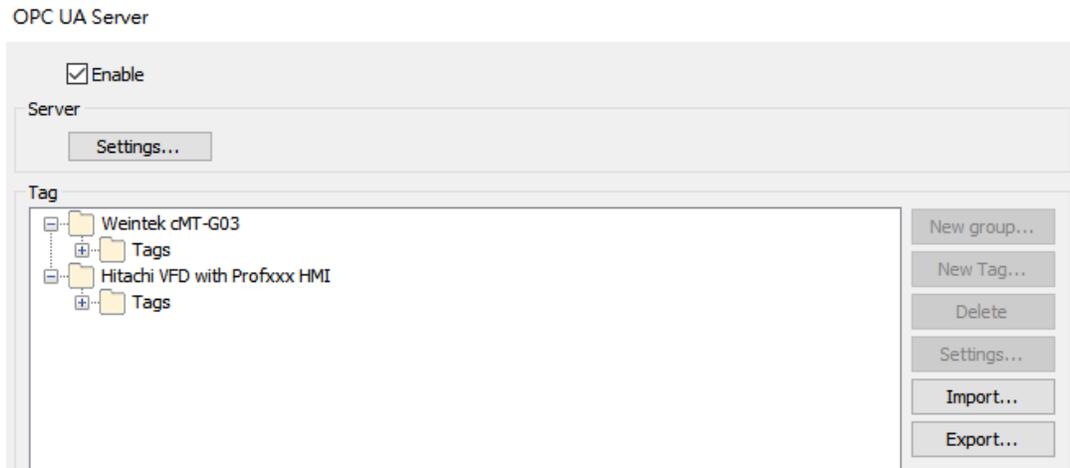
18.9.2. How to Use Macro Function Library

16.2. Building Address Tag Library

Step2. -

Click [OPC UA] button on the main screen or go to [IIoT/Energy] » [OPC UA Server] on the toolbar, and check [Enable] checkbox to enable OPC UA server.

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Click [Tags] within [Hitachi VFD..](Controller name) and then click [New Tag] to add OPC UA tags.

For example, add a tag for Main speed command.

[Name]: Enter **Function name + unit**

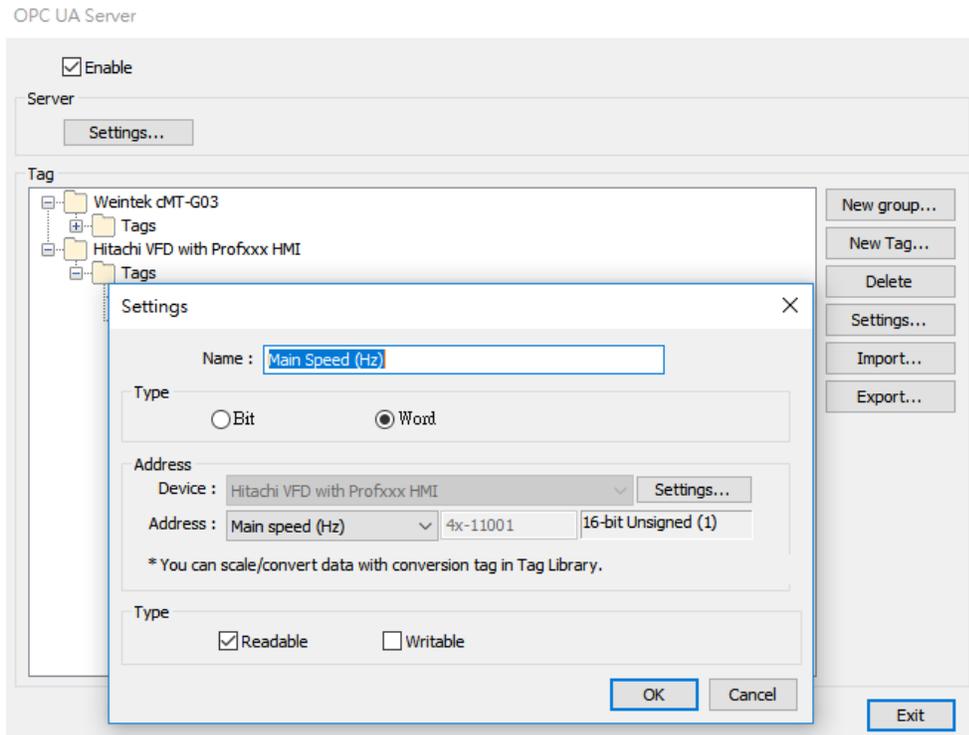
[Type]: Data type is **Word**.

[Address]: Enter **Modbus function code + register number (Decimal)** or choose a user-defined tag from [Settings] » [User-defined tag].

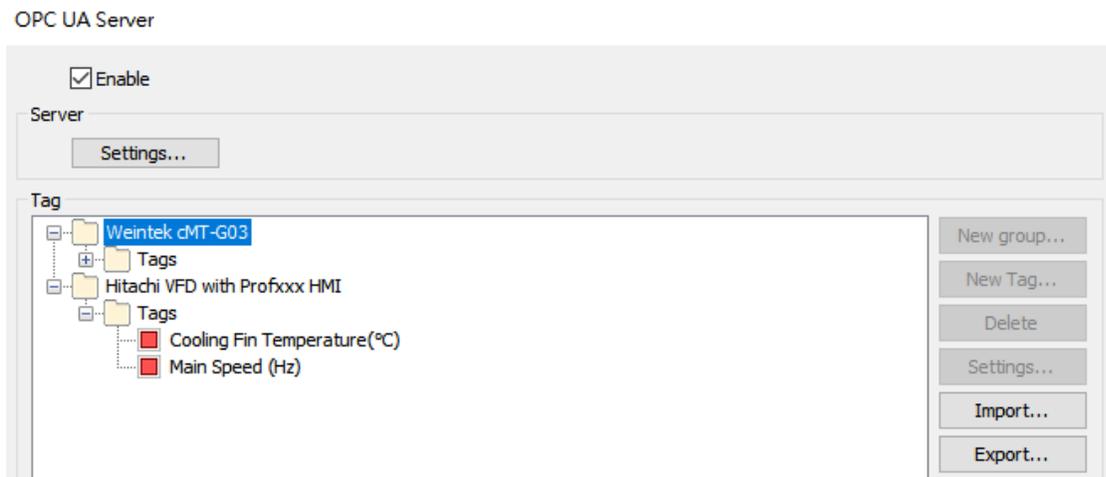
[Type]: data is readable and writable.

Click [OK] to exit.

cMT-G03 with OPC UA Server



The window as shown includes all tags created in the OPC UA server.



Step3. -

Connect the **LAN** port of the cMT-G03 and the PC to a router with an Ethernet cable. Click [Download] button on the main screen or go to [Project] » [Download] on the toolbar. You can find the cMT-G03 by clicking [Search and Change IP].

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Download (PC->HMI) ✕

Ethernet Password/Port no. of download/upload : [Settings...](#)

◀ IP HMI Name ▶

HMI : cMT-9956

Search

Search All

Search and Change IP

Runtime *Necessary if update runtime or execute download first time. [What's my IP?](#)

Reset recipe (RW, RW_A) Reset event log Reset data sampling

Automatically using current settings to download after compiling

Download Stop Exit

In this window, you can choose DHCP or Static IP for the cMT-G03 according to your Intranet. Click on [Apply] to complete.

Search and Change IP ✕

HMI Name	IP	HMI Model	Ma
▶ cMT-0AAB	192.168.0.144	cMT-G03 Ga...	00t

Refresh

DHCP : On Off

IP : 192 . 168 . 0 . 144

Subnet mask : 255 . 255 . 255 . 0

Password : ●●●●●●

Blink LED Apply

Exit

cMT-G03 with OPC UA Server

Choose the cMT-G03 and click [Download].

Download (PC->HMI)

Ethernet Password/Port no. of download/upload : Settings...

IP HMI Name

HMI : cMT-0AAB

192.168.0.144 (cMT-0AAB)

Search
Search All
Search and Change IP

Runtime * Necessary if update runtime or execute download first time. [What's my IP?](#)

Reset recipe (RW, RW_A) Reset event log Reset data sampling

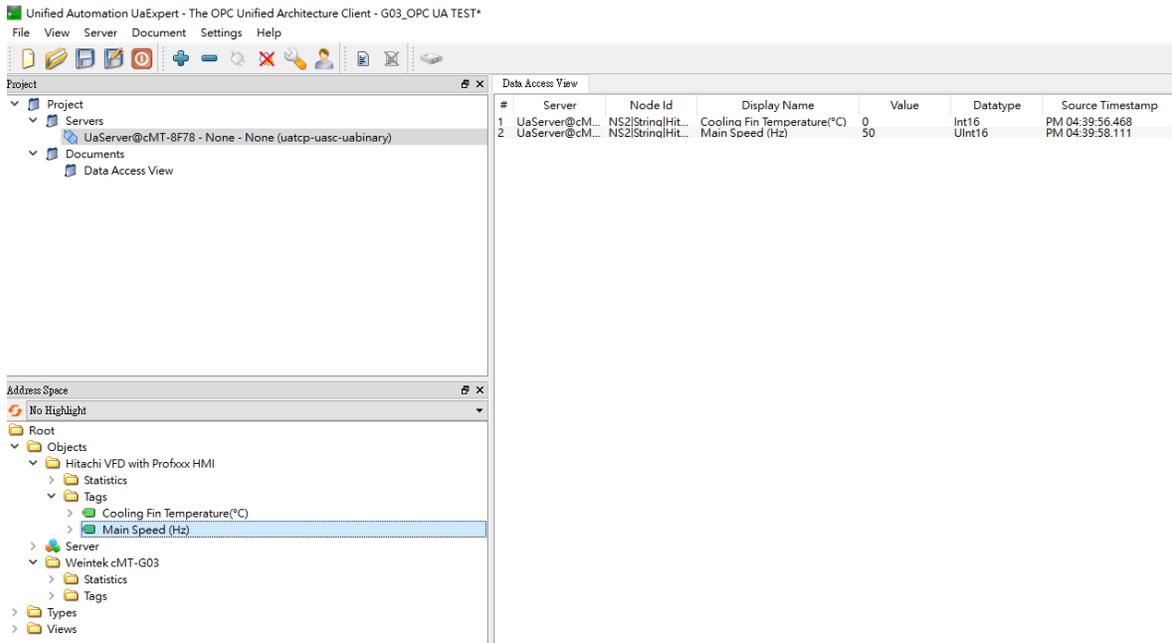
Automatically using current settings to download after compiling

Download Stop Exit

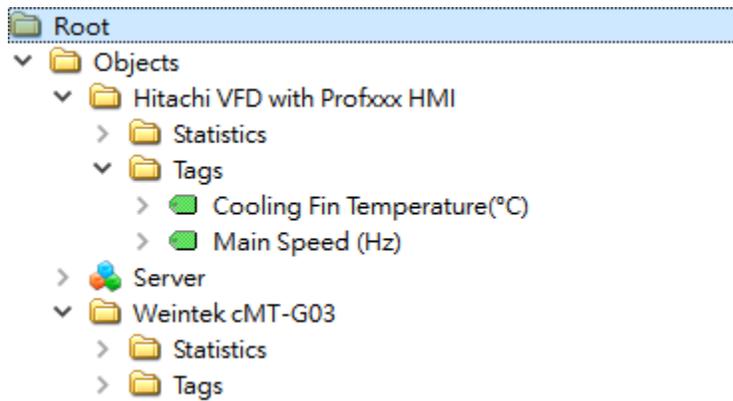
Testing:

After downloading the project file, launch the OPC UA client software UAExpert on a PC to monitor OPC UA tags data.

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You can drag and drop tags configured in the OPC UA server to [Data Access View].



The data will be displayed as shown.

#	Server	Node Id	Display Name	Value	Datatype	Source Timestamp
1	UaServer@cM...	NS2 String Hit...	Cooling Fin Temperature(°C)	0	Int16	PM 04:28:00.282
2	UaServer@cM...	NS2 String Hit...	Main Speed (Hz)	50	UInt16	PM 04:28:01.899

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Reference Link:

Weintek Labs website: <http://www.weintek.com>



Founded in 1996, WEINTEK LABS is a global-leading HMI manufacturer and is dedicated to the development, design, and manufacturing of practical HMI solutions. WEINTEK LAB's mission is to provide quality, customizable HMI-solutions that meet the needs of all industrial automation requirements while maintaining customer satisfaction by providing "on-demand" customer service. WEINTEK LABS brought their innovative technology to the United States in 2016, WEINTEK USA, INC., to provide quality and expedient solutions to the North American industrial market.

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