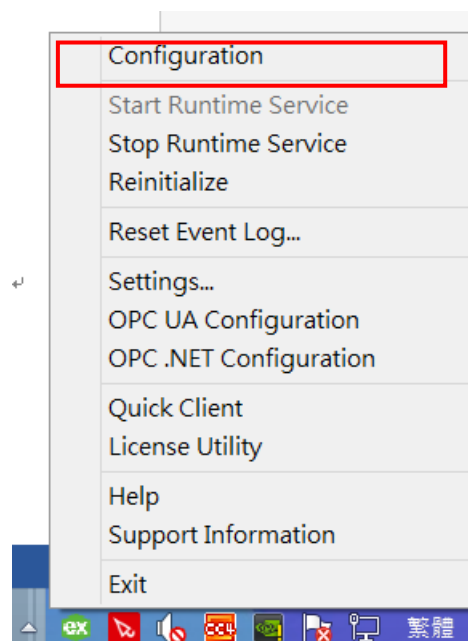
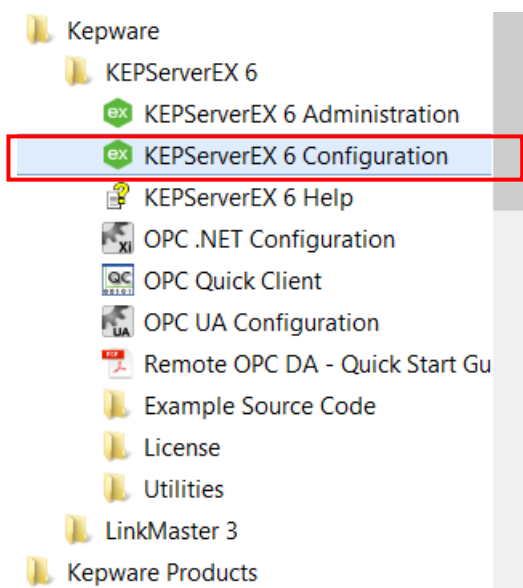
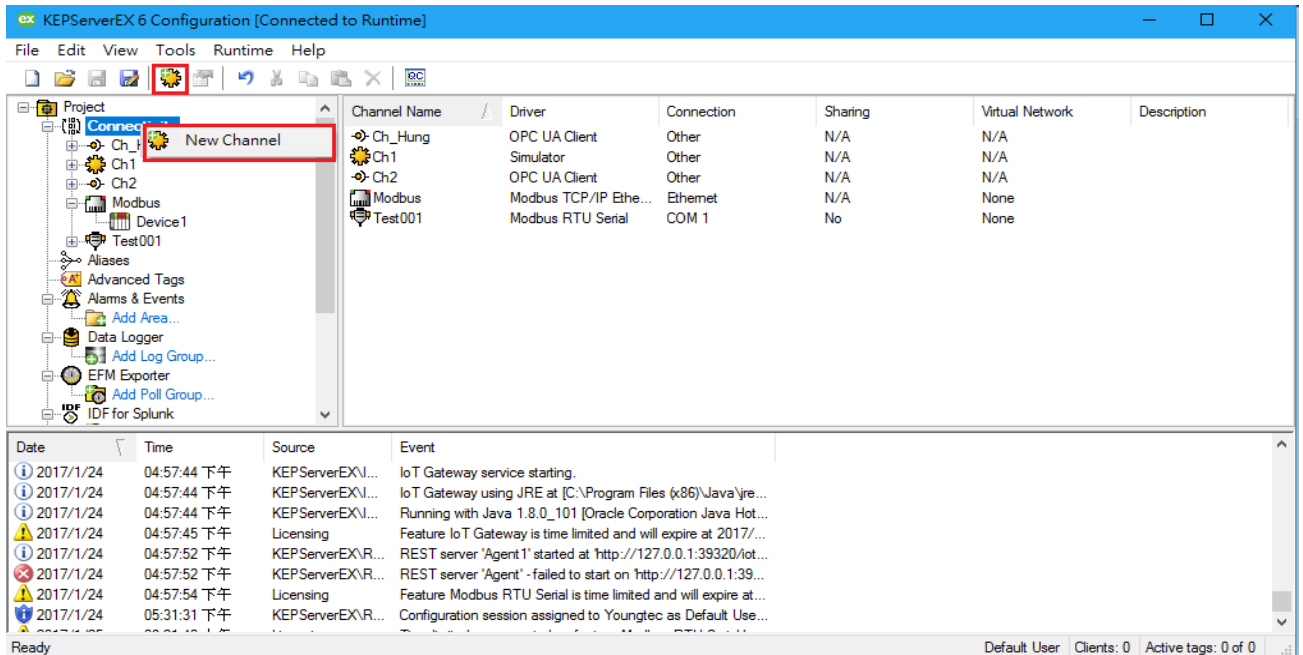


KEPServerEX 6 – Modbus RTU Serial 使用說明

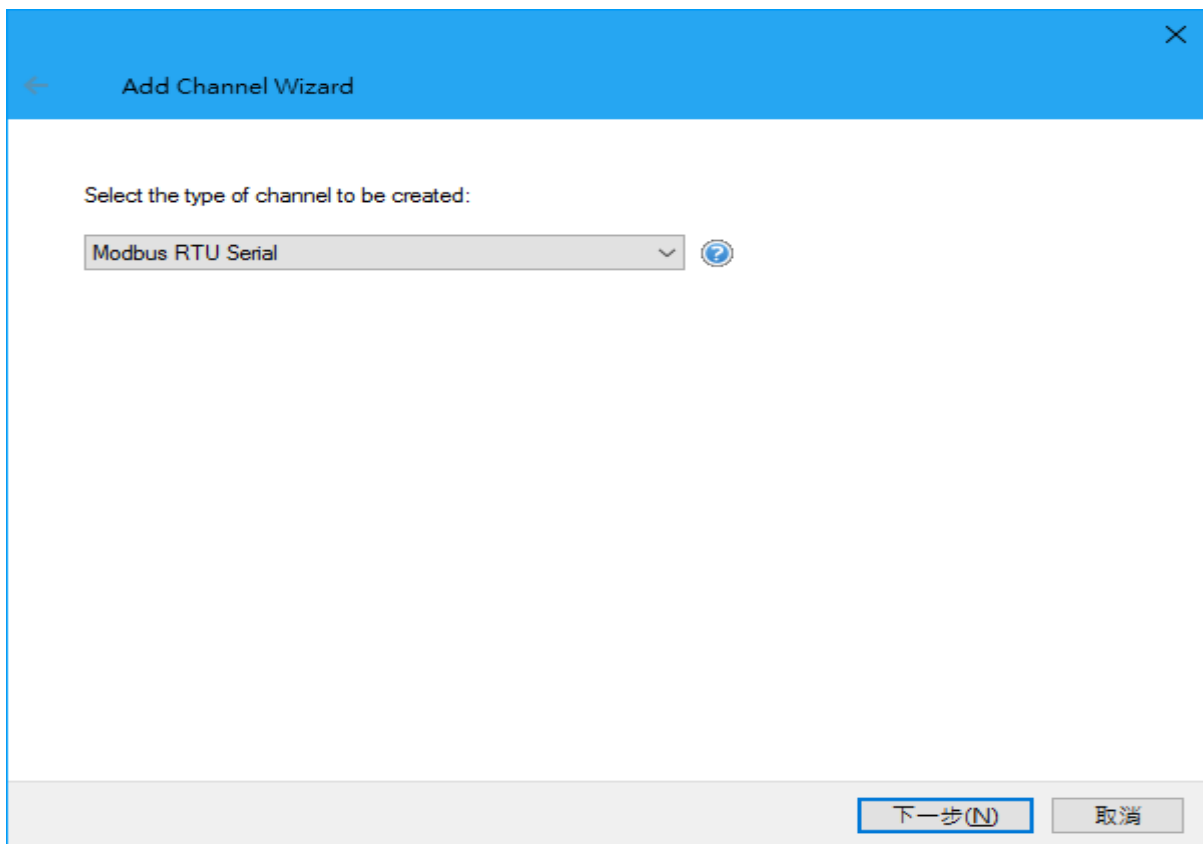
1. 安裝 Kepware(最新版本 KEPServerEX V6，可從 Youngtec 研杰科技網站下載試用版)，然後在開始→程式集→開啟 KEPServerEX 6 Configuration 或是從桌面右下方的 System Tray 圖示中 KEPServerEX 6 小圖示按滑鼠右鍵，點選 Configuration。



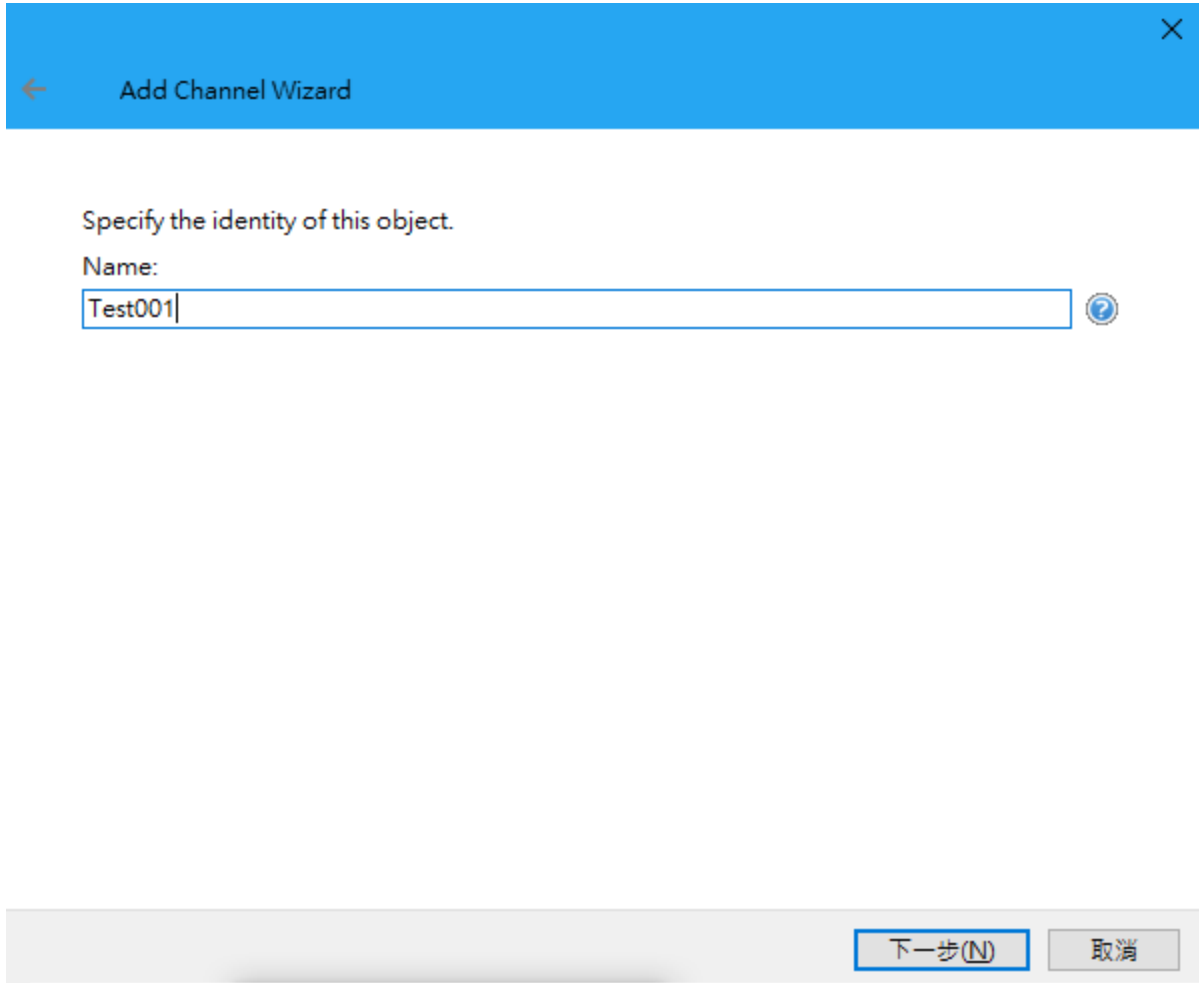
2. 首先，再左邊的 Project 群組的頁面對 Connectivity 點擊滑鼠右鍵，選取 New Channel、工具列上的 、或是 Connectivity 類別裡點擊滑鼠右鍵來新增 Channel。



3. 選擇 type of channel 為 Modbus RTU Serial。



4. 輸入 Channel Name，「Channel1」可自行定義名稱，然後按「下一步」。



A screenshot of a software dialog box titled "Add Channel Wizard". The dialog has a blue header bar with a back arrow icon and a close button (X). Below the header, the text "Specify the identity of this object." is displayed. Underneath, the label "Name:" is followed by a text input field containing "Test001". To the right of the input field is a help icon (question mark in a circle). At the bottom right of the dialog, there are two buttons: "下一步(N)" (Next) and "取消" (Cancel).

5. 設定通訊序列化，底下為選項說明，使用預設的設定即可：

Virtual Network：此參數指定通訊序列化的頻道(Channel)模式。

選項包括 None，Network 1 - Network 50。默認設置為“None”。

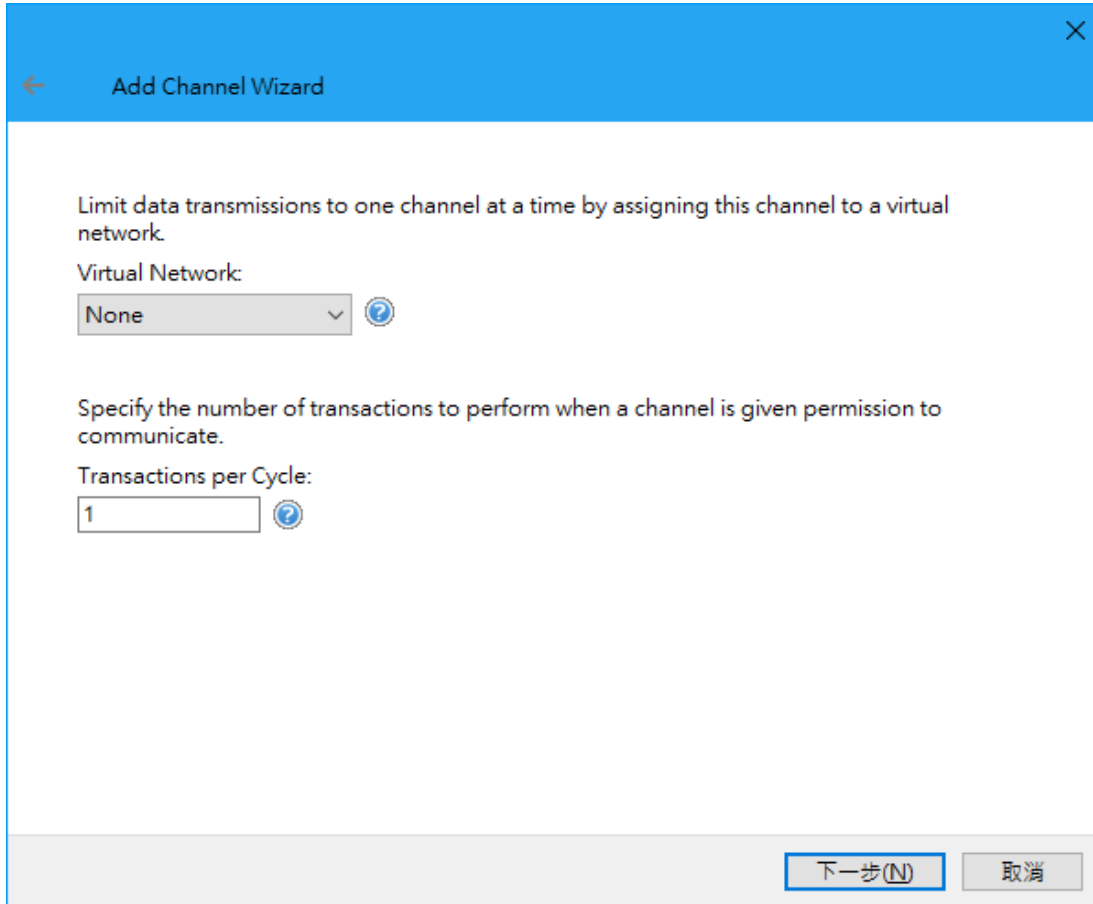
選項說明如下：

None：此選項為停用通訊序列化的通道。

Network 1 - Network 50：此選項會對指定的虛擬網路頻道進行分配。

Transactions per Cycle：當 channel 被設為允許連線時，執行 Transactions

註：有關虛擬網絡的更多信息，請參閱 Help — “Communication Serialization”。



The image shows a screenshot of the 'Add Channel Wizard' dialog box. The title bar is blue with a back arrow and the text 'Add Channel Wizard'. The main area is white and contains the following text and controls:

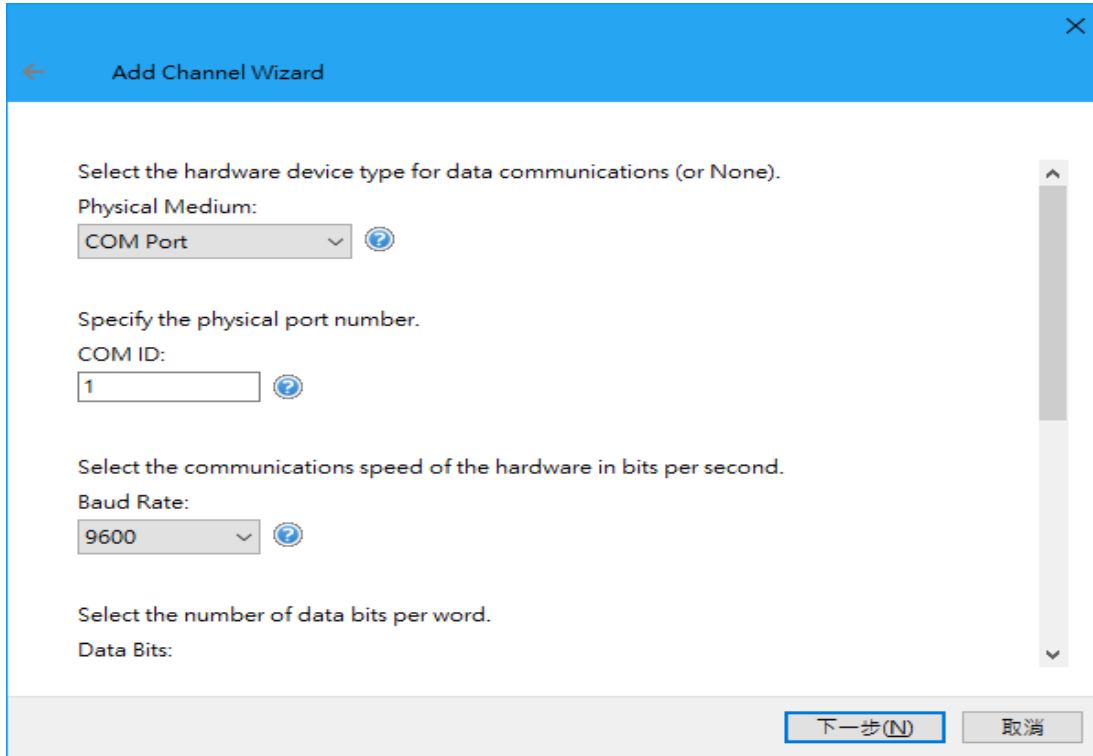
- Limit data transmissions to one channel at a time by assigning this channel to a virtual network.
- Virtual Network: A dropdown menu showing 'None' with a question mark icon to its right.
- Specify the number of transactions to perform when a channel is given permission to communicate.
- Transactions per Cycle: A text input field containing the number '1' with a question mark icon to its right.

At the bottom right, there are two buttons: '下一步(N)' (Next) and '取消' (Cancel).

6. 設定通訊形態以及通訊埠設定(Communications)，請參考 PLC 上的參數來設定。

底下為選項說明：

(欲了解更多，請參閱：KEPServerEX Help 文件中的 Channel Properties - Communications)。



The image shows the 'Add Channel Wizard' dialog box. It has a blue title bar with a back arrow and a close button. The main area is white and contains the following sections:

- Select the hardware device type for data communications (or None).**
 - Physical Medium:** A dropdown menu showing 'COM Port' with a help icon.
- Specify the physical port number.**
 - COM ID:** A text input field containing '1' with a help icon.
- Select the communications speed of the hardware in bits per second.**
 - Baud Rate:** A dropdown menu showing '9600' with a help icon.
- Select the number of data bits per word.**
 - Data Bits:** A dropdown menu (partially visible).

At the bottom right, there are two buttons: '下一步(N)' (Next) and '取消' (Cancel).

COM ID：指定通訊 ID，會使用在和裝置所分配的 Channel 進行通訊的時候。有效範圍是 1 到 999，預設為 1，現場使用輸入目前本機實際連接的 COM Port。

Baud Rate：指定傳輸速率。

Data Bits：指定資料字元的位元數量。選項包括：5，6，7，8。

Parity：指定的資料的類型。選項包括：”Odd”(奇數)，”Even”(偶數)，或 “None(無)”。

Stop Bits：指定資料資源的停止位元數量。選項包括 1，2。

Flow Control：指定如何使用 RTS 和 DTR control lines。請參考下面的” **Flow Control 說明**”。

Report Comm. Errors：指定開啟或關閉低階(low-level)的通訊錯誤報告。預設為 Yes。

Close idle connection：指定在沒有任何 Tag 被 Client 端引用時，關閉 COM Port。預設為 Yes。

Idle time before close：指定在關閉 COM Port，所有 Tag 被移除之前，Server 等待的時間，預設為 15 秒。

Flow Control 說明：

流量控制，可能需要以與特定的串連設備進行通訊。選項說明如下：

None：不需切換 Control Line。

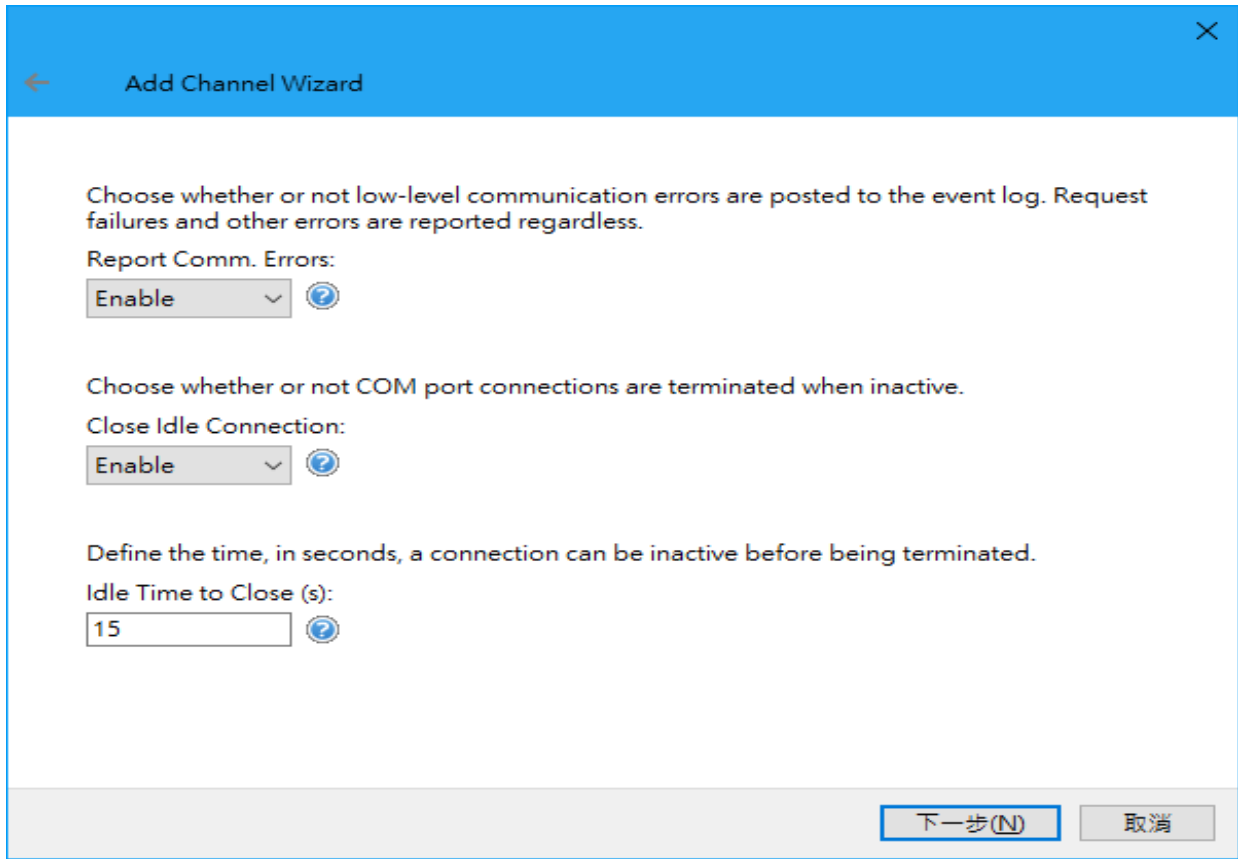
DTR：指定並堅持使用 DTR Line，且維持通訊 Port 的開啟。

RTS：如果位元組可用於傳輸，則 RTS Line 為最高的 Control Line。在所有緩衝的位元組發送之後，RTS Line 會比較低。這通常是使用在 RS232/RS485 轉換器硬體設備。

RTS, DTR：此選項是 DTR 和 RTS 的結合。

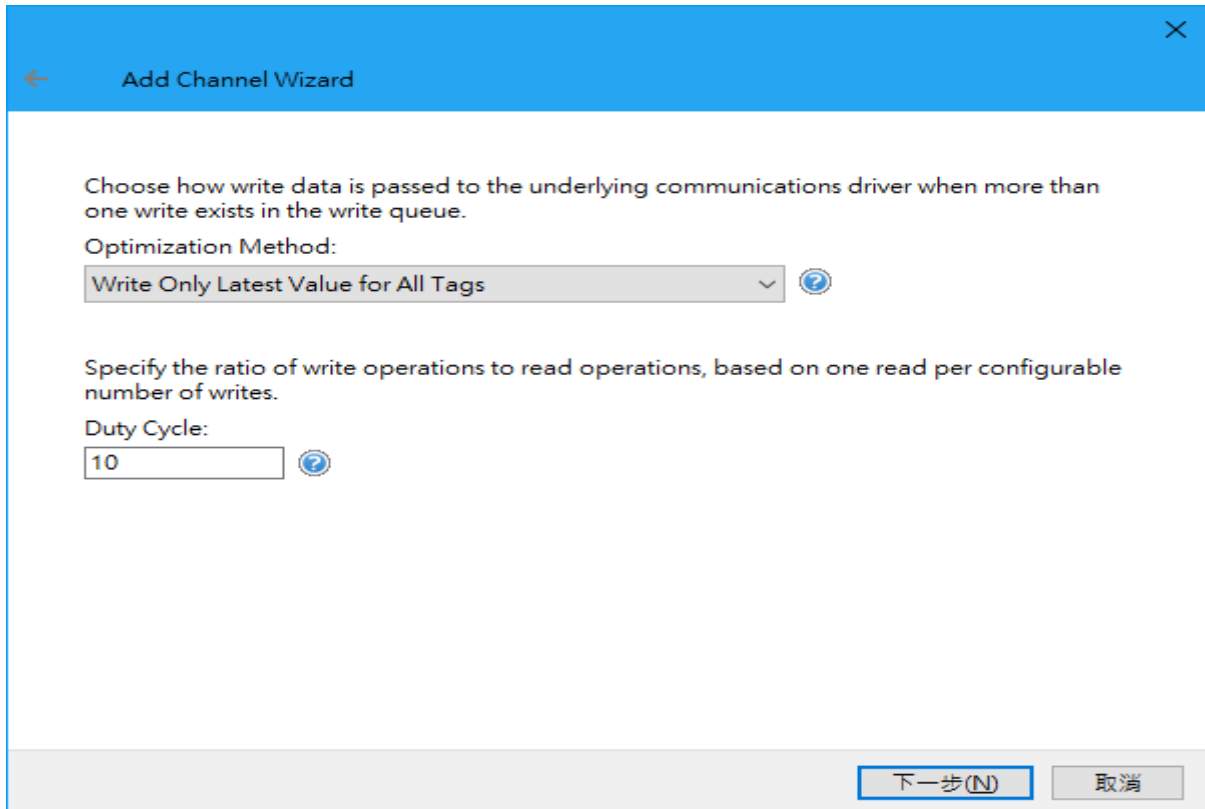
RTS Always：指定並堅持使用 RTS Line，且維持通訊 Port 的開啟。

7. 設定連結方式，回報錯誤訊息(Report Comm.Errors)，關閉閒置的連線(Close Idle Connection)，使用預設的設定即可。



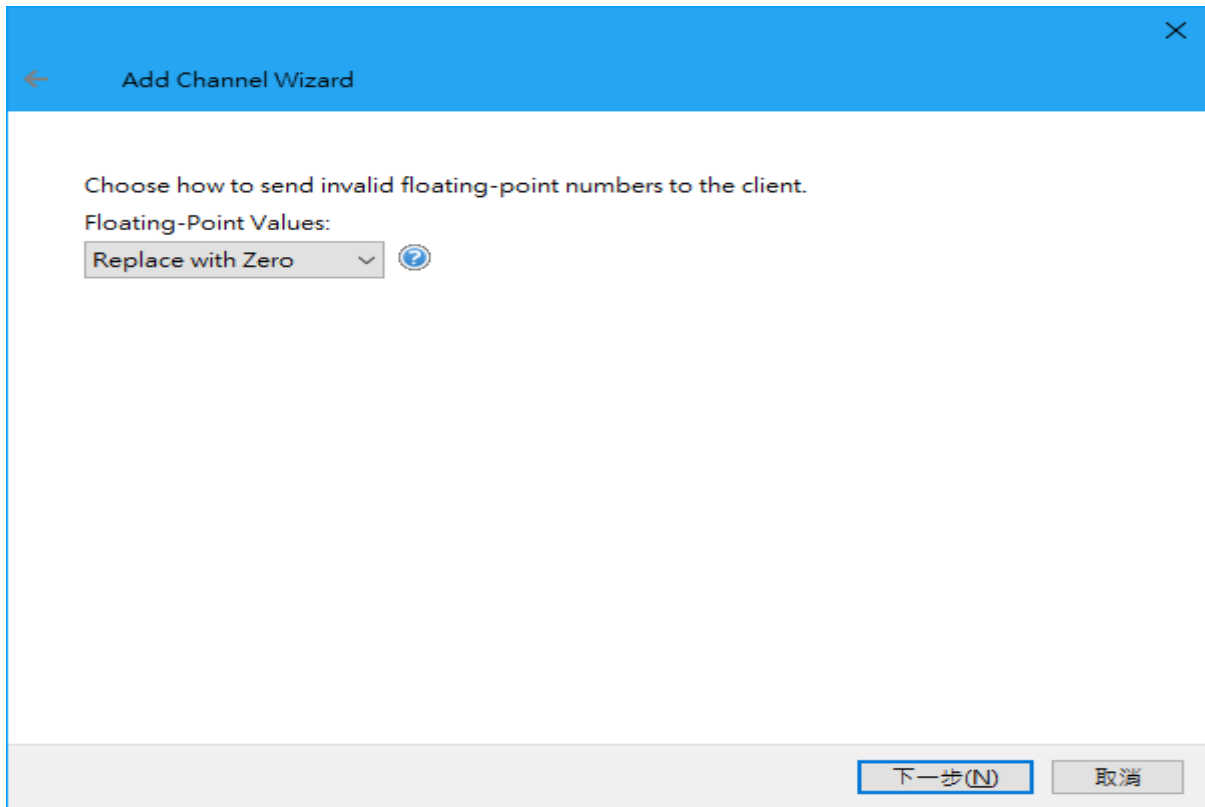
The image shows a screenshot of the 'Add Channel Wizard' dialog box. The title bar is blue with a back arrow and a close button. The main area has a white background. It contains three sections: 1. 'Choose whether or not low-level communication errors are posted to the event log. Request failures and other errors are reported regardless.' with a dropdown menu set to 'Enable' and a help icon. 2. 'Choose whether or not COM port connections are terminated when inactive.' with a dropdown menu set to 'Enable' and a help icon. 3. 'Define the time, in seconds, a connection can be inactive before being terminated.' with a text box containing '15' and a help icon. At the bottom right, there are two buttons: '下一步(N)' (Next) and '取消' (Cancel).

8. 設定寫入最佳化，工作週期(Duty Cycle)利用預設的設定即可。



The image shows a screenshot of the 'Add Channel Wizard' dialog box. The title bar is blue with a back arrow and a close button. The main area has a white background. It contains two sections: 1. 'Choose how write data is passed to the underlying communications driver when more than one write exists in the write queue.' with a dropdown menu set to 'Write Only Latest Value for All Tags' and a help icon. 2. 'Specify the ratio of write operations to read operations, based on one read per configurable number of writes.' with a text box containing '10' and a help icon. At the bottom right, there are two buttons: '下一步(N)' (Next) and '取消' (Cancel).

9. 設定 Floating-Point Values，若選擇 Replaced with zero，當有非正規化浮點數時”更改為 0”，若勾選 Unmodified，當有非正規化浮點數時則”不做更動”，可使用預設 Replaced with zero。



← Add Channel Wizard

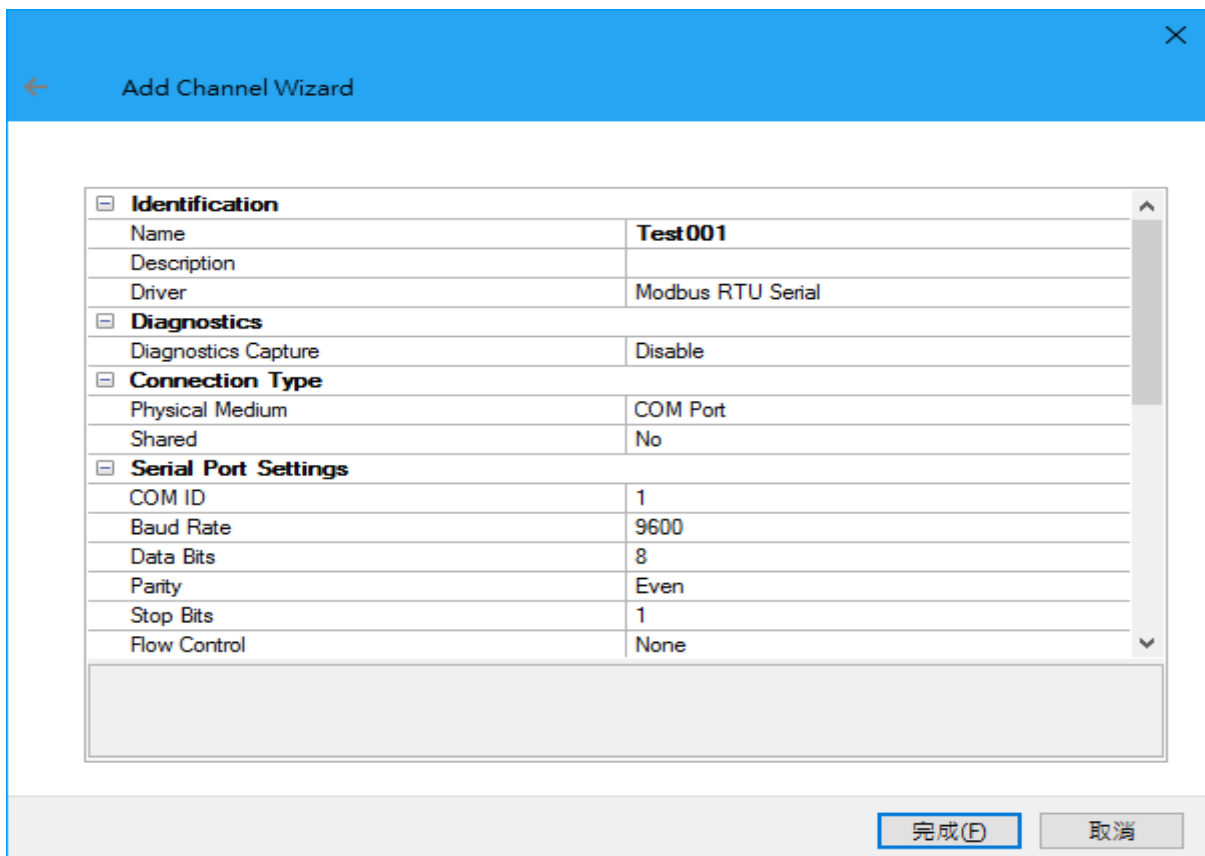
Choose how to send invalid floating-point numbers to the client.

Floating-Point Values:

Replace with Zero 

下一步(N) 取消

10. 檢視設定的總結，如果沒問題請按完成。

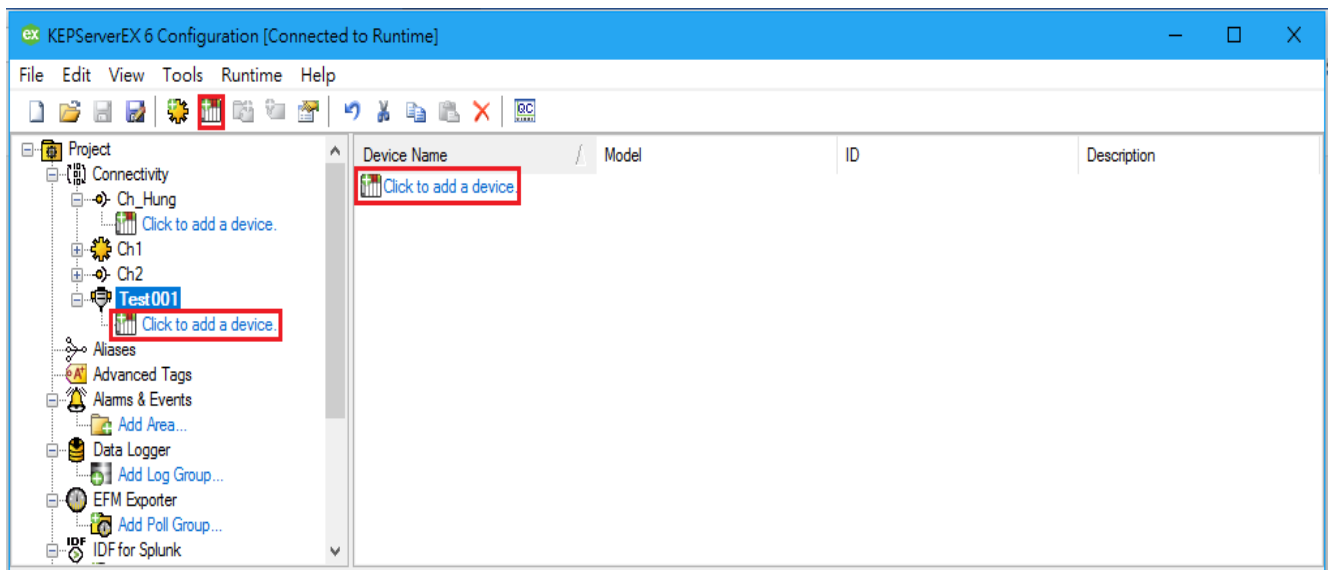


← Add Channel Wizard

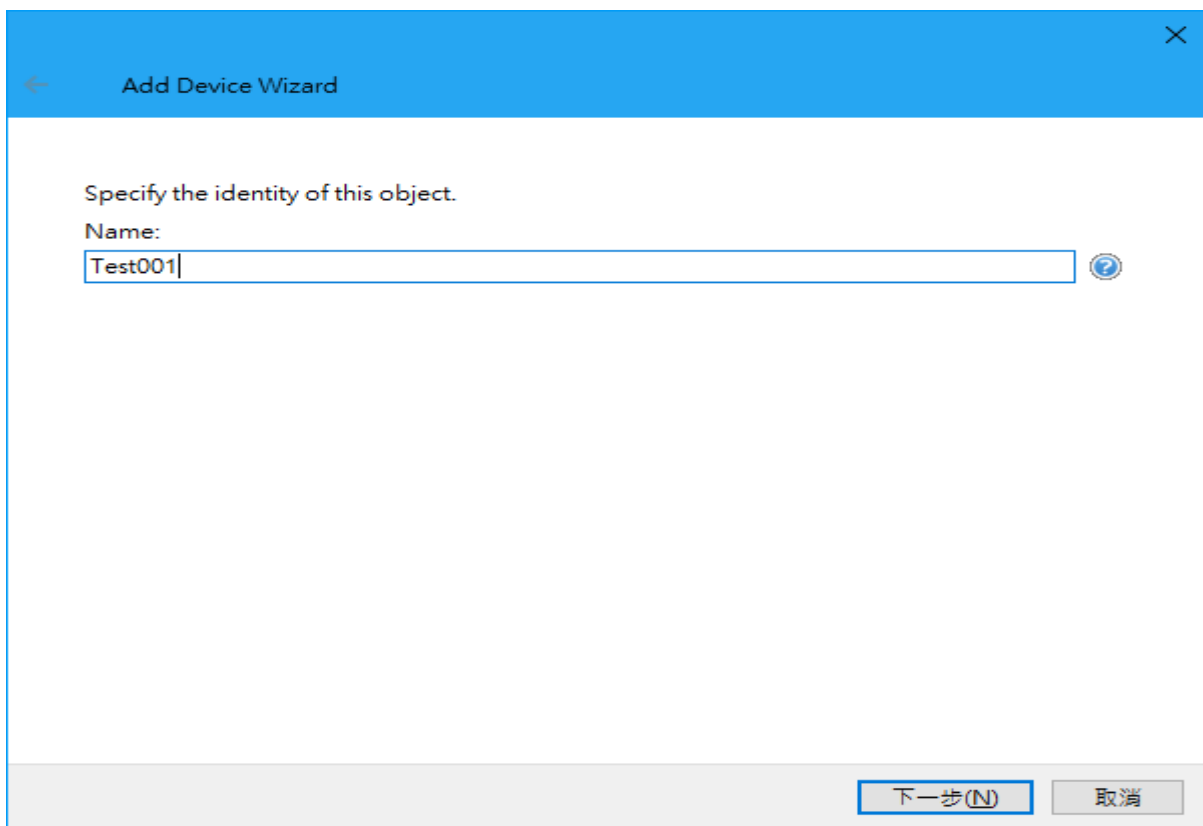
Identification	
Name	Test001
Description	
Driver	Modbus RTU Serial
Diagnostics	
Diagnostics Capture	Disable
Connection Type	
Physical Medium	COM Port
Shared	No
Serial Port Settings	
COM ID	1
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Flow Control	None

完成(F) 取消

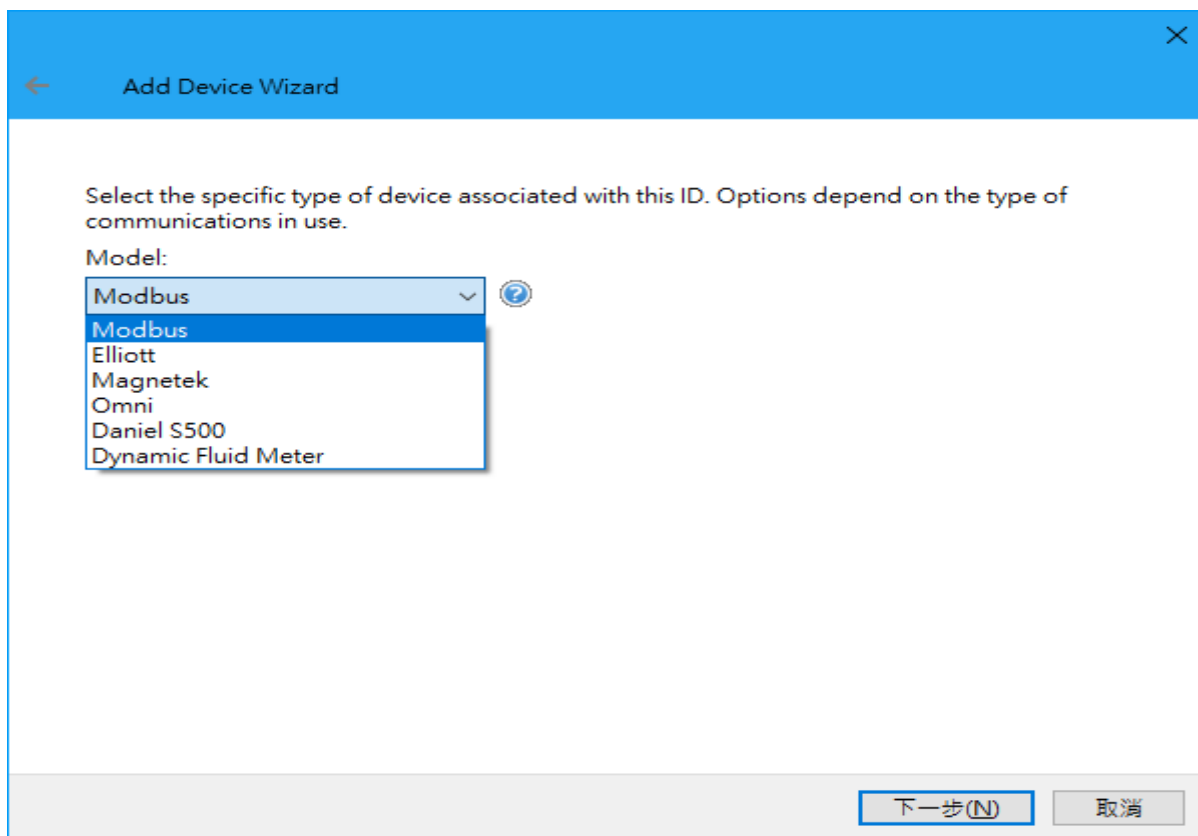
11. 接著開始新增 Device 以及設定 Device，點擊 Click to add a device，在 Channel 裡的 Click to add a device 或是點擊上方的  按鈕來新增 Device。



12. 接著開始設定 Device，新增一個「Device name」，可自行定義。



13. 選擇裝置的種類，在此選擇 Modbus。



← Add Device Wizard

Select the specific type of device associated with this ID. Options depend on the type of communications in use.

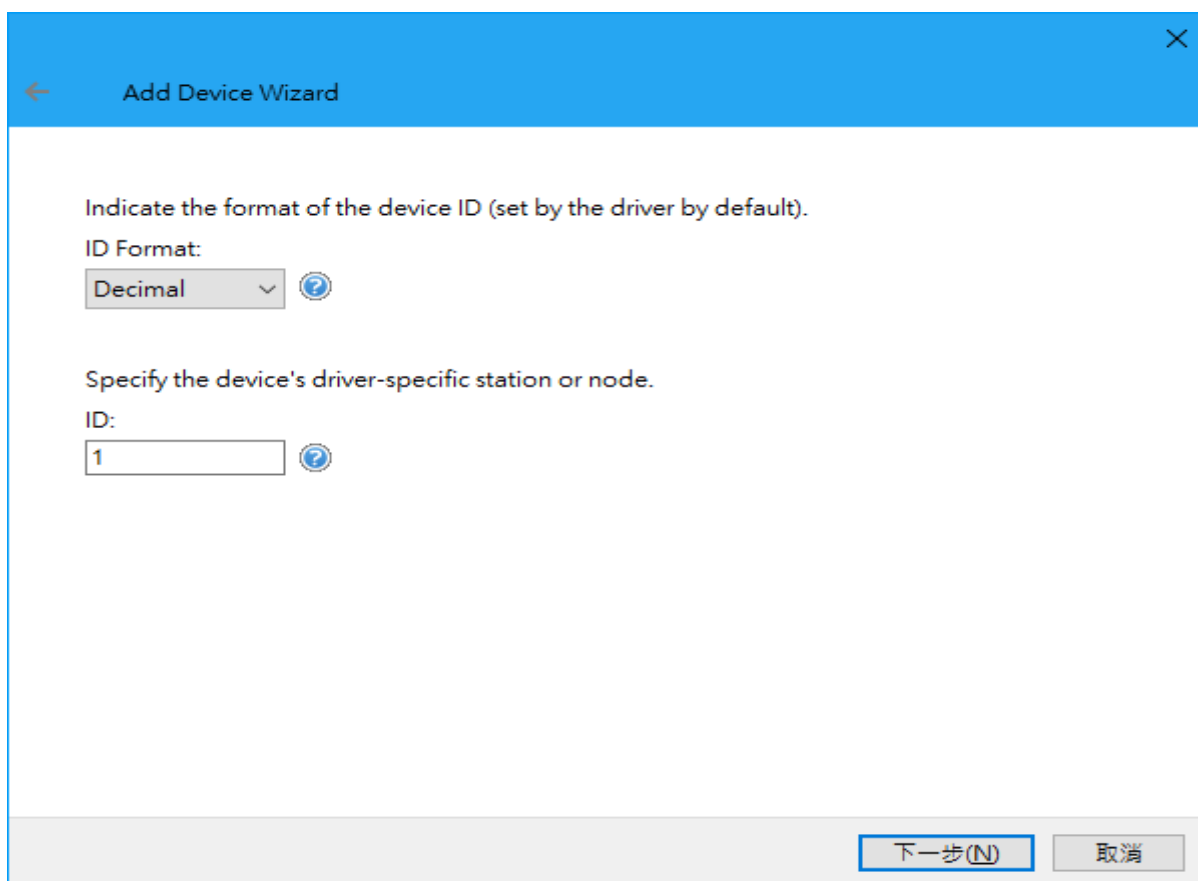
Model:

Modbus

- Modbus
- Elliott
- Magnetek
- Omni
- Daniel S500
- Dynamic Fluid Meter

下一步(N) 取消

14. 設定 ID，利用預設的設定即可。



← Add Device Wizard

Indicate the format of the device ID (set by the driver by default).

ID Format:

Decimal

Specify the device's driver-specific station or node.

ID:

1

下一步(N) 取消

15. 設定掃描模式(Scan Mode)，底下為選項說明：

Respect Client-Specified Scan Rate：遵守客戶端指定的掃描速度。

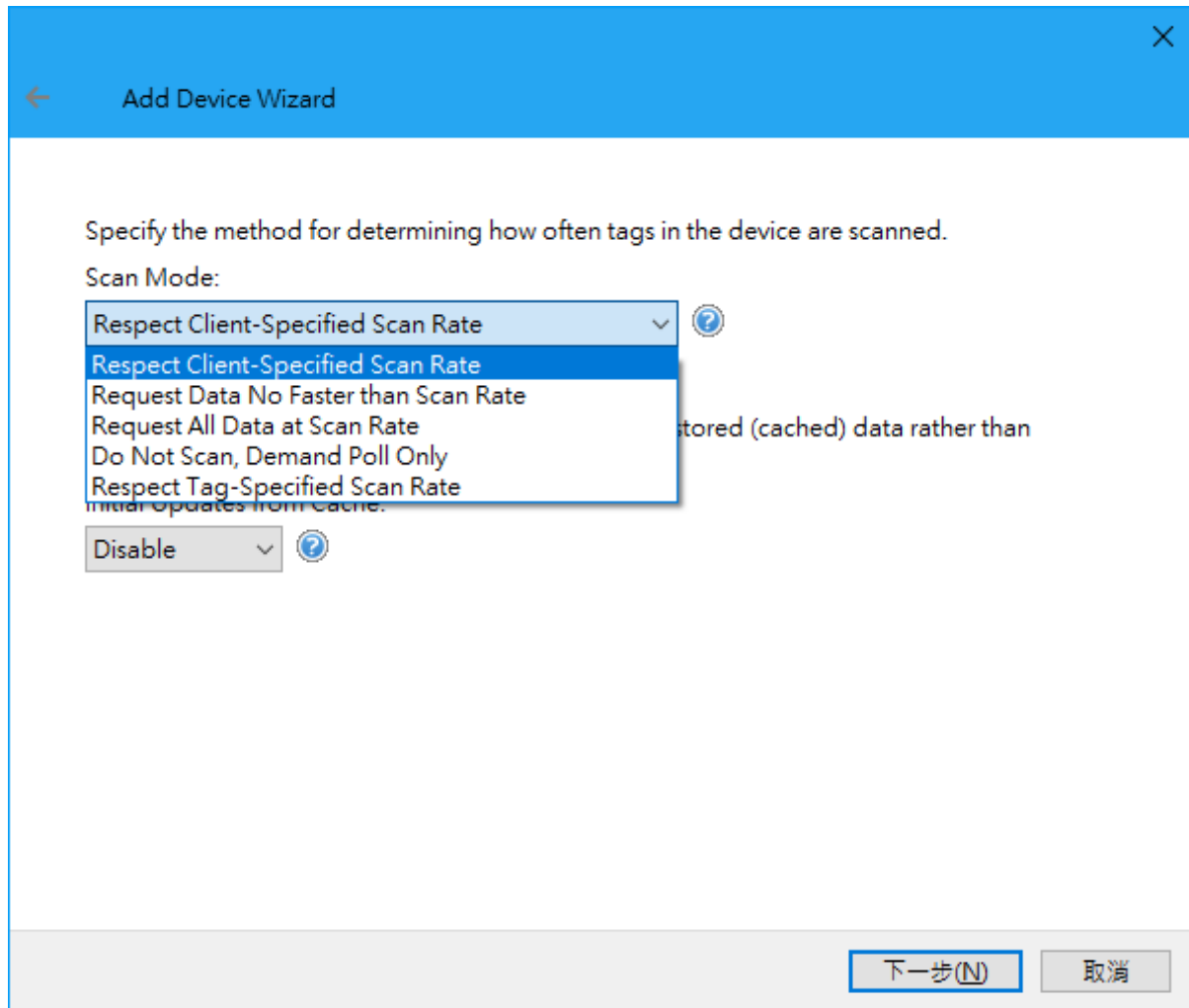
Request Data No Faster than Scan Rate：取得資料的速度不得超過您所設定的掃描頻率(Scan Rate)。

Request All Data at Scan Rate：依照您所設定的掃描頻率(Scan Rate)來取得所有資料。

Respect Tag-Specified Scan Rate：指定各別的 Tag 掃描頻率(Scan Rate)來取得資料。

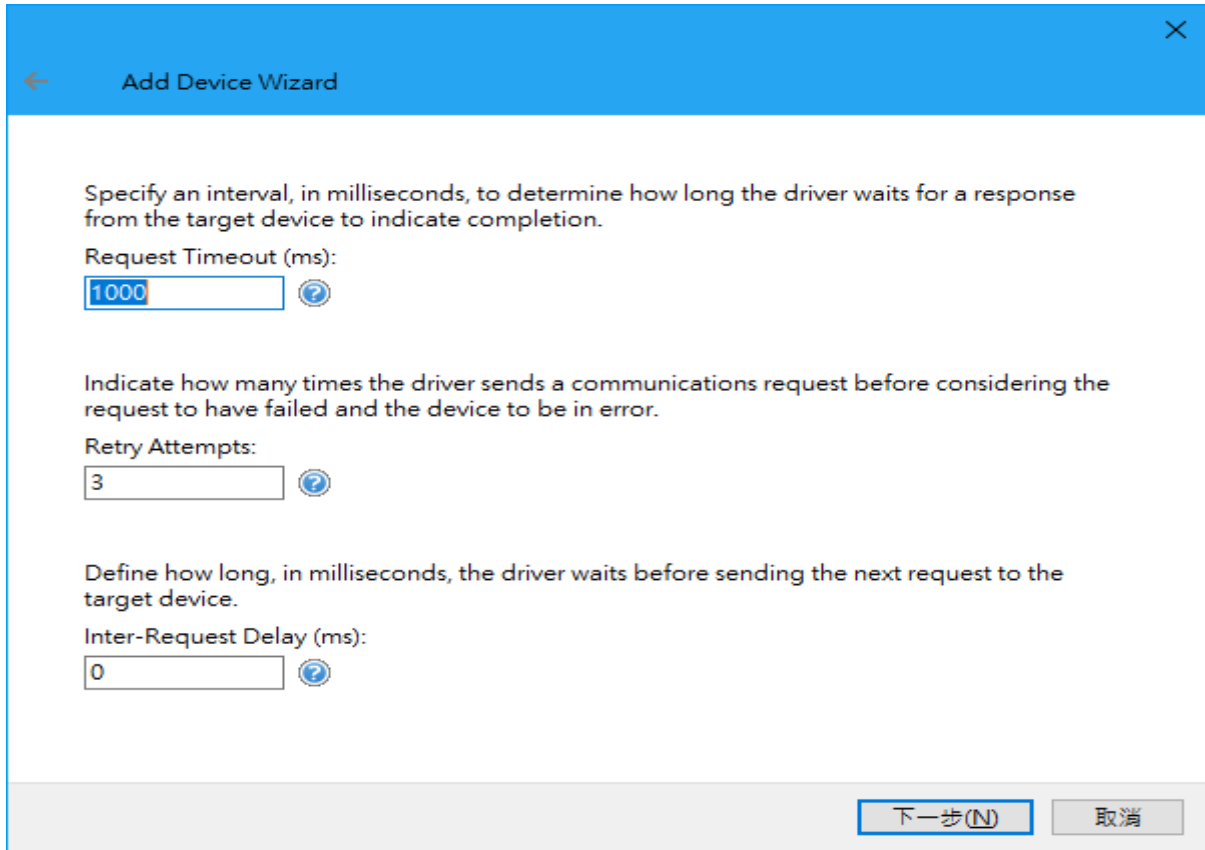
若無特殊考量，在此建議選擇 **Respect Client-Specified Scan Rate**。

Initial Updates from Cache：預設為 Disable。



The screenshot shows a software window titled "Add Device Wizard" with a blue header bar. Below the header, there is a text instruction: "Specify the method for determining how often tags in the device are scanned." Underneath, the "Scan Mode:" label is followed by a dropdown menu. The dropdown menu is open, showing five options: "Respect Client-Specified Scan Rate" (which is highlighted in blue), "Request Data No Faster than Scan Rate", "Request All Data at Scan Rate", "Do Not Scan, Demand Poll Only", and "Respect Tag-Specified Scan Rate". To the right of the dropdown menu, there is a question mark icon and the text "stored (cached) data rather than". Below the dropdown menu, there is another dropdown menu with the text "Initial Updates from Cache:" and the option "Disable" selected. At the bottom right of the window, there are two buttons: "下一步(N)" (Next) and "取消" (Cancel).

16. 設定通訊時機，利用預設的設定即可。



Specify an interval, in milliseconds, to determine how long the driver waits for a response from the target device to indicate completion.

Request Timeout (ms):
 ?

Indicate how many times the driver sends a communications request before considering the request to have failed and the device to be in error.

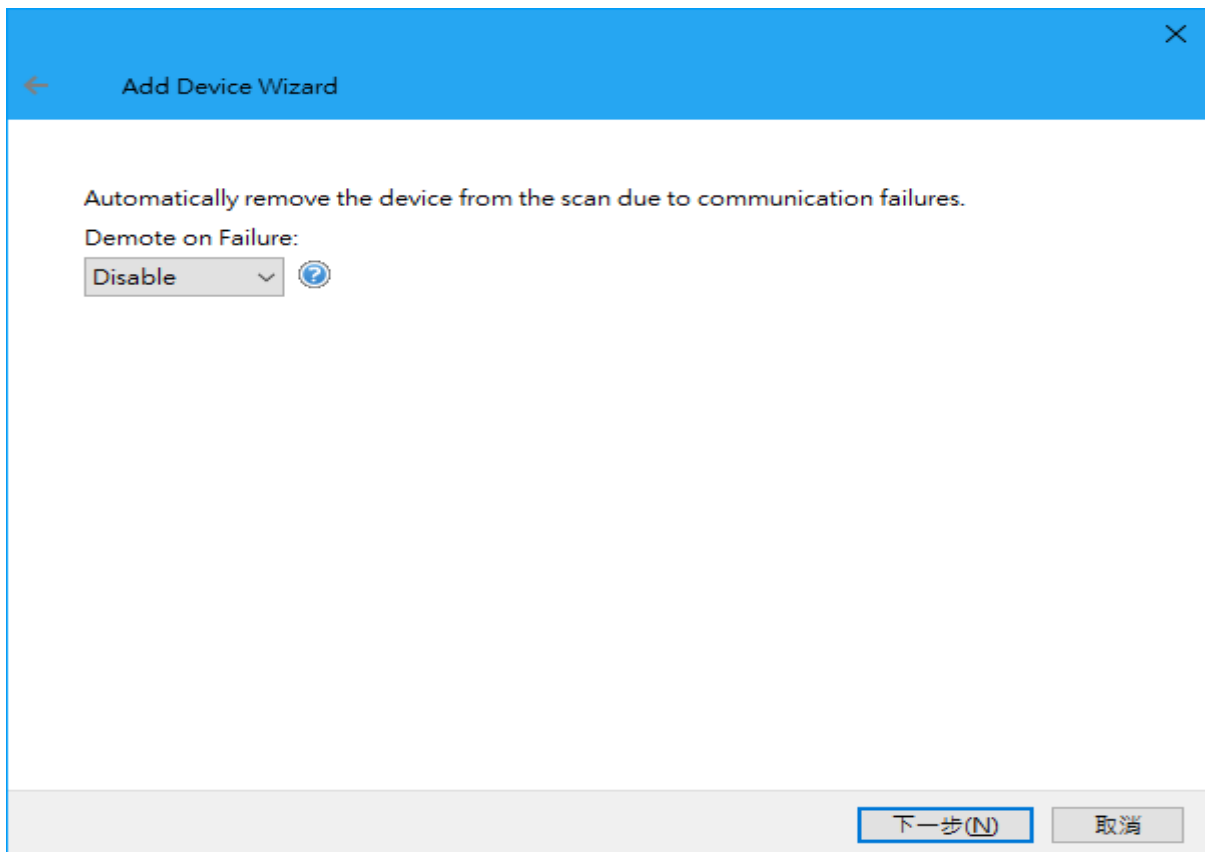
Retry Attempts:
 ?

Define how long, in milliseconds, the driver waits before sending the next request to the target device.

Inter-Request Delay (ms):
 ?

下一步(N) 取消

17. 設定自動降級，利用預設的設定即可。



Automatically remove the device from the scan due to communication failures.

Demote on Failure:
 ?

下一步(N) 取消

18. 設定資料庫的建立，利用預設的設定即可，底下為選項說明：

啟動時(On Device Startup)：

Do not generate on startup: 在 KEPServerEX 啟動的時候，不會在 Server 的 Tag 空間(Tag Space)中自動新增 OPC Tag。

Always generate on startup: 每次啟動 Server 的時候，都會對裝置進行評估，同時會在 Server 的 Tag 空間(Tag Space)中自動新增 OPC Tag。

Generate on first startup: 在專案於第一次被執行的時候，將會對目標裝置(Device)做評估，同時也會在 Server 的 Tag 空間(Tag Space)中自動新增所需的 OPC Tag。

在此建議使用預設的”Do not generate on startup”。

(遇到重複的 Tag)On Duplicate Tag：

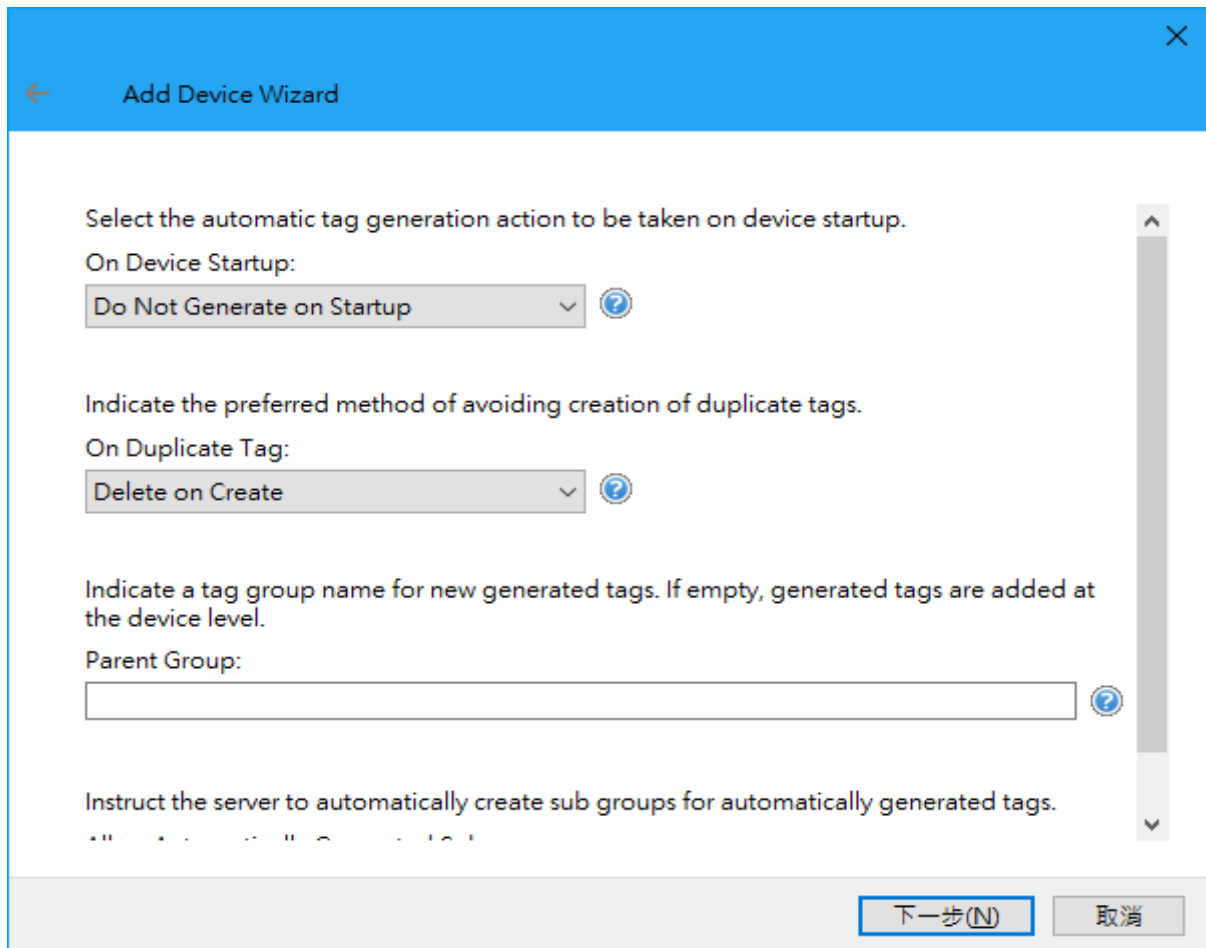
Delete on create: 在新增任何新的 Tag 資訊之前，會將 Tag 空間(Tag Space)中舊的 Tag 資訊刪除。

Overwrite as necessary: 用新的 Tag 資訊來複寫 Tag 空間(Tag Space)中，舊的 Tag 資訊。沒有被複寫的資料依然會留在 Tag 空間(Tag Space)。

Do not overwrite: 不複寫任何在 Tag 空間(Tag Space)中的任何資料，只能新增 Tag 資訊。

Do not overwrite, log error: 與上一個選項相同，但如果發生資料被複寫的情況，將會產生 Event Log。

在此建議使用預設的”Delete on create”。



19. 設定資料存取(Data Access Settings)，利用預設的設定即可，底下為選項說明：

Zero based addressing：將存取位址(addressing)設為從 0 開始，在預設的情況下，在您輸入一個位址(addressing)後，將會從 Modbus 裝置中的通訊架構中減去一個框架(frames)，若您的裝置並不遵循此慣例，則取消勾選此選項。

Zero based bit addressing within registers：勾選時，位址(addressing)是從 bits 的 0 開始存取，若取消勾選此選項，位址(addressing)是從 bits 的 1 開始存取。

Use holding register bit mask writes：如果該裝置有支援 holding register bit access，那就勾選此項目。

Holding Register Bit Writes：

寫入 Holding register 的位元位置，Driver 只修改有做更動的部分，有些設備可以藉由專有的指令去操作已儲存在 register 的位元位置(功能代碼為 16 進位 0x16 或十進位 22，如果設備沒有支援此功能的話，只能執行讀入、寫入、更改單個位元。啟用時，驅動程式使用的代碼為 16 進位，停用時，會依據 Modbus function 06 對 register 的寫入來判斷是 0x16 或 0x10，預設為停用。

Modbus function 06 for single register writes：在大部分的情況下，Modbus 驅動程式在編寫 Holding register 的時候會使用兩種 Modbus 協議功能(Modbus protocol functions)，在編寫單一 16 bits 的 Holding register 時，使用 Modbus function 06 來編寫；而在編寫單一 32 bits 的 Holding register 時，使用 Modbus function 16。裝置會根據需要在 06 以及 16 之間相互切換使用。勾選此項目的話，將強制該裝置在大部份的寫入都使用 06，而在必要的時候才使用 16。如果裝置所有的寫入操作僅需要 Modbus function 16，則取消勾選此項目。

Modbus function 05 for single coil writes：在大部分的情況下，在編寫 Output Coil 的時候會用兩種 Modbus 協議功能(Modbus protocol functions)，在編寫單一 Output Coil 時，使用 Modbus function 05；在編寫一組陣列 Output Coil 時，使用 Modbus function 15，裝置會根據需要在 05 以及 15 之間相互切換使用。勾選此項目的話，將強制該裝置在大部份的寫入都使用 05，而在必要的時候才使用 15。如果裝置所有的寫入操作僅需要 Modbus function 15，則取消勾選此項目。



 Add Device Wizard

Specify if the address numbering convention for the device starts at zero (Enable) or one (Disable). By default, addresses have one subtracted when frames are constructed to communicate with a Modbus device. If the device doesn't follow this convention, choose

Zero-Based Addressing:



Specify if the first bit in a register address begins at 0 (Enable) or 1 (Disable) for memory types that allow bits within words to be referenced as a Boolean (<address>.<bit> where <bit> represents the bit number within the word).

Zero-Based Bit Addressing:



Enable if the device supports holding register bit access to manipulate only the bit of interest in a single command (as opposed to performing a Read/Modify/Write operation to manipulate a single bit).

Holding Register Bit Writes:



下一步(N)

取消

20. 設定資料編碼，利用預設的設定即可，底下為選項說明：

Modbus byte order：此選項允許將裝置內的位元組排序由預設的 **Modbus** 位元組排序，修改為 **Intel** 位元組排序。這是為 **Modbus** 兼容性裝置所設置的。如果該裝置使用 **Intel** 位元組排序，則取消勾選此項目，已啟動 **Modbus** 的驅動來正確的讀取 **Intel** 格式的資料。

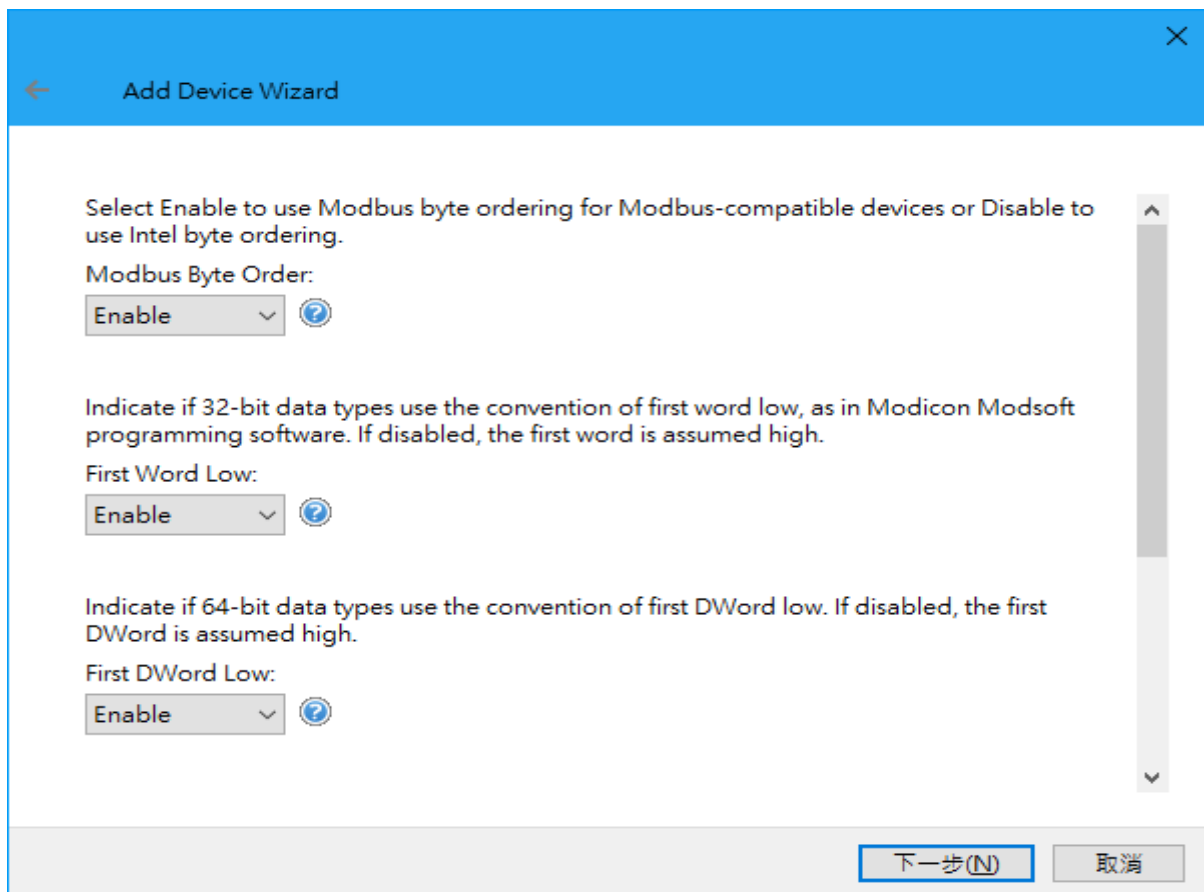
註：此項目不是用於 **Omni model**，**Omni model** 只使用 **Modbus** 位元組排序。

First word low：在 **Modbus** 中，兩個連續的 **register** 使用的是 32 位元的資料形態，使用者可以決定第一個 **Word** 是要低於 32 位元或是高於 32 位元，在預設的情況下，為第一個 **Word** 低於 32 位元。

First DWord low：在 **Modbus** 中，四個連續的 **register** 使用的是 64 位元的資料形態，使用者可以決定第一個 **DWord** 是要低於 64 位元或是高於 64 位元，在預設的情況下，為第一個 **DWord** 低於 64 位元。

Modicon bit ordering (bit 0 is MSB)：驅動程式將反轉位元排序，讀取後，在依照 **Modicon** **Modsoft** 編寫軟體寫入 **register** 中。例如，勾選後，寫入位址 40001.0/1 的資料將會影響裝置裡的 15/16 位元。預設是 **Disable**。

Treat long as decimals：當被選取時，**Driver** 的編碼和解碼將轉變為 **double-precision** 的 **long** 以及 **Dword** 的資料型態，其值的範圍介於 0 到 99999999 之間。



21. 設定區間的大小，利用預設的設定即可，底下為選項說明：

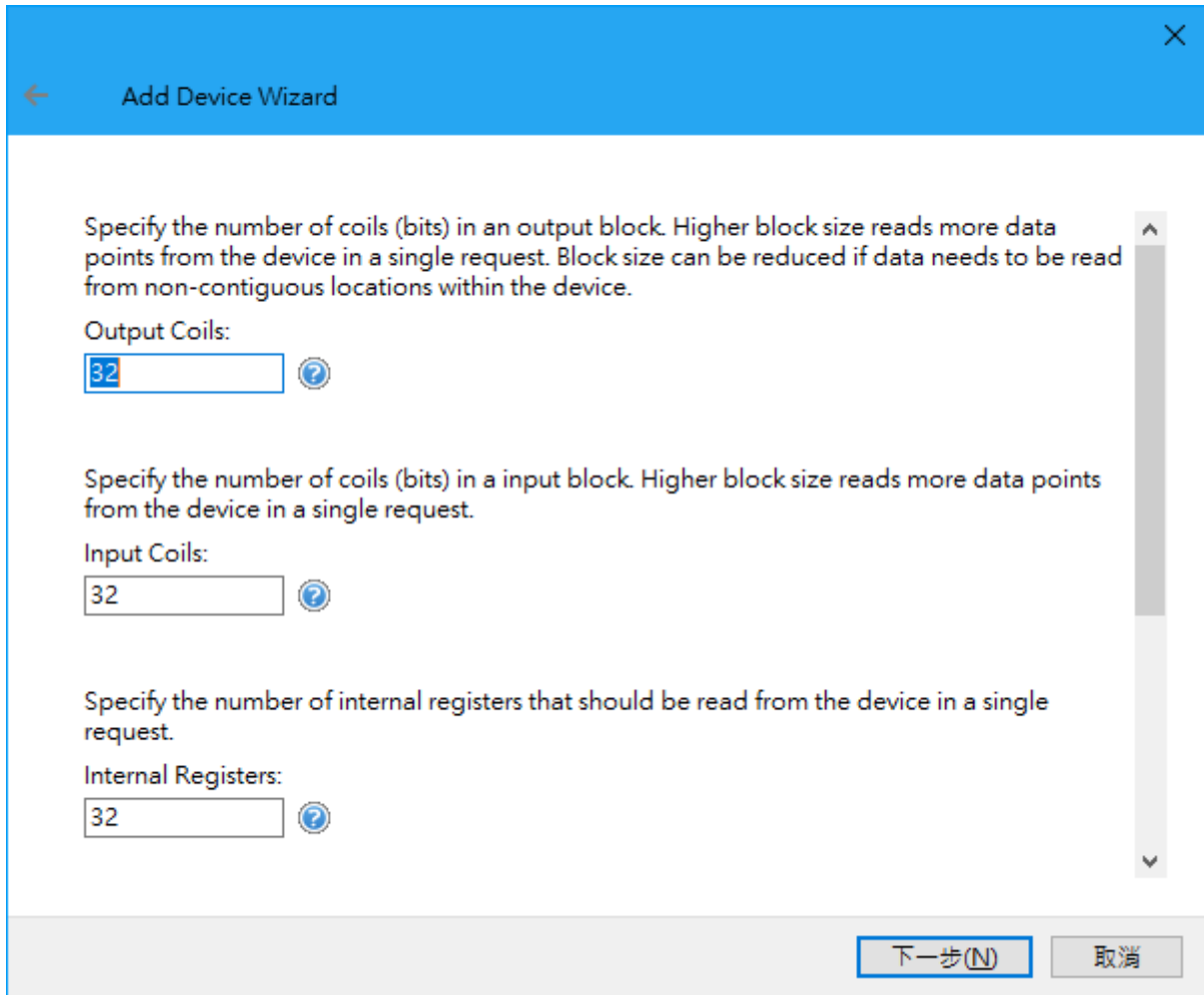
Coils(範圍是 8-2000 bit，且一定要是 8 的倍數)

如果將 Coils 的 Output 以及 Input 的數值設定越大，效率就會越高，但是還是要依照實際情況以及需求進行調整，如果電子儀表無法負荷，會導致傳輸上的錯誤。如果預設的數值依舊造成傳輸上出現錯誤，那麼請依照 8 的倍數慢慢往下修正。

Registers(範圍是 1-125 words)

如同上述，如果將 Registers 的 Internal 以及 Holding 的數值設定越大，效率就會越高，請依照實際情況以及需求進行調整。如果預設的數值依舊造成傳輸上出現錯誤，那麼請慢慢往下修正。

Block Read Strings：將群組的 string tag 讀入至 Modbus model 的 string tags,預設為未啟用。



Specify the number of coils (bits) in an output block. Higher block size reads more data points from the device in a single request. Block size can be reduced if data needs to be read from non-contiguous locations within the device.

Output Coils:

32

Specify the number of coils (bits) in a input block. Higher block size reads more data points from the device in a single request.

Input Coils:

32

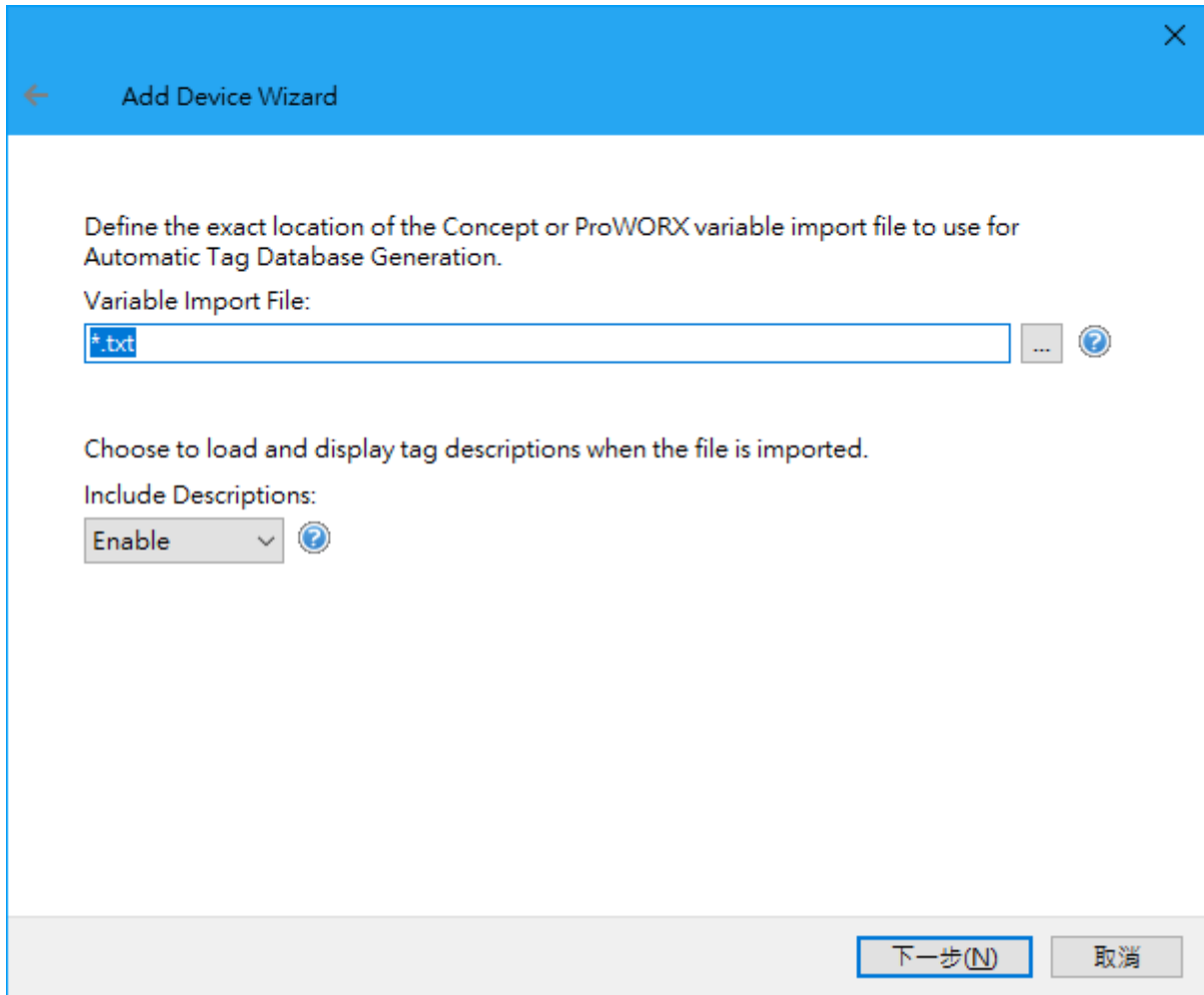
Specify the number of internal registers that should be read from the device in a single request.

Internal Registers:

32

下一步(N) 取消

22. 設定匯入檔案的類型(Variable Import Settings)，利用預設的設定即可，直接下一步。



The image shows a software window titled "Add Device Wizard" with a blue header bar. Inside the window, there is a text instruction: "Define the exact location of the Concept or ProWORX variable import file to use for Automatic Tag Database Generation." Below this, the label "Variable Import File:" is followed by a text input field containing "*.txt". To the right of the input field are three small icons: an ellipsis, a question mark, and a help icon. Further down, another instruction reads: "Choose to load and display tag descriptions when the file is imported." Below this, the label "Include Descriptions:" is followed by a dropdown menu set to "Enable" and a question mark icon. At the bottom right of the window, there are two buttons: "下一步(N)" (Next) and "取消" (Cancel).

Define the exact location of the Concept or ProWORX variable import file to use for Automatic Tag Database Generation.

Variable Import File:

*.txt

Choose to load and display tag descriptions when the file is imported.

Include Descriptions:

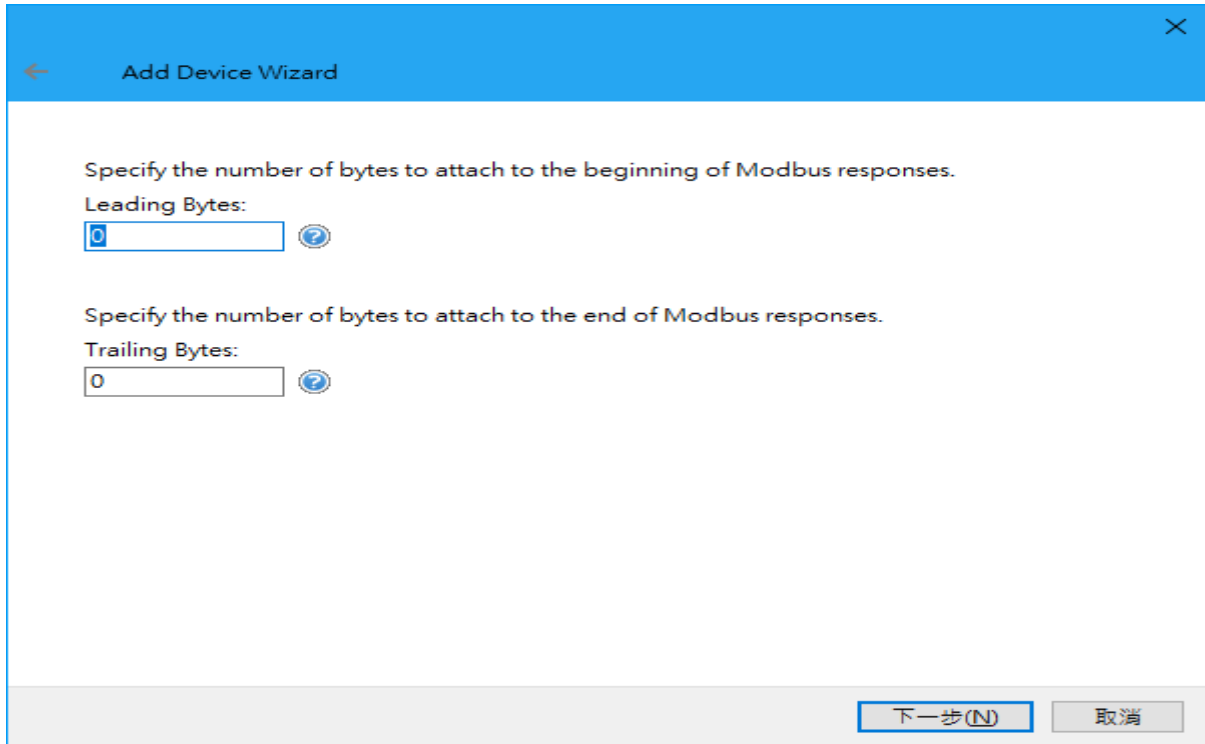
Enable

下一步(N) 取消

23. 設定架構，利用預設的設定即可，底下為選項說明：

Leading bytes：此參數可以指定放在回來的封包前面的前置位元數，值的範圍為 0-8。

Trailing bytes：此參數可以指定放在回來的封包後面的後置位元數，值的範圍為 0-8。

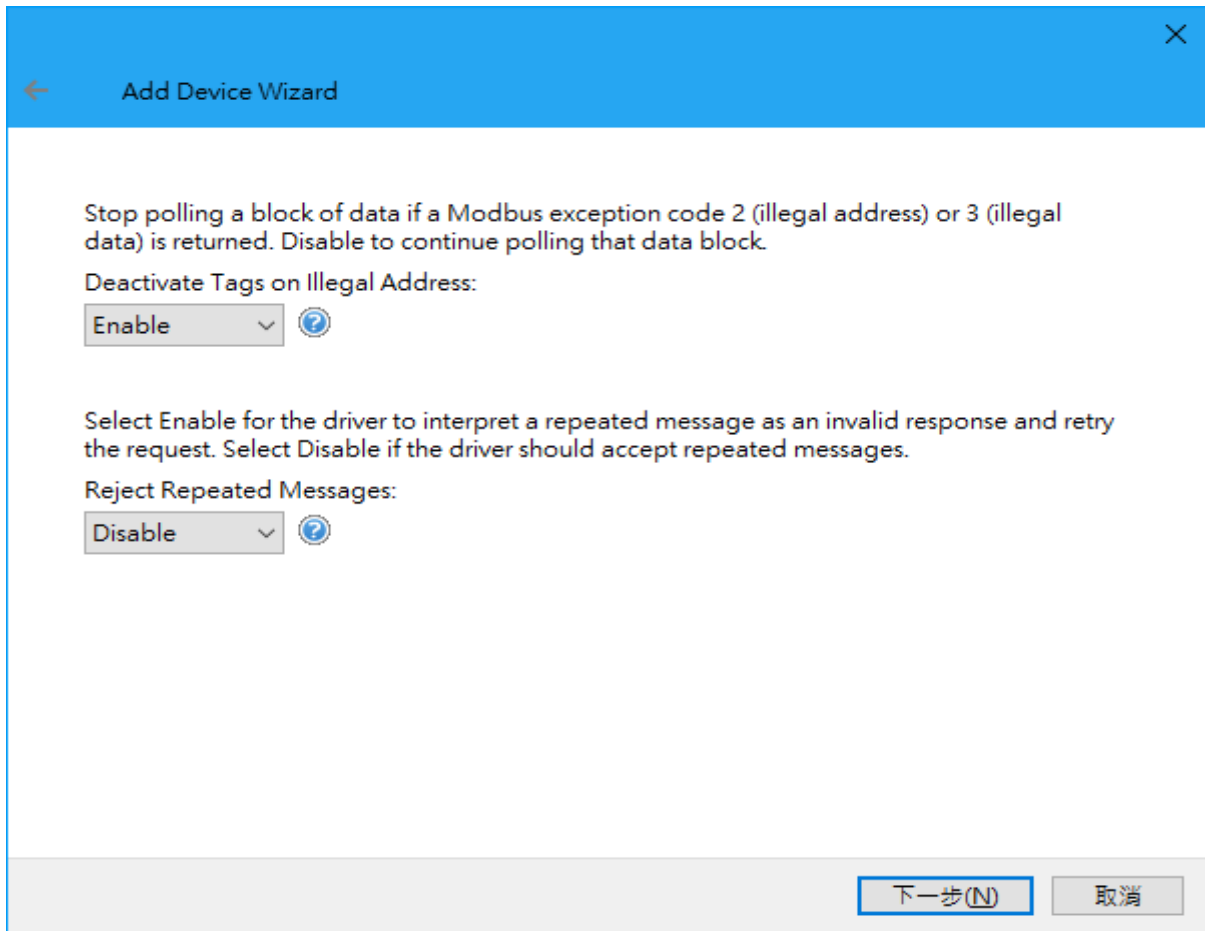


The image shows a software window titled "Add Device Wizard" with a blue header bar. Inside the window, there are two sections for configuring Modbus responses. The first section is titled "Specify the number of bytes to attach to the beginning of Modbus responses." and contains a label "Leading Bytes:" followed by a text input field containing the value "0" and a help icon (a question mark in a circle). The second section is titled "Specify the number of bytes to attach to the end of Modbus responses." and contains a label "Trailing Bytes:" followed by a text input field containing the value "0" and a help icon. At the bottom right of the window, there are two buttons: "下一步(N)" (Next) and "取消" (Cancel).

24. 設定框架，利用預設的設定即可：

Deactivate tags on illegal address：關閉非正規位置的 TAG。

Reject repeated messages：不要傳送重複訊息。



The image shows a software window titled "Add Device Wizard" with a blue header bar. Inside the window, there is instructional text about Modbus exception codes. Below this, there are two settings, each with a dropdown menu and a help icon. The first setting, "Deactivate Tags on Illegal Address:", has its dropdown set to "Enable". The second setting, "Reject Repeated Messages:", has its dropdown set to "Disable". At the bottom right of the window, there are two buttons: "下一步(N)" (Next) and "取消" (Cancel).

← Add Device Wizard

Stop polling a block of data if a Modbus exception code 2 (illegal address) or 3 (illegal data) is returned. Disable to continue polling that data block.

Deactivate Tags on Illegal Address:

Enable ▾ ⓘ

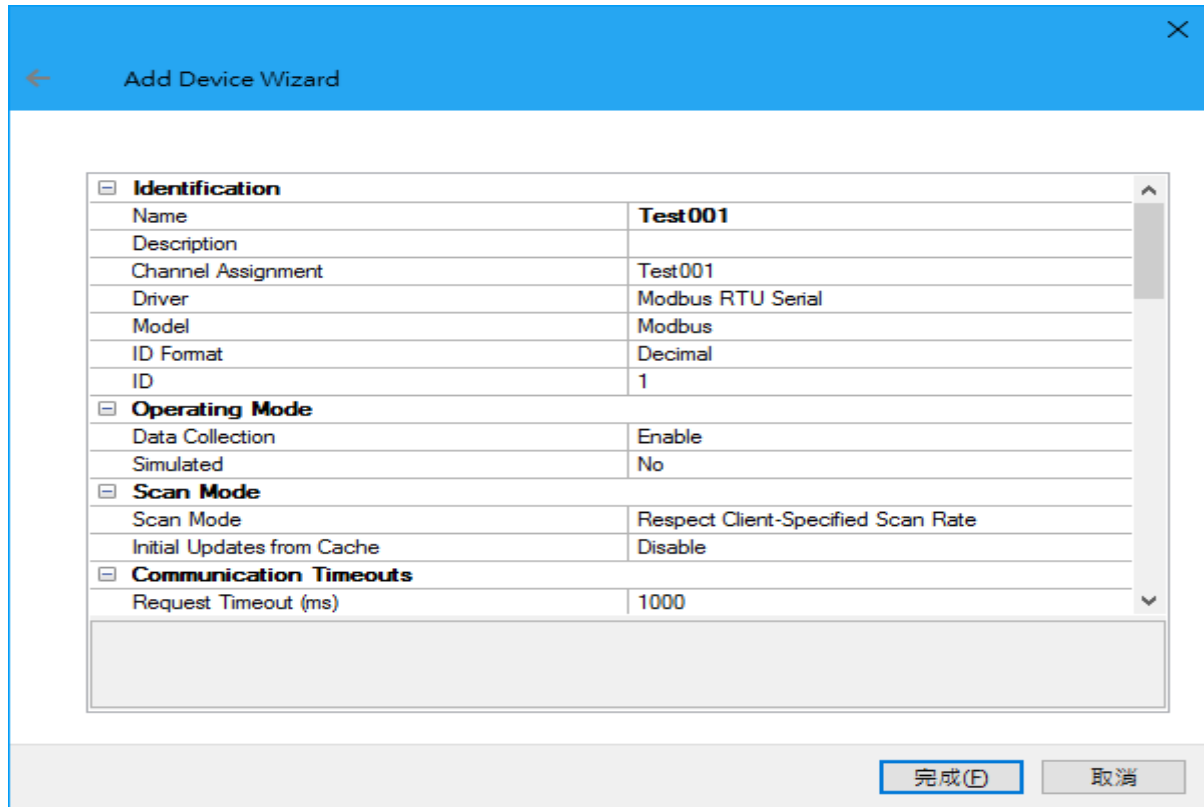
Select Enable for the driver to interpret a repeated message as an invalid response and retry the request. Select Disable if the driver should accept repeated messages.

Reject Repeated Messages:

Disable ▾ ⓘ

下一步(N) 取消

25. 檢視設定的總結，如果沒問題請按完成。

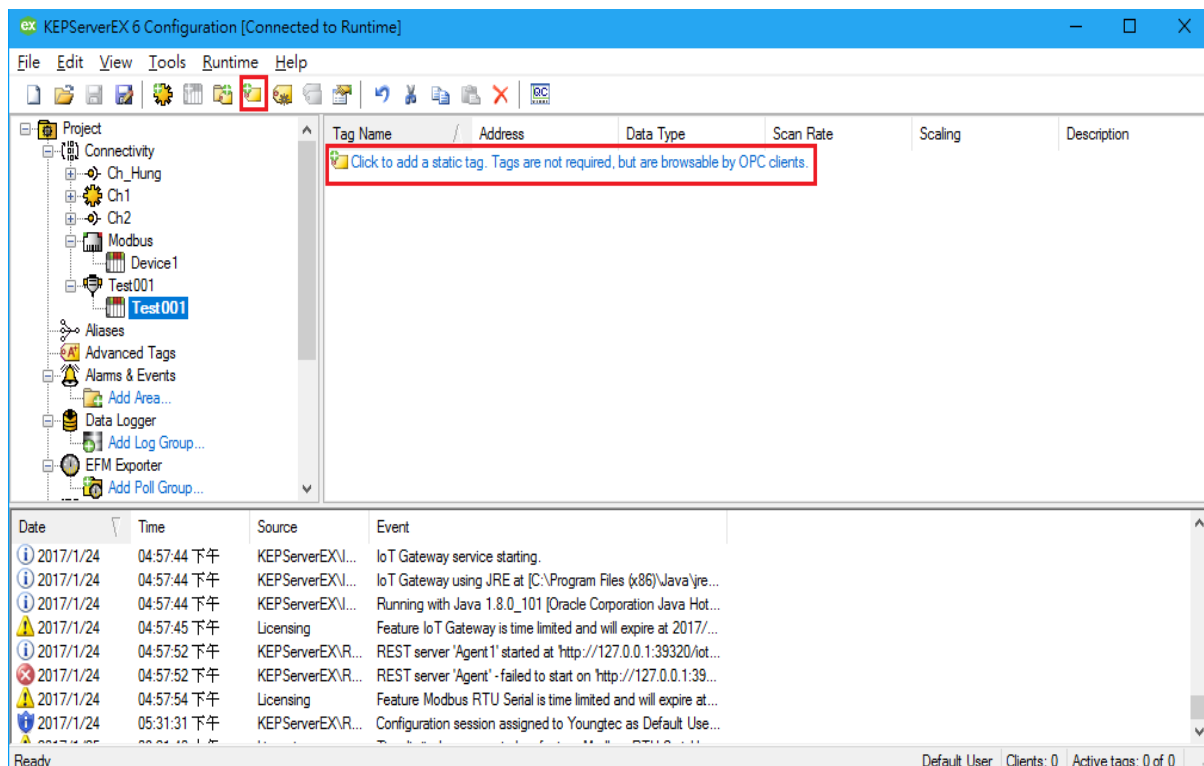


Add Device Wizard

Identification	
Name	Test001
Description	
Channel Assignment	Test001
Driver	Modbus RTU Serial
Model	Modbus
ID Format	Decimal
ID	1
Operating Mode	
Data Collection	Enable
Simulated	No
Scan Mode	
Scan Mode	Respect Client-Specified Scan Rate
Initial Updates from Cache	Disable
Communication Timeouts	
Request Timeout (ms)	1000

完成(F) 取消

26. 接著開始設定 Tag，點擊 "Click to add a static tag" 或是上方工具列的  圖示來新增 Tag。



KEPServerEX 6 Configuration [Connected to Runtime]

File Edit View Tools Runtime Help

Project Tree:

- Connectivity
 - Ch_Hung
 - Ch1
 - Ch2
 - Modbus
 - Device1
 - Test001
- Aliases
- Advanced Tags
- Alarms & Events
 - Add Area...
- Data Logger
 - Add Log Group...
- EFM Exporter
 - Add Poll Group...

Tag List:

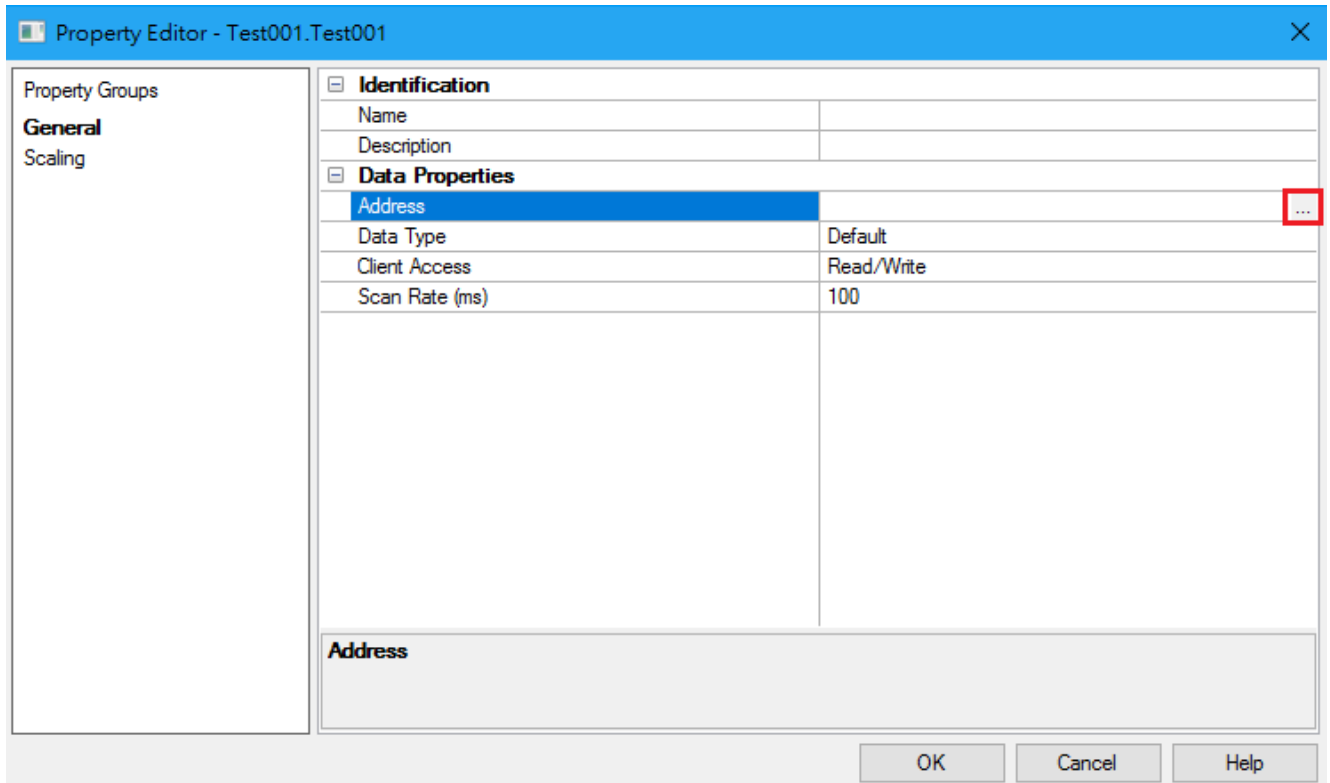
Tag Name	Address	Data Type	Scan Rate	Scaling	Description
Click to add a static tag. Tags are not required, but are browsable by OPC clients.					

Event Log:

Date	Time	Source	Event
2017/1/24	04:57:44 下午	KEPServerEXV...	IoT Gateway service starting.
2017/1/24	04:57:44 下午	KEPServerEXV...	IoT Gateway using JRE at [C:\Program Files (x86)\Java\jre...
2017/1/24	04:57:44 下午	KEPServerEXV...	Running with Java 1.8.0_101 [Oracle Corporation Java Hot...
2017/1/24	04:57:45 下午	Licensing	Feature IoT Gateway is time limited and will expire at 2017/...
2017/1/24	04:57:52 下午	KEPServerEXV...	REST server 'Agent 1' started at 'http://127.0.0.1:39320/iot...
2017/1/24	04:57:52 下午	KEPServerEXV...	REST server 'Agent 1' - failed to start on 'http://127.0.0.1:39...
2017/1/24	04:57:54 下午	Licensing	Feature Modbus RTU Serial is time limited and will expire at...
2017/1/24	05:31:31 下午	KEPServerEXV...	Configuration session assigned to Youngtec as Default Use...

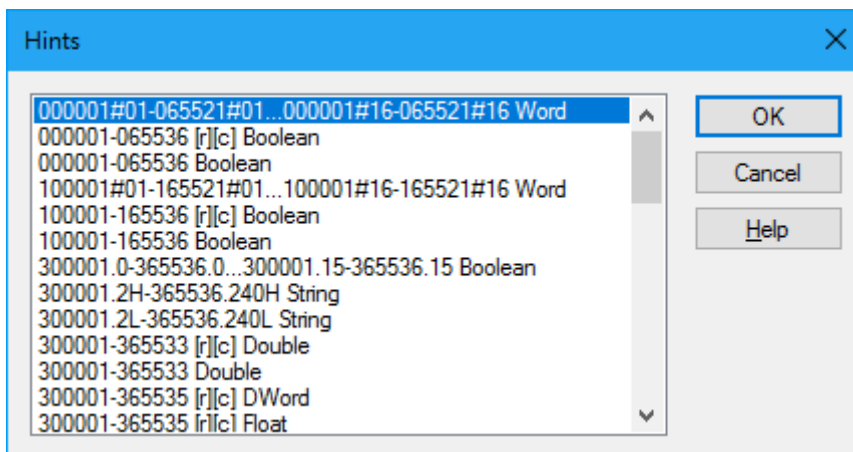
Ready Default User Clients: 0 Active tags: 0 of 0

27. 然後開始設定 Tag，輸入名稱(Name)，以及位址(Address)，位址(Address)的設定請按下後方的藍色問號按鈕(下圖紅框處)來查詢如何設定。



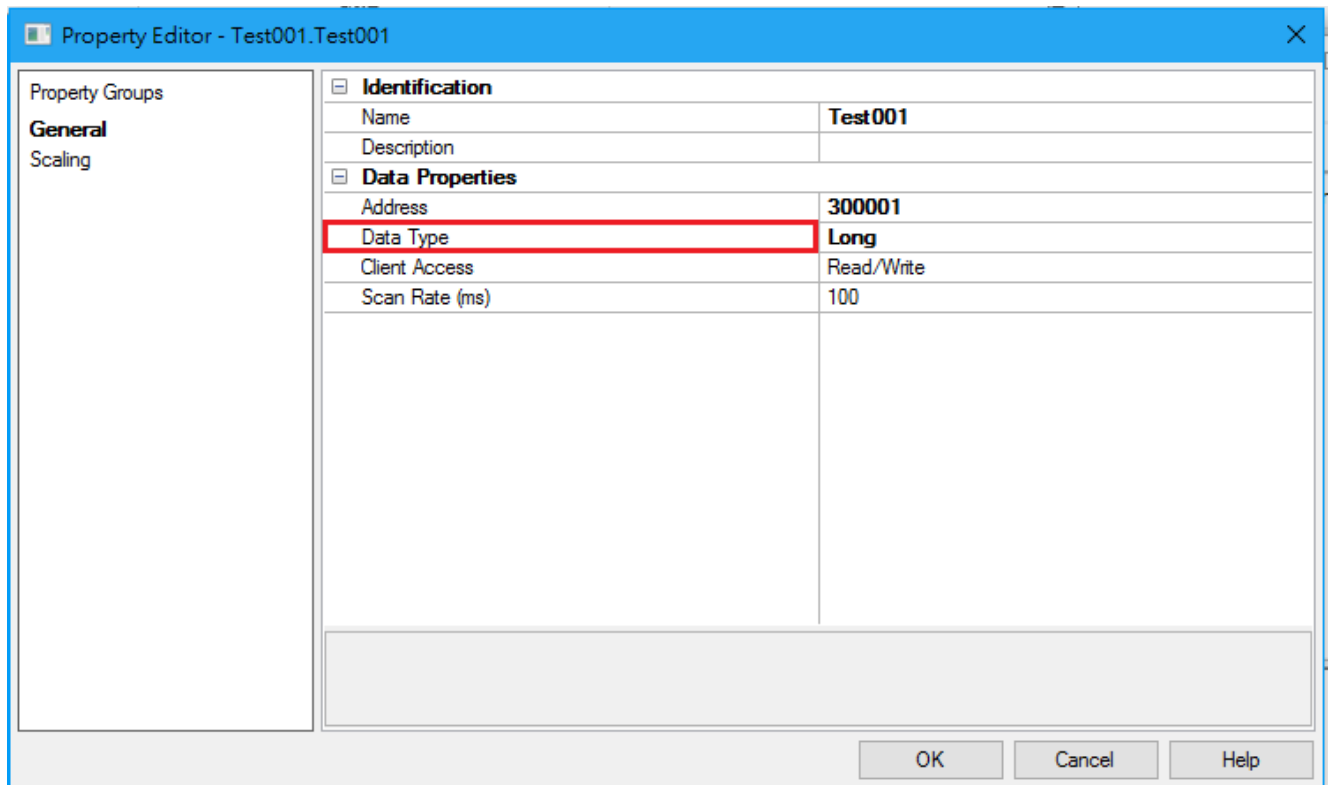
The image shows the 'Property Editor' window for 'Test001.Test001'. On the left, there is a 'Property Groups' sidebar with 'General' and 'Scaling' options. The main area is divided into two sections: 'Identification' and 'Data Properties'. Under 'Data Properties', the 'Address' field is highlighted in blue. To the right of the 'Address' field, there is a small blue question mark icon, which is highlighted with a red rectangle. Below the 'Data Properties' section, there is a large text area labeled 'Address'. At the bottom right, there are 'OK', 'Cancel', and 'Help' buttons.

Address 的 Hints 查詢表：

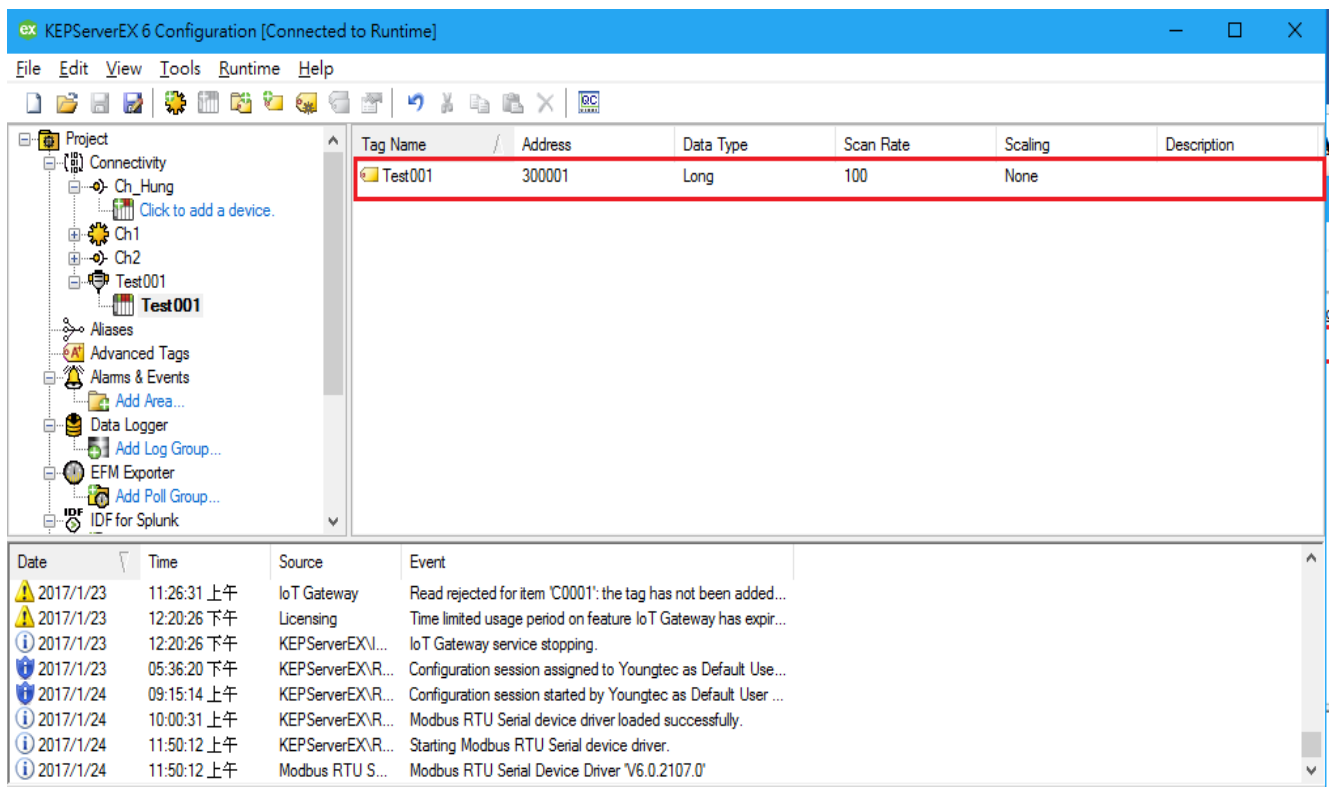


The image shows the 'Hints' dialog box. It contains a list of hints in a scrollable area. The first hint is selected: '000001#01-065521#01...000001#16-065521#16 Word'. Other hints include various Boolean, Word, String, Double, and Float values with their respective addresses and data types. To the right of the list, there are 'OK', 'Cancel', and 'Help' buttons.

28. 設定完名稱(Name)，以及位址(Address)後，記得設定 Data type 以符合上述所設定的位址 (Address)，設定完後按下 OK。



29. 這樣就新增完成了。



30. 接著按下工具列最後面的 Quick Client 小圖示 ，來檢視目前 Value 的數值。



31. 在 Quick Client 裡，選項我們 Add 新增的 Item Tag Name，看目前 Value 數值，Quality 正常是 Good 的，如果沒有連接成功會顯示 Bad，如果要詳細了解 Quick Client 操作，可以參考 OPC Quick Client Help。

