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將設備的 TransSECS 用在基於 Modbus PLC 的 SECS / GEM 界面

使用設備的 TransSECS 創建 SECS /
GEM 工具界面，並與 Modbus PLC
進行數據連接



簡介

本指南將向您展示如何使用 TransSECS 編輯器將 Modbus 寄存器鏈接到 SECS / GEM 並部署您的 Modbus-SECS / GEM 解決方案。

在這裡簡單介紹了 TransSECS 編輯器界面。如果您對於 SECS / GEM 有些研究，您應該不會對這些概念感到陌生。

之後，您將學習如何將 Modbus 寄存器鏈接到 SECS / GEM 以及如何部署您的界面。

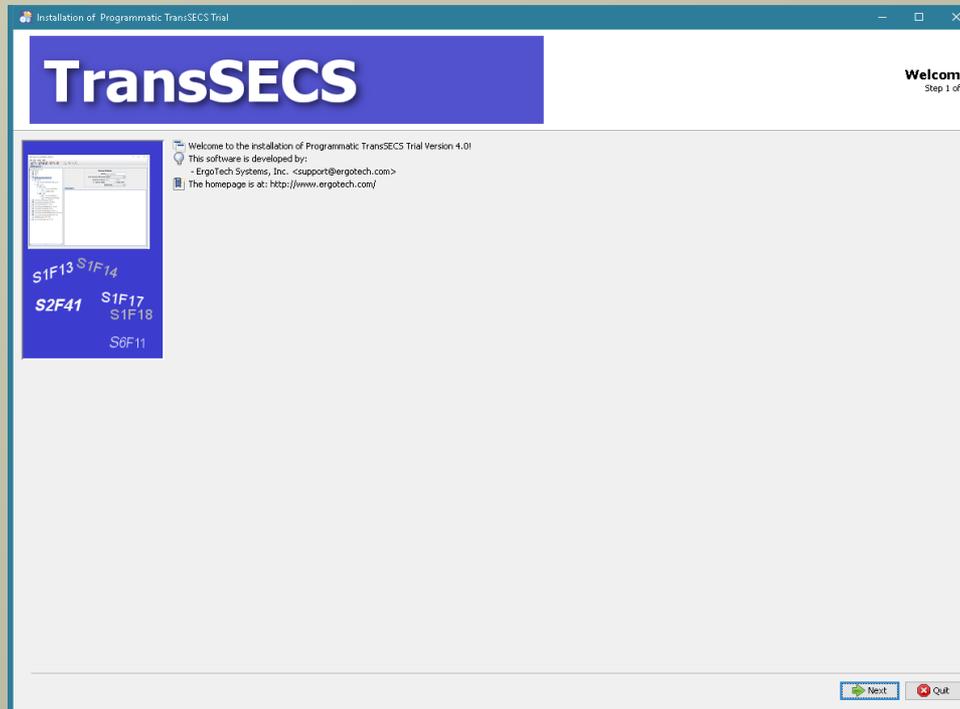
最後，將讓您了解如何使用 TransSECS 測試主機測試您的界面。



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安裝 TransSECS



雙擊安裝程序，然後在出現提示時點擊下一步。安裝完成後，啟動 TransSECS 設備構建器應用程序 (MIStudioSuite/TransSECS/Builder/TransSECSDevices.exe)



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当您启动 TransSECS 设备构建器时，系统将加载如以下示例一样的 PLCTool。然后，我们将加载 ModbusPLCTool 示例。

PLCTool 示例項目將模擬數據源用於 VIDs、ALIDs 和 CEIDs。此項目擁有專門的文檔，可以單獨研究參考。

Modbus 項目示例相當類似於 PLCTool，但是現在我們將會先連接到 Modbus PLC。



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使用文件菜單中的“打開項目”來加載示例 ModbusPLCTool 項目。瀏覽名為“ ModbusPLCTool” 的綠色項目文件夾，然後雙擊它。

TransSecs Build:12371 - PLCTool

File Edit Tools Help

- New Project Ctrl-N
- Add New Tool Ctrl-A
- Open Project Ctrl-O
- Close Project Ctrl-D
- Load Tool Ctrl-L
- Remove Tool Ctrl-F
- Delete Tool
- Save Project Ctrl-S
- Import SML
- Import Grapheq
- Import UsingScript
- Exit

Opens an existing Project.

2F41 W
2F41 W
BadParam: S2F42
F42

Tool Attributes

Tool Name: PLCTool Host Equip.

Uses GEM

Device ID: 1 Port: 5010 Baud Rate: 9600

T1: 0.5 T2: 10.0 T3: 45.0 T4: 45.0 T6: 5.0 T7: 10.0

Description

A GEM Tool with a minimal subset of SECS/GEM. Use the GEMHost project as a test host or use the SECS Tester.

Open

Look In: Devices

- ModbusPLCTool
- PLCTool



以下是 TransSECS 中已加載的 ModbusPLCTool 示例

TransSecs Build:12371 - ModbusPLCTool

File Edit Tools Help

ModbusPLCTool

- ModbusPLCTool
 - ALIDs
 - CEIDs
 - VIDs
 - HostCommandRejectedBadParam: S2F42
 - HostCommandReply: S2F42
 - HostCommandSTART: S2F41 W
 - HostCommandSTOP: S2F41 W
 - Test: S2F17 W
 - Devices

Tool Attributes

Tool Name: ModbusPLCTool Host: Equip.:

Uses GEM:

Device ID 1: Port: 5010 Baud Rate: 9600

T1: 0.5 T2: 10.0 T3: 45.0 T4: 45.0 T6: 5.0 T7: 10.0

Description

A GEM Tool with a minimal subset of SECS/GEM. Use the GEMHost project as a test host or use the SECS Tester.

工具界面默認為在端口 5010 (HSMS) 上運行

與設備 ID 1



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以下是 TransSECS 中已加載的 ModbusPLCTool 示例

在此處配置左側面板中所選項目的數據和其他詳細信息

TransSecs Build:12371 - ModbusPLCTool

File Edit Tools Help

ModbusPLCTool

ModbusPLCTool

- ALIDs
- CEIDs
- VIDs
- HostCommandRejectedBadParam: S2F42
- HostCommandReply: S2F42
- HostCommandSTART: S2F41 W
- HostCommandSTOP: S2F41 W
- Test: S2F17 W
- Devices

Tool Attributes

Tool Name: ModbusPLCTool Host: Equip.:

Uses GEM:

Device ID1: Port: 5010 Baud Rate: 9600

T1: 0.5 T2: 10.0 T3: 45.0 T4: 45.0 T6: 5.0 T7: 10.0

Description

A GEM Tool with a minimal subset of SECS/GEM. Use the GEMHost project as a test host or use the SECS Tester.

在開發界面時，可在此處輸入所選項目的註釋和描述。



以下是 TransSECS 中已加載的 ModbusPLCTool 示例

該工具已經定義了一些VIDs，ALIDs和CEIDs。

該工具擁有一些定義為示例的主機命令信息。

TransSECS Build:12371 - ModbusPLCTool

File Edit Tools Help

ModbusPLCTool

- ModbusPLCTool
 - ALIDs
 - CEIDs
 - VIDs
 - HostCommandRejectedBadParam: S2F42
 - HostCommandReply: S2F42
 - HostCommandSTART: S2F41 W
 - HostCommandSTOP: S2F41 W
 - Devices

Tool Name: ModbusPLCTool Host Equip.

Uses GEM

Device ID: 1 Port: 5010 Baud Rate: 9600

T1	0.5	T2	10.0	T3	45.0	T4	45.0	T6	5.0	T7	10.0
----	-----	----	------	----	------	----	------	----	-----	----	------

Description

A GEM Tool with a minimal subset of SECS/GEM. Use the GEMHost project as a test host or use the SECS Tester.



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您可以將腳本添加到任何信息或數據項目中。例如，在此項目中，我們已將腳本添加到“主機命令開始”的信息中，以進行數據分析並向主機發送正確的回復信息。

The screenshot displays the ModbusPLCTool software interface. The window title is "TransSecs Build:12371 - ModbusPLCTool". The menu bar includes "File", "Edit", "Tools", and "Help". The toolbar contains various icons for file operations and editing. The left sidebar shows a tree view of the project structure, with "HostCommandSTART: S2F41 W" selected. The main area is divided into two panes. The top pane, titled "Message Attributes", shows the configuration for the selected message: Name: HostCommandSTART, Auto Response Message: <none>, Stream & Function: S2 F41, Expects Reply: checked, Remote Command: checked, Message Direction: In Message, and Snoop Only and Send Err Msg are unchecked. The bottom pane, titled "Script", shows a Java script for handling the message. The script includes comments and code to parse the message, find the controller, and send a response.

```
4 print("Host Command START");
5 //1. START has been requested. Parse parameter(s) in the message to get the PPID.
6 //2. Store PPID in RecipeName device register
7 //3. Set STARTFlag in PLC to 99
8 //4. Wait up to 2000 ms for PLC to signal OK or error in register STARTFlag
9 // 0 or 4(OK), 2 (cannot perform now), 5 (already in that state)
10 //5. Send reply to host
11
12
13 var TransSecsController = Java.type("com.ergotech.transsecs.secs.TransSecsController");
14 try {
15
16 secsInterface=TransSecsController.findController("ModbusPLCTool");
17 hostcommand=secsInterface.getMessageBean("HostCommandSTART");
18
19 //recipe name is the second element of the first parameter array
20 //Note:if CPName Validation is not used, you need to manually check that there is a
21 //single CPName which is "PPID". This example assumes this host message matched HostComm
22 recipeName = hostcommand.getCommandParams().elementAt(0).elementAt(1);
23
24 /Devices/DemoServers_Servers/RecipeName->setStringValue(recipeName);
25
```



以下是 TransSECS 中已加載的 ModbusPLCTool 示例

TransSECS Build:12371 - ModbusPLCTool

File Edit Tools Help

ModbusPLCTool

- ALIDs
- CEIDs
- VIDs
- HostCommandRejectedBadParam: S2F42
- HostCommandReply: S2F42
- HostCommandSTART: S2F41 W
- HostCommandSTOP: S2F41 W
- Devices

Tool Attributes

Tool Name: ModbusPLCTool Host Equip.

Uses GEM

Device ID: Port: Baud Rate:

T1: T2: T3: T4: T6: T7:

Description

A GEM Tool with a minimal subset of SECS/GEM. Use the GEMHost project as a test host or use the SECS Tester.

這是將 PLC 服務器和寄存器添加到項目中的“設備”節點



選擇 Modbus TCP 設備節點

此處可對 Modbus TCP 設備服務器的連接參數和配置進行設置。

The screenshot shows the ModbusPLCTool software interface. The left sidebar displays a tree view of the project structure, with the 'ModbusTCP' folder under 'Devices' selected. The main window is divided into two tabs: 'Basic' and 'Expert'. The 'Basic' tab is active, showing the following configuration parameters:

Property	Value
Modbus TCP Device Server	ModbusTCP
Name	ModbusTCP
Response Timeout	250
Simulating ?	False
Hostname	192.168.5.98
Maximum Socket Connections	5

The 'Description' tab is also visible, containing the text: "Modbus PLC Connection. Check the Hostname property to enter the IP address of the controller."



展開 Modbus TCP 設備節點

The screenshot shows the ModbusPLCTool software interface. The left pane displays a tree view of the ModbusTCP folder, which is expanded to show its contents: TriggerMsg, OnlineOfflineSwitch, LocalRemoteSwitch, Event, Alarm, PPID, and ECID. A red box highlights this folder and its contents. The right pane shows a description of devices, stating: "Devices are data sources for VIDs, ALIDs, and CEIDs." An arrow points from the text box to the ModbusTCP folder in the tree view.

我們已經設置了一些設備寄存器來讀取或將數據寫入 PLC。我們將添加另一個寄存器來讀取 VID 1512 的過程溫度。



添加 Modbus 浮點以更精準地讀取過程溫度

The screenshot shows the ModbusPLCTool software interface. The left pane displays a tree view of the project structure, including folders for ALIDs, CEIDs, VIDs, and Devices. A context menu is open over the 'Modbus TCP' device, with 'Modbus Float' selected. The right pane shows the configuration settings for the selected device, including the 'Basic' tab with fields for 'Modbus TCP Device Server', 'Block Reads', 'Modbus Port', 'Use Transaction IDs?', 'Link Timeout', 'Screen Local?', and 'Timebase'. The 'Description' tab is also visible, providing a brief overview of the connection.

Property	Value
Modbus TCP Device Server	ModbusTCP
Block Reads	True
Modbus Port	502
Use Transaction IDs ?	True
Link Timeout	0.0
Screen Local ?	False
Timebase	1 n

右鍵單擊 ModbusTCP 設備並添加 Modbus 浮點



添加 Modbus 浮點以更精準地讀取過程溫度

The screenshot shows the ModbusPLCTool software interface. The left pane displays a tree view of the project structure, with the 'TemperatureReading' register under the 'ModbusTCP' folder selected. The right pane shows the configuration details for this register.

Basic	
Modbus 4x Float	TemperatureReading
Name	TemperatureReading
Reg. Address	120
Register Type	4X Register
Script	Not Set
Swap Style	Word Swap
Slave Node Address	0
Timebase	1.0

Description

將 Modbus 浮點重新命名為“溫度讀取”，並將寄存器地址設置為 120。



將溫度讀取 Modbus 浮點分配給過程溫度 VID (VID 1512)

選擇 VID 節點並找到過程溫度 VID

將設備名稱更改為 ModbusTCP

從標籤名稱列表中選擇“溫度讀取”

ModbusPLCTool

File Edit Tools Help

CEIDs

VIDs

SetPoint

GasFlow

ProcessTemperature

WaferCount

MDLN

SOFTREV

CommunicationsState

ControlState

LastControlState

LocalRemoteState

OnlineOfflineState

TimeFormat

CLOCK

EstablishCommunicationsTimeout

SpoolCountActual

SpoolCountTotal

EnableSpooling

MaxSpoolTransmit

MaxSpoolSize

OverWriteSpool

SpoolStartTime

SpoolFullTime

S5F1ReplyBit

EventReportsReplyBit

EventReportFunction

AlarmsEnabled

AlarmsSet

EventsEnabled

VID

Name: ProcessTemperature

VID: 1512

Data Type: Float-4

VID Type: SVID

Units:

Initial Value:

Limit Min:

Limit Max:

Deadband:

Change Limit CEID:

Device Name: ModbusTCP

Tag Name: TemperatureReading

Event

LocalRemoteSwitch

OnlineOfflineSwitch

PPID

RecipeBody

RecipeName

TemperatureReading

TriggerMsg

Description

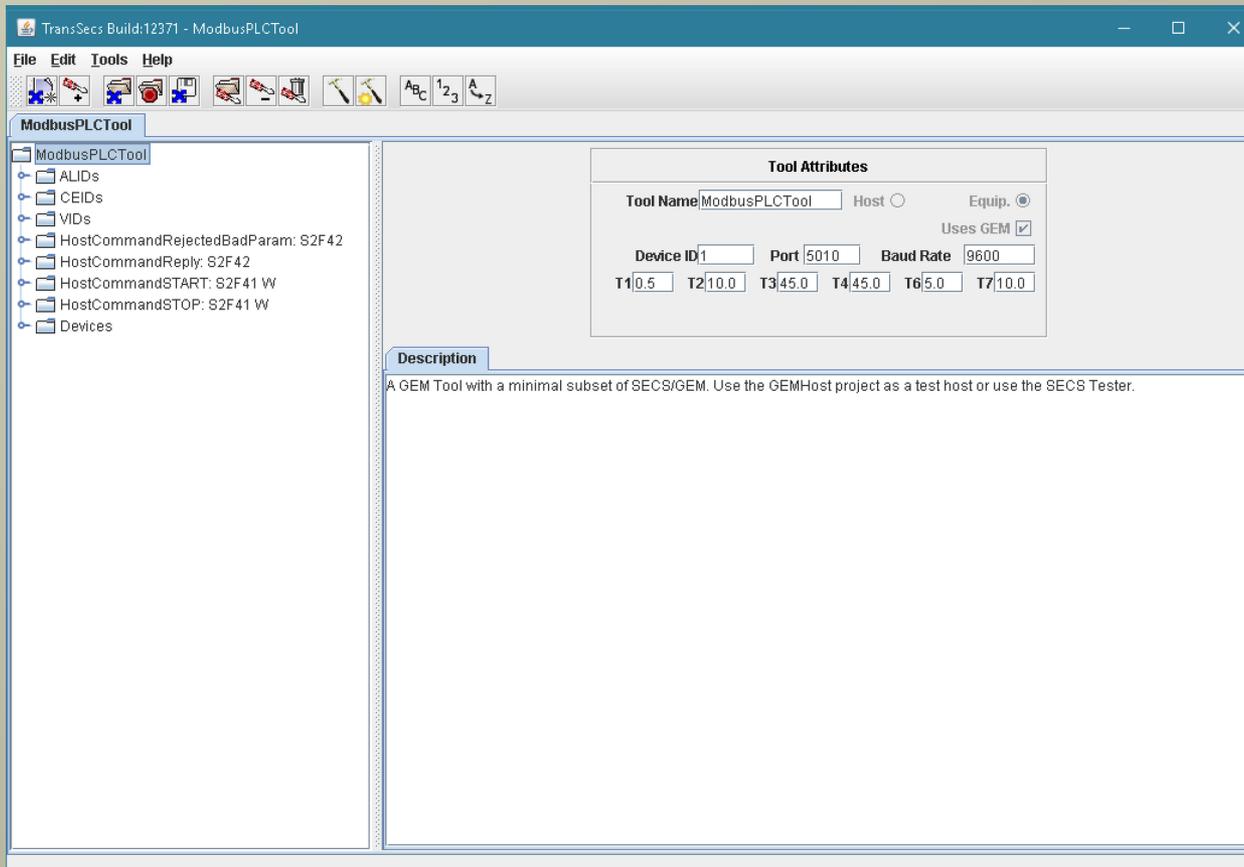
An SVID with the process temperature value



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現在讓我們測試項目的更改。我們將構建項目，然後運行它並使用主機應用程序對其進行測試

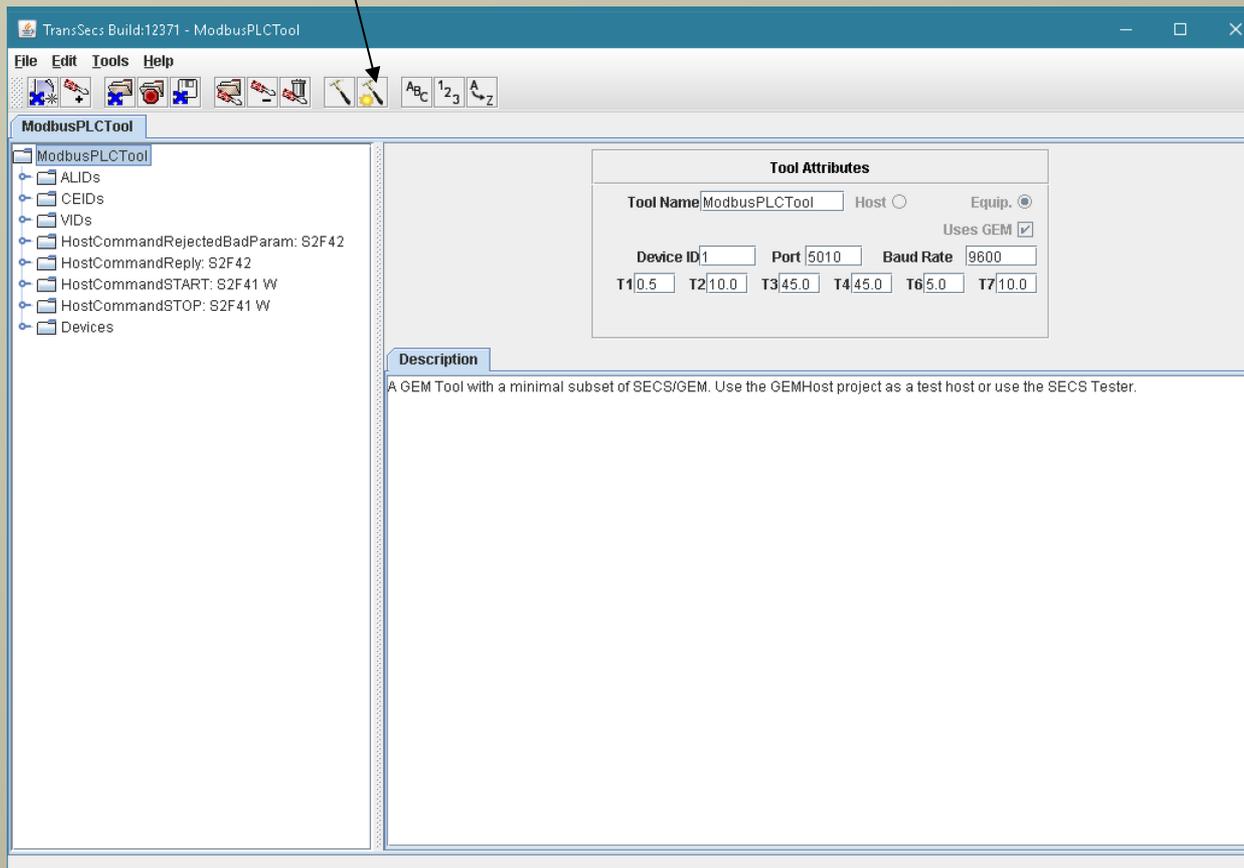




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按下錘子 / 星星按鈕以構建項目

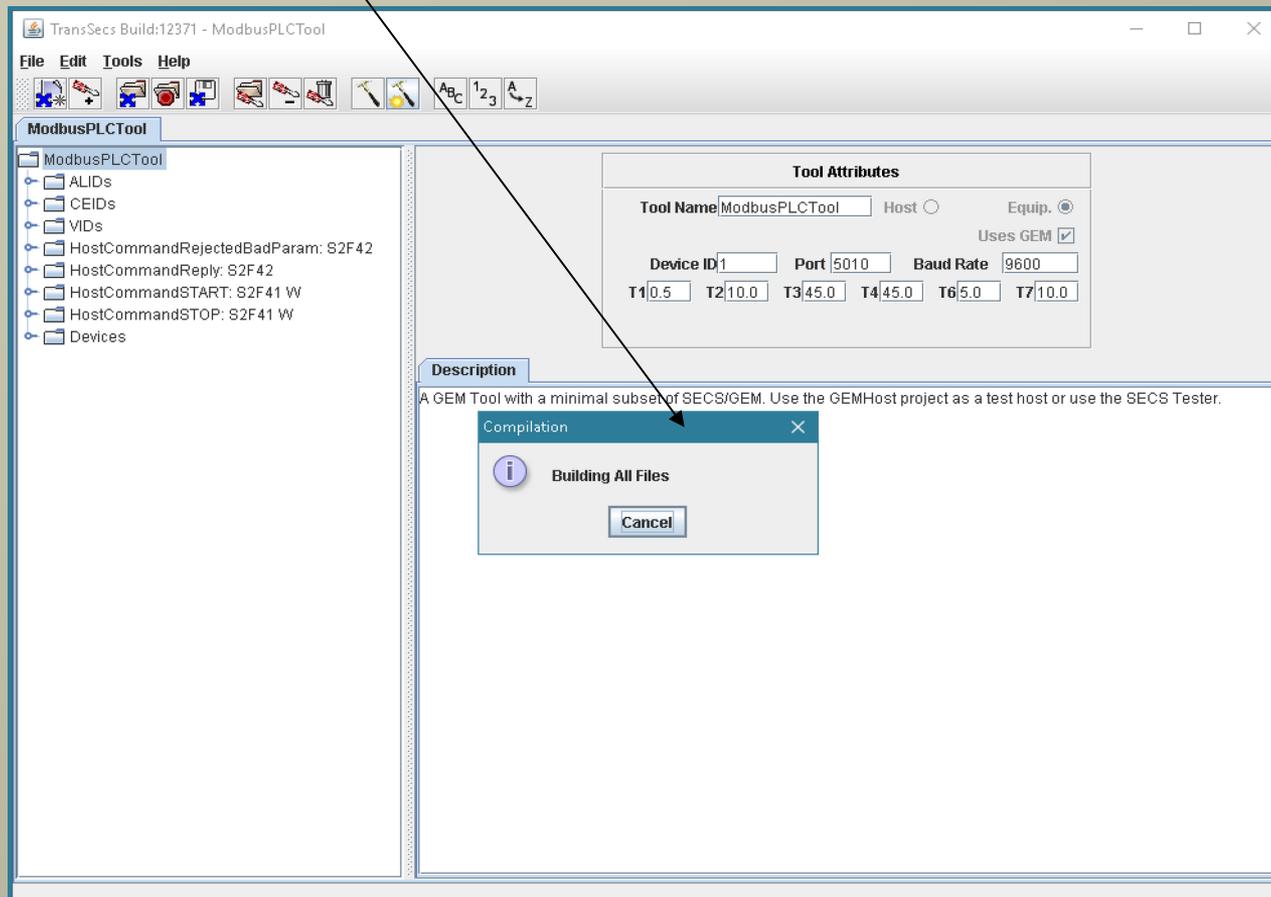




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當“編譯”彈出窗口關閉時，表示構建已完成。這可能需要大約一分鐘時間左右。

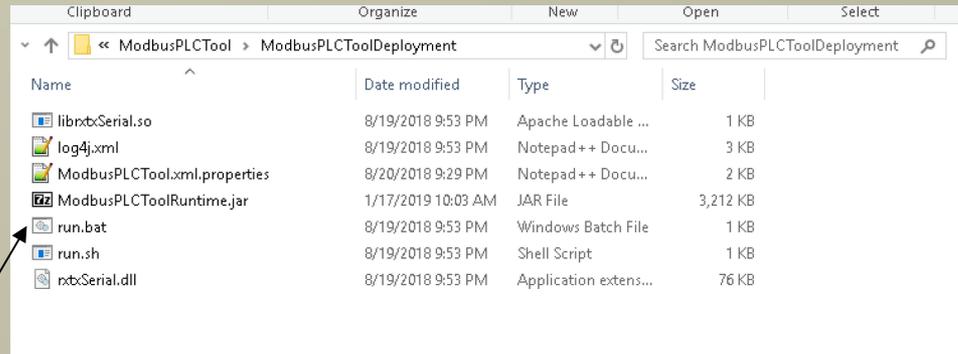




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代碼生成後，工具的代碼將被儲存於項目的 ModbusPLCTool/
ModbusPLCToolDeployment 目錄中。



雙擊 Windows 的 run.bat 以運行該工具。

對於 Linux 系統，例如 Raspberry Pi，請使用 run.sh

此文件夾中包含運行 SECS / GEM 界面所需要的所有內容。對於已部署的應用程序，您不需要使用編輯器。



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運行 SECS / GEM 界面

使用部署目錄中的 run.bat 文件。
如果您曾移動過文件位置，則可能需要額外編輯 jre 的路徑。

```
F:\TransSECSProjects\Devices\ModbusPLCTool\ModbusPLCToolDeployment>rem Ensure there is a jre on the path. Copy the  
jre provided or install a jvm  
  
F:\TransSECSProjects\Devices\ModbusPLCTool\ModbusPLCToolDeployment>set classpath=././ModbusPLCToolRuntime.jar  
  
F:\TransSECSProjects\Devices\ModbusPLCTool\ModbusPLCToolDeployment>java deploy.ModbusPLCTool.EquipmentController  
user.dir F:\TransSECSProjects\Devices\ModbusPLCTool\ModbusPLCToolDeployment  
ECID SetPoint (2000) value changed  
Started tool ModbusPLCTool on port 5010 device id 1  
-
```

當您運行所生成的 run.bat 時，該
工具的 SECS / GEM 將在端口
5010 和設備 ID 1 上運行



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測試

在上一張幻燈片中，您部署了完整的 SECS / GEM 兼容解決方案，其中包含 Modbus PLC 或其他支持 Modbus 設備的鏈接。

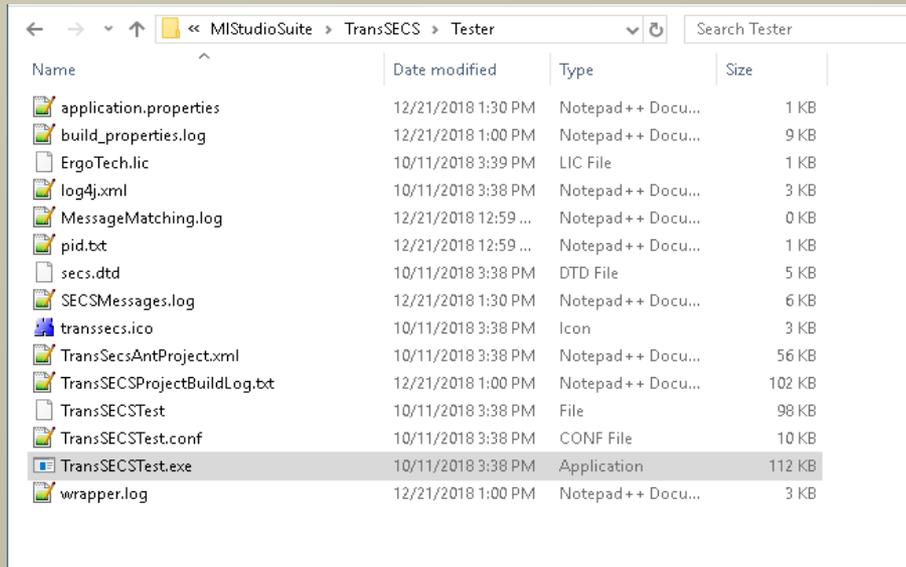
下一節將提供有關測試此界面（或任何其他 SECS / GEM 界面）的說明。



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使用 TransSECSTest.exe 與 TransSECS GEMHost 測試 SECS / GEM 界面



這將以 GEMHost 項目啟動 TransSECS ，項目將作為主機運行以測試工具界面。



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作為測試主機運行 TransSECS

在構建 GEM 主機項目之前設置為 LIVE 模式

Tool Attributes

Tool Name	GEMHost	Host <input checked="" type="radio"/>	Equip. <input type="radio"/>
Tool IP Addr...	localhost	Uses GEM <input checked="" type="checkbox"/>	
Device ID 1		Port	5010
		Baud Rate	19200
T1	0.5	T2	10.0
T3	45.0	T4	45.0
T6	5.0	T7	10.0
Deployment Type	Test Host Only		

Description

Sample Host for TransSECS. Use with the GEMTool project.

使用錘子 / 星星按鈕構建

構建主機後，它將運行並自動連接到 GEMTool，然後開始設置事件報告與啟用警報

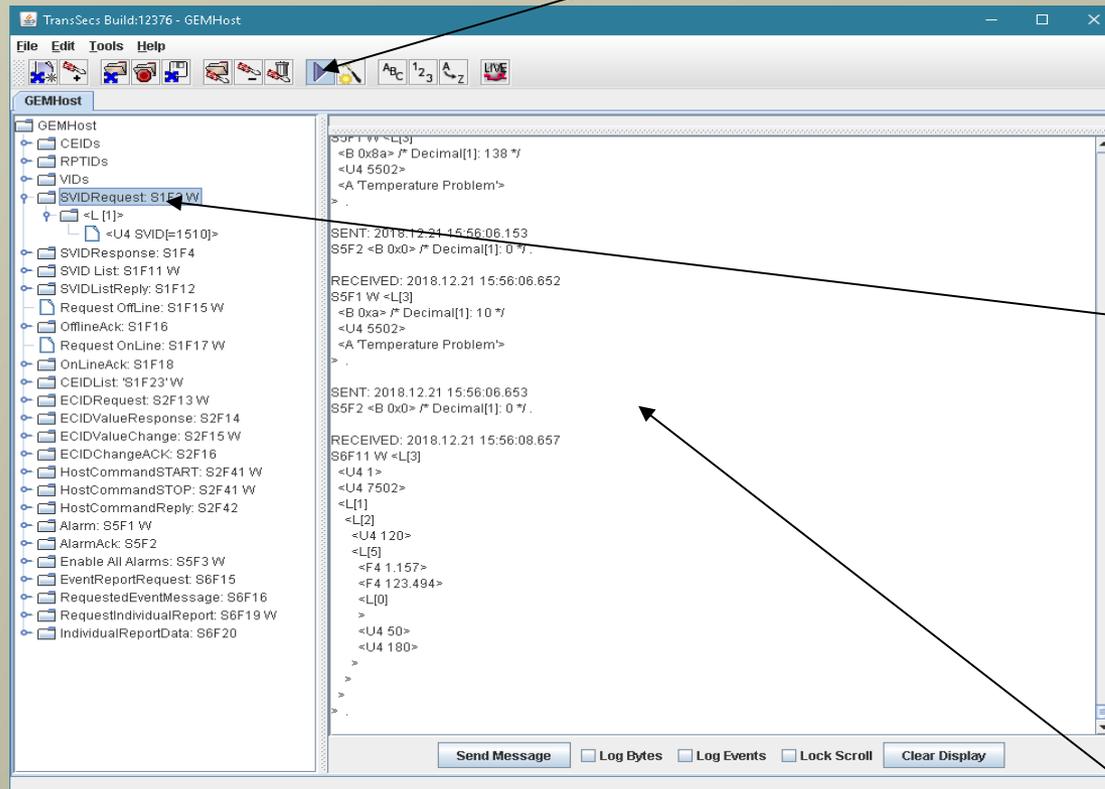


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作為主機運行 TransSECS 測試

此箭頭表示主機正在運行



選擇一個主要（外發）
信息，然後按“發送信息”
按鈕進行發送

已發送和接收的信息將顯示在“信息”
面板中（選擇信息時）



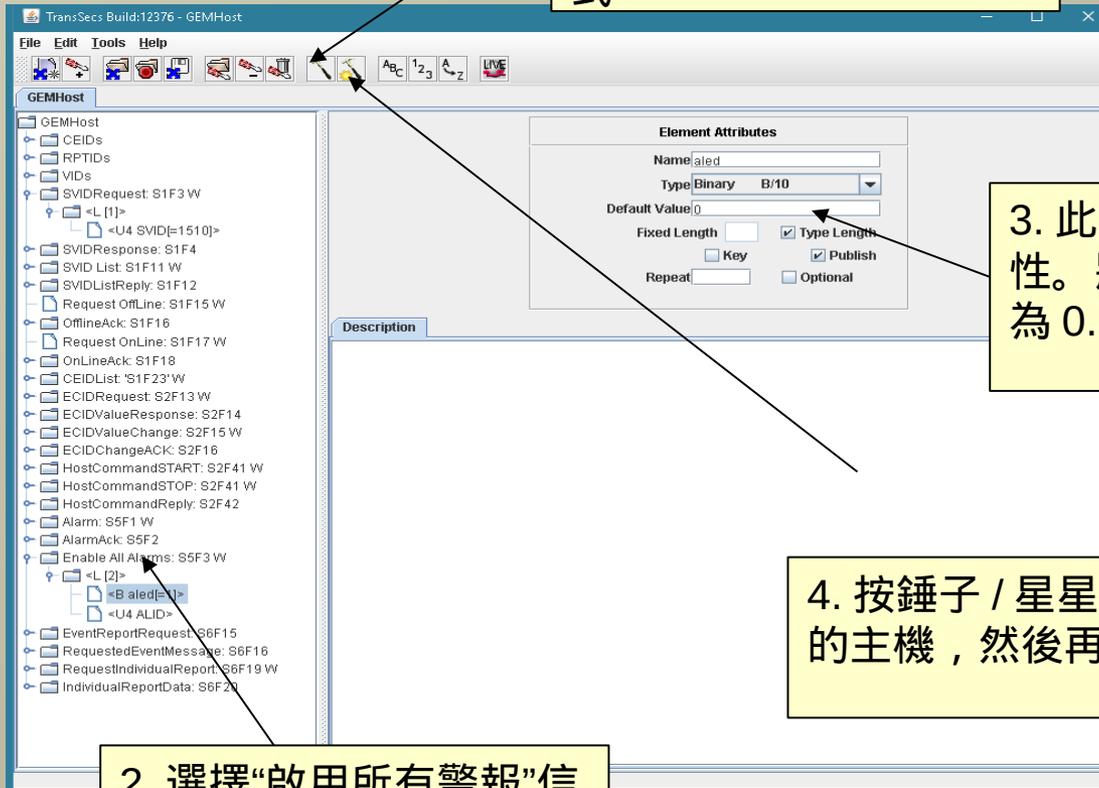
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您可以在 TransSECS 主機中更改信息並發送已更改的信息

暫時停用警報

1. 按下運行按鈕以讓 TransSECS 退出運行模式



3. 此處顯示信息字段屬性。將 aled 值從 1 更改為 0.3。

4. 按錘子 / 星星按鈕構建帶有此更改的主機，然後再次運行它

2. 選擇“啟用所有警報”信息，將其展開，然後選擇 aled 字段

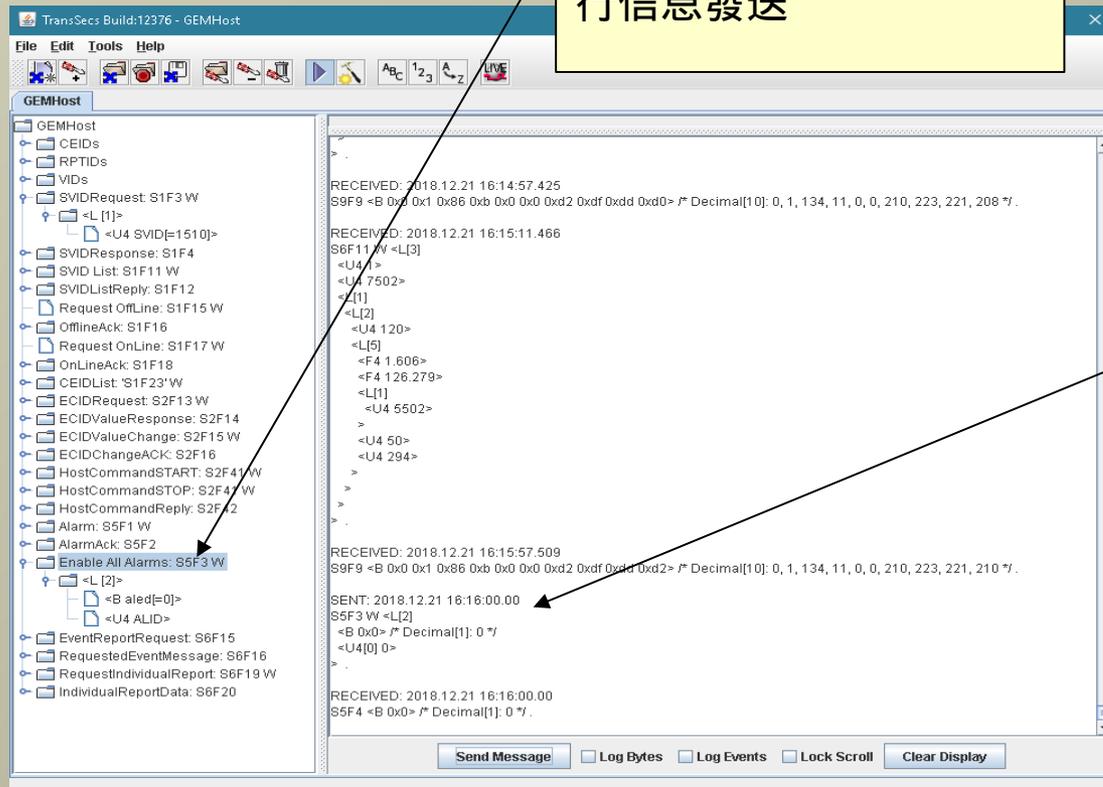


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暫時停用警報

選擇啟用所有警報，然後使用發送信息按鈕進行信息發送



該工具的信息和確認答復將顯示在此處



當您正在進行測試時，如果停用了警報信息，則會較容易觀察事件和主機信息



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發送主機信息

選擇啟用所有警報，然後使用發送信息按鈕進行信息發送

The screenshot shows the 'TransSecs Build:12376 - GEMHost' application. On the left, a tree view lists various system components. The 'Enable All Alarms: S5F3 W' option is highlighted. On the right, a log window displays a series of messages, including 'RECEIVED: 2018.12.21 16:14:57.425' and 'SENT: 2018.12.21 16:16:00.00'. At the bottom of the log window, there are buttons for 'Send Message', 'Log Bytes', 'Log Events', 'Lock Scroll', and 'Clear Display'.

該工具的信息和確認答復將顯示在此處



當您正在進行測試時，如果停用了警報信息，則會較容易觀察事件和主機信息

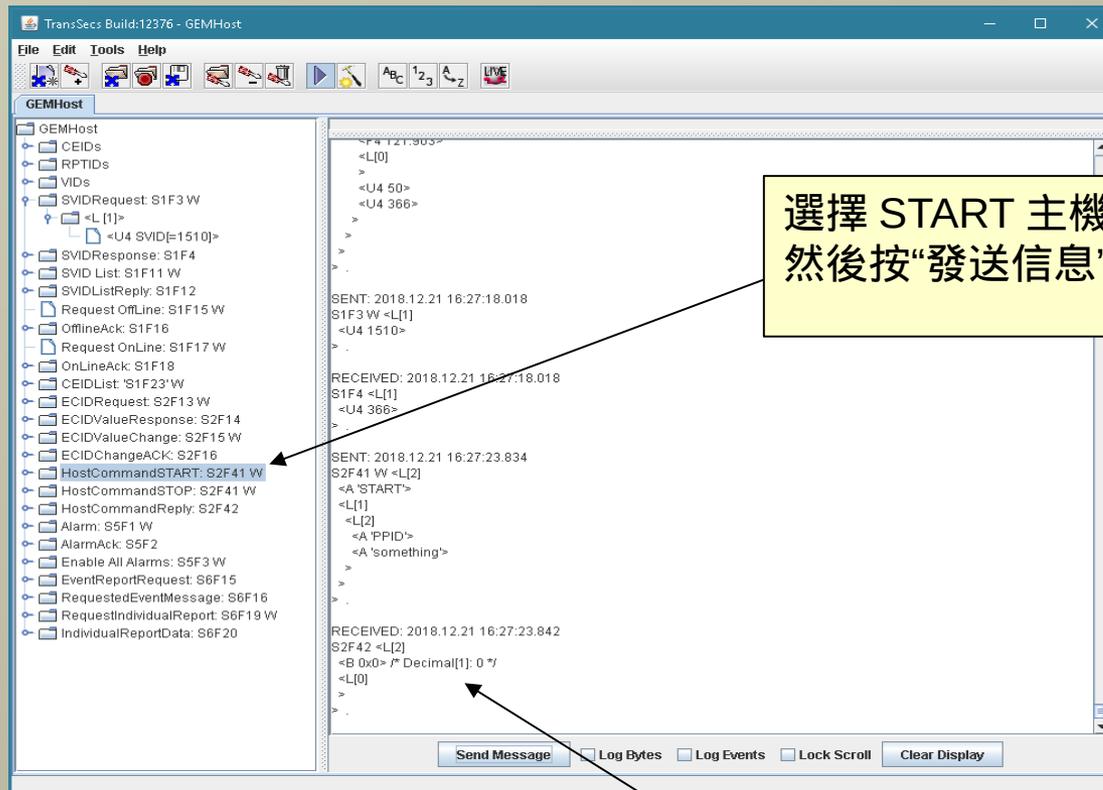


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向工具發送主機信息

設置 GEMTool 以處理主機命令“START”



選擇 START 主機命令，然後按“發送信息”按鈕

工具已正確處理該信息，並且已將答復發送給主機



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檢查過程溫度 VID

使用 VID 1512 將 S1F3 發送到工具以檢查從 PLC 讀取的當前溫度

The screenshot shows the 'ExtendedHost' window in TransSecs. The left pane lists various messages, including 'SVIDRequest: S1F3 W'. The right pane shows the details of the selected message, displaying a list of SVID messages. A yellow callout box with arrows points to two 'RECEIVED' messages:

```
RECEIVED: 2019.01.17 10:29:38.449
S1F4 <L[1]
<F4 233.2>
> .

RECEIVED: 2019.01.17 10:29:52.619
S1F4 <L[1]
<F4 230.7>
> .
```

At the bottom of the window, there are buttons for 'Send Message', 'Log Bytes', 'Log Events', 'Lock Scroll', and 'Clear Display'.

這是來自 PLC 的兩個當前溫度值



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僅此而已

這個簡單的 ModbusPLCTool 界面示例想必應該為您提供了一些想法並解決了您心裡的一些困惑。您需要添加連接到 PLC 中寄存器的 VIDs、ALIDs 和 CEIDs。此外，更多的主機命令信息處理也可以進行添加，並且還設有用於手動處理配方信息的選項，又或者您可以自己設置簡單的自動配方處理。