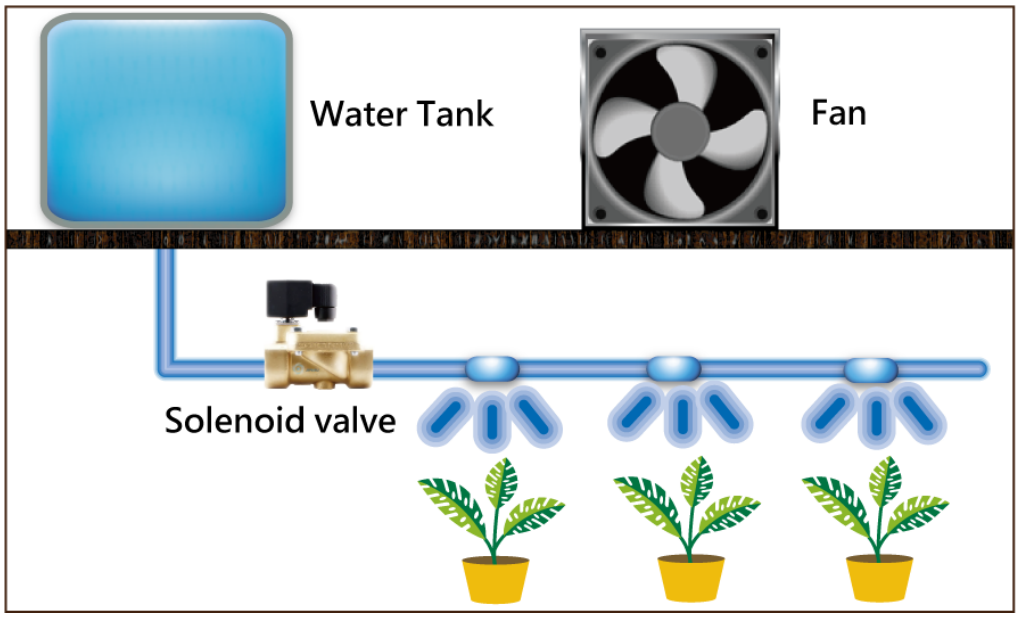
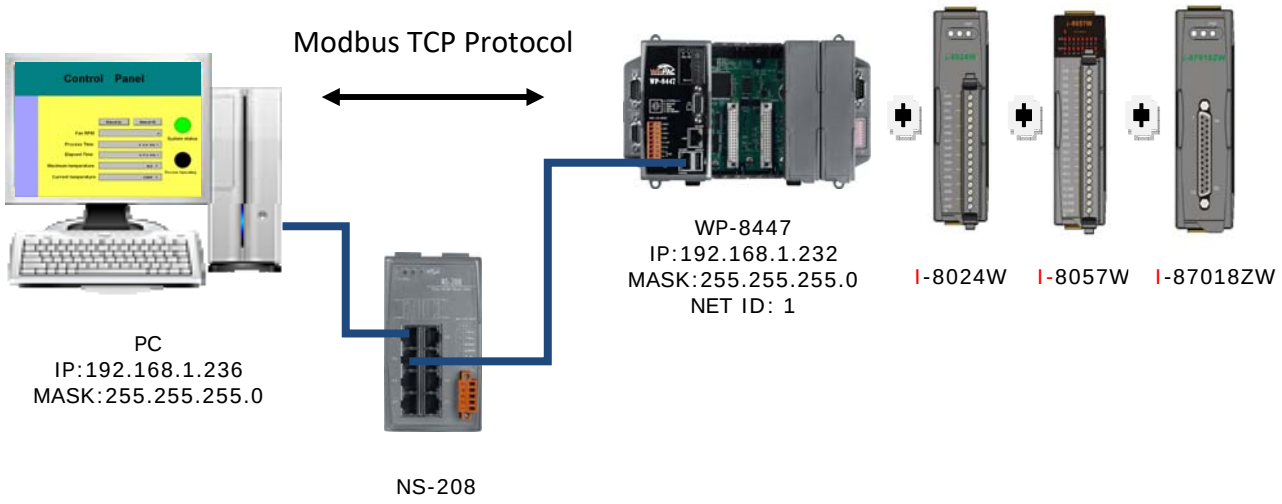
How to communicate between InduSoft local HMI and ISaGRAF PACs via Modbus TCP protocol

Application Diagram:





This document、ISaGRAF demo project and InduSoft project can be downloaded from the following website :
https://www.icpdas.com/en/faq/index.php?kind=280#751 > FAQ-140

For more detail about designing InduSoft HMI, please refer to the following website:
http://www.icpdas.com/en/download/index.php?nation=US&kind1=6&kind2=17&model=&kw=Indusoft

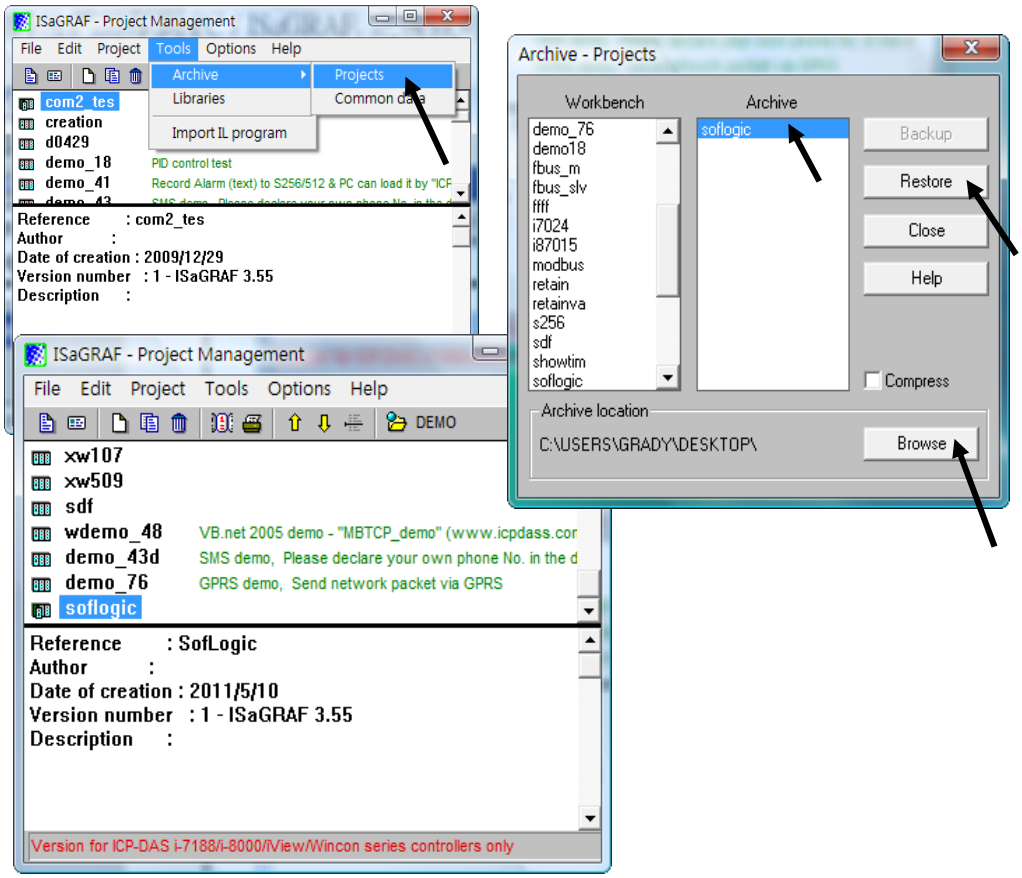
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Application introduction：

This document will show user how to design an InduSoft local HMI to communicate with ISaGRAF PACs via Modbus TCP protocol.

1.1 : Restore the ISaGRAF demo program ”Soflogic.pia” to PC / ISaGRAF

The faq140_demo_chinese.zip contains one ISaGRAF demo program (Soflogic.pia). Please restore it to the PC ISaGRAF. Then user can refer to it easily.



If user are not familiar with ISaGRAF programming, recommend to refer to the Chapter 2 of the “ISaGRAF User’s manual” to learn how to write a simple program.

The PDF manual is the “user_manual_i_8xx7.pdf” which can be found in the CD-ROM delivered with the ISaGRAF PAC or downloaded from the following website.
http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=6&kind2=8&model=&kw=isagraf

ISaGRAF PACs data sheet:
http://www.icpdas.com/en/download/index.php?nation=US&kind1=6&kind2=15&model=&kw=isagraf
If user doesn’t have the standard version of ISaGRAF workbench, please refer the following website to install the trial version of it.
https://www.icpdas.com/en/faq/index.php?kind=280#751 >FAQ-139

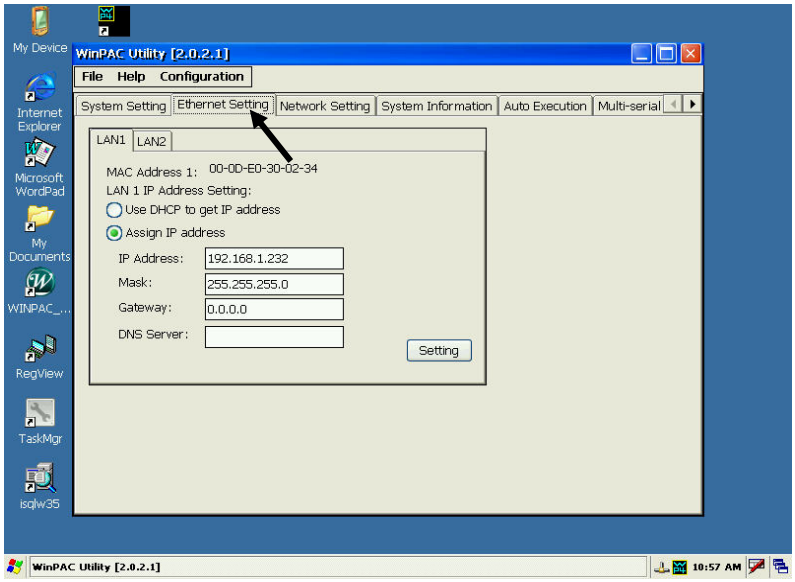
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1.2: How to test this demo

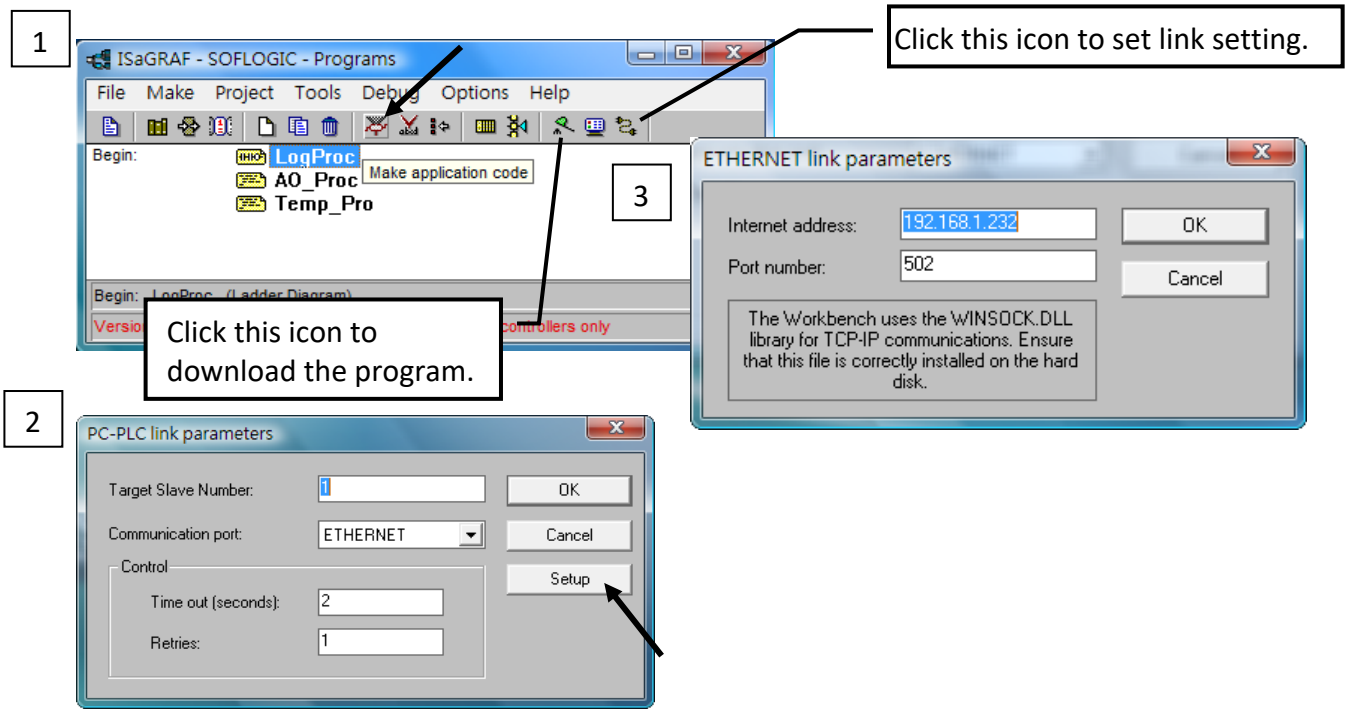
1. Execute the WinPAC Utility in the WP-8447, then click the tab of “Ethernet Setting” to set network environment.

IP : 192.168.1.232
Mask : 255.255.255.0

Then, click the “Setting” button and click [File] > [Save and Reboot] on tool bar. Then the new registry will be applied after the WP-8447 rebooting.



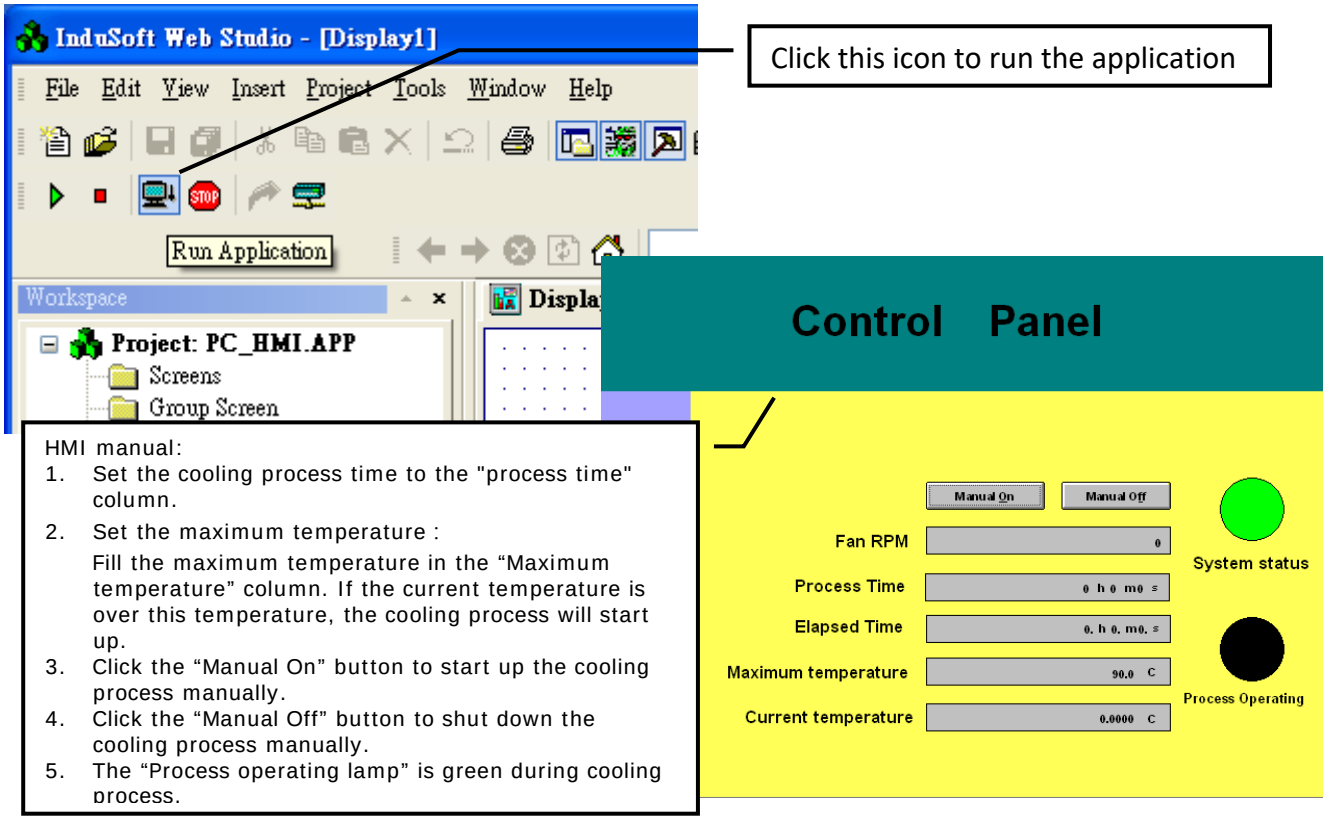
2. Open the ISaGRAF demo program “Soflogic”, compile it and download it to the WP-8447.



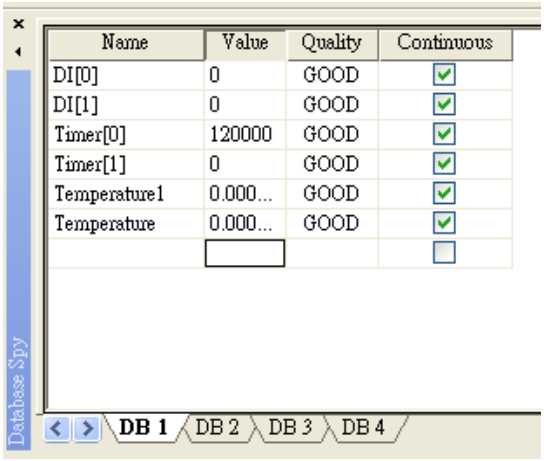
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3. Open the InduSoft demo project “PC_HMI”

The faq140_demo_chinese.zip contains one InduSoft demo project (PC_HMI). Click the file “PC_HMI.APP” in project folder to open it.

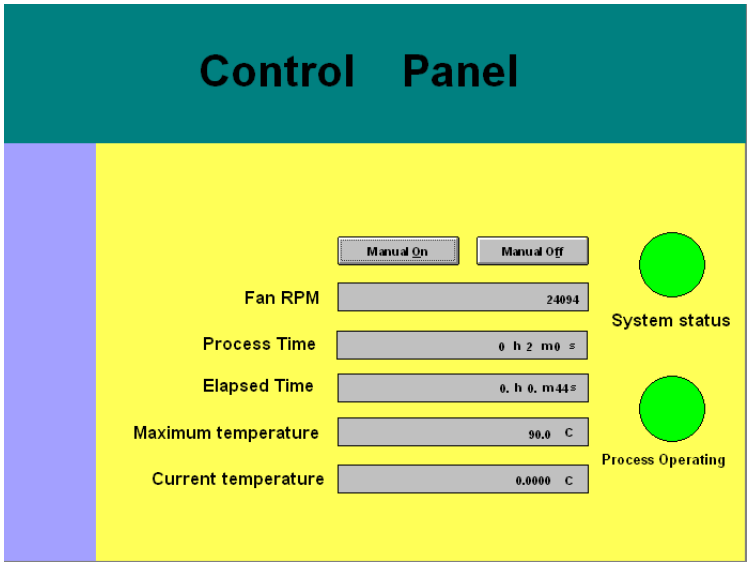


4. If the communication between HMI and ISaGRAF PAC is good, the “System status” lamp is green. If it is bad, the “system status” lamp is red.
Or user can check the communication quality good or bad from the tag in the window of Database Spy. If the quality is bad or the “system status” lamp is red, please recognize whether the WP-8447 and PC are in the same Domain and the network wire is connected or not.



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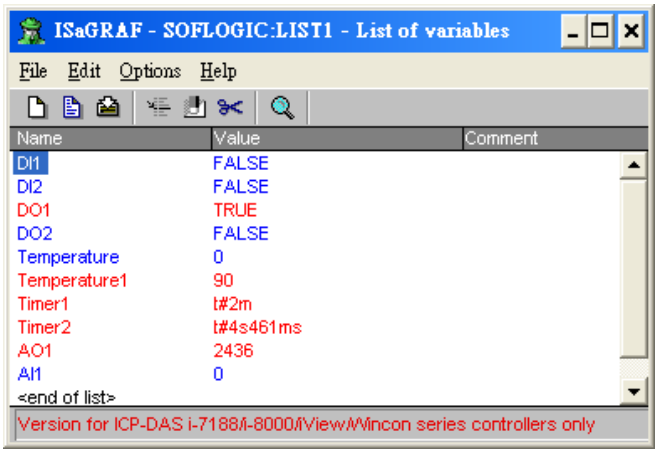
5. The “Process operating” lamp is green during the cooling process, and HMI will show how long the time of the process is passing by in the column of Elapsed Time.



6. User also can observe the variables in the Spy list of ISaGRAF Workbench synchronously to recognize that the cooling system is working or not.

When the cooling system starting up：

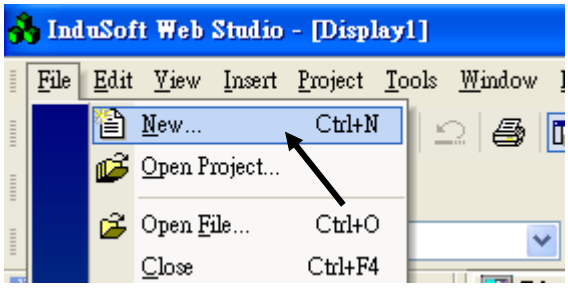
1. The value of DO1 is True to turn the solenoid valve ON for spraying water.
2. The value of AO1 will output continuously to control the RPM of fan.
3. Timer2 is ticking.



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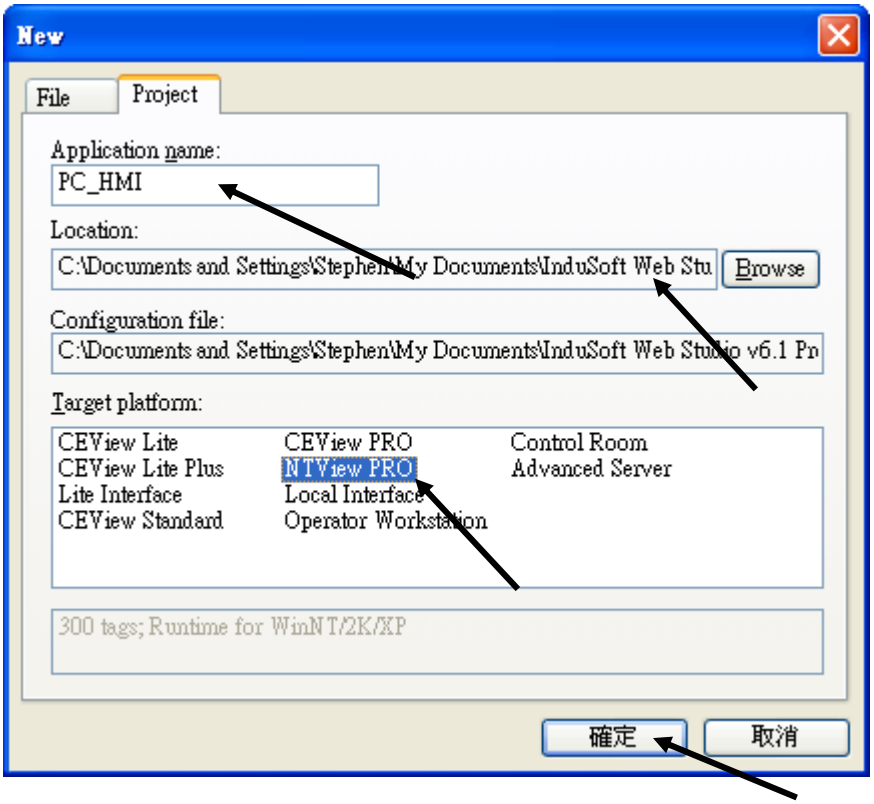
1.3: Create an InduSoft project

1. Select [File] > [New] from the tool bar of InduSoft studio



2. Select the Project tab in the new dialog, and specify a Location, a Configuration file and a Target platform

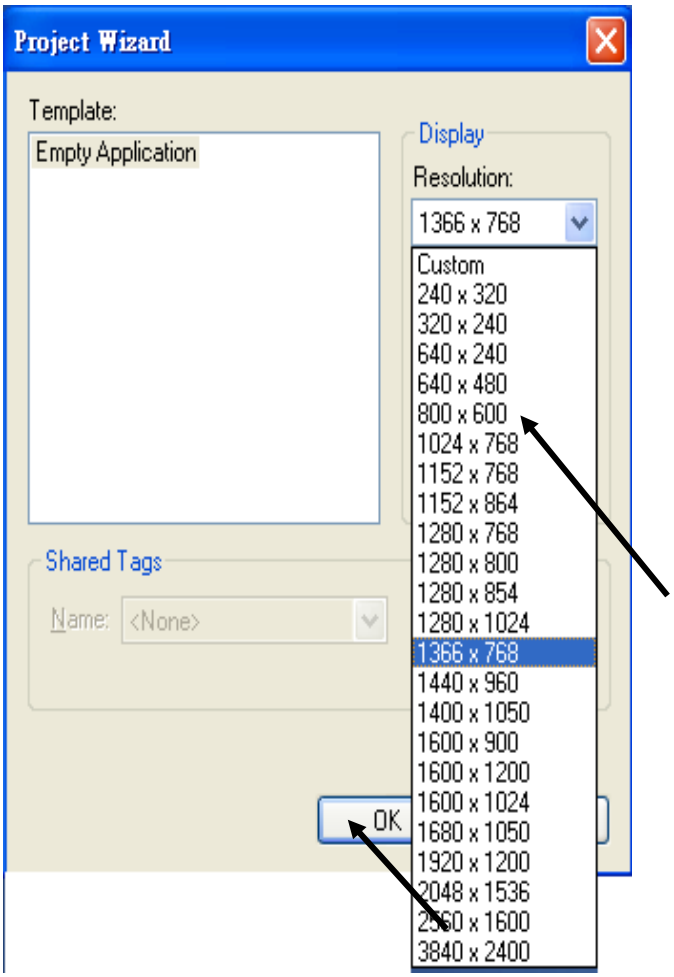
   Input “PC_HMI” in the Application name text box and select “NTViewPRO”.
   Finally, click “OK” button.



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3. Specify the resolution of screen

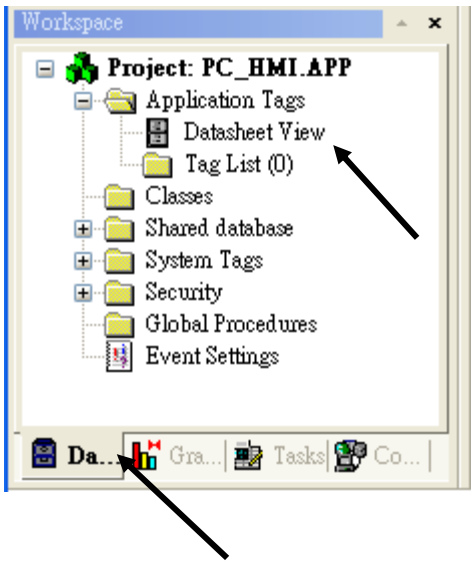
   Specify the resolution to 800*600. Click OK to close the Project wizard dialog.



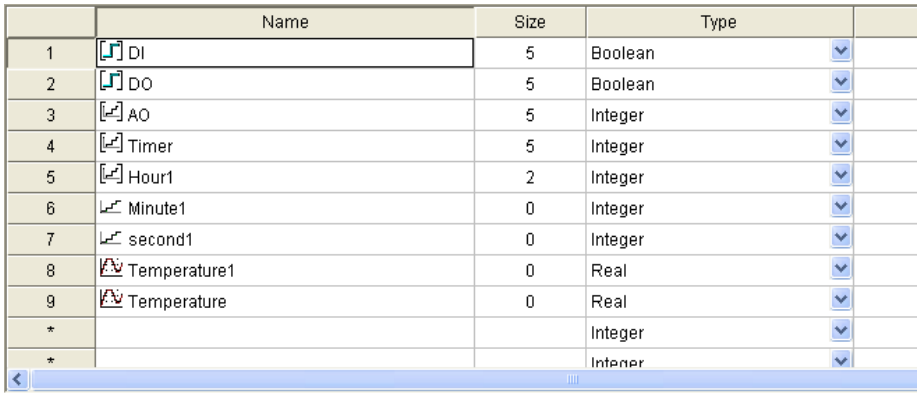
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1.4: Create tags

Select the Database tab in the Workspace pane. Expand the Application Tags folder and right-click the Datasheet View icon. And then select the “Open" to open the Application Tags window in the pop-up menu.



1. Use the following information to complete the fields on this window.

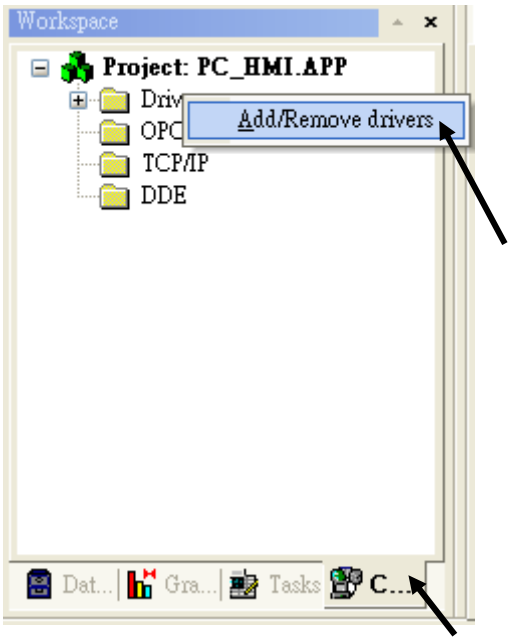


Tag name	Array size	Type	Description
DI	5	Boolean	DO in ISaGRAF
DO	5	Boolean	DI in ISaGRAF
AI	5	Integer	AO in ISAGRAF
Timer	5	Integer	Timer in ISaGRAF
Hour1	0	Integer	Internal
Minute1	0	Integer	Internal
Second1	0	Integer	Internal
Temperature	0	REAL	Current Temperature
Temperature1	0	REAL	Maximum temperature

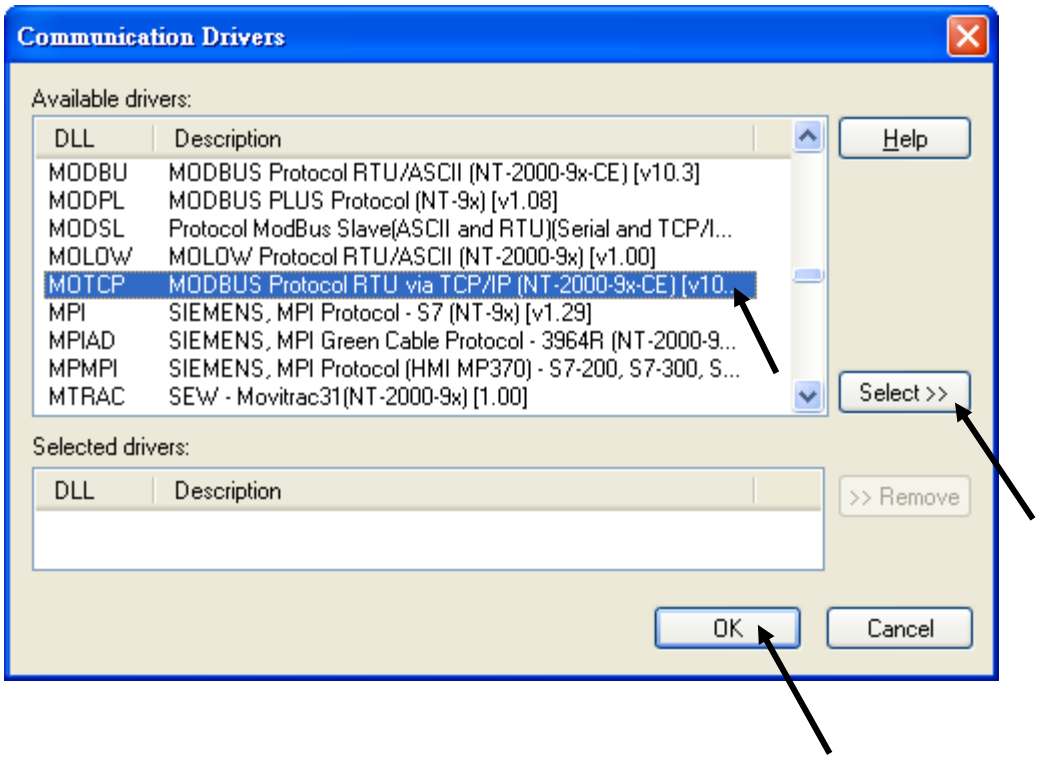
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1.5: Create the Modbus TCP worksheet

1. In the Workspace panel, select the Comm tab. Expand and right-click the “Drivers” folder. And then select the “Add/Remove drivers” in the pop-up menu to open the Communication Drivers dialog.

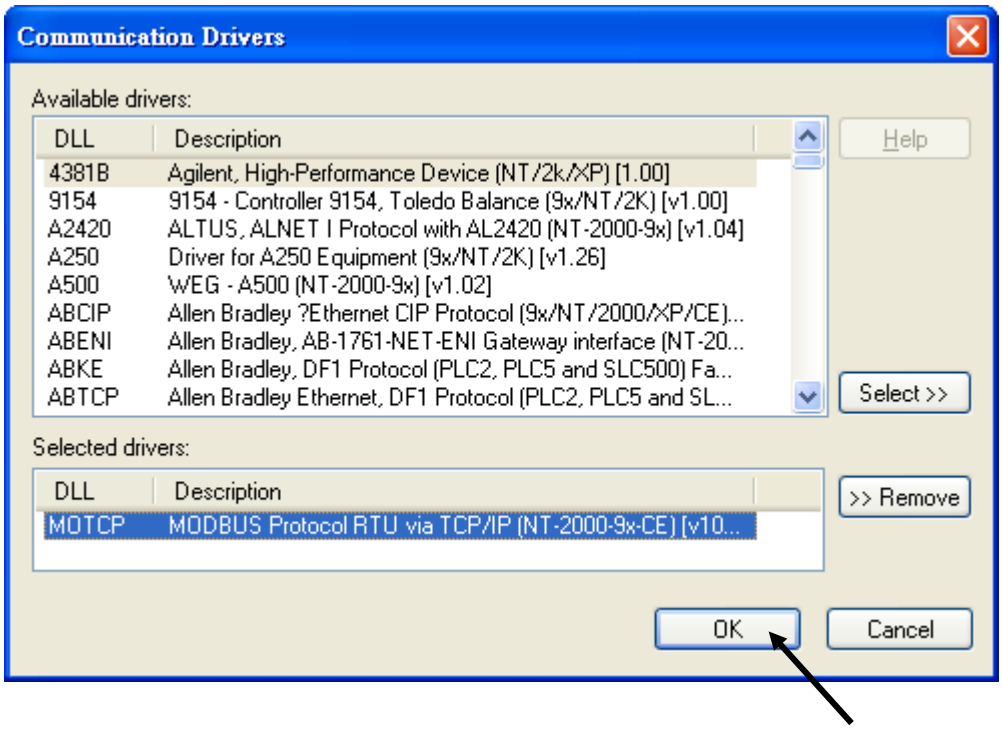


2. Click the MOTCP driver in the list of Communication drivers. Then Click the “select” button.

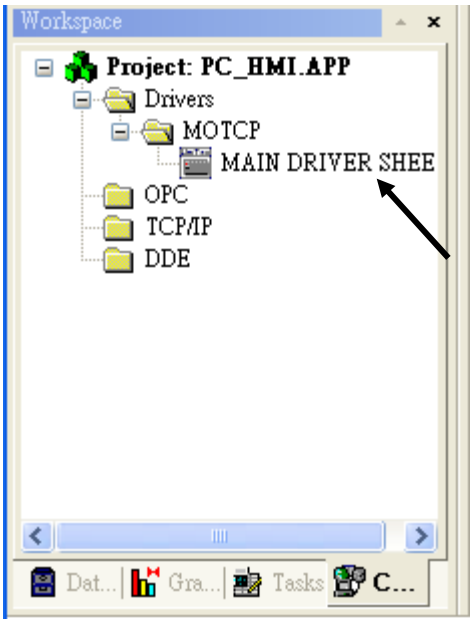


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3. When the MOTCP driver show in the “Selected drivers” list, please click the “OK” button to close the dialog.

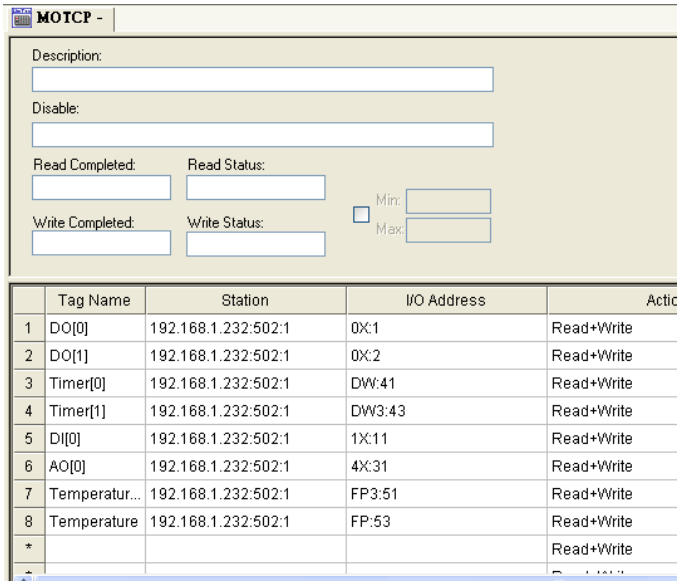


4. Select the Comm tab in the Workspace, expand the MOTCP folder. And double click the “main driver sheet” icon to open worksheet.



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5. Use the following information to complete the fields on this work sheet.



The map of Modbus address of the Open variable in the ISaGRAF PAC:

Variable name	Type	Address	Comment
DI1~DI5	Boolean	1~5	Internal variables to trigger or stop the cooling process
DO1~DO3	Boolean	11~13	Control the channel 1~3 of I-8057
DO4	Boolean	14	Check the state of communication between HMI and ISaGRAF PAC
DO5	Boolean	15	Control the channel 4 of I-8057
AI1~AI5	Integer	21~25	The state of the channel 1~5 of I-87018
AO1~AO5	Integer	31~35	Control the channel 1~4 of I-8024
Timer1	Integer	41	The time of total process
Timer2	Integer	43	Elapsed time

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The map of tags：

Tag Name	station	I/O address
DO[0]	192.168.1.232:502:1	0X:1
DO[1]	192.168.1.232:502:1	0X:2
Timer[0]	192.168.1.232:502:1	DW:41
Timer[1]	192.168.1.232:502:1	DW3:43
DI[0]	192.168.1.232:502:1	1X:11
AO[0]	192.168.1.232:502:1	4X:31
Temperature1	192.168.1.232:502:1	FP3:51
Temperature	192.168.1.232:502:1	FP:53
DI[4]	192.168.1.232:502:1	1X:14

The detail information of the Column Field Name：

- **Tag Name: a tag name for communication driver to use**
- **Station: the equipment station number within the network.**
  Please refer to the following syntax to fill in this field

  <IP address>:<Port Number>:<Slave ID>
  IP address: the IP address of the Modbus device
  Port Number: the port number for the Modbus TCP protocol(usually 502)
  Slave ID: the slave ID of Modbus device

  EX: ISaGRAF PAC IP : 192.168.1.232, TCP Port : 502,
  Slave ID(Number) : 1

  192.168.1.232:502:1

- **I/O address: the Modbus address of the associated device register.**
  Please refer to the following syntax to fill in this filed

  <Type>:<Address>
  Type : Register type

  The map of the type to Read/Write open variable in ISaGRAF PAC

ISaGRAF variable	Type
Read Boolean	1X
Read and write Boolean	0X
Read integer	3X
Read and write integer	4X
Read long integer	DW3
Read and write long integer	DW
Read Timer	DW3
Read and write Timer	DW
Read real	FP3
Read and write real	FP

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Address : Address of the device register(in Decimal)

EX: Address of the device register：41, read a timer variable

I/O address → DW3:41

For more detail about designing InduSoft HMI, please refer to the following website:
http://www.icpdas.com/en/download/index.php?nation=US&kind1=6&kind2=17&model=&kw=Indusoft

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