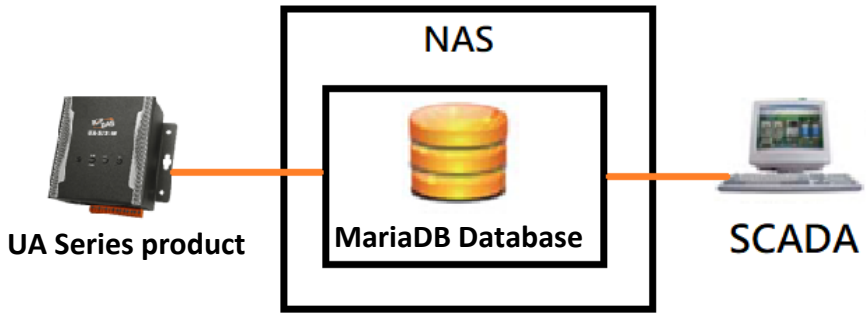
● How to save the UA collected data into MariaDB in NAS and then show the trend chart in InduSoft? (Take NAS DS712+ as an example)

UA series products of ICP DAS provide a useful service to transfer TCP/RTU data into the database. The NAS can be used to store the database data, and then by using InduSoft can retrieve the data to manage the database easily. Due to the time format written by UA being different from the reading format of InduSoft, here is how InduSoft read data.

(In this example, we use UA-5231M-4GE / Windows 10 64 bits OS / MariaDB 10 Database / NAS DS712+ / DL-302 with Modbus RTU protocol)



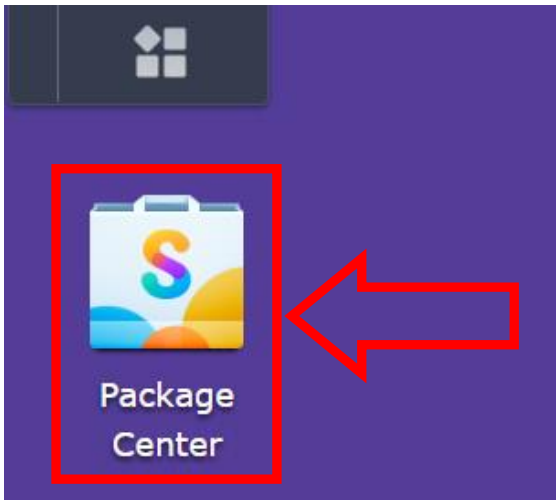
This FAQ will introduce:

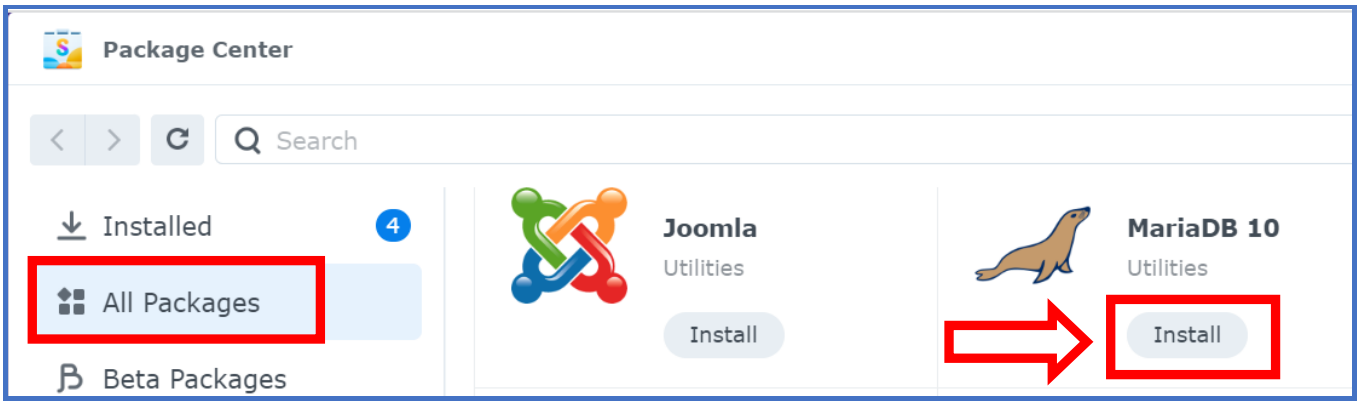
1. **How to Create MariaDB Environment in NAS?**
2. **How to set up UA products to save Modbus RTU data into the Database?**
3. **After transferring UA data into Database, how to combine the Date and Time columns?**
4. **How InduSoft read data in the Database?**

1. How to Create MariaDB Environment in NAS?

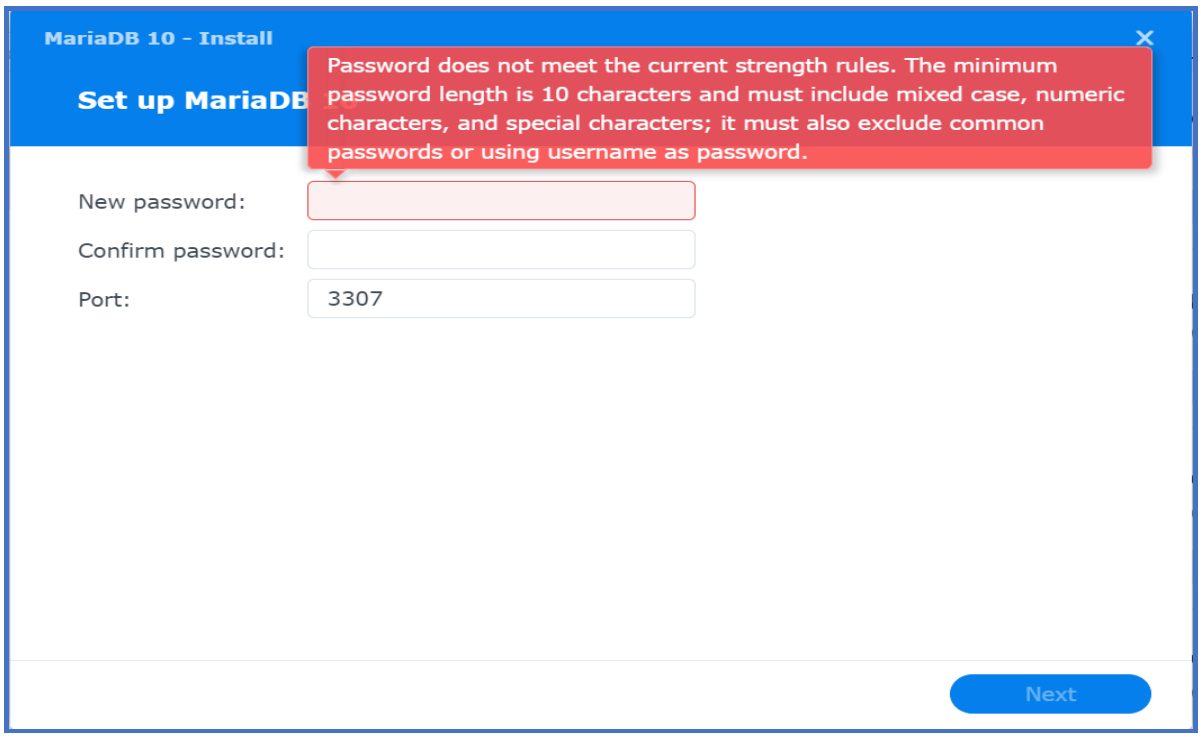
First, go to [Package Center] of NAS.

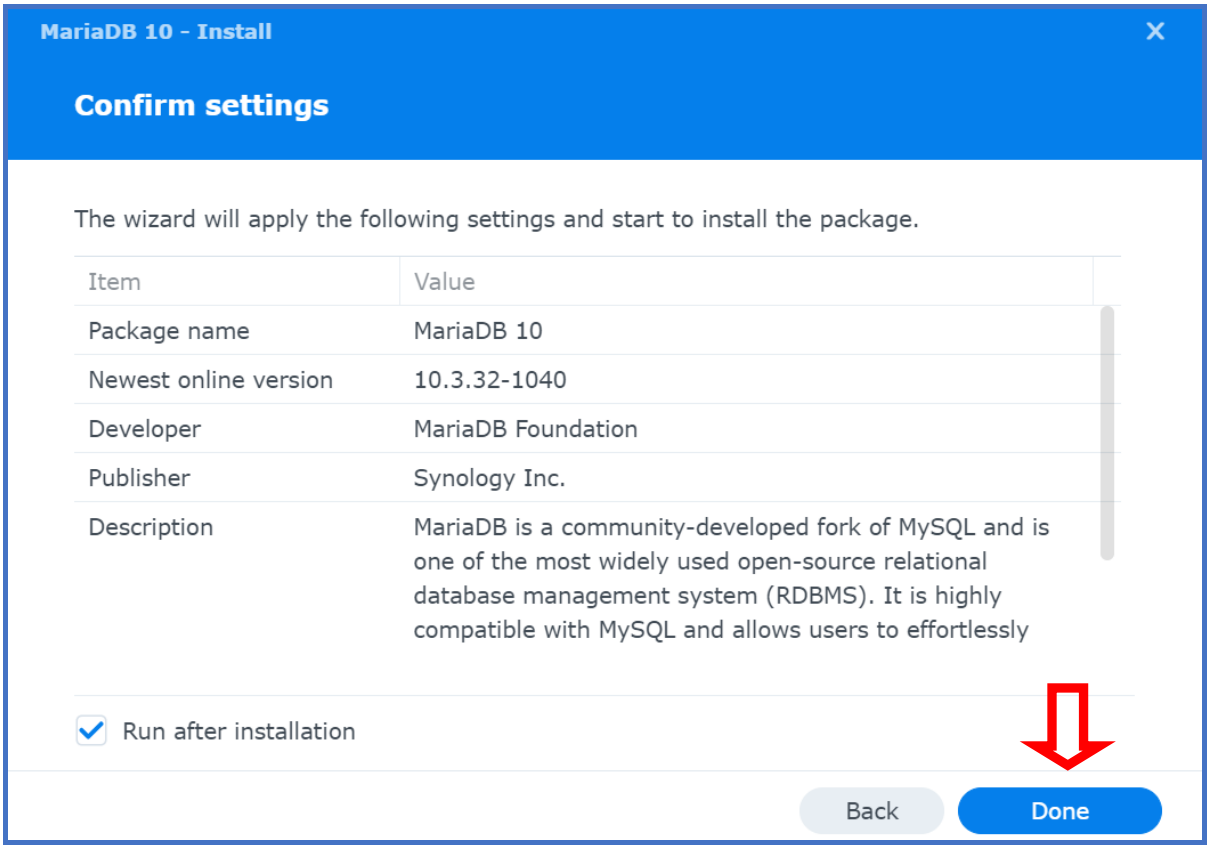
In the [All Packages], select [MariaDB 10] and click on the [**Install**].



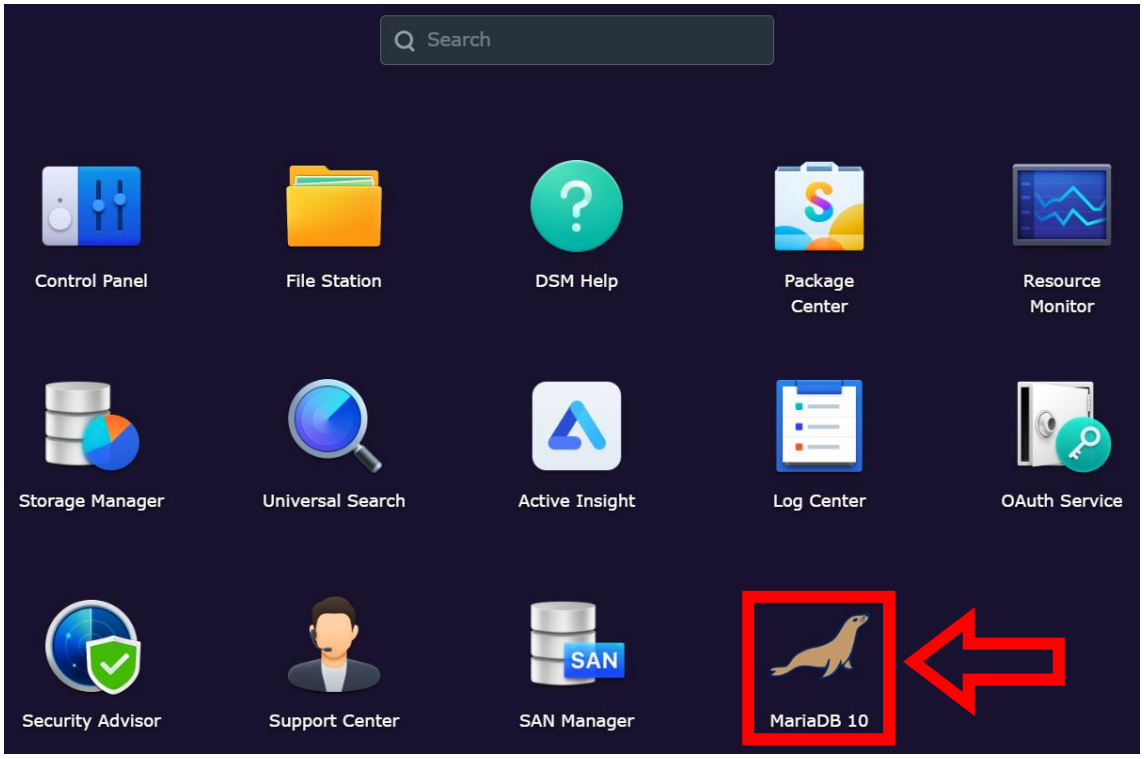


Fill in the password to install the package.

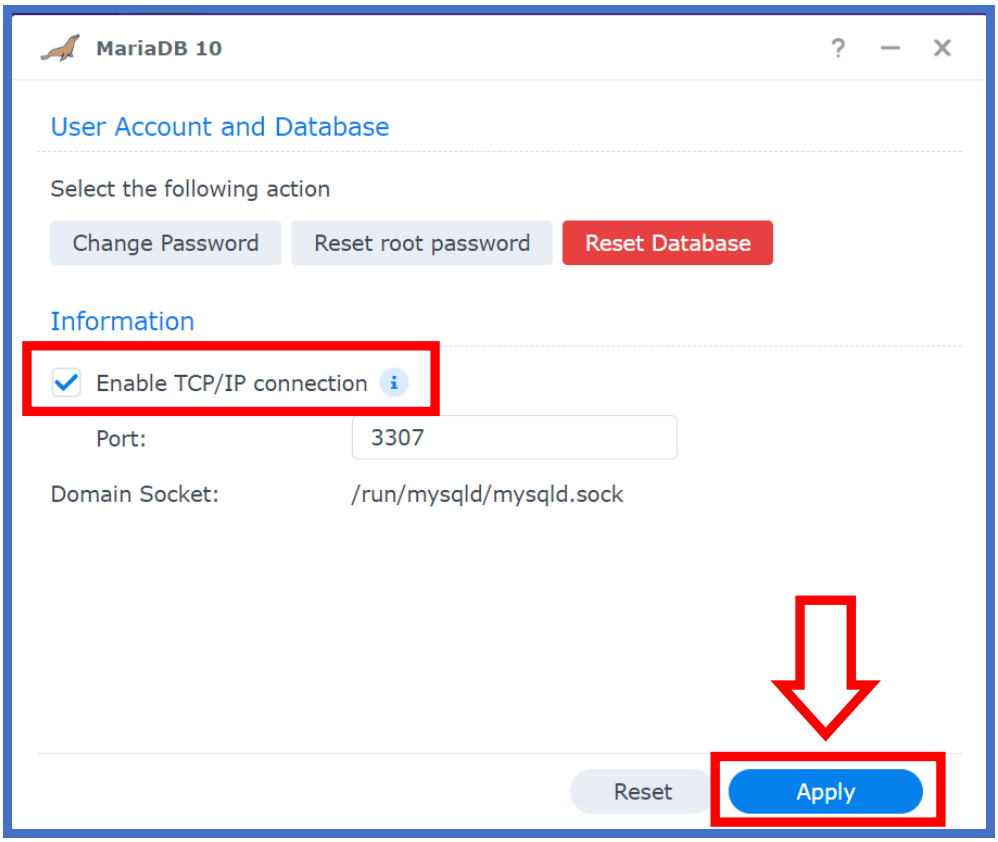




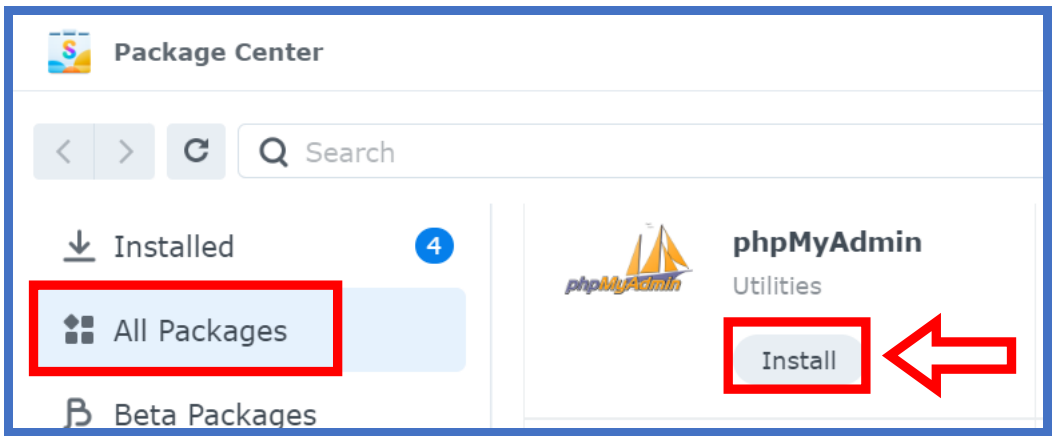
Run the MariaDB 10.



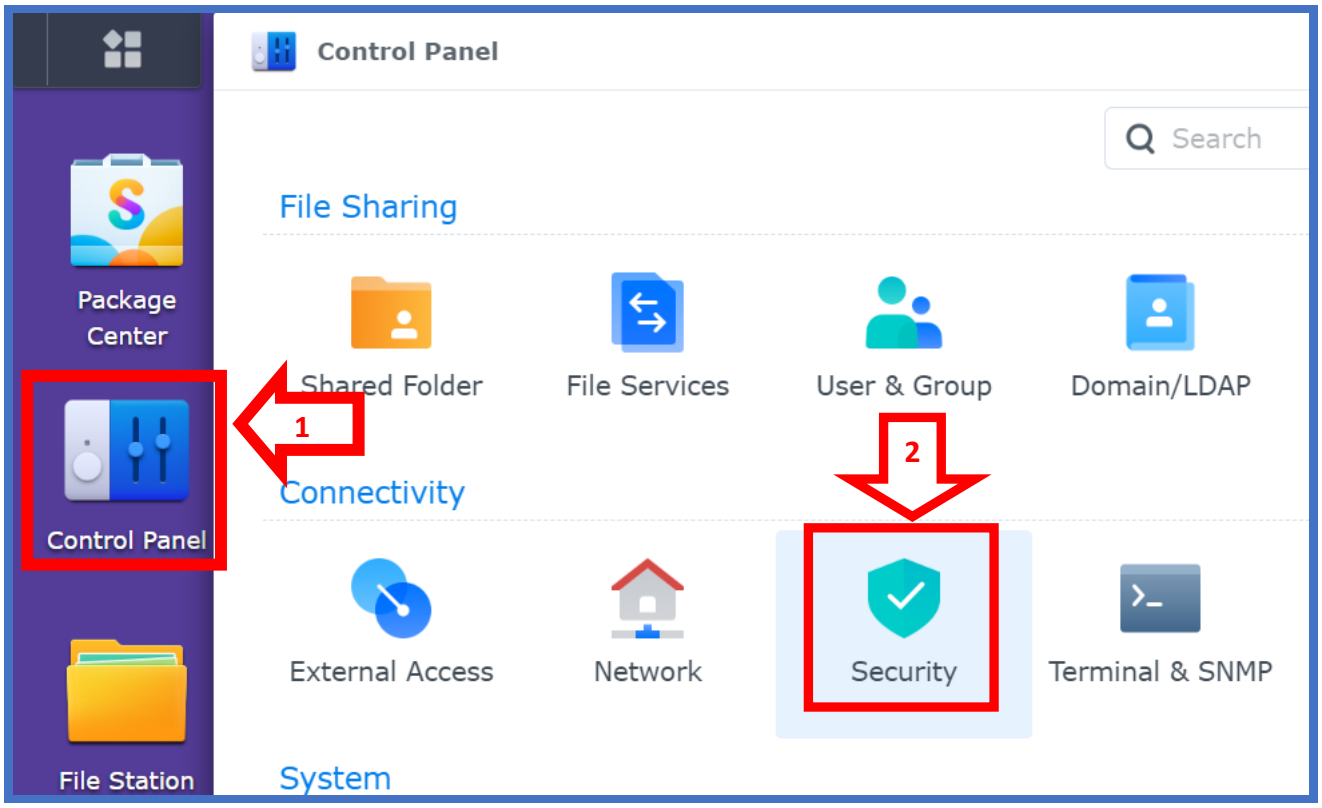
Check the [**Enable TCP/IP connection**] and click [**Apply**].

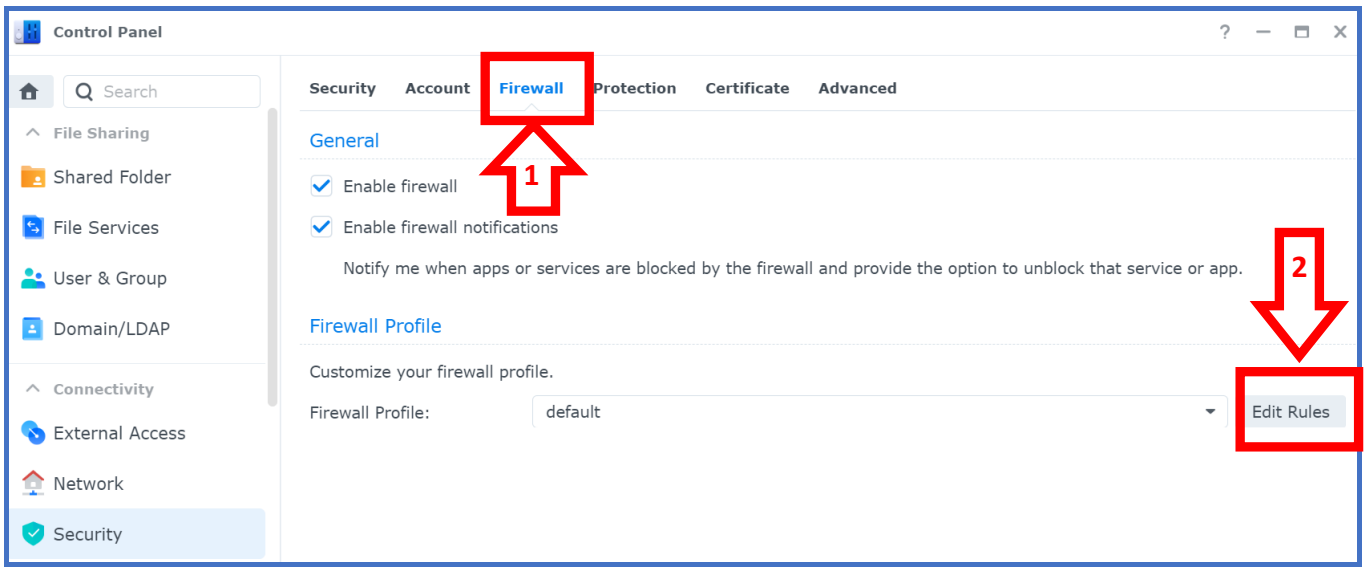


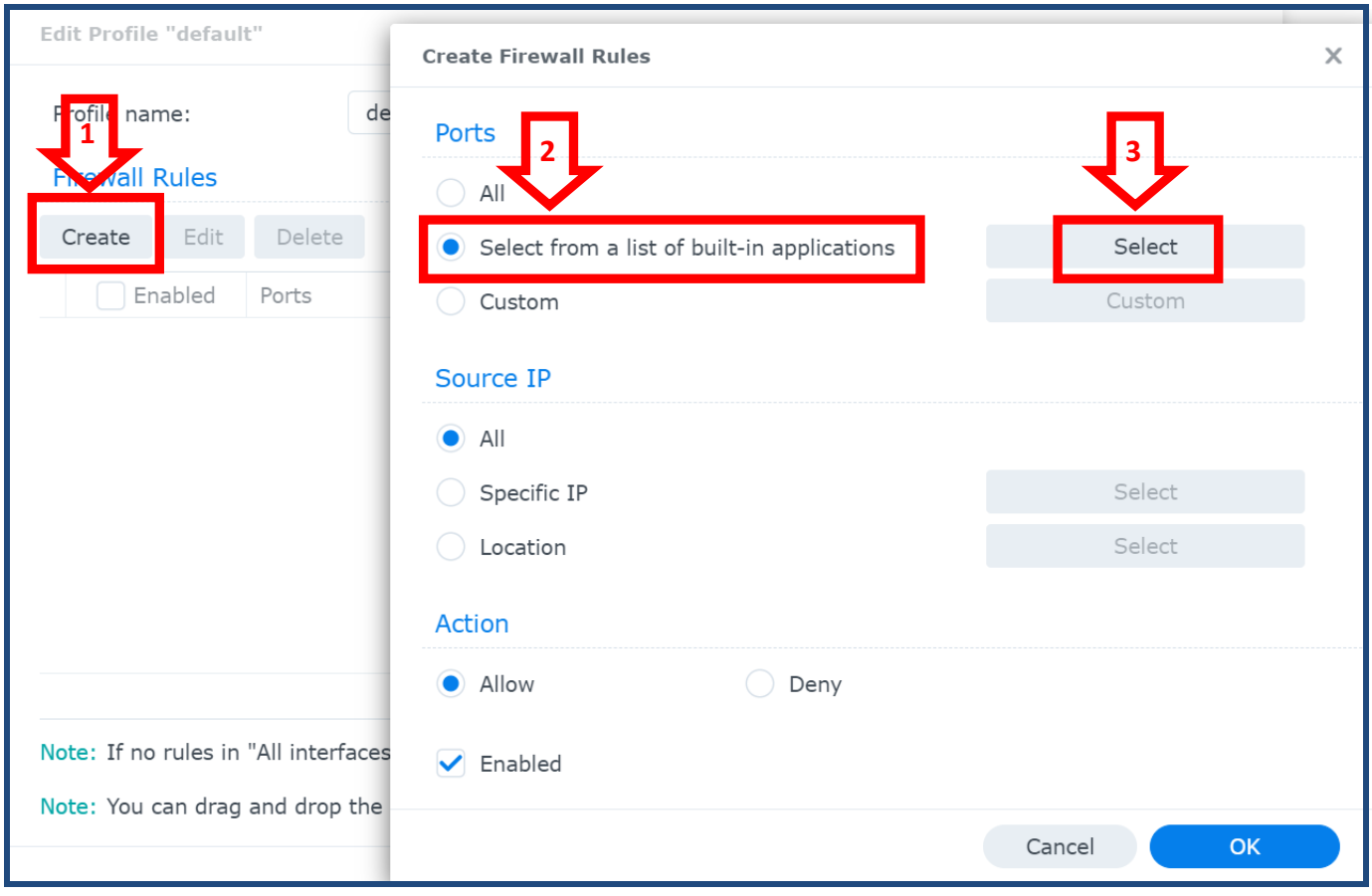
In the [All Packages], select [**phpMyAdmin**] and click on the [**Install**].



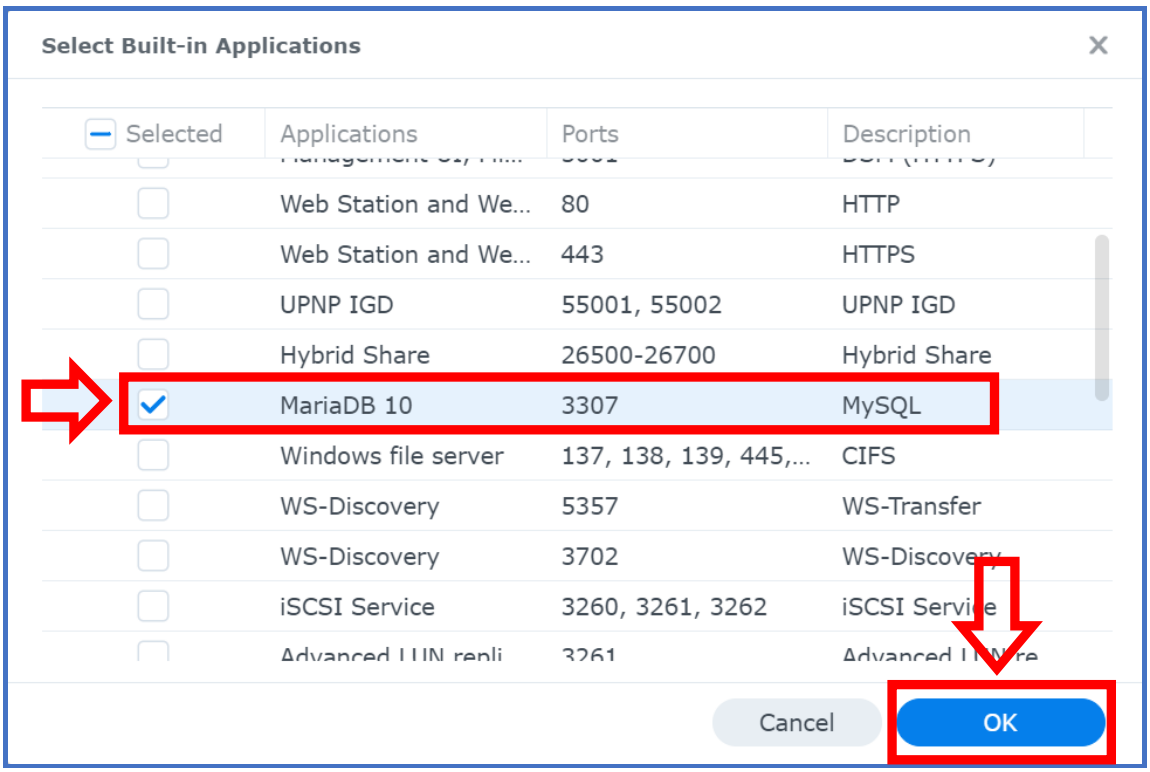
If the firewall is enabled, go to [**Control Panel**] and then the [**Security**] to set it up.

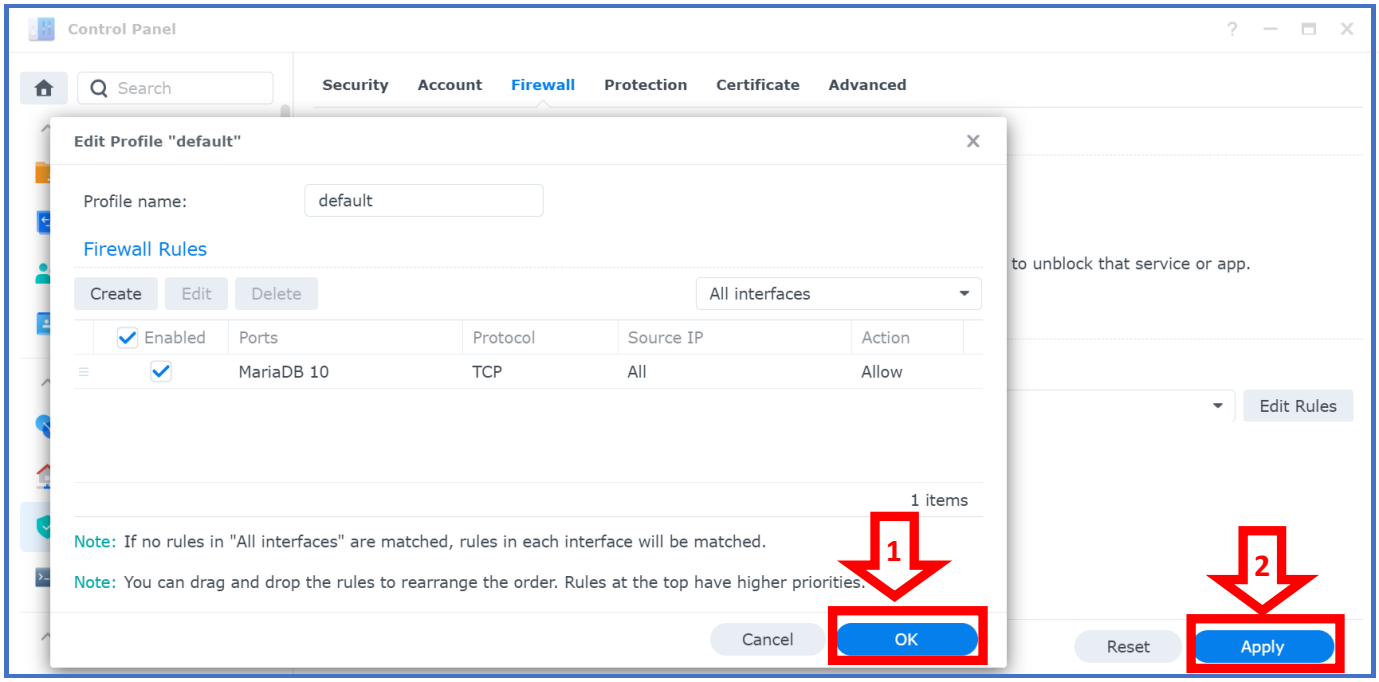



Control Panel
Search
File Sharing
Shared Folder
File Services
User & Group
Domain/LDAP
Connectivity
External Access
Network
Security
Security
Account
Firewall
Protection
Certificate
Advanced
General
Enable firewall
Enable firewall notifications
Notify me when apps or services are blocked by the firewall and provide the option to unblock that service or app.
Firewall Profile
Customize your firewall profile.
Firewall Profile:
default
Edit Rules
1
2

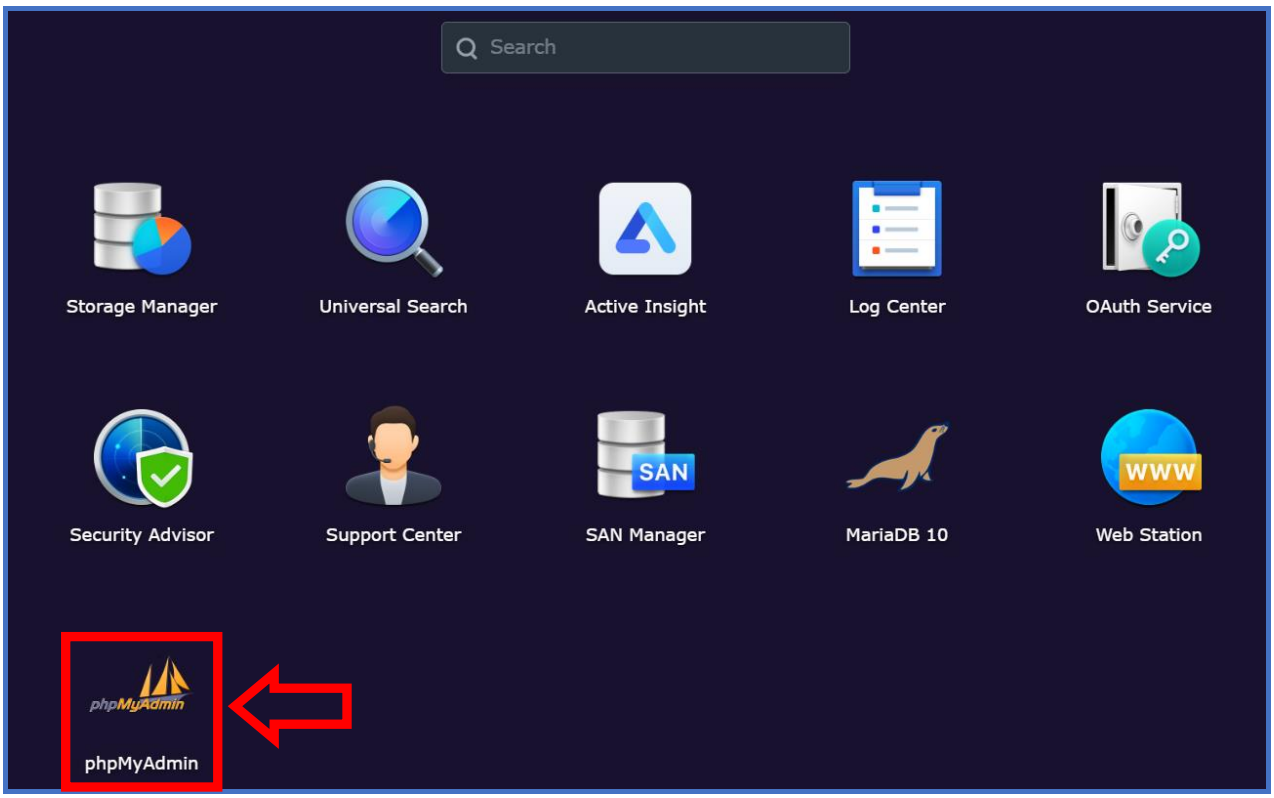

Edit Profile "default"
Profile name:
Firewall Rules
Create
Edit
Delete
Enabled
Ports
Note: If no rules in "All interfaces
Note: You can drag and drop the
1
Create Firewall Rules
Ports
All
Select from a list of built-in applications
Custom
Select
Custom
Source IP
All
Specific IP
Location
Select
Select
Action
Allow
Deny
Enabled
Cancel
OK
2
3

Add the MariaDB 10 to the Allow list.





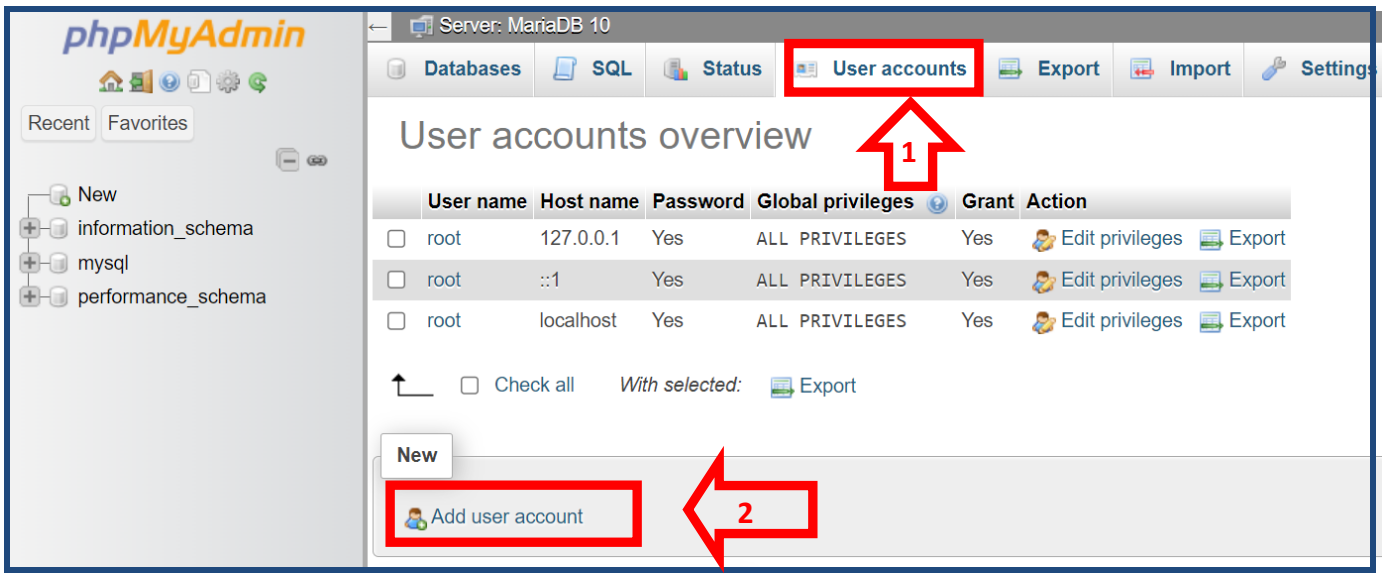
After settings, click the Menu icon on the left top, and run the **phpMyAdmin**.



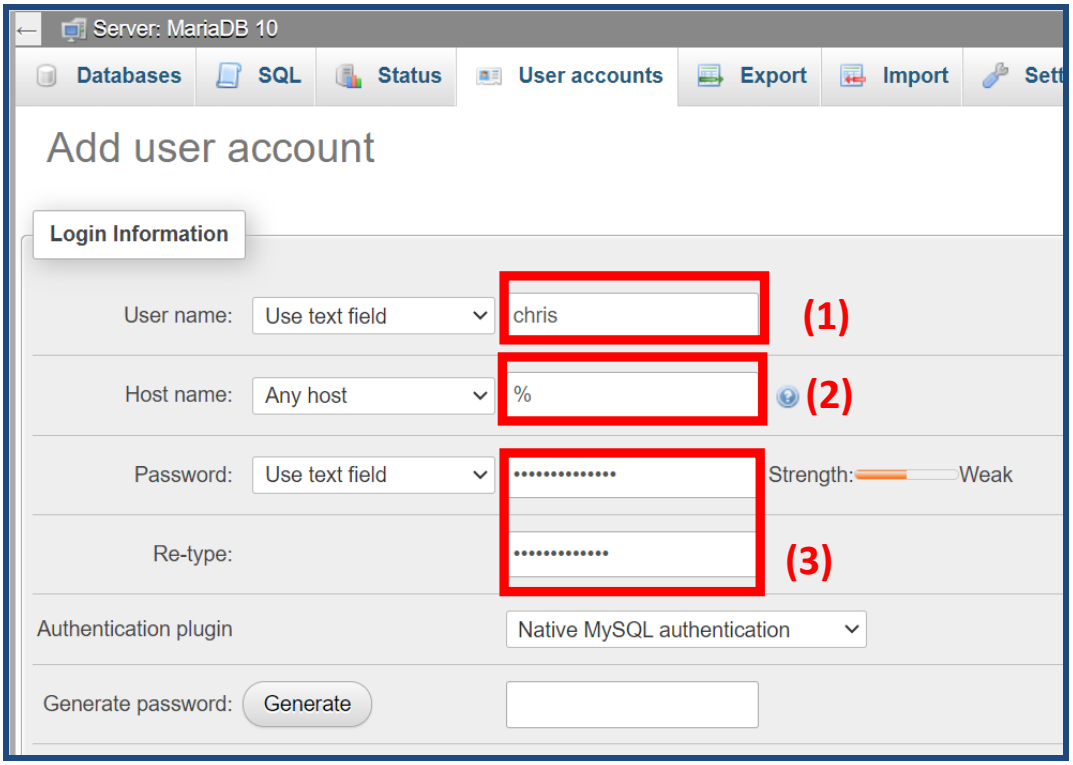
Default Username: root

Password: password entered during installation

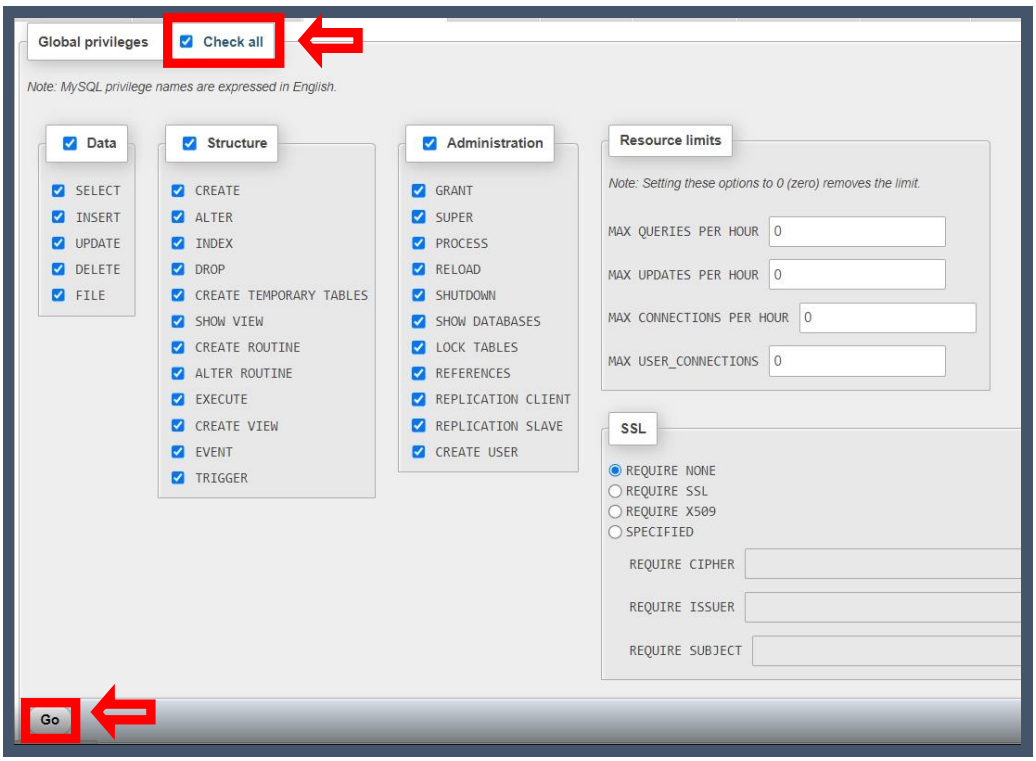
Add user account.



Add User accounts, allow any host to be [%], and set [password].

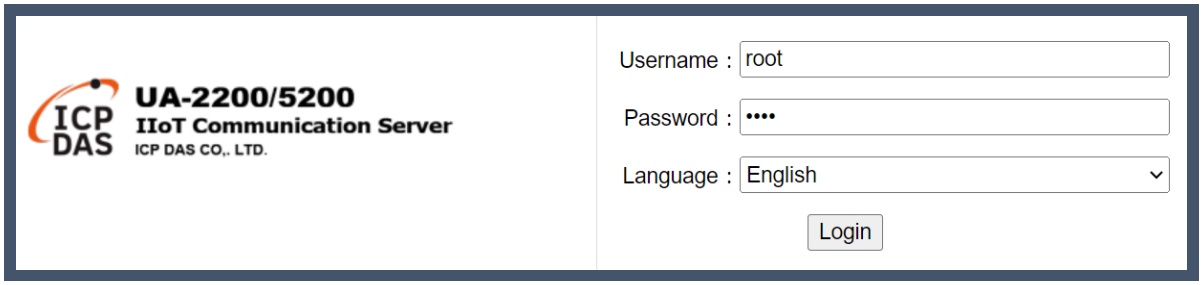


Database [Permission] setting, check [**Check All**], and click [Go].

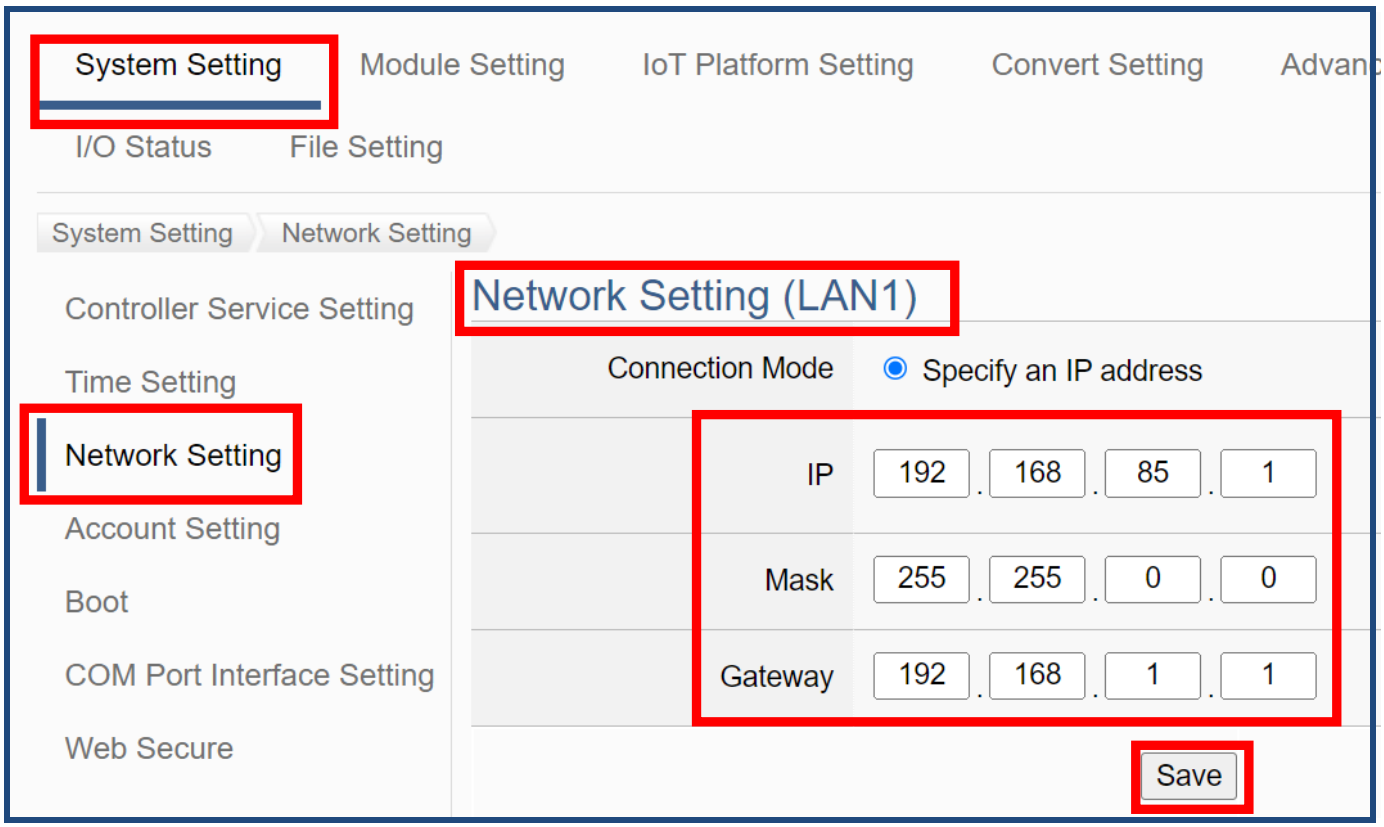


2. How to set up UA products to save Modbus RTU data into the Database?

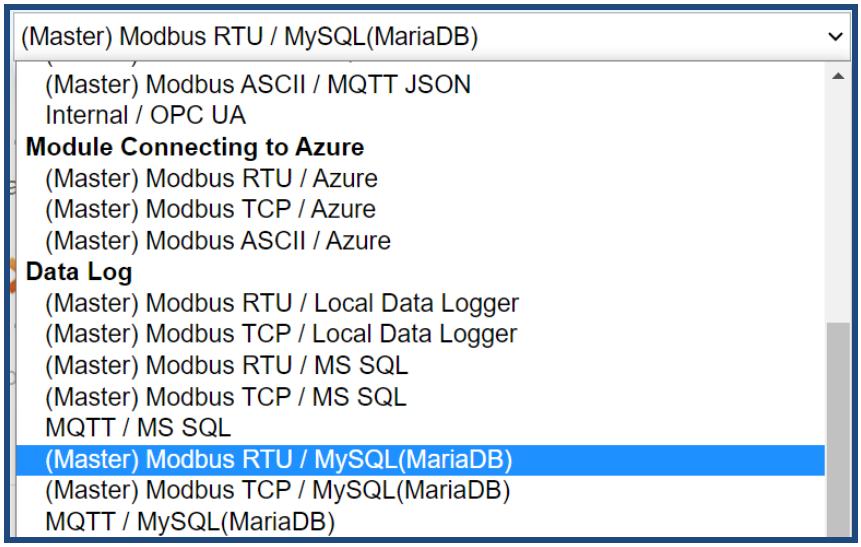
Enter http://192.168.255.1 in the URL bar and after the Web UI login page appears, log in with the default Web UI account/password root/root.



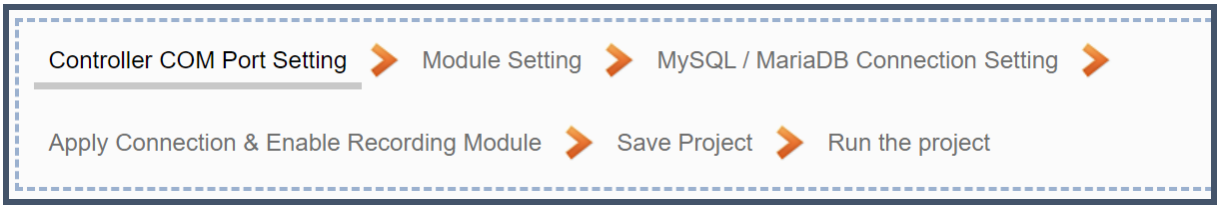
After successful login, go to [**System Setting**] => [**Network Setting**] => [**Network Setting (LAN1)**] to change the network settings according to the actual network environment.



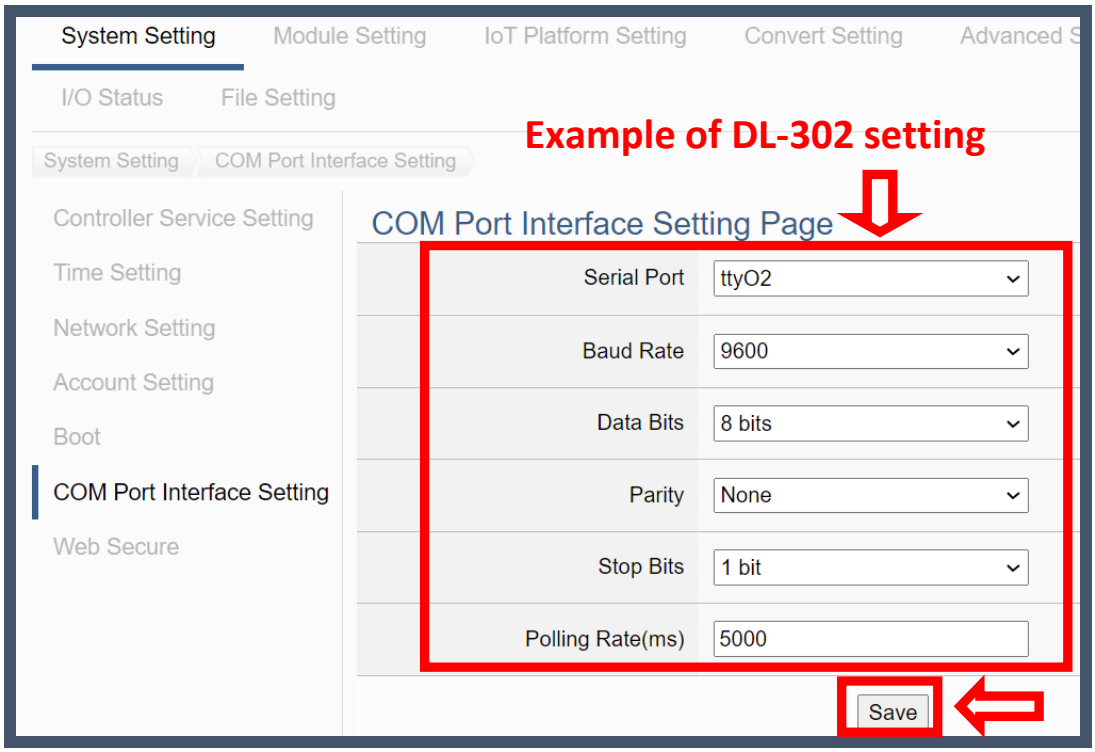
After re-entering the page, select [**(Master) Modbus RTU / MySQL(MariaDB)**] from the menu in the upper right corner.



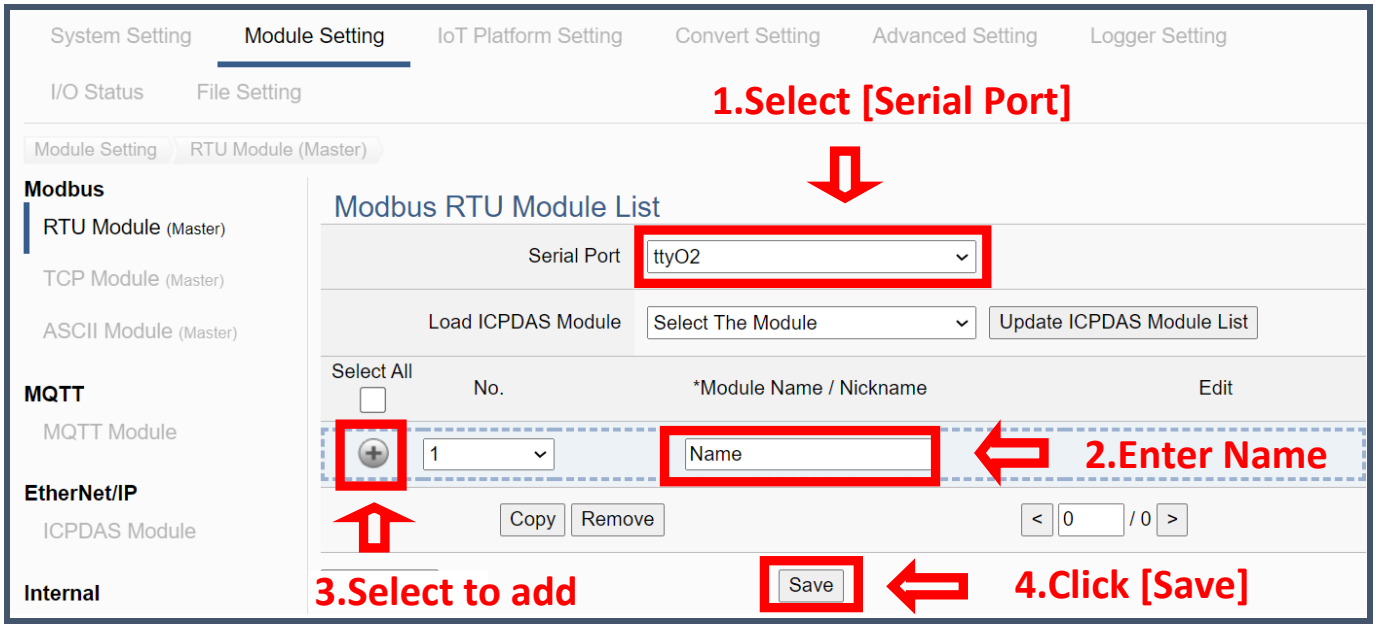
Simply follow the steps on the screen to set up and complete your project!

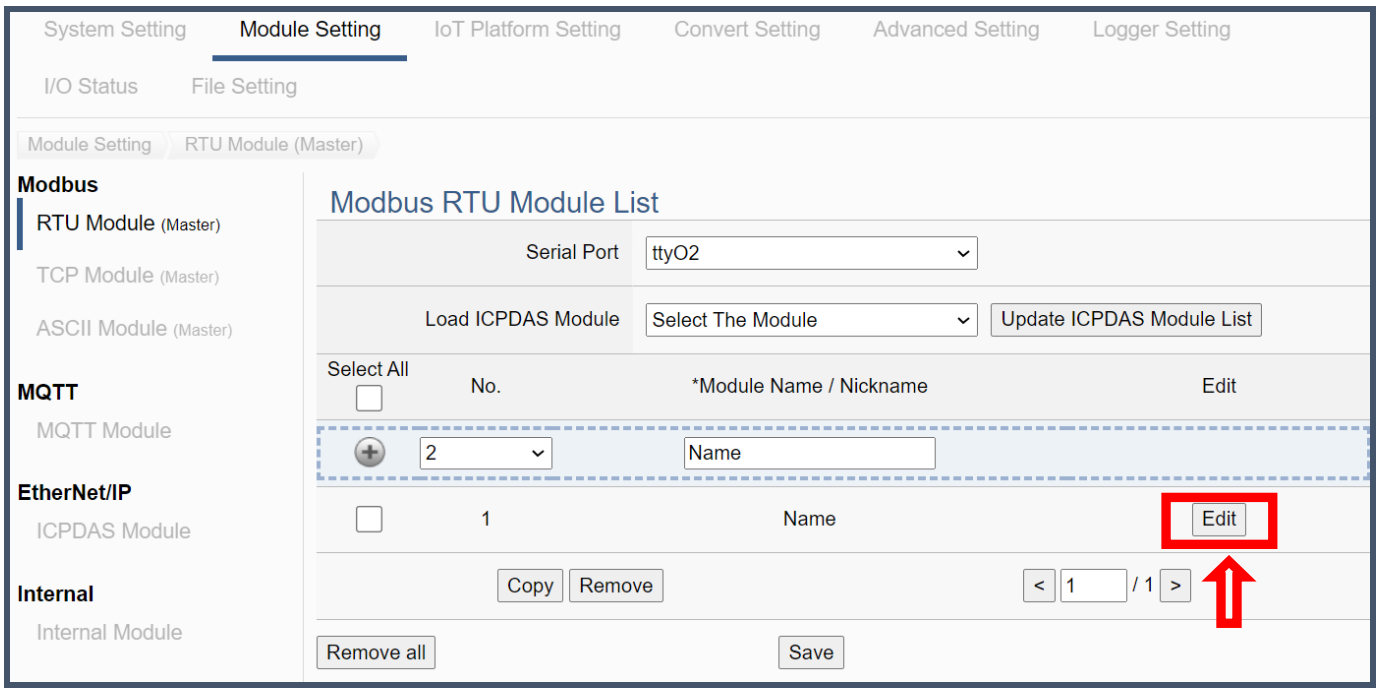


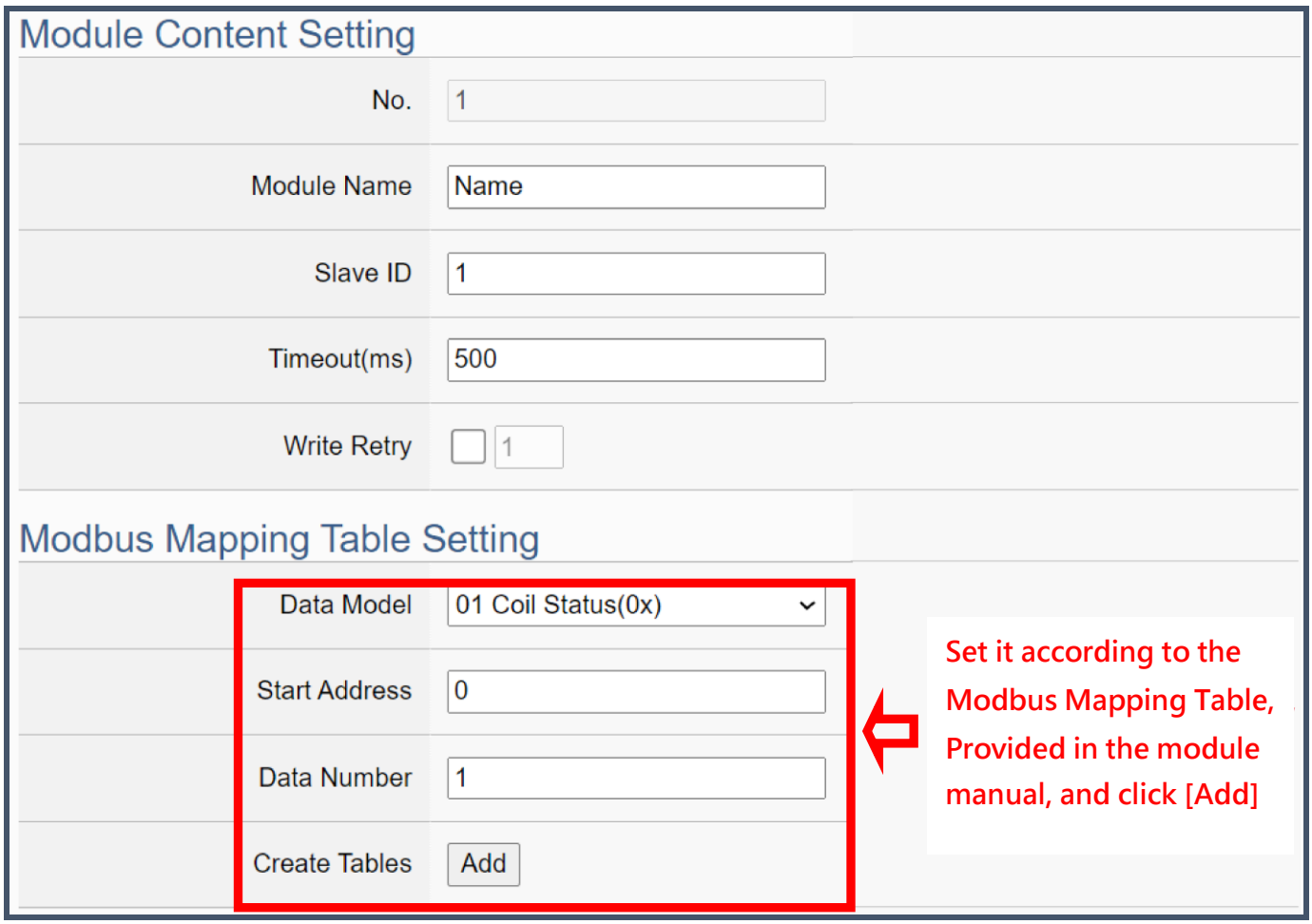
COM Port settings are based on the DL-302 as an example.



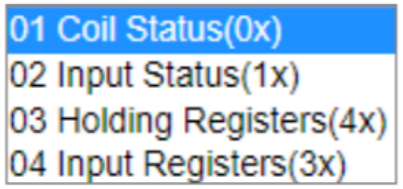
Address: Sets the address for a module.
Default: 1 Range: 0 ~ 255
Protocol: Sets the communication protocol.
- ModbusRTU (default) - DCON - DCONChkSum: uses DCON protocol and enables checksum validation feature
Baud Rate
Default: 9600 Support Baud Rate: 1200/ 2400/ 4800/ 9600/ 19200/ 38400/ 57600/ 115200 (unit: bps)
Parity
Default: N,8,1 Support format: N81, N82, E81, O81
Response Delay (ms): Sets the delay time between receiving the command and sending the data.
Default: 0 ms Range: 0 ~ 30 (unit: ms)
Save: Saves the modification and returns to the Settings menu. All the changes take effect immediately after saving changes.
Skip: Returns to the Settings menu without saving any changes.




System Setting
Module Setting
IoT Platform Setting
Convert Setting
Advanced Setting
Logger Setting
I/O Status
File Setting
Module Setting
RTU Module (Master)
Modbus
RTU Module (Master)
TCP Module (Master)
ASCII Module (Master)
MQTT
MQTT Module
EtherNet/IP
ICPDAS Module
Internal
Internal Module
Modbus RTU Module List
Serial Port
ttyO2
Load ICPDAS Module
Select The Module
Update ICPDAS Module List
Select All
No.
*Module Name / Nickname
Edit
2
Name
1
Name
Edit
Copy
Remove
< 1 / 1 >
Remove all
Save


Module Content Setting
No.
1
Module Name
Name
Slave ID
1
Timeout(ms)
500
Write Retry
1
Modbus Mapping Table Setting
Data Model
01 Coil Status(0x)
Start Address
0
Data Number
1
Create Tables
Add
Set it according to the Modbus Mapping Table, Provided in the module manual, and click [Add]

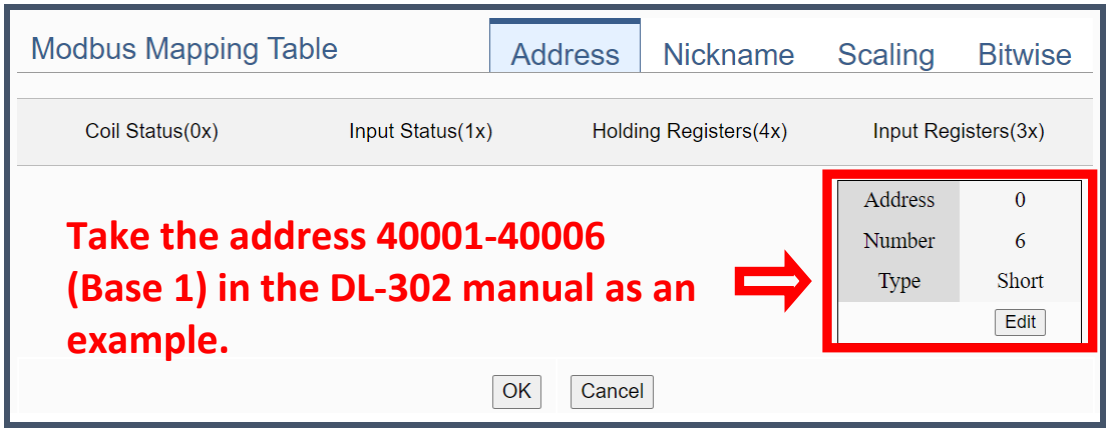
Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)
Start Address	The start address of the Modbus command. **Note:** the Start Address of UA is bass on 0, even if some modules are bass on 1, here it needs to follow UA to set bass on 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.



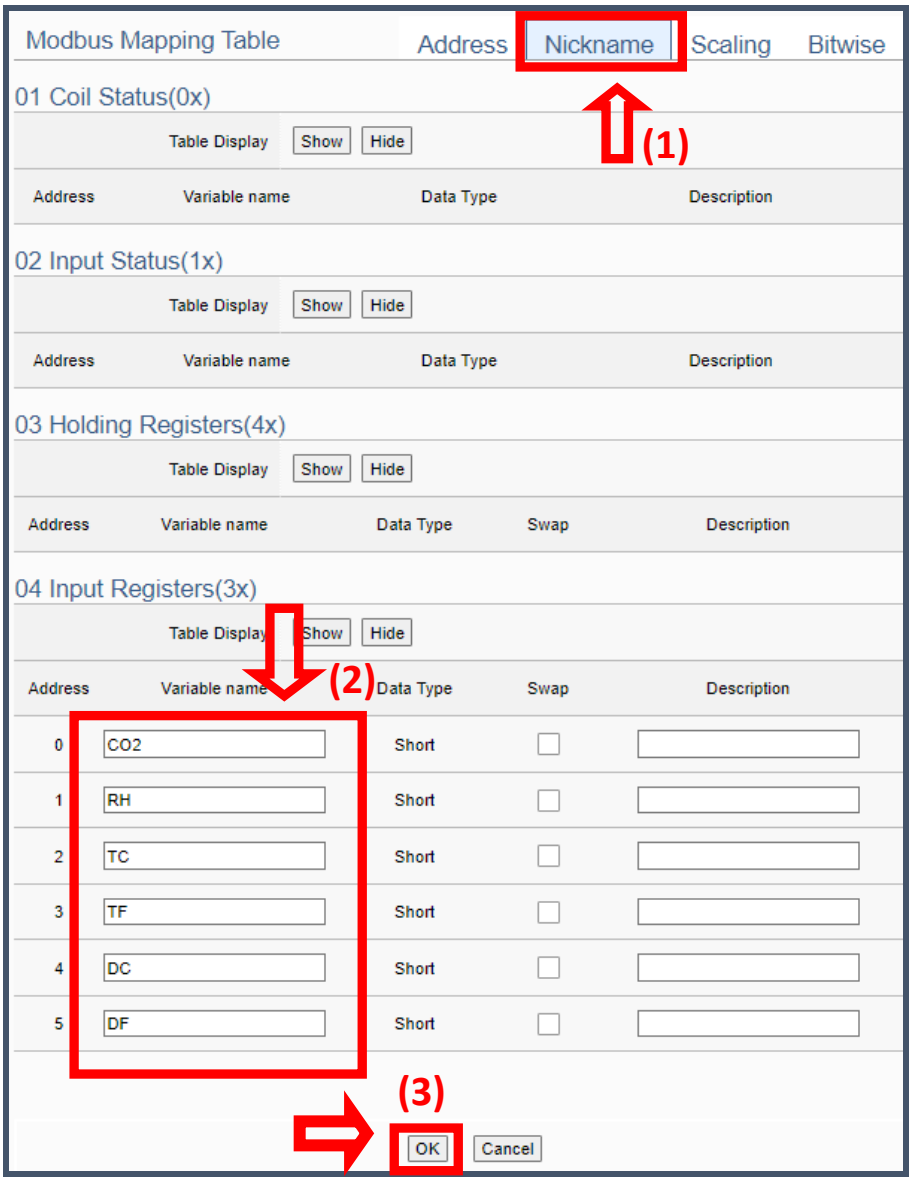
DL-302 Modbus Address Mappings (Base 1)

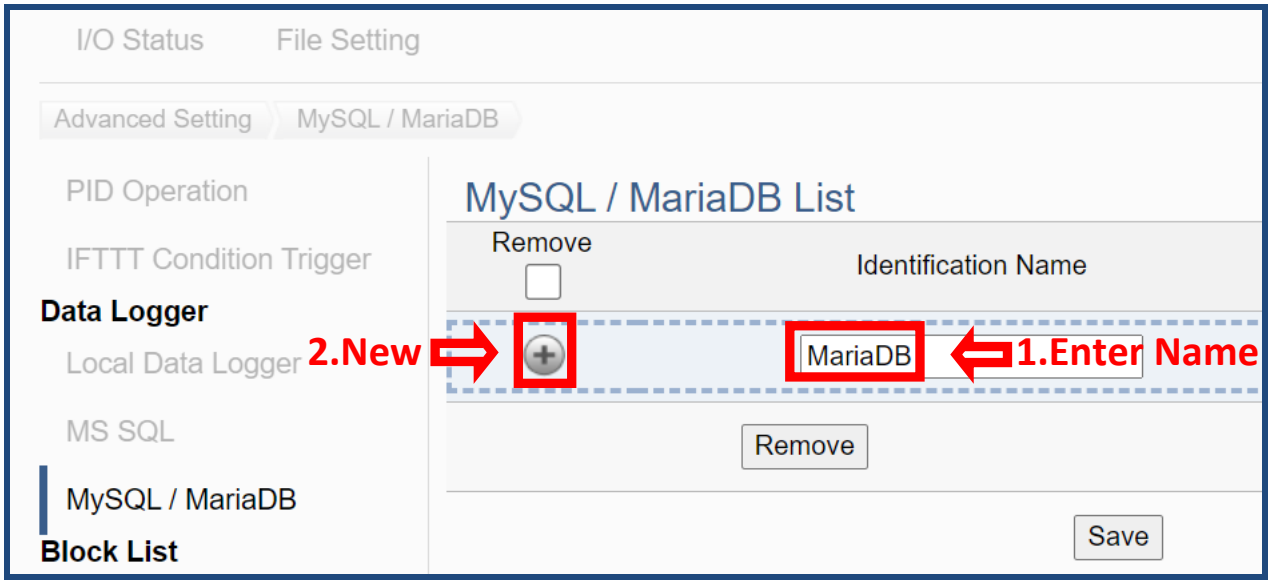
Address	Description	Attribute
30001 ~ 30006 40001 ~ 40006	Analog input value of channel 0 to 5. channel 0: CO_2 in 1ppm, channel 1: relative humidity in 0.01%, channel 2: temperature in 0.01°C, channel 3:temperature in 0.01°F, channel 4: dew point temperature in 0.01°C, channel 5: dew point temperature in 0.01°F	R

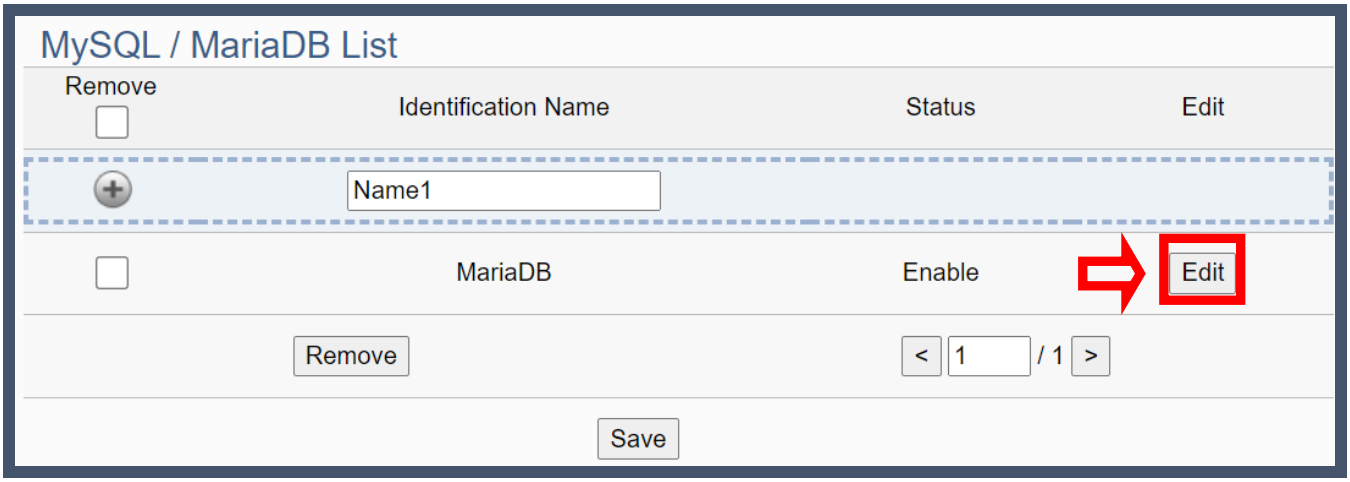
Address Setting: Modbus Mapping Table Display and Edit



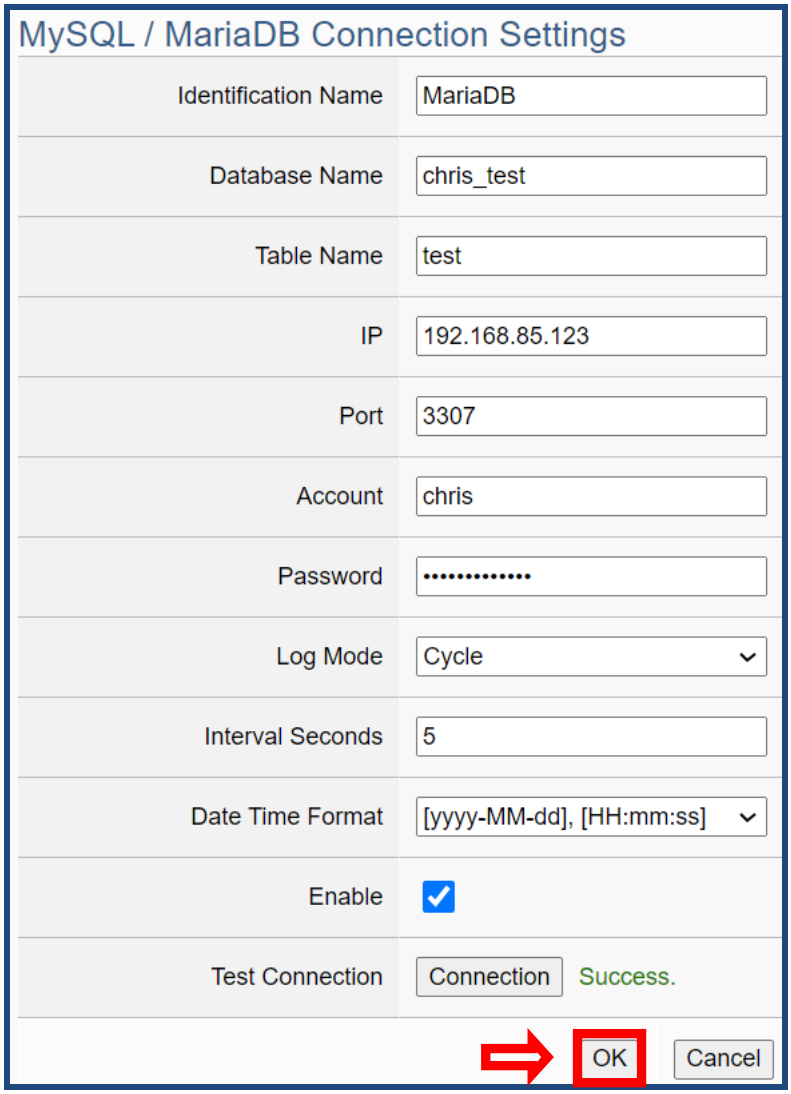
Nickname Setting: If you want to set the variable name or add a description, you can click [**Nickname Setting**] to add it.

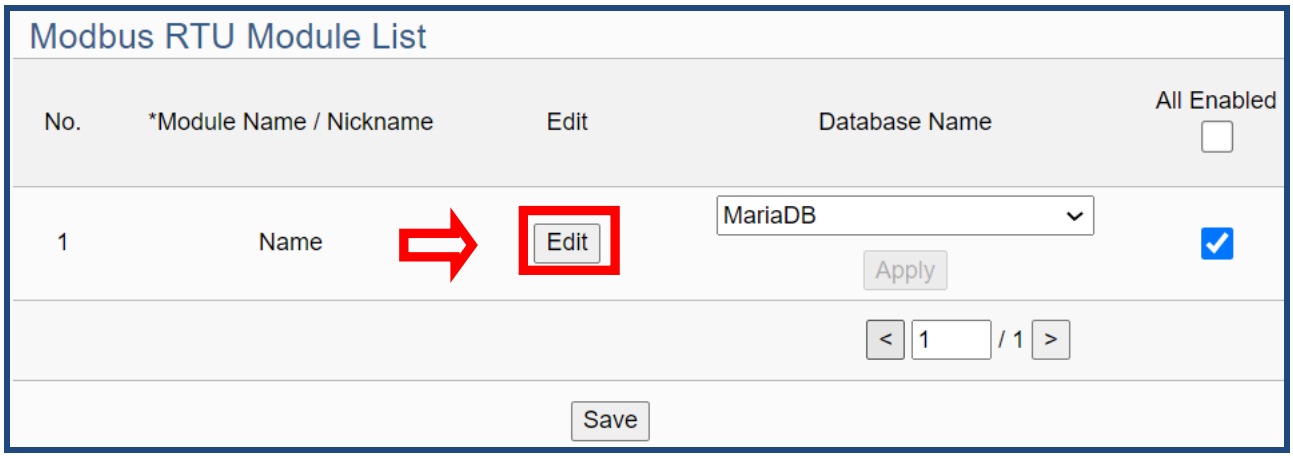


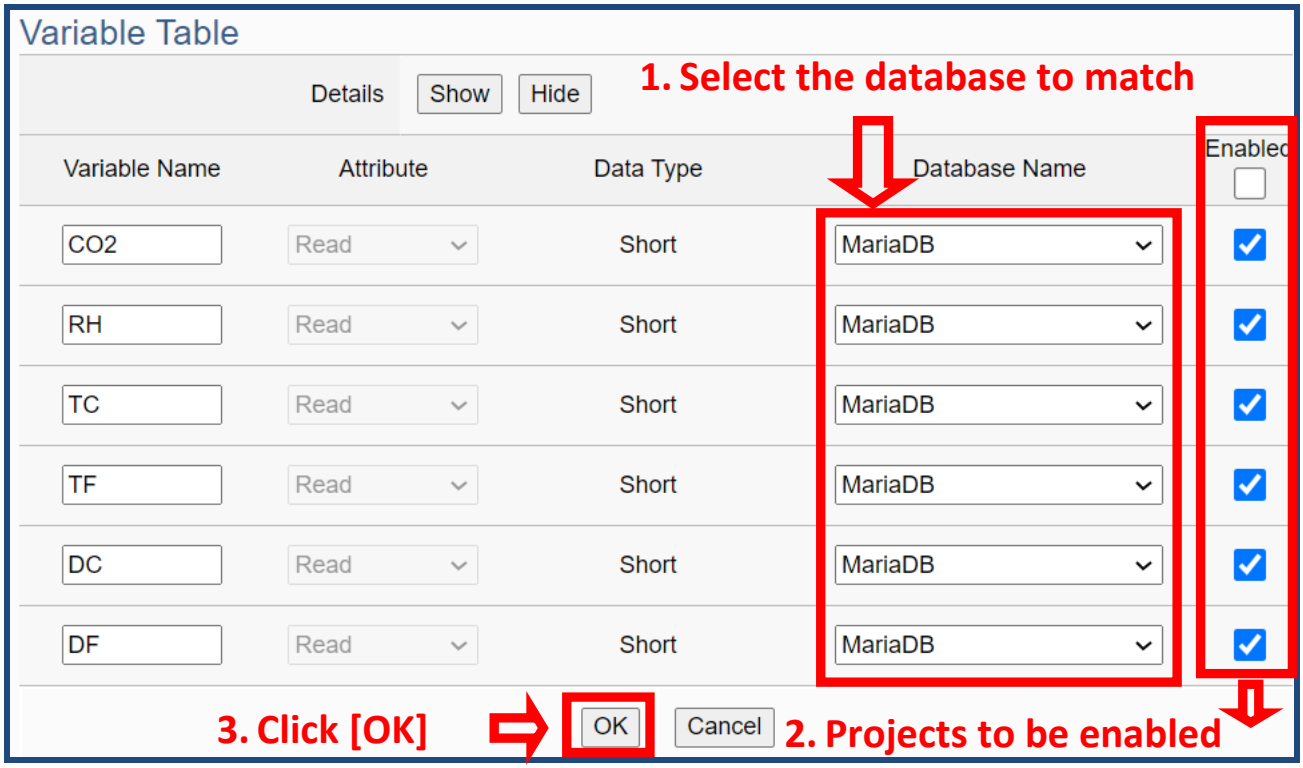

I/O Status
File Setting
Advanced Setting
MySQL / MariaDB
PID Operation
IFTTT Condition Trigger
Data Logger
Local Data Logger
MS SQL
MySQL / MariaDB
Block List
MySQL / MariaDB List
Remove
Identification Name
2.New
MariaDB
1.Enter Name
Remove
Save

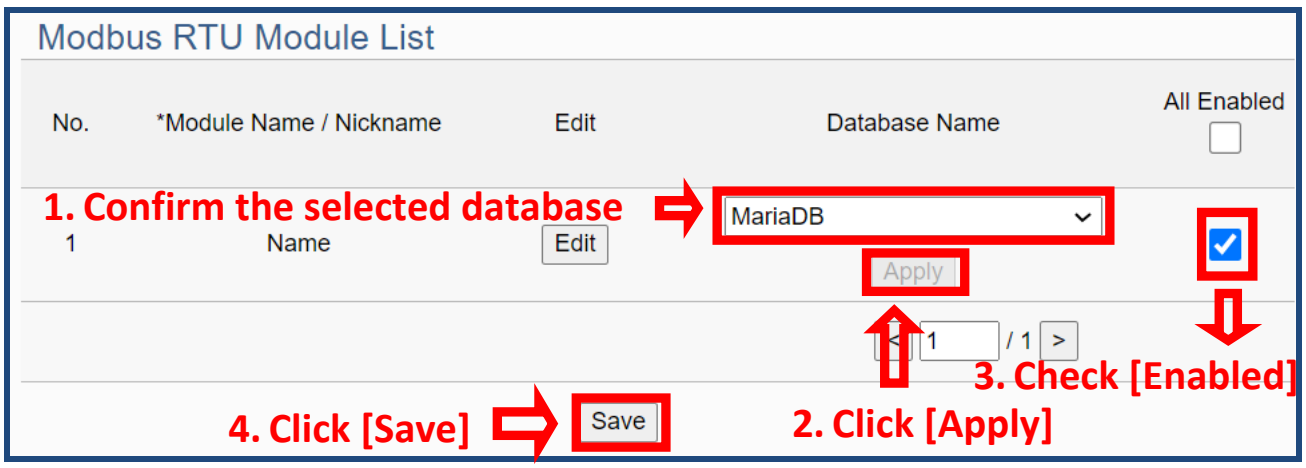

MySQL / MariaDB List
Remove
Identification Name
Status
Edit
Name1
MariaDB
Enable
Edit
Remove
< 1 / 1 >
Save

Enter the name of the database and table, and click [OK].



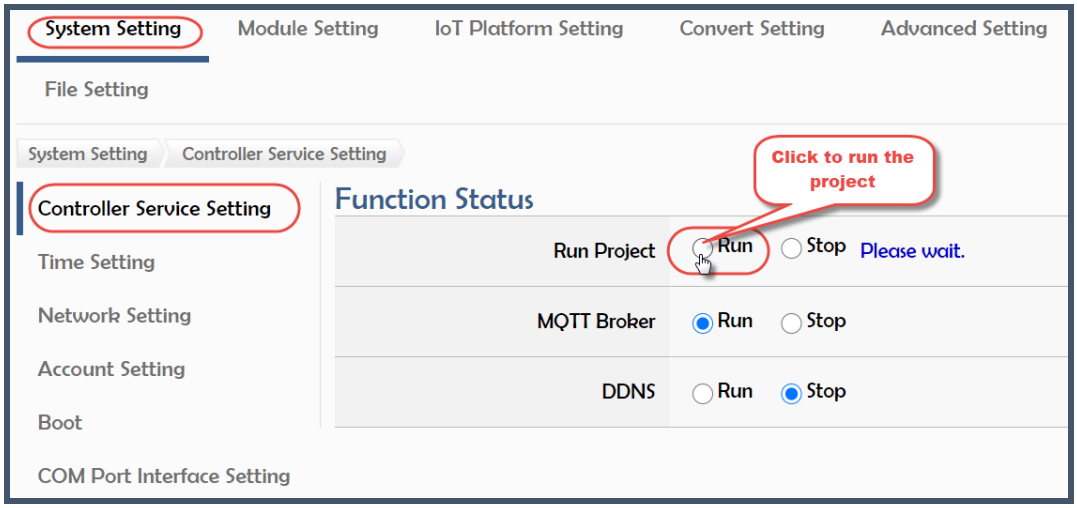



Variable Table
Details
Show
Hide
1. Select the database to match
Variable Name
Attribute
Data Type
Database Name
Enabled
CO2
RH
TC
TF
DC
DF
Read
Short
MariaDB
3. Click [OK]
OK
Cancel
2. Projects to be enabled

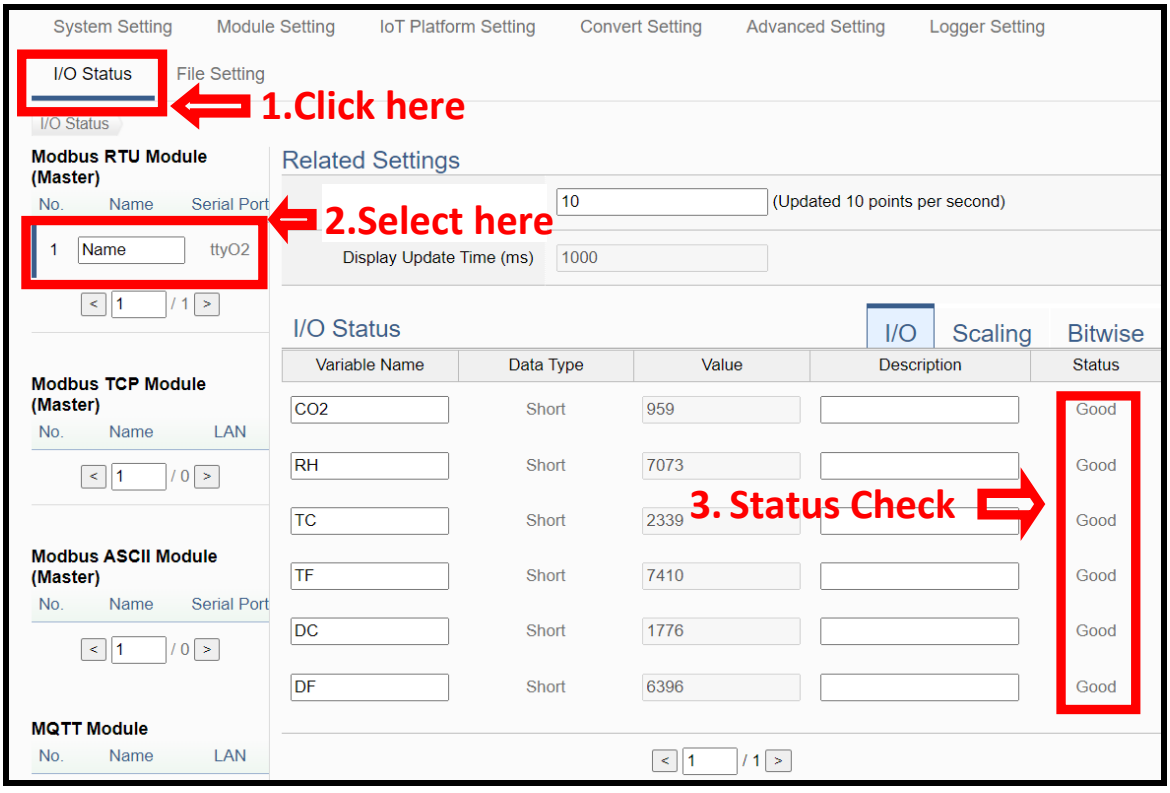

Modbus RTU Module List
No.
*Module Name / Nickname
Edit
Database Name
All Enabled
1. Confirm the selected database
1
Name
Edit
MariaDB
Apply
1
/ 1
3. Check [Enabled]
4. Click [Save]
Save
2. Click [Apply]

Click the next step [**Save Project**], the Step Box will show an animation as in the below picture which means the project is saving. When the animation vanished, the project was saved completely.

After saving, the project needs to execute. Click the next step [**Run the Project**]. This step can also via the [**System Setting** > **Controller Service Setting** > **Run Project**] to Stop and Run the project.



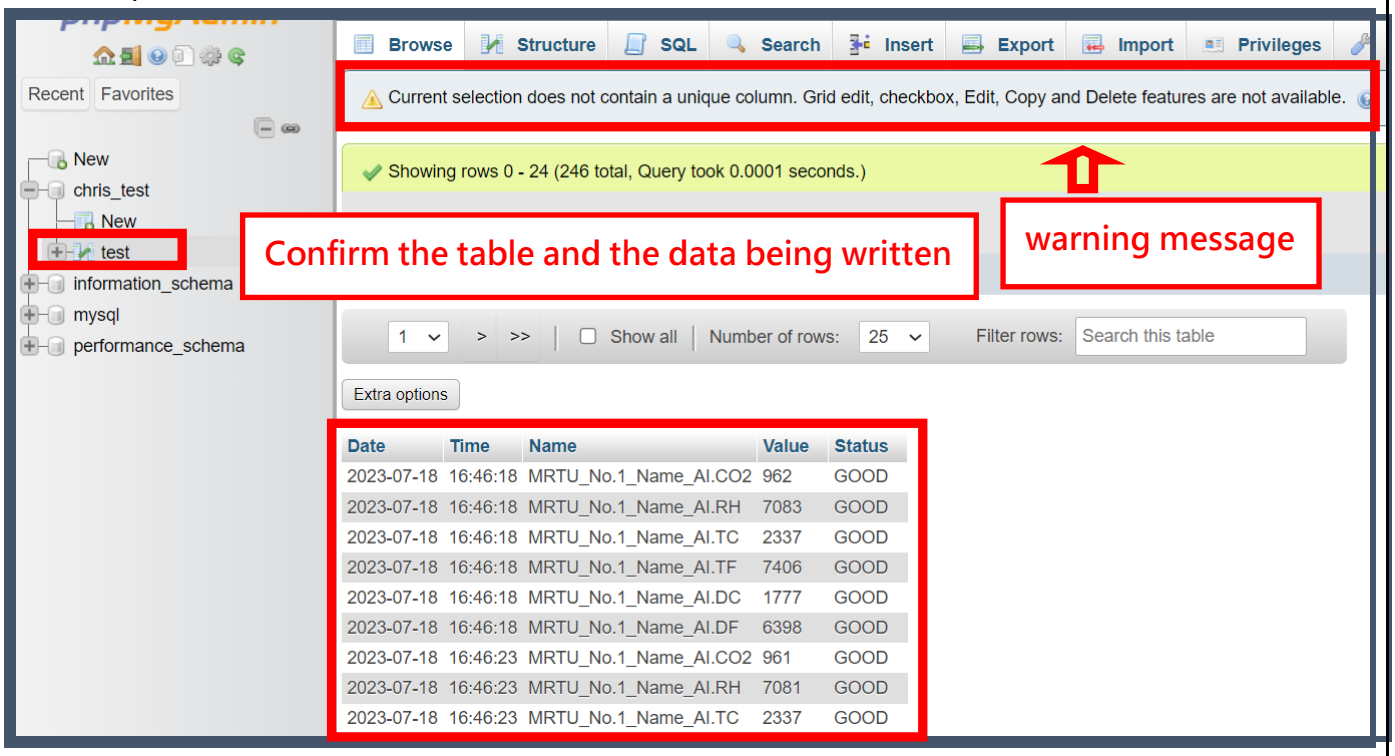
To check the I/O Status, click the [**I/O status**] and choose from the left-hand list. Confirm the connection value and status.



3. After transferring UA data into Database, how to combine the Date and Time columns?

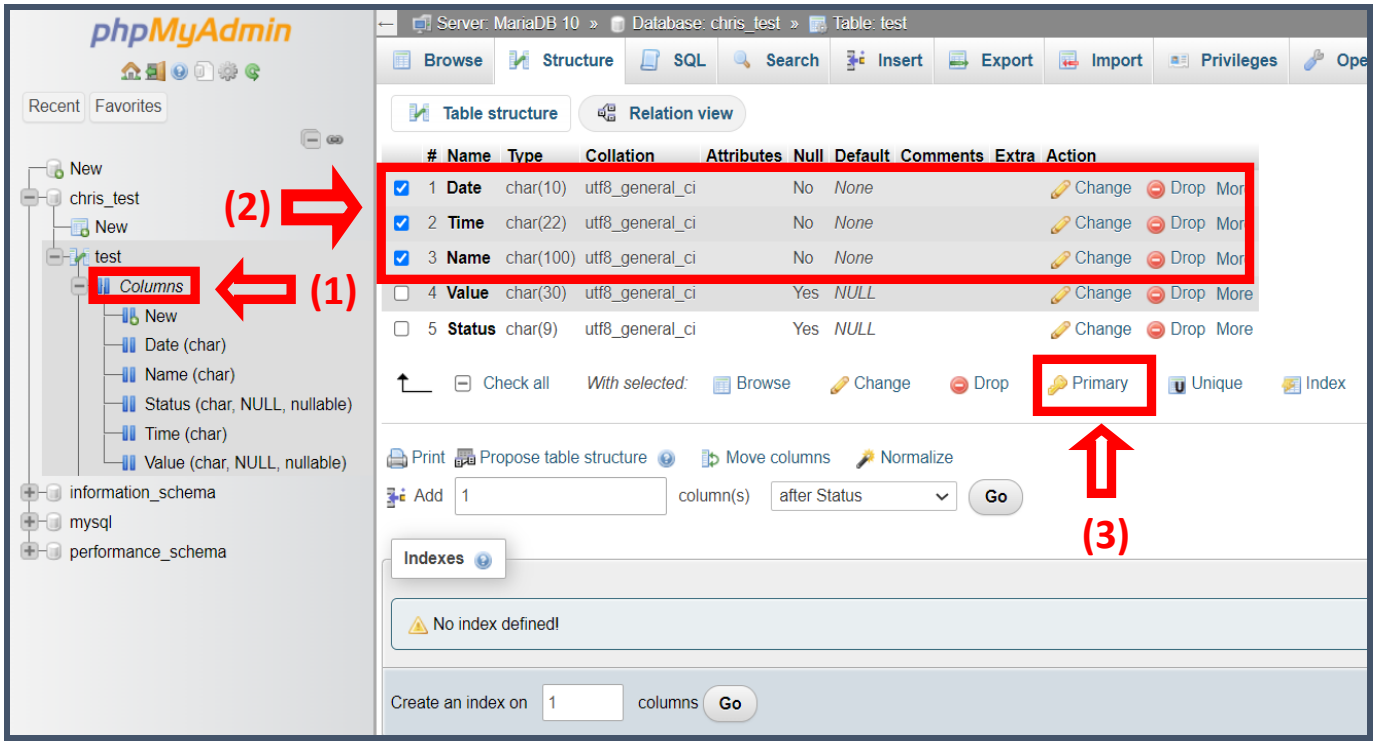
Log in to phpMyAdmin, and enter your account and password.

Confirm the table and data written for the UA product and a warning message will appear at the top.

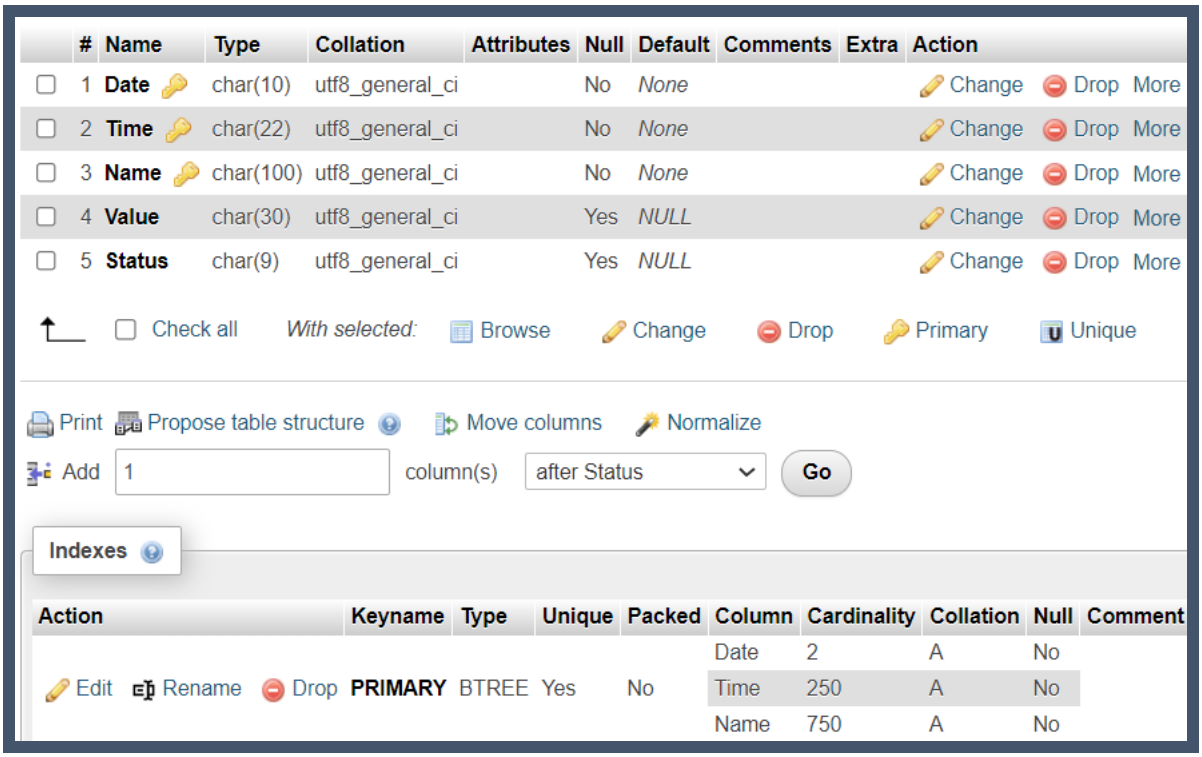


After setting the primary key, the warning message will disappear.

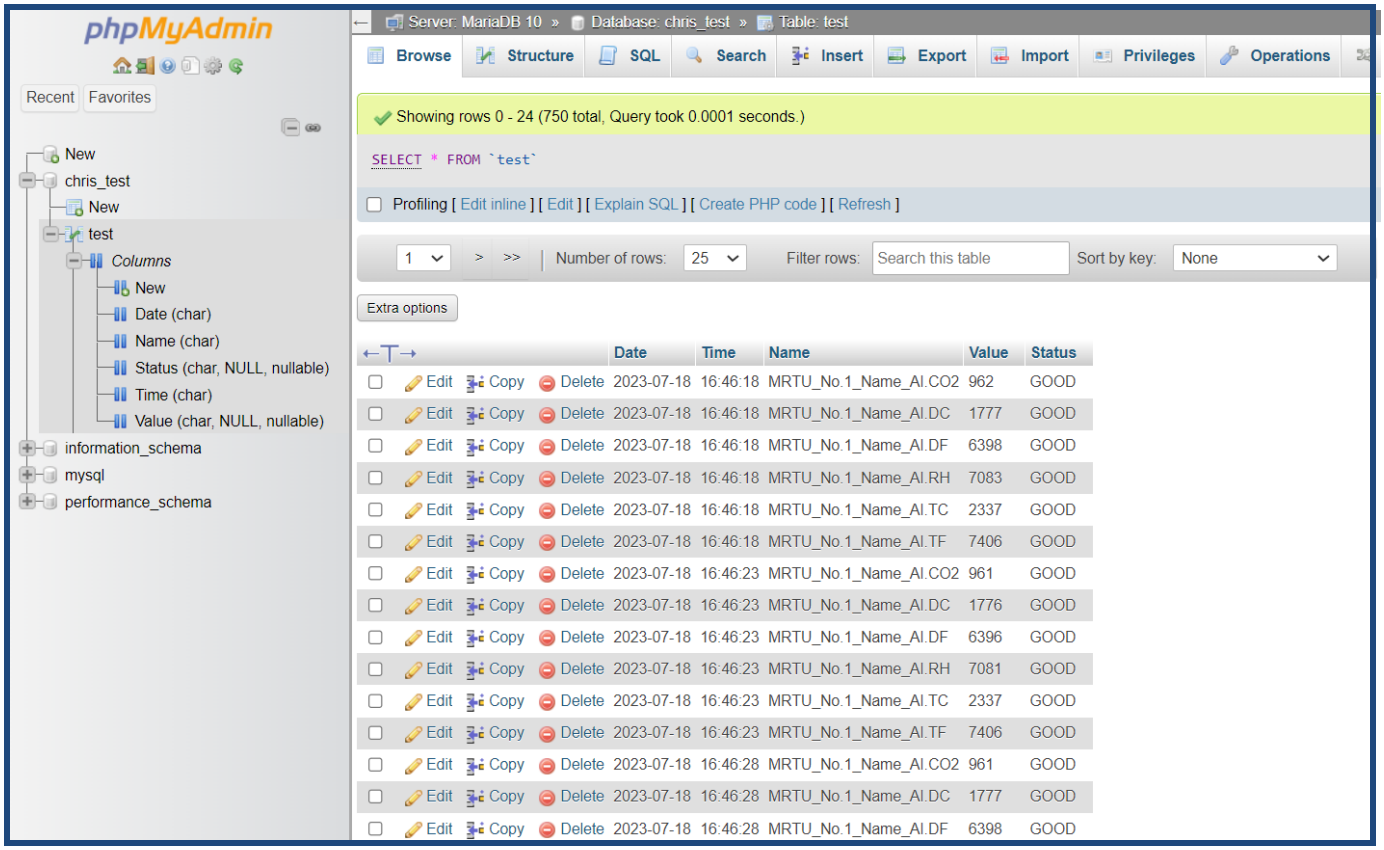
Expand the Table and click on the [**columns**], check Date/Time/Name, and press the [**Primary key**].



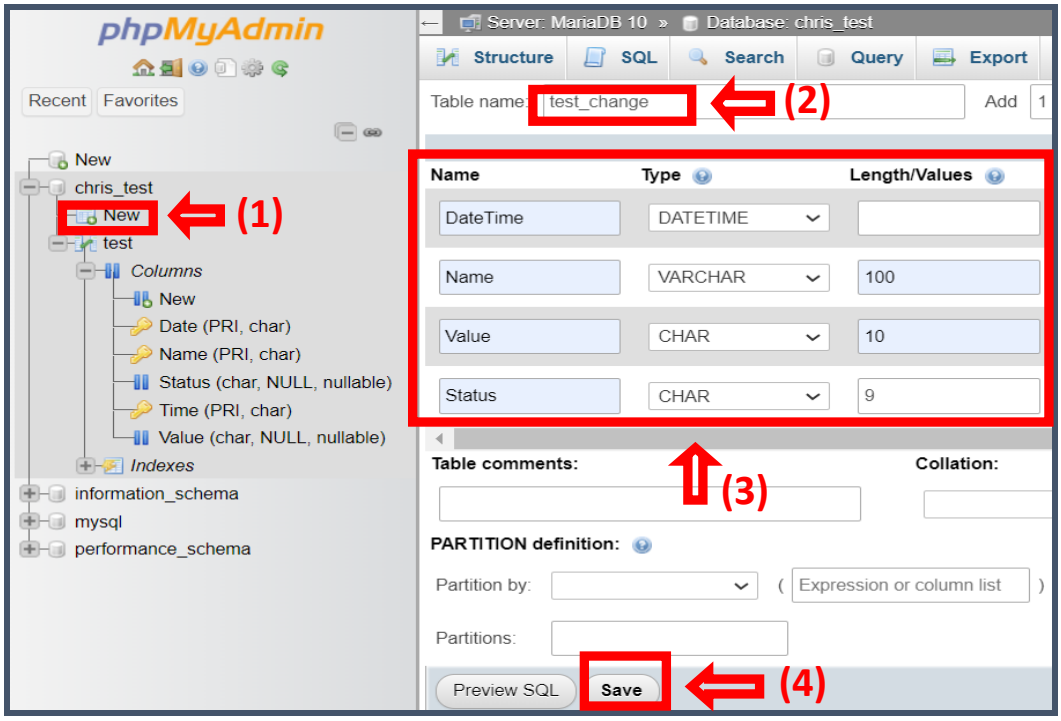
The following picture shows the settings.



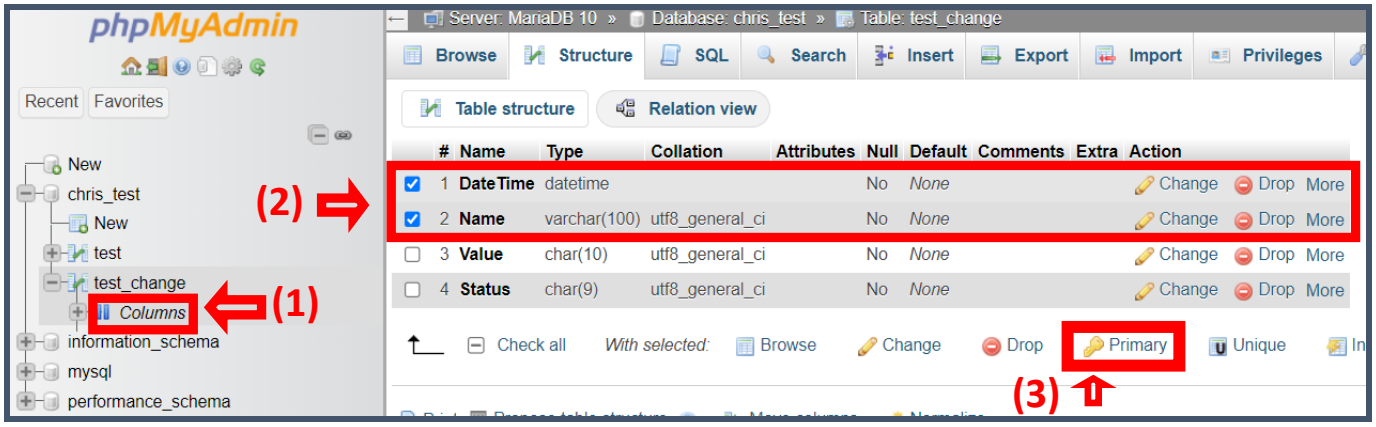
This warning message will not display anymore.



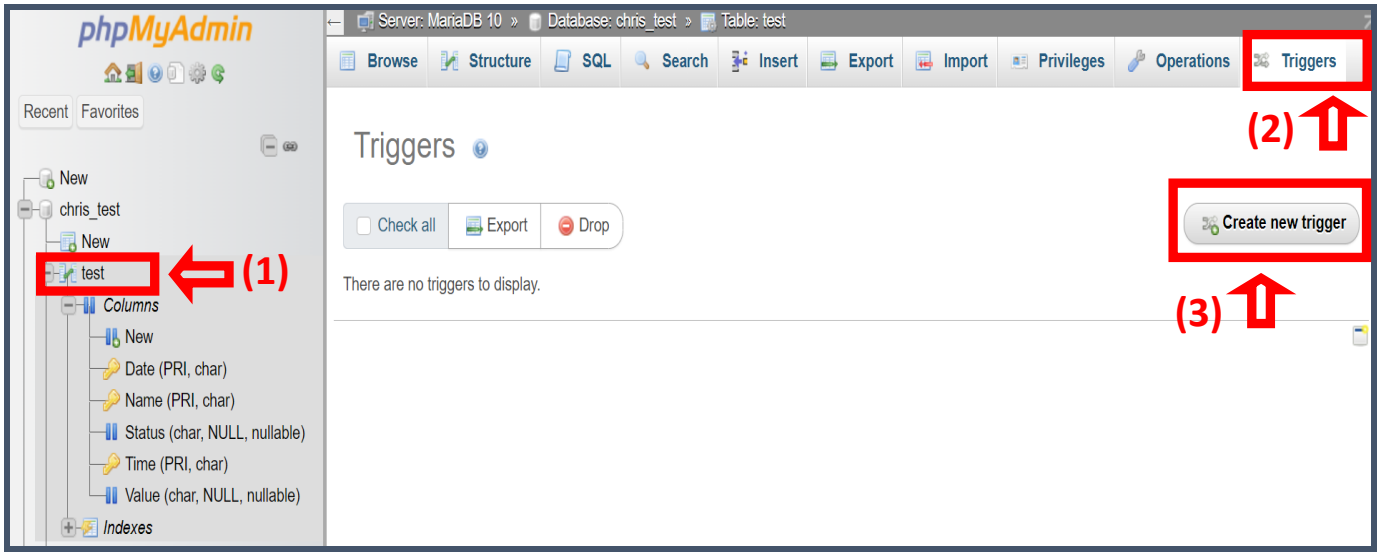
Click [**New**] below the database where UA sends data, fill in the table name, fill in the name/type/length/values of the columns, and click [**Save**], then the columns will be combined in the new table.



Then set the primary key.



Click on the table where UA is transferred data, go to the upper right corner of [**Triggers**], and click on [**Create new trigger**]



Entry Trigger Name

TIME Select [**AFTER**]

Event Select [**INSERT**]

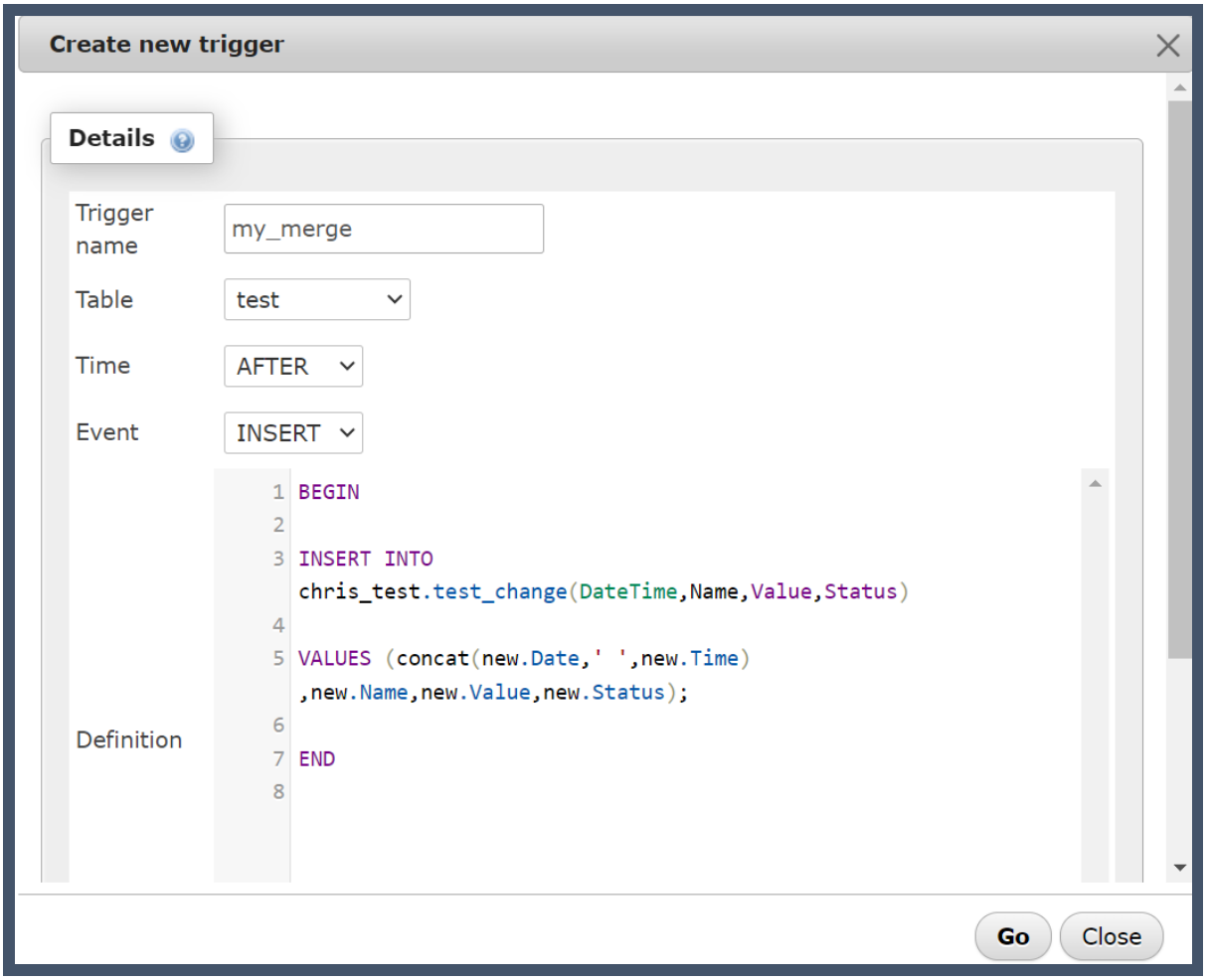
And paste the following code into the definition.

```
BEGIN
INSERT INTO chris_test.test_change(DateTime,Name,Value,Status)
VALUES (concat(new.Date,' ',new.Time) ,new.Name,new.Value,new.Status);
END
```

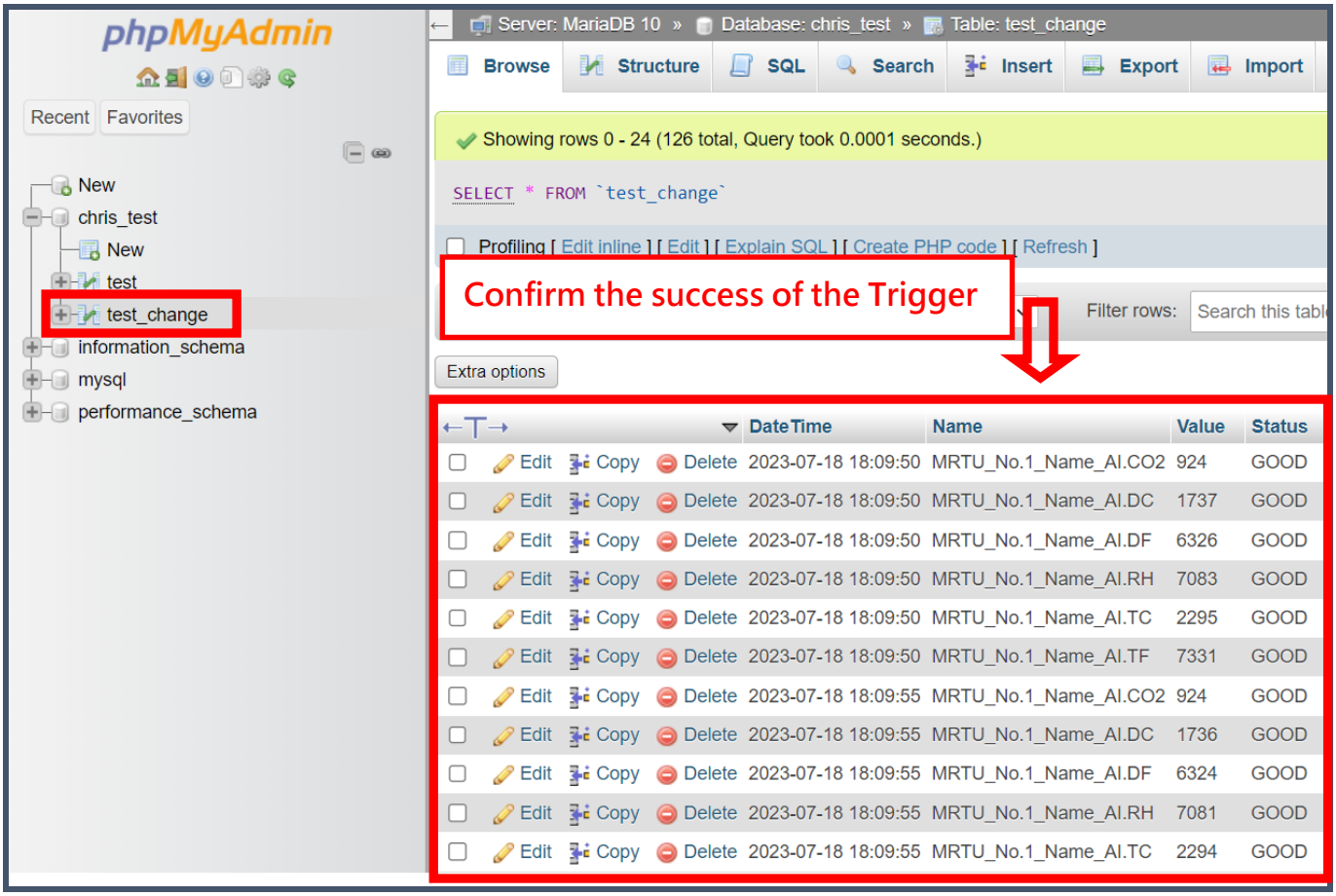
<Description>

In this program, chris_test.test_change, please follow the new database name and table name to modify.

When finished, as shown below, click [**Go**]



Confirm the success of the Trigger.

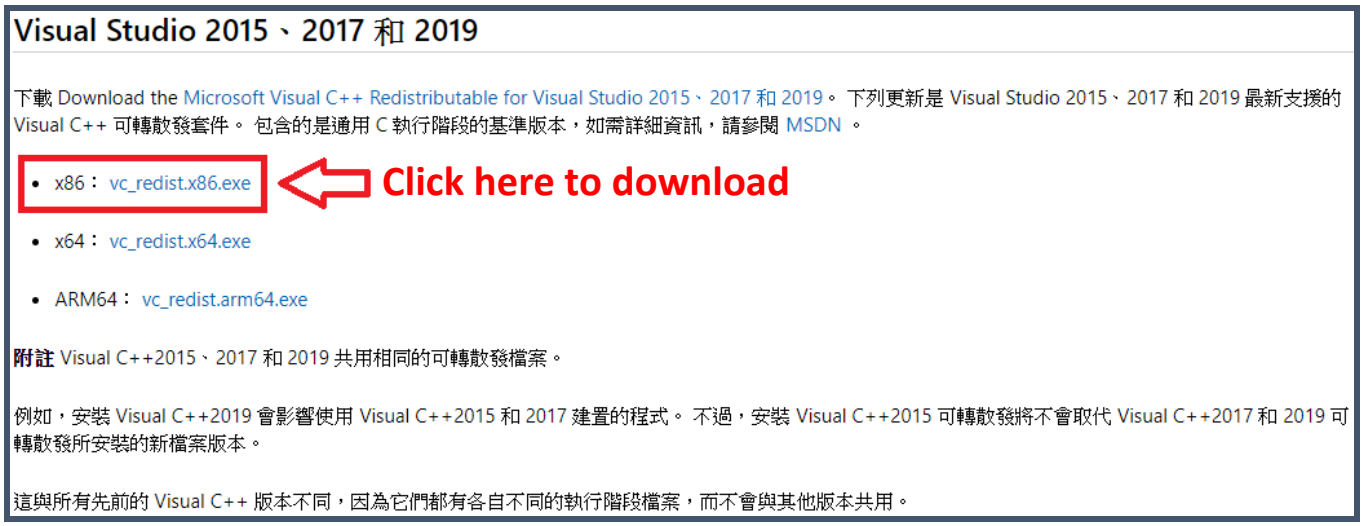


4. How InduSoft read data in the Database?

Go to the Download Center of Microsoft to download the program

Select x86 : vc_redist.x86.exe to download and install

URL: https://support.microsoft.com/zh-tw/help/2977003/the-latest-supported-visual-c-downloads

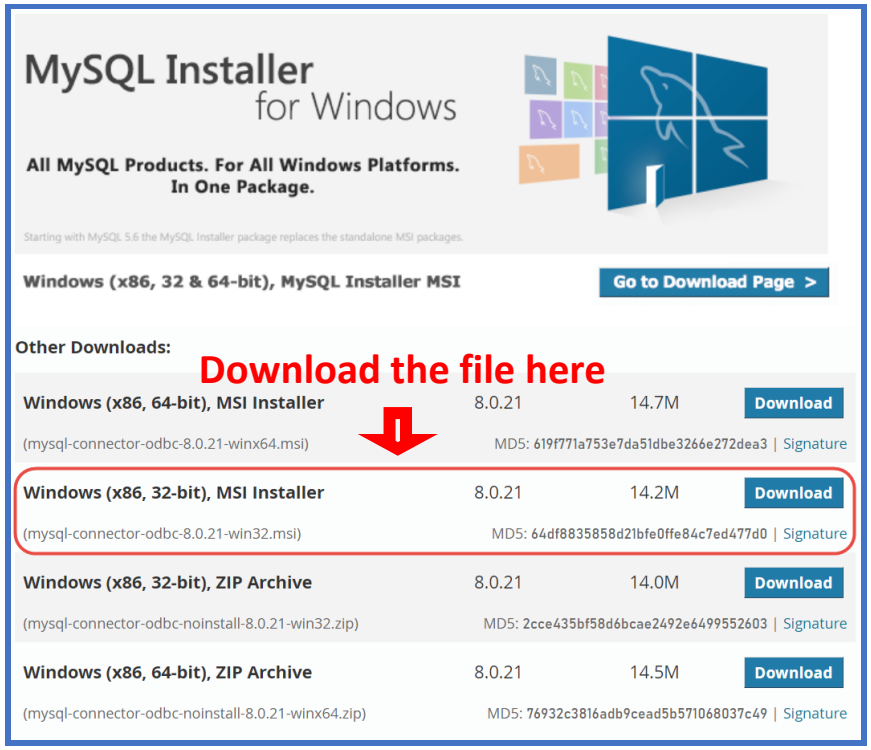


Install MySQL ODBC

Go to the MySQL website to download the program

Select Windows(x86, 32-bit), MSI Installer to download and install

URL: https://dev.mysql.com/downloads/connector/odbc/



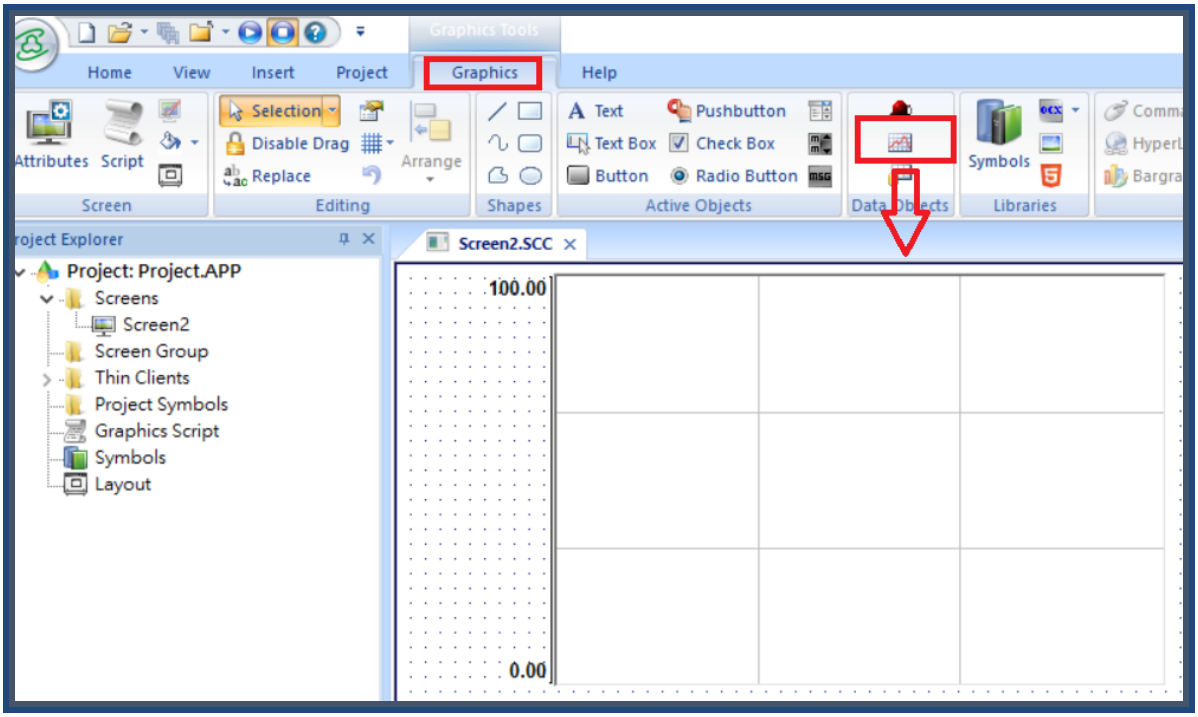
ODBC Settings

Before setting up InduSoft to read the database in this section, please make sure that the InduSoft (IWS) remote MariaDB database access function has been set up, if not, please complete it first, you can refer to the MySQL ODBC settings in the following appendix to set up.

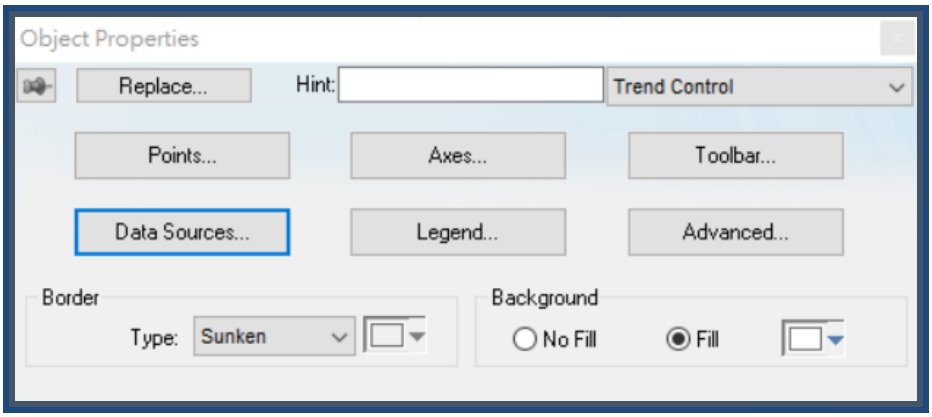
5. Appendix: How IWS Accesses Remote MySQL Database via ODBC

<Note> MariaDB 10 default port is 3307.

After completing the ODBC settings, enter InduSoft and click on the image of the trend chart in Graphics.

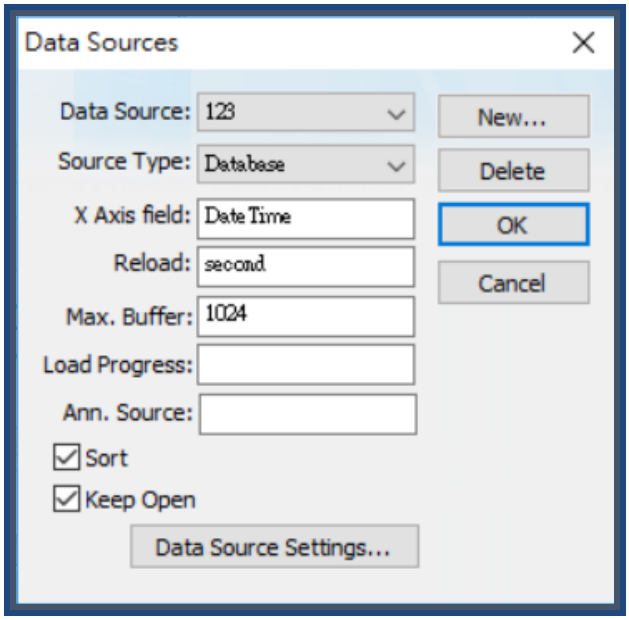


2. Double-click the trend chart to open the object properties window

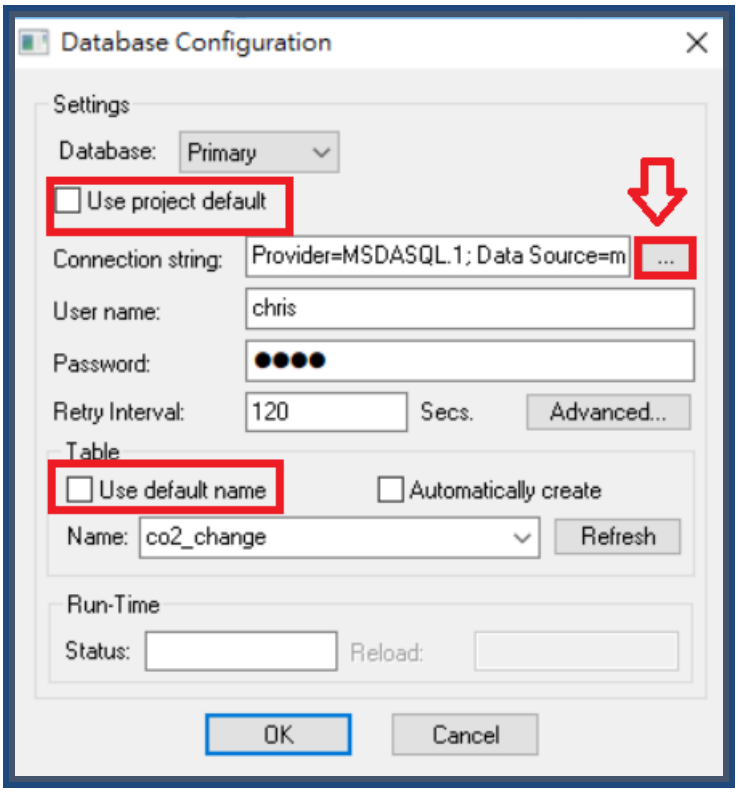


Click [**Data Sources**], click [New], enter a name, and then click the [**Create**] button.

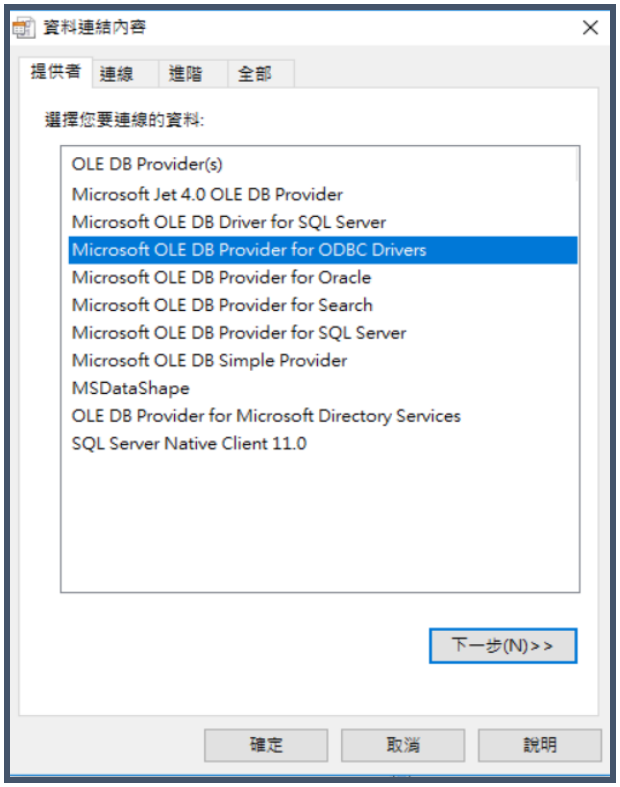
X Axis field is the name of the column in which the time record in the database is entered.



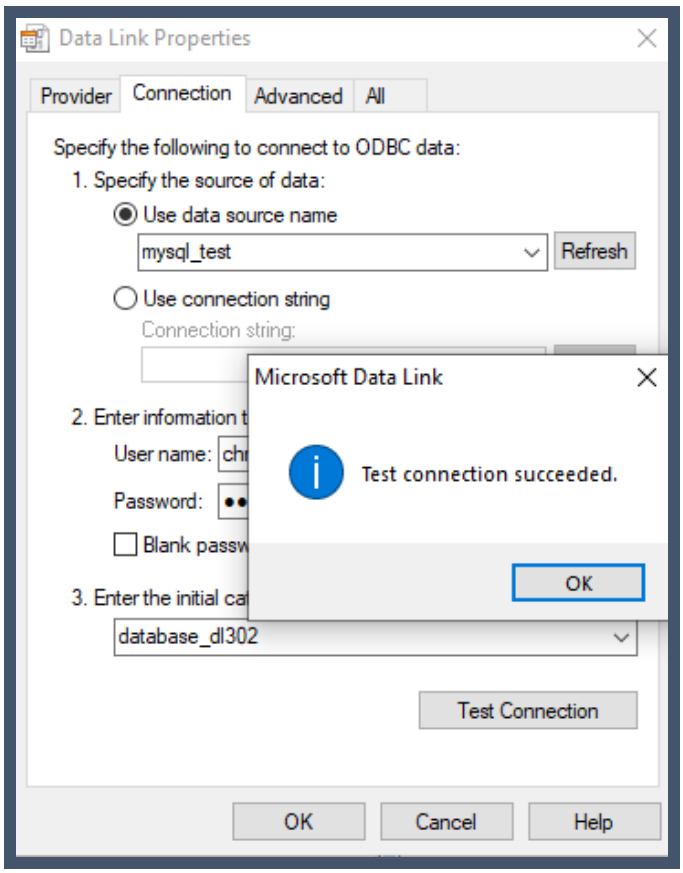
Click [**Data Source Settings**], cancel the checkbox of [Use project default] and [Use default name], and click the ... button.



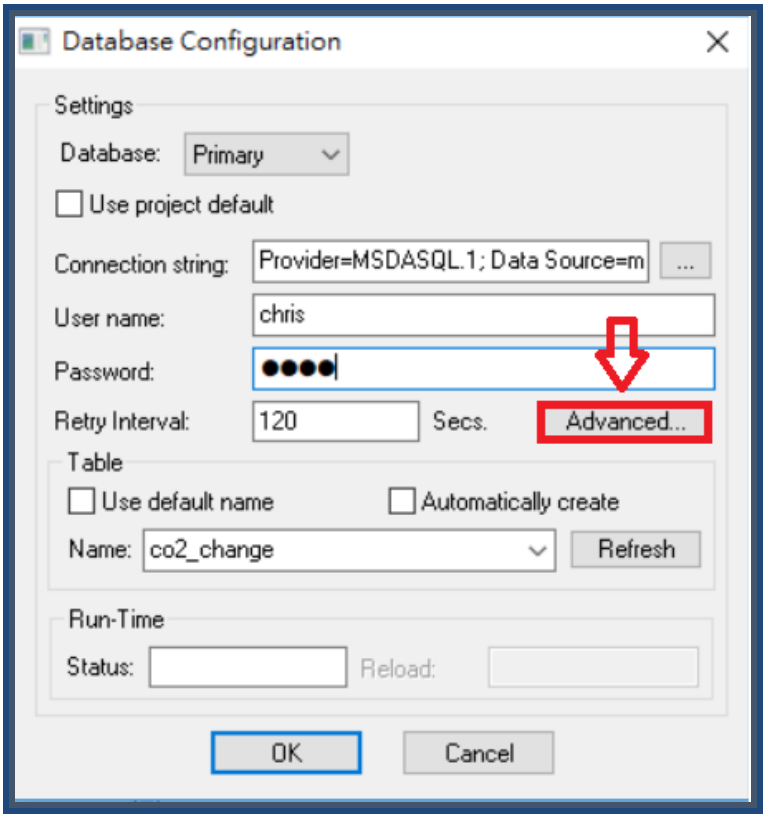
After clicking [**Microsoft OLE DB Provider for ODBC Drivers**], click [**Next**].



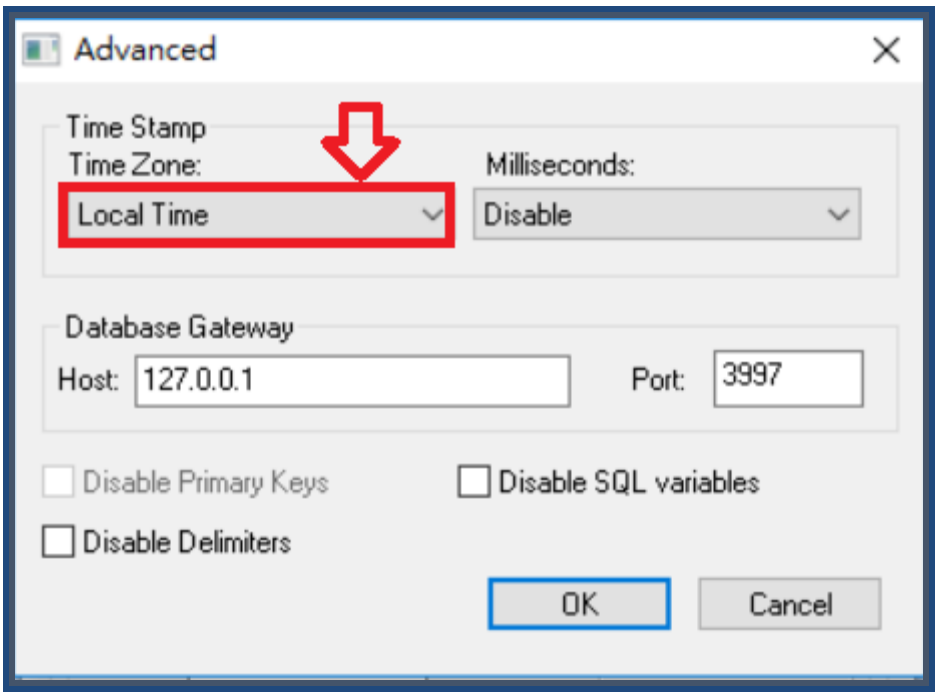
Fill in the content of [Connect], after the test connection is successful, click [**OK**]



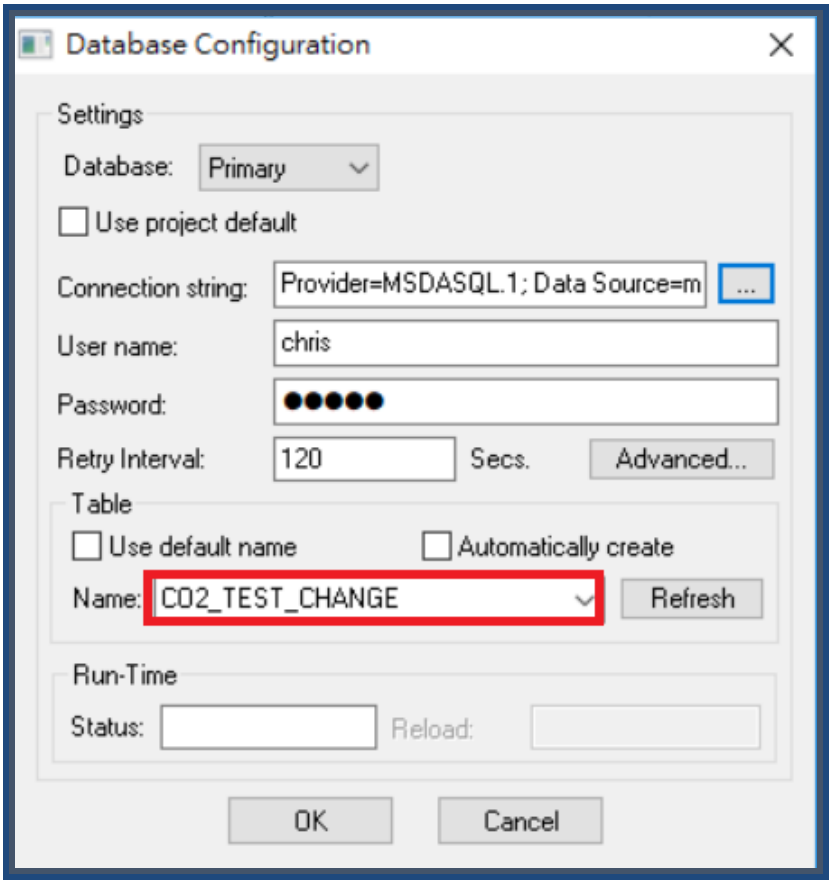
Click [**Advanced**]



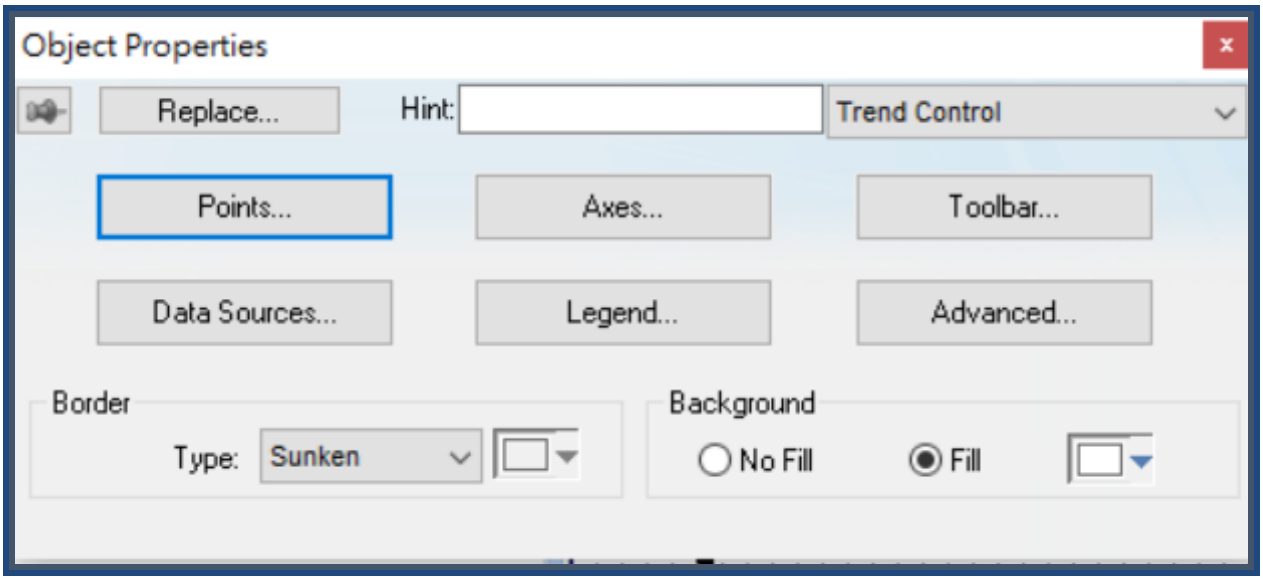
Select [**Time Zone**]option as [**Local Time**] (Depending on your needs)



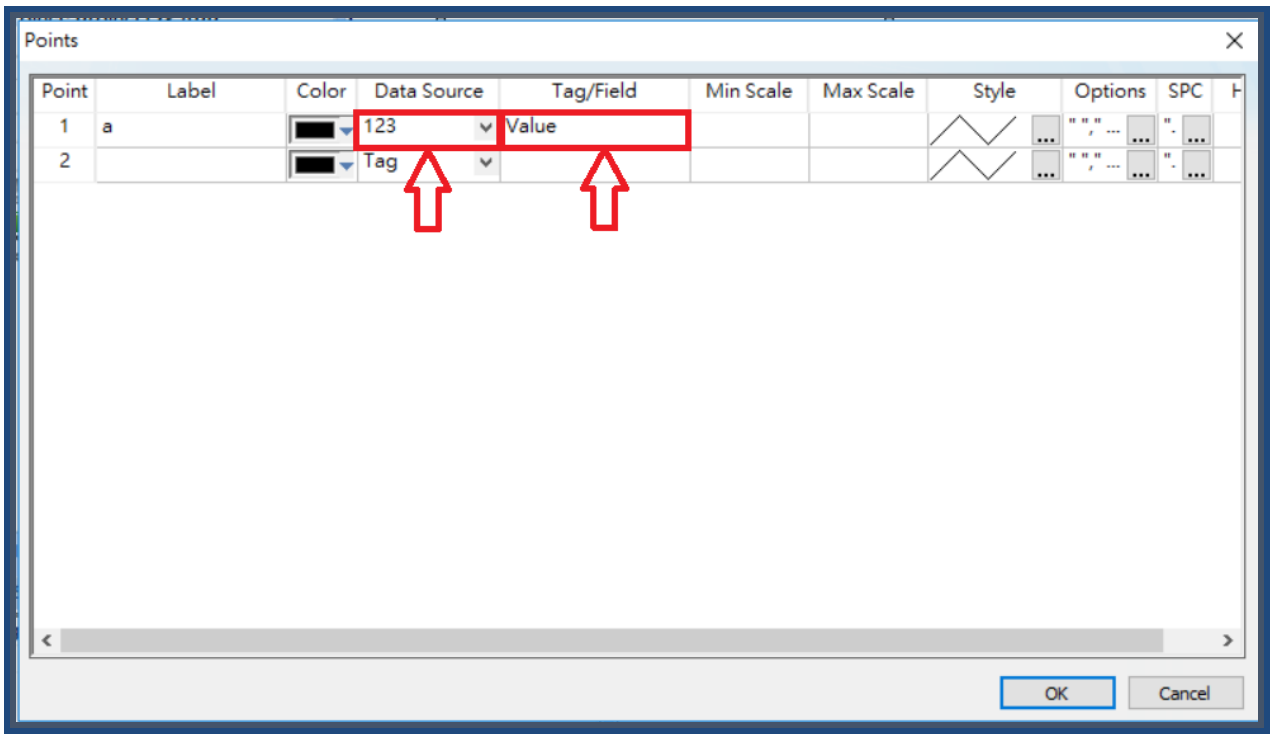
After selecting the table for reading, click [**OK**].



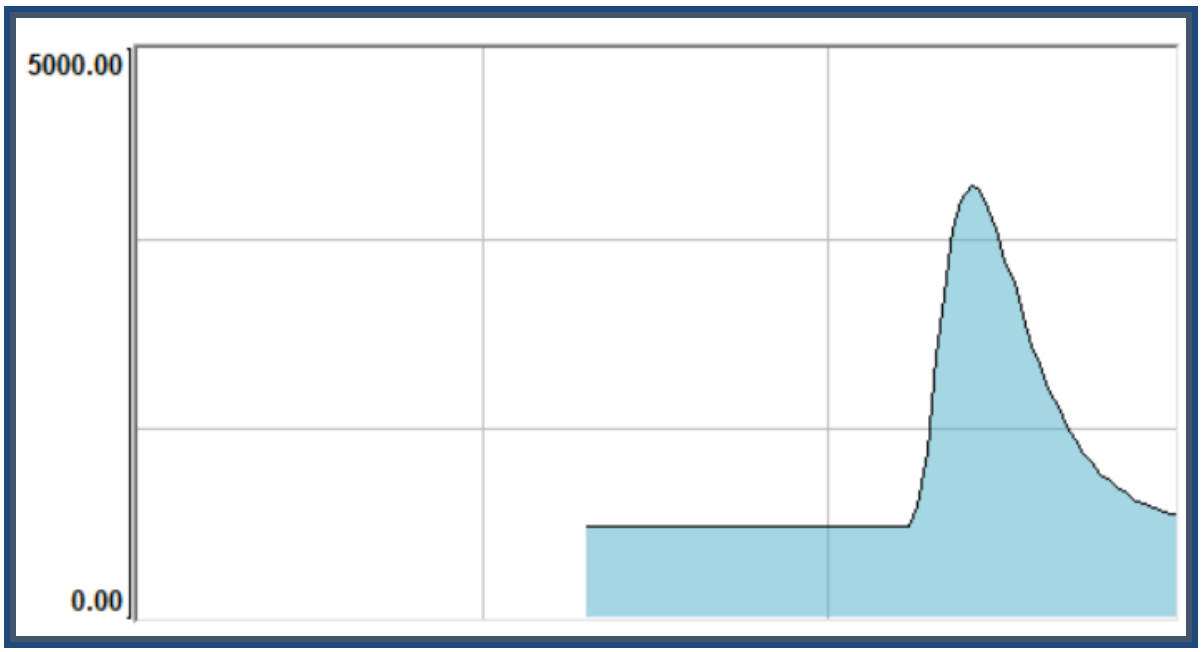
Double-click the trend chart to open the object properties window, and click [**Points**]



After selecting and filling in the Data Source and Tag/Field to be used click [OK].



Finished.



5. Appendix: How IWS accesses remote MySQL database through ODBC

Step 1：Installation Environment (This example uses the following PC Environment)

(1) Server: Install MySQL Workbench

(2) Client: Install ODBC for MySQL

	Server Side	Client Side
OS Version	Windows 8.1 Professional	Windows 7 Professional
MySQL Workbench Version	v6.3.9 (MySQL Installer 5.7.18, x86 32bit) https://dev.mysql.com/downloads/file/?id=470091	N/A
InduSoft Version	N/A	v8.0.2.0
ODBC for MySQL	N/A	V5.3.8 (win32) https://dev.mysql.com/downloads/file/?id=470365

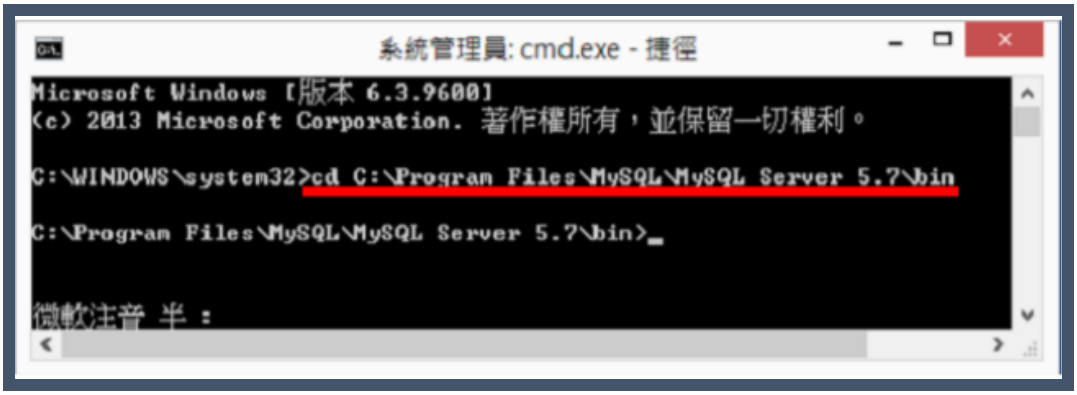
Step 2：Open MySQL Server Remote connection Permission (Server Side)

(1) Execute as Administrator: C:\Windows\system32\cmd.exe

(2) Switch the document to where “MySQL.exe” located

```
>cd C:\Program Files\MySQL\MySQL Server version\bin
```

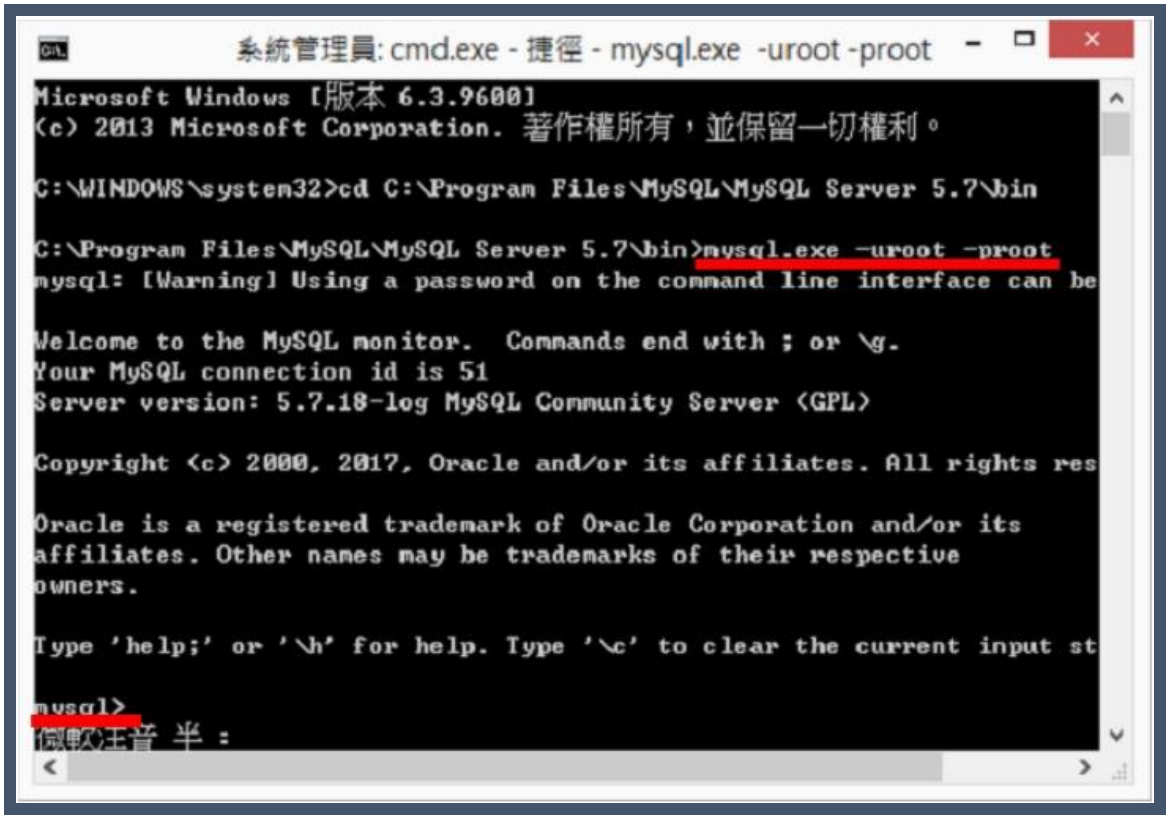
Note: version is the installed version. This example is 5.7



(3) Login MySQL server (The account / password is set during installation)

>mysql -uroot –proot

Remarks: -u account -p password (-u -p followed by account password directly without spaces). After successful login, you will see mysql>



(4) Enter the command to set permissions

> GRANT ALL PRIVILEGES ON *.* TO USERNAME@IP IDENTIFIED BY PASSWORD;

Remarks: USERNAME is generally the default root; if the IP set to '%', all computers can connect; PASSWORD is the connection password

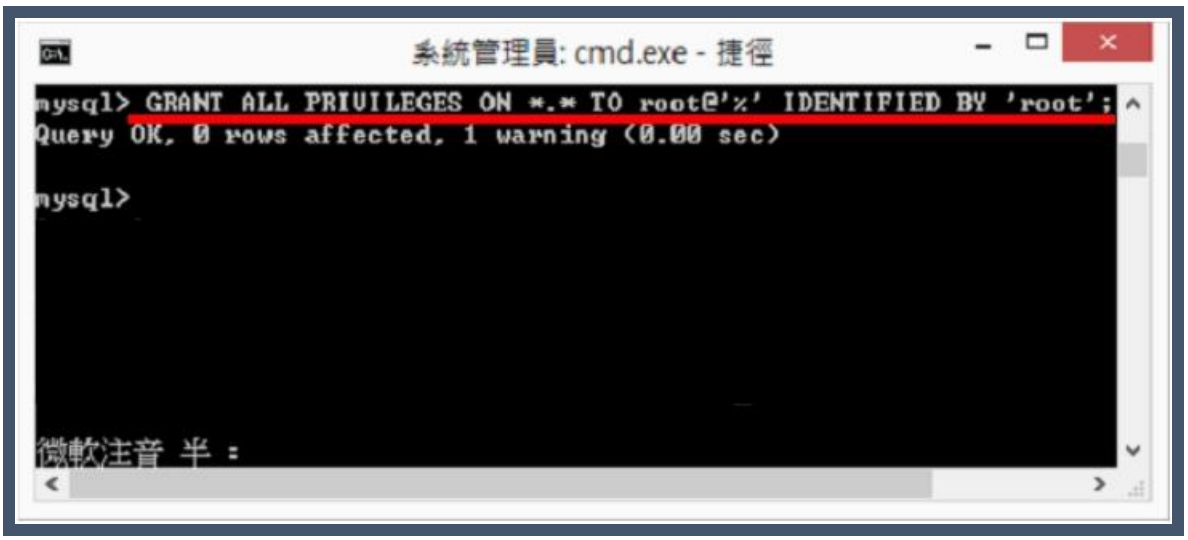
範例：

mysql>GRANT ALL PRIVILEGES ON *.* TO root@172.17.20.176 IDENTIFIED BY root;

Allow 172.17.20.176 to log in using account root and password root

mysql>GRANT ALL PRIVILEGES ON *.* TO root@'%' IDENTIFIED BY root;

Allow all computers to log in with account root and password root



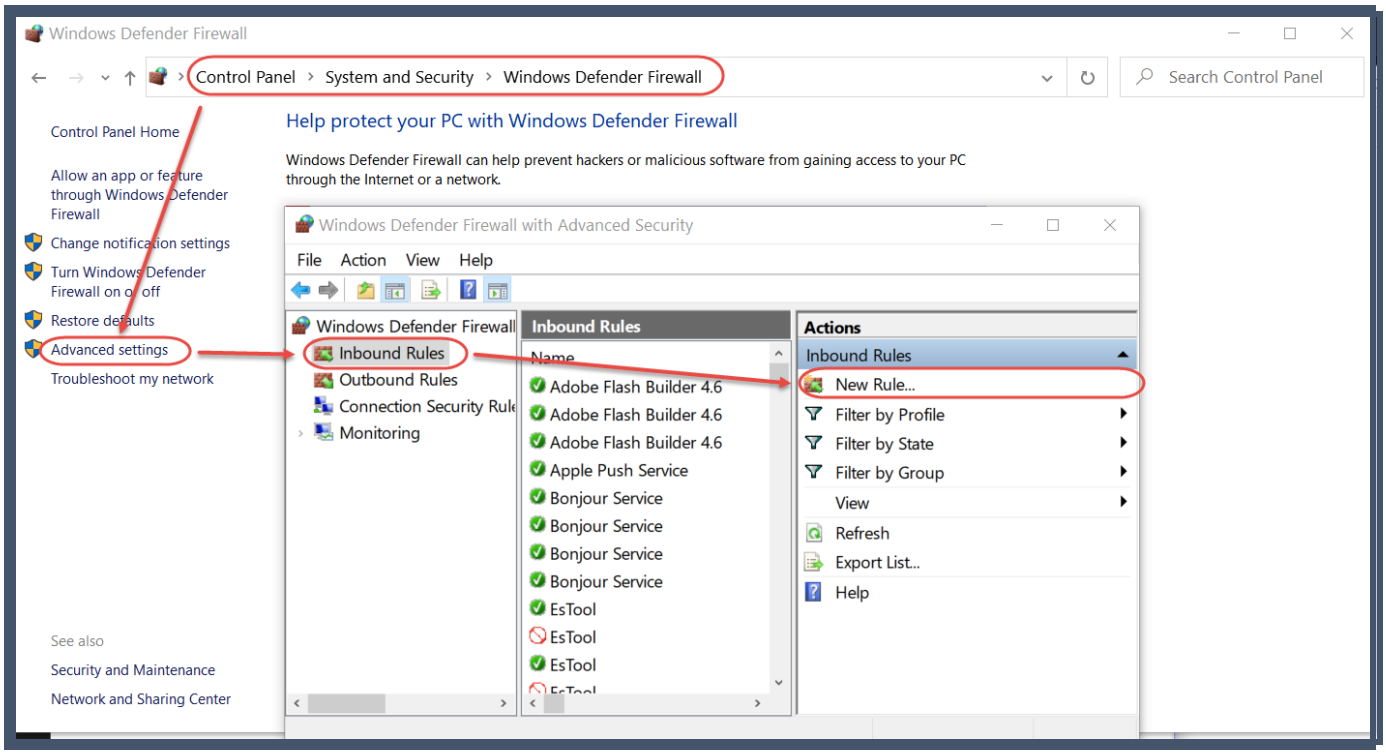
(5) Update permission settings and leave MySQL

```
mysql>FLUSH PRIVILEGES;
mysql>quit;
```

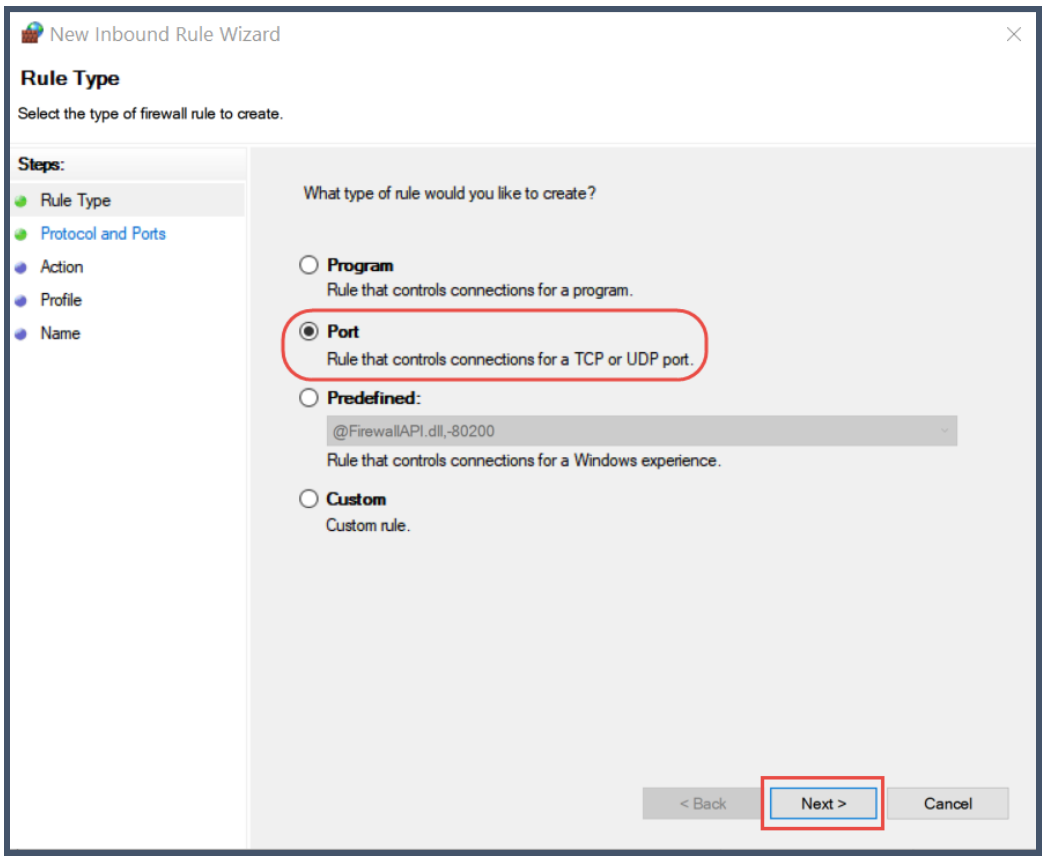
Step 3：Add 〃Inbound Rules〃 in the Windows Defender Firewall (Server)

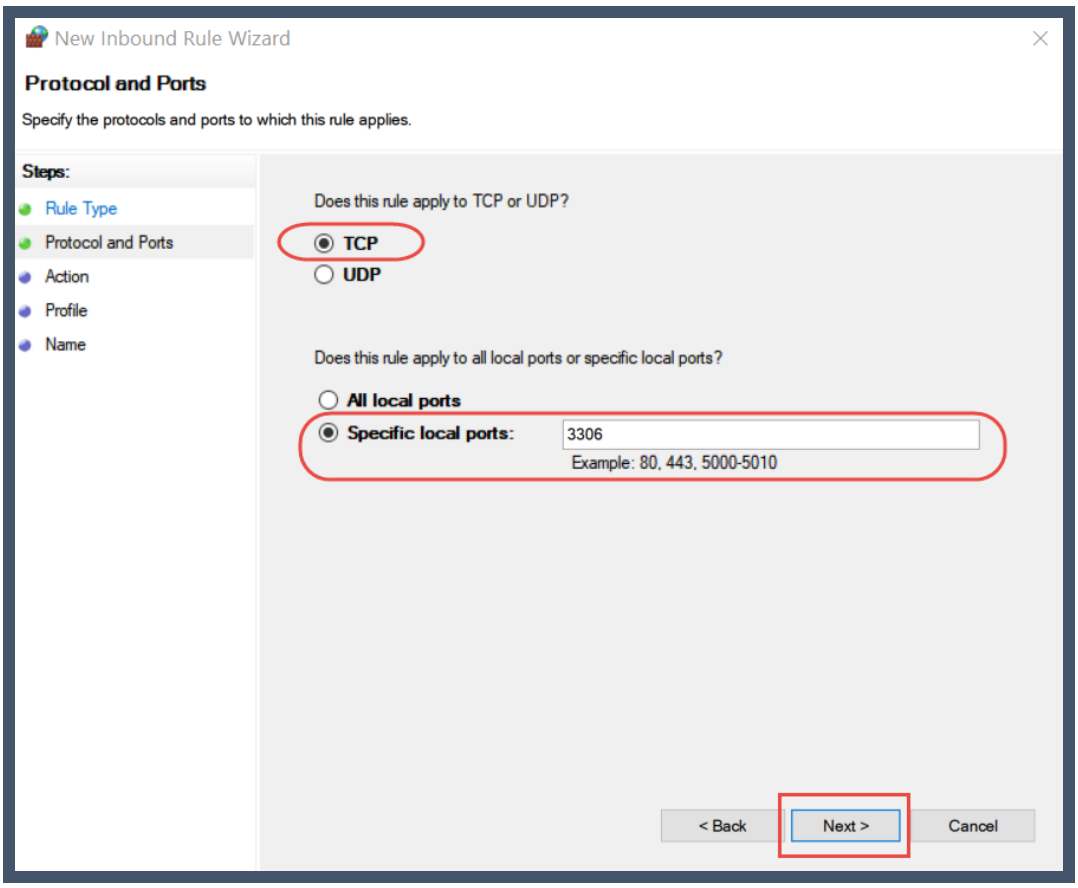
Allow MySQL pass through the firewall Port 3306, so that the remote device can access the MySQL services

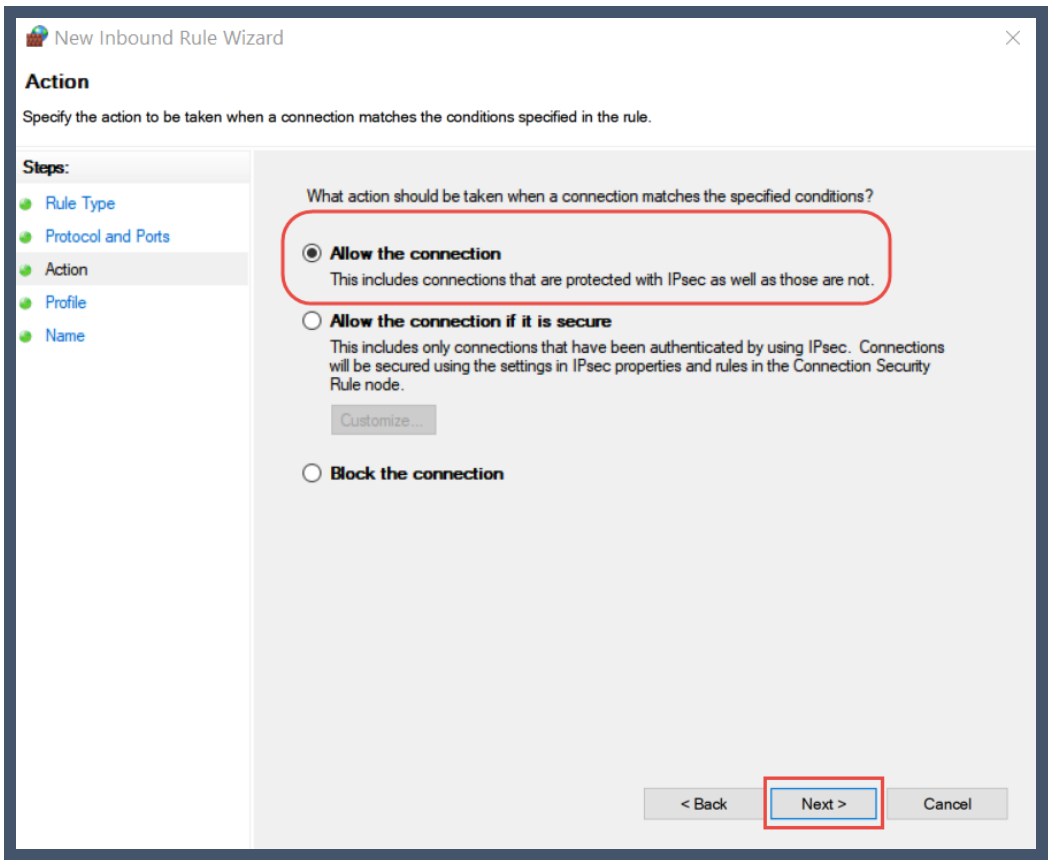
(1) Open 〃Control Panel〃→ Windows Defender Firewall→ Advanced Settings→ Inbound Rules→ New Rule

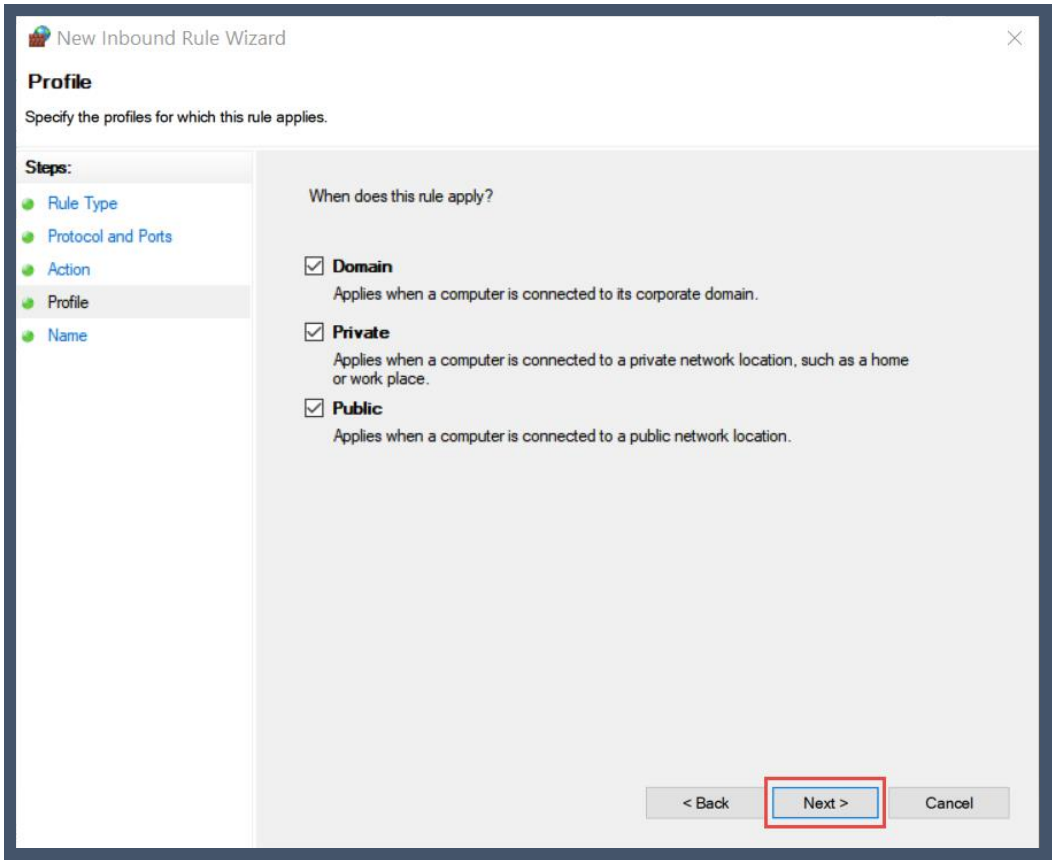


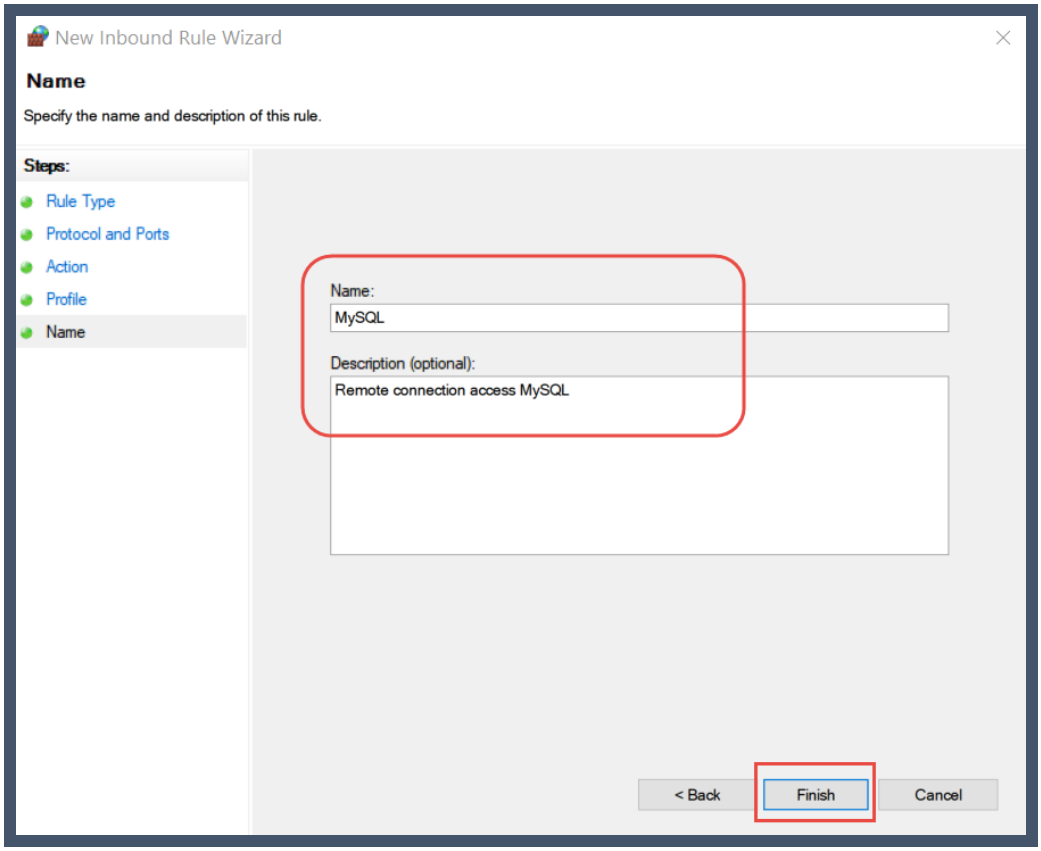
(2) Refer to following settings (Captures)

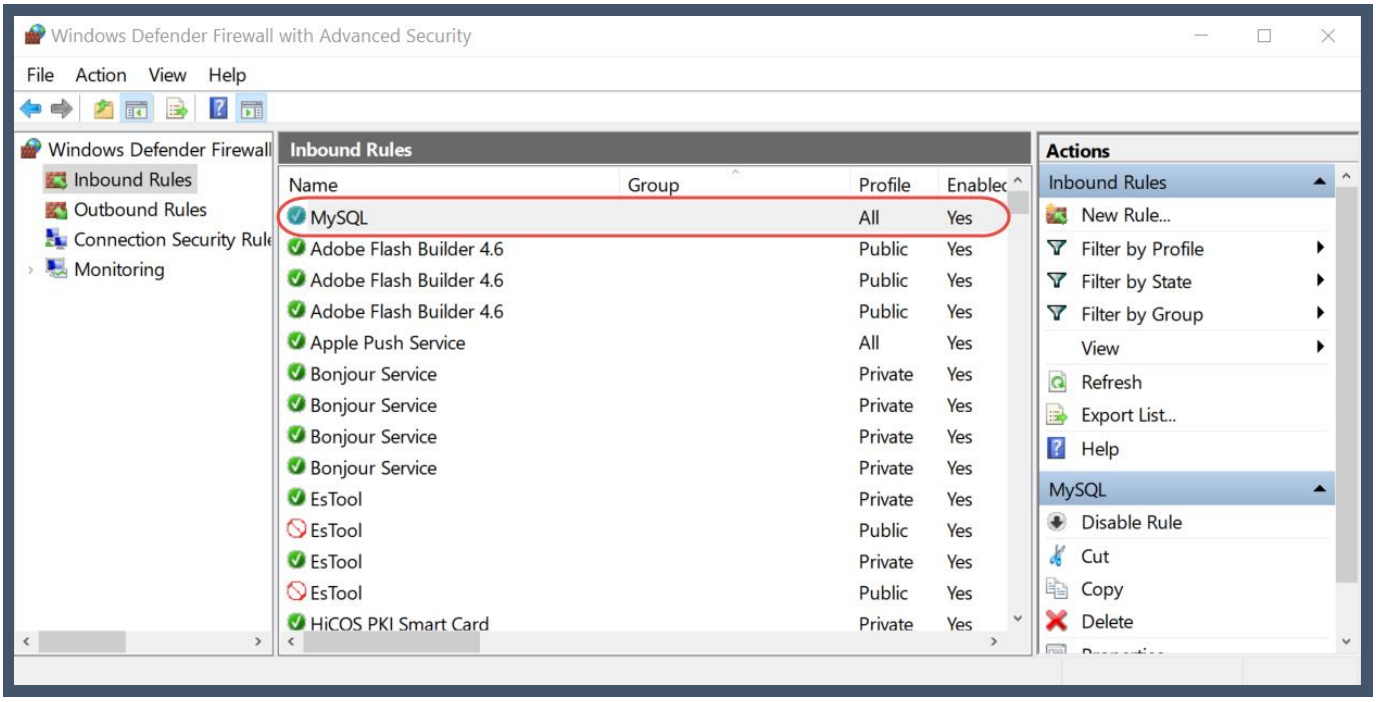

New Inbound Rule Wizard
Rule Type
Select the type of firewall rule to create.
Steps:
Rule Type
Protocol and Ports
Action
Profile
Name
What type of rule would you like to create?
Program
Rule that controls connections for a program.
Port
Rule that controls connections for a TCP or UDP port.
Predefined:
@FirewallAPI.dll,-80200
Rule that controls connections for a Windows experience.
Custom
Custom rule.
< Back
Next >
Cancel


New Inbound Rule Wizard
Protocol and Ports
Specify the protocols and ports to which this rule applies.
Steps:
Rule Type
Protocol and Ports
Action
Profile
Name
Does this rule apply to TCP or UDP?
TCP
UDP
Does this rule apply to all local ports or specific local ports?
All local ports
Specific local ports:
3306
Example: 80, 443, 5000-5010
< Back
Next >
Cancel


New Inbound Rule Wizard
Action
Specify the action to be taken when a connection matches the conditions specified in the rule.
Steps:
Rule Type
Protocol and Ports
Action
Profile
Name
What action should be taken when a connection matches the specified conditions?
Allow the connection
This includes connections that are protected with IPsec as well as those are not.
Allow the connection if it is secure
This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.
Customize...
Block the connection
< Back
Next >
Cancel


New Inbound Rule Wizard
Profile
Specify the profiles for which this rule applies.
Steps:
Rule Type
Protocol and Ports
Action
Profile
Name
When does this rule apply?
Domain
Applies when a computer is connected to its corporate domain.
Private
Applies when a computer is connected to a private network location, such as a home or work place.
Public
Applies when a computer is connected to a public network location.
< Back
Next >
Cancel

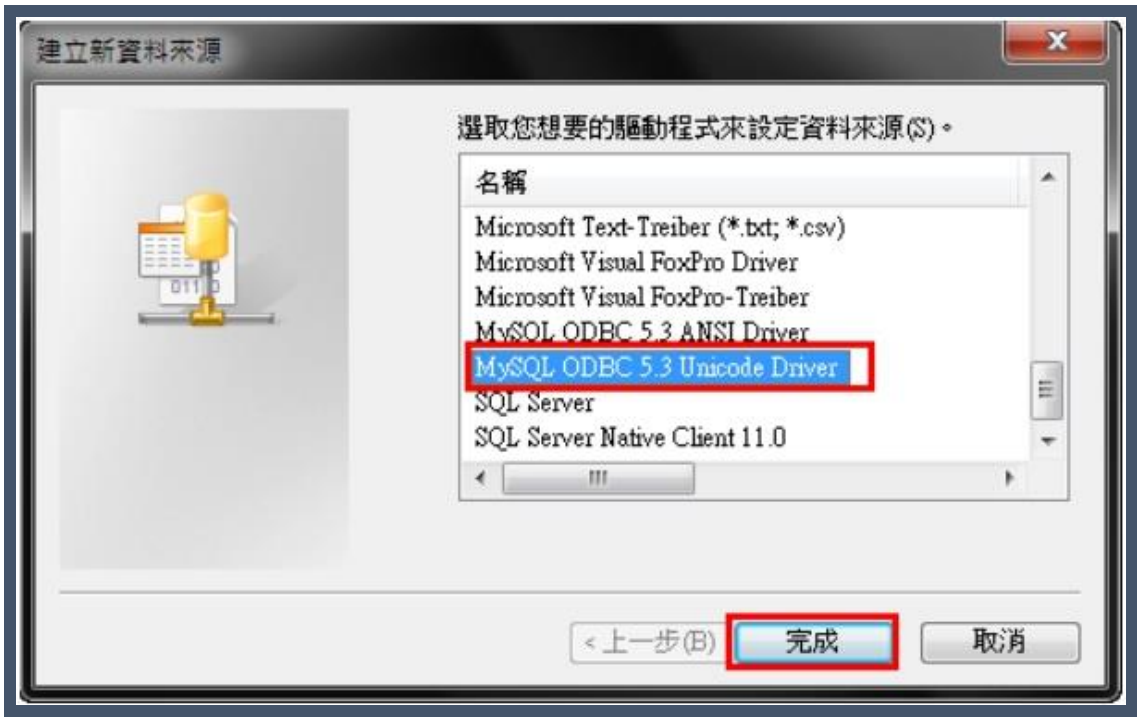

New Inbound Rule Wizard
Name
Specify the name and description of this rule.
Steps:
Rule Type
Protocol and Ports
Action
Profile
Name
Name:
MySQL
Description (optional):
Remote connection access MySQL
< Back
Finish
Cancel


Windows Defender Firewall with Advanced Security
File Action View Help
Windows Defender Firewall
Inbound Rules
Outbound Rules
Connection Security Rule
Monitoring
Inbound Rules
Name Group Profile Enabled
MySQL All Yes
Adobe Flash Builder 4.6 Public Yes
Adobe Flash Builder 4.6 Public Yes
Adobe Flash Builder 4.6 Public Yes
Apple Push Service All Yes
Bonjour Service Private Yes
Bonjour Service Private Yes
Bonjour Service Private Yes
Bonjour Service Private Yes
EsTool Private Yes
EsTool Public Yes
EsTool Private Yes
EsTool Public Yes
HiCOS PKI Smart Card Private Yes
Actions
Inbound Rules
New Rule...
Filter by Profile
Filter by State
Filter by Group
View
Refresh
Export List...
Help
MySQL
Disable Rule
Cut
Copy
Delete

Step 4：Set up ODBC Connections (Client)

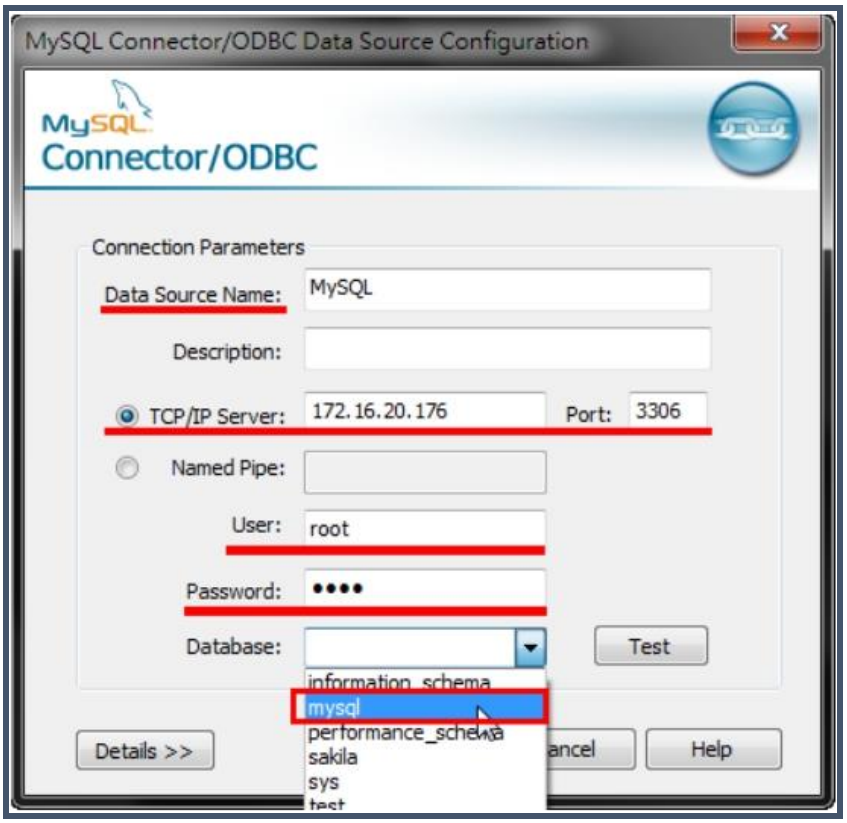
(1) Execute as Administrator: C:\Windows\SysWOW64\odbcad32.exe➔ Add

選擇資料來源



(2) Set the connection name (used by IWS) / server IP, Port / login account password/database. Press OK to close when finished

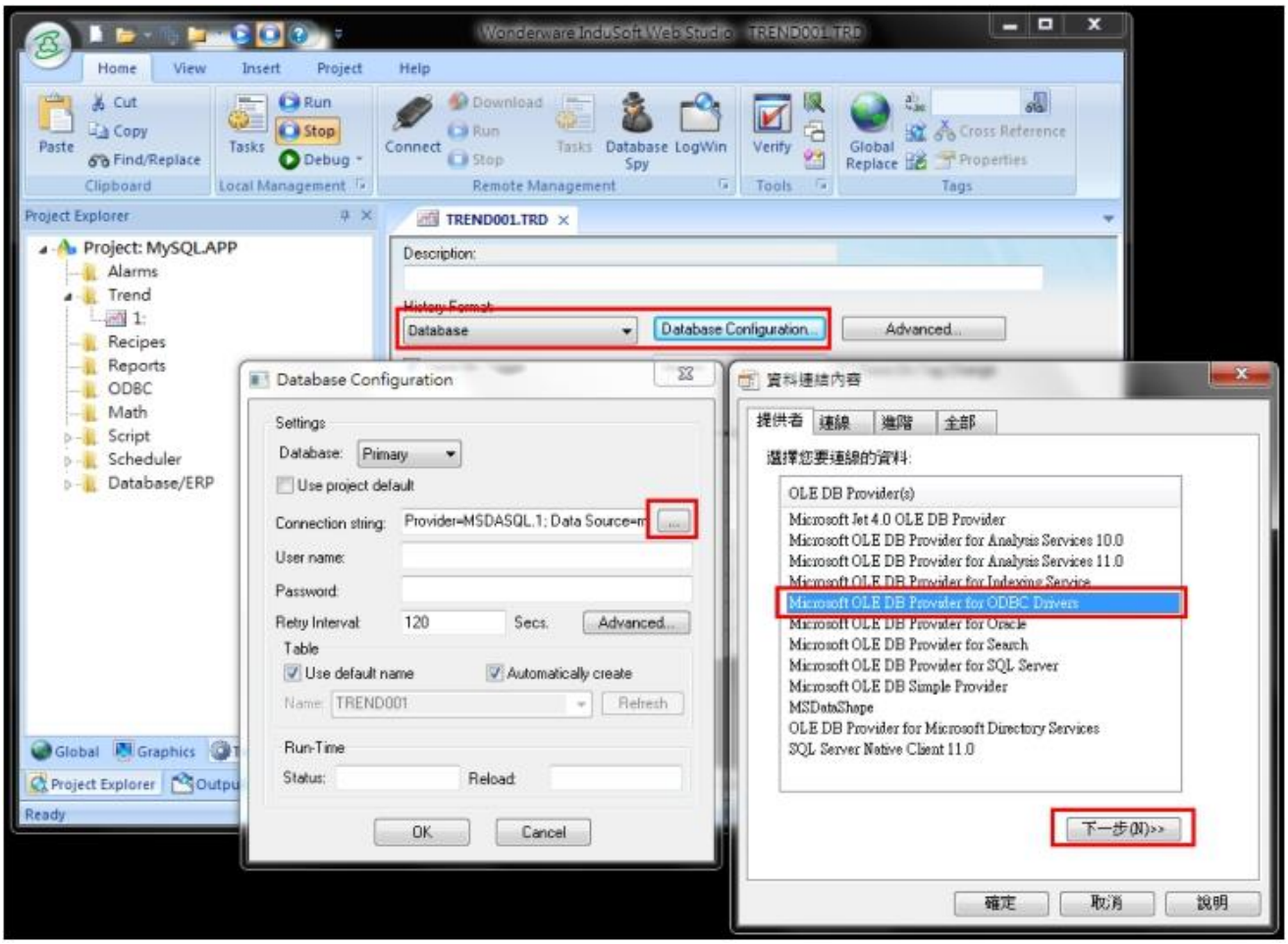
Note: The database (Schema) has to create in advance and can add using the MySQL Workbench management tool.



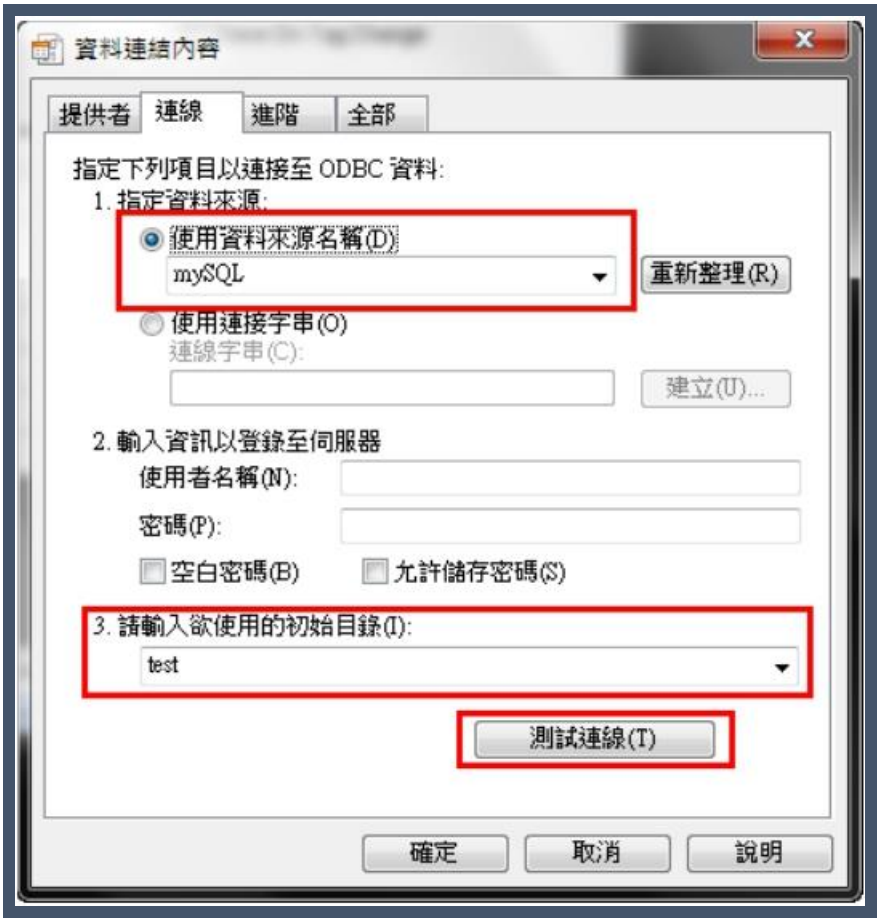
(3) Make sure the ODBC connection is established successfully

Step 5：Set up InduSoft database connection (Client)

(1) Take the trend chart form as an example. Under “Provide” Tag, chooses Microsoft OLE DB Provider for ODBC Drivers



(2) Set the data source name (mySQL) → the database to be used (test) →test connection



(3) Successfully connected means to complete the setting.