



cMT Database Server MySQL Quick Start Guide

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This manual walks you through the steps to set up a MySQL Server and cMT Database Server object, and then uses Microsoft Excel to read historical data from the HMI.

- cMT-SVR Models
- cMT3000 Models
- cMT-HDMI

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Overview

This user manual explains step by step how to install and set up a MySQL server on your PC, how to connect Excel to MySQL server, and how to design an EBPro project with a Database Server object to send data to the MySQL server.

The Database Server object is available for cMT Series Smart HMIs in EBPro V5.05.02 and later versions. The Database Server can synchronize sampled data and event logs to a remote MySQL server so that the user can use third-party software, such as Microsoft Office Excel, to manage the data on the server.

EBPro V6.00.01 adds the ability to query and display data from the MySQL server. The last section of this manual will cover the configuration of SQL Query and SQL Query Result Viewer objects.

Installing MySQL Server onto a PC

The SQL server used in the following demonstration is MySQL.

1. Download MySQL Workbench from this link: <http://dev.mysql.com/downloads/mysql/>
2. Click the [Download] button to download a Windows MySQL Installer MSI.

MySQL Community Server 8.0.18

Select Operating System:

Microsoft Windows

[Looking for previous GA versions?](#)

Recommended Download:



MySQL Installer
for Windows

All MySQL Products. For All Windows Platforms.
In One Package.

Starting with MySQL 5.6 the MySQL Installer package replaces the standalone MSI packages.

Windows (x86, 32 & 64-bit), MySQL Installer MSI

[Go to Download Page >](#)

Other Downloads:

Windows (x86, 64-bit), ZIP Archive	8.0.18	272.3M	Download
(mysql-8.0.18-winx64.zip)	MD5: 3c1fc0bc3368639d968f8e5bf8afa23d		Signature

The [Go to Download Page] button gives further download options.

3. Open the downloaded .msi file to start installing MySQL.
4. Select [Custom] as the Setup Type.

Choosing a Setup Type

Please select the Setup Type that suits your use case.

- Developer Default**
Installs all products needed for MySQL development purposes.
- Server only**
Installs only the MySQL Server product.
- Client only**
Installs only the MySQL Client products, without a server.
- Full**
Installs all included MySQL products and features.
- Custom**
Manually select the products that should be installed on the system.

Setup Type Description

Allows you to select exactly which products you would like to install. This also allows to pick other server versions and architectures (depending on your OS).

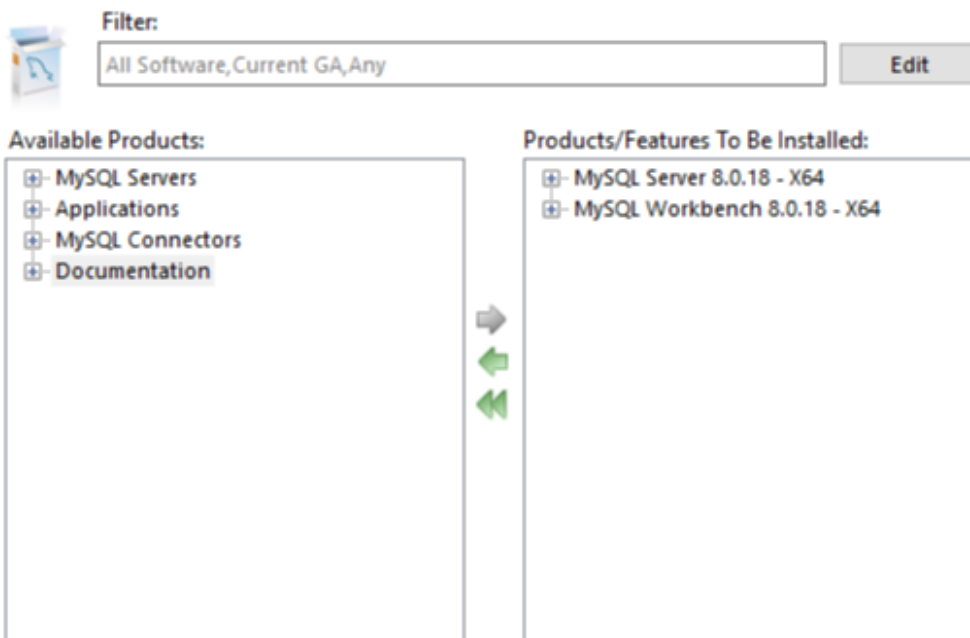
Next >

Cancel

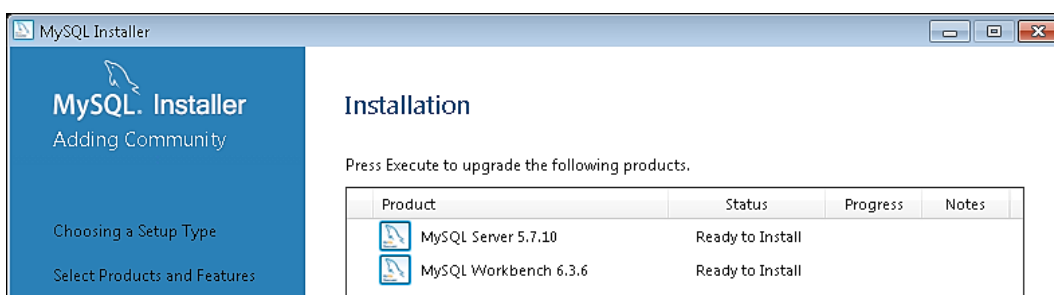
5. Select the following two products and click Next:
6. [MySQL Servers] » [MySQL Server] » [MySQL Servers x.x] » [MySQL Servers x.x.x –X64/X86]
7. [Application] » [MySQL Workbench] » [MySQL Workbench -X64/x86]

Select Products and Features

Please select the products and features you would like to install on this machine.



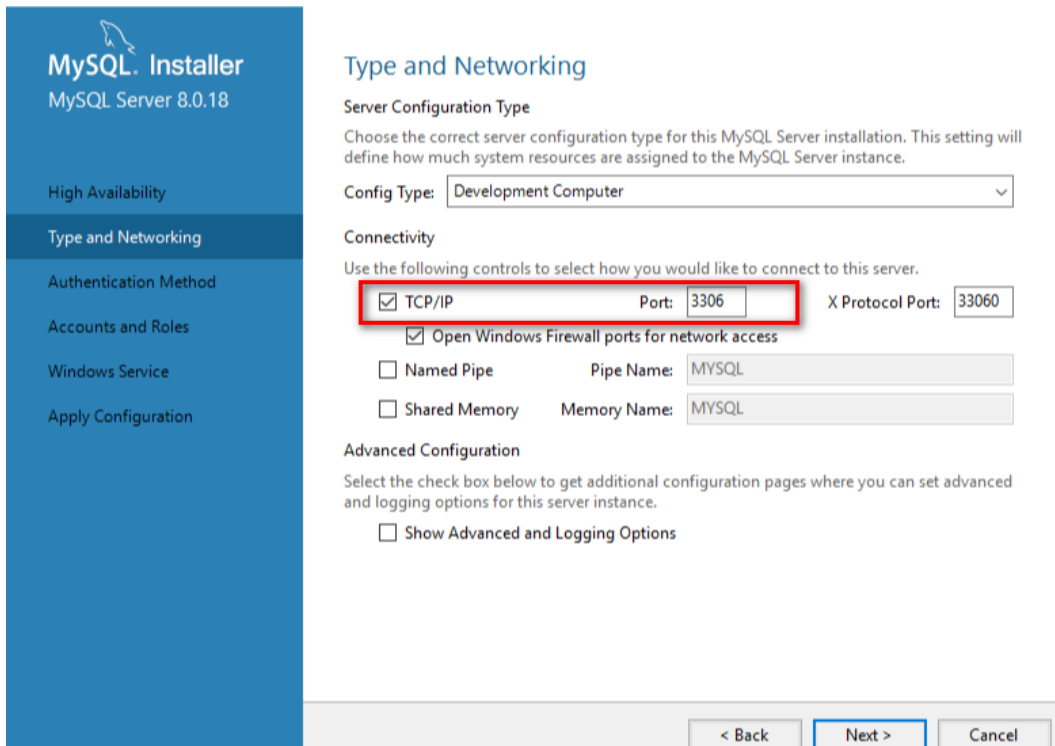
8. Click [Execute] to start installing the selected products. You may have to install failing requirements first.



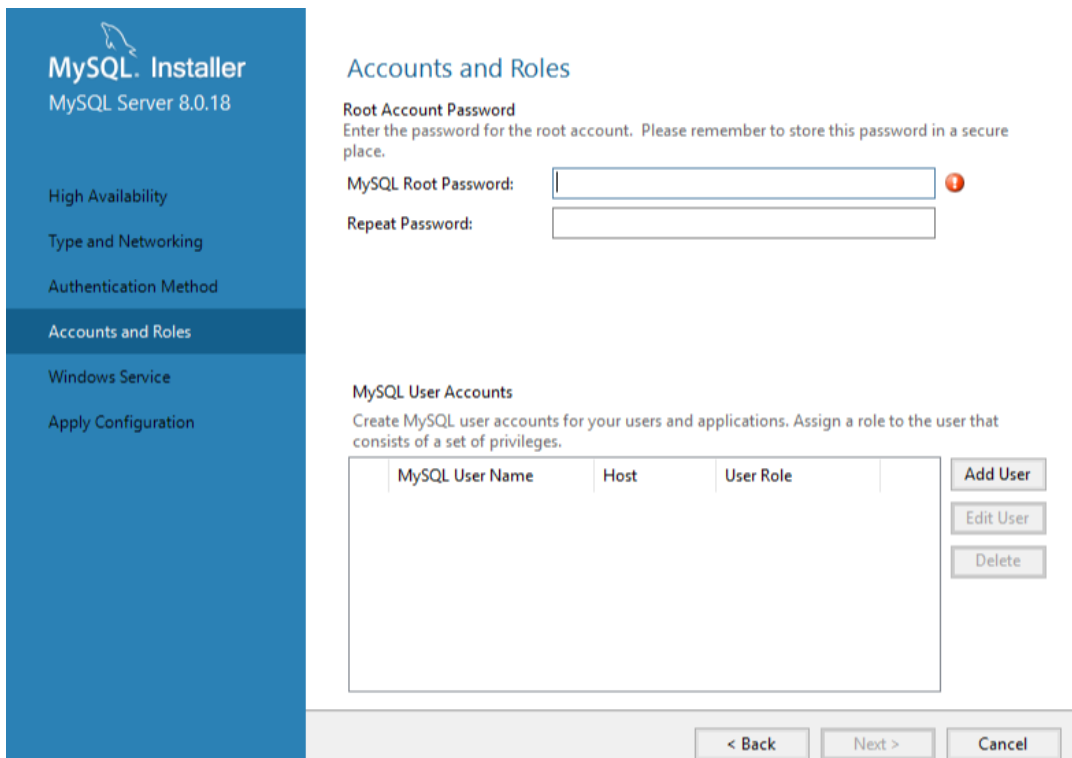
A green check mark is displayed beside each successfully installed item.



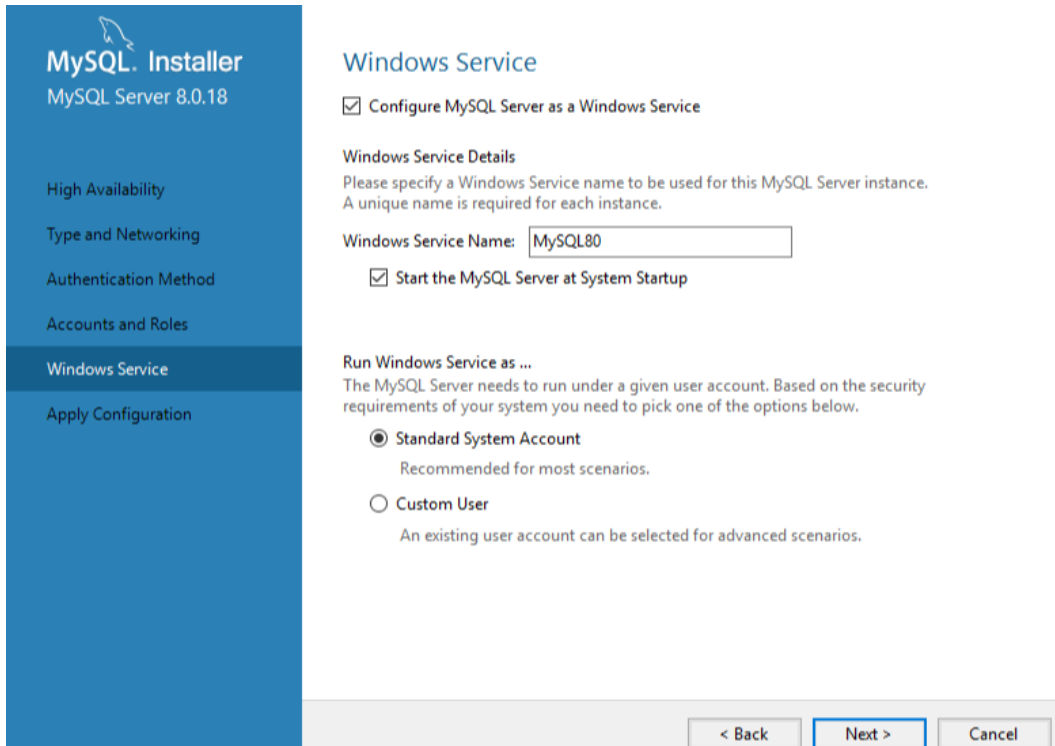
9. Set the TCP/IP Port Number and make note of it.



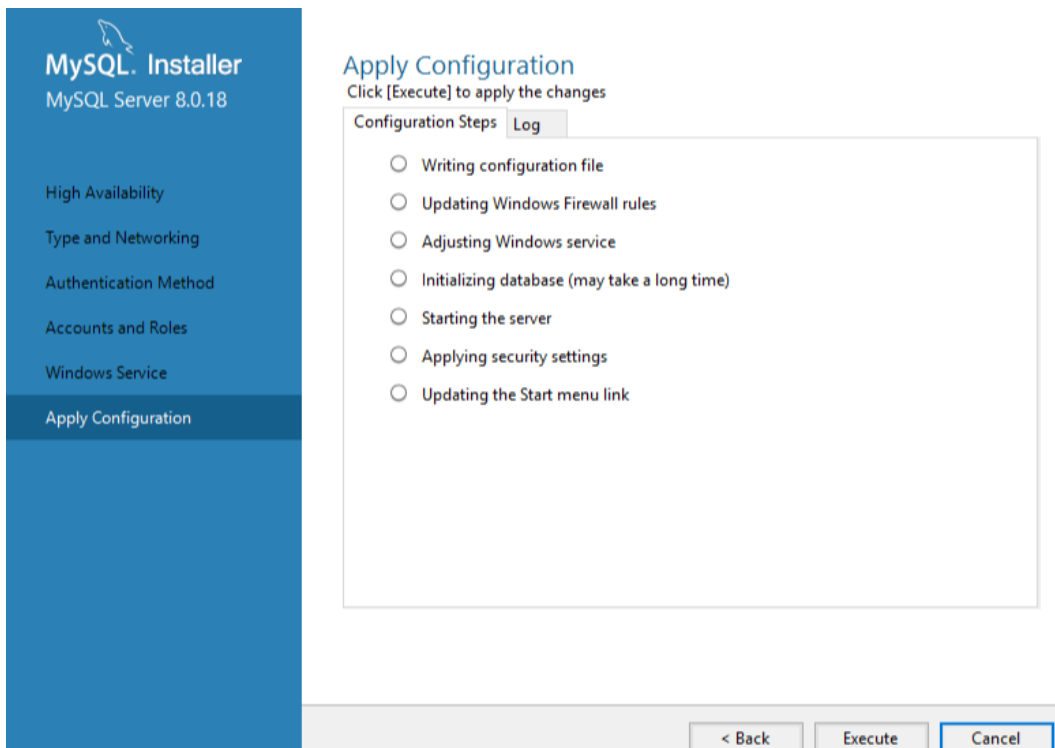
- 10. Create your MySQL root password and make note of it. This example will use Maple Systems' default 111111 password.



11. The rest of the settings can remain default.



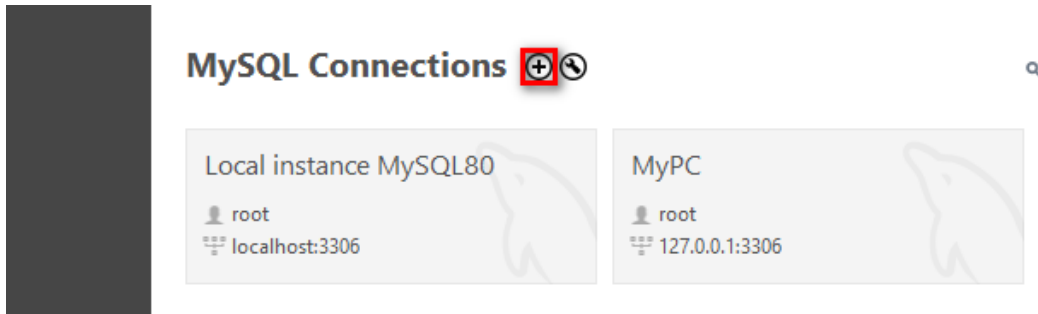
12. Click [Execute].



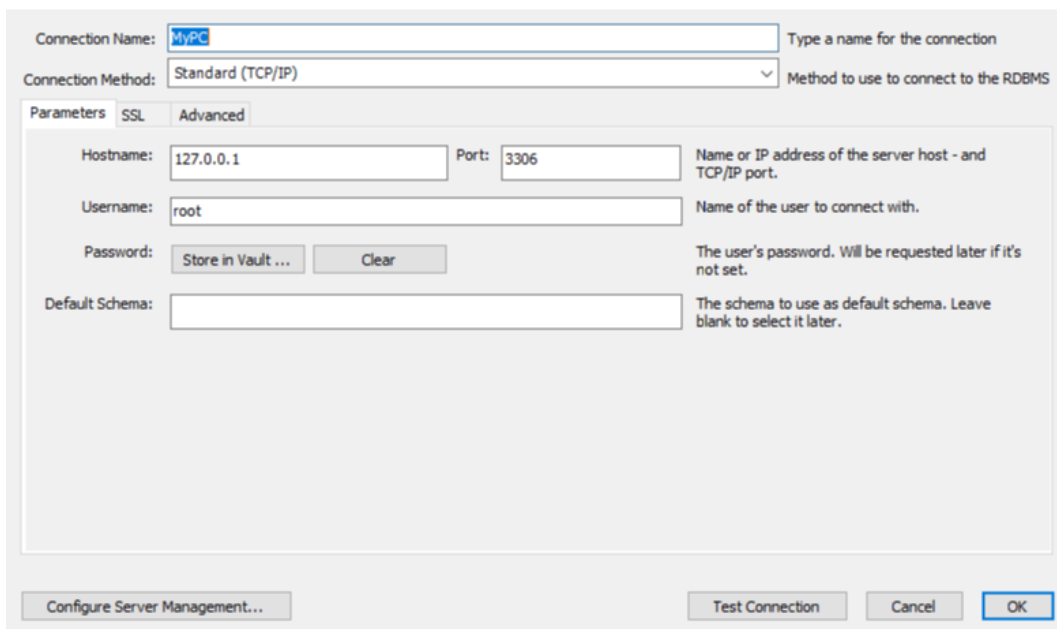
Building the MySQL Database

After installing MySQL, a Schema must be created in MySQL to synchronize the HMI historical data.

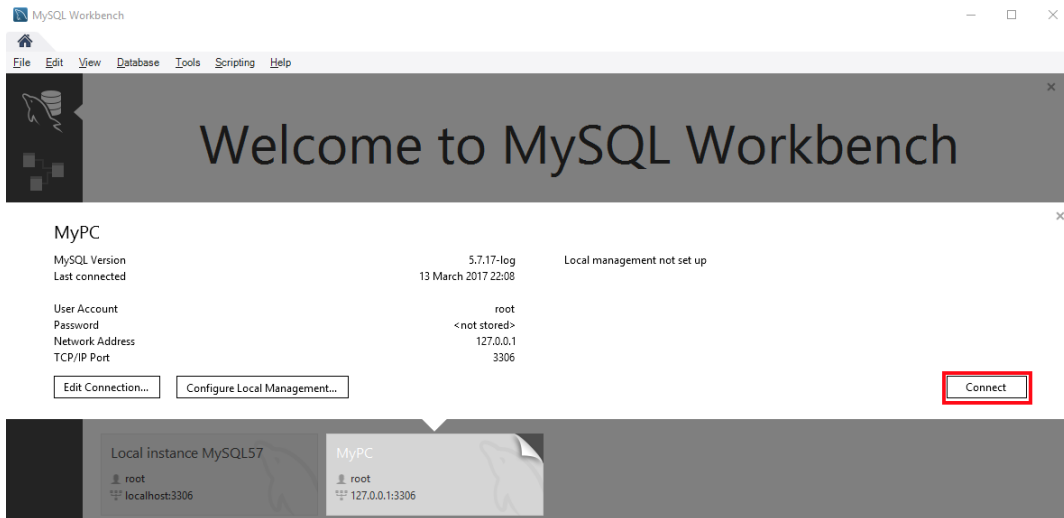
1. Launch MySQL Workbench. Click the + icon to create a Database Server connection.




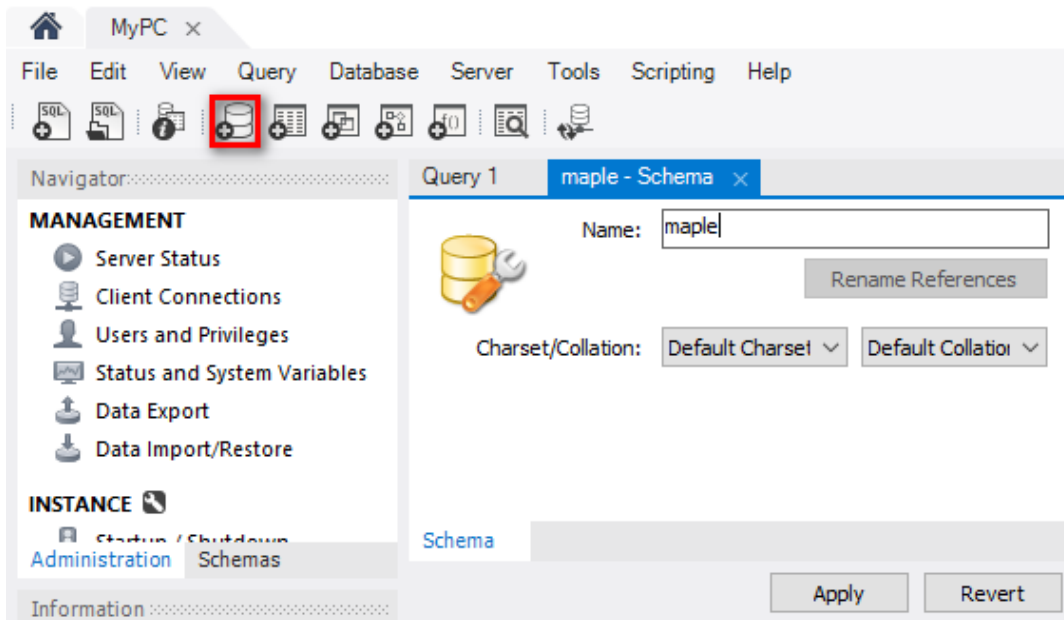
2. Enter [Connection Name], [Hostname], [Port], [Username], and use Port 3306.



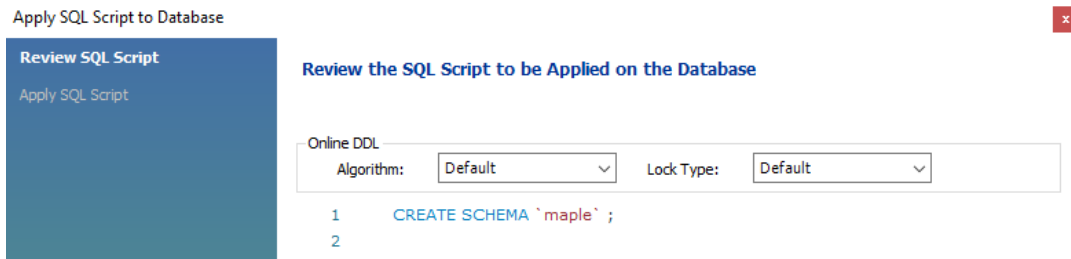
- When finished, your new connection will be shown on your workbench. Click the connection to open the settings window.



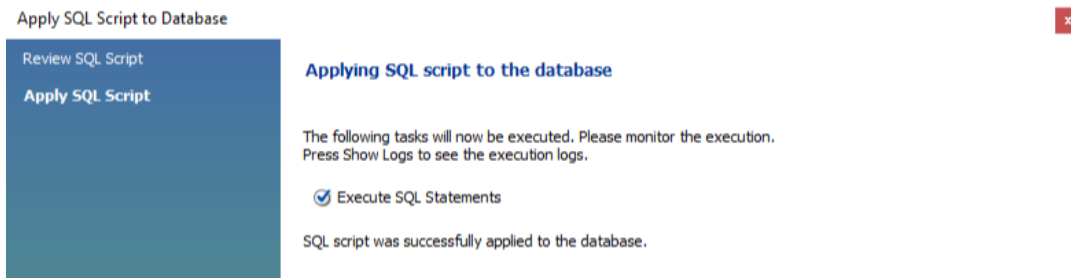
- Click the  icon to create the Schema, enter the name of the Schema and click [Apply].



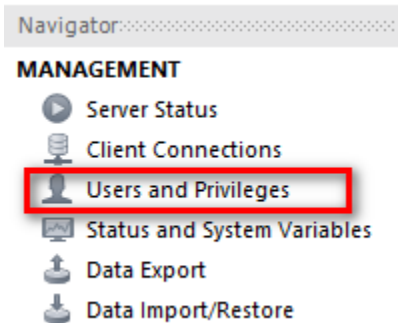
5. The program will prompt you to review the SQL Script. Click [Apply].



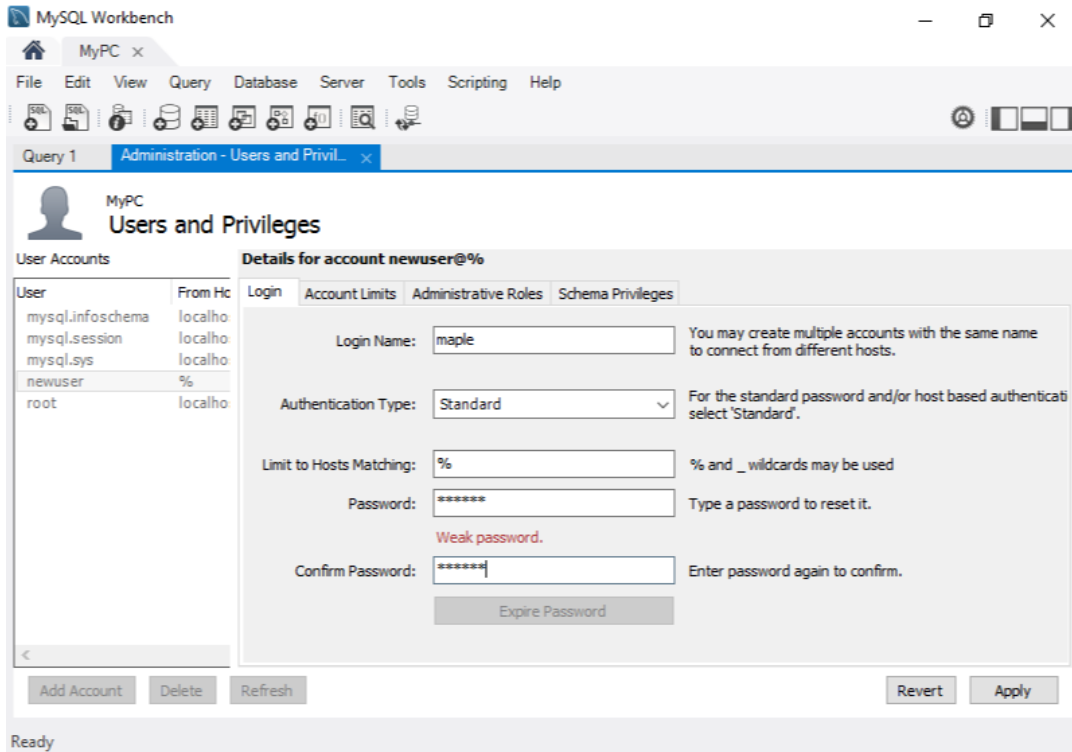
6. Then click [Finish].



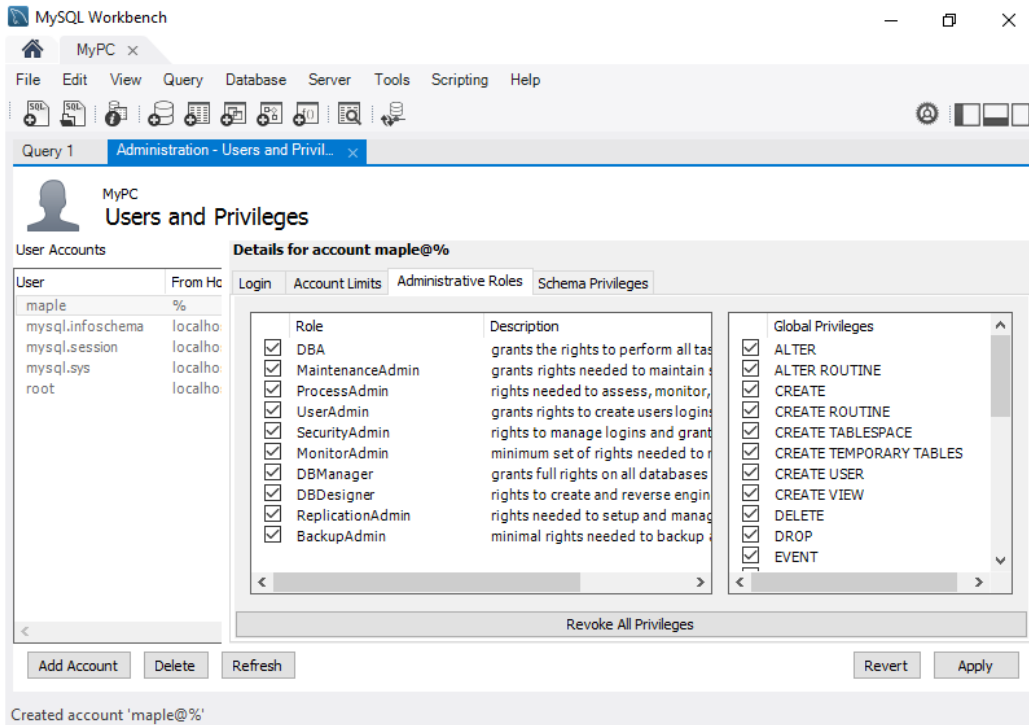
7. Under Navigator, select [Users and Privileges].



- Click [Add Account] and enter the user credentials in the [Login] tab. Click [Apply].



9. In the [Administrator Roles] tab select all the roles and privileges.



10. Click [Apply] when finished.

Creating a Database Object in the EPro Project File

This section goes through the Database Server configuration in EPro. This configuration is already done in the cMT_SQL_Database_Server.cmtmp sample project, which we will use to generate data to sync to our MySQL database and display in Excel.

1. Open the cMT_SQL_Database_Server.cmtmp project file in EPro. In the main menu, click [Data/History] » [Database Server].
2. The General tab lists the Database Server parameters. In this example, we will be using on-line/off-line simulation mode on our PC, so we set the Database Server IP to 127.0.0.1. In real world situations, you will use the IP address of the remote PC running your MySQL database.

The screenshot shows the 'Database Server' configuration window. The 'General' tab is selected. The 'Server system' is set to 'MySQL'. The 'IP' is set to '127 . 0 . 0 . 1'. The 'Port' is set to '3306'. The 'Username' is 'maple' and the 'Password' is '111111'. The 'Database name' is 'maple'. There is also a 'Use IP' dropdown menu and a 'Comment' field.

3. In the Status/Control tab, you can set the Status and Control Addresses. The status addresses can display the connection status with SQL server on the HMI, and the control addresses can be used to change connection parameters dynamically on the HMI.

- The [Sync to database] for both the Data Sampling object and the Event Log object is used to synchronize the historical data to the Database Server.

Data Sampling Object

Comment :

Sampling mode
 Time-based Trigger-based
 Sampling time interval : 1 second(s)

Read address
 Device : Local HMI
 Address : LW 0

Data Record
 Data length : 6 word(s)

Hold address
 Enable Mode : ON
 Device : Local HMI
 Address : LB 20

Control address
 Enable
 Device : Local HMI
 Address : LW 20 16-bit Unsigned
* Control command : 1 [clear], 2 [sync.], 3 [sync. and clear], 4 [clear and restore log index], 5 [recover freeze state]

History file
 Enable
 All records in one file
 Customized file handling
 File name : Datalog

Save to
 HMI memory (10000 limited)
 USB disk SD card

Sync. to database
 Enable
 Database : 1. 127.0.0.1

Preservation limit (1 ~ 1000 days)
 Auto sync. periodically
 Enable status address

OK Cancel

Event (Alarm) Log

Category : [Edit category name mapping...](#)

No.	Category	Text	Mode	Condition	Read address	Notification address	Buzzer	e-Mail

Control address
 Enable

History files
 Enable
 Save to
 HMI memory (10000 limited)
 USB disk SD card

Sync to database
 Enable Database : 1. 127.0.0.1

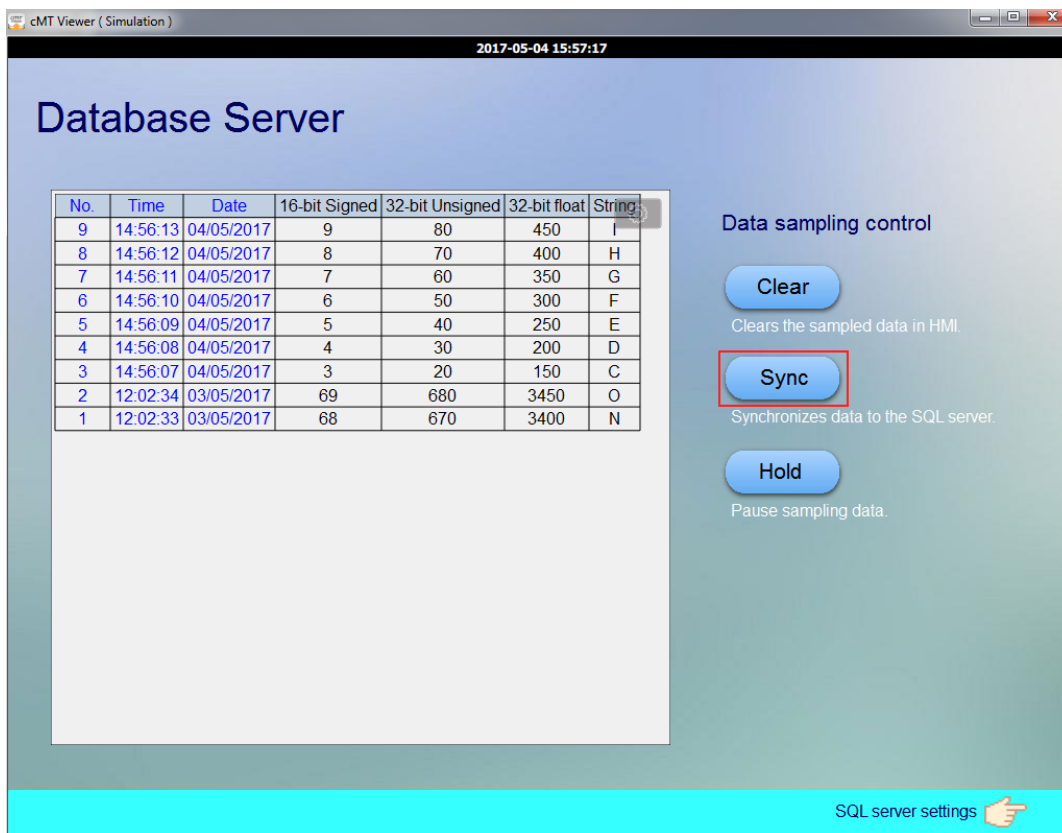
- If a Control Address is enabled in the Data Sampling and Event Logs, the following values will produce the referenced commands.

Value of 1: This will clear the sampled data in the HMI.

Value of 2: This will synchronize the historical data to the SQL server.

Value of 3: This will synchronize the historical data to the SQL server and clear the sampled data in the HMI.

- These are the relevant settings to direct data to your MySQL database. Now we will run the project in online simulation mode to generate data for the MySQL database to be displayed in Excel in the next section.



The screenshot shows the 'cMT Viewer (Simulation)' window with a timestamp of '2017-05-04 15:57:17'. The main content area is titled 'Database Server' and contains a table of sampled data. To the right of the table is a 'Data sampling control' panel with three buttons: 'Clear', 'Sync', and 'Hold'. The 'Sync' button is highlighted with a red box. Below the 'Sync' button is a link for 'SQL server settings' with a hand icon.

No.	Time	Date	16-bit Signed	32-bit Unsigned	32-bit float	String
9	14:56:13	04/05/2017	9	80	450	I
8	14:56:12	04/05/2017	8	70	400	H
7	14:56:11	04/05/2017	7	60	350	G
6	14:56:10	04/05/2017	6	50	300	F
5	14:56:09	04/05/2017	5	40	250	E
4	14:56:08	04/05/2017	4	30	200	D
3	14:56:07	04/05/2017	3	20	150	C
2	12:02:34	03/05/2017	69	680	3450	O
1	12:02:33	03/05/2017	68	670	3400	N

- Allow the project to generate some data, and then click the [Sync] button to synchronize the data to the MySQL database. If the sync has succeeded, three tables will have been generated in the database with the following name format: <HMI Name>_<DATALOG NAME>_data.

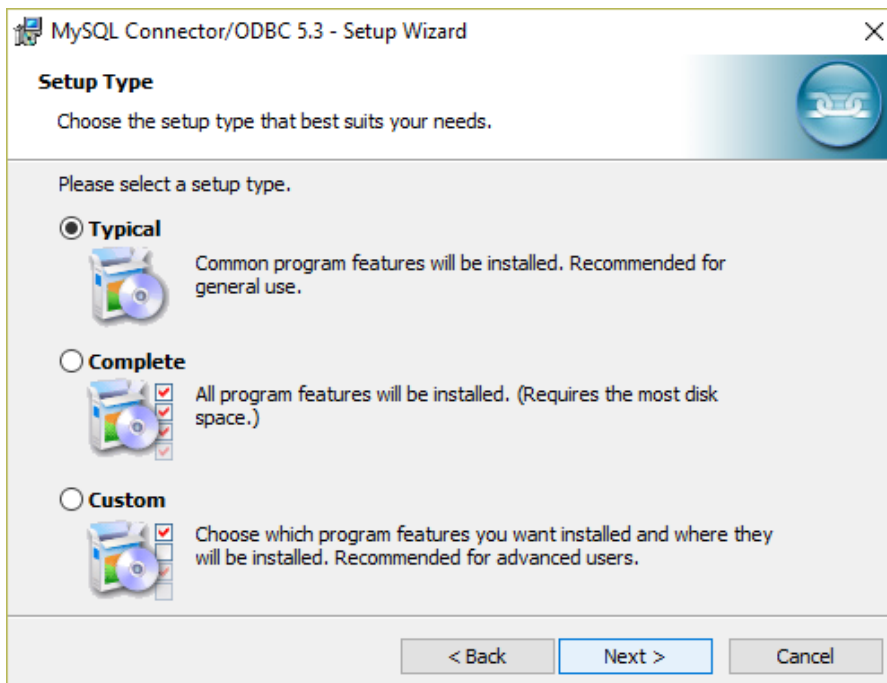
Synchronizing the MySQL Database to Microsoft Office Excel

Connecting Microsoft Office Excel to MySQL requires the ODBC Connector (Open Database Connectivity). This section explains how to set the communication parameters in ODBC Connector and Excel.

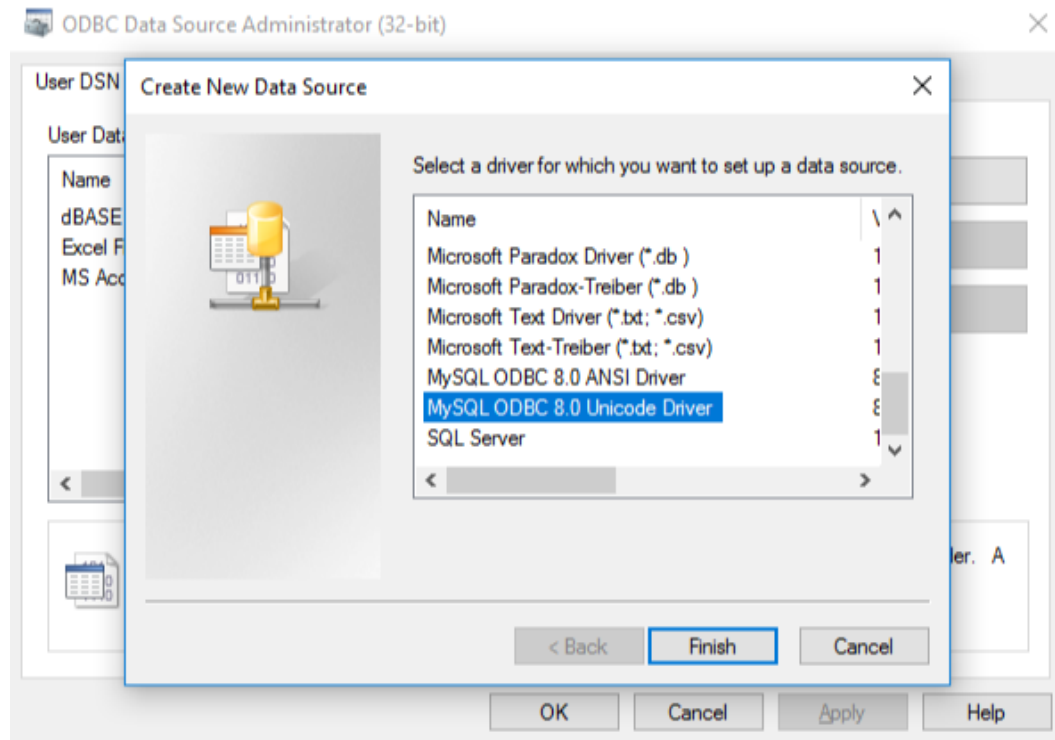
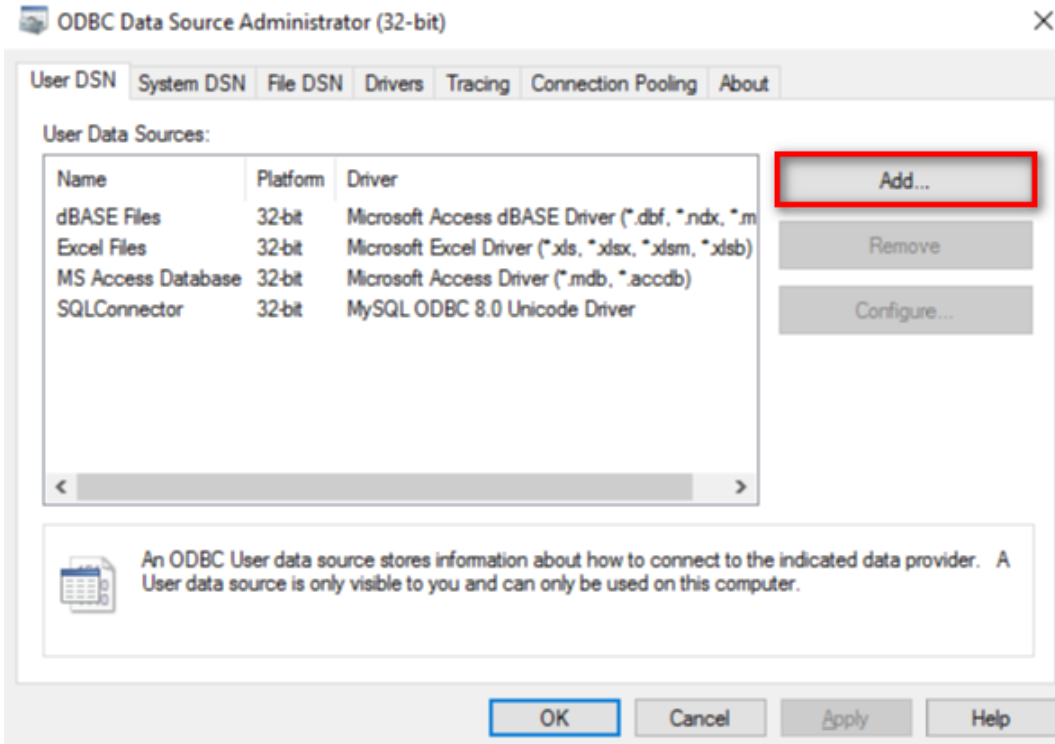
1. Visit the MySQL website and download the ODBC Connector:
<https://dev.mysql.com/downloads/connector/odbc/>
2. Excel is a 32-bit based software, so we will need the Windows (x86, 32-bit) version.

Windows (x86, 32-bit), MSI Installer (mysql-connector-odbc-5.3.4-win32.msi)	5.3.4	7.0M	Download
Windows (x86, 64-bit), MSI Installer (mysql-connector-odbc-5.3.4-winx64.msi)	5.3.4	7.2M	Download
Windows (x86, 32-bit), ZIP Archive (mysql-connector-odbc-noinstall-5.3.4-win32.zip)	5.3.4	7.6M	Download
Windows (x86, 64-bit), ZIP Archive (mysql-connector-odbc-noinstall-5.3.4-winx64.zip)	5.3.4	7.8M	Download

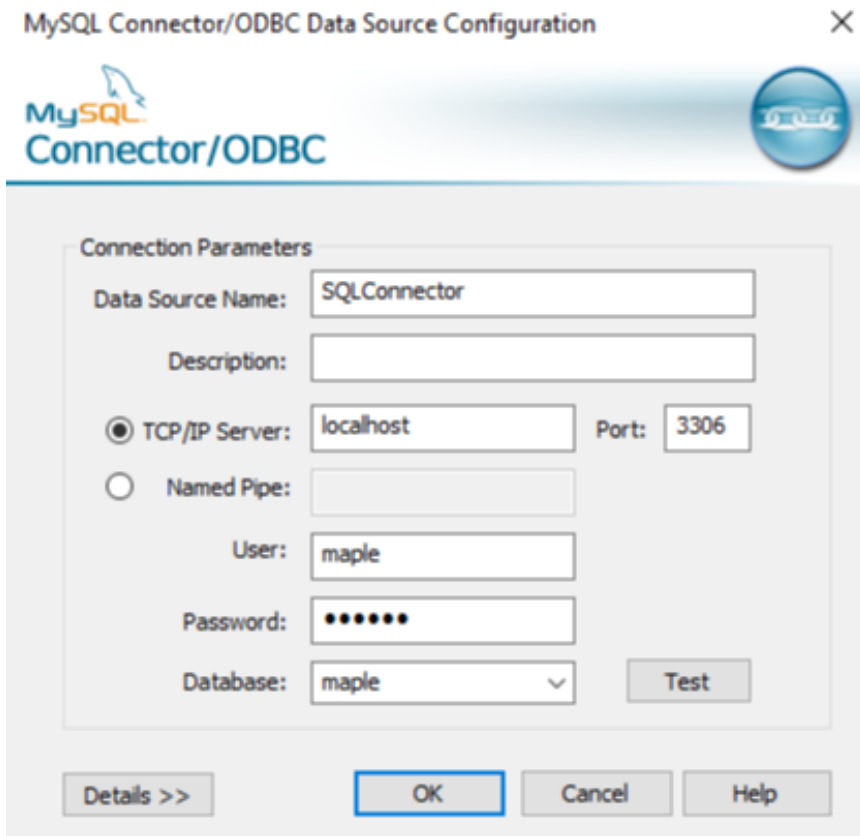
Install the downloaded connector and open Data Sources (ODBC). If you are running Windows 64bit, go to C:\Windows\SysWOW64\odbcad32.exe to run the ODBC connector once installed.



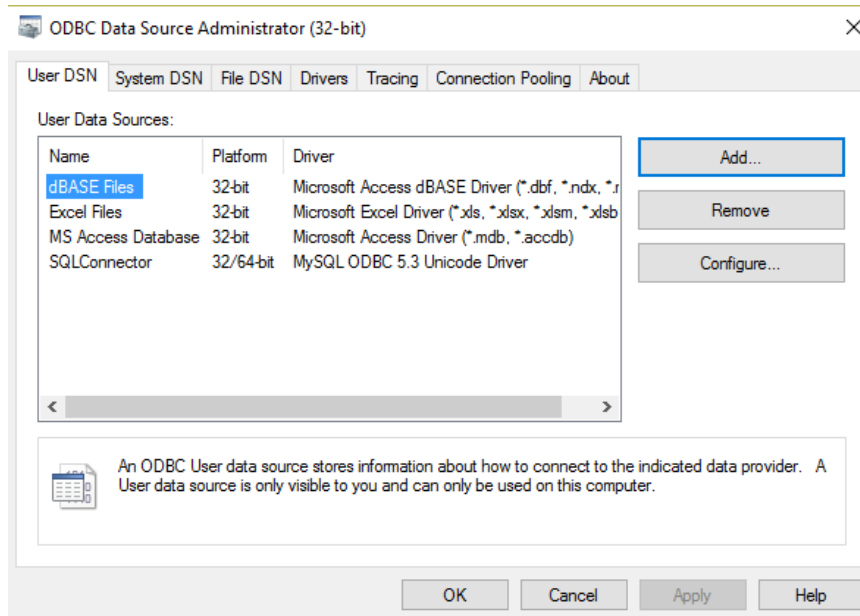
3. Click [Add] to create a new data source and select “MySQL ODBC 8.0 Unicode Driver”.



- Set the communication parameters:



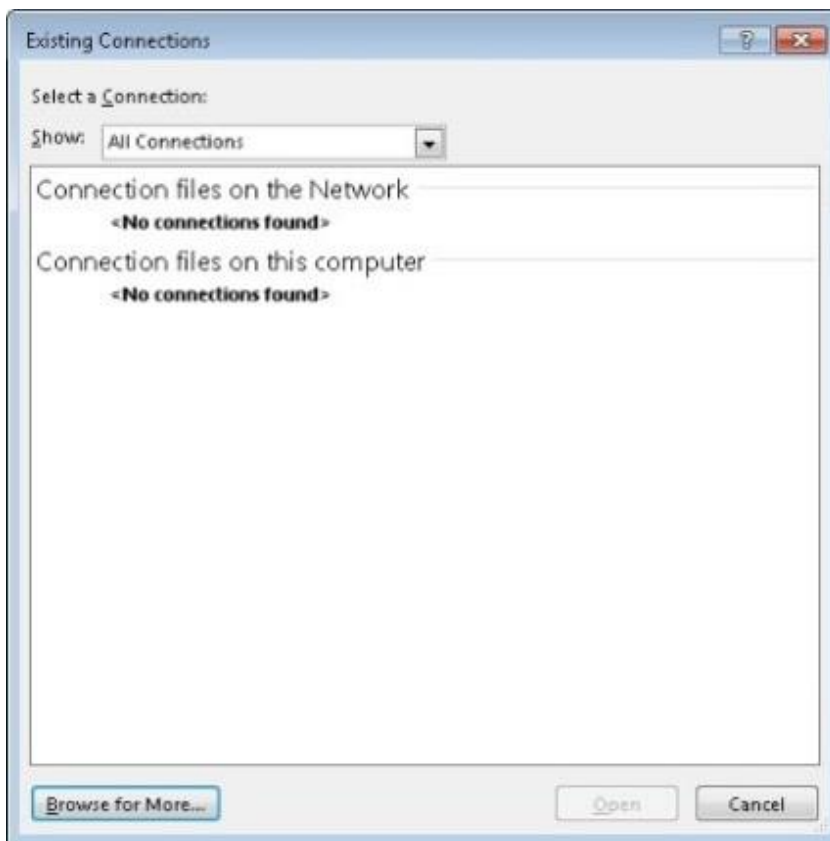
- Click [OK]. Your new data source has been created.



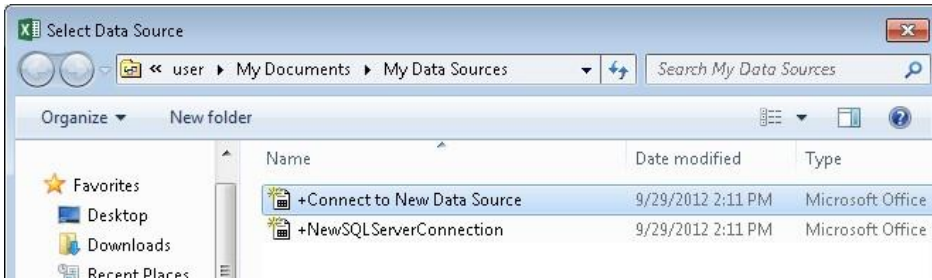
- Open Excel, go to the [Data] tab and select [Connections].



- Click [Add] to build a new connection.
- Click [Browse for More...].

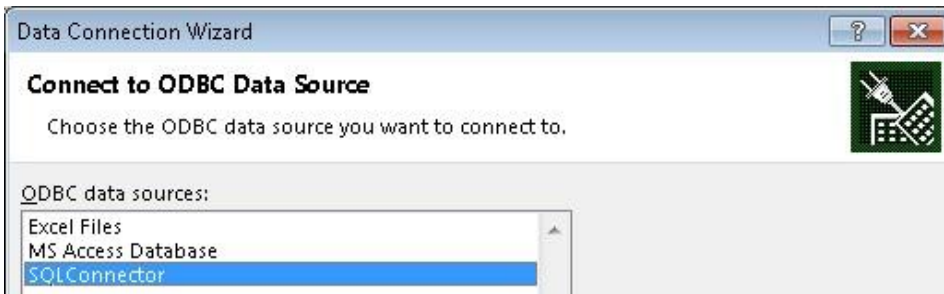


- Go to C:\Users\user\Documents\My Data Sources and select [Connect to New Data Source].



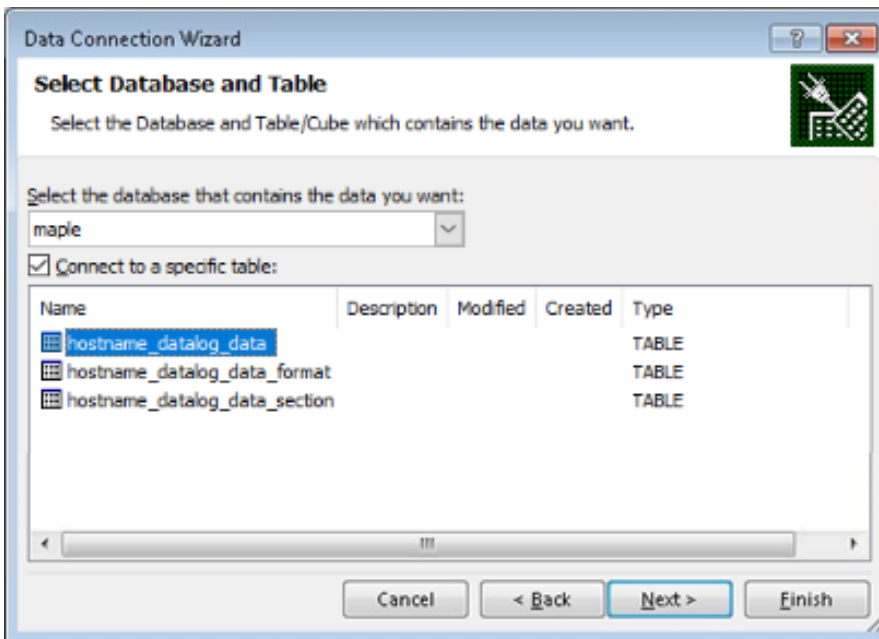
- In the Data Connection Wizard window, select [ODBC DSN].

- Select the previously created data source.



- Select the items to be connected:

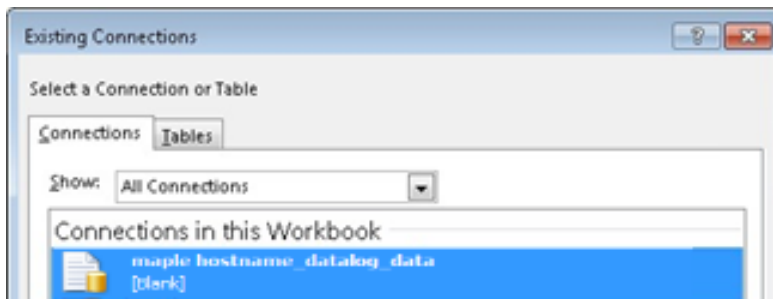
Data Sampling: <HMI NAME>_<DATALOG NAME>_data
 Event Log: <HMI NAME>_event



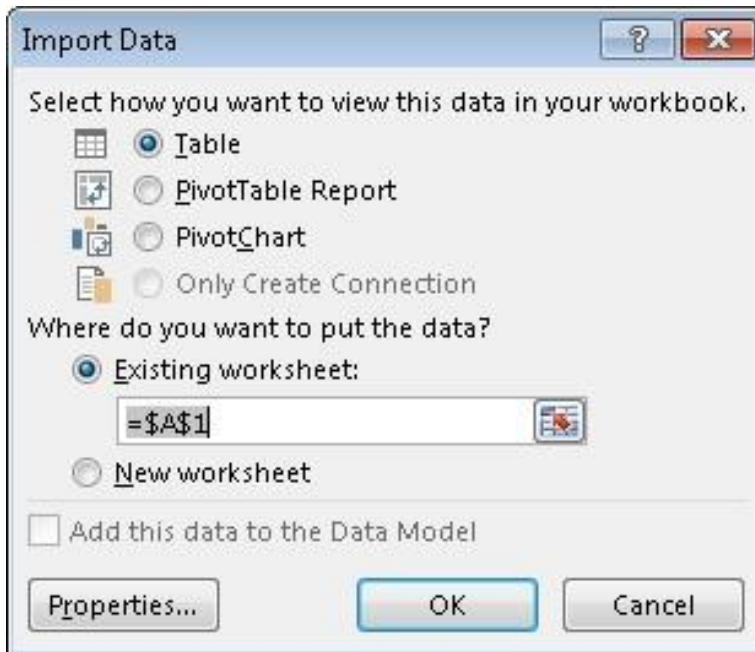
13. Click the [Finish] button.
14. Go to the [Data] tab and select [Existing Connections].



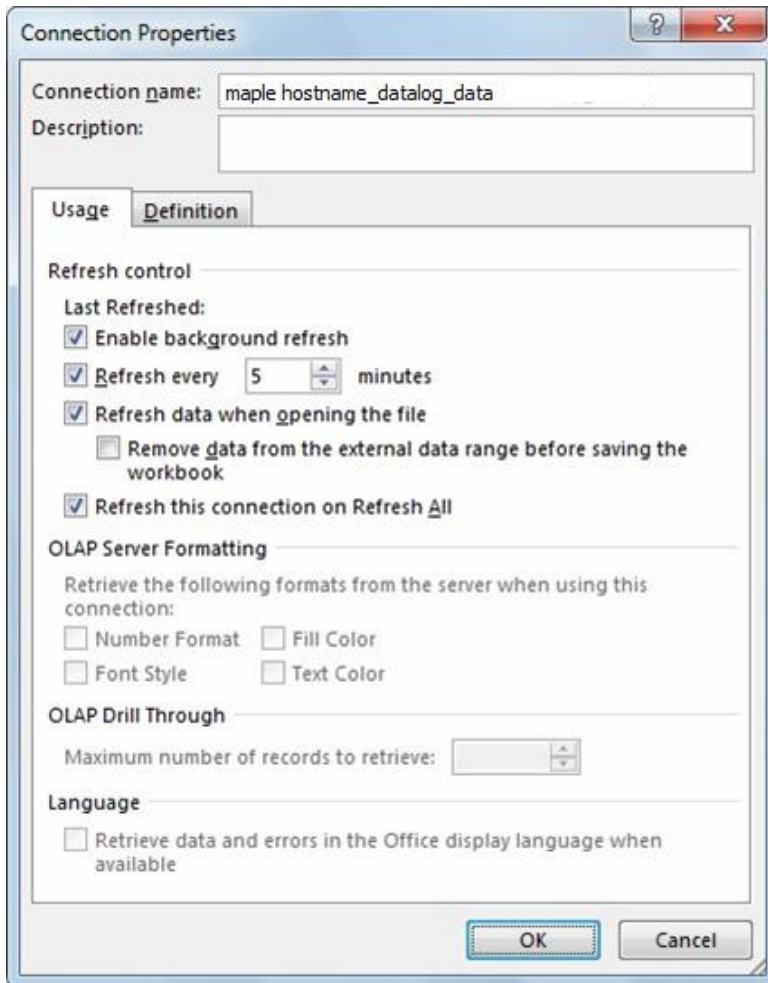
15. Select the previously built connection.



16. Select the beginning data location



- Go to the [Data] tab and select [Connections]. Select the connection and open its [Properties] settings window. In the [Usage] tab, select [Refresh every * minutes].



18. Now the Excel worksheet will display historical data from the cMT series HMI when it is synchronized to MySQL.

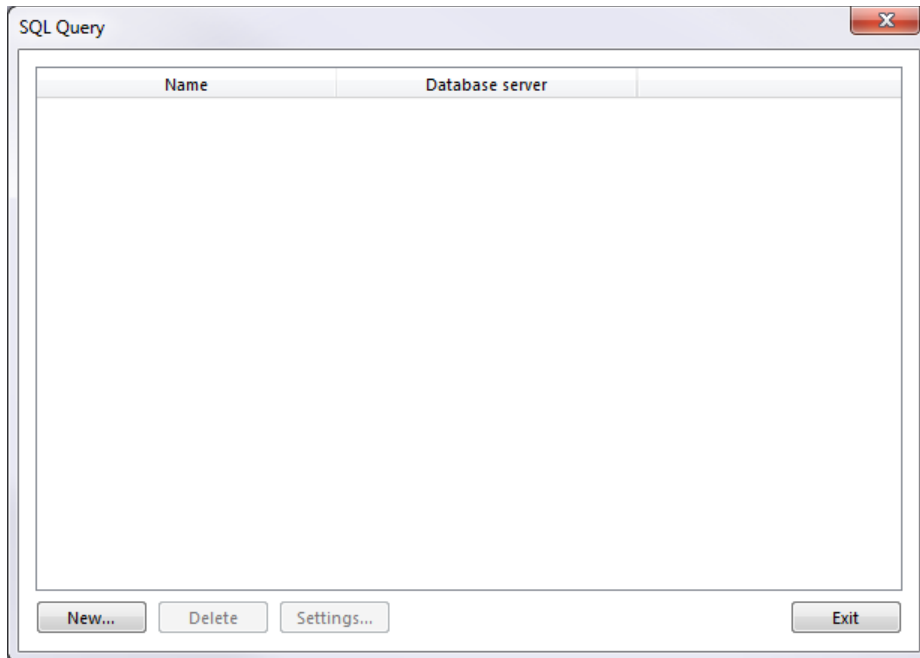
	A	B	C	D	E
1	data_index ▼	time@timestamp ▼	data_format_0 ▼	data_format_1 ▼	data_format_2 ▼
2	5384	1453915082	-0.906303167	0.714389682	-0.330768824
3	5385	1453915082	-0.953719914	0.807743073	-0.449516267
4	5386	1453915083	-0.976301134	0.863846481	-0.526046038
5	5387	1453915083	-0.99619323	0.937895536	-0.635889471
6	5388	1453915083	-1	0.980105877	-0.705340028
7	5389	1453915084	-0.991442561	1.032004952	-0.802969456

Configuring an SQL Query Object

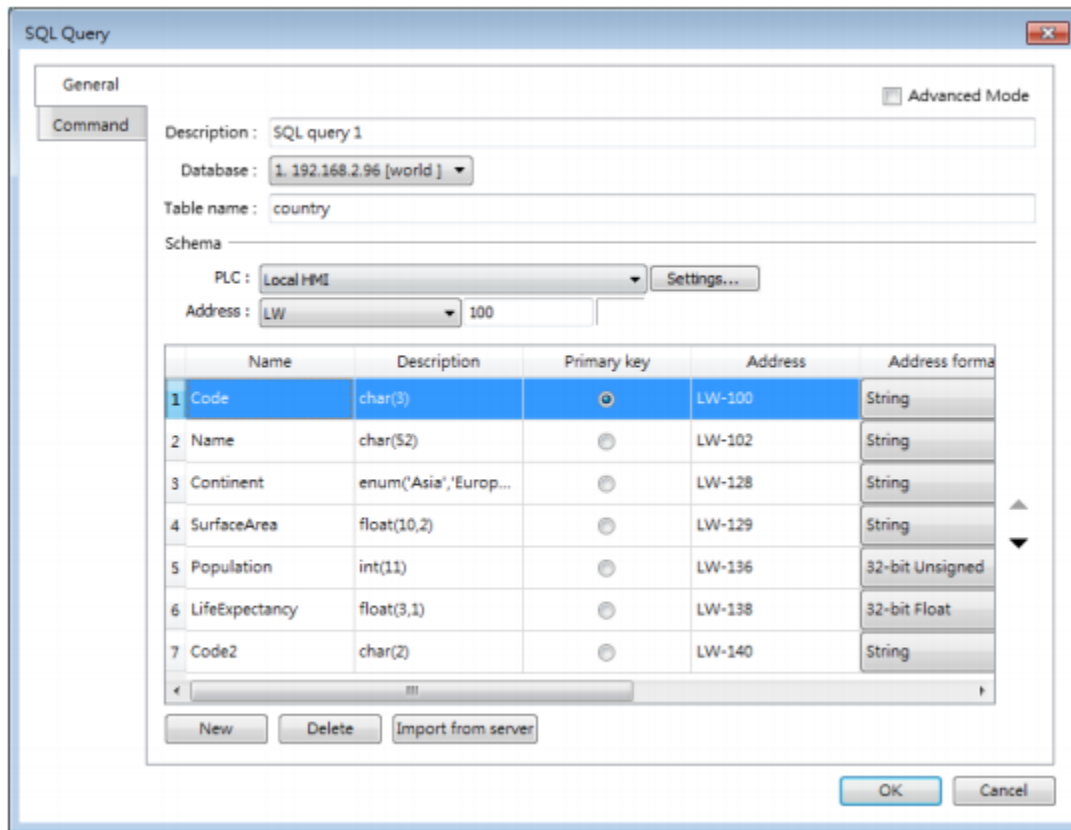
The SQL Query object can exchange data with a MySQL database. Before enabling SQL Query, a Database Server object must be configured in EBPro.



Click [Data/History] » [SQL Query] to open the settings dialog box. Click **New** to create a new object.

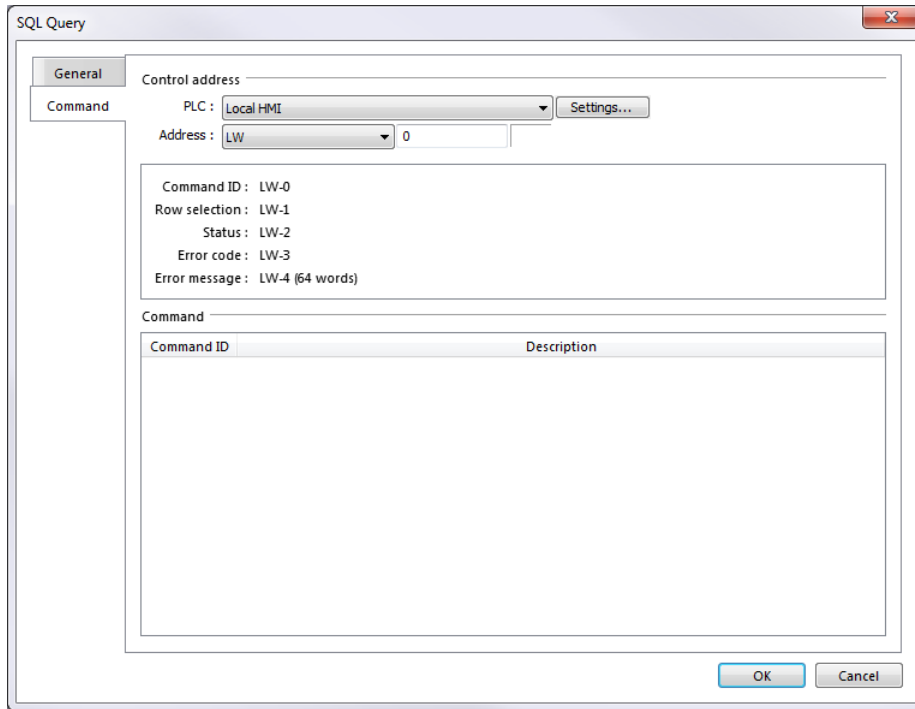


General Tab



Setting	Description
Advanced Mode	When selected, advanced mode allows you to manually enter syntax in the Command tab to control the MySQL database. Note: Once Advanced Mode is selected, it is not possible to go back to General Mode.
Description	User's description about this query.
Database	Select the source database to read from.
Table Name	Enter the name of the query table.
Schema	Click [New] to add an entry. The data read from database will be written to the corresponding address specified in the schema. You must manually set Address Format for each entry. Note: A Primary Key should contain only numeric values.

Command Tab

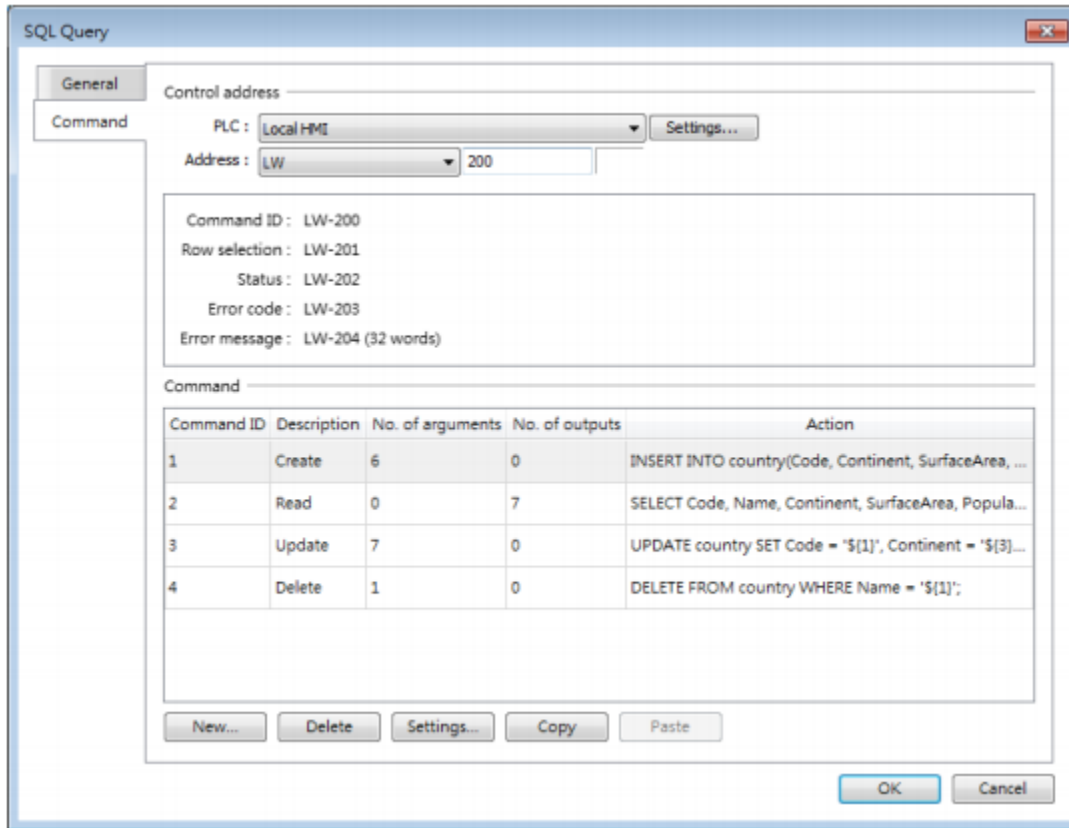


Setting	Description
Control address	Designate five consecutive registers to execute commands and show results. When importing the table from database, four commands will exist by default in the Command table: Create, Read, Update, and Delete

Status Value	Meaning
0	Normal
1	Query result exceeds 1000 records. Using LIMIT clause can constrain the number of rows in one page.

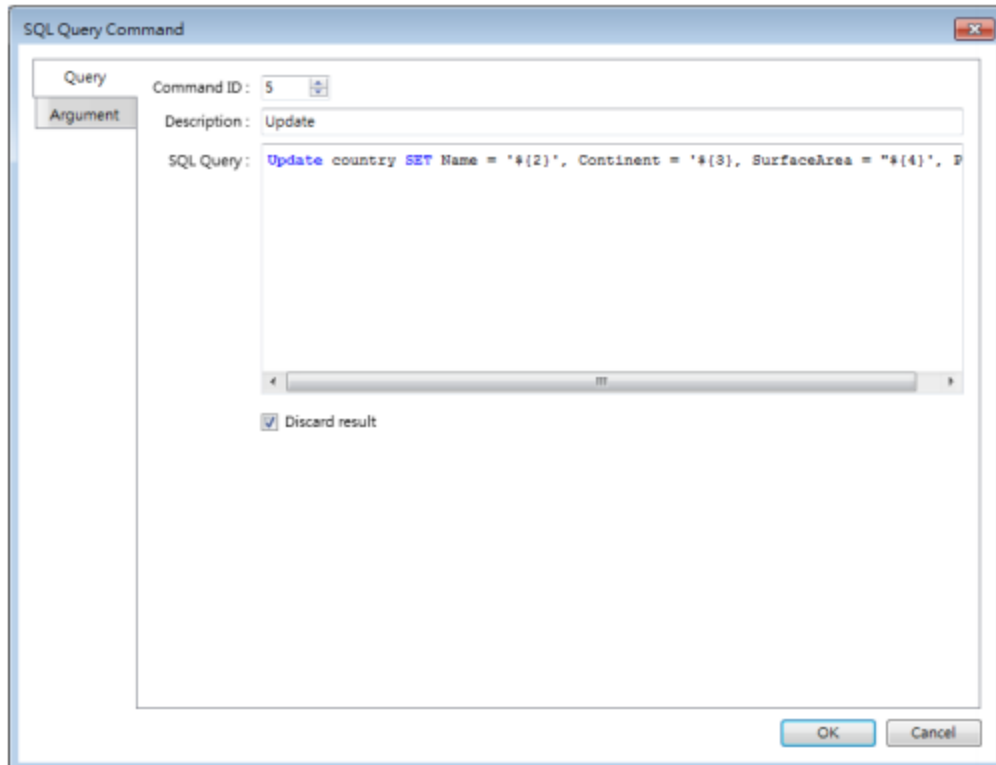
Error Code	Meaning
0	No errors
1	Unknown error
2	Invalid command
3	Database Server is not connected
4	Argument cannot be read
5	Cannot write and output
6	Incorrect number of arguments
7	Error in MySQL, please read error message
8	Unsupported datatype
9	Number of columns exceeds the limit
10	Number of rows exceeds the limit
11	Inside error

Advanced Mode



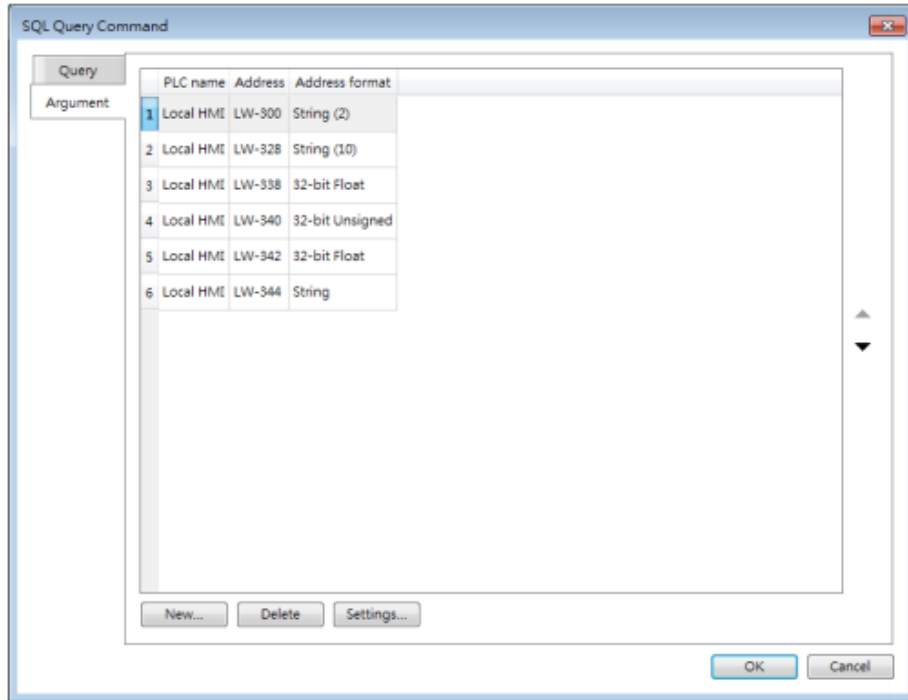
In Advanced Mode, [No. of arguments], [No. of outputs], and [Action] columns can be found in the Command table. Click [New] or [Settings] to open the **SQL Query Command** window.

Query Tab



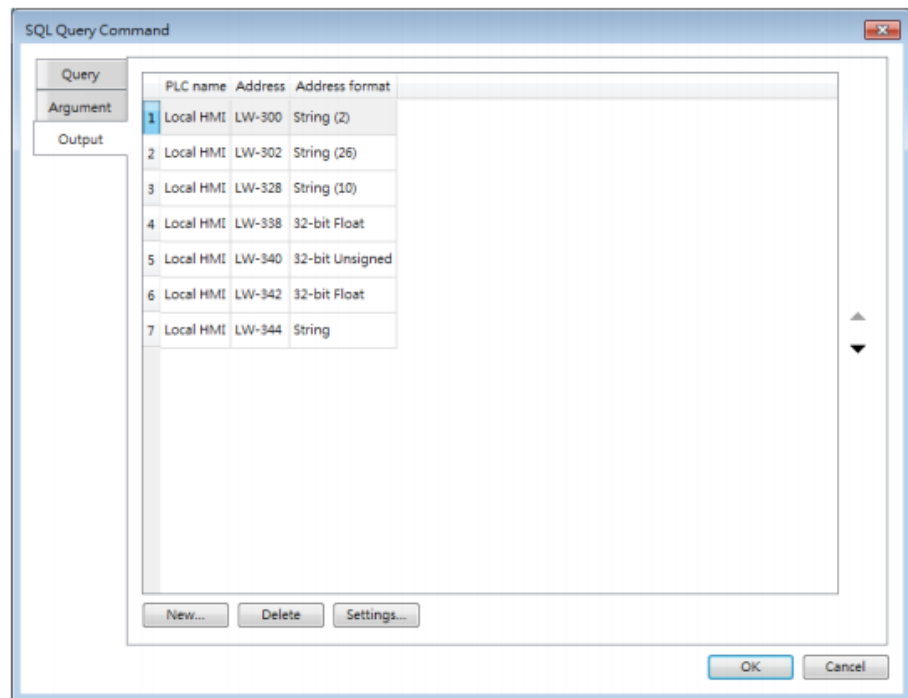
Setting	Description
Command ID	Specify the ID number used to give this command.
Description	Enter the description of this command.
SQL Query	Enter the syntax for this command. An argument should be enclosed in braces: <code>\${argument no.}</code>
Discard result	When selected, the result of executing this command will not be shown in SQL Query Result Viewer object. This checkbox can be selected for commands that are done directly to the database that do not require a result, such as INSERT INTO, UPDATE, DELETE...etc.

Argument Tab



If an argument is used in the syntax of a command in [Query] tab, the system will refer to the address specified in this tab according to the argument number enclosed in \${argument no.}.

Output Tab



After reading database, the result will be stored in the addresses specified in this tab.

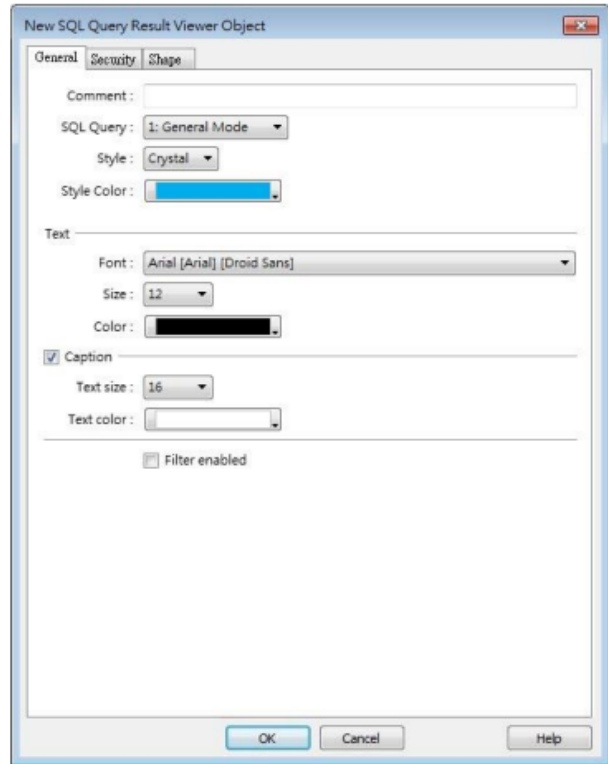
Datatype Conversions

The following table illustrates the allowable datatype conversions when reading from a MySQL database. If conversion cannot run properly, error code 5 will be set. For example, when converting MySQL's INT into EBPro's 16-bit Unsigned, if the value exceeds the limit of 16-bit Unsigned, error code 5 will show.

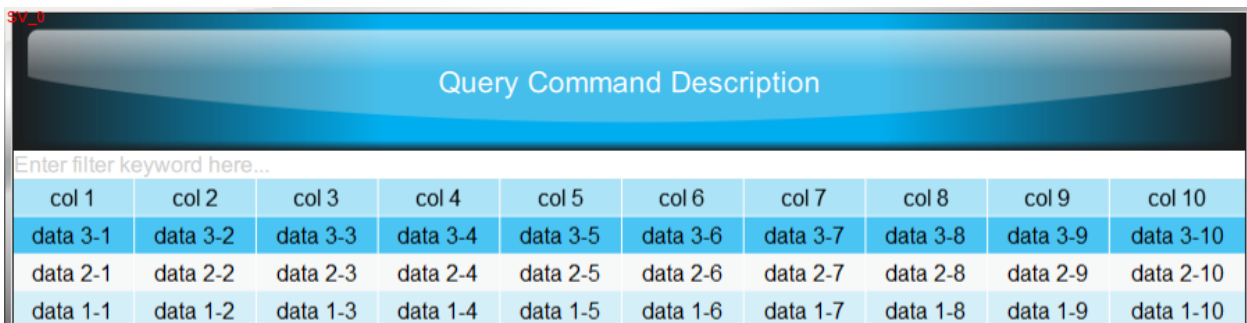
MySQL Data Format	Allowable EBPro Datatypes
TINYINT SMALLINT MEDIUMINT INT BIGINT BIT	16/32-bit BCD 16/32-bit HEX 16/32-bit Binary 16/32-bit Signed 16/32-bit Unsigned
FLOAT DOUBLE DECIMAL	32-bit Float
DATETIME CHAR VARCHAR BINARY VARBINARY BLOB TINYBLOB MEDIUMBLOB LONGBLOB TEXT TINYTEXT MEDIUMTEXT LONGTEXT	String

Configuring the SQL Query Result Viewer

The SQL Query Result Viewer shows the results obtained by running SQL Query. Click [Data/History] » [SQL Query Result Viewer] to open the settings dialog box to configure the viewer parameters.



Setting	Description
Comment	User's comment about this result viewer
SQL Query	Select an existing SQL Query to show its result.
Style/ Style Color	Select a style and a color for this result viewer.
Text	Set the font, font size, and font color for the text shown in this result viewer.
Caption	Set the font size and font color for the caption of this result viewer
Table	This group box opens when selecting Default as style. The attributes of the query table can be configured.
Filter enabled	When selected, the user can enter keywords in the SQL Query Result Viewer to search for specific text.



References

1. MySQL requires .NET Framework 4.0, available here:
<https://www.microsoft.com/zh-tw/download/details.aspx?id=17718>
2. MySQL requires Visual C++ Redistributable Packages for Visual Studio 2013, available here:
<https://www.microsoft.com/en-US/download/details.aspx?id=40784>
3. Click [here](#) for download link of cMT Database Server Demo Project or visit our support center at
<https://www.maplesystems.com/cgi-bin/download/sample.asp>

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