

# BlueStar

IEC 870-5-102

## WEDAT-BS05 Wireless Energy Data Acquisition Terminal User Manual

## TMR-BS02 Energy Data Acquisition System Basic Edition User Manual

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## Table of Contents

1. Overview.....	3
2. System connection .....	4
3. Usage .....	7
4. Main technical parameters .....	8
5. Transportation and storage .....	9
6. Warranty .....	9
Appendix: .....	9
1. General problems and solutions.....	9
2. Special notices when operating WEDAT .....	10
3. WEDAT-BS05 connection diagram .....	11
4. Bluestar TMR-BS02 Basic Edition Instruction.....	12
5. Short messages to set up WEDAT .....	40

### **SPECIAL NOTE:**

**MAKE SURE THAT THE MOBILE PHONE SIM CARD USED IN WEDAT-BS05 HAS BEEN USED SUCCESSFULLY IN A MOBILE PHONE.**

# 1. Overview

Bluestar WEDAT-BS05 meets China electric power industry standard DL/T 698-1999 “Low power user meters reading technique requirement”. WEDAT5 uses DL/T 645 protocol to talk to electricity meters and IEC870-5-102 compatible protocol to talk to master station software running on central computer.

WEDAT5( Wireless Electric Data Acquisition Terminal ) is a terminal unit used to collect energy meter data through RS-485 bus and then sends data back to central station through GPRS channels.

WEDAT5 is running on top of popular embedded real-time multi-tasking operating system. The central process is MC9S12A128B made by FreeScale; 2M Flash chip T45DB161B made by Atmel is selected as memory to save data. WEDAT uses the mobile phone module GR47 made by Sony Ericsson, which has a very low power consumption while guarantying transmission reliability.

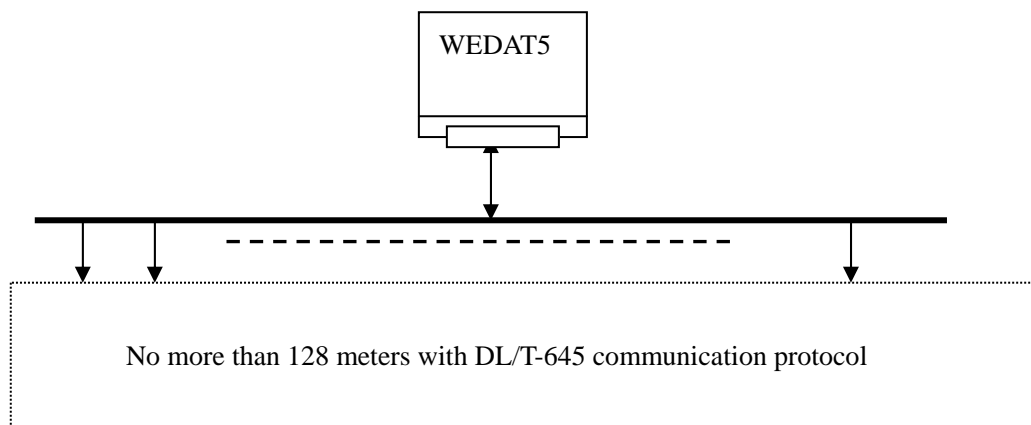
WEDAT5 can configure timing tasks to collect data from electricity meters. The collected data will be stored parallel in central station and WEDAT, i.e. the collected electricity meters data will be saved in WEDAT and sent to central station for backup in the meantime. This way can guarantee the data integrity and easy to inquire.

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To meet the user’s data acquisition requirements, the timing mode can be configured as minute timing, hourly timing, daily timing or monthly timing, and the statistical reports can be generated based on the stored data. WEDAT storage space is 2M bytes of FLASH memory, which is indexed by time. The data is saved in independent data package which can be searched quickly and efficiently, and no mess-up will occur. For the convenience of data viewing, user can query the latest data of the timing tasks very easily without complicated operations.

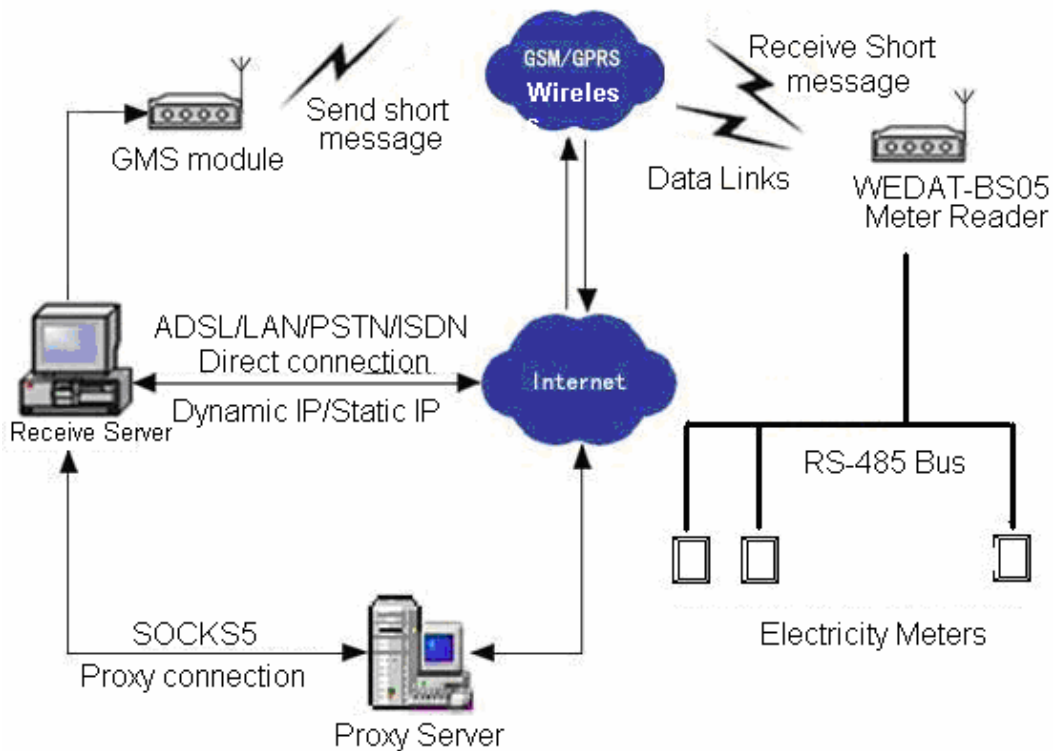
## 2. System connection

### 1. Connection between WEDAT5 and meters;



As shown in the below diagram, up to 128 WEDAT can connect to one master station, each WEDAT can connect to up to 128 meters. Therefore the maximum capacity of one master station is  $128 \times 128 = 16,384$  meters.

## 2. The whole system layout



## 3. Functions

- 1) Clock synchronization between master station and WEDAT
- 2) Configuring and reading the broadcasting clock sync tasks between WEDAT and meters
- 3) Set, modify, delete and read meter archives at real-time
- 4) Set and read WEDAT archive at real time
- 5) Set, modify, delete and read timing tasks at real time

Tasks looping cycle minimum unit is minute; it can be configured according to the number of meters so to meet the time required to read all of the meters data.

Each meter reading task is called one single unit:

For example, if connected to 100 meters, (to read 4 tariff and overall energy data) ,

up to 1000 units can be stored, that is:

If read meter every year, then data of 1000 years can be stored

If read meter every month, then data of 1000 months can be stored

If read meter every day, then data of 1000 days can be stored

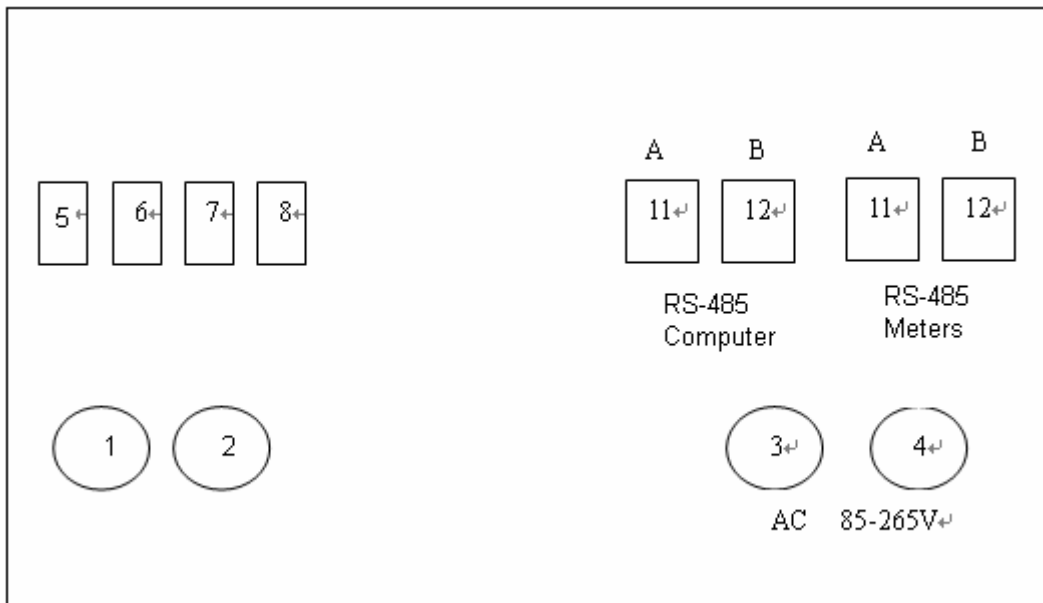
If read meter every hour, then data of 1000 hours can be stored

If read meter every minute, then data of 1000 minutes can be stored

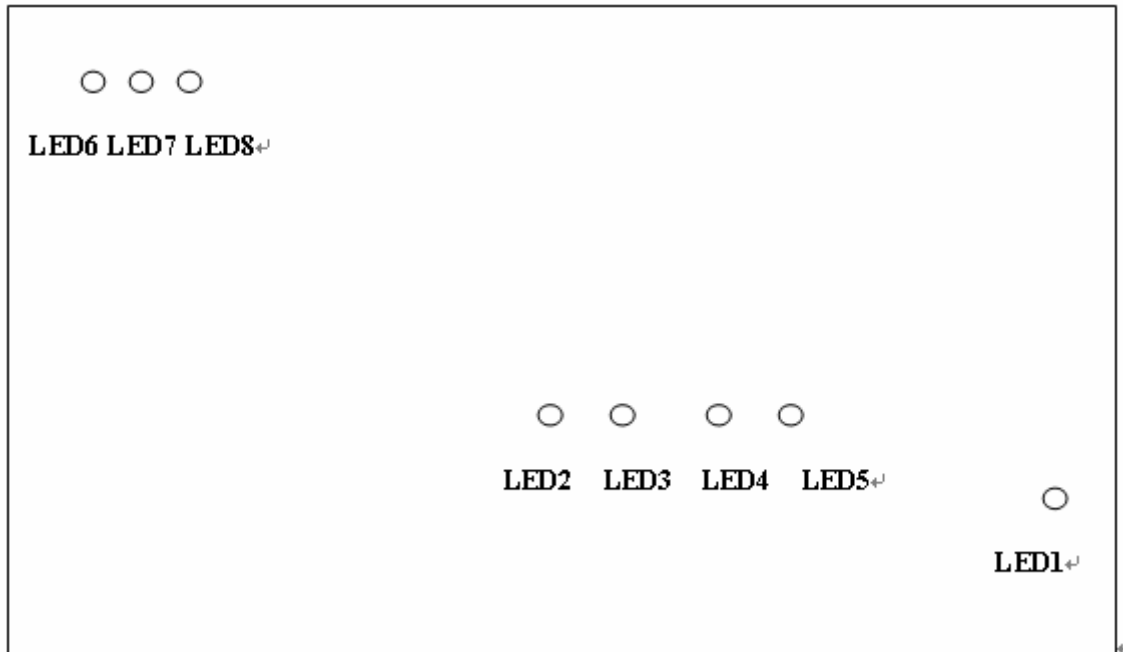
- 6) Inquire the timing tasks data by time ranges
- 7) Read the last timing task data
- 8) Read all of the connected meters data items at real time
- 9) Read WEDAT malfunction signals.
- 10) Automatically sends the timing tasks data back to central station

## 3. Usage

### 1. Installation terminal diagram



### 2. WEDAT indication lights – front view



- LED1—WEDAT power indication
- LED2—WEDAT is sending data to central station
- LED3—WEDAT is receiving data from central station
- LED4—WEDAT is sending data to electricity meter
- LED5—WEDAT is receiving electricity meter's data
- LED6—CPU Running indication
- LED7—Wireless mobile phone module is sending/transmitting data
- LED8—Wireless GPRS networks running indication

### 3. WEDAT address configuration

As default shipping setting, each WEDAT has a unique address, which is 4 digit number labeled on the name plate of the terminal. It can be modified in actual application. But the old address is needed when modifying. (it is recommended to use the original address). Data can not be read if address is forgotten.

## 4. Main technical parameters

- 1.Can connect to 1-128 meters. (Bluestar electricity meters meet this standard)
- 2.Power consumption is less than 2 W
- 3.Power supply: AC 220 V
- 4.Data retention : 20 years

5. Working temperature: -30 ~ +75°C

## 5. Transportation and storage

4. Avoid impact during transportation and unpacking
5. Should keep in internal package; storage temperature should be -40~70°C 内, relative humidity less than 80%, no causticity in the air.
6. Piling layer number should not exceed 6 in storage
7. Not recommended to store for long term after unpackaged.

## 6. Warranty

If quality issue occurs, it can be returned with 3 months; it can be fixed for free with 3 years and maintenance for lifetime after 3 years with cost expenses.

## Appendix:

### 1. General problems and solutions

1. LED1 is not ON. Please check if the power supply connector is connected correctly, make sure power supply is working properly.
2. LED6 flashes regularly means that the system is working properly. If it is ON or OFF all the time, please disconnect the power supply. If this problem continues, the possible reason is that CPU is broken.
3. Central station can not read data when requesting, or can not connect to WEDAT.

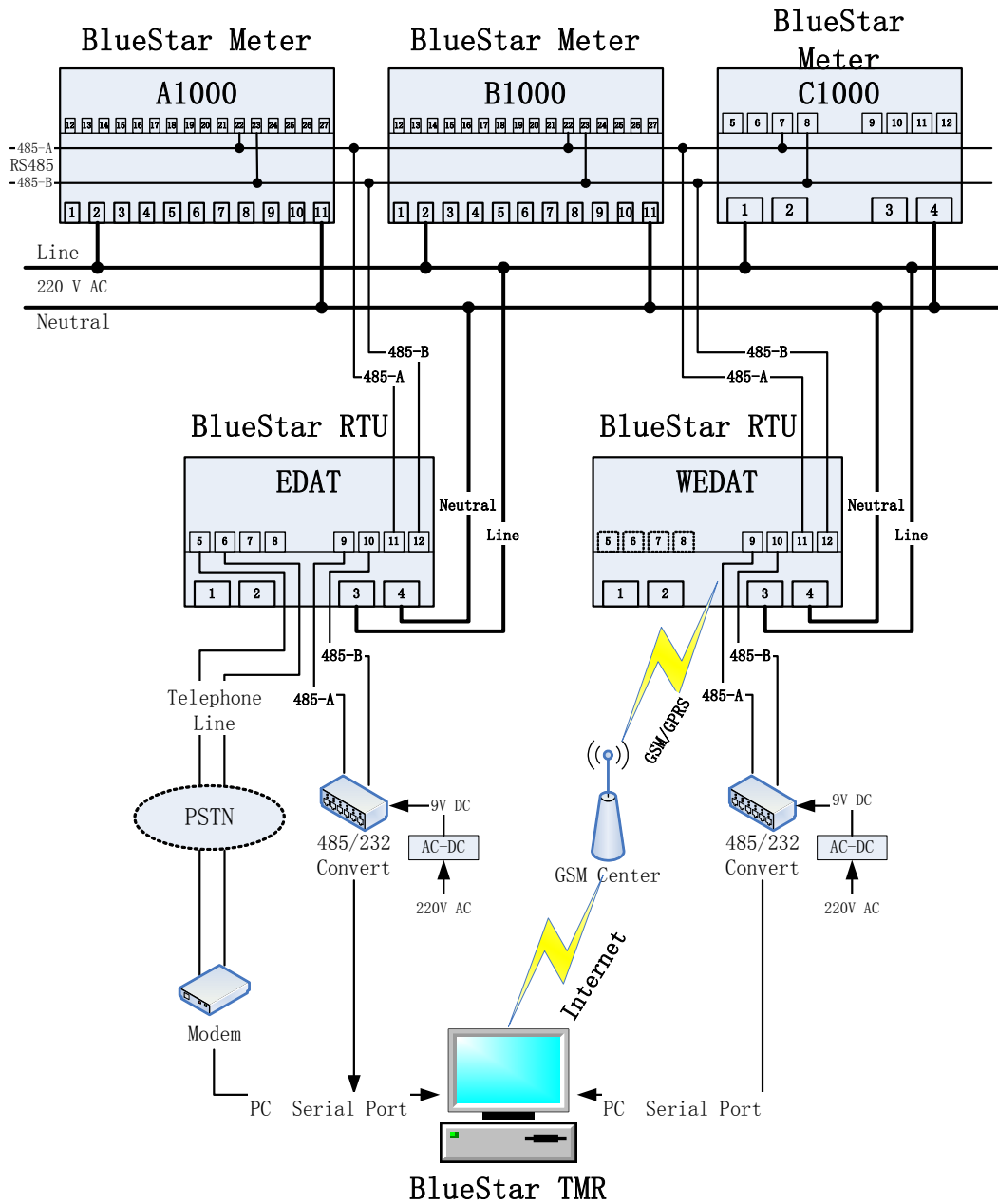
Please check if LED8 flashes regularly; if it is always On, it means that there is no GPRS networks found. Please check LED2 and LED3 respectively; according to the explanation to see if the receiving light is lit after sending light is lit; if not, then it means there is problem with the physical link. Please check the RS85 physical connections.

4. Make sure that central station is correctly connected to the Internet so it can communicate with WEDAT.

## 2. Special notices when operating WEDAT

1. Task execution minimum cycle is greater than the total time to read all of the meters data for one time. Otherwise it is possible to drop some data.
2. When requesting for electricity data in reasonable ranges, if the system indicates that there is no data available, it is because the system is busy; please re-try again, then the data can be retrieved.
3. If it can not connect to central station or it returns too quickly, please open the error message window on central station to view the history records and find where it goes wrong.
4. Before connecting, make sure to check all the wiring is connected correctly.
5. When the task has too much data, it is recommended to divide the data into multiple sections to avoid too long of waiting and any unpredictable situations.

### 3. WEDAT-BS05 connection diagram



## 4. Bluestar TMR-BS02 Basic Edition Instruction

TMR (Energy Tele-Meter Reading System) consists of 3 layers, i.e. 3 tiers: application client, application server and database.

This section gives a brief summary of how to install the Energy Tele-Meter Reading System. The installation is simple and involves the following steps:

### **Step1: Install MySQL database**

Double click the file “mysql-essential-4.1.12a-win32.exe” to execute MySQL setup file, following the instructions step by step to install MySQL, and write down MySQL service’ s port number, user name and password. For detailed operation instructions, please see “ *1.1 MySQL 4.1.12 installation* ” .

### **Step2: Install Java virtual machine**

Double click the file” j2re-1\_4\_0\_03-windows-i586-i.exe” to execute Java VM setup file, follow the instructions step by step to install Java virtual machine. For detailed operation instructions, please see “ *1.2 Java 2 Runtime Environment Installation* ” .

### **Step3: Install Tele-Meter Reading System**

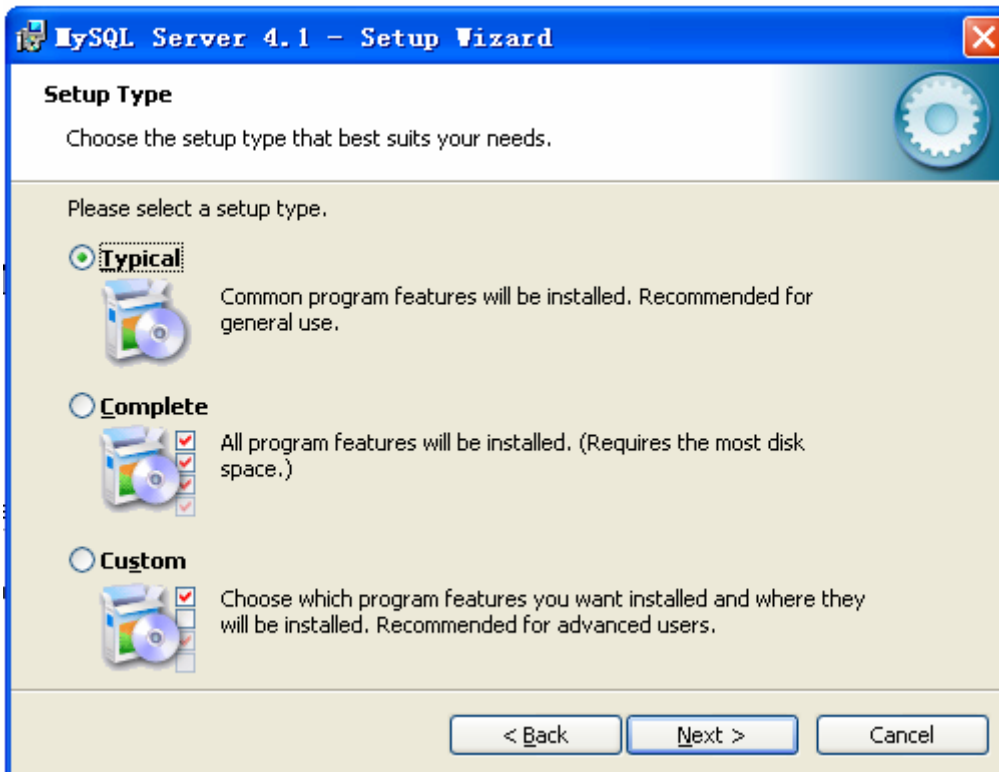
Double click the file “\WEDAT Setup\Setup.Exe” ,to install Energy Tele-Meter Reading System. For detailed operation instructions, please see “ *1.3 WEDAT data acquisition System Installation* ” .

### **Step4: Initialize Database and Tables**

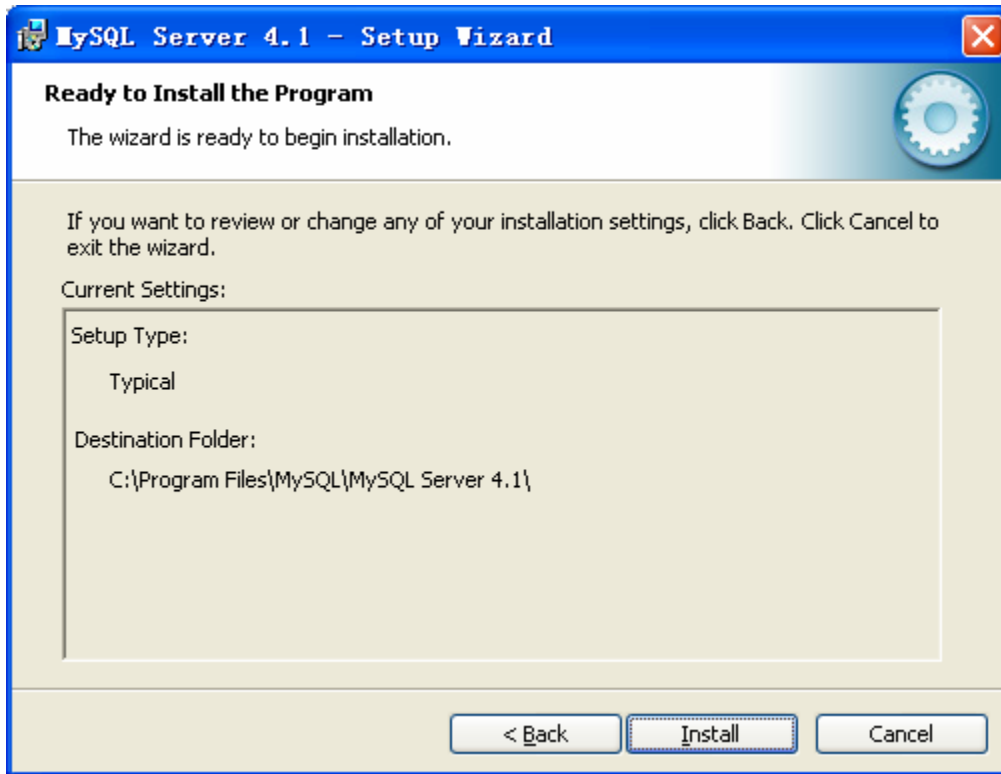
When MySQL, j2re, and Tele-Meter Reading System are installed successfully, user should initialize the database and tables before you first run the system. For detailed operation instructions, please see “ *1.5 Database and Tables Installation* ” .

## 1.1. MySQL installation

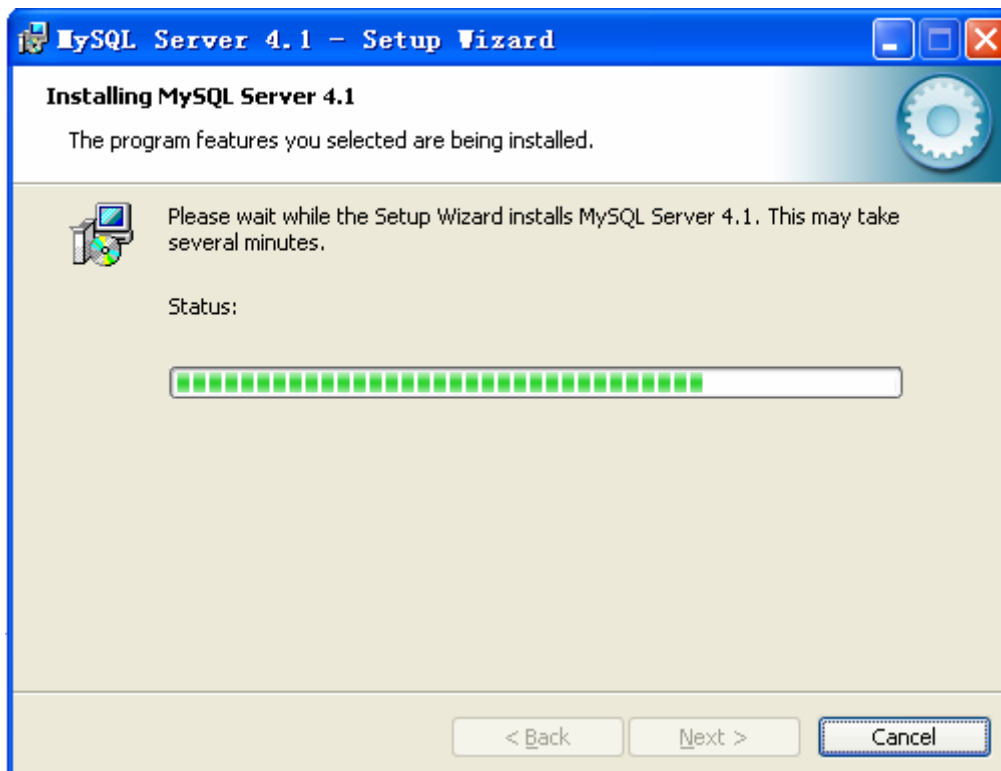
If you already have MySQL on your computer, please uninstall it first. Double click the setup icon, and the setup wizard appears. Click “Next” button to continue.



Then choose the setup type, the default type is “Typical” . If you want to change installation directory, choose the “Custom “ type.

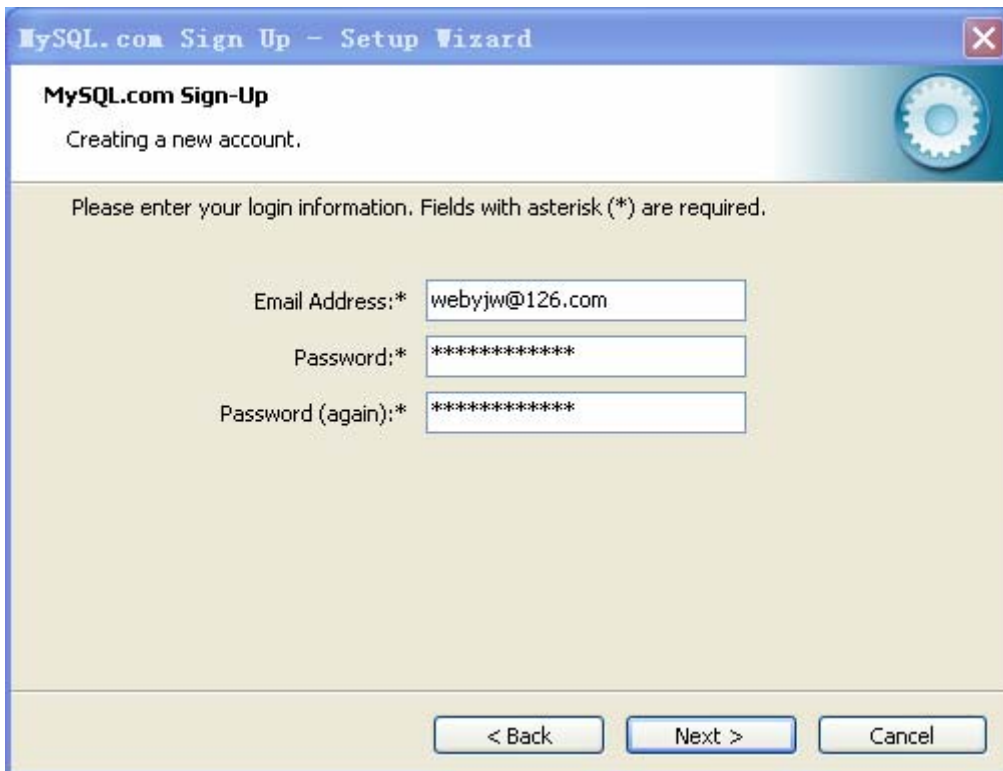


Then click the “Next” button, and the wizard will show the type and the install directory you choose. Press “install” to carry out the installation.



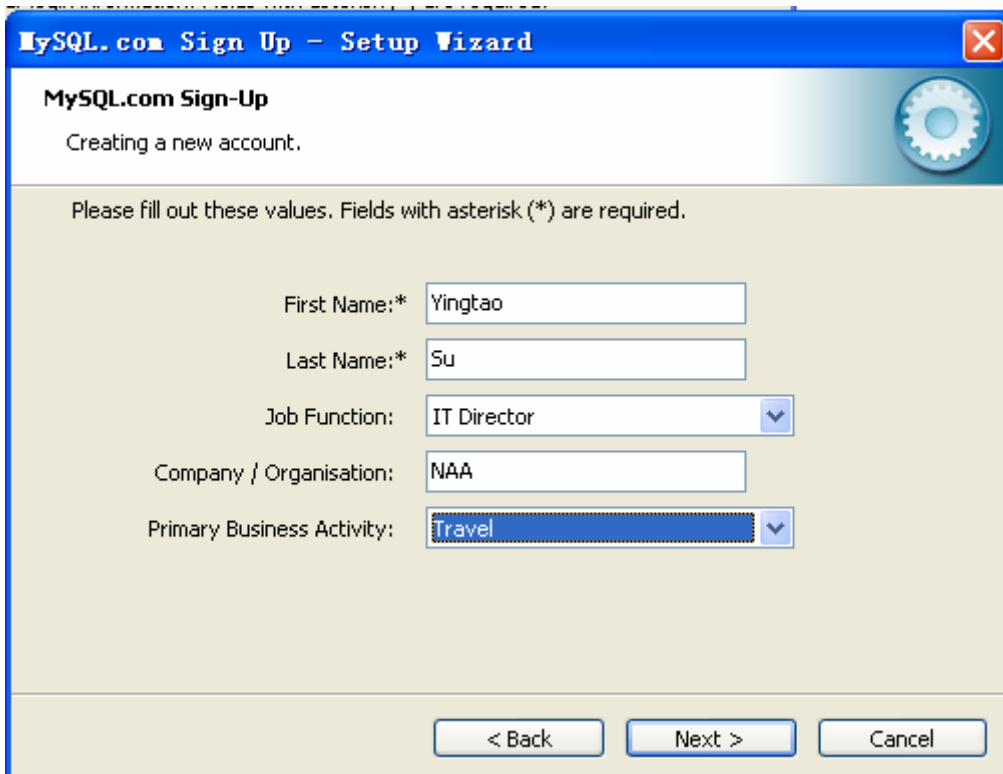
Then click the “Next” button, and the wizard will show the type and the install directory you

choose. Press “install” to carry out the installation.



The screenshot shows the MySQL.com Sign Up - Setup Wizard window. The title bar reads "MySQL.com Sign Up - Setup Wizard". The main heading is "MySQL.com Sign-Up" with the subtext "Creating a new account." Below this, a message states: "Please enter your login information. Fields with asterisk (\*) are required." The form contains three input fields: "Email Address:\*" with the value "webyjw@126.com", "Password:\*" with "\*\*\*\*\*", and "Password (again):\*" with "\*\*\*\*\*". At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

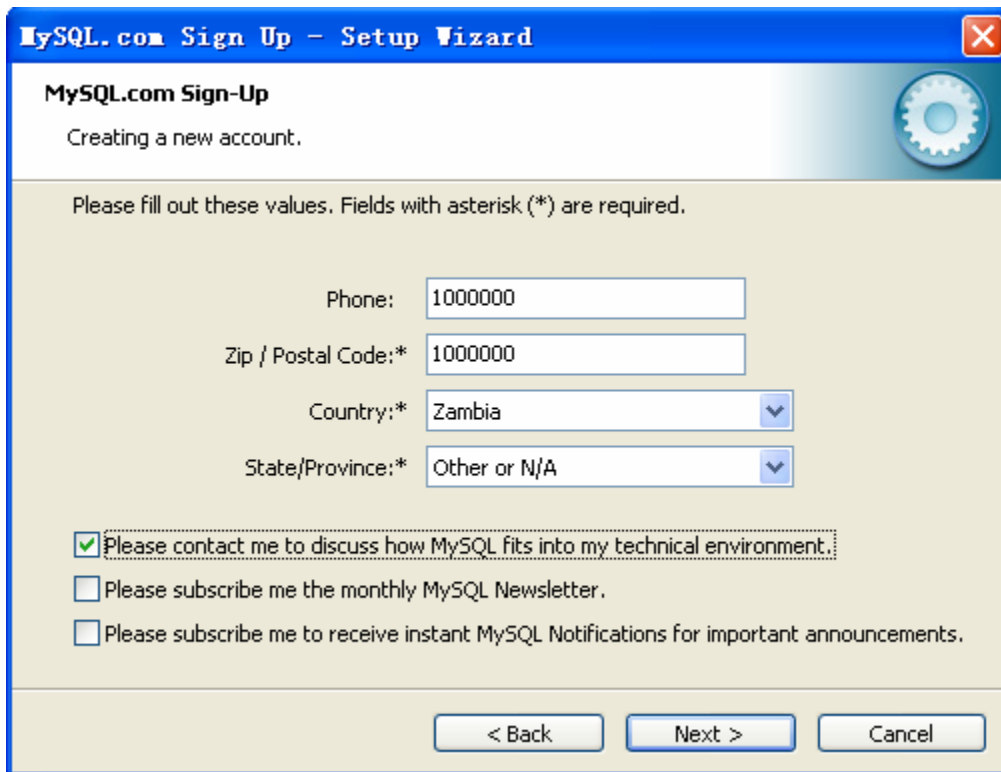
Click “Next” and fill in the blank with your personal information.



The screenshot shows the MySQL.com Sign Up - Setup Wizard window at a later stage. The title bar reads "MySQL.com Sign Up - Setup Wizard". The main heading is "MySQL.com Sign-Up" with the subtext "Creating a new account." Below this, a message states: "Please fill out these values. Fields with asterisk (\*) are required." The form contains five input fields: "First Name:\*" with "Yingtao", "Last Name:\*" with "Su", "Job Function:" with a dropdown menu showing "IT Director", "Company / Organisation:" with "NAA", and "Primary Business Activity:" with a dropdown menu showing "Travel". At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

Again click “Next” , input the information needed. And if you want to get the information

about MySQL, choose the relevant item(s).



**MySQL.com Sign Up - Setup Wizard**

**MySQL.com Sign-Up**  
Creating a new account.

Please fill out these values. Fields with asterisk (\*) are required.

Phone:

Zip / Postal Code:\*

Country:\*

State/Province:\*

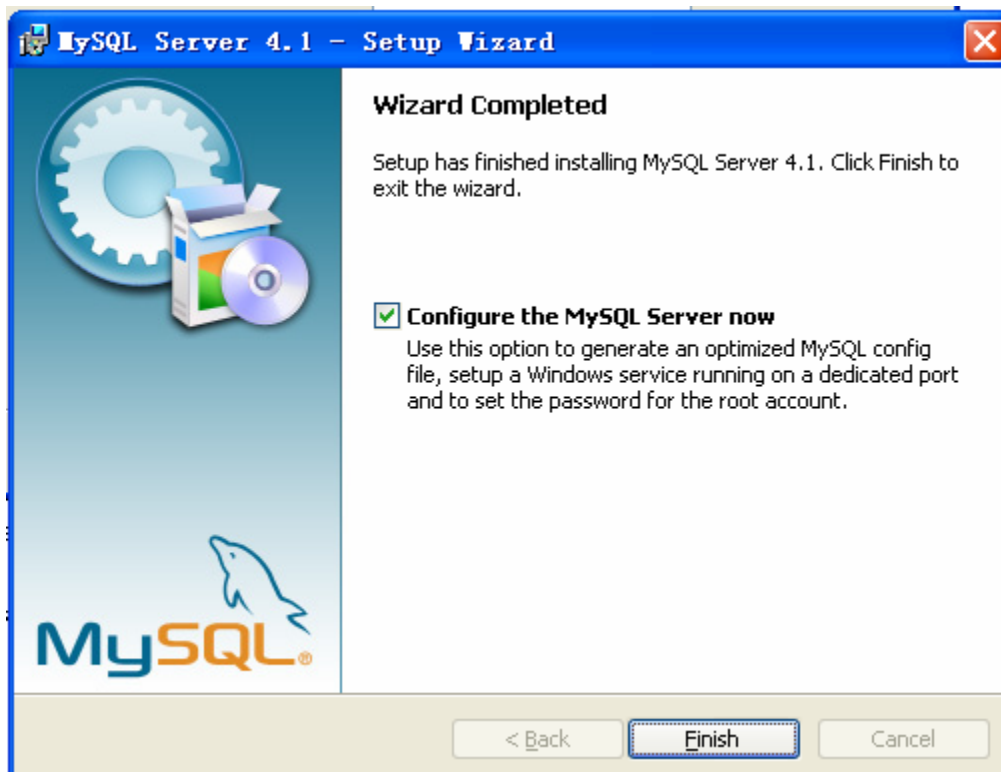
Please contact me to discuss how MySQL fits into my technical environment.

Please subscribe me the monthly MySQL Newsletter.

Please subscribe me to receive instant MySQL Notifications for important announcements.

< Back    Next >    Cancel

Press “Next”, the wizard show all the information you fill in. If you agree, click “Next” and the final step appears.



**MySQL Server 4.1 - Setup Wizard**

**Wizard Completed**

Setup has finished installing MySQL Server 4.1. Click Finish to exit the wizard.

**Configure the MySQL Server now**  
Use this option to generate an optimized MySQL config file, setup a Windows service running on a dedicated port and to set the password for the root account.

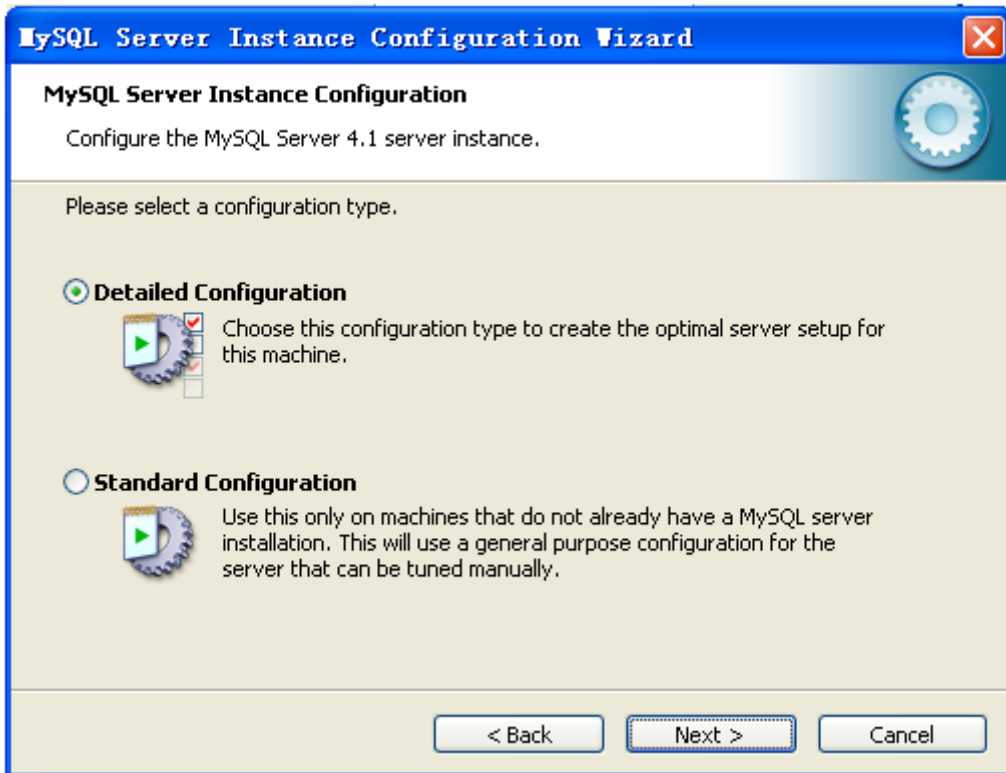
< Back    **Finish**    Cancel

Press “Finish” to complete the setup wizard.

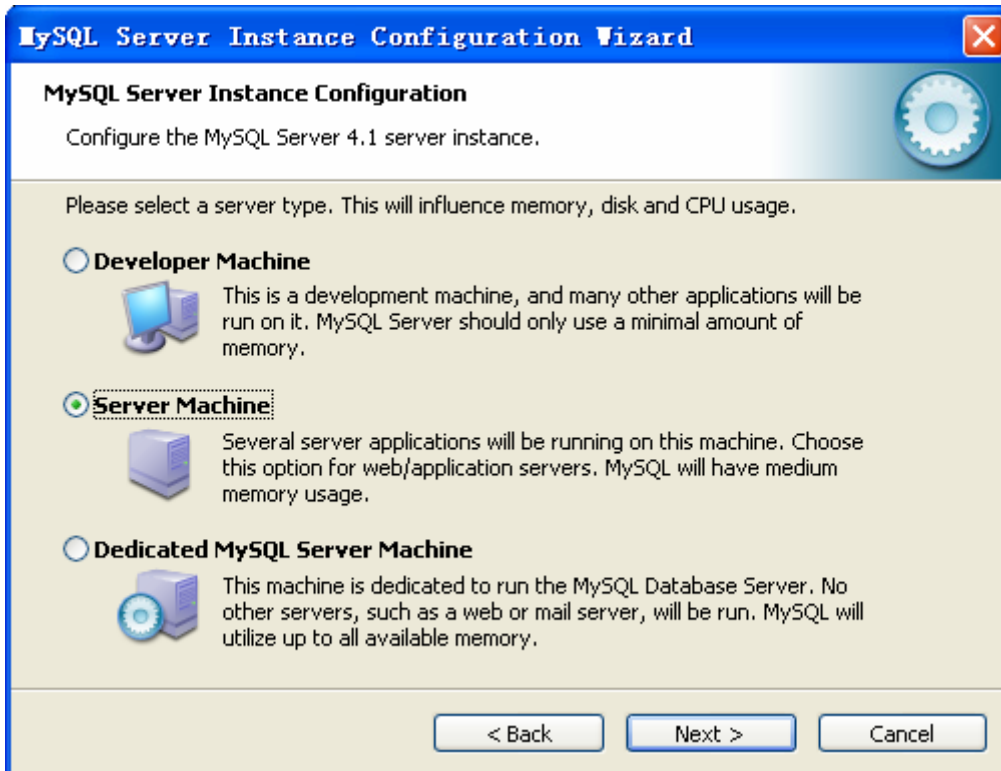
In the final step of setup wizard, if you choose the default option, MySQL server Instance Configuration will pop up automatically. If cancelled, it will not pop up, and then you can find it in the directory where MySQL is installed or in start menu.

When MySQL Server Instance Configuration Wizard appears, click “Next” to continue.

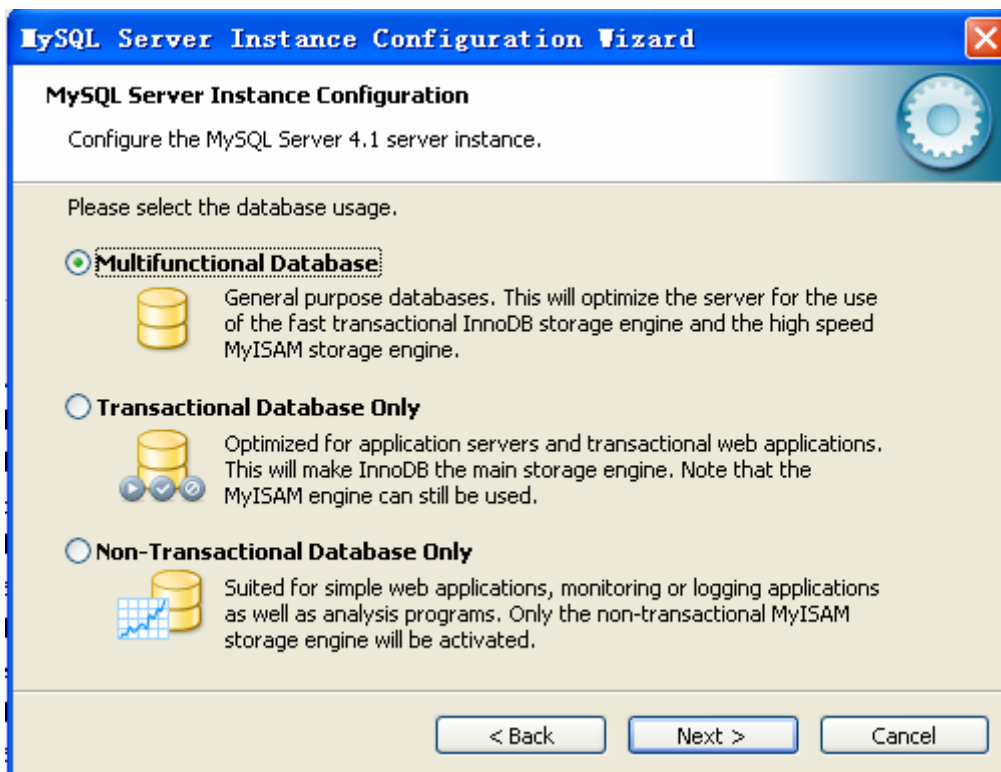
In the second step, choose suitable configuration.



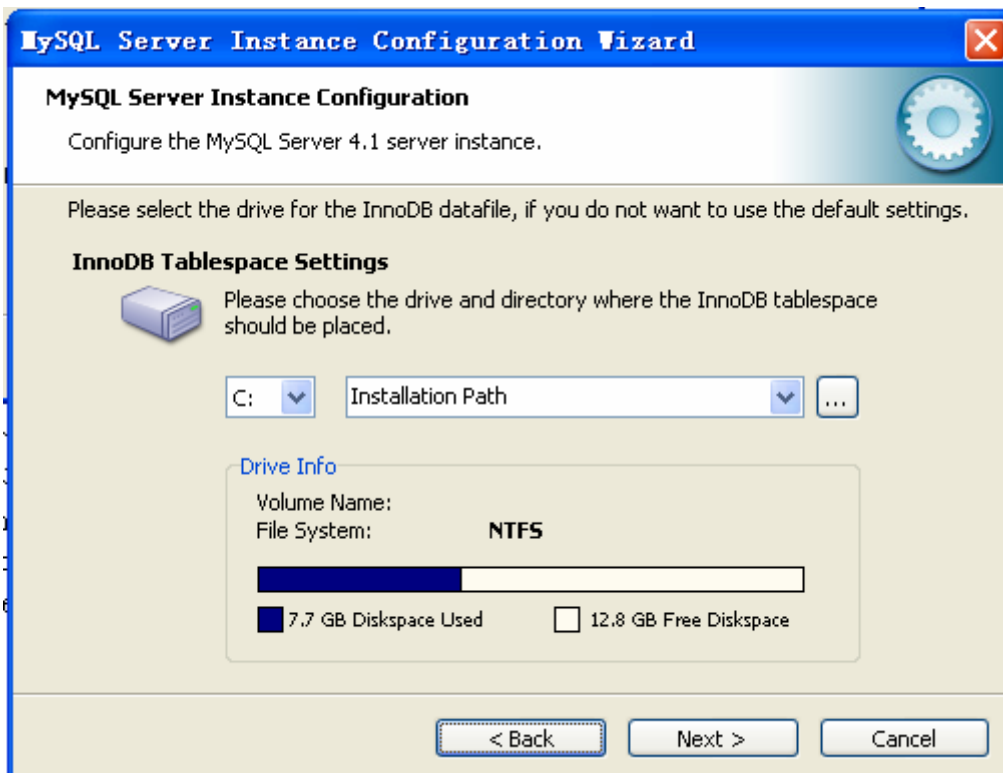
Then choose the machine type you want. If the machine is just for service but not development, “Server Machine” is recommended.



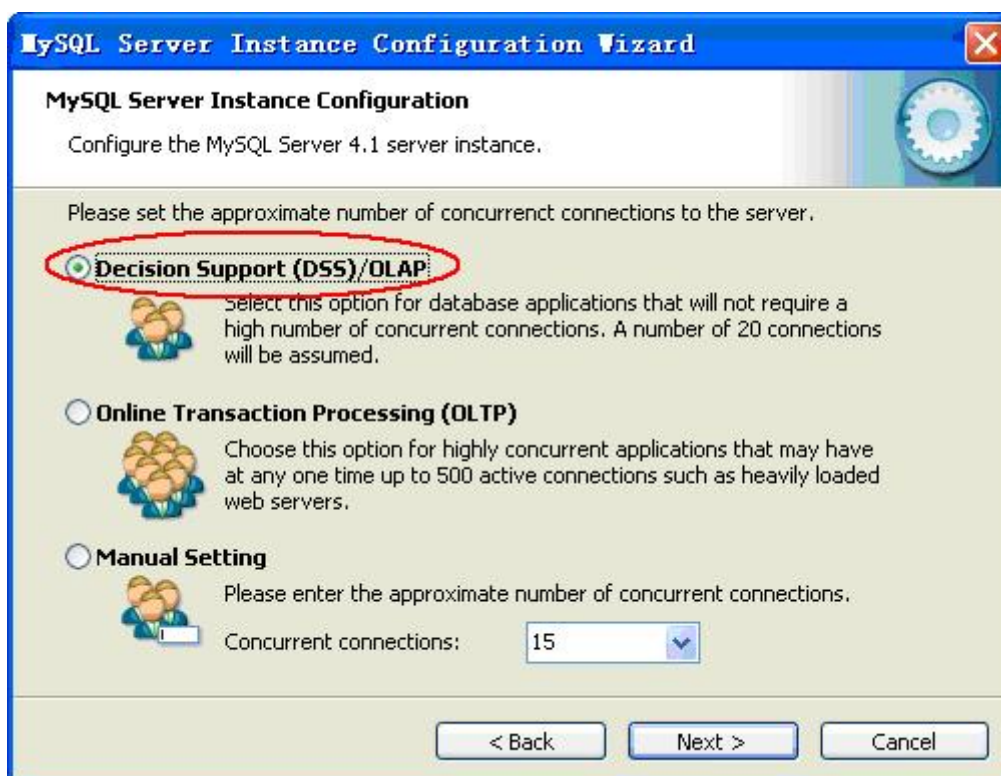
The next step is to choose the database, please choose Multifunctional Database.



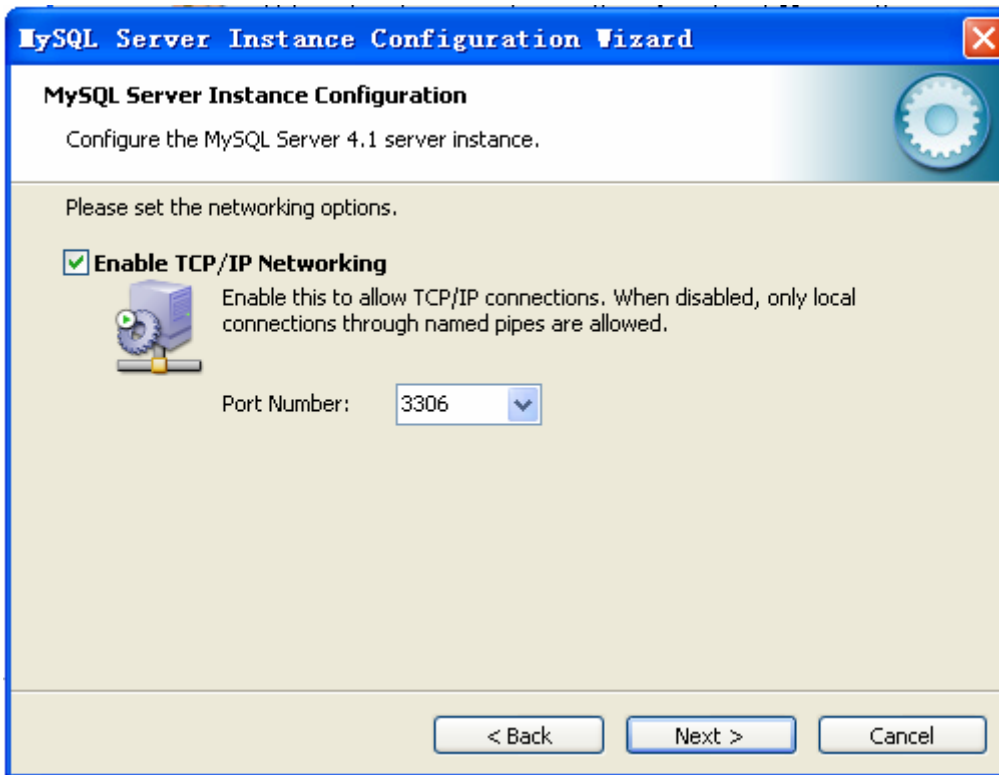
Click “Next” , come to InnoDB Tablespace Settings, you can use the default setting and press “Next” directly, or define it by yourself.



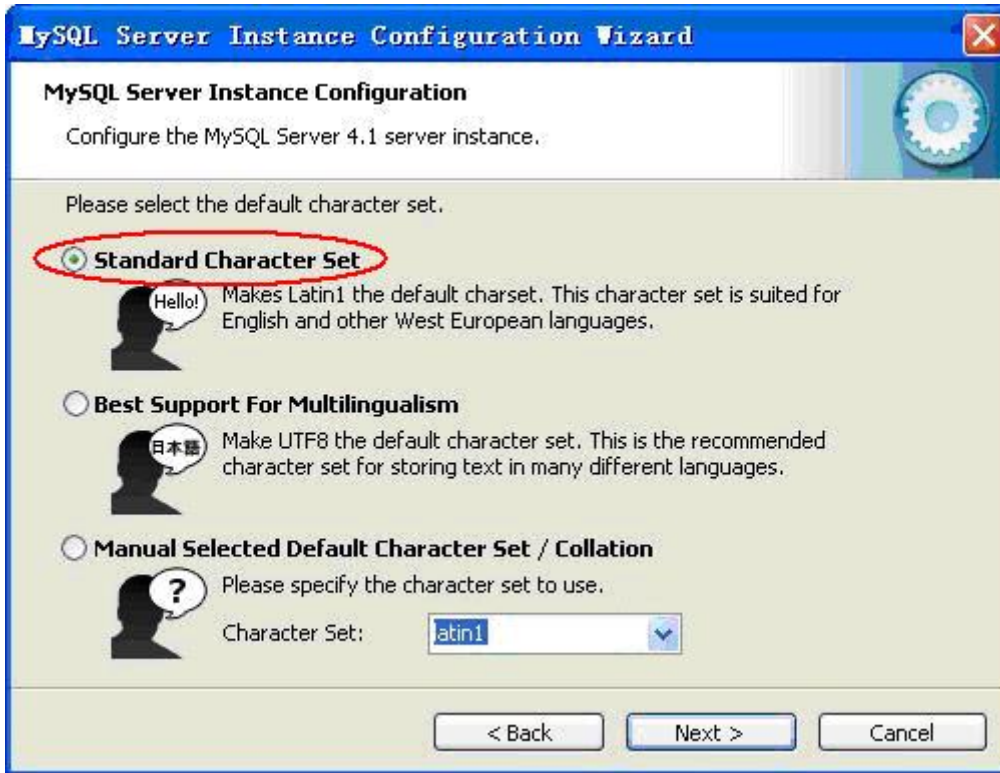
Then choose the suitable option corresponding to the potential connection numbers. Please choose **Decision Support (DSS)/OLAP** item.



Then the next step is to enable/disable TCP/IP Networking and to choose Port. Default setting is recommended.



Click "Next", and now choose the character set. Please select "Standard Character Set" .

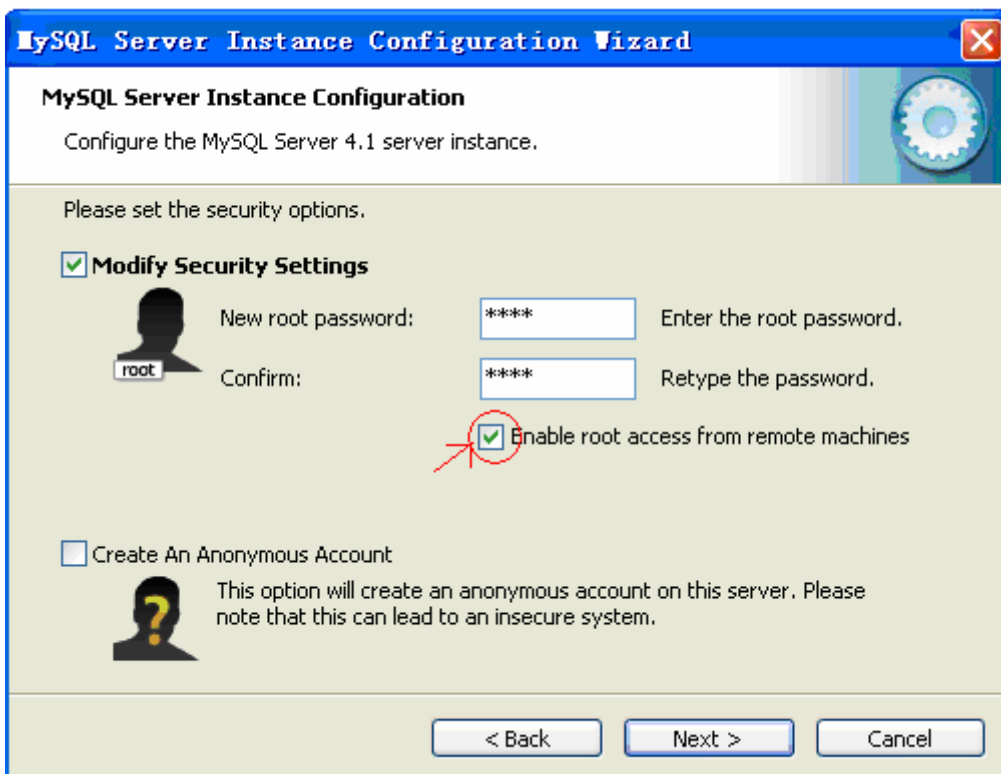


In the next step, select the Service Name and **make sure** to select “**Include Bin Directory in Windows PATH**” option (see the arrow and circle in the drawing), or else the user’s database could not be set up correctly. If you have set up MySQL3.0 before and uninstalled, please change Service Name “MySQL” to other name, e.g.”MySQL1”, or the service may not be enabled at last. The reason is that although you have uninstalled MySQL3.0, its service may still exist. Then press “Next”, come to next step.

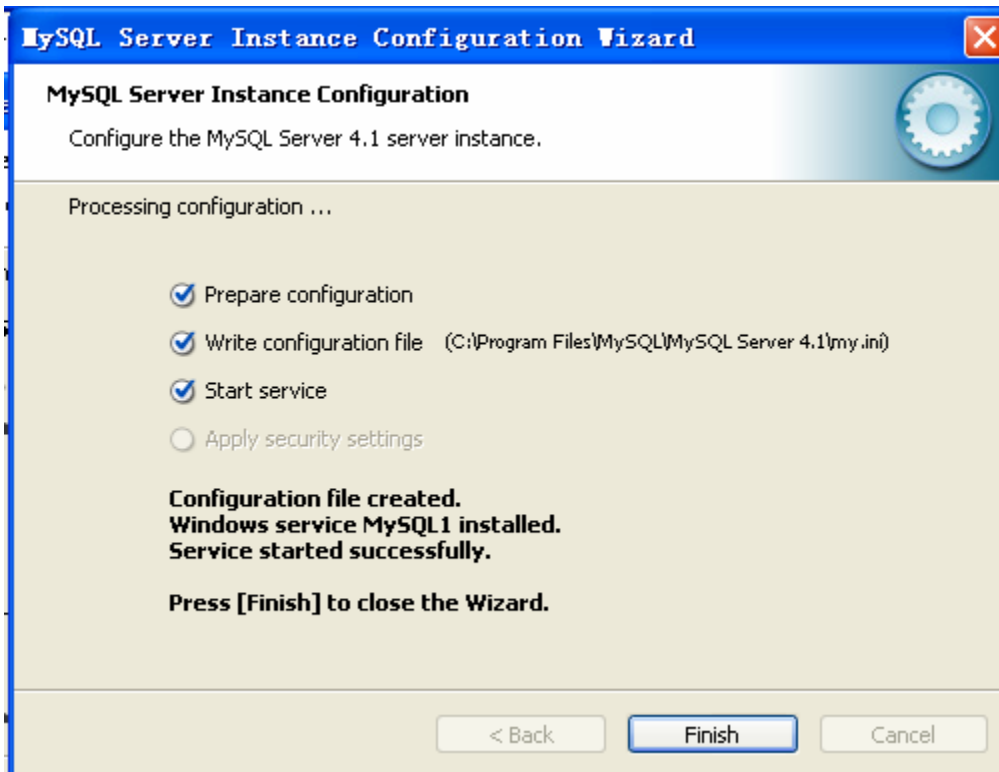


You can modify security settings here to fill in the password of MySQL or skip it. If skipped, the password is null, i.e. no password.

But if you want to make remote access from other machines, you should select the security settings. Enter the password and confirm it, then **make sure** to select the item “**Enable root access from remote machines**” as follows.

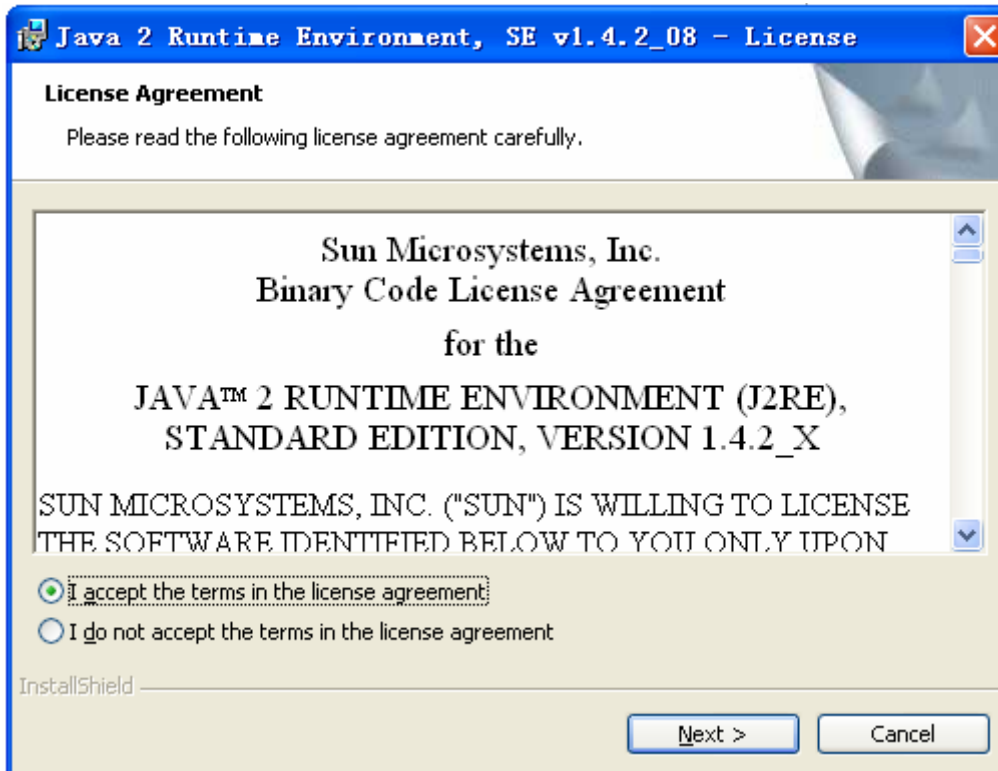


Press “Next”, then press “Execute”, if the service starts, press “Finish”. If failed, go back and check the previous options.

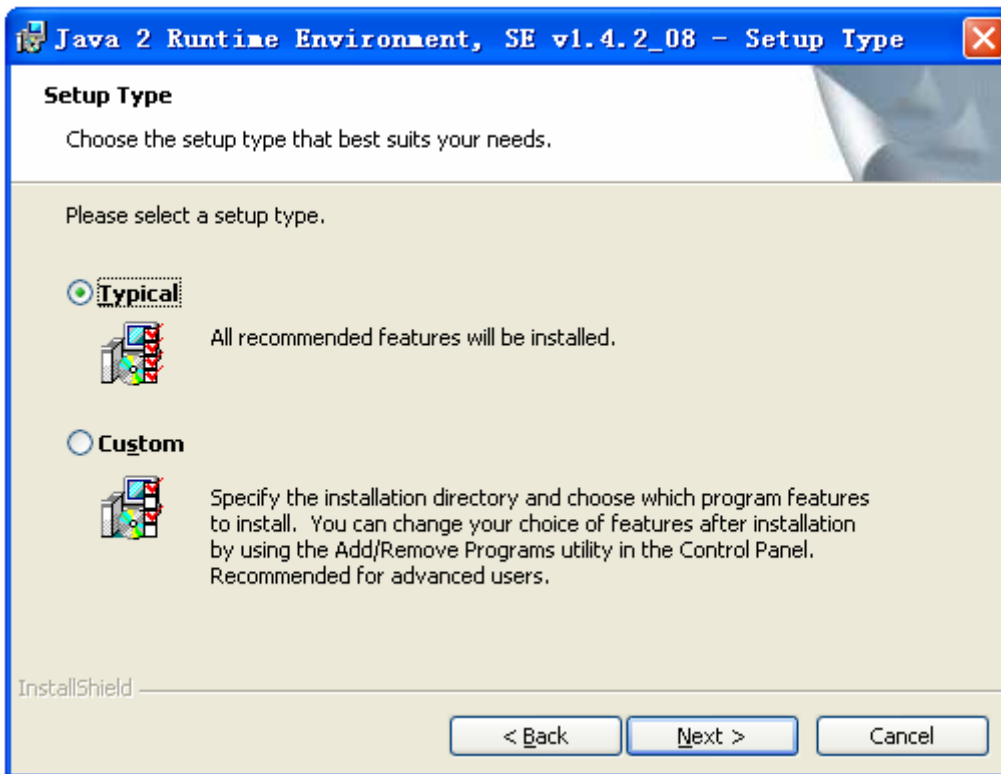


## 1.2. Java 2 Runtime Environment Installation

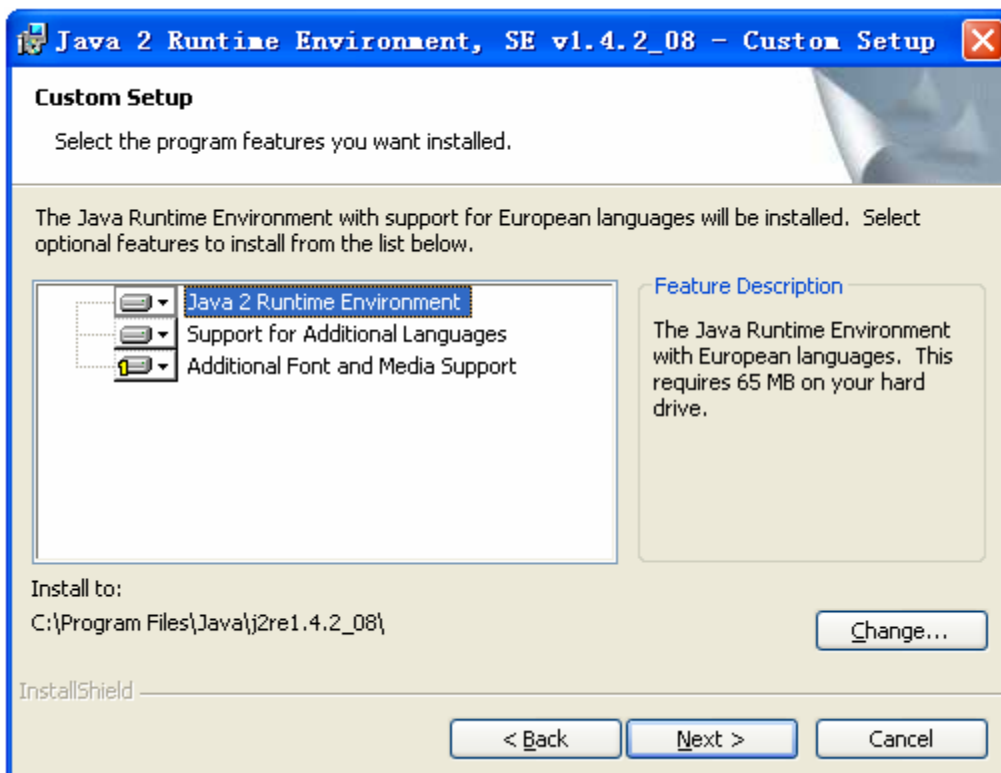
Launch it and now the installation starts.



As always accept the agreement to continue the installation.

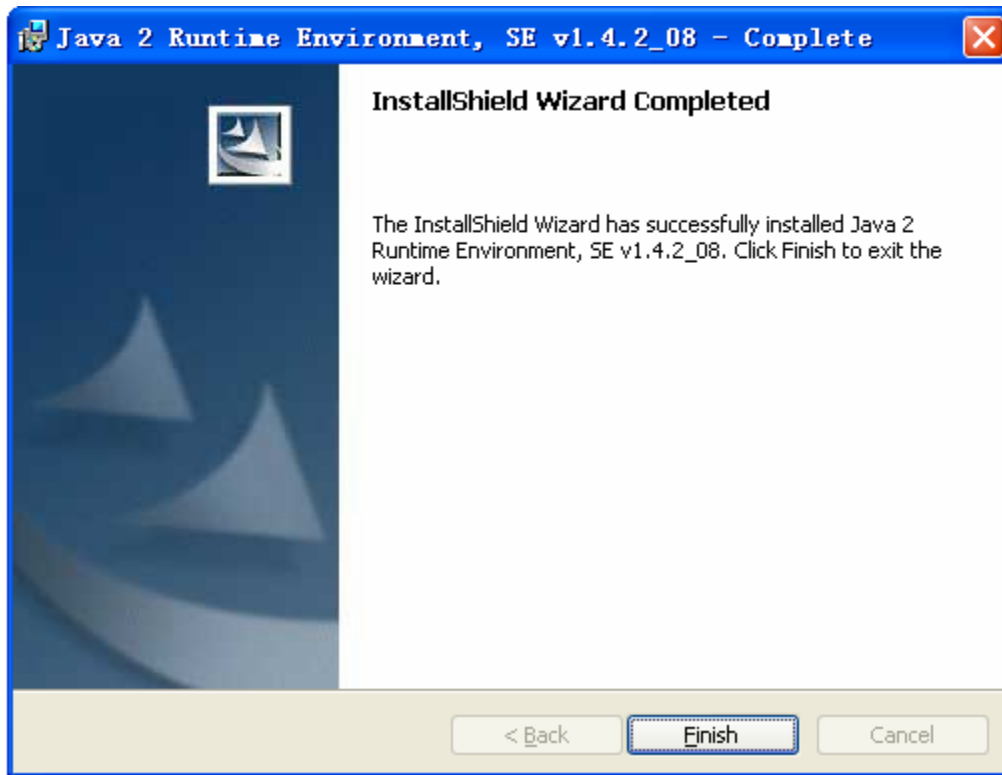


In the following screen please choose the setup type. Default setting is recommended. If the custom type is selected, it allows you to change installation directory and character set is selected supported.





Here is the last step, press “Finish” , thus the installation is over.



**NOTE:**

After installing the j2re, user need to install the Java (tm) communications API into J2RE, simply follow the following steps:

We assume that the user has installed the J2RE in C:\Program Files\Java\j2re1.4.2\_08.

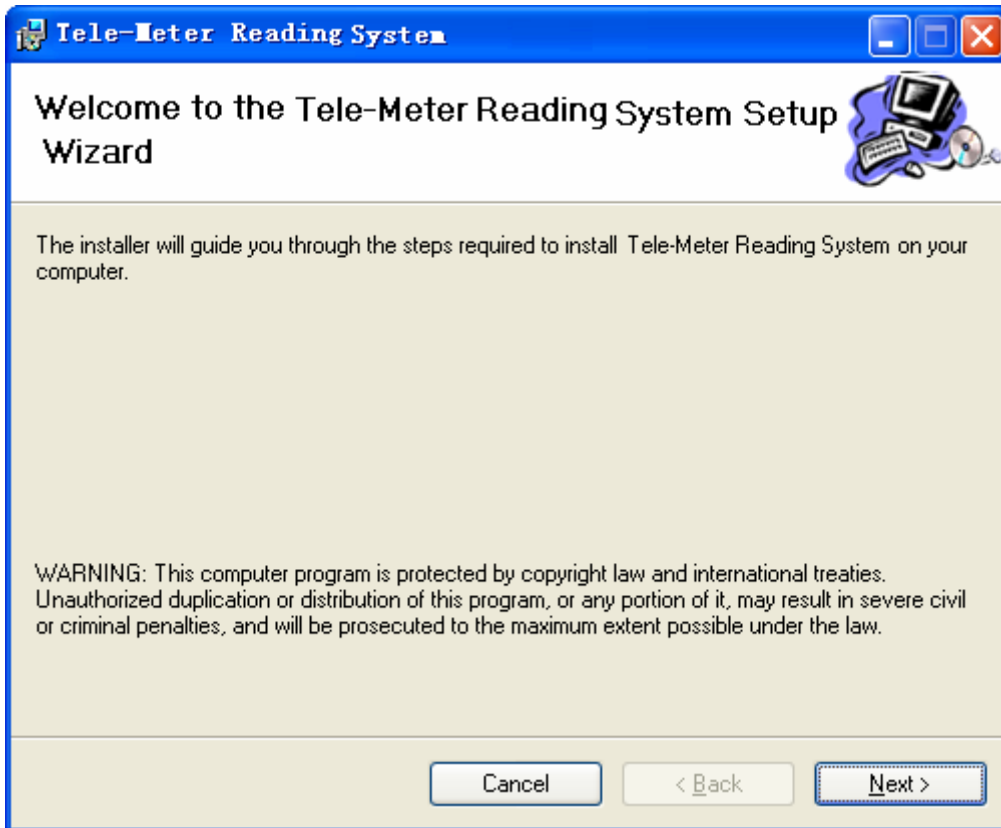
**Step 1:** Copy the file “ \commapi\win32com.dll ” to the directory “ C:\Program Files\Java\j2re1.4.2\_08\bin” .

**Step 2:** Copy the file “ \commapi\comm.jar ” to the directory “ C:\Program Files\Java\j2re1.4.2\_08\lib” .

**Step 3:** Copy the file “ \commapi\javax.comm.properties ” to the directory “ C:\Program Files\Java\j2re1.4.2\_08\lib” .

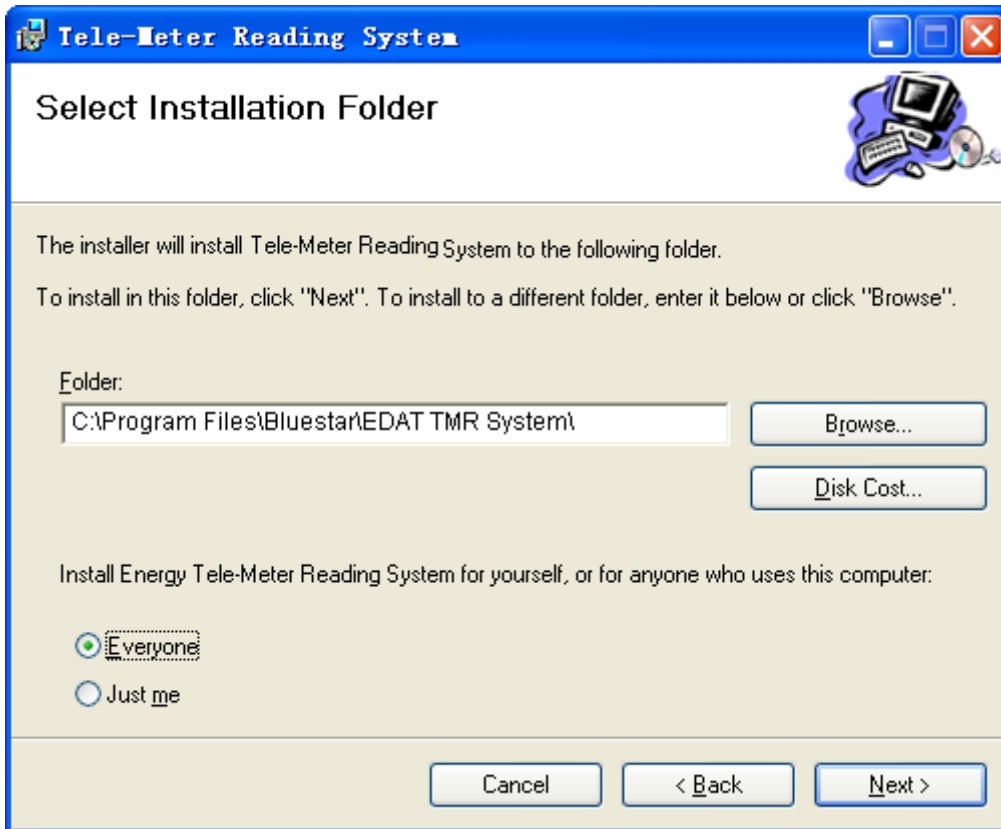
### 1.3. WEDAT data acquisition System Installation

Double click Setup.Exe, and the installation will carry out.

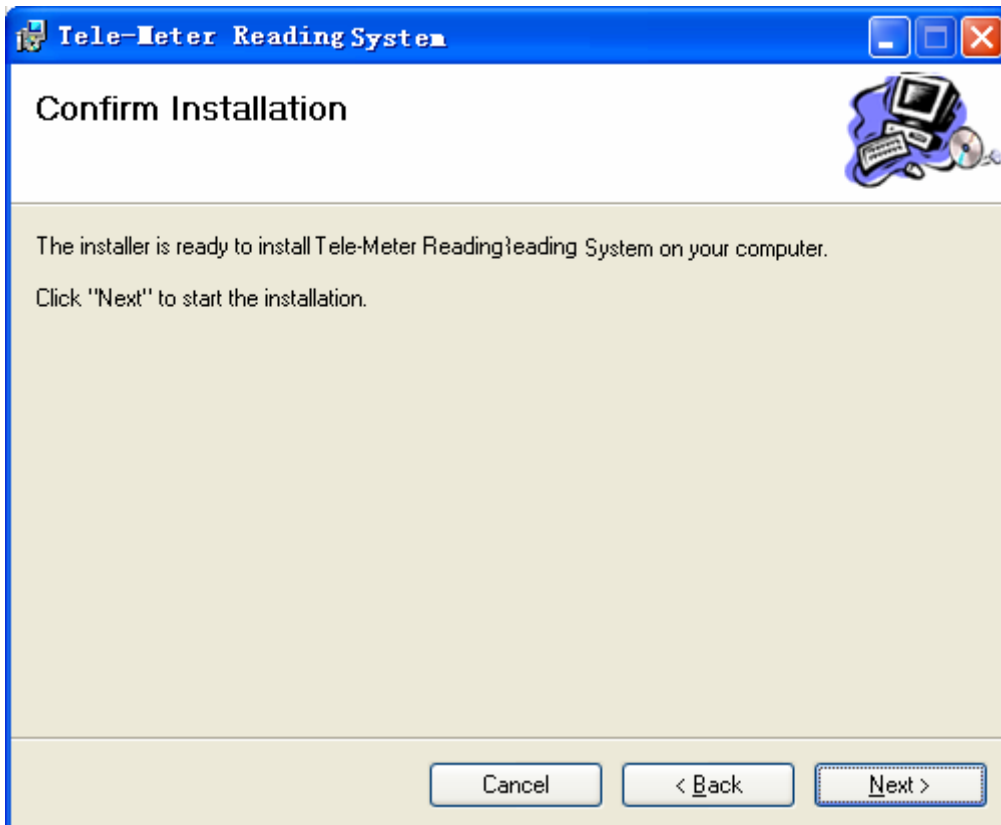


Always click “Next” to continue.

Then choose the folder you want to install Energy Tele-Meter Reading System, and decide how many accounts you allow.

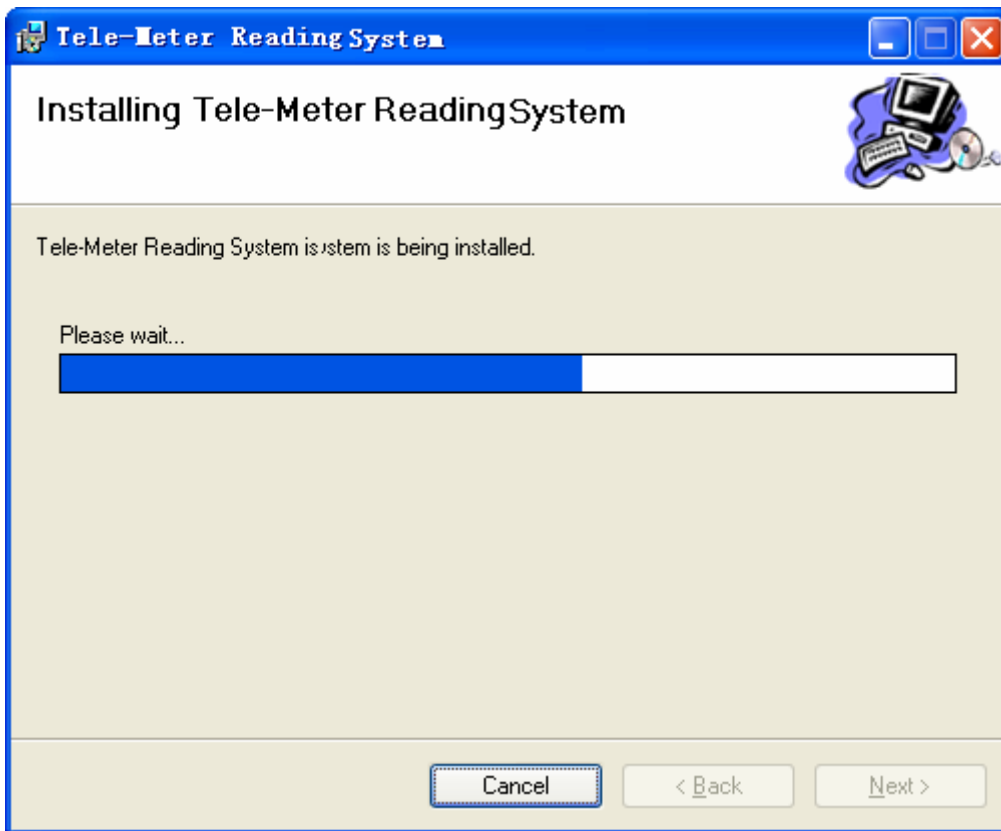


Then click “Next” to continue installation.

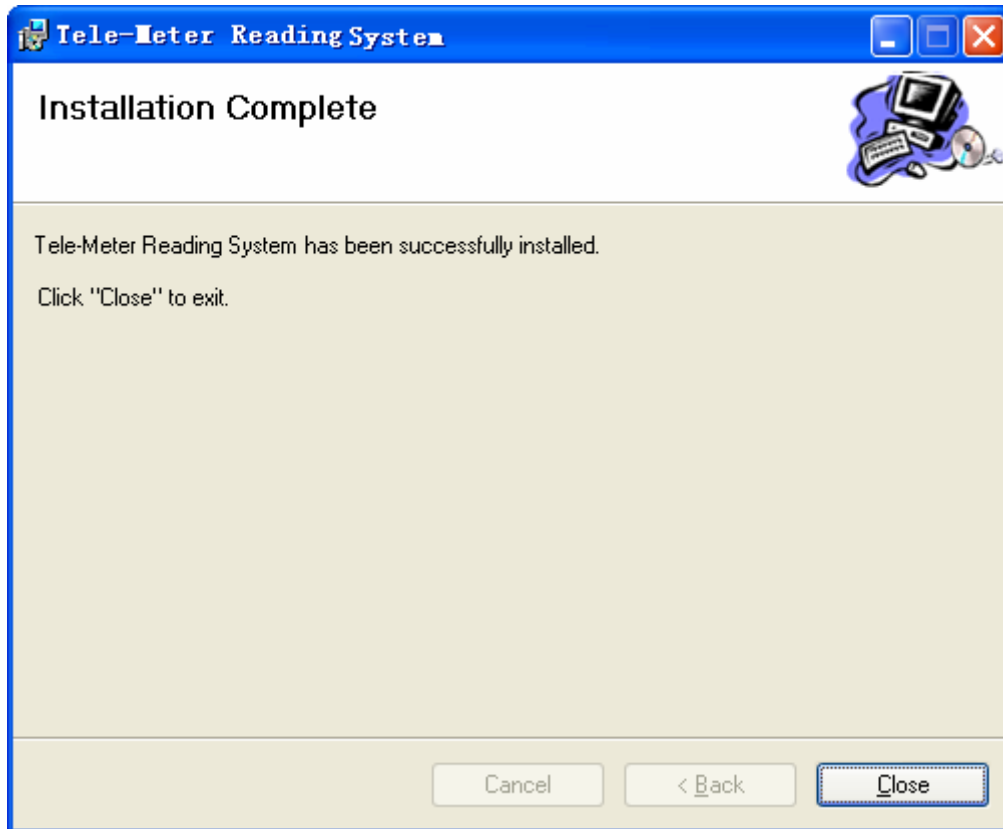


Here the installation asks you to confirm the setting. Click “Next” to continue. If you want to reset the setting, click “Back” .

If press “Next” , you will see the process of installation. Please wait.

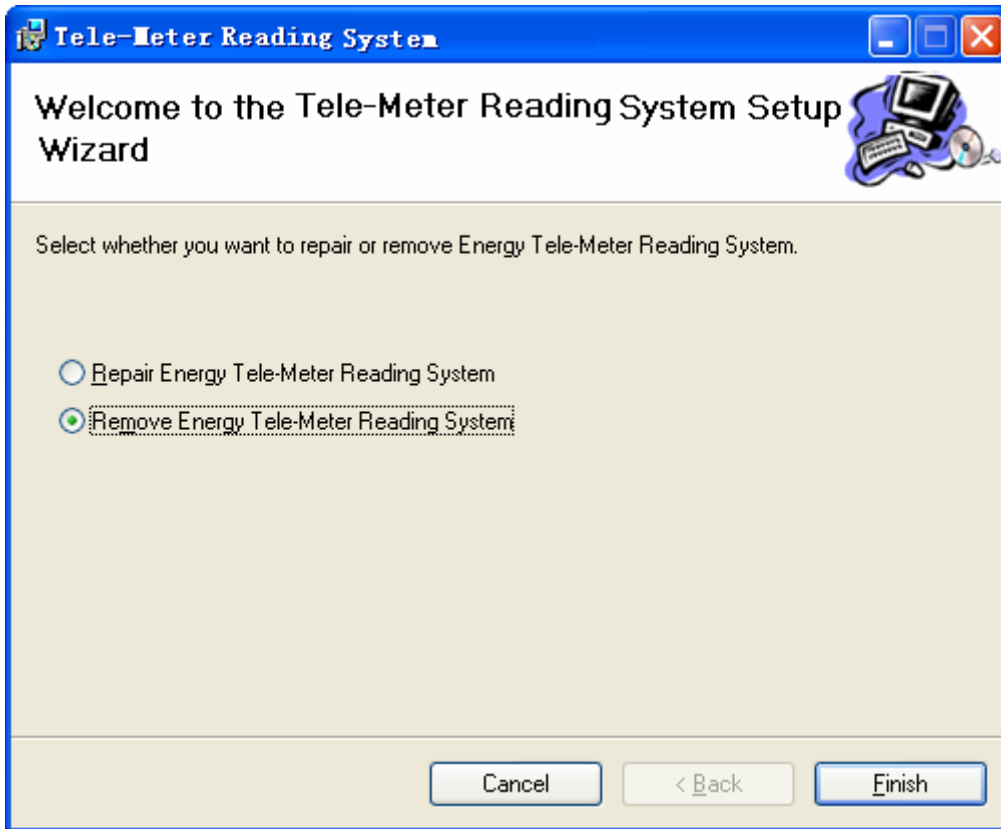


In the final step, click “Finish” , thus the installation is complete!

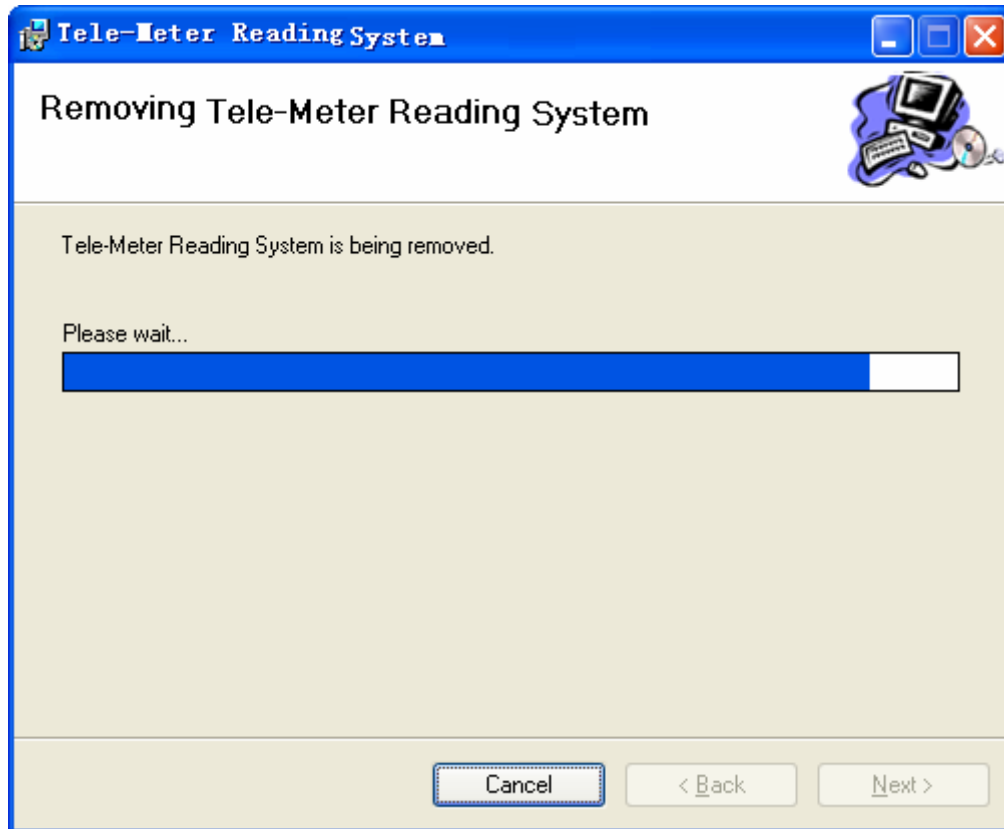


## 1.4. Energy Tele-Meter Reading System Uninstallation

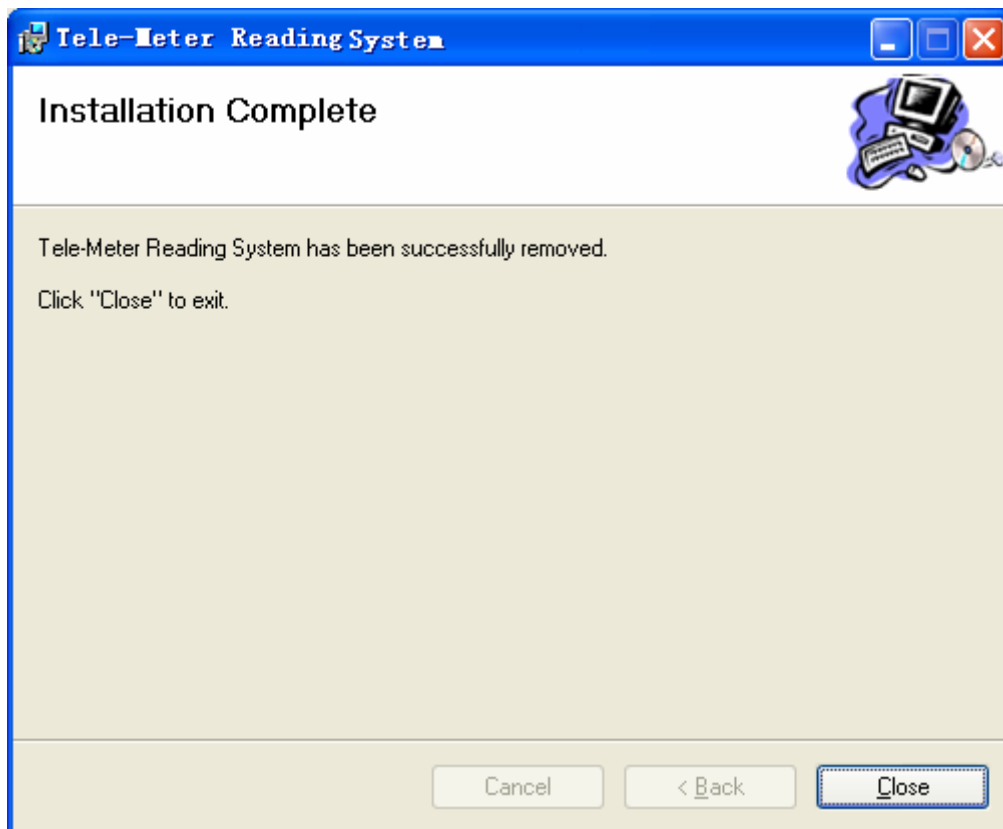
To uninstall Energy Tele-Meter Reading System, just double click Setup.Exe.



Choose the corresponding item. For example, if you want to uninstall the system, choose “Remove Energy Tele-Meter Reading System”, and click “Finish”. The process will take several seconds.



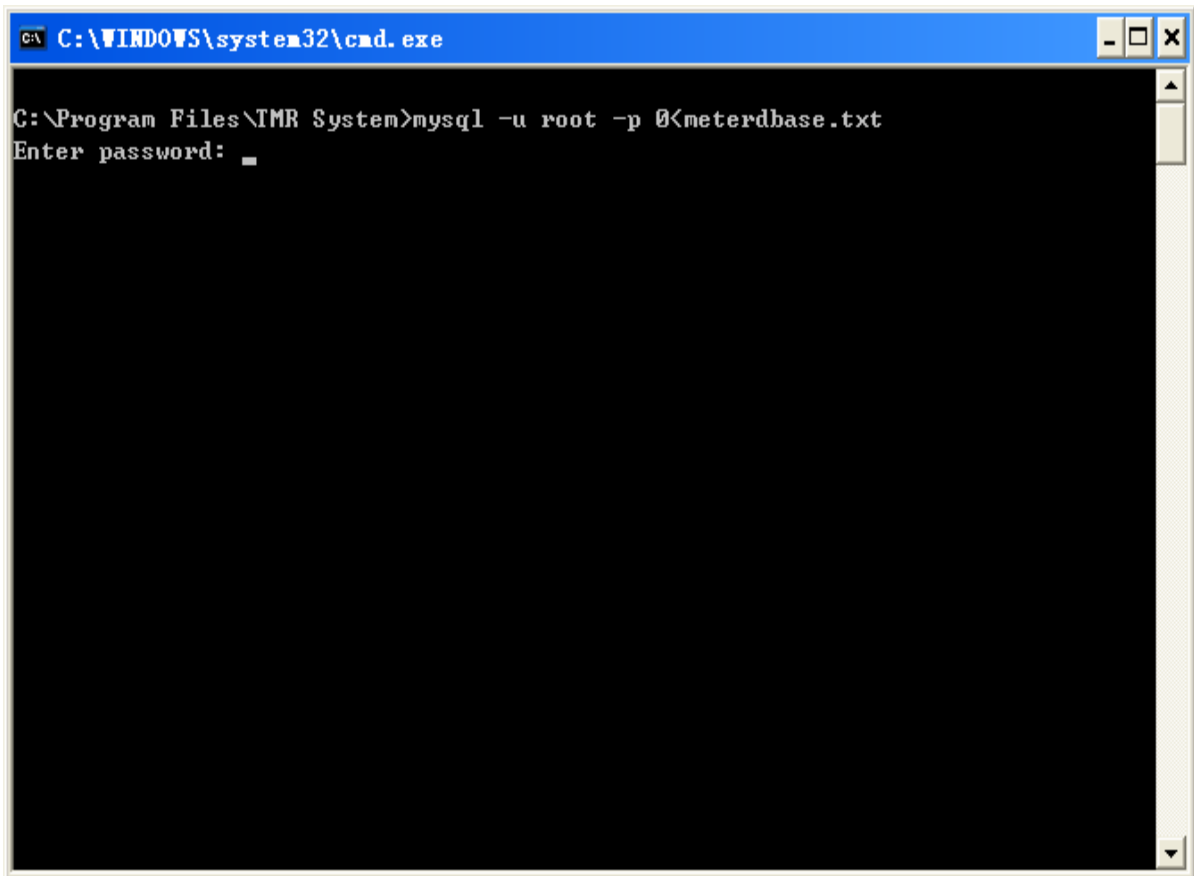
Then just press "Close" and the whole process is complete!



## 1.5. Database and Tables Installation

When MySQL and Energy Tele-Meter Reading System are installed successfully, you should set up the database and tables before you first run the system.

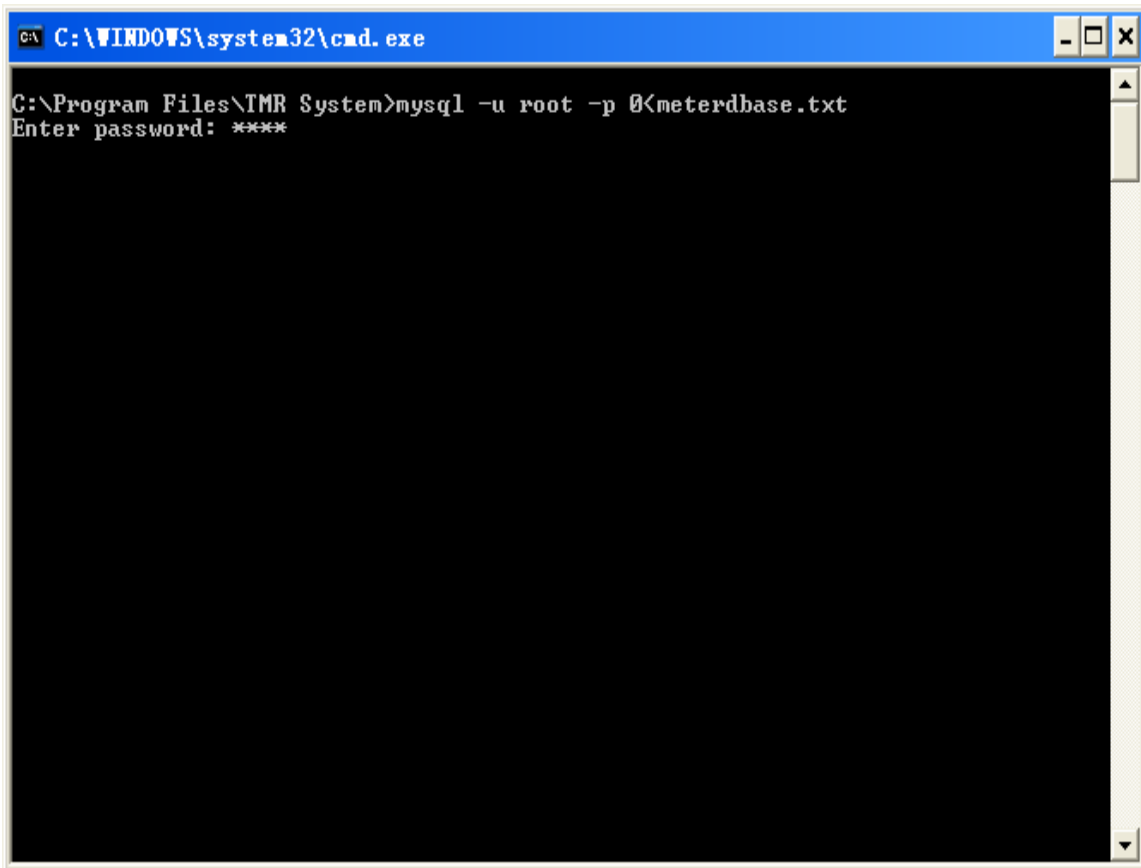
click the batch file "setup.bat".



```
C:\WINDOWS\system32\cmd.exe

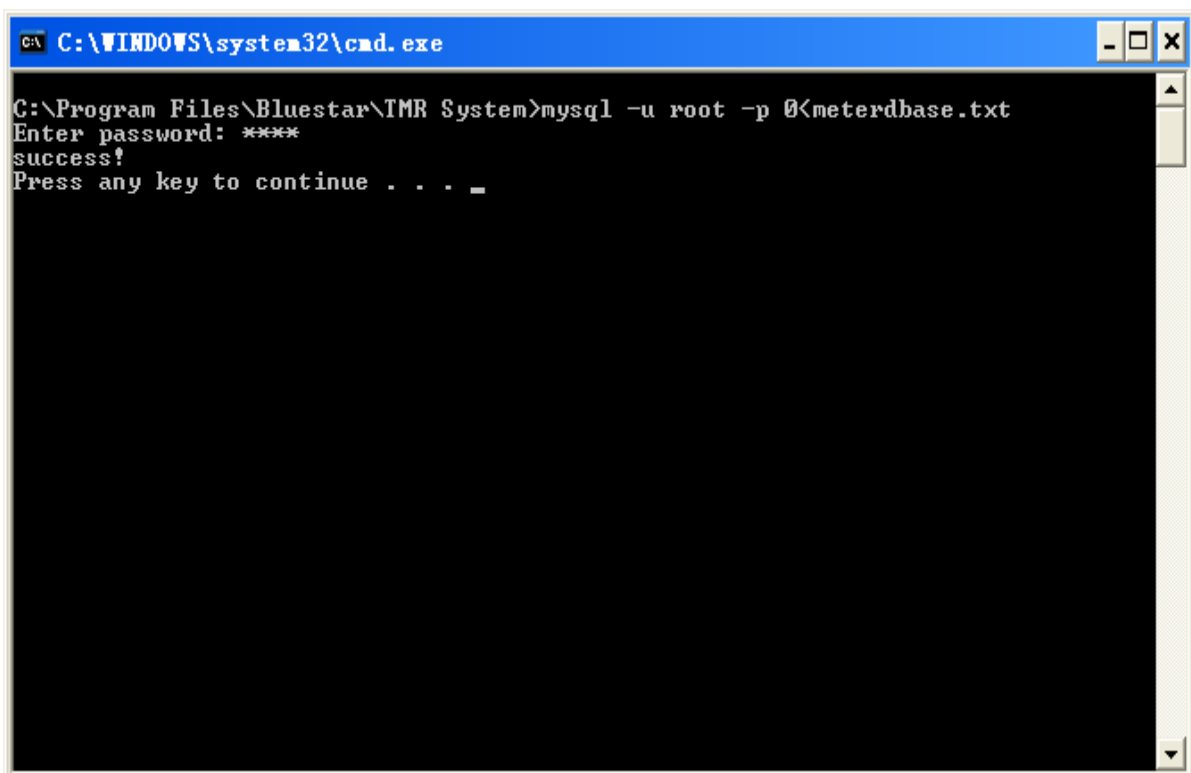
C:\Program Files\TMR System>mysql -u root -p 0<meterdbase.txt
Enter password: _
```

On the pop-up panel please input MySQL password you' ve just set in MySQL configuration, and press button "Enter".



```
C:\WINDOWS\system32\cmd.exe
C:\Program Files\TMR System>mysql -u root -p 0<meterdbase.txt
Enter password: ****
```

If the installation succeeds, you'll see the success information on the command line prompt.



```
C:\WINDOWS\system32\cmd.exe
C:\Program Files\Bluestar\TMR System>mysql -u root -p 0<meterdbase.txt
Enter password: ****
success!
Press any key to continue . . . _
```

Press any key, and the panel will disappear!

After executing the batch file "setup. bat", open the folder where you install Energy Tele-Meter Reading System, eg. the default folder is C:\Program Files\Bluestar\WEDAT, Here you may set up some parameters corresponding MySQL configuration. There is a file db.properties in the installation directory, which has 5 parameters, they are *dbserver*, *dbport*, *dbname*, *username*, *password*

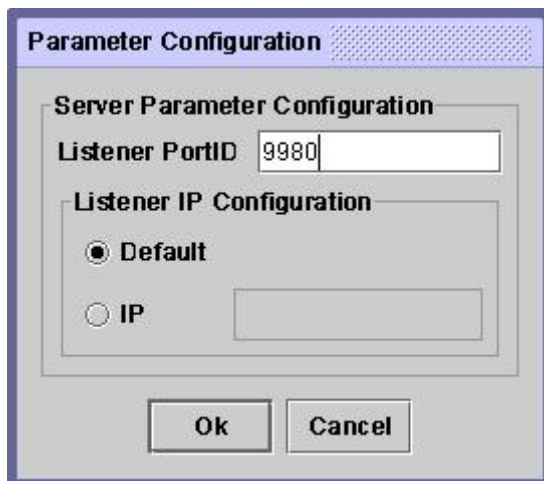
Dbserver is the computer' s name that has installed mysql; dbport is the mysql service port number which you type in when installing mysql; dbname is the name of the database; username is the user' s name to access the database; password is for database access protection. All these parameters have default values. User can change them according to actual requirement. TMR-BS02 can connect to database correctly only if the values in this property file have been correctly configured.

**Note: Do not change the dbname parameter.**

The installation thus complete!

Guide to the system usage:

After installing, user can start WEDAT Data Acquisition system by clicking on Start button on the bottom left screen, the following screen displays:



The default port ID is 9980, which has to match with the port number configured at WEDAT. User can configure this by sending short message to WEDAT by using a regular mobile phone. Then user selects the IP address on which the software runs on. If the computer has only one Networking card, then select the Default option. Or user can designate an IP address on which the software runs. Then click OK, the system will monitor the port on the IP address for incoming message from WEDAT.

If there is any error when running the software, the possible reason is that the system can not connect to database correctly, please check the file db.properties to make sure they have correct values.

The user interface has two main application function menus:

**1. Parameter Configuration** menu, it has 3 submenus. The first one is DataItem Management menu, its function is to define data acquisition items. The system already has default data items, which can be added, modified and deleted according to requirement. The second one is Terminal Parameters Archive Management, which is to define meter archive, timing meter reading tasks under the terminal. The terminal archive must have the same address as the remote terminal's so that they can communicate correctly. The default address is 1. The third submenu is Automatic Process Management.

**2. Terminal Communications** menu, it has 2 submenus. The first one is Remote Archive Management, its function is to configure the parameters in the WEDAT parameters archive management archive into remote terminals. WEDAT parameters include terminal archive, energy meter archive, timing meter reading task WEDAT archive operations include setting and reading. If you want to change the remote terminal address, then you first connect to this terminal, then modify the terminal address and set it to this terminal. The energy meter archive operations include setting, reading and deleting. The timing meter reading task operations include setting, reading and deleting. The second submenu is Read WEDAT Energy Data menu. There are two reading modes, one is to read energy meters real-time data. It will be saved to database after reading back. NOTE: the real-time data items to be read must match the saved timing meter reading task's data items. The other reading mode is to read the timing meter reading task's data in WEDAT, the data can be saved to this task's table in the system.

**3. Query Menu**, it to view the timing meter reading task data stored at system database. The interface is as follows:

**Inquiry conditions**

task1:1

**Available meters**

- Available meters
  - eda8(1)
    - Electricity Meter
      - 1(1)

**Data item to read**

- current total import active energy
- current tariff 1 import active ene
- current tariff 2 import active ene
- current tariff 3 import active ene
- current tariff 4 import active ene
- current total export active energy
- current tariff 1 export active ene
- current tariff 2 export active ene
- current tariff 3 export active ene
- current tariff 4 export active ene

Data of all time

select time range

start date 2005-06-22 16:40:39

end date 2005-07-22 16:40:39

**WEDAT Data Acquisition System**

Exit Parameter Definition Terminal Communications Query View Interface Style Help

**Energy data inquiry**

Terminal ID	Electricity meter ID	Meter data acquisition time	current total import active energy	current tariff 1 import active energy	current tariff 2 import active energy
1	1	2005-09-14 13:25:00	0.47	0.01	0.17
1	1	2005-09-14 13:30:00	0.47	0.01	0.17
1	1	2005-09-14 13:35:00	0.47	0.01	0.17
1	1	2005-09-14 13:40:00	0.47	0.01	0.17
1	1	2005-09-14 13:45:00	0.47	0.01	0.17
1	1	2005-09-14 13:50:00	0.47	0.01	0.17
1	1	2005-09-14 13:55:00	0.47	0.01	0.17
1	1	2005-09-14 14:00:00	0.47	0.01	0.17
1	1	2005-09-14 14:05:00	0.47	0.01	0.17
1	1	2005-09-14 14:10:00	0.47	0.01	0.17
1	1	2005-09-14 14:15:00	0.47	0.01	0.17
1	1	2005-09-14 14:20:00	0.47	0.01	0.17
1	1	2005-09-14 14:25:00	0.47	0.01	0.17
1	1	2005-09-14 14:30:00	0.47	0.01	0.17
1	1	2005-09-14 14:35:00	0.47	0.01	0.17
1	1	2005-09-14 14:40:00	0.47	0.01	0.17
1	1	2005-09-14 14:45:00	0.47	0.01	0.17
1	1	2005-09-14 14:50:00	0.47	0.01	0.17
1	1	2005-09-14 14:55:00	0.47	0.01	0.17
1	1	2005-09-14 15:00:00	0.47	0.01	0.17

Besides the above 3 application function menus, there are some other menus. Menu View can be used to display or hide the toolbar, display or hide error messages.

## 5. Short messages to set up WEDAT

1. Configure the central station IP address and port number:

BSIPXXX.XXX.XXX.XXX,XXXX

For example: BSIP221.226.181.188,9980

WEDAT will reply short message on success as: 221.226.181.188,9980

2. Select the connection mode with central station

BSCSX

X --- 1, GPRS communication ; 2, COM serial communication

For example: BSCS2 to select serial comm.

The reply short message is: Communication mode has been set to Serial mode!

3. Configure APN :

BSAPNxxxxxxxx;

For example: BSAPNcmnet;

The reply short message on success is: BSAPNcmnet

### **NOTE:**

Serial communication is for debug, demonstration and local data reading only, it can not be used for long term!

After communication, if user does not operate central station software TMR for 5 minutes, or cycle the power of WEDAT, it will return to GPRS mode automatically. GPRS is the default communication mode. If user wants to use serial communication mode, the it is necessary to set up again by sending short messages.