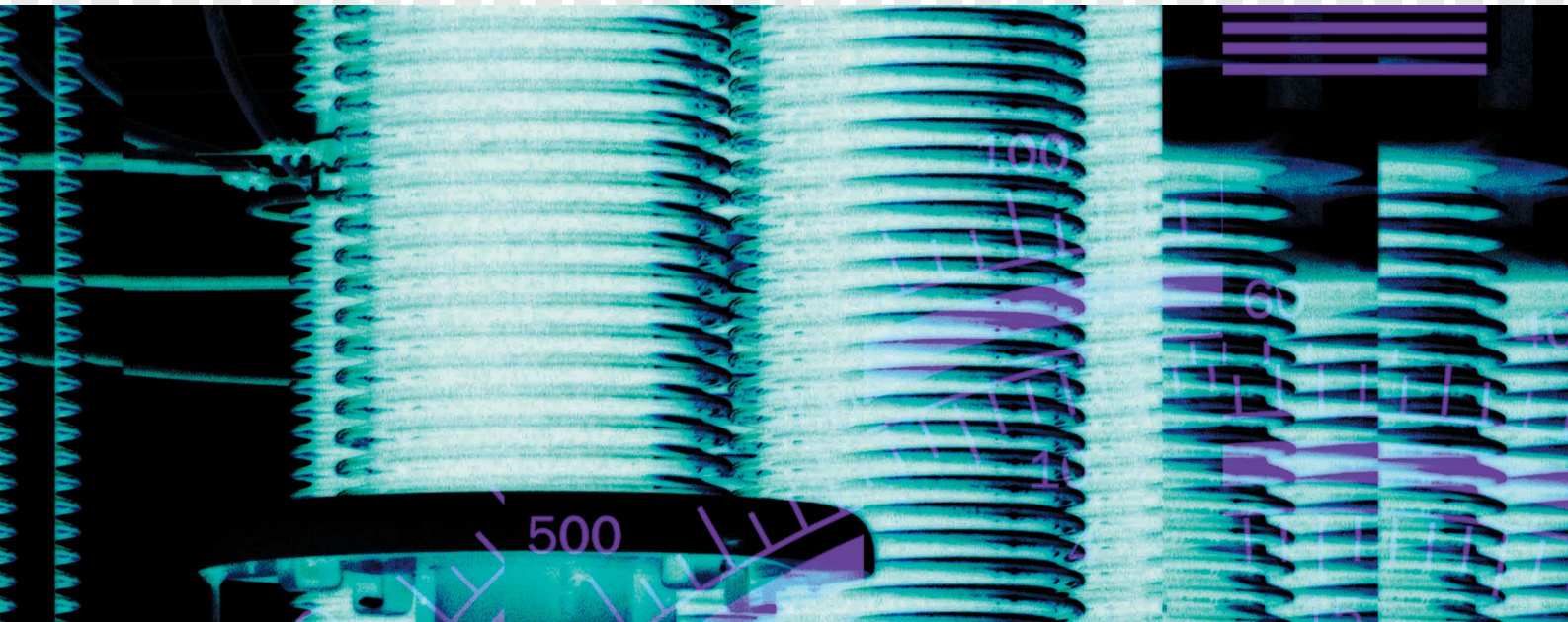


■ AC Power
for Business-Critical Continuity™

Liebert AF2 Monitoring Software

User Manual



Liebert AF2 Monitoring Software

User Manual

Version: V1.0
Revision date: September 22, 2008

Emerson Network Power provides customers with technical support. Users may contact the nearest Emerson local sales office or service center.

While every precaution has been taken to ensure accuracy and completeness in this manual, Emerson Network Power assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

Emerson Network Power pursues a policy of continuous product development and reserves the right to change the equipment design without notice.

Copyright © 2008 by Emerson Network Power
All rights reserved. The contents in this document are subject to change without notice

Contents

| | |
|---|-----------|
| 1. Introduction | 1 |
| 1-1 System requirements | 1 |
| 2. Installing <i>Liebert AF2 Monitoring Software</i> | 2 |
| 3. Function Descriptions | 6 |
| 3-1 Getting Started with <i>Liebert AF2 Monitoring Software</i> | 6 |
| 3-2. Status & Information..... | 11 |
| 3-3. Waveform | 14 |
| 3-4. Spectrum | 16 |
| 3-5. Event log | 18 |
| 3-6. Compensation Selection..... | 19 |
| 3-7. Parallel Information | 24 |
| 3-8. Dry Contact Setting..... | 25 |
| 3-9. Parameter Record | 27 |
| 3-10. Disconnected..... | 28 |
| 4. Communication Port Setting..... | 29 |
| 4-1. TCP/IP Setting..... | 29 |
| 4-2. USB Setting..... | 29 |
| 4-3. COM(RS-232) Setting | 30 |
| 4-4. RS-485/422 Setting | 30 |

1. Introduction

We thank you for the trust in selecting our **Liebert AF2 Monitoring Software**.

Liebert AF2 Monitoring Software is for monitoring Liebert AF2 Active Harmonic Filter. User can use this software to monitor the operational status of Liebert AF2 and download the waveform, spectrum and event log data from the equipment through the communication port (RS234/422/485, USB and RJ45) that Liebert AF2 provides.

This software package only has one software CD below. The CD consists of setup program and user manual.



This manual explains how to install and operate **Liebert AF2** Monitoring Software.

1-1 System requirements

Basic requirements

- Pentium-III 800M Hz, 256MB, HD500MB
- Microsoft Windows 2000
- Display 1024x768

Recommend requirements

- Pentium-4 1.8G Hz, 512MB, HD2GB
- Microsoft Windows XP
- Display 1024x768

2. Installing *Liebert AF2* Monitoring Software

The installation steps are as follows,

Step1:

Double click Setup.exe to execute the Setup program; refer to figure 2-1.

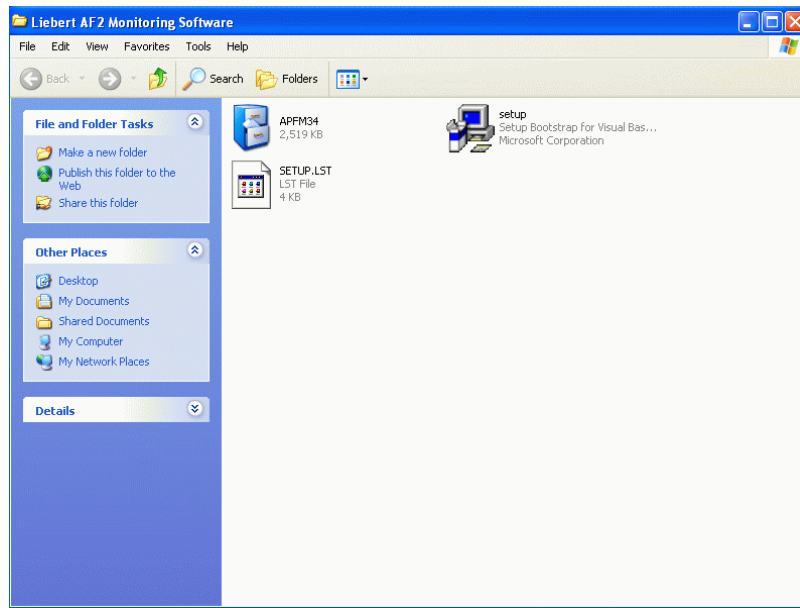


Figure 2-1

Step2:

If you agree to this Software License Agreement, please click "ACCEPT" to continue setup program. If you do not, please click "DO NOT ACCEPT" to stop the installation; refer to figure 2-2.

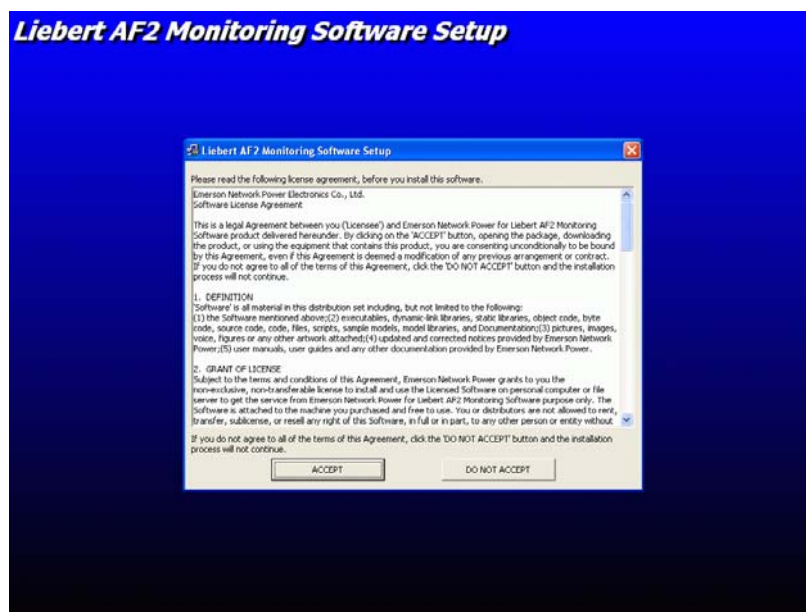


Figure 2-2

Step3:

Click “OK” button to continue setup program; refer to figure 2-3.

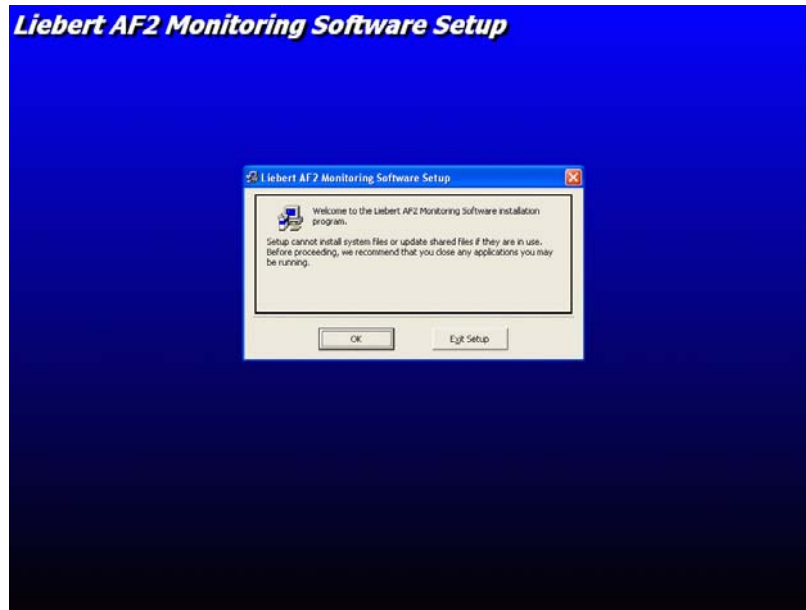


Figure 2-3

Step4:


Change the directory to you specified destination directory and then click  button to install this program; refer to figure 2-4.



Figure 2-4

Step5:

Enter the program group name and click “Continue” button to continue install program; refer to figure 2-5.

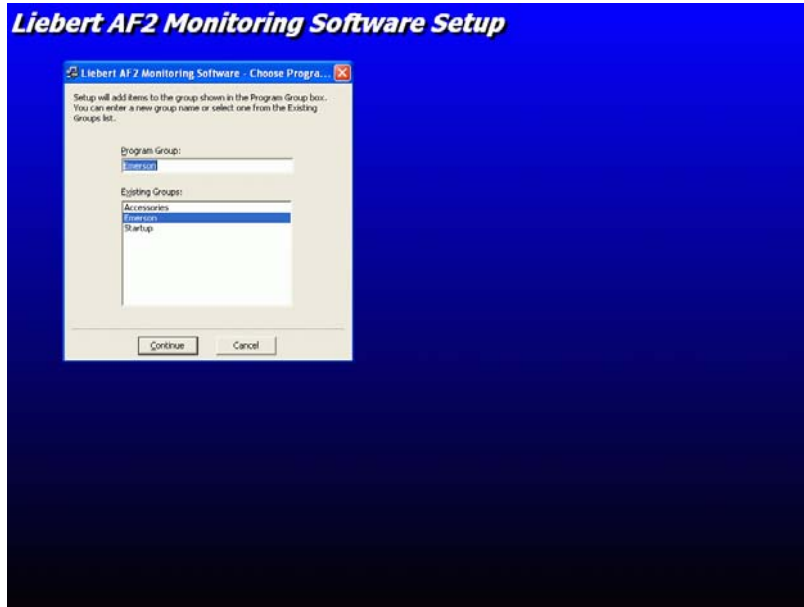


Figure 2-5

Step6:

Program setup is now completed successfully. Click “OK” button to exit this setup program; refer to figure 2-6.

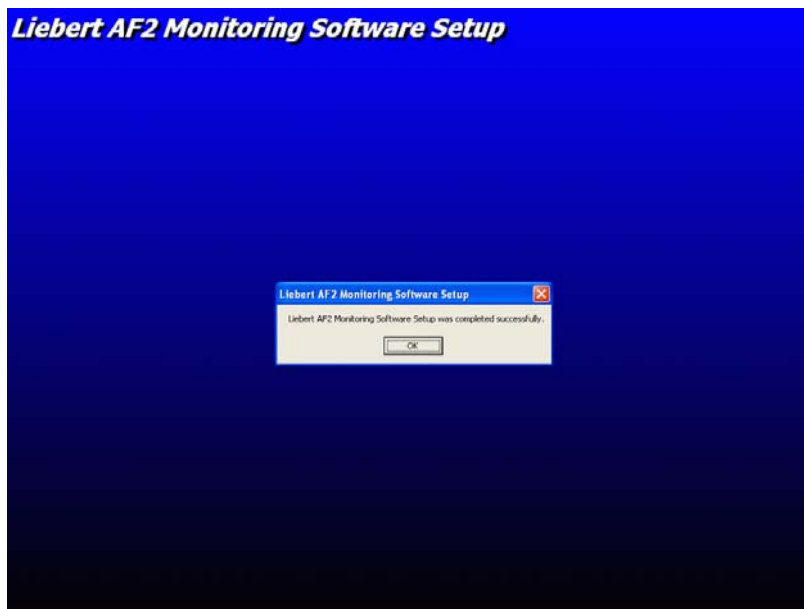


Figure 2-6

Step7:

Go to Control Panel → Select Regional and Language Options to install East Asian language, if required; refer to figure 2-7.

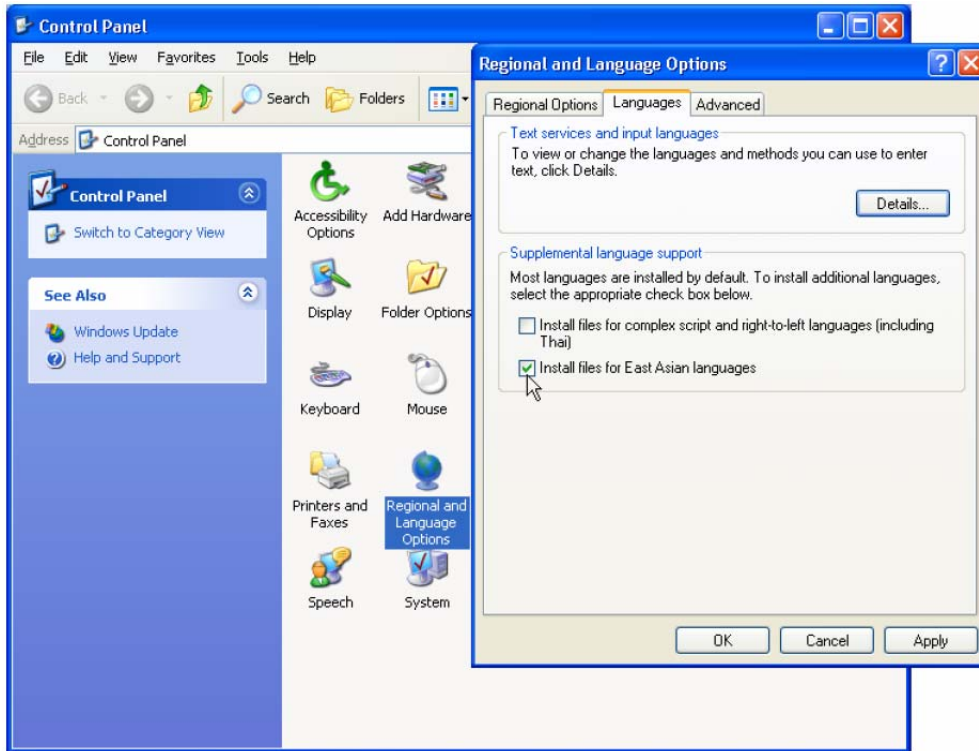


Figure 2-7

Step8:

You can now start **Liebert AF2** Monitoring Software.

3. Function Descriptions

This Section will introduce the operation of each functional windows.

3-1 Getting Started with *Liebert AF2 Monitoring Software*

Step1:

Start *Liebert AF2 Monitoring Software* by clicking on the “Liebert AF2 Monitoring Software” icon; refer to figure 3-1.



Figure 3-1

Step2:

Please key in Serial number and Password, and then click **Register** button to register this software; refer to figure 3-2. If the Serial number or Password wasn't correct, *Liebert AF2 Monitoring Software* can't be executed. Please contact Emerson Network Power representative to get a valid Serial Number and Password.

Note : The password and serial number are printed on the sticker the CD cover. The password is the same as Administrator Login password.

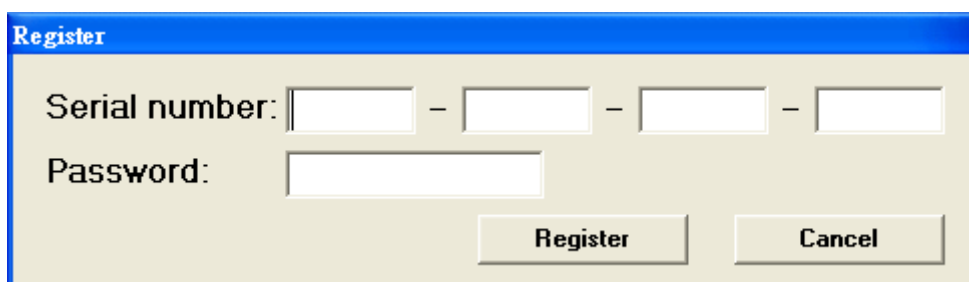


Figure 3-2

Step3:

Figure 3-3 is setting windows of **Liebert AF2 Monitoring Software**; the functions are described as follows,

- a. **Enter system** : Enter **Liebert AF2 Monitoring Software** main window.
- b. **Function** :
 - Add a new AHF** : Add a new Liebert **AF2** into this monitoring system. The maximum number of units that can be monitored with this monitoring software is 255.
 - Delete an existing AHF** : Delete an existing **Liebert AF2** from this monitoring system.
 - Record interval of parameter** : To set the power parameters record interval, start and end record time. The record interval time can be set from 1 to 60 minutes; refer to figure 3-4.
Note: The hard disk space requirement is less than 100MB if you record power parameters of a Liebert AF2 per minute for one year.
- c. **About** : This function displays the information about **Liebert AF2 Monitoring Software**.
- d. **ID** : ID is Identification number of a particular **Liebert AF2** unit. Each **Liebert AF2** has an ID number that is stored in the EEPROM of **Liebert AF2** controller. This number has to be the same as the ID number that is stored in the EEPROM of **Liebert AF2** controller. If the numbers are different, computer can't communicate with **Liebert AF2**. If you use RS422 or RS485 communication port, all AHF units ID can't be the same. User can use "*AF Setting Tool*" to read and set the ID number of the AHF unit. For further details, please refer to "*Liebert AF2 User Manual*".
- e. **Name** : The Identification name of a particular **Liebert AF2** unit that is defined by user.
- f. **Baud Rate** : This set value has to be the same as communication card. User can use "*AF Setting Tool*" to set the baud rate of communication card. For further details, please refer to "*Liebert AF2 User Manual*".
- g. **Connected type** : There are three types communication port can be selected. They are Com port, USB port and TCP/IP port. Please choose the right type of communication port that a **Liebert AF2** is connected with. For further details, please refer to chapter 4 of this manual.
- h. **Record** : When this option is selected, the power parameters record function is enabled. Otherwise this function is disabled.

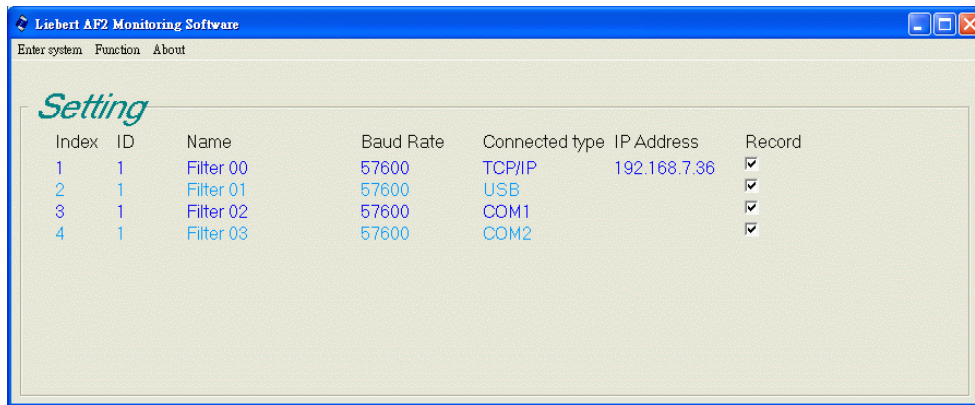


Figure 3-3

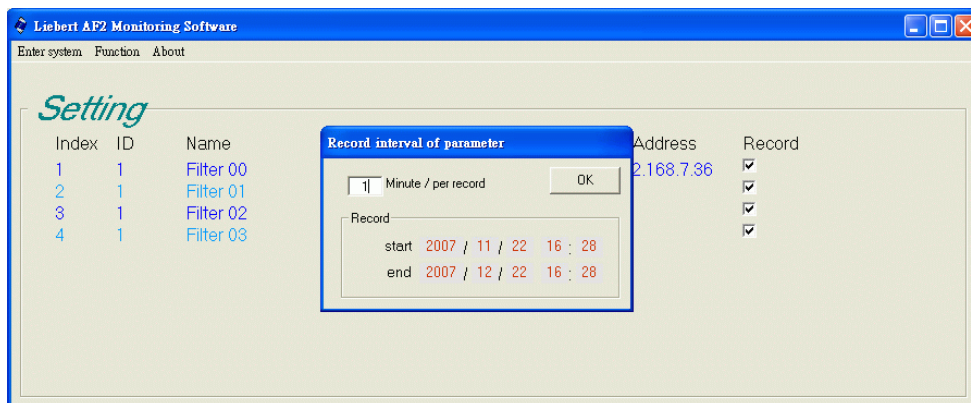




Figure 3-4



Step4:

When all of the settings are completed, please select “Enter system” to enter **Liebert AF2 Monitoring Software** main window; refer to figure 3-5. The functions of main window are described as follows,

a. Communication Status :

-  Connected.
-  Disconnected.

b. Parameter Record Status :

When power parameters record function is enabled  icon will be shown. Otherwise  icon will be hidden. The icon will be blinking when the parameter data is being recorded.

c. Name :

The identification name of a **Liebert AF2** that is defined by the user. Double click this Name to see more detailed information of **Liebert AF2**.



d.  Filtering :

This indicator is green  when a **Liebert AF2** is turned on. This indicator is white  when a **Liebert AF2** is shut down,.

e.  Full Correcting :

This indicator is yellow  when **Liebert AF2** operates under full load condition. Otherwise this indicator is white .

f.  Error :

This indicator is red  when some possible external or internal abnormal conditions occur and the AHF unit stops working. Otherwise this indicator is white .

g. Phase/Wire :

Displays the utility system if it is 3-phase 3 wire (3P3W) or 3-phase 4 wire (3P4W).

h. Frequency. :

Displays the utility frequency as 50Hz or 60Hz.

i. Panel :

Displays the control panel type of your Liebert AF2 as LCD or LED Panel.

j. Event :

Displays the latest event or status of **Liebert AF2** unit.

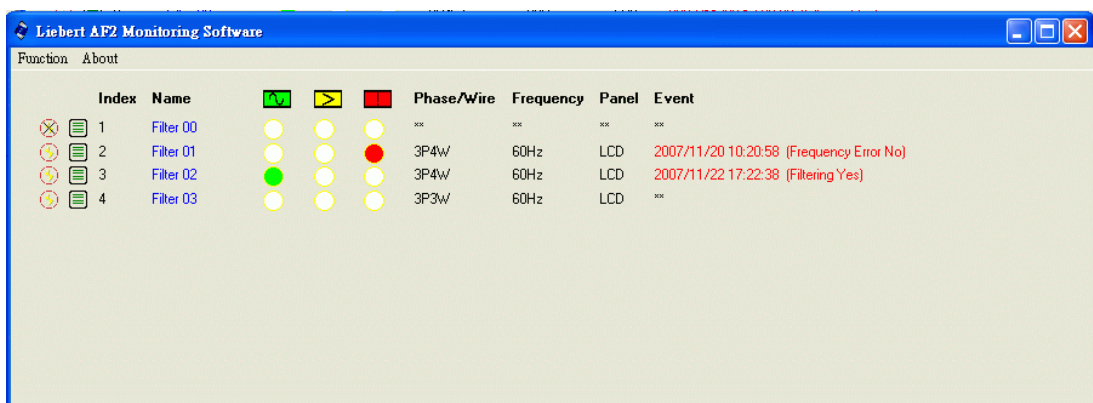


Figure 3-5

If some of the settings need to be edited, you may select **Function** → **Go to Setting Page** to edit/modify them and return back to Setting window.

Table 3-1 shows the function list of **Liebert AF2 Monitoring Software**. When the control panel of **Liebert AF2** is LCD panel, all functions are supported. The LED panel does not support some of the functions.

Table 3-1 Function list of **Liebert AF2 Monitoring Software**

| Function \ Panel | LCD Panel | LED Panel |
|------------------|-----------|-----------|
| Status | ● | ● |
| Identification | ● | ● |
| Parameters | ● | X |
| Waveform | ● | X |
| Spectrum | ● | X |
| Event Log | ● | ● |

| | | |
|------------------------|---|---|
| Compensation Selection | ● | ● |
| Dry Contract | ● | ● |
| Parameter Record | ● | X |

● : Support this function

X : Without this function

3-2. Status & Information

Figure 3-6 shows the Status & Information window. All functions are described as follows,

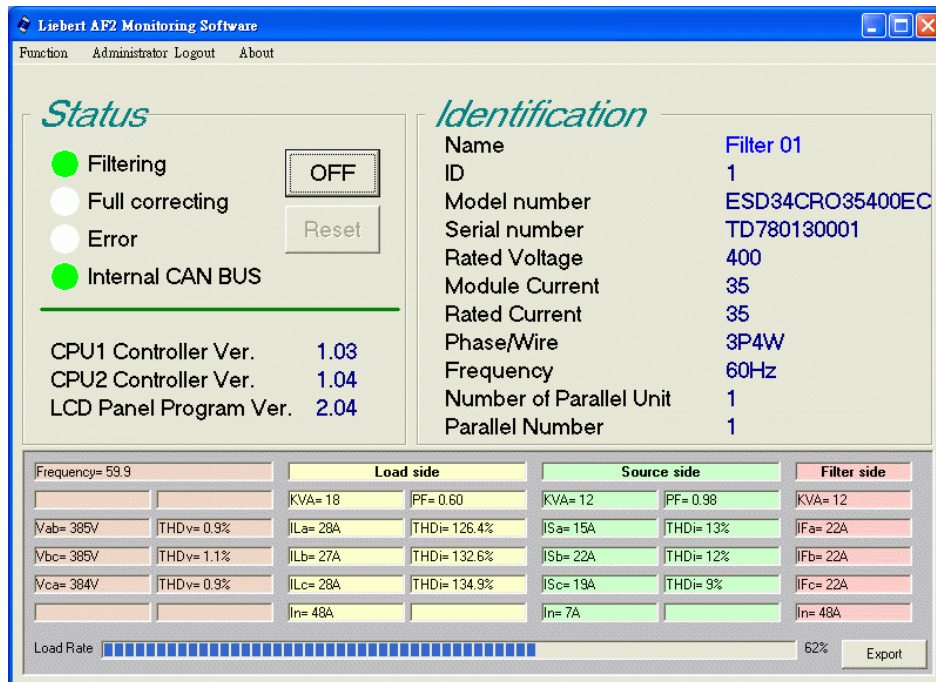


Figure 3-6

a. Function :

User can use this menu to switch function windows as.

- 1) **Status & Information**
Indicates **Liebert AF2** operation status and unit identification.
- 2) **Waveform**
Displays voltage and current waveform.
- 3) **Spectrum**
Displays voltage and current harmonic spectrum.
- 4) **Event log**
Download the event logs from **Liebert AF2**.
- 5) **Compensation Selection**
Shows **Liebert AF2** compensation setting.
- 6) **Parallel Information**
Shows system level parallel information.
- 7) **Dry Contact Setting**
Define the action of each dry contact.
- 8) **Parameter Record**
Shows the records of power parameters.

b. Status :**1) Filtering :**

This indicator is green when **Liebert AF2** is turned on,.

2) Full Correcting :

This indicator is yellow when the AHF operates under full load condition,

3) Error :

This indicator is red when a AHF unit stops working due to possible external or external abnormal conditions.

4) Internal CAN BUS :

The indicator is green when the communication between **Liebert AF2** control board and LED/LCD panel is normal. If the communication is abnormal, the indicator turns red.

5) CPU1 Controller Ver. :

Displays the CPU1 controller version.

6) CPU2 Controller Ver. :

Displays the CPU2 controller version.

7) LCD Panel Program Ver. :

Displays the LCD Panel controller version.

c. Control Button :**1) ON/OFF :**

Only Administrator can click this button to control **Liebert AF2** to turn on or turn off.

2) RESET :

Click this button to clear the error status.

d. Identification : Displays the information of **Liebert AF2**.

1) Name : The Identification name of **Liebert AF2** unit.

2) ID : The Identification number of **Liebert AF2** unit.

3) Model Number : The model number of **Liebert AF2** unit.

4) Serial Number : The equipment serial number of **Liebert AF2** unit

5) Rated Voltage : Rated voltage of **Liebert AF2** unit.

6) Module Current : Rated current of each Power Module.

7) Rated Current : Rated current of **Liebert AF2** system.

8) Phase/Wire : Displays the utility system as 3P3W (3 phase 3 Wire) or 3P4W

(3 phase 4 wire).

- 9) **Frequency** : Display the utility frequency as 50Hz or 60Hz.
- 10) **Number of Parallel Unit** : Displays the number of parallel units of Control Module. If 4 Control Modules operate in parallel, 4 will be displayed.
- 11) **Parallel Number** : Displays the parallel number of Control Module.

e. **Parameters** : Display the power parameters information.


- 1) **Frequency** : Utility frequency.
- 2) **3 phase voltage** :
 - 2-1) V_{ab}, V_{bc}, V_{ca} : RMS Voltage.
 - 2-2) THD_v : Voltage total harmonic distortion.
- 3) **Load Side** :
 - 3-1) KVA : Apparent Power of Load side.
 - 3-2) PF : Power Factor of Load side.
 - 3-3) $I_{La}, I_{Lb}, I_{Lc}, I_n$: Load side RMS Current.
 - 3-4) THD_i : Load side current total harmonic distortion.
- 4) **Source Side** :
 - 4-1) KVA : Apparent Power of Source side.
 - 4-2) PF : Power Factor of Source side.
 - 4-3) $I_{Sa}, I_{Sb}, I_{Sc}, I_n$: Source side RMS Current.
 - 4-4) THD_i : Source side current total harmonic distortion.
- 5) **Filter Side** :
 - 5-1) KVA : Apparent Power of Filter side.
 - 5-2) $I_{Fa}, I_{Fb}, I_{Fc}, I_n$: Filter side RMS Current.

f. **Load Rate** : The percentage of **Liebert AF2** output current to the rated capacity.

g. **Export** : Export the parameter data in a CSV file which is Comma Separated Value (CSV) file format.

3-3. Waveform

Figure 3-7 shows the Waveform window, this window can display waveforms of voltage and current on source, load and Filter side. The function describes as follows,

- a. **Update** : Click **Update** button to download the waveform from **Liebert AF2**.
- b. **Export** : Click **Export** button to store the waveform data in a CSV file which is the Comma Separated Value (CSV) file format.
- c. **Color** : Click **Color** button to change the waveform color.
- d. Click the up/down  button to change the current scale.
 - (1) IL/IS : Source side current and Load side current.
 - (2) IF : Filter side current.
- e. **Waveform menu of window 1**. There are 15 waveforms can be selected individually.
 - (1) Vab, Vbc, Vca : 3 phase line-line (L-L) voltage waveform.
 - (2) ILa, ILb, ILc, ILn : 3 phase current waveforms of load side.
 - (3) ISa, ISb, ISc, ISn : 3 phase current waveforms of source side.
 - (4) IFa, IFb, IFc, IFn : 3 phase current waveforms of filter side.
- f. Waveform menu of window 2.
- g. Waveform display window 1.
- h. Waveform display window 2.

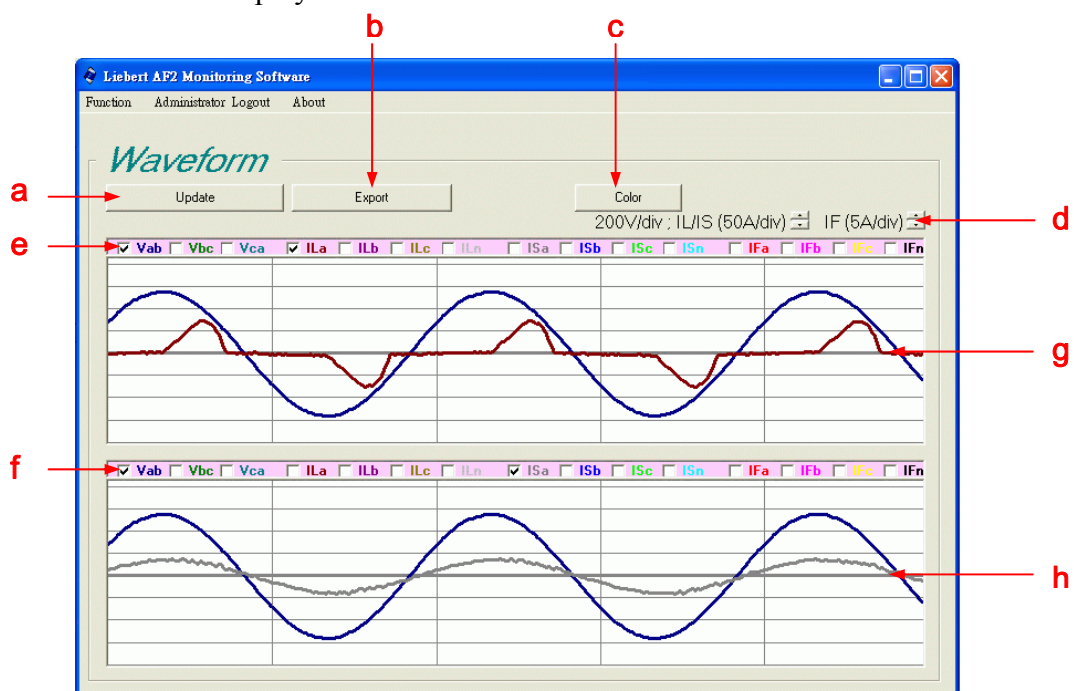


Figure 3-7

3-4. Spectrum

Figure 3-8 and figure 3-9 are Spectrum window. Figure 3-8 shows Harmonic Spectrum in graph and figure 3-9 shows Harmonic Spectrum in data table. User can use this function to view the spectrum of voltage and current harmonics. The function is described as follows,

- a. **Update** : Click **Update** button to download the spectrum data from **Liebert AF2**.
- b. **Export** : Click **Export** button to store the waveform data in a CSV file which is in the Comma Separated Value (CSV) file format.
- c. **Color** : Click **Color** button to change the color of spectrum bar.
- d. **Spectrum** : Click **Spectrum** button to show the spectrum in bar-graph.
- e. **Table** : Click **Table** button to show the spectrum in data table.
- f. The menu of voltage and current spectrum.
 - 1) Vab, Vbc, Vca : 3 phase line voltage.
 - 2) ILa, ILb, ILc : 3 phase current of load side.
 - 3) ISa, ISb, ISc : 3 phase current of source side.

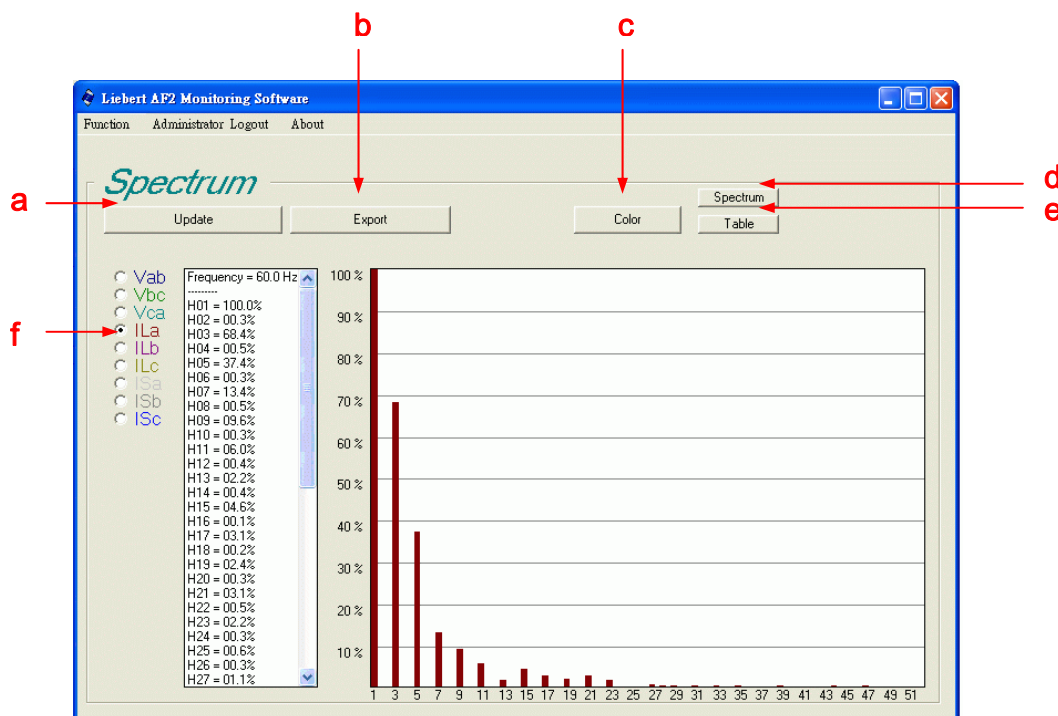


Figure 3-8

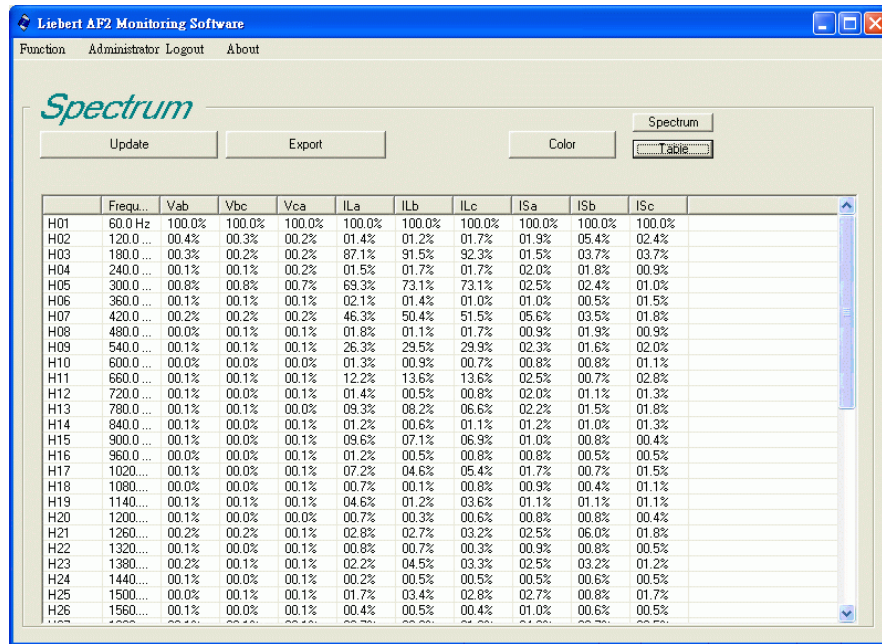


Figure 3-9

3-5. Event log

Figure 3-10 shows the Event log window, User can download the event logs from **Liebert AF2**. The function is described as follows,

- a. **Update** : Click **Update** button to download the event log data from **Liebert AF2**.
- b. **Export** : Click **Export** button to store the event log data in a CSV file which is the Comma Separated Value (CSV) file format.
- c. **Count** : Choose the number of event logs to be downloaded.

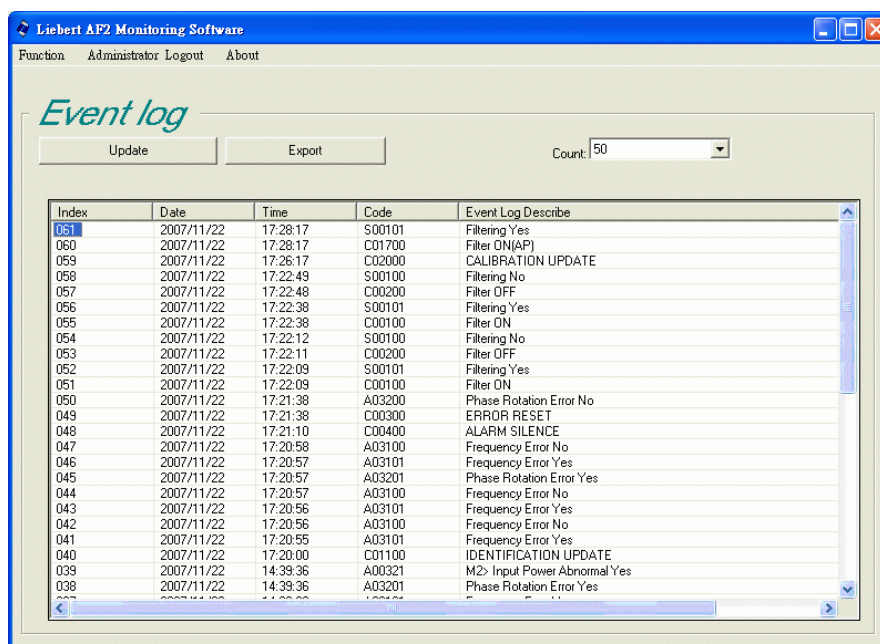


Figure 3-10

3-6. Compensation Selection

Figure 3-11 and figure 3-12 show Compensation Selection window. This window only provides user to view the compensation setting of **Liebert AF2**. Users cannot change any setting. If user wants to change the setting, please contact Emerson Network Power authorized representative.. The function is described as follow,

3-6-1. Setting Function (Service Option Only)

(1) Compensation Setting

Table 3-2. Compensation Setting Description

| Item | Function Description | Option or Input Range | Default |
|--|---|---|----------|
| Harmonic Compensation | To enable or disable Harmonic Compensation functionality | ENABLE DISABLE | ENABLE |
| Power Factor Correction | To enable or disable displacement Power Factor Correction functionality | ENABLE DISABLE | DISABLE |
| Compensation Priority | To set the priority of the compensation, either Harmonic Compensation or Power Factor Correction. | Harmonic PFC | Harmonic |
| Reactive Power | To set the reactive power compensation mode as Target DPF (Displacement Power Factor) or Fixed KVAR basis when Power Factor Correction is enabled. | Dynamic Fixed | Dynamic |
| Target DPF (Displacement Power Factor) | To set the Target DPF $\cos\phi_1$. | +: leading - : lagging 0.7~1.0 | -0.95 |
| Fixed KVAR | To set the Fixed KVAR compensation value. | +: leading - : lagging Please refer to table 3-3 for input range. | 0 |
| Balance Utility | When 3 Phase load current load is unbalance and Balance Utility is enabling LIEBERT AF2 will compensate the utility current to balance. This function is only for 3 Phase 4 Wire applications. 480V Model of Liebert AF2 is not equipped with this function. | ENABLE DISABLE | DISABLE |
| Application Mode | LIEBERT AF2 is inbuilt with several control parameters set that are used for different type loads to obtain the best performance. | (1~7) Please refer to table 3-4. | 2 |

Table 3-3. Fixed KVAR Input Range

| Liebert AF2 Model | | Input Range (KVAR) |
|--------------------------|---------------|--------------------|
| Voltage Rated | Current Rated | |
| 400V | 35 A | -24.2 ~ +24.2 |
| | 60 A | -41.6 ~ +41.6 |
| | 90 A | -62.4 ~ +62.4 |
| | 120 A | -83.1 ~ +83.1 |
| <u>380V</u> | <u>35 A</u> | <u>-23.0~+23.0</u> |
| | <u>60 A</u> | <u>-39.5~+39.5</u> |
| | <u>90 A</u> | <u>-59.2~+59.2</u> |
| | <u>120 A</u> | <u>-79.0~+79.0</u> |
| 480V | 30 A | 0 ~ +24.9 |
| | 50 A | 0 ~ +41.6 |
| | 75 A | 0 ~ +62.4 |
| | 100 A | 0 ~ +83.1 |

Table 3-4. Application Mode List

| | Application Mode |
|---|--------------------------|
| 1 | User Define |
| 2 | 6P UPS + Passive Filter |
| 3 | 6P UPS |
| 4 | 12P UPS + Passive Filter |
| 5 | 12P UPS |
| 6 | User Define |
| 7 | 6P UPS + Passive Filter |

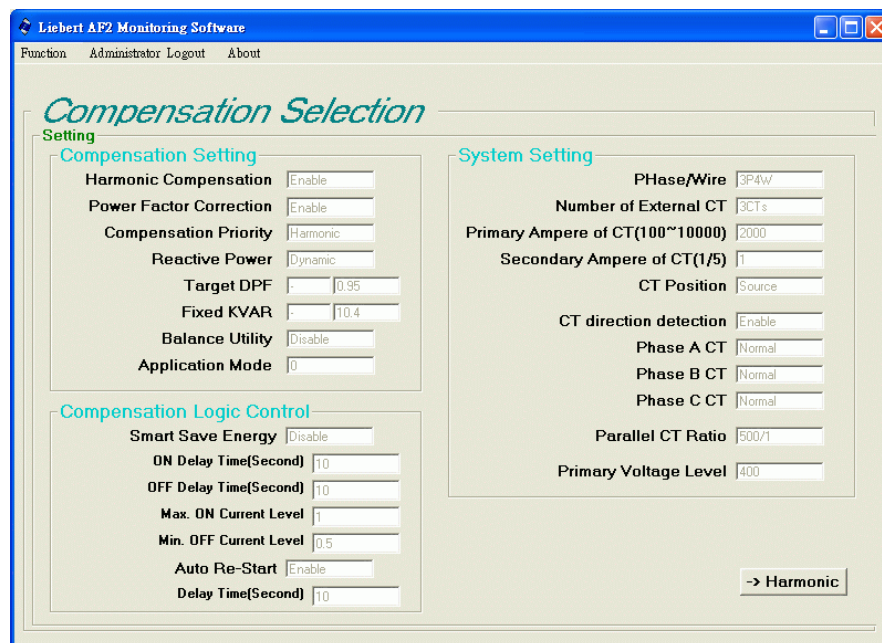


Figure 3-11

(2) Compensation Logic Control

Table 3-5. Compensation Logic Control Description

| Item | | Function Description | Option or Input Range | Default |
|--------------------------|------------------------|--|-----------------------|---------|
| Smart Save Energy | Smart Save Energy | When this function is enabled, the filter can start-up or shutdown automatically, according to the load current level. When the load current less than Min. OFF Current Level for OFF delay time, the filter will shutdown automatically and remain OFF until the load current greater than Max. ON Current Level for ON Delay Time. | ENABLE DISABLE | DISABLE |
| | ON Delay Time | The delay time for automatic start-up. | 0~3600 Sec | 10 |
| | OFF Delay Time | The delay time for automatic shutdown. | 0~3600 Sec | 10 |
| | Max. ON Current Level | The current level for automatic start-up. For example, if the Max. ON Current Level is 1.0 for 60A Liebert AF2 , it means the load current has to be greater than 60Ax 1.0=60A. This current level has to greater than Min. OFF Current Level. | 0.1~10.0 | 1.0 |
| | Min. OFF Current Level | The current level for automatic shutdown. For example, if the Min. OFF Current Level is 0.5 for 60A Liebert AF2 , it mean the load current has to greater than 60Ax 0.5=30A. This current level has to less than Max. ON Current Level. | 0.1~10.0 | 0.5 |
| Auto Re-Start | Auto Re-Start | When this function is enabled, Liebert AF2 is allowed to automatic re-start after some abnormal conditions return to normal. The abnormal conditions include system voltage abnormal, frequency error, etc. | ENABLE DISABLE | ENABLE |
| | Delay Time | The delay time for automatic re-start. | 0~3600 Sec | 10 |

(3) System Setting

Table 3-6. System Setting Description

| Item | Function Description | Option or Input Range | Default |
|------------------------|---|-------------------------------------|----------------|
| Phase/Wire | Select 3P3W (3 phase 3 wire) or 3P4W (3 phase 4 wire) power system that Liebert AF2 is connected to. If the system is 3P3W, neutral line doesn't need to be connected/compensated. | 3P3W 3P4W | 3P3W |
| Number of External CT | Select 2 or 3 external CTs that will install at Source/Load side. If the system is 3P4W, 3 CTs are needed. | 2 CTs 3 CTs | 3 CTs |
| Primary Ampere of CT | Set the primary current rating of External CT. | 100~10000 | 1000 |
| Secondary Ampere of CT | Set the secondary current rating of External CT. The Control Module can accept 1A or 5A rating. 1A is standard. If 5A CT will be used, an optional auxiliary CT card is needed. | 1 A 5 A | Auto Detection |
| CT Position | Select location where External CT is installed. | Load Source | Source |
| CT Direction Detection | When this function is enabled, Liebert AF2 will diagnose the polarity of External CT. When the polarity is incorrect, Liebert AF2 will provide alarm and can not start-up. | ENABLE DISABLE | ENABLE |
| Phase A CT | When the polarity of Phase A External CT is incorrect, set CT reversed can change CT polarity and users don't need to reconnect the CT wires. | Normal Reverse | Normal |
| Phase B CT | When the polarity of Phase B External CT is incorrect, set CT reversed can change CT polarity and users don't need to reconnect the CT wires. | Normal Reverse | Normal |
| Phase C CT | When the polarity of Phase C External CT is incorrect, set CT reversed can change CT polarity and users don't need to reconnect the CT wires. | Normal Reverse | Normal |
| Parallel CT Ratio | When Control Modules operate in parallel, Parallel CTs have to be installed at the total output of Liebert AF2 . Each phase has to install 1 CT. | 500/1 1000/1 1500/1 2000/1 | 500/1 |
| Primary Voltage Level | Liebert AF2 is allowed to be applied in different voltage levels with an external transformer that can be installed at the input side of the filter. When the external transformer is used, the voltage level should be set to primary voltage of the transformer. | 190~6600V | 400 |

3-6-2. Harmonic Function

a. Order :

This shows the harmonic order that users want to compensate.
The maximum number of selected harmonic order is 12.

b. Active :

The function shows the harmonic orders which are compensated by **Liebert AF2**. If the resonance occurs between **Liebert AF2** and load, the filter will disable the respective harmonic order creating resonance.

c. Reduction(%) :

The function is to set harmonic reduction ratio. For example, when the load 5th harmonic current is 10A and the reduction is set 80%, **Liebert AF2** only compensate $10A \times 80\% = 8A$ 5th harmonic current.

d. High Order Compensation :

Global compensate from 32nd to 51st harmonic orders.



Figure 3-12

3-7. Parallel Information

Figure 3-13 shows system level Parallel Information window. It can show the status of Control Modules and the rated current of the total Power Modules which is connected to a Control Module. As a reference, one Control Module can be connected with total 4 numbers Power Module totaling maximum rating as 120A. 8 such units can be paralleled to offer maximum rating of AHF to 960A.

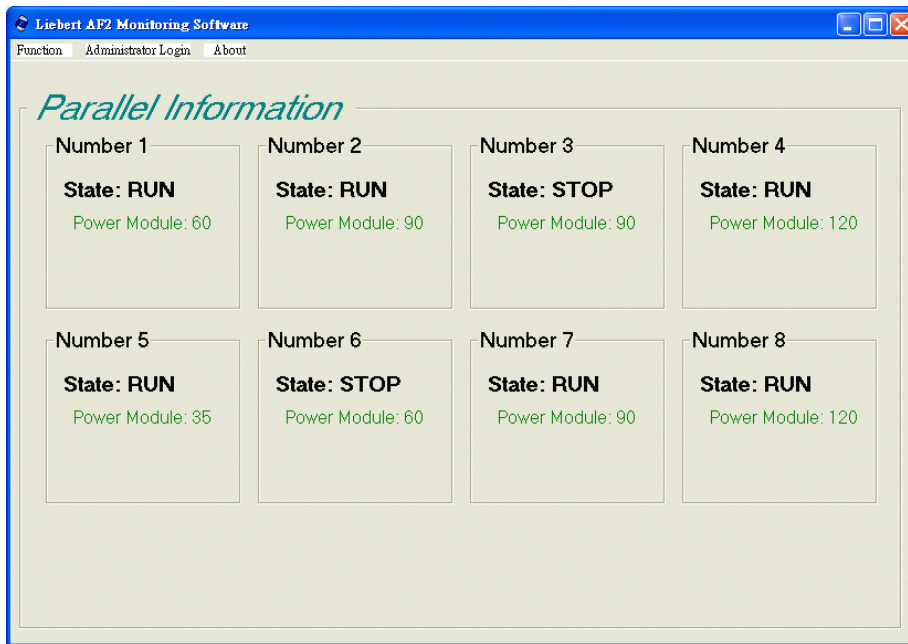


Figure 3-13

3-8. Dry Contact Setting

Figure 3-14 shows Dry Contact Setting window. User can define the action of each dry contact by this window. Click **Edit** button to enter modify window (figure 3-15) and then set each dry contact setting. There are 38 action events can be set (refer to table 3-7) and the action mode can be set either NO (Normal Open) or NC (Normal Close). After finish the setting, click **Update** button to store the new setting.

The default definitions of the output dry contacts are as per Table 3-8.

The Remote Control is set the function of input dry contact. The detail description refers to Section 2-1-2(D) of “*Liebert AF2 User Manual*”.

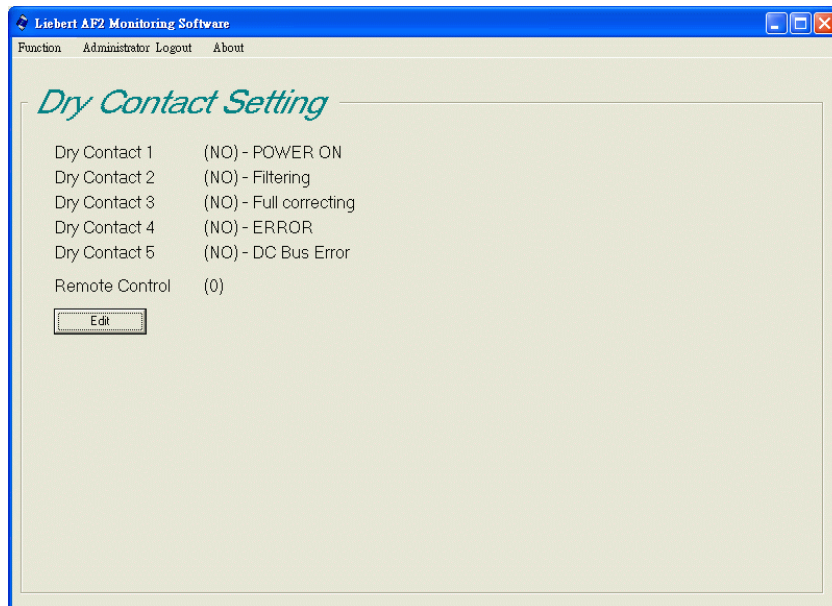


Figure 3-14

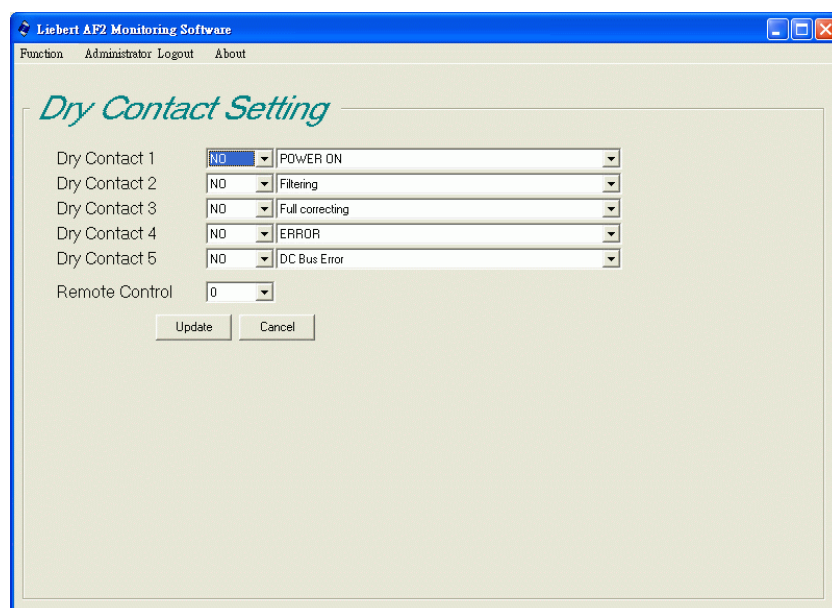


Figure 3-15

Table 3-7 Event list

| Item | Event | Item | Event |
|------|----------------------------|------|----------------------------|
| 1 | POWER ON | 2 | Filtering |
| 3 | Full correcting | 4 | ERROR |
| 5 | MCCB Tripped | 6 | Fuse Blown |
| 7 | Input Power Abnormal | 8 | IGBT Fault |
| 9 | High Frequency Resonance | 10 | Over Peak Current |
| 11 | Over Current | 12 | Over Temperature(Power) |
| 13 | Fan Fault | 14 | Temp. Sensor Disconnected |
| 15 | DC Bus Error | 16 | DC Bus Under Voltage |
| 17 | DC Bus Over Voltage | 18 | External CTA Reversed |
| 19 | External CTB Reversed | 20 | External CTC Reversed |
| 21 | Parallel CTA Reversed | 22 | Parallel CTB Reversed |
| 23 | Parallel CTC Reversed | 24 | System Voltage Abnormal |
| 25 | System Under Voltage | 26 | System Over Voltage |
| 27 | Frequency Error | 28 | Phase Rotation Error |
| 29 | Control Board Error | 30 | Control Board EEPROM Error |
| 31 | Control Panel EEPROM Error | 32 | Power Supply Error |
| 33 | Current Cable Disconnected | 34 | CAN Bus Disconnected |
| 35 | Parallel Disconnected | 36 | Parallel ID Duplicated |
| 37 | Parallel Setting Error | 38 | Over Temperature(Control) |

Table 3-8 The Default Definition of the Output Dry Contacts

| Dry Contact | Event | Active |
|---------------|-----------------|------------------|
| Dry Contact 1 | POWER ON | NO (Normal Open) |
| Dry Contact 2 | Filtering | NO (Normal Open) |
| Dry Contact 3 | Full correcting | NO (Normal Open) |
| Dry Contact 4 | ERROR | NO (Normal Open) |
| Dry Contact 5 | DC Bus Error | NO (Normal Open) |

3-9. Parameter Record

Figure 3-16 shows the Parameter Record window. This window provides the view of records of power parameters. The function is described as follows,

- a. **Viewing Period** : Set the start and end viewing time.
- b. **Option** : Choose the power parameters that users want to view.
- c. **View** : Click **View** button and then loading the power parameters data according to the setting of Viewing Period and Option.
- d. **Export** : Click **Export** button to store the power parameters data in a CSV file which is the Comma Separated Value (CSV) file format.
- e. **Delete Records** : Click **Delete Records** button and then set the start and end time on figure 3-17. Now, click Delete button to delete the power parameters data from database of computer.

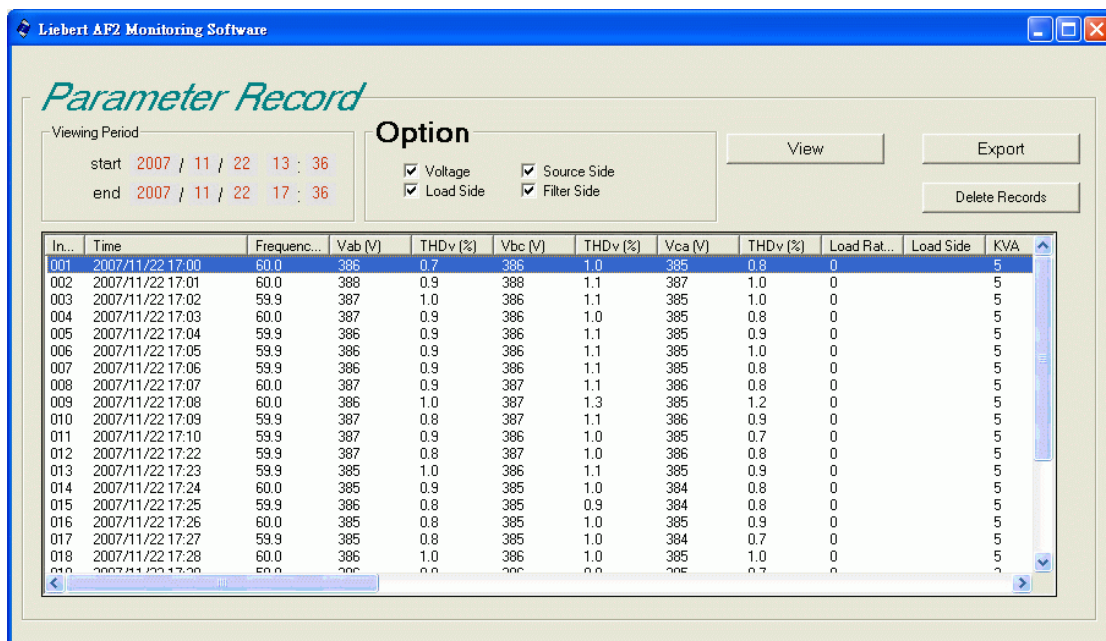



Figure 3-16



Figure 3-17

3-10. Disconnected

When some external abnormalities causes the communication disconnected, the **Liebert AF2 Monitoring Software** main window will show the disconnected sign  and other function windows will show **de-link** message. Please refer to figure 3-18 and figure 3-19.

When the communication is disconnected, please check the communication cable between the computer and **Liebert AF2** is connected properly and the communication card operates properly. If the problem persists, please contact with local Emerson Network Power representative.

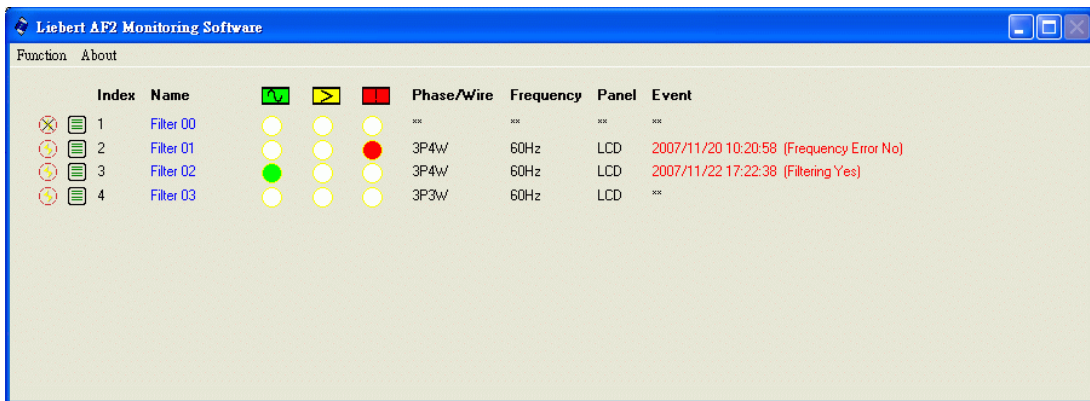


Figure 3-18

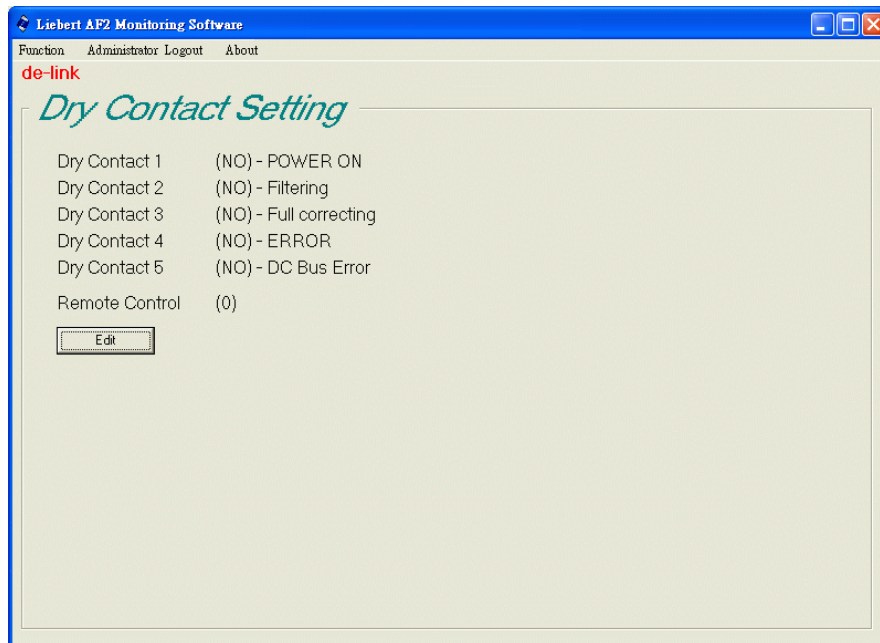


Figure 3-19

4. Communication Port Setting

4-1. TCP/IP Setting

When the connected type is TCP/IP, user has to set ID, Baud Rate and IP Address. The ID number has to be the same as **Liebert AF2** and baud rate and IP Address setting has to be the same as the communication card of **Liebert AF2**.

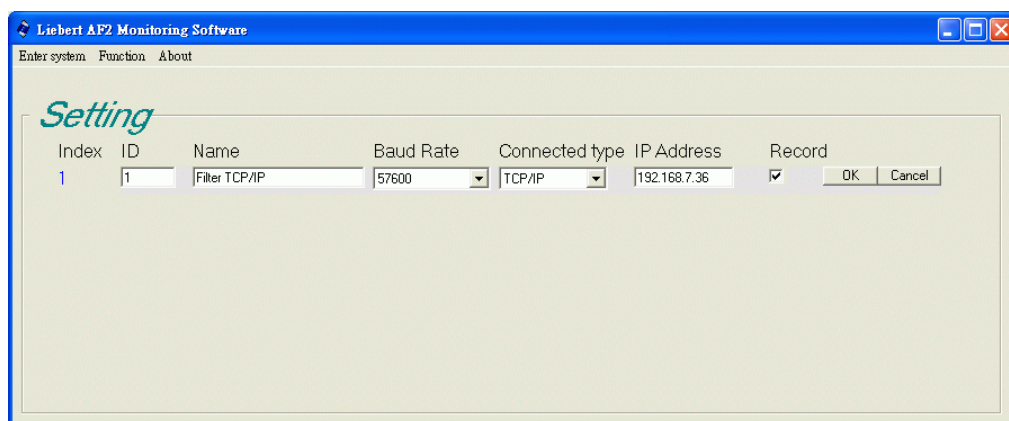


Figure 4-1

4-2. USB Setting

When the connected type is USB, user has to set ID and Baud Rate. The ID number has to be the same as **Liebert AF2** and baud rate setting has to be the same as the communication card of **Liebert AF2**.

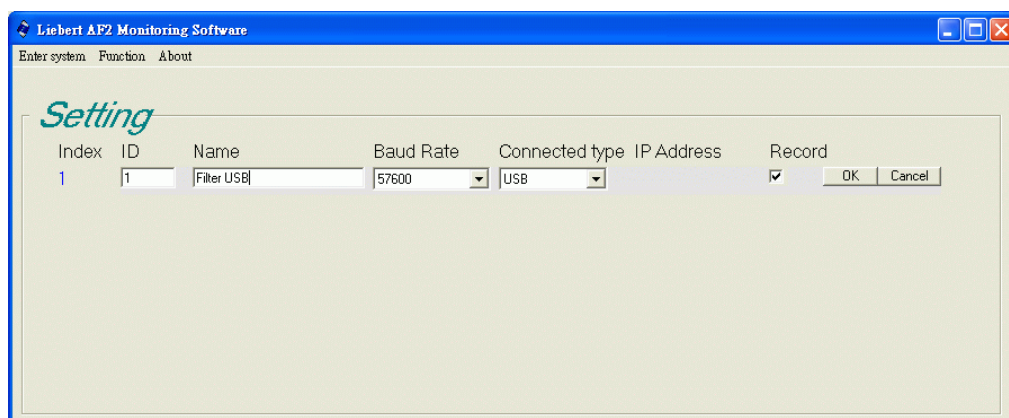


Figure 4-2

4-3. COM(RS-232) Setting

When the connected type is COM port, user has to set ID and Baud Rate. The ID number has to be the same as **Liebert AF2** and baud rate setting has to be the same as the communication card of **Liebert AF2**. If using USB to RS232 converter is used, please ensure that the COM port setting is correct.

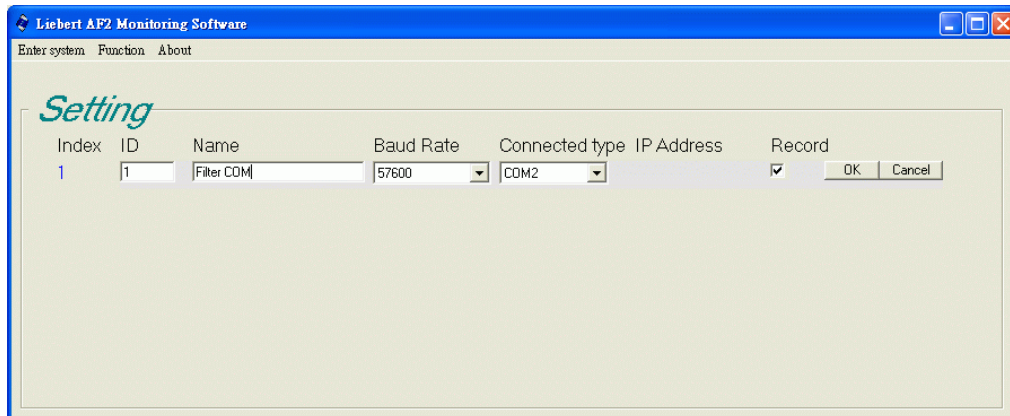


Figure 4-3

4-4. RS-485/422 Setting

For connection through RS-485/422 COM port, user has to set ID and Baud Rate. The ID number has to be the same as **Liebert AF2** and baud rate setting has to be the same as the communication card of **Liebert AF2**. All **Liebert AF2** IDs can't be the same.

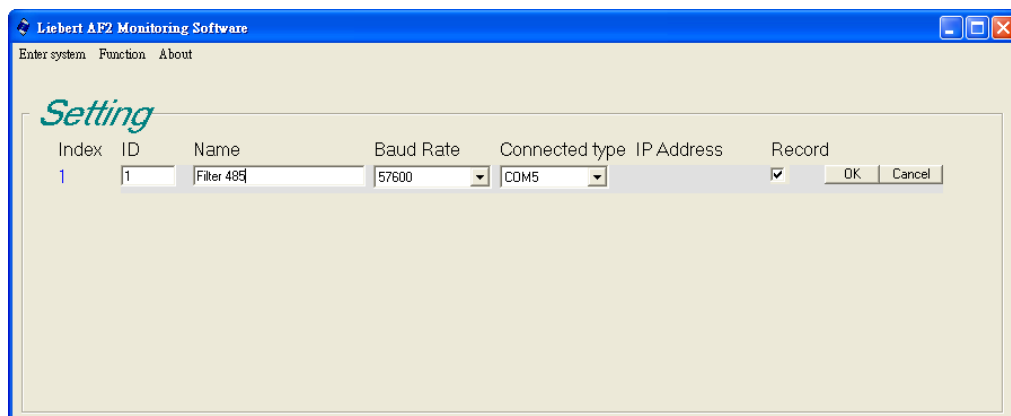


Figure 4-4

**Emerson Network Power Asia Pacific
(Headquarters)**

T: 852-25722201

F: 852-28029250

Australia

T: 1800-065345

F: 61-2-97438737

China

T: 86-755-86010808

F: 86-755-86010909

Hong Kong

T: 852-25722201

F: 852-28310114

India

T: 91-22-25807000 / 2388

F: 91-22-25828358

Indonesia

T: 62-21-2513003

F: 62-21-2510622

Japan

T: 81-3-54038594

F: 81-3-54032924

Korea

T: 82-2-34831502

F: 82-2-5927883

Malaysia

T: 603-7884 5000

F: 603-7884 5188

New Zealand

T: 64-3-3430235

F: 64-3-3430250

Philippines

T: 63-2-8934177 / 178

F: 63-2-8112027

Singapore

T: 65-64672211

F: 65-64670130

Taiwan

T: 886-2-2528 3535

F: 886-2-2528 3100

Thailand

T: 66-2-6178260

F: 66-2-6178277 / 278

Vietnam

T: 84-4-762 8908

F: 84-4-762 8909

Emerson Network Power.

The global leader in enabling business-critical continuity.

www.EmersonNetworkPower.com

■ AC Power Systems

■ Embedded Power

■ Power Switching and Control

■ Surge Protection

■ Connectivity

■ Integrated Cabinet Solutions

■ Precision Cooling

■ Embedded Computing

■ DC Power Systems

■ Outside Plant

■ Site Monitoring

■ Services

Business-Critical Continuity, Emerson Network Power and the Emerson Network Power logo are trademarks and service marks of Emerson Electric Co.

© 2006 Emerson Electric Co.