

MQ48D-I controller

Management Operating Manual

ImPow



Impow Power Inc

MQ48D-I controller
Management Operating Manual
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Admonishments Used in this Document



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Introduction

Preface

These instructions describe the complete functionality of the MQ48D-I controller. Some functionality is dependent on hardware connected to the MQ48D-I. Your system may not utilize all the functionality described. Refer also to the MQ48D-I Table of Set Values or the MQ48D-I Configuration Drawing that may be furnished with your system for a list of factory default settings.

Overview

The MQ48D-I performs the following functions:

- Rectifier Control, including an Energy Optimization Mode
- System Components Monitoring and System Alarms Generation
- Battery Management
- Supervisory Module Monitoring
- Maximum Current Limit Function
- Communications Function

MQ48D-I controller has built-in web and SNMP management capabilities. You can view system status and set system configuration data either with internet explorer or MIB browser.

Features:

- Monitor system data and configure system remotely by network
- Web management with built-in authentication. User name and passwords can be changed by user
- Support SNMP V1, V2C
- 10M/100M based Ethernet interface
- Flexible network deployment

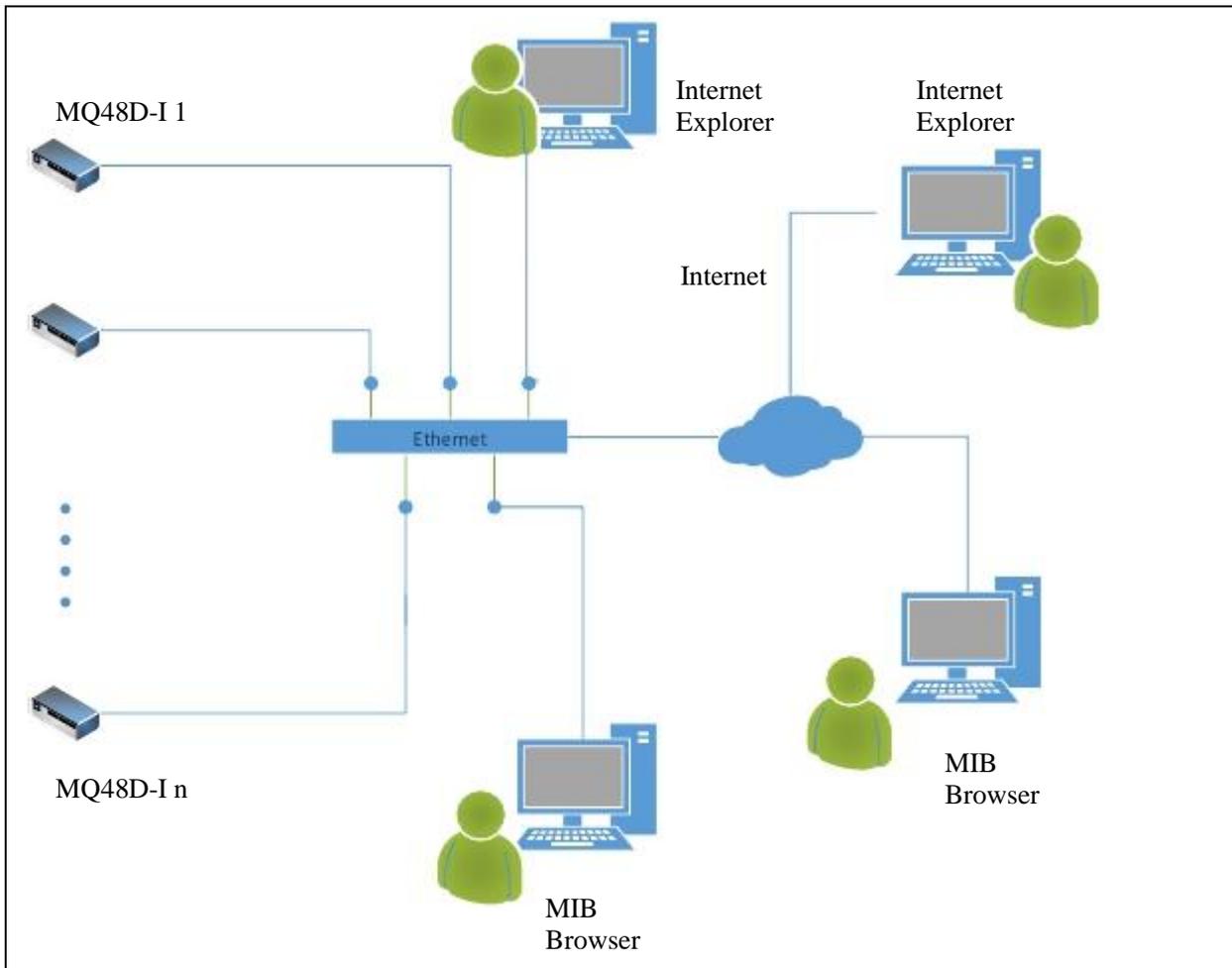


Figure 1. MQ48D-I controller web and SNMP management deployment diagram

Function Descriptions

MOQ48D-I CONTROLLER

The MOQ48D-I controls rectifiers.

SYSTEM COMPONENTS MONITORING AND SYSTEM ALARMS GENERATION

The MOQ48D-I monitors the components comprising the system (such as the rectifiers and supervisory modules) and generates alarms if a fault condition occurs.

The available system alarms are programmed with an Alarm Severity Level.

- The alarm indicator turns OFF if the fault(s) that triggered the alarm clears.
- The audible alarm is also silenced if the fault(s) that triggered the alarm clears.
- The audible alarm can also be disabled.

The available system alarms can also be mapped to alarm relays (located on MQQ48D-I interface boards) that can be wired to external alarm circuits.

BATTERY MANAGEMENT

The MQQ48D-I provides the following battery management functions.

- Battery Charge Temperature Compensation
- Battery Equalize Charge
- Battery Charge Current Limit
- High and Low Battery Temperature Alarms
- Battery Discharge Test
- Battery LVD (Low Voltage Disconnect)

Battery Charge Temperature Compensation

The MQQ48D-I can be programmed to automatically increase or decrease system output voltage to maintain battery float current as battery temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. Temperature is monitored by a sensor mounted on the battery.

Functional Description (See Figure 2):

Battery charge temperature compensation adds a correction term, related to the temperature of the batteries, to the nominal value of the system voltage. The degree of regulation (TempComp Coeff), expressed in mV/°C/battery string, can be set per battery manufacturer recommendations. To protect batteries and voltage-sensitive loads, compensation is automatically limited to a maximum of two volts (48V systems) above or below the nominal output level (float setting). Temperature compensation can be set to clamp lower than this by enabling the Temperature Compensation Clamp feature. When enabled, temperature compensation will clamp if the battery temperature reaches either the Temp Comp Max Voltage setting or the Temp Comp Min Voltage setting.

Temperature compensation is automatically disabled if communication between the controller and all rectifiers is lost, a DC over or under voltage alarm activates, a low voltage disconnection occurs, manual mode is entered, or the system enters the Equalize or Test modes.

Battery Equalize Charge and Battery Charge Current Limit

The MQQ48D-I can increase system output voltage for equalizing the charge on all battery cells of a conventional flooded cell battery, or for recharging the battery following a commercial power failure. The charging function can be initiated cyclically (scheduled), automatically, or manually. Refer to the battery manufacturer's instructions for equalize charging instructions.

Functional Description (See Figure 3):

- **Start of Charging:** When the battery charge current exceeds a preset value for three (3) minutes

or if the calculated battery capacity has decreased to a preset value (after a commercial AC failure, for example), the charging function of the MQ48D-I is activated. A charging signal is sent from the MQ48D-I to the rectifiers to increase the voltage up to the battery charging level (V_{equalize}).

- **Battery Current Limitation:** After a commercial AC failure or when some battery cells are permanently damaged, the current to the batteries can be quite extensive. To avoid overheating or further damages to the battery, the MQ48D-I limits the battery current to a preset level by limiting the charging voltage of the rectifiers.
- **End of Charging:** When the charging current drops below a preset value, a defined prolonged charging time is started before the charging is stopped and the voltage of the rectifiers return to the float charging level (V_{nom}). For safety, there is an equalized charging limit time that stops the charging after a preset time.

Figure 2. Temperature Compensated Voltage Control

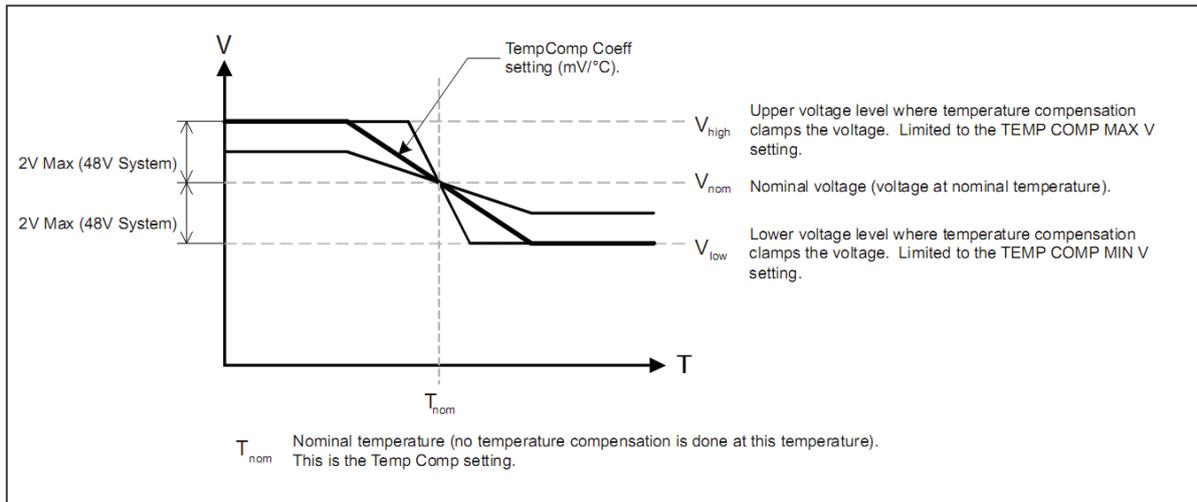
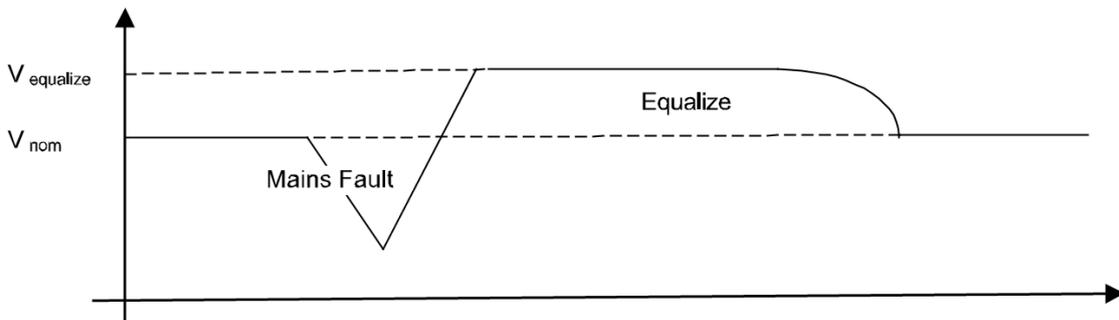


Figure 3. Voltage Characteristics on Commercial AC Failure and Automatic Equalize Charging



High Battery Temperature Alarms

The MQ48D-I can monitor battery temperature via a temperature sensor mounted on a battery cell. Values for high battery temperature alarms can then be programmed into the MQ48D-I.

Battery Thermal Runaway Management (BTRM) Feature

The Battery Thermal Runaway Management (BTRM) feature reduces voltage during a high battery temperature condition. The BTRM sensor has High BTRM temperature alarm limits. If battery temperature exceeds the “BTRM Temp High ” setting, system voltage is lowered to the BTRM voltage setting.

Battery Discharge Test

The MQ48D-I can perform battery discharge tests to check the condition of the battery. A User can manually start a battery discharge test . During a battery discharge test, the MQ48D-I controls rectifier output to place the entire load or partial load on the batteries.

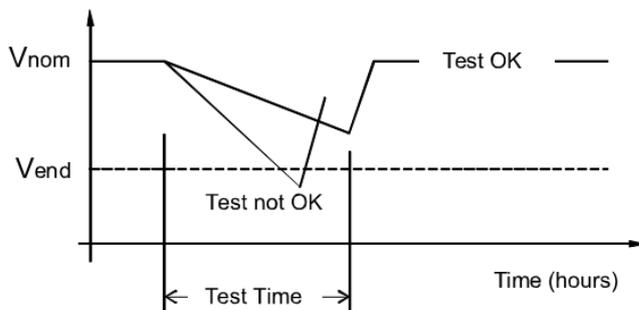
Functional Description:

For manual as well as for scheduled battery discharge tests the following parameters must be set: Test Time .

Battery Discharge Test Sequence:

- The preset test time, see Figure 4, expires. The battery has passed the test.
 - The battery voltage drops below the preset end voltage level (V_{end}) (see Figure 4). The battery has not passed the test and the test is interrupted. A bad battery alarm is activated.
 - The battery capacity drops below the preset Test End Battery Capacity. The battery has not passed the test and the test is interrupted. A bad battery alarm is activated.
- A battery test alarm is active during a battery discharge test.
 - After the battery discharge test, the output voltage of the rectifiers increases so that the rectifiers supply the system and charge the batteries.

Figure 4. Battery Test Diagram



Battery LVD (Low Voltage Disconnect)

To prevent serious damage to the batteries during a commercial AC power failure, the batteries can be disconnected by voltage or time control. The batteries are reconnected automatically when commercial AC power is restored and a predetermined DC voltage level is reached.

- Voltage Controlled Disconnection:** When the set voltage level is reached, the batteries are disconnected.

Battery Capacity Prediction

The system uses several control mechanisms to avoid thermal runaway.

- During a short high rate discharge, the batteries will normally get hot. The MQ48D-I takes this into consideration. After completion of the discharge duty, the batteries are recharged with a limited current to avoid heating the batteries any further.
- The temperature of the batteries can be monitored, and the MQ48D-I sets the charge voltage appropriately, as previously described under Battery Charge Temperature Compensation.
- In addition to battery temperature compensation, if battery temperature rises above a set temperature limit, the system stops battery charging completely by lowering the output voltage to the “BTRM Voltage” setting. This allows the batteries to cool down. The system also provides alarm notification of this occurrence. Power supplied to customer equipment is not interrupted.
- The battery LVD circuits can be programmed to open (disconnect) if a high temperature event occurs (HTD-High Temperature Disconnect). The contactor(s) open when battery temperature rises above a programmable value and close again when battery temperature falls below another programmable value.

The MQ48D-I provides an Energy Optimization Mode function.

Energy Optimization permits an installation to only operate rectifiers as needed to maintain the load and keep batteries in a fully charged condition. As load increases, Energy Optimization turns on additional rectifiers as needed to maintain the load. As load decreases, Energy Optimization places rectifiers in standby to conserve energy usage. Rectifiers which are always operating to maintain any load requirements are cycled through the group of rectifiers controlled by this feature to provide uniform operating times for each rectifier.



ALERT! The Energy Optimization Mode should NOT be used in systems that operate without battery.

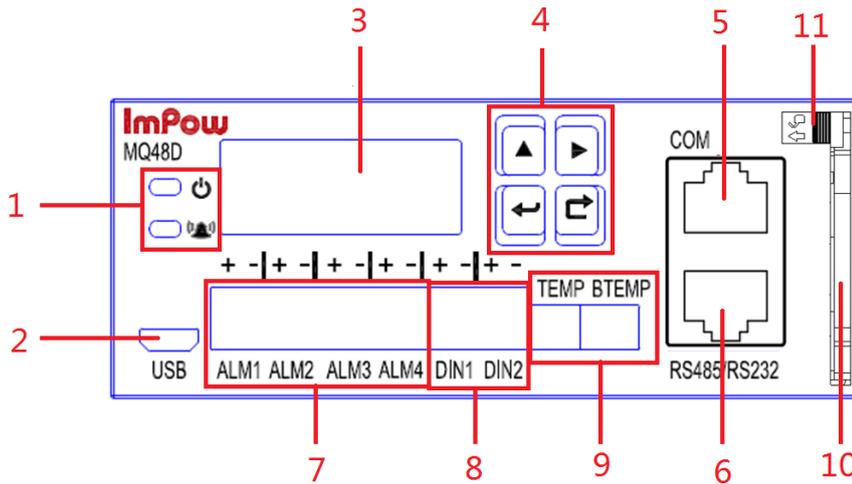
Operation

Local Indicators

Location and Identification: Refer to Figure5

Description: There are three (2) indicators located on the MOQ48D-I's front panel. Refer to Table 2 for the function of the indicators.

Figure5. Controller panel



- | | | |
|-----------------------------|-------------------|---------------------------------|
| 1. Operation indicator | 2. USB | 3. Liquid crystal display (LCD) |
| 4. Buttons | 5.COM Port(SNMP) | 6.RS485/RS232 Port |
| 7. Dry contact output ports | 8.DI Port | 9.TEMP/Batthey TEMP |
| 10. Handle | 11. Locking latch | |

Table 2 Description of Indicators

Symbol	Status	Abnormal Cause
Working indicator (green)	off	The MQ48D-I is faulty or has no DC input.
	on	Working properly
Fault indicator (red)	off	No critical or major alarm is generated.
	on	Steady on A critical or major alarm is generated.

Passwords and Privilege Levels

- Users (for local and Web access to the MOQ48D-I) are set via the Web Interface.

Note: Anyone can browse the MOQ48D-I via the local keypad and display. A password is required to change settings. Web access always requires a User name and password to be entered to gain access.

- Users are configured with a User Name, password, and privilege level.

User Name: Maximum 13 Characters (0-9, a-z, A-Z, _).

Password: Maximum 13 Characters (0-9, a-z, A-Z, _).

Note: Once a password is entered, it remains in effect for a preset time period to allow navigating between menus without re- entering the password.

Using the Local Keypad and Display

LOCAL MENU NAVIGATION KEYS AND LCD DISPLAY

Location and Identification: Refer to Figure 5.

Description: There are four (4) menu navigation keys and an LCD display located on the MQ48D-I's front panel. Refer to Table 3 for the

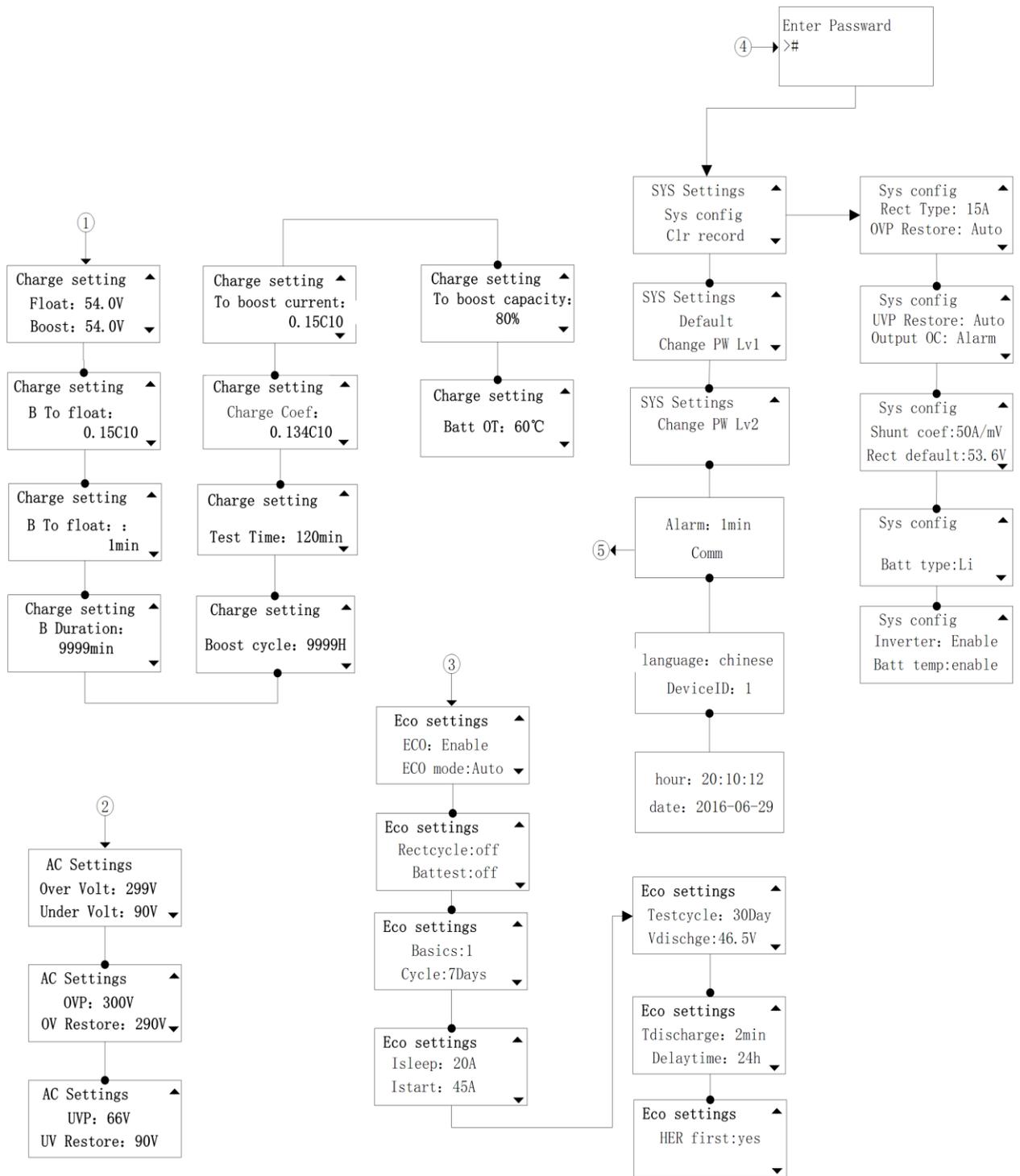
function of the menu navigation keys.

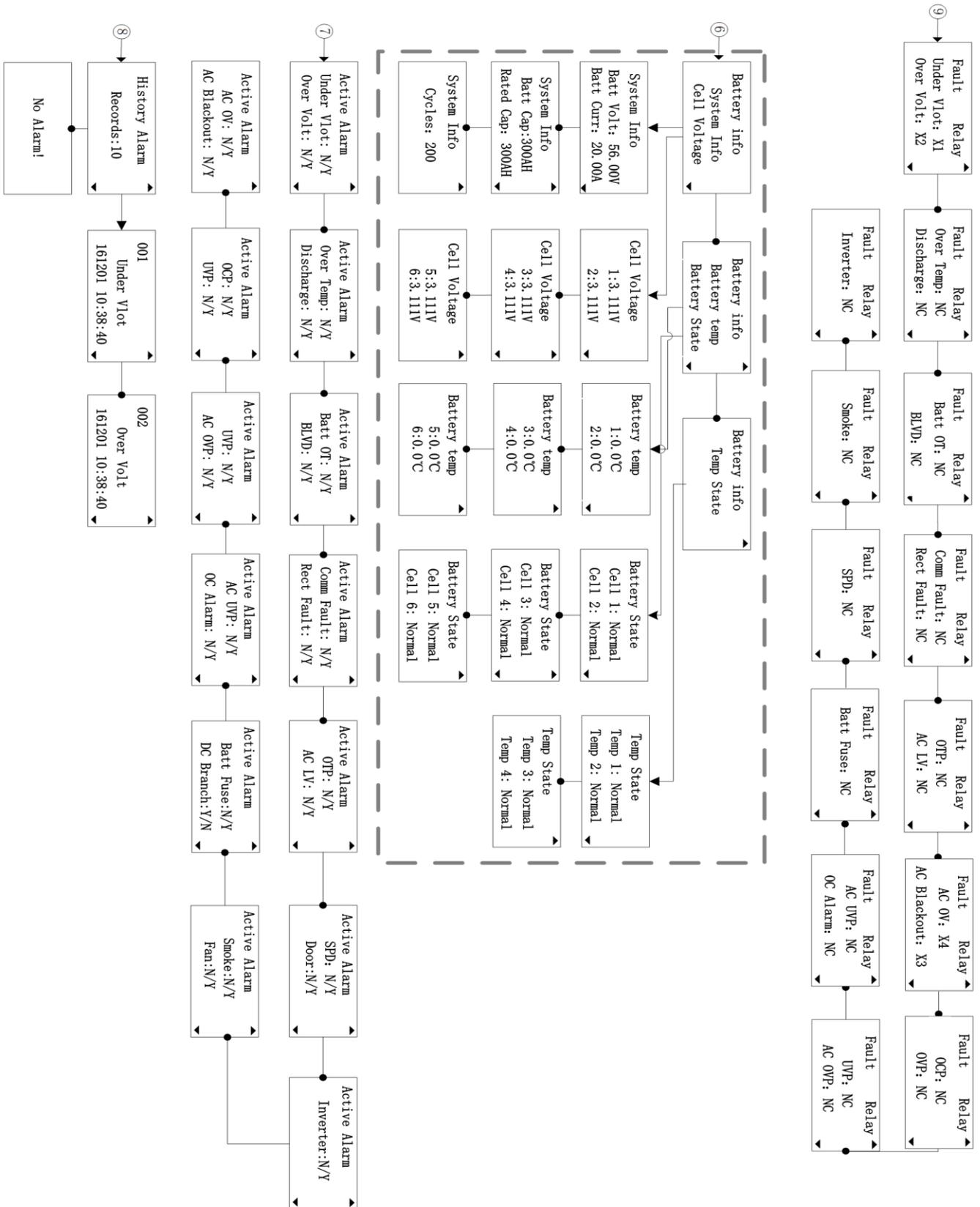
Note: When the LCD is lit, if no button is pushed for eight (1) minutes, the backlight of the LCD display extinguishes and the MQ48D-I returns to the Main Menu. Press any key to re-activate the LCD display.

Table 3. Local Menu Navigation Keys

Symbol	Key name	Functions
	Page Up	Cursor movement, horizontal movement, numerical change, status change,
	Page Right	page turn
	Confirm	Confirm the selected menu and parameters. Once the setting is modified, press "Enter" for confirmation.
	Back	Return to the previous menu or cancel settings.

USB Port: You can insert a USB flash drive into the USB port to upgrade software.





Note: A valid password is required to access menus that allow changing any power system parameter.

Using the Web Interface

Note: The MQ48D-I supports a 10/100M Ethernet connection.

OVERVIEW

Via the Web Interface, a User can:

- View real-time information .
- Send control commands.
- Set programmable parameters.

MULTIPLE BROWSERS SUPPORTED

Multiple browsers are supported in the Web Interface. The User can use Internet Explorer, Chrome, Safari, or Firefox.

Communication Port

Table 4 describes the communication ports on the MQ48D panel.

Table 4 MQ48D-I communication port description

Communication Port	Communications Parameter	Communications Protocol	Function
COM port	10/100 M auto-adaptation	HTTPS, and simple network management protocol (SNMP)	Connects to An upper-level NMS
RS485/RS232 port	PORT1: Baud rate: 1200,2400,4800,9600 bit/s, PORT2: Baud rate: 9600 bit/s, 19200 bit/s,115200 bit/s,	PORT1: BMS Protocol PORT2: Modbus protocol	PORT1 Connects to BMS PORT2 Connects to upper-level device such as BBU,

Table 5 Definition of dry contact

No.	Definition of Dry Contact	Note
ALM1	DRY1 AC input cut-off alarm	Can be set
ALM2	DRY2 DC low	Can be set
ALM3	DRY3 rectifier fault alarm	Can be set
ALM4	DRY4 SPD fault alarm	Can be set

The RS485/RS232 /SNMP telecom ports are used for remote central monitoring and control. Network ends are used as output terminal for telecom port, which is shown in Figure 6, the pin definition is shown in Table 7 /8.

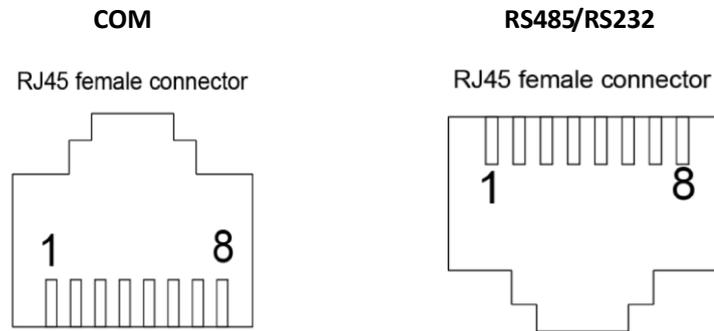


Figure6. Pins in the COM and RS485/RS232 port

Connect the COM port on the MQ48D by using a network cable, as shown in Fig 6-1.

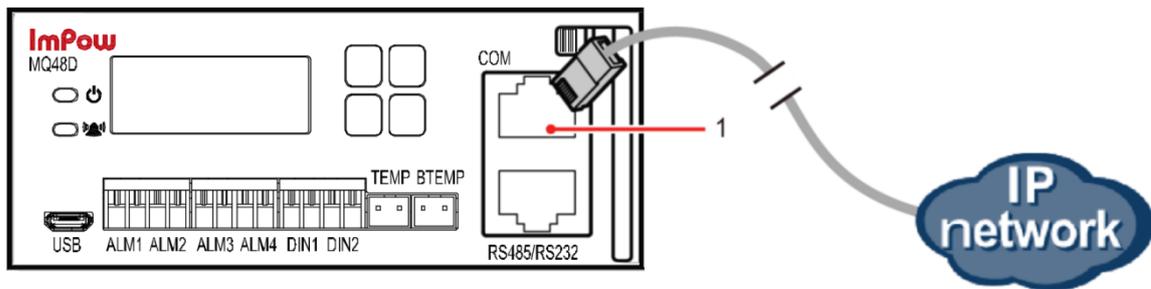


Table 7 The definition of pins of telecom port

Pins	Signal	description
1	T232B	RS232 PORT1can be connected to BMS
2	R232B	
3	GND232	RS485 or RS232 port2
4	485AE	
5	485BE	
6	T232E	
7	R232E	
8	485GND2	

Table 8 The definition of pins of COM(SNMP) port

Pins	signal	description
1	TX+	Sends data over Com port
2	TX-	
3	RX+	Receives data over Com port
6	RX-	
4,5,7,8	none	N/A

PROCEDURES

Setting IPv2 Communications Parameters

The controller's IPv2 parameters (IP, subnet mask, and gateway addresses) must be set to match your company's network settings. The default settings for these parameters are shown below.

- IP Address: 192.168.1.190
- Subnet Mask Address: 255.255.255.0
- Gateway Address: 192.168.1.1

Local Menu Navigation:

Main Menu / Sttings / Sys Settings / SNMP/ enter parameters.

Web Menu Navigation:

Options / IP / enter parameters.

Initial setup

The IP address (default 192.168.1.190), subnet mask and default gateway address should be set up correctly to enable network management to work. So when these parameters don't match your network (e.g. the first installation), you can't change them by internet explorer, then you should use the windows application "MConfig.exe".

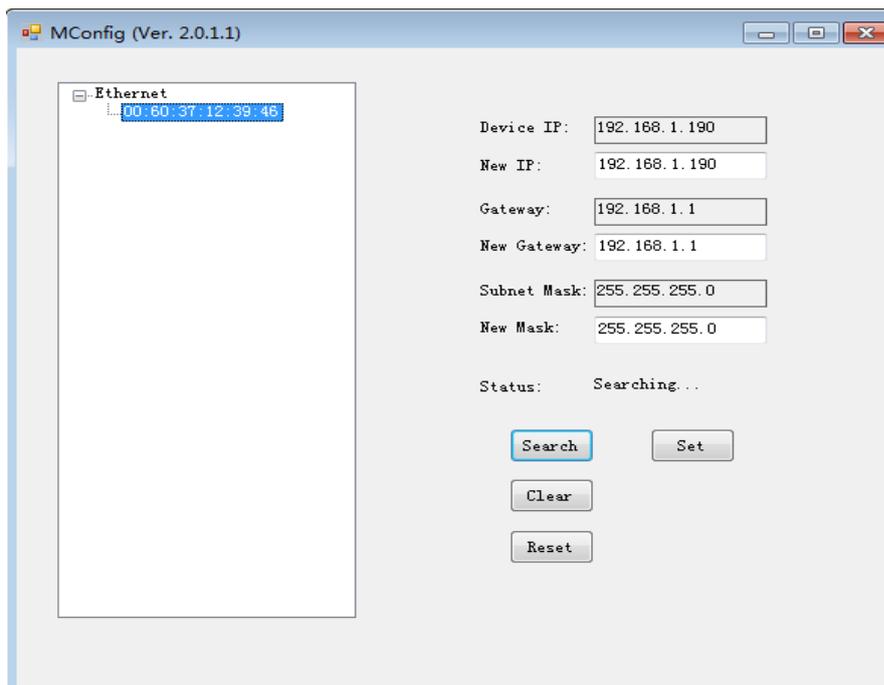


Figure7. "MConfig.exe" User Interface

Click on button "Search", wait for a while, all MQ48D-I controller Ethernet address will be displayed. Select the Ethernet address which you want configure, fill the correct IP address, gateway IP address, subnet mask IP address, then Click on button "Set". If these status display "Set Successfully", then the corresponding MQ48D controller's IP address is OK.

Please note that the IP addresses of the PC and MQ48D-I controller should be in the same subnet. If there is more than one network interface in your PC, you should disable irrelevant interface to prevent troubles.

Web Management

Internet Explorer, version 6 or newer, is supported . Chrome, Safari, and Firefox are also supported.

1. In your browser, enter `http://` and the controller's IP address and press ENTER. If your site requires secure HTTP and you were furnished with an MQ48D-I configuration with secure HTTP, enter `https://` and the controller's IP address and press ENTER. The following Web Interface Login window opens. Enter a valid User Name and Password, then click OK.

Note: By default, the "User Name" is "impow_super" and the "Password" is "impow_super". It is recommended to change the default password the first time you login using the default User Name `impow_super`.

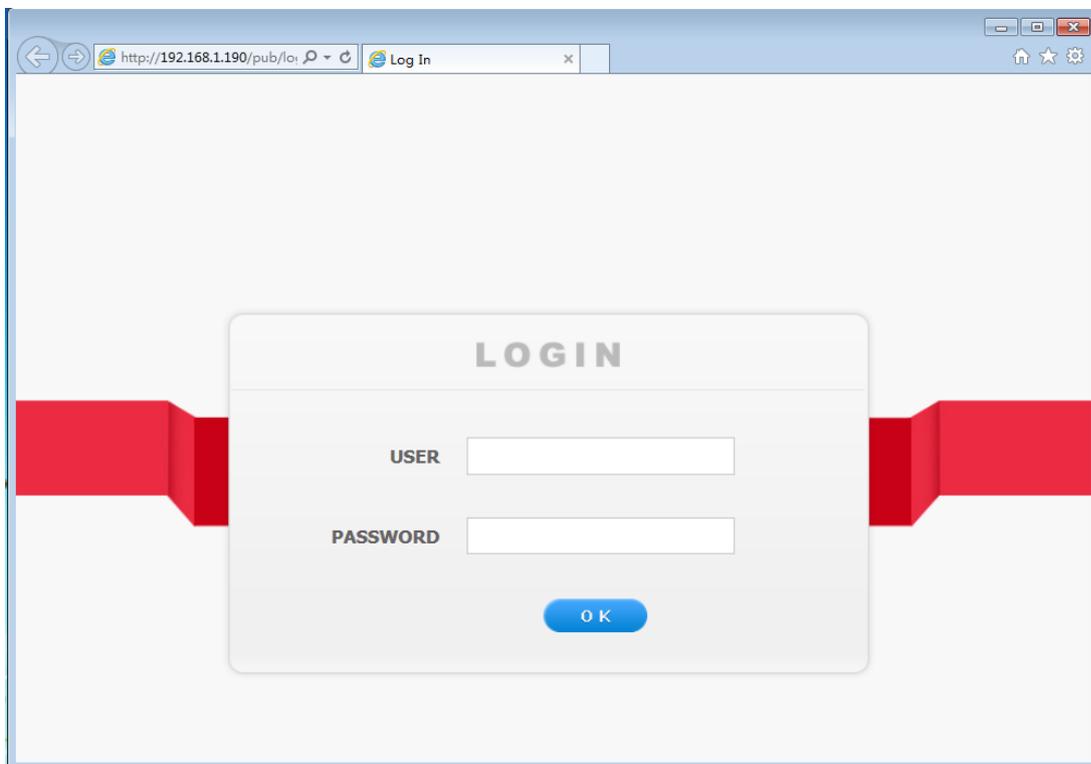


Figure8. Web login interface

USER: `impow_super`

PASSWORD: `impow_super`

Enter user name and password, then click on button "OK", it will show status interface.



Figure9. Status interface

In status interface, if there is any abnormal data, it will be showed in red color.

In Config interface, you can change the configuration data.

The Settings Menu allows you to change the settings of the various programmable parameters. Settings are grouped per function. Select a tab in the Settings Menu to change that functions programmable parameters.

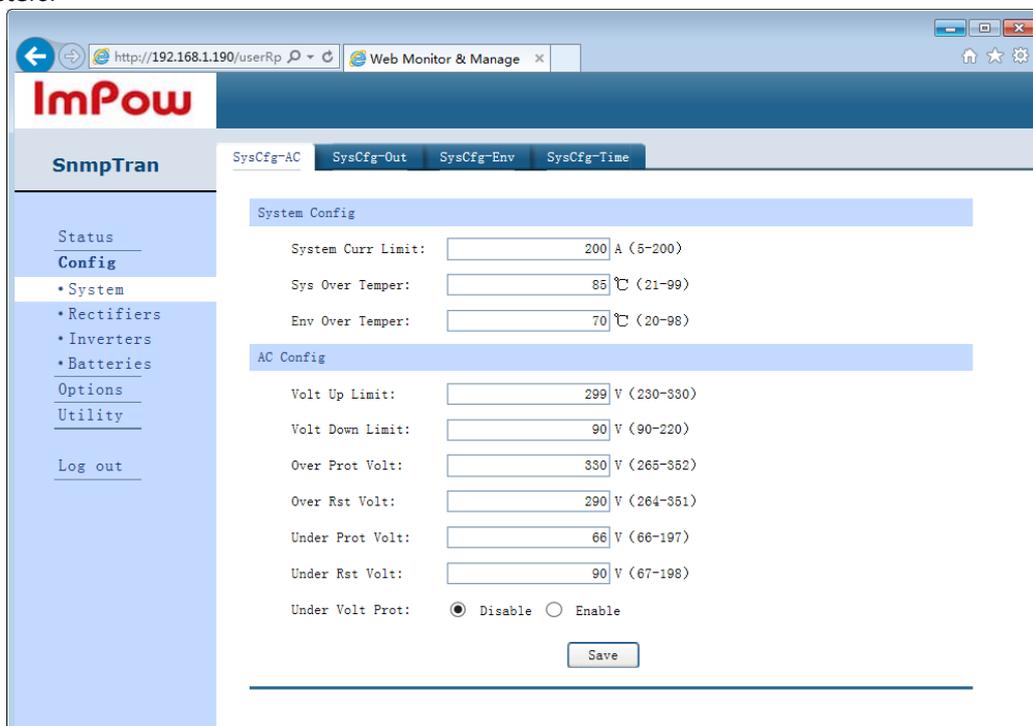


Figure10. Settings interface

Table 9 SNMP parameter table

Setting parameters	Web interface		
System Configuration	System Config		
System output current limit value	System Curr Limit:	200A (5-200)	
System over temperature	Sys Over Temper:	85℃ (21-99)	
Environment Over temperature	Env Over Temper:	70℃ (20-98)	
AC configuration	AC Config		
Over voltage alarm point	Volt Up Limit:	300V (230-330)	
Under voltage alarm point	Volt Down Limit:	90V (90-220)	
Over voltage protection	Over Prot Volt:	330V (265-352)	
Over voltage protection recovery voltage	Over Rst Volt:	290V (264-351)	
Under voltage protection	Under Prot Volt:	66V (66-197)	
Under voltage protection recovery voltage	Under Rst Volt:	90V (67-198)	
Under voltage protection enabled	Under Volt Prot:	Disable Enable	
System output parameter configuration	Output Config		
Output over voltage alarm	DC Volt Up Limit:	62.4V (54.0-63.0)	
Output under voltage alarm	DC Volt Down Limit:	43.0V (39.0-54.5)	
Output over current protection	Over Current:	230A (10-2000)	
System output over voltage protection	Over Prot Volt:	64.0V (54.5-64.0)	
System output under voltage protection	Under Prot Volt:	40.0V (38.0-54.0)	
LLVD 1 disconnection time	1st PD Time:	5Min (1-60)	
LLVD 2 disconnection time	2nd PD Time:	10Min (1-60)	
LLVD 3 disconnection time	3rd PD Time:	30Min (1-60)	
LLVD 4 disconnection time	4th PD Time:	45Min (1-60)	
LLVD 1 disconnect voltage	1st PD Volt:	52.0V (40.0-60.0)	
LLVD restores the connection voltage	1st PD Restore Volt:	51.5V (40.0-60.0)	
LLVD 2 disconnect voltage	2nd PD Volt:	50.0V (40.0-60.0)	
LLVD 3 disconnect voltage	3rd PD Volt:	48.0V (40.0-60.0)	
LLVD 4 disconnect voltage	4th PD Volt:	46.0V (40.0-60.0)	
Over voltage recovery mode	Over Volt Restore:	Auto	Manual
Under voltage recovery mode	Under Volt Restore:	Auto	Manual
Over current alarm mode	Over Current:	Protect	Alarm
Power Down Mode	Power Down Mode:	5 times	2 times
Battery parameter configuration	Battery Config		
Battery protection voltage(BLVD)	Protect Volt:	46.0V (40.0-51.0)	

Battery recovery access voltage	Restore Volt:	49.5V (41.0-52.0)	
Charging current limit	Charge Curr Limit:	0.20C10 (0.01-0.25)	
Battery Capacity	Battery Capacity:	150AH (10-400)	
Equal Charge voltage	Equal Charge Volt:	58.4V (39.0-64.0)	
Float Charge voltage	Float Charge Volt:	53.7V (38.0-63.0)	
Equal charge and float charge conversion current	Charge Trans Curr:	0.080C10 (0.001-0.100)	
Charge charging time	Equal Charge Prot:	666min (60-2880)	
Equal charge cycle	Equal Charge Period:	333Hour (50-8760)	
Equal charge charging to floating charge	To Equal Chrg Cap:	56.0% (10.0-99.0)	
Floating charge to equal charge rechargeable battery capacity	To Equal Chrg Curr:	0.12C10 (0.01-0.25)	
Equal charge charging to floating charge	Equal Charge Time:	1min (1-1440)	
Battery test time	Battery Test Time:	120min (1-960)	
Battery over temperature alarm	Battery Over Temper:	60°C (20-89)	
Battery temperature compensation reference temperature	Temper Comps Base:	25°C (10-30)	
Battery temperature compensation	Temper Comps Coef:	0mV/°C (0-500)	
Battery discharge voltage	Discharge Volt:	46.5V (46.0-48.0)	
Battery discharge time	Discharge Time:	2min (1-5)	

In IP option interface, you can change the IP addresses of the Snmp01.

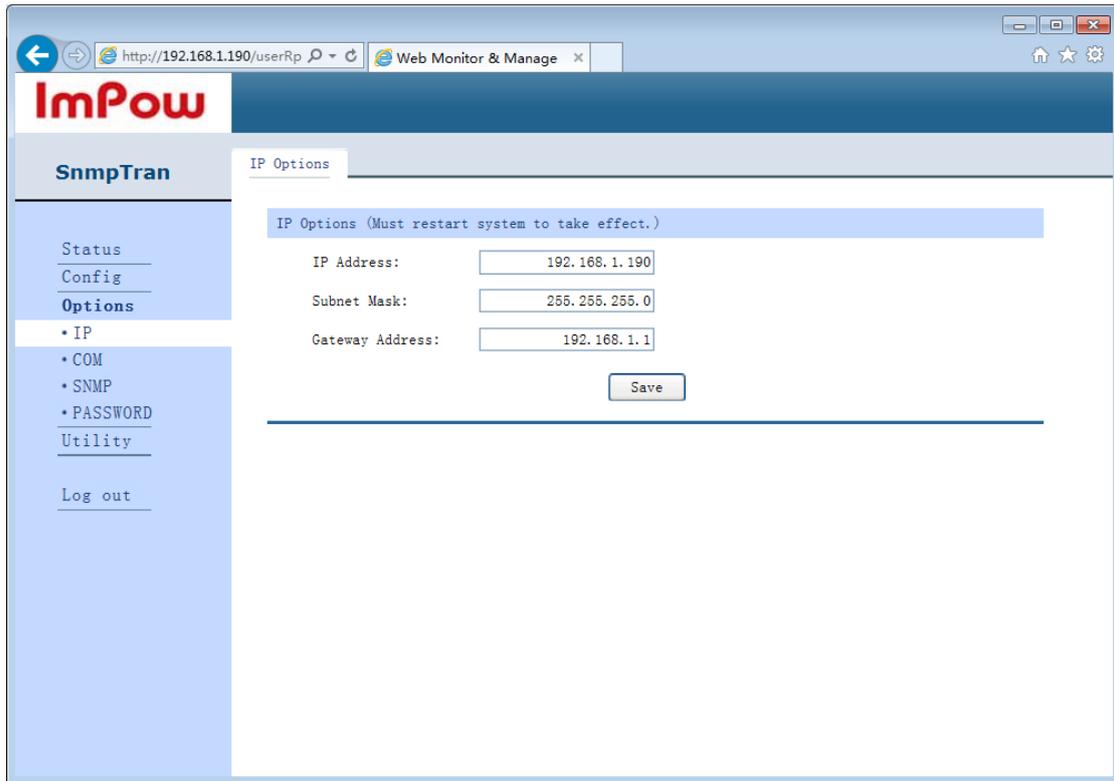


Figure11. IP option interface

In password interface, you can change current user name and password.

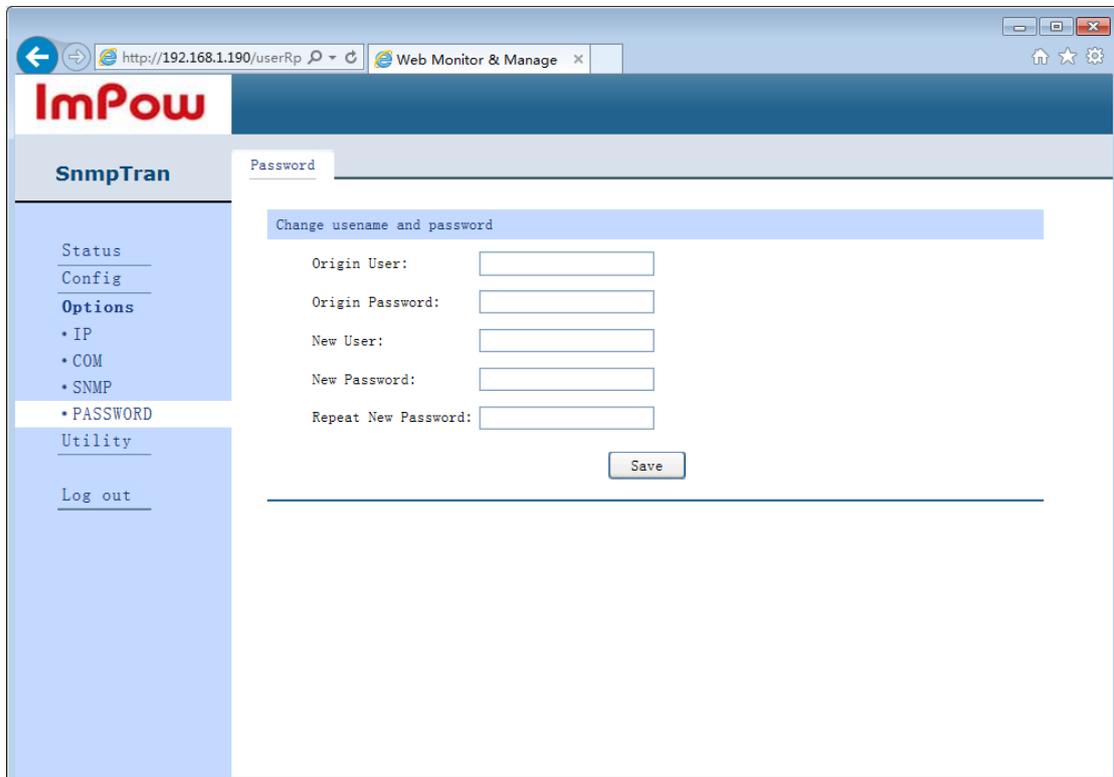


Figure12. Password interface

In Update firmware interface, Execute the IMG file , you can reset SNMP card inside MQ48D controller.



Figure13. Reset interface

At Any time, you can click on “Log out” bar to log out.

Common Tasks Performed via the Local Keypad and/or Web Interface

PROCEDURES

Viewing Alarms or History Alarm

Local Menu Navigation:

Menu / Alarm & Status /Active Alarm or History Alarm / ENT.

Web Menu Navigation:

Status/System / ENT.

Viewing System Status

Local Menu Navigation:

Menu / Alarm & Status /Rectifiers / ENT.

Menu / Alarm & Status / Battery Info / ENT.

Web Menu Navigation:

System status is displayed in the Left side window pane of the Home page. Select the Status tab and use the interactive links to view the various device group status pages.

Clearing Alarm Logs

Local Menu Navigation:

Menu / Settings /00000/ Sys Settings /10000/ Clear Record/ENT.

Web Menu Navigation:

None.

Changing the Date

Local Menu Navigation:

Menu / Settings /00000/ Sys Settings /10000/ Date /ENT.

Use the Up Arrow and right Arrow to select the date field. Press ENT.

Web Menu Navigation:

Config /System/SysCfg-Time.

Changing the Time

Local Menu Navigation:

Menu / Settings /00000/ Sys Settings /10000/ Hour/ENT.

Use the Up Arrow and right Arrow to select the time field. Press ENT.

Web Menu Navigation:

Config /System/SysCfg-Time.

Adding and Modifying Users

Local Menu Navigation:

None.

Web Menu Navigation:

Options/ Password/Change username and password.

Setting IP Communications Parameters

Local Menu Navigation:

Menu / Settings /00000/ Sys Settings /10000/ SNMP/ enter parameters.

Web Menu Navigation:

Options/ IP / enter parameters.

Setting SNMP Parameters

Local Menu Navigation:

None.

Web Menu Navigation:

Options/ SNMP/ enter parameters.

Setting Auto Equalize**Local Menu Navigation:**

Menu / Settings /00000/ Sys Settings / Batt Settings/ Charge setting/ Settings parameters.

Web Menu Navigation:

Config /Batteries / then enter the following parameters.

- Equalize Charge Volt (Equal Charge Volt)
- Equalize Start Current (To Equal Chrg Curr)
- Equalize Start Capacity (To Equal Chrg Cap)
- Equalize Stop Current (Charge Trans Curr)
- Equalize Stop Delay Time (Equal Charge Time)
- Maximum Equalize Charge Time(Equal Charge Prot)

Programming the Audible Alarm Feature**Local Menu Navigation:**

Menu / Settings /00000/ Sys Settings /10000/ Alarm /ENT.

Web Menu Navigation: None.

None.

Assigning Relays to Alarms**Local Menu Navigation:**

Menu / Maintenance /00000/ Relay Config/factory or **User/** User/ Right click/ ENT.

Web Menu Navigation:

None.

Placing the System in Equalize Charge Mode**Local Menu Navigation:**

Menu / Maintenance /00000/ Boost Charge/on.

Web Menu Navigation:

Config /Batteries /Equal Charge/on/save.

Viewing/Changing the Float Voltage Setting**Local Menu Navigation:**

Menu / Settings /00000/Batt Settings / Charge setting/ Float .

Web Menu Navigation:

Config /Batteries / Float Charge Volt/save.

Viewing/Changing the Equalize Voltage Setting**Local Menu Navigation:**

Menu / Settings /00000/Batt Settings / Charge setting/ Boost .

Web Menu Navigation:

Config /Batteries / Equal Charge Volt /save.

Setting Battery Capacity Parameters**Local Menu Navigation:**

Menu / Settings /00000/Batt Settings / Batt Basics/Capacity.

Web Menu Navigation:

Config /Batteries / Battery Capacity/save.

Setting input High Voltage Alarm**Local Menu Navigation:**

Menu / Settings /00000/AC Settings / Over Volt.

Web Menu Navigation:

Config /System/AC Config/ Volt Up Limit.

Setting input High Voltage Shutdown**Local Menu Navigation:**

Menu / Settings /00000/AC Settings / OVP.

Web Menu Navigation:

Config /System/AC Config/Over Prot Volt.

Setting input Under Voltage Alarm**Local Menu Navigation:**

Menu / Settings /00000/AC Settings / Under Volt.

Web Menu Navigation:

Config /System/AC Config/ Volt Down Limit.

Setting input Under Voltage Shutdown

Local Menu Navigation:

Menu / Settings /00000/AC Settings / UVP.

Web Menu Navigation:

Config /System/AC Config/ Under Prot Volt.

Setting output Over Voltage Alarm

Local Menu Navigation:

Menu / Settings /00000/DC Settings / Over Volt.

Web Menu Navigation:

Config /System/Output Config/DC Volt Up Limit.

Setting output Over Voltage Shutdown

Local Menu Navigation:

Menu / Settings /00000/DC Settings / OVP.

Web Menu Navigation:

Config /System/Output Config/ Over Prot Volt.

Setting output Under Voltage Alarm

Local Menu Navigation:

Menu / Settings /00000/DC Settings / Under Volt.

Web Menu Navigation:

Config /System/Output Config/DC Volt Down Limit.

Setting output Under Voltage Shutdown

Local Menu Navigation:

Menu / Settings /00000/DC Settings / UVP.

Web Menu Navigation:

Config /System/Output Config/ Under Prot Volt.

Setting Battery Charge Temperature Compensation

Local Menu Navigation:

Menu / Settings /00000/Batt Settings / Temp Comp/Coeff.

Web Menu Navigation:

Enter values for the following parameters:

Config /Batteries / Temper Comps Coef /save.

Performing a Manual Battery Discharge Test

Procedure

1. Check that the Rated Battery Capacity is set up

correctly for each battery.

Check that the following Battery Test parameters are set correctly: Battery Test Time, Floating charge status, System status is normal.

Local Menu: Menu / Settings /00000/Batt Settings / Charge setting/ Test time .

Web Menu: Config /Batteries/Battery Test Time/Save.

2. Start the battery discharge test.

Local Menu: Menu / Maintenance /00000/ Batt test/on.

Web Menu: Config /Batteries/Battery Test/on/Save.

Wait for the test to end.

Restoring Factory Default Configuration

Local Menu Navigation:

Menu / Settings /00000/ Sys Settings /10000/Default/ENT.

Web Menu Navigation:

Utility/Reset/Reboot.

ALERT! When this procedure is performed, the controller's existing configuration and parameter settings will be lost.

Resolving Alarms

Table 5 lists the alarms that are shown in the Web Interface Advanced Settings Menu under the Alarms Tab. These are also the possible alarms that display in the alarm screens on the LCD Interface and Web Interface. Table 5 also provides guidelines for fixing the condition that caused the alarm.

Note: These instructions describe the complete functionality of the controller. Some functionality is dependent on hardware connected to the controller.

Table 10. Available Alarms

Full Alarm Name – Web (Abbreviated Alarm Name - LCD)	Alarm Description	Action to Correct
Power System Alarms		
Supervision Unit Internal Fault	No information	Replace the controller.
CAN Communication Failure (CAN Comm Fail)	CAN bus communications failure.	Check communications cables.
Abnormal Load Current	Current sharing imbalance.	Check to see why current sharing is imbalanced.
Over load	Output overload condition.	Check the load.
SPD	Surge protection device needs attention.	Check surge protection device.
System Temperature Not Used	Temperature sensor port is not used.	
Over Voltage	Output voltage is higher than the Over Voltage Alarm threshold.	Check to see why system voltage is high. Check the alarm setting.
Under Voltage	Output voltage is lower than the Under Voltage Alarm threshold.	Check to see why system voltage is low. If there is a mains failure, check if some load could be switched off in order to prolong the operating time of the plant. If the system load is too high related to rectifier capacity, install additional rectifiers. If the batteries are being recharged, the alarm will cease by itself when battery voltage has increased to the charging level.
Very High Ambient Temperature	Very high ambient temperature alarm.	Check why temperature is high.
DI1 Alarm	Digital input #1 alarm is active.	Check why alarm is active.
DI2 Alarm	Digital input #2 alarm is active.	
Rectifier Group Alarms		
Multi-Rectifiers Failure	More than one rectifier has failed.	Check input voltage to rectifiers. Replace rectifiers.

Rectifier Lost	A rectifier cannot be detected by the controller.	Replace defective rectifier.
All Rectifiers Comm Fail	No response from all rectifiers.	Check the connectors and cables or the CAN loop. Replace the controller.
Rectifier Alarms		
AC Input Failure	No AC input power to a rectifier.	Check why no AC input power available.
High Temperature	A rectifier has a high temperature condition.	Check why temperature is high.
Rectifier Fault	A rectifier has a fault condition.	Replace rectifiers.
Overvoltage	A rectifier has an overvoltage condition.	
Rectifier Protected	A rectifier is in protected mode.	
Fan Failure	A rectifier's fan has failed.	Replace fan.
Current Limit	A rectifier is in current limit.	Rectifier overload. The load is higher than rectifier capacity. If the batteries are being recharged, the alarm will cease by itself when the battery voltage has increased to the charging level. If the system load is higher than the rectifier capacity, the batteries will discharge. If this is the reason, install additional rectifiers. If one or more of the rectifiers are defective, replace the faulty rectifiers.
Communication Fail	A rectifier has lost communications with the controller.	Check communications cables. Reset the Communication Fail alarm. Replace the rectifier.
Derated	A rectifier is in output power derating mode.	The AC input voltage is too low. The ambient temperature is too high.
AC Under voltage Protection	A rectifier is in under voltage protection mode.	The AC input voltage is too low.
AC Over voltage Protection	A rectifier is in over voltage protection mode.	The AC input voltage is too high.
Battery Group Alarms		
High Temp	Temperature sensor sensing	Check why temperature is high.

	temperature higher than high temperature threshold.	
Low Cell Voltage Alarm	Battery string low voltage alarm.	--
Battery fuse Alarm	Fuse is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
DC Distribution Alarms		
Over voltage	DC output is above over voltage threshold.	Check to see why voltage is high.
Undervoltage	DC output is below under voltage threshold.	Check to see why voltage is low.
DC Fuse Unit Alarms		
Fuse Alarm	DC output fuse is open.	Find out and eliminate the reason the fuse is open before replacing. Check for overload or short circuit. If the fuse was manually removed, check with the person that removed it before reinserting it.
LVD Unit Alarms (Low voltage disconnect must be present in system)		
LVD Failure	LVD contactor is in disconnect mode.	
BLVD Failure	BLVD contactor is in disconnect mode.	
AC Unit		
Over Voltage	Phase voltage is above over voltage threshold.	Check why voltage is high.
Under Voltage	Phase voltage is below under voltage threshold.	Check why voltage is low.

Connecting a New Battery

Program the MQ48D-I for the battery in use in the system per the following procedure.

Procedure

1. Connect the batteries according to the system requirements.

DANGER!

Do not reverse connect the battery polarities.

Set the battery parameters correctly according to the battery in use via the Web Interface.

Table 11. Default Battery Parameters

Table 11-1 Setting Battery Parameters

Main Menu	Second-Level Menu	three-Level Menu	Default Value	Setting Value
Settings	batt settings	Batt basic	Capacity:100AH	Set this parameter to the current value

Notes:If battery routes 1 and 2 are respectively connected to a battery string (each battery string consists of four 12 V, 100 Ah batteries in series), then set Rated Capacity to 200 Ah.Other charging parameters is set according to 200AH; Battery capacity is set according to actual capacity.

Table 11-2 Battery charging current limit Setting

Main Menu	Second-Level Menu	three-Level Menu	Default Value	Setting Value
Settings	batt settings	Charge setting	Charge Coef: 0.20C10	Set this parameter to the current value

Notes:0.20C10=0.20*Capacity=0.20*100AH=20A(Charging current)

Local Display Menus

Overview

This section provides descriptions of the Local Display Menus.

Menus

Menu flow diagrams of the menus accessed via the MQ48D-I Controller local display and keypad.

Note: These instructions describe the complete functionality of the MQ48D-I Controller. Some functionality is dependent on hardware connected to the MQ48D-I Controller. Some menu items shown may not be present in the MQ48D-I Controller used in your system.

ADJUSTMENT RANGE RESTRICTIONS

Refer to the following for adjustment range restrictions.

Float Voltage Setting

- Cannot be adjusted higher than “EQ Voltage” setting.
- Cannot be adjusted lower than 1V (48V systems) above “ Under Voltage Alarm” setting or higher than 1V (48V systems) below “Over Voltage Alarm” setting.

EQ Voltage Setting

- Cannot be adjusted lower than “Float Voltage” setting.

Under Voltage Alarm Setting

- Cannot be adjusted lower than “Under Voltage protection (UVP) setting.
- Cannot be adjusted higher than “Over Volt Alarm” setting.

Under Voltage protection Setting

- Cannot be adjusted higher than “Under Volt Alarm” setting.

Over Voltage Alarm Setting

- Cannot be adjusted higher than “Over Voltage protection (OVP) setting.
- Cannot be adjusted lower than “Under Voltage Alarm” setting.

Over Voltage protection Setting

- Cannot be adjusted lower than “Over Voltage Alarm” setting.

LLVD and BLVD Disconnect Setting

- Cannot be adjusted higher than “LLVD and BLVD Reconnect Voltage” setting.

LLVD and BLVD Reconnect Setting

- Cannot be adjusted lower than “LLVD and BLVD Disconnect Voltage” setting.

LLVD Disconnect Setting

- Cannot be adjusted lower than “ BLVD Disconnect Voltage ” setting.

BLVD Disconnect Setting

- Cannot be adjusted higher than “LLVD Reconnect Voltage” setting.
- Cannot be adjusted higher than “LLVD Disconnect Voltage” setting.

Description of Local Display Menus

Programmable Parameters

The following are descriptions of the programmable parameters presented in the local display menus.

Settings Menu

Maintenance SUB-MENU

- Boost Charge Control: Places the system in Equalize Charge or Float Charge mode.
- BattTestControl: Starts or stops a battery test.
- ECO Mode: Enables or disables the Energy Optimization Mode feature for all rectifiers. When enabled, the following parameters can be set.

ALERT! The Energy Optimization Mode should NOT be used in systems that operate without battery.

ECO Settings SUB-MENU

- Isleep and Istart: Percent of full load capacity that the rectifiers operate under in the Energy Optimization mode.
- Cycle Period: This is the time period that rectifiers are turned on and off to maintain an equal operating time for all rectifiers in the system.

Batt Settings SUB-MENU

The BATT SETTINGS sub-menu consists of following sub-menus.

Batt Basic Sub-Menu

- Batt Basic : Set the battery capacity in the system.

Charge Sub-Menu

Charge Settings SUB-MENU

The Charge Settings sub-menu consists of following sub-menus.

- Float Voltage: Float Charge output voltage setting.
- Boost: Equalize Charge output voltage setting.
- Charge Coef: Maximum battery charging current setting. For example, a value of 0.20C10 means that the charging current is limited to 20% of the battery's nominal capacity.

LVD Settings -MENU

LLVD Settings SUB -MENU

- LLVD Enable: Enables or disables LLVD.

- LLVD : LLVD low voltage disconnect setting

(when LLVD set for voltage).

- Restore: LLVD reconnect setting (when LLVD set for voltage).

BLVD Settings SUB -MENU

- BLVD Enable: Enables or disables BLVD.

- BLVD : BLVD low voltage disconnect setting

(when BLVD set for voltage).

- Restore: BLVD reconnect setting (when BLLVD set for voltage).

AC Settings SUB-MENU

- Over Volt (Nominal Plus "Mains Fail Alarm)
- Under Volt (Nominal Minus " Mains Fail Alarm)
- UVP (Nominal Minus " Mains Fail Alarm)
- OVP (Nominal Plus "V Mains Fail Alarm)

SYS Settings SUB-MENU

- Alarm(Audible): Programs the audible alarm feature.

Off: Disables the audible alarm.

On: When a new alarm occurs, the audible alarm sounds.

3 min / 10 min / 1 hr / 4 hrs: When a new alarm

occurs, the audible alarm sounds. The audible alarm automatically silences after the selected time period.

- Language: Select the language in which the menus are displayed.
- Keypad Voice: Sets the keypad sound on or off.
- Date: Sets the date. Refer to "Changing the Date" on a procedure to change the date.
- Hour: Sets the time. Refer to "Changing the Time" on a procedure to change the time.
- Default: Restores the controller's default settings.

SNMP Settings SUB-MENU

- IP : Sets the controller's IP address. Enter the address in the format nnn.nnn.nnn.nnn, where $0 \leq nnn \leq 255$. The address must be a valid address and must not be 255.255.255.255.
- Subnet: Sets the controller's network net mask. Enter the address in the format nnn.nnn.nnn.nnn, where $0 \leq nnn \leq 255$.
- Gateway: Sets the controller's gateway address.

Enter the address in the format nnn.nnn.nnn.nnn, where $0 \leq nnn \leq 255$. This is the address of the gateway of the network on which the controller resides.

The address must be a valid address and must not be 255.255.255.255.

Snmp Management

MQ48D controller support SNMP V1, V2C, V3 protocol. You can use a MIB browser (e.g. MG-SOFT MIB Browser) to view system status data and set configuration data.

The following description is based on MG-SOFT MIB Browser V10.

Compile MIB files in MIB Compiler

After install MIB Browser, you should compile and load MIB files first. The loading of MIB files into the MG-SOFT MIB Browser is an important step that will provide you with a clear overview of the object hierarchy and object attributes in any managed SNMP device. While the standard MIB files come pre-packed, MIB files supplied by the vendor of an SNMP manageable device first have to be compiled into the SMIDB binary data format that can be utilized by MG-SOFT products.

Open MIB Browser, to launch MG-SOFT MIB Compiler from MIB Browser, click the “Run MG-SOFT MIB Compiler” toolbar button in the main window.

Select the File | Compile command in the MIB Compiler main menu, select mib file and click the open button. The Save As dialog box appears. Specify the file name and saving destination and save it to the SMIDB directory by clicking the Save button.

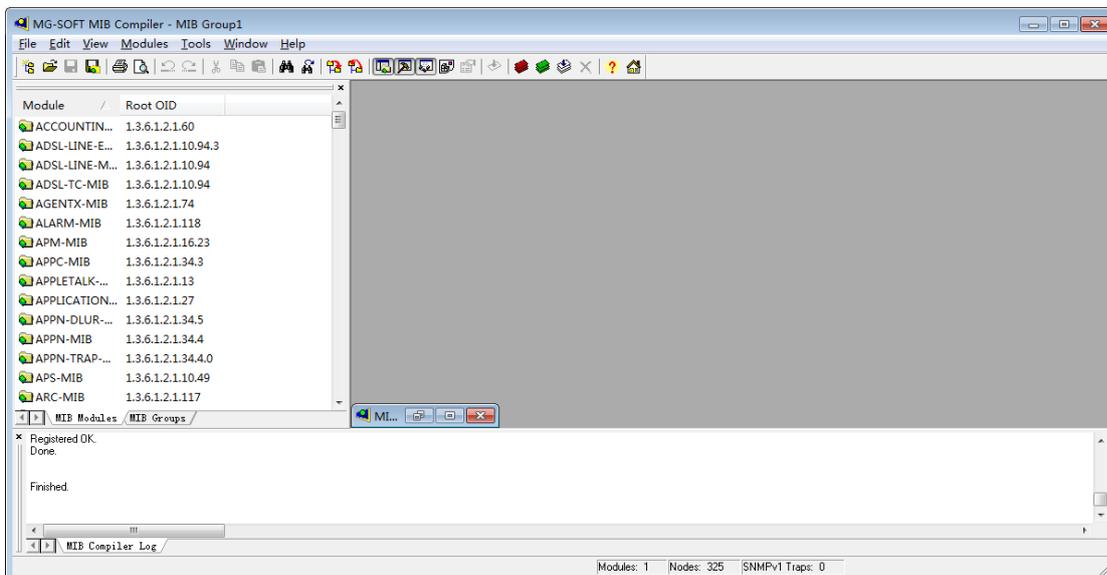


Figure14. MIB Compiler interface

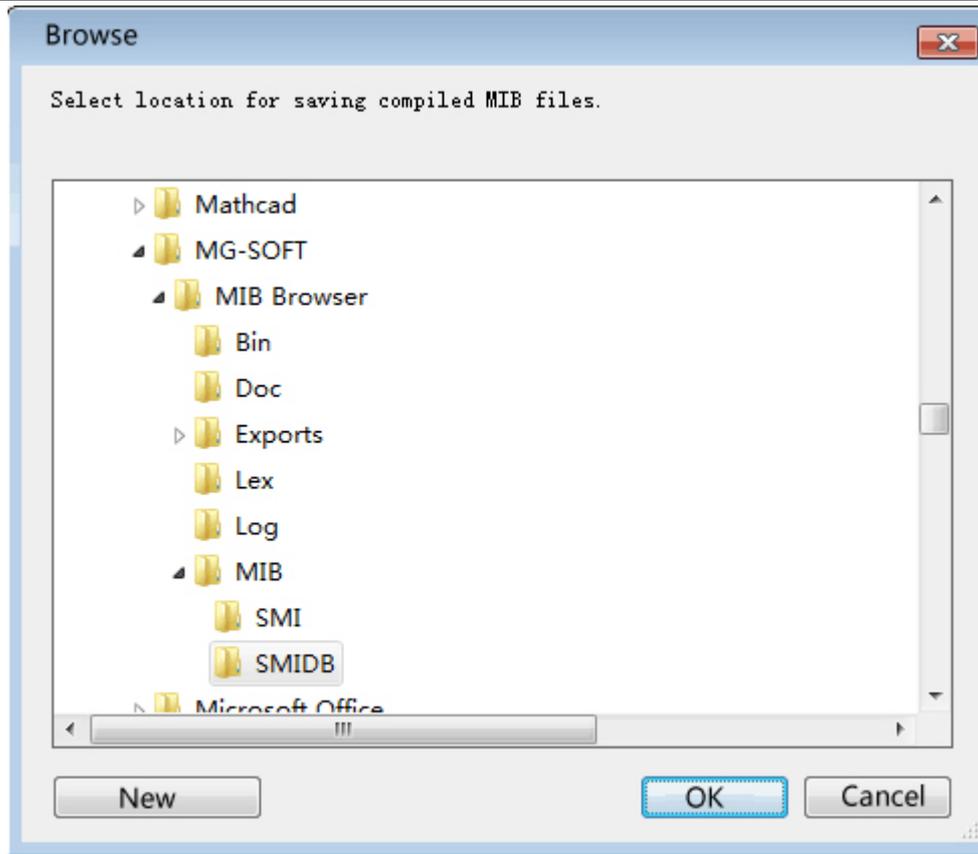


Figure15. Save compiled file to SMIDB directory

Load MIB modules in MIB Browser

Once a MIB file is compiled, you can load it in MIB Browser. To load a MIB module:

- 1) In MIB Browser's main window, switch to the MIB tab.
- 2) In the lower window panel, switch to the MIB Modules tab.
- 3) Click the Refresh Contents of the MIB Module Lists toolbar button.
- 4) In the lower window panel (MIB Modules tab), load the desired MIB module from the list by double-click its name. You should load at least the following modules: yourMib, SNMPv2-TC, SNMPv2-CONF, SNMPv2-SMI.
- 5) MIB Browser loads the selected MIB module and displays it in the list of loaded MIB modules in the upper panel.

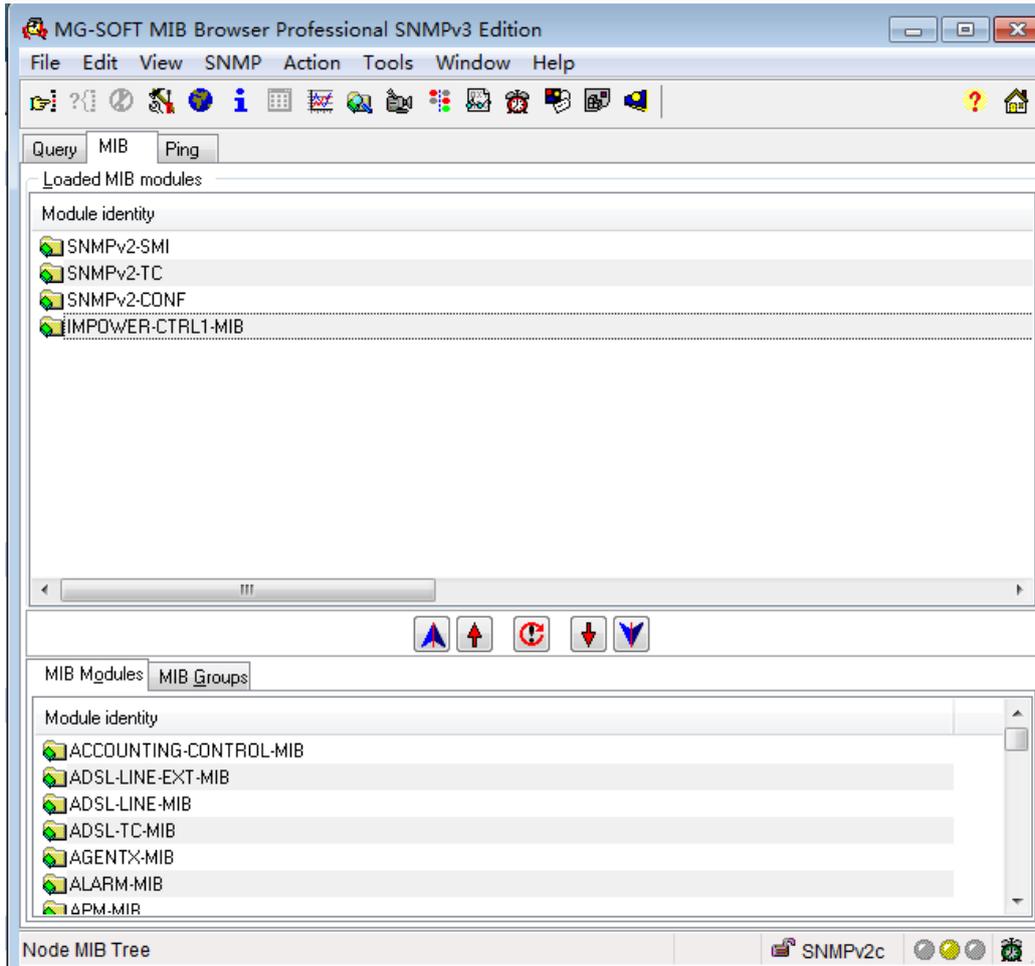
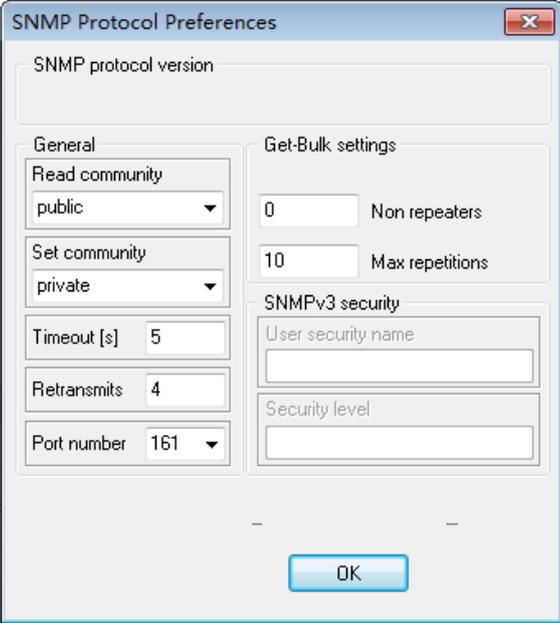


Figure16. Load MIB modules in MIB Browser

Setup protocol preference

Select Menu View | SNMP protocol preference. Select options as Figure 17, then Click Button OK.



The image shows a dialog box titled "SNMP Protocol Preferences" with a close button (X) in the top right corner. The dialog is divided into several sections:

- SNMP protocol version:** A text input field.
- General:**
 - Read community:** A dropdown menu with "public" selected.
 - Set community:** A dropdown menu with "private" selected.
 - Timeout [s]:** A text input field with "5".
 - Retransmits:** A text input field with "4".
 - Port number:** A dropdown menu with "161" selected.
- Get-Bulk settings:**
 - Non repeaters:** A text input field with "0".
 - Max repetitions:** A text input field with "10".
- SNMPv3 security:**
 - User security name:** A text input field.
 - Security level:** A text input field.

At the bottom center of the dialog is an "OK" button.

Figure17. SNMP protocol preference

Contact MQ48D-I controller

- 1) In the main window, switch to the Query tab.
- 2) Into the Remote SNMP Agent drop-down list, type the IP address of the MQ48D controller that you wish to contact.
- 3) Click the Contact Remote SNMP Agent toolbar button.
- 4) MIB Browser contacts the selected SNMP agent and displays its response in the Query Results panel (Figure 18).

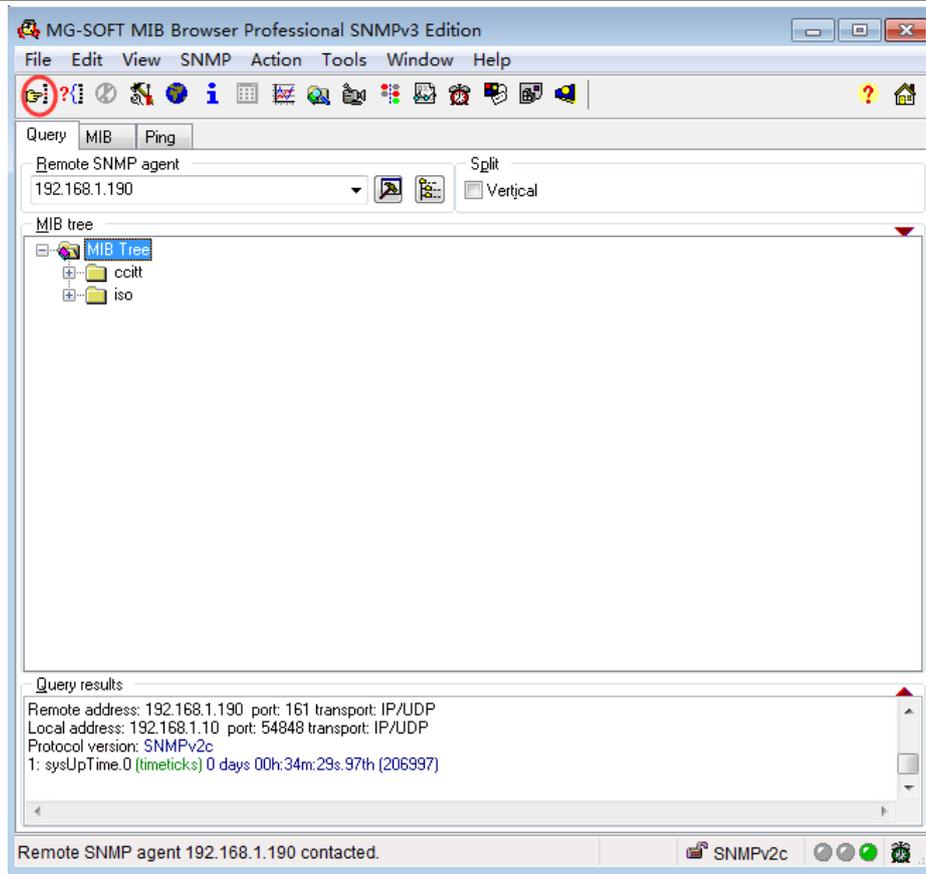


Figure 18. Contact MQ48D controller

Query and set MQ48D controller's data

In MIB Browser, loaded MIB modules are organized and represented in a MIB tree structure with nodes called MIB nodes. After expand the tree, you can see the MIB tree structure in the MIB tree panel in MIB Browser's main window.

Then you can right click any node, select get or set to query or set MQ48D controller's data. Note some data is read only and there is not set option.

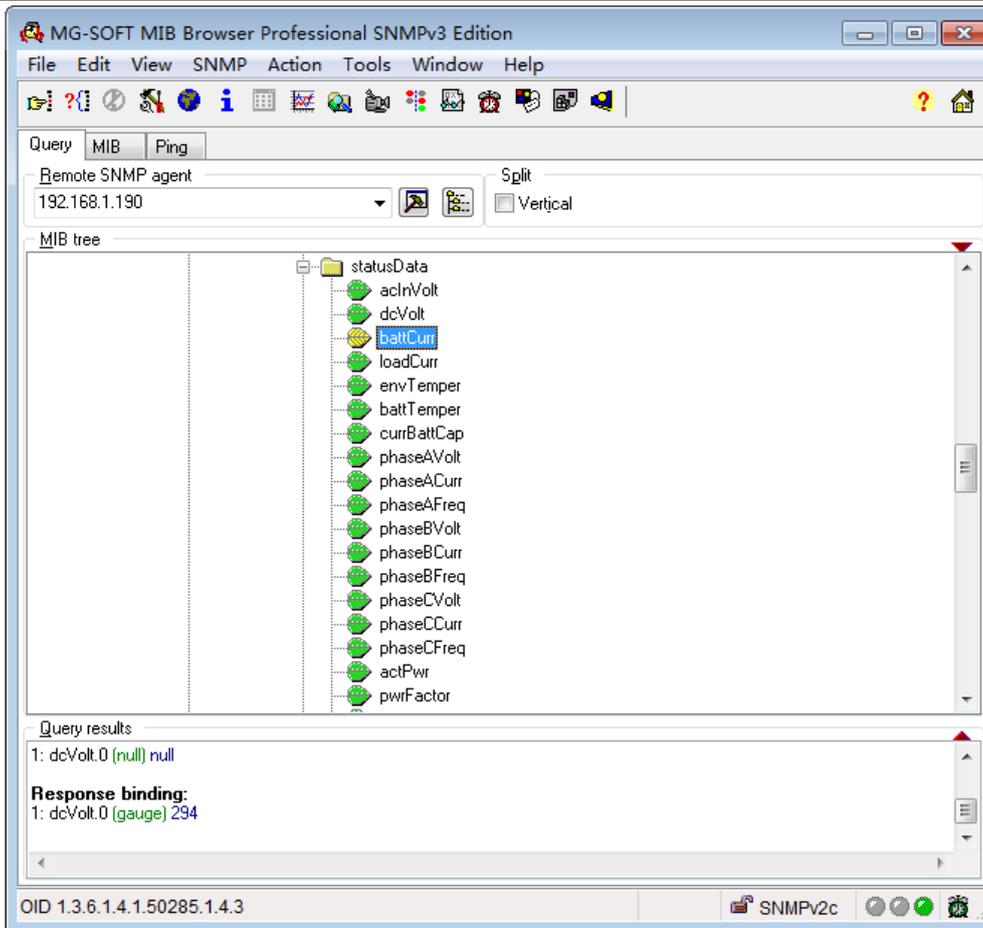


Figure 19. get or set data

Replacing an MQ48D

Prerequisites

- The cabinet door key is available.
- The new MQ48D is intact.

Procedure

Step 1 Push the locking latch towards the left.

Step 2 Pull the handle outwards and remove the MQ48D, as shown in Figure 20.

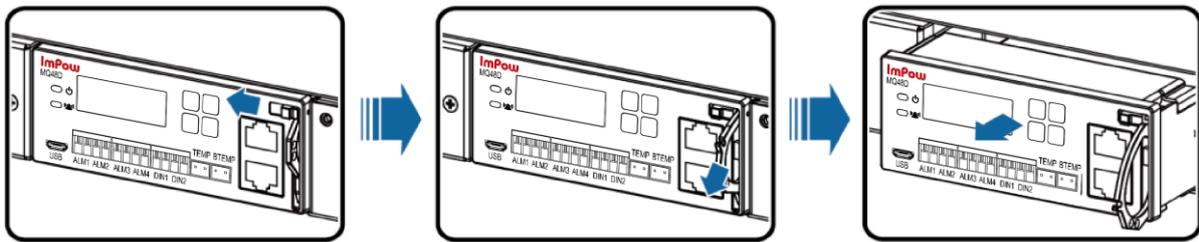


Figure 20. Removing an MQ48D

Step 3 Insert the new MQ48D into the subrack, push the locking latch towards the left, and pull out the handle.

Step 4 Slide the MQ48D into the subrack slowly along the guide rail, push in the handle, and then push the locking latch towards the right.

Step 5 Reset parameters on the MQ48D.

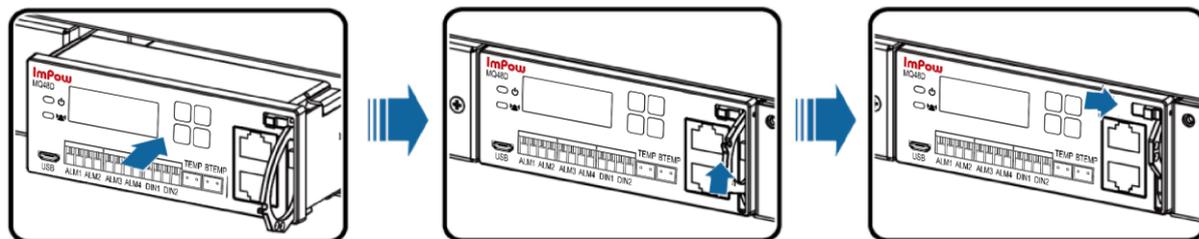


Figure 21. Installing an MQ48D

Follow-up Procedure

Pack the removed component and have it sent to the ImPow.

Appendix 1 Environmental Protection Use Period

Environment protection use period marking instructions



Environmental protection use period mark is according to the "electronic information products pollution control management measures" and "electronic information products pollution control identification requirements" make, Apply sales in China's electronic information products mark.

As long as according to the safety and instructions content use electronic information products, From the date of manufacture, in this period which products contain toxic and harmful substances not leak or mutation, Not to cause serious pollution to the environment or to persons, property damage.

The products of normal use, abandoned in the environmental protection use period or just to the term of the product, please according to the national standard to take appropriate measures for disposal.

In addition, this term is different from quality/function of the warranty.

Contains element table

(Name and content of poisonous and harmful substances or elements)							
Parts name		Poisonous and harmful substances or elements					
		(Pb)	(Hg)	(Cd)	(Cr(VI))	(PBB)	(PBDE)
complete appliance	PCB	×	○	○	○	○	○
	Liquid crystal	×	×	○	○	○	○
	Keyboard	○	○	○	○	○	○
	Electrical parts	×	○	○	○	○	○
<p>○: Express the toxic and harmful substances in the components of all homogeneous materials in the content of hazardous substances in electronic information products limited requirements Less than a standard limit requirements (SJ/T11363-2006)</p>							
<p>×: The toxic and harmful substances in one of the homogeneous material content exceeds the hazardous substances in electronic information products limited requirements standard limit requirements (SJ/T11363-2006)</p>							