MITSUBISHI

Mitsubishi Electric Air Conditioning Network System
PLC Software for Demand Input
PAC-YG41CDA
Installation (Setup) Manual

Contents

Please read this manual before using the unit.
Please keep this manual for future use.

1. Safety Precautions

- Please read the Safety Precautions section very carefully before using the unit.
- The safety cautions provided here are very important for your safety. Please observe them at all times.
- The degree of danger involved with incorrect operation of the unit are indicated in this manual using the following symbols.

⚠	WARNING	Incorrect operation could result in death or severe injury.
⚠	CAUTION	Incorrect operation could result in injury or damage to property.

- After reading this information, please keep this manual in a location where the operator can see it.

Note : Refer to the warnings and cautions in the respective installation manuals and instruction manuals for the PLC, personal computer and software, etc.

⚠ WARNING

The customer must not do any wiring or electrical work.
Have the dealer or a specialist do any wiring or electrical work. Do not do it yourself. Doing the work yourself may result in improper installation which may cause electric shock or fire.

Do not relocate the unit yourself.
Relocating the unit yourself may result in incorrect installation which may cause electric shock or fire. To relocate the unit, consult the company from which the unit was purchased.

Do not make any improvements or repairs for any reason.
Making improper improvements or repairs may cause electric shock or fire. For repairs, consult the company from which the unit was purchased.

Read the installation manuals and operation manuals for the computer, peripherals and other machines.
Improper operation could result in fire or damage to the computer or peripherals.

Stop operation if an error appears on the personal computer or PLC and operation cannot be continued or a fault occurs.
Continuing operation could result in fires or faults. Contact your dealer.

Always read the installation manual and instruction manual for the PLC.
Incorrect handling could result in PLC fires or faults, etc.

⚠ CAUTION

Do not use the product for any other purpose.
This product is for use with the Mitsubishi Electric Building Air Conditioning Control System. Do not use it with any other air conditioning control system or for any other application. Doing so may cause the unit to malfunction.

Keep children away from the unit.
Inspections and maintenance can be dangerous. Do not let children near the unit during these times.

Do not use with other applications.
Use the PC that uses this product with this product only. Using it with other applications may cause faulty operation.

Warning to all users (User Agreement)
The contents contained herein represent permission for use given to our customer by Mitsubishi Electric Corporation. By using this software, the user agrees to the conditions of the License.
- Mitsubishi Electric and associated suppliers are not responsible for any collateral, secondary, or special damages, even if notified by the distributor of the possibility of a certain type of damage. Mitsubishi Electric is not responsible for any rights claimed by a third party.

2-1 Expressions in This Manual

- Unless designated, Windows® 95, Windows® 98, Windows® Me, Windows® NT Workstation, Windows® 2000 Professional and Windows® XP are expressed as [Windows].
  * Windows is a registered trademark or trademarks of Microsoft Corporation in the United States and/or other countries.
- PLC refers to the Programmable Logic Controller.

2-2 Parts and tools required for installation

- The following parts and tools are required to install this PLC software for general equipment into the designated PLC.

<u>Table 2-1 Parts and tools required for installation</u>

No.	Item	Details
(1)	Memory card (ATA card)	Q2MEM−8MBA *Written in the software already
(2)	Manual	Installation Manual (* this manual)
(3)	Tool (for installation)	GX Developer Ver.8 or later (MELSEC PLC programming software)
(4)	Connection cable	QC30R2 (RS-232-C cable for connecting personal computer and CPU)
(5)	PLC	*Refer to chapter 2-3
(6)	Tool (for setting)	Table setting tool of PLC for general equipment control * Use as required. For detail, refer to the manual of the table setting tool.

- The following computer working environment is required to run the GX Developer tool.

<u>Table 2-2 Working environment</u>

Item	Details
Computer unit	Pentium® 133MHz or faster (For Windows®Me, recommend Pentium®150MHz or more)
Memory	32Mbyte or more, (64Myte or more for Windows 2000)
Screen resolution	800×600 or more
Compatible OS	Windows® 95/98/Me/NT4.0/2000 Pro (English Version)
Drive	CD-ROM disk drive
Communication interface	RS-232-C port
Others	Pointing device, such as a mouse

* Refer to the GX Developer Operation Manual for the detailed working environment.
* Pentium is the trademark or registered trademark of Intel corporation in the United States of America and other countries, or its subsidiary.

2-3 Applicable PLC Models

- The PLC models that can be used with this PLC software for general equipment are shown below.

<u>Table 2-3 Applicable PLC models</u>

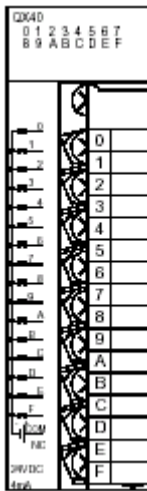| Item	Details	Notes
Maker	Mitsubishi Electric	
CPU module	Q02HCPU	
Base unit	Q33B,Q35B, Q38B,Q312B	*Differs depending on the system configuration employed
Power supply module	Q61P-A2 (A1)	A2: 200VAC ,A1: 100VAC
Ethernet module	QJ71E71-100	* Use 10Mbps LAN
Input module	QX40	* 24VDC/4mA plus common; up to two modules connectable * External power supply (24VDC) for input is required * 19V／3mA or more for ON voltage

2-4　Input Function & Controllable Quantity of G-50A

・　The input function and controllable quantity of G-50A are shown below.

Table 2-4 Input function and controllable quantity of G-50A

Items	Details	Remarks
Input function	Status at demand levels 1 ~ 4	4-input maximum
Controllable G-50A	10 sets/PLC	* Per one set of PLC

[Input specifications]

No.	Terminal block No.	Input details	Notes
0	TB1	Demand level 1	High level: Valid
1	TB2	Demand level 2	High level: Valid
2	TB3	Demand level 3	High level: Valid
3	TB4	Demand level 4	High level: Valid
4	TB5	(Unconnected)	
5	TB6	(Unconnected)	
6	TB7	(Unconnected)	
7	TB8	(Unconnected)	
8	TB9	(Unconnected)	
9	TB10	(Unconnected)	
A	TB11	(Unconnected)	
B	TB12	(Unconnected)	
C	TB13	(Unconnected)	
D	TB14	(Unconnected)	
E	TB15	(Unconnected)	
F	TB16	(Unconnected)	
COM	TB17	Common	+24V
NC	TB18	(Unconnected)	

The PLC for demand input will inform the demand levels indicated below to G-50A
at changing of the demand input.

Priority of demand levels: Level 1 < Level 2 < Level 3 < Level 4

| Demand input				Demand level to be informed
Level 1	Level 2	Level 3	Level 4	
Lo	Lo	Lo	Lo	Level 0
Hi	Lo	Lo	Lo	Level 1
Hi or Lo	Hi	Lo	Lo	Level 2
Hi or Lo	Hi or Lo	Hi	Lo	Level 3
Hi or Lo	Hi or Lo	Hi or Lo	Hi	Level 4

Note:
- If the demand level is lower than the three levels, use the input terminal from that with higher demand level. Leave the terminals at the lower class free.
- The demand input is handled as the level input.

3-1 Check the PLC Module Installation

Check that the PLC system modules are arranged in the following order. The system will not operate if the modules are not installed in order.

Lower view of PLC
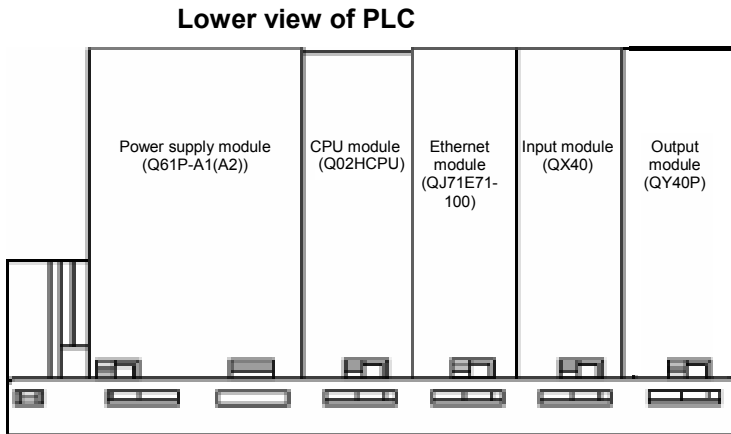
*The input and output units of general equipment are connected by pairing the input unit and output unit in a set as shown left. Please refer to Chapter 2.5.

Fig. 3-1   PLC module layout drawing (Case of max. 8 General equipments)
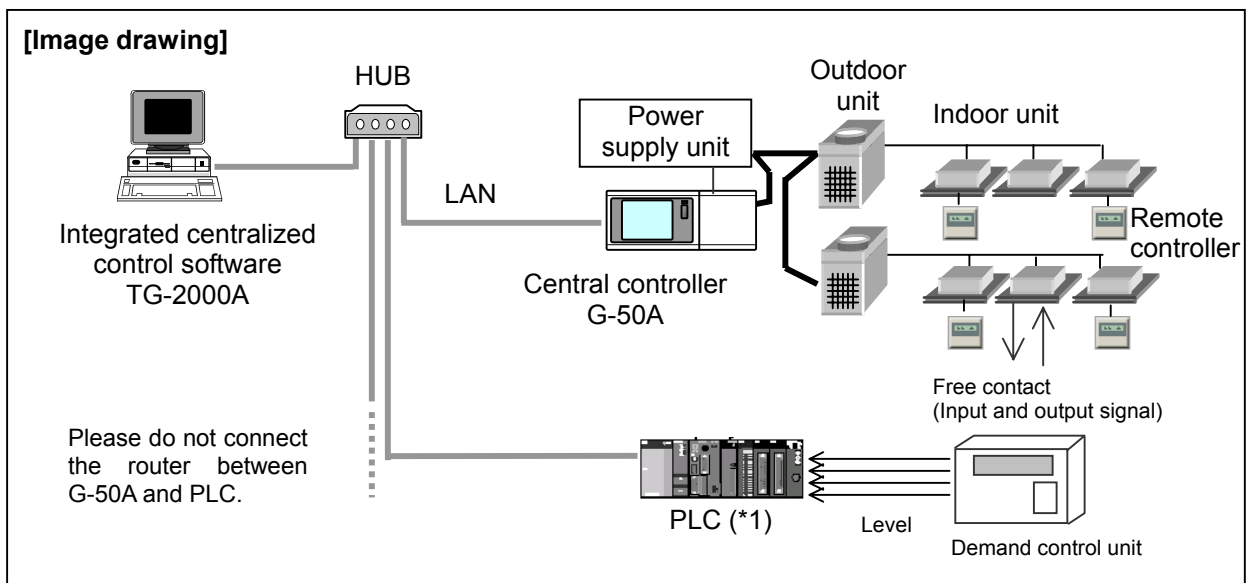
3-2 Checking the Wiring Connections

Check the wires connected to the PLC.

Item	Confirmation details	Remarks
Power cable	Confirm that the power cable is connected to the PLC power supply module.	
LAN	Confirm that the LAN cable is connected to the Ethernet module.	* This cable does not need to be connected to install this software.
Input cable	Confirm that the pulse/level output or level input wire is connected to the output or input module.	* This cable does not need to be connected to install this software.
Others	Confirm that the external input power supply (24VDC) is connected to the input module.	* This cable does not need to be connected to install this software.

* Refer to each PLC module instruction manual for details on the connected cable's specifications and connection methods, etc.
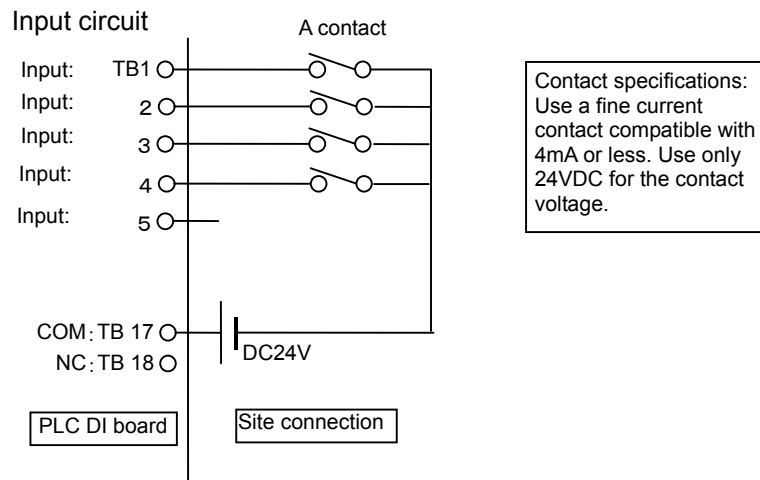
3-3 System Configuration Example

[Image drawing]

HUB

Power supply unit

Outdoor unit

Indoor unit

LAN

Integrated centralized control software TG-2000A

Central controller G-50A

Remote controller

Free contact (Input and output signal)

Please do not connect the router between G-50A and PLC.

PLC (*1)

Level

Demand control unit

*1: If the quantity of G-50A exceeds 11 sets, one set of PLC is required for each 10 sets of PLC.

4

3-4　An example of Input Wiring Connection

The demand level signal from demand control equipment is wired to the input unit of the PLC.

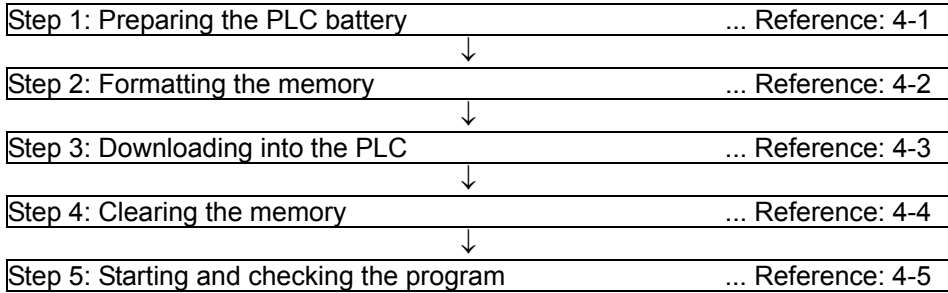An example of wiring connection for the input unit is shown below.

Input circuit

		A contact
Input:	TB1	
Input:	2	
Input:	3	
Input:	4	
Input:	5	

Contact specifications:
Use a fine current
contact compatible with
4mA or less. Use only
24VDC for the contact
voltage.

COM：TB 17
NC：TB 18
DC24V

PLC DI board	Site connection

Cautions:
- Make sure not to erroneously connect the polarity of the external power source.
  Otherwise, troubles may be caused.

Notice:
- To use two or more sets of the PLC for demand input, distribute the input signal to each PLC by using a relay.

This PLC software for general equipment is set up in the PLC in the following order.

| Step 1: Preparing the PLC battery | ... Reference: 4-1 |
↓
| Step 2: Formatting the memory | ... Reference: 4-2 |
↓
| Step 3: Downloading into the PLC | ... Reference: 4-3 |
↓
| Step 4: Clearing the memory | ... Reference: 4-4 |
↓
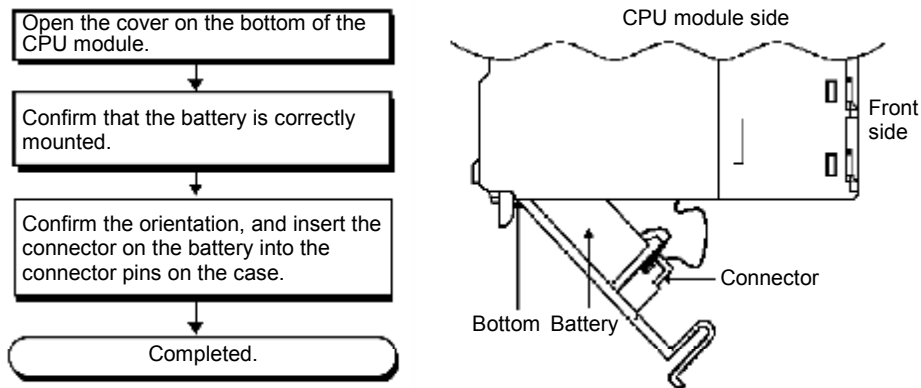| Step 5: Starting and checking the program | ... Reference: 4-5 |

4-1 Preparing the PLC Battery (Step 1)

[Procedure 1] Connect the battery

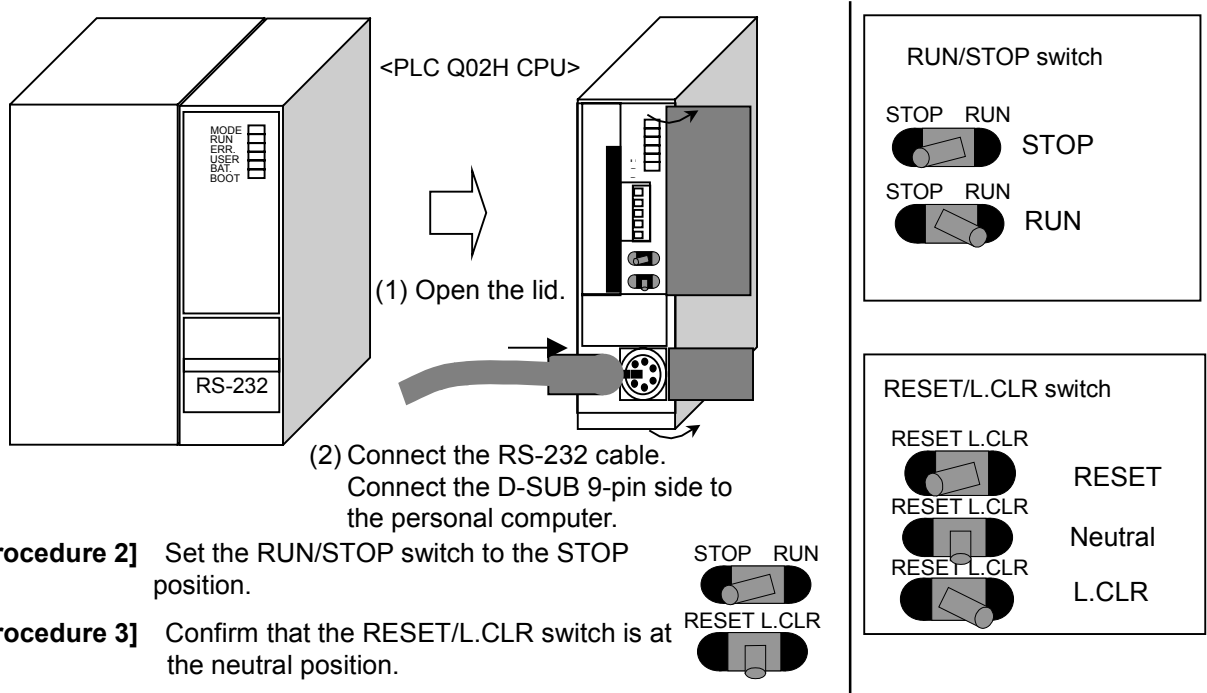Connect the CPU module's backup battery to run the PLC.

Confirm that the PLC power is OFF, and remove the CPU module from the base module. Connect the battery lead wires, and mount the battery onto the base.

Open the cover on the bottom of the CPU module.
↓
Confirm that the battery is correctly mounted.
↓
Confirm the orientation, and insert the connector on the battery into the connector pins on the case.
↓
Completed.

CPU module side

Front side

Connector

Bottom Battery

4-2 Formatting the Memory (Step 2)

(1) Connecting the RS-232-C connection cable

[Procedure 1] Open the CPU module's lid, and connect the RS-232-C cable.

<PLC Q02H CPU>

MODE
RUN
ERR.
USER
BAT.
BOOT

RS-232

(1) Open the lid.

(2) Connect the RS-232 cable.
Connect the D-SUB 9-pin side to the personal computer.

RUN/STOP switch

STOP   RUN

STOP

STOP   RUN

RUN

RESET/L.CLR switch

RESET L.CLR

RESET

RESET L.CLR

Neutral

RESET L.CLR

L.CLR

[Procedure 2] Set the RUN/STOP switch to the STOP position.

STOP   RUN

RESET L.CLR

[Procedure 3] Confirm that the RESET/L.CLR switch is at the neutral position.

(2) Turning ON the PLC power

[Procedure 1] Turn the PLC power ON.

  Battery normal : BAT LED is OFF
  Battery abnormal : BAT LED is ON

  * If the LED turns ON, there is a problem with the battery connection, so turn the power OFF and check the connection.
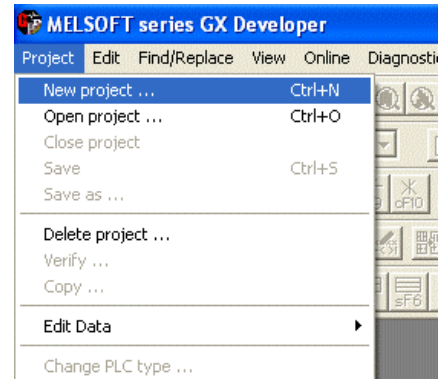
(3) Starting GX Developer and formatting

[Procedure 1] Start the GX Developer application.

[Procedure 2] Open a new project.

 Select: [Project] – [New Project…]

  The New Project screen will open.

[Procedure 3] Set the various items for creating a new project.
  – Setting details –
    PLC series   : QCPU (Q mode)
    PLC Type   : Q02(H)
    Program type   : Ladder
    Label setting   : Do not use label
    Device memory data which is the same name
    as program data's name is created
                          : Select
    Setup project name   : Do not select
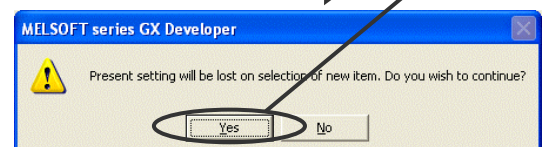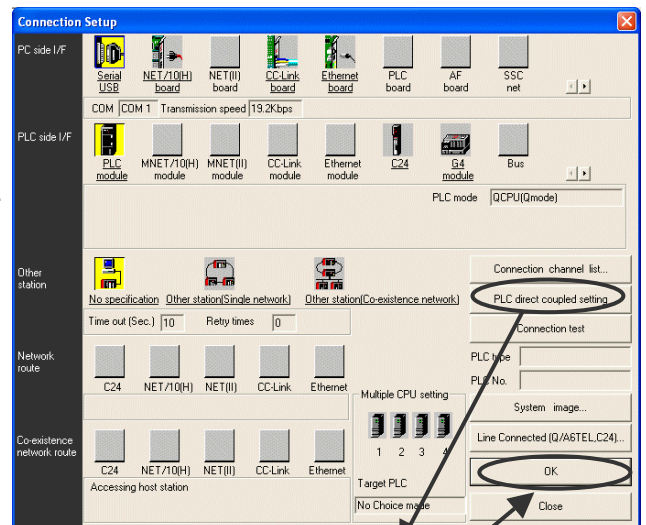
  Set the above details, and then select [OK].
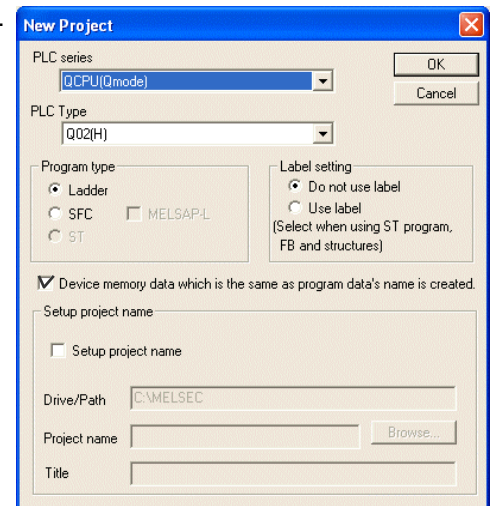
[Procedure 4] Select the connection destination.

  Select: [Online] –
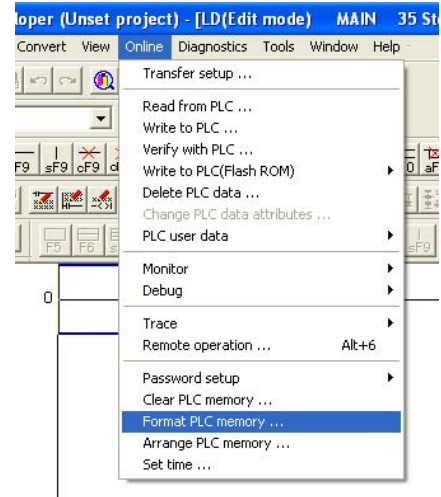   [Transfer Setup]

[Procedure 5] Select PLC Direct Coupled Setting.

  Select: [PLC Direct Coupled
          Setting] → [Yes] → [OK]

7

[Procedure 6]   Select Format PLC Memory …

Select: [Online] – [Format PLC Memory]
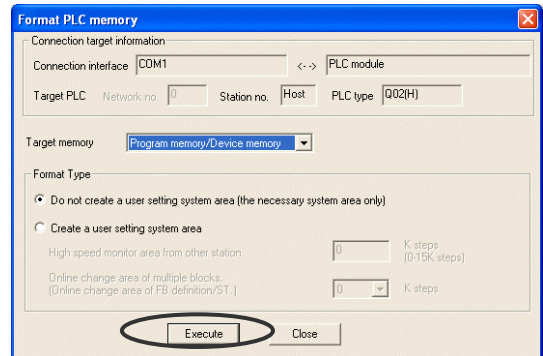The PC MEMORY FORMAT screen will
open.

[Procedure 7]   Format the "Program Memory/
Device Memory" and "Standard RAM".
1) Check the setting value, and then select
[Execute].
Target memory: "Program memory/
Device memory"
Format type:
Do not create a user setting system area

When the confirmation screen opens,
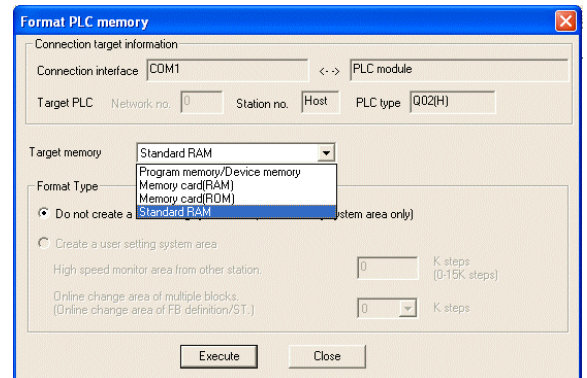select [Yes], and then select [OK] on
the completion screen.

2) Change the Target Memory to "Standard RAM",
and then format.
Target memory: "Standard RAM"
Format type:
Do not create a user setting system area

Set the target memory to "Standard RAM",
and then select [Execute]. When the
confirmation screen opens, select [Yes],
and then select [OK] on the completion screen.

[Procedure 8]   Close the FORMAT PC MEMORY screen.

Select: [Close]

4-3　Downloading into the PLC (Step 3)

(Loading from memory card to PLC standard ROM)
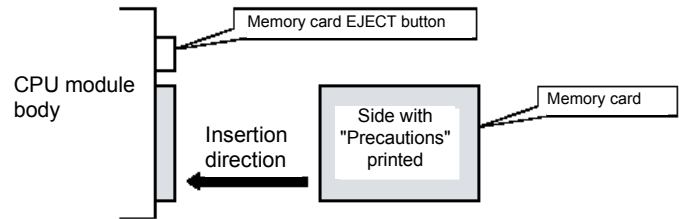
[Procedure 1]　Turn OFF the PLC power.

　　　　　　　* <u>Inserting the memory card while the power is ON will result in trouble.</u>

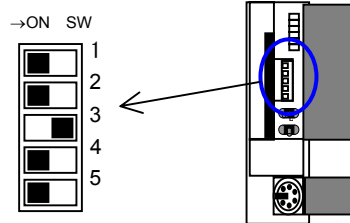**[Procedure 2]**　Insert the memory card into
　　　　　　　the PLC.

> **Maintenance Tip:**
> • Pay attention to the memory (ATA) card's insertion direction.

CPU module body

Memory card EJECT button

Insertion direction

Side with "Precautions" printed

Memory card

[Procedure 3]　Turn ON DIP switch 3.
　　　　　　　This sets the settings for the Flash/ATA card mounting.

→ON　SW
1
2
3
4
5

[Procedure 4]　Turn ON the PLC power.
　　　　　　　Boot the memory card's file into the program memory. After booting, load the program memory contents into the standard ROM.

MODE
RUN
ERR.
USER
BAT.
BOOT

→ON　SW
1
2
3
4
5
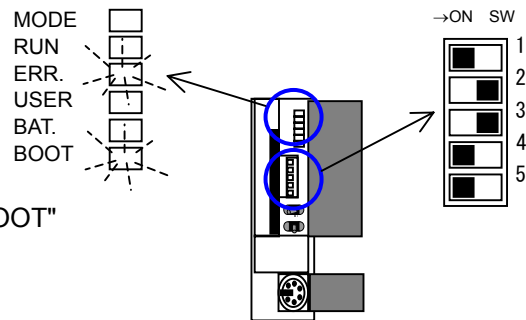
[Procedure 5]　Confirm that the "ERR" LED and "BOOT" LED are flickering.
　　　　　　　The "ERR" LED and "BOOT" LED flicker when automatic loading to the standard ROM is completed.

[Procedure 6]　Turn OFF the PLC power.

[Procedure 7]　Turn ON DIP switch 2.
　　　　　　　(This sets the parameter valid drive to the standard ROM. SW2, 3 = ON)

4-4　Clearing the memory (Step 4)

Using GX Developer, clear the PLC memory so that the PLC can be run.

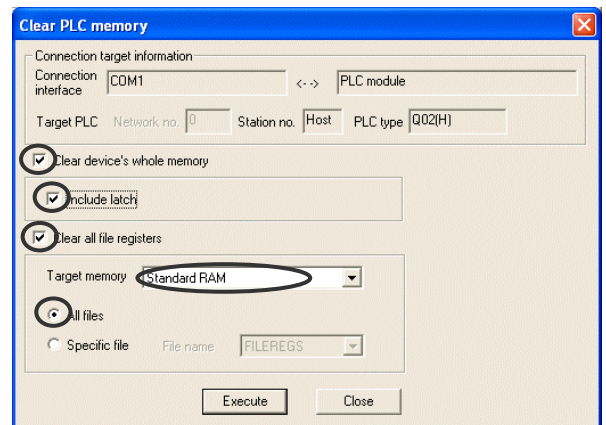**[Procedure 1]**　Turn ON the PLC power.

[Procedure 2]　Select Clear PLC Memory.

　　　　　　　(Select: [Online] – [Clear PLC Memory])

[Procedure 3]　Set the following items, and then select [Execute].
　　　　　　　– Setting details –
　　　　　　　　Clear device's whole memory: Select
　　　　　　　　Include latch　　　　　　　 : Select
　　　　　　　　Clear all file register　　　　 : Select
　　　　　　　　Target Memory　　　　　　 : Standard RAM
　　　　　　　　All Files/Specific file　　　　: All Files

Clear PLC memory

Connection target information
Connection interface: COM1　<-->　PLC module
Target PLC　Network no. 0　Station no. Host　PLC type Q02(H)

☑ Clear device's whole memory
　☑ Include latch
☑ Clear all file registers
　Target memory: Standard RAM
　⦿ All files
　○ Specific file　File name FILEREGS

Execute　　Close

　　　　　　　Select the [OK] button on the completion screen that opens when the clearing process is completed.
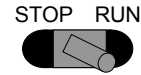
[Procedure 4]   Turn OFF the PLC power.

[Procedure 5]   Quit the GX Developer application.

[Procedure 6]   Disconnect the RS-232-C cable.

4-5   Starting and Checking the Program (Step 5)

Start the downloaded PLC software for general equipment with the PLC, and confirm that it runs.

STOP   RUN

[Procedure 1]   Set the RUN/STOP switch to the RUN position.

[Procedure 2]   Set the RESET/L.CLR switch to the neutral position.   RESET L.CLR

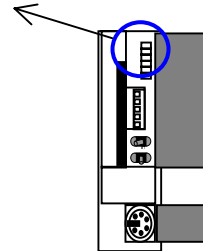**[Procedure 3]**   Turn ON the PLC power.
The contents of the standard ROM are written to the program memory, and the PLC software starts up.

[Procedure 4]   Confirm the PLC operation state.
Check the following details to confirm that the program is running correctly.

- MODE.LED is ON
- RUN.LED is ON
- ERR.LED is OFF
- USER.LED is OFF
- BAT.LED is OFF
- BOOT.LED is ON

MODE
RUN
ERR.
USER
BAT.
BOOT

Note:
- Leave DIP switch 2 and 3 set to ON.
- To make demand input valid with this PLC for demand input, it is required to execute initial settings from the integrated centralized control software TG-2000A.
- If the PLC operation state is not "correct", start again from the start.
- Refer to Section 6 and the PLC Instruction Manual for details on troubles.

Maintenance Tip
- Do not turn off the power source after starting and operating this PLC software for demand input. The demand control will not be functioned while the power source is turned off.
- Leave the memory card (ATA card) set in the PLC's memory slot. The system will not run correctly if the ATA card is removed.

5. Precautions for Running the PLC Software

The precautions for running this PLC software for demand input with the PLC are given below. Always read through these precautions before starting use.

5-1 License

By using this PLC software for demand input, the user agrees to the conditions of this License. Always read through this License before starting use.

(1) License
This user is permitted to install this software into the user's PLC. This software may not be duplicated, leased, sold, rented, transferred or resold without permission from Mitsubishi Electric Corp.

(2) Property
This software and all copies authorized by Mitsubishi Electric Corp. are the property of Mitsubishi Electric Corp.

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Mitsubishi will also not be liable to any claims by any third party.

5-2 Precautions for Operation

(1) PLC power supply
- When using this software, always leave the switch set to "RUN" after the trial operation, and leave the power ON 24 hours. The general equipment cannot be operated or monitored while the power is OFF.

(2) Battery
- Always connect a battery while using this software. (Refer to Section 4-1.) If the battery is not connected during a power failure, all of the saved power rate data will be lost.
- If the battery voltage low detection is indicated, replace the battery with a new one as soon as possible.
(The battery voltage low alarm can be confirmed on the integrated software's screen or by the lighting of the CPU module's BAT. LED (ON).)

(3) ATA card
- Leave the memory (ATA) card containing the software installed in the CPU module memory slot. The data saved in the memory card (ATA card) is used.

(4) Precautions for starting operation
- Merely following the instructions described in this Installation Manual only does not provide the normal functioning of this PLC software for demand input. As the various settings relating to the initial setting are essential before starting the operation, you are kindly requested to set them from the integrated centralized control software TG-2000A.

(5) Cautions during operation
- The demand control may not be functioned normally sometime due to the disconnection of wiring or the trouble of PLC, G-50A or demand control equipment. Please note that Mitsubishi Electric is not liable for any damages incurred from such cases.

(6) Precautions for connection work, confirmation and trial operation
- To conduct wiring work on demand control equipment or verify the continuity of the connection, obtain the approval of the administrator for the demand control equipment or the responsible person of the electric work, or clarify the limits of mutual responsibility beforehand.

(7) Miscellaneous
- The functions and specifications may be changed for improvements without prior notice.
- The liability for the defect of a PLC simple substance etc. cannot be taken.

5-3   Applicable System
This PLC software for demand input is applicable only with the "G-50A + TG-2000A" system.

6. Troubleshooting

The causes of trouble that may occur when installing this PLC software for demand input into the PLC, and the countermeasures to be taken are explained below.

Table 6-1   Troubleshooting

Details of trouble	Speculated cause	Countermeasures
The "ERR." LED turns ON or flickers when PLC software for demand input is started.	The PLC module layout is incorrect.	Turn the PLC power OFF and arrange the modules as shown in section 3-1.
	The program is not installed correctly.	Turn all of the CPU module switches OFF, and start again from 4-2 "Formatting the Memory".
The "BAT." LED turns ON.	The battery is not mounted.	(1) Connect the connector installed on the battery. (2) Reset with the RESET/L.CLR switch.
	Battery voltage low	(1) Replace with a new battery. (2) Reset with the RESET/L.CLR switch.
Error appears when accessing PLC even from GX Developer.	The PLC power is not ON.	Turn the PLC power ON, and access the PLC from the GX Developer.
	The RS-232-C cable is not connected.	Check the RS-232-C cable connection to the personal computer and PLC, and reconnect if necessary.
Demand control does not function even though the signal of demand level has been received after starting operation.	The "STOP/RUN" switch is set to "STOP".	Set the "STOP/RUN" switch to "RUN".
	The external power supply for input is OFF.	Turn ON the external power supply (24VDC) for input.
	The external power supply for input is incorrectly connected.	Confirm that the wiring of the external power source for input (DC24V) at the plus side is connected to No.17 terminal (COM) of the input unit (QX40), and that at the minus side is to the demand control equipment. Correct the wiring if erroneously connected. When the polarity of the input external power source is incorrect, the input unit may be faulty.
	The objective G-50A for demand control is not being set.	With the advance setting of TG-2000A (peak cut function setting), set the G-50A objective for peak cut operation to each PLC.
	The control details of demand (peak cut) are not being set.	Set the control details by using the peak cut setting of TG-2000A.
	The LAN wiring is disconnected or not connected.	Check the connection of the LAN wiring, and modify it if required.
	The power source of the HUB is not turned on.	Confirm that the power source of the HUB is turned on.
	The PLC with same address is duplicated	Change the PLC addresses being duplicated and reset the PLC.
	Router is locating between G-50A and PLC.	Remove the router.

* Refer to the PLC Instruction Manual for trouble not listed above.

Q&A regarding this PLC software for demand input is given below.

Table 6-2　PLC software for demand input Q&A

Question	Answer	Notes
What is the PLC's IP address?	The IP address is shown below as basic. 　PAC-YG41CDA: 192. 168. 1. 191 *　A label indicating the IP address is attached to the memory card (ATA card).	*The IP address may differ according to the site.
Are there any precautions for connecting to an existing LAN?	A router should be connected to prevent unnecessary data so that the PLC does not receive large volumes of data.	
How do we check the software version?	Check with Step 2 for setting the integrated centralized control software TG-2000A general equipment.	(Caution) Never select the "Initial Request" button. *The type and version can be confirmed. The type is [13].
How about the methods to detect the trouble of PLC?	The trouble can be checked on the screen of the integrated centralized control software TG-2000A. Another method is to use the output from the error output port provided on the power source unit of PLC.	

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