

MELSEC-L Series

Programmable Controllers

Quick Start Guide



About this manual

The texts, illustrations, diagrams and examples in this manual are provided for information purposes only. They are intended as aids to help explain the installation, operation, programming and use of the programmable controller of MELSEC L series.

If you have any questions about the installation and operation of any of the products described in this manual please contact your local sales office or distributor (see back cover).

You can find the latest information and answers to frequently asked questions on our website at *www.mitsubishi-automation.com.*

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	Quick Start Guide MELSEC-L Series Programmable Controllers		
Ver	sion	Revisions / Additions / Corrections	
A	03/2011 akl		

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Safety guidelines

For use by qualified staff only

This manual is only intended for use by properly trained and qualified electrical technicians who are fully acquainted with the relevant automation technology safety standards. All work with the hard-ware described, including system design, installation, configuration, maintenance, service and testing of the equipment, may only be performed by trained electrical technicians with approved qualifications who are fully acquainted with all the applicable automation technology safety standards and regulations. Any operations or modifications to the hardware and/or software of our products not specifically described in this manual may only be performed by authorised Mitsubishi Electric staff.

Proper use of the products

The programmable controllers of the MELSEC L series are only intended for the specific applications explicitly described in this manual. All parameters and settings specified in this manual must be observed. The products described have all been designed, manufactured, tested and documented in strict compliance with the relevant safety standards. Unqualified modification of the hardware or software or failure to observe the warnings on the products and in this manual may result in serious personal injury and/or damage to property. Only peripherals and expansion equipment specifically recommended and approved by MITSUBISHI ELECTRIC may be used with the programmable controllers of the MELSEC L series.

All and any other uses or application of the products shall be deemed to be improper.

Relevant safety regulations

All safety and accident prevention regulations relevant to your specific application must be observed in the system design, installation, configuration, maintenance, servicing and testing of these products. The regulations listed below are particularly important in this regard. This list does not claim to be complete; however, you are responsible for being familiar with and conforming to the regulations applicable to you in your location.

- VDE Standards
 - VDE 0100 Regulations for the erection of power installations with rated voltages below 1000 V
 - VDE 0105
 Operation of power installations
 - VDE 0113
 Electrical installations with electronic equipment
 - VDE 0160
 - Electronic equipment for use in power installations
 - VDE 0550/0551
 Regulations for transformers
 - VDE 0700
 - Safety of electrical appliances for household use and similar applications
 - VDE 0860

Safety regulations for mains-powered electronic appliances and their accessories for household use and similar applications.

- Fire safety regulations
- Accident prevention regulation
 - VBG No. 4
 Electrical systems and equipment

Safety warnings in this manual

In this manual special warnings that are important for the proper and safe use of the products are clearly identified as follows:



DANGER:

Personnel health and injury warnings. Failure to observe the safety warnings identified with this symbol can result in health and injury hazards for the user.



CAUTION:

Equipment and property damage warnings. Failure to observe the safety warnings identified with this symbol can result in damage to the equipment or other property.

General safety information and precautions

The following safety precautions are intended as a general guideline for using PLC systems together with other equipment. These precautions must always be observed in the design, installation and operation of all control systems.



DANGER:

- Observe all safety and accident prevention regulations applicable to your specific application. Always disconnect all power supplies before performing installation and wiring work or opening any of the assemblies, components and devices.
- Assemblies, components and devices must always be installed in a shockproof housing fitted with a proper cover and fuses or circuit breakers.
- Devices with a permanent connection to the mains power supply must be integrated in the building installations with an all-pole disconnection switch and a suitable fuse.
- Check power cables and lines connected to the equipment regularly for breaks and insulation damage. If cable damage is found immediately disconnect the equipment and the cables from the power supply and replace the defective cabling.
- Before using the equipment for the first time check that the power supply rating matches that of the local mains power.
- Take appropriate steps to ensure that cable damage or core breaks in the signal lines cannot cause undefined states in the equipment.
- You are responsible for taking the necessary precautions to ensure that programs interrupted by brownouts and power failures can be restarted properly and safely. In particular, you must ensure that dangerous conditions cannot occur under any circumstances, even for brief periods. EMERGENCY OFF must be switched forcibly, if necessary.
- Residual current protective devices pursuant to DIN VDE Standard 0641 Parts 1-3 are not adequate on their own as protection against indirect contact for installations with PLC systems. Additional and/or other protection facilities are essential for such installations.
- EMERGENCY OFF facilities conforming to EN 60204/IEC 204 and VDE 0113 must remain fully operative at all times and in all control system operating modes. The EMERGENCY OFF facility reset function must be designed so that it cannot ever cause an uncontrolled or undefined restart.
- You must implement both hardware and software safety precautions to prevent the possibility of undefined control system states caused by signal line cable or core breaks.
- When using modules always ensure that all electrical and mechanical specifications and requirements are observed exactly.

Precautions to prevent damages by electrostatic discharge

Electronic devices and modules can be damaged by electrostatic charge, which is conducted from the human body to components of the controller. Always take the following precautions, when handling the controller:



CAUTION:

- Before touching a module of the controller, always touch grounded metal, etc. to discharge static electricity from human body.
- Wear isolating gloves when touching the powered controller, e.g. at maintenance during visual check.
- You shouldn't wear clothing made of synthetic fibre at low humidity. This clothing gets a very high rate of electrostatic charge.

Symbols used in the manual

Use of instructions

Instructions concerning important information are marked separately and are displayed as follows:

NOTE Text of instruction

Use of numbering in the figures

Numbering within the figures is displayed by white numbers within black circles and is explained in a table following it using the same number, e.g.:

1234

Use of handling instructions

Handling instructions are steps that must be carried out in their exact sequence during startup, operation, maintenance and similar operations.

They are numbered consecutively (black numbers in white circles):

- 1) Text.
- Text.
- Text.

Use of footnotes in tables

Instructions in tables are explained in footnotes underneath the tables (in superscript). There is a footnote character at the appropriate position in the table (in superscript).

If there are several footnotes for one table then these are numbered consecutively underneath the table (black numbers in white circle, in superscript):

- 1 Text
- ^② Text
- ^③ Text

Writing conventions and guidance notes

Keys or key-combinations are indicated in square brackets, such as [Enter], [Shift] or [Ctrl]. Menu names of the menu bar, of the drop-down menus, options of a dialogue screen and buttons are indicated in italic bold letters, such as the drop down menu **New** in the **Project menu** or the option **Serial USB** in the "Transfer Setup Connection" screen.

Explanations of terminology

Explanations concerning the terminology used are displayed as follows:

TERMINOLOGY Term to be explained Explanation text

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1 Introduction

1.1 Using the Quick start guide

This Quick start guide explains the basic procedures for the first-time use of the Mitsubishi programmable controller of MELSEC-L series.

You can easily understand how to use the programmable controller with this guide.

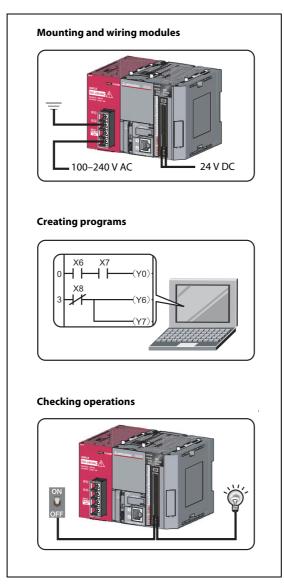


Fig. 1-1: Overview of explanations supplied with this Quick start guide

LS00001

1.2 Operations that can be performed using MELSEC-L series

1.2.1 Programmable controllers

The programmable controllers perform sequence control and logical operations by switching the output of output equipment ON/OFF according to the command signal from the input equipment.

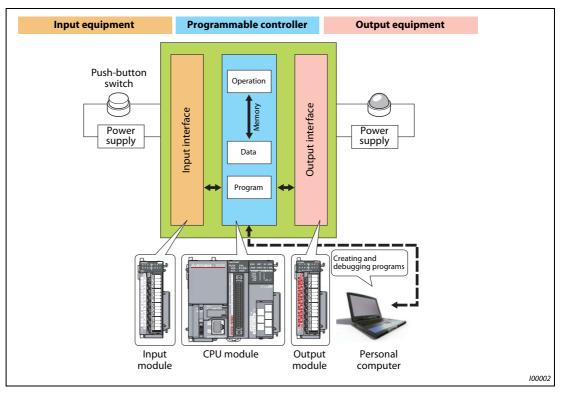
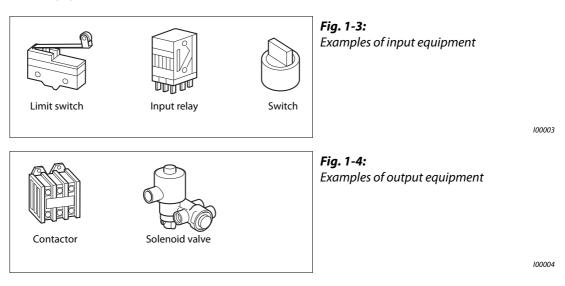


Fig. 1-2: Performing sequence control and logical operations

Other equipment is shown below.



TERMINOLOGY Sequence control	Consecutively processes each control step based on the fixed order or procedure.
Logical operations	One of the basic operation methods in programming.
	Logical operations consist of three basic operations: logical AND, logical OR, and logical NOT.
Limit switch	A switch to stop the movement of mobile objects on both sides of a moving apparatus for safety reasons.
Relay	Breaks/connects the electricity with electrical switching.
Contactor	Generally called an electromagnetic contactor to break circuits and switch the heater.
Solenoid valve	An electromagnet with a direct/alternating current. Connected to the output side of the programmable controller.

1.2.2 Features of CPU module

MELSEC-L series programmable controllers are all-in-one programmable controllers that have the following functions built into the CPU module. The use of these built-in functions enables you to design a smaller-scale system.

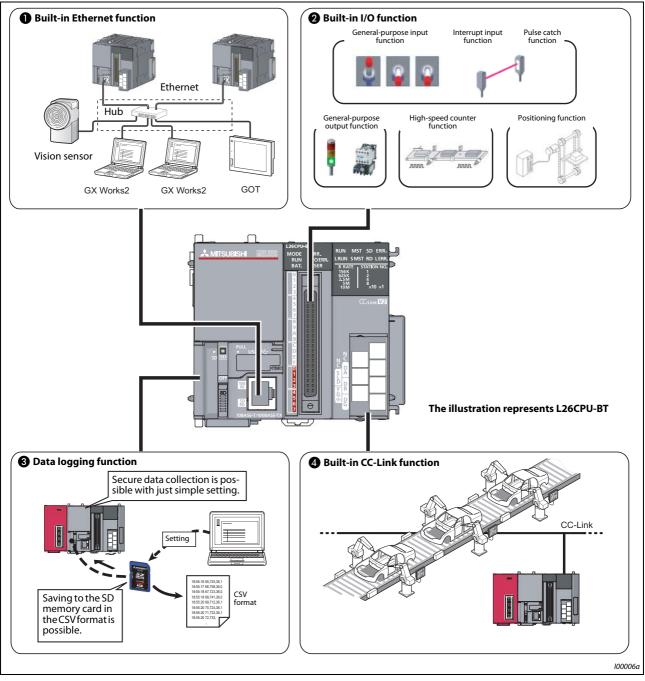


Fig. 1-5: Functions built into the CPU module

Refer to the following table for a detailed description of the features.

No.	Built-in function	Description
0	Ethernet function	A maximum of 16 external devices can be connected via a hub. The reading/writing of the device data of the CPU module and the sending/receiving of the data of the other connected devices can be performed to/from a personal computer and GOT.
0	I/O function	Single function exclusive modules become unnecessary, and a smaller- scale system can be configured using only LCPU. Therefore, system cost reduction can be realized.
0	Data logging function	Logging can be performed under various conditions using the exclu- sive configuration tools. The collected data can be saved to the SD memory card in the CSV format.
4	CC-Link function	I/O modules, intelligent function modules, and special function mod- ules, which are arranged separately, can be controlled with the CPU module. In addition, a simple separately-configured system can be designed by connecting multiple CPU modules using CC-Link.
		NOTE:
		CC-Link function is only built into L26CPU-BT.

 Tab. 1-1:
 Description of the built-in functions of the CPU module

1.2.3 System enhancement according to application

By connecting various types of modules, the system can be enhanced according to the application. As a baseless structure is employed, the space of the control panel can be used effectively without being limited by the size of the base.

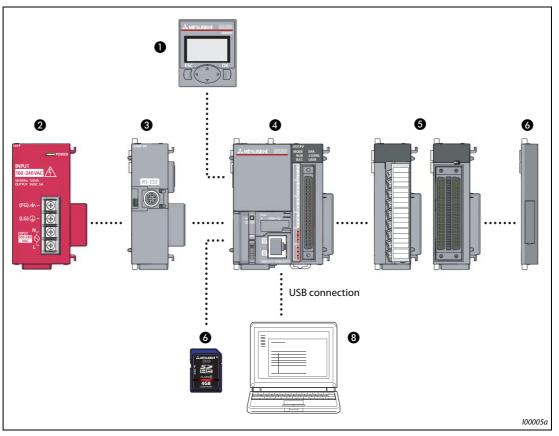


Fig. 1-6: System enhancement (for an L02CPU CPU module as an example)

No.	Module	Description	
0	Display unit (optional)	The system status can be confirmed and the system setting values can be changed by attaching this to the CPU module.	
0	Power supply module	—	
3	RS-232 adapter (optional)	Attached when connecting to GOT.	
4	CPU module	_	
0	I/O module or intelligent func- tion module	 The following modules can be attached as required. I/O modules Analog I/O modules Serial communication modules 	
0	END cover	Provided with the CPU module. Be sure to connect an END cover on the right of the terminal module.	
0	SD memory card (optional)	 Using an SD memory card enables the following functions to be used. Data logging function Boot operation via the SD memory card Backing up data to the SD memory card Restoring backup data 	
8	GX Works2	This is a programming tool to design, debug, and maintain sequence programs on a Windows personal computer. Programs can also be created effectively using FB (Function Block).	

Tab. 1-2: Description of various modules connectable to the system

2 Using programmable controllers

2.1 Preparing for operation

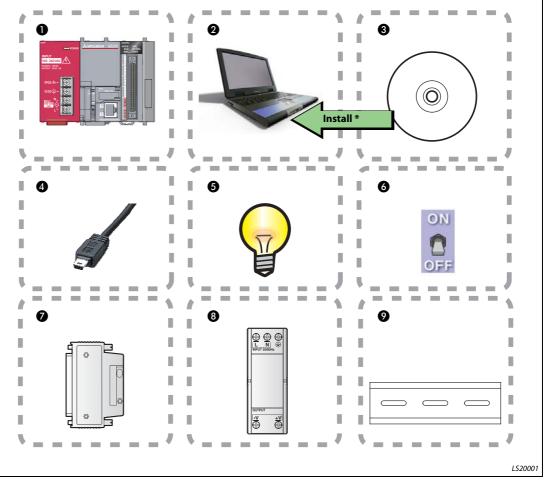


Fig. 2-1: Prepare necessary equipment

Refer to the following table for an overview of the necessary equipment to prepare operation.

No.	Description	
0	Programmable controller: Explanations for each module see next page	
2	Windows® personal computer	
3	GX Works2, Version 1.20W * GX Works2, Version 1 needs to be installed in your personal computer in advance	
4	USB cable (USB mini B type)	
6	Lamp	
6	Switch	
Ø	A6CON1	
8	External power supply	
9	DIN rail (Including DIN rail stopper)	

Tab. 2-1:	Description of necessary equipment
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2.2 System configuration

2.2.1 System configuration example

The following system configuration is explained as an example.

Inputs and outputs are configured as switches and lamps respectively.

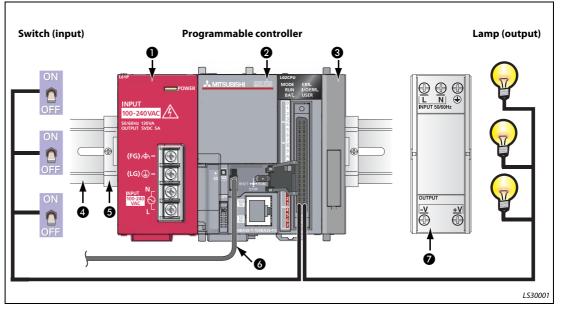


Fig. 2-2: Example of a system configuration

NOTE

Wires to the power supply module and the power of the external I/O devices are omitted.

No.	Name	Model	Description	
0	Power supply module	L61P	Supplies power to modules such as CPU module.	
0	CPU module	L02CPU	Integrates the control of the programmable control- ler.	
8	END cover	L6EC	Supplied with the CPU module. Be sure to connect an END cover on the right of the terminal module.	
4	DIN rail	(IEC 60715) • TH35-7.5Fe • TH35-7.5Al • TH35-15Fe	The programmable controller system is secured by attaching it to the DIN rail.	
6	DIN rail stopper	—	Use DIN rail stoppers that can be attached to the DIN rails.	
6	Connection cable (USB cable)	MR-J3USBCBL3M (USB A type - USB mini B type)	Connects the personal computer with GX Works2 installed and the CPU module.	
Ø	External power supply	_	Supplies power to the external I/O devices. Use the C marked models and be sure to perform grounding for the FG terminal.	



2.3 Mounting modules

CAUTION:

The power supply must be disconnected when mounting modules.

Mount the prepared modules.

A battery connector must be connected when using the CPU module for the first time.

Mounting modules

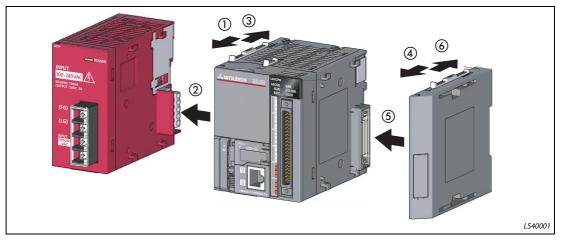


Fig. 2-3: Mounting modules procedure

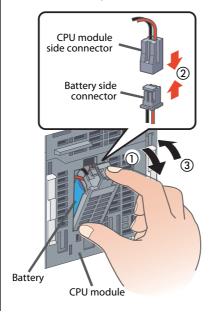
- ① Release the module joint levers located on the top and bottom of the CPU module. (Slide them towards the front of the module.)
- (2) Install the modules by inserting the connectors of the CPU module and the power supply module straight so that they can be engaged.
- ③ Lock the module joint levers located on the top and bottom of the CPU module. (Slide them towards the back of the module.)
- (4) to (6)

Using the same procedure, attach the END cover.

Procedure complete.

NOTE

Connect a battery in the CPU module by the following procedure.



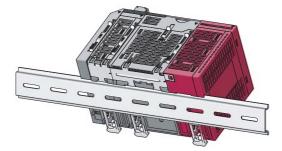
- ① Open the cover at the bottom of the CPU module.
- ② Confirm the directions of the connectors, and insert the battery side connector into the CPU module side connector.
- ③ Close the cover at the bottom of the CPU module.

Procedure complete.

Mounting modules to DIN rail

 Pull down all the DIN rail hooks on the back of the modules. (Pull them down until they click.)

- (2) Engage the claws at the top of the modules with the top of the DIN rail, and then insert the DIN rail to install.



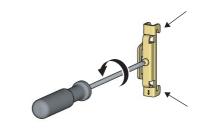
- (3) Lock the DIN rail hooks of the modules to engage them with the DIN rail.
 (Push them up until they click. If your finger does not reach the DIN rail hook, use a screwdriver, etc.)
- ④ Loosen the screws of the DIN rail stoppers.
- (5) Engage the claw at the bottom of a DIN rail stopper with the bottom of the DIN rail, and then engage the claw at the top of the DIN rail stopper with the top of the DIN rail.

(Engage the DIN rail stopper after confirming the arrow indication on the front surface of the DIN rail stopper.)

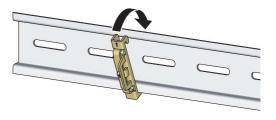
(6) Slide the DIN rain stopper to the edge of the module and tighten the screw using a screwdriver.

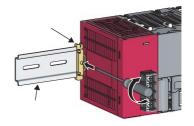
(Using the same procedure, attach a DIN rail stopper to other side of the module.)

Procedure complete.



0





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2.4 Wiring modules

This section explains the wiring of the power supply modules and the external I/O devices.



CAUTION:

The power supply must be disconnected when wiring modules.

2.4.1 Wiring the power supply module

The following shows an example of wiring the power line and the ground wire.

Grounding is performed to prevent electric shocks and malfunctions.

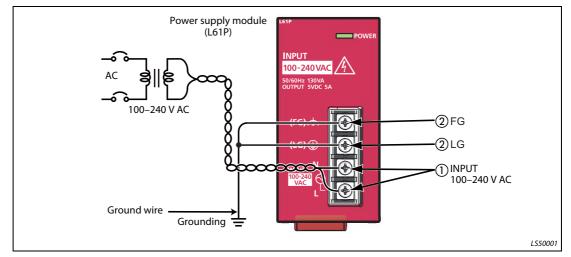


Fig. 2-4: Example: Wiring power line and ground line

- ① Connect the power supply (100–240 V AC) to the power input terminals via the breakers and the isolation transformers.
- (2) Connect the LG and FG terminals to the ground.

2.4.2 Wiring connector for external devices

The following shows an example of wiring the connectors for external devices.

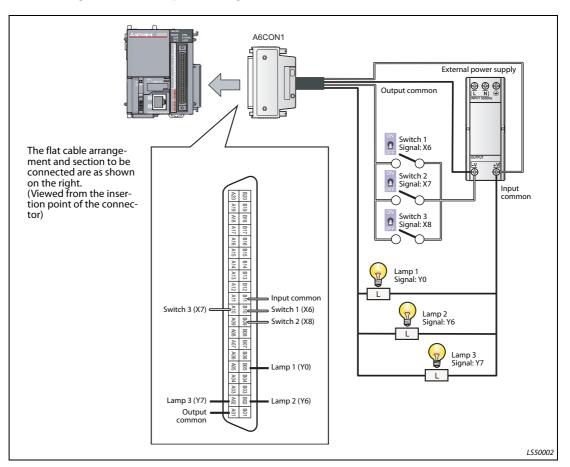


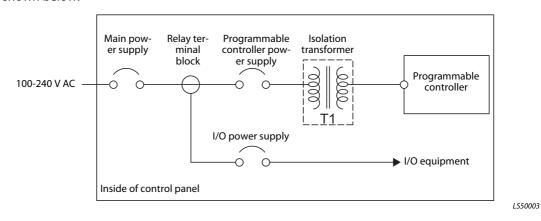
Fig. 2-5: Example: Wiring the connectors for external devices

CAUTION:

The pin arrangements of the connectors for external devices differ considerably from those of the I/O modules. Be sure to confirm the flat cable arrangement in the illustration shown above before connection.

NOTE

Wire the power supply lines for the I/O equipment and the programmable controller separately as shown below.



TERMINOLOGY	Isolation transformer	A two-winding transformer. The primary and secondary coils are wound separately to protect the secondary load.
	Control panel	This is a panel that consists of breakers, switches, protection devices, relays, and programmable controllers, etc. By combining them, the panel performs the following operation.
		 Receiving signals from external switches and sensors Supplying electricity to operate motors and solenoid valves of external machines and equipment Giving the signals to other equipment.

2.5 Checking power supply

Check that the power supply runs normally after configuring the system, mounting modules, and wiring.

Operating procedure

- Check before turning on the power supply.
 - Wiring of the power supply
 - Power supply voltage
- Set the CPU module to STOP.

Open the cover on the front of the CPU module and set the switch to STOP.

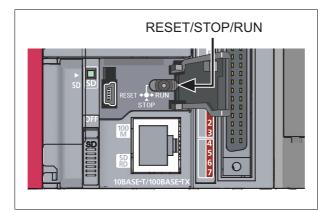


Fig. 2-6: RESET/STOP/RUN switch

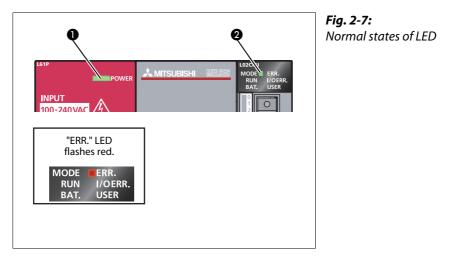
104001

- Turn on the power supply module.
- Check that the power supply runs normally.

Check the front LEDs on each module.

The following shows the normal state of the LEDs.

- Power supply module: **1** "POWER" LED lights in green.
- CPU module: **2** "MODE" LED lights in green.



LS600002

When a parameter or program is not written to the CPU module, the "ERR." LED flashes red, but it is not a problem at this stage. The LED goes off when a program is written. Also refer to section 2.7 "Writing programs".

• Construction of the system is complete. Turn off the power supply.

NOTES If the "POWER" LED of the power supply module is off, even though the power is turned on, check the wiring and installation statuses to confirm whether or not they are correct.

If the "BAT." LED of the CPU module is flashing, check whether the battery has been correctly connected.

TERMINOLOGY Parameter

Setup information necessary to operate the programmable controller system. Modules and the network are set by writing parameters to the CPU module.

2.6 Programming

This section explains how to create a program (sequence program) for sequence control.

2.6.1 "Devices" and "Instruction symbols" in programming

Combine "Devices" and "Instruction symbols" to create a sequence program.

Devices

Devices include bit devices and word devices.

• Bit device: Handles one-bit information such as the ON/OFF of a switch or a lamp.

a lamp	FF of a switch ON/	
)	ON OFF	
	OFF	L

Fig. 2-8: Examples of bit devices

LS70001

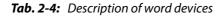
Device name	Device symbol	Description	
Input	Х	Receives a signal from an external device such as a switch.	
Output	Y	Outputs a signal to an external device such as a lamp.	
Internal relay	М	Temporarily saves data status in programs.	
Timer (contact)	т	Used to measure time. (When the set time comes, the contact is set to ON.)	
Counter (contact)	С	Used to count the number of times the input condition turns from OFF to ON. (When the counter reaches the set number, the contact is set to ON.)	

Tab. 2-3: Description of bit devices

• Word device: Handles 16-bit information such as numeric values and character strings.

Numeric value	Character string	Fig. 2-9: Examples of word devices
12345678	9 abcedefg	

Device name	Device symbol	Description
Data register	D	Registers numeric values and character strings.
Timer (current value)	т	Used to measure time. (Stores the current value of measuring time.)
Counter (current value)	С	Used to count the number of times the input condition turns from OFF to ON. (Stores the current value of the counter.)



TERMINOLOGY	Device	A location to store data such as ON/OFF, numeric values, and char- acter strings in the programmable controller.
	Internal relay	Breaks/connects the sequential circuit by switching ON/OFF.
	Contact	An input used when creating a sequence program.

Instruction symbols

The following shows the basic instructions of sequence control.

Instruction symbol	Description
1 F F5	Open contact: Conducts when an input signal is set to ON.
-1/- F6	Closed contact: Conducts when an input signal is set to OFF.
¢ F7	Coil output: Outputs data to a specified device.

 Tab. 2-5:
 Basic instructions of sequence control

TERMINOLOGY Coil

An output used when creating a sequence program.

2.6.2 Creating a program

Create a sequence program for rehearsal.

The following shows how to create a sequence program with basic devices and instruction symbols for sequence control.

The following devices and instruction symbols are used.

- Input: "X" device
- Output: "Y" device
- Instruction symbols: $\frac{1}{100}, \frac{1}{100}, \frac{1}{100}$

Create a program that performs the following controls.

- When the X6 and X7 switches are turned on, the Y0 output lamp turns on.
- When the X8 switch is turned on, the Y6 and Y7 output lamps turn off.

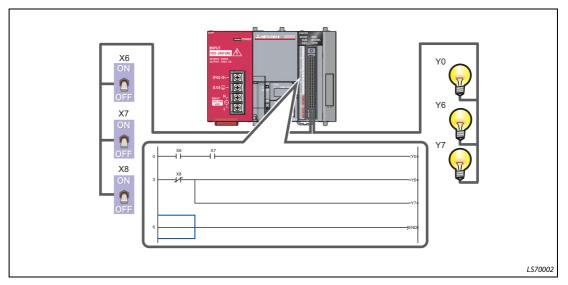


Fig. 2-10: Sequence program

The following explains the procedure to create this sequence program.

2.6.3 Starting GX Works2

Operating procedure

(1) Select Start \rightarrow All Programs \rightarrow MELSOFT Application \rightarrow GX Works2 \rightarrow GX Works2.

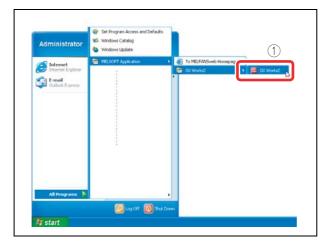


Fig. 2-11: Selecting program GX Works2

000001a

② After starting, the "GX Works2" main screen is displayed.

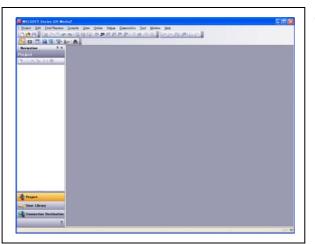


Fig. 2-12: "GX Works2" main screen

2.6.4 Creating a new project

A project consists of programs, device comments, and parameters.

Operating procedure

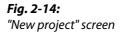
(1) Select $Project \rightarrow New...$

	mel	SOFT S	ieries GX Wo	rks2				Fig. 2-13: Select "New" ment
	Projec	D Edit	Find/Replace	Compile	View	<u>O</u> nline	Debug	
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	: 🙋 🖸)pen		Ctrl+0	0			
	<u> </u>	lose			_			
-								

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- ② Select *LCPU*.
- ③ Select the LCPU to be used (L02 in this guide).
- ④ Click the **OK** button.

OK Cancel
Cancel
2
3
]



000004a

(5) A project tree and a ladder screen are displayed.

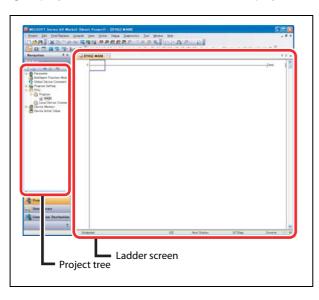


Fig. 2-15: Project tree and ladder screen

2.6.5 Creating a sequence program

Operating procedure

- Enter input device **X6**.
 - ① Click the area to enter, and then enter "X".
 - (2) Enter "6" on the ladder input screen, and then click the **OK** button.

	******	atics Tool Window Help 小部の可見見たい よなるが出ままが出		n 10
				stand day
Parameter Intelligent Function M Gibbal Device Comme Program Setting Program Program Local Device Com MAN Local Device Com Pourse Memory		CK		
11x6			- ОК	

Fig. 2-16: Enter input device X6

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• Enter input device **X7**.

(1) Click the area to enter, and then enter "X".

② Enter "7" on the ladder input screen, and then click the **OK** button.

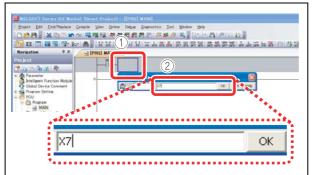


Fig. 2-17: Enter input device X7

000007a

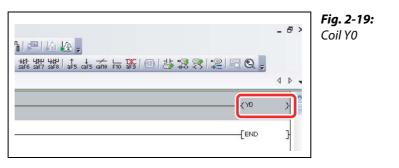
- Enter output device **Y0**.
 - ① Enter "Y".

② Enter "0" on the ladder input screen, and then click the **OK** button.

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Navigation * X Projuct * Program * Program *	
	YO ОК

Fig. 2-18: Enter output device Y0

Coil Y0 is displayed.



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• Enter input device **X8**.

1) Click $\frac{1}{F_6}$.

② Enter device "X8", and then click the **OK** button.

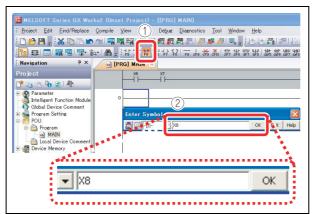


Fig. 2-20: Enter input device X8

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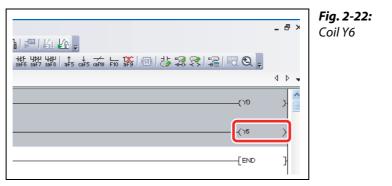
- Enter output device **Y6**.
 - 1) Enter "Y".

(2) Enter "6" on the ladder input screen, and then click the **OK** button.

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roject		
Parameter Pranneter Intelligent Function Module Global Device Comment Fropram Setting		
POU C Program	B IST Ind	ок Нер
MAIN		` ``
	A R R R R R	
		3
- Y6		ок

Fig. 2-21: Enter output device Y6

Coil Y6 is displayed.



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• Draw a line.

(1) Click the area to enter, and then enter $[Ctrl] + [\downarrow]$ and $[Ctrl] + [\rightarrow]$.

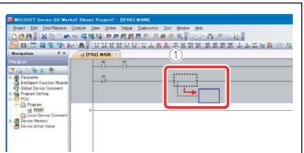
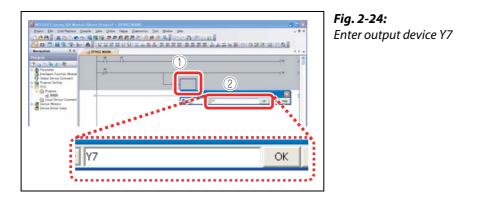


Fig. 2-23: Drawing a line

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- Enter output device **Y7**.
 - 1) Enter "Y".

② Enter "7" on the ladder input screen, and then click the **OK** button.



Coil Y7 is displayed.



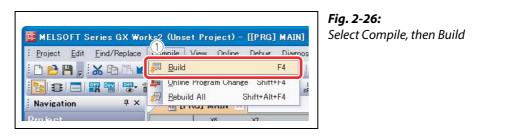
0000015a

2.6.6 Converting a program

Define the contents of the entered ladder block.

Operating procedure

(1) Select **Compile** \rightarrow **Build**.



(2) Perform the conversion to align entered ladders. When completed, the gray display turns to white.

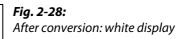


HISOIT Sreed Of Works' Dever Travel - (1745) MAN Dever Lie (notified and the second of the second o Before conversion: gray display

Fig. 2-27:

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000016a



000018a

The programming is completed.

NOTE

Lines can also be edited using the following short-cut keys.

Editing	Toolbar	Short-cut key
Drawing lines	F10	[F10]
Inputting vertical lines	l sF9	[Shift] + [F9] [Ctrl] + [↓]/[Ctrl] + [↑]
Inputting horizontal lines	F9	[F9] [Ctrl] + [←]/[Ctrl] + [→]
Inputting horizontal lines continually	_	$[Ctrl] + [Shift] + [\leftarrow]/$ [Ctrl] + [Shift] + [\rightarrow]

2.6.7 Saving a project

A program is saved in unit of project. Save the created project with a name.

Operating procedure

(1) Select **Project** \rightarrow **Save As...**

Proj	iect <u>E</u> dit	<u>F</u> ind/Replace	<u>C</u> ompile	<u>V</u> iew	<u>O</u> nline	Debug	Diagno
0	<u>N</u> ew		Ctrl+N	4 10	- 4 70 2 70	1	10
B	Open		Gtrl+C	1000	100	않았다	
	<u>C</u> lose					-	0 1 19 3
\mathbb{U}	Save		Ctrl+S	s 📕		L	

Fig. 2-29: Select Project, then Save As...

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The "Save As" screen is displayed.

- ② Specify the save location.
- ③ Enter the work space name, project name, and title.
- ④ Click the *Save* button.

Save Eolder Pati			Steps to i	follow in the "Save As" s	cre
	ings¥ZL01477¥My Documents	rowse			
Workspace/Project List:					
Workspace					
PROGRAM001					
PROGRAM001					
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	3				
Workspace Name:	PROGRAM001				
Workspace Name: Project Name:					
Project Name:	PROGRAM001 SampleProject				
	PROGRAM001				
Project Name:	PROGRAM001 SampleProject				

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⑤ Click the **Yes** button.

	OFT Series G		10000
1		ed project does n ht to create a new	
(5)	Yes] No	1

Fig. 2-31: Confirm saving of the project

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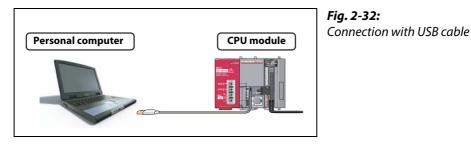
The project is saved.

2.7 Writing programs

This section explains hot to write the program to the CPU module.

2.7.1 Connecting the CPU module and the personal computer

Connect the CPU module and the USB port of the personal computer with a USB cable.



1060001

2.7.2 Turning on the programmable controller

Turn on the power supply module. Then turn on the power of the external power supply.

2.7.3 Setting GX Works2 and the programmable controller connection

Operating procedure

① Click Connection Destination.

② Double-click the data name to be transferred.

C* 🗈 🔁 🐌 🖻		-11		
Current Connection	3 -	X8		
2				
All Connections	Ļ			
Connection1	6			
	ľ			
Project				
User Library				
Connection Destination				
»				

Fig. 2-33:

Select connection destination and data name to be transferred

The "Transfer Setup Connection" screen is displayed.

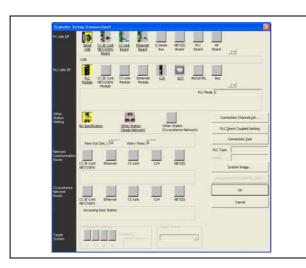


Fig. 2-34: "Transfer Setup Connection" screen

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③ Double-click Serial USB.

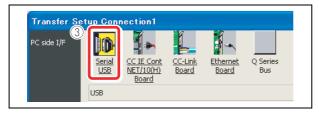


Fig. 2-35: PC side I/F part of "Transfer Setup Connection" screen

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The "PC side I/F Serial Setting" screen is displayed.

- ④ Select USB.
- (5) Click the **OK** button.

PC side I/F Serial Setting	
RS-232C	5 ок Cancel

Fig. 2-36: "PC side I/F Serial Setting" screen

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6 Click PLC module.

⑦ Click *No Specification*.

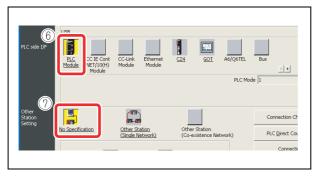


Fig. 2-37: Click appropriate options in the "Transfer Setup Connection" screen

(8) Click the Connection Test button

ither Ration Jetting				Connection Channel List
	No Specification	Other Station (Single Network)	Other Station (Co-existence Networl 8	PLC Direct Coupled Setting
	Time Out (Sec.)	0 Retry Times 0	٢	Connection Iest

Fig. 2-38: Starting the connection test

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When properly connected, the connection completion message is displayed.

(9) Click the **OK** button.

MELS	OFT Application	
(į)	Successfully connected with the L02CPU.	

Fig. 2-39: Connection completion message

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1 Click the **OK** button.

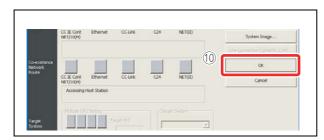


Fig. 2-40: Click the **OK** button to close the "Transfer Setup Connection" screen

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The connection setting is completed.

NOTE

If the screen shown below is displayed after step (8) is performed, check that the USB driver has been installed correctly and that an appropriate connection cable (USB cable) is being used.

MELS	:OFT application
į)	Unable to communicate with PLC. The following reasons may be responsible: Communication time out, Cable trouble, Peerson and the status, PLC power are OFF or reset status, USB trouble, Peerson, <es:01800502></es:01800502>
	<u> </u>

For the installation of the USB driver, refer to the GX Works2 installation instructions.

2.7.4 Formatting the CPU module

Before writing the program, format the CPU module to set it to the initial status.

```
(1) Select Online \rightarrow PLC Memory Operation \rightarrow Format PLC Memory.
```

HELSOFT Series GX Works2	ly Documents¥PROGRAM001EVSamo	InProject - [[PRG] MAIN]
i Broject Edit End/Replace Compile View Orl	ine Debug Diagnostics Icol Window	

Fig. 2-41: Select the "Format PLC Memory" menu

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The "Format PLC Memory" screen is displayed.

- (2) Select Program Memory/Device Memory from Target Memory.
- ③ Click the *Execute* button.

format PLC Memory	×	Fig. 2-42: "Format PLC Memory" screen
Connection Channel List		
Connection Interface USB	<> PLC Module	
Target PLC 2 rk No. Station No. Host	PLC Type LO2	
Target Memory Program Memory/Device Memory Format Type C Do not create a user setting system area (the requ C Greate a user setting system area) iired system area only)	
	K Steps	
High speed monitor area from other station	(015K Steps)	
Online change area of multiple blocks	K Steps	

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NOTE

If data such as programs and parameters are already stored in the CPU module, they are deleted. Thus the necessary data should be read from the CPU module and saved as a project before executing the Format PLC "Format PLC Memory" function.

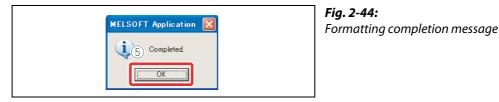
④ Click the **YES** button.

Memory will be formatted. Do you want to continue?

Fig. 2-43: Confirm memory formatting

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(5) Click the **OK** button.



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The CPU module formatting is completed.

Click the Close button to close the "Format PLC Memory" screen.

2.7.5 Writing programs to the CPU module

(1) Select **Online** \rightarrow **Write to PLC...**

👪 MELSOFT Serie	s GX Works2	¥ZL01477¥	My Documents¥PROGI	RAM001 E¥Samp	leProject
i Project Edit Ein			line Debug Diagnostics Dest for DIC Write to PLC	s <u>T</u> ool <u>W</u> indow	Help
Navigation Connection Des Part R Connection	# x tination		Start/Stop PLC Password/Keyword PLC Memory Operation	4	

Fig. 2-45: Select the "Write to PLC..." menu

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The "Online Data Operation" screen is displayed.

- ② Click **Parameter + Program**. "Program" and "Parameter" are checked.
- ③ Click the *Execute* button.

Serial Port PLC Module Conn						System Image	"Online Data Operation" scr
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Module Name Document	togram Select g		Detail	and the second s	Target Memory	529	
SangleProject	100	1 argen	Lincas	Link Change	Larget Hemory	307	
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- Parameter						1 20000000	
PLC/Network/Remote Password/Switch	h Setting	1		2009/12/25 17:16:12		2936 Bytes	
Gobal Device Conment							
COMPRENT				2009/12/25 17:16:14			
- Device Memory			Detail				
#BHADY		1.0		2009/12/25 17:16:16			
Necessary Setting(No Setting / Almosty 5 Writing Star 5,1928ytec	et) Setifitune	eded(>==	tellery (Pree Volume 81,920	Obytes	Rothesta	

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When the "Write to PLC" function is properly executed, the following message is displayed.

④ Click the **Close** button.

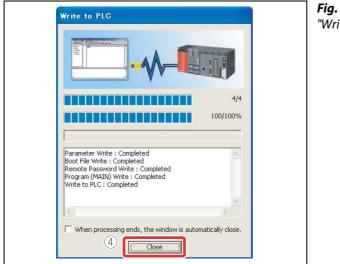


Fig. 2-47: "Write to PLC" completion message

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The program writing is completed.

Click the *Close* button to close the "Online Data Operation" screen.

2.8 Checking operation

Execute the program written to the CPU module to check the operation.

Check the program operation with the switches and lamps or the monitor function of GX Works2.

2.8.1 Executing the program written to the CPU module

Use the "RESET/STOP/RUN" switch on the front of the CPU module for the operation.

- RUN: Executes the sequence program operation.
- STOP: Stops the sequence program operation.
- RESET: Performs the hardware reset, operation error reset, and operation initialization.

Operating procedure

• Resetting the CPU module

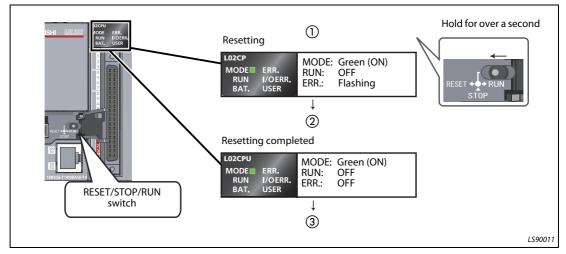


Fig. 2-48: Resetting procedure

- ① Tilt the "RESET/STOP/RUN" switch on the front of the CPU module towards "RESET" for over a second.
- ② After the "ERR." LED flashes and the "ERR." LED and "MODE" LED turn OFF, release the switch.
- ③ The switch returns to "STOP". Resetting is completed.

• Executing the program

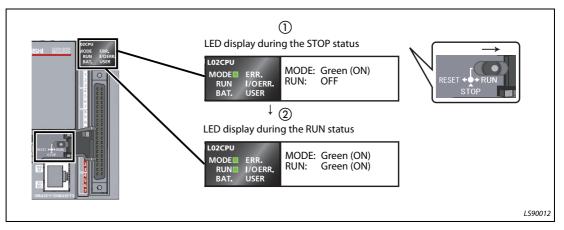


Fig. 2-49: Executing the program

- ① Tilt the "RESET/STOP/RUN" switch on the front of the CPU module towards "RUN".
- ② If the "RUN" LED turns on green, the program is running normally.

Do not use pointed tools such as a screwdriver when operating the switch. They may damage the switch.

2.8.2 Using switches and lamps to check the operation

Check the program operation by turning the switches and lamps ON/OFF.

If all of the switches (X6, X7, and X8) are off right after the execution of the program, the output lamp Y0 stays off and the output lamp Y6 and the output lamp Y7 stay on due to the instructions from the created program.

• Operation check step 1

Turn on the switch X6.

The output lamp Y0 stays off and the output lamps Y6 and Y7 stay on.

• Operation check step 2

Turn on the switch X7.

The output lamp Y0 turns on.

Operation check step 3

Turn on the switch X8.

The output lamps Y6 and Y7 turn off.

NOTE

NOTE

The described results of each step of the operation check are only valid, if the switch status of the step before is kept at the current step.

2.8.3 Checking the operation in GX Works2

Check the program operation by using the monitor mode on the GX Works2 screen, where switches and lamps can be operated and their statuses can be checked.

• Set the operating program display screen to the monitor mode.

Select **Online** → **Monitor** → **Start Monitoring**.

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		Feasiver Webdy	That Menhang F)

Fig. 2-50: Select the "Start monitoring" menu

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Execute the monitor to display the "Monitor status" screen.

	Fig. 2-51:
)GRAMUU1E¥SampleProject – [[PRG] MAIN]	Monitor status sci
stics Tool Window Pro-	ocal Device not Executed
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	4 b 🗸

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The ON/OFF status of bit devices can be checked on the ladder screen.

Contacts/outputs set to ON are displayed in blue.

Right after the program execution, bit devices X8, Y6, and Y7 are lit in blue due to the instructions from the program.

	Fig. 2-52:
	Contacts set to ON are displayed in blue
Blue illumination	
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Operation check 1

① Double-click **X6** while pressing the [Shift] key. X6 turns on.

	FIG. 2-53:
	Fig. 2-53: Operation check step 1
<->	
9. G	
5° 6	

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• Operation check 2

(2) Double-click **X7** while pressing the [Shift] key. X7 turns on and Y0 lights.

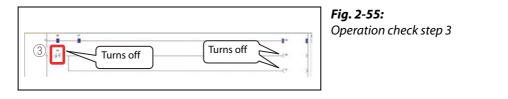
2	Fig. 2-54: Operation check step 2
Blue illumination Blue illumination	

MELSEC-L Series Quick start guide

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• Operation check 3

③ Double-click **X8** while pressing the [Shift] key. X8 turns off and Y6 and Y7 turn off.



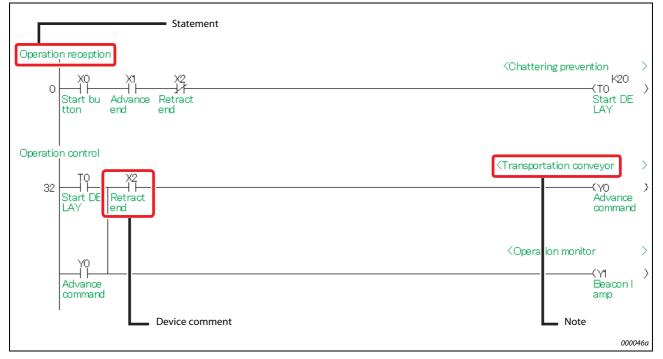
NOTE

While pressing the [Shift] key, double-click devices set to ON in Operation checks 1 and 2 to turn them off.

3 Frequently-used functions

This section explains functions frequently used in GX Works2.

3.1 Clarifying programs <Comment>



Use comments to clarify the contents of a program.

Fig. 3-1: Use of comments

The following are the three types of comment.

Туре	Description	Number of characters
Device comment	Describes roles and usage of each device.	32
Statement	Describes roles and usage of ladder blocks.	64
Note	Describes roles and usage of output instructions.	32

Tab. 3-1:Types of comment

NOTE

Select *View* \rightarrow *Comment* ([Ctrl] key + [F5] key) to switch the comment display/hide setting.

3.1.1 Creating device comments

Device comments can be entered from the list or on the ladder diagram.

Input operation from the list

① Double-click *Global Device Comment* in the project list.



Fig. 3-2: Select "Global Device Comment"

Fig. 3-3:

"Device Comment" screen

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- ② Enter the start device number in "Device Name" and press the [Enter] key.
- ③ Enter a comment in the "Comment" column.
 When entering comments for other devices, repeat Steps ② and ③.

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and the second second	210				
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	215				
	41.6				

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④ Click the 🔀 button to close the screen.

Input operation on the ladder diagram

(1) Select *Edit* \rightarrow *Documentation* \rightarrow *Device Comment*.

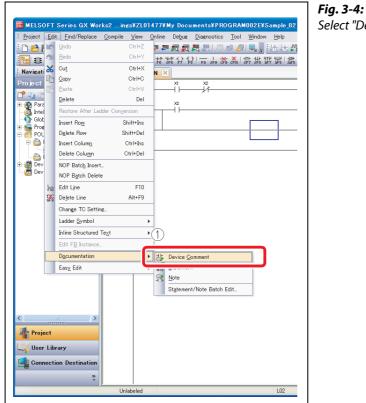


Fig. 3-4: Select "Device Comment" menu

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- ② Double-click the ladder symbol to enter a comment.
- ③ Enter a comment on the "Input Device Comment" screen.
- ④ Click the **OK** button.

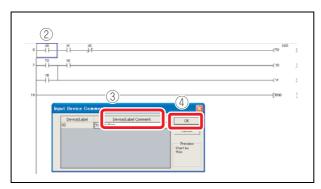


Fig. 3-5: "Input Device Comment" screen

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(5) Select the *Device Comment* menu in Step (1) again to finish the operation.

Entering comments when creating ladders

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Rogram Setting POU B C Program		LCPU Logging Configuration Tool. By/It-in I/O Module Tool	
Local Device Connent	14	Check Igtelligent Function Module Parameter Intelligent Function Module Tool	

Fig. 3-6: Select "Options" menu

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- (2) Select **Program Editor** \rightarrow **Ladder** \rightarrow **Device**.
- ③ Activate "Enter label comment and device comment".
- ④ Click the **OK** button.

lptions - Sample_02		Fig. 3-7: "Options" screen
Project Automatic Save Change History Program Editor Ladder/SPC	Operational Setting Image: Provide and device comment 3	
Device Device Device Comment Listor Parameter Monico PLC Encod(Write Orales Change Intelligent Function Module	Explanation (4)	
Back to System Default		

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After the ladder entry operation, the "Input Device Comment" screen is displayed and a comment can be entered.

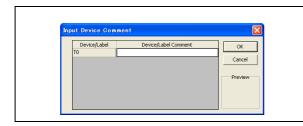


Fig. 3-8:

Enter a command on the "Input Device Comment" screen

3.1.2 Creating statements

Operating procedure

```
(1) Select Edit \rightarrow Documentation \rightarrow Statement.
    KELSOFT Series GX Works2 ...ings¥ZL01477¥My Documents¥PROGRAM0021
      Project Edit Find/Replace Compile View Online Debug Diagnostics Tool
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                  Redo
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     ** *** *> *> F9 = s+9 ** *** ***
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      Para
Intel
                      tore After Lado
                  Insert Row
                                        Shift+Ins
          POI
                  Delete Row
                                       Shift+Del
                  Insert Colum<u>n</u>
          P
                                        Ctrl+Ins
                  Delete Colu<u>m</u>n
                                        Ctrl+Del
          Dev
       NOP Batch Insert...
                  NOP Batch Delete
                  Edit Line
                                           F10
                                          Alt+F9
                  De<u>l</u>ete Line
                  Change TC Setting
                  Ladder <u>S</u>ymbol
                  Inline Structured Text
                                                Þ
                  Documentation
                  Easy Edit
                                                       Statement/Note Batch Edit
```

Fig. 3-9: Select "Statement" menu

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- 2 Double-click the ladder symbol to enter a statement.
- ③ Select In PLC.

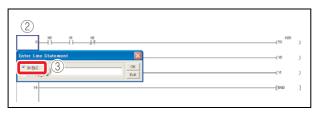


Fig. 3-10: "Enter Line Statement" screen

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④ Enter a statement.

⑤ Click the **OK** button.

Enter Line	Statement	6 🛽
 In <u>P</u>LC In Peripher 	(4) Operation reception	OK Exit

Fig. 3-11: Close the "Enter Line Statement" screen after entering a statement

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(6) Select the "Statement" menu in Step (1) again to finish the operation.
If a statement is entered, the program peeds to be "converted" to reflect the

If a statement is entered, the program needs to be "converted" to reflect the input. For details on the conversion, refer to section 2.6.6 "Converting a program".

NOTE

The following are the two types of statement.

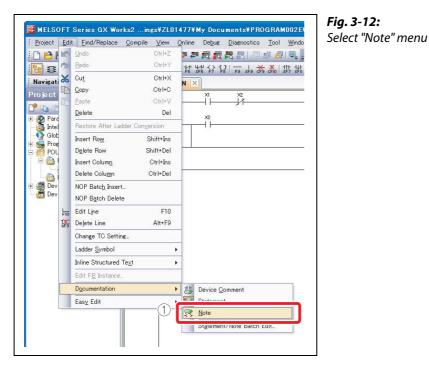
- PLC statement
- Integrated statements can be written to/read from the CPU module.
- Peripheral statement

The program memory capacity can be saved since peripheral statements are not written to the CPU module. "*" is prefixed to the peripheral statement in the program.

3.1.3 Creating notes

Operating procedure

(1) Select *Edit* \rightarrow *Documentation* \rightarrow *Note*.



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- ② Double-click an output instruction to enter a note.
- ③ Select In PLC .

|--|

Fig. 3-13: "Enter Note" screen

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④ Enter a note.

(5) Click the **OK** button.



Fig. 3-14: Close the "Enter Note" screen after entering a statement

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(6) Select the *Note* menu in Step (1) again to finish the operation. If a note is entered, the program needs to be "converted" to reflect.

If a note is entered, the program needs to be "converted" to reflect the input. For details on the conversion, refer to section 2.6.6 "Converting a program".

NOTE

The following are the two types of note.

- PLC note
 - Integrated notes can be written to/read from the CPU module.
- Peripheral note

The program memory capacity can be saved since peripheral notes are not written to the CPU module. "*" is prefixed to the peripheral note in the program.

3.2 Monitoring device values and status <Device monitor>

The following are the two types of device monitor.

Туре	Purpose
Device batch monitor	Used to monitor consecutive devices of one type.
Entry data monitor	Used to simultaneously monitor separately-located devices in the ladder or various devices on one screen.

Tab. 3-2: Types of device monitor

3.2.1 Device batch monitor

Monitors consecutive devices by specifying the start device number.

Operating procedure

(1) Select **Online** \rightarrow **Monitor** \rightarrow **Device**/Buffer Memory Batch.

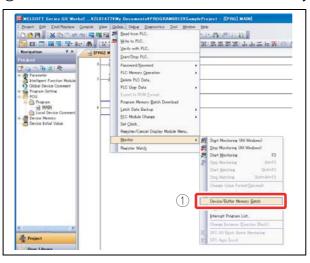


Fig. 3-15: Select "Device/Buffer Memory Batch" menu

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② Enter the start device number to be monitored and press the [Enter] key.

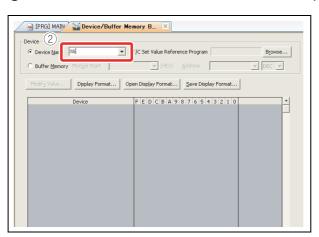


Fig. 3-16: "Device/Buffer Memory Batch" screen

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The values of devices and the ON/OFF status of contacts/coils are displayed.

③ Click the X button to close the screen.

nice (Ma		
Device Name	T/C Set Value Reference Program	Browse
Duffer Memory (Mint)/Print	+ (#1) _ (ditmi	+ 000 +
Modify Value Display Format	Open Display Format Save Display Format	L
Device	FEDCEA9876543210	
226	00000000000000	7
316	000000000000000000	
226	00000000000000000	
136	000000000000000000	0
X46	000000000000000000000000000000000000000	
156	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
756	0000000000000000000	
90%	000000000000000000000000000000000000000	
306	000000000000000000000000000000000000000	
00%6	000000000000000000000000000000000000000	
3046	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
01086	000000000000000000000000000000000000000	
XDC6	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
1006	000000000000000000	
2066	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
2066	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
1106	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
2016	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
3126	0000000000000000000	
1136	000000000000000000	
3(146	0000000000000000000	
0:156	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
31366 31376	000000000000000000	
	000000000000000000	
0186	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
0(196	000000000000000000000000000000000000000	
10A6 0086	000000000000000000000000000000000000000	
1186	000000000000000000000000000000000000000	
XIC6 XID6		

Fig. 3-17: Close "Device/Buffer Memory Batch" screen

3.2.2 Entry data monitor

The device registration methods used to perform the Entry data monitoring are the specified device registration and the device registration with ladder monitor display. The device statuses can be displayed in watch windows 1 to 4.

Specified device registration

Register specified devices in Watch window 1.

(1) Select **Online** \rightarrow **Monitor** \rightarrow **Start Monitoring**.

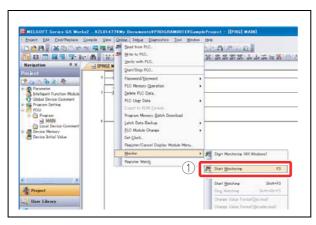


Fig. 3-18: Select "Start Monitoring" menu

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(2) Select *View* \rightarrow *Docking Window* \rightarrow *Watch1*.

	1000	w Online Debug Diagnostics Tool Toolbar	1944	ow Heb [사립:면제조 @] 000
		Statusbar	1.00	
Navigation 9 × 0	0	Qolora		
Project		Dockine Window		Navigation Window
P 24 15 Pb 21 Pb		Cogment Otri+F5	=	Function Block Sglection Window
Parameter		Statement Ctrl+F7		Qutput Window
Global Device Comment		Ngte Carl+F8	2)	Cross Beference
Rogram Setting		Non-Display Ladder Block Ctrl+Num -		
POU POU Popram		Display Ladder Block Otri+Num +		Watch1
MAIN		Non-Djsplay All Ladder Block Display All Ladder Block		
E 👹 Device Memory	10	Deges Display Cirl+Alt+F8		Watch2 Watch4
Device Initial Value		All Device Display		Intelligent Function Module Monitor
		Cancel All Device Display		and the second se
		Display Compile Result.	an.	End/Replace

Fig. 3-19: Select "Watch1" menu

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Watch window 1 is displayed on the bottom right of the screen.

③ Double-click the "Device/Label" column.



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④ Enter the device/label to be registered and press the [Enter] key.

e/lab

(5) Select **Online** \rightarrow **Monitor** \rightarrow **Start Watching**.

Powert Edit End/Replace C	1919 14 14 14 14 14 14 14 14 14 14 14 14 14	brine Debue Deemostics Tool Windo Baad tron PLC. Winze to PLC. Winze to PLC. Winzy with PLC.	011	第113553535134355535100 第1135535351343535535100 1999	Select "Start Watching" menu
Revealed in the second	0	Quer/Biop PLC. Parsmod/Egmend PLC Meany Spension Date PLC Data PLC Use Data Logart to FIOH Egment. Programmers Back Spension EgG Module Change Sof Splack. Pargetar/Splace Data Pargetar/Splace Data Pargetar/Splace Data Pargetar/Splace Data Pargetar/Splace Data Pargetar/Splace Pargetar/Parg	••••••		
c () Project		Monitor Register Wetzg	•) (

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The values of devices and the ON/OFF status of contacts/coils are displayed.

Device registration with ladder monitor display

Specify the range of the ladder diagram on the ladder monitor screen and register the devices in a batch.

(1) Select **Online** \rightarrow **Monitor** \rightarrow **Start Monitoring**.

Project Ent End/Replace Compile Ve D C R	yerity with FLC.	美国路路路武社社社社市東京(1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
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	Monitor	• 🕰 Start Monitorine (All Windows)
	Register Watch	Start Monitorine F3
e 3		Start Watching Shift+F3 Dog Matching Shift+An-F5
User Library		Orange Value Format@ecimal0 Orange Value Format@ecimal0

Fig. 3-23: Select "Start Monitoring" menu

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(2) Select *View* \rightarrow *Docking Window* \rightarrow *Watch*1.

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Project	-	Dockine Window	1	Navigation Window
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Device Memory Device Initial Value	-	Deges Display Ciri+Al+FB		Watchg Watché
		All Device Display		Intelligent Function Module Monitor
		Carcel All Device Display Display Compile Result.	iffa	Eind/Replace



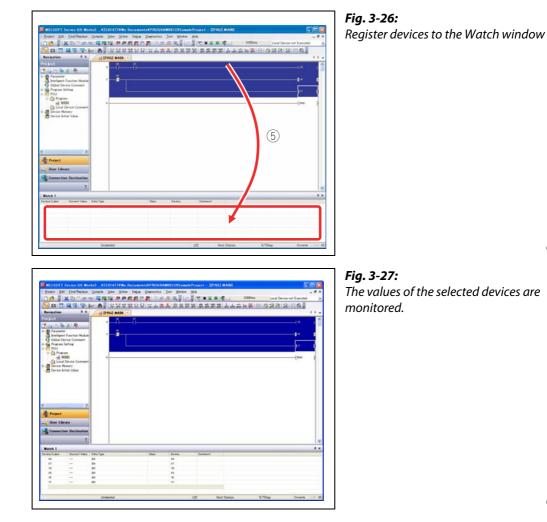
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③ Click the start point of the ladder.

④ Click the end point of the ladder while pressing the [Shift] key. The range is specified.

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Francisco Construction	4 a 2 R 4 Function Modu weice Connect Setting fain 64201 L Denice Connect		9	. A. D. H. W.	21.25.25.2		4	-(*	
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Project									
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Dear La	ion Destinatio	-							
User Li	and the second se	-							
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Dear Lik Connect Fatch 1	ion Destinatio	Data Type	Own	Device	Optimist				
Deer Lik	ion Destination		Own	Desize 18	Optimized				
Dear Li Connect Artch 1	ion Destination	Data Type	Own		Optimist				
Dear Li Connect Artch 1	ion Destination	Data Type	Own		Connect				
Dear Li Connect Artch 1	ion Destination	Data Type	Own		Gammert				
Unar Lik	ion Destination	Data Type	Own		Opened				

Fig. 3-25: Specify the range on the ladder monitor screen



(5) Drag and drop the selected range to the watch window 1.

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(6) Select **Online** → **Monitor** → **Start Watching**.

Project	PRG] M	Verity with PLC. Start/Stop PLC.	32	「教教学部」による言語。
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		Monitor Register Watch		Styrt Monitoring (All Windows) Stop Monitoring (All Windows) Start <u>Honitoring</u> F2

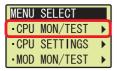


NOTE Installing the display unit allows you to monitor specified device memory values without using GX Works2.

Operating procedure

The following is an example of monitoring the Y6 value.

• Select function selection screen, then **CPU MON/TEST**, and then click the **b** button.



• Select **DEV MON/TEST**, and then click the **OK** button.



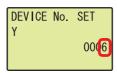
• Click the \blacktriangleleft button on the screen shown below.

X0 I	T16
	0
FEDCBA9876543	210

• Select a device using \blacktriangle or \triangledown , and then click the **OK** button.

• X	
• Y	
- M	
۰L	

Move the cursor position using ◀ or ▶, and increase/decrease the value for each digit one number at a time to specify the device number using ▲ or ▼, and then click the OK button.



The Y6 value is displayed.

Y6	IT16
	3
FEDCBA9876	543210

3.3 Changing device values <Device test>

This function forcibly turns on/off the bit devices (X and Y) or changes the current value of the word device (such as T, C, and D).

3.3.1 Forced ON/OFF of bit device

Turn on/off forcibly the bit device (X and Y) of the CPU module.

Operating procedure

(1) Select **Online** \rightarrow **Monitor** \rightarrow **Start Monitoring**.

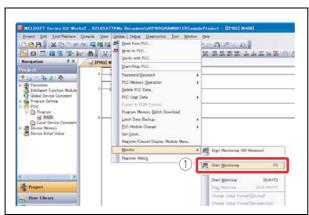


Fig. 3-29: Select "Start Monitoring" menu

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② Select **Debug** → **Forced Input Output Registration/Cancellation...**

Broject Edit Eind/Replace Compile View Onlie	e Debug Diagnostics Icol Window Help	
🗅 😝 🗿 🗶 🗈 🗅 🗠 소비 🖼 🖬 🖼 🖛 🗖	🛯 💋 Start/Stop Simulation	0 _
191日月1日 - 101 日 - 11 日本	Show Restricted Instructions	1 22 Ja Ja Ta
Navigation ² × [PRG] 2	Earced liput Output Registration/Cancellatio	n
° <u>⊣</u> ⊢	Sampline Trace	
Parameter 3 X8 Intelligent Function Module 3	Scan Time Measurement.	

Fig. 3-30: Select "Forced Input Output Registration/Cancellation..." menu

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- ③ Enter a device to be turned on/off forcibly.
- ④ Turn on/off the device forcibly.

Register FORCE ON:Turns on the device.Register FORCE OFF:Turns off the device.Cancel Registration:Cancels the registration of the specified device.

(6)				FORCE ON	
No.	Device	ON/OFF	No.	Device	ON/OFF
1			17		
2			18		
3			19		
4			20		
5			21		
6		-	22	6	
7			23		
8			24		
10			25	9	
11			25		
12		-	27		
13		-	20	9	
14		-	30		
15			31	1	
16			32		

3.3.2 Word device current value change

Changes the current value of the word device (such as T, C, and D) in the CPU module to the specified value.

Operating procedure

(1) Select **Online** \rightarrow **Monitor** \rightarrow **Start Monitoring**.

Navisation 0 × ⊇ (PR0) W Surt/Stop FLC. Projnat 0 0 Fasimer//jnyword Pasimer//jnyword Point 0 1 Point Point	
Statistics function Module Comment Commen	
Covice Sintal Volan Device Sintal Volan D	Start Monitorine (All Windows)

Fig. 3-32: Select "Start Monitoring" menu

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(2) Select **Debug** \rightarrow **Modify Value**.

D 😂 📲 😹 🗈 🗇 🗠		Debus Disensatics Tool Window Hinb Start/Stop Simulation	0
10 10 10 10 10 10 10 10 10 10 10 10 10 1		Modity Value	T ats ats
Projnot Parameter Stallient Function Module Guidal Davise Comment Forum Pour Porenn MAN Local Davise Comment	0 XB 7 T0 7 V0 1	Executional Conditioned Device Test Sampling Trace Sign Time Measurement.	•

Fig. 3-33: Select "Modify Value" menu

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- ③ Enter the device number to be changed.
- ④ Enter the value to be changed.
- (5) Click the **Set** button.

Modify Value		Fig. 3-34: "Modify Value" screer
Device/Label Buffer Memory Device/Label [T0 Data Iype Word[Signed]	3	
Yel () [20 HEX Settable Range -32768 to 32767	Sat	
Execution Result << Execution Result	Close	
Device/Label Data Type	Setting Value	

NOTE Installing the display unit allows the forced ON/OFF of X/Y device with the operation of the display unit. **Operating procedure** The following is an example of operating the forced ON/OFF of X7. • Select function selection screen, then **CPU MON/TEST**, and then click the button. MENU SELECT •CPU MON/TEST 🕨 •CPU SETTINGS -MOD MON/TEST • Select **FORCED ON/OFF**, and then click the button. MENU>CPU MON/TES •DEV MON/TEST DEVICE CLEAR FORCED ON/OFF ► • Select SET ON/OFF, and then click the OK button. MENU>CPU>ON/OFF •SET ON/OFF -CLR FORCE •CLR ALL FORCES • Select X/Y using \blacktriangle or \blacktriangledown . SET FORCE ON/OFF X)000 ON • Move the cursor position using ◀ or ▶, and increase/decrease the value for each digit one number at a time to specify the device number using \blacktriangle or $\mathbf{\nabla}$. SET FORCE ON/OFF X00(7) ON • Move the cursor position using \blacktriangleleft or \blacktriangleright , and switch ON/OFF using \blacktriangle or \triangledown , and then click the OK button. SET FORCE ON/OFF X0007 0FF

3.4 Changing running programs <Online program change>

This function writes only the modified ladder block to the CPU module while the CPU module is in the "RUN" status. A program can be written in a short time since this function does not transfer the whole program.

The following is an example of adding a contact to the ladder.

Operating procedure

① Display the ladder.

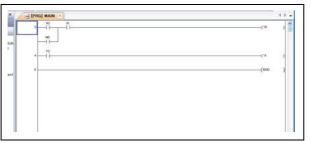
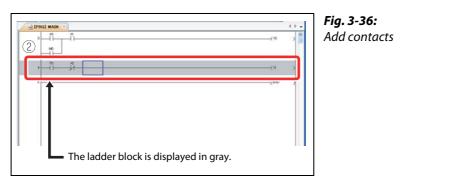


Fig. 3-35: Display ladder block to be changed

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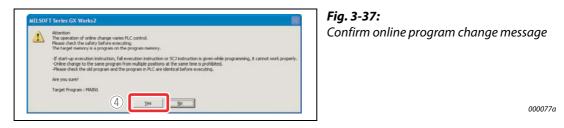
Add contacts.



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(3) Select Compile \rightarrow Online Program Change.

④ Click the Yes button.



When the online program change has been properly completed, the following message is displayed.

(5) Click the **OK** button.



NOTE

The program in the CPU module and the program to be modified in GX Works2 must be the same to perform the online program change. If you are not sure, verify the programs in advance or modify the ladder after performing the "Read from PLC" function.

3.5 Checking errors < Error jump>

If an error occurs, it can be checked with PLC diagnostics. By using the Error jump, you can jump to the step number of the sequence program corresponding to the error.

3.5.1 PLC diagnostics

The details of errors occurring can be checked from the PLC diagnostics.

Operating procedure

(1) Select **Diagnostics** \rightarrow **PLC Diagnostics**.

Project Edit Find/Replace	Compile View Online Debu		_
		ELC Diagnostics	- 14 k
Navigation P X	・ 曲。 計 話 封 話 分 別 -	CC-Link [E Control Diagnostics	75 434 484 1 76 5477 5478 475 0
Project		MELSECNET Disensatics QC-Link Diagnostics System Monitor	

Fig. 3-39: Select "PLC Diagnostics" menu

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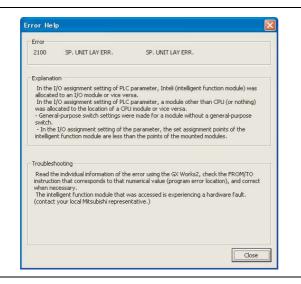
② Click the *Error Help* button of the current error or the error history.

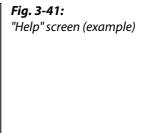
Hontor Status	Connection Channel Li	A				
Horitoring		Serial Port PLC Modul	Re Connection(USB)			System Image
	Model Name	Operation Status STOP	Setub			
	LLEOU	STOP	5100			
The Function menu is extended						
from the PLC image.						
	Error Information					
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T	PLC Status No.	Carert Error(Aldrevi		0 TeacMont	(Cer Tine	Entra Junp Entra Brib
	PLC Status No.		No Error	0 Textford	Vier Tee	
	PLC Status No. 1 0 Error History Occur	rrence Order Display	Ascending 💌		F	Error (Hilp
	PLC Status No. Dror History Cocus Status No. Error	rrence Order Display [/ Messace(Abbrevistion)	No Error Ascending 💌	There Pite (F	Error (Hilp
	PLC 24ms No. Error History Occu 24ms No. Error 1000 BATT	rrence Order Digiles [- Message(Abbrevision) ERY DRACE	Ascending Brox Message(Detail) BATTERY (ESROR)	1000 Ptr (2		Error Heltory
	PLC 2445 No. Error Hetory Coco 2646 No. Error 1600 BATT 1600 BATT 1600 BATT	rrence Order Display (J Messace(Abbrevision) EXY ERROR C DOWN	Aconding According A	Tear Ply 2000 - 1		Error (Hilp
	PLC Sature No. Error History Occur Zatus No. Error 1000 BATT 1000 BATT 1000 BATT 1000 BATT	rrence Order Dapley () Message/Abbrevision) tory DROR C Dowly Exry DROR	According According Chron Message/Detail Actics Down Actics Down Battery Earce	The Pt (2)	\$88 \$	Error Heltory
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	PLC 29456 16	rrence Order Display (2 Message/Abbrevistics) Elsy EBROR C DOWN Elsy EBROR C DOWN Elsy EBROR	Asomding According Trop Message/Detail BATTER EBROR ACEC DOWN BATTER EBROR ACEC DOWN BATTER EBROR BATTER EBROR BATTER EBROR	1000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1	\$88 \$	Error Heltory
	PLC Status No. 1 0 Dror History Occur Status No. Dror Allow Allow Astronomy Astronomy	rrence Onder Display (J Message/Abbrewickon) Etry DROB C DOWN Etry DROB C DOWN Etry DROB C DOWN	According	Tea Ply (2 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1		Error Brib Error Hetary Gew Hetary
	PLC Status No. 1 0 Error History Occur Page No. Bron A 1500 AGD A 1500 AGD A 1500 AGD A 1500 AGD A 1500 AGD	rrence Order Display Persoan-Ribbrevision Enr Display Enr Display Enr Display Enr Display Enr Display Code Cod	Acondreg Acondreg Acondreg Acon MessaerDetall BATTER (BARC AcOn Down Acon Down Acon Down Acon Down Acon Down	2000 1 1 2000 1 1 2000 1 1 2000 1 1 2000 1 1 2000 1 1 2000 1 1	22122	Enor Helary Geor Helary Dror Hela
	PLC Status No. 1 0 Dror Hellowy Occur Zeglus No. Dror Hellowy Alloo Battin Dror Allow Alloo Battin Dror Allow	rrence Order Display Messaco/Abbrevictori Igor IBP/OR C DOWN ENY ENPOR C DOWN ENY ENFOR C DOWN C DOWN C DOWN	According Accord	Tea Ply 2 2000-1- 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1	0 0 000 0 120 1 42 1 42 1 55:47 122:20:11	Env Hetry Gew Hetry
	PLC Status No. L 0 Error History Occur Return No. Denor A 1500 ACD A 1000 BATT A 1000 ACD A 1000 ACD A 1000 ACD A 1000 ACD	rmon Order Display (* Personer/Aberevision) Electrosec Coowle Coowle Coowle Coowle Coowle Coowle Coowle Coowle	Accending	Year/Per 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1 2000-1-1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Envr Bilb Envr Hetary Gear Hetary Envr Hetary
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Fig. 3-40: "PLC diagnostics" screen (example)

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The details of the error and its countermeasures are displayed.





3.5.2 Error jump

Errors can be checked easily with the error jump function of PLC diagnostics.

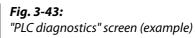
Operating procedure

(1) Select **Diagnostics** \rightarrow **PLC Diagnostics**.

📕 MELSOFT Series OX Works2 (Unset Project) - [[PRO] MAIN]	Fig. 3-42: Select "PLC Diagnostics" menu
Bound Est End Provide Concile View Online View Online Bound Test End Provide View Online Bound Test End View On	Sciele The Diagnostics mena

② Click the *Error Jump* button.

	nnection Ch	annel Lat					
torizong		Senal Port. PLC Modu	le Connection(USB)		1	-	ustam Image
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The cursor jumps to the step number of the sequence program corresponding to the selected error.

0 SM400 M0/20	EMOV	K-1	ZO	Н
			-CY100	7
6			-[END	Η

Fig. 3-44: Step number of selected error

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NOTES Installing the display unit allows you to confirm the errors occurring and errors which have occurred in the past with the display unit. **Operating procedure** The following is an example of the operating procedure to check the latest errors occurring in the CPU module. • Select function selection screen, then **CPU MON/TEST**, and then click the **b** button. MENU SELECT •CPU MON/TEST • CPU SETTINGS ► •MOD MON/TEST • Select **ERROR MONITOR**, and then click the button. MENU>CPU MON/TES -SCAN TIME MON -BLT-IN I/O MON► • ERROR MONITOR ▶ • Select *MONITOR*, and then click the **OK** button. MENU>CPU>ERR -MON | TOR •L0G - CLEAR Error information is displayed. Error code Number of pages to be changed No. 2300 1/3Error message ICM. OPE. ERROR Date of occurrence of error 2009/10/22 14:30:12 Time of occurrence of error Use ◀ or ▶ to display individual error information and common error information.

To return to the previous screen, click the **ESC** button.

The error history can be displayed and "Clearing the errors", etc. can also be performed using the display unit.

3.6 Monitoring system status <System monitor>

This function monitors the system status of the CPU module and other modules.

Operating procedure

(1) Select **Diagnostics** \rightarrow **System Monitor**.

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Project	K 0X	MELSEONET Disensation.	
PORDER		System Monitor_	

Fig. 3-45: Select "System monitor" screen

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(2) The "System monitor" screen is displayed.

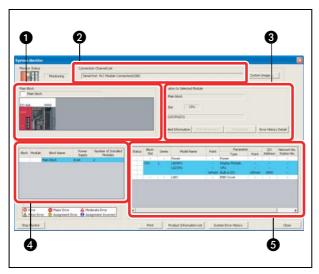
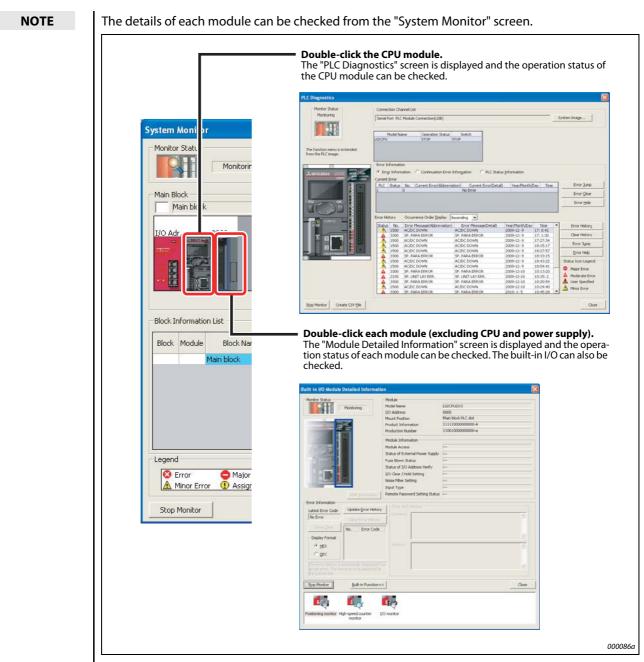


Fig. 3-46: "System monitor" screen Explanations see table below.

No.	Area	Description
0	Main block	Displays the module operation statuses and I/O addresses.
0	Connection channel list	Displays the details of the connection target being set.
8	Operation to selected module	Displays the I/O and model of the module being selected.
4	Block information list	Displays the block information.
6	Module information list	Displays the model, type, and start I/O of the module being selected.

Tab. 3-3: Areas of "System monitor" screen





Check details of each module

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W



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