ZEN-SOFT01-V3

ZEN Support Software

OPERATION MANUAL

Cat.No.W386-E1-03

ZEN Support Software

OMRON

ZEN-SOFT01-V3 ZEN Support Software

Operation Manual

Revised April 2003

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

⚠ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ Caution Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

Software Copyright

The ZEN Support Software (referred to as “the software”) is sold under the assumption that the purchaser agrees to the following conditions. If you do not agree, please return the software to the location from which you purchased it.

1. Copyright
   The copyright to the software and all related programs and documentation belongs to OMRON Corporation.
2. Range of Application
   The customer is entitled to copy the software to one computer for application of the software on that computer.
3. Copying
   With the exception of the above range of application, the customer may not copy all or part of the software for any purpose.
4. Software Modifications
   The customer may alter the software for his own application, but under no means will OMRON take responsibility for any problems or damages that result from such alteration.
5. Distribution
   The customer may in no way give, loan, or allow any third party to use the software.
6. Exception of Responsibility
   OMRON is in no way responsible for direct, indirect, or extended damages resulting from defects in the software. OMRON is in no way responsibly for any damages resulting from the application of the software. In the event that OMRON is held responsible for damages, such responsibility shall be limited to the purchase price of the software.

OMRON Product References

All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note Indicates information of particular interest for efficient and convenient operation of the product.

1,2,3... 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

Precaution Indicates precautionary information that should heeded in using the ZEN.

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TABLE OF CONTENTS

About this Manual:

This manual describes the installation and operation of the ZEN-SOFT01 ZEN Support Software and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install or operate the ZEN Support Software. Be sure to read the precautions provided in the following section.

Precautions provides general precautions for using the ZEN Support Software and related devices.

Section 1 describes how to install and start the ZEN Support Software. The screen configuration is also explained, along with the submenus for the Menu Bar, Toolbar, and Status Bar

Section 2 describes how to create, save, edit, and print ladder programs

Section 3 describes how to connect to the ZEN and how to transfer programs between the ZEN and the ZEN Support Software

Section 4 describes ZEN system settings, how to set passwords to protect ZEN ladder programs, and how to clear the ZEN memory

Section 5 describes the simulation function, which can be used to simulate ladder program execution without downloading the program to the ZEN.

Section 6 describes errors that may occur while using the ZEN Support Software and possible countermeasures.

The following two manuals are provided for the ZEN Programmable Relays. Refer to them as required in operation.

Manual	Contents	Cat. No.
ZEN Programmable Relays Operation Manual	ZEN specifications, functions, and operating methods.	W385
ZEN Support Software Operation Manual	Installation and operating procedures for the ZEN Support Software	W386

Note On the ZEN Support Software displays bits in ZEN memory are called “relays,” program input bits are called “contacts,” and program output bits are called “coils.”

⚠ **WARNING** Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

PRECAUTIONS

This section provides general precautions for using the ZEN Support Software for the ZEN Programmable Relays.

The information contained in this section is important for the safe and reliable application of the ZEN. You must read this section and understand the information contained before attempting to set up or operate a ZEN.

1 Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of installing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of managing FA systems and facilities.

2 General Precautions

The user must operate the product according to the performance specifications described in the operation manuals.

Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.

Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

This manual provides information for installing and operating OMRON Motion Control Units. Be sure to read this manual before operation and keep this manual close at hand for reference during operation.

⚠ WARNING It is extremely important that a PC and all PC Units be used for the specified purpose and under the specified conditions, especially in applications that can directly or indirectly affect human life. You must consult with your OMRON representative before applying a PC system to the above mentioned applications.

3 Safety Precautions

⚠ WARNING Always confirm the safety of the controlled system before transferring programs to the ZEN or before manipulating the status of bits in ZEN memory. Unexpected system response may result, possibly causing injury.

4 Application Precautions

Observe the following precautions when using the ZEN Support Software.

- Observe the following precautions before starting the ZEN Support Software
  - Close all software programs not related to the ZEN Support Software. It is particularly important to close all programs that start periodically or intermittently, such as screen savers, virus checkers, email and other communications programs, and schedulers.
  - Do not share hard disks, printers, or other devices with other network computers while running the ZEN Support Software.
  - Some notebook computers set the RS-232C port to modem or infrared application by default. Change the settings according to the operating instructions for your computer so that the RS-232C port can be used as a normal serial communications port.
  - Some notebook computers set the RS-232C port to not supply power (5 V) to the port to save energy by default. Change the settings according to the operating instructions for your computer to provide power to the port. (There are Windows settings and also possibly settings for computer-specific utilities or BIOS settings to save power.)
- Confirm that no adverse effect will occur in the system before attempting any of the following. Not doing so may result in an unexpected operation.
  - Changing the operating mode.
  - Setting and resetting bits in memory.
  - Changing bit status or parameter settings.
- Check the user program for proper execution before actually transferring it to or running it on the Unit. Not checking the program may result in an unexpected operation.

5 Support Software Version Upgrades

The following table shows the relationship between the version and functions of the ZEN Support Software and the ZEN CPU Unit.

Date of revision	ZEN CPU Unit	ZEN Support Software
Released in January 2002	System Software (See note 1.) The system software was upgraded to version 1.10. Main Changes The following display functions have been added to LCD-type CPU Units. • Clear display function • The display object DAT1 (day/month)	Changes Applicable from Version 2.00 (ZEN-SOFT01-V2) • Changed to handle additional display functions. • Simulation function added. • Improvements made to functions, operability, and display.
Released in April 2003	System Software (See note 1.) The system software was upgraded to version 2.00. (“-V1” was added to the CPU Unit model number.) Main Changes (See note 2.) • The number of timers, counters, weekly timers, calendar timers, and display bits was increased from 8 to 16. The number of holding timers was increased from 4 to 8. • A 20-point CPU Unit was added to the lineup.	Changes Applicable from Version 3.00 (ZEN-SOFT01-V3) • Changed to handle the memory area expansion in “-V1” CPU Units. • Changed to handle addition of 20-point CPU Units.

Note

1. “System software” is the software for processing the CPU Unit’s program. With LCD-type CPU Units, the system software version can be read by selecting *Other/System information* from the menu. With “-V1” CPU Units, “V02.00” will be displayed as the system software version.
2. The following table shows a memory area comparison of “-V1” CPU Units with other CPU Units.

Item	“-V1” CPU Units (with system software version 2.00)		CPU Units without “-V1”
	10 I/O points	20 I/O points	10 I/O points
	ZEN-10C□□□-□-V1	ZEN-20C□□□-□-V1	ZEN-10C□□□-□
CPU Unit input bits	I0 to I5 (6 bits)	I0 to Ib (12 bits)	I0 to I5 (6 bits)
CPU Unit output bits	Q0 to Q3 (4 bits)	Q0 to Q7 (8 bits)	Q0 to Q3 (4 bits)
Timers	T0 to Tf (16 timers)		T0 to T7 (8 timers)

Item	"-V1" CPU Units (with system software version 2.00)		CPU Units without "-V1"
	10 I/O points	20 I/O points	10 I/O points
	ZEN-10C□□□-□-V1	ZEN-20C□□□-□-V1	ZEN-10C□□□-□
Holding timers	#0 to #7 (8 timers)		#0 to #3 (4 timers)
Counters	C0 to Cf (16 counters)		C0 to C7 (8 counters)
Weekly timers	@0 to @f (16 timers)		@0 to @7 (8 timers)
Calendar timers	∗0 to ∗f (16 timers)		∗0 to ∗7 (8 timers)
Display bits	D0 to Df (16 bits)		D0 to D7 (8 bits)

Compatibility between Support Software and Data

Data	Version of ZEN Support Software			
	Ver. 1.00	Ver. 1.10	Ver. 2.00	Ver. 3.00
Data created with Ver. 1.00	Yes	Yes	Yes	Yes
Data created with Ver. 1.10	Yes	Yes	Yes	Yes
Data created with Ver. 2.00	No (See note.)	No (See note.)	Yes	Yes
Data created with Ver. 3.00	No (See note.)	No (See note.)	No (See note.)	Yes

Note A message saying that it was not possible to read the file will be displayed if an attempt is made to read incompatible data.

Compatibility between ZEN CPU Unit and Support Software

Version of CPU Unit	Version of ZEN Support Software			
	Ver. 1.00	Ver. 1.10	Ver. 2.00	Ver. 3.00
Ver. 1.00	Yes	Yes	Partial (See note 2.)	Partial (See note 2.)
Ver. 1.10	Partial (See note 3.)	Partial (See note 3.)	Yes	Yes
Ver. 2.00 ("-V1" CPU Units)	Partial (See notes 3 and 4.)	Partial (See notes 3 and 4.)	Partial (See notes 3 and 4.)	Yes

Note

1. With LCD-type CPU Units, the system software version can be read by selecting *Other/System information* from the menu. With "-V1" CPU Units, "V02.00" will be displayed as the system software version.
2. The contents set by a display bit (D) will appear as follows:

- If the day/month date (DAT1) is specified for display, the LCD display will show T#● and the display function will not operate.
- If clear (C) is set as a function, the LCD display will appear as [--| |----------0D0] and the display function will not operate.

Note The above operations were not supported in ZEN versions prior to 1.10.

3. The following settings are new for a display bit (D) and cannot be used.
   - Specifying a day/month date (DAT1) for display.
   - Specifying clear (C) as a function.

   If a program containing these new settings for a display bit (D) is downloaded to the ZEN, it will be processed as follows:

The contents set by a display bit (D) will appear as follows:

- If the day/month date (DAT1) is specified for display, it will appear as a CHR (character designation).
- If clear (C) is set as a function, the display bit (D) itself will be deleted from the program.

Note The above operations were not supported in ZEN Support Software versions prior to 2.00.

4. The 20-point CPU Units cannot be used.

   Memory that can be used with 10-point “-V1” CPU Units is restricted to the memory that can be used with 10-point CPU Units without “-V1.”

SECTION 1
Installation and Startup

This section describes how to install and start the ZEN Support Software. The screen configuration is also explained, along with the submenus for the Menu Bar, Toolbar, and Status Bar.

1-1 Before Operation

1-1-1 Product Contents

Check that the package for the ZEN Support Software (ZEN-SOFT01-V3) contains one CD-ROM setup disk.

1-1-2 Compatible Computers

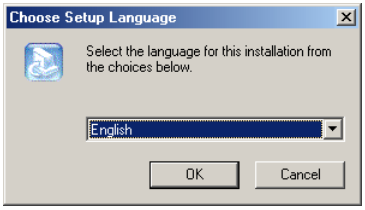
The ZEN Support Software can be used on the computers specified in the following table.

Item	Conditions
Operating system	Windows 95, 98, ME, 2000, XP, or NT4.0 Service Pack 3
CPU	Pentium 133 MHz or better Pentium 200 MHz or better recommended.
Memory	64 Mbytes or more
HDD	40 Mbytes or more of available disk capacity
CD-ROM drive	Required.
Communications	1 serial port (COM port)
Keyboard and mouse	Required.
Monitor	800 x 600 dots (SVGA) min., 256 colors min.

1-2 Installing and Uninstalling ZEN Support Software

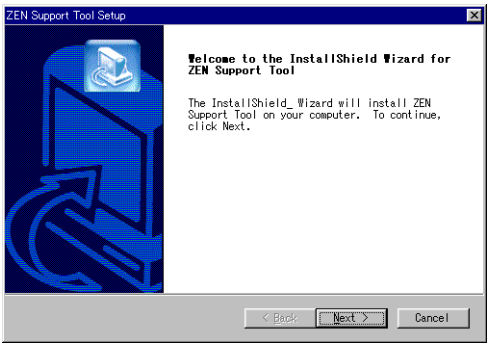
1-2-1 Installation

1,2,3... 1. Insert the Setup Disk in the CD-ROM drive of the computer. After a short while the Language Selection Screen will be displayed. Click the **OK** Button.

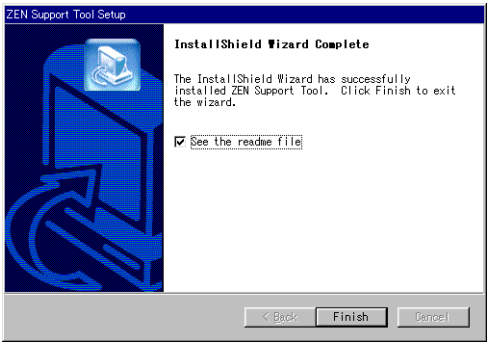


Note If the Language Selection Screen is not displayed when the CD-ROM is inserted, go to *My Computer*, open the *Setup Disk (CD-ROM)* icon, and double-click the *Setup.exe* file.

2. The Setup Screen will be displayed. Check the details, enter the required information, and click the **Next** Button.



3. When the setup operation has been completed, the following screen will be displayed. Click the **Finish** Button.



1-2-2 Uninstalling the ZEN Support Software

Use the following procedure to uninstall the ZEN Support Software from a computer.

1,2,3...

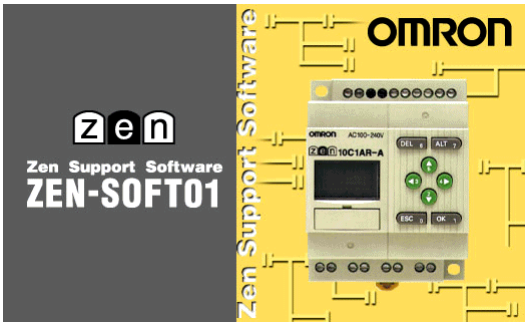
1. Select ***Settings/Control panel*** from the Windows Start Menu.
2. Select ***Add or delete applications*** from the Windows Control Panel and then select and delete ***OMRON ZEN Support Software.***

1-3 Starting and Quitting

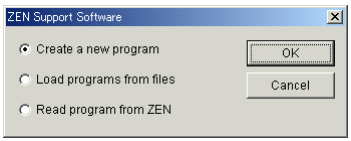
1-3-1 Starting ZEN Support Software

This section explains the procedure for starting and quitting the ZEN Support Software. After a moment the initial screen will be displayed.

1,2,3... 1. Select ***Program/Omron/ZEN Support Software/ZEN Support Software*** from the Windows Start Menu.



2. When display of the opening screen is finished, the following screen will be displayed. Select ***Create a new program*** and click the **OK** Button.

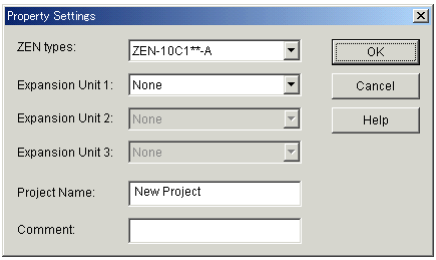


Note a) Click ***Load programs from files*** and double-click the **OK** Button to open existing ladder programs when starting up the ZEN Support Software. Refer to *2-6-2 Opening Saved Files* for the rest of the procedure for opening existing ladder programs.

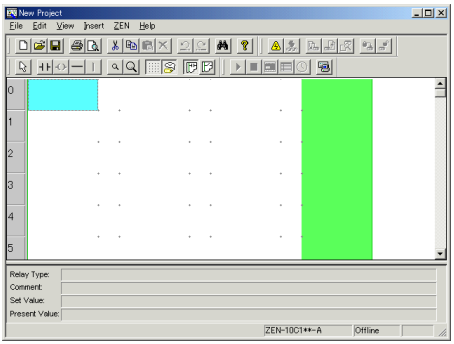
b) If uploading a program from ZEN is selected:

- Using the ZEN online function, read the contents of the property settings (ZEN model and Expansion I/O Unit configuration) from ZEN and make the settings.
- Transfer the program (ZEN to computer).
- The ladder diagram display will be generated automatically.

3. The Property Settings Screen will be displayed. Enter the ZEN model and configuration (i.e., whether or not Expansion I/O Units are connected), the project name, and a comment and press the **OK** Button.



4. The ZEN Support Software will start.



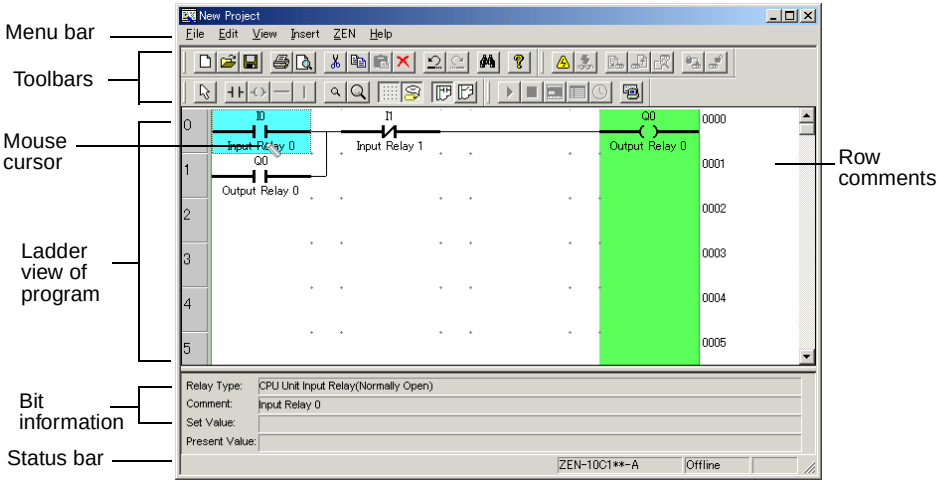
1-3-2 Quitting ZEN Support Software

Select ***File/Exit*** from the Menu Bar to close the ZEN Support Software.

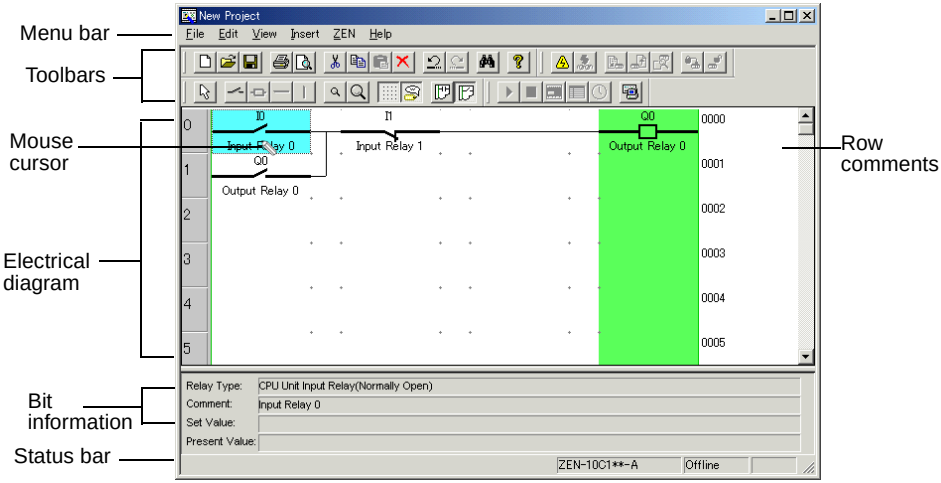
1-4 Screen Configuration

The ZEN Support Software allows the display to be set to either a Ladder Diagram Display or an Electric Circuit Display. The functionality of the ZEN Support Software is the same regardless of which display is used.

Ladder Diagram Display

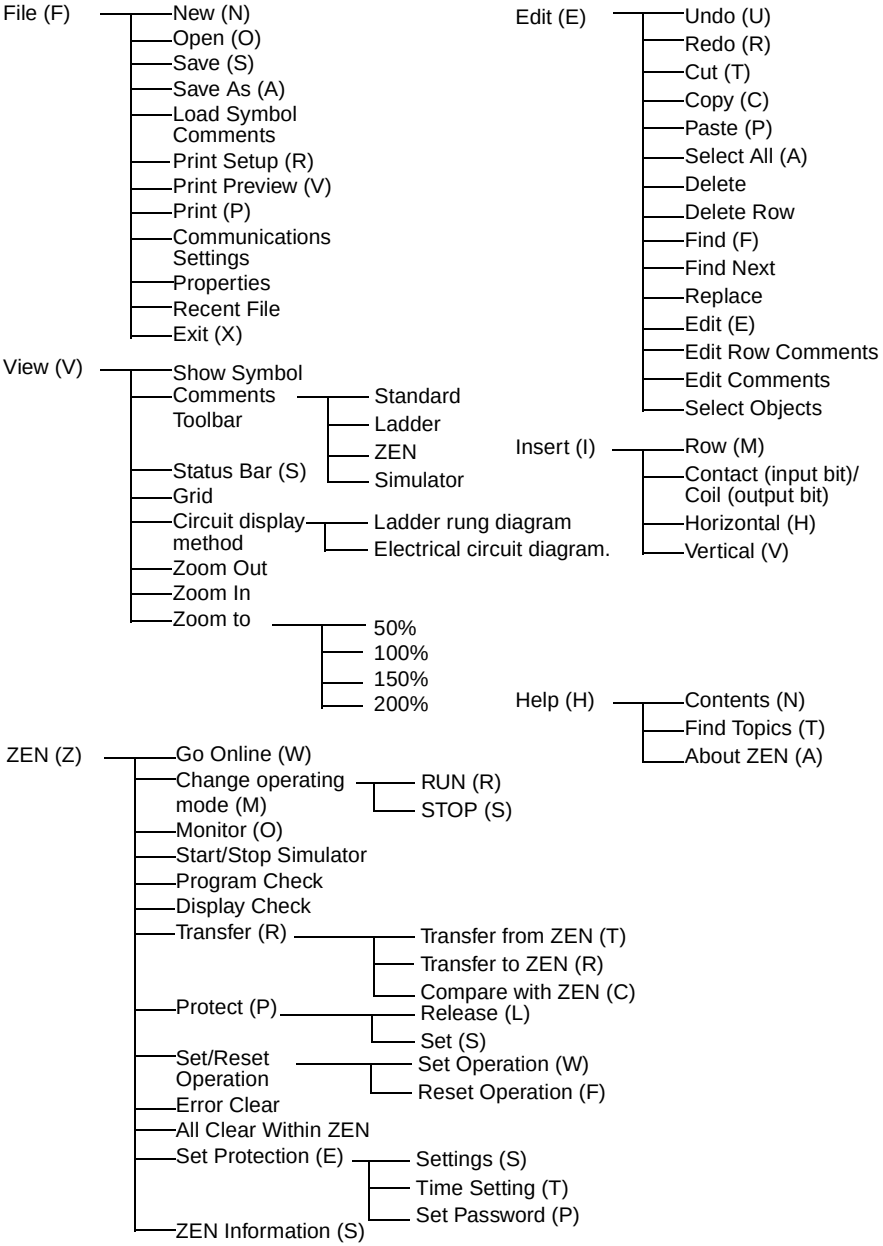


Electrical Circuit Display



Note To switch between the ladder diagram and electrical diagram displays, either click on the buttons in the Toolbar or else select ***View(V)/Circuit display method/Ladder rung diagram/Electrical circuit diagram*** from the File menu.

Menu Bar The Menu Bar functions are listed in the following menu tree.



Note On the ZEN Support Software displays bits in ZEN memory are called “relays,” program input bits are called “contacts,” and program output bits are called “coils.”

Toolbars

The following shortcut keys can be used from the Toolbars. Select ***View/Toolbar*** from the Menu Bar to display or not display the Toolbars.

Standard

- New
- Open
- Save
- Print
- Print Preview
- Cut
- Copy
- Paste
- Delete
- Undo
- Redo
- Find
- About ZEN

Ladder

- Select objects
- Insert Contact (input) condition
- Insert Coil (output)
- Insert Horizontal
- Insert Vertical
- Zoom Out
- Zoom In
- Show Grid
- Show Comments
- Ladder rung diagram
- Electrical circuit diagram

ZEN

- Go Online
- Toggle Monitoring
- Transfer to ZEN
- Transfer from ZEN
- Compare with ZEN
- Set Protection
- Release Protection

Simulator

- RUN
- STOP
- ZEN Image Display
- Present Value List Display
- Clock Display
- Start/Stop Simulator

Note On the ZEN Support Software displays bits in ZEN memory are called “relays,” program input bits are called “contacts,” and program output bits are called “coils.”

Mouse Cursors

There are two types of cursors used with ZEN. A right-click menu can be used with either of them.

Pencil Cursor

Appears when performing ladder program input operations.

Arrow Cursor

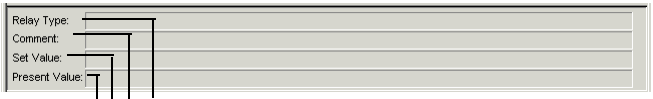
Appears when performing operations from the Menu Bar or the Toolbar. Also used for specifying the range when editing ladder programs.

Right-click Menu

Edit (E)
Find (F)
Cut (T)
Copy (C)
Paste (P)
Delete (D)
Set/Reset (S) — Set (W), Reset (F)
Row (L) — Insert (W), Remove (R)

Bit Information

Information on bits is displayed in the Bit Information Area.



The bit type is displayed here.
Comments are displayed here.
Set values for timers, counters, etc., are displayed here.
Input information and present values for timers, counters, etc., are displayed here.

Status Bar

The Status Bar displays information on the model of the connected ZEN, the connection status, operating status, and comments.

1	Connected ZEN model	Displays the model of the ZEN selected at startup.
2	Connection status	Indicates online or offline status.
3	Operating status	Indicates RUN or STOP (displayed only when online).
4	Comments	Displays operation explanations and online errors.

SECTION 2
Creating Ladder Programs

This section describes how to create, save, edit, and print ladder programs.

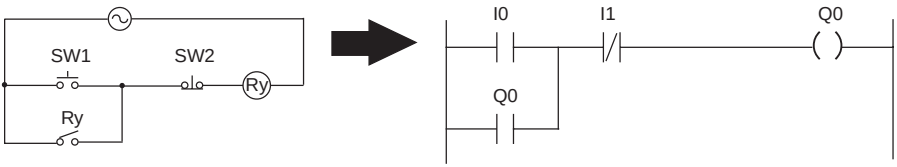
2-1 Circuit Diagrams and Ladder Programs

In preparation for creating ladder programs, this section describes the relationship between relay circuits and ladder programs.

2-1-1 Ladder Programs

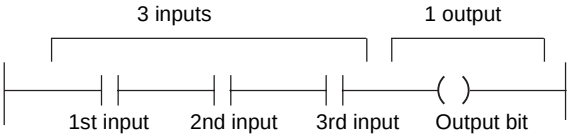
The ZEN uses ladder programs that appear like relay circuit diagrams.

Relay Circuit **Ladder Program**



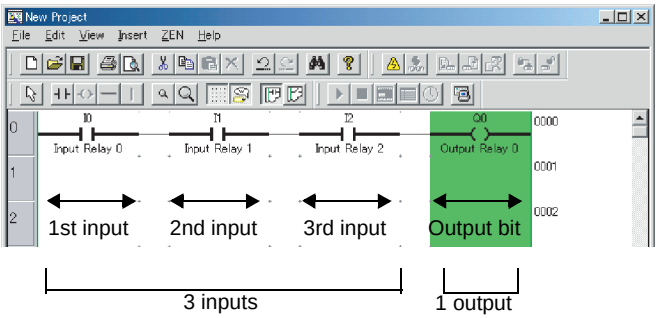
2-1-2 Basic Configuration of ZEN Ladder Programs

The ZEN can execute up to 96 lines of programming, with 3 inputs and 1 output per line. Outputs can be specified at the right ends of lines only. Inputs cannot be specified after outputs.

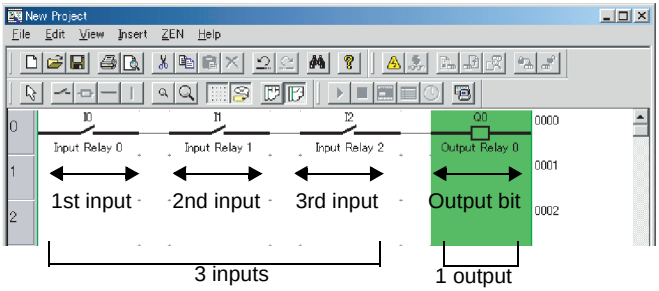


The ladder program inputs and outputs are displayed on the ZEN Support Software screen as shown below.

Ladder Diagram Display



Electrical Circuit Display



Note On the ZEN Support Software displays bits in ZEN memory are called “relays,” program input bits are called “contacts,” and program output bits are called “coils.”

2-1-3 Memory Areas

The memory areas shown in the following table can be used in ZEN ladder programs.

Symbol	Name	Function	Usable as input condition	Usable as output
I	CPU Unit input bits	Correspond to CPU Unit input terminals.	Yes	No
X	Expansion I/O Unit input bits	Correspond to Expansion I/O Unit input terminals.	Yes	No
B	Button switches	Turn ON/OFF when operation buttons are pressed on the CPU Unit during ZEN operation.	Yes	No
A	Analog comparator bits	Perform comparisons on a set value and the input values for CPU Units with DC power supply inputs. (The analog input terminals correspond to I4 and I5 in 10-point CPU Units, and to Ia and Ib in 20-point CPU Units.)	Yes	No
P	Timer/counter comparator bits	Compares timer/counter present values and timer/counter present values and settings.	Yes	No
@	Weekly timers	Turns ON/OFF between specified days and times.	Yes	No
*	Calendar timers	Turns ON/OFF between specified dates.	Yes	No

Symbol	Name	Function		Usable as input condition	Usable as output
Q	CPU Unit output bits	Correspond to CPU Unit output terminals.	Can specify Normal output ([]), Set (S), Reset (R), or Alternate (A) operation.	Yes	Yes
Y	Expansion I/O Unit output bits	Correspond to Expansion I/O Unit output terminals.		Yes	Yes
M	Work bits	Bits that can be used in the ladder program.		Yes	Yes
H	Holding bits	Bits that maintain ON/OFF status at power interruptions and can be used in the ladder program.		Yes	Yes
T	Timers	Timers that can be used for ON delay (X), OFF delay (■), Oneshot pulse (O), or Flashing pulse (F).		Yes	Yes
#	Holding timers	Timers that maintain the present value at power interruptions. (ON delay operation only.)		Yes	Yes
C	Counters	Incremental or decremental counters		Yes	Yes
D	Display bits	Display character strings, month/day, time, timer/counter present value, or analog conversion value on CPU Unit LCD display.		No	Yes

2-1-4 Memory Area Differences between Versions

The following table shows the differences between different models and different versions with respect to the memory areas that can be used.

Symbol	Name	Bit number (See note 1.)		
		ZEN-20C□□□-□-V1	**ZEN-10C□□□-□-V1**	**ZEN-10C□□□-□**
I	CPU Unit input bits	0 to b (12 bits)	0 to 5 (6 bits)	0 to 5 (6 bits)
Q	CPU Unit output bits	0 to 7 (8 bits)	0 to 3 (4 bits)	0 to 3 (4 bits)
X	Expansion I/O Unit input bits (See note 2.)	0 to b (12 bits max.)		
Y	Expansion I/O Unit output bits (See note 2.)	0 to b (12 bits max.)		

Symbol	Name	Bit number (See note 1.)		
		ZEN-20C□□□-□-V1	ZEN-10C□□□-□-V1	ZEN-10C□□□-□
M	Work bits	0 to f (16 bits)		
H	Holding bits	0 to f (16 bits)		
B	Button switches (See note 3.)	0 to 7 (8 bits)		
A	Analog comparator bits (See note 4.)	0 to 3 (4 bits)		
P	Timer/counter comparator bits	0 to f (16 bits)		
T	Timers	0 to f (16 timers)		0 to 7 (8 timers)
#	Holding timers	0 to 7 (8 timers)		0 to 3 (4 timers)
C	Counters	0 to f (16 counters)		0 to 7 (8 counters)
@	Weekly timers (See note 3.)	0 to f (16 timers)		0 to 7 (8 timers)
*	Calendar timers (See note 3.)	0 to f (16 timers)		0 to 7 (8 timers)
D	Display bits (See note 3.)	0 to f (16 bits)		0 to 7 (8 bits)

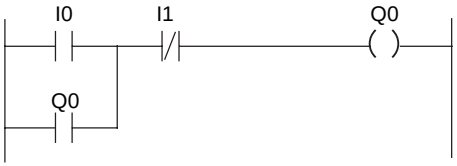
Note

1. Bit numbers are specified in hexadecimal (0,1,2,3.... 9, a, b,...e, f).
2. The bit numbers that can be used depend on the Expansion I/O Unit connection configuration.
3. Button switches, weekly timers, calendar timers, and display bits can be used only for CPU Units with an LCD screen and operation buttons.
4. Analog comparator bits can be used only for CPU Units with 24 VDC power supplied.

2-2 Inputting Ladder Programs

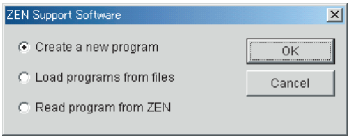
This section describes how to input the following simple program using the ZEN Support Software.

Example Ladder Program



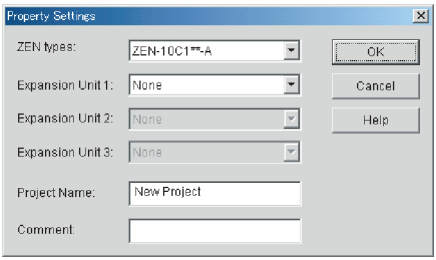
1,2,3...

1. If the ZEN Support Software has not been started, select ***Programs/Omron/ZEN Support Software/ZEN Support Software*** from the Windows Start Menu. Select ***Create a new program*** and press the **OK** Button.

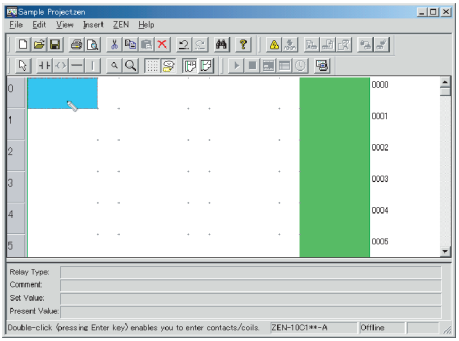


If the ZEN Support Software has already been started, click the **New** Button on the Toolbar. Alternatively, select ***File/New*** from the Menu Bar.

2. The Property Settings Screen will be displayed. Enter the ZEN model, configuration (i.e., Expansion I/O Units), project name, and comment, and then click the **OK** Button.



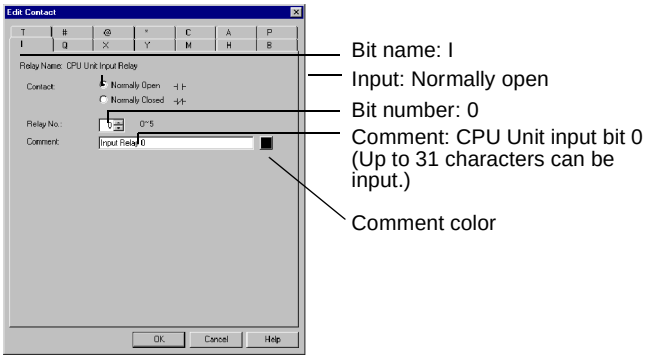
3. An empty screen in ladder-view format will be displayed. Double-click the mouse on the position for the first input condition.



Note Input positions for input and output bits can be set by using the mouse or cursor keys to move to the input or output position and then 1) pressing the **Enter** Key, 2) double-clicking, 3) clicking the **Insert Input** or **Insert Output** Button on the Toolbar, 4) selecting ***Insert-Contact/Coil*** from the

Menu Bar, 5) selecting ***Edit/Edit*** from the Menu Bar, or 6) clicking the right mouse button and selecting ***Edit.***

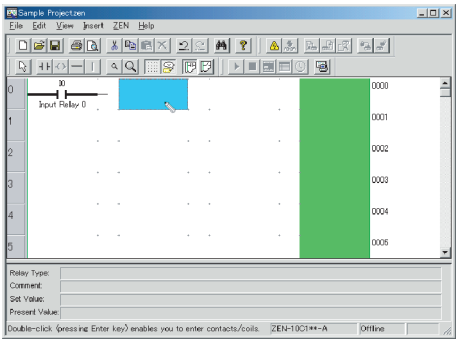
4. The Edit Input Dialog Box will be displayed. Specify the bit type, type of input, and bit number, and enter a comment if required.



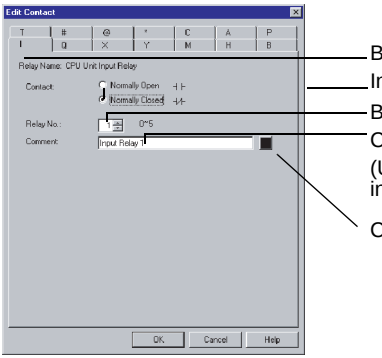
Note a) Parameter settings are also specified for timers and counters.

b) Parameters are set on the Edit Input Dialog Box.

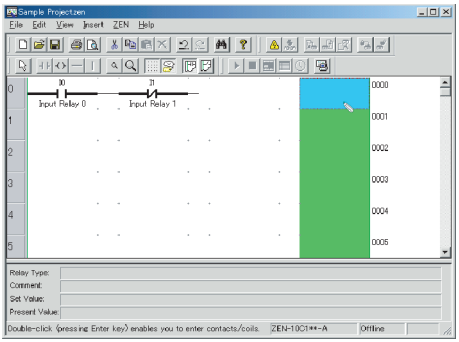
5. Double-click the mouse on the next input position.



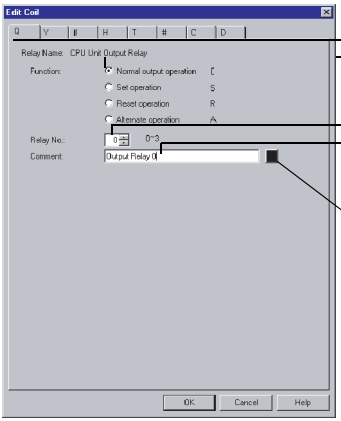
6. The Edit Input Dialog Box will be displayed again. Specify the bit type, type of input, bit number, and enter a comment if required, just as you did in step 4.



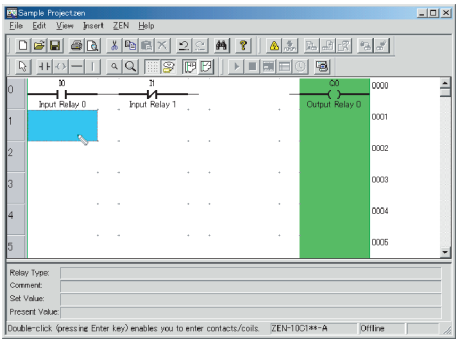
7. Move the mouse to the output bit position and double-click the mouse.



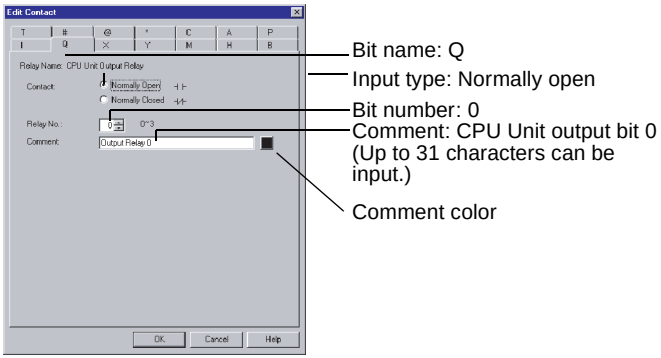
8. The Edit Output Dialog Box will be displayed. Specify the bit type, function, and bit number, and enter a comment if required.



9. Move the mouse to the input position on the next line and double-click.

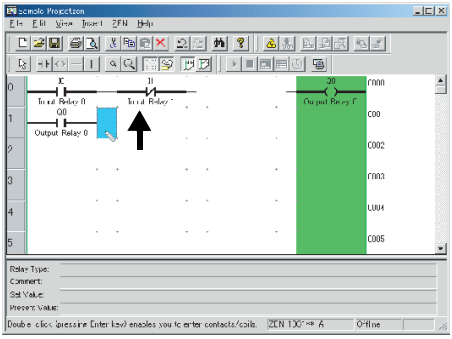


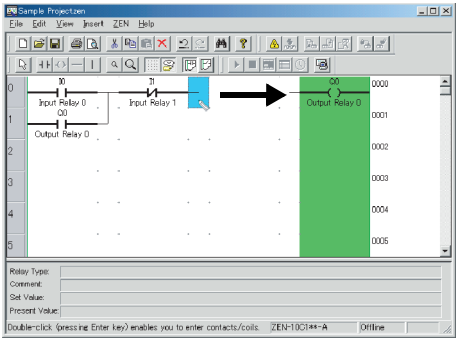
10. The Edit Input Dialog Box will be displayed. Specify the bit type, type of input, and bit number, and enter a comment if required, just as you did in step 4.



Note The comment will be automatically displayed for bit types and bit numbers that have comments.

11. Drag the mouse vertically to draw a connection line.

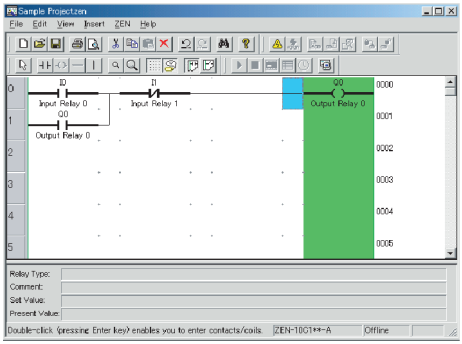




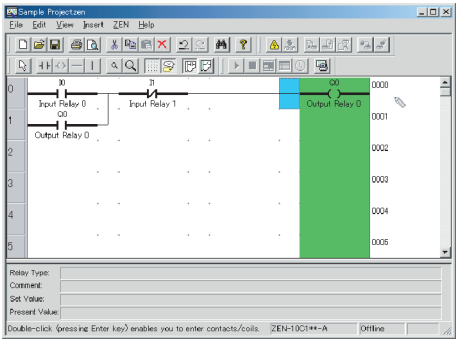
Note a) Vertical connection lines can also be drawn by 1) using the mouse or Cursor Keys to move to the connection line position and pressing the **|** Key, 2) clicking the **Insert Vertical** Button on the Toolbar, or 3) selecting ***Insert/ Vertical*** from the Menu Bar. The vertical line will be drawn down from the cursor position.

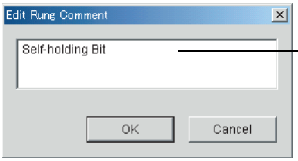
b) Horizontal connection lines can be drawn by using the mouse or Cursor Keys to move to the connection line position and pressing the **-** Key, clicking the **Insert Horizontal** Button on the Toolbar, or selecting ***Insert/ Horizontal*** from the Menu Bar.

12. The ladder program has now been completed.

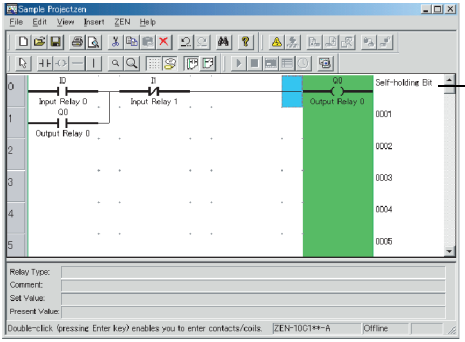


13. Double-click in the row comment area to write row comments for the ladder program. It is also possible to write comments by first using either the mouse or the cursor keys to move to the row comment area, and then selecting ***Edit (E)/Edit row comments***.





Enter row comment.



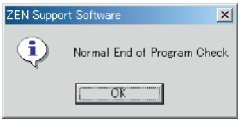
Row comment is displayed.

Note Up to 63 characters can be input for a row comment.

2-3 Checking Ladder Programs

2-3-1 Program Check

Select ***ZEN/Program Check*** from the Menu Bar and check the program. The following dialog box will be displayed if the program check was completed without finding any errors.

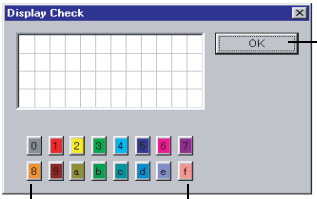


Note For details on error messages during program checking, refer to *6-2 Program Check Errors and Warnings*.

2-3-2 Display Check

Select ***ZEN(Z)/Display Check*** from the Menu Bar, and then use the Display Check Dialog Box to check the display contents for the display bits D0 to Df that are used in the program. The contents of each

are displayed in different colors, so overlapping displays can be checked.



Click to open the Display Check Dialog Box.

Click with the mouse to toggle between displaying or not displaying the display contents for each of the display bits D0 to Df.

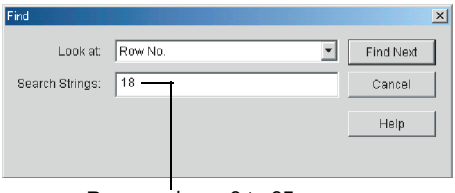
2-4 Editing Ladder Programs

This section describes how to edit existing ladder programs.

2-4-1 Searching for Inputs and Outputs

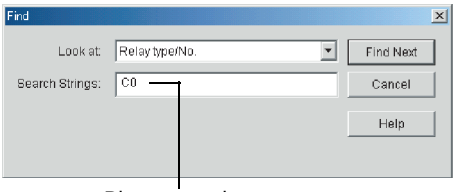
Click the **Find** Button on the Toolbar or select ***Edit/Find*** from the Menu Bar.

Finding by Row Number



Row numbers: 0 to 95

Finding by Bit Type or Bit Number



Bit type number

2-4-2 Replacing Inputs

To replace an input, select ***Edit(E)/Replace*** from the Menu Bar.

Replace the inputs while doing the search. (As each input is found, confirm whether or not it is to be replaced.)

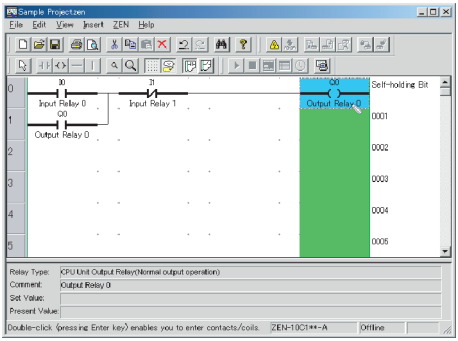
Replace all of the inputs in the ladder program (without confirming them individually).

Bit type number

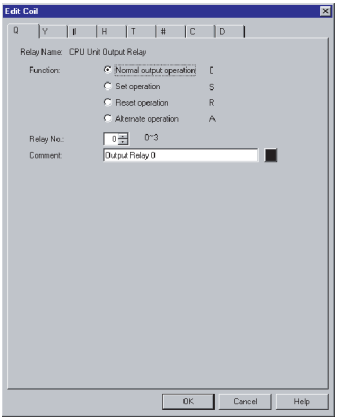
2-4-3 Changing Inputs, Outputs, and Settings

Input positions for input and output bits can be changed by using the mouse or cursor keys to move to the input or output position and then 1) pressing the **Enter** Key, 2) double-clicking, 3) clicking the **Insert Input** or **Insert Output** Button on the Toolbar, 4) selecting ***Insert-Contact/Coil*** from the Menu Bar, 5) selecting ***Edit/Edit*** from the Menu Bar, or 6) clicking the right mouse button and selecting ***Edit***.

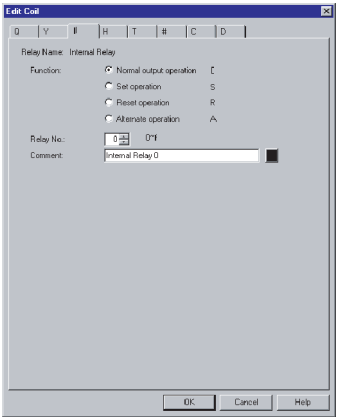
1,2,3... 1. For this example, double-click built-in output Q0.



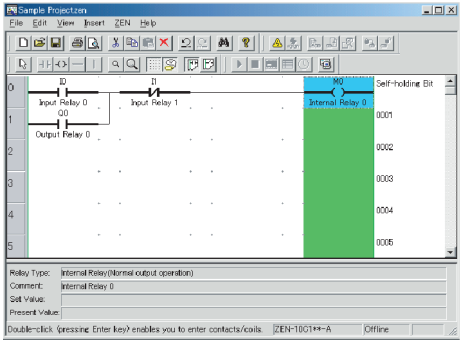
2. The Edit Output Dialog Box will be displayed.



3. Change the bit type in the Edit Output Dialog Box from Q to M (holding bit), specify the function and bit number, and enter a comment if necessary.



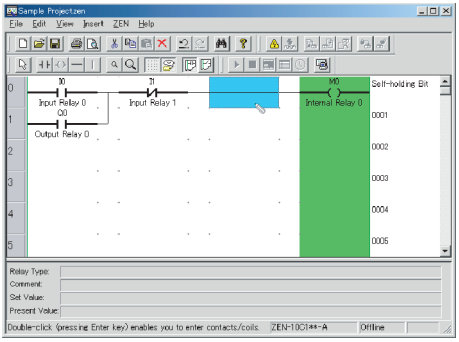
The output change has now been completed.



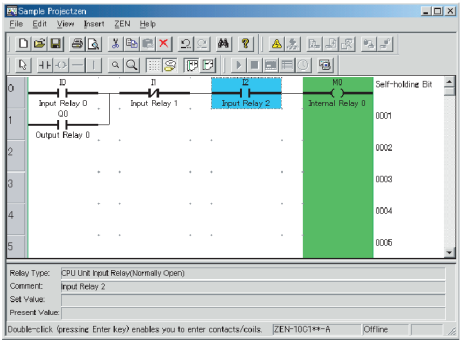
2-4-4 Inserting Inputs

Input positions for input and output bits can be inserted by using the mouse or cursor keys to move to the input or output position and then 1) pressing the **Enter** Key, 2) double-clicking, 3) clicking the **Insert Input** Button on the Toolbar, 4) selecting ***Insert-Contact/Coil*** from the Menu Bar, 5) selecting ***Edit/Edit*** from the Menu Bar, or 6) clicking the right mouse button and selecting ***Edit***.

1,2,3... 1. Double-click the ladder program connection line.



2. Use the Edit Input Dialog Box to insert a input at the connection line.



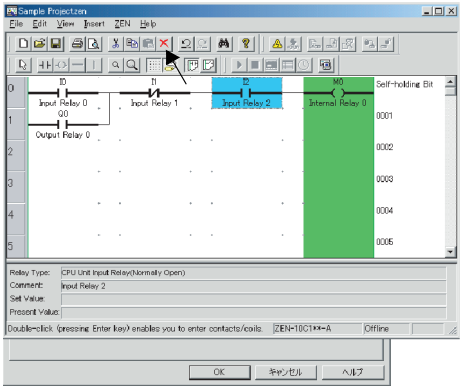
2-4-5 Deleting Inputs and Outputs

To delete an input or output, first use the mouse or the cursor keys to highlight the input or output that is to be deleted. Then use any of the following methods.

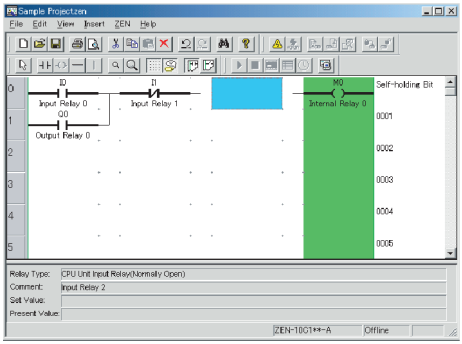
- Click the **Delete** Button in the Toolbar.
- Select ***Edit(E)/Delete*** from the Menu Bar.
- Click the right mouse button and select ***Delete(D)***.
- Press the **Delete** Key on the keyboard.

1,2,3... 1. Move the cursor to the input.

2. Click the **Delete** Button on the Toolbar.



The input will be deleted.



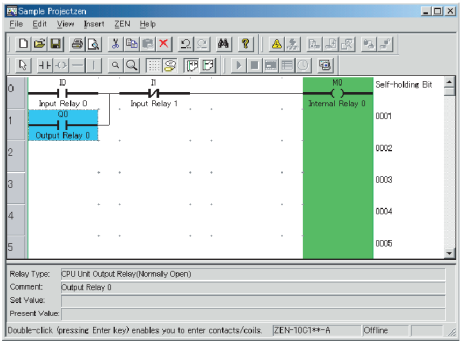
Note All inputs and outputs within a specified area can be deleted at once if the method to specify an area outlined under *2-4-8 Copying, Cutting, and Pasting Inputs and Outputs* is used.

2-4-6 Inserting Rows

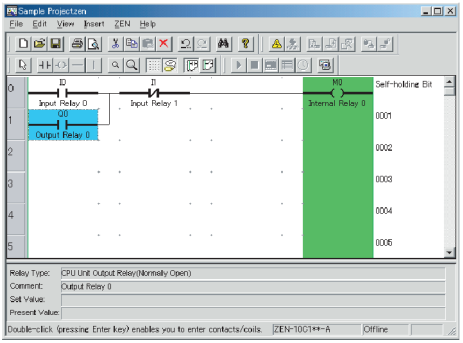
Using either the mouse or cursor keys, highlight the position where the row is to be inserted, and then use one of the following methods to insert a blank row.

- Select ***Insert(I)/Row(M)*** from the Menu Bar.
- Click the right mouse button and select **Row(L)/Insert(W)**.

1,2,3... 1. Highlight the position and then select ***Insert(I)/Row(M)*** from the Menu Bar.



2. The blank row will be inserted above the highlighted position.



2-4-7 Editing Connection Lines

Use one of the following operations to delete connection lines.

1,2,3... 1. Drag the mouse along the existing line. (“Drag” means to move the mouse while holding down the mouse button.)

2. Use the mouse or Cursor Keys to move to the connection line and 1) click the **Delete** Button on the Toolbar, 2) select ***Edit/Delete*** from the Menu Bar, or 3) press the **Delete** Key on the keyboard.

Use one of the following operations to create new connection lines.

1,2,3... 1. Drag the mouse from the desired position to create a new line. (“Drag” means to move the mouse while holding down the mouse button.)

2. Use the mouse or Cursor Keys to move to the desired position for the connection line and 1) click the **Insert Horizontal** or **Insert Vertical** Button on the Toolbar, 2) select ***Insert/Horizontal*** or ***In-***

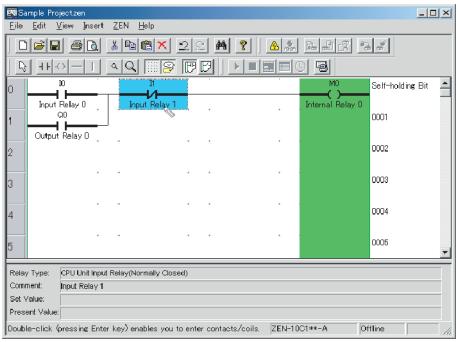
sert/Vertical from the Menu Bar, or 3) press the **- or I** Key on the keyboard.

2-4-8 Copying, Cutting, and Pasting Inputs and Outputs

Inputs and outputs within a specified range can be easily copied and moved if the cut, copy, or paste functions are used.

Copying, Cutting and Pasting Individual Objects

1,2,3... 1. Using the mouse or cursor keys, select the input or output that is to be copied or cut.



2. Use the following procedures for copying and moving.

When Copying

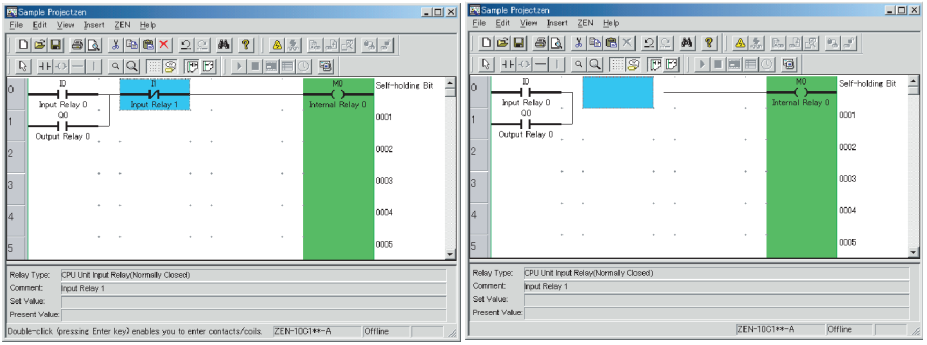
Any of the following methods can be used for copying inputs and outputs.

- Click the **Copy** Button on the Toolbar.
- Select ***Edit(I)/Copy(C)*** from the Menu Bar.
- Click the right mouse button and select ***Copy***.

When Moving

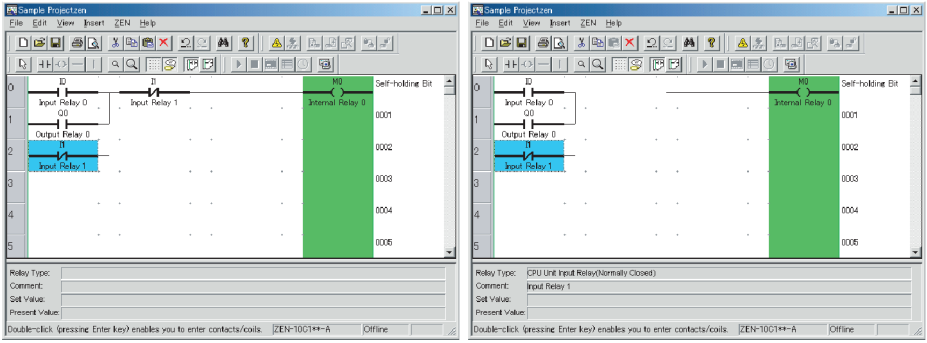
Any of the following methods can be used for cutting inputs and outputs.

- Click the **Cut** Button on the Toolbar.
- Select ***Edit(I)/Cut(T)*** from the Menu Bar.
- Click the right mouse button and select ***Cut***.



3. Any of the following methods can be used for pasting inputs and outputs.
   - Click the **Paste** Button on the Toolbar.
   - Select ***Edit(I)/Paste(P)*** from the Menu Bar.
   - Click the right mouse button and select ***Paste***.

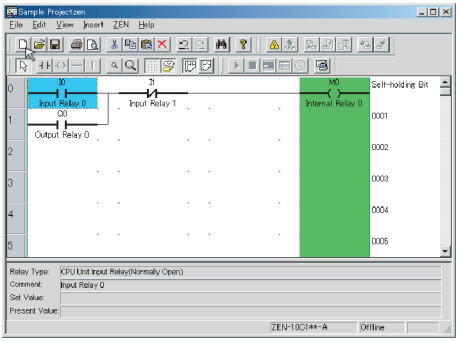
When Copying **When Moving**



Note Either the pencil or arrow cursor can be used to copy, cut, and paste individual objects.

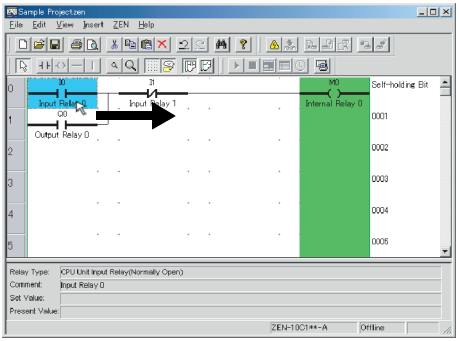
Copying, Cutting, and Pasting a Specified Range

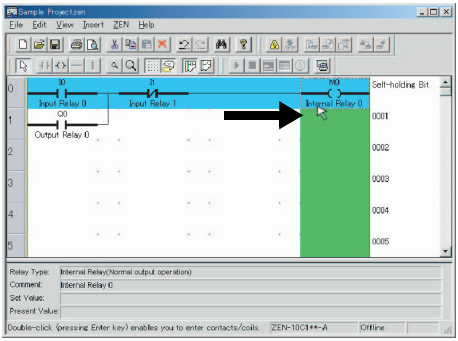
1,2,3... 1. Click the **Select objects** Button on the Toolbar or select ***Edit/Select Objects*** from the Menu Bar.



Note Connection lines cannot be moved by the mouse while the **Select objects** Button on the Toolbar is pressed. To return to normal program edit mode, click the **Select Objects** Button again or press the **Esc** Key.

2. Drag the mouse from the start of the range to the end of the range. (“Drag” means to move the mouse while holding down the mouse button.)





3. Use the following procedures for copying and moving.

When Copying

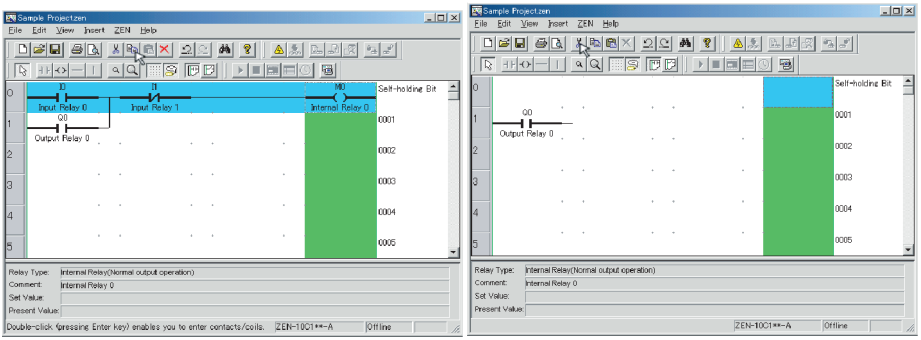
Any of the following methods can be used for copying a specified range.

- Click the **Copy** Button on the Toolbar.
- Select ***Edit(I)/Copy(C)*** from the Menu Bar.
- Click the right mouse button and select ***Copy***.

When Moving

Any of the following methods can be used for cutting a specified range.

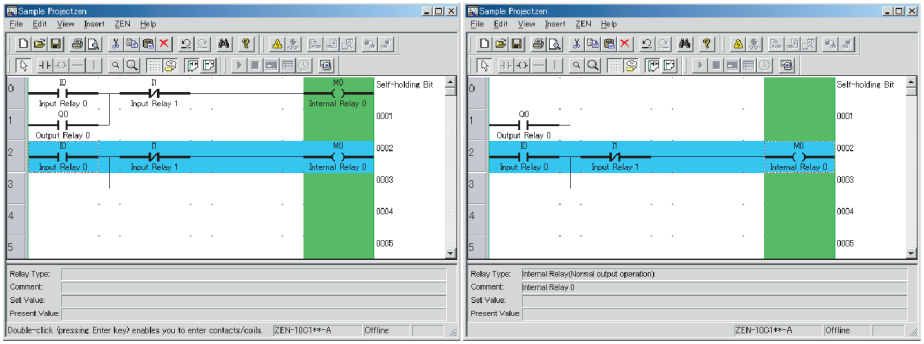
- Click the **Cut** Button on the Toolbar.
- Select ***Edit(I)/Cut(T)*** from the Menu Bar.
- Click the right mouse button and select ***Cut***.



4. Any of the following methods can be used for pasting inputs and outputs.
   - Click the **Paste** Button on the Toolbar.
   - Select ***Edit(I)/Paste(P)*** from the Menu Bar.
   - Click the right mouse button and select ***Paste***.

When Copying

When Moving



Note To copy a ladder program in an existing file, start up the ZEN Support Software separately and then the ladder program can be copied and pasted.

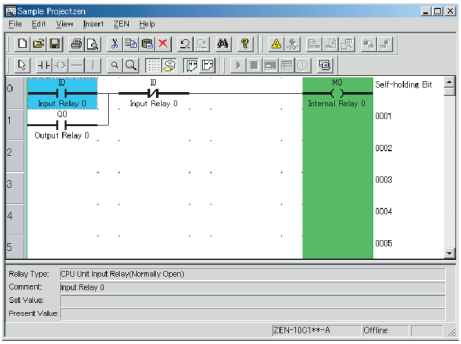
2-4-9 Deleting Rows

Using either the mouse or cursor keys, highlight the row that is to be deleted. Then use one of the following methods to delete the row.

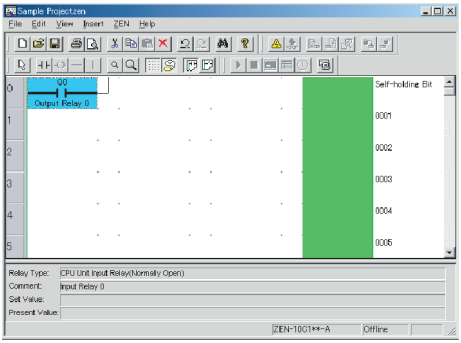
- Select ***Edit(E)/Delete Row*** from the Menu Bar.
- Click the right mouse button and select **Row(L)/Delete(R)**.

1,2,3...

1. Highlight the position and then select ***Edit(E)/Delete Row*** from the Menu Bar.



2. The highlighted row will be deleted, and the next row will be moved up.



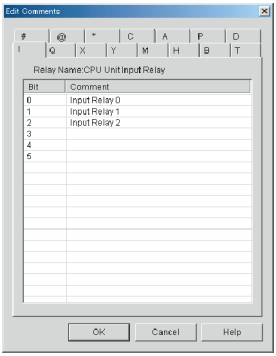
2-5 Editing Comments

The comment edit function is used to display or edit all I/O comments by bit type.

1,2,3...

1. Select ***Edit/Edit Comments*** from the Menu Bar.

2. Edit the comment in the Edit Comment Screen.



Note

1. Programs are easier to understand and manage if actual I/O device names or names relating to functions are used in the I/O comments.
2. Click the **Show Comments** Button on the Toolbar or select ***View/Show Symbol Comments*** from the Menu Bar to display or not display the I/O comments in ladder view on the screen.

2-6 Saving Ladder Programs

This section describes how to save ladder programs to file.

2-6-1 Saving to File

1,2,3...

1. Select ***File/Save As*** from the Menu Bar.
2. The Save As Dialog Box will be displayed. Enter the save destination and file name and click the **Save** Button.

Note

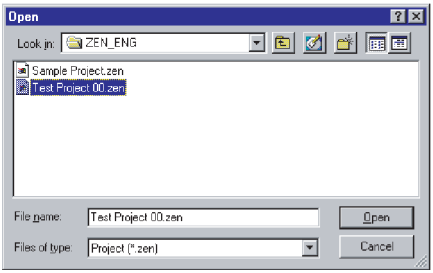
1. When saving existing ladder programs that have been edited since they were saved, you can also click the **Save** Button on the Toolbar or select ***File/Save*** from the Menu Bar to overwrite the existing file.

2. The system settings and password set under ***ZEN/Set Protection*** will also be saved with the file.

2-6-2 Opening Saved Files

1,2,3...

1. Click the **Open** Button on the Toolbar or select ***File/Open*** from the Menu Bar to open saved files.
2. The Open File Dialog Box will be displayed. Specify the file location and file name and click the **Open** Button.



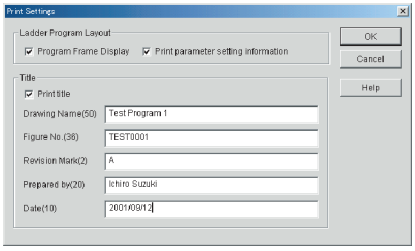
2-7 Printing Ladder Programs

2-7-1 Print Settings

This section describes the layout and heading settings that must be made before printing ladder programs.

1,2,3...

1. Select ***File/Print Setup*** from the Menu Bar.
2. The Print Settings Dialog Box will be displayed. Make the settings for each item.



Setting	Explanation
Program frame display	Check this box to print the print frame.
Parameter settings information	Check this box to print the timer, counter, and other parameter settings. Information will be printed only for portions of the memory areas that are being used.

Setting	Explanation
Print title	Check this box to print the title.
Drawing name	Enter the drawing name.
Figure No.	Enter the drawing number.
Revision mark	Enter the revision mark.
Prepared by	Enter the name of the person who wrote the program.
Date	Enter the date the program was written.

3. Click the **OK** Button to save the settings as the print settings for the ZEN Support Software. Click the **Cancel** Button to discard the settings.

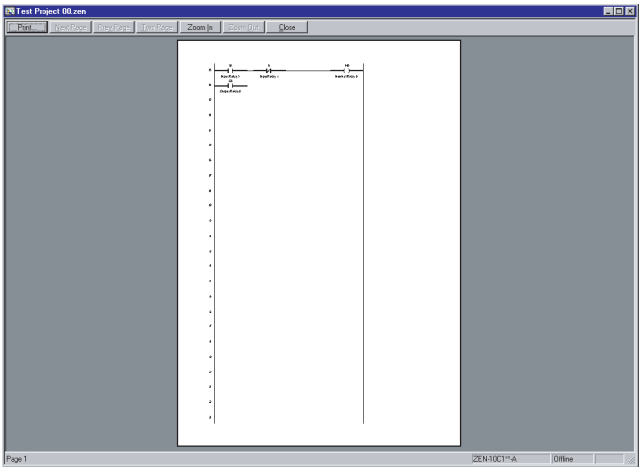
Note a) To specify whether I/O comments are to be printed, either click the **Show Comments** Button on the Toolbar or select ***View(V)/Comments*** from the Menu Bar.

b) To specify whether a ladder diagram or electrical circuit diagram is to be printed, either click the **Ladder rung diagram** Button or the **Electrical circuit diagram** Button on the Toolbar or else select ***View(V)/Circuit display/ Ladder rung diagram*** or ***Electrical circuit diagram*** from the Menu Bar.

2-7-2 Print Preview

1,2,3...

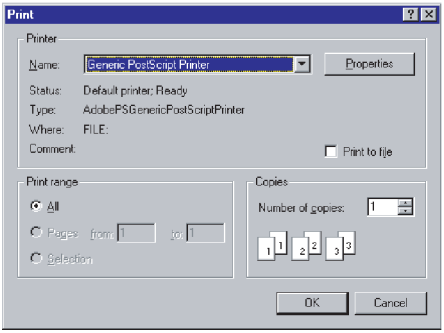
1. Click the **Print Preview** Button on the Toolbar or select ***File/Print Preview*** from the Menu Bar to check the print layout.
2. The Print Preview Screen will be displayed.



2-7-3 Printing

1,2,3...

1. Click the **Print** Button on the Toolbar or select ***File/Print*** from the Menu Bar.
2. The Print Dialog Box will be displayed. Make settings for each item and click the **OK** Button.



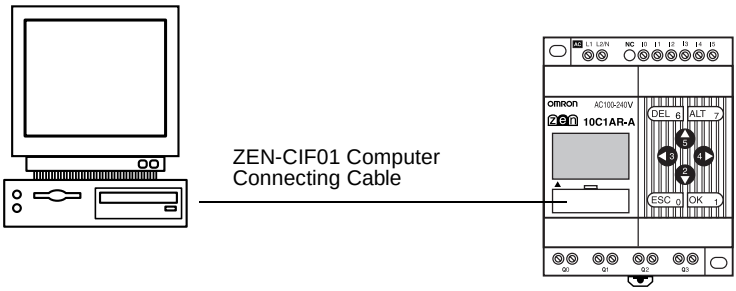
SECTION 3
Transferring and Monitoring Programs

This section describes how to connect to the ZEN and how to transfer programs between the ZEN and the ZEN Support Software.

3-1 Connecting the ZEN and Communications Settings

3-1-1 Connecting to the ZEN

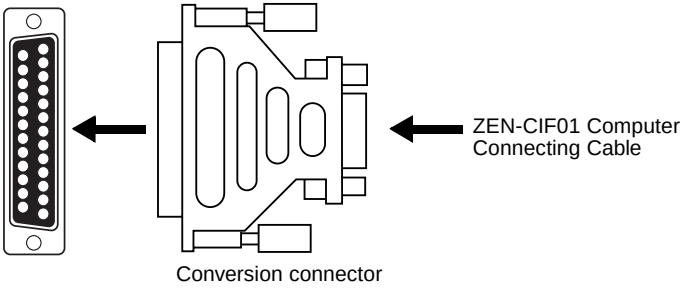
Use a ZEN-CIF01 Computer Connecting Cable to connect the ZEN and a serial port (COM port) of the computer.



Note The connector on the computer side of the ZEN-CIF01 Computer Connecting Cable is a 9-pin D-sub connector. If the computer has a 25-pin D-sub connector, use a commercially available conversion connector or conversion cable.

For 9-pin D-sub Serial Port Connectors

For 25-pin D-sub Serial Port Connectors

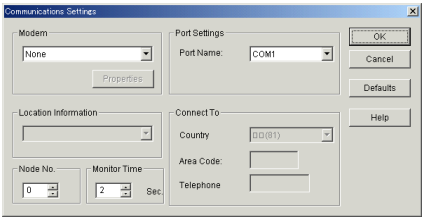


3-1-2 Communications Settings

Communications settings must be made in the ZEN Support Software before commencing communications with the ZEN.

1,2,3...

1. Select ***File/Communications Settings*** from the Menu Bar.
2. The Communications Settings Dialog Box will be displayed. Make the settings for each item.



Setting	Details	Default
Modem	Set to “None.” The port specified under Port name will be connected to the ZEN.	None
Local information (See note b.)	This is the local information set on the computer.	---
Country code (See note b.)	The connection destination country code.	---
Area code (See note b.)	The connection destination area code.	---
Telephone No. (See note b.)	The connection destination telephone number.	---
Port name	Select either COM1 or COM 2.	COM 1
Node No. (See note a.)	Specify a node number between 0 and 9.	0
Monitor time	Specify the communications monitor time between 0 and 30 s.	2

Note a) Set the same node number as set on the ZEN. Communications cannot be performed if the node numbers are different.

b) Do not make any settings for these items. These settings are for function expansion.

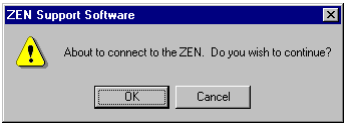
3. Click the **OK** Button to save the settings in the project.
Click the **Cancel** Button to discard the settings.
Click the **Defaults** Button to return to the default settings.

3-2 Connecting Online

Check communications with the ZEN before transferring or verifying programs. Connect the ZEN and perform the check operation with the project file open.

1,2,3...

1. Select ***File/Properties*** from the Menu Bar and make the ZEN model and Expansion I/O Units 1 to 3 settings in the Properties Dialog Box to match the system configuration of the ZEN to be connected online.
2. Click the **Go Online** Button on the Toolbar or select ***ZEN/Go Online*** from the Menu Bar. A confirmation dialog box will be displayed. Click the **OK** Button.



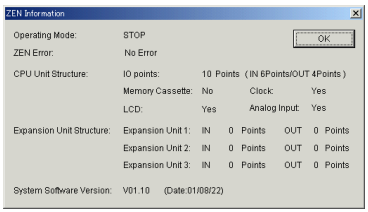
3. Check that the Status Bar display has changed from *Offline* to *Online*. The background color for the ladder view area will change to gray when the ZEN is online.

Click the **Go Online** Button on the Toolbar again or select ***ZEN/Go Online*** from the Menu Bar. The display on the Status Bar will return from *Online* to *Offline* and the Ladder Program Screen will change back to the normal background color.

Note

a) Ladder programs cannot be edited when online. Always go offline before creating or editing ladder programs.

b) Select ***ZEN/ZEN Information*** from the Menu Bar while online to obtain information about the connected ZEN.



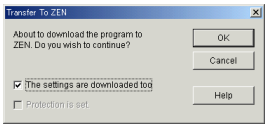
3-3 Transferring Programs to the ZEN

This section describes how to transfer ladder programs created using the ZEN Support Software to the ZEN.

The ZEN must be connected and online and the project file opened before the program transfer operation can be executed.

⚠ **Caution** Check the safety of connected devices before transferring programs to the ZEN. Injuries may occur if programs are transferred carelessly.

1,2,3... 1. Click the **Transfer to ZEN** Button on the Toolbar or select ***ZEN/Transfer/Transfer to ZEN*** from the Menu Bar. The Transfer to ZEN Dialog Box will be displayed. Click the **OK** Button to transfer the program to the ZEN. Click the **Cancel** Button to cancel the transfer.



Settings Details

- Turn ON *The settings are downloaded too* in the Transfer to ZEN Dialog Box to download the ZEN settings in the ZEN Support Software at the same time.
  Refer to *4-1 ZEN Settings* for information on the various ZEN settings.
- Turn ON *Protection is set* in the Transfer to ZEN Dialog Box if the ZEN is to be protected by the password set in the ZEN Support Software. Leave this check box turned OFF if no password has been set.
  Refer to *4-2 Setting a Password* for information on setting passwords.

Note Refer to *6-2 Program Check Errors and Warnings* for information on error messages that occur during transfer from the computer to the ZEN.

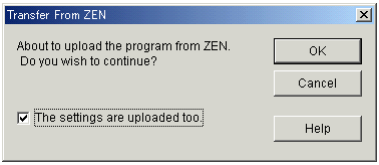
3-4 Transferring Programs from the ZEN

This section describes how to transfer ZEN ladder programs to the ZEN Support Software.

The ZEN must be connected and online and the project file opened before the program transfer operation can be executed.

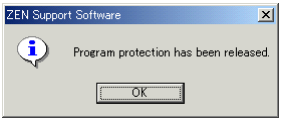
1,2,3...

1. Click the **Transfer From ZEN** Button on the Toolbar or select ***ZEN/Transfer/Transfer from ZEN*** from the Menu Bar. The Transfer From ZEN Dialog Box will be displayed. Click the **OK** Button to transfer the program from the ZEN. Click the **Cancel** Button to cancel the transfer.



Settings Details
Turn ON *The settings are uploaded too* in the Transfer From ZEN Dialog Box to upload the ZEN settings at the same time.

2. If the transfer from the ZEN to the computer has been completed normally, the set password will be cleared. A confirmation box confirming the clearing of the password will be displayed. If no password had been set, this confirmation box will not be displayed.



Note Refer to *6-2 Program Check Errors and Warnings* for information on error messages that occur during transfer from the ZEN to the computer.

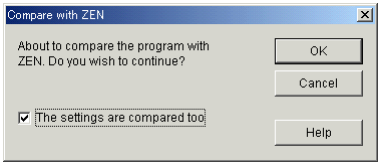
3-5 Verifying Programs with ZEN

This section describes how to compare the programs in the ZEN and ZEN Support Software to verify that they are the same.

The ZEN must be connected and online and the project file opened before the program verification operation can be executed.

1,2,3...

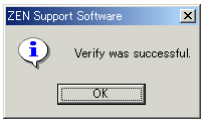
1. Click the **Compare with ZEN** Button on the Toolbar or select ***ZEN/Transfer/Compare with ZEN*** from the Menu Bar. The Compare With ZEN Dialog Box will be displayed. Click the **OK** Button to compare the ZEN and ZEN Support Software programs. Click the **Cancel** Button to cancel the verification.



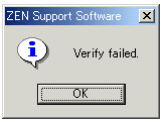
Settings Details
Turn ON *The settings are compared too* in the Compare With ZEN Dialog Box to compare the ZEN and ZEN Support Software settings at the same time.

2. A confirmation dialog box will be displayed if the verification has been completed normally.

When Programs Are the Same



When Programs Are Different



Note Refer to *6-2 Program Check Errors and Warnings* for information on error messages that occur during verification.

3-6 Operating and Stopping the ZEN

This section describes how to operate and stop the ZEN from the ZEN Support Software.

The ZEN must be connected and online and the project file opened before these operations can be executed.

Note

1. Check that the power supply and input and output circuits are wired correctly before starting operation.
2. Remove the output wiring before performing operation tests for systems that have loads connected to the output circuit that could cause serious damage to persons or equipment if there is a malfunction.
3. Always check safety in the vicinity of equipment before turning ON the power or changing operation modes.

1,2,3...

1. Select ***ZEN/Change operating mode/RUN*** from the Menu Bar.
2. Check that the Status Bar display changes from *STOP* to *RUN*.

3. Select ***ZEN/Change operating mode/STOP*** from the Menu Bar to stop ZEN operation. The Status Bar display will change from *RUN* to *STOP*.

3-7 Monitoring Programs

3-7-1 Monitor

This section describes how to monitor programs being executed by the ZEN.

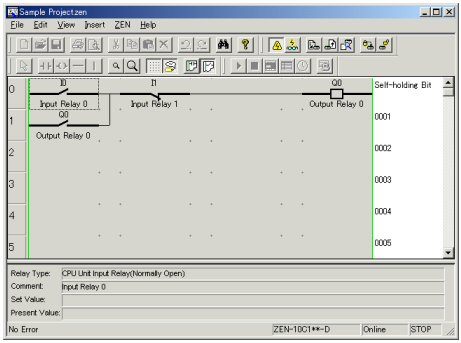
The ZEN must be connected and online and the project file opened before the programs can be monitored. The ZEN and ZEN Support Software programs must be the same before programs can be monitored. Use the procedures outlined under *3-3 Transferring Programs to the ZEN*, *3-4 Transferring Programs from the ZEN*, and *3-5 Verifying Programs with ZEN* to transfer and verify the programs.

1,2,3...

1. Use the procedure outlined under *3-6 Operating and Stopping the ZEN* to start ZEN operation. Check that the Status Bar display changes from *STOP* to *RUN*.

2. Click the **Toggle Monitoring** Button on the Toolbar or select ***ZEN/Monitor*** from the Menu Bar.

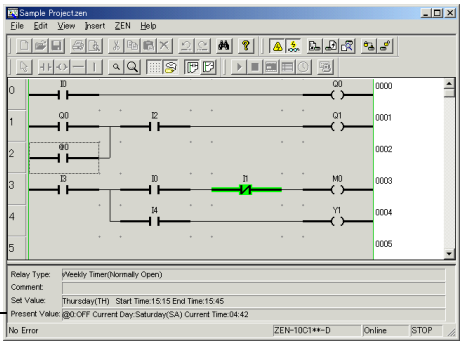
3. When the mode is changed to MONITOR, the closed circuits of the ZEN ladder program are highlighted in green.



3-7-2 Displaying Present Values

Present values, the ON/OFF status of inputs, etc., can be displayed during monitoring of programs being executed by ZEN.

During monitoring, moving the cursor to a timer/counter or other output will cause the present value to be displayed.



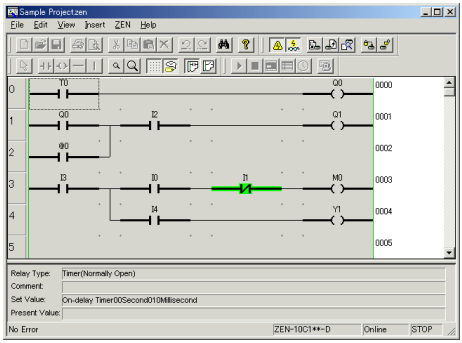
3-7-3 Changing Settings Online

Set values can be changed while connected to ZEN online.

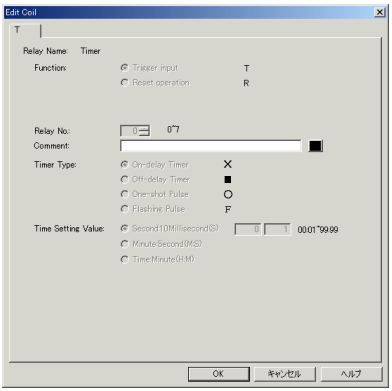
1,2,3... 1. While online, use either the mouse or the cursor keys to highlight the output that is to be changed. Then use any of the following methods to change the setting.

- Press the **Enter** Key or double-click.
- Select ***Edit(E)/Edit(E)*** from the Menu Bar.

- Click the right mouse button and select ***Edit(E)***.



2. The Edit Dialog Box will be displayed. When the settings are changed and the dialog box closed, the changes will be transferred to ZEN and reflected there.



Note The following table shows the settings that can be changed online.

Bit type	Content of change
Timer (T)	Time setting
Holding timer (#)	Time setting
Counter (C)	Counter setting
Weekly timer (@)	Start/stop days of the week, times
Calendar timer (*)	Start/stop months, days
Analog comparator (A)	Input bits, constants, operators

3-8 Setting and Resetting Inputs

This section describes how to set (turn ON) and reset (turn OFF) ZEN bits from the ZEN Support Software.

The ZEN must be connected and online and the project file opened before inputs can be set or reset. Also, the ZEN and ZEN Support Software programs must be the same before inputs can be set or reset. Use the procedures outlined under *3-3 Transferring Programs to the ZEN*, *3-4 Transferring Programs from the ZEN*, and *3-5 Verifying Programs with ZEN* to transfer and verify the programs.

⚠ **Caution** Check that connected devices are safe before changing bit status. Injuries may occur if bit status is changed carelessly.

1,2,3... 1. Use the procedure outlined under *3-6 Operating and Stopping the ZEN* to start ZEN operation. Check that the Status Bar display changes from *STOP* to *RUN*.

2. Use the procedure outlined under *3-7 Monitoring Programs* to change to MONITOR mode.
3. Use the mouse or cursor keys to move to the input that is to be set or reset, and then perform either of the following operations:
   - Select ***ZEN(Z)/Set/Reset Operation*** and then either ***Set Operation(W)*** or ***Reset Operation(F)*** from the Menu Bar.
   - Click the right mouse button and then select ***Set/Reset Operation(S)*** and then either ***Set Operation(W) or Reset Operation(F)***.

Note The inputs that can be set or reset are shown in the following table.

Bit type	Comments
CPU Unit input bits (I)	Input terminal ON/OFF status has priority.
CPU Unit output bits (Q)	Set/reset possible for inputs only. (Not possible for outputs.)
Expansion I/O Unit input bits (X)	Input terminal ON/OFF status has priority.
Expansion I/O Unit output bits (Y)	Set/reset possible for inputs only. (Not possible for outputs.)
Work bits (M)	
Work bits (H)	

3-9 Clearing Errors

If an error occurs, use the following procedure to clear the error and then remove the cause of the error.

The ZEN must be connected and online for this operation.

1,2,3... 1. Select ***ZEN/Error Clear*** from the Menu Bar to clear the error.

2. Repeat this step to clear multiple errors.

Note

a) Refer to *Section 6 Troubleshooting* in the *ZEN Operation Manual (W385)* for information on ZEN errors.

b) ZEN errors that occur while online will be displayed in the Status Bar.

SECTION 4
System Settings

This section describes ZEN system settings, how to set passwords to protect ZEN ladder programs, and how to clear the ZEN memory.

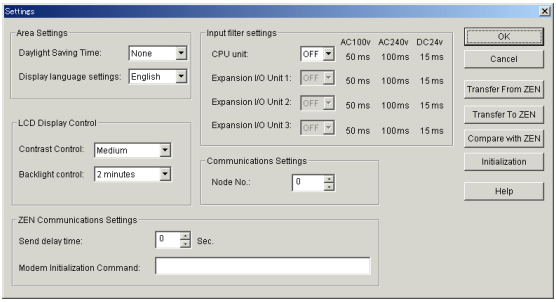
4-1 ZEN Settings

This section describes how to change ZEN settings from the ZEN Support Software.

4-1-1 Settings

1,2,3...

1. Select ***ZEN/Set Protection/Settings*** from the Menu Bar.
2. The Settings Dialog Box will be displayed. Make the settings for each item.



Setting		Details	Default
Daylight saving time (See note a.)		None, manually, EU Type, US Type	None
Display language		English, Japanese, German, French, Italian, Spanish	English
Contrast control (See note b.)		Light, Slightly light, Medium, Slightly shaded, Shaded	Medium
Backlight control (See note b.)		2 min, 10 min, 30 min, always	2 min
Input filter	CPU Unit	OFF: No input filter ON: With input filter	OFF
	Expansion I/O Unit 1 (See note c.)		
	Expansion I/O Unit 2 (See note c.)		
	Expansion I/O Unit 3 (See note c.)		
Node No.		Specify a node number between 0 and 9.	0
Send delay time (See note d.)		This is the delay time for sending the initialization command to the modem set on the ZEN side.	0
Modem initialization command (See note d.)		Initialization of the modem connected to the ZEN.	None

Note a) Daylight saving can be used for CPU Units that have built-in calendar and clock functions (ZEN-□□C1□□-□(-V1)).

b) Contrast and backlight control can be used for LCD-type CPU Units (ZEN-□□C1□□-□(-V1)).

c) Input filters can be set for Expansion I/O Units only when Expansion I/O Units are connected.

d) Do not make any setting for send delay time or modem initialization command. These options are for future function expansion.

3. Click the **OK** Button to save the settings.
Click the **Cancel** Button to discard the settings.
Click the **Initialization** Button to return to the default settings.

4. Settings can be sent between the ZEN and the ZEN Support Software if the ZEN is connected and online.
Click the **Transfer to ZEN** Button to transfer the settings to the ZEN or the **Transfer from ZEN** Button to transfer the settings from the ZEN to the ZEN Support Software.
Press the **Compare with ZEN** Button to compare the settings on the computer and the ZEN.

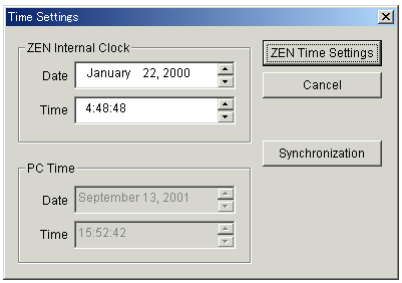
4-1-2 Time Settings

Use the following procedure for ZEN-□□C1□□-□(-V1), which have time functions, to set the date and time.

The ZEN must be connected and online to set the date and time.

1,2,3...

1. Select ***ZEN/Set Protection/Time Setting*** from the Menu Bar.
2. The Time Settings Dialog Box will be displayed. Set the date and time for the internal ZEN clock.



Settings		Details
ZEN internal clock	Date	Edit the ZEN date. (Date read from ZEN at startup or same date as computer)
	Time	Edit the ZEN time. (Time read from ZEN at startup or same time as computer)

Settings		Details
PC time	Date	Displays the computer date.
	Time	Displays the computer time.

3. Click the **OK** Button to send the settings to the ZEN.
   Click the **Cancel** Button to discard the settings.
   Click the **Synchronization** Button to use the computer date and time as the ZEN date and time. When the Synchronization Button is clicked, the computer date and time will be shown under the ZEN date and time on the screen, but these settings will not be sent to the ZEN.

Note To set the date and time display styles, select ***Settings/Control Panel/Regional Settings*** from the ***Start*** menu. Select ***Date*** to set a date style or ***Time*** to set a time style.

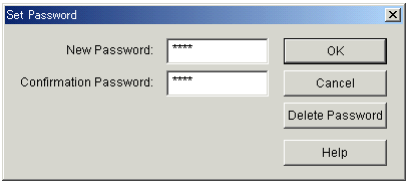
4-2 Setting a Password

This section describes how to set a password for the ZEN Support Software. This password is used to set and clear protection for ZEN programs.

Note Refer to *4-3 Protecting Programs* for information on how to set and clear ZEN program protection.

1,2,3...

1. Select ***ZEN/Set Protection/Set Password*** from the Menu Bar.
2. The Set Password Dialog Box will be displayed. Enter the password and confirm the password.



3. Click the **OK** Button to set the password as entered. Click the **Cancel** Button to clear the entered password. Click the **Delete Password** Button to delete an existing password.

4-3 Protecting Programs

This section describes how to protect ZEN programs from intentional or unintentional alteration by other users. Protected ZEN programs cannot be altered until the protection is removed and the protection can only be removed if the password is input correctly. For these reasons, care must be taken when using program protection.

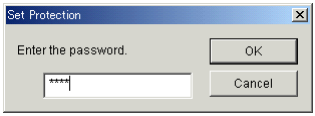
The ZEN must be connected and online before program protection can be executed.

Note Refer to *4-2 Setting a Password* for information on how to set and change passwords.

4-3-1 Setting Program Protection

1,2,3...

1. Click the **Set Protection** Button on the Toolbar or select ***ZEN/Protect/Set*** from the Menu Bar. The Set Protection Dialog Box will be displayed.
2. Enter the 4-digit password set under the password settings.

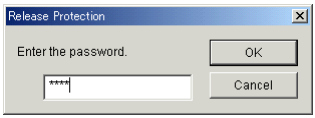


Once the above procedure has been completed, programs cannot be transferred to or from the ZEN or compared with the ZEN until the protection is removed.

4-3-2 Removing Program Protection

1,2,3...

1. Click the **Release Protection** Button on the Toolbar or select ***ZEN/Protect/Release*** from the Menu Bar. The Release Protection Dialog Box will be displayed.
2. Enter the 4-digit password set under the password settings.



Programs can now be transferred to or from the ZEN or compared with the ZEN.

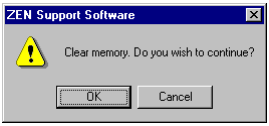
Note Refer to *6-2 Program Check Errors and Warnings* for information on any error messages that appear during setting or removal of program protection.

4-4 Clearing ZEN Memory

This section describes how to clear ZEN memory from the ZEN Support Software. The ZEN must be connected and online to perform this operation.

ZEN memory data	Status after memory cleared
Ladder programs (including parameter settings information)	Ladder program code is completely cleared. No ladder programming will remain.
Password settings	The password will be cleared and program protection removed.
I/O bits	All inputs will be reset (turned OFF) and holding timer and counter present values cleared to 0.

1,2,3... 1. Select ***ZEN/All Clear within ZEN*** from the Menu Bar.



2. Click the **OK** Button to clear all memory in the ZEN. Click the **Cancel** Button to cancel the all clear operation.

SECTION 5
Simulation Function

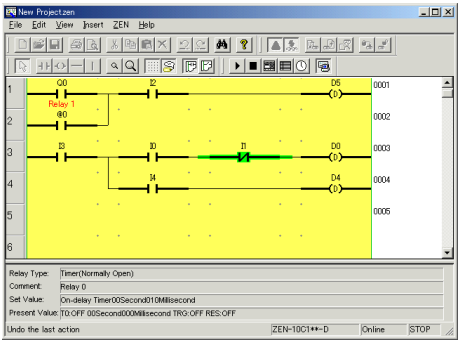
This section describes the simulation function and corresponding displays.

5-1 Starting and Stopping the Simulation Function

A ladder program created with the Support Software can be run by the Support Software without transferring it to the ZEN.

1,2,3...

1. Display the ladder program for which operation is to be simulated and then click the **Start/Stop Simulator** Button on the Toolbar or select ***ZEN(Z)/Start/Stop Simulator*** from the Menu Bar.



Note Set values can be changed during simulation. For details, refer to Changing Settings Online in *3-7 Monitoring Programs*.

2. When the simulator is started, the background color will change to yellow and the **RUN**, **STOP**, **ZEN Image Display**, **Present Value List Display**, **Clock Display**, and **Start/Stop Simulator** Buttons on the Toolbar will be enabled. Also, depending on the content of the ladder program, the ZEN Image Window, the Present Value List Window, and the Clock Window will be opened.
3. To start the simulation, click the RUN Button on the Toolbar. The simulator ZEN will change to RUN mode and the ladder program will be executed.
   To stop the simulation, click the STOP Button on the Toolbar.

Toolbar Button Functions

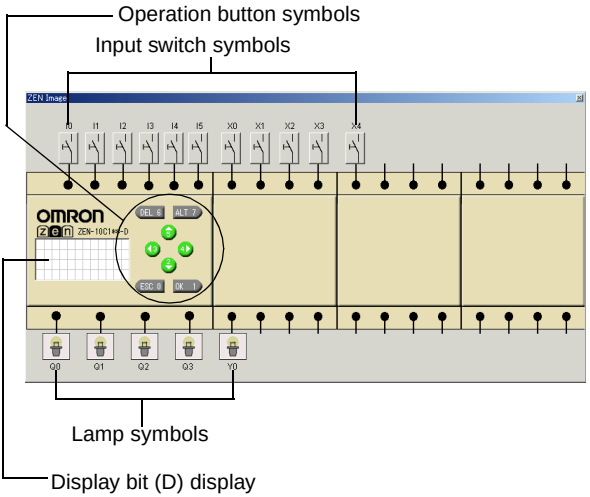
	RUN	Executes the ladder program.
	STOP	Stops the ladder program execution.
	ZEN Image Display	Specifies whether or not the ZEN Image Window will be displayed.
	Present Value List Display	Specifies whether or not the Present Value List Window will be displayed.

	Clock Display	Specifies whether or not the Clock Window will be displayed.
	Start/Stop Simulator	Starts and stops the Simulator.

4. To stop the simulator, click the **Start/Stop Simulator** Button on the Toolbar or select ***ZEN(Z)/Start/Stop Simulator*** from the Menu Bar.

5-2 ZEN Image Display

CPU Unit and Expansion I/O Unit images are displayed according to the configuration in the property settings, and input switches and lamps are allocated to the I/O bits used in the ladder program.



Note To display or hide the ZEN Image Window, click the **ZEN Image Display** Button on the Toolbar.

Input switch specifications can be changed by right-clicking the input switch symbol.

Input Switch Symbols

Symbol	Input specifications	Operation
	Momentary: NO condition	Normally OFF. ON only when left mouse button is held down.
	Momentary: NC condition	Normally ON. OFF only when left mouse button is held down.

Symbol	Input specifications	Operation
	Alternate: NO condition	Remains ON after being clicked. Remains OFF after being clicked again.
	Alternate: NC condition	Remains OFF after being clicked. Remains ON after being clicked again.
	Analog input	Select when using I4/I5 as analog inputs with a DC-type CPU Unit.

With LCD-type CPU Units, operation buttons can be used by the simulator. Either momentary or alternate operation can be selected by right-clicking the operation button symbols.

Operation Button Symbols

Input specifications	Operation
Momentary	Normally OFF. ON only when left mouse button is held down.
Alternate	Remains ON after being clicked. Remains OFF after being clicked again.

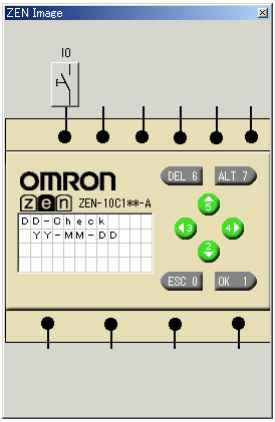
- External inputs can be turned ON and OFF by clicking the input symbols. When an external input is turned ON, the color of the connection line between the input symbol and the ZEN terminal changes to red.
- The results of ladder program processing can be checked by observing the status of lamp symbols connected to output terminals.

Lamp Symbols

Symbol	Status
	Output terminal OFF
	Output terminal ON

- When a display bit (D) is used in the ladder program, the display conditions are shown on the ZEN display.

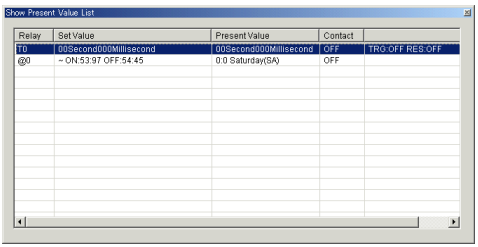
Display Bit (D) Function



Multiple display bits (D) can be executed simultaneously, and their display conditions monitored.

5-3 Present Value List Display

The current values for timers, holding timers, weekly timers, calendar timers, counters, analog comparators, and comparators used in the ladder program are displayed in list format.

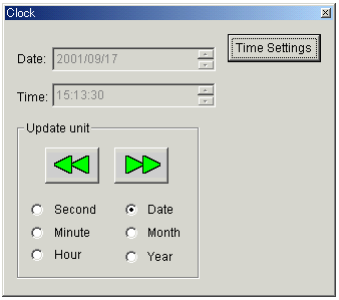


Note To specify whether or not the Present Value List Window is to be displayed, click the **Present Value List Display** Button on the Toolbar.

Present values can be changed by double-clicking on the Present Value Dialog Box.

5-4 Clock Display

When weekly timers or calendar timers are used in the ladder program, present dates and times can be simulated.



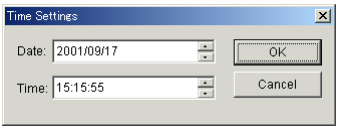
Note To specify whether or not the Clock Display Window is to be displayed, click the **Clock Display** Button on the Toolbar.

Setting the Clock Forward or Back

The present date and time can be set forward or back in whatever units are set (seconds/minutes/hour/day/month/year) by clicking the **Forward** or **Reverse** Buttons.

Changing the Present Time

The present time can be changed by clicking on **Time Setting** to open the Time Settings Dialog Box.



Note To set the date and time display styles, select ***Settings/Control Panel/Regional Settings*** from the ***Start*** menu. Select ***Date*** to set a date style or ***Time*** to set a time style.

SECTION 6
Troubleshooting

This section describes errors that may occur while using the ZEN Support Software and possible countermeasures.

6-1 Online Errors and Warnings

Error messages: Messages indicating fatal errors

Error message	Probable cause	Countermeasure
Communications Error has occurred.	No response to a command from the ZEN Support Software. Communications timed out.	Check that the Computer Connecting Cable is connected properly to the ZEN and the computer serial port. Check that the communications settings match the connection configuration of the ZEN.
Failed to connect to ZEN. The connected ZEN type ( ) does not match the project's ZEN type ( ). Cannot continue.	Online connection attempted while the ZEN system configuration and the ZEN model in the ZEN Support Software property settings are not the same.	Change the ZEN model in the property settings and the Expansion I/O Unit settings to match the system configuration of the ZEN to be connected online.
Operation failed since ZEN is in RUN mode. STOP ZEN running.	Command executed from ZEN Support Software while ZEN in RUN mode.	Change the ZEN to STOP mode and re-execute the command.
Operation failed since ZEN is protected. Release the protection.	Command executed from ZEN Support Software while ZEN protected.	Remove the protection from the ZEN and re-execute the command.
Operation failed since LCD is operating. Restore the main screen of LCD.	Command executed from ZEN Support Software while LCD operations being performed on the ZEN.	Return the LCD operations to the Main Screen and re-execute the command.
Error rung found in the program. Program transfer is cancelled.	There is an error in the program.	Refer to the probable causes and countermeasures for Program Check error messages.

Dialog boxes are displayed for determining processing. Follow the instructions given in the dialog boxes.

Messages

ZEN is in RUN mode; execution not possible. Change to STOP mode? Y/N

Return to RUN mode? Y/N

A circuit in the program generated a warning. Continue program transfer?

6-2 Program Check Errors and Warnings

Error messages: Message indicating fatal errors
The Program Check Results Dialog Box will be displayed.

Error message	Probable cause	Countermeasure
A bit (“relay”) type unsupported by the system is used. Check the ladder program.	Bit type used in ladder program that cannot be used with the system configuration set under property settings.	Revise the system configuration set under property settings or change the bit type that cannot be used. The following bit types cannot be used with the following ZEN models: ZEN-□□C2□□-□(-V1) Weekly timers (@) Calendar timers (∗) Display bits (D) ZEN-□□C□□□-A(-V1): Analog comparator bits (A) Analog comparators (A) cannot be designated for display bits (D). The following bit types cannot be used when no Expansion I/O Units are connected: Expansion I/O Unit input bits (X) Expansion I/O Unit output bits (Y) Also, the bit addresses that can be used depend on the configuration of Expansion I/O Units.
The setting unsupported in the connected ZEN is used.	An operation has been written that cannot be set for this ZEN version.	The following operations cannot be used with versions prior to 1.10: Setting the date (DAT1) for display with a display bit (D). Setting clear (C) as a function.

Warning messages: The Program Check Results Dialog Box will be displayed with messages to prompt corrective actions.

Error message	Probable cause	Countermeasure
No contact or coil (input or output) is connected, or a connection line is disconnected.	Ladder program input, output, or connection line not connected.	Check the horizontal connections for inputs and outputs and the vertical and horizontal connections for connection lines in ladder programs. Correct any breaks.
Duplicated coil ( )	The same output is used more than once in the ladder program.	Check the program and correct any duplications.
Duplicated timer number ( )		
Duplicated counter number ( )		

6-3 Protect Setting and Clearing Errors

Warning messages: A dialog box will be displayed warning of errors in the password.

Error message	Probable cause	Countermeasure
The password is incorrect.	A different password has been entered from the password that was set under the password settings or protect settings.	Re-enter the correct 4 digits set under the password settings or protect settings.
The password was set incorrectly.	The password and the reconfirmation of the password differ or more or less than 4 digits were input as the password.	Enter the same 4 digits in both the password and password confirmation text boxes.

Descriptive messages: A dialog box will be displayed prompting operation. Follow the instructions given in the dialog box.

Error message	Probable cause	Countermeasure
No password is set. Set a password, and try again.	The ZEN protect operation has been attempted while no password has been set.	Enter and reconfirm a password under the password settings and re-execute the protect operation.

Appendix A

Shortcut Keys and Hot Keys

Shortcut Keys

Key	Explanation
Ctrl + A	Select All
Ctrl + C	Copy
Ctrl + F	Find
Ctrl + N	Create
Ctrl + O	Open
Ctrl + P	Print
Ctrl + R	Edit Row comments
Ctrl + S	Save
Ctrl + V	Paste
Ctrl + W	Online Connect/Disconnect
Ctrl + X	Cut
Ctrl + Y	Undo
Ctrl + Z	Redo
Ctrl + Alt + DOWN	Insert Row
Alt + LEFT	Zoom Out
Alt + RIGHT	Zoom In
Alt + F4	Quit
I	CPU Unit Input Bit Edit Dialog Box Display
Q	CPU Unit Output Bit Edit Dialog Box Display
X	Expansion I/O Unit Input Bit Edit Dialog Box Display
Y	Expansion I/O Unit Output Bit Edit Dialog Box Display
M	Work Bit Edit Dialog Box Display
H	Holding Bit Edit Dialog Box Display
B	Button Switch Edit Dialog Box Display
T	Timer Edit Dialog Box Display
#	Holding Timer Edit Dialog Box Display
@	Weekly Timer Edit Dialog Box Display
*	Calendar Timer Edit Dialog Box Display
C	Counter Edit Dialog Box Display
A	Analog Comparator Edit Dialog Box Display
P	Comparator Edit Dialog Box Display
D	Display Edit Dialog Box Display

Key	Explanation
Delete	Delete
F3	Find Next
F1	Help

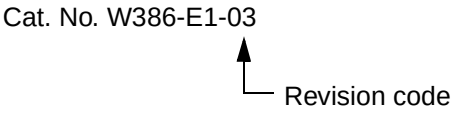
Hot Keys

Hot keys can be used to insert a programming element into a selected cell. If inputs and outputs are already set, however, the existing data will be given priority.

Key	Explanation
SHIFT + I	Insert Input (Input Edit Dialog Box Display)
SHIFT + O	Insert Output (Output Edit Dialog Box Display)
-	Insert Horizontal Connection Line
I	Insert Vertical Connection Line

Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.



The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

Revision code	Date	Revised content
01	March 2001	Original production
02	October 2001	1. Additions made to display bit (D) functionality accompanying new version of the ZEN Programmable Relays (Ver. 1.10). 2. Additions for the new software version (Ver. 2.00). Added Functions Simulation, row comments, input replacements, display checks, and set value changes during online operation. Improvements in Functionality, Operation, and Displays Program checks and program uploading from the ZEN when the ZEN Support Software is started were added, as were color displays for comments, searching for comments, and printing of comments (printing input, output, and parameter setting information), and monitor displays of outputs.
03	April 2003	**Page xiv:** Major changes made to information on compatibility between versions. **Page 2:** Version number changed and Windows XP added as a compatible operating system. **Page 13:** Major changes made to table. **Page 21:** “D7” changed to “Df”. **Page 22:** First screen image changed and “D7” changed to “Df”. **Page 51:** Model numbers changed in several places. **Page 63:** Model numbers changed in two places.

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