TOSHIBA

UM-TS03***-E045

PROGRAMMABLE CONTROLLER

PROSEC **T-SERIES**

# PROGRAM DEVELOPMENT SYSTEM

# *T-PDS32 for Windows*

## *Version 2.30*

# BASIC OPERATION MANUAL

**TOSHIBA CORPORATION**

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# Preface

## About the T-PDS32 for Windows

The T-PDS32 for Windows (hereafter called T-PDS32) is the programming support software for PROSEC T-series programmable controllers (PLCs). The T-PDS32 is used to create program, load the program into PLC, monitor the execution status, debug the program, and for documentation. It is also useful for the PLC maintenance.
T-PDS32 for Windows runs on the Microsoft Windows 95/98/Me/NT4.0/2000/XP/7 platform. It allows all programming operations to be done using the mouse, including program creation; copy, move, delete and other editing operations; and setting/changing of monitoring data (program operation status, current data values, etc.). The T-PDS32 provides an efficient program development.

## T-PDS32 Versions

This manual is prepared for T-PDS32 Version 2.2x.
The table below shows the version history of the T-PDS32.

| Version | Release date | Major revisions |
|---|---|---|
| 2.0 | Aug. 1999 | Initial release of 32-bit version (T-PDS32) for Windows 95, 98 and NT4.0 |
| 2.1 | Dec. 1999 | • Error handling improvements (Jump to the error position, jump to offset address, etc.)<br>• Jump to next/prev block support for T1-series PLC |
| 2.11 | Mar. 2000 | • Block/rung comment improvements<br>• Documentation improvements |
| 2.12 | Jan. 2001 | • For Windows 95, 98, Me, NT4.0, 2000<br>• Connection retry for T1-series non parity setting<br>• Force setting color indication<br>• Improvement of Timer/Counter search in offline |
| 2.13 | Oct. 2001 | • S2T support<br>• Coil cross-reference print with ladder program |
| 2.14 | Mar.2002 | • For Windows 95, 98, Me, NT4.0, 2000 and XP<br>• Improvement of communication time-out processing<br>• Event history file output function<br>• Online monitor window size expansion<br>• Improvement of usage map with ATOH instruction |
| 2.20 | Oct. 2002 | • CD-ROM version<br>• Toolbar improvement<br>• S2T - C2 data exchange setting function<br>• Improvement of block merge |
| 2.21 | Oct. 2005 | • S2E support |
| 2.30 | Nov. 2010 | • Improvement of Counter search in offline<br>• Improvement of display cross-reference and usage-map<br>• For Windows 7(32bit) |

## About This Manual

This manual explains basic information of T-PDS32, hot to install and the basic operations using the T-PDS32. For details of each functions and operations, refer to the T-PDS32 online Help.

### Related Manuals

The following related manuals are available T-series PLC. Read the manuals for your PLC model for your better understanding.

| | |
|---|---|
| **T-series common:** | |
| T-series Instruction Set | UM-TS03***-E004 |
| T-PDS32 for Windows Operation manual (Ver. 2.30) | UM-TS03***-E045 (This manual) |
| T-series Computer Link Operation Manual | UM-TS03***-E008 |
| Handy Programmer (HP911) Operation Manual | UM-TS03***-E025 |
| DDE Server Software (T-PSV) | UM-TS03***-E044 |
| **T1/T1S:** | |
| T1-16S User's Manuals - Basic Hardware and Function | UM-TS01***-E031 |
| T1-16S User's Manuals - I/O Modules | UM-TS01***-E034 |
| T1-16S User's Manuals - Communication Function | UM-TS01***-E033 |
| T1/T1S User's Manuals - Basic Hardware and Function | UM-TS01***-E001 |
| T1/T1S User's Manuals – Expansion I/O | UM-TS01***-E002 |
| T1/T1S User's Manuals - Communication Function | UM-TS01***-E003 |
| **T2E/T2N:** | |
| T2E User's Manual | UM-TS02E**-E001 |
| T2N User's Manual | UM-TS02N**-E001 |
| T2E/T2N Enhanced Communication Function | UM-TS02E**-E003 |
| T2 Analog I/O Module (AD268/DA264/TC218) | UM-TS02***-E026 |
| T2 2-Channel Pulse Input Module (PI232/272) | UM-TS02***-E021 |
| T2 2-Axis Motion Control Module (MC212) | UM-TS02***-E018 |
| T2 Communication Interface Module (CF211) | UM-TS02***-E013 |
| **T3/T3H:** | |
| T3 User's Manual – Hardware | UM-TS03***-E002 |
| T3 User's Manual – Function | UM-TS03***-E003 |
| T3H User's Manual | UM-TS03***-E032 |
| T3 Analog Input Module (AD368/AD318/AD328/AD338) | UM-TS03***-E016 |
| T3 Analog Output Module (DA364/DA374) | UM-TS03***-E017 |
| T3 Pulse Input Module (PI312) | UM-TS03***-E018 |
| T3 ASCII Module (AS311) | UM-TS03***-E020 |
| T3 Change Detect DC Input Module (CD332) | UM-TS03***-E024 |
| **S2T/S2E:** | |
| S2T User's Manual – Hardware | 6F8C0926 |
| S2T User's Manual – Function | 6F8C0928 |
| S2E User's Manual – Hardware | 6F8C1094 |
| S2E User's Manual – Function | 6F8C1132 |
| **Network:** | |
| T2N Ethernet function | 6F3B0362 |
| Ethernet Module (EN311) for T3H | 6F3B0361 |
| TOSLINE-S20 - T2/T3 Station | 6F3B0354 |
| TOSLINE-S20 - SIF Station | 6F3B0352 |
| TOSLINE-S20 - Active Star Coupler ASC22 | 6F3B0358 |
| TOSLINE-S20 - Active Star Coupler ASC25 | 6F3B0360 |
| TOSLINE-S20LP - T2N/T3H Station | 6F3B0356 |
| TOSLINE-S20/S20LP - S2T Station | 6F8C0890 |
| TOSLINE-S20/S20LP - Loader software S-LS for Windows | 6F3B0357 |
| DeviceNet Scanner Module for T2 (DN211A) | 6F3B0364 |
| DeviceNet Scanner Module for T3 (DN311A) | 6F3B0363 |
| DeviceNet Scanner Module for S2T (DN611A) | 6F8C1043 |
| DeviceNet Wizard for Toshiba | - |
| TOSLINE-F10 User's Manual - T2/T3 System | UM-TLF10**-E001 |
| **C2:** | |
| Computer Module C2 User's Manual | 6F8C1111 |

## Preparations and Checks

### Operating Environment

The T-PDS32 for Windows program runs on a PC/AT compatible computer with the specifications shown in the table below.

| Category | | Specification |
|---|---|---|
| OS | Operating System | Windows 95<br>Windows 98 SE<br>Windows Me<br>WindowsNT4.0 SP3<br>Windows 2000<br>Windows XP<br>Windows 7(32bit) |
| CPU | Main Processor | Min. Pentium 150 MHz<br>(MMX Pentium 200MHz or faster) |
| Memory | RAM | Min. 32MB<br>(64MB or more) |
| Display | Display unit<br><br>Graphics monitor | Color/gray scale monitor 16 colors or more<br><br>Min. 640 x 480 pixels VGA/SVGA<br>(800 x 600 pixels or more) |
| Input device | Keyboard<br><br>Mouse | 101 keys/84 keys<br><br>PS2 or serial |
| Disk drive | Hard disk drive<br><br>CD-ROM drive | Min. 80MB<br><br>For setup only |
| Interface | RS-232C *1<br><br>Printer<br><br>LAN | 9600bps<br><br>Mono or Color Printer<br><br>Ethernet |

( ): Recommended

*1: USB/Serial adapter is not guaranteed. It may cause unstable communication between T-PDS and PLC. If your computer has no serial port, it is recommended to use an RS-232C PCMCIA card.

# T- PDS32 Installation

## T- PDS32 Installation

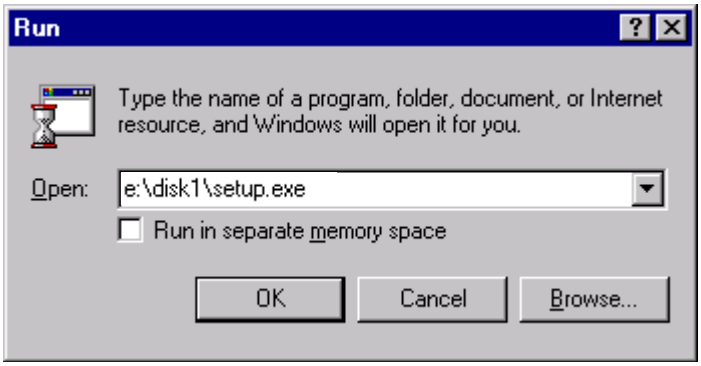
The T-PDS32 installation files are provided by a CD-ROM.
Use the following procedure to install the T-PDS32 for Windows program.
The following steps describe the procedure used to install the T-PDS32 into the hard disk drive C.
On machines with a different drive configuration, change the drive names as needed.

(1) Startup the Windows operating system.

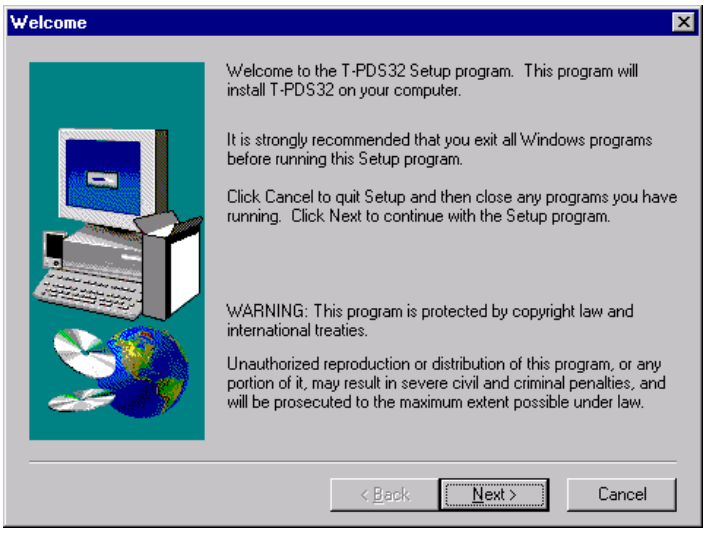
(2) Insert the T-PDS32 CD-ROM. (Drive E in this example)

(3) Point to the Start Bar and then click Run....

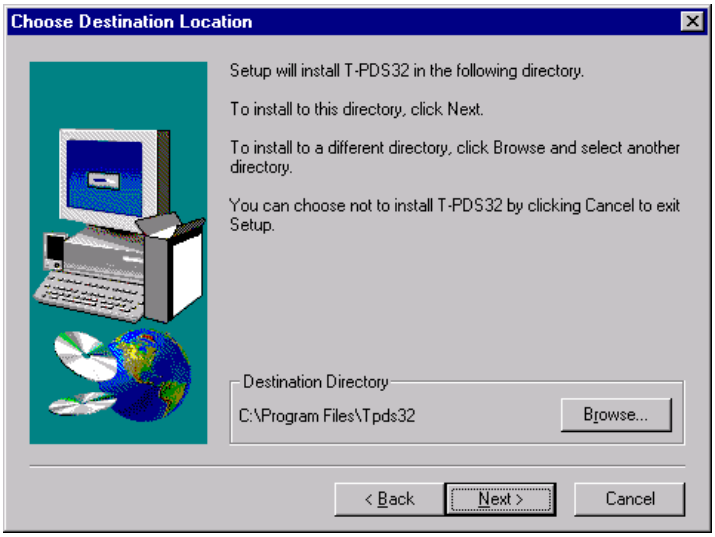
(4) In the command line box, enter "e:\disk1\setup.exe" and click OK.
Then the T-PDS32 installer program will be started.



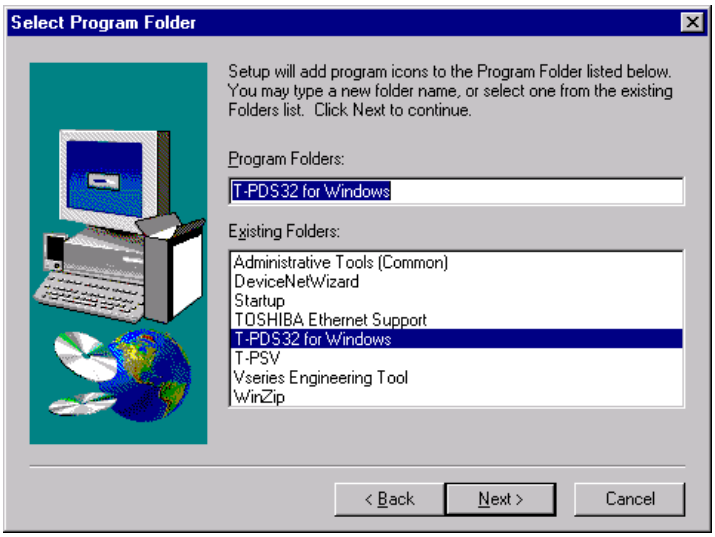
(5) When the installation environment is complete, the following dialog box will appear. Click Next.



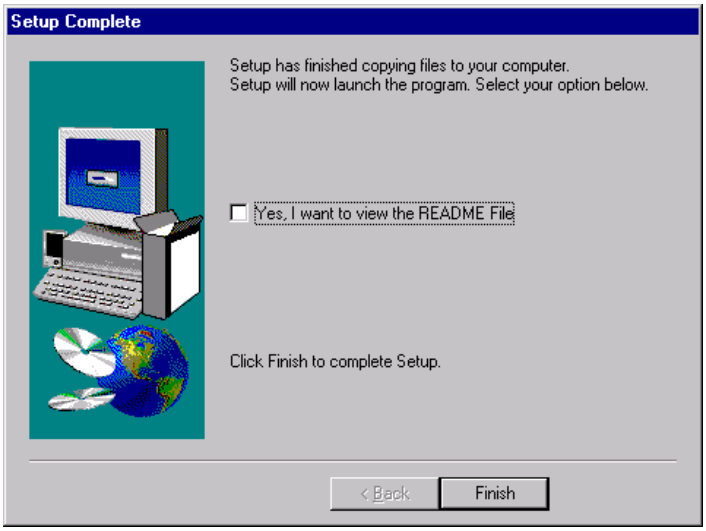

(6) The Destination Location dialog box will appear. The default option for the destination is "C:\Program Files\Tpds32". To change the destination directory, you must enter a new directory. Click Browse. A dialog box for selecting the drive and directory will appear. Select the directory from the list.
Then click Next.



(7) The Program Folder dialog box will appear. The default option for the folder name is "T-PDS32 for Windows". To change the folder name, you must enter a new folder name.
When preparations for installation are complete, click Next. To cancel the installation process, click Cancel.




(8) When installation of T-PDS32 for Windows is completed properly, the execution files and other files will be registered in the T-PDS32 for Windows folder.

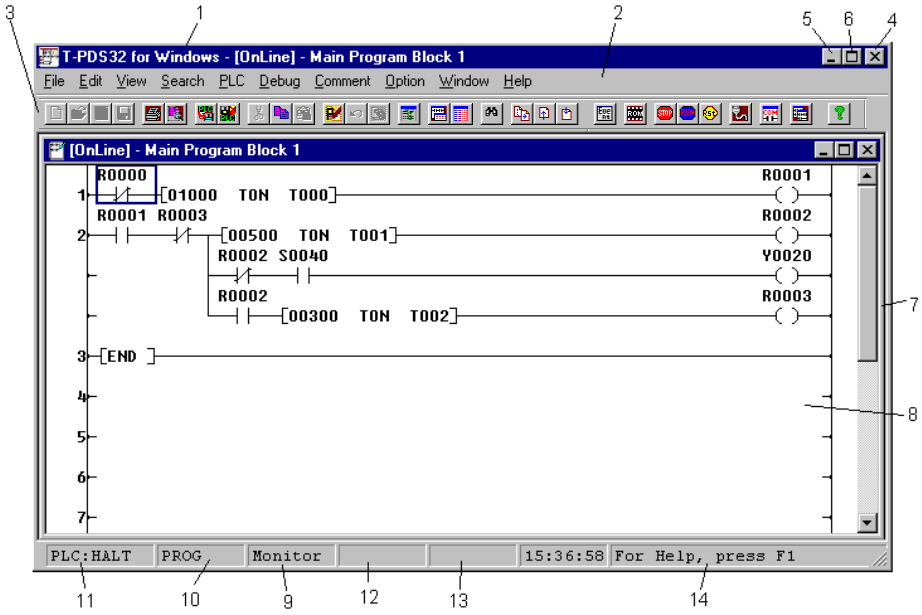



(9) There is an installation necessity Windows help program (WinHlp32.exe) for Windows 7 when Windows 7 is used. Please download from the homepage of Microsoft Corporation, and install it.

# Before Operation

## Screen Configuration of T-PDS32 for Windows

The configuration for the main window screen is described below.




1 - Title bar: Shows the name of the window.
2 - Menu bar: Shows the names of the main menus.
3 - Toolbar: Displays icons for tools that can be used. You can hide the toolbar by changing the Toolbar setting on the View menu.
4 - Control-menu box: Clicking this button closes the window.
5 - Reduce button: Clicking this button shrinks the window so it is displayed as an icon.
6 - Restore button: This button appears when the window fills the entire screen. Clicking the button restores the window to its original size.
7 - Client area: This area shows the data for the selected function.
8 - Work window: The work area for the selected function.
9 - Current command: Shows the currently selected command.
10 - Status: Shows programming enable or protected status of the controller.
11 - Operational status: When the T-PDS32 is online mode, "PLC" appears in the status bar, followed by the operational mode of the controller.
"OFFLINE" appears when the T-PDS32 is offline mode.
12 - Insert/Overwrite: In Edit mode, this shows whether insert or overwrite mode. It can be controlled by [Ins] key.
13 - SFC line number: Shows the SFC line number of the cursor position (at SFC programming).
14 - Help message: Shows help messages pertaining to the toolbox.

### Selecting Functions

In the T-PDS32 for Windows program, you can select operational modes using the main menus on the menu bar.

| | |
|---|---|
| [File] | Used to open, save and print projects and to quit the program. Program load/save between the PLC is under this menu. |
| [Edit] | Used to write a program, modify the program, and online write into the PLC. |
| [View] | Used to display the data monitor window, change the data display format, zoom in/out the program display, etc. |
| [Search] | Used to perform the search function for designated operand and/or instruction, and jump to the designated location in the program. |
| [PLC] | Used to monitor/set the PLC system parameter, monitor the maintenance information, control the PLC mode, etc. The T-PDS32 online/offline mode selection is under this menu. |
| [Debug] | Used for program debugging functions such as force, data set/reset, sampling trace, etc. |
| [Comment] | Used to edit/display the comment. Comment conversion to/from CSV file is also available. |
| [Option] | Used to display cross-reference, usage-map and force list. The T-PDS32 connection method selection and some customize function are under this menu. |
| [Window] | Used to open or change the display status of windows. |
| [Help] | Used to access the help function and display the version data. |

Menu items may be selected either by using the mouse or by pressing keys on the keyboard.

| | |
|---|---|
| Using the mouse: | Move the mouse pointer on the item in the menu bar and click the left mouse button. |
| Using the keyboard: | Press the Alt key and select the menu, then use the cursor keys to select the desired menu item and press Enter key. |

### Menu Configuration

**[File]** Used to open, save and print projects and to quit the program. Program load/save between the PLC is under this menu.

| | |
|---|---|
| New Project | Opens a new project |
| Open Project | Opens an existing project |
| Save Project | Saves changes to the project |
| Save Project As | Saves the project under a different name |
| Close Project | Closes the project |
| Compare Project | Compares the PLC program with another project |
| Multiple Projects | Opens another project |
| Print | Prints the project |
| Print Preview | Shows a preview of printing |
| Print Setup | Used to choose the printer settings |
| Transfer Program | Transfers the project between PLC and disk file |
| Program Block Read | Appends the program blocks to the editing program |
| Recent File List | Shows a list of recently accessed files |
| Exit | Quits the program |

**[Edit]** Used to write a program, modify the program, and online write into the PLC.

| | | |
|---|---|---|
| Edit Mode | | Changes the mode to Edit mode |
| Undo | | Recovers the last edit operation |
| Cut | | Cuts the circuit (Ladder) |
| Copy | | Copies the circuit (Ladder) |
| Paste | | Pastes the circuit (Ladder) |
| Insert | Line | Inserts a line (ladder) |
| | Rung | Inserts a rung (ladder) |
| | Column | Inserts a column (SFC) |
| Delete | Line | Deletes a line (ladder) |
| | Rung | Deletes a rung (ladder) |
| | Column | Deletes a column (SFC) |
| Direct | | Used to edit the transition/action directly (SFC) |
| Edge/Digit/ Index | Edge | Used to set/release Edge execution setting |
| | Digit | Used to set/release Digit designation |
| | Index | Used to set/release Index modification |
| Change Language | | Selects the language either Ladder or SFC |
| Block | Edit Block | Edits the program in block units (Block copy/move) |
| | Merge Block | Merges the block with another |
| | Divide Block | Divides the block |
| Function | Change Device | Changes register or device |
| | Replace Address | Search and replace the designated registers or devices |
| Check Program | | Checks the program |
| Write | | Writes the edited program into PLC (online) or into internal memory (offline) |

**[View]** Used to display the data monitor window, change the data display format, zoom in/out the program display, etc.

| | |
|---|---|
| Tool Bar | Displays/hides the toolbar |
| Status Bar | Displays/hides the status bar |
| Data Box | Displays the data box to set data |
| Auxiliary Monitor | Displays auxiliary data monitor window. (simultaneous monitor with program execution) |
| Data Monitor | Displays the data monitor window (32 words data) |
| Data Format | Changes the data display format |
| Trace Format | Changes the trace display format |
| Zoom In/Out | Enlarges/reduces the display size |
| Fit To Window | Fit the display to the window size |

**[Search]** Used to perform the search function for designated operand and/or instruction, and jump to the designated location in the program.

| | | |
|---|---|---|
| Find | | Searches for designated register/device in the program |
| Rung | Start of Block | Moves to the first rung in the block |
| | End of Block | Moves to the last rung in the block |
| Block | Start of Program | Moves to the first block of the program type |
| | End of Program | Moves to the last block of the program type |
| | Next Block | Moves to the next block |
| | Previous Block | Moves to the previous block |
| Goto | | Used to display the designated program type and block |

**[PLC]** Used to monitor/set the PLC system parameter, monitor the maintenance information, control the PLC mode, etc. The T-PDS32 online/offline mode selection is under this menu.

| | | |
|---|---|---|
| System Parameters | | Monitors/edits the system parameters |
| I/O Allocation | I/O Allocation | I/O module allocation data |
| | Interrupt Assignment | Interrupt assignment data |
| | Network Assignment | Link data allocation for network module |
| Event History | | Reads and displays the PLC's event history |
| Scan Time | | Reads and displays the scan time |
| Power Interruption | | Used to set the power interruption function |
| C2 Access Setting | | Used to set the register allocation for data exchanging between S2T and C2 |
| Memory Management | Clear Event | Clears the event history |
| | Clear Memory | Clears entire PLC memory |
| | Clear IC Card | Clears the IC card memory |
| | Read EEPROM/ IC Card | Loads program from EEPROM or IC card and stores it in PLC's memory |
| | Write EEPROM/ IC Card | Writes PLC memory program into the built-in EEPROM or IC card |
| Password | Change Protect Level | Changes the level accessible with the password |
| | Set Password | Sets a password |
| PLC Control | Halt | Stops the program execution |
| | Run | Starts the program execution |
| | Force Run | Starts the program execution without checking I/O mounting status |
| | Error Reset | Resets the PLC error status |
| | Hold | Stops the program execution with keeping I/O update |
| | Hold Cancel | Cancels hold mode and returns to Run |
| | Float Box | Displays/hides the PLC control box |
| Online/Offline | | Toggles the mode between Online and Offline |

**[Debug]** Used for program debugging functions such as force, data set/reset, sampling trace, etc.

| | |
|---|---|
| Force | Used to set force input or force coil |
| Set On/Off | Used to set data into the register/device |
| Change Value | Used to write data into the register or change the constant operand value |
| Sample Trace | Used to execute the sampling trace function |
| Status Latch | Used to execute the status latch function |
| Data Validity Check | Used to execute the bit-pattern check function |

**[Comment]** Used to edit/display the comment. Comment conversion to/from CSV file is also available.

| | | |
|---|---|---|
| View | | Displays/hides the comment on the program |
| Edit | Block Comment | Edits block comments |
| | Rung Comment | Edits rung comments |
| | Reg/Dev Comment | Edits register/device comments |
| Append | Program Comment | Appends the block/rung comment from the existing comment file |
| | Reg/Dev Comment | Appends the register/device comment from the existing comment file |
| Convert | | Converts the comment file to/from CSV file |
| Select Comment File | | Selects the reference comment file in online mode |

**[Option]** Used to display cross-reference, usage-map and force list.
The T-PDS32 connection method selection and some customize function are under this menu.

| | | |
|---|---|---|
| Cross Reference | | Shows the cross reference list |
| Usage Map | | Shows the register/device usage map |
| Forced List | | Shows the list of forced inputs/coils |
| Instruction Box | | Sets the instruction bar option |
| Communication | | Sets communication method between PLC |
| Customize | Comment Font | Customizes the comment font |
| | Color Set | Customizes the color |
| | User Instruction | Customizes the user Instruction group |

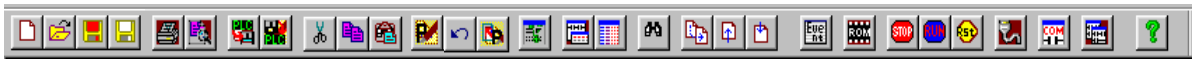
**[Window]** Used to close or change the display status of windows.

| | |
|---|---|
| New Window | Opens a new program window |
| Cascade | Displays windows overlapped in cascading fashion |
| Tile | Displays windows side by side in tiled fashion |
| Arrange Icons | Changes window into icon |
| Close All | Closes all open windows |
| List of Open Windows | Displays/hides a list of open windows |

**[Help]** Used to access the help function and display the version number.

| | |
|---|---|
| Contents | Displays help categories |
| Search on Help | Searches help by key word |
| About T-PDS for Windows | Displays the version data |

### Toolbar Configuration



The toolbar contains the most frequently used functions.

| | |
|---|---|
| [File] [New Project] | Opens a new project |
| [File] [Open] | Opens an existing project |
| [File] [Save] | Saves changes to a project |
| [File] [Save Project As] | Saves the project under a different name |
| [File] [Print] | Prints the program |
| [File] [Print Preview] | Displays the print preview |
| [File] [Program Transfer] [PLC→File] | Uploads the program from PLC to file |
| [File] [Program Transfer] [File→PLC] | Downloads the program from file to PLC |
| [Edit] [Cut] | Cuts the rungs |
| [Edit] [Copy] | Copies the rungs |
| [Edit] [Paste] | Pastes the rungs |
| [Edit] [Edit Mode] | Selects/deselects program edit mode |
| [Edit] [Undo] | Recovers the last edit operation |
| [Edit] [Write] | Writes the program into PLC or offline memory |
| [View] [Data Box] | Displays the data box |
| [View] [Auxiliary Monitor] | Displays the auxiliary monitor window |
| [View] [Data Window] | Displays the data monitor window |
| [Search] [Find] | Searches operand and/or instruction |
| [Search] [Go to] | Moves to the designated location |
| [Search] [Block] [Previous Block] | Moves to the previous block |
| [Search] [Block] [Next Block] | Moves to the next block |
| [PLC] [Event History] | Displays the event history |
| [PLC] [Memory Management] [Write EEPROM] | Executes EEPROM write command |
| [PLC] [PLC Control] [Halt] | Executes HALT command |
| [PLC] [PLC Control] [Run] | Executes RUN command |
| [PLC] [PLC Control] [Error Reset] | Executes Error Reset command |
| [PLC] [Online/Offline] | Switches T-PDS32 mode online/offline |
| [Comment] [Comment Format] | Displays comments on the program |
| [Window] [New Window] | Opens program window |
| [Help] | Calls online help |

### Key Operation

Described below are the key functions of the T-PDS32.

<<File>>

- Ctrl + N — Opens a new project.
- Ctrl + O — Opens an existing project.
- Ctrl + S — Saves on the same file name.
- Ctrl + A — Saves as a new file.
- Ctrl + P — Prints out
- Alt + F4 — Ends the T-PDS32

<<Common to program view and edit (Ladder/SFC's Action and Transition)>>

- [→] — Moves the cursor to right.
- Shift + [→] — Moves the cursor to the extreme right.
- [←] — Moves the cursor to left.
- Shift + [←] — Moves the cursor to the extreme left.
- [↑] — Moves up the cursor to the line above.
- [↓] — Moves down the cursor to the line below.
- Shift + [↓] — Selects a range from the cursor rung. (up to 11 lines)
- Shift + [↑] — Cancels the selected range.
- Home — Moves the cursor to the first rung of the block.
- End — Moves the cursor to the last rung of the block. (for ladder only)
- PageUp — Scrolls up the circuit. (for ladder only)
- PageDown — Scrolls down the circuit. (for ladder only)
- Shift + PageUp — Moves to the previous block.
- Shift + PageDown — Moves to the next block.
- Ctrl + E — Edit mode/Edit quit
- Ctrl + C — Copies a range of the program.

<<Commn to program view and edit (SFC)>>

- [→] — Moves the cursor right.
- [←] — Moves the cursor left.
- [↑] — Moves up the cursor to the line above.
- [↓] — Moves down the cursor to the line below.
- Home — Moves the cursor to the home position.
- End — Moves the cursor to the last symbol position.
- PageUp — Moves up the cursor to the 12 lines above.
- PageDown — Moves down the cursor to the 12 lines below.
- Ctrl + E — Edit mode/Edit quit

<<Program edit (Ladder/SFC's Action and Transition)>>

| | |
|---|---|
| - Shift + 0 to 8 | Specifies the digit designation. (Q0 to Q8) |
| - Shift + Ctrl + 0 to 8 | Cancels the digit designation. (Q0 to Q8) |
| - Shift + I, J, K | Specifies the index modification. (I, J, or K) |
| - Shift + Ctrl + I, J, K | Cancels the index modification. (I, J, or K) |
| - Shift + P | Specifies/cancels the edge execution modifier. |
| - Ctrl + H | Changes constant operand input format. (Decimal/hexadecimal) |
| - Insert | Changes overwrite/insert mode. |
| - Delete | Deletes instructions. |
| - Space | Clears operand. |
| - Enter | Enters the instruction. If blank, inserts a line blow cursor. |
| - Shift + Enter | Inserts a line below the cursor position. (for ladder only) |
| - Ctrl + Z | Undoes the recent edit operation. (for ladder only) |
| - Ctrl + X | Cuts a range of the program. (for ladder only) |
| - Ctrl + C | Copies a range of the program. (for ladder only) |
| - Ctrl + V | Pastes a cut or copied program. (for ladder only) |
| - Ctrl + W | Writes the edited program. (for ladder only) |
| - Shift + C | Erases circuits. (for ladder only) |
| - Shift + X | Deletes lines. (for ladder only) |
| - Esc | Cancels the edit process. |

<<Program edit (SFC)>>

| | |
|---|---|
| - Insert | Changes overwrite/insert mode. (toggle) |
| - Delete | Deletes symbols. |
| - Space | Clears operand. |
| - Enter | Enters the operand and confirms it. |
| - Shift + [↓] | Selects lines from the symbol on the cursor position. |
| Shift + [↑] | Cancels the selected line. |
| - Ctrl + W | Writes programs |
| - Esc | Cancels the edit process. |

<<Data Monitor>>

| | |
|---|---|
| - [→] | Moves forwards between blocks. |
| - [←] | Moves backwards between blocks. |
| - [↑] | Scrolls up the block. |
| - [↓] | Scrolls down the block. |
| - PageUp | Scrolls by the block size in the decrement direction. |
| - PageDown | Scrolls by the block size in the increment direction. |
| - Home | Moves the cursor to the first address of the block. |
| - End | Moves the cursor to the last address of the block. |
| - Enter | Edits the data value at the cursor position. (in data box) |

<<Auxiliary monitor>>

| | |
|---|---|
| - [→] | Moves forwards between blocks. |
| - [←] | Moves backwards between blocks. |
| - [↑] | Scrolls up the block. |
| - [↓] | Scrolls down the block. |
| - PageUp | Scrolls by the block size in the decrement direction. |
| - PageDown | Scrolls by the block size in the increment direction. |
| - Home | Moves the cursor to the first address of the block. |
| - End | Moves the cursor to the last address of the block. |
| - Enter | Registers the data address to the cursor position and edit the data value. (in data box) |
| - Delete | Deletes the registration. |

<<Comment window>>

| | |
|---|---|
| - [↑] | Scrolls up the screen. |
| - [↓] | Scrolls down the screen. |
| - PageUp | Scrolls up by 32 addresses.. |
| - PageDown | Scrolls down by 32 addresses. |
| - Home | Moves the cursor to the first address. |
| - End | Moves the cursor to the last address. |
| - Enter | Edits the tag/comment at the cursor position. (in data box) |

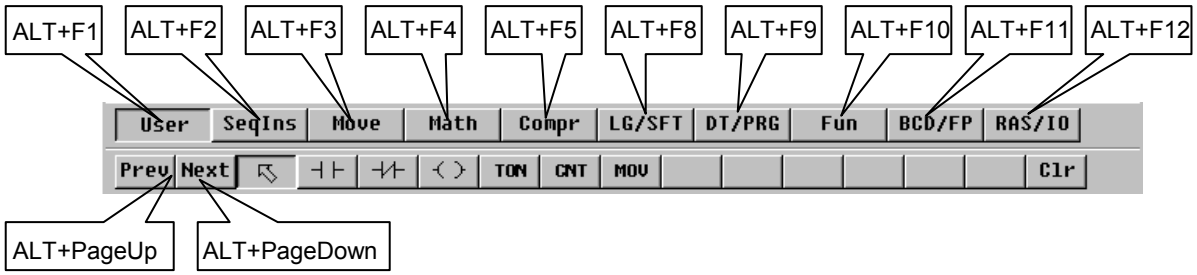
<<Debug>>

| | |
|---|---|
| - Ctrl + 1 | Sets the device ON. |
| - Ctrl + 2 | Resets the device OFF. |
| - Ctrl + 3 | Sets force the device. |
| - Ctrl + 4 | Resets force the device. |

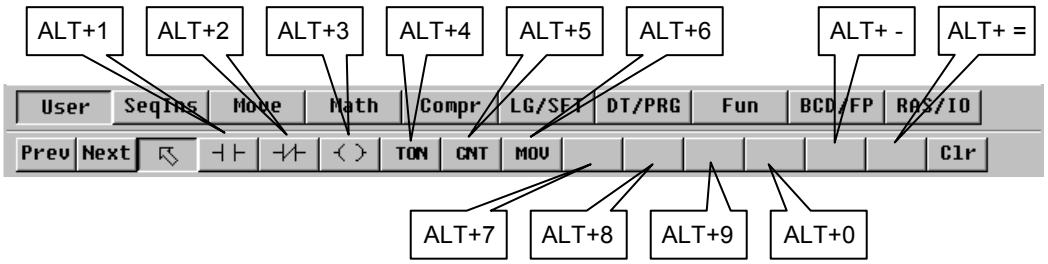
### Key Assignment to the Instruction bar

The instruction type and instruction toolbar buttons have a shortcut key allocated.

The instruction type can be selected by pressing one of the following shortcut keys.




The instruction will be pasted to the cursor position by pressing the following shortcut keys.



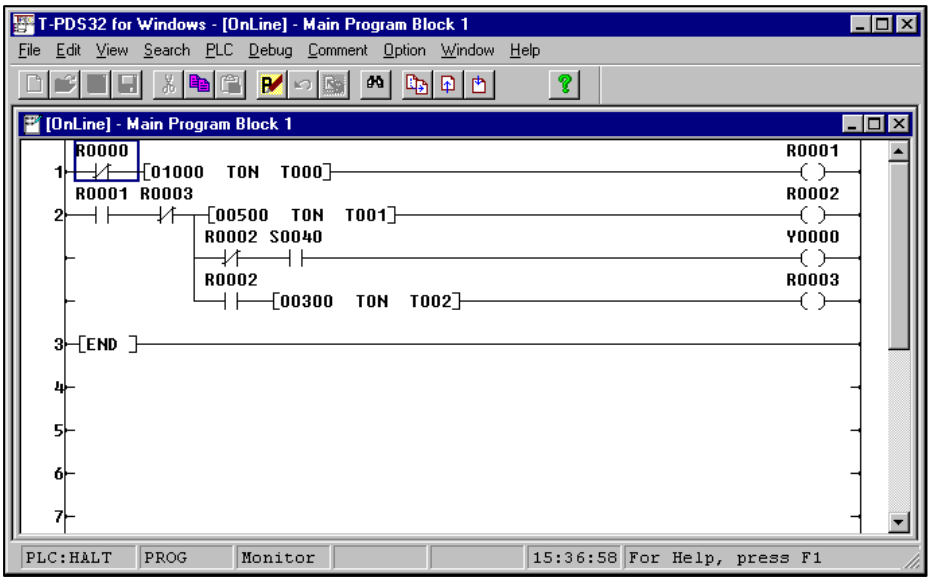
# 1. Procedure

## Basic Operation

### 1. Procedure

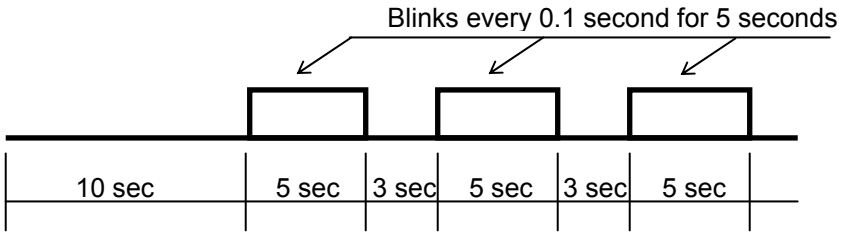
#### 1.1 Sample Program

In this manual, the operation of the T-PDS32 is explained through the process of creating a control program for the flicker circuit shown below.




- Flicker Circuit Operation

10 seconds after startup, the flicker circuit blinks for 5 seconds at 3-second intervals.




Contact S0040 is a special relay (timing relay) that goes on and off every 0.1 second. During its 5-second operation it turns the device (output coil) on and off every 0.1 second.

When there is an I/O card (D0334 and R0364 [T3], D031 and D032/R061 [T2] or other output module), it should be installed in slot 0.
Program execution can be checked on the module operation LEDs. Program creation and execution is possible even if the I/O card is not installed.

## 1.2 Procedure

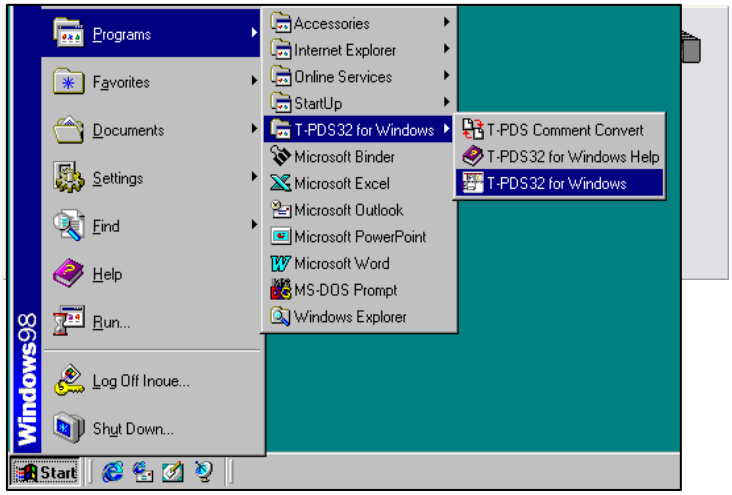
This manual describes how to create the program for the flicker circuit using the following procedure.

| | |
|---|---|
| Check system configuration | - Check the program for the flicker circuit. |
| Connect controller | - Connect the controller to the programmer. |
| Starting up T-PDS32 | - Launch the programmer. |
| Register system control data | - Register the control parameters for the flicker circuit. |
| Register I/O card | - Register the I/O card to be used with the flicker circuit. |
| Programming 1 | - Place symbols and write operands to create a sample program. |
| Write program | - Write the program to the controller. |
| Execute program<br>Check operation 1<br>Check operation 2 | - Execute the program and check the operation on the Program screen and the Register All screen. |
| Insert circuit | - Insert a circuit and change some of the sample program functions. |
| Set data | - Execute the corrected program and then change some of the data being executed and check operation. |
| Delete circuit | - Delete a portion of the circuit and finish the revised program. |
| Save program | - Save the program on a floppy disk. This section also discusses how to load programs from the floppy disk. |
| Helpful function | - This section describes how to name the registers for the program, sample the operational status and check it on a time chart, debug programs and print out programs. |

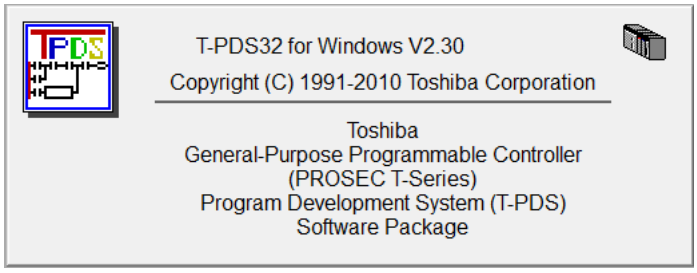
# 2. Starting Up the T-PDS32

## 2.1 System Startup

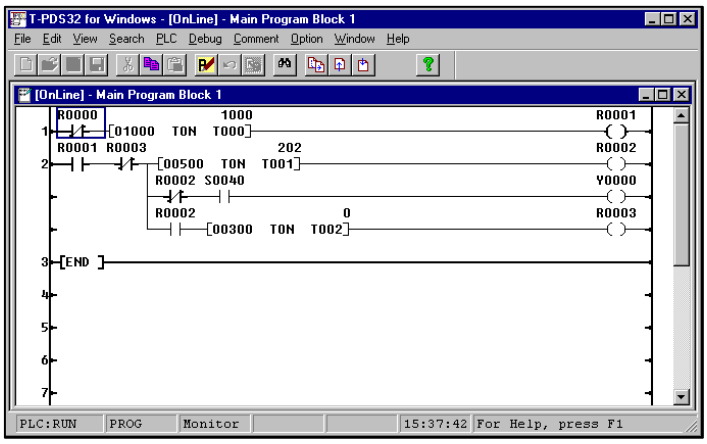
You need to connect the programmer to the controller before starting up the system. The cable can be connected to the controller while it is running or power on.




Connect the male connector of the dedicated cable to the [PROG] connector on the CPU module of the T-series controller.
To launch the T-PDS32 for Windows program, double-click the T-PDS32 icon in the T-PDS32 group. Only one project is opened when the program is launched.



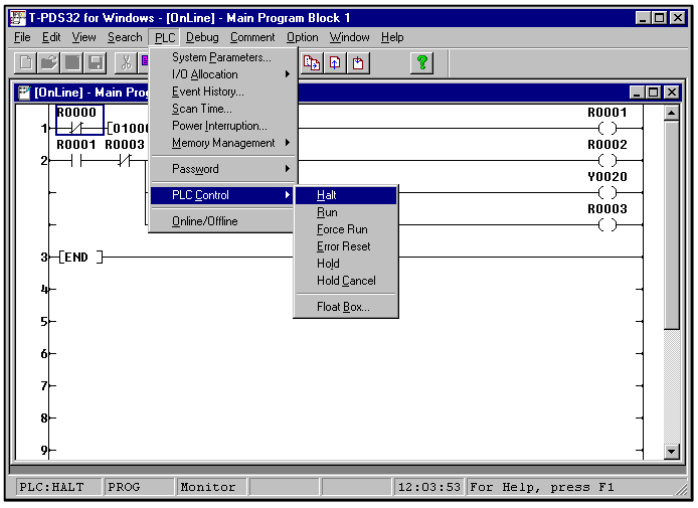

When the system starts up, the title screen will appear, followed by the default screen.




After a while, the base system programs of the controller appear.

If the programmer is not connected properly to the controller through the dedicated cable, a screen in offline mode appear.

## 2.2 Changing the PLC Operation Mode



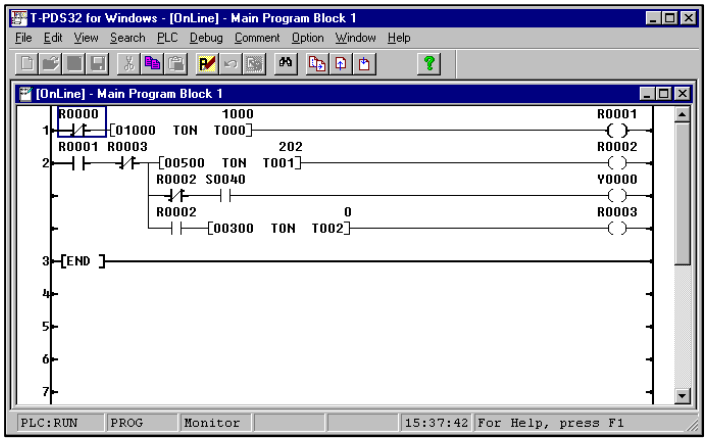

The operational status of the controller can be changed from the programmer as well as by using the operation selector switch on the CPU module.

To change the operation mode using the programmer, point to PLC Control in the PLC menu. Another submenu will appear containing a list of controller operation modes.
There are six controller operation modes

- Halt
- Run
- Force Run
- Error Reset
- Hold
- Hold Cancel

Click the desired mode.


A dialog box will appear, asking you to confirm that you want to change the controller operation mode.
Click OK.

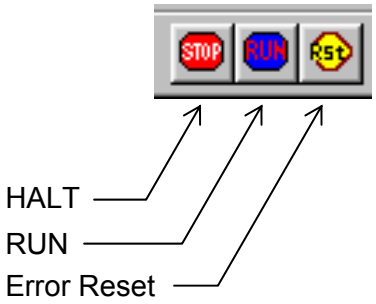



The controller will change to the designated mode. Check the mode displayed at the bottom of the screen.

**Additional Information**

### Using the toolbar to control the PLC operation mode

The PLC operation mode can be changed at any time when the PLC Control toolbar is displayed.
When you click one of the buttons in the toolbar, a dialog box will appear, asking you to confirm the mode change.

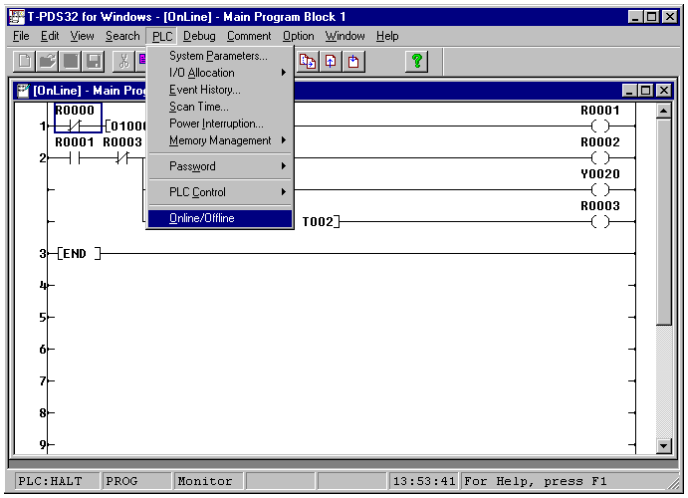



Click OK to change the mode. Click Cancel to cancel the operation.

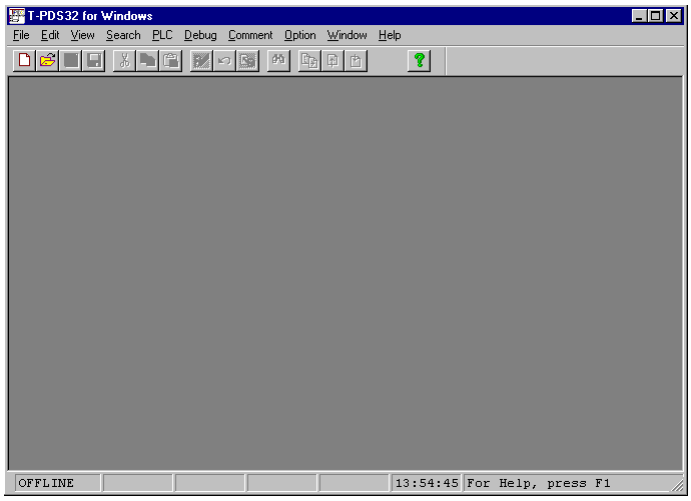
The operation mode can be changed from the T-PDS32 only when the operation switch on the controller is set to RUN or P-RUN. If an attempt is made to change the mode from the T-PDS32 when the operation switch is set to HALT, a "Mode Unmatch" message will appear. Set the operation switch to RUN or P-RUN and then repeat the mode changing procedure. If the controller cannot be operated properly (in other words, if the mode cannot be changed to RUN), a message explaining the cause will appear.

## 2.3 Switching Between Online and Offline Mode

In addition to creating programs and setting data in online status, with the programmer and controller connected, the T-PDS32 for Windows program can also be used to create and edit programs in offline mode with the programmer alone.




To change the online/offline mode, use Online/Offline on the PLC menu. Clicking Online/Offline toggles the status to the opposite of the current status. When the status is changed from Offline to Online, a project for that controller opens and the program for the first block is displayed.




No project is displayed when the status is changed from Online to Offline. You have to create a new project or open an existing project for editing in offline mode.

**Additional Information**

**Using the toolbar t ange Online/Offlin**

You can ge the T-PDS32 ope
online a offline by clicking the to

**Additional Information**

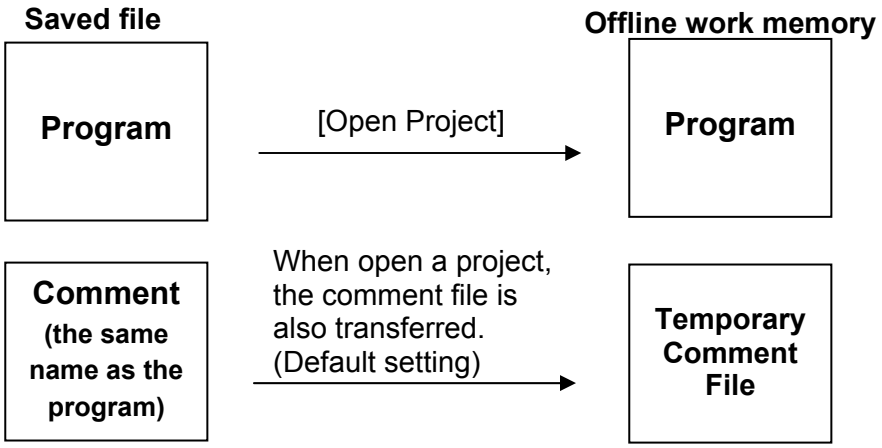
1. The difference in operation between online and offline are as follows:

   Online: The T-PDS32 reads/writes program and data with the connected PLC memory.
   The T-PDS32 reads/writes comments either in the specified comment file or in the PLC memory (T3/T3H/S2T/S2E only).

   Offline: The T-PDS32 reads/writes program and data with the offline work memory on the PC.
   The T-PDS32 reads/writes comments in the offline work memory (temporary comment file).
   It is necessary to save them into a file before exit.

2. Relation between work memory and comment file

   When a project is opened, the T-PDS32 reads the program and data from the file and load them in the work memory as follows.



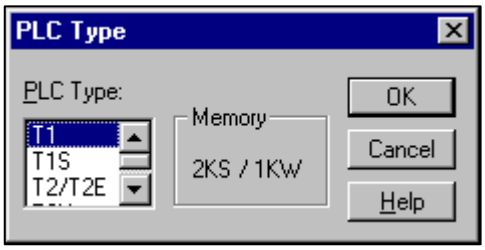

   In the default setting, the comment file is also transferred to the work memory (temporary comment file) when [Open Project] is executed.
   If you do not want to transfer the comments, uncheck comment in the transfer items. (See Section 2.5 on Page 30)

   The temporary comment file is initialized when creating a New Project.

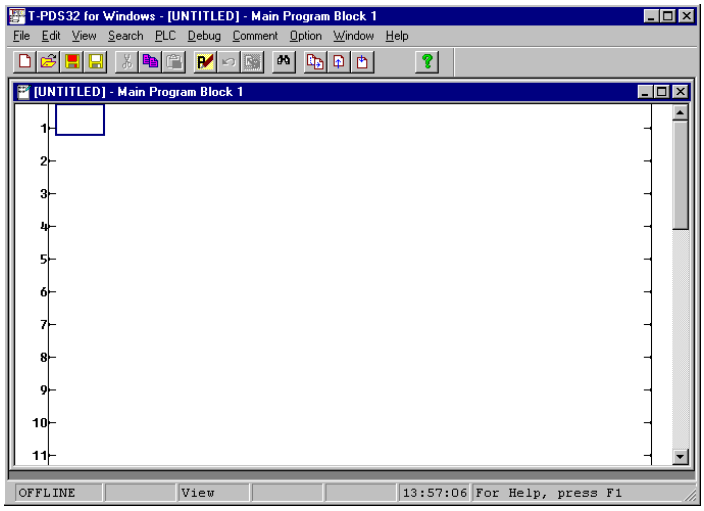
   When you load comments into the temporary comment file from another comment file, use [Append] function under [Comment] menu.

## 2.4 Opening a New Project

To create a new program in Offline status, first you must open a new project. Click New Project on the File menu. (Toolbar is also available)



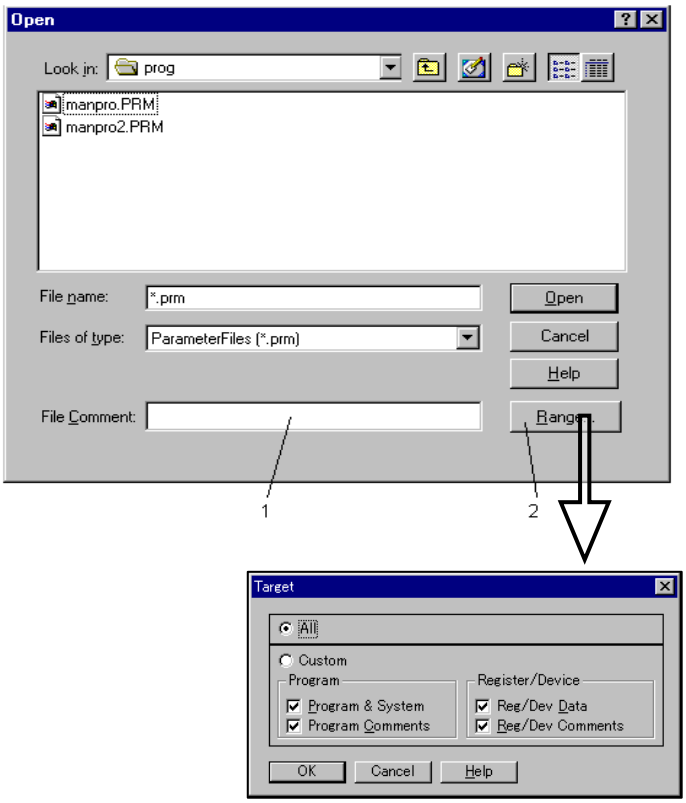

The PLC Type list box will appear asking you to select the PLC.
In the PLC Type list box, select the controller PLC type (T1, T1S, T2/T2E, T2N, T3, T3H-32K, T3H-64K, S2T-32K, S2T-64K or S2E).
The memory size and data register size for the selected type will appear.




Click OK to create a new project for the selected controller type; the Program screen will appear. Click Cancel to cancel the creation process.

### 2.5 Opening an Existing Project

To use an existing project, click Open Project on the File menu.
(Toolbar is also available)

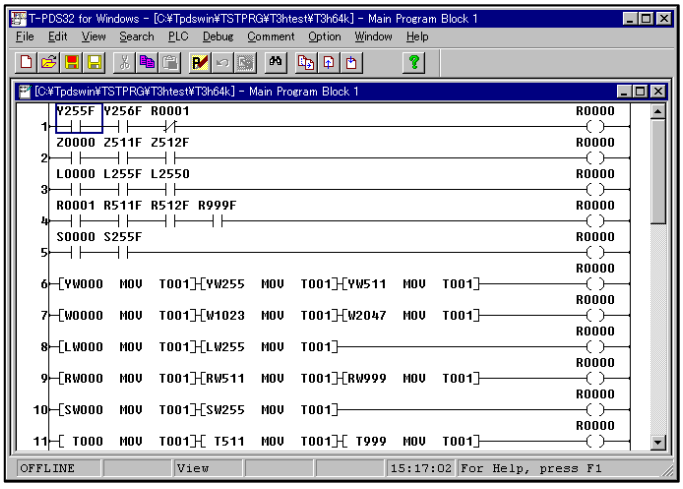



A dialog box will appear, asking you to select the project.

(1) File Comment
Shows the title of the project at the location of the cursor in the File Name list box.
(2) Range
Displays dialog box used to select the type of files to be loaded.

To designate an existing project, select the file from the ones in the File Name list box, or enter the name of the file in the File Name text box.

Clicking Range shows the Target dialog that allows you to select either program files only or both program and data files .



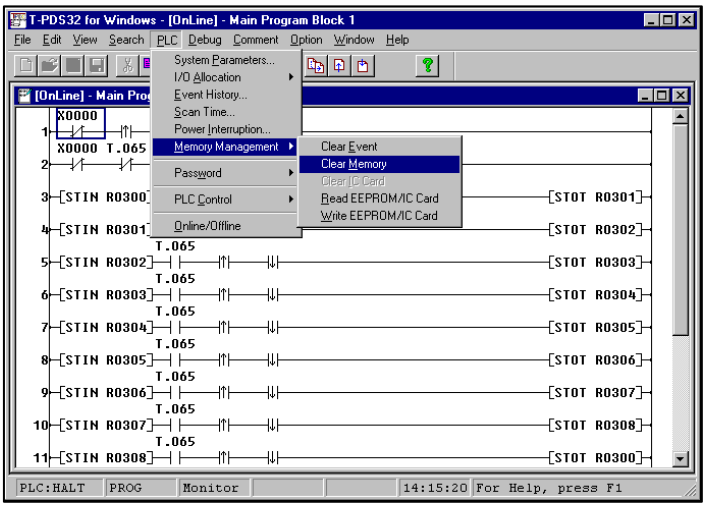

Click OK in the Select Project box to open the designed project.
Click Cancel to cancel the open project process.

# 3. Programming

The first step in the programming process is to register the I/O card and the system parameters needed by the control system.
In this manual, programming steps are explained using online mode. Basically programming in offline mode is almost same as online mode.

## 3.1 Clear Memory

When you program initially, you should clear the controller memory using the Clear Memory command.

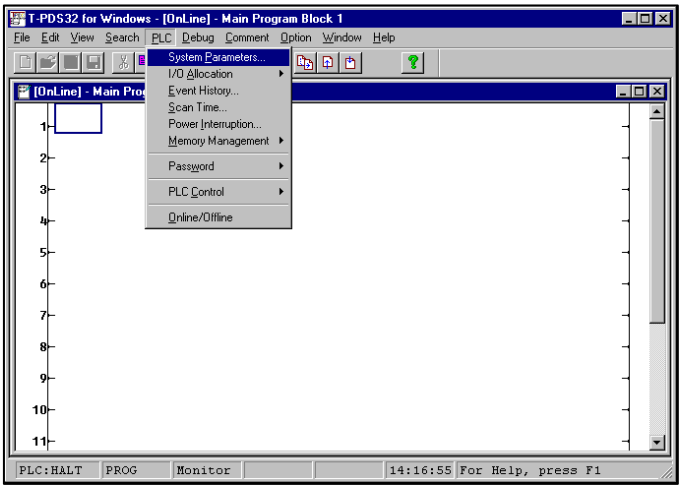



On the PLC menu, point to Memory Management and click Clear Memory.
A dialog box will appear, asking you to confirm that you want to clear the memory.
Click OK.

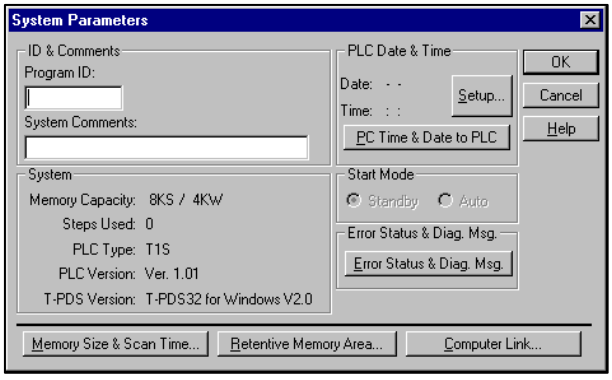
This will initialize system parameters, clear I/O registration, all program and register data. This command cannot be undone, so be sure you want to clear the memory before initiating the procedure. Back up necessary data to a disk.

### 3.2 Registering System Parameters

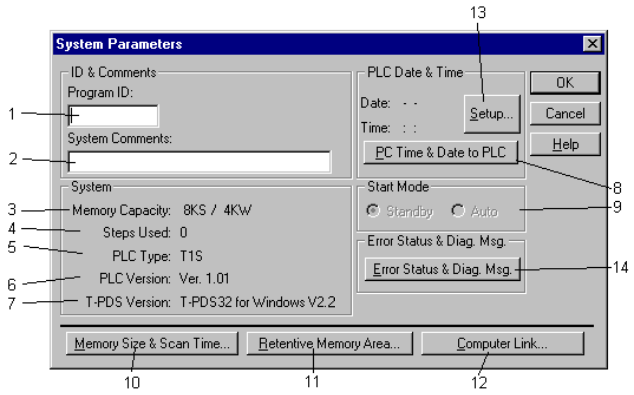
This section describes how to register the system parameters needed to control the flicker circuit.




Click System Parameters on the PLC menu. The System Parameters box will appear.




The System Parameters window will appear. On this window, connected PLC information, loaded program information and control parameters are displayed.

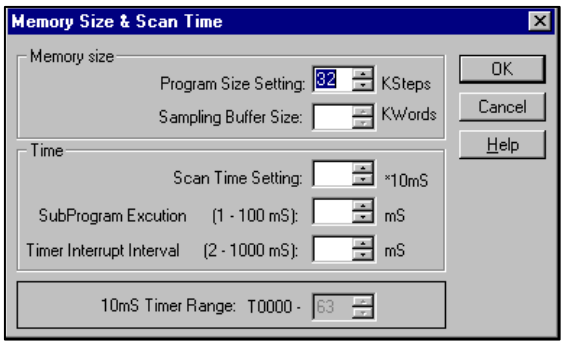



<System Parameters box>

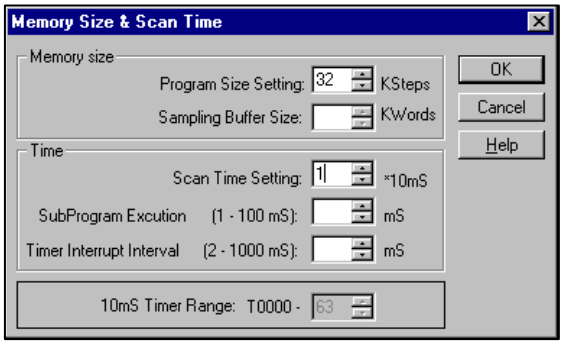
| | |
|---|---|
| 1 - Program ID: | The name used to identify the user program (Up to 10 characters) |
| 2 - System Comments: | Comments added for the user program (Up to 30 characters) |
| 3 - Memory Capacity: | Shows the PLC's memory capacity (Program in K steps / Data registers in K words) |
| 4 - Steps Used: | Shows the number of steps used in the user program. |
| 5 - PLC Type: | Shows the PLC type. (online only) |
| 6 - PLC Version: | Shows the PLC version. (online only) |
| 7 - T-PDS Version: | Shows the version number of the T-PDS32. |
| 8 - PLC Date & Time: | Shows the date and time that is managed in the PLC. (online only) |
| - PC Time & Date to PLC: | Used to set the PC's date and time to the PLC. (online only) |
| 9 - Start Mode: | Selects the PLC's initial operation mode immediately after the power is turned on. (for T3H only) |
| | Standby: Starts up in HALT mode regardless of the position of the operation mode switch on the CPU |
| | Auto: Goes into RUN mode when the operation mode switch on the CPU is RUN or P-RUN |
| 10 - Memory Size&Scan Time: | Displays a dialog box used to set the program size, sampling buffer, scan time, subprogram execution time, timer interrupt interval and 10ms timer allocation. |
| 11 - Retentive Memory Area: | Displays a dialog box used to set the retentive register area. |
| 12 - Computer Link: | Displays a dialog box used to set the computer link transmission parameters. |
| 13 - Setup (online only): | Used to set the PLC's date and time. |
| 14 - Error status/diagnostics: | Displays a dialog box showing the error status and diagnostics. (online only) |

# 3. Programming

In this example, you will set the scan time for the flicker circuit control program.




Click the Memory Size & Scan Time button to display the Memory Size & Scan Time box.



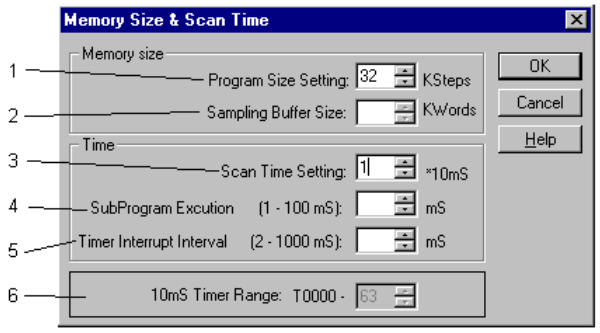

Move the cursor to the Scan Time Setting box. Enter a scan interval and click OK, which saves the value temporary.
Then, return to the System Parameter box. Click the OK button in this dialog box to register and confirm the entered value as a system parameter.


You will see a dialog box, asking you to confirm that you want to register the new data.
To register the data for the controller, click OK. To cancel the registration process, click Cancel.

## Additional Informtion

**In the Event of a Registration Error (Mode Unmatch)**

System data can only be registered when the controller is in HALT mode. If a registration error occurs, change the controller operation mode to HALT mode, either by using the operation mode switch on the controller or by using Control command of T-PDS32.




<Memory Size & Scan Time box>

1 - Program Size Setting: Sets the size of memory reserved for the program. This item is available for T1S to select memory mode 4K or 8K, and for T3/T3H/S2T/S2E to reserve comment memory in the PLC.

2 - Sampling Buffer Size: Sets the buffer memory size for the sampling trace function. The setting range is shown below.

| PLC type | Minimum | Maximum | Note |
|---|---|---|---|
| T1, T1S | 1KW | 1KW | Fixed at 1KW |
| T2/T2E, T2N | 8KW | 8KW | Fixed at 8KW |
| T3, T3H | 0KW | 8KW | |
| S2T, S2E | 8KW | 8KW | Fixed at 8KW |

3 - Scan Time Setting: Sets the constant scan interval for main program. The setting range is 10 to 200ms. The value is set in 10ms increments, so enter a value from 1 to 20.

4 - Sub Program Execution: Sets the execution time limit for sub-program. The range for this setting is shown below.

| PLC type | Minimum | Maximum | Note |
|---|---|---|---|
| T1, T1S | 0ms | 0ms | Not supported |
| T2/T2E, T2N | 0ms | 0ms | Not supported |
| T3, T3H, S2T, S2E | 1ms | 100ms | |

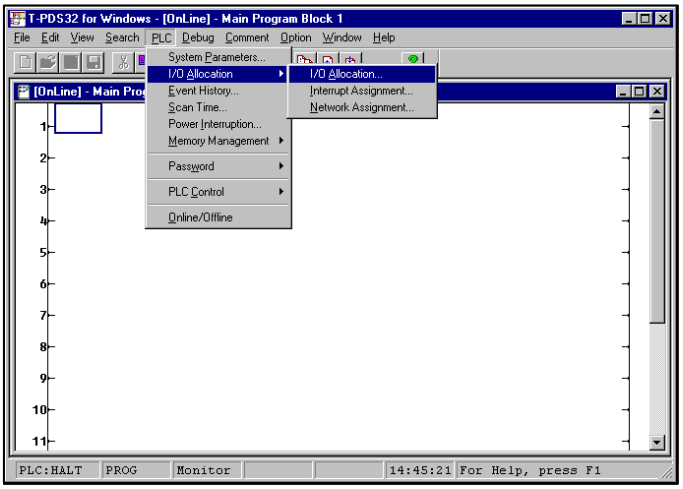
5 - Timer Interrupt Interval: Sets the interrupt interval for the timer interrupt program. The setting range is shown below:

| PLC type | Minimum | Maximum | Note |
|---|---|---|---|
| T1, T1S, T2/T2E, T2N | 5ms | 1000ms | 5ms increments |
| T3 | 2ms | 1000ms | 1ms increments |
| T3H, S2T, S2E | 1ms | 1000ms | 1ms increments |

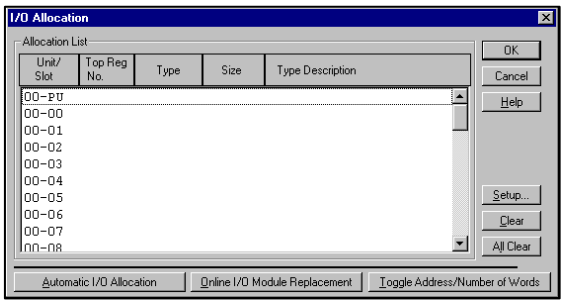
6 - 10ms Timer Range: Sets the 10ms timer allocation range. The default setting is T000 to T063. Other than this range of timers works as 100ms timer. (T3H, S2T, S2E only)

### 3.3 Registering I/O Cards

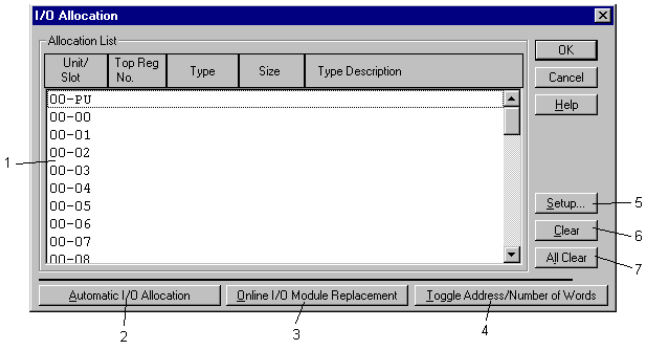
This section describes how to register the system parameters needed to control the flicker circuit.




On the PLC menu, point to I/O Allocation and click I/O Allocation on the submenu.




The I/O allocation box will appear.




<I/O Allocation box>

1 - Allocation List:

Shows the I/O allocation status.

- Unit/Slot:

Shows the unit and slot numbers separated by a hyphen (unit - slot). Unit 0 means the main unit, Unit 1 means the expansion unit 1, and so on. The available setting ranges of the unit - slot and the maximum number of I/O modules are shown below.

| PLC type | Unit - slot | I/O modules | Note |
|---|---|---|---|
| T1, T1-40S | 0 - 0 to 0 - 7 | 2 option card + 4 I/O module | Main unit is allocated on unit 0 - slot 0 |
| T1-16S | 0 - 0 and 1 - 0 to 1-7 | 8 | Main unit is allocated on unit 0 - slot 0 I/O modules are allocated on the unit 1 |
| T2/T2E, T2N | 0-3 | 32 | |
| S2T, S2E | 0-3 | 32 | |
| T3 | 0-3 | 43 | |
| T3H | 0-6 | 76 | |

- Top register no:

When the unit base address setting function is used, the setting address is displayed.

- Type: The I/O type is displayed.
- Size: The shared I/O register size is displayed.
- Type Description:

Shows the I/O module name. (available at setting)

2 - Automatic I/O Allocation:

Used to automatically register the I/O card when the I/O card is installed. (online only)

3 - Online I/O Module Replacement:

Used to disconnect a designated I/O card in software to enable online I/O replacement. To use this function, locate the cursor on the slot to be disconnected, then click the Online I/O Module Replacement button. When disconnected, ampersand (&) mark will appear on the slot. During this status, the I/O module can be replaced.
To recover to normal operation, point the slot and click again the Online I/O Module Replacement button.

4 - Toggle Address/Number:

Used to check the leading register address assigned to the I/O card.

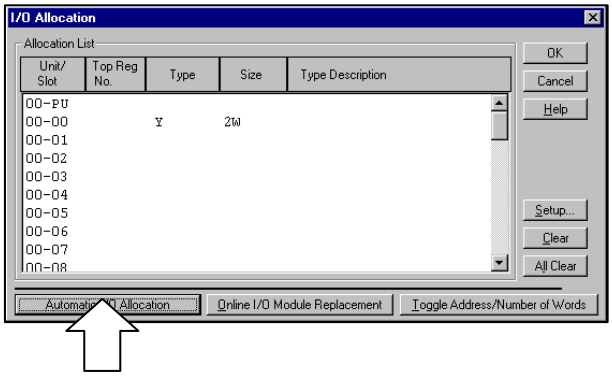
5 - Setup: Used to set the I/O allocation. Point the slot, then click the Setup button.

6 - Clear: Clears the I/O allocation data for the slot where the cursor is positioned.

7 - All Clear: Clears all I/O allocation data.

### 3.3.1 When I/O Cards are Installed

When an I/O card is installed in the controller slot, the Automatic I/O Allocation function can be used to have the installed I/O card automatically registered.

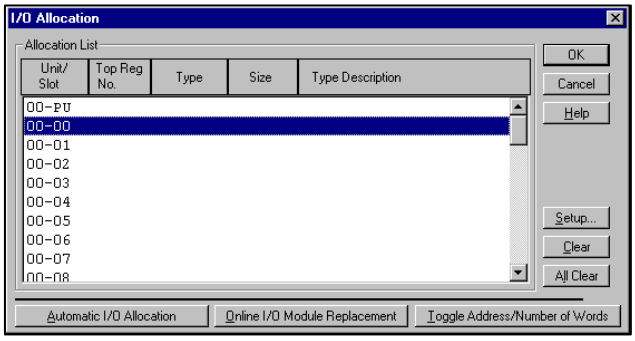



Click the Automatic I/O Allocation button. The programmer will check the type of card installed in the slot and display it on the screen. Check to make sure that "Y 2W" is displayed for slot 0.

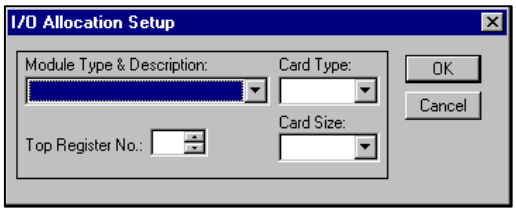
The card type "Y" indicates an output card, used for flicker circuit lamp output. The card size "2W" indicates that the card handles 32 output points.

### 3.3.2 When No I/O Card is Installed

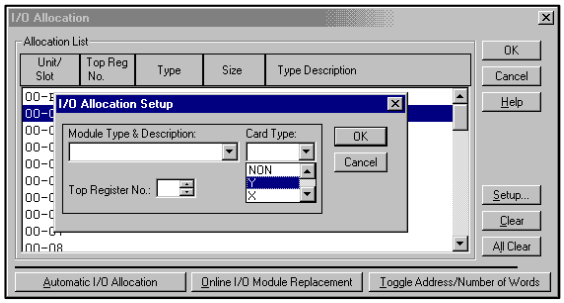
When no I/O card is installed, the I/O card data must be set manually. The following example describes how to set data by registering a 32 output points module in slot 0 of the base unit.



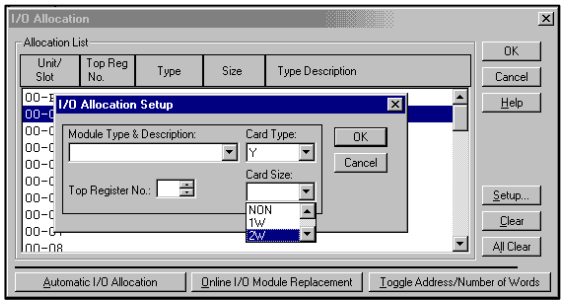

Designate the slot position and click Setup.



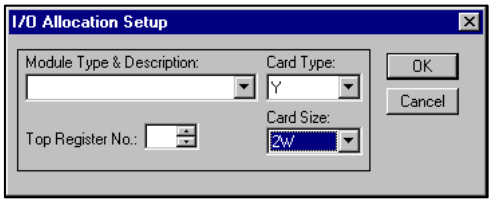

The I/O Allocation Setup box will appear.




Move the cursor to the Card Type area. Select the card type from those displayed in the list box.
For this example, select "Y."

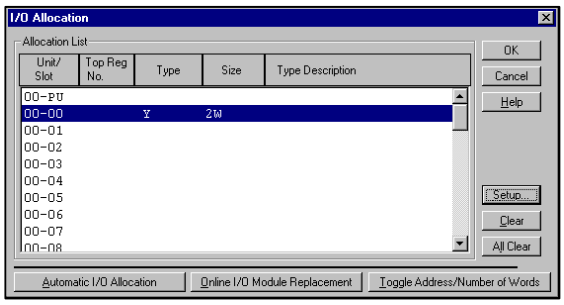



Next, move the cursor to the Card Size area. Select the card size from those displayed in the list box.
For this example, select "2W."
Click OK. The I/O Allocation box will become the active window again. When this happens, the data will be displayed at the location of the corresponding slot.




To write the setting, click OK.

To cancel the setting process, click Cancel.



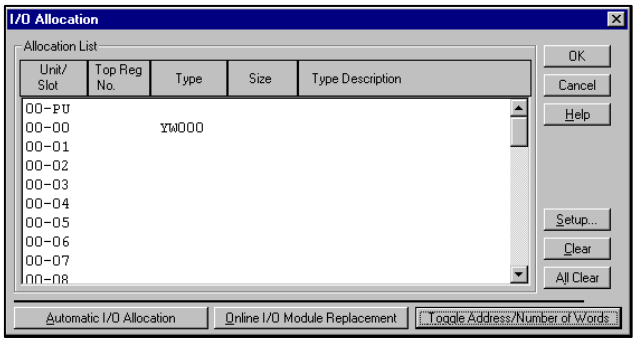

To set the I/O allocation for a different slot, repeat the same procedure for each slot in the I/O Allocation box.

## Additional Information

Even if you click OK in the I/O Allocation Setup box, the settings are not registered until you click OK in the I/O Allocation box.

### 3.3.3 Checking Register Numbers

When I/O card registration is complete, you should check the register address for the card.




Click Toggle Addresses/Number of Words. The data for slot 2 will change from card type/size "Y 2W" to "YW000". Clicking the button again causes the card type/size data to reappear.

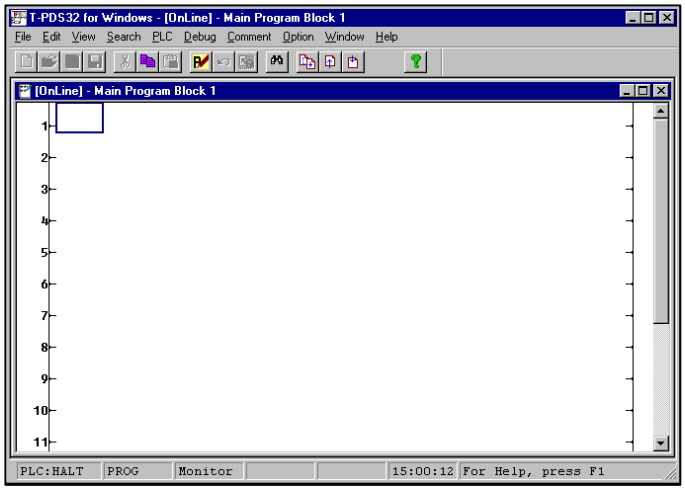
This shows that the card registered in this example has been allocated to two word of the YW000 output register. Designating device number Y000 - Y01F for the flicker circuit lamp output in the program causes the data to be output to this card.

## 3.4 Programming

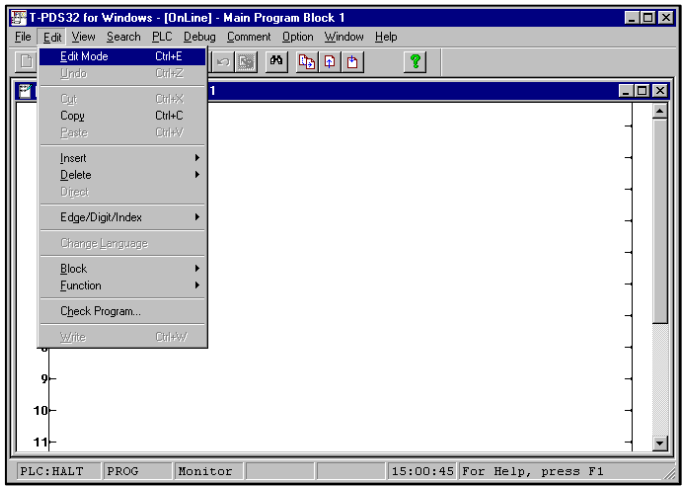
Now you can create the program for the flicker circuit. Programming is done in Edit mode.

### 3.4.1 Programming screen

Open the Programming screen. This prepares a blank screen for creating the program.

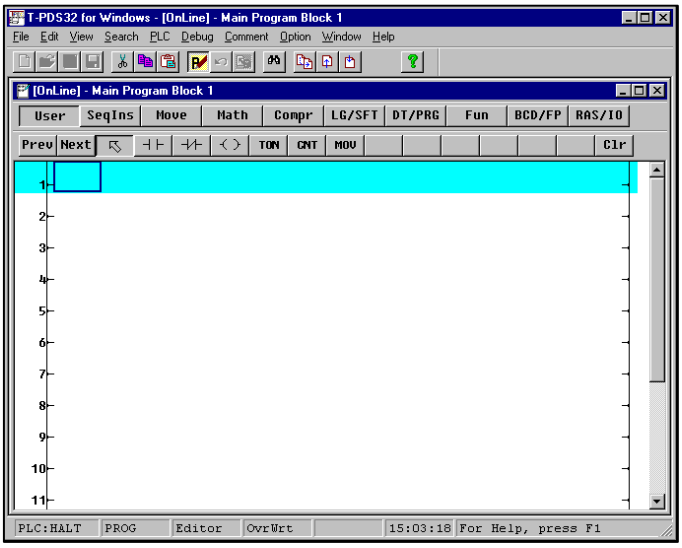



When the operation status is changed to Online, a Programming screen with a bus for the ladder program will appear.
If a program already exists in the controller, the program is displayed.




Programming is done in Edit mode.
On the Edit menu, click Edit Mode.
(Toolbar is also available)


A dialog box will appear, allowing you to select the programming language.
Select Ladder and then click OK.

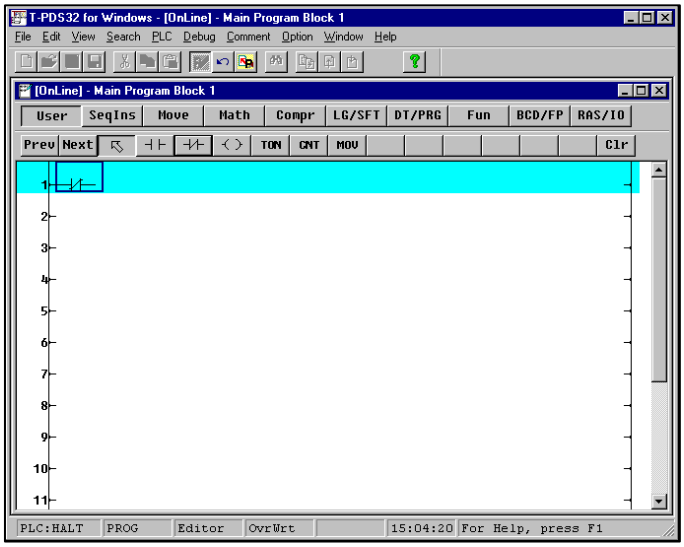



The programming window will change to editable status and the circuit at the position of the box cursor will be shaded. A toolbar containing instruction will also appear.
Editing can be done for the circuit at the current location of the cursor. You may also use the Shift + ↓ keys to designate the range for editing. Up to 11 lines may be designated in this manner.

Editing may be done in only one programming window per project.
Online traces cannot be displayed in the programming window being edited.

### 3.4.2 Creating Circuit 1

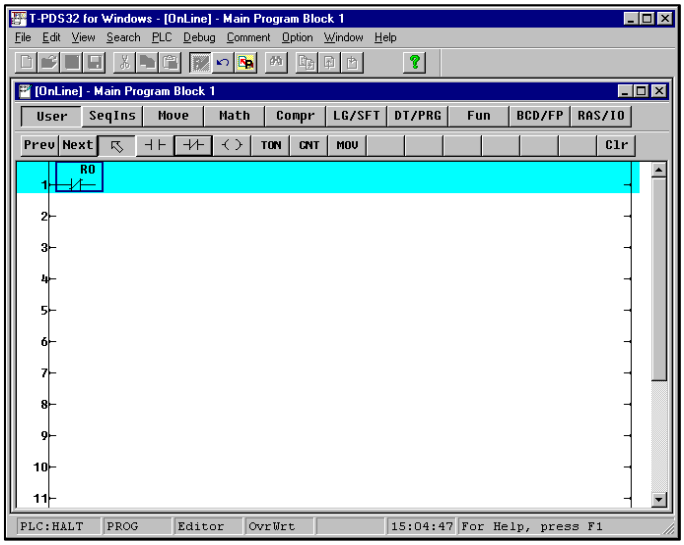
Now you are ready to create the first circuit for the flicker circuit.



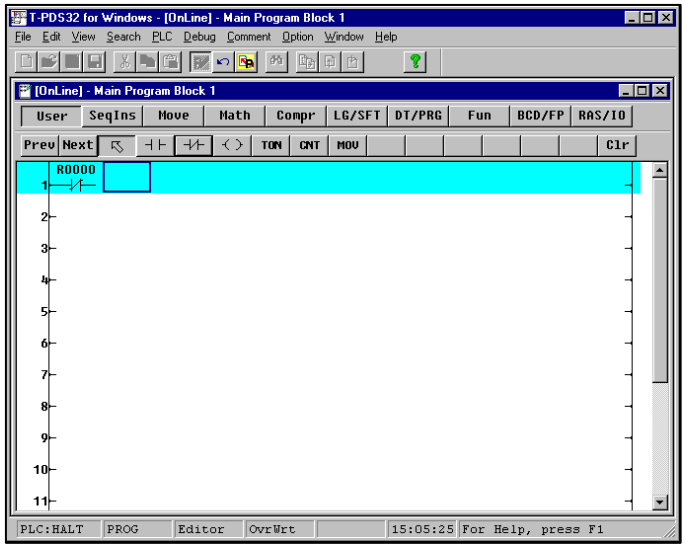

To make a circuit, pick-up an instruction by mouse click, place it on the position in the edit area by mouse click, then enter the operand (register, device, or constant value).
In this example you will first place a NC contact of R000.
In the Ladder Instruction toolbar, pick-up NC contact and place it on the left end of circuit 1. This will place a NC contact at that location.

**Additional Information**

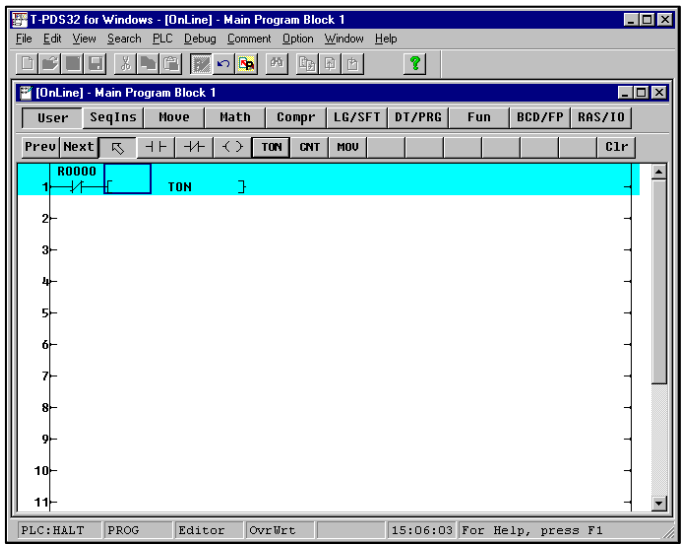
To continuously place the same instruction, select an instruction and click the left mouse button while pressing the Shift key.



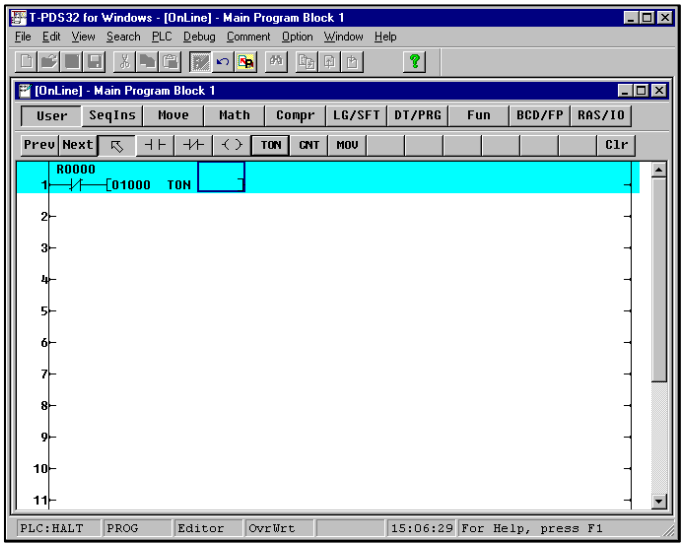

Operands may be entered when the box cursor is at the location of the symbol. Enter "R0" on the keyboard. When "R0" appears above the NC contact, press the Enter key.



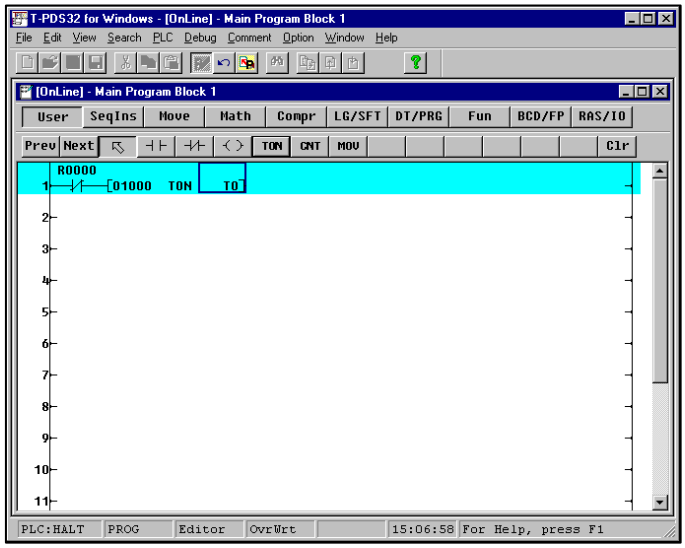

When you enter operands, you may omit the zeroes after the register number and device number codes.
For example, to enter "R0001F," you can enter "R1F".
Also, even if you enter small letters such as "r" in operands, these will be converted to capital letters when Enter key is pressed.



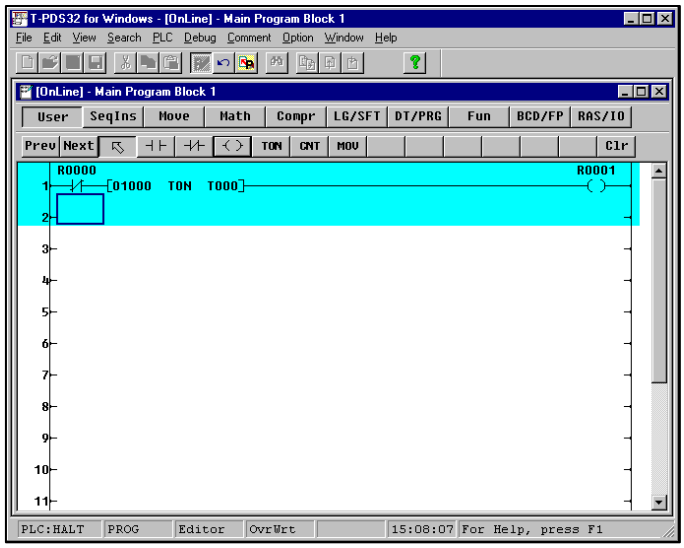

Next you will place an ON delay timer connected to the NC contact.
Select "TON" instruction and then move the mouse pointer to the right of the NC contact and click the button. The symbol for the ON-delay timer will appear.




Two operands are needed for the ON-delay timer: the preset time and the timer number. Check that the box cursor is at the preset time position then enter the preset time setting by the keyboard. Preset time is entered in 10ms increments for T0 to T63 and in 100ms increments for T64 and after.
The startup time setting for this flicker circuit is 10 seconds. Enter "1000."

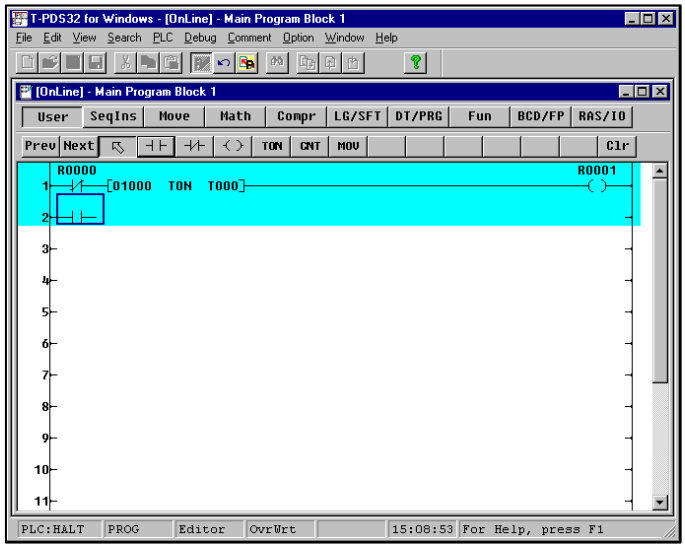



When the Enter key is pressed, the cursor will move to the timer number position. Then enter the timer number. In this sample, timer 0 is used. So enter "T0".
When the Enter key is pressed, "T000" will appear and the cursor will move to the right of the ON-delay timer symbol.

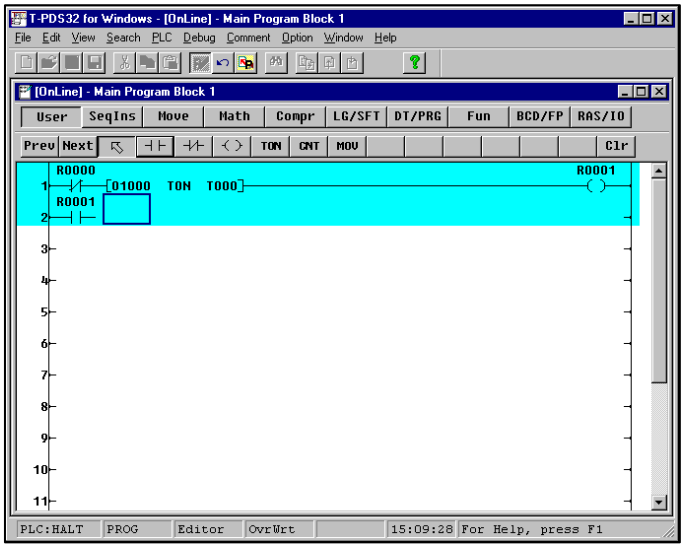



Select the symbol for output coil, then point the right of the ON-delay timer and click the mouse.
The output coil will be placed at the right end of circuit 1. The connection line is automatically drawn between the ON-delay timer and the coil.
Check that the cursor is at the output coil position and enter "R1" by the keyboard.
When the Enter key is pressed, "R0001" will appear above the coil.

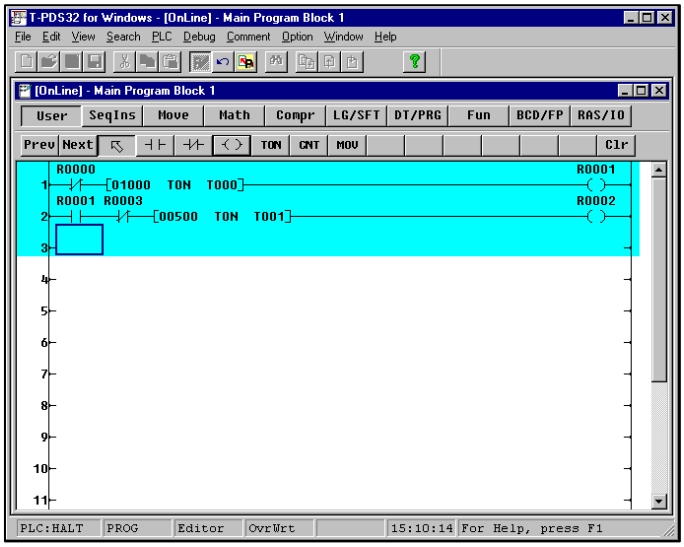
### 3.4.3 Creating Circuit 2




Place an NO contact of R0001.
In the Ladder Instruction toolbar, select NO contact and move the mouse pointer to the left end of circuit 2 and click the left mouse button.
This will place an NO contact at that location.



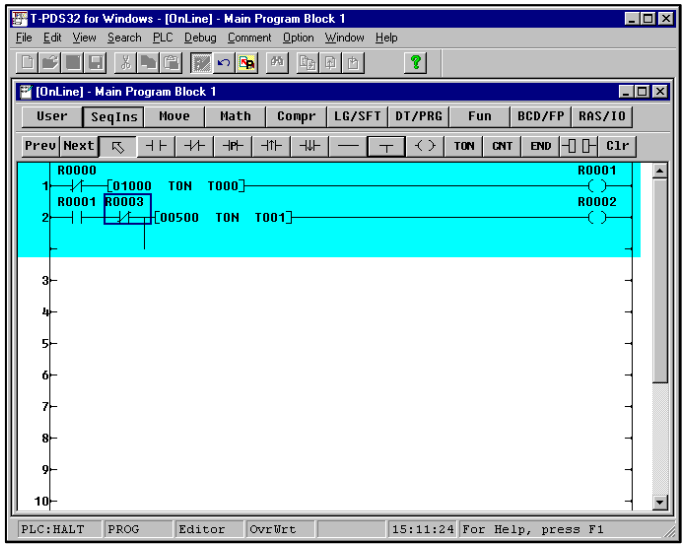

After you placed the NO contact, enter the operand.
Enter "R1" on the keyboard. When "R1" appears above the NO contact, press the Enter key.




As same manner, place an NC contact of R0003, an ON delay timer (preset time 5 sec, timer 1) and an output coil of R0002.

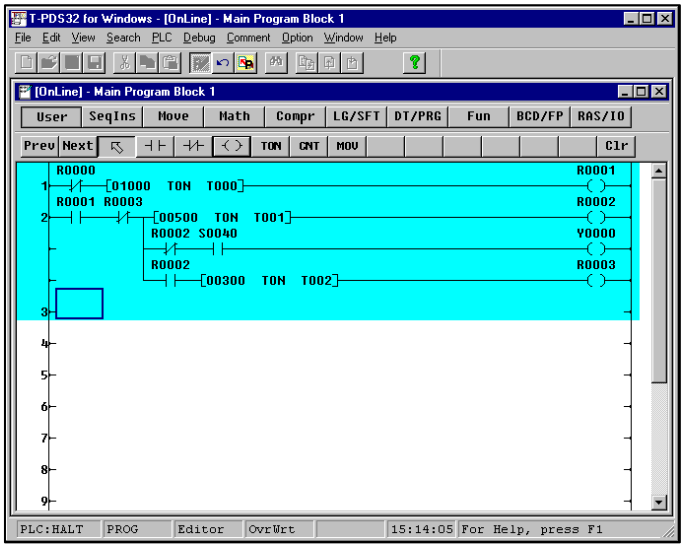
<Summary>

| | | | |
|---|---|---|---|
| Select NO contact | Click left button | Enter R1 | Press [Enter] |
| Select B contact | Click left button | Enter R3 | Press [Enter] |
| Select TON | Click left button | Enter 500 | Press [Enter] |
| | | Enter T1 | Press [Enter] |
| Select coil | Click left button | Enter R2 | Press [Enter] |




Next, a vertical connection must be placed on the output side of the NC contact of R0003 for branching.
The vertical line is in the SeqIns (sequence instruction) group. Select the SeqIns and click the vertical line. Then place it on the NC contact of R0003. The vertical line is drawn from right hand to downward.
In this manner, a vertical circuit will be created to the right below the position of the cursor.

To clear the vertical line, select the vertical line and place on the position to be cleared. Then the vertical line will be cleared.




Now you will create the second and third lines of the circuit.
Move the cursor to the second line of the circuit and move it to the right of the vertical connection and place a symbol there. Then click the operand item.
To place a vertical connection on the third line of the circuit, move the cursor to the vertical connection on the second line, then select the vertical connection item and click the left button. A one-line vertical connection will be placed there.

<Summary>
Move cursor to third line of Circuit 2 (to right of vertical connection)

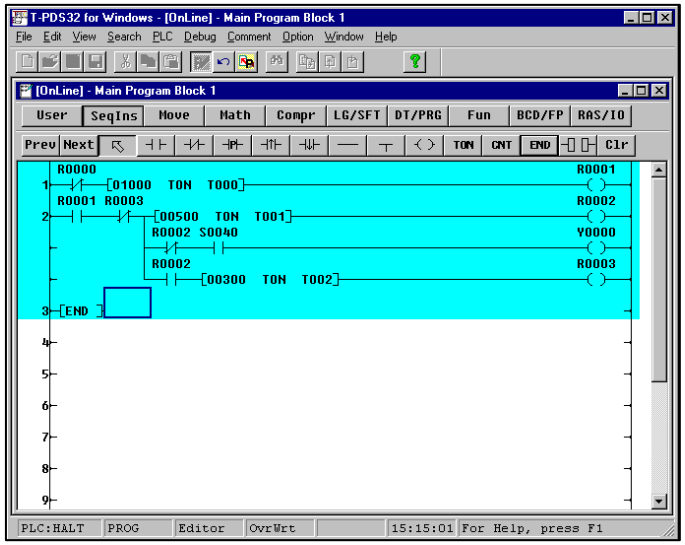
| | | | |
|---|---|---|---|
| Select NC contact | Click left button | Enter R2 | Press [Enter] |
| Select NO contact | Click left button | Enter S40 | Press [Enter] |
| Select coil | Click left button | Enter Y0 | Press [Enter] |

Move cursor to vertical connection on second line of Circuit 2

| | | | |
|---|---|---|---|
| Select NO contact | Click left button | Enter R2 | Press [Enter] |
| Select TON | Click left button | Enter 300 | Press [Enter] |
| | | Enter T2 | Press [Enter] |
| Select coil | Click left button | Enter R3 | Press [Enter] |

### 3.4.4 Finishing the Program

An END instruction is always required at the end of the program.

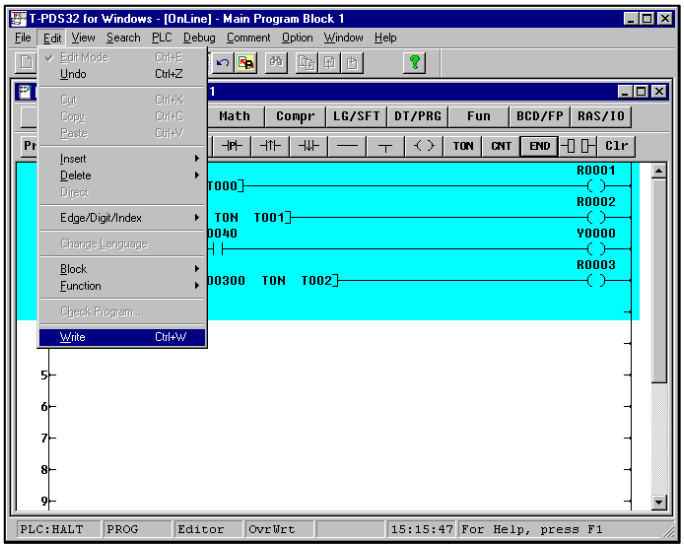



Move the box cursor to the top of Circuit 3, then select END on the toolbar and click the left button. The END instruction symbol will appear in Circuit 3.

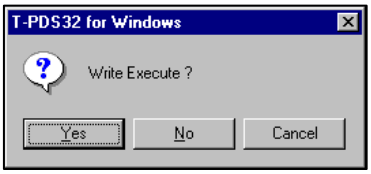
At this point, the END instruction symbol is not connected to the right bus. However, when the program is written, the END instruction will be automatically connected to the right bus, so there is no need to do this manually.

### 3.4.5 Writing the Program

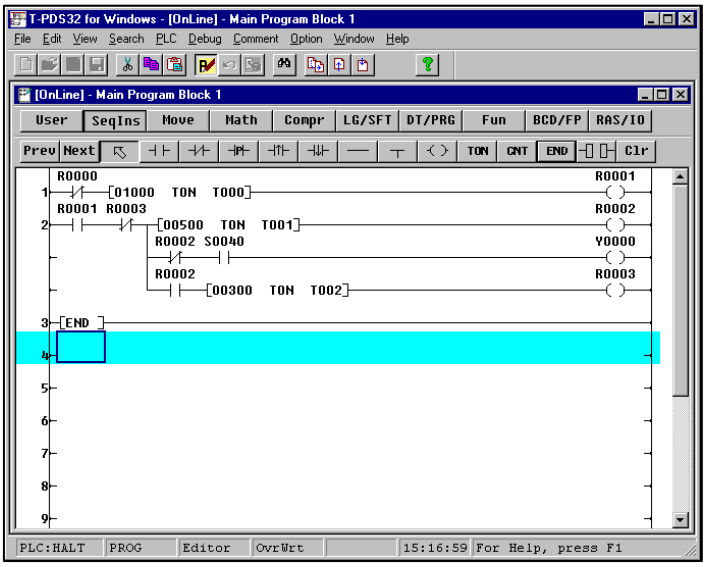
Now you will write the program that you have created to the controller.




On the Edit menu, click Write.
(Toolbar is also available)




A message will appear, asking you to confirm that you want to execute the write command. Click Yes. The program will be written to the controller.



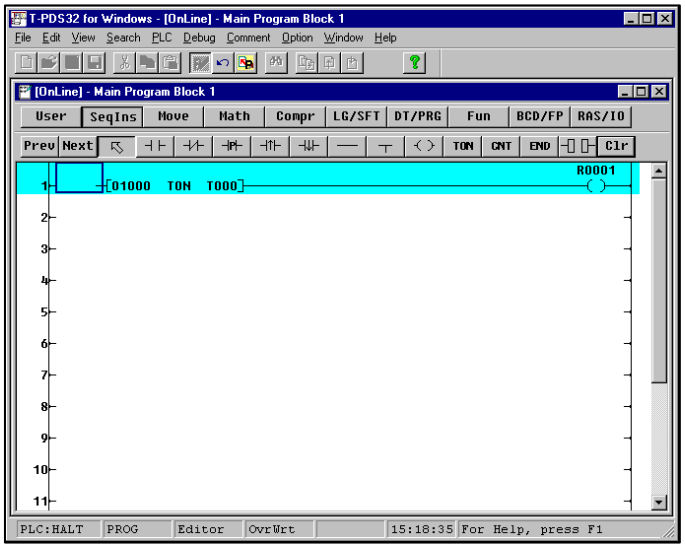

When the write process is complete, click Edit Mode on the Edit menu.
The T-PDS32 will quit edit mode and the Program screen will reappear.

Pressing the Ctrl + E keys can also quit edit mode.

### 3.4.6 Correcting the Instruction

#### Clear the Instruction Symbol

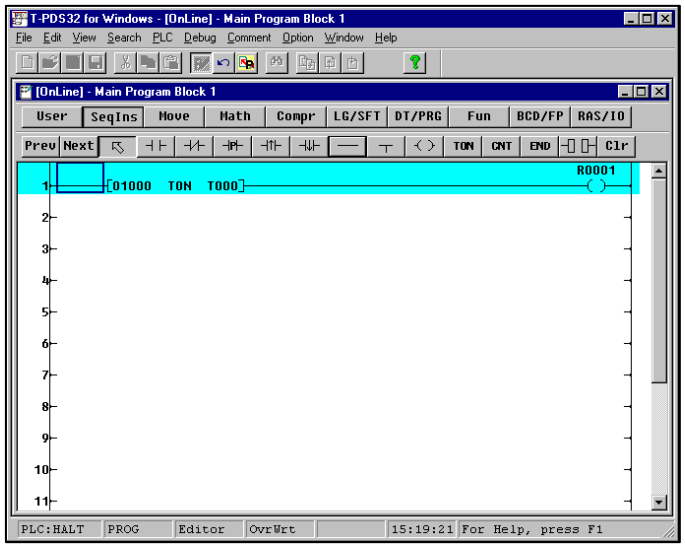
If you have made a mistake in the symbol placement process, click Clr in the Ladder Instruction toolbar to delete the mistake. For this example you will delete the first symbol that you placed, the NC contact of R000.




Click Clr in the Ladder Instruction toolbar and then move the mouse pointer to the NC contact and click the mouse button. The symbol and operand will be deleted.

[Del] (Delete) key on the keyboard can also be used to clear the instruction.

You may also use the space key on the keyboard to delete an operand that has been entered by mistake.



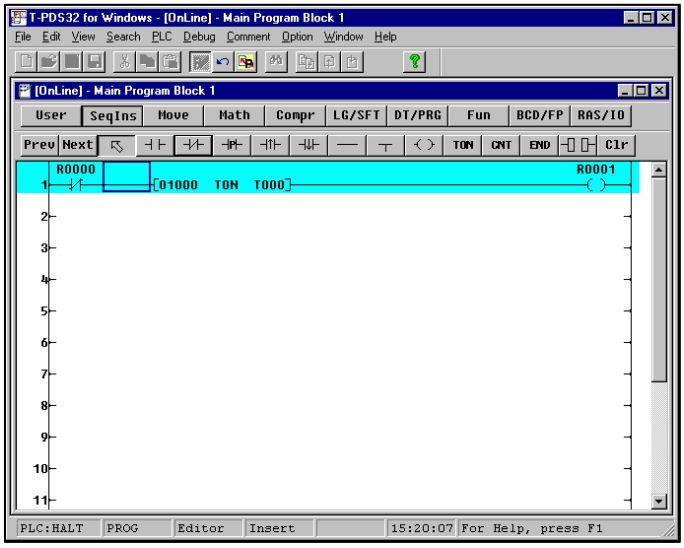

When a symbol has been cleared, a blank space will remain at the cleared location. Leaving this as it is will result in an incomplete connection, so you should connect the circuit through this area.

In the toolbar, select the symbol for horizontal short and then move the mouse pointer to the blank area and click the mouse button.

To delete the ON-delay timer, click Clr and move the mouse pointer to the TON position at the ON-delay timer and click the mouse.
You may also use the space key on the keyboard to delete an operand that has been entered by mistake.
Move the cursor to the operand position and press the space key. Only the operand will be deleted, so enter the operand again.

### Overwrite/Insert

Two modes are available for placing symbols in the circuit: Overwrite mode and Insert mode. Pressing the Ins key on the keyboard toggles the mode to Overwrite (and the indicator in the status bar at the bottom of the screen changes to "OvrWrt").



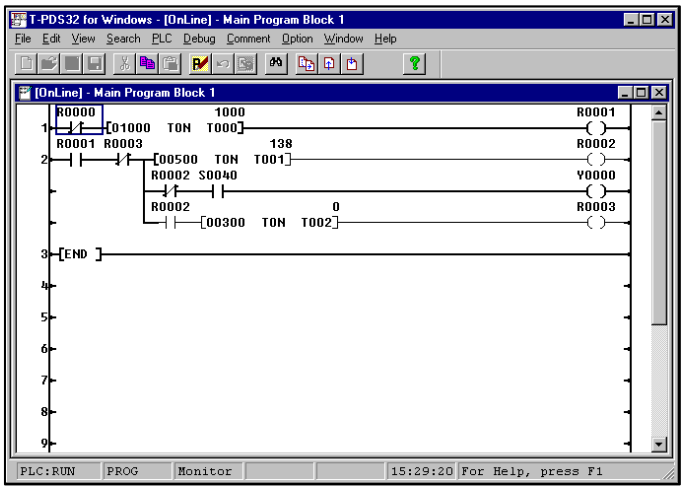

In Overwrite mode, entering a symbol replaces the data at the position of the mouse pointer.
In Insert mode, the symbol is inserted at the position of the mouse pointer.
In this example, you will use this function to place the B contact symbol again (the one that you cleared in the previous example).
Change the mode to Insert, then select B contact in the Ladder Instruction toolbar. Place the mouse pointer to the left end of circuit 1 and click the mouse button.
One B contact will be inserted at the position of the cursor. After inserting the B contact, enter the operand again.

# 4. Program Execution

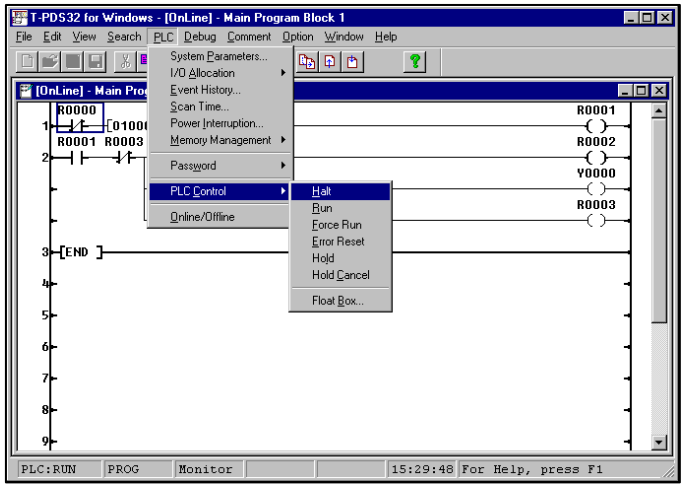
In this procedure, you will execute a program and check its operation. The execution status can be checked in the program as well as using the Data Monitor command on the View menu.

## 4.1 Executing the Program

First you will execute the program.

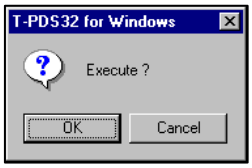



Programs can be executed using the operation mode switch on the controller. Execution can also be started and stopped with the programmer.
Setting the operation mode switch on the controller to RUN will execute the program.
Check to make sure that "PLC:RUN" is displayed for the operation status in the lower left-hand corner of the window.
If an I/O card is installed, the bit 0 in the operation status LED will blink. Check to make sure it blinks in line with the program.




With the I/O card setting for the program created in this example, an error will result if the program is executed with no I/O card installed. If no I/O card is installed, use the procedure described in "Registering I/O Cards" earlier in this manual to change the setting to "no I/O card registered."

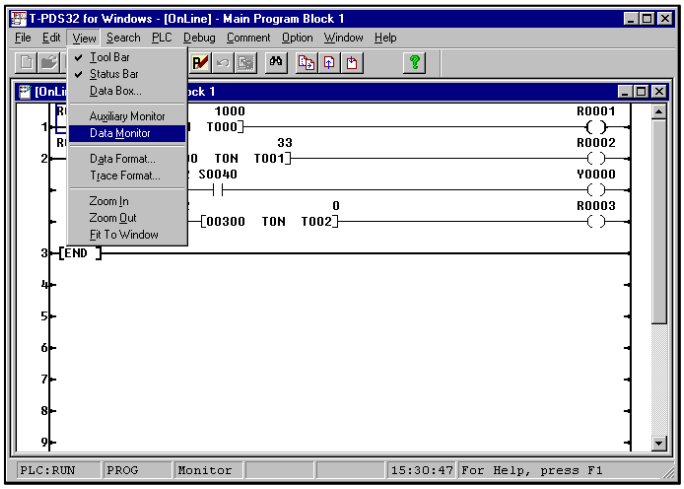
You can also operate the controller from the programmer. On the PLC menu, point to PLC Control. A submenu listing the operation modes will appear; select Halt and then click the mouse button or press the Enter key. (Toolbar is also available)



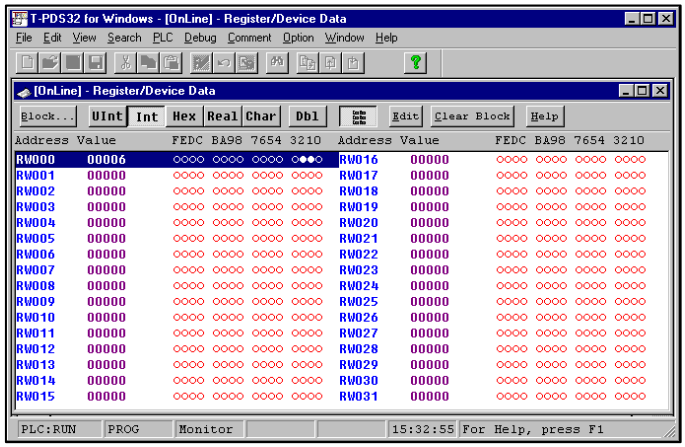

A message will appear, asking you to confirm that you want to execute that command. Click OK. The operation status in the screen will change to "PLC:Halt" and the controller will stop operating.

## 4.2 Checking Operation

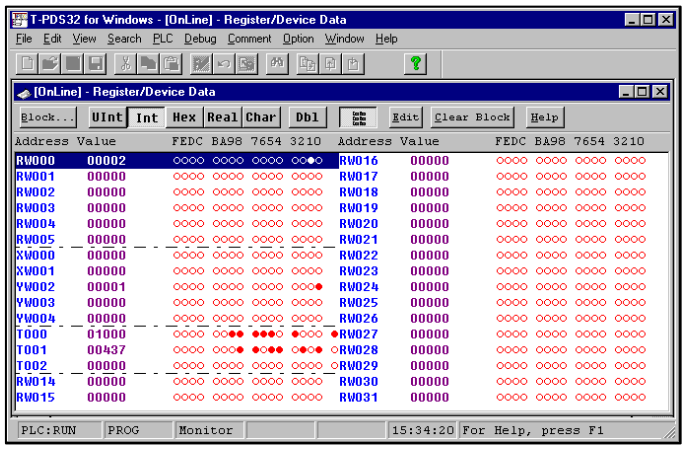
Program operation can also be checked using the Data Monitor command on the View menu.




On the View menu, click Data Monitor. (Toolbar is also available)
A list will appear showing the current register values and the on/off status of each register bit.




The column on the left marked "Address" shows the registers (such as RW000) registered to the controller. The circles to the right correspond to the bits (0 - F) for these registers. A black circle indicates that the bit is on; a white circle indicates that the bit is off.
In addition to the displayed internal auxiliary registers, the Data Monitor command can also be used to display and check I/O registers and timer data. Current values can also be set and changed.

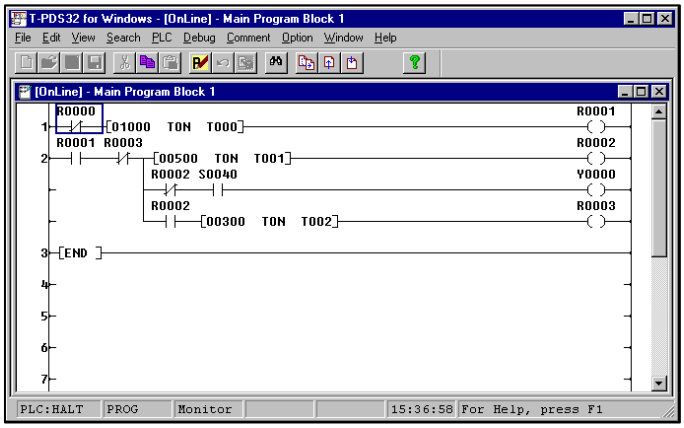



This figure shows the I/O registers and timer registers displayed in a single screen.
For more information on the data and register settings shown, see the Online HELP.
Check to make sure that the bit 0 in the YW000 register blinks in line with the progress of the program.

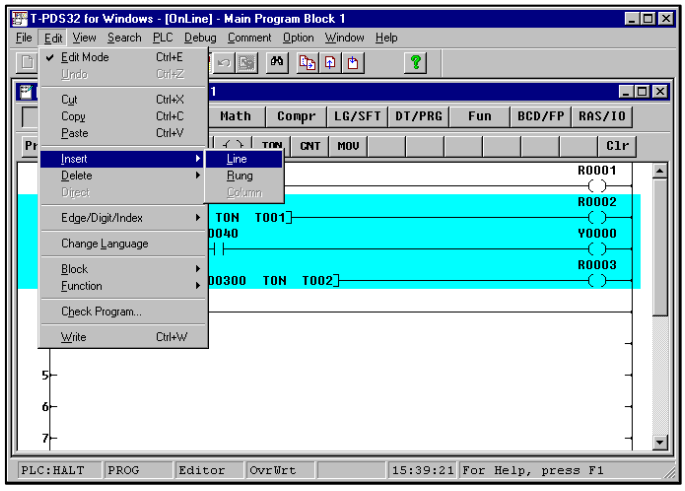
# 5. Advanced Editing

## 5.1 Inserting Circuits

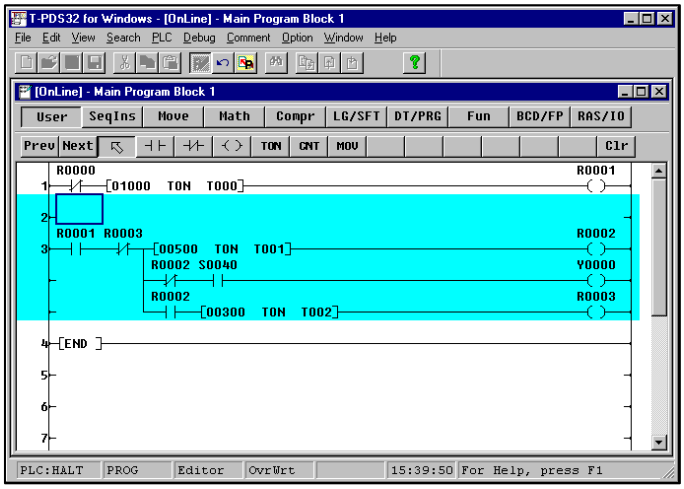
In this section, you make a few edits and corrections to the circuit to add some features. You will begin by inserting a circuit.



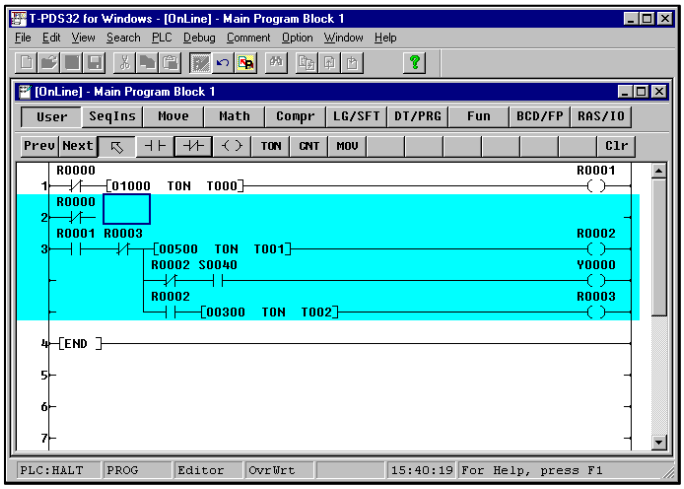

In this example, first assume a flicker circuit for which the lighting interval has been set to 3 seconds by writing an ON delay timer directly. Then you will change this circuit to such a configuration that the data for the lighting interval for the circuit is set to the data register in advance and the ON delay timer references the value in this data register.



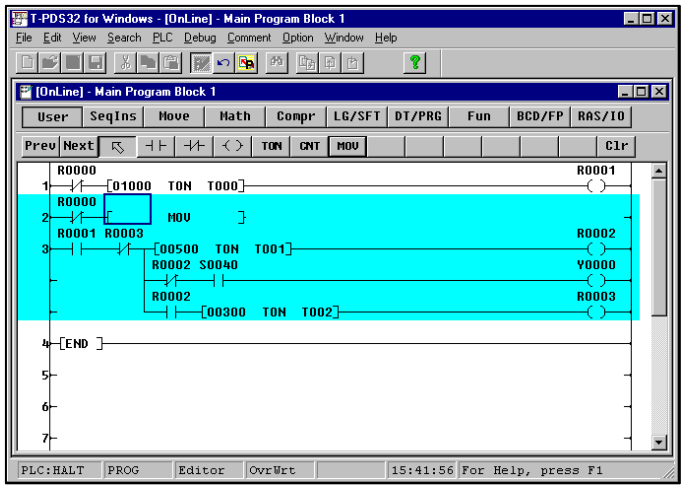

First, add a circuit in front of Circuit 2.
To add a circuit, use the Line insertion function.
On the Edit menu, click Edit Mode.
In Edit mode, move the box cursor to the insertion point. Then, on the Edit menu, point to Insert and then click Line on the submenu.



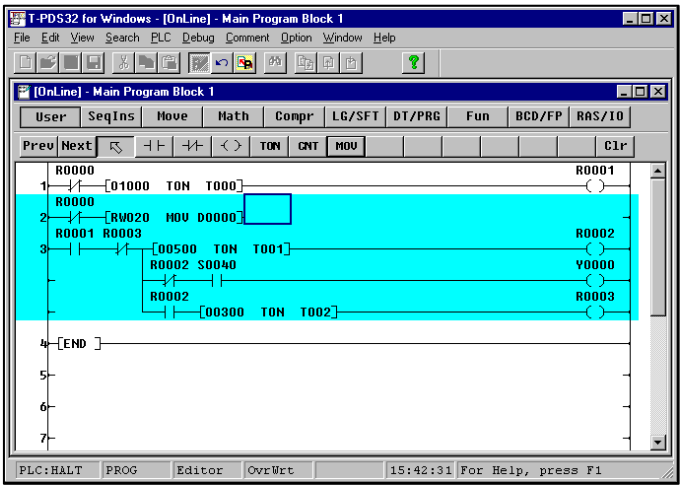

A blank line will be inserted. The existing circuits will move down from the next line on, as shown in the figure.




You will create a circuit on this line to set the lighting interval.
Check to make sure that the box cursor is at the beginning of Circuit 2, then start by placing a NC contact of R0000.

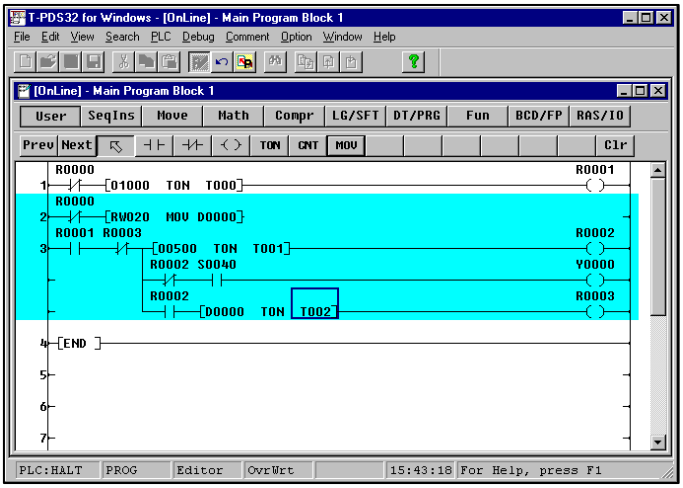



When you have placed the NC contact, place the symbol for setting data to the data register.
Select the "Mov" item and then click to the right of the B contact. The Mov instruction symbol will be placed there.

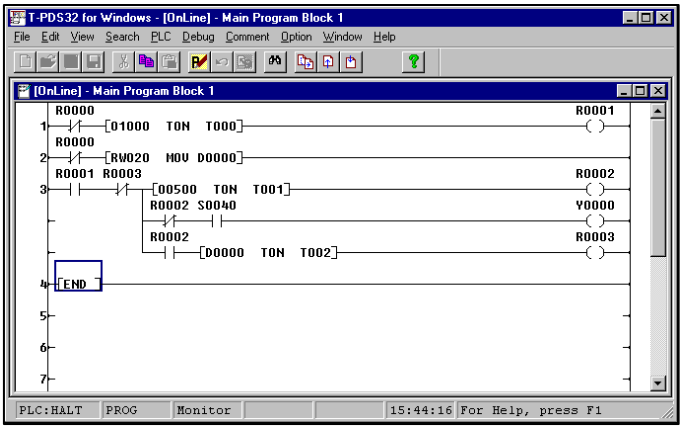



Two operands are entered for the Mov instruction symbol, a transfer source register or a constant and a transfer destination register.
In this example, we will assume that the data for the flicker circuit lighting interval is determined in another program (for example, to match the level of error occurrence) and stored in RW020, and we will transfer this data to data register D0000.
Enter the two operands on the keyboard.

The line from the Mov instruction symbol to the right bus is unconnected, but it will be automatically connected when the program is written like the END instruction issued.

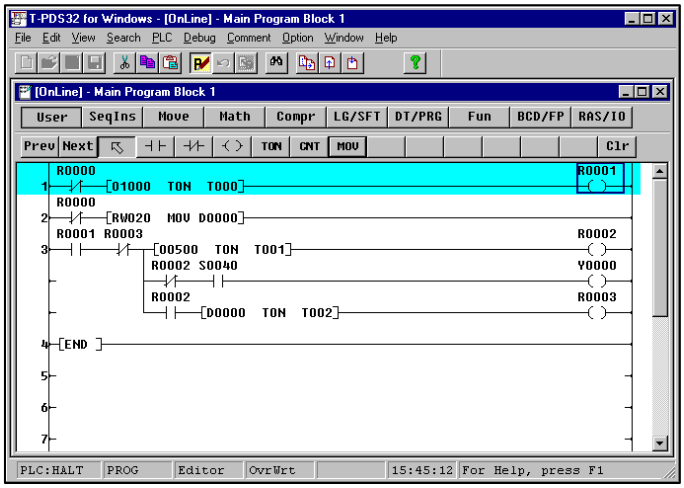



Now you will do a little editing on circuit 3.
In this example, you will change the setting for the ON delay timer from a constant to the data register number.
Move the box cursor to the first operand in the ON delay timer instruction in the third line of Circuit 3, then enter "D0" and press the Enter key.
This will cause the ON delay timer setting to be replaced with the value in data register D0000.
When the operand has been properly entered, select Write to write the data to the controller.

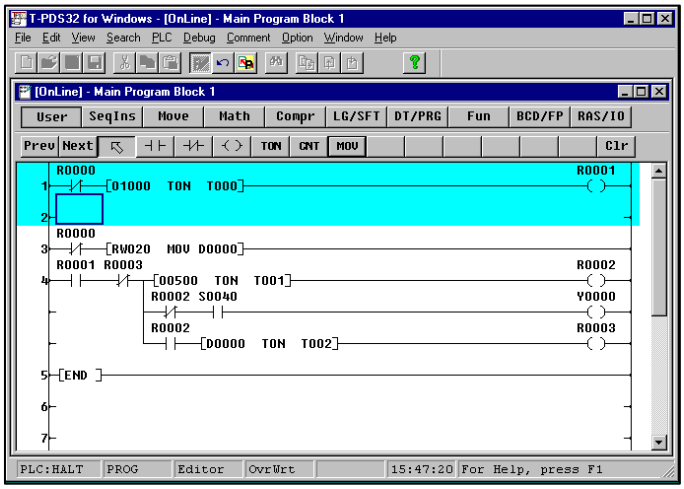



Check to make sure that the new circuit has been added to Circuit 2 and the subsequent circuits have moved down accordingly. Then quit Edit mode and return to Monitor mode.

# 5. Advanced Editing



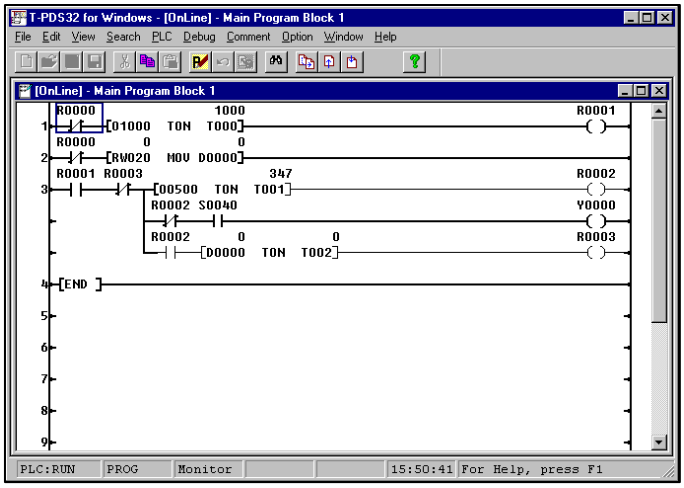

Circuits may be inserted by using the Insert function. This may also be done by pressing the Enter key with the box cursor at the extreme right margin to insert a new line.
Change to Edit mode and move the box cursor to the last position in the first line.



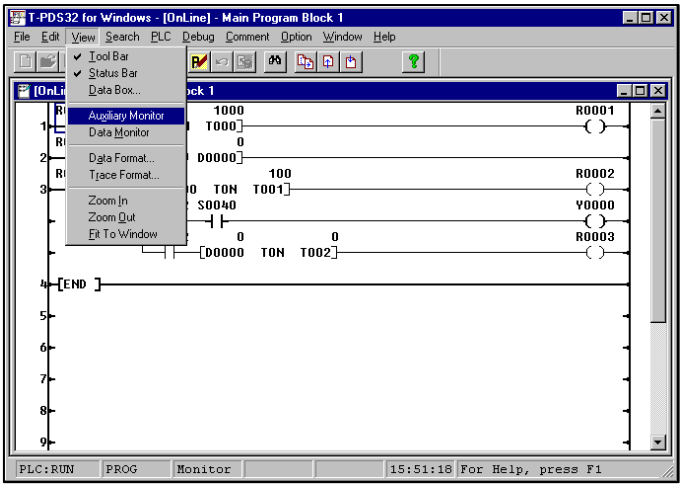

Press the Enter key. A new line will be inserted and the editing area will also be enlarged by one line.
To edit including Circuit 3, use Shift + ↓ to enlarge the editing area to Circuit 3 before a new line inserted.

## 5.2 Setting Data

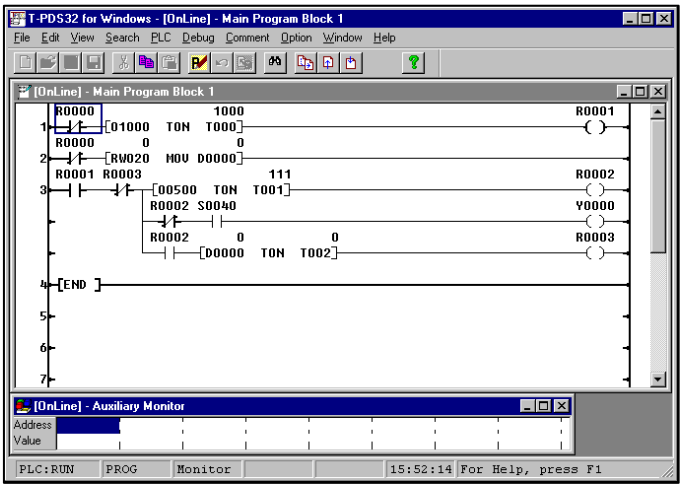
Register data may be set in the Program screen. Let's use this function to set the data for register RW020. Execute the program.



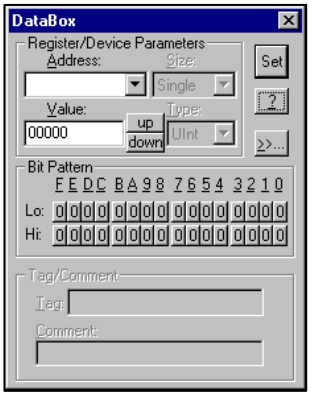

Check to make sure that the live wires and current values for the circuit being executed are displayed on the screen. In this program, the data for RW020 is 0, so it should blink continuously.



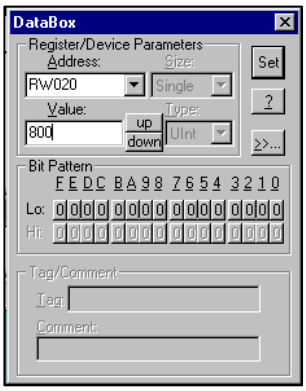

On the View menu, click Auxiliary Monitor.
(Toolbar is also available)



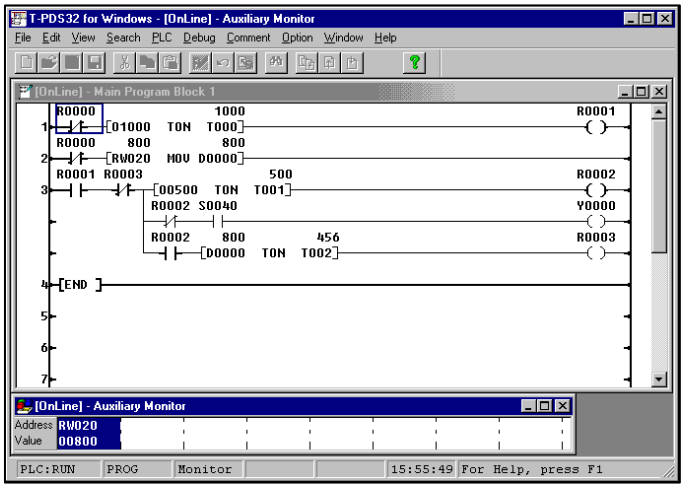

The Auxiliary Monitor window will open in the programming window. This window allows current values to be set for any register and device.



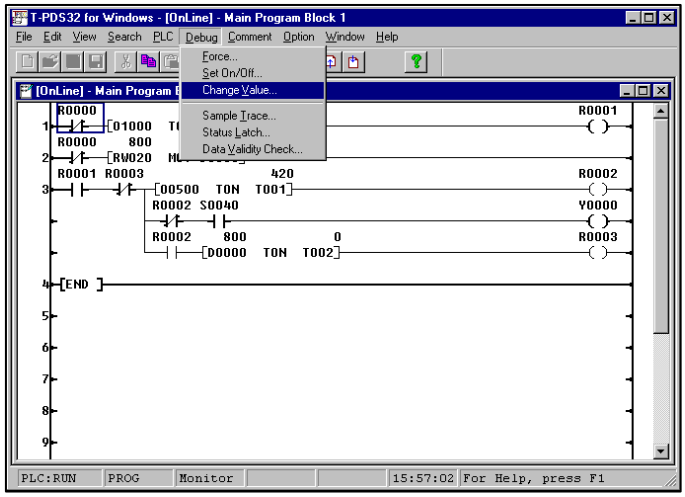

Clicking the mouse at the position of the cursor in the Auxiliary Monitor window will display the DataBox.
Enter the register number and data value that you wish to set in the Auxiliary Monitor window.




For "Addresses," you will designate register RW020.
Enter "R20". "0" will be displayed for the current value in the "Value" area.
Enter the desired setting on the keyboard and press Enter.
Register RW020 will be registered in the Auxiliary Monitor window and the current value will be replaced with the data you have just entered.
To close the DataBox, click the Close button in the upper right-hand corner.



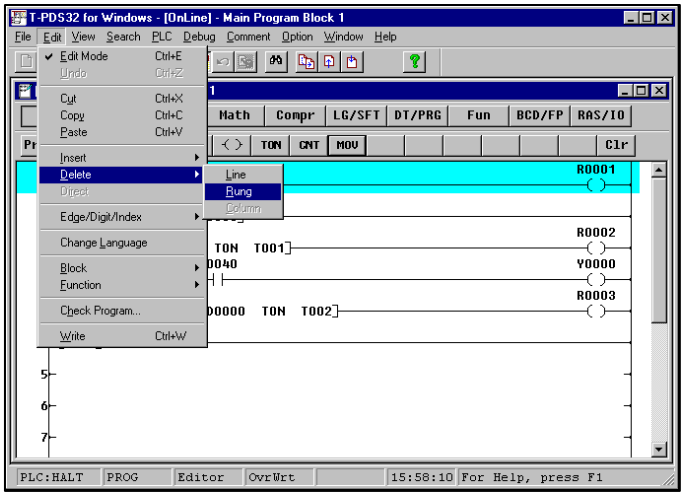

The flicker circuit will operate at the designated interval.
If an I/O card is installed, check the operation on the operation lamp.
At the same time, check to make sure that data is sent to the data registers in the program and that the current values are displayed.




You can set data directly in the registers in the circuit program.
On the Debug menu, click Change Value. The DataBox will appear.
When a register is designated with the box cursor in the programming window, the current value for that register will be displayed and that value can be changed.

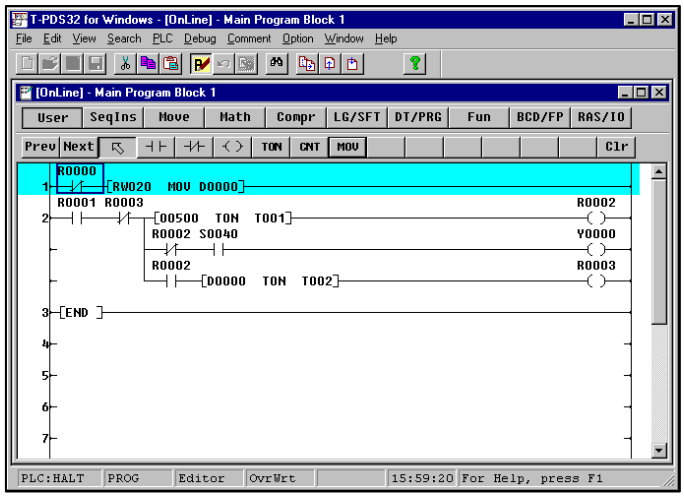
## 5.3 Deleting Circuits

This section covers how to delete unnecessary circuits. In this example, you will delete the circuit that waits for ten seconds after startup in Circuit 1.

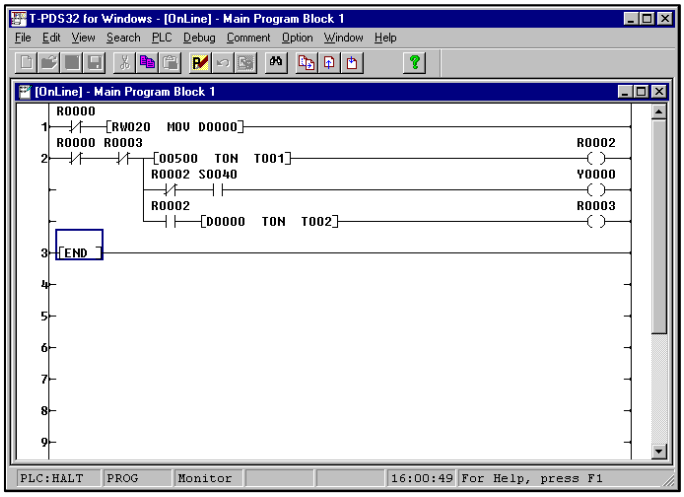



Move the box cursor onto the circuit that you want to delete.
On the Edit menu, point to Delete and click Rung on the submenu.


A message will appear asking you to confirm that you really want to delete the circuit. Click Yes.



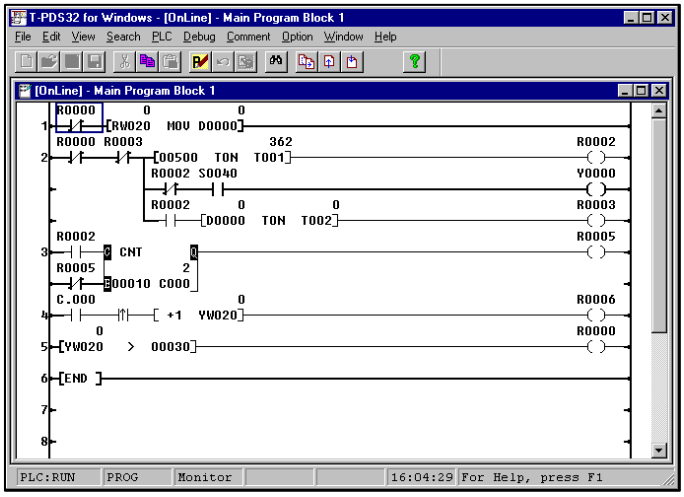

The designated circuit will be deleted and the subsequent circuits will move up.




When you have deleted Circuit 1, change the NO contact of R0001 at the beginning of circuit 2 to the NC contact of R0000.

## 5.4 Complex Circuits

This screen shows a counter function added to the flicker circuit. Try creating this program circuit as a final exercise.




- The number of R0002 turning ON is counted in Circuit 3.
  The counter is reset every 10 counts.
- The value for output register YW020 is increased by 1 every 10 counts in Circuit 4.
- And in Circuit 5, when the value for output register YW020 exceeds 30, R0000 is turned on and flickering stops.

When an I/O card corresponding to YW020 is installed, the LEDs on the I/O card indicates the counting operation. When the I/O card is not installed, you can confirm the operation on the program monitor screen or data monitor screen.

<Summary>
Insert one line in Circuit 3.

- Circuit 3

| | | | |
|---|---|---|---|
| Select NO contact | Click left button | Enter R2 | Press [Enter] |
| | | | Press [Enter] |
| Select NC contact | Click left button | Enter R5 | Press [Enter] |

Move the box cursor to the right of the NO contact.
In the Ladder Instruction toolbar, display the CNT instruction

| | | | |
|---|---|---|---|
| Select CNT | Click left button | | |

Move cursor to lower left of CNT instruction

| | | | |
|---|---|---|---|
| Enter 10 | Press [Enter] | | |
| Enter C0 | Press [Enter] | | |
| Select coil | Click left button | Enter R5 | Press [→] [→] [→] and [Enter] |

- Circuit 4

| | | | |
|---|---|---|---|
| Select NO contact | Click left button | Enter C.0 | Press [Enter] |
| Select Pulse (rising) | Click left button | | |

Select the arithmetic instruction group

| | | | |
|---|---|---|---|
| Select Math | Click left button | | |
| Select +1 (increment) | Click left button | Enter YW20 | Press [Enter] |
| Select coil | Click left button | Enter R6 | Press [Enter] |

- Circuit 5

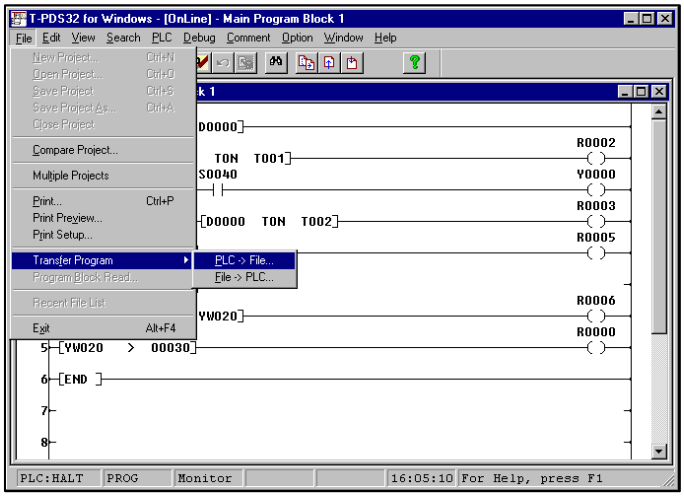
Select the comparison instruction group

| | | | |
|---|---|---|---|
| Select Compr | Click left button | | |
| Select > (greater than) | Click left button | Enter YW20 | Press [Enter] |
| | | Enter 30 | Press [Enter] |
| Select coil | Click left button | Enter R0 | Press [→] |

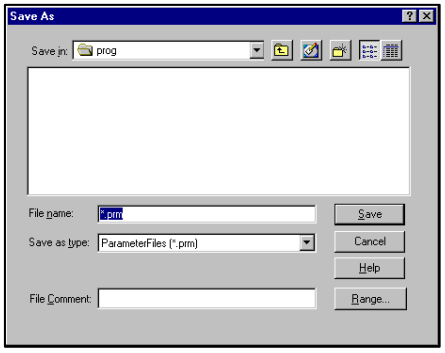
# 6. Saving Program

## 6.1 Save to Disk

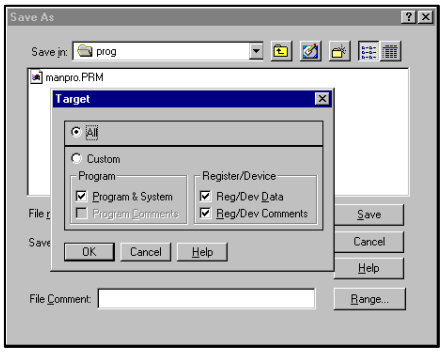
The Transfer Program command is used to save the programs that have been created to disk or to load them from disk.




On the File menu, point to Transfer Program and click PLC -> File on the submenu.
(Toolbar is also available)



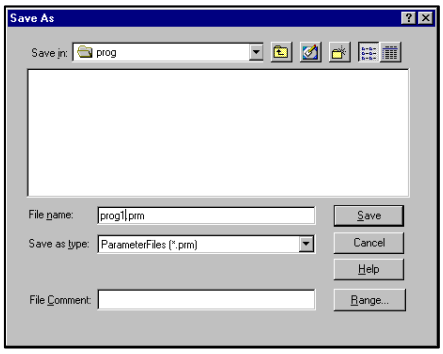

A dialog box will appear on the screen. This box is used to save data from the controller to disk.
It shows data in the folder currently available. To change the folder, click on the folder list box and select the desired folder.
When the folder has been selected, a list of files in that folder will appear in the File Name list box.




Select “Range” and specify the items to be transferred.

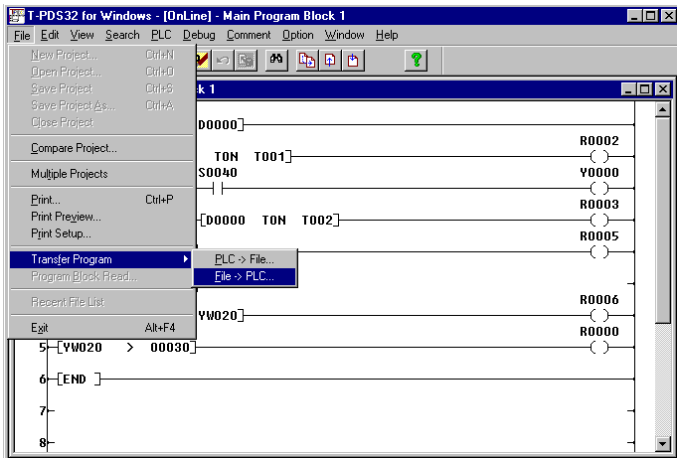
When a comment has been registered in the controller, the comment will be saved under the Comment File as the same file name.

# 6.Saving Program

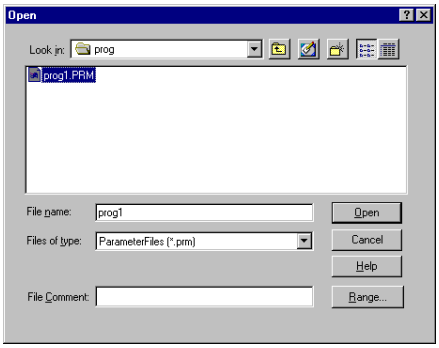



Enter the name of the file in the File Name text box.
In this example, enter "prog1".
After entering the file name, click OK. The program will be stored in that file.

## 6.2 Loading Programs from Disk




To load programs from disk, point to Transfer Program on the File menu and click File -> PLC on the submenu. (Toolbar is also available)




A dialog box will appear.
This dialog box is used to enter the name of the file to be loaded from the disk.

Designate the name of the file to be loaded from the disk.
You may change the folder in the same manner as when saving programs to disk.
To specify the name of the file for loading from the disk, either enter the name on the keyboard in the File Name text box or select the name from the File Name list box.
After entering the file name, click OK. The program will be loaded from that file.

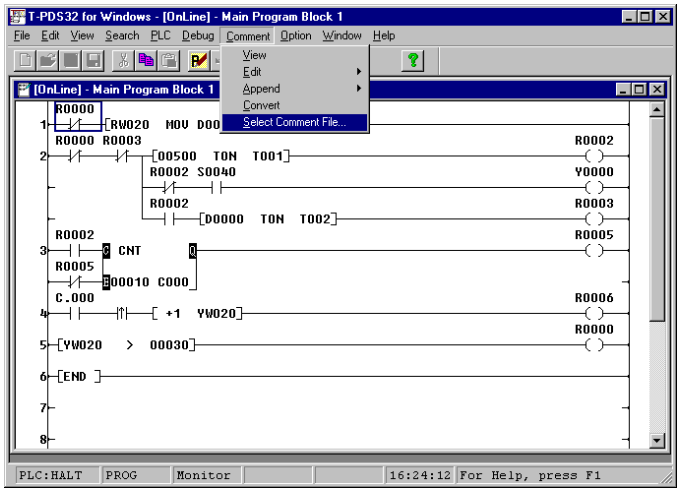
# 7. Beyond the Basic

## 7.1 Register/Device Comment

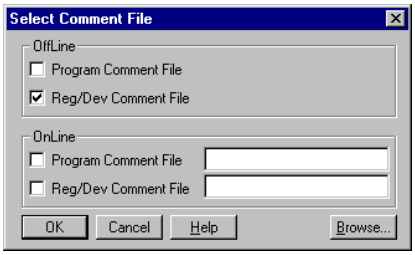
You can assign comments to the program blocks, circuits, relays and registers. This allows you to have the relays and devices displayed with comments in the program, and the program blocks and circuits with complementary comments.
Display the flicker circuit created in Chapter 5 on the screen.
In this example, you will assign the tag name "DATA1" to the D000 data register used in this program.

### 7.1.1 Select Comment File

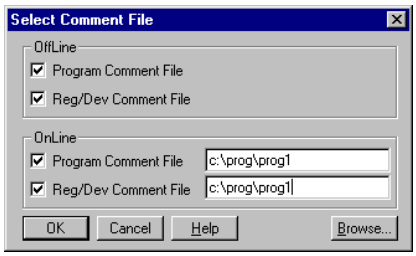
Note that assigning comments to relays and registers and saving these names will require files.



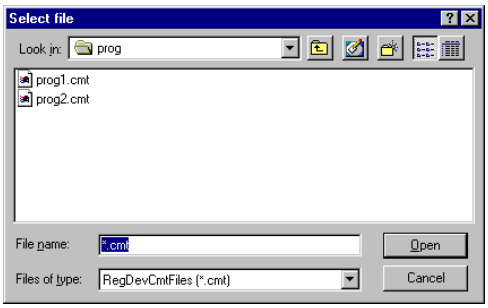

On the Comment menu, click Select Comment File. A dialog box allowing you to select the comment file will appear.




When you use register/device comment in offline mode, click the Reg/Dev Comment File check box in OffLine area. Click OK.
Then the temporary comment file is created, and you can use the register/device comment.

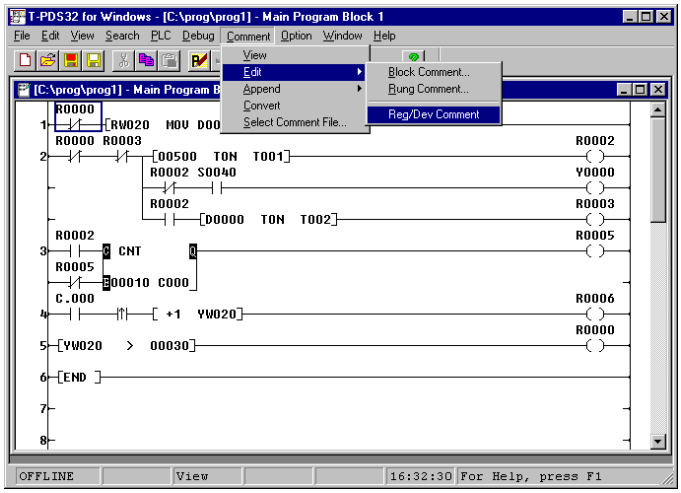



When you want to display the register/device comment in online mode, click the Reg/Dev Comment File check box in OnLine area.
Clicking Browse displays a dialog box for selecting the file for referring.

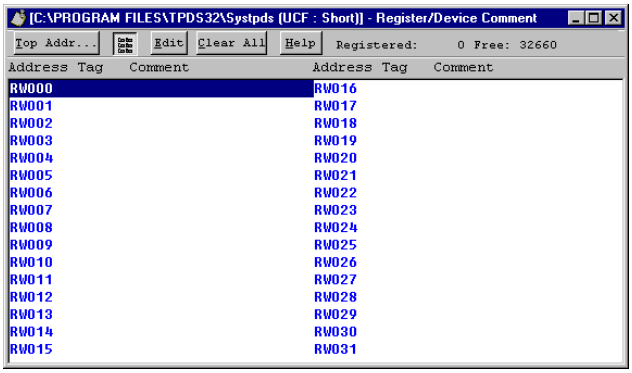



Select the comment file name and click OK.
If you are designating a new file, enter the file name in the Data Comment File text box. The extender ".CMT" is used for data comment files, but you do not need to enter this.

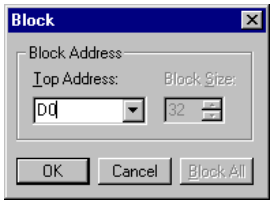
### 7.1.2 Registering Names



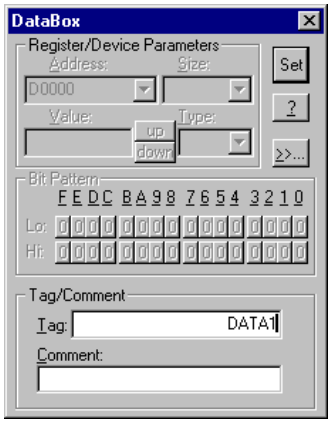

On the Comment menu, point to Edit and click Reg/Dev Comment on the submenu. The Register/Device Comment window will appear.



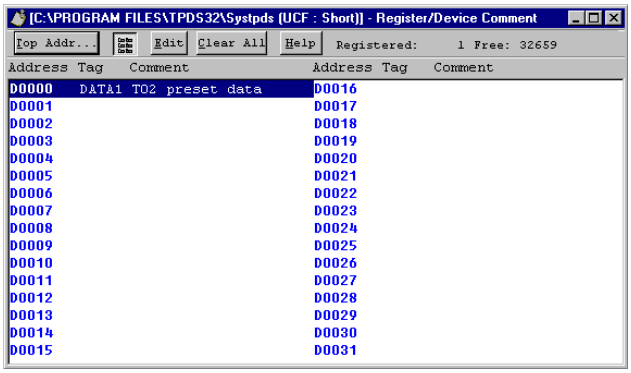

The number of currently registered items is shown in the upper right-hand corner, as well as the number of free items.
To register a name for D0000, you must change the display area. Click Top Addr on the toolbar.
A dialog box allowing you to designate the starting address will appear.




Enter "D0" in the Top Address text box.
The Block Size item is fixed at 32.
Then click OK.

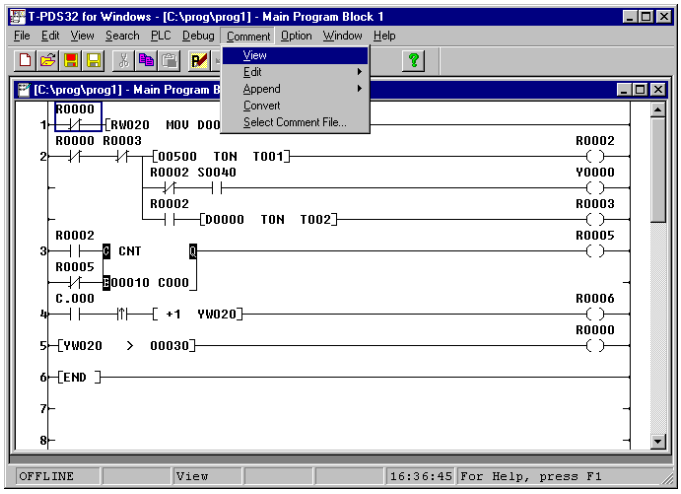



When D0000 - D0031 appears on the screen, click Edit on the toolbar to open the DataBox data editing dialog box. Comments as well as relay and register names may be registered with the Comment function.
Check to make sure that the cursor is in the Tag text box, then enter "Data 1" and click OK. Close the DataBox dialog box by clicking the Close button in the upper left-hand corner.

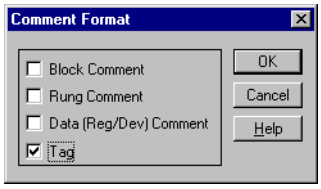



The tag name will appear under Tag in the Register/Device Comment window.

### 7.1.3 Displaying Names




When the names and comments have been registered, click View on the Comment menu.
(Toolbar is also available)

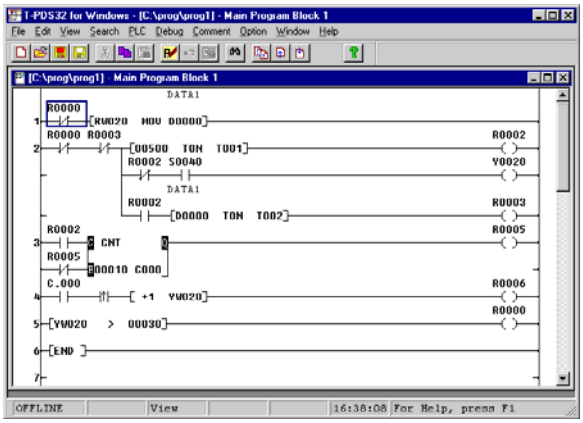



A dialog box allowing you to specify the display format for comments will appear.

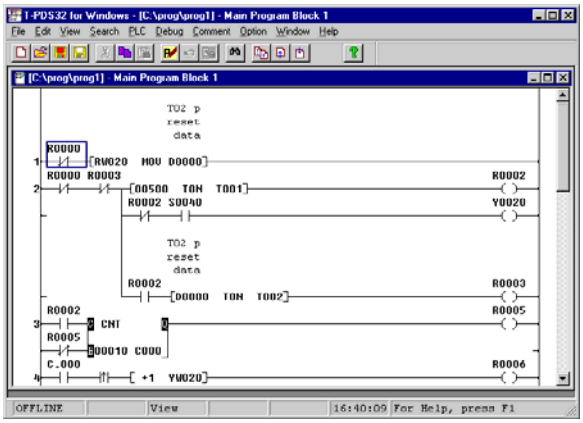
Click in the Tag check box so the box is checked.
The tag name is displayed above the register and device numbers.

Check this in the program. The “DATA1” above the ON delay timer and MOV symbol operand D0000. When the Data (Reg/Dev) Comment is specified for display, comment will appear.

- Tag Display




- Comment Display

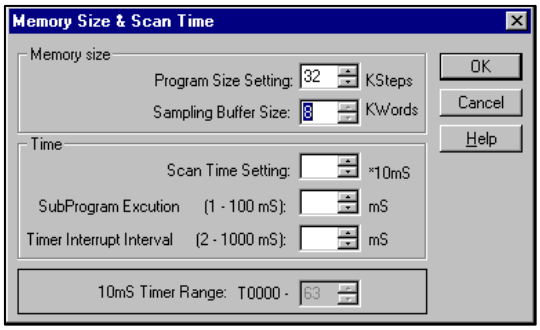


## 7.2 Sampling Trace

The controller has a function that enables you to sample and display changes in device status and register values during program execution. In this example, you will use this function to check on device and register trends in the flicker circuit.

### 7.2.1 Setting the Sampling Buffer

In order to sample data, it is necessary to secure a buffer, i.e. the memory area in which the sampling data will be stored. This is set in the system data.

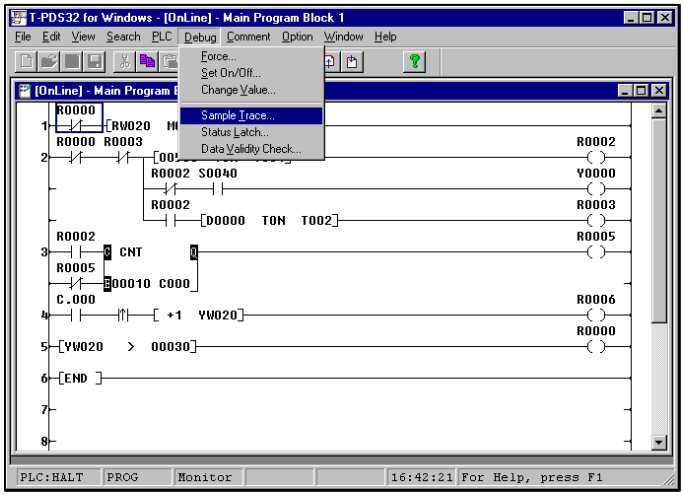



On the PLC menu, click System Parameters. The System Parameters screen will appear. Click Memory Size & Scan Time.
Then set the Sampling Buffer Size in the Memory Size area. For the T3, the sampling buffer may be set up to a maximum of 8KW.

**Additional Information**

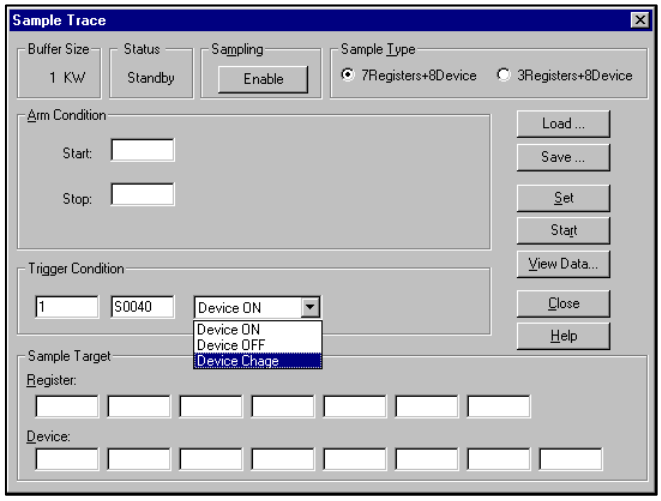
- On the T3/T3H the F register or an IC memory card is used for the sampling buffer. Note that setting a sampling buffer will decrease the amount of memory used by the program by the amount of the buffer setting.
- On the T2, IC cards are used to store sampling data.
- When performing a sample trace on the T2, be sure to insert an IC memory card and assign the memory card using the "I/O Card Allocation" procedure. The sampling buffer size is fixed at 8KW.
- For the T2E/T2N, the sampling buffer size is fixed at 8kW and uses internal memory.
- For the T1/T1S, the sampling buffer size is fixed at 1kW and uses internal memory.
- For the S2T/S2E, the sampling buffer size is fixed at 8kW and uses internal memory.

### 7.2.2 Setting the Sampling Condition




On the Debug menu, click Sample Trace. The Sample Trace dialog box will appear.

The Sample Trace dialog box is used to set the registers for data sampling, the sampling trigger condition and other data.

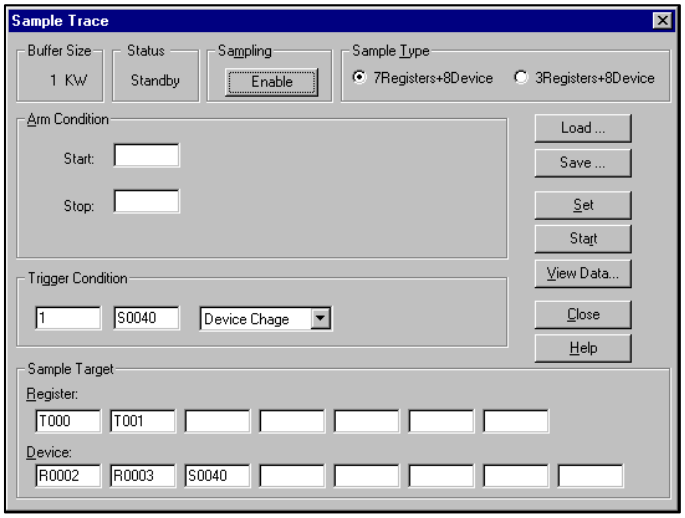



First check to make sure that the sampling buffer size set as system data is displayed in the upper left-hand corner.

In this example, you will set the trigger condition.
The trigger condition sets the timing for data sampling during program execution (during scanning). The trigger condition is specified as a device and a register condition, such as when the device status has changed or when the register has reached a certain constant value.

In this example, you will set the trigger to be activated when the timing relay (S0040) goes ON or OFF.

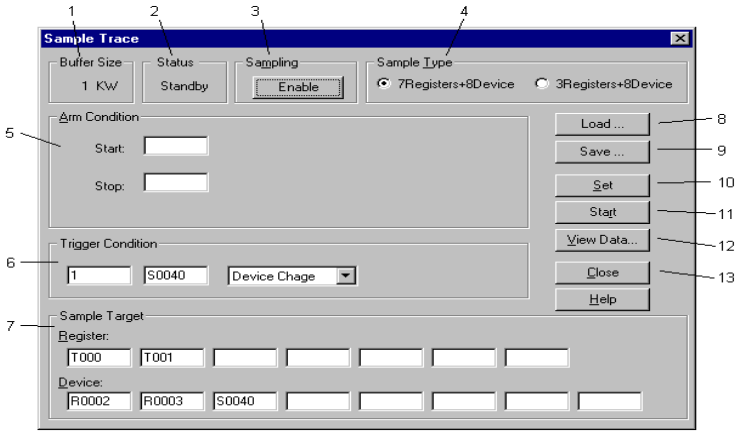
Move the mouse to the Trigger Condition text box and enter "1".
This designates how many times sampling is performed when the sampling conditions are fulfilled. Setting the value to "1" causes sampling to be performed for each scan that fulfills the trigger conditions.
Move the mouse pointer to the right and enter "S0040" for the sampling device. Then select the operation condition to one of the choices in the list box (Device ON, Device OFF or Device Change). In this example, you will set it to Device Change.




When the trigger conditions have been set, move the mouse pointer to the Sample Target area.
This area is used to designate the devices and registers for sampling. Enter the device and register numbers.
In this example, enter T000 and T001 for the registers and R0002, R0003 and S0040 for the devices.
When the settings are complete, click Set to save them.
As a result of these settings, when the S0040 relay changes from ON to OFF or vice versa, the current values for timer 0 and timer 1 and the ON/OFF status of R0002, R0003 and S0040 will be sampled.

The sampling conditions have now been set. Click Enable at the top of the dialog box. This completes the preparations for sampling.
Execute the program using the key-switch on the T3 or PLC Control. When the program is ready for execution, click Start. Sampling will begin. When sampling has been performed for 10 seconds or more (and flickering has begun), click Stop. Sampling will stop and the program operation status will be stored in the sampling buffer.

# 7. Beyond the Basic




<Sample Trace dialog box>

1 - Buffer Size: Shows the sampling buffer size (0 - 8kw).

2 - Status: Shows the status of sampling execution.
- Executing: Sampling in progress
- Standby: Sampling stopped

3 - Sampling: This button shows whether sampling is enabled or disabled. The status can be toggled by clicking the button.
- Enable: Sampling is enabled. Clicking the button changes this to Disable and sampling is stopped.
- Disable: Sampling is disabled. Clicking the button changes this to Enable.

4 - Sample Type: This area is used to select the number of registers and devices sampled. You may choose either of two options:
- 7 registers + 8 devices
- 3 registers + 8 devices

5 - Arm Condition: This area is used to set the arm conditions. Setting these values causes sampling to begin and end automatically in line with the arm conditions.
- Start: The start condition for sampling. Enter a register or device, a timing value or (in the case of numerical change) a numerical value in the box.
- Stop: The stop condition for sampling.
- After: Sets how many sampling scans are performed after the Stop conditions are met.

6 - Trigger Condition: Sets the timing for the sampling operation. The trigger condition is set in the same manner as Arm Condition above. The setting for number of trigger operations determines the number of times sampling is performed each time trigger conditions are fulfilled. If this value is set to 1 or left blank, sampling is performed each time the conditions are fulfilled. Similarly, if the register and device boxes are left blank, sampling is performed for each scan.

7 - Sample Target: Sets the registers and devices for which sampling is performed.

8 - Load: This button is used to load files containing sampling conditions and reflect these conditions on the screen.

9 - Save: This button is used to save the sampling conditions set on the screen to a file.

10 - Set: This button sets the sampling conditions currently displayed on the screen.

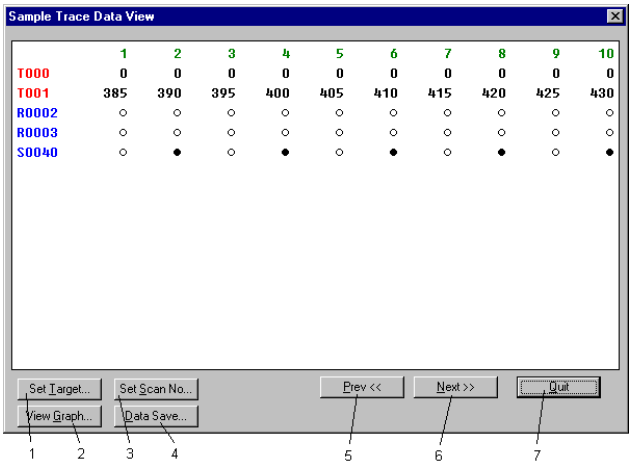
11 - Start: Clicking this button starts the sampling procedure in sampling ready status. The button changes to "Stop" when sampling begins. Clicking the Stop button stops the sampling process.

12 - View Data: This button loads the results of the sampling procedure from the PLC and displays them in the Sample Trace Data View window.

13 – Close: Clicking this button closes the sample trace dialog box.

### 7.2.3 Viewing Sampling Trace Data

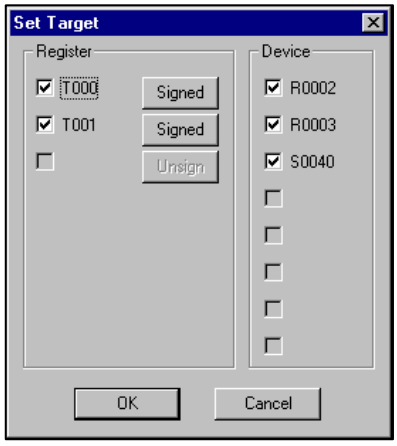
In this example, you will view the sampled data. Click the View Data button to display all of the sampled data.




The top part of the data shows the timer register values. The bottom part shows the device on/off status. White circles indicate ON status and black circles indicate OFF status.
The numbers at the very top are scan numbers. You may use the Set Scan No. button to display the data from any scan number. Click Prev to display the data for the previous ten scan items. Click Next to display the data for the next ten scan items.

<Sample Trace Data View dialog box>

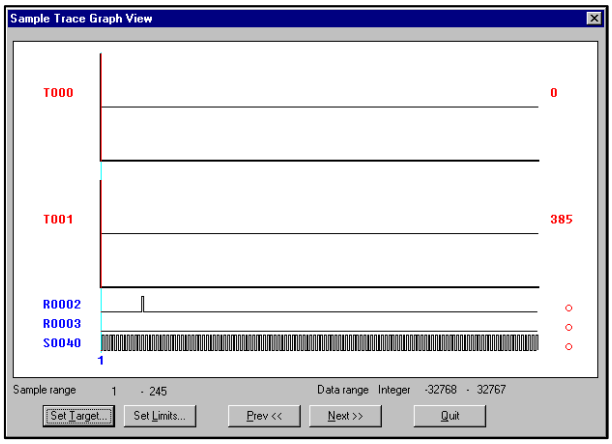
1 - Set Target: Clicking this button displays the Set Target dialog box, enabling you to set the devices and registers to be displayed.
2 - View Graph: Clicking this button displays a dialog box with a graph of the sample data.
3 - Set Scan No: Clicking this button displays a dialog box used to set the first scan number for the sample data.
4 - Data Save: Save the sample data to the file in CSV format.
5 - Prev: Shows the previous page of data.
6 - Next: Shows the next page of data.
7 - Quit: Returns to the Sample Trace dialog box.



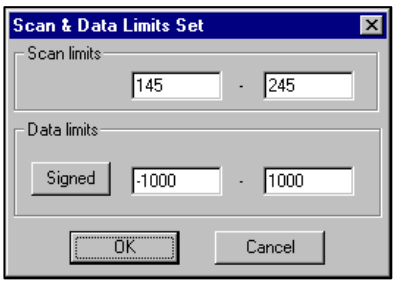

- Set Target screen

### 7.2.4 Timing Chart Disply

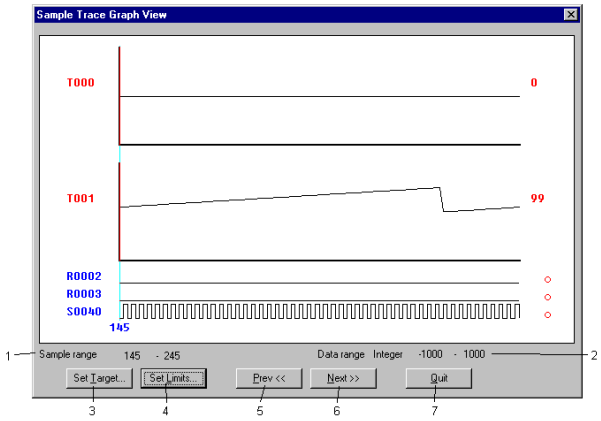
In this example you will view the time chart for this data.




Click the View Graph button. The sampled data will be displayed in the form of a time chart.
The time chart shows the scans from number 1 to number 256.
In this format, the data is a bit difficult to view, so you should change the scan range (the scale of the time axis in the chart).




Click the Set Limits button. A dialog box will appear, enabling you to set the display range for the data.




<Sample Trace Graph View>

| | |
|---|---|
| 1 - Sample Range: | Shows the lower and upper limits for the currently displayed scan range. |
| 2 - Data Range: | Shows the lower and upper limits for the display data. |
| 3 - Set Target: | Clicking this button displays the Device/Register Data dialog box. |
| 4 - Set Limits: | Clicking this button displays the Display Data Range dialog box. |
| 5 - Prev: | Shows the previous page of data. |
| 6 - Next: | Shows the next page of data. |
| 7 - Quit: | Returns to the Sample Trace Data View screen. |

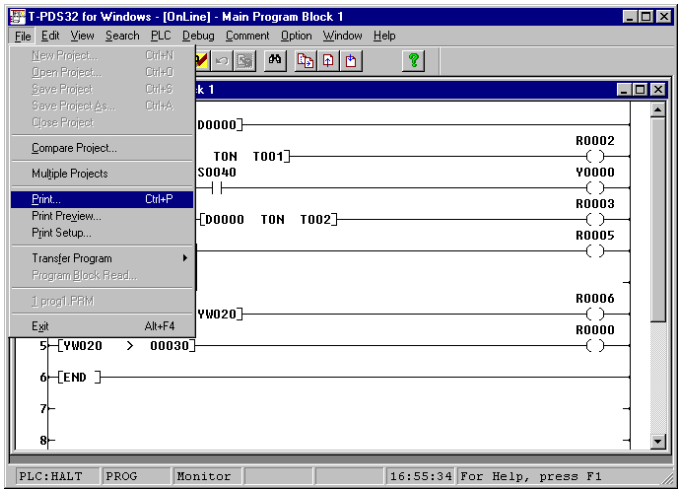
**Additional Information**

The following keyboard shortcuts can also be used:

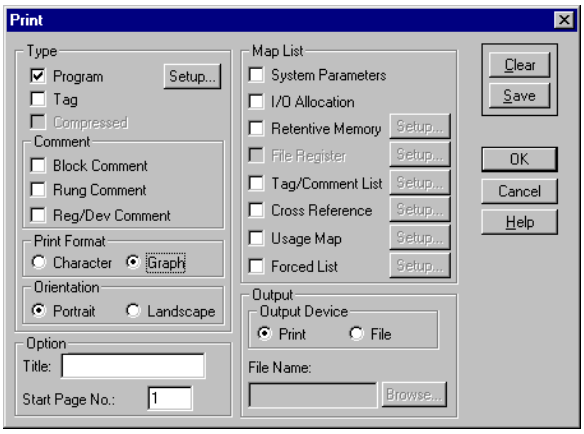
| | |
|---|---|
| Left/right arrow keys | Moves the sample cursor. |
| T | Displays the Device/Register Data dialog box. |
| L | Displays the Display Data Range dialog box. |
| P | Shows the previous page of data. |
| N | Shows the next page of data. |

### 7.3 Printing the Program

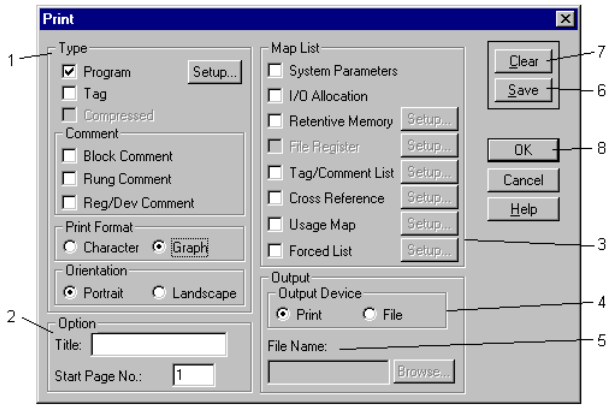
The Print command on the File menu allows you to print out the program, system information, device/register data, cross-reference, etc.
In this example, you will use this command to print out the program.




On the File menu, click Print.
(Toolbar is also available)

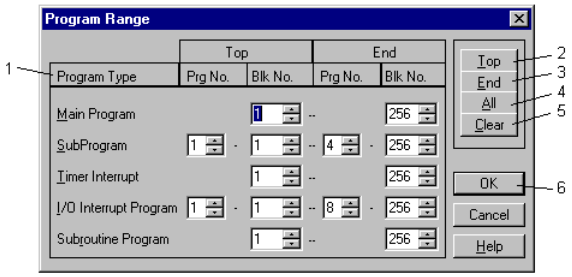



The Print dialog box will appear.




<Print dialog box>

| | |
|---|---|
| 1 - Type: | This item is used to specify the program print-out format. |
| Program: | Check here to print out the program. The program range to be printed can be specified. |
| Tag: | Check here to print out the program with the tags. |
| Comment: | Used to add the comments on the program. The following types of comments are available.<br>- Block Comment<br>- Rung Comment<br>- Register/Device Comment |
| Print Format: | Select the print out mode either character mode or graphics mode. |
| 2 - Option: | This item is used to specify the print-out header title and the starting page number. |
| 3 - Map List: | This item is used to select the optional maps to be printed. |
| System Parameters: | Check here to print the system parameters. |
| I/O Allocation: | Check here to print the I/O allocation information. |
| Retentive Memory: | Check here to print the data of the retentive registers. |
| File Registers: | Check here to print the data of the file registers (F registers). |
| Tag/Comment List: | Check here to print the list of the register/device comments. |
| Cross Reference: | Check here to print the cross-reference list. |
| Usage Map: | Check here to print the register/device usage map. |
| Forced List: | Check here to print the list of forced devices/coils. |
| 4 - Output: | This item is used to select the output device. |
| 5 - Output Device: | Select the output device either printer or file. |
| File Name: | When file is selected as the output device, enter the file name here. |
| 6 - [Save] button: | Saves the print settings into the system file. |
| 7 - [Clear] button: | Clears the setting. |
| 8 - [OK] button: | Starts the printing. |

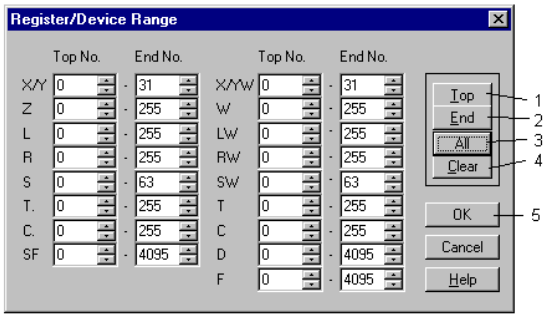



On the Print dialog, when you check the Program and click the [Setup] button, the Program Range dialog box will appear. Set the block range for each program type to be printed on this dialog box.

<Program Range dialog box>

| | |
|---|---|
| 1 - Program Type: | Sets the program ranges to be printed. |
| 2 - Top: | Sets the starting program number (if any) and the block number to be printed on the cursor position. |
| 3 - End: | Sets the last program number (if any) and the block number to be printed on the cursor position. |
| 4 - All: | Sets all the program range. |
| 5 - Clear: | Clears the settings. |
| 6 - OK: | Registers the settings and returns to the Print dialog box. |

When you want to print the system parameter, I/O allocation, cross-reference, etc., check the desired items on the Map List.




When you check the Retentive Memory, File Register, Tag/Comment List, Cross Reference, Usage Map, or Forced List, click the [Setup] button to set the register range to be printed. The Register/Device Range dialog box will appear.

<Register/Device Range dialog box>

| | |
|---|---|
| 1 - Top: | Sets the starting register address to be printed on the cursor position. |
| 2 - End: | Sets the last register address to be printed on the cursor position. |
| 3 - All: | Sets all the register range. |
| 4 - Clear: | Clears the settings. |
| 5 - OK: | Registers the settings and returns to the Print dialog box. |

When you have finished the necessary setting, click the [OK] button on the Print dialog box. The print-out will be started.
If you want to save the setting, click the [Save] button on the Print dialog box. The current setting is saved in the system file, and it will be displayed when the next time you open the Print dialog box.

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# Error Message

## Error Message Overview

There are 4 types of error messages as follows.

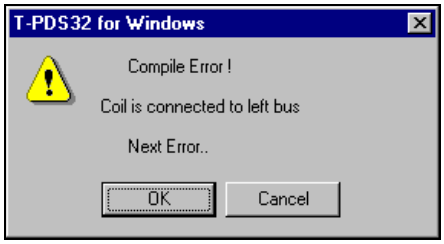
### A. Operation Error

These error messages are displayed for the T-PDS operation which you attempt to do. Communication error between T-PDS and PLC is also included in this type. It is displayed in the message box.



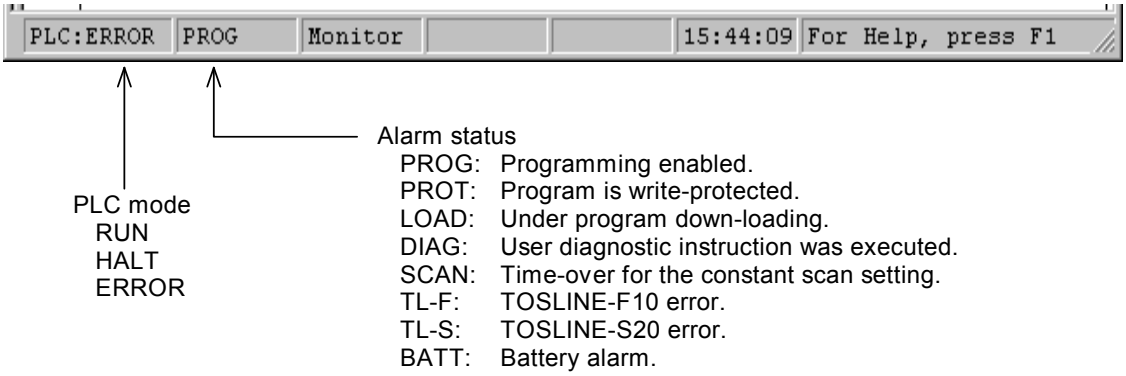
### B. Compile Error

These errors are detected in the T-PDS when edited program is compiled. It is displayed in the message box.




### C. PLC Status Line

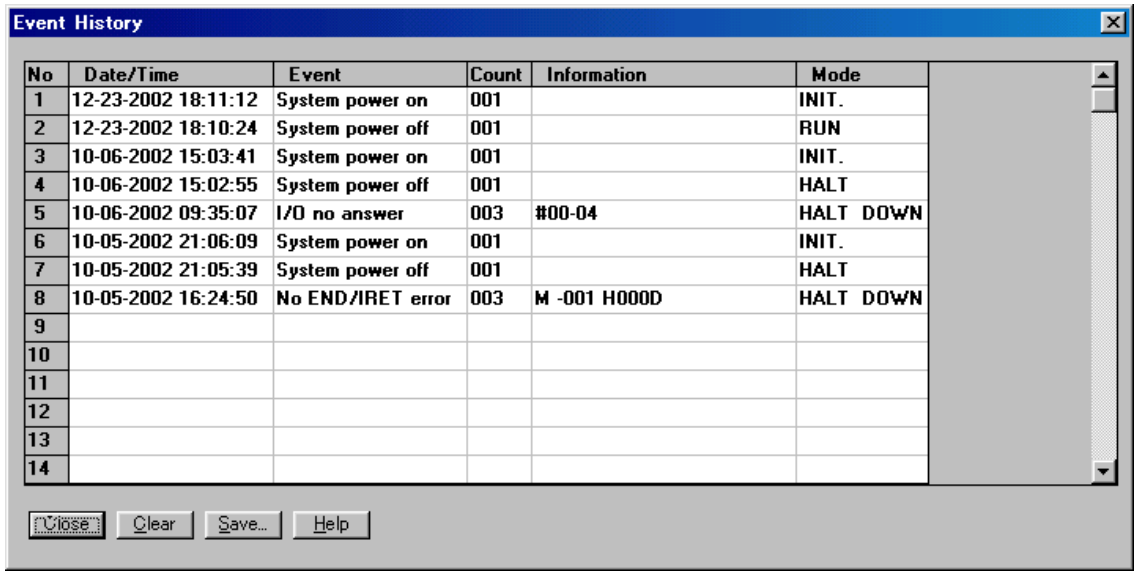
When the T-PDS is on-line mode, the PLC's operation mode (RUN, HALT, or ERROR) and alarm status are displayed in the status line.



### D. Event History Table

When the PLC detects some abnormality in its diagnostic checks, it is recorded in the PLC memory called Event history table. In the Event history table, the last 30 event messages (15 in case of T1/T1S) are stored in this table. The contents of the Event history table can be monitored on the T-PDS screen by [PLC] [Event History] menu.

<Event History Table>




| | |
|---|---|
| Date | The date the error occurred (requires RTC/calendar). |
| Time | The time the error was detected (requires RTC/calendar). |
| Event | Description of what occurred. |
| Count | Number of retries to correct the event. |
| Information | Additional information about the event. |
| Mode | The operation mode when the event occurred. |
| DOWN | The event caused the controller to enter the Error Mode. |

[Save] button is used to save the Event history table contents into the disk file.

Usually a PLC goes into the error mode when one of its diagnostic checks determines that something has occurred which interferes with normal operation. When a controller is in the error mode, all outputs turn OFF and operation stops. Nothing else is possible until Error Reset is executed. The basic recovery procedure is:

(1) Execute Error Reset (reset the error and put the PLC in the Halt Mode).
(2) Study the Event History Table.
(3) Make the necessary corrections.
(4) Return to the Run Mode.

**Error Message List**

## A...

| Message | Type of Error | Description |
|---|---|---|
| Address limit over | Operation error | The register address is not valid. |
| Address over<br>Limit the size? | Operation error | The block specified will exceed the address range. Limit the block size automatically? |
| Address setting error | Operation error | The address specified is not correct. |

## B...

| Message | Type of Error | Description |
|---|---|---|
| Batt voltage drop | Event history | Battery voltage drop or back-up data error was detected.<br>Replace the battery if it is used. |
| Block separation impossible (max 16 blocks) | Operation error | Number of divided blocks in the data monitor is 16 blocks maximum. |
| Block size error | Operation error | Specified block size is illegal. |
| Block size error | Operation error | The block number specified is out of the allowable range. |
| Block/rung comment file is not specified | Operation error | Block/rung comment file has not been specified. |
| BLOCKEDI.EXE running | Operation error | The edit block function has already activated. |
| Boundary error | Event history | The index modified operand exceeds the allowable address/data range.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Info 3: Function No.<br>Check the program for the index registers data. |
| Branch connection below MCS/JCS | Compile error | MCS and JCS must be the last instruction in a rung. |
| Branch connection error | Operation error | The program cannot be displayed because it contains illegal branch connection. (Program abnormal) |
| Branch connection error | Compile error | In the SFC program, combination of divergence and convergence is not correct. |

## C...

| Message | Type of Error | Description |
|---|---|---|
| Can't check register/device comment file type | Operation error | The format type, long or short, of the comment file could not be confirmed. |
| Cannot connect with other instruction | Compile error | This instruction cannot be connected with other instructions. |
| Cannot copy because of memory capacity over | Operation error | The block copy operation specified will cause memory capacity over. |
| Cannot delete | Operation error | The delete range specified is illegal. |
| Cannot delete line | Operation error | The current cursor position is illegal to execute the line delete operation. |
| Cannot execute because of memory allocation error | Operation error | Block edit cannot be started because of insufficient memory. |
| Cannot execute because of TPDS.EXE not loaded | Operation error | The block edit cannot be started because T-PDS has not been executed. |
| Cannot insert | Operation error | The current cursor position is illegal to execute the insert operation. |
| Cannot insert line | Operation error | The current cursor position is illegal to execute the line insert operation. |
| Cannot Load Spin.VBX Place the file on the path | Operation error | The Spin.vbx file was not found in the folder of Tpds.exe file. |
| Cannot move because of insufficient empty blocks | Operation error | The block move operation specified is not possible because empty blocks are not sufficient. |
| Cannot Open File | Operation error | The file specified could not be opened. |
| Cannot Save This File | Operation error | Saving into the file was failed. |
| Changing item not found | Operation error | The target was not found for the search & replace function. |
| Channel Size Error | Operation error | Channel number specified for F10 assignment is out of allowable range. |
| Clock-calendar err | Event history | An error was detected in the calendar LSI. (no error down)<br>Reset the clock-calendar data. |
| Coil is connected to left bus | Compile error | Coil cannot be connected to the left bus directly. |

| Message | Type of Error | Description |
|---|---|---|
| Column over | Operation error | The program cannot be displayed because it contains excess columns. (Program abnormal) |
| Combination error | Operation error | The combination of I/O type and size is invalid. |
| Comm format error | Operation error | Communication format error has occurred. |
| Command line not found | Operation error | Command line could not be found. |
| Comment character size error | Operation error | Data comment character size exceeds the limit. |
| Comment file insert error | Operation error | An error occurred during writing to the comment file. |
| Comment file open error | Operation error | The comment file could not be opened. |
| Comment file write error | Operation error | An error occurred during writing to the comment file. |
| Comment space full | Operation error | The comment memory is full. |
| Comment space full | Operation error | The comment memory is full. |
| CommonData Lock Error | Operation error | Common data could not be obtained. |
| Communication busy | Operation error | When the programmer port and the computer link port are used simultaneously, the PLC CPU cannot respond due to busy status for other communication support. |
| Communication err | Operation error | Communication error has occurred. |
| Communication error | Operation error | Communication error between T-PDS and PLC has occurred. |
| Communication timeout | Operation error | Communication time-out error occurred. |
| Connection error | Compile error | In the SFC program, there are illegal connections. |
| Connection error for edge detect instruction | Compile error | No instruction cannot be connected to the output of the edge detect modified instruction. |
| Connection error for multi-input instruction | Compile error | Vertical connection point cannot be connected directly with the input of a multi-input instruction.<br>(except for the enable input) |
| Contact is connected to right bus | Compile error | Contact instruction cannot be connected to the right bus. |

| Message | Type of Error | Description |
|---|---|---|
| Control inst incl. | Operation error | In the on-line program changes, the following instructions cannot be deleted or added.<br>FOR, NEXT, MCS, MCR, JCS, JCR, END, JUMP, LBL, CALL, SUBR, RET, IRET |
| CRect over | Operation error | The printing space is not sufficient. |

## D...

| Message | Type of Error | Description |
|---|---|---|
| Data type mismatch | Operation error | The data format specified is not allowed for the operand. |
| Device context error | Operation error | The device context could not be obtained. |
| Direct Instruction or Operand | Operation error | Specify the instruction or operand to be searched. |
| Disk full | Operation error | The disk is full. |
| Duplicate coil | Operation error | Duplicate coil was detected in the program check function. |
| Duplicate entry No. | Event history | LBL or SUBR instruction is duplicated<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Info 3: Entry No.<br>Check the program. |
| Duplicate I/O reg | Event history | Duplication of XW/YW registers is detected.<br>Info 1: Unit No. - slot No.<br>Info 2: Register address<br>Check the I/O allocation information (unit base address setting). |
| Duplicate mark information | Operation error | The mark ID specified has already been registered. |
| Duplicate Registers | Operation error | X/Y registers are duplicated due to incorrect unit base address setting. |
| Duplicate SFC No. | Event history | The SFC program No. is duplicated.<br>Info 1: Program type - block No.<br>Info 2: SFC program No.<br>Check the program. |
| Duplicate step No. | Compile error | SFC step number is duplicated. |

## E...

| Message | Type of Error | Description |
|---|---|---|
| Edit line over | Operation error | Editing range exceeds 11 lines. |
| Edit size over | Compile error | Number of steps in the rung exceeds 132 steps. |
| EEPROM BCC error | Event history | BCC error was detected in the user program memory (built-in EEPROM). Initial load was not executed.<br>Info 1: Illegal BCC data<br>Check the program. Then write into the EEPROM again. |
| EEPROM warning | Event history | The number of times of EEPROM write has exceeded the life (100,000 times).<br>Info 1: Excess times of EPROM write |
| EEPROM write error | Operation error | Error occurred during writing into built-in EEPROM. |
| Empty block has been specified | Operation error | An empty block was specified as copy source. |
| END exists in subroutine | Compile error | END instruction cannot be programmed in the subroutine. |
| Entered tag(s) has already been registered | Operation error | Entered tag is duplicated. |
| Entry block has been specified | Operation error | Programmed block cannot be specified as copy destination. |
| Ethernet not support | Operation error | Ethernet is not supported in the computer. |
| Exceeds 132 steps | Operation error | A rung contains more than 132 steps. |
| Expansion unit err | Event history | 5 Vdc power f the expansion unit is not normal. |
| ExtDeviceMode function not support | Operation error | The printer driver does not support Landscape mode printing. |

# Error Message

## F...

| Message | Type of Error | Description |
|---|---|---|
| File access error | Operation error | An error occurred during accessing the file. |
| File access error | Operation error | File access error occurred during accessing comment file. |
| File append impossible | Operation error | File append is not possible. |
| File name not exist | Operation error | The specified file was not found. |
| File open error | Operation error | The file specified could not be opened. |
| File read error | Operation error | The file read error has occurred. |
| File Save Error | Operation error | An error occurred in writing to the file. |
| File write error | Operation error | The file write error has occurred. |
| File write error | Operation error | File writing error occurred during accessing comment file. |
| FileName is Illegal | Operation error | The file name specified is illegal. |

## I...

| Message | Type of Error | Description |
|---|---|---|
| I/O bus error | Event history | I/O bus check error occurred.<br>Info 1: Unit No.<br>Info 2: Illegal data<br>Check the expansion cable connection, I/O module mounting condition. |
| I/O mismatch | Operation error | The specified device/register does not match with the I/O allocation status. |
| I/O mismatch | Operation error | The operand specified does not match the I/O allocation status. |
| I/O mismatch | Event history | The I/O allocation information and actual I/O mounting status are not matched.<br>Info 1: Unit No. - slot No.<br>Info 2: Register address<br>Check the I/O allocation information and the I/O module mounting position. |

| Message | Type of Error | Description |
|---|---|---|
| I/O no answer | Event history | No answer was acknowledged from the I/O module.<br>Info 1: Unit No. - slot No.<br>Info 2: Register address<br>Check the I/O allocation information and the I/O module mounting position. |
| I/O parity error | Event history | I/O bus parity error occurred during accessing the I/O module.<br>Info 1: Unit No. - slot No.<br>Info 2: Register address<br>Check the I/O module mounting condition. |
| IC card BCC error | Event history | BCC error was detected in the user program memory (IC card). Initial load was not executed.<br>Info 1: Illegal BCC data |
| IC card type error | Event history | The program stored in the IC card is bigger than the PLC memory. Check the IC card. |
| Illegal file name | Operation error | Illegal file name was specified. |
| Illegal Filename | Operation error | The file name specified is illegal. |
| Illegal I/O reg | Event history | XW/YW register address exceeded the limit in allocating I/O modules.<br>Info 1: Unit No. - slot No.<br>Info 2: Register address<br>Check the I/O allocation information. |
| Illegal inst | Event history | An illegal instruction was detected in the program.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Clear memory and reload the program. |
| Illegal instruction | Operation error | The program cannot be displayed because it contains illegal instruction. (Program abnormal) |
| Illegal mode | Operation error | The function attempted is not allowed in the current operation mode. |
| Illegal Parameters | Operation error | Sampling parameters specified are illegal. |
| Illegal register/device comment file type | Operation error | The format type of the register/device comment file is illegal. |
| Illegal sys intrpt | Event history | Illegal system interrupt was detected.<br>Info 1: Interrupt address 1<br>Info 2: Interrupt address 2<br>Check external noise environment. |

| Message | Type of Error | Description |
|---|---|---|
| Immediate data only in Offline mode | Operation error | Register data setting on the program window is not allowed in off-line mode. |
| Impossible in the specified block | Operation error | The block divide operation specified will cause memory capacity over. |
| In and Out of the instruction are shorted | Compile error | The input and output of an instruction are shorted. |
| In/Out Method Error | Operation error | Global setting is not allowed for F10 assignment. |
| Incorrect connection | Compile error | The combination of the line connectors is not correct. |
| Incorrect cursor position | Operation error | The current cursor position is illegal to execute the operation specified. |
| Incorrect End position | Compile error | In the SFC program, position of the SFC End is not correct. |
| Incorrect Macro End position | Compile error | The position of the SFC Macro End is not correct. |
| Incorrect range specification | Operation error | The range specified is not correct. |
| Incorrect register/device specification | Operation error | The register/device specified is not correct. |
| Incorrect search target specification | Operation error | The search target specified is not correct. |
| Incorrect target | Operation error | The register address range specified is not correct. |
| Incorrect target specification | Operation error | The range specified is not correct. |
| Index/digit option is added to the operand | Operation error | Data setting was attempted to an operand with index modification/digit designation. |
| Initial and End steps combination error | Compile error | In the SFC program, combination of Initial step and End step is not correct. |
| Input error | Operation error | The instruction cannot be placed on the specified position. |
| Insufficient comment area | Operation error | The comment memory is full. |
| Insufficient comment area in workfile | Operation error | The comment memory allocated in the PLC is full. |

| Message | Type of Error | Description |
|---|---|---|
| Insufficient disk capacity | Operation error | The disk capacity is not sufficient. |
| Insufficient disk capacity | Operation error | Disk full is detected during accessing comment file. |
| Insufficient Memory | Operation error | Memory allocated is not sufficient to execute. |
| Insufficient memory capacity | Operation error | Memory allocated is not sufficient to execute. |
| Invalid block No. | Operation error | The required block number is out of the allowable range. |
| Invalid combination | Operation error | The combination of I/O type and size is invalid. |
| Invalid cursor position | Operation error | The current cursor position is illegal to execute the operation specified. |
| Invalid data | Operation error | The data specified is not valid. |
| Invalid data range | Operation error | The data value range specified is not correct. |
| Invalid digit specification | Operation error | The digit specification exceeds the allowable data size for the instruction. |
| Invalid entry | Operation error | The value set is invalid. |
| Invalid for SFC block | Operation error | The function required is not allowed in the SFC block. |
| Invalid format specification | Operation error | The data format specified is not allowed for the operand. |
| Invalid Fun inst | Event history | Unavailable function instruction for the PLC is programmed.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Info 3: Function No.<br>Check the program. |
| Invalid function in online mode | Operation error | The function required is invalid in on-line mode. |
| Invalid function No. | Operation error | The function number specified is not valid. |
| Invalid I/O intrpt | Event history | Unused I/O interrupt signal was detected.<br>Info 1: Unit No. - slot No.<br>Allocate the interrupt module correctly. Check external noise environment. |
| Invalid in constant scan mode | Operation error | The Subprogram execution time assignment is invalid if Constant scan mode is selected. |

# Error Message

| Message | Type of Error | Description |
|---|---|---|
| Invalid in offline mode | Operation error | The function is not available in off-line mode. |
| Invalid instruction in detail part | Compile error | In the SFC transition condition or action part, unavailable instruction is programmed. |
| Invalid location | Operation error | The current cursor position is not allowed for the I/O type specified. |
| Invalid operand | Operation error | The operand specified is not valid. |
| Invalid operand | Operation error<br>Compile error | The operand specified for the instruction is not valid. |
| Invalid operation | Operation error | The cursor position is not correct for the operation specified. |
| Invalid output range specification | Operation error | The output range specified is invalid. |
| Invalid program | Event history | Program management information is not normal.<br>SUBR instruction is not programmed before RET instruction.<br>END instruction is programmed in the interrupt program.<br>IRET instruction is programmed in other than the interrupt program.<br>SFC is programmed in other than the main or subprogram.<br>Unavailable instruction for the PLC is used.<br>Info 1: Program type - block No.<br>Check the program. |
| Invalid register/device in offline mode | Operation error | The register/device specified is invalid in off-line mode. |
| Invalid Rung No. | Operation error | The required rung number is out of the allowable range. |
| Invalid sampling range | Operation error | The sampling range specified is not correct. |
| Invalid SFC Prog | Event history | The correspondence between initial step and end step, or the macro entry and macro end is not correct.<br>Info 1: Program type - block No.<br>Check the program. |
| iomodule.sys file format error | Operation error | The format of the I/O module type file (iomodule.sys) is not correct. |
| IP Address no entry | Operation error | The IP address for Ethernet is not entered. |

| Message | Type of Error | Description |
|---|---|---|
| IP Address or Port No no entry | Operation error | IP address or Port number for Ethernet connection was not entered. |

## J...

| Message | Type of Error | Description |
|---|---|---|
| Joint connection error | Operation error | The program cannot be displayed because it contains illegal joint connection. (Program abnormal) |
| Jump target error | Event history | LBL instruction corresponding to the JUMP instruction is not programmed, or it is on the incorrect location.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Info 3: Jump label No.<br>Check the program. |

## L...

| Message | Type of Error | Description |
|---|---|---|
| Last block cannot divided | Operation error | The last block (block 256) cannot be divided. |
| Last block cannot specified | Operation error | The last block (block 256) cannot be divided. |
| Latch Condition Data Error | Operation error | The data for latch condition is illegal. |
| Latch target No. x is Illegal | Operation error | The latch target specified on No. x is illegal. |
| LBL/SUBR is not connected to left bus | Compile error | No other instruction is allowed in the rung of LBL or SUBR instruction. |
| Limit over | Operation error | The value set is out of the range specified. |
| Line Clear Error | Operation error | The current cursor position is illegal to execute the line clear operation. |
| Line Delete Error | Operation error | The current cursor position is illegal to execute the line delete operation. |
| Line Insert Error | Operation error | The current cursor position is illegal to execute the line insert operation. |
| Line over | Operation error | The program cannot be displayed because it contains excess lines. (Program abnormal) |

| Message | Type of Error | Description |
|---|---|---|
| Loop nesting error | Event history | The nesting level of FOR-NEXT loops exceeds the limit specified.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Check the program. |
| LP exec timeout | Event history | The execution of the language processor (LP) did not finish within the time specified, or scan time exceeded the time specified.<br>Reduce the scan time or use WDT instruction. |
| LP function error | Event history | An error was detected during the language processor (LP) function check.<br>Info 1: Error code<br>Info 2: Error data<br>Turn off power and on again. |
| LP reg R/W error | Event history | An error was detected in the initial read/write check for the language processor (LP).<br>Info 1: Error code<br>Info 2: Error data<br>Turn off power and on again. |
| LP start chk error | Event history | The language processor (LP) could not be started normally. |

## M...

| Message | Type of Error | Description |
|---|---|---|
| Meaningless specification | Operation error | The erase range specified has no meaning. |
| Memory capacity not compatible | Operation error | The memory capacity is not matched. |
| Memory full | Operation error | The program memory is full. |
| Memory protect | Operation error | The writing operation is prohibited by P-RUN. |
| Merging block mismatch | Operation error | Ladder and SFC blocks cannot be merged. |
| Mode mismatch | Operation error | The current PLC operation mode does not allow to execute the required function. |
| Mode mismatch | Operation error | Sampling parameters can be set into the PLC when the PLC is HALT or sampling is disabled. |
| Move destination is invalid | Operation error | Same block is specified for move source and destination. |

## N...

| Message | Type of Error | Description |
|---|---|---|
| Next block exists | Operation error | Block divide operation is not allowed because the next block exists. |
| No address specified | Operation error | The register address range specified is not correct. |
| No buffering comment data | Operation error | Rung comment paste operation is not possible because the buffer is empty. |
| No comment registered | Operation error | No comment is registered. |
| No Data Latched | Operation error | No data has been latched. |
| No device setting | Operation error | In the bit pattern check function, the device setting is not correct. |
| No EEPROM | Operation error | EEPROM write was not executed because no EEPROM is mounted. |
| No empty block | Operation error | Copy or move is not possible because there is no empty block. |
| No END/IRET error | Event history | END instruction is missing in the main or subprogram, or IRET instruction is missing in the interrupt program.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Check the program. |
| No entry | Operation error | A required entry item was not made. |
| No entry block | Operation error | Block operation is not possible because there is no programmed block in the program type. There is no programmed block in the erase range specified. |
| No entry range | Operation error | The range has not been specified. |
| No mark information | Operation error | The mark ID specified has not been registered. |
| No merging block | Operation error | The next block to be merged does not exist. |
| No operand | Operation error<br>Compile error | Necessary operand has not been entered. |
| No parameter file | Operation error | The parameter file was not found. |

# Error Message

| Message | Type of Error | Description |
|---|---|---|
| No pattern setting | Operation error | In the bit pattern check function, the on/off pattern setting is not correct. |
| No print out item | Operation error | The print item has not been specified. |
| No program in any specified blocks | Operation error | There is no program in the blocks specified. |
| No program in the compile range | Compile error | Empty rung cannot be compiled. Use rung delete function. |
| No program monitored | Operation error | Program is not monitored. |
| No range specified | Operation error | The range has not been specified. |
| No register setting | Operation error | In the data validity check function, the register setting is not correct. |
| No RET error | Event history | RET instruction is not programmed in the subroutine.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Info 3: Subroutine No.<br>Check the program. |
| No Sampling Buffer | Operation error | No sampling buffer is allocated. |
| No sampling data | Operation error | There is no sampling data in the buffer to be displayed. |
| No SFC jump label | Event history | SFC label corresponding to the SFC jump is not programmed.<br>Info 1: Program type - block No.<br>Info 2: SFC label No.<br>Check the program. |
| No SFC macro entry | Event history | Macro program corresponding to the macro step is not programmed.<br>Info 1: Program type - block No.<br>Info 2: Macro No.<br>Check the program. |
| No sub-r entry | Event history | SUBR instruction corresponding to the CALL instruction is not programmed.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Info 3: Subroutine No.<br>Check the program. |
| No support device | Operation error | The device specified is not supported. |

| Message | Type of Error | Description |
|---|---|---|
| Not a WinSock error | Operation error | The specified target could not be confirmed. |
| Not Support | Operation error | The function specified is not supported. |
| Not support device | Operation error | The device specified is not supported. |
| Not support yet | Operation error | The function required is not supported. |
| Number of SFC steps exceeds the limit | Compile error | In the SFC block, the number of SFC steps exceeds the limit (128). |

## O...

| Message | Type of Error | Description |
|---|---|---|
| One device at a time for T. and C. | Operation error | For timer device (T.) or counter device (C.), only one device can be specified at a time. |
| Open circuit | Compile error | A line is not complete between the instructions. |
| Operand error | Operation error | The device/register specified is illegal. |
| Operand error | Event history | Input device/register is used for output.<br>Unavailable device/register for the PLC is used.<br>Timer or counter is duplicated.<br>Unavailable subroutine number for the PLC is used.<br>Unavailable operand modification for the PLC is used.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Check the program. |
| Operand range mismatch | Operation error | The replace address exceeds the limit in the search & replace function. |
| Operand range over | Operation error<br>Compile error | The operand specified is out of the allowable data range or register/device address range. |
| Operand type error | Operation error | The operand types are not matched in the search & replace function. |
| Out of address range | Operation error | The register address is out of the range specified. |
| Out of input range | Operation error | The value set is out of the range specified. |
| Out of Position | Operation error | The current cursor position is illegal to execute the operation specified. |

| Message | Type of Error | Description |
|---|---|---|
| Out of range | Operation error | The value set is out of the range specified. |
| Out of value range | Operation error | The value set is out of the allowable data range. |

## P...

| Message | Type of Error | Description |
|---|---|---|
| Pair inst error | Event history | Program error was detected for MCS/MCR or JCS/JCR combination.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Check the program. |
| Parameter error | Operation error | Comment file parameter error is detected. |
| Parameter file error | Operation error | The contents of the parameter file are not correct. |
| Password mismatch | Operation error | The password entered is not matched. |
| Password protect | Operation error | The operation was rejected by the PLC due to password protection. |
| Peripheral LSI err | Event history | An error was detected in peripheral LSI checking.<br>Info 1: Error code<br>Turn off power and on again. |
| PLC communication error | Operation error | Communication error between T-PDS and PLC has occurred. |
| Port No no entry | Operation error | The Port number for Ethernet is not entered. |
| Position error | Operation error | The current cursor position is illegal to execute the operation specified. |
| Position of LBL/SUBR is not correct | Compile error | No other instruction is allowed in the rung of LBL or SUBR instruction. |
| Position of RET/IRET is not correct | Compile error | Position of RET or IRET instruction is not correct. |
| Power interrupt | Event history | Power interruption is detected. (T3/T3H only) |
| Power intr resumed | Event history | Power interruption has been recovered. (T3/T3H only) |

| Message | Type of Error | Description |
|---|---|---|
| Program abnormal | Operation error | Program management information is not normal.<br>SUBR instruction is not programmed before RET instruction.<br>END instruction is programmed in the interrupt program.<br>IRET instruction is programmed in other than the interrupt program.<br>SFC is programmed in other than the main or subprogram. |
| Program BCC error | Event history | BCC error was detected in the user program memory (RAM).<br>Info 1: Illegal BCC data<br>Check the program. If it looks normal, save it into a disk file, and remake BCC by Block edit function. |
| Program error detected (stopped) | Operation error | An error is detected in the program. Therefore the operation is stopped. |
| Program is empty | Operation error | The function specified cannot be executed because the program is empty. |
| Program loaded | Operation error | The initial load (from EEPROM/IC card to RAM) was executed, or program was loaded through other communication port. |
| Program type of merging block mismatch | Operation error | Ladder and SFC blocks cannot be merged. |
| ProgramComment character size error | Operation error | Length of System Comment is up to 30 characters. |
| ProgramID character size error | Operation error | Length of Program ID is up to 10 characters. |

## R...

| Message | Type of Error | Description |
|---|---|---|
| RAM check error | Event history | Read/write error was detected in the user data memory (RAM).<br>Info 1: Error address<br>Info 2: Error data<br>Info 3: Test data<br>Turn off power and on again. |
| Range error | Operation error | The range specified is not correct. |
| Range over | Operation error | The value set is out of the range specified. |
| Reg No./size error | Operation error | The required register is out of the allowable range.<br>Register type - bit position, register address |
| Register/Device No. is Illegal | Operation error | The register/device specified for latch condition is illegal. |
| Reverse signal flow | Compile error | Power flow from right to left is not allowed. |
| RUN mode - cannot execute | Operation error | The operation cannot be executed because the PLC is RUN. |

## S...

| Message | Type of Error | Description |
|---|---|---|
| Same target name entry | Operation error | The target name is duplicated. |
| Sampling buffer Allocation error | Operation error | Sampling buffer could not be allocated correctly. |
| Sampling status is Disable | Operation error | Sampling trace is disabled. |
| Scan time over | Event history | Scan time exceeded the time specified.<br>Info 1: Scan time<br>Reduce the scan time or use WDT instruction. |
| Set Data is Illegal | Operation error | The data set for latch condition is illegal. |
| SFC jump label err | Event history | The SFC label is duplicated.<br>Info 1: Program type - block No.<br>Info 2: SFC label No.<br>Check the program. |
| SFC Jump/Label connection error | Compile error | In the SFC program, combination of SFC Jump and Label is not correct. |

| Message | Type of Error | Description |
|---|---|---|
| SFC macro No. err | Event history | Macro No. is duplicated, or the same macro No. is called from two or more locations.<br>Info 1: Program type - block No.<br>Info 2: Macro No.<br>Check the program. |
| SFC step No. err | Event history | Step No. is duplicated, or step No. is not matched between Initial and End steps.<br>Info 1: Program type - block No.<br>Info 2: Step No.<br>Check the program. |
| Short circuit | Compile error | In the SFC program, no step or transition is programmed between divergence and convergence. |
| Size error | Operation error | The value set is out of the range specified. |
| SLATCH.EXE running | Operation error | The status latch function has already activated. |
| SMPTRACE.EXE running | Operation error | The sampling trace function has already activated. |
| Specified file has already be used as user comment file | Operation error | The file specified is currently used as comment file. |
| Specified name not registered | Operation error | The name (tag) is not registered. |
| Specified tag not registered | Operation error | The tag specified has not been registered. |
| Step connection error | Compile error | In the SFC program, step connection is not correct. |
| Step no. error | Operation error | The step number is not correct. |
| Steps connected | Compile error | In the SFC program, no transition is programmed between steps. |
| Sub-r nesting err | Event history | The nesting level of subroutines exceeds the limit specified.<br>Info 1: Program type - block No.<br>Info 2: Offset address in the block<br>Info 3: Subroutine No.<br>Check the program. |
| Sys RAM check err | Event history | Read/write error was detected in the system memory (RAM).<br>Info 1: Error address<br>Info 2: Error data<br>Info 3: Test data<br>Turn off power and on again. |

| Message | Type of Error | Description |
|---|---|---|
| Sys ROM BCC error | Event history | BCC error was detected in the system memory (ROM).<br>Info 1: Illegal BCC data<br>Turn off power and on again. |
| System power off | Event history | PLC power is turned off. (no error) |
| System power on | Event history | PLC power is turned on. (no error) |

## T...

| Message | Type of Error | Description |
|---|---|---|
| Tag character size error | Operation error | Tag character size exceeds the limit. |
| Tag not registered | Operation error | The tag specified has not been registered. |
| Target name no entry | Operation error | The target name for Ethernet is not entered. |
| Target not found | Operation error | The search target was not found. |
| The rung that contains more than 132 steps detected | Operation error | The rung contains excess program steps. The maximum size of a rung is 132 steps. |
| This file is not T-PDS project file | Operation error | The file specified is not a T-PDS project file. |
| Timeout offset no entry | Operation error | The time-out offset for Ethernet is not entered. |
| Top Register Limit over | Operation error | The unit base address specified is out of the allowable range. |
| Top register/device is out of range | Operation error | The register/device address specified is out of the allowable range. |
| Top rung of block cannot divide | Operation error | The top rung of the block cannot be specified for the block divide operation. |
| Top rung of block cannot specified | Operation error | The top rung of the block cannot be specified for the block divide operation. |
| Total program steps of this block exceeds the limit | Compile error | Number of steps in the SFC block exceeds 1021 steps. |
| Transition connection error | Compile error | In the SFC program, transition connection is not correct. |
| Transitions connected | Compile error | In the SFC program, no step is programmed between transitions. |

## U...

| Message | Type of Error | Description |
|---|---|---|
| Unable to allocate *** memory | Operation error | *** could not be allocated to the memory. |
| Unable to Execute for BLOCKEDI.EXE | Operation error | The edit block function could not be started. |
| Unable to execute for SLATCH.EXE | Operation error | The status latch function could not be started. |
| Unable to execute for SMPTRACE.EXE | Operation error | The sampling trace function could not be started. |
| Unable to get file information | Operation error | The file information could not be read. |
| Unavailable in this block | Compile error | The instruction is not allowed in this block. |

## V...

| Message | Type of Error | Description |
|---|---|---|
| Vertical connection impossible | Operation error | Vertical connection cannot be entered on the specified position. |

## W...

| Message | Type of Error | Description |
|---|---|---|
| WD timer error | Event history | Watchdog timer error occurred.<br>Info 1: Address 1<br>Info 2: Address 2<br>Check external noise environment. |
| Write protect error | Operation error | The drive specified is write protect state. |

## X...

| Message | Type of Error | Description |
|---|---|---|
| XY Register Size Limit error | Operation error | The registers allocated to I/O types X, Y and X+Y exceed the address limit. |

## Z...

| Message | Type of Error | Description |
|---|---|---|
| Z Register Size Limit error | Operation error | The registers allocated to I/O type Z exceed the address limit. |

## List of Instructions

| alphabet | Symbol | Function | Menu |
|---|---|---|---|
| **A** | ABS | Absolute value | Fun |
| | ACOS | Arc cosine function | Fun |
| | AND | AND | LG/SFT |
| | ASC | ASCII conversion | Fun |
| | ASIN | Arc sine function | Fun |
| | ATAN | Arc tangent function | Fun |
| | ATOH | ASCII to HEX conversion | Fun |
| | AVE | Average value | Fun |
| **B** | B* | BCD multiplication | BCD/FP |
| | B+ | BCD addition | BCD/FP |
| | B+C | BCD addition with carry | BCD/FP |
| | B- | BCD subtraction | BCD/FP |
| | B-C | BCD subtraction with carry | BCD/FP |
| | B/ | BCD division | BCD/FP |
| | BC | Bit counter | DT/PRG |
| | BCD | BCD conversion | Fun |
| | BIN | Binary conversion | Fun(Fun) |
| | BTM | Bit->table transfer | Move |
| **C** | CALL | Subroutine call | DT/PRG |
| | CAM | Cam sequencer | DT/PRG |
| | CLDS | Calendar operation | RAS/IO |
| | CLND | Set calendar | RAS/IO |
| | CNT | Counter | SeqIns |
| | COS | Cosine function | Fun |
| **D** | D* | Double length multiplication | Math |
| | D*/ | Double-word multiplication and division | Math |
| | D+ | Double length addition | Math |
| | D+1 | Double length increment | Math |
| | D+C | Double length addition with carry | Math |
| | D- | Double length subtraction | Math |
| | D-1 | Double length decrement | Math |
| | D-C | Double length subtraction with carry | Math |
| | D/ | Double length division | Math |
| | D< | Double length less than | Compr |
| | D<= | Double length less than or equal | Compr |
| | D<> | Double length not equal | Compr |
| | D= | Double length equal | Compr |
| | D> | Double length greater than | Compr |
| | D>= | Double length greater than or equal | Compr |
| | DABS | Double length absolute value | Fun |
| | DAND | Double length AND | LG/SFT |
| | DB | Dead band | Fun |
| | DB* | Double length BCD multiplication | BCD/FP |
| | DB+ | Double length BCD addition | BCD/FP |
| | DB+C | Double length BCD addition with carry | BCD/FP |
| | DB- | Double length BCD subtraction | BCD/FP |
| | DB-C | Double length BCD subtraction with carry | BCD/FP |
| | DBC | Double length bit counter | DT/PRG |

| | | | |
|---|---|---|---|
| **D** | DBCD | Double length BCD conversion | Fun |
| | DBIN | Double length binary conversion | Fun |
| | DEC | Decode | DT/PRG |
| | DENR | Double length NOT exclusive OR | LG/SFT |
| | DEOR | Double length exclusive OR | LG/SFT |
| | DFL | Digital filter | RAS/IO |
| | DI | Disable interrupt | DT/PRG |
| | DIAG | Diagnostic display | RAS/IO |
| | DIAGR | Diagnostic display reset | RAS/IO |
| | DIV | Unsigned double/single division | Math |
| | DMOV | Double length data transfer | Move |
| | DNEG | Double length 2's complement | Fun |
| | DNOT | Double length Invert and transfer | Move |
| | DOR | Double length OR | LG/SFT |
| | DPX | Demultiplexer | Move |
| | DRUM | Drum sequencer | DT/PRG |
| | DSR | Bi-directional shift register | LG/SFT |
| | DTST | Double length bit test | LG/SFT |
| | DW | Double length conversion | Fun |
| | DXCH | Double length data exchange | Move |
| **E** | EI | Enable interrupt | DT/PRG |
| | ENC | Encode | DT/PRG |
| | END | End | SeqIns |
| | ENR | NOT exclusive OR | LG/SFT |
| | EOR | Exclusive OR | LG/SFT |
| | EXP | Exponential function | Fun |
| **F** | F* | Floating point multiplication | BCD/FP |
| | F+ | Floating point addition | BCD/FP |
| | F- | Floating point subtraction | BCD/FP |
| | F/ | Floating point division | BCD/FP |
| | F/F | Flip flop | DT/PRG |
| | F< | Floating point less than | BCD/FP |
| | F<= | Floating point less than or equal | BCD/FP |
| | F<> | Floating point not equal | BCD/FP |
| | F= | Floating point equal | BCD/FP |
| | F> | Floating point greater than | BCD/FP |
| | F>= | Floating point greater than or equal | BCD/FP |
| | FABS | Floating point abusolute value | BCD/FP |
| | FACOS | Floating point arc cosine function | BCD/FP |
| | FASIN | Floating point arc sine function | BCD/FP |
| | FATAN | Floating point arc tangent function | BCD/FP |
| | FCOS | Floating point cosine function | BCD/FP |
| | FDB | Floating point dead band | BCD/FP |
| | FEXP | Floating point exponential function | BCD/FP |
| | FG | Function generator | Fun |
| | FIX | Fixed point conversion | BCD/FP |
| | FLL | Floating point lower limit | BCD/FP |
| | FLOG | Floating point logarithm | BCD/FP |
| | FLT | Floating point conversion | BCD/FP |
| | FNEG | Floating point sign inversion | BCD/FP |
| | FOR | FOR-NEXT loop(FOR) | DT/PRG |

| | | | |
|---|---|---|---|
| **F** | FPID | Floating point PID | BCD/FP |
| | FPID2 | Floating point deviation aquare PID | BCD/FP |
| | FPID3 | Floating point essential PID | BCD/FP |
| | FRT | Floating point square root | BCD/FP |
| | FSIN | Floating point sine function | BCD/FP |
| | FTAN | Floating point tangent function | BCD/FP |
| | FUL | Floating point upper limit | BCD/FP |
| **H** | HTOA | HEX to ASCII conversion | Fun |
| **I** | I/O | Direct I/O | RAS/IO |
| | INTG | Integral | Fun |
| | IRET | Interrupt return | DT/PRG |
| **J** | JCR | Jump control reset | SeqIns |
| | JCS | Jump control set | SeqIns |
| | JUMP | Conditional jump | DT/PRG |
| **L** | LBL | Jump label | DT/PRG |
| | LL | Lower limit | Fun |
| | LOG | Logarithm | Fun |
| **M** | MAVE | Moving average | RAS/IO |
| | MAX | Maximum value | Fun |
| | MCR | Master control reset | SeqIns |
| | MCRn | Master control reset(for nesting) | SeqIns |
| | MCS | Master control set | SeqIns |
| | MCSn | Master control set(for nesting) | SeqIns |
| | MIN | Minimum value | Fun |
| | MOV | Data transfer | Move |
| | MPX | Multiplexer | Move |
| **N** | NEG | 2's complement | Fun |
| | NEXT | FOR-NEXT loop(NEXT) | DT/PRG |
| | NOT | Invert and transfer | Move |
| **O** | OR | OR | LG/SFT |
| **P** | PID | PID | Fun |
| | PID2 | Deviate square PID | Fun |
| | PID3 | Essential PID | Fun |
| | POPF | Pop first | Move |
| | POPL | Pop last | Move |
| | PUSH | Push | Move |
| **R** | RAMP | Ramp function | Fun |
| | READ | Special module data read | RAS/IO |
| | RECV | Network data receive | RAS/IO |
| | RET | Subroutine return | DT/PRG |
| | RLC | n bit rotate left with carry | LG/SFT |
| | RLC1 | 1 bit rotate left with carry | LG/SFT |
| | RRC | n bit rotate right with carry | LG/SFT |
| | RRC1 | 1 bit rotate right with carry | LG/SFT |
| | RST | Reset device/register | DT/PRG |
| | RSTC | Reset carry | DT/PRG |
| | RT | Square root | Fun |
| | RTL | n bit rotate left | LG/SFT |
| | RTL1 | 1 bit rotate left | LG/SFT |
| | RTR | n bit rotate right | LG/SFT |
| | RTR1 | 1 bit rotate right | LG/SFT |

| | | | |
|---|---|---|---|
| **S** | SCH | Data search | Fun |
| | SEND | Network data send | RAS/IO |
| | SET | Set device/register | DT/PRG |
| | SETC | Set carry | DT/PRG |
| | SFIZ | SFC initialize | DT/PRG |
| | SFT | Device shift | LG/SFT |
| | SHL | n bit shift left | LG/SFT |
| | SHL1 | 1 bit shift left | LG/SFT |
| | SHR | n bit shift right | LG/SFT |
| | SHR1 | 1 bit shift right | LG/SFT |
| | SIN | Sine function | Fun |
| | SR | Shift register | LG/SFT |
| | SS | Single shot timer | SeqIns |
| | STIN | Step sequence input | DT/PRG |
| | STIZ | Step sequence initialize | DT/PRG |
| | STLR | Status latch reset | RAS/IO |
| | STLS | Status latch set | RAS/IO |
| | STOP | Stop | DT/PRG |
| | STOT | Step sequence output | DT/PRG |
| | SUBR | Subroutine entry | DT/PRG |
| **T** | TAN | Tangent function | Fun |
| | TAND | Table AND | LG/SFT |
| | TBM | Table->bit transfer | Move |
| | TCMP | Bit file comparison | Compr |
| | TENR | Table NOT exclusive OR | LG/SFT |
| | TEOR | Table exclusive OR | LG/SFT |
| | TEST | Bit test | LG/SFT |
| | TINZ | Table initialization | Move |
| | TMOV | Table transfer | Move |
| | TNOT | Table invert and transfer | Move |
| | TOF | OFF delay timer | SeqIns |
| | TON | ON delay timer | SeqIns |
| | TOR | Table OR | LG/SFT |
| | TRCR | m bit file n bit rotate right with carry | LG/SFT |
| | TRG | Timer trigger | SeqIns |
| | TRLC | m bit file n bit rotate left with carry | LG/SFT |
| | TRST | Table bit reset | DT/PRG |
| | TRTL | m bit file n bit rotate left | LG/SFT |
| | TRTR | m bit file n bit rotate right | LG/SFT |
| | TSET | Table bit set | DT/PRG |
| | TSHL | m bit file n bit shift left | LG/SFT |
| | TSHR | m bit file n bit shift right | LG/SFT |
| | TTST | Bit file bit test | LG/SFT |
| **U** | U* | Unsigned multiplication | Math |
| | U/ | Unsigned division | Math |
| | U/D | Up down counter | DT/PRG |
| | U< | Unsigned Less than | Compr |
| | U<= | Unsigned less than or equal | Compr |
| | U<> | Unsigned not equal | Compr |
| | U= | Unsigned equal | Compr |
| | U> | Unsigned greater than | Compr |

| | | | |
|---|---|---|---|
| **U** | U>= | Unsigned greater than or equal | Compr |
| | UL | Upper limit | Fun |
| | WDT | Watchdog timer reset | DT/PRG |
| **W** | WRITE | Special module data write | RAS/IO |
| **X** | XCHG | Data exchange | Move |
| | XFER | Expanded data transfer | RAS/IO |
| **etc** | * | Multiplication | Math |
| | + | Addition | Math |
| | +1 | Increment | Math |
| | +C | Addition with carry | Math |
| | - | Subtraction | Math |
| | -1 | Decrement | Math |
| | -C | Subtraction with carry | Math |
| | / | Division | Math |
| | 7SEG | 7 segment decode | Fun |
| | < | Less than | Compr |
| | <= | Less than or equal | Compr |
| | <> | Not equal | Compr |
| | = | Equal | Compr |
| | > | Greater than | Compr |
| | >= | Greater than or equal | Compr |
| | -( )-\| | Coil | SeqIns |
| | -( I )-\| | Invert coil | SeqIns |
| | -(N)-\| | Negative transition-sensing coil | SeqIns |
| | -(P)-\| | Positive transition-sensing coil | SeqIns |
| | -\| / \|- | Normally close contact | SeqIns |
| | -\| I \|- | Inverter | SeqIns |
| | -\| \|- | Normally open contact | SeqIns |
| | -\|N\|- | Negative transition-sensing contact | SeqIns |
| | -\|P\|- | Positive transition-sensing contact | SeqIns |
| | -\|↑\|- | Transitional contact(rising) | SeqIns |
| | -\|↓\|- | Transitional contact(falling) | SeqIns |

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