

SCARA Robots
Programming software

SCARA Studio

USER'S MANUAL

OMRON

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Before getting started

■ About this manual

This manual describes how to install SCARA Studio software for OMRON YRC series robot controller as well as major functions you can run with SCARA Studio software. Before installing SCARA Studio be sure to read this manual and follow the instructions. For detailed information on how to use SCARA Studio and its functions, refer to help in the SCARA Studio software.

■ CAUTION

- When operating a robot in Auto mode or Manual mode, make sure the robot movement range is clear and be prepared to press the emergency stop button if necessary.
- This software alone cannot perform all YRC series robot controller operations (via serial communication). You will need a PB (Programming Box) for the robot setup.
- For information on how to operate the robot controller and robots including precautions, refer to the user's manuals that come with the controller and the robot you are going to use and follow the instructions in those manuals.

■ SCARA Studio package contents

- Setup disk (CD-ROM) 1
The setup disk contains the "SCARA Studio installation data" and "SCARA Studio user's manual" (PDF file).



WARNING

THE SETUP DISK (CD) IS NOT AN AUDIO CD. NEVER PLAY IT IN AN AUDIO CD PLAYER. THE LOUD VOLUME MIGHT SERIOUSLY DAMAGE YOUR HEARING AND/OR THE AUDIO EQUIPMENT. WE TAKE NO RESPONSIBILITY FOR ANY DAMAGE OR INJURY ARISING FROM USE OF THE SETUP DISK.

■ System requirements

The following hardware and software are required to install and use SCARA Studio.

- System requirements
 - Operating system (OS) : Microsoft Windows 2000/XP/Vista
* 64-bit version is not supported.
 - CPU : Performance matching the OS being used
 - RAM memory : Capacity sufficient for the OS being used
 - Hard disk : 40MB or more free space for SCARA Studio installation
 - CD-ROM drive
 - Serial communication port
 - Color display monitor supporting VGA or higher resolution
 - Serial communication cable (connects between computer and robot controller)

- Robot and robot controller
 - YRC series robot controller
 - OMRON robot that connects to YRC series controller
 - * To operate the robot from the computer, the robot must be connected to the robot controller and the setup already completed.
- When using a network connection (Ethernet connection)
 - LAN port, LAN cable, and hub
 - Ethernet unit for YRC series

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1. About SCARA Studio

■ SCARA Studio is...

SCARA Studio is support software for OMRON YRC series robot controllers. In addition to the functions of the previously released "SCARA Studio Windows" software, SCARA Studio includes an easy-to-use GUI (graphical user interface). SCARA Studio also allows control by 2 or more controllers or access to a controller from 2 or more clients via Ethernet connection.

- With SCARA Studio you can:
 - Do offline editing of all data used on robot controllers
 - Operate and monitor robots connected to robot controllers
 - Do online editing of all data used with robot controllers
 - Back up and restore robot controller data
- Functions and features newly added to SCARA Studio:
 - Ethernet connection to controllers
 - Supports data input in spreadsheet software format
 - Seamless backup and restoring of controller information such as point data
 - Syntax coloring
 - Data transfer between the online controller and an offline document by drag & drop
 - Executes online commands using a terminal window
 - Controller tree and document tree functions similar to Windows Explorer

TIP

Refer to SCARA Studio help to find detailed information on SCARA Studio functions and operation.

■ Compatible robot controllers

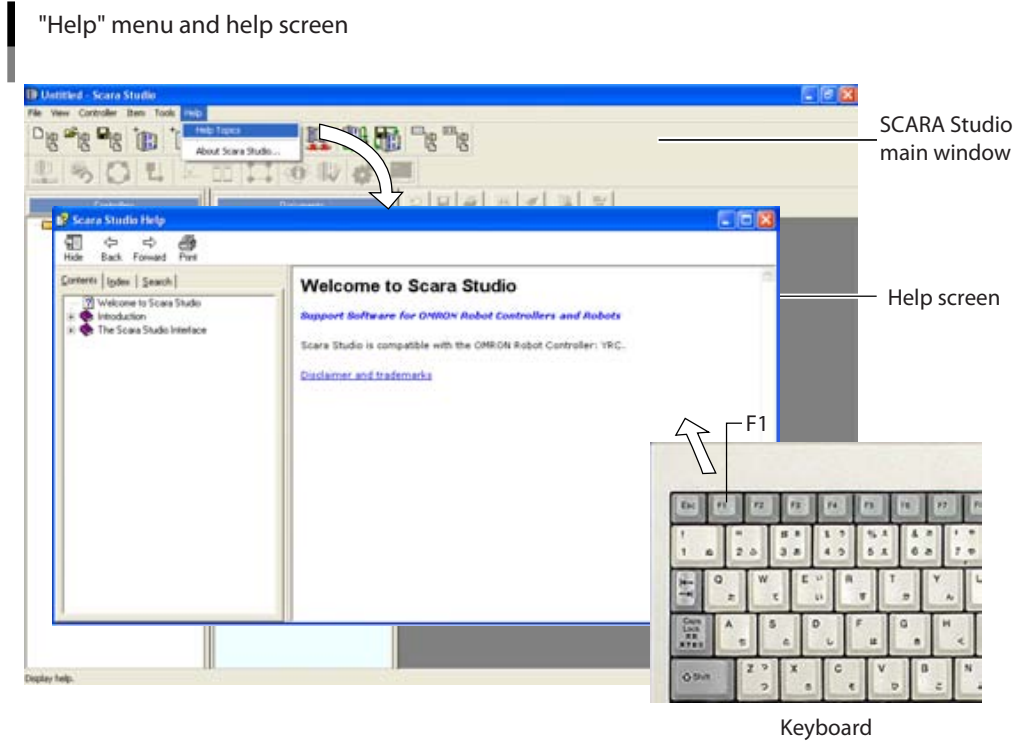
SCARA Studio supports the following OMRON YRC series robot controller:

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■ SCARA Studio help

SCARA Studio help appears on the screen by selecting "Help Topics" from the "Help" menu or by pressing the [F1] key on the keyboard.

SCARA Studio help gives you detailed information on how to use SCARA Studio as well as functions for performing specific tasks. You can display the help screen at any time needed while SCARA Studio is running.



NOTE

On the left side of the help screen, there are three tabs, [Contents], [Index] and [Find]. These tabs help you find and view the information you need in different ways. To select a topic from the table of contents click the [Contents] tab. To find an item by keyword click the [Index] tab. To find a text click the [Find] tab and enter the text.

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2. Installing and uninstalling SCARA Studio

To use SCARA Studio on your computer, you must install the SCARA Studio application in your computer. If an older version of SCARA Studio is already installed in your computer, then you must first of all uninstall it. (SCARA Studio can be installed even if "SCARA Studio Windows" is already installed.)

■ To install SCARA Studio

1 *Turn on the computer where you will install SCARA Studio.*

2 *Insert the setup disk into the CD-ROM drive of the computer.*

The installer wizard starts up automatically.

TIP

If the installer wizard does not start, double-click the "My Computer" icon on the desktop and then double-click the "CD-ROM" icon to open it. Then double-click "Scara Studio 1.2.1.2 setup.exe".

3 *When the installer wizard screen appears, click the [Next] button.*

4 *Follow the instructions that appear on the screen to continue the installation.*

5 *When installation is complete, click the [Finish] button.*

The above completes the installation of SCARA Studio. Check that the "SCARA Studio" icon now appears on the desktop.

|"SCARA Studio" icon



CAUTION

YOU MAY NEED TO RESTART THE PC DEPENDING ON THE PC SETTINGS.

■ **To uninstall SCARA Studio**

1 ***Open the Windows Control Panel.***

2 ***Double-click the "Add or Remove Programs" icon.***

A list of the currently installed programs then appears.

3 ***Select "SCARA Studio" from the program list and click the [Remove] button.***

4 ***When a confirmation message appears, click the [Yes] button.***

Uninstall action of SCARA Studio is then performed.

3. Starting and exiting SCARA Studio

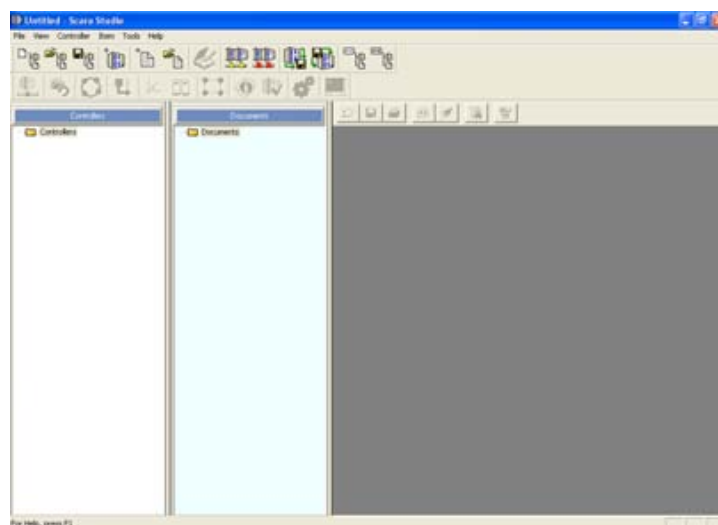
■ To start SCARA Studio

Use either of the following two methods to start SCARA Studio.

- Double-click the "SCARA Studio" icon on the desktop.
- Click the Windows Start button, select "All programs", select "SCARA Studio", and then click "SCARA Studio".

The SCARA Studio main window appears when SCARA Studio has started.

SCARA Studio main window



■ To exit SCARA Studio

Use either of the following two methods to exit SCARA Studio.

- On the "File" menu, click "Exit".
- Click the [×] (close) button on the top right of the SCARA Studio main window.

Exit

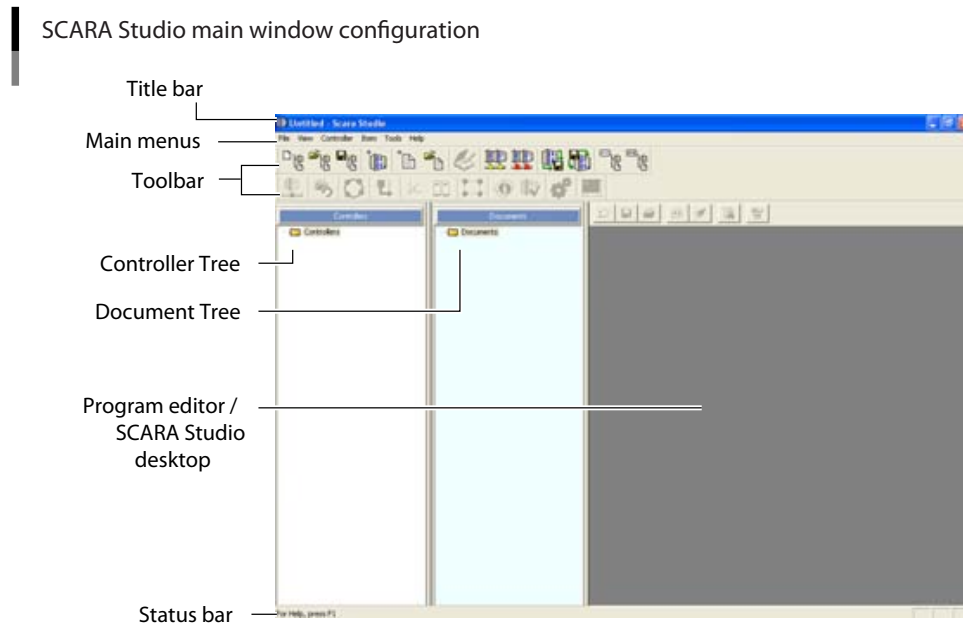


CAUTION

- IF DATA CURRENTLY BEING EDITED IS NOT YET SAVED, A CONFIRMATION MESSAGE APPEARS ASKING WHETHER TO SAVE IT.
- IF THE ROBOT IS OPERATING IN AUTO MODE, A CONFIRMATION MESSAGE APPEARS ASKING WHETHER TO STOP OR CONTINUE THE AUTOMATIC OPERATION.

4. SCARA Studio main window

When SCARA Studio has started, the main window appears as shown below.



The SCARA Studio main window consists of the following sections.

TIP

Refer to "SCARA Studio Main Window" in SCARA Studio help for details on each menu and items shown in the window.

■ Title bar

The title bar displays the name of the currently selected SCARA Studio project file. (Advanced mode only)

■ Main menus

The following 6 main menus are available in the SCARA Studio main window.

- File
- View
- Controller
- Item
- Tools
- Help

■ Toolbar

The toolbar contains short-cut buttons to run frequently used menu commands. The buttons that become active depend on the controller connection state.

■ Controller Tree

The Controller Tree is a tree-like graphical representation of online or offline controllers that can be connected to the computer running SCARA Studio, showing their information and icons.

■ Document Tree

The Document Tree is a tree-like graphical representation of various offline documents (programs, point data, etc.), showing their information and icons.

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- **Program editor / SCARA Studio desktop**

This section of the SCARA Studio main window is used for creating, viewing, and editing programs that control the robot motion and functions.

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- **Status bar**

The status bar displays helpful instructions for users and also displays information about data transmission between the computer and connected controllers.

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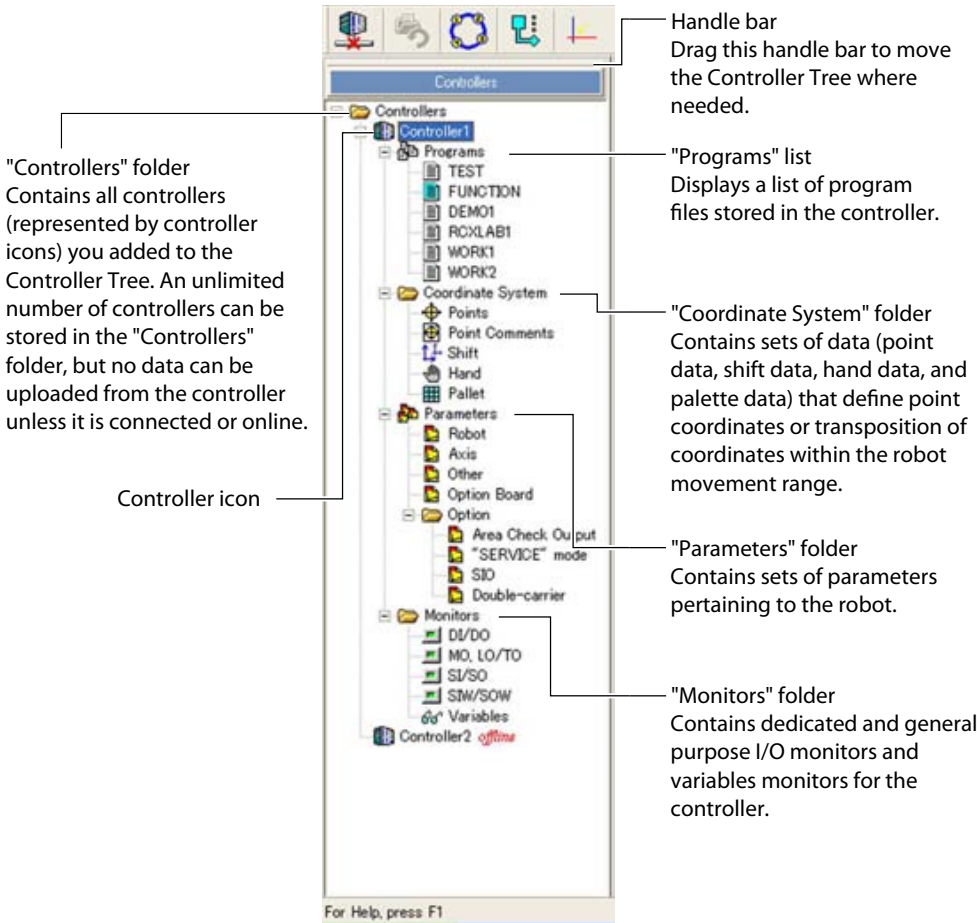
4.1 Controller Tree

The Controller Tree is displayed while SCARA Studio is running, and is docked at the left side of the SCARA Studio main window. The Controller Tree is a graphical representation of online or offline controllers that can be connected to the computer running SCARA Studio, showing their information and icons. The Controller Tree panel can be docked at the right side of the SCARA Studio main window as needed.

■ Controller Tree display

An example of Controller Tree with the "Controllers" folder expanded is shown below. This Controller Tree contains 2 controllers, "Controller1" and "Controller2". The "Controller1" is connected (online) to the computer and its information is displayed. The "Controller2" is disconnected (offline) and only its icon is displayed.

Example of Controller Tree



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- 2
- 3
- 4
- 5
- 6
- 7
- 8
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4.2 Document Tree

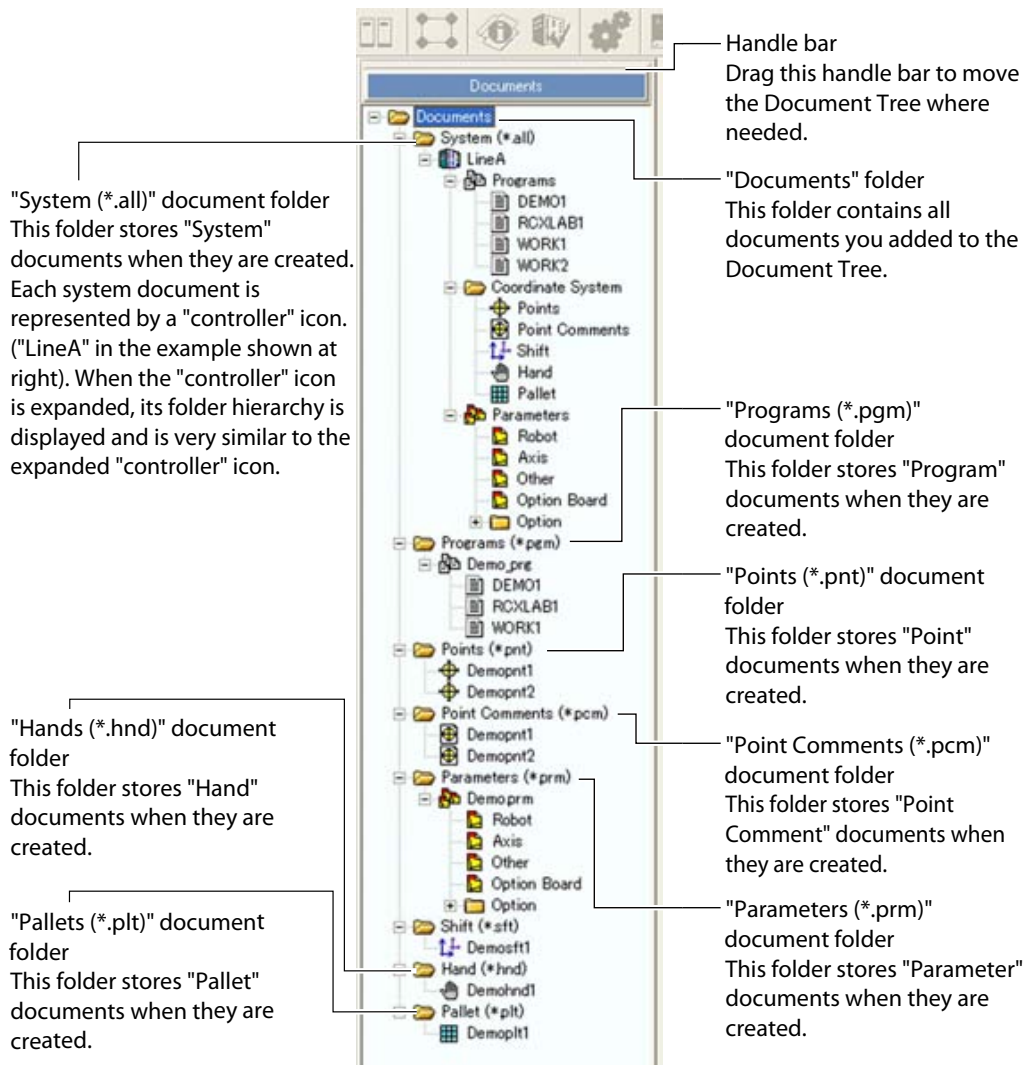
The Document Tree is displayed while SCARA Studio is running, and is docked next to the Controller Tree at the left side of the SCARA Studio main window. The Document Tree is a graphical representation of various folders containing different offline document types such as robot programs and point data.

The Document Tree panel can be moved and docked at the right or right side of the SCARA Studio main window as needed.

■ Document Tree display

An example of Document Tree with the "Documents" folder expanded is shown below. The "Documents" folder contains various types of documents.

Example of Document Tree



■ About documents

"Documents" used in SCARA Studio are graphical representations of various types of controller data files such as robot programs and point data. Documents are grouped in folders on the Document Tree in the SCARA Studio main window according to document type. These can be created, saved, and edited in the SCARA Studio main window.

Please note that each document on the Document Tree is only a graphical representation of its associated data file and is not the actual file. Therefore, deleting a document from the Document Tree will not delete the associated data file. (For more information on documents and associated data files, refer to "Introduction to Documents" in SCARA Studio help.)

TIP

A pop-up menu appears when you right-click a document icon in a folder displayed in the Document Tree and allows you to select a related command.



CAUTION

EVEN WHEN A DOCUMENT IS REMOVED FROM THE DOCUMENT TREE, THE ASSOCIATED DATA FILE STILL EXISTS IN ITS STORED LOCATION. HOWEVER, DELETING A "PROGRAM" DOCUMENT ALLOWS OVERWRITING OF THE ASSOCIATED FILE OR DELETES THAT PROGRAM.

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5. Online robot operation

You can remotely control robots connected to the controller and monitor their operating status from the computer running SCARA Studio. The following sections describe how to register and connect controllers to SCARA Studio as well as how to control the online robot operation.

Adding a controller	⇒ 5.1
Returning the robot to origin position	⇒ 5.2
Operating the robot in Manual mode	⇒ 5.3
Operating the robot in Auto mode	⇒ 5.4
Initializing the controller data	⇒ 5.5



WARNING

WHEN OPERATING A ROBOT, MAKE SURE THE ROBOT MOVEMENT RANGE IS CLEAR AND BE PREPARED TO PRESS THE EMERGENCY STOP BUTTON IF NECESSARY.

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5.1 Adding a controller

This section describes how to register a robot controller to the SCARA Studio Controller Tree and connect (online) to the computer.

1 ***Connect the computer to the robot controller.***

First make sure the robot controller is not in automatic operation and then connect the computer to the robot controller. For information on how to make connections, refer to the user's manual that comes with the robot controller and the "Ethernet for YRC series" user's manual.


2 ***Start SCARA Studio.***

The SCARA Studio main window opens.

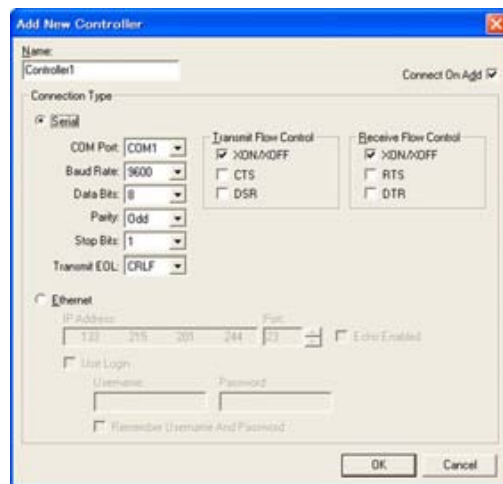
3 ***From the "File" menu, select "Add Controller".***

The "Add New Controller" dialog box appears.

TIP

You can also click the  button on the toolbar or right-click the "Controllers" folder in the Controller Tree and select "New Controller..." from the pop-up menu.

"Add New Controller" dialog box



4 ***Enter a name for the controller.***

In the "Name" box, enter a name for the controller as you want it to appear in the Controller Tree. Names can be any combination of up to 25 characters.

5 ***Check the "Connect On Add" check box.***

If you want SCARA Studio to start connecting to the controller as soon as it is added to the Controller Tree, check the "Connect On Add" check box. If not, clear this check box.

6 **Select the "Connection Type".**

Select "Serial" when using a serial connection, or select "Ethernet" when using a network connection. Parameters for the selected item then become active.

7 **Select the communication port and settings.**

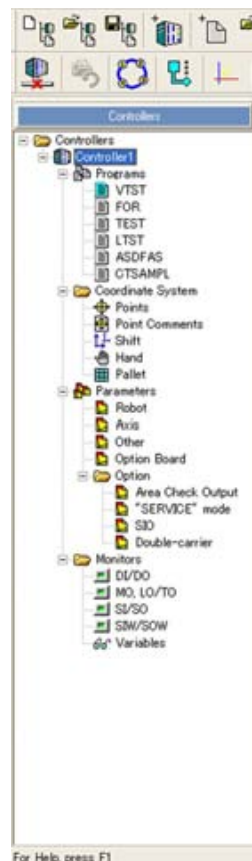
Make sure that the communication settings and parameters match those assigned to the controller.

8 **Click the [OK] button.**

The new controller will be registered in SCARA Studio and its icon and name appear ("Controller1" in the example below) in the Controller Tree.


If the "Connect On Add" check box was checked in step 5, then SCARA Studio will automatically connect to the controller, and the component folders (programs, coordinate system, parameters, monitors) will automatically open and appear in the Controller Tree.

Example of Controller Tree
Connected to controller



■ To disconnect (go offline) the controller from the Controller Tree

Use either of the following methods to disconnect the controller. When disconnected (offline), the "*Offline*" indication appears in red next to the controller name.

- In the Controller Tree, right-click the controller you want to disconnect and select "Delete".
- In the Controller Tree, select (highlight) the controller you want to disconnect and then click the  (Disconnect) button on the toolbar.
- In the Controller Tree, select (highlight) the controller you want to disconnect and then select "Disconnect" from the "Controller" menu.



NOTE

The "Disconnect" command and [Disconnect] button are active only when the selected controller is online.

Example of Controller Tree
Offline




5.2 Returning the robot to origin position


Before operating the robot, make sure it is correctly connected to the controller.

1 ***Make sure that the desired controller is connected (online) to SCARA Studio.***

If not online, make a connection (online) by using either of the following methods.

- Right-click the desired controller in the Controller Tree and select "Connect".
- Select (highlight) the desired controller in the Controller Tree and then click the  (Connect) button on the toolbar.

2 ***Display the "Origin Reset" dialog box by using either of the following methods.***

- Right-click the desired controller in the Controller Tree and then select "Manual Mode" → "Absolute Reset".
- Select the desired controller in the Controller Tree and then click the  (Absolute Reset) button on the toolbar.
- Select the desired controller in the Controller Tree, and then from the "Controller" menu, select "Manual Mode" → "Absolute Reset".

"Origin Reset" dialog box



TIP

If return-to-origin is incomplete, the Status label in the "Origin Reset" dialog box shows "INCOMPLETE". For more details on the "Origin Reset" dialog box, refer to SCARA Studio help.

3 ***Select the "Motor Type"***

Select "Absolute" if using an absolute type robot or select "Incremental" if using an incremental type robot.

4 ***Ensure safety and click the [Search Origin] button.***

The robot will move to its origin position.

5 ***When a message appears stating that return-to-origin is complete, click the [OK] button.***

Return-to-origin status and the machine reference are then displayed in the "Origin Reset" dialog box. Make sure that the "Status" label shows "COMPLETE".


6 ***Click the [X] button to close the "Origin Reset" dialog box.***

5.3 Operating the robot in Manual mode

This section describes how to operate the robot in Manual mode, such as to jog the robot or move it to a desired point.

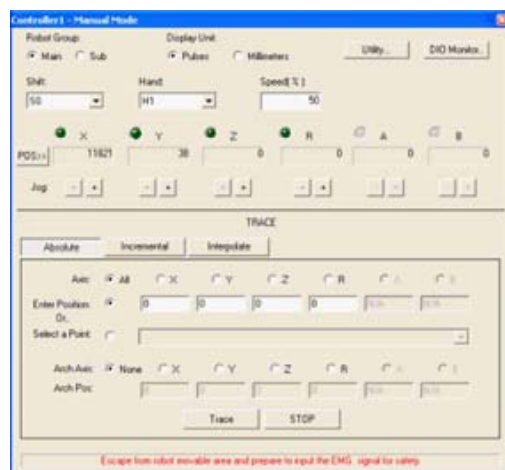
1 ***Make sure that the desired controller is connected (online) to SCARA Studio.***

2 ***Enter Manual mode by using either of the following methods.***

- Right-click the desired controller in the Controller Tree and then select "Manual Mode" → "Manual Control".
- Select the desired controller in the Controller Tree and then click the  (Manual Control) button on the toolbar.
- Select the desired controller in the Controller Tree, and then from the "Controller" menu, select "Manual Mode" → "Manual Control".

The "Manual Mode" window appears when in Manual mode.

"Manual Mod" window



TIP

To find detailed information on the "Manual Mode" window, use SCARA Studio help.

3 ***Ensure safety and then manually operate the robot from the "Manual Mode" window.***

Use the [-] and [+] buttons to jog each axis separately or use the [Trace] button to move each axis or all axes under the conditions you set.

4 ***When manual operation is finished, exit Manual mode.***

Click the [×] button on the top right of the "Manual Mode" window.

5.4 Operating the robot in Auto mode


This section describes how to operate the robot in Auto mode using a created program, such as to perform step operation (line-by-line execution) or automatic operation.

■ Step operation

Use the following procedure to perform step operation by executing the selected program line by line.

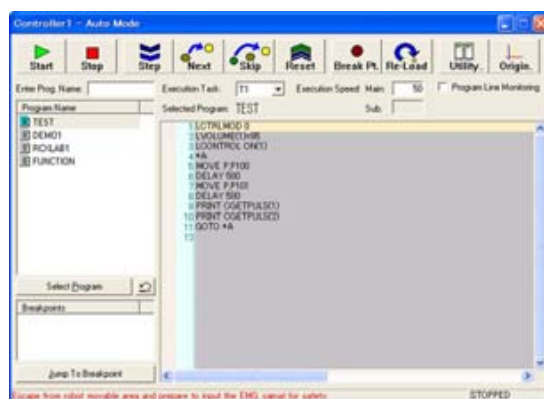
1 ***Make sure that the desired controller is connected (online) to SCARA Studio.***

2 ***Enter Auto mode by using either of the following methods.***

- Right-click the desired controller in the Controller Tree and then select "Auto Mode".
- Select the desired controller in the Controller Tree and then click the  (Auto Mode) button on the toolbar.
- Select the desired controller in the Controller Tree, and then from the "Controller" menu, select "Auto Mode".

Click [Yes] when a confirmation message appears asking if you want to enter Auto mode, and the "Auto Mode" window appears.

"Auto Mode" window




TIP

To find detailed information on the "Auto Mode" window, use SCARA Studio help.

3 ***Select the program.***

From the "Program Name" list at the left of the "Auto Mode" window, select (highlight) the program to use to operate the robot and click the [Select Program] button under the list. (You can select the program by double-clicking it in the list.)

The currently selected program is indicated by a light blue icon () in the "Program Name" list. At the same time, the program name appears next to the "Selected Program" label.

4 ***Specify the "Execution Task" and "Execution Speed".***

5 ***Ensure safety and then click the [Step] button.***

Only the highlighted statement of the program is executed and the highlight moves to the next statement. (If the highlighted statement calls a sub-routine, the first statement of that sub-routine will be executed.)

TIP

Pressing the [Skip] button advances to the next statement without executing the highlighted statement.

Pressing the [Next] button executes the highlighted statement the same way as the [Step] button.

However, if the highlighted statement calls a sub-routine, the entire sub-routine will be executed.

6 ***Click the [Step] button to execute the next statement.***

One statement is executed each time you click the [Step] button.

If you want to return to the first statement of the program, click the [Reset] button.

■ Automatic operation

Automatic operation executes the selected program statements sequentially from the first to the last line.

1 ***Enter Auto mode and select the program.***

Follow the same procedure as described in steps 1 to 3 in the preceding section "Step operation".

2 ***Specify the "Execution Task" and "Execution Speed".***

3 ***Ensure safety and then click the [Start] button.***

Automatic operation of the robot starts in accordance with the selected program. The operation will automatically stop when the program execution is complete.

If you want to stop the automatic operation before it is complete, click the [Stop] button. To resume the automatic operation, click the [Start] button again.

4 ***When the robot operation is finished, exit Auto mode.***

Click the [×] button on the top right of the "Auto Mode" window.

5.5 Initializing the controller data

Initialization provides a quick and easy way to clear all or selected portions of a controller's memory.

1 ***Make sure that the desired controller is connected (online) to SCARA Studio.***

2 ***Select the "Initialize" command by using either of the following methods.***

- Right-click the desired controller in the Controller Tree and then select "System Mode" → "Initialize".
- Select the desired controller in the Controller Tree, and then from the "Controller" menu, select "System Mode" → "Initialize".

The "Initialize" dialog box then appears.

"Initialize" dialog box



3 ***Select the data items you want to initialize.***

Check the "Initialize All" checkbox to clear all of the controller data, or uncheck the "Initialize All" checkbox and check the data items you want to clear.



CAUTION

IF YOU INITIALIZE PARAMETER DATA, YOU WILL HAVE TO USE THE "GENERATION" FUNCTION TO RELOAD THE ROBOT CONFIGURATION DATA.

4 ***Click the [Initialize] button.***


The selected data is then initialized.

5 ***Close the "Initialize" dialog box.***

After initialization is complete, click the [Done] button to close the dialog box.

6. Data backup and restore

SCARA Studio includes a handy utility for backing up controller data to any desired location. Backup data can then be restored to the controller.


-  **NOTE** _____
To back up or restore controller data, the desired controller must be connected (online) to the PC running SCARA Studio.

6.1 Backing up controller data

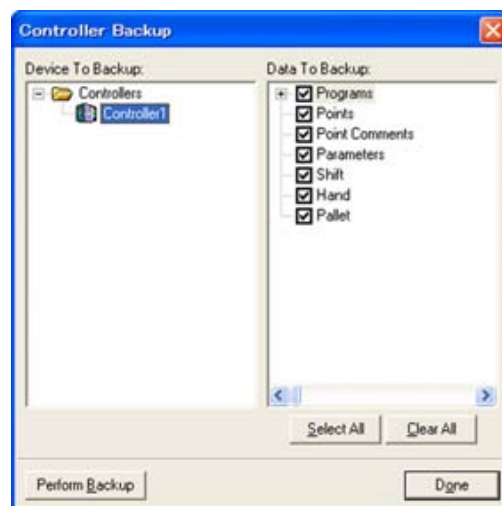
This section describes how to back up data from a controller to any desired location. Backup files of controller data are saved with an extension of "*.all".

- 1 ***Make sure that the desired controller is connected (online) to SCARA Studio.***
- 2 ***Execute the "Controller Backup..." command by using either of the following methods.***

The "Controller Backup" dialog box then appears.

- Select "Controller Backup..." from the "Tools" menu.
- Click the  (Backup Controller Data) button on the toolbar.

"Controller Backup" dialog box



- 3 ***Select the controller whose data you want to back up.***

From the "Device to Backup" list, click to select the controller whose data you want to back up.

4 **Select the data you want to back up.**

From the "Data to Backup" list, select the folders (Programs, Points, Point Comments, Parameters, etc.) you want to back up, by checking the checkbox next to the folder name.

The "Programs" folder can be expanded to allow selective backup of specified programs. By default, all folders and programs are selected for backup.

5 **Click the [Done] button.**

The "Save As" dialog box then appears as shown below.

"Save As" dialog box



6 **In the "File name" box, enter a name for the backup file.**



NOTE

An extension "*.all" is automatically assigned to controller backup files. You do not have to select the file extension in the "Save as type" box.

7 **Specify the location to save the backup file.**

From the "Save in" drop-down list, select the location where you want to save the backup file.

8 **Click the [Save] button.**

Backup of the files then starts.

The progress indicator is displayed during saving of backup data.

Backup in progress



- 9 ***When the "Backup completed" dialog box appears, click the [OK] button.***

"Backup completed" dialog box



- 10 ***Click the [Done] button in the "Controller Backup" dialog box.***

The "Controller Backup" dialog box then closes.

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6.2 Restoring controller data

Backup data can be restored to the controller as described below.

- 1 ***Make sure that the desired controller is connected (online) to SCARA Studio.***
- 2 ***Execute the "Controller Restore..." command by using either of the following methods.***

The "Controller Restore" dialog box then appears.

- Select "Controller Restore..." from the "Tools" menu.
- Click the  (Restore Controller Data) button on the toolbar.

"Controller Restore" dialog box



- 3 ***Display the "Open" dialog box.***

Click the  button in the "Controller Restore" dialog box to open the "Open" dialog box.

"Open" dialog box

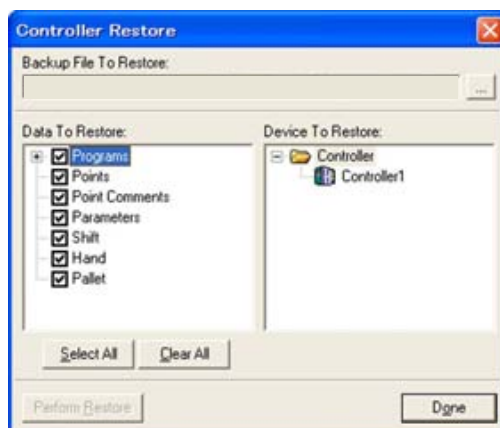


4 *Select the files you want to restore.*

Locate and select the file (extension "*.all") you want to restore (upload) to the controller, and then click the [Open] button.

The selected data file appears in the "Data to Restore" list of the "Controller Restore" dialog box.

"Data to Restore" list



5 *Select the folders from which you want to restore data.*

In the "Data to Restore" list, select the folders (Programs, Points, Point Comments, Parameters, etc.) you want to restore, by making sure the checkbox next to the folder name is checked.

The "Programs" folder can be expanded to allow selective restore of specified programs. By default, all folders and programs are selected for restore.

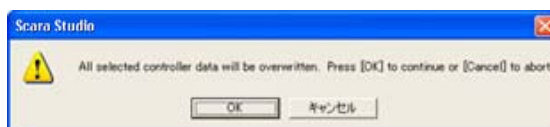
6 *Select the controller to which you want to restore the data.*

In the "Device to Restore" list, click to select the controller to which you want to restore the data. The [Perform Restore] button then becomes active.

7 *Click the [Perform Restore] button.*

The following warning message appears, asking whether or not the existing controller data should be overwritten.

Warning message



CAUTION

WHEN RESTORE IS PERFORMED, ALL DATA RESIDENT IN THE SELECTED CONTROLLER WILL BE OVERWRITTEN.

- 8 *After confirming that you want to overwrite the existing controller data, click the [OK] button.*

The progress indicator is displayed during restore of the controller data.



- 9 *When the "Restore completed" dialog box appears, click the [OK] button.*

"Restore completed" dialog box



- 10 *Click the [Done] button in the "Controller Restore" dialog box.*

The "Controller Restore" dialog box then closes.

7. Editing online controller data

SCARA Studio allows you to directly edit programs, point data, parameters, shift data, hand data, and pallet data stored in robot controllers. This section describes the following online editing tasks.

Creating a new program	⇒ 7.1
Editing programs	⇒ 7.2
Editing point data	⇒ 7.3
Editing parameters	⇒ 7.4
Editing Shift data	⇒ 7.5
Editing Hand data	⇒ 7.6
Editing Pallet definition data	⇒ 7.7



NOTE

To edit online controller data, SCARA Studio must be connected (online) to the desired controller.

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7.1 Creating a new program

New programs can be created from scratch or by copying an existing program, renaming it, and editing it as desired.


1 ***Make sure that the desired controller is connected (online) to SCARA Studio.***

If not online, make a connection (online) by using either of the following methods.

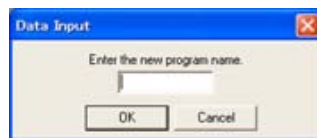
- Right-click the desired controller in the Controller Tree and select "Connect".
- Select (highlight) the desired controller in the Controller Tree and then click the  (Connect) button on the toolbar.

2 ***Display a dialog box to enter a program name.***

- To create a new program from scratch:

Right-click the "Programs" list icon () in the Controller Tree and then select "New Program...". The "Data Input" dialog box then appears as shown below.

"Data Input" dialog box



- To create a new program by copying an existing program:

In the Controller Tree, right-click the icon () of the program you want to copy and then select "Copy...". The "Data Input" dialog box then appears as shown below.

"Data Input" dialog box



3 ***Enter a name for the new program.***

Program names can be up to 8 alphanumeric characters. Underscores (_) are also acceptable.

4 ***Click the [OK] button.***

The new program name and its icon then appear in the "Programs" list of the Controller Tree.

5 ***Write command statements in the new program.***




For detailed information, refer to the next section, "7.2 Editing programs".

7.2 Editing programs

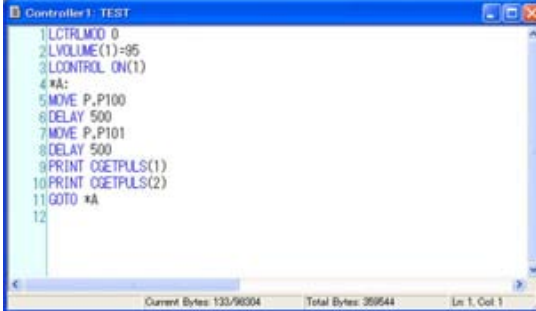
SCARA Studio has a "Program Editor" that allows you to easily edit programs.

1 ***In the Controller Tree, click to highlight the program you want to edit.***

2 ***Open the "Program Editor" window by using either of the following methods.***

- Right-click the Program icon () of the program you want to edit and select "Edit..." from the pop-up menu.
- Double-click the Program icon () of the program you want to edit
- From the "Item" menu, select "Edit...".
- Click the  (Edit Program) button on the toolbar.

"Program Editor" window



```

Controller 1: TEST
1 LCTRLMOD 0
2 LVOLUME(1)=95
3 LCONTROL ON(1)
4 *A:
5 MOVE P,P100
6 DELAY 500
7 MOVE P,P101
8 DELAY 500
9 PRINT OGETPULS(1)
10 PRINT OGETPULS(2)
11 GOTO *A
12

```

Current Bytes: 133/9004 Total Bytes: 39944 Lin 1, Col 1

When the "Program Editor" window has opened, the program editor toolbar becomes active. For detailed information on the program editor toolbar, refer to "Editing Programs" in SCARA Studio help.

Program editor toolbar



3 ***Edit the program.***

Using the program editor toolbar, insert command statements in the "Program Editor" window. You can check syntax errors and delete blank lines as needed.





4 ***After editing the program, save it in the controller.***

Click the  (Save) button on the program editor toolbar to save the program.

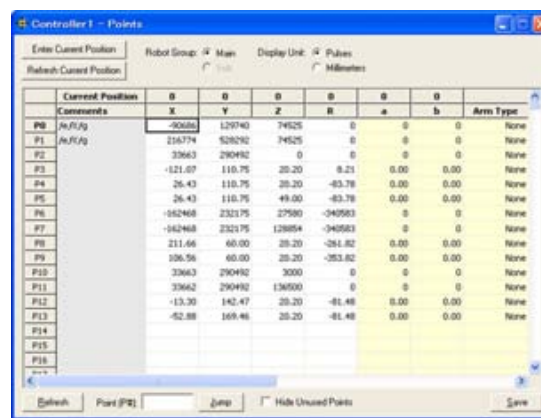
7.3 Editing point data

The point data table shown below allows you to display and edit the point data in the controller.

1 *Display the point data table by using either of the following methods.*

- On the Controller Tree, double-click the "Points" icon () in the "Coordinate System" folder.
- Right-click the "Points" icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Points" icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Point data table



Current Position		X	Y	Z	R	a	b	Arm Type
P0	An/P/G	-90.00	129740	74525	0	0	0	None
P1	An/P/G	216774	526292	74525	0	0	0	None
P2		33663	290492	0	0	0	0	None
P3		-121.07	110.75	20.20	8.21	0.00	0.00	None
P4		26.43	110.75	20.20	-83.78	0.00	0.00	None
P5		26.43	110.75	-89.00	-83.78	0.00	0.00	None
P6		-142468	232175	27580	-349583	0	0	None
P7		-142468	232175	128854	-349583	0	0	None
P8		211.66	60.00	20.20	-261.82	0.00	0.00	None
P9		106.56	60.00	20.20	-353.82	0.00	0.00	None
P10		33663	290492	3000	0	0	0	None
P11		33662	290492	136500	0	0	0	None
P12		-13.30	142.47	20.20	-81.48	0.00	0.00	None
P13		-82.88	169.46	20.20	-81.48	0.00	0.00	None
P14								
P15								
P16								

2 *Edit the point data.*

In the point data table, you can enter data in the cells the same way as you use spreadsheet software. One point contains data of a maximum of 6 axes (X, Y, Z, R, a, b), and "Arm Type" is only specified for SCARA robots.

Clicking the [Enter Current Position] button transfers the current position of the robot axis or axes, to the selected cells for the corresponding axis or axes.

TIP





Refer to "Introduction to Points" in SCARA Studio help for detailed information on the point data table.

3 *After editing the point data, click the [Save] button to save them in the controller.*

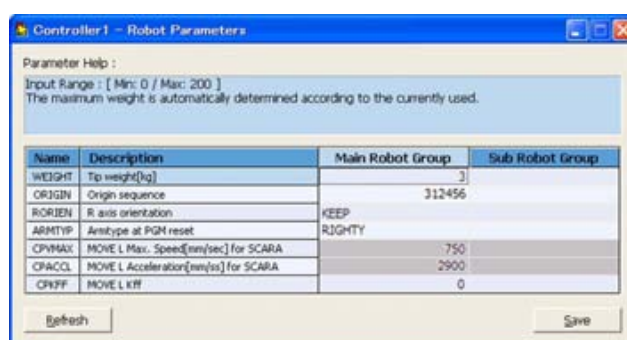
7.4 Editing parameters

Parameters are grouped into "robot parameters", "axis parameters", "other parameters", and "option parameters". The edit window for each parameter group allows you to display and edit the parameters.

1 *Display the parameter edit window by using either of the following methods.*

- On the Controller Tree, double-click the desired parameter icon () in the "Parameters" folder.
- Right-click the desired parameter icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the parameter icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

"Robot Parameters" edit window



TIP

The above shows the "Robot Parameters" edit window as an example. To find detailed information on the edit window for each parameter group, refer to "Robot Parameters", "Axis Parameters", and "Other Parameters" in SCARA Studio help.

2 *Edit the parameters.*





In the parameter edit window, you can enter parameters in the cells the same way as you use spreadsheet software. If the cell requires the entry of a particular setting (text or character string), double-click the cell and select the desired setting from the drop-down list.

3 *After editing the parameters, click the [Save] button to save them in the controller.*

7.5 Editing Shift data

The Shift data table shown below allows you to display and edit the Shift data in the controller.

1 *Display the Shift data table by using either of the following methods.*

- On the Controller Tree, double-click the "Shift" icon () in the "Coordinate System" folder.
- Right-click the "Shift" icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Shift" icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Shift data table



	X	Y	Z	R
S0	2.00	2.00	3.00	4.00
SP0	5.00	0.00	0.00	0.00
SM0	0.00	0.00	0.00	0.00
S1	0.00	0.00	0.00	0.00
SP1	0.00	0.00	0.00	0.00
SM1	0.00	0.00	0.00	0.00
S2	0.00	0.00	0.00	0.00
SP2	0.00	0.00	0.00	0.00
SM2	0.00	0.00	0.00	0.00
S3	0.00	0.00	0.00	0.00
SP3	0.00	0.00	0.00	0.00
SM3	0.00	0.00	0.00	0.00
S4	0.00	0.00	0.00	0.00
SP4	0.00	0.00	0.00	0.00
SM4	0.00	0.00	0.00	0.00

2 *Edit the Shift data.*

In the Shift data table, you can enter data in the cells the same way as you use spreadsheet software. In addition to the shift coordinates (S0 through S9), you can also specify a shift coordinate range for each shift coordinate to restrict the robot operating area to a desired range. In the Shift data table, the "SPx" values set the plus (+) limit for each axis, while the "SMx" values specify the minus (-) limit for each axis.

TIP

Refer to "Introduction to Shift Data" in SCARA Studio help for detailed information on the Shift data table.





3 *After editing the Shift data, click the [Save] button to save them in the controller.*

7.6 Editing Hand data

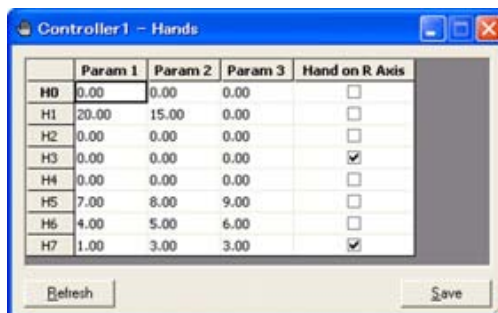
By defining Hand data, you can change the robot working points with standard coordinate settings to the working points of a hand installed on the robot.

The Hand data table shown below allows you to display and edit the Hand data in the controller.

1 *Display the Hand data table by using either of the following methods.*

- On the Controller Tree, double-click the "Hand" icon () in the "Coordinate System" folder.
- Right-click the "Hand" icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Hand" icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Hand data table



	Param 1	Param 2	Param 3	Hand on R Axis
H0	0.00	0.00	0.00	<input type="checkbox"/>
H1	20.00	15.00	0.00	<input type="checkbox"/>
H2	0.00	0.00	0.00	<input type="checkbox"/>
H3	0.00	0.00	0.00	<input checked="" type="checkbox"/>
H4	0.00	0.00	0.00	<input type="checkbox"/>
H5	7.00	8.00	9.00	<input type="checkbox"/>
H6	4.00	5.00	6.00	<input type="checkbox"/>
H7	1.00	3.00	3.00	<input checked="" type="checkbox"/>

2 *Edit the Hand data.*

In the Hand data table, you can enter data in the cells the same way as you use spreadsheet software. There are 4 types of hand definitions, and up to 8 different hands (hand numbers H0 to H7) can be specified for each type.

TIP





Refer to "Introduction to Hand Data" in SCARA Studio help for detailed information on the Hand data table.

3 *After editing the Hand data, click the [Save] button to save them in the controller.*

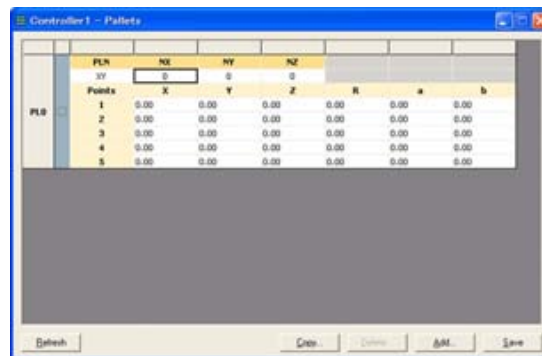
7.7 Editing Pallet definition data

The Pallet data table shown below allows you to display and edit the Pallet data in the controller.

1 *Display the Pallet data table by using either of the following methods.*

- On the Controller Tree, double-click the "Pallet" icon () in the "Coordinate System" folder.
- Right-click the "Pallet" icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Pallet" icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Pallet data table



PLN	NC	NY	NZ			
XY	Z					
Points	X	Y	Z	R	a	b
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00

2 *Edit the Pallet data.*

In the Pallet data table, you can enter data in the cells the same way as you use spreadsheet software. Pallet data can easily be created or transferred to another pallet by copying entire pallet definitions.

TIP

Refer to "Introduction to Pallet Data" in SCARA Studio help for detailed information on the Pallet data table.

3 *After editing the Pallet data, click the [Save] button to save them in the controller.*

8. Editing offline documents

SCARA Studio allows you to edit offline documents such as programs, point data, parameters, shift data, hand data, and pallet data which are displayed in the Document Tree of the SCARA Studio main window.

Creating a new document	⇒ 8.1
Opening documents	⇒ 8.2
Editing a document	⇒ 8.3
Deleting a document	⇒ 8.4
Document properties	⇒ 8.5

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8.1 Creating a new document

This section describes how to create a new offline document such as a program or point data.




NOTE

Creating a new offline document means that you create and save a data file associated with that document and then add the document icon representing that file to the Document Tree.

TIP

By dragging a program or point data icon displayed in the Controller Tree into the desired location in the Document Tree, you can easily create a document for offline editing and its associated data file.

1 **Display the "New Document" dialog box by using either of the following methods.**

- From the "File" menu, select "New Document" and then the desired document type (System, Program, Point, etc.) you want to create.
- In the Document Tree, right-click the "Documents" folder and then select "New Document" → "document type (System, Program, Point, etc.)" you want to create.
- Click the  (New Document) button on the toolbar.

"New Document" dialog box



2 **Select the document type.**

When you selected a document type in step 1 using a method other than the toolbar button, only the selected document type is enabled.

3 **Enter a name for the new document.**

Document names can be any combination of up to 25 characters.

4 **Select the controller type.**

5 **Click the [Browse] button to specify the location to save the document.**

The "Save As" dialog box then appears. Specify the location to save the document.

You do not have to select the file extension in the "Save as type" box, since the file extension will be assigned automatically based on the selected document type.

- 6 ***Click the [Save] button in the "Save As" dialog box.***

The file associated with the new document is then saved

- 7 ***Click the [OK] button in the "New Document" dialog box.***

The new document now appears in the Document Tree, in the appropriate subfolder.



NOTE

If the new document is a "System (*.all)" document or a "Program (*.pgm)", a dialog box appears asking you to enter a name for the new program. Enter the program name.

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8.2 Opening documents


This section describes how to open an offline document such as a program or point data.



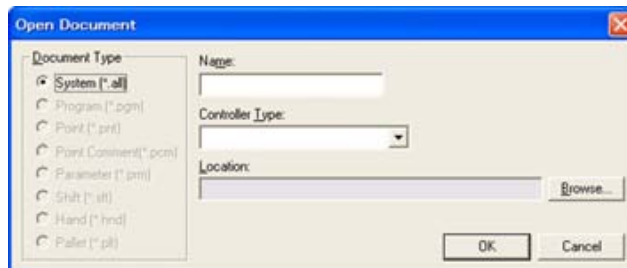
NOTE

Opening a document means that you specify the file where the associated data is stored, and add the document icon representing that file to the Document Tree. At this point, therefore, you need to assign a name to the document as you want it to appear in the Document Tree.

1 **Display the "Open Document" dialog box by using either of the following methods.**

- From the "File" menu, select "Open Document" and then the desired document type (System, Program, Point, etc.) you want to open.
- In the Document Tree, right-click the "Documents" folder and then select "Open Document" → "document type (System, Program, Point, etc.)" you want to open.
- Click the  (Open Document) button on the toolbar.

"Open Document" dialog box



2 **Select the document type.**

When you selected a document type in step 1 using a method other than the toolbar button, only the selected document type is enabled.

3 **Enter a name for the document.**

Document names can be any combination of up to 25 characters.

4 **Select the controller type.**

5 **Click the [Browse] button to specify the associated data file.**

The "Open" dialog box appears. Specify the associated data file you have saved.

You do not have to specify the file extension in the "Save as type:" box, since the file extension will be selected automatically based on the selected document type.

6 **Click the [OK] button in the "Open" dialog box.**

The specified document is then opened and added to the Document Tree, in the appropriate subfolder.

8.3 Editing a document




You can edit offline documents such as programs and point data in the Document Tree.

8.3.1 Editing a program

Use the "Program Editor" when editing an offline document.

1 *In the Document Tree, click to highlight the program you want to edit.*

2 *Open the "Program Editor" window by using either of the following methods.*

- Right-click the program icon () of the program you want to edit and select "Edit..." from the pop-up menu.
- Double-click the program icon () of the program you want to edit
- From the "Item" menu, select "Edit...".
- Click the  (Edit Program) button on the toolbar.

"Program Editor" window



```

1 CE=1
2 START *PICT.T2
3 *1:
4 MME P.0 0 0 0 0 0
5 DELAY 1000
6 MME P.1638400 0 0 0 0 0
7 DELAY 1000
8 GOTO *1
9 *PICT:
10 VSEL CAM 1
11 VSEARCH 1,3
12 PRINT Ck: " ";VGETONT
13 CE=CE+1
14 GOTO *PICT
15

```

When the "Program Editor" window has opened, the program editor toolbar becomes active. For detailed information on the program editor toolbar, refer to "Editing Programs" in SCARA Studio help.

Program editor toolbar



3 *Edit the program.*

Using the program editor toolbar, insert command statements in the "Program Editor" window. You can check syntax errors and delete blank lines as needed.


4 *After editing the program, save it.*

Click the  (Save) button on the program editor toolbar to save the program.

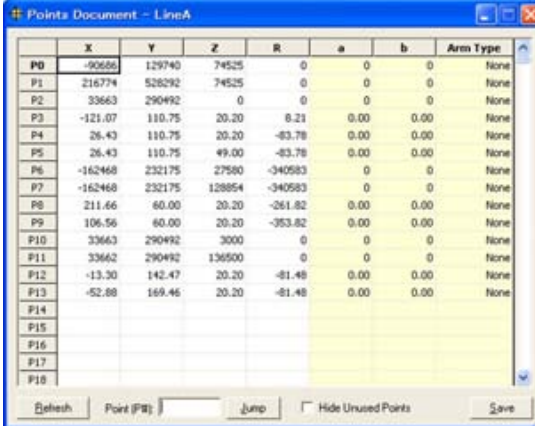
8.3.2 Editing point data

You can do offline editing of point data in the point data table shown below.

1 *Display the point data table by using either of the following methods.*

- In the Document Tree, double-click the "Points" icon (📍) in the "Coordinate System" folder.
- Right-click the "Points" icon (📍) and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Points" icon (📍) and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Point data table



	X	Y	Z	R	a	b	Arm Type
P0	-90666	129740	74525	0	0	0	None
P1	216774	528292	74525	0	0	0	None
P2	33663	290492	0	0	0	0	None
P3	-121.07	110.75	20.20	8.21	0.00	0.00	None
P4	26.43	110.75	20.20	-83.78	0.00	0.00	None
P5	26.43	110.75	49.00	-83.78	0.00	0.00	None
P6	-162468	232175	27580	-340583	0	0	None
P7	-162468	232175	12854	-340583	0	0	None
P8	211.66	60.00	20.20	-261.82	0.00	0.00	None
P9	106.56	60.00	20.20	-353.82	0.00	0.00	None
P10	33663	290492	3000	0	0	0	None
P11	33662	290492	136500	0	0	0	None
P12	-13.30	142.47	20.20	-81.48	0.00	0.00	None
P13	-52.88	169.46	20.20	-81.48	0.00	0.00	None
P14							
P15							
P16							
P17							
P18							

2 *Edit the point data.*

In the point data table, you can enter data in the cells the same way as you use spreadsheet software. One point contains data of a maximum of 6 axes (X, Y, Z, R, a, b), and "Arm Type" is only specified for SCARA robots.

TIP





Refer to "Introduction to Points" in SCARA Studio help for detailed information on the point data table.

3 *After editing the point data, click the [Save] button to save them.*

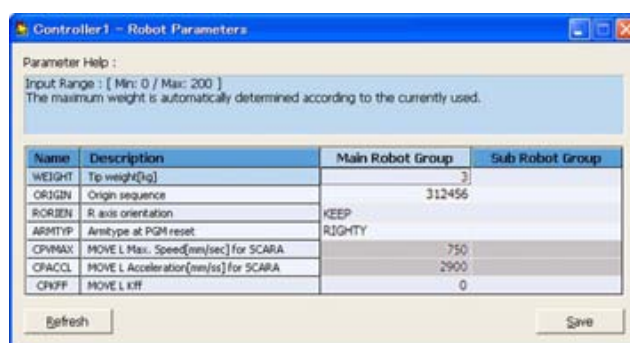
8.3.3 Editing parameters

Parameters are grouped into "robot parameters", "axis parameters", "other parameters", and "option parameters". You can do offline editing in the edit window for each parameter group.

1 *Display the parameter edit window by using either of the following methods.*

- In the Document Tree, double-click the desired parameter icon () in the "Parameters" folder.
- Right-click the desired parameter icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the parameter icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

"Robot Parameters" edit window



TIP

The above shows the "Robot Parameters" edit window as an example. To find detailed information on the edit window for each parameter group, refer to "Robot Parameters", "Axis Parameters", and "Other Parameters" in SCARA Studio help.

2 *Edit the parameters.*





In the parameter edit window, you can enter parameters in the cells the same way as you use spreadsheet software. If the cell requires the entry of a particular setting (text or character string), double-click the cell and select the desired setting from the drop-down list.

3 *After editing the parameters, click the [Save] button to save them.*

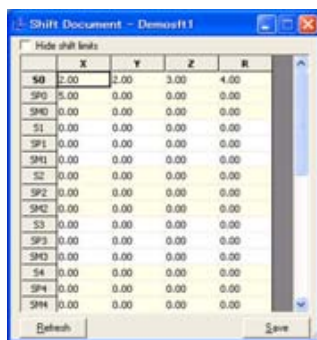
8.3.4 Editing Shift data

You can do offline editing of Shift data in the Shift data table shown below.

1 *Display the Shift data table by using either of the following methods.*

- In the Document Tree, double-click the "Shift" icon () in the "Coordinate System" folder.
- Right-click the "Shift" icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Shifts" icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Shift data table



	X	Y	Z	R
S0	2.00	2.00	3.00	4.00
SP0	5.00	0.00	0.00	0.00
SM0	0.00	0.00	0.00	0.00
S1	0.00	0.00	0.00	0.00
SP1	0.00	0.00	0.00	0.00
SM1	0.00	0.00	0.00	0.00
S2	0.00	0.00	0.00	0.00
SP2	0.00	0.00	0.00	0.00
SM2	0.00	0.00	0.00	0.00
S3	0.00	0.00	0.00	0.00
SP3	0.00	0.00	0.00	0.00
SM3	0.00	0.00	0.00	0.00
S4	0.00	0.00	0.00	0.00
SP4	0.00	0.00	0.00	0.00
SM4	0.00	0.00	0.00	0.00

2 *Edit the Shift data.*

In the Shift data table, you can enter data in the cells the same way as you use spreadsheet software. In addition to the shift coordinates (S0 through S9), you can also specify a shift coordinate range for each shift coordinate to restrict the robot operating area to a desired range. In the Shift data table, the "SPx" values set the plus (+) limit for each axis, while the "SMx" values specify the minus (-) limit for each axis.

TIP

Refer to "Introduction to Shift Data" in SCARA Studio help for detailed information on the Shift data table.





3 *After editing the Shift data, click the [Save] button to save them.*

8.3.5 Editing Hand data

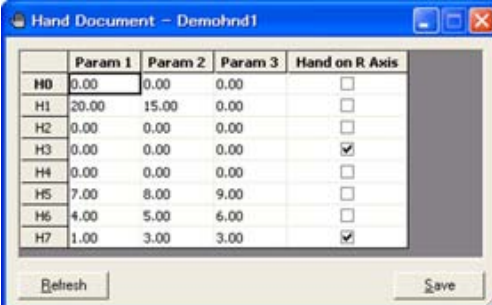
By defining Hand data, you can change the robot working points with standard coordinate settings to the working points of a hand installed on the robot.

You can do offline editing of Hand data in the Hand data table shown below.

1 *Display the Hand data table by using either of the following methods.*

- In the Document Tree, double-click the "Hand" icon () in the "Coordinate System" folder.
- Right-click the "Hand" icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Hand" icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Hand data table



	Param 1	Param 2	Param 3	Hand on R Axis
H0	0.00	0.00	0.00	<input type="checkbox"/>
H1	20.00	15.00	0.00	<input type="checkbox"/>
H2	0.00	0.00	0.00	<input type="checkbox"/>
H3	0.00	0.00	0.00	<input checked="" type="checkbox"/>
H4	0.00	0.00	0.00	<input type="checkbox"/>
H5	7.00	8.00	9.00	<input type="checkbox"/>
H6	4.00	5.00	6.00	<input type="checkbox"/>
H7	1.00	3.00	3.00	<input checked="" type="checkbox"/>

2 *Edit the Hand data.*

In the Hand data table, you can enter data in the cells the same way as you use spreadsheet software. There are 4 types of hand definitions, and up to 8 different hands (hand numbers H0 to H7) can be specified for each type.

TIP





Refer to "Introduction to Hand Data" in SCARA Studio help for detailed information on the Hand data table.

3 *After editing the Hand data, click the [Save] button to save them.*

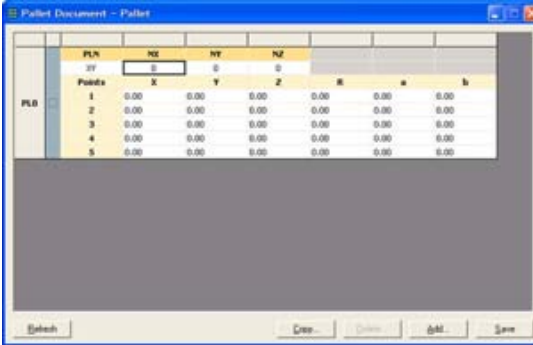
8.3.6 Editing Pallet data

You can do offline editing of Pallet data in the Pallet data table shown below.

1 *Display the Pallet data table by using either of the following methods.*

- In the Document Tree, double-click the "Pallet" icon () in the "Coordinate System" folder.
- Right-click the "Pallet" icon () and then select "Edit..." from the pop-up menu.
- Select (highlight) the "Pallet" icon () and then select "Edit..." from the "Item" menu or click the  (Edit) button on the toolbar.

Pallet data table



PLN	XYZ			L	W	H
	X	Y	Z			
PL0	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00

2 *Edit the Pallet data.*

In the Pallet data table, you can enter data in the cells the same way as you use spreadsheet software. Pallet data can easily be created or transferred to another pallet by copying entire pallet definitions.

TIP

Refer to "Introduction to Pallet Data" in SCARA Studio help for detailed information on the Pallet data table.

3 *After editing the Pallet data, click the [Save] button to save them.*

8.4 Deleting a document

This section describes how to delete documents displayed in the Document Tree. The documents deleted here can be redisplayed in the Document Tree with the procedure described in section 8.2, "Opening documents".



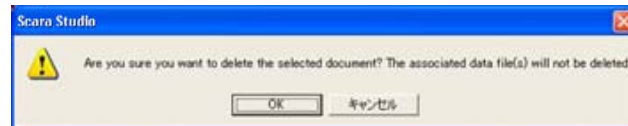
NOTE

Even when a document is removed from the Document Tree, the associated data file still exists in its stored location. However, deleting a "Program" document (📄), which is part of a "System (*.all)" or "Programs (*.pgm)" file, overwrite the associated file or deletes the program of the "System (*.all)" or "Programs (*.pgm)" file.

- 1 ***In the Document Tree, select (highlight) the document you want to delete.***
- 2 ***Execute the "Delete" command by using either of the following methods.***
 - Right-click the selected document and select "Delete" from the pop-up menu.
 - Select "Delete" from the "Item" menu.

- 3 ***A confirmation message appears.***

Confirmation message

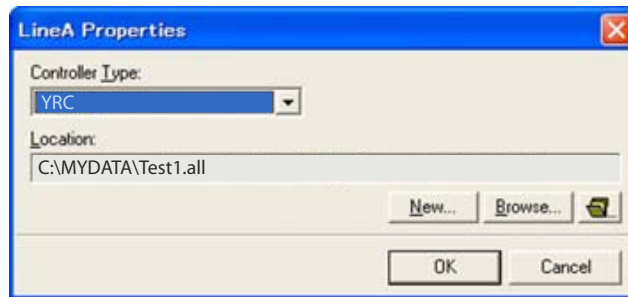


- 4 ***Click the [OK] button to delete the document.***
The selected document is then deleted from the Document Tree.

8.5 Document properties

To view a document's properties, right-click the document displayed in the Document Tree and select "Properties" from the pop-up menu. The "Properties" dialog box then appears, showing the location and name of the data file associated with the document.

"Properties" dialog box




TIP

Refer to "Document Properties" in SCARA Studio help for detailed information on the "Properties" dialog box.

9. SCARA Studio Projects

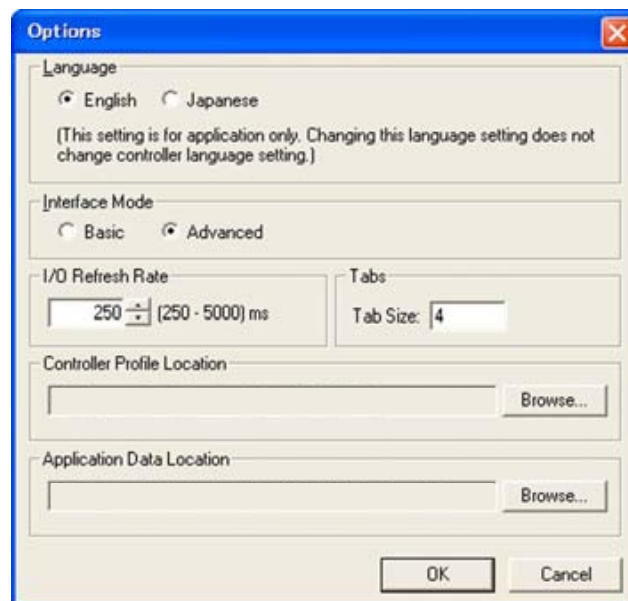
The SCARA Studio Project function allows you to save various types of controllers and data files (documents) you have configured in the Controller Tree and Document Tree as project files (designated by file extension "*.yvp"). Just opening a project file will redisplay its same settings and tree configurations in the SCARA Studio main window. This eliminates the need to retrieve and reconstruct the controller data and documents in the Controller Tree and Document Tree.

 **NOTE** _____
The SCARA Studio Project function is only available when SCARA Studio is running in Advanced mode.




■ Switching between Advanced mode and Basic mode

To switch between Advanced mode and Basic mode, select "Options" from the "Tools" menu. The "SCARA Studio Options" dialog box then appears as shown below. Select "Advanced" or "Basic" under "Interface Mode". (SCARA Studio must be restarted to enable the mode changeover.)

"SCARA Studio Options" dialog box



The following commands and toolbar buttons are displayed in Advanced mode.

File menu command	Toolbar button	Description
New Project		Creates a new SCARA Studio project file.
Open Project		Locates and opens SCARA Studio project files that are stored on either the computer running SCARA Studio or on the network.
Save Project		Saves changes that have been made to the currently selected SCARA Studio project file.
Save Project As	—	Saves the currently selected SCARA Studio project file and any changes made to that file, under a new filename and in the desired location on the computer or network.

TIP

Refer to "Introduction to SCARA Studio Projects" in SCARA Studio help for detailed information on the SCARA Studio Project function.

Revision History

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

Cat. No. I148E-EN-01



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

Revision code	Date	Revised content
01	July 2010	Original production