

3.0 Printing Programs

Print a program to mark up or maintain a paper record of it. You can print:

- an entire program or a range of rungs
- rung descriptions
- only rung descriptions
- variable descriptions
- instruction cross-reference
- program cross-reference
- multiple copies of a program


The ladder diagram prints out on the default printer you have defined for the computer. Make sure that this printer is connected and the proper print driver is installed. See the Windows 95 documentation for more information.

You can print a program by choosing:

- the Print button from the Standard toolbar
- Print from the File menu

To print a program from the Standard toolbar

Step 1. Make sure that the program you want to print is in the active program window.

Step 2. Choose 

To print a program using the Print command

Step 1. Make sure that the program you want to print is in the active program window.

Step 2. Do one of the following:

- From the File menu, choose Print.
- or
- Press CTRL+P

The Print dialog box appears. You can use the Print dialog box to change the number of pages, page orientation, or set new print options.

Step 3. Use this table to help you with your next steps:

To:	Do the following:
print all the rungs in the program	In the Print Range box, select All.
print only the rungs within a selected range	In the Print Range box, select Selected Rungs.
print more than one copy of the program	Enter or select the number of copies using Copies.
define page margins	Choose Page Setup.
define other print options	Choose Options.

Step 4. When you are ready to print the program, choose OK.

The document is sent to the printer that is displayed at the top of the dialog box (the default printer).

3.1 What Is Included in a Printed Copy of a Program

Your program printout includes the items you have chosen to print using the Print Options tab.

A program printout includes:

- header information, which describes the program's path, when it was last edited, and whether the page is the program's source code or cross-reference
- rungs, which you can select to print using the Print Options tab
- variable and rung descriptions, both of which you can select to print using the Print Options tab
- program and instruction cross-references, both of which you can select to print using the Print Options tab; see below for more information on the program cross-reference
- initial value table for the variables that have a user-specified or retained initial value that is different from the default value
- program properties table, which lists pertinent data about the program such as:
 - the program's name and path
 - program's scan time displayed in the Scan Info Tab of the Program Properties
 - the number of rungs and symbols in the program
 - the date the program was created and the date it was last revised
 - the size of the program's image, its verify status, and the amount of online reserve memory it requires; see Appendix D for more information

When you print the Program (task) cross-reference, it prints at the end of the printout and is printed for the entire program, even if you selected only a range of rungs to print. The program cross-reference contains the following items:

variable name table	This table includes each variable used in the task, its data type, the instruction and rung where it is used, its I/O type, the hardware address, its description, and the line cross-reference. If the database does not exist, the text "Unknown" is printed for the descriptions and cross-reference information.
rung table	This table includes information about each variable used as an output in the program, including the rung number where the variable appears, its name, the instruction symbol or mnemonic in which the variable is used, I/O description, and the variable description from the program variable table.
messages	The Editor prints any messages about the cross-reference summary, verify result summaries, print processing, and database processing after the rung table. When printing the program from the Editor, verify warnings are printed if you have not selected Ignore Warnings in the General Tab.

The items in the program are printed in the following order:

1. rungs
2. instruction cross-reference (if selected)
3. initial value table
4. program cross-reference, including the variable table, rung list, legends, scan information, verify error statement, and summary (if selected)

3.2 Setting Print Options

You can choose the type of information to print on your programs' printout. Choose to print or not to print the following:

To print:	Choose:	Result:
a program's ladder logic rungs	Rungs	The rungs are printed.
any description assigned to rung	Rung Descriptions	The rung descriptions print above the rung. The line length is the same as the page width. The description is truncated if it is longer than the page width.
only rung descriptions	Rung Descriptions Only	The rungs, variable descriptions, and instruction cross-reference are not printed. You can also choose to print the program cross-references when you choose Rung Descriptions Only.
any description assigned to a variable	Variable Descriptions	The variable descriptions are taken from program symbol table and are printed above variable name, just as they are displayed in the program.
information that helps you track where variable names are written and where they are read	Instruction Cross-Reference	The instruction cross-reference is printed with each rung. When only a range of rungs is selected, the instruction cross-reference still includes references for the entire program.
variable name table and a rung table	Program Cross-Reference	The program (task) cross-reference prints at the end of the program printout after the rungs. Included is a variable name table and a rung number table. When only a range of rungs is selected, the program cross-reference is still printed and provides references for the entire program.

Choose any print options on the Print Options Tab, which you can access from the Tools menu or from the Print dialog box. These items are printed by default:

- rungs
- variable and rung descriptions
- program and instruction cross-references

To define the print options

- Step 1. Access the Print Option Tab by choosing:
- Options from the Tools menu and then the Print Tab or
 - the Options button on the Print dialog box
- Step 2. Choose the items you wish to print when you print a program. Your choices are listed within the Print What group box.
- Step 3. Click OK.

The options you choose apply to any program that you print.

Tip

To return to using the default print options, select the Use Defaults button.

3.3 Defining the Page Setup


You can change the page margins for the paper copies of the programs that you print.

The default margins are:

- top and bottom margins, 1 inch
- left and right margins, 0.5 inches.

Once you set the page margins, they apply to all subsequent programs that you print.

To set the page margins for the programs that you print

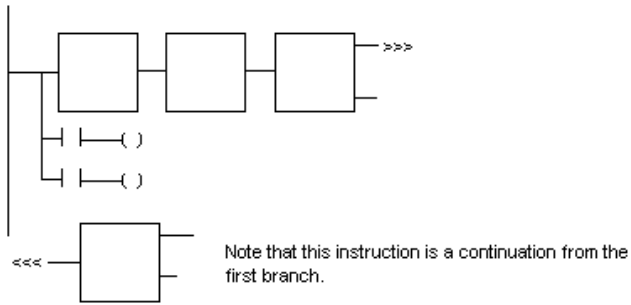
- Step 1. Do one of the following:
- Click on  or
 - From the File menu, choose Print or
 - Press CTRL+P
- Step 2. At the Print dialog box, choose Page Setup.
- Step 3. Enter the new measurements for the top, bottom, left and right margins.
- Note: If you choose margins that are less than the printable area on the printer/paper, the printout is still printed, but the measured margin may not accurately match your selections.*
- Step 4. Click OK.

3.4 How a Rung Is Printed To Fit on a Single Page

The Editor prints a rung (including rung descriptions, variable names and descriptions, and instruction cross-references) on one page. If a rung or an instruction block cannot be printed entirely on one page and there are other rungs on the page, the Editor forces the logic to a new page. If the rung or an instruction cannot be printed entirely on the new page, the Editor breaks up the logic as follows:

If a rung or instruction cannot be printed to fit on the page:	The Editor:	The split is indicated as follows:
vertically	finishes printing it on a new page	<p>⋮ ⋮ ⋮ This symbol prints at the bottom of the page, indicating lines continue on the next page.</p> <p>⋈ ⋈ ⋈ This symbol prints at the top of the page, indicating lines continue from the previous page.</p>
horizontally	<p>wraps it to the next line</p> <p>Wrapped rungs are printed across the page from top to bottom then left to right. This means that if one branch of a rung cannot be printed across the page, the continuation of the branch appears below the last branch of the rung as illustrated in the figure below.</p> <p>When a wrapped rung is printed on a page, the next rung in the program prints on a new page.</p>	<p>➤ This symbol prints on the right side of the page, indicating that instructions are being extended to the next line.</p> <p>⋈ This symbol prints on the left side of the page, indicating that the instructions are continuations of the rung or branch above.</p>

Wires and instructions can also be split. See the following example:



3.5 Inserting and Deleting Page Breaks

Use a page break to paginate a program's printout for a cleaner look.

To insert or delete a page break

Step 1. If you are inserting a page break, select a program object with which you want to start a new page. If you are deleting a page break, select a program object that starts a new page.

Step 2. From the Insert menu, choose Page Break.

The Editor inserts or deletes the page break above the selected program object. Page breaks are displayed horizontally across the screen.


3.6 Printing a Range of Rungs

If you do not want to print an entire program, you can print a range of rungs that you have selected.

To print a range of rungs

Step 1. Within the program, select the rungs you want to print.

Step 2. Do one of the following:

- Click on 
- or
- From the File menu, choose Print
- or
- Press CTRL+P

Step 3. In the Print dialog box, choose Selected Rungs.

Step 4. Define page margins or print options, if necessary.

Step 5. Click OK.

The document is sent to the printer that is displayed at the top of the dialog box (the default printer). If you have selected to print a program cross-reference, one is printed for the entire program.

3.7 Displaying and Printing Coils as Right-Justified

Use the Right Justify Coils after Verify feature to automatically move coils to the right side of the printout so that you can more easily read your program. If coils are not blocked by another instruction, the Editor aligns them against the first vertical page break. Coils that already extend past this page break are moved left and up. (They are not moved to the next page break.)

To display and print programs with right-justified coils

- Step 1. From the Tools menu, choose Options.
- Step 2. On the General Tab, choose Right Justify Coils after Verify.
- Step 3. Click OK.


Coils are only moved out to the grid limit when the limit is to the left of the first vertical page break.

The default option is not to right-justify coils after verifying or printing a program. The rungs are displayed and printed compressed up and to the power rail when you verify or print the program.

3.8 Printing Multiple Copies of Programs

You can print more than one copy of a program at a time.

To print multiple copies of a program

- Step 1. Make sure that the program you want to print is in the active program window.
- Step 2. Do one of the following:
 - Click on 
 - or
 - From the File menu, choose Print
 - or
 - Press CTRL+P
- Step 3. Within the Print dialog box, use the Copies spinner box to enter or select the number of copies you want to print.