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6 GETTING STARTED
SECTION 1
INTRODUCTION

1.1 RobotPro Features and Benefits

RobotPro® is a PC-based expert system for preventive maintenance consultation, error-code troubleshooting, and repair procedures. RobotPro provides effective step-by-step procedures, drawings, schematics, and other information.

Main Features
- Test and repair procedures
- On-line troubleshooting
- Illustrative graphics
- Preventive maintenance procedures
- Service and training information
- Graphical user interface
- Tailored to specific robot and controller models

Benefits
- Maximum robot uptime
- Lower repair costs
- Reduced spares inventory
- Increased productivity
- Increased troubleshooting proficiency
- Reduced training costs
- Easy to use
- No special hardware required
1.2 System Requirements
To run RobotPro, the following hardware and software are required:
Computer .........................IBM-compatible personal computer (PC)
Processor ......................Pentium, 200 MHz (400 MHz recommended)
Memory ..................64 MB minimum (128 MB recommended)
Hard Disk .................200 MB for complete installation to hard disk
CD-ROM Drive ...........4x speed or faster
Monitor .....................SVGA, 800x600 resolution, 16 million colors, small fonts selected.
Input Device ...............Mouse
Operating System .........Microsoft Windows 98 with Y2K Update
Microsoft Windows 98 2nd Edition
Microsoft NT4 SP5 or greater
Web Browser ..............Internet Explorer 5 or greater

NOTE: RobotPro is a tool for robot service personnel. This manual assumes that the user is already familiar with PC usage and robot programming.
If you experience abnormal display of RobotPro screens, ensure that your system is set to use small fonts in the monitor setup control panel.

1.3 RobotPro Components
The RobotPro package consists of the InSupport™ engine, the RobotPro CD-ROM, User’s manual, and a hardware key. Each package has a unique part number.

Table 1-1 RobotPro Part Numbers by Robot Model

<table>
<thead>
<tr>
<th>Robot model</th>
<th>Motoman Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SK16X</td>
<td>142551-1</td>
</tr>
<tr>
<td>UP6</td>
<td>142551-2</td>
</tr>
<tr>
<td>SV3X</td>
<td>142551-3</td>
</tr>
<tr>
<td>UP130/165</td>
<td>142551-4</td>
</tr>
<tr>
<td>UP20</td>
<td>142551-6</td>
</tr>
<tr>
<td>UP50</td>
<td>142551-7</td>
</tr>
<tr>
<td>UP20M</td>
<td>142551-8</td>
</tr>
<tr>
<td>SP100X</td>
<td>142551-9</td>
</tr>
<tr>
<td>UP20-6</td>
<td>142551-10</td>
</tr>
<tr>
<td>UP165-100</td>
<td>142551-11</td>
</tr>
</tbody>
</table>

NOTE: Call Motoman Customer Service (See Section 1.5, Customer Service Information) for ordering information. RobotPro sets for additional robots are under development.
Before you start the RobotPro installation, make sure that your RobotPro package includes all of the items listed below:

- **RobotPro CD-ROM** (packaged by robot model)
- **Hardware key** (Motoman Part Number 141722-15)
- **RobotPro User’s Manual** (Motoman Part Number 143235-1)

### 1.4 Care of the RobotPro Components

Take precautions to avoid scratching the CD. Always store the CD in its case and avoid placing the CD on any surface when not in its protective case.

Keep this User’s Manual in a safe place and refer to it whenever necessary. Additional copies of this manual are available from Motoman.

---

**CAUTION!**

*Keep the hardware key in a safe place. If you lose the hardware key, RobotPro XRC User’s will not work and you will have to purchase a new copy of the software. If the key is accidentally damaged, return it to Motoman for replacement.*

- Observe the following guidelines to protect your hardware key:
  - Remove the hardware key from the computer if the parallel port is used for any other operation.
  - The key may not operate properly when stacked with any additional keys or if attached to anything other than a parallel port (e.g. SCSI adapter).

It is highly recommended that the key(s) be insured for the full value of the software package. **Lost or stolen keys cannot be replaced.** If the key is lost, users will have no alternative but to purchase a new copy of the software.

If the key is accidentally damaged, return it to Motoman for replacement. **There is a charge for key replacement.**

### 1.5 Customer Service Information

If you are in need of technical assistance, contact the Motoman service staff at (937) 847-3200. Please have the following information ready before you call:

- RobotPro model and version
- System configuration (hard disk capacity, memory, operating system, software, etc.)
- Description of difficulty (make a note of any error messages)
2.1 Introduction

It is the purchaser's responsibility to ensure that all local, county, state, and national codes, regulations, rules, or laws relating to safety and safe operating conditions for each installation are met and followed.

We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems. This information can be obtained from the Robotic Industries Association by requesting ANSI/RIA R15.06. The address is as follows:

Robotic Industries Association
900 Victors Way
P.O. Box 3724
Ann Arbor, Michigan 48106
TEL: (734) 994-6088
FAX: (734) 994-3338

Ultimately, the best safeguard is trained personnel. The user is responsible for providing personnel who are adequately trained to operate, program, and maintain the robot cell. **The robot must not be operated by personnel who have not been trained!**

We recommend that all personnel who intend to operate, program, repair, or use the robot system be trained in an approved Motoman training course and become familiar with the proper operation of the system.

This safety section addresses the following:

- Standard Conventions (Section 2.2)
- General Safeguarding Tips (Section 2.3)
- Mechanical Safety Devices (Section 2.4)
- Installation Safety (Section 2.5)
- Programming Safety (Section 2.6)
- Operation Safety (Section 2.7)
- Maintenance Safety (Section 2.8)
2.2 Standard Conventions

This manual includes information essential to the safety of personnel and equipment. As you read through this manual, be alert to the four signal words:

- DANGER
- WARNING
- CAUTION
- NOTE

Pay particular attention to the information provided under these headings which are defined below (in descending order of severity).

DANGER!
Information appearing under the DANGER caption concerns the protection of personnel from the immediate and imminent hazards that, if not avoided, will result in immediate, serious personal injury or loss of life in addition to equipment damage.

WARNING!
Information appearing under the WARNING caption concerns the protection of personnel and equipment from potential hazards that can result in personal injury or loss of life in addition to equipment damage.

CAUTION!
Information appearing under the CAUTION caption concerns the protection of personnel and equipment, software, and data from hazards that can result in minor personal injury or equipment damage.

NOTE: Information appearing in a NOTE caption provides additional information which is helpful in understanding the item being explained.
2.3 General Safeguarding Tips

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. General safeguarding tips are as follows:

- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation of this robot, the operator's manuals, the system equipment, and options and accessories should be permitted to operate this robot system.
- Do not enter the robot cell while it is in automatic operation. Programmers must have the teach pendant when they enter the robot cell.
- Improper connections can damage the robot. All connections must be made within the standard voltage and current ratings of the robot I/O (Inputs and Outputs).
- The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- In accordance with ANSI/RIA R15.06, section 6.13.4 and 6.13.5, use lockout/tagout procedures during equipment maintenance. Refer also to Section 1910.147 (29CFR, Part 1910), Occupational Safety and Health Standards for General Industry (OSHA).

2.4 Mechanical Safety Devices

The safe operation of the robot, positioner, auxiliary equipment, and system is ultimately the user's responsibility. The conditions under which the equipment will be operated safely should be reviewed by the user. The user must be aware of the various national codes, ANSI/RIA R15.06 safety standards, and other local codes that may pertain to the installation and use of industrial equipment. Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. The following safety measures are available:

- Safety fences and barriers
- Light curtains
- Door interlocks
- Safety mats
- Floor markings
- Warning lights

Check all safety equipment frequently for proper operation. Repair or replace any non-functioning safety equipment immediately.
2.5 Installation Safety

Safe installation is essential for protection of people and equipment. The following suggestions are intended to supplement, but not replace, existing federal, local, and state laws and regulations. Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. Installation tips are as follows:

- Be sure that only qualified personnel familiar with national codes, local codes, and ANSI/RIA R15.06 safety standards are permitted to install the equipment.
- Identify the work envelope of each robot with floor markings, signs, and barriers.
- Position all controllers outside the robot work envelope.
- Whenever possible, install safety fences to protect against unauthorized entry into the work envelope.
- Eliminate areas where personnel might get trapped between a moving robot and other equipment (pinch points).
- Provide sufficient room inside the workcell to permit safe teaching and maintenance procedures.

2.6 Programming Safety

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. Programming tips are as follows:

- Any modifications to PART 1 of the controller PLC can cause severe personal injury or death, as well as damage to the robot! Do not make any modifications to PART 1. Making any changes without the written permission of Motoman will VOID YOUR WARRANTY!
- Some operations require standard passwords and some require special passwords. Special passwords are for Motoman use only. YOUR WARRANTY WILL BE VOID if you use these special passwords.
- Back up all programs and jobs onto a floppy disk whenever program changes are made. To avoid loss of information, programs, or jobs, a backup must always be made before any service procedures are done and before any changes are made to options, accessories, or equipment.
- The concurrent I/O (Input and Output) function allows the customer to modify the internal ladder inputs and outputs for maximum robot performance. Great care must be taken when making these modifications. Double-check all modifications under every mode of robot operation to ensure that you have not created hazards or dangerous situations that may damage the robot or other parts of the system.
- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this robot should be permitted to operate the system.
Inspect the robot and work envelope to be sure no potentially hazardous conditions exist. Be sure the area is clean and free of water, oil, debris, etc.

Be sure that all safeguards are in place.

Check the E-STOP button on the teach pendant for proper operation before programming.

Carry the teach pendant with you when you enter the workcell.

Be sure that only the person holding the teach pendant enters the workcell.

Test any new or modified program at low speed for at least one full cycle.

2.7 Operation Safety

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. Operation tips are as follows:

Be sure that only trained personnel familiar with the operation of this robot, the operator's manuals, the system equipment, and options and accessories are permitted to operate this robot system.

Check all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.

Inspect the robot and work envelope to ensure no potentially hazardous conditions exist. Be sure the area is clean and free of water, oil, debris, etc.

Ensure that all safeguards are in place.

Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this robot should be permitted to operate the system.

Do not enter the robot cell while it is in automatic operation. Programmers must have the teach pendant when they enter the cell.

The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.

This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller, external servo box, and other equipment. Disconnect and lockout/tagout all electrical circuits before making any modifications or connections.

All modifications made to the controller will change the way the robot operates and can cause severe personal injury or death, as well as damage the robot. This includes controller parameters, ladder parts 1 and 2, and I/O (Input and Output) modifications. Check and test all changes at slow speed.
2.8 **Maintenance Safety**

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. Maintenance tips are as follows:

- Do not perform any maintenance procedures before reading and understanding the proper procedures in the appropriate manual.
- Check all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this robot should be permitted to operate the system.
- Back up all your programs and jobs onto a floppy disk whenever program changes are made. A backup must always be made before any servicing or changes are made to options, accessories, or equipment to avoid loss of information, programs, or jobs.
- Do not enter the robot cell while it is in automatic operation. Programmers must have the teach pendant when they enter the cell.
- The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- Be sure all safeguards are in place.
- Use proper replacement parts.
- This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller, external servo box, and other equipment. Disconnect and lockout/tag out all electrical circuits before making any modifications or connections.
- All modifications made to the controller will change the way the robot operates and can cause severe personal injury or death, as well as damage the robot. This includes controller parameters, ladder parts 1 and 2, and I/O (Input and Output) modifications. Check and test all changes at slow speed.
- Improper connections can damage the robot. All connections must be made within the standard voltage and current ratings of the robot I/O (Inputs and Outputs).
SECTION 3
INSTALLATION

Section 3.1 covers installation of RobotPro. Section 3.2 covers installation of the hardware key required for RobotPro to operate.

3.1 Installing RobotPro
1. Place the RobotPro CD in your computer’s CD-ROM drive.
2. Locate and run d:\setup.exe on the CD (where d: is the letter of your CD-ROM drive).
3. The RobotPro Installation Wizard will appear and offer you options for installation location, program group, etc.
4. Follow the on-screen instructions to install RobotPro.

NOTE: Windows NT users have the option of creating a shortcut for the currently logged user or all users. If RobotPro is not installed for “...All Users,” then RobotPro will have to be reinstalled for other users or a user with administrator privileges will have to create shortcuts.

3.2 Hardware Key Installation

The hardware key, supplied with RobotPro, must be installed on your computer or RobotPro will not start. The hardware key attaches to the computer’s parallel port connector. This port is commonly used to connect printers and other peripheral devices to your computer. To attach the hardware key:

1. Turn your computer off.
2. Disconnect printer, or other peripheral devices currently connected to your computer’s parallel port.
3. Carefully insert the hardware key into the parallel connector. If the key does not fit, do not force it. The key should fit snugly but does not require significant force to insert.

NOTE: Consult the documentation that came with your PC if you are unsure which connector is the parallel port.

CAUTION!
Proper use of the hardware key is extremely important! Performing tape backups, file transfers, I/O control, or using parallel communication cables between devices with the key installed may permanently damage the key.

- Observe the following guidelines to protect your hardware key:
- Remove the hardware key from the computer if the parallel port is used for any other operation.
- The key may not operate properly when stacked with any additional keys or if attached to anything other than a parallel port (e.g. SCSI adapter).
It is highly recommended that the key(s) be insured for the full value of the software package. **Lost or stolen keys cannot be replaced.** If the key is lost, users will have no alternative but to purchase a new copy of the software.

If the key is accidentally damaged, return it to Motoman for replacement. **There is a charge for key replacement.**

### 3.3 First Use Instructions

When you launch RobotPro for the first time, you will be greeted by a message box informing you that you must define a robot configuration for the RobotPro database.

Follow the directions in Section 4.3 to set up a description for your robot system. Repeat this step for each robot type or configuration that you own.


SECTION 4

MENUS AND DIALOGS

4.1 File Menu

The File menu contains commands for printing RobotPro pages and exiting the program. A description of each command follows.

Print Setup...

The Print Setup... menu command opens a standard Windows print setup panel which allows you to specify which printer (if multiple printers are installed) will be used. The Setup button allows you to set options such as paper orientation and print quantity for the selected printer.

Print Pages...

The Print Pages... menu selection opens the Print Pages panel which has options for print orientation, selection, etc.

Arrangement: allows you to specify how many screens will be printed per page. The options are 1, 2, 4, 8, 16, or 32 screens per page. Screens printed at 1/32 their original size will be too small to read unless using a large-format printer.

Page Range: enables you to specify which screen(s) to print.

The buttons on the right side of the panel are:

- Print
  Prints the screen(s) according to the current Page Range settings.

- Preview
  Creates a screen representation of the printed page.

- Cancel
  Returns you to the previous screen without printing.

- Options
  Provides various printing options such as margin width and scaling.

- Header; and Footer
  Allows you to add headers and footers to the pages.

- Setup
  Opens the same panel as the “Print Setup...” command.
Print Report...

The Print Report... command allows you to print information from each screen of a specified range. This feature is helpful for printing task outlines and other lists for reference.

This panel has two windows that display the names of fields which are available or set to be printed. To select a field for printing, click once on the field name in the list and click Add. The Field name will appear in the right-hand window. Multiple fields may be selected for printing.

To remove a field from the Print window, click once on the field name to be removed and click Remove.

Clear resets all selections and moves all field to the “Available” window.

The “Style” and “Groups Across” options determine how the field data will be printed. Clicking Columns will display all data across the page with each field organized by column. Clicking Groups will display all data together organized by page.

The buttons on the right side of the panel are:

- **Print**
  Prints the screen(s) according to the current Page Range settings.

- **Preview**
  Creates a screen representation of what the printed page will look like.

- **Cancel**
  Returns you to the previous screen without printing.

- **Options**
  Provides various printing options such as margin width and scaling.

- **Header** and **Footer**
  Allows you to add headers and footers to the pages.

- **Setup**
  Opens the same panel as the “Print Setup...” command.

**Exit**

Selecting the “Exit” command exits the RobotPro program.
4.2 Page Menu

The Page menu contains commands for navigating through RobotPro pages. Many commands have a keystroke equivalent displayed next to them in the menu. A description of each command follows.

**Bookmark**

This command turns the bookmark function on and off for the current page. The bookmark function is described in Section 5.1.6.

**Notes...**

This command opens the Notes pane which enables you to create and view notes for the current page. If a page has a note attached, the note icon in the upper-right corner of the screen will highlight to a brighter color.

You can also click the note icon to create a note for the current page.

**History...**

The “History...” command opens a panel that lists all the screens visited during the current session. Click a topic once to highlight it and then click **OK** to go to the selected page. You may also double-click a topic/page to go to the page.

**Back**

The “Back” command returns you to the **last visited** screen. Selecting this command repeatedly will step you backward through all visited screens until you reach the first page.

4.3 Robot Database Menu

The Robots menu contains commands for selecting and configuring the robots presently loaded in RobotPro.

**Select/Edit Configuration...**

Each robot name displayed is actually a description of a robot and all of its supporting equipment. Each robot description should have a unique name to describe it that will not be confused with other robots.

The “Select/Edit Configuration” command opens the Edit Robot Database panel. This panel allows you to add, modify, and delete robot descriptions.
If you click the *New* button, an empty panel appears so you can give the new description a name and select the appropriate equipment databases. Clicking the *Delete* button will remove the selected robot description.

To change a robot description, click *Edit*. The panel shown to the right will appear to prompt you for information that describes the robot system. The descriptive name of the robot can be edited by clicking the Name box. The Manipulator, Controller, and Application boxes all have drop-down lists that will show all available robot databases.

Select the equipment options that describe your system and click the *Save* button to return to the selection screen.

If you click the *Clear PM* button, all the data in the preventive maintenance database will be cleared. Use with caution.

### 4.4 Preferences Menu

**Display Robot Name**

This menu command toggles display of the selected robot. When active, the active robot’s name will appear next to the Select Robot button in the upper right corner of the RobotPro window.

**Torque Units...**

Certain screens and repair procedures reference torque specifications. This command opens a torque units dialog box which allows you to specify which torque measurement unit is displayed.

### 4.5 Help Menu

**Contents**

This command opens Windows help for RobotPro.

**About RobotPro...**

This command opens the “About...” dialog which also appears at startup. It provides version and copyright information.
SECTION 5
SCREENS

5.1 Screen Controls
The controls described in this section are available in most RobotPro screens.

5.1.1 Contents Bar and Buttons
Click on the CONTENTS bar to display the contents buttons. The contents buttons enable you to quickly jump from one category to another. Each category contains information identified by the button names.

There is a button for each of the categories—Information, Troubleshooting, Procedures, Parts, Wiring, and Maintenance. Click a button to jump to the corresponding category. RobotPro will display that category’s Topic Selection screen.

5.1.2 Topic Selection Screen
Most of the category buttons open the topic selection screen.

As you click on the various category buttons, the topics listed in the topic selection box will change depending on the type of information presented. The title of the category is displayed at the top of the window.

**Topic Selection Box**
The Topic Selection box on the left side of the screen displays the names of all topics available within the category for equipment selected in the equipment selection box. To open a topic:

Double-click the topic (click expandable or expanded topics only once) or click a topic once to highlight it and then click **Go To**.

**Equipment Selection Box**
The Equipment Selection box on the right side of the screen displays the names of the equipment for the selected robot. Topics will be displayed in the topic selection box for equipment that is checked. Topics for equipment that is not checked will not be displayed in the topic selection box. Click the check box to turn a piece of equipment “on” or “off.”

NOTE: RobotPro is comprised of three manuals: one each for RobotPro, the specified robot, and the specified XRC Controller. As you navigate through RobotPro, the appropriate manual will be loaded automatically. Switching between manuals is transparent to the user. The name of the currently loaded manual is displayed in the top title bar.
**Expandable Topic**
The Expandable Topic is a parent heading that can be expanded to show subheadings or topics. An Expandable Topic has a small, yellow button; with a plus sign inside it. Click the plus button once to expand the topic. Once the topic is expanded, the plus sign will turn into a minus sign and the topics and subheadings will appear.

**Expanded Topic**
Any topic that has already been expanded will display a minus sign in the small yellow button; and be followed by topics and subheadings. Click the minus button once to collapse the topic.

**Topic**
A topic is an actual page of information. Topics can reside in a list by themselves or within expandable topics. Topics are marked with small, blue diamonds. Subtopics are indented to differentiate them from standalone individual topics.

To open a topic, double-click the topic or highlight the topic and click the Go To button toward the bottom of the screen.

5.1.3 **Select Robot Button**
The Select Robot button opens the Select/Edit Robot Database panel. Use this button to select a robot when multiple robot data sets are installed. Only topics which apply to the currently selected robot/controller will appear in the Topic Selection box.

5.1.4 **Notes Button**
The Notes button allows you to record notes for a given page. Clicking the Notes icon will open a Notes screen and display notes or provide a blank note pad if no notes are already recorded.

The Notes icon changes to let you know if the current page has notes.

**NOTE:** If you change pages while the Notes screen is open, the Notes feature is disabled until you close the Notes screen and then reopen it. The Notes icon will change to tell you the feature is disabled.

5.1.5 **Back Button**
When pressed, the Back button redisplay previously viewed pages in the reverse order they were visited. Click repeatedly to back up multiple pages.

5.1.6 **Bookmark Feature**
The bookmark feature allows you to mark individual pages for easy return at a later time. You can move to another page and later return to the bookmarked page(s) by simply clicking on the bookmark category button to open a list of all bookmarked pages.
To mark/unmark a page:

1. Go to the page you wish to mark.
2. Move the cursor to the upper right-hand corner of the window. Notice that the cursor changes to a bookmark symbol as you approach the corner. When you click the left mouse button, the corner of the page will “fold over” to let you know the page is marked.

- To turn a bookmark off, simply click the bookmarked corner a second time. The folded corner will disappear. The page is no longer bookmarked.
- You can also bookmark a page by selecting the “Go to Bookmarked Page…” command in the Page menu.

**NOTE:** You cannot bookmark the first page of a category. Use the category buttons at the bottom of the window to go to the different categories.

**Bookmarks Panel**

The Bookmarks panel provides a summary of all pages you have bookmarked.

To return to a bookmarked page, select the desired bookmark and click *Go to Bookmark* or click *Remove* to delete the bookmark.

You can also delete all bookmarks by clicking *Clear All Bookmarks*.

Clicking the check boxes in the gray rectangle will display or hide bookmarks from the specified manuals. This feature is useful if you have many pages bookmarked and you would like to narrow the selection by hiding unnecessary bookmarks.

### 5.2 Information Category

The Information category contains service policies, specifications, safety information, and other useful information. Screens within this category typically contain a scrolling text box with information but may also contain graphics.
5.3 **Troubleshooting Category**

The Troubleshooting screen is the heart of the RobotPro expert system. Through presentation of increasingly specific requests for information, RobotPro is able to recommend procedures to resolve hundreds of robot problems. Click the **Start** button to begin a troubleshooting session.

5.3.1 **Question Window**

The question window is located at the top of the Troubleshooting screen. This window displays questions during the troubleshooting process. Different questions will guide you through the troubleshooting process.

5.3.2 **Symptom Window**

The window on the left side of the Troubleshooting screen and below the question window contains a list of alarm symptoms. Click to select alarms that most closely answer the question and click **OK**. RobotPro will analyze your answer and either ask additional questions or recommend a course of action.

For each question displayed in the Question window, there will be one or more responses available in the Symptom window.

Information about the selected alarm is displayed in the symptom information box on the right side of the Troubleshooting screen below the question window. Click an alarm code and a description of the alarm code will appear.

If you choose “Alarm on the Programming Pendant,” an alarm selection box will appear in the lower-left corner of the screen. You can type alarm codes directly in the gray box or select multiple alarms from the symptoms list.

**NOTE:** All selected alarms will be processed when you click the OK button. If you do not want an alarm processed with other selected alarms, click the alarm code a second time to remove it from the list or highlight it in the small box and click “Unselect.”

5.3.3 **Response Buttons**

Depending on the nature of the question and the point in the troubleshooting process, the Troubleshooting screen will display certain response buttons. Responses that are not applicable will be dimmed and not available. Click the highlighted button that most appropriately answers the current question.

**OK Button**

Click **OK** to submit any item or acknowledge a message in the question window.

**How Button**

Whenever a response instructs you to perform a task, the **How** button is highlighted. Clicking **How** will take you to the appropriate procedure screen for task instructions.
**Strategy Button**

The Strategy button opens the Strategy screen (shown at right), which lists suspected failures/causes for the indicated problem. From this screen, you can navigate forward and backward through the troubleshooting steps, go to test and repair procedures, print troubleshooting reports, or return to troubleshooting.

**NOTE:**

You can click on a selected operation in the status column to select from predefined status messages.

**Start Over Button**

Start Over resets the current troubleshooting session and presents the opening alarm query.

### 5.4 Procedures Category

The Procedures category contains overview information and task instructions for performing repair and maintenance procedures on Motoman Robots. Specific procedures can be accessed directly by clicking the Procedures category button or by using hotlinks from other screens. If the Procedures category button is used, select the desired topic and the appropriate Procedure screen will appear. The screen shown to the right is an overview screen for a multitask procedure. Simple procedures may not have an overview screen. Instead, the Procedure Task screen will open, providing procedural information.

**Overview Description Box**

The Overview Description box on the left side of the screen contains a high-level description of what the procedure entails, required parts, and time required to complete the procedure.

**NOTE:**

You can click a blue number; beside a procedure title to jump directly to the corresponding procedure.

**Overview Illustration**

The Overview Illustration shows the robot/controller components involved with the current task.
5.4.1 Procedure Controls

The procedure control buttons provide the ability to move between the task screens for the individual procedures. The procedure controls include the **Prev**, **Next**, and **Done** buttons; and the Procedure Sequence box.

**Procedure Sequence Box**

The Procedure Sequence box tells you if you are viewing the procedure overview or the procedures themselves and (if the latter) which procedure in the sequence.

**Prev Button**

The **Prev** (Previous) button shows the previous set of tasks. If you are on the first procedure, the **Prev** button will be dimmed and unavailable. Check the Procedure Title box for the task number.

**Next Button**

The **Next** button shows the next set of tasks. Click **Next** to view the procedure descriptions in detail. When you click **Next** from the overview; page, the Procedure Task Screen will appear. If you are on the last procedure, the **Next** button will be dimmed and unavailable. Check the Procedure Title box for the task number.

**Done Button**

The **Done** button halts the current operation and returns you to the previous category or hotlink used to jump to the present procedure.

For example, if you were in the Troubleshooting category and you clicked the **How** button to get procedural information, you will be returned to the Troubleshooting category when you click the **Done** button. If you are in a procedure containing multiple tasks, clicking **Done** will jump to the Overview screen. Clicking **Done** a second time will return you to the previously visited category or hotlink.

5.4.2 Task Description Box

The Task window lists the step-by-step instructions for completing a procedure. Figure references and hotlinks to other procedures are inserted throughout the task information.

**NOTE:** Figure references in the Task Description box are hotlinked to the figure window. If you click on a colored figure reference, the corresponding figure will appear.
5.4.3 **Task Illustration Window**

The Task Illustration Window displays images to help you better understand the current task. Since only one figure can be displayed at a time, buttons are provided to view different figures as the tasks refer to them.

**Previous** Button

The Previous button shows the previous figure. If you are viewing the first figure, the last figure will be displayed. Check the Figure Sequence box for the figure number.

**Figure Sequence Box**

The Figure Sequence box displays the sequence number of the figure in the following format: “Figure 1 of 14,” “Figure 2 of 5,” etc.

**Next** Button

The Next button shows the next figure. If you are viewing the last figure, the first figure will be displayed. Check the Figure Sequence box for the figure number.

**Torque Pop-Ups**

RobotPro provides torque specifications for procedures which involve tightening a nut, bolt, screw, or any other threaded fastener. Move the cursor over the label that points to the fastener and a small window will appear displaying the proper torque value.

5.5 **Parts Category**

The Parts category contains exploded views of the robot and spare parts lists. Parts screens will vary depending on the type of part.

5.5.1 **Parts Information Screen**

The Parts Information screens contain descriptions of parts and part number information.
5.5.2 **Parts Assembly Screen (Not Available for All Models)**

The Parts Assembly screens contain parts information and displays an exploded-view illustration for each assembly.

**Parts Information Window**

The Parts Assembly window (on the left side of the screen) contains a reference number, a part number, a description, and a quantity for each part in the assembly.

**Exploded View Window**

The right side of the Parts screen contains a thumbnail of the exploded view of the assembly.

This viewing window has two menus and zoom buttons that appear above the illustration. To view different parts of the illustration, click and drag the illustration with the mouse.

**NOTE:** You can also use the “+” and “-” keys on your keyboard to change viewing magnification.

5.6 **Wiring Category**

The Wiring category contains wiring diagrams for motors, encoders, etc.; and electrical system prints for the controller. The screen that appears depends on the complexity of the diagram. Simple schematics and part diagrams will appear on a small diagram screen, as shown here.

Sets of diagrams and complex diagrams such as electrical system prints will be presented on a different screen. On this screen you’ll find a control to browse through available drawings.

This viewing window works exactly like the exploded view window in the Wiring category.
5.7 **Maintenance Category**

The Maintenance category contains periodic maintenance procedures organized by servo-hour frequency.

The individual maintenance pages are divided into four major columns. The first shows inspection (procedure) items sequenced in logical order. The second column displays service interval in days or servo hours. The third column provides fill-in spaces for you to enter date and servo hours at the time the maintenance was completed along with your name or initials. The fourth column displays when the next service is due by date or servo hours.

**NOTE:** If you double-click or highlight a preventive maintenance task and then click the “Go To” button, RobotPro will take you to the Procedure screen that describes how to complete the task. Clicking the Done button or the Back button on the Procedure screen will take you back to the Maintenance Schedule screen.

**Servo Hour Color Coding**

Numbers are colored to signify maintenance status.

- **Green:** Servo hour numbers mean that the task is not due for some time.
- **Yellow:** Means the task is due within the threshold period specified in the Select/Edit Robot Database dialog.
- **Red:** Means the maintenance task is overdue.

The threshold period can be set by changing the number in the “Number of Days Threshold;” box in the Select/Edit Robot Database dialog. By default, this number is set to 7 days. A task will turn yellow 7 days before the prescribed date.

When you have completed a maintenance task, click the “Servo Hrs./Completed;” column next to the task. A dialog will appear to prompt you for accumulated servo hours and the date. This is very important. **If you do not complete this step, RobotPro cannot notify you when the next service interval is due.**

Click the “By” column to enter the name of the person who performed the service.
**Import/Export PM Data**

Click the **Import/Export Table** button to import or export comma-delimited text files. The following dialog will appear giving you options for which files to import/export and where to write the PM-DATA.txt file.
The first time you use RobotPro, you may be a little unsure of where you need to go first. RobotPro is very easy to use and was created to be intuitive. Be sure to read the descriptions of the various screens in Section 5 of this manual.

Where you go from here depends on what you want to do. If you want to get basic information about Motoman service policies, training, etc.; click on the Information category button at the left side of your screen. **If the buttons are not visible, click the Contents bar on the left side of the screen.**

If you want to start a Troubleshooting session to identify a problem with your robot or controller, click the Troubleshooting button and so forth for other activities.

**The key to learning RobotPro is to roam about and explore.** RobotPro is designed to be intuitive and easy to use. If you go into a screen that you don’t understand, simply experiment with the control buttons or consult this manual for an explanation of the screen.

Give yourself a few hours to familiarize yourself with this program before using it for Troubleshooting and other functions.

Many years of robot expertise went into creating RobotPro’s robot databases. In a short time, you will consider it to be an indispensable part of your robot maintenance, repair, and training programs.
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