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Chapter 1
Introduction / Description

1.1 About This Document

Always use this WeldHound™ Operator’s Manual in conjunction with the Hyperfeed II / MWI Wire Feeder System Manual that is supplied with your particular Motoman® welding solution package.

This manual provides basic coverage of the Motoman® WeldHound™ Weld Process Monitor, and is organized as follows –

CHAPTER 1 – INTRODUCTION / DESCRIPTION
Chapter 1 provides an introduction to and a description of the WeldHound™ System. Also provided is contact information for Motoman’s 24/7 Customer Support Department.

CHAPTER 2 – SAFETY
Chapter 2 provides general safety information regarding the installation, operation, and troubleshooting of Motoman® robotic systems and peripheral equipment.

CHAPTER 3 – OPERATION
Chapter 3 provides WeldHound™ operation and setup information. Here, the reader also finds computer screen "captures" of the various operation and setup screens required for WeldHound™ operation.

CHAPTER 4 – TROUBLESHOOTING
Chapter 4 provides Motoman®-recommended WeldHound™ troubleshooting procedures and techniques.

APPENDIX–A
Appendix A provides a listing (glossary of terms) of WeldHound™ weld parameters, along with their associated definitions.
1.2 **WeldHound™ Overview**

The Motoman® WeldHound™ provides comprehensive monitoring and reporting on critical aspects of the welding process and also automates record keeping for Motoman robotic welding cells. The WeldHound™ hardware and software package is designed to aid plant personnel in applying welding fundamentals required to produce good welds.

Welding codes and most ISO quality documents specify that a joint be welded and then tested to verify its acceptance. The parameters used to produce the passing weld joint are documented on a Procedure Qualification Record (PQR). Many codes specify an allowable range for essential variables (Amps, Volts, Robot Travel Speed, etc.). Manufacturers should have a Welding Procedure Specification (WPS) which lists the range of variables that can be used to produce a given weld. This is based on the PQR data used to produce the tested part plus/minus the allowable percentage of the variable.

WeldHound™ provides a simple LEARN mode to record welding parameters, then automatically generates a PQR, assuming weld acceptance. WeldHound™ automatically generates the WPS by applying predefined limits of essential variables. Reports are in HTML format and can be accessed via a web browser from a notebook computer at the welding cell, or any networked PC via an Ethernet connection. Data from multiple robot cells can be accessed from a single PC if the cells are networked.

WeldHound™ verifies each part’s adherence to the WPS during production. For each part, welds are monitored for conformance to limits set forth in the WPS. Based on this information, the welding cell can be programmed to alert the operator to prompt for inspection, should any weld NOT be in conformance with the WPS limits. The history of weld results can be viewed remotely via web browser, as WeldHound™ generates its own web pages. Limits can be placed on weld set-points to alert supervisors via e-mail if programmed values are changed beyond limit values.

WeldHound™ tracks a comprehensive choice of welding process parameters, including (both programmed and actual) –

- Weld Current
- Weld Voltage
- Welding Gas Flow
- Welding Wire Feed Rate
- Robot Position and Speed

Using data associated with these five parameters, WeldHound™ reads, generates, and calculates the following signals –

- Commanded Vweld (max, avg, and min)
- Commanded Aweld (max, avg, and min)
- Commanded Robot Travel Speed (max, avg, and min)
- Measured Voltage (max, avg, and min)
- Measured Current (max, avg, and min)
• Measured Wire Usage per Weld
• Measured Commanded ArcOn Time
• Measured ArcEstablish time
• Calculated Weld Length
• Calculated Heat Input to the Weld

Refer to the GLOSSARY in Appendix A for a listing of the various weld parameters, along with their associated definitions.

1.3 Location of WeldHound™ Components

1.3.1 WeldHound™ Components Located in the Wire Feeder

The robot-mounted Hyperfeed II-EA wire feeder contains the following WeldHound™ components –

• Mass Air Flow Sensor
• Wire Feed Rate Encoder Assembly

Figure 1 shows the location of these components in the wire feeder.

Figure 1  WeldHound™ Components Located in the Hyperfeed II-EA Wire Feeder
1.3.2 **WeldHound™ Components Located in the Robot Controller Cabinet**

The Robot Controller Cabinet contains the following WeldHound™ components –

- Compact Computer
- Power Supply for Compact Computer

Figure 2 shows the location of these components.

![Figure 2 WeldHound™ Components Located in the Robot Controller Cabinet](image)

The compact computer (see Figure 2 and Figure 3) contains a database that stores programmed and actual weld data.

The compact computer also features an embedded web-server that utilizes Active Server Pages (ASP) to create continuously-updated, HTML-based web pages. These web pages display weld data that is stored in the database. The web pages are viewable on any computer that is running web browser software (Internet Explorer, NetScape, Mozilla Firefox, etc).

The web pages provide a "window" through which authorized personnel interact with WeldHound™.

The compact computer also features a standard RJ-45 jack for Ethernet connectivity (see Figure 3). Ethernet connectivity, combined with the web server mentioned above, provides for...
WeldHound™ operation/monitoring from virtually any location — across the shop floor, across town, or (via Internet) from the other side of the world.

For reliability and long life, the compact computer does not contain any moving or rotating parts. Cooling is accomplished by means of passive convection cooling (no cooling fan), while data storage is handled by a high-capacity memory card (no hard disk drive).

**Figure 3** Compact Computer — Front Panel / Rear Panel Details

*NOTE – Network IP / DNS address label on compact computer is not illustrated.*
1.4 **Reference Documentation**

Always use this *WeldHound™ Operator’s Manual* in conjunction with the *Hyperfeed II/MWI Wire Feeder System Manual* that is supplied with your particular Motoman® welding solution package.

1.5 **Customer Support Information**

If you need assistance with any aspect of your WeldHound™ system, please contact Motoman Customer Support at the following 24-hour telephone number –

(937) 847-3200

For **routine** technical inquiries, you can also contact Motoman Customer Support at the following e-mail address –

techsupport@motoman.com

When using e-mail to contact Motoman Customer Support, please provide a detailed description of your issue, along with complete contact information. Please allow approximately 24 to 36 hours for a response to your inquiry.

*Note: Please use e-mail for routine inquiries, only. If you have an urgent or emergency need for service, replacement parts, or information, you must contact Motoman Customer Support at the telephone number shown above.*
Chapter 2

Safety

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 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 (RIA) by requesting document ANSI/RIA R15.06-1999.

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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.

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 chapter 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, Operation, and Maintenance Safety (Section 2.6)
2.2 Standard Conventions

This manual includes the following alerts – in descending order of severity – that are essential to the safety of personnel and equipment. As you read this manual, pay close attention to these alerts to insure safety when installing, operating, programming, and maintaining this equipment.

![WARNING!]

Information appearing in a WARNING 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 in a CAUTION 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 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 R15.06-1999, section 4.2.5, Sources of Energy, 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 R15.06-1999 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 equipment is provided as standard –

- Safety fences and barriers
- Light curtains and/or safety mats
- Door interlocks
- Emergency stop (E-Stop) palm buttons located on Operator Station, robot controller, and Programming Pendant

Check all safety equipment frequently for proper operation. Immediately repair or replace any non-functioning safety equipment.

### 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 R15.06-1999 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, Operation, and 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. 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 program, operate, and maintain the system. All personnel involved with the operation of the equipment must understand potential dangers of operation.

- 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 all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
• Do not enter the robot cell while it is in automatic operation. Be sure that only the person holding the Programming Pendant enters the workcell.

• Check the E-Stop button on the Programming Pendant for proper operation before programming. The robot must be placed in Emergency Stop (E-Stop) mode whenever it is not in use.

• Back up all programs and jobs onto suitable media before 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.

• Any modifications to PART 1, System Section, of the robot controller concurrent I/O program can cause severe personal injury or death, as well as damage to the robot! Do not make any modifications to PART 1, System Section. Making 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.

• The robot controller allows modifications of PART 2, User Section, of the concurrent I/O program and modifications to controller parameters for maximum robot performance. Great care must be taken when making these modifications. 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 and other parts of the system. Double-check all modifications under every mode of robot operation to ensure that you have not created hazards or dangerous situations.

• Check and test any new or modified program at low speed for at least one full cycle.

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

• Do not perform any maintenance procedures before reading and understanding the proper procedures in the appropriate manual.

• Use proper replacement parts.

• 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).
Chapter 3
Operation

3.1 Introduction

This chapter presents information on WeldHound™ installation, setup, and operation procedures, including screen captures of web pages generated by the web page server. Each screen typically consists of a list of system attributes, their corresponding values at the time a report is generated, as well as a brief description for each attribute.

3.2 Installation

Upon receiving your WeldHound™ system, you will find that Motoman factory technicians have completed installation of the compact computer, interface boards, and wiring, prior to shipment to your location.

If a WeldHound™ system is to be added to an existing Motoman welding solution, you should contact Motoman Customer Support (refer to Section TBD). At your convenience, they will dispatch a Motoman-trained Field Service Representative to your location. Upon arrival, the Field Service Representative can quickly and correctly install all WeldHound™ hardware / software, and assist in recording Golden Weld data. The Field Service Representative can also provide training on the operation and capabilities of the WeldHound™ system. For this reason, little will be covered in this manual regarding actual WeldHound™ setup.

3.2.1 Network Cable Connections

Note: The customer shall supply all network cables and connectors.

Procedure –

1. Route a suitable network interface cable to the Robot Controller cabinet.
2. Route the cable into the cabinet through a removable glandplate.
3. One inside the cabinet, continue to route the cable to the compact computer (see Figure 2 for location of the compact computer).
4. Connect the network cable to the LAN–1 RJ-45 connector, located on the rear panel of the compact computer (see Figure 2 and Figure 3).
3.2.2 **Network Setup**

**CAUTION!**
If you are not comfortable with the network setup task, please contact your company’s IT department, or contract with a company that is thoroughly familiar with network setup concepts and procedures. Network setup requires specialized knowledge of computers and Ethernet networks.

Motoman programs a unique network address (name) into each WeldHound™ system prior to shipment to a customer. This unique network identifier (name) can conform to either of the following two network naming conventions –

- Internet Protocol. ....................... IP
- Domain Name System ................. DNS

*Note: The WeldHound™ network address (name) is typically printed on a label that is attached to the compact computer (see Figure 2 and Figure 3).*

3.2.2.1 **Definition — Internet Protocol (IP) Network Address**

An Internet Protocol (IP) network address identifies a computer or device on a TCP/IP network. Networks using the TCP/IP protocol, route messages based on the IP address of the destination. An IP address is always a series of integers divided by periods, commonly known as a dotted quad.

As an example, **203.051.104.62** is in the form of a typical IP network address.

3.2.2.2 **Definition — Domain Name System (DNS) Server**

A Domain Name System (DNS) server is located on the network and serves to translate DNS-type network addresses into IP addresses.

As an example, **weldhound-1.bigcompany.com** is in the form of a typical DNS network address.

3.2.3 **DNS Setup**

If your company employs a DNS network, you must add the WeldHound™ DNS name to your local DNS server.

After the WeldHound™ DNS name is added to the DNS server, you access the WeldHound™ for that particular system by typing the WeldHound™ DNS name into a browser connected to the same network. The DNS server translates the DNS name into an IP network address.

3.2.4 **Fixed-IP Address Setup**

**CAUTION!**
You should assign Fixed-IP Address Setup to an IT professional or someone who is familiar with Windows XP networking.
Customers without a DNS server on their network will use a fixed IP address to identify each WeldHound™ system to their network.

This method of identification typically requires advanced network knowledge, as well as connection of a keyboard, mouse, and video monitor to the compact computer.

3.3 Power Up

When you enable power to the Robot Controller, you also enable power to the WeldHound™ system. No additional steps are required to supply the required voltages to the WeldHound™ system.

Note: The boot time for the compact computer is comparable to the boot time required for the NX100 controller.

If the WeldHound™ system is used with an ERC, MRC, or XRC generation Robot Controller, please allow 30-45 seconds after Robot Controller power up before starting any welding operations. Failure to do this, may result in a missed weld. This, in turn, will throw off WeldHound™ sequencing.

3.4 Power Down

The Robot Controller and other peripheral equipment can be shut down as usual with no special consideration required for the WeldHound™ system. The WeldHound™ compact computer does not require any type of special power-down sequence.

Note: Do not remove power from the compact computer during a welding process. Doing so, risks corruption of the database that is stored in the compact computer.

3.5 Enabling the PROPORTIONAL SPEED OUTPUT Function

The WeldHound™ system incorporates the ability to monitor robot Tool Control Point (TCP) travel speed during welding, and to report if changes have occurred with the programming.

In order for the WeldHound™ system to monitor the TCP travel speed, a function called PROPORTIONAL SPEED OUTPUT must be enabled. This enabling shall be accomplished by Motoman personnel, only. Contact Motoman Customer Support for additional information (refer to Section 1.5).
3.6 Concept of the GOLDEN PART and LEARN MODE

3.6.1 The GOLDEN PART

The Golden Part provides a baseline to which all future welded parts can be compared. In running a new Golden Part, the WeldHound™ system records all welding parameters during each of the welds on the Golden Part. These values are stored in the compact computer database, where they can be recalled at a later time, and used for comparison to subsequent welds to determine if those welds are within limits.

3.6.2 LEARN MODE

Learn Mode notifies the Robot Controller and the WeldHound™ system that the operator is running a new Golden Part and that all subsequent data should stored in the database for later recall during an actual production run.

Learn Mode is typically run following part programming and set-up. Upon completion, a known good set of weld settings and resulting parts are produced. Sometimes, this may require destructive testing via cut & etch or bend testing. The key being that prior to running Learn Mode the best or ideal weld conditions have been achieved and the setting are optimized for the part and application.

3.7 Running a GOLDEN PART

Once a part has been programmed to the criteria mentioned above, LEARN MODE must be enabled. Accomplish this by executing the R*-Hound macro job on the NX100 (the "*" indicates which robot you wish to control — R1-Hound for robot 1 and R2-Hound for robot 2).

If you wish to enable LEARN MODE for both robots, both commands must be called. The macro job can be found under the MACRO menu on the inform list.

The R*-Hound macro contains the following three parameters (see Figure 4) –

1. **LEARN MODE** — Setting this parameter to "1" enables LEARN MODE and notifies the WeldHound™ system that all subsequent welds are to be associated with the Golden Part and stored in the database for future comparison. Setting this parameter to "0" notifies the WeldHound™ system that it is running normal production and is using the stored Golden Part parameters for comparison to actual production welds.

2. **STATION A/B** — This parameter tells the WeldHound™ system which station is following the following welds are going to be made on. Setting this parameter to a "0" indicates "Station A" and setting this to "1" indicates "Station B"
3. **INC PART / CLR WLD** – Increments the part count and clears the weld count as would be done before executing a new weld. This is typically done at the start of a new part and setting this parameter to "1" performs this operation. There is no need to set the parameter back to "0" unless you make a change to either of the other two parameters.

![Figure 4 Programming / Teach Pendant — R*-Hound Macro Job](image)

**3.8 Running Production Parts**

When the GOLDEN PART has been created in LEARN MODE, the WeldHound™ system is ready to begin normal production.

Procedure –

1. Ensure that LEARN MODE is disabled via the macro job (see Figure 4).
2. Load the first production parts into the fixture and execute the job as normal.
Note: At the completion of each weld, WeldHound™ compares the last weld’s results to the results measured during LEARN MODE. Depending on certain limiting parameters and the enabling of specified windows of operation, each weld is analyzed to ensure that it complies with the commanded values and the specified measured values. A corresponding input is turned on if the last weld’s results are not within the window of operation. These two inputs are active only if the weld does not comply with specified requirements. No logic or job is provided with the system to monitor these two inputs. Instead the end customer is responsible for determining their operation. The input will remain on until the start of the next weld.

3. At weld completion, you can view the results of the welded part via the PC web page browser (refer to Section TBD).

**Figure 5** Programming / Teach Pendant — Programming Requirements
3.9 Screen Captures — WeldHound™ Weld Result Reports

WeldHound™ reports are generated by Active Server Pages (ASP) and are viewable on any of the popular web page browsers (Internet Explorer, NetScape, Mozilla Firefox, etc.). If possible, always use the latest browser software available.

Note: For both glass CRT and flat panel LCD video displays, Motoman recommends a minimum 19-inch screen size and a screen resolution setting of 1280 X 1024 for best viewing of the WeldHound™ report web pages. Always set glass CRT video displays to a vertical refresh rate of 75 Hz (or higher) to prevent distracting screen flicker. Always set LCD flat panel displays to a vertical refresh rate of 60 Hz.

3.9.1 WeldHound™ HOME Page

The WeldHound™ HOME page is the first web page displayed by the browser software (see Figure 6). From the HOME page, you can select the following linked report pages –

• All Weld Results
• View Specific Part
• PQR & WPS Data
• Add / Modify PQR
• Limits

Note: Procedures for access to ROBOT 1 and ROBOT 2 report pages are identical. As a result, this chapter of the manual describes and illustrates only those procedures for ROBOT 1.

![Figure 6 WeldHound™ Home Page](image)
3.9.2 **WeldHound™ ALL WELD RESULTS Page**

Click on the ALL WELD RESULTS link on the WeldHound™ HOME page to display the following WeldHound™ report –

![WeldHound™ ALL WELD RESULTS Report Page](image)

**Figure 7** WeldHound™ — ALL WELD RESULTS Report Page
### 3.9.3 WeldHound™ VIEW SPECIFIC PART Page

Click on the VIEW SPECIFIC PART link on the WeldHound™ HOME page to display the following WeldHound™ report –

![WeldHound™ VIEW SPECIFIC PART Report Page](image_url)

**Figure 8** WeldHound™ — VIEW SPECIFIC PART Report Page

<table>
<thead>
<tr>
<th>Station</th>
<th>Part Number</th>
<th>Date</th>
<th>Weld Number</th>
<th>Result at Time of Weld</th>
<th>Controlling Limits</th>
<th>Voltage (Max/Min)</th>
<th>Current (Max/Min)</th>
<th>Rht Speed (Max/Min)</th>
<th>ArcOn Time</th>
<th>ArcExstab Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1A</td>
<td>0</td>
<td>12/3/2007</td>
<td>10</td>
<td>Command</td>
<td>High</td>
<td>24.0 ± 1.0</td>
<td>294.7 ± 121.2</td>
<td>63.5 ± 53.0</td>
<td>1.54</td>
<td>1.32</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>1</td>
<td>Command</td>
<td>High</td>
<td>39.4 ± 18.52</td>
<td>291.1 ± 113.3</td>
<td>65.3 ± 53.6</td>
<td>1.76</td>
<td>1.43</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>2</td>
<td>Command</td>
<td>High</td>
<td>24.0 ± 17.61</td>
<td>266.6 ± 121.2</td>
<td>65.3 ± 53.4</td>
<td>1.56</td>
<td>1.36</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>3</td>
<td>Command</td>
<td>High</td>
<td>25.3 ± 18.08</td>
<td>268.3 ± 115.3</td>
<td>65.3 ± 55.0</td>
<td>1.56</td>
<td>1.36</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>4</td>
<td>Command</td>
<td>High</td>
<td>26.3 ± 18.32</td>
<td>285.8 ± 111.4</td>
<td>65.3 ± 52.7</td>
<td>1.55</td>
<td>1.38</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>5</td>
<td>Command</td>
<td>High</td>
<td>27.0 ± 18.03</td>
<td>239.4 ± 119.7</td>
<td>65.3 ± 53.0</td>
<td>1.57</td>
<td>1.37</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>6</td>
<td>Command</td>
<td>High</td>
<td>24.1 ± 17.95</td>
<td>352.8 ± 120.7</td>
<td>65.3 ± 53.3</td>
<td>1.57</td>
<td>1.36</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>7</td>
<td>Command</td>
<td>High</td>
<td>25.4 ± 17.95</td>
<td>266.8 ± 121.2</td>
<td>65.3 ± 53.0</td>
<td>1.56</td>
<td>1.36</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>8</td>
<td>Command</td>
<td>High</td>
<td>23.1 ± 17.88</td>
<td>342.6 ± 125.1</td>
<td>65.3 ± 53.0</td>
<td>1.58</td>
<td>1.37</td>
</tr>
<tr>
<td>R1A</td>
<td>106</td>
<td>12/3/2007</td>
<td>9</td>
<td>Command</td>
<td>High</td>
<td>42.1 ± 18.37</td>
<td>361.1 ± 119.2</td>
<td>65.3 ± 53.0</td>
<td>1.56</td>
<td>1.36</td>
</tr>
</tbody>
</table>
3.9.4 WeldHound™ PQR & WPS DATA Page

Click on the PQR & WPS DATA link on the WeldHound™ HOME page to display the following WeldHound™ report –

![WeldHound™ PQR & WPS DATA Report Page](image)

**Figure 9** WeldHound™ — PQR & WPS DATA Report Page
3.9.5 WeldHound™ ADD / MODIFY PQR Page

Click on the ADD / MODIFY PQR link on the WeldHound™ HOME page to display the following WeldHound™ report –

![WeldHound™ report](image)

**Figure 10** WeldHound™ — ADD / MODIFY PQR Report Page
3.9.6 WeldHound™ LIMITS Page

Click on the LIMITS link on the WeldHound™ HOME page to display the following WeldHound™ report –

![WeldHound™ LIMITS Report Page]

Figure 11 WeldHound™ — LIMITS Report Page
Chapter 4
Troubleshooting

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
</table>
| When connecting to WeldHound™, the web page will not load | • Power not applied to embedded box computer inside the robot controller cabinet  
• Ethernet cables disconnected  
• WeldHound™ IP address is unknown or incorrect  
• Router / Hub defective | • Ensure that output LED on the Din-Mounted 24 VDC power supply is illuminated. If not, check for input voltage to the power supply  
• Ensure that Ethernet cables are connected between client and server  
• See procedure for determining embedded server’s name and IP address.  
• Contact your company’s IT specialist to determine if routers and hubs are operational |
| Displayed web page exceeds width of the CRT or LCD    | • Display resolution too low  
• Web browser display text too large | • Increase display resolution settings on client computer  
• Change the text size for your web browser |
| Nothing displayed when looking for Weld Procedure Specification (WPS) or Procedure Qualification Record (PQR) data | • Golden weld data has not been captured | • Run a part while LEARN mode is enabled. Upon completion, look for the WPS or PQR data |
| After selecting (clicking) ALL WELD RESULTS at the WeldHound™ home page, no data is displayed. | • No individual weld results recorded  
• Robot is in LEARN mode | • Must run a part in production mode  
• Take the robot out of LEARN mode, then execute a weld on the next part. Reselect ALL WELD RESULTS after the weld is complete |
<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>After selecting (clicking) VIEW SPECIFIC PART at the Weld-Hound™ home page, no part numbers are shown</td>
<td>• No individual weld results have been recorded&lt;br&gt;• Robot is in LEARN mode</td>
<td>• Must run a part in production mode&lt;br&gt;• Take the robot out of LEARN mode, then execute a weld on the next part. Reselect VIEW SPECIFIC PART after the weld is complete</td>
</tr>
<tr>
<td>Web browser reports an error with the page that is being displayed. Details of the error are displayed</td>
<td>• Possible database error / corruption, or technical problem with the generated web page</td>
<td>• Contact Motoman Customer Support and relay to them the error details that are displayed on the web page</td>
</tr>
</tbody>
</table>
Appendix A

Glossary of Terms

This section of the manual provides definitions for weld data parameters that appear on the WeldHound™ setup and operation web pages (refer to Chapter 3 of this manual).

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>DEFINITION / EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ActualsOK</td>
<td>Details the status of the actual weld results as measured during the last weld. Parameters that influence this value include: Max/Avg/Min voltage, Max/Avg/Min current, Arc Establised Time, ArcAlive, Wire Used, and Gas Used. If all of these parameters are within commanded/programmed limits at the time of the weld, a GREEN check box will appear for this weld. A RED box without a check mark indicates that at least one parameter was outside of the commanded limits.</td>
</tr>
<tr>
<td>ArcAlive</td>
<td>The proportion of ArcEstabTime divided by ArcOnTime. [UNITS = PERCENTAGE (%)]</td>
</tr>
<tr>
<td>ArcEstabTime</td>
<td>The actual (recorded) &quot;Arc Established&quot; time, as reported by the Weld Power Supply. Indicates the length of time that a valid arc was present at the workpiece. [UNITS = SECONDS]</td>
</tr>
<tr>
<td>ArcOnTime</td>
<td>The actual (recorded) &quot;Arc On&quot; time as specified in the job (program) statement. The amount of time between the programmed &quot;ArcOn&quot; or &quot;ArcStart&quot; command and the programmed &quot;ArcOff&quot; or &quot;ArcEnd&quot; command. [UNITS = SECONDS].</td>
</tr>
<tr>
<td>AvgAmps</td>
<td>The actual (recorded) average electrical current for a given weld. [UNITS = AMPERES (A)]</td>
</tr>
<tr>
<td>AvgVolts</td>
<td>The actual (recorded) average voltage for a given weld. [UNITS = VOLTS]</td>
</tr>
<tr>
<td>CmdsOK</td>
<td>Details the status of the commanded / programmed VWELD, AWELD, RBT-SPEED, and ARCON time as compared to the PQR data in comparison to the limits specified at the time the weld was made. A GREEN check box (on the WeldHound™ web page) indicates that all commanded / programmed values were within limits. A RED box without a check mark indicates that at least one parameter was outside of the commanded limits.</td>
</tr>
<tr>
<td>GasUsed</td>
<td>Indicates the amount of shielding gas used during the last weld. [UNITS = STANDARD LITERS PER MINUTE (SLPM)]</td>
</tr>
<tr>
<td>PARAMETER</td>
<td>DEFINITION / EXPLANATION</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>HeatInput</td>
<td>This is calculated heat input to the weld. Determined by Average Voltage, Average Current and Robot Travel Speed. [units = kiloJoules per centimeter (kJ / cm)]</td>
</tr>
<tr>
<td>MaxAmps</td>
<td>Maximum weld current recorded during the course of a weld. Measured from ArcEstablished to ArcOff. [UNITS = AMPERES (A)]</td>
</tr>
<tr>
<td>MaxVolts</td>
<td>Maximum weld voltage recorded during the course of a weld. Measured from ArcEstablished to ArcOff. [UNITS = VOLTS (V)]</td>
</tr>
<tr>
<td>MinAmps</td>
<td>Minimum weld current recorded during the course of a weld. Measured from ArcEstablished to ArcOff. [UNITS = AMPERES (A)]</td>
</tr>
<tr>
<td>MinVolts</td>
<td>Minimum weld voltage recorded during the course of a weld. Measured from ArcEstablished to ArcOff. [UNITS = VOLTS (V)]</td>
</tr>
<tr>
<td>Procedure Qualification Records (PQR)</td>
<td>A record (electronic or hardcopy) of welding variables used to produce an acceptable test weldment, and the results of the tests conducted on the weldment to qualify a Welding Procedure Specification (WPS). See also Welding Procedure Specification in this glossary.</td>
</tr>
<tr>
<td>RbtAvgSpeed</td>
<td>Average robot travel speed recorded during the course of a weld, as reported by the robot controller. [units = centimeters per minute (cm / min)]</td>
</tr>
<tr>
<td>RbtAvgAWeld</td>
<td>Average command / programmed wire feed speed / current as reported by the MWI Welder Interface Board (inside the robot controller). This value is scaled by the Welder Condition File to a range of 0 – 14 VAC. [UNITS = VOLTS (V)]</td>
</tr>
<tr>
<td>RbtAvgVWeld</td>
<td>Average commanded / programmed weld voltage as reported by the MWI Welder Interface Board (inside the robot controller). This value is scaled by the Welder Condition File to a range of 0 – 14 VDC. [UNITS = VOLTS (V)]</td>
</tr>
<tr>
<td>RbtMaxSpeed</td>
<td>Maximum robot travel speed recorded during the course of a weld, as reported by the robot controller. Expressed as centimeters per minute (cm / min).</td>
</tr>
<tr>
<td>RbtMaxAWeld</td>
<td>Maximum command / programmed wire feed speed / current as reported by the MWI Welder Interface Board (inside the robot controller). This value is scaled by the Welder Condition File to a range of VAC. [UNITS = VOLTS (V)]</td>
</tr>
<tr>
<td>RbtMaxVWeld</td>
<td>Maximum commanded / programmed weld voltage as reported by the MWI Welder Interface Board (inside the robot controller). This value is scaled by the Welder Condition File to a range of 0 – VDC. [UNITS = VOLTS (V)].</td>
</tr>
<tr>
<td>RbtMinSpeed</td>
<td>Minimum robot travel speed recorded during the course of a weld, as reported by the robot controller. Will often report a &quot;0&quot; value due to the fact that robot will stop and wait for &quot;Arc Established&quot; during a standard &quot;ArcStart&quot;. [UNITS = CENTIMETERS PER MINUTE (CM / MIN)]</td>
</tr>
<tr>
<td>RbtMinAWeld</td>
<td>Minimum command / programmed wire feed speed / current as reported by the MWI Welder Interface Board (inside the robot controller). This value is scaled by the Welder Condition File to a range of 0 – 14 VAC. [UNITS = VOLTS (V)]</td>
</tr>
<tr>
<td>RbtMinVWeld</td>
<td>Minimum commanded / programmed weld voltage as reported by the MWI Welder Interface Board (inside the robot controller). This value is scaled by the Welder Condition File to a range of 0 – 14 VDC. [UNITS = VOLTS]</td>
</tr>
</tbody>
</table>

Note: All units are in the specified format unless otherwise noted.
## Welding Procedure Specifications (WPS)

A document (electronic or hardcopy) that provides the required welding variables for a specific application to assure repeatability by properly trained welders and welding operators. Provides direction to the welder or welding operator for making production welds in accordance with Code requirements.

## WireUsed

Indicates the amount of welding wire used per weld. [UNITS = CENTIMETERS (CM)]

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>DEFINITION / EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WeldLength</td>
<td>Calculated weld length. Determined by robot travel speed and reported arc established time. [UNITS = CENTIMETERS (CM)]</td>
</tr>
<tr>
<td>Welding Procedure Specifications (WPS)</td>
<td>A document (electronic or hardcopy) that provides the required welding variables for a specific application to assure repeatability by properly trained welders and welding operators. Provides direction to the welder or welding operator for making production welds in accordance with Code requirements.</td>
</tr>
<tr>
<td>WireUsed</td>
<td>Indicates the amount of welding wire used per weld. [UNITS = CENTIMETERS (CM)]</td>
</tr>
</tbody>
</table>
NOTES