

Motoman

HyperFeed EA Wire Feeder Manual

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Chapter 1

Introduction

1.1 About This Document

The HyperFeed EA Wire Feeder Manual provides instructions for the HyperFeed EA wire feeder and is organized as follows:

SECTION 1 - INTRODUCTION

This section provides general information about the HyperFeed EA wire feeder, a list of reference documents, and customer service information.

SECTION 2 - SAFETY

This section provides information regarding the safe use and operation of the HyperFeed EA wire feeder.

SECTION 3 - EQUIPMENT DESCRIPTION

This section provides detailed descriptions of the major components of the HyperFeed EA wire feeder. It also includes a table listing component specifications.

SECTION 4 - INSTALLATION

This section provides instructions for installing the HyperFeed EA wire feeder.

SECTION 5 - OPERATION

This section provides basic operating functions for the HyperFeed EA wire feeder.

SECTION 6 - MAINTENANCE

This section provides detailed instructions for maintaining the HyperFeed EA wire feeder.

APPENDIX A - ILLUSTRATED PARTS LIST

Appendix A provides exploded parts views and illustrated parts lists for the HyperFeed EA wire feeder.

1.2 Overview

The HyperFeed EA wire feeder is designed for use with the Motoman EA-series robots and Motoweld E-350 and E-500 digital welding power sources. It is a compact, open frame-type, and electrically isolated wire feeder equipped with four geared feed rolls. It is rated at 500 amps at a 100% duty cycle with a maximum speed of 750 IPM (inches per minute). It is equipped with 0.035"/0.045", (1.2 mm/1.6 mm) feed rolls as standard. Optional feed roll kits listed in Table 4 are available through Motoman. The feeder weighs 7 kg and comes complete with gas valve and a motor control cable.

1.2.1 System Layout

The HyperFeed EA wire feeder provides a compact and rugged 4-roll wirefeeding solution for Motoman's Easy Arc (EA) series robots. The HyperFeed EA is designed to fit closely to the robot upper arm, providing minimal overhang and allowing easy maintenance and access. Simple four bolt mounting and standard Tweco #5 torch adapter provide quick and easy replacement of existing wire feeder with no torch replacement required. The open design provides quick access to feeder mechanism for fast change out of feed rolls. The integrated shock sensor cable enables quick recovery from crashes. Cable clamps are located on the back of the wire feeder to provide strain relief for the weld cable, control cable, and gas hose.

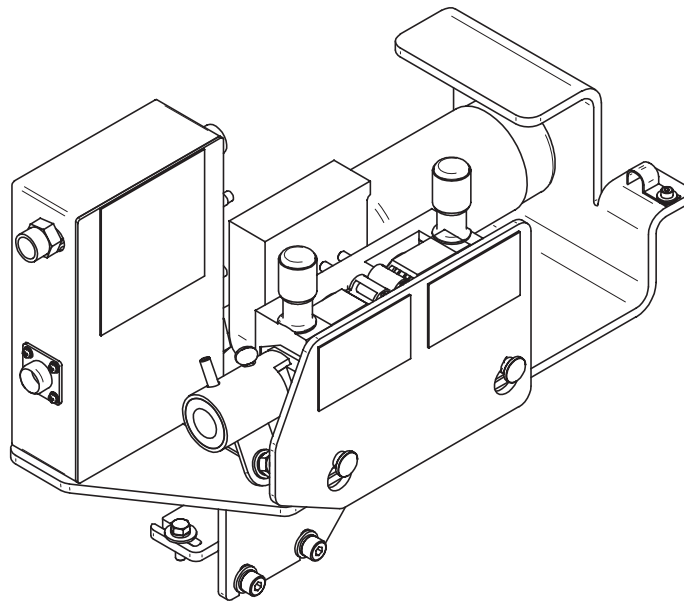


Figure 1 HyperFeed EA Wire Feeder

Table 4 Optional Feed Roll Kits

Wire Size	Groove	Wire Type	Motoman Part Number
045" / .062" (1.2 mm/1.6 mm)	V-Groove	Hard Wire	147809-2
.039" / .045" (1.0 mm/1.2 mm)	Knurled V-Groove	Hard Wire	147809-3
045" / .054" (1.2 mm/1.4 mm)	Knurled V-Groove	Hard Wire	147809-4
062" / .078" (1.6 mm/2.0 mm)	U-Groove	Soft Wire	147809-5
.045" / .062" (1.2 mm/1.6 mm)	U-Groove	Soft Wire	147809-6
095" / .125" (2.4 mm/3.2 mm)	U-Groove	Soft Wire	147809-7
.039" / .045" (1.0 mm/1.2 mm)	U-Groove	Soft Wire	147809-8

1.3 Reference to Other Documentation

For additional information refer to the following:

- Robotic Arc Welding Manual for MotoWeld (P/N 148984-1)
- Operator's Manual for Arc Welding (P/N 149235-1)
- Motoman Manipulator for your robot type
- Vendor manuals for system components not manufactured by Motoman

1.4 Safety Features

The user is responsible for safeguarding per ANSI/RIA R15.06. If you need assistance, contact Motoman customer service.

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:

- Robot Type (EA-series)
- System Type (HyperFeed EA)
- Application Type (welding)
- Software Version (access using TOP MENU/SYSTEM INFO/VERSION/SYSTEM on the programming pendant)
- Robot Serial Number (located on back side of robot arm)
- Robot Sales Order Number (located on front door of controller)

Notes

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 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 XRC 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/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.
- 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

Equipment Description

3.1 Hyperfeed EA Components

The Hyperfeed EA wire feeder is an open frame type wire feeder equipped with four geared feed rolls and is rated at 500 amps at 100% duty cycle with a maximum speed of 700 in. (17.78 m) per minute. It is equipped with 0.035"/0.045" (0.9mm/1.2 mm) feed rolls as standard. Optional feed rolls listed are available thru Motoman. The feeder weighs 7 kg and comes complete with gas valve and motor control cable. Features include:

- Low-inertia drive system, and smaller diameter drive rolls (provide faster response for improved arc starting and reduced spatter)
- Wide range of Motoman supplied feed roll options (feed roll kit numbers and toll free phone number are clearly marked on the feeder)
- Easy feed roll change-out
- Standard Tweco #5 adaptor
- 4-pin shock sensor plug
- Powerful 4-roll low-inertia feed head with 100 watt motor
- Encoder feedback

Figure 2 shows the front view of the Hyperfeed EA wire feeder.

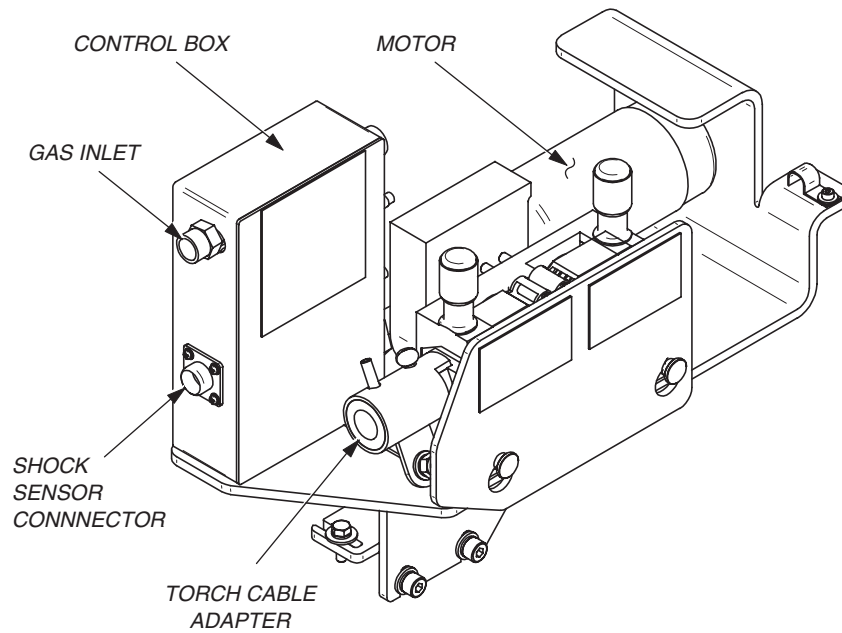


Figure 2 Hyperfeed Front View

3.1.1 Control Box

The control box provides a single connection point for all feeder interface cables. Inside, the gas valve is housed along with three terminal strips, providing connection points for all incoming and outgoing cables. Located on the control box are connections for incoming gas (from gas supply), outgoing gas (to torch cable), shock sensor, motor power, encoder signals, and power source.

3.1.2 Torch Cable Adapter

The HyperFeed EA wirefeeder comes equipped with a Tweco #5 torch adaptor. Torch change out simply requires inserting the torch power pin into the adaptor and tightening the retaining screw.

3.1.3 Shock Sensor Connector

A 4-pin-bulkhead shock sensor connector is mounted on the front of the control box. Contact closure between pins one and two provide a closed circuit to clear any shock sensor alarm.

Figure 3 shows the back view of the Hyperfeed EA Wire Feeder.

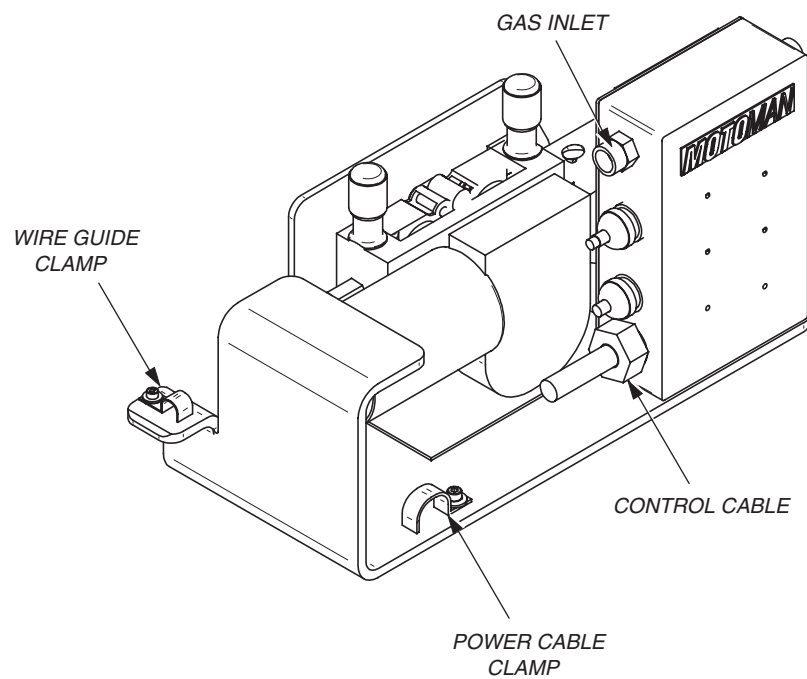


Figure 3 Hyperfeed Back View

Figure 5 shows feedroll assembly components.

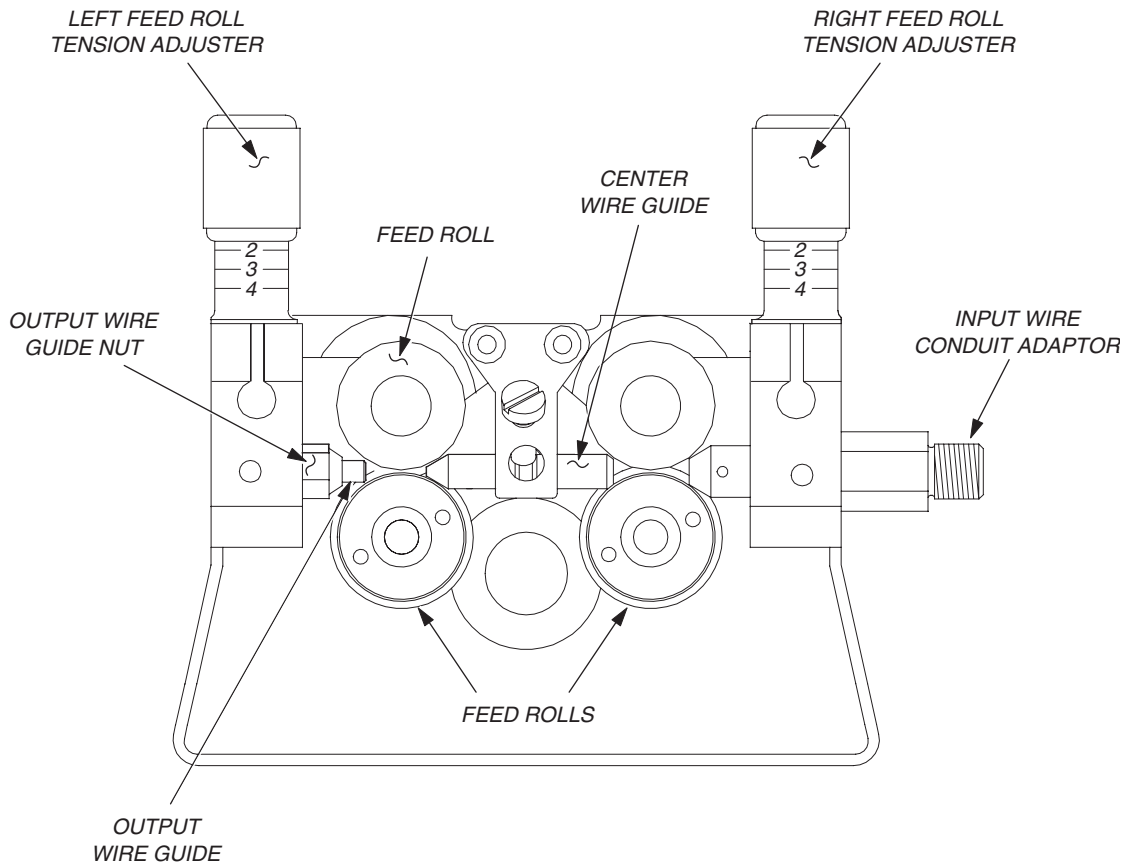


Figure 4 Feedroll Assembly

3.1.4 System Specifications

Table 5 Hyperfeed EA Specifications

Max. Rated Output	100W @ 200 rpm, 750 IPM (inches per minute)
Wire Diameter:	Standard: 0.9/1.2 Dia. common Option: aluminum (1.0 mm Dia.) Option: stainless steel, mile steel (0.8/0.9), (1.0), (1.2), (1.4) mm Dia.
Mass:	7 kg (15 lb)

Chapter 4

Installation

The HyperFeed EA wire feeder is designed to be used exclusively with the MotoWeld E-350 and E-500 digital power sources and the Motoman EA-Series robots. If the HyperFeed EA is being used with another power source, refer to system prints for wiring, mounting and cable configurations. The HyperFeed EA is designed for quick mounting and service, and requires minimal maintenance. Four screw mounting and interchangeability of parts limits the number of spare parts inventory required.

Installation of the Hyperfeed EA should be performed by personnel who are familiar with Motoman products. Follow established safety procedures **at all times** throughout the installation process. Failure to use safe work practices can result in damage to the equipment and injury to the workers.

4.1 Materials Required

This section identifies customer-supplied items and tools required to complete installation.

4.1.1 Customer-supplied Items

- Gas hose with 5/8-18 right-hand-thread hose fitting (optional)
- Wire conduit with 1/2-20 UNF female fitting

4.1.2 List of Tools

- Safety glasses
- Socket head wrenches (standard and metric)
- Open-end wrench sets (standard and metric)
- Adjustable wrench set
- Flat and Phillips screwdriver set
- Allen wrench set (metric)

4.2 Mounting Hyperfeed EA

The Hyperfeed EA Wire Feeder must be firmly mounted on the rear U-axis of a Motoman EA-Series robot. The following instructions assume any existing wirefeeder has been removed. To install Hyperfeed, proceed as follows:

1. Carefully remove Hyperfeed EA from cardboard box and plastic bag.
2. Inspect Hyperfeed EA for shipping damage.



Note: If damage is found, notify the shipper immediately.

3. Locate mounting hardware attached to feeder.
4. Using the pendant, jog the robot to a lowered position for easy access to upper arm.
5. Shut power OFF to robot and power source.

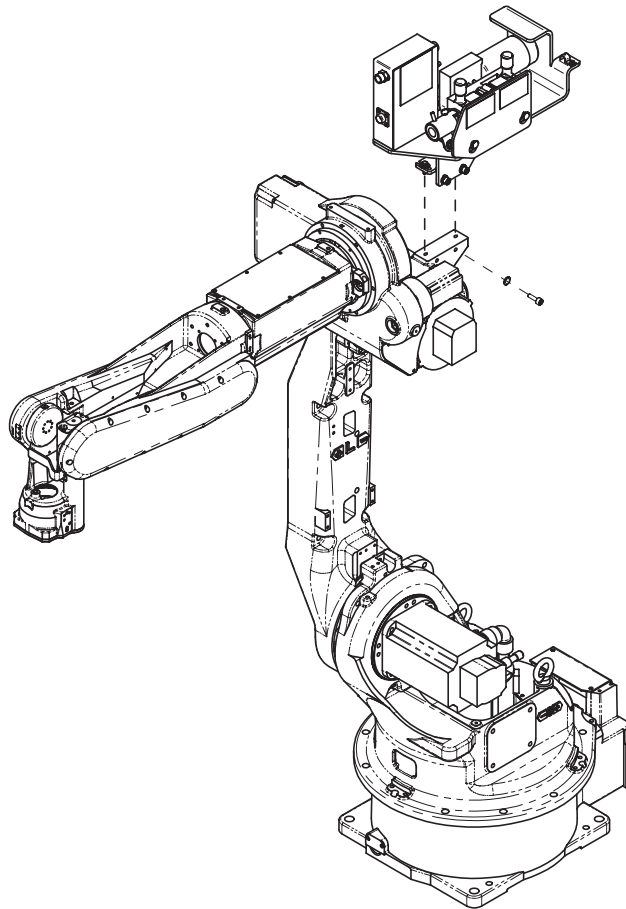


Figure 5 Hyperfeed EA Installation



Note: It's easiest to start the two side mounting bolts and slide the feeder mounting bracket down onto these, allowing the feeder to rest before inserting the two upper mounting bolts.

6. Secure Hyperfeed EA to rear of U-axis using four M6 bolts and washers and tighten with an M10 wrench.

4.3 Connecting Cables

Do not make any connections until feeder is securely in place.

4.3.1 Connecting the Welding Power Cable

The welding power cable is routed through the side cable clamp and connected to the buss bar attached to the torch adapter. To connect the welding power cable, proceed as follows:



CAUTION!

Ensure proper slack in weld power cable to allow the robot to reach its full operating range.

1. Loosen the M5 cable clamp bolt and route weld cable through the cable clamp.
2. Loosen thumbscrews and remove wirefeeder cover.
3. Route weld cable in front of feeder assembly to torch adapter.
4. Using a 10 mm Allen wrench, remove the bolt and washers from the buss bar connection (see Figure 6).
5. Secure power cable to buss bar using bolt and washers removed in previous step.
6. Tighten M5 cable clamp after power cable is properly routed and attached to the buss bar connection and replace wirefeeder cover using hardware removed in Step 2.

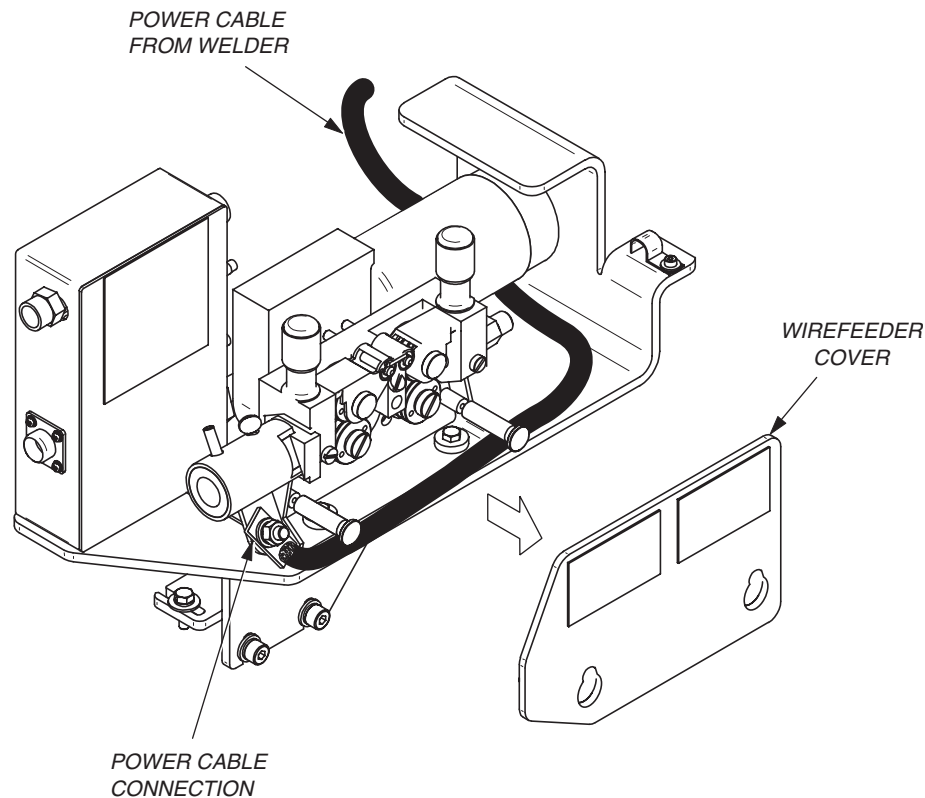


Figure 6 Power Cable Connection

4.3.2 Connecting the Gas Line



CAUTION!

Loose gas line connections will cause excessive consumption of gas.

Customer supplied gas hose with 5/8-18 right-hand-thread hose fitting required. No other gas line modifications are necessary.

1. Connect external gas hose to the gas adapter on back of control box.
2. Verify connection is tight.

4.3.3 Connecting the Control Cables

The HyperFeed EA wire feeder is delivered with the appropriate control cable connected to the back of the control box. Once HyperFeed EA has been properly mounted, the other end of this cable must be connected to the connector on top of the robot. An additional control cable is then connected between the back of the robot to the power source. To connect the control cables, proceed as follows:

1. Remove cable from shipping bag and inspect for damage.



Note: If damage is found, notify shipper immediately.

2. For UP-series robots, connect the feeder-to-controller cable to the matching connector on the robot.
For ERC and MRC robots, connect the feeder-to-controller cable to the matching connector on the controller.

4.3.4 Connecting the Impact Sensor Cable and Torch

1. Connect impact sensor cable to front of wire feeder (see Figure 7).

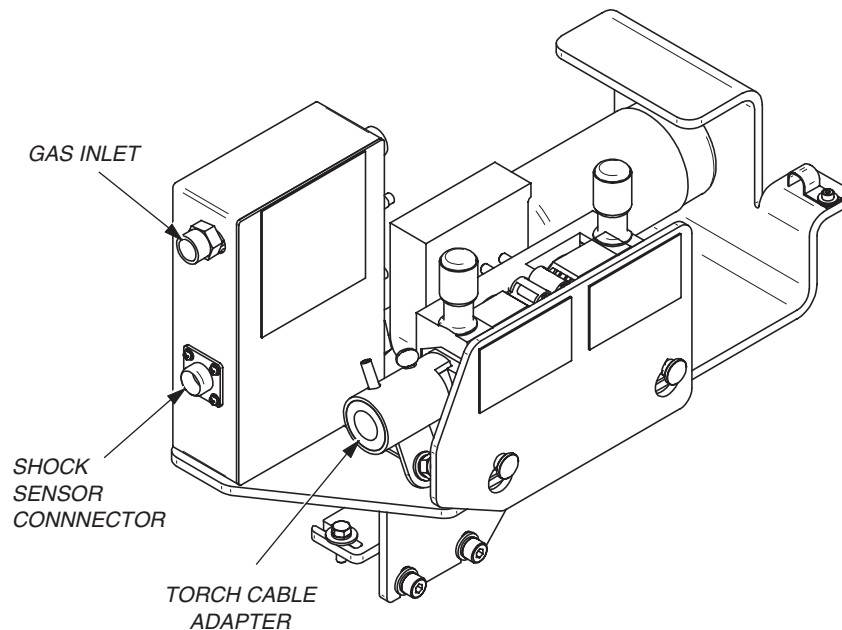


Figure 7 Impact Sensor/Feeder to Controller Cable Connection Points

2. Loosen the torch locking knob on the torch cable adapter.
3. Insert torch end into the torch cable adapter until it stops.
4. Tighten the torch locking knob.
5. Lightly pull torch to ensure a tight fit.

4.3.5 Connecting and Feeding Weld Wire

Customer supplied wire conduit with 1/2-20 UNF female fitting required.

1. Turn all power (power source, robot) OFF.
2. Locate customer-supplied wire conduit.
3. Trim liner to 65 mm (2.56 in.).
4. Route wire conduit through back of wire feeder.
5. Loosen set screw on input wirefeeder guide.
6. Insert liner into input wirefeeder guide and tighten collar nut.
7. Tighten set screw on input wirefeeder guide.

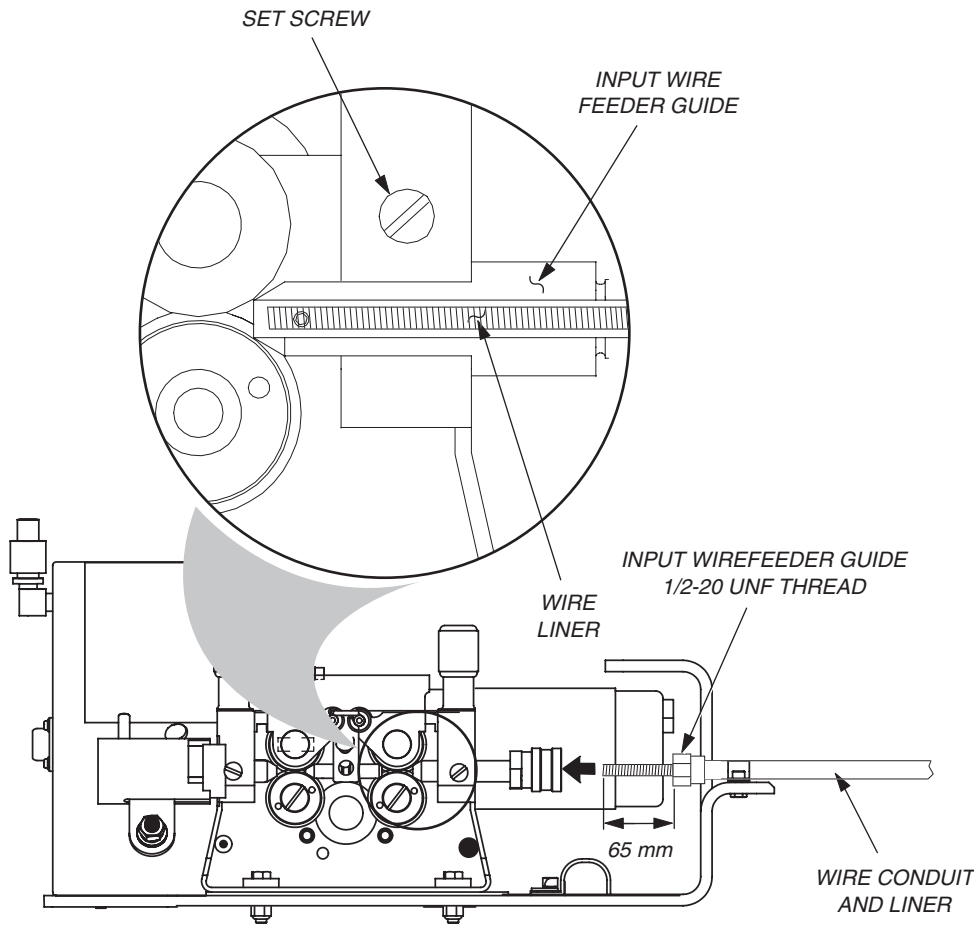


Figure 8 Conduit Guide Installation

8. Release tension adjusters and lower both feed roll carriages.

To feed the welding wire through wire feeder, proceed as follows:

1. Turn the power source OFF.
2. Leave robot servo power OFF.
3. Pull approximately 12 inches of welding wire from the wire liner, and six inches of wire liner from the wire conduit.
4. Release tension adjusters and lift both feed roll carriages.
5. Insert welding wire into input wirefeeder guide and through center guide tube output wire feeder guide.
6. Raise feed rolls and engage tension adjusters.
7. Guide the wire liner into the input wire feeder guide and past the set screw (see Figure 8). Do not push liner past input wire feeder guide.
8. Tighten the set screw onto the wire liner with a 1.5 mm Allen wrench.
9. Connect the wire conduit connector to the input wirefeeder guide. The input wirefeeder guide has a 1/2-20 UNF male thread.
10. Push and hold the Feed push button on the programming pendant.
11. The welding wire tension may need adjustment to allow wire to pass through.

Adjusting the Welding Wire Tension

Excessive wire tension is the most common cause of poor wire feed performance.



CAUTION!

Over-tightening the feed roll tension adjusters causes excessive knurling and/or deformation of the wire.

Too much wire tension may cause excessive wear of the feed rolls and shorten the welding tip service life.

1. Feed welding wire through the torch and onto the floor.
2. Inspect the shape of welding wire on the floor. When the tension adjustments are set properly, the wire on the floor forms a large uniform circle with no spiral or helix. No further adjustments are needed. If a spiral or helix is formed, there is too much wire tension.



Note: Use the indicator markings on the feed roll tension adjusters for pressure reference only.

However, the numeric markings must match on each adjuster for proper wire pressure/tension.

3. Adjust the feed roll tension adjusters to eliminate wire slippage or tension. On each tension adjuster, the number 4 indicates the highest tension applied to the wire, number 1 indicates the lowest tension. Repeat steps 1 through 3 as necessary.

Notes

Chapter 5

Maintenance

Maintenance of the Hyperfeed EA components should be performed by authorized personnel who are familiar with the design and construction of this product. The following procedures should be performed only as needed. Read through the instructions completely before performing any maintenance procedure. Be sure that you understand the procedure, have the proper tools, and observe all applicable safety precautions.



DANGER!

Ensure that power is off before performing the following procedures. Observe standard lockout/tagout practices.

5.1 Spare Parts

When a part malfunctions, it is helpful to have replacement parts in stock for quick replacement. Motoman recommends the following parts be kept on hand:



DANGER!

Always use Motoman spare parts when servicing Hyperfeed EA. Use of non-Motoman parts may void your warranty and may result in machine malfunction, machine damage, or injury to personnel.

Table 6 Recommended Spare Parts

Part Name	Motoman Part Number	Recommended Qty
Retainer, Shaft, Motor	148443-1	1
Key, Motor, Shaft	148442-1	1
Gear, Main Drive, Feed Roll	148436-1	1
Retainer, Pressure Arm	148432-1	2

Table 6 Recommended Spare Parts

Part Name	Motoman Part Number	Recommended Qty
Gear, Main Drive Roll	148436-1	1
Adapter, Gear, Feed Roll	148438-1	4
Washer, Retaining	TBD	4
Retainer, Axle Pressure Roll	TBD	1

5.2 Ordering Parts

Contact the Motoman service staff at 937.847.3200 to order spare parts. Please have the following information ready before you call:

- Machine type (wire feeder)
- Machine Name (Hyperfeed EA)
- Motoman Part No. (Use Appendix A to identify part)
- Part name (Use Appendix A to identify part)
- Number of parts

Place your order with: Motoman Customer Service

Telephone:(937) 847-3200

Telefax: (937) 847-3211

5.3 Drive Motor

Do not disassemble the motor. Contact the Motoman Service Department at (937) 847-3200 when overhaul becomes necessary.



Note: The motor is not recommended for field service. The unit should be returned to Motoman for repairs to this component.

5.4 Maintenance Schedule

Table 7 Maintenance Schedule

Inspection Item	Frequency	Inspection Operation
Physical Damage	Daily	Check for physical damage from load collision or evidence of misuse.
Excessive or unusual noise	Daily	Listen for grinding, excessive or irregular noise. Contact Motoman Service Department at (937) 847-3200.
Cleaning	As Required	Clean with dry cloth or compressed air.
Lubrication – gears	500 hours	Lubricate gears.

5.5 Replacing Feed Rolls

Use these instructions for replacing feed rolls or changing the .045/.030 wire size.

5.5.1 Replacing the Upper Feed Rolls

To replace the upper feed rolls, proceed as follows:

1. Shut power OFF to robot and power source.
2. Remove wirefeeder cover.
3. Pull both feed roll tension adjusters to release/lower both feed roll carriages.

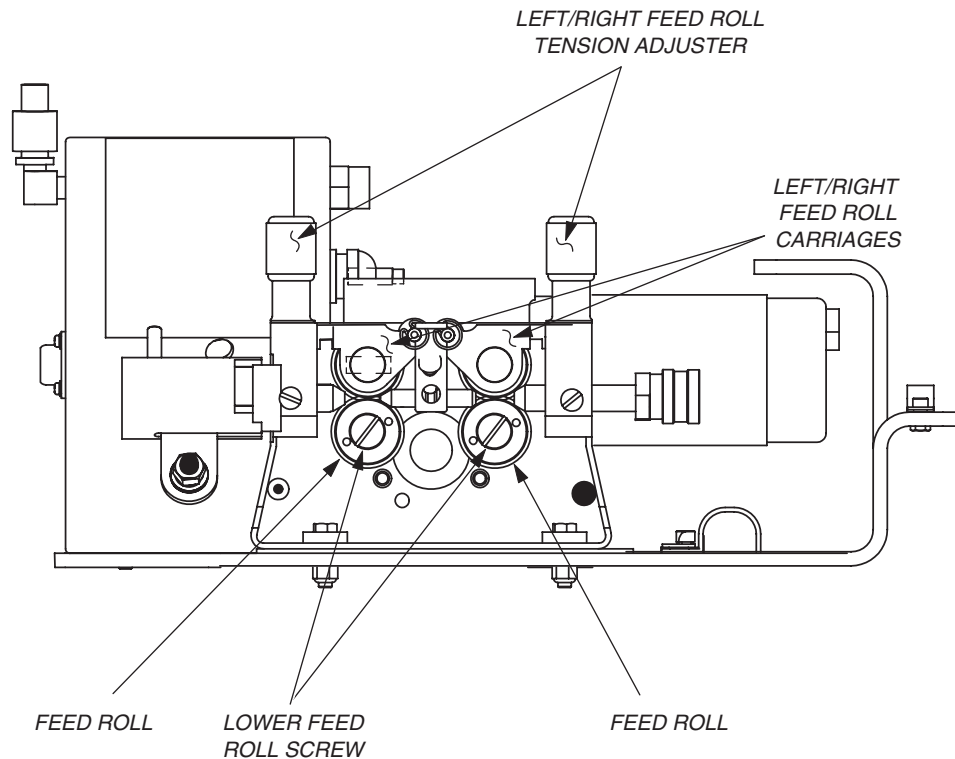


Figure 9 Replacing the Feed Rolls

4. Loosen and remove both lower feed roll screws using a flat-head screwdriver. Save hardware for installing new feed rolls.
5. Pull the old feed rolls off the feed roll gear adapters.
6. If changing wire size from .045 to .030 (or vice versa), simply reverse each feed roll side and reinstall.
7. With proper alignment, push the new (or reversed old) feed rolls to the back of the feed roll gear adapters.
8. Reinstall both upper feed roll screws and tighten with a flat-head screwdriver.

5.5.2 Replacing the Lower Feed Rolls

To replace the lower feed rolls, proceed as follows:

1. Shut power OFF to robot and power source.
2. Remove wirefeeder cover.
3. Pull both feed roll tension adjusters (see Figure 9) to release/raise both feed roll carriages.
4. Loosen and remove lower feed roll screws. Save hardware for installing new feed rolls.

5. Carefully remove both feed roll assemblies (including washers, spacer, and feed roll gear adapter) from the feed roll carriages.
6. Disassemble the washers, spacers, and feed roll adapters from the feed rolls and save all components.
7. If changing wire size from .045 to .030 (or vice versa), simply reverse each feed rolls, reassemble with washers, spacers, and feed roll adapters, and reinstall.
8. With proper alignment, push the new (or reversed old) feed rolls to the back of the feed roll gear adapters.
9. Place the new feed roll assemblies (including washers, spacers, and feed roll gear adapters) onto feed roll carriages.
10. Lower the left feed roll tension adjuster to horizontal position.
11. Lower the left feed roll carriage to horizontal position.
12. Raise the left feed roll tension adjuster into locking vertical position to support the feed roll carriage.
13. Lower the right feed roll tension adjuster to horizontal position.
14. Lower the right feed roll carriage to horizontal position.
15. Raise the right feed roll tension adjuster into locking vertical position to support the feed roll carriage.
16. Push the lower feed roll screws, from step 4, through the upper feed roll assemblies and tighten finger tight.

5.6 Changing the Wire Size

To change wire size, the center guide tube and output wire feeder guide must be replaced. The inside diameter of these two components match the nominal size of the welding wire. To change the wire size, proceed as follows:

Removing Old Welding Wire

1. Shut power OFF to robot and power source.
2. Remove wirefeeder cover.
3. Pull both feed roll tension adjusters (see Figure 9) to release/raise both feed roll carriages.

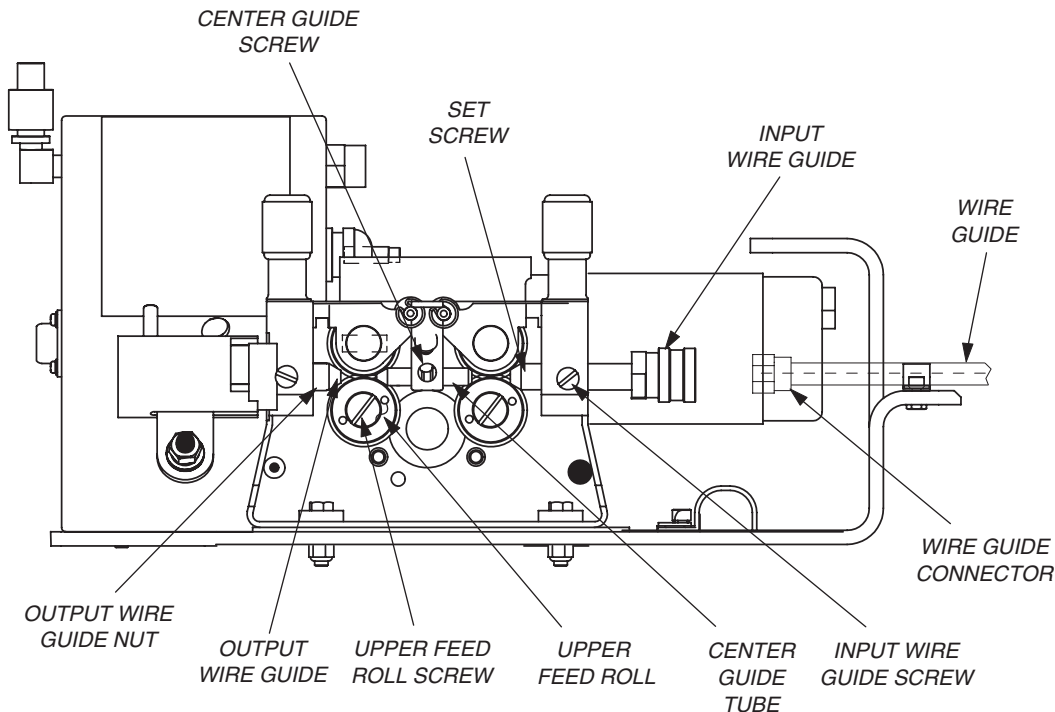


Figure 10 Replacing the Center Guide Tube/Output Wire Feeder Guide

4. Using a 1.5 mm Allen wrench, loosen the set screw (see Figure 10) on the input wirefeeder guide.
5. Loosen the wire guide and remove it from input wire feeder guide.
6. Cut welding wire.
7. Pull remaining wire out through the torch.

Replacing the Output Wire Feeder Guide/Center Guide Tube

1. Loosen, but do not remove, the torch locking knob.
2. Remove the torch assembly.
3. Using a flat-head screwdriver, remove the lower-right feed roll screw (see Figure 9).
4. Remove the lower right feed roll.
5. Using an 11 mm wrench, remove the output wire feeder guide nut.
6. Remove the old output wire feeder guide through the central assembly adapter.
7. Loosen, but do not remove, the center guide tube screw.
8. Remove the center guide tube.
9. Install the new center guide tube and center it.
10. Tighten the center guide tube screw.
11. Push the new output wire feeder guide through the central assembly adapter.

12. Install the torch.
13. Install the output wire feeder guide nut. Tighten with a 11 mm wrench.
14. Replace the lower-right feed roll.
15. Insert feed roll screw and tighten with a flat-head screwdriver.
16. Lower the right feed roll tension adjuster to horizontal position and hold.
17. Lower the right feed roll carriage to horizontal position and hold.
18. Raise the feed roll tension adjuster into locking vertical position.



Note: Installing the input wire feeder guide with the set screw visible allows for easy adjustments if needed.

19. Install the input wire feeder guide with the set screw clearly visible.
20. Tighten the input wire feeder guide screw using a flat-head screwdriver.
21. Check that the input wire feeder guide and center guide tube are secure. Adjust as necessary
22. Insert and feed the new welding wire through the wire feeder.

Inserting and Feeding Welding Wire

To feed the welding wire through wire feeder, proceed as follows:

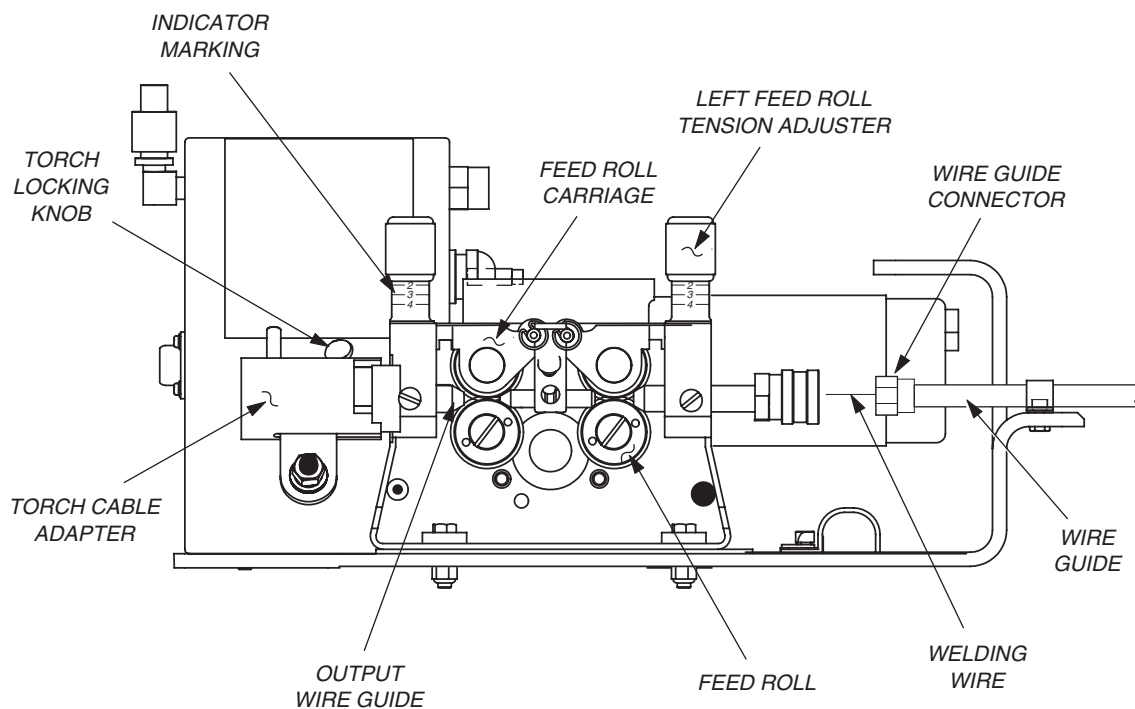


Figure 11 Feeding the Welding Wire

1. Turn the power source ON.
2. Leave robot servo power OFF.
3. Pull approximately 12 inches of welding wire from the wire liner, and six inches of wire liner from the wire guide.
4. Pull both feed roll tension adjusters to release/raise both feed roll carriages.
5. Push the welding wire through the input wirefeeder guide, center guide tube, feed rolls, and into the output wire guide.
6. Lower the left and right feed roll carriages into place using the feed roll tension adjusters to lock into position.
7. Engage both feed roll tension adjusters.
8. Push the wire liner into the input wire feeder guide past the set screw (see Figure 12), but not out of the input wire feeder guide.

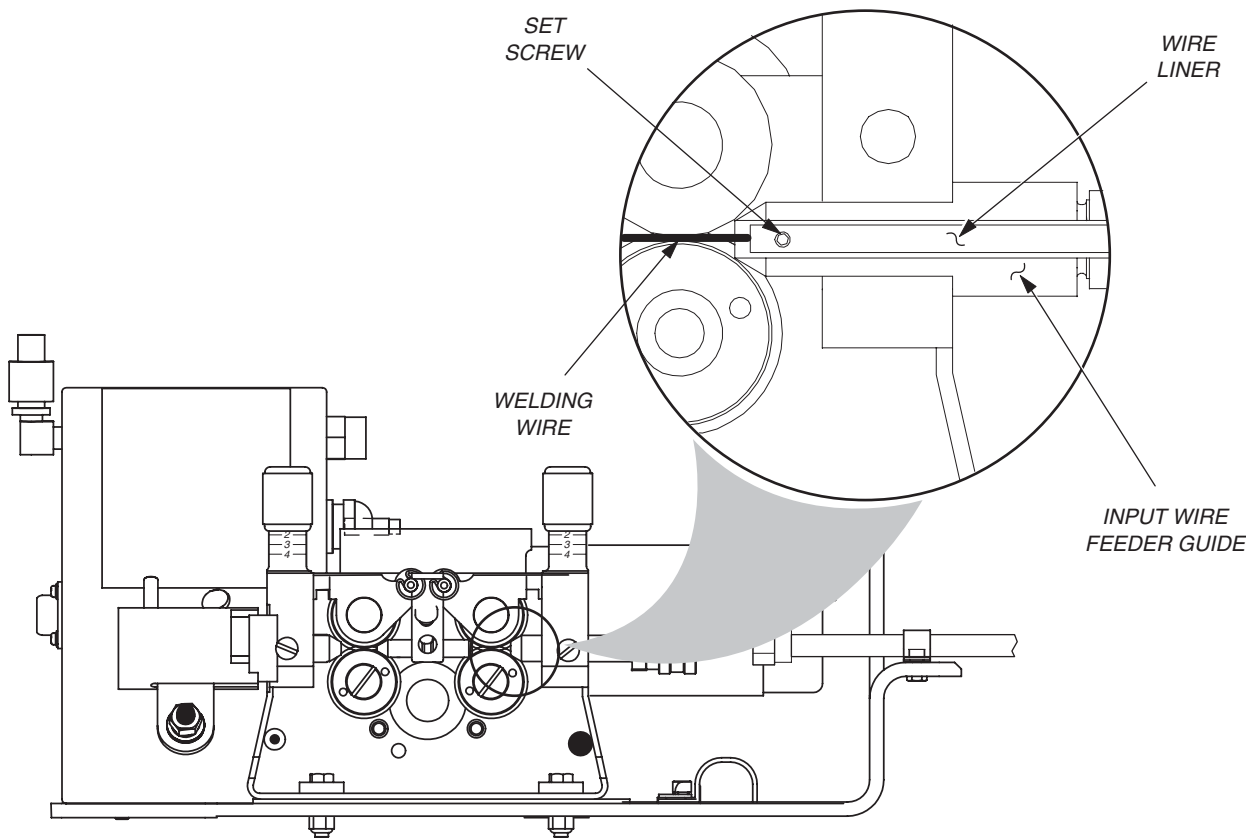


Figure 12 Install Welding Wire and Liner

9. Tighten the set screw onto the wire liner with a 1.5 mm Allen wrench.
10. Connect the wire guide connector to the input wirefeeder guide.

11. Feed the wire until it comes out of the torch tip. The welding wire tension may need adjustment to allow wire to pass through.

Adjusting the Welding Wire Tension

Excessive wire tension is the most common cause of poor wire feed performance.



CAUTION!

Over-tightening the feed roll tension adjusters causes excessive knurling and/or deformation of the wire.

Too much wire tension may cause excessive wear of the feed rolls and shorten the welding tip service life.

1. Press and hold the feed button on the programming pendant to feed welding wire through the torch and onto the floor.
2. Inspect the shape of welding wire on the floor.
When the tension adjustments are set properly, the wire on the ground forms a large uniform circle with no spiral or helix. No further adjustments are needed. If a spiral or helix is formed, there is too much wire tension.



Note: Use the indicator markings on the feed roll tension adjuster for pressure reference only. However, the numeric markings must match for proper wire pressure/tension.

3. Adjust the feed roll tension adjusters to eliminate wire slippage or tension. On each tension adjuster, the number 4 indicates the highest tension applied to the wire, number 1 indicates the lowest tension. Repeat steps 1 through 3 as necessary.

5.7 Troubleshooting

Table 8 Troubleshooting

Problem	Cause	Corrective Action
Welding wire does not feed properly	Wire size does not match with the marking.	Replace the feed roller with the one matched with the wire size (see Section 5.5.1).
	Groove is worn. V-groove is rounded off.	Replace the feed roller with a new one (see Section 5.5.1).
	Gear roller is covered with rust.	Remove feed roll (see Section 5.5.1) and clean with cloth. Do NOT file.
	Wire is damaged.	Replace the feed roller with the one matched with the wire size (see Section 5.5.1).
	Groove of roller is not aligned wire	Remove feed rolls (see Section 5.5.1) and reinstall.
	Powder or dust accumulated in input wire guide.	Remove input wire guide (see Section 5.6) and clean.
	Powder or dust accumulated in output wire guide.	Remove output wire guide (see Section 5.6) and clean.
	Tension Adjusters: Pressure is applied too weakly or strongly	Adjust the welding wire tension (see 5.5).
No gas at the weld	Gas valve needs replaced	Call Motoman service to replace gas valve.

Appendix A

Illustrated Parts List

A.1 Introduction

A.1.1 General

The Illustrated Parts List identifies, describes, and illustrates detail parts of the main assemblies for the HyperFeed EA manufactured by Motoman.

A.1.2 Purpose

This list provides parts identification and descriptive information for use in provisioning, requesting, purchasing, storing, and issuing spare parts.

A.1.3 Arrangement

Appendix A is arranged as follows:

Appendix A.1 – Introduction

Appendix A.2 – Illustrated Parts List

A.1.4 Explanation of Parts List

Contents

The parts list contains a breakdown of the equipment into detail parts. All parts of the equipment are listed except the following:

1. Standard hardware items (attaching parts) such as nuts, screws, washers, etc., which are available commercially.
2. Bulk items such as wire, cable, sleeving, tubing, etc., which are also commercially available.
3. Permanently attached parts which lose their identity by being welded, soldered, riveted, etc., to other parts, or assemblies.

Parts List Form

This form is divided into four columns as follows:

1. "Figure - Item Number" Column
This Figure column lists the figure number of the illustration applicable to a particular parts list and also identifies each part in the list by an item number. These item numbers also appear on the illustration. Each item number on the illustration is connected to the part to which it pertains by a leader line and arrow. Thus, the figure and item numbering system ties the parts list to the illustrations and vice versa.
2. "Motoman Part Number" Column
All part numbers appearing in this column are Motoman part numbers.
3. "Description" Column
The item nomenclature appears in this column.
4. "QTY" Column
This column indicates the quantity of parts required for an assembly or subassembly in which the part appears. This column does not necessarily reflect the total used in the complete end item.

A.2 Parts List

A.2.5 Explanation of Parts List Arrangement

The parts list is arranged so that the illustration will appear on left-hand page and the applicable parts list will appear on the opposite right-hand page. Unless the list is unusually long, the user will be able to look at the illustration and read the parts list without turning a page.

A.2.6 Symbols and Abbreviations

The following is a list of symbols and abbreviations used in the parts list.

amp – ampere

AC – alternating current

cyl – cylinder

DC – direct current

fig – figure

hex – hexagon

ID – inside diameter

in. – inch

m – meter

mm – millimeter

No. – number

psi – pounds per square inch

v – voltage

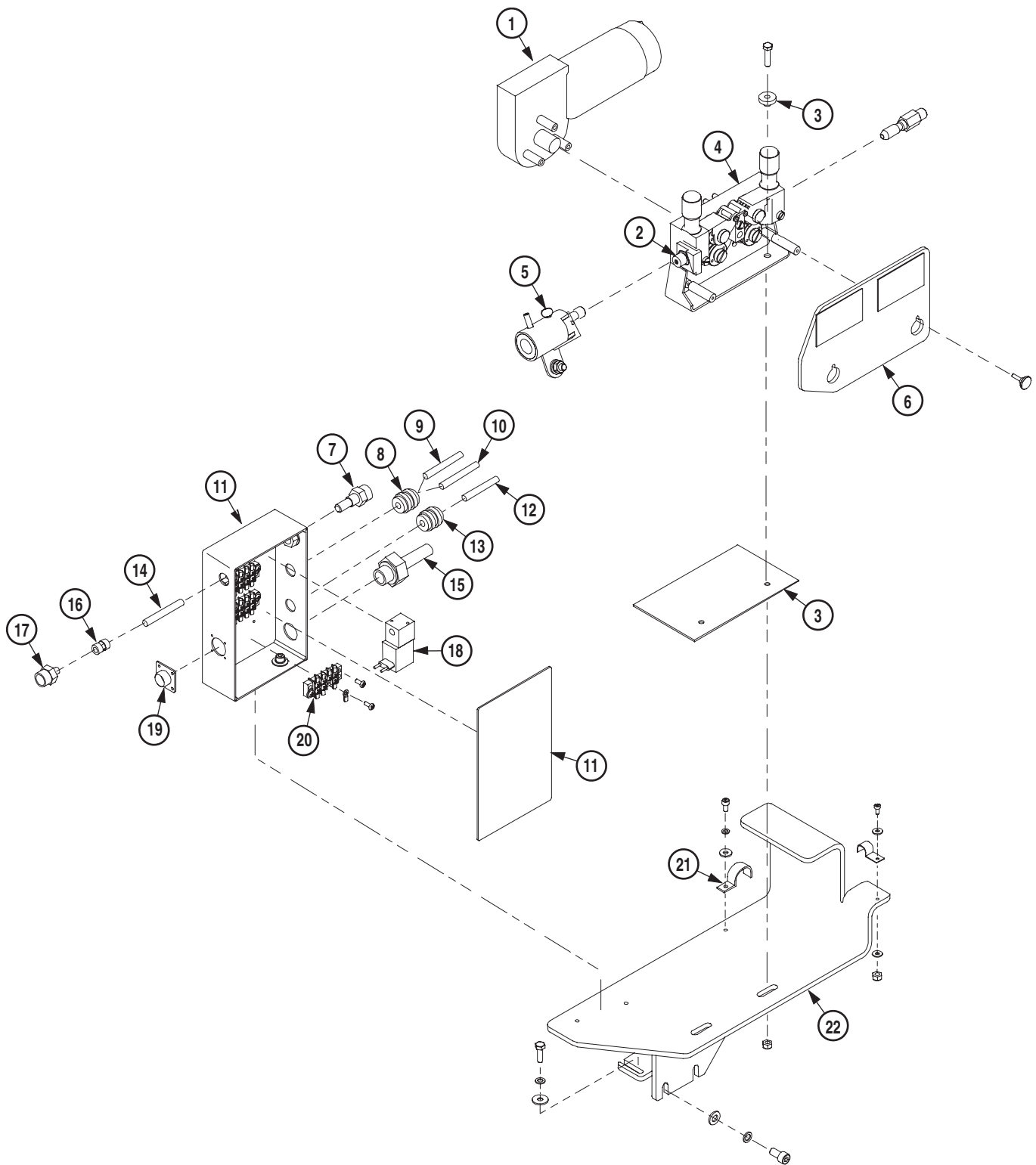


Figure 13 Hyperfeed EA Wire Feeder Exploded

Table 9 Parts List – Hyperfeed Components

Item Numbers	Motoman Part Number	Description	QTY
1	147753-1	MOTOR, WIREFEEDER, 24VDC	1
2	149938-1	ADAPTOR, POWER PIN	1
3	147658-1	INSULATOR, KIT	2
4*	147752-1	FEEDHEAD*	1
5	141470-1	POWERPIN, TWECO #5	1
6	149792-1	COVER, WIREFEEDER	1
7	372074-1	ADAPTOR, GAS, RIGHT HAND	1
8	131380-17	GRIP, CORD, PLASTIC	
9	149790-1	CABLE ASSY, MOTOR LEAD TO J-BOX	1
10	149786-1	CABLE ASSY, VOLTAGE SENSE	1
11	149664-1	ENCLOSURE, ALTERED, J-BOX	1
12	149787-1	CABLE ASSY ENCODER TO J-BOX	1
13	472110-2	GRIP, CORD, PLASTIC	1
14	149791-1	FITTING, NIPPLE, LONG	1
15	149788-1	CABLE ASSY, CONTROL, UPPER ARM	1
16	472468-1	FITTING, COUPLING, FEM	1
17	148931-2	FITTING ADAPTOR, B-SIZE, FEM 1-8NPT	1
18	130829-1	VALVE, GAS, 24VDC-7W	1
19	149789-1	CABLE ASSY, SHOCK SENSOR	1
20	132212-4	TERMINAL, DOUBLE ROW	3
21	148999-1	CLAMP, CABLE	1
22	149656-1	BRACKET, MOUNTING	1

* See Figure 14 for exploded view.

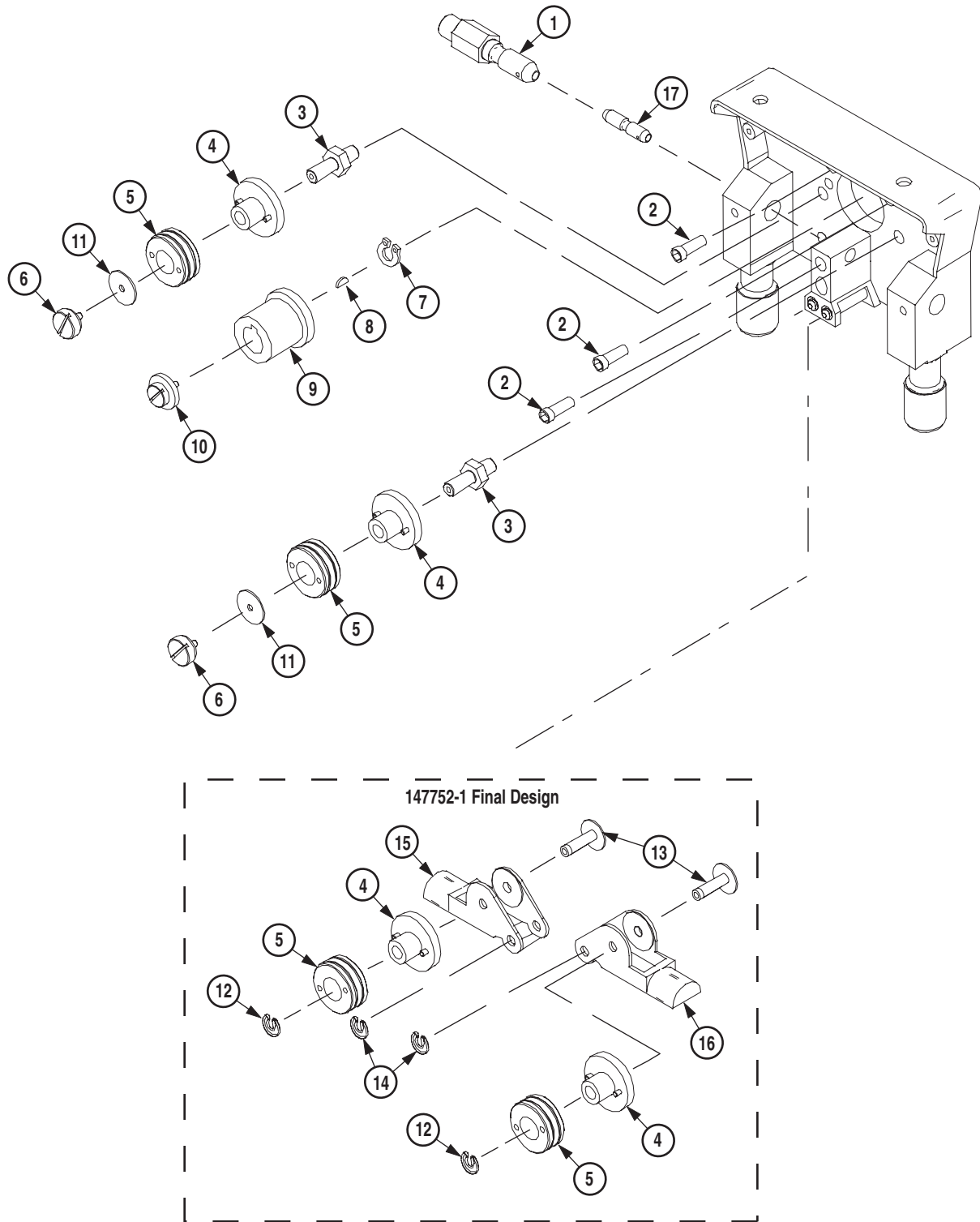


Figure 14 Front Released Mounting Frame Exploded

Table 10 Parts List – Hyperfeed Wire Drive Components

Item Number	Motoman Part Number	Description	QTY
1	148439-1	GUIDE, WIREFEEDER, INPUT	1
2	148444-1	SCREW, MOUNT, MOTOR	3
3	148437-1	SHAFT, GEAR ADAPTOR, FEED ROLL	2
4	148438-1	ADAPTOR, GEAR, FEED ROLL	2
5	147809-1	FEED ROLL KIT, V-GROOVE, .035" - .045" (0.9-1.2 MM) HARD WIRE	1
6	148434-1	SCREW, FIXING, KNURLED	2
7	148443-1	RETAINER, SHAFT, MOTOR	1
8	148442-1	KEY, MOTOR, SHAFT	1
9	148436-1	GEAR, MAIN DRIVE, FEED ROLL	1
10	148433-1	SCREW, RETAINING, FEED ROLL	1
11	148435-1	WASHER, RETAINING	2
12	149370-1	CLIP, RETAINING, C-RING	2
13	148440-1	SHAFT, SCREW, PRESSURE ROLL	2
14	148432-1	RETAINER, PRESSURE ARM	2
15	150221-1	RIGHT HAND PRESSURE ARM	1
16	150222-1	LEFT HAND PRESSURE ARM	1
17	148095-1	TUBE, GUIDE, CENTER	1

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