

MODEL 52 WELD HEAD OPERATION MANUAL

MODEL 52 WELD HEAD OPERATION MANUAL

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WARNING



The nature of the GTAW process creates some POTENTIAL HAZARDS. In accordance with international safety regulations the EXCLAMATION SYMBOL indicates that this equipment is considered HAZARDOUS until an operator has been made aware of these POTENTIAL HAZARDS by **READING THIS MANUAL**. The LIGHTNING FLASH SYMBOL indicates that there are potential electrical hazards. The use and display of these symbols make it the OPERATOR'S RESPONSIBILITY TO INSURE THAT THEY HAVE READ AND/OR BEEN MADE AWARE OF ALL OF THE SAFETY-RELATED ITEMS CONTAINED IN THIS MANUAL.

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OPERATION MANUAL
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SECTION I - INTRODUCTION

1.0 INTRODUCTION

This manual is intended to assist users of this equipment in set up and basic operation. Automatic Gas Tungsten Arc Welding (GTAW) welding with filler requires a good deal of operator/welder expertise which requires AMI supplied training. THIS MANUAL IS NOT INTENDED AS A SUBSTITUTE FOR THAT TRAINING.

The M-52 Weld Head can be configured in many versions. However, all M-52 Weld Head versions have a common design and are used essentially the same. This Manual is intended to cover the entire M-52 Product Line and not just one version. Version specific performance specifications can be found in the appropriate AMI Weld Head Specification. Version specific wiring and parts information can be found in the appropriate Illustrated Parts Breakdown Manual (IPB) supplied with each Weld Head.

The Model 52 Weld Head is part of a complete welding system intended for the welding of metal pipes, plates and fittings. The complete system consists of an AMI Model 415 Power Supply, Adapter Cable, Gas Lines and the M-52 Weld Head.


The standard AMI power supply provides GTAW current with pulsation controls, high frequency or touch arc starting, purge gas controls, weld head arc rotation, cold wire feed, Arc Voltage Control, Torch Weave/Steering (Oscillation) and automatic timing functions. Users need only to supply input AC power, regulated torch shielding gas source with flow meter and the M-52 Weld Head.

NOTE A complete understanding of Orbital Welding techniques and the use of the M-415 Power Supply is required before installation or operation of a M-52 is attempted. Detailed descriptions of Power Supply general system operation, modes or functions mentioned in this manual can be found in the M-415 pipe welding power supply Operation Manuals and are not covered in this document.

In-depth weld development instructions, weld head set-up, maintenance and troubleshooting are contained in other manuals, documents and training classes and are not included in this manual. Contact your AMI representative for more information about these items.

1.1 SAFETY PRECAUTIONS


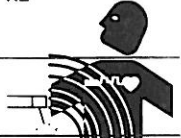






This section contains cautions and warnings concerning the operation of this equipment and welding equipment in general. However, in addition to reading this manual and before operating this or any welding equipment, users should reference and be familiar with "**ANSI-49.1 Safety in Welding and Cutting**". This standard is published by the American National Standards Institute and the American Welding Society.

	<p>WARNING: Touching energized electrical parts can cause a fatal shock or burns. When in weld sequence the electrode and work are electrically energized. Incorrectly installed or improperly grounded equipment is a hazard.</p>
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SECTION I - INTRODUCTION





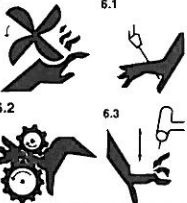
1.1 SAFETY PRECAUTIONS (continued)

<p>1.1</p> 	<p>WARNING: This equipment is authorized to use a type of arc starter that produces a High Frequency Radio Wave (sometimes called HF and/or RF Starting). It can cause interference and sometimes even damage to nearby electronic equipment (such as computers) that are un-protected or poorly protected against such interference.</p>
<p>1.2</p> 	<p>WARNING: Magnetic Fields from High Currents can affect pacemakers. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR.</p>
<p>1.3</p> 	<p>WARNING: Disconnect the input power to the machine before opening or servicing. Discharge all circuits that store high voltage such as capacitor packs. Only QUALIFIED service personnel should open this equipment.</p>
<p>2</p> 	<p>WARNING: Welding can cause fires or explosions. Do not weld near FLAMMABLE or EXPLOSIVE MATERIALS. Watch for fire. Have proper type of extinguisher in work area.</p>
<p>2.1</p> 	<p>WARNING: Welding Operators should wear non-flammable protective clothing, footwear and head gear.</p>
<p>2.2</p> 	<p>WARNING: Never weld on sealed containers or pipes. This may result in an EXPLOSION.</p>
<p>2.3</p> 	<p>WARNING: Welding produces high temperatures in both the welded components and the welding equipment. Both can cause severe burns. Do not touch recently welded components. Avoid touching internal components of the welding system soon after use. Avoid touching torch components and welding fixtures soon after welding.</p>
<p>3</p> 	<p>WARNING: The welding arc emits ultra-violet (UV) radiation and the molten weld gives off infra-red. Both can burn eyes and skin if unprotected. Suitable eye and skin protection must be worn.</p>

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION I - INTRODUCTION

1.1 SAFETY PRECAUTIONS (continued)

<p>4</p> 	<p>WARNING: Weld materials can emit toxic fumes during welding. WELD ONLY IN AREAS WITH ADEQUATE VENTILATION.</p>
<p>4.1</p> 	<p>WARNING: Most GTAW gases like Argon are non-toxic, however, Argon is heavier than air and will displace the normal atmosphere in enclosed areas. DO NOT WELD IN ENCLOSED AREAS WITH OUT PROPER VENTILATION OR RESPIRATORS.</p>
<p>5</p> 	<p>WARNING: AMI factory training is essential for all Welding Operators and Maintenance Technicians who operate AMI equipment.</p>
	<p>WARNING: Before operating, storing or handling, always make sure that the Power Supply, Pendant, weld heads and cables are not exposed to rain or standing water. SYSTEM COMPONENTS ARE NOT WEATHER-PROOF.</p>
<p>6</p> 	<p>WARNING: Keep hands and fingers clear from moving parts such as fans, gears, rotors, Wire Feed, Rotation, OSC and AVC Mechanisms.</p> <p>The M-52 AVC and Oscillator Slide Assemblies have a great deal of power and it is possible, by their nature of operation, to harm any object or body part that may get into these areas. USE EXTREME CAUTION.</p>

1.2 OPERATIONAL PRECAUTIONS

The following is a basic check list for operating personnel to follow to insure minimum system down-time due to improper operation and handling:

1. TOO AVOID severe equipment damage VERIFY that the Power Supply is connected to the correct Input AC power before turning power on..
2. Before operating, check all fittings and connectors for proper seating and that all protective boots are in place. If not properly seated or protected, short circuits, poor connections or inert gas leaks could occur.
3. The M-52 is intended for typical GTAW gases ONLY. *NEVER CONNECT OXYGEN OR ACETYLENE TO THE M-52.*
4. Before operating, insure that all cables are routed or protected in such a way that they will not be subject to heat, equipment and/or personnel traffic. Insure that the cables DO NOT come in contact with HOT PIPE.

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SECTION I - INTRODUCTION

1.2 OPERATIONAL PRECAUTIONS (continued)

5. When storing or handling cables, always keep the protective boots and dust caps on all connectors and fittings until ready to install. A major cause of downtime in any automatic welding system is improper care and use of cables.
6. Before operating, insure that the Power Supply has adequate air flow. Do not restrict the intakes or exhaust vents of the power supply.
7. Before operating, always insure that there is bare metal contact between the weld head components which connect to GROUND (clamps, etc.) and the tube or pipe to be welded.
8. When storing or handling weld heads, always keep them in the protective containers they are shipped in, until ready to install.
9. When operating, storing or handling, insure that the M-52 is protected against dirt, dust, etc. NEVER GRIND NEAR AN EXPOSED WELD HEAD or POWER SUPPLY.
10. Do not use acid, corrosives, liquid "Easy Out" or any liquid substance on the M-52. When cleaning, use only a light solution of Isopropyl alcohol on a soft cloth .
11. When handling, take extreme care to avoid dropping the power supply, weld heads, cables or any accessories.
12. Do not attempt to move the tube end into position using the weld head as a lever.
13. Do not add any lubrication like graphite, oil or grease to the weld heads or power supply unless it is specified in the operation or maintenance manual for that equipment.
14. Never use a M-52 or any AMI Power Source for the purposes of pipe thawing.
15. Proper operation of the wire feeder (and acceptable welds) depends on the spools being filled properly without contaminating the wire and also winding properly to insure the wire comes off the spool smoothly and consistently.

1.3 SHOCK HAZARD WARNING

The ELECTRODE (tungsten) is an "exposed terminal" and by its nature the GTAW process requires electrical potential to be present on the electrode during arc starting and of course during welding.

All AMI Power Supplies contain a "bleeder" circuit to ground any residual potential after welding or after an aborted or bad "arc start" attempt. However, these circuits take a few seconds to operate or COULD FAIL.

"THE ELECTRODE SHOULD ALWAYS BE CONSIDERED A POSSIBLE SHOCK HAZARD". This is especially true when ever the system is in "weld sequence" ready to weld, is welding or has just finished welding. However, equipment/component failure, system abuse, or improper maintenance could result in electrical potential at the weld head "even when not in weld sequence".

1.4

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION I - INTRODUCTION

1.3 SHOCK HAZARD WARNING (continued)

The users/operators of this equipment must take all precautions necessary to avoid contact with the ELECTRODE at "ALL TIMES". The only exception is when actually replacing or adjusting the electrode and this should be done "WITH THE POWER TURNED OFF".

If performed with the power "ON" the system must be in test mode out of weld sequence and the USER MUST OBSERVE COMMON SAFETY PRACTICES such as grounding the electrode to insure discharge before actually touching it.

REMEMBER, there is a "POSSIBLE" shock hazard in all welding power supplies at "ALL" times.

Most AMI Power Supplies feature High Frequency (HF) Arc Starting. This is a High Voltage/High Frequency electrical transmission process. To eliminate any HF shock possibility "AVOID ALL CONTACT" with the Welding WORK (ground), the ELECTRODE or the M-52 during arc start.

1.4 RF AND EMI EMISSIONS

1. WHY RF?

"It has long been recognized that in the practice of welding and cutting, there are circumstances where it is required to assist the process using radio frequency voltage. In order to arc weld an electric arc must be created, because of safety and economic concerns, the no load voltage of arc power sources is kept as low as practical. Thus, a source of high voltage with a high safety factor must be utilized. Radio Frequency voltage is the best method of meeting these criteria for many reasons." (quoted from CISPR/B/63).

2. RF REGULATION

The FCC regulates the RF emission limitations for welding equipment by the use of an IEC (international) regulation created by the Special Committee on Radio Interference (known as CISPR) subcommittee B. The regulation of record is:

CISPR/B/63

"CODE OF PRACTICE FOR THE USE OF WELDING AND CUTTING POWER SOURCES UTILIZING RADIO FREQUENCY VOLTAGE FOR STARTING OR STABILIZING THE ARC."

The regulation states that due to the variety of work requirements and conditions it is virtually impossible to establish fixed, normalized and predictable tests and test setups for RF limits that would actually mean something. Instead of limits they state the following:

"The manufacturer must design and produce equipment that is functional but at the same time, design this equipment to keep electromagnetic radiation at a minimum."

"The user has the responsibility to install and use the power source per the instructions of the manufacturer. Through this practice, it is reasonable to assume that the probability of electromagnetic disturbances will be significantly reduced. However, if some electromagnetic disturbances are felt, then it is the responsibility of the USER of the equipment to resolve the situation."

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION I - INTRODUCTION

1.4 RF AND EMI EMISSIONS (continued)

3. RF PROTECTION

AMI policy is to comply with the IEC (and thus FCC) regulations. Our design rules and procedures include testing and observing this area. We can assure our customers that every effort has been made to reduce RF emissions to the absolute minimum from our power sources.

However, this does not mean that a user will not have occasional problems with RF interference with other equipment due to the use of our equipment. This is the nature of RF starting.

Most RF noise interference problems are going to be either set-up related or caused by poor or no filtering on the behalf of the equipment that is being interfered with. Most problems are easily correctable but each one must be looked at on a "case by case basis."

4. EMI SUPPRESSION

AMI Power Supplies are equipped with a heavy-duty Pi-Network filter, connected to the input power line, to prevent propagation of EMI either into or out of the Power Supply. The all-metal enclosures and internal shields prevent radiated EMI.

1.5 BASIC COMPONENTS

For purposes of description the Model 52 consists of five (5) basic assemblies. A brief description of each is as follows (Refer to Figure 1).

1. Main Weld Head Assembly (Figure 1, Item 1)

1. This Assembly contains the rotation Drive Motors, the Torch Oscillation Motor and the Arc Voltage Control (AVC) Motor.
2. The main housing mounts to the Guide Ring Assembly (see Section 1.5.5) on the pipe to be welded. The gears on the underside of the Left Hand and Right Hand Drive Carriage Assemblies engage the gear teeth on the Guide Ring.
3. The Weld Head Main Assembly is held on the Guide Ring by Latch Roller assemblies (on each drive carriage) that lock the Weld Head onto the Guide Ring.

2. Torch and Wire Manipulator Assembly (Figure 1, Item 2)

1. The Torch Assembly contains a TIG water cooled Torch with Torch Position adjustments. The Torch Assembly also contains Wire Feed entry adjustments.
2. The Model 52 can be equipped with many different Torch Assemblies. Each provides different options for clearance and operation techniques.

1.6

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION I - INTRODUCTION

1.5 BASIC COMPONENTS (continued)

3. Cable and Connector Assembly (Figure 1, Item 3)

1. The Cable and Connector Assemblies supply the pervious two assemblies with cooling water, Electrode Power (welding Current), welding Inert Gas and Electrical Control wiring for Weld Head Motor functions.

4. Wire Feed Assembly (Figure 1, Item 4) Single Wire Feed (CCW) model shown (Standard).

1. The Wire Feed Motor assembly is mounted on the Main Housing. This unit provides puller filler wire feed capability. The Wire Feed Assembly contains a Drive Motor with Wire Feed Gears and a Wire Spool Holder assembly designed to use Industry Standard 8 inch-10 pound wire spools (4 inch and 12 inch are Options).
2. The Mode 52 Weld Head is designed to use one (1) or two (2) Wire Feed Assemblies. The Dual Wire Feed Option provides automatic Wire Feeder selection as a function of the Travel Mode direction. The CCW Wire Feeder (standard) is operational in the CCW direction of travel. The CW Wire Feeder (optional) is operational in the CCW direction of travel. The CW Wire Feeder (optional) is operational in the CW direction of travel. Use of the Dual Wire Feed option requires the use of dual-entry torch.

5. Weld Head Guide Rings and Flat Track (Figure 2)

The M-52 can use two (2) different types of Guides Rings and Flat Track. The first is standard M-15 Guide Rings and Guide Tracks:

1. The M-15 Guide Rings or Guide Track provide the Drive Surface (Gear Teeth) for the Weld Head and align the Weld Head to follow the Weld Seam or joint.
2. The M-15 Guide Rings come in standard Pipe Sizes from 10 inch to 60 inch or larger.
3. Any Guide Ring can be mounted on a pipe one (1) pipe size smaller. Example: A 12 inch Pipe Guide Ring can be mounted on a 12 inch Pipe or a 10 inch Pipe.
4. The Guide Ring is a two (2) piece split device that is connected by four (4) Captive screws (2 on each side). The Guide Rings have multiple spring loaded feet for mounting and alignment, and solid feet for locking the Guide Ring on the Pipe.

The M-52 can also use another style of track designed just for the M-52:

5. The M-52 Guide Ring or Flat Track provides the drive surface (sprocket holes) for the M-52 Weld Head and aligns the Weld Head to follow the Weld Seam or joint.
6. The M-52 Guide Rings are wider and mount higher off of the pipe surface. Sprocket Drive is used instead of Gear and Gear Tooth Drive. Adapters to the Left Hand and Right Hand Carriage Drive units must be installed to use the M-52 style Track.

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MODEL 15 MAJOR ASSEMBLIES

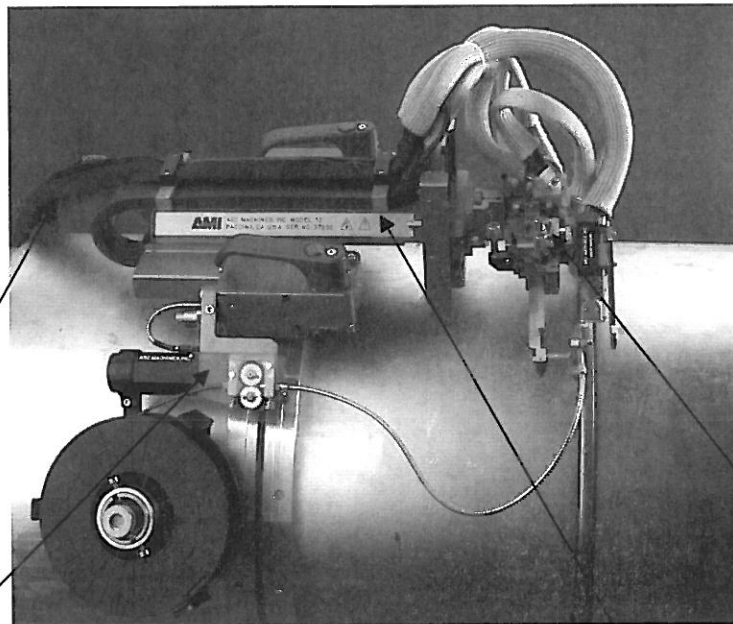


FIGURE 1

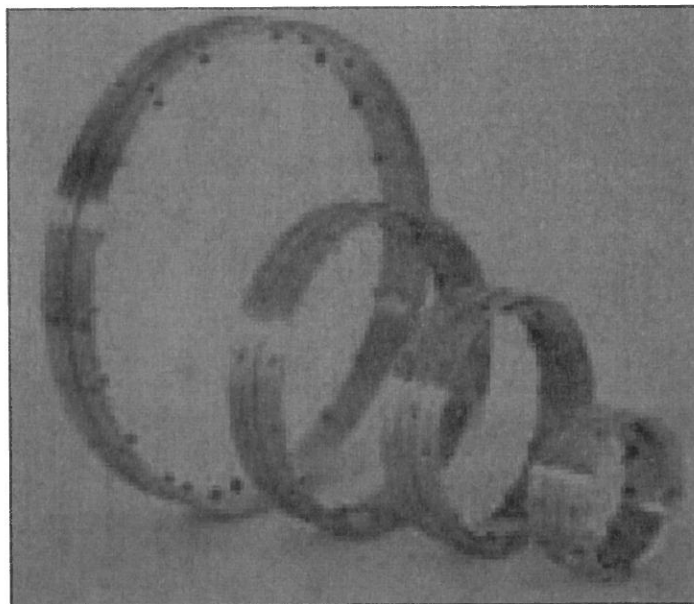


FIGURE 2

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION II - SPECIFICATION

2.0 INTRODUCTION

The Model 52 (M-52) is intended for all position, automated welding of pipe, plate or fittings using the Cold or Hot Wire Feed GTAW (TIG) process. The M-52 is intended for use with an Arc Machines, Inc. (AMI) Model 415 Power Supply/Controller Unit. Together they form an Automated Welding System.

AMI offers many types of Automated Welding Heads and Systems and the M-52 is intended to fill a very specific slot within the AMI family of products. The M-52 provides a durable, extremely versatile, heavy duty platform for using a variety of complex Torch Options for Narrow Groove Welding, Remote Welding with vision and Hot Wire Welding.

The M-52 is a "full function" welding Head, meaning that it provides all functions necessary for true automated welding including Arc Rotation, Arc Voltage Control (AVC) for arc gap control, Wire Feed (weld filler) and Torch Oscillation (weave). The M-52 also features range expandability of most of these functions as well as providing other standard features that are Options on most other Weld Heads (including other AMI models)

This specification is intended to outline the ranges and capabilities of the M-52 Weld Head and some of its Options.

2.1 WELDING RANGE

1. Minimum Outside Diameter = 10 inch pipe (10.75" O.D. (273 mm)
2. Maximum O.D. = No Limit, can be mounted on any large diameter including flat plate

NOTE: Can be adapted to 8.625" (8" pipe) O.D. using the 10 inch pipe Guide Ring and extension feet. Radial Clearance will increase accordingly.

NOTE: Can be adapted to I.D. Track applications. Minimum I.D. is 26.00" (660.4 mm)

3. Maximum Wall Thickness = Dependant on torch type, Options and Accessories

2.2 WELD HEAD CLEARANCE ENVELOPE

1. Radial Clearance increases as Guide Ring Diameter increases. Radial clearance is also dependent on Torch Type, Torch Set Up and AVC Stroke.

<i>RADIAL CLEARANCE</i>		
	ON 10 INCH PIPE	ON FLAT TRACK
With 2 inch AVC NO TORCH	6.56" (166.6 mm)	6.90" (175.3 mm)
With 4 inch AVC NO TORCH	7.05 (179.1 mm)	7.50" (190.5 mm)
With "P" Torch	8.50" (215.9 mm)	9.00" (228.6 mm)

NOTE: P Torch clearance is absolute minimum and would require some cable re-routing. Normal P, N, D and NGT Torch wiring is usually routed above the torch increasing radial clearance.

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OPERATION MANUAL
SECTION II – SPECIFICATION**

2.2 WELD HEAD CLEARANCE ENVELOPE

1. Radial Clearance (continued)

NOTE: In addition to adequate radial clearance, there must be adequate clearance for the mounting of the Guide Track and the Installation and Removal of the Weld Head.

2. Axial Clearance

Axial Clearance is dependant on torch type. The following is based on a Type P Torch and can be considered typical but will vary slightly from torch to torch.

1. Electrode to Rear of Head = 19.9" (505.5 mm) with Oscillator at Center of stroke.
2. Electrode to Bulkhead (P Torch only) = 0.69" (18 mm)
3. Minimum straight length of pipe required for mounting = 11.88" (301.7 mm)
Oscillator at Center of stroke.

3. Reference **AMI Outline Drawing 40520001** for additional dimensions.

2.3 FUNCTION PERFORMANCE AND RANGES

NOTE: Regulation methods and tolerances given are actually controlled by the Power Supply/Controller Unit. They are given here only as assurance that the devices used in the M-52 to perform these functions can meet these criteria.

1. TRAVEL (Arc Rotation)

The M-52 Mounts on a Guide Ring or Flat Track that is previously mounted on the pipe or plate to be welded. Mounting is via quick release levers and the M-52 can be mounted and dismounted very quickly without the use of tools. All Travel speeds given are based on the drive gear surface of the Guide Ring or Flat Track and not on the surface of the weld or weld diameter.

1. Minimum Travel Speed = 0.2 IPM / 50 ms slew
2. Maximum Travel Speed = 20 IPM (.5 m/min) / 50 ms slew (full vertical load)
3. Regulation is closed loop servo in IPM using 5 VDC Tachometer Feedback
Digital Tachometer feedback also available.
4. Regulation tolerance is +/- 1 % or 0.2 IPM (5.1 mm/min) whichever is greater.
5. An Encoder is attached to the rotation drive train to indicate back to the power supply the position of the weld head (on the track).

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SECTION II - SPECIFICATION

2.3 FUNCTION PERFORMANCE AND RANGES

1. TRAVEL (continued)

6. To insure "zero" backlash and provide adequate power and torque the M-52 Rotation drive train uses a two motor, two drive gear arrangement. Power and torque figures will vary. However, the M-52 and M-415 System will always provide more than enough power to propel the Weld Head and Torch Option vertical up at maximum speed.

2. WIRE FEED

Single Wire Feeder Assembly on CCW side of Weld Head is standard.

1. Minimum Wire Feed Speed = 5 IPM (0.13 m/min)
2. Maximum Wire Feed Speed = 200 IPM (5 m/min)
3. Regulation is closed loop servo in IPM using 5 VDC Tachometer Feedback Digital Tachometer feedback also available.
4. Regulation tolerance is +/- 1 % or 0.2 IPM (5.1 mm/min) whichever is greater.
5. Although not supplied as standard, the M-52 Wire Feeder can have an encoder attached to the wire output to measure true Wire Speed. The M-52 is wired as standard for this option.
6. Wire Size, standard = .030" to .045" (.76 to 1.1 mm)
Using V-Groove serrated roller. One size Smooth U rollers up to .060" (1.5 mm) are available.
7. Wire Feed Capacity – Industry Standard 8" (10 lb.) (203 mm /4.5 kg) spool
Options for 4" and 12" spools are available.
8. This Wire Feeder, related Wire Liners and Wire Feed Nozzles are intended primarily for mild carbon steels and most Austenitic Stainless Steel wires not exceeding 0.045" in diameter.

Harder wires such as high chrome or Stellite may require special roller, liner or nozzle options. Larger Wire sizes will also require special roller, liner and nozzle options.

The standard V-Groove serrated rollers can, depending on usage, nick or mark the wire. In cases of aluminum, this is not desirable and the use of size specific U-Groove smooth rollers may be necessary. Standard Wire Liners use Teflon inner sleeves. In the case of aluminum welding or in radiation environments, this is not recommended and in most cases should be replaced with a Nylon based liner.

Your application wire feed needs should be discussed with an AMI representative before final configuration of the Wire Feeder.

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SECTION II - SPECIFICATION

2.3 FUNCTION PERFORMANCE AND RANGES

3. TORCH OSCILLATOR and Cross-Seam Adjust (steering)

The Torch Oscillator provides both Cross-seam adjustment for steering and it also provides the electro-mechanical ability to oscillate (weave) across the weld seam during a weld sequence.

1. Total Mechanical Movement = 4.00" (101.6 mm)
 1. Maximum Oscillator Amplitude (weave) = +/- 0.50" (12.7 mm)
 2. Minimum Oscillator Amplitude = 0.020 (0.5 mm)
2. Regulation of position and oscillator weave during welding is closed loop position servo using a precision encoder for feedback and to display position.
3. Regulation is in thousands of an inch and the accuracy is +/- 1 % or 0.010" (0.25 mm) whichever is greater. The tolerance is setup by the controlling device (power supply). However, the mechanics are such as to not impede the stated tolerances of the power supply..
4. Worst case acceleration and deceleration time is 50 milliseconds (time required to go from zero to full speed or full speed to zero).
5. Maximum slew speed = 1.0 IPS (50 ms acceleration)

NOTE: Speed is determined by the "Excursion" Time Versus the amplitude "Distance" to be traveled by the torch. The Model 415 can be programmed for an amplitude and excursion time that may require greater speed.

6. The Oscillator will not creep in standby or power off conditions
 7. Maximum Load = 20 LBS. (9.1 kg)
4. ARC VOLTAGE CONTROL (AVC)

The AVC provides a means of maintaining a uniform arc length as the weld head rotates around the weld. The AVC mechanism provides motorized torch travel in a plane which is radial to the pipe centerline. The AVC mechanism is built into and attached to the moving portion of the Oscillator mechanism.

1. AVC Mechanical Stroke = 4.00" (101.6 mm)
2. Maximum speed = 1.0 IPS (50 ms acceleration)
3. Regulation is a closed loop position servo maintaining a programmed Arc Voltage. The Voltage is sensed at the Torch (electrode) and through the Track to work (ground).
4. Regulation is in Volts DC (VDC) and the accuracy is +/- 1% or 0.1 VDC whichever is greater. The controlling device (power supply) sets this tolerance. However, the mechanics are such as to not impede the stated tolerances of the power supply.
5. The AVC has a position encoder built in to provide a position readout and to be used in conjunction with a set function (preset auto slew to before arc start).

2.4

MODEL 52 WELD HEAD

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SECTION II - SPECIFICATION

2.3 FUNCTION PERFORMANCE AND RANGES

4. ARC VOLTAGE CONTROL (continued)

6. The AVC will not creep in standby or power off conditions
7. Maximum Load = 20 LBS. (9.1 kg) (Torch Option Weight)
8. Arc Starting Method = Touch or High Frequency depending on Torch type.
9. AVC features Dove Tail Slide Torch Mounting with the AVC slide Assembly providing +/- 15 degrees of Lead/Lag Torch Tilt Adjustment over Torch Centerline.

5. WELDING POSITIONS

The M-52 can weld in the 1G, 2G, 5G, and 6G positions (including vertical up on flat track) with any torch Option (section 5.0).

2.4 TORCH OPTIONS

The following is a list of Torch Options available as of this Specification Revision. For Torch details reference the individual specifications for each torch and the AMI Outline drawing noted for each Torch Type.

<i>Torch Type</i>	<i>Description</i>	<i>Outline Drawing No.</i>	<i>Specification No.</i>
M-52 "A"	Single Wire Feed	40150057 *	No. 15 *
M-52 "C"	Dual Wire Feed	40150055 *	No. 15-C *
M-52 "N"	Dual Wire Feed, Direct View Cameras Motorized Manipulators	40150078 *	No. 15-N *
M-52 NGT	Narrow Gap Osc Tungsten, Single Wire Feed, Direct View Cameras	40150075 *	No. 15-NGT-B *
M-52 "D"	Hot Wire Narrow Gap, Single or Dual Wire Feed Entry, with or without vision	none	No. 52-D
M-52 "P"	Dual Wire Feed, Direct View Cameras Motorized Manipulators	40520001	No. 15-P *

***NOTE** - M-15 specifications and Torch Outlines apply except where differences in mounting and Lead/Lag Tilt occur (see 4.0.9)

2.5 WELD HEAD CABLING and WIRING

1. Weld Head Control Cable = 5 meters (16.4 ft)
Weld Head Service Cable = Nominal 5 meters, varies with Torch type.

The interface connections for control, weld power, gas and coolant are secured through a strain relief mounted rigidly to the reverse side of the weld head housing. The strain relief provides mechanical and thermal protection for the cable assembly and prevents any cable motion from being felt at the torch.

40 foot Adapter Service and Control Cables are provided with the M-415 Power Supply and these cables make the transition between the weld head and the Power Supply. Additional 50' or 75' Extension cable assemblies are available as an option which will allow weld head operation up to 200 feet (61 m) away for the Power Supply

MODEL 52 WELD HEAD
OPERATION MANUAL
SECTION II - SPECIFICATION

2.5 WELD HEAD CABLING and WIRING

2. One wrap of cabling (including any remote camera cables) will not exceed the radial and axial clearance.

2.6 TEMPERATURE RANGE/PREHEAT CONDITIONS

1. The Weld Head is provided with built-in water cooling for the main housing and temperature sensitive components such as motors and encoders. This does not mean the head is intended for un-restricted preheat and Hi Temp applications.
2. No minimum or maximum preheat or ambient temperature range is given. Actual working conditions, Torch type, welding duty cycle, weld parameters and other conditions vary too much to state a rigid temperature.
3. All temperature range assessments are based upon the maximum allowable Motor Winding Temperature that can be tolerated by the internal Permanent Magnet D.C. motors of the Weld Head and their encoders.
4. Winding temperature depends on pipe temperature, ambient air temperature, mounted duty cycle and Motor Torque (how hard are the motors being run??)
5. As a guideline, we state that the M-52 Weld Head Housing temperature should not exceed 140 F (60 C) at any time. The standard M-52 can be installed on short duration pre-heated welds in excess of 250 F (121 C) and not exceed this. On the other hand, this number can be exceeded in non-preheated applications with high duty cycles and high welding currents. It all depends on the application.
6. Encoder and Camera performance begins to decay at 120 F (49 C)
7. The M-52 uses a liquid cooled housing. When used with an efficient cooling unit, it can easily maintain the Weld Head Housing temperature under 120 F (49 C) and thus can be used in most preheat and non-preheat applications.
8. Liquid cooled Guide Rings and special insulation are also available for pre-heat applications. Consult with an AMI representative for specific information based on the actual application.

2.7 GENERAL

1. The position encoders (rotation, AVC, Oscillator) are not absolute. They do not remember their position at power down of the power supply. They must be reset to the desired reading after the power supply and weld head have been turned on.
2. AVC/OSC Interchange –The M-52, via the M-415 Power Supply, can switch the AVC Weld Head mechanics to become the Torch Oscillator and allow the Torch Oscillator to become the AVC. This allows the Torches to be tilted 90 degrees from normal for such items as flange and seal welding. This is a standard feature, no Option is needed.
3. AVC Tilt – Anytime the Torch needs to be tilted more than 15 degrees from the perpendicular a problem can occur with the Torch needing to move in a different plane or Angle than the AVC provides. The M-52 corrects this problem, via the M-415 Power Supply and can control the AVC in the desired plane with tilts up to 45 degrees. See the M-52 Operation Manual (740098) for more information on how this works. This is a standard feature, no Option is needed.

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SECTION II - SPECIFICATION

2.8 GUIDE RING and TRACK OPTIONS

The M-52 requires that a Guide Ring or Track be mounted on the pipe or plate to be welded and the M-52 mounts to that Guide Ring or Track. The M-52 can use two different kinds of Guide Rings or Track.

1. Model 15 Guide Rings, Flat Track and Track Segments.

All M-15 Guide Rings, Flat Track, Track Segments and mounting methods can be used to Mount the M-52 onto the pipe or plate. See Specification No. 15-GR for full M-15 Guide Ring and Track details and track options.

2. Model 52 Guide Rings, Flat Track and Track Segments.

This is a lighter, more flexible and wider base type track than the M-15 Track. It uses a Sprocket type drive (versus M-15 machined gear teeth) and is considerable less expensive to produce and thus for customers without M-15 Weld Heads it is a better choice in most cases. However, if a customer has both M-15 and M-52 Weld Heads it will be, in most cases, cheaper and better to use the M-15 Guide Rings and only buy one type of track.

2.9 OPTIONS

1. **M-52-CW Dual Wire Feeder Option** – Provides an additional Wire Feeder and 8 inch Spool Holder on the CW side of the Weld Head. Recommended for use with any Dual Wire Entry Torch. This Option enables the Weld Head to weld in the Counter Clockwise or Clockwise direction. This eliminates the need to rewind after each pass. It also allows for double up or double down weld passes to be run. All Specifications for the standard CCW Wire Feeder (Section 4.0.2) apply.
2. **M-52-CCW 4 inch Wire Spool Holder** – Provides a Wire Spool Holder for the CCW side that can accommodate an Industry Standard 4 inch Wire Spool. See Specification No. 15-WF for details
3. **M-52-CW 4 inch Wire Spool Holder** – Same as 2 above except for CW Wire Feeder.
4. **M-52-CCW 12 inch Wire Spool Holder** – Provides a Trailing Carriage (that mounts to the Guide Ring) and allows the M-52 to tow a 12 inch wire spool. See Specification No. 15-WF for details.
5. **AVC Stroke Expansion** – The standard AVC stroke of 4" can be replaced with an Optional AVC Assembly providing additional stroke in 2" increments.
6. **Oscillator Stroke Expansion** – The standard Oscillator stroke of 4" can be replaced with an Optional Oscillator Assembly providing additional stroke in 2" increments up to a maximum of 16" of stroke.
7. **300 IPM Wire Feed Option** – See Specification No. 15-WF for more details.
8. **40 IPM Hi Speed Rotation Option** – Increases maximum speed to 40 IPM. However a decrease in power may limit application and what torches can be used.

**MODEL 52 WELD HEAD
OPERATION MANUAL
SECTION III - INSTALLATION**

3.0 INSTALLATION INSPECTION

1. Before installing the Model 52 weld Head, perform a general inspection of the head as follows:
 1. Check the water and gas hoses for damage (cracks, holes, wear, etc.).
 2. Check the water and gas quick disconnects for clean and tight connections.
 3. Check the Weld Head control cable for frays and the connectors for tightness.
 4. Insure that all assemblies are connected and no hardware, brackets or pieces are missing.

3.1 WELD HEAD CONNECTION

1. Connect the Model 52 water return, gas (Figures 3) and electrode quick disconnects to the 40-foot Power Supply Adapter Cable (supplied with the Power Supply). Note the Keyway on the gas and water quick disconnects. The notch on the knurled ring must line up with the Keyway (Figure 4). Install the protective rubber boots on all connections when made (Figure 5)
2. Connect the Model 52 control cable connector (multi-pin electrical connector) to the Power Supply forty (40) foot control cable. The connector is keyed, and should slide in (Figure 6) easily. The connector ring should turn easily. **DO NOT FORCE.** If it is difficult to connect, check the keyway and condition of the Locking pins and slots.
3. Connect the two Dust Caps (one on Weld Head connector, one on Adapter Cable) together to prevent damage to them. Do not leave them dangling (Figure 7).
4. Connect the forty (40) foot adapter cables (service and control) to the Power Supply (Figure 8). Align all connector keyways . **DO NOT FORCE.** any connectors.

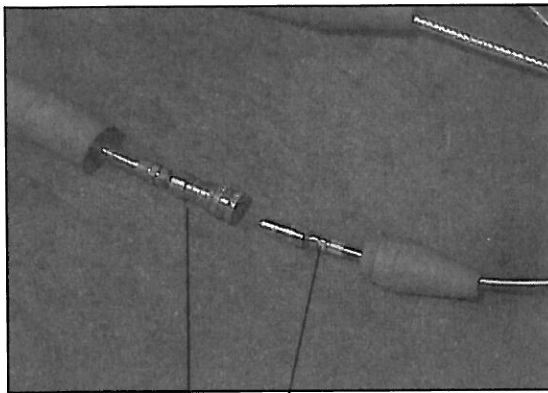
3.2 WELD HEAD GUIDE RING MOUNTING

The M-52 can use both Model 15 type guide rings and Custom M-52 Guide Rings. Instructions for the M-52 Guide Ring Installation are supplied separate. The following section is for mounting of M-15 Guide Rings only.

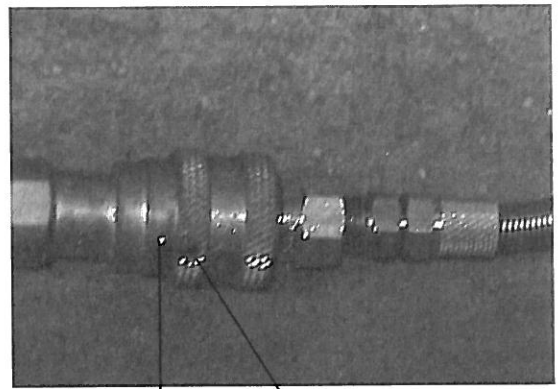
NOTE: For the purpose of description, the front of any device will be considered toward the torch assembly or weld joint and the rear will be toward the cable assembly located on the Weld Head.

1. Shipped with the M-15 Guide Ring in the Accessory kit containing the following (Figure 9);
 1. 4 sets (8 total) of short Solid feet
 2. 4 sets (8 total) of long Solid feet
 3. 1 each Guide Ring Foot Adjustment tool
 4. 1 set (2 each) Latch Rollers (not used on M-52, for M-15 only)
2. In each half of the Guide Ring are multiple sets of spring loaded feet (quantity varies with Guide Ring size). The Guide Ring comes with all positions filled with spring loaded feet (Refer to Figures 10 and 11). In most cases this is not adequate to actually lock the Guide Ring on the Pipe. A certain number of spring loaded feet should be replaced with solid feet.

MODEL 52 WELD HEAD OPERATION MANUAL



Adapter *Weld Head*
FIGURE 3



Key *Notch*
FIGURE 4

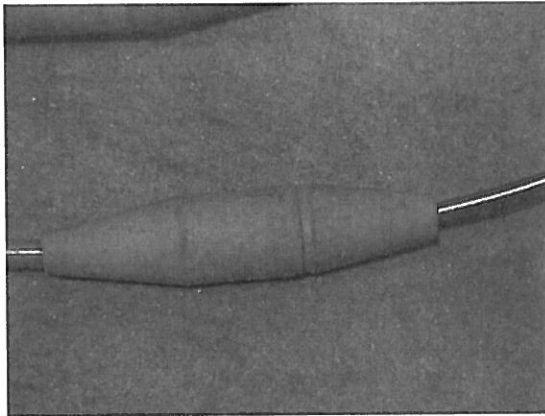
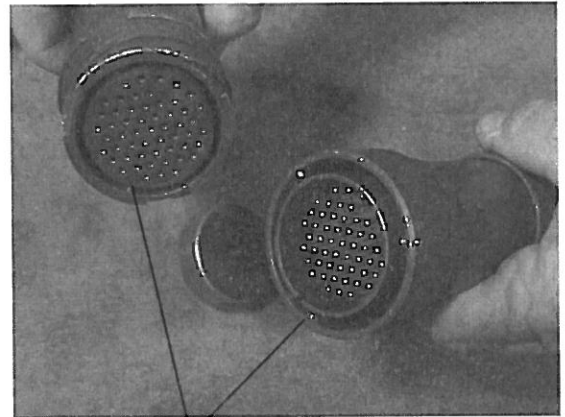
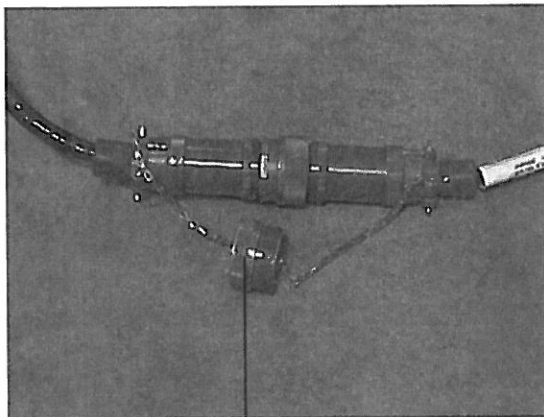


FIGURE 5



Key
FIGURE 6



Dust Caps
FIGURE 7

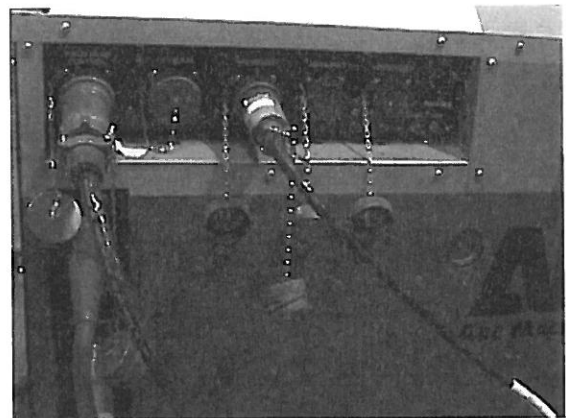


FIGURE 8

MODEL 52 WELD HEAD OPERATION MANUAL



FIGURE 9

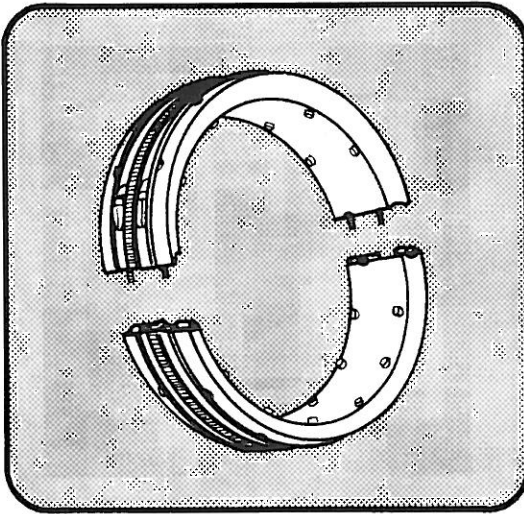


FIGURE 10

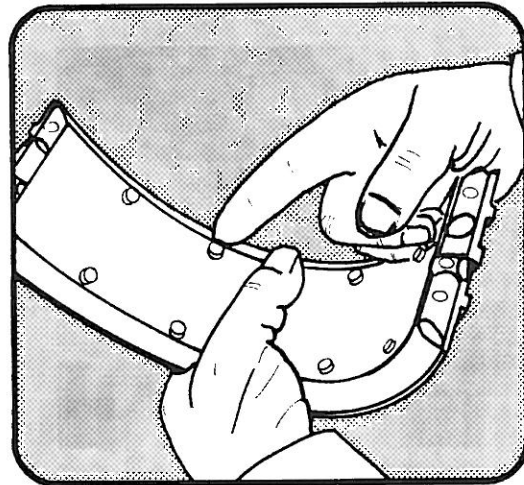


FIGURE 11

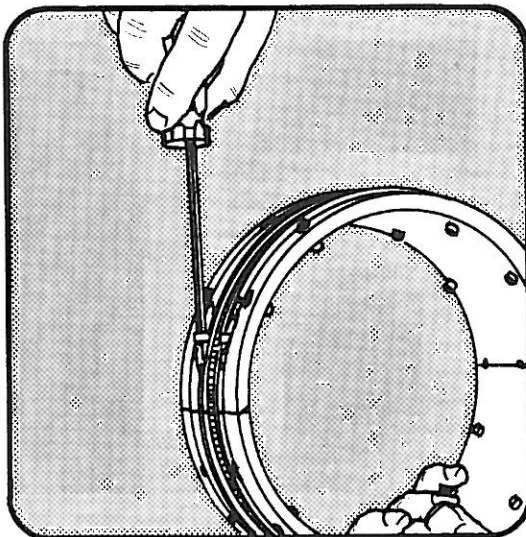


FIGURE 12

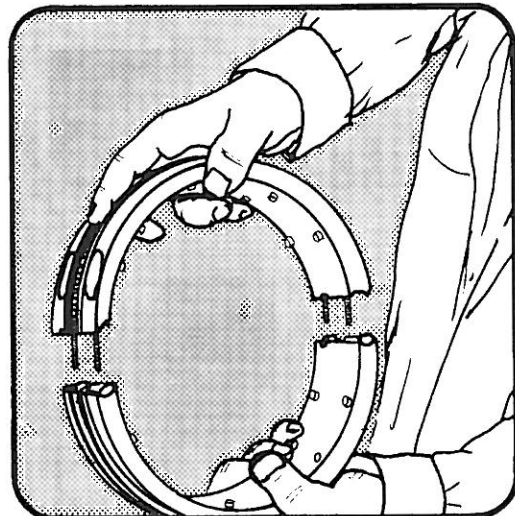


FIGURE 13

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION III - INSTALLATION

3.2 WELD HEAD GUIDE RING MOUNTING

3. Separate the two halves of the Guide Ring by unscrewing the captive screws (refer to Figures 12 and 13).
4. Remove 3 or 4 sets of spring loaded feet using the adjustment tool. Replace with Short solid feet using a slot (Blade) screw driver (Refer to Figure 14). If the Guide Ring has an EVEN number of feet, remove 4 sets of feet 90 degrees apart. If the Guide Ring has an ODD number of feet, remove 3 sets of feet 120 degrees apart (Refer to Figure 15).

NOTE: Guide Ring feet cannot be removed from the outside of the Guide Ring. They must be screwed toward the center of the Guide Ring to be removed (Refer to figure 14).

1. The solid feet should be screwed up into the Guide Ring as far as possible before mounting the Guide Ring on pipe (Refer to Figure 16).
5. Before mounting the Guide Ring, it is essential that the area where the Guide Ring will clamp be clean, bare metal (grind clean as shown in figure 17). The Guide Ring Feet must make electrical contact with the pipe surface (360 degrees around the pipe).
6. The distance the guide ring should be from the Weld Joint Centerline varies with each Torch Type and the Brackets used to mount the torch. Check with the appropriate AMI Outline Drawing or with an AMI representative as to the optimum distance and measure (Figure 21) after initial mounting.
7. Connect the two halves of the Guide Ring together with the pipe in the middle. Tighten the captive screws until the two pieces have no gap between them (Refer to Figures 18 and 19).
8. The Guide Ring should now be gently connected to the Pipe. It should stay in place but be moveable if pressure is applied. If it is too loose or too tight use the adjustment tool to loosen or tighten the spring feet.

NOTE: The spring feet should not be compressed completely and all spring feet should protrude the same distance from the Guide Ring (Refer to Figure 20).

9. Align the Guide Ring parallel to the weld joint. Remember, the more accurate the alignment, the less steering will be necessary while welding (refer to Figure 21).
10. Tighten the solid feet down. Do this evenly and slowly so the solid feet do not mis-align the Guide Ring (Refer to Figure 22).
11. When properly tightened, the Guide Ring should be firmly connected to the Pipe, and Mounting or Rotating the Weld Head should not move it.

MODEL 52 WELD HEAD OPERATION MANUAL

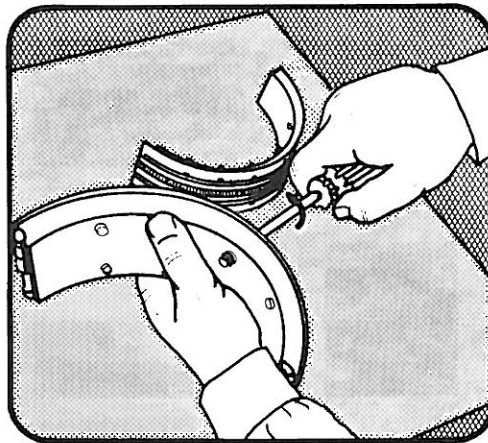


FIGURE 14

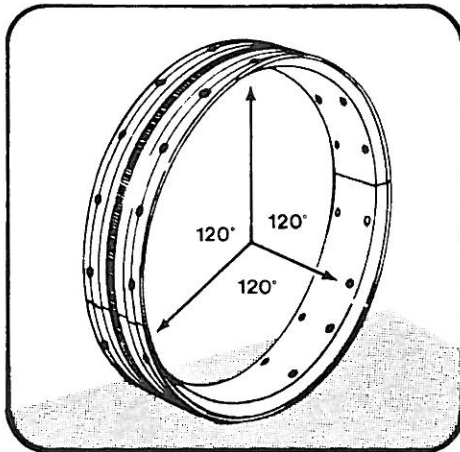


FIGURE 15A

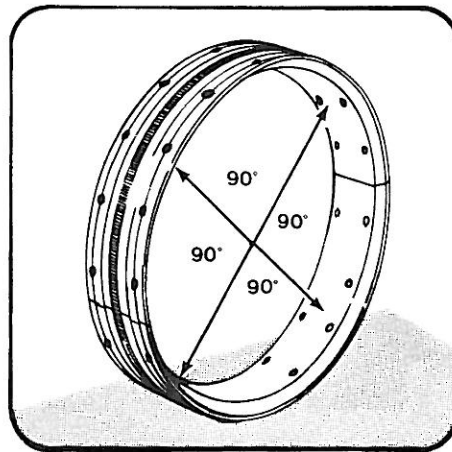


FIGURE 15B

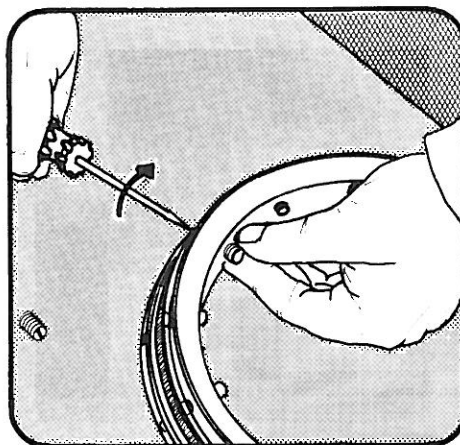


FIGURE 16

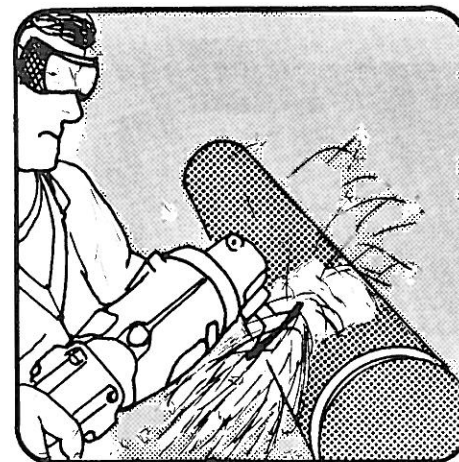


FIGURE 17

**MODEL 52 WELD HEAD
OPERATION MANUAL**

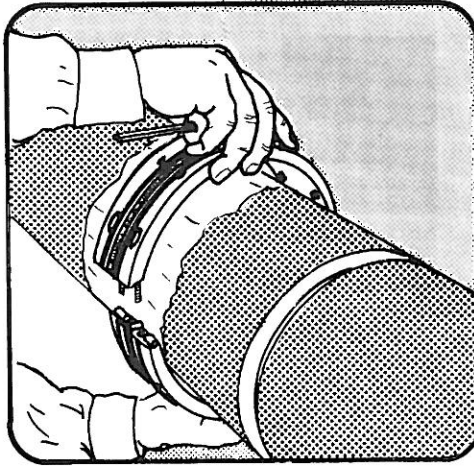


FIGURE 18

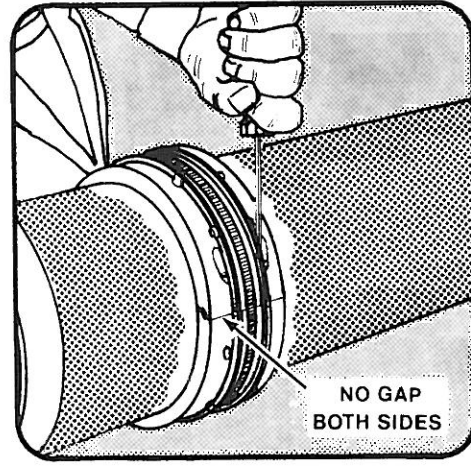


FIGURE 19

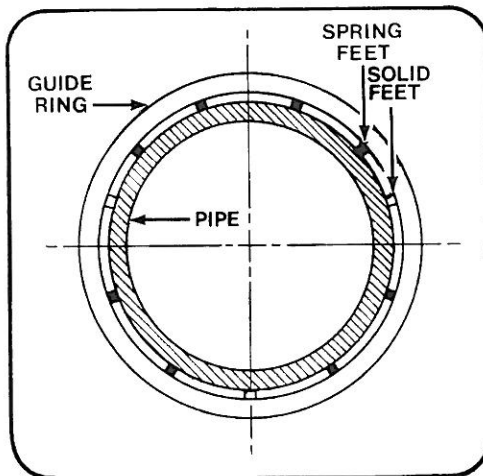


FIGURE 20

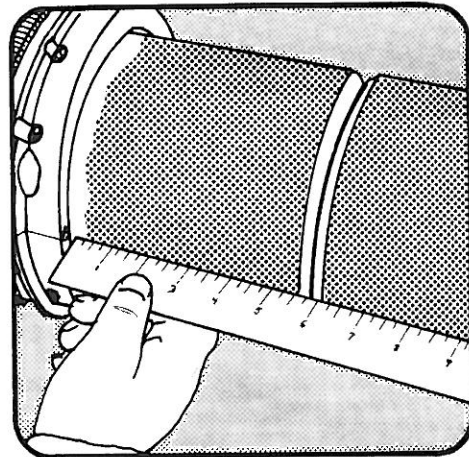


FIGURE 21

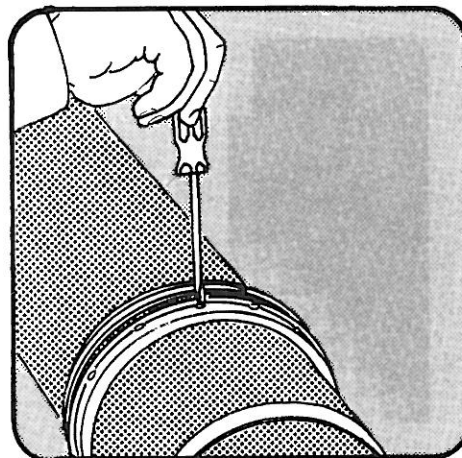


FIGURE 22

**MODEL 52 WELD HEAD
OPERATION MANUAL**

SECTION III - INSTALLATION

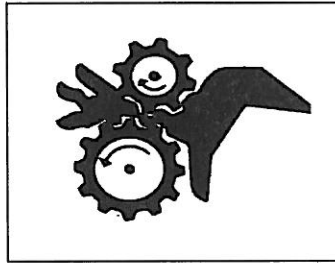
3.3 WELD HEAD MOUNTING

NOTE: Mounting and dismounting of the Weld Head should be done with the Power Off.

1. Engage the Weld Head Latch Release Buttons on each Latch Lever and open the Latch Levers about 45 degrees until they lock open.. This Spreads the Latch Rollers apart so the Guide Ring can be inserted between them. (Refer to Figure 23, 24, 25).
2. Set the Head onto the Guide Ring, insuring the Guide Ring sets in the channel of the Drive Gears. Close the Latch Levers, locking the Latch Rollers onto and under the Guide Ring lip

NOTE: If not previously adjusted for the pipe size, the Wire Feed Assembly(s) may interfere with the mounting. If so, prior to mounting loosen (using the provided hex wrench) either or both Wire Feeder and Wire Spool position adjustment clamps (See Figure 26) and move the Wire Feeder and Spool out of the way.. After mounting, re-adjust and clamp the Wire Feeders and Spools to provide the lowest Radial profile possible.

3. After mounting, Turn the Model 415 Power Supply ON, select M-52 and using the Remote Pendant (Figure 27) Jog the Head forward and reverse a few times to allow the Gears to mesh up



WARNING:

The M-52 Travel, AVC and Oscillator Slide Assemblies have a great deal of power and it is possible, by their nature of operation, to harm any object or body part that may get into these areas. **USE EXTREME CAUTION.**

3.4 FILLER WIRE INSTALLATION

NOTE: The Model 52 is designed to use Industry Standard 8 inch machine wound spools of wire. Do not use hand wound spools of wire. Erratic operation and weld defects could result.

1. Remove the Wire Spool Retaining Ring from the Spindle (Figure 28).
2. Remove the Grey Nylon Spool to Wire Feeder Liner Assembly (Figure 26)
3. Remove the Armored Wire Liner Assembly from the Torch and the Wire Feeder and unscrew the Wire Nozzle from the Liner Assembly. (Refer to Figures 29 and 30).

CAUTION: Most wire liner assemblies have a Teflon inner liner and an armored metal outer liner. Attempting to install the wire without removing the liner assembly will usually result in gouging or poking holes in the Teflon liner. Also, the wire nozzles are not self-feeding, and it is not always possible to get the wire to feed through the nozzles without removing them first.

MODEL 52 WELD HEAD OPERATION MANUAL

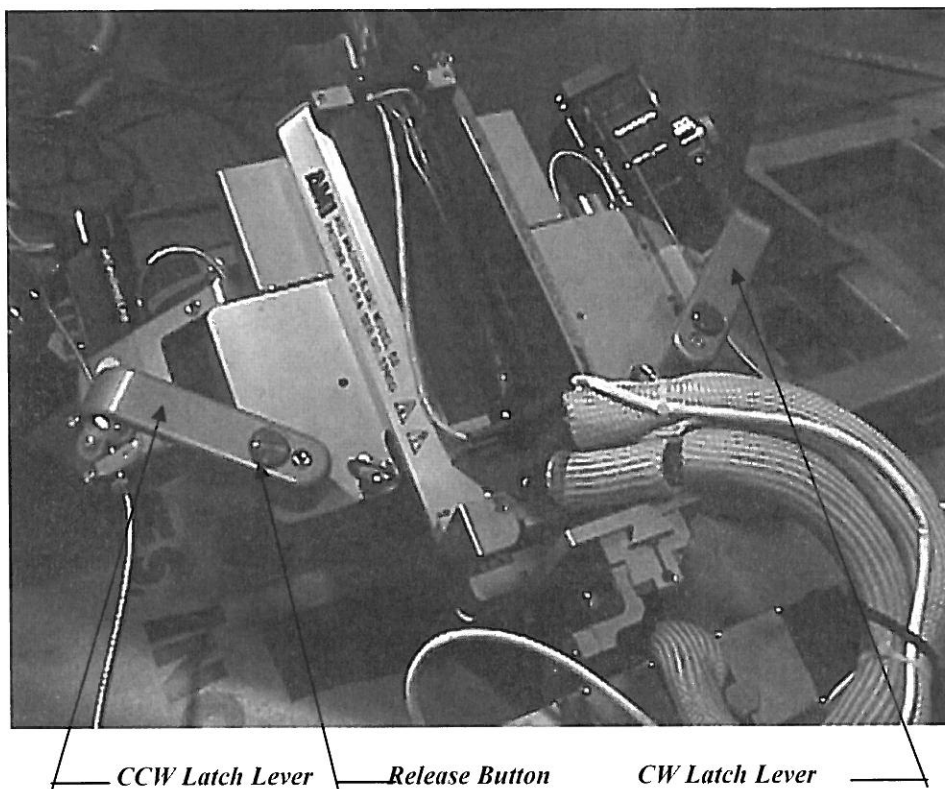
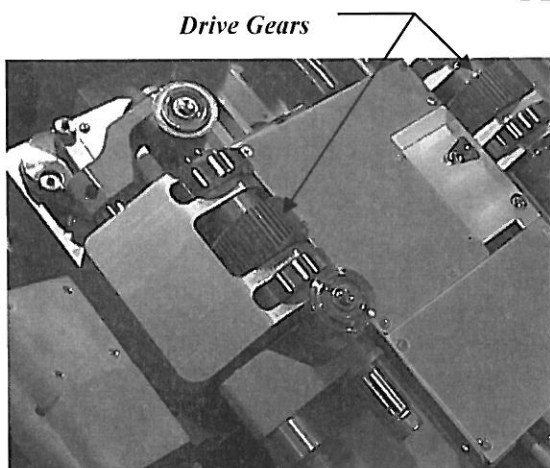
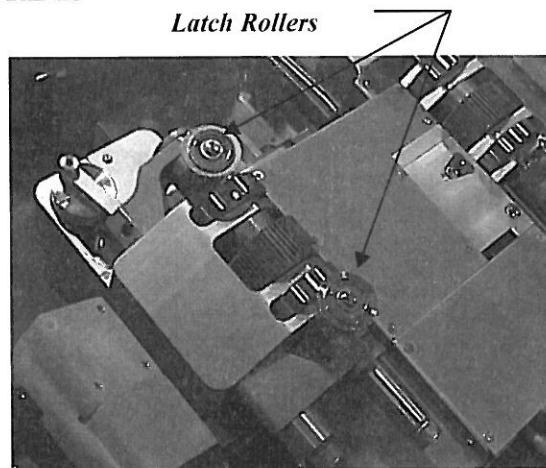


FIGURE 23



Latch Rollers Open

FIGURE 24

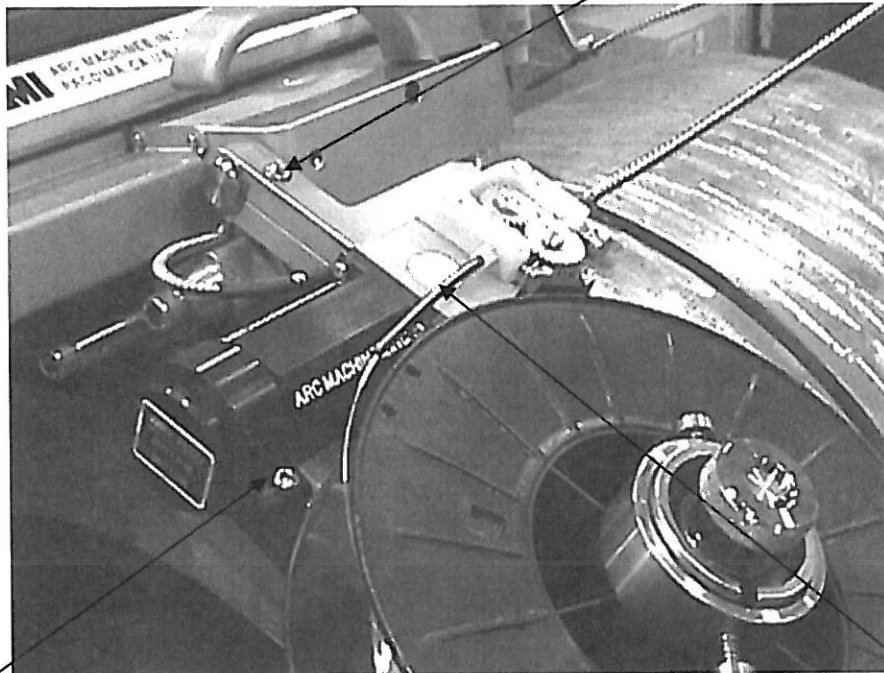


Latch Rollers Closed

FIGURE 25

**MODEL 52 WELD HEAD
OPERATION MANUAL**

Wire Feeder Position Clamp Screw



Spool Position Clamp Screw

Spool to Wire Feeder Liner

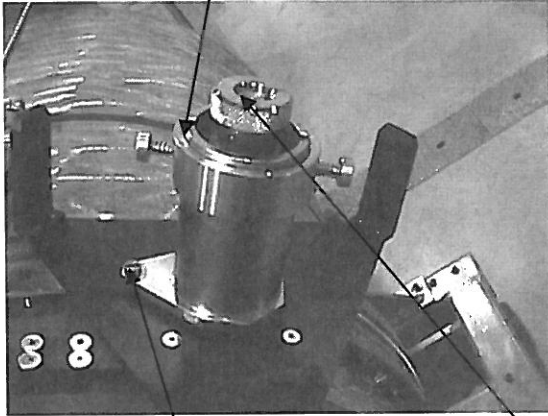
FIGURE 26



FIGURE 27

MODEL 52 WELD HEAD OPERATION MANUAL

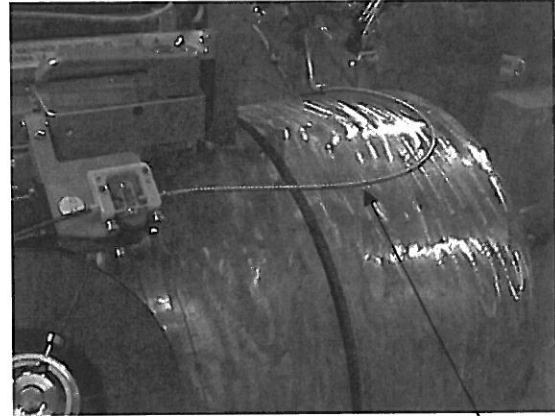
Retaining Ring



Anti-slip Pin

Spool Tension Adjust

FIGURE 28



Wire Feeder to Torch Liner Assemblby

FIGURE 29

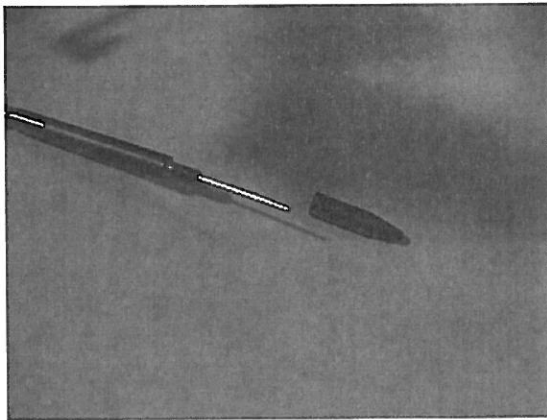


FIGURE 30

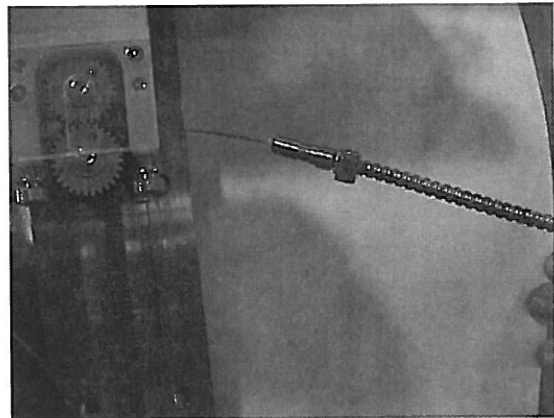


FIGURE 31

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION III - INSTALLATION

3.4 WIRE INSTALLATION

4. Wire Spool Preparation:

1. Holding the wire spool firmly, remove the wire end from the locking hole on the wire spool. Allow approximately 4 inches of wire to be exposed and keep it from unwinding.
2. Cut the bent or twisted end off, leaving straight undamaged wire (Refer to Figure 32).
3. Using a small file, file the end of the wire to remove burrs, preventing possible damage to the wire liner (Refer to Figure 33).
5. The spindle on the wire Spool Holder should rotate. It should not, however, spin freely. If it is too loose or too tight, turn the tension adjusting knob on the top of the spindle to loosen or tighten. (Figure 28).
6. Without letting go of the wire, install the spool on the spindle. There is a locating hole or recess near the hub of the spool (Figure 34), this needs to be placed over the Anti-Slip Pin (Figure 28) at bottom of the spindle.

Slide the Spool to Wire Feeder Liner onto the wire and push the wire by hand until it comes into contact with the wire feed Roller Gears. Jog the wire feed forward and engage the wire so it feeds into the rollers and through to the front side of the wire feed assembly (Refer to Figure 35). Lock the Spool to Wire Feeder Liner in place.
7. Jog the wire forward until the bare length of wire is longer than the Wire Feeder to Torch Wire Liner (previously removed). Hand thread the wire into the liner until it protrudes out the end (Refer to Figure 30 and 31). Re-connect the wire liner to the wire feed assembly. Thread the Wire Nozzle back on the liner and screw it on. Re-connect the Nozzle end of the liner to the Torch. .
- 8.. Cut back any protruding wire from the end of the nozzle..
- 9.. Replace wire spool Retaining Ring onto the Spindle.

3.5 TORCH SET UP

Reference Figure 36 for the Model 15 "A" Torch, Figure 37 for the "C" Torch and Figure 38 for the "N" Torch.

1. The torch assembly requires the following adjustments and must be set up in accordance with a qualified weld procedure:

Item 1 - Torch Tilt In and Out Angle.
Item 2 - Torch Lead/Lag Angle.
Item 3 - Wire Entry Angle Adjust.
Item 4 - Wire In/Out Position Adjust.
Item 5 - Torch (Tungsten) to Manipulator Position Adjust. ("A" and "C" Torches only)
Item 6 - Electrode Stick Out.
Item 7 - Gas Cup, Gas Lens.
Item 8 - Camera View Angle Adjust ("N" Torch only)
Item 9 - Illumination Adjust ("N" Torch only)

***MODEL 52 WELD HEAD
OPERATION MANUAL***

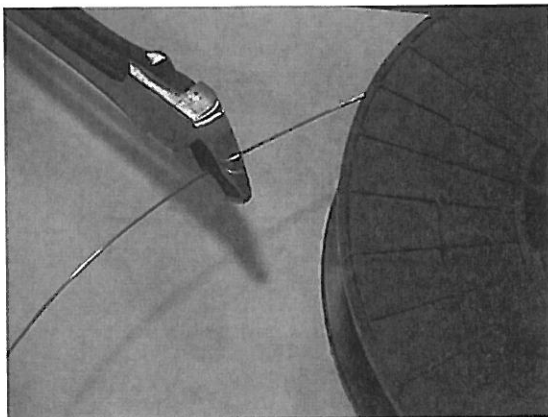


FIGURE 32



FIGURE 33

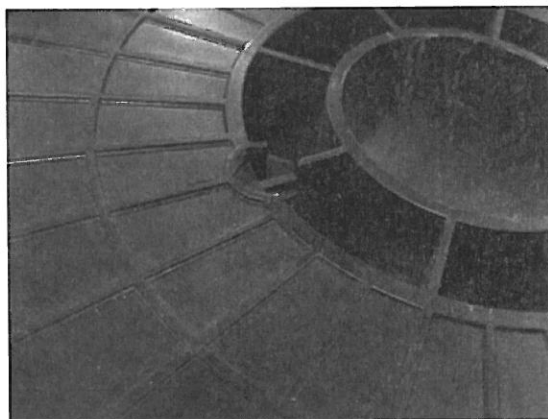


FIGURE 34

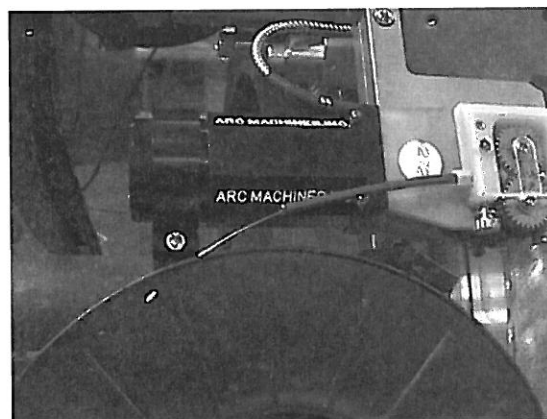


FIGURE 35

**MODEL 52 WELD HEAD
OPERATION MANUAL**

MODEL 15 "A" TORCH

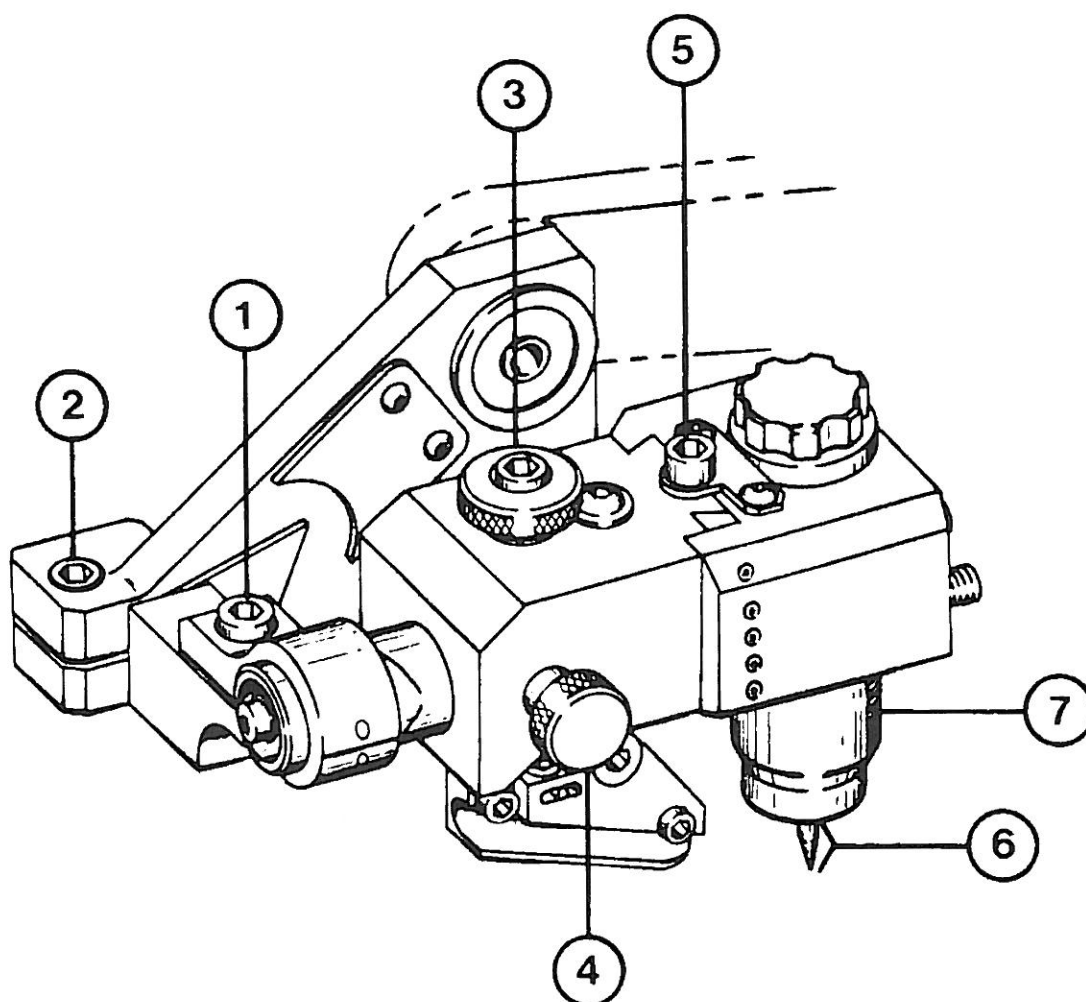


FIGURE 36

**MODEL 52 WELD HEAD
OPERATION MANUAL**

MODEL 15 "C" TORCH

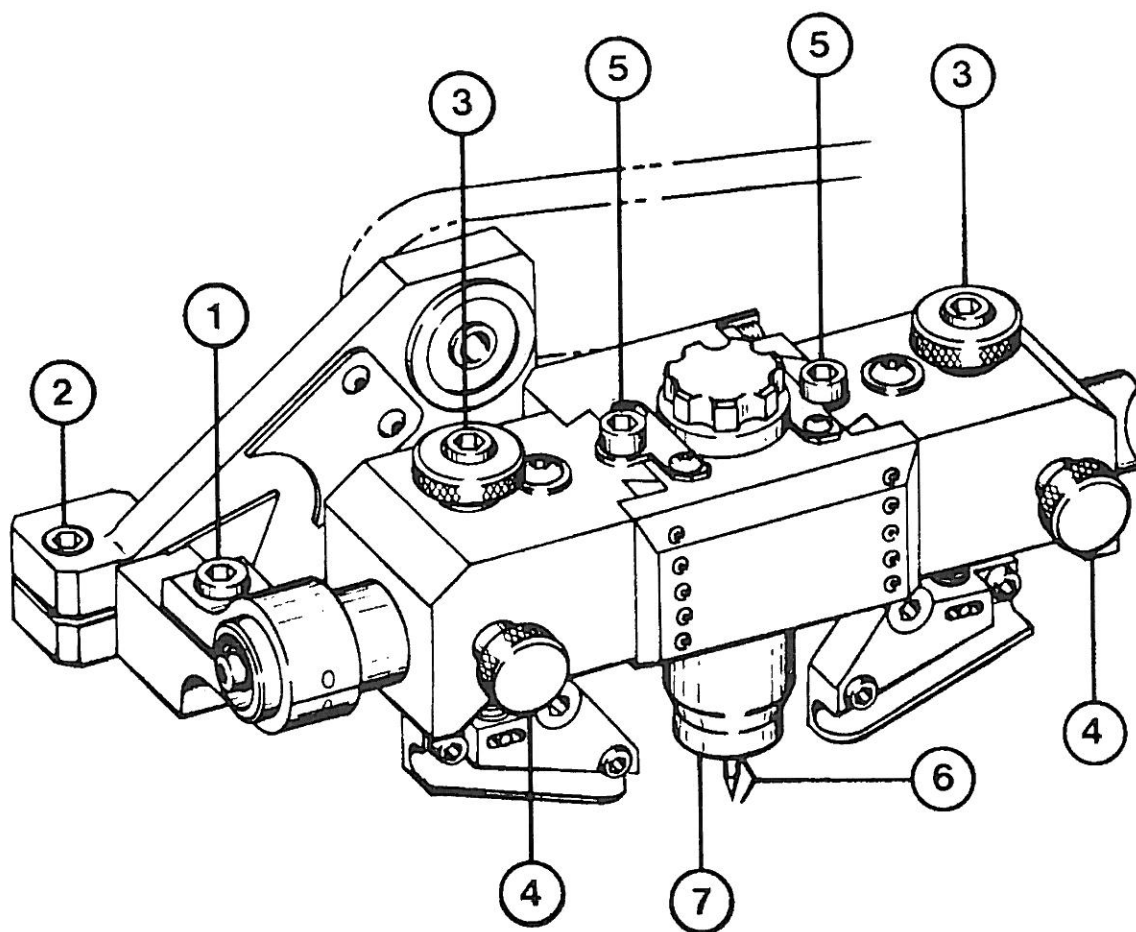


FIGURE 37

**MODEL 52 WELD HEAD
OPERATION MANUAL**

MODEL 15 "N" and MODEL 52 "P" TORCH

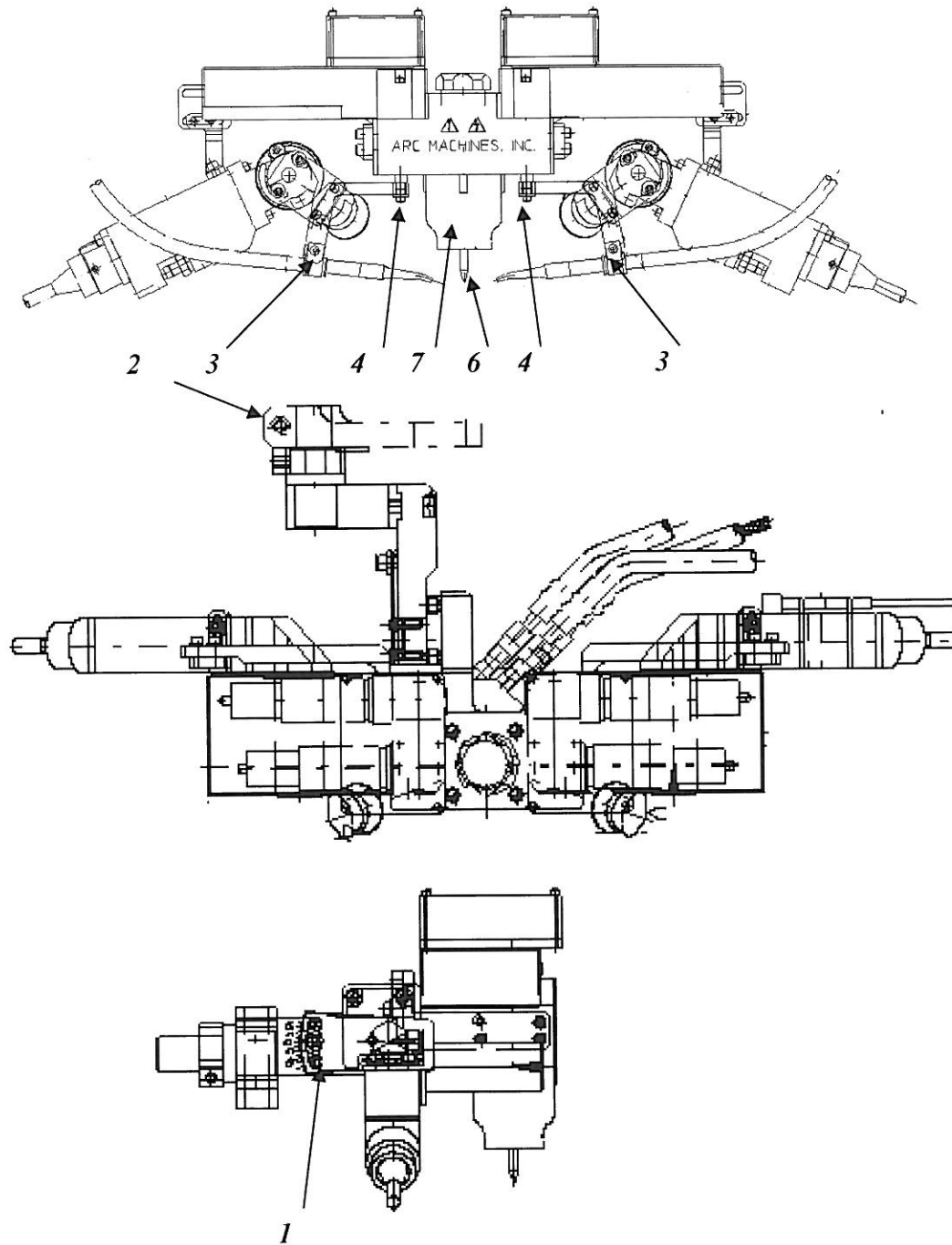


FIGURE 38

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION IV – CALIBRATION

4.0 SYSTEM OPERATION

When installed, the Model 52 Weld Head becomes an integral part of a Welding System consisting of the Weld Head and the Power Supply. Calibration and Operation involve both products. Consult the Operation Manual for the Power Supply before Calibrating or Operating the Model 52 Weld Head.

4.1 CALIBRATION GENERAL

1. Most calibrating functions are contained in the Power Supply/Controller Unit, however all AMI Weld Heads must be calibrated (matched) for Wire Feed Speed and Travel Speed to the Power Supply/Controller that it is used on. ANYTIME a Weld Head is changed from one Power Supply to another it must be checked for calibration of these (2) functions.
2. Calibration of the Travel speed for a Model 52 is the same as all other AMI Pipe Weld Heads. Follow the procedure given in the Operation and Maintenance Manual for the Power Supply/Controller Unit in use. The Travel Calibration Potentiometer is located on the Weld Head Rear Plate and Labeled "CALIBRATION" (Figure 39)
3. Calibration of the Wire Feed for a Model 15 is the same as all other AMI Pipe Weld Heads. Follow the procedure given in the Operation and Maintenance Manual for the Power Supply/Controller Unit in use. The Wire Feed Calibration Potentiometer is located on the Wire Feed Drive Roller Assembly (Figure 40).

4.2 TRAVEL CALIBRATION PROCEDURE

Perform the following steps to calibrate the Model 52 Travel Speed:

1. Mount the Model 52 on any diameter pipe with the appropriate guide ring and rollers and arrange for unobstructed travel.
2. Using a permanent ink marker or equivalent, mark the edge of the guide ring surface with 2 marks spaced 4 inches apart.
3. Select a reference point on the Weld Head (leading edge of the Wire Feed Assembly is good). Jog the Weld Head so the reference point is in line with the first mark on the guide ring and will move toward the second mark in the CCW (counter-clockwise) direction.
4. Program the Power Supply in accordance to the Travel Calibration Procedure contained in the Power Supply Operation and Maintenance Manual.
5. Program the following changes in the parameters:

Travel Speed - 4.0 IPM
Time - 60 SEC (Total Time Travel)
Timer Mode - Auto

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION IV – CALIBRATION

4.2 TRAVEL CALIBRATION (continued)

6. Insure that System Mode (Weld/Test) is in Test.
7. Press the Sequence START Button. After Sequence is completed and the M-52 has come to a stop, check to see that the Weld Head reference mark is lined up with the second mark on the Guide Ring. The distance should be 4.0 inches (+/- 0.04 in.).
8. If out of tolerance, adjust the TRAVEL CALIBRATION Potentiometer located at the rear of the Weld Head (Figure 39). Turn clockwise to increase speed. Jog the Head to the first Guide Ring reference mark and repeat Step 7 and 8 until correct.
9. Set the TRAVEL MODE to the CW (clockwise) Mode. Jog the M-52 to the second reference mark so travel is towards the first reference mark.
10. Press SEQUENCE START. The M-52 should travel 4.0 inches +/- 0.04 in. If it does not consult the Operation Manual for the Power Supply being used. There are Null and Offset Adjustments that may need to be made to the Power Supply.

4.3 WIRE FEED CALIBRATION

ANYTIME a Weld Head is changed from one Power Supply to another, calibration must be checked for Wire feed Speed. To insure calibration accuracy over the entire range of wire feed speeds and direction, a full calibration of the Power Supply WIRE FEED SERVO Section is recommended. Refer to the Calibration Section of the Operating and Maintenance Manual of your Power Supply.

1. Tighten the tension on the Wire feed Drive Rollers until the wire can be jogged without slipping. Cut the wire off flush with the nozzle tip. Insure that WIRE ON/OFF in the ON position.
2. Program the Power Supply in accordance to the Wire Feed Calibration Procedure contained in the Power Supply Operation and Maintenance Manual.
3. Program the following changes in parameters:

Wire feed Speed - 40.0 IPM
Time - 60 SEC (Total Wire feed time)
Timing Mode - Auto

4. Insure that System Mode (Weld/Test) is in TEST.
5. Press the SEQUENCE START Button. After the Sequence is complete and the wire has stopped, cut the wire flush with the nozzle and measure its length. It should be 40 inches (+/- 0.4 in.).

If wire length is not correct, adjust the Wire feed Calibration Point located on the front of the Wire feed Assembly (Figure 40). Turn the CW to increase speed. Repeat Steps 4 and 5 until it is correct.

6. If the M-52 also has a CW Wire feeder (2 Wire feed Assemblies) set the TRAVEL MODE to the CW direction. Repeat steps 4 and 5 for this wire feeder.

***MODEL 52 WELD HEAD
OPERATION MANUAL***

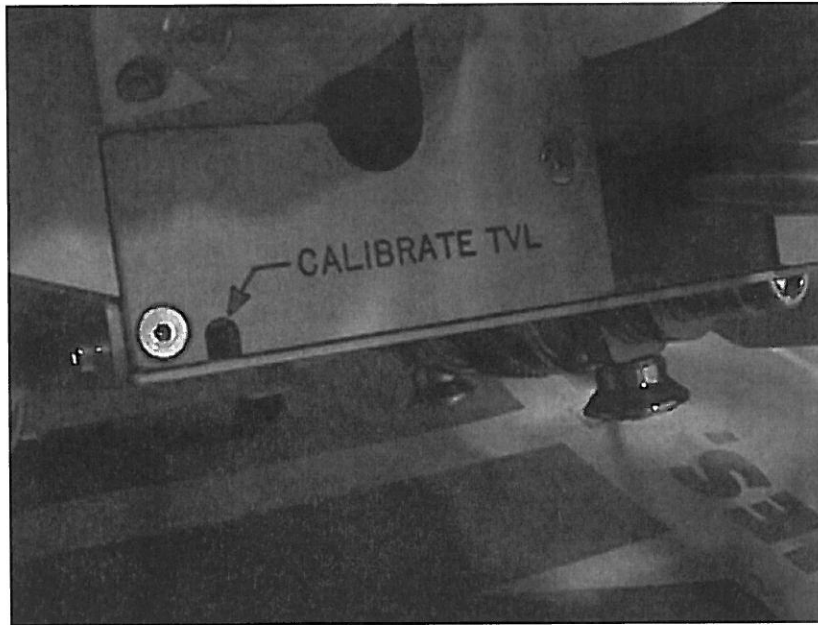


FIGURE 39



FIGURE 40

MODEL 52 WELD HEAD OPERATION MANUAL

SECTION V – ELECTRICAL SCHEMATICS

5.0 WELD HEAD WIRING DIAGRAMS

CAUTION

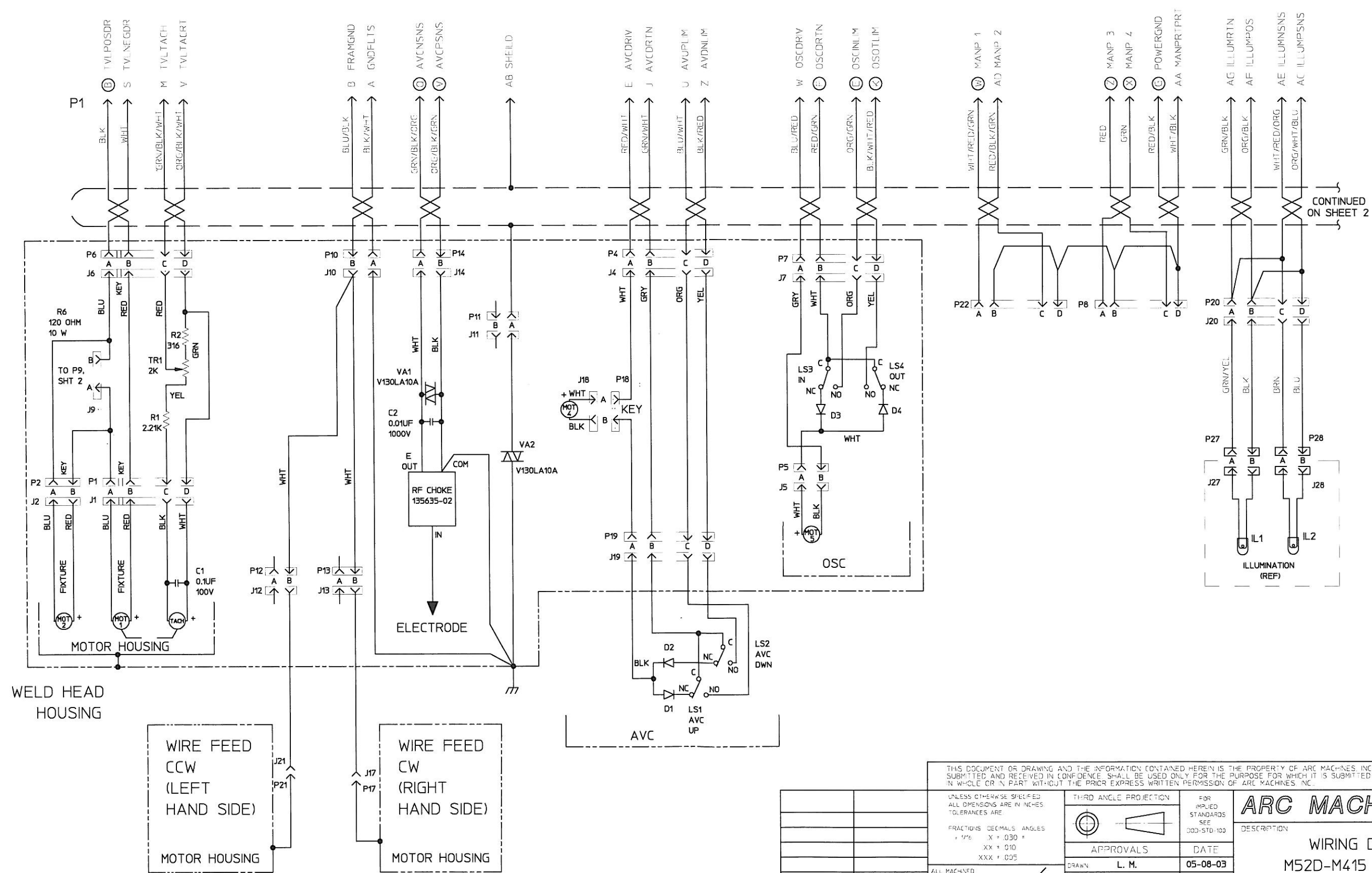
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Detailed, up to date, revised copies of these documents are available from AMI upon request. Please contact an AMI Service representative for further information.

NOTES:

1. USE CONTRASTING INK FOR MARKING
REFERENCE DESIGNATORS TO CONNECTORS.

ZONE	LTR	ECO	REVISIONS	DATE	BY	APPR
	B	4169	CHANGED POLARITIES ON P10/P10/P12/P12.P13/P13&P9	11-08-04	NC	
B5.B3 SHT2	C	4292	DELETED OPTIONAL FROM AVC ENCODER POSITION, CHANGED TRAVEL POSITION ENCODER PART NO.	09-15-05	FG	
	D	4774	SWAP PINS ON P/J5 OSC MOTOR	4/10/08	EO	



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		UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES. TOLERANCES ARE FRACTIONS DECIMALS ANGLES + 1/16" X + .030" XX + .010 XXX + .005	THIRD ANGLE PROJECTION	FOR IMPLIED STANDARDS SEE DOD-STD-100	ARC MACHINES, INC		
							
			APPROVALS	DATE			
			DRAWN L. M.	05-08-03			
		CHECKED LECII	06-02-03				
		ALL MACHINED SURFACES TO BE 	APPROV		DESCRIPTION WIRING DIAGRAM M52D-M415 WELDHEAD		
-----	M15/415 N TORCH	MATERIAL					
NEXT ASSY.	USED ON						
APPLICATION							
			QUOTATION				
			SCALE NONE	DO NOT SCALE DRAWING	SHEET 1 OF 2		

