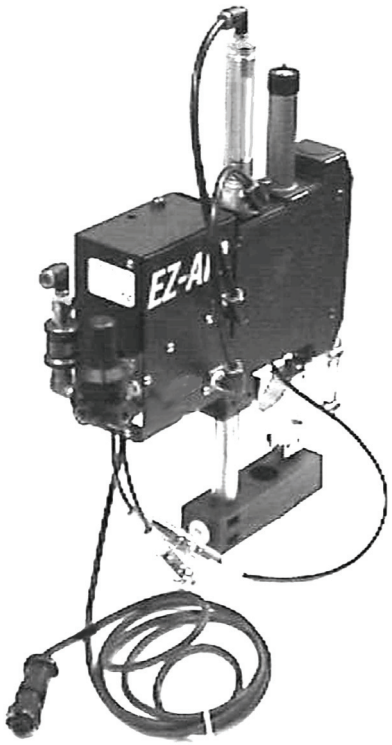
USER'S MANUAL 990-126
Revision D August 2005

OPERATION AND MAINTENANCE MANUAL

FOR THE

SINGLE EZ-AIR™ KIT

Model EZ/SAK



Revision Record

Revision	EO	Date	Basis of Revision
A	17926	10/99	Original publication.
B	17936	11/99	Production release
C	19146	1/02	Change name of equipment to Miyachi Unitek
D	20505	8/05	Addition of EZ-AIR-DC

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CONTACT US

Thank you for purchasing a Miyachi Unitek Single EZ-Air™ Kit.

Upon receipt of your equipment, please thoroughly inspect it for shipping damage prior to its installation. Should there be any damage, please immediately contact the shipping company to file a claim, and notify Unitek Miyachi Corporation at:

1820 South Myrtle Avenue
P.O. Box 5033
Monrovia, CA 91017-7133
Telephone: (626) 303-5676
FAX: (626) 358-8048
e-mail: info@unitekmiyachi.com

The purpose of this manual is to supply operating and maintenance personnel with the information needed to properly and safely operate and maintain the Miyachi Unitek Single EZ-Air Kit.

This kit can be added to an existing weld head (typically a Model 80A, 83A, 84A, 86A, or 180A), and will replace a standard air kit. The installation instructions give procedures for retrofitting a weld head that has a standard air kit installed.

We have made every effort to ensure that the information in this manual is accurate and adequate.

Should questions arise, or if you have suggestions for improvement of this manual, please contact us at the above location/numbers.

Unitek Miyachi Corporation is not responsible for any loss due to improper use of this product.

SAFETY NOTES

This instruction manual describes how to operate, maintain and service the Single EZ-Air Kit, and provides instructions relating to its SAFE use. Separate manuals provide similar information for the Power Supply and the Weld head. Procedures described in these manuals MUST be performed, as detailed, by QUALIFIED and TRAINED personnel.

For SAFETY, and to effectively take advantage of the full capabilities of the workstation, please read these instruction manuals before attempting to use the workstation.

Procedures other than those described in these manuals or not performed as prescribed in them, may expose personnel to electrical, burn, or crushing hazards.

After reading these manuals, retain them for future reference when any questions arise regarding the proper and SAFE operation of the workstation.

Please note the following conventions used in this manual:

WARNING: Comments marked this way warn the reader of actions which, if not followed, might result in immediate death or serious injury.

CAUTION: Comments marked this way warn the reader of actions which, if not followed, might result in either damage to the equipment, or injury to the individual if subject to long-term exposure to the indicated hazard.

CHAPTER 1
DESCRIPTION

Section I: Features

Features

The Single EZ-Air Kit, herein called EZ-Air, is an accessory for weld heads that pneumatically controls the actuation of the electrodes and maintains the preset firing force. At a predetermined firing force the EZ-Air closes the inlet and outlet valves to the weld head actuation cylinder and eliminates over-force. EZ-Air operates from power supply-generated power and has the following features:

- Is compactly packaged and can be retrofitted to Miyachi Unitek Models 80A, 83A, 84A, 86A, or 180A weld heads without removal of the weld head covers
- Powered from the power supply: EZ-AIR: 24 VAC output; no separate control box required
  EZ-AIR-DC: 24 VDC output; no separate control box required
- Contains EZ-CLEAN Valve which eliminates the need to re-adjust force after cleaning and dressing electrodes
- Contains operator-visible firing indicator lights
- Permits easy set-up of multiple weld heads to fire at the same force
- Contains a built-in down speed limiter to eliminate weld over-force and limit excessive impact force
- One knob force setting (per electrode), which requires no resetting, simplifies set-up and setting maintenance, with the following effects:
  - Process stability reduces process maintenance and training for users
  - Delivers accurate and repeatable force set-up with reduced process variation
  - Produces higher yields with reduced scrap from process variation due to incorrect force set-up

Section II: Kit Components

Reference Publications

Related manuals, which you will need, include the manuals that are provided with your weld head and your power supply. If you need additional copies of any of these manuals, they can be procured from Miyachi Unitek.

Major Components

Figure 1-1 shows the major components of the unit. Normally, these will be the only components associated with installation and operation. The function of each item is described below.

Firing Indicator. A green indicator that lights when the firing switch closes and stays lit until the end of the weld cycle. Thus, if a malfunction occurs, the operator can determine whether or not a firing signal is present.

Initialization Signal Received Indicator. An amber indicator, visible through a hole in the EZ-Air cover, that lights when the initialization signal is received from the power supply, and stays lit until the pre-set force has been reached. If a problem occurs, the operator can determine whether or not the problem is internal to the EZ-Air.

Air Cylinder Down Supply. Male elbow fitting, ¼ inch OD tube to ⊂ inch male NPT brass. Connects controlled compressed air to weld head air cylinder top port.

Air Cylinder Up Supply. Male elbow fitting, ¼ inch OD tube to ⊂ inch male NPT brass. Connects controlled compressed air to weld head air cylinder bottom port.

Down Speed Control Valve Adjustment. Operator adjustment that allows setting of the downspeed of the electrodes to reduce part impact pressure.

Weld Head Firing Switch Cable and Connector. Female cable jack, Amphenol Type 80-MC2F. Mates with connectors (Amphenol Type MC23M80-MC2M) from the weld head,.

EZ-Clean Valve. Allows bleeding of input air supply to permit dressing of electrodes.

Shop Air Supply Input Fitting. ⊂ inch F'NPT fitting for connecting shop compressed air to EZ-Air. Shop air supply must be 85–140 psi . (586–965 kPa).

Fixed Air Regulator. Controls pressure of air from shop air source into EZ-Air. Regulator is factory set for 78 psi (538 kPa) and does not require any user adjustment.

EZ-AIR

24 Volt Power Source Cable and Connector. Conducts 24 volt solenoid drive power from the power supply to the EZ-Air.

Signal Cable and Connector. Two-conductor male plug to connect firing signal to the power supply.

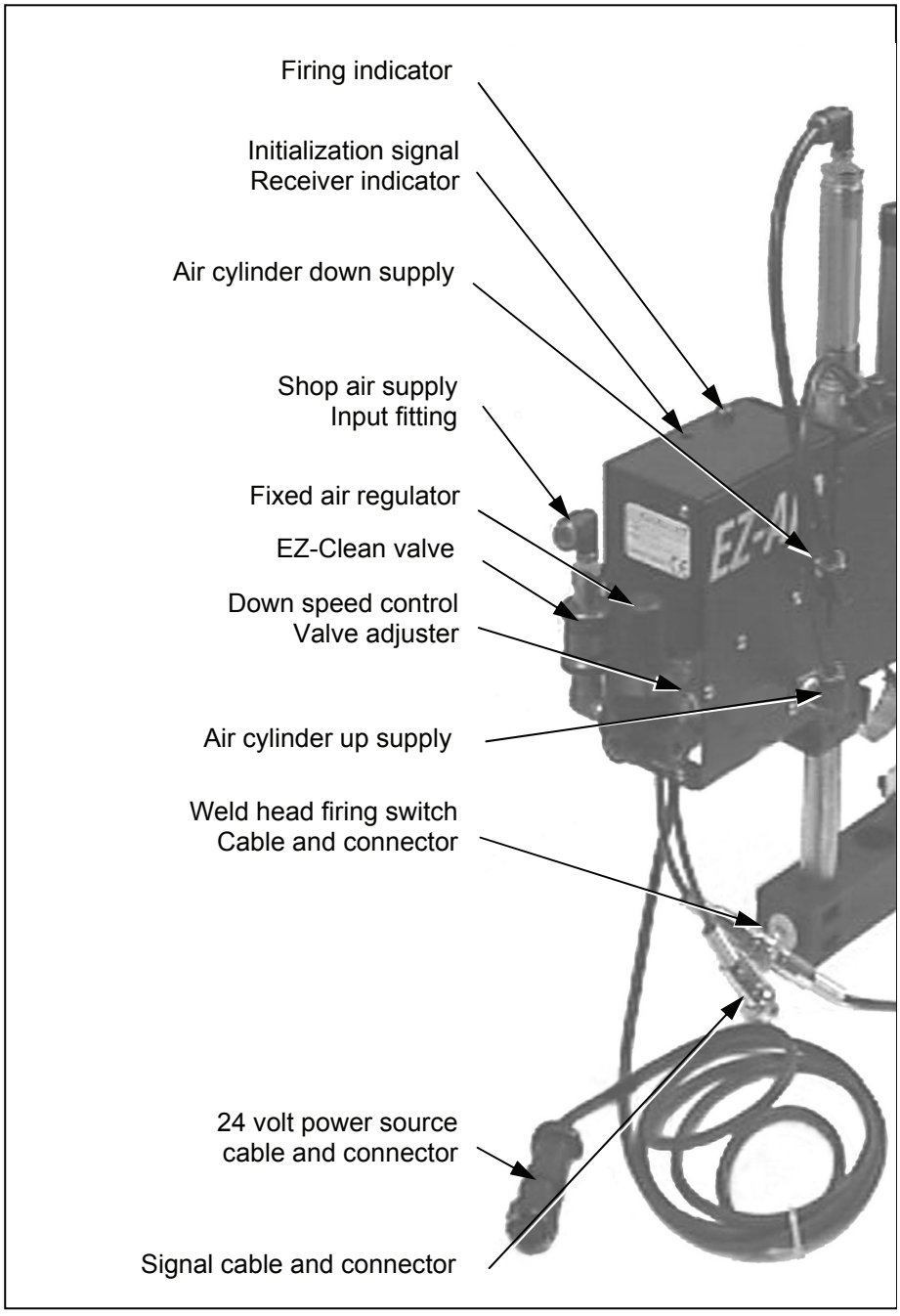
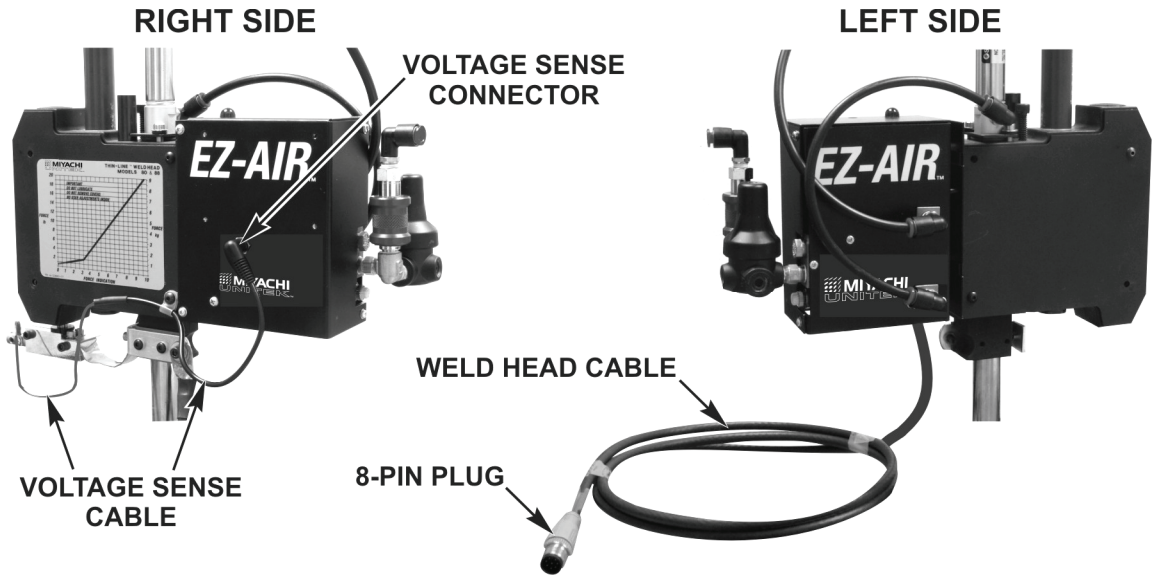


Figure 1-1. Single EZ-Air, Components

EZ-AIR-DC

8-pin weld head connector. Conducts 24 VDC solenoid drive power from the power supply to the *EZ-AIR-DC*, connects firing signal and voltage pickup to the power supply.



Section III: Sequence of Operation

EZ-Air uses a single four-way solenoid valve to direct air between the down solenoid valve and the up solenoid valve (figure 1-2). The following steps describe the sequence of operation of the EZ-Air kit.

① **Initial Air Applied.** Upon initial application of air (whether or not power is applied), air pressure is applied through the four-way solenoid valve and the up solenoid valve to the lower chamber of the cylinder, driving the piston up. Air is exhausted through the four-way solenoid valve.

② **Down Stroke.** During the electrode down stroke, air pressure is directed to the upper chamber of the cylinder, forcing the piston down. Waste air exhausts from the lower chamber through the down solenoid valve and the four-way solenoid valve.

③ **Constant Force.** When the electrode reaches weld force, the up and down solenoid valves close and air is trapped in both the upper and lower chambers of the cylinder. Weld force remains constant as the air cylinder piston cannot move. The four-way solenoid valve also switches to its off position, reversing the air connections to the up and down solenoid valves.

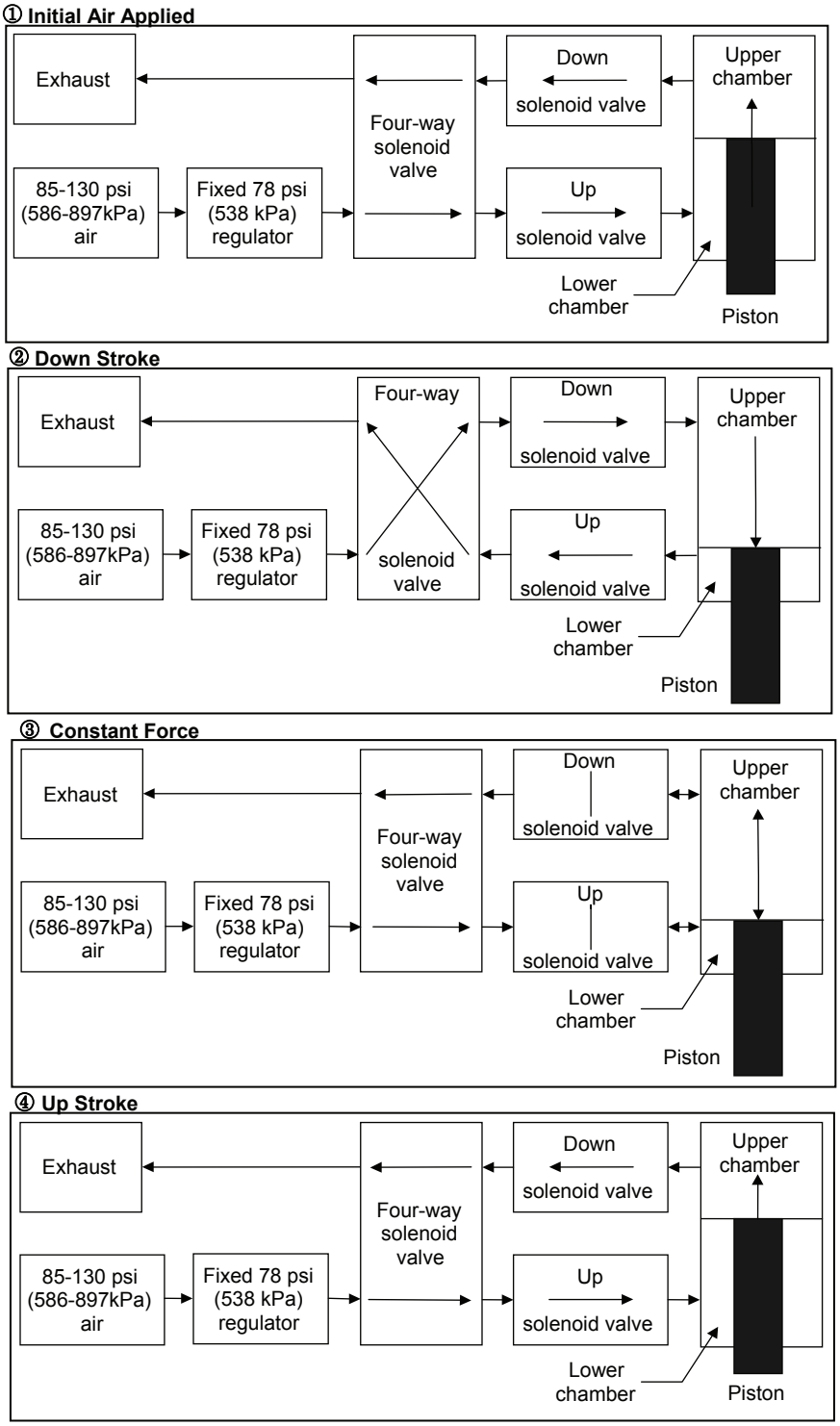


Figure 1-2. Sequence of Operation

④ **Up Stroke**. At the completion of the weld, the up and down solenoid valves open. This causes the application of air pressure to the lower chamber of the cylinder, returning the piston to its up position.

CHAPTER 2
GETTING STARTED

Section I: Planning for Installation

EZ-Air is about the same size as the standard air system and uses power from the weld head power supply. Therefore, there should be no space or power problems in installing the EZ-Air onto an existing weld head.

Space Requirements

An outline drawing of the EZ-Air is included in Appendix A. The specific dimensions are:

Width:	3.5 in. (88.9 mm)
Depth	6.4 in. (162.6 mm)
Height	5.5 in. (139.7 mm)
Weight	2.5 lb. (1.1 kg)

Power Requirements

Power is derived directly from the power supply; no special considerations are required. The EZ-Air requires the following power:

EZ-AIR:	24 VAC +/- 10% power, 1/2 A
EZ-AIR-DC:	24 VDC +/- 10% power, 1/2 A

Compressed Air Requirements

The EZ-Air has a c inch F'NPT fitting for connection to a shop air source of 85–130 psi (586–897 kPa). It is recommended that a auto drain air filter with a 5-micron element (part number 10-373-01, catalog number ADAF) be placed in the air line.

CAUTION: A shop air compressor using synthetic oil will cause damage to the EZ-Air, Petroleum-based oil only is recommended.

Section II: EZ-Air Set-up

Unpacking

Unpack the EZ-Air from its shipping box and verify that all parts are present. Table 1-2 lists the components of the ship kit, part number 4-81108-01, which contains parts needed to install the EZ-Air.

NOTE: Carefully place the packing materials back in the packing boxes and store for future shipping.

Table 2-1. Ship Kit List

Item	Use	Part No.	Qty
Plastic tubing	Make pneumatic connections	050-138	9 ft
Elbow fitting	Replace existing fitting on weld head	325-200	2
Fitting	Adapter for shop-air input	325-185	1
Wrench	Install EZ-Air	4-35442-01	1
Bolt, hex head	Mount EZ-Air on 180 weld head	160-063	2
T-Nut	Mount EZ-Air on 180 weld head	465-231	2
Flange screw	Mount EZ-Air on 80 weld head	160-060	2
Cap screw	Mount EZ-Air on 84 weld head	160-061	2
Washer, flat	Mount EZ-Air	755-025	2
User's Manual	Installation/Operation instructions	990-126	1

Installation

Installation consists of physically mounting the EZ-Air on the weld head, connecting the power and signal cables, and connecting the pneumatic tubing. If the EZ-Air is a retrofit, the original air system must first be removed and the new kit installed.

Removing Existing Air System from Weld head

1 Turn off shop air and remove connection to existing kit.

2 Remove the existing tubes to the top and bottom of the cylinder.

3 Note which way each of the two valve assemblies are facing. Remove the existing valve assemblies from the top and bottom of the air cylinder. Clean any pipe joint sealant from cylinders (figure 2-1).

4 Disconnect the weld head firing switch cable and the air kit cable from the power supply.

NOTE: If weld head cylinder has exceeded 10 million cycles, we recommend replacing it at this time. See

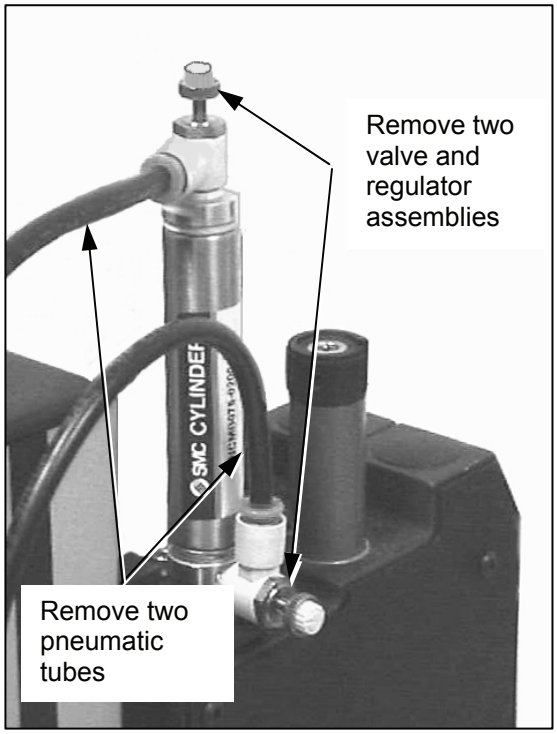


Figure 2-1. Removing Existing Air System Pneumatics

your weld head manual for instructions.

4 From the packing box, remove the EZ-Air and shipping kit (which contains the mounting hardware). **NOTE:** Only one set of mounting hardware will apply to each application; the remaining parts are extra. See table 2-1 for appropriate parts.

5 See the following paragraphs for the appropriate steps to physically replace the existing air kit with the new EZ-Air.

Installing EZ-Air on an 80A or 86A Weld Head

1 Remove the two mounting bolt that secure the existing air kit and remove the air kit.

2 Loosely install two new hex head flange screws from the ship kit.

3 Slide the EZ-Air onto the two screws (figure 2-2) and tighten the screws with the open-end wrench from the ship kit.

CAUTION: Be sure no part of the EZ-Air touches the copper power bars; any contact will cause shorting of the weld current.

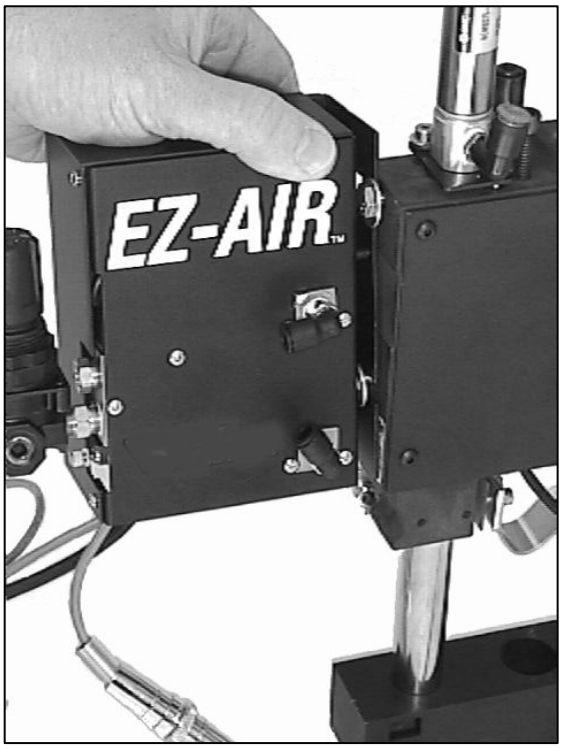


Figure 2-2. Installing EZ-Air On Model 80A or 86A Weld Head

Installing EZ-Air on an 83A or 84A Weld Head

CAUTION: In the case of the 84 weld head, the air kit mounting screws **also** secures the weld head. Be sure to secure the weld head from falling before removing the air kit mounting screws.

1 After securing the weld head, remove the two mounting bolts that secure the existing air kit and weld head to the vertical support. Remove the air kit.

2 Loosely install two new hex head cap screws, from the ship kit, through the vertical support into the weld head.

3 Slide the EZ-Air onto the two screws and tighten the screws with the end wrench from the ship kit.

CAUTION: Be sure no part of the EZ-Air touches the copper power bars; any contact will cause shorting of the weld current.

Installing the EZ-Air on an 180A Weld Head

1 From the weld head vertical support, remove the plastic end cap.

2 Loosen the two screws that secure the air kit and slide the air kit, screws, and T-nuts upward out of the top of the vertical support.

3 Loosely install two new flanged hex head bolts, from the ship kit, into the two T-nuts, also supplied in the ship kit. Slide the two assemblies into the vertical support slot and replace the end cap.

4 Slide the EZ-Air onto the two screws and adjust it so that its top is approximately at the same height as the air cylinder. Tighten the screws with the end wrench from the ship kit.

CAUTION: Be sure no part of the EZ-Air touches the copper power bars; any contact will cause shorting of the weld current.

Section III: Pneumatic and Power Connections

Pneumatic

1 From the packing kit locate two new elbow joints (without valves) and install the joints into the two valve ports of the cylinder. The elbow fittings should face in the general direction that the earlier valve assemblies faced. That is, the lower one faces upwards, and the upper one faces slightly outward of the rear of the weld head.

NOTE: The cuts to be made in step 2 must be smooth and square. We recommend using an SMC TKA-1 tube cutter. Do not use pliers, wire nippers or scissors.

2 From the packing kit, locate the pneumatic tubing for connections between the EZ-Air and the up and down ports of the cylinder. Cut two pieces from the tubing 9inches long. The remaining tubing can be used for the shop-air connection (step 4).

3 Using the included push-in fittings, connect the pneumatic tubing. **NOTE:** Be sure the tubing is pushed in all of the way to prevent leakage, leading to imperfect welds. As shown in figure 2-3, the connections are intuitive. That is, the upper valve goes to the cylinder's upper port; the lower valve to the lower port.

4 Connect the shop air to the EZ-Air shop air supply input fitting.

Figure 2-3. Installation of New Elbow Fittings and Pneumatic Tubes

Power

1 Connect the valve driver cable connector to the 24 volt connector on the rear of the power supply.

2 24VAC EZ-AIR:

A Connect the valve driver cable connector to the 24 volt connector on the rear of the power supply.

B Connect the signal cable connector to the firing switch connector on the power supply.

3 24VDC EZ-AIR-DC

A Connect weld head driver cable to connector labeled WELD HEAD on control

B Connect voltage sense cable between EZ-AIR-DC and electrodes, if desired

CHAPTER 3
OPERATING INSTRUCTIONS

Section I: Operating Precautions

General Operator Safety

WARNINGS

Always wear safety goggles any time you are operating a weld head.

Never wear loose clothing or jewelry when operating the weld head. It could be caught in the mechanism.

Before operating a weld head, read the manuals on the power supply and the weld head. Particularly note the specific hazards associated with those components.

Section II: Preparing for Operation

Pre-Operational Checks

Before operating the equipment, verify that the power and compressed air connections are made to the EZ-Air as described in Chapter 2, Section III. Verify that all pneumatic connections are secure and that there are no air leaks.

Verify that the (red) EZ-Clean valve (figure 1-1) is slid fully down (non-purge position).

Verify that the weld head and power supply are properly connected.

Turning the Equipment On

To apply power to the unit, follow the directions in the respective power supply User's Manual.

Section III: Operation

Set-Up

CAUTION: Adjustment of the EZ-Air should only be done by an experienced and trained individual.

1 Refer to the appropriate weld head user's manual for spring-force set-up. Disregard air adjustments.

2 Set the down speed control valve adjuster (figure 1-1) to provide an acceptable welding speed.

NOTE: Once set-up is completed, there are no separate steps required during weld head operation except that the EZ-Clean valve (figure 1-1) can be actuated to purge the air during electrode dressing. To do so, push the EZ-Clean (red) slide valve up. To restore pressure, slide the valve down.

CHAPTER 4
USER MAINTENANCE

Section I: Precautions

General Operator Safety

WARNINGS

Always wear safety goggles any time you are operating a weld head.

Never wear loose clothing or jewelry when operating the weld head. It could be caught in the mechanism.

Before operating a weld head, read the manuals on the power supply and the weld head. Particularly note the specific hazards associated with those components.

Section II: Operator Maintenance

Preventive Maintenance

The only preventive maintenance required for the EZ-Air is occasional lubrication of the EZ-Clean valve, whenever necessary. The valve should only be lubricated with a petroleum or lithium based grease.

CAUTION: Do not use synthetic oil. It will damage the EZ-Air.

Corrective Maintenance

The only recommended user corrective maintenance is clearing foreign matter that might jam a valve open. If the weld head fails to move up or down, refer to table 4-1 and perform the actions prescribed.

Table 4-1. Troubleshooting Table

NOTE: Table presumes all power and pneumatic connections are made and properly adjusted.

Fault	Check for:	Possible Cause	Action
Weld head does not move upward when air is first applied.		Problem with input shop air	Verify correct input shop air pressure. See Chapter 2, Compressed Air Requirements.
		EZ-Clean valve is closed (in up position).	Open valve by pushing downward.
		Internal valve is stuck.	Contact company representative.
Weld head does not go downward when footswitch is pressed (first position for two-level foot switches).	Neither green firing indicator nor amber initialization signal received indicator light.	Problem exists in power supply, footswitch, or cable connections.	Check cable connections. Refer to appropriate power supply manual.
	Amber initialization signal received indicator is lit.	Internal valve is stuck.	Contact company representative.
		Down Speed Control valve is closed.	Turn valve counterclockwise to open.
Weld head moves downward too forcefully when footswitch is pressed (first position for two-step foot switches).		Down Speed Limiter valve requires adjustment.	Contact company representative.

Repair

If problems cannot be resolved using the above troubleshooting table, contact Unitek Miyachi at the address/telephone/fax shown in the Foreword.

APPENDIX A
Specifications

Item	Specification
Dimensions	Width: 3.5 in. (88.9 mm) Depth 6.4 in. (162.6 mm) Height 5.5 in. (139.7 mm)
Weight	2.5 lb. (1.1 kg)
Power Requirements	EZ-AIR: 24 VAC ±10%, 1/2 A (Derived from power supply) EZ-AIR-DC: 24 VDC ±10%, 1/2 A (Derived from power supply)
Compressed air Requirements	85–140 psi . (586–965 kPa) An auto drain air filter with a 5-micron element (part number 10-373-01, catalog number ADAF) is recommended **CAUTION:** Compressor supplying air must ***not*** be lubricated with synthetic oil.
Operating Environment	60-113ºF (15.5-45ºC) 93% Relative Humidity (maximum) at 104ºF (40ºC)

Outline Drawing

(Dimensions are in inches)

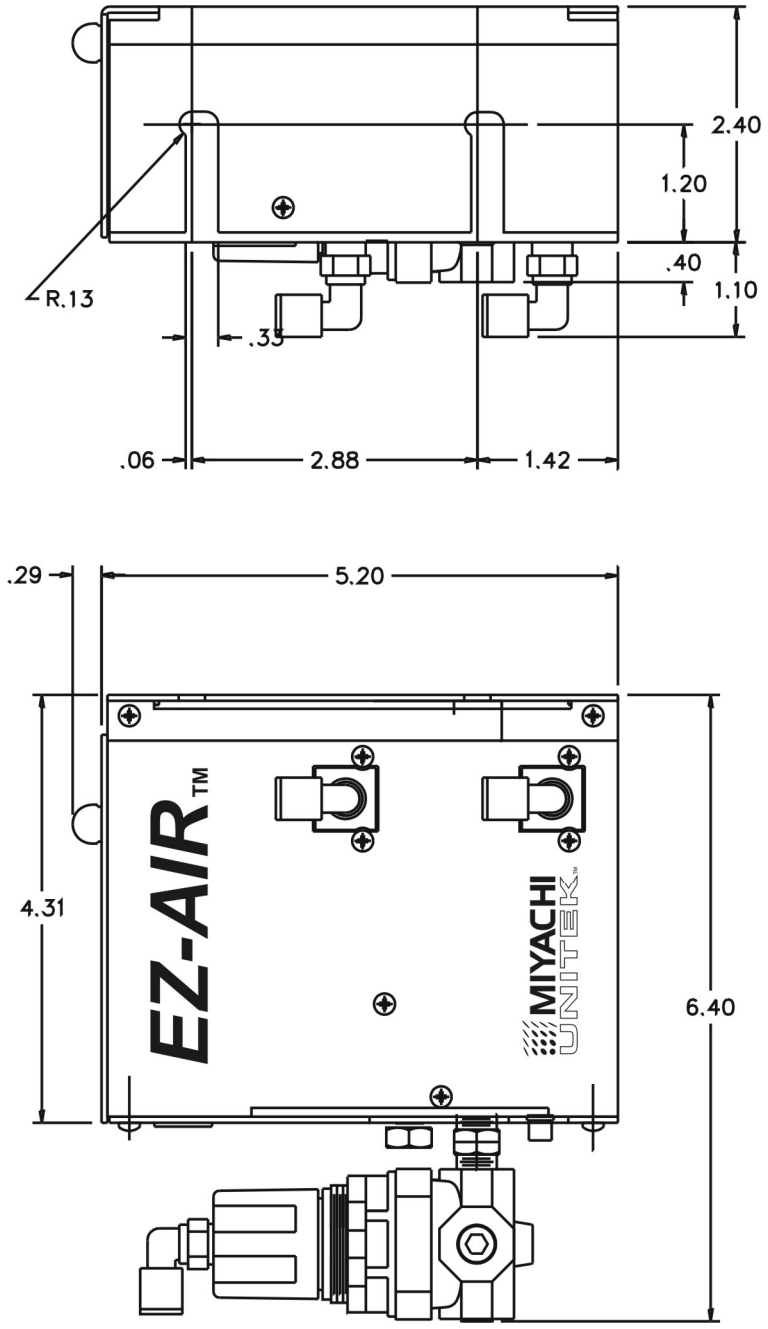


Figure A-1. Outline Dimensions