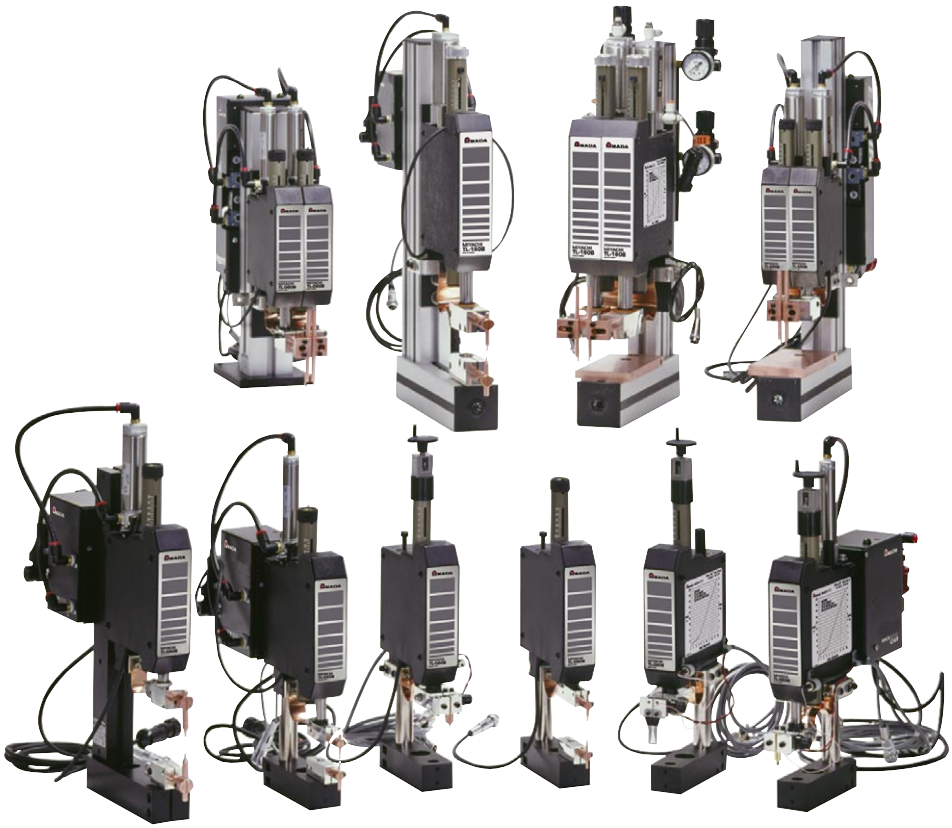


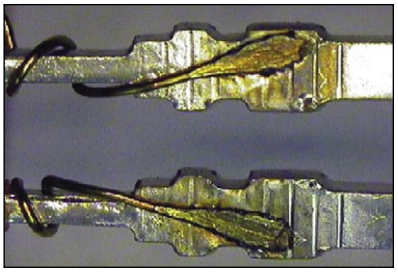
THIN-LINE®
Weld Heads

AMADA WELD TECH's THIN-LINE Heads for spot welding applications comprise three families of full-featured products for resistance spot welding: TL-080B Series (0.25 lb (1N) - 40 lbs (178N)), and TL-180B Series (100 lb (445 N)). All are precision, low inertia, force-fired designs, with narrow vertical profiles. Inline and parallel gap spot welding configurations available. Ideal for both production line and benchtop applications, THIN-LINE weld heads can operate at speeds greater than 3600 welds per hour.

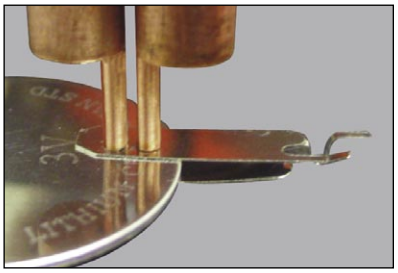
KEY FEATURES

- Low inertia, fast follow-up designs improve weld consistency, reduce metal expulsion, and improve weld appearance
- Adjustable force firing ensures weld force is independent of electrode stroke length resulting in higher quality welds
- EZ-AIR® technology ensures force consistency and simplifies set-up
- Rugged industrial design improves productivity, minimizes repair costs and ensures long life
- Pneumatic or manual actuation

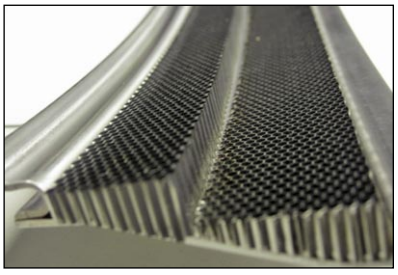
TYPICAL APPLICATIONS



Magnet wire to terminal



Coin cell battery tab



Honeycomb tacking

PRECISION PERFORMANCE THROUGH INTELLIGENT DESIGN

The THIN-LINE Ranges

AMADA WELD TECH's THIN-LINE Weld Heads consist of two families of full-featured products for precision metals joining:

TL-080B Series – 0.25 to 20 lbs. (1.1 to 89 N)
4 to 40 lbs. (18 to 178 N)

TL-180B Series – 5 to 100 lbs. (22 to 445 N)

Durable High Quality Design

Rugged construction, linear ball bearing bushings and an over-sized, anti-rotation bearing system provide perfect linear travel of the upper electrode arm. This system minimizes the potential for electrode wiping action during the weld, even at maximum force settings. Based on actual test data, bearing life exceeds 25 million operations when used according to the specifications.

High Speed Capability

EZ-AIR ensures repeatable, reliable, high-speed operation in automated applications. Threaded holes on the back of the heads make them easy to mount, without their post or base, in automated work stations. EZ-AIR provides unsurpassed repeatability and ease of set-up.

Precision Control

THIN-LINE Weld Heads add consistency and control to complex welding applications. Their low inertia designs ensure the fast dynamic response required for the electrodes to follow the minute expansion and contraction of the weld joint as it heats and cools. A differential motion force-firing system initiates the welding control at the precise moment when the pre-set electrode force is applied to the workpieces.

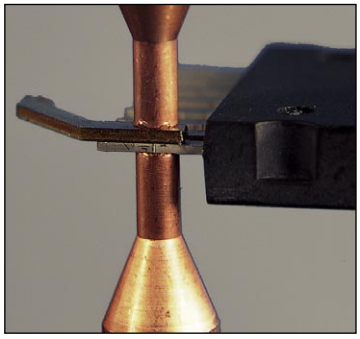
Electrodes and Accessories

A complete line of accessories and electrodes are available. Optics are available for all heads. All heads are supplied with firing switch cables, mounting hardware, and one set of electrodes.

ELECTRODE CONFIGURATIONS MATCH SPECIFIC APPLICATION NEEDS

Opposed Configuration

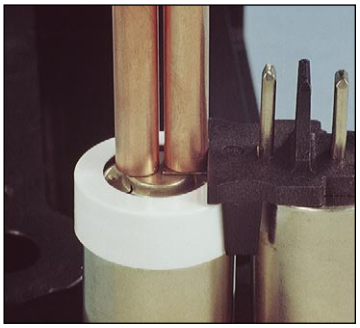
Top and bottom electrodes are used to hold the parts and provide the current path. An opposed weld is preferred over other configurations because it is easier to set-up and control the current path. It should be used whenever possible.



Opposed weld

Step Configuration

THIN-LINE weld heads designed for series welding can also be set up in a step configuration. Two top electrodes are used, but one electrode contacts the top part and the other electrode contacts the bottom part. A single weld is produced at the part to part interface. Independent force control allows the electrode force on the bottom part to be set much higher than the force on the top part.



Step weld

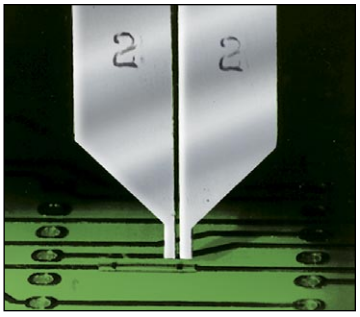
Series Configuration

Using two top electrodes, a series weld can be used when there is no access to the bottom part. Both electrodes contact the top part and current is passed through the top part to the bottom part. Two weld spots are produced, one under each electrode. Independent force control allows for separate adjustment of each electrode force and is used to balance the heat between the two weld spots.

Series weld

Parallel Gap Configuration

Parallel gap welding results in a single weld spot under the gap between the electrodes. It is used to weld very small parts. Two styles of parallel gap electrodes are available: UNITIPS® which are permanently bonded together with an insulating spacer and fixed gap; and UNIBOND® Electrodes which allow for adjustment of the gap.



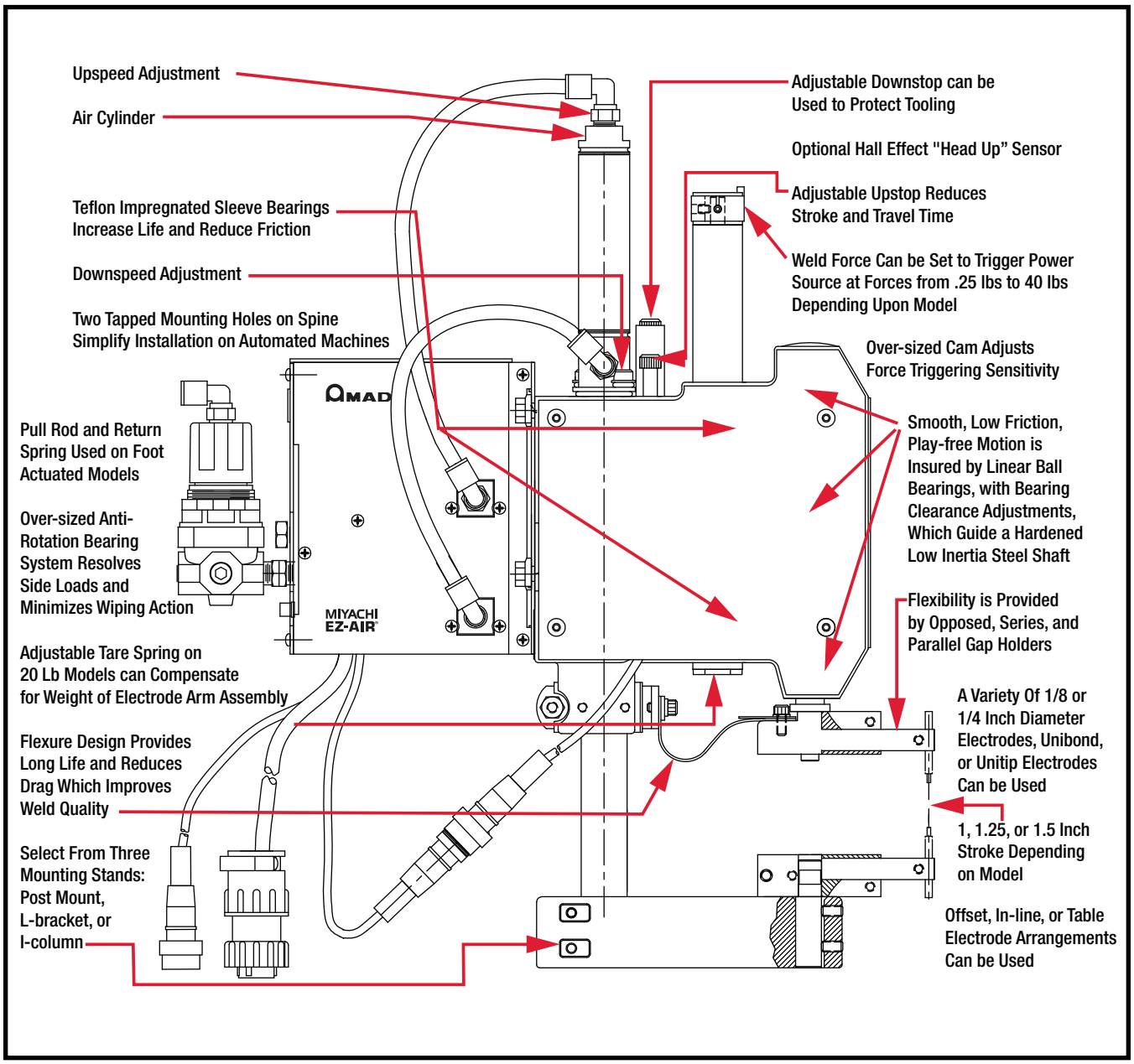
Parallel gap weld

HIGH QUALITY, FULL FEATURED

All AMADA WELD TECH weld heads are subjected to environmental life testing designed to guarantee specifications and performance.

Air actuated weld heads are supplied with an EZ-AIR force control module. The air actuation system includes a linear spring which ensures proper operation at low forces. EZ-AIR provides high repeatability and eliminates overforce. The air systems can be moved to other locations when the heads are incorporated in work stations or automated systems. The heads can be supplied with an optional Hall Effect Limit Switch Kit, which will detect when the head is in the up or down position. This feature can prevent damage when automated machine tooling is indexed.

TL-080B SERIES DESIGN FEATURES



TL-080B SERIES THIN-LINE WELD HEADS –
Force Range 0.25 to 20 Lbs. (1.1 to 89 N)

TECHNICAL SPECIFICATIONS

Model	Unit of measure	TL-080B-F*1	TL-080B-EZ	TL-086B-F*2	TL-086B-EZ*3	TL-087B-F*1	TL-087B-EZ	TL-088B-F	TL-088B-EZ
Actuation		Manual	Air	Manual	Air	Manual	Air	Manual	Air
Weld force	Maximum lb (N) Minimum lb (N)	20 (89) 0.25 (1.1)	20 (89) 0.5 (2.2)	20 (89) 0.25 (1.1)	20 (89) 0.5 (2.2)	20 (89) 0.25 (1.1)	20 (89) 0.5 (2.2)	20 (89) 0.5 (2.2)	20 (89) 0.5 (2.2)
Maximum rating	KVA (Watt-secs)	2 (250)	2 (250)	1 (125)	1 (125)	2 (125)	2 (125)	5 (250)	5 (250)
Maximum electrode stroke	in (mm)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)
Electrode diameter	in (mm)	0.125 (3.2)	0.125 (3.2)	UNIBOND UNITIPS	UNIBOND UNITIPS	Thermodes UNITIPS	Thermodes UNITIPS	0.245 (6.2)	0.245 (6.2)
Electrode configuration		Opposed	Opposed	Parallel gap	Parallel gap	Parallel gap	N/A	Series	Series
Electrode holder type		Offset	Offset	Offset	Offset	Offset	Offset	Offset	Offset
Maximum throat size (H x D)	in (mm)	1.94 x 6.0 (49 x 152)	1.94 x 6.0 (49 x 152)	3.38 x 5.19 (86 x 132)	3.38 x 5.19 (86 x 132)	2.55 x 5.25 (65 x 133)	2.55 x 5.25 (65 x 133)	6.2 x 6.25 (157 x 159)	6.2 x 6.25 (157 x 159)
Maximum gap between electrodes	Iin (mm)	– –	– –	0.040 (1.0)	0.040 (1.0)	0.040 (1.0)	0.040 (1.0)	1.75 (44.5)	1.75 (44.5)
Electrode series		ES-0400	ES-0400	EU or UT	EU	17*4 or UT	17*4	ES-0800E	ES-0800E
Foot pedal model		CP	–	CP	–	CP	–	MSP	–
Footswitch model	–	–	FS1L, FS2L	–	FS1L, FS2L	–	FS1L, FS2L	–	FS1L, FS2L
Air solenoid voltage	VAC	–	24	–	24	–	24	–	24
Air pressure for max. force	psig (bar)	–	65 (4.5)	–	65 (4.5)	–	65 (4.5)	–	65 (4.5)
Air cylinder inside diameter	in (mm)	–	0.75 (19)	–	0.75 (19)	–	0.75 (19)	–	.75 (19)
Cycle rate: @min. force @> 20% of rated force	Full strokes/sec Full strokes/sec	– –	1 2.5	– –	1 2.5	– –	1 2.5	– –	1 2.5

WEIGHT & DIMENSIONS

Maximum dimensions (including stand & air kit)	Height – in (mm) Depth – in (mm) Width –in (mm)	13.7 (348) 6.93 (176) 1.8 (46)	15.9 (404) 13.8 (350) 3.5 (89)	16 (406) 6.6 (168) 2.2 (56)	16.5 (419) 13.8 (350) 3.5 (89)	16 (406) 7.0 (178) 2.2 (56)	16.5 (419) 13.8 (350) 3.5 (89	16.7 (424) 13.5 (343) 4 (102)	19.3 (490) 15.6 (396) 5.6 (142)
Weight (before packing)	lb (kg)	5 (2.3)	7 (3.2)	5.5 (2.5)	7 (3.2)	5.5 (2.5)	7 (3.2)	14 (6.4)	17 (7.7)

**1 Model TL-080B-F/LF and TL-087B-F/LF have a force range of 0.25 - 10 lbs (1.1 - 44.5 N)*

**3 a UTA to mount UNITIPS is needed on the 86 weld heads*

**4 17BM, 17F, 17M, 17P or 17SR*

See page 7 for EZ-AIR specifications

TL-080B-EZ

Offset/opposed
(See EZ-AIR)

TL-086B-F

Offset/parallel gap

TL-088B-EZ

Offset /series
(See EZ-AIR)

TL-080B SERIES THIN-LINE WELD HEADS –
Force Range 4 to 40 Lb (18 to 178 N)

TECHNICAL SPECIFICATIONS

Model	Unit of Measure	TL-082B-A*1	TL-084B-F	TL-084B-EZ	TL-089B-F	TL-089B-EZ
Actuation		Air	Manual	Air	Manual	Air
Weld force	Maximum lbs (N) Minimum lbs (N)	40 (178) 6 (27)	40 (178) 4 (18)	40 (178) 6 (27)	40 (178) 4 (18)	40 (178) 6 (27)
Maximum rating	KVA (Watt-secs)	5 (250)	5 (250)	5 (250)	5 (250)	5 (250)
Maximum electrode stroke	in (mm)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)
Electrode diameter	in (mm)	0.25 (6.4)/0.125 (3.2)	0.25 (6.4)	0.25 (6.4)	0.245 (6.2)	0.245 (6.2)
Electrode configuration		Opposed	Opposed	Opposed	Series	Series
Electrode holder type		In-Line	Offset	Offset	Offset	Offset
Maximum throat size (H x D)	in (mm)	N/A	3.3 x 6.1 (84 x 155)	3.3 x 7.8 (84 x 198)	8.7 x5.6 (221 x 142)	8.7 x 8.2 (221 x 208)
Maximum gap between electrodes	in (mm)	– –	– –	– –	1.75 (44.5)	1.75 (44.5)
Electrode series		ES-0800/ES-0400	ES-0800	ES-0800	ES-0800E	ES-0800E
Foot pedal model		–	MSP	–	MSP	–
Footswitch model	–	FS1L, FS2L	–	FS1L, FS2L	–	FS1L, FS2L
Air solenoid voltage	VAC	24	–	24	–	24
Air pressure for max. force	psig (bar)	55 (3.8)	–	55 (3.8)	–	55 (3.8)
Air cylinder inside diameter	in (mm)	1.0625 (27)	–	1.0625 (27)	–	1.0625 (27)
Cycle Rate: @ min. force **@> 20% of rated force**	Full strokes/sec Full strokes/sec	1 2.5	– –	1 2.5	– –	1 2.5

WEIGHT & DIMENSIONS

Maximum Dimensions (including stand & air kit)	Height – in (mm) Depth – in (mm) Width – in (mm)	16.2 (411) 17.7 (450) 4.6 (117)	16.7 (424) 10.0 (254) 2.6 (66)	19.3 (490) 11.9 (302) 4.6 (117)	21.9 (556) 14.6 (371) 4.9 (124)	24.5 (622) 16.0 (406) 10.5 (267)
Weight (before packing)	lb (kg)	5 (2.3)	8 (3.6)	10 (4.5)	20 (9.1)	23 (10.4)

**1 Model TL-082B-A does not come with the mounting stand, lower electrode or the lower electrode holder*
See page 7 for EZ-AIR specifications
EZ-AIR can be set for 24VDC operation

TL-084B-EZ

Offset/opposed

TL-089B-EZ

Offset/series

TL-180B SERIES MID-FORCE WELD HEADS
Force Range 5 to 100 Lbs. (22 to 445 N)

TECHNICAL SPECIFICATIONS

Model	Unit of Measure	TL-180B-F	TL-180B-EZ	TL-182B-A	TL-188B-EZ
Actuation		Manual	Air	Air	Air
Weld Force	Maximum lbs (N) Minimum lbs (N)	100 (445) 5 (22)	100 (445) 5 (22)	100 (445) 5 (22)	100 (445) 5 (22)
Maximum rating	KVA (Watt-secs)	20 (875)	20 (875)	20 (875)	20 (875)
Maximum electrode stroke	in (mm)	1.25 (32)	1.25 (32)	1.25 (32)	1.25 (32)
Electrode diameter	in (mm)	0.25 (6.4)	0.25 (6.4)	0.25 (6.4)	0.245 (6.22)
Electrode configuration		Opposed	Opposed	Opposed	Series
Electrode holder type		Offset	Offset	In-Line	Offset
Maximum throat size (H x D)	in (mm)	6.1 x 8.5 (154.9 x 215.9)	6.1 x 11.1 (154.9 x 281.9)	2.8 x 6.3 (71.1 x 160.0)	6.0 x 11.5 (152.4 x 292.1)
Maximum gap between electrodes	in (mm)	– –	– –	– –	3.0 (76.2)
Electrode series		ES-0800	ES-0800	ES-0800	ES-0800E
Foot pedal model		MSP	–	–	–
Footswitch model		–	FS1L, FS2L	FS1L, FS2L	FS1L, FS2L
Air solenoid voltage	VAC	–	24	24	24
Air pressure for max. force	psig (bar)		60 (4.4)	60 (4.4)	60 (4.4)
Air cylinder inside diameter	in (mm)	1.5 (38.1)	1.5 (38.1)	1.5 (38.1)	1.5 (38.1)
Cycle Rate: @ min. force **@> 20% of rated force**	Full strokes/sec Full strokes/sec	–	1 2	1 2	1 25

WEIGHT & DIMENSIONS

Maximum dimensions (including stand & air Kit)	Height – in (mm) Depth – in (mm) Width – in (mm)	24 (610) 14.9 (378) 3.5 (89)	24.75 (629) 20.15 (512) 4.2 (107)	25 (635) 13.4 (340) 6.4 (163)	24.9 (632) 19.79 (503) 6.6 (168)
Weight (before packing)	lb (kg)	18.5 (8.4)	21.5 (9.8)	21.5 (9.8)	36.5 (16.6)

See page 7 for EZ-AIR specifications
EZ-AIR can be set for 24VDC operation

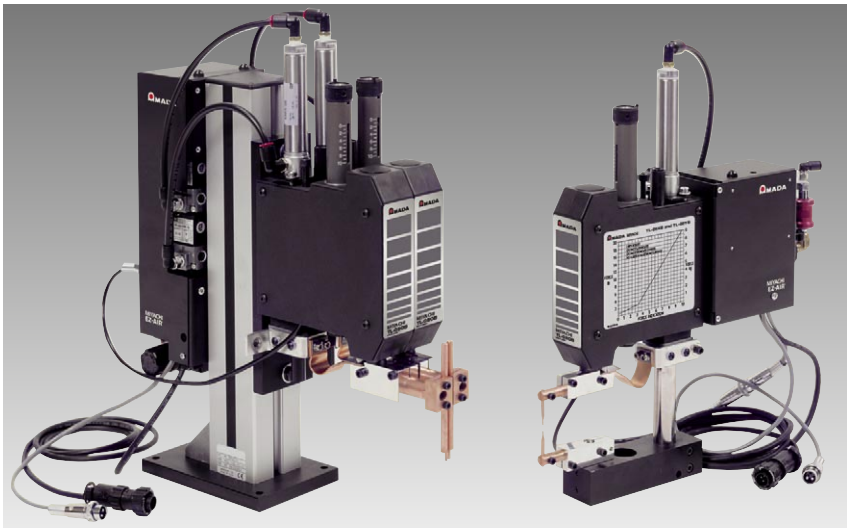
TL-180B-EZ

Offset/opposed

EZ-AIR TECHNOLOGY

The EZ-AIR weld force control system simplifies the set-up process to a single adjustment and helps prevent weld over-force by closing off the input air when the actual weld force reaches the programmed weld force level, delivering accurate force control which is repeatable across multiple weld heads without complex setup or operator training.

- Firing force is important because it controls contact resistances and, therefore, heat generation at the electrode-to-part and part-to-part interface.
- Superior force control = process stability and higher production yield with reduced maintenance time.



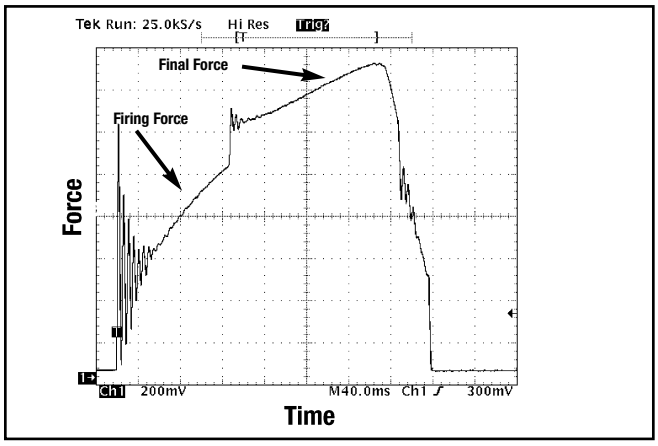
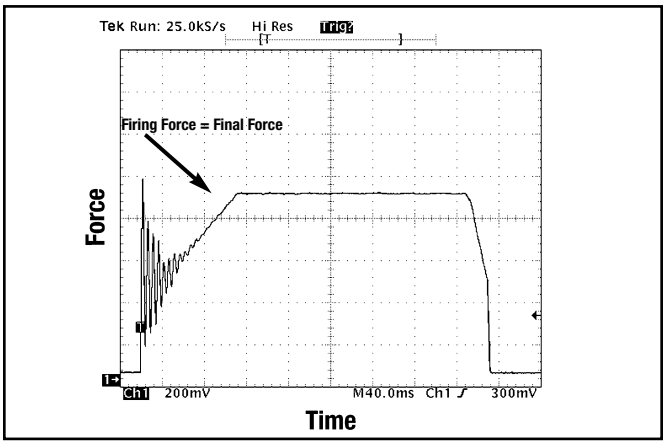
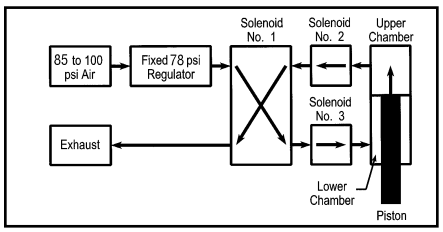


Figure 1, above, shows an incorrect balance of firing force to air pressure set by an operator after cleaning the electrodes, on a traditional weld head, resulting in poor set-up and force control.

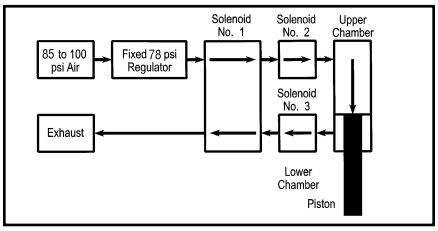


EZ-AIR insures correct set-up and good force control as seen in Figure 2, above. EZ-AIR requires no balancing of air pressure as the air pressure is constant once the firing force is reached.

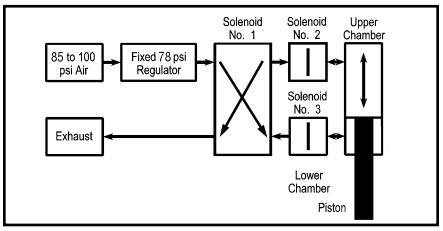
The following series of simplified diagrams explain how the EZ-AIR weld force control system works through independent control of upper and lower air chambers.



Electrode up position – air pressure in the lower chamber keeps the piston in the up position. Waste air exhausts from the upper chamber.



Electrode moves down – air pressure in the upper chamber forces the piston down. Waste air exhausts from the lower chamber.



Electrode reaches weld force – both solenoid valves close within 4ms and air pressure is trapped in both the upper and lower chambers. Weld force remains constant since the air cylinder piston cannot move. Compression spring provides instantaneous follow-up.

EZ/DAK dual air kit *EZ/SAK single air kit*

EZ-AIR force control technology is available with AMADA WELD TECH THIN-LINE weld heads as original equipment and as a retrofit for previously purchased THIN-LINE air actuated weld heads. See the Ordering Guide for more information.

THIN-LINE WELD HEAD ORDERING GUIDE

Model			Description
Weld heads TL-080B Series, TL-180B Series			**Weld head, manual or air actuation, or EZ-AIR model,** please refer to Weld Head Table, pages 4, 5 and 6, for model numbers and specifications. For air actuation, add /24 for 24 VAC or /115 for 115 VAC solenoid.
Foot actuators	**Model**	**Head Type**	**Description**
	FS1L	Air	Footswitch, single level (for all pneumatic weld heads).
	FS2L	EZ-AIR	Footswitch, two level (for all pneumatic weld heads).
	CP	Manual	Cable pedal, rated: 25 lbs, 1 in stroke, with 6 ft cable (for manual weld heads).
	MSP	Manual	Foot pedal, medium force swing type, rated: 100 lbs, 5:1 mechanical advantage (40 lb and higher force manual weld heads).
Head options & accessories	**Model**	**Type**	**Description**
	HS20	Option	Hall effect sensor kit for 20 lb cylinders. Includes: cylinder, clamp, and sensor. Use on TL-088B-EZ. TL-088B-EZ requires two kits.
	HS40	Option	Hall effect sensor kit for 40 lb cylinders. Includes: cylinder, clamp, and sensor. Use on 40 lb TL-080B-EZ models. TL-089B-EZ requires two kits.
	DFS	Accessory	Firing switch junction box. Connects two firing switch cables in parallel to one power supply.
	DFS/88	Accessory	Series firing switch junction box. Connects two firing switch cables in series (included in models TL-088B-EZ, TL-089B-EZ, TL-188B-EZ).
	BPTL	Accessory	Base plate, anodized. Supports optic mounting assembly.

Viewing accessories	
OMA	Optic mounting assembly. Use with Nikon, and BPTL.
NIKON	Optic, stereo zoom, Nikon, 10X eyepiece, 0.5X auxiliary objective lens.
BLFOI	Fiber optic illuminator system, 115V-50/60 Hz. Self-supporting gooseneck, bifurcated light pipes, focusing lenses and mounting adapter for optic mounting assembly.
BLFOI/230	Fiber optic illuminator system, 230V-50/60 Hz. Self-supporting gooseneck, bifurcated light pipes, focusing lenses formounting adapter for optic mounting assembly.

Process set-up tools	
FG20	Electrode force gage, 20 lb, scale 20 lb x 0.2 lb
FG100	Electrode force gage, 100 lb, scale 100 lb x 1 lb
FG200	Electrode force gage, 200 lb, scale 200 lb x 2 lb
FG10KG	Electrode force gage, 10 kg, scale 10 kg x 0.1 kg
FG100KG	Electrode force gage, 100 kg, scale 100 kg x 1 kg
	All available with or without serial number.
Miscellaneous accessories	
UTA	UNITIP adapter, allows use of UNITIP electrodes in model 86.
WP	Work Positioner, 3 in diameter. Height adjustable from 1-7/16 in to 2 in (models 86, 87, 88, 89).

EZ-AIR TECHNICAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Force adjustment range models: TL-080B-EZ, TL-086B-EZ, TL-088B-EZ	1 to 20 lbs (4.4 to 89 N)
Force adjustment range models: TL-084B-EZ, TL-089B-EZ	4 to 40 lbs (17.8 to 178 N)
Force adjustment range models: TL-180B-EZ	5 to 100 lbs (22 to 445 N)
Valve driver input	24 VAC
Input air pressure	85 to 130 psi (482 kPa to 896 kPa), unlubricated air

CE

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