MIDWEST FASTENERS, INC.

Solid State – Capacitor Discharge

Pin Welding System

Owner's Manual

TALON

Solid State – Capacitor Discharge

Pin Welding System

Owner's Manual

- **Installation**
- **Operation**
- **Maintenance**

MIDWEST FASTENERS, INC.
450 Richard Street
Miamisburg, OH 45342
Phone: (800) 852-8352
Fax: (937) 866-4174

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WARRANTY: All parts used in the assembly of your MIDWEST FASTENERS Talon Pin Welding System are fully guaranteed for three (3) years from factory shipment date.

Under this warranty, MIDWEST FASTENERS reserves the right to repair or replace, at its option, defects in material or workmanship which occur during the warranty period. Notice of any claim for warranty repair must be furnished to MIDWEST FASTENERS within ten (10) days after the defect is discovered. MIDWEST FASTENERS does not assume liability for shipping, or liability for any labor or material related to use of this system, unless such costs are expressly authorized in writing by MIDWEST FASTENERS.

MIDWEST FASTENERS, INC. does not warrant defects in welders, parts or accessories resulting from abuse, improper installation or use, or for reasons beyond its control.

This warranty is valid only when welding pins and/or studs purchased from or approved by MIDWEST FASTENERS.

SAFETY PRECAUTIONS

- Comply with all electrical, fire and other applicable codes or ordinances in the installation and use of stud welding systems.
- Remove all combustible or volatile materials from the weld area. Although weld splatter resulting from stud welding is normally minimal, proper precautions should be taken when welding near or through combustible materials to insure that sparks or weld material do not come in contact with combustible material.
- Recommend wearing of eye protection at all times when welding. Spectacle type frames with Shade No. 3 absorptive and filter lens and side shields are suggested. Never look directly at the weld arc without wearing eye shields. Precautions are especially recommended when welding overhead.
- Recommend use of proper ear protection with all CAPACITOR DISCHARGE stud welding systems. The stud welding operator and anyone working within five (5) feet of the stud welding operation should use ear protection devices, under certain circumstances.
- Use of protective clothing is suggested. Type of clothing will vary as to application, weld position and stud welding being used; however, in all cases, it should be fire resistant and sufficient to protect welding operator from weld splatter and material, especially when welding overhead.
- Keep hands, clothing, etc. away from the weld stud, stud-holder and all other parts in contact with them during the weld cycle.
- Keep weld cable and connectors in good condition. Inspect periodically for broken insulation and/or other electrical hazards.
- Do not operate with worn or poorly connected cables. Inspect all cables often for bare or exposed wires, broken insulation layers and/or loose connections. Repair all such connections before welding use.
- Do not stand in water or on damp surfaces while welding. Avoid wearing wet or sweaty clothes. Do not weld in the rain.

WARNING

Use extreme caution when servicing or troubleshooting
any component of this stud welding system.
If possible, turn all power controls **"OFF"**
and disconnect all electrical cables.

For other suggested precautions, safe practices, etc.
regarding welding, refer to "Safety in Welding and Cutting",
AWS Z49.11 (1999), American Welding Society.

TALON OVERVIEW

The Talon is a compact, heavy duty, capacitor discharge pin welder. The weld energy is stored in capacitors located inside the control unit. The amount of stored energy can be controlled by rotating the voltage control knob located on the front panel.

CD weld pins, or studs, used with the Talon must have a specially designed projection at the weld end. When the pin is inserted on the weld gun and placed against the workpiece, and the trigger switch is depressed, the following occurs:

1. The energy stored in the capacitors travels through the weld cables to the pin.
2. The rapid rise in current ignites the pin tip and allows a welding arc to be established between the pin and the workpiece.
3. The arc melts the base of the pin and a portion of the workpiece.
4. The spring pressure from the welding gun forces the pin into the molten metal created by the arc.
5. The weld cycle ends upon contact of the pin to the workpiece.
6. The welding gun is then removed. Upon removal, the controller will automatically recharge to the set voltage.

CAUTION

The **noise** generated by stud welding
may exceed allowable levels
established by O.S.H.A. For this reason
it is recommended that proper ear protection be worn
based on the weld pin type and application.

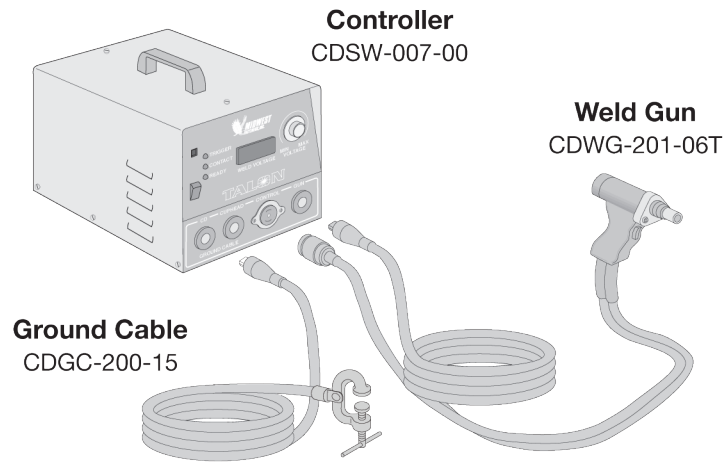
WARNING

Voltages inside the unit can reach 200 volts D.C.
even if the unit is turned off. All repair work
should be handled by factory trained personnel.

TALON INSTALLATION

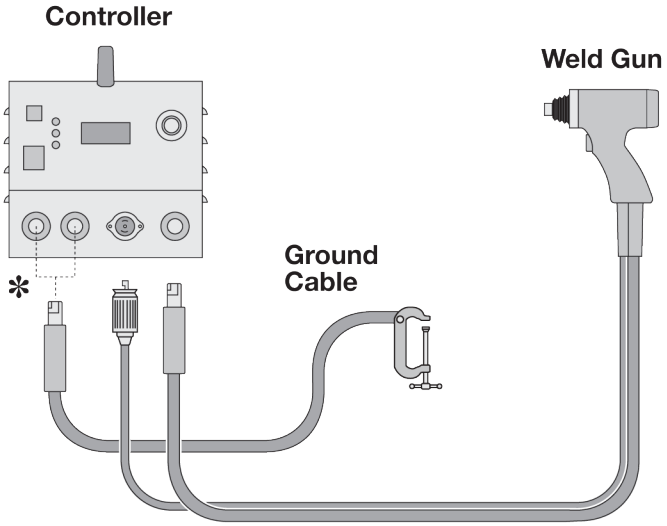
Follow the process below to properly install your Talon pin welder.

Talon Components



1. Carefully remove the controller, cables and weld gun from the shipping packaging.
2. Set the **Controller** on a clean, dry, sturdy surface near an appropriate voltage supply and the workpiece.
3. Connect the **Ground Cable** male cam-lok connector to the controller receptacle marked “CD” or “CUPHEAD” (depending on the fastener type to be welded).

Talon Cable Connections



* See Gun Setups for proper cable orientation.

NOTE: All cables should be laid out straight or in large loops. Poor welds may result if welding cables are closely coiled or stacked up.

4. Attach the **Ground Cable** firmly to a clean (free from paint, rust, scale, grease or oil) area on the workpiece.

5. Connect the **Gun Cable** male cam-lok weld connector to the Talon receptacle marked “GUN”.

6. Connect the **Gun Cable** control connector to the Talon receptacle marked “CONTROL”.

7. Plug the Controller **Power Cord** to appropriate power source.

TALON SETUP

After installation, two setup phases must be completed before welding can begin. These phases are:

- **Talon Weld Gun Setup**, and
- **Controller Adjustment**.

TALON GUN SETUP

Your Talon gun setup will depend on your application and the particular pin to be welded. Setting up the gun consists of the following:

1. Locate the pins (or studs) that were shipped for your job and load a pin to the weld gun.

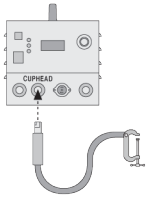
2. Make sure that the gun “setup” accessories that came with the Talon weld gun are adjusted properly and fastened tightly. Illustrations on the following pages show proper setup for:

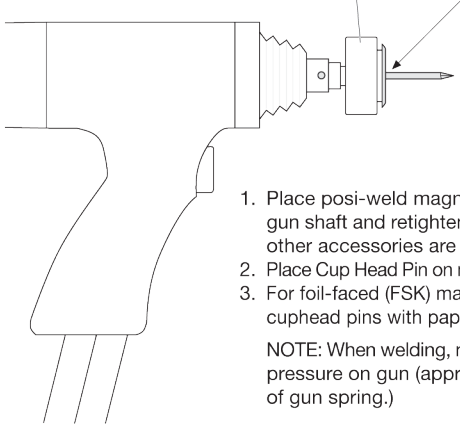
   - Cuphead Pins (Fig. 1)
   - Insulation Pins (Fig. 2)
   - Insulation Pins with Collet Protector (Fig. 3)
   - Insulation Pins with Internal Stop (Fig. 4)

   NOTE: These components may need to be adjusted, or changed, as your job requirements change. Also, accessories should be changed as wear or arcing begins to affect weld quality and performance.

TALON Gun Setup

CUPHEAD PINS





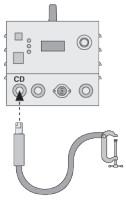
1. Place posi-weld magnetic chuck in gun shaft and retighten set screw. No other accessories are required.
2. Place Cup Head Pin on magnetic chuck.
3. For foil-faced (FSK) material — use cuphead pins with paper washers.

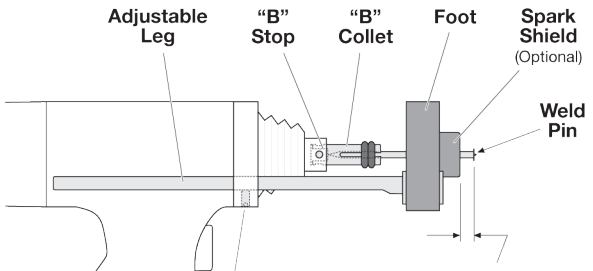
NOTE: When welding, maintain correct pressure on gun (approximately 1/8" of gun spring.)

(Fig. 1)

TALON Gun Setup

INSULATION PINS



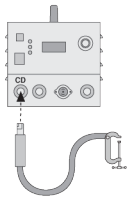


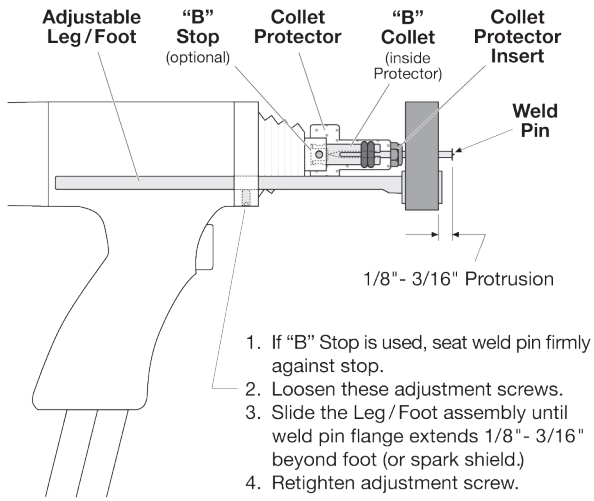
1. Seat weld pin firmly against stop.
2. Loosen these adjustment screws.
3. Slide the Leg / Foot assembly until weld pin flange extends 1/8"- 3/16" beyond foot (or spark shield.)
4. Retighten adjustment screw.

(Fig. 2)

TALON Gun Setup

INSULATION PINS WITH COLLET PROTECTOR



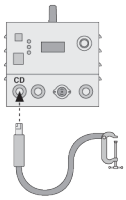


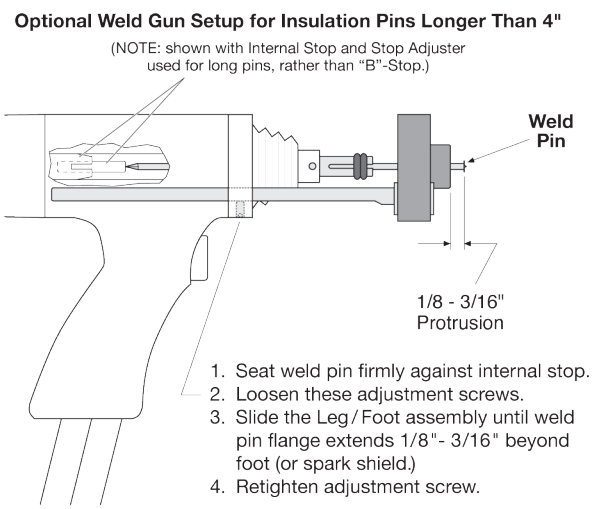
1. If "B" Stop is used, seat weld pin firmly against stop.
2. Loosen these adjustment screws.
3. Slide the Leg / Foot assembly until weld pin flange extends 1/8"- 3/16" beyond foot (or spark shield.)
4. Retighten adjustment screw.

(Fig. 3)

TALON Gun Setup

INSULATION PINS WITH INTERNAL STOP





1. Seat weld pin firmly against internal stop.
2. Loosen these adjustment screws.
3. Slide the Leg / Foot assembly until weld pin flange extends 1/8"- 3/16" beyond foot (or spark shield.)
4. Retighten adjustment screw.

(Fig. 4)

CONTROLLER ADJUSTMENT & MAKING A TEST WELD

After verifying that the welding system is installed and your weld gun is setup properly for your application, the final step is to adjust your stud welding controller to the proper settings.

1. Turn the controller **ON/OFF** switch to "**ON**." Verify by observing **ON/OFF** lamp and **READY** light illuminated.

2. Using the chart below, you may adjust the "**VOLTAGE**" control up or down until the "**WELD VOLTAGE**" indicator reads the proper setting.

   The chart settings shown below are "reference" settings to be used as starting points. Actual voltage settings may vary depending upon the conditions or each application and use. The voltages shown also assume that the following are in use (as described in previous Installation/Setup sections of this manual.)

A) Straight polarity cable set ups in use (Gun = Negative, Ground = Positive.)

B) Ground connection directly to the part to be welded and connected in a solid manner, and connected to unit for proper pin/stud style in use.

C) 1/8" protrusion of pin/stud onto work (3/16" for Aluminum) for an equal amount of spring pressure in the gun.

D) "Silver" gun spring for Mild or Stainless Steel ("Black" for Aluminum applications).

E) Good, clean accessories and work surface to be welded, with proper setup of all accessories.

Pin/Stud Type	Pin/Stud Dia	Pin/Stud Mat'l.	Voltage Setting
Cuphead Pin	12 GA	Mild Steel	85-95
Insulation Pin	12 GA 10 GA	Mild Steel or Stainless	75-85 85-95
	12 GA 10 GA	Aluminum	110-120 120-130
Weld Studs (Flanged)	#10 or 3/16" 1/4"	Mild Steel or Stainless	120-130 145-155
	#8 #10 or 3/16"	Aluminum	120-130 130-140

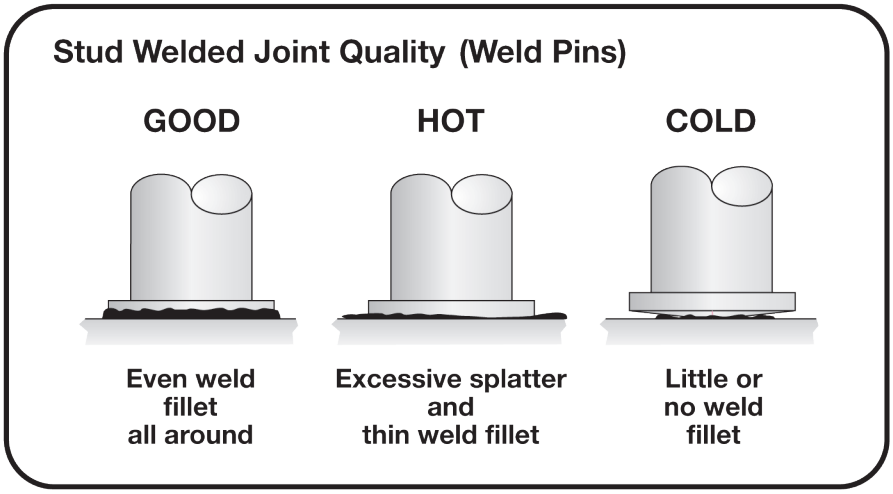
NOTE: Be sure that proper observation of all safety precautions are in place before performing the next step.

3. Pick up the weld gun and place the pin or stud firmly against the workpiece (A test workpiece should be material that is similar to the workpiece to be welded to in actual production.)

4. Depress the weld gun trigger, wait momentarily, and then pull the gun straight back off the pin.

5. Test the weld integrity (see below.)

WELD QUALITY



- A **GOOD** weld is determined by bending the welded pin back and forth. Failure should occur in the stud shank or workpiece, not in the weld. For cuphead pins, good welds resist "pull-away" pressure (not back-and-forth "shear" tests).

- **HOT** weld shows excessive splatter in and under weld area — adjust voltage downward.

- **COLD** weld shows little or no splatter and may have a void between the pin and workpiece — adjust voltage upward.

If you need assistance with setup, or operation, call ***MIDWEST FASTENERS*** Technical Support at (800) 852-8352 Monday through Friday between 8am and 5pm Eastern time.

6. Adjust the weld voltage up or down until a satisfactory weld is consistently achieved.

When weld quality is satisfactory, the Talon is properly installed and setup.

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PREVENTIVE MAINTENANCE

Your MIDWEST FASTENERS welder is designed for long service with minimal care. Ordinary common sense maintenance will keep it operating efficiently. The following are a few tips on preventive maintenance.

1. Treat the cables with respect. Avoid sharp bends or kinks which may break the cables. DO NOT use the cables as a "towline" to drag or lift the controller. Avoid damaging or straining the cables at connectors where they enter the gun or controller. Never tie-off or heavily pull on cables in any way.

2. Unit fan and louvers on the sides of the controller should be free from obstructions at all times to prevent overheating.

3. Keep the controller and gun clean and dry as well as free of grease, moisture, dust and dirt. Do not lubricate any part of your Talon weld gun.

4. The weld gun is for welding pins and studs only. Do not use the weld gun as a multipurpose tool (i.e., Hammer—banging pins to test welds or break studs, Scraper—removing rust, scale or weld splatter, etc.)

TROUBLESHOOTING

When troubleshooting the Talon, the following precautions must be observed.

1. Controller power must be **TURNED OFF** and unplugged!

   NOTE: Dangerous voltage levels can still be present in the controller—even after power is disconnected.

2. The use of a volt/ohmmeter is recommended to verify where any voltage may, or may not, be present.

3. The use of a continuity tester (or trouble shooting light) can be used for continuity checking (disconnected) cables only.

4. On-board LEDs—color-coded notification lights are located and labeled on the Talon front panel. They indicate the following:

   READY (red)—unit is charged and ready to weld at voltage as set.

   CONTACT (yellow)—gun is in connection with grounded surface and control unit. All weld cables have continuity.

   TRIGGER (green)—gun trigger and trigger cables are in communication with control unit and have continuity.

   A sequence of red, yellow, green should produce a weld of each fastener placed. If there is an absence of any LED in sequence, consult the chart on the following pages.

The troubleshooting chart on the following pages can assist in locating and fixing problems with the Talon.

TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Welder does not turn on and will not weld.	A. Power cable connection at controller or 115 VAC outlet not complete.	Inspect power cable connection. Repair if loose.
	B. Power cable/connector damaged.	Check for continuity. Repair break or replace connector.
	C. Open circuit breaker or damaged wall outlet.	Reset circuit breaker. If problem persists, check with ohmmeter. Replace defective part.
2. Circuit Breaker trips each time the controller is turned on.	A. Shorted weld capacitor.	Check capacitors safety vent seal for rupture hole. Replace or isolate/ remove capacitor if defective.
	B. Shorted rectifier.	Check with ohmmeter. Replace rectifier if defective.
	C. Faulty circuit breaker.	Check with ohmmeter. Replace if defective.
	D. Shorted transformer.	Remove two orange wires from charge rectifier. If breaker continues to trip, replace transformer.
3. Circuit Breaker trips when weld is made.	A. Shorted charge SCR.	Check with ohmmeter. (Should not show continuity in either direction.) Replace if defective.
	B. Faulty printed circuit (PC) board.	Repair or replace PC board.
4. Welder turns on, but does not operate.	A. Open circuit in weld or ground cables.	With cables plugged into welder, touch collet or chuck to grounded surface. Check for "Contact" (yellow) light. If light does not come on, repair or replace defective cables. (NOTE: DO NOT trigger gun while in contact with grounded surface.)
	B. Open circuit in trigger cable or defective trigger switch.	With cables plugged into welder, hold gun away from grounded surface and depress trigger button. Check for "Trigger" (green) light. If light does not come on, repair or replace defective trigger switch or control cable assembly.
	C. Capacitors not charging.	Check for indication of capacitor charge on voltmeter. Replace PC board if no charge is actually occurring.

Continues, next page. >

TROUBLESHOOTING CHART *(Continued)*

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
5. Welder turns on, but does not operate. (cont.)	D. Weld SCR shorted.	Turn power off, unplug welder from AC power. Remove PC Board. Check for continuity between weld cam-lok receptacle and negative buss bar. Replace SCR if continuity exists.
	E. Defective printed circuit (PC) board.	Repair or replace PC board.
6. Weld is excessively hot regardless of voltage setting.	A. Shorted charge SCR.	Check continuity across SCR. No reading should be observed in either direction. Replace charge SCR if continuity exists.
	B. Faulty printed circuit board.	Repair or replace PC board.
	C. Open voltage potentiometer.	Replace defective voltage "pot".
7. Consistently poor or erratic welds.	A. Improper gun setup.	Check gun for proper setup (see pg.7).
	B. Improper grounding, cable installation or incorrect polarity.	Check grounding and cable installation for proper setup (see pg.7).
	C. Weld cables coiled.	Straighten out cables or place in random loops.
	D. Incorrect weld voltage setting.	Adjust as necessary (see pg.8).
	E. Pins (or studs) not perpendicular to workpiece.	Adjust gun set up as necessary. Replace bent/defective legs (see pg.7).
	F. Faulty printed circuit board.	Repair or replace PC board.
8. No "Contact" light. (Yellow LED)	A. Faulty ground connection.	Verify ground cable/connections.
	B. Break in weld cable, connectors or receptacles.	Replace defective component(s).
9. No "Trigger" light. (Green LED)	A. Faulty trigger switch.	Replace defective switch.
	B. Break in control cable, connectors or receptacles.	Replace defective component(s).
10. 1 Amp fuse blows.	A. Shorted components on PC board.	Repair or replace PC board.
11. 1/2 Amp fuse blows.	A. Shorted components on PC board.	Repair or replace PC board.
	B. Shorted digital voltmeter.	Replace voltmeter.

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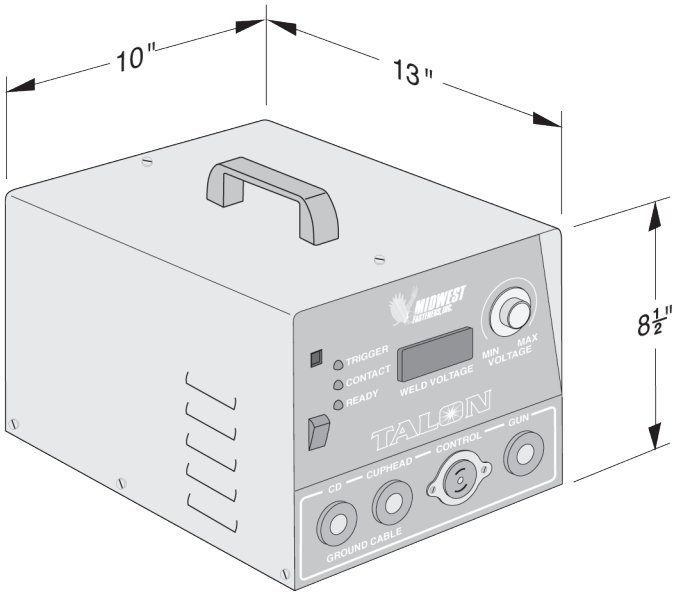
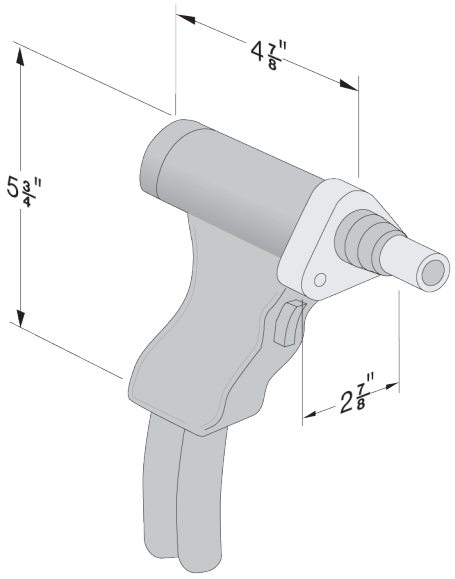
TALON WELDING SYSTEM SPECIFICATIONS



Weight.....29 pounds
Power Requirement.....115 VAC, 60 Hz, 20 Amp
Pin/Stud Range .....14 ga. – 1/4" dia. weld base
Weldable Materials .....Mild Steel, Stainless, and Aluminum
Weld Mode .....Contact, Cuphead
Weld Rate .....20/minute (maximum)*
(* Dependent on stud size.)
Weld Voltage.....35–175 VDC
Capacitance .....70,000 mfd

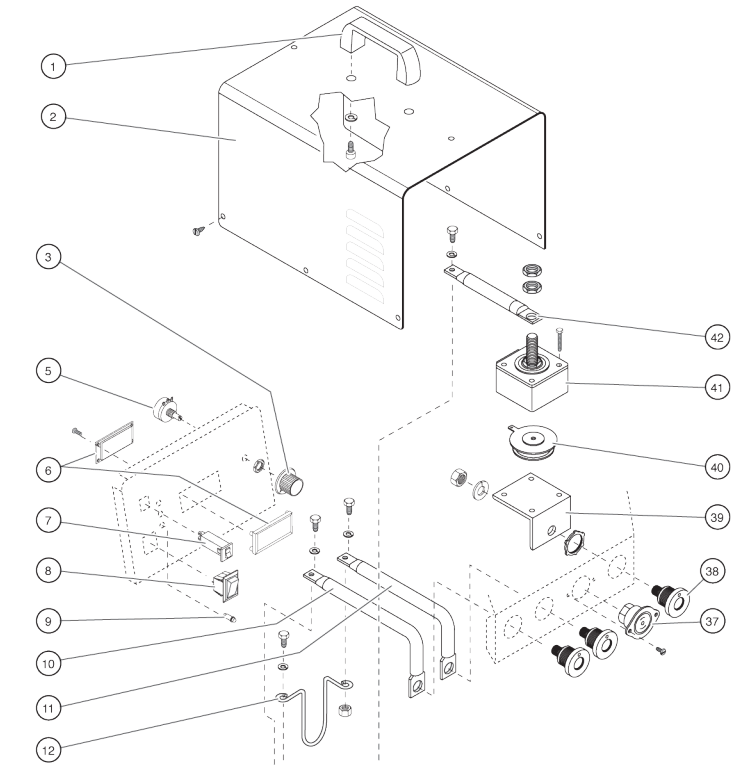
Ground.....15' Ground Cable

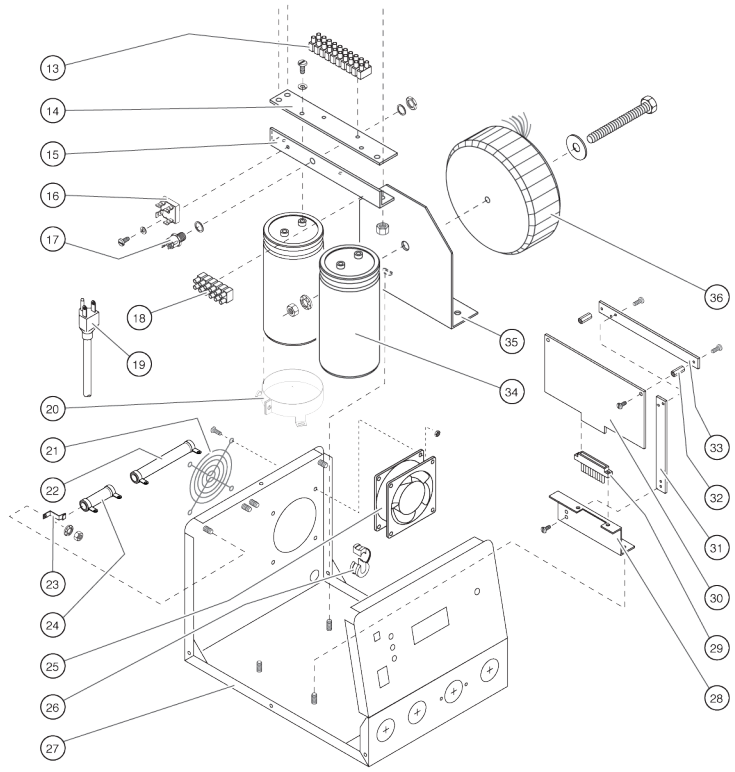
TALON GUN SPECIFICATIONS



Weight.....1.6 pounds
(not including cables)
Pin/Stud Range .....14 ga. – 1/ 4" dia.
Weldable Materials .....Mild Steel, Stainless, and Aluminum
Material .....High strength, impact resistant, polycarbonate
Dual Cable Length.....35'

TALON WELDER PARTS LIST





Item	Qt'y.	Part No.	Description
1	1	050-1004-67	Cabinet Handle
2	1	050-1002-56	Sheet Metal Cover
3	1	050-1002-87	Knob - Voltage Control
5	1	050-1003-16	Potentiometer - Voltage Control
6	1	050-1005-09	Digital Voltmeter
7	1	050-1004-11	Circuit Breaker
8	1	050-1004-05	Power Switch
9	1	050-1003-26	LED - Trigger (Green)
9	1	050-1003-27	LED - Contact (Yellow)
9	1	050-1003-28	LED - Ready (Red)
10	1	056-2001-71	Internal Cable - CD
11	1	056-2001-72	Internal Cable - Cuphead
12	1	050-1003-56	Resistor - Nichrome
13	1	050-1004-20	Terminal Strip - 12 Pin
14	1	050-1001-87	Buss Bar - Positive
15	1	050-1001-88	Buss Bar - Negative
16	1	060-1009-01	Charge Bridge Rectifier
~~	2	050-1004-73	Shoulder Bushing - Nylon
17	1	050-1003-72	Charge SCR
18	1	050-1004-21	Terminal Strip - 6 Pin
19	1	050-1004-74	Power Cord
20	2	050-1002-03	Capacitor Clamp
21	1	050-1004-82	Fan Guard
22	1	050-1003-54	Resistor - Bleed
23	4	050-1004-80	Resistor Mounting Bracket
24	1	050-1003-53	Ballast Resistor
25	1	050-1004-70	Fan
26	1	050-1004-83	Grommet - Power Cord
27	1	050-1002-25	Talon Chassis - Base
28	1	050-1001-19	PC Board Mounting Bracket
29	1	056-2001-45	Wiring Harness Assembly
30	1	056-2001-57	PC Board Assembly
31	1	050-1001-20	PC Board Support - V
32	2	050-1005-03	PC Board Standoff
33	1	050-1001-22	PC Board Support - H
34	2	050-1002-07	Weld Capacitor - Talon
35	1	050-1002-71	Transformer Mounting Bracket
36	1	056-2001-70	Main Transformer (Toroid) Assy.
37	1	050-1002-35	Control Receptacle (PM/F)
38	1	060-3068-00	Camlock Receptacle (PM/F)
39	1	050-1001-28	SCR Mounting Bracket
40	1	050-1001-29	SCR Main (Puk style)
41	1	050-1001-30	SCR Box Clamp
42	1	050-1001-31	Negative Weld Cable Assy.
			Not Shown
	2	050-1001-05	Fuse Holder
	1	050-1001-01	Fuse - 1 Amp AGC
	1	050-1001-08	Fuse - 1/2 Amp AGC
	1	050-1001-62	Data Plate
	2	050-1001-61	Talon Logo Cover Decals
	1	050-1001-60	Decal Control Panel - Top
	1	050-1001-59	Decal Control Panel - Bottom

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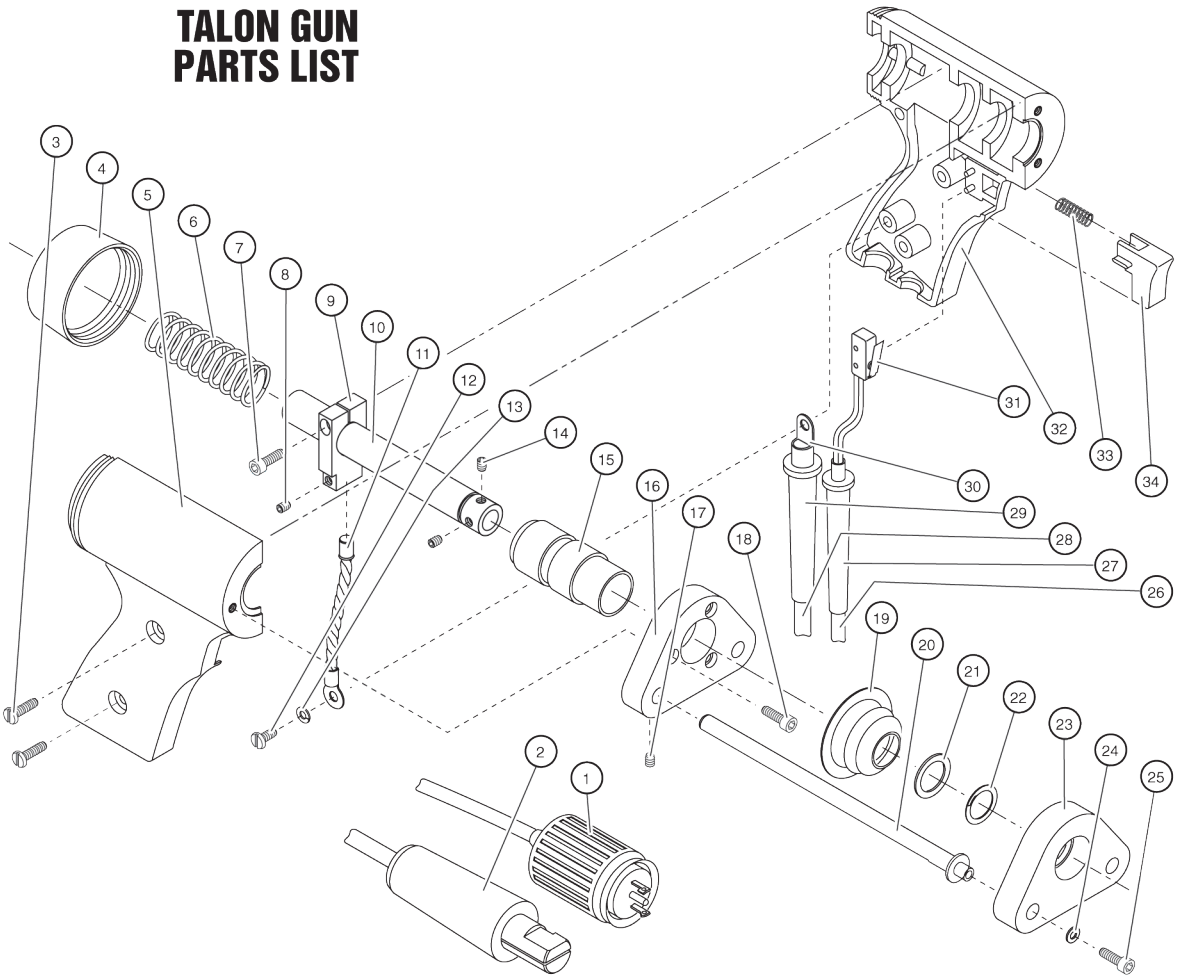
TALON GUN
PARTS LIST



Item	Qt'y.	Part No.	Description
1	1	050-1002-36	Male Control Connector
2	1	060-3046-00	Male Weld Connector
3	2	181-3029-01	10-32 x 5/8 Pan Head Screw
4	1	060-3005-01	Rear Body Cap - Talon
5	1	050-1005-65	Right Gun Body Half
6	1	060-3010-01	Shaft Spring (Silver)
7	1	181-3029-19	10-32 x 5/8 Soc Head Screw
8	1	181-3029-20	10-32 x 3/16 Set screw
9	1	060-3028-00	Gun Shaft Block
10	1	060-3029-00	Gun Shaft
11	1	060-1004-01	Pig-Tail Weld Cable
12	1	181-3029-05	10-32 x 1/2 pan Head Screw
13	1	181-1260-01	#10 Split Lock Washer
14	2	181-3029-20	10-32 x 3/16 Set Screw
15	1	050-1003-94	Shaft Bearing
16	1	101-0601-00	Standard Faceplate
17	2	181-3029-20	10-32 x 3/16 Set Screw
18	3	181-3029-18	8-32 x 3/4 Soc Head Screw
19	1	060-3221-00	Shaft Boot
20	2	101-0801-01	Weld Gun Leg (Optional)
21	1	060-3222-07	Boot Retainer

Item	Qt'y.	Part No.	Description

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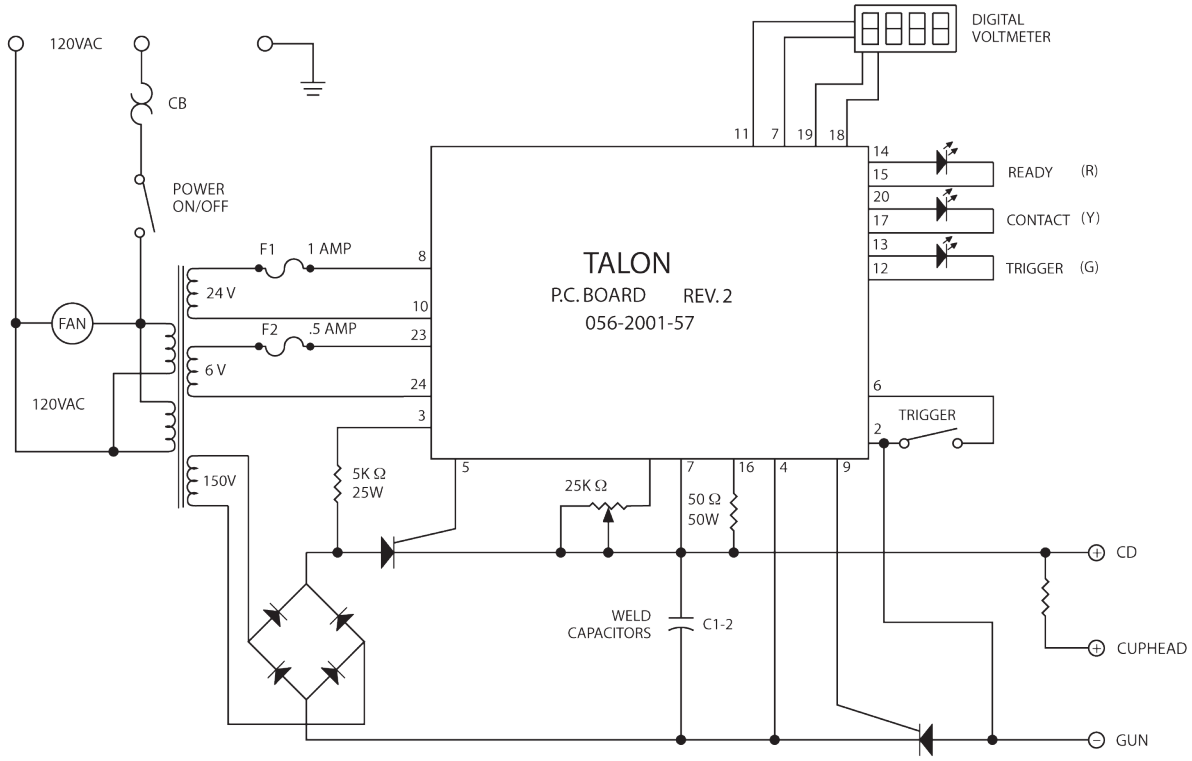
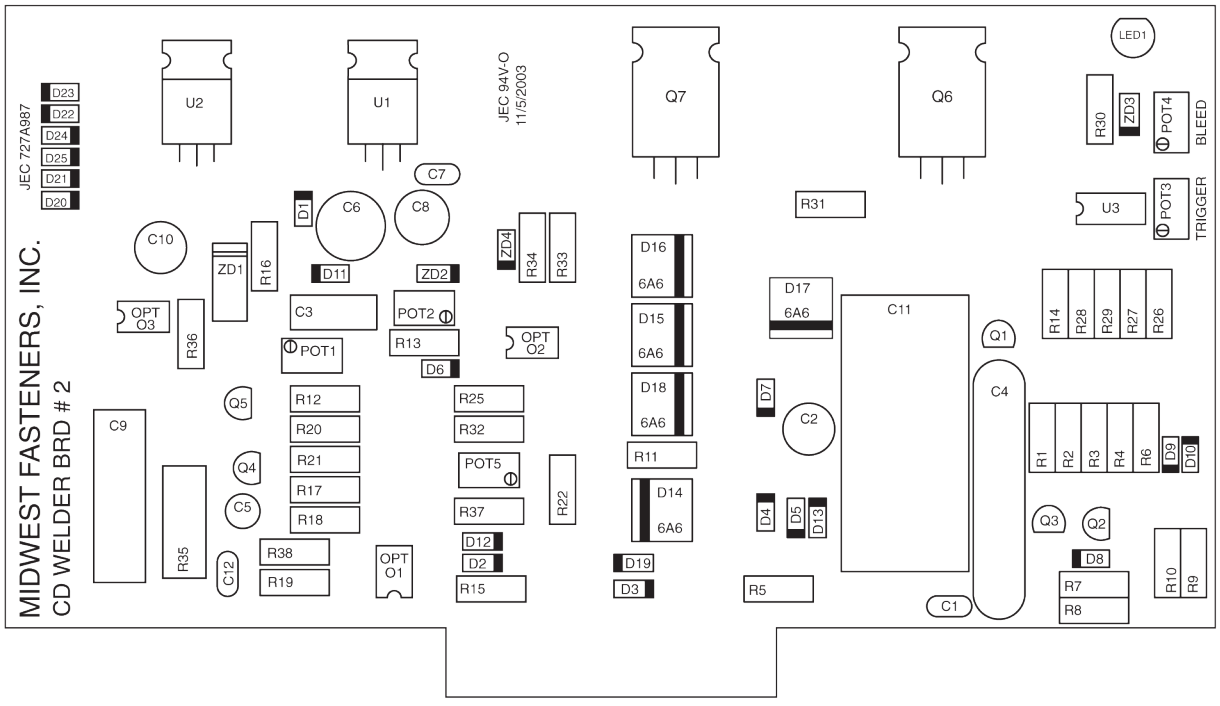
TALON ELECTRICAL SCHEMATIC



TALON PC BOARD



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NOTES:

450 Richard Street • Miamisburg, OH 45342
Phone: (937) 866-0463 • Fax: (937) 866-4174
(800) 852-8352

05/2019