

**CHICAGO** **welding**  
**ELECTRIC** **systems**

# SPOT WELDER

## 230 VOLT

**Model 45690**

### ASSEMBLY AND OPERATING INSTRUCTIONS



Visit our website at: <http://www.harborfreight.com>



**Read this material before using this product.**

**Failure to do so can result in serious injury.**

**SAVE THIS MANUAL.**

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**For technical questions or replacement parts, please call 1-800-444-3353.**

Revised Manual 02b, 09I

## SPECIFICATIONS TABLE

ITEM	DESCRIPTION
Electrical Input Requirements	230 Volt
Rated Output	1.5 KVA @ 50% Duty Cycle
Output Amps	5,500 +/- 10%
Material Capacity	1/8" Thick, Mild Steet
Tong Length	6"
Overall Dimensions	13" x 6" x 4.5"
Net Weight	23.5 Lbs.

## SAVE THIS MANUAL

You will need this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance, and cleaning procedures, parts list and assembly diagram. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep this manual and invoice in a safe and dry place for future reference.

## GENERAL SAFETY WARNINGS AND PRECAUTIONS

1. **KEEP WORK AREA CLEAN AND DRY.** Cluttered, damp or wet work areas invite injuries.
2. **KEEP CHILDREN AWAY FROM WORK AREA.** Do not allow children to handle this product.
3. **STORE IDLE EQUIPMENT.** When not in use, tools and equipment should be stored in a dry location to inhibit rust. Always lock up tools and equipment and keep out of reach of children.
4. **DO NOT USE THIS PRODUCT IF UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.** Read warning labels on prescriptions to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not attempt to use this product.
5. **USE EYE, HEARING, BREATHING, AND HAND PROTECTION.** Wear an ANSI approved welding helmet/goggles with shaded lens, hearing protectors, breathing respirator, and welding gloves when using this product. ANSI approved welding helmet/goggles with shaded lens, hearing protectors, breathing respirators, and welding gloves are available from Harbor Freight Tools.
6. **DRESS SAFELY.** Sparks and hot metal can injure. Always wear body protection. Non-skid footwear or safety shoes should be used when working with this product. Do not wear loose clothing or jewelry as they can become caught in moving parts. Wear a protective hair covering to prevent long hair from becoming caught in moving parts. If wearing a long-sleeve shirt, roll sleeves up above elbows.
7. **INDUSTRIAL APPLICATIONS MUST FOLLOW OSHA REQUIREMENTS.**

8. **DO NOT OVERREACH.** Keep proper footing and balance at all times to prevent tripping, falling, back injury, etcetera.
9. **STAY ALERT.** Watch what you are doing at all times. Use common sense. Do not use this product when you are tired or distracted from the job at hand.
10. **CHECK FOR DAMAGED PARTS.** Before using this product, carefully check that it will operate properly and perform its intended function. Check for damaged parts and any other conditions that may affect the operation of this product. Replace or repair damaged or worn parts immediately.
11. **REPLACEMENT PARTS AND ACCESSORIES.** When servicing, use only identical replacement parts. Only use accessories intended for use with this product. Approved accessories are available from Harbor Freight Tools.
12. **MAINTAIN THIS PRODUCT WITH CARE.** Keep this tool clean and dry.
13. **MAINTENANCE:** For your safety, service and maintenance should be performed regularly by a qualified technician.
14. **USE THE RIGHT PRODUCT FOR THE RIGHT JOB.** There are certain applications for which this product was designed. Do not use small equipment, tools or attachments to do the work of larger industrial equipment, tools or attachments. Do not use this product for a purpose for which it was not intended.


### **SPECIFIC PRODUCT WARNINGS AND PRECAUTIONS**

1. **GROUND THIS PRODUCT.** The *required* electrical Power Cord Plug for this product is a grounded, 230 Volt, 3-Prong Plug (not included). It is recommended that *only* a qualified technician connect a Power Cord Plug to the Power Cord. Never remove the grounding prong or modify the Plug in any way. Do not use adapter plugs with this product. When in use, make sure this product is always plugged into a grounded, 230 Volt, 3-hole electrical receptacle with an appropriate breaker switch inline.
2. **MAKE SURE THE CONTROL SWITCH (part #25) IS IN THE “OFF” POSITION BEFORE PLUGGING IN THE POWER CORD.** (See Figure D, and Assy. Diagram.)
3. **DO NOT ABUSE THE POWER CORD.** Do not use the Cord to pull the 3-Prong Plug from a power outlet. Keep Cord away from heat, oil, sharp edges, and moving parts. Replace damaged Cord immediately. Route the Power Cord safely. Protect it from being damaged by other equipment in the shop. Do not route the Cord where it can be walked on or tripped over.
4. **MAINTAIN A SAFE WORK ENVIRONMENT.** Do not use this product in or near damp or wet areas. Do not expose this product to rain. Keep work area well lit. Make sure there is adequate surrounding work space. Use this product in a well ventilated area. (Read Material Safety Data Sheets/MSDS for metals, coatings, and cleaners.) Do not operate this product in the presence of flammable liquids, gases, or dust. To avoid accidental electric shock, do not let your body come in contact with grounded surfaces such as pipes, radiators, ranges and refrigerators. Always keep a fire extinguisher nearby.

5. **DO NOT FORCE THE EQUIPMENT.** This Spot Welder will do the work better and safer at the speed and capacity for which it was designed.
6. **AVOID UNINTENTIONAL STARTING.** Make sure you are prepared to begin work before turning the Control Switch (part #25) "ON".
7. **Caution:** Never touch the Upper and Lower Tongs (parts #46, #47) when welding a workpiece. Allow the Tong Tips (part #48) and the workpiece to cool before handling. **(See Figures A, B, E, and Assy. Diagram.)**
8. **MAKE SURE THE WORKPIECE IS SECURED AT ALL TIMES DURING OPERATION.** Use a vise, clamps, etcetera (not provided).
9. **OVERUSE CAN CAUSE OVERHEATING.** After continuous use, allow the Spot Welder adequate time to cool before the next use.
10. **BEFORE TRYING NEW OR COMPLICATED TECHNIQUES, STUDY THE PROCEDURE, AND PRACTICE WITH SCRAP METAL.**
11. **ALWAYS DISCONNECT THE SPOT WELDER FROM ITS ELECTRICAL SUPPLY SOURCE BEFORE ASSEMBLING, PERFORMING ANY SERVICES OR MAINTENANCE** always disconnect the electrical cord before leaving the work area, moving the tool from one location to another, handing the tool to another person, changing Tong Tips (part #48), cleaning the unit, etcetera.
12. **WARNING:** This product, when used for welding and similar applications, produces chemicals known to the State of California to cause cancer and birth defects (or other reproductive harm). *(California Health & Safety Code 25249.5 et seq.)*
13. **WARNING:** Operation of equipment in close proximity to a heart pacemaker could cause interference or failure of the pacemaker.


## Inhalation Hazard

**Welding Produces TOXIC FUMES and GASSES.**



Exposure to welding gasses can increase the risk of developing certain cancers, such as cancer of the larynx and lung cancer. Also, some diseases that may be linked to exposure to welding gasses or fumes are:

- Early onset of Parkinson's Disease
- Damage to the reproductive organs
- Inflammation of the small intestine or stomach
- Respiratory diseases such as emphysema, bronchitis or pneumonia
- Heart Disease
- Ulcers
- Kidney damage



Safety precautions, such as using natural or forced air ventilation and wearing an ANSI approved respirator, are **ESSENTIAL** to reduce the risk of developing the above illnesses.

## UNPACKING

When unpacking, check to make sure all parts shown on the Parts List (page 12) are included. If any parts are missing or broken, please call Harbor Freight Tools at the number shown on the cover of this manual as soon as possible.

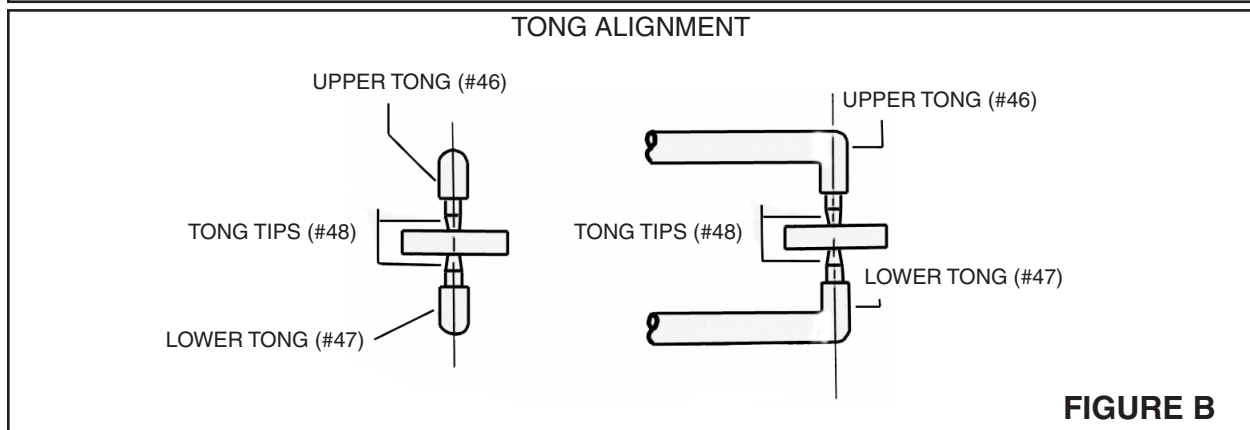
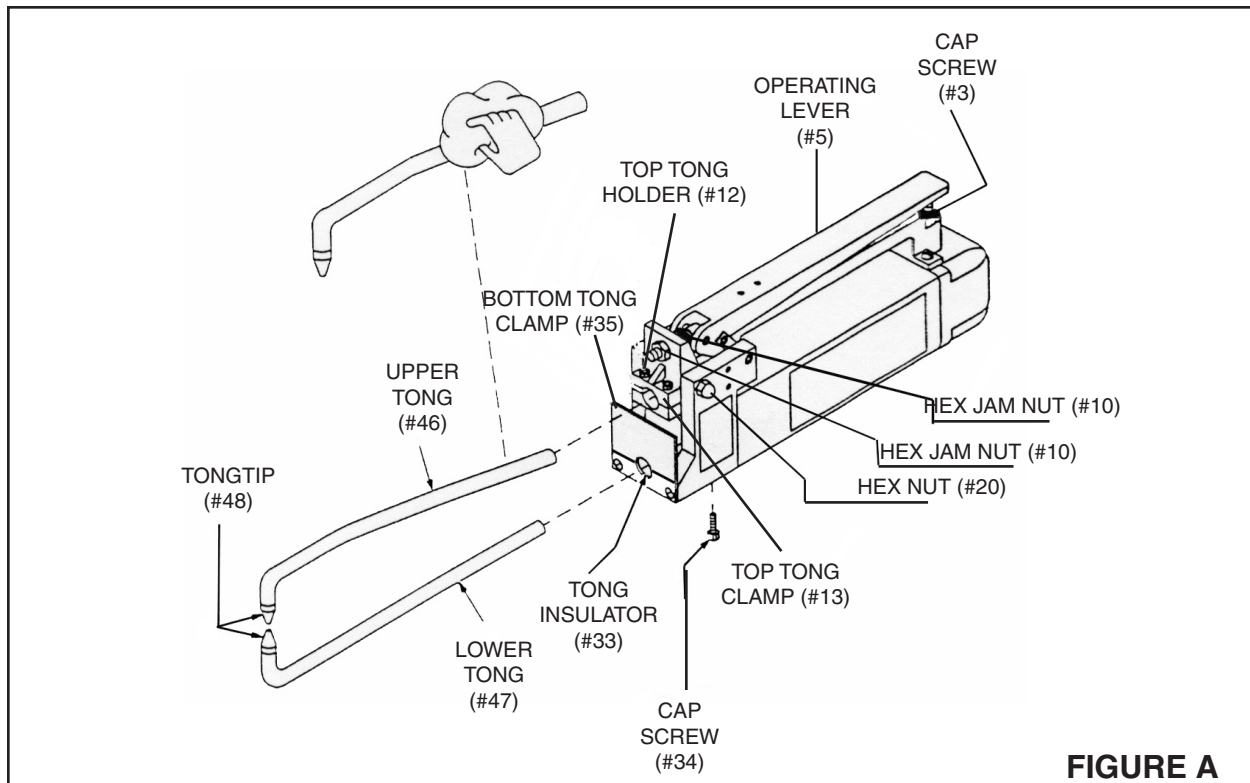
## ASSEMBLY INSTRUCTIONS

**NOTE:** For additional references to the parts listed below, refer to the **Assembly Diagram on page 13 of this manual.**

### **To Attach The Upper And Lower Tongs:**

1. **Caution:** Prior to attaching the Upper and Lower Tongs (parts #46, #47), make sure the Spot Welder is disconnected from its electrical power source.
2. **NOTE:** Make sure the Upper and Lower Tongs (parts #46, #47) are clean and not corroded before installing. If necessary, clean the Tongs with steel wool.
3. *To attach the Lower Tong* (part #47) to the Spot Welder, loosen the four Cap Screws (part #3) located at the bottom/front of the tool. **(See Figure A, and Assy. Diagram.)**
4. Slide the Lower Tong (part #47) between the Tong Insulator (part #33) and Lower Tong Clamp (part #35), and position the Lower Tong so that the Tong Tip (part #48) faces up.
5. **NOTE:** Check to make sure the Lower Tong (part #47) will align with the Upper Tong (part #46) when fully assembled. **(See Figure B, and Assy. Diagram.)**
6. Re-tighten the four Cap Screws (part #3).
7. *To attach the Upper Tong* (part #46) to the Spot Welder, loosen the four Cap Screws (parts #3, #11) located at the top/front of the tool. **(See Figure A, and Assy. Diagram.)**
8. Slide the Upper Tong (part #46) between the Tong Tip Holder (part #12) and Upper Tong Clamp (part #13), and position the Upper Tong so that the Tong Tip (part #48) faces down.
9. **NOTE:** Check to make sure the Upper Tong (part #46) will align with the Lower Tong (part #47) when fully assembled. **(See Figure B, and Assy. Diagram)**

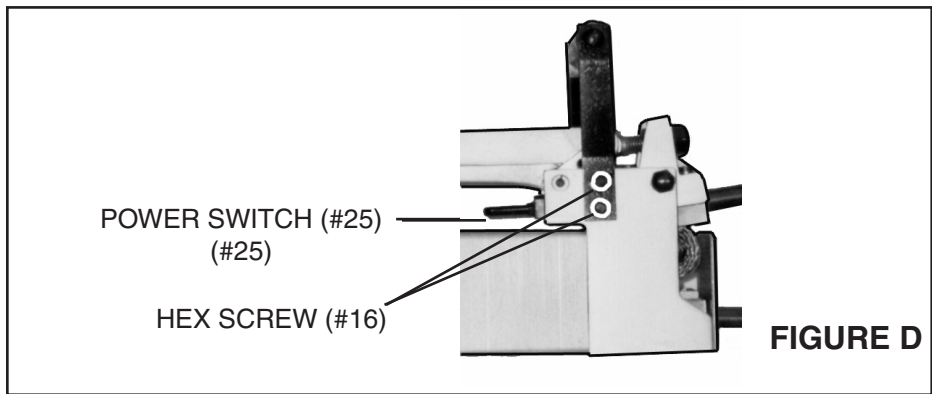
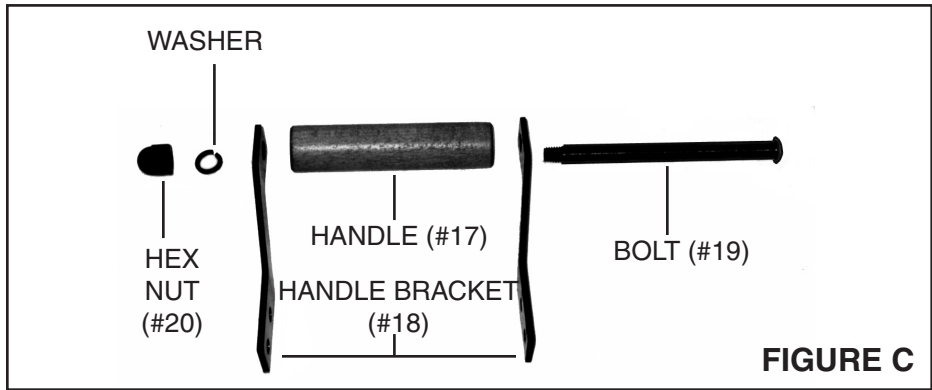
10. Re-tighten the four Cap Screws (parts #3, #11).



**To Attach The Handle To The Spot Welder:**

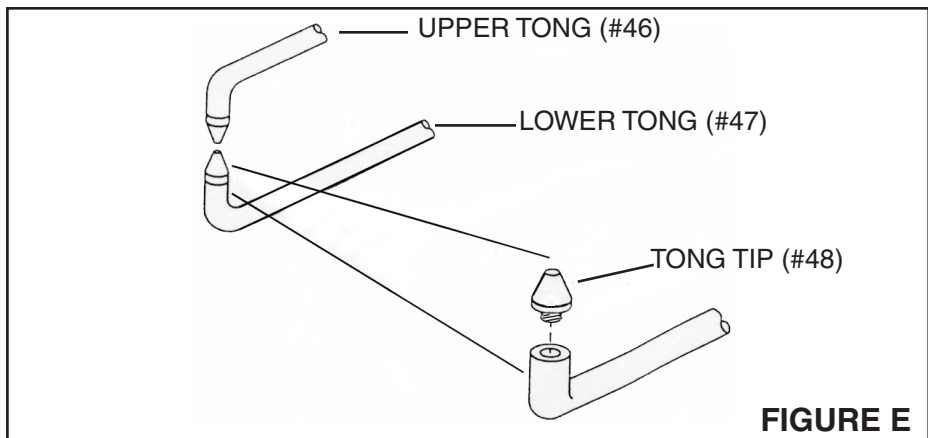
1. To attach the Wooden Handle (part #17) to the Spot Welder, insert the Bolt (part #19) through the following parts in this order: through a Handle Bracket (part #18), through the Wooden Handle, and through the remaining Handle Bracket. Then, secure the parts together, using the Lock Washer (part #49) and Hex Nut (part #20). **(See Figure C, and Assy. Diagram.)**

2. Next, Attach the complete Handle Assembly (parts #17, #18, #19, #20) to the Front Housing (part #28) of the Spot Welder, using the four Hex Head Screws (part #16). (See Figure D, and Assy. Diagram.)



***To Attach Tong Tips To The Spot Welder:***

1. **Caution:** Prior to attaching the Tong Tips (parts #48), make sure the Spot Welder is disconnected from its electrical power source.
2. To attach the Tong Tips (part #48) to the Upper and Lower Tongs (parts #46, #47), screw the Tips onto the Tongs as shown in **Figure E**.





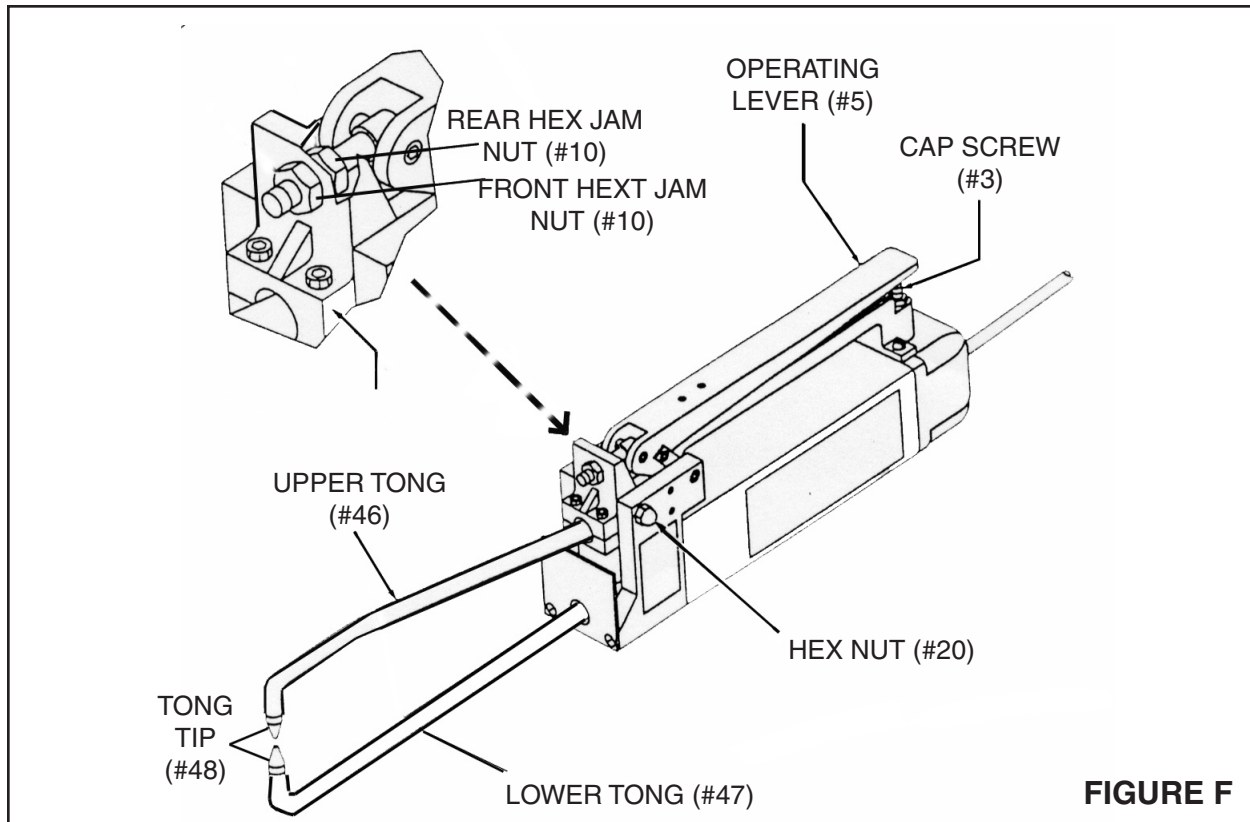
## OPERATING INSTRUCTIONS

**NOTE: For additional references to the parts listed below, refer to the Assembly Diagram on page 13 of this manual.**

### **To Adjust The Tong And Operating Lever Pressure:**

1. **Caution:** Prior to adjusting the Tongs (parts #46, #47) and Operating Lever (part #5) pressure, make sure the Spot Welder is disconnected from its electrical supply source.
2. **NOTE:** Excessive Tong (parts #46, #47) can damage the Tong Tips (part #48). Do not use the Tongs as a clamp or vice to hold the workpieces together. If the workpieces to be welded do not make good contact at the point of the intended weld, clamp the workpieces together to provide good contact between the surfaces. **(See Figures A, and Assy. Diagram.)**
3. The Tongs (parts #46, #47) pressure is adjustable, and should be checked and/or set before operation. Correct Tong pressure is necessary to create a *proper* weld and to prevent damage to the Tong Tips (part #48). **(See Figures A, F, and Assy. Diagram.)**
4. **If the Tongs (parts #46, #47) pressure is too weak**, and the workpieces are loose when the Tongs close severe arcing will occur between the workpieces and no weld can be made. **To increase the Tong pressure**, loosen the *front* Hex Jam Nut (part #10). The more the *front* Hex Jam Nut is loosened, the greater the pressure on the Tong Tips (part #48) when the Operating Lever (part #5) is closed. Next, turn the *rear* Hex Jam Nut toward the Top Tong Clamp (part #13) to lock the desired pressure in position. **(See Figures A, F, and Assy. Diagram.)**
5. **If the Tongs (parts #46, #47) pressure is too strong**, the weld nugget will dimple, and material will splash out around the nugget area. **To decrease the Tong pressure**, loosen the *rear* Hex Jam Nut (part #10) and turn the *front* Hex Jam Nut (part #10) toward the Top Tong Clamp (part #13) to lock the desired pressure in position. **(See Figures A, F, and Assy. Diagram.)**
6. The farther down the Cap Screw (part #3) is turned, the farther down the Operating Lever (part #5) will close. Adjusting the Cap Screw will determine if the Tongs (parts #46, #47) lock on the material, or just pull up tight. Adjust the Cap Screw to allow the Operating Lever to be raised easily after the weld has been completed. **(See Figures A, F, and Assy. Diagram.)**
7. To adjust the pressure required to push down the Operating Lever (part #5), turn the Hex Nut (part #20) located on each side of the Front Housing (part #28) clockwise or counterclockwise. **(See Figures A, F, and Assy. Diagram.)**





**To Use The Power Switch:**

1. The Power Switch (part #25) allows electrical current to the Spot Welder to be turned “ON” and “OFF”. (See Figure D, and Assy. Diagram.)
2. Turn the Power Switch (part #25) *sideways* in either direction to start the electrical current. Release the Power Switch to stop the electrical current.

**To Use The Operating Lever:**

1. **Caution: Never touch the Upper and Lower Tongs (parts #46, #47) when welding a workpiece.** Allow the Tong Tips (part #48) and the workpiece to cool before handling. (See Figures A, B, E, and Assy. Diagram.)
2. The Operating Lever (part #5) allows you to open and close the Upper and Lower Tongs (parts #46, #47). (See Figures A, F, and Assy. Diagram.)
3. Close the Operating Lever (part #5) during the welding process to compress the workpieces between the Tong Tips (part #48). Open the Operating Lever after the spark appears and each weld is made to release the workpieces. (See Figures B, A, F, and Assy. Diagram.)

Thickness "T" Of Thinnest Outside Workpiece (B), (C), (D)	Electrode Diameter And Shape (E)	Net Electrode Force	Weld Time (Single Impulse Cycles)	Welding Current (Approx.)	Minimum Contacting Overlap	Minimum Weld Spacing (F)	Type Of Steel
Inches	Max. Dia./In.	Lbs.	60 Per Sec.	Amps	Inches		
0.010	1/8"	200	4	4000	3/8"	1/4"	SAE 1010
0.010	1/8"	230	3	2000	3/16"	3/16"	301, 302,
0.012	1/8"	260	3	2000	1/4"	1/4"	303, 304,
0.014	1/8"	300	4	2200	1/4"	1/4"	308, 309,
0.016	1/8"	330	4	2500	5/16"	1/4"	310, 316,
0.018	1/8"	380	4	2800	5/16"	1/4"	317, 321, 347, 348

(B) Material should be free from scale, oxides, paint, grease, and oil.  
(C) Welding conditions determined by thickness of thinnest outside workpiece "T".  
(D) Data for total thickness of pile-up not exceeding 4 "T". Maximum ratio between two thicknesses 3 to 1.  
(E) Electrode Material: Class 2  
Minimum Conductivity -----75% of Copper  
Minimum Hardness -----75% Rockwell "B"  
(F) Minimum weld spacing is that spacing for two pieces for which no special measures need be taken to compensate for shunted current effect of adjacent welds. For three workpieces, increase spacing 30 percent.

## TROUBLE SHOOTING GUIDE

Trouble	Remedy
No Weld Output	Replace line fuse or reset line circuit breaker
	Reset circuit breaker and check power switch and /or start switch. Replace if necessary.
	Clean material to be welded and clean of tongs and tong holders .
Longer than normal weld time required	Dress or replace tips
	Clean workpieces
	Adjust tong pressure
	Clean ends of tongs and tong holders
	Check input line voltage
Burn through at point of weld	Shorten weld time
	Adjust tong pressure
	Dress or replace tips
	Realign tips

## INSPECTION, MAINTENANCE, AND CLEANING

1. **Caution:** Always disconnect the Spot Welder from its electrical power supply source before performing any inspection, maintenance, or cleaning.
2. Before each use, inspect the general condition of the Spot Welder. Inspect switch, power plug and cord assembly, and extension cord (if used) for damage. Check for loose screws, misalignment, binding of moving parts, broken parts and any other condition that may affect its safe operation. If abnormal noise or vibration occurs, disconnect the Spot Welder from its electrical supply source immediately and have the problem corrected before further use. Do not use damaged equipment.

3. Do not use solvents to wipe off the Spot Welder, as damage may result. If necessary, wipe with a damp cloth. You may use a mild detergent.
4. Once clean, lubricate all moving parts with a light oil.
5. When storing, keep the Spot Welder in a box or covered with a cloth cover.

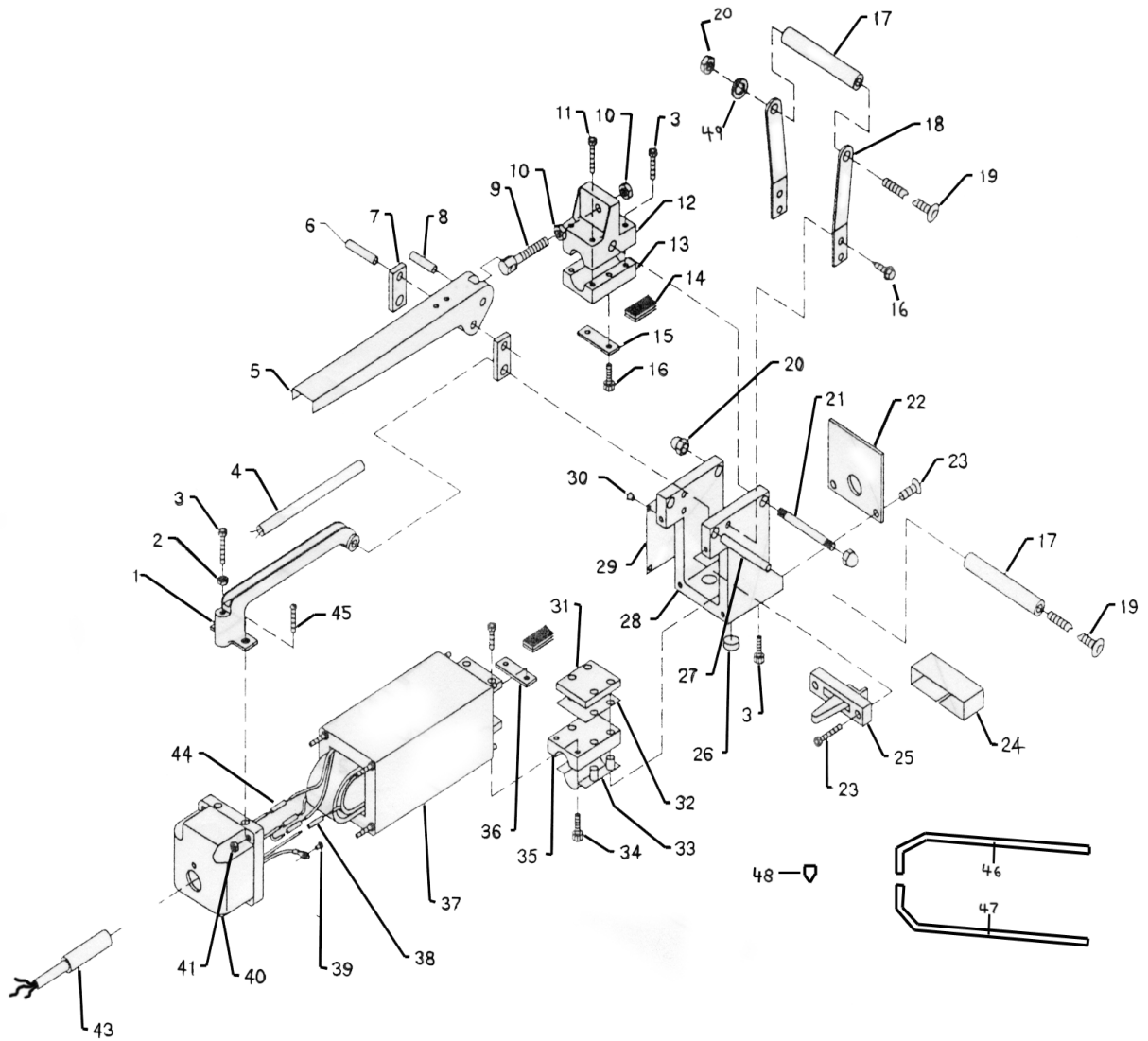
### **PLEASE READ THE FOLLOWING CAREFULLY**

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER NOR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

## PARTS LIST

Part #	Description	Qty.
1	Handle, Carrying	1
2	Nut	1
3	Screw Cap Stl Sch .250-20 x 1.250	7
4	Wiring Harness, Switch	1
5	Lever, Operating	1
6	Pin, Spring CS .312 x 1.750	1
7	Link, Tgl Connecting	2
8	Pin, Spring CS .312 x 1.250	1
9	Bolt, Pressure Adjustment	1
10	Nut, Stl Hex Jam .437-20	2
11	Screw, Cap Stl Sch .250-20 x 1.500	2
12	Holder, Tong Top	1
13	Clamp, Tong Top	1
14	Braid, Tong Set of Four	1
15	Clamp, Connecting Top Tong Braid	1
16	Screw, .250-20 x 1.000 Soc. Hex Head	8
17	Handle, Wood	1
18	Bracket, Mtg Handle	2
19	Bolt, Crg Stl .250-20 x 4.500	1
20	Nut, Al Hex .375-24	3
21	Stud, Stl .375-24 x 3.750	1
22	Guard, Spatter	1
23	Screw 10-32 x .625 Hex Head Slit Stl	4
24	Insulation, Switch	1
25	Power Switch (consisting of A, B, C, D below):	1
25A	Contact, Assembly Switch	1
25B	Contact, Switch	1
25C	Toggle, Switch	1
25D	Base	1
26	Insulator, Plug Sec Scr	2
27	Pin, Spring .375-3.00	1
28	Housing, Front	1
29	Nameplate (order by model and serial number)	1
30	Screw, Drive U 2 x 3/16"	4
31	Retainer, Clamp Tong	1
32	Insulation, Bottom Clamp	1
33	Insulator, Tong	1
34	Screw, Cap Stl Sch .250-20 x .750	4
35	Clamp, Bottom Tong	1
36	Clamp, Threaded Connecting Tong Braid (included w/Part #5)	1
37	Transformer, Power Main	1
	Label, Warning General Precautionary	1
38	Splice, Butt 16-14 Wire	1
39	Screw, 10-32 x .250 Hex Head Slit Stl	1
40	Cover	1
41	Nut, Stl Slfkg Hex Mscr 10-32	4
43	Cable, Power 10 Ft. 16 Gauge 1/C (Models w/out Timer)	1
44	Tubing, Gl Acrylic No. 7 x 2.500	3
45	Screw, 10-32 x .500 Hex Head Slit Stl	2
46	Upper Tong	1
47	Lower Tong	1
48	Tong Tip	2
49	Lock Washer	1

# ASSEMBLY DIAGRAM



**NOTE:** Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

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## LIMITED 1 YEAR / 90 DAY WARRANTY

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Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that for a period of ninety days from date of purchase that the torch, liner, wire feed mechanism (if applicable), welding clamps, electrode holders, cables and accessories packed with the welder are free of defects in materials and workmanship. This Limited 90 Day/1 Year Warranty shall not apply to consumable parts such as tips, welding wire, and gas nozzles. Harbor Freight Tools also warrants to the original purchaser, for a period of one year from date of purchase, that the transformer and rectifier are free from defects in materials and workmanship (90 days if used by a professional contractor or if used as rental equipment). This warranty does not apply to damage due directly or indirectly to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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