

PRO SPOT

Hybrid Spot

*Battery Powered
Resistance Spot Welder*

Instruction Manual

Version 1.55



Table Of Contents

Quick start instructions	3
1 Introduction	4
2 Safety	
2.0 Safety & Environmental Specifications	5
2.1 General	5
2.2 Warnings and important notices	5
2.3 Safety devices	7
2.3.1 Cooling	7
3 Installation	
3.1 General	8
3.2 Packaging and delivery inspection	8
3.3 Welder assembly	8
3.4 Connection of electrical supply	9
3.4.1 Electrical Plug / Extension cords	9
3.5 Connection of pneumatic air supply	9
4 Operation	
4.1 Before you begin welding	10
4.2 About your welder	11
4.2.1 Welder Overview & Technical Specifications	11
4.2.2 Getting familiar with your welder	11
4.2.3 Control Panel	12
4.2.4 Indications on the Control Panel	12
4.3 Turning on the welder	12
4.3.1 Checking & Charging battery voltage	13
4.3.2 Battery Alerts	13
4.3.3 Removing Battery Covers for Service	14
4.3.4 Checking Battery Water Levels	14
4.4 Choosing the weld mode	15
4.5 Setting the pneumatic air pressure	15
4.6 Setting/Changing the weld program	15
4.7 Setting the weld time	15
4.8 Checking weld quality	16
5 Double-Sided Welding	
5.1 PS-500 Double-Acting Spot Gun	17
5.1.1 PS-500 Component Diagram	17
5.1.2 Using the Double-Acting Gun	17
5.2 Extension Arms	17
5.2.1 Switching to extension arms	18
5.2.2 Extension Arms and Welding Electrodes	19
5.3 PS-500 Electrode Alignment	20
5.4 Removing Welding Electrodes	21
5.5 Welding Electrode Maintenance	22

Table Of Contents

5.6 Wheel House Arm22

5.7 X-Adapter (optional)23

 5.7.1 Attaching the X-Adapter23

 5.7.2 Using the X-Adapter24

 5.7.3 X-Adapter Configurations24

6 Single-Sided Welding

6.1 Single-Sided Welding Overview25

6.2 Single-Sided Spot Welding27

6.3 Bolt Welding27

6.4 Nut Welding28

6.5 Dent Pulling with Spot Hammer28

6.6 Moulding Clip Rivet Welding29

6.7 Dent Pulling with Washers and Slide Hammer with Hook29

6.8 Contact Shrinking30

6.9 Pro Pull Dent Pulling (optional)31

 6.9.1 Selecting Pro Pull Weld Mode31

 6.9.2 Pro Pull Component Diagram31

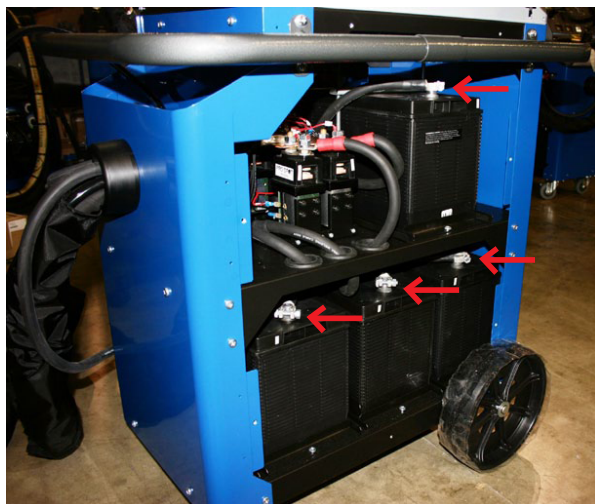
 6.9.3 Pro Pull Assembly32

 6.9.4 Dent Pulling with Pro Pull32

 6.9.5 Paintless Dent Pulling With Pro Pull32

7 Troubleshooting

 Troubleshooting33



 **READ BEFORE OPERATING WELDER!**

Connect all 4 cables to negative battery terminals Before using. To access terminals, open right side cover.

(The four cables to the negative battery terminals are disconnected during shipping.)

OPEN CIRCUIT VOLTAGE AS IT RELATES TO STATE OF CHARGE

<u>Open Circuit Voltage*</u>	<u>State of Charge</u>
12.80 or greater.....	100%
12.60.....	75%
12.30.....	50%
12.00.....	25%
12.00.....	0

* The actual stabilized OCV can only be determined after the battery has been disconnected from the charger for 24 hours.

Battery Warnings

! DANGER/POISON

 SHIELD EYES. EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.	 NO SPARKS FLAMES SMOKING	 SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.	 FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.
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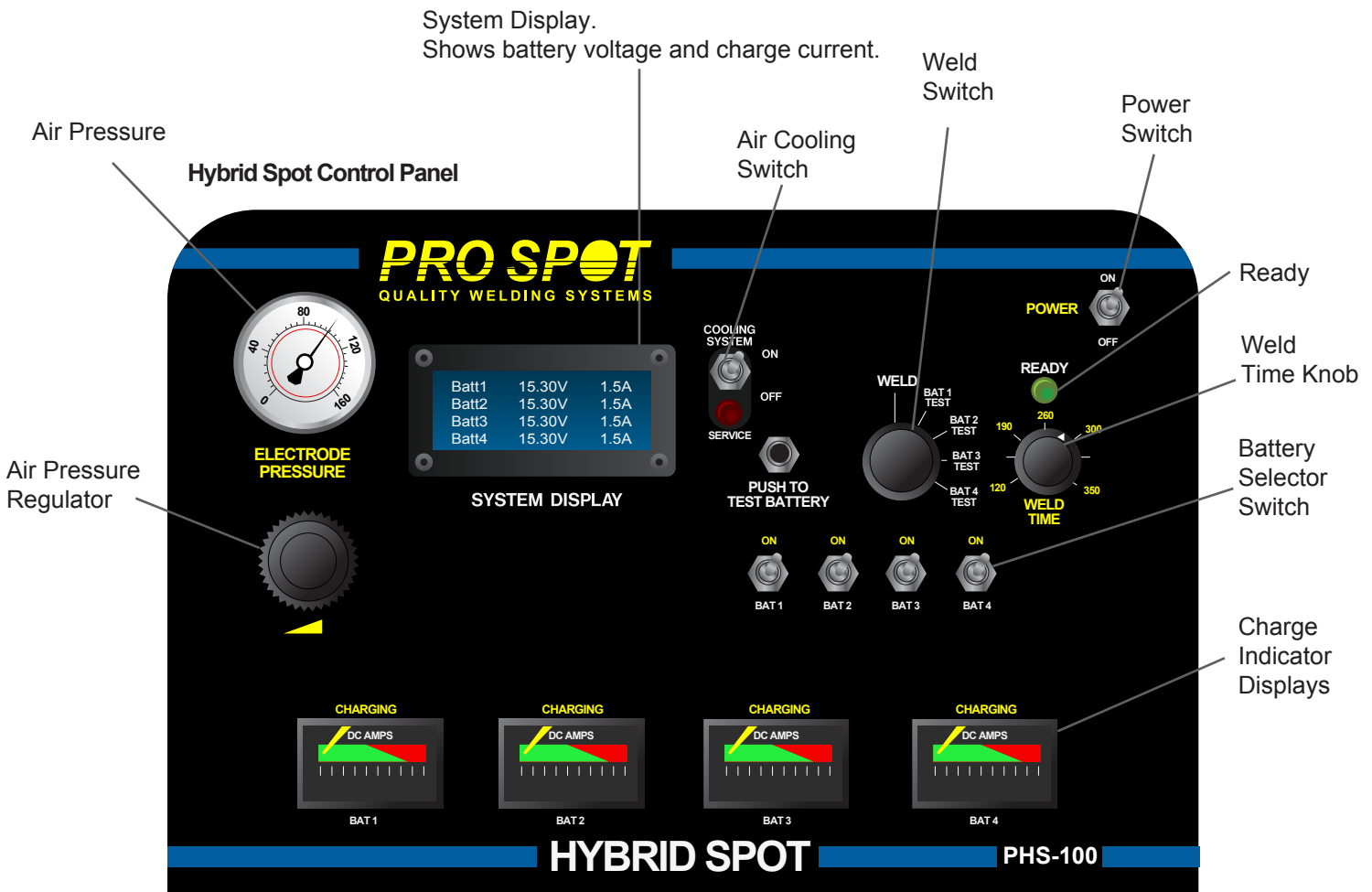
KEEP OUT OF REACH OF CHILDREN

Quick start instructions



Figure 1.1

1. Turn the power switch on the front panel ON (Fig 1.1).
 2. Connect Air to the air inlet located on the back panel.
 3. Turn the "WELD SWITCH" to the weld position.
 4. Turn on the desired amount of battery power by using the battery selector switches (1-4). For two-sided welding use 3 to 4 batteries in the ON position. For single-sided welding use one battery. Adjust weld time to 260-300 for two-sided. 120 for single-sided.
 5. Place the welding gun at the weld area and press the lower trigger button to weld. The upper weld button is for spreading the electrodes open for better access. The welder is now ready to operate. Make sure air pressure is set at 90 PSI.
- NOTE:** When the welder is not being used, turn the power switch off. Leave power cord plugged in to allow unit to charge.



1 Introduction

Congratulations on acquiring your new Hybrid Spot welder! Team Pro Spot looks forward to supporting you.

You have a welder and support group that will increase your productivity. The integrated features, ease of use, speed and quality welds that your Hybrid Spot offers will become an important part of your business.

The following information will be needed when you call Pro Spot:

* MODEL TYPE: Hybrid Spot

* SERIAL NO: _____

The serial number is located on the back of the unit.

For parts or service contact your local distributor,

Local number: _____
or in the U.S. call: Toll free: 1-877 PRO SPOT or 1-760-407-1414
for a customer service representative.

Visit Pro Spot On-Line: www.prospot.com E-mail: info@prospot.com

NOTE: You can now order parts online at: prospot.com/store/

The Hybrid Spot welder is used by body shops to duplicate the welding procedure used by the car manufacturers. Use of the equipment that is contrary to the instructions in this manual can cause personal injury and/or machine damage.

Pro Spot International, Inc. can in no way be held responsible for intentional or unintentional damage, and consequent unlimited loss of profit, loss of income, loss of business opportunity, loss of use, etc. that originates from incorrect use of this equipment in its use in a manner not intended.

Warranty

Pro Spot International, Inc. offers a two-year guarantee on the welder from the date of delivery. This guarantee covers material defects and assumes normal care and maintenance. Batteries shipped with the welder are covered by a 1 year prorated warranty.

The guarantee assumes that:

- the equipment is correctly installed and inspected
- the equipment has not been altered or rebuilt without approval from Pro Spot International, Inc.
- genuine Pro Spot International, Inc. spare parts are used to make repairs.
- operation and maintenance has been carried out according to the instructions in this manual.

All claims on warranty must verify that the fault has occurred within the guarantee period, and that the unit has been used within its operating range as stated in the specifications. All claims must include the product type and serial number. This data is stamped on the name plate.

Note: This instruction manual provides instructions for installation, operation, maintenance and troubleshooting.



IMPORTANT! Read this manual carefully to become familiar with the proper operation of the welder. Do not neglect to do this as improper handling may result in personal injury and damage to the equipment.



IMPORTANT! Lisez ce Mode d'Emploi attentivement afin de vous familiariser avec le bon fonctionnement du soudeur. Ne négligez pas de le faire puisque une mauvaise manipulation peut conduire aux blessures et dommages à l'équipement.

The drawings in this manual are presented for illustrative purposes only and do not necessarily show the design of the equipment available on the market at any given time. The equipment is intended for use in accordance with current trade practice and appropriate safety regulations. The equipment illustrated in the manual may be changed without prior notice.

The contents in this publication can be changed without prior notice.

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2 Safety

2.0 Safety & Environmental Specifications

The Hybrid Spot welder is designed for indoor use.
The Hybrid Spot welder is designed to operate from 10° C to 40° C.
Do not operate the unit on a slope of more than 10°.

2.1 General

The Hybrid Spot welder has been designed and is tested to meet strict safety requirements. Please read the following instructions carefully before operating the unit and refer to them as needed to ensure the continued safe operation of the welder.

Information provided in this manual describes the suggested best working practices and should in no way take precedence over individual responsibilities or local regulations.

The Hybrid Spot Welder is designed to comply with all applicable safety regulations for this type of equipment. During operation, it is always each individual's responsibility to consider:

- Their own and other's personal safety.
- The safety of the welder through correct use of the equipment in accordance with the descriptions and instructions provided in this manual.

By observing and following the safety precautions, users of the Hybrid Spot Spot welder will ensure safer working conditions for themselves and their fellow workers.

2.2 Warnings and important notices

The following types of safety signs are used on the equipment and in Pro Spot's instruction manuals:



Caution.
Read instruction manual.



Attention!
Lire Mode d'Emploi.



Prohibited.
Prohibits behaviour that can cause injury.



Interdit.
Interdit aux comportements qui peuvent provoquer des blessures.



Command.
Calls for a specific action.



Commande.
Appelle à une action spécifique.



Warning.
Notice of personal injury risk and or damage to equipment.



Avertissement.
Avis de risque de blessure personnelle et / ou d'endommager l'équipement.



Warning.
Some parts of the welder may become hot after prolonged use.



Avertissement.
Certaines parties du soudeur peuvent devenir chaudes après une utilisation prolongée.

The following warnings and important notices are used in the instruction manual:

	WARNING! Do not operate or place the welder near water, in wet locations or outdoors. Risk for injuries or damage to the welder.		ATTENTION! Ne pas faire fonctionner le soudeur près de l'eau, en voie humide, ou à l'extérieur. Risque de blessures ou de dommages au soudeur.
	WARNING! Do not place the welder on unstable or uneven ground. The welder might tip causing personal injuries or serious damage to the welder.		ATTENTION! Ne placez pas le soudeur sur un sol instable ou irrégulière. Le soudeur peut basculer causant des lésions corporelles ou des dommages graves au soudeur.
	WARNING! All electrical connections must be made by a qualified electrician. Risk for electrical shock.		ATTENTION! Toutes les connexions électriques doivent être faites par un électricien qualifié. Risque de choc électrique.
	WARNING! Loose cables and hoses present tripping risks. Risk for injuries.		ATTENTION! Câbles et tuyaux lâches présentent des risques de déclenchement. Risque de blessures
	WARNING! Make sure to use welding goggles when spot welding. The sparks might otherwise injure the eyes.		ATTENTION! Veuillez utiliser des lunettes de soudeur sur place. Les étincelles pourraient autrement blesser les yeux.
	WARNING! Sparks from welding could start a fire. Risk for injuries.		ATTENTION! Étincelles de soudure pourrait provoquer une incendie. Risque de blessures.
	WARNING! Risk for damage to materials close to the weld, e.g to glass or textiles.		ATTENTION! Risque de dommages aux matériaux à proximité de la soudure, par exemple verre ou textiles.
	WARNING! For proper cooling efficiency, never operate the welder without connecting it to the compressed air source.		ATTENTION! Pour refroidissement efficace, ne jamais soudeur sans attacher à la source d'air comprimé.
	WARNING! All service and maintenance must be carried out by Pro Spot service personnel and service support. Risk for electrical shock.		ATTENTION! Tout le service et l'entretien doivent être effectués par personnel et soutien de service Pro Spot. Risque de choc électrique.
	WARNING! Unplug the welder from the wall outlet before servicing, cleaning or maintenance. Risk for electrical shock.		ATTENTION! Débranchez le soudeur de la prise murale avant l'entretien, ou nettoyage. Risque de choc électrique.
	IMPORTANT! The welder may only be used by qualified personnel. The user of the welder must have knowledge of spot welding and of alignment of collision-damaged vehicles.		IMPORTANT! Le soudeur peut seulement être utilisé par personnel qualifié. L'utilisateur du soudeur doit avoir une connaissance de soudage par points et l'alignement des véhicules endommagés par collisions.
	IMPORTANT! Do not turn off the welder while cooling is activated!		IMPORTANT! N'éteignez pas le soudeur pendant que le refroidissement est activé!
	IMPORTANT! The air must be clean and free from oil and moisture. Use filter.		IMPORTANT! L'air doit être propre et sans huile et humidité. Utilisez un filtre

2.2 Warnings and important notices (cont'd.)



SHIELD EYES EXPLOSIVE GASES

Can cause blindness or injury.



NO SPARKS, FLAMES OR SMOKING



SULFURIC ACID

Can cause blindness or severe burns.



FLUSH EYES IMMEDIATELY

With water. Get medical help fast.



IF SWALLOWED

Drink as much water or milk as possible. Get medical help fast.



IF SPILLED

Spread baking SODA over spill, then dilute with large amounts of water.

KEEP OUT OF REACH OF CHILDREN

Do Not Tip, Keep Vent Caps Tight And Level

PROPOSITION 65 WARNING

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Batteries also contain other chemicals known to the State of California to cause cancer. Wash hands after handling.

OPEN CIRCUIT VOLTAGE AS IT RELATES TO STATE OF CHARGE	
Open Circuit Voltage*	State of Charge
12.80 or greater.....	100%
12.60.....	75%
12.30.....	50%
12.00.....	25%
12.00.....	0

* The actual stabilized OCV can only be determined after the battery has been disconnected from the charger for 24 hours.

Battery Warnings

! DANGER/POISON

 SHIELD EYES.	 NO SPARKS CAUSE BLINDNESS OR INJURY.	 SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.	 FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.
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EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.

KEEP OUT OF REACH OF CHILDREN

2.3 Safety devices

2.3.1 Cooling

When the Spot Gun is used continuously, the welding cables get hot. To prevent the welder from malfunctioning due to overheating, it is cooled using the built-in air cooling system. The air cooling system cools the welding cables, cable ends and the spot gun.

To activate the cooling system, turn the air cooling ON. Compressed air will flow through the weld cables. It is not necessary to leave on at all times, but should be used when the weld cables are hot to the touch.

For best results, let the welder rest when cables are too hot. Cooler weld cables result in better weld performance.

3 Installation

3.1 General

The Hybrid Spot welder is inspected and tested prior to leaving the factory to guarantee consistent quality and the highest possible reliability. Follow the installation tips and operating instructions below to ensure user safety and proper welder performance.



WARNING! Do not operate or place the welder near water, in wet locations or outdoors. Risk for injuries or damage to the welder.



WARNING! Do not place the welder on unstable or uneven ground. The welder might fall causing personal injuries and damage to the welder. Do not operate on a slope of more than 10°.



IMPORTANT! It is the responsibility of the owner to ensure that the equipment has been installed as specified in the instructions provided. It is also the owner's responsibility to ensure that the welder is inspected in accordance with applicable regulations before it is put into service. Do not use for thawing out frozen water pipes (17.1)



ATTENTION! Ne pas faire fonctionner le soudeur près de l'eau, en voie humide ou à l'extérieur. Risque de blessures ou de dommages au soudeur.



ATTENTION! Ne placez pas le soudeur sur un sol instable ou irrégulière. Le soudeur peut tomber causant des dommages graves au soudeur. Ne pas utiliser sur une pente de plus de 10°



IMPORTANT! C'est la responsabilité du propriétaire de s'assurer que l'équipement a été installé comme spécifié dans les instructions fournies. C'est aussi la responsabilité du propriétaire de s'assurer que le soudeur est inspecté conformément à la réglementation applicable avant qu'il ne soit mise en service. Ne pas utiliser pour dégelés les conduites d'eau congelées (17.1)

A grounded electrical plug must be installed (*refer to section 3.4 "Connection of electrical supply"*).

3.2 Packaging and delivery inspection

Check the contents of the shipping container against the packing list, consignment note, or other delivery documentation to verify that everything is included and in the correct quantity. Check the Spot Welder carefully to make sure that no damage has occurred during transport. If anything is damaged or missing, the welder may be unsafe to use till the part is repaired or replaced. If anything is missing, please contact your supplier. Remove all packaging material from the welder.

3.3 Welder assembly

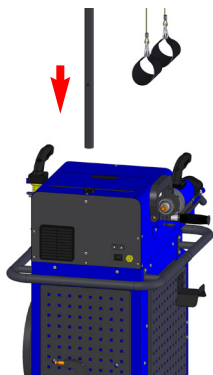


Figure 3.1

For your convenience, the welder ships fully assembled.

Insert the support arm (boom) as shown in *Figure 3.1*

3.4 Connection of electrical supply

Battery charging system:

The Hybrid Spot welder is equipped with an on-board charging system that will charge all 4 batteries at once.

To activate charging, simply plug in the power cord to the outlet on the back of the welder Fig 3.2 and the supply 120VAC or 240VAC for Europe, Australia, and China. The power supply switches automatically between 120VAC and 240VAC.

It is possible to weld while the charging is activated; the charger will automatically switch off when welding. The charger will turn back on 2 minutes after the last weld is made. To check each battery's voltage, turn the WELD switch to Bat 1 Test, Bat 2 Test, etc.

To check the battery under load press "PUSH TO TEST BATTERY" button for 3 seconds to see loaded voltage. Repeat for each battery.

3.5 Connection of pneumatic air supply

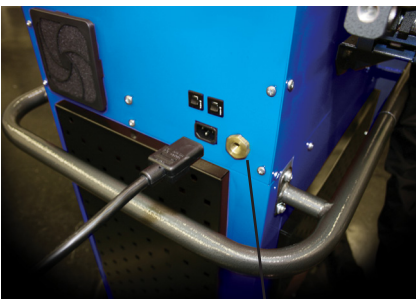


Figure 3.2

Air supply port

The Hybrid Spot welder must be connected to a pneumatic air network. (100 PSI to 130 PSI)

1. Connect the welder to the air supply via the threaded input port at the rear of the welder using a standard connector.
2. If not already set, adjust the air pressure setting on the welder front panel to 90 PSI (4-5 bar) (*refer to section 4.5 "Setting the pneumatic air pressure"*).



IMPORTANT! The air must be clean and free from oil and moisture. Use a filter.



IMPORTANT! L'air doit être propre sans huile et humidité. Utilisez un filtre.

4 Operation

4.1 Before you begin welding

Before you begin welding, be sure to read and understand the following instructions.

The Hybrid Spot is a Resistance Spot Welder that was designed for the collision repair industry. It duplicates the welding procedure used by the car manufacturers. It is important to understand the design and function of this welder before operating it.

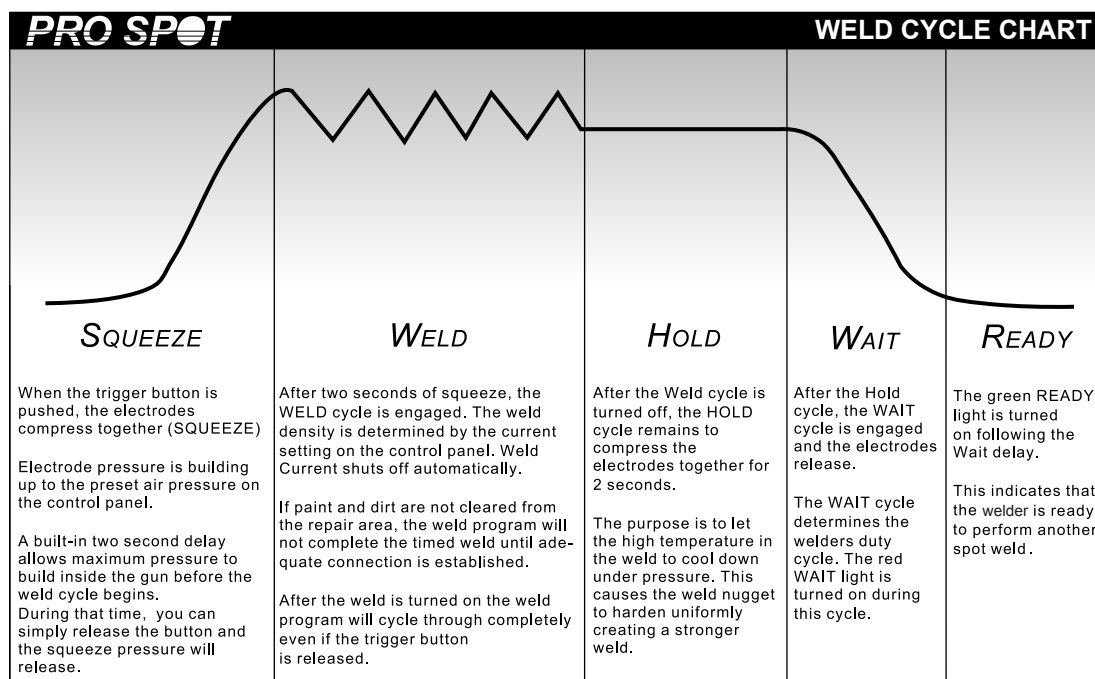
ELECTRICITY ONLY: The welder uses only electricity to create the welds unlike the MIG welder which uses an arc from a feeding wire to build a weld nugget using inert gas and the feeding wire material.

PRESSURE: The welder has a built in air cylinder that compresses the Double-Sided Gun's welding tips together automatically when triggered. The compression is an important part of a good resistance weld. The pressure is adjustable from the Control Panel. The optimum welding pressure varies between 60-90 PSI (4-6.5 BAR). 90 PSI seems to be a common starting pressure. As a rule, increase pressure with thicker metals but remember that too much pressure could decrease the resistance of the metal between the electrodes, resulting in poor weld penetration.

CURRENT: Another important aspect of a weld is the current applied through the work piece. A weld is created when a large current is transferred through the layers of sheet metal. The resistance in the metal causes the area to heat up and fuse the sheets together in a nugget.

WELD PROGRAM: Maintaining the air pressure after the current shuts off makes the weld cool down under pressure resulting in a harder, stronger weld. This feature is built in to the welder's weld control program and is engaged automatically during a weld cycle.

TIME: The Timer controls the duration of the current applied during the weld cycle. The ideal is to get a weld that uses higher current and shorter time to control heat buildup.



4.2 About your welder

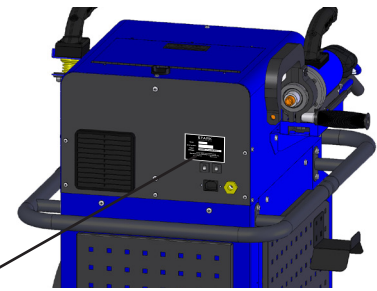
4.2.1 Welder Overview & Technical Specifications

The welder is supplied with four high performance 12V batteries.
Input voltage: 120VAC or 240VAC 1 Phase 5A

The actual voltage and frequency is stated on the rear panel name plate.
 Open circuit output voltage 15V max.

Welding amperage: 10,000A max
Cable length: 8' (2.5m) standard
Electrode force: At 7 bars (90 PSI)-280 DaN (616 Lb)
 At 8 bars (116 PSI)-320 DaN (720 Lb)
Cooling system: Air (1 fan), Compressed air
 (weld gun and weld cables)

Shipping Weight (standard): 515lb (234kg)



The name plate is at the rear of the welder unit.
 The required voltage is indicated on the label.
 Welding output is rated at 15V.

4.2.2 Getting familiar with your welder

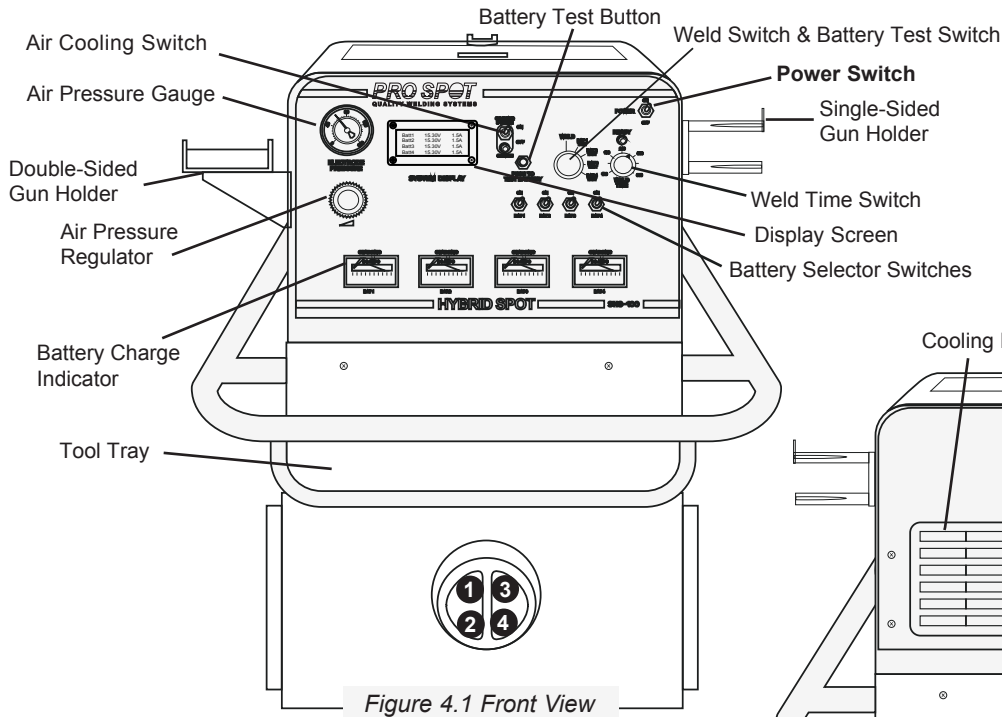


Figure 4.1 Front View

WELD CABLES CONFIGURATION

- ❶ Two-Sided spot gun cable
- ❷ Two-Sided ground cable
- ❸ Single-Sided Weld Gun cable
- ❹ Single-Sided ground cable

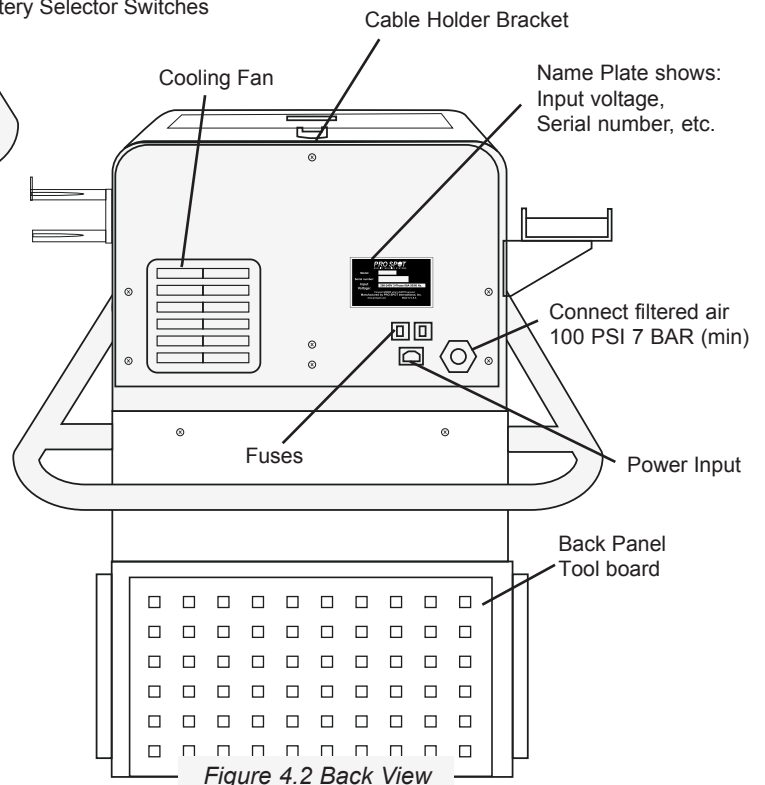


Figure 4.2 Back View

4.2.3 Hybrid Spot Control Panel

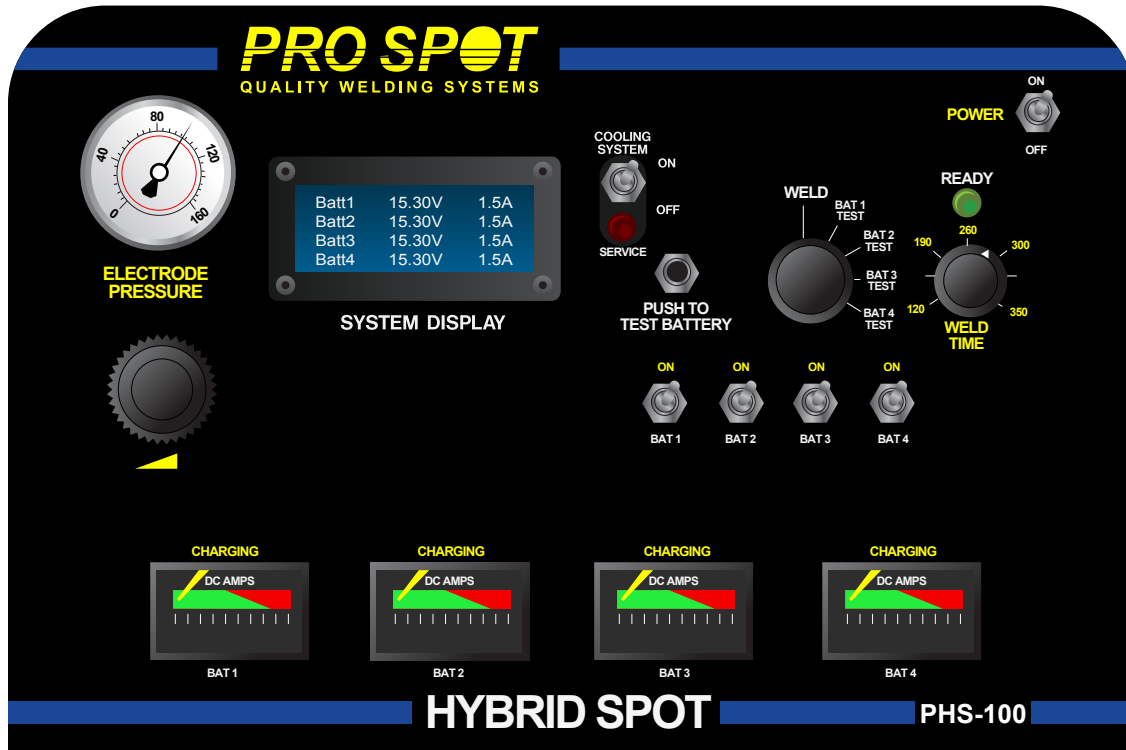


Figure 4.3 The Hybrid Spot Control Panel

4.3 Turning on the welder

1. Toggle the power switch on the front panel to “ON”.
2. The Hybrid Spot is now ready to use.
3. The System Display window will show the battery voltage & charge current on all four batteries.
4. The weld toggle switch must be in position “WELD” to perform welding duties. Start with 3 batteries ON, (BAT 1, 2, 3 switches ON) and adjust the weld time to 260-300. If more power is required, turn BAT 4 ON.
5. Increase the WELD TIME knob if a longer weld time is needed. NOTE: An increased weld time will drain the batteries quicker. Also, always clean and sharpen weld electrodes to maintain welding performance.



IMPORTANT! Make sure to read the instruction manual before operating the welder. Only trained personnel should use this welder.



IMPORTANT! Assurez-vous de lire le Mode d'Emploi avant d'opérer le soudeur. Seul le personnel qualifié devrait utiliser ce soudeur.

4.3.1 Checking the Battery Voltage

Batt1	Test:	12.66V
	Weld Count:	3

Fig. 1

When batteries are fully charged they should be between 12.8 – 13.8V with the charger turned off. When power cord is attached to 120VAC or 240VAC the batteries get charged automatically. The status of charging is displayed on front panel display (unplugged). To test each battery under load, select batteries 1-4 with the WELD switch. Note the voltage in the display screen. Push battery TEST button located to the left of the weld switch for 2-3 seconds; note the load voltage on the display screen (Fig. 1). If the voltage dips down under 12V, charge the batteries and check again. If it is still low, check and/or replace the battery. The weld count indicates the total number of welds on the unit.

VERY IMPORTANT: Do not use any other battery than those supplied by Pro Spot.

Hybrid Welder Battery Charging Instructions:

To charge the batteries in the Hybrid Welder, simply plug the power cord into a 120VAC or 240VAC outlet. The welder may be switched on or off during charging; this does not affect the charge cycle. If the operator welds while the batteries are charging, the charger will automatically shut off to protect the batteries. When 2 minutes have passed since the last weld, charging will resume automatically. While the batteries are being charged, the LCD display will show the charging voltage and current for each battery. During a normal cycle, the battery voltage can rise as high as 15.5V for several hours, and will then be reduced to 14.4V for the remainder of the charging cycle. After 10 hours of charging, the voltage will be reduced to 13.8V to provide a “float” charge. If the charger is left plugged in for more than 24 hours, it will go into standby mode. In this mode, the charger will provide a topping voltage to the batteries every 4 days to ensure that the welder will always be ready for immediate use. The welder may be left plugged in constantly; this will not damage the batteries.

4.3.2 Battery Alerts

During the charge cycle or welder operation, the LCD may display status alerts to indicate when user action is necessary to keep the batteries in good condition. These alerts are described below:

Batt1	Low Battery	
Batt2	15.30V	0.0A
Batt3	15.30V	0.0A
Batt4	15.30V	0.0A

Fig. 2

LOW VOLTAGE

This alert indicates that the battery has reached the maximum safe discharge level and needs to be charged (Fig. 2). The welder will disable the depleted battery and sound an audible alert if the operator tries to use this battery to weld. Any batteries not showing this alert can still be used to weld. To clear this alert, plug in the power cord and allow the batteries to charge. When any low battery is recharged to at least 13.8V, the alert will clear automatically and welding can resume.

Batt1	15.30V	0.0A
Batt2	SERVICE	
Batt3	15.30V	0.0A
Batt4	15.30V	0.0A

Fig. 3

SERVICE

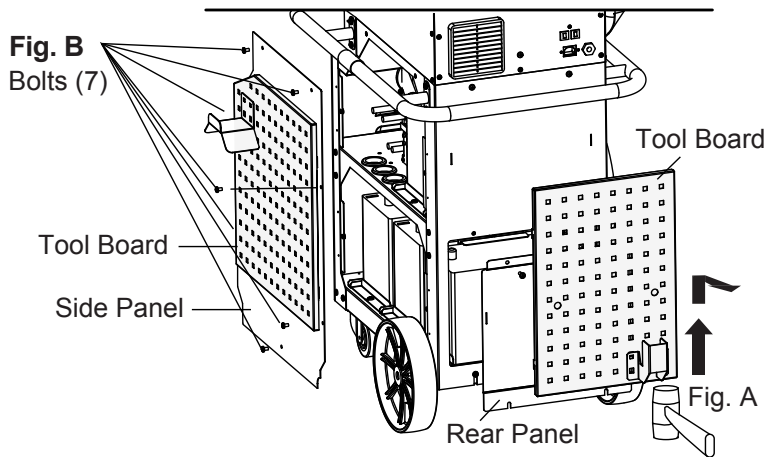
This alert indicates that the battery voltage has fallen below 11.5V and the battery needs to be replaced (Fig. 3). The charger will not attempt to charge a battery that has discharged this low, as doing so might cause the battery or charger to overheat.

Check Battery Water Levels

Fig. 4

WARNING: Warranty is voided if battery water level has not been maintained. Check battery water level at consistent intervals (Fig. 4).

4.3.3 To remove side panel covers for service:



NOTE: Remove all tools from tool boards on side & rear panels before proceeding.

Rear Panel Removal:

Start with rear toolboard panel removal, tap bottom of toolboard with rubber mallet in an upward motion to loosen from slots (Fig. A). After toolboard is removed, remove two top screws in rear panel cover plate and loosen two bottom screws - remove panel.

Side Panel Removal:

Remove 7 bolts located on side panel (Fig. B). To remove panel, pull away from welder and maneuver downward to clear the handle on the welder. Repeat for opposite side.

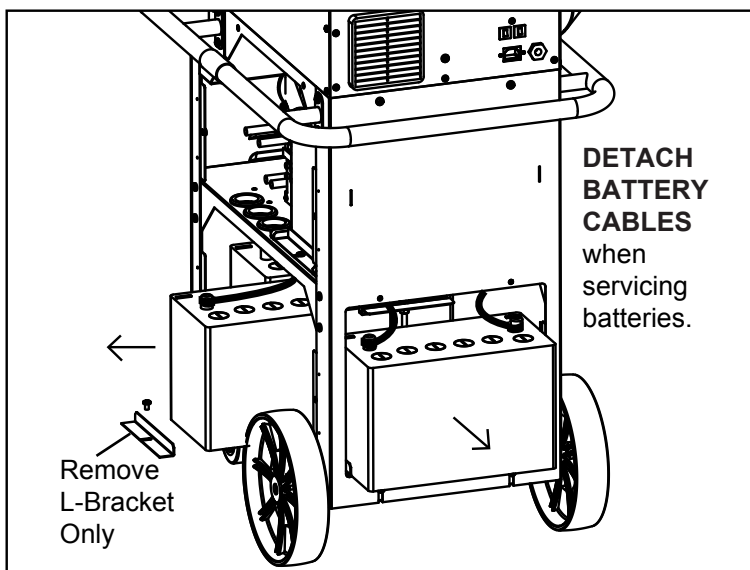
4.3.4 Checking Battery Water Levels

Check Battery
Water Levels

Fig. 4

The charging process can result in a normal gradual depletion of the water levels in the welder batteries. The battery charger will occasionally remind the operator to check the water level in all battery cells to ensure that enough distilled water remains for safe operation (Fig. 4). If the charger is left plugged in constantly, this alert will occur roughly every 2 weeks, depending on welder usage. To clear this alert, unplug the charger, turn off the welder, and check the water levels. When the welder is next turned on or charged, the alert will have cleared.

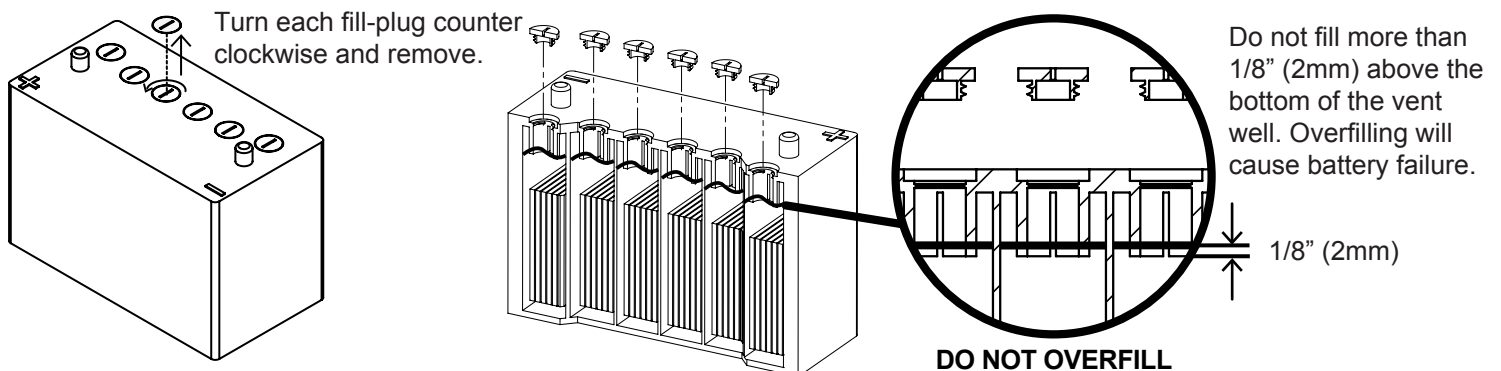
It is very important to keep the distilled water level within specification. Do not let the water level go too low, this will reduce battery life and could destroy the battery. When the cells inside the battery have been exposed to air, the cell is most likely damaged and cannot be recovered even if water is filled. Check level every 2 months. To check water level, follow steps below.



To check water levels, remove side panel covers from welder (refer to 4.3.2). Detach the battery cables from the batteries then remove the batteries from the welder.

Remove the cell caps and check the water level with flashlight and fill if necessary. If low, fill with distilled water to the edge of vent well. Do not fill more than 1/8" (2mm) from the bottom of the vent well.

WARNING: DO NOT LET ACID TOUCH SKIN OR EYES



4.4 Choosing the weld mode

The Hybrid Spot is a multi-functional resistance spot welder. It is equipped with a four weld cable system for your convenience. Two of the weld cables are connected to the Two-Sided Spot Gun and the other two are connected to the Single-Sided Weld Gun.

For Two-Sided welding, use 3 to 4 batteries in the ON position.
For Single-Sided welding, use 1 battery in the ON position. Using more than one battery for Single-Sided welding will result in burn through due to excessive weld power.

4.5 Setting the pneumatic air pressure

Pneumatic air is used for:

- forcing the spot gun to close and open.
- cooling the welding cables that are connected to the spot gun.

The air pressure is regulated with the air regulator, and the set pressure is indicated on the pressure gauge. Default pressure is 90 PSI.

Change the air pressure as follows:

1. Unlock the pressure regulator by pulling on the adjustor knob till it snaps into the unlocked position.
2. Turn the pressure regulator knob clockwise to increase or counter-clockwise to decrease the air pressure.
3. Lock the pressure regulator by returning the knob to the lock position.

4.6 - 4.7 Setting/Changing the weld program

There are two different ways to set the weld power. One is by selecting 1-4 batteries for two sided welding. It is recommended to use 3-4 batteries for all two sided welding procedures, if using 1-2 batteries, weld power will be limited and will create a substandard weld.

The other adjustment available is the WELD TIME Switch - it is used to set the duration of the weld. 250ms is a recommended setting for weld time, if you choose a longer weld time, you will risk draining of the batteries more quickly.

Always keep electrodes sharpened and properly aligned, this will minimize the need for high weld times & will help to maintain weld quality.

4.8 Checking Weld Quality

Peel Test

To perform destructive weld testing: Make a weld on two test pieces and tear them apart using a Vise & Vise-Grip pliers. Note the strength of the weld. It is important to test the same materials that you would normally use for repair in a weld destructive testing procedure. Expect to tear a hole around the weld nugget as the two metals are peeled apart.

IMPORTANT: Use the same metal as you are welding.



5 Double-Sided Welding

5.1 PS-500 Double-Acting Spot Gun

The spot gun is used for the following weld programs:

- Two-Sided spot welding - HSS Galvanized steel, Mild steel, Weld Bonding, Boron Steel, Pulse welding and Custom Modes

(see section 4.8 "Setting the default welding programs")

5.1.1 PS-500 Component Diagram

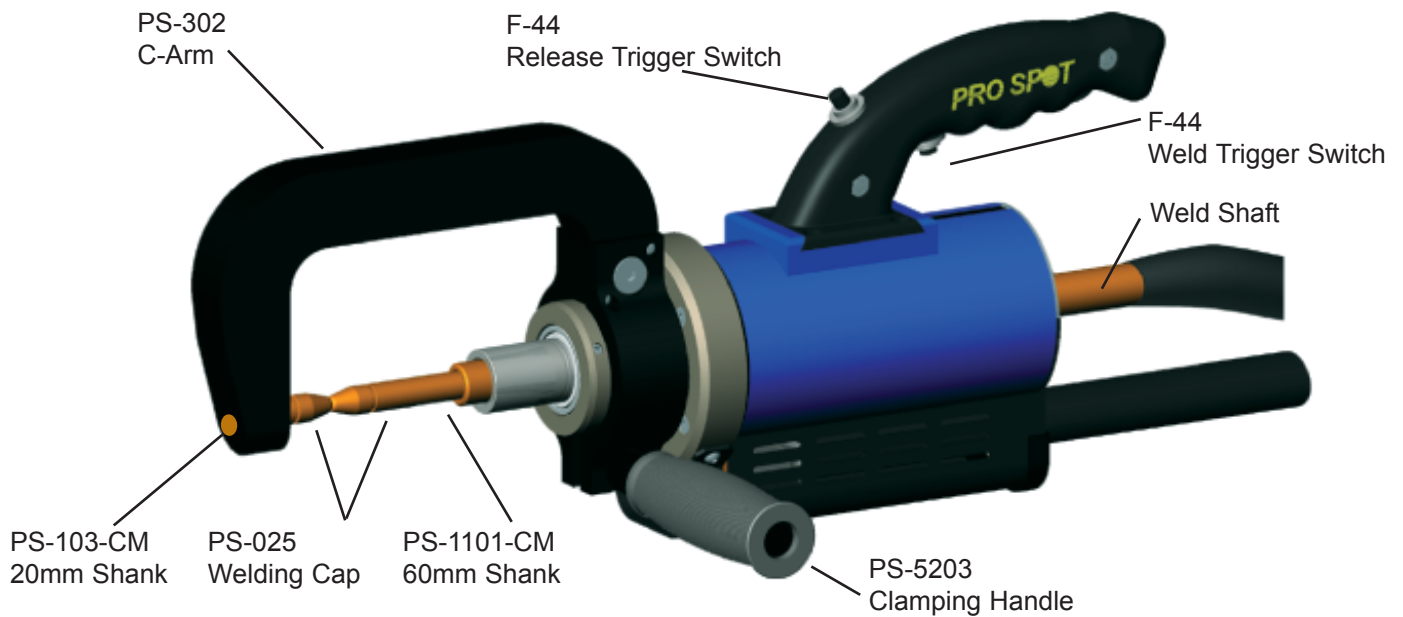


Figure 5.1 PS-500 Spot Gun - Component Diagram

5.1.2 Using the Double-Acting Gun



Push this button to open electrodes wide.

Push this button to close electrodes and weld.

5.2 Extension Arms

The Hybrid Spot comes with a variety of extension arms to accommodate any welding job situation.

Please refer to *fig. 5.3* for details on what welding electrodes to use with each extension arm.



NOTE: Extension arms marked “*optional*” are available from your local distributor or online at www.prospot.com

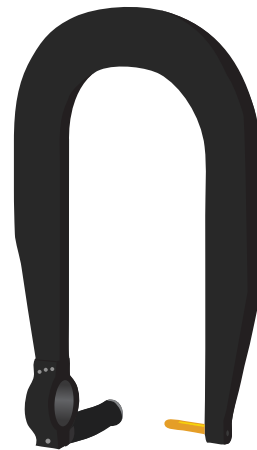


REMARQUE: bras d'extension portant la mention «*facultatif*» sont disponibles à partir de votre Distributeur régional ou en ligne à www.prospot.com

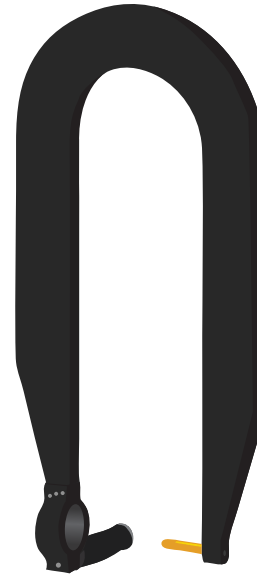
Figure 5.2 Hybrid Spot Extension Arms



PS-306
(optional)



PS-305
508mm Extension Arm



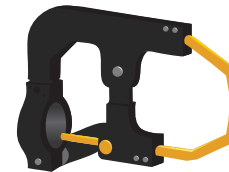
PS-503-W
(optional)



PS-52
Wheelhouse Arm

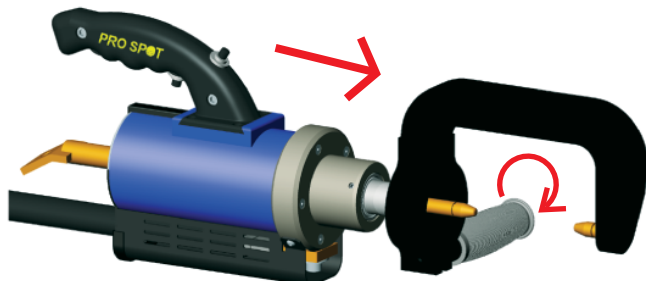


PS-302 C-Arm

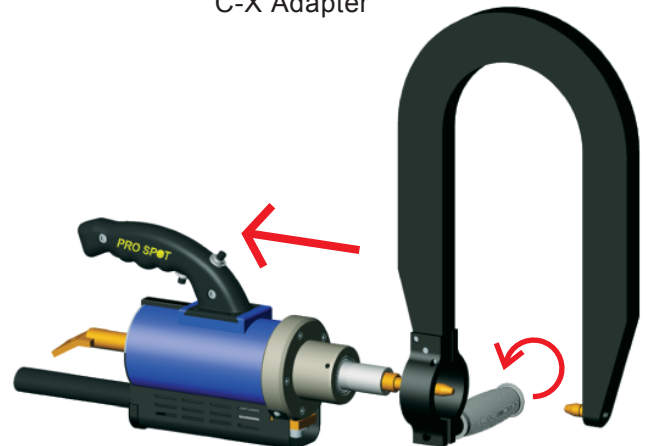


PS-403 (optional)
C-X Adapter

5.2.1 Switching to extension arms



Loosen the handle and pull off the C-arm...



Now, insert the extension arm and tighten the handle.

5.2.2 Extension Arms and Welding Electrodes

Different extension arms require the use of different welding electrodes. Use charts in *fig. 5.3 and 5.4 to determine the correct combination of extension arms and welding electrodes.*



IMPORTANT! Using incorrect welding electrodes with extension arms may result in weak welds and/or damage to your welder.



IMPORTANT! En utilisant des électrodes de soudage inexactes au bras d'extension peut donner des soudures faibles et / ou endommager votre soudeur.

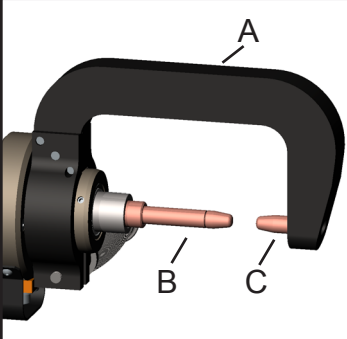
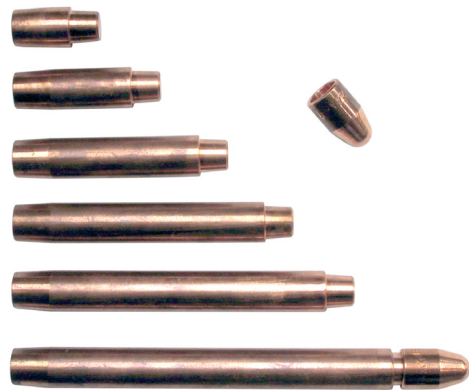
	A	B	C
	PS-302	PS-1101-CM	PS-103-CM
	PS-52-5/8	PS-1101-CM	PS-1133-5/8
	PS-403	see Sec. 5.7.3	see Sec. 5.7.3
	PS-305	PS-1101-CM	PS-129-CM
	PS-503-W	PS-1101-CM	PS-128-CM

Figure 5.3 Extension arm - Welding electrode configuration chart



Electrode Shank	PS-025: Welding Cap
PS-103-CM	← 40 mm* →
PS-102-CM	← 60 mm* →
PS-1101-CM	← 80 mm* →
PS-128-CM	← 100 mm* →
PS-129-CM	← 120 mm* →
PS-130-CM	← 160 mm* →

* length with Welding Cap attached. -20mm w/o cap

Figure 5.4 Welding electrode selection chart



NOTE: PS-025 Welding Caps can be purchased in packages of 15 from your local distributor or online at www.prospot.com



REMARQUE: PS-025 caps de soudure peuvent être achetés en paquets de 15 à partir de votre distributeur local ou en ligne à www.prospot.com

5.3 PS-500 Electrode Alignment

Use the set screws (A, B, C) to align the electrodes. Ex: to move electrode down, loosen screw (C) and tighten screws (A and B).

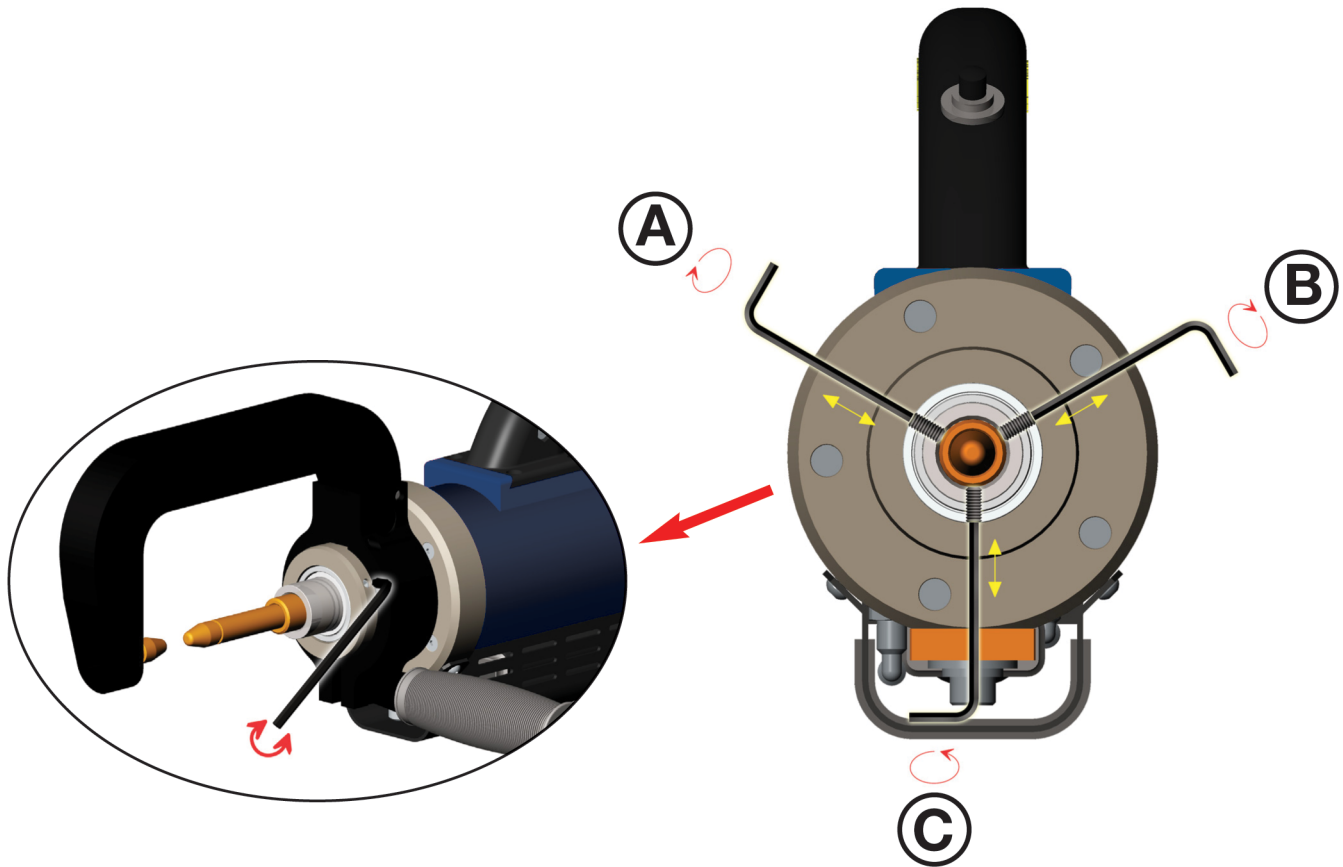
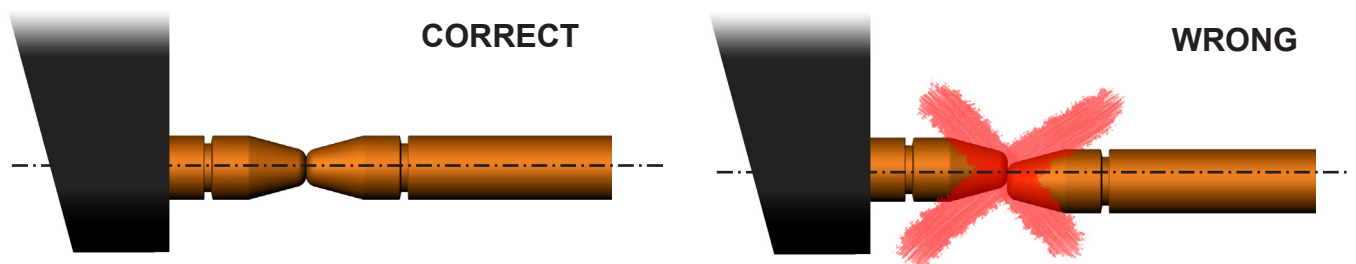


Figure 5.5 Electrode Alignment



IMPORTANT! Always maintain proper electrode alignment. Not doing so may result in weak, substandard welds!



IMPORTANT! Toujours maintenir l'alignement des électrodes appropriées. Ne pas le faire peut conduire aux soudures faibles de qualité inférieure!

5.4 Removing Welding Electrodes

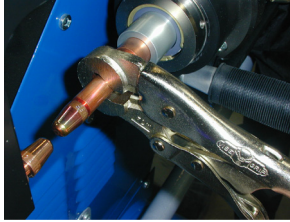


Figure 5.6a: Removing Piston Electrode

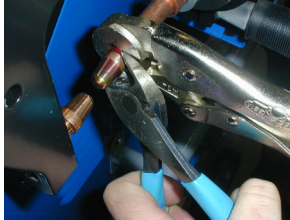


Figure 5.6b: Removing Welding Cap

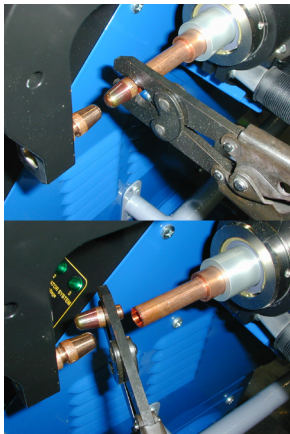


Figure 5.6c: Optional Weld Cap Removal Tool

Removing Extension Arm Electrode

The extension arm electrodes can be easily removed by lightly tapping them with a pin and hammer as shown in *fig. 5.6*

To remove the piston electrode:

1. Grip piston electrode with a set of pliers or vise-grips (*fig. 5.6a*).
2. Rock the pliers back and forth to loosen the electrode from the holder.
3. Remove the electrode

Note: Vise-Grips shown in *fig. 5.6a* are specially designed to hold round objects without damaging or scarring them. You can purchase a set from your local distributor or online at: www.prospot.com



IMPORTANT! Do not attempt to remove the electrode by hitting it. This could damage the electrode and the spot gun.



IMPORTANT! N'essayez pas de retirer l'électrode en la frappant. Cela pourrait endommager l'électrode et le "pistolet".

Removing Welding Caps

To remove a welding cap:

1. Hold piston electrode with a set of pliers or vise-grips.
2. Grip welding cap with another set of pliers or wedge side cutters between cap and shank as shown in *fig. 5.6b*
3. Twist the two to loosen and remove the welding cap.



NOTE: An optional welding electrode cap removal tool is available, which makes cap removal easy (*fig. 5.6c*). You can order the cap removal tool from your local distributor or online at: www.prospot.com



NOTE: Une option d'un outil pour enlever le bouchon est disponible, Pour faciliter le retrait du bouchon (*fig. 5.6c*). Vous pouvez commander cet outil de votre distributeur local ou en ligne à l'adresse: www.prospot.com

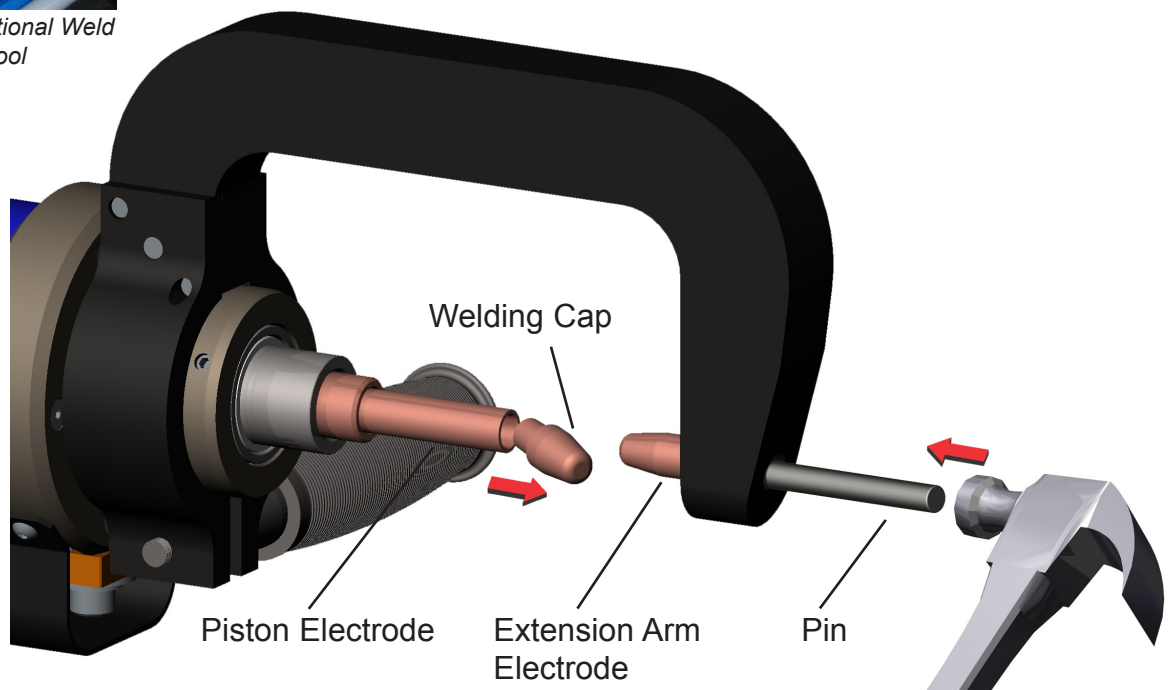


Figure 5.6 Removing Welding Electrodes

5.5 Welding Electrode Maintenance



Fig. 1

To maintain structurally-sound welds it is important to keep your welding electrodes clear from build-up. It is also important to maintain a 6mm weld nugget diameter. Clean electrodes with a file and periodically replace welding caps as explained in Section 5.4 “Removing Welding Electrodes”

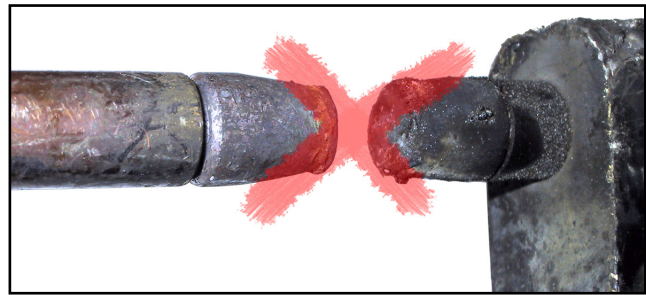
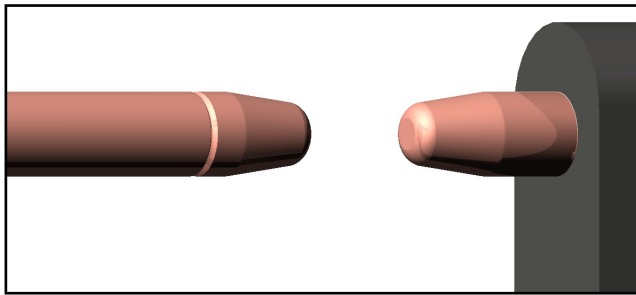
Also Available: Pro Spot PLT-50/A Pneumatic Low Profile Dresser sharpens your dull tips without having to remove the arm (Fig. 1).



WARNING! The electrodes may be hot. Use caution when handling them.

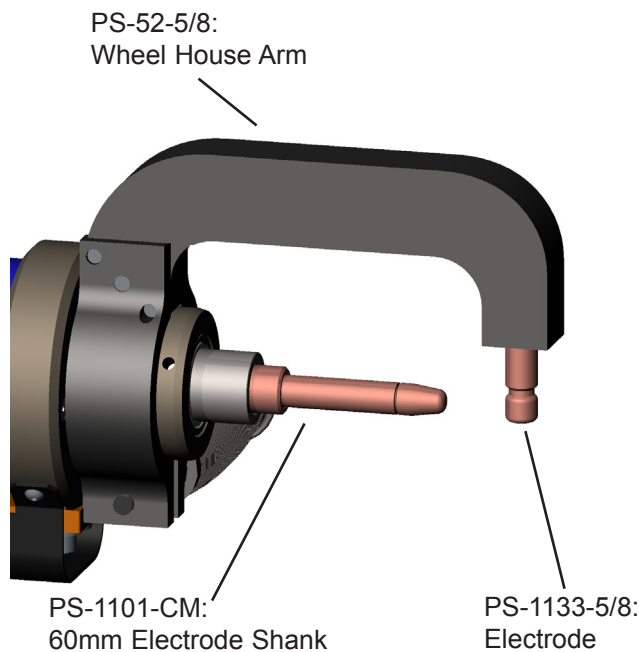


ATTENTION! Les électrodes peuvent être chauds. Soyez prudent lors de leur manipulation.

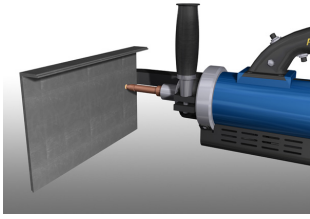


5.6 Wheel House Arm

The wheel house adapter allows access to hard to reach areas such as the wheel house



5.7 X-Adapter (optional)



C-TYPE GUN

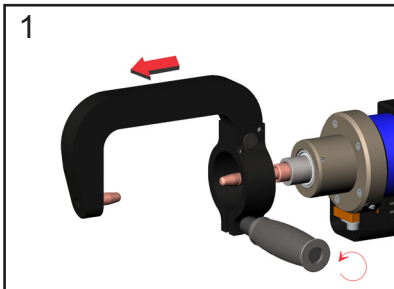
The advantage of the C-Type Spot Gun is that when making vertical pinch welds on quarter panels, rocker panels, door pillars, etc., the spot gun is positioned perpendicular to the work area. Easy to reach! Easy to use!



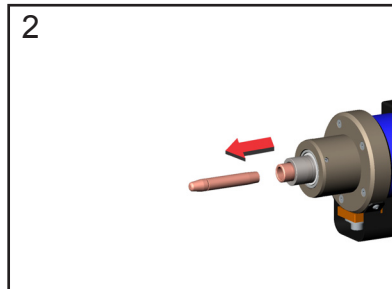
X-TYPE GUN

The X-type design is used on certain applications where the C-type can't reach. 90% of all welding needs can be done with the C-type but for some radiator support and truck bed pinch welds, the X-Adapter works better. This new invention makes it possible to weld where you never could before!

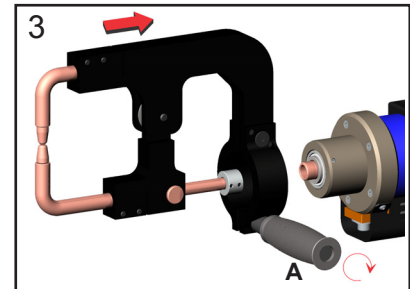
5.7.1 Attaching the X-Adapter



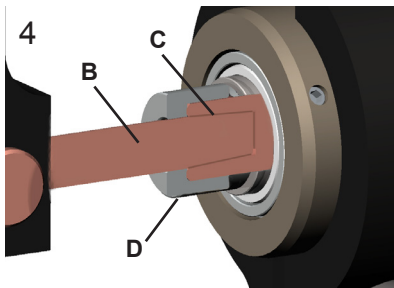
1
Loosen the handle and pull out C-arm...



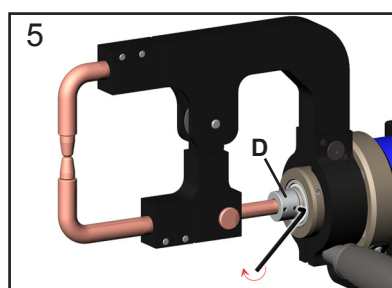
2
Follow instructions in **Sec. 5.4** to remove piston electrode



3
Insert the X-Adapter onto the gun. Tighten handle (A).



4
Insert the Tapered Electrode (B) into the Shaft (C). Apply air (carefully) to put pressure on the electrodes so that Tapered Electrode seats firmly in the shaft before tightening the Collar (D) set screw.



5
Tighten the Collar (D) set screw.



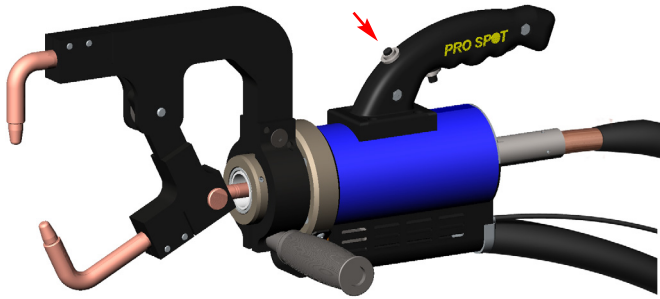
IMPORTANT! Do not tighten the Collar before the inserting Tapered Electrode into the shaft. The collar is designed to prevent the Tapered Electrode from falling out of the Shaft when the gun is fully opened.



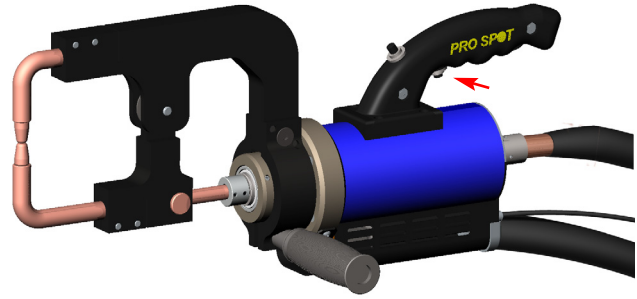
IMPORTANT! Ne serrez pas le collier avant de glisser l'Électrode Rétréci dans le tube. Le collier est conçu pour empêcher l'Électrode Rétréci de tomber du tube quand le pistolet est complètement ouvert.

5.7 X-Adapter (optional) cont.

5.7.2 Using the X-Adapter



Push the upper switch to open electrodes wide.



Push the lower switch to close electrodes and weld.

5.7.3 X-Adapter Configurations

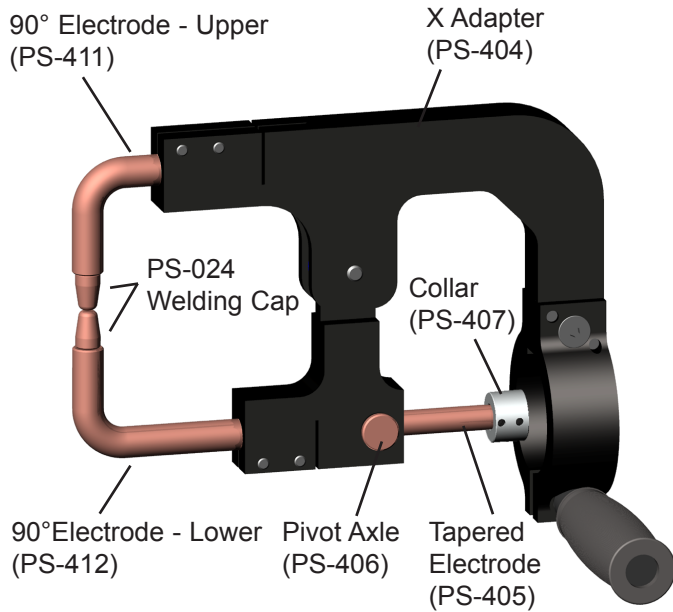


Figure 5.7 90° Arm Set

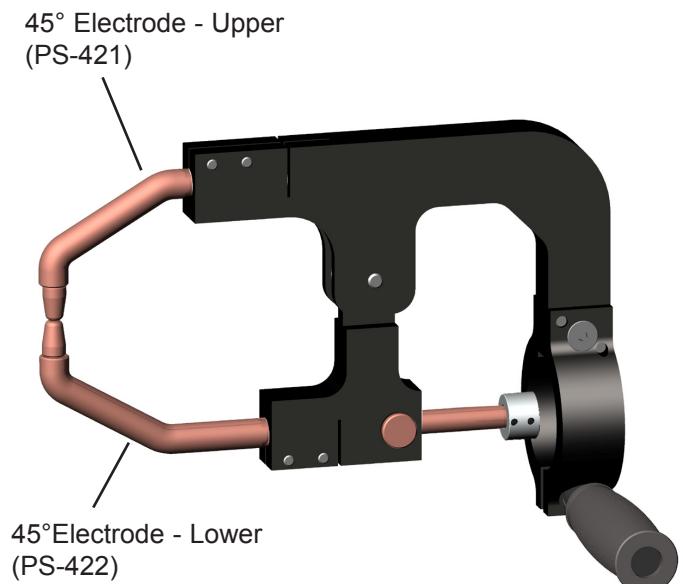


Figure 5.8 45° Arm Set

6 Single-Sided Welding

6.1 Single-Sided Welding Overview (Not recommended for structural welding, for cosmetic only.)

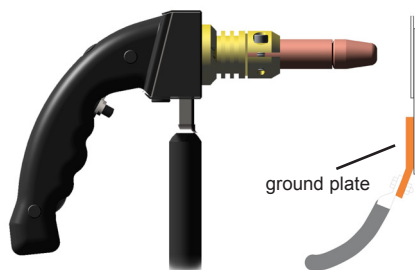


Figure 6.1



Figure 6.1b

The Single-Sided Weld System allows the operator to carry out welding tasks using a Single-Sided Weld Gun. The Single-Sided weld procedure requires contact only from one side compared to two sides in Two-Sided welding. A ground plate must be connected to the panel to be welded for it to work (fig. 6.1).

You can also use an optional magnetic ground plate to easily attach the ground cable to the metal (fig. 6.1b).



NOTE: Make sure the ground plate is clamped firmly in place on the inside of a clean metal surface as near as possible to the weld location. Do not attach the ground to the metal you're about to weld on. When performing other weld tasks such as dent pulling, etc., the ground attachment location becomes less critical.



REMARQUE: Assurez-vous que la plaque de terre est serré solidement en place à l'intérieur d'une surface métallique propre aussi près que possible du lieu de soudure. Ne fixez pas le terre et le métal que vous êtes sur le point de soudure. En accomplissant d'autres tâches comme la soudure dent de traction, etc, le lieu de saisie devient moins critique.

In the Single-Sided weld mode the following weld procedures are available for the Hybrid Spot:

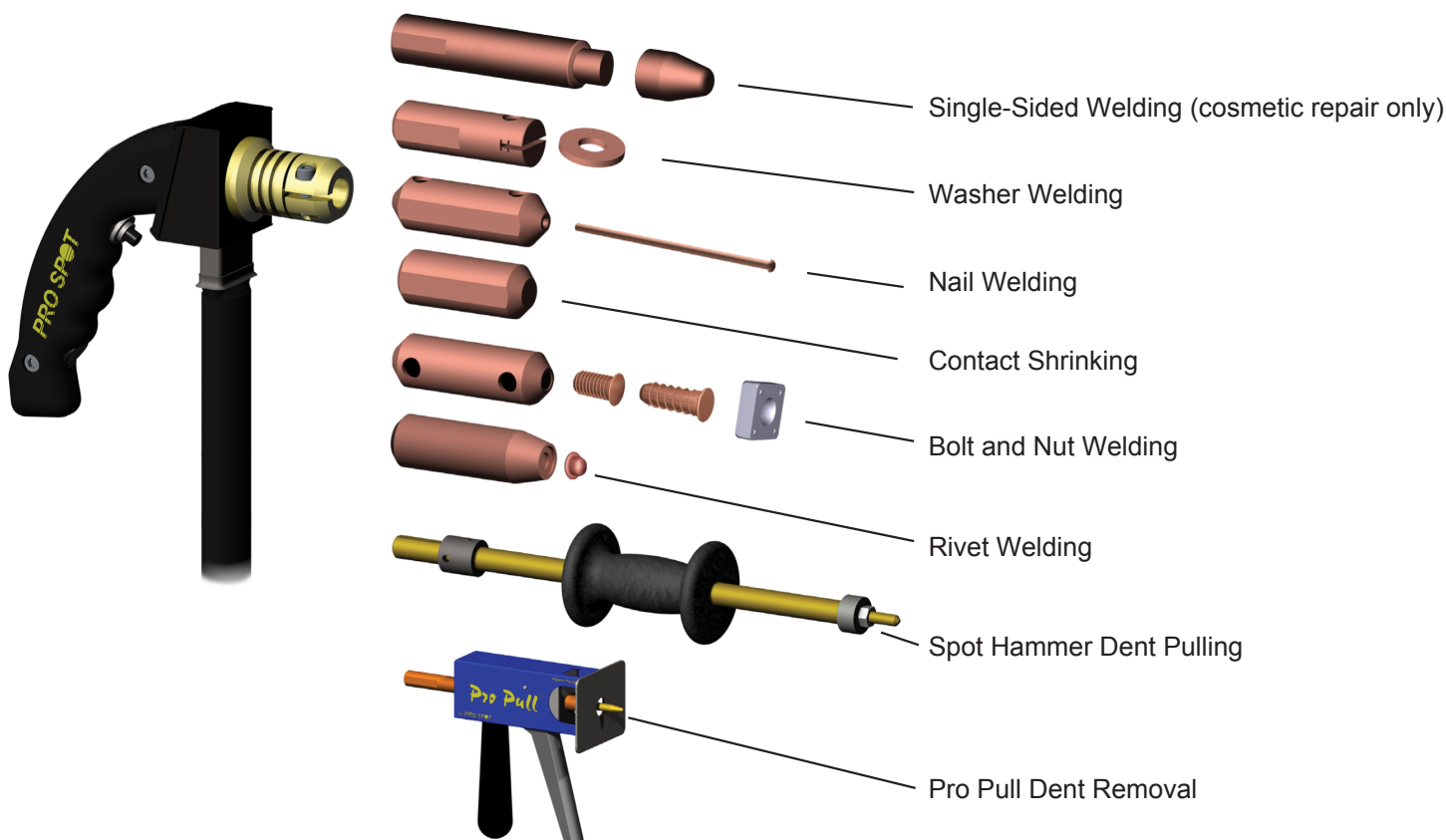


Figure 6.2 Single-Sided applications

Single Sided Welding Reference:

For single sided welding with the Hybrid Spot, it is important to not use too many batteries in the ON position as the weld power will be too high.

Start with 1 battery in the ON position and the lowest weld time.

For dent pulling use 1 battery and the lowest time setting available. If less power is needed, try to separate the ground cable further away from the weld area to create more power resistance and/or use the pointed spot hammer tip to spread out the heat zone.

6.2 Single-Sided Spot Welding

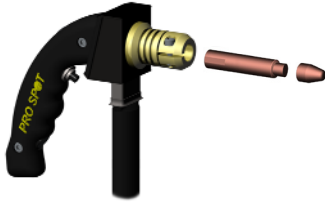


Figure 6.9

Single-Sided spot welding is used where Two-Sided spot welding cannot be used.



Important: The Single-Sided spot welding is not permitted on supporting frameworks of a vehicle. It is only permitted for cosmetic purposes.



Important: Le soudage de Côté Unique par points n'est pas autorisée sur les cadres de soutien d'un véhicule. Il est seulement permis à des fins cosmétiques.

1. Select 1-4 Batteries in the ON position.
2. Fit the Single-Sided Gun with Single-Sided electrode (*fig. 6.9*).
3. Grind between the inner and the outer body sheets to remove paint, primer and rust. This ensures good electrical contact when performing Single-Sided welding.
4. Ground the working area (*refer to section 6.1 "Single-Sided Welding Overview"*).
5. Apply about 33-44 lbs of pressure on the Single-Sided gun and push the trigger to weld. Reposition and weld again.



Note: Make sure that Single-Sided electrode is clean. If it isn't, use a file or tip dresser to clean it. If the weld cap shows considerable wear, it should be replaced (*refer to section 5.4 "Removing Welding Electrodes"*)



Remarque: Assurez-vous que l'électrode Côté Unique est propre. Si ce n'est pas, utilisez une lime pour le nettoyer. Si le bouchon de soudure est considérablement usé, il devrait être remplacé (voir la section 5.4 "Enlèvement d'Electrodes de soudage»)

6.3 Bolt Welding

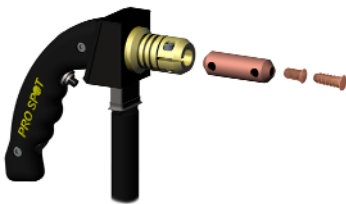


Figure 6.12

Many of today's car bodies come with factory equipped threaded studs. After a collision, the studs may be lost or do not accompany the replacement part. With the Hybrid Spot, threaded studs can be welded-on in factory style. This type of stud is also common throughout the car body for attachments of interior, tail lights, door moldings, etc.



Tip: A threaded stud can also be used to fasten the ground clamp directly to the panel, minimizing the area needed for grinding.



Astuce: Un goujon fileté peut également être utilisé pour fixer la pince directement sur le panneau, ce qui réduit la surface nécessaire au broyage.

Studs are held in place during welding with magnetic adapter electrode.

1. Select 1-2 Batteries in the ON position.
2. Fit Single Sided gun with the magnetic stud adapter (*fig. 6.12*).
3. Insert stud into the adapter (*fig. 6.12*).
4. Prepare the surface area by removing paint and primer.
5. Ground the working area (*refer to section 6.1 "Single-Sided Welding Overview"*).
6. Position single sided gun over work area and push the trigger to weld.
7. Repeat as needed.

6.4 Nut Welding

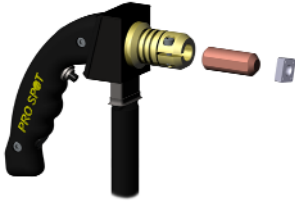


Figure 6.15

Weld-on nuts are common throughout the car body for attachments of interior, tail lights, door moldings, etc. and are applied with ease using the Hybrid Spot.



Tip: Different size nuts are available from your local Pro Spot distributor or on the web at Pro Spot online store.



Astuce: noix de différentes tailles sont disponibles chez votre distributeur local Pro ou sur le web à la boutique Pro Spot en ligne.

Nuts are held in place during welding with a shrinking electrode.

1. Select 1-2 Batteries in the ON position.
2. Fit Single-Sided gun with the Shrink Electrode (*fig. 6.15*).
3. Prepare the surface area by removing paint and primer.
4. Ground the working area (*refer to section 6.1 "Single-Sided Welding Overview"*).
5. Press weld-on nut to the metal with Contact Shrinking electrode, apply some pressure and push the trigger to weld.
6. Repeat as needed.

6.5 Dent Pulling with Spot Hammer

Spot hammer dent pulling is used to repair dents on a vehicle body. The spot hammer welds directly onto the work area and pulls the dent.



Tip: The replaceable welding tip should last for over one thousand welds. Contact your local distributor to order replacement tips, or order on the web at Pro Spot online store.



Astuce: Le bout de soudage remplaçable devrait durer plus d'un millier de soudures. Contactez votre distributeur local pour commander des pointes de rechange, ou commandez sur la Web Pro Spot au magasin en ligne.

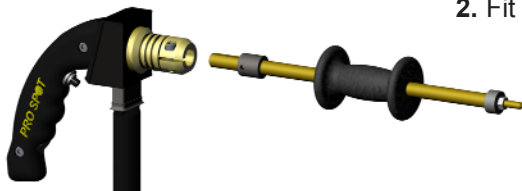


Figure 6.18

1. Select 1 Battery in the ON position.
2. Fit Single-Sided gun with the spot hammer (*fig. 6.18*).
3. Prepare the dent surface area by removing paint and primer.
4. Ground the working area (*refer to section 6.1 "Single-Sided Welding Overview"*).
5. Position the spot hammer tip at the bottom of the dent and push the trigger to weld the electrode onto the metal.
6. Pull out a dent then release by twisting the hammer.
7. If needed, reposition, weld, and pull again.



Note: Check spot hammer tip periodically to make sure it is in good working order. If the tip looks worn, replace it with a new one.



Note: Contrôlez le bout marteau périodiquement pour s'assurer qu'il est en bon état de marche. Si le bout semble usé, le remplacer par un nouveau.

6.6 Moulding Clip Rivet Welding

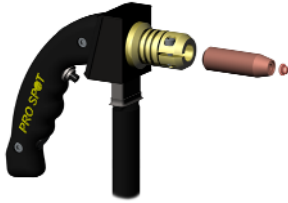


Figure 6.21

This function will weld on factory type clips for the window moulding. The clips that hold the moulding do not, usually, come on the replacement parts.

Rivets are held in place during welding with magnetic adapter electrode.

1. Select 1 Battery in the ON position, minimum weld time.
2. Select Rivet Welding Program by pressing the Left or Right Navigation Buttons
3. Choose weld power level by pressing the “Next Program” button repeatedly.
4. Fit Single-Sided gun with the magnetic rivet adapter (*fig. 6.21*).
5. Insert rivet into the adapter (*fig. 6.21*).
6. Prepare the surface area by removing paint and primer.
7. Ground the working area (*refer to section 6.1 "Single-Sided Welding Overview"*).
8. Position Single-Sided gun over work area and push the trigger to weld.
9. Repeat as needed.

6.7 Dent Pulling with Washers and Slide Hammer with Hook

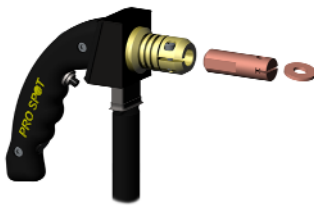


Figure 6.24

The slide hammer with hook (optional) can be used in conjunction with washers to repair car body dents.



Tip: You can purchase a slide hammer with hook from your local Pro Spot distributor or on the web at Pro Spot online store.



Astuce: Vous pouvez acheter un marteau glissant avec crochet de votre distributeur locale Pro Spot ou sur le web à la boutique Pro Spot en ligne.

Washers are held in place during welding with magnetic adapter electrode.

1. Select 1 Battery in the ON position.
 2. Fit Single-Sided gun with the magnetic washer adapter (*fig. 6.24*).
 3. Insert washer into the adapter (*fig. 6.24*).
 4. Prepare the dent surface area by removing paint and primer.
- When welding on washers, you only need to clean the area where the washer touches the metal since the grounding system is connected through a separate cable.
5. Ground the working area (*refer to section 6.1 "Single-Sided Welding Overview"*).
 6. Position the washer at the bottom of the dent and push the trigger to weld the washer onto the metal.
 7. Hook the washer with the slide hammer and pull out the dent.
 8. Repeat as needed.



Tip: You can, also, pull multiple washers by welding on a row of washers at the bottom of the dent, inserting a rod through the washers and pulling the rod with the slide hammer with hook.



Astuce: Vous pouvez, également, tirer plusieurs rondelles par soudage sur une rangée de rondelles au bas de la Dent, insertant une baguette par les rondelles et en tirant la tige avec le marteau glissant avec crochet.

6.8 Contact Shrinking



Figure 6.27

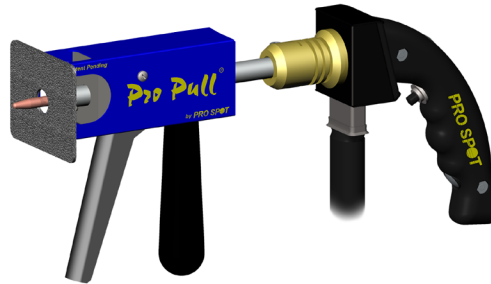
Dent pulling with washers creates high spots in the metal. Until now, the common practice would have been to grind the surface, resulting in a loss of sheet metal thickness. With the Hybrid Spot, use the shrinking tip instead of a grinder to remove the high spots, leaving a smooth and clean surface that's every bit as thick and strong as before. Shrinking electrode also acts as a nut adapter (*refer to section 6.4 "Nut Welding"*). With this electrode you get two convenient tools in one.

1. Select 2 Batteries in the ON position.
2. Fit Single-Sided gun with the contact shrinking electrode (*fig. 6.27*).
3. Prepare the surface area by removing paint and primer.
4. Ground the working area (*refer to section 6.1 "Single-Sided Welding Overview"*).
5. Position the contact shrinking electrode over the high spot, apply some pressure and push the trigger to weld.
6. Repeat as needed.

6.9 Pro Pull Dent Pulling (optional)

Pro Pull can be fitted to most resistance spot welders or dent pullers.
Welder & Adapters not included.

Pro Pull is a patented, innovative tool for fast and accurate dent pulling. It features painless dent removal functionality (see sec. 6.3.5 "Painless Dent Pulling With Pro Pull").



6.9.1 Selecting Pro Pull Weld Mode



Make sure the ground plate is clamped firmly in place on the inside of a clean metal surface as near as possible to the weld location.

NOTE: Do not attach the ground to the metal you're about to weld on. When performing other weld tasks such as dent pulling, etc., the ground attachment location becomes less critical.



Assurez-vous que la plaque de terre est serré fermement en place à l'intérieur d'une surface propre de métal le plus près que possible au lieu de soudure.

NOTE: Ne fixez pas le terre et le métal que vous êtes sur le point de souder. Lors de l'exécution d'autres tâches comme la soudure dent de traction, etc, le terre du lieu de saisie devient moins critique.

6.9.2 Pro Pull Component Diagram

Pro Pull comes with three different Blocking Plates with Quick-Connect design.

Block window size:
2.5"(63mm) x 1.5"(38mm)

PP-10-04



Large openings for great visual control of the pulling area.

Block window size:
1.75"(44mm) x 1"(25mm)

PP-10-03



Block window size:
0.75" (19mm) dia.

PP-10-01



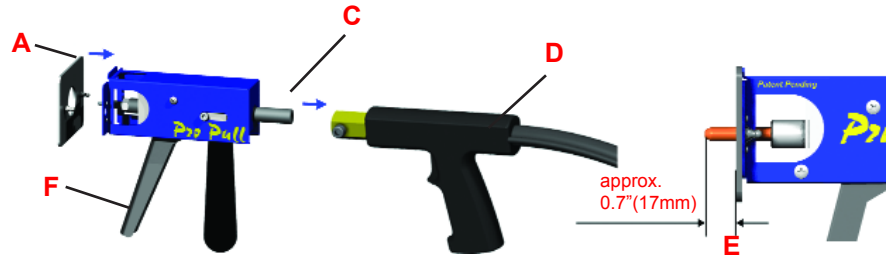
CLT-55
Electrode

N-38
Nut

Retrofit point for different end adapters. Available for most weld guns. (not included) See prospot.com for more information.

CLP-75
Removable weld shaft. The weld current is transferred through the shaft and NO CABLE is required to transfer the current

6.9.3 Pro Pull Assembly

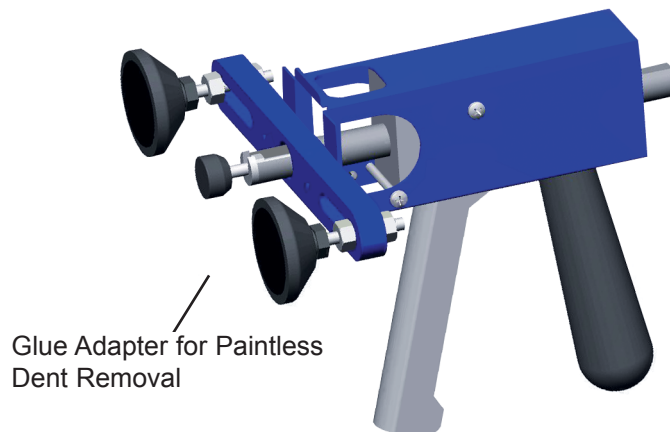


1. Attach the Weld Gun (D) to Weld Shaft (C). Secure Lock Bolt (G).
2. Slide weld shaft and gun to standard distance (E).
3. Attach desired block plate (A)
4. Position the weld tip in the “bottom” of the dent, weld, then pull the handle (F) to initiate the pulling action. Use the shortest weld TIME possible to prevent extensive weld marks.

6.9.4 Dent Pulling with Pro Pull



6.9.5 Paintless Dent Pulling With Pro Pull



7 Troubleshooting

1. The display says “Low Voltage” on Batt1 display line.

This indicates that Battery 2's voltage line reached the minimum safe operating voltage and has been disabled. The battery is not available for welding and is being charged automatically (if welder is plugged in). An alarm will sound when attempting to weld if “Low Voltage” alert is displayed. To clear “Low Voltage” alert and continue welding with remaining batteries, turn off the switch (Batt2 in this example) and welding can continue. When Battery 2 reaches 13.8V it will be available to use again when the switch is turned on.

IMPORTANT: Do not leave the batteries in a discharged condition. Charge Immediately.

2. The display shows “SERVICE” on Batt 3 display line

This alert indicates that the battery voltage has fallen below 11.5V and the battery needs to be replaced (Fig. 3). The charger will not attempt to charge a battery that has discharged this low, as doing so might cause the battery or charger to overheat.

3. The display says “Check Battery Water Levels”

This indicates that it is time to perform a battery water level check (see section 4.3.4). This alert is triggered based on accumulative battery charge time. It is extremely important to maintain correct water levels. Failure to do so will result in failure of batteries and warranty is voided.

4. Low weld power & Batteries not charging; Fan is not on, but otherwise the welder appears normal.

- Check power cable for voltage reading.
- Check small breakers on back of panel, the breakers are resettable by pushing the breaker.

5. The gun is closing the weld tips but not welding.

- Make sure the weld switch is in weld mode and not in Batt test mode.
- Battery switches off?
- Batteries may be in disabled mode due to a “Low Voltage Condition” See low voltage alert.

5. Single Sided gun trigger does not work or seems intermittent.

The welder is programmed with 5 sec delay between welds to conserve power and prevent overheating.

NOTES



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