

CTR9 Spot welder

Instruction Manual



(49023, rev 4) 2020-01, EN

CAR-O-LINER®

Foreword

The spot welder CTR9 is used by body shops to duplicate the welding procedure used by the car manufacturers. All other use of the equipment, or use which is contrary to the instructions given in this manual, can cause personal injury and/or machine damage.

Car-O-Liner 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 or other similar nuisance, irrespective of how this has arisen, that originates from incorrect use of this equipment or its use in a manner not intended.

Warranty

Car-O-Liner offers a one-year guarantee from the date of delivery. This guarantee covers material defects and assumes normal care and maintenance.

The guarantee assumes that:

- the equipment is correctly installed and inspected in accordance with current local regulations.
- the equipment has not been altered or rebuilt without approval from Car-O-Liner.
- genuine Car-O-Liner spare parts are used in any 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, plus that the unit has been used within its operating range as stated in the specifications. All claims must include the product, article number and serial number. This data is to be found stamped on the name plate, see section 1.3 *Marking* for location.

Note

This instruction manual gives advice as well as instructions for installation, operation, maintenance and trouble shooting.

IMPORTANT! Read this manual carefully to become familiar with the proper operation of the spot welder CTR9. It is recommended that you use your authorized Car-O-Liner Distributor for maintaining and servicing your products. Never perform repairs, adjustments or any other work on the products which may result in personal injury and damage to the product.

Your Car-O-Liner Distributor employs factory trained technicians and is focused on offering you the best overall experience with your new Car-O-Liner product. Additionally your authorized Car-O-Liner Distributor is prepared to make sure that any revisions or upgrades, as required by Car-O-Liner, will be performed on your product.

The photographs and drawings in this manual are intended only to be illustrative 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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Conformity with directives and standards

The spot welder CTR9 is designed and manufactured by Car-O-Liner Group AB.

The spot welder CTR9 complies with relevant standards and directives. Only Car-O-Liner approved equipment and spare parts may be used together with the the spot welder CTR9.

Any alterations not approved by Car-O-Liner renders the certifications issued by Car-O-Liner invalid.

Conformity with directives and standards

The CTR9 is manufactured by Car-O-Liner Group AB, which is an ISO 9001:2008 and ISO 14001:2004 accredited organisation.

Below an example of how the EC Declaration of Conformity for the CTR9 is outlined.

A signed and dated copy of the EC Declaration of Conformity, including serial number, is included in the documentation for the CTR9. Please contact your distributor if you need a new copy of the Declaration of Conformity.

CAR-O-LINER®		ORIGINAL
EC DECLARATION OF CONFORMITY		
We	CAR-O-LINER GROUP AB Hulda Mellgrens gata 1 421 32 Västra Frölunda Sweden	
Herewith declare under the sole responsibility that the product:		
Type of equipment: Model Types: Serial number(s):	Medium Frequency Resistance Spot Welder CTR9 143	
Is in conformity with the provisions of the following EC directive(s):		
2006/42/EC 2014/35/EU 2014/30/EU 2013/35/EU 2012/19/EU 2011/65/EU EC 1907/2006	Machinery Directive Low Voltage Directive (LVD) Electromagnetic Compatibility directive (EMC) Electromagnetic Field Directive (EMF) Waste Electrical and Electronic Equipment Directive (WEEE) Restriction of Hazardous Substances Directive (RoHS) Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)	
References of harmonized standards applied for this EC declaration of conformity, or parts there of:		
EN 60204-1:2006+A1:2009	Safety of Machinery; Electrical Equipment of Machines – Part 1: General Requirements	
EN 62135-1:2015	Resistance Welding Equipment Part 1: Safety requirements for design, manufacture and installation	
EN 62135-2:2015	Resistance Welding Equipment Part 2: Electromagnetic compatibility (EMC) requirements	
EN 62233:2008	Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	
(Place and date of issue)		
(Name, signature and title or equivalent marking of authorized person)		
CAR-O-LINER Group AB • Hulda Mellgrens gata 1 • SE-421 32 Västra Frölunda • Sweden • Telephone +46 227 412 00 • Telefax +46 227 319 00 www.car-o-liner.se • info@car-o-liner.se		

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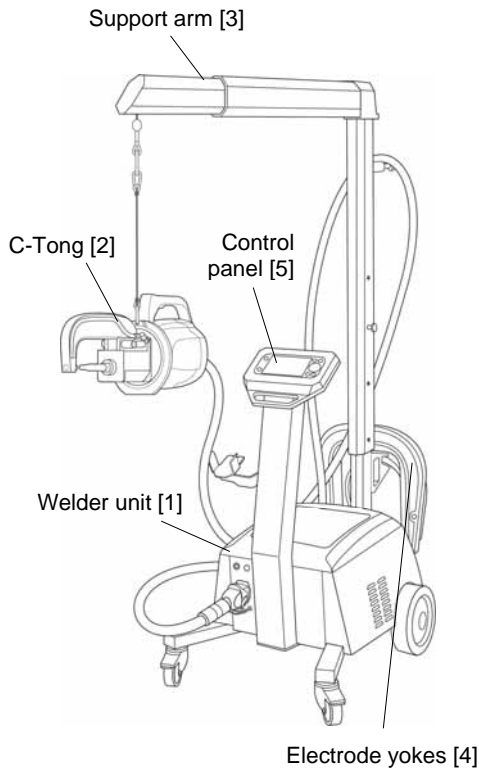
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1 Introduction

1.1 General



The CTR9 is a medium frequency spot welder, designed for body shops to replicate the welding procedure used by car manufacturers. It consists of a welder unit [1] fitted with a C-Tong [2], a support arm [3] that suspends the C-Tong and holds the electrode yokes [4], a control panel with display for welder settings [5]. The multi-function gun, an optional accessory, can also be used by connecting it to the welder.

For safety reasons, it is important to understand the design and function of the inverter welder before using it:

- The CTR9 uses electricity only to create the welds, unlike the MIG welder that uses an arc from a feeding wire that forms a weld nugget out of the material in the feeding wire. A weld is created when high current is transferred through the metals; the resistance in the metals heats it up and fuses the metals together in a nugget.
- The CTR9 C-Tong also has a built-in pneumatic feature that presses the welding electrodes together automatically when triggered. Electrode force is an important ingredient in a good resistance weld. The pressure setting is visible in the control panel display and can be automatically or manually set.
- The timer controls the duration of the current applied to the weld. The ideal is to try to attain a weld that uses higher current and shorter time and therefore reducing heat buildup.
- By automatically keeping the pressure after the current shuts off, the weld cools down under pressure and therefore forms a hardened and stronger weld.



IMPORTANT! The CTR9 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.



WARNING! Always use the handle to move the welder. Do not pull the cable or the tong to move the welder. The welder might tip, causing personal injuries or serious damage to the welder. When moving the machine, the C-Tong must be fixed at the intended holder (on the side of the machine) and must not hang on the support arm. A swinging tong might cause personal injuries or material damage.

1.2 Welder overview

The CTR9 consists of a welder unit fitted with a C-Tong.
An external multi-function gun is also available as option.

The welder is furnished with the following voltage and frequency combination:

- 208 V -5 % +10%, 50-60 Hz, 3-phase
- 230 V -5 % +10%, 50-60 Hz, 3-phase
- 400 V -5 % +10%, 50-60 Hz, 3-phase
- 460 V -5 % +10%, 50-60 Hz, 3-phase

The actual voltage and frequency is stated on the name plate,
see section 1.3 Marking.

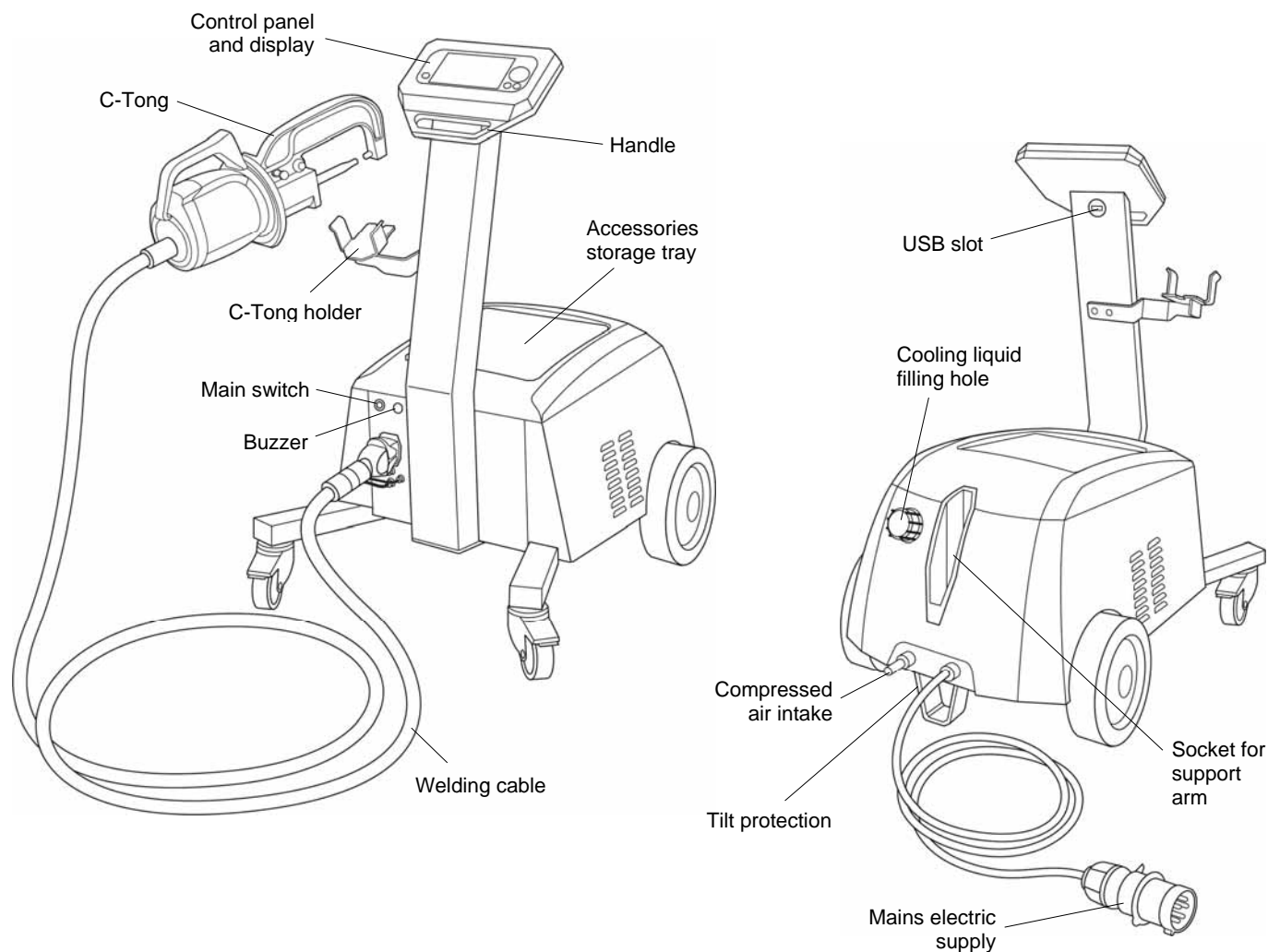
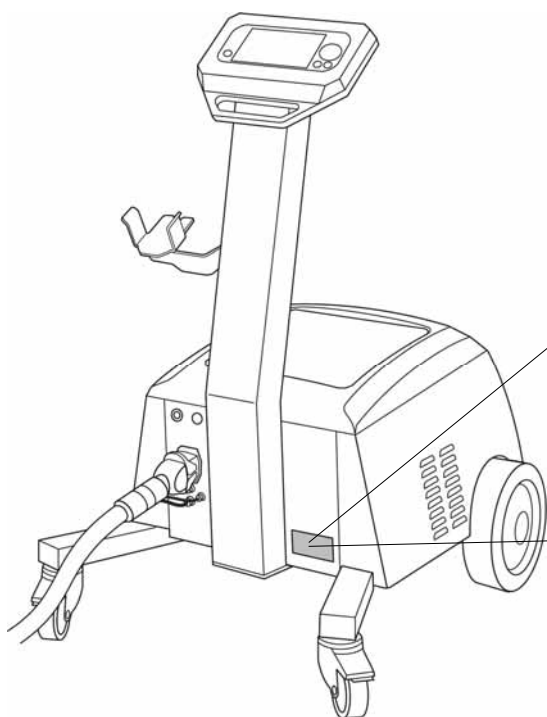


Figure 1.2 CTR9 overview.

1.3 Marking

The name plates are located at the front of the welder unit and on the right side of the C-Tong.

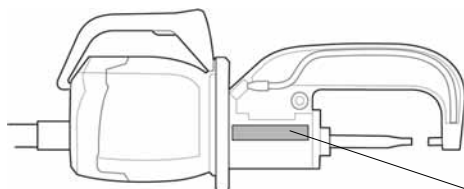


CAR-O-LINER®		Factory address: CAR-O-LINER GROUP AB Granlidsvägen 4 SE-736 32 Kungsör	
PRODUCT Spot welding machine MODEL NO. CTR9 TYPE NO. 143 SERIAL NO. 		 CONFORMS TO UL STD 499 CERTIFIED TO CAN/CSA STD C222.2.88	
Power Supply $U_{IN} = 208\text{ V}$ 3ph 50-60 Hz 60 A $S_2 = 117\text{ kVA}$ X = 10%		Output $U_{2d} = 12\text{ V}$ $I_{2oc} = 16.0\text{ kA}$ $I_{2p} = 14.1\text{ kA}$	
Insulation F Cooling WF	m 92 kg Protection IP21	F_{max} 550 daN Q 3 l/min ΔP 1.8 bar	P_{1max} 10.0 bar P_{1min} 6.8 bar
49081			

Name plate for CTR9 208V, art.no 49081

CAR-O-LINER®		CAR-O-LINER GROUP AB Hälsöla Mälgårns gata 1, 431 33 Västra Frölunda, Sweden	
PRODUCT Spot welding machine MODEL NO. CTR9 TYPE NO. 143 SERIAL NO. 		 Factory address: CAR-O-LINER GROUP AB Granlidsvägen 4 SE-736 32 Kungsör	
Mains Supply $U_{IN} = 400\text{ V}$ 3 ~ 50-60 Hz 32 A $S_2 = 132\text{ kVA}$ X = 10%		Output $U_{2d} = 13\text{ V}$ $I_{2oc} = 16.0\text{ kA}$ $I_{2p} = 15.6\text{ kA}$	
Insulation F Cooling WF	m 92 kg Protection IP21	F_{max} 550 daN Q 3 l/min ΔP 1.8 bar	P_{1max} 10.0 bar P_{1min} 6.8 bar
49083		EN 62135.1-2015	

Name plate for CTR9 400V, art.no 49083



MODEL	TYPE	VOLTAGE	SERIAL NO
CTR9	143	400V	

48918

Name plate for CTR9 C-Tong, art.no 48918

Figure 1.3 Examples of CTR9 name plates.

2 Safety

2.1 General

The CTR9 has been designed and tested to meet strict safety requirements. The instructions provided together with the CTR 9 cover the equipment in the as-delivered state. No modifications shall be made and if the user does not respect the instructions covered in this manual a risk analysis of the user's responsibility must be made prior using the equipment.

Please read the following instructions carefully before operating the CTR9 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.

Great effort has been placed on the design and manufacture of the CTR9 so that it will comply with all applicable safety aspects for this type of equipment. During operation and other work, 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 CTR9 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 Car-O-Liner's instruction manuals:

**Prohibited**

Prohibits behaviour that can cause injury.

**Command**

Prescribes a specific responsibility or action.

**Warning**

Warns of risks for personal injuries and or damages to equipment.

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

**WARNING**

Warning (in bold type) is used in this manual to indicate a possible danger that could lead to personal injury. An instruction is normally given, followed by a short explanation plus the possible effect if the instruction is not followed.

**IMPORTANT**

Important (in bold type) is used to indicate a possible danger that could lead to damage to the equipment and/or cause environmental damage.



Note: (in bold type) is used to accentuate supplementary information that is required for problem-free use or optimal use of the welder.

In addition to the safety signs illustrated in section 2.3 "Safety signs", the following warnings and important notices appear in the manual:

IMPORTANT SAFETY INSTRUCTIONS:

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



WARNING! Do not place the welder on unstable or uneven ground. The welder might tip causing personal injuries or material damage.



WARNING! All electrical connections must be made by a qualified electrician. Risk for electrical shock.



WARNING! Loose cables and hoses present tripping risks. Risk for injuries.



WARNING! Never spill liquid of any kind on the welder. Risk for injuries or damage to the welder.



WARNING! Sparks and welding spatter from the spot welder can start a fire. Risk for fire damages.



WARNING! Sparks and welding spatter from the spot welder can damage your eyes and face. To avoid risk for personal injuries, always use a visor.



WARNING! Make sure that you know where the fire extinguishing equipment is. Risk for injuries.



WARNING! The tools or electrodes may be hot. Risk for burning injuries.



WARNING! It is very important to turn the handle firmly to fasten the yoke.



WARNING! All service and maintenance must be carried out by Car-O-Liner service personnel and service support. Risk for electrical shock.



WARNING! Do not remove any covers of the welder. Risk for electrical shock.



WARNING! Unplug the welder from the wall outlet before servicing, cleaning or maintenance. Risk for electrical shock.



WARNING! Ground Fault Circuit Interrupter (GFCI) must be used.



WARNING! Don't remove any covers when cleaning the welder. Risk for electrical shock.



WARNING! Before plugging the mains plug into the on-site socket, make sure that it is appropriate. If not, do not put the machine into service.



WARNING! Do not exceed the recommended value (daN) on the safety sign on the yoke. Risk for damage to the equipment.



WARNING! Always use the handle to move the welder. Do not pull the cable or the tong to move the welder. The welder might tip, causing personal injuries or serious damage to the welder. When moving the machine, the C-Tong must be fixed at the intended holder (on the side of the machine) and must not hang on the support arm. A swinging tong might cause personal injuries or material damage.



WARNING! Risk of crushing (moving electrodes).



WARNING! Electromagnetic field may damage pacemaker, watches, magnetic strip cards and magnetic data carriers.



WARNING! Appropriate protection (protective gloves, visor, clothing and shoes) must be worn when using this equipment.



WARNING! Do not fill the water tank with anything but water (and antifreeze agent, if needed). Improper handling may result in personal injury and/or damage to the equipment.



WARNING! Please note, that the support arm is designed only for a limited sideways rotation angle. Do not exceed this angle by pulling the hanging C-Tong sideways. The welder might tip, causing personal injuries or material damage.



WARNING! Please note, that the support arm is designed only for a limited lengthwise range of 45° from vertical. Do not exceed this angle. When the balancer suspension rope is fully extended, do not pull the hanging C-Tong any further. The welder might tip, causing personal injuries or material damage.



WARNING! To avoid the risk of the welder tipping when using the support arm, always work within the allowed range as described above. If you need to reach further, move the machine. *See section 3.12.2 Moving the machine with support arm.*



WARNING! When working with the C-Tong hanging from the support arm, always make sure that the wheels are unblocked. Otherwise the welder might tip, causing personal injuries or material damage.



WARNING! The support arm is only intended for suspension of the C-Tong. No other objects are allowed. Maximum weight on the suspension rope is 20 kg (44 lbs). Do not exceed this limit. The welder might tip, causing personal injuries or material damage.



WARNING! Water must not come in contact with electrical contacts of the welder when disconnecting the welding cable water hoses. Risk of material damage.



WARNING! This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electro-magnetic compatibility in those locations, due to conducted as well as radiated disturbance.



WARNING! The C-Tong must be held correctly during welding.
Risk of crushing (moving electrodes).



WARNING! A high sensitive Ground Fault Circuit Interrupter (GFCI) must always be used on the mains to protect the welder from stray current.
Risk of damage to the welder.



WARNING! Tighten the yoke locking lever fully to ensure correct locking of the yoke. Risk of personal injuries or material damage.



IMPORTANT! For good cooling efficiency, never operate the welder without connecting it to the compressed air network.



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! The CTR9 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! Do not turn off the welder while cooling is activated!



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 used.



IMPORTANT! The compressed air must be filtered and free from oil and moisture. Use air filter/water separator.



IMPORTANT! Maximum air pressure 10 bar (145 PSI). Recommended air pressure between 5 bar (73 PSI) and 10 bar (145 PSI).



IMPORTANT! The recommended air pressure shall not normally be changed!



IMPORTANT! It is important to ground the welding object to obtain quality weld nuggets.



IMPORTANT! When not in use, be sure to place the multi-function gun and the ground connector so that they do not make electrical contact. Risk for short circuit.



IMPORTANT! Be sure to begin welding at the point farthest from the ground connector.



IMPORTANT! Make sure to connect the ground connector to an area where the inner body sheet is level and not curved.



IMPORTANT! For the sake of the environment, it is important that the equipment is dismantled in an environmentally friendly way.



IMPORTANT! All straight electrodes have an inner tube that must be fitted to provide sufficient cooling.



IMPORTANT! It is not possible to start welding before cooling water pump flow is turned on.



IMPORTANT! The machine must be securely strapped and the front wheel roll brakes must be locked in transport mode. The C-Tong must be placed on the pallet.



IMPORTANT! Single sided spot welding is not permitted on supporting frameworks of a vehicle. It is only permitted for cosmetic purposes.



IMPORTANT! The outer sheet must be the thinnest sheet when performing single sided spot welding. The thickness of the outer sheet to be welded must be less than 1.5 mm, and the thickness of the inner sheet must be less than 2 mm



IMPORTANT! When not in use, be sure to place the multi-function gun and the ground connector so that they do not make electrical contact. Risk for short circuit.



IMPORTANT! Before starting the welder again, fit the electrode cap and fill up with cooling liquid, *see section 3.7 Filling of cooling liquid*.



IMPORTANT! If the thermal breaker has switched off the welder, please contact Car-O-Liner authorized service personnel.



IMPORTANT! Do not use water that is salt, brackish or rich in lime. If there is any uncertainty regarding the quality of the water, use distilled water.



IMPORTANT! If the heater is used in temperatures below freezing point, Car-O-Liner's recommended antifreeze agent must be used. If the machine is used in temperatures below -10°C, a higher concentration of High-Tech Protection Fluid must be used.



IMPORTANT! It is the responsibility of the owner to ensure that the work place is well ventilated with a local fume extractor.



IMPORTANT! The shape of the caps is essential and the electrode caps must be changed regularly to maintain good welding results! The radius of a new cap is R15.



IMPORTANT! Never use water jet, detergents, solvents, thinners or benzene when washing the welder since they can damage the welder.



IMPORTANT! Risk for damage to materials close to the weld, e.g to glass or textiles.



IMPORTANT! Ensure that all electrical equipment within the welding object is disconnected. Risk for interference.

SAVE THESE INSTRUCTIONS!

2.3 Safety signs

Undamaged safety signs shall always be attached at the indicated places (see section 2.3.1 "Placement of safety signs"). If any signs are damaged or missing, the user is responsible for their immediate replacement. The following safety signs can be found on the welder unit and C-Tong:



WARNING!

Risk of tripping on loose hoses, etc. (Art no. 99786)



WARNING!

All electrical connections must be made by a qualified electrician. Disconnect the supply before performing any service or installation work. (Art no. 43720)



WARNING!

Appropriate protection (protective gloves, visor, clothing and shoes) must be worn when using this equipment. (Art no. 46002)



WARNING!

Risk of crushing (moving electrodes), risk of burning, electromagnetic field may damage pacemaker, watches, magnetic strip cards and magnetic data carriers. (Art no. 48913)



WARNING!

Maximum air pressure 10 bar (145 PSI). Recommended air pressure between 5 bar (73 PSI) and 10 bar (145 PSI). (Art no. 43712)

2.3.1 Placement of safety signs

The safety signs are placed as follows:

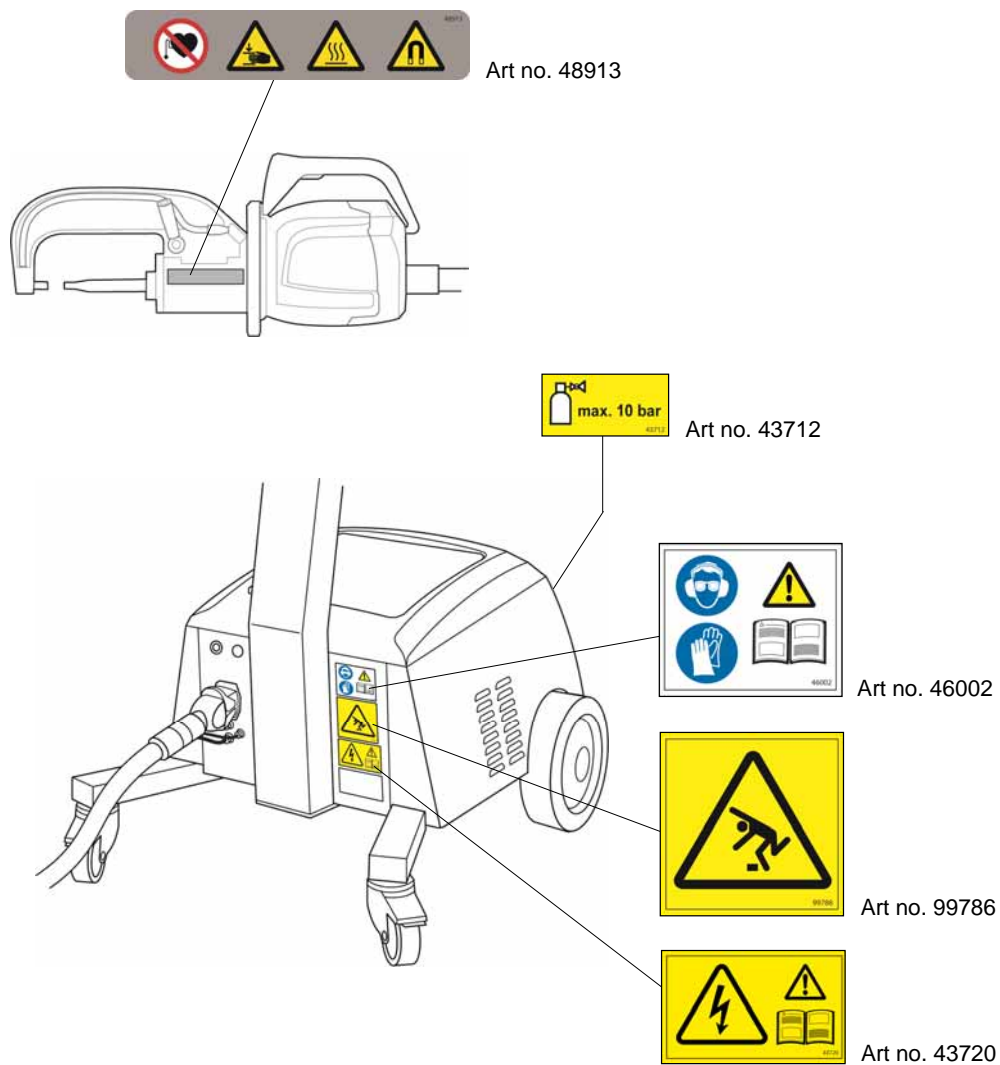


Figure 2.1 Placement of safety signs.

2.4 Safety devices

If the C-Tong is used frequently, the welding cables and the power transformer become very hot. To prevent the welder from malfunctioning due to overheating, it is continuously cooled during operation.

2.4.1 Cooling

The fan starts when you press the C-Tong trigger button. The CTR9 is equipped with water cooling of electrodes, yokes and transformer/rectifier.

2.4.2 Overheat protection

The CTR9 has an overheat protection system which monitors the welder when the C-Tong is used. The electrodes become hot if the C-Tong is used frequently, which may affect the quality of the weld nuggets.

The overheat protection is in two levels. The power transformer is monitored by a thermal sensor and a thermal breaker. The sensor and the breaker disables the welder in case of overheating. The welder remains disabled until the temperature decreases to a safe level. Even though the welder is disabled in case of overheating, the fan in the welder cabinet continues to operate. When the welder has cooled, it is able to operate again.



IMPORTANT! Do not turn off the welder while cooling is activated!



IMPORTANT! If the thermal breaker has switched off the welder, please contact Car-O-Liner authorized service personnel.

2.4.3 Hazards from electromagnetic disturbances



WARNING! This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated disturbance.

Electromagnetic disturbances are produced during the operation of welding machines. The welding machines are designed to be used in industrial environment. Their use in residential premises may cause interference with radio and television reception.

The field intensity is particularly high in the immediate vicinity of the welding workplace so that the function of electronic equipment (IT systems, CNC appliances etc.) may be affected. Therefore users of so-called active implants – persons with heart pacemakers, heart defibrillators, insulin pump and other similar implants – are not allowed to work on resistance spot welding machines!

Always remember that this type of machine produces powerful magnetic fields that have a strong force of attraction on magnetic metals and could damage watches, magnetic stripe cards and magnetic data carriers. Users of heart pacemakers have to take medical advice before going anywhere near welding equipment or welding workplaces. Contrary to the strong magnetic fields being produced along the cables of conventional welding guns, the transformer gun only produces very weak magnetic fields along its cables: approx. 2 % compared to conventional guns.

The staff must wear safety goggles and safety gloves. Rings, watches and clothing with metallic accessories must be avoided.

The persons involved in the work on the machine must be protected against flying sparks.

To maintain the immunity to electromagnetic inferences and compatibility (EMC), you are responsible in your capacity as owner/operator of ensuring that

- your machine is only connected to suitably grounded power supply system

- standard cables are not modified further technical modification is only carried out by qualified staff being able to check afterwards that the machine still complies with the EMC regulations
- existing interference suppression elements and filters as well as shielded cables are only replaced by identical parts.

Electromagnetic interferences may be reduced by:

- performing regular maintenance on the complete installation
- keeping welding cables as short as possible
- shielding, where necessary, cables, leads and electric equipment in the vicinity of the welding workplace

The Spot Welder CTR 9 uses high currents to heat the welding point. This current is supplied by the transformer through the C-tong to the welding point. The current creates electro-magnetic fields (EMF) around the C-tong and the transformer.

3 Installation

3.1 General

The welder is inspected and checked prior to leaving the factory to guarantee consistent quality and the highest possible reliability. Instructions for installation, with general tips and directions, are provided as follows.



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



WARNING! Do not place the welder on unstable or uneven ground. The welder might tip causing personal injuries or serious damage to the welder.



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 used.

Before use, the welder must be installed in the following steps:

- Connection of electrical supply.
- Connection of pneumatic air supply.

3.2 Packaging and delivery inspection

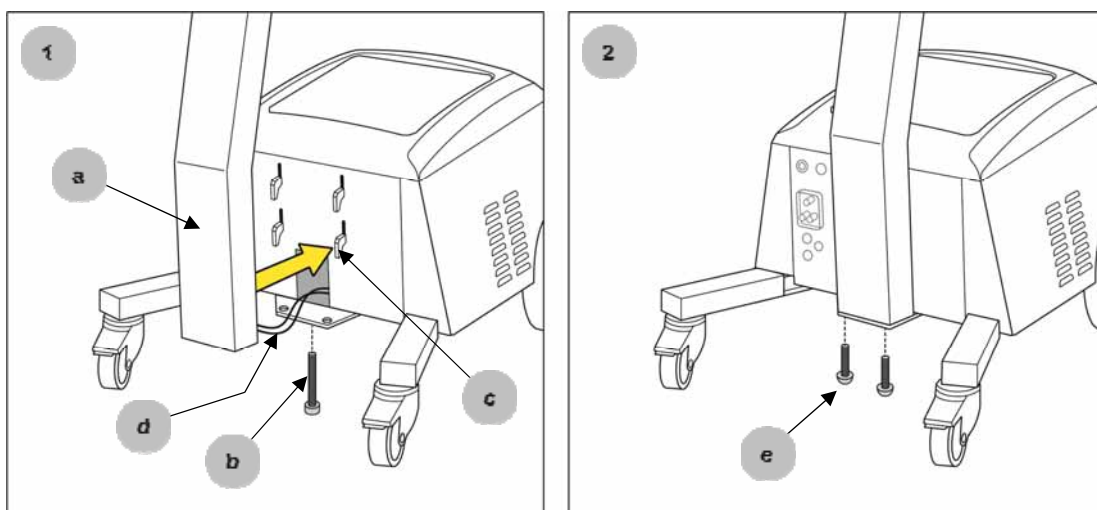
Check the delivery against the packing list, consignment note, or other delivery documentation to verify that everything is included and in the correct quantity. Check the CTR9 carefully to make sure that no damage has occurred during transport. If any part is damaged or missing, the welder may not be used until 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

Before use, the welder must be assembled as follows:

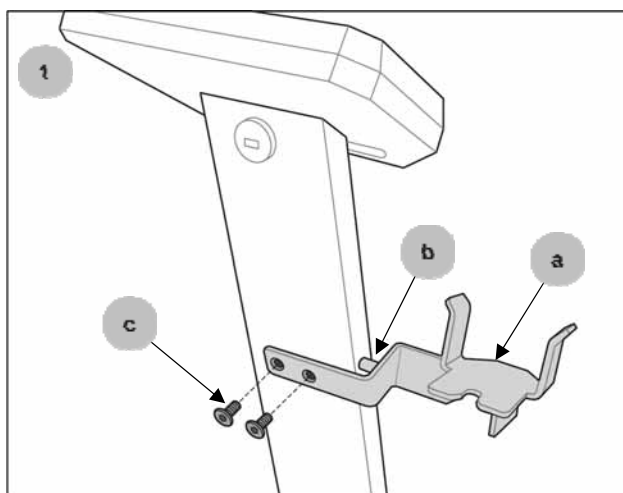
- 1 **Fit the control panel column [a] onto the welder unit by tightening hex/allen screw (b) to engage the four hooks [c] into the column. Be careful with the electric cables [d] when fitting the column!**
- 2 **Lock the column with the two hex/allen screws [e].**



3.3.1 C-Tong holder assembly

Fit the C-Tong holder as follows:

- 1** Fit the C-Tong holder [a] onto the panel column by inserting rod [b] and tightening the two hex/allen screws [c].



3.4 Connection of electrical supply

The CTR9 requires the following voltage/frequency combination:

- 208 V -5 % +10%, 50-60 Hz, 3-phase
- 230 V -5 % +10%, 50-60 Hz, 3-phase
- 400 V -5 % +10%, 50-60 Hz, 3-phase
- 460 V -5 % +10%, 50-60 Hz, 3-phase

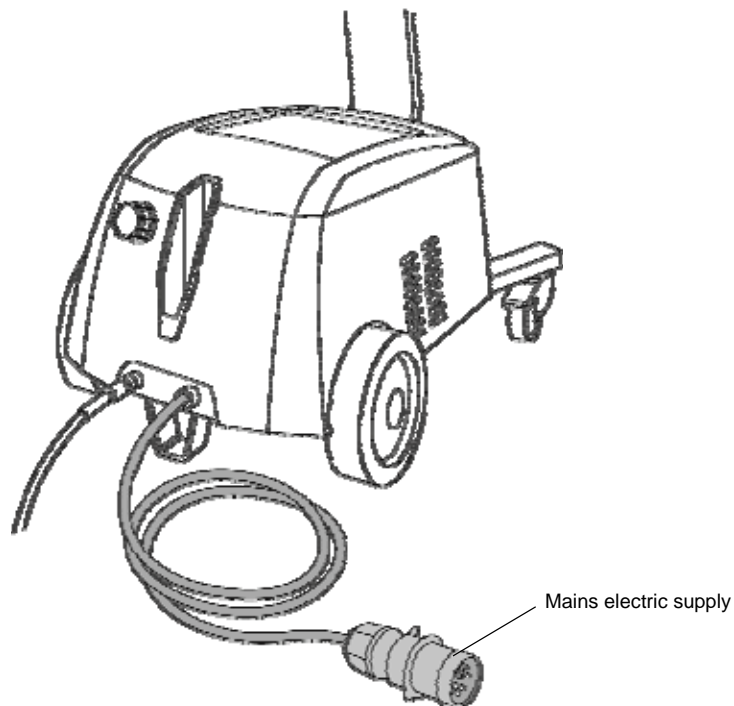
The required voltage and frequency is preset upon leaving the manufacturer.



Note: Make sure that the supplied voltage and frequency are the same as shown on the welder. The actual voltage and frequency is stated on the name plate (see section 1.3 "Marking").

This machine must only be connected to a TN earthing system. The supply must also be protected with a fuse as follows:

- The 208 V supply requires a 60 Amp slow blow fuse Type K or equivalent.
- The 230 V supply requires a 63 Amp slow blow fuse (Circuit breaker Type D).
- The 400 V supply require a 32 Amp slow blow fuse (Circuit breaker Type D).
- The 460 V supply requires a 30 Amp slow blow fuse Type K or equivalent.





The spot welder consequently may only be connected to public low-voltage mains for industrial environment.

Only qualified staff being familiar with the safety instructions is allowed to install the welding machine. Optionally, the spot welder may be designed for special voltage. Before connecting the spot welder to the mains, check that the mains voltage corresponds to that stated on the rating plate.

Only plug the welding machines into properly grounded power outlet sockets! The connecting leads must be in perfect condition and equipped with protective conductor and mains plug!

Make sure that the connection data stated on the rating plate of your welding machine correspond to the mains voltage and fuse protection on site. Please refer to the technical data (*see chapter 10 Technical specifications*) for the cross section of cables and the amperage of the slow-blow fuses to be used. It is recommended to feed the welding machine via mains disconnect switch for facilitating maintenance.



WARNING! Before plugging the mains plug into the on-site socket, make sure that it is appropriate. If not, do not put the machine into service.

All the welding machines that are not ready to be plugged in upon delivery must be connected to the mains by a qualified electrician (IEC 3544/DIN EN 60204/1) in accordance with valid regulations. The same applies to machines designed for multi-voltage or special voltage connection – they must be properly adapted to the available mains voltage. Any phase relation is possible since it has not influence on the direction of rotation of fans or pumps. The line impedance on the power grid should be less than:

- 400/460V 0,4 Ohm
- 208V 0,2 Ohm



WARNING! All electrical connections must be made by a qualified electrician. Risk for electrical shock.



WARNING! Unplug the welder from the wall outlet before installation. Risk for electrical shock.



WARNING! Ground Fault Circuit Interrupter (GFCI) must be used.

3.4.1 Grounding risk

CTR9 has a grounded welding tong. Therefore the welding object must be isolated from ground. All other work with grounded equipment shall not be performed at the same time as welding. Always use Ground Fault Circuit Interrupter (GFCI) to avoid stray current damages on the welder.

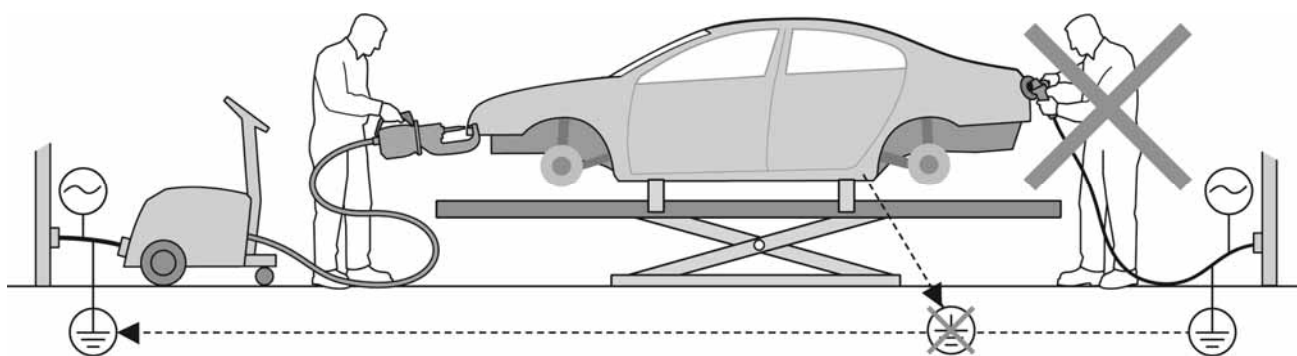


Figure 3.1 Grounding risk

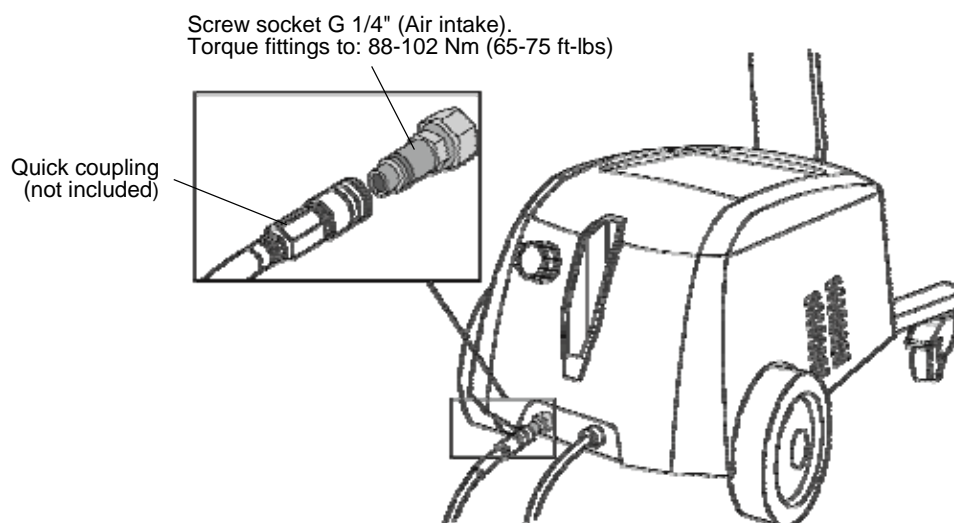


WARNING! A high sensitive Ground Fault Circuit Interrupter (GFCI) must always be used on the mains to protect the welder from stray current. Risk of damage to the welder.

3.5 Connection of air supply

The CTR9 shall be connected to a compressed air network.

1. **Connect the welder to the pneumatic air network via the screw socket at the rear of the welder unit using a standard compressed air connector.**
2. **Make sure that the compressed air network pressure to the welder has a minimum pressure of between min 5 bar (73 PSI) and max 10 bar (145 PSI).**



IMPORTANT! The compressed air must be filtered and free from oil and moisture. Use air filter/water separator.



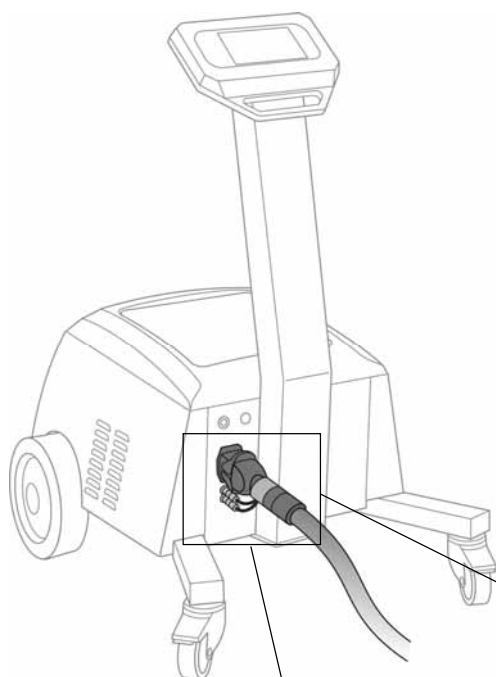
IMPORTANT! Maximum air pressure 10 bar (145 PSI). Recommended air pressure between 5 bar (73 PSI) and 10 bar (145 PSI).

3.6 Connection and disconnection of the welding cable

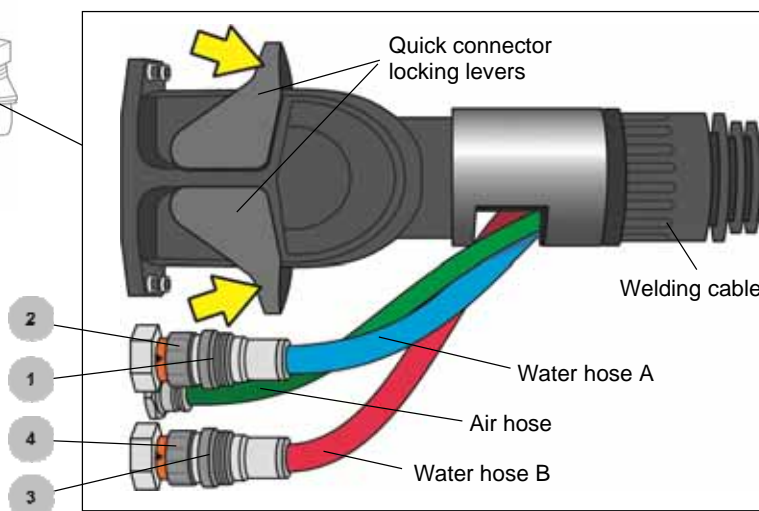
The welding cable is connected to the welder by a quick connector with separate water and air outlet hoses.

- Connecting:**
1. Connect water hose A (blue) to water outlet by pushing it into coupling [1]. Lock by clockwise twisting and pulling inner grey ring [2].
 2. Connect water hose B (red) to water intake by pushing it into coupling [3]. Lock by clockwise twisting and pulling inner grey ring [4].
 3. Connect air hose (green) to air hose outlet.
 4. Connect welding cable quick connector and lock the locking levers.

- Disconnecting:**
1. Release the locking levers and disconnect welding cable quick connector.
 2. Disconnect air hose.
 3. Before disconnecting water hoses, turn off water flow, *see section 6.7 Turning off cooling water*
 4. To avoid water spill, place a container under water hose B.
 5. Disconnect water hose B by counterclockwise twisting and pushing inner grey ring [4]. Push outer grey ring [3] and release hose.
 6. Disconnect water hose A by counterclockwise twisting and pushing inner grey ring [2]. Push outer grey ring [1] and release hose.



Welding cable quick connector





WARNING! Water must not come in contact with electrical contacts of the welder when disconnecting the welding cable water hoses. Risk of material damage.

3.7 Filling of cooling liquid

Use Car-O-Liner High-Tech Protection Fluid (art no 33944). Mix 3 litres of concentrate with 17 litres of decalcified water, see water quality information below (the CTR9 tank has a volume of 20 litres). Freezing point -10°C.



WARNING! Do not fill the water tank with anything but water (and antifreeze agent, if needed). Improper handling may result in personal injury and/or damage to the equipment.

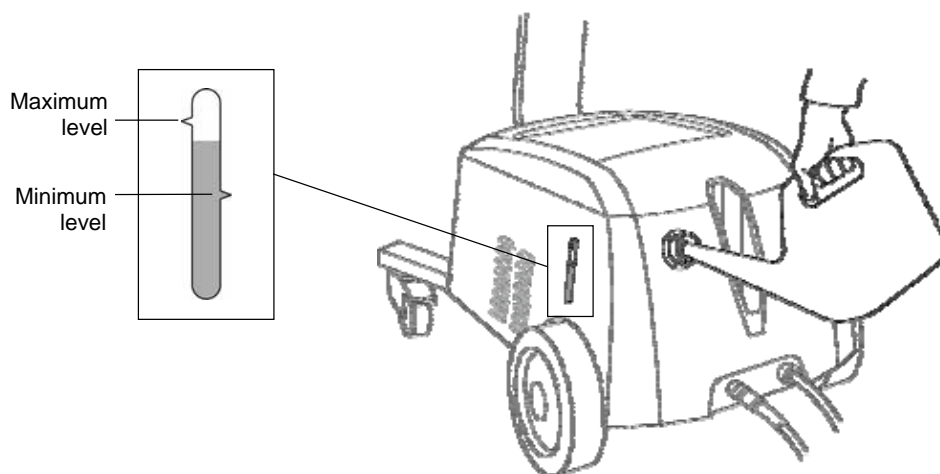


IMPORTANT! Do not use water that is salt, brackish or rich in lime. If there is any uncertainty regarding the quality of the water, use distilled water.



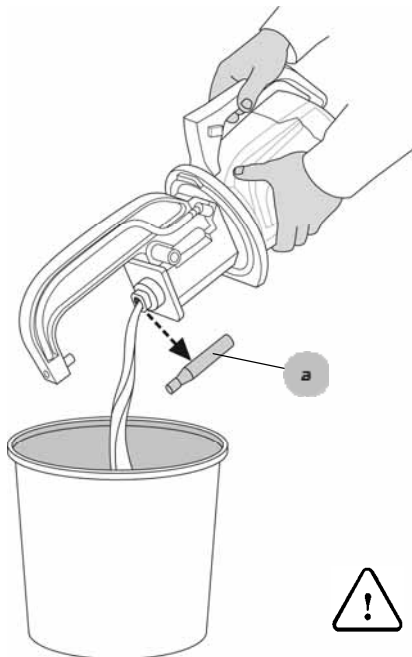
IMPORTANT! If the heater is used in temperatures below freezing point, Car-O-Liner's recommended antifreeze agent must be used. If the machine is used in temperatures below -10°C, a higher concentration of High-Tech Protection Fluid must be used.

1. Loosen the lid on the top of the water tank.
2. Fill the water tank with water mixed with antifreeze.



NOTE: Do not fill up the tank entirely to allow space for the hot water to expand. Maximum/minimum level is marked on the cooling liquid display.

3.8 Draining the cooling system



1. Turn off the water flow,
see section 6.8 Turning off cooling water.
2. Remove the cylinder electrode [a] from the C-Tong,
see section 4.5.2 Changing the C-Tong electrodes.
3. Place a bucket under the C-Tong to collect the cooling liquid.
4. Turn on the water flow,
see section 6.8 Turning off cooling water.
5. Turn off the water flow as soon as it starts to pump air.



IMPORTANT! Before starting the welder again, fit the electrode cap and fill up with cooling liquid, *see section 3.7 Filling of cooling liquid.*



WARNING! The tools or electrodes may be hot. Risk for burning injuries.

3.9 C-Tong transformer gun

The C-Tong on the CTR9 features transformer gun technology for greater working range, and includes a number of features:

1. **Rotating handle**
2. **Trigger button**
3. **Rotating attachment for Support arm**
4. **Cylinder electrode**
5. **Yoke electrode**
6. **Electrode caps**
7. **Standard electrode yoke, 80 mm throat depth, water cooled**
8. **Locking lever for electrode yoke**
9. **Cooling liquid hoses for electrode yoke**
10. **Button for handle rotation**
11. **Transformer**
12. **Connector for Multi Function Gun control cable**
13. **Safety knob for electrode yoke release**
14. **LED indicators**



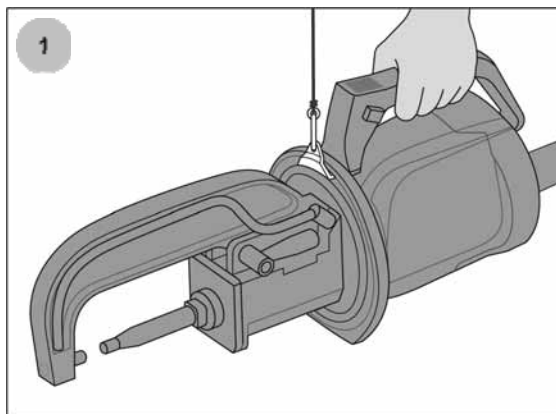
Figure 3.2 C-Tong transformer gun

3.9.1 Rotating the C-Tong gun

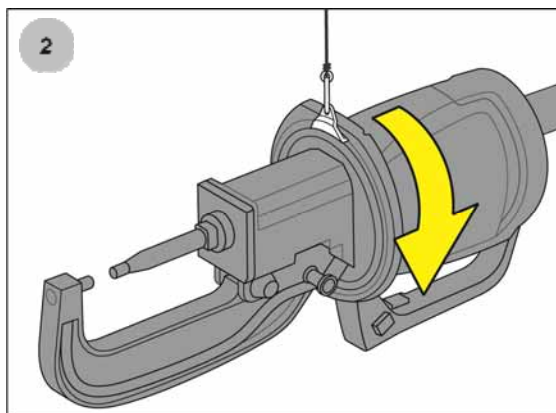
To facilitate welding, the C-Tong gun can be rotated to desired position. This can be performed in two ways:

1. Rotating complete C-Tong gun 360° continuously, when suspended in the Support arm, see 3.12 Support arm:

1. Hold the C-Tong handle.

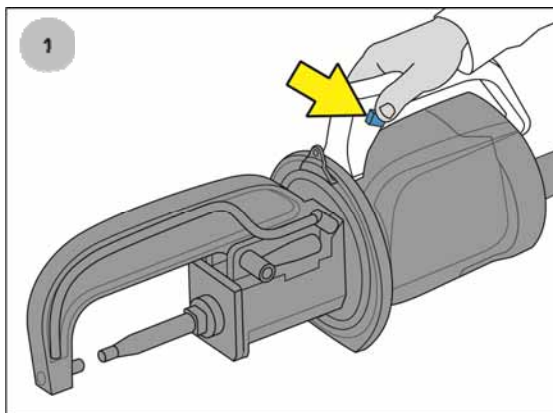


2. Rotate C-Tong to desired position.

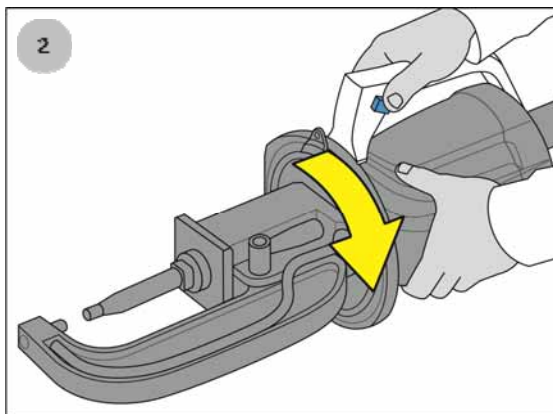


2. Rotating C-Tong body, without rotating handle:

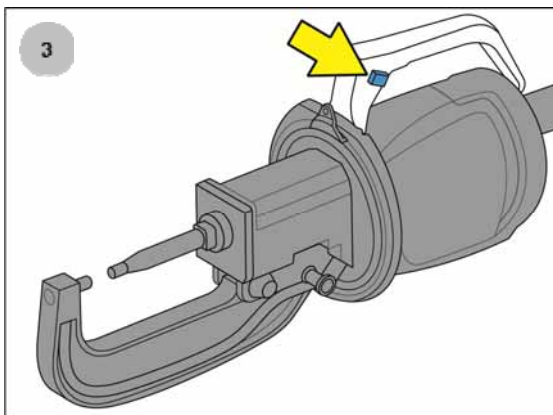
1. Push button (left or right side of handle) to rotate C-Tong body.



2. Rotate C-Tong body to desired position.



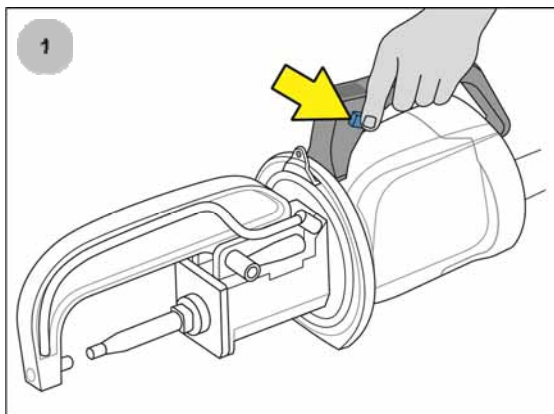
3. Release button to lock C-Tong body.



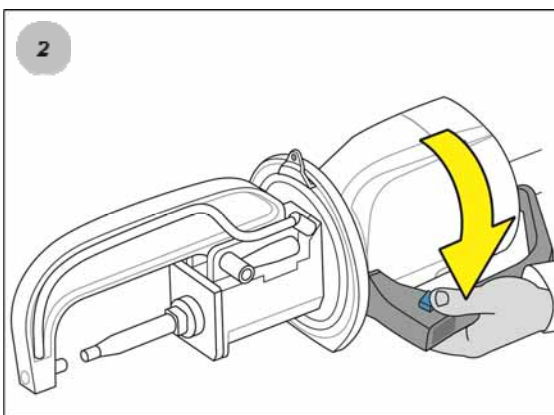
3.9.2 Rotating the C-Tong handle

To further facilitate welding, the C-Tong handle can also be rotated 355° independently of the C-Tong body.

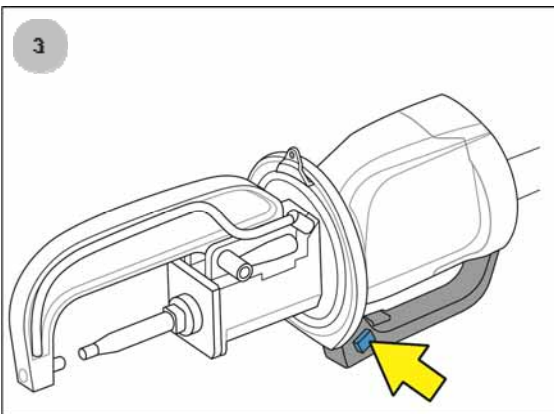
1. **Push button (left or right side of handle) to rotate C-Tong handle.**



2. **Rotate C-Tong handle to desired position.**



3. **Release button to lock C-Tong handle.**



3.10 C-Tong accessories: electrode yokes

In addition to the standard 80 mm yoke, there are three different electrode yokes available for the CTR9:

1. 40 mm throat depth, water cooled
2. 350 mm throat depth, water cooled
3. 500 mm throat depth, water cooled

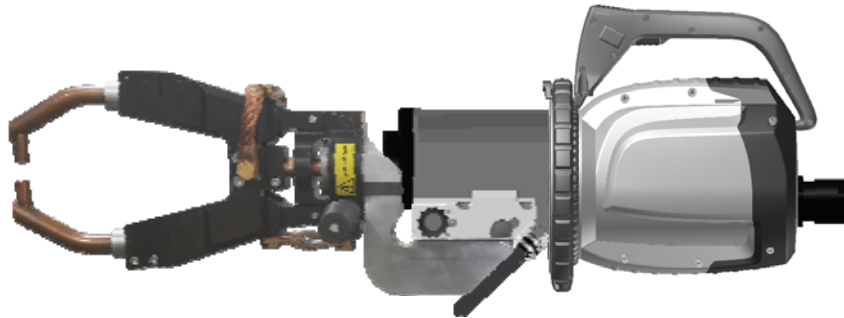


Figure 3.3 C-Tong accessories, electrode yokes

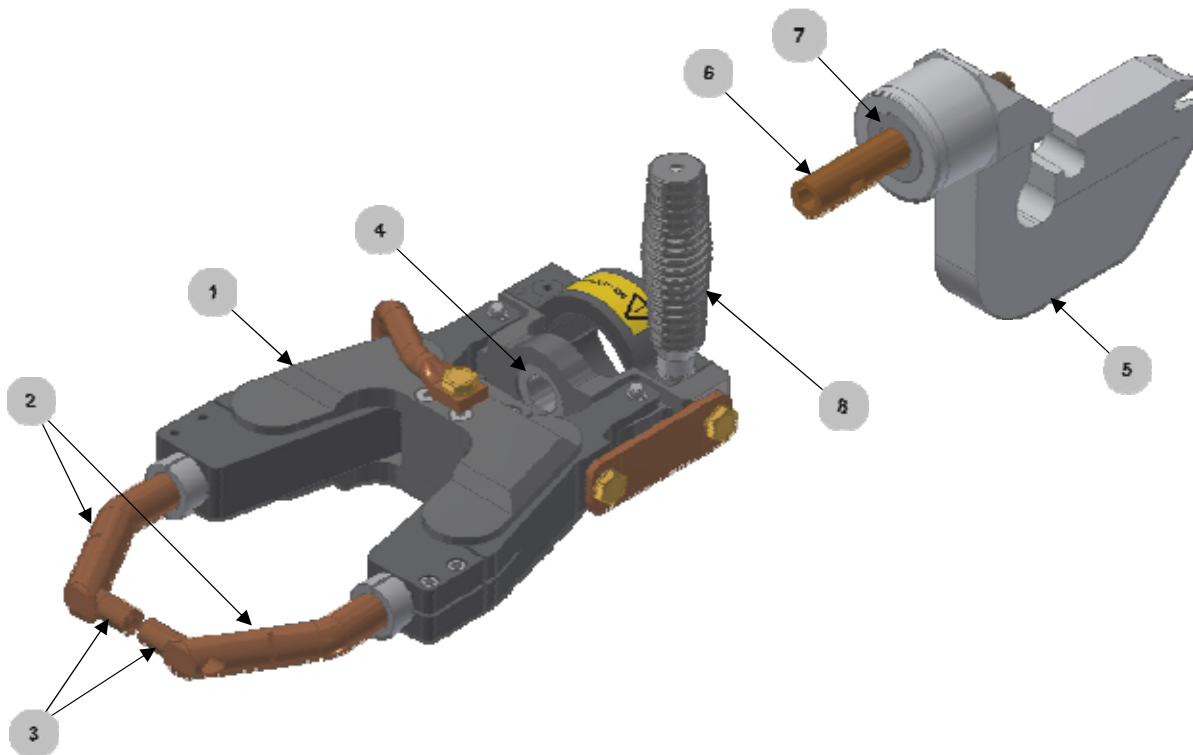
For instructions how to change yokes, electrodes and caps, see section 4.5 *Preparing the C-Tong for welding operation*.

3.11 C-Tong accessory: A-Tong (optional)

The C-Tong can be converted to an A-Tong. The A-Tong has two moving electrode arms which increases the range of the welder. The A-Tong is also fully rotatable to further increase access.



The A-Tong Adapter Kit consists of A-Tong [1], electrode holder arms [2], electrodes [3], bushing [4], adapter [5], adapter electrode [6], insulation cap [7], and A-Tong handle [8].



For more extensive information regarding the A-Tong,
see sections 4.5.4 -4.5.7

3.12 Multi function gun (optional)

The optional Multi Function Gun can be fitted with a number of tools to further widen the areas of use for the CTR9:

- **Single spot**
- **Dent puller**
- **Zig zag wire**
- **Screw 6 mm**
- **Screw 5 mm**
- **Clip rivets**
- **Stitch weld**
- **Carbon rod**

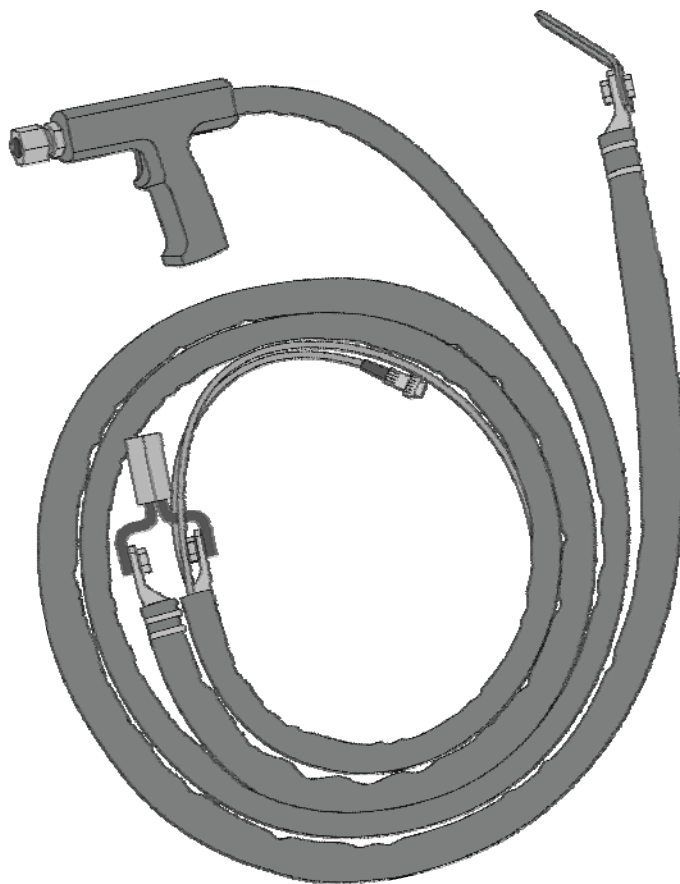


Figure 3.4 Multi Function Gun

For more extensive information regarding the Multi function gun
see section 6.10 Multi function gun settings

3.13 Support arm

The CTR9 can be equipped with a Support arm for suspension of the C-Tong.

For more extensive information regarding installation of the Support arm, see separate *Support arm Installation instruction*.

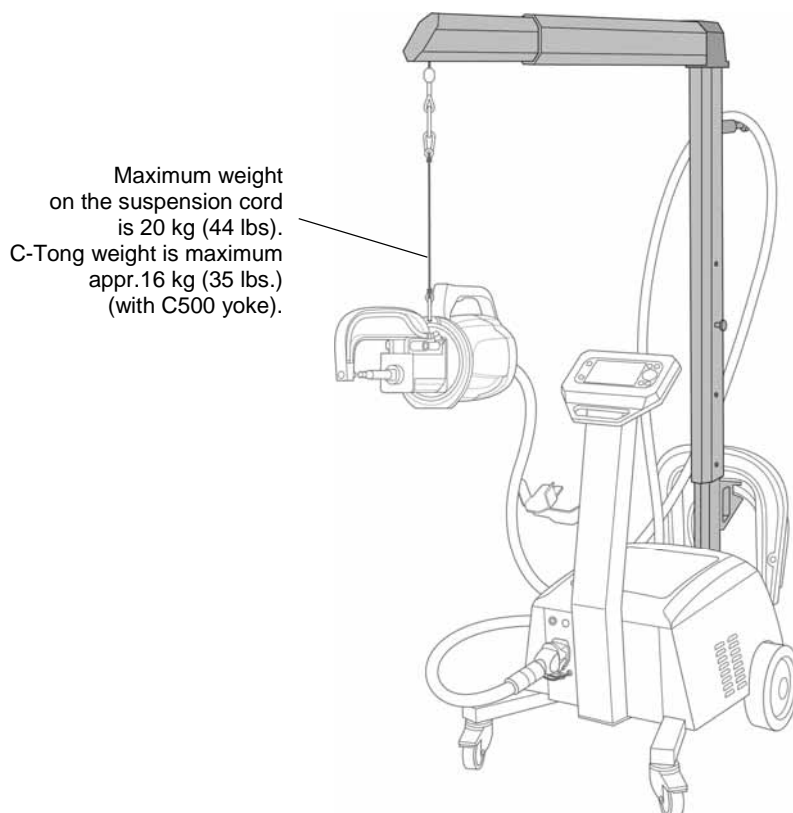


Figure 3.5 The Support arm



Note! Use extension cord to reach low welding areas.



WARNING! The support arm is only intended for suspension of the C-Tong. No other objects are allowed. Maximum weight on the suspension cord is 20 kg (44 lbs). Do not exceed this limit. The welder might tip, causing personal injuries or material damage.

3.13.1 Working with the C-Tong hanging from the support arm



WARNING! Please note, that the support arm is designed only for a limited sideways rotation angle (fig 1). Do not exceed this angle by pulling the hanging C-Tong sideways. The welder might tip, causing personal injuries or material damage.



WARNING! Please note, that the support arm is designed only for a limited lengthwise range of 45° from vertical (fig 2). Do not exceed this angle. When the balancer suspension rope is fully extended, do not pull the hanging C-Tong any further. The welder might tip, causing personal injuries or material damage.



WARNING! To avoid the risk of the welder tipping when using the support arm, always work within the allowed range as described above. If you need to reach further, move the machine. *See section 3.12.2 Moving the machine with support arm.*



WARNING! When working with the C-Tong hanging from the support arm, always make sure that the wheels are unblocked. Otherwise the welder might tip, causing personal injuries or material damage.

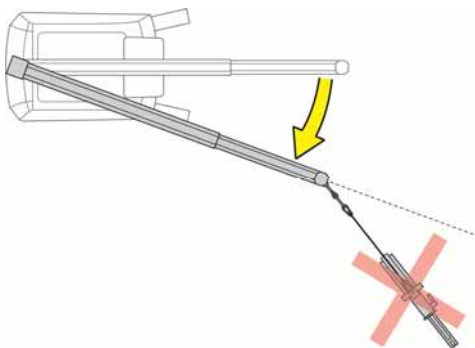


Fig 1. The position of the C-Tong shall not exceed the limited sideways rotation angle!

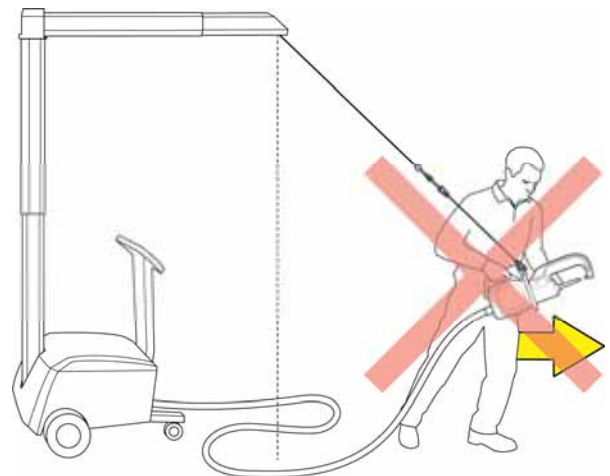
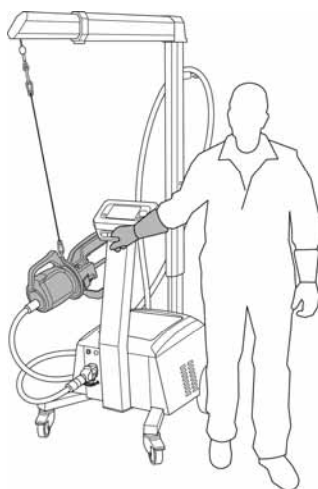


Fig 2. The position of the C-Tong shall not exceed the limited lengthwise range of 45° from vertical!

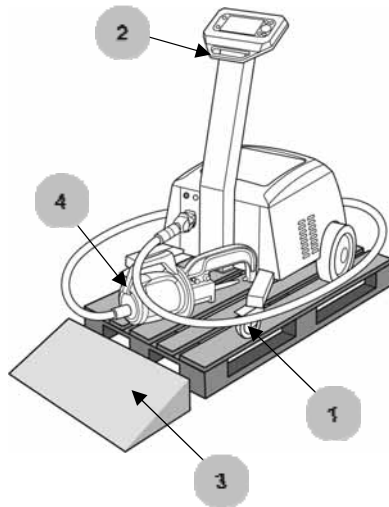
3.13.2 Moving the machine with support arm



WARNING! Always use the handle to move the welder. Do not pull the cable or the tong to move the welder. The welder might tip, causing personal injuries or serious damage to the welder. When moving the machine, the C-Tong must be fixed at the intended holder (on the side of the machine) and must not hang on the support arm. A swinging tong might cause personal injuries or material damage.



3.14 Transport



When moving the machine to a new workplace, release the roll brakes (1) and then pull or push the machine by the handle (2). Pay attention to obstacles such as dispersed cables and unevenness of the floor!

When transporting the welding machine to another location, power supply and compressed air supply must first be disconnected. Use a ramp (3) to roll the machine on to the pallet. Lock the roll brakes (1). Place the C-Tong on the pallet (4), not on the C-Tong hanger. Lift the pallet with a fork lift. The welder must be securely strapped to the pallet before transport, in the same way as when it was delivered from the manufacturer!

Before transporting a welder that is filled with decalcified water and Car-O-Liner High-Tech Protection Fluid at temperatures below -5°C , completely drain the cooling liquid. Fill up the system with 2 L pure concentrated High-Tech Protection Fluid and start up the machine. Then let the fluid circulate together with the remaining cooling liquid in the system.

The manufacturer shall not be liable for any damage resulting from improper transportation!



IMPORTANT! The machine must be securely strapped and the front wheel roll brakes must be locked in transport mode. The C-Tong must be placed on the pallet.

3.15 Storage

Storing conditions to be fulfilled when storing the packed or unpacked welding machine and its accessories are:

- Must be stored indoors
- Maximum atmospheric humidity of 80%
- Temperature range of ambient air: -15°C^* to $+45^{\circ}\text{C}$
(corresponds to a range from $+5^{\circ}\text{F}$ to $+113^{\circ}\text{F}$)



* The minimum temperature of -15°C ($+5^{\circ}\text{F}$) only applies to machines with empty tank. Before storing machines that are filled with clean water (according to the water quality information in section 3.6) and Car-O-Liner High-Tech Protection Fluid at temperatures below -10°C , completely drain the cooling liquid. If storing below -10°C , fill up the system with 2 litres of pure concentrated High-Tech Protection Fluid, start up the machine and let the fluid circulate.

Suitable precautions are necessary to protect the machine against humidity, dirt and corrosion. The manufacturer shall not be liable for any damage resulting from improper storage!

4 Operation

4.1 Before you begin welding

Before you begin welding, be sure to read the instructions in this instruction manual and that you understand them. Be sure to follow the car manufacturers instructions as well, for example welding parameters.

With the CTR9, a high current is applied through the work piece. When the current is transferred through the work piece, the resistance in the metals heats the metal and fuses the metals together to a weld nugget.



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 an unstable or uneven ground. The welder might tip, causing personal injuries or serious damage to the welder.



WARNING! Never spill liquid of any kind on the welder. Risk for injuries or damage to the welder.



WARNING! Sparks and welding spatter from the spot welder can start a fire. Risk for fire damages.



WARNING! Make sure that you know where the fire extinguishing equipment is. Risk for injuries.



WARNING! Appropriate protection (protective gloves, visor, clothing and shoes) must be worn when using this equipment.



WARNING! Sparks and welding spatter from the spot welder can damage your eyes and face. To avoid risk for personal injuries, always use a visor.



WARNING! Loose cables and hoses present tripping risks. Risk of injuries.



WARNING! Risk of crushing (moving electrodes).



WARNING! The tools or electrodes may be hot. Risk for burning injuries.



IMPORTANT! Risk for damage to materials close to the weld, e.g to glass or textiles.



IMPORTANT! Ensure that all electrical equipment within the welding object is disconnected. Risk for interference.



IMPORTANT! For good cooling efficiency, never operate the welder without connecting it to the compressed air network.



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! 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 use.



IMPORTANT! It is the responsibility of the owner to ensure that the work place is well ventilated with a local fume extractor.

4.2 Starting the welding machine

The welding machine has been properly set up and connected to the mains. Switch on the machine by the blue lit main switch. When the machine is on the main switch turns green.

After the machine has been switched on, it takes a few seconds for the welding control system to start the machine. During this time, the Car-O-Liner logo is displayed on the screen. The C-Tong mode and Full Auto mode will then be displayed on the screen.

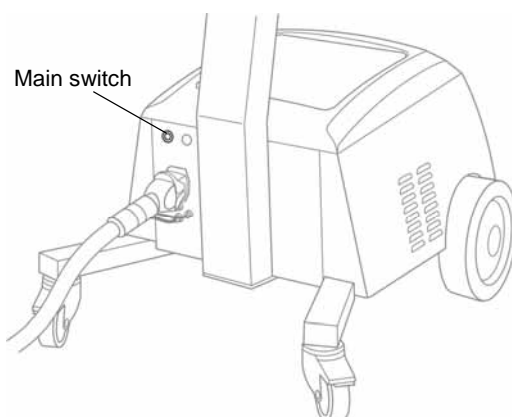


Figure 4.1 Starting the welding machine

4.3 Using the C-Tong trigger button

When pressing the trigger button [1] on the C-Tong, the cylinder electrode [2] moves out against the work piece and the welding cycle starts. The welding cycle can be cut off before the welding current is activated (approximately 0.5 sec) by releasing the trigger button. When the welding current has started you can not cut off the welding cycle. Always hold the C-Tong according to figure 4.4 below.

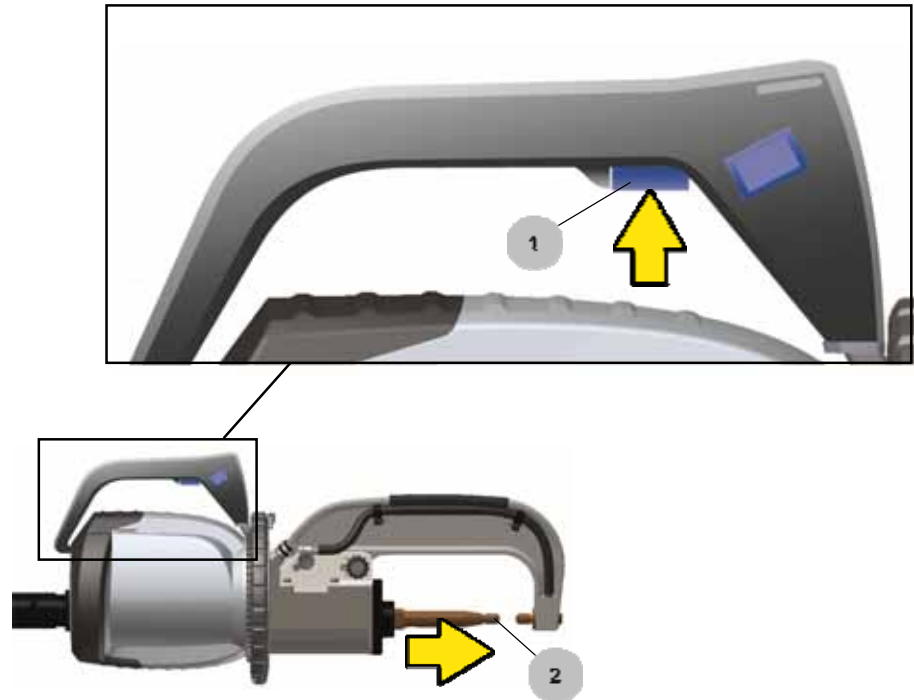


Figure 4.3 Using the C-Tong trigger button

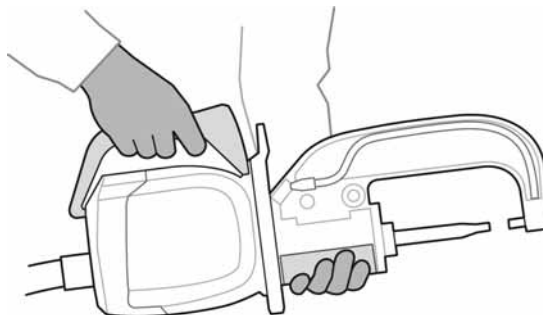


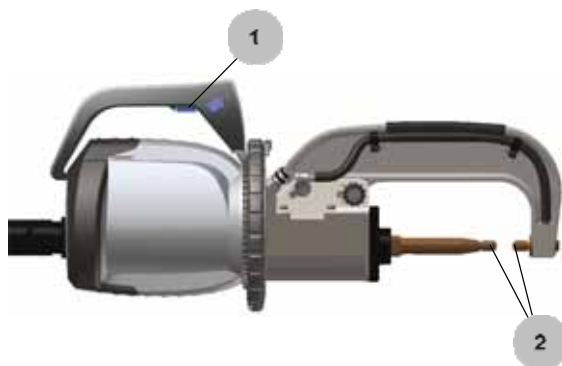
Figure 4.4 Holding the C-Tong correctly during welding.



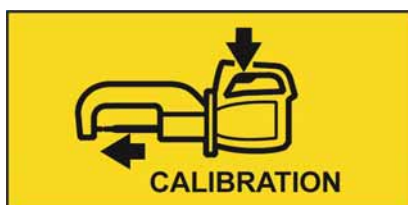
WARNING! The C-Tong must be held correctly during welding.
Risk of crushing (moving electrodes).

4.3.1 Calibrating the welder

Calibration must always be performed at Startup and with necessary intervals. To calibrate welder, push C-Tong trigger button [1] and weld without anything between the electrodes [2].



The "Calibration" message below is shown on the Control panel display when calibration is necessary.



To perform a correct calibration, the electrode caps must be clean and have the right radius, *see section 4.5.3 Changing the C-Tong electrode caps*. The "Caps Service" message below is shown on the Control panel display when cleaning or changing electrode caps is necessary.



4.4 C-Tong LED indicators and reset button

Status [1]: Green LED indicates that welding machine is ok and spot weld is ok. Green LED will flash during weld and returns to steady green if spot weld is ok.

Machine fault [2]: Red LED indicates error, *see section 8.1 Fault tracing table*.

Service [3]: Yellow LED indicates that electrode cap service is necessary. Can be cleared by using reset button [5] *or in Welder control panel*.

Weld quality fail [4]: Red LED indicates faulty spot weld. Welding could not be performed because of measured parameters outside limits. Must be cleared by using reset button [5] *or in Welder control panel*.

Reset button [5]: For error and warning acknowledgement or clearing of Weld quality fail.

Service LED [3] and Weld quality fail LED [4] are flashing:
Perform electrode calibration, *in Full Auto mode in Welder control panel*.

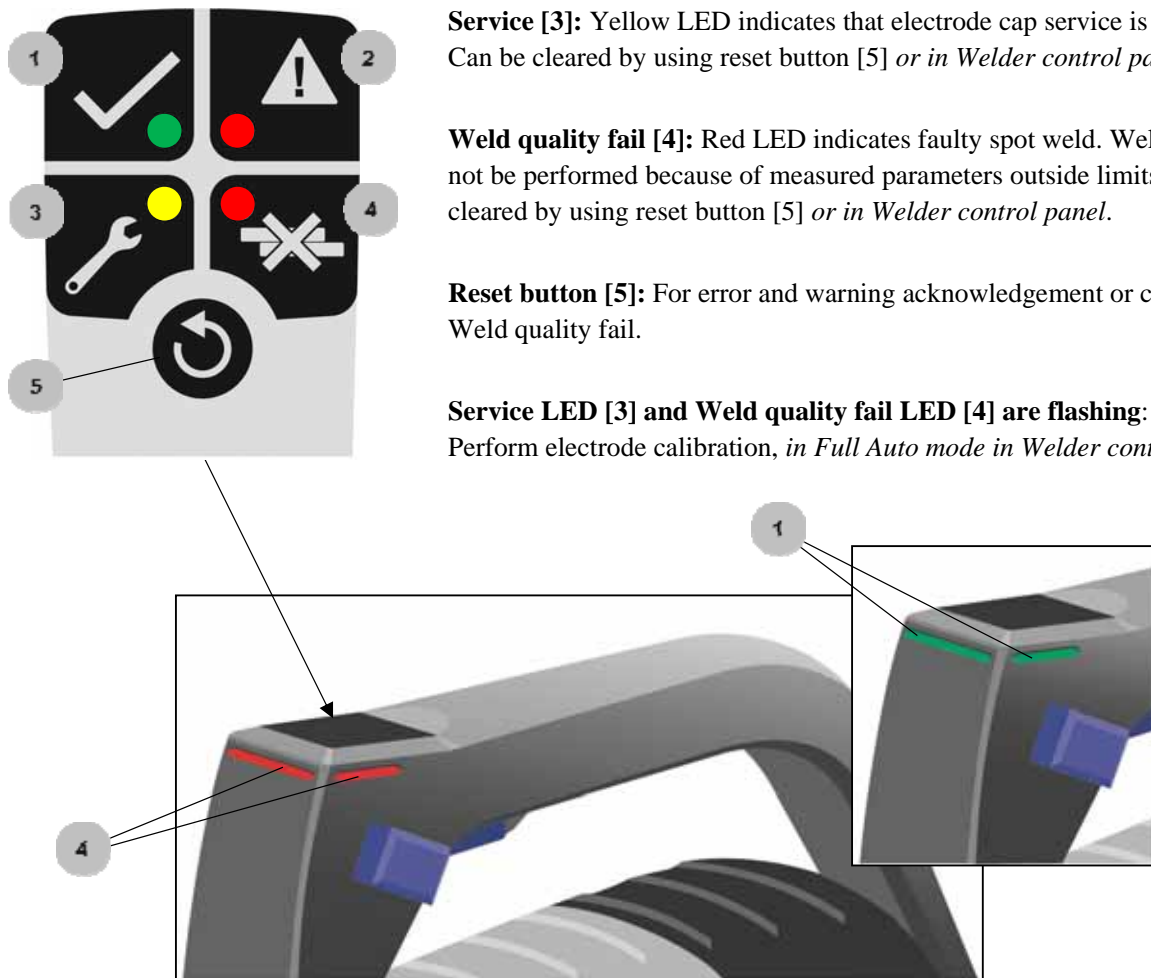


Figure 4.5 C-Tong LED indicators

4.5 Preparing the C-Tong for welding operation



When carrying out the operations described in section 4.5, it is recommended to keep the C-Tong in the C-Tong holder of the welding machine.

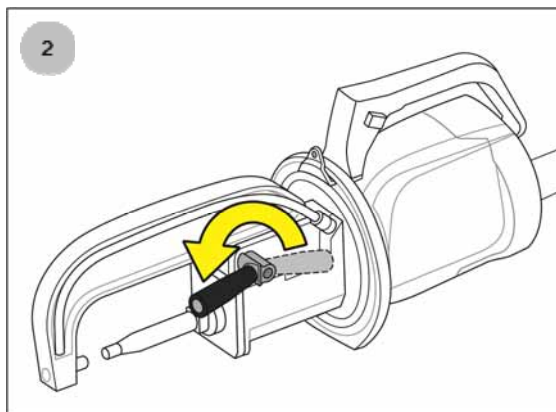
4.5.1 Changing the C-Tong electrode yoke

Change the electrode yoke by following the instructions below:

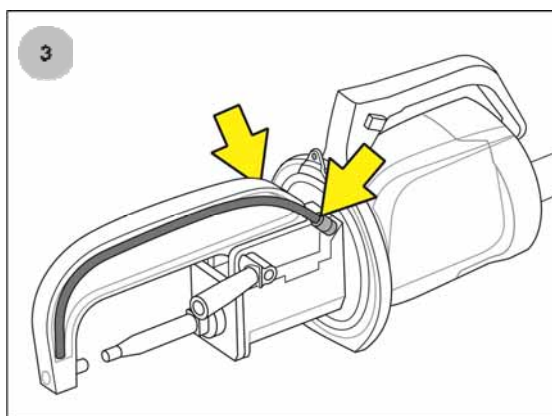
1. Press the "Water flow" button to turn OFF water pump flow.



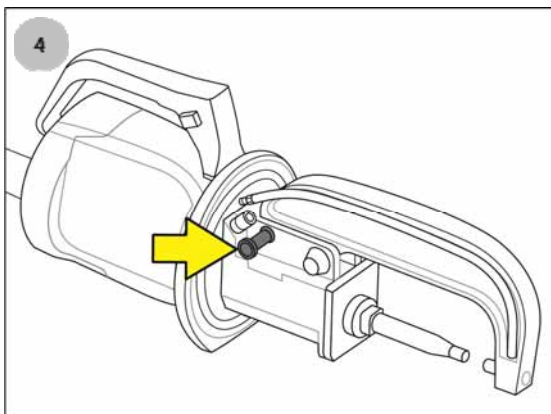
2. Release the yoke locking lever.



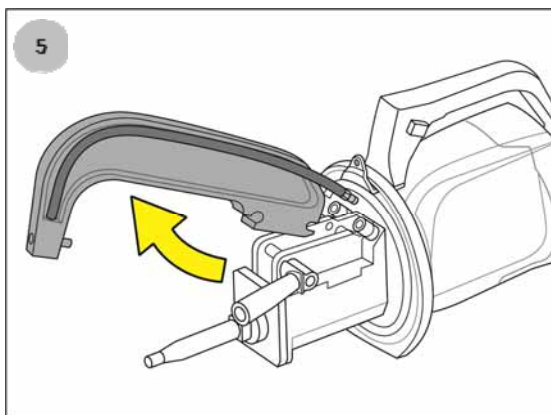
3. Disconnect the two cooling liquid hoses by the quick-action couplings.



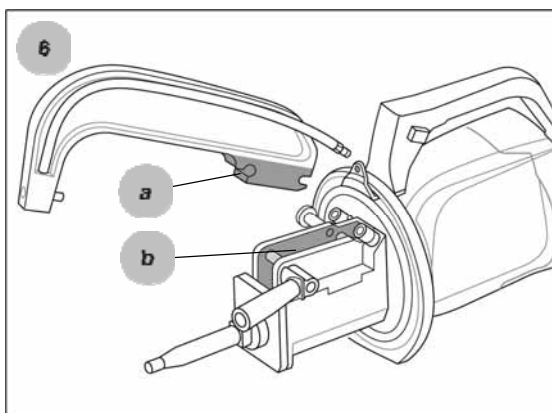
4. Release the electrode yoke by pulling the safety knob.



5. Remove the yoke.

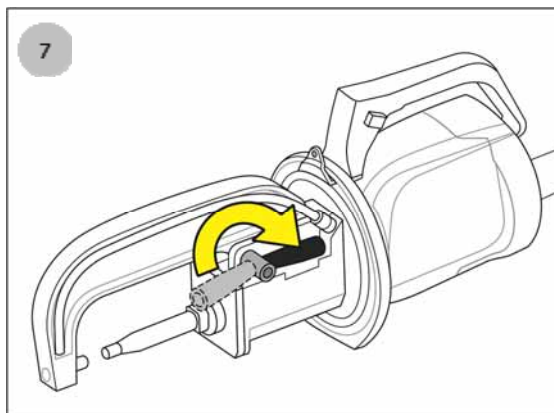


6. To fit a yoke, insert the connection shank [a] into the yoke holder [b] of the C-Tong body.



WARNING! The tools or electrodes may be hot. Risk for burning injuries.

7. **Tighten the yoke locking lever fully to ensure correct locking of the yoke.**



8. **Reassembly is the reversal of the foregoing instructions.**

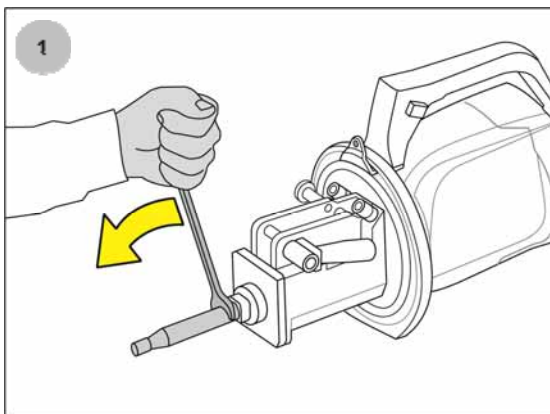


WARNING! Tighten the yoke locking lever fully to ensure correct locking of the yoke. Risk of personal injuries or material damage.

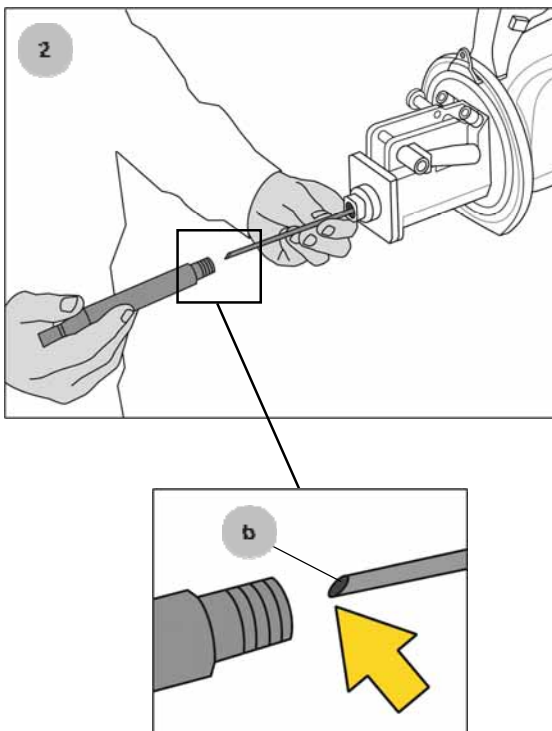
4.5.2 Changing the C-Tong electrodes

Change the electrodes by following the instructions below:

1. **Release the cylinder electrode with a 17 mm wrench placed at the flat area of the electrode.**

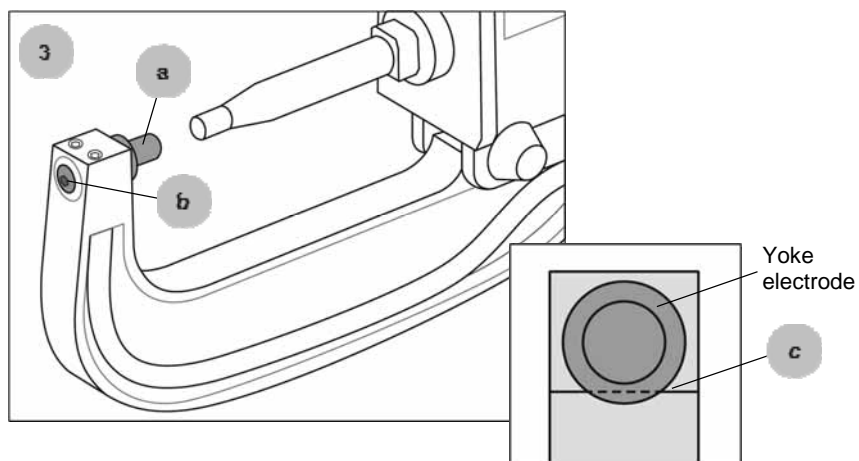


2. **When reassembling, ensure that the bevelled end [b] of the electrode inner tube is pointing to the electrode.**



3. To remove the yoke electrode [a], release the hex/allen screw [b] and pull out the electrode.

When inserting a new electrode, fit flat side of the electrode brim to the yoke edge [c].



IMPORTANT! All straight electrodes have an inner tube that must be fitted to provide sufficient cooling.

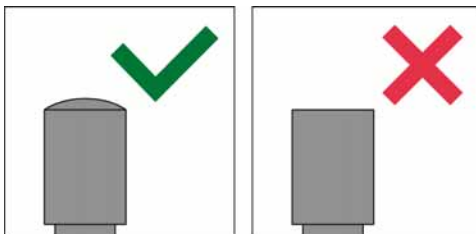


WARNING! The tools or electrodes may be hot. Risk for burning injuries.

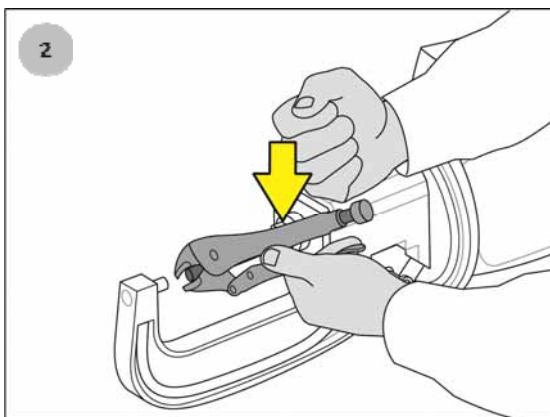
4.5.3 Changing the C-Tong electrode caps

Change the electrode caps by following the instructions below:

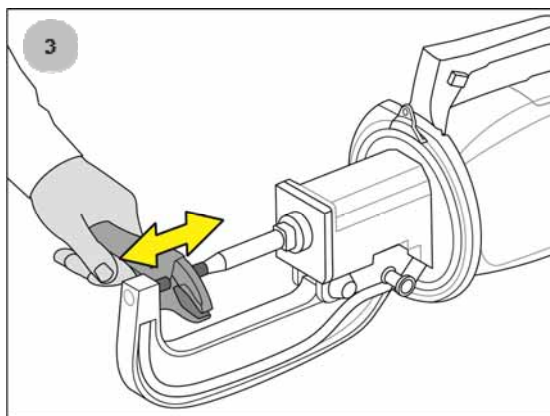
1. **Electrode cap must be changed BEFORE the rounded tip becomes flat. The standard cap radius is R15.**



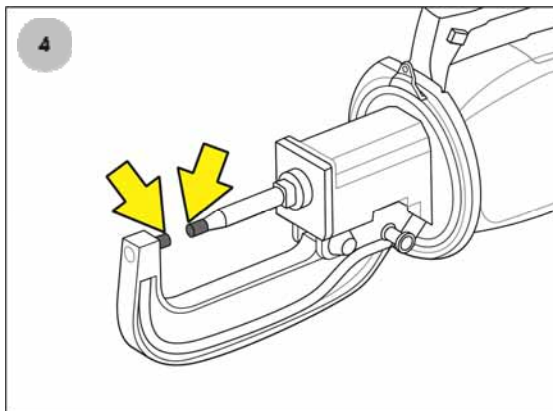
2. **To remove the old electrode caps, use for example locking pliers. Lock the tong and knock it hard.**



3. **To fit the new caps, place a welding tong between caps and hammer them into position.**



4. To clean the electrode caps from impurities, use Scotch-Brite hand pads.



The "Caps Service" message below is shown on the Control panel display when cleaning or changing electrode caps is necessary.



IMPORTANT! The shape of the caps is essential and the electrode caps must be changed regularly to maintain good welding results! The radius of a new cap is R15.

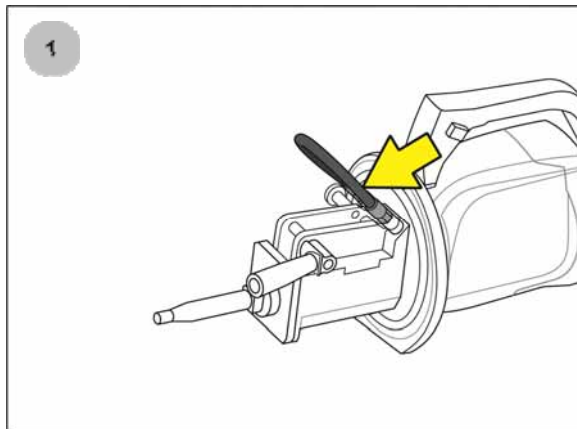


WARNING! The tools or electrodes may be hot. Risk for burning injuries.

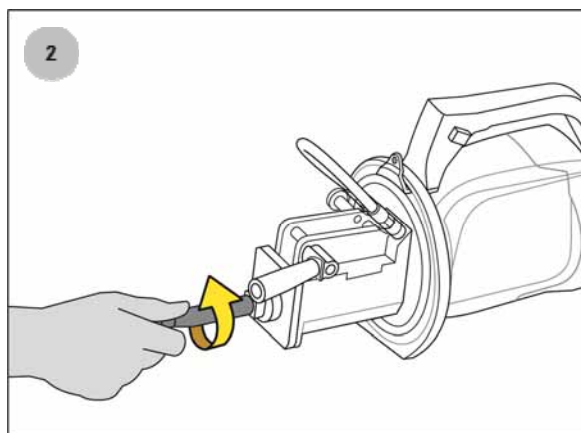
4.5.4 Converting C-Tong to A-Tong

Convert C-Tong to A-Tong by following the instructions below:
(Before mounting the A-Tong, the C-Tong electrode yoke must be demounted, *see section 4.5.1 Changing the electrode yoke.*)

- 1. Connect the by-pass hose to the cooling liquid couplings to bridge the cooling liquid flow.**



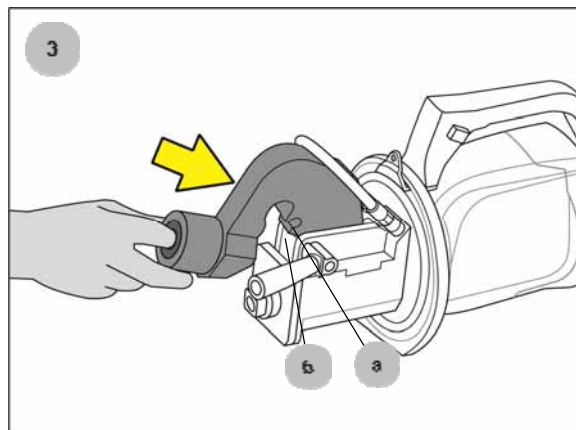
- 2. Release and demount the C-Tong electrode.**



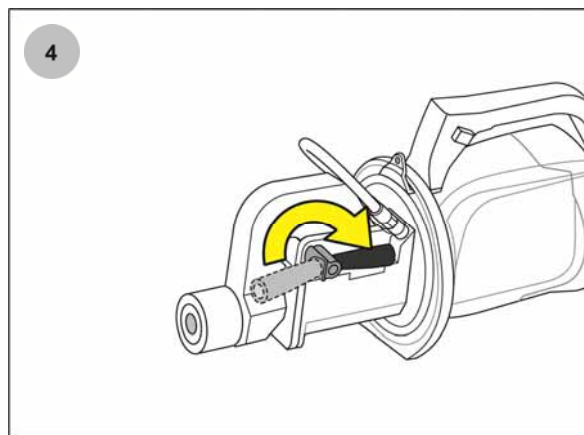


IMPORTANT! The A-Tong adapter connection shank and the yoke holder must be greased with a small amount of copper paste before assembling to prevent sticking and to maintain proper electrical conductivity.

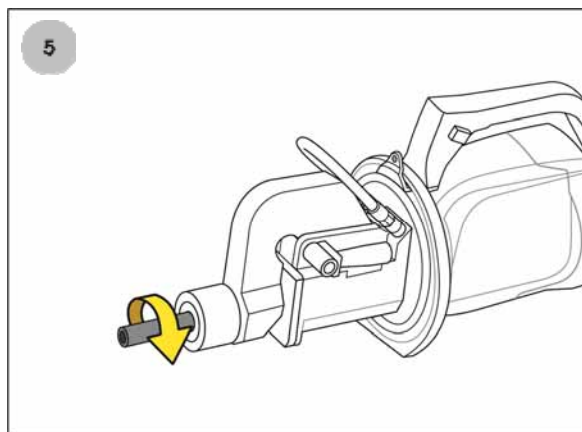
3. Grease the A-tong adapter connection shank [a] and the yoke holder [b] with a small amount of copper paste. Mount the A-Tong adapter.



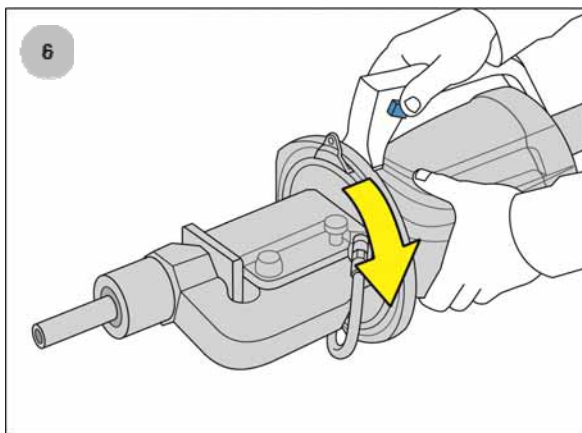
4. Lock the A-tong adapter by tightening the yoke locking lever.



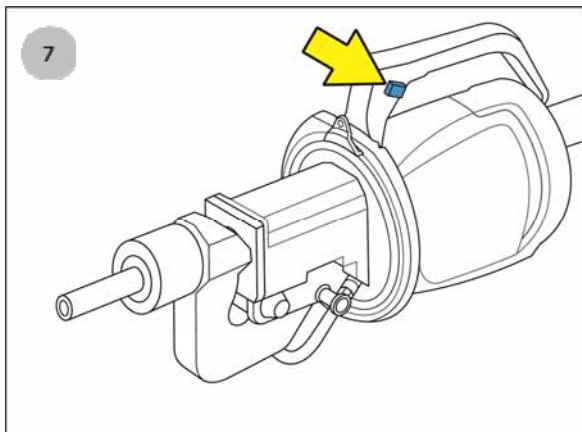
5. Insert and tighten the A-Tong adapter electrode.



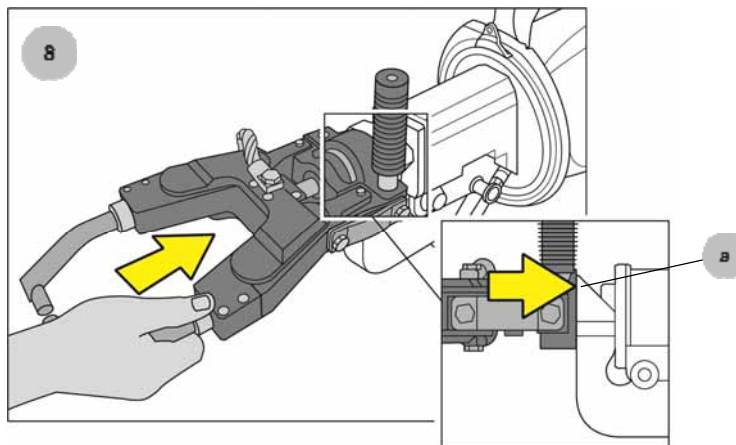
6. Push button to rotate the A-Tong adapter 180°.



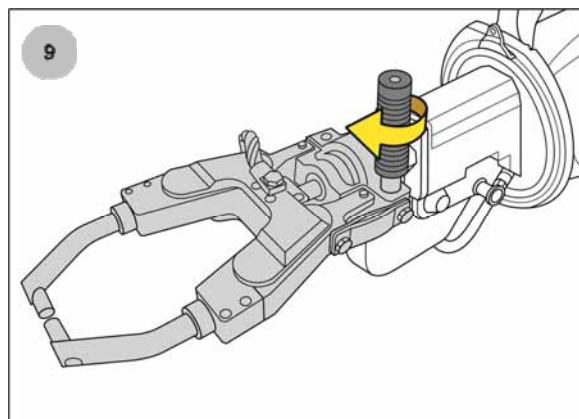
7. Release button to lock the A-Tong adapter.



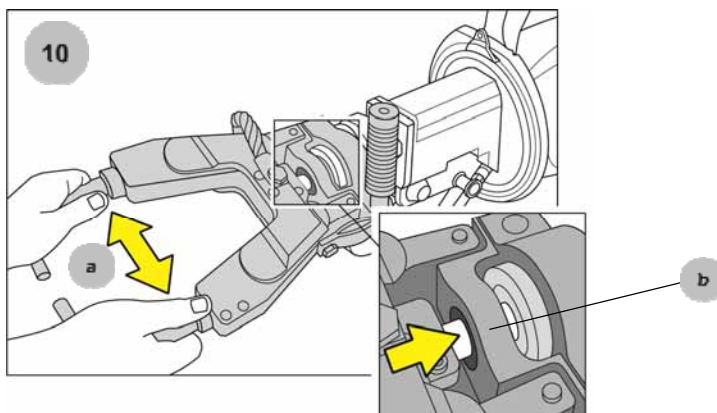
- 8. Fit the A-Tong to the A-Tong adapter electrode. Push in the A-Tong completely [a].**



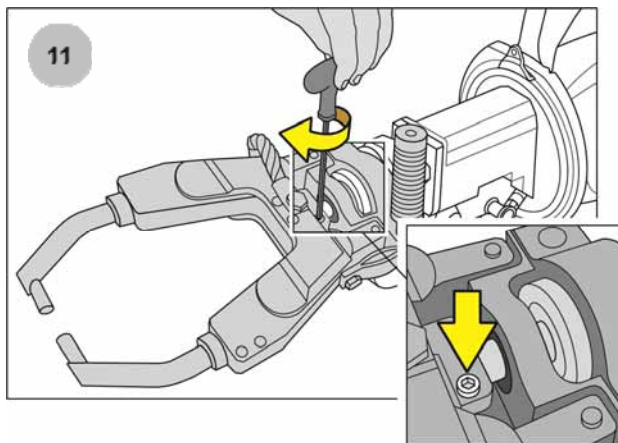
- 9. Lock the A-tong by tightening the A-Tong handle.**



- 10. Pull A-Tong electrodes apart [a] and push in the adapter electrode completely [b].**



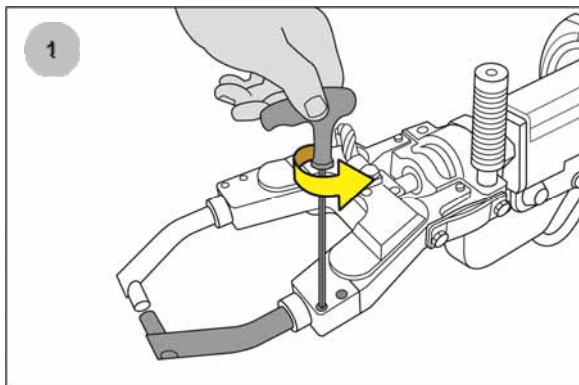
- 11. Lock the electrode by tightening the locking screw.
The A-Tong is now ready for action!**



4.5.5 Changing and aligning the A-Tong electrodes

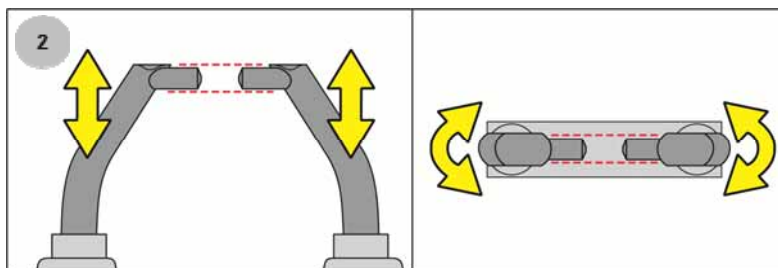
Change the A-Tong electrodes by following the instructions below:

1. Release the two locking screws and detach the electrode.



IMPORTANT! After electrodes are changed they must be aligned to maintain optimal performance.

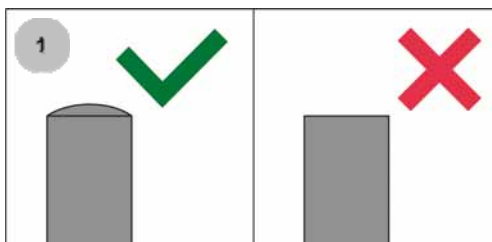
2. Align the electrodes (lockings screws released)
by adjusting them in height and for rotation.



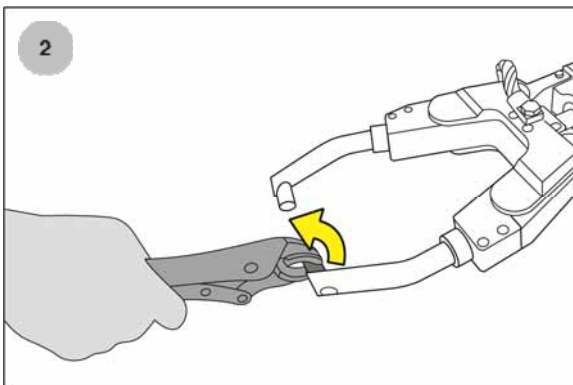
4.5.6 Changing the A-Tong electrode caps

Change the electrode caps by following the instructions below:

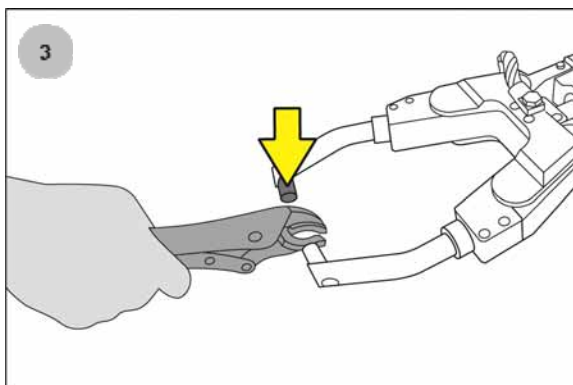
- 1. Electrode cap must be changed BEFORE the rounded tip becomes flat. The standard cap radius is R15.**



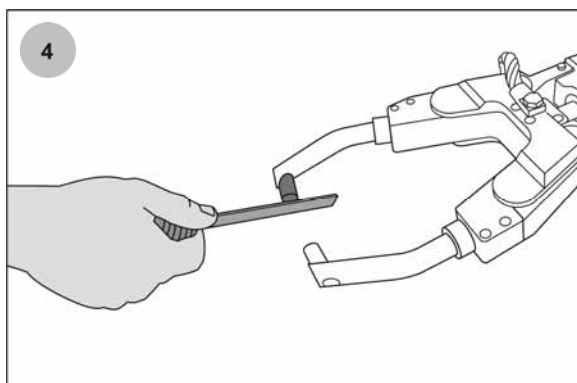
- 2. To remove the old electrode caps, use for example a welding tong.**



- 3. To fit new caps, gently hammer them into position with the locking tong.**



4. To clean the electrode caps from impurities, use a rasp.



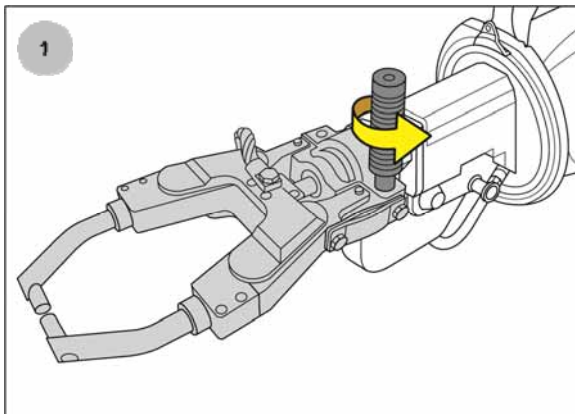
IMPORTANT! The shape of the caps is essential and the electrode caps must be changed regularly to maintain good welding results! The radius of a new cap is R15.

4.5.7 Setting the A-Tong in horizontal or vertical position

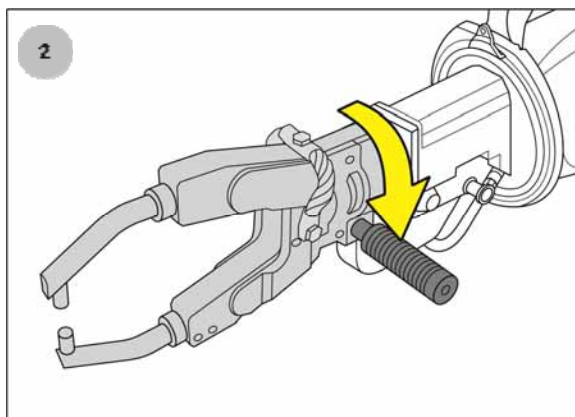
The A-Tong can be set in either horizontal or vertical position for optimal working angle.

You can rotate the A-Tong stepless to desired position either by using the A-Tong handle or the swivel ring.

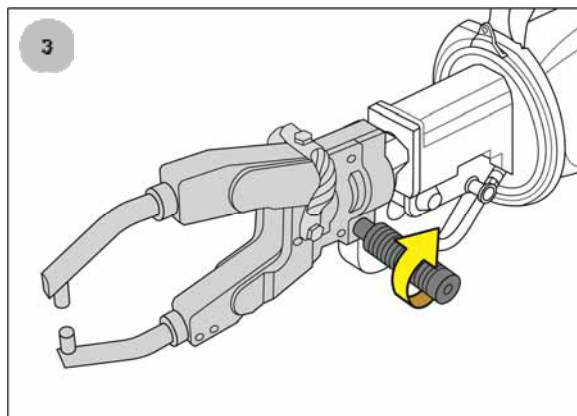
1. Release the A-Tong handle.



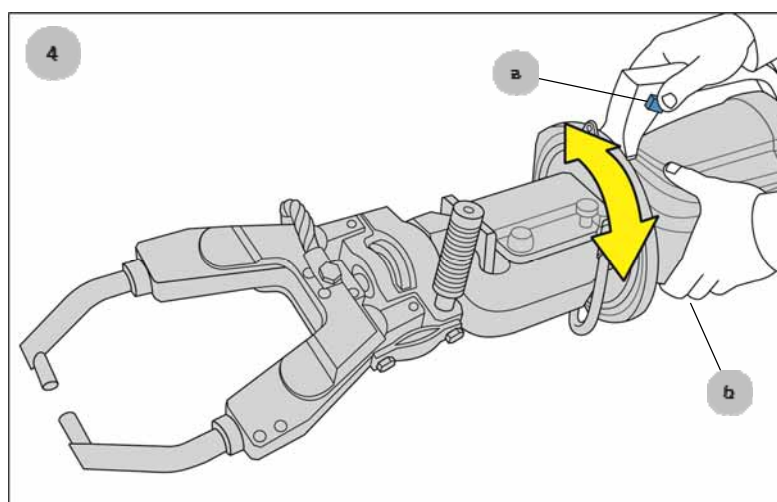
2. Grab the handle and rotate the A-Tong to desired position.



3. Tighten the A-Tong handle.



4. Alternate rotating method: Push button [a] and rotate [b] the A-Tong to desired position.



5 Welding menu

5.1 General

The following welding programs are available on the CTR9 welder:

- **Two sided spot welding**
- **Multi-function gun applications:**
Dent puller, Welding of clip rivets, Welding of screws and Carbon rod for shrinking, Welding of nuts, Stich welding.
- **A-Tong mode**

5.2 Control panel and display

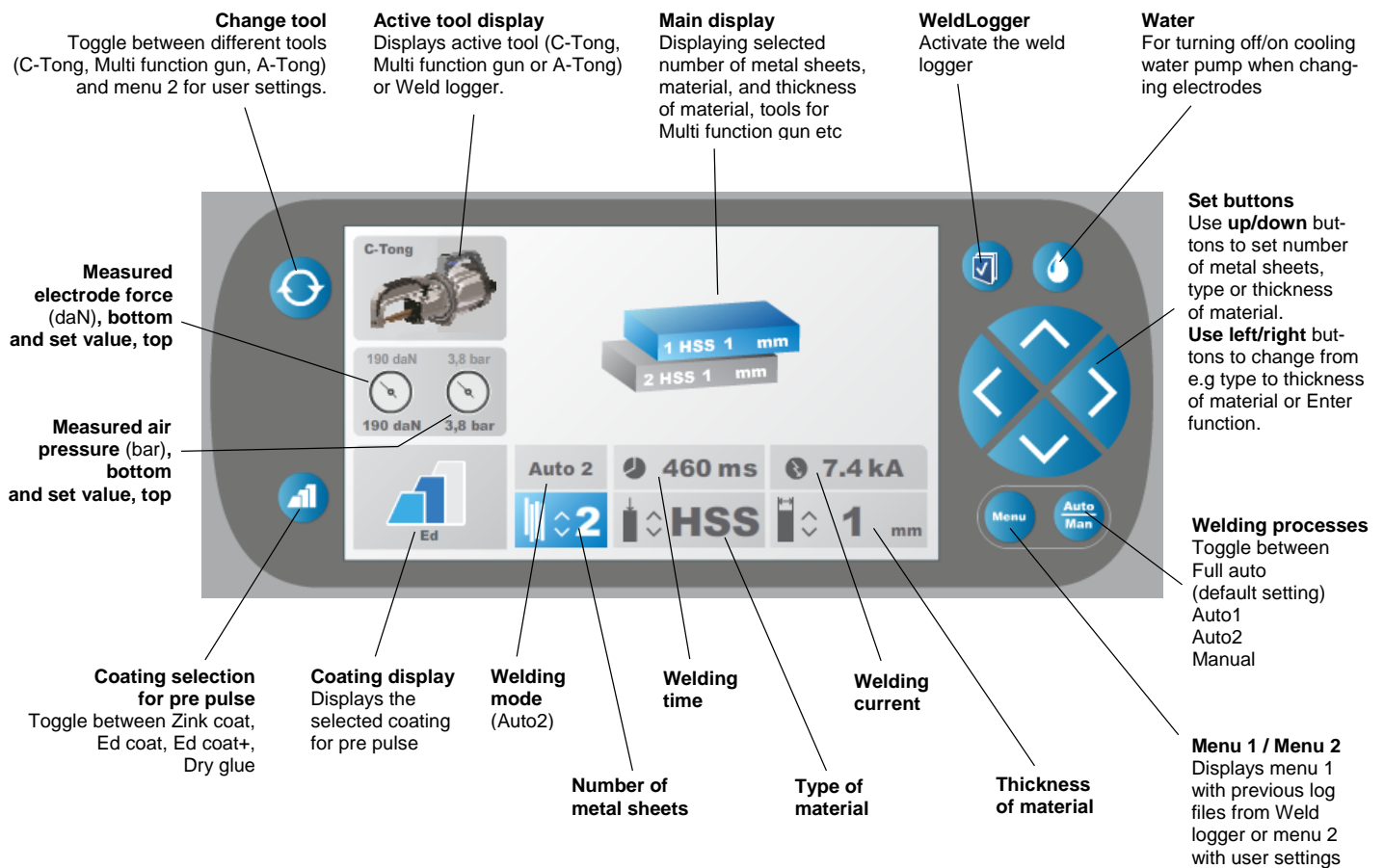


Figure 4.4 The CTR9 control panel and display

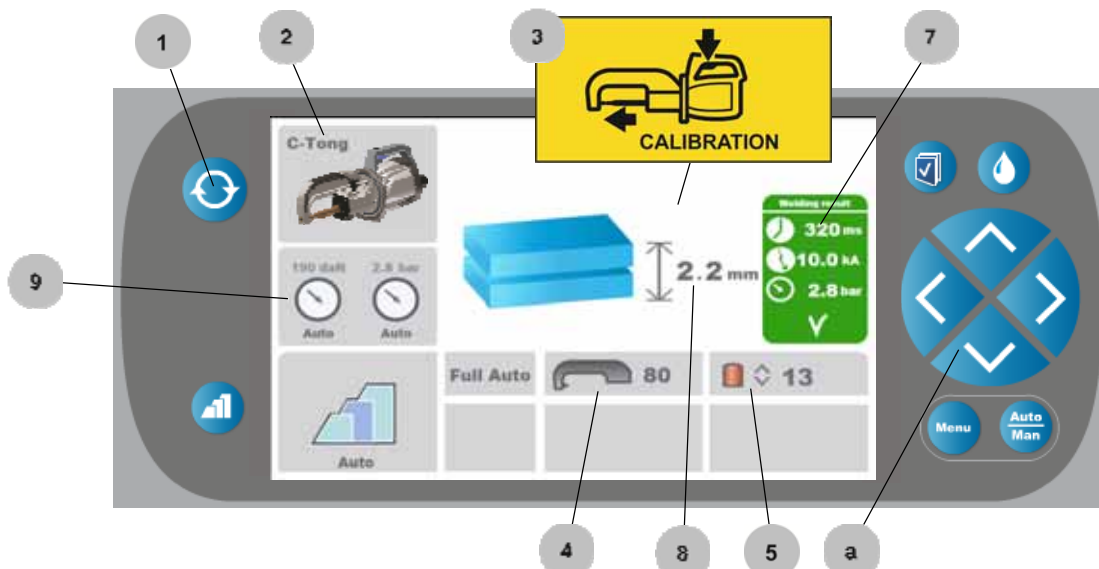
6 Welding modes

Having switched on the spot welder, you have to select and determine the type of welding process first. You may choose one of the following processes: "Auto 1" , "Auto 2" or "Manual" ("Fully Automatic" is default mode).

6.1 Fully Automatic mode

The Fully Automatic mode is default mode. In this mode all values are automatically set, except caps.

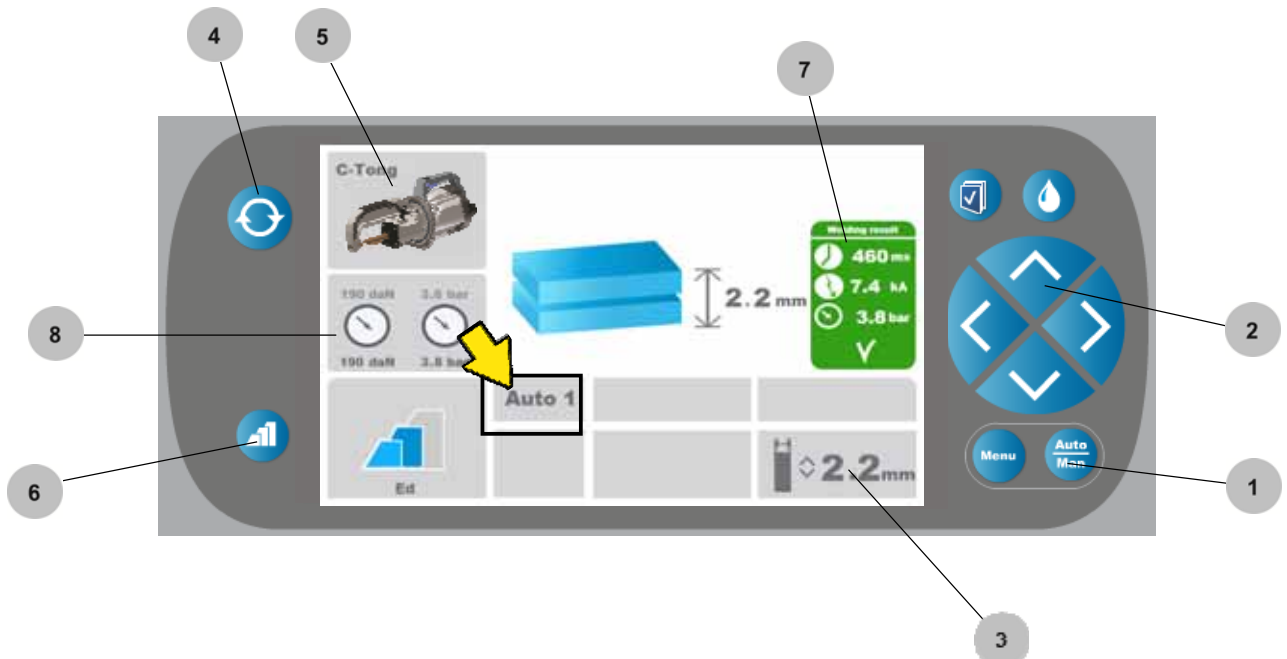
1. Select tool by pressing the "Change tool" button.
2. Selected tool is displayed, in the given example the C-Tong.
3. "Calibrate electrodes" will be displayed when entering "Full Auto", see section 8.2 Display information messages.
4. Fitted (automatically detected) yoke is displayed.
5. Select caps by pressing "up/down" button [a].
Check that cap size is matching your setting.
6. Start welding by pressing C-Tong trigger.
7. Successful welding! If welding is faulty, a red box with "X" is displayed. A buzzing sound and red light in the handle display also helps to indicate a faulty welding.
8. After welding, measured material thickness is displayed.
9. Displayed electrode force (daN) and air pressure (bar).



6.2 Auto 1 mode

In Auto 1 mode all values are automatically set, except the total material thickness which has to be manually set.

1. Set the "Auto 1" mode by pressing the "Auto/Man" button. With this button you can toggle between "Auto 1", "Auto 2" and "Manual" modes.
2. Set the material thickness by pressing the "up/down" buttons.
3. Material thickness is displayed.
4. Select tool by pressing the "Change tool" button.
5. Selected tool is displayed, in the given example the C-Tong.
6. Pre pulse - select type of coating (see section 6.5 Pre pulse)
7. Succesfull welding! If welding is faulty, a red box with "X" is displayed. A buzzing sound and red lighth in the handle display also helps to indicate a faulty welding.
8. Displayed electrode force (daN) and air pressure (bar).

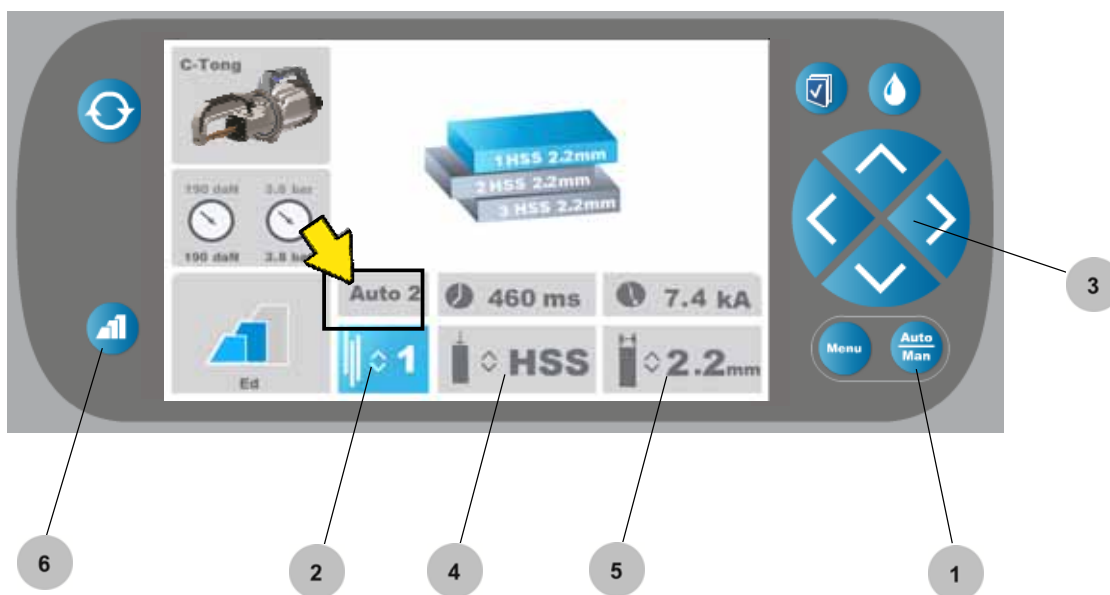


6.3 Auto 2 mode

In the "Auto 2" mode you can individually set number of metal sheets, type of material and total material thickness.

In the "Auto 2" mode tool selection and pre pulse function similar to "Auto 1" mode.

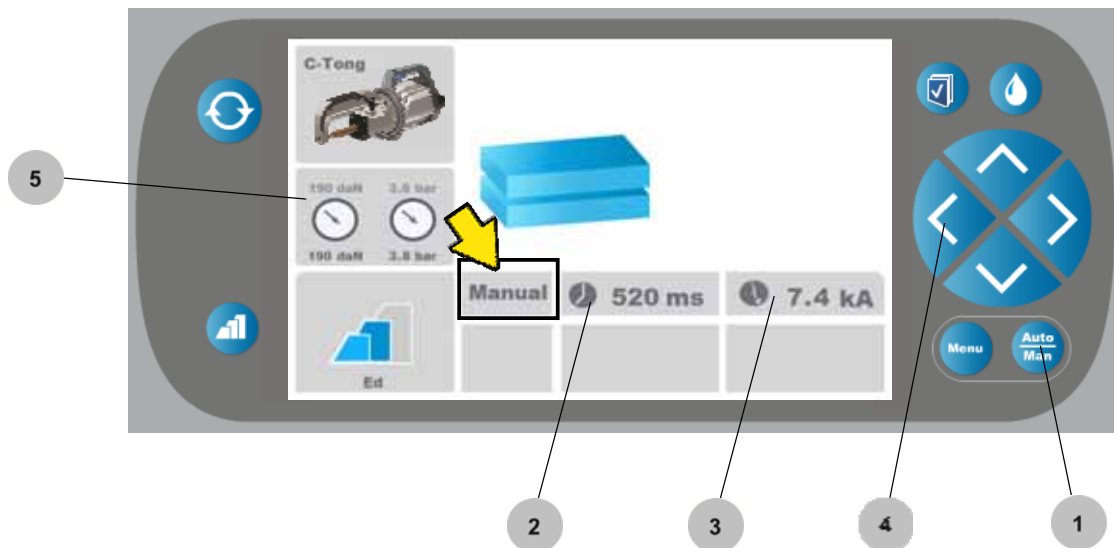
1. Set the "Auto 2" mode by pressing the "Auto/Man" button.
2. Set the number of metal sheets. Change number of metal sheets by using the up/down buttons
3. Select "Set the type of material" by pressing the "right/left" buttons.
4. Set the type of material by pressing the "up/down" buttons.
5. Set the material thickness by pressing the "up/down" buttons.
6. Pre pulse - select type of coating (see section 6.5 Pre pulse).



6.4 Manual mode

In the "Manual" mode all settings are the same as in "Auto 2" except for the settings of **welding time**, **welding current** and **electrode force** that can be manually set.

1. Set the "Manual" mode by pressing the "Auto/Man" button.
2. Set the welding time by pressing the "left" button twice when you are in "Number of metal sheets" position. Change value by using "up" or "down" button.
3. Set the welding current by pressing the "left" button when you are in "Number of metal sheets" position. Change value by using "up" or "down" button.
4. Set the air pressure by pressing the "left" button. Change value by using "up" or "down" button.
5. Electrode force (daN) and air pressure is displayed.



6.5 Pre pulse - for burning off coatings

Pre pulse (a short time welding) is necessary when Zn (zinc plated), Ed coating (electrolytic dipped) or dry glue needs to be burned off to achieve approved welding result.

The pre pulse from the welder must be set according to the type of coating.

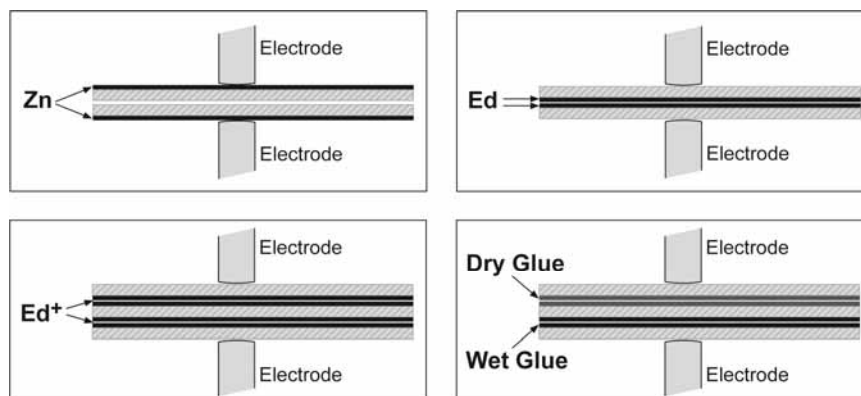
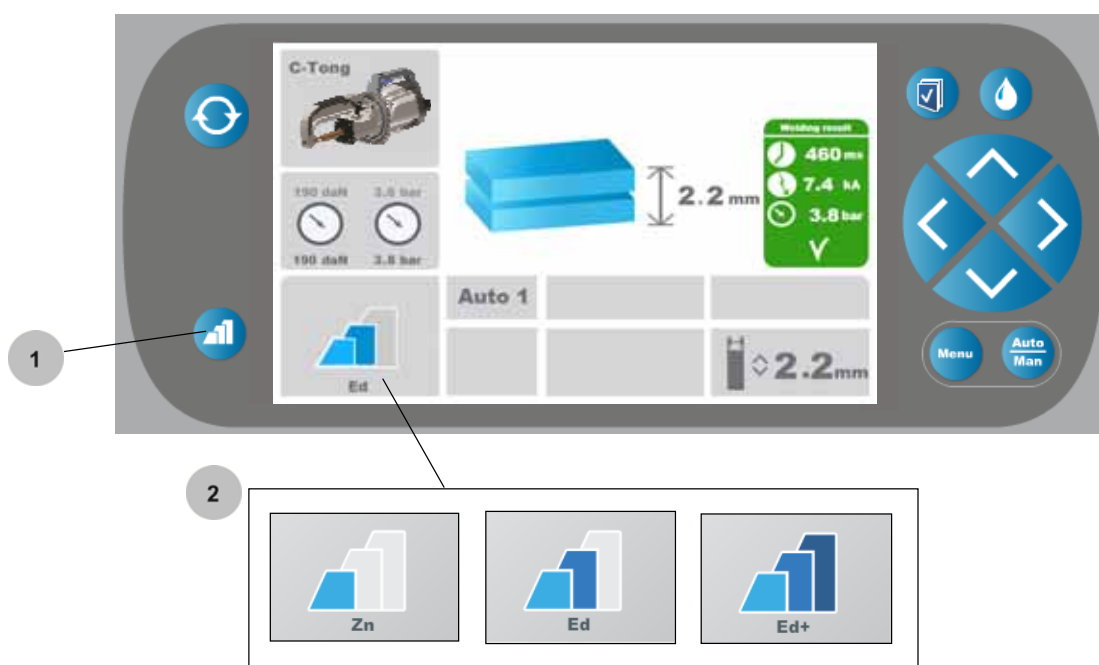


Figure 6.1 Four different kinds of coating eliminated by Pre pulse welding.

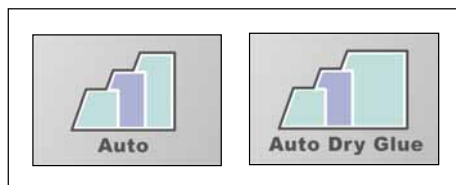
1. Select "Pre pulse" by pressing the Pre pulse button.
Toggle between Zn, Ed, Ed+ coating and Dry Glue.
2. The selected pre pulse modes are displayed.
In Auto1, Auto2 and Manual there are three selections for pre pulse: Zn, Ed and Ed+.



3. In Full Auto there are two selections for pre pulse:
Auto and Auto Dry Glue.

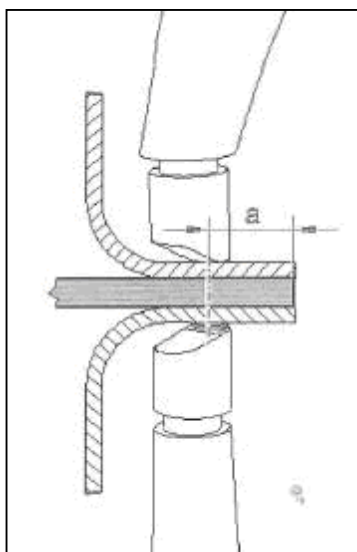
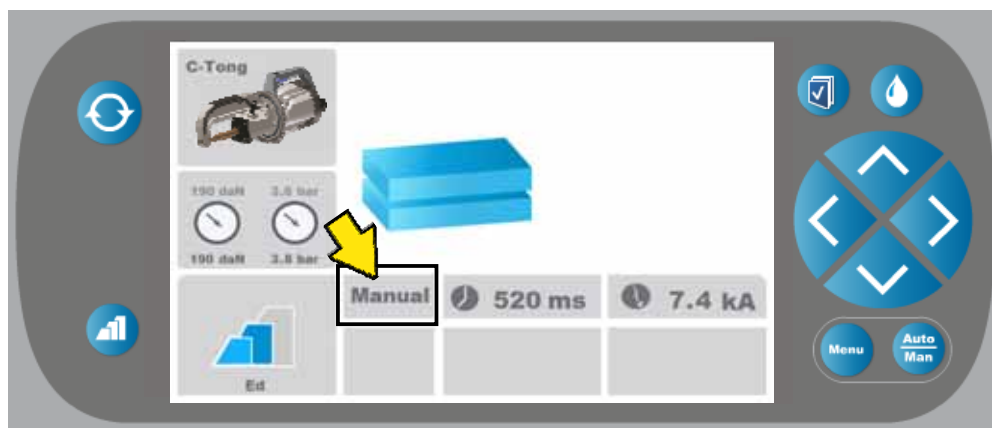


3



6.6 Using edge welding caps

Recommended start setting value when using edge welding cap (part no 45785) in standard mode is CURRENT/kA: 6.0 and TIME/ms: 500 (Weld parameters may vary depending on sheet thickness).



Attention: If the welding spots are placed on the edge of the heat moulded metal sheets (*see picture above*), the metal sheets joints will be altered by the increased temperature which will affect collision characteristics in a negative way.

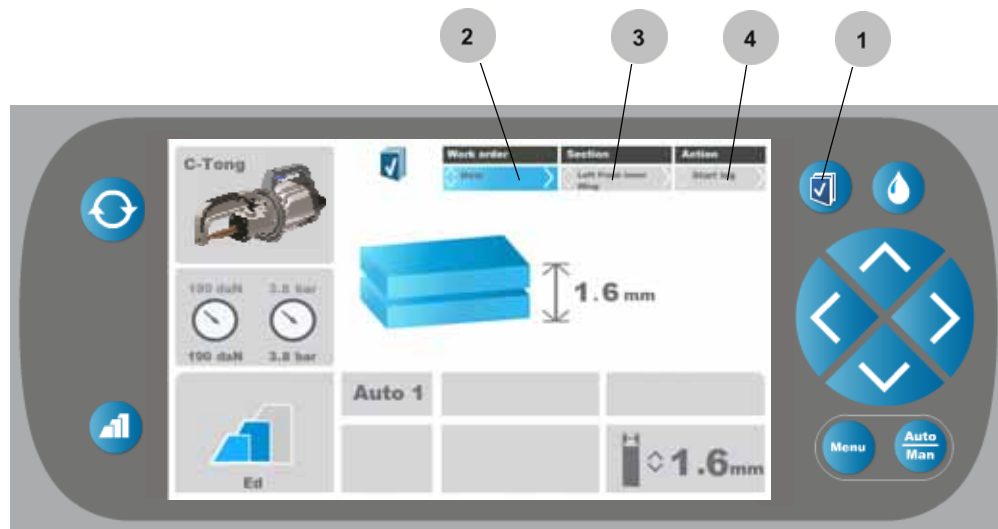
To avoid this, the welding spots must be placed as far inward as possible. With edge welding caps, the OEM repair manual demands for the a-measure (*see picture above*) will be achieved.

6.7 WeldLogger (in CTR9 welder and optional PC software)

6.7.1 Activate WeldLogger

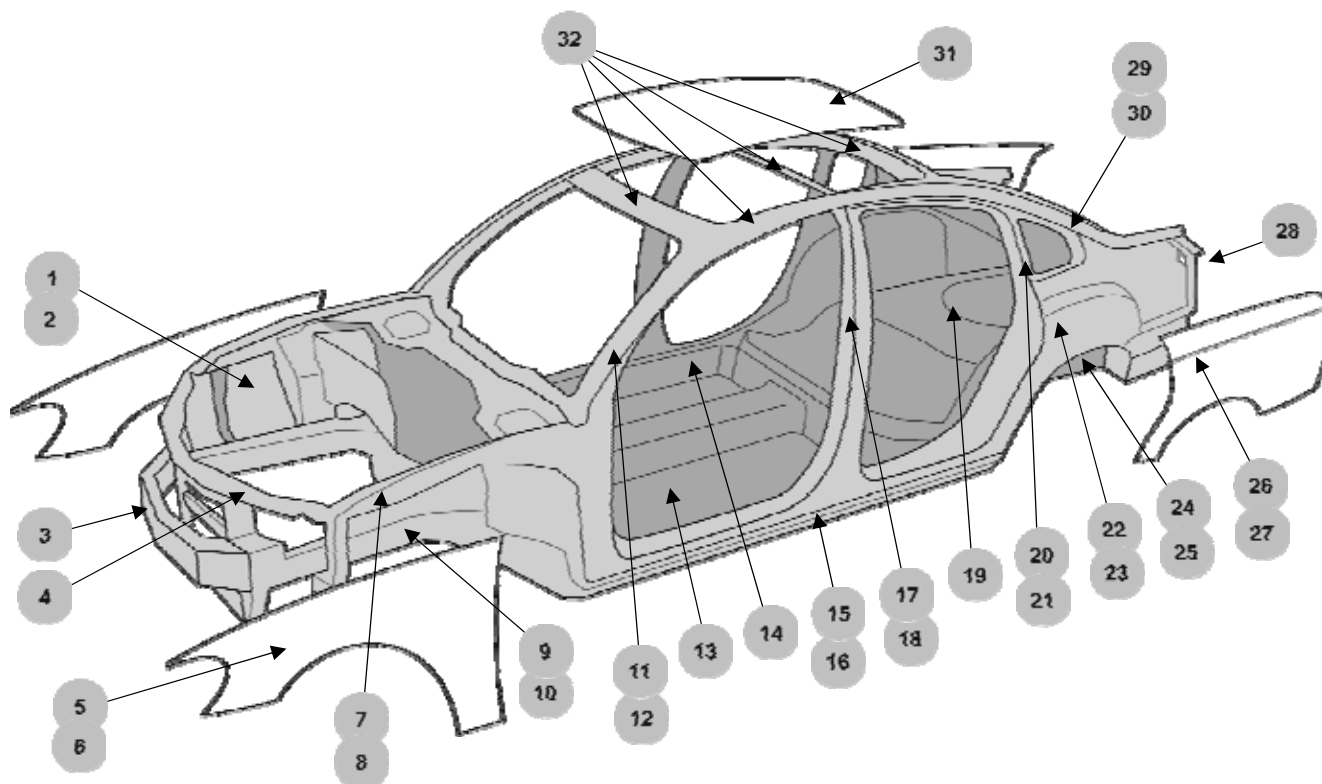
In the "WeldLogger" you can create work orders and all your welding work is documented in log files. These log files may be printed using the optional PC software.

1. **Open the "WeldLogger" by pressing the "WeldLogger" button**
2. **Create new log file or continue to work on existing log file**
3. **Go to section of the vehicle by pressing the "right" button. Select vehicle section by pressing the "up/down" button** (for explanation of section codes, see section 6.5.2 Vehicle section codes).
4. **Activate "WeldLogger" by pressing the "right" button (Start Log).**
5. **To end "WeldLogger", press "down" button (End Log).**



6.7.2 Vehicle sections list

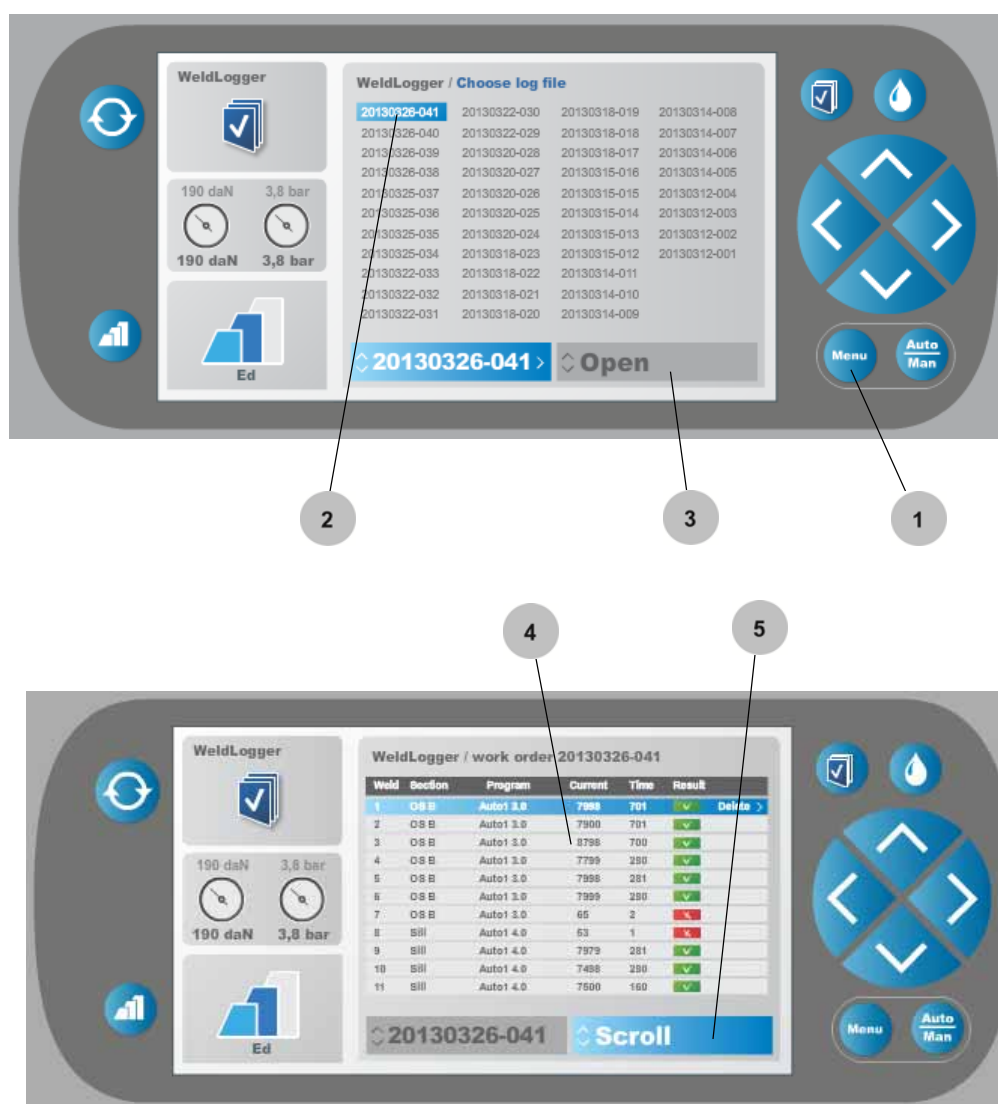
1	Left Front Inner Wing	17	Left B post
2	Right Front Inner Wing	18	Right B post
3	Front Cross member	19	Boot Floor
4	Front Panel	20	Left C post
5	Left Front Fender	21	Right C post
6	Right Front Fender	22	Left Rear Inner Wing
7	Left Front Upper Chassis Leg	23	Right Rear Inner Wing
8	Right Front Upper Chassis Leg	24	Left Rear Chassis Leg
9	Left Front Chassis Leg	25	Right Rear Chassis Leg
10	Right Front Chassis Leg	26	Left Rear Quarter Panel
11	Left A post	27	Right Rear Quarter Panel
12	Right A post	28	Rear Panel
13	Floor	29	Left D post
14	Floor Reinforcement	30	Right D post
15	Left Sill	31	Roof
16	Right Sill	32	Roof Reinforcement



6.7.3 Check previous log files from the "WeldLogger"

In the "WeldLogger" menu you can open and check previous log files.

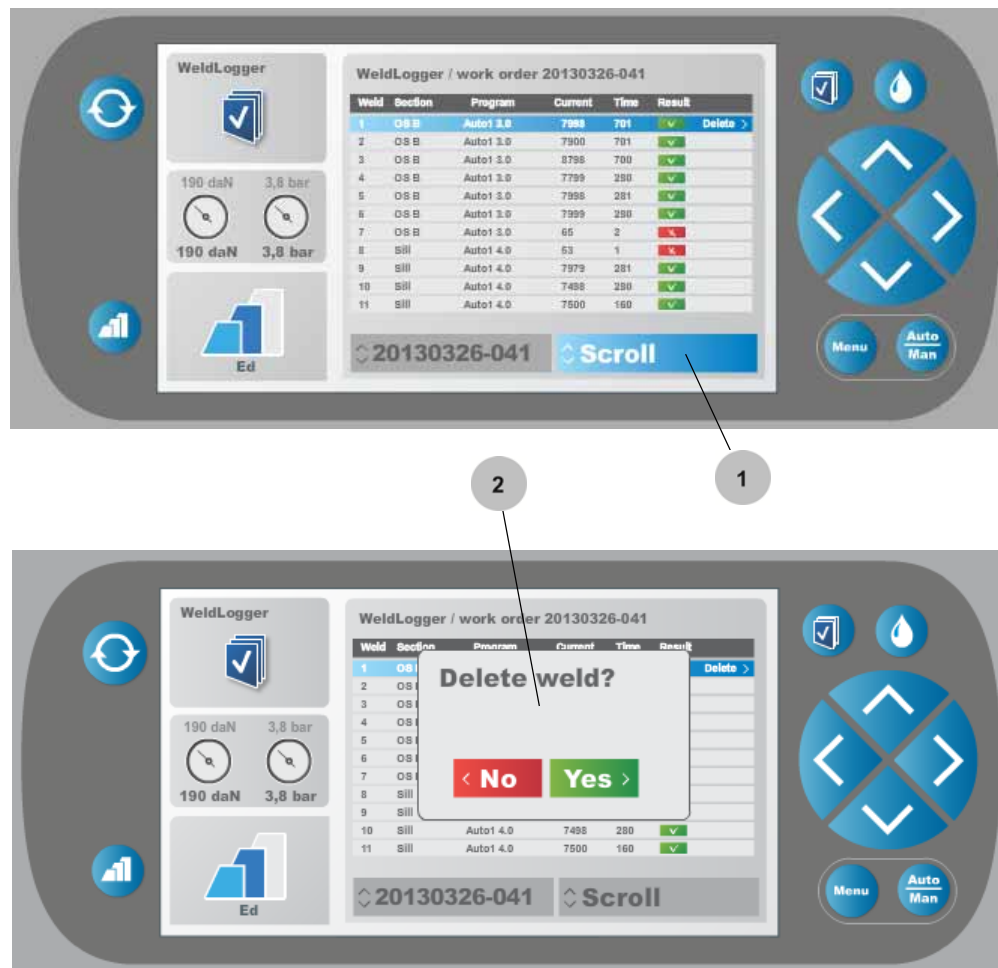
1. Open the "Weld logger" log files menu by pressing the "Menu" button
2. Select log file by pressing the "up/down" button.
3. Open log file by pressing the "right" button.
4. Selected log file opens up. Results of performed weldings are displayed. Green tick for approved welding, red x for bad welding that needs to be improved.
5. Scroll in the log file menu by pressing the "up/down" buttons.



6.7.4 Delete unsatisfactory welding

If one or more weldings are unsatisfactory you can remove them.

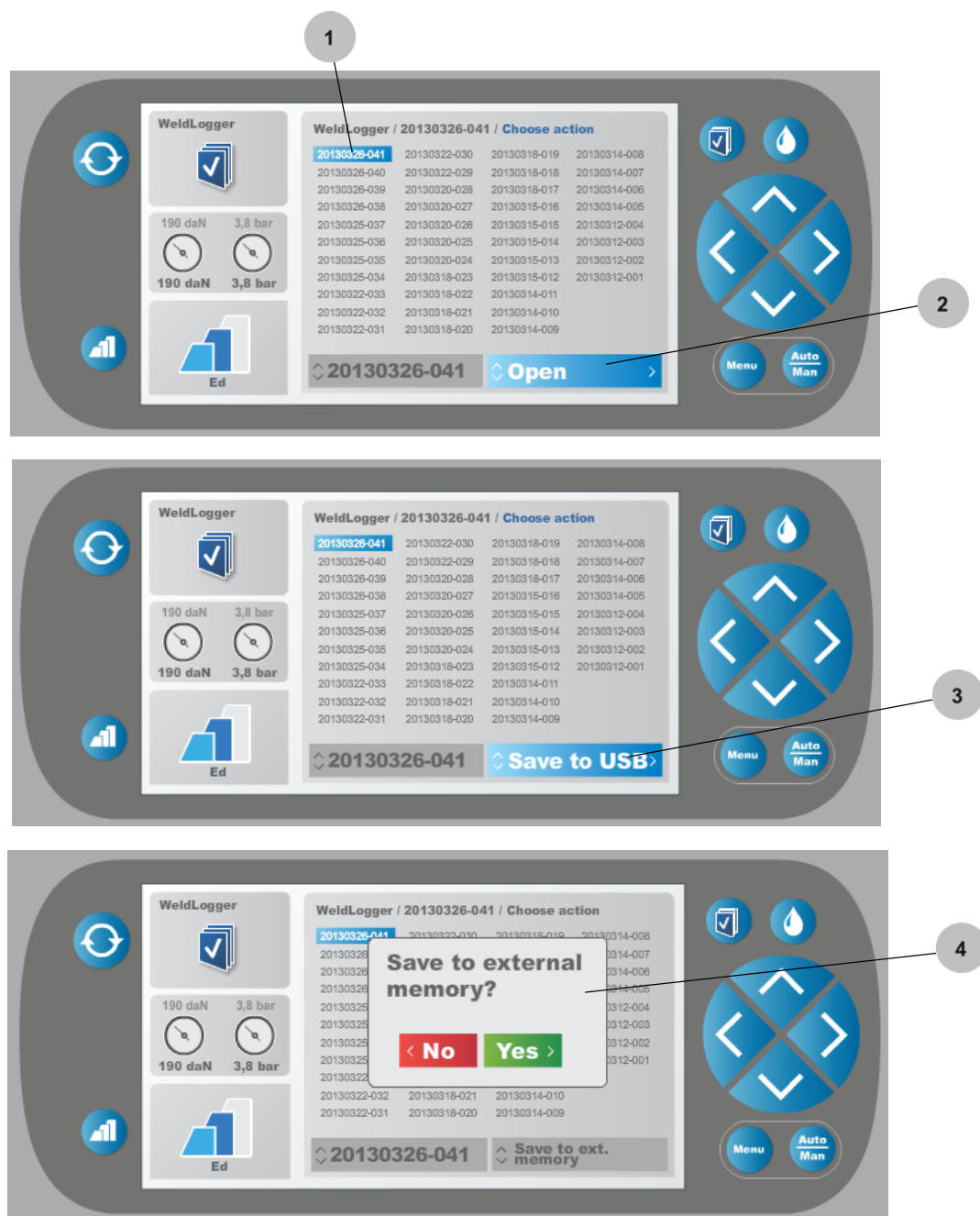
1. When in "scroll" mode, press "right" button.
2. Box with "Delete weld?" is displayed. For "No" press the "left" button, for "Yes" press the "right" button.



6.7.5 Save log files to USB memory

In the "WeldLogger" log file menu you can save log files to USB memory. This allows you to transfer the log files to a PC.

1. Select requested log file from menu
2. Press "right" button to "Open" mode
3. Press "up/down" button" to "Save to USB" mode
4. Press "right" button. Select "Yes" or "No"



6.7.6 Optional: Print from WeldLogger PC software

The optional WeldLogger PC Software allows you to document, save and print your log files transferred from the USB memory.

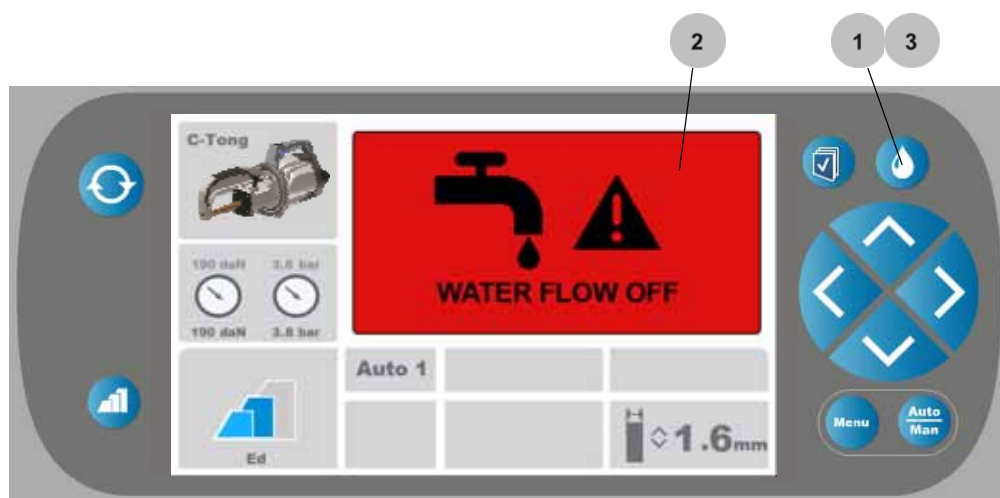
1. **Work orders saved on the computer.**
2. **Basic information form. Here you can edit your work order.**
3. **Click on this button to import work order from the USB memory.**
4. **Opened work order with welding values, including results.**
5. **Click on this button to print the work order.**



6.8 Turning off cooling water when changing electrodes

When you change electrodes you need to turn off the cooling water pump in order to prevent water from pouring out from the yoke.

1. Press the "Water flow" button to turn OFF the cooling water pump.
2. Red box with "Water flow off" is shown.
3. After changing the electrodes, press the "Water flow" button again to turn ON cooling water pump before you start welding!



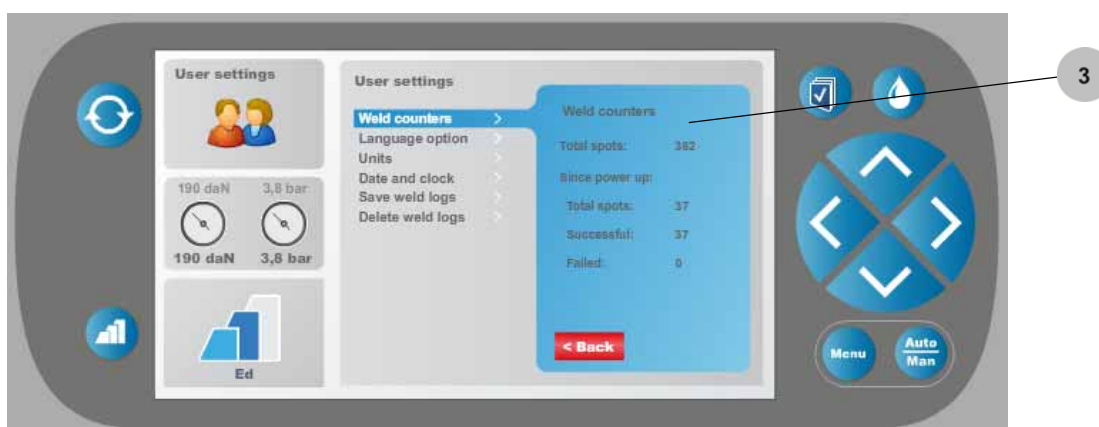
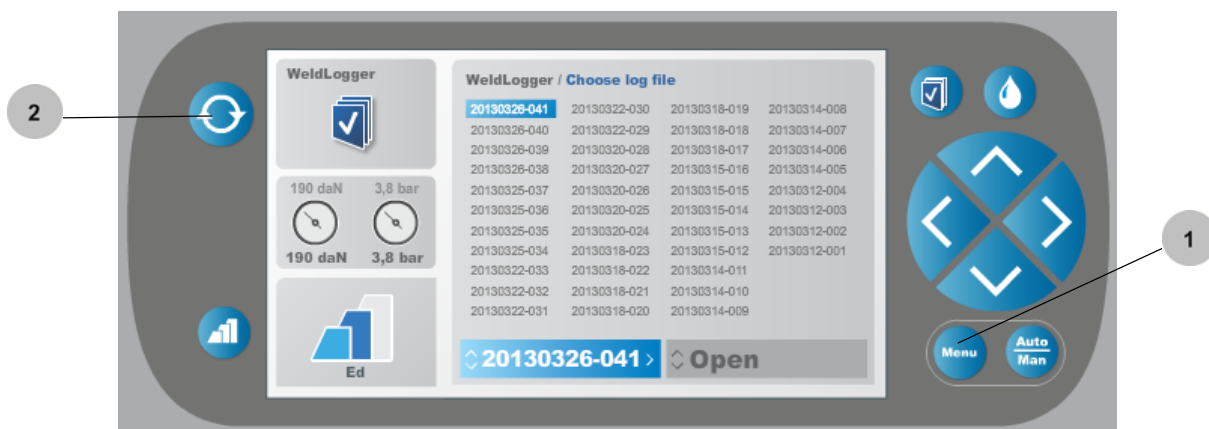
IMPORTANT! It is not possible to start welding before cooling water pump flow is turned on.

6.9 User settings

In "User settings" you can do set up for:

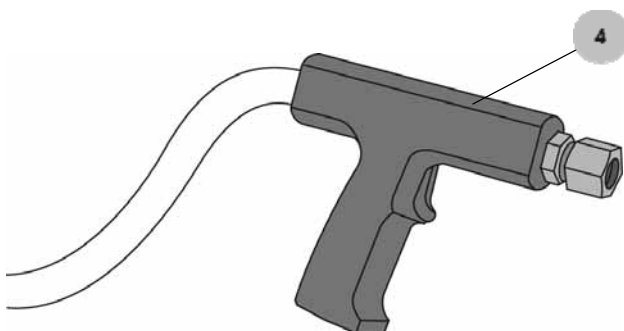
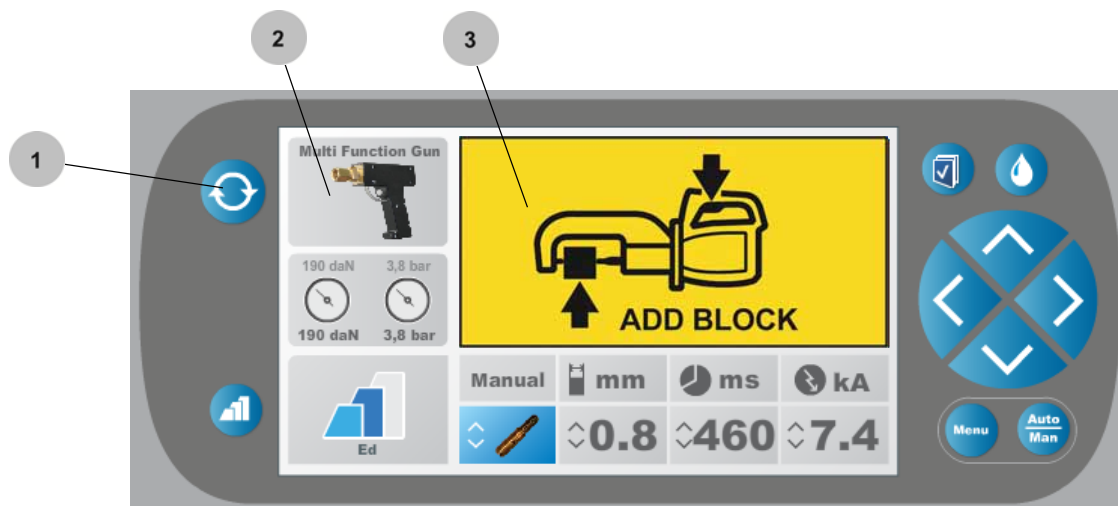
- **Weld counters** - shows number of total spots (successful and failed).
- **Language option**
- **Units**
- **Date and clock**
- **Save weld logs** - Saving ALL existing Weld Logs.
- **Delete weld logs** - Deleting ALL existing Weld Logs.

1. If you are in welding mode, press the "Menu" button. Then the "Log files" menu appears.
2. Then press the "Change tool" button. In this mode it will open the "User settings" menu
3. In the given example Weld counters shows number of total spots and number of spots since last start up of the machine (successful and failed).



6.10 Multi function gun settings

1. Select Multi function gun by pressing the "Change tool" button.
2. The Multi function gun is displayed.
3. Yellow box with "Add block" is shown.
4. Multi function gun must now be installed.



6.10.1 Installing the multi-function gun

Installing the multi-function gun cable to the C-Tong:

1. **Fit the current cable adapter between the electrodes.**
2. **Follow the polarity shown on the label.**
3. **Press the trigger button on the C-Tong once. The gun closes, contacts the adapter and stays closed.**
4. **Insert and lock the control plug in the socket at the left side of the C-Tong.**
5. **Fit the multifunction gun with the desired tool.**
6. **The welding object must be grounded with the connector.**

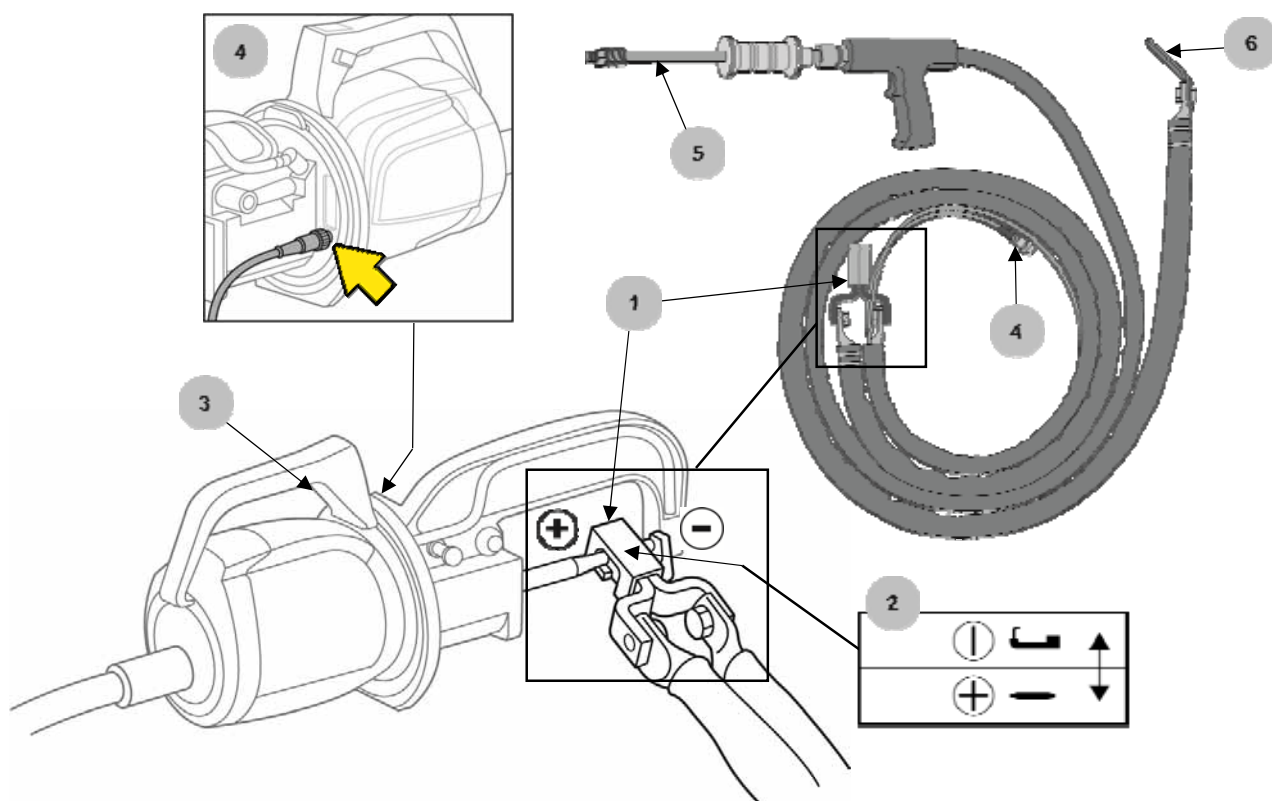


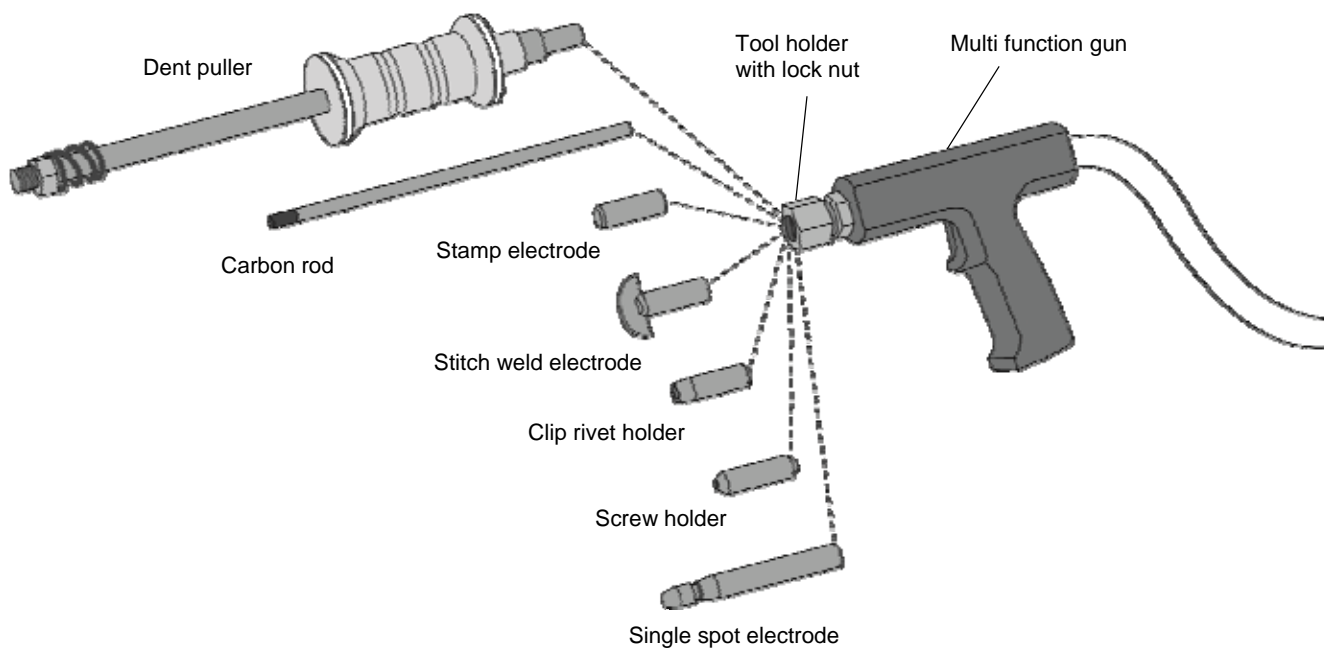
Figure 6.2 Installing the Multi-function gun



NOTE: The ground connector must be connected to the outer body sheet.

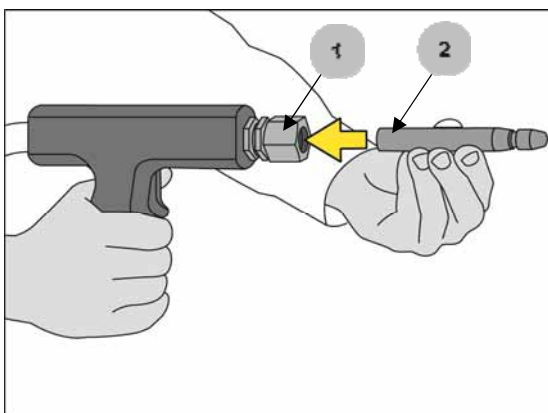
6.10.2 Fitting the multi-function gun

The multi-function gun can be fitted with a number of tools.
The most common tools are shown below.



Fit the multi-function gun with tools as follows:

1. **Release the lock nut on the multi-function gun by hand or with a wrench to open the tool holder.**
2. **Insert the desired tool into the tool holder.**
3. **Lock the tool holder by tightening the lock nut.**



➡ **NOTE:** The threads of the multi-function gun can be greased with a small amount of copper paste to reduce friction of the lock nut.

6.10.3 Grounding the welding object when using tools (except single spot)

The welding object must be grounded by doing as follows:

1. **To achieve good contact, remove paint, primer and rust by grinding the area onto which the ground connector shall be connected.**

➡ **NOTE:** These instructions do not apply to single sided spot welding.

➡ **NOTE:** The ground connector must be connected to the outer body sheet.

➡ **NOTE:** For best results, apply the ground connector as close to the welding area as possible. The ground connector should be applied at a maximum distance of one meter from the welding object.

2. **Once the outer sheet is grinded, free from paint, primer and rust, clamp the ground connector to the sheet with a set of pliers or a clamp.**

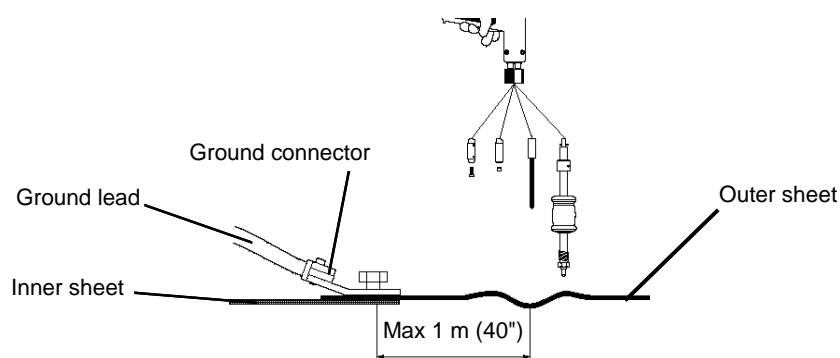


Figure 4.9 Connection of the ground lead when using the tools.

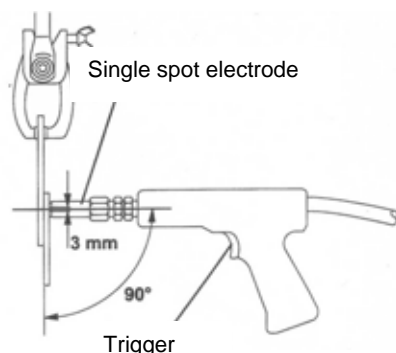
6.10.4 Select required tool

When Multi function gun is installed you can select the required tool.

1. **Select tool by pressing the "up/down" button.**
2. **Selected tool is displayed.**
3. **Set welding time and current by pressing the "right/left" and "up/down" buttons.**



6.10.5 Single spot welding



The maximum electrode-side sheet thickness is 1.5 mm; the thickness of the sheet on the opposite side should however be higher. Prior to welding, ensure that the sheets are perfectly clean and close lying.

For optimum results, use a single spot electrode in good condition (with rounded tip) and with a maximum electrode tip diameter of between 3.5 and 4.5 mm; you can also use a suitable electrode cap.

Always attach the work piece clamp to the lower sheet or, if the weld zone cannot be accessed from the rear, press the work piece clamp against the rear plate by using the copper lug that was delivered together with the other equipment. Already welded spots produce a parallel resistance, and thus an energy loss. To reduce this loss to the greatest possible extent, the following spots must be welded in direction to the ground clamp.

Place the gun with the single spot electrode at right angle onto the sheets to be welded, press strongly (approx. 80 kg) against the sheets and activate the trigger. (See figure above).

Reference and welding values are automatically set by the chosen material thickness.

1. **Select "Single spot" tool by pressing the "up/down" button.**
2. **Set the total sheet material thickness. Welding time and current will be automatically set ("right/left" button)**
3. **Manual setting of welding time and current ("up/down" button).**





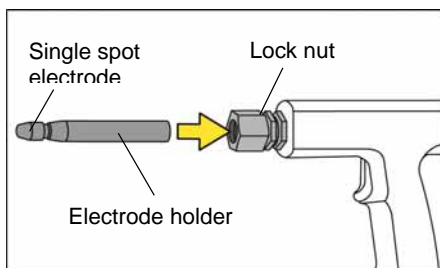
IMPORTANT! Single sided spot welding is not permitted on supporting frameworks of a vehicle. It is only permitted for cosmetic purposes.



IMPORTANT! The outer sheet must be the thinnest sheet when performing single sided spot welding. The thickness of the outer sheet to be welded must be less than 1.5 mm, and the thickness of the inner sheet must be less than 2 mm.



IMPORTANT! When not in use, be sure to place the multi-function gun and the ground connector so that they do not make electrical contact. Risk for short circuit.



Fitting the multi-function gun with a single side electrode

1. **Release the lock nut on the multi-function gun by hand or with a wrench to open the tool holder.**
2. **Make sure that the tip of the single side electrode is rounded. For changing the electrode, see section "Changing the single spot electrode" on the following page.**
3. **Insert the single side electrode and the electrode holder into the tool holder.**
4. **Lock the tool holder by tightening the lock lock nut.**



NOTE: To achieve a quality weld nugget it is important that the tip of the single spot electrode is evenly rounded. It is also important that the tip of the electrode is rounded.

A used electrode can be sharpened using a electrode tip dresser. Place the electrode into the drill chuck. Rotate the drill chuck and grind the electrode tip using a electrode tip dresser.

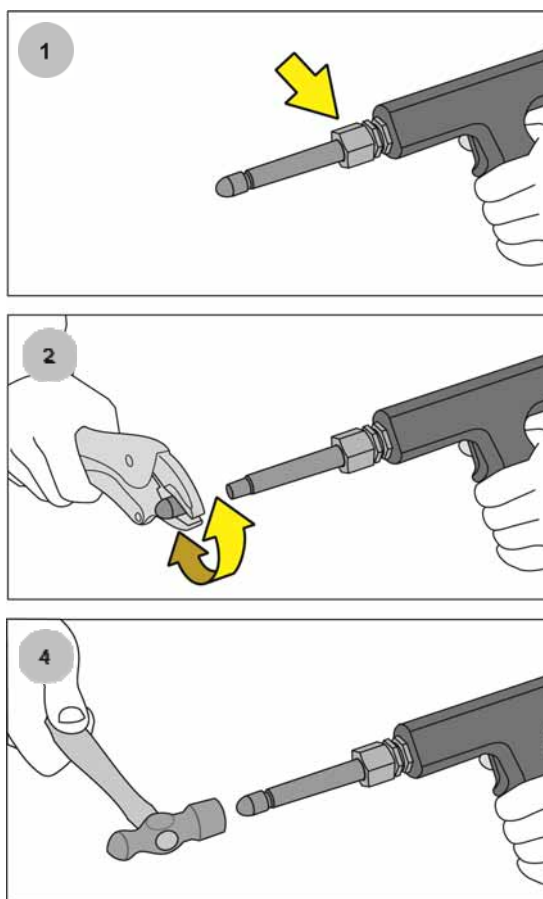


NOTE: The electrode, not the file, shall rotate when sharpening the electrode.

Changing the single spot electrode

To change the single spot electrode:

1. **Make sure that the electrode holder is fitted correctly to the multi-function gun with the lock nut fully tightened.**
2. **Grip the electrode with a set of pliers. Turn the pliers and the electrode back and forth to loosen the electrode from the electrode holder.**
3. **Remove the used electrode from the holder.**
4. **Place a new electrode into the electrode holder. This can be done by hand or by knocking it gently with a small hammer.**



NOTE: Do not loosen the electrode by hitting it. This could damage either the electrode, the electrode holder or the multi-function gun.



WARNING! The tools or electrodes may be hot. Risk for burning injuries.

Grounding the welding object when performing single sided spot welding

1. **To achieve a good contact, remove paint, primer and rust by grinding the area on the inner body sheet onto which the ground connector shall be connected.**



IMPORTANT! Make sure to connect the ground connector to an area where the inner body sheet is level and not curved.



NOTE: Remove paint, primer and rust and apply the ground connector as close to the welding area as possible, and at a maximum distance of one meter from the welding area.

2. **Once the inner sheet is ground free from paint, primer and rust, clamp the ground connector to the inner sheet with a set of pliers or a clamp.**
3. **Set the welding power.**

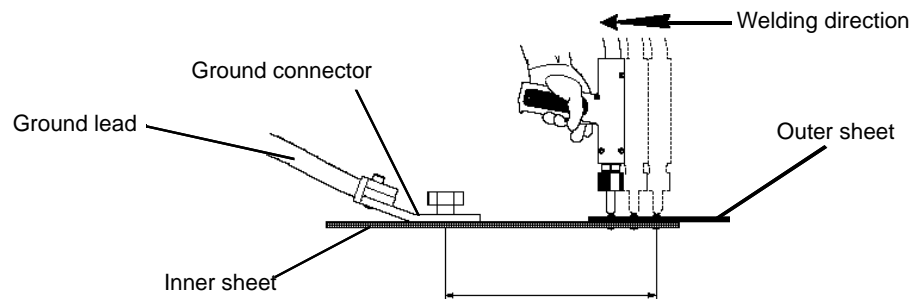
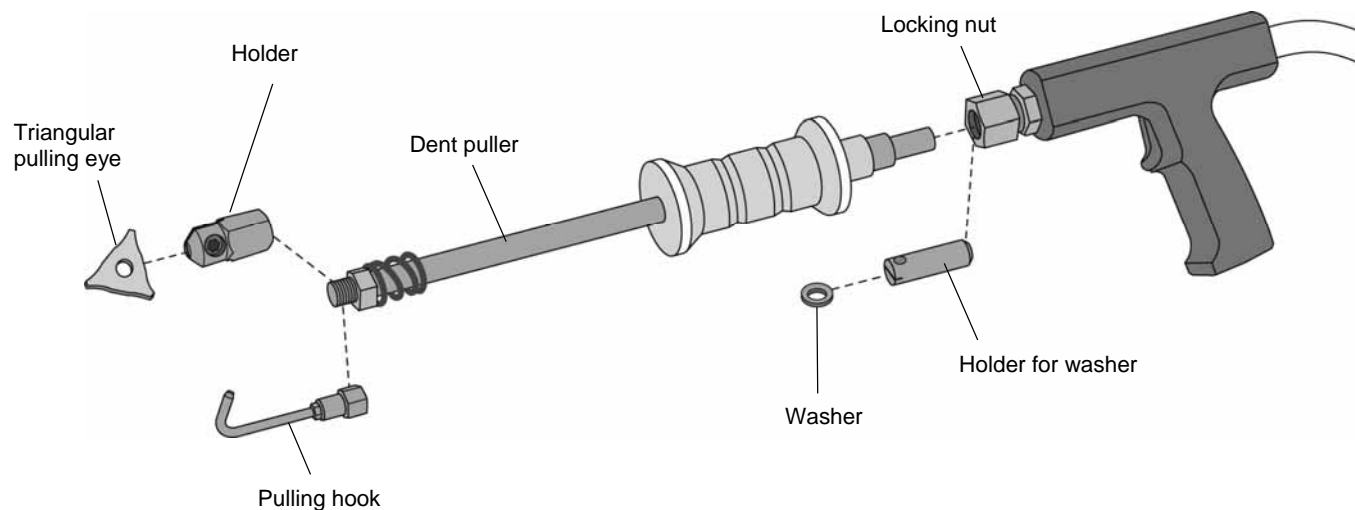


Figure 4.10 Connection of the ground connector when performing single sided spot welding

6.10.6 Dent puller - for washers and triangular pulling eye

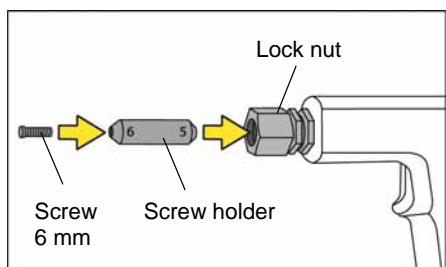
When using the dent puller, standard procedures are welding of washers or triangular pulling eye.



1. Select "Dent puller" tool by pressing the "up/down" button.
2. Set welding time and current.



6.10.7 Screw 6 mm

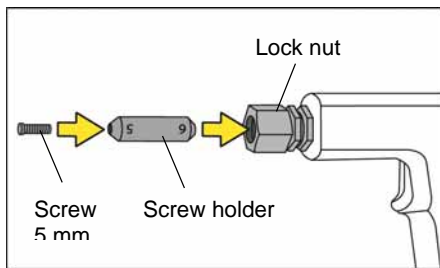


The screw tool is a multi-function gun application for fastening trim and clips.

1. Select "Screw 6mm" tool by pressing the "up/down" button.
2. Set welding time and current.



6.10.8 Screw 5 mm

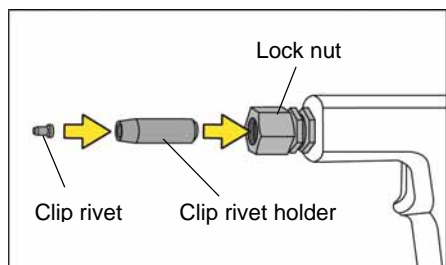


The screw tool is a multi-function gun application for fastening for example trim, electric cables and brake pipes.

1. Select "Screw 5mm" tool by pressing the "up/down" button.
4. Set welding time and current.



6.10.9 Clip rivet

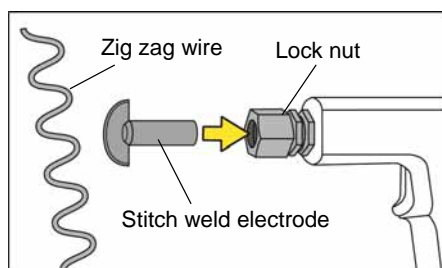


The clip rivet tool is a multi-function gun application for fastening clips.

1. Select "Clip rivet" tool by pressing the "up/down" button.
2. Set welding time and current.



6.10.10 Stitch welding and welding of Zig zag wire

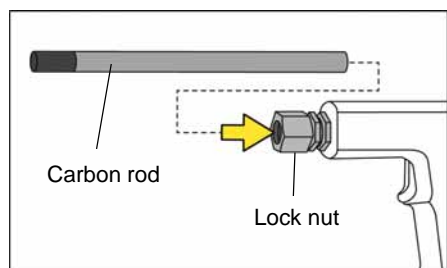


The stitch weld electrode is a multi-function gun application for producing a seam weld and for welding Zig zag wire.

1. Select "Stitch weld" tool by pressing the "up/down" button.
2. Set welding time and current.

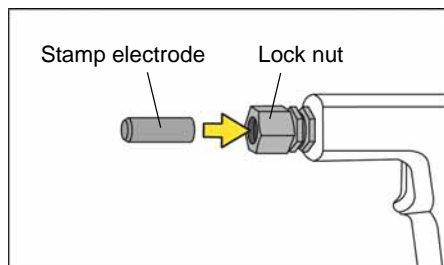


6.10.11 Carbon rod and stamp electrode shrinking



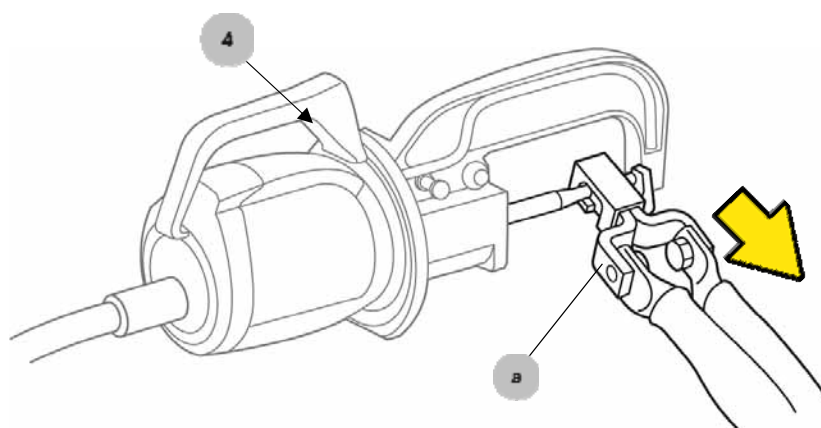
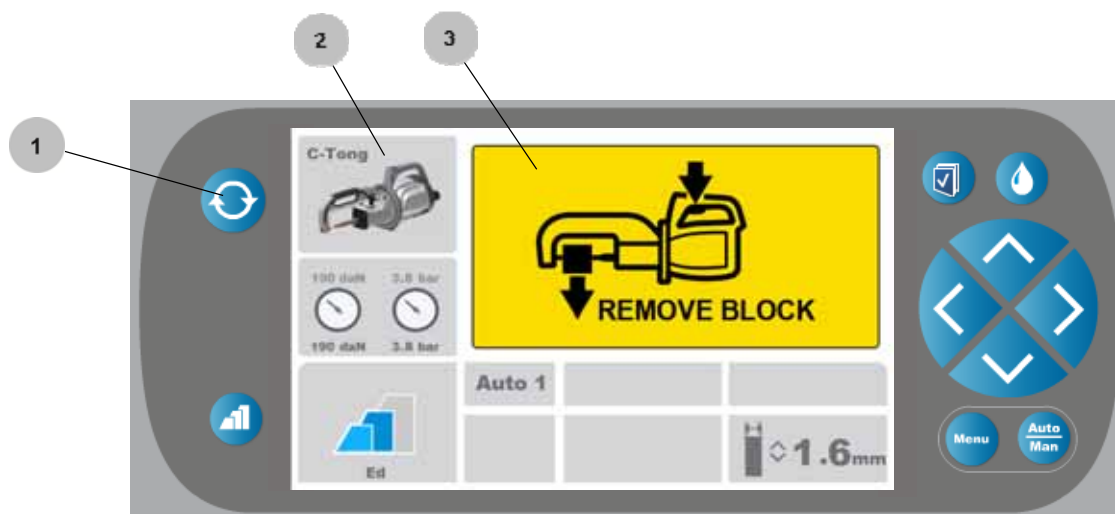
Carbon rod is a multi-function gun application for shrinking metal. Use rod for larger area and stamp electrode for smaller area. (Break off carbon rod to desired length.)

1. Select "Carbon rod" tool by pressing the "up/down" button.
2. Set current.



6.10.12 Ending the multi-function gun program

1. Select C-Tong by pressing the "Change tool" button.
2. The C-Tong is displayed.
3. Yellow box with "Remove block" is shown.
4. Push the C-Tong trigger button to release the block [a].



6.11 A-Tong settings

When A-Tong is selected there are three available modes: Auto 1, Auto 2 and Manual (Fully Automatic is not available).

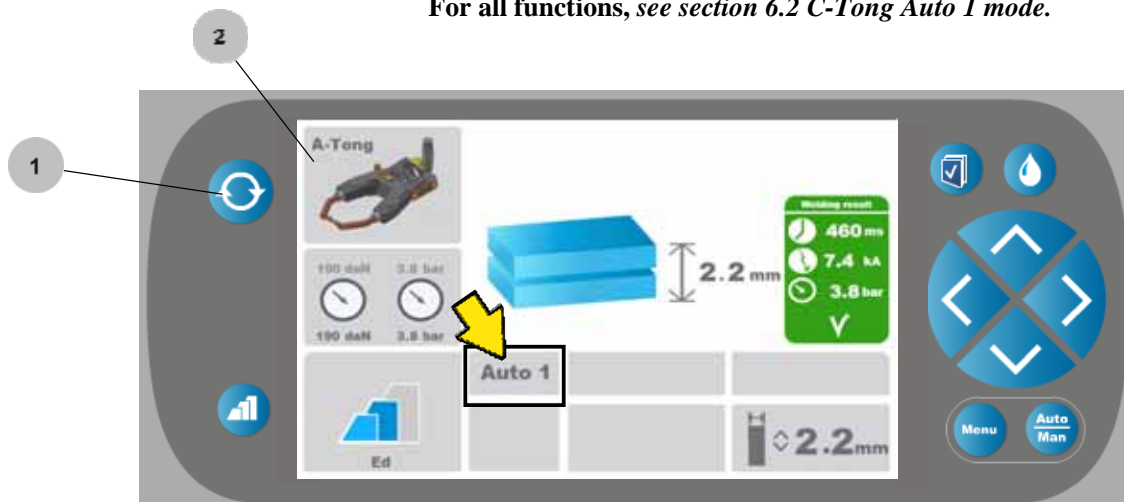


NOTE: For mounting of the A-Tong, see section 4.5.4 *Converting C-Tong to A-Tong*.

6.11.1 Auto 1 mode

1. Select A-Tong by pressing the "Change tool" button.
2. The A-Tong is displayed.

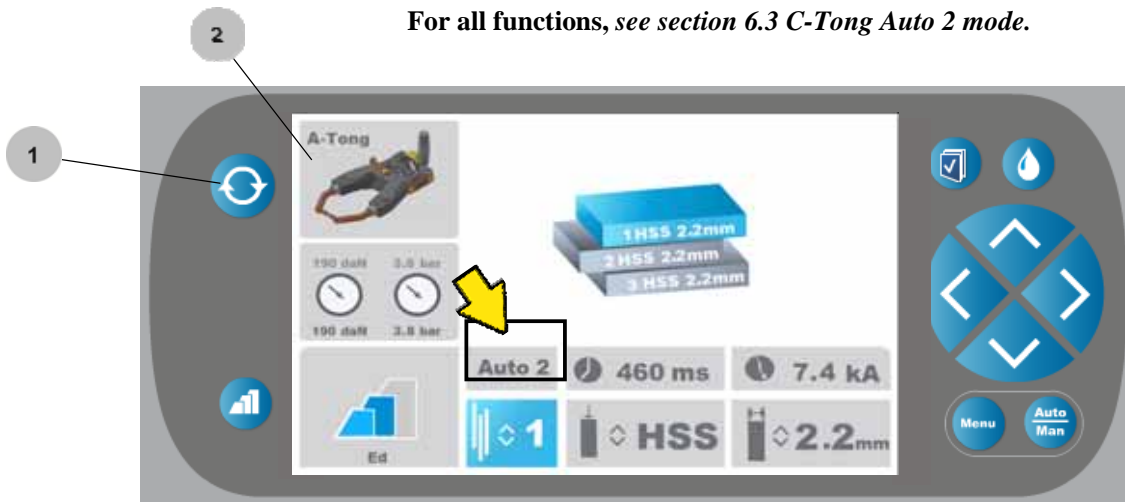
For all functions, see section 6.2 *C-Tong Auto 1 mode*.



6.11.2 Auto 2 mode

1. Select A-Tong by pressing the "Change tool" button.
2. The A-Tong is displayed.

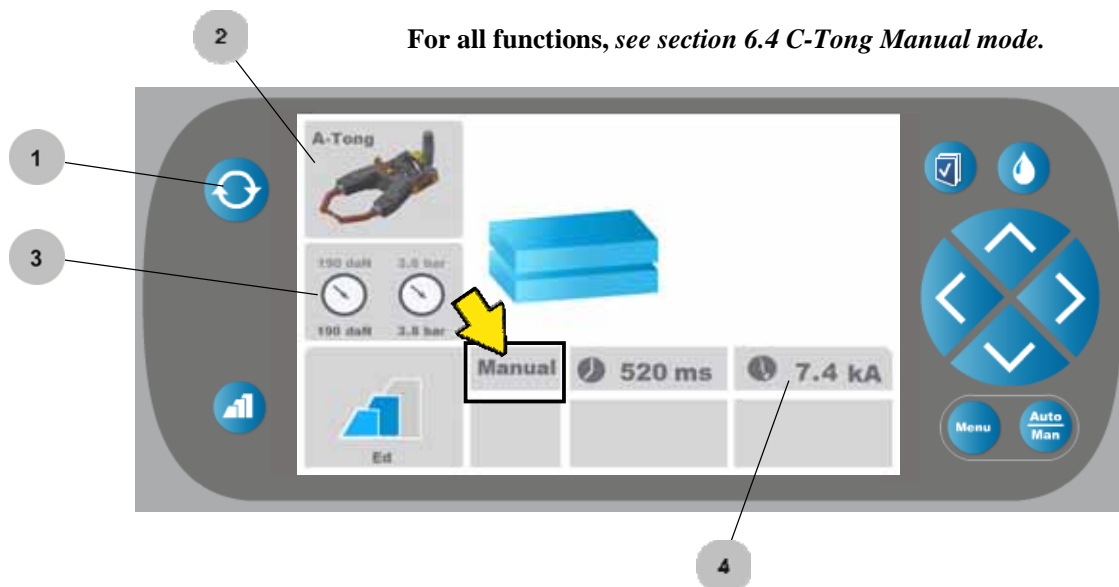
For all functions, see section 6.3 C-Tong Auto 2 mode.



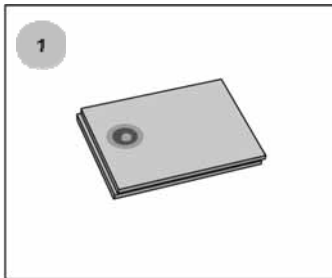
6.11.3 Manual mode

1. Select A-Tong by pressing the "Change tool" button.
2. The A-Tong is displayed.
3. The max force is limited to 450 daN.
4. The max current is limited to 10 kA.

For all functions, see section 6.4 C-Tong Manual mode.

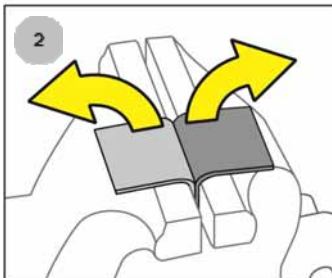


6.12 Performing nugget strength tests



It is important that the weld nuggets have sufficient quality. The quality of the weld nuggets are checked with strength tests. When performing these tests, you are ensured that the set weld current and weld time is sufficient.

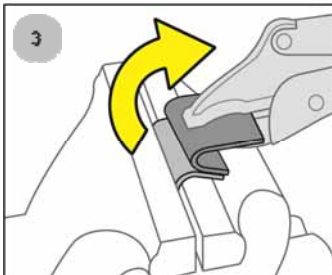
To perform a simple strength test, follow the instructions below:



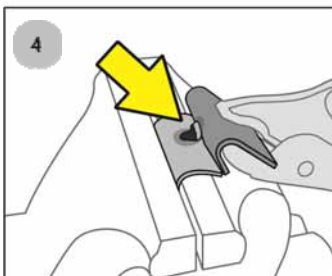
1. **Set the desired welding program (see chapter 6 "Welding modes") and weld two metal sheets of the same thickness as those to be welded on the vehicle.**

2. **Place the welded metal sheets, with weld nugget pointing downwards, in a vise and knock them apart with a sledge hammer.**

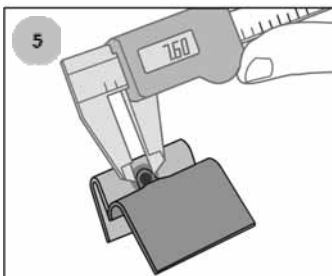
3. **Now place the metal sheets according to the picture and bend them apart with a set of pliers.**



4. **If the weld nugget is successful, the metal sheet - not the weld nugget - shall break.**



5. **Measure the weld nugget to check that the diameter is correct.**



7 Service and Maintenance



WARNING! All service and maintenance must be carried out by Car-O-Liner service personnel and service support. Risk for electrical shock.



WARNING! Do not remove any covers of the welder. Risk for electrical shock.



WARNING! Unplug the welder from the wall outlet before servicing, cleaning or maintenance. Risk for electrical shock.



IMPORTANT! Never use water jet, detergents, solvents, thinners or benzene when washing the welder since they can damage the welder.

7.1 Service

Service must be performed by authorized Car-O-Liner service personnel under the following conditions:

- When the power cord is damaged or frayed.
- If liquid has been spilled into the product.
- If the welder has been exposed to rain or water.
- If the welder is producing unusual noises or odors.
- If the welder has been dropped or the cabinet has been damaged.
- If the thermal breaker has switched off the welder.

7.2 Maintenance

The amount of use and the working environment should be taken into consideration when planning the frequency of maintenance for the welder. Careful use and preventive maintenance will help you to ensure trouble-free operation.

Follow the Inspection plan below for correct inspection intervals and service actions:

	Daily inspection	Weekly inspection	Monthly inspection	Annual inspection
Check condition of C-tong, air connections and air hoses to prevent overheating and malfunction due to poor cooling	●			
Check condition of welding cables. Do not use faulty cables	●			
Check that mains connection cables are safe and in compliance with local regulations	●			
Check that all welding caps are in good condition. Cleaning with Scotch-Brite Hand Pads. Use a tip dresser to maintain the proper shape. Change caps if necessary	●			
Check coolant level	●			
Check support arm cord	●			
Check function of support arm spring and locking mechanism	●			
Clean air filters, see <i>figure 7.1 on the following page</i>		●		
Change coolant and high-tech anti freeze, see <i>3.7 Filling of cooling liquid</i>			●	
Check possible oxidation since it may cause contact resistance in the welding circuit. Remove oxidation with fine sandpaper if necessary			●	
Check cooling tubes. Each cap holder electrode has a specific coolin tube that goes in it			●	
Clean the spot welder and remove dirt and metal particles that might be attracted by the machine's magnetic field			●	
Check all screws on electrode yokes, electrode holders, plates, rigid and flexible junctions. Tighten if necessary			●	
Completely drain off and replace coolant				●



WARNING! Do not remove any covers when cleaning the welder.
Risk for electrical shock.



IMPORTANT! Never use water jet, detergents, solvents, thinners or benzene when washing the welder since they can damage the welder.

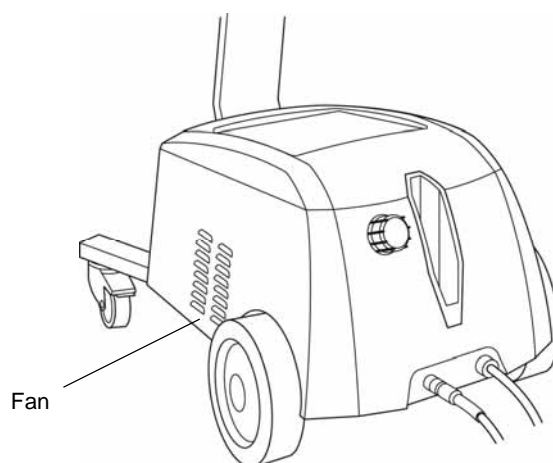


Figure 7.1 Air filter by the fan.

8 Troubleshooting

The troubleshooting instructions in this chapter will help you to quickly find and correct the most common faults that may occur when using the welder.

The error message list is useful in interpreting any error messages shown on the display of the welder (red display background), *see 8.1. Fault tracing table*. A red error message automatically stops the welder. The fault-tracing table is useful when tracing welder faults. The table presents the most common faults and their possible causes.

There are also information messages (yellow display background), *see 8.2 Display information messages*.

When yellow information messages are shown, the welder can still be used.



WARNING! All electrical connections must be carried out by a qualified electrician. Risk for electrical shock.

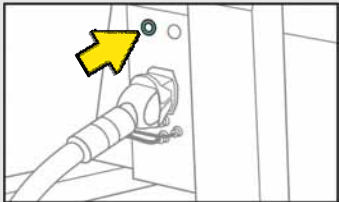











WARNING! Unplug the welder from the wall outlet before servicing, cleaning or maintenance. Risk for electrical shock.





WARNING! Never remove any covers or perform any work to the welder without unplugging the welder from the wall outlet. Risk for electrical shock.

8.1 Fault tracing table welder unit

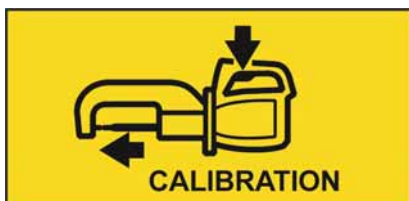
Error	Possible cause	Solution
No power The main switch button must be lighted. 	<ul style="list-style-type: none"> - No supply voltage. - Blown fuse(s) in the main supply on the wall outlet. - Loose connections. 	<ul style="list-style-type: none"> - Check if there is power in the wall outlet. - Check the main supply fuses. - Make sure that there are no loose connections in the electrical plug and the wall outlet. - Contact authorized Car-O-Liner service personnel
Faulty spot weld The welding current has not reached 80% of the set current. 	<ul style="list-style-type: none"> - Isolation between the metal sheets of the welding object, for example adhesive. - Uneven caps on the electrodes. - The welder does not receive sufficient power. - Voltage drop from power supply. - Blown fuse(s) 	<ul style="list-style-type: none"> - Clean between the metal sheets. - Change or clean electrode caps. <p>Note: <i>To confirm the message, press any key to return to the chosen welding program (The message locks the system at function).</i></p>
Connection error Communication error between front display and the welder. 	<ul style="list-style-type: none"> - Cable to the front display is broken or disconnected. - Cable to C-Tong is broken or disconnected. 	<ul style="list-style-type: none"> - Contact authorized Car-O-Liner service personnel.
Wrong pressure 	<ul style="list-style-type: none"> - No supply air pressure. - Supply air pressure is too high or too low. 	<ul style="list-style-type: none"> - Connect the supply air pressure. - Contact authorized Car-O-Liner service personnel.

Water flow off		
	<ul style="list-style-type: none"> - The cooling water flow is not sufficient. 	<ul style="list-style-type: none"> - Make sure that the cooling water pump is not switched OFF. 
Over temperature		
	<ul style="list-style-type: none"> - The welder is overheated. 	<ul style="list-style-type: none"> - Wait and try again when "Over temperature" message disappears. - Check cooling water level. Add cooling water if level is low.
Control voltage error		
	<ul style="list-style-type: none"> - Missing supply voltage or value below specified level. 	<ul style="list-style-type: none"> - Contact authorized Car-O-Liner service personnel.
Fan error		
	<ul style="list-style-type: none"> - Fan malfunction. 	<ul style="list-style-type: none"> - Contact authorized Car-O-Liner service personnel.
System error		
	<ul style="list-style-type: none"> - Welder internal error. 	<ul style="list-style-type: none"> - Contact authorized Car-O-Liner service personnel.

Sensor error		
	- Sensor malfunction.	- Contact authorized Car-O-Liner service personnel.
3 phase error		
	- One or more phases are missing.	- Check fuses in main supply system.
Pump error		
	- Pump malfunction.	- Contact authorized Car-O-Liner service personnel.

8.2 Display information messages

Messages with yellow background gives you important information in certain situations, for example when installing/removing Multi Function Gun or when electrode caps service is necessary.



"Calibration" is always shown at Startup and with necessary intervals. To calibrate welder, push C-Tong trigger button and weld without anything between the electrodes.



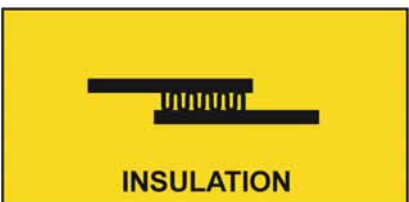
"Add Block" is shown when Multi function gun is selected with the "Change tool" button on the control panel.



"Remove Block" is shown when C-Tong is selected with the "Change tool" button on the control panel.



"Caps Service" is shown when cleaning or changing electrode caps is necessary.



"Insulation" is shown when there is coating, adhesive or other impurities between metal sheets of welding object that prevents current to transfer through the metals.



"No USB" is shown when you select "Save to USB" in the "WeldLogger" (or other functionalities) and no USB is inserted to the welding unit.



"Thickness too high" is shown when metal sheet thickness is over 10 mm.



"Thickness too low" is shown when metal sheet thickness is below 0,8 mm.



"Invalid parameter" is shown when a material is not supported by the welding process.



"Low Battery" is shown when the clock battery needs to be replaced. Contact authorized Car-O-Liner service personnel.

9 Dismantling and Salvage



IMPORTANT! For the sake of the environment, it is important that the equipment is dismantled in an environmentally friendly way.

To limit strain on the environment and its natural resources, it is important that the various parts of the welder are recycled.

Mechanical components, electrical components, plastic hoses, and steel and aluminium should be sorted for material recycling.

10 Technical Specifications

10.1 208V

CTR9 Spot Welder 208V	
Rated input voltage, U _{1N} :	3 x 208V -5% +10%, 50 Hz-60 Hz
Power supply fuse	60A slow blow or circuit breaker Type K
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, p _{1min} auto - p _{1max} :	5.0-10 bar (72-145 psi)
Duty factor, X:	10%
Maximum short circuit input current, ILCC:	317A
Permanent power (100 % duty factor), Sp:	116 kVA
Permanent input current, ILp:	324 A
Welding Output	
Maximum short circuit output current, I _{2cc} :	16.0 kA
Permanent output current (100 % duty factor), I _{2p} :	14.1 kA
No-load voltage, U _{2d} :	12.0 V
Liquid Cooling	
Cooling power:	1000W
Tank capacity:	20 l (5.3 gal)
Rated cooling liquid flow, Q:	3 l/min (0.79 gal/min)
Cooling liquid pressure drop, D _p :	1.79 bar (26.0 psi)
Mechanical Data	
Electrode force, F _{min} -F _{max} :	350-640 daN (787-1439 lbf)
Dimensions (HxWxD) approximately (without support arm):	1130 x 650 x 930 mm (44.5 x 25.5 x 36.5 in)
Weight approximately (with support arm, 20 l water and 80 mm yoke):	135 kg (298 lbs)
Weight C-Tong, with 80 mm yoke, approximately:	11,4 kg (25.2 lbs)
Cable length:	6 m (19.7 ft)

Table 10.1 Technical specifications for CTR9 208V welding machine.

10.2 230V

CTR9 Spot Welder 230V	
Rated input voltage, U _{1N} :	3 x 230V -5% +10%, 50 Hz-60 Hz
Power supply fuse	63A slow blow or circuit breaker Type D
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, p _{1min} auto - p _{1max} :	5.0-10 bar (72-145 psi)
Duty factor, X:	10%
Maximum short circuit input current, I _{LCC} :	243 A
Permanent power (100 % duty factor), Sp:	120 kVA
Permanent input current, I _{Lp} :	301 A
Welding Output	
Maximum short circuit output current, I _{2cc} :	16.0 kA
Permanent output current (100 % duty factor), I _{2p} :	15.8 kA
No-load voltage, U _{2d} :	13.4 V
Liquid Cooling	
Cooling power:	1000W
Tank capacity:	20 l (5.3 gal)
Rated cooling liquid flow, Q:	3 l/min (0.79 gal/min)
Cooling liquid pressure drop, D_p :	1.79 bar (26.0 psi)
Mechanical Data	
Electrode force, F _{min} -F _{max} :	350-640 daN (787-1439 lbf)
Dimensions (HxWxD) approx. (without support arm):	1130 x 650 x 930 mm (44.5 x 25.5 x 36.5 in)
Weight approximately (with support arm, 20 l water and 80 mm yoke):	135 kg (298 lbs)
Weight C-Tong, with 80 mm yoke, approximately:	11,4 kg (25.2 lbs)
Cable length:	6 m (19.7 ft)

Table 10.2 Technical specifications for CTR9 230V welding machine.

10.3 400V

CTR9 Spot Welder 400V	
Rated input voltage, U _{1N} :	3 x 400V -5% +10%, 50 Hz-60Hz
Power supply fuse	32A slow blow or circuit breaker Type D
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, p _{1min} auto - p _{1max} :	5.0-10 bar (72-145 psi)
Duty factor, X:	10%
Maximum short circuit input current, ILCC:	136 A
Permanent power (100 % duty factor), Sp:	130 kVA
Permanent input current, ILp:	190 A
Welding Output	
Maximum short circuit output current, I _{2cc} :	16.0 kA
Permanent output current (100 % duty factor), I _{2p} :	15.8 kA
No-load voltage, U _{2d} :	13.0 V
Liquid Cooling	
Cooling power:	1000W
Tank capacity:	20 l (5.3 gal)
Rated cooling liquid flow, Q:	3 l/min (0.79 gal/min)
Cooling liquid pressure drop, D _p :	1.79 bar (26.0 psi)
Mechanical Data	
Electrode force, F _{min} -F _{max} :	350-640 daN (787-1439 lbf)
Dimensions (HxWxD) approx. (without support arm):	1130 x 650 x 930 mm (44.5 x 25.5 x 36.5 in)
Weight approximately (with support arm, 20 l water and 80 mm yoke):	135 kg (298 lbs)
Weight C-Tong, with 80 mm yoke, approximately:	11,4 kg (25.2 lbs)
Cable length:	6 m (19.7 ft)

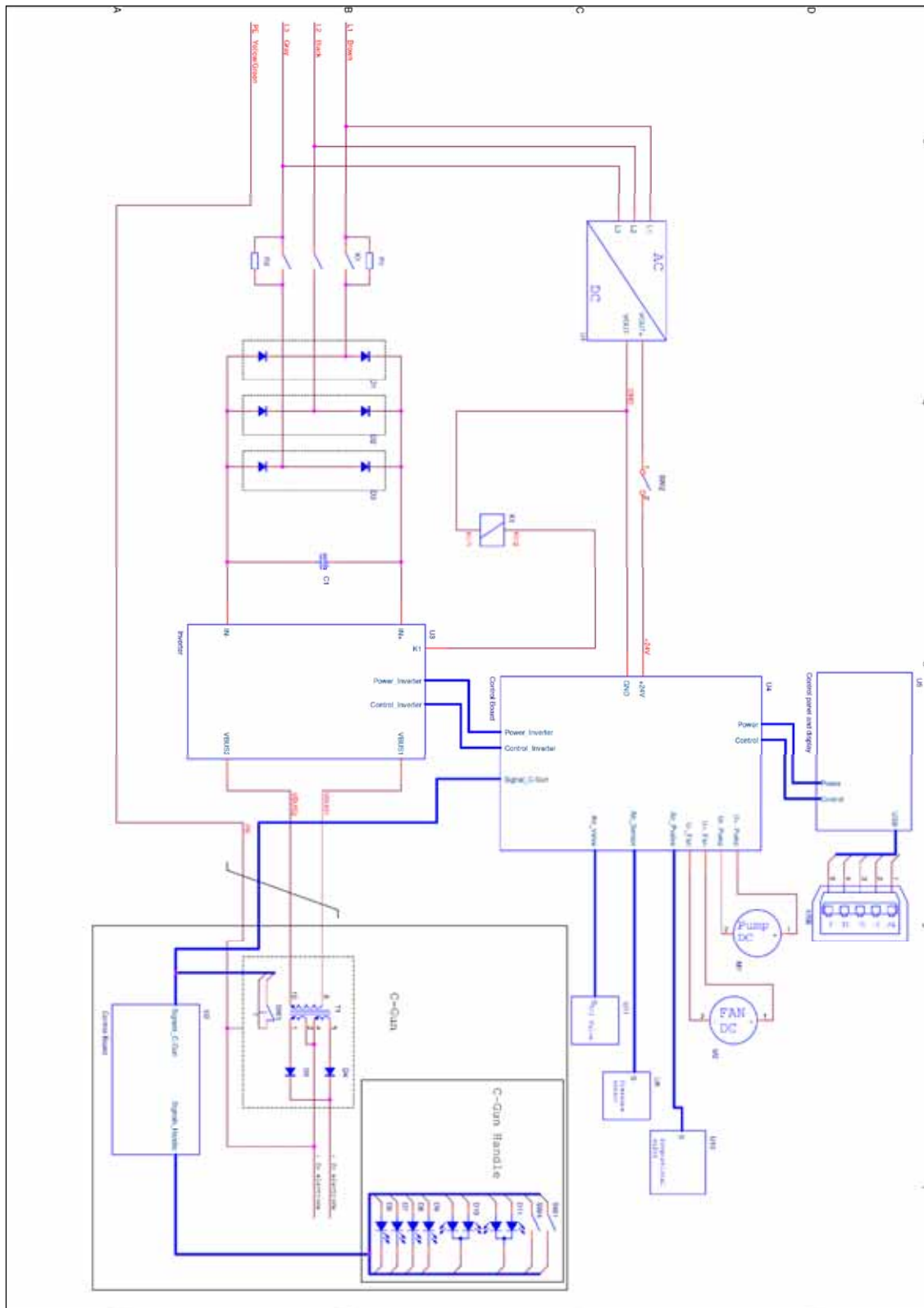
Table 10.3 Technical specifications for CTR9 400V welding machine.

10.4 460V

CTR9 Spot Welder 460V	
Rated input voltage, U _{1N} :	3 x 460V -5% +10%, 50 Hz-60 Hz
Power supply fuse	30A slow blow or circuit breaker Type K
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, p _{1min} auto - p _{1max} :	5.0-10 bar (72-145 psi)
Duty factor, X:	10%
Maximum short circuit input current, I _{LCC} :	109 A
Permanent power (100 % duty factor), Sp:	128 kVA
Permanent input current, I _{Lp} :	161 A
Welding Output	
Maximum short circuit output current, I _{2cc} :	16.0 kA
Permanent output current (100 % duty factor), I _{2p} :	15.8 kA
No-load voltage, U _{2d} :	14.5 V
Liquid Cooling	
Cooling power:	1000W
Tank capacity:	20 l (5.3 gal)
Rated cooling liquid flow, Q:	3 l/min (0.79 gal/min)
Cooling liquid pressure drop, D_p :	1.79 bar (26.0 psi)
Mechanical Data	
Electrode force, F _{min} -F _{max} :	350-640 daN (787-1439 lbf)
Dimensions (HxWxD) approx. (without support arm):	1130 x 650 x 930 mm (44.5 x 25.5 x 36.5 in)
Weight approximately (with support arm, 20 l water and 80 mm yoke):	135 kg (298 lbs)
Weight C-Tong, with 80 mm yoke, approximately:	11,4 kg (25.2 lbs)
Cable length:	6 m (19.7 ft)

Table 10.4 Technical specifications for CTR9 460V welding machine

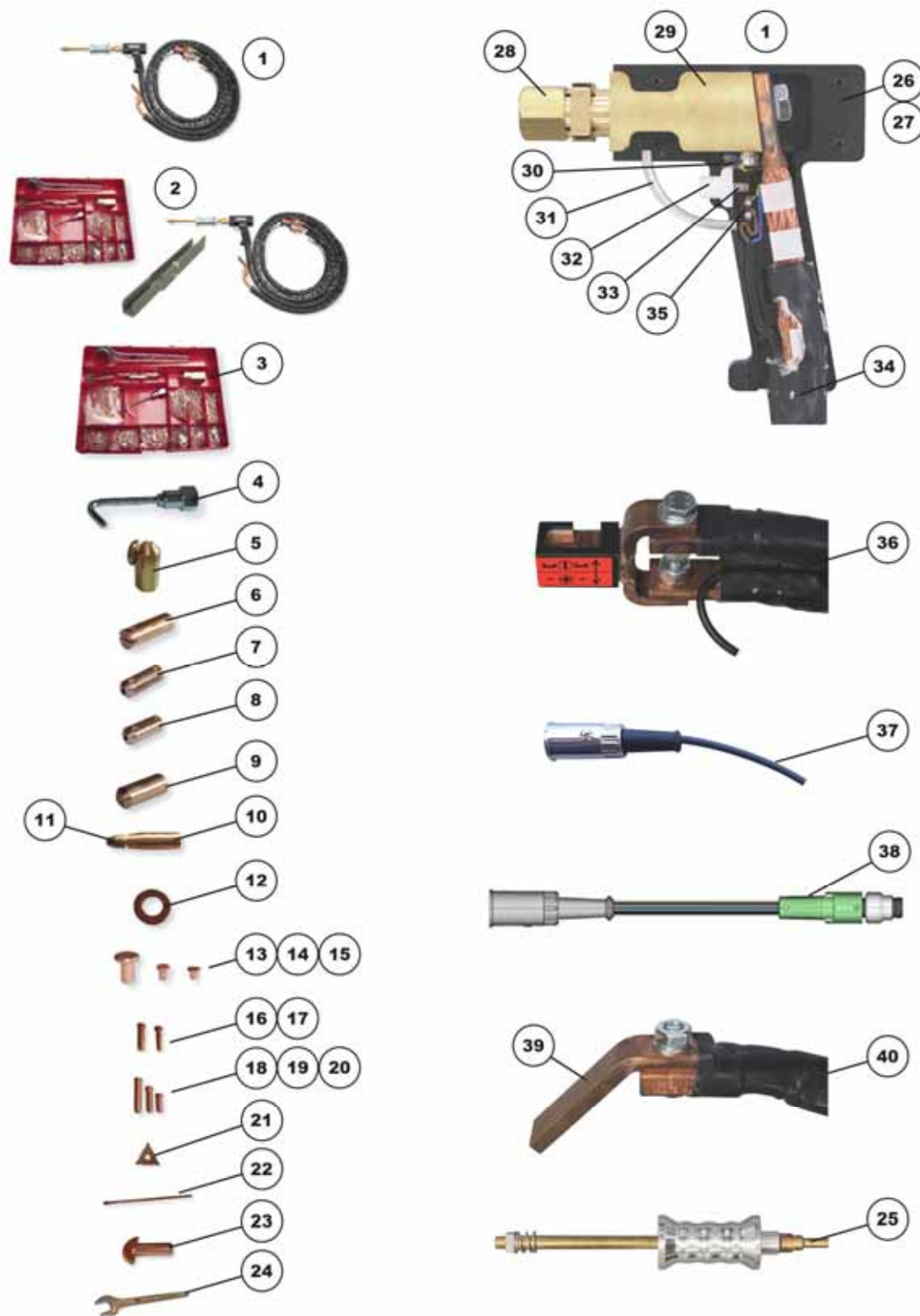
11 Electrical diagram



Essential parts list	
Item	Description
C1	Capacitor
D1,D2,D3	Rectifier diode
D4,D5	Welding diode
D6,D7,D8,D9	LED
D10,D11	Bi-Color LED
K1	Contactora
M1	Water pump
M2	Fan for water cooler
P2	USB connector
R1,R2	Resistors
SW1	Trigger button
SW2	Main switch
SW3	Thermal switch for over temperature protection
SW4	Reset switch
T1	Transformer
U1	Power supply
U2,U4	Control Board
U3	Inverter
U5	Control panel and display
U6	Pressure sensor
U10	Proportional valve
U11	3/2 Valve




12 Spare Parts and Accessories

12.1 Multi Function Gun and Accessories Box



Pos	Qty	Kit	Parts no	Description
1			41889	Multi Function Gun kit , including MF Gun, workpiece cable with connector, ground cable and pulling hammer
2			41888	Complete Multi Function Gun kit , including MF Gun, workpiece cable with connector, ground cable, delivery plate, pulling hammer and accessories box kit
3		A	41894	Accessories box kit
4	1	A	41895	Pulling hook for slide hammer
5	1	A	41897	Washer welding electrode
6	1	A	41898	Electrode for set screw
7	1	A	41899	Electrode for set screw
8	1	A	41900	Electrode for trim strip nipple
9	1	A	41901	Electrode for sheet pulling
10	1	A	41902	Spot welding electrode
11	100	A	41903	Electrode cap for spot welding electrode 13 mm
12	100	A	41904	Washers 8x16x1,5 mm coppered
13	100	A	41905	Trim strip nipple 3x3,2 mm
14	100	A	41906	Trim strip nipple 3x4,5 mm
15	100	A	41907	Holding nipple 5x8,2 mm
16	100	A	41908	Set screw M4x12 mm
17	100	A	41909	Set screw M5x18 mm
18	100	A	41910	Set screw with coarse-pitch thread 5x12 mm
19	100	A	41911	Set screw with coarse-pitch thread 5x18 mm
20	100	A	41912	Set screw with coarse-pitch thread 5x25 mm
21	20	A	41913	Special triangular pulling eye
22	1	A	41914	Carbon electrode for sheet pulling
23	1	A	41915	Seam welding electrode
24	1	A	41916	Flat wrench
25	1		41892	Pulling hammer
26	1		44421	Grab handle left
27	1		44424	Grab handle right
28	1		44422	Connecting nut
29	1		44423	Retainer nut II
30	1		44425	Thermo switch
31	1		44426	Retaining clip
32	1		44427	Control push button
33	1		44428	Clip
34	1		44430	Hose package
35	1		44069	Micro switch
36	1		44431	Current adapter
37	1		44432	Conector 3-pole
38	1		49108	MFG adapter
39	1		44433	Work piece
40	1		44434	Ground cable

13 CTR9 Electrodes Chart

<p>40 mm Yoke</p> 	<p>Cylinder electrode</p> <p>43025</p> 	<p>Yoke electrode</p> <p>49426</p> 
<p>80 mm Yoke</p> 	<p>Cylinder electrode</p> <p>48251</p> <p>Electrode plus 129 kit</p> 	<p>Yoke electrode</p> <p>48314</p> <p>Electrode minus 15 kit</p> 
<p>350 mm Yoke</p> 	<p>49850</p> <p>Electrode plus 99 kit</p> 	<p>48249</p> <p>Electrode minus 45 kit</p> 
	<p>49851</p> <p>Electrode plus 47 kit</p> 	<p>48250</p> <p>Electrode minus 96 kit</p> 
	<p>Cylinder electrode*</p> <p>48251</p> <p>Electrode plus 129 kit</p> 	<p>Yoke electrode*</p> <p>48250</p> <p>Electrode minus 96 kit</p> 
<p>500 mm Yoke</p> 	<p>48252</p> <p>Electrode plus 180 kit</p> 	<p>48249</p> <p>Electrode minus 45 kit</p> 
	<div>   41959 13 mm Standard </div> <div>  41960 16 mm BMW </div> <div>  44357 16A mm VAS 6755 </div>	

*Electrode combinations for 500 mm yoke: 48251 with 48250.
48252 with 48249.

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