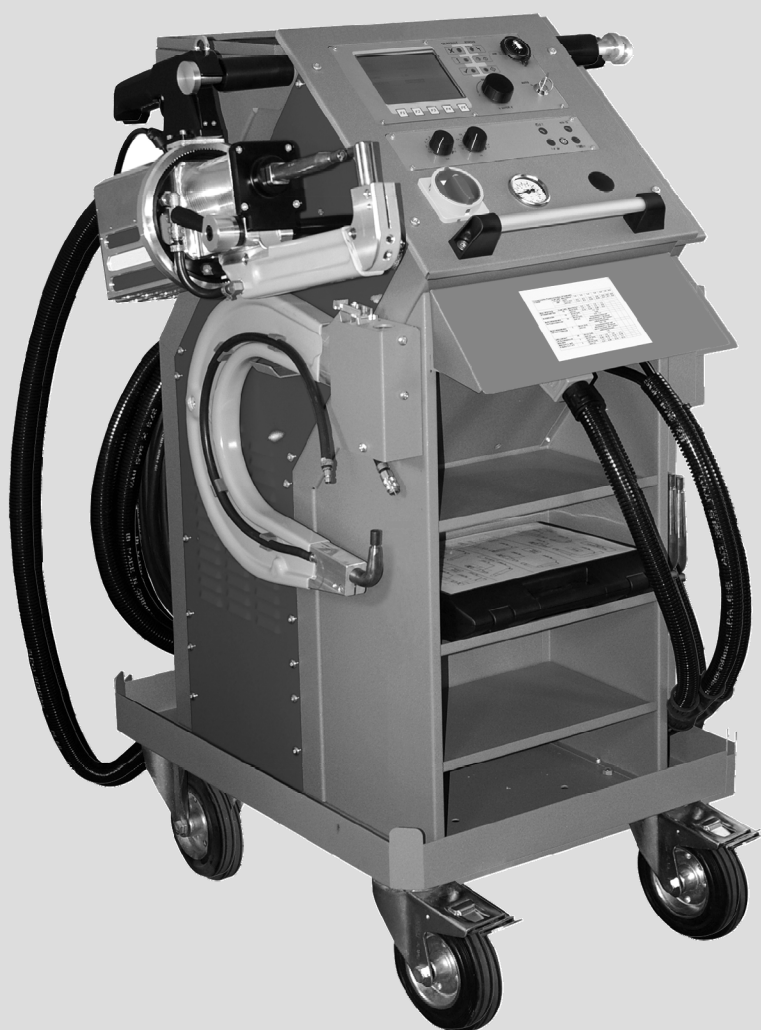


# CTR12000

General information and instructions, Part 1

## Instruction Manual (ORIGINAL)



(41643, rev 2) 2016-10, ENG

**CAR-O-LINER®**

## Foreword

The Spot Welder CTR12000 is used by body shops to duplicate the welding procedure used by the car manufacturers. All other use of the equipment, or use that is contrary to the instructions in this manual, can cause personal injury and/or machine damage. Pictures in this manual, where nothing else is mentioned, and the term “the welder” concerns all welders.

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

Wearing parts are excluded from these terms of warranty. The warranty does not cover normal wear and tear or damage caused by third persons, by improper handling or by manipulation by third persons. Normal wear and tear, mechanical damage or defects resulting from improper handling are expressly excluded from this warranty.

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 AB.
- Genuine Car-O-Liner AB 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 type and article number. This data is stamped on the name plate.

## Note

This instruction manual provides advice as well as instructions for installation, operation, maintenance and troubleshooting.



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

The 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 CTR12000 is manufactured by Car-O-Liner 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 CTR12000 is outlined.

A signed and dated copy of the EC Declaration of Conformity, including serial number, is included in the documentation for the CTR12000. Please contact your distributor if you need a new copy of the Declaration of Conformity.

<b>CAR-O-LINER®</b>		ORIGINAL
<b>EC DECLARATION OF CONFORMITY</b>		
We	<b>CAR-O-LINER GROUP AB</b> Hulda Mellgrens gata 1 SE-421 32 VÄSTRA FRÖLUNDA SWEDEN	
herewith declare under the sole responsibility that the product:		
<b>Type of equipment:</b>	<b>Medium Frequency Resistance Spot Welder</b>	
<b>Model</b>	<b>CTR12000</b>	
<b>Types:</b>	<b>141, 142, 143 and 144</b>	
<b>Serial number(s):</b>		
is in conformity with the provisions of the following EC directive(s):		
<b>2006/42/EC</b>	<b>Machinery Directive</b>	
<b>2006/95/EC</b>	<b>Low Voltage Directive (LVD)</b>	
<b>2004/108/EC</b>	<b>Electromagnetic Compatibility (EMC)</b>	
References of harmonized standards applied for this EC declaration of conformity, or parts there of:		
<b>EN 60204-1:2006</b>	<b>Safety of Machinery; Electrical Equipment of Machines – Part 1: General Requirements</b>	
<b>EN 62135-1:2008</b>	<b>Resistance Welding Equipment Part 1: Safety requirements for design, manufacture and installation</b>	
<b>EN 62135-2:2008</b>	<b>Resistance Welding Equipment Part 2: Electromagnetic compatibility (EMC) requirements</b>	
<b>The EMF is fulfilled according to risk analyses at given distances</b>		
(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 • <a href="http://www.car-o-liner.com">www.car-o-liner.com</a> • <a href="mailto:info@car-o-liner.se">info@car-o-liner.se</a>		

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# 1 General

## 1.1 About this manual

This manual provides information on operating the following appliance:

CTR12000 with connection for water cooled C welding gun and optionally available multifunction gun.

For further information on special features of our equipment you may perhaps need and that are fully or partly missing in this manual, please contact your local Car-O-Liner distributor.

This manual has been drawn up for shop managers and for any other person that is involved in machine installation, operation and maintenance. Make sure that these persons have fully read and understood this manual and the information contained therein.

Keep it at a well-known, easily accessible place and look it up for advice, if need be.

Please read the manual carefully before putting the welding machine into operation for the first time. It contains important information on installation, startup, operation, cleaning, maintenance and troubleshooting. Therefore keep it carefully in an easily accessible place.

## 1.2 Previous knowledge and experience

Users should have basic knowledge of resistance spot welding; otherwise they will not be able to understand the manual.

### *The general rule is*

- The welding machines being subject of this operating manual have been developed and designed for industrial use only and for operation by specialist staff.

<b>WARNING</b>
----------------

This equipment does not comply with IEC 61000-3-12. If it is connected to a public low-voltage system, it is the responsibility of the installer or user of the equipment to ensure, by consulting with the distribution network operator if necessary, that the equipment may be connected"

**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 conducted as well as radiated disturbances

- Installation, maintenance and repair work on the machine of what kind ever must only be executed by qualified and trained technicians who are familiar with the machines and have read and understood the relevant chapters of the operating manuals.
- The welder should be used in an occupational environment by an expert or an instructed person.

### 1.3 Use to the intended purpose



The resistance spot welding power source CTR12000 has been designed for repair work in body shops: Resistance welding procedure for spot welding, sheet forming with spotter (rivets and washers), local heating of steel plates (carbon electrode) and stitch welding on stainless steel (with multi-function gun being optionally available).

The welding machine must under no circumstances be used for other purposes, as for example for heating steel parts or for executing other work by using the pneumatic squeeze pressure of the welding gun. The machine has been designed for operation by one person only and the operating elements provided facilitate ease of operation and handling.

Any other usage shall be deemed to be incorrect and not in accordance with the intended purpose. The manufacturer and supplier shall not be liable for any consequential damage resulting from such improper usage.

Any alteration of the machine, even to a small extent, is forbidden, since any modification results in the invalidity of the CE certificate and the warranty.

### SIGNS USED ON THE MACHINE AND IN THE MANUAL



**ATTENTION!** This symbol indicates that the chapter contains very important information.



**CRUSHING HAZARDS!** This sign indicates a dangerous situation in which the operator may crush his upper limbs; be very careful!

The manufacturer is entitled to modify his products without preliminary notification.

## 1.4 Brief description of the welding machine

### 1.4.1 Design

The figure below shows the essential components of the multi-process spot welder and the basic details of construction.

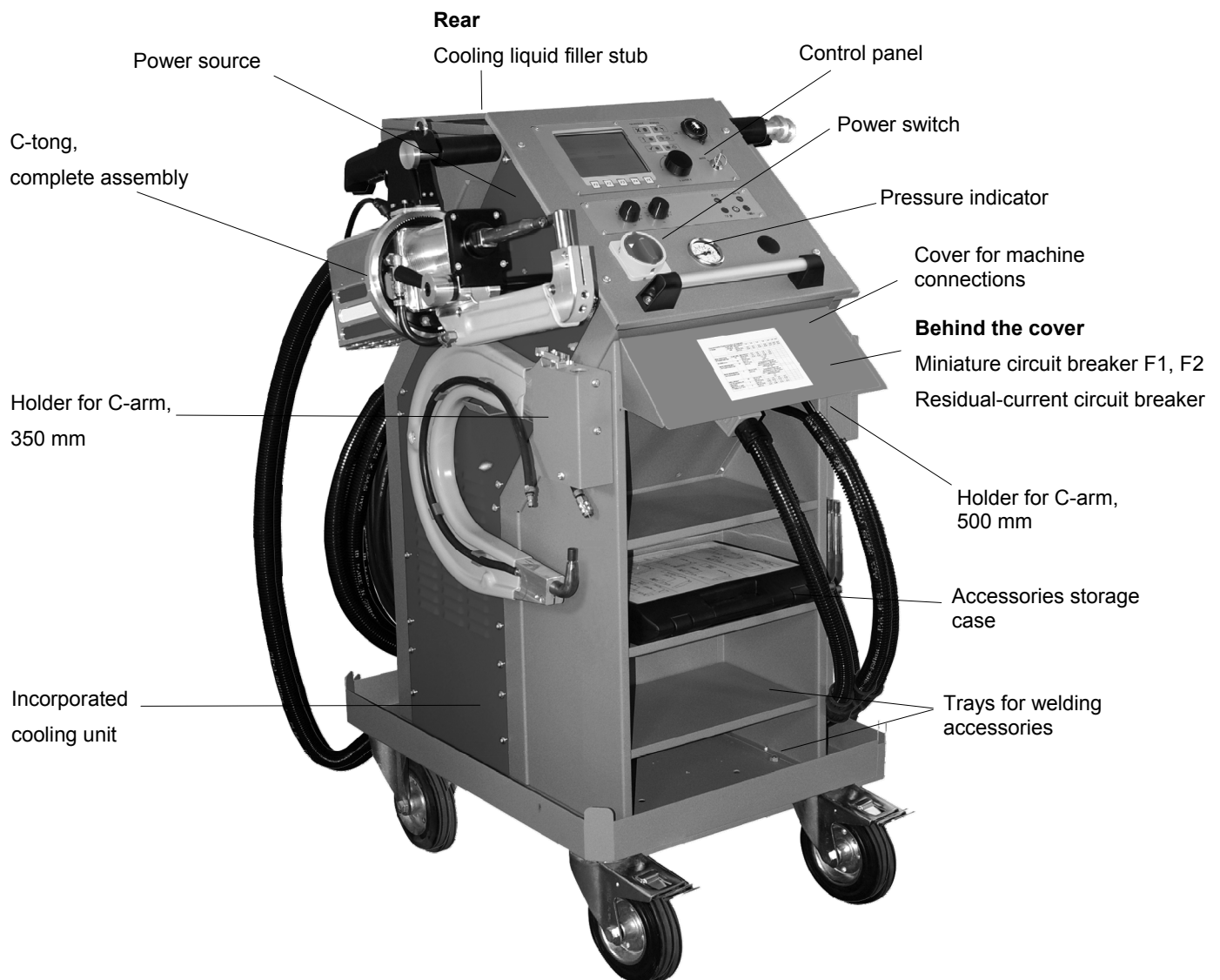


Figure 1.1 CTR12000



## 1.5 Welding power source

The welding power source has the task to control the welding process and to feed the welding gun with welding current, compressed air and cooling water.

The machine has been designed for repair jobs in body shops and must be installed on even floor. Make sure that power cable and compressed air hose are not squeezed.

The machine is not intended for use in production.

On the front face of the machine housing, power switch, operator panel as well as compressed air indicator and adjuster knob is located.

The following components are installed in the power source housing:

- Power section with thermal protection
- Residual-current operated circuit breaker (located behind the detachable cover)
- Microprocessor control unit
- Cooling fan
- Water cooling assembly for the welding gun
- Cooling liquid store tank

The operating principle of the power section is based on medium-frequency inverter technology. Thus dimensions and weight could be reduced. Additional benefits are:

- Fast-response current control
- Precisely defined initial conditions are produced before the real welding process is started
- Process control via current and energy control
- Maximum reproducibility

The machine's microprocessor control system accesses a physical welding database that contains parameters of different welding processes and guarantees thus maximum reproducibility and setting accuracy. The different programs can be invoked by means of the rotary encoder and synergistically adjusted, where appropriate.

The large illuminated display offers, together with the single-knob control, an operating convenience similar to that you know and are used to from your PC with windows system.

The side panels of the power source can be opened for service purposes. Service and maintenance work on the current supply and control systems must only be carried out by qualified and trained electricians.

The thermal protection prevents the welding machine from being overheated by initiating automatic machine stop in case of imminent overheating. The risk of overheating may result from insufficient cooling liquid level or cooling circuit interruption.

## **1.6 Optional equipment**

The standard CTR12000 machine is delivered with a C-tong. In principle, the machine can also be equipped with

- Multifunction gun
- Airpuller
- X gun
- Hand-held remote control

but preliminary modification may be necessary. Except the multifunction gun, these elements are not fully described nor illustrated in this manual.

## 2 Safety

### 2.1 Safety instructions



In order to ensure safe operation, only qualified staff is allowed to install the machine observing all the instructions mentioned in the section “INSTALLATION and ASSEMBLY”.

Strictly comply with the safety instructions in the section “MAINTENANCE AND UPKEEP” when servicing and maintaining the machine.

Remember in particular that the welding machine must be stopped and that the compressed air supply must be cut off prior to any maintenance work on electrodes.

We strongly recommend having this work done by qualified staff. All the persons involved in works on the machine must be informed on possible hazards and dangers and must have read and understood this manual.

Only authorized and qualified personnel is allowed to set up the machine since this work interferes with operational safety.

It is strictly forbidden that more than one person is simultaneously working on the machine.

Access to the machine must be restricted. Only authorized persons are allowed to access the machine.

Pay attention to the safety instructions stated herein. If necessary, also instruct your staff to observe the notes and instructions.

In addition to the instructions stated in this section, strictly comply with the national legal regulations being valid in the country where the machine is installed.

## 2.2 Warning and danger signs and terms

This manual mainly uses self-explaining picture symbols (pictographs) for indicating dangers and hazards. In addition, signal words in square brackets are used:

**DANGER**

“**Danger**“ indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**CAUTION**

“**Caution**” indicates a potentially hazardous situation, which, if no suitable precautions are taken, may result in minor injury and/or property damage.

**WARNING**

“**Warning**” indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

*The terms used comply with the recommendations as per ANSI 535.4-1991*



The **hand** symbol announces useful hints, additional tips or a possibility to ease the job.

## 2.3 Welding hazards



The use and handling of electricity, compressed gases, molten bath and open flame, such as the electric arc, is dangerous. The same applies to the emissions produced during the welding process – such as luminous and thermal radiation, gases, fumes, noise - which may cause lasting harm to your health. The following pages are intended to inform you on the most important hazards and suitable precautions and remedies. This enumeration does not claim to be complete nor does it discharge you from the obligation to make yourself familiar with the regulations on workplace safety and accident prevention.



The greatest hazard when working with the machine is that the operator may crush his hands when arms and electrodes are moved. Therefore be very careful and observe all the instructions in this manual and remember in detail:

- Keep your hands away from moving parts.
- Use grip pliers or other suitable tools for positioning workpieces while keeping the hands at the same time away from the electrodes.

An electromagnetic valve generally leads the current to the pneumatic gun. This valve is normally closed and controlled by the mains on/off switch to avoid hazards that may result from a lack of electric but not pneumatic energy. Immediately cut off the electric power supply, if water is leaking and might reach the machines inside components.

## 2.4 Electrical hazards



**DANGER**



Touching live parts can be fatal. Electric shock is dangerous to life!

The hood of the power source must be shut. Only qualified and trained electricians shall be allowed to open up the power source and work on the power supply and control systems! Unplug the power cable before opening the welding machine. **It is not sufficient to switch the welder off!**

**Wait a few minutes until capacitors are discharged!**

Only plug the welding machine into suitably grounded socket outlets! Only use connecting cables in perfect condition with PE conductor and protection plug! Regularly check connecting leads and mains plug for over-ageing and damage. Immediately stop the machine if insulations and/or components are damaged! Before starting your work, make sure that all protecting devices have been properly installed and are operational! Cables and leads must be dry and clean (no grease, no oil) and protected against conducting metal and sparks!

Do not touch conducting parts with bare skin! Always wear appropriate protective clothing and dry gloves. Even mild shocks that are not hazardous to life can give you a fright so that, when working at great heights, there is a higher risk of fall!

Ensure that there is sufficient insulating storage for depositing the welding gun when not being used!

In case of malfunction, immediately stop the welding plant. Only qualified staff is allowed to eliminate malfunctions!

- **IN CASE OF EMERGENCY, ALWAYS SWITCH THE MACHINE TO “OFF”!**
- **UNPLUG THE MAINS PLUG!**

## 2.5 Hazards from electromagnetic disturbances



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 interferences 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 12000 uses high currents to heat the welding point. This current is supplied by the transformer through the C-arm to the welding point. The current creates electro-magnetic fields (EMF) around the C-arm and the transformer.

Exposure to high levels of EMF may be harmful and to reduce the exposure to acceptable levels the user of the welding gun should keep a minimum distance from the head and trunk to the transformer and C-arm during welding as follows:

When using the C40 arm the distance to the C-arm should be at least 500 mm and to the transformer at least 300 mm.

When using the C500 arm the distance should be at least 600 mm and to the transformer at least 450 mm.

## 2.6 Fires and explosions



There are various sources possibly causing fire: Flying sparks spatters of molten metal bath, hot slag, red hot pieces, thermal conduction or radiation, short circuit, etc. and if explosive liquids, dust, vapour or gases are also involved, deflagrations and explosions may be the result.

It is important and necessary to eliminate possible fire sources already before the machine start and to take suitable precautions



- If possible, do not perform welding in areas with increased fire risk!
- If welding cannot be avoided in dangerous areas, remove all highly inflammable or explosive substances (such as fuels, gases, dust, inflammable liquids) from the workplace!
- If this is not possible, cut off combustible materials by appropriate covers, guards or similar devices!
- Before starting any welding and cutting operation on empty containers, check in any case whether they have held fuels, greases, solvents or other highly inflammable or explosive substance! If required, clean and ventilate the container thoroughly! Even small traces of these substances left in the containers are a major risk of explosion!
- Do not cover the ventilating slits of the power source. Insufficient ventilation and aeration may cause overheating.
- Remove any highly inflammable objects such as matches or lighters from your working clothes.
- Tightly connect the workpiece clamp to the workpiece or the welding bench before starting the welding process (stray welding currents may damage the protective conductor systems and cause fires)!
- During welding, pay always attention to sources of fires!



- Allow the workpieces to cool down after the welding process! Keep away hot weld metal from combustible materials!
- Keep children and animals far away from the workplace!

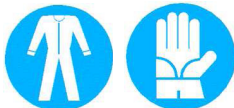
Approved fire extinguishers, suitable for the different welding processes, should be nearby and easily accessible.

If the material to be welded produce smoke or fumes, install a suitable extraction system.

## 2.7 Hazards from heat



The risk of injury by burning resulting from the contact with hot work pieces or other hot surfaces at the welding workplace or from metal spatters is obvious. For this reason be always careful and wear the prescribed appropriate protective clothing!



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

## 2.8 Hazards from noise



Noise emissions at the welding place depend on the welding process and are caused additionally by other environmental sources. In any case, the exposure to loud noise above 70dBA can permanently damage your hearing. Local regulations on workplace safety should be considered.



## 2.9 Organizational measures

The user has to provide the required personal protective equipment. All the available safety devices are to be checked at regular intervals.

## 2.10 Informal safety precautions

Always keep the operating manual at the machine location and workplace. In addition to this operation manual, copies of the generally applicable and local accident prevention and environmental protection rules must be kept on hand, and of course observed in practice.

All the safety instructions and danger warnings on the machine itself shall be maintained in legible condition.

## 2.11 Personal safety precautions

For your personal protection, always wear clear-glass safety goggles with side-guards or safety shields, whether you are eyeglass wearer or not. To protect yourself against burning and mechanical injury, wear a leather apron, gauntlet gloves and safety boots.

The operating staff may not wear conductive rings, keys or watch chains to prevent parallel resistance causing injury by burning.

Depending on the pre-set welding current, safety distances in accordance with BGV B11, referring to field strength limits for personal protection, must be strictly adhered to.

Of course, in-house regulations on the use of personal protection equipment must be fully observed, too.

## 2.12 Admitted operators

Only authorized staff at a minimum age of 18 years are allowed to operate the machine. Within the working areas, operators are responsible of ensuring the safety of third parties.

Competences for different kinds of work and jobs must be clearly defined and observed. Unclear competences present a potential safety hazard.

The owner has to make available the operating manuals to the operator and make sure that the operator has read and understood the content therein.

All work on the machine's electrical equipment may be done by qualified electricians only.

### 2.13 Safety precautions at the machine installation site

The machine must be installed on suitable even floor with sufficient bearing capacity and not in the open air. Make sure that the individual mechanical components are safely fastened as prescribed.

- Safe access must be guaranteed at all times.
- **Always keep clear escape routes!**

The owner is responsible of ensuring non-slip even floor and sufficient workplace lighting.

Make sure that the workplace and its immediate vicinity are clean and tidy. Keep other people, especially children, far away from the machine.

### 2.14 Protection equipment

Safety devices are provided to protect life and health of the the operating staff. They shall under no circumstance be modified, removed or avoided by means of alteration of the machine.

The customer is responsible of providing the guards and/or ensuring the cor-doning off that are required for normal operation. The machine must not be operated without these protections.

### 2.15 Warranty and liability

Our "General terms of sale and delivery" shall generally apply. The owner/operator should have already received them, at the latest together with our offer.

We shall, however, not accept warranty and liability claims for physical and/or property damage, if the damage is a result of:

- Any other than the intended use of the machine
- Improper mounting, commissioning, operation or maintenance of the machine.
- Operation of the machine with defective protection gears or with improperly mounted and/or non-operational safety devices and protections.

- Non-observance of the operating instructions for transport, storage, mounting, commissioning, maintenance and retrofitting of the machine. Alteration of the machine without the prior approval of Car-O-Liner; insufficient supervision of machine parts that are subject to wear; improper repair.
- Foreign objects or an act of God

## 2.16 Informative material

If you need information on standards, directives and regulations referring to electric arc welding and associated processes, we recommend the following information sources:

Supplier	Titel
Beuth Verlag, Berlin	DIN EN 50063 DIN VDE 0545
Carl-Heymanns - Verlag, Cologne	UVV VBG 4 (replaced by BGV – A3)
Your professional association	Safety rules

## 3 Installation

### 3.1 Delivery

Our welding plants are mostly factory-preassembled and ready to be plugged in, meaning that the welding power source is equipped with 8 m power cable and 32 A plug.

Further equipment being part of standard version delivery (other versions see section 3.9):

- 1 complete set of C-tong arms (40 mm, 80mm, 350 mm, 500 mm)
- 1 tube of very conductive grease for lubricating the tong arms
- 1 operating, maintenance and spare parts manual
- 1 wheel extension kit

### 3.2 Incoming inspection

Remove the original packing. Be careful and check whether all the parts stated on the delivery note have been received and are in perfect condition without any damage.



According to legal regulations, the purchaser shall bear the transport risk, so that it is strongly recommended to have confirmed any recognized damage by the driver who shall take it down on the delivery note. Do not put into service faulty appliances! Immediately notify the damage to the supplier!

### 3.3 Packing

Properly dispose of the original packing in accordance with applicable environmental protection regulations!

### 3.4 Installation

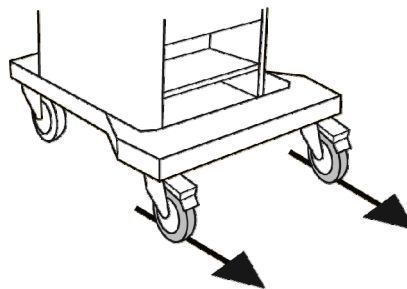


The place of installation must satisfy the following conditions:

- Enclosed room; the welding machine is not intended for operation in the open.
- Ambient temperature must range between 0 and 40° C at a maximum height of 1000 m above sea level.
- Operate the welding machine only in well-ventilated, clean rooms where no vapors or exhalation of acids may be produced.



- Keep inflammable materials away from the workplace to prevent fire by spatters of hot molten metal.
- The room / workplace must have sufficient lighting that is appropriate for the welding jobs to be performed.
- The welding machine must be positioned on absolutely even floor without any unevenness that may be dangerous during the welding process. If the machine is used for welding jobs with possible smoke development, a suitable extraction plant must be installed.
- **Ensure that the machine is only operated after the steerable castors of the carriage have been locked in straight position (see the figure below).**



- Make sure during the first installation and also later that the cooling of the power source is not impaired. Insufficient ventilation or aeration may result in dangerous overheating!

### 3.5 Electrical connection



The EMC limit values of the spot welder comply with class A. 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 6*) 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.

**DANGER**

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 no influence on the direction of rotation of fans or pumps. When running 12 kA the impedance on the power grid should be less than 6 mohm resistance and 4 mohm reactance and when running 8 kA the impedance on the power grid should be less than 19 mohm resistance and 12 mohm reactance.

### 3.6 Compressed air supply

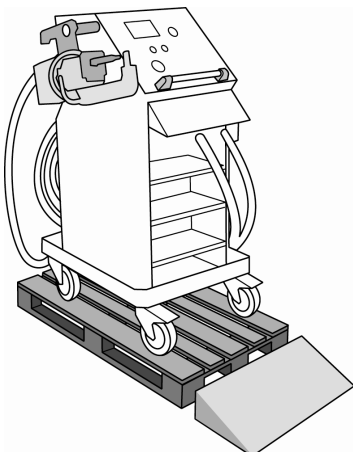
Suitable compressed air supply to the machine requires a central unit or a compressor delivering dry cool air at the pressure and quantity stated in the chapter “TECHNICAL DATA”. Strictly observe the required hose cross-sections. In case of frequent pressure variation, we recommend installing a 25 l buffer container with check valve and contents manometer.

The spot welder is equipped with an air servicing unit with pressure reducer and water separator that needs to be discharged regularly.

### 3.7 Transport



Cut off current and compressed air supply before transporting the welding machine to another location. Release the roll brake and then pull or push the machine to the new workplace. Pay attention to obstacles such as dispersed cables and unevenness of the floor!



To transport the welder, use a pallet and carry it by a fork lift. Use a ramp to roll the welder on to the pallet. The welder must be securely strapped to the pallet before transport, in the same way as when it was delivered from the manufacturer!

Ramp not provided by Car-O-Liner

### 3.8 Storage

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

- Storage must be in enclosed rooms
- Maximum atmospheric humidity of 80%
- Temperature range of ambient air:  $-15^{\circ}\text{C}^*$  to  $+45^{\circ}\text{C}$  (corresponds to a range from  $+5^{\circ}\text{F}$  to  $+113^{\circ}\text{F}$ )

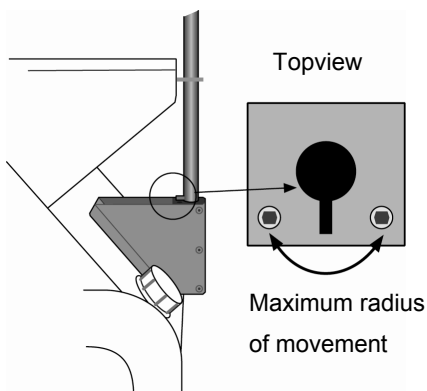
**CAUTION**

\* The minimum temperature of  $-15^{\circ}\text{C}$  ( $+5^{\circ}\text{F}$ ) only applies to machines with empty tank. Before storing machines that are filled with tap water and KF 330 coolant at temperatures below  $-2^{\circ}\text{C}$ , completely drain the cooling liquid. Make sure that the cooling circuit is fully emptied. Owner/operators **MUST** read the chapter **Coolant!**

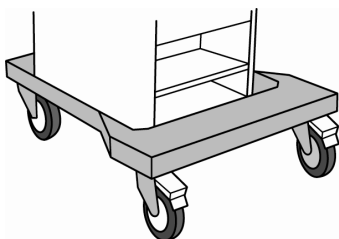
Anyway, suitable precautions are necessary to protect the machine against humidity, dirt and corrosion. The manufacturer shall not be liable for any damage resulting from improper storage!

### 3.9 Using of the optional Support arm and Balancer (included in the VAS 6755 and BMW version)

#### Workmode



Please note, that the support arm is designed only for limited radius of movement. Do not overstep this radius, as there is an acute tilting danger by the hanging welding gun.



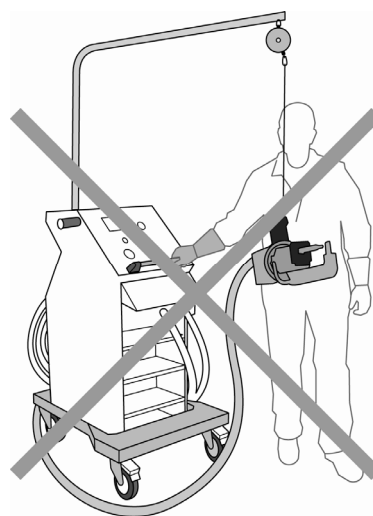
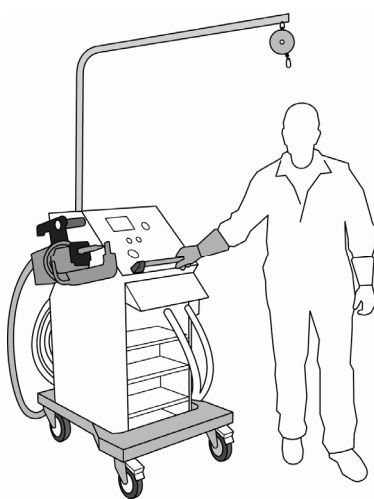
Wheel extension is included in the CTR12000 standard delivery, see supplementary mounting instruction 44131.

## Moving the machine



When moving the machine, the welding gun must be fixed at the intended holder (on side of the machine) and must not hang on the balancer.

Do not move the machine while the welding gun is hanging on the balancer!



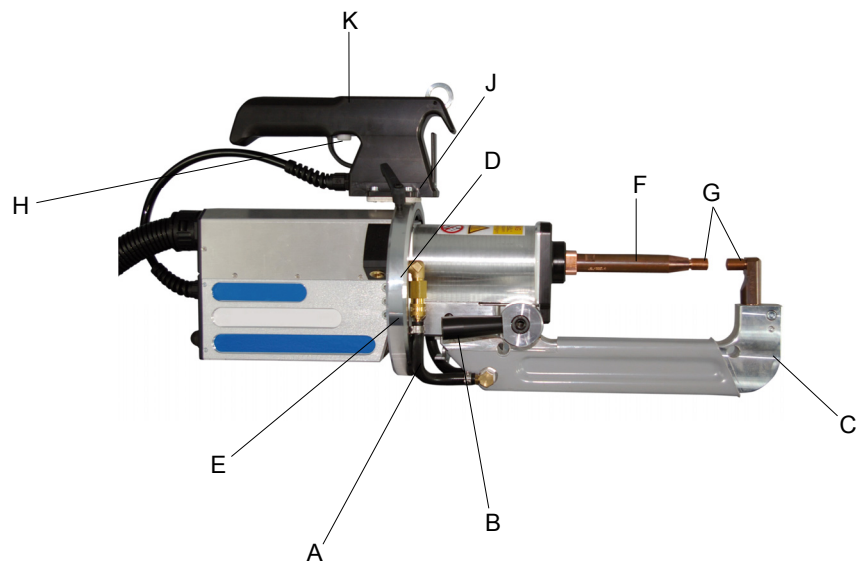


## 4 Welding machine set-up

### 4.1 Preparing the C-tong for welding operation



Different C-arms, as shown left, may be fitted to the C-tong. To fit a C-arm, put the connection shank, to be slightly greased before, into the arm holder of the tong body and lock it by pushing the slide **A** up. Now turn the C-arm into position and lock it with the lever **B**. Both copper electrodes must be perfectly aligned. To ensure their true alignment, the position of the electrode in the C-arm may be adjusted and corrected, if necessary, by unscrewing the two hexagon screws **C**. The electrode caps **G** should be new or at least in good condition and must sit tightly on the electrode shank. The electrode holder is of conical shape so that the electrode caps can be easily pushed onto it. The coolant hoses of the C-arm must be connected to the rapid-action coupling **D** (back flow) on the one hand, and to the plug-in nipple **E** (forward flow) of the tong body on the other.



For using the extension C-arm, replace the electrode shank **F** with its inside tube by the longer one. The start button **H** has three action points: if you press this button to the first action point and release it afterwards, the electrode is slowly closed and opened without current. The second action point actuates the working valve and the micro-switch at the end of the third action point (press the button as far as it will go) initiates the welding process.

The lever **J** being released, the handle can be turned around the gun body to facilitate correct positioning. The upper part of the handle **K** houses the light-emitting diodes for tool, electrode check, fuse monitoring, welding operation error, and error acknowledgment button.

## **4.2 Motional mechanism**

### **4.2.1 C- Clamps**

#### **1. Closing Clamp**

- a. rig, clamp trigger in position 1, closing C- clamp
- b. release trigger, clamp opens by spring pressure
- c. work pressure, clamp trigger in pos. 2
- d. release trigger, clamp opens by spring pressure
- e. welding, clamp trigger in pos. 3, start process

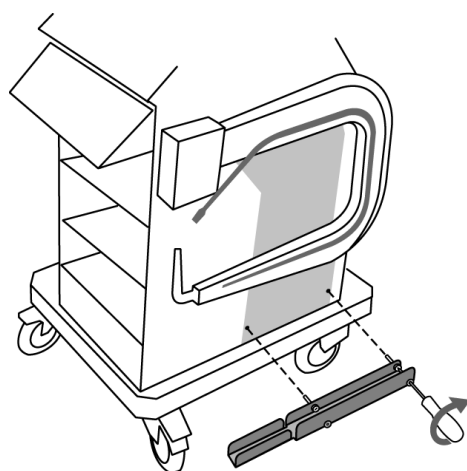
#### **2. end of welding process**

- clamp opens automatically after dwell- time by spring pressure

### 4.3 Appliance Multifunction gun (Option)



Hang the current cable adapter **A** acc. to photo polarity direction in the gun and insert & lock control plug **B** in the appropriate socket at the rear side of the gun transformer. Fit the multifunction gun with the desired electrode, switch on the current source, turn on switch SINGLE on the front side of the current source and press once the Start button on the transformer gun. The gun closes, contacts the adapter and stays closed. After attaching the earth-ling lead clamp **C** to the car body, work can now start with the multifunction gun. Now set the desired welding current and time, bring the multifunction gun into position, press together, press the Start button **D** and hold steady in position until the welding process has been completed.

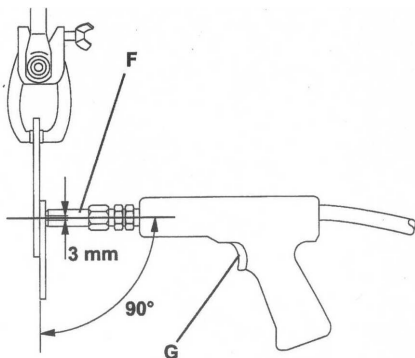


Holder for Multifunction gun

The earth lead clamp must be attached to the metal on the bodywork as close to the welding point as possible. Important is a good electrical transfer, sometimes it is better to work with 2 earth leads.

When working with the multifunction gun has been completed, press the Start button again on the transformer gun - this opens and the adapter can be taken out.

### 4.3.1 Spotting



The maximum electrode-side sheet thickness is 1.25 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 an electrode **F** in good condition 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 electrode **F** at right angle onto the sheets to be welded, press strongly against them and activate the trigger **G**. (See figure above).

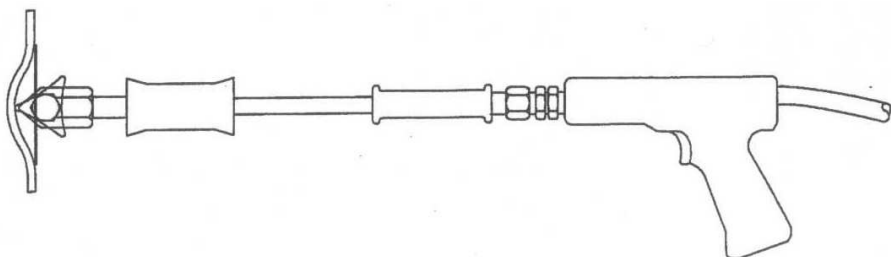
Reference and standard values are stated on the adhesive label on the accessories box of the multi-function gun. For program selection, see part "Control System"

### 4.3.2 Dent pulling

The machine offers almost everything that is required and available on the welding market.

Standard procedures are:

3. Welding of rivets, nails /studs **H** and washers **E** and subsequent recovery with the slide hammer **N** and suitable replaceable head fittings **K**, **L**.
4. Use of the triangular pulling eye **M**. (See figure below).

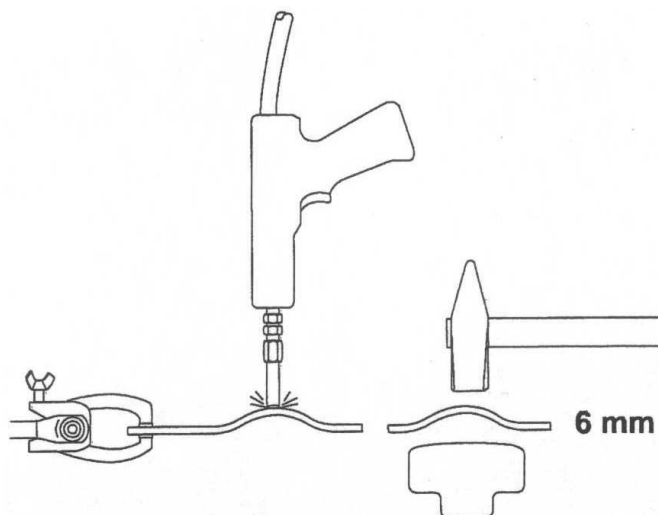


### 4.3.3 Heating up steel sheets for shrinking or stiffening

Small convex dents can be pulled in with the copper electrode **D** while applying heat (welding current) and pressure at the same time.

Larger flat dents or sheet sections, the elasticity of which should be increased, can be heated up with the carbon electrode **C**.

Reference and standard values are stated on the adhesive label on the accessories box of the multi-function gun.



### 4.3.4 Stud welding

All the elements used in car body construction such as setscrews M4, M5 **J**, T-pins for trim strips and rubber holder **B** as well as setscrews with coarse thread for plastic nuts **J** can be welded with the multi-function gun and suitable electrodes **B**, **J**. In the electrode, a magnet holds the pieces to be welded.

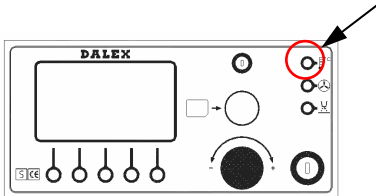
Place the gun with the electrode at right angle onto the sheets to be welded, press strongly against them and activate the trigger.

Reference and standard values are stated on the adhesive label on the accessories box of the multi-function gun.

## 4.4 Power source set-up

### 4.4.1 Coolant

#### General



Due to the increased current load during resistance spot welding, power section, transformer, rectifier, hose pack and electrodes must be cooled with a cooling liquid.

During welding operation, this cooling liquid is made circulating by a circulation pump. It flows from the cooling unit through power section, transformer, rectifier and hose pack to the electrodes in the gun ("Forward flow"). It absorbs the heat and returns to the cooling unit ("Back flow").

The circulating pump of the cooling system is driven via 230V AC motor. The welding machine being started at the mains switch, the cooling system is also ready for operation.

It is stopped automatically, if the power source is ON for a longer period of time without that welding operation is started. The coolant pump is automatically cut in when the start button is activated; its follow-up time is adjustable.

#### Malfunctions

The coolant circuit is supervised by temperature and level sensors. In case of pump failure during welding or if the cooling liquid does not circulate for other reasons, the control system cuts off the welding current. The same applies to the case of insufficient cooling liquid level. In both cases, the red error lamp on the control panel of the power source lights up (Symbol).

#### Topping-up

Circulating in a closed circuit, the coolant can only evaporate to a small extent so that it does not often need to be topped up. Topping-up mostly is necessary after hose packs have been replaced, or if a larger amount of coolant has leaked through defective hoses or joints.

The coolant level is controlled by a sensor initiating a message of topping-up on the display. The filler stub is on the rear of the power source.

The storage tank of the cooling unit has a volume of about 20 litres.

## Coolant KF 330

If delivery is made ex works, the welding machine is filled up with a type of coolant that has proved to be the most suitable for welding machines.

You may order it at any time from us. Upon the order state the designation.

### Cooling liquid KF 330

Delivery is made in 3-liter plastic canisters.

If the 3 liter canister is used together with 17 liter water to fill up the 20 liter tank in CTR12000, the frost resisting degree will be around -2 C.

Transportation of the welder with filled up water tank should only be done if the surrounding temperature is over this value.

If the surrounding temperature is under this value, risk of damages on condenser and c-tong is high.

## Properties, handling and disposal of KF 330

<b>CAUTION</b>
----------------

The cooling liquid KF 330 may be mixed with water at any ratio. There are no particular hazards. Nevertheless keep it away from children and avoid any contact with beverages, food or feed stuff.

If you have accidentally swallowed some coolant, first rinse the mouth with water and then drink a lot of water; in case of contact with the skin, thoroughly wash the areas concerned with water. KF 330 may cause light irritation of the eyes. We thus recommend wearing safety goggles. In case of contact with the eyes, rinse them thoroughly with water for at least 10 minutes.

Use water to sweep away small quantities of spilled coolant; larger spillage must be eliminated by using liquid-binding materials (sand, kieselguhr, universal binder, sawdust). Dispose of the coolant or contaminated material by transporting it to a dump and observe local regulations (Waste code 07 01 04, name "Other organic solvents").

## Other types of coolant

To ensure trouble-free operation and at least average service life of the welding machine, the coolant used must satisfy the following conditions:

- Conductivity as low as possible (<100 mS/cm)
- No metallic components
- No corrosive substances (Chloride < 5 ppm/ Sulfate < 5 ppm)
- Frost-resisting up to - 15°C

### *a) Tap water*

Tap water only satisfies the first three conditions and only if it complies with the following specification:

PH	7-9
Chloride	max. 20 mg/l
Nitrate	max. 10 mg/l
Sulfate	max. 100 mg/l
Insoluble substances	max. 250 mg/l
Total hardness D	max. 10 Deutschgrad
Specific resistance	min. 2000 $\Omega$ /cm



Ask your local waterworks for the analytical findings to learn whether your tap water is within the permissible limits.



Always remember that water freezes at 0°C! In case of unexpected cold spells, the freezing water may not only cause malfunctions during operation but also serious damage to the cooling unit and the pump. Therefore, in areas with cold winter climate, you should never use water as coolant. Only use it (small amounts of max. 0.5 l) for topping up the coolant level, if your stock of KF 330 has run out.

Please take into account that – in the opposite case – small amounts of coolant, when added to tap water, cannot make your plant freeze-resisting.

**Car-O-Liner is not liable for frost damages to the welding machine if these instructions are not followed!**

### *b) Distilled water*

Distilled water is not suitable for serving as coolant in the CTR12000 since it may cause corrosion damages.

### *c) Other coolants or addition agents*

**CAUTION**

Car-O-Liner strongly advise not to use other coolants. Never mix our cooling liquid KF 330 with other types of coolant or with anti-freezing, rust preventing or anticorrosive agents!

**Car-O-Liner is not liable for any damages to the welding machine if these instructions are not followed!**



## Draining the coolant

Prior to longer storage of the welding machine, completely drain the coolant (see chapter Storage).

To this aim, proceed in the following order:

- Switch off the welding machine at the mains switch
- Cut off the coolant back flow connection at the back of the cooling unit
- Put the back-flow hose into a suitable receptacle (pail or similar container)
- Switch on the machine by using the mains switch

The cooling unit is started and the coolant is pumped out and flows into the receptacle. After 180 seconds – factory-adjusted time – the pump automatically stops. Switch the power source off and on and repeat this procedure until there is no coolant left that escapes from the hose.

### 4.4.2 Compressed air supply

Compressed air supply to the welding machine is either done by a central supply system or a compressor. The required pressure ranges from 5 to 8 bars at an air consumption rate of about 500Nl for every 1000 spots. The minimum air hose section is 6 mm. If more important compressed air drops are likely to occur, the power source should be fed via a buffer tank of at least 25 l volume with a non-return valve. The condensate must be regularly drained out off the servicing unit.

## 5 Machine start-up

You **SHALL** make yourself familiar with all the operating and functional elements the power source disposes of: To this aim, fully read the corresponding chapters in this manual attentively before starting up your welding machine for the first time.

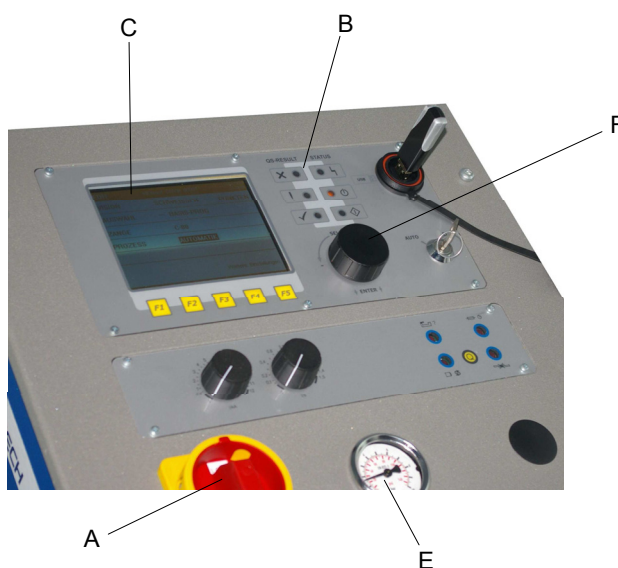
Machine commissioning includes additional preparation and setting-up operations welding specialists should generally be familiar with. If this manual gives detailed information on several procedures, then the intention is to make you familiar with certain features of your welding machine.

These operations are described in chapter 4.

You have performed all the setting-up work and connected the welding machine to the mains supply and the pressure reducer to the compressed air supply system. The mains switch **A** on the front of the power source is OFF.

- Turn the mains switch to I (see figure below).

The yellow pilot lamp **B** at the top right of the control panel lights up and the CAR-O-LINER logo is displayed on the screen **C** for about 5 – 10 seconds. During this time, the machine then performs a self-test (initialization). The fan and the circulating pump of the cooling unit both start running (you can hear the noise). Select the desired welding program with the rotary encoder **F**. You **MUST** read the corresponding information in part 2 of this manual “Control System“.



## 6 Technical specifications

### 6.1 208 V

<b>CTR 12000 Spot Welder</b>	<b>208 V</b>
Rated input voltage, $U_{1N}$ :	3 x 208 V -5% +10%, 50-60 Hz
Power supply fuse:	60 A slow blow or circuit breaker type K
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, $p_{1min}$ - $p_{1max}$ :	6-8 bar (87-116 psi)
Duty factor, X:	10%
Maximum short circuit input current, $I_{1cc}$ :	208 A
Permanent power (100% duty cycle), $S_p$ :	75 kVA
<b>Power unit for transformer gun</b>	
Peak output current:	255 A
Output voltage:	295 V
Inverter frequency:	2-10 kHz
<b>Liquid cooling</b>	
Cooling power:	1000 W
Tank capacity:	20 l (5.3gal)
Rated cooling liquid flow, Q:	6 l/min (1.58 gal)
Cooling liquid pressure drop, $\Delta p$ :	0.02 MPa (2.9 psi)
<b>Configuration</b>	
Dimensions (HxWxD) approx. (without support arm)	1220 x 680 x 800 mm (48 x 27 x 32 in)
Approx. weight: (without support arm)	95 kg (209 lbs)
<b>Technical data transformer C-gun:</b>	
<b>Connection Data</b>	
Primary voltage / Frequency:	295 V/10 kHz
Permanent power (100% duty cycle), $S_p$ :	75 kVA
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, $p_{1min}$ - $p_{1max}$ :	6-8 bar (87-116 psi)
<b>Welding Output</b>	
Maximum short circuit output current corresponding to maximum impedance, $I_{2CC}$ :	10 000 A
Maximum short circuit output current, $I_{2CC}$ :	12 000 A
No-load voltage, $U_{2d}$ :	20 V
Welding current:	===
<b>Liquid Cooling</b>	
Rated cooling liquid flow, Q:	6 l/min (1.58 gal/min)
Cooling liquid pressure drop, $\Delta p$ :	0.02 MPa (2.9 psi)
<b>Mechanical Data</b>	
Electrode force, $F_{min}$ - $F_{max}$ :	0 - 500 daN (0-1124 lbf)
Weight, with 80mm yoke, ca:	12 kg (26 lbs)
Cable length:	6 m (19.7 ft)

## 6.2 460 V

<b>CTR 12000 Spot Welder</b>	<b>460 V</b>
Rated input voltage, $U_{1N}$ :	3 x 460 V -5% +10%, 50-60 Hz
Power supply fuse:	30 A slow blow or circuit breaker type K
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, $p_{1min}$ - $p_{1max}$ :	6-10 bar (87-145 PSI)
Duty factor, X:	10%
Maximum short circuit input current, $I_{1CC}$ :	90 A
Permanent power (100% duty cycle), $S_p$ :	75 kVA
<b>Power unit for transformer gun</b>	
Peak output current:	110 A
Output voltage:	677 V
Inverter frequency:	2-10 kHz
<b>Liquid cooling</b>	
Cooling power:	1000 W
Tank capacity:	20 l (5.3gal)
Rated cooling liquid flow, Q:	6 l/min (1.58 gal)
Cooling liquid pressure drop, $\Delta p$ :	0.02 MPa (2.9 psi)
<b>Configuration</b>	
Dimensions (HxWxD) approx. (without support arm)	1220 x 680 x 800 mm (48 x 27 x 32 in)
Approx. weight: (without support arm)	95 kg (209 lbs)
<b>Technical data transformer C-gun:</b>	
<b>Connection Data</b>	
Primary voltage / Frequency:	677 V/10 kHz
Permanent power (100% duty cycle), $S_p$ :	75 kVA
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, $p_{1min}$ - $p_{1max}$ :	6-8 bar (87-116 psi)
<b>Welding Output</b>	
Maximum short circuit output current corresponding to maximum impedance, $I_{2CC}$ :	10 000 A
Maximum short circuit output current, $I_{2CC}$ :	12 000 A
No-load voltage, $U_{2d}$ :	20 V
Welding current:	===
<b>Liquid Cooling</b>	
Rated cooling liquid flow, Q:	6 l/min (1.58 gal/min)
Cooling liquid pressure drop, $\Delta p$ :	0.02 MPa (2.9 psi)
<b>Mechanical Data</b>	
Electrode force, $F_{min}$ - $F_{max}$ :	0 - 500 daN (0-1124 lbf)
Weight, with 80mm yoke, ca:	12 kg (26 lbs)
Cable length:	6 m (19.7 ft)

## 6.3 400 V

<b>CTR 12000 Spot Welder</b>	<b>400 V</b>
Rated input voltage, $U_{1N}$ :	3 x 400 V -5% +10%, 50-60 Hz
Power supply fuse:	32 A slow blow or circuit breaker type D
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, $p_{1min} - p_{1max}$ :	6-10 bar (87-145 PSI)
Duty factor, X:	10%
Maximum short circuit input current, $I_{1cc}$ :	108 A
Permanent power (100% duty cycle), $S_p$ :	75 kVA
<b>Power unit for transformer gun</b>	
Peak output current:	133 A
Output voltage:	565 V
Inverter frequency:	2-10 kHz
<b>Liquid cooling</b>	
Cooling power:	1000 W
Tank capacity:	20 l (5.3gal)
Rated cooling liquid flow, Q:	6 l/min (1.58 gal)
Cooling liquid pressure drop, $\Delta p$ :	0.02 MPa (2.9 psi)
<b>Configuration</b>	
Dimensions (HxWxD) approx. (without support arm)	1220 x 680 x 800 mm (48 x 27 x 32 in)
Approx. weight: (without support arm)	95 kg (209 lbs)
<b>Technical data transformer C-gun:</b>	
<b>Connection Data</b>	
Primary voltage / Frequency:	565 V/10 kHz
Permanent power (100% duty cycle), $S_p$ :	75 kVA
Protection type:	IP21
Insulation class:	F
Cooling type:	Liquid cooled
Compressed air supply, $p_{1min} - p_{1max}$ :	6-8 bar (87-116 psi)
<b>Welding Output</b>	
Maximum short circuit output current corresponding to maximum impedance, $I_{2CC}$ :	10 000 A
Maximum short circuit output current, $I_{2CC}$ :	12 000 A
No-load voltage, $U_{2d}$ :	20 V
Welding current:	---
<b>Liquid Cooling</b>	
Rated cooling liquid flow, Q:	6 l/min (1.58 gal/min)
Cooling liquid pressure drop, $\Delta p$ :	0.02 MPa (2.9 psi)
<b>Mechanical Data</b>	
Electrode force, $F_{min} - F_{max}$ :	0 - 500 daN (0-1124 lbf)
Weight, with 80mm yoke, ca:	12 kg (26 lbs)
Cable length:	6 m (19.7 ft)

## 7 Maintenance and upkeep

This chapter describes required maintenance work that is obligatory:

- For ensuring trouble free, safe and efficient performance of the spot welder.
- For avoiding the causes, mostly quite simple, that lead to impaired welding results.

### GENERAL WARNINGS

**WARNING**

Always disconnect the machine from the mains and the air supply prior to any maintenance:

- Ensure that all the screws on gun arms, electrode holders, plates, and rigid and flexible junctions are well-tightened.
- Remove possible oxidation with fine sandpaper since it may cause contact resistance in the welding current circuit. If need be, slightly grease the electrode arms and shank with very conducting grease.
- Grease shafts and bearings with a few drops of oil at regular intervals (not later than every six months).
- Clean the spot welder and remove dirt and particles of metal that might be attracted by the machine's magnetic field.
- Clean the inside of the power source and the cooling unit at least every six months. In particular dusty environment, suck off the dust.
- Never use a water jet for washing the machine neither use strong detergents, solvents, thinners or benzene since those could damage the coat of varnish or the plastic components of the machine. Keep the coolant level to approximately  $\frac{3}{4}$ . Once a year, completely drain off and replace the coolant.
- For machine storage in winter season in rooms without heating, sufficient antifreeze agent must replace the coolant.

### ELEKTRODES

Disconnect the machine from the mains and the air supply before maintaining electrodes.

- Keep electrodes clean during the welding process and ensure that the electrode tip diameter suits the welding task. Strongly worn electrodes or caps must be replaced.

### PNEUMATIC CONTROL

Maintenance work on the pneumatic control system may be exclusively performed by qualified and trained persons being familiar with the safety regulations and rules. If possible, switch off the machine prior to this work, cut off the air supply and release the residual air pressure.

- In case of leakage, immediately stop maintenance and eliminate the causes for the leakage.
- Check the automatic drain system of the water separator.
- Check manometer gauge for precision.

## **CURRENT-CONDUCTING COMPONENTS**

Maintenance work on the electric equipment of the machine may be exclusively carried out by qualified and trained persons being instructed to do their job in a safe environment. Unplug the mains plug to avoid fatal electric shocks before performing the following checks.

Check the grounding at regular intervals.

Check the function of the control elements at regular intervals: micro switch, sockets, plugs, control cable.

Check control elements, associated cables of inner and outer connectors more often for their condition and perfect function.

## **WHAT TO DO IN CASE OF EMERGENCY**

**In emergency; switch off the spot welder with the mains switch.**

**If intrushing water might penetrate the machine, immediately unplug the mains plug.**

**In case of fire hazard, do not use water but suitable fire extinguishers.**

After a case of emergency, trained and qualified staff being instructed on the required test procedures must start up the power source again.

## **BATTERY MAINTENANCE**

Expected lifetime for the battery in the control unit is 5 years. The battery shall be changed by authorised service personnel.

## 8 Dismantling and salvage

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 equipment are recycled.

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

### **Battery**

-The battery in the CTR12000 (control unit) must be recycled or disposed of properly.



## 9 Service

Any repair on the power source shall be carried out by trained and authorized staff.

If a machine failure makes it necessary - even if the warranty time has already expired contact our Car-O-Liner distributor.

## 10 Spare parts

### Appendix A Spare Parts











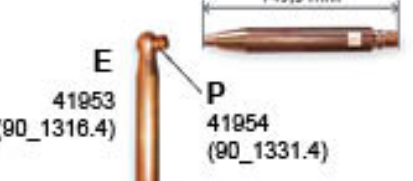









#### Power source CTR12000

Description	Part No:
Delivery plate, 3-parts incl. mat	43943
<b>Gun supporter:</b>	
Aluminium cap	43944
Plastic tube	43945
Transport grip, without screw	43946
Spare key for switch	43942
Side plate (water side) blue colour	43645
Side plate (water side) white colour (BMW)	43580
Side plate blue colour	43646
Side plate white colour (BMW)	43581
Front plate	43091
Decal for front plate (German)	43714
Decal for front plate (English)	43722
Decal for front plate (French)	43743
Decal for front plate (Italian)	43736
Decal for front plate (Swedish)	43772
Decal for front plate (Spanish)	43729
Decal for front plate (Russian)	43778
Decal for front plate (Chinese)	43785
Cable support	43947
Support for electrode arm	43090
Support 1 for rack / C-arm right	43948
Support 1 for rack / C-arm left	43949
Support 2 for rack / C-arm right	43950
Support 2 for rack / C-arm left	43951
Protective cover right	43952
Protective cover left	43953
Delivery plate for spotter	41893
Cooling liquid KF 330 (3-liter-plastic canister)	41928

## Appendix B Welding tongs

Description		Part No:
	C-tong, type CTR12000, 208V complete with hose package, without electrode and electrode arms	43462
	C-tong, type CTR12000, 230V complete with hose package, without electrode and electrode arms	43463
	C-tong, type CTR12000, 400V complete with hose package, without electrode and electrode arms	43009
	C-tong, type CTR12000, 460V complete with hose package, without electrode and electrode arms	43464
A	Electrode arm, inclined shape, small 40 mm, without cooling	41944
B	Electrode arm, straight, 80 mm, with cooling	41945
C	Electrode arm, curved shape, 350 mm, with cooling	41946
D	Electrode arm, curved shape, 500 mm, with cooling	41947
E	Ball electrode with thread for electrode	41953
F	Electrode cap holder, curved shape, water-cooled	41949
G	Adaptor for curved electrode holder	41950
H	Electrode cap holder, straight water-cooled version, cylinder side; L=74mm	41963
J	Electrode cap holder, straight water-cooled type, cylinder side; L=81mm	41951
K	Electrode cap holder, curved water-cooled type, for 500 mm arm	41969
L	Electrode cap holder, straight water-cooled type	41956
M	Electrode cap holder, straight water-cooled type, cylinder side; L=124mm	41957
N	Electrode cap holder, straight water-cooled type, cylinder side; L=139mm	41967
O	Electrode cap holder, curved water-cooled type for electrode arms of 150, 350 and 500mm;	41962
P	Special electrode M8 for ball electrode	41954
	Electrode cap 13mm R15mm	41959
	Electrode cap 16mm BMW	41960
	Tube of copper grease	41983
H	Water (cooling) pipe for article no. 41963	41964
N	Water (cooling) pipe for article no. 41967	41968
M	Water (cooling) pipe for article no. 41957	41958
J	Water (cooling) pipe for article no. 41951	41952
E	Water (cooling) pipe for article no. 41953	41955
	Water bridge tube (for use in the 40 mm arm)	41970
B	Water tube female for article no. 41945 (80 mm arm)	41971
	Water tube male for article no. 41945 (80 mm arm)	41972
	Elbow (for 80 mm arm)	41973
	Water tube female for article no. 41946 (350 mm arm)	41974
	Tube male for article no. 41946 (350 mm arm)	41975
C	Tube female for article no. 41947 (500 mm arm)	41976
	Tube male for article no. 41947 (500 mm arm)	41977
	O-ring inner (14-2 mm) for mobile electrodes (G, H, J, N, M)	41984
	O-ring outside (12-2 mm) for electrode shanks (E, K, L, O)	41985

## CTR12000 Electrodes Chart

 <p><b>E</b> 41953 (90_1316.4)</p> <p><b>G</b> 41950 (90_1328.4)</p> <p><b>F</b> 41949 (90_1315.4)</p>	<p><b>A*</b></p>  <p>40mm</p>				
 <p><b>E</b> 41953 (90_1316.4)</p> <p><b>Q</b> 41965 (90_1702.4)</p>	<p><b>A</b></p>  <p>40mm</p>				
 <p><b>L</b> 41956 (90_1319.4)</p> <p><b>M</b> 41957 (90_1325.4)</p>	<p><b>B*</b></p>  <p>80mm</p> <p><b>C</b></p>  <p>350mm</p>				
 <p><b>O</b> 41962 (90_1327.4)</p> <p><b>J</b> 41951 (90_1324.4)</p>	<p><b>B</b></p>  <p>80mm</p> <p><b>C*</b></p>  <p>350mm</p>				
 <p><b>E</b> 41953 (90_1316.4)</p> <p><b>P</b> 41954 (90_1331.4)</p> <p><b>M</b> 41957 (90_1325.4)</p>	<p><b>B</b></p>  <p>80mm</p> <p><b>C</b></p>  <p>350mm</p>				
 <p><b>K</b> 41969 (90_1317.4)</p> <p><b>Q</b> 41965 (90_1702.4)</p>	<p><b>D*</b></p>  <p>500mm</p>				
 <p><b>O</b> 41962 (90_1327.4)</p> <p><b>N</b> 43031 (90_1734.4)</p>	<p><b>D</b></p>  <p>500mm</p>				
<p>41959 13 mm standard</p>  <p>41960 16 mm BMW</p>  <p>44357 16A mm VAS 6755</p> 	<table border="1"> <tr> <td><b>A</b></td><td><b>B</b></td></tr> <tr> <td><b>C</b></td><td><b>D</b></td></tr> </table>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>A</b>	<b>B</b>				
<b>C</b>	<b>D</b>				

\*Standard combination for this arm

43723 (Version 2)

## Multifunction gun (Optional)

Description	Part No:
Complete set Spotter (Spot gun with pulling hammer, workpiece cable and ground cable 2,5 m , delivery plate and accessory box)	41888
Spotter (Spot gun with pulling hammer and workpiece cable and ground cable 2,5 m)	41889
Accessories box with electrodes and consumables as-sortment.	41894
Pull hammer	41892
Special chuck for puller ring	41896
Carbon electrode for pulling in	41914
Disc electrode	41897
Electrode for threaded pins	41958
Electrode for threaded pins	41899
Electrode for trim nipple	41900
Upsetting electrode for pulling sheet	41901
Push point electrode	41902
Electrode cap push pointer 13mm	41903
Puller hook for slide hammer	41895
Disc 8 x 16 x 1.5 mm copper-plated 100 pcs	41904
Special puller ring, triangular 1 VE= 20 pcs	41913
Trim nipple 3 x 3,2 mm 100 pcs	41905
Coarse threaded pin 5x25 mm 100 pcs	41912
Coarse threaded pin 5x18 mm 100 pcs	41911
Coarse threaded pin 5x12 mm 100 pcs	41910
Threaded pin M5x18 mm 100 pcs	41909
Threaded pin M4x12 mm 100 pcs	41908
Fixer nipple 5 x 8,2 mm 100 pcs	41907
Trim nipple 3 x 4,5 mm 100 pcs	41906
O-ring 14-2 inside	41984
O-ring 12-2 outside	41985
<b>Optional</b>	
Seam welding electrode	41915
Waved wire	41934





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