

CTR12000

Part 2 - Welding menus and settings

Instruction Manual (ORIGINAL)



(41644, rev 2) 2012-10, EN

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.

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

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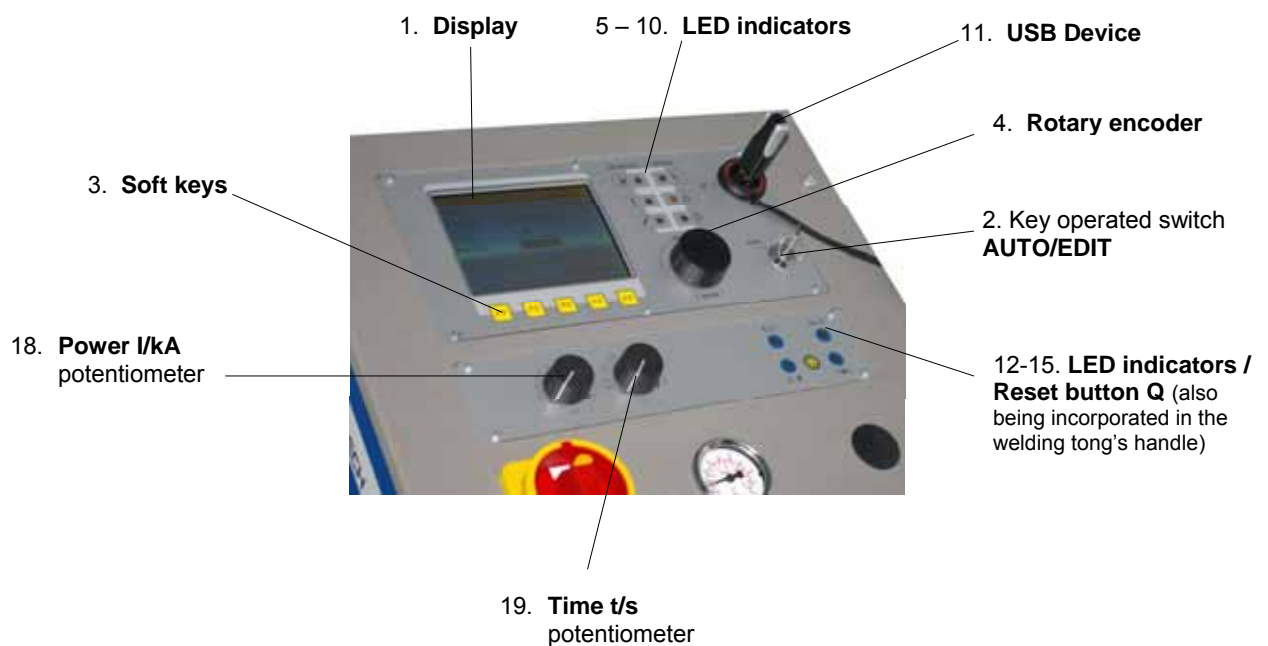
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1 Operation

1.1 General

Your welding machine offers multiple functions and a large range of different settings though the number of control elements is quite reduced. This “economy of switches“ results from the high-tech microprocessor control system.

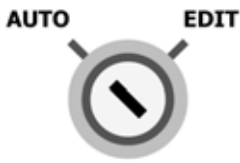
The most important control element – the rotary encoder – is located on the power source’s control panel. Together with the large, easy-to-read display, this switch offers to the user unique operating convenience: You may easily switch between different programs for different – and also very demanding – welding tasks and with the same convenience; you may also adapt the programmed combination of parameters to special requirements.



1.1.1 Display (1)

The machine has a liquid crystal display (LCD). For detailed information on the different screens, such as for the different welding programs, see *chapter 2 Welding menus*.

1.1.2 Key-operated switch (2)



The key lock switch allows access and selection of the operating modes “**AUTO**” (Automatic operation) and “**EDIT**” (Edit//Program). The standard mode for welding operation is “**AUTO**”.

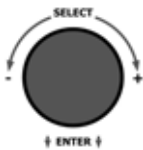
Service menus are only accessible while the key lock switch is in position “**EDIT**”. Pull out the key to prevent any manipulation by unauthorized persons and keep it in a safe and accessible place.

1.1.3 Soft keys (3)



The soft keys (membrane switches) are used for selecting the functions that are indicated in the lower display bar – exactly above the corresponding soft key. You can also use the rotary encoder to call these functions.

1.1.4 Rotary encoder (4)



The rotary encoder can be used to select all the welding functions being available. For this purpose, turn the rotary encoder until the desired function is displayed in a gray field. Then press the switch for activating the corresponding function or the selection menu (windows based).

Depending on the menu, the **ESCAPE** button (at the bottom right of the display) or the term “**ESCAPE**” appears. Select the **ESCAPE** button or the **ESCAPE** function, if you do not wish to make a choice. All the settings made before in the menu concerned are cancelled and the original values are maintained.

1.1.5 LED indicators (5-10)



(5) **YELLOW:** Indicates that the welder is ready for operation



(6) **GREEN:** Indicates that welding operation is being performed



(7) **RED:** Indicates pending malfunction



(8) **QS-RED:** Indicates that spot weld is faulty or not weldable, or faulty current tong calibration or that the tong used is not suitable.



(9) **QS-YELLOW:** Indicates heating phase for preparing the spot weld or warning limit for current tong calibration.



(10) **QS-GREEN:** Indicates that spot weld and/or current tong calibration has been okay. Indicates alarm limit or current tong calibration error, if the LED indicator QS-Yellow and/or QS-Red lights up, too.



QS-RED/YELLOW: Indicates that the spot weld is faulty, that there is a problem of insulation, and that the welding operation has been interrupted during the preheating phase.

1.1.6 USB- Device (11)

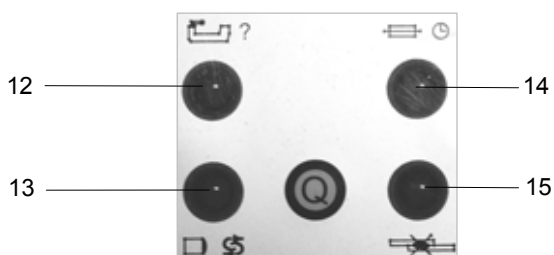
The USB- Device offers most simple data transfer between operator and machine. The data is downloaded on or uploaded from a USB- Stick. See *chapter 3.8 “USB drive”* for information on use.

Additional control elements are located on the lower control panel of the power source.

1.1.7 LED indicators (12-15) / Reset button Q



NOTE! Also being incorporated in the handle of the welding tong.



LED for "Tool" (12)

Indicates incorrect calibration of the current tong or that the tong is not suitable, or – the LED's Tool and Electrode being flashing – that calibration of the current tong is necessary

LED for "Electrode" (13)

Indicates that electrodes need to be checked (limit of the spot counter has been reached). With flashing LED: see above.

LED for "Fuse" (14)

Indicates that the start of the welding operation has been suppressed during the recovery time of the primary fuse.

LED for "Spot welding error" (15)

Indicates faulty spot weld, welding could not perform because of full or part insulation or welding time outside the QS limits.

Reset button Q

For error acknowledgement.

1.1.8 Selector switch for "Welding power" I/kA (18)

The potentiometer "Power" I/kA has two functions

1. In Manual STANDARD welding mode (conventional spot welding), the welding current is adjusted by means of the potentiometer "Power" I/kA on a scale in kA.
2. While in the Semi Automatic ELMA-QS mode (ELMA spot welding with QS supervision), the potentiometer "Power" is used to preset the total material thickness on the large display (independent of the scale) with all the relevant welding parameters being adjusted automatically in the background (synergy table).

1.1.9 Selector switch “Time“ t/s (19)

While in the STANDARD welding mode (conventional spot welding), this potentiometer is used to preset the welding time on a scale in t/s. For all the other operating modes, this potentiometer has no function.

2 Welding menus

2.1 General

Basic screen

Programs, selection menus and parameters are selected from and displayed on the basic screen. Display button (F5) is used to indicate and display programs, set points and actual values.

Optional program VAS 6755.

Optional program BMW.

Choose with soft key F5.

Display screen

The example above shows the following setting:

AUTO (--- BASIC-PROGRAM)		SET-POINT VALUE
GUN C-80	VISION Automatic	Methode Check Electrode
0	Spot counter	0.0
		THICKNESS in mm
STATUS		END

Welding task: CHECK-EL, Welding process: VISION, welding program: BASIC, C-gun: C 80 arm, electrode CAP: 13 mm and welding operation: AUTOMATIC.

The integrated welding programs that are stored in the physical welding database have write protection. They can however be used to create personalized welding program (see 3.7) , while being in the EDIT mode.

Additionally, you may create personalized welding programs to be saved as follows:

- Up to 99 synergic user programs: X01 - X99
- Up to 99 JOBS: J01 - J99 (see 2.10.2)

You may modify or overwrite synergic user programs (X01 - X99) as often as you like.



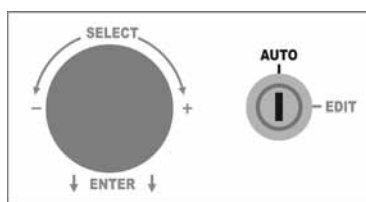
Attention: While on the screen „Synergic user programs“, the machine always offers to the user the program X01 first. Save your newly written program under another name (e.g. X02, X03 ... or J01, J02...) to prevent other priority created programs from being overwritten.

2.2 Starting the welding machine

The welding machine has been properly set up and connected to the mains. Now switch on the machine using the main switch (see chapter 5: “Start-up” in the first part of the operating manual).

After the machine has been switched on, it takes about 5 – 10 seconds until the welding control system has performed a self-test. During this time, the Car-O-Liner logo is displayed on the screen. After that, the selected synergic welding program or the last program used is displayed on the screen.

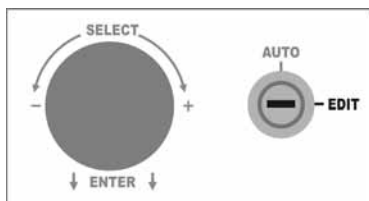
2.3 Operating mode “AUTO” (Running mode)



The “**AUTO**” mode allows welding programs to be selected via synergic selection parameters (welding process, task, selection, and tong).

This operating mode does not allow program modification but the selection of invariable programs or, while in the ELMA-QS mode, to adapt the total plate thickness and thus the synergic background parameters to the welding task by means of the potentiometer “Power” I/kA. The plate thickness is adjusted independently of the potentiometer dial and is displayed in mm on the large display screen.

2.4 Operating mode “EDIT” (Modification mode)



For welding program modification, the key has to be put into the key lock switch and turned to “**EDIT**”. Only then you have access to variable parameters that are explained in Optional settings, page 27.

2.5 Operating mode “Expert”

This mode allows extended-range modification of the basic machine settings. However, improper handling may impair welding results. Therefore access is protected by a password.

If you are interested in the Expert operating mode, please contact your local Car-O-Liner distributor which will be pleased to offer you instructions and, if necessary, more detailed information about this mode.

3 Welding processes

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: VISION, VISION ED coat, ELMAQS, STANDARD, specific automaker program OPEL and OPEL-VP for Opel. Also available optional programs like BMW-QS for BMW or VAS 6755 for Volkswagen. It is also possible to use the SINGLE- mode for the single sided tong.

3.1 Fully automatic: VISION / VISION ED COAT

VISION: Welding on clean grinded surface sheet metal.

VISION ED COAT: Welding on electrolytic dipped sheet metal.

By pressing the gun trigger and closing the tong a complex measuring system starts its work. It is able to collect the total thickness of the material which should be welded, and with the start of the current flow it recognises if there is a normal or high strength steel between the electrode caps, within some milliseconds. For that the machine controls the welding process fully automatic without any adjustments.

By selecting the "WELDING" mode, the following display appears on the screen:

CAR-O-LINER CTR 12000	
VISION	WELDING
SELECTION	--- BASIC-PROGRAM
GUN	C-80
E- CAP	13
OPERATION	AUTOMATIC
FURTHER ADJUSTMENTS	
MEMORY	SERVICE DISPLAY

Flashing of the two LED' s „TOOL“ and „ELECTRODE“ indicates that the machine has to pass the calibration of the welding tong. The calibration is used to collect the exact process resistance during the welding process, adjusting the right tong tool and to calibrate the pulse- sonar- system of the welding tong.

Before starting with the fully automatic welding process, you have to do the following adjustment:

1. Choose „CHECK-EL“ in the task menu.

CAR-O-LINER CTR 12000	
VISION	CHECK-EL
SELECTION	--- BASIC-PROGRAM
GUN	C-80
E- CAP	13
OPERATION	AUTOMATIC
FURTHER ADJUSTMENTS	
MEMORY	SERVICE DISPLAY

2. Choose the connected tong and electrode arm.
The following adjustments are possible.

CAR-O-LINER CTR 12000	
VISION	CHECK-EL
SELECTION	--- BASIC-PROGRAM
GUN	C-80
E- CAP	C-80
OPERATION	C-350
	C-500
	C-40
	C-150
	C-250
	C-450
	C-550
MEMORY	SERVICE DISPLAY

Attention: C-40 is not used in VISION/VISION EDcoat mode!

3. Choose electrode cap.

Standard version:

CAR-O-LINER CTR 12000	
VISION	CHECK-EL
SELECTION	--- BASIC-PROGRAM
GUN	C-80
E- CAP	13
OPERATION	16 C
FURTHER ADJUSTMENTS	
MEMORY	SERVICE DISPLAY

VW version:

CAR-O-LINER CTR 12000	
VAS 6755	CHECK-EL
SELECTION	--- BASIC-PROGRAM
GUN	C-80
E- CAP	16A
OPERATION	13
	16 C
	16A
FURTHER ADJUSTMENTS	
MEMORY	SERVICE DISPLAY

BMW version:

CAR-O-LINER CTR 12000	
BMW-QS	CHECK-EL
SELECTION	--- BASIC-PROGRAM
GUN	C-80
E- CAP	16
OPERATION	13
	16 C
	16A
FURTHER ADJUSTMENTS	
MEMORY	SERVICE DISPLAY

4. Choose the MODE „AUTOMATIC“

The screenshot shows the CAR-O-LINER CTR 12000 control panel. The OPERATION menu is open, and the AUTOMATIC option is selected. Other options visible are MANUAL and MENTS. The panel also includes buttons for VISION, CHECK-EL, SELECTION, GUN, E-CAP, MEMORY, SERVICE, and DISPLAY.

In operation mode AUTOMATIC the EDIT- key should be switched to AUTO because otherwise the puls-sonar system which is integrated in the tong, could not collect the total thickness of the material and the right parameters that are needed are locked.

If the EDIT- key is on EDIT, an error message (red fault light) would also be shown, which has to be quitted by the user.

This screenshot is similar to the previous one, but with a yellow arrow pointing to the F18-Key switch on EDIT Setting-S1. The OPERATION menu is still open, and the AUTOMATIC option is selected. The panel also includes buttons for VISION, CHECK-EL, SELECTION, GUN, E-CAP, MEMORY, SERVICE, and DISPLAY.



Attention! Always use new or clean electrode caps when making CHECK-EL!

CAR-O-LINER CTR 12000	
VISION <input type="button" value="v"/>	CHECK-EL <input type="button" value="c"/>
SELECTION <input type="button" value="s"/>	--- BASIC-PROGRAM <input type="button" value="p"/>
GUN	C-80 <input type="button" value="g"/>
E- CAP	13 <input type="button" value="e"/>
OPERATION	AUTOMATIC <input type="button" value="o"/>
	FURTHER ADJUSTMENTS <input type="button" value="f"/>
MEMORY <input type="button" value="m"/> SERVICE <input type="button" value="s"/> DISPLAY <input type="button" value="d"/>	

The result of the calibration is displayed with the LED' s of the QS- “traffic light” and the LED' s “tool” and “electrode” in the lower control panel.



If the machine has performed the CHECK-EL successfully change the adjustment to menu task „ WELDING“

Now the machine is ready to start welding.

CAR-O-LINER CTR 12000	
VISION <input type="button" value="v"/>	WELDING <input type="button" value="w"/>
SELECTION <input type="button" value="s"/>	--- BASIC-PROGRAM <input type="button" value="p"/>
GUN	C-80 <input type="button" value="g"/>
E- CAP	13 <input type="button" value="e"/>
OPERATION	AUTOMATIC <input type="button" value="o"/>
	FURTHER ADJUSTMENTS <input type="button" value="f"/>
MEMORY <input type="button" value="m"/> SERVICE <input type="button" value="s"/> DISPLAY <input type="button" value="d"/>	

By pressing the soft key F5 you change to display mode.

AUTO (--- BASIC-PROGRAM)		SET-POINT VALUE
GUN	VISION	Methode
C-80	Automatic	Welding
1 <input type="button" value="1"/>	Spot counter	2.0 <input type="button" value="2"/>
		THICKNESS in mm
STATUS <input type="button" value="s"/>		END <input type="button" value="e"/>

By changing the „**OPERATION MODE**“ from AUTOMATIC to MANUAL the automatic measuring system to collect the total material thickness is switched off. Instead you can adjust the thickness of material you want to weld manually by turning the “**Power**” potentiometer.

The image shows the control panel of the CAR-O-LINER CTR 12000. It features several dropdown menus and buttons. The 'VISION' menu is set to 'VISION'. The 'WELDING' menu is set to 'WELDING'. The 'SELECTION' menu is set to 'SELECTION'. The 'GUN' menu is set to 'GUN'. The 'E-CAP' menu is set to 'E-CAP'. The 'OPERATION' menu is set to 'MANUAL'. The 'BASIC-PROGRAM' menu is set to '--- BASIC-PROGRAM'. The 'C-80' menu is set to 'C-80'. The '13' menu is set to '13'. The 'MANUAL' menu is set to 'MANUAL'. The 'AUTOMATIC' menu is set to 'AUTOMATIC'. The 'MANUAL' menu is set to 'MANUAL'. The 'MEMORY' button is highlighted. The 'SERVICE' button is highlighted. The 'DISPLAY' button is highlighted.

The CTR12000 is equipped with a quality control system (QS), which give a statement about every single spot during the welding process. The in particular phases resulting parameter characteristics are evaluated by program segments and depending on this, engagements are created to lead to a safe quality result.

Following phases could appear individually:

Total isolation, in such a case an isolation between the metal sheets which should be welded and lack of a bypass (spot weld nearby or vise grip) could cause that no welding current is generated at the caps. The machine stops the process automatically and displays the signal spot error (red), error code 16.

Partwise isolation, the welding current do not flow the direct way from the electrode through the metal sheets, but a detour. Then a preheating is activated automatically which heat the metal sheets and through maceration or evaporation, burns through the glue or varnish rest at the spot area. The term of that phase the yellow light keeps lighting. If that will not succeed in a pre-setted time the process will be aborted. The red light signals the error. In the case of success the yellow light stops lighting and the green light appears.

During "pre pulse" segment the process is leaded by the virtual generator. The goal is to reach the welding current, which is reached individual in a different time without any disturbance through evaporation with weld spatters. Normal steel will suffice in some milliseconds, with high strength steel it could last for up to 300ms. Please pay attention that with high strength steel, at that phase, up to 50 percent of the inserted energy is transferred, so the welding time will not extend. For the case that the presetted critical time ex-

ceed, the red light signals an error (Error code 3). If the process was successful the green light is shown.

The process is controlled in the welding segment either with the current for normal steel or with a lower current for high strength steel. The decision criterion has been created in the segment “pre pulse”. The process is not, in opposition to usual procedures, time- oriented. The energy at the electrode caps is balanced and compared with the energy- target value in the database. With the achievement of the target energy within the presetted critical time the process ends.

During the welding, following signals could appear:

- a) green; code 10 (the resistance is between the reference resistance and the presetted maximum resistance)
- b) green after yellow; code 11 (resistance is higher than the presetted maximum resistance)

If the resistance by reaching the target energy lower than the reference resistance, there is a bypass on the workpiece and the virtual machine calculates the seize of the bypass and add the correct energy value.

- a) green after yellow; code 12 (energy was added because of a bypass)
- b) green after yellow; code 13 (process ended without adding energy)
- c) green after yellow; code 14 (process ended with adding energy)

The segment post heating stopps the process. The currentflow- and time are different at normal- and high strength steel.

Status signals ERROR x, CODE y; are displayed in the debugger mode, af_hv09 (cell 181 with VM1).

Error code list

Error 11	F11- Check (Resistance- ZERO)	
Error 12	F12- Check Distance (Position- Zero)	
Error 13	F13- Check value Distance out of tolerance	
Error 14	F14- Check-Resistance too high	
Error 15	F15- Check-Resistance too low	
Error 16	F16- Total-Isolation	
Error 17	F17- Measured value out of Tolerance	
Error 18	F18- Key switch on EDIT Setting	
Error 19	F19- Starting energy too low	
Error 20	F20- Start button not activated	
Error 21	F21- Test cycles not successfull	
Error 22	F22- Critical time reached	
Error 23	F23- Sheet thickness lower 0,1 mm	
Error 24	F24- No valid Check values	
Error 25	F25- No Isolation breakthrough after Pre-heating	
Error 26	F26- 120% Application of energy exceeded	

With the oscillograph- plug in, 3 status signals could be displayed after the process:

- a) integrated process resistance during the segment "pre pulse" (SAutoTX)
- b) Averaged process resistance during the segment welding (SAuto)
- b) display status (Error- code: 1 to 12), (Success- code: from 10)

The status is displayed in 0,5V steps (e.g. Error 5=> 2,5V; Code 12=> 6V)

The QS- System was optimised, that after a welding a definite conclusion is displayed:

Green for a successful action or red for an automatic process abort. A process abort is achieved if a given critical time exceeds, that could happen during an unusual activity. That could happen if, e.g. the electrodes are positioned on the edge of the work piece or there is an interruption on the mains. Such an interruption also could happen if the calibration (CHECK-EL) is made with dirty electrode caps.

These differences, which could be tolerated and which are lower than with a usual current/ time control are displayed with a yellow light during the process. After the process stops, the yellow light is replaced usually by the green light, if the CTR12000 control system finish the process successfully.

Intermediate messages, yellow, could appear if, e.g. to breakthrough a part wise isolation or the resistance characteristic is higher than generally expected.

Attention! Exceeding of welding time indicates that the calibration was incorrect. This may occur when copper electrodes are not cleaned. Please clean the electrode caps at the contact surface. Be careful not to make scratches or slots! Dirty electrode caps could endanger the calibration and thus the quality and safety management of the machine.

Attention! The measuring system reach it's correct accuracy normally when the electronic components are at it's operating temperature. Please perform the CHECK- EL after some minutes after switching on the machine.

Attention! Please be careful by changing the electrode arms. The welding tongs contain a sensitive measuring system inside which could be damaged by intrusion of water. It's important that the solid arm of the X- tong is in the

upper position. Please make sure that leaking water is collected e.g. with a drapery. Please also pay attention with the arm- connection surface. At the connection surface up to 12 000 A could be transferred. Any impurities on the connection surface should be removed with a fine sandpaper, to prevent any interference in the current flow.

3.2 Semi automatic: ELMA-QS

The welding process called ELMA-QS designates the ELMA spot welding procedure that allows for the energy applied and observes the welding time by means of the QS (quality assurance) supervision system. This process being selected, the following screen appears:

The image shows two screenshots of the CAR-O-LINER CTR 12000 control panel. The left screenshot shows the 'ELMA-QS' menu selected, with options like 'CHECK-EL', 'BASIC-PROGRAM', 'C-80', '13', 'AUTOMATIC', and 'FURTHER ADJUSTMENTS'. The right screenshot shows the 'SELECTION' menu with options like 'GUN', 'MATERIAL', 'OUTER SHEET', 'C-ELMA', 'NORMAL STEEL', and '<1mm'.

If both LEDs “Tool” and “Electrode” are flashing on the lower control panel, the current tong needs to be calibrated. This calibration is necessary for precisely determining the process impedance during the welding process and for checking the tool (tong) used.

The image shows a screenshot of the CAR-O-LINER CTR 12000 control panel. The 'WELDING' menu is selected, with options like 'SELECTION', 'BASIC-PROGRAM', 'C-ELMA', 'NORMAL STEEL', and '>1mm'.

After you have selected CHECK-EL from the menu “Tasks and gun set-up“, press the start button to initiate calibration. **DO NOT FORGET that the calibration must be made with clean copper-bright electrodes WITHOUT work piece (electrodes).**

The calibration result is indicated by the LEDs of the “QS lights“ as well as by the LEDs “Tool“ and “Electrode“ on the lower control panel:

QS-RED/YELLOW/GREEN	Faulty calibration (upper limit) or unsuitable tong
QS-YELLOW/GREEN	Calibration okay, (upper alarm limit)
QS-GREEN	Calibration okay
QS-YELLOW	Calibration okay, (lower alarm limit)
QS-RED	Faulty calibration (lower limit) or unsuitable tong

Steadily flashing LEDs “Tool” and “Electrode” on the lower control panel indicate that the calibration was not successful or that the gun used is not suitable. If both LEDs do not light up, the calibration was okay.

When the LED “Fuse” is also on, the automatic recovery phase has been initiated for the primary fuse. After the recovery time has expired, the LED goes automatically out and the restart of the machine is released. This procedure prevents in a reliable way any overheating of the mains fuse and the mains supply connection cable.

After successful current tong calibration, select "WELDING" from the “Tasks” menu. The key-operated switch must be in position AUTO.

The menu item TONG-TYPE allows different guns to be selected in addition to the ELMA C-gun, e.g. the ELMA X-tong. The materials to be welded (you may choose between normal or high-grade steel) are selected via the menu item MATERIAL.

You additionally may also choose here a pre-spot program designated “PRE-SPOT OPERATION” (detailed information is given later in this manual).

Furthermore you shall adjust the thickness of the OUTER SHEET to more than 1 mm or less.

CAR-O-LINER CTR 12000

ELMA-QS WELDING

SELECTION --- BASIC-PROGRAM

GUN C-ELMA

MATERIAL NORMAL STEEL

OUTER SHEET <1mm

FURTHER ADJUSTMENTS

MEMORY SERVICE DISPLAY

If you wish to return to the display screen, simply press the right soft key below the field DISPLAY or activate this field by using the rotary encoder.

AUTO (--- BASIC-PROGRAM) SET-POINT VALUE

GUN ELMA-QS Methode

C-Elma Pre-spot Check-EL

0 Spot counter 3.8 THICKNESS in mm

OUTER SHEET < 1mm

STATUS END

This screen allows you to adjust the total thickness of the plates to be welded with the potentiometer “Power” I/kA to the desired value. The control system computes the required welding current, energy and pressure in the background. The value set with the second potentiometer „Time“ t/s is not considered with this procedure.

For positioning the welding tong on the work piece, the tong may be opened and closed without current by pressing and releasing the start trigger up to and from the first action point (please refer also to part 1 of the operating manual “Setting up the welding machine”). After the welding tong has been positioned, press the start button as far as it will go to start the welding process.

Then the intelligent program ELMA-QS (while the tong being positioned and closed) checks the initial welding conditions and takes into account par-

allel resistance, surface coatings or dirt that may have accumulated. The program branches automatically for deciding in favour of a welding procedure developed by Car-O-Liner that produces reliable welding spots.

At the end of each spot weld, the welding result is indicated as follows:

QS-GREEN

Welding operation was successful.

QS-RED

A defined time-limited test operation proves and indicates that the welding operation was not successful. One cause may be complete electrical insulation. The QS-RED, however, can also result from the fact that the start button has been released too early or that the welding time has not been within the defined time window. The welding operation was stopped since the maximum time limit had been reached. Welding operation is interrupted and stopped if the energy applied after half welding time is only half the set point.

QS-YELLOW

Indicates during welding operation that the program is branching into the preheating segment.

QS-YELLOW/RED

Although the program has branched into the segment PREHEATING, welding operation has not been successfully completed. Possible causes: insulating layer or excessive resistance of the work piece material.

Over- or underrange of the defined time window may result from:

1. Incorrectly adjusted total plate thickness
2. Worn or damaged electrodes
3. Miscalibrated C-gun (CHECK-EL)
4. Material features of the plates to be welded do not comply with the materials used for drawing up the saved synergic tables.

Before welding on cars using the free synergic program ELMA-QS, you have to perform in any case a test weld, if materials, plate thickness and coatings cannot be precisely defined. Inspect and analyze the results

achieved from the test weld(s), and, if necessary, adapt individual welding parameters to suit the requirements.

In case of faulty welding operation (indicated by QS-RED or QS YELLOW/RED), the LED “Spot error“ on the lower control panel lights up too and the welder is automatically locked until the fault occurred is acknowledged by pressing the “RESET“ button Q. The LED “Spot error” goes out and QS-RED is reset at the next welding operation. **A faulty spot must be repeated by doing a new one to be welded next to the original spot.** If the LED “Fuse“ lights up too, the automatic recovery phase for the primary fuse has been initiated. At the end of this phase, the LED automatically goes out and a machine restart is released.

In background operation, the program sums up the number of welded spots and compares it to the preset maximum spot number. The LEDs “Electrode” and “Tool” light up as soon as this maximum number has been achieved, or the LED “Electrode” lights up and any further welding operation is blocked to allow inspection and, if necessary, replacement of the electrode caps. Such inspection and replacement is only possible while the power source is OFF and consequently, the error message will be reset only after the power source has been switched off and on. After this inspection and restart of the machine, the program asks again for CHECK-ELECTRODE (alternating light).

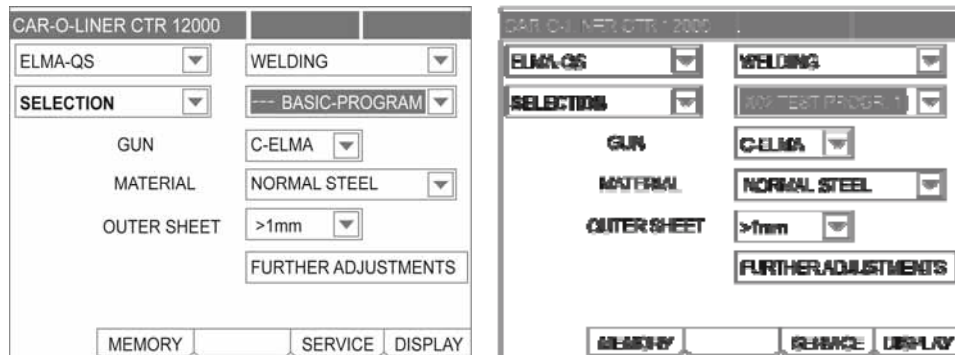
3.2.1 Pre Spot Operation program


The screenshot shows the control panel of the CAR-O-LINER CTR 12000. The panel has a title bar 'CAR-O-LINER CTR 12000'. Below it, there are several dropdown menus and buttons. The 'ELMA-QS' dropdown is set to 'WELDING'. The 'SELECTION' dropdown is set to '--- BASIC-PROGRAM'. The 'GUN' dropdown is set to 'C-ELMA'. The 'MATERIAL' dropdown is set to 'PRE-SPOT-OPER.'. The 'OUTER SHEET' dropdown is set to 'NORMAL STEEL'. The 'PRE-SPOT-OPER.' dropdown is set to 'PRE-SPOT-OPER.'. The 'FURTHER ADJUSTMENTS' button is visible. At the bottom, there are three buttons: 'MEMORY', 'SERVICE', and 'DISPLAY'.

This program is used, if more than two sheets are to be joined by welding. In this case, spot welding is first done on the sheets in the car and outside on service parts where two sheets need to be welded and joined. This operation is done to eliminate and burn off contaminating materials between the sheets, such as primer, paint, glue, as well as to ensure good transition for the subsequent spot welding operation. After you have selected the PRE-SPOT OPERATION program, welding settings are done by adjusting material thickness as with the standard welding program ELMA-QS.

After the service parts have been fitted into the vehicle, the final spot welds are exactly welded on the pre-welded spots.

3.2.2 Optional settings

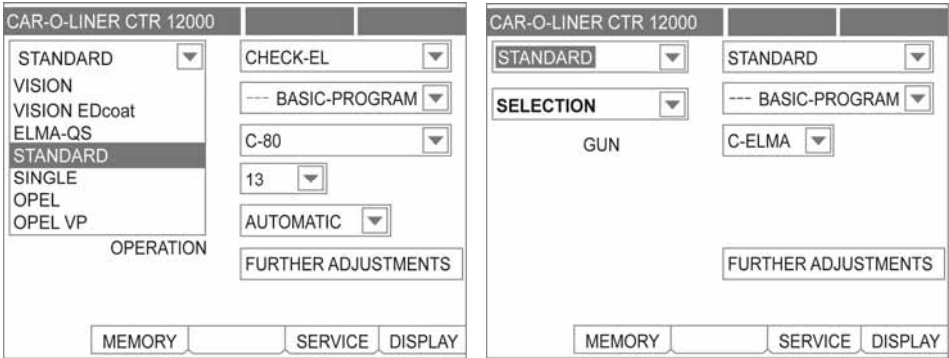


Back on the selection screen (by pressing the soft key END), further optional settings can be performed. The screen indicates besides the selection menu whether the selected combination can be welded by displaying the accordingly defined program or the “BASIC PROGRAM”. If more than one program is available, the selection arrow  appears on the screen.

Several selectable programs are displayed according to the following priority scheme:

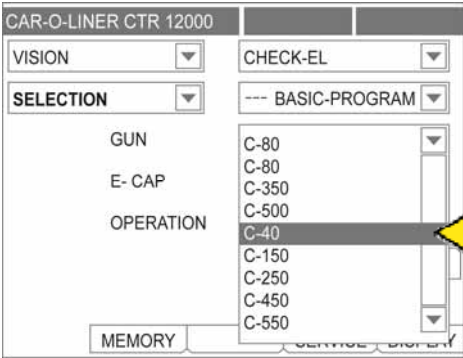
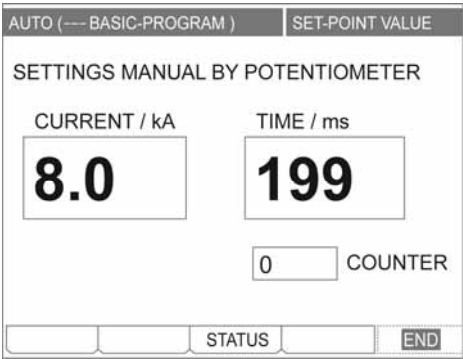
1. JOB
2. X-programs (customized)
3. D-programs (standard programs)
4. (- - - BASIC PROGRAM)

3.3 Manual: STANDARD (conventional resistance spot welding)



This chapter explains how to proceed for Manual (STANDARD) welding.

Now the process selected is conventional resistance spot welding. Welding current and time are adjusted afterwards exclusively by means of the two potentiometers “Power” I/kA and “Time” t/s on the corresponding scale observing plate thickness and material. For recommended welding values, see table on page 31 (see also decal on the front cover). Experienced values serve as setting parameters.

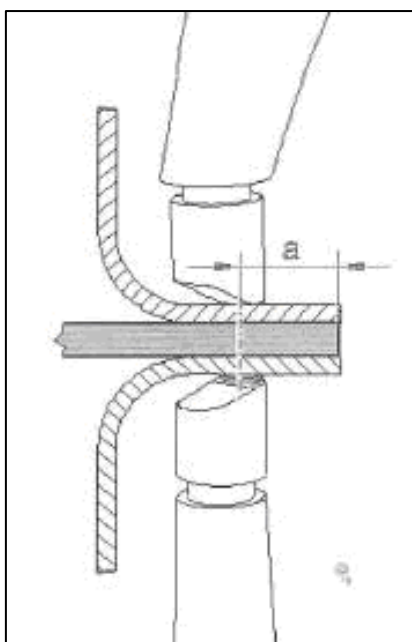


Attention: C-40 is available only in STANDARD mode.

3.3.1 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).

AUTO (— BASIC-PROGRAM)		SET-POINT VALUE
SETTINGS MANUAL BY POTENTIOMETER		
CURRENT / kA	TIME / ms	
6.0	500	
	0	COUNTER
STATUS		END



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.

3.4 Multi-function welding gun (optional tool): SINGLE

The multi-function gun is to be used for SINGLE welding operation.



The Single- side- gun adapter for the C/X- Gun should be clamped between the electrodes of the gun, by pressing the gun trigger once, with the polarity as guided on the adapter. Open the gun by pressing the trigger again.

CAR-O-LINER CTR 12000	
SINGLE ▼	MULTIFUNCTION ▼
VAS 6755	--- BASIC-PROGRAM ▼
VAS 6755 EDcoat	C-ELMA ▼
VISION	
ELMA-QS	
STANDARD	
SINGLE	
FURTHER ADJUSTMENTS	
MEMORY	SERVICE DISPLAY

Setting parameters (approximate values) for the multi-function gun are given below. We recommend checking individual settings by doing welding trials on test material before welding on vehicles.



We recommend checking individual settings by doing welding trials on test material before welding on vehicles.

Conventional spot-welding (STANDARD)							43722		
C-caliper (C-tong)	Force [dN] at 6 bar	Plate thickness > [mm]	1.6	2.0	2.4	3.0	4.0	5.0	6.0
	380	Current [kA]	8.0	8.2	8.4	8.6	9.0	9.0	9.0
		Time [sec.]	0.26	0.3	0.35	0.43	0.57	0.7	0.9
MULTI-TORCH (Multi function gun)	Force [dN]	Plate thickness >	0.6	0.8	1.0	1.5			
IMPACT POINTS	70	Current [kA]	4.0	4.8	5.5	6.8			
		Time [s]	0.18	0.28	0.40	0.52			
BUCKLING	10	Current [kA]	1.2 - 2.8						
		Time [s]	0.02						
Plate contraction with copper electrode	25	Current [kA]	0.9 – 1.5						
		Time [s]	Set time potentiometer to maximum value and determine current time yourself by releasing the button.						
Plate contraction with carbon electrode	2	Current [kA]	0.4 – 0.8						
		Time [s]	Set time potentiometer to maximum value and determine current time yourself by releasing the button.						
CORRUGATED WIRE with sickle-shaped electrode	20	Current [kA]	1.0						
		Time [s]	0.1						
Bolts Metric and coarse	5	Current [kA]	2.4	2.8	3.6	4.2			
		Time [s]	0.08	0.10	0.14	0.16			
T-pins 3.2 and 4.5	5	Current [kA]	1.4	1.4	1.5	1.7			
		Time [s]	0.04	0.06	0.10	0.12			

Setting parameters (recommended values) are also indicated on the decal on the front cover of the welder. The multifunction gun is exclusively designed for repair work on car bodies. Since the gun is not water-cooled, an overheat protection device (thermostat) has been fitted that is triggered at thermal overload and prevents the machine from being restarted. The cooling-down phase following such overheating can last up to 20 minutes until the machine restart is released.

3.5 Special automaker programs

To access special automaker programs, for example select OPEL or OPEL VP for Pre-spot operation from the menu “Welding process”. The following screen is then displayed:

The screenshot shows the CAR-O-LINER CTR 12000 interface. On the left, a dropdown menu is open, showing options: VISION, ELMA-QS, STANDARD, SINGLE, OPEL (highlighted), and OPEL VP. To the right, there are several controls: a 'CHECK-EL' dropdown, a '--- BASIC-PROGRAM' dropdown, a 'C-ELMA' label, and a 'GME-01' dropdown. Below these is a 'FURTHER ADJUSTMENTS' button. At the bottom, there are three buttons: 'MEMORY', 'SERVICE', and 'DISPLAY'.

The different special automaker programs can be selected from the field to the right of the parameter PROGRAM and generally run under Welding.

The screenshot shows the CAR-O-LINER CTR 12000 interface. On the left, there are two dropdown menus: 'OPEL' and 'SELECTION'. Below them, the labels 'GUN' and 'PROGRAM' are visible. To the right, there are several controls: a 'WELDING' dropdown, a '--- BASIC-PROGRAM' dropdown, a 'C-ELMA' label, and a dropdown menu showing options: GME-01 (highlighted), GME-02, GME-03, GME-04, GME-05, and GME-06. At the bottom, there are three buttons: 'MEMORY', 'SERVICE', and 'DISPLAY'.

These kinds of program are not freely adjustable like the ELMA-QS. They in fact are a set of precisely defined parameters for one special welding task.

Having selected OPEL VP (PSO Pre Spot Operation) the screen below appears:

The screenshot shows the CAR-O-LINER CTR 12000 control panel. At the top, there is a title bar with 'CAR-O-LINER CTR 12000'. Below this, there are several dropdown menus and buttons. The first row has 'OPEL VP' and 'PRE-SPOT'. The second row has 'SELECTION' and '--- BASIC-PROGRAM'. The third row has 'GUN' and 'C-ELMA'. The fourth row has 'PROGRAM' and 'GME-PSO'. Below these, there is a button labeled 'FURTHER ADJUSTMENTS'. At the bottom, there are three buttons: 'MEMORY', 'SERVICE', and 'DISPLAY'.

After having switched to the DISPLAY mode, settings for welding operation are made by adjusting the material thickness. Same procedure as with standard spot welding procedure ELMA-QS.

When the impurities is too thick, the welder will not allow welding. For this reason it is recommended to use Pre Spot Operation (PSO). This operation will eliminate all impurities such as ED coat, dirt, thin bonding, thin rust etc.

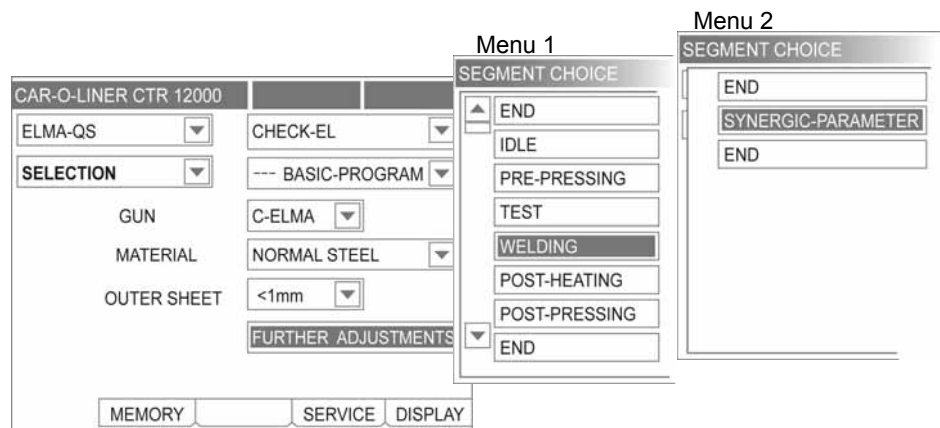
The program to be selected for the different welding tasks is determined by the automaker and given in his parameter documentation for car repair zones.

Special service instructions issued by the automakers must be strictly observed.

3.6 Further adjustments

3.6.1 Description of settings in the "ELMA QS" mode

The menu item FURTHER ADJUSTMENTS contains the sub-menus to the individual program segments:



The sub-menus allow the following parameters and synergic parameters (see also chapter "Editing synergic characteristics") to be adjusted:

IDLE segment		
Parameters	Setting	Remarks
ELECTRODE CYCLES	0- 999	Elec. Cycles till next calibration (CHECK-EL)
FUSE MONITORING	0=No, 1=Yes	Fuse monitoring
Synergic parameters		
PREPRESSING segment		
Parameters	Setting	Remarks
TEST segment		
Parameters	Setting	Remarks
Synergic parameters		
I-PREHEATING	0-9 kA	Preheating current
TAU-PREHEATING	0-250 ms	Time factor for preheating operation
WELDING segment		
Parameters	Setting	Remarks
T-LIMIT	100-300% T-WELD	Time limit
Synergic parameters		
I-WELD	0-9 kA	Welding current
REF-ENERGY	0-10 kW	Reference energy
T-REF	10-1500 ms	Welding time
QA-WINDOW	1-100- %	Welding time tolerance range
POSTHEATING segment		
Parameters	Setting	Remarks
Synergic parameters		
I-POSTHEATING	0-9 kA	Postheating current
T-POSTHEATING	0-500 ms	Postheating time
POSTPRESSING segment		
Parameters	Setting	Remarks
T-POSTPRESSING	50-3000 ms	Postpressing time of gun (without current)

3.6.2 Welding process segments in ELMA-QS mode

The welding process is divided into individual segments that are displayed on the screen. The figure below shows their chronology during welding operation.



3.6.3 Welding process segments in the "VISION" mode

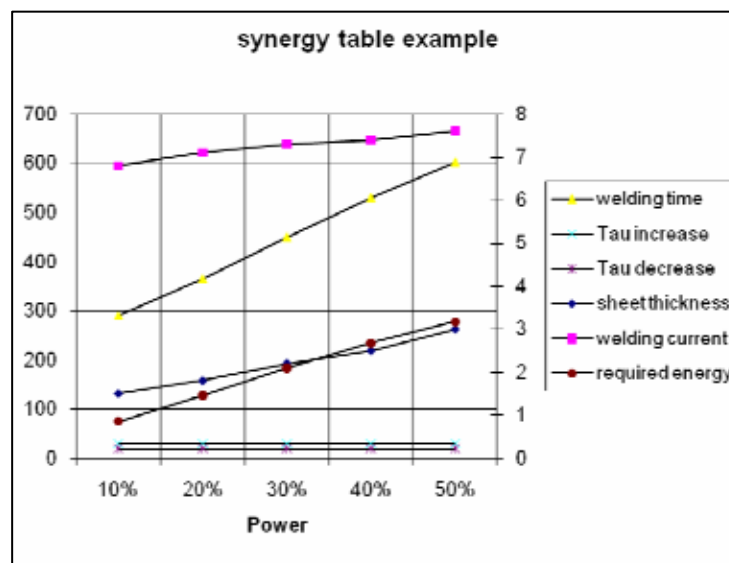


3.6.4 Editing synergy characteristics in the "ELMA QS" mode

Definition of "welding power characteristics"

Welding power characteristics are created from a family of characteristics assigned to several parameters. In case of spot welding, these parameters are total material thickness, welding current, set point energy, welding time and choke effect (time constant for current slope-up and time constant for current slope-down). A "Point" is defined as the synergic parameters that are registered and saved for one power value. Up to 20 points can be saved without prescribed order for creating a characteristic.

The computer computes and indicates the intermediate values between two points from a line equation. The parameters of a characteristic for those power values being before the point of the lowest and/or behind the point of the maximum power value are predicted by the computer from the initial or final straight line. Of course, these parameters are displayed, too



Entry of points for welding characteristics in ELMA-QS mode

As already described in chapter 3.6 Further Adjustments, you can select and edit individual data fields by using the rotary encoder. Values being outside the corresponding MIN/MAX limits are not accepted for entry.

When you change one or several data fields, for example thickness, the following screens will appear:

The first screenshot shows the initial state with THICKNESS at 3.8 mm. The second screenshot shows THICKNESS highlighted. The third screenshot shows THICKNESS changed to 2.5 mm, with a yellow arrow pointing to the new value.

SYNERGIC-PARAMETER	WELDING	NORM-E-QS-T
END		
EL-FORCE	2.4 kN	
I-WELD	8.9 kA	
REF-ENERGY	4.29 kW	
THICKNESS	3.8 mm	
END		
		66.0% 66.0% END

SYNERGIC-PARAMETER	WELDING	NORM-E-QS-T
END		
EL-FORCE	2.4 kN	
I-WELD	8.9 kA	
REF-ENERGY	4.29 kW	
THICKNESS	3.8 mm	
END		
		66.0% 66.0% END

SYNERGIC-PARAMETER	WELDING	NORM-E-QS-T
END		
EL-FORCE	2.4 kN	
I-WELD	8.0 kA	
REF-ENERGY	4.29 kW	
THICKNESS	2.5 mm	
END		
		66.0% 66.0% QUIT

Synergic characteristics for the most common welding jobs have already been drawn up and memorized by the manufacturer. If need be, they can be adapted to customer's requirements.

Any modification of data fields (synergy or other parameters) made in the EDIT mode is marked with and displayed between two asterisks (***) and stored in the computer's buffer memory. Modified data are thus immediately available for the welding process.

The first screenshot shows I-WELD at 8.9 kA. The second screenshot shows I-WELD changed to 8.0 kA, with a yellow arrow pointing to the new value.

SYNERGIC-PARAMETER	WELDING	NORM-E-QS-T
END		
EL-FORCE	2.4 kN	
I-WELD	8.9 kA	
REF-ENERGY	4.29 kW	
THICKNESS	3.8 mm	
END		
		66.0% 66.0% END

SYNERGIC-PARAMETER	WELDING	NORM-E-QS-T
END		
EL-FORCE	2.4 kN	
I-WELD	8.0 kA	
REF-ENERGY	4.29 kW	
THICKNESS	3.8 mm	
END		
		66.0% 66.0% QUIT

The defined values of a synergy table are indicated in percent ("%"). Choose one point to have displayed the associated synergic parameters.

Saving points


After you have modified data in the mask for synergic and other parameters and wish to quit this mask, the system asks whether the modification should be saved. The display normally offers to you the customized program X01.



Always save personalized programs under a new name (e.g. X02, X03 ..., or J01, J02...), to prevent already saved data from being overwritten. To this purpose, activate the window “RENAME“. The following alphanumerical field opens up and allows you to enter the new name:

In this mask you may activate different fields to produce the following effects:

“**STORE**“: New synergic parameters are saved and already memorized parameters are overwritten.

To save a program, just click the  symbol on the left side of the input field.

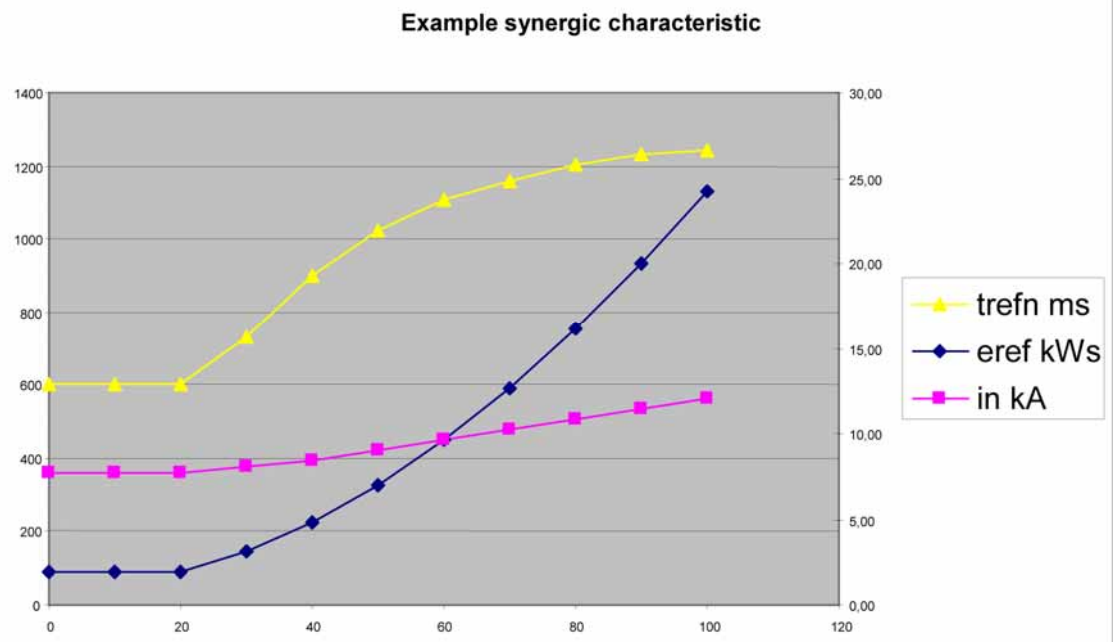
“**REJECT**“: Modified data are cancelled and old values are restored.

“**BACK**“: You turn back to the screen with the synergic parameters without saving the modifications you have made.

3.6.5 Editing synergy characteristics in the "VISION" mode

Definition of "welding power characteristics"

Optimising of parameters in the EDIT- mode the OPERATION MODE, MANUAL should adjusted. It is recommended that no new Synergic parameters are set, because a correct adjustment between the %- parameters vab and the value THICKNESS is required. Depending on the automatically collected total thickness of the material, the database provides 35 physical parameters for each welding process, which are controlled by the control system Virtual Machine. The characteristic curves which are generated by the virtual generator effect a drastic compensation of splatters, also with a combination of long electrode arms, with a lower electrode force (<3,6 kN).



Entry of points for welding characteristics

Same procedure as ELMA-QS, see chapter 3.6.4 (Entry of points).

Saving points

Same procedure as ELMA-QS, see chapter 3.6.4 (Saving points).

3.7 Options

3.7.1 General

In addition to the possibility of adapting existing programs to special customer requirements and saving them as so-called X programs, the system offers also the possibility to save selected working points of the synergistically operating programs that are perfectly adapted to the corresponding welding task as so-called “Jobs“. These “jobs” are not running synergistically but are in fact selected working points of a synergic program with an invariable set of parameters.

For saving such jobs, select – while in the EDIT mode – the synergic welding program that suits the welding task (via synergic parameters) and determine in the individual case the welding energy required. After that, save this “working point“ as a job named from J01 to J99. If required, the welding parameters of a saved job can always be corrected in the EDIT mode and “working points” can even be completely deleted or overwritten

Welding machines disposing of suitable optional interfaces can be used for welding operation via remote control unit or with welding robots. If such an automatic welding program is selected, the microprocessor control system of the CTR12000 ensures that the welding operation is exactly performed with “the selected working point“ – i.e. with the optimum welding energy determined and the associated synergic parameters.

The job programs are activated in the AUTO mode via remote control or robot interface. Additionally, invariable synergic programs and X programs may be selected via the remote control and robot interface. To this purpose, the interface must be configured in the menu Machine configuration.

3.7.2 Working with “Jobs”

a) *How to call an existing Job?*

AUTO

Activate the menu field besides SELECTION to check whether the memory already contains jobs or X programs. With the key lock switch in position “AUTO”, a window opens up and shows the existing programs that can be selected. The window looks like below.

The image shows the control panel of a CAR-O-LINER CTR 12000. The panel features several buttons and a display area. The 'SELECTION' button is active, showing a menu with 'X02 Special Program' highlighted. Other visible buttons include 'VISION', 'WELDING', 'GUN', 'E- CAP', 'OPERATION', 'AUTOMATIC', 'FURTHER ADJUSTMENTS', 'MEMORY', 'SERVICE', and 'DISPLAY'.

CAR-O-LINER CTR 12000			
VISION		WELDING	
SELECTION		X02 Special Program	
		X02 Special Program 1	
		--- BASIC-PROGRAM	
GUN		13	
E- CAP			
OPERATION		AUTOMATIC	
		FURTHER ADJUSTMENTS	
MEMORY		SERVICE	DISPLAY

Use the cursor to select the corresponding programs manually.

In case of external program selection via remote control or robot interface, select in the menu SELECTION the item JOB.

CAR-O-LINER CTR 12000			
VISION		WELDING	
JOB		--- BASIC-PROGRAM	
SELECTION		C-80	
JOB		13	
TASTRONIK		AUTOMATIC	
OPERATION		FURTHER ADJUSTMENTS	
MEMORY		SERVICE	DISPLAY

The screen changes as follows:

AUTO (X02 Special Program)		SET-POINT VALUE	
GUN C-80	VISION Automatic	Methode Check Electrode	
0	Spot counter	2.5	THICKNESS in mm
		STATUS	END

By calling “JOB“ in the AUTO mode, you can activate the remote control or robot interface, and the desired jobs can now be selected via the interface.

b) How to create or modify a Job?

In order to create or modify a special job and save the corresponding settings, first activate the field “**SELECTION**” and select a synergic program from the right menu field.

To give you an example how the screen could look like:

The screenshot shows the main control interface of the CAR-O-LINER CTR 12000. At the top, there are two tabs: 'VISION' and 'WELDING'. Below them, the 'SELECTION' menu is active, displaying a list of options: GUN, E- CAP, and OPERATION. To the right of these options, there are corresponding dropdown menus: 'C-80' for GUN, '13' for E- CAP, and 'AUTOMATIC' for OPERATION. Below these dropdowns is a button labeled 'FURTHER ADJUSTMENTS'. At the bottom of the screen, there are three buttons: 'MEMORY', 'SERVICE', and 'DISPLAY'.

Now activate the DISPLAY mode (Soft key DISPLAY).

The screenshot shows the 'DISPLAY' mode of the CAR-O-LINER CTR 12000. The top bar displays 'AUTO (--- BASIC-PROGRAM)' and 'SET-POINT VALUE'. Below this, there are three columns of information: 'GUN' (C-80), 'VISION' (Automatic), and 'Methode' (Check Electrode). In the center, there is a large digital display showing '0' for the 'Spot counter' and '2.0' for the 'THICKNESS in mm'. At the bottom, there are two buttons: 'STATUS' and 'END'.

Use the potentiometer “**Power**” I/kA to adjust the desired total material thickness and perform a test weld.

This screenshot is identical to the one above, showing the 'SELECTION' menu. However, the 'FURTHER ADJUSTMENTS' button is now highlighted with a grey background, indicating it is the next step in the process.

Optimize the welding parameters in the menu “**FURTHER ADJUSTMENTS**” (key lock switch in position “**EDIT**”) and save the optimum value as “working point”, e.g. “**J01 COMPONENT A**”. The maximum number of available memory locations is 99 (from J01 to J99).



Remember that the option of saving is only available after having modified one or more than one parameter in the menu “FURTHER ADJUSTMENTS”. Any modification is marked in the program selection field with * *. You only have to modify and re-modify one parameter.

You may correct the welding power of a job at any time. The same goes for the synergic and remaining parameters to be approached by the field “FURTHER ADJUSTMENTS” of the corresponding table.

The operations and displays when creating and saving jobs mostly correspond to those performed and appearing when editing synergic characteristics. Therefore no details are given at this place. See *chapter 2.9.3 “Editing synergy characteristics”*

3.8 USB- Drive

The USB device of your machine has various functions:

- Backup of personalized welding programs.
- Backup of the complete data stock of the machine.
- Cloning of the machine data base.
- Error analysis and remote maintenance in case of malfunction.
- Data transfer to the PC for welding program visualization.
- Installation of updates (Updates of the plug&weld data base for welding parameters).
- Installation of special welding software (new materials – new processes).
- Backup of QS data (only available for machines with QS system).

How to use the USB- Device

Normal welding operations generally do not require the USB drive. If you wish to use the USB device nevertheless, proceed as follows:

Insert the USB- STICK



1. **Open the USB- slot by removing the protection cap**
2. **Turn the cap against clockwise direction**
3. **Insert the USB- key**



3.9 Welding program management

The following function can be selected and called from the MEMORY screen.

- **DELETE** welding programs

Attention: The use of this function is only possible in EDIT- mode! It is necessary that an USB- key is in the USB- device!

CAR-O-LINER CTR 12000

VISION [dropdown] WELDING [dropdown]

SELECTION [dropdown] --- BASIC-PROGRAM [dropdown]

GUN C-80 [dropdown]

E- CAP 13 [dropdown]

OPERATION AUTOMATIC [dropdown]

FURTHER ADJUSTMENTS

MEMORY SERVICE DISPLAY

After you have pressed the soft key F2 under the MEMORY field and have selected the menu PRINT, the following screen is displayed:

CAR-O-LINER CTR12000

VISION [dropdown] WELDING [dropdown]

DELETE PROGRAM:

X02 Special Program 1 [dropdown]

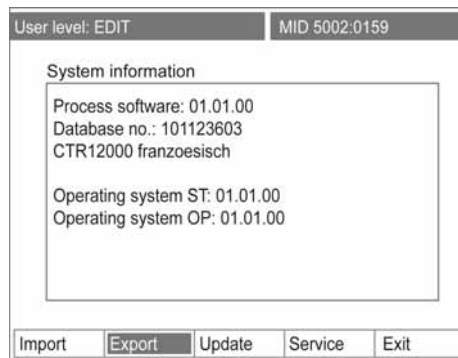
DELETE END

MEMORY SERVICE DISPLAY

The window that pops up and program stack “ACTION” gives access to the function, DELETE.

Export of data

After entering the field Export, following window appears on the screen:



In that menu you can export the individual welding programs with the modified parameters to an USB-stick. If you want to store your individual programs, choose **UserDB**.



SpotQS logfile export

To copy the **SpotQS logfile**, you have to insert the USB- Stick to the USB- Drive of the machine. Choose **SpotQS logfile export** to transfer the QS- data to the USB- stick. Please also read the additional instruction manual: Analysing Spot- QS datasheets.



EXPORT logs

This point is just used by the manufacturer and is out of action in normal use.

Basic machine settings

Expert mode

Press the soft key SERVICE to open the following window:

Expert (010100-2)	SERVICE
ENTER EXPERT/SERVICE PASSWORD	
ENTER DATE/TIME	
MACHINE- CONFIGURATION	
USB-FLASH-MEMORY SERVICES	
CONTRAST	
SYSTEM RESET	
ERROR LOG	
USER LANGUAGE	
<div>ESC</div>	

For access to the expert mode, turn the key lock switch to EDIT and enter the password that is required for accessing this mode.

After activating the field “EXPERT/SERVICE RELEASE“, the user has access to further possibilities of program editing but only qualified users that have been trained by Car-O-Liner should make use of them.

For this reason, the access to the EXPERT mode is protected by a password. You will receive this password after you have been given special instruction or training by our service staff.

Having entered the password and accessed the expert mode, you can change the password, if you like. If so, select the menu item “MODIFY EXPERT PASSWORD” (*this item is displayed only after the correct password has been entered)

Please note: You always can quit the password window without having entered a word by activating the field “ESCAPE“ or pressing the soft key for “ESCAPE“.

MACHINE CONFIGURATION

While in the AUTO or EDIT mode, parameters are displayed, but cannot be modified.

Modifications are only allowed while in the expert mode. Only skilled users who have been trained by Car-O-Liner should modify parameter fields.

ENTRY OF DATE/TIME

Activate the field "DATE/TIME ENTRY" to set date and time. Move the cursor onto the corresponding field or use the rotary encoder.

ERROR LOG

Activate the field "ERROR LOG" to display a possible fault. If no error (malfunction) occurred, the mask "NO PENDING ERROR" appears. Otherwise the corresponding fault is displayed on the screen.

SYSTEM RESET

Activate the field "SYSTEM RESET" to initiate system reset, i.e. the micro-processors are re-started and the system is reset.

3.10 Machine shut-down

To shut down the machine, proceed in the following order:

1. **Turn the mains switch to "0"**
2. **Loosen the air hose**
3. **Pull out the mains plug**

4 Troubleshooting

The tests and procedures stated in the table below facilitate diagnosing the causes of the most frequent troubles and ease self-remedy where appropriate.

	Possible cause	Solution
The welding machine cannot be started	Mains fuses	Check fuses, and replace, if necessary.
	Residual current circuit breaker or internal miniature circuit-breakers have tripped.	Switch on residual current circuit breaker or internal miniature circuit-breakers (located behind the cover plate).
	No mains voltage	Check
	Defective power switch	Replace, if necessary.
Machine stops during welding operation and the LED "Error" on the top right of the control panel lights up.	Thermal overload resulting from duty cycle overrange.	Let cool down the power source. Power source OFF/ON
	Error in the cooling circuit, failure of fans.	Check cooling circuit, pump, fan, cooling liquid level, hose connections. Switch power source OFF/ON
	Power section error.	Switch power source OFF/ON
	Delivered compressed air is not sufficient.	Check compressed air supply, pressure adjusted at the pressure reducer ≥ 3 bars, hose connections Switch power source OFF/ON
Mains fuse is triggered during welding	Wrong mains fuses.	Clean the metal from any rust, color etc. To confirm the message, press any key to return to the chosen program/welding. (The message locks the system function).
	Duty cycle is exceeded.	Enter rated current of the existing mains fuses in the BREAK program segment
	Wrong fuse selection in the program segment BREAK or cancel fuse function.	Enter measured current of the existing mains fuses in the program segment BREAK or select fuse function.
Cooling unit is not running, no indication on the display	Internal miniature circuit breakers have tripped	Check miniature circuit breakers and switch them on, if necessary
	Pump is blocked or defective.	Check
	Defective control.	Replace
Gun does not close after user has pressed the start pushbutton.	No or insufficient compressed air supply.	Check compressed air supply and hose connections
	The electromagnetic valve is defective or does not switch.	Check mains fuses

Fault	Possible cause	Solution
Gun is closed after the start button has been pressed, but there is no welding current	The current tong has not been calibrated yet (CHECK-EL), LEDs Tool and Electrode flash.	Select CHECK-EL and perform tong calibration
	Recovery phase for the mains fuse. LED Fuse lights up.	Wait until recovery time has expired
	Pending spot error that has not been acknowledged. LED Spot error lights up.	Acknowledge the spot error by activating the reset button "Q"
	The condition of the electrodes must be checked. LED Electrode lights up.	Switch off power source, check electrode condition and replace, if necessary
	No start signal, the green LED right above the keylock switch must light during the welding procedure.	Check start pushbutton, control cable and plug.
	Pending error, the red LED right above the keylock switch lights up. Error possibly resulting from overheating, insufficient pressure in the air circuit (<3bars), or malfunction of the power section.	Let cool down the power source, check compressed air and settings, switch the power source off and on.
After CHECK-EL, the QS light permanently shows RED or GREEN/YELLOW/RED and the LED's Tool/Electrode do not stop flashing	Wrong spot gun, wrong gun arm or not greased, worn electrode caps, electrode holder not greased, interrupted measuring lead.	Use the gun prescribed, grease the gun arms and electrode holders with conductive grease, replace electrode caps, check measuring lead.
QS lights show RED or YELLOW/RED after welding procedure and LED for spot error lights up.	Poor contact between the sheets to be welded and/or the electrodes.	Remove insulation layer, if necessary create special program with suitably adapted parameters.
	Sheets are not close-lying.	Increase electrode squeeze pressure
	The transition resistance of the sheets to be welded does not correspond to the value preset in the welding program.	Repeat the spot, if necessary, create special program with suitably adapted parameters
	Welding time is outside the tolerance window.	Repeat the spot, if material features are not clear, create special programs with suitably adapted parameters
	Wrong program has been selected, adjusted value for total material thickness is not correct.	Correct settings and repeat the spot.
	CHECK-EL has been performed with unclean, worn electrode caps	Clean or replace electrode caps and repeat CHECKEL.
LED- Electrode lights up or flashes together with the LED Tool	Check the condition of the electrodes.	Switch off the power source, check condition of electrodes and replace them, if necessary
LED- Tool lights up and/or flashes together with the LED Electrode	The current tong has not been calibrated yet or a foreign tong has been installed.	Select CHECK-EL and perform tong calibration or connect the correct tong
LED- Fuse lights up	Recovery phase of the primary fuse.	Wait until the recovery time has expired
Material thickness cannot be adjusted while in the display mode	Turn keylock switch to EDIT.	Keylock switch must be turned to AUTO.
While in STANDARD mode, welding current and time cannot be adjusted	Keylock switch is in position EDIT.	Keylock switch must be turned to AUTO.
Display is dark	Display is in stand-by mode.	Activate the rotary encoder.
	Defective mains fuses.	Check fuses and replace, if necessary.
Electrode caps burn out	Insufficient cooling.	Check coolant level, cooling circuit, hose connections and tube in the electrode shank.

Fault	Possible cause	Solution
Workpieces stick to the electrodes.	Excessive welding current.	Reduce welding power.
	Unsuitable electrode caps.	Use correct caps.
	Insufficient electrode pressure.	Increase contact pressure.
Poor welding spot.	Insufficient welding current, welding time and/or energy applied.	Increase welding current and/or time, create special program with suitably adapted parameters, if necessary.
	Electrode pressure is too high.	Reduce contact pressure.
	Electrodes are in poor condition, diameter is too large.	Clean electrodes, reshape and restore correct dimensions, replace electrode caps, if necessary.
	Wrong program has been selected.	Correct selection.
	Wrong adjustment of total material thickness.	Correct adjustment.
	Poor sheet position, not close-lying.	Correct
Welding spatter	Color or dirt between the sheets.	Clean.
	Poor contact between the workpieces or between the workpiece and the electrode	Increase electrode pressure.
	Excessive welding current, welding time and/or energy applied.	Reduce welding current, energy and/or time, create special program with suitably adapted parameters, if need be.
	Current slope-up time is too short.	Increase slope-up time.
	Electrode diameter is too large, worn electrode.	Clean electrodes, reshape and restore correct dimensions, replace electrode caps, if necessary.
	Insufficient electrode pressure.	Increase electrode pressure.
Burnt spots or spots with craters or imprints.	Excessive welding current, welding time and/or energy applied.	Reduce welding current, energy and/or time, create special program with suitably adapted parameters, if need be.
	Insufficient electrode pressure.	Increase electrode pressure.
	Deformed electrode caps.	Clean electrodes, reshape and restore correct dimensions, replace electrode caps, if necessary.
	Poor sheet position, not close-lying.	Correct.



DANGER

General information on troubleshooting and remedy actions.

Only qualified electricians are allowed to open up power source and mains plug.

ATTENTION! Prior to any work on open power source, disconnect the machine from the mains and discharge the intermediate circuit.

Car-O-Liner® is a Leading Global Provider of Assured and Profitable Alignment Processes to the Automotive Industry, including Technical Development, Training and Service. Over 55 000 Car-O-Liner Collision Repair Systems are in use worldwide. Car-O-Liner runs operations of its own in Scandinavia, USA, UK, France, Germany, Singapore, India and China and sells through local distributors in more than 60 countries.

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