

InvertaSpot GT®

 **AUTOMATIC**



Original - Working Instructions Part 2
Setup of the welder, use and handling
CS-twin sided welding gun
V3 - 3000

Service-Hotline (+49) 07720 / 83 17 0



Stand 05-2011



MV Marketing und Vertriebs-GmbH & Co.KG
Wieländer+Schill
Professionelle Karosserie-Spezialwerkzeuge



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Legal relationship

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Attention:

Before starting to use this welder, always read the safety instructions first: Please see the Working Instructions Part 1

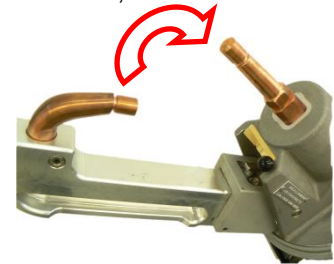
1 Resistance spot welder InvertaSpot GT

1.1 Details of the machine

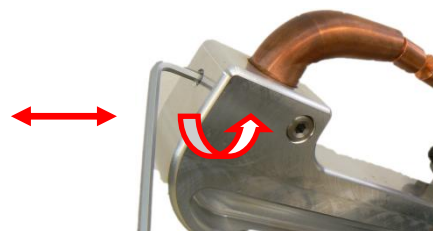
Main items of the machine: control unit + twin sided welding gun type CS + balancer



Opening of the electrode arms, slide black lever



Secure and lock the electrode arms



For perfect welding results clean the electrode caps regularly. If case caps are over-used and out of original shape please replace the electrode caps.



InvertaSpot GT with C-gun balancer assembled

1.2 Technical data

Welding power

	Spot-welding
Setting range:	0 – 13 kA
Welding current:	DC current
Max. welding power:	13 kA
Continuous duty 100% ED duty ratio	2,8 kA
Open circuit voltage VOC:	12 V DC

Main parts of the spot welder: power and control unit, twin-sided gun type CS and spring balancer.

Technical data

Mains supply:	Europe: 3 x 400 V 50/60 Hz USA: 3 x 208 V 50/60 Hz
Max. power with 5 % duty ratio:	156 kVA
Continuous power ratio (100% ED)	35 kVA (Europe) 45 kVA (USA)
Fuse (slow blow):	32 A (Europe) 63 A (USA)
Power cable (copper):	5 metre long 5 x 6 mm ² (Europe) 197 incl. long 4 x 10 mm ² (USA)

System of protection:	IP 21
Temperature class:	A

Air pressure	6 to 8 bar /90-120 psi
--------------	------------------------

Others

Length welding cable	3 m
Refrigerant	Tap water with antifreeze (do not use distilled water)
Tank volume	80 l - 22.45 gal.
Flow rate	5 l/min - 1,3 gal/min
Dimension (height x broad x width)	810 x 560 x 750 mm Approx. 32 x 22 x 30 inch.
Weight without refrigerant	119 kg - 262 lbs.
Noise emission	≤ 70 dB (A)

2 Important notice before using the InvertaSpot GT in **AUTOMATIC-Mode**

Before starting to use the InvertaSpot GT in  **AUTOMATIC-Mode** please note:

For quality control we recommend that you first make sample welds of the material which is going to be spot welded and then check the nugget size by opening the welded sample.



Note: This resistance spot welder should only be used by professional and experienced staff.



Calibration: Working in automatic mode, re-calibration of the welder has to be carried out after each re-start, after each change of the caps, after each change of the electrode arms. Please read also chapter 7.2

Only perfectly dressed and clean surfaces of the electrode caps guarantee perfect welding results.

If spot welding in Automatic Mode is not recommended or allowed, then please use the machine in manual mode – read configuration in chapter 11.1.4



Automatic-Mode









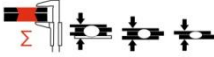

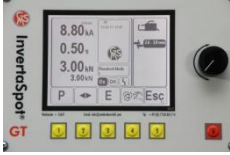




Manual-Mode



3 The program structure of the InvertaSpot GT



Automatic	Automatic-Mode	Manual	Manual-Mode																																				
																																							
	<p>The GT automatically checks and measures the total metal thickness. Gun Pressure + Amps + Time are controlled and regulated continuously.</p>		<p>Parameters can be selected manually by turning the knob. Air pressure and current are automatically controlled at all times during the whole welding process.</p>																																				
	<p>Calibration of the welder: It is important to do this when starting to use the welder, changing of the electrode caps or changing the arms</p>		<p>Weld parameters according to total metal thickness, irrespective of metal quality or coatings</p>																																				
	<p>To set the O – point: Press button no 1 Weld copper to copper. Electrode caps must always be clean.</p>		<p>Measure of total metal thickness</p> 																																				
	<p>Single: Each weld will be measured and each one will receive its optimized weld parameters</p>		<p>Set parameter via the black knob. Air pressure sets automatically</p> <table border="1" data-bbox="1265 1541 1385 1749"> <thead> <tr> <th>Progr</th> <th>mm</th> <th>mm</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>≤ 1,50</td> <td></td> </tr> <tr> <td>2</td> <td>1,60</td> <td>2,00</td> </tr> <tr> <td>3</td> <td>2,10</td> <td>2,50</td> </tr> <tr> <td>4</td> <td>2,60</td> <td>3,00</td> </tr> <tr> <td>5</td> <td>3,10</td> <td>3,50</td> </tr> <tr> <td>6</td> <td>3,60</td> <td>4,00</td> </tr> <tr> <td>7</td> <td>4,10</td> <td>4,50</td> </tr> <tr> <td>8</td> <td>4,60</td> <td>5,00</td> </tr> <tr> <td>9</td> <td>5,10</td> <td>5,50</td> </tr> <tr> <td>10</td> <td>5,60</td> <td>6,00</td> </tr> <tr> <td>11</td> <td>≥ 6,50</td> <td></td> </tr> </tbody> </table>	Progr	mm	mm	1	≤ 1,50		2	1,60	2,00	3	2,10	2,50	4	2,60	3,00	5	3,10	3,50	6	3,60	4,00	7	4,10	4,50	8	4,60	5,00	9	5,10	5,50	10	5,60	6,00	11	≥ 6,50	
Progr	mm	mm																																					
1	≤ 1,50																																						
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4	2,60	3,00																																					
5	3,10	3,50																																					
6	3,60	4,00																																					
7	4,10	4,50																																					
8	4,60	5,00																																					
9	5,10	5,50																																					
10	5,60	6,00																																					
11	≥ 6,50																																						
	<p>Lock: Press No 5 so all the following welds will be spot welded using the same parameters</p>		<p>Expert-mode: The user chooses all parameters himself. Air and current control operates at all times. Memorising of the parameters is available.</p>																																				

4 Electrode arms for CS gun in use with Automatic-Mode

Empfohlener Einsatz der C-Arme in Abhängigkeit der Gesamtblechstärke
 Recommend area of operations for C-Arms according to the overall thickness of metal sheet

Automatic - Modus
 Manueller Modus



Programm			1	2	3	4	5	6	7	8	9	10	11
Art.-Nr.	Modus	Bild	<= 1,5 mm	1,6 - 2,0 mm	2,1 - 2,5 mm	2,6 - 3,0 mm	3,1 - 3,5 mm	3,6 - 4,0 mm	4,1 - 4,5 mm	4,6 - 5,0 mm	5,1 - 5,5 mm	5,6 - 6,0 mm	>=6,1 mm
- PARAMETER -			8,00 kA 0,20 s 2,50 kN	8,20 kA 0,40 s 2,60 kN	8,60 kA 0,50 s 2,80 kN	8,80 kA 0,50 s 3,00 kN	9,00 kA 0,60 s 3,20 kN	9,20 kA 0,62 s 3,50 kN	9,40 kA 0,68 s 3,50 kN	9,50 kA 0,72 s 3,60 kN	9,60 kA 0,75 s 3,80 kN	9,80 kA 0,80 s 3,90 kN	10,00 kA 0,90 s 4,00 kN
495620			←										→
495606			←										→
495607			←							→			
495645			←			→							
495602			←				→						
495604			←		→								
495613			←							→			
495611			←							→			
495650			←							→			
495625			←								→		
495615			←								→		



Survey: Use of electrode arms in relation to weld parameters and/or programs, together with the total material thickness. Most of the arms can be used together with the Automatic Mode. .

Please note: Based on physical terms, all electrode arms have their individual charge and force limit see red in above diagram. In case you are forced to use the electrodes over their limit please select parameters individually. Make sure you have test welds with appropriate quality control.

The maker reserves the right to alter or to extend the selection of the electrode arms.

The maker reserves the right to alter or to extend welding programs and parameters.

All welding electrodes can also be used in manual mode. Please always respect the physical limits of each electrode arm.

5 Standard front display



After re-starting of the welder, the front screen will show the standard front display. ATTENTION: Do not start to work until this front display is fully set-up.



CS ZANGEV4 400

Information serial number about the twin sided gun in use



Select Automatic-Mode by pushing button no



Select Manual Mode by pushing button no



Service

Service button:

SETUP + caps test by pushing of button no



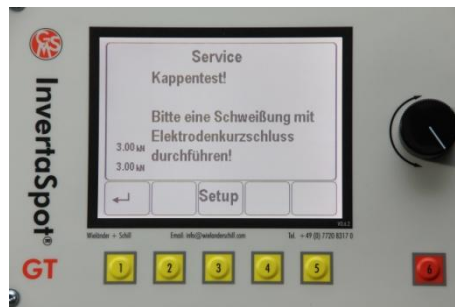
6 Cap test + electrode caps service

Only perfectly dressed caps guarantee perfect spot weld results!

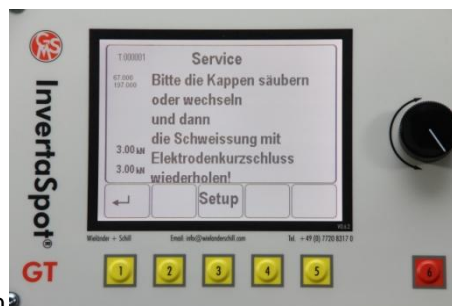
After re-starting the machine, you will first get the message to check the electrode caps. If you do not want to have caps test showing up in the front page each time please read chapter on configurations.



First make a spot weld copper to copper (no metal between). The electrodes will close. After that follow the instructions shown on front display.



Schleifschlamm



Electrode caps shape **G**:

This is the **standard cap** shape for **Automatic and Manual Mode**.

When using Automatic Mode please only use electrode cap shape G..



For spot weld jobs using Manual Mode there are more caps of different shapes, lengths and sizes available. In such case please set and use welder only in expert mode.

All electrode caps have to be cleaned up with an abrasive sponge to guarantee perfect spot weld results.

7 Spotwelding in Automatic Mode



7.1 Calibration before starting to use and weld in Automatic Mode.

Each time you are going to use the Automatic Mode the calibration must be carried out



Attention: Calibration is necessary

- Each time you start the spot welder
- Each time you changed the electrode caps
- Each time after cleaning the electrode caps
- Each time you changed electrode arms

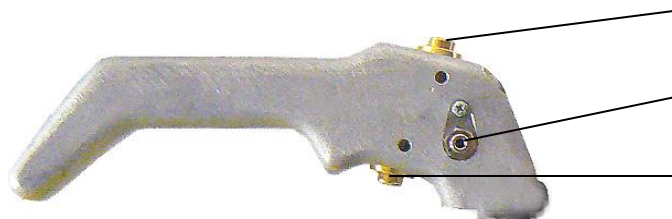


Step 1: press button 1

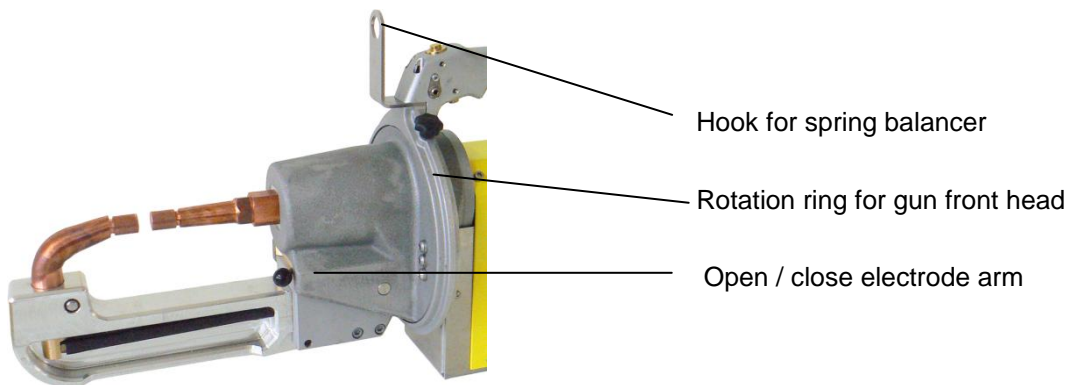


Push button at the bottom of the handle. The weld power is released. Keep button closed until the electrodes automatically open again.

After this, the spot welder is ready for use in Automatic Mode.



- To open electrode arms
- Connector for lead cable single sided gun
- To close electrode arm and release spot welding current



7.2 Spot welding in Automatic Mode – weld process



- Press lower button on grip handle, gun will close electrodes
- Air pressure is automatically adjusted, regulated and continuously controlled. First there is a pre-weld to prepare the material for spot welding; important in case of spot weld gluing, dirty panels, zinc coatings or multi layers of sheet metal with different sizes and thicknesses
- The second pulse (main power) makes the weld. The current is controlled continuously through the whole weld process.
- Weld process control of current (amps), time and gun pressure throughout the complete weld process.
- Registration of each weld in data software. Later you will be able to print the data. Each weld process can be shown in graphs on computer for single analysis
- **Single mode**
- **Lock mode**



Single-Mode: Check-up of material thickness before each weld. Comes into use in case of changing materials, changing material thicknesses and/or changing quality.

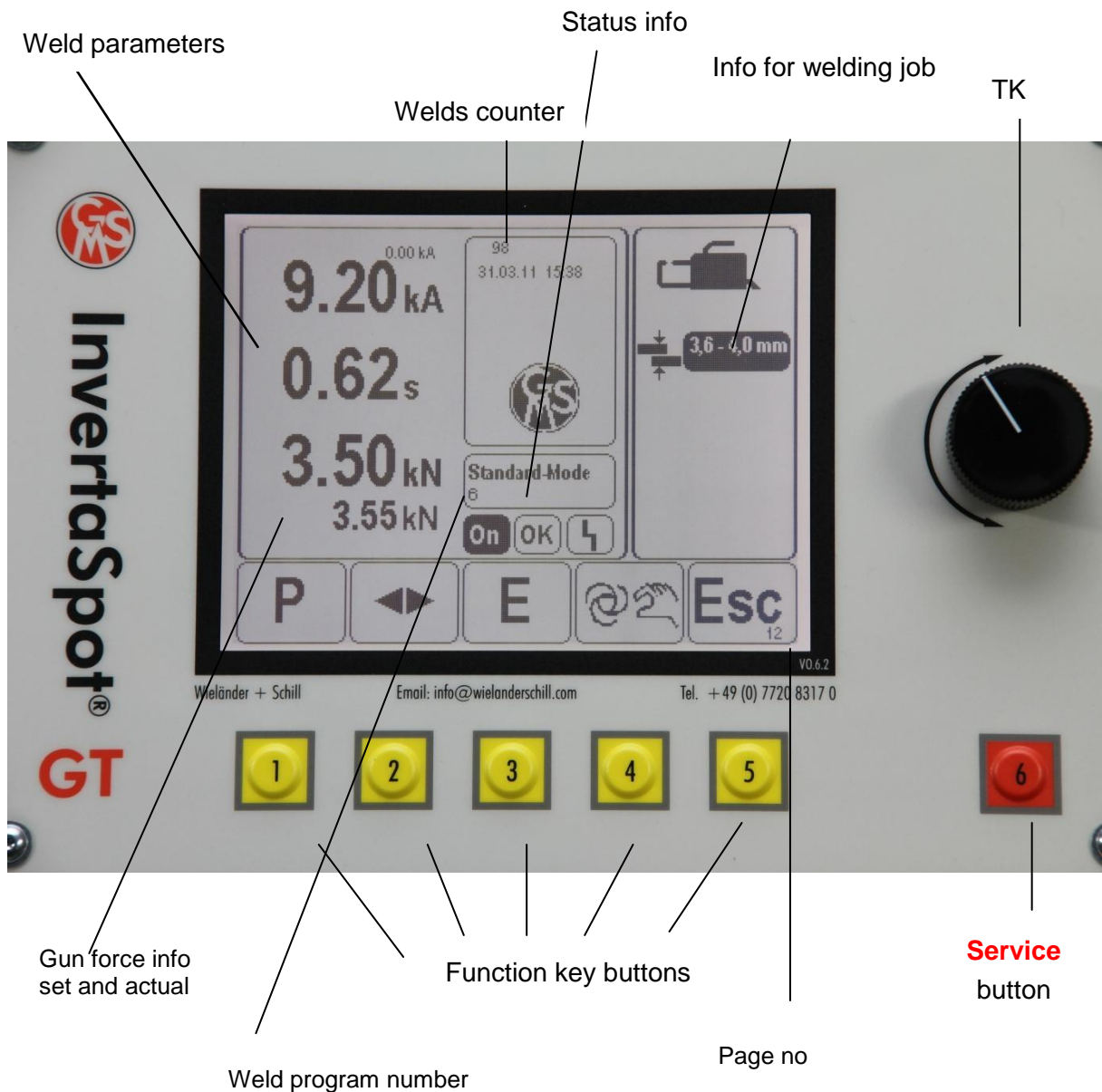


Lock-Mode: All the following welds will be spot welded with the same parameters. Comes into use if many welds have to be done in the same configuration, same material thickness and same quality.

8 Spotwelding in Manual Mode 1



When you select the Manual Mode you'll find the following details on the front display



8.1 Functions shown on front display

Weld parameters indicate the selected parameters of weld current [kA], the weld time [s] and the gun force in [kN].

The gun force is shown in two figures.

- **Required force:** shows the force which is programmed for the selected weld parameter.
- **Real force:** shows the actual force which is controlled by the system.

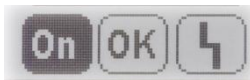


You have the choice of how you want the time and gun force shown in the display. The time such as [ms] or [s] and the force as [daN] or [kN]. You may choose or alter these settings – move to the chapter about changing options and select time or force. (see chapter 11 Setup)

Weld program number This shows the programmed number of selected weld program

Page no: This is important information for the service engineer. This will help him to assist you in the case of service and backup.

Status info **ON:** Main power unit ready

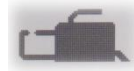


OK: Weld job done according to the selected parameters

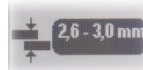
⚡: Mistake during weld process

Info for welding job:

Selected tool



Material thickness



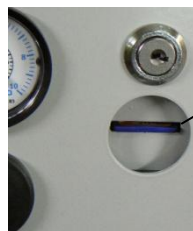
8.2 Pre-set parameters and programs in Manual Mode

Program in relation to total material thickness and the job to weld

Weld program not shown in front display.



It is possible and may sometimes be necessary to adjust the weld programs via software updates. This is done by means of new SD card. Attention: software updates should only be carried out by experienced service engineers.



SD card:
 Weld program
 Updates
 Data memory

Progr	mm	mm
1		≤ 1,50
2	1,60	2,00
3	2,10	2,50
4	2,60	3,00
5	3,10	3,50
6	3,60	4,00
7	4,10	4,50
8	4,60	5,00
9	5,10	5,50
10	5,60	6,00
11	≥ 6,50	

8.3 Weld data to store and to print out

All weld data and all welding results are stored on the SD card. For print outs please use InvertaSpot GT print software (optional)

8.4 Function key buttons

You select jobs and actions by means of the 5 function keys. The functions are always shown directly above the buttons. Sometimes there is more than one function behind the function keys.

The turn-push knob button **TK** comes in use by turning or pushing to set the parameters.

General function keys

The general function keys will show up in several different menus but still having the same functions.

Home: Return to basic setting in Manual Mode

ESC: Back to previous screen

C: Cancel or delete the last letter/figure

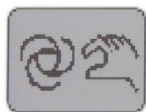
Enter: Enter, confirms settings



Navigation or manual selection. Also to switch between parameters



Manual storing of weld parameters



Switch between Automatic and Manual mode

9 Gun force control via automatic air control valve

In order to achieve the correct weld results, the correct gun force plays a major role, together with the correct weld power and time. The InvertaSpot GT Automatic is fitted with an automatic air valve control system.

Each pre-programmed weld program of the GT also has its own individual gun force. After release of weld power by pressing the button at the bottom of the handle (chapter 7.1) the gun closes automatically. The air valve is building up the pressure for the gun force. Throughout the complete weld process the gun force will be controlled and regulated continuously.



The gun force control is working all the time. If the air pressure is missing or if there is any air pressure fluctuation of +/- 50 N the weld process will be stopped immediately. You will see in front display the warning message F 34 or F 35 (see chapter 15)



The user has the possibility to alter the tolerance of the air pressure control individually upon his personal needs.

Alterations, see "change options", force control (see chapter 11.1.3)

In case of any alterations to the gun force control level, test welds will be required with following qualified quality control checks for nugget size etc.

10 Functions of Manual Mode 2 = Expert mode



10.1 Expert mode general basic info



Push the function key no **3** and you will be in the Expert mode.

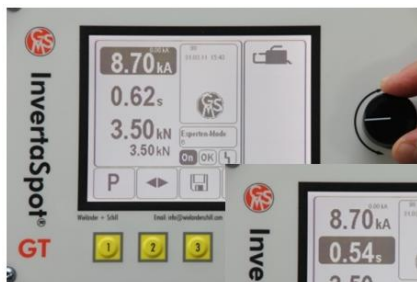


When using the Expert mode the user is fully responsible for the weld program, the weld parameters, the quality of the welds, the quality control and the quality safety control of the welding results.



Attention: It is recommended to secure each new weld job with the approved quality control systems for spot welding.

Wrong weld parameters may result in metal sparks which may create personal injuries and also cause damage to the equipment.



Choose the required setting via the **TK knob**



Change between the parameters
kA – s – daN
 via the flash key

10.2 The Expert mode in detail

10.2.1 The front display in the Expert mode



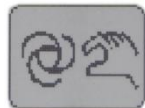
level 1



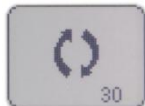
Return to front page of Expert mode



Info-Mode



Switch back to Automatic



Activate TK to create individual parameter



level 2



Choose stored program



Switch between parameters



Storing of parameters



Menu weld programming



Back to level 1 Expert mode

10.2.2 Individual setting of weld programs

See also **chapter 7.1**.

Tip: it is strongly recommended to go one step at a time to achieve the final settings. You may start with the amps and then choose time and gun force accordingly.

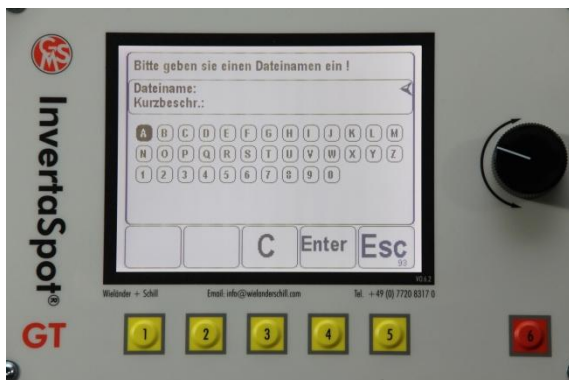
10.2.3 Selecting and saving of weld parameters



1. Activate key no 3



2. Do you wish to save weld parameter?



3. Edit name of weld program
max 5 letters

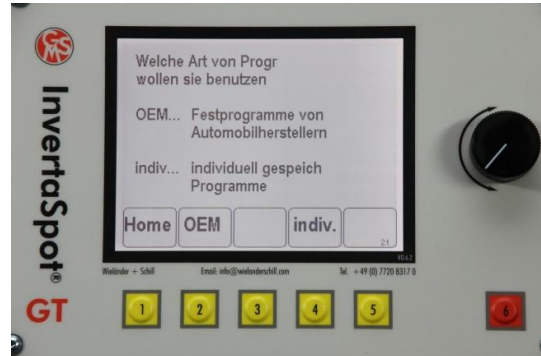


4. Store and save program in file

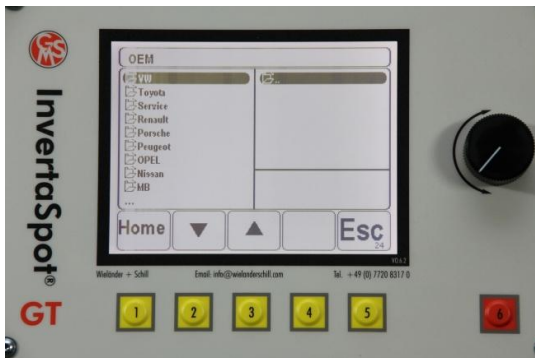
10.2.4 To spot weld with saved programs



1. Select key no 1



2. Choose either key 2 or key 4



3. OEM: make your choice and confirm with TK



4. Individual Programme choose and confirm with TK

10.2.5 Edit spot weld programs



Select and choose parameter with TK.

Edit each parameter manually.

Confirm each parameter with a little push onto the TK button.

During editing, the field stays grey. The parameter is only confirmed when the grey field changes back to white again.

At the end secure and save the data - see chapter 10.2.3



Attention: It is recommended to secure each new weld job with the approved quality control systems for spot welding.

You are responsible for your own weld parameter and for testing results.



Wrong weld parameters may result in metal sparks which may create personal injuries and also cause damage to the equipment.

11 Setup



When starting the machine you'll find the following information on the front display.

Then first push button no 6 to set up or edit the basic settings



Function key no 3: opens the menu for the different configurations in Setup



Function key no1 key returns you to the start menu

11.1 Configuration 1:



Push TK

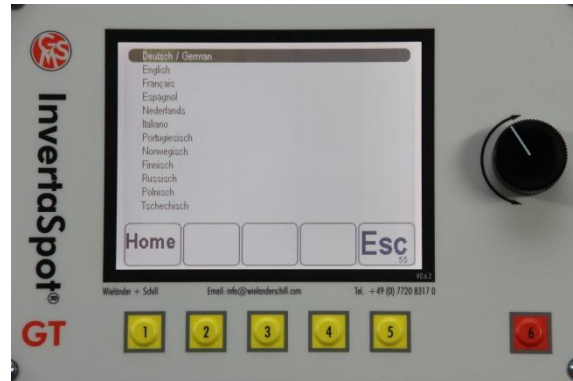
Note: Configuration 2 = not in use

11.1.1 Configuration: Date / Time



Select and confirm at the end with push on TK

11.1.2 Configuration language



11.1.3 Configuration change options: machine basic settings



Decide whether you want work data to appear automatically each time you start the welder
 Booster: please do not activate.
 Special tuning of gun force control. Only by experienced staff.

11.1.4 Configuration change options: spot weld gun options

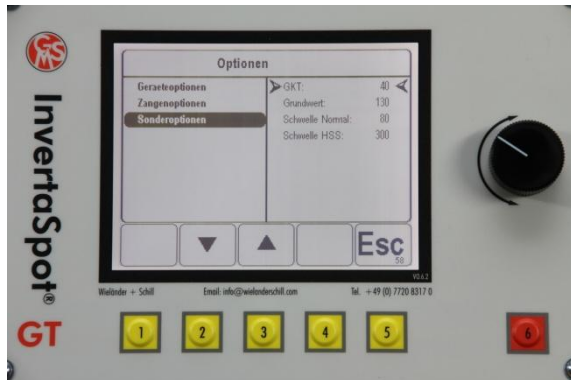


Configuration of the basic functions

At this point you may activate or de-activate different functions. Any alterations should only be made by experienced staff.

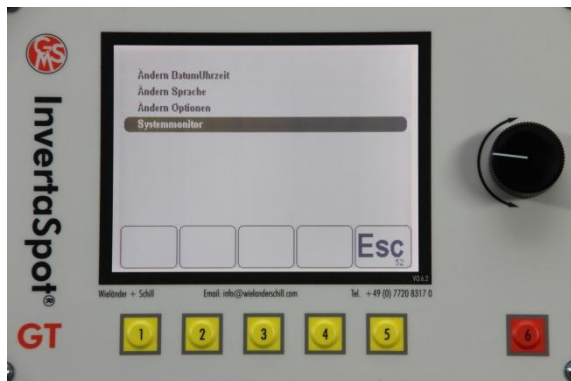
Set up of the caps test. This should be only be carried out by experienced and/or fully trained service engineering personnel.

11.1.5 Configuration special options



Spot welding in automatic mode please have the water pump running at all times

11.1.6 Configuration system monitor

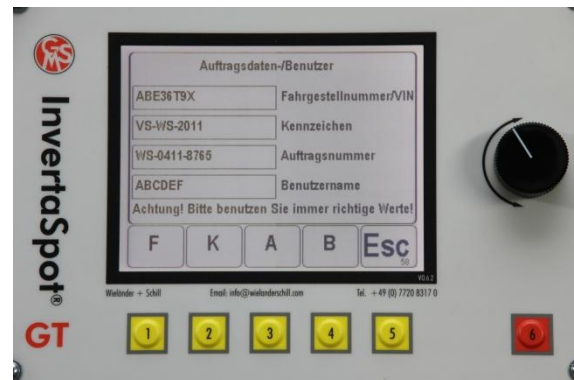


Important information for service personnel. Only to use by trained and experienced staff.

11.1.7 Configuration job data information



Push button no 4 – menu opens



Edit job data, confirm with push on TK

Should you prefer to have this data for every welding job, program the GT so that each time you start the machine the display will automatically ask you for job data – see chapter 11.1.3.

It is also possible to change this data info during a job, e.g. should a second colleague continue doing an existing job, you can enter the 2nd person's name into the data as well.

11.2 Configuration 2: Registration



The set up for the registration software will be carried out ex-factory or via service engineer.

12 Info: data memory



A sub-menu of the expert mode

The InvertaSpot GT comes with a very big data base. For each weld you will be able to get all the information:

- Date, time
- Data as VIN code, car number plate, user and work order no
- The weld job
- Parameters which have been used
- Each weld in numeric row and graph shown in screen
- Resistance curve
- Printout via data software, including data export (optional)



Button no 2 opens the data base

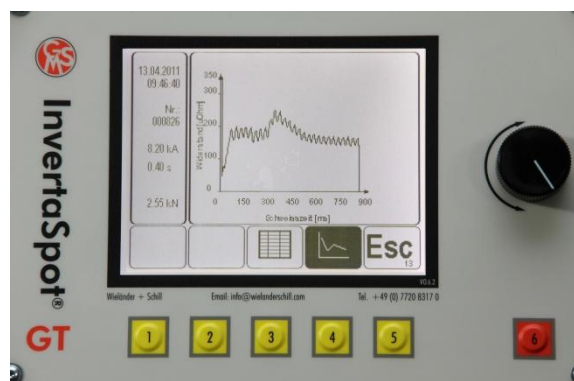
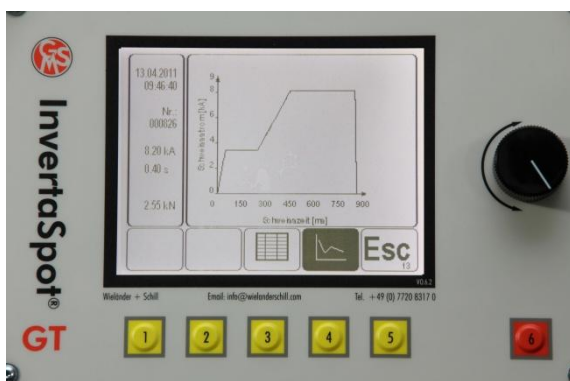


The screen is self explaining

Level 1 shows all basic information

Button 3 will open the graphic display

Push TK and you'll have the resistance curve



13 Single sided spot welding – light gauge sheet metal up to 1,0 mm



Attention: It is recommended to secure each new weld job with the approved quality control systems for spot welding.

Wrong weld parameters may result in metal sparks which may create personal injuries and also cause damage to the equipment.



Single sided spot welding with GT is only for light gauge sheet metal up to max. 1mm. Please always respect welding instructions and spot weld specifications.

Working instructions for single sided spot welding comes with the single sided spot welding gun, on a separate instruction sheet.

14 X- gun spot welding

There is the opportunity to use also an X-type spot welding gun with the InvertaSpot GT.



ATTENTION: Only the standard X-gun 120mm electrode arms should be used if working with the automatic mode. All other X-gun electrode arms should only be used when working with the expert mode.

Wrong weld parameters may result in metal sparks which may create personal injuries and also cause damage to the equipment. Each time please control the parameters before each job. Please always do test welds together with quality control.

Working instructions for the X-gun twin sided spot welding gun comes with X-gun on a separate instruction sheet.

15 Error codes

All error codes will be shown in the front display. It is also possible to activate an audible whistle tone which will sound when some error codes occur. The whistle is synchronised to be heard when mistake happen. To activate the whistle, do so via “change options” – see chapter 11.1.3




Examples:



Depending on the type of error code the confirmation will show up in two ways:

- You will be able to continue to spot weld. The error had been sounded from the previous weld.
- The error still exists and spot welding no longer possible until the error has been rectified.

15.1 Weld process controls of the GT: indication of error codes and their meaning

Code	Text	description	Art
F21	Power unit not ready	The internal power circuit is below the specification.	b)
F22	Power unit damaged	 Service necessary. Mistake on IGBT – main inverter.	b)
F23	Missing phase – spot weld not possible	 At least 1 phase missing. Please check main fuses first!	b)
F24	Trafo overheated	Trafo or even rectifier twin sided gun overheated	b)
F25	Inverter overheated	Inverter overheated	b)
F26	Tool not connected	No tool connected to main power unit	
F31	No current	 In most cases the weld area is not 100% clean of paint or dirt or others - isolated.	a)
F33	Gun force too little	The controlled gun force is lower than what the minimum nominated gun force should be.	a)
F35	Gun force too high	The controlled gun force is higher than what the minimum nominated gun force should be.	a)

16 Save, read and print out of the weld data from SD card

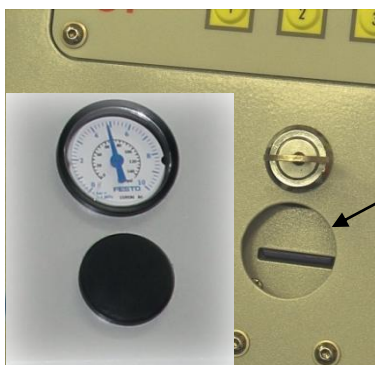
The InvertaSpot GT comes with a SD memory card, which will store all the data of each weld job automatically. A special software program will be required to read and to print the data. This needs to be ordered separately



Please ensure you place and push in the SD card correctly Please be aware the SD card could fall inside the machine, if you do not fit it carefully.



Before moving or replacing the SD card the GT must be turned off from main power.



Front slot for SD card





17 InvertaSpot GT Documentation, print software and data storing

Whilst spot welding with the InvertaSpot GT all relevant data will be stored on the SD card.

Should the spot weld documentation be required, every detail of all the data can be saved and shown on your computer,

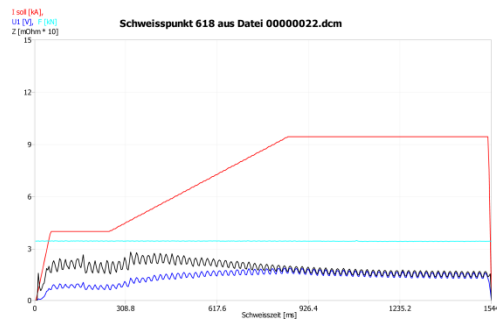
Note: A special InvertaSpot GT print software program is required.

InvertaSpot GT - Dokumentation

Auftrag	Hotline	Fußnote	Code¹	Code²
Benutzername	Tel.: (+49)7720 8317-0	0 - Standard	Blechart 0: ---	
WV-Code	Fax: (+49)7720 8317-1255	1 - Experte	Blechart 1: 3 Bleche	
Kfz-Kennzeichen	e-mail: info@wielanderschill.com	2 - Programm	Blechart 2: HSS	
Auftragsnr.		3 - Spezial	Blechart 3: verzinkt	
GT Ident-Nr 3582.9			Blechart 4: HSS + 3 Bleche	
			Blechart 5: verzinkt + HSS	
			Blechart 6: 3 Bleche + verzinkt	
			Blechart 7: verzinkt + HSS + 3 Bleche	

Schweißparameter

Lfd. Nr.	Datum	Zeit	Programm ²	Soll-Schweißstrom [A]	Soll-Schweißzeit [ms]	Anpresskraft [kN]	Blech [mm]	Code für Blechart ²	Bewertung [0..9]
11	08.04.2011	07:56:35	1	7000	620	3.2	3.2	0.0	9
12	08.04.2011	07:57:26	2	7000	300	2.0	2.0	0.0	9
13	08.04.2011	07:57:30	2	7000	300	2.0	2.0	0.0	9
14	08.04.2011	07:57:33	2	7000	300	2.0	2.0	0.0	9
15	08.04.2011	07:57:40	1	8000	300	2.0	2.0	0.0	9
16	08.04.2011	07:57:42	1	8000	300	2.0	2.0	0.0	9
17	08.04.2011	07:57:45	1	8000	300	2.0	2.0	0.0	9
18	08.04.2011	07:57:51	1	9000	300	2.0	2.0	0.0	9
19	08.04.2011	07:57:54	1	9000	300	2.0	2.0	0.0	9
20	08.04.2011	07:57:57	1	9000	300	2.0	2.0	0.0	9
21	08.04.2011	07:58:02	1	10000	300	2.0	2.0	0.0	9
22	08.04.2011	07:58:05	1	10000	300	2.0	2.0	0.0	9
23	08.04.2011	07:58:07	1	10000	300	2.0	2.0	0.0	9
24	08.04.2011	07:58:49	1	7000	300	2.4	0.0	0.0	9
25	08.04.2011	07:58:59	1	7000	300	3.1	0.0	0.0	9
26	08.04.2011	07:59:06	1	7000	300	3.8	0.0	0.0	9
27	08.04.2011	07:59:16	1	7000	300	4.5	0.0	0.0	9
28	08.04.2011	08:01:02	1	3000	200	2.4	0.0	0.0	9
29	08.04.2011	08:01:19	2	8900	620	3.3	0.0	0.0	9
30	08.04.2011	08:01:43	2	8900	620	3.3	0.0	0.0	9
31	08.04.2011	08:02:09	0	8000	200	2.4	1.5	0.0	9
32	08.04.2011	08:38:14	1	4000	200	Werkzeugcode unbekannt!	0.0	0.0	9
33	08.04.2011	08:38:35	1	4000	200	Werkzeugcode unbekannt!	0.0	0.0	9
34	08.04.2011	08:39:11	1	3500	200	Werkzeugcode unbekannt!	0.0	0.0	9
35	08.04.2011	08:40:00	0	8200	400	2.6	2.0	0.0	9
36	08.04.2011	08:40:23	0	8200	400	2.6	2.0	0.0	9
37	08.04.2011	08:40:43	1	3500	200	Werkzeugcode	0.0	0.0	9





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