

Clarifire®

weld



SPOT WELDER

Models CSW6T & CSW13T

Part Nos. 6030005 & 6030010

0204

OPERATING & MAINTENANCE
INSTRUCTIONS



Clarke[™] INTERNATIONAL

This is an important document and should be retained

DECLARATION OF CONFORMITY



We declare that this product complies with the following standards/directives:

- 73/23/EEC
- 89/336/EEC
- EN 50063
- EN 50240

Description: **SPOT WELDER**

Model No: **CSW SERIES**

Serial (Batch) No: **See Product Data Plate**

Signed: 

Clarke[®] INTERNATIONAL
Hemhall Street, Epping, Essex CM16 4LG

Thank you for purchasing this CLARKE Spot Welder.

Before attempting to operate this machine, please read this leaflet thoroughly and follow the instructions carefully, in doing so you will ensure the safety of yourself and that of others around you, and you can look forward to the welder giving you long and satisfactory service.

GUARANTEE

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission.

This guarantee does not effect your statutory rights.

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ELECTROMAGNETIC INTERFERENCE (EMC)

Whilst this unit complies with EMC regulations, the user is responsible for installing and using the welding equipment according to the manufacturers instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation. In some cases this remedial action may be as simple as earthing the welding circuit, see 'Note'. In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note - The welding circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorised by a person who is competent to assess whether the changes will increase the risk of injury, e.g. by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

1. ASSESSMENT OF AREA

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. Avoid using your inverter in the vicinity of:

- a) other supply cables, control cables, signalling and telephone cables; above, below and adjacent to the welding equipment;
- b) radio and television transmitters and receivers;
- c) computer and other control equipment;
- d) safety critical equipment, e.g. guarding of industrial equipment;
- e) pacemakers and hearing aids etc.;
- f) equipment used for calibration or measurement;
- g) other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;

It may be possible to avoid the above by changing the time of day that welding or other activities are to be carried out.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

2. METHODS OF REDUCING EMISSIONS

2.1 Mains supply

Welding equipment should be connected to the mains supply according to the manufacturers recommendations. If interference occurs, it may be necessary to

take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

2.2 Maintenance of the welding equipment

The welding equipment should be routinely maintained according to the manufacturers recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturers

instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturers recommendations.

2.3 Equipotential bonding

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrodes at the same time. The operator should be insulated from all such bonded metallic components.

2.4 Earthing of the workpiece

Where the workpiece is not bonded to earth for electrical safety, nor connected to earth because of its size and position, e.g. ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances.

Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment.

Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

2.5 Screening and shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.

SAFETY PRECAUTIONS

ALWAYS

- ✓ **Wear suitable safety goggles**, manuf. to the latest European Safety Standards.
- ✓ **Use appropriate safety equipment**, such as protective footwear, overalls, gloves etc., with NO metal accessories.
- ✓ **Make sure there is adequate ventilation**. Don't weld in confined or enclosed areas.
- ✓ **Switch off and disconnect the Spot welder** from the mains supply when it is not in use, and before any adjustment or maintenance.
- ✓ **Comply with ALL instructions** regarding Electrical Connections.
- ✓ **Disconnect the machine from the power supply** before servicing or performing other maintenance tasks.
- ✓ **Ensure the working area is clean and well lit**. NEVER work in your own shadow.
- ✓ **Use only original CLARKE spare parts and accessories**. Improper accessories could be hazardous.
- ✓ **Keep proper footing** and balance at all times.
- ✓ **Keep children and visitors away from the machine**. Only qualified personnel should be authorised to use this machine.
- ✓ **Maintain the machine in top condition**. Keep it clean for best and safest performance.
- ✓ **Keep the work area as childproof as possible** by using padlocks and master switches.
- ✓ **Switch machine OFF** when changing/substituting fittings.

NEVER

- x **Use the Spot welder in wet or damp conditions** or in the rain.
- x **Attempt any electrical or mechanical repairs yourself**. Contact CLARKE Service Department for advice.
- x **Place your hands close to the electrodes**.
- x **Pull the plug from the power supply** by the power cable.
- x **Use the machine in an area where fumes from paint**, solvents, or flammable liquids pose a potential hazard. Keep flammable material away from the machine when operating. All flammable waste, such as cleaning rags etc., should be placed in a closed metal container and disposed of properly.
- x **Weld containers which have held liquid or gaseous combustibles** unless they have been cleaned thoroughly in accordance with COSHH regulations.
- x **Operate the machine while under the influence of drugs**, alcohol or other medication.
- x **Force the machine to do a job for which it was not designed**. Use it ONLY for its' intended function.
- x **Use machine if power cable is worn** or chafed or suspect in any way.
- x **Allow inexperienced personnel to operate this machine** unless they are under direct supervision

FEATURES

Model CSW6T

This 230V 50Hz, portable Spot Welder is provided with an electronic timer which allows precise control of welding time. The control knob is arrowed in Fig. 1.

Electrode pressure may be mechanically adjusted from 40 to 120kg, to spot weld low carbon sheet steel up to 1 + 1 mm in thickness.

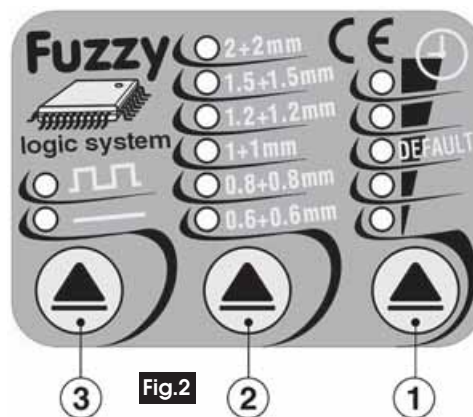


Model CSW13T

The most important features of this 230V 50Hz Portable Spot Welder are controlled by a microprocessor, managed from the control panel, shown in Fig. 2. These features are:

1. Welding time, set according to the thickness of metal to be welded.
2. Changing selection for Welding thickness
3. Changing resistance welding machine operating mode... normal or pulse.

Selecting 'PULSE' mode improves welding capacity on material with high yield points or materials with protective coatings. The pulsation period is preset and does not require adjustment.



4. Electrode pressure may be mechanically adjusted from 40 to 120kg, to spot weld low carbon sheet steel up to 2 + 2 mm in thickness.

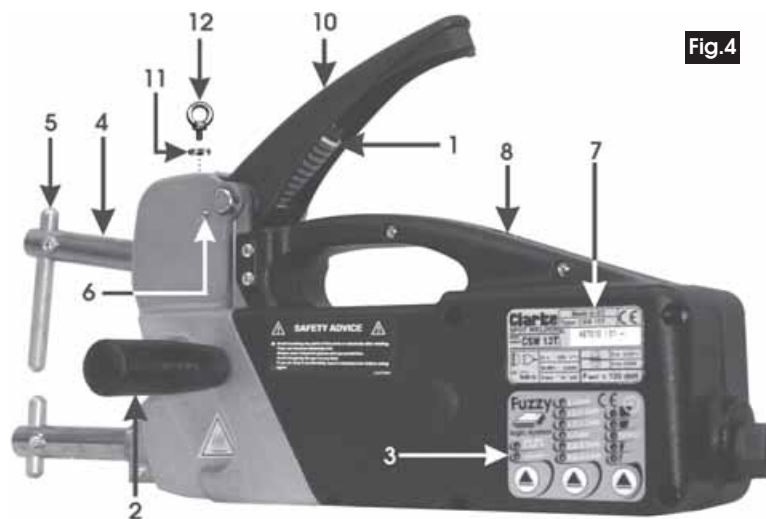
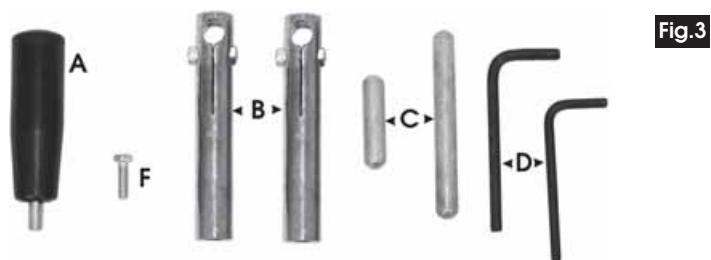
Both Models

- 120mm Electrode Arms and standard electrodes are provided.
- An eye bolt may be fitted to the machine (see your Clarke dealer), for use in supporting the machines weight when repetitive welds are required (see your Clarke dealer). **IMPORTANT! When using the Eye Bolt, Take care NOT to screw it more than 8mm into the screw hole.**

UNPACKING & PARTS IDENTIFICATION

Unpack and lay out the components, checking against the following list. Please report any damage which may have occurred during transit, to your CLARKE dealer immediately.

- | | |
|---|---------------------------------|
| 1. Welder complete. | 5. 2 x Hex. Wrenches - D |
| 2. 1 x Handle - A | 6. 1 x M6 Screw - F |
| 3. 2 x Electrode Holders - B | |
| 4. 2 x Electrodes (straight) - C | |



- | | |
|----------------------------|----------------------------|
| 1. Pressure Adjuster screw | 7. Data Label |
| 2. Handle | 8. Microswitch |
| 3. Control panel (13T) | 9. Weld Time Adjuster (6T) |
| 4. Electrode Arm | 10. Operating Lever |
| 5. Electrode (Long) | 11. Spacer (Optional) |
| 6. Screw Locating Hole | 12. Lifting Eye (optional) |



ASSEMBLY

1. Screw the handle (2) into the threaded hole provided on either the left or right hand side, as desired.
2. Insert the Electrode Arms, to their fullest extent, into their receptacles and nip up the clamps using the Hex. wrench provided...do not fully tighten at this stage.

NOTE: Whenever removing and replacing the holders, ensure they, and the receptacles, are clean and free from oil, grease or other contaminants.

3. Connect the machine to the electrical supply in accordance with IEE regulations and the following instructions:

ELECTRICAL CONNECTIONS

Connect the mains lead, through a suitably fused isolator switch, to a 230 Volt (50Hz) electrical supply, in accordance with IEE regulations and ensuring the fuse rating is according to the specifications given on page 17. A standard 13 Amp plug **MUST NOT** be used with this machine.

WARNING! THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow	-	Earth
Blue	-	Neutral
Brown	-	Live

As the colours of the flexible lead of this appliance may not correspond with the coloured markings identifying terminals in your electrical supply, proceed as follows:

- Connect GREEN & YELLOW cord to terminal marked with a letter "E" or Earth symbol "⏚" or coloured GREEN or GREEN & YELLOW.
- Connect BROWN cord to terminal marked with "L" or coloured RED.
- Connect BLUE cord to terminal marked with "N" or coloured BLACK.

WARNING!
IF YOU ARE IN ANY DOUBT ABOUT ELECTRICAL CONNECTIONS, CONSULT A
QUALIFIED ELECTRICIAN.

NEVER ATTEMPT ELECTRICAL REPAIRS YOURSELF.

Cable Extensions:

IMPORTANT:

For extensions up to 10M, the size of the conductors **MUST** be at least the same size as that used on the machine - 2.5mm². It is **NOT** advised to use extensions greater than this, but if it is absolutely necessary, the conductor size must be 4mm² up to a maximum of 25M in length.

PREPARING THE WELDER FOR USE

WARNING!

ENSURE THE WELDER IS DISCONNECTED FROM THE SUPPLY, BEFORE PROCEEDING

1. Fit the Electrodes to the Electrode Arms. Whether or not the longer electrode is located in the upper or lower arm, depends upon the work in hand. It may be necessary for example to reach over a lip in a workpiece, necessitating the longer electrode to be positioned in one particular arm. Normally however, the longer electrode is located in the upper arm. Nip up the clamps but do not fully tighten.

2. Depress the operating lever fully, and insert the M6 screw provided, into the threaded hole, as shown in Fig.5.

Screw in fully so that the lever is held in the fully down position as shown. This is the position used for adjusting the electrode gap.

3. Before setting the electrode gap however, it is important to ensure that the electrode arms are parallel to each other and the electrodes are perfectly in line, on the same axis, when the operating lever is fully depressed. This is achieved by slackening the respective arm clamp and rotating the arms within the receptacle until the electrodes meet exactly and are perfectly in line. When satisfied, tighten the clamps.

4. Slacken off the upper electrode clamp and move the electrode so that a piece of material of the same total thickness as that to be welded, can be inserted between the electrodes, then tighten the electrode clamp. The correct gap is now set.

5. Remove the M6 screw and release the lever.

6. Adjust the pressure to be exerted by the electrodes by turning the adjuster screw (item 1, Fig.4), using the Hex. wrench provided, clockwise to increase, anticlockwise to decrease, according to the scale shown in Fig.6.



NOTE:

Always remember that too high a pressure will result in damage to the electrode tips, whereas too little pressure will result in a poor weld. Pressure is also dependant upon the length of electrode arms....the longer the arms the lighter the pressure setting. This must be taken into account if/when replacing the electrode arms with any of those available from you Clarke dealer, (see Accessories).

7. Set the welding time by either turning the dial adjuster, shown in Fig. 1, (model 6T), or pressing the button shown at 1 Fig. 2 (model 13T). Generally, the thicker the workpiece, the longer the welding time.

NOTE:

The time scale shown on the control panel of the 13T, is a general guide only. It is advisable to make a few test welds on material similar to the workpiece before commencing work, making adjustments of pressure and welding time, as necessary, until a perfect weld is achieved.

8. MODEL 13T only

- 8.1 Select the welding mode...normal or pulse, by pressing the appropriate button on the control panel accordingly. (Button 3, Fig 2)
- 8.2 Select the welding thickness by pressing the appropriate button on the control panel accordingly. (Button 2, Fig 2)

OPERATION

WARNING!

BE AWARE THAT THE MACHINE PRODUCES VERY INTENSE ELECTROMAGNETIC FIELDS. THIS COULD SERIOUSLY EFFECT PEOPLE WEARING PACEMAKERS OR FITTED WITH PROSTHESES. THESE PEOPLE SHOULD NOT BE ALLOWED TO USE THE MACHINE OR BE IN ITS VICINITY.

MALFUNCTIONS OR DAMAGE TO WATCHES, MAGNETIC CARDS, INSTRUMENTATION, DATA TRANSMISSIONS OR TELEPHONE RECEPTION COULD ALSO OCCUR. THESE POINTS MUST ALWAYS BE TAKEN INTO CONSIDERATION WHEN SITING THE WELDER

IMPORTANT!

1. **Ensure the work surfaces are perfectly clean. There should be no rust or other contaminants which would seriously impair the quality of the weld. Ideally, the workpieces should be clamped together.**
 2. **Ensure the electrode tips are correctly formed. They should be checked regularly when welding to ensure they make perfect contact with the work.**
A Spot Welding Tip dresser is available from your Clarke dealer, please call for details.
- With the machine correctly adjusted, connect to the mains supply.
 - Bring the lower electrode up to the work so that it is positioned directly beneath the point to be welded.
 - Depress the operating lever fully so that the microswitch is activated, and hold in this position for a short period. Current to the electrodes will automatically shut off after the welding time has been reached, at which time you may withdraw the welder. A short delay, from the end of the weld cycle to removing the electrodes, will improve the weld characteristics.

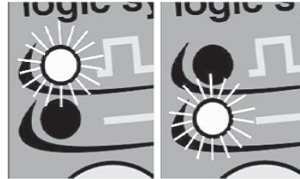
Should the welder not operate correctly, or a particularly poor weld is produced, the following checks may determine the cause.

- a. Ensure the work is perfectly clean
- b. Ensure the welding parameters are all correct.
- c. Ensure the microswitch is actually pressed, and held for the duration of the weld.
- d. Ensure the thermal overload has not been activated.

Fig.7

NOTE:

*The **THERMAL OVERLOAD** is a protection device which operates when the electrical circuits have overheated. This prevents the machine from operating until it has cooled down to satisfactory levels. The device will operate if the **DUTY CYCLE** has been exceeded or if the ambient temperature becomes too high. **NEVER EXCEED THE DUTY CYCLE** - See Specifications*



On model 13T, if the thermal overload has intervened, the two lamps shown in Fig. 7 will flash alternately.

MAINTENANCE

⚡ WARNING! ⚡

ELECTRICITY CAN KILL

NEVER TOUCH LIVE ELECTRICAL COMPONENTS

DISCONNECT THE POWER SUPPLY BEFORE ALL INSPECTIONS AND MAINTENANCE OPERATIONS

BEWARE HOT SURFACES.....ALWAYS LET THE POWER SUPPLY COOL DOWN BEFORE ACCESSING INTERNAL COMPONENTS.

Frequency of maintenance operations depends on the operating conditions: how intensively the welder is used, how clean or dirty the welding site is (aggressive atmospheres, etc).

Before use, always inspect the welder, checking for security and cleanliness of arms and electrodes, to ensure they are in perfect condition. Ensure also that the power cable is in perfect condition at all times.










As a general rule the power supply should be inspected internally at least twice a year.

1. Access the inside of the machine by removing the screws securing the side cover and carefully hinge the cover down.
2. Clean the transformer using a blast of dry compressed air with a **maximum** pressure of 10bar. **NEVER direct the compressed air jet on to the circuit boards.** These should be cleaned with a soft brush and vacuumed or blown with air at very low pressure. **ALWAYS use a face mask for these operations.**
3. Check all wiring for insulation damage or loose or oxidised connections. Repair/replace where necessary. Check all screws and connections are tight and there are no signs of oxidation or overheating.
4. Replace the cover.

WARNING! NEVER CONNECT THE MACHINE UNLESS THE COVER IS REPLACED

ACCESSORIES

The following accessories are available from your Clarke dealer.

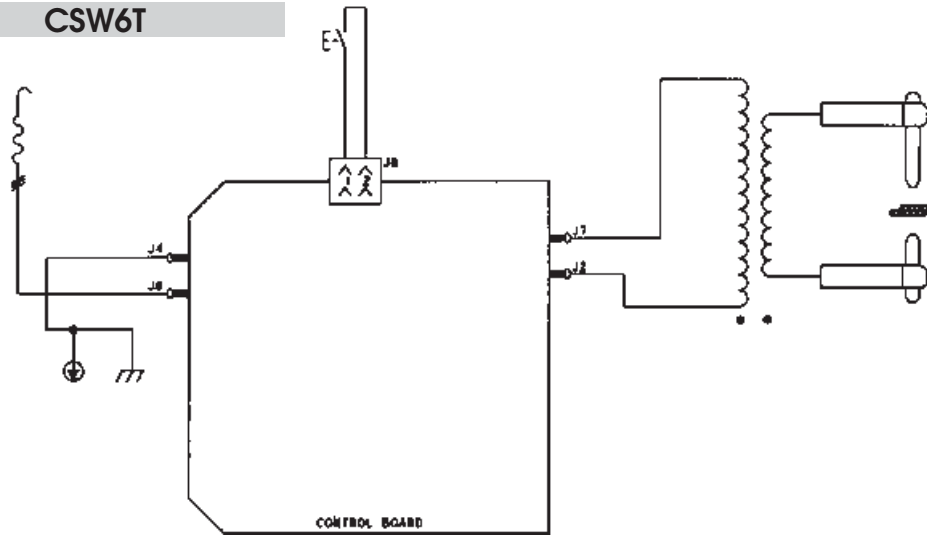
Description	Throat	Part No.	
Electrodes 'L'	120mm	6030105	
Electrodes 'L'	250mm	6030107	
Electrodes 'L'	500mm	6030109	
External Profile Electrodes	-	6030111	
Internal Profile Electrodes	-	6030113	
Electrodes	120mm	6030115	
Electrodes	350mm	6030117	
Electrodes	350mm	6030119	
Electrodes	120mm	6030121	

Lifting Eye See your Clarke dealer

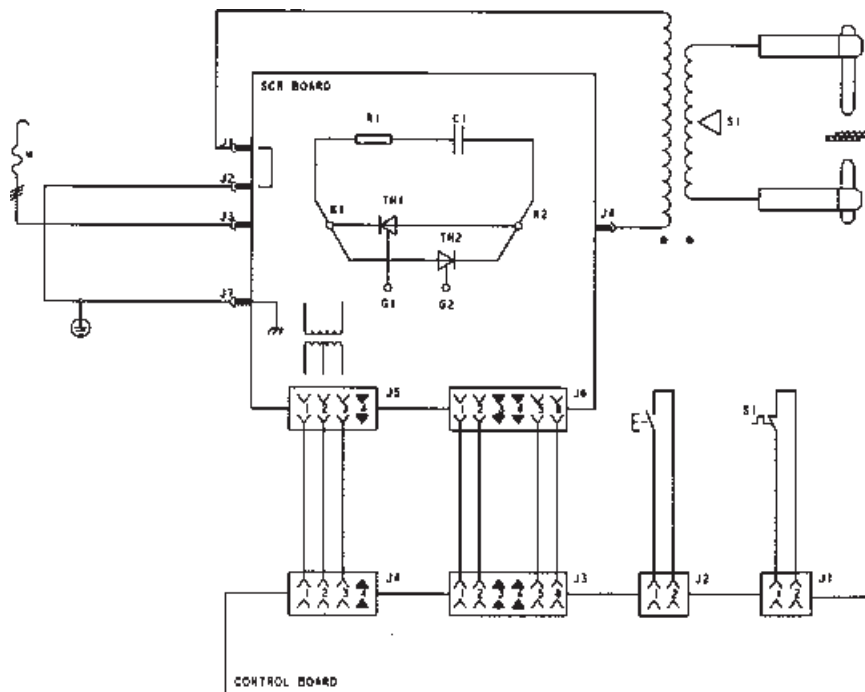
Electrode Tip Dressing Tool See your Clarke Dealer

SCHEMATIC WIRING DIAGRAMS

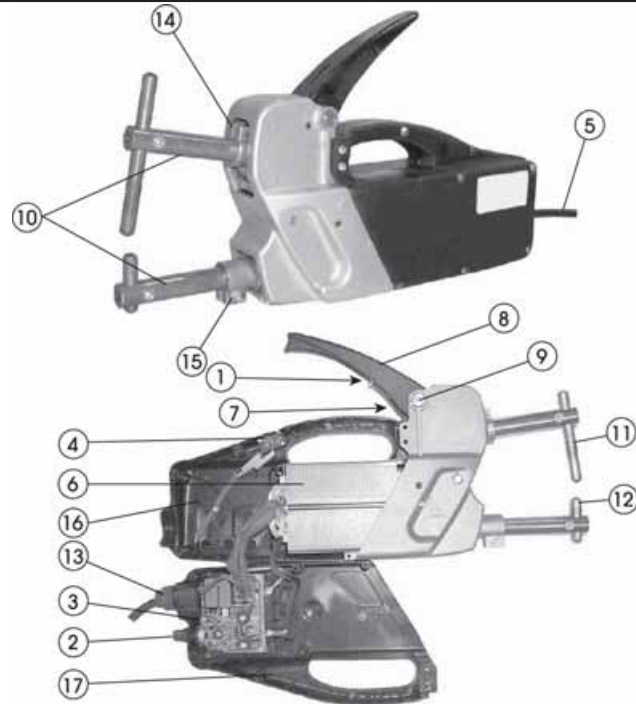
CSW6T



CSW13T

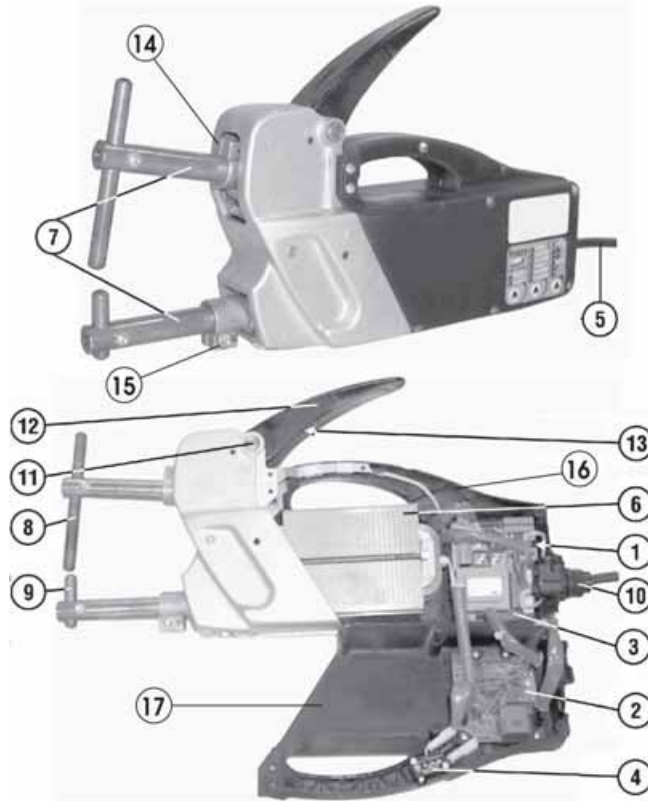


SPARE PARTS - CSW6T



No.	Description	No.	Part Number
1	Bush	1	TT322518
2	Potentiometer (Adjuster) Knob	1	TT112299
3	Timer PCB	1	TT114236
4	Microswitch	1	TT122393
5	Mains Cable	1	TT132104
6	Transformer	1	TT169152
7	Adjuster Screw	1	TT121263
8	Operating Lever	1	TT322512
9	Pivot Pin	1	TT482887
10	See Page 13 for full range of Arms		
11	See Page 13 for full range of Electrodes		
12	See Page 13 for full range of Electrodes		
13	Cable Kit - Bushing, Ring Nut	1	TT990046
14	Upper Arm Clamp	1	TT522020
15	Lower Arm Clamp	1	TT522023
16	Left Shell	1	TT322509
17	Right Shell	1	TT322526

SPARE PARTS - CSW13T



No.	Description	No.	Part Number
1	Screw	1	TT113908
2	Control PCB	1	TT114070
3	Power PCB	1	TT114085
4	Microswitch	1	TT122393
5	Mains Cable	1	TT132104
6	Transformer	1	TT169034
10	Cable Kit - Bushing, Ring Nut	1	TT990046
11	Pivot Pin	1	TT482887
12	Operating Lever	1	TT322512
13	Adjuster Screw	1	TT212163
14	Upper Arm Clamp	1	TT522020
15	Lower Arm Clamp	1	TT522023
16	Right Shell	1	TT322510
17	Left Shell	1	TT322511

SPECIFICATIONS

	CWS6T	CWS13T
Power Supply	230V 50Hz 1Ph	230V 50Hz 1Ph
Max Absorbed Power	6kW	13kW
Power Rating	1.2kW	2.3kW
Mains Fuse	16Amp	25Amp
Spot Welding Current (Max)	3800Amps	6300Amps
Duty Cycle	3 spots/min. with minimum down time of 20 secs.	
Max. Welding Thickness	1+1mm	2+2mm
Dimensions (mm)	440x110x185	440x110x185
Weight	10.5kg	11kg

Please note that the details and specifications contained herein, are correct at the time of going to print. However, CLARKE International reserve the right to change specifications at any time without prior notice. Always consult the machine's data plate

SPARE PARTS AND SERVICE CONTACTS

For Spare Parts and Service, please contact your nearest dealer, or CLARKE International, on one of the following numbers.

PARTS & SERVICE TEL: 020 8988 7400

PARTS & SERVICE FAX: 020 8558 3622

or e-mail as follows:

PARTS: Parts@clarkeinternational.com

SERVICE: Service@clarkeinternational.com

EXPLANATION OF ELECTRICAL SYMBOLS

The meaning of the markings and symbols shown in the table are explained as follows.

50Hz	Rated frequency for alternating current
I_{2cc}	Short Circuit Secondary Current
$I_2 A$	Symbol and dimension for the welding current
U_1	Rated value of the supply voltage
IP__	Degree of protection (e.g. IP21)
S max	Max. Absorbed Power
U 20	No Load Secondary Voltage
F max	Electrode max. strength