

Clarke

weld[®]

OPERATING AND MAINTENANCE INSTRUCTIONS FOR

MIG 155T TURBO

MIG 170T TURBO



GUARANTEE

This Clarke product is guaranteed against faults in manufacture, for 12 months from purchase date.

Keep your receipt as proof of purchase.

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

The reason for return must be clearly stated.

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BENTLEY'S
10 5113ER

Congratulations on the purchase of your new Clarke Mig Welder. Before attempting to operate this machine, please read this instruction manual thoroughly and follow all directions carefully. By doing so you will ensure the safety of both yourself and others around you, and at the same time, you should look forward to long and troublefree service from your Clarke Mig Welder.

CAUTIONS FOR SAFETY

Special care is taken during all stages of manufacture to ensure that your Clarke Mig Welder arrives with you in good condition. However, before using the machine it is in your own interest to read and pay attention to the following rules:

- 1) Do not attempt to remove side panels of the machine unless the mains plug is disconnected.
- 2) Do not use the machine with any of the panels removed.
- 3) Do not try to attempt any electrical or mechanical repair unless you are a qualified technician. If you have a problem with your machine contact your local dealer.
- 4) Remove any flammable materials from the welding area.
- 5) Do not expose gas cylinder to high temperature, and do not strike an arc near or on the gas cylinder.
Caution: Gas cylinders are pressurized containers. Do not pierce or burn, even when empty. Protect from direct sunlight.
- 6) Make sure you have good ventilation in the welding area since toxic gases are released during the MIG welding process.
- 7) Ultra-violet radiation is released by the MIG welding process and it is of the utmost importance that the operator, and any spectators, protect themselves by using welding face-shields or helmets with suitable filter lenses. The wearing of gloves and proper working clothes is also recommended.
- 8) Never use in a wet/damp environment.

MIG WELDING - HOW IT WORKS

MIG (Metal Inert Gas) welding is a process in which a power wire electrode is fed continuously into the weld pool at a controlled constant rate.

The wire is connected to the positive side of a rectified voltage supply. The workpiece is connected to the negative side of the supply.

When the wire is fed, it comes into contact with the workpiece and an arc is struck. The arc melts the wire and it is deposited onto the workpiece.

The wire, which is fed by the wire feed motor is fed into the weld pool, burning itself off at a rate dependent upon the selected wire feed speed.

To protect the weld pool from oxidation & impurities during the welding process, a shielding gas flows over and around the weld pool. This gas flow must be sufficient to protect the weld, but not wasteful.

NOTE: Poor gas coverage will result in poor welding. Excessive gas coverage is expensive.

5. 50% faster welding time.
- Operator training time kept to a minimum.
3. There is no slag removal, thus eliminating almost all post-welding cleaning operations.
4. Minimum waste of welding consumables.
5. Overall, a faster more efficient way of getting the job done.
6. Less heat - less distortion.
7. Ability to weld thin material.

WELDER SPECIFICATION

PRIMARY OR INPUT POWER DATA

	MIG 155T	MIG 170T
Primary Volts -----	240V/1PH*	240V/1PH*
Primary Amps -----	17 Amps	20 Amps
Frequency -----	50 HZ**	50 HZ**

*= For North America 220V/1PH

**= For North America 60 HZ

SECONDARY OR OUTPUT POWER DATA

Sec. Volts -----	18-28 V	18-29 V
Max. Sec. Amps -----	155 Amps	170 Amps
Current Range -----	28-155 Amps	28-170 Amps

DUTY CYCLES

100%-----	45 Amps	50 Amps
60% -----	80 Amps	85 Amps
30% -----	100 Amps	120 Amps

NOTE: Duty Cycles are rated over a 10 minute period.

USABLE WIRE SIZES

Mild Steel Wire -----	0.6-0.8mm	0.6-0.8mm
Stainless Steel Wire -----	0.8mm	0.8mm
Aluminium wire -----	0.8mm	0.8mm

USABLE GASES

MAIN USES

75% Argon 25% CO2	-	Thin Sheet Metal, Mild Steel
100% Argon	-	Welding Aluminium, Stainless Steel
100% CO2	-	Mild Steel

WIRING

Connect the mains lead to a suitably fused 240V/1 phase (North America 220V/1 phase) electricity supply. Installation must be carried out to I.E.E. recommendation and connection to the mains supply must therefore be carried out by a qualified electrician.

This welder is factory wired for 240V, 1 phase, 50HZ (North America 220V/1Phase. 60HZ). Check the voltage indicated at the input cable before connecting to mains.

WARNING: THIS MACHINE MUST BE EARTHED/GROUNDED.

IMPORTANT! The wires in the mains lead of your welder are colour coded as follows: Green and Yellow = Earth, Blue = Neutral, Brown = Live. As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol \perp or coloured green or green-and-yellow. The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black. The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

For North America only - the wires of the mains lead are colour - coded as follows: Green and yellow = Neutral, Blue and Brown = Live.

ASSEMBLY (see diagram 1)

1) Remove the side panel by sliding upwards and check that all the accessories listed below are included:

2	Wheels	1	Gas regulator
1	Axle	2	Worm drive clips for gas hose connections
2	Wheel retaining washers	1	Brass spacer (only for MIG 170T)
1	Front foot	1	Plastic cover for torch lead connections (")
2	Small bolts for front foot	2	Bolts for cover (")
1	Handle	2	Self tapping screws for cover (")
4	Handle retaining screws	1	0,6mm. welding tip
1	Mask	1	0,8mm. welding tip
1	Dark glass	1	1,0mm. welding tip
1	Transparent glass		
1	Welding torch and lead		

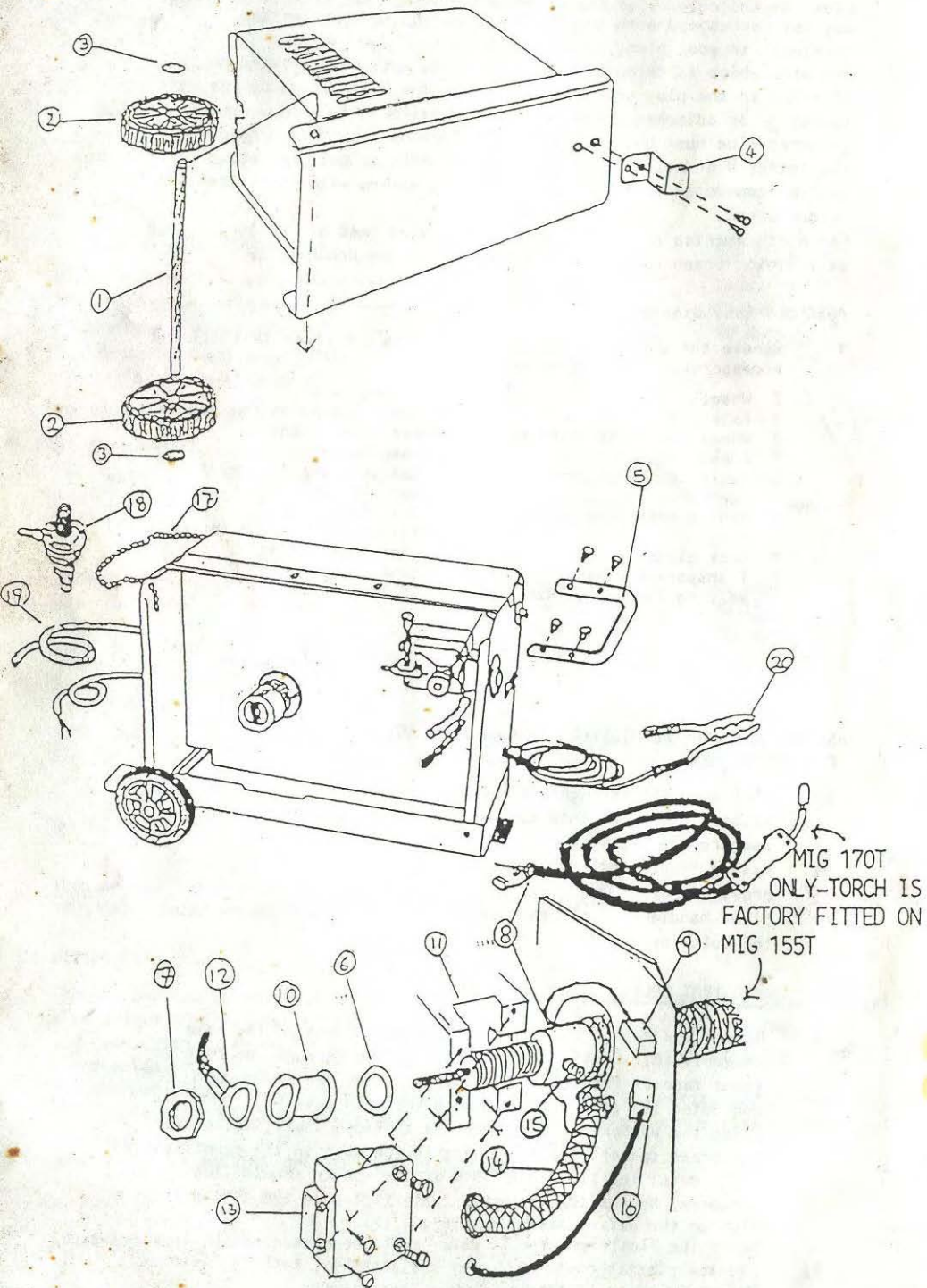
SHOULD ANY PART BE MISSING OR DAMAGED CONTACT YOUR LOCAL DEALER FOR REPLACEMENT.

- 2) Slot axle (1) through the holes at the rear of the machine and slide a wheel (2) onto each end, retaining with retaining washers (3) provided.
- 3) Fasten front foot (4) to the machine using the bolts provided.
- 4) Slide handle (5) into the top of the machine and secure using the bolts provided.

MIG 170T ONLY - ITEMS 5/10:

- 5) Remove the washer (6) and nut (7) from the end of the hose assembly (8). Carefully feed the hose end through the hole in front face of the welder, taking care that the electrical connector (9) is fed through with the main assembly.
- 6) Slide the washer (6) back onto the threaded shaft, followed by the brass spacer (10) which sits in the slot in the mounting block (11). Note: The flattened flange on the spacer should face outwards, Next slide the power cable (12) over the thread and tighten the entire assembly with nut (7).
Note: The flattened edge of power cable connector should face outwards.
- 7) Fit the plastic cover (13) over the assembly, securing with two bolts and two self tapping screws (see diagram).

DIAGRAM 1



- 8) Connect the gas pipe (14) to the hose gas nipple (15), securing with worm drive clip supplied.
- 9) Make the electrical connection by joining connectors (9) and (16). Note: The connectors only clip together when correctly mated. Do not force.
- 10) To assemble face shield, first place the darkened plastic window in the recessed window area of the body. Secure in place using the bolts provided. Locate the handle fixing into the slot in the shield body, press firmly and rotate the handle through 90° until the lug locates into the hole in the shield body.

WARNING: Never look directly at welding arc, it can seriously damage your eyes. Always use the faceshield provided or any proper welding mask or helmet.

ATTACHING GAS BOTTLE AND REGULATOR

(see diagram 1)

- 1) The bottle (not supplied) should be located at the rear of the welder and is held in position using the chain (17) supplied.
- 2) Screw the gas regulator (18) fully down onto the gas bottle valve (do not overtighten).
- 3) Connect the gas hose (19) to the regulator (18), securing using the worm drive clip provided.
- 4) For safety and economy, ensure that the regulator is fully closed (turning anti-clockwise) when not welding and/or before fitting or removing the gas bottle.

Note: If you experience difficulties obtaining gas supplies contact your local Clarke stockist.

CONNECTING THE WIRE FEED

(see diagram 2)

- 1) Your Mig 155T or Mig 170T is designed to accept either 5 Kg or 15 Kg wire spools of mild steel, stainless steel or aluminium according to the type of metal you wish to weld. Wire spools ARE NOT supplied with the unit and must be purchased separately.
- 2) Your welder is supplied with a plastic spacing collar fitted to the spool holder, which is required for 5 Kg wire spools only. If using 15 Kg wire spools this collar should be removed.
- 3) To fit your wire spool simply slide the spool (3) over the spool holder (H) until it clicks home, ensuring that the steel pin engages on the hole provided on the wire spool.
- 4) Initially tighten the drum brake wingnut (I) sufficiently to allow the spool to rotate smoothly but with a slight amount of braking friction. Do not overtighten as this will exert undue pressure on the wire drive motor and may cause serious damage.
- 5) Loosen the plastic knob (K) (turn anti-clockwise) that holds pressure on the wire via the roller (L) then raise the pressure roller (M) and pull out any wire that has been left in the hose.
- 6) Cleanly clip the end of the wire from the spool and straighten if necessary, then feed the wire through the guide tube (N) over the channel on the roller (L) and into the torch sheath (O) about 10-15cm.
- 7) Reposition the pressure roller (M) and plastic knob (K) and tighten slightly.

(TOO TIGHT WILL CRUSH THE WIRE AND DAMAGE THE WIRE FEED MOTOR; TOO LOOSE WILL NOT ALLOW THE WIRE TO BE PULLED BY THE ROLLER).

Pull off the torch shroud (item 8, page 19) and unscrew the contact tip (item 9, page 19).

Close the side panel of the machine, plug into a 240V,* 50HZ outlet, switch on the machine and press the trigger. The wire will feed through the hose and when it appears at the torch end, release the trigger, switch off the machine and replace the contact tip and the torch shroud.

*= North America 220V, 60HZ.

PREPARATION FOR WELDING

- 1) Plug the machine into a 240V* - 50HZ outlet.
- 2) Open the gas tap of the regulator (turn knob clockwise).
- 3) Attach ground clamp (Diagram 1, Item 20) to bare metal to be welded making sure of good contact.
- 4) Make sure that the wire-roller groove (Diagram 2, Item L) corresponds to the diameter of the welding wire being used.

Note: That each roll has two grooves, one for 0.6 mm. wires and one for 0.8 mm wires.

To change position just unscrew the Allen screw that holds the roller in place, reverse the roller and replace the Allen screw.

- 5) Adjust the gas regulator to the proper setting position (this varies with different metals, thickness and current needed).

*= North America 220V, 60HZ.

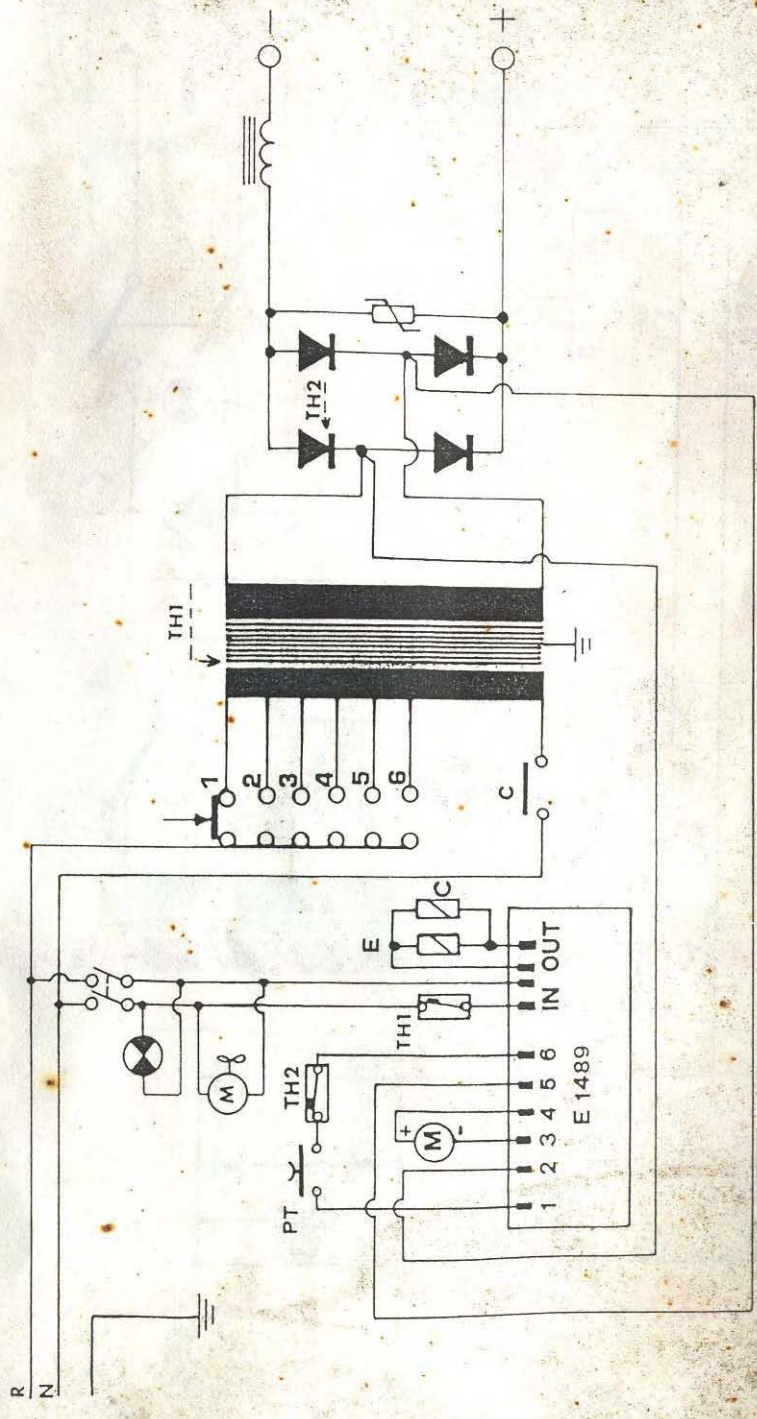
WELDING PROCEDURES

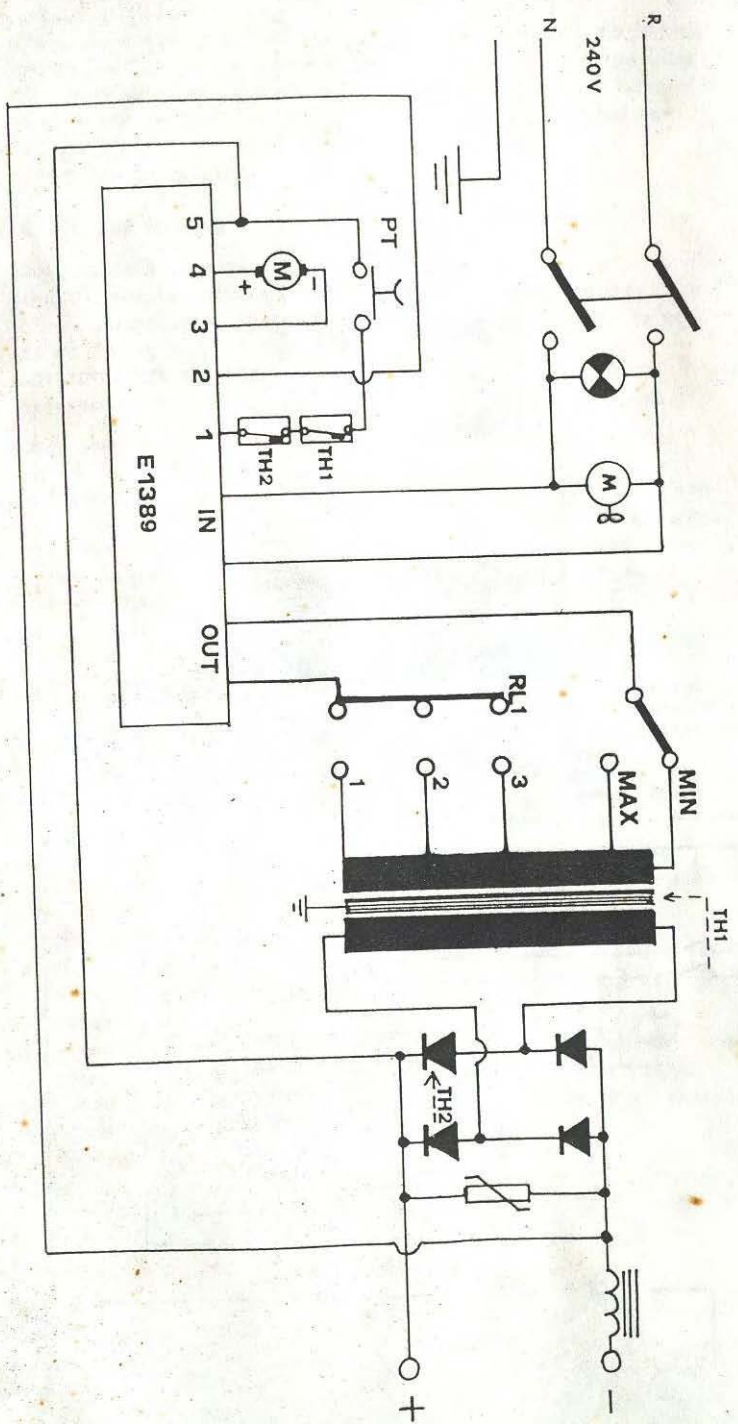
- 1) Your welding machine has 6 positions in which to regulate current for various conditions, obtainable through one two-position (Min-Max) switch and one 3-position switch (Mig 155T) or one 6-position switch (MIG 170T).
- 2) The selection of a welding position is determined by the thickness of the metal to be welded. The thicker it is, the higher the current must be.
- 3) According to the thickness to be welded, the amount of gas regulated to the work also varies and must be adjusted to comply.
- 4) For welding adjustments please refer to the wire size specification chart on page 10.

5) WARNING

- i) Make sure all flammable materials are removed from the work area.
- ii) Never look directly at welding arc, it can seriously damage your eyes. Always use an approved welding mask or helmet.
- iii) Wear protective clothing so that all skin areas are covered.
- iv) Keep a fire extinguisher handy.

MIG 170T CLARKE





E1389

5

4

3

2

1

IN

OUT

PT

M

+

-

TH1

TH2

R

N

240V

RL1

MIN

MAX

1

2

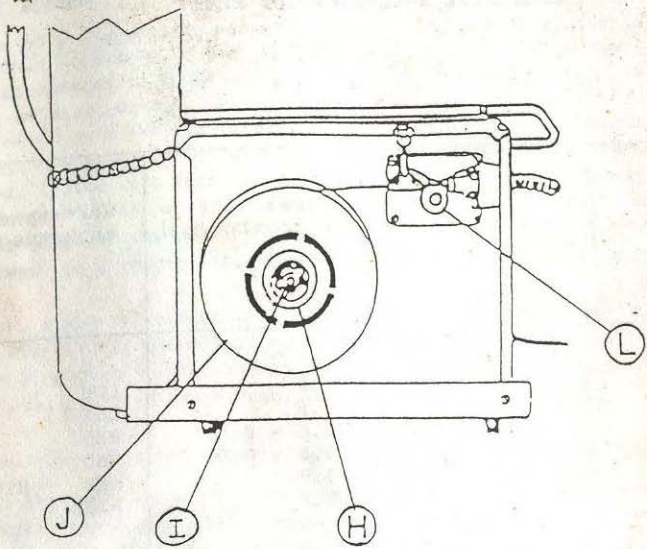
3

TH1

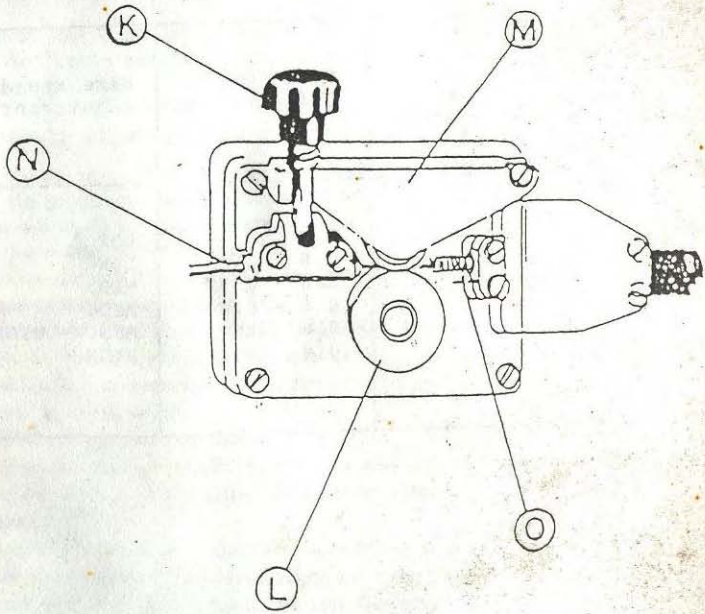
TH2

+

-

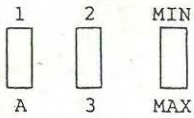


See also
exploded
diagram
below

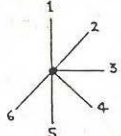


WIRE SIZE SPECIFICATION CHART

MIG 155T

Switches		Steel wire diameter (mm)	Wire speed adjustment
Switch Positions	<ul style="list-style-type: none"> 1 - Min 1 - Max 2 - Min 2 - Max 3 - Min 3 - Max 	<ul style="list-style-type: none"> 0.6 0.6 0.6 - 0.8 0.6 - 0.8 0.8 0.8 	<ul style="list-style-type: none"> LOW LOW MED. MED. MED. - HIGH HIGH

MIG 170T

Switch		Steel wire diameter (mm)	Wire speed adjustment
Switch Positions	<ul style="list-style-type: none"> 1 2 3 4 5 6 	<ul style="list-style-type: none"> 0.6 0.6 0.6 - 0.8 0.6 - 0.8 0.8 0.8 	<ul style="list-style-type: none"> LOW LOW MED. MED. MED. - HIGH HIGH

TUNING THE WELDER

The tuning of a Mig welding machine requires some practice, due to the fact that - contrary to the arc welding procedure - two parameters must be accommodated to achieve a perfect weld. These are wire feed speed and welding voltage. It is important to arrive at the correct combination to suit the type and thickness of material to be welded. The current necessary for welding is directly dependent upon the wire feed speed. If the wire feed speed is increased, the current is also increased; whereas the arc length is shortened. Vice versa, the arc length increases if the current is decreased. Increase of the welding voltage leads to a longer arc, without substantially effecting the current.

Vice versa, a shorter arc is created by means of a decreased welding voltage, whereas the current is again not substantially changed. A change in wire diameter results in changed parameters. A smaller diameter wire requires an increase in wire feed speed to reach the same current.

If certain limits are exceeded, a satisfactory weld cannot be obtained.

- a) A too high wire feed speed (too high with regard to the welding voltage) results in pulsing within the torch. This is because the wire electrode dips into the puddle and cannot be melted off fast enough.
- b) If the welding voltage is set too high, large drops can be seen at the end of the wire electrode. These drops are often deposited beside the welding seam.

The correct ratio of wire feed speed (current) and welding voltage results in little spatter and a continuous, intensive hissing can be heard from the arc.

WELDING HINTS AND MAINTENANCE

- 1) Hold the gun at a 45° angle to the work-piece with the nozzle about 6mm from the surface.
 - 2) Move the gun smoothly and steadily as you weld.
 - 3) Avoid welding in very draughty areas. A weak pitted and porous weld will result due to air blowing away the protecting welding gas.
 - 4) Keep wire and wire liner clean. Do not use rusted wire. Check all cables periodically. They must be in good condition and not cracked.
 - 5) Sharp bends or kinks on the welding hose should be avoided.
 - 6) Always try to avoid getting particles of metal inside the machine since they could cause shortcircuits.
 - 7) If available, use compressed air to periodically clean the hose liner when changing wire spools and the inside of the welder.
- IMPORTANT: Disconnect from power.
- 8) Using low pressure air (20-30 PSI), occasionally blow the dust from the inside of the welder. This keeps the machine running cooler. Note: do not blow air over the printed circuit board and electronic components.
 - 9) The wire feed roller will eventually wear during normal use. With the correct tension the pressure roller must feed the wire without slipping. If the pressure roller and the wire feed roller make contact (with wire between them), the wire feed roller (grooved) must be replaced.
 - 10) Should you have a problem with your machine contact your local service agent of Clarke International (telephone 071/254 6421).
- North America - Please call Clarke Power Products INC. AT (419) 3522299.

TYPES OF JOINTS



BUTT JOINT



SINGLE V-JOINT



DOUBLE V-JOINT



SINGLE BEVEL
JOINT



DOUBLE BEVEL
JOINT



CORNER JOINT



SINGLE FILLET
LAP JOINT



DOUBLE FILLET
LAP JOINT



SINGLE STRAP
JOINT



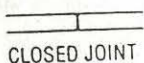
DOUBLE STRAP
JOINT



SINGLE FILLET
T-JOINT



DOUBLE FILLET
T-JOINT



CLOSED JOINT

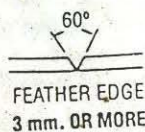


OPEN JOINT



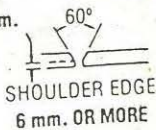
VEE JOINT

2 to 3 mm.

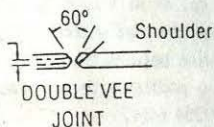


60°
FEATHER EDGE
3 mm. OR MORE

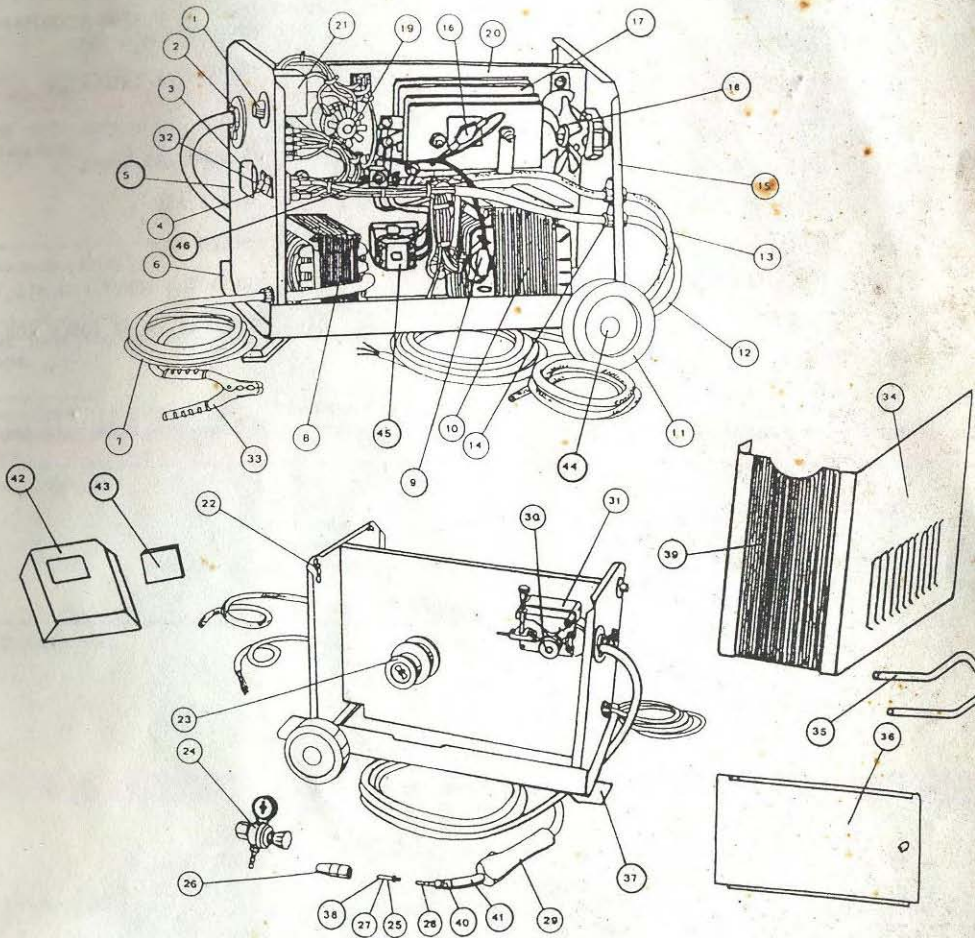
2 to 3 mm.



60°
SHOULDER EDGE
6 mm. OR MORE



60°
Shoulder
DOUBLE VEE
JOINT



- | | | | |
|-----|------------------------------------|------|--|
| 01. | P.C. BOARD KNOB | 36. | LEFT-SIDE PANEL |
| 02. | TORCH GROMMET ON FRONT PANEL | 37. | FRONT FOOT |
| 03. | SWITCH | 38. | 1,0MM. CONTACT TIP |
| 04. | PILOT-LIGHT SWITCH | 39. | RUBBER MAT |
| 05. | FRONT PANEL | 40. | TORCH INSULATOR YELLOW TYPE
(ONLY FOR MIG 155T) |
| 06. | LOWER PANEL | 41. | TORCH NECK INSULATOR |
| 07. | EARTH CABLE | 42. | MASK |
| 08. | CHOKE/INDUCTANCE | 43.A | TRANSPARENT GLASS |
| 09. | THERMOSTAT OF TRANSFORMER | 43.B | DARK GLASS |
| 10. | TRANSFORMER | 44. | WHEELS-AXLE |
| 11. | WHEEL | 45. | CONTACTOR (ONLY FOR MIG 170T) |
| 12. | INPUT CABLE | 46. | SOLENOID VALVE (ONLY FOR MIG 170T) |
| 13. | GAS HOSE | | |
| 14. | CABLE CLAMP | | |
| 15. | BACK PANEL | | |
| 16. | THERMOSTAT OF RECTIFIER | | |
| 17. | RECTIFIER | | |
| 18. | COMPLETE FAN | | |
| 19. | WIRE FEEDING MOTOR | | |
| 20. | CENTRAL DIVIDING PANEL | | |
| 21. | P.C. BOARD | | |
| 22. | CHAIN | | |
| 23. | WIRE SPOOL HOLDER | | |
| 24. | PRESSURE REGULATOR | | |
| 25. | 0,8MM. CONTACT TIP | | |
| 26. | TORCH GAS NOZZLE | | |
| 27. | 0,6MM. CONTACT TIP | | |
| 28. | TORCH NECK WITH GAS DIFFUSER | | |
| 29. | COMPLETE TORCH | | |
| 30. | WIRE FEEDING ROLL | | |
| 31. | COMPLETE WIRE FEEDER | | |
| 32. | MIN-MAX SWITCH (ONLY FOR MIG 155T) | | |
| 33. | EARTH CLAMP | | |
| 34. | UPPER PANEL | | |
| 35. | HANDLE | | |

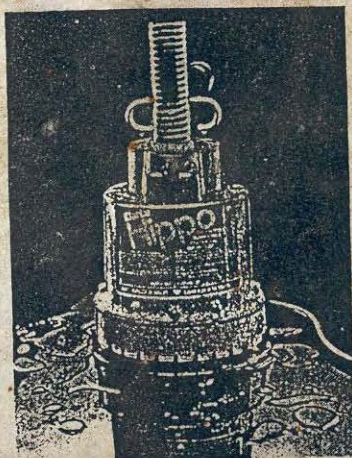
TROUBLE SHOOTING

Your **Clarke** Mig welder has been designed to give long and trouble free service. If however, having followed the instructions in this booklet carefully, you still encounter problems the following points should help identify and resolve them.

PROBLEM	CAUSE	REMEDY
1 No "life" from welder	Check fuses and mains plug-lead.	Replace fuses as necessary. If problem persists return welder to your local dealer.
2 No wire feed.	Motor malfunction.	Return welder to your local dealer.
3 Feed motor operates but wire will not feed.	a) Burr on end of wire. b) Liner blocked or damaged. c) Inferior wire.	a) Re-cut wire square with no burr. b) Clear with compressed air or replace liner. c) Use only good quality "clean" wire.
4 Wire welds itself to tip.	Wire feed speed too slow.	Unscrew tip, cut wire and fit new tip. Increase wire speed before operating again.
5 Wire feeds into "birds nest" tangle.	Wire welded to tip.	As above plus reduce feed roller pressure so that if blockage occurs wire slips on roller i.e. no feed.
6 Loose coils of wire tangle around wire drum inside machine.	Drum brake too slack.	Tighten drum brake. Caution: Do not over tighten.
7 Erratic wire feed.	a) Drum brake too tight. b) Feed roller worn. c) Insufficient pressure on feed roller. d) Wire dirty, rusty, damp or bent. e) Liner partially blocked.	a) Loosen drum brake slightly. b) Check and replace if necessary. c) Increase pressure on feed roller. Caution: Do not over tighten. d) Re-cut wire and ensure it is clean. e) Clear with compressed air.
8 Poor quality welds.	a) Insufficient gas at weld area. b) Incorrect gas/wire combination. c) Rusty, painted, damp, oil or greasy workpiece. d) Rusty/dirty wire. e) Poor earth contact.	a) Check that gas is not being blown away by draughts and if so move to more sheltered weld area. If not increase gas supply. b) See charts on pages 5, 12 & 13 of this booklet. c) Ensure workpiece is clean and dry. d) Ensure wire is clean and dry. e) Check ground clamp/workpiece connection.
9 Torch shroud loose.	Shroud insulator burnt or worn.	Replace insulator (item No. 32 page 21).
10 Wire jams in tip when welding aluminium.	Tip too small.	Use slightly oversize tip i.e. for 0.8 mm. wire use 1 mm. tip. (Note: Applies to aluminium only).
11 Welder cuts out whilst in use.	Duty cycle exceeded (auto cut-out operates).	Allow welder to cool for 15-30 mins before continuing. Note: if duty cycle is continually exceeded, welder output is probably too small for application.

If you have any problems which cannot be resolved by reference to the above, or if you require spare parts for your welder please contact your local welding dealer.

Thank you for purchasing this **Clarke** Mig. welder.
Other products within our vast range of workshop equipment covering all types of applications from DIY and hobby to automotive and industrial include: AIR COMPRESSORS, ARC WELDERS, MIG WELDERS, GENERATORS, METAL AND WOODWORKING MACHINE TOOLS, WATER PUMPS, BATTERY CHARGERS/BOOSTERS, HYDRAULIC GARAGE EQUIPMENT, ELECTRIC MOTORS, POWER WASHERS AND SPACE HEATERS.



Clarke
POWER PRODUCTS

LOWER CLAPTON RD, LONDON E5 ORN
BOWLING GREEN, OHIO, U.S.A.

Clarke
INTERNATIONAL