

CLARK®

weld



MIG220TE, MIG255TE & MIG270TE WELDERS

OPERATING & MAINTENANCE INSTRUCTIONS



GC09/12

INTRODUCTION

Thank you for purchasing this CLARKE MIG Welder.

Before attempting to operate the machine, it is essential that you read this manual thoroughly and carefully follow all instructions given. In doing so you will ensure the safety of yourself and that of others around you, and you can also 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.

SPECIFICATIONS

	220TE TURBO	255TEC TURBO	270TE TURBO
Power Supply	230V 50Hz 1Ph	230V 50Hz 1Ph	400V 50Hz 3Ph
Main Fuse Rating	25 Amps	40 Amps	16 Amps
Current Range	40-200A	30-250A	30-260A
Max. Metal Thickness (m/s)	10-11mm	10-11mm	10-11mm
Welding Wire Sizes	0.6-0.8mm	0.6-0.8mm	0.6-0.8mm
Duty Cycle* 20%	200A	-	-
30%	-	250A	-
35%	-	-	260A
60%	123A	150A	170A
100%	95A	140A	135A
Dimensions (no handle) mm	740x830x500	740x830x500	740x830x500
Weight	71 kg	47 kg	79 KG
Part No.	6015220	6015510	6015240

* Duty Cycle: Determines the machine 'down time'.

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

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GENERAL SAFETY PRECAUTIONS FOR ALL TYPES OF WELDING



WARNING: As with all machinery, there are certain hazards involved with their operation and use. Exercising respect and caution will considerably lessen the risk of personal injury. However, if normal safety precautions are overlooked, or ignored, personal injury to the operator may result.

FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

GENERAL PRECAUTIONS

A) Burn prevention

Wear protective clothing - gauntlet gloves designed for use in welding, apron, and protective shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag. Wear helmet with safety goggles or glasses with side shields underneath, appropriate filter lenses or plates (protected by clear glass). This is a **MUST** for welding (and chipping) to protect the eyes from radiant energy and spatter. Replace cover glass when broken, pitted, or spattered. Avoid oily greasy clothing. A spark may ignite them. Hot metal should never be handled without gloves. First aid facilities and a qualified first aid person should be available unless medical facilities are close by for immediate treatment of flash burns of the eyes and skin burns. Ear plugs should be worn when working overhead or in a confined space. A hard hat should be worn when others work overhead. Flammable hair preparations should not be used by persons intending to weld or cut.

NOTE: ALL protective wear incl. masks & head shields MUST comply with PPE Directive 89/686/EEC

B) Toxic fume prevention

Severe discomfort, illness or death can result from fumes, vapours, heat, or oxygen enrichment or depletion that welding (or cutting) may produce. Prevent them with adequate ventilation. NEVER ventilate with oxygen. Lead-, cadmium-, zinc-, mercury- and beryllium-, bearing materials, when welded (or cut) may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used, or each person in the area as well as the operator must wear an air-supplied respirator. For beryllium, both must be used. Metals coated with or containing materials that emit toxic fumes should not be heated unless coating is removed from the work surface, the area is well ventilated, or the operator wears an air-supplied respirator. Work in a confined space only while it is being force ventilated and, if necessary, while wearing an air-supplied respirator. Vapours from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, and other lung and eye irritating products. The ultraviolet (radiant) energy of the arc can also decompose trichloroethylene and perchloroethylene vapours to form phosgene. **DO NOT WELD** or cut where solvent vapours can be drawn into the welding or cutting atmosphere or where the radiant energy can penetrate to atmospheres containing even minute amounts of trichloroethylene or perchloroethylene.

C) Fire and explosion prevention

Causes of fire and explosion are:

- 1) combustibles reached by the arc, flame, flying sparks, hot slag or heated material;
- 2) misuse of compressed gases and cylinders
- 3) short circuits.

BE AWARE that flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall or floor openings, out of sight of the goggled operator.

To prevent fires and explosion: keep equipment clean and operable, free of oil, grease, and (in electrical parts) of metallic particles that can cause short circuits. If combustibles are in area, do NOT weld. Move the work if practicable, to an area free of combustibles.

Avoid working in paint spray rooms, dip tanks, storage areas, ventilators. If the work cannot be moved, move combustibles away from sparks and heat; or protect against ignition with suitable fire-resistant covers or shields.

Walls, ceilings, and floor near work should be protected by heat resistant covers or shields. Fire watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if:

- a) appreciable combustibles (including building construction) are within 10m.
- b) appreciable combustibles are further than 10m, but can be ignited by sparks.
- c) openings (concealed or visible) in floors or walls can expose combustibles to sparks.
- d) combustibles adjacent to walls, ceilings, roofs or metal partitions can be ignited by radiant or conducted heat.

After work, check that area is free of sparks, glowing embers, and flames. An empty container that held combustibles, or that can produce flammable or toxic vapours when heated, must never be welded on or cut, unless container has first been cleaned. This includes a thorough steam or caustic cleaning (or a solvent or water washing, depending on the combustible's solubility) followed by purging and inerting with nitrogen or carbon dioxide, and using protective equipment.

Water filling just below working level may substitute for inerting.

A container with unknown contents should be cleaned (see paragraph above), do NOT depend on sense of smell or sight to determine if it is safe to weld or cut. Hollow castings or containers must be vented before welding or cutting - they can explode.

In explosive atmospheres, never weld or cut where the air may contain flammable dust, gas, or liquid vapours.

ELECTRIC ARC (MIG, TIG) WELDING

Comply with precautions in above, and this section. Arc welding, properly done, is a safe process but a careless operator invites trouble. The equipment carries high currents at significant voltages. The arc is very bright and hot. Sparks fly, fumes rise, ultraviolet and infrared energy radiates and work pieces are hot. The wise operator avoids unnecessary risks and protects himself and others from accidents.

A) BURN PROTECTION

The welding arc is intense and visibly bright. It's radiation can damage eyes, penetrate lightweight clothing, reflect from light coloured surfaces and burn the skin and eyes. Skin burns resemble acute sunburn, those from gas - shielded arcs are more severe and painful.

DON'T GET BURNED! FOLLOW ALL SAFETY PRECAUTIONS!

Protective clothing

Wear long sleeved clothing (particularly for gas shielded arc) in addition to gloves, apron and strong shoes. As necessary, use additional protective clothing such as leather jacket or sleeves, flameproof apron, and fire-resistant leggings. Avoid outer garments of untreated cotton. **Bare skin protection:** Wear dark substantial clothing, Button collars closed to protect the chest and neck and button any pockets to prevent entry of sparks.

Eye and head protection

Protect eyes from exposure to arc. NEVER look at an electric arc without protection. Welding helmet or shield containing an appropriate filter plate (**Please refer to the section 'Welding Shield**). Place over face before striking arc. Protect filter plate with a clear cover plate. Cracked or broken helmet or shield should NOT be worn; radiation can pass through to cause burns. Cracked, broken, or loose filter plates must be replaced IMMEDIATELY. Replace clear cover plate when broken, pitted, or spattered. WE SUGGEST you wear flash goggles with side shields under the helmet, to give some protection to the eyes should the helmet not be lowered over the face before an arc is struck. Looking at an arc momentarily with unprotected eyes (particularly a high intensity gas-shielded arc) can cause a retinal burn that may leave a permanent dark area in the field of vision. Before welding whilst wearing contact lenses, seek advice from your optician.

Protection of nearby personnel

For production welding, a separate, well vented room or enclosed bay is best. In open areas, surround the operation with low reflective, non-combustible screens or panels. Allow for free air circulation, particularly at floor level. Provide face shields for all persons who will be looking directly at the weld. Others working in the area should wear flash goggles. Before starting to weld, make sure that screen or bay doors are closed.

B) TOXIC FUME PREVENTION

Comply with all precautions in 1B.

C) FIRE AND EXPLOSION PREVENTION

Do not overload arc welding equipment. It may overheat cables and cause a fire. Loose cable connections may overheat or flash and cause a fire. Never strike an arc on a cylinder or other pressure vessel. It creates a brittle area that can cause a violent rupture or lead to such a rupture later under rough handling.

D) SHOCK PREVENTION

Exposed live conductors or other bare metal in the welding circuit, or in unearthed, electrically-LIVE equipment can fatally shock a person whose body becomes a conductor. DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH a wet surface when welding, without suitable protection.

PROTECTION FOR WEARERS OF ELECTRONIC LIFE SUPPORT DEVICES (PACEMAKERS).

Magnetic fields from high currents can affect pacemaker operation. Persons wearing pacemakers should consult with their doctor before going near arc welding or spot welding operations.

E) PROTECTION AGAINST SHOCK:

Keep body and clothing dry. Never work in damp area without adequate insulation against electric shock. Stay on a dry duckboard or rubber mat when dampness or sweat can not be avoided. Sweat, sea water, or moisture between body and an electrically LIVE part - or earthed metal - reduces the body surface electrical resistance, enabling dangerous and possibly lethal currents to flow through the body.

1) Earthing the equipment

When arc welding equipment is earthed according to the National Electrical Code, and the workpiece is earthed, a voltage may exist between the electrode and any conducting object.

Examples of conducting objects include, but are not limited to, buildings, electrical tools, work benches, welding power source cases, workpieces, etc. Never touch the electrode and any metal object unless the welding power source is off. When installing, connect the frames of each unit such as welding power source, control, work table, and water circulator to the building earth.

Conductors must be adequate to carry earth currents safely. Equipment made electrically LIVE by stray current may shock, possibly fatally. Do not EARTH to electrical conduit, or to a pipe carrying ANY gas or a flammable liquid such as oil or fuel.

2) Torch

A fully insulated torch should be used without protruding screws or other damage.

3) Connectors

Fully insulated lock-type connectors should be used to join welding cable.

4) Cables

Frequently inspect cables for wear, cracks and damage. IMMEDIATELY REPLACE those with excessively worn or damaged insulation to avoid possibly lethal shock from bared cable. Cables with damaged areas may be taped to give resistance equivalent to original cable. Keep cable dry, free of oil and grease and protected from hot metal and sparks.

5) Terminals and other exposed parts

Terminals and other exposed parts of electrical units should have insulating covers secured before operation.

6) Safety devices

Safety devices such as interlocks and circuit breakers should not be disconnected or shunted out. Before installation, inspection, or service of equipment, shut OFF all power and remove line fuses (or lock or red-tag switches) to prevent accidental turning ON of power. Do not open power circuit or change polarity while welding. If, in an emergency, it must be disconnected, guard against shock burns, or flash from switch arcing. Always shut OFF and disconnect all power to equipment. A power disconnect switch must be available near the welding power source.

PREPARATION OF THE WORKING AREA

The working area must be sufficiently spacious, not humid, and well-ventilated as to avoid any fumes which develop from the welding process and from incidental material adhering to the pieces to be welded (oils, paints, tars...) which may cause danger to the operator.

Avoid welding tanks which may contain flammable residuals.

DANGER - ELECTRIC SHOCK CAN BE FATAL.

A person qualified in first aid should always be present in the working area.

If person is unconscious and electric shock is suspected, do not touch the person if he or she is in contact with the welder or cables. Disconnect the welder from the power source and then use First Aid. Dry wood, or other insulating material can be used to move cables, if necessary, away from the person.

ADDITIONAL SAFETY PRECAUTIONS FOR MIG WELDING

1. **ALWAYS** ensure that there is full free air circulating around the outer casing of the machine, and that the louvres are unobstructed.
2. Welding arc can seriously damage your eyes. Both operator and spectators must **ALWAYS** use a proper welding face shield or helmet with suitable filter lenses. Proper gloves and working clothes should be worn at all times.
3. **ALWAYS** check that the pressure regulator and gauges (where fitted), are working correctly. DO NOT lubricate the regulator.
4. **ALWAYS** use the correct regulator. Regulators are designed to be used with a specific gases.
5. **ALWAYS** inspect the torch hose before use to ensure it is in good condition.
6. **ALWAYS** keep the free length of torch hose outside the work area.
7. **ALWAYS** remove all flammable materials from the welding area.
8. **NEVER** remove any of the panels unless the machine is disconnected from the supply, AND never use the machine with any of the panels removed.
9. The MIG welding process uses an INERT gas to protect the weld pool. It is important to ensure the appropriate gas is being used. **NEVER** use gas from a cylinder, the content of which is unknown.
 - a. Use a damaged cylinder.
 - b. Lift the cylinder by the valve.
 - c. Expose the cylinder to a heat source or sparks.
10. **NEVER** use or store in a damp environment. DO NOT EXPOSE TO RAIN.

11. **ALWAYS** keep fire extinguisher handy....'Dry Powder, CO₂ or BCF, NOT Water
12. **NEVER** attempt any electrical or mechanical repair unless you are a qualified technician. If you have a problem with the machine contact your local CLARKE dealer.
13. **NEVER** continue to weld, if, **at any time**, you feel even the smallest electric shock. Stop welding IMMEDIATELY and DO NOT attempt to use the machine until the fault is diagnosed and corrected.
14. **NEVER** point the MIG torch at any person or animal.
15. **NEVER** touch the MIG torch nozzle until the welder is switched OFF and the nozzle has been allowed to cool.
16. **NEVER** connect, disconnect, or attempt to service the welding torch, until the machine is switched OFF and disconnected from the mains supply.
17. **NEVER** allow the earth cable or torch hose to become wrapped around the operator or any person in the vicinity.

A comprehensive range of CLARKE safety equipment for use when welding is available from your local dealer.

ELECTROMAGNETIC INTERFERENCE (EMC)

Whilst this unit complies with EMC regulations, the user is responsible for installing and using the welding equipment correctly. If electromagnetic disturbance is detected it is the responsibility of the user to resolve the situation. 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.

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.

ASSESSMENT OF AREA

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. Avoid using your welder 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 choosing 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 taking place. The surrounding area may extend beyond the boundaries of the premises.

METHODS OF REDUCING EMISSIONS

Welding equipment will be connected to the mains supply but 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.

The welding equipment should be routinely maintained according to the manufacturer's 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 manufacturer's instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturers recommendations.

The welding cables should be kept as short as possible and should be positioned close together, running at or close to the floor level.

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.

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.

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.

ELECTRICAL CONNECTIONS

WARNING! THIS APPLIANCE MUST BE EARTHED.


MIG 220TE & 255TEC

Connect the mains lead, through a suitably fused isolator switch, to a 230 Volt (50Hz) electrical supply, having a fuse rating in accordance with that given in the specification chart on page 2. A standard 13 Amp plug **MUST NOT** be used with this machine.

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

MIG 270TE

This model is designed for use with a **400V three-phase** supply, and should be connected through a suitably fused isolator switch.

The GREEN or GREEN & YELLOW wire should be connected to the EARTH terminal or terminal marked with "" symbol. The other two wires are for connection to the phase wires.

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.

DANGER



**NEVER OPERATE THIS MACHINE WITH THE SIDE PANELS PARTIALLY
OPENED OR COMPLETELY REMOVED**



MIG WELDING - PRINCIPLES OF OPERATION

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 the material, fusing it together. 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 and 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 be wasteful.

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

BENEFITS OF MIG WELDING

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

DECLARATION OF CONFORMITY

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

- 93/68 EEC
- 89/336 EEC
- 73/23 EEC
- 98/37 EC
- EN50 119
- EN 60 974-1

Signed _____



L.E. Fergusson
Engineering Manager

UNPACKING & PARTS IDENTIFICATION

Unpack and lay out the components, checking against the following list. Any damage or deficiency should be reported to your CLARKE dealer immediately.

Some components are stored within the side compartment. To open the compartment, slide the recessed handle backwards.

1. Welder complete with power cable and gas hose.
2. 2 x Wheels
3. 2 x Castors
4. 1 x Tubular Axle
5. 1 x Handle
6. 1 x Welding Mask
7. 1 x Welding Mask Handle
8. 1 x Package containing 1x Clear Glass and 1x Dark Glass Lens
9. 1 x Package containing 6 screws and nuts for welding mask
10. 1 x Gas Regulator with nut and tail connector.
11. 1 x Package containing:
 - a. 2 x circlips for wheel axle (wheel retainers)
 - b. 2 x Hex. socket head screws for securing the handle.
 - c. Worm drive hose clip for gas hose to regulator
 - d. 3 x spare welding tips...0.6mm and 0.8mmNOTE: A 0.6mm tip is also fitted to the torch

12. Torch & Hose Assembly

13. Earth Lead Assembly

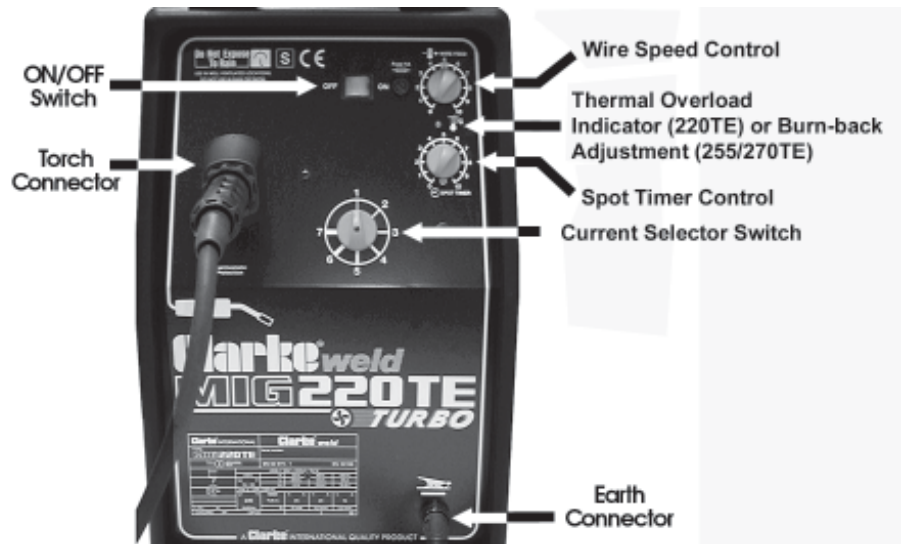
Fig. 1



GENERAL LAYOUT



Fig.2



ASSEMBLY

Wheels & Castors

Raise the machine and thread the axle into its housing and attach the wheels, securing with the circlips provided.

Thread the castors into their mountings and tighten the bolts.

Handle

Attach the handle to the top front of the machine using the two hex. socket head screws.

Hose and Earth Cable

Simply screw the Torch Hose connector into the adapter on the front panel, ensuring the pins are correctly aligned. DO NOT force it into place.

Tighten the large plastic round nut.

The earth cable plug is inserted into its receptacle on the lower front panel, ensuring the key lines up with the keyway, and then rotated through 90 degrees to lock into place.

Gas Supply

It is necessary to obtain a cylinder of gas suitable for the job in hand.

Locate the gas cylinder on the platform at the rear of the unit and secure using the chain provided.

A regulator is provided, complete with outlet pressure gauge for use with argon or argon mix gas bottles. Should you wish to use Carbon Dioxide, it will be necessary to purchase an appropriate regulator with a female connector. Your Clarke dealer will be happy to advise in this regard.

Ensure the outlet of the gas bottle is clean, then screw on the regulator and nip up... do not overtighten.

Always use the appropriate gas for the material being welded. If you are unsure, consult a qualified tradesman or a suitable reference book.

Attach the nut and tail to the gas hose using the worm drive clip provided, then screw the nut on to the regulator outlet and tighten.

Open the gas valve and screw in the regulator knob allow gas into the system to check for gas leaks. If any are found they must be rectified before proceeding. Turn off the gas when satisfied the system is leak free.

The Welding Shield

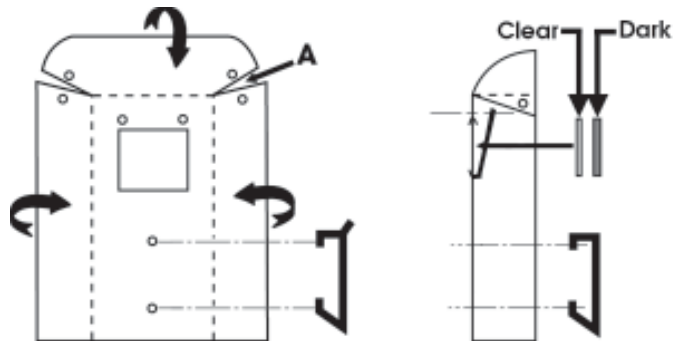


Fig.3

1. Remove the shield, handle and screws bag from the packaging.
2. Carefully bend the side and upper panels 'inwards' so that the holes in the upper panel and top of the side panels coincide (A). Secure together with screws and nuts provided.
3. Prise back the window flap and insert the clear glass first, followed by the dark glass, ensuring they fit snugly in the recesses, then secure the flap with two screws with nuts provided.

IMPORTANT: The clear glass MUST installed BEFORE the dark glass.

It is important to pay attention to the notes on welding shield maintenance, given on page 25. When replacing the glass panels, always use parts supplied by Clarke International. The dark panel is a certified, specific optical class, and should not be exchanged for any other type.

The clear glass panel should be replaced when it becomes badly pitted.

WARNING:

NEVER look at an electric arc without eye protection as this can injure the eyes permanently. ALWAYS use a protection mask or welding helmet.

NOTE: The correct shade of glass should be used in accordance with the following chart:

	CURRENT (amps)			
	80	100	200	300
Heavy Metals	10	11	12	
Light Alloys	10	11	12	13

All components are now correctly assembled, and the welder may now be prepared for use as follows: _____

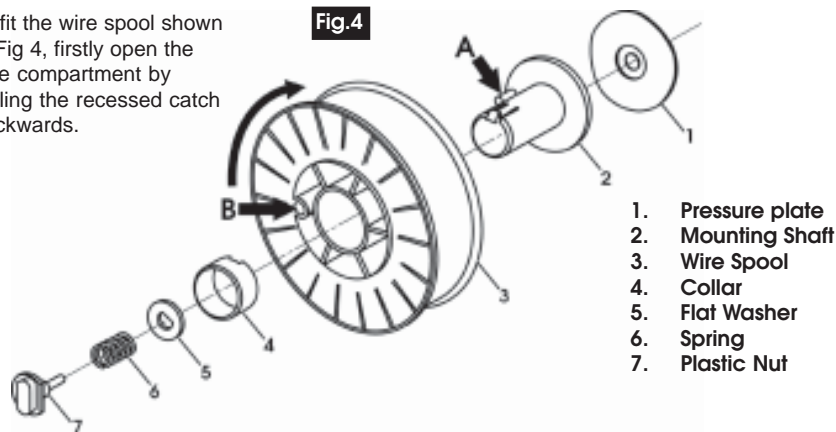
PREPARATION FOR USE

Installing the Welding Wire

NOTE: These machines are designed to accept either the Clarke 5kg or 15kg wire spools of mild steel, stainless steel or aluminium according to the type of metal you wish to weld. Wire spools must be purchased separately. See your Clarke dealer for full details.

1. **IMPORTANT:** Ensure that the gas and electrical supplies are disconnected.

2. To fit the wire spool shown in Fig 4, firstly open the side compartment by pulling the recessed catch backwards.

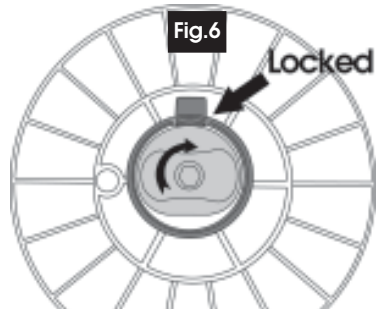
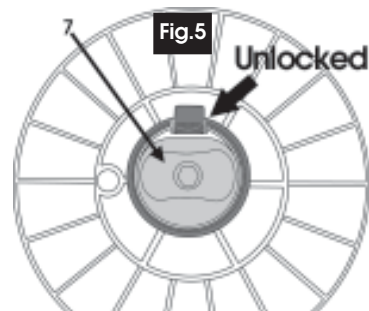


3. Turn the plastic knob with cam (7) to the position shown in Fig 5, so that the latch is unlocked, and pull off the collar (6).

4. Slide the spool on to the shaft, ensuring that the Peg 'A' locates snugly in locating hole 'B', ensuring the direction of feed of the wire is in the direction of the arrow.

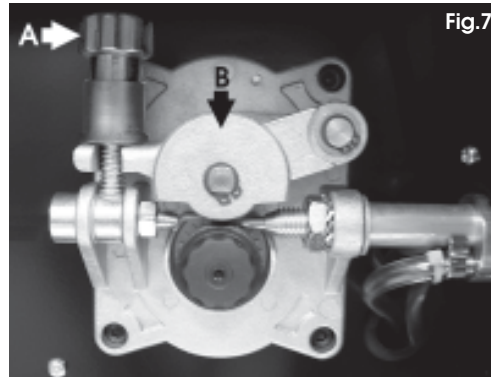
5. Replace the collar - 4, (5kg spool ONLY), and turn the plastic knob with the cam (7) to the position shown in Fig 6, thereby locking the spool on the shaft.

NOTE: The plastic knob, (item 7 - Fig 4), is also used to apply slight tension to the wire spool. This prevents the spool from running freely, which could cause the wire to unspool, creating a 'birds nest' tangle within the side compartment. Adjust by hand and test the tension.



6. Unscrew the pressure roller bracket securing knob (A, in Fig 7), whilst holding down the pressure roller bracket (B), against spring pressure, so that the screw rod hinges out of its slot. This releases the pressure roller bracket which, when released, will pivot upwards under spring pressure.

IMPORTANT!



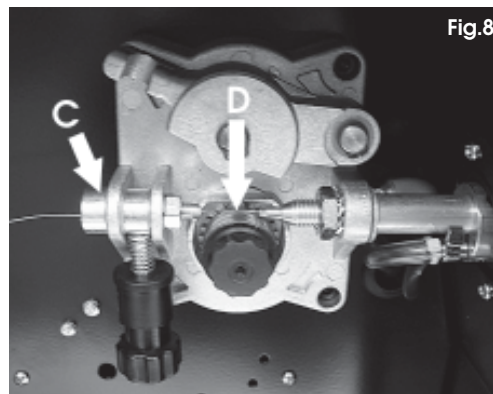
Before fitting any wire, ensure the correct groove on the roller is in place. (See page 19).

7. Pull out the end of the wire from the rim of the spool, taking care NOT to release it. The spool is wound firmly and should remain this way.

Ensuring the wire is straight and not kinked in any way, clip off the end with a sharp pair of snips ensuring there are no burrs or sharp edges.

Proceed to feed it through the guide tube (C, Fig 8), over the groove on the roller (D), and into the wire liner, by about 10 - 15 cm.

8. Reposition the pressure roller bracket and securing knob (A) and tighten slightly.

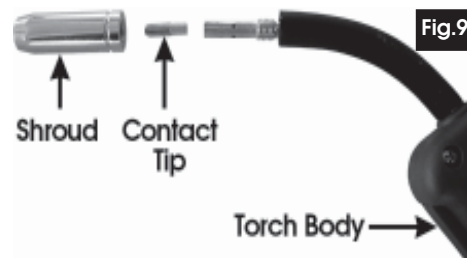


Tightening the knob (A) too tightly will crush the wire and damage the wire feed motor, too loose will not allow the wire to be pulled by the roller.

9. (Ref. Fig 9)

Remove the torch shroud by twisting it anti clockwise and pulling it off, then unscrew the contact tip.

Should any wire protrude from the tip....pull it out completely and discard.



10. Close the side panel of the machine and switch on at the mains or isolator.
11. Set the wire feed rotary switch on the front panel to position 6 or 7, 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 disconnect from the mains supply. Replace the contact tip and the torch shroud.

IMPORTANT:

Ensure the hose is kept straight during this operation, to assist the wire as it is fed through to the wire liner and torch.

Selecting the Correct Drive Roller Groove

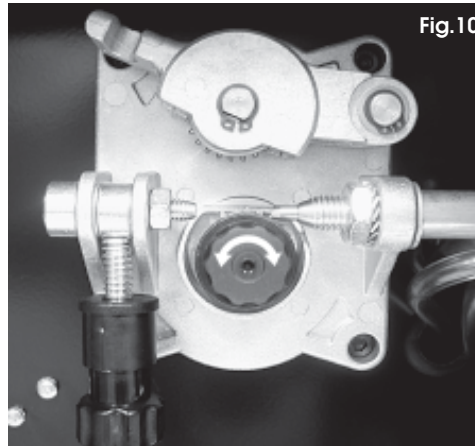
As previously mentioned, it is important that the correct groove in the drive roller is selected for the particular wire being used. The roller provided has 0.6 and 0.88mm grooves.

The welder is factory set with the 0.8mm groove in position.

To change grooves, proceed as follows:

1. With the pressure roller bracket raised, and the old wire removed, remove the roller securing knob (arrowed), by turning it fully anti-clockwise, then pull the roller from the shaft.
2. Ensure the appropriate groove is facing inwards before sliding the roller on to the shaft.

Screw on the securing knob to lock the roller securely in place.



OPERATION

Each time you use the machine it will be necessary to perform the following operations:

Check the Welding Wire

Check to ensure the correct type of welding wire is installed for the job in hand and is correctly adjusted.

Prepare the Work

MOST IMPORTANT!

It is vital that the workpiece is perfectly clean at the point of weld. Any coating, plating or corrosion **MUST** be removed, otherwise a good weld will be impossible to achieve.

Set the Controls

In order to produce a satisfactory weld, the controls must be fine tuned whenever there is a material change in weld characteristics. This is generally referred to as '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:

(1) Welding Current, and (2) Wire Feed Speed,

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 related to the wire feed speed.

As the **current is increased**, the **wire feed speed** is also **increased**.

Conversely, **if current is decreased** the **wire feed speed is decreased**.

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. These are:

- A) An excessive wire feed speed (too high with regard to the welding current), 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 current 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 rate of wire feed speed and welding current, results in very little spatter and a continuous, intensive hissing can be heard from the arc.

(i) WELDING CURRENT CONTROL

Select the welding current according to the type of metal and thickness to be welded. The control has 7 positions as indicated in the chart below. Experience will determine the optimum setting for the job in hand, but the chart gives general settings from which to work.

		Steel Wire Diameter (mm)	Wire Speed Adjustment
Switch Positions	1	0.6	LOW
	2	0.6	LOW
	3	0.6 - 0.8	MEDIUM
	4	0.6 - 0.8	MEDIUM
	5	0.8	MEDIUM _ HIGH
	6	0.8	HIGH
	7	1.0	HIGH

PLEASE NOTE: If the current and hence the wire speed is increased, the volume of gas at the nozzle must also be increased. Turn the regulator knob accordingly.

(ii) WIRE FEED SPEED CONTROL

The WIRE FEED Rotary Control Knob, with graduations from 0 to 10, is used to fine tune the wire speed feed to the nozzle. The knob should be set to position 6 to begin with for welding steel, and 8 for welding aluminium, then adjusted as required.

Note: This control is for fine tuning the wire speed. The speed of wire delivery will increase automatically as the current is increased and vice versa. Therefore, once the ideal speed is achieved by fine tuning, it should not be necessary to adjust this control when the welding current is changed.

It is always better to start with too high a speed, and back off slightly, to avoid the possibility of the wire welding itself to the tip.

Timer Control

This is explained in more detail on page 23. For all normal welding operations, set this control to zero.

Welding Wire

Trim the welding wire so that it protrudes no more than 5mm from the end of the shroud.

The Earth Clamp

Attach the earth clamp to the workpiece as close to the point of weld as possible, without it being intrusive. Ensure there is good contact and if necessary, clean the area with a wire brush beforehand.... Remember, the contact **MUST** be on bare metal - thoroughly clean.

The Gas Valve

Open the gas valve on the gas cylinder. Regulate the pressure by turning the regulator knob clockwise (to increase pressure), and adjust to the desired setting. **NOTE: this varies with different metals, thicknesses and currents. Refer to a MIG welding manual for instructions.**

Your welder is now fully prepared for welding as follows:

With the welding current set, and welding wire trimmed, set the wire feed control to 6, (8 for aluminium).

Plug the machine into the mains supply or switch on at the isolator and ensuring all precautions have been taken and with the machine set up correctly, switch ON the machine and lower the torch to the workpiece with one hand, whilst holding the welding mask in the other.

Approach the work with the tip at an angle of approx. 45° and pull the torch trigger fully. A welding current is now available at the tip and gas will be issued.

As the wire touches the workpiece, an arc will be struck.....**BEFORE** it is struck, cover the face with the face mask.

Maintain a gap of approx. 5 - 7mm from the workpiece to the tip, and feed the wire into the molten pool at a steady rate, along the line of the proposed weld.

The speed of weld will depend upon the wire speed and welding current.

NOTES:

As MIG welding is an acquired skill, it is strongly advised that, if you are not fully familiar with this type of welding, you practice on a piece of material with the same characteristics as your workpiece, until you are satisfied with the result, and you have fine tuned your welder to produce a satisfactory weld.

One of the problems experienced with novice welders, is the welding wire sticking to the contact tip. This is as a result of the wire feed speed being too slow. It is always better therefore to start with too high a speed, and back off slightly, to avoid the possibility of the wire welding itself to the tip. This is the reason position 6 is recommended for start up.

The Wire Feed control is for fine tuning the wire speed. The speed of wire delivery will increase automatically as the current is increased from MIN to MAX, and vice versa. Therefore, once the ideal speed is achieved, by fine tuning, it should not be necessary to adjust this control when the welding current is changed.

Listen to the sound made. An irregular crackling sound denotes too high a wire speed. Decrease the speed until a regular, strong buzzing sound is heard.

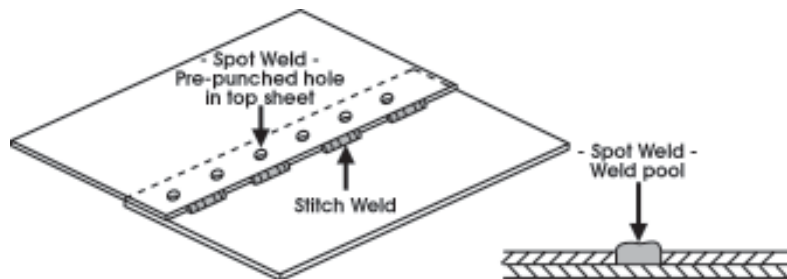
GENERAL INFORMATION

Spot Timer Control

This control may be used for spot (plug) welding, or stitch welding. The control is set so that the duration of weld lasts for a predetermined time.

For plug welding, a special nozzle is required, (see your CLARKE dealer) which is pressed hard against the two pieces of material to be welded, as the trigger is pressed. The arc will last for a predetermined time, depending upon the control setting, melting the metal and fusing the two parts together.

Allow a short period with parts held together before withdrawing the nozzle.



Thermal Overload (MIG220TE)

The 'Thermal Overload' is a safety device which shuts off the welder when the duty cycle has been exceeded. This is to prevent damage to the machine caused by overheating.

When this occurs, the warning lamp will glow (amber). Allow the welder to cool, until the amber light extinguishes before resuming.

For details of the duty cycle...i.e. the length of time the machine may be used at a particular welding current, refer to the data and notes on page 24.

Burn Back Adjustment

This takes the form of a trimmer, located between the control knobs on the front panel which can be adjusted with a screwdriver either clockwise or anti-clockwise.

It is used to regulate the amount of welding wire to "burn back" after releasing the trigger of the torch. For example, if this is set to Maximum, when the weld is finished, the wire will burn back almost to the nozzle tip. Initially set the trimmer to an intermediate setting but this may be adjusted according to the diameter of wire being used.

WELDING TIPS

- Try to maintain the tip of the nozzle at an angle of approx. 45° and at a constant distance of approx 5-7mm from the workpiece.
- Try to maintain a constant speed of movement with the torch.
- Do not weld in windy conditions or in an area where ventilation is a problem, or where air flow fluctuates.
- ALWAYS keep the wire and nozzle clean...NEVER use rusted wire.
- Avoid sharp bends or kinks in the welding hose.
- Whenever possible, clean out the wire liner with compressed air when replacing the wire spool.
- Periodically remove the dust, using LOW PRESSURE compressed air, within the casing. Adequate heat dissipation is essential during the welders operation.

DUTY CYCLE

These models are covered by regulations EN 60974-1 and EN 50199, where the Duty Cycle (X) is expressed as a percentage of time the machine may be used in a given period for a specified welding current.

i.e. using the example below, which is an illustration of the 270TE data plate.....

When welding at 170 Amps the machine may be used for 6 minutes (60%) in any 10 minute period.....

Clarke INTERNATIONAL		Clarke weld			
TYPE 270TE		SERIAL NUMBER			
1~ — () — 1~		EN 60974-1 EN50199			
30A / 16.5V - 260A / 26V	X		35%	60%	100%
	U ₀ V	I ₂	260A	170A	135A
50V	17 ÷ 38V	U ₂	25.5V	22.5V	20.7V
1~ 50/60Hz COOLING AF I.C.L. H	U ₁ V	T 16 A	I ₁ 13.3 A	I ₁ 8.5 A	I ₁ 5.7 A
	400V		S ₁	8.8 kVA	5.9 kVA
IP 22	50/60Hz				

.....or, the machine may be used continuously, (100%) when welding at 135 Amps

ACCESSORIES

A full range of accessories is available from your Clarke dealer.

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, and how clean or dirty the welding site is (aggressive atmospheres, etc).

Always inspect the earth return and torch hose, before use to ensure they are in perfect condition and earth clamp is clean and secured correctly to the cable.

Check the gas hose and pressure regulator for security and serviceability, and ensure there is sufficient gas to complete the job in hand.

As a general rule the power supply should be inspected internally at least annually. Consult your CLARKE dealer.

THE WELDING SHIELD

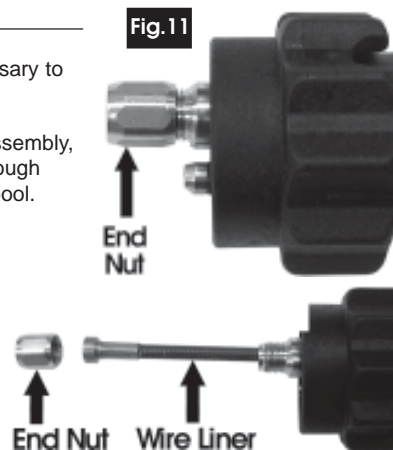
Always maintain the welding shield in good condition. If the clear glass protection lens becomes badly pitted, sufficient to interfere with vision, or cracked, have it replaced immediately. Replacement clear and dark lenses are available from your Clarke dealer - see Parts Lists for details. NEVER use any dark filter lens other than that provided by CLARKE International, or one with the same certified 'Optical class' (degree of protection).

The shield should always be cleaned with a clean soft cloth after use, ensuring the lenses are clean. Remove any dust that may have accumulated and store it in a safe place where it cannot be damaged. NEVER use a shield that is **not** in perfect condition.

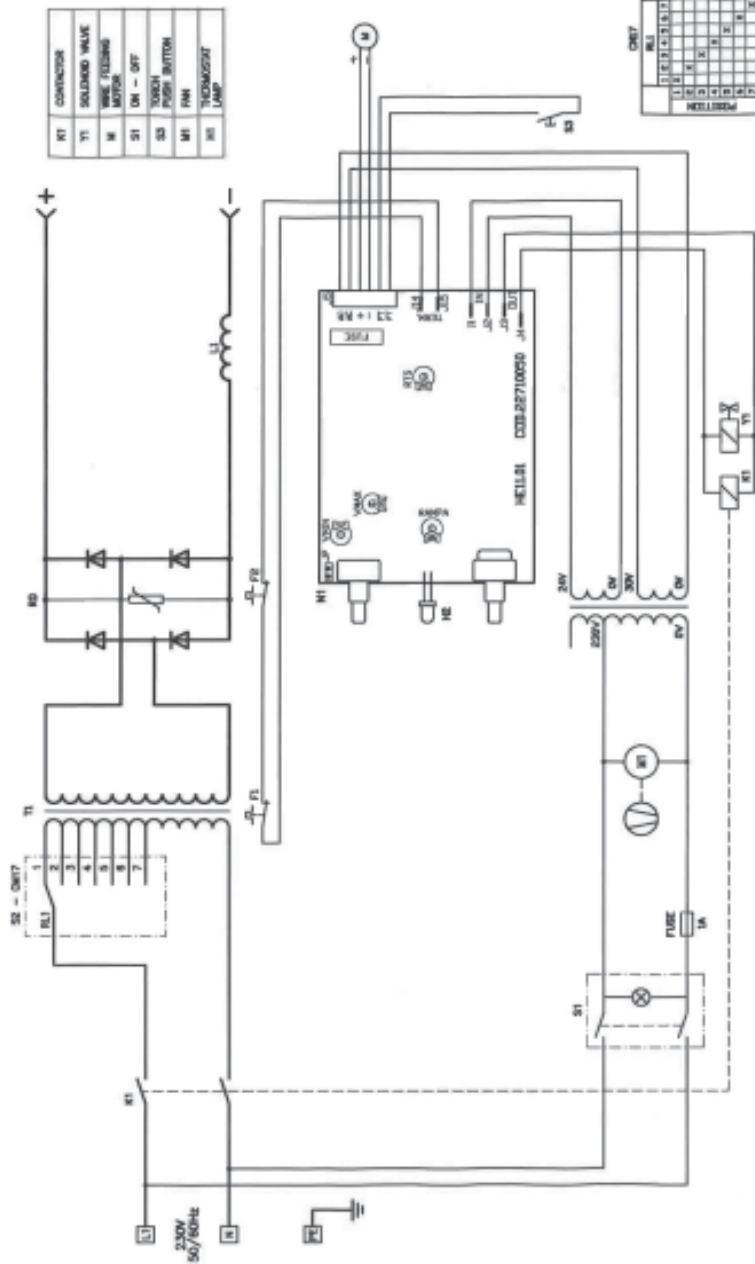
RENEWING THE WIRE LINER

If the liner becomes damaged or kinked it will be necessary to replace it.

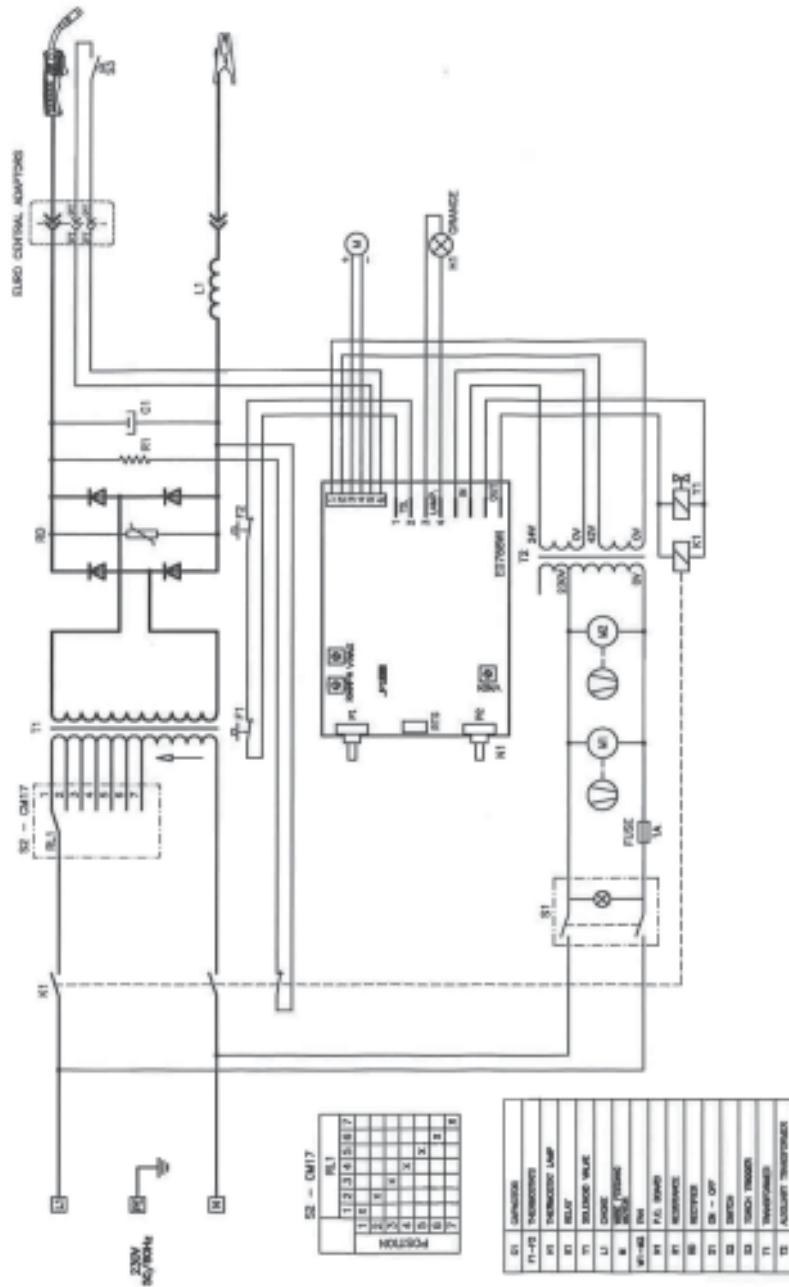
1. Remove the welding wire from the hose & torch assembly, either by cutting it at the wire spool and pulling through from the nozzle end, or rewinding it back on the spool.
2. Disconnect the hose from the machine.
3. Unscrew the end nut shown in Fig 11 using a 12mm spanner and having straightened the hose assembly, pull the liner completely out of the hose.
4. Thread the new liner into the hose fully, then screw the end nut back into place.



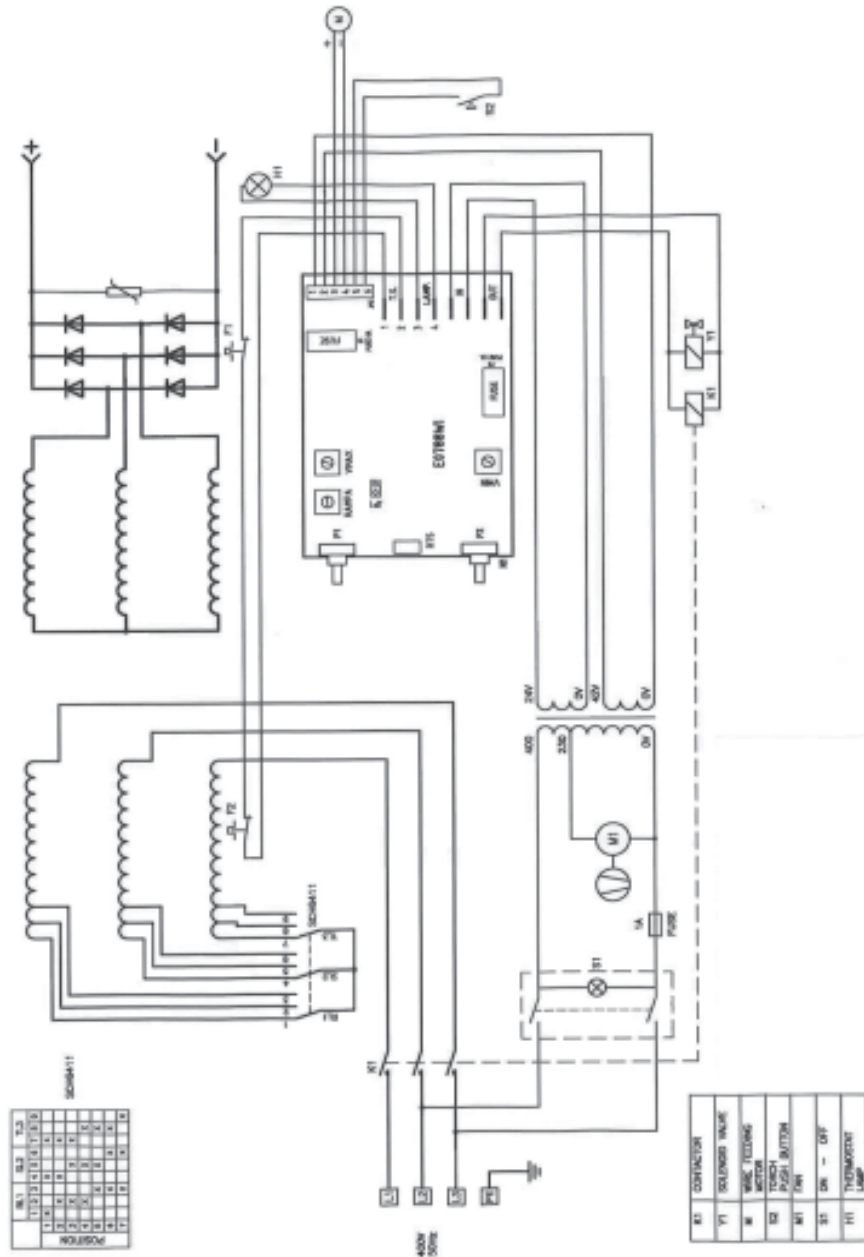
WIRING DIAGRAM - MIG220TE



WIRING DIAGRAM - MIG255TE



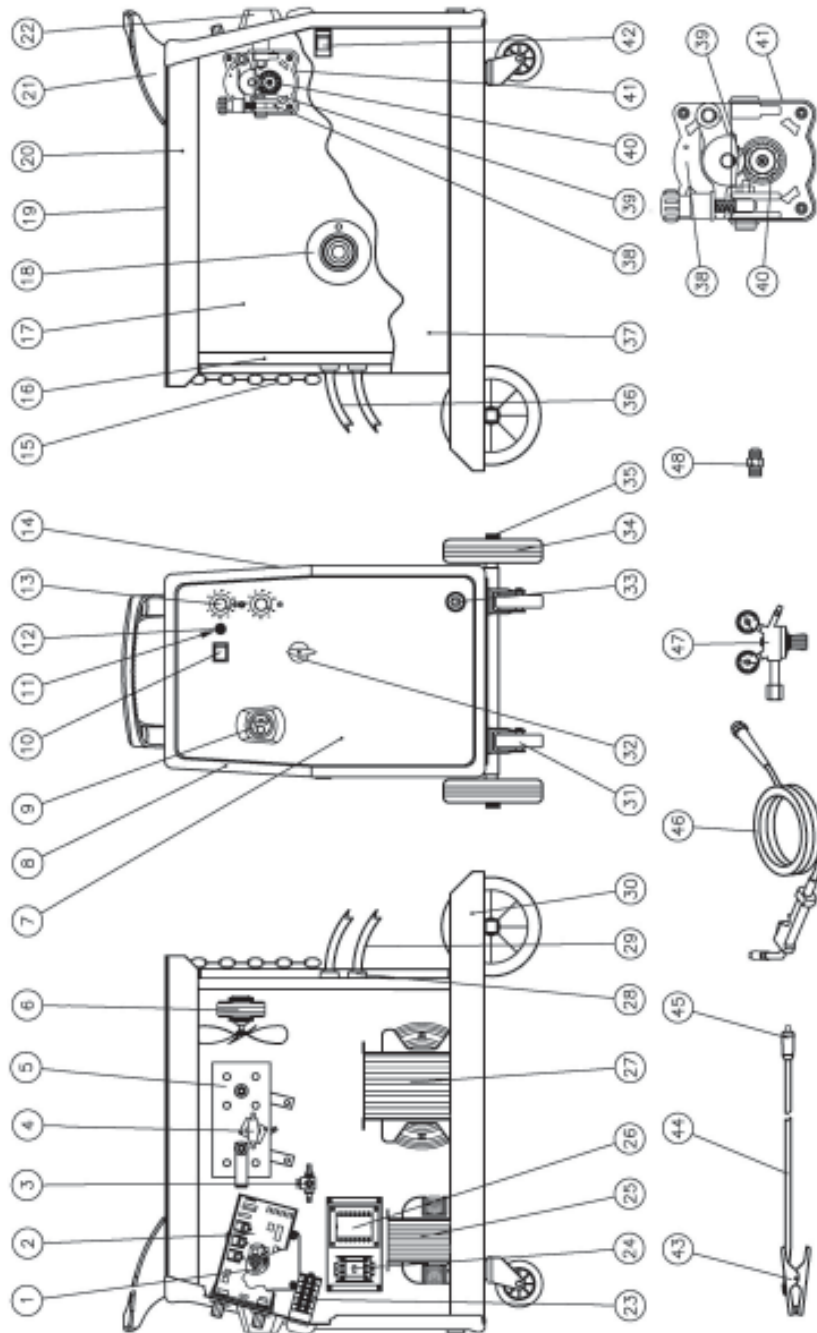
WIRING DIAGRAM - MIG270TE



PARTS LIST - MIG 220TE

No.	Description	Part No.
01	Motor + Pinion	1 EM04600147
02	Motor Control PCB	1 EM22710050
03	Gas Solenoid Valve	1 EM22900002
04	Thermostat + Support	1 EM04600113
05	Rectifier	1 EM22400085
06	Fan 220V	1 EM22800002
07	Front Panel	1 EM33710295
08	Plastic Front Frame	1 EM21690285
09	Binzel / Euro Torch Adaptor	1 EM23005351
10	On/Off Switch	1 EM22200002
11	Fuse 1A 250V	1 EM22220002
12	Fuse Holder	1 EM22220016
13	Potentiometer Knob	2 EM04600332
14	Right Side Panel	1 EM33705326
15	Zinc Chain	1 EM04600205
16	Rear Panel	1 EM33715096
17	Dividing Panel	1 EM33720211
18	Complete Spool Holder	1 EM04600001
19	Tool Mat	1 EM30905045
20	Upper Panel	1 EM33705628
21	Handle	1 EM21600042
22	Torch Connection Cover	1 EM21690267
23	Switch 20A	1 EM22205033
24	24V Contactor	1 EM22225022
25	Choke	1 EM44135082
26	Auxiliary Transformer	1 EM44140054
27	Transformer	1 EM44120109
28	Cable Clamp	2 EM21605010
29	Input Cable	1 EM20220020
30	Lower Panel	1 EM33700317
31	Castor	2 EM21625003
32	Switch Knob	1 EM21690268
33	Female Dinse Plug	1 EM22100002
34	Rear Wheel	2 EM21625048
35	Wheels Axle	1 EM55200036
36	Black Hose	1 EM30900027
37	Left Access Panel	1 EM33705627
38	Aluminium Wire Feeder + Gear	1 EM44410021
39	Wire Block Roll	1 EM33805007
40	Wire Feed Roll 0,6-0,8mm	1 EM33805003
40	Wire Feed Roll 1,0-1,2mm	1 EM33805005
40	Wire Feed Roll 0,8-1mm	1 EM33805021
41	Wire Feeder Protection	1 EM21690194
42	Slide Clip	1 EM21690226
43	Earth Clamp 300A	1 EM22110033
44	Earth Cable	1 EM43210167
45	Dinse Plug	1 EM22100001
46	Torch	1 EM23000424
47	Reducer c/w Gauge	1 EM22905017
49	Mask	1 EM21905019
50	Clear Glass	1 EM21905020
51	Dark Glass	1 EM21905024

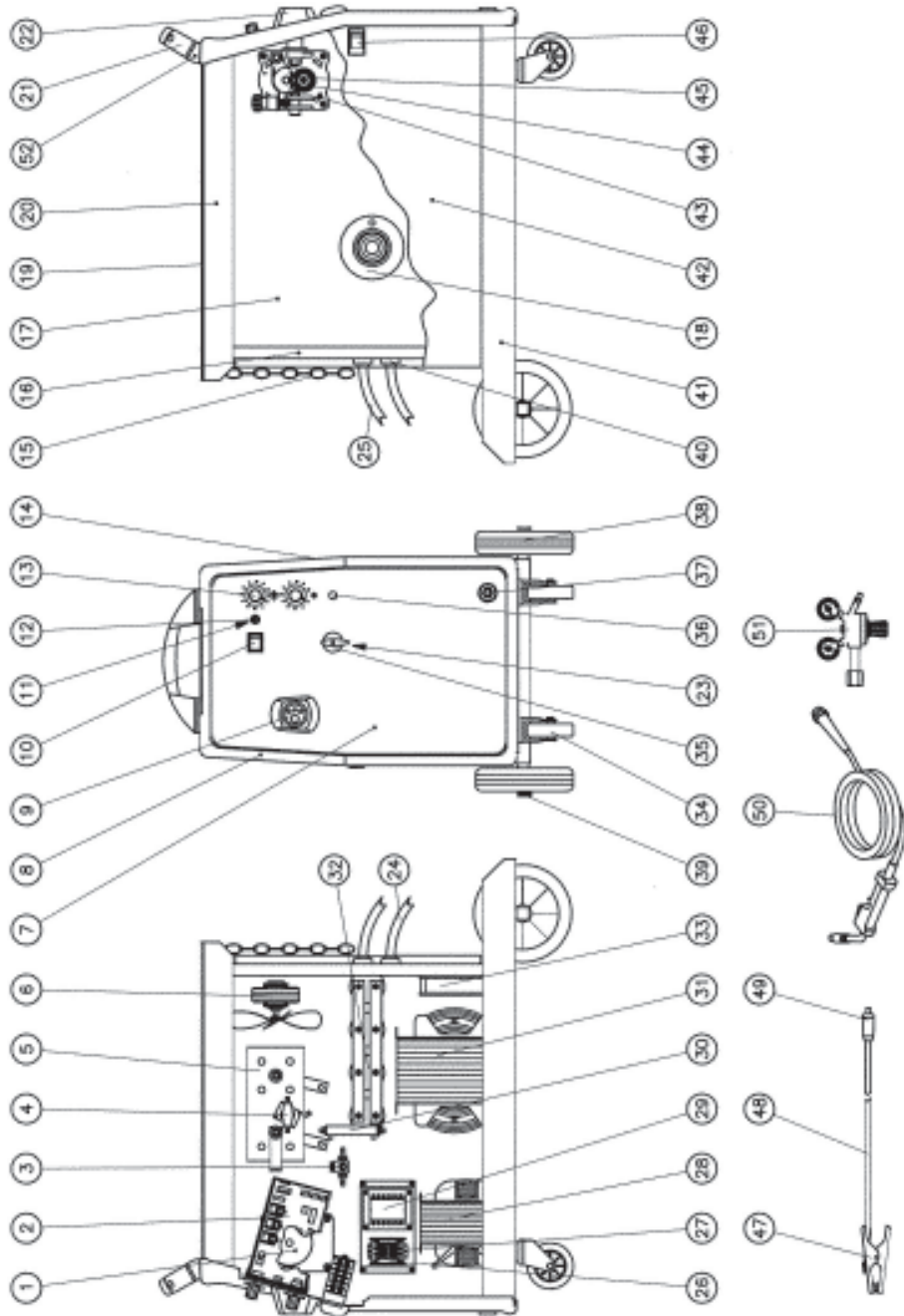
PARTS DIAGRAM - MIG220TE



PARTS LIST - MIG 255TE

No.	Description	Part No.	No.	Description	Part No.
01	Wire Feed Motor 42V	EM22810006	30	Resistor	EM22305004
02	P.C. Board	EM22710051	31	Transformer	EM44120147
03	Gas Solenoid Valve	EM22900002	32	Capacitor	EM22315003
04	Complete Thermostat	EM04600113	33	Complete Fan	EM22800021
05	Rectifier	EM22400086	34	Castor	EM21625003
06	Fan	EM22800002	35	Switch Knob	EM04600268
07	Front Panel	EM33710295	36	Orange Pilot-lamp	EM22610011
08	Plastic Front	EM21690285	37	Female Plug	EM22100002
09	Torch Adaptor	EM23005351	38	Rear Wheel	EM21625048
10	On/Off Switch	EM22200002	39	Wheels Axle	EM55200036
11	Fuse	EM22220002	40	Cable Clamp	EM21605010
12	Fuse Holder	EM22220016	41	Lower Panel	EM33700317
13	Potentiometer Knob	EM04600332	42	Left Access Panel	EM33705627
14	Right Side Panel	EM33705626	43	Aluminium wire Feeder	EM44410017
15	Chain	EM04600205	44	Feed Roll 0.6-0.8mm	EM33805003
16	Rear Panel	EM33715096	44	Feed Roll 1.0-1.2mm	EM33805005
17	Dividing Panel	EM33720211	44	Feed Roll 0.8-1.0mm nylon	EM33805021
18	Complete Spool Holder	EM04600001	44	Feed Roll 1.2-1.6mm nylon	EM33805022
19	Mat For Tools	EM30905045	45	Block Roll	EM33805007
20	Cover Panel	EM33705628	46	Slide Clip	EM21690226
21	Handle	EM21600042	47	Earth Clamp	EM22110033
22	Torch Connect Cover	EM21690267	48	Earth Cable	EM43210167
23	Switch	EM22205155	49	Dinse Plug	EM22100001
24	Input Cable	EM20220136	50	Torch	EM23000424
25	Black Gas Hose	EM30900027	51	Reducer	EM22905017
26	Contactora	EM22225022	52	Handlebase	M21690235
27	Auxiliary Contacts	EM22225018	--	Face Mask	EM21905019
28	Choke	EM44135128	--	Transparent Glass	EM21905020
29	Auxiliary Transformer	EM44140054	--	Dark Glass	EM21905024

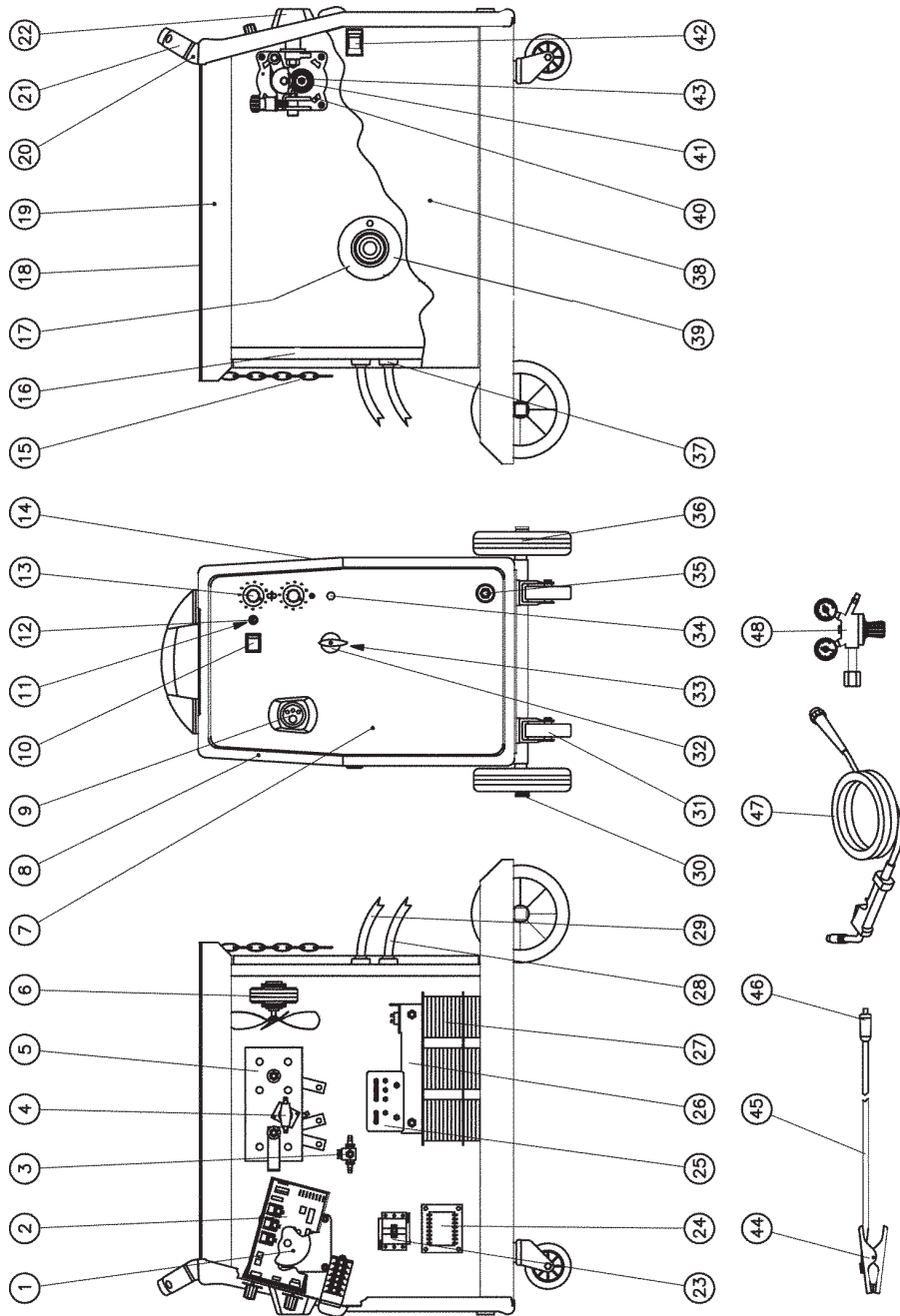
PARTS DIAGRAM - MIG255TE



PARTS LIST - MIG 270TE

No.	Description	Part No.	No.	Description	Part No.
01	Wire Feed Motor 42V	EM22810006	28	Input Cable	EM20220030
02	P.C. Board	EM22710051	29	Black Hose	EM30900027
03	Gas Solenoid Valve	EM22900002	30	Rear Wheel	EM21625048
04	Thermostat + Support	EM04600113	31	Castor	EM21625003
05	Rectifier	EM22400029	32	Switch Knob	EM04600268
06	Fan	EM22800005	33	Female Dinse Plug	EM22100002
07	Front Panel	EM33710295	34	Orange Pilot-lamp 24V	EM22610011
08	Front Frame	EM21690285	35	Wheels Axle	EM55200036
09	Euro Torch Adaptor	EM23005351	36	Cable Clamp	EM21605010
10	Green Pilot-light Switch	EM22200005	37	Lower Panel	EM33700317
11	Fuse 1A 250V	EM22220002	38	Left Access Panel	EM33705627
12	Fuse Holder 3A 250V	EM22220016	39	Al.. Wire Feeder +Gears	EM44410017
13	Potentiometer Knob	EM04600332	40	Wire Feed Roll 0,6-0,8mm	EM33805003
14	Right Side Panel	EM33705626	40	Wire Feed Roll 1,0-1,2mm	EM33805005
15	Zinc Chain 0,76 Mt	EM04600205	40	Wire Feed Roll 0,8-1mm Nylon	EM33805021
16	Rear Panel	EM33715096	41	Wire Block Roll	EM33805007
17	Compl. Spool Holder	EM04600001	42	Slide Clip	EM21690226
18	Mat For Tools	EM30905045	---	-----	-----
19	Upper Panel PVC	EM33705628	44	Earth Clamp 300A	EM22110033
20	Dividing Panel PVC	EM33720211	45	Earth Cable	EM43210167
21	Handle	EM21600042	46	Dinse Plug	EM22100001
22	Torch Connection Cover	EM21690267	47	Torch-bl/blk Handle	EM23000424
23	Switch 16 A	EM22205030	48	Reducer 2/Gauges	EM22905018
24	Contacto	EM22225022	--	Face Mask	EM21905019
25	Auxiliary Transformer	EM44140036	--	Transparent Glass	EM21905020
26	Transformer 230/400V	EM44125038	--	Dark Glass	EM21905024
27	Al Side Winding 230V	EM44025084			

PARTS DIAGRAM - MIG270TE



TROUBLESHOOTING

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.

	CAUSE	REMEDY
1. No "life" from welder	a) Check fuses and mains lead	a) Replace fuses as necessary If problem persists return welder to your local dealer b) Check fuse size
2. No wire feed	Motor malfunction	Return welder to your local dealer
3. Feed motor operates but wire will not feed	a) Insufficient Feed Roller Pressure b) Burr on end of wire c) Liner blocked or damaged d) Inferior wire e) Roller worn out	a) Increase roller pressure b) Re-cut wire square with no burr c) Clean with compressed air or replace liner. d) Use only good "clean" wire e) Replace roller
4. Wire welds itself to tip	a) Wire feed speed too low b) Wrong size tip	a) Unscrew tip, cut wire and fit new tip Increase wire speed before operating again b) Fit correct size tip
5. Wire feeds into 'birds nest' tangle	a) Wire welded to tip b) Wire liner damaged preventing smooth operation	a) As above plus reduce feed roller pressure so that if blockage occurs wire slips on roller i.e. no feed b) Renew wire liner
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) Clean 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) Consult your MIG welding manual for correct set-up c) Ensure workpiece is clean and dry d) Ensure wire is clean and dry e) Check earth clamp/work onnection.
9. Wire jams in tip when welding aluminium	a) Tip too small	a) Use slightly oversize tip i.e., for 0.8mm wire use 1mm tip. (Note: Applies to aluminium only)
10. Welder cuts out whilst in use	a) Duty cycle exceeded (auto cut-out operates)	a) Allow welder to cool 15-30 mins before continuing Note: If duty cycle is continually exceeded, damage to the welder may result, and 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 Clarke dealer.

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