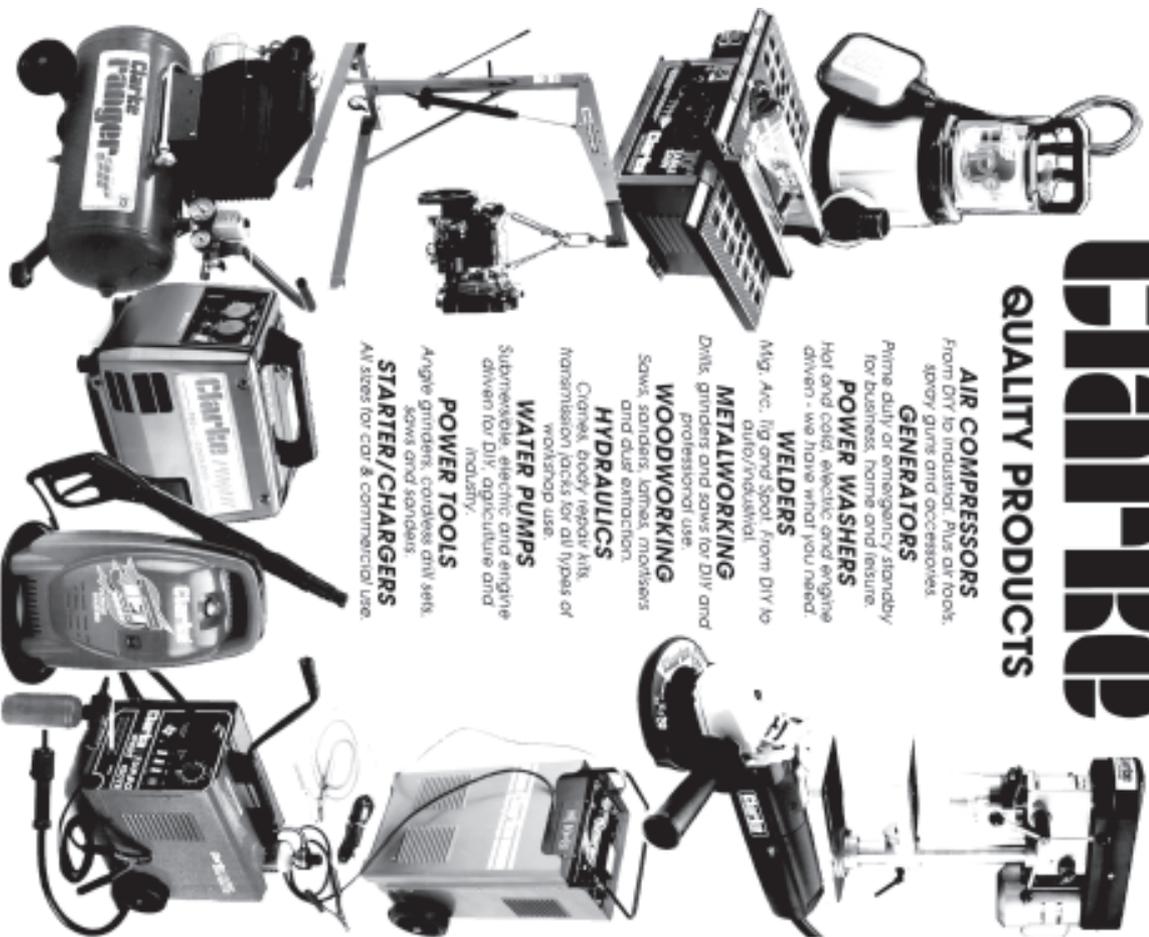


A SELECTION FROM THE VAST RANGE OF

# Char-Ko®

QUALITY PRODUCTS



**AIR COMPRESSORS**

From DIY to industrial. Plus air tools, spray guns and accessories.

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Prime duty or emergency standby for business, home and leisure.

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Mig, Arc, Tig and Spot. From DIY to auto/industrial.

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Drills, grinders and saws for DIY and professional use.

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Submersible, electric and engine driven for DIY, agriculture and industry.

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Angle grinders, cordless cutters, saws and sanders.

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All sizes for car & commercial use.

**Char-Ko® INTERNATIONAL**

For spare parts and servicing, please contact your nearest dealer, or Char-Ko International on

**020 - 8988 - 7400**

e-mail: [Parts@charkeinternational.com](mailto:Parts@charkeinternational.com) e-mail: [Service@charkeinternational.com](mailto:Service@charkeinternational.com)

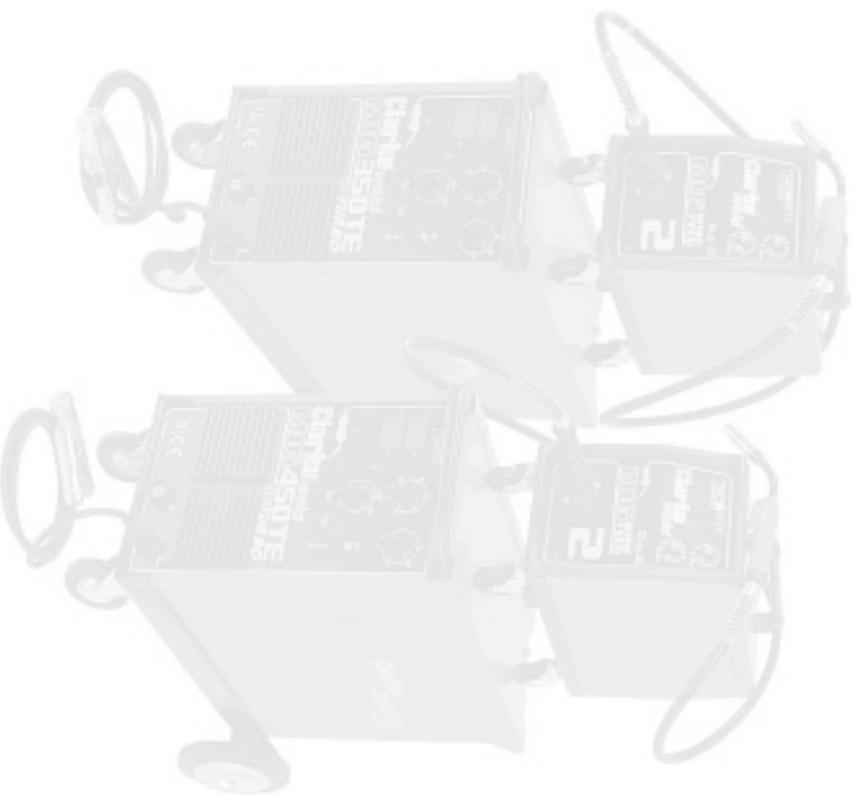
# Char-Ko®



**MIG 355TE • MIG 455TE**

**OPERATING & MAINTENANCE  
INSTRUCTIONS**





## 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  \_\_\_\_\_

## ACCESSORIES

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

## 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](mailto:Parts@clarkeinternational.com)**

**SERVICE: [Service@clarkeinternational.com](mailto:Service@clarkeinternational.com)**



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.

## PARTS AND SERVICE CONTACTS

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**PARTS: Parts@clarkeinternational.com**

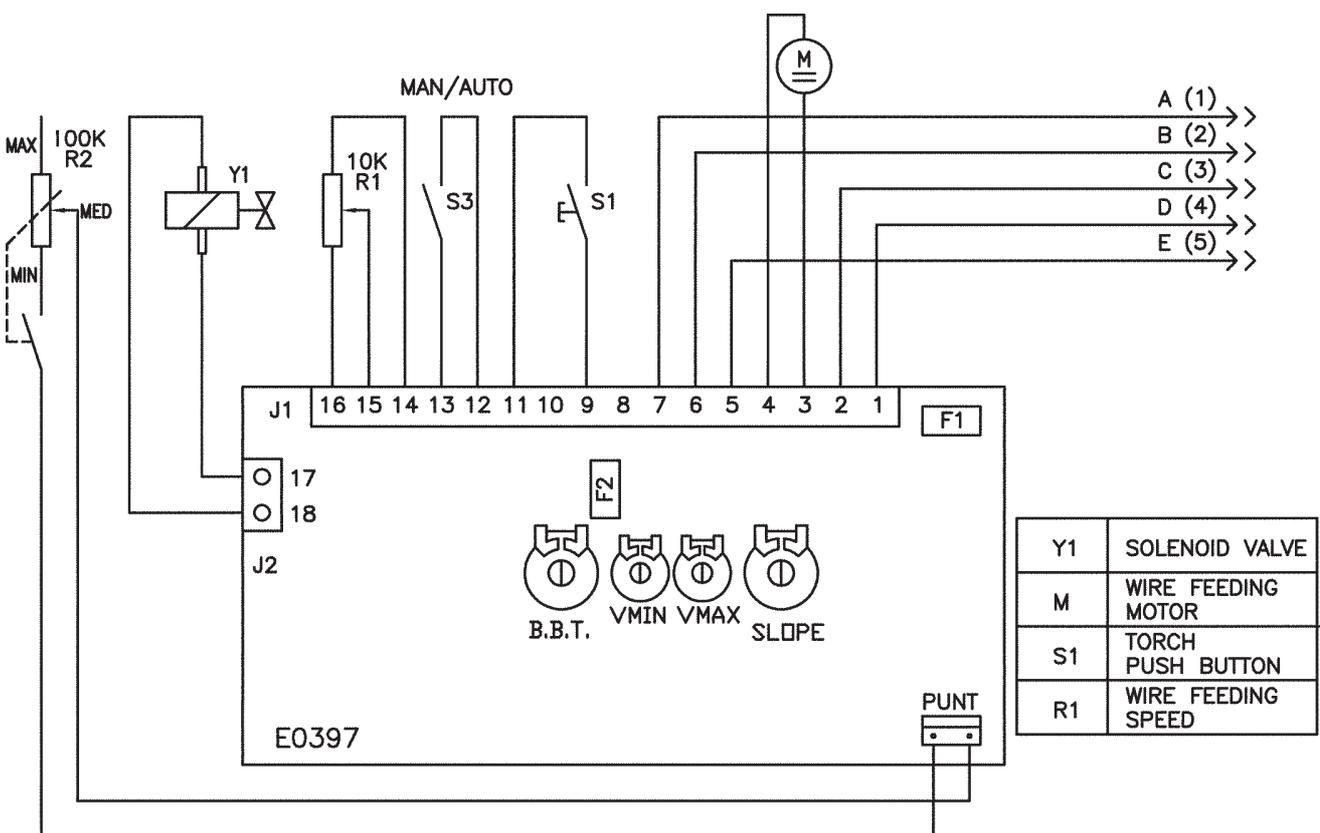
**SERVICE: Service@clarkeinternational.com**

## 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.

PROBLEM	CAUSE	REMEDY
1. No "life" from welder	Check fuses and mains lead	d) 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	d) Insufficient Feed Roller Pressure b) Burr on end of wire c) Liner blocked or damaged e) Inferior wire d) Roller worn out	d) 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	d) Wire feed speed too low b) Wrong size tip	d) 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	d) Wire welded to tip b) Wire liner damaged preventing smooth operation	d) 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	d) 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	d) 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	d) 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	d) 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/workpiece connection
9. Wire jams in tip when welding aluminium	Tip too small	Use slightly oversize tip i.e., for .8mm wire use 1mm tip. (Note: Applies to aluminium only)
10. Welder cuts out whilst in use	Duty cycle exceeded (auto cut-out operates)	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.



ELECTROMAGNETIC INTERFERENCE (EMC)

Whilst this unit complies with EMC regulations, the user is responsible for installing and using the welding equipment according to the manufacturer's 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 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 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 manufacturer's 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 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 manufacturer's recommendations.

## 2.3 Welding cables

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

## 2.4 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.

## 2.5 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.

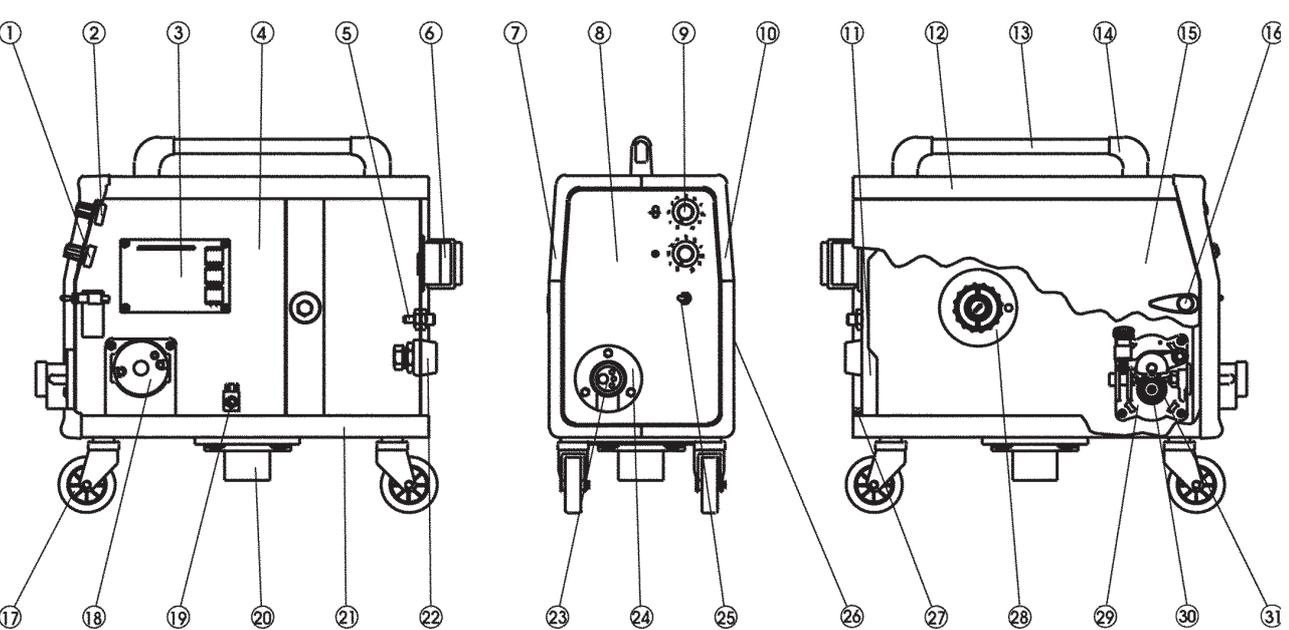
Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment.

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.

## 2.6 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.

## WIRE FEED ASSEMBLY (TOP BOX)



## PARTS LIST - WIRE FEED ASSEMBLY

No.	Description	Part No.	No.	Description	Part No.
01	Potentiometer 100k	26086002	20	Pivoting Top	21890026
02	Potentiometer 10k	26086001	21	Bottom	33700181
03	P.C. Board	222710030	22	Dinsel Socket 50mm <sup>2</sup>	22100004
04	Dividing Panel	33720105	23	Torch Adaptor	23005126
05	Gas Connector	222910013	24	Torch Conn Grommet	21690003
06	Multi Conn Outlet Case	22105002	25	Manual/Auto Sw.	22200014
07	Front Panel - LH	2169029	26	Right Side Panel	33705336
08	Front Panel	33710253	27	Retractable Pin	33810082
09	Potentiometer Knob	21690107	28	Spool Holder	21690049
10	Front Panel - RH	21690295	29	Alum. wire Feeder	44410018
11	Back Panel	33715098	30	Fd Roll 0.6-0.8mm	33805003
12	Cover Panel	33705340	30	Fd Roll 1.0-1.2mm	33805005
13	Handle D.20 L=280	33725079	30	Fd Roll 0.8-1mm Nylon	33805021
14	Handle Support	21600031	30	Fd Roll 1.2-1.6mm Nylon	33805022
15	Access Panel	33705337	31	Wire Block Roll	33805007
16	Slide Clip	21690226	-	Torch Ergoplus	23000351
17	Wheel + Pivot Support	21625038	-	Welding Mask 82x108	21905019
18	Wire Feeding Motor	22810009	-	Transparent Glass	21905020
19	Gas Solenoid Valve	222900002	-	Dark Glass	21905024

## SAFETY PRECAUTIONS FOR ALL TYPES OF WELDING

### 1. 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**

## 2. 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 EU 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. Sparks and slag can fly 10M.

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 paint spray rooms, dip tanks, storage areas, ventilators. If the work cannot be moved, move combustibles at least 10M, away out of reach of sparks and heat; or protect against ignition with suitable and snug fitting, 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 within 10M 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 is done, 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.

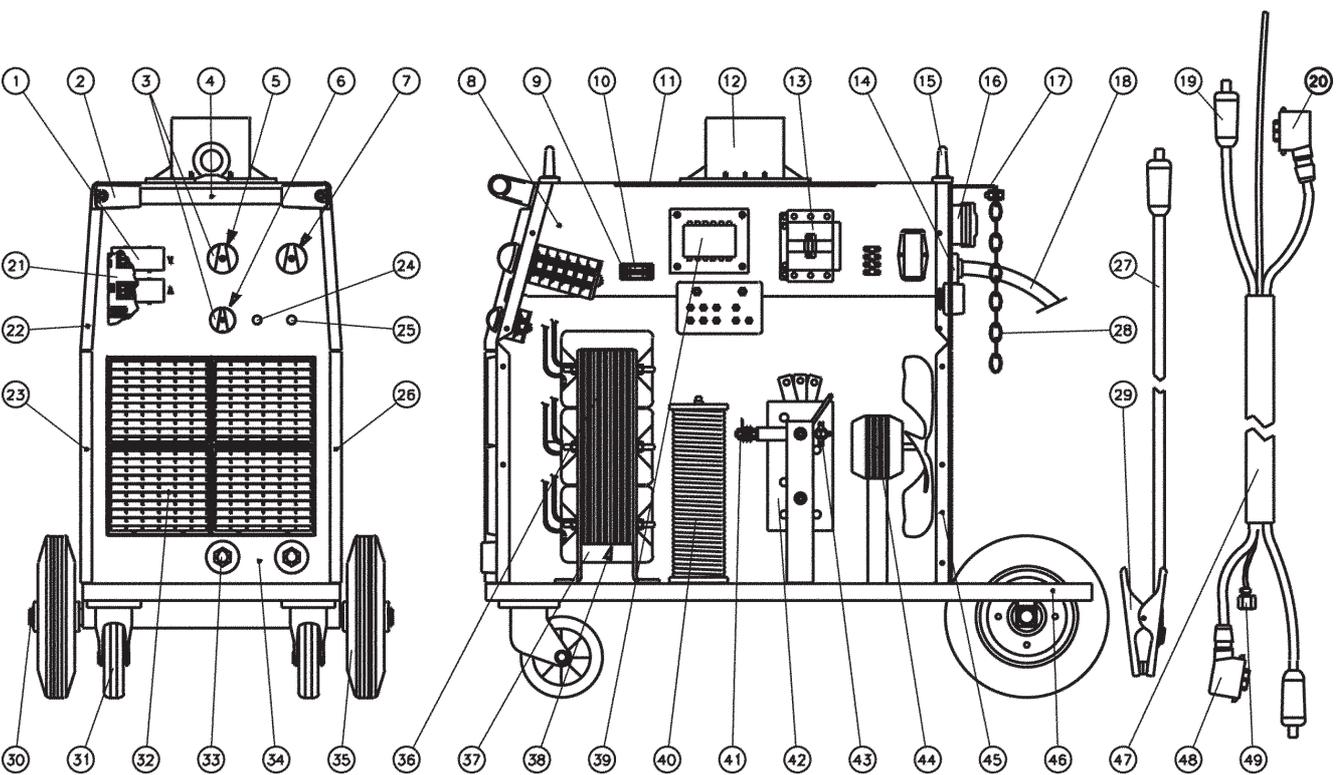
Water filling just below working level may substitute for inerting.

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.

## PARTS LIST

No.	Description	Qty	MIG 355TE	MIG455TE
01	Red Glass For Digital Instrument	2	EM21690250	EM21690250
02	Handle Kit	1	EM04600175	EM04600175
03	Switch Knob	1	EM21690312	EM21690312
03	Switch Knob	2	EM21690313	EM21690313
04	Handle Grip D.25	1	EM33725077	EM33725077
05	Switch 20 A 7 Positions	1	EM22205047	EM22205088
06	Switch 12 A On-off	1	EM22205009	EM22205009
07	Switch 20A	1	EM22205034	EM22205087
08	Internal Panel	1	EM33720085	EM33720085
09	Fuse Holder	2	EM22220043	EM22220043
10	Fuse 4A 250V	2	EM22220018	EM22220018
11	Mat For Tools	1	EM30905032	EM30905032
12	Pivoting Base Of Wire Feeder	1	EM21890027	EM21890027
13	Contact 24V 40A	1	EM22225011	EM22225011
14	Cable Clamp	1	EM21605011	EM21605011
15	Lifting-eye	2	EM21070001	EM21070001
16	Multiple Conn. Outlet Case (Groove)	1	EM22105003	EM22105003
17	Chain Support	1	EM33740128	EM33740128
18	Input Cable	1	EM20220072	EM20220076
19	Dinse Plug 50sqmm	3	EM22100003	EM22100003
20	Multiple Connecting Plug Case	1	EM22105004	EM22105004
22	Reking Upper Panel	1	EM33705403	EM33705403
23	Left Side Panel	1	EM333705397	EM333705397
24	Orange Pilot-lamp 24V	1	EM22610011	EM22610011
25	Green Pilot-lamp 220V	1	EM22610008	EM22610008
26	Right Side Panel	1	EM333705396	EM333705396
27	Earth Cable 35 Sqmm	1	EM43210142	EM43210076
28	Chain	0,6	EM110990011	EM110990011
29	Earth Clamp 500 A	1	EM22110026	EM22110015
30	Wheel Axle	1	EM55200034	EM55200034
31	Caster	2	EM21625036	EM21625036
32	Plastic Vent-hole	4	EM21690217	EM21690217
33	Dinse Socket 50sqmm	3	EM22100004	EM22100004
34	RdKing Front Panel	1	EM33710318	EM33710318
35	Rubber Wheel	2	EM21625035	EM21625035
36	Transformer 230/400V	1	EM44125041	EM44125042
37	Primary Winding 230-400V	3	EM44025018	EM44025038
38	Secondary Winding	3	EM44025012	EM44025034
39	Auxiliary Transformer	1	EM44140030	EM44140030
40	Choke	1	EM44135012	EM44135019
42	Rectifier	1	EM22240004	EM22240004
43	Thermostf	1	EM22210014	EM22210014
44	Fan 25W 230V	1	EM22800009	EM22800020
45	Bock Panel	1	EM33715107	EM33715107
46	Lowtr Panel Assembly West	1	EM333700725	EM333700725
47	Wire Feeder Interconnect Cable	1	EM44890001	EM44890004
48	Multiple Connecting Plug Case	1	EM22105005	EM22105005
49	Compl.connection 3/8 Gas	1	EM222910015	EM222910015
50	Reducer Maxi Atg/Uk 2/Gauges	1	EM222905018	EM222905018



### 3. ELECTRIC ARC (MIG, TIG) WELDING

Comply with precautions in 1. 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, weldments are hot. The wise operator avoids unnecessary risks and protects himself and others from accidents.

#### 3A) BURN PROTECTION

Comply with precautions in 2. The welding arc is intense and visibly bright. Its 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! COMPLY WITH PRECAUTIONS!

##### 1) Protective clothing

Wear long sleeved clothing (particularly for gas shielded arc) in addition to gloves, apron and shoes (2A). 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 collar to protect chest and neck and button pockets to prevent entry of sparks.

##### 2) 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.

##### 3) 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.

### 3B) TOXIC FUME PREVENTION

Comply with precautions in 2B.

### 3C) FIRE AND EXPLOSION PREVENTION

Comply with precautions in 2C. Equipment's rated capacity. 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.

### 3D) 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.

### 3E) PROTECTION FOR WEARERS OF ELECTRONIC LIFE SUPPORT DEVICES (PACEMAKERS)

Magnetic fields from high currents can affect pacemaker operation. Persons wearing electronic life support equipment (pacemaker) should consult with their doctor before going near arc welding, gouging, or spot welding operations.

### 3F) TO PROTECT AGAINST SHOCK:

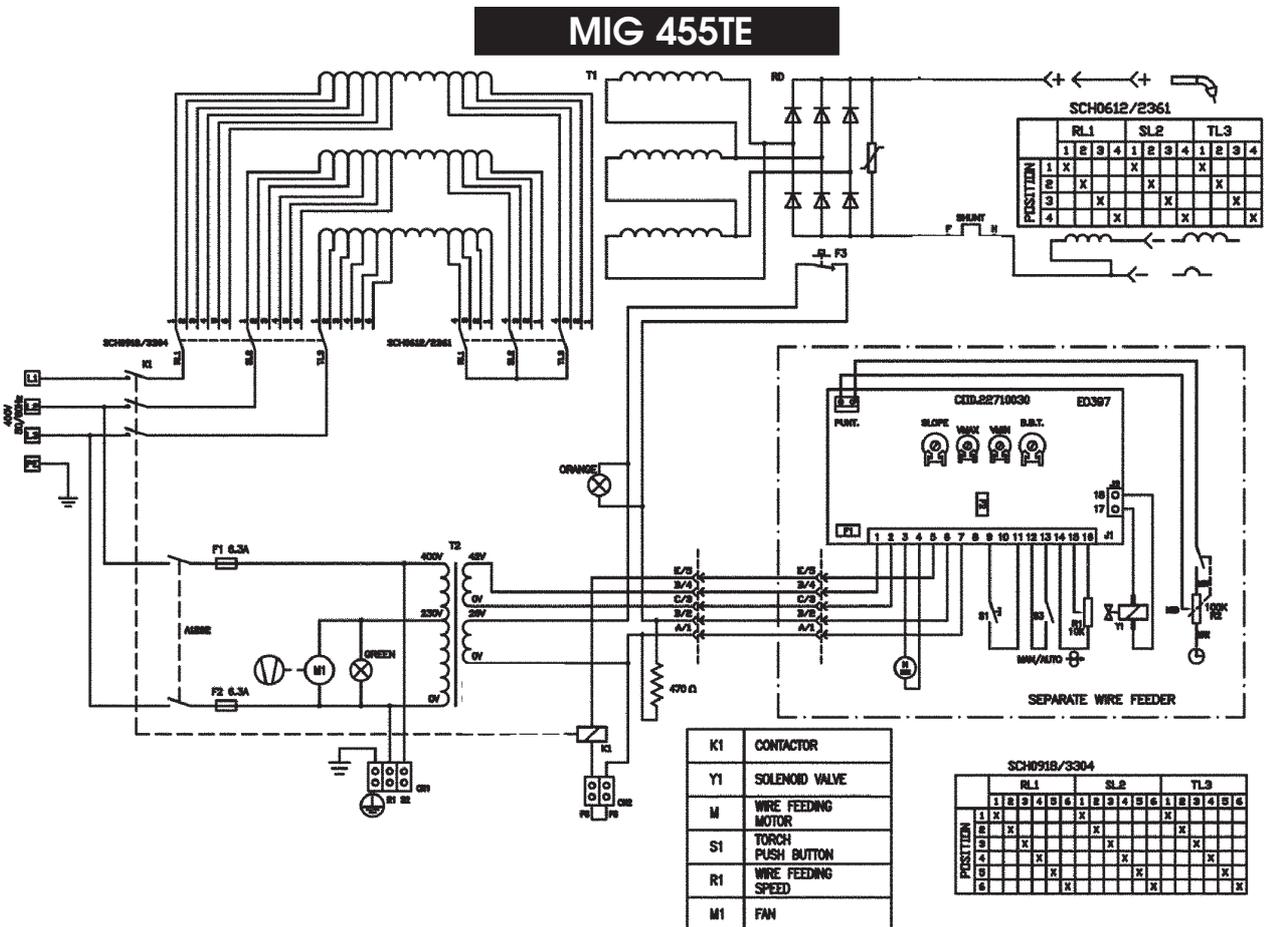
Keep body and clothing dry. Never work in damp area without adequate insulation against electrical shock. Stay on a dry duckboard, or rubber mat when dampness or sweat can not be avoided. Sweat, sea water, or moisture between body and an electrically LIVE part - or earthed metal - reduces the body surface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

#### 1) Earthing the equipment

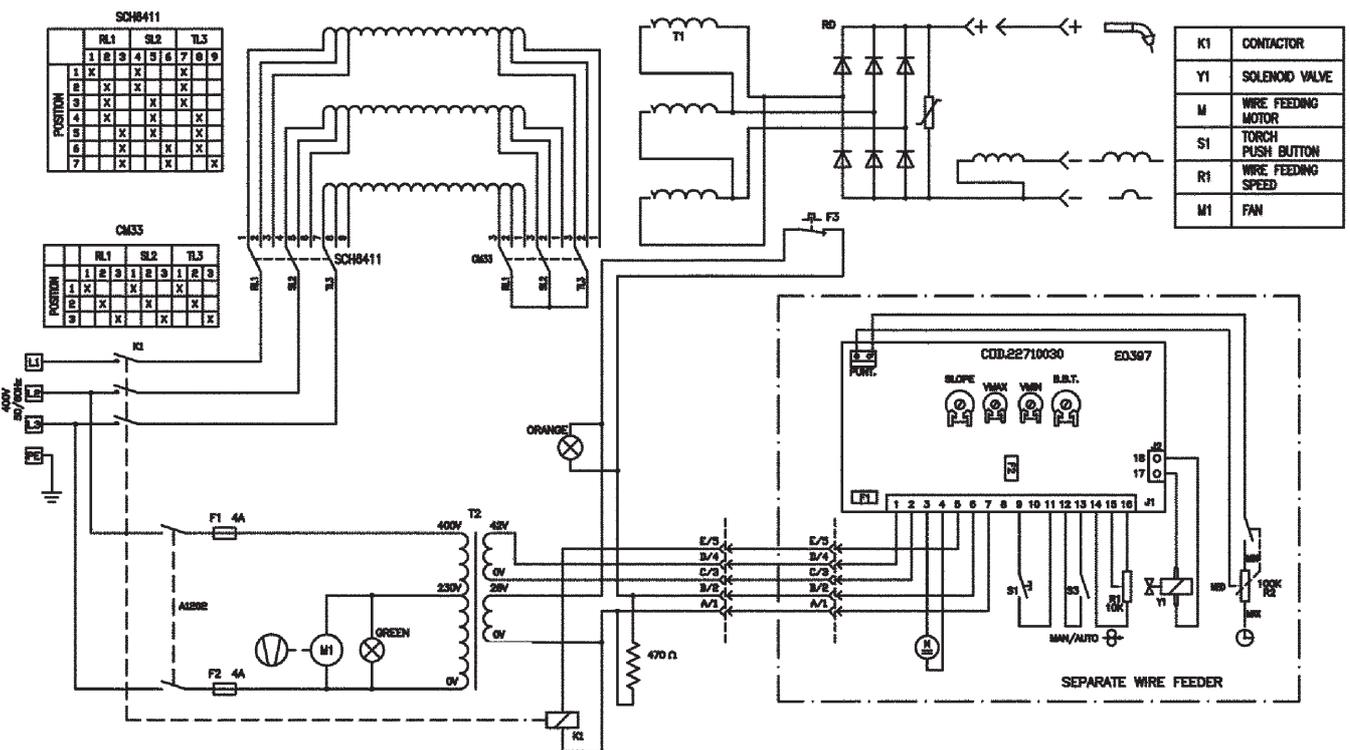
When arc welding equipment is earthed according to the National Electrical Code, and the workpiece is earthed, a voltage may exist between the electrode and any conducting object.

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.



MIG 355TE



2) Torch

Fully insulated torch should be used. Do NOT use a torch with protruding screws or with any form of 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. 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

- ✓ **ALWAYS** ensure that there is full free air circulating around the outer casing of the machine, and that the louvres are unobstructed.
- ✓ 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.
- ✓ **ALWAYS** check that the pressure regulator and gauges (where fitted), are working correctly. DO NOT lubricate the regulator.
- ✓ **ALWAYS** use the correct regulator. Regulators are designed to be used with a specific gases.
- ✓ **ALWAYS** inspect the torch hose before use to ensure it is in good condition.
- ✓ **ALWAYS** keep the free length of torch hose outside the work area.
- ✓ **ALWAYS** remove all flammable materials from the welding area.
- ✓ **ALWAYS** keep fire extinguisher handy....: **Dry Powder, CO<sub>2</sub> or BCF, NOT Water**
- ✗ **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.
- ✗ **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.
- ✗ **NEVER** use or store in a wet/damp environment. DO NOT EXPOSE TO RAIN.
- ✗ 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.
- ✗ **NEVER**
  - a. Use a damaged cylinder.
  - b. Lift the cylinder by the valve.
  - c. Expose the cylinder to a heat source or sparks.
- ✗ **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.
- ✗ **NEVER** point the MIG torch at any person or animal.
- ✗ **NEVER** touch the MIG torch nozzle until the welder is switched OFF and the nozzle has been allowed to cool off.
- ✗ **NEVER** connect, disconnect, or attempt to service the MIG torch, until the machine is switched OFF and disconnected from the mains supply.
- ✗ **NEVER** allow the earth cable or torch hose to become wrapped around the operator or any person in the vicinity.

## PARTS LISTS AND WIRING DIAGRAMS MIG's 355 & 455



## ELECTRICAL CONNECTIONS

### WARNING! THIS APPLIANCE MUST BE EARTHED

This machine MUST be connected to a **400 Volt, 3 PHASE 50Hz** supply through a suitably fused isolator switch. It **cannot** be operated from a single phase supply.

Connect the GREEN or GREEN & YELLOW coloured wire, to the terminal marked with the letter "E" or Earth symbol " $\perp$ "

The three remaining wires are connected, each to one of the other phases.

**NOTE: there is NO neutral conductor.**

It is possible that the welder may cause interference to other appliances or to the supply of other electricity users.

**WARNING!**  
IF YOU ARE IN ANY DOUBT ABOUT ELECTRICAL CONNECTIONS, CONSULT A QUALIFIED ELECTRICIAN.  
DO NOT ATTEMPT ELECTRICAL REPAIRS YOURSELF.

## 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 MASK

Always maintain the welding mask 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 and torch assembly, either by cutting it at the wire spool and pulling through from the nozzle end, or rewinding it back on to 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.



Fig. 11



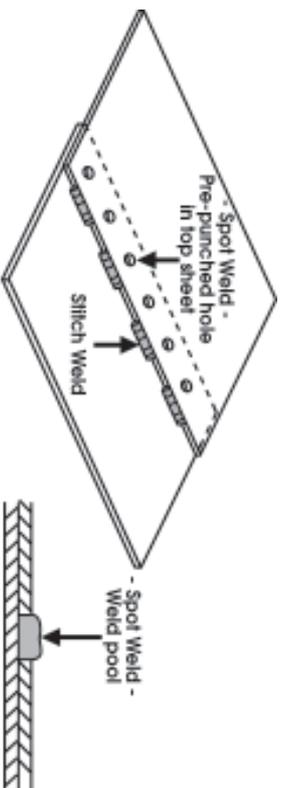
## GENERAL INFORMATION

### A. 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.



### B. Thermal Overload

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 28.

## 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 compartments.** To open the compartments, slide the recessed handle backwards.

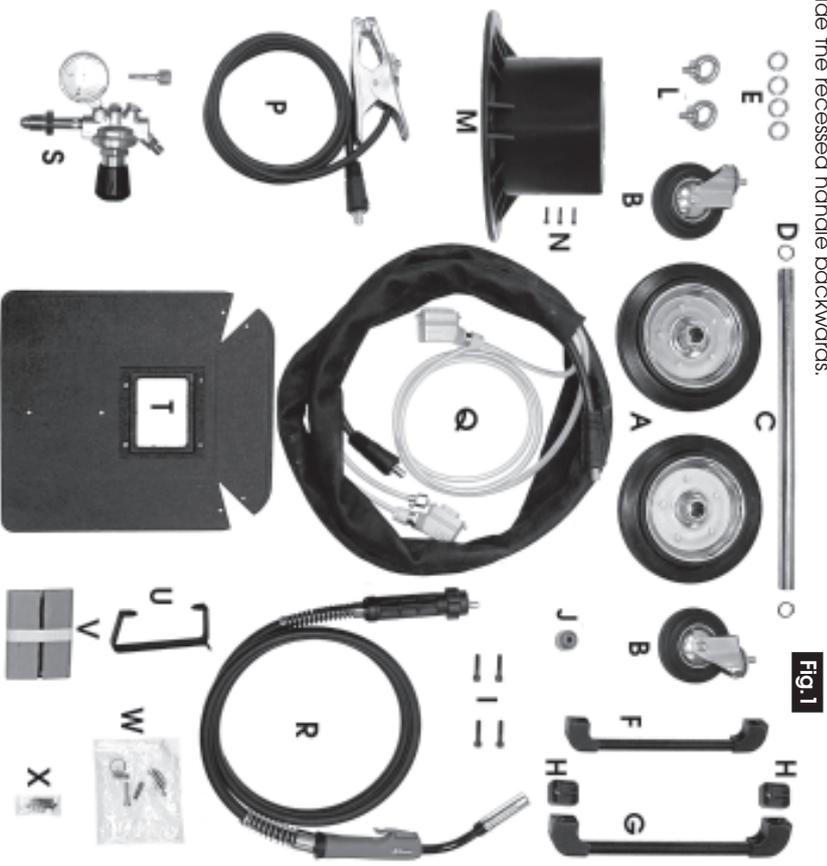
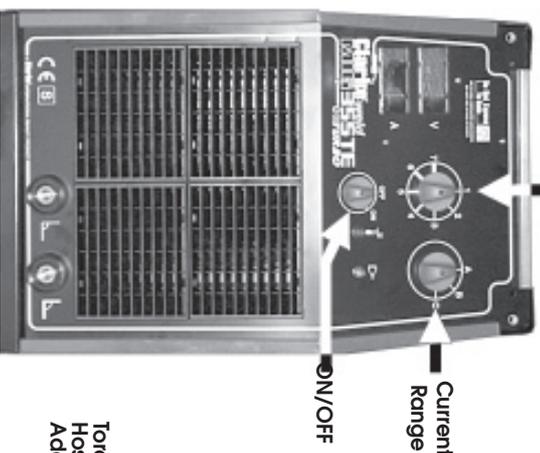


FIG.1

- |                                   |                                       |
|-----------------------------------|---------------------------------------|
| A. Wheels (x2)                    | Q. Gas Hose Complete (x1)             |
| B. Casters (x2)                   | R. Torch and Hose Complete (x1)       |
| C. Axle (x1)                      | S. Gas Press. Regulator c/w hose tail |
| D. Circlip (x2)                   | T. Face Mask (x1)                     |
| E. Copper Washers (x4)            | U. Face Mask Handle (x1)              |
| F. Handle (small) (x1)            | V. Pkt containing dark & clear glass  |
| G. Handle (large) (x1)            | W. 1xPackage containing:              |
| H. Handle Support Blocks (x2)     | a. 2xHex. socket head screws          |
| I. Hex. Socket Head bolts (x4)    | for securing the handle.              |
| J. Wire Roller (x1)               | b. 3xspare welding tips...            |
| K. Lifting Eyes (x2)              | c. Worm Drive Clip for gas hose       |
| L. Turntable base (x1)            | X. 1xPackage containing 6 screws and  |
| M. Screws for Turntable Base (x3) | nuts for welding mask                 |
| N. Earth Cable Complete (x1)      |                                       |
| P.                                |                                       |



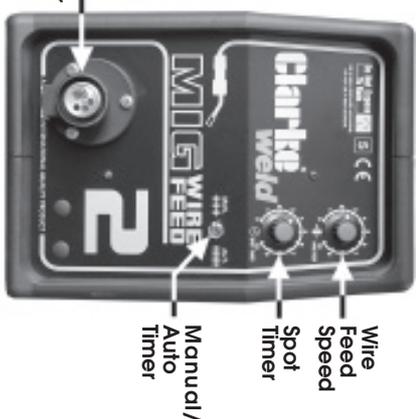
**Fig 2**



**Fig.2a**  
Welding Current  
Fine Control

Current  
Range

ON/OFF



**Fig.2b**

Wire  
Feed  
Speed

Spot  
Timer

Manual/  
Auto  
Timer

Torch  
Hose  
Adapter

## G. Switching ON & Striking an Arc

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 practise on a piece of material with the same characteristics as that of 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.*

## 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.

## (B) Current Fine Control

Set the Fine Tuning control to 3 or 4 to start, and fine tune during the welding process.... experience will determine the optimum setting for the job in hand.

### (2) 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.**

**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.**

### D. Trim the Welding Wire

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

### E. Attach 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, if necessary, clean the area with a wire brush beforehand....Remember, the contact MUST be on bare metal - thoroughly clean.

### F. Open 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:**

## ASSEMBLY & INSTALLATION

### A. Wheels and Castors

Remove the two bolts on the top of the main unit and screw in the eye bolts firmly, by hand only. Using a crane and sling with the two lifting eyes, raise the machine and thread the axle into its housing. Attach the wheels, securing with the clips provided.

Thread the casters into their mountings and tighten the bolts.

### B. Handle

Attach the handle to the top front of the main unit using the two hex socket head screws provided, and similarly, the handle to the Wire Feed unit using the two hex socket head bolts supplied, ensuring the handle sits correctly in the locating holes.

### C. Hose & Earth Cable

Simply screw the Torch Hose connector into the adapter on the front panel (see Fig 2.), taking care to ensure 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.

**NOTE: Two earth receptacles are provided. For thin welding wires, use the left hand, lower impedance receptacle, and for thicker wires...the right hand receptacle.**

### D. Gas Supply

It is necessary to procure 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 require to use Carbon Dioxide, it will be necessary for you 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 apparent, they must be rectified before proceeding. Turn off the gas when satisfied the system is leak free.

## E. The Welding Shield

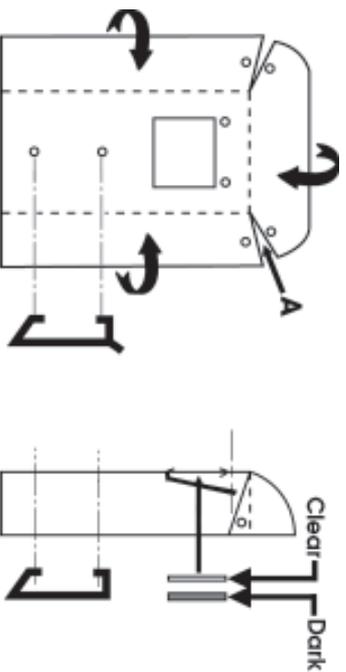


Fig.3

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 27. When replacing the glass panels, use ONLY those 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:**

	100	200	300	400	500
Heavy Metals	11	12		13	
Light Alloys	11	12	13		14

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

These machines have a multi position current range switch, with an additional multi position switch to finely control the current over reach of the current ranges (see Fig.9).

**Note: see the data plate on the rear of the main unit (explanation appears on page 27) for details of current ranges.**

The selection of the current range is determined by the thickness of the metal to be welded. The thicker it is, the higher the current must be.

According to the thickness to be welded, the amount of gas regulated to the work also varies and must be adjusted accordingly.

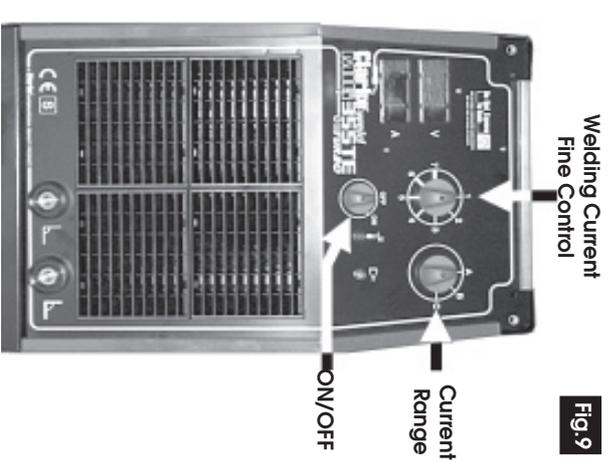


Fig.9

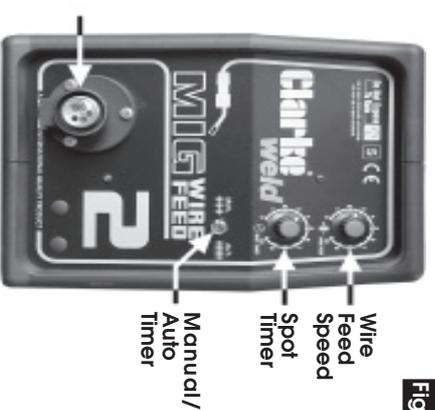


Fig.10

The wire feed unit has a wire feed speed control knob, a manual/ automatic switch and a timer knob (for stitch and spot welding) which operates when switched to automatic only.

## (1) Welding Current Control

### (A) Current Range

Select the range according to the thickness of the material to be welded. (MIG355: 3-position switch.....MIG455: 4-position switch)

A rough guide, position A should be selected for thin materials...B, C and D for progressively thicker materials.

## OPERATION

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

### A. 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.

### B. Check The Welding Wire

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

### C. Tune the Welder

#### **General Notes**

*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 considered in order 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) A too high 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.

## PREPARATION FOR USE

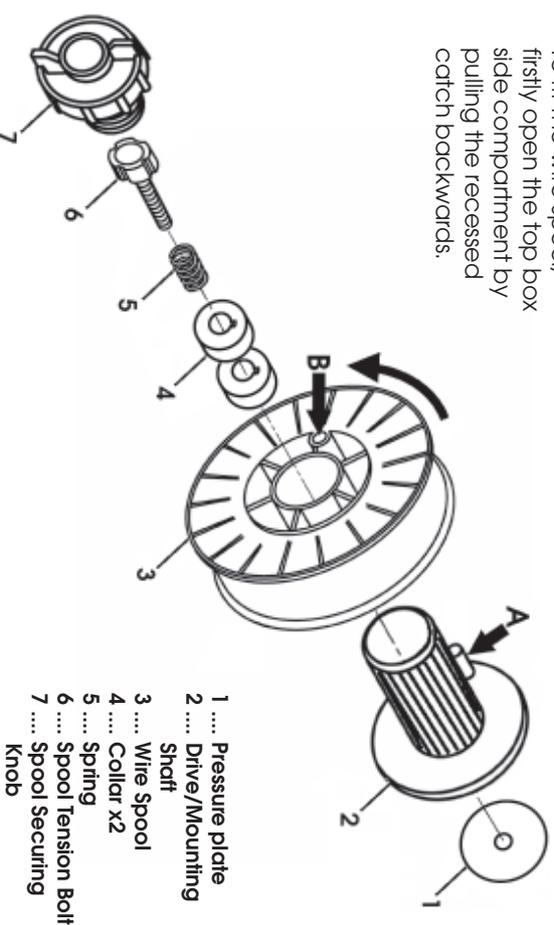
### A. Installing the Welding Wire

**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. **REF: FIG 4**

To fit the wire spool, firstly open the top box side compartment by pulling the recessed catch backwards.



3. Unscrew and remove the Spool Securing Knob (7).

4. Slide the spool on to the shaft, ensuring that the Drive Peg 'A' locates snugly in locating hole 'B', and the direction of feed of the wire is in the direction of the arrow i.e., ANTICLOCKWISE, then replace Spool Securing knob (7).

**NOTE: The plastic, Knob Headed bolt (Spool Securing knob), item 6, Fig.4 is used to apply 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. This is discussed later**

- Pull off the plastic cover from the bottom half of the Feed Roller assembly then unscrew the tensioner (A, Fig 5), whilst holding down the pressure roller bracket (B), against spring pressure, so that the tensioner hinges out of its slot.

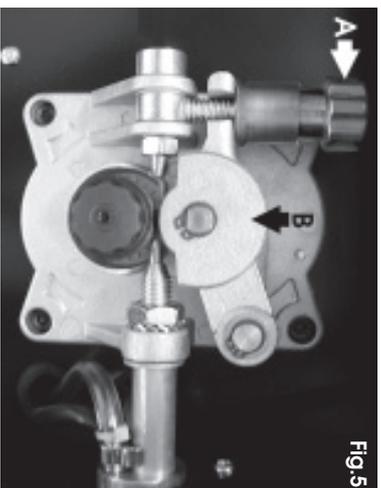


Fig.5

**IMPORTANT!**  
**Before fitting ANY wire, ensure the correct groove on the roller is in place.**  
**(see page 20)**

- Pull out the end of the wire from the rim of the spool, **taking great care NOT to release it.** The spool is wound firmly and should remain this way. Releasing it at this stage could cause the wire to unwind, causing a 'birds nest tangle'. Apply tension to the wire spool by tightening the Tensioning bolt (6, Fig.4) 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.6), over the groove on the roller (D), and into the wire liner, by about 10 - 15 cm.

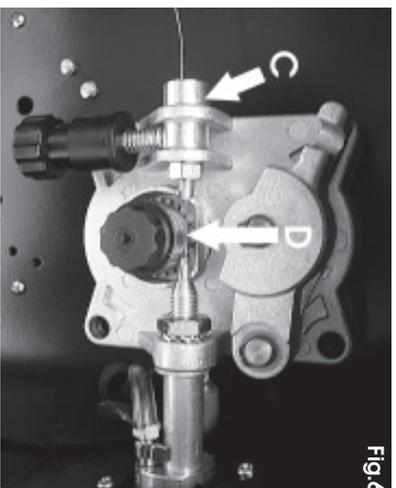


Fig.6

- Reposition the pressure roller bracket and tensioner (A, Fig.5) and tighten slightly so that the wire is held within the wire feed assembly.

**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.**

- (Ref. Fig 7)**  
 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.

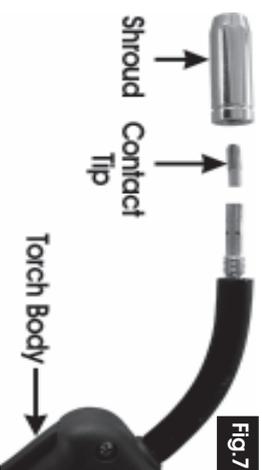


Fig.7

- Close the side panel of the machine, connect to the mains supply and switch ON.
- Set the Wire Feed rotary switch, on the front panel, to position 6 OR 7, switch on the machine and press the trigger.

**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.**

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.

#### D. 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. Two rollers are provided, one with 0.6 and 0.88mm grooves, and one with 1.0 and 1.2mm grooves.

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

To change grooves, proceed as follows:

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

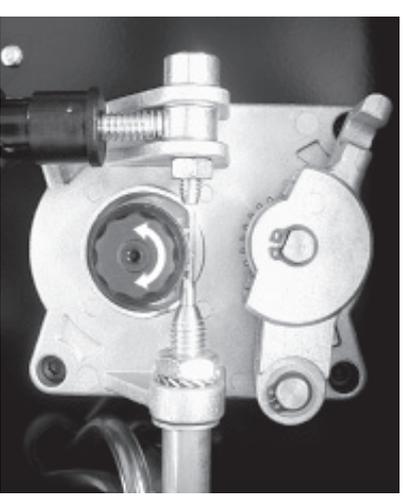


Fig.8