Clarke® weld

OPERATING & MAINTENANCE INSTRUCTIONS

MIG 190T TURBO
MIG 220T TURBO
MIG 260T TURBO

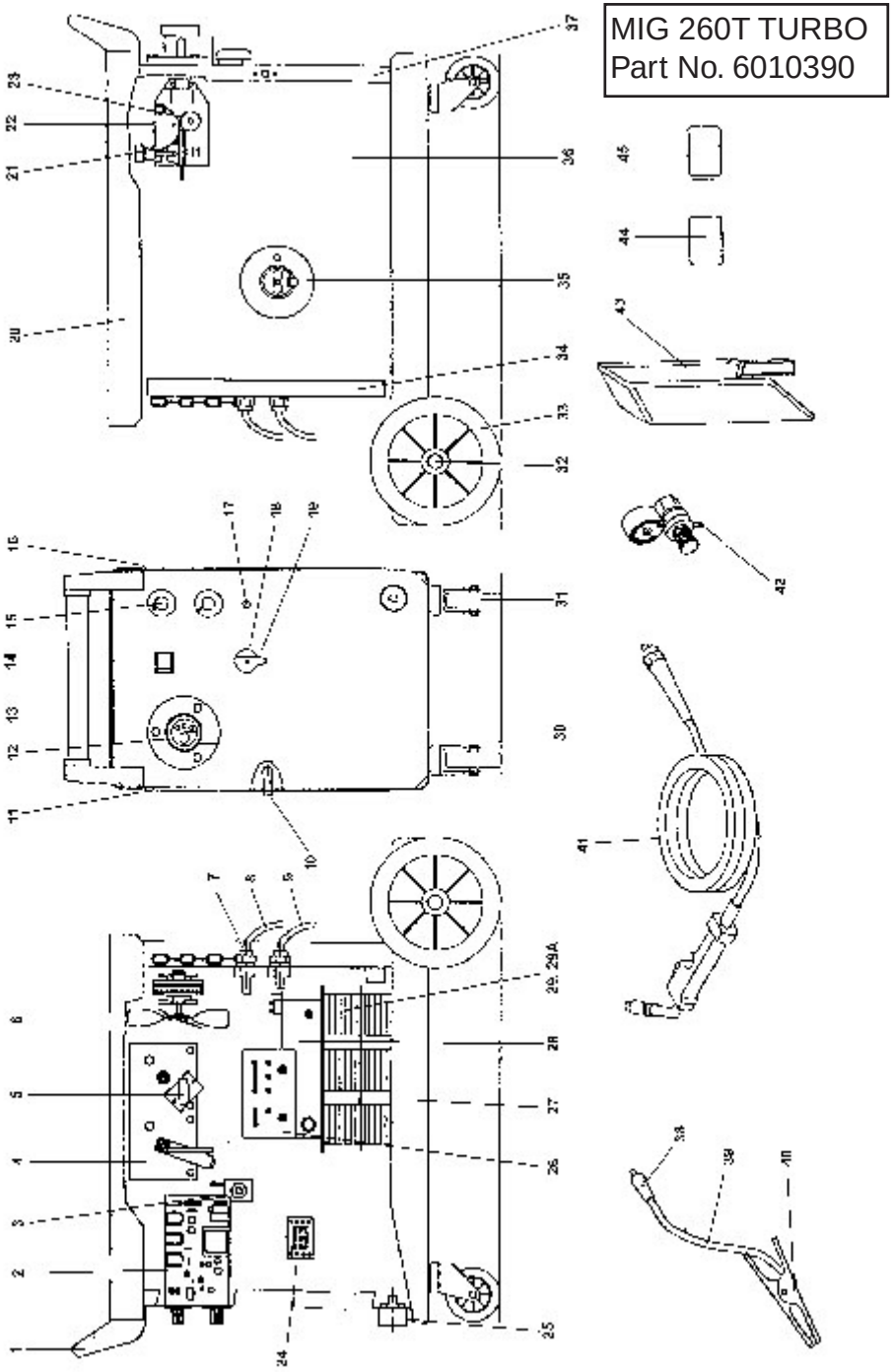
CE

7/97

SPARE PARTS LIST

Model: MIG 260T Turbo (SEE DIAGRAM ON PAGE 22) **Part No.** 6010390

Item	Description	Part No.
1	2 oval shaped handles	EM21600012
2	Printed circuit board	EM22710010
3	Gas solenoid valve	EM22900001
4	Rectifier	EM22400029
5	Rectifier thermostat	EM22210601
6	Complete fan	EM22800006
7	2 Cable clamps for hole D.20	EM21605010
8	2 Gas hoses	EM10900003
9	Input cable	EM20220030
10	Side panel locking clip	EM21690046
11	Left side panel	EM33705164
12	Torch grommet on front panel	EM21690003
13	Handle bar	EM33725047
14	Green pilot light switch	EM22200005
15	Timer switch	EM21690058
16	Right side panel	EM33705163
17	Orange pilot light	EM22610013
18	Power setting control switch knob	EM21690015
19	Power setting control switch	EM22205030
20	Top panel	EM33705162
21	Complete wire feeder	EM44410010
22	Wire feeding motor	EM22810006
23	Wire feed roller 0.6-0.8 mm	EM33805003
23	Wire feed roller 1.0-1.2 mm	EM33805005
23	Wire feed roller 0.8-1.0 mm (nylon)	EM33805021
23	Wire feed roller 1.2-1.6 mm (nylon)	EM33805022
24	Contactor	EM22225008
25	Dinsel socket	EM22100002
26	Voltage change board	EM21890001
27	Bottom panel	EM33700111
28	Transformer	EM44125068
29	2 Lateral windings	EM44025084
29A	Central winding	EM44025085
30	Binzel torch connection	EM23005048
31	2 Castors	EM21625002
32	Wheel axle	EM55200001
33	2 Wheels	EM21625009
34	Back panel	EM33714054
35	Spool holde for coil D.50	EM21690032
36	Dividing panel	EM33720013
37	Front panel	EM33710134
38	Dinsel plug	EM22100001
39	Earth cable	EM43210013
40	Earth clamp	EM22110009
41	Torch with hose assembly	EM23000319
42	Reducer	EM22905018
43	Mask	EM21905019
44	Transparent glass	EM21905020
45	Dark glass	EM21905024



MIG 260T TURBO
Part No. 6010390

Thank you for purchasing this CLARKE Mig Welder. Before attempting to operate the machine, please read this instruction manual and follow all directions carefully. This is for your own safety, and that of others around you, and so that it will provide you with long and troublefree service.

GUARANTEE

This CLARKE product is guaranteed against faults in manufacture for 12 months from the purchase date. Please keep your receipt which will be required as proof of purchase. This guarantee is invalid if the product has been found to have been abused or tampered with in any way, or not used for the purpose for which it was intended. The reason for return must be clearly stated. This guarantee does not effect your statutory rights.

CONTENTS

SAFETY - GENERAL

Special care is taken during all stages of manufacture to ensure that your CLARKE Mig Welder arrives with you in good condition.

Before using the machine it is in your own interest to read this manual thoroughly, paying particular attention to the following rules, and the EMC regulations:

1. Do not open or remove side panels from the machine unless the mains plug is disconnected.
2. Do not use the machine with any of the panels open or removed.
3. Do not attempt any electrical or mechanical repair unless you are a qualified technician. If you have a problem with your machine contact your local dealer or CLARKE International Service Department on 0181 556 4443.
4. Remove any flammable materials from the welding area.
5. Do not expose gas cylinder to high temperature, and do not strike an arc near or on the gas cylinder.
   CAUTION: Gas cylinders are pressurised containers. Do not pierce or burn, even when empty. Protect from direct sunlight.
6. Make sure you have good ventilation in the welding area since toxic gases are released during the MIG welding process.
7. Ultra-violet radiation is released by the MIG welding process and it is of the utmost importance that the operator, and any spectators, protect themselves by using welding face shields or helmets with suitable filter lenses. The wearing of gloves and proper working clothes is also strongly recommended.
8. Never use in a wet or damp environment.
9. If welding outdoors, screens MUST be used around the weld site, to protect the general public from the glare of the arc.

ELECTROMAGNETIC INTERFERENCE (EMC)

IMPORTANT

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' below. 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:

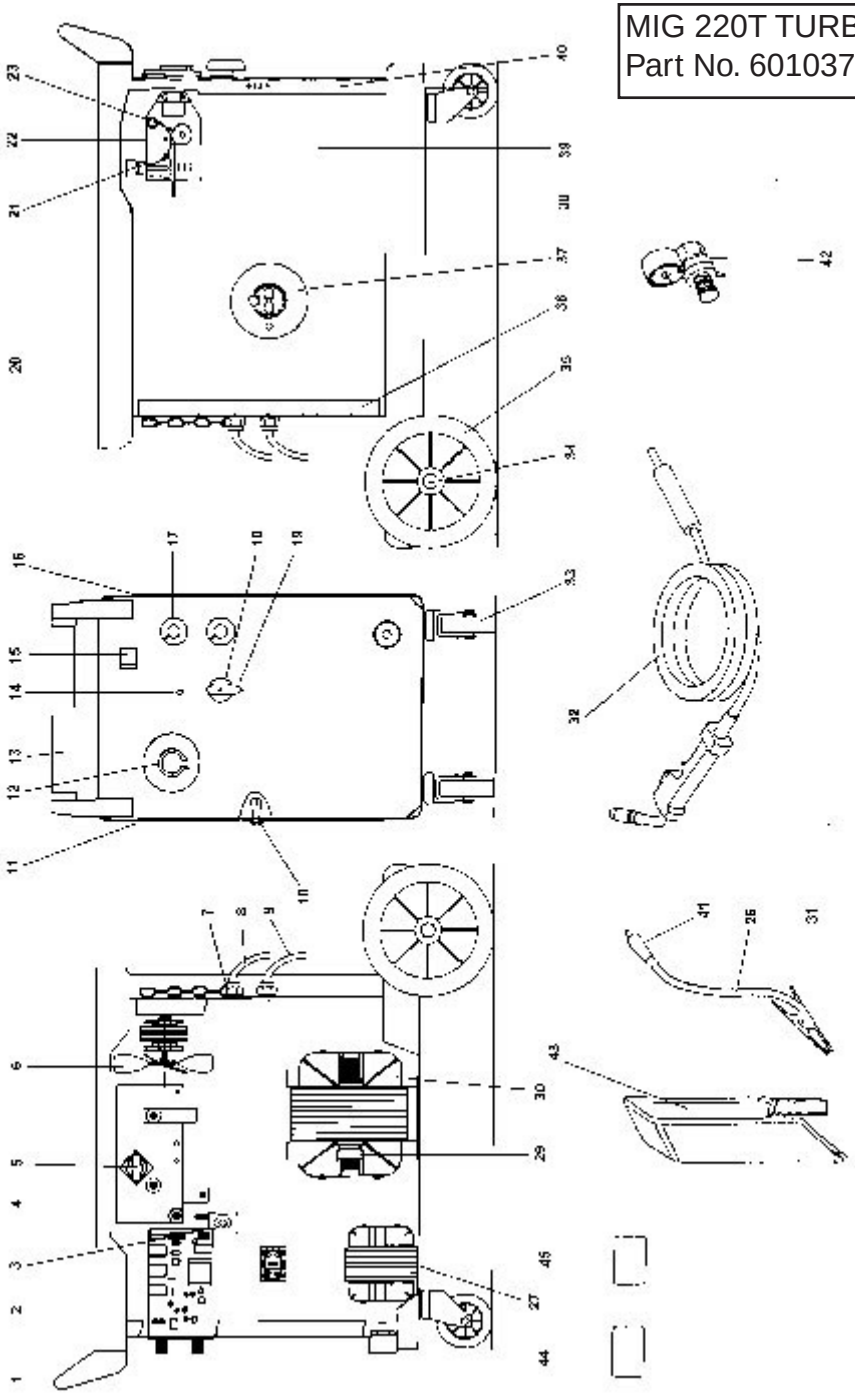
a) other supply cables, control cables, signalling and telephone cables; above, below and adjacent to the welding equipment;
b) radio and television transmitters and receivers;

SPARE PARTS LIST

Model: MIG 220T Turbo (SEE DIAGRAM ON PAGE 20) **Part No.** 6010370

Item	Description	Part No.
1	2 oval shaped handles	EM21600012
2	Printed circuit board	EM22710010
3	Gas solenoid valve	EM22900001
4	Rectifier	EM22400009
5	Rectifier thermostat	EM22210601
6	Complete fan	EM22800013
7	2 Cable clamps for hole D.20	EM21605010
8	3 Gas hoses	EM10900003
9	Input cable	EM20220020
10	Side panel locking clip	EM21690046
11	Left side panel	EM33705065
12	Torch grommet on front panel	EM21690003
13	Handle bar	EM33725046
14	Orange pilot light	EM22610013
15	On/off switch	EM22200002
16	Right side panel	EM33705066
17	2 timer switches	EM21690058
18	Power setting control switch knob	EM21690015
19	Power setting control switch	EM22205016
20	Top panel	EM33705064
21	Complete wire feeder	EM44400003
22	Wire feeding motor	EM22810003
23	Wire feed roller	EM33805023
24	Contactor	EM22225006
25	Auxiliary contact	EM22225018
26	Dinsel socket	EM22100002
27	Choke	EM44135006
28	Resistance	EM22305004
29	Thermostat	EM22210016
30	Transformer	EM44120016
31	Capacitor	EM22315002
32	Binzel torch connection	EM23005047
33	2 Castors	EM21625002
34	Wheel axle	EM55200016
35	2 Wheels	EM21625009
36	Back panel	EM33715026
37	Spool holder for coil D.50	EM21690032
38	Bottom panel	EM33700056
39	Dividing panel	EM33720014
40	Front panel	EM33710054
41	Dinsel plug	EM22100001
42	Pressure regulator	EM22905004
43	Mask	EM21905019
44	Transparent glass	EM21905020
45	Dark glass	EM21905021
46	Earth clamp	EM22110007
47	Torch with hose assembly	EM23000322
48	Earth cable	EM43210009

MIG 220T TURBO
Part No. 6010370



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 stabilising 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 workpiece 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.

SAFETY PRECAUTIONS

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

1. GENERAL PRECAUTIONS

1.1 Burn prevention

Wear protective clothing - gauntlet gloves designed for use in welding, hat, 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 cover glass). This is a MUST for welding or cutting, (and chipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered. Avoid oily greasy clothing. A spark may ignite them. Hot metal such as electrode stubs and workpieces should never be handled without gloves. First aid facilities and a qualified first aid person should be available for each shift 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.

1.2 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 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.

1.3 Fire and explosion prevention

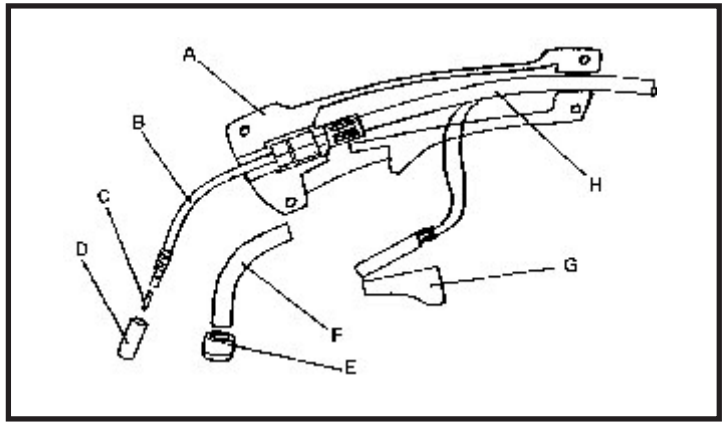
Causes of fire and explosion are: combustibles reached by the arc, flame, flying sparks, hot slag or heated material; misuse of compressed gases and cylinders; and short circuits. BE AWARE THAT flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall 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

SPARE PARTS LIST

Model: MIG 190T Turbo (SEE DIAGRAM ON PAGE 17) **Part No.** 6010350

Item	Description	Part No.
50	Pressure roller bracket	n/a
51	Pressure roller adjuster knob	n/a
52	Wire pressure roller	n/a
53	Wire liner	EM23005025
54	Wire liner support bracket	n/a
55	Support bracket cover	n/a
56	Flat copper washer	n/a
57	Electrical connector	n/a
58	Hose assembly support bracket	n/a
59	Brass collar	n/a
60	Wire liner plastic shroud	n/a
61	Hose assembly end nut	n/a
62	Brass nut	n/a
63	Electrical connection	n/a
64	Electrical connection	n/a
65	Hose support bracket assembly	n/a
66	Worm drive clip	n/a
67	Gas hose nipple	n/a

TORCH ASSEMBLY



A. Torch handle
B. Torch neck with gas diffuser
C. Contact tip
D. Torch gas nozzle
E. Torch neck insulator collar
F. Torch neck insulator
G. Trigger assembly
H. Complete torch/hose assembly

SPARE PARTS LIST

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6	Complete fan	EM22800013
7	2 Cable clamps for hole D.20	EM21605010
8	3 Gas hoses	EM10900003
9	Input cable	EM20220020
10	Side panel locking clip	EM21690046
11	Left side panel	EM33705065
12	Torch grommet on front panel	EM21690002
13	Handle bar	EM33725046
14	Orange pilot light	EM22610013
15	On/off switch	EM22200002
16	Right side panel	EM33705066
17	2 timer switches	EM21690058
18	Power setting control switch knob	EM21690015
19	Power setting control switch	EM22205016
20	Top panel	EM33705064
21	Complete wire feeder	EM44400003
22	Wire feeding motor	EM22810003
23	Wire feed roller	EM33805023
24	Contactor	EM22225006
25	Dinsel socket	EM22100002
26	Earth cable	EM43210009
27	Choke/Inductance	EM44135006
28	Spool holder hub	EM21690011
29	Transformer thermostat	EM22210016
30	Transformer	EM44120040
31	Earth clamp	EM22110007
32	Torch with hose assembly	EM23000324
33	2 Castors	EM21625002
34	Wheel axle	EM55200016
35	2 Wheels	EM21625009
36	Back panel	EM33715026
37	Spool holder for coil D.50	EM21690032
38	Bottom panel	EM33700056
39	Dividing panel	EM33720014
40	Front panel	EM33710054
41	Dinsel plug	EM22100001
42	Pressure regulator	EM22905004
43	Mask	EM21905019
44	Transparent glass	EM21905020
45	Dark glass	EM21905021
46	Spool holder outer collar	EM21690012
47	Spool holder spring	EM33800004
48	Spool holder knob	EM22180036
49	Wire guide	n/a

electrical parts) of metallic particles that can cause short circuits. If combustibles are in the area, do NOT weld or cut. 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 touching combustibles on opposite sides should not be welded on (or cut). 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 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.

2. 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.

2.1 Burn protection

Comply with precautions in 1.1. 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!

2.2 Protective clothing

Wear long sleeved clothing (particularly for gas shielded arc) in addition to gloves, hat and shoes (see 1.1). As necessary, use additional protective clothing such as leather jacket or sleeves, flameproof apron, and fire-resistant leggings. Avoid outer garments of untreated cotton. Protect bare skin. Wear dark substantial clothing. Button collar to protect chest and neck and button pockets to prevent entry of sparks.

2.3 Eye and head protection

Protect eyes from exposure to arc. NEVER look at an electric arc without protection. Welding helmet or shield containing a filter plate shade no. 12 or denser must be used when welding. 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 to 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. Seek advice from your optician before welding whilst wearing contact lenses.

2.4 Protection of nearby personnel

For production welding, a separate 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.

3. TOXIC FUME PREVENTION

Comply with precautions in 1.2. Generator engine exhaust must be vented to the outside air. CARBON MONOXIDE CAN KILL.

3.1 Fire and explosion prevention

Comply with precautions in 1.3 and 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.

3.2 Shock prevention

Exposed hot conductors or other bare metal in the welding circuit, or in unearthed, electrically-HOT 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.

3.3 Protection for wearers of electronic life support devices (pacemakers)

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

3.4 To protect against shock:

Keep body and clothing dry. Never work in a 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 HOT part - or grounded metal - reduces the body surface electrical resistance, enabling dangerous and possibly lethal currents to flow through the body.

a) Grounding the equipment - When arc welding equipment is grounded according to the National Electrical Code, and the work is grounded, 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 ground. Conductors must be adequate to carry ground currents safely. Equipment made electrically HOT by stray current may shock, possibly fatally. DO NOT GROUND to electrical conduit, or to a pipe carrying ANY gas or a flammable liquid such as oil or fuel.

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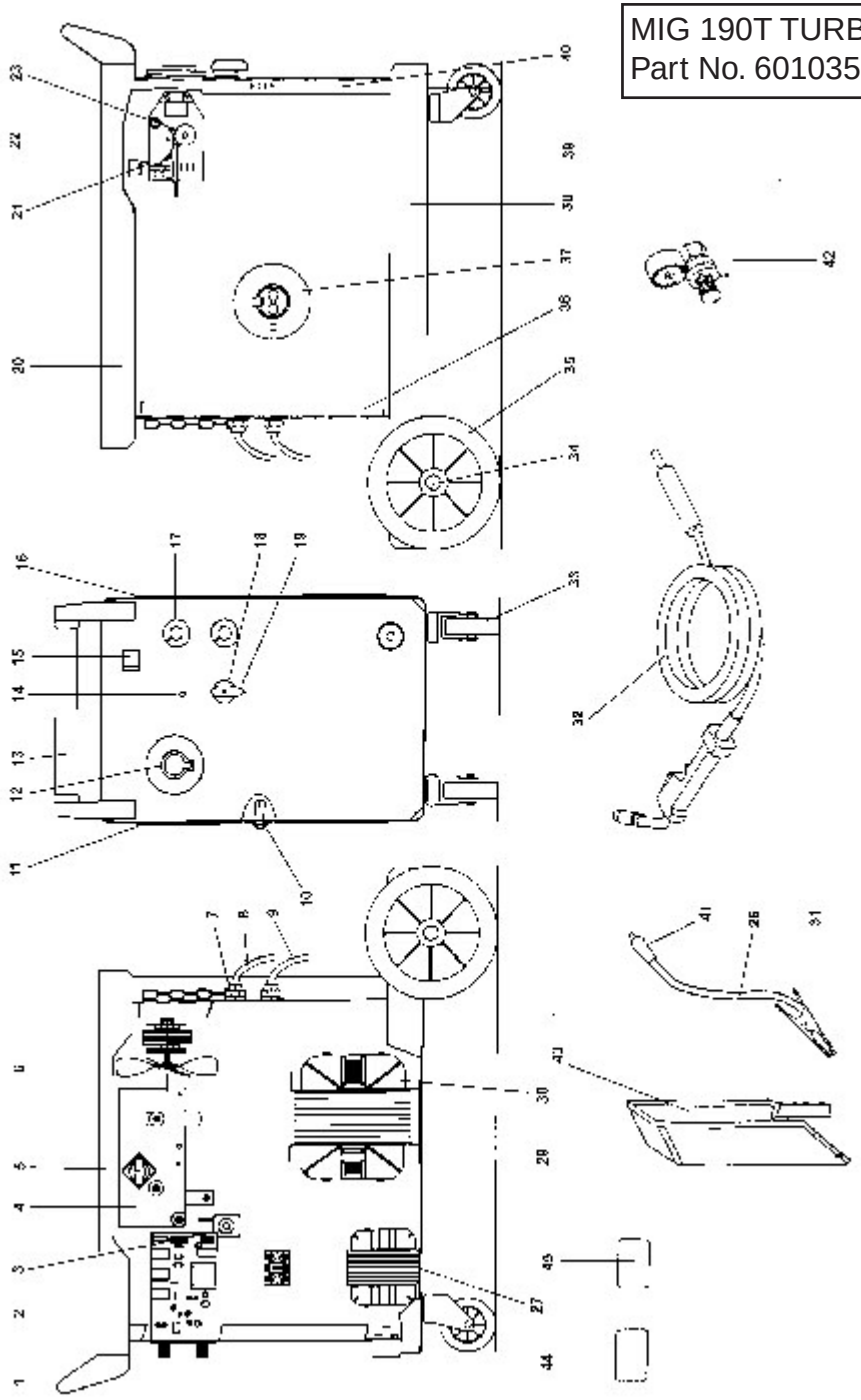
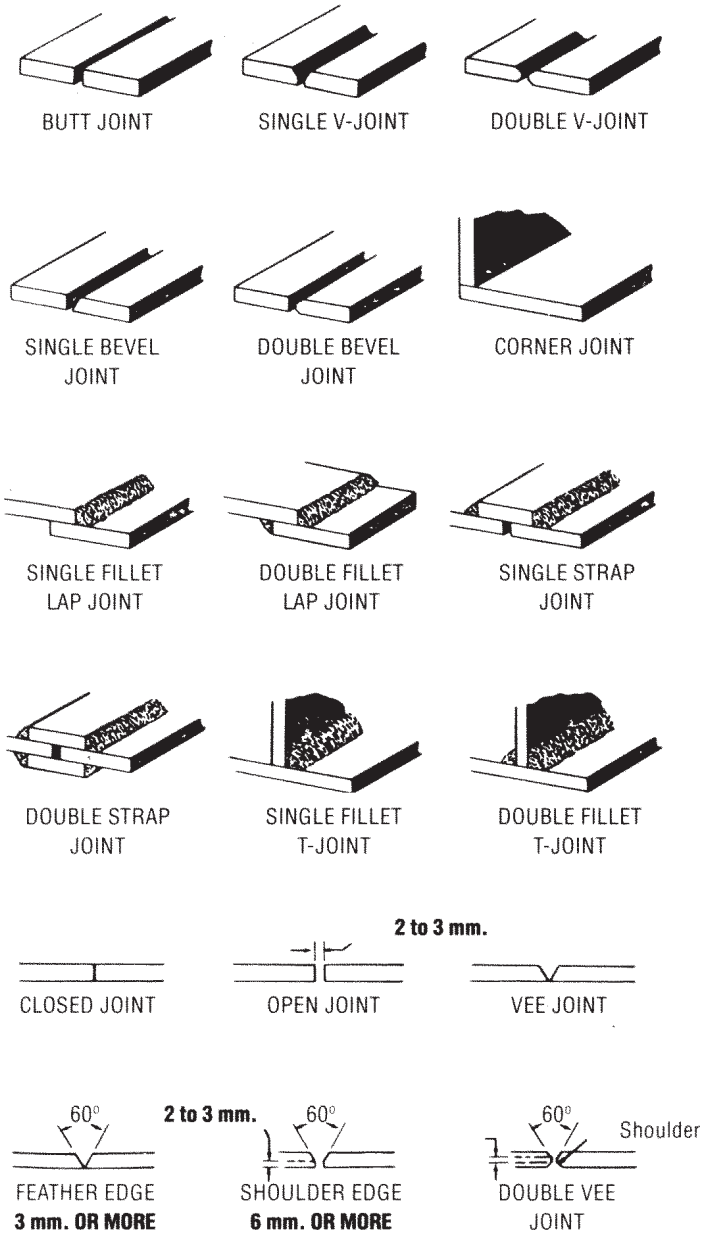


TYPES OF JOINTS



b) Electrode holders - Fully insulated electrode holders should be used. Do NOT use holders with protruding screws or with any form of damage.

c) Connectors - Fully insulated lock-type connectors should be used to join welding cable lengths.

d) 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.

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

f) Electrode - i) Equipment with output on/off control (contactor)

Welding power sources for use with the gas metal arc welding, gas tungsten arc welding and similar processes normally are equipped with devices that permit on/off control of the welding power output. When so equipped the electrode wire becomes electrically HOT when the power source switch is ON and welding gun switch is closed. Never touch the electrode wire or any conducting object in contact with the electrode circuit unless the welding power source is off.

- ii) Equipment without output on/off control (no contactor)

Welding power sources used with shielded metal arc welding and similar processes may not be equipped with welding power output on/off control devices. With such equipment the electrode is electrically HOT when the power switch is turned ON. Never touch the electrode unless the welding power source is off.

g) 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 annoyance to the operator.

Avoid welding by contact with humid parts or near to combustible liquids. Least of all, do not weld upon tanks which may contain inflammable residuals.

ELECTRICAL CONNECTIONS

WARNING: This machine MUST be earthed. This welder must be connected to a 230 V (50 Hz) supply, having a rated capacity of greater than 12 amps. **A 13 amp (BS1363) plug is NOT supplied for this device.** Connect the three core mains leads to a suitably fused supply through an isolator or heavy duty plug.

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

Green and yellow	Earth
Blue	Neutral
Brown	Live

Connect GREEN & YELLOW cord to plug terminal marked with a letter “E” or the earth symbol.
Connect BROWN cord to plug terminal marked with a letter “L”.
Connect BLUE cord to plug terminal marked with a letter “N”.

We recommend that this machine is connected to the mains supply through a Residual Current Device (RCD). If in doubt, consult a qualified electrician. Do not attempt any electrical repairs yourself. Fuse rating is indicated on the machine’s specification plate.

SAFETY EQUIPMENT

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

WELDER SPECIFICATIONS

The technical specifications for your unit are printed on the data plate on the front of the machine. The data plate carries the following information:

1. **Supply Voltage**
2. **Duty Cycle -** percentage of a period of 10 minutes in which the unit can operate at a stated current output with no risk of over-heating or internal damage. e.g. a unit with a duty cycle of 60% at 80 Amps can weld for 6 minutes over a 10 minute period at 80 Amps. Down time is 4 minutes over a 10 minute period.
3. **Primary or input power data, number of phases and supply frequency**
4. **Fuse Rating**
5. **Protection**
6. **Insulation class**
7. **Type of static characteristic**
8. **Welder type and batch number**
9. **Regulation range**

ASSEMBLY

1. Refer to the appropriate parts diagram for your machine (190T page 17, 220T page 20, 260T page 22).
2. Remove the side panel by sliding it upwards and check that all the accessories listed below are included:

2 wheels	1 gas regulator
1 axle	1 0.6mm welding tip
2 wheel retaining washers	1 0.8mm welding tip
2 castors	1 1.0mm welding tip
1 handle with brackets	1 chain
4 screws	1 mask handle
1 mask body	1 welding torch and lead (fitted)
1 earth lead and clamp	

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

3. Attach the handle to the welder unit by sliding the brackets into the holes provided on the front of the machine, lining up the holes with those in the casing and securing the four screws provided.
4. Fix the wheels to the back of the unit and the castors to the front.
5. Connect the earth return lead to the negative (-) socket on the front panel of the welder unit.
6. Ensure that the side panels are securely closed before using the welder.
7. Connect the torch lead assembly to the welder, following the appropriate instructions below:

TORCH LEAD ASSEMBLY INSTRUCTIONS

MIG 220T and MIG 260T

Plug the torch hose into the socket on the front of the welder and secure by hand screwing in the threaded connection.

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. If you have any problems which cannot be resolved here, please contact your local Clarke dealer.

PROBLEM	CAUSE	REMEDY
1. No 'life' from welder	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	a) Increase roller presure b) Re-cut wire square c) Clear with compressed air or replace liner d) Use only good clean wire
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) Renew wire liner
5. Wire feeds into 'bird's nest' tangle	a) Wire welded to tip b) Wire liner damaged preventing smooth operation	a) As above plus reduce feed roller presure 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 - DO NOT OVERTIGHTEN
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 DO NOT OVERTIGHTEN d) Re-cut wire & ensure it is clean e) Clear with compressed air
8. Poor quality welds	a) Insufficient gas at weld area b) Incorrect gas/wire combination c) Rusty, painted, damp, oily or greasy workpiece d) Rusty/diry wire e) Poor earth contact	a) Check that gas is not being blown away by draughts, if so, move to a sheltered area. If no draught, increase gas supply b) Consult your Mig welding manual c) Ensure workpiece is clean & dry d) Ensure wire is clean and dry e) Check ground clamp/workpiece connection
9. Wire jams in tip when welding aluminium	Tip too small	Use slightly oversize tip i.e. for 0.8 mm wire use 1 mm tip (Applies to aluminium only)
10. Welder cuts out whilst in use	Duty cycle exceeded (auto cut-out operates)	Allow welder to cool for 15-30 mins before continuing. Note: if duty cycle is continually exceeded, damage to the welder may result and welder output is probably too small for application.

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 the perfect weld. These are:
Wire feed speed and
Welding current.
It is important to arrive at the correct combination to suit the type and thickness of material to be welded. **The wire speed is directly dependent upon the current.**

If the current is increased, the wire feed speed is also increased, whereas the arc length is shortened. Conversely, if the current is decreased, the wire feed speed is therefore decreased, and the length of arc is increased.

An increase in the welding voltage leads to a longer arc, (without substantially effecting the current). A decreased welding voltage results in a shorter arc, (the current again is not substantially changed).

A change in wire diameter results in changed parameters. A smaller diameter wire requires an increase in current to reach the same wire feed speed.

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

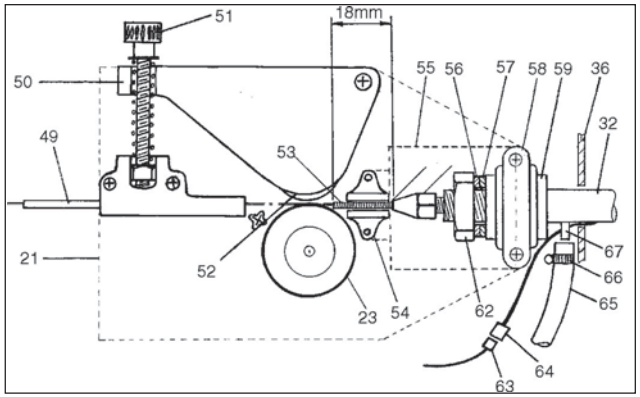
A) If the wire feed speed is too high, (in relation to the welding voltage) pulsing will occur within the torch. This is because the wire electrode dips into the puddle and cannot be melted off fast enough.
B) If the welding voltage is set too high large drops can be seen at the end of the wire electrode.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

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

WELDING HINTS AND MAINTENANCE

1. Always weld clean, dry and well prepared material.
2. Hold gun at 45° angle to the workpiece with nozzle about 6 mm from the surface.
3. Move the gun smoothly and steadily as you weld.
4. Avoid welding in draughty areas. A weak, pitted and porous weld will result, due to air blowing away the protective welding gas.
5. Keep wire and wire liner clean. Do not use rusted wire.
6. Sharp bends or kinks on the welding hose should be avoided.
7. Always try to avoid getting particles of metal inside the machine as these can cause short circuits.
8. If available, use compressed air to periodically clean the hose liner when changing wire spools. **IMPORTANT: Disconnect from power source when carrying out this operation.**
9. Using low pressure air, (20-30 PSI) occasionally blow the dust from the inside of the welder. This keeps the machine running cooler. **NOTE: Do not blow air over the printed circuit board and electronic components.**
10. The wire feed roller will eventually wear during normal use. With the correct tension the pressure roller must feed the wire without slipping. If the pressure roller and the wire feed roller make contact, (when the wire is in place between them) the wire feed roller MUST be replaced.
11. Check all cables periodically. They must be in good condition and not cracked.

MIG 190T (Ref to Fig 1)



(a) It is necessary to fit the torch hose assembly (32) on to the machine, but before doing so you must first measure the length of protusion of the liner (53) from the brass nut (61).
IMPORTANT: This measurement should be a maximum of 18 mm (see Fig 1), and if necessary should be carefully trimmed to this length using a good pair of side cutters, or similar, ensuring there are no burrs or sharp edges which may impede the progress of the wire when fitted.
(b) Having checked the protusion of the liner, and trimmed where necessary, remove the washer (56) and nut (62) from the end of the torch assembly (32). Carefully feed the hose assembly through the hole in the front face of the welder (40), taking care to feed the electrical connectors (64) through at the same time. Continue to feed the hose assembly through the brass collar (59) in the bracket assembly (58).
(c) You will notice an electric terminal (57) roughly in position to be threaded on to the end of the hose assembly, as it appears through the brass collar (59) in the bracket assembly (56). Thread the terminal on to the hose assembly, followed by the washer (56) and screw on the nut (62). Carefully tighten the nut.
NOTE: When correctly assembled, the wire liner (53) must not be in contact with the wire feed roller (23).
(d) Fit the plastic cover (55) over the complete assembly, securing with the two self tapping screws provided.
(e) Connect the gas hose (65) to the gas hose nipple (67) securing with the worm drive clip (66) provided.
(f) Make the electrical connections by joining connectors 63 and 64.
NOTE: The connectors are a one-way fit, and simply clip together - do not use excessive force.

FACE MASK

To assemble the face mask, first place the dark glass window (45) and the clear glass window (44) together in the recessed window area of the body (43).
IMPORTANT: The clear glass window should be placed on the outside of the mask.
Secure in place using the screws and nuts provided. Bend the sides of the mask into shape and fix together using the screws and nuts provided, and finally, fit the handle to the shield body also using the screws and nuts provided.

ATTACHING GAS BOTTLE AND REGULATOR

1. The bottle (not supplied) should be located at the rear of the welder, securely held in position by the chain provided.
2. For safety and economy, ensure that the regulator is fully closed, (turning anti-clockwise) when not welding and when fitting or removing from the gas cylinder.
3. Connect the gas hose (8) to the regulator (42), securing with the clip/nut provided.
4. Screw the gas regulator (42) fully down on to the gas bottle valve, and fully tighten.

5. Turn the power on, open the cylinder valve, then set the gas flow to approx. 8 l/min on the regulator. Operate the torch trigger to ensure that the gas is flowing through the torch.

NOTE: If you experience difficulties in obtaining gas supplies, contact your local CLARKE dealer.

LOADING WIRE

NOTE: The MIG 190T Turbo, MIG 220T Turbo and MIG 260T Turbo are designed to accept either 5kg or 15kg wire spools of mild steel, stainless steel or aluminium according to the type of metal you wish to weld. Wire spools ARE NOT supplied with the unit and must be purchased separately.

1. Ensure that the gas and electrical supplies are disconnected.
2. **(Ref Fig. 2)** To fit your wire spool first remove parts 46, 47 and 48, and then simply slide it over the hub (28), ensuring that the spool's wire supports fit snugly on the shoulder of the inner collar.
3. Replace the outer collar (46), (centralising the wire spool about the hub) followed by the spring (47) and plastic knob (48)).
4. Initially tighten the plastic knob (48) sufficiently to allow the spool to rotate smoothly but with a slight amount of braking friction. Do not over-tighten as this will exert undue pressure on the wire drive motor and may cause damage.

Fig 2

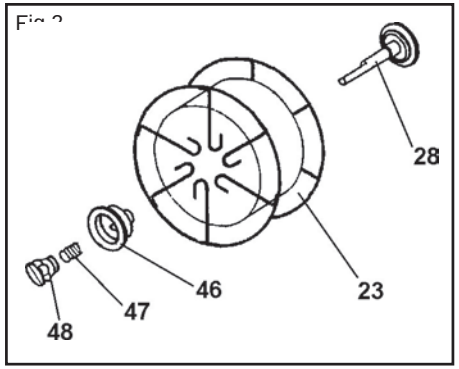
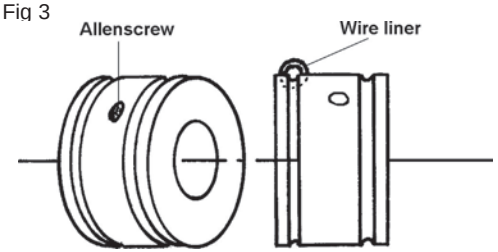


Fig 3



5. **(Ref Fig. 1 on page 11)** Loosen the plastic knob (51) by turning it anti-clockwise, (this maintains pressure on the wire via the roller (52)). Pull the plastic knob so that the screw rod comes out of its slot, thereby releasing the pivoted roller bracket (50). Raise the bracket together with the pressure roller (52), and pull out any wire that has been left in the hose.
6. If you are changing the size of the wire you must also select the appropriate groove on the feed roller (23) **(Ref Fig. 3)**. To change to the other groove undo the allen screw and remove the roller from its shaft. Turn it through 180°, replace it on its shaft and adjust so that the groove is **directly** in line with the wire liner **(Ref Fig. 3)**. Firmly secure it in that position with the allen screw.
7. Clip the end of the wire cleanly, ensuring there are no burrs or sharp edges, and **ensuring it is straight**, feed it through the guide tube (74) over the channel on the roller (23) and into the wire liner by approx. 10-15 cm.
8. Reposition the pressure roller (52) and plastic knob (51) and tighten slightly.

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

9. Pull off the torch shroud (D) **(Ref Fig. 4, page 19)** and unscrew the contact tip (C). Close the side panel of the machine, plug into the mains, switch on the machine and press the trigger. The wire will feed through the hose and when it appears at the torch end release the trigger, switch off the machine and replace the contact tip and the torch shroud.

IMPORTANT: ENSURE THE HOSE IS KEPT STRAIGHT DURING THIS OPERATION, TO ASSIST THE WIRE AS IT IS FED THROUGH THE NOZZLE.

PREPARATION FOR WELDING

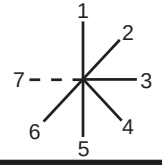
1. Attach the earth clamp to the bare metal to be welded, making sure of good contact.
2. Make sure that the wire-roller groove in the roller corresponds to the diameter of the welding wire being used. Refer to 'Loading Wire' above.
3. Plug the machine into a 230 V AC (50 Hz) outlet.
4. Open the gas valve on the gas cylinder regulater, (turn knob clockwise) and adjust the gas regulater to the proper setting position. **NOTE: this varies with different metals, thicknesses and currents. Refer to a MIG welding manual for instructions.**

OPERATION

1. The MIG260T has 7 welding positions and the MIG190T and 220T have 6 welding positions (see the table below) in which to regulate current for various conditions.
2. The selection of a welding position is determined by the thickness of the metal to be welded. The thicker it is, the higher the current must be.
3. According to the thickness to be welded, the amount of gas regulated to the work also varies and must be adjusted accordingly.
4. For welding adjustments, refer to the table below.

WARNING:

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

	SWITCH 	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 (MIG260T Turbo only)	1.0	High