CASTOMAG 180

SEMI—AUTOMATIC MIG/MAG
WELDING MACHINE

OPERATING INSTRUCTION MANUAL

Eutectic+Castolin

INDEX

TECHNICAL SPECIFICATION

CASTOMAG 180

INPUT

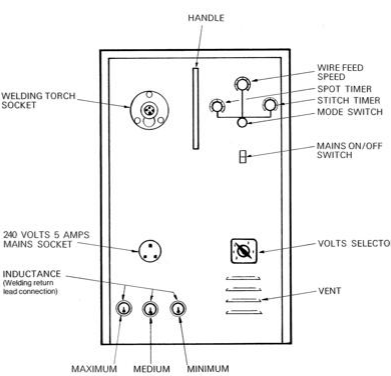
Voltage : 240v single phase
Frequency : 50/60 HZ
Max. Rating : 4.75 KVA
Primary Fuse : 20 A rewireable
This equipment may be used on a 13 amp socket outlet but fuses may blow at high settings or in the spot weld mode.

OUTPUT

Duty Cycle : 180 amps @ 60%
125 amps @ 100%
Open Circuit Voltage : 18—32
Voltage Steps : 6
Inductance Settings : 3
Spot Timer : 0—3 secs
Stitch Timer : 0.7—1.6 secs (0.5 secs off time)
Wire Feed Rate : 2—10.5m/min
Wire Size : 0.6—0.8mm Ø 1.0mm for Aluminium only
Forced air cooling : (Fan)

DIMENSIONS

Weight : 102 Kgs
Dimensions : 735mm height x 385mm width x 890mm depth
Mounted on 4 wheels



OPERATING INSTRUCTIONS FOR CASTOMAG 180

1. DESCRIPTION

The CastoMag 180 is a self-contained, semi-automatic welding machine, designed for continuous welding using a solid wire and a suitable shielding gas.

The unit is suitable for use with wire of 0.6, 0.8 mm diameter and 1.0 mm aluminium. The CastoMag 180 unit is of the constant voltage type, relying on the wire feed rate to determine the welding current output.

The CastoMag 180 unit is designed to work in conjunction with the CastoMag 180 air cooled torch, however, for light gauge work such as car body repairs etc., the lightweight CastoMag 160 air cooled torch is available.

2. CONSTRUCTION

The CastoMag 180 is a mobile unit mounted on two large wheels and two durable castors and, even with a gas cylinder mounted, has excellent stability.

The front panel houses all the controls with a strong handle for easy manoeuvrability. One side of the machine hinges up to allow ease of access to the wire feed system and wire spool. A robust gas cylinder stand is provided at the rear of the unit and the gas cylinder is.secured by a safety chain. A small powerful fan in fitted in the rear panel to provide the necessary forced air cooling at a rate of 200 CFM. Thermal overload protection is provided by a thermostat fitted to the main transformer. The thermostat operates when the transformer temperature reaches approximately 140°C, although the insulation used in the transformer is capable of operating well above this temperature. The CastoMag 180 unit also includes a 240 V 5 amp output socket to operate the Eutectic ID Weld 25 or a CO_2 heater. It is also possible to operate small hand drills or small hand grinders, maximum 500 watts.

3. *INSTALLATION*

Connection to Mains Supply

The CastoMag 180 is designed to operate from 240 volts 50/60 Hz mains supply and should be wired into a switch isolator with 20 amp re-wireable fuses as shown in the specification table.

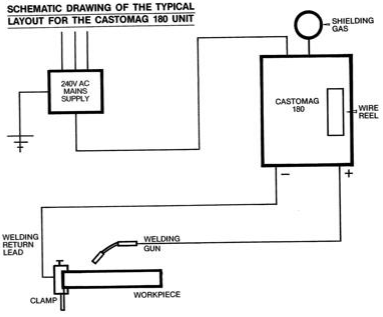
It is possible to operate the CastoMag 180 from a 13 amp household type socket when the plug is fitted with a 13 amp fuse. It should be noted however that the maximum welding output must be reduced and also it will NOT be possible to use the spot weld facility.

Before switching on the 240 volt supply, check that the fan aperture at the rear of the unit and also the louvres on the front control panel are not obstructed, as severe overheating will occur.

ALWAYS ISOLATE MACHINE FROM MAINS SUPPLY BEFORE REMOVING COVER.

FIG. 1

SCHEMATIC DRAWING OF THE TYPICAL LAYOUT FOR THE CASTOMAG 180 UNIT



3.1 Connection of Shielding Gas

Ensure that the shielding gas is of the correct type *(see Table 1)*. Place the cylinder on the stand at the rear of the CastoMag 180 and align into the cradle at the top. The safety chain should then be pulled tight around the cylinder and dropped into the slot on the other side.

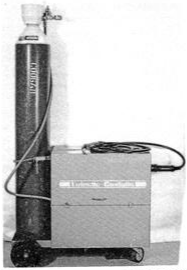


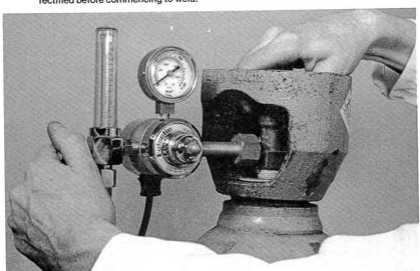
FIG. 2

SECURE GAS CYLINDER TO CASTOMAG 180

A regulator is then screwed into the top of the gas cylinder, observing that no particles of dirt are allowed to get into the joint between cylinder valve and regulator. The gas supply hose is then connected to the outlet of the flowmeter and then the flowmeter connected to the regulator outlet *(Fig. 3)*.

It is advisable to purge the gas system after changing the gas cylinder. This is achieved by turning the wire speed control to 'O' setting, switching on the CastoMag 180 and depressing the torch switch trigger.

To purge the torch and machine lines increase the gas flow rate, and then reduce to the desired setting prior to welding. On release of the torch switch trigger the gas flow should rapidly return to zero. If it does not return to zero, a leak is present and this should be rectified before commencing to weld.



CONNECT REGULATOR TO GAS CYLINDER AND SET FLOW RATE

FIG. 3

Typical gases used for MIG/MAG welding with CastoMag 180 machine:

MATERIAL	*STANDARD SHIELDING GAS*
STEELS AND LOW ALLOY STEELS	ARGON + 20% CO_2 ARGON + 5% CO_2 CO_2 (CARBON DIOXIDE)
STAINLESS STEEL	ARGON + 1% OXYGEN ARGON + 2% OXYGEN
ALUMINIUM	ARGON

(TABLE 1)

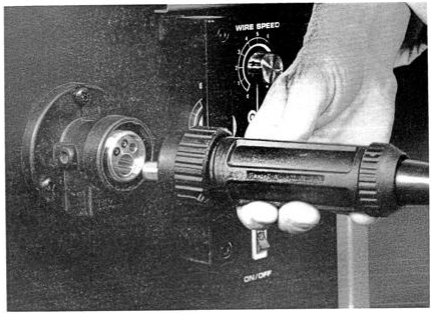
Carbon dioxide (CO_2) requires the use of a heater type regulator to dry and prevent the gas from freezing as it leaves the cylinder. CO_2 gas is only recommended for dip transfer.

High purity argon is recommended for the welding of aluminium and its alloys.

Other gas mixtures are available such as ARGON + HELIUM, further information on these and standard gases is available from your nearest supplier—ALWAYS OBSERVE THE SAFETY REGULATIONS WHEN HANDLING GAS CYLINDERS AS LAID DOWN BY THE MANUFACTURER.

3.2 Connection of Welding Torch

The torch is fitted with a "Euro plug" which simply fits into the socket on the front of the CastoMag 180 and is secured by screwing down the locking ring attached to the plug. Two torches are available—CastoMag 160 or CastoMag 180 *(see page 24 for specifications).*



CONNECT TORCH INTO THE SOCKET *FIG. 4*

4. INSTALLING THE WELDING WIRE

4.1 It is important that the torch contact tip and wire is of the correct type and size required.

4.2 Remove the gas nozzle and copper contact tip from the torch.

4.3 Install the reel on the reel carrier of the machine, making sure that the pin enters the locating hole on the end of the spool (with the wire feeding from the top of the reel).

The reel holder includes a tension screw (*see Fig. 7)* which has been pre-set in our factory. In the event that further adjustment is required, ensure that the reel runs freely and without the wire overrunning after the torch trigger has been released after welding.

4.4 Release the wire feed tension spring (A) from beneath the adjustment screw (B), then swing the spring blade sideways and lift the idler roller assembly (C) clear of the drive roller (D).

4.5 Ensure that the drive roller (D) is fitted with the correct groove (large groove 0.8 mm—small groove 0.6 mm). The correct groove roller for the wire size must be nearest to the motor. If this requires changing, remove fixing screw (E) and slide the roller off the shaft, taking care not to lose the small steel key. Reverse the roller and replace screw.

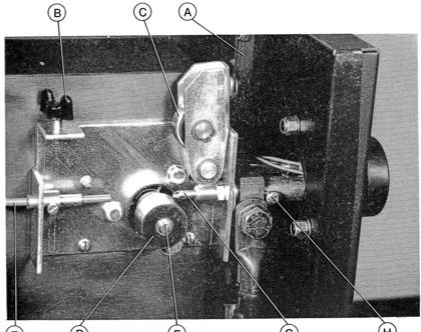
4.6 The wire is then fed from the top of the reel as follows:—

a) Straighten the first eight inches of the wire, remove any burrs from the end of the wire then feed it through the wire guide (F) over the drive roller and into the end of the guide tube (G).

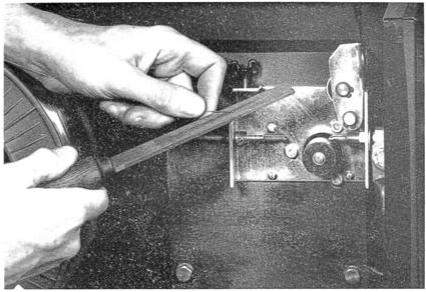
b) Manually feed a few inches of wire through the guide tube (G) until the wire has entered the welding torch liner.

c) Lower the idler roller (C) on to the drive roller (D), making sure the wire enters the groove and then swing the tension spring blade back under the adjustment screw.

A—TENSION SPRING	**E**—FIXING SCREW
B—ADJUSTMENT SCREW	**F**—WIRE GUIDE
C—IDLER ROLLER	**G**—GUIDE TUBE
D—DRIVE ROLLER (Left hand thread)	**H**—GUIDE TUBE FIXING SCREW



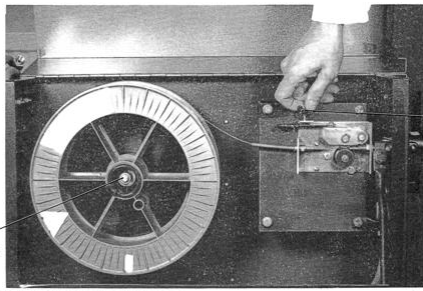
WIRE DRIVE ROLL SYSTEM *FIG. 5*



REMOVE BURR FROM THE END OF THE WIRE *FIG. 6*

d) Select continuous feed on the mode switch, set the wire feed speed control knob to 5 and depress the torch switch trigger. The wire should then feed down the torch hose assembly until it appears at the torch. (Allow 3 inches of wire to protrude).

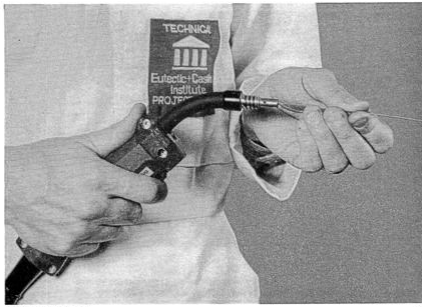
e) Check that the wire feeds evenly. Hold the wire between fingers and apply light pressure. If the wire slips in the rolls, increase wire tension screw until satisfactory feed is achieved. Minimum, rather than maximum tension will produce the smoothest wire feed.



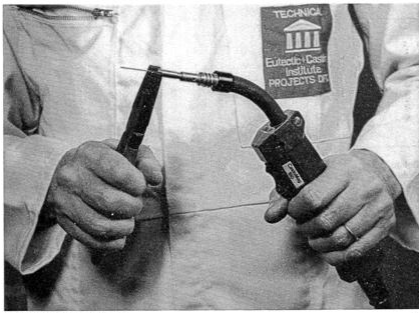
FIT WIRE REEL AND ADJUST TENSION SCREW *Fig. 7*

f) Fit the correct contact tip *(Fig. 9)* and nozzle *(Fig. 10)* to the welding torch head.

g) Cut the filler wire approximately 10 mm from the end of the contact tip.



CHECK THE WIRE FEED *FIG. 8*



FIT THE CORRECT CONTACT TIP *FIG. 9*

FIT THE CORRECT NOZZLE

FIG. 10

5. *SUGGESTED GUIDELINE SETTINGS FOR STEEL WIRES*

(TABLE 2)

		Inductance		*Volts*		*Wire Speed*	
Wire Size		**0.6**	**0.8**	**0.6**	**0.8**	**0.6**	**0.8**
Material Gauge	2 mm	MIN	MIN	1	2	3	3
	Light	MIN	MIN	2	2	4	4
		MIN	MED	3	3	5	5
		MED	MED	4	4	6	6
	Heavy	MED	MAX	5	5	7	7
	8 mm	MED	MAX	6	6	8	8

Before commencing welding, check that the gas flow rate is not set too high and also that the initial surge of gas is not high.

It is essential that the welding return lead clamp is properly connected to the workpiece in order to complete the welding circuit. If the workpiece is rusty, covered with millscale, oil or paint, an area must be cleaned free of any of these contaminants before the welding return clamp is connected. **Poor connections mean poor welding results.**

Where an adjustable regulator and flowmeter are used, the secondary pressure should be set to 1 Bar (15 psi) and the flowmeter set to around 10—12 L.P.M. (20—24 C.F.H.). Where a pre-set regulator and flowmeter are used, the flowmeter should be set to around 10—12 L.P.M. (20—24 C.F.H.). If only a twin stage, two gauge regulator is used, this should be set to around 20—24 C.F.H. These flow rates are typical when using either CO_2 or Argon + CO_2 mixtures for welding steels.

LPM — litres/minute
CFH — cubic feet/hour

It is recommended that a flowmeter is always used to ensure accurate gas flow rates.
With these flow rates, gas from the torch should be just audible.

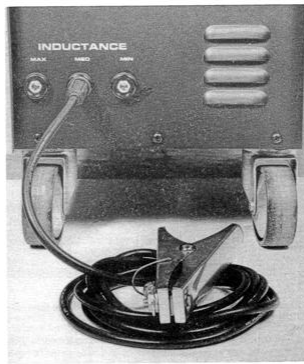
Recommended regulator types for MIG/MAG welding:—

CO_2 regulator (pre-set pressure) with incorporated heater and flowmeter. 110 V or 220 V versions available.

Argon-mixed gas regulator (pre-set pressure) complete with flowmeter.

6. WELDING

6.1 Connect the work return cable plug into one of the three sockets marked "inductance". *(See Table 2).*

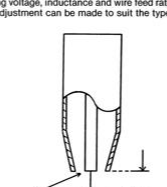


CONNECT THE WELDING RETURN LEAD

FIG. 11

6.2 Set the voltage switch to the setting required. *(See Table 2).*

6.3 Set the wire feed speed control to the setting required. (Initially a reasonable weld can be obtained by setting voltage, inductance and wire feed ratios to around their mid positions, after which fine adjustment can be made to suit the type of work being carried out). *(See Table 2).*



7. BURNBACK

A device is fitted in the CastoMag 180 to limit the amount of wire that appears at the end of the torch on completion of a weld. This device merely allows welding current to flow for a short time after release of the trigger and is pre-set electronically. It is fitted to prevent the welding wire attaching itself to the work piece when spot welding.

If the wire becomes fused to the contact tip because of a burnback, the welding wire may start to wrap around the wire feed drive roller, so do not attempt to force the wire through by pressing the torch trigger switch.

Remove the contact tip and pull away from the torch until a couple of inches of wire protrude. Cut wire, lightly clamp the contact tip in a vice and lightly file the fused wire until it is possible to pull the wire free. Use a tip cleaner to remove any remaining debris and replace into the torch. If the damage caused by the fused wire is extensive or the orifice has become excessively enlarged, replace with new contact tip.

8. GENERAL HINTS AND SUGGESTIONS

8.1 Keep the torch nozzle and contact tip free of weld spatter—apply anti-spatter compound at regular intervals and remove adhering spatter.

8.2 Base metals which exhibit badly corroded areas should be thoroughly cleaned—remove all traces of paint, rust, oil or water from the welding area.

8.3 Remember to isolate the equipment when making electrical connections or internal fault finding.

8.4 Dust may accumulate on the CastoMag 180 unit and inside the drive roll compartment—clean regularly.

8.5 Always maintain the CastoMag 180 unit and associated equipment in good order.

8.6 Use this equipment in a safe manner—observe safe working practice *(see SAFETY section).*

8.7 Replace worn contact tips—worn tips contribute to defective welds and irregular feeding.

8.8 Any accidental damage to either torch or CastoMag 180 unit must be repaired, and if necessary, replaced.

9. MAINTENANCE AND SERVICE

In order to maintain trouble free wire feed, regularly clean the drive roll mechanism and torch liner with moisture-free compressed air.

The CastoMag 180 should be cleaned using compressed air on a yearly basis to remove dust and other contaminants. This method of cleaning may be performed on a more regular basis especially in workshops where dust and other particulate levels are high. Use only dry air at 2 Kg/cm² (30 psi)

10. WIRE FEED CONTROL

The wire speed control provides the welding current or amperage which is directly proportional to the wire feed rate and wire diameter.

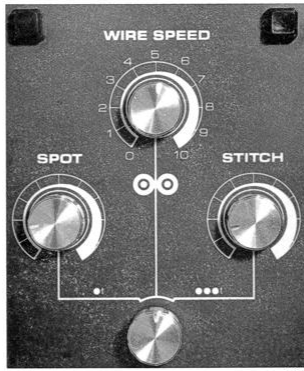


FIG. 12

The welding current is picked up by the wire as it passes through the copper contact tip inside the welding torch. When the arc is initiated current flows from the end of the wire through the arc into the weld pool.

The CastoMag 180 power source is so designed to provide the necessary electrical current required to melt the wire at the same rate it is fed into the welding arc. If the wire speed is increased, the current automatically increases to provide the balance and vice versa.

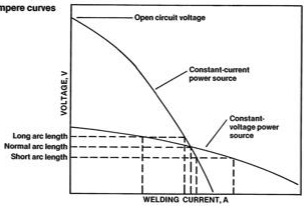
11. VOLTAGE CONTROL

Once the wire diameter and wire feed rate have been selected, the next stage is to select the arc voltage. There are six voltage selections available with the CastoMag 180 unit providing initially open circuit voltages which become actual arc voltages when welding commences. *(Fig. 13).*

FIG. 13

Voltage is the essential factor when controlling arc length, as the arc current increases. As the weld pool size increases a longer arc is required in order to spread the heat across the weld pool width, in turn, providing good fusion at the weld toes. Arc voltage, therefore, tends to increase with current.

Volt-ampere curves



12. ARC SPOT WELDING

The CastoMag 180 unit includes an arc spot welding facility with added filler metal to produce strong, consistent spot welds in thin sheet metal up to approximately 1.0 mm. The spot weld timer controls the gas flow, contactor, and wire feed time. The timer and wire speed must be pre-set together with volts and inductance. The spot timer range is between 0—3 seconds. *(See Fig. 12).*

The necessary changes are the mode switch which is placed on spot and a special nozzle is fitted to the gun and then placed on the workpiece in order to gain steady control of the welding gun and to maintain the correct contact tip to workpiece distance.

Setting-Up Procedure

12.1 Fit spot nozzle to welding gun.

12.2 Set mode switch to spot-●t. *(See Fig. 12).*

12.3 Set wire feed speed to max. (10).

12.4 Set volts to max. (6).

12.5 Set inductance (usually min.).

12.6 Select the spot control knob to weld time.
Gas flow rates will be similar to normal dip transfer welding i.e. 10—12 litres/min.

Ensure that the spot nozzle is firmly in contact with the workpiece and hold the welding gun steady throughout the welding cycle. To initiate the spot welding cycle, simply press the torch lever and hold until welding is completed.

Weld time will depend upon plate thickness, wire diameter and shielding gas type. Weld timer is adjustable between 0—3 seconds. Some variation may also be required with wire feed speed and voltage depending upon the thickness and mass of base metal.

Thicknesses above 1.0 mm can be MAG spot welded, but the top sheet metal must be pre-drilled in order to allow penetration and fusion of the bottom sheet.

NOTE: Both the SPOT and STITCH welding cycle commences on the "off time" to allow sufficient pre-flow of shielding gas, therefore, there will be a short time lapse prior to arc ignition.

13. *STITCH WELDING*

The stitch welding facility provides intermittent wire feeding which reduces heat input in order to bridge gaps and weld thin sections with reduced distortion effects. Also for joining dissimilar thickness sections, building up edges, or assisting with tack welding sequences.

The stitch timer operates on a TIME 'ON'/TIME 'OFF' system with 0.7—1.6 seconds 'ON' time followed by a 0.5 second 'OFF' time and so on until welding has been completed. The 'ON' time being variable by simply adjusting the STITCH control and pressing the torch trigger and the stitch welding cycle commences. Only when the trigger is released does the cycle finish.

Setting-Up Procedure

The setting up procedure will depend upon application, wire size and thickness of base metal, therefore test welds should be performed in order to obtain desired settings.

A test weld can be produced using the continuous welding technique and when an acceptable condition is achieved, simply set the mode switch to Stitch. The following steps should be followed.—

13.1 Set mode switch to STITCH.—●●●t.

13.2 Set approximate voltage and wire speed.

13.3 Set STITCH timer to approximately half way.

13.4 Produce test weld and, if required, re-set wire speed and/or timer.

The inductance, in most cases, will be connected to "min.". The ON/OFF frequency time will only function whilst the welding gun trigger is depressed and the cycle will always commence with the "OFF" time.

14. *INDUCTANCE*

The CastoMag 180 unit is fitted with Inductance tappings, three settings min. (minimum), med. (medium) and max. (maximum). Inductance is also commonly termed the "choke" or "stabilizer" and is required to improve dip transfer.

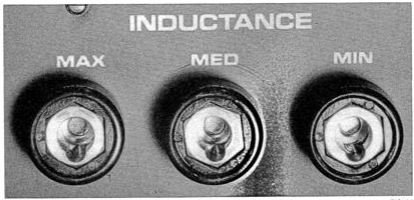


FIG. 14

At lower arc voltages and currents generally in the range 18—26 V 60—180 A, metal transfer takes place during short circuits between the wire and the weld pool. These follow a consistent sequence of alternate arcing and short circuiting causing the end of the electrode wire to dip into the weld. As the wire touches the weld pool there is a rise in current, the resistance of the wire causes heating and the end of the electrode melts. The wire "necks" due to a magnetic pinch effect and the molten metal flows in the pool. During this short circuit period the current delivered by the power source is much higher than during arcing. This creates high forces which have an explosive effect on the weld pool and spatter is considerable.

To reduce this effect an inductance is connected in series with the power source, and the arc, to reduce the rate of rise in current during the short circuit period. The short circuit is cleared more slowly and gently, and the spatter is reduced to an acceptable level. Ideally an almost regular dip/arc cycle takes place between 50—200 times/second.

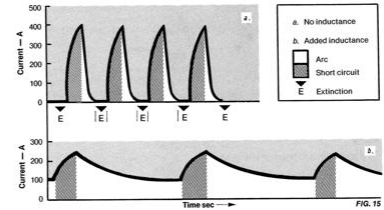


FIG. 15

The diagram illustrates that the increasing inductance increases the arc time and eliminates arc extinction.

It is important that the correct inductance setting is selected for a particular wire size, voltage and welding current.

To Summarise

Inductance provides a smoothing effect to the high amperage rise during dip transfer MIG/MAG welding, which in turn improves the weld bead and reduces spatter levels.

Once voltage and wire speed has been selected and found to be satisfactory the inductance setting is then made in order to produce a defect-free weld bead.

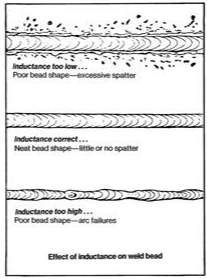


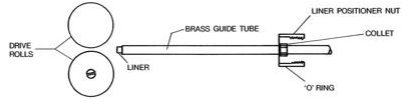
FIG. 16

Suggested inductance settings in conjunction with voltage and wire speeds for welding steels can be found on page 10, table 2.

15. WELDING ALUMINIUM

It is possible to MIG weld small aluminium components and thin sections using the CastoMag 180 unit, but only using 1.0 mm diameter wires. It will be necessary to fit a special contact tip—PART NO. 3118204; a Teflon liner—PART NO. 3118203 to the CastoMag 180 torch (3 metres only); a 1.0mm drive roll—PART NO. 3118206 and brass guide tube—PART NO. 3118205 to the welding unit. To be fitted as follows:—

15.1 Cut brass guide tube to length and fit as illustrated:



15.2 Place liner through torch until it fits approx. 2.0 mm away from the contact tip.

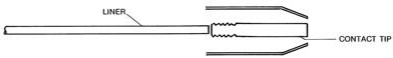


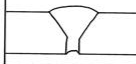
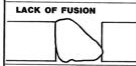
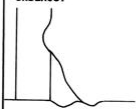
FIG. 17

15.3 Ensure that the opposite end of liner fits approx. 1.0—1.5 mm away from the drive rolls.

16. FAULT FINDING — DEFECTS IN WELD

Once the desired parameter settings have been established, satisfactory welds should be consistently achieved. Should welding defects occur, visual examination will act as a guide to identify the cause and what parameter modifications are required.

FAULT	POSSIBLE CAUSES	REMEDY
SPATTER 	Insufficient inductance	*Increase inductance*
	Rusty base metal	*Clean areas to be welded*
	Inadequate gas flow	*Obtain correct flow rate*
	Contact tip and nozzle blocked	*Remove adhering spatter and apply anti-spatter compound*
	Voltage too high	*Select correct voltage*
POROSITY 	Draughts or windy conditions	*Ensure welding area is protected*
	Blocked contact tip/nozzle	*Remove spatter and apply anti-spatter compound*
	Gas flow rates too high/too low	*Obtain correct gas flow rate*
	Rusty or damp base metal	*Remove rust. Dry base metal*
	Nozzle to workpiece distance too long	*Maintain correct distance*
	Gas leak	*Check all connections and torch hose*
POOR BEAD SHAPE 	High inductance	*Reduce inductance*
	Excessive wire speed/voltage ratio	*Select correct current*
	Welding speed too slow/ too fast	*Modify welding speed*

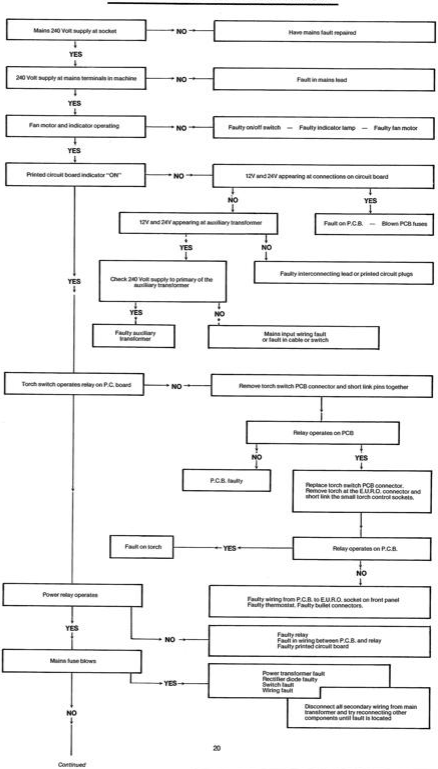
FAULT	POSSIBLE CAUSES	REMEDY
WIRE SNAGGED (BIRDNESTING)	Wire bent inside liner Drive roll tension too tight Wire feed drive faulty	*Defective liner* *Reduce tension* *Check roller system*
BURNING THROUGH BASE METAL	Wire feed speed too high Welding speed too slow	*Reduce wire feed speed* *Increase speed of travel*
WIRE STUBBING INTO WELD POOL	Wire feed speed too high Voltage too low Inductance too high	*Reduce wire feed speed* *Increase volts* *Reduce inductance setting*
LACK OF PENETRATION 	Wire feed speed too low Misaligned joint Root gap too small Incorrect technique Worn contact tip	*Increase wire feed speed* *Modify joint preparation* *Modify joint preparation* *Repeat technique on test piece* *Replace tip*
LACK OF FUSION 	Volts too low Incorrect torch angle Incorrect wire feed speed	*Increase volts* *Adjust torch angle* *Obtain correct setting*
UNDERCUT 	Travel speed too fast Wire feed speed too high Incorrect technique	*Reduce speed of travel* *Reduce feed speed* *Repeat technique on test piece*

17. FAULT FINDING — EQUIPMENT

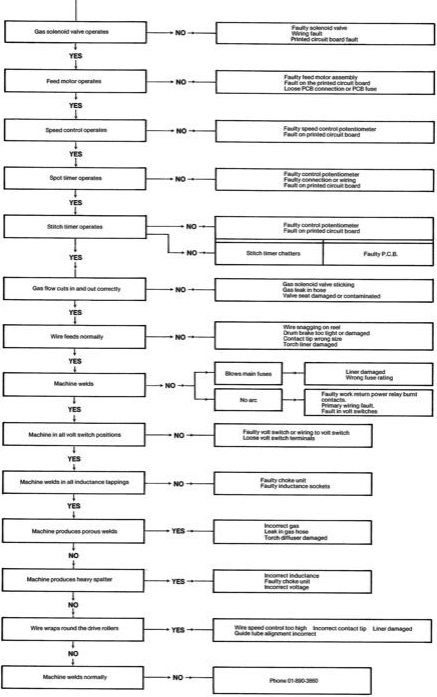
Provided the CastoMag unit is handled correctly and maintained in good order, equipment failure should not normally occur in service. In the event faults do arise, it is important to follow the sequence of fault listed on page 20.

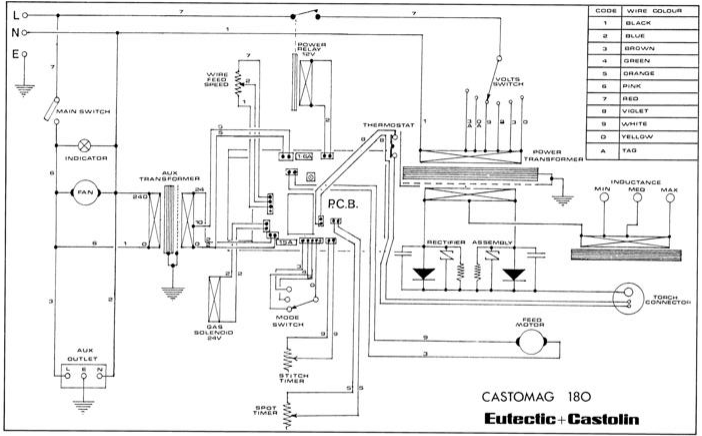
IT IS STRONGLY ADVISED THAT EQUIPMENT DEFECTS SUCH AS CONTROL CIRCUITS, SWITCHES, TRANSFORMER ETC. BE DEALT WITH BY TRAINED SERVICE TECHNICIANS.

CASTOMAG 180 FAULT LOCATION GUIDE



Continued


Gas solenoid valve operates
NO
Faulty solenoid valve
Wiring fault
Printed circuit board fault
YES
Feed motor operates
NO
Faulty feed motor assembly
Fault on the printed circuit board
Loose PCB connection or PCB fuse
YES
Speed control operates
NO
Faulty speed control potentiometer
Fault on printed circuit board
YES
Spot timer operates
NO
Faulty control potentiometer
Faulty connection or wiring
Fault on printed circuit board
YES
Stitch timer operates
NO
Faulty control potentiometer
Fault on printed circuit board
NO
Stitch timer chatters
Faulty P.C.B.
YES
Gas flow cuts in and out correctly
NO
Gas solenoid valve sticking
Gas leak in hose
Valve seat damaged or contaminated
YES
Wire feeds normally
NO
Wire snagging on reel
Drum brake too tight or damaged
Contact tip wrong size
Torch liner damaged
YES
Machine welds
NO
Blows main fuses
Liner damaged
Wrong fuse rating
No arc
Faulty work return power relay burnt contacts.
Primary wiring fault.
Fault in volt switches
YES
Machine in all volt switch positions
NO
Faulty volt switch or wiring to volt switch
Loose volt switch terminals
YES
Machine welds in all inductance tappings
NO
Faulty choke unit
Faulty inductance sockets
YES
Machine produces porous welds
YES
Incorrect gas
Leak in gas hose
Torch diffuser damaged
NO
Machine produces heavy spatter
YES
Incorrect inductance
Faulty choke unit
Incorrect voltage
NO
Wire wraps round the drive rollers
YES
Wire speed control too high
Incorrect contact tip
Liner damaged
Guide tube alignment incorrect
NO
Machine welds normally
NO
Phone 01-890-3880


L
N
E
MAIN SWITCH
INDICATOR
FAN
AUX TRANSFORMER
240
AUX OUTLET
L E N
GAS SOLENOID 24V
MODE SWITCH
STITCH TIMER
SPOT TIMER
WIRE FEED SPEED
POWER RELAY 12V
T1.0A
T.5A
P.C.B.
THERMOSTAT
VOLTS SWITCH
POWER TRANSFORMER
RECTIFIER ASSEMBLY
INDUCTANCE
MIN MED MAX
TORCH CONNECTION
FEED MOTOR
CODE | WIRE COLOUR
1 BLACK
2 BLUE
3 BROWN
4 GREEN
5 ORANGE
6 PINK
7 RED
8 VIOLET
9 WHITE
0 YELLOW
A TAG
CASTOMAG 180
Eutectic+Castolin

SAFETY

Protect yourself and others, read and understand this statement. Take precautions when welding . . . Follow your employer's safety practices which should be based on manufacturers' hazard data available to him . . . Fumes and gases can be dangerous to your health . . . Arc rays can injure eyes and burn skin . . . Electric shock can kill . . . Read and understand the manufacturer's instructions and your employer's safety practices . . . Keep your head out of the fumes . . . Use enough ventilation . . . Exhaust at the arc, or both, to keep fumes and gases from your breathing zone, and the general area . . . Wear correct eye, ear and body protection . . . Do not touch live electrical parts.

Further details can be referred to in the EUTECTIC publication, *"CODE OF PRACTICE"*, copies of which may be obtained by writing to EUTECTIC COMPANY.

Other recommended HEALTH AND SAFETY REFERENCE PUBLICATIONS

BS679 . . . . Filter for use during welding and similar operations.
BS1542 . . . Equipment for eye, face and neck protection against radiation arising during welding and similar operations.
BS2653 . . . Protective clothing for welders.
BS5378 . . . Safety colours and safety signs.
BS638 . . . . Arc welding plant, equipment and accessories *(Parts 1—8).*

BS Code of Practice — CP1013:1965 — Earthing.

Health and Safety Executive

EH 40 . . . . Occupational Exposure Limits (Reviewed annually)

The Welding Institute Cambridge

— The present position concerning the biological effects of exposure to fume in welders.
— Health and safety in welding and allied processes.
— Welding fume—a welders guide.
— Welding fume—sources, characteristics, control.

(All the above publications available to non-members)

RoSPA

— Welding hazards and how to avoid them.

Air Products

— Cylinder oxygen and acetylene—safety data sheet
— Coogar—safety data sheet.

Electrical Safety:

IEE Wiring Regulations 15th Edition London Inst. of Electrical Engineers.

Others

— Protection of the eyes regulation 1974.
— Factories act 1961 section 31.
— The ship building and ship repairing regulations 1960.

CastoMag Torches

DESCRIPTION	PRODUCT CODE NO.
CASTOMAG 160 TORCH Air cooled Max. current: 160A CO_2 140 A mixed gases Duty cycle: 60% Wire sizes (mm): 0.6, 0.8 Length: 3 metres Recommended for use with the CastoMag 180 machine (Contact tip supplied with torch 0.8mm)	3118100
CASTOMAG 180 TORCH Air cooled Max. current: 180A CO_2 150 A mixed gases Duty cycle: 60% Wire sizes (mm): 0.6, 0.8 Length: 3 metres Recommended for use with the CastoMag 180 machine (Contact tip supplied with torch 0.8mm)	3118200

Accessories

CO_2 REGULATOR WITH HEATER & FLOWMETER Regulator pre-set at 3.5 kg/cm² Adjustable flowmeter up to 30 litres/min. Heater: 220V or 110V CO_2 regulator complete as above—110V CO_2 regulator complete as above—220V	 3150000 3151000
ARGON MIXED GASES REGULATOR COMPLETE WITH FLOWMETER Regulator pre-set at 3.5 kg/cm² Adjustable flowmeter up to 30 litres/min Argon mixed gases regulator as above	 3160000
HEADSCREEN	5840300
HANDSCREEN	5840100
WIRE CUTTERS	3160200
ANTI-SPATTER COMPOUND . . .	3160100
GLOVES 150mm (6") CUFF CHROME LEATHER	5840600

Comprehensive range of CastoMag MIG/MAG welding wires are available including steels, stainless steels, nickel alloys, copper alloys, aluminium alloys and special wires for hard overlays.

For further information . . .
Contact your local Technical Representative or Eutectic Head Office