



230V GAS/GASLESS MIG WELDERS

71091-71095



IMPORTANT: Please read these instructions carefully to ensure the safe and effective use of this product and save these instructions for future reference. This manual has been compiled by Draper Tools and is an integrated part of the product with which it is enclosed and should be kept with it for future references.

This manual describes the purpose for which the product has been designed and contains all the necessary information to ensure its correct and safe use. We recommend that this manual is read before any operation or, before performing any kind of adjustment to the product and prior to any maintenance tasks. By following all the general safety instructions contained in this manual, it will ensure both product and operator safety, together with longer life of the product itself.

All photographs and drawings in this manual are supplied by Draper Tools to help illustrate the operation of the product. Whilst every effort has been made to ensure accuracy of information contained in this manual, the Draper Tools policy of continuous improvement determines the right to make modifications without prior warning.

1. TITLE PAGE

1.1 INTRODUCTION:

USER MANUAL FOR:

230V GAS/GASLESS MIG WELDERS

Stock nos. 71091 & 71095.

Part no. MW140T & MW170T.

1.2 REVISIONS:

Date first published June 2017

As our user manuals are continually updated, users should make sure that they use the very latest version.

Downloads are available from: <http://www.drapertools.com/manuals>

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1.3 UNDERSTANDING THIS MANUALS SAFETY CONTENT:

WARNING! Information that draws attention to the risk of injury or death.

CAUTION! Information that draws attention to the risk of damage to the product or surroundings.

1.4 COPYRIGHT © NOTICE:

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3. GUARANTEE

3.1 GUARANTEE

Draper tools have been carefully tested and inspected before shipment and are guaranteed to be free from defective materials and workmanship.

Should the tool develop a fault, please return the complete tool to your nearest distributor or contact Draper Tools Limited, Chandler's Ford, Eastleigh, Hampshire, SO53 1YF. England.

Telephone Sales Desk: (023) 8049 4333 or Product Helpline (023) 8049 4344.

A proof of purchase must be provided with the tool.

If upon inspection it is found that the fault occurring is due to defective materials or workmanship, repairs will be carried out free of charge. This guarantee period covering parts/labour is 12 months from the date of purchase except where tools are hired out when the guarantee period is 90 days from the date of purchase. This guarantee does not apply to normal wear and tear, nor does it cover any damage caused by misuse, careless or unsafe handling, alterations, accidents, or repairs attempted or made by any personnel other than the authorised Draper warranty repair agent.

Note: If the tool is found not to be within the terms of warranty, repairs and carriage charges will be quoted and made accordingly.

This guarantee applies in lieu of any other guarantee expressed or implied and variations of its terms are not authorised.

Your Draper guarantee is not effective unless you can produce upon request a dated receipt or invoice to verify your proof of purchase within the guarantee period.

Please note that this guarantee is an additional benefit and does not affect your statutory rights.

Draper Tools Limited.

4.1 SCOPE

These MIG welders are a limited duty machine designed to perform ARC welding fabrication on a variety of steel types with either shield gas or flux cored filler wire.

4.2 SPECIFICATION

Stock no.	71091	71095
Part no.	MW140T	MW170T
Input:		
Voltage (U ₁ ..V)	230V.....	230V
Phase	1	1
Frequency	50Hz.....	50Hz
Rated maximum supply current (I _{1max})	25A.....	25A
Rated supply current (I _{1eff})	8A.....	8A
Capacity	3600W.....	5200W
Output:		
No-load voltage (U ₀ ..V)	33V.....	34V
Welding current range (..A to ..A)	50A-130A.....	60A-160A
(..V to ..V)	16.5V to 20.5V.....	17V to 22V
Duty factor:		
10%	130A.....	160A
35%	70A/17.5V	86A/18.3V
60%	53A/17A	65A/17.3A
100%	-	-
Protection fuse.....	16A.....	16A
Welding wire	0.6mm-0.9mm	0.6mm-0.9mm
Torch coupling	Direct	Direct
Insulation class	H	H
IP Protection class.....	IP21S.....	IP21S
Cooling device	Fan.....	Fan
Max. working temperature	40°C.....	40°C
Dimensions (mm)	540x300x440mm	695x395x450mm
Weight	31kg.....	37kg

4.3 HANDLING & STORAGE

Care must still be taken when handling and lifting. Dropping this machine will have an effect on its operation and may also result in personal injury. This machine is not a toy and must be respected.

The environment will have a negative result on its operation if you are not careful. If the machine is unprotected from dust and debris; components will become clogged:

And if not cleaned and maintained correctly or regularly the machine will not perform at its best.

5. HEALTH & SAFETY INFORMATION

5.1 GENERAL SAFETY INSTRUCTIONS

WARNING: When using electric tools basic safety precautions should always be followed to reduce the risk of fire, electric shock and personal injury including the following.

Read all these instructions before attempting to operate this product and save these instructions.

Electric shock can kill:

- Remove the plug from the socket before carrying out adjustment, servicing or maintenance.
- Allow 5 minutes waiting time for the capacitors to discharge before removing the panels for any maintenance operations
- Do not touch live electrical parts.
- Never use electrode holders or cables with damaged or deteriorated insulation.
- Keep working environment, equipment, cables and clothing free from grease, oil, moisture and dirt.
- Ensure welding machine has been correctly earthed and all panels are fitted securely.
- The operator must be insulated from the floor and work bench using a dry insulation mat.
- Wear isolating footwear and gloves that are in good condition, i.e. without holes.
- In hazardous conditions of increased electric shock always ensure a second person is present in case of accident.
- Never change electrodes with bare hands or damp gloves (for ARC/MMA welders).
- Keep welding cables away from power cables.
- Regularly inspect the condition of the welding, earth, and power cables for signs of damage.
- Do not leave machine unattended and remove plug from socket when not in use.
- Do not use welding cables unsuitable for the amperage.
- Ensure earth clamp is adjacent to weld seam, secured to bare metal and when not in use is insulated for safety.
- Keep all equipment well maintained.
- The operator shall prevent gas cylinders in the vicinity of the work piece from becoming part of the welding circuit.

Fumes & gases can be harmful:

- The welding process generates hazardous fumes as a by product. Inhalation of these fumes is hazardous to health.
- Keep your head away from the weld to avoid breathing the fumes.
- If welding in confined spaces ensure adequate ventilation and use a fume extractor.
- Welding fumes displace oxygen. Danger of suffocation.
- By products of welding can react with other chemical vapours to produce a toxic/explosive environment.

Welding can cause fire or explosion:

- Arc welding and allied processes can cause fire and explosions and precautions shall be taken to prevent these hazards.
- Before starting a weld ensure the area is clear of flammable materials.
- Remove any inflammables to a safe distance, especially substances likely to generate a dangerous vapour.

5. HEALTH & SAFETY INFORMATION

- The welding arc can cause serious burns. Avoid contact with skin.
- Sparks and molten metal are cast out during welding. Take precautions to prevent fire igniting and wear protective clothing.
- Sparks and molten metal can pass through gaps. Be aware that fire can start out of sight. Flammables in a locked cabinet may not be safe.
- Do not weld pressurised containers.
- Do not weld tanks, drums or other vessels until they have been correctly cleaned/prepared for welding.
- Always have appropriate and fully maintained fire fighting equipment suitable for the materials used and for use in electrical environments available in close proximity at all times.
- Keep clothing free from oil and grease.
- Wear hat, flame-proof apron, woollen clothing, gloves, long sleeve tops with closed neck, trousers (without turn-ups) to cover non-slip boots.
- Protective head and shoulder coverings should be worn when overhead welding.
- Avoid taking any fuels with you e.g. cigarette lighters or matches.
- Hot spots and their immediate surroundings should be observed until their temperature has dropped to normal.

Personal Protection:

- The body should be protected by suitable clothing.
- The use of neck protection may be necessary against reflected radiation.
- Wear safety glasses when chipping, wire brushing, grinding or when near cooling welds as metal filings or slag can be thrown up. Fully enclosed goggles are advisable.
- Arc machines generate a magnetic field which is detrimental to pacemaker recipients. Consult your doctor before going near welding equipment/operations.
- The UV and IR radiation generated by welding is highly damaging to the eye, causing burns. This can also affect the skin. Protect the eyes and face.
- The face and eyes shall be protected by suitable welding shields equipped with appropriate ocular protection filters.
- Where environments are subject to pedestrians and traffic ensure a protective screen is used to avoid accidental arc glare.
- Do not weld in the vicinity of children or animals and ensure no one is looking before striking up.
- In the welding environment, damaging levels of noise can exist. Wear hearing protection if the process dictates.
- Do not touch hot equipment or metal. Allow the weld time to cool, use the correct tool and wear protective welding gauntlets.
- Wear flame retardant clothing (leather, wool, etc.).
- Take care when adjusting or maintaining the torch that it has had time to cool sufficiently and is disconnected.
- The arc generates
 - ultra-violet radiation (can damage skin and eyes);
 - visible light (can dazzle eyes and impair vision);
 - infra-red (heat) radiation (can damage skin and eyes);
- Such radiation can be direct or reflected from surfaces such as bright metals and light coloured objects.

5. HEALTH & SAFETY INFORMATION

Gas cylinders:

- Gas cylinders should be located or secured so that they cannot be knocked over.
- Shield gas containers can explode if damaged. Take care when handling.
- Ensure gas cylinders are shut-off when not in use and between operations.
- Take care that no build-up of gas is permitted to form in confined area's.
- Cylinders must be in an upright position at all times during use and storage.
- The gas cylinder must never come in to contact with the electrode.
- Follow the manufacturer's instructions for handling, storing and using the gas bottle correctly and safely.
- Use the correct equipment to connect the gas bottle to the welding torch.

Limitations:

- Do not use for;
 - operations in severe conditions (e.g. extreme climates, freezer applications, strong magnetic fields etc).
 - operations subject to special rules (e.g. potentially explosive atmospheres, mines etc).
 - operations that require ingress protection greater than IPX0, e.g. in rain or snow etc.

DRAPER [®]		Stock No.71091 Part No.MW140T DRAPER TOOLS LIMITED. SO53 1YF. UK		
MW140T	NO.:			
	IEC 60974-1			
	50A/16.5V-130A/20.5V			
S	U ₀ = 33V	X (%)	10	60
		I ₂ (A)	130	53
		U ₂ (V)	20.5	17
	U ₁ = 230V	I _{1max} = 25A	I _{1eff} = 8A	
IP21S	H		WEIGHT: kg	

General:

- Training should be sought out in
 - the safe use of this equipment;
 - the processes;
 - the emergency procedures;
- Welding power sources are not to be used for pipe thawing.
- Take precautions against toppling over, if the power source shall be placed on a tilted plane.
- All equipment should be kept in good working condition, inspected and, when defective, promptly repaired or withdrawn from service - All equipment should be placed so that it does not present a hazard in passageways, on ladders or stairways, and should be operated in accordance with the manufacturer's instructions.
- In the vicinity of an arc, non-reflective curtains or screens shall be used to isolate persons from the arc radiation. A warning, e.g. a symbol for eye protection, should refer to the hazard of arc radiation.

DRAPER [®]		Stock No.71095 Part No.MW170T DRAPER TOOLS LIMITED. SO53 1YF. UK		
MW170T	NO.:			
	EN 60974-1			
	60A/17V-160A/22V			
S	U ₀ = 34V	X (%)	10	60
		I ₂ (A)	160	65
		U ₂ (V)	22	17.3
	U ₁ = 230V	I _{1max} = 25A	I _{1eff} = 8A	
IP21S	H		WEIGHT: kg	

5. HEALTH & SAFETY INFORMATION

5.2 CONNECTION TO THE POWER SUPPLY

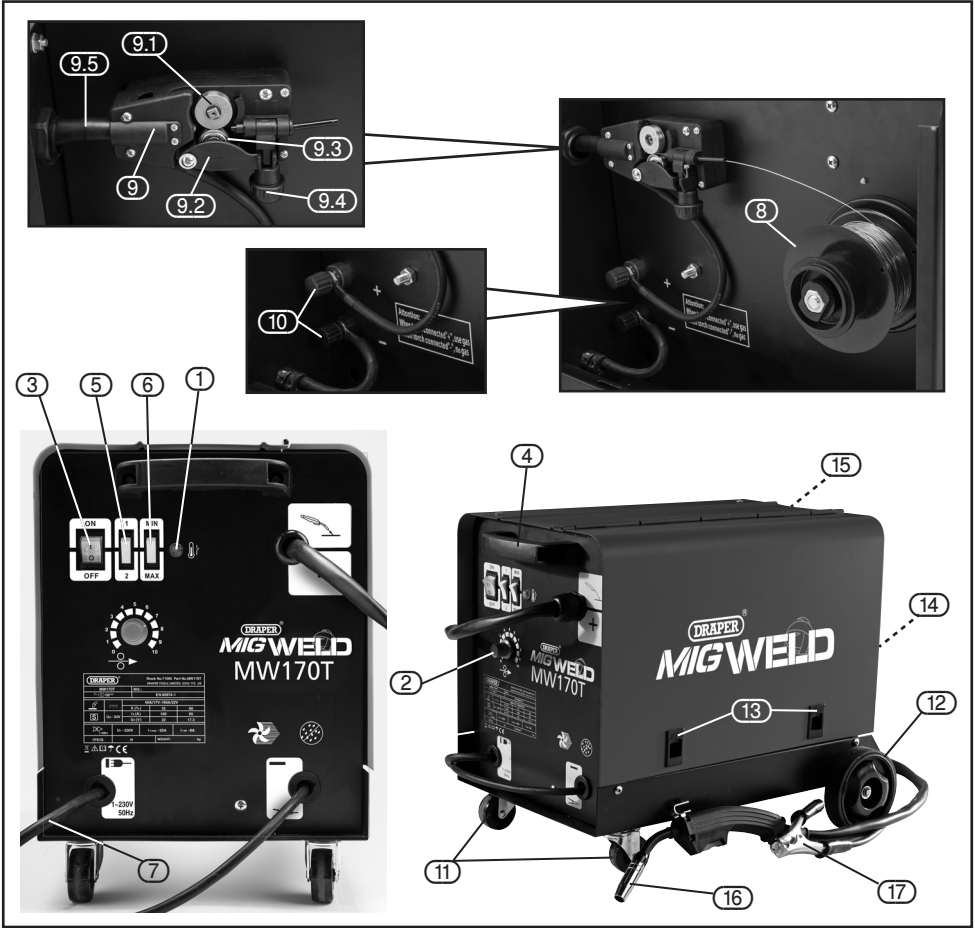
Make sure the power supply information on the machine's rating plate is compatible with the power supply you intend to connect it to.

This machine comes supplied without a plug. It is designed for connection to a 16amp power supply rated at 230V AC.

A suitable plug must be fitted by a qualified electrician.

Because it is constructed mostly of metal parts, it is a Class 1 machine; meaning, it must have an earth connection in the power supply. This is to prevent electrocution in the event of a failure.

6. IDENTIFICATION



- ① Thermal cutout warning light.
- ② Wire speed control.
- ③ On/off switch (includes voltage selection).
- ④ Handle.
- ⑤ 1/2 switch.
- ⑥ Min/Max switch.
- ⑦ Power cable.
- ⑧ Spool hub (spool shown not supplied).
- ⑨ Wire drive unit.
- ⑨.1 Drive roller.
- ⑨.2 Tensioning arm.

- ⑨.3 Tension roller.
- ⑨.4 Tensioner adjustment knob.
- ⑨.5 Wire guide.
- ⑩ Gas/No gas polarity terminals.
- ⑪ Front castors.
- ⑫ Rear wheels.
- ⑬ Latch.
- ⑭ Cooling fan.
- ⑮ Gas bottle hose connector.
- ⑯ Direct connection MIG torch.
- ⑰ Earth clamp.

7. UNPACKING & CHECKING

7.1 PACKAGING

Carefully remove the product from the packaging and examine it for any sign of damage caused during shipping. Lay the contents out and check them. If any part is damaged or missing, do not attempt to use the tool and contact the Draper Helpline immediately (see back page for details).

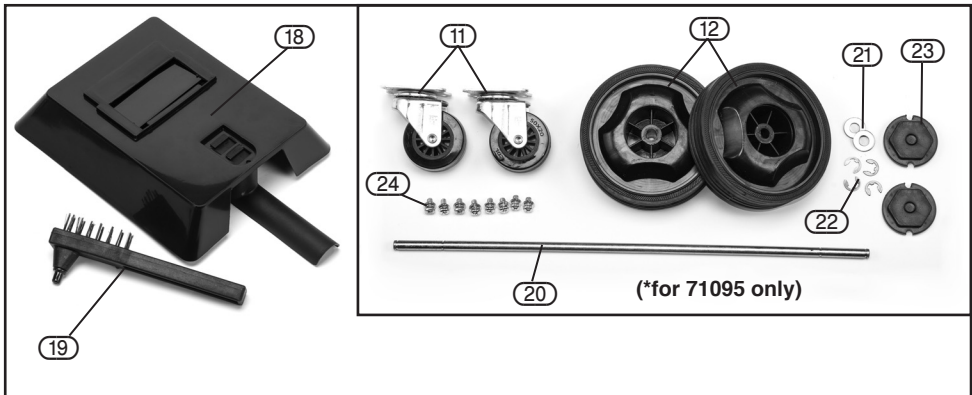
Retain the packaging material at least during the guarantee period: in case the machine needs to be returned for repair.

Warning! Some of the packaging materials used may be harmful to children, keep them out of reach from children.

Disposed of any packaging correctly and according to local regulations.

7.2 WHAT'S IN THE BOX?

As well as the product; there are several parts not fitted or attached to it.



(18) Chipping hammer/wire brush.

(19) Hand held mask.

(For Stock No.71095 only)

(11) Front castors.

(12) Rear wheels.

(20) Wheel axle bar.

(21) Washers x2.

(22) Wheel circlips x4

(23) Wheel covers.

(24) Bolts x8.

8. PREPARING THE WELDERS

Warning! Do not make any adjustments, maintenance or servicing with the machine connected to the power supply.

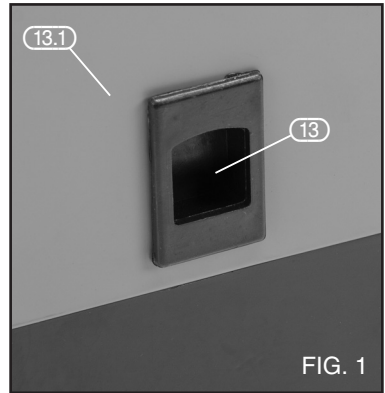
8.1 FITTING THE WHEELS (71095 ONLY)

- i. Fit the front castor wheels using the 8 screws provided.
- ii. Slide axle through both axle loops (4 per wheel).
- iii. Fit one circlip to the groove on the axle closest to machine body each side.
- iv. Slide on a wheel followed by the plain washer and then another circlip, repeat for other side.
- v. Fit the plastic caps.

8.2 LOCATION

Locate the machine in close proximity to the correct power supply and allow 500mm air gap around to ensure sufficient ventilation. There is one cooling fan located in the rear of the machine housing which must be kept clear. Equally, ensure no debris can be drawn into the machine.

Make certain the location does not pose any hazards as detailed in the safety instructions, before attempting to start the machine.



8.3 INSTALLING THE FILLER WIRE - FIGS. 1 - 4

The welding machines are designed to accept the standard size drums of wire up to 15kg.

Do not let the filler wire become uncoiled or tangled as this will lead to problems with delivery to the welding torch.

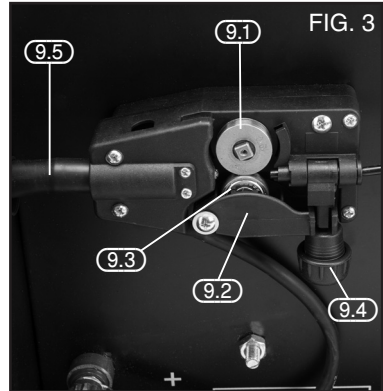
Select the filler wire suitable for the parent metal and with a gauge to match the welder specification.

Note: If the welding machine is not regularly used, remove the wire which is prone to rusting and will cause feed problems next time.



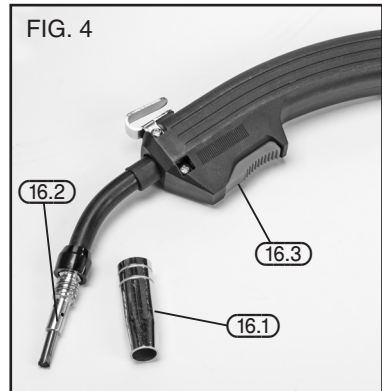
8. PREPARING THE WELDERS

- i. Lift the latch (13) to release the side cover (13.1).
- ii. For smaller reels; remove the locking nut (8.1) and spring (8). Install the small spool onto the spool holder. Refit in reverse order.
- iii. Fit the wire spool so that it feeds off the top of the roll towards the wire drive unit.
- iv. Loosen tensioner (9.4) (see page 13) anticlockwise enough to swing it downwards and raise arm (9.2), moving the tension roller (9.1).
- v. Trim 10cm of wire and discard it, before flattening out the next 15cm. Do not let the wire lose tension.
- vi. Pass the filler wire through the guide (9.5) and underneath the tension roller (9.3). The drive roller comes with two grooves for different wire gauges. Remove nut to see the groove size that is NOT in use.



Note: The wire must sit in the appropriate groove for the wire gauge. The groove size is etched on the side of the roller. To reverse the roller, remove nut and flip the drive roller over before refitting nut.

- vii. Make sure the wire is well inside the torch liner before closing the arm (9.2) and tensioner (9.4).
- viii. Connect the welding machine to the power supply. Position the switch to 'on'. This will be 230V or 400V depending on the power supply you connect the machine to.
- ix. Unscrew/remove the gas shroud (16.1) and with a small spanner unscrew and remove the tip (16.2). Pull the trigger (16.3) and observe the wire feed mechanism. If the wire is being fed correctly it will come out of the swan neck. Pass the tip over the wire and secure back onto the swan neck. Do not over tighten. Re-secure the gas shroud and trim the wire back as required.



Caution: Do not look directly into swan neck as if filler wire emerges suddenly, serious injury could occur.

Note: Ensure the tip size matches the wire size prior to installing.

8. PREPARING THE WELDERS

8.4 GAS/NO GAS

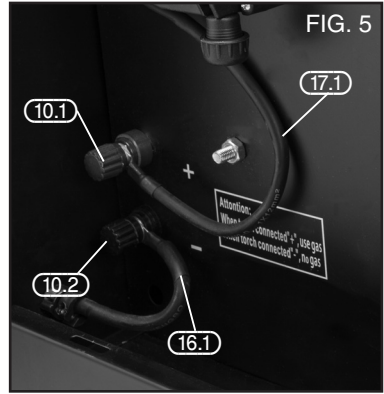
For a successful weld joint, the molten metal must be protected from contaminating gases found in the air. This is either achieved by supplying the torch with gas from a bottle or setting the machine up for no-gas and using a flux cored filler wire. The shield is produced as the flux in the wire melts.

8.5 POLARITY (FIG.5)

The polarity of the torch and earth clamp must be made correctly to suit the gas setup.

- i. Attach the earth clamp connector (17.1) to the positive terminal (10.1).
- ii. Attach the welding torch connector (16.1) to the negative terminal (10.2).

Note: This configuration is for no-gas (flux cored) welding. Reverse the torch and earth clamp for gas welding.



8.6 GAS BOTTLE CONNECTION (FIG.6)

To connect a gas bottle to the welder, you may need a suitable regulator such as Draper Stock No.44509, or similar.

- i. Attach a suitable gauge gas hose (not supplied) to the large gas bottle connector (15) and secure with a hose clip, then attach the other end to a regulator and gas bottle.



9. OPERATING INSTRUCTIONS

9.1 ON/OFF SWITCH (FIG.7)

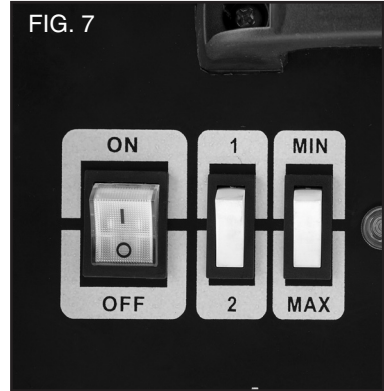
The on/off switch is a rocker switch. Press the top half in to switch the welder 'on' and the bottom half in to switch the welder 'off'.

Warning: Turning the machine switch to wrong setting for the supply voltage can cause damage that would not be covered under warranty.

9.2 WELDING CURRENT REGULATION SWITCHES (FIG.7)

The current regulation switches regulate the welders power in four steps. Min +1, Min +2, Max +1 and Max +2.

Regulate the welding current in conjunction with the wire speed to achieve the optimum arc for the workpiece thickness and type.



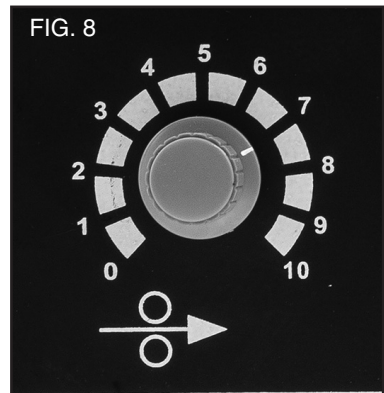
9.3 WIRE SPEED ADJUSTMENT (FIG.8)

Wire speed is dependent on material thickness, welding current and shield gas. Being able to judge the correct wire speed based on the sound and quality of the weld will only come from practice.

- Too fast will result in holes blowing in the weld or the wire hitting the metal will force the torch backward.
- Too slow will result in the wire burning back to the torch into a ball and clogging the tip.

With the spot weld function, you can select settings 1-10 to feed a set length of filler wire for each pull of the trigger for uniform spot welds.

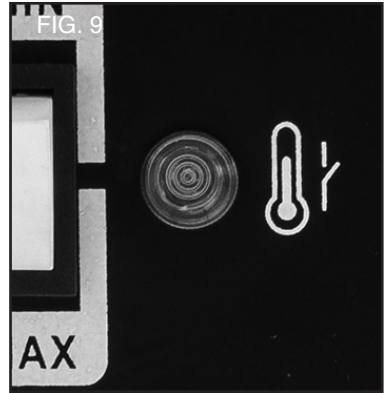
Note: When using the welder on a very low amp setting/low wire speed, it is necessary that the wire drive tension is increased on the adjustment to avoid the spool stalling.



9. OPERATING INSTRUCTIONS

9.4 THERMAL CUT-OUT (FIG.9)

If the duty cycle of the welder is exceeded, the thermal cut out will activate to prevent damage to the internal components or further overheating. When the thermal cut-out warning light is lit, the welder must be left to cool down before it can be restarted.

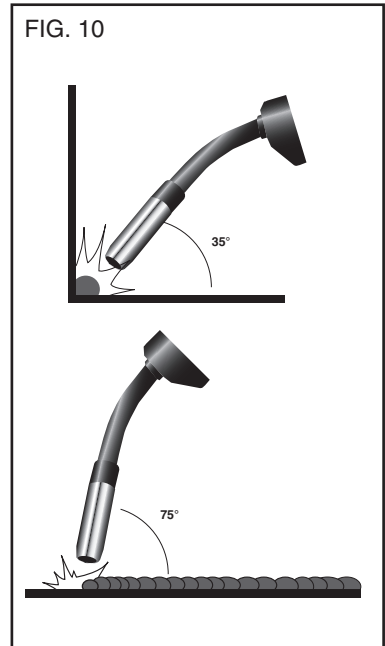


9.5 MIG WELDING PRINCIPLES (FIG.10)





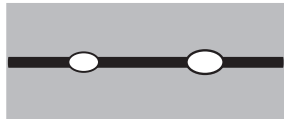
The Mig welding process allows two similar materials to be fused together without altering the properties of the material. The electric arc created between the electrode (the welding wire) and the work piece produces the required heat for turning the metal into a molten state. The gas creates a shield around the arc and the molten metal, on a no gas welder the shield gas comes from the flux cored welding wire that must be used. The shield gas required will either be CO² or Argon or a CO²/Argon mix. The choice of gas is dependent upon the material to be welded.

When operating outdoors measures to create a wind break may be necessary as a break down of the shield gas may occur resulting in a poor weld. The area to be welded and the earth point must be clean of grease, dirt, paint and rust. Clean with a wire brush as necessary. Position the earth clamp as close as possible to the working area and ensure a tight grip is achieved.

Select the welding current based on the thickness of the material. A thick piece will require a high current, however due to the duty cycle this will effect the welding time by significantly reducing it. A thin piece will only require minimal heat and so the current can be less. This will allow a longer period of welding. Ensure the gas (where applicable) flow is set on the regulator accordingly. The position of the torch is critical to the arc and end results. The position of the welding torch is important to achieve a good quality bead. Position the torch at approximately 35° vertically and 75° horizontally and up to 20mm* distance from the join. 20mm is the maximum that can be achieved on the maximum setting. Ensure the gas shroud remains clean of spatter as a build up will start to reduce the flow/effects of the shield gas. Likewise and more importantly the wire feed tip must be kept clean to avoid the wire becoming blocked or restricted. Use of an anti-spatter spray (Draper Stock No.05709) will help keep the end result more tidy.



10. TROUBLESHOOTING

EXAMPLE	TERM	CAUSE
 A cross-sectional diagram of a butt joint weld. The weld metal is dark grey, and the base metal is light grey. The weld metal does not reach the root of the joint, leaving a gap between the two pieces of metal.	Insufficient penetration	<ul style="list-style-type: none">- Incorrect arc distance.- Welding current too low.- Wire speed too low.- Welding line not central to butt.
 A cross-sectional diagram of a butt joint weld. The weld metal is dark grey, and the base metal is light grey. The weld metal is applied on top of the base metal but does not fuse to it, creating a distinct overlap.	Overlap	<ul style="list-style-type: none">- Wire size too large for application.- Torch speed too slow.
 A cross-sectional diagram of a butt joint weld. The weld metal is dark grey, and the base metal is light grey. The weld metal contains numerous small, dark, irregular spots representing pits.	Pitting	<ul style="list-style-type: none">- Contamination in the metal (eg rust).- Shield gas breakdown.- Incorrect arc distance.- Area cooling down too fast.
 A cross-sectional diagram of a butt joint weld. The weld metal is dark grey, and the base metal is light grey. The weld metal has a wavy, irregular surface, indicating it is untidy.	Untidy weld	<ul style="list-style-type: none">- Unsteady torch movement.- Worn wire tip.
 A cross-sectional diagram of a butt joint weld. The weld metal is dark grey, and the base metal is light grey. The weld metal has two distinct circular holes, indicating it has burned through the base metal.	Burn through	<ul style="list-style-type: none">- Current too high for material thickness.- Torch speed too slow.

11. MAINTENANCE

11.1 MAINTENANCE

Warning: Remove the plug from the power supply. Periodically the welder must be checked as detailed below.

- Check the gas hose, torch cable and ground cable connections.
- Clean the contact tip and the gas diffuser with an iron brush. Replace if worn.
- Clean the outside of the welder with a damp cloth.
- Every time the wire spool is replaced:
 - Check the alignment, cleanliness and state of wear of the wire roll.
 - Remove any metal powder deposited on the wire feeder mechanism.
 - Clean the wire guide liner with anhydrous solvent and grease remover and then dry with compressed air.
- Check the condition of the warning labels.
- Replace any worn parts.

12. EXPLANATION OF SYMBOLS

12.1 EXPLANATION OF SYMBOLS



Warning!
Read the instruction manual



Warning! Disable the machine
before attempting to maintain it



Thermal cut out



Danger! Electricity.
Keep your distance



Metal inert gas



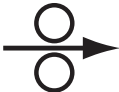
Class 1 appliance
(must be earthed).



Keep away from rain



Conforms to all relevant
safety standards.



Wire feed



WEEE
Do not dispose of Waste
Electrical & Electronic
Equipment in with domestic
rubbish



Energy input

13. DISPOSAL

13.1 DISPOSAL

- At the end of the machine's working life, or when it can no longer be repaired, ensure that it is disposed of according to national regulations.
- Contact your local authority for details of collection schemes in your area.

In all circumstances:

- Do not dispose of power tools with domestic waste.
- Do not incinerate.
- Do not abandon in the environment.
- Do not dispose of WEEE* as unsorted municipal waste.



* Waste Electrical & Electronic Equipment.

14.1 GLOSSARY

ALPHABETICAL LIST OF WORDS RELATING TO THIS MANUAL

- Duty cycle** The duty cycle is the percentage of 10 minutes that the machine can weld for at a set amperage (10%=1min up to 100%=10mins). The higher the amperage, the lower the welding time.
- Polarity** The relative orientation of electric poles.

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YOUR DRAPER STOCKIST

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