

INSTRUCTION MANUAL

AUTOMIG X



micatronic

Valid from 8647

50170005

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Only first-class materials have been used for the development and production of **MIGATRONIC** welding machines. The materials are subject to current control and quality supervision and then processed and mounted together into **MIGATRONIC** welding machines.

No matter how good materials we have used and no matter how carefully the mounting has been done, an advanced product as a **MIGATRONIC** MIG-MAG-welding machine demands your effort to operate perfectly for years.

Therefore study carefully this instruction before your initial operating. This should assure a profitable use of your new **MIGATRONIC** welding machine.

CONGRATULATIONS!

GENERAL DESCRIPTION

MIGATRONIC welding machines, type **Automig: 140 Mono X, 140 X, 180 Mono X, 180 X, 185 X, 200 X, 250 X and 300 X** have been developed for thin plate welding and car body repair.

The **Automig 140 Mono X** and **180 Mono X** are designed to normal single-phase 220-240 V plug (F+0+earth)/10 Amp(16Amp) where as the **Automig 140 X, 180 X, 185 X, 200 X, 250 X, 300 X** are designed for three-phase 220-380 V (3F+earth)/10Amp.




Automig 185 X needs only two phase wires (2F+earth)/16Amp.

The main parts of the machine are the main transformer, the contactor, the rectifier for welding current, the condenser battery (only 140 M X, 180 M X, 185 X), the control transformer, the wire feed motor, the solenoid valve and the electronic control.

The welding transformer has been dimensioned to obtain optimum welding capacities, and for a working temperature of 180°C. For further protection a thermal fuse has been incorporated which automatically cuts out the machine at 150°C. The overheating protection will switch on automatically when the transformer has cooled. The rectifier is electronically protected against overloading in case of short circuit of the welding current, the machine will cut out after approx. 3 sec.

Mode of operation: When the trigger at the welding handle is activated the contactor will couple voltage to the welding transformer which will give a secondary voltage decided by the position of the voltage switch. In the rectifier this AC voltage is transformed into a DC voltage which is applied between welding torch and return cable. At the same time the flow of protection gas and the wire feed motor are started. The number of revolutions is decided by the adjustment button. When you lift your finger from the trigger the motor will stop and after a short delay the contactor and the welding current are interrupted.

This delay which is called "burn back delay" has the effect that the welding wire will burn back a little from the molten pool and thus does not stick to the pool. The time of delay can be set by the lowest trimpotentiometer at the print card.

The electronic control can be set to the functions "seam" , "spot" , and "interval" .

At "seam" the welding will start when you press the trigger and stop when you release the trigger.

At "spot" the welding will stop after a delay that can be set by the button "welding time". Using this function you are sure of a uniform interval welding.

In the position "interval" the wire feed motor will stop with intervals that can be set by the buttons "welding time" and "pause time". When you put "pauses" into the welding, the average heat volume added is reduced to prevent a burning through on difficult welding tasks.

INITIAL OPERATING

Mains connection:

Input voltage should be as stated on the type plate of the machine. If dual voltage, the tapping must be checked before mains connection.

Shielding gas connection:

The shielding gas bottle is mounted on the machine and the regulator on the bottle. If the regulator is equipped with flowmeter, the gas quantity is adjusted on 5-15 litres/min.

Welding hose connection:

The welding hose is put through the hole in the front plate and into the switch on the wire feed console (see page 11). Keep the inlet nozzle as close to the wire feed roller as possible without letting them touch each other. Fasten the Allen screw and mount the gas hose and the control wire. Check that the hole in the inlet nozzle is in line with the groove of the wire feed roller.

Fitting the welding wire:

Turn the tension spring aside and tip it up. Check that the wire feed roller, the wire guide liner and the contact tip correspond to the wire diameter, the wire feed roller is designed for two wire dimensions and should be turned around until the outer side is showing the wire size being used. The following wire guide liner is recommended

WIRE DIAMETER FE.WIRE mm	WIRE GUIDE LINER INT.DIAM. mm
∅ 0.6 ∅ 0.8 - ∅ 1.0	∅ 1.0 (∅ 1.5) ∅ 1.5

WIRE DIAMETER AL.WIRE mm	WIRE GUIDE LINER INT.DIAM. mm
∅ 0.8 ∅ 1.0	∅ 1.5 ∅ 1.5

When using aluminium wire use a special guide liner where the internal liner goes all the way through the inlet nozzle. This prevents the aluminium wire from being damaged.

The reel of wire is put on the hub, and the wire is put through the wire feed unit and some centimeters into the hose. As the wire guide liner is vulnerable to burrs at the point of the wire, it is important to file the point of the wire in order to remove all burrs and it is equally important to straighten out the first 10-15 cm. Unscrew contact nozzle. Tip up the lever. Set the wire speed at 6, press the start button, the wire runs through the hose. When the wire is through the hose, stop the machine and mount the contact nozzle. The pressure of the lever is adjusted to allow the wire feed roller just to slide on the wire when this is stopped at the contact nozzle.

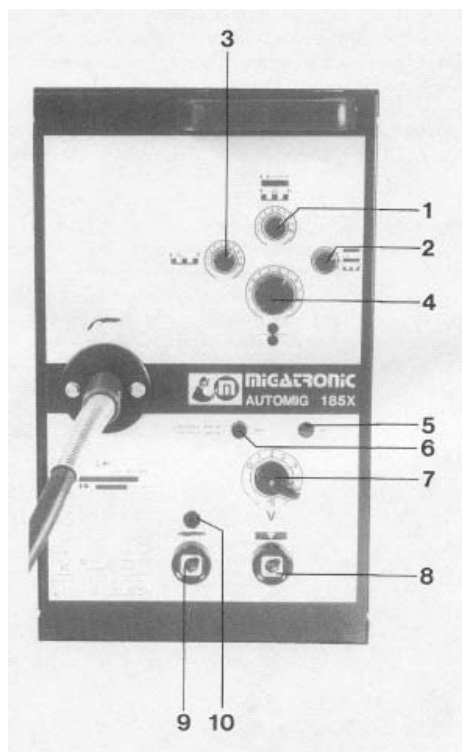
Automig 185 X

The special welding hose is mounted at the quick clutch of the machine and the Jack-sleeve and the welding handle is mounted with the desired electrode holder.

For planishing of dents with carbon the voltage switch of the machine shall be set at step 8 whereas voltage step 7 is used when welding nails or discs. Using this method it is important for a satisfactory result that you do not press the handle too hard against the workpiece as the contact resistance between nail (discs) and the piece is reduced and the desired generation of heat is decreased.

You must also take care that the return clip is in good contact with the piece and is not attached too far from the welding point.

CONTROL SWITCHES/INSTRUCTIONS



1. **Welding time:** With this switch the welding time is chosen, when 2 is in position: interval and spot.

2. **Switch:**

Seam:

The switch is set at seam. The trigger on the welding handle is activated, welding starts. By letting go the trigger you stop the welding process.

Spot:

The switch is set at spot. When the trigger on the welding handle is activated, welding starts. Welding automatically stops, depending on the time adjusted by button 1 (0.2-1.5 sec.)

Interval:

The switch is set at interval. When the trigger is activated, welding starts. The welding automatically stops, depending on the time adjusted by button 1. After an interval fixed at button 3 the same cycle continues automatically and is only interrupted when the trigger on the welding handle is released.

3. **Adjustable pausetime:** With this button the pause time is chosen, when button 2 is in position: interval.

4. **Wire speed:** With this button the wire feed speed is adjusted, depending on the welding voltage and wire diameter.
Wire speed range: 2-12 m/min.

5. **Control lamp:** Lights when the machine is on.

6. **Fuse**

7. Adjustment of welding voltage and main switch ON-OFF.

8. Earth cable (only at Automig 185X).

9. Connection for bolt welding hose (only at Automig 185 X).

10. Pilot cable for bolt welding hose (only at Automig 185 X).

WELDING TECHNIQUE

Setting of the machine

The setting of a MIG-MAG welding machine demands some practice from the welder, the machine having two control points that have to conform. These two are the wire feed speed and the welding voltage. The welding current is determined by the wire feed speed, and it should correspond to the workpiece. The current will increase with increased wire speed, resulting in a shorter arc. Less wire speed will reduce the current and lengthen the arc. Increasing the welding voltage hardly alters the current intensity, but lengthens the arc. By decreasing the voltage a shorter arc is obtained with little change in current intensity.

When using CO₂ as shielding gas, increase the voltage by about 5 Volts per 100 Amp.

When changing the wire diameters, different control settings are required. A thinner wire needs more speed to acquire the same current strength. A satisfactory weld cannot be obtained if extreme values are exceeded.

If the feed speed is too high for the welding voltage, blockage will occur in the torch as the wire dips into the molten pool and does not melt. Welding in these conditions normally gives faults due to lack of fusion. If, however, the welding voltage is too high, large drops will form on the end of the wire, causing spatter.

The correct setting of voltage and speed can be seen in an even and calm arc.

See tables.

Influence of the welding position

The position of the torch and the work piece is important for the quality and appearance of the seam.

The diagrams on the next page show some of the many possibilities and indicate schematically the importance of these positions. In practice one of course uses all combinations of welding positions, torch directions and positions of the work piece.

Together with the figures, the diagram below may help when an estimation of the importance of separate factors for welding quality is needed.

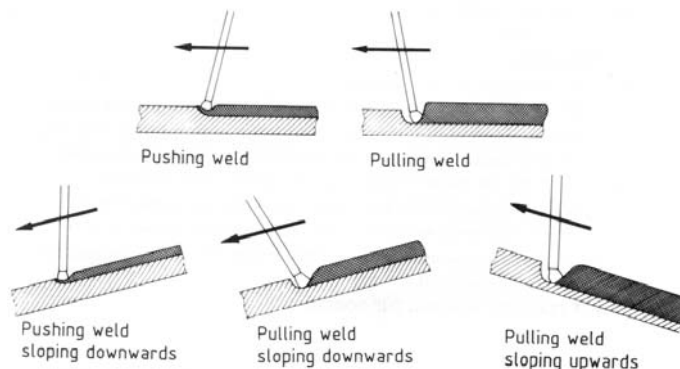
The terms drawing weld and thrusting weld mean:

Drawing weld: torch sloped in direction of weld

Thrusting weld: torch sloped away from direction of weld.

Drawing weld is sometimes designated "dragging welding" and thrusting weld "stabbing" welding

	Thrusting weld	Drawing weld
Width of seam	wider	narrower
Upper bead	smaller	larger
Penetration	decrease	increase
Tendency to lack of fusion	greater	lesser



MAINTENANCE

The following items demand special attention:

Wire feed unit

This unit is to be checked regularly at the wire feed roller and the wire nozzles, as it is of great importance for a satisfactory welding result and a minimum of wear and tear that the wire passes through the mechanism without any deformations of the wire or the wire feed roller.

The wire nozzles should often be checked and changed if the copper coating of the wire is damaged on its way through the nozzles. Copper dust may totally hinder free passage through the wire liner.

A weekly check and cleaning of the nozzles as well as the wire feed roller is recommended.

Welding hose

Great care should be taken that the welding hose is not overloaded. It should not be pulled over sharp edges, and other heavy machines should not run over it as it may damage the wire lines. The hose should be dismantled every week and blown out with dry air.

Welding torch

There are many parts in the welding torch that have to be cleaned regularly. The main ones are the contact tip and the gas nozzle. During the welding process, these parts are bombarded with spatter that sticks in the nozzles. This may disturb the shielding gas flowing from the gas nozzle down to the molten pool.

Otherwise, if the gas nozzle is blocked up with spatter, there is a danger that a short-circuit will occur between the contact tip and the gas nozzle. The spatter should therefore be removed regularly and spatter remover applied in order to prevent spatter from burning into the nozzles. During the cleaning process, the gas nozzle should be removed.

DO NOT CLEAN BY BEATING THE TORCH

Power source

The rectifier and transformer should be blown out with dry air occasionally, otherwise the air circulation will be affected by the dust.

FAULTS

FAULT:

Too little welding effect
The welding seam forms a bead.

PROBABLE CAUSE:

1. One of the three fuses in the main switch is not working (one phase is missing).
2. The welding voltage is too low.
Switch one setting higher.

The wire feed is blocking.

1. The inlet nozzle and the wire are not in alignment with each other.
2. The reel of wire is too taut, the wire must come off the reel evenly.
3. The inlet or contact tip is worn out or is blocked up.
4. The welding wire is not clean or it is rusty. It could also be of an inferior quality.
5. The pressure roller has to be tightened.

Spatter

1. The wire feed is too fast for the voltage setting.
2. Worn out contact tip.

Porous weld.
A cone is formed when spot welding

1. Insufficient gas - not enough pressure or the bottle is empty.
2. Contact tip is blocked up.
3. Leakage - air is pumped in and mixes with the shielding gas.

The arc does not look normal, and there is a lot of spatter

1. The material is dirty, underseal or paint.

The wire keeps sticking in the contact tip and is very slow

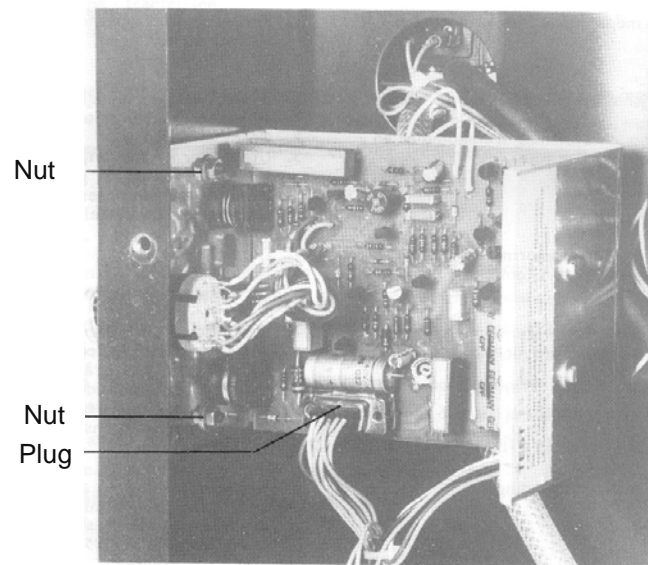
1. The wire can be malformed.
The damaged wire should be cut off, pulled out and replaced. The pressure on the wire feed roller should be checked.
2. Worn out contact tip.

No welding voltage

1. Working voltage interrupted due to overloading of the transformer. Automatic switch on after cooling (15-30 min.).

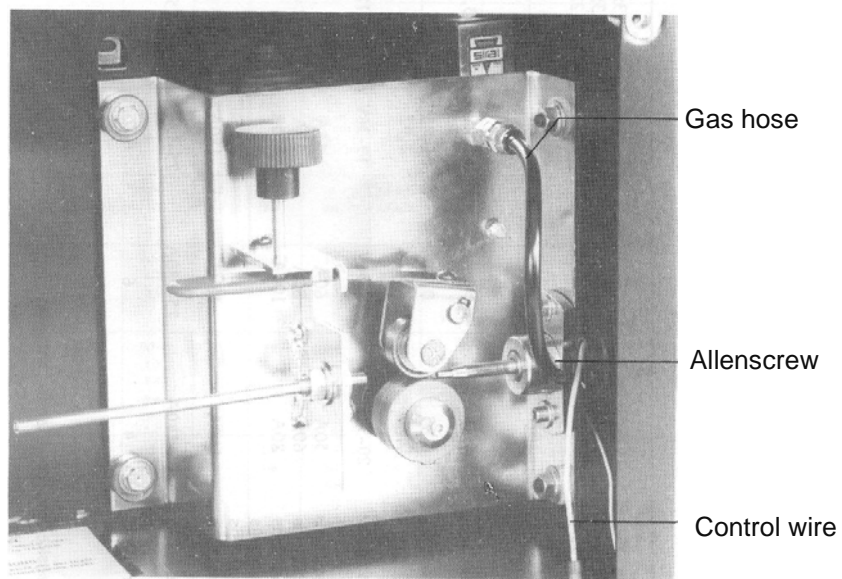
REPLACEMENT OF CONTROL UNIT

1. Switch off current.
2. Remove buttons on the front plate.
3. Remove side panel.
4. Disconnect multiplug outlets and unscrew the nuts.
5. Dismount potentiometer for pause time.
6. Pull out control unit.
7. Mount the new control unit inversely.
8. Do not connect the machine before the multiplug is in the right place.



REPLACEMENT OF WIRE GUIDE LINER

1. Unscrew the Allen screw, disconnect the gas hose and the control wire, pull out the welding hose.
2. Dismount the welding torch.
3. Unscrew the Allen screw for fixing the wire guide liner. The nozzle to which the wire guide liner has been fixed can now be pulled out to the rear.
4. Push in the new wire guide liner. During the mounting the hose should be in as straight a line as possible.
5. Press home the nozzle and screw the Allen screw for fixing the wire guide liner.
6. Cut the liner so that it is in line with the outer edge of the connection nipple. If the wire guide liner is of plastic, cut it with a sharp knife.
7. Mount the welding torch.
8. Connect the welding hose as explained page 5.



TECHNICAL DATA

	140 MX	180 MX	185 X	140 X	180 X	200 X	250 X	300 X
Mains voltage 50 Hz	1x220V	1x220V	1x380V	3x380V	3x380V	3x380V	3x380V	3x380V
Mains voltage 50 Hz	1x240V	1x240V	1x415V	3x415V	3x415V	3x415V	3x415V	3x415V
Mains voltage 50 Hz			1x220/380V	3x220/380V	3x220/380V	3x220/380V	3x220/380V	3x220/380V
Fuse 220/240V	10A	16A	25A	10A	16A	16A	16A	25A
Fuse 380/415V			16A	10A	10A	10A	10A	16A
Consumption max.	2.6 kVA	6.3 kVA	5.3 kVA	3.5 kVA	4.5 kVA	6.2 kVA	9.2 kVA	12.2 kVA
Efficiency	0.85	0.85	0.85	0.85	0.85	0.85	0.82	0.82
Cos. phi.	0.90	0.95	0.92	0.89	0.85	0.87	0.87	0.87
Open circuit voltage	20-31V	20-36V	19-36V	18-25V	17-31V	15-31V	15-37V	16-44V
100% duty cycle	50A	60A	65A	45A	65A	95A	145A	165A
60% duty cycle	60A	80A	85A	60A	85A	125A	185A	210A
35% duty cycle	80A	100A	110A	75A	110A	160A	220A	260A
25% duty cycle						200A	250A	300A
20% duty cycle								
15% duty cycle	140A	180A	180A	115A	180A			
Current range	25-140A	25-180A	25-180A	25-140A	25-180A	25-200A	25-250A	25-300A
Voltage adjustment	4	6	6+2	4	7	10	10	10

Available for other mains voltages

TABLES FOR SETTING OF THE MACHINE

These tables are only intended as a guide, as the datas may change depending on the length of the arc, the torch handling and the position of the welding seam.

Furthermore, the values change if the mains voltage is appreciably above or beneath 380V (220V). The values are based on CO₂ shielding gas.

When welding with mixed gas as shielding gas, wire speed should be increased by about 10 or welding voltage should be decreased by about 10 (1-2 steps).

SEAM- AND INTERVAL WELDING								SPOT WELDING			
		0.6 mm		0.8 mm		1.0 mm				0.8 mm	
	Material thickness mm	Welding voltage setting	Wire speed	Welding voltage setting	Wire speed	Welding voltage setting	Wire speed	Material thickness mm	Welding voltage setting	Wire speed	Welding time
140 MX	0.5-1 1-2	2-3 3-4	2-4 5-8	2-3 3-4	2-3 3-4.5						
180 MX	0.5-1 1-2 2-4	2 3-4	2-3.5 4-5	2-3 3-4 5	2-3 3-3.5 8			0.5+0.5 1+1	5 5-6	5 5-7	0.5 1-2
185 X	0.5-1 1-2 2-4	2-3 3-4	2-3.5 3.5-5	2-3 3-4 5-6	2-3 3-4 5-7			0.5+0.5 1+1	5 5-6	5 5-7	0.5 1-2
140 X	0.5-1 1-2	1-2 3-4	3-5 5-6	2 3-4	2.5-3.5 3.5-4.0						
180 X	0.5-1 1-2 2-4	3-4 5-6	2.5-3.5 6.5-8.5	3-4 4-5 5-7	2-3 3-4.5 4.5-6.5			0.5+0.5 1+1	7 7	7-8 7-9	1 2-4
200 X	0.5-1 1-2 2-4 4-6	2-3 4-5	3-4 4-6	2-3 3-5 5-7 7-9	2-3 3-4 4-6.5 6.5-10			0.5+0.5 1+1	9 10	7-8 10	0.8 1
250 X	0.5-1 1-2 2-4 4-6	1-3 4-5	2-3 4-6	2-3 3-5 5-6 7-10	2-3 3-4 4-7 6-10	2-3 3-4 5-6 7-9	0.5-1 1-2 2-3 3-4	0.5+0.5 1+1	8 9	7 8-10	0.8 1

