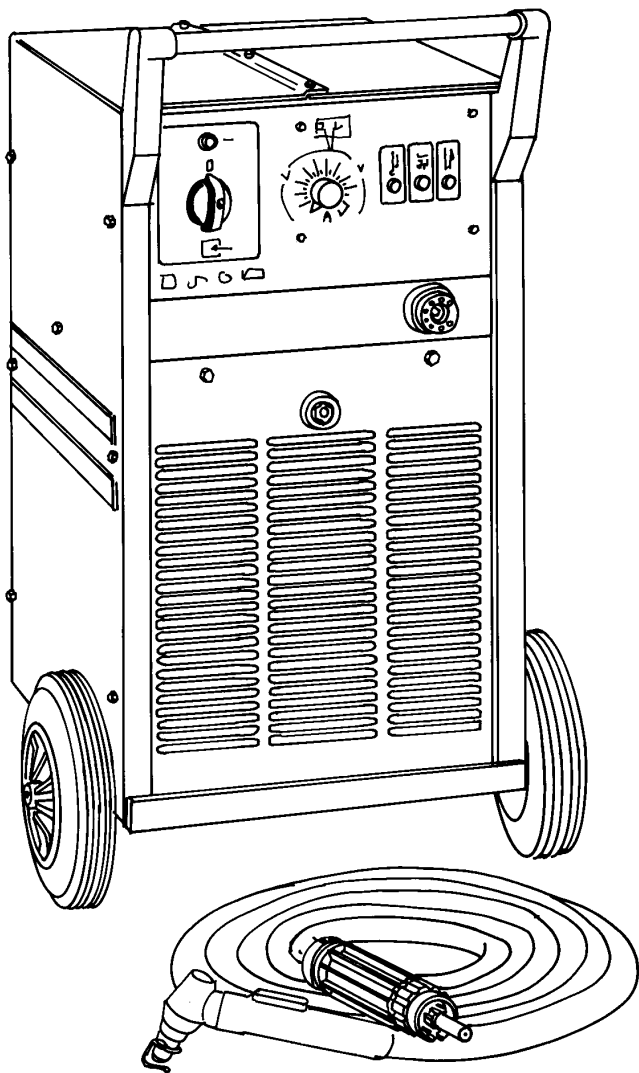


OPERATING INSTRUCTIONS MANUEL D'INSTRUCTIONS MANUAL DE INSTRUCCIONES

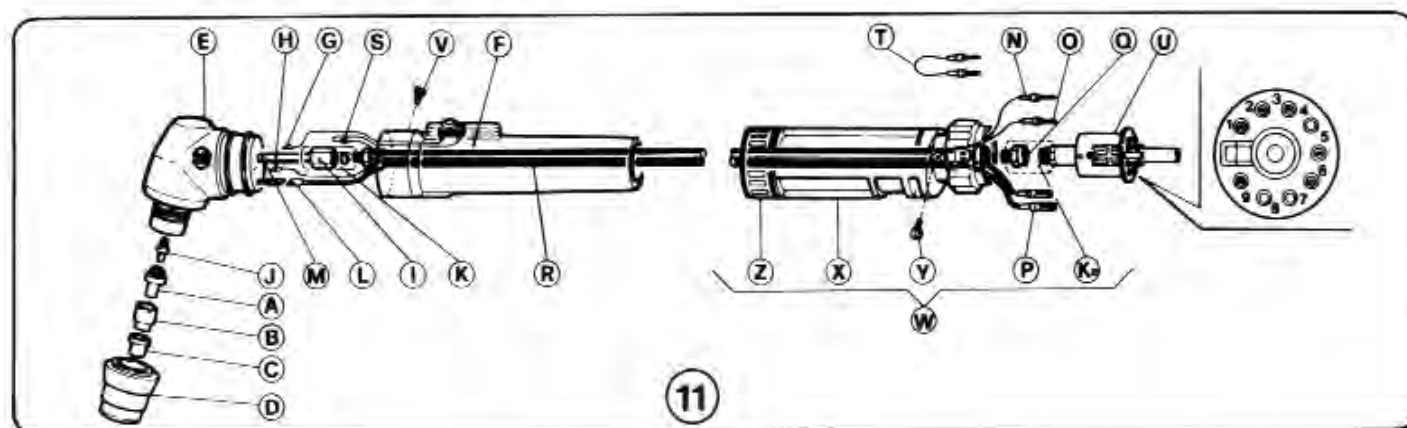
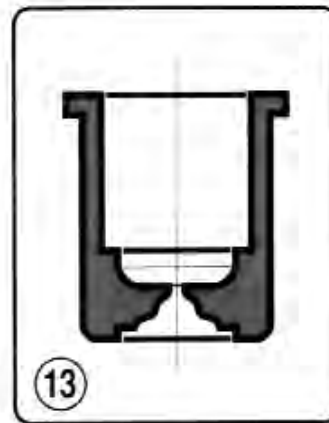
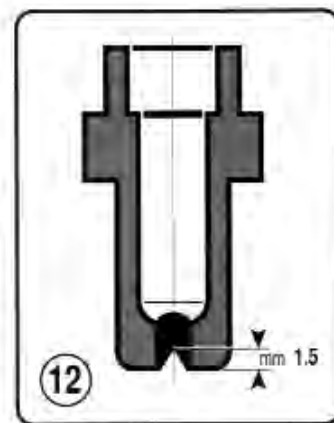
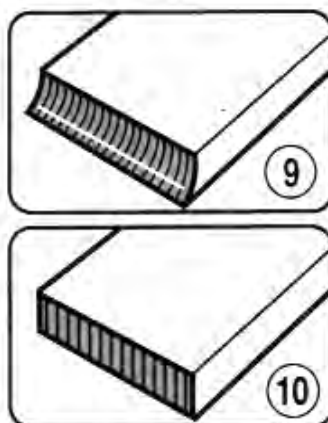
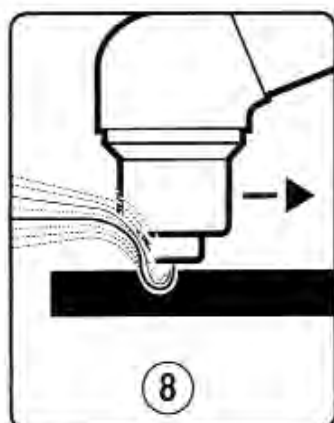
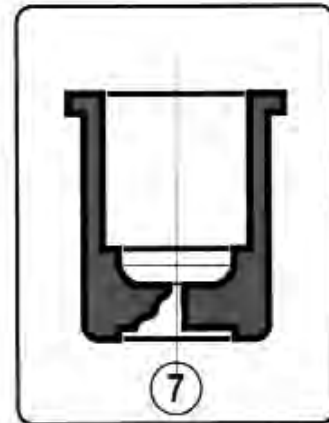
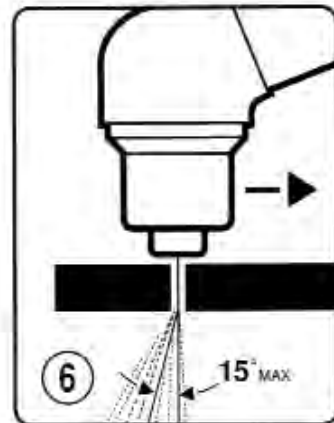
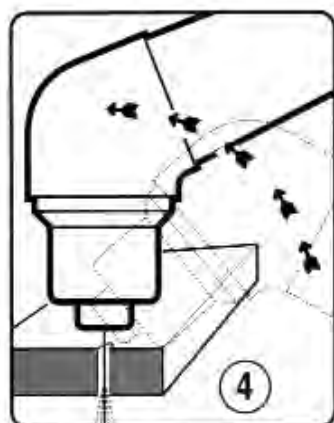
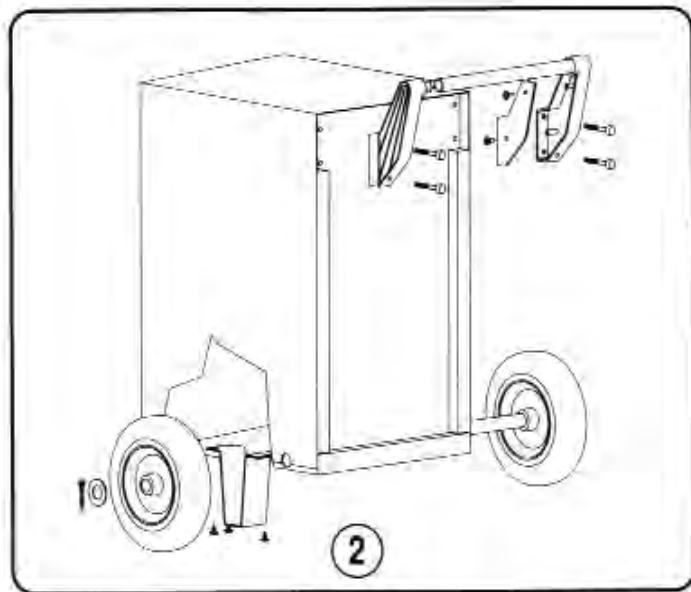
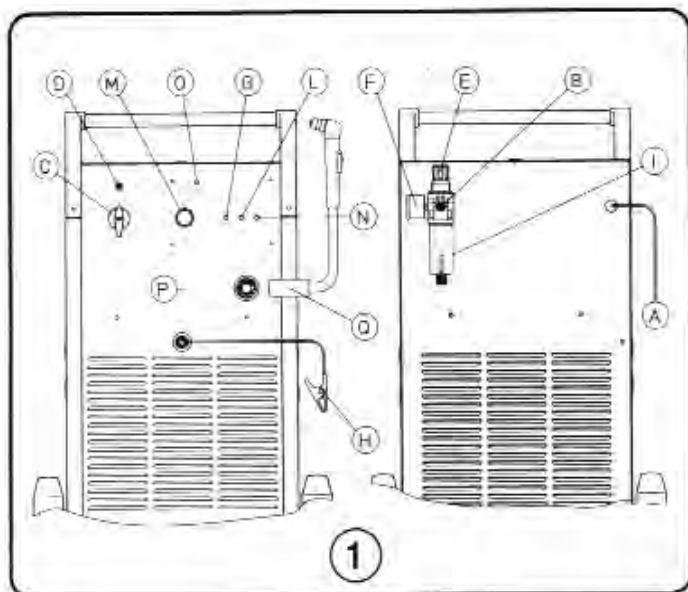
FOR MODELS:
SERIES A

M12152
83-384



IMPORTANT OPERATING INSTRUCTIONS
SAVE THESE INSTRUCTIONS

3.300.735



INSTRUCTION MANUAL FOR PLASMA CUTTER

IMPORTANT

Before using this device all people authorized to use, repair or control, should read the following instructions of safety and use.

Remember: YOUR SAFETY DEPENDS ON YOU!!!

Follow all safety rules and instructions.

It is your job to protect yourselves and others against the risks related to cutting.

Operator is responsible for his own safety and the safety of others in the work area. He must know all safety rules and obey them.

NOTHING CAN REPLACE GOOD COMMON SENSE!!!

Always use original spare parts so as to ensure the safety of unit and torch.

BASIC SAFETY PRECAUTIONS

ELECTRIC SHOCK



Electric shock can kill. All electric shocks are potentially fatal.

This plasma cutter requires high voltages for arc spark starting (approx. 250 " 300 V). The following safety rules must be therefore observed when using the unit:

- Do not touch live parts.
- Insulate yourselves from the piece to be cut and from earth by wearing insulating gloves and clothing
- Keep your clothing (gloves, shoes, hats, dresses) and body dry
- Do not work in humid or wet areas
- Avoid touching or holding by hand the piece to be cut
- Always arrange for a proper insulation against electric shock.

Should you work close to or in a dangerous area use all possible precautions.

- If you feel even the slightest electric shock sensation, stop cutting at once. Do not use the machine until the problem is identified and solved.
- Always fit an automatic wall switch with adequate power, if possible close to the machine so as to immediately switch the unit off in an emergency event.
- Check often mains cable, torch cable, earth cable and torch. Never use the unit when one of them is damaged. Replace them immediately.

- Disconnect mains cable from mains before replacing cables or before removing unit covers.
- Always switch the unit off or disconnect it before replacing nozzle, swirl ring, electrode or nozzle holder.
- Do not use the unit without protecting covers.
- Always replace any damaged parts of the unit, torch and cables with original material.
- Never remove torch or unit safety devices.
- Make sure that the supply mains line is equipped with an efficient earth plug.

Any maintenance should be only carried out by qualified personnel aware of the risks due to dangerous voltages necessary to make the unit work.

ATTENTION: Never screw nozzle holder D (see picture 11) to torch body E without fitting consumables electrode A, diffuser B, nozzle C.

RADIATIONS



Ultraviolet radiations created by the arc may damage your eyes and burn your skin. Then:

- Wear proper cloth and helmets.

- Do not use contact lenses!! The intense heat coming from the arc may stick them on the cornea.
- Use masks with grade DIN 10 safety lenses, at least.
- Protect people surrounding the cutting area.

FUMES



Cutting operations give off fumes and harmful metal dusts which may damage health, therefore:

- Do not work in areas without proper ventilation.
- Keep your head out of fumes.
- In closed rooms use suitable exhaust fans, placed under the cutting area, if possible.
- If ventilation is not enough, use breathing sets approved for this procedure.
- Clean the material to be cut off solvents or halogen degreasers giving rise to toxic gases when cutting: some chlorine solvents may decompose with radiations emitted by the arc and create phosgene gas.
- Do not cut plated metals or metals containing lead, graphite, cadmium, zinc, chrome, quicksilver or beryllium unless you have a proper breathing set.
- The electric arc creates ozone. After long exposure to high concentrations of ozone you may have headache, nose, throat and eyes irritation as well as serious congestion and breast pains.

IMPORTANT: DO NOT USE OXYGEN FOR VENTILATION.

FIRE



- Avoid producing fire because of sparks, hot metal or pieces.

- Make sure that suitable fireproof devices are available close to cutting area.
- Remove from cutting area and surrounding area (33 feet at least) all inflammable and combustible material.
- Do not cut containers of combustible or lubricating material, even when empty. These should be carefully cleaned before being cut.
- Let the material cut cool down before touching it or putting it in contact with combustible or inflammable material.
- Do not cut parts with hollow spaces including inflammable material.
- Do not work under conditions of high concentration of combustible vapours, gases or inflammable dust.
- Always check the work area half an hour after cutting so as to make sure that no fire is starting to burn.

BURNS

- Wear fire-proof clothes all over your body to protect your skin against burns caused by ultraviolet radiations from the arc, from sparks and hot metal.
- Wear no turn-up trousers to prevent sparks and metal to deposit in them.
- Wait for the torch to be cooled down and then switch the unit off before touching the front side of the torch.
- Torch is provided with a pilot arc, then as soon as you press the button, the plasma spark starts even if earth cable is not connected. Avoid directing jet towards your own body or towards other people surrounding the cutting area.
- To prevent spark to start by chance, always switch the unit off before putting down your torch.
- Do not carry combustible material, such as lighters or matches in pocket.

EXPLOSIONS



- Do not cut above or near containers under pressure.
- Do not cut in environments containing explosive dusts, gases or vapours.

This plasma cutter uses compressed air to work; should you use compressed air bottles follow suitable precautions:

A) BOTTLES

- Do not directly connect bottle to reducing unit without a pressure regulator; pressure might exceed the reducing unit capacity making it explode.
- Feeding pressure must not exceed 120 PSI (8bar/KPa x100)
- Handle or use pressure bottles in conformity with the existing rules.
- Do not use leaking or damaged bottles.
- Do not use not well fixed bottles.
- Do not carry bottles whose content is not clearly identified.
- Never lubricate bottle valves with oil or grease.
- Do not put electrically in contact bottle with plasma arc.
- Do not expose bottles to excessive heat, sparks, hot metal or flames.
- Do not tamper bottle valves.
- Do not try to loosen all tight valves by means of hammers, keys or something else.

B) PRESSURE REGULATORS

- Keep pressure regulators in good conditions. Damaged regulators may give rise to damage or accidents; they should only be repaired by skilled personnel.
- Do not use regulators for gases other than those they are manufactured for.
- Never use a leaking or damaged regulator.
- Never lubricate regulators with oil or grease.

C) AIR HOSES

- Replace air hoses if damaged.
- Keep hoses unwound so as to avoid from bending.
- Keep the exceeding hose wound and keep it out of the working area so as to avoid any damage.

NOISE



These power sources alone do not produce noise levels exceeding 80 dB. The cutting procedure, however, may produce noise levels in excess of 80 dB in which case the operator must take the necessary safety precautions as prescribed by the national safety regulations.

PACEMAKER

Magnetic fields created by the high currents in the cutting circuit can affect pacemaker operation. Persons wearing electronic life support equipment (pacemakers) should consult their doctor before going near any arc welding, gouging, cutting, or spot welding equipment in operation.

SAFETY DEVICES: indicator lights on front of machine

This unit is provided with the following safety devices:
Thermic: located on the power transformer windings to avoid overloads and signalled by indicator light G on (see picture 1).

Pneumatic: located on the torch feed line to avoid insufficient air pressure and signalled by indicator light L (see picture 1).

Electric: 1) located on torch body to avoid dangerous voltages while replacing nozzle, diffuser, electrode or nozzle holder.

2) To stop the unit when the electrode is so worn that it is required to be replaced. This second function is signalled by indicator light (N) (picture 1).

• **Do not remove or short-circuit the unit safety devices.**

• **Only use original spares.**

• **Always replace any damaged part of the unit or torch with original material.**

• **Do not use any torches other than the original one.**

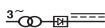
• **Do not let the unit work without covers. This would be dangerous for operator and for those who are surrounding the work area and would prevent the unit from cooling efficiently.**

DESCRIPTION OF TECHNICAL SPECIFICATIONS

IEC 974.1 This machine is manufactured according to EN 60947.1 these international standards.

N°. Machine Serial Number which must appear on requests or inquiries concerning the machine.

Three-phase transformer-rectifier.



Drooping characteristic.



P.A.C. Plasma Arc cutting.

U₀. Secondary no-load voltage

X. Duty-Cycle Percentage

The duty-cycle is the number of minutes, expressed as a percentage, the machine can operate (arc on) within a ten minute period without overheating. The duty cycle varies according to the output current.

I₂. Output cutting current

U₂. Secondary voltage, cutting current = I₂

U₁. Nominal supply voltage

3~50/60Hz Three-phase input supply at 50 or 60 Hz







I₁. Input Amps absorbed corresponding to different output levels (I₂).

IP21. Machine case protection class.

The 1 in the second digit place means that this unit is not fit to work outdoors in the rain.

Fit to work in hazardous areas.



		N°			
		EN 60974-1			
 P.A.C. TORCH TYPE	 U ₀ - V PEAK	- A / - V - - A / - V			
		X	- %	- %	
		I ₂	- A	- A	
		U ₂	- V	- V	
 					
- ~ 50 Hz	U ₁	- V - V	I ₁	- A - A	- A - A
PROTEZIONE TERMICA THERMAL PROTECTION PROTECTION THERMIQUE THERMISCH GESCHÜTZ PROTECCION TERMICA		IP 21 CL. H		VENTILAZIONE FORZATA FORCED VENTILATION VENTILE KUHLART F VENTILACION FORZADA	

NOTE: This machine has also been designed to work in class 3 pollution areas (see IEC 664)

DESCRIPTION OF UNIT DEVICES (see picture 1)

- A) Feed cable
- B) Compressed air fitting (1/4" female gas thread)
- C) Mains switch
- D) Mains pilot light
- E) Air pressure reducing unit
- F) Gauge
- G) Light signalling thermostat is open
- H) Work clamp
- I) Water trap
- L) Light signalling air pressure is not enough
- M) Cutting power adjusting knob
- N) Light signalling electrode is worn out producing a dangerous condition
- O) This warning lights up to indicate that you must not cut with the nozzle in contact with the workpiece.

ASSEMBLY AND ARRANGEMENT

Unpack the unit, fit wheels, stand and handle following the instructions of picture 2. Place the unit in properly ventilated if possible undusty room making sure that the air inlet and outlet from cooling slots are not obstructed.

Fit torch on the unit Fig. 1 by tightening the adapter ring nut (Q) to the fixed fitting (P) thus avoiding air leaks damaging torch working. Pay particular attention not to dent the power pin and not to bend the adapter pins (Q); a dented pin cannot be disconnected, once fit, from the fixed fitting (P); a bent pin prevents the adapter (Q) from being correctly mounted on the fixed fitting (P) and the unit from working.

This machine is suitable for MARQUETTE torch M15823 only, and MARQUETTE does not assume any responsibility in case that a different kind of torch is used.

SETTING AT WORK

The unit must be installed by skilled personnel. All fittings must be in conformity with the existing rules and in full compliance with safety regulations.

Connect the air feed to fitting **B** making sure that pressure is 88PSI (6bar or KPa X100) at least with a minimal capacity of 420 CFH (200 liters/min.)

Should air feed come from a pressure reducing unit of a compressor or of a centralized plant, the reducing unit should be adjusted at the highest output pressure which should not exceed 120 PSI (8bar or KPa x100). Should air feed come from a compressed air bottle, this should be provided with a pressure regulator; **never connect compressed air bottles directly to the reducing unit! Pressure may exceed the reducing unit capacity and then explode!**

Check that the mains power supply matches that indicated on the rating plate attached to the power supply cable. If this is not the case, change the connections on the change voltage terminal board inside the equipment.

Connect supply cable **A**: the yellow-green wire of cable must be connected to an efficient earth ground plug of the system, the remaining wires should be connected to the feed line by means of the switch placed, if possible, close to the cutting area so as to switch the unit off quickly if necessary.

The magnetothermic switch capacity or of fuses in series with switch should be equal the current I_1 absorbed by the unit.

Current I_1 absorbed is known by reading the technical specifications on the unit i.e. feed voltage U_1 available. Any extensions should have adequate sections for current absorbed I_1 .

USE

Switch the unit on by turning knob **C** of the mains switch; this is shown by light **D** which is on.

By pressing for a second the torch button, the compressed air flow is opened. Check that, under this condition, the pressure shown on gauge **F** is about 75 PSI (4,5"4,7 bar or KPaX100), otherwise adjust it by means of knob **E** of reducing unit, then lock this knob by pressing it down. Connect work clamp **H** to the piece to be cut.

Set the cutting current by means of the knob **M**.

Use the \varnothing 1 mm nozzle up to 45"50 A and the \varnothing 1,2 mm one from 45 to 70 A.

N.B. Cut quality is greatly improved if the nozzle is kept at a distance of approx. 2 mm (3/27") from the workpiece. Often for practical reasons, however, cutting is performed with the nozzle in contact with the workpiece. Cutting with the nozzle in contact with the workpiece must not be performed at currents above 45A as this leads to rapid (sometimes even instantaneous) destruction of the nozzle hole; this in turn leads to poor cutting quality.

When the red warning light (O) lights up this indicates that cutting must be performed using the spring or the spacer.

Clean the work piece to ensure good electrical contact of the work clamp.

Do not connect work clamp to the material to be removed. Press torch button to start pilot arc, if cutting does not start after 2 or 3 seconds, the pilot arc turns off and the button should be pressed again to repeat the operation.

When possible, the torch should be pulled. Pulling is easier than pushing.

Keep torch in vertical position when cutting.

Once cutting is over and after releasing button, air continues to flow out of the torch for about 40 seconds so it enables torch to cool down. It is recommended not to turn the unit off before that time.

Should holes be drilled or should the piece be cut starting from its center, torch should be tilted and then slowly straighten to prevent molten metal from being spread on nozzle (see picture 4). This operation should be carried out with material thickness above 1/8"(3 mm). If you have to cut near angles or recesses (see picture 5) it is recommended to use extended electrodes and nozzles. Should circular cut be done it is recommended to use caliper (supplied on request).

Avoid keeping pilot arc uselessly on, in air to avoid electrode, diffuser and nozzle consumption.

CUTTING TROUBLE

1) Insufficient penetration

This may be due to:

- high speed. Always make sure that arc thoroughly passes through the piece to be cut and that it is not tilted, when going forward, by a percentage above 10 " 15° (see picture 6). It is thus avoided to wear nozzle (see picture

7) out and to burn the nozzle holder (see picture 8).

- Excessive thickness of piece (see graph of cutting speed and thickness)
- Work clamp H not properly in electric contact with piece
- Worn nozzle and electrode
- Too low cutting current.

When the unit does not thoroughly pass through, nozzle is clogged by scums.

2) Cutting arc switches off

This may be due to:

- worn nozzle, electrode or diffuser
- too high air pressure
- too low feed voltage

3) Tilted cutting

When cutting is tilted (see picture 9) switch the unit off, loosen nozzle holder and turn nozzle by a quarter turn, then lock and try again.

Repeat until cutting is straight (see picture 10).

4) Excessive wear of consumable parts

This may be due to :

- a) too low air pressure with respect to the recommended one
- b) excessive burns on the end part of nozzle holder.

PRACTICAL RECOMMENDATIONS

- If the system air contains much humidity and oil it is required to use a drying filter to avoid excessive oxidation and wear of consumable parts, to avoid torch damage or to reduce speed and quality of cutting.
- Impurities of air favour oxidation of electrode and nozzle and make it difficult to start pilot arc. If this occurs, clean the end part of electrode and inside the nozzle with fine abrasive paper.
- Make sure that new electrode and nozzle to fit are clean and degreased.
- To avoid damage of torch always use original spares.

TORCH MAINTENANCE

Always disconnect the unit before any repair of torch.

1) Replace wear parts (picture 11)

The parts subject to wear are electrode **A**, diffuser **B** and nozzle **C**. Either part may be only replaced after loosening nozzle holder **D**.

Electrode **A** should be replaced when a 1/16" (1.5 mm) deep crater is created in the middle (see picture 12).

ATTENTION! Do not make sudden stresses when unscrewing the electrode, but gradually force so as to have the thread unlocked. Lubricate the thread of the new electrode with silicone lubricant (on supply with the unit). This new electrode is required to be screwed in its housing and locked without tightening.

Nozzle **C** should be replaced when its central hole is damaged or enlarged with respect to the new part (see picture 13).

Use of worn electrode quickly wears out the nozzle.

Excessive use of electrode causes overheating and reduces the life of diffuser **B**.

Make sure that after replacing it, nozzle **D** is tight enough.

ATTENTION! Nozzle holder **D should be only screwed on head when electrode **A** diffuser **B** and nozzle **C** are assembled.**

2) Replace torch body **E (see picture 11).**

Withdraw handle **F** from body **E** by swaying it and making sure that button wires are not torn when separating both parts. Withdraw the **G** and **H** safety contacts wires.

Withdraw the contact **L**. Unscrew fitting **I** after cutting the insulating hose **K**.

Assemble the new body of torch making all above operations inversely.

Fitting **I** is insulated by shrink hose **K** stuck to the fitting when heated by a small source (ex. a lighter).

Before replacing handle make sure that cables are far away from each other and that fittings are tightly secured.

3) Substitution of adapter (W**) (see picture 11)**

Remove ring nut (**Z**) and cut the clamps locking cable (**R**). Loosen screw (**Y**) and extract cover (**X**). Extract the control cable pins (**N**) and (**O**) and the red cable pins for pilot arc (**P**). Cut the insulating sheath (**K2**) and loosen the adapter body (**U**) from connector (**Q**). Fit the new adapter body carrying out all previous operations in reverse order. Use sealing adhesive for threads in order to lock the adapter body thread (**U**) on connector (**Q**). Pins (**N**) and (**O**) of the control cable should be connected to contacts (1) and (9) of adapter body (**U**). Pins (**P**) of the red cable for pilot arc should be connected to contacts (5) and (6) of adapter body (**U**). Sheath (**K2**) acts as insulating material and adheres to connector (**Q**) after warming it up.

4) Replacement of cable **R (see picture 11)**

To replace cable follow instructions as per pos.2 and 3 and connect **S**.

N.B.: Fitting **S should be properly insulated.**

5) Replacement of handle with button.

To replace handle with button it is required to follow instructions as per pos. 2.

MAINTENANCE AND CONTROL

It is recommended to keep nozzle free from slag.

Avoid using sharpened bodies thus avoiding damaging the nozzle hole.

Even if the unit is provided with an automatic device for water discharge, working whenever air feed is closed, it is recommended to check from time to time that no water remains in trap **I** of reducer (picture 1).

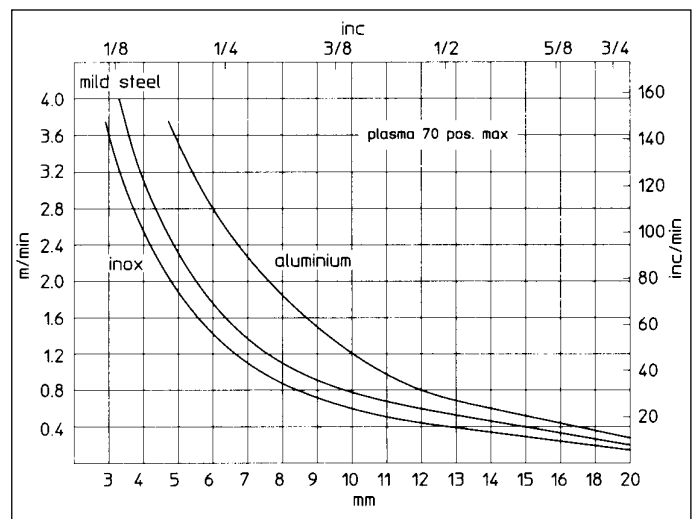
It is required to clean from time to time the unit inside and make it free from metal dust by means of compressed air.

Operations to be carried out inside the unit must be effected after disconnecting feed cable.

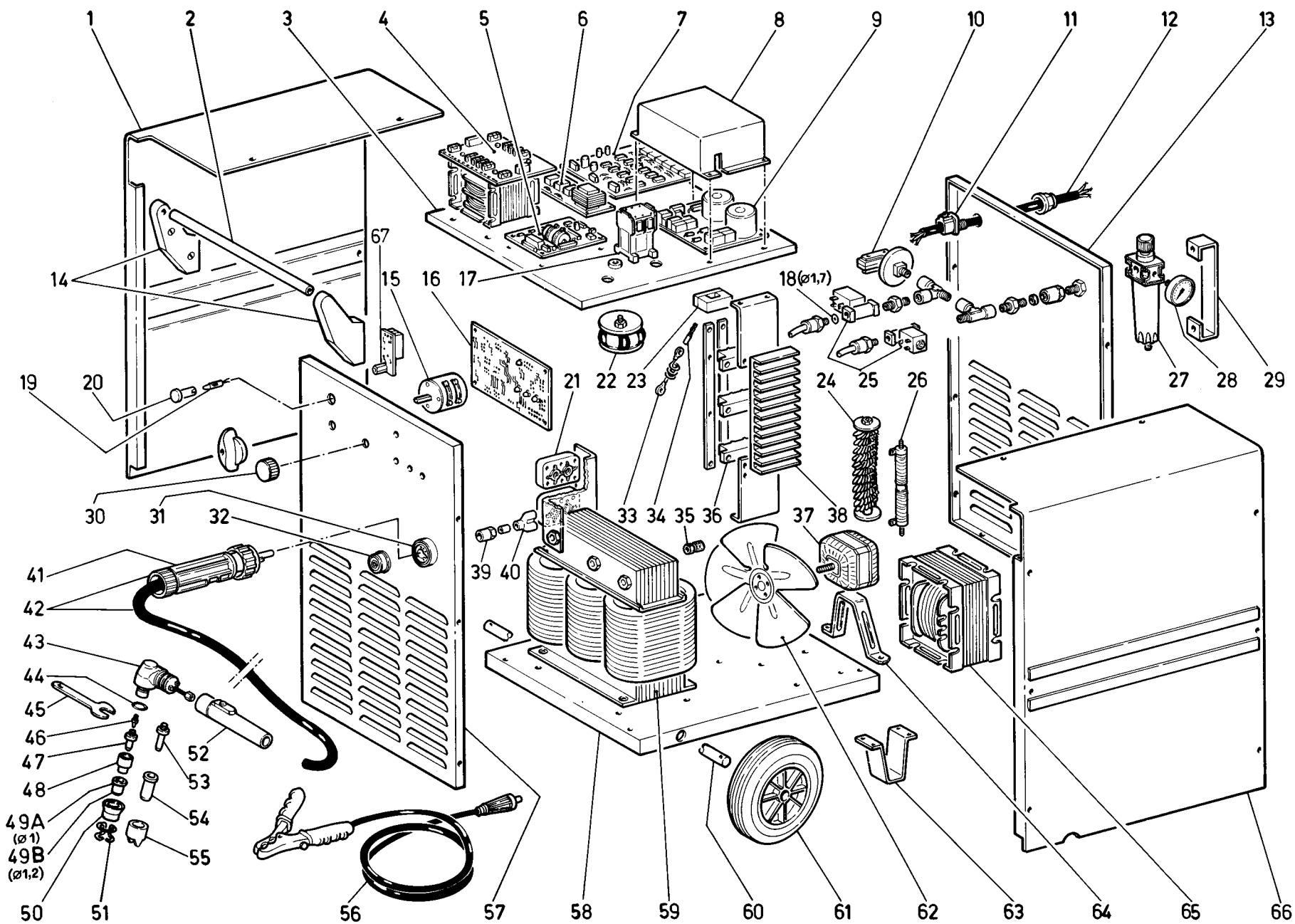
not started, check the following:

- air pressure is enough.

CUTTING SPEED SCHEME



	WIRING DIAGRAM COLOUR CODE
A	BLACK
B	RED
C	GREY
D	WHITE
E	GREEN
F	PURPLE
G	YELLOW
H	BLUE
K	BROWN
J	ORANGE
I	PINK
L	PINK-BLACK
M	GREY-PURPLE
N	WHITE-PURPLE
O	WHITE-BLACK
P	GREY-BLUE
Q	WHITE-RED
R	GREY-RED
S	WHITE-BLUE
T	BLACK-BLUE
U	YELLOW-GREEN
V	BLUE



M12152, 83-384 70 Amp 3 Phase Plasma Cutter

Item	Lincoln Stock #	Customer #	Description
1	411-109-026	250907	Left Side Panel
2	312-512-666	250728	Handle
3		250725	Center Divider
4		251204	Control Transformer
5		250891	Filter Circuit
6		250727	Synchronism Circuit
7		251205	Reg. Circuit Board
8		251014	Cover
9		250892	High Voltage Circuit
10	246-532-666	B7005380	Pressure Switch
11	541-279-666	250874	Strain Relief
12		251206 (3195302)	Power Cord
13	411-120-016	250877	Back Panel
14	312-514-666	250896	Handle Support
15		250903 (3190038)	Switch w/knob
16		251207 (5600933)	Control Circuit Board
17		B7100370 (3190268)	Remote Switch
18	541-279-666	250894	Thermostat
19		246254 (3175409)	Pilot Lamp
20	245-168-666	246250	Lamp Holder
21		250868 (3170054)	Terminal Board
22		251208	High Voltage Transformer
23		250900 (5710303)	Transducer
24	215-036-666	B7029380	Resistor
25		B7105370 (3160181)	Solenoid
26		250887 (3205065)	Resistor
27	254-006-666	B7006380	Air Regulator
28		250876 (3160165)	Gauge
29	215-031-666	250901	Metal Shield
30		246946 (3055121)	Knob
31		250882 (3080155)	Torch Connector
32	079-306-666	B7073370	Quick Connector
33	210-358-666	251192	Coil
34	411-125-666	250885	Reed
35		251209 (3175600)	Fuse Holder
36		250883 (3200129)	SCR

Item	Lincoln Stock #	Customer #	Description
37	216-108-666	246224	Fan Motor
38		250731 (3065088)	Radiator
39	253-341-666	B7004380	Coupling
40		250872 (3160046)	Fitting
41		251210 (3080156)	Adaptor
42		251211 (5580637)	Torch Cable
43	334-599-000	M15820,250747,83-673	Torch Head
44	512-264-666	251194	O-Ring
45		M15818,250745,83-671	Electrode Wrench
46		251195	Diffuser
47	334-591-000	M15815,YA5550A1,83-668	Short Electrode
48	334-589-000	M15852,M15803,YA22257,83-667	Diffusers (2)
49	334-653-000	M15814,YA22252,83-666	Short Nozzle (1.0mm)
		M15812,83-664	Short Nozzle (1.2mm)
50	334-651-000	M15810,YA22259,83-662	Nozzle Holder
51		M15809, YA5550A8, 83-661	Spring Standoff
52	312-518-666	B7037380	Handle & Trigger
53	334-638-000	M15816Ya5550A4,83-669	Long Electrode
54		M15813,YA5550A5,83-665	Long Nozzle (0.9mm)
55		M15808	Two Point Standoff
56	238-714-666	251196	Ground Cable
57		251212, 251213, 251034	Front Panel
58	411-124-666	250893	Base
59		251214 (5600650)	Transformer
60	413-121-666	250881	Axle
61	413-118-666	B7033380	Wheel
62	216-109-666	250726	Fan Blade
63	412-756-666	B7035380	Foot
64		250879 (5803475)	Support
65		251125 (3205319)	Reactor Coil
66	411-108-026	250897	Right Side Panel

Not Shown

67		250890 (5600992)	Filter
68		247506m, 250508n, 251255s	Label
69		247509	Warning Label
70		M15823, 250749, 83-676	Complete Torch Assy.

11/10/05

Model	Primary Input	Input Plug	Duty Cycle at Rated Output
M12152, 83-384	220 - 380 Vac, 3 Phase, 77A	N/A	40%

Rated Output	Voltage Settings	Agency Listing	Max Cutting Thickness
70 amps	Infinite	CSA	3/4"

