OPERATION MANUAL

for the

GOODWIN P6 AR

AIR PLASMA CUTTING SYSTEM

JUNE.1996
ISSUE 3

The Company reserves the right to make such changes to the design or specification of the equipment as it shall see fit. The information contained in this manual is issued for the guidance of users and does not form part of any contract. It is strongly recommended that all users and supervisors familiarise themselves with the contents, **PRIOR TO COMMENCING USE OF THE SYSTEM**, and in particular, the section on safety precautions, which should be used as a guide to safe operation in accordance with the requirements of the Health and Safety at Work Act 1974 and any other relevant legislation.

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1. SAFETY PRECAUTIONS

Before cutting operations are commenced, the user must ensure that the installation and proposed working methods comply with all relevant safety regulations. (Such as HSWA, environmental and electricity standards) In addition the following points are particularly important:

a. The mains connection must be properly grounded and the supply lines must be fitted with fuses of the specified ratings. The mains cable must be properly secured and protected from possible damage.

b. High voltage exists at the torch when power is applied and the pilot arc is struck (up to 300V) and when the main arc is cutting (150V). Under no circumstances should the nozzle be touched with power applied to the torch, and all adjustments and replacement of parts should be undertaken with the power unit switched off. The torch should not be used in excessively wet conditions, or if the torch or hose set are damaged.

c. The mains supply should be isolated from the unit AT THE SUPPLY before removing any panels from the unit. Only authorised service personnel should remove panels.

d. Keep the work area clear of all inflammable materials. Ensure that any material ejected from the cut is not a source of danger to the operator or others.

e. Protection is necessary against the ultraviolet radiation from the arc. A helmet or shield with shade glass is recommended, with gloves and adequate protective clothing where appropriate. Adequate screening should be arranged to protect others in the vicinity or passing by, similar to that required for arc welding operations.

f. Adequate ventilation is required at all times around any plasma cutting operation, to remove the cutting fumes and dust. In machine torch applications a shallow water bed cutting table will greatly reduce the fumes and dust which mainly occur below the cut.

g. The wheels on the unit are meant for ease of movement around the workplace and should not be used over rough surfaces nor at excessive speeds.

2. GENERAL DESCRIPTION

Various methods of cutting metals by use of plasma arc technology have been used , mainly on stainless steel, aluminium and other materials which cannot easily be cut by the more traditional oxy/fuel gas systems.

Developments in air plasma have improved the economics and performance of the plasma process to such a degree that in many applications involving mild steel , the use of air plasma is to be preferred to the oxy/fuel gas process.

With the P6 system, there is an additional advantage, arising from the portability of the unit, and it's requirement only for a suitable electricity supply, because the gas being used is air from a compressor in the power pack.

The process is created by first passing a stream of clean air, provided by an oil free compressor, through a NOZZLE in the torch. The air stream is then ionised by the application of a "PILOT ARC" through it, from ELECTRODE to nozzle, initiated by a High Frequency (HF) ignition unit, which then allows the passage of the MAIN ARC down the ionised stream TRANSFERRING to the metal to be cut, which in turn is "EARTHED" or "GROUNDED" to the power pack. Thus a jet of high energy is channelled to give a highly concentrated cutting process with low heat input to the metal.

This gives fast cutting, particularly on thin materials, a minimum heat affected zone in the cut edge, and low plate distortion.

It is necessary to cool the electrode and nozzle with water and to aid arc stability the air is caused to swirl around the arc as it passes through the nozzle.

The main transformer is fan cooled and incorporates a thermostat to protect the windings if, in spite of the 60% duty cycle, the safe operating temperature is exceeded.

The HF unit operates automatically to establish an arc when power is applied to the torch and it ceases to operate when an arc is established. The control of the output, is by handle switch for the hand torch, or remote control, or machine interfaced controls for the machine torch, and is interlocked to prevent damage to the torch or machine. The power level is non-adjustable, and is typically 40 amps at 150 volts DC ie. 6kW output.

3. INSTALLATION

The power unit is provided with a length of flexible cable which must be connected to the customers supply having the following minimum voltage and power ratings to suit the machine :

3 phase and earth (ground)

220 volts	60Hz	40 amps
380 volts	50Hz	25 amps
415 volts	50Hz	20 amps
440/480 volts	60Hz	20 amps
500 volts	50Hz	20 amps
575 volts	60Hz	15 amps

The supply should be fitted with fuses or circuit breakers of appropriate rating.

A means of isolating the power unit from the supply should be provided.

The installation should be arranged such that the only path to earth (or ground) from the workpiece is by way of the earth lead connected to the front of the machine.

Where the material to be cut forms part of the structure which is earthed or grounded to the mains electrical supply system, then the cutting current could flow through that route rather than the earth return lead to the machine. Always ensure that there is a good connection between the workpiece and the machine via the “earth” or “ground” lead, as a poor connection will cause excessive current in the mains earth cable which will create a current trip fault condition (see fault finding).

A this point it is important to connect the torch to the machine, See next section.

After connecting the torch, earth lead, and mains supply, it is necessary to check the rotation direction of the compressor fan to ensure correct phase connections. This can be done by checking that the cooling air flow is blowing over the compressor cylinders.

Alternatively, use a torch or similar light shone through the louvres at the right hand side of the casing to show the fan blade rotation. The correct rotation is clockwise.

If the above direction is not correct, change two of the three phase connections and re-test as above.
If there are any doubts about installation consult your distributor or the manufacturer.

4. TORCH CONNECTION TO POWER UNIT

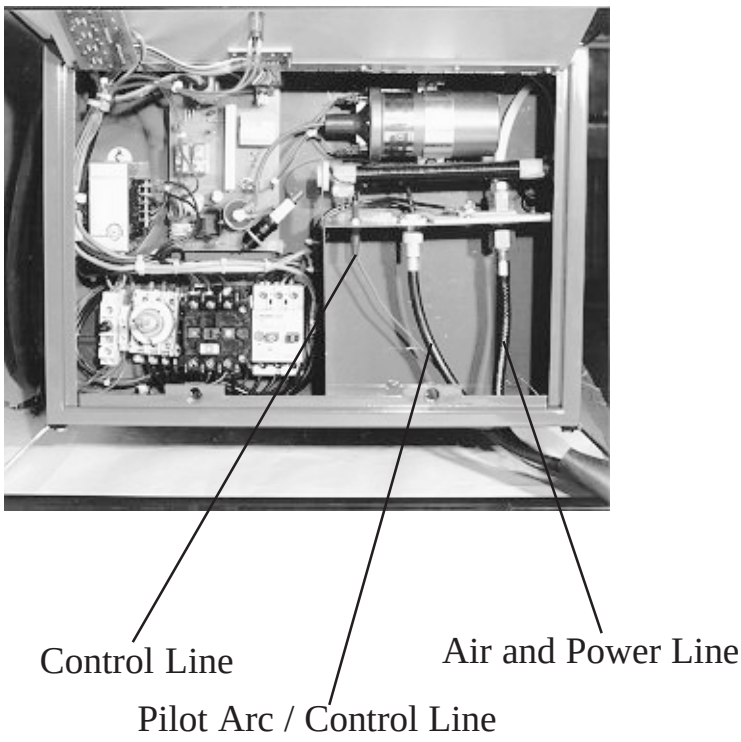
Do not run the power unit without the torch connected to it.

Torch connection to the power unit is made via a composite hose set.

Air and Power Line	-	Black Hose, screwed fitting.
Pilot Arc / Control Line	-	Co-axial Cable and Plug.
Control Line	-	Red Lead, 4mm Plug.

The appropriate connections are located under the top panel of the power unit. Please remember to pass the hose end through the front case apperture **before** making the connections. Also, please take care to obtain good connections of the whole system. All electrical connections must be clean, dry and tight, and there should be no air leak from the air/power connection.

The workpiece “earth” or “ground” is connected via the "push in and twist clock-wise" socket on the front casing.



5. OPERATION

5.1 Power Up Procedure

Having completed all the mains and cutting earth wiring, and connected the torch and checked the fan rotation, as explained in previous sections, the machine is ready for use.

The air regulator should be wound fully anticlockwise. Feel for good air flow through the torch nozzle and listen for air leaks at the torch air hose connection.

Readjust the regulator so that the air flow is reduced and, provided all interlocks check positively, and the power and ready indicators are illuminated, the pilot arc can be initiated. It is necessary to adjust the air pressure to give the highest possible reading consistent with good arc starting and a stable pilot arc. Start the pilot arc and increase the air pressure until it is at maximum or the pilot arc becomes unstable (very noisy, misfire, and the voltage indicator shows 300 volts). At this point reduce the pressure to restore stability (arc less noisy, stable arc, and the volt meter indicates 250/280 volts).

Always maintain as high an air pressure as possible for pilot arc.

The output neon is “on” and the output indicator reads between 250 vdc and 280 vdc at this stage.

5.2 Machine Controls

The front panel of the machine provides a range of displays and control gear to ensure correct operation

Main Isolator switches machine on and off.

Power Indicator indicates that power is available to the system control circuit.

Ready Indicator indicates that all system interlocks are operational and that the machine is ready to go.

Temperature Indicator shows when the main transformer temperature is too high. Cutting operations will immediately stop. Allow the fan to cool the transformer.

Air Pressure Indicator indicates an air leak in the system. (Power unit & torch).

Current Trip Indicator indicates excessive pilot arc current due to incorrectly installed or damaged consumables in the torch, OR the main arc cutting current is flowing in a secondary earth path, OR insufficient air flowing through torch.

Output "ON" Indicator indicates that power is applied to the torch.

Machine Controls cont'd.

Output Indicator shows output voltage in ten increments of 30v i.e. 0-300 volts. Normal operation is indicated as follows:

Power applied but no arc	300v
Pilot arc	250/280v
Cutting	120/150/180v

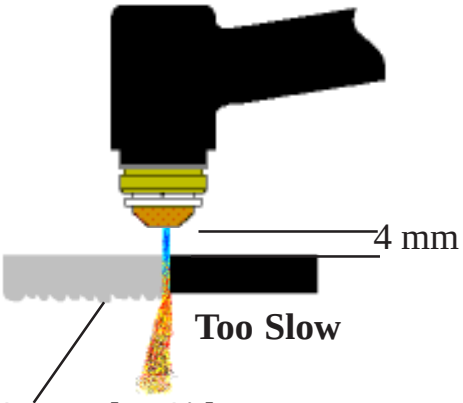
Air Regulator sets the air flow through the torch. Adjust for a stable pilot arc.

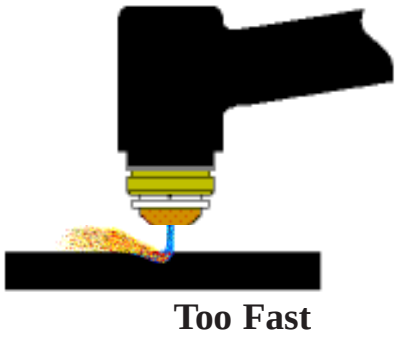
6. THE CUTTING PROCEDURE

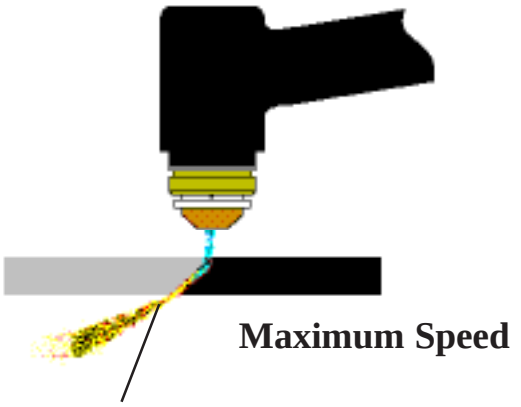
6.1 Cutting Procedure

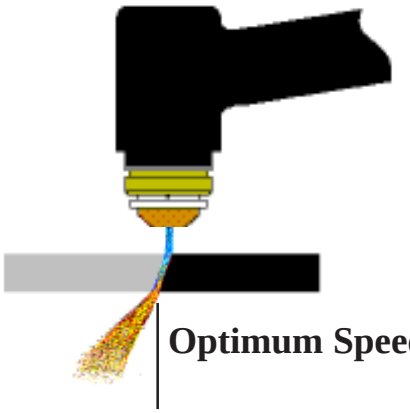
The best results are usually obtained by cutting at the highest possible speed.

Correct cutting speed can be judged with experience by the angle at which the cut material leaves the lower edge of the plate, either by observing the ejected material or studying the surface of a cut after completing a test cut.









Starting the cut requires more care and technique, particularly on thicker material and particularly with aluminium. In this case the cut will appear to be slow to start and to penetrate right through the material. This will continue until the arc has penetrated the lower surface of the material. Once a cut is established then cutting speeds may be increased.

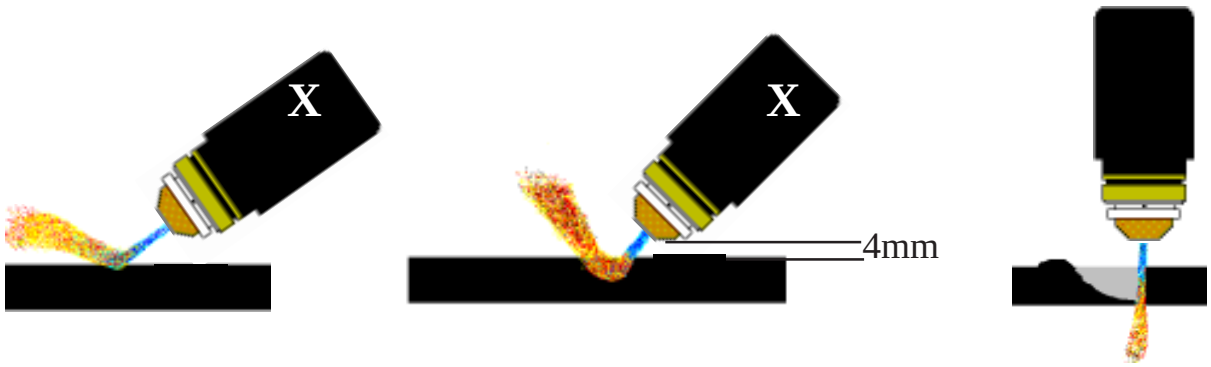
For normal work, the torch stand - off (i.e. the distance between the tip of the nozzle and the workpiece) should be about 4mm. The front cap guide provides this stand-off for most cutting work. On materials with little risk of material blow-back damaging the nozzle, this stand-off can be reduced. This can be used on clean mild steel and on thinner materials. It should not be attempted on rusty or scaly mild steel or on thicker sections of stainless steel or aluminium etc., where a build up of material on top of the plate can cause nozzle damage.

Cutting Procedure cont'd.

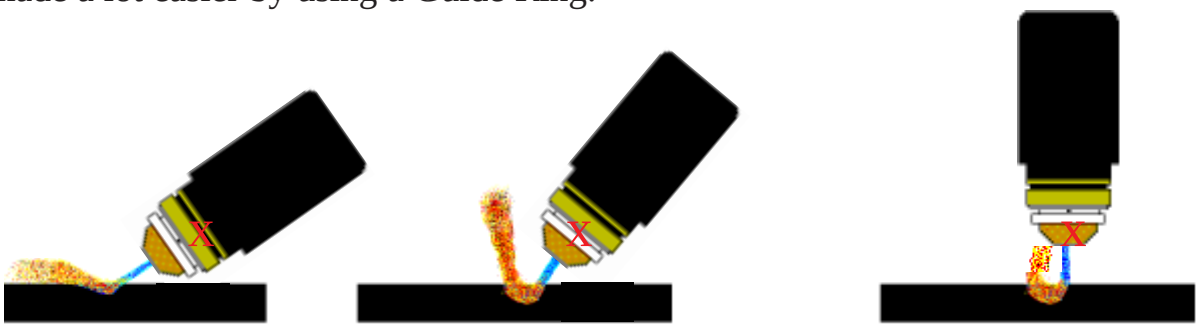
The cut can be started either by initiating the pilot arc and moving the torch into the proximity of the workpiece, or by positioning the torch over the workpiece and switching on. It is better to start a cut at a plate edge or hole. Piercing involves cut material being ejected upwards which can be dangerous, and carries a risk of damaging the torch nozzle or front cap. These problems are worsened as material thickness increases. If it is necessary to pierce, then this is best done by angling the torch and gradually bringing it upright as piercing is completed.

Piercing Method For Hand Torch

FIG 1 **FIG 2** **FIG 3**



Lay the torch over at approximately 60º and press the torch button, using the "x" as an imaginary rotation point (see fig 1), twist the torch slowly to a vertical position, (see fig 2 and 3) holding the nozzle at 4mm off the work piece. This is made a lot easier by using a Guide Ring.



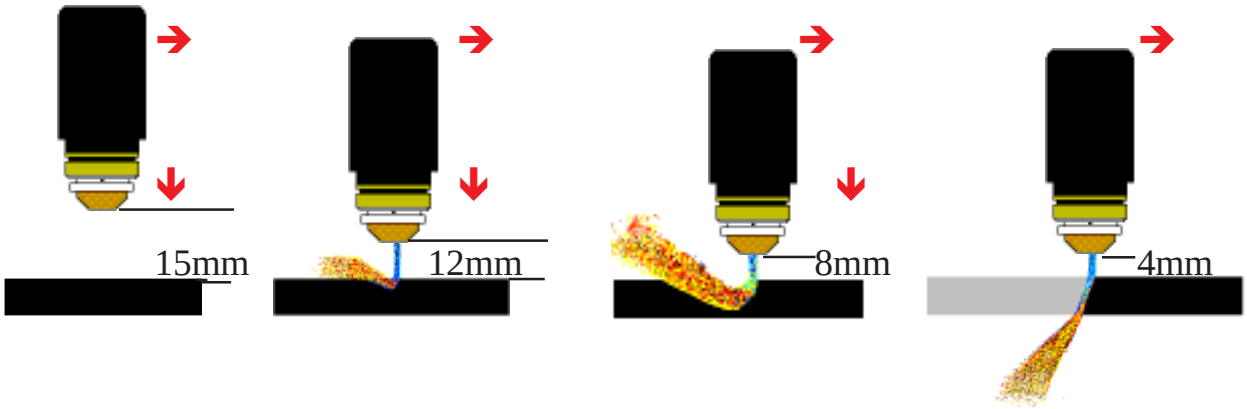
The **INCORRECT** way of piercing is to twist the torch using the Nozzle as the imaginary rotation point. This will cause Nozzle and Front Cap damage or even torch damage.

The cut may be stopped by releasing the torch switch, switching off the power, or by withdrawing from the workpiece (best done rapidly), when the pilot arc will continue or be reinitiated.

Cutting Procedure cont'd.

When using a machine torch, it will not generally be possible to angle the torch for piercing. In this case, it is best to start the arc above the material to be cut and with the torch travelling at about 50% of normal cutting speed, lowering the torch until the arc transfers. Once piercing is complete the torch may be brought to normal cutting stand off and speed.

Piercing Method For Machine Torch



Position torch 15mm from the workpiece, start pilot arc and profile machine or torch manipulator moving, lower torch until main arc transfers. At this point the descent speed of the torch is important, if it is too fast the ejected molten metal will damage the torch. So lower the torch slowly after arc transfer until the nozzle is 10mm from the workpiece, then wait until the arc has penetrated through, then the torch can be lowered and maintained at 4mm for the duration of the cut.

IMPORTANT

If the arc should “flare”, or be coloured green, or emit any unusual noise, it is recommended that the unit be switched off immediately and the condition of the consumables checked. Continuing to cut under these conditions may result in damage extending beyond the consumables to other parts of the torch.

6.1.1 Cutting Faults

Excessive dross on lower edge of cut	Cutting speed too low. Torch consumables worn or damaged. Incorrect air flow.
Double arcing	Damaged torch consumables. Air flow insufficient. Nozzle
blocked by workpiece.	dross or too close to
Main arc not square to workpiece	Nozzle orifice damaged. Electrode eroded “off centre”. Consumables wrongly fitted.
Excessive bevel or rounded cut surface	Speed too high Stand off too high. Arc not straight - consumables damaged or misaligned.

6.1.2 Consumable Life

A good consumable life is the most important factor in achieving optimum cutting economics of any plasma cutting unit.
This life is dependent on the intrinsic life of the consumables, correct alignment and the incidence of transient and operational damage.

6.1.3 Intrinsic Life

The intrinsic life of the consumables is determined by the rate at which they are eroded by the arc process. This erosion rate is low however, and in practice the life is limited by operational factors.

6.1.4 Alignment

The alignment and construction of your Goodwin Air Plasma Torch is such that problems of grinding and adjusting electrodes do not occur; with reasonable care in fitting the consumables alignment problems should not arise.

6.1.5 Iransient Damage

On starting directly onto main arc, it is occasionally possible to erode some of the copper from the electrode before the arc settles onto the insert material. This generates a crater in the electrode and the insert burns back to remain flush with the surface. Consumable life is reduced by a high number of starts relative to total cutting time.

6.2.1 Operating Damage

This is the most likely cause of limited consumable life. Since the arc is quite capable of cutting copper, anything which causes the arc to deviate from the centre of the nozzle will result in damage to the orifice. In extreme cases the arc passes not through the orifice but from the electrode to the nozzle and from the nozzle to the workpiece double arcing causing the rapid erosion of copper from both electrode and nozzle.

The most common cause of these problems is ejected cut material entering the orifice particularly when piercing or obstructing the nozzle with the workpiece.

It is best to maintain a constant stand off height, (approx. 4mm), operate within the maximum speed capabilities of the machine and avoid unnecessary piercing and stop-start cutting whenever possible.

To obtain maximum performance on certain materials with little risk of material blow-back, such as clean mild steel, thin sheet etc., the stand-off can be reduced, giving improvements in performance and cut quality.

6.2.2 Electrode “non-starting”

Occasionally, it may happen that it is difficult to start the pilot arc. This happens when the oxidized material from the electrode insert is deposited over the surface of the copper electrode. Starting can be improved by cleaning or scratching the surface of the electrode, particularly on the bevelled corner with a wire brush or sharp implement. Always switch off the power unit before removing the nozzle for this purpose. Once a “non-starting” electrode has been used a few times starting usually improves.

It is often preferable to start the cutting arc without the pilot arc showing. Hold the nozzle over the edge of the workpiece and press the torch handle switch. After starting, continue cutting for about 30cm. Repeat the operation until the pilot arc is normal.

It is not good practice to fire the pilot arc continually in midair, without striking the cutting arc, because this oxidizes the surface of the electrode and leads to “non-starting” problems.

6.3 Changing Consumables

The torch carries a number of elements known as the "consumables" which are eroded during the cutting process. These consumables consist of:-

a) Nozzle
b) Electrode Assembly (comprising electrode, swirl bush & "O" ring)

Other parts which may easily be replaced if damaged are the front cap, front cap retaining ring, contact tube.

To renew the consumables, the following procedure should be adopted, remembering that care and cleanliness are of utmost importance.

1. Switch off machine at the mains supply.

2. Remove front cap. The cap is a push fit over an "O" ring in the torch body.

3. Unscrew the nozzle with the special tool supplied.

4. Check the condition of the electrode. If it must be removed, grip the electrode assembly with the special pliers provided, and pull out from the torch body.
(See picture below)

The small insert which is pressed into the centre of the copper body of the electrode will burn back slightly each time the main arc is started. It is this which dictates the remaining life left in the electrode. The crater can be more than 1mm deep before the electrode is considered to be "expired".

5. Press a new electrode assembly carefully but firmly over the contact tube until fully home and central, using the handle of the nozzle tool.
THIS IS VERY IMPORTANT ! If the electrode is not pressed fully home on the contact tube the swirl bush may be partly crushed by the nozzle, thus interfering with the air flow.

6. Carefully screw the nozzle into the assembly using the special tool until fully home.
DO NOT OVERTIGHTEN.

7. Refit front cap.

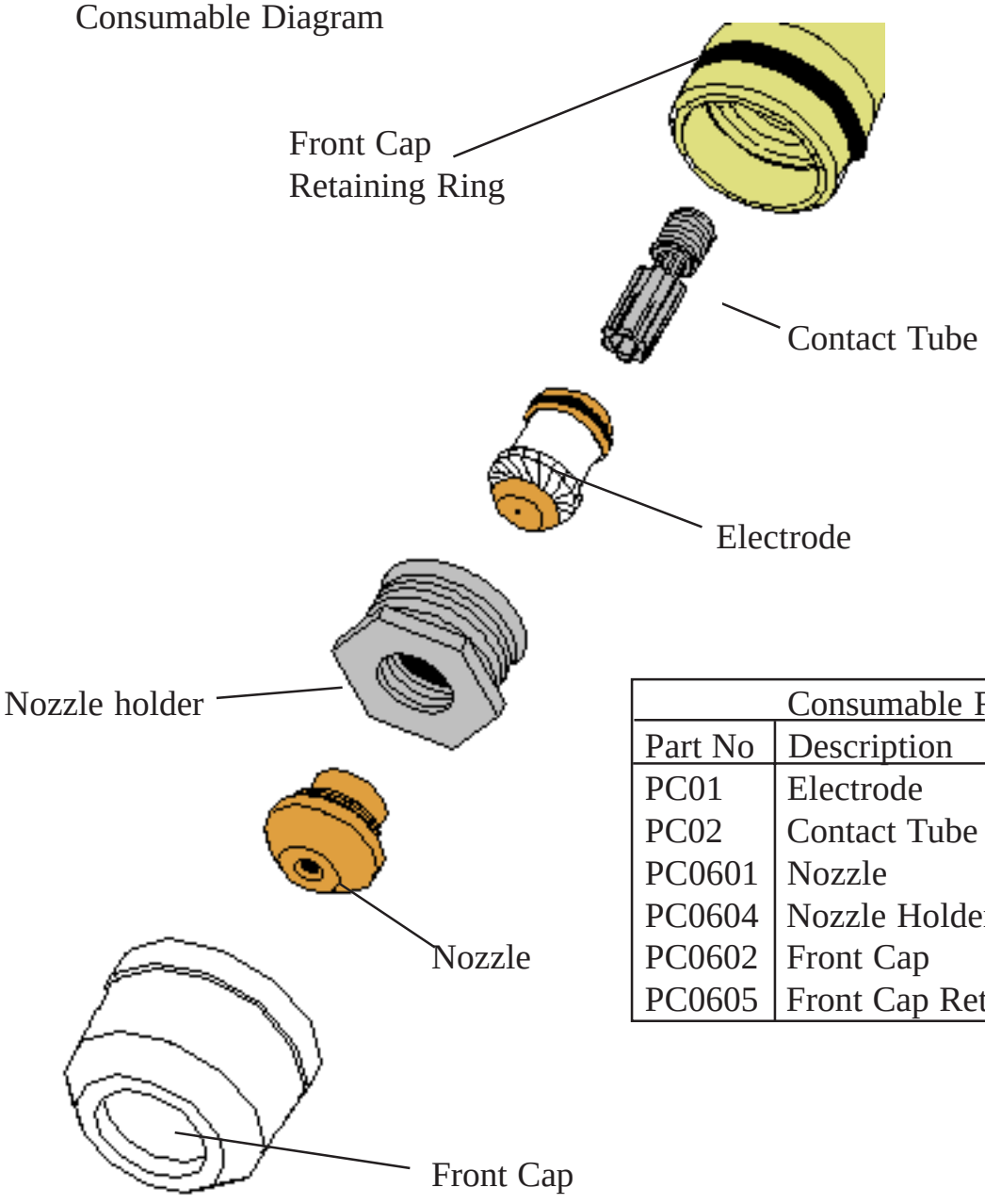
NOTE:-

Silicone grease is used to ease the fitting of, and protect the front cap. It should be applied liberally around the nozzle and all over the Front Cap after it has been fitted. Cleanliness and care must be taken when fitting Consumables.

Should the contact tube need changing, this is done by inserting an 1/8 th allen key down the centre and unscrewing until it is removed. To fit the new one, insert the 1/8 allen key and screw until tight. **Do not over tighten** this may cause the electrode to be off centre causing bevel.

Goodwin P6 Torch Head

Consumable Diagram



Consumable Replacement	
Part No	Description
PC01	Electrode
PC02	Contact Tube
PC0601	Nozzle
PC0604	Nozzle Holder
PC0602	Front Cap
PC0605	Front Cap Retaining Ring

7. TECHNICAL DATA

7.1 Power Unit

Electrical Input

Available for the following supplies:
All 3 phase, 14kVA at 0.65 power factor.

220v	60Hz	36 amps
380v	50Hz	21 amps
415v	50Hz	20 amps
440/480v	60Hz	19 amps
500v	50Hz	17 amps
575v	60Hz	14 amps

Other voltages and frequencies available to order.

Input is via 3 core and earth flexible: 4 x 4.0 sq mm section 3 metre length standard.

Electrical Output

Open circuit voltage	300dc
Typical arc voltage	150dc
Main arc power	6 kw (40 amps at 150V).
Pilot arc current	15 - 20 amps

Miscellaneous

Compressor type	TI GH-3052 oil free twin cylinder Maintenance free (10,000 hrs)

Dimensions

Height	790 mm
Width	535 mm
Depth	500 mm
Weight	75 kg

7.2 Torch and Hose Set.

Hand Torch

Torch body diameter	26 mm
Torch weight Head	0.2 kg
Effective (inc.hose set)	0.5 kg
Hose set length	7.5m, 15m, to special order

Machine Torch

Torch body diameter	24mm
Torch body length	200mm
Torch weight: Head	0.2 kg
Effective (inc.hose set)	0.5 kg
Hose Set length	7.5m, 15m, to special order

APPENDIX 2 SERVICE INFORMATION

8. THE POWER UNIT

8.1 Main Circuits and Systems

Output power is supplied from a fan cooled transformer, and an air cooled rectifier with varistor diode protection. The transformer is rated at 60% duty cycle and is protected by a thermostat.

The power is carried to the torch electrode via a cable within the air line and the pilot arc connector to the nozzle is made via a current limiting resistor above the main transformer and a coaxial cable in the hose set.

The oil-free and maintenance free air compressor is protected by a thermal/magnetic overload switch. The compressor is normally switched on by means of the main isolator switch but if the overload should operate, it should be reset by removing the cover and pressing the manual reset button on the overload unit. The compressor rotation direction is the only phase sensitive component and it is essential to ensure that this is correct to the manufactures specification.
SEE INSTALLATION INFORMATION.

The air regulator control on the front of the machine allows air to bypass the torch in the stand-by and pilot arc modes. It should be wound fully anticlockwise so that no air is by-passed - (this ascertains absence of air leaks). (Note: high pressure readings can also be obtained by a blockage in the torch air path and it is necessary to check for a good air flow through the torch). However, if the pilot arc starting is difficult or the pilot arc is unstable (for instance if the supply voltage to the machine is low) then the control should be turned slowly clockwise by the minimum amount until a stable pilot arc is obtained. If the air control is turned too far the air pressure light will indicate and the machine will not operate.

The HF arc ignition is fully automatic in operation, being powered from the torch power lines.

8.2 Displays and Controls

The front panel of the machine provides a range of displays and control gear to ensure correct operation

Power Indicator indicates that power is available to the system control circuit, that is the 12 volt operatation and saftey curcuits

Ready Indicator indicates that all system interlocks are operational and that the machine is ready to operate.

Temperature Indicator shows when the main transformer temperature is too high. Cutting operations will immediately stop. Allow the fan to cool the transformer.

Current Trip Indicator indicates excessive pilot arc current due to incorrectly installed or damaged consumables in the torch, OR the main arc cutting current is flowing in a secondary earth path, OR insufficient air flowing through torch.

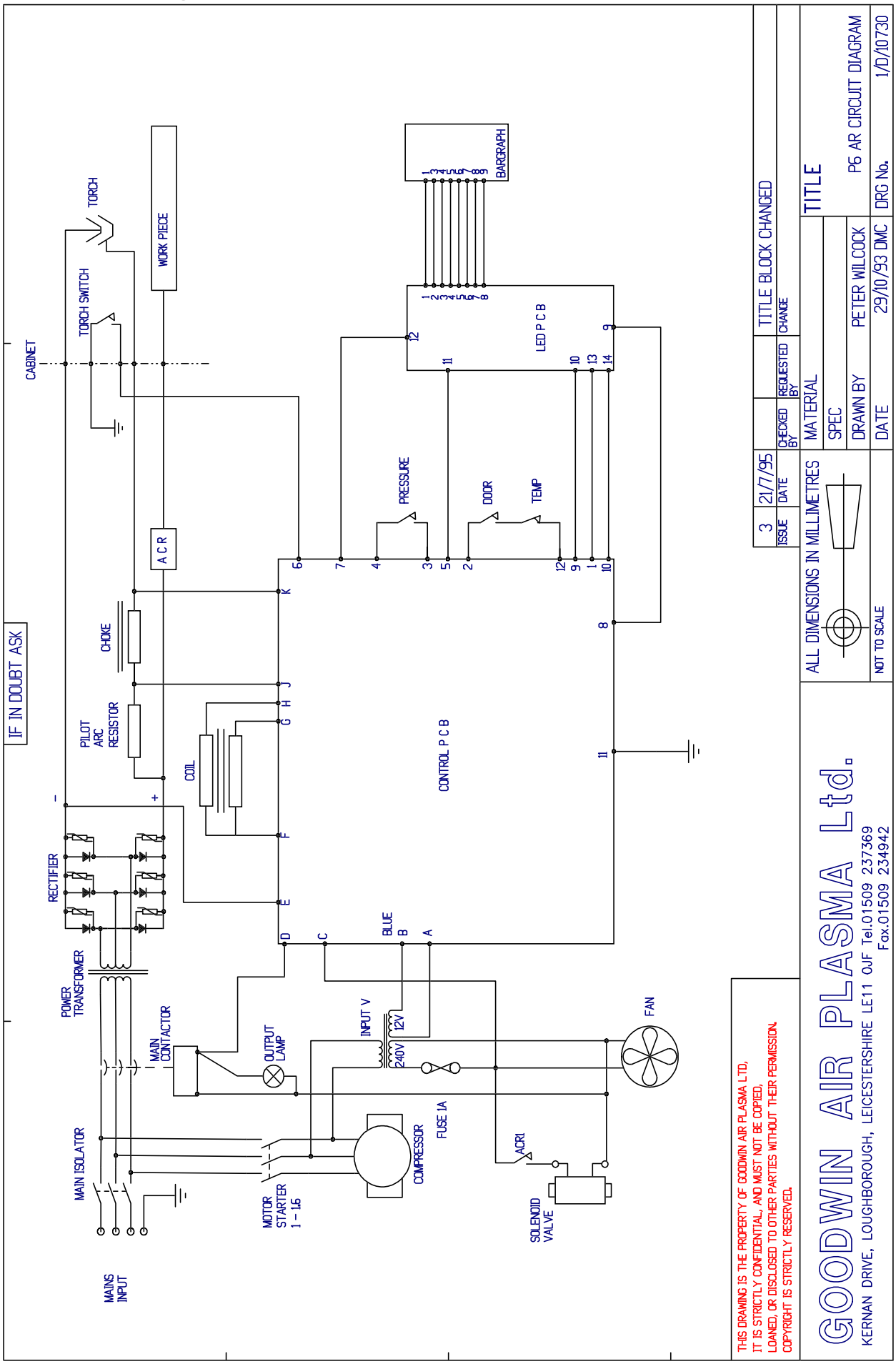
Output "ON" Indicator indicates that power is applied to the torch.

Output Indicator shows output voltage in ten increments of 30V i.e. 0-300 volts.

Air Pressure Indicator indicates an air leak in the system (machine & torch).

Air Regulator sets the air flow through the torch and is adjusted to give a stable pilot arc.

9. Circuit Daigram



10. MAINTENANCE

Routine Maintenance

CHECK		
Daily	Operator as required	Condition of consumables
Monthly	(depending on usage)	Check for air leaks, clean or replace air intake filters, blow dust from inside machine.
Annually for fan	or more frequently in poor conditions or high usage.	Replace air intake filters, check max air delivery, check for free running, tightness of all mechanical connections and operation of all controls and indicators.

The Goodwin Air Plasma Cutting Systems are designed so that a minimum amount of maintenance is required, and by following the above procedure the maximum life will be gained from its components. However if and when a component fails simply replace that component and continue usage.

11. THE TORCH

Rebuilding torches requires special training and instruction and is not within the scope of this manual.

Users who wish to repair damaged torches themselves should consult their supplier or the manufacturer.

The torch is supplied with electrical power, at high voltage and compressed air which must not be allowed to escape from their designed confines. It is a precise assembly of electrically conductive parts and P.T.F.E. insulators.

The hand torch is housed in a metal body enclosed by a silicone rubber outer cover. The machine torch is of a fully serviceable design.

The torch carries a number of elements known as the "consumables" which are eroded during the cutting process. These consumables consist of:-

a) Nozzle
b) Electrode Assembly (comprising electrode, swirl bush & 'O' ring)

Other parts which may easily be replaced if damaged are the front cap, front cap retaining ring, guide ring, contact tube and nozzle holder.

To renew the consumables the following procedure should be adopted, remembering that care and cleanliness are of utmost importance.

1. Switch off the machine.

2. Remove the front cap. The cap is a push fit over an 'O' ring in the torch body.

3. Unscrew the nozzle using the special tool supplied.

4. Check the condition of the electrode. If it must be removed, first remove the nozzle holder using the tool supplied, grip the electrode and pull it out from the torch body.

5. Press a new electrode assembly carefully but firmly over the contact tube until fully home and central, using the handle of the nozzle tool.

6. Carefully screw the nozzle holder and nozzle into the assembly using the special tools until fully home, **DO NOT OVERTIGHTEN.**

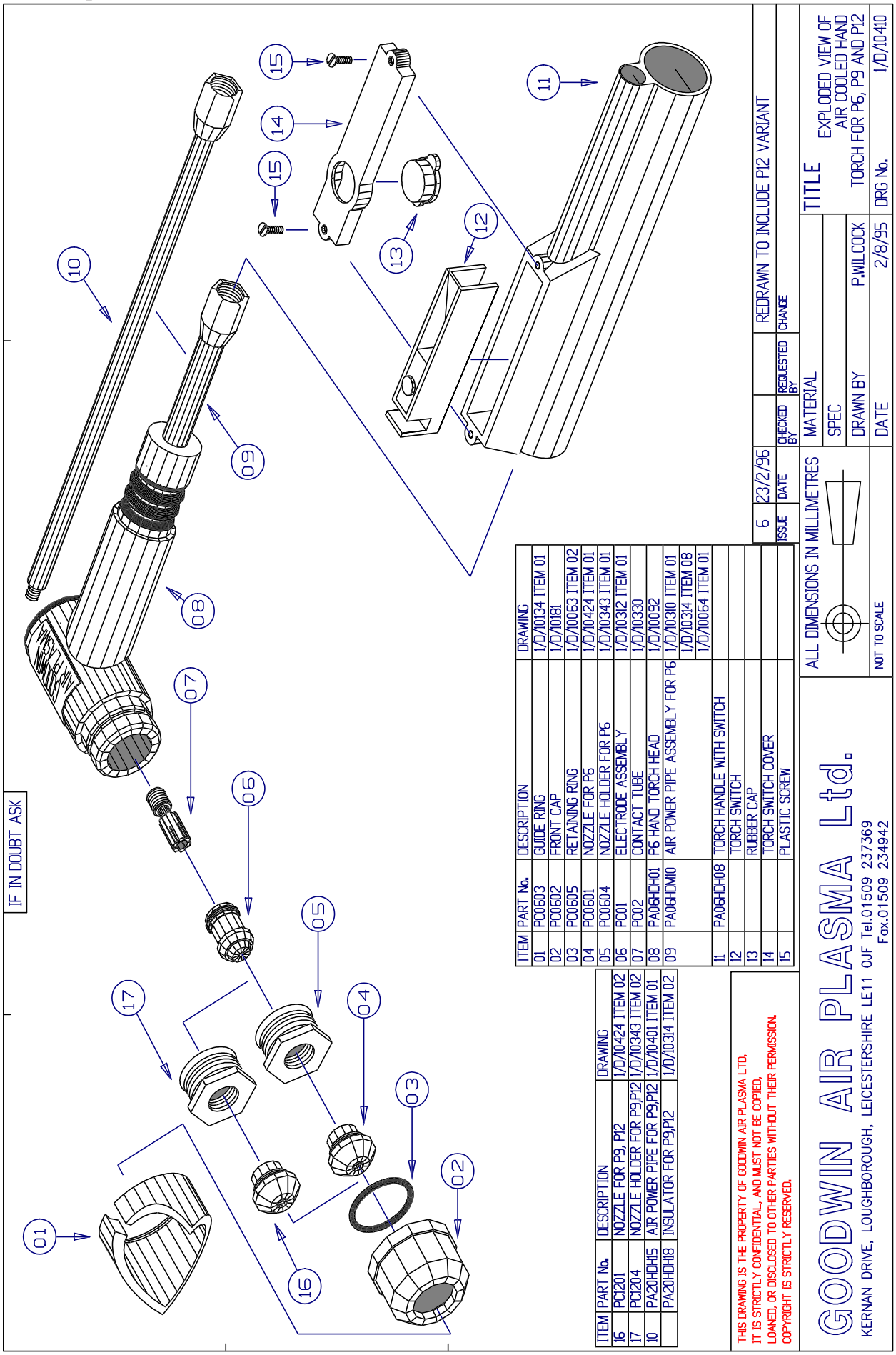
7. Refit the front cap.

NOTE:-

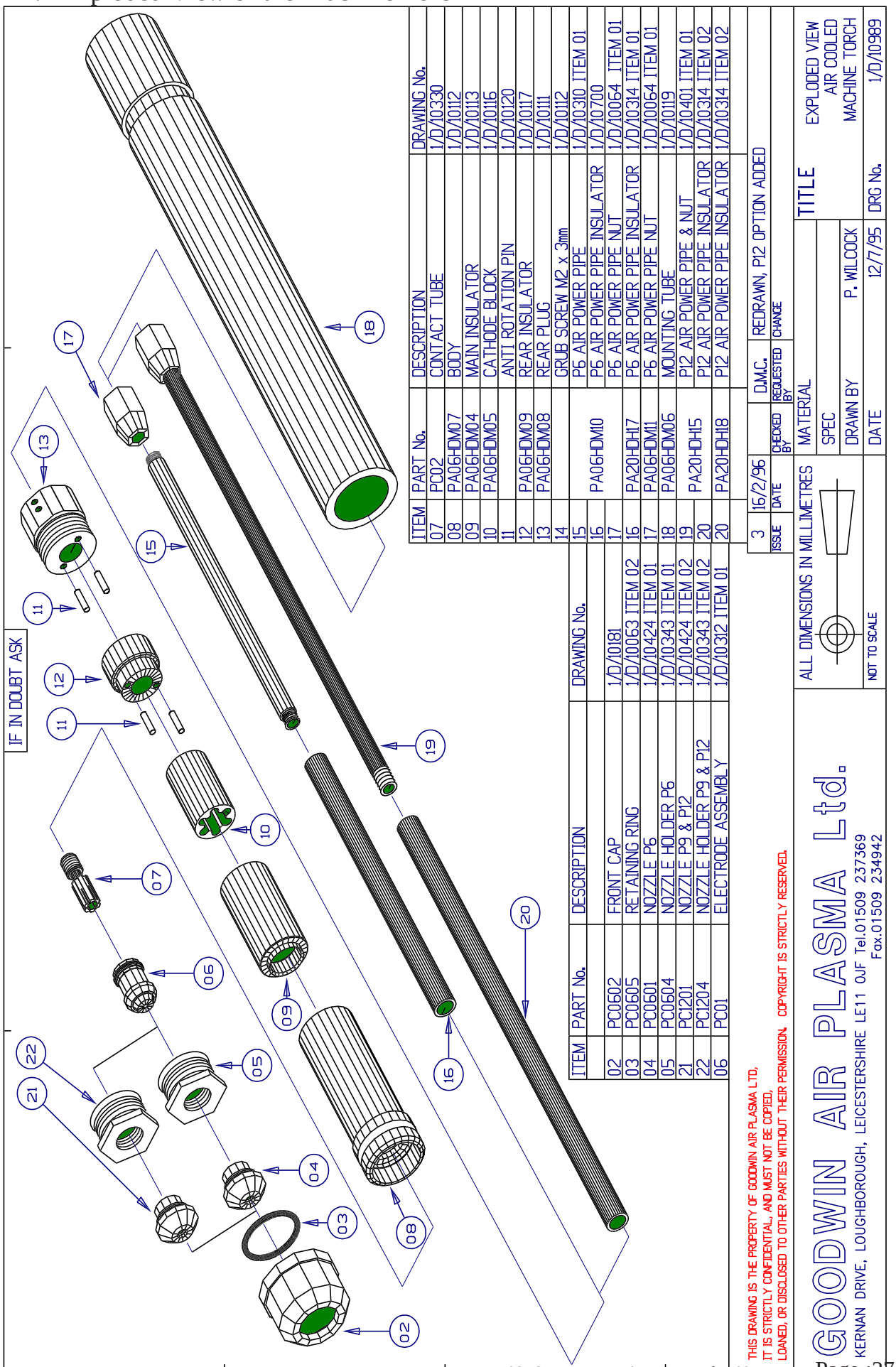
Silicone grease may be used to ease the fitting of, and protect, the front cap and nozzle. Cleanliness and care in fitting are most important in obtaining a good service life from the torch and consumables.

If it is necessary to replace the contact tube then this may be unscrewed using the hexagon wrench (1/8th 3.2mm) in the tool kit. Replace and tighten firmly, before re-fitting the electrode.

12.1 Exploded View of the Hand Torch



12.2 Exploded View of the Machine Torch



ITEM	PART No.	DESCRIPTION	DRAWING No.
07	PC02	CONTACT TUBE	1/D/10330
08	PA06HDM07	BODY	1/D/10112
09	PA06HDM04	MAIN INSULATOR	1/D/10113
10	PA06HDM05	CATHODE BLOCK	1/D/10116
11		ANTI ROTATION PIN	1/D/10120
12	PA06HDM09	REAR INSULATOR	1/D/10117
13	PA06HDM08	REAR PLUG	1/D/10111
14		GRUB SCREW M2 x 3mm	1/D/10112
15	PA06HDM10	P6 AIR POWER PIPE	1/D/10310 ITEM 01
16		P6 AIR POWER PIPE INSULATOR	1/D/10700
17	PA20HDH17	P6 AIR POWER PIPE NUT	1/D/10064 ITEM 01
16		P6 AIR POWER PIPE INSULATOR	1/D/10314 ITEM 01
17	PA06HDM11	P6 AIR POWER PIPE NUT	1/D/10064 ITEM 01
18	PA06HDM06	MOUNTING TUBE	1/D/10119
19	PA20HDH15	P12 AIR POWER PIPE & NUT	1/D/10401 ITEM 01
20		P12 AIR POWER PIPE INSULATOR	1/D/10314 ITEM 02
20	PA20HDH18	P12 AIR POWER PIPE INSULATOR	1/D/10314 ITEM 02

ITEM	PART No.	DESCRIPTION	DRAWING No.
02	PC0602	FRONT CAP	1/D/10181
03	PC0605	RETAINING RING	1/D/10063 ITEM 02
04	PC0601	NOZZLE P6	1/D/10424 ITEM 01
05	PC0604	NOZZLE HOLDER P6	1/D/10343 ITEM 01
21	PC1201	NOZZLE P9 & P12	1/D/10424 ITEM 02
22	PC1204	NOZZLE HOLDER P9 & P12	1/D/10343 ITEM 02
06	PC01	ELECTRODE ASSEMBLY	1/D/10312 ITEM 01

ISSUE	DATE	CHECKED BY	REQUESTED BY	CHANGE
3	16/2/96	D.M.C.		REDRAWN, P12 OPTION ADDED

ALL DIMENSIONS IN MILLIMETRES

NOT TO SCALE

MATERIAL

SPEC

DRAWN BY P. WILCOCK

DATE 12/7/95

TITLE EXPLODED VIEW AIR COOLED MACHINE TORCH

DRG No. 1/D/10989

GOODWIN AIR PLASMA Ltd.
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13. Fault Finding

Below is a list of the most common reasons for **non operation** of a Goodwin Air Plasma Cutting System.

Symptom	Probable cause	Remedy
No Pilot arc at torch head when torch button is depressed	a) Machine Ready Light not on	Check for red indicator being on (If so refer to Manual)
	b) Output Indicator not on	Check torch switch and 220v fuse
As above with output indicator on	c) Non starting electrode	(Refer to manual)
	d) Bargraph not reading 300v	Telephone Goodwin Air Plasma
As above with voltmeter reading 300v	e) No HF on P C Board	Telephone Goodwin Air Plasma
	f) Broken HF cable on hose set	Telephone Goodwin Air Plasma
Current trip indicator coming on	a) Electrode incorrectly fitted	Refit correctly
	b) Low air flow through torch	Increase flow, check for air leaks
	c) A path to mains earth	Ensure workpiece is completely isolated from mains earth
Misfiring pilot arc	a) Too much air flowing through torch	Decrease flow
	b) Blown diode	Telephone Goodwin Air Plasma
Tracking :- Spark appears at front of torch and no pilot arc.	a) Slag build up on Front Cap	Clean slag from around Nozzle
	b) Front Insulator damaged	Replace Front Insulator
Front Caps and Nozzles burning up rapidly	a) Incorrect operation of torch	See operating instruction pages
	b) Not using Silicone Grease	Apply Silicone Grease
Excessive bevel, poor cut quality	a) Damaged Consumables	Change Consumables
	b) Electrode eroded off centre	Change Consumables
	c) Misaligned Consumables	Change Contact Tube and Consumables.
	d) Low air pressure	Clean Air Filters, check for air leaks.
	e) Cut speed too fast	See operating instruction pages.
	f) Stand off too high	See operating instruction pages.