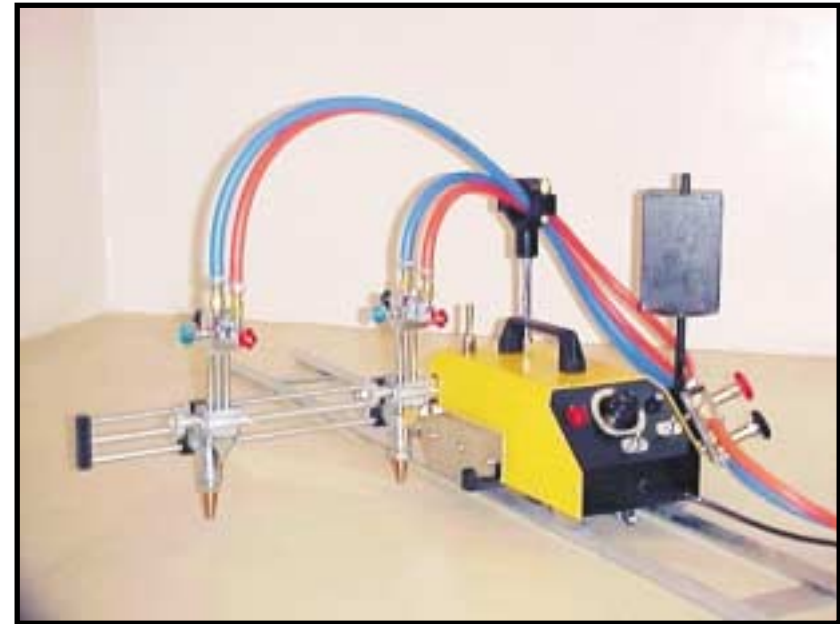


INSTRUCTION MANUAL

MultiCut

GAS CUTTING MACHINE



SEC Machines

Welding and Cutting Support Machines Mfrs.

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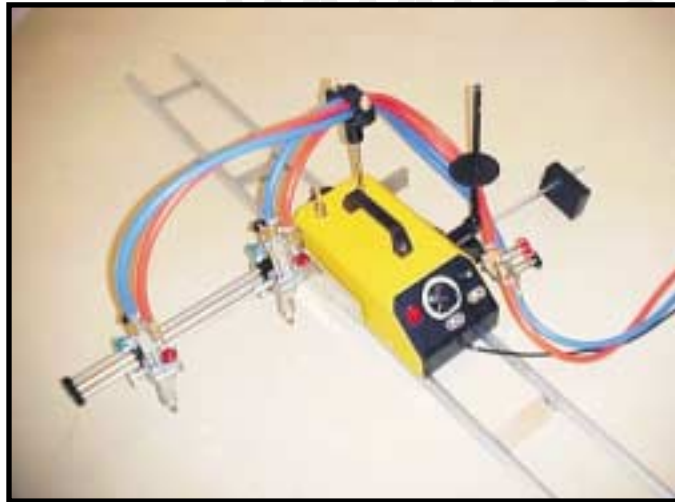
Contents

1.	Introduction.....	1	9..	Nozzle & Cutting Data.....	13
2.	Packing list.....	2	10.	Flame Setting.....	14
3.	External Parts' Names.....	3	11.	Straight Line Cutting.....	15
4.	Specifications.....	4	12	Bevel Cutting.....	16
5.	What is Gas Cutting?.....	5	13.	Circle Cutting.....	17/18
6.	Safety Precautions.....	6/7	14.	Maintenance.....	19/20
7.	Installation	8/9/10	15.	Electrical Circuit & Spares Details..	21/22/23
8.	Machine Operation.....	11/12			

Introduction

1

Multicut is a robust, yet portable trolley system designed for smooth, accurate and vibration free operation. This economical and easy to operate cutting machine is best suited for straight line, circular and bevel cutting.



Multicut is a four wheel traversing system. It has a forward and reverse selector switch. Its speed can be varied by a fine adjustment indexed selector knob from maximum to minimum speed. The machine can also be supplied with further slower or faster speed as per the requirement.

The control of the machine is conveniently located in the front and all in one place for easy and quick operation.

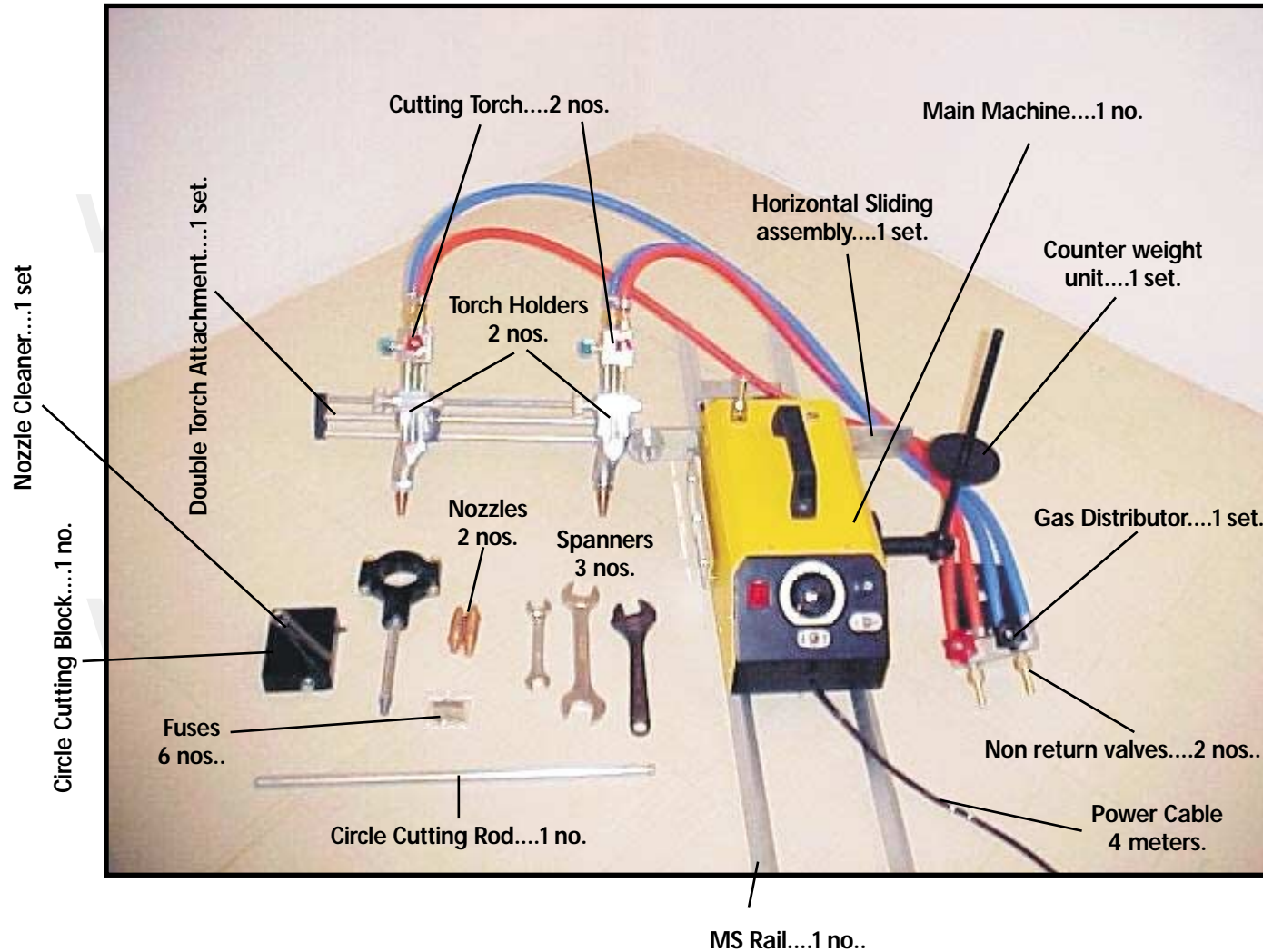
Multicut has a long sliding arm, jerk free fine adjustment vertical sliding system, counter balance facility, two meters M.S. Solid Rail Track, Circle Cutting Attachment, Illumination Power Switch, Two Speed Ranges, all enclosed in a thick gauge pressed steel body, which is externally protected from heat radiation by a large rectangular heat shield, this makes

Multicut an exclusive choice for small fabricators to big ship builders.

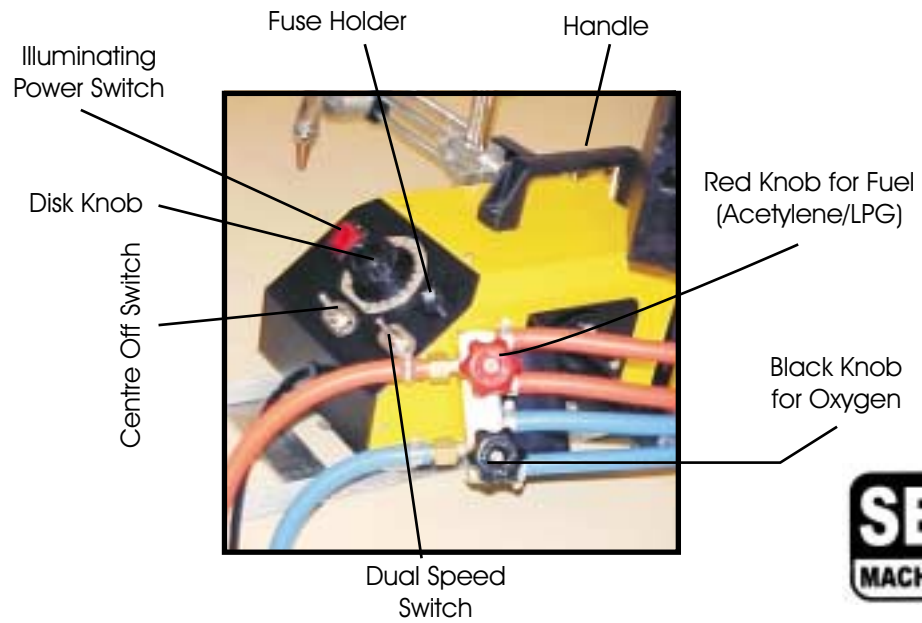
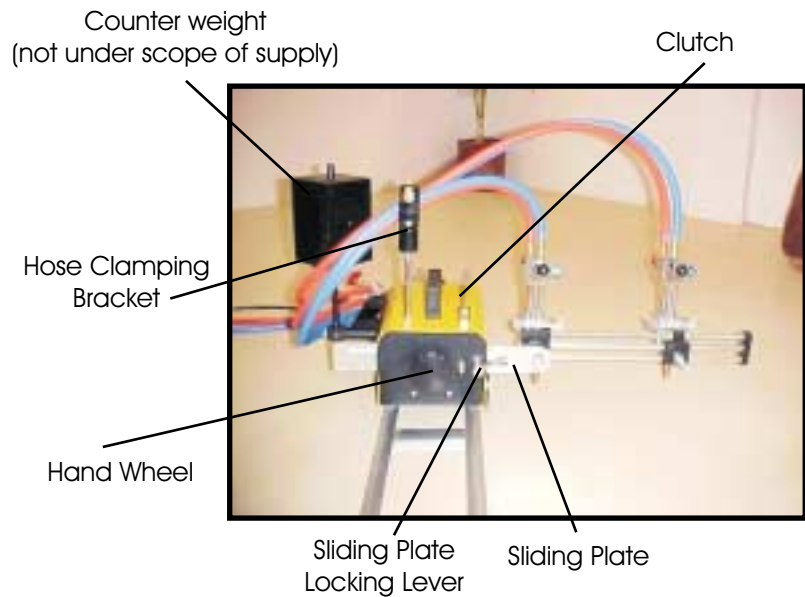
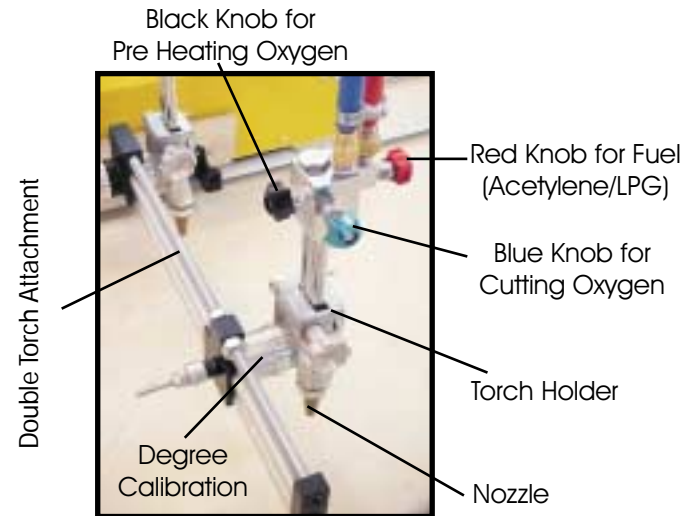
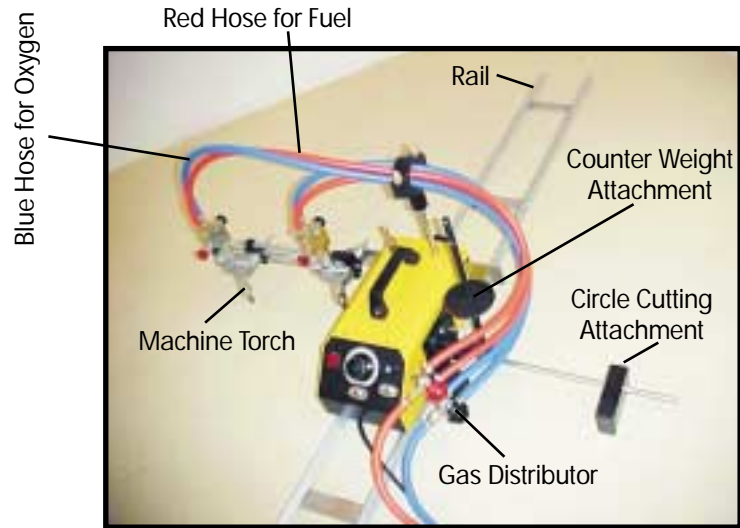


Packing List

2



External Parts



Specification

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- Straight Cuts : 2meters and multiples .
- Cutting Capacity : 5mm to 150mm plate thickness.
- Bevel Cuts : 45 degrees , including 1.V, X and Y.
- Circle Cutting : 30mm diameter to 2500mm diameter
- Number of Torches : 2 nos. torches, spaced from 80mm to 300mm
- Fuel gas : Propane & Methane (Natural Gas)
- Power supply : 220V , 50 hz, (1 Amp).
- Hose Connection : 1/4"G Fuel gas (Left) and 1/4"G Oxygen (Right)
- Dimensions : 370mmx370mmx190mm(with single torch).
- Weight without rail : 23 Kgs.
- Rail Dimension : 2000mmx200mmx30m
- Rail Weight : 13 Kgs

Gas Cutting

5

Flame cutting, commonly known as "Oxy Acetylene" or Gas cutting is a thermal cutting process. In this process, the metal is preheated to ignition temperature by heating flame before the jet of cutting oxygen with purity of 99.5% minimum, commences its combustion. This rapid and continuous process of preheating and combustion of the metal produces a uniform cut in the work piece. The travel speed of the torch is selected depending upon the cutting thickness. The slag produced during combustion is blown off by the force of the cutting oxygen jet.



An Oxy Acetylene flame can cut all structural steels, mild steels and low alloy steel which can satisfy the following:

1. The melting point of the metal must be well above its ignition temperature in oxygen.
2. The preheated metal must be combustible in Oxygen jet.
3. The combustion temperature must be higher than the melting point of the oxide formed which can be ejected by cutting oxygen stream.
4. The metal must oxidize rapidly at a temperature well below its melting point.
5. The oxide of the metal must have a melting point lower than that of the metal itself.
6. During combustion, the oxide formed must be fluid, so that it can run off without interruption to Further cutting.



Stainless steel, brass, aluminum and its alloys form refractory oxides during combustion, and therefore cannot be cut with the oxy acetylene flame. For these metals the most suitable process is Plasma Arc Cutting.

The cutting torch works on a combination of oxygen and acetylene/propane with appropriate cutting nozzles. With correct settings of gas pressures, cutting speed and cutting nozzles, clean, smooth and accurate cuts are achieved. The purer the oxygen (99.5%) the better is the finish of the cut surface. Acetylene can be replaced with LPG/Propane/Mapp, but then the cutting nozzles and parameters will have to be suitably changed.

Safety Precautions - 1

6

GENERAL

As with other industrial processes, gas cutting requires safety precautions to be adopted to avoid risk to personnel.

FUMES

Fumes from gas cutting are not considered to be dangerous provided there is adequate ventilation.

GASES

A variety of combustible gases can be used for the cutting process, all of which should be considered a potential explosion hazard. No naked flames should be near cutting blowpipes when purging hoses or making preliminary / flow adjustments to blowpipes. Keep open flames away from storage areas of cylinders and hoses. Acetylene pipelines and bottles must never be exposed to temperature exceeding 54° (130°F).

Oxygen itself is not inflammable but in its presence combustible material burn more readily.

Great caution must be exercised in preventing oxygen enrichment of the atmosphere, particularly in confined space situations.

Oxygen in contact with oil, grease or other hydrocarbons can cause spontaneous ignition resulting in fires or explosions.

Oxygen must not be used to clear hoses or dust. However, all new hose must be purged before bringing into service and this may be done with oil free, -AIR, NITROGEN, CARBON DIOXIDE.

BLOW PIPES

Use a friction lighter or pilot flame as source of ignition. Do not use matches or hot metal to light blowpipes.

Always light and extinguish by the correct sequence:

To Start:

1st..... Fuel gas on
Next..... Heating oxygen on
Last.....Cutting oxygen on

To Shut:

1st.....Cutting oxygen off
Next.....Fuel gas off
Last.....Heating oxygen off

USE ONLY APPROVED BLOWPIPES AND NOZZLES FOR THE PROCESS.

REGULATORS AND GAUGES

All sources from which gas supplies are taken must be fitted with regulators capable of controlling the source outlet pressures to those recommended in the relevant cutting data for the equipment. Never use a regulator with other than the gas for which it is designed. Release the control pressure when shutting down, after the pressure in the hose has been released.

Treat regulators and gauges as precision instruments. Do not subject them to sudden pressure surges caused by the rapid opening of supply valves.

Regulators that creep, which passes gas when the pressure regulating screw is released or builds up pressure on the low pressure side when the blowpipe trimming valve is shut, should be replaced.

Regulators, valves and pipe work must be kept clean and free from oil grease.



Safety Precautions - 2

7

PROTECTIVE CLOTHING

For the best protection cotton overalls should be worn when cuttings, and feet should be protected from slats and falling of cuts. Leather gloves should be worn at all times.

Goggles with suitable filters to guide best viewing of flame should be used. The equipment should be installed and maintained in accordance with the current issue of the Regulation for the 'Safety in welding and Cutting'.

ELECTRICAL EQUIPMENT

Servicing or maintenance must not be carried out unless the apparatus is disconnected from the electrical supply.

LEAKAGES

Gas leaks at valve glands, joints and hoses can be detected by application of soap water and remedied by tightening of gland nuts and joints.

Do not test leakages with a flame Particular care should be observed when changing nozzles, by making gas tight joints by ensuring that seatings are clean.

HOSES

Do not expose hoses to heat, slag, sparks, oil or grease. Faulty hoses should be replaced or repaired by cutting out a faulty section of hose and inserting an approved coupling.

DO NOT USE WIRE TO SECURE HOSES. USE APPROVED HOSE CLIPS ONLY.

When acetylene gas is employed as the fuel, do not use copper tubing to connect hose. Hoses must not be kinked or nipped in order to cut off gas supply temporarily.

FLASHBACK

Flashback can be serious and may damage hose and regulators. In severe cases, the operator could be at risk. It can be avoided by adherence to recommended operating procedures.

Should a flashback occur, switch off the electrical supply at the control cabinet, and shut off the gas services as quickly as possible.

A detailed inspection should be made of the equipment to ascertain the cause as soon as it is safe to do so. The most probable cause are loose connection(s), faulty seating in blowpipe block, a dirty or faulty nozzle, incorrect pressures, or ignition has been applied before the flow of fuel gas is properly established.

A maintenance check should also be carried out covering the items from the nozzle(s) to the supply sources, such as nozzle, nozzle block hoses, manifolds, regulators, solenoid valves and pressure gauges.

Purge the hoses as the normal practice prior to lighting the blowpipe(s), having first ensured that there are no naked flames in the vicinity. Adjust the pressure to those required and relight the blowpipe(s)

NOTE

Purging of hoses should always be carried out before operating machine.

FURTHER INFORMATION

More detailed information can be obtained from the following publication. It should be noted that this publication is subject to periodical revision and care should be taken to use the latest edition. "Safety in welding and cutting American National Standard, 249.1. ANSI, NEWYORK



Installation - 1

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Installation - 2

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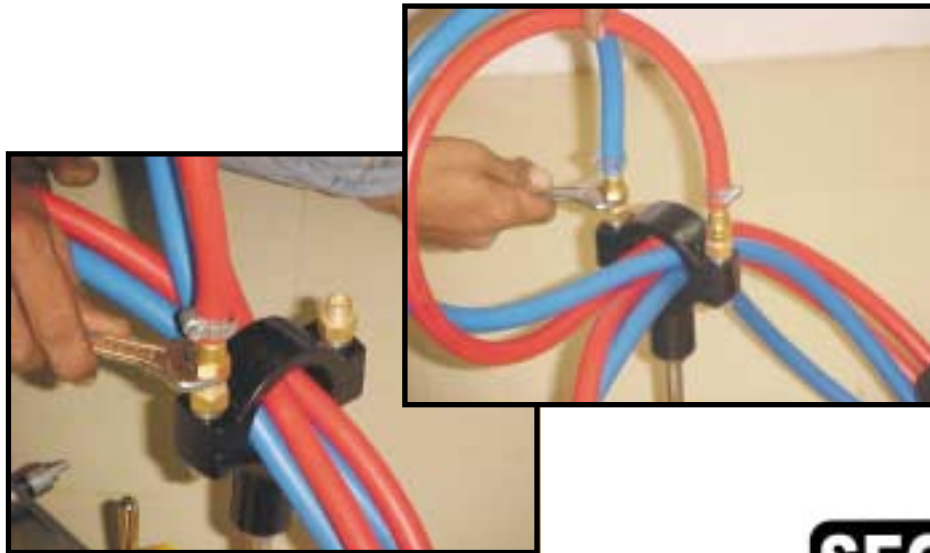
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Installation - 3

10

Single Torch cutting



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Machine Operation-1

Check List : Before Starting the machine .

1. Always check that the cutting torch is absolutely vertical before commencing the cut.
2. Ensure that the work is correctly supported. No support should, however, foul the line of cut.
3. Remove all scales, dirt and rust from the path of cut. This may be done by moving the cutting torch along the line of cut with the preheat flames alight thereafter brushing the plate with a wire brush.
4. If possible, start the cut at the edge of the plate. Try to arrange the template so that at least one point is close to the edge of the plate and then start cutting from this point.
5. If the cut cannot be started at the edge of the plate, a 12.7 mm diameter hole in the plate greatly facilitates starting.
6. In thinner sections, a hole may be made by piercing the plate with the flame. Bring the plate to the point of incandescence and gradually open the cutting jet. A light rotary movement with the cutting torch will be found useful during this operation.
7. When starting a cut at the edge of the plate set approximately half the nozzle diameter over the plate edge.
8. Insert wedges in the 'kerf' as the cut proceeds to avoid distortion.

Before starting the cutting operation, the following guideline should be followed :

1. Ascertain that the three gas valves on the cutting torch are closed.
2. Open the oxygen and acetylene cylinder valves making certain that the pressure adjusting screws on the oxygen and acetylene regulators are released.
3. Open acetylene valve (red) on the cutter and adjust the required acetylene pressure on the regulator.
4. Open the heating oxygen valve (black) and cutting oxygen valve (green) and adjust the oxygen pressure as per the operating data.
5. Shut all the valves on the cutting torch.
6. Open the acetylene valve (red) on the cutter little and ignite the nozzle.
7. Adjust the acetylene valve (red) according to the required flame.
8. Open heating oxygen valve (black) and adjust both valves until correct flame conditions are obtained as explained earlier.
9. Now open cutting oxygen valve (green) and observe that a stream of cutting oxygen passes from the nozzle center through the heating flame.
10. Set cutter either in the vertical or angular position for the bevel required using the graduated scale on cutting holder.
11. Set speed control knob for movement of the equipment (A guideline can be obtained from the nozzle selection data.)
The machine is now ready for cutting.

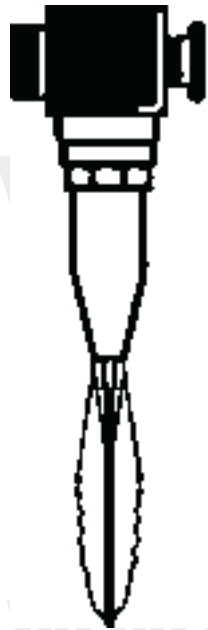
Nozzle Cutting Data

Nozzle Selection , Gas Pressure , Cutting Speed, Gas Consumption Data

Material Thickness		Nozzle Size		Oxygen Pressure		Fuel Pressure		Cutting Speed		Kerf Width	
mm	inch	mm	inch	kg/cm ²	lb/in ²	kg/cm ²	lb/in ²	mm/min	inch/hr	mm	inch
6	1/4	0.8	1/32	1.8	25.2	0.15	2.1	660 - 550	26 -- 22	0.1 - 1.5	0.04 - 0.06
6 -- 12	1/4 -- 1/2	1.2	3/64	2.2	30.8	0.15	2.1	550 - 490	22 -- 19	1.5 - 2	0.06 - 0.08
12 -- 25	1/2 -- 1	1.6	1/16	2.6	36.4	0.15	2.1	490 - 450	19 -- 18	2 - 2.5	0.08 - 0.10
25 -- 50	1 -- 2	1.6	1/16	3.3	46.2	0.15	2.1	450 - 360	18 -- 14	2.2 - 3	0.09 - 0.12
50 -- 75	2 -- 3	2	5/64	3.7	51.8	0.15	2.1	360 - 280	14 -- 11	3.5 - 4	0.14 - 0.16
75 -- 100	3 -- 4	2	5/64	4.4	61.6	0.15	2.1	280 - 200	11 -- 8	3.8 - 4.2	0.15 - 0.17
100 -- 150	4 -- 6	2.4	3/32	4.8	67.2	0.15	2.1	200 - 150	8 -- 6	4 - 4.5	0.16 - 0.18

Note : The above table is only for guidance actual parameters may vary depending on local conditions and other factors such as different type and make of nozzles, regulators, hoses lengths , plate material, oxygen purity, carbon contents of steel , operators working, gas mixing ratio, distance between plate and nozzle etc.

Flame Setting



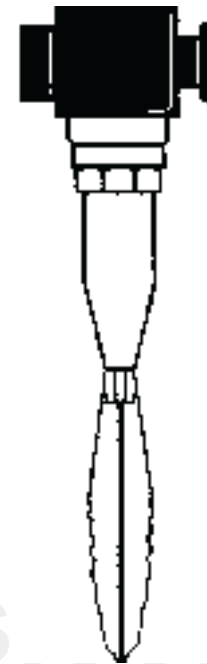
EXCESS ACETYLENE

The inner cone is long without a distinct outline.
If used, the top edges of cut will be badly melted.



EXCESS OXYGEN

The inner cone has the peculiar shape as shown and the whole flame is short.
Liable to backfire. This type of flame may also be the result of the dirty nozzle.

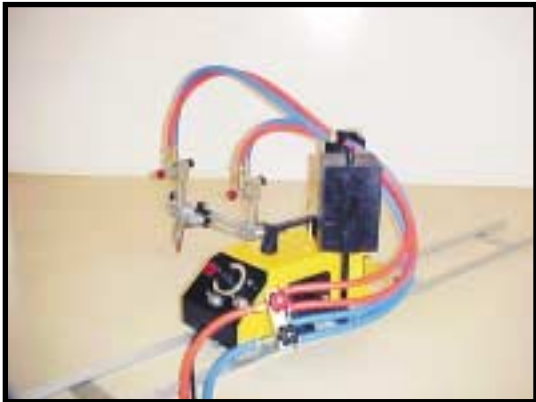


CORRECT ADJUSTMENT

The inner cone is from 2.4 mm to 6.3 mm long.
According to pressure and thickness of steel being cut,
And has a sharply defined outline.

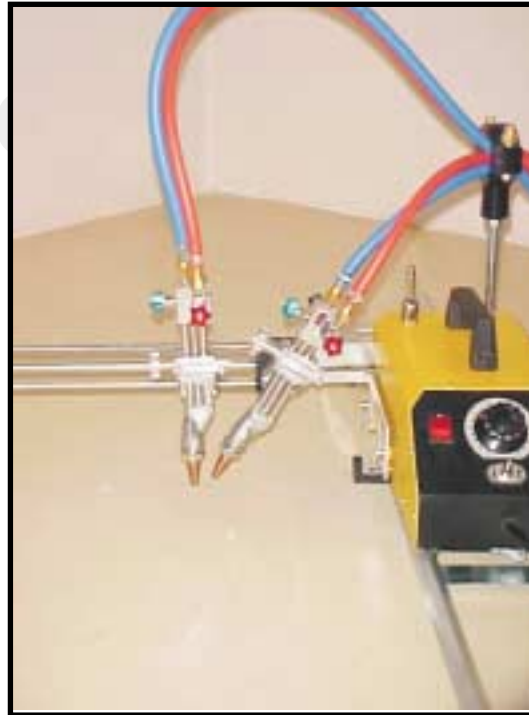


Straight Line Cutting



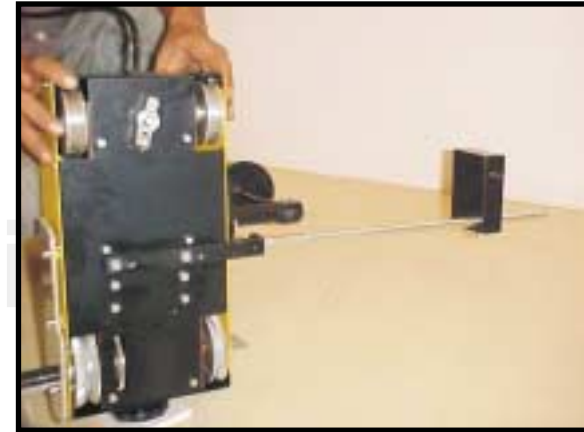
Bevel Cutting

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Circle Cutting - Larger Diameters

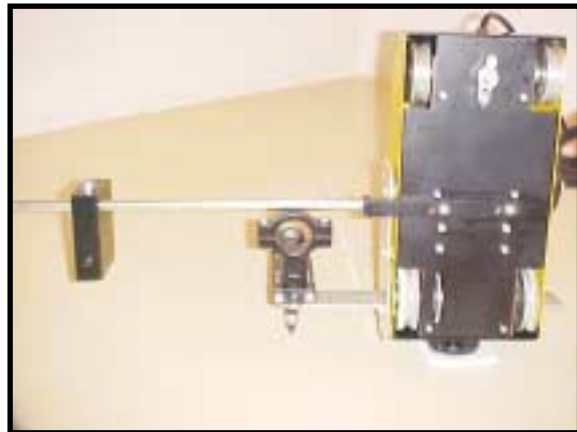
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Circle Cutting - Smaller Diameters

18



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MAINTENANCE

The machine has been designed in such a simple fashion that maintenance work required for efficient operation of the machine has been cut to a minimum.

The machine should always be kept clean. Dirt, slag or grit accumulated on any part of the machine should be removed.

All oxygen and acetylene gas hoses should be inspected frequently to ensure that they are in good condition.

DAILY MAINTENANCE:

Wipe over the machine to remove any oxide dust. Lightly oil the flanged bushes of the wheels and the castor wheel pin.

Examine hoses and power lead for damages.

MONTHLY MAINTENANCE:

1. Clean the machine external parts, and free the machine from oxide and metallic dust, or oil etc.
2. Check for gas tightness of all hose connections and check the spindles and gland nuts of valve block with soap water for leakages. Particular care should be taken that soap or teepol solution used for leak testing of valve block do not enter into the electrical control panel underneath. In case of leakage from hose connections-tighten hose clip or nuts as necessary.
3. Lightly Oil bushes and related moving parts, the oil should never drip. Be careful that oil does not enter in the electrical chamber, or towards the cutting torch.
4. Open the machine handle, heat shield and machine tin sheet cover. Blow 0.7 Kg/cmsqr air through motor ventilator holes from gearbox end. Also blow air around the machine to blow of the dust, please do not blow excessive pressure air as this can damage the wiring connections.
5. Open the gearbox front cover and check if gear grub screw are tight, tighten the loose ones if any. Change the grease if not thick.
6. Set the cutting torch holder's setting screws for correct movement pressure.
7. Blow air forcefully out of torch after removing the nozzle to clean the dust particles if any in the cutting torch.

DO NOT USE OXYGEN FOR CLEANING



ELECTRICAL MAINTENANCE :

Due to its modular design not much of maintenance work will be necessary on the electrical portion. In case of any electrical fault, check for short circuits and insulation strength.

MAINTENANCE OF NOZZLES :

Cutting nozzles should be treated with care. This will be amply repaid by the length of satisfactory service which these are expected to give if carefully handled.

If when lighting the cutter, a number of "pops" and "crackles" are produced, this indicates a leak in the nozzle seat at the head. The nozzle should be taken out and inspected to see if a piece of dirt or a damaged seat is the cause. The two seats on the nozzle which are located in the cutting torch head make individual gas tight passages for the acetylene and oxygen gas mixture and cutting oxygen supplies to the nozzle orifices. Any damage to the nozzle seats or on the mating seatings in the cutter will result in bad flame conditions, back firing etc. Never leave a nozzle lying around where it can be damaged, always replace in the carton in which it is supplied.

Nozzle orifices should always be kept clean. Cleaning of the nozzle orifices should be done with the nozzle cleaner set only, in no case any hard material be used for such cleaning.

The small ports at the seating end of the nozzle must not be touched.

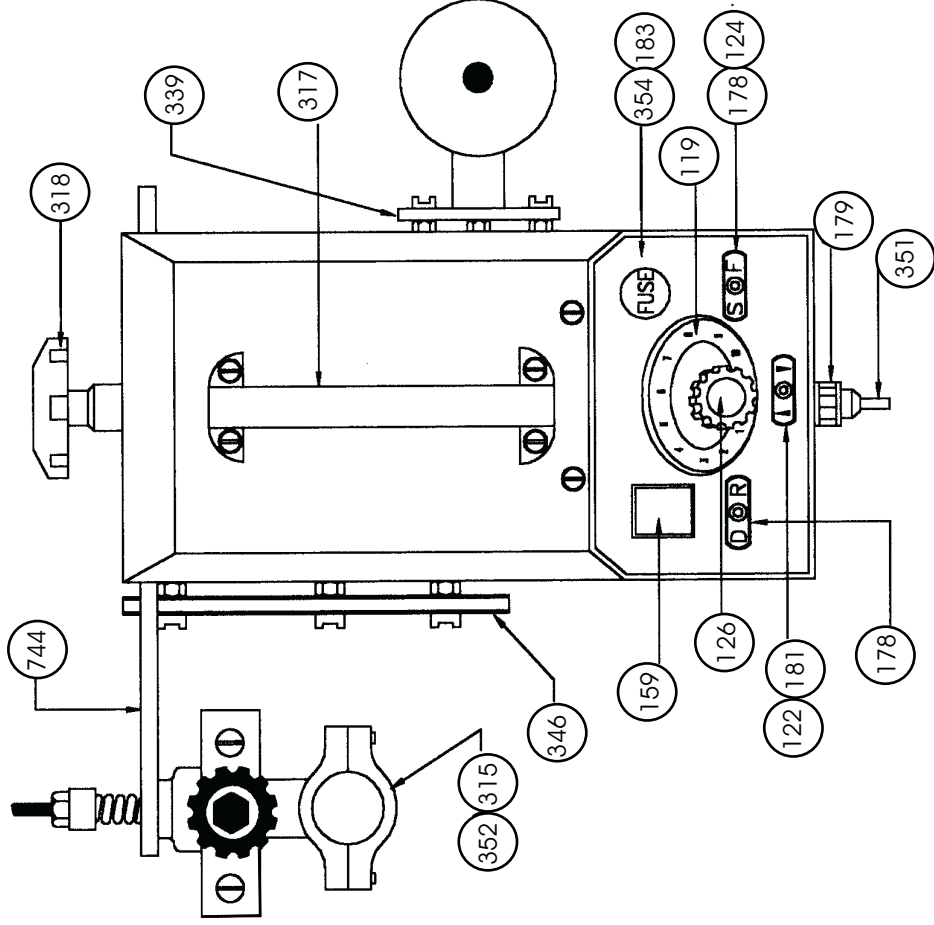
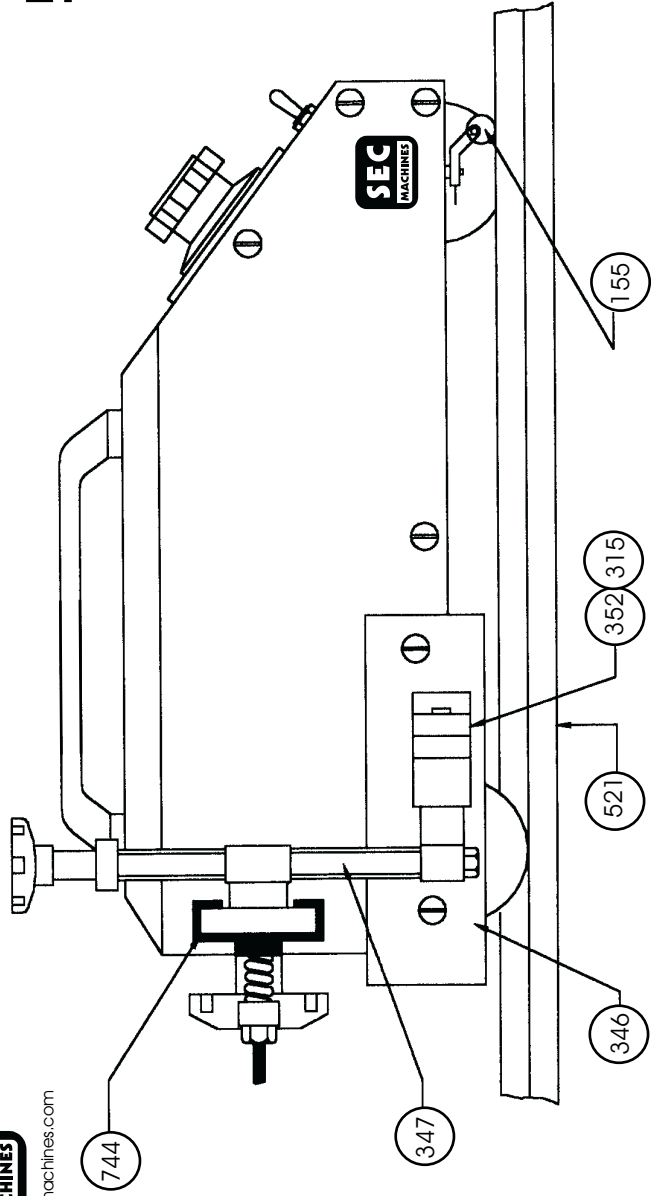
Any damage to the flame orifices of acetylene nozzle may be corrected by filling away the damaged portion and then polishing with smooth emery powder laid on a piece of glass sheet followed by removing any burrs with a copper poker.

The nozzle face must be kept square with the nozzle body.

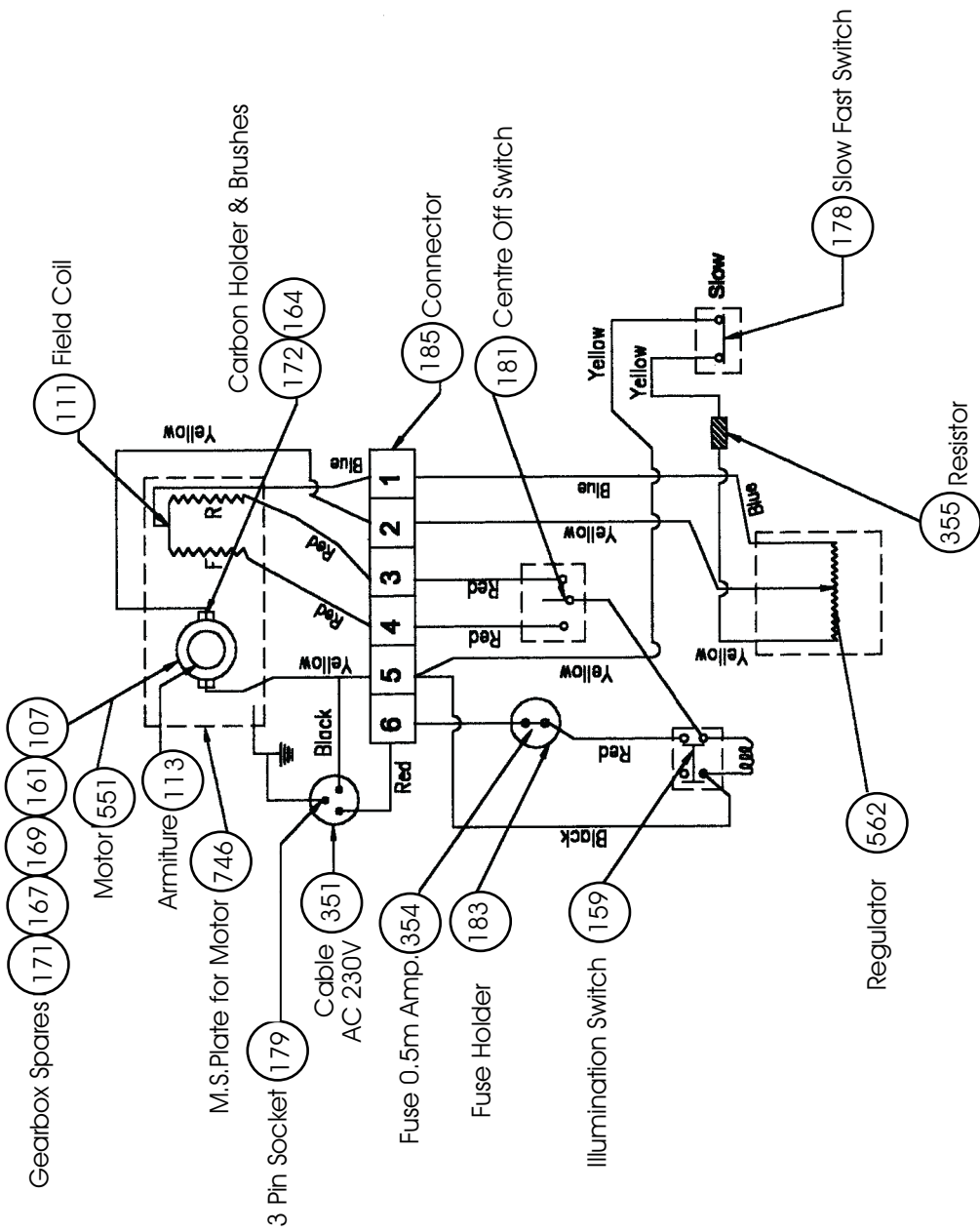
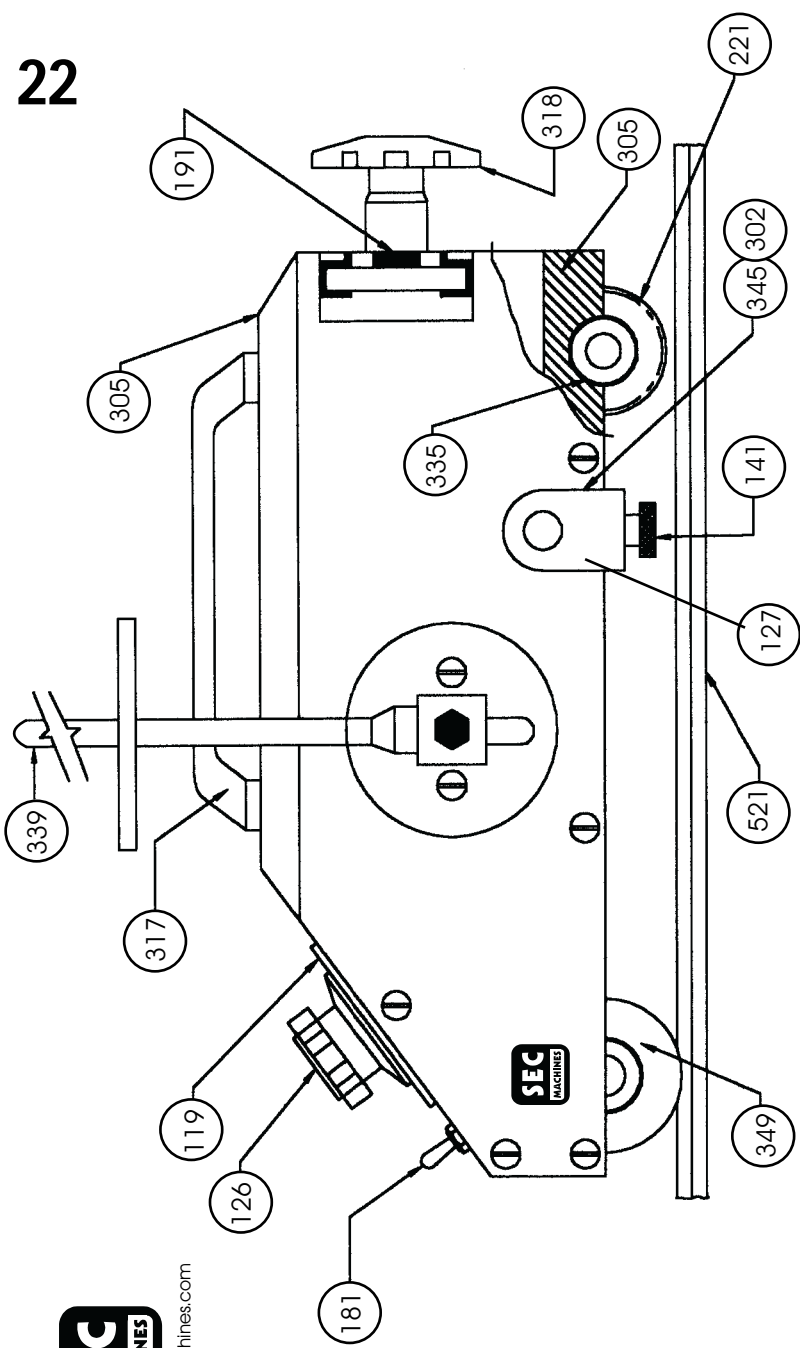
Complete nozzle maintenance instructions are included with each nozzle.

WARNING : No oil or grease of any kind must be allowed to come into contact with high pressure oxygen.
Oxygen is not inflammable, but in its presence with combustible materials burn much more readily and fiercely than in air.





Multicut spares' General Arrangement Drawing.



Multicut spares' General Arrangement Drawing.

Spares List

Part No.	Description	Qty.
107	Gearbox - Unit	1 Set
111	Field Coil	1 Pc
113	Armature	1 Pc
119	Regulator Label	1 Pc
122	FOR Label	1 Pc
124	Slow Fast Label	1 Pc
126	Disk Knob	1 Pc
127	Circle Cutting Attachment	1 Pc
141	L Plate Bolts	1 Set
155	Swivel wheel assembly	1 Set
159	Illumination Switch	1 Pc
161	Output Gear - Motor	1 Pc
164	Carbon Brush Set	1 Set
167	Double Start Worm	1 Pc
169	Brass Gear - Gear Box	1 Pc
171	Fibre Gear - Gear Box	1 Pc
172	CarbonHolder With Cap	1 Set
178	Slow/Fast Switch	1 Pc
179	Three Pin Socket	1 Pc
181	Centre Off Switch	1 Pc
183	Fuse Holder	1 Pc
185	Connector - Small	1 Pc
191	Handwheel Pinion - small	1 Set
221	Wheel Gear	1 Pc
302	Weight - Circle Cutting	1 Pc
305	Chasis Casting Plasma	1 No
315	Torch Bracket Small - Plasma	1 Pc
317	Handle Plasma	1 Pc
318	Handwheel Knob	1 Pc
335	Chasis Bushes Plasma	1 Set
339	Counter weight Unit	1 Set
345	L Plate	1 Pc
346	Plasma Heat Shield Unit	1 Set
347	Verticle Slide Unit	1 No
349	Wheel Assembly - Plasma	1 Set
349	Wheel Set	4 Nos
351	Cable - 4 Mtr	4 Mtrs
352	Torch Bracket Big - Plasma	1 Pc
354	Fuse 0.5	1 Pc
355	Resistor 10W	1 Pc
505	Tin Body - Plasma	1 Set
521	MS Solid Rail - Plasma	1 Pc
551	Motor	1 Set
562	Regulator	1 Pc
744	Sliding Plate Plasma	1 Pc
746	MS Plate for Motor	1 No

