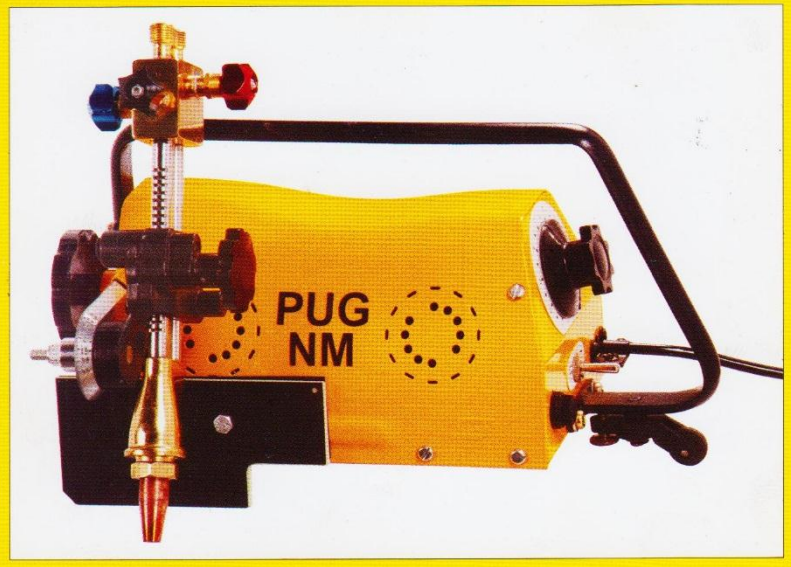
PUG NM

Portable Straight Line and Circle Cutting Machine with latest nozzle - mixing technology



INSTRUCTION MANUAL

ESAB®

PUG NM

Portable Straight Line and Circle Cutting Machine With Latest Nozzle-mixing Technology

INSTRUCTION MANUAL
FOR
INSTALLATION, OPERATION & MAINTENANCE

Manufactured at

ESAB INDIA LIMITED

EQUIPMENT FACTORY

P-41 Taratala Road, Kolkata - 700 088, INDIA

Contents

INTRODUCTION

Oxygen cutting results from the exothermic chemical reaction of a jet of high purity oxygen impinging on steel at the elevated temperature. The red hot metal in the path of the oxygen jet is eroded as iron oxide and the steel plate is served.

PUG NM portable cutting machine incorporating the latest nozzle-mixing technology is a power driven tool which will cut mild steel plate upto 100 mm. thick. Vertical cuts or bevels upto 45° can be made by the following methods.

a. Straight line cuts of any length with the machine running on an Aluminium track available in length of 1.8 Mts. and multiples.

b. Circle from 75 - 1140 mm. diameter when using the circle cutting attachment.

c. Freehand cutting of simple curves by hand steering (vertical cuts only).

The machine mounted NM cutter is designed such that Oxygen and the fuel gas (Acetylene or LPG) get mixed in the nozzle only, making it much safer than the conventional injector type cutters. It is suitable for use with Acetylene or LPG as fuel gas. 3-seat swaged NM nozzles manufactured by **ESAB INDIA LIMITED** should be used for excellent performance.

Machining or other finishing may not required as post cutting operations if the correct gas pressure and speed of the cutter movement are used during cutting. High degree of accuracy can also be obtained in this process of thermal cutting by synchronizing the gas flow rate and speed of the cutter.

SPECIFICATIONS

Cutting Capacity	100 mm. thick Mild steel (approx). Bevel cutting 75 mm thick upto 45°
	Circles from 75 mm to 1140 mm diameter using circle cutting attachment (can be procured additionally)
Cutting Speed Range	190-830mm / min at 220 volts, 1 phase, 50 HZ, AC Supply
Cutter (NM Type)	Vertical Adjustment 68 mm. Horizontal adjustment 90 mm. Gas Hose connections 1/4" BSP left hand for fuel gas, RH for Oxygen
Input for Drive Motor	220/240 volts 50 HZ, 1 phase AC for the Fractional Horse Power geared motor.

STANDARD PUG NM

(Code No.432-0156-100)

The following items are supplied when a standard PUG NM is ordered.

(i) PUG NM straight and circle cutting machine (without track and circle cutting attachment) - 1 (One) No.

(ii) ANM Nozzle no.12 (3/64") - 1 (One) No.
ANM Nozzle no.16 (1/16") - 1 (One) No.
These nozzles are suitable for use with Acetylene as fuel gas. PNM nozzles (suitable for use with LPG) can be purchased additionally.

(iii) 9 Mtrs long, 3 core cable attached to drive motor

(iv) Hose Nut Spanner - 1 No.

(v) Head Nut spanner - 1 No.

(vi) Connection Hose 1/4" - 2 Nos.

(vii) Nut Hose coupling LH 1/4" BSP - 1 No.

(viii) Nut Hose coupling RH 1/4" BSP - 1 No.

(ix) Nut 3/8" BSP (R.H) - 1 No.

(x) Nut 3/8" BSP (L.H) - 1 No.

(xi) Card Cutting Data - 1 No.

(xii) Connection Hose 3/8" x 1/4" BSP - 2 Nos.

(xiii) Instruction Manual - 1 No.

Recommended Additional Accessories to be used with PUG NM

(i) Track Aluminium (1.8 m length) - 1 No.

(ii) ESAB DURA (0-10) Oxygen Regulator - 1 No.

(iii) ESAB DURA (A-1.5) Acetylene - 1 No.

(iv) ESAB PROTEX RO Flashback Arrestor - 1 NO

(v) ESAB PROTEX RA Flashback Arrestor - 1 NO

(vi) Circle Cutting Attachment - 1 No.

(vii) Hose 5 mm Blue (length of 10 mtrs) - 1 length

(viii) Hose 5 mm Red (length of 10 mtrs) - 1 length

The above can be obtained from ESAB India. Ltd.

Also the following accessories are required :

A pair of welder's goggles, spark lighter, cylinder key, spindle key, key outfit, hose clips (5 mm) - 4 nos;

Leather hand gloves - one pair

INSTALLATION

Place the machine on a piece of steel plate and connect the 3 pin socket to 220 volts, 1 phase, 50 HZ, AC Supply line. An isolator should be used in the main line. Now connect the 3 core cable with the supply line and switch 'ON' the isolator (if any), check the running by operating Forword/OF/Reverse switch and Speed Control Knob. **"Do not push the machine by hand unless the front left hand (driving) wheel is lifted off the surface."**

Connect Oxygen and Acetylene hoses to cutter. Connect the other ends of hoses to the Oxygen and Acetylene supply line through the regulators.

WARNING : DO NOT USE OIL OR GREASE ON OXYGEN CONNECTIONS.

Refer to operating data and ensure to fit ANM NOZZLE to the cutter.

ALWAYS USE TWO SPANNERS WHILE TIGHTENING OR LOOSENING THE NOZZLE NUT. THIS WILL PREVENT DAMAGE OR DISTORTION TO THE CUTTER ASSEMBLY.

Figure - 1

Nozzle seats and the mating seatings in the cutter are manufactured to high degree of surface finish and close tolerances. Hence clean properly before assembly, otherwise gas leakage and backfire may occur during working.

OPERATING INFORMATION

(a) Before starting the cutting operation, the following guidelines should be followed :

(i) Ascertain that the three gas valves on the cutter are closed.

(ii) Open the Oxygen and Acetylene gas cylinder valves making certain that the pressure adjusting screws on the Oxygen and Acetylene regulators are released.

(iii) Open Acetylene valve (RED) on the cutter and adjust the required Acetylene pressure on the regulator.

(iv) Open the heating Oxygen valve (BLUE) and cutting Oxygen valve (BLACK) and adjust the Oxygen pressure as per the operating data.

(v) Shut all the valves on the cutter.

(vi) Open Acetylene valve (RED) on cutter and tight the nozzle.

(vii) Open heating Oxygen valve (BLUE) and adjust both valves until correct flame conditions are obtained as shown in Fig.1 (FLAME CONDITIONS).

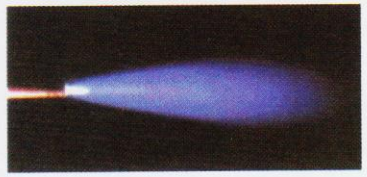
(viii) Now open cutting Oxygen valve (BLACK) and observe that a stream of cutting Oxygen passes from the nozzle centre through the heating flame.

(ix) Set cutter either in the vertical or angular position for the bevel required using the graduated scale on cutter holder.

(x) Set speed control knob for movement of the equipment (A guideline can be obtained from the operating data).

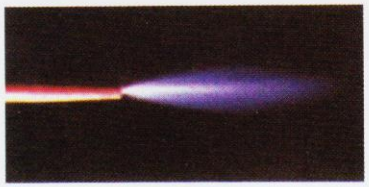
(xi) The machine is now ready for cutting.

FLAME CONDITIONS



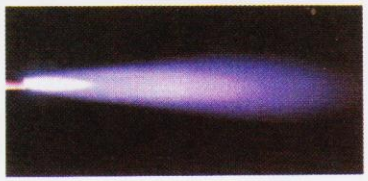
Correct Adjustment

The inner cone is from 2.5 mm. to 6 mm. long, according to pressure and thickness of steel being cut, and has a sharply defined outline.



Excess Oxygen

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



Excess Acetylene

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

Figure - 2

(b) Straight-line Cutting with Track

Place track on the plate to be cut, 75/100 mm, away from and parallel to the line of cut. Lock castor wheel assembly with lock screw and place the machine on track ensuring that all three wheels are located in their respective track guides (Fig.3).

Adjust nozzle height with handwheel for vertical adjustment and its position over the line of cut with handwheel for horizontal adjustment.

Position machine so that the cutting Oxygen orifice of the nozzle is just clear of the plate edge, light up heating flame to pre-heat plate edge. Open cutting Oxygen valve to its full extent and simultaneously switch on drive motor.

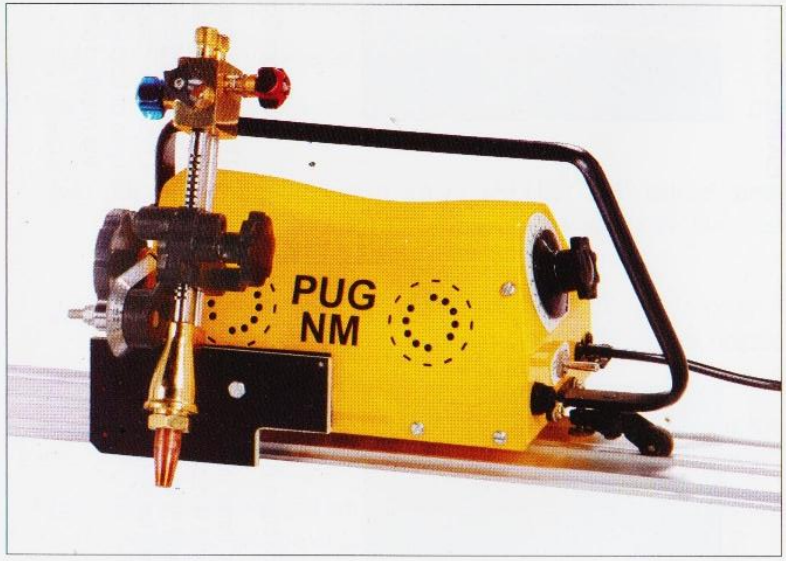


Figure - 3

(c) Straight-line Cutting with a straight - edge

This is an alternative method of straight line cutting when track is not used.

Select a piece of straight metal between 8 mm. to 19 mm. thick and clamp to the plate 20 cm. away from and parallel to the line of cut. The straight - edge should preferably over - hang the plate by 30 cm. on each side.

If cutting is to extend to full plate width, a support must be provided to the machine beyond the plate edges. This can be done with two pieces of metal having the same thickness as the plate laid underneath the overhanging ends of the straight edge.

Lock the castor wheel and place the machine on plate with its right hand wheel and bracket (Fig.3) in contact with the straight - edge and the machine itself between the straight - edge and the line of cut. Adjust cutting nozzle for height and position over line of cut.

The machine should move backwards while cutting, i.e. drive motor must be switched to REVERSE mode.

(d) Circle Cutting

Trammel bar should be assembled with the machine base.

For cutting circles 510 mm. to 1140 mm, diameter, the trammel bar should be positioned as in Fig.4. For circles 75 mm. to 600 mm. diameter, assemble the trammel bar on the cutter side of the machine using the same fixing holes. Unlock castor wheel so that it is free.

Trammel block must be assembled on the trammel bar with the hardened steel centre in line with axle.

Set out the circle to be cut, making due allowance for kerf and at its centre make a punch mark about 1.5 mm. deep. Adjust the distance between the cutting nozzle and steel centre in the trammel block approximately to the radius of the circle to be cut. Position the machine on plate with the trammel block centre in the centre punch mark and make final adjustments of nozzle height and position with hand wheels.

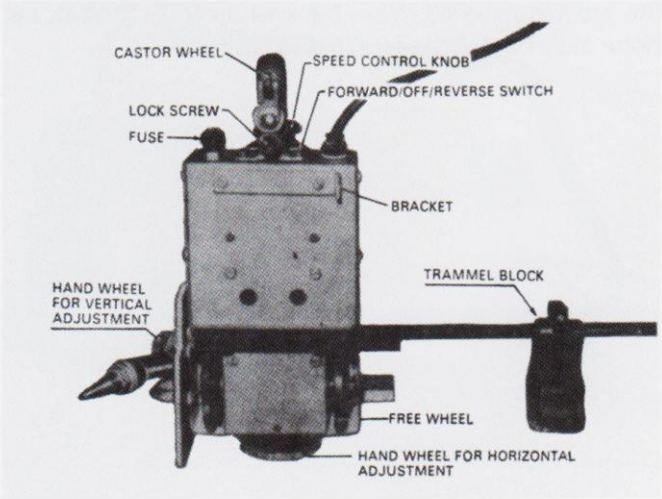


Figure - 4

Note : When cutting circles, the gas hoses and motor cable must be looped or supported properly to avoid fouling or excessive drag.

The following methods may be used for cutting circles :

1. Drill a hole 12.5 mm. diameter or more in the scrap portion of plate so that a point on its circumference coincides with the circumference of the circle to be cut. The edge of this hole can be used as a starting point for pre-heat and subsequent cutting.

2. Position nozzle over line of cut, pre-heat plate and open cutting Oxygen valve. When the Oxygen jet has pierced the plate, switch on drive motor. Where piercing takes place, there will be a scar on the cut edge of the material.

3. Move the cutter by means of handwheel away from the line of cut approximately 12.5 mm. into the scrap portion of plate. Pierce the plate (as described in point 2) and move the cutter back to the line of cut, again by handwheel. When the periphery of the circle to be cut is reached switch on drive motor and allow the machine to take over cutting.

   When moving the cutter back to the circle periphery, it should be at a speed approximately the same as circle cutting.

(e) Free-hand Cutting

When free hand cutting simple curves, the machine is steered-round the outline of the shape to be cut. Do not push the machine.

The castor wheel must be free to swivel and all three wheels should be in contact with the plate. To start cutting from a plate edge, hold the machine by its handle with the front wheels just resting on the plate. When cutting has processed a sufficient distance, steer the machine on the outline of the shape to be cut.

CUTTING DATA

PUG NM

Material Thickness m.m.	Vertical Cutting								Bevel Cutting						
	3	6	13	18	25	50	75	100	3	6	13	18	25	50	75
ANM Nozzle size	1/32	1/32	3/64	3/64	1/16	1/16	1/16	5/64	3/64	3/64	1/16	1/16	1/16	1/16	5/64
Oxygen Pressure Bar	1.8	1.8	2.1	2.1	2.8	3.2	3.5	3.5	1.8	2.1	2.8	3.2	3.5	3.5	3.5
Acetylene Pressure Bar	.14	.14	.14	.14	.14	.14	.14	.2	.14	.14	.14	.14	.14	.14	.2
Speed Setting	5-6	5	4.5	4	3-4	2	1-2	1	5	4-5	4	3-4	2	1-2	1

Note : The figures given are intended as a guide and may vary according to local conditions e.g. flame setting condition of material, experience of operation etc.

Notes :

(1) Cutting Data is given as a guide only and may vary to suit the nature of the work.

(2) For bevels less than 30° slightly increase cutting speed or reduce Oxygen pressure.

(3) For bevels greater than 30°, reduce the cutting speed slightly.

(4) A minimum Acetylene pressure of 0.15 kg/cm^2 is required to operate the cutter.

INSPECTION AND MAINTENANCE

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 damage.

Monthly Maintenance

- Unscrew 4 cheese head screws and remove handle Orifices.
- Unscrew 2 hexogen head screws and remove heat shield.
- Unscrew 8 self-tapping screws and remove cover.
- Blow through motor ventilator holes at gearbox end of motor with air at 0.7 kg/cm^2, Do not use Oxygen.
- Re-assemble the machine

Six Monthly Maintenance

Remove and examine motor brushes for wear and tear. Ensure that they are replaced in their original positions. Renew when only 6 mm. of brush remains. Unscrew 3 screws holding the gearbox to motor casing. Remove gearbox and re-pack with light grease.

Note : It may be necessary to lightly tap the gear box with a mallet to free it.

In case of any further assistance required, please contact AREA MANAGER - Gas Equipment at the nearest office of ESAB INDIA LIMITED

ESAB NM NOZZLES

ANM nozzles should be treated with care. The maintenance of the genuine nozzle will get repaid by the period of satisfactory service and performance. The manufacturing of cutting nozzle is a technology by itself which can not be judged by the external appearance. The total cost of cutting can become more than double including the wastage of manpower if a genuine nozzle is not used with this equipment. Hence it is recommended that the user should insist only on ANM NOZZLES manufactured by **ESAB INDIA LIMITED.**

The two seats on the nozzle which locate in the cutter head produce individual gas tight passages for the heating oxygen, acetylene and cutting oxygen supplies to the nozzle orifices. Any damage to these seats or mismatch seatings in the cutter head will result in bad flame, backfire etc. Never leave a nozzle lying around where it can get damaged; always try to keep it safe, and **reconfirm the genuine ANM NOZZLE before use.**

Nozzle orifices should always be kept clean. A copper wire sharpened to a fine point as a poker can be used to clear the orifices. Hard wire should not be used for cleaning.

Do not attempt to clean the small gas ports at the seating end of the nozzle. **Complete maintenance instructions are available with the packing of each nozzle.**

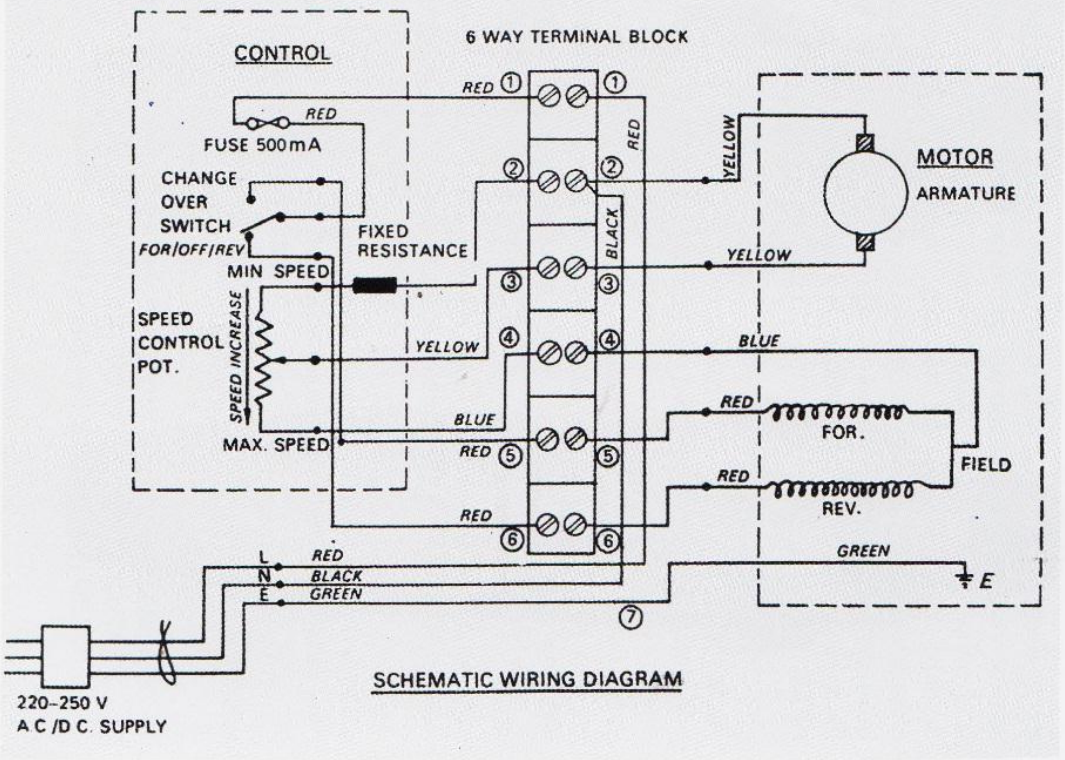
Always use NM nozzles - either ANM or PNM for Acetylene or LPG as fuel gas respectively.

WARNING : **DO NOT ALLOW OIL OR GREASE OF ANY KIND TO COME INTO CONTACT WITH HIGH PRESSURE OXYGEN.**

ACETYLENE, NOZZLE MIX

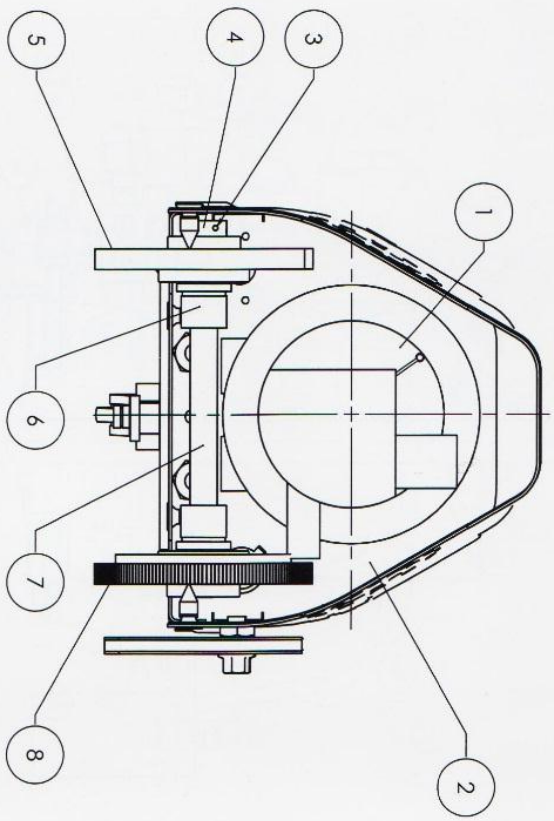
Three Seats Nozzle

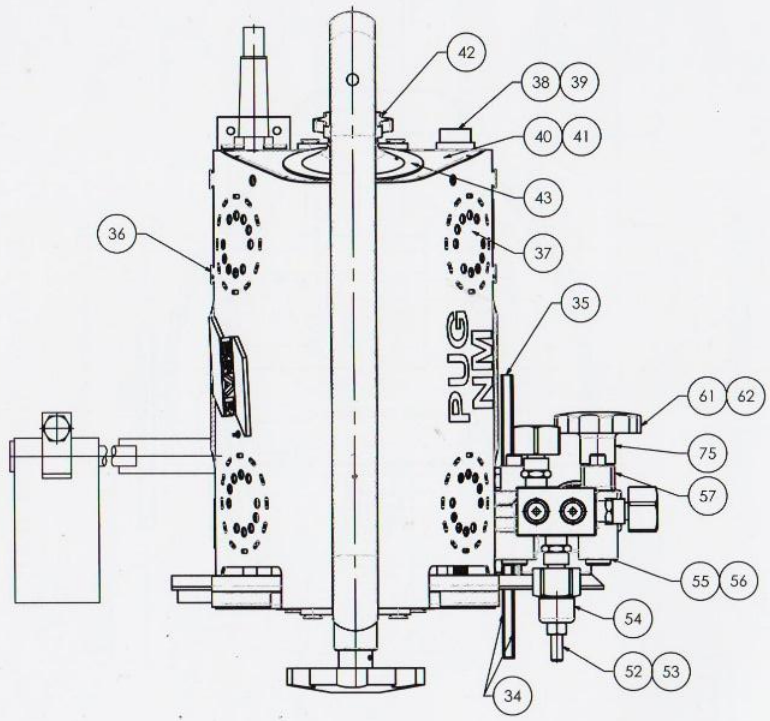
MOTOR CIRCUIT DIAGRAM



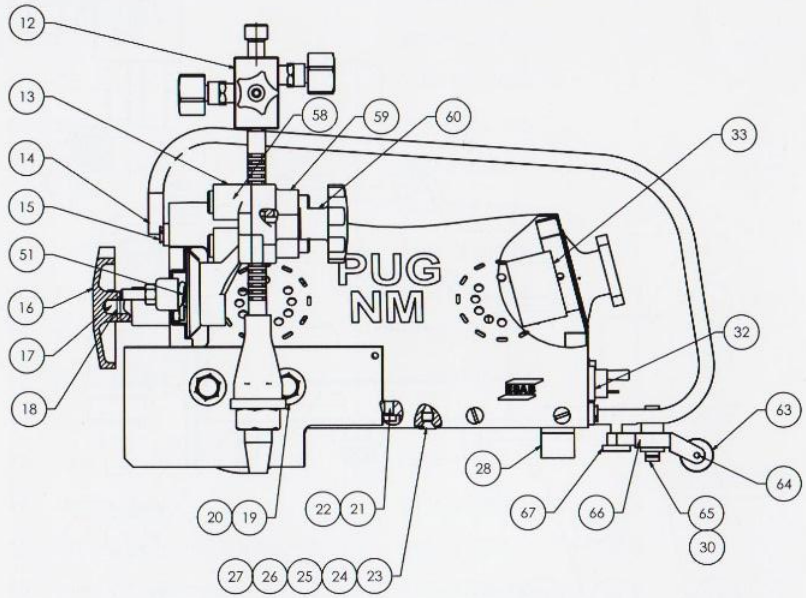
SCHEMATIC WIRING DIAGRAM

VIEW WITHOUT END COVER

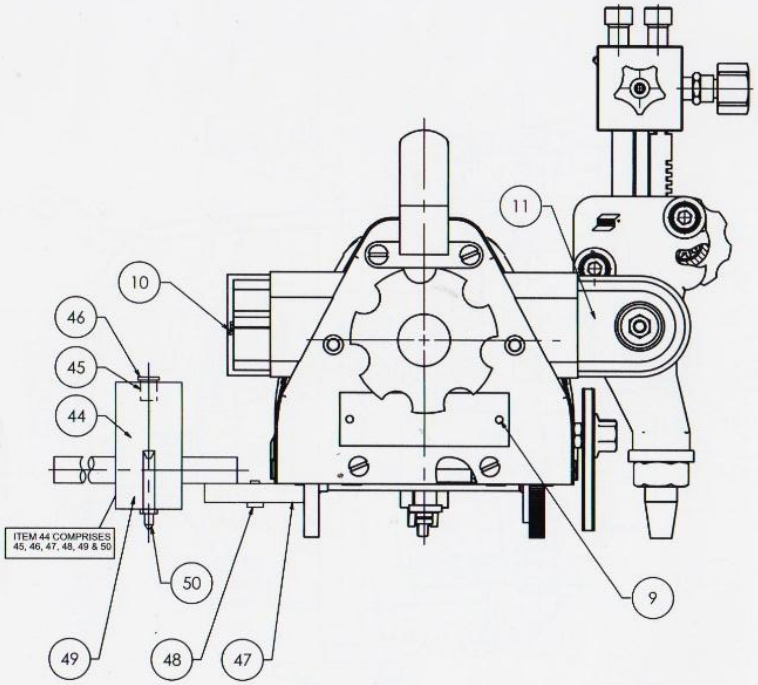




TOP VIEW



SIDE VIEW



END VIEW

PARTS LIST

THESE ITEMS ARE NOT SOLD AS SPARES INDIVIDUALLY, BUT SUPPLIED AS ASSEMBLIES. SEE PAGE 23

ITEM NO.	DESCRIPTION	CODE NO.	NO. OFF	REMARKS
1.	Motor	0134-1155-426	1	
2.	Chimney	0134-1155-331	1	
3.	Pin Split	0134-1155-445	2	
4.	Collar	0434-1155-085	1	
5.	Wheel Free	0434-1155-156	1	
6.	Bush Flanged	0434-1155-311	2	
7.	Axle	0434-1155-055	1	
8.	Wheel Drive	0134-1155-157	1	
9.	Plate Serial No.	1034-1156-535	1	
10.	Screw Ch. Hd.	0134-1155-506	1	
11.	Rack & Slide	0134-1155-476	1	
12.	Cutter Assy.	0134-1155-257	1	
13.	Assy Cutter Holder	0434-1156-034	1	
14.	Handle Assy	0134-1155-257	1	
15.	Ch. HD SCR. 1/4" B.S.F.3/8" L	0134-1155-504	4	
16.	Hand Wheel Large	0134-1155-366	1	
17.	Pinion Steel	0134-1155-456	1	
18.	Pin Valve	0134-1155-447	1	
19.	SCR. HEX 1/4" B.S.F. x ½ L	0134-1155-507	2	
20.	Washer 11/4" B.S.F. C.D.P.	0134-1155-616	2	
21.	Washer Shake Proof	0134-1155-615	2	
22.	CH. HD. Screw	0134-1155-505	2	

ITEM NO.	DESCRIPTION	CODE NO.	NO. OFF	REMARKS
23.	Connector 6 Way	0134-1155-354	1	
24.	Resistance 150 Ohms 10 W	0134-1155-480	1	
25.	Wire PVC Red	0134-1151-851	1 mt.	23/02 MM
26.	Wire PVC Blue	0134-1155-625	1 mt.	23/0.2 MM
27.	Wire PVC Yellow	0134-1151-852	1 mt.	23/0.2 MM
28.	Bracket	0134-1155-300	1	
29.	Cable 3 Core	0134-1151-420	9 mt. Long	
30.	Castor Sub Assy.	0434-1155-207	1	
31.	Switch Motor Sp. Dt.	0134-1155-580	1	
32.	Lable (For Rev.)	0134-1155-430	1	
33.	Potentiometer	0134-1155-470	1	700 Ohms 50
34.	Backing Plate	0134-1155-465	2	
35.	Shield Heat	0134-1155-525	1	
36.	SCR. Pan Head S/Tapping	0134-1155-515	18	
37.	Cover Sub Assy.	0134-1155-259	1	
38.	Fuse Holder	0134-1155-380	1	
39.	Fush	0134-1155-362	1	0.5 A
40.	Chasis S/A	0134-1155-258	1	
41.	Plate Motor	0434-1155-210	1	
42.	Kob Speed Control	0134-1155-416	1	
43.	Dial. Speed Control	0134-1155-360	1	
44.	Attachment CIRC. Cutting	0134-1155-260	1	Optional Extra
45.	Clamp	0134-1155-080	1	Optional Extra
46.	Hex. HD. Screw	0134-1155-509	1	Optional Extra
47.	Trammel Assy.	0434-1155-010	1	Optional Extra
48.	Captive Scr.	0434-1155-135	2	Optional Extra
49.	Trammel Block	0434-1155-060	1	Optional Extra
50.	Centre	0434-1155-075	1	Optional Extra
51.	Spring	0134-1155-560	1	

ITEM NO.	DESCRIPTION	CODE NO.	NO. OFF	REMARKS
52.	Hex. HD. Screw	0134-1155-500	1	
53.	Nut Nyloc	0134-1155-436	1	
54.	Cap Spring	0134-1155-322	1	
55.	Scr. Soc. Hd	0134-1156-568	2	
56.	Holder Rear	0134-1155-064	1	
57.	Holder Front	0134-1156-065	1	
58.	Spring Holder Rear	0134-1153-601	2	
59.	Pinion Cutter	0134-1156-518	1	
60.	Bush	0134-1156-315	1	
61.	Hand Wheel	0134-1155-365	1	
62.	Washer O.B.A.	0134-1673-850	1	
63.	Castor Wheel	0434-1155-155	1	
64.	Pin Castor	0134-1155-446	1	
65.	Circlip	0134-1155-340	1	
66.	Swivel	0434-1155-145	1	
67.	Lock Screw	0434-1155-136	1	
68.	SCR. Ch. HD. No. 2BA x 5/8"	0134-1155-512	2	
69.	Hex Nut No.2BA	177-1847-463	2	
70.	Spanner	1300-100-301	1	
71.	Spanner	1300-100-305	1	
72.	ANM Nozzle 12 (3/64")	0135-1121-416	1	
73.	ANM Nozzle 16 (1/16")	0135-1121-418	1	
74	Card Cutting Data	0134-1156-5311	1	
75.	Pin ϕ.062x11/16: Long	0134-1155-446	1	

PACKING LIST

PUG NM CUTTING MACHINE

SL. NO.	DESCRIPTION	QTY.	REMARKS
1.	PUG NM CUTTING MACHINE	1 NO.	
2.	SPANNER DOUBLE ENDED 5/16w 3/8 BS & 1/4w 5/16 BS.	1 NO.	
3.	SPANNER DOUBLE ENDED ½w 9/16 BS & 7/16w ½ BS.	1 NO.	
4.	ANM NOZZLE NO. 12 (3/64")	1 NO.	
5.	ANM NOZZLE NO. 16 (1/16")	1 NO.	
6.	CONNECTION HOSE 1/4"	2 NOS.	
7.	NUT LH 1/4" BSP	1 NO.	
8.	NUT RH 1/4" BSP	1 NO.	
9.	CARD CUTTING DATA	1 NO.	
10.	INSTRUCTION MANUAL	1 NO.	
11.	NUT 3/8" BSP RH & LH	1 SET	
12.	CONNECTION HOSE 3/8" X 1/4" BSP	2 NOS.	

Optional Extra* (If circle cutting is required)

*CIRCLE CUTTING ATTACHMENT COMPRISING OF :

1. TRAMMEL BAR ASSEMBLY WITH TWO CAPTIVE SCREWS — 1 SET
2. TRAMMEL BLOCK WITH — 1 SET
   A) CENTRE
   B) CLAMP
   C) SCREW HEX HEAD

Note : For spare parts requirement, refer the enclosed diagram.

SAFETY PRECAUTIONS

General

As with other industrial process, 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 pressure/flow adjustments to blowpipes.

Keep open flames away from storage areas, cylinders and hoses.

Acetylene pipelines and bottles must never be exposed to a temperature exceeding 54°C (130°F)

Oxygen itself is not inflammable but in its presence combustible 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 hydro carbons can cause spontaneous ignition resulting in fires or explosions.

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

Blowpipes

Use a friction lighter or pilot flame as a source of ignition. Do not use matches or hot metal to light blowpipes. Always light and extinguish by the correct sequence:

ON Fuel gas on
Heating oxygen on
Cutting oxygen on

OFF Cutting oxygen off
Heating oxygen off
Fuel gas off

Use only approved blowpipes and nozzle 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 (pass gas when the pressure regulating screw is released) or build up pressure on the low pressure side when the blowpipe trimming valve is shut, should be replaced.

Gauges, which do not return to zero when the pressure is released have faulty mechanisms and therefore cannot be relied upon to read correct pressures. On this account they should be replaced.

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

Protective Clothing

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

Goggles with suitable filters to give best viewing of flame should be used for gas processes to protect eyes.

Electric Shock

The equipment should be installed and maintained in accordance with the current issue of the Regulations for the Electrical Equipment. Servicing or maintenance must not be carried out unless the apparatus is disconnected from the electrical supply.

Do not ignore water, air or gas leakages.

Water leakages are self-evident, but should be taken up immediately to prevent damage to other equipment.

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

DO NOT TEST FOR LEAKAGE WITH A FLAME

Particular care should be observed when changing nozzles, to the making of 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.

Where acetylene gas is employed as the fuel do not use copper tubing to connect hose.

Hoses mut not be linked 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, or alternatively 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 causes 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 nozzles, 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 pressures to those required and retight 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, NEW YORK.

USE ESAB PROTEX RO AND ESAB PROTEX RA FLASH BACK ARRESTORS FOR SAFETY

ESAB INDIA LIMITED

Regd. & H.O. : 13, Industrial Estate, II Main Road, Ambattur, Chennai 600058, Tel : 044-42281100 Fax : 044 42281107
Equipment Factories : Taratala, Kolkata and Irungattukottai, Chennai
Divisional Sales : Email : equipment.sales@esabindia.co.in

Regional Office :
East : P41 Taratala Road, Kolkata 700088, Tel : (033) 2401 9671, Fax : (033) 2401 4427
West : 501/502, 5th Floor, Sagar Tech-B, Andheri Kurla Road, Saki Naka, Andheri East, Mumbai 400072
Tel : (022) 2851 7386, Fax : (022) 2852 4974
North : 71/1 Najafgarh Road, New Delhi 110015, Tel : (011) 4142 7191, Fax : (011) 4142 7099
South : Karamuttu Centre, 6th Floor, New No. 634, Annasalai, Nandanam Chennai 60035
Tel : (044) 4204 0294, Fax (044) 4204 0289
Central : No.218, Ashirvad South Ambazari Road, Bajaj Nagar, Nagpur 440010
Tel : (0712) 2229547/48, Fax : (0712) 222 9549

RDPL/ 04-2014