

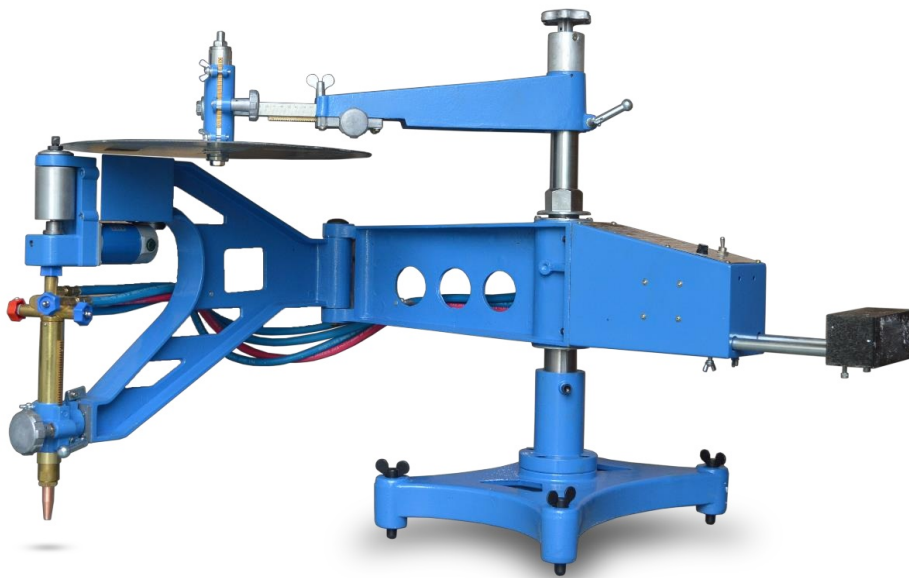


INDUSTRIAL EQUIPMENTS PVT. LTD.

WING1800P

Profile Gas Cutting Machine

Template (magnetic tracer) cutting | Oxy-fuel 4 - 150 mm | Circles up to Ø 1800 mm | Plasma ready



INSTRUCTION MANUAL

Please read this manual carefully before installing and using the machine.

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This manual contains the description, installation, operation and maintenance instructions for the Cruxweld WING1800P profile gas cutting machine.

The efficiency and service life of the machine depend on correct operation and regular care. Please read and understand this manual before installing and operating the machine, and keep it near the machine for future reference.

Cruxweld provides a warranty for this machine from the date of purchase, as stated in Chapter 13. The contents of this manual may be revised without prior notice.

Signs used in this manual

▲ DANGER	A serious hazard which may cause death, serious injury or major damage if it is not observed.
▲ WARNING	A hazard which may cause injury or damage to property if it is not observed.
▲ ATTENTION	A risk which may cause a fault in, or damage to, the machine if it is not observed.
Note	Useful information for correct operation.

1 Safety precautions

Gas cutting uses oxygen and flammable fuel gases at high temperature. Read this chapter carefully and follow all safety rules and local regulations for gas cutting and welding work.

1.1 Operator

- The machine may be operated only by adult persons who are trained in gas cutting, have been instructed in the safety rules and know how to operate this machine.
- Keep unauthorised persons away from the cutting area.

1.2 Protective equipment

- Wear closed cutting goggles with filter glass of the correct shade to protect the eyes from the light of the flame, sparks and slag.
- Wear flame-resistant work clothing, leather gloves, leather apron and safety shoes. Wear hearing protection where required.

1.3 Gases, fire and explosion

- Oxygen, acetylene and LPG must be handled with great care. Keep cylinders upright, secured and away from heat, sparks and the cutting area.
- Never allow oil or grease to come into contact with oxygen valves, regulators, hoses or connections – this can cause fire or explosion.
- Use regulators with flashback arrestors and check all hoses and connections for leaks with soapy water before starting. Never test for leaks with a flame.
- Keep flammable materials away from the cutting area and keep a fire extinguisher ready at the workplace.
- Never cut containers or pipes which have held flammable or unknown substances.
- Take care not to damage the tip of the nozzle – a damaged nozzle can cause backfire.
- Cut only in a well-ventilated area; use fume extraction where necessary.

1.4 Electrical safety

- Connect the machine only to an earthed 220 V single-phase supply.
- Disconnect the supply plug before cleaning, maintenance or opening the control box.
- Keep the power cable away from hot slag, the flame and sharp edges.

1.5 Prohibited

- Starting work without inspecting the machine and the fire safety of the workplace.
- Using the machine if it is mechanically damaged.
- Modifying the machine or its components.
- Working without fire-fighting equipment at the workplace.

2 General description

The Cruxweld WING1800P is a portable profile (template) cutting machine. A magnetic tracing roller runs along the edge of a steel template, and the cutting torch reproduces the same shape on the plate. The machine is ideal for cutting many identical parts in batch production, and because it is compact but has a large cutting range, it is suitable for site work as well as for large, medium and small workshops.

The WING1800P offers two cutting processes: **oxy-fuel cutting** (acetylene or LPG) for plates from 4 to 150 mm, and **plasma cutting** with the straight-neck plasma torch head supplied with the machine, for thin plates below 4 mm and for non-ferrous metals (plasma power source not included).

2.1 Applications

Machine building, boiler making, shipyards, rolling stock, oil and gas, infrastructure, metallurgy and all industries where the same part must be cut many times.

2.2 Salient features

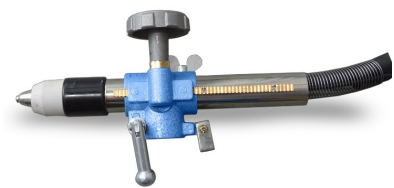
- **High cutting accuracy** of 1.5 mm or better.
- **Versatile template holder** which can be adjusted freely, for fast and accurate batch production of identical parts.
- **Large cutting range:** circles from Ø 20 to Ø 1800 mm and straight lines up to 1650 mm.
- **Durable gas distributor** made of pure copper, with neatly arranged hoses.
- **Advanced control board:** the cutting speed can be adjusted smoothly within the range without affecting the motor performance, for stable speed control.
- **Stable, adjustable base** with four adjustable foot screws for levelling and positioning.
- **Interlock:** the travel motor starts automatically when the cutting oxygen is opened and stops when it is closed.
- **Plasma ready:** quick-attach straight-neck plasma torch head with built-in gear for torch height adjustment, supplied at no extra cost.



Typical cut parts



Cutting accuracy ≤ 1.5 mm



Plasma torch head (supplied)

2.3 Construction

The machine is made of high-strength precision die-cast aluminium alloy – light, strong and corrosion resistant. It consists of the body with the main shaft (column), the template tracing mechanism with drive motor, the torch assembly, the template arm, the base and the balance weight. The main shaft is fixed to the base and acts as the pivot of the main arm; with the balance weight the arm stays balanced in any position within the cutting range. All moving parts run on rolling bearings for smooth motion.

The drive is a permanent-magnet DC motor with an integrated-circuit (SCR) speed controller and a three-stage gear reduction (ratio 1:175) which drives the magnetic tracing roller (Ø 10 mm).

3 Technical specifications

Model	WING1800P
Input voltage	AC 220 V $\pm 10\%$, 1 phase, 50 / 60 Hz
Cutting modes	Oxy-fuel (gas) cutting or plasma cutting
Cutting thickness (oxy-fuel)	4 – 150 mm
Cutting speed	50 – 750 mm/min
Diameter of cutting circle	Ø 20 – 1800 mm
Template mounted on template holder	Any profile within a Ø 30 – 700 mm circle
Template mounted on centre shaft	Any profile within a Ø 700 – 1800 mm circle
Length of straight cutting line	1650 mm
Magnetic tracing roller	Ø 10 mm
Electric motor	DC 110 V, 24 W, 3600 r/min, with gear reduction
Speed control	SCR, continuously variable by a rotary knob
Direction control	FORWARD – OFF – REVERSE toggle switch
Tracer direction	Clockwise and anti-clockwise
Torch movement	Vertical, by rack and pinion
Accuracy	≤ 1.5 mm
Cutting torch	Injector type, to suit acetylene / LPG
Dimensions (L x W x H)	1190 x 335 x 800 mm
Weight	58 kg

Specifications may change without notice as a result of continuous improvement.

3.1 Scope of supply

Item	Qty	Item	Qty
Main body	1 set	Power cable	1
Standard torch assembly	1 set	Gas inlet connectors	1 set
Plasma torch head	1	Balance bar	1
Cutting nozzles (acetylene)	3	Heavy punch	1 set
Circle sample plate (template)	1 set	Connecting shaft for large templates	1
Instruction manual and test certificate	1 each		

4 Machine overview and controls

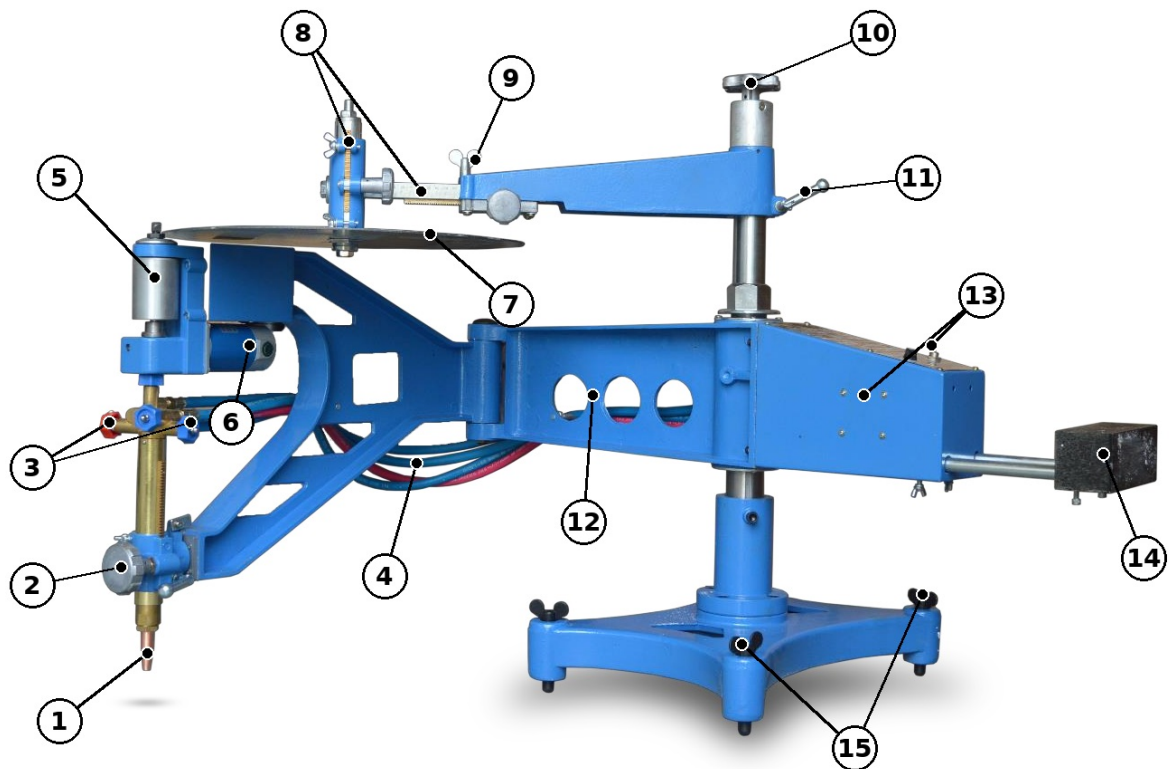


Fig. 4.1 Main parts of the WING1800P

1	Cutting nozzle	9	Template arm locking wing screw
2	Torch height adjusting handwheel (rack and pinion)	10	Lifting nut of the main shaft (column)
3	Torch valves (fuel gas, preheating oxygen, cutting oxygen)	11	Template arm clamping lever
4	Gas hoses	12	Main arm
5	Magnetic tracing roller head	13	Control box with control board
6	Drive motor and gearbox	14	Balance weight
7	Template (circle sample plate shown)	15	Base with adjustable foot screws
8	Template holder with slide scale		

4.1 Control board



Fig. 4.2 Control board

Control	Function
INDICATOR lamp	Lights when the machine is connected to the supply.
FORWARD - OFF - REVERSE switch	Selects the direction of travel of the tracing roller (clockwise or anti-clockwise around the template), or stops the drive (OFF).
ADJUSTING SPEED knob	Sets the cutting speed on the scale 0 – 10. Turn clockwise to increase and anti-clockwise to decrease the speed.

▲ ATTENTION

Change the direction only when the machine has stopped. Switching the direction while the motor is running damages the motor and shortens its life. Always check the position of the direction switch before starting.

4.2 Cutting torch

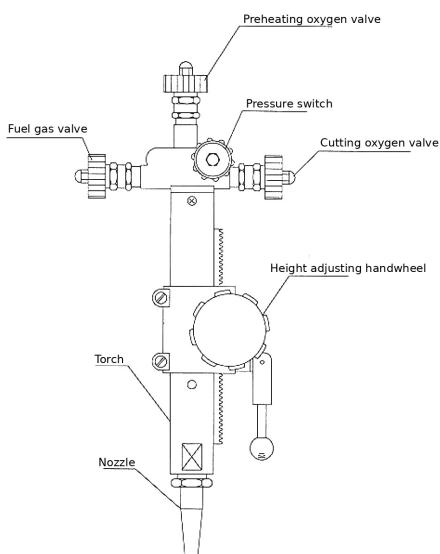


Fig. 4.3 Machine cutting torch

The torch has three gas valves and a pressure switch:

Valve	Function
Fuel gas valve	Controls the fuel gas (acetylene or LPG) for the preheating flame.
Preheating oxygen valve	Controls the oxygen for the preheating flame.
Cutting oxygen valve	Opens the cutting oxygen jet which cuts the preheated steel.
Pressure switch	Connected to the cutting oxygen line. When the cutting oxygen flows, the pressure switch closes and the drive motor starts; when the cutting oxygen is closed, the motor stops. The machine therefore travels only while the torch is cutting.

The torch height is adjusted with the handwheel (rack and pinion, about 100 mm).

Note: After the cutting oxygen is closed, the machine may continue to run for a moment because of the oxygen remaining in the pressure switch line.



Copper gas distributor



Adjustable template holder



Base with adjustable feet

5 Installation and assembly

5.1 Assembly

1. Insert the two balance bars into the holes under the gearbox (rear of the main arm), fit the balance weight and fix it with the screws.
2. Connect the AC 220 V supply cable to the socket on the side of the control box, and the plug to an earthed single-phase socket.
3. Connect the oxygen and fuel gas supplies to the gas distributor with Ø 8 mm rubber hoses, through regulators with flashback arrestors. Secure the hoses with hose clamps.
4. Select the nozzle according to the plate thickness (Chapter 9) and the fuel gas used. Screw it into the torch and tighten the nozzle nut **slowly and evenly** so that the seats mate properly.

▲ ATTENTION

Do not overtighten the nozzle nut - the nozzle heats up during cutting and becomes tighter; if it is overtightened it will be difficult to remove. Take care not to damage the nozzle tip or seat, as this can cause backfire.

5.2 Setting up the base

- Place the machine on a flat, stable surface, or directly on the plate to be cut.
- The four corners of the base have adjustable foot screws. Use them to level the machine, to fix it firmly and to adjust its position on the plate.

5.3 Height of the machine body

- For normal work, place the machine directly on the plate to be cut.
- For plates or workpieces at a different height, raise or lower the whole body by turning the lifting nut on the main shaft. Insert a round bar into one of the small holes in the lifting nut to turn it.
- For small height corrections use the torch height handwheel (range about 100 mm).
- Because the main arm can rotate around the main shaft, the cutting position can also be changed by swinging the arm.

5.4 Cutting range

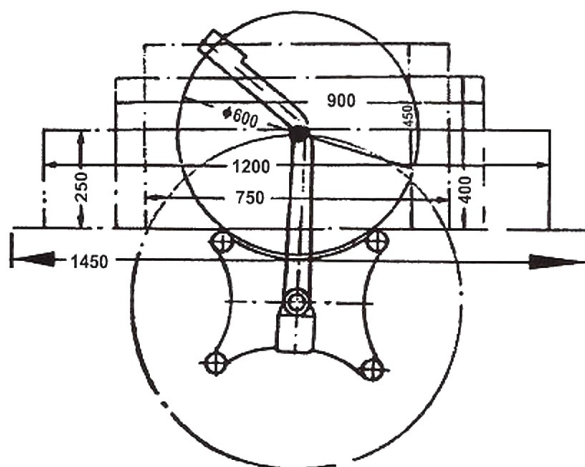


Fig. 5.1 Cutting range of the main arm (dimensions in mm)

6 Templates

6.1 Fixing the template

Method 1 - small parts (up to Ø 300 mm): drill a Ø 10.5 mm hole in the centre of the template, then (Fig. 6.1, left):

1. Insert the fixing bolt through the template hole from below.
2. Place a washer on top of the template.
3. Fit the bolt into the threaded stud of the connector from below.
4. Place the second washer on the bolt and tighten the nut.

Method 2 - parts up to Ø 700 mm: drill a Ø 31 mm hole in the template. Insert the fixing bolt through the template hole from below, pass it through the connector and tighten the nut (Fig. 6.1, right).

Method 3 - large parts (Ø 700 - 1800 mm): make a large circular template. Replace the main shaft of the template arm with the connecting shaft supplied, and fix the template to the connecting shaft on the centre shaft with the lock nut.

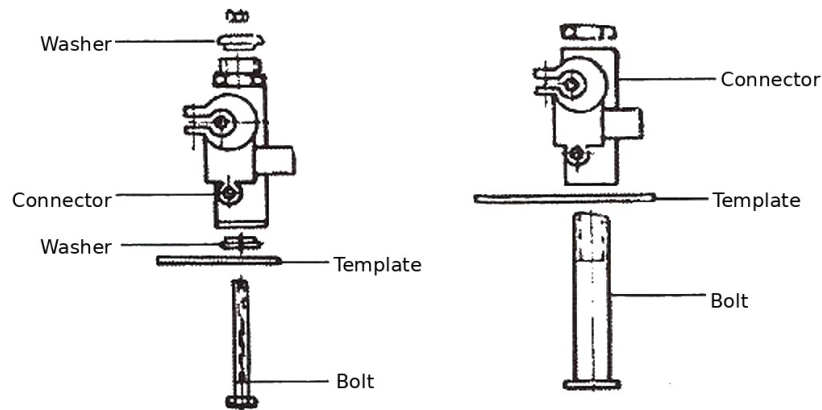


Fig. 6.1 Fixing the template: Method 1 (left) and Method 2 (right)

6.2 Adjusting the template arm

- The vertical handwheel of the template arm moves the template up and down to the height of the magnetic roller. Loosen the wing screw on the arm first, adjust, then retighten.
- The fore-and-aft handwheel moves the template along the slide scale (range 120 mm). This is also used to bring the roller onto the template edge at the start of cutting.
- When the template is positioned, lock the slide with the locking screw. Use the scale on the slide to align the template.
- Tighten all template fixing screws, and check that the magnetic roller touches the edge of the template correctly and that no parts of the machine collide during the movement.

6.3 Making templates

The torch follows exactly the path of the centre of the magnetic tracing roller. The nozzle centre line must be on the same vertical line as the roller centre line. The template is therefore **not** the same size as the part to be cut: its size must be corrected for the roller radius and half the kerf width.

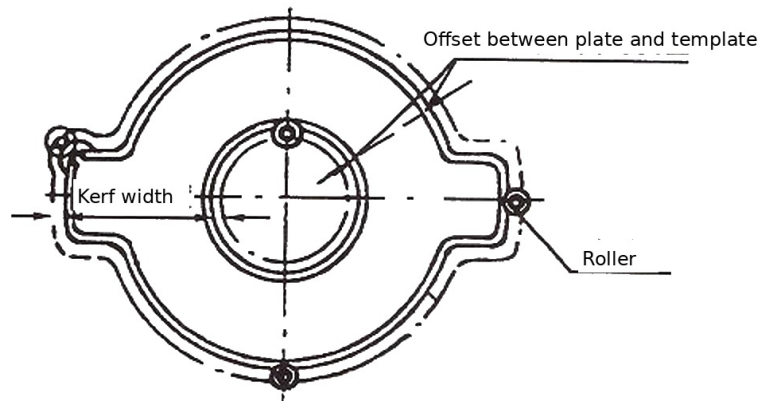


Fig. 6.2 Relationship between template, roller and kerf

Offset between template and part = R (roller radius) – r (half kerf width)

Nozzle no.	1	2	3
Kerf width (mm)	1.5	1.75	2.0
Offset for Ø 10 mm roller (mm)	3.5	3.25	3.0

Table 6.1 Template offset. Add (+) the offset when the roller runs inside the template (internal tracing); subtract (–) it when the roller runs outside (external tracing).

6.4 Template material

- Make templates from mild steel plate, at least **6 mm** thick; for precision cutting use more than **8 mm** to give a stronger magnetic grip.
- The edge of the template on which the roller runs must be smooth, clean and **perpendicular** to the template surface; otherwise the magnetic force is reduced.
- Keep the template and the magnetic roller always clean.

7 Operation

7.1 Before cutting

1. Select the correct nozzle for the plate thickness and the fuel gas (Chapter 9) and fit it (5.1).
2. Level the machine with the base screws.
3. Fix the template (6.1) and adjust the template arm so that the magnetic roller rests on the template edge.
4. Adjust the distance between the nozzle and the plate with the torch height handwheel.
5. Set the gas pressures on the regulators according to Chapter 9.
6. Check the position of the direction switch (FORWARD / REVERSE) and set the speed knob.

7.2 Oxy-fuel cutting

1. Open the **fuel gas valve** slightly and light the gas with a spark lighter.
2. Open the **preheating oxygen valve** and adjust both valves to a neutral preheating flame.
3. Preheat the starting point of the cut until the steel is bright red.
4. Open the **cutting oxygen valve**. The pressure switch starts the drive motor automatically and the magnetic roller moves along the template while the torch cuts.
5. Adjust the speed with the ADJUSTING SPEED knob according to the plate thickness and the quality of the cut. Clockwise increases the speed.
6. At the end of the cut, close the **cutting oxygen valve** – the machine stops automatically.
7. Close the **fuel gas valve**, then the **preheating oxygen valve**.
8. Turn the speed knob down and set the direction switch to OFF.

Speed: the cutting speed depends on the plate thickness and the nozzle. Because the speed scale is only a guide, check the actual speed with a trial run of the roller before cutting.

7.3 Cleaning the nozzle during work

The nozzle is mounted low, which can make cleaning difficult. Loosen the handle of the torch holder and swing the torch through 90°, then clean the nozzle with the nozzle cleaner. Before starting work again, swing the torch back and align the holder with the centre line of the main arm.

7.4 Plasma cutting

1. Remove the oxy-fuel torch and mount the straight-neck plasma torch head in the torch holder.
2. Fit the machine plasma torch of your plasma cutter into the plasma torch head and connect the plasma cutter according to its own manual. The plasma power source is not included.
3. Set the torch height with the built-in gear of the plasma torch head.
4. Start the travel with the direction switch and set the speed according to the plasma cutter's cutting chart.

▲ WARNING

For plasma cutting follow all the safety instructions of the plasma cutter. Wear eye protection with the correct filter shade.

8 Circle cutting attachment

With the circle cutting attachment, circles and flanges with a radius of about **14 to 225 mm** can be cut within the range of the scale, without making a template.

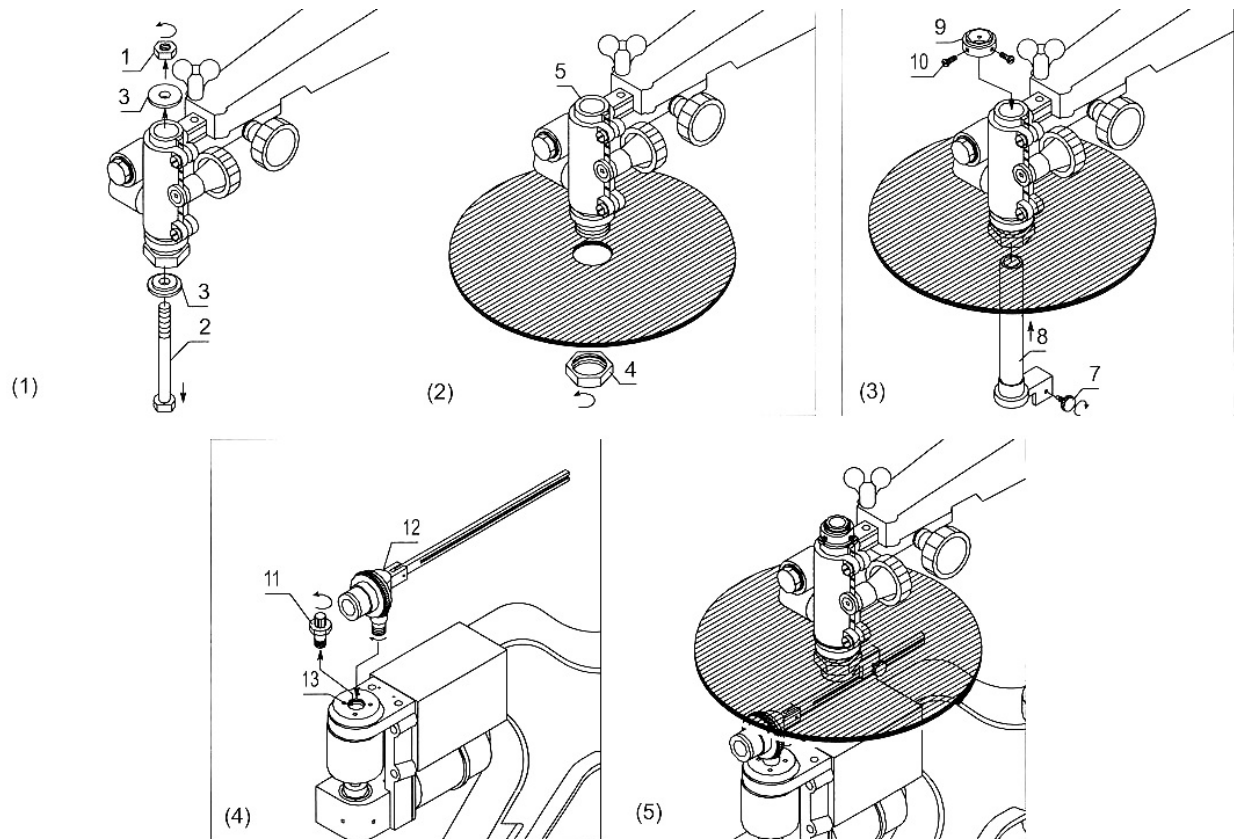


Fig. 8.1 Fitting the circle cutting attachment, steps (1) to (5)

8.1 Fitting the attachment

1. **Step (1):** loosen nut 1 and remove parts 2 and 3.
2. **Step (2):** loosen the large nut 4, place the circular template plate 6 on the template arm shaft 5 and tighten nut 4.
3. **Step (3):** screw screw 7 into part 8 and insert part 8 into part 5. Then fit part 9 onto part 8 and tighten screw 10.
4. **Step (4):** remove part 11 from the magnet base 13 and screw the magnetic head 12 into the magnet base 13.
5. **Step (5):** insert the assembled part 12 into the straight slot of part 8, adjust its position according to the circle diameter to be cut, and tighten screw 7.

8.2 Using the attachment

- Adjust the scale to the required radius and lock it with the locating screw.
- Check that the drive wheel runs freely and adjust the position of the plate and the roller; then tighten the screws.
- Turn the handle of the template arm to bring the torch to the cutting position.
- Cut as described in 7.2.

Note: The diameter of the cut circle depends on the scale setting and the kerf. Make a trial cut and correct the scale if necessary.

9 Cutting data

Select the nozzle according to the plate thickness and the fuel gas. The values are for mild steel and are a guide only – the actual values depend on the steel grade, the surface condition and the gas purity.

9.1 Acetylene nozzles (supplied)

Nozzle no.	Plate thickness (mm)	Oxygen pressure (MPa)	Acetylene pressure (MPa)	Cutting speed (mm/min)
00	5 – 10	0.20 – 0.30	> 0.03	450 – 600
0	10 – 20			380 – 480
1	20 – 30	0.25 – 0.35	> 0.03	320 – 400
2	30 – 50			280 – 350
3	50 – 70	0.30 – 0.40	> 0.04	240 – 300
4	70 – 90			200 – 260
5	90 – 120	0.40 – 0.50		170 – 200

9.2 LPG / propane gas-mixing nozzles (PM type, optional)

Nozzle no.	Plate thickness (mm)	Oxygen pressure (MPa)	Fuel gas pressure (MPa)	Cutting speed (mm/min)
0 PM	5 – 15	0.20 – 0.30	0.02 – 0.03	380 – 480
1 PM	15 – 25	0.20 – 0.30	0.02 – 0.03	320 – 400
2 PM	25 – 55	0.25 – 0.35	0.02 – 0.03	280 – 350
3 PM	50 – 75	0.30 – 0.40	0.02 – 0.04	240 – 300
4 PM	75 – 100	0.30 – 0.40	0.02 – 0.04	200 – 260
5 PM	100 – 150	0.40 – 0.50	0.02 – 0.04	170 – 200

1 MPa = 10 kg/cm² (approx.). For LPG / propane use the gas-mixing (PM) nozzles; for acetylene use the acetylene nozzles.

9.3 Cut quality guide

Observation	Correction
Top edge melted and rounded	Speed too low or preheat flame too strong – increase speed, reduce preheat, raise the nozzle.
Heavy slag on the bottom edge	Speed too high or oxygen pressure too low – reduce speed, check pressure and nozzle size.
Strongly curved drag lines; cut does not go through	Speed too high – reduce speed.
Irregular, gouged cut face	Dirty or damaged nozzle, dirty template or roller – clean or replace.
Part size wrong	Template offset not correct – check Table 6.1.

10 Maintenance, storage and transport

▲ DANGER

Close the gas supply and disconnect the supply plug before any maintenance.

10.1 Maintenance

- **Daily:** clean slag and dust from the machine, the template and the magnetic roller. Check hoses and connections for leaks and damage. Keep the nozzle clean.
- **Handling:** the body is made of aluminium alloy. Handle it carefully – avoid dropping it and avoid sharp blows and shocks.
- **After cleaning the nozzle** make sure the torch holder is aligned with the centre line of the main arm before starting work.
- **Speed check:** because the speed scale may differ from the actual speed, check the actual speed from time to time.
- **Every 6 months** of continuous use: inspect the gear reduction of the motor and lubricate it, to extend its life.
- After long continuous use, check the gearbox for oil leakage.
- Keep the rolling bearings and slides clean; do not use oil or grease near the oxygen parts of the torch and the gas distributor.

10.2 Storage

- Store the machine indoors at +5 °C to +40 °C and a relative humidity of not more than 70 %.
- Operating ambient temperature: –10 °C to +40 °C.
- Close the gas supply and release the pressure in the hoses before storing.

10.3 Transport

The machine may be transported in any closed vehicle. Protect it against shocks and moisture. Remove the balance weight and secure the arms during transport.

11 Troubleshooting

Problem	Possible cause	Remedy
Indicator lamp off	No supply; plug, cable or fuse faulty.	Check the supply, the cable and the fuse.
Motor does not run when the cutting oxygen is opened	Direction switch on OFF. Speed knob at 0. Pressure switch faulty or oxygen pressure too low. Control board faulty.	Set FORWARD or REVERSE. Turn the speed knob up. Check oxygen pressure; check the pressure switch. Contact Cruxweld service.
Machine does not stop after cutting	Residual oxygen in the pressure switch hose.	Normal for a moment. If it keeps running, check the pressure switch and set the direction switch to OFF.
Uneven or jerky speed	Dirty magnetic roller or template edge. Hoses or cable pulling on the arm. Gearbox worn or dry.	Clean the roller and template. Route hoses and cable freely. Lubricate or repair the gearbox.
Roller slips off the template	Template too thin or edge not square. Roller not at the correct height.	Use a template of 6 – 8 mm with a square edge. Adjust the template arm height.
Wrong part size	Template offset wrong; kerf changed.	Correct the template (6.3).
Backfire or popping at the nozzle	Nozzle dirty, damaged or loose; gas pressure too low; nozzle too close to the plate.	Clean or replace the nozzle; check pressures; raise the torch.
Poor cut quality	Wrong nozzle, pressure or speed.	See Chapter 9.

If a fault cannot be corrected, contact Cruxweld service.

12 Electrical circuit diagram

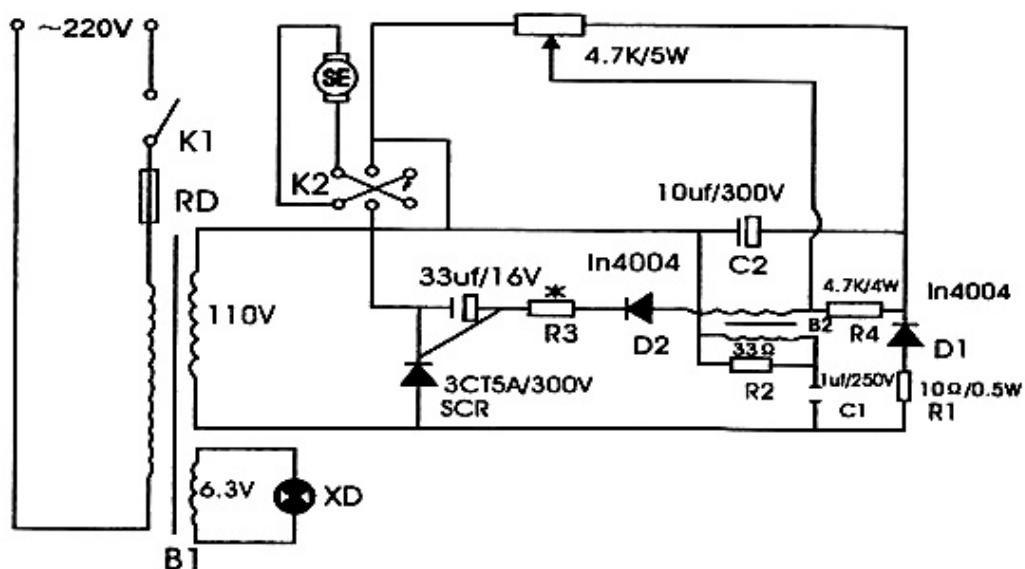


Fig. 12.1 Electrical circuit diagram

Symbol	Description	Symbol	Description
~220 V	Single-phase supply	SE	DC drive motor (110 V, 24 W)
K1	Power switch / pressure switch contact	K2	Direction switch (FORWARD / REVERSE)
RD	Fuse	SCR	Thyristor of the speed controller
B1	Transformer, 220 V / 110 V and 6.3 V	4.7 kΩ / 5 W	Speed adjusting potentiometer
XD	Indicator lamp (6.3 V)	D1, D2, R, C	Diodes, resistors and capacitors of the control circuit

▲ DANGER

Only qualified personnel may open the control box and work on the electrical circuit, after disconnecting the supply plug.

13 Warranty

Cruxweld warrants the WING1800P against defects in material and workmanship for the period stated in the sales contract, from the date of invoice, provided the machine is operated, transported and stored according to this manual. The warranty does not cover nozzles, hoses, templates and other wear parts, or damage caused by incorrect supply voltage, backfire or flashback, dropping, misuse, lack of maintenance or repair by unauthorised persons.

Model	WING1800P
Serial number	
Invoice no. / date	
Customer	
Dealer stamp	

Service record

Date received	Date returned	Work carried out	Service engineer

For service, spare parts, nozzles and accessories please contact:

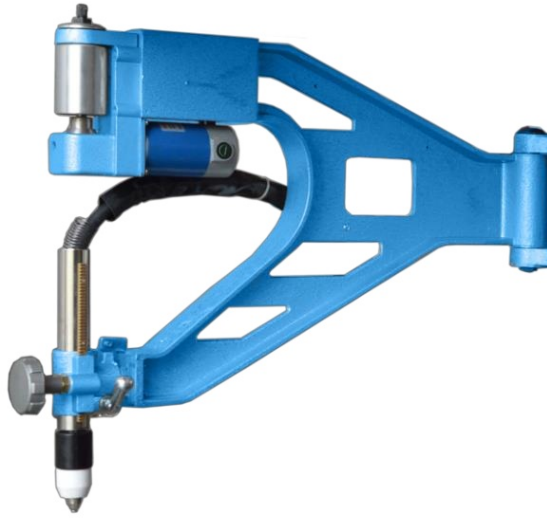
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