



INDUSTRIAL EQUIPMENTS PVT. LTD.

iTIG400ACDC

TIG 400 AC/DC Pulse Welding Machine

IGBT inverter | AC TIG · DC TIG · Pulse TIG · MMA | 3 phase 415 V | 10 – 400 A



INSTRUCTION MANUAL

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

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This manual contains the description, installation, operation, safety and maintenance instructions for the Cruxweld iTIG400ACDC TIG 400 AC/DC pulse welding machine.

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 10.

Cruxweld improves its products continuously. The contents of this manual may be revised without prior notice.

Signs used in this manual

▲ DANGER	Immediate danger which will cause death or serious injury if it is not avoided.
▲ WARNING	A potential hazard which may cause death or serious injury if it is not avoided.
▲ CAUTION	A hazard which may cause injury or damage to the machine if it is not avoided.
Note	Useful information for correct operation.

1 Safety precautions

Arc welding can be dangerous to the operator and to people in or near the work area. Follow the precautions in this manual, otherwise accidents may occur. The supply installation, the choice of the work site and the use of high-pressure gas must comply with the applicable standards and regulations. Installation, operation, maintenance and repair must be carried out only by trained and qualified persons. Unauthorised persons must be kept out of the welding area.

The machine must not be used for any purpose other than welding (for example battery charging, heating or thawing frozen pipes).

1.1 Electric shock can kill

- Never touch live parts, the tungsten electrode, the electrode holder or bare metal parts of the torch while the machine is switched on.
- Have a qualified electrician earth the machine and connect the supply cable. Cable insulation must not be damaged.
- In damp or confined places, make sure that your body is insulated from the workpiece and the ground. Wear dry insulating gloves and rubber-soled shoes.
- Use a safety harness when working at height.
- Switch off the machine and the mains isolator when not working and before connecting cables or carrying out maintenance.

1.2 High frequency (HF) arc ignition

- The HF arc starter produces a high voltage at the torch. Never touch the tungsten or the torch head while pressing the trigger.
- HF can interfere with radio, computers, CNC controls and other electronic equipment. Keep the torch and work cables short and close together, and earth the workpiece and the machine properly.
- Persons with a cardiac pacemaker must consult their doctor before welding or going near welding operations.

1.3 Fumes and gases

- Use fume extraction or good ventilation to avoid poisoning and suffocation. Argon is heavier than air and collects in low places.
- When working inside a tank or container, harmful gases can collect around you. Provide special ventilation and have a second person watch from outside.

1.4 Arc rays, spatter and hot metal

- Wear a welding helmet with a filter of sufficient shade (normally 10 – 13 for TIG). Arc rays burn the eyes and skin.
- Wear leather gloves, long-sleeved flame-resistant clothing, a cap, an apron and safety shoes to protect against arc rays, spatter and hot slag.
- Protect other people with non-flammable screens.

1.5 Fire and explosion

- Remove combustible material from the welding area. Sparks and hot metal can cause fire.
- Tighten the work cable connection to the workpiece. A loose connection can overheat and cause fire.
- Never weld on tanks, drums or pipes that contain or have contained flammable gas or liquid.
- Keep a fire extinguisher ready at the work site.

1.6 Gas cylinders

- Secure the argon cylinder upright with a chain so that it cannot fall. Keep it away from heat, sparks and electrical circuits.
- Use a regulator and flow meter suitable for argon. Open the cylinder valve slowly and close it after work.

1.7 Rotating parts

- Keep fingers, hair and clothing away from the cooling fan and other rotating parts. Do not operate the machine with covers removed.

1.8 Moving and lifting the machine

- When a forklift or crane is used, nobody may stand under or in front of the machine.
- Lift only by the lifting eye, with a rope or chain strong enough for the load. The angle between the rope and the hook must not exceed 30°. Remove the torch, cables and gas cylinder before lifting.
- On uneven floors, take care that the machine cannot roll or fall over. Lock the castors.

1.9 Machine malfunction

- If the machine does not work normally, stop using it at once and refer to Chapter 9, or contact Cruxweld service.
- Only qualified persons may open or repair the machine. Do not modify the machine.

▲ WARNING

Dangerous voltages remain inside the machine for some minutes after switching off. Wait at least 5 minutes after disconnecting the supply before removing any cover.

2 General description

The Cruxweld iTIG400ACDC is a high-performance IGBT inverter TIG welding machine with AC and DC output, pulse function and MMA (stick) welding. It welds aluminium and aluminium alloys (AC TIG) as well as mild steel, stainless steel, alloy steel, copper, nickel alloys and titanium (DC TIG), in thin sheet and thick plate. The pulse mode reduces heat input and distortion and gives better control of the weld pool.

2.1 Features

- IGBT inverter with PID closed-loop control – fast response, concentrated and stable arc, resistant to supply voltage fluctuation.
- AC square-wave output with adjustable AC frequency and AC width (cleaning balance) for clean, bright aluminium welds.
- DC pulse function with adjustable pulse current, pulse width and pulse frequency.
- High-frequency (HF) arc ignition – reliable, contact-free arc start, even at low current.
- 2T / 4T torch trigger modes with initial current, up slope, down slope and crater current.
- Adjustable gas post-flow to protect the tungsten and the weld.
- MMA welding with all common electrodes.
- Remote (foot pedal) control possible.
- Water-cooled TIG torch for continuous work at high current.
- Well-ventilated, dust-resistant construction; switching frequency above the audible range for quiet operation.
- Over-temperature and supply fault protection with a warning lamp.

TIG WELDING

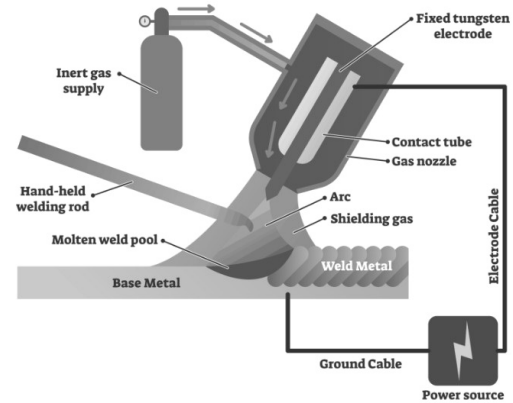


Fig. 2.1 The TIG welding process

2.2 Working principle

The 3-phase supply is rectified and filtered. The IGBT inverter converts the DC into medium-frequency AC of about 20 kHz by PWM control. The main transformer reduces the voltage, and fast recovery diodes rectify it to DC. For AC TIG, a secondary inverter converts the DC into an AC square wave of 50 – 150 Hz. The PID control circuit adjusts the output continuously, so the arc stays stable when the supply or the arc length changes.

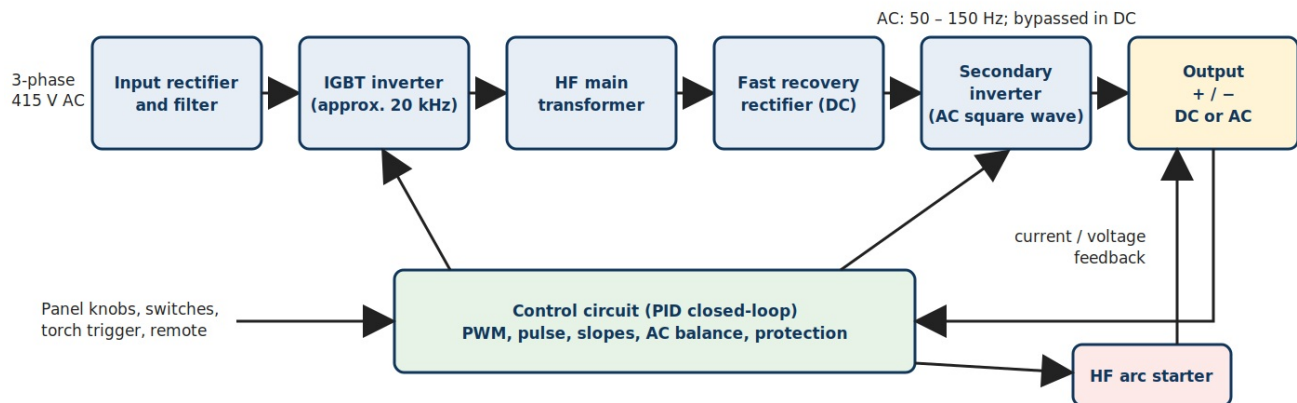


Fig. 2.2 Block diagram of the iTIG400ACDC

3 Technical specifications

Specification	iTIG400ACDC
Input voltage	3 phase ~ 415 V $\pm$15 %, 50 / 60 Hz
Power capacity	12.5 kVA
Rated input peak current	30 A
Rated output voltage	26 V
No-load voltage	68 V
Welding current range - TIG	10 - 400 A
Welding current range - MMA	20 - 400 A
Welding processes	AC TIG, DC TIG, pulse TIG, MMA
Arc start	High frequency (HF)
AC frequency	50 - 150 Hz
Clean-up width (AC balance)	20 - 80 %
Pulse frequency	0.5 - 300 Hz
Pulse duty ratio	10 - 90 %
Base current	20 - 90 %
Up-slope / down-slope time	0 - 10 s
Pre-flow time	0 - 1 s
Post-flow time	1 - 10 s
Spot welding time	0.5 - 10 s
Arc force current range (MMA)	0 - 100 A
Remote control	Yes
Efficiency	85 %
Power factor (cos ϕ)	0.93
Torch cooling	Water
Insulation class	H
Protection class	IP23
Dimensions (L x W x H)	560 x 360 x 485 mm
Weight	56 kg

Specifications may change without notice as a result of continuous improvement. The values on the rating plate of the machine apply. The adjustment range of each control is printed on its dial on the front panel.

3.1 Scope of supply

No.	Item
1	iTIG400ACDC welding machine
2	Water-cooled TIG torch, 4 m (13 ft)
3	Electrode holder with 3 m (10 ft) cable
4	Earth clamp with 3 m (10 ft) cable
5	Gas hose
6	Argon regulator with flow meter
7	TIG accessories: 3 collets, 1 collet body, 3 alumina ceramic cups, 1 long back cap, 1 short back cap
8	User manual

The torch is water-cooled. A water cooling unit (coolant tank) is required to operate it; it is not part of the standard supply unless ordered separately.

3.2 Duty cycle

The duty cycle is the percentage of a 10-minute period during which the machine can weld at a given current without overheating. For example, at 60 % duty cycle the machine can weld for 6 minutes and must then rest for 4 minutes. Check the rated duty cycle on the rating plate and work within it.

If the duty cycle is exceeded, the over-temperature protection switches off the output and the **Warning** lamp lights. Leave the machine switched on so that the fan cools it; welding can continue when the lamp goes out.

3.3 Rating plate symbols

U₀	No-load voltage, V	U₁	Rated supply voltage, V
X	Rated duty cycle, %	I_{1max}	Maximum input current, A
I₂	Welding current, A	I_{1eff}	Effective input current, A
U₂	Conventional load voltage, V	IP23	Degree of protection of the enclosure

3.4 Operating conditions

Ambient temperature during welding	–10 °C to +40 °C
Relative humidity	below 85 %, no condensation
Location	dry, out of direct sunlight and rain; free from heavy dust and corrosive gases
Free space around the machine	at least 20 cm; air inlets and outlets must never be blocked
Supply voltage	3 phase 415 V ±15 %, 50 / 60 Hz

▲ CAUTION

If the machine is used or stored below 0 °C, the torch coolant must contain antifreeze. Frozen coolant damages the torch and the cooling unit.

4 Machine overview and controls



Fig. 4.1 Front view of the iTIG400ACDC

1	Lifting eye	7	Gas outlet (to the torch)
2	Digital ammeter display	8	Liquid coolant output (to the torch water inlet)
3	Control panel	9	Output terminal (–) – TIG torch
4	Air inlet louvres	10	Castors
5	Output terminal (+) – work cable	11	Handles
6	Torch switch socket (control / remote)		

4.1 Rear panel

The rear panel carries the **mains input cable**, the **power switch** (ON / OFF), the **gas inlet** (from the argon regulator), the **liquid coolant input** (from the water cooling unit) and the **cooling fan**. Keep the fan opening free.

4.2 Control panel

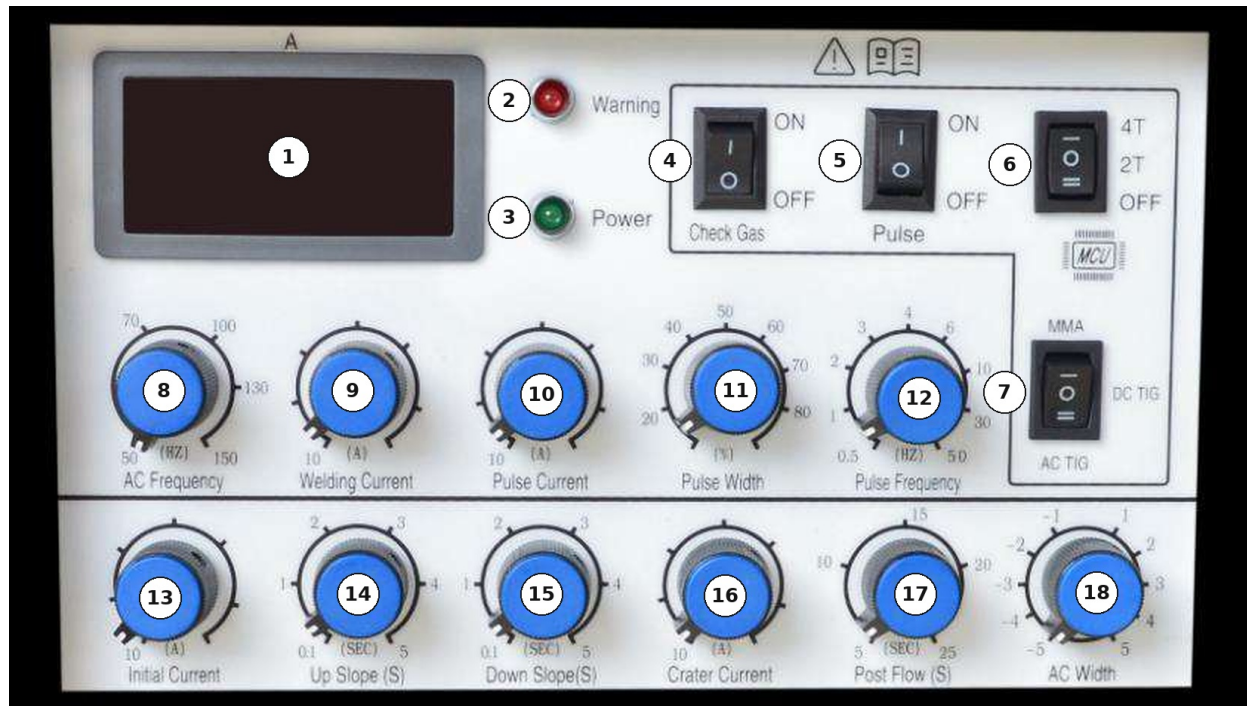


Fig. 4.2 Control panel

No.	Control	Function
1	Digital ammeter (A)	Shows the set current before welding and the actual welding current during welding.
2	Warning lamp	Lights when the supply voltage is too high or too low, when the machine is overheated, or in case of an internal fault. The output is switched off.
3	Power lamp	Lights when the power switch is ON.
4	Check Gas switch	ON: the gas valve opens without welding, to purge the hose and set the flow on the flow meter. Set to OFF before welding.
5	Pulse switch	ON: pulse TIG – Pulse Current, Pulse Width and Pulse Frequency are active. OFF: no pulse; these three knobs have no effect.
6	4T / 2T / OFF switch	Selects the torch trigger mode (see 6.5). In 2T the up-slope and down-slope knobs have no effect.
7	Welding mode switch	Selects MMA , DC TIG or AC TIG . HF arc ignition works only in the TIG positions. Use AC TIG for aluminium and its alloys, DC TIG for all other metals.
8	AC Frequency (Hz)	AC TIG only. Sets the frequency of the AC output. Higher frequency gives a narrower, more focused arc for fillet welds and thin sheet; lower frequency gives a wider, softer arc.
9	Welding Current (A)	Sets the welding current. In pulse mode it sets the base (background) current. In MMA mode it sets the MMA welding current.
10	Pulse Current (A)	Pulse mode only. Sets the peak current of the pulse.
11	Pulse Width (%)	Pulse mode only. Sets the proportion of each pulse period at peak current.
12	Pulse Frequency (Hz)	Pulse mode only. Sets the number of pulses per second.
13	Initial Current (A)	4T only. Current when the arc starts, before up-slope – used to preheat and to locate the start position.
14	Up Slope (s)	4T only. Time for the current to rise from the initial current to the welding current.
15	Down Slope (s)	4T only. Time for the current to fall from the welding current to the crater current.
16	Crater Current (A)	4T only. Current at the end of the weld, to fill the crater and avoid crater cracks.
17	Post Flow (s)	Time that gas continues to flow after the arc stops, to protect the hot tungsten and the weld. Increase it for higher currents.
18	AC Width	AC TIG only. Sets the balance between the cleaning (electrode positive) and the penetration (electrode negative) half-waves. Turn clockwise for more oxide cleaning (the tungsten runs hotter); anti-clockwise for deeper penetration and less tungsten wear. Normally set in the middle of the scale.

4.3 TIG torch



Fig. 4.3 Water-cooled TIG torch



Fig. 4.4 Torch connections

Torch connection	Connect to
Water out (M16 x 1.5)	Coolant return to the water cooling unit.
Water in (M12)	Liquid coolant output on the front of the machine.
Gas (M10)	Gas outlet on the front of the machine.
Switch plug	Torch switch socket on the front of the machine.
Welding current connection	Output terminal (–) of the machine.

The thread sizes are marked on the photograph. See 5.3 for the complete connection of the torch, the machine and the water cooling unit.

4.4 Torch parts

- **Tungsten electrode** – carries the current and the arc; it is not consumed in the weld.
- **Collet and collet body** – hold the tungsten. Use the collet size that matches the tungsten diameter.
- **Ceramic cup (nozzle)** – directs the shielding gas. Use a larger cup for higher currents.
- **Back cap (long / short)** – closes the torch head and holds the tungsten in place. Use the short cap in tight spaces.

5 Installation

5.1 Location

- Use the machine in a relatively dry place (relative humidity below 85 %, no condensation), out of direct sunlight and rain.
- Ambient temperature: $-10\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$. Avoid places with heavy dust or corrosive gases.
- Keep at least **20 cm** between the machine and surrounding objects. Never block the air inlet and outlet.
- Place the machine firmly and lock the castors. If the floor is wet, place the machine on a stand 30 – 50 cm high to prevent leakage currents and moisture damage.
- Keep the welding site away from flammable and explosive materials.

5.2 Mains connection

▲ DANGER

Before making any connection, switch off the supply at the distribution box and switch off the power switch of the machine. The connection must be made by a qualified electrician.

1. Check that the supply is **3 phase, 415 V $\pm 15\%$, 50 / 60 Hz**.
2. Connect the input cable of the machine to a distribution box with an isolator and fuses or a circuit breaker of suitable rating (recommended **32 A**).
3. Use a 4-core copper cable (3 phases + earth) of at least **4 mm²**.
4. Connect the earth conductor to a reliable protective earth. **The machine must always be earthed.**

Do not connect the machine to a single-phase supply or to a supply with a missing phase. An engine generator must have adequate capacity and a stable voltage.

5.3 Connecting the welding system

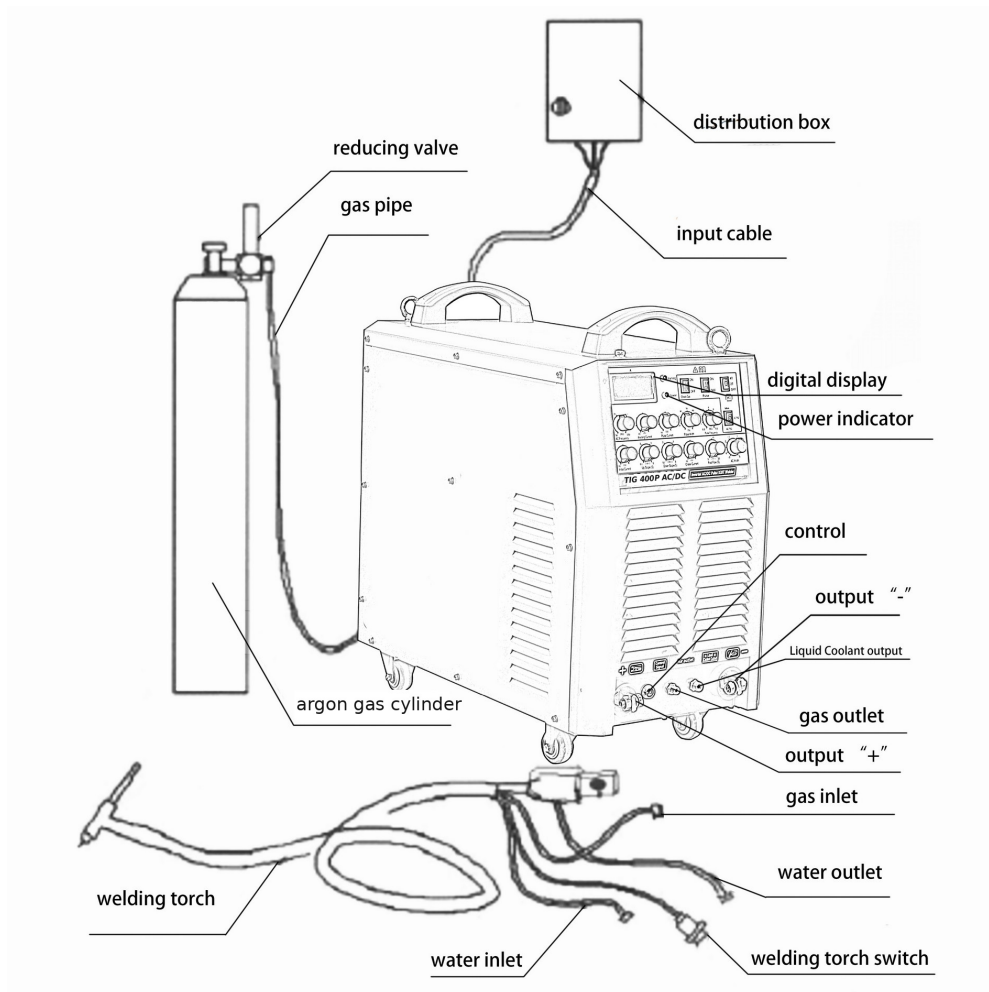


Fig. 5.1 Connection diagram for TIG welding

1. Connect the **torch power cable** to the output terminal **(-)** and tighten it.
2. Connect the **earth (work) cable** to the output terminal **(+)**, tighten it, and fix the earth clamp to the workpiece.
3. Connect the **torch switch plug** to the torch switch socket and tighten the ring nut.
4. Connect the **torch gas hose** to the gas outlet of the machine and tighten it so that no gas leaks.
5. **Water cooling:** connect the torch water inlet to the **liquid coolant output** on the front of the machine, and the torch water outlet to the **coolant return** of the water cooling unit. Connect the **coolant output** of the water cooling unit to the **liquid coolant input** on the rear of the machine.
6. Connect the **gas hose** from the argon regulator to the **gas inlet** on the rear of the machine and fix it with a hose clamp.
7. Connect the **input cable** to the 3-phase distribution box (5.2).
8. Check all connections. Open the argon cylinder and set the regulator, then switch on the distribution box.
9. Switch on the **power switch**. The power lamp lights and the display shows the set current.

▲ CAUTION

For TIG welding the torch must be connected to **(-)** and the workpiece to **(+)**. With reversed connection the tungsten is overheated and destroyed.

5.4 Connection for MMA welding

1. Disconnect the TIG torch from the output terminal.
2. Connect the electrode holder cable and the earth cable with the polarity recommended by the electrode manufacturer. Most basic (low-hydrogen) electrodes are welded with the electrode holder on **(+)** (DCEP); many rutile electrodes can be used with the electrode holder on **(-)**.

5.5 Water cooling

- Fill the water cooling unit with **distilled or de-ionised water** or ready-mixed welding coolant. Where temperatures can fall below 0 °C, add a suitable antifreeze (ethylene-glycol based, without additives that form deposits).
- Switch on the cooling unit before welding and check that coolant flows back from the torch.
- Never weld with the water-cooled torch without coolant flow – the torch will burn out within seconds.

5.6 Shielding gas

- Use pure argon (99.99 %) for TIG welding of all metals. For special applications argon/helium mixtures can be used.
- Set the **Check Gas** switch to ON and adjust the flow on the flow meter (see Table 7.1). Set the switch back to OFF.
- Check the hoses and connections for leaks. A leak draws air into the gas and causes porosity.

5.7 Preparing the tungsten electrode

Process	Tungsten type	Tip shape
DC TIG	Ceriated, lanthanated or thoriated	Ground to a point; tip angle about 30 – 60°, larger angle for higher current. Grind lengthwise, not around the tip.
AC TIG	Lanthanated, zirconiated or pure tungsten	Slightly blunted point; in AC a small rounded ball forms at the tip during welding.

- Use a collet and collet body that match the tungsten diameter. The tungsten should stick out of the ceramic cup by about 3 – 5 mm (up to 8 mm for fillet welds).
- If the tungsten touches the weld pool or the filler wire, stop and regrind it – a contaminated tungsten gives an unstable arc.

6 Operation

6.1 AC TIG welding (aluminium and aluminium alloys)

1. Set the welding mode switch to **AC TIG**.
2. Set the trigger switch to **2T** and the Pulse switch to **OFF**.
3. Set the **Welding Current**, and set **AC Frequency** and **AC Width** for the material (start with AC Width in the middle of the scale).
4. Set the **Post Flow** according to the current.
5. Hold the torch with the tungsten about 2 – 3 mm above the work and press the trigger. The HF ignites the arc without touching. Form the pool, then add filler wire at the front edge of the pool.

The AC frequency of this machine is adjustable from 50 to 150 Hz. **AC Width** controls how strongly the oxide film on the surface of aluminium is removed. More cleaning gives a brighter weld but increases tungsten wear. If the weld surface is dull or black, or the pool does not wet, increase the AC Width slightly. If the tungsten ball becomes large or melts, reduce it.

6.2 DC TIG welding (steel, stainless steel, copper, titanium)

1. Set the welding mode switch to **DC TIG**.
2. Set the trigger switch to **2T** and the Pulse switch to **OFF**.
3. Set the **Welding Current** and the **Post Flow** according to the current.
4. Press the trigger to ignite the arc by HF and weld.

6.3 DC pulse TIG welding

1. Set the welding mode switch to **DC TIG** and the Pulse switch to **ON**.
2. Set the **Pulse Current** (peak) and the **Welding Current** (base).
3. Set the **Pulse Frequency** and **Pulse Width** for the job.

Pulsing gives good penetration at the peak and lets the pool cool at the base current, which reduces heat input and distortion. It is useful for thin sheet, stainless steel, root runs and positional welding. A low pulse frequency (about 0.5 – 3 Hz) gives a regular ripple and helps to time the filler additions; a higher frequency gives a stiffer, more focused arc.

6.4 MMA (stick) welding

1. Connect the electrode holder and earth cable (5.4).
2. Set the welding mode switch to **MMA** and the Pulse switch to **OFF**.
3. Set the **Welding Current** for the electrode diameter (see Table 7.4).
4. Strike the arc by scratching the electrode on the work, and weld. Remove the slag after each pass.

▲ WARNING

In MMA mode the electrode holder is live as soon as the machine is switched on. Place the holder on an insulated surface when not welding.

6.5 Torch trigger modes

Mode	Sequence
2T	Press and hold the trigger: gas flows, the HF ignites the arc and the machine welds at the welding current. Release the trigger: the arc stops and the gas flows for the post-flow time. The up-slope and down-slope knobs have no effect.
4T	1st press: the arc starts at the initial current . 1st release: the current rises to the welding current in the up-slope time, and welding continues without holding the trigger. 2nd press: the current falls to the crater current in the down-slope time. 2nd release: the arc stops and post-flow follows.
OFF	The trigger sequence functions are switched off.

Example - DC pulse TIG in 4T: set the welding mode to DC TIG, the trigger switch to 4T and Pulse to ON. Set Initial Current, Welding Current, Crater Current, Up Slope and Down Slope. Press the trigger – the arc starts at the initial current; release – the current rises to the welding current; press again at the end of the weld – the current falls to the crater current; release – the arc stops.

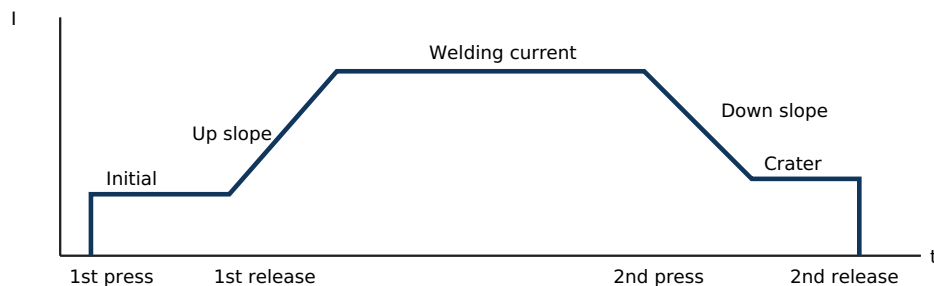


Fig. 6.1 Current sequence in 4T mode

6.6 Finishing work

1. After welding, keep the torch over the end of the weld until the post-flow stops.
2. Close the argon cylinder valve.
3. Let the machine and the cooling unit run for a few minutes without welding to cool down.
4. Switch off the power switch and the distribution box.

7 Welding guide

7.1 Tungsten diameter, current and argon flow

Welding current (A)	Tungsten diameter (mm)	Argon flow (L/min)
5 - 15	0.5	3 - 7
10 - 65	1.0	4 - 8
55 - 120	1.6	6 - 9
85 - 150	2.0	6 - 10
120 - 200	2.4	7 - 10
200 - 320	3.2	10 - 15
320 - 400	4.0	12 - 20

Table 7.1

7.2 AC TIG welding of aluminium

Plate thickness (mm)	Tungsten diameter (mm)	Filler wire diameter (mm)	Welding current (A)	Argon flow (L/min)
0.6	1.0 - 1.6	none or 1.0	25 - 40	4 - 5
1.0	1.0 - 1.6	none or 1.6	40 - 60	4 - 7
1.5	1.0 - 1.6	none or 1.6	60 - 90	6 - 9
2.5	1.6 - 2.4	1.6 - 2.4	80 - 120	6 - 9
3.0	1.6 - 2.4	1.6 - 2.4	100 - 160	7 - 10
4.0	2.4	1.6 - 2.4	130 - 200	10 - 15
5.0	2.4 - 3.2	2.4 - 3.2	150 - 250	10 - 15
6.0	3.2 - 4.0	2.4 - 3.2	200 - 280	10 - 15
8.0	3.2 - 4.0	3.2 - 4.0	200 - 300	12 - 18

Table 7.2 Guide values, butt welds in the flat position

7.3 DC TIG welding of stainless steel

Plate thickness (mm)	Tungsten diameter (mm)	Filler wire diameter (mm)	Welding current (A)	Argon flow (L/min)
1.0	1.0 - 1.6	1.0 - 1.6	30 - 60	5 - 7
2.0	1.6 - 2.4	1.6 - 2.0	70 - 100	6 - 8
3.0	2.4	2.0 - 2.4	100 - 140	7 - 9
4.0 - 5.0	2.4 - 3.2	2.4 - 3.2	130 - 180	8 - 10
6.0 and above	3.2	3.2	170 - 250	9 - 12

Table 7.3 Guide values, butt welds in the flat position (mild steel needs about 10 % more current)

7.4 MMA welding

Electrode diameter (mm)	Welding current (A)
2.5	60 – 90
3.15	90 – 140
4.0	130 – 190
5.0	180 – 260
6.3	250 – 350

Table 7.4 Guide values for mild steel electrodes; follow the electrode packet

7.5 TIG technique

- Hold the torch at 70 – 80° to the work, tilted in the direction of travel. Feed the filler rod at a low angle (15 – 20°) into the front edge of the pool.
- Keep a short arc, about equal to the tungsten diameter. Keep the hot end of the filler rod inside the gas shield.
- Clean the joint and the filler rod thoroughly. For aluminium, remove the oxide with a stainless steel brush or solvent just before welding.

7.6 Weld defects

Defect	Possible cause	Remedy
Porosity	Insufficient gas; draught; gas leak; dirty base metal or filler; wet coolant leaking into gas.	Check flow and hoses; screen from draught; clean the joint; check the torch.
Black or grey weld (aluminium)	Insufficient cleaning action; oxide not removed; poor gas shield.	Increase AC Width; clean the joint; check gas flow and cup size.
Tungsten melts or balls excessively	Current too high for the tungsten; AC Width too high; torch on (+).	Use a larger tungsten; reduce AC Width; connect the torch to (–).
Tungsten contamination	Tungsten touched the pool or filler.	Regrind the tungsten; keep a steady arc length.
Wandering arc	Contaminated or badly ground tungsten; low current; AC frequency too low.	Regrind; adjust current; increase AC frequency.
Oxidised, discoloured weld	Post-flow too short; gas flow too low.	Increase post-flow and gas flow.
Crater cracks	Arc stopped abruptly.	Use 4T with down slope and crater current.
Undercut / burn-through	Current too high; travel too slow.	Reduce current or use pulse; travel faster.

8 Maintenance

▲ WARNING

Switch off the machine and the distribution box before any maintenance. Wait at least 5 minutes before removing covers. Only qualified persons may work inside the machine.

Interval	Work
Daily	Check the supply cable, torch, earth cable and connections for damage and tightness. Check that the fan runs. Check the coolant level and flow, and the gas hoses for leaks. Check the tungsten, collet and ceramic cup.
Weekly	Clean the torch parts. Check the O-rings and insulation of the torch. Check that the knobs and switches work correctly.
Every 3 – 6 months	Remove the covers and blow dust out of the machine with dry, low-pressure compressed air (more often in dusty workshops). Check the tightness of internal connections. Clean the radiator of the cooling unit.
Yearly	Replace the coolant and clean the coolant tank. Have the insulation and earth connection checked by a qualified electrician.

8.1 General care

- Protect the machine from rain, moisture, metal dust and grinding dust. Metal dust inside the machine can cause short circuits.
- Do not place the machine on the floor of a grinding or cutting area.
- Replace a damaged torch cable, gas hose or coolant hose immediately.
- Replace worn collets, cracked ceramic cups and damaged back caps. Use only genuine spare parts.
- Store the machine in a dry place, with the coolant drained or protected with antifreeze if it may freeze.

9 Troubleshooting

▲ CAUTION

Only qualified technicians may repair the machine. To avoid electric shock, follow all safety instructions in this manual.

Fault	Possible cause	Remedy
Machine switched on but no welding output	Insufficient supply or a phase missing. Input connection fault. Internal secondary power supply fault.	Check the 3-phase supply. Reconnect the input cable. Contact Cruxweld service.
Display lit, but no HF discharge sound and no arc ignition	Torch switch faulty. HF discharge gap faulty or wrongly set. Torch switch plug wrongly connected. Welding mode switch in MMA.	Replace the torch switch. Have the discharge gap adjusted by service. Reconnect the plug. Select AC TIG or DC TIG.
HF discharge present, but no welding current	Earth cable not connected. Torch cable short-circuited or broken.	Connect the earth clamp to the work. Check / replace the torch cable.
Current present but not adjustable	Remote (foot pedal) control wrongly connected or wrong mode. Potentiometer of the remote control damaged or worn.	Check the remote connection and setting. Replace the potentiometer.
Warning lamp lit	Over-temperature (duty cycle exceeded). Excessive dust inside causing a fault. Supply voltage too high or too low. Internal component fault.	Leave the machine on to cool, then continue. Blow out the machine with dry compressed air. Check the supply. Contact Cruxweld service.
Oxide on aluminium not removed; poor aluminium weld	Welding mode not AC TIG. AC Width too low. Secondary inverter fault.	Select AC TIG. Increase the AC Width; clean the oxide mechanically. Contact Cruxweld service.
Current present but no gas flow	Gas nozzle blocked. Torch gas hose cracked or worn. Cylinder empty or valve closed. Gas solenoid valve or its circuit faulty.	Clean the nozzle. Replace the hose. Replace the cylinder / open the valve. Contact Cruxweld service.
Tungsten burns away quickly	AC Width too high. Torch connected to (+). Tungsten too small for the current. Insufficient gas.	Turn the AC Width anti-clockwise. Connect the torch to (-). Use a larger tungsten. Increase the gas flow.
Earth cable becomes very hot	Loose earth cable connection.	Tighten the connections at the machine and at the work.
Torch becomes very hot	No coolant flow; coolant level low; hoses kinked or connected wrongly.	Check the cooling unit and hoses (5.3); top up the coolant.

If a fault cannot be corrected with this table, contact Cruxweld service and state the model and serial number from the rating plate.

10 Warranty

Cruxweld warrants the iTIG400ACDC against defects in material and workmanship for the period stated in the sales contract, from the date of invoice. During the warranty period Cruxweld will repair or replace, free of charge, parts that are found to be defective due to faulty material or workmanship.

The warranty does not cover:

- consumable and wearing parts such as tungsten electrodes, collets, collet bodies, ceramic cups, back caps, torch cables, earth clamp and electrode holder;
- damage caused by incorrect supply voltage, a missing phase, missing earth, overload or operation beyond the duty cycle;
- damage caused by operating the water-cooled torch without coolant, by frozen coolant or by unsuitable coolant;
- damage caused by dust, moisture, blocked ventilation, falls, transport, lack of maintenance, misuse, or repair or modification by unauthorised persons.

Model	iTIG400ACDC
Serial number	
Invoice no. / date	
Customer	
Dealer stamp	

For service and spare parts please contact:

Cruxweld Industrial Equipments Pvt. Ltd.

5, Sector 29, Faridabad - 121008 (Haryana), India

Phone: +91 8800 882 983 | +91 (129) 489 2868

Email: sales@cruxweld.com | Service: support@cruxweld.com

www.cruxweld.com

When ordering spare parts, always state the model and serial number from the rating plate.



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Cruxweld improves its products continuously. The technical data in this manual may change without notice.