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INSTRUCTION MANUAL

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DESCRIPTION

The TOP.DC AC/DC TIG200 is the new generation of multi functional high quality welding machine, designed and developed independently by our company. The welder adopts a microcomputer system control, dual current loop PWM control, full-bridge high frequency inverter system. It has convenient operation, stable performance, small size and high duty cycle. The welder is mainly applied to the welding of aluminum, aluminum alloy, copper, titanium, and other non-ferrous metals and stainless steel, carbon steel and other metals,

Characteristics

- ☆ High successful rate of arc start
- ☆ Stable arc without breaking arc
- ☆ Safety, efficiency
- ☆ One model, seven functions:
 - ◆ TIG/DC
 - ◆ TIG/PULSE
 - ◆ TIG/AC
 - ◆ TIG/AC /PULSE
 - ◆ TIG/MIX
 - ◆ TIG/SPOT
 - ◆ MMA

SAFETY

Arc welding can be dangerous and can cause serious and even fatal injuries

Protect yourself and others

Ensure the following safety precautions are taken:

Arc radiation Protect yourself with a helmet fitted with filters

Rain, steam, damp Use your welding unit in a clean/dry environment, on a flat surface.

Electric shock This device must only be used with an earthed power supply. Do not touch high voltage parts. Check that the power supply is suitable for this unit

Falls Ensure the unit is placed in a stable position to prevent the machine from falling onto people/objects

Burns Wear protective (fire-proof) clothing (cotton, overalls or jeans).

Wear protective gloves and a fire-proof apron

Ensure other people keep a safe distance from the work area and do not look directly at welding arc.

protect others by installing fire-proof protection walls.

Fire risks Remove all flammable products from the work area. Do not work in presence of flammable gases

Fumes Do not inhale welding gases and fumes. Use the device in a well ventilated environment, with artificial extraction if welding indoors

Additional

Precautions

Any welding operation undertaken in.....

- rooms where there is an increased risk of electric shocks,
- poorly ventilated rooms,

- in the presence of flammable or explosive material, should always be approved by a "responsible expert", and made in presence of people trained to intervene in case of emergency.

Technical protection as described in the Technical Specification CEI/IEC 62081 must be implemented. Welding in raised positions is forbidden, except in case of safety platforms use.

SPECIFICATION

SPECIFICATION

	TIG /DC	TIG /PULSE	TIG /AC	TIG/AC /PULSE	TIG /MIX	TIG /SPOT	MMA
Rated input voltage	AC230V±15% (195V~265V) 50/60Hz						
Max input power factor	8.1KW						10.5KW
Rated open voltage	70V						70V/12 V
Load voltage V	10.2~18	10.2~18	10.4~18	10.4~18	10.4~18	10.2~18	20.2~28
Welding current A	5~200	5~200	10~200	10~200	10~200	5~200	5~200
Arc current A	5~200	5~200	10~200	10~200	10~200	/	/
Base current %	/	10~90	/	10~90	/	/	/
Crater current	5~200	5~200	10~200	10~200	10~200	/	/
Arc force current	/	/	/	/	/	/	5~200
Pulse Frequency Hz	/	0.1~800	/	0.1~800	/	/	/
Pulse ratio %	/	10~90	/	10~90	/	/	/

AC Frequency Hz	/	/	30~200	30~200	30~200	/	/
AC Balance %	/	/	10~50	10~50	10~50	/	/
Slop up time S	0~10	0~10	0~10	0~10	0~10	/	/
Slop down time S	0~10	0~10	0~10	0~10	0~10	/	T
Pre Gas Time S	0~10						/
Post Gas Time S	0~30						/
Spot time S	/	/	/	/	/	0.01-5	/
Duty Cycle at 25 °C	60	60	50	50	50	60	60
Insulation class	F						
IP class	IP21S						
Dimension mm	443*200*238						

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FRONT PANEL LAYOUT

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The front panel includes 6 button switches (welding model switch, welding function switch, arc start switch, 2T/4T switch, VRD switch, data loading and recall switch), 1 encoder switch, 33 LED indicator and 1 digital display.

Welding model switch:

MMA

DC TIG

AC TIG

SPOT

Welding function switch

DC (Pulse)

Pulse (output current will change periodically based on the setted Pulse frequency and base current)

MIX (AC square wave current will be inserted a DC current to stabilize arc)

Arc start switch

LIFT TIG: Contact start

HF TIG: High frequency start without contact

2T/4T switch

2T: short welding

4T: long welding

VRD switch

ON/OFF

Working (Open voltage will be limited DC 12V safe voltage)

Data loading and recall switch

Loading(20 of setting mode can be saved)

Recall

Encode switch(Setting)

The switch can be turned and pushed. Turning for choosing program and adjust data. Pushing for confirming and exit of program and data.

Setting:

Start setting: Push the setting switch to start the setting, the default setting LEDs are on

Program choosing: Turn the setting switch to choose program for setting,

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the matched LED will be on.

Adjust parameters: Push the setting again, the chosen LED shining, then turn the setting for adjust the parameters.

Parameter confirmation: .Push the setting again for confirmation set parameters, the LED keeps on.

Exit of setting: Push the setting again, the chosen LED off, then quit the setting.

Digital display

Current

Time

Frequency

Balance %

TIG/DC operation

Data setting: Choose the TIG /DC model, DC welding function, LIFT/HF , 2T/4T, adjust the pre gas time, arc current, slope up time, peak current, slop down time, crater current, slope down time.

1. Pre gas time setting: In order to ensure that the workpiece and the

tungsten from contamination and burnout, set the pre gas time to let go argon air to push out the rest air in the torch. The pre-gas provides protection for the area where the welding pool will be formed. It also improved stability when the welding arc is created.

2. Arc current Setting: Usually set the current less than the max current.

3. Slop up time Setting: Time needed to go from minimum current welding current.

4. Max Current: It is the welding current. Set the current refer to the TIG welding table.

5. Slop down time Setting: Time needed to shift from welding current to minimum current. Avoid cracks and craters at the end of welding.

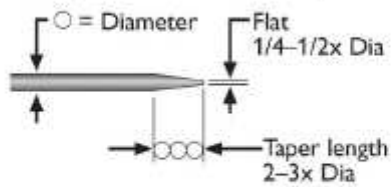
6. Crater current Setting: Usually set the current less than the max current.

7. Post gas time Setting: In order to ensure that the workpiece and the tungsten from contamination and burnout, set the pre gas time to let go argon air keep some time. It protects the weld pool and the electrode against oxidization whilst the metal is cooling after welding.

TIG/DC WELDING TABLE

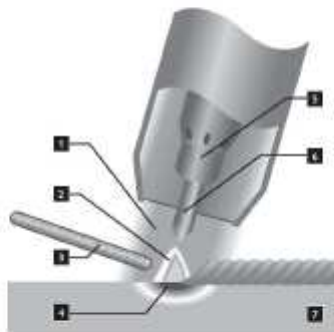
MATERIAL	WORKPIECE THICKNESS (MM)	Φ Electrode (MM)	Φ Rod (filler metal) (MM)	CURRENT(A)	Flow rate (Argon L/mn)
STAINLESS STEEL (DC+)	0.6	1.0,1.6	~1.6	20~40	4
	1.0	1.0,1.6	~1.6	30~60	4
	1.6	1.6,2.4	~1.6	60~90	4
	2.4	1.6,2.4	1.6~2.4	80~120	4
	3.2	2.4,3.2	2.4~3.2	110~150	5
	4.0	2.4,3.2	2.4~3.2	130~180	5
	4.8	2.4,3.2,4.0	2.4~4.0	150~220	5
DEOXIDIZED COPPER (DC+)	1.0	1.6	~1.6	60~90	3~4
	1.6	2.4	1.6~2.4	80~120	3~4
	2.4	2.4,3.2	2.4~3.2	110~150	4
	3.2	3.2,4.0	3.2~4.8	140~200	4~5
	4.0	3.2,4.0,4.8	4.0~4.8	180~250	4~5
	4.8	4.0,4.8	4.8~6.4	250~300	5~6
ALUMINIUM (AC)	1.0	1.6	~1.6	50~60	5~6
	1.6	1.6,2.4	~1.6	60~90	5~6
	2.4	1.6,2.4	1.6~2.4	80~110	6~7
	3.2	2.4,3.2	2.4~4.0	100~140	6~7
	4.0	3.2,4.0	3.2~4.8	140~180	7~8
	4.8	3.2,4.0,4.8	4.0~6.4	170~220	7~8
Magnesium (AC)	1.0	1.6	~1.6	30~40	3~4
	1.6	1.6,2.4	1.6~2.4	40~70	4~5
	2.4	1.6,2.4	1.6~2.4	60~90	4~5
	3.2	1.6,2.4	2.4~3.2	75~110	5~6
	4.0	2.4,3.2	3.2~4.0	90~120	5~6
	4.8	3.0,4.0	3.2~4.8	110~150	5~6
	6.4	3.2,4.0	4.0~4.8	130~170	6~7

To optimize the welding process, it is recommended to grind the electrode prior to welding as described in the diagram below



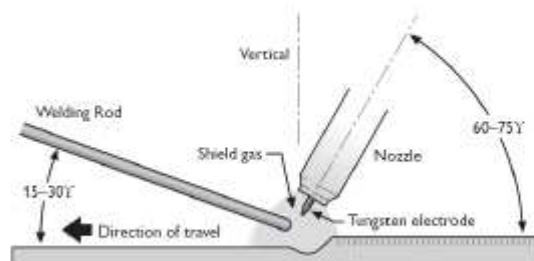
TIG welding process

1	Shielding gas
2	Arc
3	TIG filler rod
4	Weld pool
5	Collect
6	Tungsten Electrode
7	Workpiece

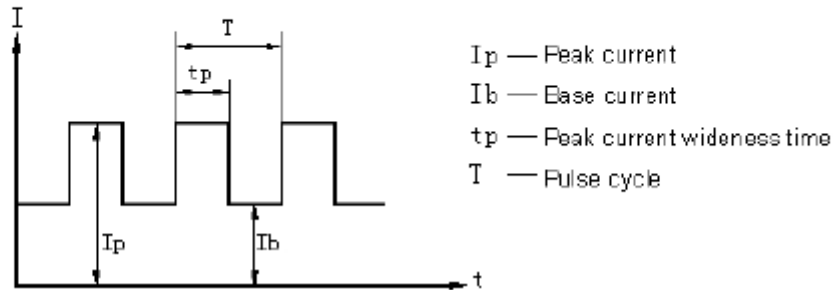


TIG welding techniques

The suggested electrode and welding rod angles for welding a bead on plate. The same angles are used when making a butt weld. The torch is held $60-75^\circ$ from the metal surface. This is the same as holding the torch $15-30^\circ$ from the vertical. Take special note that the rod is in the shielding gas during the welding process




TIG/DC/PULSE Operation






Data setting: Choose the TIG /DC model, Pulse welding function, LIFT/HF , 2T/4T, adjust the pre gas time, arc current, slope up time, peak current, base current, slope down time, crater current, slope down time, pulse frequency, pulse ratio..

- 1. Base current setting:** Usually set in a small value as long as not break the arc.
- 2. Pulse ratio setting:** The ratio determines the heat input, the bigger ratio it is, the weld seam is wider and deeper and vice versa. Usually set the ration between 30%-70%.
- 3. Pulse frequency setting:** The higher frequency it is, the weld seam denser and vice versa.

TIG/DC/PULSE welding Table1

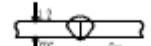
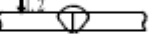


MATERIAL	JOINT SHAPE	GAP MM	PULSE CONDITION				WELDING SPEED CM/MIN	FEED SPEED CM/MIN
			PEAK CURRENT T (A)	BASE CURRENT (A)	PULSE FREQUENCY (HZ)	PULSE RATIO%		
MILD STEEL		0	200	50	2.5	50	60	60
		1.2	150	20	1.5	45	30	60
		1.6	130	20	1	50	15	40

STAINLESS STEEL		0	150	50	3	50	80	40
		1.2	150	20	1	35	17	40
		1.6	130	20	0.8	30	10	40
		2.0	130	20	0.8	30	83	0
COPPER		0	280	50	3	50	80	75
		1.2	280	50	2	50	50	75
		1.6	280	50	1.5	40	25	75
TITANIUM		0	200	100	1	30	25	0

SHILDING GAS: ARGON (10L/MIN); ELECTRODE: Thoriated tungsten

electrode (3.2MM); FILL METAL: Φ 1.2MM; LENGTH OF ARC: 2MM

TIG/DC/PULSE welding Table2

MATERIAL	JOINT SHAPE	GAP MM	PULSE CONDITION				WELDING SPEED CM/MIN	FEED SPEED CM/MIN
			MAX CURRENT (A)	BASE CURRENT (A)	PULSE FREQUENCY (HZ)	PULSE RATIO%		
STEEL+ MILD STEEL		1	250	50	0.8	20	10	60
STAINLESS STEEL+ MILD STEEL		1	170	60	2.5	50	50	60
MILD STEEL		1	120	50	2	50	20	30
STAINLESS STEEL		1	160	50	1.5	45	8.5	60

SHILDING GAS: ARGON (10L/MIN); ELECTRODE: Thoriated tungsten
 electrode (2.4MM); FILL METAL: Φ 1.2MM; LENGTH OF ARC: 2-3MM

TIG/AC Operation

Data setting: Choose the TIG /AC model, , LIFT/HF , 2T/4T, adjust the pre gas time, arc current, slope up time, peak current, slop down time, crater current, slope down time, AC frequency, AC balance.



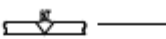


1. AC frequency setting: The higher frequency it is , the arc concreted more intensive, weld seam smoother, but the sound of arc relatively shrill. Usually suggest the low AC frequency.
2. AC Balance (EP ratio) setting: It is the percentage of AC negative wave against AC period. The higher it is, the weld seam smoother, but the penetration more shallow, tungsten worn easier. Usually suggest the low EP ratio

TIG/AC/Pulse Operation

Data setting: Choose the TIG /AC model, Pulse welding function, LIFT/HF , 2T/4T, adjust the pre gas time, arc current, slope up time, peak current, base current, slop down time, crater current, slope down time, Pulse frequency , Pulse Ratio , AC frequency, AC balance.

TIG/DC/PULSE welding Table2

MATERIAL	JOINT SHAPE	THICKNESS KNE SS MM	PULSE CONDITION				Filler metal	
			PEAK CURRENT A	BASE CURRENT NTA	PULSE FREQUENCY HZ	PULSE RATIO %	DIAMETER MM	FEED SPEED CM/MIN
ALUMINIUM		1.0	70	25	1	50	1.6	75
		1.5	80	40	1	50	1.6	95
		1.5	90	25	1	50	1.6	75
		1.5	85	25	1	50	1.2	95
		3.2	170	25	1	50	1.2	290
		3.0	170	25	1	50	1.6	170
		6.0	220	25	1	50	1.6	250

	FIRST L	6.0	180	25	1	50	1.6	
	SECOND		180	25	1	50	1.6	250
		6.0	220	25	1	50	1.6	270 ¹²
		3.0	120	25	1	50	1.6	60

TIG/MIX Operation

MIX TIG: AC welding 0.3s+DC welding 0.2s.

Data setting: Choose the TIG /AC mode, MIX welding function, LIFT/HF , 2T/4T, adjust the pre gas time, arc current, slope up time, peak current,, slop down time, crater current, slope down time, AC frequency, AC balance.

Welding can refer to the TIG DC instruction.

TIG/SPOT Operation

Data setting: Choose the SPOT mode, adjust the pre gas time, slope up time(spot time), peak current,, slop down time.

In this mode, the machine can works in HF and 2T only.

MMA Operation

Data setting: Choose the MMA mode, adjust slope up time(Arc force), peak current.

Welding current setting table- Flat welding

ELECTRODE \ MM	2.6	3.2	4.0	4.5	5.0
Ilmenite electrode	50~85	80~130	120~180	145~200	170~250
Titania calcium electrode	50~100	90~130	140~180	160~210	190~150
low hydrogen electrode	55~85	100~140	140~190		190~250

Welding current setting table- Vertical welding

ELECTRODE \ MM	2.6	3.2	4.0	4.5	5.0
Ilmenite electrode	40~70	60~110	100~150	120~180	130~200
Titania calcium electrode	50~90	80~130	110~170	125~190	140~210
low hydrogen electrode	50~80	90~130	120~180		160~210

TROUBLE SHOOTING

Symptom	Causes
The device does not deliver any current and the yellow LED in on	Thermal protection is on
No arc exists	Torch switch is useless
	Power switch is broken
	The cable to switch is disconnected
	The cable to workpiece is disconnected
	The cable of torch is broken
Starting arc is not good or jarless	Connecting tie-in is loose
	Argon gas is not pure
	The tungsten electrode is no good fixed or its quality is no good
Surface of welding line is no good	Dunghill or grease exists on the surface of workpiece
	Argon gas is not pure
	Flux of argon gas is not enough
	Dunghill exists on the surface of tungsten electrode
Tungsten electrode wastes hard	Current is too great or tungsten electrode is too thin
	Argon gas is not pure
	Polarity error

WELDER PARTS LIST AND ASSEMBLY DIAGRAM