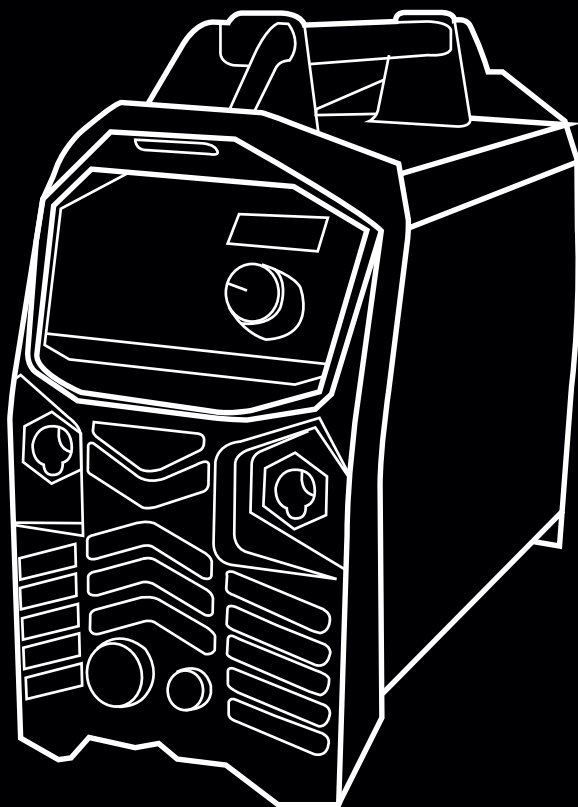


LAUNCHEurope

***TIG 200 DC
PULSE***

 **OPERATING MANUAL**





SAFETY RULES

These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted.

The equipment must only be used for the purpose it was designed for. Using it in any other way could result in damage or injury and in breach of the safety rules. Only suitably trained and competent persons should use the equipment. Operators should respect the safety of other persons.

Prevention against electric shock

The equipment should be installed by a qualified person and in accordance with current standards in operation. It is the user's responsibility to ensure that the equipment is connected to a suitable power supply. Consult with your utility supplier if required.

- If earth grounding of the work piece is required, ground it directly with a separate cable. Do not use the equipment with the covers removed.
- Do not touch live electrical parts or parts which are electrically charged. Turn off all equipment when not in use.
- Cables (both primary supply and welding) should be regularly checked for damage and overheating. Do not use worn, damaged, under sized, or poorly jointed cables.
- Ensure that you wear the correct protective clothing, gloves, head and eye protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work ground.
- Never touch the electrode if you are in contact with the work ground, or another electrode from a different machine.
- Do not wrap cables over your body.
- Ensure that you take additional safety precautions when you are welding in electrically hazardous conditions such as damp environments, wearing wet clothing, and metal structures. Try to avoid welding in cramped or restricted positions.
- Ensure that the equipment is well maintained. Repair or replace damaged or defective parts immediately. Carry out any regular maintenance in accordance with the manufacturer's instructions.

Safety against fumes and welding gases

- Locate the equipment in a well-ventilated position.
- Keep your head out of the fumes. Do not breathe the fumes.
- Ensure the welding zone is in a well-ventilated area. If this is not possible provision should be made for suitable fume extraction.
- If ventilation is poor, wear an approved respirator. Read and understand the Material Safety Data Sheets (MSDS's) and the manufacturer's instructions for



metals, consumable, coatings, cleaners, and de-greasers. Do not weld in locations near any de-greasing, cleaning, or spraying operations. Be aware that heat and rays of the arc can react with vapours to form highly toxic and irritating gases.

- Do not weld on coated metals, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings on many metals can give off toxic fumes if welded.

Prevention against burns and radiation

- Arc rays from the welding process produce intense, visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.
- Wear an approved welding helmet fitted with a proper shade of filter lens to protect your face and eyes when welding or watching
- Wear approved safety glasses with side shields under your helmet. Never use broken or faulty welding helmets.
- Always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the welding area. Ensure that there are adequate warnings that welding or cutting is taking place.
- Wear suitable protective flame resistant clothing. The sparks and spatter from welding, hot work pieces, and hot equipment can cause fires and burns
- Welding on closed containers, such as tanks, drums, or pipes, can cause them to explode. Accidental contact of electrode to metal objects can cause arcs, explosion, overheating, or fire.
- Check and be sure the area is safe and clear of inflammable material before carrying out any welding.

Protection against noise

- Some welding and cutting operations may produce noise.
- Wear safety ear protection to protect your hearing.

Protection from moving parts

- When the machine is in operation, keep away from moving parts such as motors and fans. Moving parts, such as the fan, may cut fingers and hands and snag garments.
- Protections and coverings may be removed for maintenance and controls only by qualified personnel, after first disconnecting the power supply cable.
- Replace the coverings and protections and close all doors when the intervention is finished, and before starting the equipment.
- Take care to avoid getting fingers trapped when loading and feeding wire during set up and operation. When feeding wire be careful to avoid pointing it at other people or toward your body.
- Always ensure machine covers and protective devices are in operation.



Precautions against fire and explosion

- Avoid causing fires due to sparks and hot waste or molten metal
- Ensure that appropriate fire safety devices are available near the cutting / welding area.
- Remove all flammable and combustible materials from the cutting / welding zone and surrounding areas. Do not cut/weld fuel and lubricant containers, even if empty. These must be carefully cleaned before they can be cut/welded.
- Always allow the cut/welded material to cool before touching it or placing it in contact with combustible or flammable material.
- Do not work in atmospheres with high concentrations of combustible fumes, flammable gases and dust. Always check the work area half an hour after cutting to make sure that no fires have begun.

Risks due to magnetic fields

- The magnetic fields created by high currents may affect the operation of pacemakers or electronically controlled medical equipment.
- Wearers of vital electronic equipment should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.
- Do not go near welding equipment with any sensitive electronic equipment as the magnetic fields may cause damage.

RF Declaration

Equipment that complies with directive 2010/108/EC concerning electromagnetic compatibility (EMC) and the technical requirements of EN60974-10 is designed for use in industrial buildings and not those for domestic use where electricity is provided via the low voltage public distribution system. Difficulties may arise in assuring class A electromagnetic compatibility for systems installed in domestic locations due to conducted and radiated emissions.

In the case of electromagnetic problems, it is the responsibility of the user to resolve the situation. It may be necessary to shield the equipment and fit suitable filters on the mains supply.

LF Declaration

Consult the data plate on the equipment for the power supply requirements. Due to the elevated absorbance of the primary current from the power supply network, high power systems affect the quality of power provided by the network. Consequently, connection restrictions or maximum impedance requirements permitted by the network at the public network connection point must be applied to these systems. In this case the installer or the user is responsible for ensuring the equipment can be connected, consulting the electricity provider if necessary.

**Materials and their disposal**

- The equipment is manufactured with materials, which do not contain any toxic or poisonous materials dangerous to the operator.
- When the equipment is scrapped, it should be dismantled separating components according to the type of materials.
- Do not dispose of the equipment with normal waste. The European Directive 2002/96/EC on Waste Electrical and Electronic Equipment states the electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility.

Handling of Compressed gas cylinders and regulators

- All cylinders and pressure regulators used in welding operations should be handled with care. Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Always secure the cylinder safely. Never deface or alter any cylinder.



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1. PREFACE

1.1 General

Congratulations on choosing TitanTig 200 DC Pulse welding machine. Used correctly, our products can significantly increase the productivity of your welding, and provide years of economical service.

This operating manual contains important information on the use, maintenance and safety of our product. Please read the manual carefully before using the equipment for the first time.

For your own safety and that of your working environment, pay particular attention to the safety instructions in the manual.

For more information on our products, contact us, consult an authorised dealer, or visit our website.

The specifications presented in this manual are subject to change without prior notice.

Important notes

Items in the manual that require particular attention in order to minimise damage and personal harm are indicated with the '**NOTE!**' notation. Read these sections carefully and follow their instructions.

Disclaimer

While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions.

We reserve the right to change the specification of the product described at any time without prior notice.

1.2 Introduction

TitanTig 200 DC Pulse welding machine adopts the latest pulse width modulation (PWM) technology which can change work frequency to medium frequency so as to replace the traditional hulking work frequency transformer with the cabinet medium frequency transformer. Thus, it is characterized with portable, small size, light weight, low consumption and etc.

The HF arc ignition provides pre gas and instant arc ignition with the press of the torch switch leaving no tungsten inclusion and no contamination of the tungsten electrode. Digital set of Pre Gas Time, Start Current Level, Up Slope Time, Down Slope Time, Finish Current Level and Post Gas Time combined with the choice of 2 or 4T trigger function allows you to control the start and finish of the weld process at the highest professional level. The Digital Control Pulse Frequency allows full parameter setting of Peak Current, Base Current, Pulse Frequency and Pulse Width, allowing to manipulate the heat input to the work, control penetration and minimise distortion. Combining the functions of the Titan 200 DC TIG ensures comprehensive control of the welding



parameters when welding all DC weldable materials to produce high quality Tig welds. Our unique Torch Remote Control Interface provides remote amperage control from the torch in both static and live welding modes. The DC MMA welding function delivers a smooth and stable arc allowing easy welding with electrodes obtaining high quality welds including cast Iron, stainless and low hydrogen. The added bonus of Arc Ignition and Arc Force control allows you to set the ideal arc condition no matter what electrode you choose. The TitanTig 200 DC TIG is a professional machine that is suitable for multiple applications, stainless steel fabrication, dairy & food industry, site welding, repair and maintenance applications. Built to our specification and manufactured in compliance to EN 60974-1.

Product functions

DC MMA, polarity connection can be chosen according to different electrodes.

DC TIG, DCEP is used normally (workpiece connected to positive polarity, while torch connected to negative polarity). This connection has many characters, such as stable welding arc, low tungsten pole loss, more welding current, narrow and deep weld;

DC Pulsed TIG has the following characters: 1) Pulse heating. Metal in Molten pool has short time on high temperature status and freezes quickly, which can reduce the possibility to produce hot crack of the materials with thermal sensitivity. 2) The workpiece gets little heat. Arc energy is focused. Be suitable for thin sheet and super thin sheet welding. 3) Exactly control heat input and the size of the molten pool. The depth of penetration is even. Be suitable for welding by one side and forming by two sides and all position welding for pipe. 4) High frequency arc can make metal for microlite fabric, eliminate blowhole and improve the mechanical performance of the joint. 5) High frequency arc is suitable for high welding speed to improve the productivity.

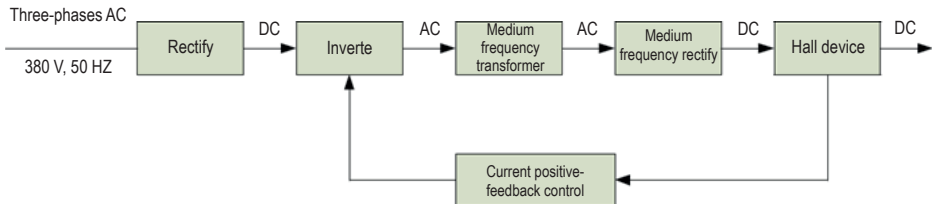
Product performance characteristics

- Latest IGBT Inverter Technology • Digital Weld Program Sequence Control
- DC TIG (DC tungsten inert gas welding)
 - a. HF Arc Ignition (prevents tungsten inclusion & tungsten damage)
 - b. Adjustable Pulse Frequency 0.5 - 200Hz
 - c. Peak Current, Base Current and Pulse Width Adjustment
 - d. 2/4T Trigger + Spot Time Adjustment
 - e. Start & Final Current Adjustment
 - f. Pre and Post Gas Flow Adjustment
 - g. Up and Down Slope Adjustment
 - h. Remote Torch Amp Control

- MMA (stick electrode)
 - a. Arc Ignition
 - b. Arc Force
- Thermal Overload Protection
- Generator compatible (recommend 9.0KVA 230V)

Working Principle

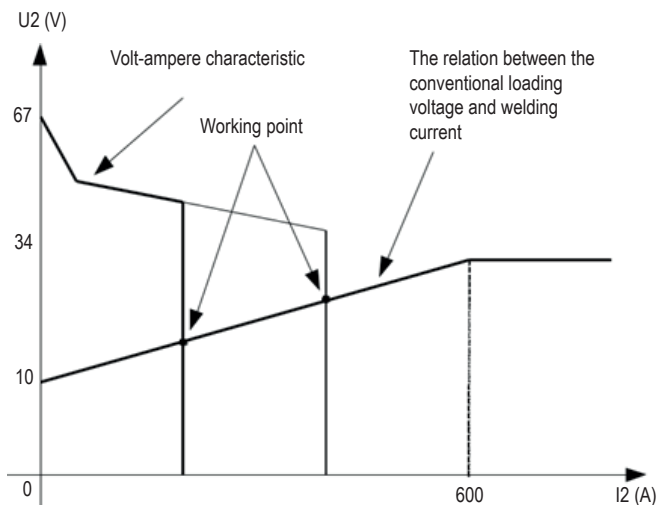
The working principle of TitanTig 200 DC PULSE welding machines is shown as the following figure. Single phases work frequency AC 220V (50 Hz) is rectified into DC (about 312V), then is converted to medium frequency AC (about 40KHz) by inverter device (IGBT), after reducing voltage by medium transformer (the main transformer) and rectifying by medium frequency rectifier (fast recovery diode), and is outputted by inductance filtering. The circuit adopts current feedback control technology to insure current output stably. Meanwhile, the welding current parameter can be adjusted continuously and steplessly to meet with the requirements of welding craft.



Volt-Ampere Characteristic

TitanTig 200 DC Pulse welding machine has an excellent volt-ampere characteristic, whose graph is shown as the following figure. The relation between the conventional rated loading voltage U_2 and the conventional welding current I_2 is as follows:

When $I_2 \leq 600A$, $U_2 = 10 + 0.04I_2(V)$; When $I_2 > 600A$, $U_2 = 34(V)$.



1.3 Technical Specifications

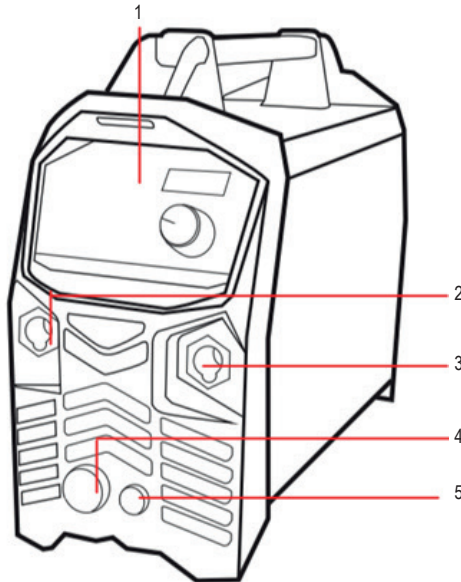
Note: The above parameters are subject to change with the improvement of machines.

Parameters	Model Tig 200 DC PULSE	
Input power	Single phase, 220V-240V, 50/60Hz	
Rated Input Power (KVA)	7.0	
ieff (Amps)	14.6	
Rated Input Current (A)	20.0	
	TIG	MMA
Rated input current (A)	34	43
Rated input power (KW)	7.8	9.6
Power factor	0.7	
Welding current range (A)	5 - 200	
No-load voltage(V)	43	
Efficiency	≥85%	
Duty cycle (40 °C, 10 minutes), see §3.2)	35% 200 A	
	60% 155 A	
	100% 120 A	
Protection class	IP21	
Insulation class	H	
Dimensions of Machine (L×W×H) (mm)	365 x 135 x 277	
Weight (Kg)	7.0	

1.4 Overview of machine

Front View

1. Control Panel
2. "+" Output terminal
3. "-" Output terminal
4. Control cable connector
5. Gas outlet



2. INSTALLATION

Unpacking

Check the packaging for any signs of damage.

Carefully remove the machine and retain the packaging until the installation is complete.

Location

The machine should be located in a suitable position and environment. Care should be taken to avoid moisture, dust, steam, oil or corrosive gases

Place on a secure level surface and ensure that there is adequate clearance around the machine to ensure natural airflow.

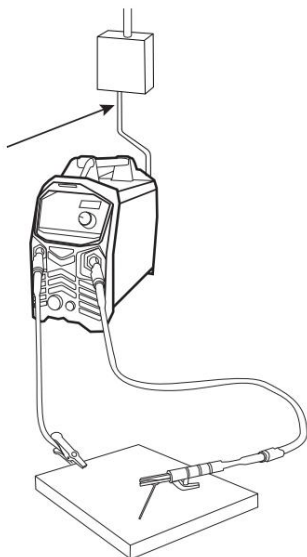


Input connection

Before connecting the machine you should ensure that the correct supply is available. Details of the machine requirements can be found on the data plate of the machine or in the technical parameters shown in the manual.

The equipment should be connected by a suitably qualified competent person. Always ensure the equipment has a proper grounding.

Never connect the machine to the mains supply with the panels removed.



Output connections

Electrode polarity

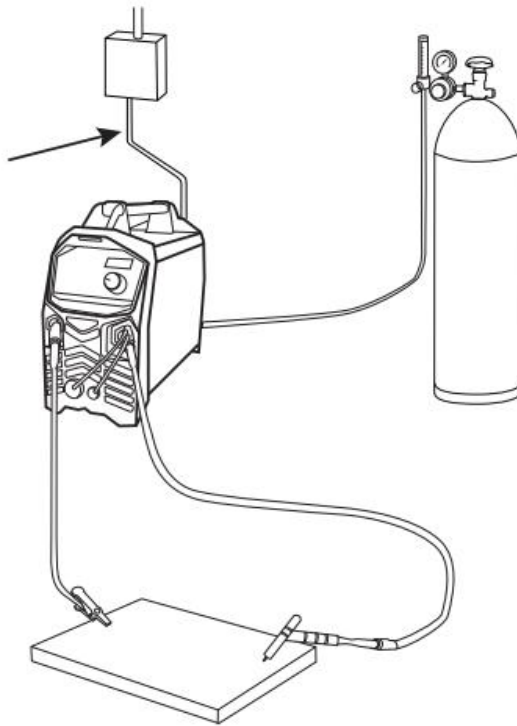
In general when using manual arc welding electrodes the electrode holder is connected the positive terminal and the work return to the negative terminal. Always consult the electrode manufacturer's data sheet if you have any doubts.

When using the machine for TIG welding the TIG torch should be connected to the negative terminal and the work return to the positive terminal.

MMA welding

Insert the cable plug with electrode holder into the "+" socket on the front panel of the welding machine, and tighten it clockwise.

Insert the cable plug of the work return lead into the "-" socket on the front panel of the welding machine, and tighten it clockwise.

TIG Welding

Insert the cable plug with the work clamp into the "+" socket on the front panel of the welding machine, and tighten it clockwise.

Insert the cables plug of the TIG torch into the "-" socket on the front panel of the machine and tighten clockwise.

Connect the gas hose to the regulator / flow meter located on the shield gas cylinder and connect the other end to the machine.

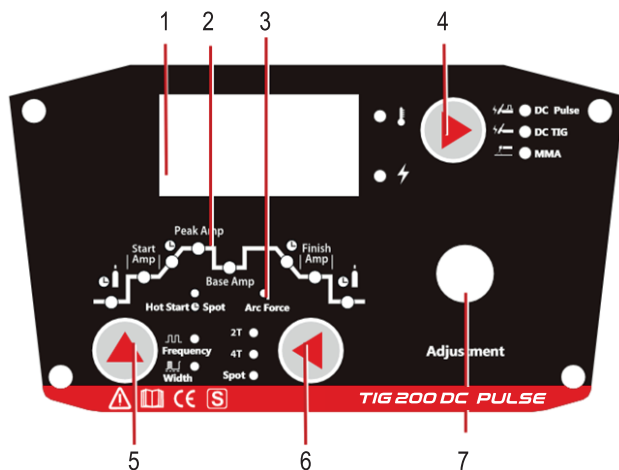
Open the valve on the TIG torch and "scratch" the electrode on the work piece to start the arc.

The control cable of torch switch consists of 2 wires, pedal control of 3 wires and the aero socket has 14 leads.

When TitanTig 200 PAC/DC welding machines are operated in HF ignition method, the ignition spark can cause interferences in equipment near the welding machine. Be sure to take specially safety precautions or shielding measures.

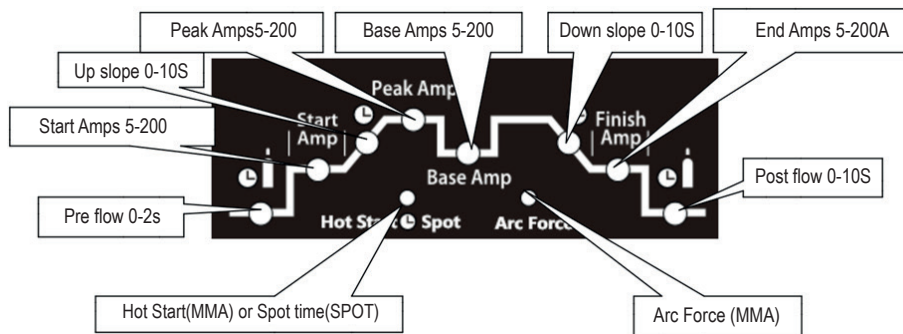
3. OPERATION

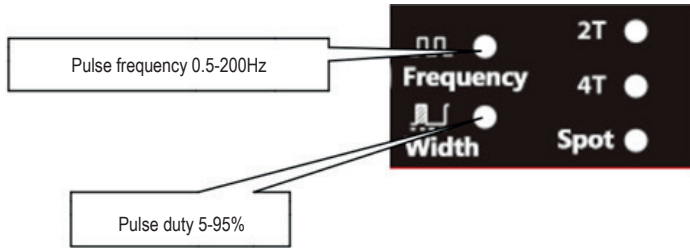
Layout of Panel



1. Voltage/ Current display
- 2) Tig parameter select
2. Hotstart/Spot time/Arc force select
3. DC TIG Pulse/DC TIG/ MMA select
4. TIG Pulse parameter select
5. Tig 2T/4T
6. Adjusting dial

Before starting any welding activity ensure that you have suitable eye protection and protective clothing. Also take the necessary steps to protect any persons within the area.





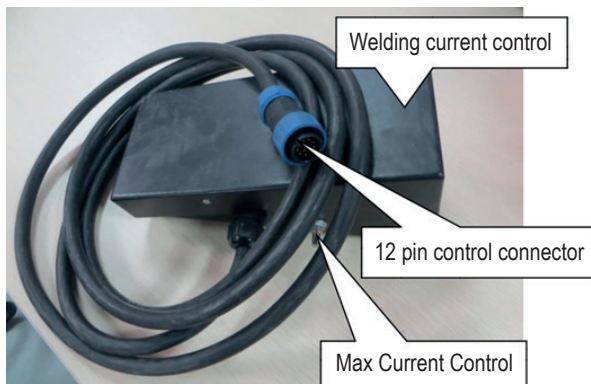
Note: The parameters may be changed after the improvement, please refer to the actual parameter on the display.

Pedal switch control (Optional only)

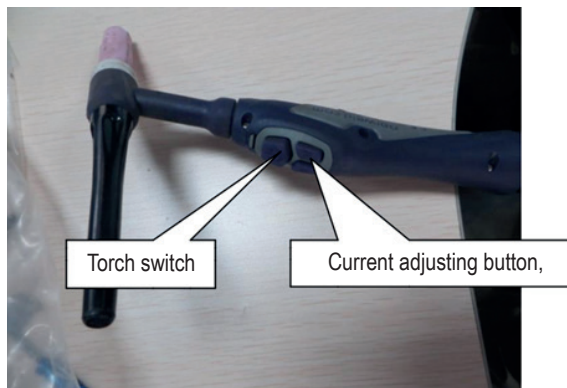
When plug the fourteen-lead aero-socket of pedal switch in it. Welder will identify the pedal switch, the welding current knob on the front panel will can't use, and only 2T can be selected.

When use the adjustment knob of max-welding current beside the pedal ,can set the max-current you want.

The eighth and ninth of the fourteen-lead aero-socket is gun switch; The first and second of the fourteen-lead aero-socket is short circuit; The third, fourth and fifth of the fourteen-lead aero-socket is pedal adjustable resistance.



Gun switch control current(Optional only)



TIG mode

Connect the TIG torch leads as detailed above. Ensure that a suitable inert gas supply is connected. Switch the power switch on the back panel to "ON"

Select the TIG welding mode using the selector switch. There is voltage output at both output terminals.

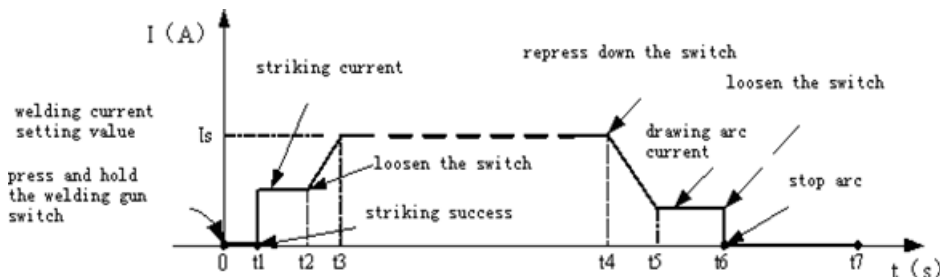
After the parameters are set appropriately, open the gas valve of the cylinder, the gas valve on the torch and adjust the gas regulator to obtain the desired flow rate.

The arc will start when the tungsten electrode touches the work piece and is lifted off after touching by between 2-4mm

The arc will cease when the electrode (torch) is moved away from the work area.

TIG welding (4T operation)

The start current and crater current can be pre-set. This function can compensate the possible crater that appears at the beginning and end of the welding. Thus, 4T is suitable for the welding of medium thickness plates.





Introduction

0: Press and hold the gun switch, Electromagnetic gas valve is turned on. The shielding gas starts to flow;

0 ~ t1: Pre-gas time (0~2S);

t1 ~ t2: Arc is ignited at t1 and then output the setting value of start current;

t2: Loosen the gun switch, the output current slopes up from the start current;

t2 ~ t3: The output current rises to the setting value (Iw or Ib), the upslope time can be adjusted;

t3 ~ t4: Welding process. During this period, the gun switch is loosen;

Note: Select the pulsed output, the base current and welding current will be outputted alternately; otherwise, output the setting value of welding current;

t4: Press the torch switch again, the welding current will drop in accordance with the selected down-slope time.

t4 ~ t5; The output current slopes down to the crater current. The downslope time can be adjusted;

t5 ~ t6; The crater current time;

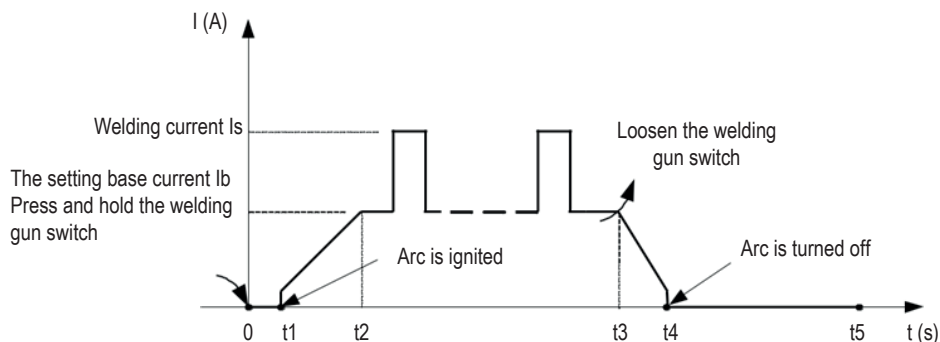
t6; Loosen the gun switch, stop arc and keep on argon flowing;

t6 ~ t7; Post-gas time can be set by the post-gas time adjustment knob on the front panel (0 ~ 10S);

t7; Electromagnetic valve is closed and stop argon flowing. Welding is finished.

TIG welding (2T operation)

This function without the adjustment of start current and crater current is suitable for the Re-tack welding, transient welding, thin plate welding and so on.



Introduction:

0: Press the gun switch and hold it. Electromagnetic gas valve is turned on. The shielding gas starts to flow.

0 ~ t_1 : Pre-gas time (0~2s)

t_1 ~ t_2 : Arc is ignited and the output current rises to the setting welding current (I_w or I_b) from the min welding current.

t_2 ~ t_3 : During the whole welding process, the gun switch is pressed and held without releasing.

Note: Select the pulsed output, the base current and welding current will be outputted alternately; otherwise, output the setting value of welding current;

t_3 : Release the gun switch, the welding current will drop in accordance with the selected down-slope time.

t_3 ~ t_4 : The current drops to the minimum welding current from the setting current (I_w or I_b), and then arc is turned off.

t_4 ~ t_5 : Post-gas time, after the arc is turned off. You can adjust it (0~10s) through turning the knob on the front panel.

t_5 : electromagnetic gas valve turned off, the shield gas stops to flow, and welding is finished.

Short circuit protect function:

1. TIG /DC/LIFT: If the tungsten electrode touches the workpiece when welding, the current will drop to 20A, which can reduce the tungsten spoilage farthestly, prolong the using life of the tungsten electrode, and prevent tungsten clipping.

2. TIG /DC/HF: If the tungsten electrode touches the workpiece when welding, the current will drop to 0 within 1s, which can reduce the tungsten spoilage farthestly, prolong the using life of the tungsten electrode, and prevent tungsten clipping.
3. MMA operation: if the electrode touches workpiece over two seconds, the welding current will drop to the 0 automatically to protect the electrode.
Prevent arc-break function: TIG operation, Avoid arc-break with special means, even if arc-break occurs the HF will keep the arc stable
4. TIG: If the TIG torch is pressed quickly, the welding current will drop a half, then if the TIG torch is pressed quickly again, the welding current will get back.

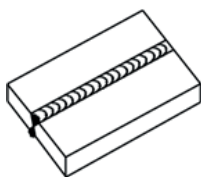
Notices:

- Check the condition of welding and connection units firstly, otherwise there will be malfunction such as ignition spark, gas leakage, out of control and so on.
- Check that whether there is enough Argon gas in the shield gas cylinder, you can test the electromagnetic gas valve through the switch on the front panel.
- Do not let the torch aim at your hand or else of your body. When you press the torch switch, the arc is ignited with a high-frequency, high-voltage spark, and the ignition spark can cause interferences in equipment.
- The flow rate is set according to the welding power used in the job. Turn the regulation screw to adjust the gas flow which is shown on the gas hose pressure meter or the gas bottle pressure meter.
- The spark ignition works better if you keep the 3mm distance from the workpiece to the tungsten electrode during the ignitionn.

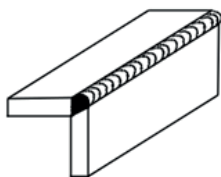
Note: When select AC output, the current and the wave form are as same as the above, but output polarity changes alternately.

Welding Parameters

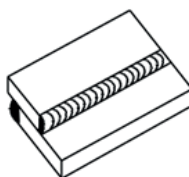
Joint forms in TIG/MMA



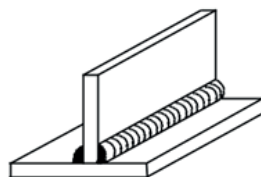
a butt joint



b lap joint



c coner joint



d T joint

The explanation of welding quality

The relation of welding area color & protect effect of stainless steel.



Welding area color	argent , golden	blue	red-grey	grey	black
Protect effect	best	better	good	bad	worst

The relation of welding area color & protect effect of Ti-alloy.

Welding area color	bright argent	orange-yellow	blue-purple	caesious	white powder of titanium oxid
Protect effect	best	better	good	bad	worst

TIG Parameters Matching

The corresponding relationship between gas nozzle diameter and electrode diameter

Gas nozzle diameter /mm	Electrode diameter /mm
6.4	0.5
8	1.0
9.5	1.6 or 2.4
11.1	3.2
Notice: the above parameters originate from (Welding Dictionary) P142, Volume 1 of Edition 2.	

Gas nozzle and the shield gas flow rate.

Welding current range/A	DC positive connection	
	Gas nozzle diameter/mm	Gas flow rate/L·min-1

10 ~ 100	4 ~ 9.5	4 ~ 5
101 ~ 150	4 ~ 9.5	4 ~ 7
151 ~ 200	6 ~ 13	6 ~ 8
201 ~ 300	8 ~ 13	8 ~ 9

Notice: the above parameters originate from (Welding Dictionary) P149, Volume 1 of Edition 2



tungsten electrode diameter /mm	sharpened of the electrode diameter/ mm	angle of cone (°)	background current/A
1.0	0.125	12	2 ~ 15
1.0	0.25	20	5 ~ 30
1.6	0.5	25	8 ~ 50
1.6	0.8	30	10 ~ 70
2.4	0.8	35	12 ~ 90
2.4	1.1	45	15 ~ 150
3.2	1.1	60	20 ~ 200

TIG of stainless steel (single run welding)

Workpiece thickness /mm	Joint form	tungsten electrode diameter/ mm	welding wire diameter/ mm	Argon gas flow rate/ L·min ⁻¹	welding current (DCEP)	Welding speed/ cm·min ⁻¹
0.8	Butt joint	1.0	1.6	5	20 ~ 50	66
1.0	Butt joint	1.6	1.6	5	50 ~ 80	56
1.5	Butt joint	1.6	1.6	7	65 ~ 105	30
1.5	Corner joint	1.6	1.6	7	75 ~ 125	25
2.4	Butt joint	1.6	2.4	7	85 ~ 125	30
2.4	Corner joint	1.6	2.4	7	95 ~ 135	25
3.2	Butt joint	1.6	2.4	7	100 ~ 135	30
3.2	Corner joint	1.6	2.4	7	115 ~ 145	25
4.8	Butt joint	2.4	3.2	8	150 ~ 225	25
4.8	Corner joint	3.2	3.2	9	175 ~ 250	20

Notice: the above parameters originate from (Welding Dictionary) P150, Volume 1 of Edition 2.

Parameters of piping back sealing welding for mild steel (DCEP)

Piping diameter rΦ/mm	Tungsten electrode diameter/ mm	Gas nozzle diameter/ mm	Welding wire diameter/ mm	Welding current/ A	Arc voltage/ V	Argon flow rate / L·min-1	Welding rate/ cm·min-1
38	2.0	8	2	75 ~ 90	11 ~ 13	6 ~ 8	4 ~ 5
42	2.0	8	2	75 ~ 95	11 ~ 13	6 ~ 8	4 ~ 5
60	2.0	8	2	75 ~ 100	11 ~ 13	7 ~ 9	4 ~ 5
76	2.5	8 ~ 10	2.5	80 ~ 105	14 ~ 16	8 ~ 10	4 ~ 5
108	2.5	8 ~ 10	2.5	90 ~ 110	14 ~ 16	9 ~ 11	5 ~ 6
133	2.5	8 ~ 10	2.5	90 ~ 115	14 ~ 16	10 ~ 12	5 ~ 6
159	2.5	8 ~ 10	2.5	95 ~ 120	14 ~ 16	11 ~ 13	5 ~ 6
219	2.5	8 ~ 10	2.5	100 ~ 120	14 ~ 16	12 ~ 14	5 ~ 6
273	2.5	8 ~ 10	2.5	110 ~ 125	14 ~ 16	12 ~ 14	5 ~ 6
325	2.5	8 ~ 10	2.5	120 ~ 140	14 ~ 16	12 ~ 14	5 ~ 6

Notice: the above parameters originate from (Welding Dictionary) P167, Volume 1 of Edition 2.

MMA-Modus

After connecting the welding leads as detailed you will need to switch the power switch on the back panel to "ON"

Select MMA by switching to the MMA welding mode. There is voltage output at both output terminals. Set the amperage on the machine suitable for the electrode being used. Ensure you check that you have the electrode polarity correct. Please see below a guide to amperages required.

Electrode Diameter (mm)	Welding Current (A)	Electrode Diameter (mm)	Welding Current (A)
1.0	20 ~ 60	3.2	108 ~ 148
1.6	40 ~ 84	4.0	140 ~ 180
2.0	60 ~ 100	5.0	180 ~ 220
2.5	80 ~ 120		

Operation Environment

- Height above sea level is below 1000 m.
- Operation temperature range: -100°C ~ +400°C.
- Relative humidity is below 90 % (200°C).



- Preferably site the machine some angles above the floor level, the maximum angle does not exceed 150.
- Protect the machine against heavy rain or in hot circumstance against direct sunshine.
- The content of dust, acid, corrosive gas in the surrounding air or substance can not exceed normal standard.
- Take care that there is sufficient ventilation during welding. There is at least 30 cm free distance between the machine and wall.

Operation Notices

- Read §1 carefully before attempting to use this equipment.
- Connect the ground wire with the machine directly, and refer to §3.5.
- In case closing the power switch, no-load voltage may be exported. Do not touch the output electrode with any part of your body.
- Before operation, no concerned people should be left. Do not watch the arc in unprotected eyes.
- Ensure good ventilation of the machine to improve duty ratio.
- Turn off the engine when the operation finished to economize energy source.
- When power switch shuts off protectively because of failure. Don't restart it until problem is resolved. Otherwise, the range of problem will be extended.

4. TROUBLE SHOOTING

In the event of a failure of the machine, contact an authorised service agent. The following operation

requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing the machine covers. Before taking your unit for servicing, check the list below.

If there are some simple troubles of TitanTig 200 PAC/DC -series welding machine, you can consult the following overhauling chart:

S/N	Troubles	Reasons	Solution
1	Turn on the power source, and fan works, but the power pilot lamp is not on.	The power light damaged or connection is not good.	Check and repair Pr7.
		The transformer of power is broken.	Repair or change the transformer.
		Control PCB failures.	Repair or change the control Pr4.



2		Turn on the power source, and the power lamp is on, but fan doesn't work.	There is something in the fan.	Clear out.
			The start capacitor of fan damaged.	Change capacitor.
			The fan motor damaged.	Change fan.
3		Turn on the power source, the power lamp is not on, and fan doesn't work	No power supply input.	Check whether there is power supply.
			The fuse inside the machine damaged.	Change it (3A).
4		The number on the display is not intact.	The LED in the display is broken.	Change the LED.
5		The max and min value displayed doesn't accord with the set value.	The max value is not accordant (refer to §3.1).	Adjust potentiometer Imin on the powerboard.
			DThe min value is not accordant (refer to §3.1).	Adjust potentiometer Imax in the current meter.
6		No no-load voltage output (MMA).	The machine is damaged.	Check the main circuit and the Pr4.
7	Arc can not be ignited (TIG).	There is spark on the HF igniting board.	The welding cable is not connected with the two output of the welder.	Connect the welding cable to the welder's output.
			The welding cable damaged.	Repair or change it.
			The earth cable connected unstably.	Check the earth cable.
			The welding cable is too long.	Use an appropriate welding cable.
			There is oil or dust on the workpiece.	Check and remove it.
			The distance between tungsten electrode and workpiece is too long.	Reduce the distance (about 3 mm).
		There is not spark on the HF igniting board.	The HF igniting board does not work	Repair or change Pr8.
			The distance between the discharger is too short.	Adjust this distance (about 0.7 mm).
			The malfunction of the welding gun switch.	Check the welding gun switch, control cable and aero socket.



S/N	Troubles	Reasons	Solution
8	No gas flow (TIG).	Gas cylinder is close or gas pressure is low.	Open or change the gas cylinder.
		Something in the valve.	Remove it.
		Electromagnetic valve is damaged.	Change it.
9	Gas always flows	The gas-test on the front panel is on.	The gas-test on the front panel is off.
		Something in the valve.	Remove it.
		Electromagnetic valve is damaged.	Change it.
		The adjustment knob of pre-gas time on the front panel is damaged.	Repair or change it.
10	The welding current can not be adjusted.	The welding current potentiometer on the front panel connection is not good or damaged.	Repair or change the potentiometer.
11	No AC output while selecting "AC"	The power PCB is in trouble.	Repair or change it.
		The AC drive PCB damaged.	Change it.
		The AC IGBT module damaged.	Change it.
12	The welding current displayed isn't accordant with the actual value.	The min value displayed isn't accordant with the actual value. (Please refer to §3.1)	Adjust potentiometer Imin on the power board.
		The max value displayed isn't accordant with the actual value. (Please refer to §3.1)	Adjust potentiometer Imax on the power board.
13	The penetration of molten pool is not enough.	The welding current is adjusted too low.	Increase the welding current.
		The arc is too long in the welding process.	Use 2T operation.



S/N		Troubles	Reasons	Solution
14	The alarm lamp on the front panel is on	Over heat protection	Two much welding current	Reduce the welding current output
			Working time too long	Reduce the duty cycle (work intermittently)
		Over-voltage protection	Power supply fluctuates	Using the stable power supply
		Low-voltage protection	Power supply fluctuates	Using the stable power supply
			Too many machines using power supply in the same time	Reduce the machines using power supply in the same time
		Over-current protection	Unusual current in the main circuit	Check and repair the main circuit and drive Pr6



5. MAINTENANCE

The utilisation level of the power source and its working environment should be taken into consideration in planning the frequency of maintenance of the machine. Appropriate use and preventive maintenance guarantee the trouble-free use of the equipment. This allows you to avoid interruptions in use and increases the productivity of the machine.

5.1 Cables

Check the condition of welding and mains cables daily. Do not use damaged cables. Also make sure that all extension cables used in the mains connection are in proper condition and compliant with regulations.

NOTE! The mains cables may be repaired and installed only by electrical contractors and installers authorised to perform such operations.

5.2 Power source

Before cleaning the interior of the machine, you need to remove the case by unscrewing the mounting screws at the top and sides of the machine.

NOTE! To prevent damage, wait approximately two minutes after disconnecting the mains cable before removing the machine's case. Perform the following cleaning and maintenance at least every six months:

1. Clean the interior of the machine and the fan grill's net of any dust and stains – for example, with a soft brush and vacuum cleaner.
 - Do not use pressurised air. The stain may become compressed into the grooves of the coolers.
 - Do not use a pressure-washing device.
2. Check the electrical connections of the machine. Clean any oxidised connections, and tighten the loosened ones.
 - Check for the right tension before you start repairing the connections.

NOTE! Remember that the machine may be repaired only by an electrical contractor or installer authorised to perform such operations.

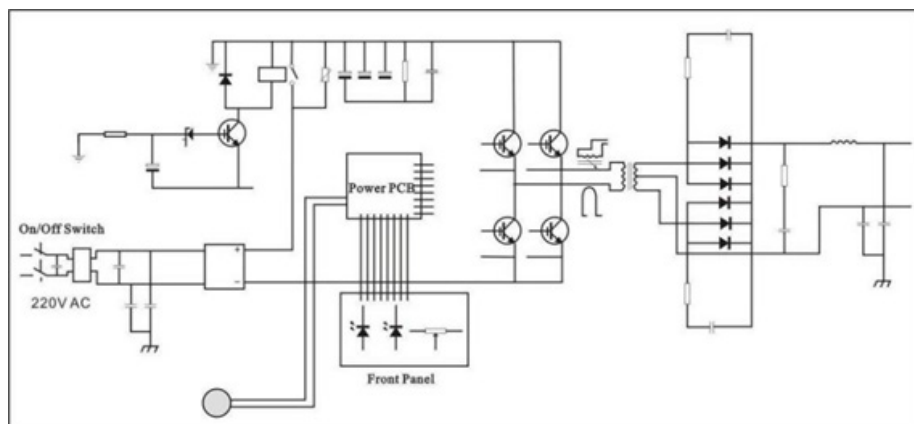
5.3 Regular maintenance

Authorised service agents perform regular maintenance by agreement. Tasks included in regular maintenance:

- Cleaning of equipment.
- Inspection and maintenance of the welding gun.
- Checking of connectors, switches, and control knobs.
- Checking of electrical connections.

- Checking of the mains cable and plug.
- Replacement of damaged or worn parts.
- Calibration testing, with adjustment of the functions and operational values of the machine, if necessary.

Electrical principle diagram







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