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TIG 210EXT DIGITAL TIG WELDER

OPERATION INSTRUCTIONS

CE

Version 2014-1

Thank you for selecting the R-Tech TIG 210EXT Digital Inverter AC/DC Tig Welder.

The POWER TIG 210EXT Digital has many benefits over traditional TIG welders, including 9 memory stores, advanced AC waveforms, pulse welding, slope up/down, remote foot option and an industrial 60% duty cycle.

We want you to take pride in operating our TIG 210EXT Digital as much pride as we have taken in making this product for you. Please read all information in this manual before operation

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt from the courier. Consequently all claims for material damaged in shipment must be made by purchaser against the transportation company used.

Please record your equipment identification below for future reference. This information can be found on data plate at rear of machine.

Product TIG 210EXT DIGITAL

Serial No. _____

Date of Purchase _____

Where Purchased _____

Whenever you request replacement parts or information on this equipment please always supply information you have recorded above

This product is covered by our 2 year collect and return UK warranty, External items, torch, earth lead etc are covered by 3 months warranty. Any faults/damage found caused by customer will be charged pro-rata.

Pay particular attention to the safety instructions we have provided you for your protection

The level of seriousness to be applied to each section is explained below

WARNING 

This statement appears where the information must be followed exactly to avoid serious personal injury.

CAUTION

This statement appears where the information must be following to avoid a minor personal injury or damage to this equipment.

Introduction

The R-Tech TIG210EXT Digital is a member of our field acclaimed family of welding products. Premium features include:-

1. Inverter power source – more efficient to operate, provides smoother weld characteristics.
2. Full Featured Pulse welding in AC & DC Tig welding modes
3. HF Arc start – Easy arc striking and prolonged tungsten life
4. Slope up / slope down
5. Remote foot pedal option
6. Digital control panel with 9 memory store function.
7. Industrial 60% Duty cycle at 210 Amps @ 40C
8. Easy setup mode for automatic setting of parameters.

Recommended Processes

The R-Tech TIG 210EXT Digital is recommended for the Tig welding processes within its output capacity of 210 Amps

Equipment Limitations

The R-Tech TIG 210EXT Digital is protected from overloads beyond the output ratings and duty cycle as per machine specifications with thermostat protection of the output coils and rectifiers.

Welding Capability – Duty Cycle

The R-Tech TIG 210EXT Digital is rated at 210 Amps at 60% duty cycle on a ten minute basis. If the duty cycle is exceeded a thermal protector will shut machine off until the machine cools.

Technical Specifications

Model No.	TIG 210EXT DIGITAL	
Input	240V AC 50/60Hz PFC	Input Amperage TIG 16A MMA 23A
MMA	No-load Voltage	70v
	Current Range	20A – 160A
	Rated Output Current	160A @ 35%, 130A @ 100%
	Arc Force Control	0 - 100%
	Hot Start	0 - 2 seconds
	Hot Start Amps %	0 -100%
	VRD Safety Function	Yes
TIG	No-load Voltage	70v
	Current Range	5A – 210A DC Mode, 10A - 210A AC Mode
	Rated Output Current	210A
	Duty Cycle Tig	60% @210A
	Up-Slope Time	0-25 Seconds
	Down-Slope Time	0-25 Seconds
	Pulse Frequency Range	0.1 - 500 Hz DC 0.1 - 250 Hz AC Advanced Squarewave 0.1 - 10 Soft Square, Triangular & Sinewave
	Pulse Width Range	3 - 100%

	Pulse Amperage Range	5 - 95%
	Gas Post Flow Time	0 - 50 Seconds
	Gas Pre Flow Time	0 - 25 Seconds
	Arc Starting Mode	High Frequency
	AC Waveforms	Advanced Squarewave Soft Squarewave Triangular Sine Wave
	AC Balance Control	5 - 90% of Electrode Positive
	AC Easy Start Parameters	AC Frequency 120Hz AC Balance 25% Pre flow Gas .5 seconds Post Flow Gas 4 seconds Main Amps 120A Start/End Amps 50A Upslope 1 seconds Downslope 3 seconds
	DC Easy Start Parameters	Pre flow Gas .5 seconds Post Flow Gas 4 seconds Main Amps 90A Start/End Amps 50A Upslope 1 seconds Downslope 3 seconds
	Gross Weight	24 KG
	Insulation	IP21S
	Dimensions mm	438H x 232W x 550L (mm)

Safety Precautions

Read entire section before starting installation

WARNING! 

Electric Shock can kill – Only qualified personnel should perform this installation. Turn off input power at the fuse box before working on this equipment. Do not touch electrically live parts. Always connect the machine to an earthed mains supply as per national recommended standards.

Select suitable location

Place the welder where clean cooling air can freely circulate in and out of the front & rear louver vents. Dirt, dust or any foreign material that can be drawn through vents into welder must be kept to a minimum. Failure to observe these precautions can result in excessive operating temperatures which can lead to plant failure.

Grinding

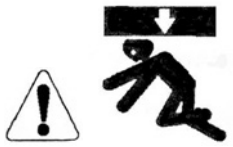
Do not direct grinding particles towards the welder. An abundance of conductive material can cause plant failure.

Stacking

This machine cannot be stacked.

Transport – Unloading

Never underestimate the weight of equipment, never move or leave suspended in the air above people. Use recommended lifting equipment at all times.



WARNING!
Falling Equipment can cause injury. Never lift welder with gas bottle attached. Never lift above personnel.

Tilting

Machine must be placed on a secure level surface or on a recommended undercarriage/trolley. This machine may topple over if this procedure is not followed.

Environmental Rating

The welding power source carries the IP21S rating. It may be used in normal industrial and commercial environments. Avoid using in areas where water / rain is around.

Read and follow the 'Electric Shock Warnings' in the safety section if welding must be performed under electrically hazardous conditions such as welding in wet areas or water on the work piece.

Electrical Installation

WARNING!

ELECTRIC SHOCK CAN KILL

Machine grounding and High Frequency Interference Protection

This welder must be grounded to earth. See national electrical codes fro proper grounding methods.

The high frequency generator being similar to a radio transmitter may cause interference to radio, TV and other electronic equipment. These problems may be the result of radiated interference. Proper grounding methods can reduce or eliminate this.

Radiated interference can develop in the following ways

1. Direct interference from welder power source

2. Direct interference from the welding leads

3. Direct interference radiated from feedback into power lines

4. Interference from re-radiation by un-grounded metallic objects.

Keeping these contributing factors in mind, installing equipment as per following instructions should minimize problems.

1. Keep the welder input power lines as short as possible and enclose as much of them as possible in metal conduit or equivalent shielding. There should be a good electrical contact between this conduit and ground (Earth).

2. Keep the work and electrode leads as short as possible. Tape the leads together where practical.

3. Be sure the torch and earth leads rubber coverings are free from cuts and cracks that allow welding power leakage

4. Keep earth lead connection to work in good condition – Clean area on workbench where earth clamp is situated on a regular basis.

Input Connections

Make sure the voltage, phase and frequency of input power is as specified on machine rating plate located at rear of machine.

Have a qualified electrician provide suitable input power as per national electrical codes. Make sure machine is earthed / grounded.

Make sure fuse or circuit breaker is correct rating for machine. Using fuses or circuit breakers smaller than recommended will result in 'nuisance' shut off from welder inrush currents even if welding at low amperages.

Failure to follow these instructions can cause immediate failure within the welder and void machines warranty.

Turn the input power OFF at the mains switch & fuse box before working on this equipment.

Have a qualified electrician install & service this equipment.

Allow machine to sit for 5 minutes minimum to allow the power capacitors to discharge before working inside this equipment. Do not touch electrically live parts

The TIG 210EXT DIGITAL Inverter Tig Welder requires a 240V 50/60Hz supply. It requires a 16A supply for Tig operation and 23A for MMA welding. It comes with a 2.5 metre mains cable attached.

Connect wires according to national coding.

Brown wire – Live
Blue wire – Neutral
Green/Yellow Wire – Earth (Ground)

Connecting to a mains electrical supply

THIS MACHINE IS OF AN INDUSTRIAL SPECIFICATION AND MUST BE FITTED TO A MINIMUM of 23AMP 240V MAINS INPUT

Connecting to an Engine Driven Generator

If connecting this machine to an engine driven generator please ensure the following

Minimum Generator KVA Output – 7.0 KVA continuous

Generator to be fitted with AVR (automatic voltage regulation)

DO NOT USE ON A GENERATOR WITHOUT AVR

Connecting to a generator without the above minimum requirements will invalidate your warranty.

Connections for TIG 210EXT Digital

Rear machine connections

Fig 1

1. **On/Off Switch**

2. **240V AC Auxiliary output**

   Connect water cooler to socket, when machine is turned on by on/switch it will then output power from aux socket.

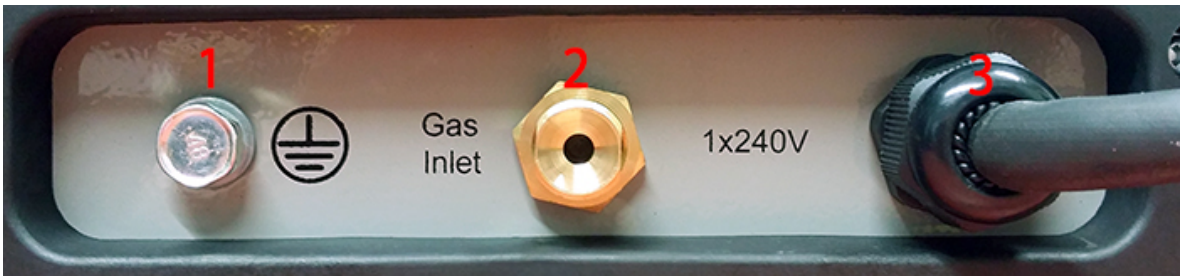


Fig1.1

1. **Main chassis earth bolt**

   If you experience interference you can fit extra earth to this point (Not normally used)

2. **Gas Input connector**

   Connect input gas hose ensuring connection is tight - 34/8 BSP thread

3. **Mains input cable**

   Fit required plug as per your electrical installation

Connections for TIG (GTAW) Welding

Fig 2

1. **Negative power connector -**

   Connect Tig Torch Dinze to power connector by inserting and twisting until tight

   ENSURE TIG TORCH IS FITTED TO NEGATIVE CONNECTOR OTHERWISE YOU WILL EXPERIENCE TUNGSTEN BURNBACK

2. **Gas outlet - Quick release type**

   Connect the torch gas hose

3. **Positive power connector +**

   Connect the earth lead to by inserting and twisting until tight and the earth clamp to work/bench

4. **Torch control socket 7-Pin**

   Connect torch control plug

To avoid a High Frequency shock keep the Tig torch in good condition and replace if any of the insulation is damaged.

Connect the gas input hose to gas regulator and use ‘Pure Argon’ Gas, available from local suppliers. Set gas flow/pressure to 8-12 LPM. Make sure gas bottle is secured to avoid injury.

Remote Foot Pedal connection.

Disconnect Tig Torch switch plug from torch control socket (Fig2.4) and connect plug from foot pedal.

Connections for STICK MMA (SMAW) Welding

Fig 3

1. **Negative power connector -**

   Connect the earth lead to by inserting and twisting until tight and the earth clamp to work/bench.

2. Not used for MMA welding

3. **Positive power connector +**

   Connect the electrode holder by inserting and twisting until tight

4. Not used for MMA welding

Controls and Settings

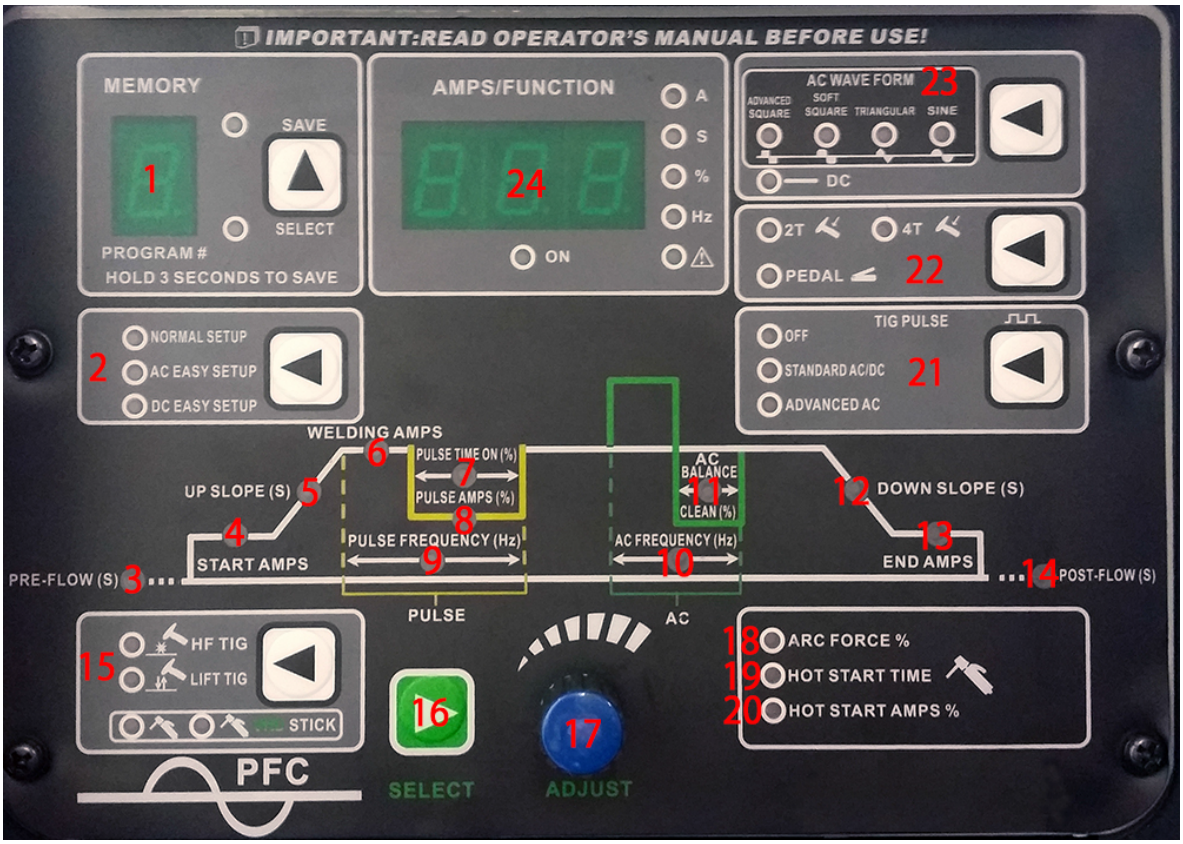


Fig 4

1. **Memory store function**

   There are 9 memory store programs to enable you to select required parameters for job in hand and then store to select channel.

   Press memory button until required program you wish to store is showing in LED

   Then enter parameters as required, now press and hold save button for 3 seconds and release, the green save LED will now light for about 2 seconds and then go out.

   The parameters have now been stored.

   The red select LED will then come back on, if you make any more adjustments these will not be save until you save again

2. **Normal / Easy start setup**

   This machine features two easy startup modes, one for AC and one for DC. They have pre-programmed settings that are generally useable for most situations and many parameters will be blocked out, however you can still adjust amperage etc. In normal mode ALL functions can be programmed.

3. Pre-flow gas

Adjustable from 0 - 25 seconds, this enables the backed up gas pressure to be released from torch before actual arc is started. Common settings for most application is about .3 to .5 seconds - If welding stainless steel etc sometimes a longer pre-flow is required.

4. **Start Amperage**

This allows you to set the initial start current from 5A DC and 10A AC. In 4T mode when trigger is pressed and held you will remain at start amps, when you let go machine will then go to main set amps.

Do not set the start amperage too low for tungsten size otherwise you may experience sluggish / non arc starting. I.E A 3.2mm tungsten is for high range 160+ amps welding, so you would not need to set start amps at 5. The thicker the tungsten used the higher the start amperage has to be. We recommend to achieve faster arc starting:-

1.0mm Tungsten - 5 Amps minimum
1.6mm Tungsten - 15-20 Amps minimum
2.4mm Tungsten - 40 Amps minimum
3.2mm Tungsten - 60 Amps minimum

Note: **Start amps is used when using foot pedal as well, so ensure this is set to above guide.**

5. **Up-Slope**

Adjustable from 0 - 25 seconds, This allows you to gradually increase the amperage from start amps to main amps when using torch trigger operation.

When using foot pedal ensure up-slope is set to 0 or you may experience sluggish arc starting.

6. **Main current control**

This adjusts the main welding current and is shown in L.E.D (Fig 4.24) when welding is in process.

Welding range AC is 10A to 210A
Welding range DC is 5A to 210A

7. **Pulse width adjustment (pulse on time)**

When pulse welding you have the main (peak) amperage and base (background) amperage set. By adjusting the width you determine which will be more prominent, the pulse or the base. This is adjustable from 5-95%. At a low % the base current will be on long so you will reduce heat input. At a high % the pulse current will be more prominent so you will get increased heat input..

8. Pulse amps %

This sets the base amperage as a % of main amps set.

I.E if mains amperage is 120A and you set to 50%, base amps will be 60A

You can use the remote foot pedal and as you depress the pedal and raise the main

amperage the base amperage will adjust to pulse amps %.

9. **Pulse frequency adjustment**

   This can be adjusted as follows:

   DC Mode 0.1 to 500Hz
   AC Advanced Squarewave 0.1 - 250Hz
   AC Soft Square, Triangular and Sinewave 0.1 - 10Hz
   Advanced AC Pulse 0.1 - 10Hz

10. **AC Frequency**

    Transformer based welders are normally fixed at 60Hz, due to the advanced inverter technology you can adjust from 20 - 250Hz.

    The higher the AC frequency the narrower the arc becomes allowing you to have a more precise weld bead and penetration. This can also quicken up travel speed and ideal for production welding.

    You will hear the pitch of the weld noise get higher, this is normal.

    Welding at lower frequency will give reduced control of arc and a wider weld pool.

11. **AC Balance**

    This sets the % of electrode positive used during AC welding to provide a cleaning action as alloys have a oxide layer that has a higher melting temperature than the base metal and this needs to be lifted off.

    So you can control the amount of cleaning or penetration.

    Too much cleaning will cause the tungsten to wobble and split, Too little cleaning can result in a dirty dull weld.

    So as you increase the % the more cleaning will happen however less penetration will be achieved.

    For most situations a setting of 30 - 40% will give you a good clean weld finish, If you go above 50% you will find the tungsten will overheat and the end can fall of into weld pool.

    If you find you are getting tungsten wobble using 30-40% balance then you may need to go up a tungsten size.

12. **Down-Slope**

    Adjustable from 0 - 25 seconds, This allows you to gradually decrease the amperage from main amps to end/final amps when using torch trigger operation.

    When using foot pedal ensure down-slope is set to 0

13. **End Amperage**

    This allows you to set the end current from 5A DC and 10A AC. In 4T mode when trigger is pressed and held the second time you will remain at end amps, when you let go machine will then stop welding.

Note: **When using foot pedal ensure this is set to minimum unless you want to have a HOT burst at end of weld.**

14. **Post Flow Gas**

    Adjustable from 0 - 50 seconds. When you stop welding the gas will continue to flow for this set amount of time, this allows the tungsten to cool without getting contaminated and also protect the weld bead until it has cooled slightly.
    For up to 100 amps use about 8 seconds, for 100 - 150 use 12 seconds and 150-210 use 15 seconds.

15. **Process selector**

    Options are:-

    HF Tig - For automatic arc starting (normal setting for AC & DC Tig Welding)

    Lift Tig - If welding near sensitive electronic devices (car ECU etc) DC Only

    Stick - NON VRD - Normal 70v OCV is present before welding happens

    Stick - VRD (Voltage reduction device).

    The OCV is reduced to below 20V (+/- 3v) for added safety. Once the electrode touches workpiece the arc is established and weld carries on as normal. However when using VRD sometimes it can be harder to strike the arc and you may need to scratch the electrode on work a bit more, even more so with rusty / dirty metals.

    When welding with VRD you may notice a slight delay in the initial striking, this is normal.

16. **Parameter selector**

    Press this button to scroll left to right through the machine parameters

17. **Parameter adjuster**

    Turn this knob to adjust parameter values, if you hold the knob in and turn it increase adjustment speed.

18. **MMA Arc Force control**

    This controls the arc response to when electrode is held close/away from workpiece. Arc force automatically adjusts by changing the volts / amps to maintain a stable arc.

    This is represented as a % of available arc force amperage

19. **MMA Hot Start time**

    Adjusts the time from 0 - 2 seconds that the hot start will happen at beginning of weld. This helps to reduce electrode sticking to work.

20. **MMA Hot Amps %**

    For controlling the amount of extra amps when the arc is first started and prevents the electrode sticking to work. Adjustable from 0 - 100% of hot start amps available.

21. **Tig Pulse mode selector**

This machine has two pulse modes.

Standard pulse works in both AC and DC modes

Advanced AC pulse works only in AC mode

Pulse is used to help control the amount of heat going into workpiece and commonly used on stainless steels and alloys.

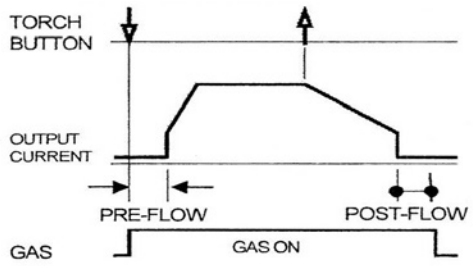
It standard mode AC, both the pulse peak and base amperage are AC
In standard mode DC, both the pulse and base amperage are DC

In advanced AC pulse mode, the machine pulses between AC and DC- and is ideal to control the heat input on thin alloys.

22. **2T/4T, remote foot pedal and torch amp control selector**

2/4 Step trigger mode switch – Tig welding can either be done in 2 or 4 step mode.

When the trigger mode is in the 2 step position the following sequence will occur



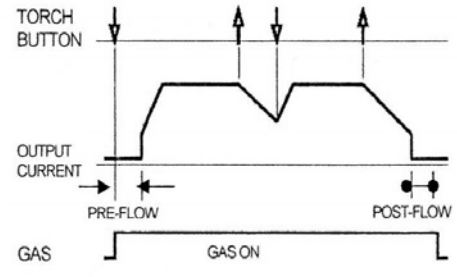
Press and hold the Tig torch switch to start sequence.

The machine will open gas valve to start flow of shield gas, after the set pre-flow time to purge air from torch hose the welding output of machine will be turned on and the arc will be started. After the arc is started the output current will increase from the start (min) current to base (main) current in time selected by slope-up.

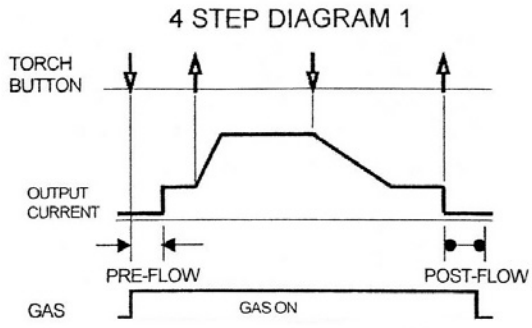
Release the Tig torch switch to end sequence.

The machine will now decrease output to finish (min) current in time set by slope-down, once at finish (min) current the machine will stop output and the gas valve will continue to operate for the selected time (post flow)

Possible variations of this standard sequence are shown in diagram below. It is possible to press and hold Tig torch switch a second time during down slope time to restart. After the switch is pressed the output current will raise to base (main) current



When the trigger mode is in the 4 step position the following sequence will occur



Press and hold the Tig torch switch to start sequence.

The machine will open gas valve to start flow of shield gas, after preset gas pre-flow time to flow time to purge air from torch hose the welding output of machine will be turned on and the arc will be started at start (min) current

This condition can be maintained as long as required.

Release the Tig torch switch to go to step 2, the machine will now increase output to peak (main) current in time set by slope-up.

Press and hold the Tig torch switch when main weld is complete

The machine will now decrease the welding output current to finish (min) in down-slope time set. Once at finish (min) output you can release the Tig torch switch to end weld the gas post-flow will continue to run for set time.

Foot pedal operation

When using a foot pedal you can adjust the amperage while you are welding by pressing the pedal, the more you press the more amps you will achieve.

The foot pedal at maximum depression will go to the amperage set in LED before welding.

I.E set the welding amps to 120A and when pedal is fully depressed you will achieve 120Amps.

Foot pedal can't be used with 4T operation, ensure 2T operation is set.

Remote amperage torch

When using a remote amperage torch you can adjust the amperage while you are welding

by using your thumb to adjust knob on torch handle.

This does take some getting used to but is handy when you are welding in a position where a foot pedal is not use-able.

You can use a remote amperage torch in 2T or 4T mode, most common is 4T as you press trigger to start weld and then release you can then use thumb/finger for torch switch to adjust amperage knob, once weld has finished press the torch switch again to finish weld.

23. **AC Waveform / DC selector**

The TIG210EXT features AC and DC operation, it also has 4 x AC waveforms allowing very specialised welding to be carried out.

Advanced Squarewave is the default mode and offers excellent arc control.

Soft square and Sinewave are similar to older transformer style welders.

Soft square gives a smooth buttery feel and maintains good control of the arc

Sinewave gives a softer arc with less control.

Triangular wave is designed for rapid wet in and high travel speed and a rapid freeze of weld puddle.

24. **LED Data indicator**

This single display shows the data always accompanied by a corresponding LED light which indicates what value is being represented.

Amps
Seconds
Percent %
Hertz
Warning
On

This also includes a self diagnosing function which shows an error code if case of machine problem..

Operating machine

SAFETY PRECAUTIONS

WARNING! 

ELECTRIC SHOCK CAN KILL

Do not touch electrically live parts or electrode with skin or wet clothing.
Insulate yourself from work and ground
Always wear dry insulating gloves

WARNING! 

FUMES AND GASES can be dangerous

Keep your head out of fumes & gases produced from welding.
Use ventilation or exhaust to remove fumes & gases from breathing zone and general area.

WARNING! 

WELDING SPARKS can cause fire or explosion

Keep flammable material away from work area.
Do not weld on containers that have held combustibles

WARNING! 

ARC RAYS can burn

Wear eye, ear and body protection – Make sure work area is protected by proper shielding to avoid injury to passers by.

Welding in TIG mode – No Pulse – No remote foot pedal

1. Connect the Tig Torch to machine, connect earth lead to machine & work piece.
2. Set to Tig mode pulse off (Fig 4.21)
3. Select 2 or 4 way torch operation (Fig 4.22)
4. Connect Argon gas and set flow to approx 8-12 LPM
5. Set Gas post flow to 3 x diameter of tungsten width (Fig 4.14)
6. Adjust welding amps to desired welding current
7. Press the Tig torch switch to start welding and release to finish

Welding in TIG mode –with Pulse – No remote foot pedal

1. Connect the Tig Torch to machine, connect earth lead to machine & work piece.
2. Set to Tig mode pulse on (Fig 4.21)
3. Select 2 or 4 way torch operation (Fig 4.22)
4. Connect Argon gas and set flow to approx 8-12 LPM
5. Set Gas post flow to 3 x diameter of tungsten width
6. Adjust Pulse freq. to desired setting (how often pulse happens) (Fig 4.9)
7. Adjust base amperage % (Fig 4.8)
8. Adjust pulse width to desired setting (how long pulse happens) (Fig 4.7)
9. Adjust main current for maximum welding current (Fig 4.6)
10. Press the Tig torch switch to start welding

The benefits of pulse welding is the ability to control the weld pool and amount of heat absorbed by work resulting in a smaller heat affected zone which results in fewer deformations and reduced chance of cracking. There are no set rules for pulse welding as this is down to personal choice by the welder.

Welding in TIG mode – with Remote foot pedal

1. Connect the Tig Torch to machine, connect earth lead to machine & work piece.
2. Connect remote foot pedal to machine
3. Set to Tig mode pulse off or Tig mode pulse on (Fig4.21)
   In welding with pulse in foot pedal, the foot pedal controls peak main welding amperage

4. Select 2 way torch operation – (Fig 4.22) Foot pedal will not work in 4-WAY mode
5. Connect Argon gas and set flow to approx 8-12 LPM
6. Set Gas post flow to 3 x diameter of tungsten width
7. Adjust peak current knob on machine to desired maximum welding current that foot pedal will go to.
8. Press the foot pedal to start welding. (on maximum depression it will go to maximum amps set on machine)

Note: When welding with remote foot pedal

Upon pressing of foot pedal welding arc will start, if you find it hard to start arc push pedal down a bit further to aid starting.

The benefits of a remote foot pedal is greater control of amount of heat going into work. Press pedal fully to start weld, upon weld pool formation you can release the pedal to decrease amperage to sustain perfect weld pool and increase again as required to sustain weld characteristics.

The foot pedal adjusts from Start (min) current to maximum current as set on main current knob on front of machine.

Welding in TIG mode – with Remote amperage torch

1. Connect the Tig Torch to machine, connect earth lead to machine & work piece.
2. Set to Tig mode pulse off or Tig mode pulse on (Fig4.21)
   In welding with pulse in remote torch, the foot pedal controls peak main welding amperage

3. Select 2T or 4T torch operation – (Fig 4.22) - Ensure the PEDAL (remote) led is illuminated.
4. Connect Argon gas and set flow to approx 8-12 LPM
5. Set Gas post flow to 3 x diameter of tungsten width
6. Adjust welding amps knob on machine to desired maximum welding current that remote torch will go to.
7. Press the torch switch to start welding. (on maximum it will go to maximum amps set on machine)

Tig tungsten size / amperage guide

All values below are based on using pure argon shielding gas. Other current values may be employed depending on the shielding gas and application

ELECTRODE RATINGS			
Electrode Diameter (mm)	**2% Thoriated on DC (amps) Red Tip – Grind to point**	**Pure Tungsten on DC (amps)**	**Zirconiated 0.8% Tungsten on AC (amps) White Tip – No need to grind**
1.0mm / 0.040”	5 - 80	30	20 - 60
1.6mm / 1/16”	40- 150	80	40 - 100
2.4 mm/ 3/32”	140 - 250	130	80 - 180
3.2mm / 1/8”	240 - 400	180	160 - 250
4.0mm / 5/32”	380- 500	240	220 - 320
4.8mm / 3/16”	500- 750	300	280 - 390
6.4mm / 1/4”	750 - 1000	400	360 - 525

Welding in STICK MMA (SMAW) Mode

1. Fit MMA electrode holder to + terminal on machine (Fig 3.3)
2. Fit earth lead to - terminal on machine and to work piece (Fig 3.1)
3. Select stick on front panel (Fig 4.15)
4. Place electrode in holder
5. Select desired welding current (Fig 4.24) with selector knob (Fig4.17)
6. Select desired MMA options, Arc Force, Hot start time and Amps (Fig 4.18-20)
7. Strike arc and weld

WARNING! 

ELECTRIC SHOCK CAN KILL

When machine is switched to MMA mode, output terminals are always live, take care and do not touch electrode and earth by person at same time, otherwise electric shock will occur.

The foot pedal has no affect on welding current in MMA mode and the gas flow and high frequency starting circuit is disabled.

Maintenance

Routine and periodic maintenance

WARNING! 

ELECTRIC SHOCK CAN KILL

Turn the input power OFF at the mains switch & fuse box before working on this equipment.

Have a qualified electrician install & service this equipment.

Allow machine to sit for 5 minutes minimum to allow the power capacitors to discharge before working inside this equipment.

Do not touch electrically live parts

1. Periodically remove the side/top panels of machine and clean out machine with a low pressure dry air line paying particular attention to PC Boards, Fan blades, HF points
2. Inspect input and output cables & hoses for fraying, cuts & bare spots
3. Keep tig torch and cables in good condition
4. Clean air vents to ensure proper air flow and cooling
5. The fan motor has sealed bearings which requires no maintenance

Troubleshooting

Service & repair should only be performed by R-Tech welding trained personnel. Unauthorised repairs performed on this welding equipment may result in danger or injury to the technician and machine operator and will invalidate your warranty.

For your safety and to avoid electric shock, please observe all safety notes and precautions detailed throughout this manual

The troubleshooting guide is provided to help you locate possible machine malfunctions

If fault / problem is not listed below check our Tig Welder Support page on our website

www.r-techwelding.co.uk/support.php

or contact R-Tech by phone. Contact details can be found on front of this manual and our website

Tig welding problems

- **No output - Power light is not lit**

  Check machine on/off switch is in the 'on' position
  Check Input power to machine
  Check plug wiring
  Check mains trip / fuses

- **No output - Fan runs - Power light is lit**

  Check torch connections are secure and torch switch operation, try replacing tig torch.

  If you have a multi-meter check continuity between pins 1 and 2 on torch switch plug when pressing torch switch

- **No output - Power light is lit - Warning light is lit**

  Welding application may have exceeded recommended duty cycle, allow machine to cool down until the warning light goes out.

- **No output – Power light is lit – Gas at torch end when trigger pressed**

  Check torch condition – possible break in torch power cable – replace torch

- **Machine keeps overheating - Warning light is lit on machine**

  Check if fan is running – if not contact R-Tech for repair

  Check the cooling vents for obstruction, blow out machine with clean dry low pressure air supply. Check for adequate ventilation around machine

- **Porosity in weld – No / low gas at torch tip**

  Check gas supply from gas bottle

  Check flow rate on regulator

  Check gas hose for restrictions

  Check for draughts in local area, open doors etc

  Replace tig torch – may have gas restriction

- **Poor weld penetration**

  Check condition of earth lead and clamp and ensure clamp is connection via a clean area on work piece

  Check condition of tig torch, try other tig torch

- **Machine stuck on minimum amps when welding although higher amperage has been set**

  Make sure machine has not been set to 4-way operation as when in this mode when you press torch switch you get minimum amps and when you let go of switch machine will go to maximum amps set.

- **When using foot pedal machine is stuck on minimum amps**

  Make sure 2/4 way selector is in 2 way position, the remote foot pedal will not work in the 4-way position, this is for torch switch operation only or remote amperage control torch.

- **Arc 'Flutters' when TIG welding**

  1. Tungsten electrode may be too large in diameter for the current setting.

  2. Tungsten not sharp when in DC mode

  3. Gas shielding flow may be low or high, check gas flow , reduce tungsten stick out beyond ceramic

  4. Check for leaks in torch & gas hoses

- **Black areas along weld bead**

  1. Clean any oily or organic contamination from the work piece

  2 Tungsten electrode contaminated. Replace or sharpen

  3 Check for leaks or contamination on gas hoses & connections.

  4 Gas flow may be insufficient, Increase gas flow, reduce tungsten stick out from ceramic

- **Weak HF – Poor arc striking – welding output normal**

  1 Check torch and earth connections – is torch cable insulation in good condition.

  2 Check for leaks or contamination on gas hoses & connections.

  3 Gas flow may be insufficient, increase gas flow, reduce tungsten stick out from ceramic

  4 Keep output cables short as possible

- **HF spark is present at the tungsten electrode but unable to start welding arc, Machine has normal welding output**

  1 Tungsten may be contaminated - replace or sharpen

  2 The current may be set too low

  3 Tungsten may be to large for process

  4 Gas flow may be insufficient, increase gas flow, reduce tungsten stick out from ceramic

- **No HF when torch trigger pressed, no blue spark between HF points**

  Examine and clean HF points with clean dry low pressure air line

  HF PCB faulty – Contact R-Tech for repair

MMA Stick welding problems

- **Stick electrode 'blasts off' when arc is struck**

  Welding current set to high, reduce amperage or use thicker electrode

  Contaminated electrodes or material

- **Electrode sticks in weld puddle**

  Welding current is set too low

  Arc is too short, keep electrode further away from work

- **Excessive splatter**

  Too long an arc, keep electrode closer to work

- **Poor penetration**

  Travel speed too fast

  Too much welding current, reduce welding amperage

- **Porosity in weld**

  Electrodes are damp

  Arc too long, get electrode closer to work

			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或湿衣物切勿接触带電部件及銲條。 ● 使你自己與地面和工件絶緣。	● 把一切易燃物品移離工作場所。	● 保戴眼、耳及身體勞動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재외 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التى يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	WARNING
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish AVISO DE PRECAUCION
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French ATTENTION
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German WARNUNG
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese ATENÇÃO
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切って下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese 注意事項
● 頭部遠離煙霧。 ● 在呼吸區使用通風或排風器除煙。	● 維修前切斷電源。	● 儀表板打開或沒有安全罩時不準作業。	Chinese 警 告
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean 위 험
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهرباني قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic تحذير

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.