



# Owner's Manual



Made In  
**Texas**



Tested On  
Human Children

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## **This is a Pretty Good Warranty**

**Actually, it's only good for domestic U.S. purchasers.  
For export buyers, it's pretty much useless.**

For thirty days after you buy an Arc Pig, if you are dissatisfied for any reason, we will refund your money.

Every Arc Pig is warranted against failure for two years (domestic U.S. buyers) or one year for export buyers. During this period, we will repair or replace the Pig at our discretion.

We don't care where you bought it or why it failed. If you buy an Arc Pig on Ebay and drop it into a wood chipper, we will fix it or replace it. Just tell us the truth.

### **Caveats**

You must ship us a recognizable carcass at your expense. Ship it with tracking, so if it never arrives, everyone will know who to blame. We will pay domestic US shipping back to you, via UPS ground.

Outside the USA, you must pay shipping both ways. Sorry.

To get your money back within thirty days, you must return your Pig in good condition. You can keep this manual, since you probably smeared grease on the cover and dog-eared the setup page.

We will fix your stupid mistake free, once. If you break your Pig more than once by doing something dumb, we will charge you \$100 to fix it. (So far, this has never happened.) But if the stupid one was *us*, we will keep fixing until we get it right.

We will not pay for *anything* beyond fixing your Arc Pig. Act accordingly.

The Arc Pig radiates powerful electromagnetic interference, which can confuse or damage nearby electronic devices. It is your sole responsibility to ensure that all nearby devices, including your welder and your pacemaker, can tolerate HF.

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## Welcome

Congratulations on acquiring your Pig, the best arc starter available anywhere. The Pig offers outstanding performance, ground-breaking flexibility, and an owner's manual.

Extensive market research<sup>1</sup> has revealed that a person who owns a Pig is likely to be independent, self-assured, male, and not interested in this introductory drivel.

Your Pig offers the following useful features:

- Powered entirely by your welder. No wall plug.
- Not fussy about its power source.
- 250 amps at 60% duty (Arc Pig.)
- 750 amps at 100% duty (TIG Pig with water cooling.)
- Higher current is possible. (Talk to us.)
- Strap it to a table leg, or drag it around.
- Prevents rectification.
- Intelligent spark timing for reliable ignition.
- Strap-on trigger included with purchase.
- Minimal maintenance.
- \$3 spark gap lasts a lifetime for most users.
- Full power spark, far from your power source.
- 5 lbs.
- Won't rust.
- Sexy.

## Scope of this Manual

This manual describes the Pig's setup, operation and maintenance. This manual will not teach you how to weld, because I suck at welding. However, with a Pig I suck less and enjoy it more.

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1. No market research was conducted.



## What is the Pig?

The Pig is a high-frequency arc starter and arc stabilizer. The Pig comes in two varieties: Arc Pig and TIG Pig. The TIG Pig accepts water cooling for higher rated current.

The Pig wires into your weld cables and gooses your weld voltage with HF (High-Frequency) sparks. The HF sparks leap the weld gap and start an arc without touching. While you weld, the Pig keeps your arc lit.

The Pig needs no wall plug. It draws all its power from your weld cables.

The Pig works with most TIG or stick welders intended for handheld use, including EN or EP, CC or CV, DC or AC 25-60Hz.

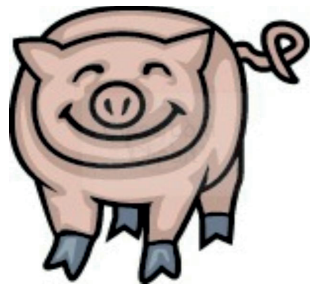
The Pig gives you no-touch strikes for TIG or stick, and will keep your arc lit so you can TIG aluminum.

If you let the Pig's HF spark jump to your skin, it will zing you like static electricity. If you like the pain and keep doing it, you will eventually get a small, deep burn.

When the Pig fires, it makes a buzzing noise. This is the spark gap. The buzzing means your torch is doing something interesting.

Holding the trigger gives you intelligent continuous fire.

Well, it's *semi-intelligent* continuous fire. The Pig checks your arc 120 times per second and fires only as needed. You may hear the Pig crackle as it restarts your arc faster than you can see. When TIG-welding aluminum, the Pig may fire continuously as it constantly relights your arc.



*No animals were harmed while making this device unless they had it coming.*

## Hazards

The Pig is powered by weld voltage, which is safer than mains voltage.

Nevertheless, welding is not safe, and the Pig may become hazardous due to design flaw or malfunction. For example, an insulation failure could connect dangerously high voltage to your weld cables.

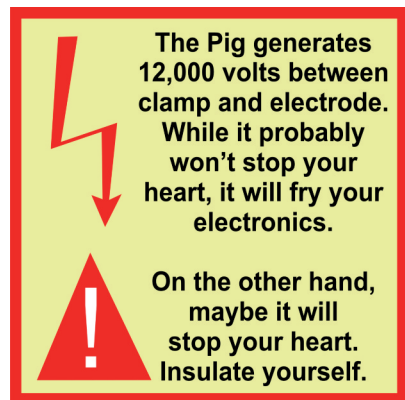
We promise only that the Pig's designer uses a Pig himself and rarely bothers to wear gloves. But he might be an idiot.

Obvious hazards of the Pig include:

- The Pig makes sparks.
- The Pig makes high voltage.

Less obvious hazards include, but are not limited to:

- The Pig induces high-voltage transients in nearby wires.
- The Pig radiates massive electronic interference that can interfere with radio signals and damage electronic devices. This problem is worse if you use long output cables.
- The Pig draws current intermittently, which can boost weld voltage.
- The Pig's internal power discharges are not safe. If they find a way out, they will hurt like hell and could kill you.



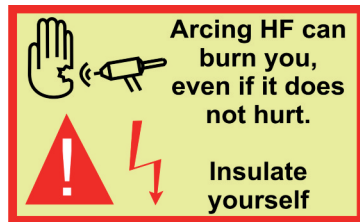
### **Caution: The Pig makes sparks**

Do not use the Pig in the presence of flammable gas. In fact, when air is flammable, you should avoid welding-related activities.

### **Caution** **The Pig makes high voltage**

Do not touch the HF spark. I have touched it dozens of times, with no obvious ill effect, but it will probably kill you.

If HF energy reaches you by arcing through the air, or through a hole in your glove, its energy could focus to a tiny patch and burn you deeply. You may not notice, because everyone has numb spots.



If your torch is poorly insulated, you might get zinged by HF leaking through your gloves.

### **Caution** **Water + Electricity**

Water could let the Pig's high internal voltage escape.

Water will wick into wires and corrode them. If your Pig gets wet, remove its outer tube (the printing can't take the heat) and dry the innards in the oven at 160F, with foil on the lower shelf to block radiant heat.

### **Caution** **The Pig can boost weld voltage**

The Pig draws current intermittently, which can boost weld voltage. The Pig monitors itself to ensure it does not raise weld voltage to unsafe levels, but this monitoring could fail.

## Caution

### Magnetic Fields and Electromagnetic Interference

The Pig broadcasts radio waves from your weld cables. These radio waves induce sub-microsecond spikes up to thousands of volts in nearby wires, which will confuse or destroy some electronic devices. Do not operate the Pig in a flying airplane, or when you visit Grandpa in intensive care. If your body contains implanted electronics, consider gas welding.

For instructions on protecting your welder, see Page 10

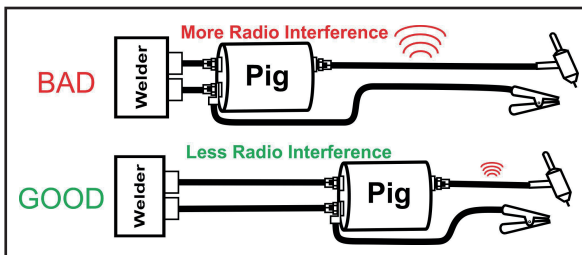
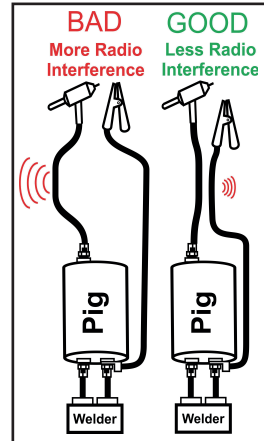
To reduce electronic interference, ground everything in your shop and cover the windows with grounded wire mesh.

Interference drops rapidly with distance, so separate your weld cables from other wires, including the Pig's input cables. (Uncoil your cables before use.)

Some people claim exposure to electromagnetic fields, such as those generated by the Pig, is harmful. If you're not willing to assume the risk of electromagnetic fields, you should not arc weld.

To reduce your exposure:

- Use a short torch cable.
- Route both cables on the same side of your body.
- Encase your body in iron or nickel.
- Keep a safe distance while Sancho does your welding.



# General Hazards of Welding

## Quick Overview

The hazards of welding are extensive, and not all of them are described here. No sensible person would weld anything.

### **DANGER**

Electricity can stop your heart!

Insulate yourself!

### **DANGER**

Arc light will sunburn any part of your body!

It can sunburn your eyes from a long distance!

Sunburn can permanently damage your eyes!

Sunburned eyes really hurt! For a long time!

Gas goggles are not dark enough for arc welding!

### **DANGER**

Do not breathe the fumes!

### **DANGER**

Welding is hot!

Molten metal flies everywhere!

Wear lots of thick leather!

Do not weld near stuff that can catch fire!

Do not weld over flooring your wife cares about!

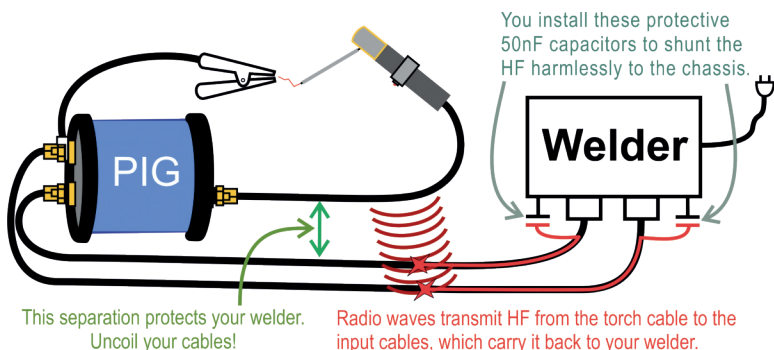
Even ceramic tile!

Trust me on this!

# Protecting Your Welder From HF

## Quick Overview

The Pig sends HF through your torch cable. The cable broadcasts HF energy as radio waves, which spread outward to induce HF in nearby wires. HF energy can cause immediate electronic failure or slowly-accumulating long-term damage.

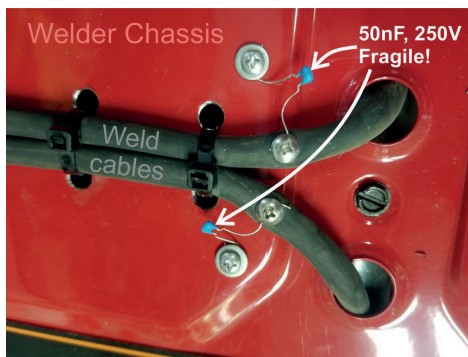


## How to Protect Against HF Energy

Your welder can be protected by two capacitors, size 0.05  $\mu\text{F}$  (50 nanofarads) rated for at least 250 volts. Consult with the manufacturer before adding capacitors to any square-wave or exotic-waveform welder.

Use the capacitors to connect your welder's output terminals to its metal case.

You can make it prettier if you open the case, but this will work.



# Welders and Torches

## Quick Overview

The Pig works with most welders up to 60 Hz, and with any torch that does not contain electronics or motors.

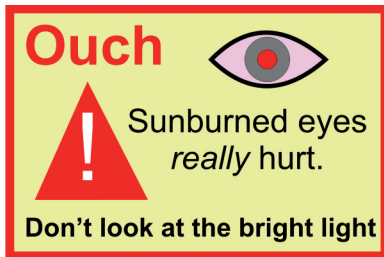
## Delicate Electronic Welders

The Pig broadcasts HF energy to *everything*, including your welder. A well-made welder will not be damaged, but if you have doubts, see Page 10 for protection instructions.

## Welding Modes

The Pig automatically adjusts to weld voltage, phase, and polarity. It works with TIG, stick, AC, DC, CC, CV, EN, EP.

**Warning:** Do not plug the Pig into a wall outlet. It will refuse to spark, and it lacks safety features for mains-powered devices.



## Frequency

The Pig fires 50-120 bursts per second. Thus it will fire every half cycle for AC frequencies between 25 and 60 HZ. When DC welding, the Pig will fire 70 bursts per second.

For AC below 25Hz, or above 60Hz, the Pig may perform poorly.

## MIG

The Pig is not useful for wire welding, and may damage a spool gun.



**Don't spark a spooldrive**

## Operation

**How to Strike an Arc:** Position the electrode 1/8" from the workpiece. Press the trigger and move in until the arc ignites.

**Power Switch (Lack Of):** The Pig has no On/Off switch. It cannot interrupt your weld current. However, it won't spark unless you press the trigger.

**Continuous Fire:** The Pig monitors your arc and fires as needed to keep it lit. So feel free to press the trigger throughout the weld, even if you don't need it.

**Overheat:** If the Pig overheats, it will shut down and sing. Singing could mean you overheated the high-voltage coil by prolonged continuous fire. (Usually more than fifteen minutes.) This is no big deal. We leave Pigs running for weeks and let the thermal alarm manage their duty cycle.

Otherwise, singing means you overheated the Pig by exceeding its rated current. If you ignore this warning and keep welding, something bad might happen.

**Handles:** The Pig is designed to be dragged or dangled by weld cables, but do not pull too hard. You will know you have pulled too hard when you hear a cracking noise.

**Polarity:** Any polarity is okay, straight, reverse, or AC.

**Voltage Sensing:** At power-up, the Pig beeps while it measures weld voltage. You may hear several quick beeps as the Pig waits for your weld voltage to stabilize. For a clean read, don't touch the electrode at startup.

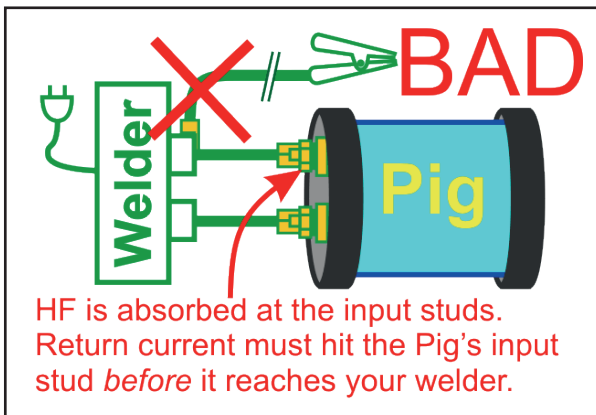
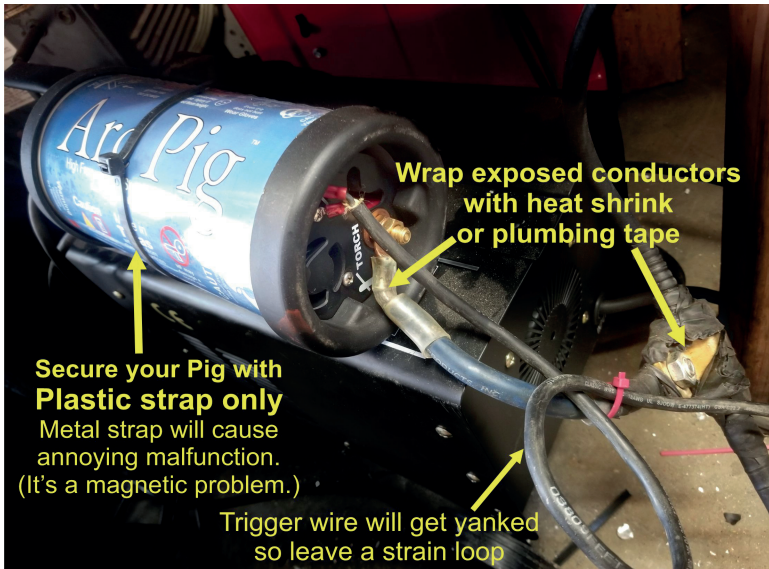
**Lift Start:** The Pig needs your welder's full open-circuit voltage at startup, so you must disable lift start. You may have to switch your welder to "Stick" mode.





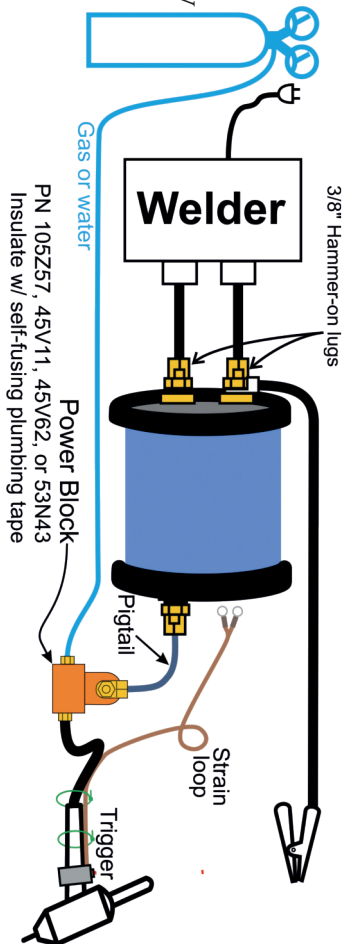
## Cables and Setup

### Setup Tips

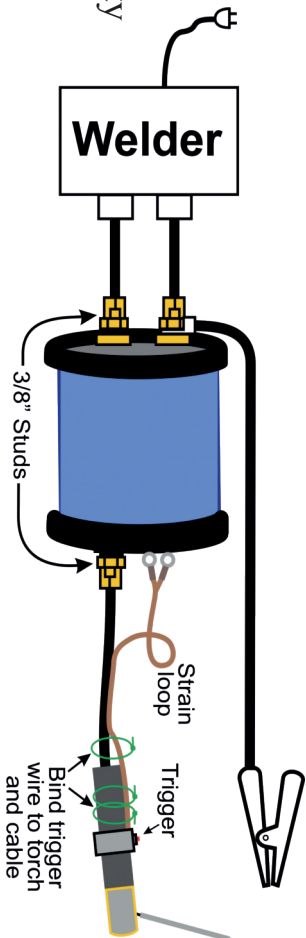


# Setup

**TIG with an Arc Pig**  
Capacity 250A at 60% duty  
200A at 100% duty

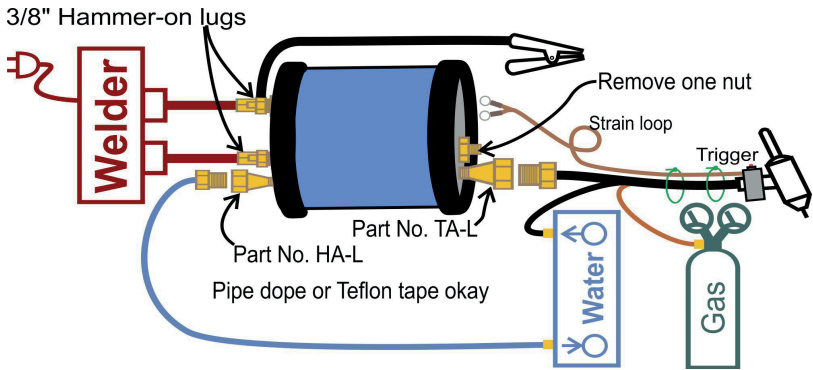


**Stick Welding  
(Arc Pig or TIG Pig)**  
Capacity 250A at 60% duty  
200A at 100% duty



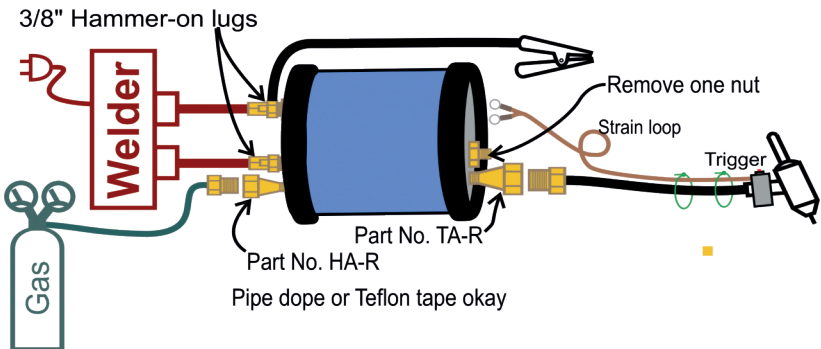
## TIG Pig Water-Cooled

Capacity 750A at 100% duty  
Higher current requires custom cabling  
to feed current directly into wet port.



## TIG Pig Dry

Capacity 250A at 60% duty  
200A at 100% duty



Teflon tape in these spots  
will stop leaks without  
reducing rated current.

## Adapters



### TIG Power Block

Connects TIG torch to a pigtail.  
Then pigtail connects to Arc Pig.  
NOT NEEDED with a TIG Pig.



Water fittings have left-handed threads  
and different part numbers.

We don't sell these.  
Get them at any welding supply.



### 3/8" Cable lug

Connects weld cable to  
the Pig's 3/8" studs.

Size to fit your cables.

We don't sell these.  
Get them at any welding supply.



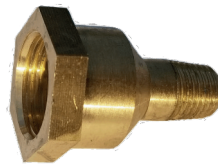
### TIG hose adapter

5/8-14 to 1/4-NPT

Connects water/gas hose  
to TIG Pig.

Part No. HA-L for water  
HA-R for gas

We sell this at [ArcPig.com](http://ArcPig.com)



### TIG Torch adapter

7/8-14 to 1/4 NPT

Connects torch cable  
to TIG Pig.

Part No. TA-L for water  
TA-R for gas

We sell this at [ArcPig.com](http://ArcPig.com)

# Triggers

Your Pig comes with one free trigger.

You can make a trigger from any mechanical switch.

We make two trigger versions: Pushbutton and toggle. Most users prefer the pushbutton. Choose the toggle only if you need to move your thumb.

The Pig's trigger cannot control other devices, because they will read the Pig's isolation transformer as a closed switch. Sorry, this means your gas solenoid will need it's own switch.



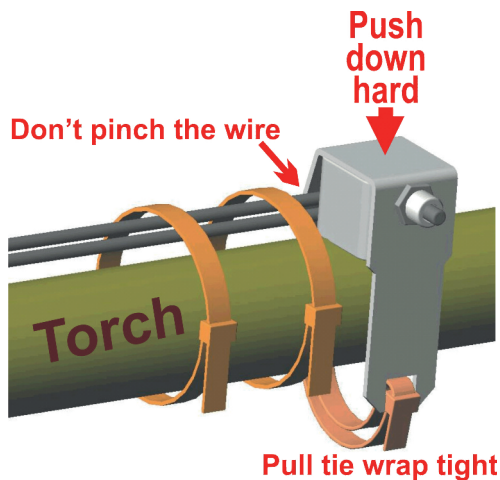
## Strap-on Pushbutton

Most rugged  
Most popular



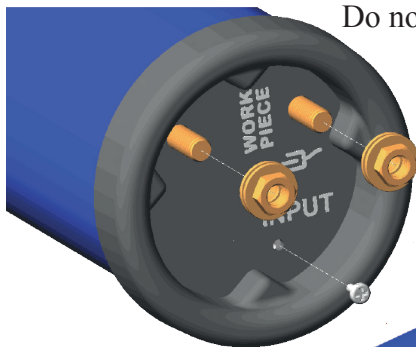
## Strap-on Toggle

HF stays on  
until you turn it off.

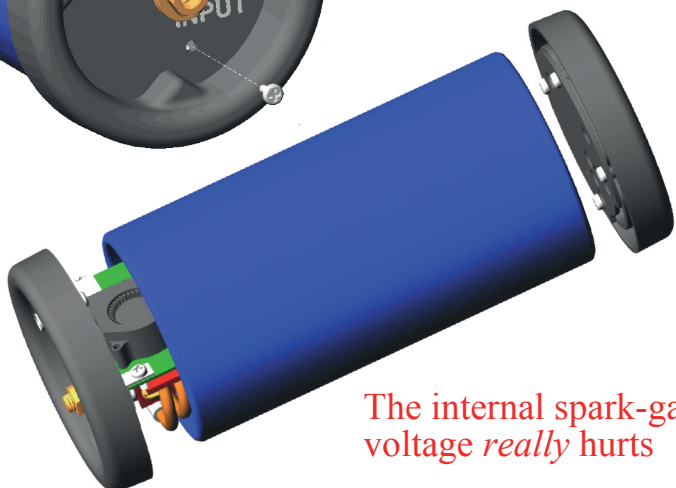


## Disassembly

Disassemble the Pig by removing the input-side bumper and sliding out the internals.



Do not operate the Pig without its protective shell. Its internal high voltage is dangerous and not well insulated.



The internal spark-gap voltage *really* hurts

Widen spark gap for hotter spark.  
Too wide will misfire.



## Reassembly

Be careful not to pinch the wires.

The power studs are just brass. You can break them.

## Maintenance

After a few years, you should inspect the insulation on the high-voltage wire. (The wire that connects to the spark plug.) We think the silicone insulation will last a long time, but we won't know for sure until it has been a long time.

In the meantime, for most users, the Pig's only maintenance is occasionally to tighten the nuts and clean the fan.

The exception, for some users, is the spark plug.

## Spark Plug

The spark plug is good for a lifetime of arc strikes, or a few hundred hours of continuous fire.

The spark plug is NGK BP4HS or BP7HS, available online for \$5. In a pinch, use any non-resistor spark plug with a screw terminal.

Resistor plugs (with an *R* in the part number) won't work.

The wider the spark gap, the hotter the spark. Too wide will misfire. Hotter spark radiates more electronic interference and stresses all components.

When the Pig fails to spark, it squeaks. Occasional misfires are normal, but constant chirping indicates a failing plug.

## Fan

The fan spins briefly at startup, then only while the HF is firing or the Pig is warm.

Replace it with Orion Fans Part No. OD4020-12HSS. Just cut the fan wires and solder in the new one.

In a pinch, use any 12V, 40mm fan, like those used in computer graphic cards.

## The TIG Pig's Rated Current

The TIG Pig offers dual inputs: a wet port and a dry stud. The wet port accepts cooling water and/or weld current.

Water cooling raises the rated current from 250A, 60%-duty to 750A, 100% duty. Ratings assume 1-LPM water flow.

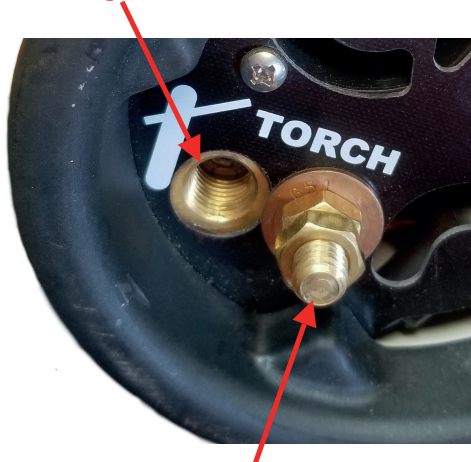
You can boost the rated current to 1000 Amps (100% duty) by feeding weld current directly to the wet port. You'll need custom cables. We suggest running the weld current through the copper tube that carries the water.

At 1000A and 1 LPM, the cooling water will be heated by approximately 22 Deg C. If the cooling water stops, the TIG Pig will do something dramatic.

We are aware some customers claim to run TIG Pigs above 1000A with increased cooling-water flow. We can't verify this claim, because our test supply only puts out 1000 amps.

We thought 1000A at 100% duty was pretty good.

**Wet Input Port (1/4" NPT)**  
Max 1000 Amps w/1 LPM water



**Dry Input Stud (3/8\"-16)**  
Max 250 A (60% duty) dry  
Max 750 Amps w/1 LPM water through wet port



# Overheat

## Quick Overview

Casual users cannot overheat the Pig, because the Pig can handle more current than any welder from Home Depot, and its high-voltage coil has more stamina than you.

## Cooling

Without cooling water, all Pigs have a 60% duty cycle at the rated current of 250A. After six minutes of arc time at 250 Amps, you must let a Pig cool for at least four minutes with the fan running, or fifteen minutes with the power off.

A dry Pig is cooled by thermal conduction through your weld cables, so for heavy welding, use big cables.

To reduce maintenance, the Pig's fan runs only when it is needed.

*When the fan is running,  
it should blow out a match*

## Overheat Damage

Exceeding rated current will shorten your Pig's life and possibly your own.

### WARNING

Serious overheat releases a cloud of corrosive fumes that will damage steel tools and your lungs.



If you manage to overheat the high-voltage coil (by prolonged continuous fire) the Pig will shut down and sing. This is not dangerous or damaging, just annoying.

Overheat damage is covered by your warranty, because everything is covered by your warranty. We'll fix a failed Pig or replace it (our choice) regardless of why it failed, but WE WON'T PAY FOR ANYTHING ELSE. Act accordingly.

## Weak Spark

If your HF spark is weak, check the following:

**Burnback** or electrode tip covered with slag. Give it a tap.

**Ground clamp not connected:** Yeah, we do it too.

**Long output cable:** Long cables absorb the spark energy and convert it to radio waves. The ideal torch cable is 8 ft, but you can stretch that to 33 ft (10 meters) if you don't mind a weak spark and lots of radio interference. To stretch farther, lengthen the *input* cable and drag your Pig to the work.

**Cracked cable insulation** lets the spark leak out.

**Reversed connection:** The output stud is for your torch. If you connect it to your ground clamp, the spark will be weak.

**Spark plug:** (It's inside the Pig.) Widening the spark-plug gap gives a hotter spark, but the higher voltage will stress everything.

**Broken ferrite rod:** This will only happen if you drop your Pig farther than three feet, so don't do that.

## Trouble with TIG?

The Pig performs beautifully on aluminum. It's a joy.

But even with a Pig, TIG-welding aluminum requires practice, attention to detail, and balanced AC current. Incorrect AC balance, poor gas flow, slight contamination, even a faint breeze will ruin your bead or burn your tungsten.

Aluminum overheats rapidly. You must preheat or run short beads, maybe only two inches.

The Pig's *only* function is to ignite your arc and keep it lit.

The Pig cannot burn your tungsten or ruin your bead.

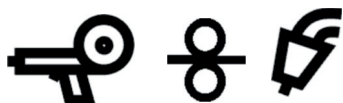
Only you can do that.

# Troubleshooting

Symptom	Cause	Solution
Leaking (Water or Argon)	Loose connection	Use Teflon tape or pipe dope
Pig won't power up	Lift-start	Switch welder to stick mode
Flashing light behind fan	Spark gap	It's normal Don't fix it
Singing	Overheat	Give it a rest
Blower but no HF	Broken trigger	Fix it
Beeping	Spark gap failed or fouled	Replace the spark plug with NGK BP4HS
	Low weld voltage	Normal for a very tight arc
	Magnetic induction	Secure the Pig with plastic straps only
	HF interfering with your welder	Uncoil your cables Install the protective caps (See Page 10)
Rolls closer when my back is turned	Demonic possession	Move to Detroit
Weak Spark	Various	See previous page
Arc is lit, but the bead is ugly	Contamination	See previous page
HF sparks, but arc won't strike	Forgot the ground clamp	It happens
	Burnback	Tap electrode tip

## Symbol Glossary

This section included by law.



MIG or wire welder



Your welding torch



Your workpiece (Ground) clamp



Alien invader,  
possibly  
malevolent



Trigger



Something you  
should not weld



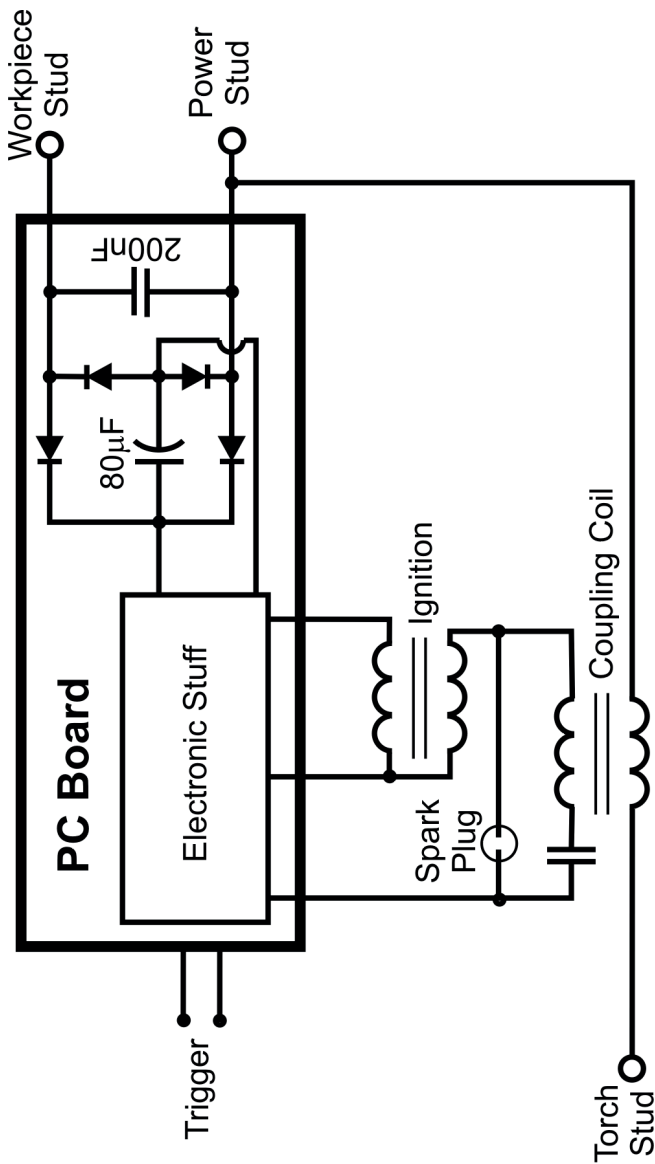
AC or DC power



Lift Start



# Schematic



## Specifications

Current Capacity:	<b>Dry</b> 250A at 60% duty 200A at 100% duty  <b>Water Cooling</b> (TIG Pig only) 750A at 100% duty
Min Water Flow:	1 liter per minute (TIG pig only)
Cooling load:	200W at 600A
Input Voltage:	24 V <sub>RMS</sub> -130V <sub>PEAK</sub>
Input frequency:	AC 25-60Hz, or DC
Firing Rate:	50-120 Hz
Power Consumption:	30W
Peak Output Voltage:	20KV (12KV into 220pF)
Operating Frequency:	low MHz, varies with weld cables
Output cable length:	0-25 ft (8 ft suggested)
Input Cable Length:	Unlimited
Input Capacitance:	200nF (plus startup surge)
Enclosure Protection:	IP21S
Power Connectors:	3/8"-16 studs 1/4 NPT Female (TIG Pig only.)
Trigger:	Any mechanical SPST (On/off only)
Dimensions:	5" X 5" X 10", 5 lbs

## **FCC Declaration of Conformity**

### **Arc Pig**

This device complies with Part 18 of the FCC Rules.

Responsible Party:

Arc Pig Co.  
575 19<sup>th</sup> St,  
Beaumont TX 77706.



### **Technical Support**

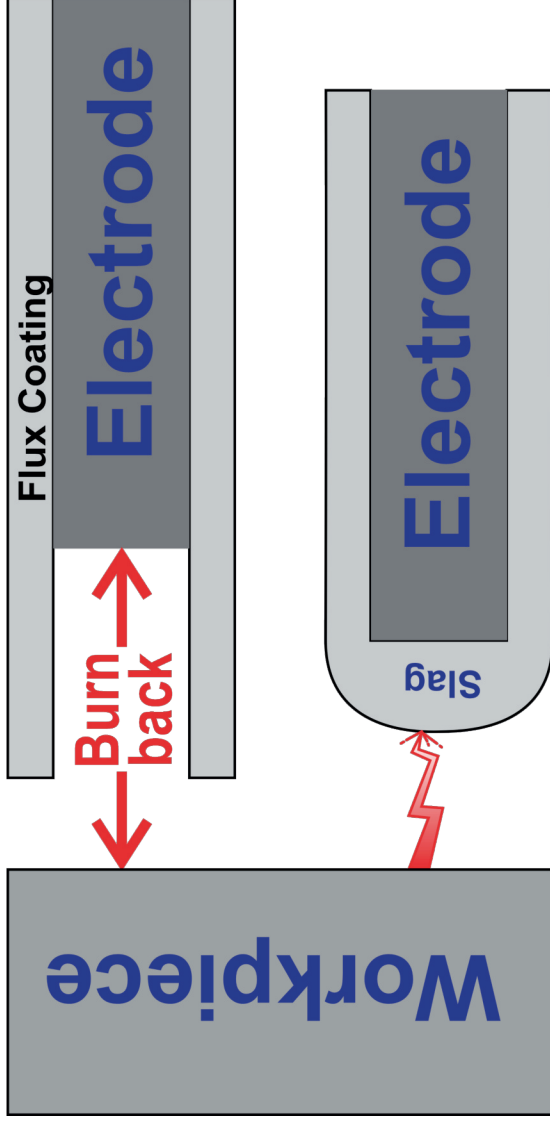
For more help, visit [arcpig.com](http://arcpig.com)

Or send inquiries to [support@arcpig.com](mailto:support@arcpig.com)

Or call us at 409-234-2652

Do not ask us for marital advice.

## Two Ways to Block a Stick-Welding Arc



Either can be fixed with a firm tap