This is a Pretty Good Warranty
for domestic US purchasers.
For export buyers, it's mediocre.

For thirty days after you buy an Arc Pig from us, 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. Except it is okay if you dog-eared the owner's manual.

You can be stupid once. If you break your Pig more than one time by doing something dumb, we will charge you $100 to fix it. But if the stupid one was us, we will keep fixing until we get it right. Probably we will get it right the first time.

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.
Welcome

Congratulations on acquiring an Arc Pig, the best arc starter available anywhere. The Pig offers outstanding performance, and ground-breaking flexibility.

Extensive market research\(^1\) has revealed that a person who owns an Arc 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.
- 250A at 60% duty
- 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, including more information than you really need. 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 Arc Pig is a high-frequency arc starter and arc stabilizer. It wires into your weld cables, and gooses your weld voltage with HF (High Frequency) sparks. The sparks have low current, but their voltage is high enough to leap the weld gap, and start an arc without touching the workpiece. While you weld, the Pig monitors your progress, and instantly restarts your arc, when your elbow is jostled by the invisible fairies.

The Pig needs no wall plug. It draws all its power from your weld cables. It 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's HF output is not painful. If you carelessly touch your electrode, you will feel only the normal, unpleasant zing from your weld voltage. However, if you *almost* touch your electrode, the spark will leap to your skin. This looks cool. It also tingles unpleasantly, and will eventually give you a small, deep burn.

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

While you press the trigger, you get continuous fire, but not blind fire. The Pig checks your arc, 120 times per second, and fires as needed. You may hear your Pig crackle, as it restarts your arc faster than you can see. On some jobs, especially aluminum TIG, the Pig will fire continuously as it prevents rectification and keeps your arc lit.
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. 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, which can interfere with radio signals, and damage electronic devices. The amount of radio interference depends on the length of your torch and ground 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 Arc Pig in the presence of flammable gas. In fact, when air is flammable, you should avoid most 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 you touch the workpiece, and 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 17.

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 are not willing to assume the risk of exposure to 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!
Operation

**Suggested Technique:** Position the electrode 1/8” from the workpiece. Press the trigger, and move straight in until the arc ignites. Leave the trigger pressed through the weld.

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

**Overheat:** The Pig's audible overheat alarm works like the overheat light in your car. It means you have already done some damage, and if you keep going, something bad will 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:** Either polarity is okay. Just don't connect the Torch stud to anything with electronics.

**Voltage Sensing:** At power-up, the Pig beeps while it measures weld voltage. This is how the Pig knows when your weld voltage nears its maximum. (This is the best time to fire the HF spark.) At startup, you may hear several quick beeps, as the Pig waits for your weld voltage to stabilize.

For a clean read, do not touch the electrode at startup.

**Lift Start:** Disable lift start, because it interferes with the Pig's startup calibration, and may even withhold power from the Pig. You may have to switch your welder to “Stick” mode.

Some lift-starts can be spoofed with a motor run capacitor. Try 20 uF between the Pig's input studs. Be advised, this trick might not work, and could overload a square-wave welder.
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 17 for instructions on protecting your welder.

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. For DC, the Pig will fire roughly 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.
Strap-On Thumb Trigger

The trigger straps to your torch, and lies under your thumb.

Secure the wire to your torch, close to the trigger, so it won't flex. The trigger lies under your *thumb*. Not your finger. It sounds clumsy, but it isn't.

If you think our trigger sticks out too far, you can make your own. But before you do, think about finding it with your glove.

We make two triggers: pushbutton and toggle. The pushbutton is more comfortable and rugged, but the toggle lets you move your thumb.

You can make your own trigger, with any switch.
Cables and Setup

Before you cut any wires, strap on the trigger, to get the length right.

Your trigger wire will get jerked, so leave some slack.

3/8" hammer-on lugs

Connect weld cable to the Pig

BAD

HF is absorbed at the input studs. Return current must hit the Pig's input stud before it reaches your welder.

PN 105Z57, 45V11, 45V62, or 53N43 Wrap w/ self-fusing plumbing tape.

Gas or water
**Maintenance**

**Regular 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 blower.

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 firing continuously.

The spark plug is a Champion CJ7Y, available everywhere for less than $5. Do not use a resistor plug.

An eroded plug sparks harder.

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

Grind off the gap arm

![Image of a spark plug with the gap arm ground off]

So it looks like this

No burrs

A new plug may spark weakly, until a few hours of continuous fire wears it smooth.
Disassembly
Disassemble the Pig by removing the input side, and sliding out the internals.

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

Reassembly
First, align the little screw, by twisting the black bumper.
Remember, the studs are just brass. You can break them, if you overtighten the nuts.

The internal spark gap voltage really hurts
Overheat

Quick Overview

Casual users cannot overheat the Pig, because the Pig can handle more current than any welder from Home Depot.

Thermal Details

After six minutes of arc time at 250 Amps, you must let the Pig cool for at least four minutes with the power on, or fifteen minutes with the power off. At 200 Amps, the Pig can operate continuously. In extreme hot weather, allow more cooling time.

The Pig is substantially cooled by thermal conduction through your weld cables. So for heavy welding, use big cables. The Pig's current rating assumes AWG 1 cables.

The Pig cools faster with its blower. After heavy welding, try to leave your welder turned on for five minutes.

Try not to trigger the thermal alarm. The alarm sounds when the Pig's internal circuit board reaches 160F. By then, the power cable may have reached high temperatures. This will shorten the Pig's life, and could eventually create a hazard of unknown but perilous nature.

If you manage to overheat the high-voltage coil (by prolonged continuous fire,) the Pig will shut down, and sing annoyingly while it cools off. But it probably won't happen, because the Pig's HV coil has more stamina than you.

Overheat damage is covered by your warranty, because everything is covered by your warranty. We trust you, because we sell to the people who make things.
Protecting Your Welder From HF

Quick Overview

The Pig sends HF through your torch cable, which broadcasts some of the HF energy as radio waves, which spread outward to induce HF in nearby wires.

How to Protect Against HF Interference

Interference drops rapidly with distance, so keep your weld cables well separated from other wires. Most important, uncoil your cables before use, so the Pig's output cables are not coiled with the cables to your welder.

Your welder can be protected by two capacitors, size 0.05 uF (50 nanofarads) rated for at least 200 Volts. These came free with your purchase, and we suggest you use them.

Use the capacitors to connect your welder's output terminals to its metal case, as shown in orange. To do this, you may have to open your welder's metal case, and connect to it with sheet-metal screws. Be sure the case is grounded.

Larger capacitors would conduct enough weld current to give you a zing, if your welder's case is not well grounded.

Consult with the manufacturer before adding capacitors to any square-wave or exotic-waveform welder.
Weak Spark
If your 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. Ideally, your torch cable will be 8 ft, but 25 ft will work. To work farther away, lengthen the Pig's input cable.

**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.

**New plug:** A new plug has rough surfaces that sparc easily.

You can break in a new plug, and increase your spark power, by turning on continuous fire for a couple of days. Disconnect the torch cable to reduce EMI, and don't mind when the Pig stops sparking for a while, and sings while it cools off.

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

Ferrite Rod
The ferrite rod will survive a three-foot drop, but a larger shock might break it. If that happens, the spark will be weak.

Lucky for you, a broken ferrite is covered by your warranty, because everything is covered by your warranty.
# Troubleshooting

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<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overheats quickly. Exhaust won't blow out a match</td>
<td>Blower clogged or failed</td>
<td>Clean or replace blower</td>
</tr>
<tr>
<td>Pig won't power up</td>
<td>Lift-start withholding power</td>
<td>See the bottom of Page 10</td>
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<tr>
<td>Singing</td>
<td>Overheat</td>
<td>Give it a rest</td>
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<tr>
<td>Blower but no HF</td>
<td>Broken trigger</td>
<td>Fix it</td>
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<td>Constant chirp or chittering</td>
<td>Spark gap failed or fouled</td>
<td>Spark for 3 minutes to clean the plug. If that fails, replace the spark plug.</td>
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<tr>
<td>Rolls closer when my back is turned</td>
<td>Demonic possession</td>
<td>Move to Detroit</td>
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<tr>
<td>Weak Spark</td>
<td>Various</td>
<td>See previous page</td>
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<tr>
<td>Arc hard to strike</td>
<td>Burnback</td>
<td>Tap electrode tip</td>
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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

 Surprise

Welding creates hazards we have not warned you about.
Schematic
Specifications

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

Input Voltage: 24 V_{RMS}-130V_{PEAK}

Input frequency: AC 25-60Hz, or DC

Firing Rate: 50-120 Hz

Power Consumption: 30W

Peak Output Voltage: 20KV (12KV into 220pF)

Max Altitude: 15,000 Ft (4800M)

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

Trigger Switch: Any mechanical SPST

Dimensions: 5” X 5” X 10”, 5 lbs

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Technical Support

For more help, visit arcpig.com

Or send inquiries to support@arcpig.com

Or call us at 409-234-2652

Do not ask us for marital advice.
FCC Declaration of Conformity

Arc Pig

This device complies with Part 18 of the FCC Rules.

Responsible Party:
Arc Pig Co.
575 19th St,
Beaumont TX 77706.
Two Ways to Block a Welding Arc

Either can be fixed with a firm tap