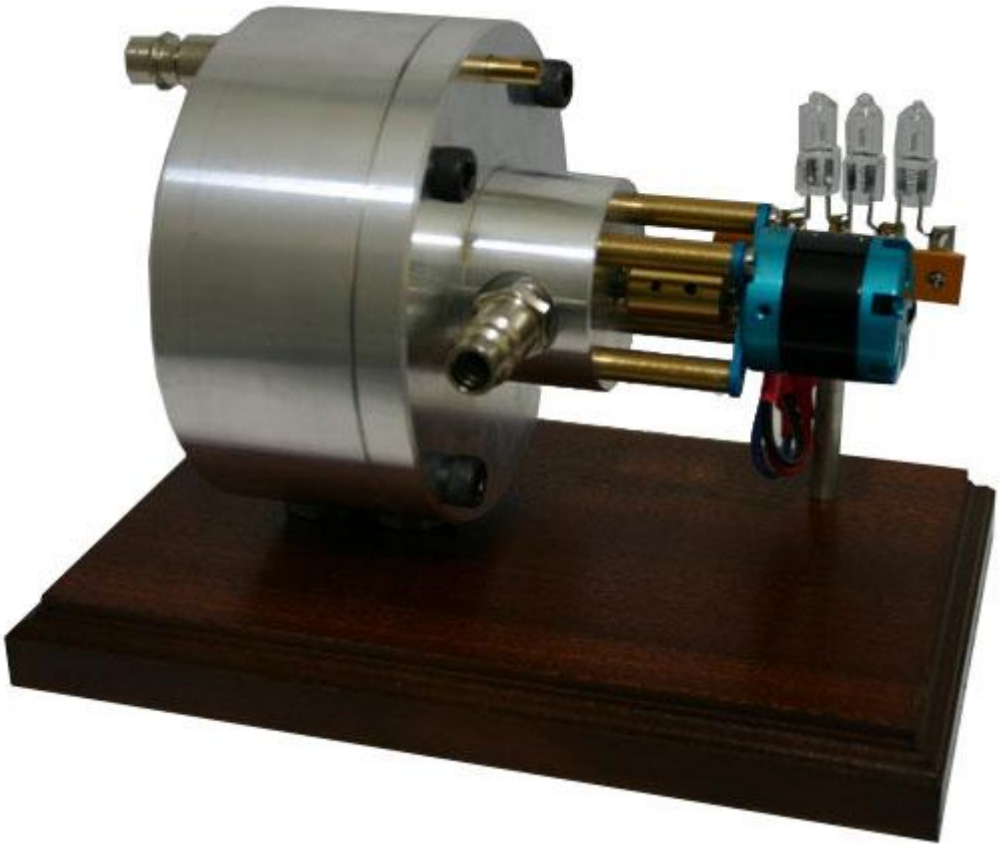
Tesla Turbine

By Gyroscope.com



Contents

Warnings – read before use

It is important to understand that this turbine is an experimental device. It is not intended to be used for prolonged periods or to be permanently used. If you do use the turbine for this function, use at your own risk.

Safety Checks and Warnings.

- Make sure that all the screws are tightened before use (both on the casing and inside, on the spindle).
- Make sure the grub screws on the generator coupling are particularly tight as they will be spinning at high speed. If in doubt use screw/thread sealant to reduce risk of them becoming lose.
- Always use eye protection/goggles when using the turbine.
- Use a tachometer to measure the RPM of the turbine while running. Do not let the turbine run to excessive speeds, particularly if the generator/load is not attached.
- After longer periods of use or possible stress check the bearings for damage or wear.
- The bearings have a 'push' fitting making them easy to remove/replace/change; however this means it is possible that the bearing will spin in the housing at very high speeds or over longer running times. This would cause damage to the housing after prolonged use. If you intend to run the turbine for longer periods or high speed it is recommended the bearings are sealed (similar to glue) using bearing sealant.
- Do not touch the bulbs while running they will be very HOT
- Do not touch the motor or shaft while running
- Do not touch or put anything close to the electrics, board or bulb holder while running. The underside of the bulb holders (board) is **electrified** while in use.
- Under extreme pressures and stress Tesla stated that disks are liable to warp. It is unlikely to happen on this version but please be aware that it is possible.
- The turbine is designed for use with compressed air. It should be quite easy to run the turbine from steam but new bearings will be needed and a seal added to the axle. Proceed at your own risk.

Specification

Sizes	
Turbine diameter:	100mm
Turbine length (ex generator + mounts):	75mm
Blade/disk diameter:	78mm
Blade/disk thickness:	1.2mm
Blade/disk gap:	1.2mm
Number of Blades/disks:	10
Over base size:	113mm x 185mm
Total Weight:	1420g approx
Materials Used	
Case :	HE30 aluminium
Spindle :	303 stainless steel
Disk Spacers :	HE30 aluminium
Injector :	CZ121 brass
Connectors	
Inlet :	1/4 BSP
Outlet :	1/4 BSP
Adapters (supplied) :	Uni connectors
Generator	
Output :	60 watts @ 10.5 VAC @ 25,000 RPM
type :	3 phase AC
MAX Output :	150 watts
Interesting features	
Reversible:	Yes, using flat screwdriver
Medium:	Compressed air, vacuum. steam, gasses or liquids possible but require new seals.
Design improvements:	Injector system and modular designs
Replaceable parts:	Motor can be upgraded Bulbs can be changed
Possible experiments:	New design for injector new disks, amount of disks different mediums different generators
Free spare:	free 'blank' injector that can be redesigned

History

A Tesla turbine is a quite unique technology. It was invented and patented by Nikola Tesla on the 21st October 1909 at the United States Patent Office from experiments done in England. The patent 1061206 was granted on the 6th May 1913. Although, it is thought that a Tesla first showed a 200 hp 16,000 RPM version on the 10th of July 1906 (on Tesla's 50th birthday).

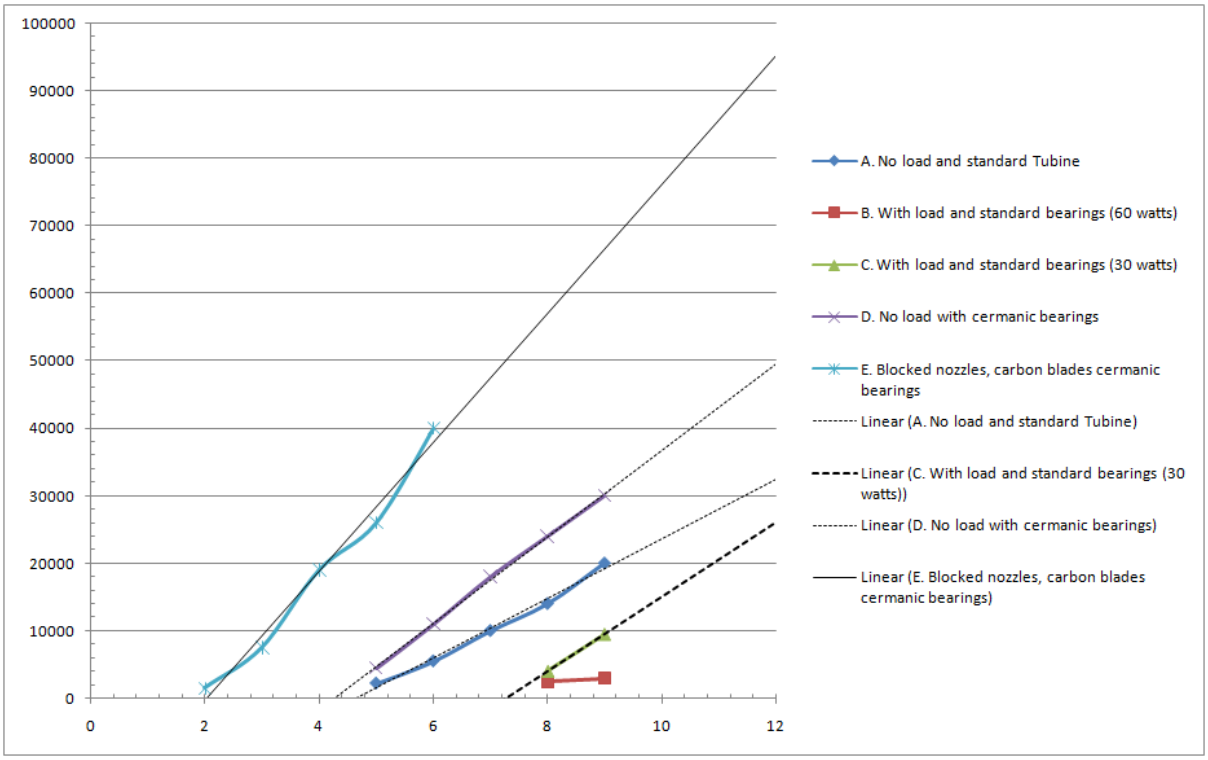
From what Tesla wrote in the patent it seems his experiments were mainly done with fluids but had confirmed it works with air as well. Unlike conventional turbines, jet engines and most pumps, Tesla's turbine can be designed to be reversible with no loss in efficiency. Normally compressed air, fluids or steam is applied to the 'inlet' and the turbine spins giving a mechanic rotational output. However, it can also double up as a pump, by rotating the shaft the air/fluid/steam can and be sucked and blown from the inlets / outlets. This makes it unique in being a reversible turbine and a reversible pump. However efficiency increases can be made by tailoring the pump to the medium.

The technology has remained very underused, unknown and under-developed despite its promising characteristics. The efficiency is the stubbing block and generally unproven. I expect over the next few years that efficiency of the turbines will dramatically improve, particularly now that this turbine is available off-the-shelve.

Maintenance

Very little or no maintenance is required. The bearings are sealed and lubricated for life, however the compressed air may force the oil/grease out over time. Please be aware of this and change the bearings if needed. All screws should be checked regularly to make sure they are tight. From time-to-time the disks should be inspected for warping.

Performance



The graph above shows the turbine in a number of configurations. As standard the turbine can spin at the speeds indicated on line A (5 to 9 CFM) and with a bulbs connected 8 to 9 CFM is required to power them, this is shown on line B. Changing the bulbs from 60 watts to 30 watts results in the requirements shown in line C.

Line D and E shows the turbine after being modified. As you can see there is still huge potential for performance improvements.

We commend testing and developing the turbine with a 8 to 10 CFM air source with a pressure between 60 and 120psi.

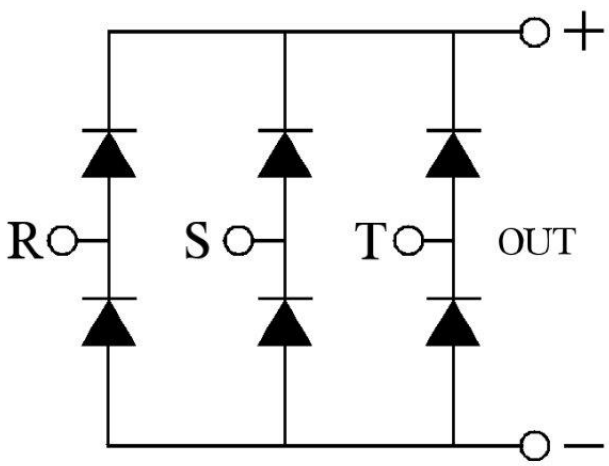
It has been untested with steam, water and other mediums. However we are people that have been adapting the turbine for such purposes.

The generator and converting the 3 phase AC to DC output

A 3 phase generator was chosen because of the cost, performance, efficiency, size and ability to run at high speed over its DC equivalents. The generator is an 'outrunner', with static coils/windings are in the centre and the magnets rotating around. This allows it to run at very high speeds. The generator is capable of generating around 150watts. The turbine is supplied with 3 x 20 watt lamps but these could be increased or even reduced for lower wattage versions. If the bulbs are removed the generator will free-wheel with almost no resistance.

Three bulbs were the easiest way to place a load on the generator for demonstration purposes. However a 3 phase output is not ideal in most cases for a practical output, this can easy be fixed using a bridge rectifier or otherwise known as a diode rectifier. This will create a pulsed DC output, which can be smoothed using capacitors if required.

The circuit required is as follows.



For further information on the subject visit

http://en.wikipedia.org/wiki/Bridge_rectifier

How to contact us

If you have any further questions you may contact Glenn at sales@gyroscope.com or visit www.gyroscope.com

Expected ways to improve performance