

Tubular Turbine Generator Unit

GD-WZ-20-10KW

User Manual

Ver 1.1



IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions that shall be followed during installation and maintenance of the ***GD-WZ-20-10KW***.

To reduce the risk of electrical shock, and to ensure the safe installation and operation of the ***GD-WZ-20-10KW***, the following safety symbols are used to indicate dangerous conditions and important safety instructions.

WARNING:

This indicates a fact or feature very important for the safety of the user and / or which can cause serious hardware damage if not applied appropriately.

Use extreme caution when performing this task.



NOTE: This indicates a feature that is important either for optimal and efficient use or optimal system operation.

Main Specifications

Specifications	
Model	GD-WZ-20
Nominal Power	10KW
Recommended Water Turbine Power (Max)	10kW
AC Power (Max)	max= 10kW
Output Voltage (Max)	230 V
Efficiency (Max)	$\eta_{max} > 95\%$
Operating Range Utility Voltage	210 – 230 V AC
Operating Range Utility Frequency	49 – 51 Hz
Total Harmonic Distortion (THD)	THDAC < 4 %
Power Factor	>0.98
Utility monitoring	Islanding protection VAC; fAC in accordance with UL 1741, IEEE929, G83/1
Short circuit protection	Current controlled
Communication Interfaces	RS485
Operation Surroundings Temperature	- 25°C ~ + 60°C
Operation Surroundings Humidity	0 ~ 95%
Size & Weight	Size (w x h x d): (x x mm) Weight: kg
Ingress Protection Waterproof Class	IP31
Grid Interference	EN61000-3-2
Safety	Short circuit Protection、 Islanding Protection、Over Heat protection、Over Load Protection、 Grounding Fault Protection

#1 Overview

This tubular turbine generator unit is applicable to the low-head power station which has a head of less than 20m and the diameter of runner is less than 3m. With the merits of considerable and well-going flow, and high efficiency, this unit is perfectly suitable for developing water resources of low head and large flow in the areas of plains, hills and Coastal place. In terms of the runner structure, it has two categories GD type and slurry GT type. In terms of connected structure, there are two types- direct connect and indirect connect which has a planet gear accelerator to increase the speed. The GD type apply to the power station which has a small change in flow, head and load while the GT type apply to the station which has a relatively large changes in flow and load .

#2Structural characteristics:

The feature of this tubular turbine generator unit is that, the turbine is installed in a “s” type flow pipe, and the axis of turbine pierce through the pipe wall then connect with the generator installed outside the pipe. Between the turbine and generator there can be easily installed a accelerator to make the turbine’s speed out of the constraint on the synchronous speed. The guide vanes and runner have the same characteristics as that of the bulb tubular turbine. Its overall layout is diverse and is up to the unit’s size, capacity and the specific circumstances of hydropower stations. For example, generators can be installed in the upstream side of turbine (front axle stretch), and also can be installed in the downstream side (rear axle stretch); Unit’s axis can be level (level axle stretch) or tilted (tilted axle stretch); Flow Road “S” curve can be both vertical and level, it may also be tilted. The most representative of them is the level rear axle stretch form (generators horizontally installed above the draft tube downstream-side of the turbine). This unit has several merits: can be used for large-scale units, the total flow road is shorter than the front axle stretch style, generator has a high installation elevation, and operating and maintaining are convenient. The drawback: draft tube flow bend a lot, partial loss of the hydropower has some influence on efficiency of the unit; Runner installed with a higher elevation so that there is a constraint on the air performance and the crew of flow; Layout for generators, sufficient distance is necessary between the axis and the top of the draft tube.

#3Performance features:

High specific speed, largest flow and high efficiency, low investment and so on. Compared with

the traditional vertical axial units, it has simple structure and larger volume of cross flow, less construction works is needed of and the maintaining is easy as well. With the same capacity, tubular turbine unit has a runner of which the diameter is smaller than the axial tubular unit by 10 % -15 % , the annual generating capacity is larger by 10 % -15 % , and the investment costs can be saved than axial of about 20 % , its economic benefits is significant.

Meanwhile, this unit can against the problems that it is difficult to buy accessories and to maintain and the problem that lack of technology, for its simple and reasonable structure, fewer parts, lower noise, good performance and easiness of installation and maintaining. As to the Turbine structure, the fixed guide vanes lead water into the runner, the bearing is made of wear-resistant materials, Filter is designed to filter the lubrication water, and overall structure is simple and reliable.

The generator is a neodymium permanent-magnet generator without any brush. It is also a single-phase AC generator. It suits the middle and low water-head with a big discharge.

I .Major Technical Data

Turbine Type : **GD- WZ- 20- 10KW**

Flow: **0.165m³ / S** Water-head: **11m**

Turbine capacity: **10KW**

Generator Type: **XYDF112M-10.0KW**

Rating speed: **1500 r / m i n**

Generator capacity: **10KW** Voltage: **230 V Single-phase**

II . The Main points of Installation

1. To choose water resources and installation site. Having a canonical civil engineering design and building. Having a canonical installation of water pipeline.

2. To build the room and tail water pit (pond) and tail water canal according to the drawing.

3. Put the line position , putting the machine in the corresponding position and in level. The foot studs must be fixed in the concrete well.

4. After the foot studs is fixed , put the tail water pipe into the obligate hole and then install the electro motion valve , flex jointer and turbine gradationally. Adjust the flexible nodal amount and make the foot bore of turbine aimed at with the installation bores and fix the bolt mildly in order to adjust.

5. Connect the tail water pipe with the turbine. The seals must be put in the position to guarantee tight. The level ground bore is wiped out with concrete at last.

6. Install the generator and adjust the axis. Fix the bolt and the jointer of axis tight. Moving the jointer of axis with a hand lightly , the generator and turbine should turn freely.

7. Put the electricity hot tube in the appropriate location and connect the lead.

8. Install the control equipments according to the connect line diagram.

9. Check and confirm all the parts and then adjust and circulate.

III . Adjust and Circulate

1. The controller and the shell of generator must be connected with the earth.

2. The Installation of regulator :

a). The load of regulator is put by the side of turbine appropriate position (the position of easy to drainage) .

b). Connect the lead of load of regulator with the controller according to the connect line diagram.

c). Open the valve and the water amount should be propriety.

3. Check-up before turn on the machine. The valve should be at the close position.

4. Turn on and send the electricity.

a). Turn the valve and watch the voltage meter. Let the voltage rise to the rating level (watching the turbine and generator) . If it is in gear , the press-button

can be pressed to deliver electricity .

b). After deliver electricity , adjust the voltage (normal or so 220V) .If using an electromotor , the voltage can rise a little.

c). The regulator has been adjusted by us.

IV . Routine Faults Treatment

1. The contribute of turbine is shortage. Please check the tail water pipe , water amount and the trash boom of intake.

2. The voltage can not rise and the current is big. One reason is the burthen is big. The other reason is the circuit may be short circuit. Maybe the water amount is not enough.









