

model: **Wind power-GTBD1800**

Wind Photovoltaic Complementary Power Generation Training system

1. Features

- 1) This system should be manufactured in a structure that converts the DC power of the wind power generation system into a chopper method and converts it into AC power using an inverter method.
- 2) The inverter must have a structure that can operate sufficiently with the capacity of the output voltage from the wind power generation voltage and various protection devices are built in.
- 3) Practice load characteristics with output voltage of inverter.
- 4) The power converter of the power conversion system provides the circuit diagram and configuration so that the waveform measurement and the principle can be learned.
- 5) built in electric motor and lamp load to practice power generation experiment.
- 6) It provides intelligent digital multi instrumentation instrument and can be learned through a program that can monitor the measurement (wind power generator voltage, current, power
- 7) generation voltage, current, power generation) using PC.

2. System configuration



3. Spec

1) Wind Power Generator

- (1) The main body is made of aluminum cast for aircraft, and it is light and strong, and the inside is completely sealed to prevent corrosion. The wing has a built in output limiting device with rated output.
- (2) It adopts a brushless generator made of permanent magnets and realizes the best operation and maintenance.
- (3) It is installed inside using a wind generator with the capacity that is actually applied to the site, but it is designed to understand the principles of wind power generation through laboratory practice.
- (4) It is easy to move using auto caster and absorbs vibration by using dustproof pad during lab training.
- (5) The support is made of extruded aluminum and anodized surface type product should be used. It is composed of X shaped guide that stably supports the wind power generator.
Output voltage: DC 12V or 24V or more
Starting wind speed: 2.7m / s
Wind speed: 50m / s
Wing: Safety wing type

5) Number of wings: 3

2) Virtual automatic / manual air volume control device

- (1) Manual mode and automatic mode can be selected. When selecting automatic control, the air volume is virtually adjusted by the set pattern. When manual control is selected, the air volume can be adjusted by using the variable handle.
- (2) Built in wind control motor / mechanical structure included
- (3) Automatic voltage regulator (compensation circuit built in type)
- (4) Manual air volume control
- (5) Built in voltage output device by FV system
- (6) Built in speed display

3) Solar cell module

- (1) Monocrystalline Silicon Type
- (2) Internal By pass Diode
- (3) Maximum output: 36.0V, 4.45A, 160W \diamond 3
- (4) Open Voltage: 43.2V
- (5) Short circuit current: 5.0A
- (6) Support: Al profile and powder coating

4) Grid linked system controller

- (1) It consists of a system that can control the power obtained from the wind power generator and run in parallel with the grid line, transmit power to the grid when surplus power is generated, and supply power from the grid to the load in case of insufficient power generation.

(2) Enclosure

Made of high strength aluminum extrusion and DIE CASTING, robust and designed according to IEC 297 1, 2, 3 and DIN 41494, the case is made of various compatible structures, the main frame is specially coated with aluminum extrusion AL6063 T5 .

FRONT DOOR uses handle type lock device and high strength color glass to check the operation status of measuring instruments and display devices attached to the inner panel.

Attach POWER CONSENT for power supply and FAN for heat dissipation.

Print the system diagram on the panel of the device to understand the wind power generation.

(3) Power converter

It should be possible to check the internal parts as related and it is possible to measure the waveforms necessary for power conversion

Power control method uses IGBT, the latest power semiconductor

Using a capacitor and inductor filter, the output is converted to the optimal direct current.

Inverter capacity for grid linkage: 1.5kVA

Inverter Electrical Characteristics

- * Input rated voltage: DC 200V ~ DC 450V
- * MPPT control range: DC 280V ~ DC 340V
- * rated capacity: 1.5kVA
- * Constant: single phase or three phase
- * Output voltage: grid line voltage (220V / 380V)
- * Output frequency: 60Hz \pm 1%
- * Efficiency: 90% or more
- * Output voltage stability: \pm 1%
- * Transient response time: within 100ms
- * Overload capacity: 120% 10 minutes, 150% 3 seconds
- * Voltage unbalance: \pm 5%

Inverter main circuit configuration

- * Inverter type: Voltage type current control type
- * SW method: Sine wave PWM method

Inverter Control Method

- * Power control method: Maximum output control method(MPPT)
- * Auxiliary function: SOFT START function
- * Operation control function: automatic start / stop

Inverter protection circuit method

- * AC overcurrent: 150% or less
- * AC ground fault: 30mA
- * Grid and undervoltage: grid voltage \pm 5% V
- * Over grid frequency: 60 \pm 1% Hz

Inverter Control Panel

- * Digital Panel Meta: Power Meter 6Digits FND LED Display (with protective window)
- * Digital Panel Meta: Electricity Meter 6Digits FND LED Display (with protective window)
- * digital panel meta: DC 600V
- * digital panel meta: DC 10A
- * START / STOP: Push Button
- * POWER / ON: Lamp
- * MAIN POWER: MCCB (ABS53A 20A)

Intelligent I Digital Multi Instrumentation Device

- * Measurement function: voltage, current, active power, reactive power, power factor, frequency
- * 15 elements can be displayed by voltage and current input
- * precision (0.5 ~ 1%)
- * Easy direct input converter (TD) not required (direct connection up to 600V without PT)
- * Built in intelligent unmanned operation monitoring
- * CPU: ONE CHIP DSP with 16BIT 30MIPS
- * Accurate measurement function over a wide frequency input range (45 ~ 65HZ)
- * Built in automatic reset function in case of malfunction by WATCHDOG function
- * Built in PT, CT automatic incorrect wiring check function
- * Multi drop communication method

5) Monitoring and Instrumentation Learning Program

- (1) Must be a program running in a Windows based environment.
- (2) Operational status can be checked through virtual simulation and real time monitoring and control of devices without interface module is possible without additional equipment.
- (3) Voltage display function: Real time monitor the voltage of each phase (graph, digital display function)
- (4) Current display: Real time monitoring of current in each phase (graph, digital display)
- (5) Power amount display: Load power real time monitor function (digital display function)
- (6) Frequency display: Real time monitor function of power frequency value (digital display function)
- (7) data graph setting: selectable up to time axis (hourly, date, monthly)
- (8) Real time graph display (1 cycle stop function, continuous graph display function selection)
- (9) Print function: Print function after data collection (Graph data after 1 cycle)
- (10) Communication method: RS 232, none parity, 8 bit, 1 stop bit communication speed selectable
- (11) Observing data on the generation amount, generation voltage, output voltage, output current and frequency of wind power generation system.