



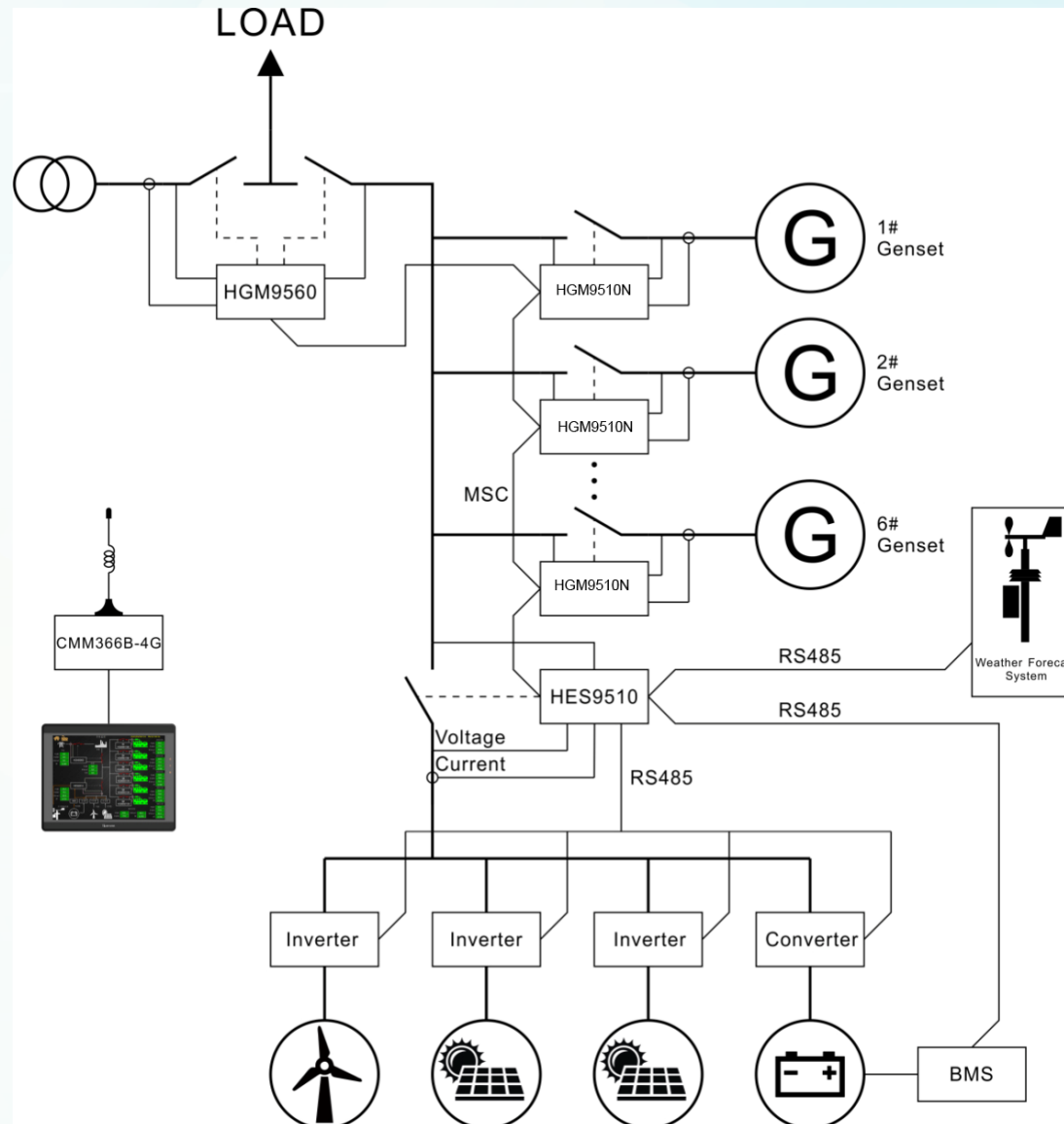
**SmartGen**  
ideas for power



**Hybrid Energy Controller-HES9510**



# □ System Diagram



## □ Overview

**HES9510 Hybrid Energy Controller** is used for diesel gensets with solar energy, wind energy, energy storage battery using inverter as output energy systems. It can control the start and stop of inverter power supply, output mode, output range as well output closing/opening of breaker, etc. It can also control the start and stop of gensets in system according to the loads, and provide spinning reverse for the inverter power supply. In addition, it can also control the inverter for energy storage battery charging and discharging.

## □ Functions 1/3

- ✓ Two RS485 communication ports enable remote control, remote measuring, remote communication via MODBUS protocol;
- ✓ A variety of built-in protocols enable communication with inverters such as HUAWEI;
- ✓ Suitable for 3-phase 4-wire, 3-phase 3-wire, single phase 2-wire, and 2-phase 3-wire systems with voltage 120/240V and frequency 50/60Hz;
- ✓ Collects and displays 3-phase voltage, frequency, 3-phase current, power and voltage harmonic parameters; For Busbar, controller has loss of phase and reverse phase sequence detection functions; For new energy, controller has over voltage, under voltage, over frequency, under frequency, high unbalanced voltage, high total harmonic distortion, over current, earth fault, high unbalanced current, low power factor, over power, reverse power, loss of excitation, loss of phase, reverse phase sequence detection functions;
- ✓ 5 analog sensor inputs can be set to temperature, pressure, level, power inverters or irradiance sensors, in which 2 inputs can connect with current-type, voltage-type and resistor-type sensors.
- ✓ Voltage, current and power display of up to 4-way solar panel channels can be set;

## □ Functions 2/3

- ✓ The maximum capacity of PV calculated by collecting up to 3-way solar panel temperature and 3-way solar irradiance.
- ✓ Busbar normal automatic closing and starting with load, automatic soft loading and soft unloading;
- ✓ Two active power control modes (fixed power, inverter control);
- ✓ Three reactive power control modes (fixed power, power factor, inverter control);
- ✓ Each energy can be set or calculated rated active power, rated reactive power and rated apparent power. The rated active power of PV power station can be calculated in real time according to the sensor data and weather data, the rated power of gensets can be calculated in real time according to the information of online units, the rated power of energy storage power station and mains supply can be set for direct use;
- ✓ The controller is able to control the priority of energy use (mains supply, gensets, PV power station (including wind power station), energy storage power station). Each energy can be prioritized separately, and the smaller the priority value, the higher the priority. Default: PV power station >energy storage station >Mains supply>gensets. It supports dynamic prioritization;
- ✓ The input port can be set to make them unavailable for mains supply, PV power station, gensets and energy storage power station. When the energy is unavailable, the energy will no longer provide energy and spinning reserve.

## □ Functions 3/3

- ✓ Event log, real-time clock;
- ✓ Black box function, which allows to record the genset data of 5 alarms;
- ✓ 10 digital outputs: 2 inputs with 16A(DC output), 3 outputs with 5A(DC output), 3 outputs with 8A(volt-free output), 2 outputs with 1A (Transistor DC output);
- ✓ 10 digital inputs;
- ✓ 2 RS485 ports, ETHERNET port, 2 CANbus ports, and USB port;
- ✓ Optional language with Chinese, English and other languages;
- ✓ DC+5V output;
- ✓ IP65 level;
- ✓ Can expand with DIN16A, DOUT16A, and AIN8;
- ✓ Built-in PLC;
- ✓ 2 analog outputs (-10V~+10V)

## □ Technical Data

Items	Content
Working Voltage	Range: DC8V ~ DC35V continuous, DC reverse connection protection Resolution: 0.1V Accuracy: 1%
Overall Consumption	<7W(standby mode: : ≤2.5W)
AC Voltage	Phase voltage Range: AC15V ~ AC360V (ph-N) Resolution: 0.1V Accuracy: 0.5%
	Wire voltage Range: AC30V - AC620V (ph- ph) Resolution: 0.1V Accuracy: 0.5%
AC Frequency	Range: 5Hz - 75Hz Resolution: 0.01Hz Accuracy: 0.1Hz
AC Frequency	Rated: 5A Range: 0A – 10A Resolution: 0.1A Accuracy: 1%

# □ Operation Instruction



Alarm Indicator

Running Status

Close Button

Bus Normal

New Energy Normal

Open Button

Hybrid Energy System

Auto Mode Indicator

Auto Mode Button

Alarm Mute Indicator

Alarm Mute Button

Start Button

Stop Indicator

Stop Button

Mode Button

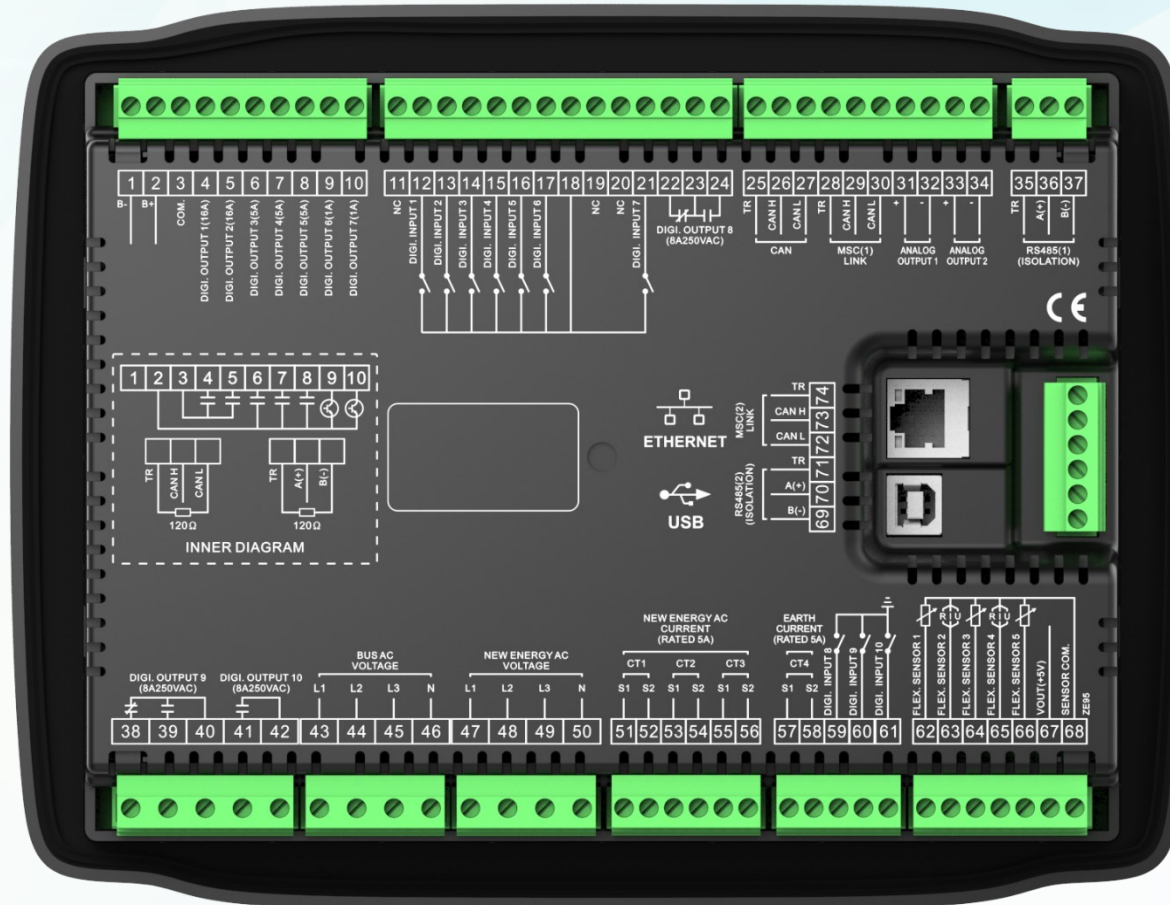
Mode Indicator

Manual Button

Manual Indicator



# □ Back Panel



# □ Application Mode

## **Mains Available (Large power grid)**

The power is adjusted by HGM9560, and according to the energy priority to output constant active power and reactive power to the mains supply.

VF is provided by bus and PQ is provided by other energy.

## **Island Mode (Micro-grid)**

Mains is unavailable, and according to the setting energy priority (exclude the mains supply) to take load.

The genset provides VF prior to energy storage power station.

PV power station can't take load separately.

# □ Automatic Start Instruction of PV Power Station

**Application mode: when mains supply is available, the system priority is: PV>Storage Energy>Mains Supply>Gen**

When mains supply is normal, and the mains supply module sends out start order or remote start input is active, the PV power station will start and output power to the load, and VF (constant frequency and constant voltage) is provided by the mains power.

When mains supply is abnormal, and the mains supply module sends out start order or remote start input is active, if the energy storage power station is allowed to start, the energy storage power station will start in VF mode (constant frequency and constant voltage), the PV power station will start and output power to the load.

**Application mode: island mode, the system priority is: PV>Storage Energy >Gen**

Remote start input is active, if busbar is normal, PV power station will start and output power to the load; otherwise if storage energy is allowed to start, the energy storage power station will start in VF mode (constant frequency and constant voltage), the PV power station will start and output power to the load.

Remote start input is active, if busbar is normal, PV power station will start and output power to the load; otherwise if storage energy is not allowed to start, the gensets will start in VF mode (constant frequency and constant voltage), the PV power station will start and output load to the load

# □ Automatic Stop Instruction of PV Power Station

**Application mode: when mains supply is available, the system priority is: PV>Storage Energy>Mains Supply>Gen**

When mains supply is normal, and the mains supply module sends out stop order or remote start input is inactive, the PV power station will stop with soft unloading.

When mains supply is abnormal, and the mains supply module sends out stop order or remote start input is inactive, if storage energy is not allowed to discharge, PV power station will stop with soft unloading.

**Application mode: island mode, the system priority is: PV>Storage Energy >Gen**

When energy storage station is not allowed to discharge and gensets are not allowed to start, PV power station will stop with soft unloading.

When remote start input is inactive, PV power station will stop with soft unloading.

# □ Automatic Start of Storage Energy Power Station

**Application mode: when mains supply is available, the system priority is: PV>Storage Energy>Mains Supply>Gen**

When mains supply is normal, PV power station will output power to the load, when the target power of new energy from mains supply module is greater than the power of PV power station, and the energy storage power station is allowed to discharge, the storage energy breaker will close and output, the energy storage station starts and outputs power to the load.

When mains supply is abnormal, the energy storage power station will start in VF mode (constant frequency and constant voltage), the PV power station starts and outputs power to the load.

**Application mode: island mode, the system priority is: PV>Storage Energy >Gen**

If remote start input is active, energy storage power station will start.

When gensets haven't been started, the energy storage power station will start in VF mode (constant frequency and constant voltage), and the energy storage switch closes and outputs;

When genset have been started, the energy storage power station will start in PQ mode (constant power), and the genset operates in VF mode (constant frequency and constant voltage).

# □ Automatic Stop of Storage Energy Power Station

**Application mode: when mains supply is available, the system priority is:  
PV>Storage Energy>Mains Supply>Gen**

Mains supply is normal, when the target power of new energy from mains supply module is lower than the power of PV power station, the PV power station will charge for energy storage power station, and the unit will stop when energy storage power station is fully charged.

**Application mode: island mode, the system priority is: PV>Storage Energy >Gen**

When energy storage station is not allowed to discharge, gensets will start and energy storage power station will stop with soft unloading. When remote start input is inactive, energy storage power station will stop.

## □ Automatic Start/Stop of Gensets

**Automatic Start of Gensets: Application mode: when mains supply is available, the system priority is: PV>Storage Energy>Mains Supply>Gen**

The mains supply module controls the start of gensets.

**Application mode: island mode, the system priority is: PV>Storage Energy >Gen**

Remote start input is active, when energy storage power station is not allowed to discharge, the gensets will start in VF mode (constant frequency and constant voltage).

**Automatic Stop of Gensets:**

**Application mode: when mains supply is island, the system priority is: PV>Storage Energy>Mains Supply>Gen**

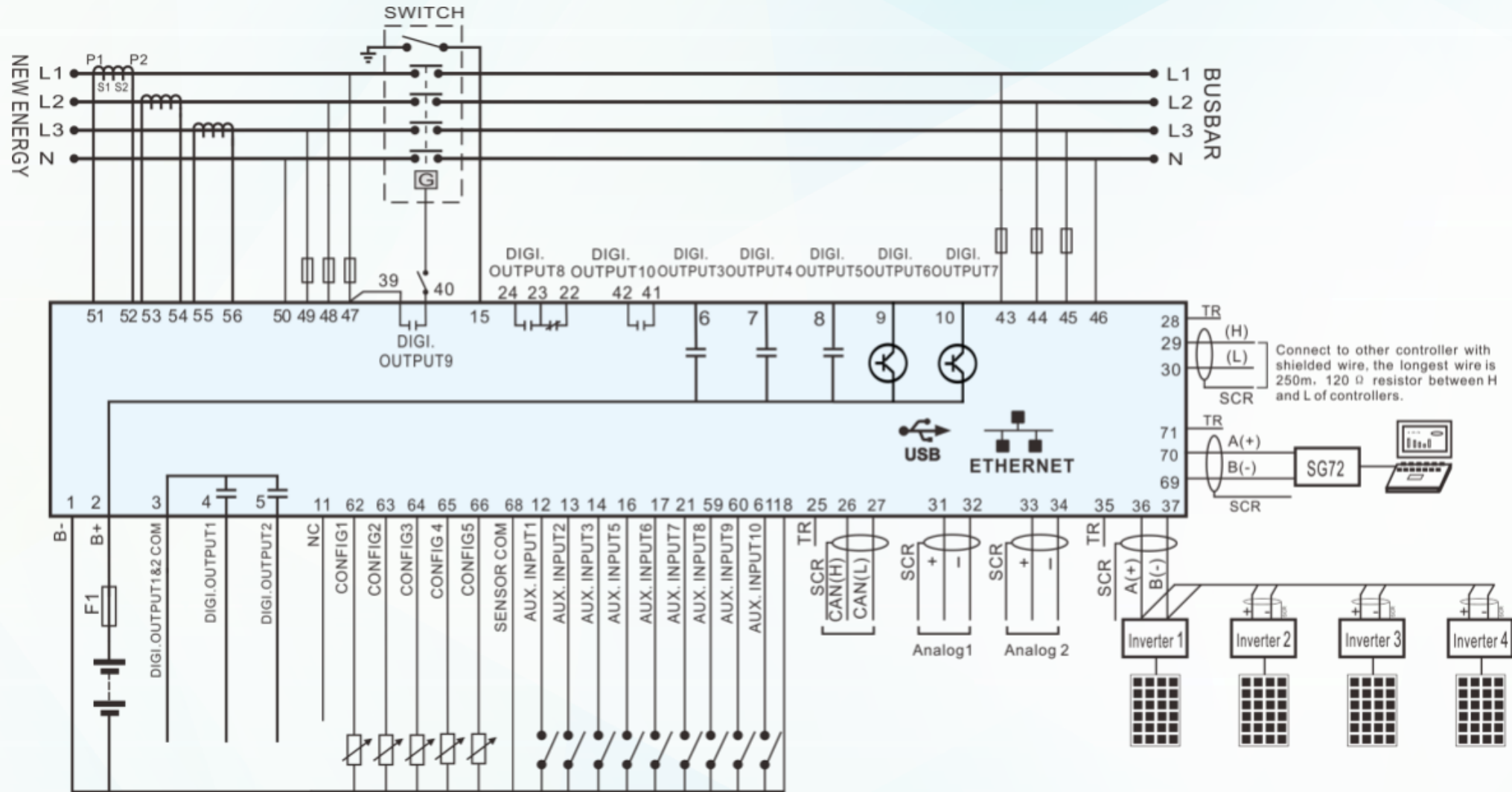
The mains supply module controls the stop of gensets.

**Application mode: island mode, the system priority is: PV>Storage Energy >Gen**

Energy storage power station is allowed to discharge and meets the load requirements, the gensets will stop.

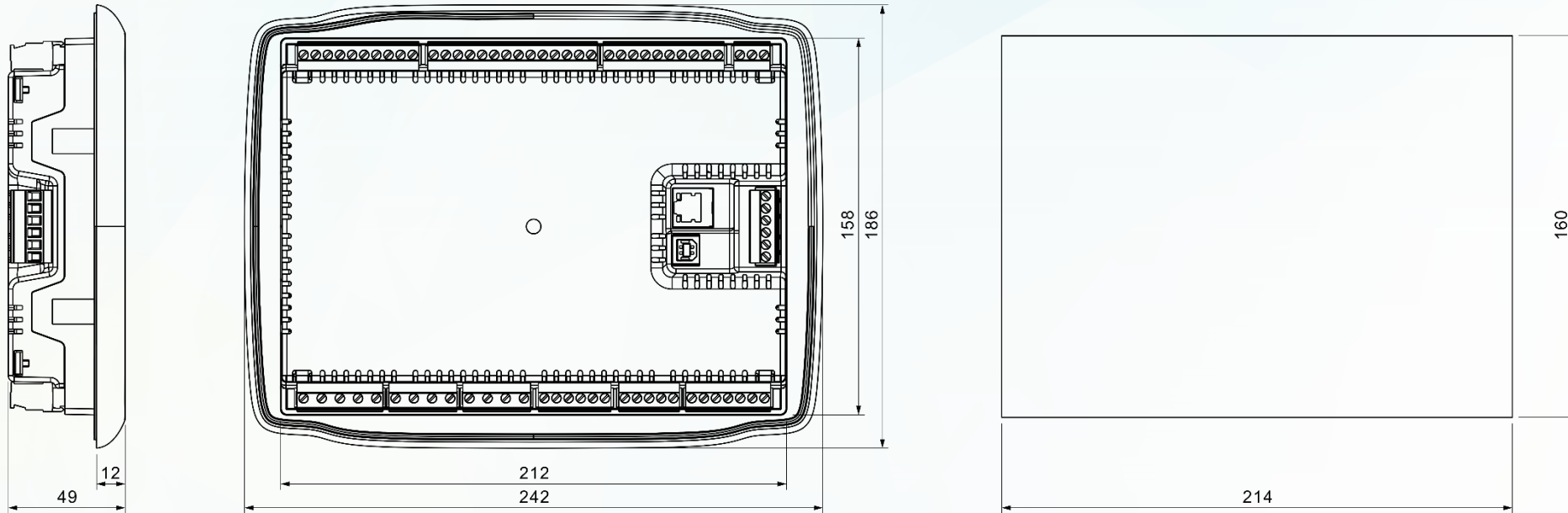
Remote start input is inactive, the gensets will stop

# □ Typical Diagram

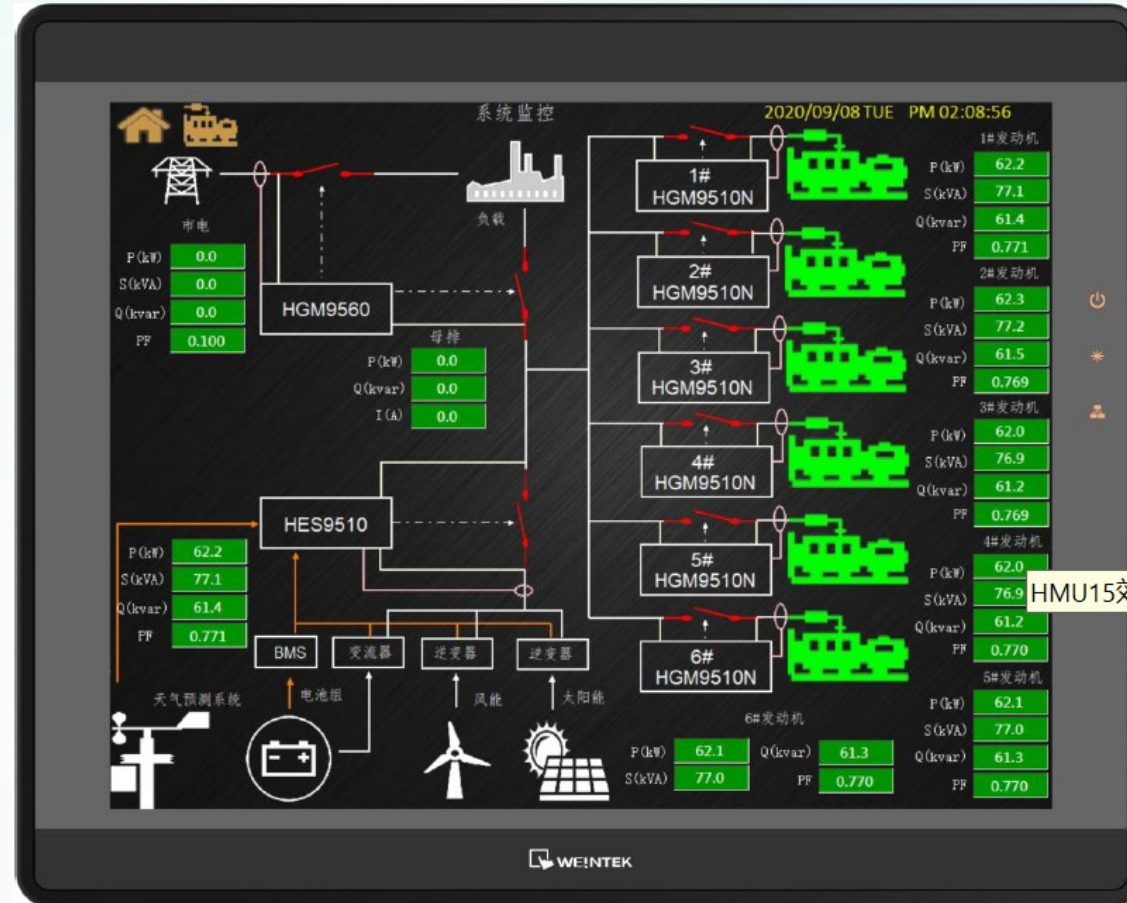




# □ Installation Dimensions



# Hybrid Monitoring System HES9510-RM



# □ Hybrid Monitoring System HES9510-RM

HES9510-RM hybrid energy monitoring system is suitable for remote monitoring single/multi HGM9510N genset controllers, HGM9560 bus tie mains parallel controller, HES9510 hybrid energy controller, which can realize auto start/stop/closing/opening, data measurement, alarm display functions of controller. It fits with LCD display and touch screen, so as to make this module easy and reliable to use.

HES9510-RM controller based on high-end microprocessor design, communicates with HGM9510N genset controller and HES9510 hybrid energy controller via ETHERNET interface, communicates with HGM9560 via RS485. The parameters can be read directly through communication interface and displayed on the HES9510-RM screen, which can realize display general system layout and branch system parameters.

## □ HES9510-RM Functions

- Single or up to 6 HGM9510N genset controllers can be monitored remotely;
- Single HGM9560 bus tie mains parallel controller can be monitored remotely;
- Single HES9510 hybrid energy controller can be monitored remotely;
- High-end ARM microprocessor as the core, LCD with backlight, visualization display, touch screen operation;
- Real-time display genset parameters and alarm information that detected by controller;
- HES9510-RM visualization display monitors the detailed parameters of controller and is able to control the push-button operation;
- Modular design, pluggable wiring terminals, embedded mounting, compact structure and easy installation.

# □ HGM9510N Monitoring Screen



# □ HGM9560 Monitoring Screen



# □ HES9510 Monitoring Screen



# □ HES9510-RM Configuration Screen





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