PCS-9563

PV Grid-Connected Inverter

PV grid-connection system refers to the system that converts solar power to electric power and transmits to the grid. It mainly consists of solar array, PV combiner box, PV grid- connected inverter, metering and control devices, and grid- connection system. The grid-connected inverter is one of the key equipments in the PV grid-connection system, and it is responsible for making the highest power output by solar cell panel, also converts the output DC electric energy to AC electric energy and transmits it to the power grid.

PCS-9563 series PV grid-connected inverter consists of advanced IGBT controlled inverter, protection & control equipment and I/O switchgear etc. The system power capacity portion is designed in modularized structure featuring easy extension, convenient installation and maintenance, optimal layout, and less land occupation. The system control portion is based on the professional control & protection platform featuring abundant hardware resources, complete software functions, and flexible configuration of control/operation parameters, to maximally meet the extension demand of on system flexibility and extensibility.

There are two types of PV grid-connected inverters provided by NR.

- PCS-9563 series central inverter: generally used in large-scale power plant.
- PCS-9563S series string inverter: suitable for small and medium-sized rooftop PV power generation system and small ground power station.

The main functions of the two types of inverters are the same, as shown below.

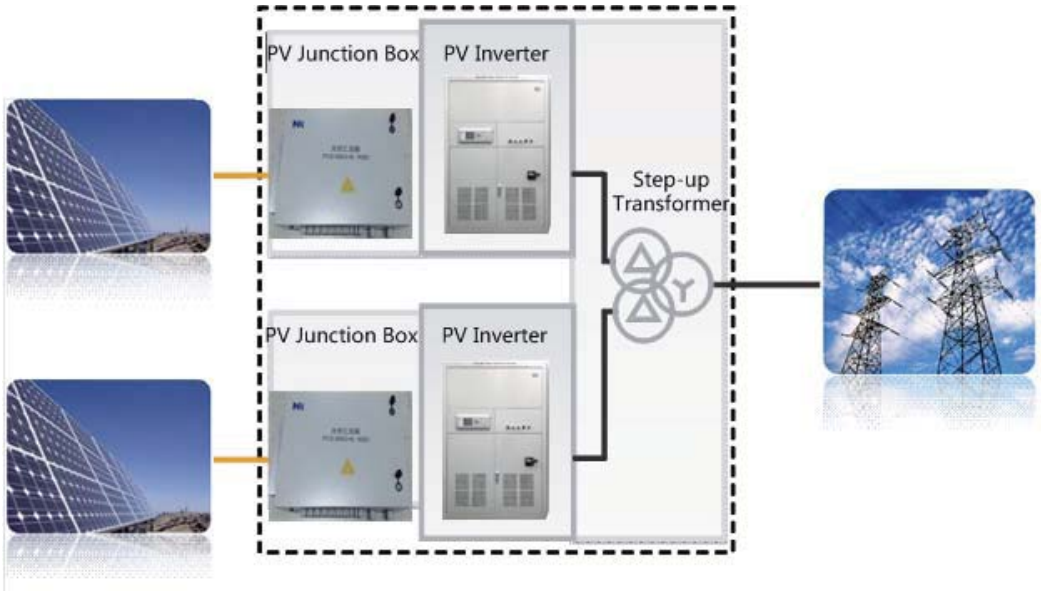

Figure 1 PCS-9563 PV Grid-connected Inverter

Function

- Soft grid-connected control
  The control system can accurately control the inverter output voltage in real-time based on the detected grid voltage and eliminate dynamic/static error to realize impulse-free grid- connection.
- Maximum Power Point Tracking (MPPT) control
  The system can search the maximum Power Point automatically based on the collected PV cell information, and control the real-time tracking of inverter to achieve the maximum power efficiency.
- Dynamic reactive power control and compensation
  In case of voltage drop in the grid, the control system can provide automatic reactive power compensation to maintain the grid voltage based on the voltage dip and duration.
- Islanding detection
  The system can rapidly detect the occurrence of islanding and handle it according to the preset strategy.
- Low voltage ride through (LVRT) operation
  The PCS-9563 inverter can maintain grid-connection operation and realize LVRT in case of low voltage fault in the grid.
- Power quality (PQ) control
  The PV inverter is designed with grid-connection power optimization stability to ensure power quality.
- Various operating modes
  The PCS-9563 has three working modes—Standby, Run and Stop, two self-check statuses—Normal and Fault, several running control modes—PQ control, Voltage Frequency control and Low voltage ride through (LVRT) etc, and several auto control logics—Auto run, Auto stop, Emergency stop etc.
- Auto start/stop
  The PCS-9563 PV grid-connection inverter is designed with auto grid connection and manual control is not required. The inverter automatically detects the DC/AC system data in standby mode and automatically shifts to 'Run' mode for grid connection when the running conditions are fulfilled. It tracks the PV array Maximum Power Point (MPP) in real-time and maintains the maximum power output during running.
- Auto fault processing
  During grid-interconnection operation, the inverter detects the self-operation condition and the status of PV array and AC grid in real-time. Once any fault or abnormal condition is detected in the PV power generating system, the inverter will stop running, send out alarm signals and enter fault emergency stop mode. The detailed fault information will be displayed on the LCD of control devices. The inverter will continuously detect the system status in fault mode and automatically restore running after the system fault is cleared for 5 minutes.

Features

For PCS-9563 series central inverter

Grid-friendly

- LVRT
- Overload capacity enhanced at least 10%
- Active power continuously adjustable (0~100%)
- Reactive power control on power factor
- Smart control, meet all requirements of grid-connection
- Communication compatible with grid-connection codes

Efficiency

- Max. efficiency at 98.9%
- Efficient MPPT control design, more solar power yields
- Efficient PWM algorithm, low power consumption
- Temperature controlled air-cooling, energy saving

Flexible

- -25˚C ~50˚C continuously operating at rated power
- Continuously and stably working in high altitude environment

Maintainable

- Design on proven grid protection & control hardware, utility level reliability and availability
- Built-in Transient Fault Recording function, outstanding error tracking, higher maintenance efficiency
- Fully metal encloser controller, higher corrosion resistance
- No cable connection in inverter controller, higher reliability
- Adoption of axial flow fan, longer service life

For PCS-9563S series string inverter

Grid-friendly

- LVRT
- Overload capacity enhanced at least 10%
- Meet all requirements of grid-connection
- Communication compatible with grid-connection codes

Efficiency

- Max. efficiency at 99%
- Efficient MPPT control design, more solar power yields
- Efficient PWM algorithm, low power consumption
- Temperature controlled air-cooling, energy saving

Flexible

- -25˚C ~60˚C operating ambient temperature range
- Continuously and stably working in high altitude environment

Maintainable

- Design on proven grid protection hardware, utility level reliability and availability
- Built-in Transient Fault Recording function, outstanding error tracking, higher maintenance efficiency
- IP65 Ingress protection rating design

Technical Data

For PCS-9563 series central inverter

Type	PCS-9563-500	PCS-9563-630
DC Input		
MPPT range (V)	500~850	520~850
Nominal continuous operating power(kW)	500	630
Nominal operating current (A)	1000	1000
AC Output		
Grid configuration(s) allowed for product connection	Three-phase three-wire system	Three-phase three-wire system
Nominal (line to line/line-neutral) operating voltage (V/AC)	315	360
Operating voltage range (V/AC)	283.5~346.5	324~396
Operating frequency range or single frequency (Hz)	49.5~50.2/59.5~60.2	49.5~50.2/59.5~60.2
Normal frequency (Hz)	50/60	50/60
Maximum continuous operating power @ 50˚C (kW)	500	630
Maximum continuous operating power @ 25˚C (kW)	550	690
Nominal continuous operating current (A)	916	1010
Maximum continuous operating current (A)	1008	1111
Power factor range	-0.9~+0.9	-0.9~+0.9
Maximum efficiency	98.9%	98.9%
Other Parameters		
Maximum full power operating ambient (˚C)	50˚C (500kW)	50˚C (630kW)
Enclosure ratings	IP20	IP20
Shipping temperature range	-40~70˚C	-40~70˚C
Operating temperature range	-25~50˚C	-25~50˚C
Display	LCD	LCD
Communication interface	RS485/Ethernet	RS485/Ethernet

For PCS-9563S series string inverter

Type	PCS-9563S-F40KTL	PCS-9563S-F50KTL	PCS-9563S-F80KTL
DC Input			
No. of MPPTs	3	3	4
Start up voltage for control circuit	300V	300V	200V
MPP voltage range	300V~950V	300V~1000V	200V~1000V
Max. number of PV strings per MPP	3/3/2	3/3/3	4/4/4/4
Max. input current	88A	99A	176A
Max. current for input connector	12A		
Max. input voltage	1000V	1100V	1100V
AC Output			
Rated output power	40kW	48kW	80kW
Max. output power (PF=1)	44kW	53kW	88kW
Supported power grid type	IT		
Rated voltage	480V/3-PE	540V/3-PE	540V/3-PE
AC voltage range	408~528V	459~594V	432~594V
Rated frequency	50Hz/60Hz		

Type	PCS-9563S-F40KTL	PCS-9563S-F50KTL	PCS-9563S-F80KTL
Rated AC current	48A	51A	86A
Max. output current	53A	56.7A	94A
THD (Total Harmonic Distortion)	<3% (rated)		
DC current injection	<0.5%		
Power factor	-0.8~0.8		
Protection			
LVRT	YES		
Anti-islanding protection	YES		
DC reverse-polarity protection	YES		
AC short-circuit protection	YES		
Leakage current protection	YES		
DC fuse	YES		
DC surge current protection	YES		
Insulation resistance monitoring	YES		
Overcurrent protection	YES		
System Parameters			
Max. efficiency	98.89%	99%	99%
Isolation method	Transformerless		
Ingress protection rating	IP65		
Operating temperature range	-25~60℃		
Allowable relative humidity range	0~100%		
Cooling type	Self-adaptive forced air cooling		
Pollution degree	3		
Max. operating altitude	3000m (>3000m derating)		
Mechanical Specifications			
Dimensions (W*H*D)	550W*792H*257D mm		690W *853W *309D mm
Mounting method	Wall bracket		
Weight	55kG	55kG	65kG
Communication			
RS485	Support		
USB	Support		
PLC	Support	Support	Optional
BLUETOOTH	Support		