KHKSCO
GROUP

KHKSCO Solar Water Pumping System

شركة خليل حمدان خليل واولاده

Khalil Hamdan Khalil & Sons Co






www.khkscogroup.com

HITACHI
Inspire the Next

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

From 18.5 kW to 250kW

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

Highlights

- Inverters with Solar Water Pump Control Option
- Available in Power Range from 0.75kW to 250kW
- Global Standard Approvals - CE, UL, c-UL, c-Tick
- Customized Programming Facility like Tank Water Level Control, Pump Dry Run Protection, Low Speed Slip Function etc.
- Total KWh/Power generated by Solar PV Panel Recording

Features

- **Intelligent Pump Control**

  1. Automatic Start/Stop of Pump Motor based on Irradiation of Sun.
  2. Delay auto restart logic for drip irrigation systems.
  3. Dedicated reduce torque control mode for Pump operation.

- **Powerful PC Software**

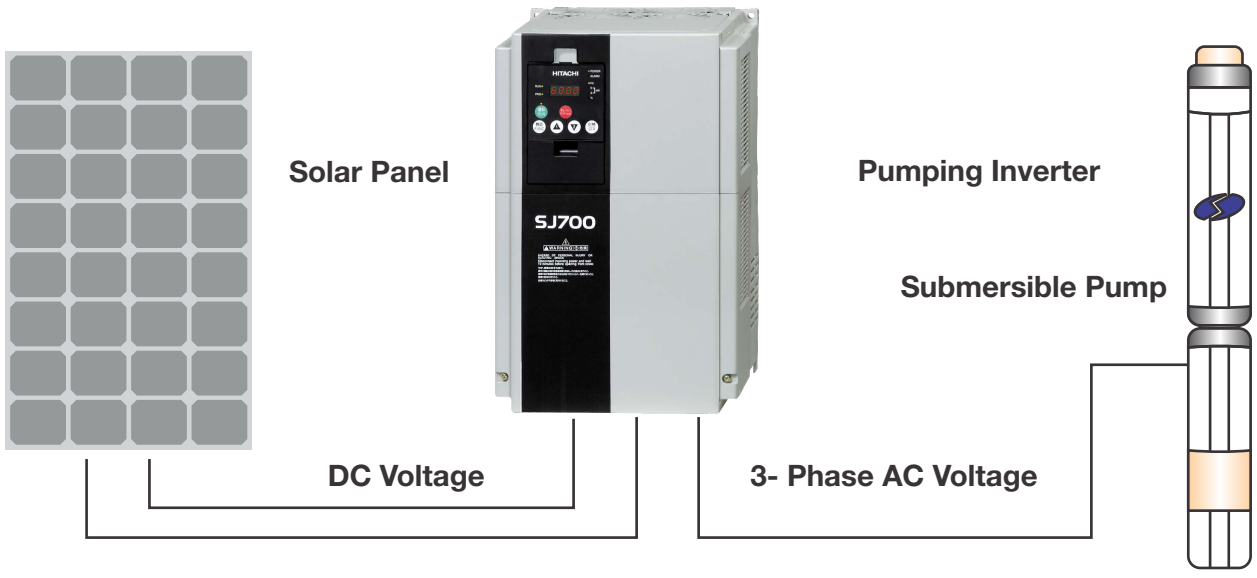
  1. Easy commissioning and monitoring of Water flow of pump and Power generation / utilization of PV module.

- **In-Built Maximum Power Point Tracking (MPPT) Control System**

  1. Optimum Power utilization of PV Solar Panel
  2. Control and changes Output of Inverter as per Demand and availability of Power from Sunlight.
  3. Saves Money and Fuel during Daylight Hours

- **Compact Control Panel**

Solar Pump VFD



With Advance MPPT Technology

New Line up

SJ700 Series

1 Dual rating

SJ700D can be used for both heavy and normal duty.
One-frame-size smaller SJ700D may be applicable for variable torque applications.

SJ700D-150LFF (15 Kw)

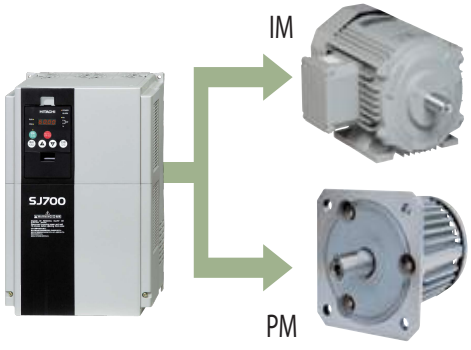
Heavy duty → 15kW
(overload capacity:150%,60sec)

Nomal duty → 18.5kW
(Overload capacity:120%,60sec)

2 Induction motor & permanent magnetic motor control with one inverter (PM motor control : ordering production)

IM+Inverter

PM
+Dedicated Controller



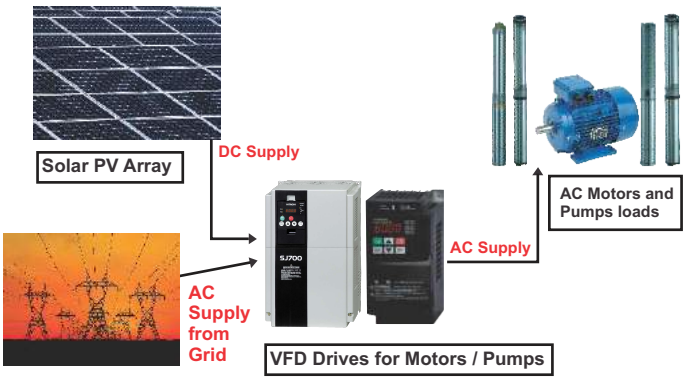
˜ The SJ700D series inverter can drive both induction motors (IM)and permanent magnetic motors (PM).

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

Solar Pump System

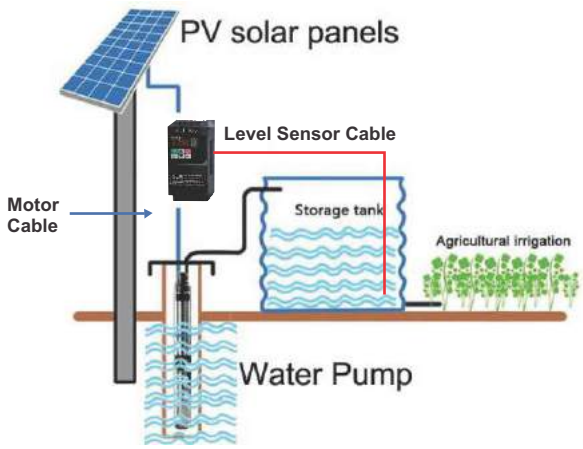
- Solar Pump System uses Photo-Voltaic Energy of the Sun to pump water for Agriculture/ Irrigation purposes and to feed water in Over-Head Tanks for Residential uses.
- Solar Pump uses Clean and Renewable energy.
- Operation principle is to convert the energy from Solar Radiation to Mechanical Energy of motor-shaft to pump water at specified flow-rate in the head.

Working Principle



- Works on both AC grid power supply and DC power supply from solar panel.
- Also Wireless monitoring system available for remote control.

Intelligent Pump Control



Hitachi Inverter uses Water Level Sensor which is placed in different position in Water Tower and Well.

For Bore Well: Stops pumping water when water level lower than low water level threshold and start pumping water when it is higher than high water level threshold. That will protect motor automatically.

For Overhead Tank: Stops pumping water when water level higher than high water level threshold and start pumping water when water level lower than low water level threshold.

Maximum Power Point Tracking Control (MPPT)

The Maximum Power Point Tracking (MPPT) ensures you to get the best output Power possible from your Solar Panel and it maximizes the performance of your Pump along the day while the automatic start and stop with solar radiation can save money and fuel during daylight hours.

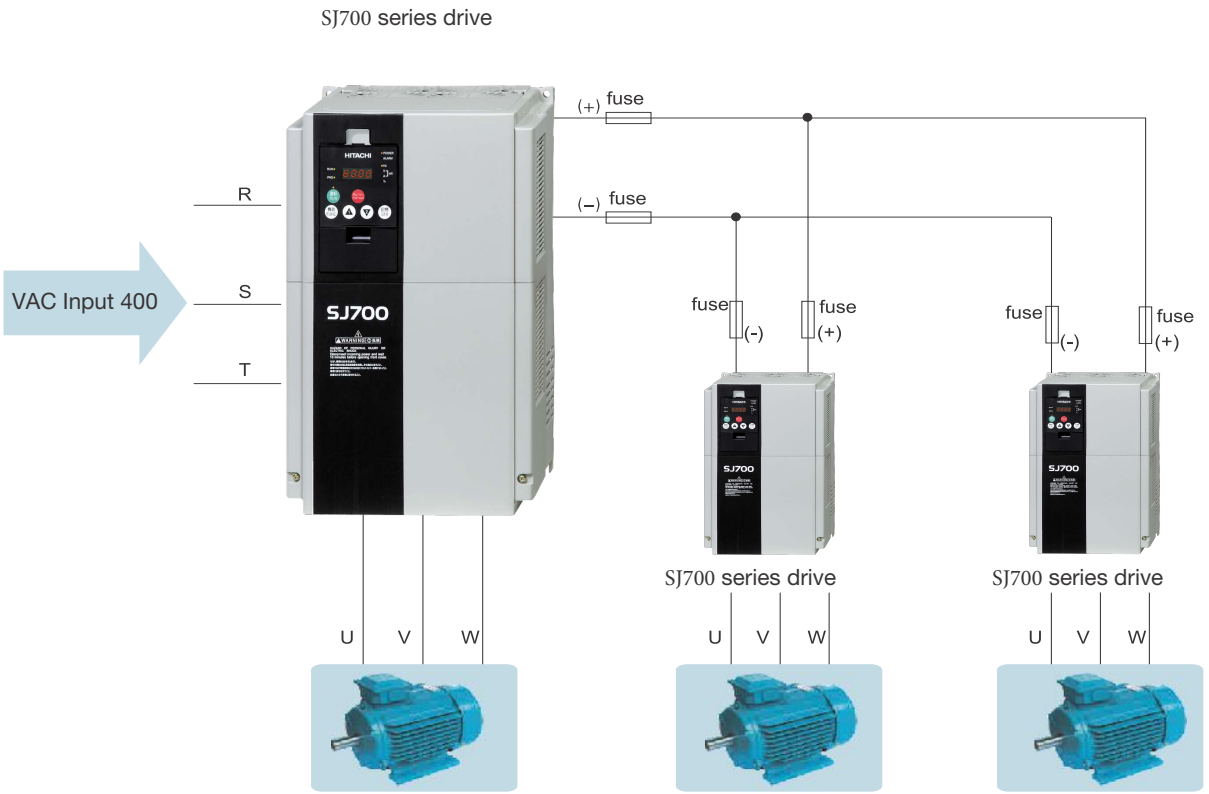
Hitachi Solar Pump inverter has In-Built MPPT Control that provides the best compromise between Convergence Speed, Efficiency and Performance- thus gives the best possible output from the pump.

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

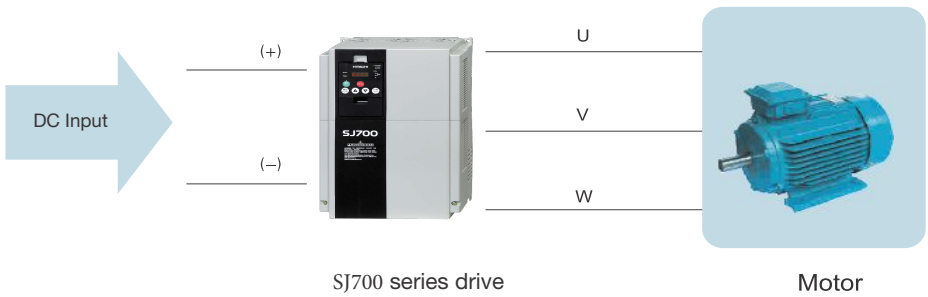
Supporting common DC bus ■

Reduce the power lost on DBR

Note the impact current and the capacity of the input AC system

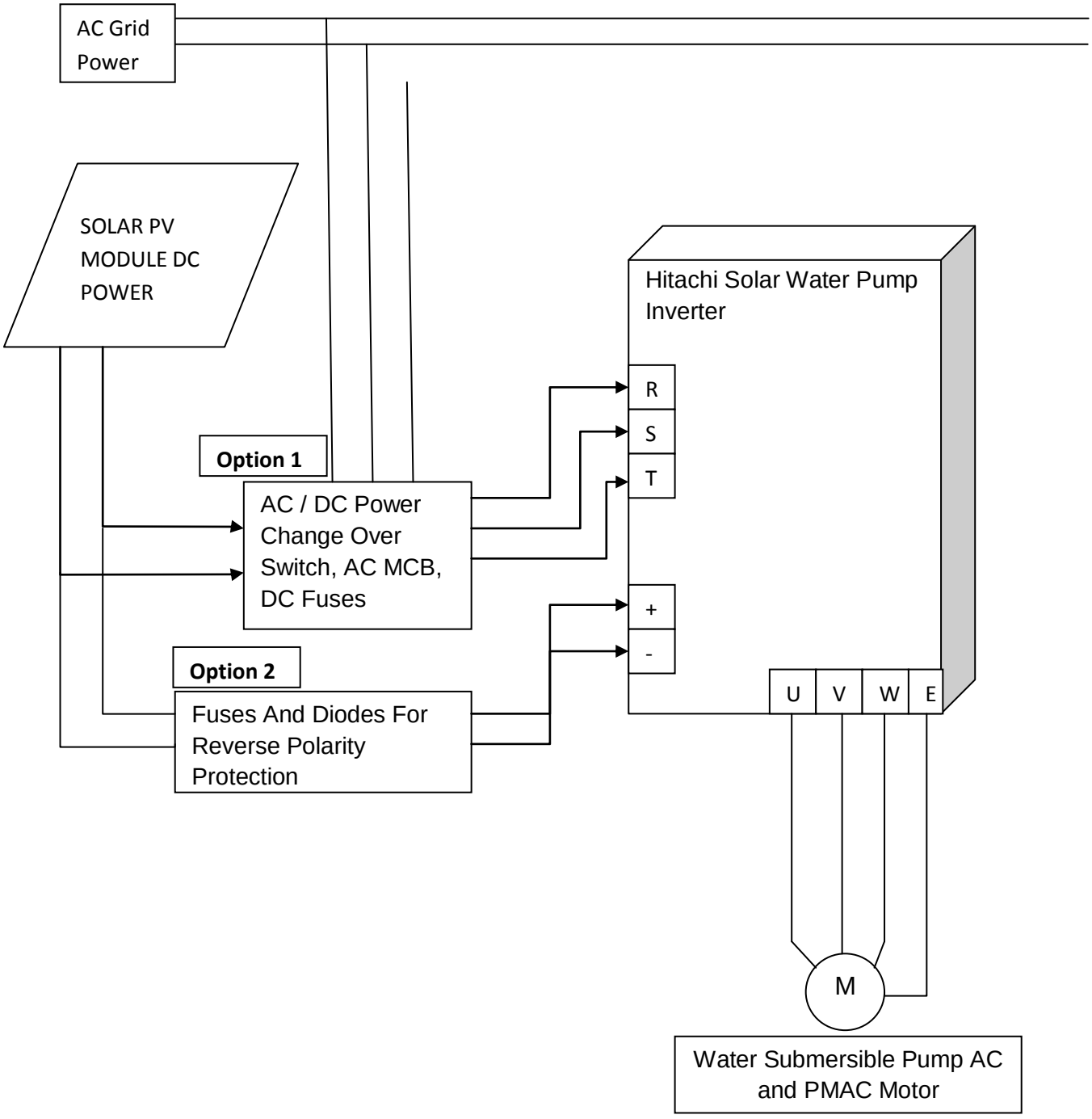


Available on DC power supply ■



Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

Power Wiring For Solar Power and Grid Power in Solar Water Pump Inverter



Note:

Option 1: When AC Grid Power and DC PV Power use with change over switch, Alternatively AC and DC power use in Inverter

Option 2: When AC Grid and DC PV Power use together In Inverter Where DC PV Module Total Vmp Value should be higher than (AC Grid Voltage x 1.414).

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

● General Specifications

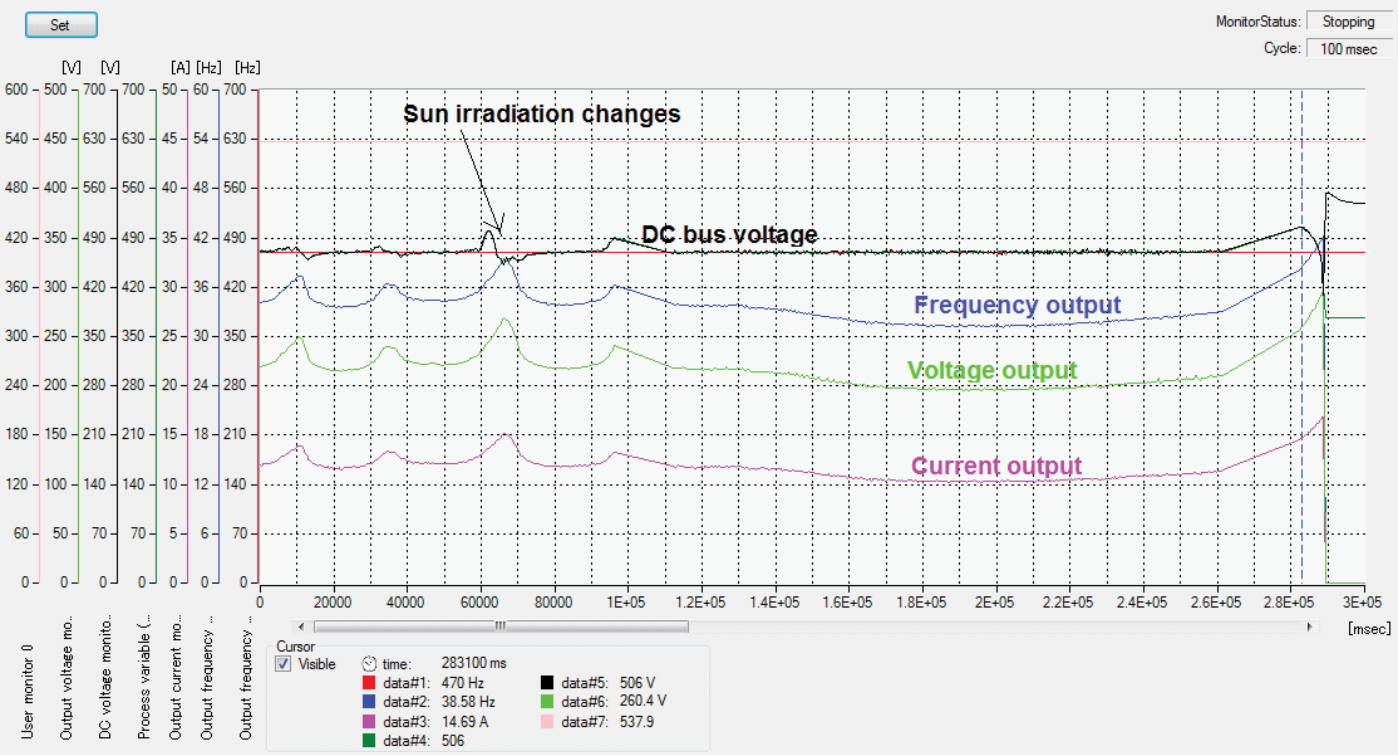
Maximum DC Input Voltage	400 V DC*1 900 V DC*2
MPPT Voltage Range for 3 phase 220 VAC Pumps	250 V DC to 400 V DC*1
MPPT Voltage Range for 3 phase 380 VAC pumps	460 V DC to 800 V DC*2
Output Frequency	Hz 60 - Hz 50

			General Specifications
Control	Control method		Line to line sine wave pulse-width modulation (PWM) control
	Output frequency range (*6)		0.1-400.0Hz(400kW:0.1-120Hz)
	Frequency accuracy		Digital: ±0.01% of the maximum frequency, Analog: ±0.2%(25±10˚C)
	Frequency resolution		Digital setting: 0.01Hz, Analog setting: (Maximum frequency)/4,000 (O terminal: 12bit 0-10V, O2 terminal: 12bit -10-+10V)
	V/f characteristics		SJ700D：IM : V/f optionally variable (30-400Hz of base frequency), V/f control (constant torque, reduced torque), sensorless vector control,0Hz ranged sensorless vector control (only CT), vector with sensor (SJ-FB card option , only CT) [ordering production] PM : sensorless vector control (only VT) SJ700/SJ700B：IM : V/f optionally variable (30-400Hz of base frequency), V/f control (constant torque, reduced torque), sensorless vector control 0Hz ranged sensorless vector control, vector with sensor (SJ-FB card option)
	Speed fluctuation		±0.5% (sensorless vector control)
	Acceleration/deceleration time		0.01-3,600sec. (Linear/curve, accel./decel. selection), Two-stage accel./decel.
	Starting Torque	SLV	SJ700/SJ700D (CT) 200%/0.3Hz, (VT) 150%/0.5Hz, 75kW to 150kW (CT) 180%/0.3Hz, (VT) 120%/0.5Hz, 185kW and over 150%/0.3Hz. SJ700B : 150%/0.5Hz, 90kW and over : 120%/0.5Hz,
		0Hz-SLV	SJ700/SJ700D (CT) (0Hz domain with motor one frame size down) 150% at around 0Hz, 75kW and over: 130% at around 0Hz. SJ700B : 120% at around 0Hz,SJ700D (VT):Disable.
		PM-SLV[ordering production]	SJ700D (0.4 to 132kW) : 50% (at 10% of motor constant speed) [ordering production] (only SJ700D (VT))
	Carrier frequency range		SJ700/SJ700D (CT) 0.5 to 15kHz, (VT) 0.5 to 12 kHz, 75kW to 150kW (CT) 0.5 to 10kHz, (VT) 0.5 to 8 kHz,185kW and over : 0.5 to 3.0kHz SJ700B : 0.5 to 12.0kHz (90kW and over : 0.5 to 8.0kHz)
	DC braking		Performs at start: under set frequency at deceleration, via an external input (braking force, time, and operating frequency).
Input signal	Frequency setting	Operator	Up and Down keys
		External signal(*8)	DC 0-10V, -10-+10V (input impedance 10kΩ), 4-20mA (input impedance 100Ω)
		External port	Setting via RS485 communication
	Forward /reverse Start /stop	Operator	Start/stop commands (forward/reverse switching by parameter setting)
		External signal	Forward-operation start/stop commands (reverse-operation start/stop possible when relevant commands are assigned to intelligent input terminals)3-wire input possible (when relevant commands are assigned to control circuit terminals)
		External port	Setting via RS485 communication
	Intelligent input terminals	Terminals	8 terminals, NO/NC switchable, sink logic/source logic switchable
		Functions	Reverse operation (RV), Multi-speed 1 setting (CF1), Multi-speed 2 setting (CF2), Multi-speed 3 setting (CF3), Multi-speed 4 setting (CF4), Jogging (JG), external DC braking (DB), 2nd motor control (SET), 2-stage acceleration/deceleration (2CH), free-run stop (FRS), external trip (EXT), unattended start protection (USP), commercial power supply switching (CS), software lock (SFT), analog input switching (AT), 3rd motor control (SET3), reset (RS), starting by 3-wire input (STA), stopping by 3-wire input (STP), forward/reverse switching by 3-wire input (F/R), PID disable (PID), PID integration reset (PIDC), control gain switching (CAS), acceleration by remote control (UP), deceleration by remote control (DWN), data clearance by remote control (UDC), forcible operation (OPE), Multi-speed bit 1 (SF1), Multi-speed bit 2 (SF2), Multi-speed bit 3 (SF3), Multi-speed bit 4 (SF4), Multi-speed bit 5 (SF5), Multi-speed bit 6 (SF6), Multi-speed bit 7 (SF7), overload restriction selection (OLR), torque limit selection (enabling/disabling) (TL), torque limit 1 (TRQ1), torque limit 2 (TRQ2), P/PI switching (PPI), braking confirmation (BOK), orientation (ORT), LAD cancellation (LAC), clearance of position deviation (PCLR), permission of 90˚shift phase (STAT), trigger for frequency addition (A145) (ADD), forcible-terminal operation (F-TM), permission of torque command input (ATR), cumulative power clearance (KHC), servo-on (SON), pre-excitation (FOC), general-purpose input 1 (MI1), general-purpose input 2 (MI2), general-purpose input 3 (MI3), general-purpose input 4 (MI4), general-purpose input 5 (MI5), general-purpose input 6 (MI6), general-purpose input 7 (MI7), general-purpose input 8 (MI8), analog command holding (AHD), Multistage position settings selection 1 (CP1), Multistage position settings selection 2 (CP2), Multistage position settings selection 3 (CP3), Zero-return limit function (ORL), Zero-return trigger function (ORG), Forward drive stop (FOT), reverse drive stop (ROT), Speed / position switching (SPD), Pulse counter (PCNT), Pulse counter clear (PCC), Emergency stop (EMR) ,EzSQ PRG-Run(PRG)(*12) ,no assignment (no)
	Thermistor input		1 terminal (PTC characteristics)
Output signal	Intelligent output terminals	Terminals	5 open-collector output terminals, NO/NC switchable, sink logic/source logic switchable 1 relay (1c-contact) output terminal: NO/NC switchable
		Functions	Running (RUN), constant-speed reached (FA1), set frequency overreached (FA2), overload notice advance signal (1) (OL), output deviation for PID control (OD), alarm signal (AL), set frequency reached (FA3), over-torque (OTQ), instantaneous power failure (IP), undervoltage (UV), torque limited (TRQ), operation time over (RNT), plug-in time over (ONT), thermal alarm signal (THM), brake release (BRK), braking error (BER), 0Hz detection signal (ZS), speed deviation maximum (DSE), positioning completed (POK), set frequency overreached 2 (FA4), set frequency reached 2 (FA5), overload notice advance signal (2) (OL2), PID feedback comparison (FBV), communication line disconnection (NDc), logical operation result 1 (LOG1), logical operation result 2 (LOG2), logical operation result 3 (LOG3), logical operation result 4 (LOG4), logical operation result 5 (LOG5), logical operation result 6 (LOG6), capacitor life warning (WAC)(*11), cooling-fan speed drop (WAF), starting contact signal (FR), heat sink overheat warning (OHF), low-current indication signal (LOC), general-purpose output 1 (M01), general-purpose output 2 (M02), general-purpose output 3 (M03), general-purpose output 4 (M04), general-purpose output 5 (M05), general-purpose output 6 (M06), inverter ready (IRDY), forward rotation (FWR), reverse rotation (RVR), major failure (MJA), window comparator O (WCO), window comparator OI (WCOI), window comparator O2 (WCO2), alarm code 0 to 3 (AC0 to AC3)
		Monitor output terminals	Analog voltage output, analog current output, pulse-string output (e.g., A-F, D-F [n-fold, pulse output only], A, T, V, P)
Monitoring on display			Output frequency, output current, output torque, frequency conversion data, trip history, input/output terminal status, electric power, and others
Other functions			Free V/f setting (7 breakpoints), frequency upper/lower limit, jump (center) frequency, acceleration/deceleration according to characteristic curve, manual torque boost level/breakpoint, energy-saving operation, analog meter adjustment, start frequency setting, carrier frequency adjustment, electronic thermal function (available also for free setting), external start/end frequency/frequency rate, analog input selection, retry after trip, restart after instantaneous power failure, output of various signals, starting with reduced voltage, overload restriction, initial-value setting, automatic deceleration at power failure, AVR function, fuzzy acceleration/deceleration, online/offline auto-tuning, high-torque multi-motor operation (*11) (sensorless vector control of two motors by one inverter)
Protective functions			Overcurrent protection, overvoltage protection, undervoltage protection, electronic thermal protection, temperature error protection, instantaneous power failure protection, phase loss input protection, braking-resistor overload protection, ground-fault current detection at power-on, USP error, external trip, emergency stop trip, CT error, communication error, option board error, and others
Environmental conditions	Ambient operating/storage temperature (*7)/ humidity		-10-50˚C (*9) / -20-65˚C / 20-90%RH (No condensation)
	Location		Altitude 1,000m or less, indoors (no corrosive gases or dust)
Options	Digital input expansion card		SJ-DG (4digits BCD, 16bits binary)
	Feedback expansion card		SJ-FB (vector control loop speed sensor)
	Network interface card		SJ-DN2 (DeviceNet (TM)) (*13), SJ-PB (T)2 (PROFIBUS) (*13)
	Others		EMI filters, input/output reactors, radio noize filters, braking resistors, braking units, LCR filter, communication cables

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

Powerful PC Software

Software Functions for Easy Analysis and Operation



Data Logging Facilities , Monitor and Records

- Power Generated
- Motor Curr ent (Amp)
- Motor Speed (Hz)
- Solar DC voltage

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

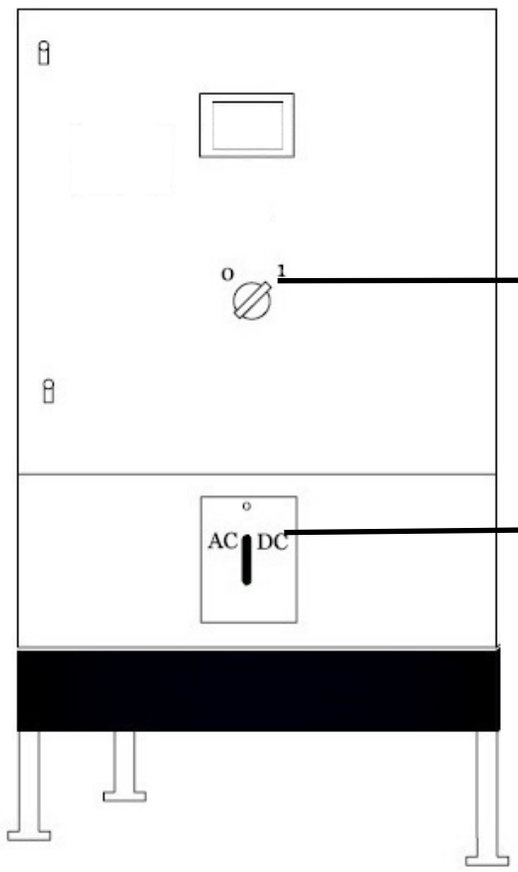
General Specification data of HITACHI Solar Water pumping System

Model Number	Power KW	Output Current-A	Solar Arrays (W)	Inverter Dimensions (mm)				Panel Dimensions		
				Height	Width	Depth	Weight(kg)	Height	Width	Depth
Input DC 350 V to 780V , for 3 phase Output 380 V/400 V AC - 50/60 Hz Pumps										
SJ700-185H-Solar	22	43	28000	390	250	190	14			
SJ700-220H-Solar	30	57	37500	390	250	190	14			
SJ700-300H-Solar	37	70	47000	540	310	195	22			
SJ700-370H-Solar	45	85	57000	550	390	250	30			
SJ700-450H-Solar	55	105	69000	550	390	250	30			
SJ700-550H-Solar	75	135	94000	550	390	250	30			
SJ700-750H-Solar	90	160	112000	700	390	270	60			
SJ700-900H-Solar	110	195	138000	700	390	270	60			
SJ700-1100H-Solar	132	230	165000	740	480	270	80			
SJ700-1320H-Solar	160	290	200000	740	480	270	80			

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

SYSTEM PANEL

مكونات لوحة النظام

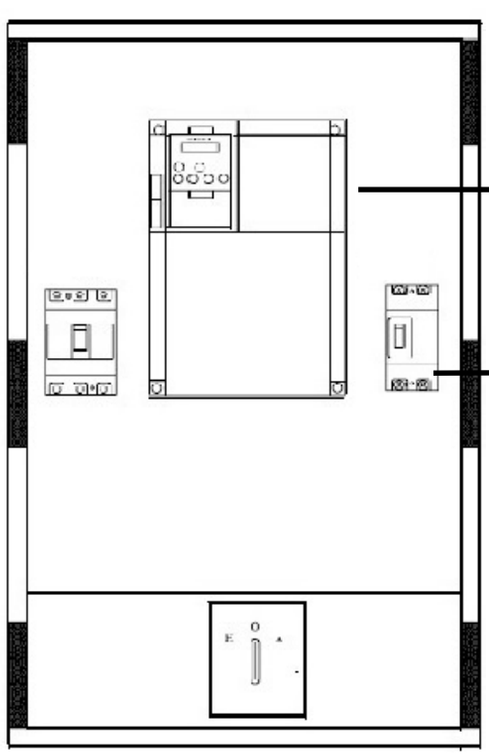


RENY

On/Off
Selector Switch For
The System

telergon

Ac / Dc
Changeover Switch



HITACHI

Hitachi
Solar Inverter

HITACHI

(M)olded
(C)ase
(C)ircuit
(B)reakers

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

telergon

SPECIALIZED FOR SOLAR SYSTEM

Changeover switch (Up to 600 A)

SPECIALIZED TO CHANGING BETWEEN AC / DC

DC Switch Disconnect :

25 TO 1250A, 1000V DC FOR PHOTOVOLTIC INSTALLATIONS

DC Fuse :

SOLAR PROTECTION FOR PHOTOVOLTIC COMBINER BOX

SYSTEM PANEL

HITACHI
Inspire the Next

HITACHI MCCB

MOLDED CASE CIRCUIT BREAKER

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

KHKSCO – ControL & Monitoring

KHKSCO - HMI System

KHKSCO - LCD GSM System

Control & Monitoring Your Pump Via SMS

Hitachi NJ600B & SJ700 Inverter for Solar Water Pump

لوحة نظام تشغيل المضخات

مشاريع تشغيل مضخات المياه بالطاقة الشمسية

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