



KHKSCO Solar Water Pumping System

شركة خليل حمدان خليل واولاده

Khalil Hamdan Khalil & Sons Co



www.khkscogroup.com

Hitachi WJ200 Inverter for Solar Water Pump

Pursuing the Ideal Compact Inverter

WJ200 Series

Designed for excellent performance and user friendliness



HITACHI
Inspire the Next

Hitachi WJ200 Inverter for Solar Water Pump

From 0.2 kW to 15 kW

Let Your Pump
Run on Sun Light



Hitachi WJ200 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

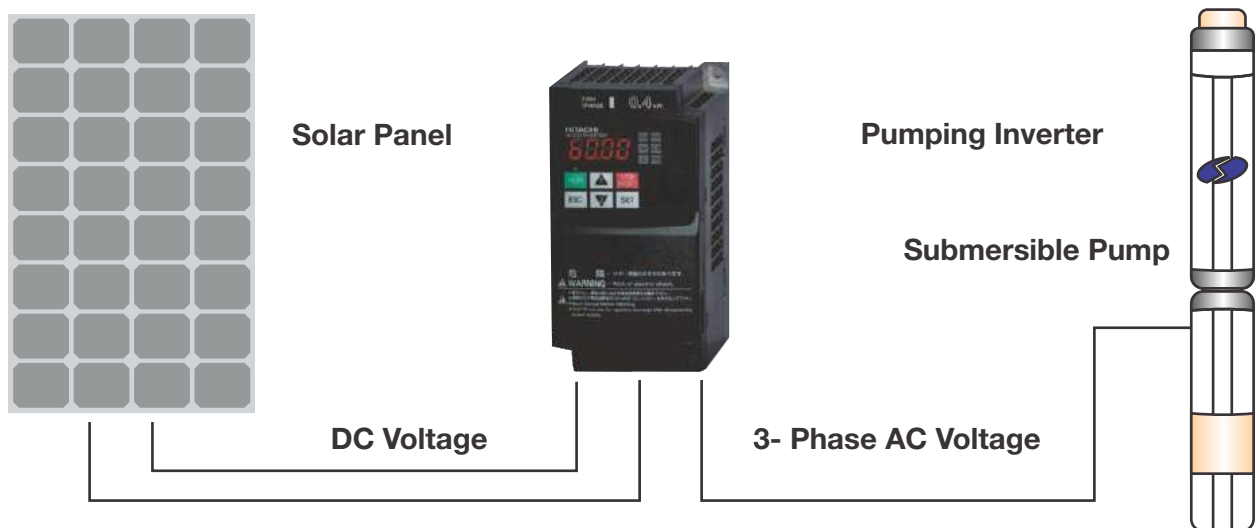
Features

- **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



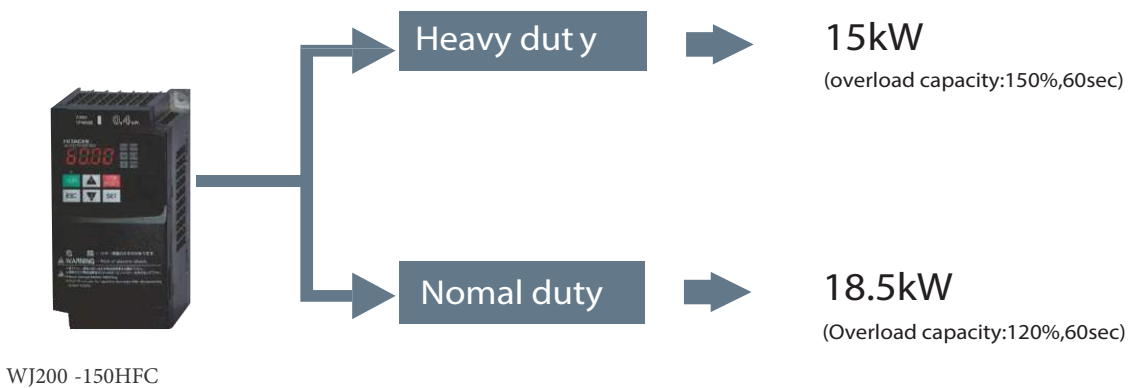
With Advance MPPT Technology



WJ200 Series

1 Dual rating

WJ200 can be used for both heavy and normal duty
One-frame-size smaller WJ200 may be applicable for variable torque applications



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



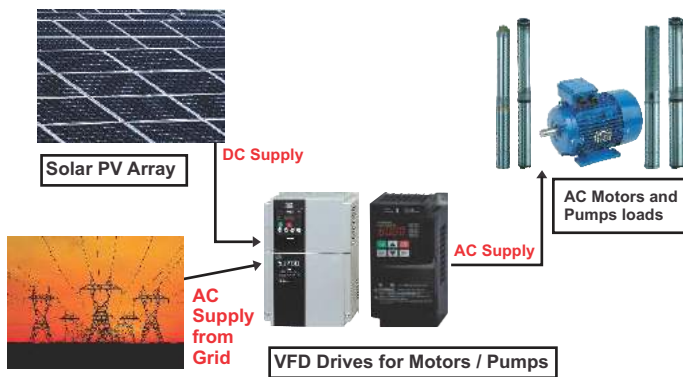
The WJ200 series inverter can drive both ~ induction motors (IM) and permanent magnetic motors (PM).

Hitachi WJ200 Inverter for Solar Water Pump

Solar Pump System

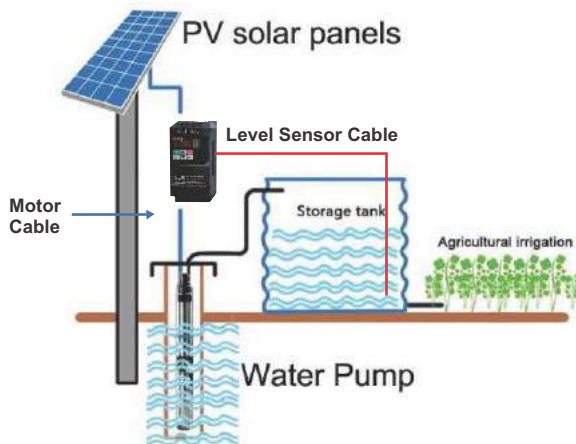
- Solar Pump System uses Photo-Voltaic Energy of the Sun to pump water for Agriculture/ Irrigation purposes and to feed water in Over-Head Tanks for Residential uses.
- Solar Pump uses Clean and Renewable energy.
- Operation principle is to convert the energy from Solar Radiation to Mechanical Energy 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 WJ200 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

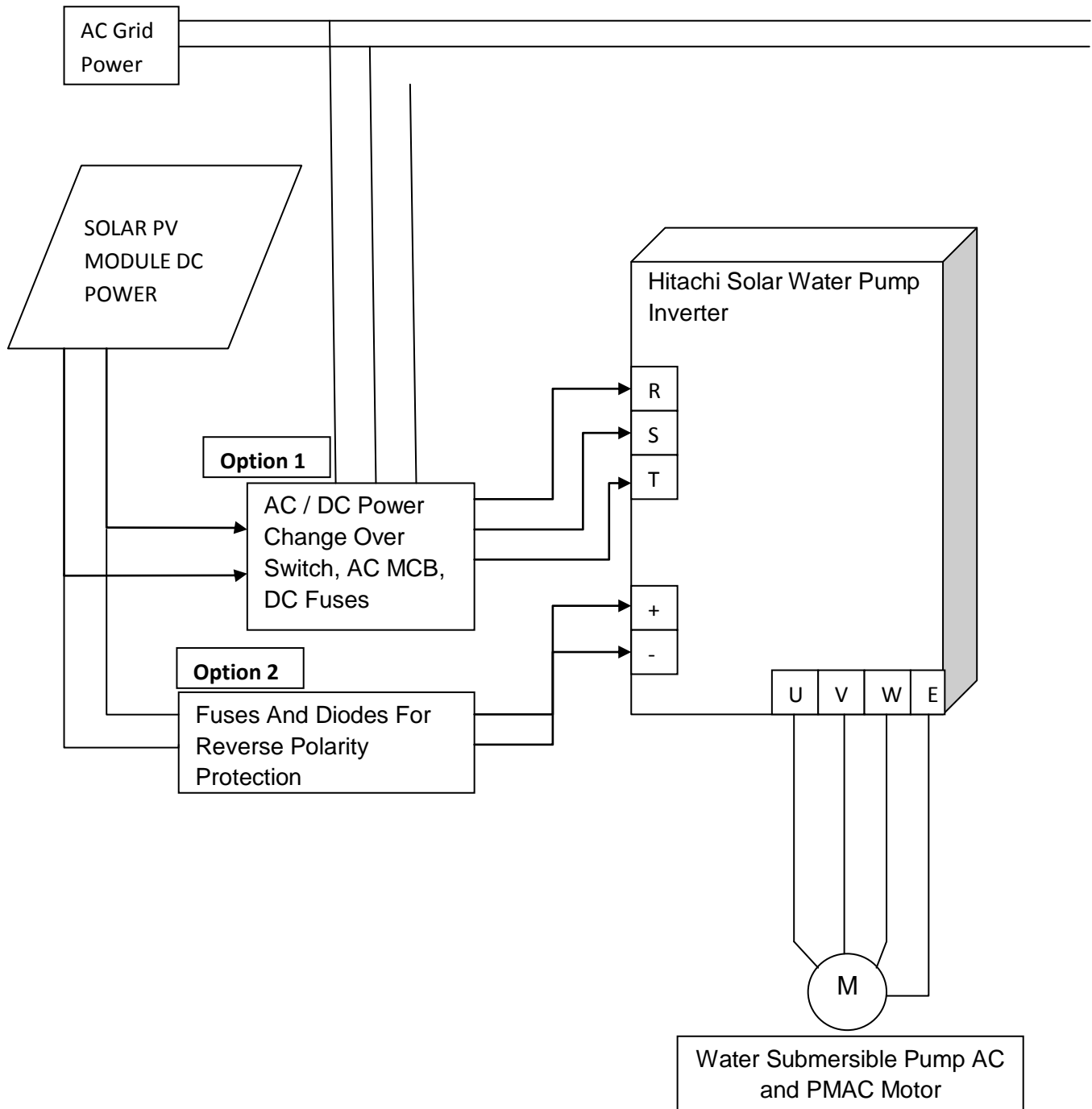


■ Available on DC power supply



Hitachi Wj200 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 WJ200 Inverter for Solar Water Pump

● General Specifications

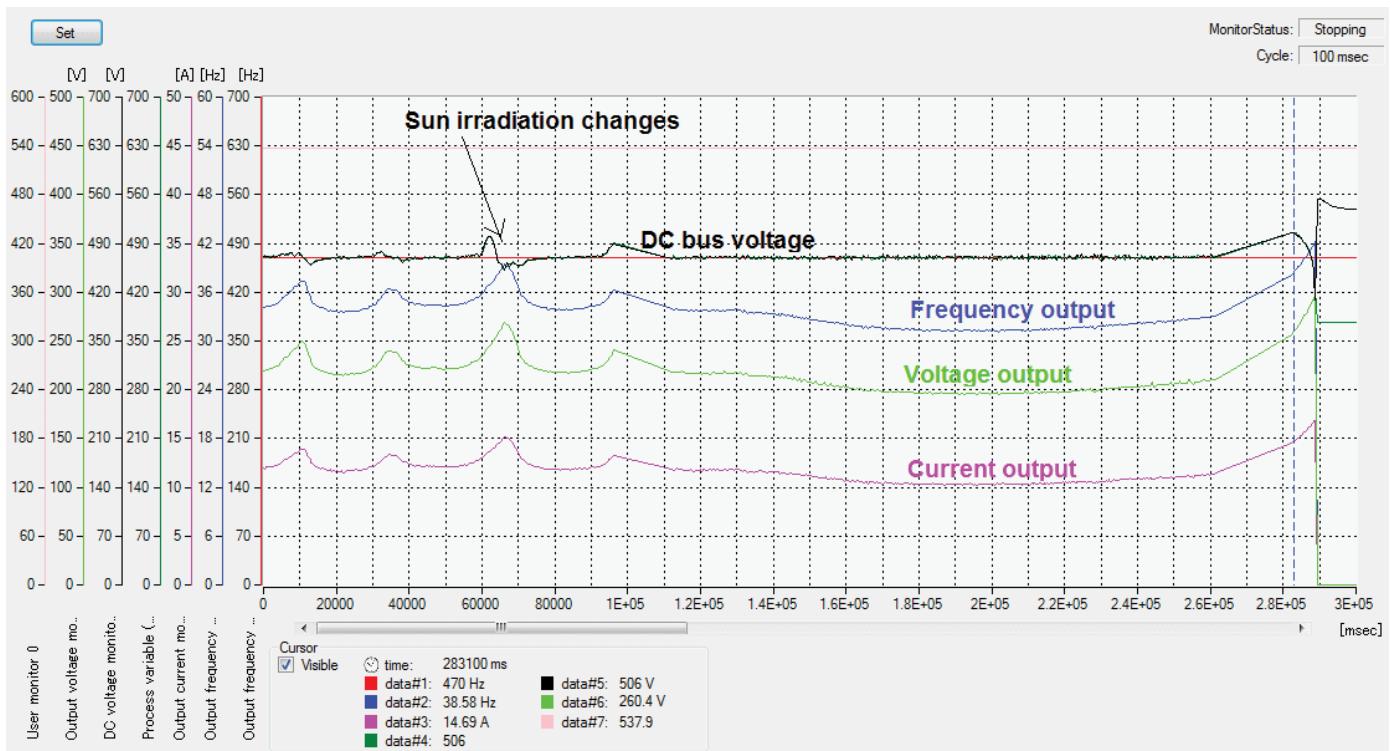
Maximum DC Input Voltage	400 V DC*1 900 V DC*2
MPPT Voltage Range for 3 phase 220 VAC Pumps	250 V DC to 400 V DC*1
MPPT Voltage Range for 3 phase 380 VAC pumps	460 V DC to 800 V DC*2
Output Frequency	Hz 60 - Hz 50

Item		General Specifications	
Protective housing *3		IP20	
Control method		Sinusoidal Pulse Width Modulation (PWM) control	
Carrier frequency		2kHz to 15kHz (derating required depending on the model)	
Output frequency range *4		0.1 to 400Hz	
Frequency accuracy		Digital command: $\pm 0.01\%$ of the maximum frequency Analog command: $\pm 0.2\%$ of the maximum frequency (25°C $\pm 10^\circ\text{C}$)	
Frequency setting resolution		Digital: 0.01Hz; Analog: max. frequency / 1000	
Volt. / Freq. characteristic		V/f control (constant torque, reduced torque, free-V/F): base freq. 30Hz – 400Hz adjustable, Sensorless vector control, Closed loop control with motor encoder feedback (only V/f control).	
Overload capacity		Dual rating: CT (Heavy duty): 60 sec. @150% VT (Normal duty): 60 sec. @120%	
Acceleration / deceleration time		0.01 to 3600 seconds, linear and S-curve accel / decel, second accel / decel setting available	
Starting torque		200% @0.5Hz (sensorless vector control)	
DC braking		Variable operating frequency, time, and braking force	
Input signal	Freq. setting	Operator panel	$\Delta \nabla$ keys / Value settings
		External signal *6	0 to 10 VDC (input impedance 10k Ω), 4 to 20mA (input impedance 100 Ω), Potentiometer (1k to 2k Ω , 2W)
		Via network	RS485 ModBus RTU, other network option
	FWD / REV run	Operator panel	Run / Stop (Forward / Reverse run change by command)
		External signal *6	Forward run / stop, Reverse run / stop
		Via network	RS485 ModBus RTU, other network option
	Intelligent input terminal	Terminals	7 terminals, sink / source changeable by a short bar
	68 functions assignable	Functions	FW (forward run command), RV (reverse run command), CF1 – CF4 (multi-stage speed setting), JG (jog command), DB (external braking), SET (set second motor), 2CH (2-stage accel. / decel. command), FRS (free run stop command), EXT (external trip), USP (startup function), CS (commercial power switchover), SFT (soft lock), AT (analog input selection), RS (reset), PTC (thermistor thermal protection), STA (start), STP (stop), F / R (forward / reverse), PID (PID disable), PIDC (PID reset), UP (remote control up function), DWN (remote control down function), UDC (remote control data clear), OPE (operator control), SF1 – SF7 (multi-stage speed setting; bit operation), OLR (overload restriction), TL (torque limit enable), TRQ1 (torque limit changeover1), TRQ2 (torque limit changeover2), BOK (Braking confirmation), LAC (LAD cancellation), PCLR (position deviation clear), ADD (add frequency enable), F-TM (force terminal mode), ATR (permission of torque command input), KHC (Cumulative power clear), MI1 – MI7 (general purpose inputs for EzSQ), AHD (analog command hold), CP1 – CP3 (multistage-position switches), ORL (limit signal of zero-return), ORG (trigger signal of zero-return), SPD (speed/position changeover), GS1,GS2 (STO inputs, safety related signals), 485 (Starting communication signal), PRG (executing EzSQ program), HLD (retain output frequency), ROK (permission of run command), EB (rotation direction detection of B-phase), DISP (display limitation), NO (no function)
	Output signal	Intelligent output terminal	Functions
Monitor output (analog)			Output freq., output current, output torque, output voltage, input power, thermal load ratio, LAD freq., heat sink temperature, general output (EzSQ)
Pulse train output (0 – 10VDC, 32kHz max.)			[PWM output] Output freq., output current, output torque, output voltage, input power, thermal load ratio, LAD freq., heat sink temperature, general output (EzSQ) [Pulse train output] Output frequency, output current, pulse train input monitor
Alarm output contact		ON for inverter alarm (1c contacts, both normally open or closed available.)	
Other functions		Free-V/f, manual / automatic torque boost, output voltage gain adjustment, AVR function, reduced voltage start, motor data selection, auto-tuning, motor stabilization control, reverse running protection, simple position control, simple torque control, torque limiting, automatic carrier frequency reduction, energy saving operation, PID function, non-stop operation at instantaneous power failure, brake control, DC injection braking, dynamic braking (BRD), frequency upper and lower limiters, jump frequencies, curve accel and decel (S, U, inverted U,EL-S), 16-stage speed profile, fine adjustment of start frequency, accel and decel stop, process jogging, frequency calculation, frequency addition, 2-stage accel / decel, stop mode selection, start / end freq., analog input filter, window comparators, input terminal response time, output signal delay / hold function, rotation direction restriction, stop key selection, software lock, safe stop function, scaling function, display restriction, password function, user parameter, initialization, initial display selection, cooling fan control, warning, trip retry, frequency pull-in restart, frequency matching, overload restriction, over current restriction, DC bus voltage AVR	
Protective function		Over-current, over-voltage, under-voltage, overload, brake resistor overload, CPU error, memory error, external trip, USP error, ground fault detection at power on, temperature error, internal communication error, driver error, thermistor error, brake error, safe stop, overload at low speed, modbus communication error, option error, encoder disconnection, speed excessive, EzSQ command error, EzSQ nesting error, EzSQ execution error, EzSQ user trip	
Operating environment	Temperature	Operating (ambient): -10 to 50°C / Storage: -20 to 65°C *7	
	Humidity	20 to 90% humidity (non-condensing)	
	Vibration *8	5.9m/s ² (0.6G), 10 to 55 Hz	
	Location	Altitude 1,000m or less, indoors (no corrosive gasses or dust)	
Coating color		Black	
Options		Remote operator unit, cables for the units, braking unit, braking resistor, AC reactor, DC reactor, EMC filter	

Hitachi WJ200 Inverter for Solar Water Pump

Powerful PC Software

Software Functions for Easy Analysis and Operation



Data Logging Facilities, Monitor and Records

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

Hitachi WJ200 Inverter for Solar Water Pump

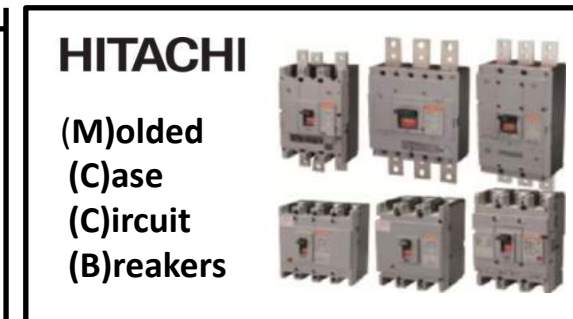
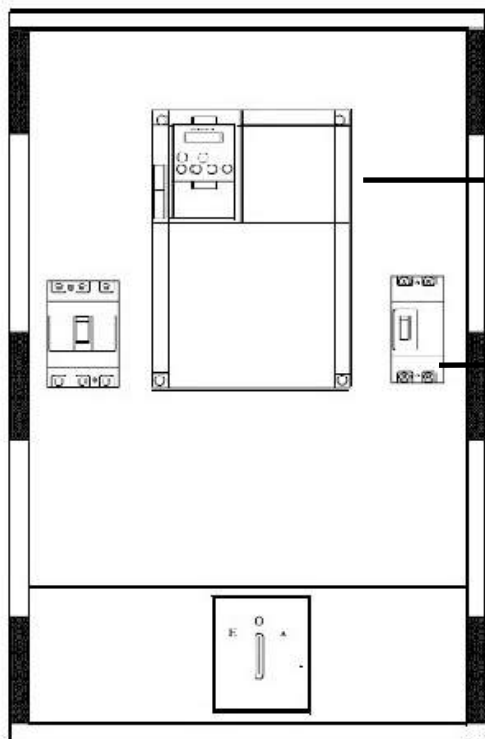
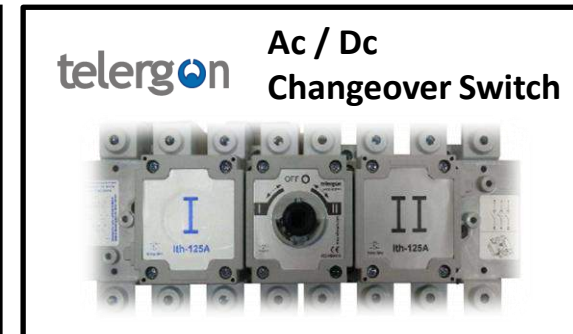
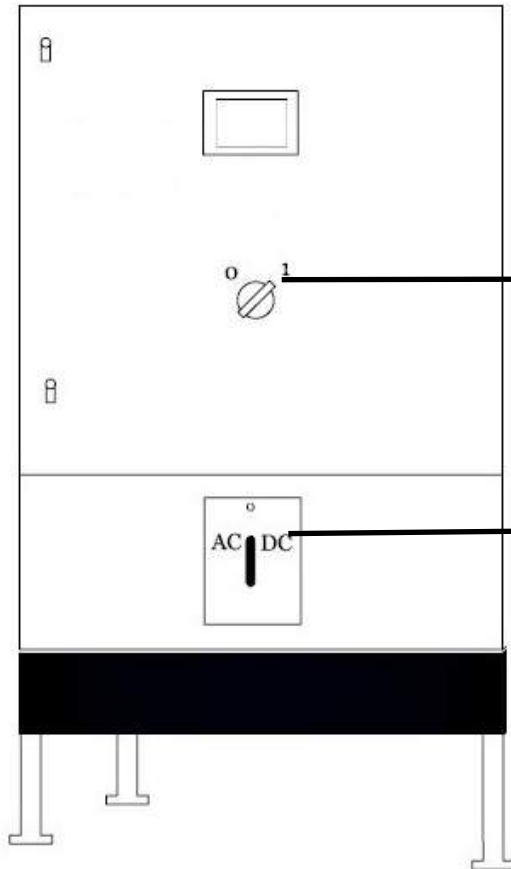
General Specification data of HITACHI Solar Water pumping System

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 250 V to 400 V , for 1 Phase & 3 phase Output 220 V AC - 50/60 Hz Pumps										
WJ200-001S-Solar	0.2	1.2	300	128	68	109	1			
WJ200-002S-Solar	0.4	1.9	600	128	68	109	1			
WJ200-004S-Solar	0.55	3.5	900	128	68	122.5	1.1			
WJ200-007S-Solar	1.1	6	1800	128	108	170.5	1.6			
WJ200-015S-Solar	2.2	9.6	2750	128	108	170.5	1.8			
WJ200-022S-Solar	3	12	3750	128	108	170.5	1.8			
Input DC 350 V to 780V , for 3 phase Output 380 V/400 V AC - 50/60 Hz Pumps										
WJ200-004H-Solar	0.75	2.1	1000	128	108	143.5	1.5			
WJ200-007H-Solar	1.5	4.1	1900	128	108	170.5	1.6			
WJ200-015H-Solar	2.2	5.4	2750	128	108	170.5	1.8			
WJ200-022H-Solar	3	6.9	3750	128	108	170.5	1.9			
WJ200-030H-Solar	4	8.8	5000	128	108	170.5	1.9			
WJ200-040H-Solar	5.5	11.1	7000	128	140	170.5	2.1			
WJ200-055H-Solar	7.5	17.5	9500	260	140	155	3.5			
WJ200-075H-Solar	11	23	14000	260	140	155	3.5			
WJ200-110H-Solar	15	31	18750	296	180	175	4.7			
WJ200-150H-Solar	18.5	38	23500	296	180	175	5.2			

Hitachi WJ200/SJ700 Inverter for Solar Water Pump

SYSTEM PANEL

مكونات لوحة النظام



Hitachi WJ200/SJ700 Inverter for Solar Water Pump



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**



HITACHI

Inspire the Next

HITACHI

MCCB

MOLDED CASE

CIRCUIT BREAKER



**SYSTEM
PANEL**

Hitachi WJ200/SJ700 Inverter for Solar Water Pump

KHKSCO – Control & Monitoring

KHKSCO - HMI System



KHKSCO - LCD GSM System

Control & Monitoring Your Pump Via SMS



Hitachi WJ200/SJ700 Inverter for Solar Water Pump

لوحة نظام تشغيل المضخات



مشاريع تشغيل مضخات المياه بالطاقة الشمسية





KHALIL HAMDAN KHALIL & SONS CO.
AL RAED INDUSTRIAL ELECTRIC

Agents & Manufacturers

Jordan-Amman

Mobile : +962 795108102 – Murad@khkscogroup.com
Tele: +962 6 4161162 - Fax: +962 6 4161402

Saudi Arabia-Riyadh

Mobile : +966 556222634
Email : Murad@khkscogroup.com
www.khkscogroup.com - www.facebook.com/KHKSCO

