

FRENIC Solar Pump Controller

Compatible with Induction and PMSM Pumps

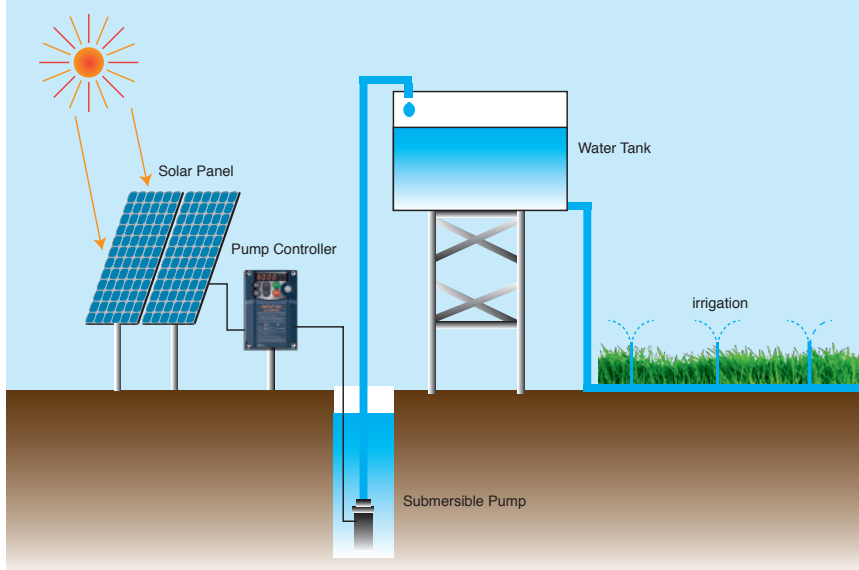
Installation Over 15000 Across India



Frenic Mini Solar Controller
Power Range-0.5 to 15KW

Frenic Ace Solar Controller
Power Range- 18.5 to 90 KW

Architecture of Solar Pump System:



- The performance of a solar water pumping system consists of a photovoltaic (PV) array, Motors; it can be Submersible or Surface . The efficiency of the system is improved with Maximum Power Point Tracker (MPPT).
- The MPPT (V_{MPP} search) will change the set point value in order to search the maximum power of the photovoltaic panel. The maximum power point depends on the panel temperature and the solar irradiation.
- Sudden change in the DC bus voltage, caused by a fast change on the irradiation condition (for example from/to cloudy conditions). The Controller is suitable to follow the actual DC bus voltage by a multiplication factor.

High Performance Functions in Solar Pump Controller

<p>Optimal Operating Point Calculation Function At every Start the inverter determines the optimal operating point depending on current conditions.</p>	<p>MPPT Function During Operation is searches the working point that provides maximum power. The conditions (Mainly temperature and irradiance) will change during operation</p>
<p>Start Criteria by PV Panel Voltage and Time Stop Criteria Selectable by Frequency or Power At every Start / Stop the inverter determines the optimal operating point depending on current conditions.</p>	<p>Detection of Sudden Changes of Conditions (Especially irradiance) Detects a sudden changes in the operating conditions and changes the working point accordingly.</p>
<p>Dry Pump Detection Function Detects that the water is not reaching the pump Water tank maximum Level Detection If the Tank level reaches the maximum level the pump will stop</p>	<p>Two Sets of PID gains The PID Controller has to respond rapidly or slowly depending on the operating conditions changes.</p>
<p>Low Power Function It indicates that the output power is low. For example due to dust on the solar PV Panels.</p>	<p>IEC Approval For rated output efficiency measurement (IEC61683) and climate test (IEC60068) as per standard.</p>

Remote Monitoring: GPRS/GSM based controller to collect data and transmit that data to a remote central server. We can have a live monitoring of status of solar water pump working, flow rate, electrical parameters from a mobile or computer.

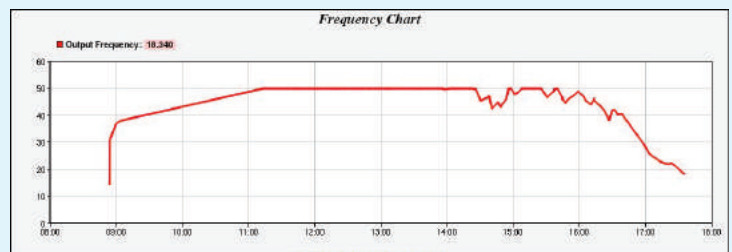
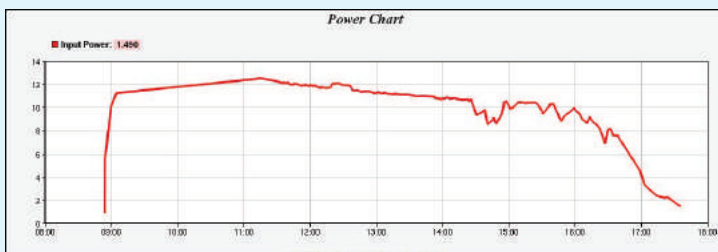


Features

1. Remote monitoring system facility is available with online data Read/Write (optional)
2. Function safety compliance
3. ISO13849-1 PL-e Cat3 ISO1800-5-2 STO SIL3
4. Global standard Compliance
5. Solar Panel voltage set point calculation at every start
6. True Maximum Power Point Tracking (MPPT) function
7. Available with IP54 Certified Panel

With Remote monitoring functionality for Pump Controller & integrated data logging

- Server functionality is also available.
- RMU can work with internal Drive supply.



Technical Data

Electrical Specification	
Input DC supply	230V Drives: 120DC to 400DC 415V Drive: 240VDC to 800VDC
Control Method	V/F & PMSM Control
Overload capability	150% of rated current for 1min, 200% of rated current for 0.5s
Applicable Safety Standards	UL508C, EN61800-5-1:2007
MPPT Efficiency	99%
Protection Degree	IP20

IEC 61683- EFFICIENCY TEST:

This standard describes guidelines for measuring the efficiency of controller used in stand-alone and utility-interactive photovoltaic systems, where the output of the controller is a stable A.C. voltage. The efficiency is calculated from a direct measurement of input and output power in the factory. Frenic solar controller FRN0011C2S-4SL has been tested at nominal voltage 575 VDC.

Ordering Data

Model No.	Power Rating	O/P Voltage	Maximum O/P Current
FRN0006C2S-7SL	0.75 KW	230V	4.2 Amp
FRN0010C2S-7SL	1.5 KW	230V	7.5 Amp
FRN0012C2S-7SL	2.2 KW	230V	11 Amp
FRN0007C2S-4SL	2.2 KW	415V	5.5 Amp
FRN0011C2S-4SL	3.7 KW	415V	9.0 Amp
FRN0013C2S-4SL	5.5 KW	415V	13 Amp
FRN0018C2S-4SL	7.5 KW	415V	18 Amp
FRN0024C2S-4SL	11 KW	415V	24 Amp
FRN0030C2S-4SL	15 KW	415V	30 Amp

IEC60068-2- CLIMATE TEST:

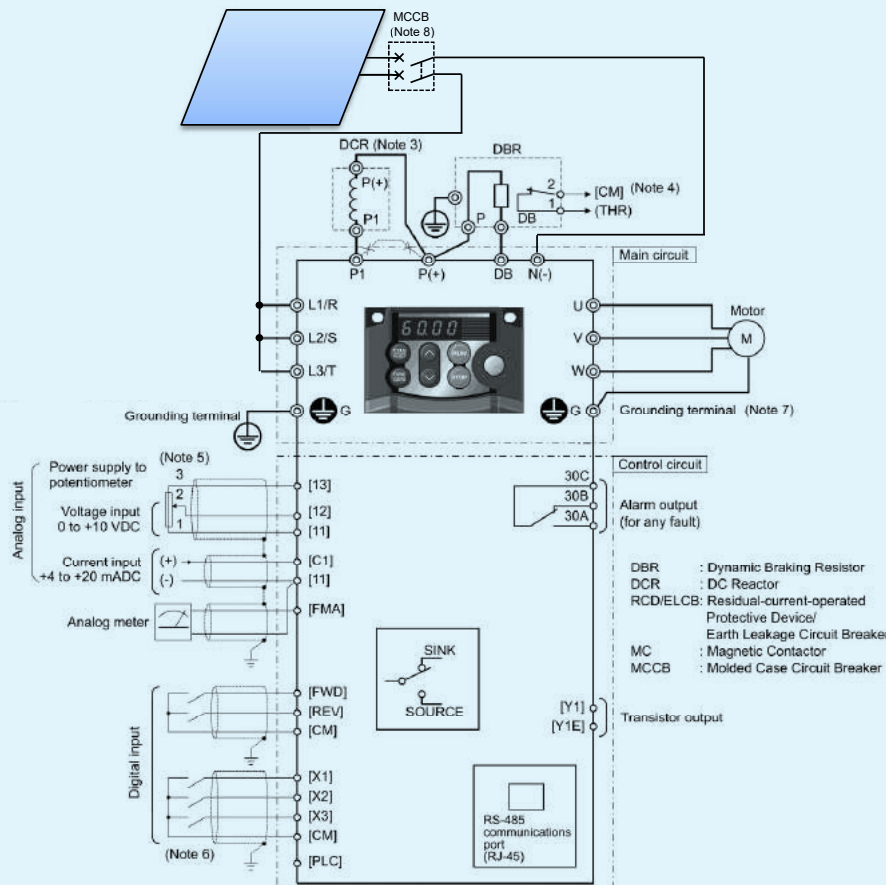
Environmental tests are used to verify a piece of equipment can withstand the rigors of harsh environments, this test is subdivided as follows:

1. IEC 60068-2-1 : COLD TEST
2. IEC 60068-2-2 : DRY HEAT TEST
3. IEC 60068-2-14: CHANGE OF TEMPRATURE
4. IEC 60068-2-30: DAMP CYCLE HEAT TEST

Produkte Products		TÜVRheinland®	
Prüfbericht - Nr.: Test Report No.:	19631026 001	Seite 1 von 5 Page 1 of 6	
Auftraggeber: Client:	Fuji Electric India Pvt. Ltd. I-8, S. No. 79, Sunmeet Logistics, Village-Kukse, Nr. Shrangrila Resort Off. Mumbai, Nashik Highway, Bhiwandi 421302 India.		
Gegenstand der Prüfung: Test Item:	Solar Inverter Module.		
Bezeichnung: Identification:	FRN0011C2S-4SL	Serien-Nr.: Serial No.:	M62A458A0009AE
Wareneingangs-Nr.: Receipt No.:	1803154253	Eingangsdatum: Date of receipt:	2016.07.20
Prüfort: Testing location:	TÜV Rheinland (India) Pvt. Ltd. Plot No.17B, Electronic City Phase II Industrial Area, Hosur Road Bangalore - 560 100, Karnataka, India		
Prüfgrundlage: Test specification:	Rated Output Efficiency measurement with Submersible pump used as load, as per MNR/E / customer's requirement in accordance with table 1 of IEC 61883:1998.		
Prüfergebnis: Test Result:	Refer section " Summary of testing "		
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland (India) Pvt. Ltd. Plot No.17B, Electronic City Phase II Industrial Area, Hosur Road Bangalore - 560 100, Karnataka, India		
geprüft/tested by:	<i>K. Manjunath</i>	kontrolliert/reviewed by:	<i>Kamalatha C.S / Sr. Manager</i>
2016.09.22 Date	Manjunath.K / Sr. Engineer	2016.09.22 Date	Kamalatha C.S / Sr. Manager
sonstiges/Other Aspects:	According to the customer's requirement, the rated output efficiency measurement test conducted with Submersible pumps used as a load.		
This report consists of 5 pages including the following attachments: Attachment 1: Photo Document			
Abkürzungen: FSA = entspricht Prüfgrundlage MA = nicht anwendbar NT = nicht gemessen	Abkürzungen: FSA = passed MA = not applicable NT = not tested		
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugswise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.			
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Prüfbericht - Nr.: Test Report No.:	19631027 001	Seite 1 von 11 Page 1 of 11	
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Gegenstand der Prüfung: Test Item:	Solar Inverter Module.		
Bezeichnung: Identification:	FRN0011C2S-4SL	Serien-Nr.: Serial No.:	M62A458A0009AE
Wareneingangs-Nr.: Receipt No.:	1803154253	Eingangsdatum: Date of receipt:	2016.07.20
Prüfort: Testing location:	TÜV Rheinland (India) Pvt. Ltd. Plot No.17B, Electronic City Phase II Industrial Area, Hosur Road Bangalore - 560 100, Karnataka, India		
Prüfgrundlage: Test specification:	IEC 60068-2-30, IEC 60068-2-14, IEC 60068-2-1, IEC 60068-2-2 (As per MNR/E / customer requirement)		
Prüfergebnis: Test Result:	Refer section " Summary of testing "		
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland (India) Pvt. Ltd. Plot No.17B, Electronic City Phase II Industrial Area, Hosur Road Bangalore - 560 100, Karnataka, India		
geprüft/tested by:	<i>K. Manjunath</i>	kontrolliert/reviewed by:	<i>Kamalatha C.S / Sr. Manager</i>
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Connection Diagram:



Main Circuit	L1/R L2/S L3/T	Main circuit power input
	L1/L, □, L2/N	
	U, V, W	Inverter output
	P(+), P1	For DC reactor
	P(+), N(-)	DC link bus
	P(+), DB	For braking resistor
⊥ G	Grounding	

* For Note refer to Solar Controller Manual .
:- Preferred Connection philosophy

Control Signal			
Type	Name	Description	Comments
Digital input	FWD	Run Command	Run Permission
Digital input	TANK HL	Maximum tank level	If this signal is on inverter can not RUN
Digital input	TANK LL	Minimum tank level	To define the behaviour. Only indication.
Digital output	LOW POWER	Low Power Indication	Indicates that power is lower than expected value
Digital output	TANK FULL	Tank maximum level Indication	Indicates that tank is at or above maximum level
Digital output	TANK LOW	Tank low level Indication	Indicates that tank is at or below minimum level
Analog input	TANK LEVEL	Tabk level signal	Analog signal to indicate tank level

- The digital outputs can be configured freely.
- In order to operate the inverter it is only required (must) to give the run command (FWD or REV).

FE Fuji Electric India Pvt. Ltd.

409-410, Meadows, Sahar Plaza, Andheri Kurla Rd, Andheri (E), Mumbai-400059,
Tel: +91-022-40104870/71, 42524850

Fuji Electric India Drive Factory.

Block No. I-6, Sumeet Logistics & Industrial Park, Nashik Highway, Village Kukse,
Taluka Bhiwandi,-421302 District - Thane Maharashtra India.

Tel : 8879090765/ 8879042235

E-mail: info-fei@fujielectric.com

www.fujielectric.co.in

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