



National Institute of Solar Energy

(An Autonomous Institution of MNRE, GOI)
19 K.m Stone, Gurgaon-Faridabad Road, Gwal Phari, Gurgaon (Haryana)-122003

File No: 337/2016-17 /CSC/NISE/957

Dated: 08/11/17

To, M/S- KISAN SOLAR

A/2, Atulya Bhavan, Next to C.E.R.C.,
S.G. Highway, Thaltej, Ahmedabad - 380054

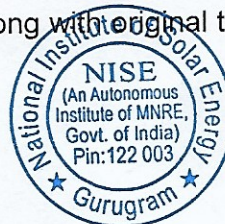
Subject: Issue of Test Report by National Institute of Solar Energy ('NISE')

Dear Sir,

Please refer to your letter No./Order Form No. 07 Dated 25/01/17. In this connection, I am directed to enclose herewith the Test Report No : 337/2016-17/CSC/NISE Dated 08/11/2017. In respect of your submitted samples in original, for ready reference and record.

2. Discrepancies, if any observed, in respect of any of the entries contained in the above report should be brought to the notice of this office within 30 days from the date of issue of this letter, falling which it will be presumed that the entries therein are in order and no further correspondence will be entertained thereafter on this particular report.
3. We would like to solicit your views and therefore enclosing a Feedback Form with a request to be filled up by you and then send as soon as possible. Your suggestions are valuable for us to make our further improvements and take corrective action in improving our quality of service.
4. Further, You are also requested to collect your samples at your cost within 30 days, from the date of issue of this letter falling which NISE will dispose of the sample in best possible manner and NISE will not be responsible in any manner for this sample.

Kindly acknowledge the receipt of this letter along with original test report and original Invoice.



Yours faithfully

[Signature]
08/11/2017

(In-charge, Customer Service Cell)
(National Institute of Solar Energy)

Encl:

1. Test Report-Total Page 08
2. Feedback Form

Copy forwarded for Information to:

1. PA to Director General-NISE
2. Guard File
3. Office Copy

National Institute of Solar Energy

(An autonomous Institute of Ministry of New & Renewable Energy)

Gurugram-Faridabad Road, Gwalpahari, Gurugram -122003

Ph. 0124-2579251 (CSC), Fax: 0124-2579207

Email id: csc.nise.mnre@gmail.com

TEST REPORT

1.	Service Request No.	31/2716
2.	Requested By (Name & Address of the organization)	M/S KISAN SOLAR A/2, ATULYA BHAVAN, NEXT TO C.E.R.C. S.G. HIGHWAY, THALTEJ, AHMEDABAD-54
3.	Details of the test item	
	a) Nomenclature	Solar Pump Controller
	b) Capacity	10 HP/9.6 kWp
	c) Manufactured By	M/S KISAN SOLAR
	d) Model / Type No.	SPCM iACQUA, 400/10
	e) Serial No.	KS 0616-0100-000484
	f) Testing procedure	Prototype submitted by client as per user specification
4.	Date of Submission of Samples	05/10/2017
5.	Condition of samples on receipt	Good
6.	Date of Completion of Tests	04/11/2017

MAJOR EQUIPMENTS USED

S.No.	Equipment Used	Model	Calibration Agency / Report Reference	Last calibration date
1	Solar array simulator	ETS600*25D-PVE	Calibrated from ERTL(N)	22/11/2016
2	Power Analyzer	WT 1800	Calibrated from ERTL(N)	25/10/2016
3	Digital Oscilloscope, Tektronix TDS210	DPO	Calibrated from ERTL(N)	28/10/2016
4.	Motor Pump setup	ANCO 10 HP Model No ASDW 102D Sr No 5484	NA	NA



Tested By

Kamlesh
Mithu Singh
 Date.....

Authorized Signatory

Rajesh Kumar
 08/11/2017
 Date.....

Issued By

Shweta
 08/11/2017
 Date.....

S.No.	Test Performed as per NMRE Specifications		Claims of Manufact	NISE's Observations				Remarks
1.	Input voltage	Inverter Minimum rated Voltage	350-560 V	380				
		Inverter Normal Voltage		450				
		90% of Inverter's maximum Input voltage		560				
2.	Insulation Resistance test			22.1 G Ω @ 500V applied for 1 minutes				Observed at 25°C & 50 % RH
3.	Output Voltage (Sine wave)		Three Phase	Three phase 93-360 V AC Sine Wave				
4.	Inductive load			Tested with Anco motor & pump 10 H.P pump				AC induction motor
5.	Low irradiation mode protection		Provided	Observed				satisfactory
6.	Dry run protection		Provided	Observed				satisfactory
7.	Reverse polarity protection		Provided	Observed				satisfactory
8.	Short Ckt protection		Provided	Observed				satisfactory
9.	Open Ckt protection		Provided	Observed				satisfactory
10.	Remote Monitoring		Provided	MPP Power, frequency, LPM, status, total energy, total flow.				Annexure -II
11.	Efficiency Tests of the Controller at Voltage (400 V)		To be Measured	Efficiency (%)	Uncertainty in eff in % ($\pm$)	MPPT Efficiency (%) with uncertainty ($\pm$ 0.36 %)	Overall System Efficiency (%)	Annexure -I
	At 10% of input power			82.67	0.61	99.8	82.51	
	At 25% of input power			92.62	0.13	99.7	92.34	
	At 50% of input power			94.84	0.14	99.4	94.27	
	At 75% of input power			95.23	0.13	99.5	94.76	
	At 100% of input power			96.19	0.73	99.8	95.99	

NOTE:

1. This test report refers only to the particular items submitted for testing as per specifications/requirements stipulated by the customer.
2. The results reported in the Test Report are valid at the time of and under the stipulated conditions of measurements.
3. The test report shall not be reproduced except in full, unless written permission for the publication of an approved abstract has been obtained from the Director, National Institute of Solar Energy.
4. The client is requested to collect the tested sample back within 30 days from the date of issue of the report.

Tested By

Kamlesh

Date.....

Authorized Signatory

Rajesh Kumar
08/11/2017

Date.....

Issued By

Rajesh Kumar
08/11/2017

Date.....



Annexure-I

Table.1: Conversion efficiency at minimum voltage (tested at Voltage at 360 V)							
S.No.	Load %	5	10	25	50	75	100
1	DC VOLTAGE 1 (V)	288.96	296.17	307.81	313.79	321.56	328.70
2	DC CURRENT 1(I)	1.69	3.25	7.95	15.31	22.40	28.14
3	TOTAL INPUT DC POWER (W)	487.27	962.58	2445.80	4805.30	7202.30	9251.10
4	AC VOLTAGE 1 (V)	94.39	141.89	219.48	284.06	328.65	358.58
5	AC CURRENT 1 (I)	7.45	9.24	11.48	13.78	15.97	17.87
6	AC VOLTAGE 2 (V)	94.87	142.47	220.05	284.88	329.88	359.91
7	AC CURRENT 2 (I)	7.65	9.46	11.62	13.93	16.16	17.99
8	ACTIVE POWER (P)	361.78	800.82	2259.21	4544.80	6319.20	8753.20
9	REACTIVE POWER (Q)	1188.40	2169.26	3804.00	5164.20	6242.60	7089.60
10	APPARENT POWER (S)	1429.03	2658.80	5077.30	7883.40	10580.50	12880.60
11	FREQUENCY (Hz)	12.57	17.59	26.39	34.25	39.75	43.52
12	Uthd-1-Total	NA	2.95	2.37	1.93	1.76	1.67
13	Ithd-1-Total	NA	8.50	5.53	3.08	2.90	2.96
14	Uthd-2-Total	NA	3.10	2.41	1.98	1.84	1.75
15	Ithd-2-Total	NA	8.70	5.69	3.13	2.94	3.00
16	EFFICIENCY (%)	74.25	83.20	92.37	94.58	94.68	94.62
17	MPPT EFFICIENCY (%)	99.5	99.60	99.40	99.80	99.90	99.70
18	OVERALL SYSTEM EFFICIENCY (%)	73.88	82.87	91.82	94.39	94.59	94.34

Table.1: Conversion efficiency at rated voltage (tested at Voltage at 450 V)							
S.No.	Load %	5	10	25	50	75	100
1	DC VOLTAGE 1 (V)	440.78	351.98	358.17	373.66	378.80	396.79
2	DC CURRENT 1(I)	1.07	2.73	6.72	12.85	19.01	23.74
3	TOTAL INPUT DC POWER (W)	473.00	961.00	2406.00	4802.00	7203.00	9420.00
4	AC VOLTAGE 1 (V)	93.07	141.77	216.50	285.47	328.07	339.68
5	AC CURRENT 1 (I)	7.20	9.31	11.21	13.85	16.00	19.17
6	AC VOLTAGE 2 (V)	93.31	142.37	217.05	286.27	329.29	340.76
7	AC CURRENT 2 (I)	7.44	9.55	11.35	14.00	16.16	19.21
8	ACTIVE POWER (P)	349.20	794.10	2228.80	4553.90	6859.30	9061.30
9	REACTIVE POWER (Q)	1131.90	2192.00	3634.20	5251.10	6209.10	7752.40
10	APPARENT POWER (S)	1363.50	2680.70	4890.30	7960.70	10569.40	13058.60
11	FREQUENCY (Hz)	12.64	17.56	26.40	34.26	39.60	43.28
12	Uthd-1-Total	NA	3.03	2.37	1.92	1.60	1.52
13	Ithd-1-Total	NA	8.62	5.29	3.16	2.74	2.46
14	Uthd-2-Total	NA	3.19	2.42	1.96	1.82	1.62
15	Ithd-2-Total	NA	8.81	5.40	3.21	2.93	2.45
16	EFFICIENCY (%)	73.91	82.67	92.62	94.84	95.23	96.19
17	MPPT EFFICIENCY (%)	99.3	99.80	99.70	99.40	99.50	99.80
18	OVERALL SYSTEM EFFICIENCY (%)	73.39	82.51	92.34	94.27	94.76	95.99

Tested By

Kamlesh

Date.....

Authorized Signatory

Rajesh Kumar
08/11/2017

Date.....

Issued By

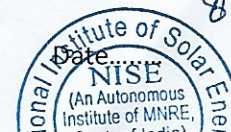
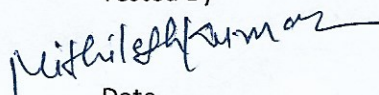
Shweta
8/11/2017

Table.1: Conversion efficiency at maximum voltage (tested at Voltage at 560 V)							
S.No.	Load %	5	10	25	50	75	100
1	DC VOLTAGE 1 (V)	419.76	432.73	425.16	439.62	465.97	489.73
2	DC CURRENT 1(I)	1.1332	2.23	5.6555	10.9419	15.4485	19.02
3	TOTAL INPUT DC POWER (W)	475.67	965	2404.6	4809.7	7198.6	9314.6
4	AC VOLTAGE 1 (V)	95.7925	144.4543	218.89	286.64	329.2	360.23
5	AC CURRENT 1 (I)	7.6972	9.6645	11.4957	13.9688	16.161	18.0885
6	AC VOLTAGE 2 (V)	96.2644	145.0258	219.33	287.05	330.21	361.37
7	AC CURRENT 2 (I)	7.8897	9.8864	11.6033	13.9945	16.2718	18.1565
8	ACTIVE POWER (P)	366.11	819.62	2259.083	4622.99	6883.9	8915.2
9	REACTIVE POWER (Q)	1248.94	2322.52	3794.1	5277.9	6344.8	7168.5
10	APPARENT POWER (S)	1496.84	2829.9	5061.2	8021.2	10693.4	13077.2
11	FREQUENCY (Hz)	12.557	17.702	26.424	34.227	39.823	43.67
12	Uthd-1-Total	NA	2.436	2.087	2.093	1.641	1.684
13	lthd-1-Total	NA	7.756	4.694	3.592	2.988	2.866
14	Uthd-2-Total	NA	2.652	2.103	2.2	1.766	1.735
15	lthd-2-Total	NA	7.92	4.896	3.755	3.083	2.914
16	EFFICIENCY (%)	76.967	84.939	93.947	96.118	95.628	95.712
17	MPPT EFFICIENCY (%)	99.8	99.6	99.4	99.8	99.6	99.7
18	OVERALL SYSTEM EFFICIENCY (%)	76.81	84.60	93.38	95.93	95.25	95.42

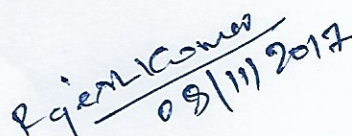
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Tested By



Date.....

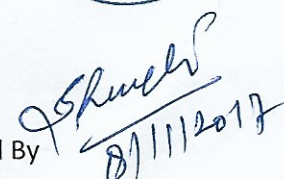


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Date.....



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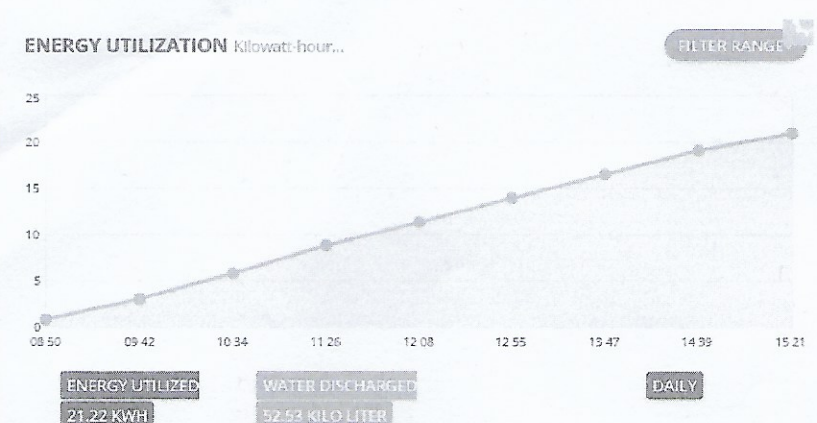


Date.....

Annexure-II

Remote monitoring:

(A) Following discharge result observed using actual measurement and using remote monitoring

Experimental discharge data	Remote monitored discharge data	Observation
53310 Ltr	52530 Ltr  ENERGY UTILIZED 21.22 KWH WATER DISCHARGED 52.53 KILO LITER	-1.5% error observed in estimated method of discharge measurement using remote monitoring

(B) Status of system and location of motor-pump controller is observed in remote monitoring as follows:

Map and Directions



PROJECT DETAILS click on tab for more info

Installation SPV Panels Pumpset Controller

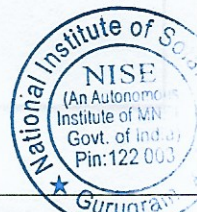
SPCM

Manufacturer: Kisan Solar

Certifications: NISE(MNRE), IP54, Remote Monitoring

Serial Number: **ks_0616_0100_000484**

Status: System is running at **ks_0616_0100_000484** in Gurgaon



National Institute of Solar Energy
 (An Autonomous Institute of MNRE)
 Govt. of India
 Pin: 122 003
 Gurugram

Tested By

Kamlesh

Date.....

Authorized Signatory

 Rajendra Kumar
 08/11/2017

Date.....

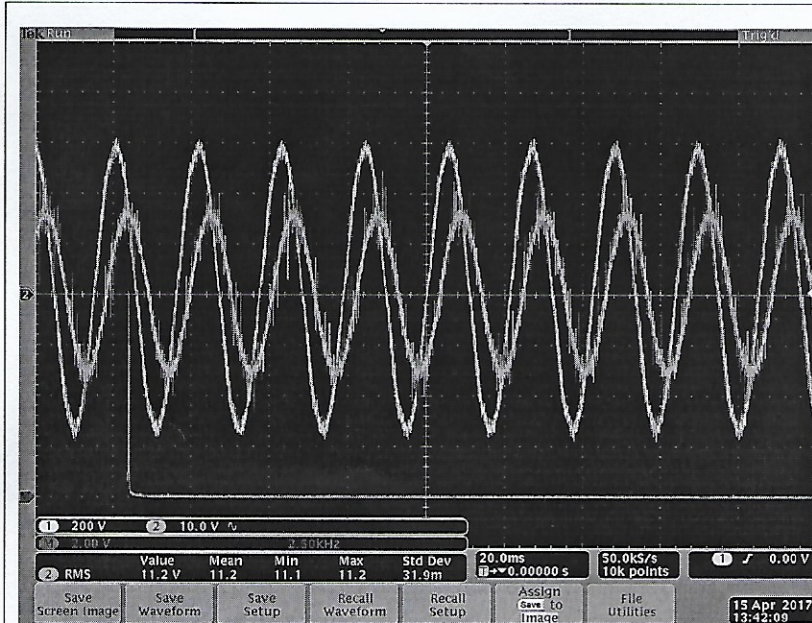
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 Shreshth
 08/11/2017

Date.....

Id #	Date	Time	MPPT Power (W)	Frequency (Hz)	Flow Rate (LPM)	Condition	Status
						All...	All...
65408	2017-11-02	13:08:26	2164	36.46	234	System OK	ON
65407	2017-11-02	13:03:13	2214	36.67	243	System OK	ON
65406	2017-11-02	12:58:01	2297	37.23	259	System OK	ON
65405	2017-11-02	12:52:48	2321	37.22	263	System OK	ON
65404	2017-11-02	12:47:36	2324	37.41	264	System OK	ON
65403	2017-11-02	12:42:23	2287	37.09	257	System OK	ON
65402	2017-11-02	12:37:11	2443	37.92	287	System OK	ON
65401	2017-11-02	12:31:58	2421	37.74	282	System OK	ON
65400	2017-11-02	12:26:46	2362	37.52	271	System OK	ON
65399	2017-11-02	12:21:34	2341	37.40	267	System OK	ON
65398	2017-11-02	12:16:21	2479	38.15	293	System OK	ON
65397	2017-11-02	12:11:09	2405	37.75	279	System OK	ON

(C) Power quality:



Sinusoidal waveform observed for both output voltage (yellow colour) and current (blue colour). Harmonic spectrum (red colour) has only dominant fundamental component and no harmonics.



Tested By

Kamlesh

Date.....

Authorized Signatory

Rajesh Kumar
08/11/2017

Date.....

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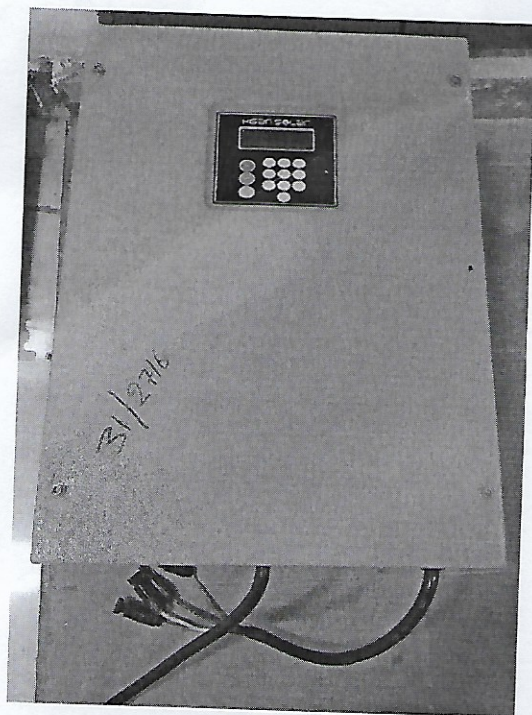
Rajesh Kumar
08/11/2017

Date.....

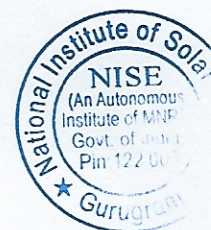
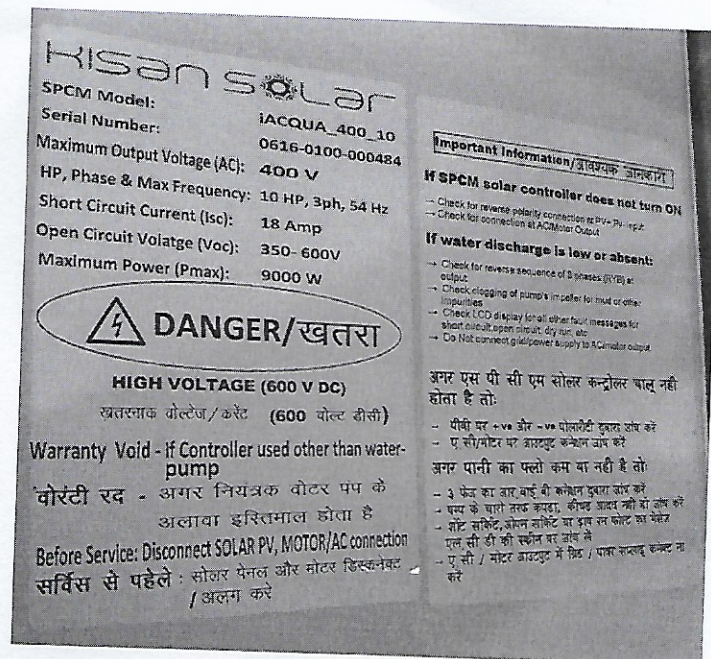
Annexure-III

Visual inspection of product

a. Front View (photograph)



b. Name Plate (photograph)



Kamlesh

Tested By

Mishu Kuma

Date.....

Rajendra Kumar
8/11/2017

Authorized Signatory

Date.....

Issued By

Kamlesh
8/11/2017

Date.....



National Institute of Solar Energy

(An Autonomous Institution of MNRE, GOI)

16 K.m Stone, Gurgaon-Faridabad Road, Gwal Phari, Gurgaon (Haryana) - 122003

Customer Service Cell

Feed Back

Company Name:

Company Address:

Name of Person giving Feedback:

Designation & Location:

Sr. No.	Particulars	Feedback Ratings			
		Excellent*	Good	Average	Poor*
1.	Content of Report				
2.	Sample Handling				
3.	Time Taken				
4.	Test Report Format				
5.	Courtesy				

*Please give comments:

Remarks: _____

Signature & Date of Client

(Name of Authorised Person)

For Official Use

Acknowledged by _____ Date _____ Mode: By Post/Hand/E-mail

T.A/T.M.E: