



TEST REPORT – Rish Eine (1 Phase - 5A)

Rishabh Instruments Pvt. Ltd. Testing, Trishala unit, Plot No. C-6, M.I.D.C., Satpur, Nashik – 422007. Maharashtra (India)	TEST REPORT NO : RIPL/TST/PT1112/044	
	DATE OF ISSUE : 6th March, 2012	PAGE : 1 of 13

DESCRIPTION OF SAMPLE :

Name : Digital Panel Meter
 Model : Rish EINE 96 X 96, Single Phase – 5A
 Specifications : Input 5A (Primary Range Programmable : 1A to 999KA)
 Auxiliary supply : 80...300VAC
 Class Index : 1
 No. of Samples : 01
 Sample Identification:
 PCB: 20100313 Rev. : B
 Firmware version : 1.00

INSTRUMENTS USED:

Sr. No.	Instrument	Make / Model	Sr. No.
1	Digital Multimeter	Gossen metrawatt: Metra Hit 28S	M49228082
2	Temperature- humidity chamber	ESPEC: 2L-KPH	14010625
3	HV Tester	Laxtronics: HV-10	1109104
4	Insulation Tester	Rish Insu 5000A	100146
5	AC Voltage Current standard	Yokogawa 2558	11AA03920
6	Vibration Test System	Saraswati Dynamics – SEV010	--
7	3 Phase Power Calibrator & Tester	Calmet –C300	SN21135

COMPLIANCE SPECIFICATION: Product datasheet : Revision E 03/2012
 Operating Manual 15001059 Rev A 02/2012

REMARKS:

The Sample has passed the specifications tested to.

PREPARED BY : RDS

CHECKED BY : SSK

APPROVED BY : SDC





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Table – A: Summary of tests Conducted

Sr. No	Test procedures	Requirement	Observation	Remark
PERFORMANCE TESTS				
1.	Intrinsic Error Test : The UUT being under reference conditions, The value indicated on the measuring instrument shall be read out at constant intervals at n-test points. Calculate the Error at each test point.	Error should be within specified accuracy limits.	See Table 1	Conforms
2.	Influence Error Resulting from the Supply Voltage : Measurement is to be taken at lower and higher limits of aux supply (80 to 300V AC) & Calculate the Error in each case.	Error should be within specified accuracy limits.	See Table 2	Conforms
3.	Influence Error Resulting from aux Supply frequency. Measurement is to be taken at lower and higher limits of aux supply frequency (45-65Hz) & Calculate the Error in each case.	Error should be within specified accuracy limits.	See table 3	Conforms
4.	Self heating due to Measured Quantity. Keep the Measuring instrument switched on at reference temperature for at least 2hrs without a measured quantity applied. At reference conditions apply 90% input and take reading after 1 st min and 30 th min. Calculate the variation.	Variation should not exceed specified accuracy limits. Instrument shall comply with the accuracy.	See table 4	Conforms
5.	Influence due to Frequency of input quantity. Measurement of upper and lower limits of input frequency (45 and 65 Hz) is to be carried out. Variation in readings is calculated with respect to readings at ref. frequency 50Hz.	Variation should not exceed specified accuracy limits.	See table 5	Conforms
6.	Influence of Storage temperature. Keep the meter in de-energized condition for 4 hours at -25 °C then keep the meter at reference condition for 2 hours recovery period & take the intrinsic error. Repeat the above procedure for +70°C.	Storage temperature should not cause any damage to instrument. After recovery period it should meet the accuracy requirement	See table 6	Conforms

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Sr. No	Test procedures	Requirement	Observation	Remark
7.	Influence Error resulting from Changes in Ambient Temperature. Take readings at reference condition 23°C. Then vary the temperature to 0°C and keep UUT energized for 2hrs with 90% input and take readings there after. Repeat the above procedure for 50°C and Calculate the Variation.	variation should not exceed : 0.05% /°C.	For results See table 7	Conforms
8.	Influence Error resulting from Changes in Relative Air Humidity. Take readings at reference conditions. Then vary the RH to 90% and keep UUT energized for 2hrs with 90% input and take readings. Calculate the Variation.	Variation should not exceed specified accuracy limits.	For results See table 8	Conforms
9.	Measurement of Supply Voltage Consumption. Measure the consumption of aux supply at full scale input.	Consumption should be less than 3VA at 240V, 50Hz aux supply.	For results See table 9	Conforms
10.	Measurement of Input Consumption. Measure the input consumption by applying full scale input.	Consumption should be less than 0.2VA.	For results See table 10.	Conforms
11.	Influence due to continuous overload Apply overload of 120% of Range for 2 hours then instrument shall be kept in switched on condition for at least 2 hours at reference condition. Take readings.	Error should be within specified accuracy limits. Overload should not cause any damage to the meter.	For results See table 11	Conforms
12.	Influence due to short term overload : a. Apply 4 times rated value for 1 second, repeated 5 times at 5 minute intervals. b. Instrument kept in switched-on condition for at least 2 hrs at reference temperature then conducts the intrinsic error test.	Meter should comply with accuracy class after test.	For results See table 12	Conforms
13.	High Voltage test Apply 2.2kV AC for 1 min between 1. All the terminals and housing. 2. Aux terminals and Input terminals.	No breakdown should occur.	No breakdown observed	Conforms

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Sr. No	Test procedures	Requirement	Observation	Remark
14.	Insulation resistance test. Measure the insulation resistance At 500V : Between input + aux and housing	---	Insulation resistance is found >100GΩ.	---
15.	Influence due to vibration Determine intrinsic error. Put UUT for vibration test. Sweep frequency range : 10-55-10Hz, amplitude ±0.15mm. scanning speed 1octave/min. number of scanning cycles : 2 in each direction of the axes (6 in all) after completion of vibration test Check UUT visually and determine intrinsic error	Vibration should not cause any mechanical damage. Instrument shall comply with the accuracy requirements after test.	For results See table 13	Conforms
16.	Influence Error Resulting from External Electromagnetic fields. a. At reference conditions, take readings without application of magnetic field. b. Place the meter in the magnetic field of 0.4kA/m and observe readings. c. Compute variation in two readings.	Variation should not exceed specified accuracy limits.	No any Variation in display observed.	Conforms
17.	Influence due to continuous operation. Keep meter ON with Full scale input for 6 hours and take readings initially and after. Calculate variation.	Variation should not exceed specified accuracy limits. Instrument shall comply with the accuracy requirements.	For results See table 14	Compliance
18.	Verification of features			
18.1	Programmable CT ratio : Check the CT primary values are Programmable.	CT primary shall be set form 1A to 999 kA	Programmable within the range of 1A to 999 kA	Conforms
18.2	True RMS measurement : Take readings with waveforms of 2 nd to 15 th harmonic with different amplitude. Take readings with individual harmonic and mixed multiple harmonics.	Meter shall show readings with accuracy with input signal up to 15 th harmonic.	For results See table 15	Conforms
18.3	Overload indication : Apply input of >125% of CT secondary value and observe the display.	After applying input of >125%, it should indicate overload on display.	It shows "-oL-" on display.	Conforms
18.4	Led Annunciation: Verify the Led annunciation is proper.	Meter shall show the reading with proper Led Annunciation.	"KA" LED glows when Reading is ≥9kA.	Conforms

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Table 1: Intrinsic Error Test

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.500 A	0.000 A	0.050 A	0.00	1.00
20.000	1.000 A	1.001 A	0.001 A	0.050 A	0.02	1.00
40.000	2.000 A	1.998 A	-0.002 A	0.050 A	-0.04	1.00
60.000	3.000 A	3.003 A	0.003 A	0.050 A	0.06	1.00
80.000	4.000 A	4.005 A	0.005 A	0.050 A	0.10	1.00
100.000	5.000 A	5.010 A	0.010 A	0.050 A	0.20	1.00
120.000	6.000 A	6.006 A	0.006 A	0.100 A	0.12	2.00

Table 2: Influence Error Resulting from the Supply Voltage

2.1 Readings at Lower aux 80V 50Hz

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.503 A	0.003 A	0.050 A	0.06	1.00
20.000	1.000 A	1.002 A	0.002 A	0.050 A	0.04	1.00
40.000	2.000 A	2.001 A	0.001 A	0.050 A	0.02	1.00
60.000	3.000 A	3.004 A	0.004 A	0.050 A	0.08	1.00
80.000	4.000 A	4.005 A	0.005 A	0.050 A	0.10	1.00
100.000	5.000 A	5.009 A	0.009 A	0.050 A	0.18	1.00
120.000	6.000 A	6.011 A	0.011 A	0.100 A	0.22	2.00

2.2 Readings at higher Aux 300V 50Hz

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.501 A	0.001 A	0.050 A	0.02	1.00
20.000	1.000 A	1.001 A	0.001 A	0.050 A	0.02	1.00
40.000	2.000 A	2.000 A	0.000 A	0.050 A	0.00	1.00
60.000	3.000 A	2.999 A	-0.001 A	0.050 A	-0.02	1.00
80.000	4.000 A	4.006 A	0.006 A	0.050 A	0.12	1.00
100.000	5.000 A	5.003 A	0.003 A	0.050 A	0.06	1.00
120.000	6.000 A	6.001 A	0.001 A	0.100 A	0.02	2.00

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Table 3: Influence Error Resulting From Aux Supply Frequency.

3.1 Readings at 50Hz

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.502 A	0.002 A	0.050 A	0.04	1.00
20.000	1.000 A	1.003 A	0.003 A	0.050 A	0.06	1.00
40.000	2.000 A	2.002 A	0.002 A	0.050 A	0.04	1.00
60.000	3.000 A	3.001 A	0.001 A	0.050 A	0.02	1.00
80.000	4.000 A	3.999 A	-0.001 A	0.050 A	-0.02	1.00
100.000	5.000 A	5.002 A	0.002 A	0.050 A	0.04	1.00
120.000	6.000 A	6.011 A	0.011 A	0.100 A	0.22	2.00

3.2 Readings at 45Hz

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.501 A	0.001 A	0.050 A	0.02	1.00
20.000	1.000 A	1.000 A	0.000 A	0.050 A	0.00	1.00
40.000	2.000 A	2.000 A	0.000 A	0.050 A	0.00	1.00
60.000	3.000 A	3.003 A	0.003 A	0.050 A	0.06	1.00
80.000	4.000 A	4.000 A	0.000 A	0.050 A	0.00	1.00
100.000	5.000 A	5.002 A	0.002 A	0.050 A	0.04	1.00
120.000	6.000 A	6.009 A	0.009 A	0.100 A	0.18	2.00

3.3 Readings at 65Hz

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.502 A	0.002 A	0.050 A	0.04	1.00
20.000	1.000 A	1.002 A	0.002 A	0.050 A	0.04	1.00
40.000	2.000 A	1.998 A	-0.002 A	0.050 A	-0.04	1.00
60.000	3.000 A	3.004 A	0.004 A	0.050 A	0.08	1.00
80.000	4.000 A	4.000 A	0.000 A	0.050 A	0.00	1.00
100.000	5.000 A	5.003 A	0.003 A	0.050 A	0.06	1.00
120.000	6.000 A	6.013 A	0.013 A	0.100 A	0.26	2.00

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Table 4: Self heating due to Measured Quantity

Test Point	Readings at 1st min.	Reading At 30th min.	Observed Variation	Allowed Variation	Observed Variation (%)	Allowed Variation (%)
4.500A	4.502 A	4.502 A	0.000 A	0.050 A	0.00	1.00
5.000A	5.004 A	5.003 A	-0.001 A	0.050 A	-0.02	1.00

Table 5: Influence due to Frequency of input Quantity

5.1 Variation at 45Hz

Test Point	Readings at 50 HZ	Readings at 45 HZ	Observed Variation	Allowed Variation	Observed Variation (%)	Allowed Variation (%)
0.500	0.502 A	0.501 A	-0.001 A	0.050 A	-0.02	1.00
1.000	1.002 A	1.001 A	-0.001 A	0.050 A	-0.02	1.00
2.000	1.999 A	2.000 A	0.001 A	0.050 A	0.02	1.00
3.000	2.999 A	2.999 A	0.000 A	0.050 A	0.00	1.00
4.000	4.005 A	4.002 A	-0.003 A	0.050 A	-0.06	1.00
5.000	5.011 A	5.008 A	-0.003 A	0.050 A	-0.06	1.00
6.000	6.001 A	6.010 A	0.009 A	0.050 A	0.18	1.00

5.2 Variation at 65Hz

Test Point	Readings at 50 HZ	Readings at 65 Hz	Observed Variation	Allowed Variation	Observed Variation (%)	Allowed Variation (%)
0.500	0.502 A	0.503 A	0.001 A	0.050 A	0.02	1.00
1.000	1.002 A	1.003 A	0.001 A	0.050 A	0.02	1.00
2.000	1.999 A	2.004 A	0.005 A	0.050 A	0.10	1.00
3.000	2.999 A	3.007 A	0.008 A	0.050 A	0.16	1.00
4.000	4.005 A	4.006 A	0.001 A	0.050 A	0.02	1.00
5.000	5.011 A	5.012 A	0.001 A	0.050 A	0.02	1.00
6.000	6.001 A	6.007 A	0.006 A	0.050 A	0.12	1.00

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Table 6: Influence of Storage temperature

6.1 Readings after storage of -25°C

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.500 A	0.000 A	0.050 A	0.00	1.00
20.000	1.000 A	0.999 A	-0.001 A	0.050 A	-0.02	1.00
40.000	2.000 A	1.997 A	-0.003 A	0.050 A	-0.06	1.00
60.000	3.000 A	2.999 A	-0.001 A	0.050 A	-0.02	1.00
80.000	4.000 A	3.999 A	-0.001 A	0.050 A	-0.02	1.00
100.000	5.000 A	5.003 A	0.003 A	0.050 A	0.06	1.00
120.000	6.000 A	6.004 A	0.004 A	0.100 A	0.08	2.00

6.2 Readings after storage of 70°C

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.500 A	0.000 A	0.050 A	0.00	1.00
20.000	1.000 A	0.999 A	-0.001 A	0.050 A	-0.02	1.00
40.000	2.000 A	1.997 A	-0.003 A	0.050 A	-0.06	1.00
60.000	3.000 A	2.998 A	-0.002 A	0.050 A	-0.04	1.00
80.000	4.000 A	4.001 A	0.001 A	0.050 A	0.02	1.00
100.000	5.000 A	5.003 A	0.003 A	0.050 A	0.06	1.00
120.000	6.000 A	6.004 A	0.004 A	0.100 A	0.08	2.00

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Table 7: Influence Error resulting from Changes in Ambient Temperature

7.1 Influence at 0°C

Test Point (A)	Readings at 23 °C	Readings at 0 °C	Observed Variation	Allowed Variation	Observed Variation (%)	Allowed Variation (%)
0.500	0.500 A	0.500 A	0.000 A	0.058 A	0.00	1.150
1.000	1.000 A	0.999 A	-0.001 A	0.058 A	-0.02	1.150
2.000	2.000 A	1.999 A	-0.001 A	0.058 A	-0.02	1.150
3.000	2.997 A	2.998 A	0.001 A	0.058 A	0.02	1.150
4.000	3.998 A	3.997 A	-0.001 A	0.058 A	-0.02	1.150
5.000	4.998 A	4.998 A	0.000 A	0.058 A	0.00	1.150
6.000	6.009 A	5.998 A	-0.011 A	0.058 A	-0.22	1.150

7.2 Influence at 50°C

Test Point (A)	Readings at 23 °C	Readings at 50 °C	Observed Variation	Allowed Variation	Observed Variation (%)	Allowed Variation (%)
0.500	0.500 A	0.501 A	0.001 A	0.068 A	0.02	1.350
1.000	1.000 A	1.002 A	0.002 A	0.068 A	0.04	1.350
2.000	2.000 A	2.002 A	0.002 A	0.068 A	0.04	1.350
3.000	2.997 A	3.008 A	0.011 A	0.068 A	0.22	1.350
4.000	3.998 A	4.013 A	0.015 A	0.068 A	0.30	1.350
5.000	4.998 A	5.016 A	0.018 A	0.068 A	0.36	1.350
6.000	6.009 A	6.019 A	0.010 A	0.068 A	0.20	1.350

Table 8: Influence Error resulting from Changes in Relative Air Humidity

Test Point (A)	Readings at 50% RH	Readings at 90% RH	Observed Variation	Allowed Variation	Observed Variation (%)	Allowed Variation (%)
0.500	0.500 A	0.500 A	0.000 A	0.050 A	0.00	1.0
1.000	1.000 A	1.000 A	0.000 A	0.050 A	0.00	1.0
2.000	2.000 A	2.000 A	0.000 A	0.050 A	0.00	1.0
3.000	2.997 A	3.002 A	0.005 A	0.050 A	0.10	1.0
4.000	3.998 A	4.002 A	0.004 A	0.050 A	0.08	1.0
5.000	4.998 A	5.007 A	0.009 A	0.050 A	0.18	1.0
6.000	6.009 A	6.008 A	-0.001 A	0.050 A	-0.02	1.0

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Table 9: Measurement of Supply Voltage Consumption

Voltage (V, 50Hz)	Current (mA)	VA	Specified VA
300	14.394	4.3182	--
240	11.422	2.74128	3.0
200	9.251	1.8502	--
110	5.518	0.60698	--
80	3.724	0.29792	--

Table 10: Measurement of Input Consumption

Input Current (A)	Voltage drop (mV)	VA	Specified VA
5	22.21	0.111	< 0.2
6	26.70	0.160	< 0.2

Table 11: Influence due to continuous overload

Readings after test

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.502 A	0.002 A	0.050 A	0.04	1.00
20.000	1.000 A	1.002 A	0.002 A	0.050 A	0.04	1.00
40.000	2.000 A	2.000 A	0.000 A	0.050 A	0.00	1.00
60.000	3.000 A	3.004 A	0.004 A	0.050 A	0.08	1.00
80.000	4.000 A	4.006 A	0.006 A	0.050 A	0.12	1.00
100.000	5.000 A	5.008 A	0.008 A	0.050 A	0.16	1.00
120.000	6.000 A	6.010 A	0.010 A	0.100 A	0.20	2.00

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Table 12: Influence due to short term overload

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.500 A	0.000 A	0.050 A	0.00	1.00
20.000	1.000 A	1.001 A	0.001 A	0.050 A	0.02	1.00
40.000	2.000 A	2.000 A	0.000 A	0.050 A	0.00	1.00
60.000	3.000 A	3.000 A	0.000 A	0.050 A	0.00	1.00
80.000	4.000 A	4.001 A	0.001 A	0.050 A	0.02	1.00
100.000	5.000 A	5.004 A	0.004 A	0.050 A	0.08	1.00
120.000	6.000 A	6.005 A	0.005 A	0.100 A	0.10	2.00

Table 13: Influence due to vibration

Test Point % of range	Test Point	UUT Reading	Observed Error	Allowed Error	Observed Error %	Allowed Error %
10.000	0.500 A	0.502 A	0.002 A	0.050 A	0.04	1.00
20.000	1.000 A	1.002 A	0.002 A	0.050 A	0.04	1.00
40.000	2.000 A	1.997 A	-0.003 A	0.050 A	-0.06	1.00
60.000	3.000 A	3.004 A	0.004 A	0.050 A	0.08	1.00
80.000	4.000 A	4.006 A	0.006 A	0.050 A	0.12	1.00
100.000	5.000 A	5.01 A	0.010 A	0.050 A	0.20	1.00
120.000	6.000 A	6.007 A	0.007 A	0.100 A	0.14	2.00

Table 14: Influence due to continuous operation

Test Point (A)	Reading Before Test	Readings After 6 Hours	Observed Variation (%)	Allowed Variation (%)	(%) Error after 6 hr.	Allowed Error (%)
0.500	0.500 A	0.500 A	0.00	1.000	0.00	1.000
1.000	1.000 A	0.999 A	-0.02	1.000	-0.02	1.000
2.000	2.000 A	2.002 A	0.04	1.000	0.04	1.000
3.000	2.997 A	2.998 A	0.02	1.000	-0.04	1.000
4.000	3.998 A	4.007 A	0.18	1.000	0.14	1.000
5.000	4.998 A	5.002 A	0.08	1.000	0.04	1.000
6.000	6.009 A	6.015 A	0.12	1.000	0.30	2.000

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Table 15: Verification of True RMS measurement

15.1 AT 50 Hz Frequency

Harmonic No	Amplitude (%)	Crest Factor	Rish master Reading (A)	Rish Eine Reading (A)	Observed Error (%)	Allowed Error (%)
1	-	1.41	4.999	4.997	-0.04	1.00
2	20	1.48	4.998	5.002	0.08	1.00
3	20	1.21	5.388	5.388	0.00	1.00
4	20	1.58	4.999	4.998	-0.02	1.00
5	20	1.66	4.998	4.997	-0.02	1.00
6	20	1.62	4.999	4.997	-0.04	1.00
7	20	1.54	4.997	4.996	-0.02	1.00
8	20	1.64	5.000	4.996	-0.08	1.00
9	20	1.66	4.994	4.998	0.08	1.00
10	20	1.65	4.995	4.999	0.08	1.00
11	20	1.61	4.997	4.999	0.04	1.00
12	20	1.65	4.997	4.997	0.00	1.00
13	20	1.66	4.997	4.996	-0.02	1.00
14	20	1.66	4.995	4.996	0.02	1.00
15	20	1.63	4.994	4.996	0.04	1.00
3,5,7,15	20	2.24	4.996	5.00	-0.02	1.00
2 to 15	10	2.68	4.996	4.994	-0.04	1.00

Prepared by:

Checked by:



RISHABH
INSTRUMENTS

Measure, Control & Record with a Difference

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TEST REPORT – Rish Eine (1 Phase - 5A)

15.2 AT 60 Hz Frequency

Harmonic No	Amplitude (%)	Crest Factor	Rish master Reading (A)	Rish Eine Reading (A)	Observed Error (%)	Allowed Error (%)
1	-	1.41	5.000	4.997	-0.06	1.00
2	20	1.48	5.003	4.998	-0.10	1.00
3	20	1.21	5.391	5.385	-0.12	1.00
4	20	1.58	5.003	4.998	-0.10	1.00
5	20	1.66	5.002	4.998	-0.08	1.00
6	20	1.62	5.002	4.998	-0.08	1.00
7	20	1.54	5.002	4.997	-0.10	1.00
8	20	1.64	5.002	4.998	-0.08	1.00
9	20	1.66	5.001	4.998	-0.06	1.00
10	20	1.65	5.001	4.997	-0.08	1.00
11	20	1.61	5.001	4.999	-0.04	1.00
12	20	1.65	5.000	4.998	-0.04	1.00
13	20	1.66	5.000	4.997	-0.06	1.00
14	20	1.66	4.999	4.998	-0.02	1.00
15	20	1.63	5.000	4.998	-0.04	1.00
3,5,7,15	20	2.24	4.990	5.00	0.20	1.00
2 to 15	10	2.68	4.993	5.002	0.18	1.00

Prepared by:

Checked by: