

**RISHABH
INSTRUMENTS**

Measure, Control & Record with a Difference

RISHABH INSTRUMENTS PVT. LTD.

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TEST REPORT

Rishabh Instruments Pvt. Ltd. Testing, R&D, Trishala unit, Plot No. C-6, M.I.D.C., Satpur, Nashik – 422007. Maharashtra (India)	TEST REPORT NO : RIPL/TST/PT1112/01	
	DATE OF ISSUE : 13 th May 2011	PAGE : 1 of 222

Customer :

Date of Testing : 12 /04/2011 to 13/05/2011

DISCRIPTION OF SAMPLE :

Product : Multifunction Meter
Model : Rish Delta Power : 96/96
Specification : Input Voltage - 100VL-L to 500VL-L Programmable
Current Rating – 1A/5A
Aux Supply : 40...300V AC.DC
Input frequency – 45...65Hz
Accuracy Class – 1

No. of Samples : 02

Sample Identification:

Firmware version : 3.05

COMPLIANCE SPECIFICATION:

IEC 60688:1992-04 : Terms, definition and test methods
Product Datasheet, Rev. B

REMARKS:

The Sample has passed the Specifications tested to.

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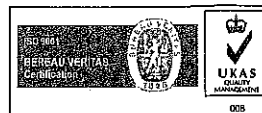
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Table – A : Summary of tests Conducted:

Sr. No	Test Description	Requirement	Observation	Remark
1. PERFORMANCE TESTS				
1	Intrinsic Accuracy Test: (As per IEC 60688, cl no. 4.2) Accuracy to be checked for Displayed Values of voltage, current, power, phase angle for All the Possible system configurations and Ranges.	Observed Error should be within specified accuracy Class	For readings see table 1.0 to 1.35	Conform
2	Variation due to frequency of input quantity(ies) (As per IEC 60688 cl 6.5) 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.	Allowed variation is 100% of the class index	For test Results see Table 2.0 to 7.4	Conform
3	Variation due to Aux supply Voltage (As per IEC 60688, cl no.6.2) Measurement to be taken at Aux voltage 40 ... 300 V \pm 5%. Test to be conducted for AC and DC Aux both.	Allowed variation is 50% of the class index	For test Results see Table 8.0 to 13.4	Conform
4	Variation due to power factor (As per IEC 60688 cl 6.8) Apply 50% of the nominal value of the input current at a power factor of 1.0 and record the value of the output signal(R).At a constant value of the measurand,increase the input current to 100% of the nominal value and reduce the power factor to 0.5 lagging.Record the value of the output signal (X).Change the power factor to 0.5 leading and record the value of the output signal (Y)	Allowed variation is 50% of the class index	For test Results see Table 14.0	Conform
5	Variation due to input voltage (As per IEC 60688 cl 6.6) Apply the nominal value of the input voltage and record the value of the output signal (R).At a constant value of the measurand,reduce the voltage to the lower limit and record the value of the output signal (X).Increase the voltage to the upper limit and record the value of the output signal (Y).	Allowed variation is 50% of the class index	For test Results see Table 15.0	Conform

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6	Variation due to the input current for PF (As per IEC 60688 cl 6.7) Apply the nominal value of the input current and record the value of the output signal (R). At a constant value of the measurand, reduce the input current to the lower limit and record the value of the output signal (X). Increase the input current to the upper limit and record the value of the output signal (Y)	Allowed variation is 100% of the class index	For test Results see Table 16.0	Conform
7	Variation due to unbalance current (As per IEC 60688 cl 6.12) The current shall be balanced and adjusted so that the output signal is approximately in the middle of the span, half-way between zero and the upper nominal value of the output signal. Record the value of the output signal (R). Disconnect one current, maintaining them equal, so as to restore the initial value of the measurand. Record the value of the output signal.	Allowed variation is 100% of the class index	For test Results see Table 17.0	Conform
8	Variation due to Self-heating (As per IEC 60688 cl 6.14) Energize the Instrument at reference conditions and take readings for all ranges at 1 st min. and 30 th min. Compute Variation	Allowed variation is 100% of the class index	For test Results see Table 18.0	Conform
9	Variation due to magnetic field of external origin (as per IEC 60688 Cl No.6.11) Placed the UUT in the centre of a coil of 1m mean diameter, record the reading with field and without field, compute the variation.	Allowed variation is 100% of the class index	For test Results see Table 19.0	Conform
10	Effect of continuous excessive input (As per IEC 60688, cl no.6.18.1) Voltage inputs, current input, including auxiliary supplies, shall be subjected to 120% of the nominal value of the voltage for 24hrs.	It should comply with the Accuracy class after test.	For test Results see Table 20.0	Conform
11	Excessive inputs of short duration (As per IEC 60688, cl no.6.18.2) For voltage input: 2 X nominal value of the measured voltage applied for 1s and repeated 10 times at 10s intervals For current input: 20 times the nominal value of the measured current applied for 1s and repeated 5 times at 300 s intervals.	It should comply with the Accuracy class after test	No change in the display readings are observed after the test.	Conform

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12	<p>Measurement of burden in Voltage circuit : Current consumption at each phase is measured at nominal input Voltage. VA is calculated from the current and input voltage</p>	Observed VA should be <0.3VA	For test Results see Table 21.0	Conform				
13	<p>Measurement of Aux supply Burden Measure the current consumed the auxiliary supply at 40V, 110V, 230V and 300V. Repeat for AC and DC supply. Compute the VA consumption in both the cases.</p>	Aux consumption should be < 3VA for both AC and DC Aux.	For test Results see Table 21.1	Conform				
14	<p>Measurement of burden in current circuit : Voltage drop at each input is measured at nominal input Current. VA is calculated from the input current and voltage drop..</p>	Observed VA should be <0.2VA	For test Results see Table 21.2	Conform				
15	<p>Variation due to Ambient temperature (As per IEC 60688, cl no.6.4) Record the readings at ref. temperature 23°C. Take readings at -10°C and 55°C after 2 hrs of conditioning period in each. Compute Variation at both the Temperatures.</p>	Observed Variation should be within specifications in datasheet.	For test Results see Table 22.0	Conform				
16	<p>Variation due to continuous operation (As per IEC 60688.cl no.6.15) Energize the UUT under reference conditions for at least the preconditioning period.Record the value of the output.After a convenient period of continuous operation (6hrs),note the value of the display</p>	It should comply with the Accuracy class after test	No significant variation in the reading is observed, UUT found within accuracy class	Conform				
17	<p>Variation due to auxiliary supply frequency (As per IEC60688.cl.no.6.3) Apply the nominal value of auxiliary supply frequency(50Hz) and record the value of the output signal. Repeat the procedure for the lower limit (45Hz) and record the value of the display.Increase the aux. frequency to the upper limit(55Hz) and record the display reading</p>	Allowed variation is 50% of the class index	No significant variation in the reading is observed	Conform				
18	<p>Influence due to Vibration Meter to be subjected to vibration in the frequency range as specified below for 5 sweep cycles.</p> <table border="1" data-bbox="284 1783 683 1877"> <thead> <tr> <th>Frequency range</th> <th>Amplitude</th> </tr> </thead> <tbody> <tr> <td>10Hz- 55Hz-10Hz</td> <td>0.15mm</td> </tr> </tbody> </table>	Frequency range	Amplitude	10Hz- 55Hz-10Hz	0.15mm	The post vibration readings should comply with the Accuracy class	UUT comply to the accuracy class after the test	Conform
Frequency range	Amplitude							
10Hz- 55Hz-10Hz	0.15mm							

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2. SAFETY TEST

2.1	<p>High Voltage Test : HV of 3.7 kV, 50Hz to be applied between group A and group B for 1 min in following cases.</p> <p>1. Group A : All Input terminals + Aux Terminals. Group B : Case, 2. Group A : Aux terminals, Group B : All Input terminals</p>	No breakdown to occur during the test	No Breakdown observed.	Conform
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3. Verification of features

Sr. No	Test Description	Requirement	Observation	Remark
3.1	<p>Programmable PT ratio : Verify the readings as per set PT ratio. Repeat for a number of possible ratios within specified range of 100V to 999kV.</p>	UUT should accept PTR form 100V to 999kV	UUT accept PTR from 100V to 999kV and found working fine	Conform
3.2	<p>Programmable PT Secondary : Select the PT secondary values in the given range of 100V to 500VL-L. Check performance with both values.</p>	UUT should comply accuracy class in all the cases	UUT comply accuracy class in all the cases, refer table 1	Conform
3.3	<p>Selection of System configuration : Configure the system type as 3 Phase 4 Wire, 3 Phase 3 Wire and single phase. Verify the parameters being displayed in each case.</p>	System type should be configurable as 3 Phase 4 Wire, 3 Phase 3 Wire and single phase.	Test results are satisfactory as per Table 1	Conform
3.4	<p>Selection of Screen Display : Select the Screen Display as Auto and fixed. Verify the parameters being displayed as per system configuration.</p>	The parameters should be correctly displayed as per selected configuration.	Parameters are correctly displayed as per table 1 in datasheet.	Conform
3.5	<p>Annunciation of Parameters: The unit of parameters being displayed should be correctly annunciated for all parameters in all the configurations.</p>	The LED indication should be as given in datasheet.	The indication found correct as per displayed parameter	Conform
3.6	<p>Display of min/max values</p>	Min and max values should be correctly stored and displayed	Min and max values are displayed correctly	Conform

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