




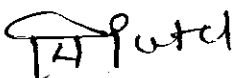

ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org
 tdc@erda.org, ene@erda.org



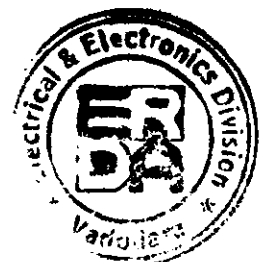
TEST REPORT

Sheet 1 of 12

NAME & ADDRESS OF CUSTOMER M/s. RISHABH INSTRUMENTS PVT. LTD. H.O.& Works: F - 31, MIDC, Satpur, NASHIK - 422 007.	REPORT NO: EMTR/02/1176 DATE : 25/9/2007	
	Customer Reference No.: RIPL/QAS/07F/01 Dtd. 19/07/2007	
	DATE OF SAMPLE RECEIPT 20/07/2007	DATE OF TESTING 17/08/2007 to 16/09/2007
	SAMPLE DESCRIPTION Digital Multifunction Instrument Model : RISH master 3430 Range : Input Voltage: 415 V (L-L) Input Current: 5 A Input Frequency: 45/66 Hz Auxiliary Supply: 100-250 V AC/DC Class : ± 0.2 % of the range for Voltage & Current ± 0.2 % for Power ± 0.15 % of mid frequency ± 1.0 % of Unity for P.F ± 1.0 % of 360° for Phase Angle ± 0.2% for Energy Make : Rishabh	
TEST DETAILS As per sheet no. 2		TEST SPECIFICATION Tests requirement as specified by customer. Test procedure as per IS:12784(Part1)1989.
REMARK- The above Digital Multifunction Instrument conforms to the requirements of the standard in respect of the tests carried out.		
NOTE: - 1) Only the tests asked by the customer have been carried out. 2) All test were carried out with auxiliary supply 240VAC, 50Hz.		
PREPARED BY 	CHECKED BY 	APPROVED BY 

- Note: 1. This report relates only to the particular sample received in good condition, for testing at ERDA.
 2. This report cannot be reproduced in part under any circumstances.
 3. Publication of this report requires prior permission in writing from Director, ERDA.
 4. Only the tests asked for by the customer have been carried out.

No. 1675219





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)

P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.

Fax : +91 (0265) 2638382.

E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org



TEST REPORT NO. EMP/002/P176

DATED: 25/09/2007

SHEET 2 OF 12

Sl. No.	TESTS	Clause no.
1	Intrinsic accuracy test	As per customer requirement and test procedure as per Cl.No.6.1 of IS: 12784(Part1) 1989
2	Influence of input frequency variation	As per customer requirement and test procedure as per Cl. No.6.1 of IS: 12784(Part1) 1989
3	Variation due to auxiliary supply voltage	As per customer requirement and test procedure as per Cl. No 6.1 of IS: 12784(Part1) 1989
4	Variation due to auxiliary supply frequency	As per customer requirement and test procedure as per Cl. No.6.2.3 of IS: 12784(Part1) 1989
5	Influence of self heating	As per customer requirement and test procedure as per Cl. No.6.3.2 of IS: 12784(Part1) 1989
6	Overload withstand test	As per customer requirement and test procedure as per Cl. No.8.3 of IS: 12784(Part1) 1989
7	Variation due to ambient Temperature	As per customer requirement and test procedure as per Cl. No.6.1 of IS: 12784(Part1) 1989
8	Variation due to Magnetic field of external origin	As per customer requirement and test procedure as per Cl. No.6.7 of IS: 12784:1989
9	Variation due to input current	As per customer requirement and test procedure as per Cl. No.6.2.3.1 of IS:12784(Part1)1989
10	Variation due to input voltage	As per customer requirement and test procedure as per Cl. No.6.2.3.1 of IS:12784(Part1)1989
11	Variation due to power factor	As per customer requirement and test procedure as per Cl. No.6.2.3 of IS:12784(Part1)1989
12	Variation due to unbalanced current	As per customer requirement and test procedure as per Cl. No.6.4 of IS:12784(Part1)1989
13	Variation due to interaction between measuring elements	As per customer requirement and test procedure as per Cl. No.6.6 of IS:12784(Part1)1989

No 1675220

PREPARED BY

Deepu

CHECKED BY

T. Patel





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org
 tdc@erda.org, ene@erda.org



TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007

SHEET 3 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks
1	Intrinsic Accuracy test. (As per customer requirement procedure as per Cl. No. 6.1 of IS:12784(Part I) 1989)	When the multifunction instrument is under reference condition and single influence quantity is varied as given below. The resultant, expressed as a percentage of the class index shall not exceed the value shown below: Parameters:		Conforms
		Voltage (V_{L-L})	Obtained % error	
		100 % of rated value	R-Y_{PP} Y-B_{PP} B-R_{PP}	
		50 % of rated value	+0.02 +0.02 +0.02	
			+0.02 0.00 0.00	
		Voltage (V_{L-N})		
		100 % of rated value	R_{ph} Y_{ph} B_{ph}	
		50 % of rated value	+0.04 +0.08 +0.02	
			+0.06 +0.02 +0.02	
		Current		
		100 % of rated value	+0.01 0.00 +0.08	
		10 % of rated value	0.00 -0.02 -0.02	
		Active Power		
		100 % of rated value	0.00 +0.08 0.00	
		10 % of rated value	0.00 0.00 0.00	
		Reactive Power		
		100 % of rated value	0.00 0.00 0.00	
		10 % of rated value	0.00 0.00 0.00	
		Apparent Power		
		100 % of rated value	0.00 0.00 0.00	
		10 % of rated value	0.00 0.00 0.00	
		Power Factor		
		0.8 Lag	1.00 1.00 1.00	
		UPF	0.00 0.00 0.00	
		0.8Lead	0.00 1.00 0.00	
		Phase Angle		
		0°	0.00 +0.02 -0.03	
		60°	-0.02 0.00 -0.02	
		180°	-0.03 0.00 -0.06	
		270°	0.00 +0.03 0.00	
		360°	-0.03 0.00 0.00	
		Frequency	Obtained % error	
		45 Hz	0.00	
		50 Hz	-0.02	
		70 Hz	-0.02	

No 1675221

PREPARED BY

[Signature]

CHECKED BY

[Signature]





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.



E-mail : erda@erda.org , dir@erda.org , phv@erda.org , ins@erda.org , plv@erda.org , mtd@erda.org
 tdc@erda.org , eng@erda.org

TEST REPORT NO. EMPR/02/1176 Dated: 25/09/2007

SHEET 4 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks																																																																																																																																											
2	Influence of input frequency variation (As per customer requirement procedure as per Cl. No. 6.1 of IS:12784(Part1) 1989)	When the multifunction instrument is under reference condition and single influence quantity is varied as given below. The resultant variation, expressed as a percentage of the class index shall not exceed the value shown below: Parameters: Frequency: 45 Hz <table border="1"> <tr> <td>Voltage (V_{L-L})</td> <td>Limits of error</td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Voltage (V_{L-N})</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Current</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Active Power</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Reactive Power</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Apparent Power</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Power Factor</td> <td></td> </tr> <tr> <td>0.8 Lag</td> <td rowspan="3">± 1 % of unity</td> </tr> <tr> <td>UPF</td> </tr> <tr> <td>0.8Lead</td> </tr> <tr> <td>Phase Angle</td> <td></td> </tr> <tr> <td>0°</td> <td rowspan="2">± 1 % of 360°</td> </tr> <tr> <td>360°</td> </tr> </table> Parameters: Frequency : 70 Hz <table border="1"> <tr> <td>Voltage (V_{L-L})</td> <td>Limits of error</td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Voltage (V_{L-N})</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Current</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Active Power</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Reactive Power</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Apparent Power</td> <td></td> </tr> <tr> <td>100 % of rated value</td> <td>± 0.2 % of range</td> </tr> <tr> <td>Power Factor</td> <td></td> </tr> <tr> <td>0.8 Lag</td> <td rowspan="3">± 1 % of unity</td> </tr> <tr> <td>UPF</td> </tr> <tr> <td>0.8Lead</td> </tr> <tr> <td>Phase Angle</td> <td></td> </tr> <tr> <td>0°</td> <td rowspan="2">± 1 % of 360°</td> </tr> <tr> <td>360°</td> </tr> </table>	Voltage (V_{L-L})	Limits of error	100 % of rated value	± 0.2 % of range	Voltage (V_{L-N})		100 % of rated value	± 0.2 % of range	Current		100 % of rated value	± 0.2 % of range	Active Power		100 % of rated value	± 0.2 % of range	Reactive Power		100 % of rated value	± 0.2 % of range	Apparent Power		100 % of rated value	± 0.2 % of range	Power Factor		0.8 Lag	± 1 % of unity	UPF	0.8Lead	Phase Angle		0°	± 1 % of 360°	360°	Voltage (V_{L-L})	Limits of error	100 % of rated value	± 0.2 % of range	Voltage (V_{L-N})		100 % of rated value	± 0.2 % of range	Current		100 % of rated value	± 0.2 % of range	Active Power		100 % of rated value	± 0.2 % of range	Reactive Power		100 % of rated value	± 0.2 % of range	Apparent Power		100 % of rated value	± 0.2 % of range	Power Factor		0.8 Lag	± 1 % of unity	UPF	0.8Lead	Phase Angle		0°	± 1 % of 360°	360°	<p>Variation in % error obtained</p> <table border="1"> <tr> <td>R-Y_{PP}</td> <td>Y-B_{PP}</td> <td>B-R_{PP}</td> </tr> <tr> <td>0.00</td> <td>+0.02</td> <td>0.00</td> </tr> <tr> <td>R_{ph}</td> <td>Y_{ph}</td> <td>B_{ph}</td> </tr> <tr> <td>0.00</td> <td>-0.04</td> <td>+0.04</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>+0.04</td> </tr> <tr> <td>-0.08</td> <td>-0.08</td> <td>+0.08</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>+0.08</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>+0.02</td> <td>-0.02</td> <td>-0.02</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>-0.02</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>-0.08</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>+0.08</td> <td>-0.17</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>-1.00</td> <td>-1.00</td> <td>0.00</td> </tr> <tr> <td>-0.03</td> <td>0.00</td> <td>-0.05</td> </tr> <tr> <td>-0.06</td> <td>-0.03</td> <td>0.00</td> </tr> </table>	R-Y_{PP}	Y-B_{PP}	B-R_{PP}	0.00	+0.02	0.00	R_{ph}	Y_{ph}	B_{ph}	0.00	-0.04	+0.04	0.00	0.00	+0.04	-0.08	-0.08	+0.08	0.00	0.00	+0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	+0.02	-0.02	-0.02	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	+0.08	-0.17	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	-1.00	0.00	-0.03	0.00	-0.05	-0.06	-0.03	0.00	Conf ms
Voltage (V_{L-L})	Limits of error																																																																																																																																														
100 % of rated value	± 0.2 % of range																																																																																																																																														
Voltage (V_{L-N})																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Current																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Active Power																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Reactive Power																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Apparent Power																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Power Factor																																																																																																																																															
0.8 Lag	± 1 % of unity																																																																																																																																														
UPF																																																																																																																																															
0.8Lead																																																																																																																																															
Phase Angle																																																																																																																																															
0°	± 1 % of 360°																																																																																																																																														
360°																																																																																																																																															
Voltage (V_{L-L})	Limits of error																																																																																																																																														
100 % of rated value	± 0.2 % of range																																																																																																																																														
Voltage (V_{L-N})																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Current																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Active Power																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Reactive Power																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Apparent Power																																																																																																																																															
100 % of rated value	± 0.2 % of range																																																																																																																																														
Power Factor																																																																																																																																															
0.8 Lag	± 1 % of unity																																																																																																																																														
UPF																																																																																																																																															
0.8Lead																																																																																																																																															
Phase Angle																																																																																																																																															
0°	± 1 % of 360°																																																																																																																																														
360°																																																																																																																																															
R-Y_{PP}	Y-B_{PP}	B-R_{PP}																																																																																																																																													
0.00	+0.02	0.00																																																																																																																																													
R_{ph}	Y_{ph}	B_{ph}																																																																																																																																													
0.00	-0.04	+0.04																																																																																																																																													
0.00	0.00	+0.04																																																																																																																																													
-0.08	-0.08	+0.08																																																																																																																																													
0.00	0.00	+0.08																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
+0.02	-0.02	-0.02																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
0.00	-0.02	0.00																																																																																																																																													
0.00	-0.08	0.00																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
0.00	+0.08	-0.17																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
0.00	0.00	0.00																																																																																																																																													
-1.00	-1.00	0.00																																																																																																																																													
-0.03	0.00	-0.05																																																																																																																																													
-0.06	-0.03	0.00																																																																																																																																													

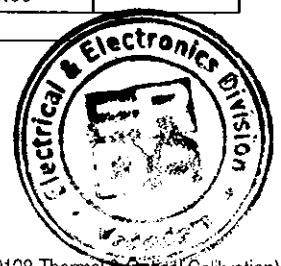
No 1675222

PREPARED BY

[Signature]

CHECKED BY

[Signature]





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)

P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.

Fax : +91 (0265) 2638382.

E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org



TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007

SHEET 5 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks
3	Variation due to auxiliary supply voltage (As per customer requirement procedure as per Cl. No. 6.1 of IS: 12784(Part1) 1989)	When the multifunction instrument is under reference condition and single influence quantity is varied as given below. The resultant variation, expressed as a percentage of the class index shall not exceed the value shown below: Parameters: Auxiliary voltage (+10% of 250V)	Variation in % error obtained	Conform
		Voltage (V_{L-L})	R-Y_{PP}	
		100 % of rated value	+0.02	
		Limits of error	Y-B_{PP}	
		± 0.1% of range	+0.02	
		Voltage (V_{L-N})	B-R_{PP}	
		100 % of rated value	0.00	
		± 0.1% of range	+0.08	
		Current	R_{ph}	
		100 % of rated value	-0.02	
		± 0.1% of range	+0.02	
		Active Power	Y_{ph}	
		100 % of rated value	0.00	
		± 0.1% of range	0.00	
		Reactive Power	B_{ph}	
		100 % of rated value	0.00	
		± 0.1% of range	0.00	
		Apparent Power		
		100 % of rated value	0.00	
		± 0.1% of range	+0.08	
		Power Factor		
		0.8 Lag	0.00	
		UPF	0.00	
		0.8Lead	0.00	
		Phase Angle		
		0°	0.00	
		± 0.5 % of 360°	0.00	
		360°	0.00	
		Frequency	Variation in % error obtained	
		50 Hz	0.00	
		± 0.075% of mid frequency		

No 1675210

PREPARED BY

Chopra

CHECKED BY

D. Patel





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.



E-mail : erda@erda.org , dir@erda.org , phv@erda.org , ins@erda.org , piv@erda.org , mtd@erda.org
 tdc@erda.org , ene@erda.org

TEST REPORT NO. EMPR/02/1176 Dated: 25/09/2007

SHEET 6 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks																																	
3	Variation due to auxiliary supply voltage (As per customer requirement procedure as per Cl. No. 6.1 of IS:12784(Part1) 1989)	When the multifunction instrument is under reference condition and single influence quantity is varied as given below. The resultant variation, expressed as a percentage of the class index shall not exceed the value shown below: Parameters: Auxiliary voltage (-10% of 100V) Voltage (V_{L-L}) Limits of error 100 % of rated value ± 0.1% of range value Voltage (V_{L-N}) 100 % of rated value ± 0.1% of range value Current 100 % of rated value ± 0.1% of range value Active Power 100 % of rated value ± 0.1% of range value Reactive Power 100 % of rated value ± 0.1% of range value Apparent Power 100 % of rated value ± 0.1% of range value Power Factor 0.8 Lag UPF ± 0.5 % of unity 0.8Lead Phase Angle 0° ± 0.5 % of 360° 360° Frequency 50 Hz ± 0.075% of mid frequency	<p style="text-align: center;">Variation in % error obtained</p> <table border="1"> <thead> <tr> <th>R-Y_{PP}</th> <th>Y-B_{PP}</th> <th>B-R_{PP}</th> </tr> </thead> <tbody> <tr> <td>+0.02</td> <td>+0.02</td> <td>-0.07</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>R_{ph}</th> <th>Y_{ph}</th> <th>B_{ph}</th> </tr> </thead> <tbody> <tr> <td>-0.04</td> <td>+0.04</td> <td>-0.04</td> </tr> </tbody> </table> <table border="1"> <tbody> <tr> <td>0.00</td> <td>-0.02</td> <td>-0.02</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>-0.08</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>+0.08</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> </tbody> </table> <p style="text-align: center;">Variation in % error obtained</p> <p style="text-align: center;">0.00</p>	R-Y _{PP}	Y-B _{PP}	B-R _{PP}	+0.02	+0.02	-0.07	R _{ph}	Y _{ph}	B _{ph}	-0.04	+0.04	-0.04	0.00	-0.02	-0.02	0.00	0.00	0.00	-0.08	0.00	0.00	+0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Conforms
R-Y _{PP}	Y-B _{PP}	B-R _{PP}																																			
+0.02	+0.02	-0.07																																			
R _{ph}	Y _{ph}	B _{ph}																																			
-0.04	+0.04	-0.04																																			
0.00	-0.02	-0.02																																			
0.00	0.00	0.00																																			
-0.08	0.00	0.00																																			
+0.08	0.00	0.00																																			
0.00	0.00	0.00																																			
0.00	0.00	0.00																																			
0.00	0.00	0.00																																			

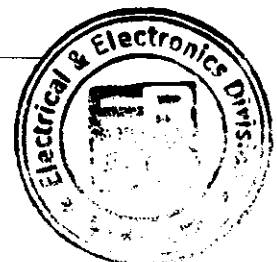
No: 1675211

PREPARED BY

[Signature]

CHECKED BY

[Signature]





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)

P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.

Fax : +91 (0265) 2638382.

E-mail : erda@erda.org , dir@erda.org , phv@erda.org , ins@erda.org , plv@erda.org , mtd@erda.org



TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007

SHEET 7 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks
4	Variation due to auxiliary supply frequency (As per customer requirement procedure as per Cl. No.6.2.3 of IS:12784(Part1) 1989)	When the multifunction instrument is under reference condition and single influence quantity is varied as given below. The resultant variation, expressed as a percentage of the class index shall not exceed the value shown below: Parameters: Auxiliary Frequency:45Hz	Variation in % error obtained	Conforms
		Voltage (V_{LL})	R-Y_{PP} Y-B_{PP} B-R_{PP}	
		100 % of rated value ± 0.1% of range	+0.02 0.00 0.00	
		Voltage (V_{LN})	R_{ph} Y_{ph} B_{ph}	
		100 % of rated value ± 0.1% of range	0.00 0.00 +0.04	
		Current		
		100 % of rated value ± 0.1% of range	-0.02 -0.08 -0.04	
		Active Power		
		100 % of rated value ± 0.1% of range	+0.08 0.00 0.00	
		Reactive Power		
		100 % of rated value ± 0.1% of range	0.00 +0.08 0.00	
		Apparent Power		
		100 % of rated value ± 0.1% of range	+0.08 0.00 0.00	
		Power Factor		
		0.8 Lag ± 0.5 % of unity	0.00 0.00 0.00	
		UPF 0.00 0.00 0.00		
		0.8Lead 0.00 0.00 0.00		
		Phase Angle		
		0° ± 0.5 % of 360°	0.00 0.00 0.00	
		360° 0.00 0.00 0.00		
		Frequency	Variation in % error obtained	
		50 Hz ± 0.075% of mid frequency	0.00	
		Parameters: Auxiliary Frequency : 66 Hz	Variation in % error obtained	
		Voltage (V_{LL})	R-Y_{PP} Y-B_{PP} B-R_{PP}	
		100 % of rated value ± 0.1% of range	+0.02 0.00 0.00	
		Voltage (V_{LN})	R_{ph} Y_{ph} B_{ph}	
		100 % of rated value ± 0.1% of range	0.00 0.00 +0.04	
		Current		
		100 % of rated value ± 0.1% of range	+0.02 -0.06 -0.04	
		Active Power		
		100 % of rated value ± 0.1% of range	+0.08 0.00 0.00	
		Reactive Power		
		100 % of rated value ± 0.1% of range	0.00 +0.08 0.00	
		Apparent Power		
		100 % of rated value ± 0.1% of range	+0.08 0.00 0.00	
		Power Factor		
		0.8 Lag ± 0.5 % of unity	0.00 0.00 0.00	
		UPF 0.00 0.00 0.00		
		0.8Lead 0.00 0.00 0.00		
		Phase Angle		
		0° ± 0.5 % of 360°	0.00 0.00 0.00	
		360° 0.00 0.00 0.00		
		Frequency	Variation in % error obtained	
		50 Hz ± 0.075% of mid frequency	0.00	

No 1675212

PREPARED BY

[Signature]

CHECKED BY

[Signature]





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org
 tdc@erda.org, ene@erda.org



TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007

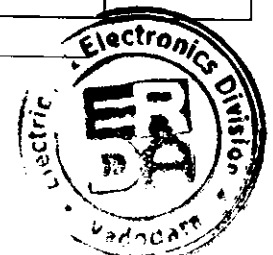
SHEET 8 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks												
5	Influence of self heating (As per customer requirement procedure as per Cl. No. 6.3.2 of IS: 12784(Part1) 1989)	The meter shall be at ambient temperature and shall have been disconnected for atleast 4 hour. Energize the meter with rated voltage and rated current at unity power factor. After 1 min and before third minute measure the value of active power. Repeat the procedure between the 30 th and 35 th minute after energization. The variation observed shall not exceed 100% of specified accuracy limit	<p style="text-align: center;"><u>Variation in % error obtained</u></p> <table border="1"> <tr> <td>R_{ph}</td> <td>Y_{ph}</td> <td>B_{ph}</td> </tr> <tr> <td>-0.08</td> <td>-0.08</td> <td>0.00</td> </tr> </table> <table border="1"> <tr> <td>R_{ph}</td> <td>Y_{ph}</td> <td>B_{ph}</td> </tr> <tr> <td>0.00</td> <td>+0.08</td> <td>+0.08</td> </tr> </table>	R_{ph}	Y_{ph}	B_{ph}	-0.08	-0.08	0.00	R_{ph}	Y_{ph}	B_{ph}	0.00	+0.08	+0.08	Conforms
R_{ph}	Y_{ph}	B_{ph}														
-0.08	-0.08	0.00														
R_{ph}	Y_{ph}	B_{ph}														
0.00	+0.08	+0.08														
6	Overload withstand test (As per customer requirement procedure as per Cl. No. 8.3 of IS: 12784(Part1) 1989)	<p>The test shall be made at reference condition. The excessive input amplitudes of short duration which shall be applied to meter is:</p> <p>a) Voltage input</p> <p>1) 120% of rated value applied for 2 hours No. of application :1</p> <p>2) 1.5 times the rated value applied for 10 second at an interval of 10 seconds. No. of application :10</p> <p>b) Current Input</p> <p>1) 120% of rated value applied for 2 hours. No. of application :1</p> <p>2) 10 times the rated value applied for 3 second at an interval of 5 minutes. No. of application :5</p> <p>After test keep meter de-energized for 2 hours and after that meter functionality shall be checked. Meter shall comply with specified limits of intrinsic error test.</p>	<p>Meter withstood the test</p> <p>Meter withstood the test</p> <p>Meter withstood the test</p> <p>Meter withstood the test</p> <p>After the test meter performed satisfactorily After all above test meter comply with the limits of intrinsic error test</p>	Conforms												

No: 1675213

PREPARED BY

CHECKED BY





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org
 tdc@erda.org, ene@erda.org



TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007

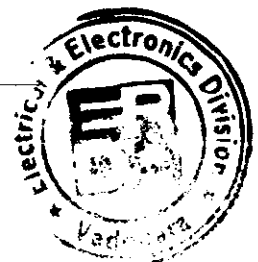
SHEET 9 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks										
7	Variation due to ambient Temperature (As per customer requirement procedure as per Cl. No.6.1 of IS:12784(Part1) 1989)	<p>At reference temperature 23°C keep meter energized for 2 hours and measure error for various parameter as per Table 1 given below.</p> <p>Increase temperature to 50°C and keep meter energized for 2 hours and measure error for various parameter as per Table 1 given below.</p> <p>Reduce the temperature to 0°C and keep meter energized for 2 hours and measure error for various parameter as per Table 1 given below.</p> <p style="text-align: center;">Table-1</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Limits of error</th> </tr> </thead> <tbody> <tr> <td>Phase to phase voltages and Line to neutral voltage. a). at 100% of range b). at 50% of range.</td> <td>0.025%/°C</td> </tr> <tr> <td>Line currents. a). at 120% of range b). at 10% of range.</td> <td>0.05%/°C</td> </tr> <tr> <td>Total Active power and total apparent power (At rated value and Cos $\phi = 1$) a) 100 % of range b) 10 % of range</td> <td>0.025%/°C</td> </tr> <tr> <td>Total reactive power (At rated value and Sin $\phi = 1$) a) 100 % of range b) 10 % of range</td> <td>0.025%/°C</td> </tr> </tbody> </table>	Parameter	Limits of error	Phase to phase voltages and Line to neutral voltage. a). at 100% of range b). at 50% of range.	0.025%/°C	Line currents. a). at 120% of range b). at 10% of range.	0.05%/°C	Total Active power and total apparent power (At rated value and Cos $\phi = 1$) a) 100 % of range b) 10 % of range	0.025%/°C	Total reactive power (At rated value and Sin $\phi = 1$) a) 100 % of range b) 10 % of range	0.025%/°C	<p>Variation observed was less than the specified accuracy limits.</p> <p>Variation observed was less than the specified accuracy limits.</p> <p>Variation observed was less than the specified accuracy limits.</p> <p>Variation observed was less than the specified accuracy limits.</p>	Conforms
Parameter	Limits of error													
Phase to phase voltages and Line to neutral voltage. a). at 100% of range b). at 50% of range.	0.025%/°C													
Line currents. a). at 120% of range b). at 10% of range.	0.05%/°C													
Total Active power and total apparent power (At rated value and Cos $\phi = 1$) a) 100 % of range b) 10 % of range	0.025%/°C													
Total reactive power (At rated value and Sin $\phi = 1$) a) 100 % of range b) 10 % of range	0.025%/°C													

No: 1675214

PREPARED BY

CHECKED BY





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org
 tdc@erda.org, ene@erda.org



TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007

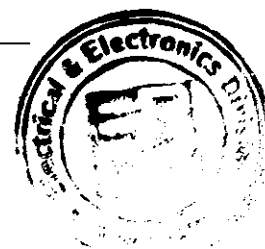
SHEET 10 OF 12

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Rem. ks			
8	Variation due to Magnetic field of external origin (As per customer requirement procedure as per Cl. No 6.7 of IS:12784(Part1) 1989)	Parameters:		Conforms			
		Voltage (V_{L-L})	Limits of error		Variation in % error obtained		
		100 % of rated value	±0.2 % of range		R-Y_{PP}	Y-B_{PP}	B-R_{PP}
					0.00	+0.04	0.00
		Voltage (V_{L-N})			R_{ph}	Y_{ph}	B_{ph}
		100 % of rated value	±0.2 % of range		0.00	+0.02	0.00
		Current					
		100 % of rated value	±0.2 % of range		0.00	0.00	-0.02
		Active Power					
		100 % of rated value	±0.2 % of range		0.00	0.00	0.00
		Reactive Power					
		100 % of rated value	±0.2 % of range		0.00	0.00	0.00
		Apparent Power					
		100 % of rated value	±0.2 % of range		0.00	0.00	0.00
		Power Factor					
		0.8 Lag	± 1 % of unity		0.00	0.00	0.00
		UPF			0.00	0.00	0.00
0.8Lead		0.00	0.00	0.00			
Phase Angle							
0°	± 1 % of 360°	0.00	0.00	0.00			
360°		0.00	0.00	0.00			
Frequency							
50 Hz	± 0.15 of mid frequency	Variation in % error obtained					
		0.00					
9	Variation due to Input current (As per customer requirement procedure as per Cl. No.6.2.3.1 of IS:12784(Part1) 1989)	a) Input current increased to 120% of the nominal value		Conforms			
		Phase Angle	Limits of error		Variation in % error obtained		
		0°	± 1 % of 360°		R_{ph}	Y_{ph}	B_{ph}
					0.00	0.00	0.00
		Power Factor					
		UPF	± 1 % of unity		0.00	0.00	0.00
		a) Input current increased to 20% of the nominal value					
Phase Angle	Limits of error						
0°	± 1 % of 360°	-0.06	-0.03	-0.03			
Power Factor							
UPF	± 1 % of unity	0.00	0.00	0.00			

No: 1675215

PREPARED BY

CHECKED BY





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org
 tdc@erda.org, ene@erda.org



TEST REPORT NO. EMPR/02/1176 Dated: 25/09/2007

SHEET 11 OF 17

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks						
10	Variation due to input voltage (As per customer requirement procedure as per Cl. No. 6.2.3.1 of IS:12784(Part1) 1989)	a) Input voltage increased to 120% of the nominal value.	Variation in % error obtained R_{ph} Y_{ph} B_{ph}		Conforms					
		<table border="1"> <tr> <th>Active Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of rated value</td> <td>± 0.1 % of range</td> </tr> </table>	Active Power	Limits of error		100 % of rated value	± 0.1 % of range	0.00	0.00	+0.08
		Active Power	Limits of error							
		100 % of rated value	± 0.1 % of range							
		<table border="1"> <tr> <th>Reactive Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of rated value</td> <td>± 0.1 % of range</td> </tr> </table>	Reactive Power	Limits of error		100 % of rated value	± 0.1 % of range	0.00	0.00	0.00
		Reactive Power	Limits of error							
		100 % of rated value	± 0.1 % of range							
		<table border="1"> <tr> <th>Apparent Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of rated value</td> <td>± 0.1 % of range</td> </tr> </table>	Apparent Power	Limits of error		100 % of rated value	± 0.1 % of range	0.00	0.00	+0.08
		Apparent Power	Limits of error							
		100 % of rated value	± 0.1 % of range							
b) Input voltage reduced to 80% of the nominal value										
<table border="1"> <tr> <th>Active Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of range</td> <td>± 0.1 % of range</td> </tr> </table>	Active Power	Limits of error	100 % of range	± 0.1 % of range	-0.08	0.00	0.00			
Active Power	Limits of error									
100 % of range	± 0.1 % of range									
<table border="1"> <tr> <th>Reactive Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of rated value</td> <td>± 0.1 % of range</td> </tr> </table>	Reactive Power	Limits of error	100 % of rated value	± 0.1 % of range	-0.08	-0.08	-0.08			
Reactive Power	Limits of error									
100 % of rated value	± 0.1 % of range									
<table border="1"> <tr> <th>Apparent Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of rated value</td> <td>± 0.1 % of range</td> </tr> </table>	Apparent Power	Limits of error	100 % of rated value	± 0.1 % of range	-0.08	0.00	0.00			
Apparent Power	Limits of error									
100 % of rated value	± 0.1 % of range									

11	Variation due to power factor (As per customer requirement procedure as per Cl. No.6.2.3 of IS:12784(Part1) 1989)	Apply 50 % of nominal input current and 100 % of nominal voltage at $\cos\phi$ and $\sin\phi = 1$ and record value of active power and reactive power respectively. At constant value of measurand increase the value of input current for different value of $\cos\phi$ and $\sin\phi$ as mentioned below and record value of active power and reactive power respectively. The variation observed shall not exceed 100% of specified accuracy limits. a) $\cos\phi$ and $\sin\phi = 0.8$ lag b) $\cos\phi$ and $\sin\phi = 0.8$ lead	Variation observed was less than 100% of specified accuracy limits.	Conforms
----	---	--	---	----------

No: 1675216

PREPARED BY

[Signature]

CHECKED BY

[Signature]





ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)
 P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043133, 3043128, 3043129, 3043130, 3043131.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , phv@erda.org, ins@erda.org, plv@erda.org, mtd@erda.org



TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007 SHEET 12 OF 17

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks				
12	Variation due to unbalanced current (As per customer requirement procedure as per Cl. No 6.4 of IS- 12784-1-1989)	Apply balance current so as to get power reading in the middle of the span and Record output value. Disconnect one current adjust other currents maintaining them equal so as to get the initial value of the measurand and record output value. Variation computed should not be less than the specified limit.	<p style="text-align: center;">Variation in % error obtained</p> <p style="text-align: center;">0.00</p> <p style="text-align: center;">+0.08</p>	Conforms				
		<table border="1"> <tr> <th>Active Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % at rated value</td> <td>± 0.2 % of range</td> </tr> </table>			Active Power	Limits of error	100 % at rated value	± 0.2 % of range
		Active Power			Limits of error			
		100 % at rated value			± 0.2 % of range			
<table border="1"> <tr> <th>Reactive Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % at rated value</td> <td>± 0.2 % of range</td> </tr> </table>	Reactive Power	Limits of error	100 % at rated value	± 0.2 % of range				
Reactive Power	Limits of error							
100 % at rated value	± 0.2 % of range							
13	Variation due to interaction between measuring elements (As per customer requirement procedure as per Cl. No.6.6 of IS- 12784-1-1989)	The voltage input of one measuring circuit alone shall be energized at nominal voltage. The current input of each of the other measuring circuit shall be energized in turn at nominal current. The maximum departure from output corresponding to zero measured quantity input shall be noted whilst the phase angle between the voltage and current is changed through 360°. Thee maximum value of the departure of output from the value zero measured quantity shall not exceed as shown below	<p style="text-align: center;">Variation in % error obtained</p> <p style="text-align: center;">0.00</p> <p style="text-align: center;">0.00</p>	Conforms				
		<table border="1"> <tr> <th>Active Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of at rated value</td> <td>± 0.1 % of range</td> </tr> </table>			Active Power	Limits of error	100 % of at rated value	± 0.1 % of range
		Active Power			Limits of error			
		100 % of at rated value			± 0.1 % of range			
<table border="1"> <tr> <th>Reactive Power</th> <th>Limits of error</th> </tr> <tr> <td>100 % of at rated value</td> <td>± 0.1 % of range</td> </tr> </table>	Reactive Power	Limits of error	100 % of at rated value	± 0.1 % of range				
Reactive Power	Limits of error							
100 % of at rated value	± 0.1 % of range							

N: 1675217

PREPARED BY

CHECKED BY



ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
EPABX : +91 (0265) 2642942, 2642964, 2642377, 2642557, 2635300, 2635253, 2657784, 2657785.
Fax : +91 (0265) 2638382.
E-mail : erda@erda.org , dir@erda.org , ad@erda.org



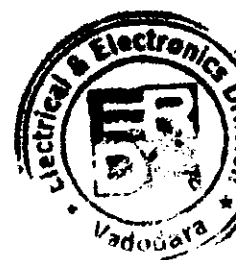
TEST REPORT

Sheet 1 of 4

NAME & ADDRESS OF CUSTOMER M/s. RISHABH INSTRUMENTS PVT. LTD. H.O.& Works:F – 31, MIDC, Satpur, NASHIK – 422 007.	REPORT NO: EMTR/02/1177 DATE : 25/9/2007	
	Customer Reference No.: Nil, Dtd. 28/7/2007	
	DATE OF SAMPLE RECEIPT 10/09/2007	DATE OF TESTING 10/09/2007 to 24/09/2007
SAMPLE DESCRIPTION Digital Multifunction Instrument Model : RISH master 3430 Range : Input Voltage: 415 V _(L-L) Input Current: 5 A Input Frequency: 45/66 Hz Auxiliary Supply: 100-250 V AC/DC Class : ± 0.2 % of the range for Voltage & Current ± 0.2 % for Power ± 0.15 % of mid frequency ± 1.0 % of Unity for P.F ± 1.0 % of 360° for Phase Angle ± 0.2% for Energy Make : Rishabh	SAMPLE IDENTIFICATION Sl. No.: 07/07/0041 ERDA CODE: EMTRWO0053963/1	
TEST DETAILS As per sheet no. 2	TEST SPECIFICATION Tests as per customer requirement. Test procedure as per Cl. No.6.15 of IEC: 60688-2002 for variation due to continuous operation only.	
REMARK- The above Digital Multifunction Instrument conforms to the requirements in respect of the tests carried out.		
NOTE: - 1) Only the tests asked by the customer have been carried out. 2) All test were carried out with auxiliary supply 240VAC, 50Hz.		
PREPARED BY 	CHECKED BY 	APPROVED BY

- Note: 1. This report relates only to the particular sample received in good condition, for testing at ERDA.
2. This report cannot be reproduced in part under any circumstances.
3. Publication of this report requires prior permission in writing from Director, ERDA.
4. Only the tests asked for by the customer have been carried out.

No 1418256



ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
EPABX : +91 (0265) 2642942, 2642964, 2642377, 2642557, 2635300, 2635253, 2657784, 2657785.
Fax : +91 (0265) 2638382.



E-mail : erda@erda.org, info@erda.org, td@erda.org TEST REPORT NO. EM/PR/02/1977 DATED: 25/09/2007

SHEET 2 OF 4

Sl. No.	TESTS	Clause no.
1	High Voltage test	As per customer requirement
2	Intrinsic error test	As per customer requirement
3	Burden	As per customer requirement
4	Storage temperature test at -20 °C and 65°C	As per customer requirement
5	Test for relative humidity	As per customer requirement
6	Variation due to continuous operation	As per customer requirement and test procedure as per Cl. No.6.15 of IEC:60688-2002
7	Vibration test.	As per Customer requirement
8	RS 485 Modbus communications output	As per customer requirement

No 1418257

PREPARED BY

CHECKED BY



ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 2642557, 2635300, 2635253, 2657784, 2657785.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , ad@erda.org



TEST REPORT NO. EMTR/02/1177 Dated: 25/09/2007

SHEET 3 OF 4

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks																											
1	High voltage test. (As per customer requirement)	Apply the 2.2kV High Voltage between the circuits and accessible surface. No breakdown to occur during the test.	No break down was observed, during the test.	Conform																											
2	Intrinsic error test (As per customer requirement)	ACTIVE ENERGY <table border="1"> <thead> <tr> <th>Current</th> <th>cosφ</th> <th>% error</th> </tr> </thead> <tbody> <tr> <td>1.0I_b</td> <td>1.0</td> <td>±0.2</td> </tr> <tr> <td>1.0I_b</td> <td>0.8Lag</td> <td>±0.2</td> </tr> <tr> <td>1.0I_b</td> <td>0.8Lead</td> <td>±0.2</td> </tr> <tr> <td>0.1I_b</td> <td>1.0</td> <td>±0.2</td> </tr> <tr> <td>0.1I_b</td> <td>0.8 Lag</td> <td>±0.2</td> </tr> <tr> <td>0.1I_b</td> <td>0.8 Lead</td> <td>±0.2</td> </tr> </tbody> </table>	Current	cosφ	% error	1.0I _b	1.0	±0.2	1.0I _b	0.8Lag	±0.2	1.0I _b	0.8Lead	±0.2	0.1I _b	1.0	±0.2	0.1I _b	0.8 Lag	±0.2	0.1I _b	0.8 Lead	±0.2	Obtained %Error <table border="1"> <tbody> <tr> <td>+0.06</td> </tr> <tr> <td>+0.05</td> </tr> <tr> <td>+0.14</td> </tr> <tr> <td>+0.12</td> </tr> <tr> <td>-0.09</td> </tr> <tr> <td>-0.02</td> </tr> </tbody> </table>	+0.06	+0.05	+0.14	+0.12	-0.09	-0.02	Conforms
Current	cosφ	% error																													
1.0I _b	1.0	±0.2																													
1.0I _b	0.8Lag	±0.2																													
1.0I _b	0.8Lead	±0.2																													
0.1I _b	1.0	±0.2																													
0.1I _b	0.8 Lag	±0.2																													
0.1I _b	0.8 Lead	±0.2																													
+0.06																															
+0.05																															
+0.14																															
+0.12																															
-0.09																															
-0.02																															
3	Burden (As per Customer requirement)	Measure burden at rated voltage in phase voltage circuits. The measured value shall be ≤ 0.2 VA Measure burden at rated current in phase current circuits. The measured value shall be ≤ 0.6 VA Measure burden at rated auxiliary voltage in auxiliary circuit. The measured value shall be ≤ 4 VA	Burden measured was less than 0.2 VA in all three phases in voltage circuits. Burden measured was less than 0.6 VA in all three phases in current circuits. Burden measured was less than 4VA in auxiliary circuit.	Conforms																											
4	Storage temperature Test at -20 °C to 65 °C. (As per Customer requirement)	The meter to be kept in de-energized condition at -20° C for a period of 4 hours and after that the meter shall be keep at 23°C for a period of 2 hours. After that meter shall meet the requirement of intrinsic accuracy test. The meter shall be keep in de-energized condition at 65° C for a period of 4 hours and after that the meter shall be keep at 23°C for a period of 2 hours. After that meter shall meet the requirement of intrinsic accuracy test	Meter was subjected to -20° C for a period of 4 hours and after that the meter was kept at 23°C for a period of 2 hours. After the test the intrinsic accuracy test was carried out and error obtained was less than the specified limits Meter was subjected to 65° C for a period of 4 hours and after that the meter was kept at 23°C for a period of 2 hours. After the test the intrinsic accuracy test was carried	Conforms																											

No: 1418259

PREPARED BY

[Signature]

CHECKED BY

[Signature]



ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

P. B. 760, ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India. Gram : ELECSEARCH
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 2642557, 2635300, 2635253, 2657784, 2657785.
 Fax : +91 (0265) 2638382.
 E-mail : erda@erda.org , dir@erda.org , ad@erda.org



SHEET 4 OF 4

TEST REPORT NO. EMTR/02/1177 Dated: 25/09/2007

Sr. No.	Particular of tests & Cl. No.	Requirement as per customer specification	Obtained value	Remarks
			out and error obtained was less than the specified limits.	
5	Test for Relative Humidity. (As per Customer requirement)	The meter to be kept in de-energized condition for a period of 24 hours at 40°C and relative humidity 90 % RH (non condensing) After the test meter shall meet the requirement of intrinsic accuracy test.	Meter was subjected to relative humidity test and obtained %error after the test were less than the specified limits.	Conform.
6	Variations due to continuous operation (As per Customer requirement and procedure as per 6.15 of IEC 60688)	Energize the meter under reference conditions for at least the preconditioning period. Record the value of the output. After a convenient period of continuous operation for 6 h, note the value of the output. Permissible variation: The meter shall continue to comply in all respects with the requirements appropriate to its accuracy class.	The meter was subjected to the test of continuous operation. The meter continued to comply with the requirements appropriate to its accuracy class after more than 6 h of continuous operation.	Conforms
7	Vibration test. (As per Customer requirement)	The meter shall be carried out in accordance with IEC 60068-2-6 with following test parameters: a) Sweep frequency range: 10-55-10 Hz b) Constant peak amplitude:0.15mm c) No of Sweep cycles: 5 d) Direction: All three mutually perpendicular axes. After conclusion of the test meter shall show no mechanical damage to occur and meter shall comply with specified accuracy limits after the test.	Meter was subjected to vibration test. After the test no mechanical damage was observed. After the test meter comply with specified accuracy class.	Conforms
8	RS 485 Modbus Communications output. (As per Customer requirement)	All the parameters available to be checked via modbus interface at baud rate: 9600 bps All the reading read through Modbus should be as per the display reading of the meter.	Readings available via modbus interface at baud rate of 9600bps are matching with display reading of the instrument.	Conforms

No: 1418258

PREPARED BY

[Signature]

CHECKED BY

[Signature]

