

ELECTRICAL RESEARCH AND DEVELOPMENT

(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. : +91 (0265) 2638382



NAME & ADDRESS OF CUSTOMER

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 REPORT NO: EMTR/02/1176

M/s. RISHABH INSTRUMENTS PVT. LTD.

H.O.& Works: F - 31, MIDC, Satpur,

NASHIK - 422 007.

DATE : 25/9/2007

SAMPLE IDENTIFICATION

Customer Reference No.: RIPL/QAS/07F/01

Dtd. 19/07/2007

DATE OF SAMPLE DATE OF RECEIPT **TESTING** 20/07/2007 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

: \pm 0.2 % of the range for

Voltage & Current

± 0.2 % for Power

± 0.15 % of mid frequency

 \pm 1.0 % of Unity for P.F.

± 1.0 % of 360° for Phase Angle

± 0.2% for Energy

Make : Rishabh Sl. No.: 07/07/0042

ERDA CODE: EMTRWO0052720/1

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.

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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.





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IESI.	REPORTANOS ENTRODAPIS DATED: 2	25/09/2007 SHEET 2 OF 12
Sl. No.	TESTS	Clause no.
	Intrinsic accuracy test	As per customer requirement and test proced as per Cl.No.6.1 of IS: 12784(Part1) 1989
2	Influence of input frequency variation	As per customer requirement and test procedures per Cl. No.6.1 of IS: 12784(Part1) 1989
3	Variation due to auxiliary supply voltage	As per customer requirement and test procedu as per Cl. No 6.1 of IS: 12784(Part1) 1989
	Variation due to auxiliary supply frequency	As per customer requirement and test procedu as per Cl. No.6.2.3 of IS: 12784(Part1) 1989
	Influence of self heating	As per customer requirement and test proceduras per Cl. No.6.3.2 of IS: 12784(Part1) 1989
6	Overload withstand test	As per customer requirement and test proceduras per Cl. No.8.3 of IS: 12784(Part1) 1989
7	Variation due to ambient Temperature	As per customer requirement and test procedu as per Cl. No.6.1 of IS: 12784(Part1) 1985
8	Variation due to Magnetic field of external origin	As per customer requirement and test procedu as per Cl. No.6.7 of IS: 12784:1989
9	Variation due to input current	As per customer requirement and test procedures 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 proceduras per Cl. No.6.4 of IS:12784(Part1)1989
	Variation due to interaction between measuring elements	As per customer requirement and test procedu as per Cl. No.6.6 of IS:12784(Part1)1989

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TI	ST REPORT NO. EM	org , un eleida.org , p org. ene.eleida.org	ภกง @ erda.org, ins@erda	a.org, plv@	erda.org	, mtd@erd	a.org
1 <u>F</u>	ST REPORT NO. EM					SHE	ET 3 OF 12
Sr.	Particular of		s per customer	Obtai	ned valu		Remarks
No.		specification					
1	Intrinsic Accuracy	When the multifu	inction instrument is				Conforms
	test. (As per	under reference of	ondition and single	ł			- 33333778
1	customer	influence quantity	y is varied as given				1
1 .	requirement	below. The result	ant, expressed as a				1
	procedure as per CI.	percentage of the	class index shall				1
	No. 6.1 of	not exceed the va	lue shown below:				Ţ
	IS:12784(Part1)	Parameters:		Ohto	ined %		1
	1989)	Voltage (V _{L-L})	Limits of error	R-Y _{PP}	Y-B _{PP}		
		100 % of rated value	± 0.2 % of range	+0.02	+0.02	B-R _{PP} +0.02	
		50 % of rated value		+0.02	0.00	0.00	
		Voltage (V _{L-N})		<u>R</u> ph	v		'
		100 % of rated value	± 0.2 % of range	+0.04	$\frac{Y_{ph}}{+0.08}$ -	<u>B</u> ph +0.02	1
[50 % of rated value		+0.06	+0.02	+0.02	1
		Current					
		100 % of rated value	± 0.2 % of range	+0.01	0.00	+0.08	
		10 % of rated value	<u> </u>	0.00	-0.02	-0.02	
		Active Power 100 % of rated value	1 1 0 2 0 / C	0.00	10.00	0.00	
		10 % of rated value	± 0.2 % of range	0.00	+0.08 0.00	0.00 0.00]
		Reactive Power		0.00	0.00	0.00	!
		100 % of rated value	± 0.2 % of range	0.00	0.00	0.00	1
1		10 % of rated value	- 0.2 70 of fainge	0.00	0.00	0.00]
		Apparent Power					[
İ		100 % of rated value	± 0.2 % of range	0.00	0.00	0.00	
1		10 % of rated value		0.00	0.00	0.00	
		Power Factor					
ĺ		0.8 Lag	± 1 % of unity	1.00	1.00	1.00	
1		UPF]	0.00	0.00	0.00	
	ļ	0.8Lead		0.00	1.00	0.00	
1	-	Phase Angle					ľ
		0° 60°	±1 % of 360°	0.00	+0.02	-0.03	
		180°		-0.02 -0.03	0.00	-0.02	
[1	270°	1	0.03	0.00 +0.03	-0.06 0.00	1
1		360°]	-0.03	0.00	0.00	1
ļ	Ī	Frequency			ned % e		
-	<u> </u>	45 Hz	± 0.15 %of mid		0.00		j
		50 Hz	frequency		-0.02		1
		70 Hz			-0.02		i

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<u>TE</u>	ST REPOR ^{th©®} O. EMT	R/02/11/6 Dated	l: 25/09/2007		_	SHEE	T 4 OF 12
Sr.	Particular of	Requirement as		Obtai	ned valu		Remarks
No.	tests & Cl. No.	specification	1	001	nou run		Comunes
2	Influence of input	When the multifund	ction instrument is	Τ -			Conft ms
	frequency	under reference con		ľ			Contins
i i	variation	influence quantity i		İ			l
	(As per customer		nt variation, expressed	j			
	requirement	as a percentage of the					1
		not exceed the value		Varia	tion in	% error	
	procedure as per Cl.	Parameters:	Frequency: 45 Hz	7 41 144	<u>obtaine</u>		
1 1	No. 6.1 of	Voltage (V _{L-L})	Limits of error	R-Y _{PP}	Y-B _{PP}		
1 1	IS:12784(Part1)	100 % of rated value	± 0.2 % of range	0.00	+0.02	0.00	'
	1989)	Voltage (V _{L-N})			Y _{ph}	B _{ph}	۱ .
		100 % of rated value	± 0.2 % of range	R _{ph}	-0.04	+0.04	
		Current	1	9.55	0,0.	.0.07	
		100 % of rated value	± 0.2 % of range	0.00	0.00	+0.04	
		Active Power			3,33	. 0.0 7	[
		100 % of rated value	± 0.2 % of range	-0.08	-0.08	+0.08	
		Reactive Power	1 = 0.2 / 0 or range		*****		
		100 % of rated value	± 0.2 % of range	0.00	0.00	+0.08	
		Apparent Power	_ 0.12 70 01 tunge				'
]		100 % of rated value	± 0.2 % of range	0.00	0.00	0.00	
		Power Factor	1 0.2 /0 01 Talige			0.00	
		0.8 Lag	± 1 % of unity	0.00	0.00	0.00]
]		UPF	± 1 76 Of unity	0.00	0.00	0.00	1
		0.8Lead		0.00	0.00	0.00	
		Phase Angle					1
		0°	± 1 % of 360°	0.00	0.00	+0.05	
		360°	2 1 70 01 300	0.00	0.00	0.00	
		Parameters:					
			requency : 70 Hz]	
1		Voltage (V _{L-L})	Limits of error		•		
ĺ		100 % of rated value	± 0.2 % of range	+0.02	-0.02	-0.02	
		Voltage (V _{L-N})		****	3,02	0.02	ı
		100 % of rated value	± 0.2 % of range	0.00	0.00	0.00	1
		Current					İ
		100 % of rated value	± 0.2 % of range	0.00	-0.02	0.00	
	-	Active Power	= 0.12 / 0 0.1 1 mgs	0.00	-0.02	0.00	
	ļ	100 % of rated value	± 0.2 % of range	0.00	-0.08	0.00	."
	<u> </u>	Reactive Power	± 0.2 70 01 tunge	0.00	0.00	0.00	i
		100 % of rated value	± 0.2 % of range	0.00	0.00	0.00	
	ŀ	Apparent Power	= 5.2 /0 of funge	0100	0.00	0.00	
	•	100 % of rated value	± 0.2 % of range	0.00	+0.08	-0.17	
	}	Power Factor	- 0.2 70 Of tange	0.00	TU.U0	*V.17	İ
	}	0.8 Lag	± 1 % of unity	0.00	0.00	0.00	
		UPF	± 1 70 Of unity	0.00	0.00	0.00	
ľ		0.8Lead		-1.00	-1.00	0.00	+]
	<u> </u>	Phase Angle	***				i
	<u></u>	0°	± 1 % of 360°	-0.03	0.00	-0.05	<u> </u>
		360°		-0.06	-0.03	0.00	1
	 						

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<u>TE</u>	ST REPORT NO. EM	FR/02/1176 Date	ed: 25/09/2007			eum	T & C/F 10
Sr.	Particular of	Requirement a	as per customer	Ohto	ained valu		T 5 OF 12
No.	tests & Cl. No.	specification	-s per customer	Out	illeu valu	е	Remarks
3	Variation due to		nction instrument is	T			 .
	auxiliary supply	under reference co	ndition and single				Conform
	voltage	influence quantity	is varied as given				
	(As per customer	below. The resulta	nt variation, expressed	1			1
1	requirement	as a percentage of	the class index shall				
	procedure as per Cl.	not exceed the valu	ie shown below.				ı
	No. 6.1 of IS:	Parameters:		Vonic	. Al	· /	
	12784(Part1)		e (+10% of 250V)	Varia	ation in S		
	1989)	Voltage (V _{L-L})	Limits of error	bv	<u>obtaine</u>		
] [1909)	100 % of rated	± 0.1% of range	$\frac{\mathbf{R-Y_{PP}}}{+0.02}$	Y-B _{PP}	B-R _{PP}	j
		value	- 0.170 of funge	10.02	+0.02	-0.07	1
		Voltage (V _{L-N})	<u>-l</u>				
	,	100 % of rated	± 0.1% of range	$\frac{\mathbf{R}_{ph}}{\mathbf{R}_{ph}}$	Y _{ph}	B _{ph}	
		value	or runge	0.00	+0.08	-0.04	
		Current	····	į			
		100 % of rated	± 0.1% of range				
		value	i i i i i i i i i i i i i i i i i i i	-0.02	+0.02	+0.02	
		Active Power					
1	ļ	100 % of rated	± 0.1% of range				ľ
		value		0.00	0.00	0.00	•
		Reactive Power					ĺ
ľ		100 % of rated	± 0.1% of range	0.00			
	·	value		0.00	0.00	0.00	j
		Apparent Power	-				İ
1		100 % of rated	± 0.1% of range				
		value		0.00	+0.08	-0.08	
	L	Power Factor					
	•	0.8 Lag	± 0.5 % of unity	0.00	0.00	0.00	1
		UPF		0.00	0.00	0.00	
ľ		0.8Lead		0.00	0.00	0.00	-
ŀ	ſ	Phase Angle	·	0.00	0.00	0.00	İ
		0°	± 0.5 % of 360°	0.00	0.00	0.00	'
		360°		0.00		0.00	İ
				0.00	0.00	0.00	
	Ė	Frequency		¥7.0	: / O/	i	
		50 Hz	+ 0.075% of mid		<u>ion in %</u>	<u>error</u>	
1			frequency	9	<u>obtained</u>	ļ	Ī
		1	requericy		0.00		•
	- <u>- L</u>						

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TI	EST REPOR ^{tdc@erda} off	R/02/11/76 Date	d: 25/09/2007			CHCE	T (OC 12
Sr.	Particular of	Requirement a	s per customer	Ohta	ined valu		T 6 OF 12
No	tests & Cl. No.	specification	s per eastorner	Oua	incu vaiu		Remarks
3	Variation due to	When the multifun	ction instrument is				Conforms
	auxiliary supply	under reference co.	ndition and single				
	voltage	influence quantity	is varied as given	l			
	(As per customer	below. The resultar	nt variation, expressed				
	requirement	as a percentage of	the class index shall				
	procedure as per Cl.	not exceed the valu	ie shown below:				İ
[No. 6.1 of	Parameters:		<u>Varia</u>	tion in ⁹	% error	
}	IS:12784(Part1)	Auxiliary voltag	e (-10% of 100V)		<u>obtaine</u>	d	į
	1989)	Voltage (V _{L-L})	Limits of error	R-Y _{PP}	Y-B _{PP}	B-R _{PP}	
	·	100 % of rated	± 0.1% of range	+0.02	+0.02	-0.07	
		value					
1		Voltage (V _{L-N})		$\underline{\mathbf{R}_{\mathtt{ph}}}$	Y_{ph}	\mathbf{B}_{ph}	
		100 % of rated	\pm 0.1% of range	-0.04	+0.04	-0.04	
		value					
		Current					
		100 % of rated	± 0.1% of range	0.00	-0.02	-0.02	
ļ		value					
	ļ	Active Power					
		100 % of rated	± 0.1% of range	0.00	0.00	0.00	
	<u>,</u>	value					
	•	Reactive Power	T				İ
		100 % of rated	± 0.1% of range	-0.08	0.00	0.00	1
!	ŀ	value					
	-	Apparent Power					j
		100 % of rated	± 0.1% of range	+0.08	0.00	0.00	ì
	-	value				İ	
	1	Power Factor		0.00	0.00		
ľ		0.8 Lag	± 0.5 % of unity	0.00	0.00	0.00	-
į	i	UPF		0.00	0.00	0.00	i
	Ļ	0.8Lead		0.00	0.00	0.00	1
		Phase Angle					ŀ
		0°	± 0.5 % of 360°	0.00	0.00	0.00	İ
		360°		0.00	0.00	0.00]
	-	Funganan		Vontati	ion !- 04		
[Frequency	1.0.0758/ 6.11		on in %	error	ļ
İ		50 Hz	$\pm 0.075\%$ of mid	<u>•</u>	<u>obtained</u>		
			frequency		0.00		

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<u>TES</u>	<u> LREPORT NO. EMT</u>	R/02/1176 Dated: 25/09/2007		SHEET 7 OF 12
Sr.	T	Requirement as per customer	Obtained value	Remarks
No.	tests & Cl. No.	specification	Commed value	Remarks

No.	tests & Cl. No.	specificat	ion	- I	Obla	anieu van	ac.	Kemarks
4	Variation due to			n instrument is under				C6
	auxiliary supply	reference condit	tion an	d single influence	1			Conforms
	frequency	quantity is varie	d as gi	ven below. The resultant				
		variation, expres	ssed as	a percentage of the class				
	(As per customer	index shall not e		the value shown below:	<u>Vari</u>	<u>ation in</u>	% error	
	requirement	Parameters:	<u>Aux</u>	iliary Frequency:45Hz	_	obtaine		
	procedure as per Cl.	Voltage (V _{L-L})		Limits of error	R-Y _{PP}			
	No.6.2.3 of	100 % of rated va	alue	± 0.1% of range	+0.02	0.00	0.30	
1	IS:12784(Part1)	Voltage (V _{L-N})			Roh	<u>Y</u> ph	<u>B</u> ph	
	1989)	100 % of rated va	alue	± 0.1% of range	R _{ph_} 0.00	0.00	+0.04	1
	1303)	Current			1			
		100 % of rated va	lue	± 0.1% of range	-0.02	-0.08	-0.04	
		Active Power			1			
1		100 % of rated va	lue	± 0.1% of range	+0.0	8 0.00	0.00	
		Reactive Power		<u> </u>	1		4.00	
		100 % of rated val	lue	± 0.1% of range	0.00	+0.08	0.00	
		Apparent Power		'	1	. 0.00	0.00	1
		100 % of rated va		± 0.1% of range	+0.03	8 0.00	0.00	İ
		Power Factor			1	0.00	0.00	
		0.8 Lag		± 0.5 % of unity	0.00	0.00	0.00	
ŀ		UPF		± 0.5 % Of utility	0.00		0.00 0.00	1
		0.8Lead			0.00		0.00	
		Phase Angle		. L	0.00	0.00	0.00	
	i	0°		± 0.5 % of 360°	0.00	0.00	0.00	
	}	360°			0.00	0.00	0.00	
1		Frequency			Variation	in % erro	r obtained	•
		50 Hz	± 0.0	75% of mid frequency		0.00	- volumen	
		Parameters:	Auxil	iary Frequency : 66 Hz	└ Variation	in % error	r obtained	
1		Voltage (V _{L-L})		Limits of error	R-Y _{PP}	Y-B _{PP}		ļ .
		100 % of rated value	ue	± 0.1% of range	+0.02		0.00	
		Voltage (V _{L-N})			<u>R</u> ph	v .	D	ŀ
i		100 % of rated valu	ue	± 0.1% of range	0.00	$\frac{\mathbf{Y}_{ph}}{0.00}$ –	B _{ph} +0.04	
	Ī	Current				3.00	. 0.0 1	
		100 % of rated valu	ıe	± 0.1% of range	+0.02	-0.06	-0.04	
	Ţ	Active Power						
	Ť	100 % of rated valu	ıe	± 0.1% of range	+0.08	0.00	0.00	
	ľ	Reactive Power			. 0.00	0.00	0.00	
		100 % of rated valu	ie T	± 0.1% of range	0.00		0.00	
- 1	ř	Apparent Power			0.00	+0.08	0.00	į
	-	100 % of rated valu	1e	± 0.1% of range				Į
	į.	Power Factor		- 0.176 Of Talige	+0.08	0.00	0.00	
	<u> </u>			1050/ 6	0.00	0.00	0.00	ļ
ŀ		0.8 Lag UPF		± 0.5 % of unity	0.00	0.00	0.00	ŧ
		0.8Lead			0.00	0.00	0.00	1
ľ	_	Phase Angle			0.00	0.00	0.00	
	<u> </u>	0°		± 0.5 % of 360°	0.00	0.00	0.00	
		360°			0.00	0.00	0.00	
]		Frequency				in % error		
-		50 Hz	± 0.07	5% of mid frequency		0.00	- speciality	
				<u> </u>		· · · · · · · · · · · · · · · · · · ·	—— -{	ectron

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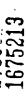
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71	<u>EST REPORT NO. EM</u>	TR/02/1176 Dated	<u>1: 25/09/20</u> 07	CH	EET 8 OF 12
Sr.	Particular of	Requirement a	s per customer	Obtained value	Remarks
No		specification	-		Remarks
5	Influence of self	The meter sha	ll be at ambier	nt	Conforms
ļ	heating (As per	temperature and	shall have bee		Comorns
i	customer	disconnected fo	r atleast 4 hour		
	requirement	Energize the meta	er with rated voltag	e.	
1	procedure as per Cl.	and rated curre	nt at unity powe	r	
	No. 6.3.2 of IS:	factor. Afte	or 1 min and before	e	
ŀ	12784(Part1)	third minute me	asure the value o	f	
}	1989)	active power. Re	peat the procedure	e	
		between the 30 th a	and 35 th minute afte	r r	
	•	energization. The	variation observed	1	
		shall not exceed	100% of specified	1	
		accuracy limit	•	<u>variation in % error</u>	ĺ
		Active Power	Limits of error	<u>obtained</u>	
		100 % of rated	$\pm 0.2 \%$ of range	R_{ph} Y_{ph} B_{ph}	
		value	7 - 012 70 of fatige	-0.08 -0.08 0.00	
		Reactive Power	-		
		100 % of rated	± 0.2 % of range	$\frac{R_{ph}}{Q_{q}Q_{q}} = \frac{Y_{ph}}{Q_{q}Q_{q}} = \frac{R_{ph}}{Q_{q}Q_{q}}$	
		value	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.00 +0.08 +0.08	1 1
6	Overload	The test shall be	made at reference	ļ	
_	withstand test (As	condition. The			Conform.
Ī	per customer	_	excessive input ort duration which		
- 1	requirement	shall be applied to n	neter is:		,
- 1	procedure as per Cl.	a) Voltage input	10.		
	No. 8.3 of IS:	1) 120% of rated v	alue applied for 2	Meter withstood the test	
	12784(Part1)	hours	11	with the test	1
	1989)	No. of application:			
		2) 1.5 times the rate	d value applied for	Meter withstood the test	1
		10 second at an inter	rval of 10 seconds.		
	İ	No. of application:	0		1
1		1) (1	1		1
		b) Current Input			1
		1) 120% of rated v hours.	alue applied for 2	Meter withstood the test	1 . 1
		No. of application:1			1
		2) 10 times the rated	t value applied for	Motor without - 1 d	
		3 second at an interv	al of 5 minutes	Meter withstood the test	
		No. of application :5			
		After test keep mete		After the test meter	
	1.	2 hours and at	fter that meter	performed satisfactorily	
]	functionality shall be	checked.	After all above test meter	
		Meter shall comply	y with specified	comply with the limits of	
		limits of intrinsic erro	or test.	intrinsic error test	

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TES	ST REPORT NO. EMTR	ene@erda.org <u>/02/1176 Dated: 25/09/</u>	2007		SH	EET 9 OF 12
Sr.	Particular of	Requirement as per cus		Obtained v		Remarks
No.	tests & Cl. No.	specification				
7	Variation due to	At reference temperat			-·- <u>-</u> -	Confe-ms
	ambient	meter energized for				'
	Temperature	measure error for vario	•			l i
	(As per customer	per Table 1 given below	/.			
Î	requirement procedure		5000 11			
	as per Cl. No.6.1 of	Increase temperature to				İ
	IS:12784(Part1)	meter energized for				
	1989)	measure error for vario				-
		per Table 1 given below	'.			
		Reduce the temperature	re to 0°C and			
		keep meter energized f				
		measure error for variou				
		per Table 1 given below				
		Table-1				'
		Parameter	Limits of error	Ĺ		[
		Phase to phase				
		voltages and Line to		1	observed	ì
		neutral voltage.		ì	than the	
		a). at 100% of range	0.025%/°C	specified	accuracy	
		b). at 50% of range.		limits.		
		Line currents.		Variation	observed	
		a). at 120% of range	0.05%/°C	was less		
		b). at 10% of range.	0.0370/ C	specified	accuracy	
		b). at 10% of range.		limits.	accuracy	
				mints.		
		Total Active power		_		
		and total apparent		Variation	observed	
		power (At rated value		was less	than the	l
		and $\cos \phi = 1$		specified	accuracy	
		a) 100 % of range	0.025%/℃	limits.	-	
		b) 10 % of range				
		Total reactive power				1
		(At rated value and				
		$Sin \phi = 1$		Variation		
		a) 100 % of range	0.025%/℃	was less		ļ
		b) 10 % of range		specified	accuracy	1
				limits.		i
ı		1				1

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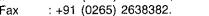




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TEST REPORT NO. EMTR/02/1176 Dated: 25/09/2007

Particular of Requirement as per customer

SHEET 10 OF 12

Rem. .ks

Obtained value

OI.	i di tiodidi oi	Requirement
No.	tests & Cl. No.	specification

INO		specification		1			1
8	Variation due to	Parameters:	_	Variatio	n in % erro	r obtained	Conforms
	Magnetic field of	Voltage (V _{L-L})	Limits of error	R-Y _{PP}		B-R _{PP}	
	external origin	100 % of rated	±0.2 % of range	0.00	+0.04	0.00	
	(As per customer	value					
	requirement	Voltage (V _{L-N})		R _{ph}	Y _{ph}	\mathbf{B}_{ph}	
	procedure as per	100 % of rated	±0.2 % of range	$\frac{\Lambda pn}{0.00}$	+0.02	$\frac{D_{pn}}{0.00}$	
	Cl. No 6.7 of	value		0.00	. 0.02	0.00	
	IS:12784(Part1)	Current					1
	1989)	100 % of rated	±0.2 % of range	0.00	0.00	-0.02	
		value		0.00	0.00	-0.02	
		Active Power					
		100 % of rated	±0.2 % of range	0.00	0.00	0.00	
		value		0.00	0.00	0.00	```
		Reactive Power					
		100 % of rated	±0.2 % of range	0.00	0.00	0.00	
		value		0100	0.00	0.00	
		Apparent Powe	r	•			
		100 % of rated	±0.2 % of range	0.00	0.00	0.00	
		value	and in the same	0.00	0.00	0.00	
		Power Factor	l				
		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°	_ 1 70 01 500	0.00	0.00	0.00	
		Frequency					
		50 Hz	± 0.15 of mid	<u>Variatio</u>	n in % error	obtained	
		JULIE	frequency		0.00		
9	Variation due to	a) Input aurment	increased to 120%	X 7. •	4'. ' 0/		Conforms
	Input current (As	of the nominal v		<u>varia</u>	tion in %		Comoniis
	per customer		Limits of error	n	<u>obtained</u>		
	requirement	Phase Angle		$\frac{R_{ph}}{\Omega}$	Y_{ph}	$\frac{B_{ph}}{A_{ph}}$	
	procedure as per Cl.		± 1 % of 360°	0.00	0.00	0.00	
-	No.6.2.3.1 of	Power Factor	10/.0	0.00	0.00	0.00	
	IS:12784(Part1)	UPF	± 1 % of unity	0.00	0.00	ייט.ט	
	1989)		increased to 20%				
	1707)	of the nominal v					
		Phase Angle	Limits of error				
		0°	± 1 % of 360°	-0.06	-0.03	-0.03	
		Power Factor			A - A		
		UPF	± 1 % of unity	0.00	0.00	0.00	1

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	REPORT NO EMPR		·	. , p			Γ 11 OF 1 [^]
Sr.	Particular of	Requirement as pe		Obtain	ed value		Remarks
No.	tests & Cl. No.	specification					
10	Variation due to a) Input voltage increased to					Conforms	
	input voltage	120% of the nomi		<u>Variation in % error</u> obtained		<u>error</u>	
	(As per customer	Active Power	Limits of error	R_{ph}	Y _{ph} _	B_{ph}	
	requirement	100 % of rated	± 0.1 % of range	0.00	0.00	+0.08	
	procedure as per Cl.	value			*		
	No. 6.2.3.1 of	Reactive Power		1			1
	IS:12784(Part1)	100 % of rated	± 0.1 % of range	0.00	0.00	0.00	
	1989)	value					
		Apparent Power	Apparent Power				ļ
		100 % of rated	±0.1 % of range	0.00	0.00	+0.08	
		value					•
		b) Input voltage	reduced to 80%	1			
		of the nominal va	lue				
		Active Power	Active Power Limits of error				
		100 % of range	± 0.1 % of range	-0.08	0.00	0.00	
		Reactive Power					
		100 % of rated	± 0.1% of range	-0.08	-0.08	-0.08	
		value					
		Apparent Power					
		100 % of rated	\pm 0.1 % of range	-0.08	0.00	0.00	
		value					
11	Variation due to	Apply 50 %	of nominal input	Variatio	on observ	ed was	Conforma
	power factor	current and 100	% of nominal	less th	han 100)% of	
	(As per customer	voltage at Cosø	and $sin\phi = 1$ and	specifie	ed a	ccuracy	
	requirement	record value of	active power and	limits.			
	procedure as per Cl.	reactive power	respectively. At	İ			
	No.6.2.3 of	constant value	of measurand				
	IS:12784(Part1)	increase the value	e of input current				
	1989)	for different value	of Cos				
		as mentioned below	w and record value				
		of active power a	nd reactive power				
		respectively. The	variation observed				
		shall not exceed	100% of specified				
		accuracy limits.	•				
		a) Cos p and S	$\sin \phi = 0.8 \log$				
			b) Cos\(\phi\) and Sin\(\phi\) = 0.8 lead				

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TEST REPORT ROLL THE PROPERTY OF Pated: 25/09/2007					SHEET 12 OF 12	
Sr.	Particular of	Requirement as pe		Obtained value	Remarks	
No.	tests & Cl. No.	specification				
12	Variation due to		rent so as to get		Conforms	
	unbalanced current	power reading in t				
	(As per customer	span and Record of	output value.			
	requirement	Disconnect one cu	rrent adjust other			
	procedure as per Cl.	currents maintaini				
	No 6.4 of IS- 12784-	as to get the initial				
	1-1989)	measurand and rec				
		Variation compute				
		less than the speci	fied limit.			
		Active Power	T ::4 C	Variation in % error		
		100 % at rated	Limits of error	<u>obtained</u>		
		value	\pm 0.2 % of range	0.00		
		Reactive Power	T • • • •		,	
		100 % at rated	Limits of error			
		value	± 0.2 % of range	+0.08		
13	Variation due to				T-2	
13	interaction between	The voltage input			Conforms	
	i e	circuit alone shall				
	measuring elements	_	he current input of			
		each of the other			1	
	(As per customer requirement	shall be energized	in turn at nominal			
	procedure as per Cl.	current. The ma				
	No.6.6 of IS- 12784-	from output corre			}	
	1-1989)	measured quantity	input shall be			
	1-1909)	noted whilst the ph			l !	
		the voltage and c	urrent is changed			
		through 360°. Thee maximum	1 C 41			
			value of the			
		departure of outpu			· .	
		zero measured que exceed as shown be				
		caccou as shown be	JUW	Variation in 0/	}	
		Active Power	Limita of a	Variation in % error		
	}	100 % of at rated	Limits of error	obtained 0.00	ĺ	
	·	value	± 0.1 % of range	0.00		
	}	Reactive Power	Limita of			
	-	100 % of at rated	Limits of error	0.00		
			± 0.1 % of range	0.00		
		value				

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TEST_REPORT

Sheet I of 4

NAME & ADDRESS OF CUSTOMER	REPORT NO: EMTR/02/1177 DATE: 25/9/2007 Customer Reference No.: Nil, Dtd. 28/7/2007		
M/s. RISHABH INSTRUMENTS PVT. LTD. H.O.& Works:F – 31,			
MIDC, Satpur, NASHIK – 422 007.	DATE OF SAMPLE RECEIPT	DATE OF TESTING	
	10/09/2007	10/09/2007 to 24/09/2007	
SAMPLE DESCRIPTION	SAMPLE IDENTIFICATION		
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	Sl. No.: 07/07.		
± 0.2 % for Power ± 0.15 % of mid frequency ± 1.0 % of Unity for P.F ± 1.0 % of 360° for Phase Angle		, i	
± 0.2% for Energy Make : Rishabh	TEST SPECIFI	CATION	

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.

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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.



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LEPORT NO EMPRIO 2/14 PPI da. or DATED: 2	25/09/2007 SHEET 2 OF 4
TESTS	Clause no.
High Voltage test	As per customer requirement
Intrinsic error test	As per customer requirement
Burden	As per customer requirement
Storage temperature test at -20 °C and 65°C	As per customer requirement
Test for relative humidity	As per customer requirement
Variation due to continuous operation	As per customer requirement and test procedure as per Cl. No.6.15 of IEC:60688-2002
Vibration test.	As per Customer requirement
RS 485 Modbus communications output	As per customer requirement
	TESTS High Voltage test Intrinsic error test Burden Storage temperature test at -20 °C and 65°C Test for relative humidity Variation due to continuous operation Vibration test.

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TF	ST REPORT NO. EMI	R/02/1177 I	Dated: 25/ <u>09</u>	/2007		ET 3 OF 4
Sr.	Particular of	Requirement	as per custo	mer	Obtained value	Remarks
No.	tests & Cl. No.	specification				C C
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	ACTIVE EN	ERGY			Conforms
2	test (As per customer requirement)	Current 1.0I _b 1.0I _b 1.0I _b	1.0 0.8Lag 0.8Lead	% error ±0.2 ±0.2 ±0.2	Obtained %Error +0.06 +0.05 +0.14	
		0.11 _b 0.11 _b 0.11 _b	1.0 0.8 Lag 0.8 Lead	±0.2 ±0.2 ±0.2	+0.12 -0.09 -0.02	i
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.		
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 deenergized 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		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		

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<u>TES</u>	TREPORT NO. EMILE	N/02/1177 Dated: 25/09/2007 Requirement as per customer	Obtained value Re	emarks
	Particular of	specification		
0.	tests & Cl. No.	specification	out and error obtained was less than the specified limits.	
	Humidity.	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	Meter was subjected to relative humidity test and obtained %error after the test were less than the specified limits.	Conform
	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	operation. The meter continued to comply with the requirements appropriate to its accuracy class after more than 6 h of continuous operation.	Confor
7	Vibration test. (As per Customer	appropriate to its accuracy class. The meter shall be carried out in accordance with IEC 60068-2-6 with following test parameters:	Meter was subjected to vibration test.	Conforms
8	requirement) RS 485 Modbus	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 mete shall show no mechanical damage to occur and meter shall comply with specified accuracy limits after the test. All the parameters available to be interfered.	After the test no mechanical damage was observed. After the test meter comply with specified accuracy class.	Confo
8 	Communications output. (As per Customer requirement)	baud rate: 9600 bps	rate of 9600bps are matching with display	•

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