



# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33

Fax : +91 (0265) 2638382 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



Certificate No. : T-0071

## TEST REPORT

SHEET : 1 OF 7

<b>NAME &amp; ADDRESS OF CUSTOMER</b>  RISHABH INSTRUMENTS PVT LTD F-31, MIDC SATPUR NASHIK-422007.		<b>TEST REPORT NO.</b> : PHV/07/646-3 <b>DATE</b> : 07.07.2008	
		<b>CUSTOMER REF.NO:</b> NIL	<b>DATE :</b> 26.02.2008
		<b>DATE OF SAMPLE RECEIPT</b>	<b>DATE OF TESTING</b>
		27.02.2008	09.04.2008 to 02.06.2008
<b>SAMPLE DESCRIPTION</b>  <b>CURRENT TRANSFORMER</b>  <b>MFD.BY : Rishabh Instruments Pvt ltd</b>  RATIO : 4000/5 A. BURDEN : 15 VA CLASS : 0.2S I.L. : 0.72/4kV FREQ : 50 Hz Insulation class : E STC : 40 kA / 1sec. TYPE : RISH XMER-140/100h ISF : ≤10		<b>SAMPLE IDENTIFICATION</b>  <b>SR.NO.</b> : 007  <b>ERDA IDENTIFICATION NO :</b> PHV 39/03  <b>TEST SPECIFICATION :</b>  IEC-60044-1/2003	
<b>TEST DETAILS</b>  As per Sheet No. 2 of 7.	<b>ENCLOSURES :</b> Number of Oscillogram : TWO Number of Photograph : ONE Number of Drawings : ONE Oscillogram No. : 1) 211/01 2)211/02 PHOTOGRAPH NO :PHV-39/166		
<b>TEST RESULTS</b> : As per sheet : 3 to 7.			
<b>REMARKS</b> : The sample <b>CONFORMS</b> to the requirements of the above mentioned IEC in the tests mentioned on sheet 2 of 7			
 <b>PREPARED BY</b>		 <b>CHECKED BY</b>	
		 <b>APPROVED BY</b>	

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

TE0040338



Certificate No. : T-0071

# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33

Fax : +91 (0265) 2638382 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



TEST REPORT NO. : PHV/07/646-3

SHEET : 2 OF 7

DATE : 07.07.2008

## TEST DETAILS (MENTIONED AS PER SEQUENCE OF TESTING)

Sr No	TESTS ( In sequence)	IEC 60044-1/2003
I	<b><u>Pre Routine Test :</u></b>	
	a) Verification of Terminal Marking	8.1
	b) Power frequency dry withstand test on secondary winding	8.3
	c) Inter-turn Overvoltage Test	8.4
	d) Determination of Errors	11.5
II	Temperature rise test	7.2
III	Determination of Errors	11.4
IV	Instrument Security factor test	11.6
V	Short Time Current Test	7.1
VI	<b><u>Post Routine Test :</u></b>	
	a) Verification of Terminal Marking	8.1
	b) Power frequency dry withstand test on secondary winding	8.3
	c) Inter-turn Overvoltage Test	8.4
	d) Determination of Errors	11.5

PREPARED BY

CHECKED BY



TE0040235



# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33

Fax : +91 (0265) 2638382 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



Certificate No. : T-0071

TEST REPORT NO. : PHV/07/646-3

SHEET : 3 OF 7

DATE : 07.07.2008

## TEST RESULTS :

### I. Pre Routine Test :

#### Ia. Verification of Terminal Marking and Polarity.

Primary winding terminals : P1-P2

Secondary winding terminals : S1-S2

Terminal Marking and Polarity found ok.

#### Ib. Power Frequency Dry Withstand Test on Secondary Winding.

The power frequency voltage of 3 kVrms was applied between the secondary winding terminals connected together and the earth. The primary winding terminals and body were shorted and connected to the earth. The test voltage was applied for 60 seconds. There was no disruptive discharge observed. CT withstood the test voltage satisfactorily.

#### Ic. Inter-turn Over Voltage Test.

With the primary winding open circuited, a voltage at rated frequency was applied to the secondary winding terminals, such as to produce a secondary limiting current of rms value equal to the rated secondary current (i.e.5 A.) for one minute.

The CT withstood the applied voltage satisfactorily for 60 seconds.

#### Id. Determination of Errors .

CURRENT TRANSFORMER : **BURDEN 15 VA, CLASS 0.2S**

% OF RATED BURDEN	% OF I RATED	RATIO ERROR IN %	PHASE ANGLE ERROR IN MIN.
-------------------	--------------	------------------	---------------------------

(A). RATIO: 4000/5 A

100	120	-0.005	1.53
100	100	0.030	1.16
100	20	0.003	3.16
100	5	-0.107	6.73
100	1	-0.532	16.38
25	120	0.061	1.27
25	100	0.064	1.35
25	20	0.042	2.96
25	5	-0.048	6.02
25	1	-0.508	17.12

PREPARED BY

CHECKED BY

TE0040236





# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33

Fax : +91 (0265) 2638382 Web : www.erd.org

E-mail : erda@erd.org, dir@erd.org



Certificate No. : T-0071

TEST REPORT NO. : PHV/07/646-3

SHEET : 4 OF 7

DATE : 07.07.2008

## TEST RESULTS :

### II. Temperature Rise Test.

Continuous rated thermal current equals to the rated primary current at rated frequency was circulated in the primary winding of the CT. Rated burden was connected across the secondary winding terminals of the CT.

At steady state, the temperature of the body and ambient were recorded. The resistance of secondary winding was measured immediately after shut down.

The temperature rise so obtained were as follows :

A) Temperature rise of :

I) Secondary winding (resistance method) : S1-S2 = 22 °C

II) Body (Thermocouple method) : 14°C

B) Ambient Temperature : 26 ° C

### III. Determination of Errors .

CURRENT TRANSFORMER : **BURDEN 15 VA, CLASS 0.2S**

% OF RATED BURDEN	% OF I RATED	RATIO ERROR IN %	PHASE ANGLE ERROR IN MIN.
-------------------	--------------	------------------	---------------------------

(A). RATIO: 4000/5 A

100	120	-0.005	1.54
100	100	0.031	1.15
100	20	0.003	3.13
100	5	-0.107	6.76
100	1	-0.531	16.35
25	120	0.062	1.28
25	100	0.065	1.31
25	20	0.040	2.97
25	5	-0.048	5.99
25	1	-0.509	17.11

PREPARED BY

CHECKED BY

TE0040307





Certificate No. : T-0071

# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33

Fax : +91 (0265) 2638382 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



TEST REPORT NO. : PHV/07/646-3

SHEET : 5 OF 7

DATE : 07.07.2008

## TEST RESULTS :

### IV. Instrument Security Factor Test.

RATIO : 4000/5 A

SLV Computed : 80.23 V

Excitation Current : 5 A

Measured secondary voltage at  
excitation current : 29.2 V

Therefore ISF : 3.64

  
PREPARED BY

  
CHECKED BY



TE0040238



Certificate No. : T-0071

# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33

Fax : +91 (0265) 2638382 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



TEST REPORT NO. : PHV/07/646-3

SHEET : 6 OF 7

DATE : 07.07.2008

## TEST RESULTS :

### V. SHORT TIME CURRENT TEST

The short time current test was performed by connecting Copper cable (passed through window of the CT) to source as per test circuit diagram no.: OLSC/IT/13 and secondary winding short circuited through a copper link of negligible impedance.

Condition of the equipment under test: As after test mentioned on sheet 3 of 7.

Test No.	Oscillogram No.	Short circuit current (kA)		Duration (sec.)	Remarks	Observation During test
		Peak	Rms			
1.	211/01	100.492	-	0.074	Dynamic peak test	No abnormality observed
2.	211/02	-	40.248	1.015	Thermal Current test	No abnormality observed

Observation after test: - No visible damage was observed.  
- CT body was intact.

PREPARED BY

CHECKED BY



TE 0009264



Certificate No. : T-0071

**ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION**

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33

Fax : +91 (0265) 2638382 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



TEST REPORT NO. : PHV/07/646-3

SHEET : 7 OF 7

DATE : 07.07.2008

**TEST RESULTS :****VI. Post Routine Test :****VIa. Verification of Terminal Marking and Polarity.**

Primary winding terminals : P1-P2

Secondary winding terminals : S1-S2.

Terminal Marking and Polarity found ok.

**VIb. Power Frequency Dry Withstand Test on Secondary Winding.**

The power frequency voltage of 2.7 kV (90% of 3kVrms) was applied between the secondary winding terminals connected together and the earth. The primary winding terminals and body were shorted and connected to the earth. The test voltage was applied for 60 seconds. There was no disruptive discharge observed. CT withstood the test voltage satisfactorily.

**VIc. Inter-turn Over Voltage Test.**

With the primary winding open circuited, a voltage at rated frequency was applied to the secondary winding terminals such as to produce a secondary limiting current of rms value equal to 90% of the rated secondary current (i.e.90% of 5A.) for one minute. The CT withstood the applied voltage satisfactorily for 60 seconds.

**VIId. Determination of Errors .**

% OF RATED BURDEN	% OF I RATED	RATIO ERROR IN %	PHASE ANGLE ERROR IN MIN.
(A). RATIO: 4000/5 A			
100	120	0.032	-0.72
100	100	0.058	-0.91
100	20	0.058	0.77
100	5	0.023	3.01
100	1	-0.160	9.11
25	120	0.083	-0.76
25	100	0.094	-0.81
25	20	0.099	1.01
25	5	0.086	2.11
25	1	-0.138	10.56

PREPARED BY

CHECKED BY

TE 0009263





# 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.



Certificate No.:T-0071

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







# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128-31,33,

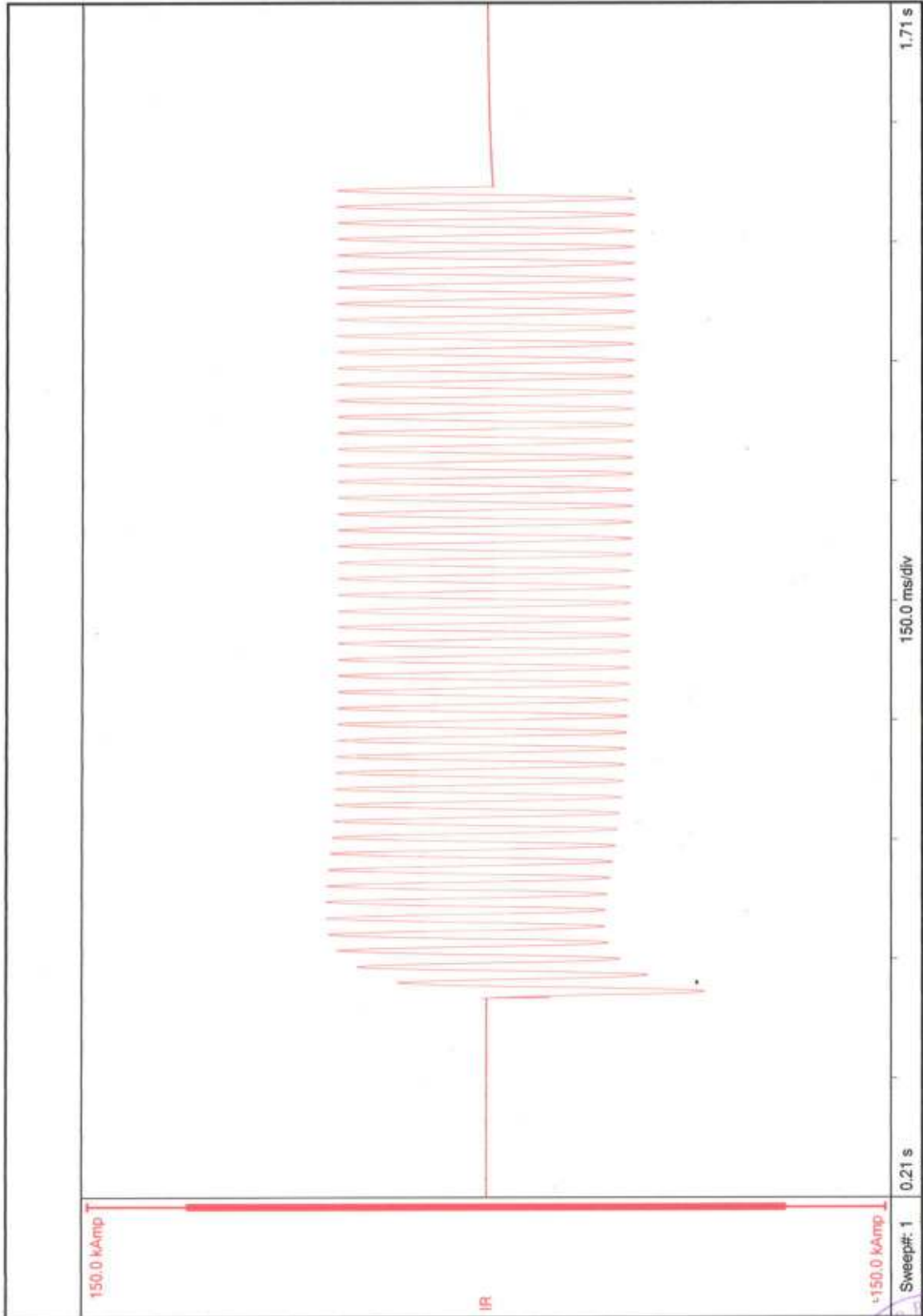
Fax : +91 (0265) 2638382, 2644923 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



Certificate No. : T-0071

TE 0001445



OSCILLOGRAM NO.:211/02



# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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

ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.

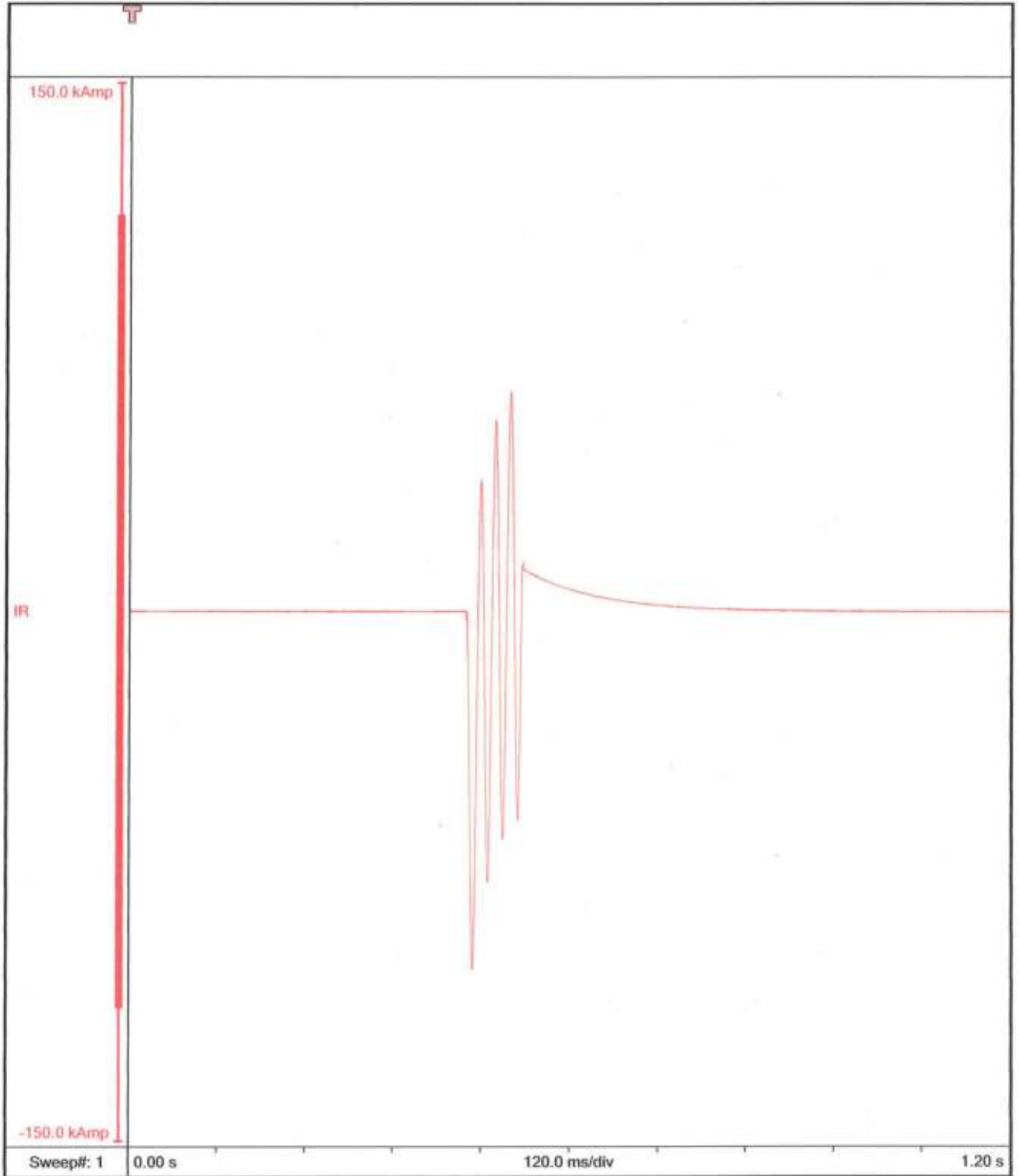
EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128-31,33,

Fax : +91 (0265) 2638382, 2644923 Web : www.erda.org

E-mail : erda@erda.org, dir@erda.org



Certificate No. : T-0071



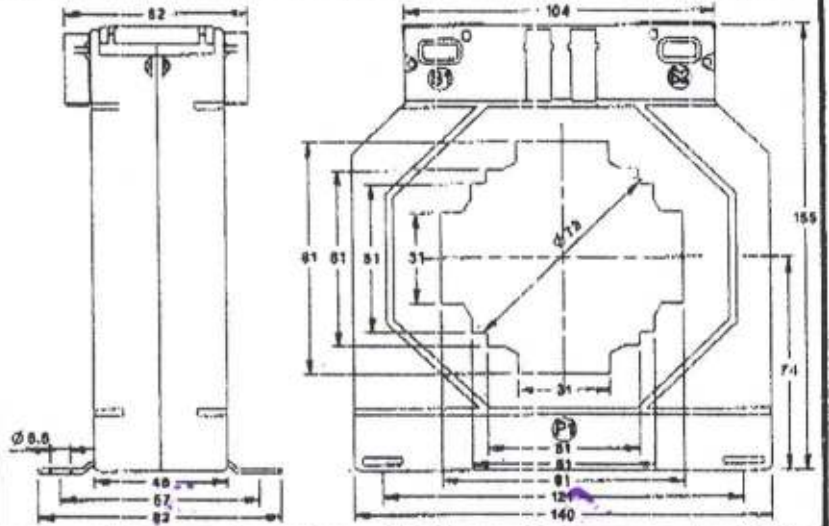
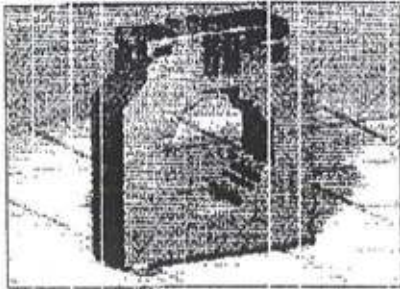
OSCILLOGRAM NO.:211/01

TE 0001446

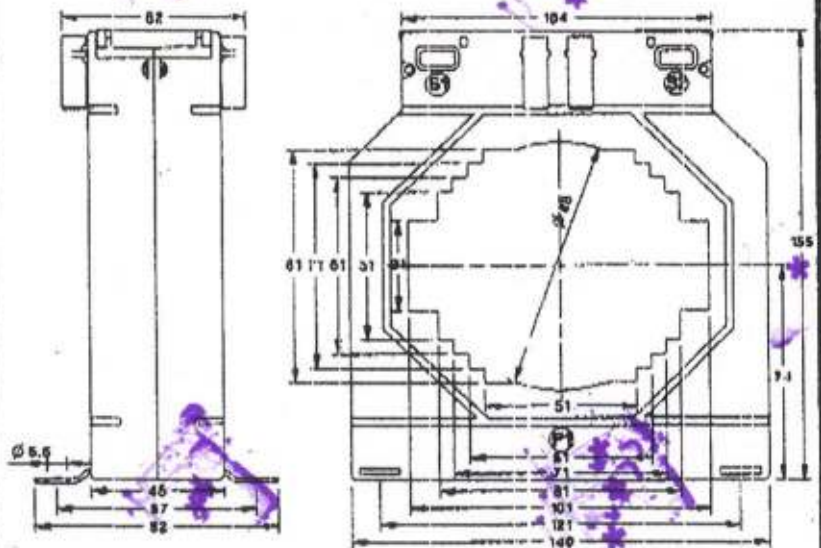


### RISH XMER 140 SERIES

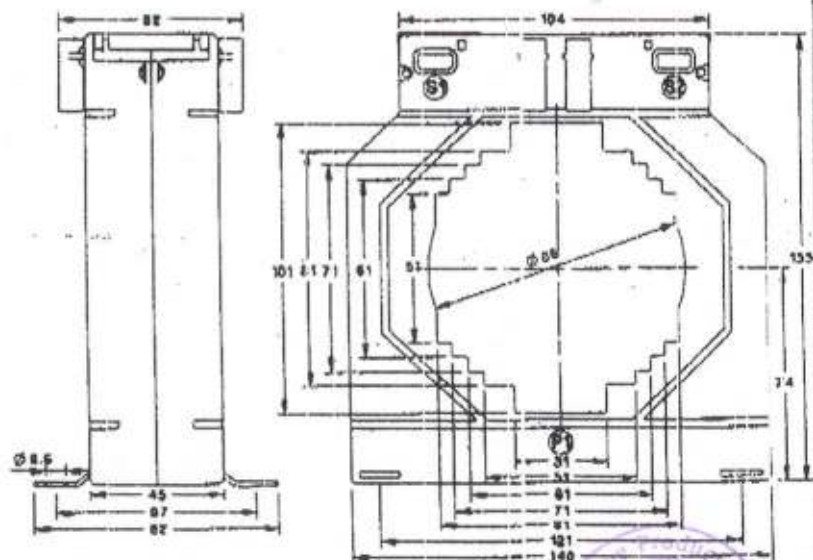
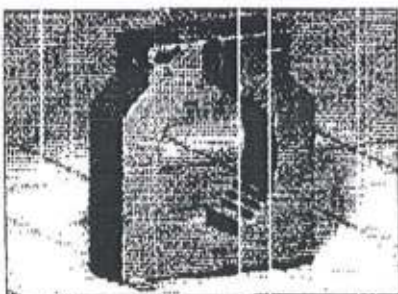
RISH XMER 140-80



RISH XMER 140-100h



RISH XMER 140-100v



ALL DIMENSIONS ARE IN MM

Handwritten signature and date: PMV/07/046-3, 9/10/08

**RISHABH INSTRUMENTS PVT. LTD.(TRISHALA UNIT)**  
**C-6,NICE AREA MIDC,SATPUR,NASHIK-7**  
**DEPT:-L.T.C.T.**

**DATA SHEET OF TYPE TEST CT**

SR NO.	CT TYPE	CT RATIO	VA/CLASS	H.S.V	STC	QTY.	CT SR.NO	Area in mm	Total Area
1	TW-2	100/5	5/1.0	0.72/4/-Kv	5 KA FOR 1.0 SEC	1	1	0.4	1.6
2	TW-6	3000/5	15/0.2s	0.72/4/-Kv	40 KA FOR 1.0 SEC	1	2	0.81	1.62
3	74/20	400/5	5/0.2s	0.72/4/-Kv	5 KA FOR 1.0 SEC	1	3	0.29	1.74
4	140/100h	4000/5	15/0.2s	0.72/4/-Kv	40 KA FOR 1.0 SEC	1	4	0.81	1.62
SR NO.	CT TYPE	CT RATIO	VA/CLASS	SEC. Cu.	NO.OF CONDUCTORS	NO.OF TURNS	WIRE DIAMETER	Total Wire Diameter	Total Area
1	TW-2	100/5	5/1.0	22 SWG	4	20	0.70	2.80	1.6
2	TW-6	3000/5	15/0.2s	19 SWG	2	600	1.02	2.04	1.62
3	74/20	400/5	5/0.2s	23 SWG	6	80	0.60	3.60	1.74
4	140/100h	4000/5	15/0.2s	19 SWG	2	800	1.02	2.04	1.62
PLANNING BY		DATE		APPROVED BY					
I.T.GHYAR		23/6/2008		S.G.DANAVALLE					