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TEST REPORT

NAME AND ADDRESS OF CUSTOMER: Ashida Electronics Pvt. Ltd., Plot No. A-308, Road No.21, Wagle Industrial Estate, Thane-400604 Maharashtra, India.	**REPORT NO.:** RP-1617-049429 **DATE** : 24/01/2017	
	CUSTOMER REF. NO.: Nil **DATED:** 12/01/2017	
	DATE OF SAMPLE RECEIPT	**DATE OF TESTING**
	12/01/2017	19/01/2017
SAMPLE DESCRIPTION: See Annexure-I Sheet No.2 of this report	**SAMPLE IDENTIFICATION:** See Annexure-I Sheet No.2 of this report	

TEST DETAILS — **TEST SPECIFICATION:**

Electrical fast transient — As per customer requirements & Procedure Followed as per Cl. No.7.2.5 of IEC 60255-26:2013

Notes:

1) Only Electrical Fast Transient/Burst immunity test has been carried out as per customer requirements.
2) Transient were applied on port mentioned on Annexure: II of this test report.
3) Operating procedure/conditions during the test & performance/acceptance criteria of the sample under test as specified by the customer are mentioned on sheet no.3, 4 & 5 of this test report.
4) Detailed operating & test procedure of the ports & performance criteria during the test mentioned on sheet No. 6 & 7 of this test report.
5) The list of the major equipments used during the test is mentioned on sheet no.9 of this report.
6) Test set up block diagram is shown on sheet no.10 of this test report.
7) Photograph of test set up and sample description mention on EUT is shown on sheet no.33 & 34 of this test report.

REMARK: The sample conforms to the requirement as specified by the customer for the above-mentioned test.

WITNESSED BY: Mr. Prashant Patil - Ashida Electronics Pvt. Ltd., Thane.

PREPARED BY	**CHECKED BY**	**Dr. Vinod Gupta** **APPROVED BY**

Notes: 1.This report relates only to the particular sample received for testing in good condition at ERDA, Vadodara.
2. This report can not be reproduced in part under any circumstances.
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ANNEXURE–I

SAMPLE DESCRIPTION:	SAMPLE IDENTIFICATION:
ASHIDA Feeder Protection Relay CT : 1A / 5A PT : 63.5 VAC Freq.: 50 Hz / 60 Hz Aux Supply = 24 V to 230 V AC/DC	**Sr. No:** 16L245M0001 **Platform:** ADR24xB-M **ERDA Sample Code No.:** ERDA-00177845
Accessories used: • Doble - Model no.:F6150, Sr. No.: 060803068 • Laptop	

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Operating procedure of the sample under test as specified by the customer:

Sample / Equipment under Test (EUT)

EUT: Feeder Protection Relay
EUT Brief Description:
The EUT is a high performance Enhance Aditya M (Modular) protection relay platform, designed for highly electrical noisy substation environment. Following are some of the feature of this platform:

- High performance 32-Bit processor with Floating point Unit operating at 200MHz
- 8 Analogue input having 16 bit simultaneous sampling ADC, design for CT or PT
- 32 Digital Input / Output extended up to 64 Nos.
- RTD and 4-20mA analogue input
- Dual redundant Ethernet ports
- RS485 port
- 16 dual colour LEDs
- Breaker Close / Trip Push buttons
- Graphical Display

Operating Procedure:
Connect the Input supply 110V DC to the power supply terminal of EUT.

Pick up value Test:

- Connect current source at 1A current to input terminal.
- Set current setting value to 100% i.e. 1A, TMS at Minimum (x0.02) value and Curve setting to C1.
- Start current injector & increase current value till relay get pick up and trip.
- The operating value should be within 1 to 1.1 times of set pickup value.

Operating Time Test:

- Set current 2N i.e. 2A and connect trip contact to timer.
- Change the TMS setting at 1.00.
- Start the current injector and measure the operating time. The trip time value should be within ±12.5% of actual value. (Actual time 10.029 Sec.)

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Operating procedure of the sample under test as specified by the customer:

Continued....

Operating condition during the test:

- EUT shall be in "ON" condition during the test.
- Applied 110 VDC to Auxiliary supply input terminal.
- Applied 63.5 VAC to PT input terminals.
- During test, Set Current value less than trip value (<90%). i.e.0.9 A
- All Binary inputs are energized with 110V DC.
- RS485 communication will be in working condition.

Performance Criteria as specified by customer :
Following parameters should be monitored Before, During & After the test.

- 'ENABLE' LED (Green) should be continuously 'ON'.
- Display of EUT should not garbage, reset and hang-up.
- All programmable LEDs (15 Nos. dual color) should remain OFF.

Following parameters of EUT should be checked before & after the test.

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up					1-1.1 Amp
Operating Time (2 Amp)					8.77-11.29 Sec

Notes:

- During performance test of EUT, measured value shall be observed on Relay test unit (Doble)/Laptop.
- Relay shall be considered to be stable subject to fulfillment of the performance criteria as specified by the customer.

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Acceptance criteria 'B' as per Table 23 of IEC 60255-26:2013 & acceptance criteria 'B' as per Tables 4 & 6 respectively item no.4.2 & 6.2 of IEC 60255-26:2013

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay should remain stable during the test. • No false indication should be observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 should not operate, which shall be checked through trip LED. (i.e. LED should be OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value should be within 1 to 1.1 times of set pickup value before & after the test. • The trip time value should be within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED should be continuously 'ON' & all other LEDs should be 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 should not operate, which shall be checked through trip LED. (i.e. LED should be OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Operating and test procedure of ports of sample under test as specified by the customer:

1) **Power Supply:**
'Non-operate' condition
- Apply 110VDC to Auxiliary power supply through CDN.
- During the test, apply 0.90*In current to each of the 3 Phase input and 0.9*In to 'Earth fault' input.

2) **A, B & C PT Input:**
'Non-operate' condition:
- Apply 110VDC to Auxiliary power supply.
- During the test, apply 0.90*In current to each of the 3 Phase input and 0.9*In to 'Earth fault' input.
- Apply 63.5 VAC to all PT input through CDN.

3) **N PT Input:**
'Non-operate' condition:
- Apply 110VDC to Auxiliary power supply.
- During the test, apply 0.90*In current to each of the 3 Phase input and 0.9*In to 'Earth fault' input.
- Apply 63.5 VAC to N PT input through CDN.

4) **A, B & C CT Input:**
'Non-operate' condition:
- Apply 110VDC to Auxiliary power supply.
- During the test, apply 0.90*In current to each of the CT input through CDN.
- During the test, apply 0.9*In current to Earth fault input.

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Operating and test procedure of ports of sample under test as specified by the customer:

Continued....

5) Earth fault Input:

'Non-operate' condition:

- Apply 110VDC to Auxiliary power supply.
- Apply 0.9*In current to 'Earth fault' input through CDN.
- During the test, apply 0.90*In current to 3 Phase current input.

6) Binary Input For H card (IN1):

'Non-Operate' condition:

- Apply 110VDC to Auxiliary power supply.
- Apply 10 VDC to Binary Input (IN1) through CDN.
- During the test apply 0.90*In current to 3 phase current input, 0.9*In to Earth fault input.

7) Binary Input For I card (IN1):

'Non-Operate' condition:

- Apply 110VDC to Auxiliary power supply.
- Apply 10 VDC to Binary Input (IN1) through CDN.
- During the test apply 0.90*In current to 3 phase current input, 0.9*In to Earth fault input.

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Annexure-II

Test shall be performed on the following ports:

Sr. No.	Port	Category	CDN	Condition	TEST LEVEL
1)	Power Supply	Aux. Supply	CDN	Non-operate	±4kV & 5 kHz
2)	A, B & C CT Input (1Amp./5Amp. CT)	Phase CT Input- A	CDN	Non-operate	±4kV & 5 kHz
		Phase CT Input- B	CDN	Non-operate	±4kV & 5 kHz
		Phase CT Input- C	CDN	Non-operate	±4kV & 5 kHz
3)	Earth Input (1Amp/5Amp. CT)	Earth CT Input	CDN	Non-operate	±4kV & 5 kHz
4)	A, B & C PT Input	Phase PT Input- A	CDN	Non-operate	±4kV & 5 kHz
		Phase PT Input- B	CDN	Non-operate	±4kV & 5 kHz
		Phase PT Input- C	CDN	Non-operate	±4kV & 5 kHz
5)	N PT Input	N PT Input	CDN	Non-operate	±4kV & 5 kHz
6)	Binary Input For H card (IN1)	Input Port	CDN	Non-operate	±4kV & 5 kHz
7)	Binary Input For I card (IN1)	Input Port	CDN	Non-operate	±4kV & 5 kHz

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LIST OF THE MAJOR EQUIPMENTS USED DURING THE TEST

Sr. No	Details of equipments used	Specifications	Traceability
1)	Fast Transient Noise Simulator with Coupling Decoupling Network • ERDA Sr. No: 17010 & 17011 • Validity of calibration till date: 07/11/2017	250V to 4.00 kV ±10% in both polarities Rise time: 5ns ±30% Pulse Width: 50 ns ±30% Pulse Repeating Frequency: 5.0 kHz and 100 kHz.	Calibration results are traceable to National standard.
2)	Relay Test Unit (provided by customer) ▪ Sr. No. 060803068 ▪ Make: Doble ▪ Validity of calibration till date: 03.03.2017	AC Amplitude Accuracy at 50/60 Hz Voltage & Current Sources: Accuracy: Typically 0.02% of Rdg Timers and Triggers Accuracy: ± 0.0005% of Rdg, ± 50µsec.	Calibration results are traceable to National Standards

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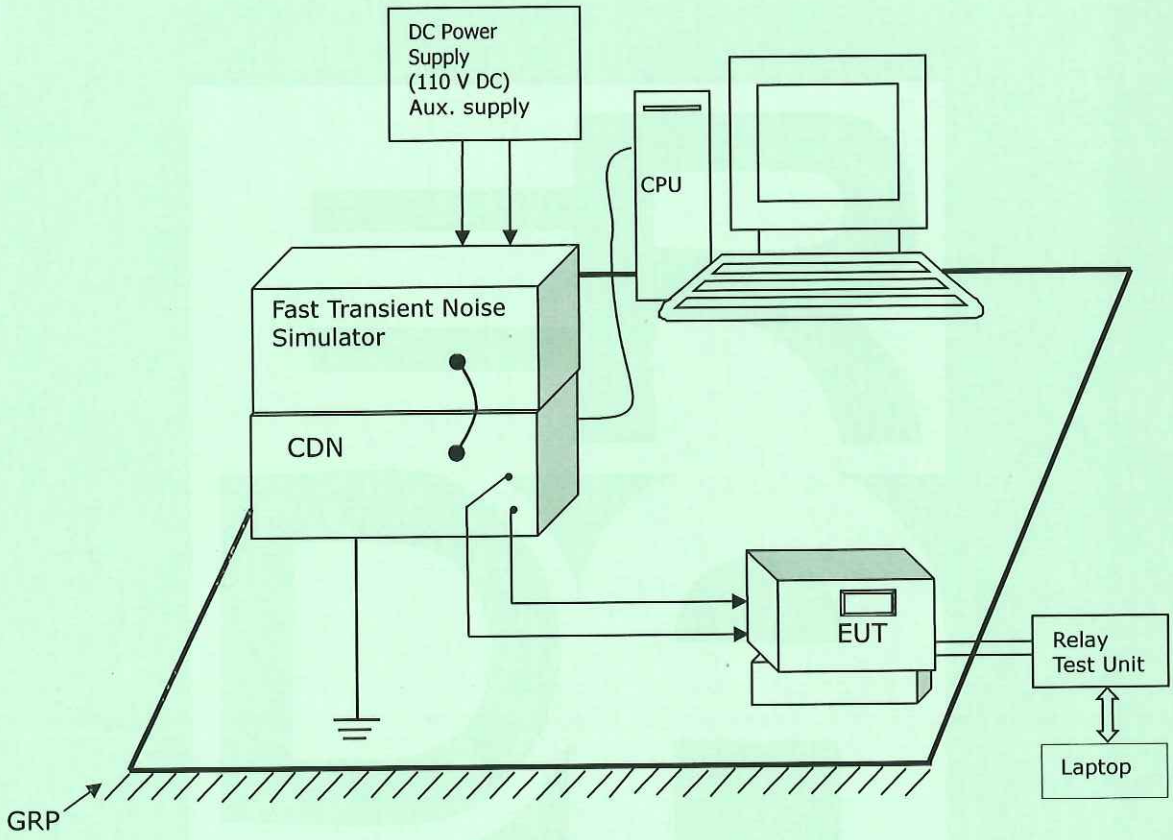

Test set up block diagram for Electrical fast transient/burst Immunity test

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Sr. No.	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
	Electrical fast transient as per customer requirements & test procedure followed as per Cl. No.7.2.5 of IEC 60255-26: 2013	The test procedure shall be followed as per clause 7.2.5 of IEC 60255-26: 2013 & IEC 61000-4-4: 2012. The test setup and procedure as per Table 13 of IEC 60255-26:2013. Test specification as per item 4.2 of table no.4 of IEC 60255-26:2013 for auxiliary power supply port are mentioned below. • Rise time t_r / duration time t_d : 5/50 ns • Test Level ZONE A : 4 kV peak voltage • Repetition frequency: 5 kHZ Performance test shall be carried out on EUT before and after the Electrical fast transient test. Electrical fast transient shall be applied under 'non-operate' condition of EUT as specified by customer, with 110VDC. Performance test shall be carried out before the test and after the test. EUT should confirm and comply with claimed tolerance as mentioned above.	The EUT was energized & operated as specified on sheet no.3 & 4 of this report. 110VDC was applied to Auxiliary power supply of the EUT through power supply.	Conforms

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Sr. No	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
		1) Power Supply port: ('Non-operate' condition) Operating & test procedure of port & performance criteria as specified by customer mentioned on sheet no. 6 of this report.	**1) 'Power Supply' port: ('Non-operate' condition)** Performance test was carried out on 'Power Supply' port of EUT before & after test. The obtained values are mentioned in Annexure-III of this report. The performance of EUT was checked before, during and after the test. Observed parameters are mentioned on sheet no.13 of this report.	
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Observed parameters

Performance test was carried out on the 'Power supply' port of EUT in 'Non-operate' condition. Following parameters were checked before, during and after the test on EUT.

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay remained stable during the test. • No false indication was observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value was within 1 to 1.1 times of set pickup value before & after the test. • The trip time value was within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED was continuously 'ON' & all other LEDs was remained 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Annexure-III
Obtained values

Before Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.06 A	1-1.1 Amp
Operating Time (2 Amp)	10.06 sec	10.07 sec	10.09 sec	10.07 sec	8.77-11.29 Sec

After Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.05 A	1-1.1 Amp
Operating Time (2 Amp)	10.52 sec	10.07 sec	10.09 sec	10.07 sec	8.77-11.29 Sec

Note: During performance test of sample, measured values were observed on Relay test unit (Doble)/Laptop.

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Sr. No	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
		2) A, B & C PT Input: ('Non operate' condition) EUT in under 'non-operate' condition, using CDN as per operating procedure mentioned on Sheets No. 6 of this report. Test specification as per item 6.2 of table no.6 of IEC 60255-26:2013 for Input and output ports are mentioned below. • Rise time t_r / duration time t_d : 5/50 ns • Test Level ZONE A : 4 kV peak voltage • Repetition frequency: 5 kHZ Operating & test procedure of port & performance criteria as specified by customer mentioned on sheet no. 6 of this report.	**2) A, B & C PT Input: ('Non operate' condition)** Performance test was carried out on A, B & C PT Input port of EUT before & after the test. The obtained values are mentioned in Annexure-IV. The performance of EUT was checked before, during and after the test. Observed parameters are mentioned on sheet no. 16 of this report.	

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Observed parameters

Performance test was carried out on the 'A, B & C PT Input' port of EUT in 'Non-operate' condition. Following monitoring parameters were checked before, during and after the test on EUT.

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay remained stable during the test. • No false indication was observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value was within 1 to 1.1 times of set pickup value before & after the test. • The trip time value was within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED was continuously 'ON' & all other LEDs was remained 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Annexure-IV
Obtained values

Before Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.05 A	1-1.1 Amp
Operating Time (2 Amp)	9.95 sec	10.06 sec	10.09 sec	10.07 sec	8.77-11.29 Sec

After Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.05 A	1-1.1 Amp
Operating Time (2 Amp)	10.06 sec	10.06 sec	9.96 sec	10.06 sec	8.77-11.29 Sec

Note: During performance test of sample, measured values were observed on Relay test unit (Doble)/Laptop.

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Sr. No	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
		3) N PT Input port: ('Non operate' condition) EUT in under 'non-operate' condition, using CDN as per operating procedure mentioned on Sheets No. 6 of this report. Test specification as per item 6.2 of table no.6 of IEC 60255-26:2013 for Input and output ports are mentioned below. • Rise time t_r / duration time t_d : 5/50 ns • Test Level ZONE A : 4 kV peak voltage • Repetition frequency: 5 kHZ Operating & test procedure of port & performance criteria as specified by customer mentioned on sheet no. 6 of this report.	**3) N PT Input port: ('Non operate' condition)** Performance test was carried out on N PT Input port of EUT before & after the test. The obtained values are mentioned in Annexure-V respectively. The performance of EUT was checked before, during and after the test. Observed parameters are mentioned on sheet no. 19 of this report	

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Observed parameters

Performance test was carried out on the 'N PT Input' port of EUT in 'Non-operate' & 'Operate' condition. Following monitoring parameters were checked before, during and after the test on EUT.

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay remained stable during the test. • No false indication was observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value was within 1 to 1.1 times of set pickup value before & after the test. • The trip time value was within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED was continuously 'ON' & all other LEDs was remained 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Annexure-V
Obtained values

Before Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.05 A	1-1.1 Amp
Operating Time (2 Amp)	9.95 sec	10.06 sec	10.09 sec	10.07 sec	8.77-11.29 Sec

After Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.06 A	1-1.1 Amp
Operating Time (2 Amp)	10.76 sec	10.07 sec	10.08 sec	10.00 sec	8.77-11.29 Sec

Note: During performance test of sample, measured values were observed on Relay test unit (Doble)/Laptop.

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Sr. No	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
		4) A, B & C CT input port: ('Non operate' condition) EUT in under 'non-operate' & 'operate' condition, using Capacitive Clamp as per operating procedure mentioned on Sheets No. 6 of this report. Test specification as per item 6.2 of table no.6 of IEC 60255-26:2013 for Input and output ports are mentioned below. • Rise time t_r / duration time t_d : 5/50 ns • Test Level ZONE A : 4 kV peak voltage • Repetition frequency: 5 kHZ Operating & test procedure of port & performance criteria as specified by customer mentioned Sheets No. 6 of this report.	**4) A, B & C CT port: ('Non operate' condition)** Performance test was carried out on A, B & C CT input port of EUT before & after the test. The obtained values are mentioned in Annexure-VI. The performance of EUT was checked before, during and after the test. Observed parameters are mentioned on sheet no. 22 of this report.	

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Observed parameters

Performance test was carried out on the 'A, B & C CT input port' of EUT in 'Non-operate' & 'Operate' condition. Following monitoring parameters were checked before, during and after the test on EUT.

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay remained stable during the test. • No false indication was observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value was within 1 to 1.1 times of set pickup value before & after the test. • The trip time value was within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED was continuously 'ON' & all other LEDs was remained 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Annexure-VI
Obtained values

Before Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.06 A	1-1.1 Amp
Operating Time (2 Amp)	10.76 sec	10.07 sec	10.08 sec	10.00 sec	8.77-11.29 Sec

After Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.05 A	1-1.1 Amp
Operating Time (2 Amp)	10.65 sec	10.06 sec	10.09 sec	10.06 sec	8.77-11.29 Sec

Note: During performance test of sample, measured values were observed on Relay test unit (Doble)/Laptop.

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Sr. No	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
		5) Earth fault input port: ('Non operate' condition) EUT in under 'non-operate' condition, using CDN as per operating procedure mentioned on Sheets No. 7 of this report. Test specification as per item 6.2 of table no.6 of IEC 60255-26:2013 for Input and output ports are mentioned below. • Rise time t_r / duration time t_d : 5/50 ns • Test Level ZONE A : 4 kV peak voltage • Repetition frequency: 5 kHZ Operating & test procedure of port & performance criteria as specified by customer mentioned Sheets No. 7 of this report.	**5) Earth fault input port: ('Non operate' condition)** Performance test was carried out on 'Earth fault input port of EUT before & after the test. The obtained values are mentioned in Annexure-VII The performance of EUT was checked before, during and after the test. Observed parameters are mentioned on sheet no. 25 of this report.	

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Observed parameters

Performance test was carried out on the 'Earth fault input port of EUT in 'Non-operate' condition. Following monitoring parameters were checked before, during and after the test on EUT.

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay remained stable during the test. • No false indication was observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value was within 1 to 1.1 times of set pickup value before & after the test. • The trip time value was within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED was continuously 'ON' & all other LEDs was remained 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Annexure-VII
Obtained values

Before Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.06 A	1.05 A	1.05 A	1-1.1 Amp
Operating Time (2 Amp)	10.81 sec	10.09 sec	10.01 sec	10.72 sec	8.77-11.29 Sec

After Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.06 A	1.05 A	1.06 A	1-1.1 Amp
Operating Time (2 Amp)	10.71 sec	10.60 sec	10.82 sec	10.06 sec	8.77-11.29 Sec

Note: During performance test of sample, measured values were observed on Relay test unit (Doble)/Laptop.

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Sr. No	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
		6) Binary input port for H card (IN1): ('Non operate' condition) EUT in under 'non-operate' condition, using CDN as per operating procedure mentioned on Sheets No. 7 of this report. Test specification as per item 6.2 of table no.6 of IEC 60255-26:2013 for Input and output ports are mentioned below. ◦ Rise time t_r / duration time t_d : 5/50 ns ◦ Test Level ZONE A : 4 kV peak voltage • Repetition frequency: 5 kHZ Operating & test procedure of port & performance criteria as specified by customer mentioned Sheets No. 7 of this report.	**6) Binary input port for H card (IN1) port: ('Non operate' condition)** Performance test was carried out on 'Binary input port for H card (IN1) port of EUT before & after the test. The obtained values are mentioned in Annexure-VIII The performance of EUT was checked before, during and after the test. Observed parameters are mentioned on sheet no. 28 of this report.	

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Observed parameters

Performance test was carried out on the 'Binary input port for H card (IN1) port of EUT in 'Non-operate' condition. Following monitoring parameters were checked before, during and after the test on EUT.

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay remained stable during the test. • No false indication was observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value was within 1 to 1.1 times of set pickup value before & after the test. • The trip time value was within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED was continuously 'ON' & all other LEDs was remained 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Annexure-VIII
Obtained values

Before Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.06 A	1.05 A	1.06 A	1-1.1 Amp
Operating Time (2 Amp)	10.71 sec	10.60 sec	10.82 sec	10.06 sec	8.77-11.29 Sec

After Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.06 A	1.06 A	1.06 A	1-1.1 Amp
Operating Time (2 Amp)	10.07 sec	10.07 sec	10.09 sec	10.08 sec	8.77-11.29 Sec

Note: During performance test of sample, measured values were observed on Relay test unit (Doble)/Laptop.

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Sr. No	Particular of test and Cl. No.	Requirement as per customer specifications	Obtained value	Remarks
		7) Binary input port for I card (IN1): ('Non operate' condition) EUT in under 'non-operate' condition, using CDN as per operating procedure mentioned on Sheets No. 7 of this report. Test specification as per item 6.2 of table no.6 of IEC 60255-26:2013 for Input and output ports are mentioned below. ◦ Rise time t_r / duration time t_d : 5/50 ns ◦ Test Level ZONE A : 4 kV peak voltage ◦ Repetition frequency: 5 kHZ Operating & test procedure of port & performance criteria as specified by customer mentioned Sheets No. 7 of this report.	**7) Binary input port for I card (IN1) port: ('Non operate' condition)** Performance test was carried out on 'Binary input port for I card (IN1) port of EUT before & after the test. The obtained values are mentioned in Annexure-IX The performance of EUT was checked before, during and after the test. Observed parameters are mentioned on sheet no. 31 of this report.	

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Observed parameters

Performance test was carried out on the 'Binary input port for I card (IN1) port of EUT in 'Non-operate' condition. Following monitoring parameters were checked before, during and after the test on EUT.

Function	Conditions for acceptance	As specified by customer
Protection	Normal performance within the specification limits, during and after the test	• The relay remained stable during the test. • No false indication was observed on EUT before, during and after the test.
Command and control	Normal performance within the specification limits, during and after the test	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)
Measurement	Temporary degradation during the test, with self-recovery at the end of the test. No loss of store data.	• The operating value was within 1 to 1.1 times of set pickup value before & after the test. • The trip time value was within ±12.5% of actual value. (Actual time 10.029 Sec.) before & after the test.
Integral human-machine interface and visual alarms	Temporary degradation or loss of function during the test, with self-recovery at the end of the test. No loss of store data.	**'Non operate' condition :** • ENABLED LED was continuously 'ON' & all other LEDs was remained 'OFF' before, during and after the test.
Data communication[b]	Possible bit error rate increase but no loss of transmitted data.	Not applicable
Binary input, binary output and output contacts	No unwanted change of status is allowed during the test[a].	**'Non-operate' condition:** • Before, during and after the test, assigned general pick up contact output 3 did not operate, which was checked through trip LED. (i.e. LED was OFF)

a For binary input the manufacture shall state the minimum filtering value for which the test was successful.
b Excluding communication ports for protection or control functionality. For those acceptance criteria see protection or command and control.

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Annexure-IX
Obtained values

Before Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.06 A	1.06 A	1.06 A	1-1.1 Amp
Operating Time (2 Amp)	10.07 sec	10.07 sec	10.09 sec	10.08 sec	8.77-11.29 Sec

After Test:

	A Ph. Value	B Ph. Value	C Ph. Value	Earth	Tolerance
Pick Up	1.05 A	1.05 A	1.06 A	1.05 A	1-1.1 Amp
Operating Time (2 Amp)	10.64 sec	10.49 sec	10.09 sec	10.06 sec	8.77-11.29 Sec

Note: During performance test of sample, measured values were observed on Relay test unit (Doble)/Laptop.

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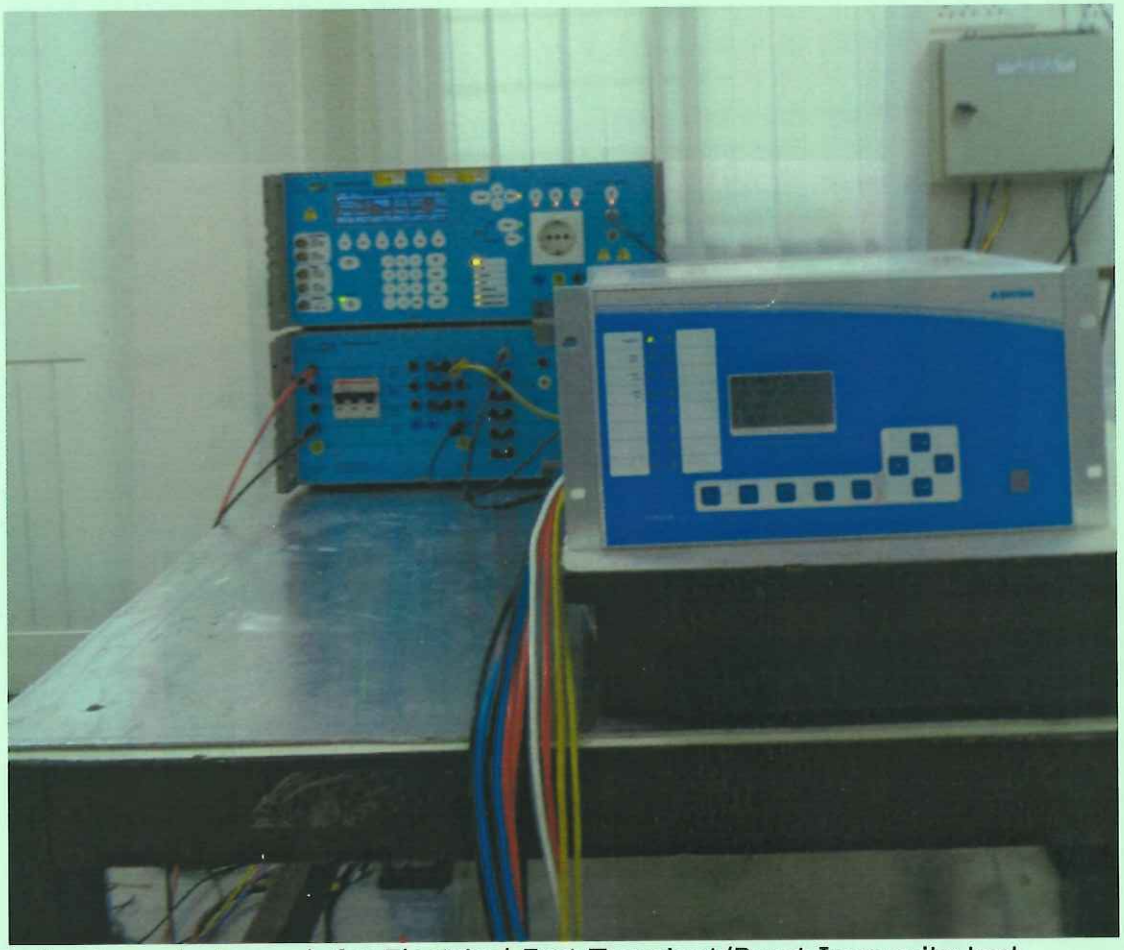

Test set up photograph for Electrical Fast Transient/Burst Immunity test

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TL 1424199

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Certificate No. : T-3359

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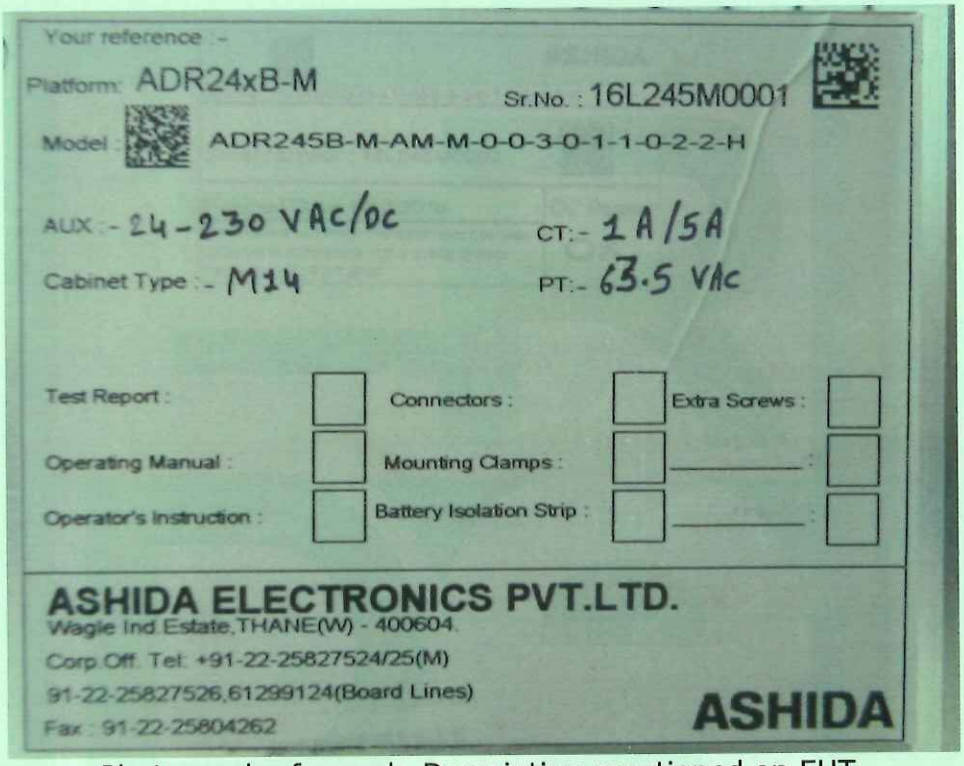

Photograph of sample Description mentioned on EUT

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Tshusha	

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