

# TSE



## Certificate of Calibration



Trident Systems Engineering  
2646 Palma Dr. Ste. 130  
Ventura, Ca. 93003  
805 - 830 - 8596

Certificate 2190091

Based on a Recommended/ agreed on Cal interval of 12 Months

Your Company Name

Test Date of Calibration 16 Jan 2019 The Recall Date is 16 Jan 2020

Your Address

Your City State Zip

PO Number Your PO Number

Manufacturer Fluke

Cal Location In Laboratory

Model 73 III

Procedure 33K8-4-14-1-122015

Description Digital Multimeter

Technician 10 Quality Assurance

Serial Number Serial Number

Temperature 22 °C

Asset Number Your Asset Number

Humidity: 45 %



### Received Condition

Fail + - The measured values of the equipment were observed out of specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values could have been in specification with a PFR of <10.0%

### Returned Condition

Pass - The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were completely in specification with a PFA of <0.15%

Cleaned and Calibrated to Manufacturer's Specifications in accordance with the procedure listed above

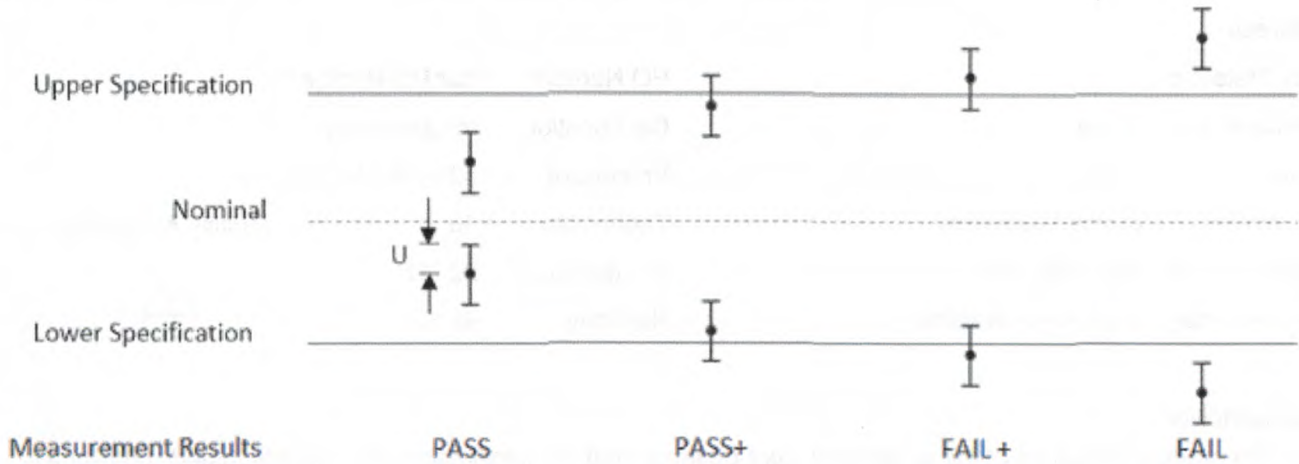
See Attached Data

This certifies that the above listed product has been calibrated with a quality system accredited to ISO / IEC 17025 : 2017  
This Calibrations report is composed of a certificate of calibration, performance test results and/or certificate appendice  
Each Report section may be numbered separately. Estimated Measurement Uncertainty is shown on the calibration Report  
Traceability is through NIST or another National Metrology Institute to the International System of Units (SI units).  
Some measurements are traceable to natural physical constants, Consensus standards or ratio type measurements  
supporting documentation relative to traceability is on file and available for examination upon request  
Although fully traceable measurements marked with an asterisk(\*) are outside our Scope of Accreditation  
This Certificate shall not be reproduced, except in full, without written approval by TSE

Lab/Operations Manager

Measurement results are reported as:

- Pass -The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.
- Pass + -The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values could have been out of specification with a PFA of <6.0%
- Fail + -The measured values of the equipment were observed out of specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values could have been in specification with a PFR of <10.0%
- Fail -One or more measured values of the equipment were observed out of specification at the points tested. Additionally, the expanded measurement uncertainty intervals about one or more measured values were entirely outside the specification



TUR ≥ 1.5 : 1

Zero Guardbanding Employed

- Pass < 0.15 % Probability of False Accept (PFA)
- Pass + < 6.0 % Probability of False Accept (PFA)
- Fail + < 10.0 % Probability of False Reject (PFR)
- Fail < 0.15 % Probability of False Reject (PFR)

Standards used in this Calibration

Asset Number	Model Number	Description	Recall Date	Trace Number
TR204	4808	Multifunction Calibrator	10 Dec 2019	1002212237
TR112	5500A	Multi-Product Calibrator	29 Dec 2019	2183022



Certificate Number 2190091DATE 19 Jan, 2019

2646 Palma Dr. #130

Ventura, Ca. 93003

Website TSECAL.com

Phone 805-830-8596

Fax 805-642-2259

TRIDENT SYSTEM &amp; ENGINEERING

Customer Your Company NameTEMP. °C 22R.H. % 45Manufacturer FlukeProcedure 33K8-4-14-1-122015As Received XModel NO. 73 III

Post Adjustment and /or Repair \_\_\_\_\_

Description Digital MultimeterSerial NO. Serial NumberAsset NO. Your Asset Number

## VERIFICATION TEST PERFORMED:

TEST	Nominal		Minimum	Measured Reading	Maximum	Manufacturer Specification	EMU ±	Acceptance Criteria
PASS/ FAIL								
4.1 DC Volts Calibration								
	300	mV	299.0	<b>298.9</b>	301.0	1.0	1.0E-01	FAIL
	3	V	2.990	<b>3.011</b>	3.010	0.010	1.0E-03	FAIL
	10	V	9.96	<b>10.05</b>	10.04	0.04	1.0E-02	FAIL
	-10	V	-10.04	<b>-9.95</b>	-9.96	0.04	1.0E-02	FAIL
	20	V	19.93	<b>20.08</b>	20.07	0.07	1.0E-02	FAIL
	-20	V	-20.07	<b>-19.92</b>	-19.93	0.07	1.0E-02	FAIL
	30	V	29.90	<b>29.89</b>	30.10	0.10	1.0E-02	FAIL
	-30	V	-30.10	<b>-30.11</b>	-29.90	0.10	1.0E-02	FAIL
	300	V	299.0	<b>301.1</b>	301.0	1.0	1.0E-01	FAIL
	550	V	547	<b>553</b>	553	3	1.0E+00	FAIL
4.2 AC Volts Calibration								
45 Hz	3	V	2.938	<b>3.063</b>	3.062	0.062	3.0E-03	FAIL
500 Hz	3	V	2.938	<b>2.937</b>	3.062	0.062	3.0E-03	FAIL
45 Hz	30	V	29.38	<b>29.37</b>	30.62	0.62	3.0E-02	FAIL
1 kHz	30	V	29.38	<b>30.63</b>	30.62	0.62	3.0E-02	FAIL
45 Hz	300	V	293.8	<b>293.7</b>	306.2	6.2	3.0E-01	FAIL
1 kHz	300	V	293.8	<b>306.3</b>	306.2	6.2	3.0E-01	FAIL
45 Hz	550	V	537	<b>536</b>	563	13	1.0E+00	FAIL
1 kHz	550	V	537	<b>564</b>	563	13	1.0E+00	FAIL
4.3 DC Current Calibration								
	30	mA	29.53	<b>29.52</b>	30.47	0.47	1.0E-02	FAIL
	300	mA	293.8	<b>306.3</b>	306.2	6.2	1.0E-01	FAIL
	9.5	A	9.34	<b>9.33</b>	9.66	0.16	1.0E-02	FAIL
4.4 AC Current Calibration								
45 Hz	30	mA	29.23	<b>30.78</b>	30.77	0.77	6.0E-02	FAIL
1 kHz	30	mA	29.23	<b>29.22</b>	30.77	0.77	6.0E-02	FAIL
45 Hz	300	mA	292.30	<b>292.2</b>	307.70	7.70	6.0E-01	FAIL
1 kHz	300	mA	292.30	<b>307.8</b>	307.70	7.70	6.0E-01	FAIL
45 Hz	9.5	A	9.25	<b>9.24</b>	9.75	0.25	2.0E-02	FAIL
1 kHz	9.5	A	9.25	<b>9.76</b>	9.75	0.25	2.0E-02	FAIL
4.5 Resistance Calibration								
	190	Ω	188.8	<b>188.7</b>	191.2	1.2	4.0E-01	FAIL
	1900	Ω	1889	<b>1912</b>	1911	11	4.0E+00	FAIL
	19	kΩ	18.89	<b>18.88</b>	19.11	0.11	4.0E-02	FAIL
	190	kΩ	188.9	<b>191.2</b>	191.1	1.1	4.0E-01	FAIL
	1.9	MΩ	1.889	<b>1.888</b>	1.911	0.011	4.0E-03	FAIL
	19	MΩ	18.61	<b>19.40</b>	19.39	0.39	6.0E-02	FAIL



Certificate Number 2190091DATE 19 Jan, 2019Tech: 10

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TRIDENT SYSTEM &amp; ENGINEERING

Customer Your Company NameTEMP. °C 22R.H. % 45Manufacturer FlukeProcedure 33K8-4-14-1-122015Model NO. 73 IIIDescription Digital MultimeterSerial NO. Serial NumberAsset NO. Your Asset Number

As Received \_\_\_\_\_

Post Adjustment and /or Repair X

## VERIFICATION TEST PERFORMED:

TEST	Nominal	Minimum	Measured Reading	Maximum	Manufacturer Specification	EMU ±	Acceptance Criteria
PASS/ FAIL							
4.1 DC Volts Calibration							
	300 mV	299.0	<b>300.0</b>	301.0	1.0	1.0E-01	<b>PASS</b>
	3 V	2.990	<b>3.001</b>	3.010	0.010	1.0E-03	<b>PASS</b>
	10 V	9.96	<b>10.00</b>	10.04	0.04	1.0E-02	<b>PASS</b>
	-10 V	-10.04	<b>-10.00</b>	-9.96	0.04	1.0E-02	<b>PASS</b>
	20 V	19.93	<b>20.01</b>	20.07	0.07	1.0E-02	<b>PASS</b>
	-20 V	-20.07	<b>-20.01</b>	-19.93	0.07	1.0E-02	<b>PASS</b>
	30 V	29.90	<b>30.01</b>	30.10	0.10	1.0E-02	<b>PASS</b>
	-30 V	-30.10	<b>-30.01</b>	-29.90	0.10	1.0E-02	<b>PASS</b>
	300 V	299.0	<b>300.1</b>	301.0	1.0	1.0E-01	<b>PASS</b>
	550 V	547	<b>550</b>	553	3	1.0E+00	<b>PASS</b>
4.2 AC Volts Calibration							
45 Hz	3 V	2.938	<b>2.996</b>	3.062	0.062	3.0E-03	<b>PASS</b>
500 Hz	3 V	2.938	<b>2.986</b>	3.062	0.062	3.0E-03	<b>PASS</b>
45 Hz	30 V	29.38	<b>29.97</b>	30.62	0.62	3.0E-02	<b>PASS</b>
1 kHz	30 V	29.38	<b>29.97</b>	30.62	0.62	3.0E-02	<b>PASS</b>
45 Hz	300 V	293.8	<b>299.6</b>	306.2	6.2	3.0E-01	<b>PASS</b>
1 kHz	300 V	293.8	<b>299.7</b>	306.2	6.2	3.0E-01	<b>PASS</b>
45 Hz	550 V	537	<b>549</b>	563	13	1.0E+00	<b>PASS</b>
1 kHz	550 V	537	<b>549</b>	563	13	1.0E+00	<b>PASS</b>
4.3 DC Current Calibration							
	30 mA	29.53	<b>30.09</b>	30.47	0.47	1.0E-02	<b>PASS</b>
	300 mA	293.8	<b>301.5</b>	306.2	6.2	1.0E-01	<b>PASS</b>
	9.5 A	9.34	<b>9.47</b>	9.66	0.16	1.0E-02	<b>PASS</b>
4.4 AC Current Calibration							
45 Hz	30 mA	29.23	<b>30.07</b>	30.77	0.77	6.0E-02	<b>PASS</b>
1 kHz	30 mA	29.23	<b>30.09</b>	30.77	0.77	6.0E-02	<b>PASS</b>
45 Hz	300 mA	292.30	<b>301.0</b>	307.70	7.70	6.0E-01	<b>PASS</b>
1 kHz	300 mA	292.30	<b>301.3</b>	307.70	7.70	6.0E-01	<b>PASS</b>
45 Hz	9.5 A	9.25	<b>9.46</b>	9.75	0.25	2.0E-02	<b>PASS</b>
1 kHz	9.5 A	9.25	<b>9.48</b>	9.75	0.25	2.0E-02	<b>PASS</b>
4.5 Resistance Calibration							
	190 Ω	188.8	<b>190.0</b>	191.2	1.2	4.0E-01	<b>PASS</b>
	1900 Ω	1889	<b>1900</b>	1911	11	4.0E+00	<b>PASS</b>
	19 kΩ	18.89	<b>19.00</b>	19.11	0.11	4.0E-02	<b>PASS</b>
	190 kΩ	188.9	<b>190.0</b>	191.1	1.1	4.0E-01	<b>PASS</b>
	1.9 MΩ	1.889	<b>1.900</b>	1.911	0.011	4.0E-03	<b>PASS</b>
	19 MΩ	18.61	<b>19.02</b>	19.39	0.39	6.0E-02	<b>PASS</b>