

NVLAP LAB CODE 200958-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

J&J Calibration Service Inc.

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Fields of Calibration

Dimensional
DC/ Low Frequency
Time & Frequency
Mechanical
Thermodynamics

This laboratory is compliant to ANSI/NCSL Z540-1-1994; Part 1. (20/A01)

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or		Expanded					
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks				
	DIMENSIONAL						
LENGTH & DIAMETER; STEP	GAGES (20/D05)						
Gage Blocks - Croblox or steel	0.050 in to 1.0 in	4 μin	Comparison to master gage Blocks using comparator				
	2.0 in to 4.0 in	2 μin + 1.5 μin/in	stand and gage amplifier				
Long blocks - steel	5.0 in to 10.0 in	2.5 μin + 1.5 μin/in	Comparison to master gage Blocks using universal				
	>10.0 in to 20.0 in	2.8 μin + 1.6 μin/in	measuring machine				
Micrometers, Outside, Inside, Depth	Up to 2 in	$40 \mu in + 0.6R$	Comparison to gage blocks				
Field calibrations available Note 4 Mobile laboratory available Note 7	>2 in to 36 in	$40 \mu in + 3 \mu in/in + 0.6R$					
Calipers	0 in to 6 in	81 μin + 0.6 <i>R</i>	Comparison to gage blocks				
Field calibrations available Note 4 Mobile laboratory available Note 7	>6 in to 60 in	81 μin + 7.9 μin/in + 0.6 <i>R</i>					
Indicators Field calibrations available Note 4	0 in to 4 in	$7.6 \mu in + 0.6R$	Comparison to gage blocks				
Mobile laboratory available Note 7							

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U		Remarks
0 in to 40 in	$160 \mu \text{in} + 1.7 \mu \text{in/in} + 0.6 \text{R}$	Comparison to gage blocks
0.10 in to 10 in	6.2 μin +1.8 μin/in	Ring comparator and gage blocks
Up to 10 in	13 μin + 1.5 μin/in	Super Micrometer and gage blocks
		Universal measuring
< 1 in	5.1 µin	machine and gage blocks
4 TPI to 80 TPI	19 μin	Gage blocks and Super Micrometer
Up to 225 in on diag.	45 μin	Digital levels
		Datum gage
	32 µin	(Repeat-o-meter)
GES (20/D14)		
> 0 in to 9 in	4.7 x 10 ⁻⁴ in	Setting plug gages
> 0 in to 9 in	33 µin	Super Micrometer and thread wires
	Range 0 in to 40 in 0.10 in to 10 in Up to 10 in 4 TPI to 80 TPI Up to 225 in on diag. Up to 12 in on diag. GES (20/D14) > 0 in to 9 in	0 in to 40 in 160 μin + 1.7 μin/in + 0.6R 0.10 in to 10 in 6.2 μin +1.8 μin/in Up to 10 in 5.1 μin 4 TPI to 80 TPI 19 μin Up to 12 in on diag. Up to 12 in on diag. 32 μin GES (20/D14) > 0 in to 9 in 4.7 x 10 ⁻⁴ in

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Measured Parameter or	DRATION AND ME.	Frequency	PABILITIES (CMC) Note Expanded	
Device Calibrated	Range	Range	Uncertainty Notes 3,5	Remarks
		NETICS – DC/LOV		
AC CURRENT (20/E02)				
AC Current - Generate Field calibrations	20 μA to 202 μA	10 Hz to 44 Hz	$0.27 \% + 0.25 \mu A$	Transmille 3010A
available Note 4 Mobile laboratory		45 Hz to 999 Hz	$0.085 \% + 0.15 \mu A$	
available Note 7		1 kHz to 10 kHz	$0.94 \% + 0.25 \mu A$	
	200 μA to 2.02 mA	10 Hz to 44 Hz	$0.27 \% + 0.25 \mu A$	
		45 Hz to 999 Hz	$0.073 \% + 0.20 \mu A$	
		1 kHz to 10 kHz	$0.59 \% + 0.30 \mu A$	
	2 mA to 20.2 mA	10 Hz to 44 Hz	0.27 % + 3.0 μΑ	
		45 Hz to 999 Hz	$0.048 \% + 2.0 \mu A$	
		1 kHz to 10 kHz	$0.31 \% + 3.0 \mu A$	
	20 mA to 202 mA	10 Hz to 44 Hz	0.27 % + 30 μΑ	
		45 Hz to 999 Hz	$0.051 \% + 20 \mu A$	
		1 kHz to 10 kHz	$0.59 \% + 40 \mu A$	
	200 mA to 2.02 A	10 Hz to 44 Hz	0.27 % + 300 μΑ	
		45 Hz to 999 Hz	$0.074 \% + 200 \mu A$	
		1 kHz to 10 kHz	$0.59 \% + 400 \mu A$	
	2 A to 30 A	30 Hz to 44 Hz	0.24 % + 3.0 mA	
		45 Hz to 99 Hz	0.10 % + 2.0 mA	
		100 Hz to 1 kHz	0.35 % + 4.0 mA	
AC Current - Measure Field calibrations	1 μA to 100 μA	10 Hz to 40 Hz	0.11 % + 15 nA	Transmille 8081
available Note 4 Mobile laboratory		41 Hz to 1 kHz	0.062 % + 12 nA	
available Note 7		1 kHz to 10 kHz	0.15 % + 30 nA	

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Measured Parameter or		Frequency	Expanded	
Device Calibrated	Range	Range	Uncertainty Notes 3,5	Remarks
Device Cambrated				Kemarks
	101 mA to 1 A	10 Hz to 40 Hz	$0.11 \% + 0.15 \mu A$	
		41 Hz to 1 kHz	$0.061 \% + 0.12 \mu\text{A}$	
		1 kHz to 10 kHz	$0.15 \% + 0.30 \mu\text{A}$	
	1.001 mA to			
	10 mA	10 Hz to 40 Hz	$0.11 \% + 1.5 \mu A$	
		41 Hz to 1 kHz	$0.074 \% + 1.2 \mu\text{A}$	
		1 kHz to 10 KHz	$0.15 \% + 3.0 \mu\text{A}$	
	10.001 mA to		·	
	100 mA	10 Hz to 40 Hz	$0.12 \% + 0.15 \mu\text{A}$	
		41 Hz to 1 kHz	$0.062 \% + 12 \mu A$	
		1 kHz to 10 KHz	$0.15 \% + 30 \mu A$	
	101 mA to 1A	10 Hz to 40 Hz	0.14 % + 0.20 mA	
		41 Hz to 1 kHz	0.084 % + 0.15 mA	
		1 kHz to 10 KHz	0.16 % + 0.50 mA	
	1.001 A to 10 A	10 Hz to 40 Hz	0.21 % + 4.0 mA	
		41 Hz to 1 kHz	0.15 % + 3.0 mA	
	10.001 A to 30 A	10 Hz to 40 Hz	0.21 % + 12 mA	
		41 Hz to 1 kHz	0.15 % + 9.0 mA	

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Measured Parameter or		Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
DC RESISTANCE AND CURREN	NT (20/E05)		
DC Current - Generate	1 μA to 202 μA	0.012 % + 10 nA	Transmille 3010A
Field calibrations available Note 4	202 μA to 2.02 mA	$61 \mu A/A + 30 nA$	
Mobile laboratory available Note 7	2.02 mA to 20.2 mA	$61 \mu A/A + 0.20 \mu A$	
	20.2 mA to 202 mA	$73 \mu A/A + 2.0 \mu A$	
	202 mA to 2.02 A	$0.016 \% + 30 \mu A$	
	2.02 A to 20.2 A	$0.035 \% + 300 \mu A$	
	20.2 A to 30 A	$0.060 \% + 450 \mu A$	

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Measured Parameter or	THE THE PARTY OF T	Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
DC Current - Measure	0.1 nA to 10 nA	2.3 % + 0.8 pA	Transmille 8081
Field calibrations available Note 4	10 nA to 100 nA	0.39 % + 3.4 pA	
Mobile laboratory available Note 7	100 nA to 1 μA	0.042 % + 17 pA	
	1 μA to 10 μA	$61 \mu A/A + 100 pA$	
	10 μA to 100 μA	$18 \mu\text{A/A} + 0.40 \text{nA}$	
	100 μA to 1 mA	$18 \mu A/A + 4.0 nA$	
	1 mA to 10 mA	$21 \mu A/A + 40 nA$	
	10 mA to 100 mA	$55 \mu A/A + 0.60 \mu A$	
	100 mA to 1 A	$0.027 \% + 13 \mu A$	
	1 A to 10 A	$0.068 \% + 350 \mu A$	
	10 A to 30 A	0.091 % + 15 mA	
Resistance - Generate	$0~\mathrm{m}\Omega$	5.9 mΩ	Transmille 3010A
Field calibrations available Note 4	100 mΩ	$0.013 \% + 0.005 \Omega$	
Mobile laboratory available Note 7	1 Ω	$0.015~\% + 0.005~\Omega$	
	10 Ω	$33 \mu\Omega/\Omega + 0.005 \Omega$	
	100 Ω	$21 \mu\Omega/\Omega + 0.005 \Omega$	
	1 kΩ	$21 \mu\Omega/\Omega + 0.005 \Omega$	
	10 kΩ	$9.8 \ \mu\Omega/\Omega + 0.05 \ \Omega$	
	100 kΩ	$22 \mu\Omega/\Omega + 0.50 \Omega$	
	1 ΜΩ	$32 \mu\Omega/\Omega + 5 \Omega$	
	$10 \mathrm{M}\Omega$	$0.011 \% + 100 \Omega$	
	$100 \mathrm{M}\Omega$	$0.21 \% + 2.0 \text{ k}\Omega$	
	1 GΩ	$1.2 \% + 30 \text{ k}\Omega$	
			Ohmmite resistors with
	1 MΩ	0.066 %	Transmille 8081
	5 ΜΩ	0.066 %	
	10 MΩ	0.066 %	
	25 ΜΩ	0.067 %	
	100 MΩ	0.068 %	
	1 GΩ	0.085 %	

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Measured Parameter or		Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
Resistance - Measure	$0.001~\Omega$ to $1~\Omega$	$29 \mu\Omega/\Omega + 6.0 \mu\Omega$	Transmille 8081
Field calibrations available Note 4	$1.001~\Omega$ to $10~\Omega$	$19 \mu\Omega/\Omega + 30 \mu\Omega$	
Mobile laboratory available Note 7	$10.001~\Omega$ to $100~\Omega$	$17 \mu\Omega/\Omega + 100 \mu\Omega$	
	$100.001~\Omega$ to $1~\mathrm{k}\Omega$	$15 \ \mu\Omega/\Omega + 800 \ m\Omega$	
	$1.001~\Omega$ to $10~\mathrm{k}\Omega$	$17 \ \mu\Omega/\Omega + 8.0 \ m\Omega$	
	$10.001~\mathrm{k}\Omega$ to $100~\mathrm{k}\Omega$	$18 \ \mu\Omega/\Omega + 800 \ \Omega$	
	$101~\mathrm{k}\Omega$ to $1~\mathrm{M}\Omega$	$22 \mu\Omega/\Omega + 2.0 \Omega$	
	$1.001~\mathrm{M}\Omega$ to $10~\mathrm{M}\Omega$	$29 \ \mu\Omega/\Omega + 80 \ \Omega$	
	$10.01~\mathrm{M}\Omega$ to $30~\mathrm{M}\Omega$	0.017 %	
	$30.01~\mathrm{M}\Omega$ to $270~\mathrm{M}\Omega$	0.016 %	
	$270.1~\mathrm{M}\Omega$ to $2700~\mathrm{M}\Omega$	0.054 %	
DC VOLTAGE (20/E06)			
DC Voltage - Generate	0 μV to 202 mV	$18 \mu V/V + 2.0 \mu V$	Transmille 3010A
Field calibrations available Note 4	200 mV to 2.02 V	$11 \mu V/V + 2.5 \mu V$	
Mobile laboratory available Note 7	2 V to 20.2 V	$9.9 \mu V/V + 24 \mu V$	
	20 V to 202 V	$14 \mu V/V + 240 \mu V$	
	200 V to 1025 V	$14 \mu V/V + 2.4 \text{ mV}$	
DC Voltage - Measure	0 nV to 100 mV	$13 \mu V/V + 0.17 \mu V$	Transmille 8081
Field calibrations available Note 4	101 mV to 1 V	$7.9 \ \mu V/V + 0.60 \ \mu V$	
Mobile laboratory available Note 7	1.001 V to 10 V	$8.5 \mu V/V + 6.0 \mu V$	
	10.001 V to 100 V	$11 \mu V/V + 80 \mu V$	
	101 V to 1050 V	$12 \mu V/V + 1.2 \text{ mV}$	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

	1			
Measured Parameter or			Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Notes 3,5	Remarks
LF AC VOLTAGE (20/E0	9)			
LF AC Voltage – Generate	0 mV to 202 mV	10 Hz to 44 Hz	$0.098 \% + 15 \mu V$	Transmille 3010A
Field calibrations available Note 4		45 Hz to 999 Hz	$0.025 \% + 15 \mu\text{V}$	
Mobile laboratory available Note 7		1 kHz to 19.999 kHz	$0.033 \% + 28 \mu\text{V}$	

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Measured Parameter or		EASUKEMENI CAPAD	Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Notes 3,5	Remarks
		20 kHz to 99.999 kHz	$0.12 \% + 40 \mu V$	
		100 kHz to 500 kHz	$0.55 \% + 100 \mu V$	
			•	
	200 mV to 2.02 V	10 Hz to 44 Hz	$0.066 \% + 180 \mu V$	
		45 Hz to 999 Hz	$0.022 \% + 120 \mu V$	
		1 kHz to 19.999 kHz	$0.032 \% + 180 \mu\text{V}$	
		20 kHz to 99.999 kHz	$0.078 \% + 300 \mu\text{V}$	
		100 kHz to 500 kHz	$0.42 \% + 450 \mu\text{V}$	
	2 V to 20.2 V	10 Hz to 44 Hz	0.060 % + 1.6 mV	
		45 Hz to 999 Hz	0.022 % + 1.0 mV	
		1 kHz to 19.999 kHz	0.032 % + 1.6 mV	
		20 kHz to 99.999 kHz	0.076 % + 3.0 mV	
	20 V to 202 V	20 11-4- 44 11-	0.062 % + 20 mV	
	20 V to 202 V	30 Hz to 44 Hz 45 Hz to 999 Hz	0.062 % + 20 mV 0.021 % + 12 mV	
		1 kHz to 9.999 kHz	0.021 % + 12 mV 0.026 % + 16 mV	
		10 kHz to 40 kHz	0.026% + 10 mV 0.040% + 30 mV	
	200 V to 1020 V	30 Hz to 44 Hz	0.040 % + 30 mV 0.072 % + 200 mV	Timital for any and
	200 V to 1020 V	45 Hz to 999 Hz	0.072% + 200 mV 0.027% + 60 mV	Limited frequency and voltage pairs
		1 kHz to 10 kHz	0.027% + 60 mV 0.033% + 120 mV	for this voltage range
		I KIIZ IO IO KIIZ	0.033 % + 120 mv	for this voltage range
LF AC Voltage – Measure	100 nV to 100 mV	10 Hz to 40 Hz	$0.097 \% + 15 \mu V$	Transmille 8081
Field calibrations available Note 4		41 Hz to 200 Hz	$0.049 \% + 9 \mu V$	
Mobile laboratory		41 112 to 200 112	0.049 /0 + 9 μ ν	
available Note 7		201 Hz to 2 kHz	$0.049 \% + 8 \mu V$	
		2 kHz to 20 kHz	$0.055 \% + 10 \mu V$	
		20 kHz to 100 kHz	$0.16 \% + 50 \mu V$	
		40.77		
	101 mV to 1 V	10 Hz to 40 Hz	$0.071 \% + 150 \mu\text{V}$	
		40 Hz to 200 Hz	$0.037 \% + 60 \mu V$	
		200 Hz to 2 kHz	$0.030 \% + 60 \mu V$	
		2 kHz to 20 kHz	$0.11 \% + 100 \mu V$	

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Measured Parameter or			Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Notes 3,5	Remarks
		20 kHz to 100 kHz	$0.14 \% + 500 \mu\text{V}$	
		100 kHz to 1 MHz	2.2 % + 25 mV	
	1.001 V to 10 V	40 Hz to 200 Hz	0.037 % + 0.6 mV	
	1.001 7 10 10 7	200 Hz to 2 kHz	0.031 % + 0.6 mV	
		2 kHz to 20 kHz	0.11 % + 1 mV	
		20 kHz to 100 kHz	0.14 % + 5 mV	
	10.001 V to 100 V	10 Hz to 40Hz	0.098 % + 15 mV	
		40 Hz to 200Hz	0.044 % + 9 mV	
		200 Hz to 2kHz	0.044 % + 7 mV	
		2 kHz to 20 kHz	0.11 % + 10 mV	
		20 kHz to 50 kHz	0.17 % + 50 mV	
	101 V to 1 kV	40 Hz to 200 Hz	0.049 % + 90 mV	
		200 Hz to 2 kHz	0.062 % + 70 mV	
		2 kHz to 20 kHz	0.093 % + 100 mV	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or		Expanded	
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks
LF CAPACITANCE (20/E10)			
LF Capacitance - Generate	10 nF	0.32 %	Transmille 3010A
Field calibrations available Note 4	20 nF	0.32 %	
Mobile laboratory available Note 7	50 nF	0.30 %	
	100 nF	0.30 %	
	1 μF	0.47 %	
	10 μF	0.71 %	
LF INDUCTANCE (20/E11)			
LF Inductance - Generate	1 mH to 10 H	0.60 %	Transmille 3010A
Field calibrations available Note 4			
Mobile laboratory available Note 7			

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Measured Parameter or		Expanded Expanded				
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks			
TIME AND FREQUENCY						
FREQUENCY DISSEMINATION	N (20/F01)	1				
Frequency Measuring Devices Field calibrations available Note 4 Mobile laboratory available Note 7	1 Hz to 10 MHz	1.2 μHz/Hz	Transmille 3010A			
Frequency Source Devices Field calibrations available Note 4 Mobile laboratory available Note 7	1 Hz to 1 MHz	$2.5 \mu Hz/Hz + 2 digits$	Transmille 8081			
	MECHA	NICAL				
TORQUE (20/M15)						
			ASME B107.14-2004, ISO 6789:2003, using torque			
Torque Tools	4 lbf-in to 50 lbf-in	0.55 %	transducers			
Field calibrations available Note 4 Mobile laboratory available Note 7	30 lbf-in to 400 lbf-in	0.46 %				
	80 lbf-in to 1000 lbf-in	0.32 %				
	20 lbf-ft to 250 lbf-ft	0.42 %				
	60 lbf-ft to 600 lbf-ft	0.41 %				
Torque Transducers Field calibrations available Note 4	4 lbf-in to 50 lbf-in 30 lbf-in to 400 lbf-in	0.20 % 0.20 %	ASME B107.29-2005 using torque arm and weights			
Mobile laboratory available Note 7	80 lbf-in to 1000 lbf-in	0.20 %				
	20 lbf-ft to 250 lbf-ft	0.20 %				
	60 lbf-ft to 600 lbf-ft	0.20 %				
	THERMOI	II.				
RESISTANCE THERMOMETR						
Temperature Source Devices (baths, calibrators)	-80 °C to 420 °C	0.22 °C	SPRT temperature probe and Transmille 8081			
Temperature Measuring Devices	0 °C to 230 °C	0.032 °C + 0.6R	SPRT temperature probe, Transmille 8081 w/temp bath			
(thermometers, probes)	>230 °C to 420 °C	$0.053 ^{\circ}\text{C} + 0.6\text{R}$	•			

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Measured Parameter or		Expanded	,		
Device Calibrated	Range	Uncertainty Notes 3,5	Remarks		
PRESSURE (20/T05)					
Pressure – hydraulic measuring			ASME B40.1-1991 using		
devices	10 psig to 500 psig	0.019 %	deadweight tester		
	200 psig to 10 000 psig	0.018 %			
END					

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Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty with a level of confidence of approximately 95 %, typically using a coverage factor of k = 2. However, laboratories may report a coverage factor different than k = 2 to achieve the 95 % level of confidence. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).

Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.

Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.

Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions*. However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.5 of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

Note 7: The laboratory utilizes a mobile lab for most of its field service work. Please note that uncertainties listed are valid whenever the work is performed in the mobile lab. If work is done in customer facility, then note 4 will apply.

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