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1. Reproduction and Use Restrictions Agreement

2. Purpose

The purpose of this document is to validate if a CA-200DV is functioning within specification tolerance.

3. Revision History

This document supersedes all previously issued versions, providing new or revised information. The most recent publication can be determined by comparing the last three characters at the end of the part number and the date issued.

Revision	Date	General Description of Changes	Revision By
AA0	03/15/2023	Initial Release	Gabe Abreo
AB0	06/19/2023	Clarify Procedure	Josh Huisenga
AB1	06/22/2023	Update number reference (Sect. 7.2.7)	Josh Huisenga
AB2	08/21/2023	Replaced image to show Fluke 568 in (Sect. 8)	Josh Huisenga
AB3	01/09/2024	Added notes to section 8 Removed [example] (Sect. 8.11)	Josh Huisenga
AB4	03/07/2024	Clarified T1 “Rounding”, Updated examples (Sect. 9)	Josh Huisenga

4. Equipment Description

This procedure establishes the methods for operator verification of the CA-200DV Calibration Assistant.

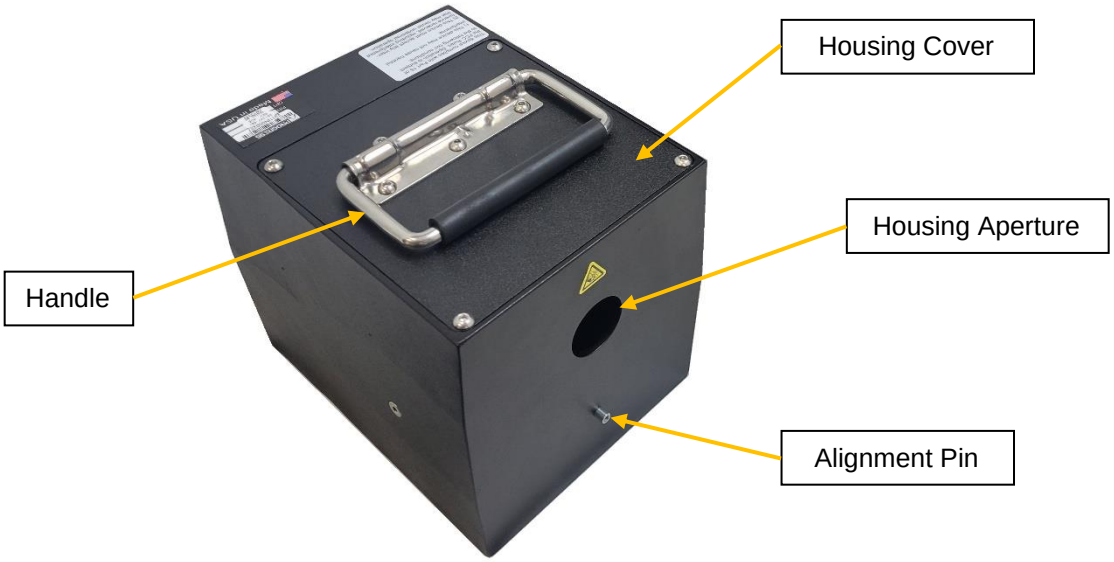
Personnel using this procedure are expected to have a high degree of confidence and expertise in related test and calibration procedures. Procedures not explained here are considered to be understood as common practice.

Hereinafter, the unit under test will be referred to as U.U.T.

5. Test Equipment

All measurement standards used in this procedure shall be traceable and shall have the precision, accuracy, stability, range, and resolution for the intended use. All deviations shall be documented.

	Equipment	Equipment Specifications
5.1.1	Power Source	FIP Panel (Connector J1)
5.1.2	Power Cable	100’ cable (400018-67-2) or 200’ cable (400018-67-3)
5.1.3	Power Source (Optional)	Standard Electrical Outlet (115VAC, 2A) (400018-67-AC)
5.1.4	Power Cable (Optional)	P.R. part number 400018-67-AC
5.1.5	Infrared Gun	Fluke 568 or equivalent, with adjustable emissivity setting
5.1.6	#2 Pencil	With soft, clean, rubber eraser



6. Preliminary Operations

6.1. Review and become familiar with entire procedure before beginning testing process.

6.2. Verify calibration of the Fluke 568 or equivalent device has not expired.

6.2.1. Reference manufacturer's service manual regarding calibration interval.

6.3. Remove housing cover of U.U.T., and ensure inside components are free of dust or debris. If dust or debris is present, used forced air to clean units, and then reassemble.

Note: Do not clean with a rag, glove, or any material other than clean compressed air. Doing so will foul the sensitive coatings on interior components.

7. Test Process

7.1. Connections:

7.1.1. Set U.U.T. in the designated test area.

7.1.2. Connect power test cable to U.U.T.

7.1.3. End of Connections.

7.2. Preliminary Setup: (Steps 7.2.2 thru 7.2.8 must be performed in the order listed)

7.2.1. Procedure must be done in an environment, in which the ambient air temperature is regulated between 65°F - 80°F (18.3°C - 26.7°C).

7.2.2. Toggle the MODE/SPIN switch to PYRO or Green side.

7.2.3. Toggle the POWER switch to ON.

7.2.4. Observe the SYSTEM HEALTH lamp illuminate momentarily Red and then Green for approximately five seconds, then revert to a 1-second flashing rate by the Green LED.

7.2.5. Observe the chopper wheel rotating after approximately 3 seconds.

7.2.6. The "Ready to Use" LED indicator will come on after approximately five minutes or less.

7.2.7. Allow the U.U.T. to remain in this condition for 1 hour, before proceeding to step 8.

7.2.8. End of Preliminary Setup.

8. Read T1 & T2 Temperature:

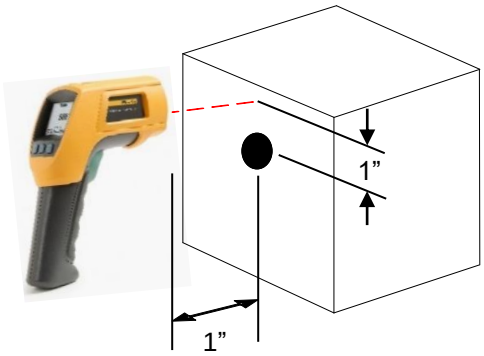


Figure 8a – Laser Alignment area

Figure 8b – Wheel (T1)

Figure 8c – Heat Source (T2)

Note:

- *Ensure the temperature gun has the emissivity value set to .91.*
- *Read measurements T1 and T2 within 60 seconds of when the wheel stops spinning so that the heat source does not have time to cool enough to invalidate the readings*.
- *Set temperature gun to display Min/Max readings*.
- *Select the T1 temperature in the chart which most closely matches your readings.*

8.1. After U.U.T is on for 1 hour, toggle the POWER switch to the OFF position. This will power down the spinning wheel.

8.2. Physically rotate the wheel 180° so the aperture hole is out of the line-of-sight using a soft tipped object such as the eraser of a #2 pencil.

8.2.1. Note: Do not touch the wheel with a sharp object or dirty finger. Doing so will foul the sensitive coating of the wheel. If the wheel is not rotated approximately 180°, it will return to the original position, and the aperture will again be present.

8.3. Measure the T1 wheel temperature with the temperature gun aligning the red measuring dot 1” above the top of the aperture hole and 1” away from the calibrator, as shown above in figure 8b.

8.4. Record this reading as the T1 wheel temperature in the chart provided on page 6.

8.5. Physically rotate the wheel so the aperture hole is aligned with the T2 heat source aperture using a soft tipped object such as the eraser of a #2 pencil.

8.5.1. Note: Do not touch the wheel with a sharp object or dirty finger. Doing so will foul the sensitive coating of the wheel.

8.6. Measure heat source temperature with the temperature gun aligning the red measuring dot 1” above the top of the aperture hole and 1” away from the calibrator, as shown above in figure 8c.

8.7. While measuring, move the temperature gun approximately ½” up and down, and left to right, and record the highest reading.

8.8. Record this reading as the T2 heat source temperature in the chart on page 6.

8.9. Referring to the chart on page 7, locate the measured reference wheel temperature on the chart (T1) in appendix A and find the corresponding T3 heat source reference temperature.

8.10. Calculate the temperature difference between the T3 heat source reference temperature and the T2 heat source measured temperature. Equation: T2 (measured) - T3 (reference) = |ΔT|.

8.11. If the ΔT result is less than ±4°F or ±2°C, the U.U.T. is in specification and factory calibration is not necessary. Otherwise, U.U.T. must be re-calibrated for accuracy.

8.12. If the U.U.T. is not within specification, the unit must be removed from service, and factory calibrated. Send the unit to Progress Rail, using the information on page 7.

8.13. If the U.U.T. is within specification, it is recommended that the customer mark the unit with tag or sticker indicating it is valid. Include date of testing.

8.14. Re-validate within 12 months from Validation Date.

8.15. End of temperature verification.

9. Calculate

Example: Use Appendix A, page 7.

9.1. T1 reading is measured to be 78°F and T2 reading is measured at 203.9°F.
9.2. Select row 13 from the table since the T1 measurement is 78°F, and record the T3 reference temperature as 204.2°F in the table below.
9.3. Subtract the T3 reference value in the table (204.2°F) from the T2 measured value (203.9°F).
9.4. Since 204.2°F minus 203.9°F is less than ±4°F, the unit is within specification and does not need to be returned to Progress Rail.
9.5. End of Calculate.

	Validation Date	U.U.T. Serial Number	T1 Measured Wheel Temp	T2 Measured Heat Source Temp	T3 Reference Temp (see page 7)	ΔT (OK if within ±4°F or ±2°C)
Ex 1	-	Example (°F)	78.1°F	203.9°F	204.2°F	-0.3°F
Ex 2	-	Example (°C)	23.4°C	95.5°C	94.5°C	1.0°C
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Appendix A

	T1 WHEEL °F		T3 REFERENCE °F		T1 WHEEL °C		T3 REFERENCE °C
1	66	1	197.9	1	18.9	1	92.2
2	67	2	198.5	2	19.4	2	92.5
3	68	3	199.0	3	20.0	3	92.8
4	69	4	199.5	4	20.6	4	93.1
5	70	5	200.0	5	21.1	5	93.3
6	71	6	200.5	6	21.7	6	93.6
7	72	7	201.0	7	22.2	7	93.9
8	73	8	201.6	8	22.8	8	94.2
9	74	9	202.1	9	23.3	9	94.5
10	75	10	202.6	10	23.9	10	94.8
11	76	11	203.1	11	24.4	11	95.1
12	77	12	203.7	12	25.0	12	95.4
13	78	13	204.2	13	25.6	13	95.7
14	79	14	204.7	14	26.1	14	95.9
15	80	15	205.3	15	26.7	15	96.3
16	81	16	205.8	16	27.2	16	96.6
17	82	17	206.3	17	27.8	17	96.8
18	83	18	206.9	18	28.3	18	97.2
19	84	19	207.4	19	28.9	19	97.4
20	85	20	208.0	20	29.4	20	97.8
21	86	21	208.5	21	30.0	21	98.1
22	87	22	209.0	22	30.6	22	98.3
23	88	23	209.5	23	31.1	23	98.6
24	89	24	210.0	24	31.7	24	98.9
25	90	25	210.5	25	32.2	25	99.2
26	91	26	211.1	26	32.8	26	99.5
27	92	27	211.6	27	33.3	27	99.8
28	93	28	212.1	28	33.9	28	100.1
29	94	29	212.6	29	34.4	29	100.4
30	95	30	213.2	30	35.0	30	100.6
31	96	31	213.7	31	35.6	31	100.9
32	97	32	214.2	32	36.1	32	101.2

10. Return invalid units to Progress Rail for Calibration

10.1. Return units that do not measure within specification to Progress Rail for factory calibration.

10.2. Schedule factory calibration, prior to shipping unit, by calling (888) 701-3479 between 8:00AM and 5:00PM, to schedule an RMA.

10.3. Ship unit to Progress Rail, 3801 S Selsa Rd #1, Independence, MO 64057.

10.3.1. Mark the RMA number on the outside of the box prior to shipping.