



ADVENT MASS FLOW CONTROL AND FEEDBACK CALIBRATION

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1. INTRODUCTION

This procedure is used to calibrate the ADVENT System mass flow control and feedback to assure accurate and reliable gas control during welding. This procedure applies to all ADVENT Systems that have a mass flow controller.

2. RESPONSIBILITIES

Performer	Responsibility
Technician	<p>After assuring prerequisites are met, performs a calibration of the ADVENT mass flow control function using steps 4.2.1 through 4.2.11.</p> <p>Performs a calibration and check of the ADVENT mass flow feedback function using steps 4.3.1 through 4.3.10.</p> <p>If the ADVENT control system fails to calibrate properly, initiate troubleshooting with assistance of AMET Technical Support.</p>

3. PREREQUISITS

Record the ADVENT unit serial number in Appendix B. The tools and equipment required to perform this calibration include:

- 3.1. DC Volt Meter (4-1/2-digit). The calibration of this meter must be verified and current. Record the serial number in Appendix B.
- 3.2. Standard head screw driver, size 00
- 3.3. Record the Mass Flow Unit serial number, pressure rating and full scale (100%) value in Appendix B, Mass Flow Unit Calibration Data Sheet.
- 3.4. Refer to Appendix A, Figure 1, Control Voltage vs. Percent Mass Flow Value to calculate the standard cubic feet per hour (scfh) values required in column 2 of Table 1, *Mass Flow Control Linearity Check* and Table 2, *Mass Flow Feedback Linearity Check* in Appendix B.

4. INSTRUCTIONS

4.1. Initial Setup

- 4.1.1. Adjust the gas supply line pressure to the correct value for the mass flow unit being calibrated.
- 4.1.2. Ensure no devices are installed in the gas supply line between the output of the gas line supply pressure regulator and the input of the mass flow unit being calibrated.
- 4.1.3. Remove the control cable from the mass flow unit that is to be calibrated.

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- 4.1.4. Connect the DC Volt Meter to the mass flow control signal wires on the cable connector removed in step 4.1.3 (Red = Cntl +; Black = Cntl -). Refer to your specific electrical schematics.

4.2. Mass Flow Control Calibration Procedure

- 4.2.1. Launch CALIBRATION from the ADVENT Control Panel.
- 4.2.2. Expand the “Analog Out Channels” on the left side of the screen by clicking on the arrow next to “Analog Out Channels.”
- 4.2.3. Double Click on “Mass Flow Cntl” from the Analog Out Channels.

**Note:**

NOTE: *If your system has more than one mass flow controller then the description “Mass Flow Cntl” may be different.*

- 4.2.4. From the “Mass Flow Cntl” window, input into the edit field a value of 0 scfh. Click on the arrow button to activate the value.
- 4.2.5. Check to make sure that the voltmeter, that is connected across the mass flow control signal, reads 0 VDC.
- 4.2.6. If the voltmeter does not read 0 VDC then locate the analog output board that is used for Mass Flow Cntl, this can be found on the system electrical schematics, and adjust the OFFSET POT until the voltmeter connected across mass flow control signal reads 0 VDC.
- 4.2.7. From the “Mass Flow Cntl” window, input into the edit field a value representing the maximum scfh output of the mass flow controller. Click on the arrow button to activate the value.
- 4.2.8. Check to make sure that the voltmeter, that is connected across the mass flow control signal, reads 5 VDC.
- 4.2.9. If the voltmeter does not read 5 VDC then locate the analog output board that is used for Mass Flow Cntl, this can be found on the system electrical schematics, and adjust the COURSE and FINE POTS until the voltmeter connected across mass flow control signal reads 5 VDC.
- 4.2.10. Repeat steps 4.2.4 through 4.2.9 until no adjustments are needed.
- 4.2.11. Perform a linearity check of the system. Use the “Mass Flow Cntl” window edit field to adjust the mass flow controller to the scfh values calculated in column 2 of Table B-1, *Mass Flow Control Linearity Check* in Appendix B. Record the volt meter readings at each setting in Table B-1, *Mass Flow Control Linearity Check*.
- 4.2.12. Reconnect the mass flow control cable connector removed in step 4.1.3.

4.3. Mass Flow Feedback Calibration Procedure

- 4.3.1. Expand the “Analog In Channels” on the left side of the screen by clicking on the arrow next to “Analog In Channels.”
- 4.3.2. Double Click on “Mass Flow Fdbk” from the Analog In Channels.

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**Note:**

NOTE: *If your system has more than one mass flow controller then the description “Mass Flow Fdbk” may be different.*

- 4.3.3. From the “Mass Flow Cntl” window, input into the edit field a value of 0 scfh. Click on the arrow button to activate the value.
- 4.3.4. Check to make sure that the “Mass Flow Fdbk” window on the operator console reads 0 scfh.
- 4.3.5. If the “Mass Flow Fdbk” window does not read 0 scfh then locate the analog input board that is used for Mass Flow Fdbk, this can be found on the system electrical schematics, and adjust the OFFSET POT so that the mass flow feedback window reads 0 scfh.
- 4.3.6. From the “Mass Flow Cntl” window, input into the edit field a value representing the maximum scfh output of the mass flow controller. Click on the arrow button to activate the value.
- 4.3.7. Check to make sure that the “Mass Flow Fdbk” window on the operator console reads the same scfh as the commanded value in step 4.3.6.
- 4.3.8. If the “Mass Flow Fdbk” window does not read the correct scfh then locate the analog input board that is used for Mass Flow Fdbk, this can be found on the system electrical schematics, and adjust the COURSE and FINE POTS so that the mass flow feedback window reads the correct value.
- 4.3.9. Repeat steps 4.3.3 through 4.3.8 until no adjustments are needed.
- 4.3.10. Perform a linearity check of the system. Use the “Mass Flow Cntl” window edit field to adjust the mass flow controller to the scfh values calculated in column 2 of Table B-2, *Mass Flow Feedback Linearity Check* in Appendix B. Record the “Mass Flow Fdbk” readings at each setting in Table B-2, *Mass Flow Feedback Linearity Check*.

5. RECORDS

The records for this calibration are in Appendix A, *ADVENT Mass Flow Control and Feedback Calibration*.

6. DEFINITIONS

None



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7. REFERENCES

ADVENT System Manual, SM-[TBD – DRAFT]
ADVENT Maintenance Manual, MM-[TBD – DRAFT]

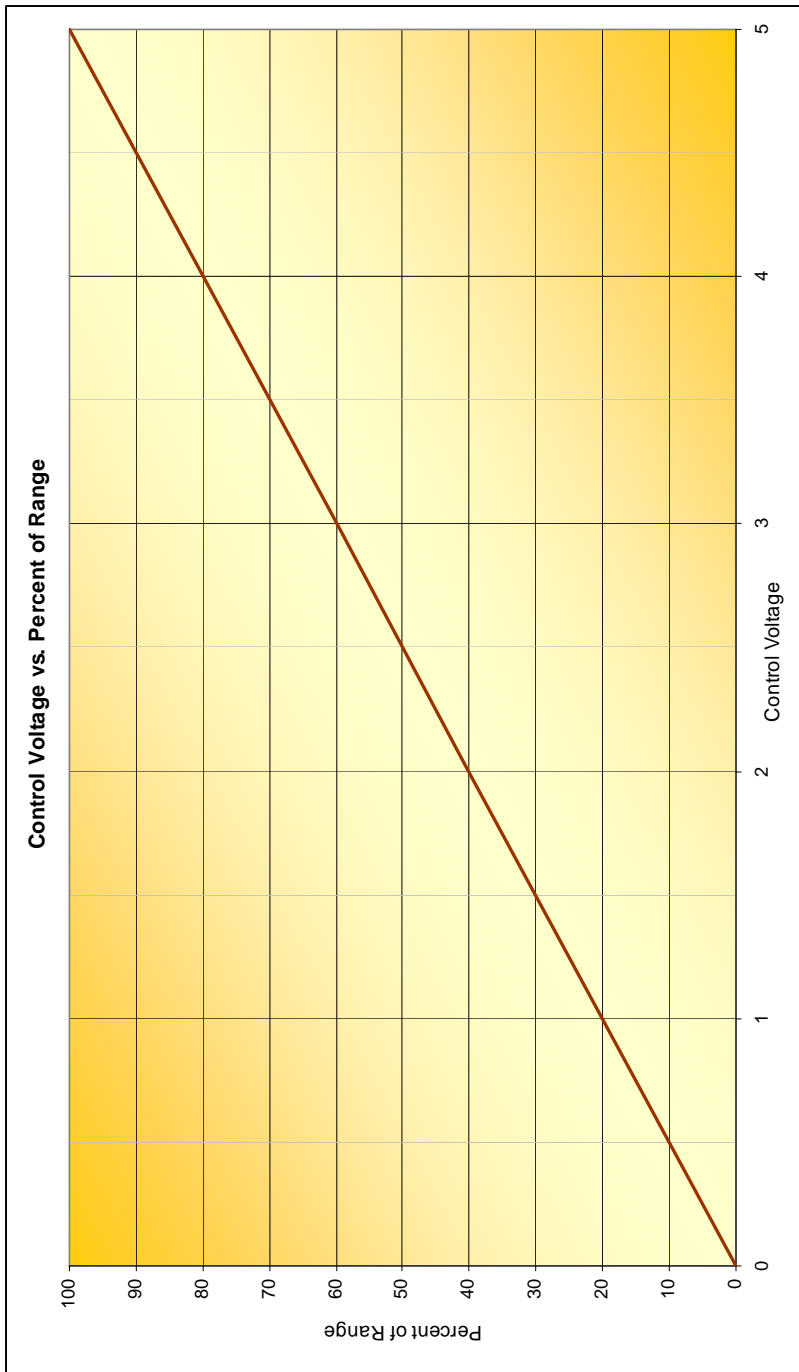
8. APPENDIXES

- 8.1. Appendix A, *Control Voltage vs. Percent Mass Flow Conversion Chart*
- 8.2. Appendix B, *ADVENT Mass Flow Control and Feedback Calibration Data*

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Appendix A

Figure 1, Control Voltage vs. Percent Mass Flow Conversion Chart





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Appendix B

ADVENT Mass Flow Control and Feedback Calibration Data

Technician	Date
Mass Flow Unit Serial Number	Mass Flow Unit Pressure Rating (psig)
Mass Flow Unit Full Scale (100%) Value	Digital Voltmeter Serial Number

Table B-1, Mass Flow Control Linearity Check

% of Full Scale	Step 3.3 Mass Flow Control Value (scfh)	Step 4.2.11 Voltmeter Reading	Expected Value (Volts)
0	0		0.0 – 0.2
20			0.8 – 1.2
40			1.8 – 2.2
60			2.8 – 3.2
80			3.8 – 4.2
100			4.8 – 5.2

Table B-2, Mass Flow Feedback Linearity Check

% of Full Scale	Step 3.3 Mass Flow Control Value (scfh)	Step 4.3.10 Mass Flow Fdbk (scfh)	Expected Value (scfh)
0	0		Column 2 ± 2 %
20			Column 2 ± 2 %
40			Column 2 ± 2 %
60			Column 2 ± 2 %
80			Column 2 ± 2 %
100			Column 2 ± 2 %