



Automated Motion Incorporated

MT-DAC  
Digital to Analog Converter

Setup and Calibration Procedures

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## DAC Configuration

This MT-DAC unit has been configured by the manufacturer to the following settings.

|               |           |
|---------------|-----------|
| Output Mode   | 4-20mA    |
| Baud Rate     | 300       |
| Data Bits     | 7         |
| Parity        | ODD       |
| Stop Bits     | 2         |
| Tank Capacity | 8 Presets |

# MT-DAC SWITCH AND JUMPER SETTINGS

**Note: Remove power to the MT-DAC before making any changes to switches or jumpers.**

**Note: Proper positioning of SW1 and SW2 is critical. Damage to the output components may occur if these switches are not correct. Please verify that all of the switch settings are correct before applying power to the MT-DAC.**



| AA | BAUD | B | POLARITY | CCC | CAPACITY | D | MULTIPLIER | E | OUTPUT MODE |
|----|------|---|----------|-----|----------|---|------------|---|-------------|
| 00 | 110  | 0 | UNIPOLAR | 000 |          | 0 | X1         | 0 | VOLTAGE     |
| 01 | 150  | 1 | BIPOLAR  | 001 |          | 1 | X10        | 1 | 4 - 20mA    |
| 10 | 300  |   |          | 010 |          |   |            |   |             |
| 11 | 600  |   |          | 011 |          |   |            |   |             |
|    |      |   |          | 100 |          |   |            |   |             |
|    |      |   |          | 101 |          |   |            |   |             |
|    |      |   |          | 110 |          |   |            |   |             |
|    |      |   |          | 111 |          |   |            |   |             |

|           | SW 2 |   |   |   |   |   |   |   | JUMPERS |     |
|-----------|------|---|---|---|---|---|---|---|---------|-----|
|           |      |   |   |   |   |   |   |   | JP1     | JP3 |
| 4 - 20mA  | 0    | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1       | 0   |
| 0 - 5VDC  | 0    | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0       | 0   |
| 0 - 10VDC | 1    | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0       | 0   |
| ± 5VDC    | 0    | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0       | 0   |
| ± 10VDC   | 0    | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0       | 1   |

1 = SWITCH ON

# Calibration

**Note: This unit has been fully programmed and calibrated by the manufacturer. The following procedures are only necessary if a different output configuration (Voltage or Current) is desired or if the unit needs to be re-calibrated.**

**Note: The MT- DAC requires approximately 25 minutes of warm-up time before attempting to calibrate.**

**Note: A high resolution Digital Multi-Meter is necessary to calibrate the MT-DAC unit. The manufacturer uses a Fluke 45 meter which measures three decimal places to the right of a 20mA signal or 20.000mA.**

**Note: For component location, please refer to the assembly drawing included with this manual.**

**Note: Calibration of the MT-DAC will require a laptop or PC using a terminal program. The RS232 cable will need to be connected from the MT-DAC to the PC serial port.**

**Note: When transmitting data to the MT-DAC, it may be necessary to include a string of characters before and/or after the value that is to be converted. This depends on the application that the MT-DAC was specifically programmed to convert.**

**Note: The zero adjustment should be the last step performed when calibrating the current output.**

## Zero Adjustment

1. Voltage Output
  - a. Select the appropriate switch and jumper settings as shown in the tables on the previous page.
  - b. Attach the Voltmeter to the output terminals.
  - c. Apply power to the MT-DAC.
  - d. Adjust R9 (ZERO) until zero volts is measured.
2. Current Output
  - a. Select the appropriate switch and jumper settings as shown in the tables on the previous page.
  - b. Attach the milliamp meter to the output terminals.
  - c. Apply power to the MT-DAC.
  - d. Transmit 000000 to the MT-DAC.
  - e. Adjust R9 (ZERO) until 4.000mA is measured. The full scale output should be verified if R9 was changed.

## Gain Adjustment

1. Voltage Output
  - a. Transmit a "full scale" value to the MT-DAC.
  - b. Attach Voltmeter to the output terminals.
  - c. Adjust R8 (GAIN) until the appropriate maximum voltage output is measured, as selected by the switches and jumper settings.
2. Current Output
  - a. Attach milliamp meter to the output terminals.
  - b. After adjusting R9 (ZERO) for 4.000mA, transmit a "full scale" value to the MT-DAC.
  - c. Adjust R8 (GAIN) for 20.000mA
  - d. Repeat steps 2b and 2c until adjustment is not needed.

## Bipolar Offset Adjustment (+/- 5V, +/- 10V)

1. Attach Voltmeter to the output terminals.
2. Transmit 00000 to the MT-DAC and adjust R14 (OFFSET) to obtain 0.00mV output.
3. Transmit "upper limit" value to the MT-DAC and adjust R8 (GAIN) until appropriate upper voltage is measured.
4. Transmit "lower limit" value to the MT-DAC and adjust R9 (ZERO) until appropriate lower voltage is measured.
5. Repeat steps 2-4 until no further adjustment is necessary.



