



# Calibration Instruction Manual for 700-24 MagnaValve®



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**Read this manual carefully before calibrating a 700-24 MagnaValve.**

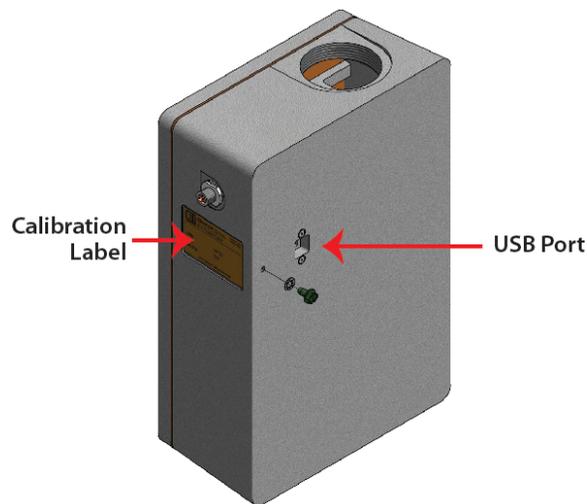
## Getting Started: The Terminal Program

The factory settings on the 700-24 MagnaValve® were made according to the flow rate and media type and size specified on the Purchase Order. These settings are noted on the Calibration Label on the side of the valve. An annual calibration of the 700-24 MagnaValve, based on the results of a catch test, is recommended. The annual calibration should be performed a year from the first date of use, not from the factory date of calibration on the MagnaValve's Calibration Label. We recommend that a new sticker be applied to the 700-24 MagnaValve that documents the first date of use and the due date of the next calibration.

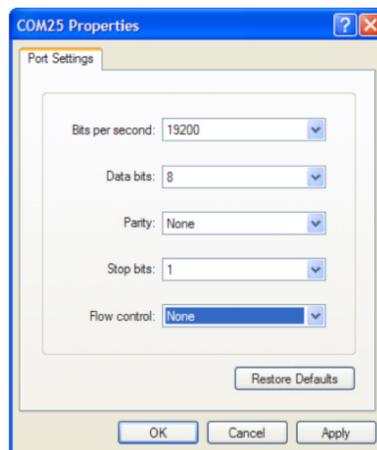
**Warning:** The air must be turned off and locked out whenever the front cover of the MagnaValve is removed. A qualified technician should perform calibration procedure.

### You will need:

- Windows-based computer with access to a Terminal program
- A standard USB Cable



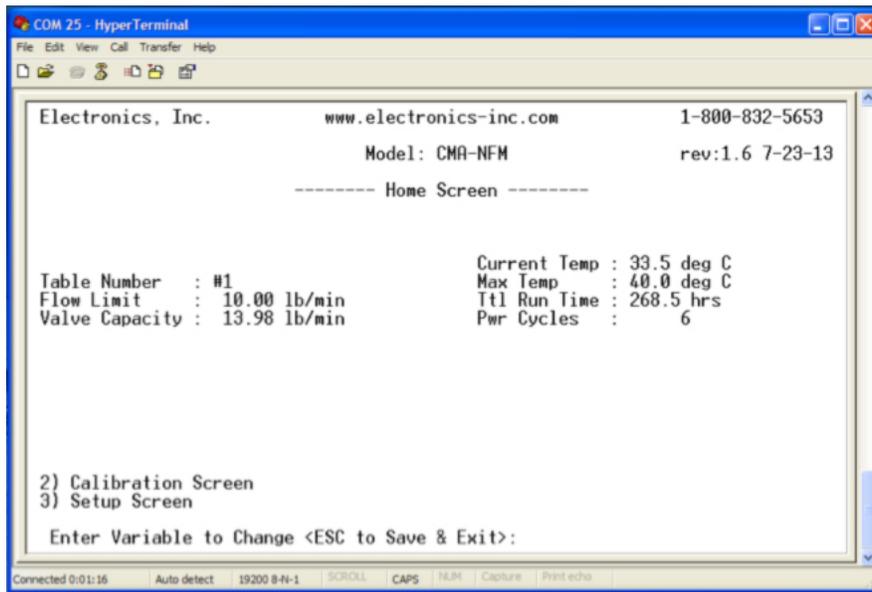
Connect the 700-24 to the computer with the USB cable. (The USB port is on the back of the MagnaValve.) Open the Terminal program on the computer. The settings should match the settings in the screenshot below. Select "Apply" and then "OK." Press the SPACE BAR to go to the Home Screen.



# Terminal Program Functions

## Home

The Home Screen provides operational status data plus access to two other screens: 2) Calibration Screen and 3) Setup Screen. The Calibration Screen allows the user to set the maximum (full-scale declaration) flow rates and to manipulate the sensor performance. The Setup Screen is used for the basic setup. Its parameters are set at the factory and generally do not require changes.



The Home Screen contains the following information.

**Table Number:** Displays the Table Number currently in use. The Advanced Calibration program can store data in five different tables, allowing for different media sizes and types without re-calibration.

**Flow Limit:** Displays the calibration flow rate. In the above example, the output voltage is 10 Vdc when the MagnaValve is flowing 10 lb/min.

**Valve Capacity:** Displays the maximum possible flow rate with the selected shot size

**Current Temperature:** Displays current temperature measured by the MagnaValve

**Maximum Temperature:** Displays the maximum temperature recorded by the MagnaValve

**Total Run Time:** Displays the total time the MagnaValve has been powered on

**Power Cycles:** Displays the number of times the MagnaValve has been powered on and off

### Home Screen Functions

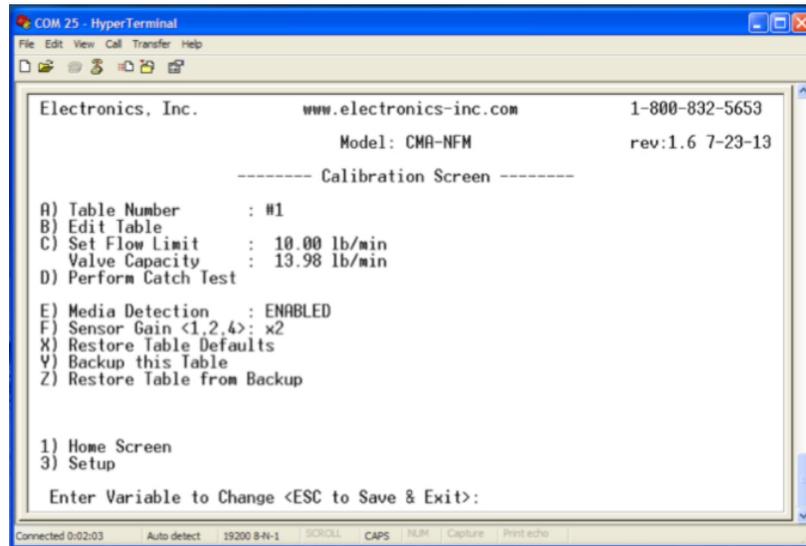
**Press 2** on the computer keyboard to access the Calibration Screen

**Press 3** on the computer keyboard to access the Setup Screen

**Press ESC** to display a blank screen and terminate the connection between the computer and the MagnaValve. Connection can be re-established by pressing the SPACE BAR. At the end of the work session, terminate the connection between the computer and the MagnaValve and unplug the USB cable.

## Calibration

Press **2** on the computer keyboard to access the Calibration Screen. The Calibration Screen allows the user to set the maximum (full-scale declaration) flow rates and manipulate the MagnaValve's performance.

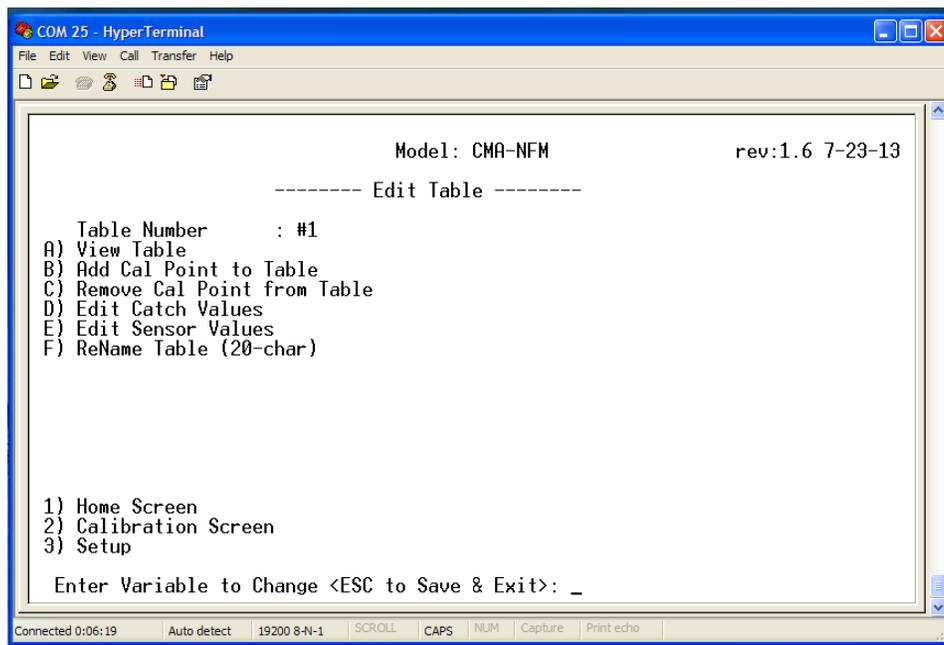


### Calibration Screen Functions

- A) **Table Number:** Selects Table Number 1 through 5. Repeated pressing of A on the computer keyboard will sequence through the list. Tables are available for other full-scale flow rates and media types and sizes.
- B) **Edit Table:** Accesses the Edit Table Screen.
- C) **Set Flow Limit:** Changes the value of the full-scale flow rate that will generate a 10.0 Vdc output signal. If the MagnaValve sensor is calibrated to 12 lb/min, when 12 lb/min flow is detected the output signal will be 10.0 Vdc. The output signal cannot go above 10.0 Vdc. If flow should go to 13 lb/min the output signal will continue to show only 10.0 Vdc. If this is a concern, request factory calibration or change the flow rate to a proper value. Changing this value in the field will not corrupt the catch test calibration data. It is not necessary to repeat catch and weight tests. **Valve Capacity:** Shows the Largest Catch Test value. This is the weight caught during the largest catch test. When higher flow rate catch tests are performed, this value will be updated. Performing lower flow rate catch tests do not affect this value.
- D) **Perform Catch Test:** Pressing D will go to the Perform Catch Test screen.
- E) **Media Detection:** Detects a low media condition when activated.
- F) **Sensor Gain:** <1, 2, 4>: This is the proximity sensor gain before the signal is digitally processed.
- X) **Restore Table Defaults:** Returns current table to the factory default settings.
- Y) **Backup this Table:** Saves the current Data Table into a backup register for this table. If the current calibration table gets changed unexpectedly, it can be restored from its own backup register. Each Data Table has its own backup register.
- Z) **Restore Table from Backup:** Retrieves data from the current Data Table's backup register (the values saved using option Y above) into the active Table.

## Calibration *continued*

### Calibration Screen – B) Edit Table



#### Edit Table Functions

- A) **View Table:** Displays the calibration data table for the listed table number.
- B) **Add Cal Point to Table:** Pressing B on the computer keyboard will add a calibration point to the listed table number. Up to 10 calibration points can be used.
- C) **Remove Cal Point from Table:** Pressing C will display the calibration table and prompt the user to enter which calibration point is to be removed from the table. This does not affect other data points or tables.
- D) **Edit Catch Values:** Pressing D will display the calibration table and prompt the user to enter a calibration point that the user wants to edit. The program will prompt the user for the new catch weight for the selected Data Table. Press ESC when finished.
- E) **Edit Sensor Values:** Pressing E will display the calibration table and prompt the user to enter the calibration point that is to be edited. The program will prompt the user for the new sensor value.

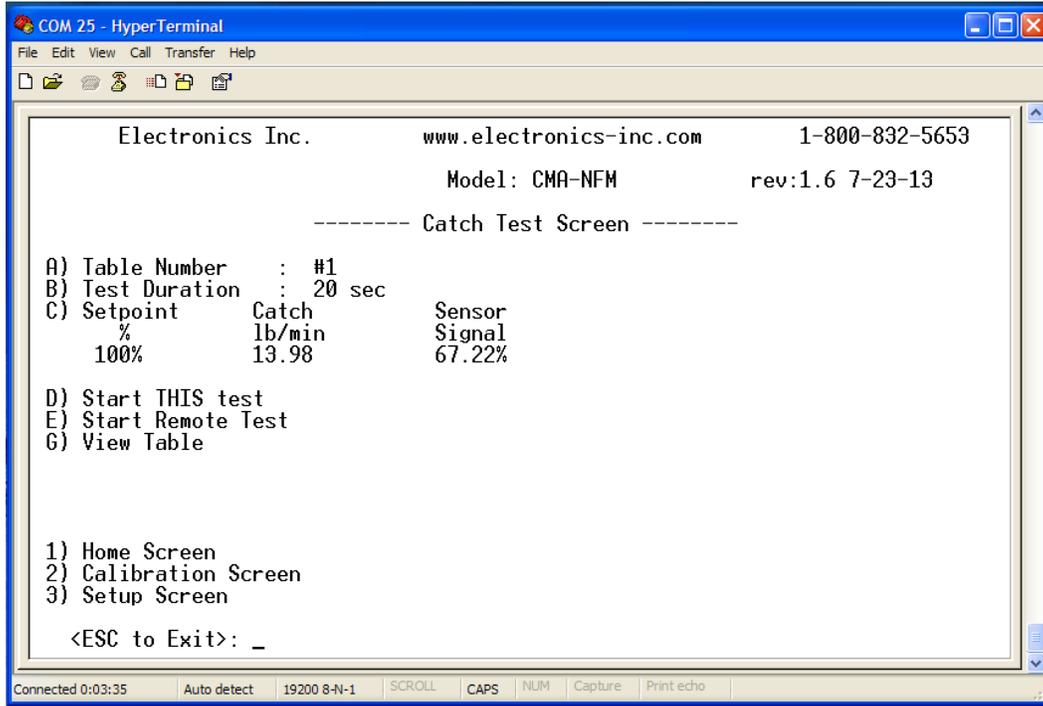
**Note:** Changes to sensor values must be made with caution. This option provides an optional manual access. There is an automatic process to acquire sensor values (See Calibration Screen – D) Perform Catch Test). **Do not attempt to manually change sensor values without factory assistance.**

- F) **Rename Table:** Pressing H will prompt the user to enter a new name for the current table. [For example: The name “Glass\_No\_6\_10\_lb\_min” could be given to table 1.]

**Note:** Changing items D or E will change the calibration of the valve for the selected table only.

## Calibration *continued*

### Calibration Screen – D) Perform Catch Test



#### Perform Catch Test Functions

- A) **Table Number:** Pressing A on the computer keyboard will advance the table number through the five Data Tables.
- B) **Test Duration:** Pressing B will toggle between the five catch test durations. The options are 10 sec, 30 sec, 60 sec, 120 sec, and 300 sec. Default is 10 sec.
- C) **Setpoint:** This is the current Setpoint to be calibrated. Pressing C will advance to the next Setpoint in the Data Table selected. The default Setpoints are 100% and 35%. Setpoints below 35% produce a flow rate of less than 1 lb/min, resulting in undesirable readings.
- D) **Start THIS Test:** Pressing D will start a catch test for the Test Duration selected above. The MagnaValve will flow media for the time duration selected. Enter the exact weight measured on the scale; ***if the weight that has been caught is less than 1 lb (for example: 0.845 lb) all digits and decimal point must be entered in order for the program to function correctly.***
- E) **Start Remote Test:** Pressing E will start a catch test that will start and stop using the ENABLE signal. When an (external) ENABLE is applied (manually by the technician) the catch test will start. When it is removed the catch test will stop. The MagnaValve will flow media while an Enable signal is applied and then stop. Enter the flow rate of the catch test.
- F) This line has been omitted intentionally.
- G) **View Table:** Displays the calibration data table for the listed table number. A sample table is shown on the next page.

## Calibration *continued*

### Calibration Screen – D) Perform Catch Test – G) View Table Example

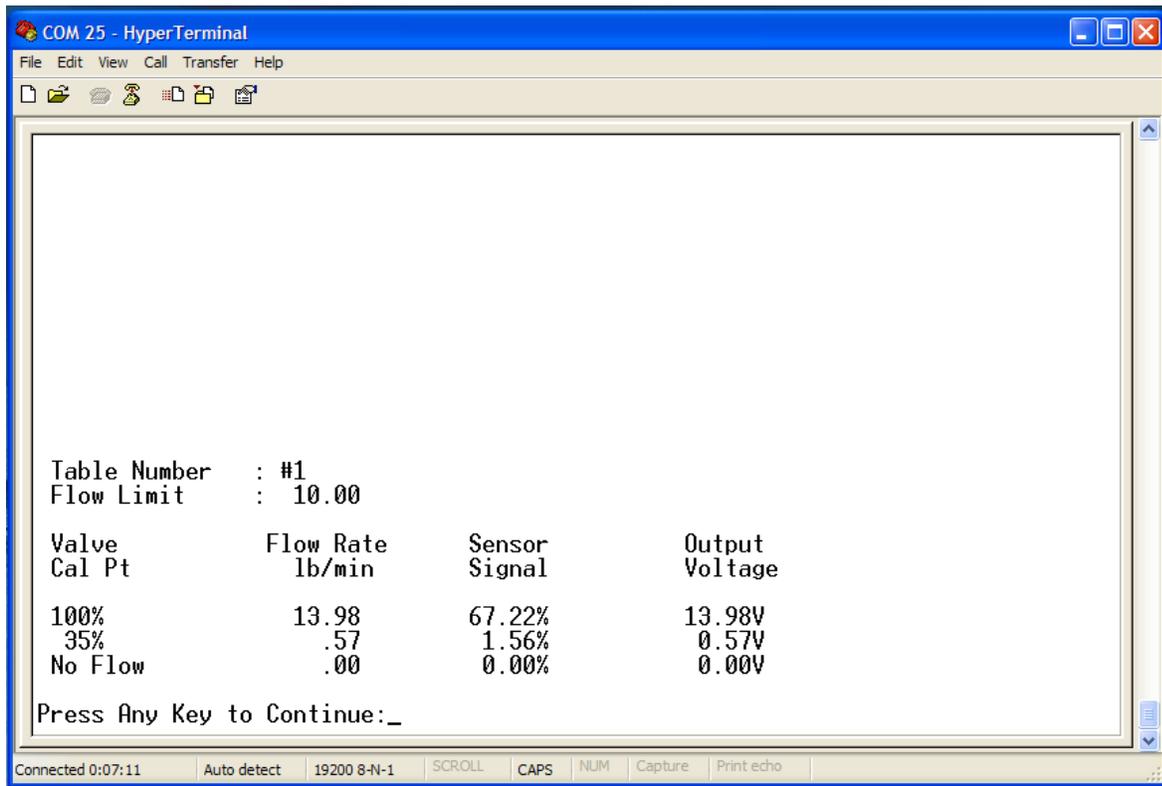
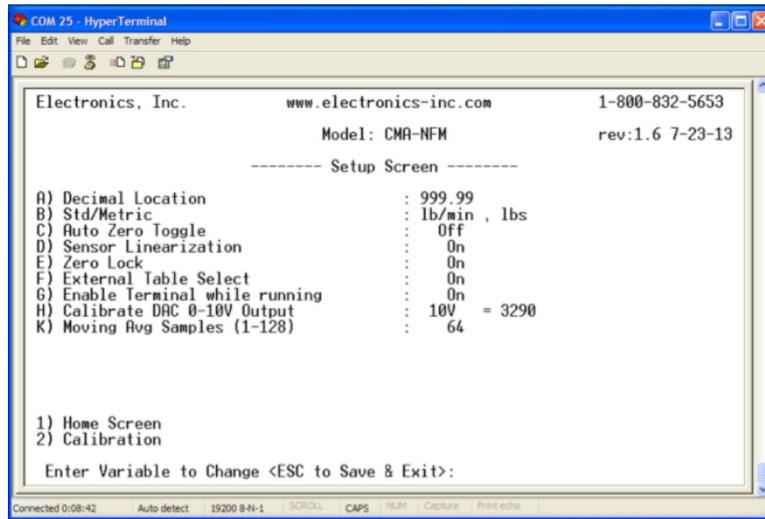


Table # 1: Example shows the two default Setpoints for the MagnaValve after a catch test. With the Setpoint set at 100%, the flow rate for the MagnaValve in this example is 13.98 lb/min. Valves may vary in this respect.

## Setup

Press **3** on the computer keyboard to access the Setup Screen. The Setup Screen displays MagnaValve functions prior to calibration catch tests.



**A) Decimal Location:** Selects the decimal point in the display of the entered catch weights: 999.99 (recommended for 24 Vdc MagnaValves) or 9999.9. Pressing A on the computer keyboard will toggle between the two values.

**B) Std/Metric:** Selects the display of catch weight either lb/min (default) or kg/min. Pressing B on the computer keyboard will toggle between lb and kg.

**C) Auto-Zero Toggle:** Activates or inhibits the Auto Zero function whenever the ENABLE signal is off. When Auto Zero is ON the output signal is monitored for any offset and adjusted to maintain a zero value. The Auto Zero function is inhibited whenever the ENABLE signal is on (during a cycle). Pressing C will toggle between on/off.

**D) Sensor Linearization:** Utilizes the value(s) in the calibration table (when available) for increased accuracy. The default value is ON. Pressing E will toggle between on/off.

**E) Zero Lock:** Activates the Zero Lock feature. The zero lock will force the output to zero when an ENABLE signal is removed, regardless of the sensor signal. The default for “zero lock” is On. Pressing D will toggle between on/off. The purpose of this option is to ensure that a zero output signal is transmitted to the FC-24 Controller or the customer's PLC during a no-flow condition.

**F) External Table Select:** Allows the remote selection of the desired table. Remote Table Select (RTS) is not available for the 700-24 MagnaValve.

## **Setup** *continued*

**G) Enable Terminal while running:** Allows continuous communication with the Terminal program. The default value is On. While “Enable Terminal while running” is On, the MagnaValve can be connected to at any time. While “Enable Terminal while running” is Off, the MagnaValve can be accessed by the Terminal program only during the first 5 seconds after application of power.

**H) Calibrate DAC 0-10V Output:** Performs two functions - it will remove any offset voltage at the analog output terminal and will establish the maximum output voltage on the analog output terminal.

**K) Moving Avg Samples (1-128):** The output signal can be altered for smoother (more stable) display readings by calculating a moving average. Selecting the options below will result in conversion of the output signal to average values. Selection 1 will report the instantaneous value. Selection 128 will report the average of the last 128 sensor signal readings. The values available are 1, 2, 4, 8, 16, 32, 64 (default), and 128.

## How to Perform a Catch Test

The 700-24 MagnaValve provides a voltage output signal proportional to the media flow rate. Factory settings of Zero and Span will provide a standard accuracy of  $\pm 5\%$  of full-scale rating using the media specified on the Purchase Order. A calibration graph has been supplied with the valve.

The standard factory calibration uses two calibration Setpoints in the first data table. Additional Setpoints may be required to increase flow rate accuracy.

Catch tests are performed by passing media through the MagnaValve for a given time (for example, 30 seconds or 60 seconds) while the valve is connected by a USB cable to a Windows-based computer. The data is entered in the Terminal program.

These catch tests may be made either with or without air pressure. With air pressure, the media is captured while exiting the blast hose nozzle. Care must be taken that all of the media is captured while allowing the high-pressure air to escape from the capture device.

**Warning:** If using a plastic catch bucket, be sure to provide a means of diverting the high voltage static charge that will accumulate during the catch period. Tests without air pressure can be conducted with the valve removed from the machine and fitted to a convenient test stand with a media hopper.

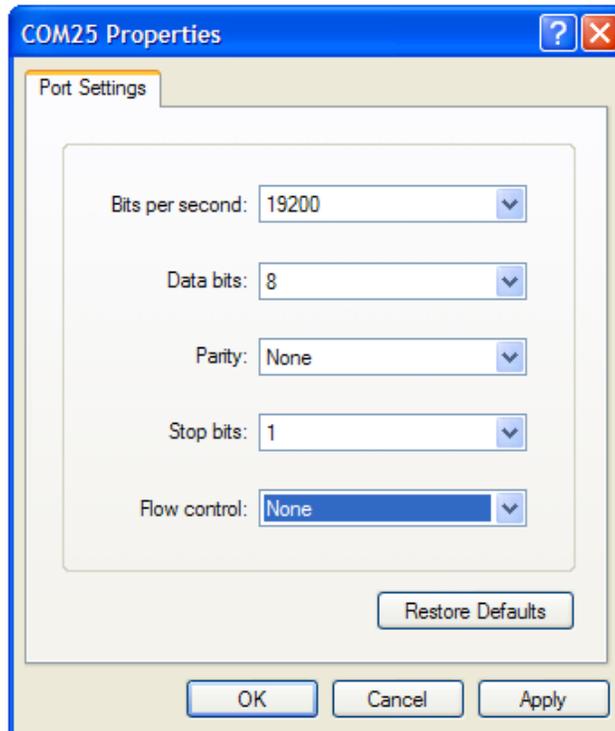
If the weight of the captured media is not approximate to the amount indicated at the output signal, adjustments can be made in the Terminal program.

# Entering Catch Test Data Into the Terminal Program

You will need:  
Windows-based computer  
USB cable

***A qualified technician should perform the Catch Test.***

Connect the 700-24 to the computer with a USB cable. (The USB port is on the back of the MagnaValve.) Open the Terminal program on the computer. Ensure all settings match the screenshot below. Select “Apply” and then “OK.” Press the SPACE BAR to go to the Home screen.



- 1) At the Home Screen, press 2 on the computer keyboard to access the Calibration Screen.
- 2) At the Calibration Screen, Press D, Perform Catch Test.
- 3) At the Catch Test Screen, choose a Table Number. Table 1 is the factory settings and it is recommended that these settings should not be changed. To choose another Table, press A to scroll through 4 additional table choices.
- 4) Set the Test Duration by pressing "B, Test Duration" until the desired test duration is displayed.
- 5) Ensure the correct Setpoint is displayed in option C, Setpoint. If the proper Setpoint is not displayed, press "C, Setpoint" until the proper Setpoint is displayed.
- 6) Place a catch container below the MagnaValve or at the end of the nozzle.
- 7) When ready press "D, Start THIS Test" or press "E, Start Remote Test."
  - If "Start This Test" was selected, you will be prompted to enter the flow rate at the end of the test.
  - If "Start Remote Test" was selected, you will be prompted to enter the amount of media caught at the end of the test.
- 8) Press S to save the data.
- 9) Return to the Calibration Screen and press "C, Setpoint" to advance to the next Setpoint and perform the next catch test.
- 10) Repeat until all Setpoints in the calibration table have been changed.

# Contacting Electronics Inc.

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