## Model 70-24 Sensor for Non-Ferrous Media



# **Instruction** Manual



56790 Magnetic Drive, Mishawaka, Indiana 46545 USA • 1-800-832-5653 or (574)256-5001 • www.electronics-inc.com

IM0115 2023-12

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## Read this manual completely before installing the Model 70-24 Sensor

## Introduction

#### **Product Overview and Principle of Operation**

The Model 70-24 Sensor will monitor the flow rate of ceramic and plastic media. The sensor can be used in directpressure, suction, or gravity-assisted suction-type air blast cleaning machines for shot peening and blast cleaning applications.

The low-maintenance sensor has only one moving part: A blade that bends to measure the flow rate. Free-falling media impacts the thin cantilever blade that deflects in response to the media flow rate. As the blade bends, a proximity sensor below the blade measures the displacement and converts it to an electrical output signal. This signal is then converted to a 0-10 Vdc analog signal for display on the Model FM-24 Flow Monitor or a PLC Screen.



U.S. Patent 8,388,407

#### FM-24 Flow Monitor for Open-Loop Sensing

In most cases, the 70-24 Flow Sensor is ordered with an Electronics Inc. FM-24 Flow Monitor. The FM-24 Flow Monitor is used to automatically display the media flow rate of the sensor. Dual high-low alarms will indicate flow rates outside of pre-set limits. The center of the alarm band may be set from the front of the monitor (Local Mode) or from an external 0-10Vdc signal (Remote Mode).

Features and benefits of the FM-24 Flow Monitor include:

- 24 Vdc Power
- Monitors flow rate in lb/min and kg/min
- Digital display 99.9 lb/min or kg/min
- Ten element bar graph display 10% increments
- High-low alarm contacts
- Accepts remote command setpoint 0-10 Vdc
- Provides analog recorder setpoint 0-10 Vdc
- Easy panel mounting DIN
- CE compliant



#### Open-Loop Operation with the 70-24 and FM-24



For more information on the FM-24 Flow Monitor, please call our Customer Service department at 1-800-832-5653 (Toll-free in USA and Canada) or (574) 256-5001.

## Installation

#### **General Considerations**

The sensor must be mounted in a vertical position with an adequate supply of media above it. For direct pressure applications, a customer-supplied mechanical valve capable of blocking media and air pressure (up to 80 PSI) must be installed above the sensor. The mechanical valve must be rated for 150% of the maximum anticipated media flow rate. Pressure in the pressure pot should not be more than 5 PSI of the blast hose pressure so that the flow rate does not become erratic and inaccurate. Note: Excessive pressure differential will damage the blade.

**Fittings** – All fittings should be made of brass since steel threads will damage the casting. Use Teflon<sup>®</sup> tape to assure that fittings are airtight.

**Grounding** – To ensure safety of the machine operators, a grounding screw is located on the back panel of the sensor. A customer-supplied ground wire should be connected from the sensor to a quality earth ground.

The media flow rate must be regulated before passing through the sensor using an orifice plate, grit valve, or similar regulating device. Standard 2" brass NPT pipe nipples must be installed above and below the sensor. **Care must be taken to not damage the female threads in the casting.** Teflon<sup>®</sup> tape should be used to help seal against air leaks and help prevent thread damage. Pipe unions or quick-connect plumbing adaptors will allow easy removal of the sensor for equipment maintenance. The sensor may be used in pressure-type or suction-type air blast machines.



#### **Critical Requirements for Machine Installation and Operation**

#### Installation

The diagrams illustrate the correct installation of the 70-24 Sensor on a direct-pressure machine and a suctionblast machine.



**Direct Pressure** 

#### **Suction Blast**

#### Operation

The following steps must be followed when starting up and shutting down the 70-24 Sensor.

	Start-Up Sequence
Step One	Turn on air valve
Step Two	Wait 10 seconds for air to stabilize
Step Three	Open pinch tube valve

I U SLAI LITTE DIASL/DEETI LYCIE	Τо	start	the	blast/	'peen	cvcle
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To stop the blast/peen cycle:

	Shut-Down Sequence
Step One	Close pinch tube valve
Step Two	Wait 10 seconds while media clears the blasting hose
Step Three	Turn off air valve

#### **General Wiring**



## **Electrical Specifications**

Description
+24 Vdc ±2 Power Supply @ 68 mA
+24 Vdc ±2 Enable Input (10K Ohm input impedance)
0-10 Vdc Output signal (into 10K Ohm input impedance)

## Dimensions

#### Inches/Millimeters



6-pin plug with 6' (1.83 m) cable is supplied with the sensor

## **Field Calibration**

The factory settings on the 70-24 Sensor 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. However, it is recommended that the sensor be recalibrated after the sensor has been installed on the machine. See "Flow Rate Adjustment | Catch Test" on page 16 for more information on how to conduct a catch test.

#### Calibration Procedure | Terminal Program

You will need:

Windows-based computer USB cable

#### Do not remove the sensor cover to perform calibration. Calibration Procedure should be performed by a qualified technician.

Connect the 70-24 Sensor to the computer with a USB cable. (The USB port is on the back of the sensor.) Start the Terminal Program. Choose a port (Com 12 is shown as an example). Ensure that all other settings match the image below. When finished, press the SPACE BAR to go to the Home Screen.

Tera Term: Serial port setup		×				
<u>P</u> ort:	COM5 ~	ок				
<u>B</u> aud rate:	19200 ~	]				
<u>D</u> ata:	8 bit ~	Cancel				
P <u>a</u> rity:	none ~	]				
<u>S</u> top:	1 bit ~	<u>H</u> elp				
<u>F</u> low control:	none ~	]				
Flow control: none Transmit delay       0     msec/ <u>c</u> har     0     msec/line						

#### **Home Screen**

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.

볼 COM5:19200baud - Tera Term VT		- 0	×
File Edit Setup Control Window Help		1 000 000 5/50	
Electronics inc.	www.electFonlcs-inc.c	com 1-000-032-3033	^
	Model: CMA-NFS	rev:3.05 7-23-18	
	Home Screen		
Table Number Full Scale Flow Largest Catch Test Value	: #1 : 10.00 lb/min : 10.00 lb/min	Current Temp : 27 deg C Max Temp : 30 deg C Ttl Run Time : 0.6 hrs Pwr Cycles : 3	
2) Calibration Screen 3) Setup Screen			
Enter Variable to Change	<esc &="" exit="" save="" to="">:</esc>		*

#### **Home Screen Functions**

- Press 2 on the computer keyboard to access the Calibration Screen
- Press 3 to access the Setup Screen
- Press ESC to display a blank screen and terminate the connection between the computer and the sensor. 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 sensor and unplug the USB cable.

COM7:19200baud - Tera Term VT	-		×
<u>File Edit Setup Control Window Help</u> Electronics Inc. www.electronics-inc.com 1-800-8	332-5	653	^
Model: CMA-NFS rev:3.04	7-19	-18	
Calibration Screen			
H) Table Number : HI B) Edit Table C) Set Full Scale Flow : 10.00 lb/min Largest Catch Test Value : 10.00 lb/min D) Perform Catch Test			
Y) Backup this Table Z) Restore Table from Backup			
1) Home Screen 3) Setup			
Enter Variable to Change <esc &="" exit="" save="" to="">:</esc>			*

#### **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 Full Scale Flow: Changes the value of the full-scale flow rate that will generate a 10.0 Vdc output signal. If the sensor is calibrated to 12 lb/min, when 12 lb/min flow is detected the output signal will be 10.0 Vdc. Changing this value in the field will not corrupt the catch test calibration data. It is not necessary to repeat catch and weight tests. The next line 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.
- 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.

Warning: Restoring a table that hasn't been backed up will overwrite the current table with random data.

#### Calibration Screen – B) Edit Table

🚇 COM7:19200baud - Tera Term VT		- 0	×
<u>File Edit Setup Control Window Help</u>			
			^
Electronics Inc.	www.electronics-inc.com	1-800-832-5653	
	Model: CMA-NFS	rev:3.04 7-19-18	
	Edit Table		
Table Number : #1 A) View Table B) Add Cal Point to Table C) Remove Cal Point from D) Edit Catch Values E) Edit Sensor Values H) ReName Table (20-char)	Table		
1) Home Screen 2) Calibration Screen 3) Setup			
Enter Variable to Change	<esc &="" exit="" save="" to="">:</esc>		~

#### **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 for the selected table and prompt the user to enter a calibration point (1-10) that the user wants to edit. Next, the program will prompt the user for the new catch weight for the selected Data Table.
- 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 then 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 to sensor values. There is an automatic process to acquire sensor values from the 3) Setup Screen.
- H. **Re-Name 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.]

#### Calibration Screen – D) Perform Catch Test

😹 COM7:19200baud - Tera Term VT	- 0	×
<u>File Edit Setup Control Window H</u> elp		
Electronics Inc. www.elect	onics-inc.com 1-800-832-565	з
Model: M	CMA-NFS rev:3.04 7-19-18	
Catch Tes	t Screen	
<ul> <li>A) Table Number : #1</li> <li>B) Test Duration : 10 sec</li> <li>C) Cal Catch Sensor</li> <li>Point 1b/min Signal</li> <li>1 10.00 22.84%</li> <li>D) Start THIS Test</li> <li>E) Start Remote Test</li> <li>G) View Table</li> </ul>		
1) Home Screen 2) Calibration Screen 3) Setup Screen Enter Variable to Change <esc exit="" to=""></esc>		*

#### **Perform Catch Test Functions**

- A. **Table Number:** Pressing A on the computer keyboard will advance the table number through the five different Data Tables.
- B. **Test Duration:** Pressing B will access the five different catch test durations. The options are 10 sec, 20 sec, 30 sec, 60 sec and 120 sec. Default is 10 sec.
- C. **Calibration Point:** This is the current calibration point to be calibrated. Pressing C will advance to the next calibration point in the calibration table for the Data Table selected.
- D. Start THIS Test: Pressing D will start a catch test for the Test Duration selected above.
- 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.
- G. View Table: Displays the calibration data table for the listed table number. Three examples are shown on the next page.

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

View Table can be accessed from two locations:

- 1. Calibration Screen  $\rightarrow$  B) Edit Table  $\rightarrow$  A) View Table
- 2. Calibration Screen  $\rightarrow$  D) Perform Catch Test  $\rightarrow$  G) View Table

Below are three examples of the View Table Screen with different numbers of Cal Points.

😕 COM7:19200baud - Tera Term VT -		😸 COM7:19200baud - Tera Term VT 🛛 —	×
Ele Edit Sahup Control Window Help	 ^	Ele Edt Stup Control Window Help	 ^
Table Number : H1 Full Scale Flow: 10.00 Cal Flow Rate Sensor Output Point Ib/win Signal Voltage 1 10.00 22.84% 10.00V No Flow .00 0.00% 0.00V Press Any Key to Continue:	v	Table Number       : #2         Full Scale Flow:       10.00         Cal       Flow Rate       Sensor       Output         Point       Ib/win       Signal       Voltage         2       10.00       22.95%       10.00V         1       5.00       11.17%       5.00V         No Flow       .00       0.00%       0.00V         Press Any Key to Continue:       1       1       1	Ŷ

#### Table with one Cal Point

Table with two Cal Point

🚇 COM7:19200baud - T	era Term VT			-	×
<u>File Edit Setup Cont</u>	rol <u>W</u> indow <u>H</u> elp				
					^
Table Number					
Full Scale Fl	ow: 20.00				
0-1	El Data	C	0		
Point	lb/min	Signal	Voltage		
-		10.154	40.000		
5	20.00	43.15%	10.000		
3	5.00	10.78%	2.50V		
2	2.00	4.31%	1.00V		
NoFlow	1.00	2.15%	0.00V 0.00V		
		2.50%			- 10

Table with five Cal Point

#### **Setup Screen**

The Setup Screen declares sensor functions prior to calibration catch tests.



- A. **Decimal Location:** Selects the decimal point in the display of the entered catch weights: 999.99 (default) or 9999.9. Pressing A will toggle between the two values.
- B. **Std/Metric:** Selects the display of catch weight either lb/min (default) or Kg/min. Pressing B 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. 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. Default, 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 customer's PLC during a no-flow condition.
- E. **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.
- H. **Remove Zero Prox Sensor Zero Offset**: Automatically removes any offset voltage from the prox sensor. Pressing H will initiate an automatic routine.
- Moving Avg Samples (1-128): The output signal may be altered for smoother (more stable) display readings. Smoothing of the output signal for a more stable display is done by a moving average of "N" samples. Selecting the options below will result in conversion of the output signal to average values. Selecting 1 will report the instantaneous value. Selection 128 will report the average of the last 128 sensor signal readings. The values available for "N" are 1, 2, 4, 8, 16, 32, 64, and 128. The default is 8.
- J. Adjust Vout Zero Offset: Provides a method to remove any deviation from the analog output signal while in the no-flow condition. Pressing J will prompt the user to enter adjustment in mV. Entering a positive number will add to the analog output voltage and entering a negative will subtract from the analog output voltage.
- K. Adjust Vout 10V Offset: Provides a method to remove any deviation from the analog output signal while in the full-flow condition. Pressing K will prompt the user to enter adjustment in mV. Entering a positive number will add to the analog output voltage and entering a negative will subtract from the analog output voltage.
- L. **Test Vout (toggle 0V/10V):** Pressing L will, toggle the analog output between the no-flow condition (0 Vout) and the full-flow condition (10 Vout).

## Flow Rate Adjustment | Catch Tests

The Model 70-24 Sensor provides a voltage output signal proportional to media flow rate. The response may exhibit non-linearity that can be corrected by performing additional catch tests for multiple flow rate settings. Documentation included with the sensor will indicate the calibration method used and the results.

Catch tests are performed by passing media through the sensor in a given time (for example: 30 seconds or one minute). If the amount caught is not close enough to the amount indicated at the output signal, adjustments can be made. These tests may be made either with or without air pressure. Tests made with air pressure are normally performed by capturing the media 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. Tests without air pressure can be done with the sensor removed from the machine and fitted to a convenient test stand with media hopper and orifice valve (or suitable media regulation valve).

**Caution**: if using a plastic catch bucket, be sure to provide means of diverting the high voltage static charge that will accumulate during the catch period.

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 (see next page).



A catch test setup at Electronics Inc. The outlet on the bottom of the 70-24 Sensor is placed over a bucket. The bucket is on a digital scale. (Not shown: An orifice plate placed 17" above the sensor.)

## Entering Catch Test Data | Terminal Program

#### You will need:

#### Windows-based computer

#### USB cable

To perform these procedures, connect the 70-24 Sensor to the computer with a USB cable. (The USB port is on the back of the sensor.) Start the Terminal Program and choose a port (see page 8). Press the SPACE BAR to go to the Home Screen.

#### Remove Zero Prox Sensor Zero Offset

- 1. At the Home Screen press 3, Setup Screen.
- 2. At the Setup Screen press H, Remove Zero Prox Sensor Zero Offset.
- 3. Press ESC twice to exit the Terminal Program.

#### Alternative

- 1. Exit Terminal Program, if connected.
- 2. Press the Zero Prox Sensor button until the green LEDs on the Proximity Sensor Indicator Panel flash. (See illustration on page 3.)

#### **Adjust Vout Zero Offset**

- 1. At the Home Screen press 3, Setup Screen.
- 2. Read the analog output voltage.
- 3. At the Setup Screen press J, Adjust Vout Zero Offset.
- 4. At the prompt enter the amount to add to Vout in millivolts.

Example 1: if Vout = 0.061V, enter -61 This will add -61mV to 0.061V, setting Vout to 0.000V

**Example 2**: if Vout = -0.015V, enter 15 This will add 15mV to -0.015V, setting Vout to 0.000V

5. Press ESC twice to exit the Terminal Program.

#### Adjust Vout 10V Offset

- 6. At the Home Screen press 3, Setup Screen.
- 7. At the Setup Screen press L, Test Vout (toggle 0V/10V). Read the analog output voltage.
- 8. At the Setup Screen press K, Adjust Vout 10V Offset.
- At the prompt enter the amount to add to Vout in millivolts.
   Example: if Vout = 10.061V, enter -61
   This will add -61mV to 10.061V, setting Vout to 10.000V
- 10. Press ESC twice to exit the Terminal Program.

#### **Perform a Catch Test**

- 1. At the Home Screen press 2, Calibration Screen.
- 2. At the Calibration Screen press D, Perform Catch Test.
- 3. At the Catch Test Screen ensure that the correct Table Number is shown. If not press A, Table Number to sequence through the different tables.
- 4. Set the Test Duration by pressing B, Test Duration until the desired test duration is displayed.
- 5. Ensure the correct cal point that is to be changed is displayed in option C, Cal Point. If the proper cal point is not displayed press C, Cal Point until the proper cal point is displayed.
- 6. Place a catch container below the sensor or at the end of the nozzle.
- 7. When ready press D, Start THIS Test or press E, Start Remote Test.

#### When prompted, enter the flow rate for that test.

- 8. Press S to save the data. To ignore the data press RETURN.
- 9. Press C, Cal Point to advance to the next cal point and perform the next catch test or press ESC twice to exit the terminal.
- 10. Repeat until all desired cal points in the calibration table have been changed.

#### Add a Calibration Point

- 1. At the Home Screen press 2, Calibration Screen.
- 2. At the Calibration Screen press A, Table Number, until the correct table number is shown.
- 3. At the Calibration Screen press B, Edit Table Screen.
- 4. At the Edit Table Screen press B, Add Cal Point to Table.
- 5. From the Edit Table Screen press 2, Calibration Screen.
- 6. At the Calibration Screen press D, Perform Catch Test.
- 7. At the Catch Test Screen, if the new cal point is not shown at option C, then press C,
- 8. Perform Catch Test on new cal point.
- 9. Press ESC twice to exit the Terminal Program.

#### **Delete a Calibration Point**

- 1. At the Home Screen press 2, Calibration Screen.
- 2. At the Calibration Screen press A, Table Number, until the correct table number is shown.
- 3. At the Calibration Screen press B, Edit Table Screen.
- 4. At the Edit Table Screen press C, Remove Cal Point from Table.
- 5. The calibration table will be shown and the user will be prompted to enter the cal point to be removed. Type in the cal point to be removed and press ENTER.
- 6. Press ESC twice to exit the Terminal Program.

#### Back Up a Table

- 1. At the Home Screen press 2, Calibration Screen.
- 2. At the Calibration Screen press A, Table Number, until the correct table number is shown.
- 3. At the Calibration Screen press Y, Backup this Table. This will back up only the current table. Each table must be backed up individually.
- 4. Press ESC twice to exit the Terminal Program.

#### **Restore a Table**

- 1. At the Home Screen press 2, Calibration Screen.
- 2. At the Calibration Screen press A, Table Number, until the correct table number is shown.
- 3. At the Calibration Screen press Z, Restore Table from Backup.
- 4. Press ESC twice to exit the Terminal Program.

## **Maintenance - Blade Replacement**

Turn off and lock out air pressure before inspecting or replacing a blade. A qualified technician should perform a blade replacement.

You will need:

- 3/16" Allen wrench
- 5/32" Allen wrench



**Step 1** Remove the twelve (12) screws with a 3/16" Allen wrench. Remove the cover plate and gasket.



Step 2 Remove the two (2) screws with a 3/16" Allen wrench and pull out the blade assembly.



Step 3

Remove the three (3) screws with a 5/32" Allen wrench , remove the blade and install a new blade. Replace and tighten the three (3) screws in the blade assembly. Insert the blade assembly in the unit; insert and tighten the two (2) screws.

#### Step 4

Adjust Gap Between Sensor and Blade

#### You will need a 3/16" Allen wrench

#### WARNING: Do NOT run the Terminal Program during the gap adjustment procedure.

The gap between the sensor and blade may need to be adjusted after blade installation. The LEDs on the Proximity Sensor Indicator Panel will help make this adjustment.

Loosen the two (2) proximity sensor screws with a 3/16" Allen wrench so the sensor can be moved up or down with your hand. (There will be some resistance when you move the sensor.) If either the **UP** or **DOWN** LED is **RED**, move the sensor up or down relative to the end of the blade. When both LEDS are GREEN, as shown below, tighten the two screws to the Proximity Sensor clamp.



## Step 5

Using a pencil or pen, press and hold the zero prox sensor button for one second, until the two green LEDs flash. This will zero out the proximity sensor.

#### Step 6

Clean media from screw holes and screws. Replace the cover plate and gasket. Replace and tighten the screws.

## **Troubleshooting Guide**

The power led is not ON	Check power supply voltage and polarity (24V ±2V typical).
	Check power supply wires.
The output will not zero	Blade is not installed properly or is deformed.*
	Check for obstruction inside the sensor.
	Check rigidity of blade deflection sensor—be sure it is tight.
	Check position of the blade deflection sensor—it may have to be re-zeroed if both LEDs are not GREEN.
The media is flowing but there is no output signal	Check wire connections.
	Ensure that an ENABLE signal is applied to the sensor.
	Check for obstruction inside the sensor that may prevent the blade from bending properly.
	If type or density of media has been changed, a different blade may be needed. Consult the factory.
Calibration is not accurate	Check for obstruction inside the sensor.
	Check condition of the blade.*
	Check media for contamination.
Output Signal is present but there is no actual media flow	This is an error condition caused by very high airflow rates when there is insufficient media. If the machine runs out of media, the pressurized air will rush past the blade causing it to bend and giving an output signal. The media supply must be continuously monitored to prevent this error condition.

\*Media abrasion on the blade may cause it to deform (bend downward) and this will increase the offset voltage. Excessive deformation may exceed the limit of the auto-zero circuit and the blade must be replaced. See instructions for blade replacement.

## **Specifications**

Power	+24 Vdc +/-2 Vdc @ 250 mA
Media	Ceramic and Plastic
Maximum Pressure	60 PSI
Temperature Range	40°F - 110°F (5°C - 43°C)
Flow Sensor Output	0 - 10 Vdc, max output 11.5 Vdc
Accuracy	±5% of Full Scale
Weight	10.8 lb (4.9 kg)

Top (entry) and Bottom (exit) are 2" NPT female threads

## **Ordering Information**

Replacement blade and 6 ft. cable with 6-pin plug can be ordered by calling Electronics Inc. at 1-800-832-5653 (Toll-free in USA and Canada) or (574) 256-5001. Please have the serial number for the 70-24 Sensor available when calling.

## **Contacting Electronics Inc.**

#### **Mailing and Shipping Address**

Electronics Inc. 56790 Magnetic Drive Mishawaka, IN 46545 USA

#### Telephone

1-800-832-5653 (Toll-free in USA and Canada) or (574) 256-5001

Fax

(574) 256-5222

#### Website

www.electronics-inc.com

For repairs and/or return instructions, please call our Customer Service department at 1-800-832-5653 (Toll-free in USA and Canada) or (574) 256-5001.

## **Limited Warranty**

The warranty obligations of Electronics Inc. for this product are limited to the terms set forth below.

Warning: Use of ferrous media, such as shot or grit, will void the warranty.

This product is intended for use with ceramic and plastic media.

#### Length of Warranty Period

This limited warranty lasts one (1) year from the shipping date of this product.

#### What is Covered

This limited warranty covers defects in materials and workmanship in this product.

#### What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Electronics Inc. to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover equipment enclosures, cables or accessories used in conjunction with this product.

#### How to Obtain a Remedy Under this Limited Warranty

To obtain a remedy under this limited warranty, contact Electronics Incorporated by letter, email, fax or telephone with the following information:

- Product name and model
- Product serial number
- Original shipping date (see label on product)
- Company name and location
- Name of contact person for description of symptoms
- Return shipping address and any special instructions

If it is determined that the product must be returned under this limited warranty, a Returned Goods (RG) number, obtained from Electronics Inc., will be required. This product should be properly packed to prevent damage in transit. Cartons not bearing a RG number will require additional processing time and repair service may be delayed.

#### What Electronics Inc. Will Do Under This Limited Warranty

Electronics Inc. will, at its sole discretion, provide one of the following remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1) Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Electronics Inc. will pay the shipping costs necessary to return this product once the repair is complete.

2) If the defective product cannot be repaired, it will be replaced with a new unit and the original warranty period will be extended by six (6) months. Electronics Inc. will pay the shipping costs necessary to replace this product.

If this product is returned to Electronics Inc., the product must be insured during shipment, with the insurance and shipping charges prepaid. If this product is returned uninsured, Electronics Inc. does not assume any risk of loss or damage during shipment. Electronics Inc. will not be responsible for any costs related to the removal or re-installation of this product.

#### **Out-of-Warranty Product**

Product that is out-of-warranty will be repaired at customer's request and the cost of repair will be disclosed prior to proceeding with the repair. A purchase order must be received prior to repair. If the product cannot be repaired, Electronics Inc. will provide one of the following remedies:

1) New unit at current pricing with a one (1) year Limited Warranty from the shipping date of product.

2) Refurbished unit (if available) at a discounted price with a six (6) month Limited Warranty from the shipping date of product.

#### **Limitation on Liability**

The maximum liability of Electronics Inc. under this limited warranty shall not exceed the actual purchase price paid for the product. Electronics Inc. is not responsible for direct, special, incidental or consequential damages resulting from any breach of warranty or condition, or under any other legal theory to the maximum extent permitted by law.

#### **Exclusive Remedy**

To the maximum extent permitted by law, this limited warranty and the remedies set forth above are exclusive and in lieu of all other warranties, remedies and conditions, whether oral or written, express or implied. To the maximum extent permitted by law, Electronics Inc. specifically disclaims any and all implied warranties, including, without limitation, warranties of merchantability and fitness for a particular purpose. If Electronics Inc. cannot lawfully disclaim or exclude implied warranties under applicable law, then all implied warranties covering this product, including warranties of merchantability and fitness for a particular purpose, shall apply to this product as provided under applicable law.

#### **Rights under State Law**

This warranty defines specific legal rights relative to these products provided by Electronics Inc. Legal rights may also vary from state to state.