Advantage III

Gold Series by Ebtron

Installation Guide

GTM108

“Plug & Play” Transmitter with
Combination Ethernet Network Output and Dual Analog Output

Document Name: IG_GTM108_R1B
Table of Contents

1 GTM108 TRANSMITTER INSTALLATION .................................................................................. 4
   1.1 GTM108 Mechanical Dimensions .................................................................................. 4
2 GTM108 TRANSMITTER INTERIOR VIEW/FEATURES ............................................................. 5
3 GTM108 TRANSMITTER POWER AND PROBE CONNECTIONS .............................................. 6
   3.1 Power Transformer Selection ......................................................................................... 6
   3.2 Connecting Power to the Transmitter ............................................................................. 6
   3.3 Connecting Sensor Probes to the Transmitter ................................................................. 7
4 GTM108 ANALOG OUTPUT AND NETWORK CONNECTIONS .................................................. 11
   4.1 GTM108 - ANALOG OUTPUT WIRING ......................................................................... 11
   4.2 GTM108 - ETHERNET NETWORK WIRING CONNECTIONS ............................................ 12
   4.2.1 GTM108 - Selecting Static or Dynamic IP Settings ................................................... 12
   4.2.2 GTM108 - Setting Ethernet Transmitter IP Address .................................................. 12
   4.2.3 GTM108 - Setting Subnet Mask ................................................................................ 12
   4.2.4 GTM108 - Setting Gateway IP .................................................................................. 12
   4.2.5 GTM108 - Setting BACnet Protocol Mode .................................................................. 12
   4.2.6 GTM108 - Setting Device Instance Number ............................................................... 12
   4.2.7 GTM108 - Resetting Communications Options to Factory Default Values .................. 12
5 GTM108 TRANSMITTER START-UP, INITIALIZATION AND SETUP MENUS ............................ 14
   5.1 Transmitter Initialization and Setup Menus .................................................................... 14
   5.2 Changing the System of Units - IP (Inch Pound) or SI (Standard International) Units .............. 14
   5.3 GTM108 Transmitter Calibration .................................................................................... 14
   5.4 GTM108 LCD Display Notifications ............................................................................. 15
   5.5 Factory Default Menu Settings for GF2 Fan inlet Sensors ................................................... 15
   5.6 GTM108 Changing Factory Default Setup Menu Settings .................................................. 16
   5.6.1 Setup Menu Options ................................................................................................... 16
   5.6.2 Selecting Actual and Standard Output Measurement Type ......................................... 16
   5.6.3 Output Scaling ........................................................................................................... 16
   5.6.4 Changing the LCD Display from Volumetric Flow CFM to Velocity FPM .................... 16
   5.6.5 Converting the Analog Output Signal from FPM to CFM ............................................. 16
   5.6.6 Locking the Configuration Settings ............................................................................ 16
6 GTM108 - Alarm Features ........................................................................................................ 17
   5.7.1 Average Alarm (AO2 ASGN=ALRM) .......................................................................... 17
   5.7.2 Fan Alarm (AO2 ASGN=FA) ..................................................................................... 17
   5.7.3 Trouble Alarm (AO2 ASGN=TRBL) .......................................................................... 17
   5.7.4 FA Remove (FA REMOVE=YES) ............................................................................ 17
   5.7.5 No Fault (NO FAULT=HI) ....................................................................................... 17
6.8 Alarm Indications ................................................................................................................ 17
   5.8.1 Average Low Alarm - “LO ALRM< ON” .................................................................... 17
   5.8.2 Average High Alarm - “HI ALRM= ON” ................................................................... 18
   5.8.3 Fan Alarm - “FA TYPE= MIN” ................................................................................. 18
   5.8.4 Fan Alarm - “FA TYPE= DEV” ................................................................................ 18
   5.8.5 Fan Alarm - “FA TYPE= %MAX” ............................................................................ 18
   5.8.6 Trouble Alarm - “AO2 ASGN=TRBL” ...................................................................... 18
5.9 GTM108 - Analog Output Type Selection and Setup ............................................................ 19
   5.9.1 GTM108 - Converting Analog Output Signal Values to Airflow and Temperature .......... 19
   5.9.2 GTM108 - OUTPUT TEST - Sending a Test Output Signal to the Host Control System .... 19
7 VIEWING SENSOR DATA ......................................................................................................... 20
   5.10 Viewing Sensor Data ..................................................................................................... 20
   5.10.1 Viewing Sensor Data on the Local LCD Display ....................................................... 20
   5.10.2 Viewing Sensor Data over BACnet or Modbus Networks or through the EB-Link Reader 20
6 SETUP MENUS ...................................................................................................................... 20
7 WIRING DIAGRAM ............................................................................................................... 20
APPENDIX A - ADVANTAGE 3 FAN ARRAY / FAN INLET SENSOR SETUP MENUS ....................... 21
   SETUP Sub-menus ............................................................................................................. 22
   TOOLS Sub-menus ............................................................................................................ 23
   DIAGNOSTICS Sub-menus ............................................................................................... 26
APPENDIX B - GTC108 WIRING DIAGRAM ........................................................................... 28
List of Figures

Figure 1. GTM108 Mechanical Dimensions ................................................................. 4
Figure 2. GTM108 Transmitter Interior View/Features .................................................. 5
Figure 3. Connecting Power to the Transmitter ............................................................. 6
Figure 4. Type B and Type C Transmitter Connector Panel Detail ................................. 7
Figure 5. Connector Detail ............................................................................................ 7
Figure 6. Sensor Addressing Detail ............................................................................... 8
Figure 7. Suggested Sensor Configurations (for Traverse decoding and EB-Link Data) .... 9
Figure 8. GTM108 Combination Analog/Ethernet Transmitter Interior Detail ................ 11

List of Tables

Table 1. GTx108 Connectivity Options ......................................................................... 5
Table 2. GTM108 Power Transformer Selection Guide .................................................. 6
Table 3. Suggested Sensor Configurations (for Traverse decoding and EB-Link Data) .... 10
Table 4. GTM108 TCP/IP Example .............................................................................. 13
Table 5. GTM108 BACnet Objects List ....................................................................... 13
Table 6. GTM108 Modbus Register Map ..................................................................... 13
Table 7. Standard “IP” and “SI” Menu Units Abbreviations ........................................... 14
Table 8. Factory Default Menu Settings ...................................................................... 15
Table 9. GTM108 Alarm Types and Notifications ......................................................... 18
Table 10. GTM108 Analog Output Conversion Factors .................................................. 19
1 GTM108 TRANSMITTER INSTALLATION

This document provides only the instructions necessary to install the GTM108 Transmitter. Transmitter installation consists of mounting the transmitter, installing output/network cables, connecting the sensor probes cables and preparing the transmitter for operation. For complete setup and operating instructions refer to the Installation, Operation and Maintenance technical manual TM_GTx108 under separate cover. The GTM108 transmitter is designed for use in an environment between -20° F to 120° F (-28.8° C to 48.8° C) where it will not be exposed to rain or snow. Install transmitter upright and in a field accessible location. The enclosure accepts 1/2 in. (12.7 mm) electrical fittings for signal and power wiring at both sides at the top of the enclosure.

Locate the transmitter so that the connecting cables from all of the sensors will reach the receptacles on the bottom of the transmitter enclosure.

⚠️ In locations exposed to direct rain and/or snow, the transmitter must be enclosed in a NEMA4 enclosure.

⚠️ Leave unobstructed space of at least 9 in. (228.6 mm) above, 2 in. (50.8 mm) to each side and 3.5 in. (88.9 mm) below the transmitter to allow for cover removal, sensor connections and heat dissipation.

⚠️ Locate the transmitter in a location that can be reached by all connecting cables from the sensors.

⚠️ Do not drill into the transmitter enclosure since metal shavings could damage the electronics.

1.1 GTM108 Mechanical Dimensions

![GTM108 Mechanical Dimensions](image-url)
2 GTM108 TRANSMITTER INTERIOR VIEW/FEATURES

Output signal terminals
(Note: The output function is dependent on which network card is installed)

LCD contrast

Transmitter status LED
(Green 1 second flash normal; 2 second flash for fault)

Network status LEDs

Power switch

LCD display

Pushbutton interface simplifies field configuration
(Note: devices are plug and play and generally do not require configuration.)

Gold plated interconnects to optional output cards

Gold plated interconnects to sensor input receptacles

Positive locking cable receptacles with gold interconnects

Note: Specify Model GTx108-B for 4 Sensor Connectors, and Model GTx108-C for 8 Sensor Connectors

Figure 2. GTM108 Transmitter Interior View/Features

Table 1. GTx108 Connectivity Options

<table>
<thead>
<tr>
<th>Output to Host Controls</th>
<th>Output/Protocols Supported</th>
<th>Airflow</th>
<th>Temperature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combination Analog / RS-485 Model GT108</td>
<td>Analog: Linear 0-5VDC / 0-10VDC or 4-20mA</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>RS-485: BACnet®-MS/TP, Modbus-RTU</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Combination Analog / Ethernet Model GM108</td>
<td>Analog: Linear 0-5VDC / 0-10VDC or 4-20mA</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>BACnet Ethernet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BACnet-IP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modbus-TCP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TCP/IP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LonWorks® - Model GTL108</td>
<td>Free Topology Transceiver</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3 GTM108 TRANSMITTER POWER AND PROBE CONNECTIONS

3.1 Power Transformer Selection

Select a 24 VAC transformer based on the maximum power requirements indicated on the transmitter label (16 VA) or from Table 2. The operating supply voltage (transmitter power “ON” with all sensor probes connected) should not be less than 22.8 VAC or greater than 26.4 VAC.

**NOTE**

In order to retain the GTx108 device CE marking, GTx108 transmitters must be powered by a transformer that also carries the CE mark.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>8</td>
<td>16</td>
</tr>
</tbody>
</table>

3.2 Connecting Power to the Transmitter

Connect 24 VAC power to the large, two position power input terminal labeled “POWER” on the upper right hand side of the main circuit board (Figure 3). Since the output signals are isolated from the power supply, it is not necessary to provide an isolated (secondary not grounded) power source.

⚠️ Multiple GTM108 transmitters wired to a single transformer must be wired “in-phase” (L1 to L1, L2 to L2).

⚠️ Sensor probes must be connected to the transmitter before turning the power switch to the “on” position to properly “flash” sensor calibration data to the transmitter.

---

**Figure 3. Connecting Power to the Transmitter**

- Power Fuse
  Replace with UL® listed, 1.5 amp, fast acting only
  P.N. 800-1115 (10 pack)

- 24 VAC Input Power
  22.8 to 26.4 VAC
  20 VA max.

- Power Switch
3.3 Connecting Sensor Probes to the Transmitter

After installing the sensor probes and transmitter, connect each of the sensor probe cable plugs to the circular receptacles located at the bottom of the GTM108 transmitter enclosure. Probes are “Plug and Play” and do not have to be connected to a specific receptacle on the transmitter unless traverse data is desired (see note below). Transmitters accept only GF2 sensors. For fan array applications, sensors must be connected in the specific order shown in Figure 6 to ensure that proper parameters (area, number of sensors, etc.) are entered during setup.

⚠️ Provide a “drip loop” at the transmitter if there will be the potential for water runoff or condensation along the sensor probe cable(s).

⚠️ Sensor probe cable plugs are “keyed” as shown below. Line up plug with receptacle and push straight on to receptacle.

⚠️ DO NOT TWIST. Squeeze cable plug “ribs” towards receptacle when removing. Forcing the cable plug in or out of the receptacle will damage the connectors and void warranty.

⚠️ When traverse data is desired (especially when using the EB-Link Reader), probes should be installed and connected to the transmitter using the mounting convention specified below in Figure 7 and Table 3. Proper installation simplifies sensor location decoding during data analysis.

Accepts up to 4 fan inlet sensors

Accepts up to 8 fan inlet sensors

Figure 4. Type B and Type C Transmitter Connector Panel Detail

Squeeze and then pull to remove
DO NOT TWIST!
Sensor Addressing and Probe Positioning

Sensors are automatically addressed after power is applied to the transmitter as shown in Figure 6 and detailed in the following paragraphs:

Type ‘B’ (4 Connector) Transmitters
The probe that is connected to the left-most used receptacle (labeled C1-C4) on the transmitter is addressed as probe 1. Up to 4 sensors can be individually viewed. To standardize installation and decoding of the data, EBTRON suggests the sensor probe mounting convention as shown in Figures 6 and 7, and Table 3.

Type ‘C’ (8 Connector) Transmitters
Probes are statically numbered. The probe that is connected to the upper row and left-most receptacle (labeled C1) on the transmitter is addressed as probe 1. Up to 8 sensors can be individually viewed. To standardize installation and decoding of the data, EBTRON recommends the sensor probe mounting convention as shown in Figure 7 and Table 3 as viewed from fan inlet.

When a probe is disconnected and then plugged in to a different port, the transmitter will re-discover it within 15 seconds and make any necessary addressing adjustments.

For fan arrays, the fan information provided is specific to the numbered connector.
SINGLE WIDTH SINGLE INLET (SWSI) AND DOUBLE WIDTH DOUBLE INLET (DWDI) - SUGGESTED SENSOR CONFIGURATIONS

SWSI FANS

Left
C1

Right
C2

DWDI FANS

Left
C1

Right
C2

Left
C3

Right
C4

FAN ARRAYS - SUGGESTED SENSOR CONFIGURATIONS

Refer to Fan Arrays Suggested Sensor Mounting Configurations of Table 3.

Figure 7. Suggested Sensor Configurations (for Traverse decoding and EB-Link Data)
Table 3. Suggested Sensor Configurations (for Traverse decoding and EB-Link Data)

**FAN ARRAYS- SUGGESTED SENSOR MOUNTING CONFIGURATIONS**

<table>
<thead>
<tr>
<th># OF FANS</th>
<th>PROBE#</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GTX108-F/A1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GTX108-F/A2</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GTX108-F/A2</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>GTX108-F/A4</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GTX108-F/A3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GTX108-F/A6</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GTX108-F/A8</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>GTX108-F/A5</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>GTX108-F/A6</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>GTX108-F/A7</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

Note: The probe numbering and suggested fan numbering convention and transmitter connections facilitates and enhances the FAN ALARM feature and use of the optional EB-Link Interface and reader.
4 GTM108 ANALOG OUTPUT AND NETWORK CONNECTIONS

This section contains analog and network output wiring instructions for the GTM108 transmitter with Ethernet and Dual Analog outputs.

4.1 GTM108 - ANALOG OUTPUT WIRING

Analog output connections are made at the top left of the transmitter main circuit board OUTPUT connector as shown in Figure 8. Independent linear analog outputs are provided for airflow at OUTPUT terminal 1, and for temperature (or alarm) at OUTPUT terminal 2, each with over voltage and over current protection. Airflow and temperature outputs are field selectable for either 0-5/0-10VDC or 4-20 mA. The OUTPUT terminal 2 can be assigned as an Alarm output to provide an active high, active low or trouble alarm output. Outputs are galvanically isolated from the main power supply to permit simple integration with virtually all building automation systems.

When configured for 4-20mA output, the GTM108 is a “4-wire” device. The host controls shall not provide any excitation voltage to the output of the GTM108.

For the analog outputs, shielded cable is recommended. To wire the analog outputs, slide the cover plate up and off of the enclosure. Ensure that the power switch is in the “OFF” position. Connect signal wires for airflow rate and temperature (or alarm) to the small, three position output terminal labeled “OUTPUT” on the upper left hand side of the main circuit board as shown in Figure 8. Airflow output is at terminal 1, and temperature or airflow alarm or trouble alarm output (depending on setup) is at terminal 2.

Figure 8. GTM108 Combination Analog/Ethernet Transmitter Interior Detail
4.2 GTM108 - ETHERNET NETWORK WIRING CONNECTIONS

An RJ45 network connector is provided on the GTM108 Ethernet/Analog combination board as shown in Figure 8. The user can manually select network protocol (BACnet/IP or BACnet Ethernet - MODBUS TCP is always enabled), IP address and device instance number, or can set the GTM108 to automatically configure itself when used on a network/segment with a DHCP server. By default, the DHCP setting is OFF (*DHCP=OFF) for manual device configuration, with BACnet IP protocol (BAC MODE=IP), a static IP address of 10.0.0.100, a subnet mask of 255.255.255.0, and with gateway set for 10.0.0.10. These values can be changed within the NETWORK sub menu as described below.

When IP configuration is complete, confirm IP communications locally by “pinging” the assigned GTM108 IP address and observing 5 rapid blinks of the ACTIVITY LED (Figure 8).

4.2.1 GTM108 - Selecting Static or Dynamic IP Settings
For automated device configuration on a network/segment with a properly operating DHCP server, set *DHCP=ON as shown in Appendix B. Then, set *BAC MODE= for BACnet/IP (factory default) or BACnet Ethernet operation, and set *DI= device instance number (factory default=2) as described below. No additional device configuration is required.

For manual device configuration of the GTM108, set menu item *DHCP=OFF (factory default) as shown in Appendix B. When manually changing IP settings (*DHCP=OFF), the display will blink the 3-digit address segment that is under change. Change the blinking segment by pressing the UP or DOWN buttons to arrive at the desired segment setting. Depress the ENTER key to set this segment and to move the blinking cursor to the next (right) segment. Repeat this until the last segment has been selected, and then depress ENTER to store the new address setting.

4.2.2 GTM108 - Setting Ethernet Transmitter IP Address
The GTM108 is factory set with an IP address of 10.0.0.100. Each transmitter must be assigned a unique address on the network/segment it is connected to. To change the IP address, navigate to the *IP=10.0.0.0 menu item and set segments as previously described. (See note above regarding *DHCP=OFF).

4.2.3 GTM108 - Setting Subnet Mask
To change this value, navigate to the *MASK=255.2... menu item, and set new segment values as previously described. (See note above regarding *DHCP=OFF).

4.2.4 GTM108 - Setting Gateway IP
To change this value, navigate to the *GATE=10.0.0... menu item, and set new segment values as previously described. (See note above regarding *DHCP=OFF)

4.2.5 GTM108 - Setting BACnet Protocol Mode
The GTM108 is factory set with *BAC MODE=IP for BACnet IP protocol operation. This menu item can be changed to *BAC MODE=ETH for BACnet Ethernet protocol as shown in Appendix A. Tables 4 through 6 provide detail of TCP/IP example, BACnet Objects and Modbus Register Maps. Note that Modbus IP is always enabled regardless of *BAC MODE setting.

**NOTE:**
For BACnet IP operation, use port 47808. For Modbus TCP operation, use port 502. Modbus IP is always enabled regardless of the *BAC MODE setting.

4.2.6 GTM108 - Setting Device Instance Number
The GTM108 is factory set with a Device Instance Number of 2 (*DI=2). The Device Instance Number can be set to any value between 0 and 4194302 as shown in Appendix A. The Device Instance Number can also be changed by writing to the Device Object’s Object Identifier Property over the network.

4.2.7 GTM108 - Resetting Communications Options to Factory Default Values
Communications options can be reset to factory default values (asterisk) * values using the GTM108 RESET NET menu option.
**Gold Series GTM108 Transmitter**

a measurable difference!

**TCP/IP**

http://10.0.0.100
(or your custom IP address)

Table 4. GTM108 TCP/IP Example

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>3094</td>
</tr>
<tr>
<td>Temperature</td>
<td>74</td>
</tr>
</tbody>
</table>

**Table 5. GTM108 BACnet Objects List**

<table>
<thead>
<tr>
<th>Type, ID</th>
<th>Name</th>
<th>Default</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
<td>GTM108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL, 1</td>
<td>Avg. Flow</td>
<td>CFM</td>
<td></td>
</tr>
<tr>
<td>AL, 2</td>
<td>Average Temperature</td>
<td>°F</td>
<td></td>
</tr>
<tr>
<td>AL, 3</td>
<td>Alarm Status</td>
<td>0: No alarm, 1: High Alarm, 2: Low Alarm, 3: Both</td>
<td></td>
</tr>
<tr>
<td>AL, 4</td>
<td>Fan Alarm Status</td>
<td>0: No alarm, 1: Alarm</td>
<td></td>
</tr>
</tbody>
</table>

**Table 6. GTM108 Modbus Register Map**

<table>
<thead>
<tr>
<th>Function</th>
<th>Address</th>
<th>Type</th>
<th>Units</th>
<th>Description</th>
<th>Range/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>10001</td>
<td>boolean</td>
<td>Trouble Status</td>
<td>0: OK, 1: Trbl</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30001-30002</td>
<td>float</td>
<td>FPM</td>
<td>Average Airflow</td>
<td>0 to 15,000</td>
</tr>
<tr>
<td>4</td>
<td>30003-30004</td>
<td>float</td>
<td>°F</td>
<td>Average Temperature</td>
<td>-20 to 160</td>
</tr>
<tr>
<td>4</td>
<td>30005</td>
<td>word</td>
<td>Number of Inserts</td>
<td>0 to 8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30006</td>
<td>word</td>
<td>Fan Count</td>
<td>1 to 8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30007</td>
<td>word</td>
<td>Alarm Status</td>
<td>0 - 3: Flow alarm, 4: Fan alarm</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30008</td>
<td>word</td>
<td>Fans in alarm</td>
<td>bitwise representation</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3009-3024</td>
<td>float</td>
<td>FPM</td>
<td>Fan Flows</td>
<td>0 to 15,000</td>
</tr>
<tr>
<td>4</td>
<td>3009-3010</td>
<td>float</td>
<td>FPM</td>
<td>Fan 1 Flow</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30023-30024</td>
<td>float</td>
<td>FPM</td>
<td>Fan 8 Flow</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30025-30026</td>
<td>float</td>
<td>°F</td>
<td>Fan Temperatures</td>
<td>-20 to 160</td>
</tr>
<tr>
<td>4</td>
<td>30039-30040</td>
<td>float</td>
<td>°F</td>
<td>Fan 8 Temp</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30041-30056</td>
<td>float</td>
<td>FPM</td>
<td>Insert Flow Traverse</td>
<td>0 to 15,000</td>
</tr>
<tr>
<td>4</td>
<td>30041-30042</td>
<td>float</td>
<td>FPM</td>
<td>Insert 1 Flow</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30055-30056</td>
<td>float</td>
<td>FPM</td>
<td>Insert 8 Flow</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30056-30072</td>
<td>float</td>
<td>°F</td>
<td>Insert Temp Traverse</td>
<td>-20 to 160</td>
</tr>
<tr>
<td>4</td>
<td>30056-30057</td>
<td>float</td>
<td>°F</td>
<td>Insert 1 Temp</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30071-30072</td>
<td>float</td>
<td>°F</td>
<td>Insert 8 Temp</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30073-30088</td>
<td>float</td>
<td>Sq Ft</td>
<td>Fan Areas</td>
<td>0 to 49.99</td>
</tr>
<tr>
<td>4</td>
<td>30073-30074</td>
<td>float</td>
<td>Sq Ft</td>
<td>Fan 1 Area</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30087-30088</td>
<td>float</td>
<td>Sq Ft</td>
<td>Fan 8 Area</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>30202</td>
<td>word</td>
<td>Float word order</td>
<td>0: high word first, 1: low word first</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Number of AV objects is dependent on the fan count.
2. User Executed Services Supported:
   - Subscribe COV, Read Property, Write Property,
   - Device Communication Control, Who-Is.
5 GTM108 TRANSMITTER START-UP, INITIALIZATION AND SETUP MENUS

To ensure a successful start-up, verify that the airflow measuring station sensor probes and transmitter are installed in accordance with EBTRON guidelines.

⚠ Check the physical installation, power connections and model specific signal wiring prior to turning the power switch to the “ON” position.

Move the power switch to the “ON” position. The transmitter executes a complete self-check each time the power is turned on that takes 10 seconds to complete.

The GTM108 default analog output signals AO1 and AO2 are set to 4-20mA. The output signal can be changed to 0-5VDC/0-10VDC by setting switches SW1, SW2. The GTM108 must be properly configured for the desired system network protocol. Review the section for the corresponding transmitter output card or contact EBTRON Customer Service, toll free, at 800-232-8766.

5.1 Transmitter Initialization and Setup Menus

The GTx108-F Transmitter automatically initializes at power-up and conducts full system diagnostics. At the first start-up, the system will initiate the Setup Wizard that guides the user through the setup of the transmitter. When completed, the Setup Wizard will store all values entered. If not completed, the Setup Wizard will again restart at the next power-up of the transmitter. Navigate through the menus as shown in Appendix B.

5.2 Changing the System of Units - IP or SI Units

The GTM108 transmitter is provided with the system of units set to IP. To change to SI units, simultaneously press and release the “ENT” and “ESC” buttons during normal operation. “IP/SI UNITS” will be indicated on the LCD display. Refer to Appendix A SYSTEM OF UNITS MENU for details on the System of Units menu. Note that Setup Menu items are shown in IP System Of Units. When SI System of Units is selected, the units of measure abbreviations used in the menus is as shown below.

<table>
<thead>
<tr>
<th>“IP” System of Units</th>
<th>Description</th>
<th>“SI” System of Units</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPM</td>
<td>Feet per minute</td>
<td>MPS</td>
<td>Meters per second</td>
</tr>
<tr>
<td>CFM</td>
<td>Cubic feet per minute</td>
<td>LPS</td>
<td>Liters per second</td>
</tr>
<tr>
<td>SQF</td>
<td>Square feet</td>
<td>SQM</td>
<td>Square meters</td>
</tr>
<tr>
<td>F</td>
<td>Fahrenheit</td>
<td>C</td>
<td>Celsius</td>
</tr>
</tbody>
</table>

5.3 GTM108 Transmitter Calibration

The GTM108 uses high quality industrial grade components and is designed for years of trouble-free operation. Periodic recalibration of the transmitter is neither required or recommended. Transmitter field calibration verifiers are available for purchase from EBTRON for installations requiring periodic validation of instrumentation. Contact EBTRON for more information.
5.4  GTM108 LCD Display Notifications

Following a brief initialization at power up, the LCD display automatically displays airflow and temperature with units of measurement in all upper case (caps) characters. The display provides additional information on system status and alarm conditions. Refer to the ALARM FEATURES section of this manual for additional detail on Alarm and Trouble Error code indications.

5.5 Factory Default Menu Settings for GF2 Fan inlet Sensors

The GTM108 transmitter is “plug and play” and does not require setup unless a network option is selected that requires configuration. Table 8 shows the factory default settings for GF2 sensors. To change the Factory Default Settings, see: CHANGING FACTORY DEFAULT SETUP MENU SETTINGS.

Table 8. Factory Default Menu Settings

<table>
<thead>
<tr>
<th>Display/Setting</th>
<th>Description</th>
<th>I-P</th>
<th>S.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIRFLOW=</td>
<td>Airflow measurement method, Actual or Standard.</td>
<td>ACT</td>
<td>ACT</td>
</tr>
<tr>
<td>*LCDU/M=</td>
<td>Airflow units of measure</td>
<td>ACFM</td>
<td>LPS</td>
</tr>
<tr>
<td>*AREA=</td>
<td>Free area where station is located (required for volumetric measurement)</td>
<td>0.00 sq.ft. (see note)</td>
<td>0.000 sq.meters (see note)</td>
</tr>
<tr>
<td>*AO1 SGNL=</td>
<td>Output 1 signal type voltage or mA (airflow)</td>
<td>mA</td>
<td>mA</td>
</tr>
<tr>
<td>*AO1 UM=</td>
<td>Output 1 units of measure</td>
<td>AFPM</td>
<td>MPS</td>
</tr>
<tr>
<td>*AO1 FS=</td>
<td>Output 1 signal full scale</td>
<td>1,000 FPM</td>
<td>50 MPS</td>
</tr>
<tr>
<td>*LLIMIT=</td>
<td>Low limit cutoff</td>
<td>0 AFPM</td>
<td>0 MPS</td>
</tr>
<tr>
<td>*FLOW ADJ=</td>
<td>Output 1 Offset-Gain On/Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>*GAIN=</td>
<td>Output 1 Gain factor</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>*OFF=</td>
<td>Output 1 Offset factor</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>*TEMP METH=</td>
<td>Temperature Averaging</td>
<td>Weighted Avg.</td>
<td>Weighted Avg.</td>
</tr>
<tr>
<td>*AO2 SGNL=</td>
<td>Output 2 signal voltage or mA (temperature or alarm)</td>
<td>mA (see alarms)</td>
<td>mA (see alarms)</td>
</tr>
<tr>
<td>*AO2 MS=</td>
<td>Output 2 signal minimum scale</td>
<td>20º F</td>
<td>30º C</td>
</tr>
<tr>
<td>*AO2 FS=</td>
<td>Output 2 signal full scale</td>
<td>180º F</td>
<td>70º C</td>
</tr>
<tr>
<td>*LCD INT=</td>
<td>Number of flow calculations to be averaged for LCD display,</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>*AO1 INT=</td>
<td>Number of flow calculations to be averaged for AO1 output,</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>*EB-LK INT=</td>
<td>Number of flow calculations to be averaged for EB-Link readings.</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>*ALT=</td>
<td>Altitude for flow correction relative to mean sea level (0 ft),</td>
<td>0 ft</td>
<td>0 m</td>
</tr>
<tr>
<td>*AO2 ASGN = TEMP</td>
<td>A02 Output indicates temperature.</td>
<td>TEMP</td>
<td>TEMP</td>
</tr>
<tr>
<td>*SETPNT=</td>
<td>Alarm setpoint value. When *AO2 ASGN=ALARM, or *AO2 ASGN=FA only, operates in conjunction with *TOL= value.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>*TOL=</td>
<td>Alarm range tolerance value. When *AO2 ASGN=ALARM, or *AO2 ASGN=FA only, this setting establishes the alarm range relative to the *SETPNT= value.</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>*NO FAULT=</td>
<td>Sets the AO2 normal (not alarm) output state relative to the full scale analog output selected. HI provides maximum full scale under normal conditions and minimum scale during alarm. LO provides minimum full scale under normal conditions and maximum scale during alarm.</td>
<td>HI</td>
<td>HI</td>
</tr>
<tr>
<td>*DELAY=</td>
<td>Time that the alarm condition must exist before alarm output is activated.</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>*ZERO OFF =</td>
<td>Set to YES to inhibit LO alarm condition when flow reading is zero (dependent on *LIMIT= setting). Set to NO to disable this feature.</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>*RESET =</td>
<td>Set to AUTO to have alarm self-clear when alarm condition no longer exists. Set to MANUAL to require manual reset of alarm.</td>
<td>AUTO</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

Note: Area is entered during setup using SETUP WIZARD.
5.6 GTM108 Changing Factory Default Setup Menu Settings

5.6.1 Setup Menu Options
The GTM108 Transmitter is setup and tested at the factory to be fully operational when sensor probes are connected and power is applied (set the power switch to the “ON” position). Factory settings can easily be changed using the SETUP MENU by simultaneously pressing and releasing the “UP” and “DOWN” buttons while the transmitter is in its normal operating mode. Appendix A details the SETUP menus. Navigate through the SETUP menus to make changes to the transmitter configuration. The settings take effect immediately. The following are common field modifications to the factory default settings.

5.6.2 Selecting Actual and Standard Output Measurement Type
The transmitter is set from the factory to provide actual airflow measurement units (displayed as “ACFM” and “AFPM”). In this mode, airflow measurements are calculated for actual inlet conditions. If using Actual conditions, corrections for altitude are entered through the ALT= setting in the Setup menu. If desired, the output can be set to provide standard airflow measurement units (displayed as “SCFM” and “SFM”) which provides measurements that are corrected to standard conditions.

5.6.3 Output Scaling
EBTRON’s Gold Series sensors are individually calibrated between 0 and the factory default full scale to standards in wind tunnels traceable to the National Institute of Standards and Technology (NIST). Sensors are independent and produce “percent of reading” accuracy. Changing the full scale value does not change the accuracy of the device. Factory default output scaling for analog GTM108 transmitter can be changed within the SETUP menus.

5.6.4 Changing the LCD Display from Volumetric Flow CFM to Velocity FPM
The GTM108 transmitter is shipped from the factory to indicate volumetric flow. To display velocity in FPM, enter the SETUP menu and in the DISPLAY submenu, change the “* LCD UM = ACFM” to “* LCD UM = AFPM”. Changing the LCD display units will not affect the analog output signal. The analog output signal can be scaled if required as described below.

5.6.5 Converting the Analog Output Signal from FPM to CFM
The GTM108 transmitter is shipped from the factory with analog output “OUTPUT 1” set to indicate velocity in AFPM. To automatically convert this analog velocity output to volumetric flow (ACFM), simply set the *AO1 UM from AFPM (default) to ACFM in the SETUP menu. If you wish to manually convert the velocity output to volumetric flow (ACFM), simply multiply the indicated output velocity (in FPM) by the free area of the air flow probe installation location. Refer also to Table 10 for a complete listing of conversions for each of the analog outputs of the GTM108. The AO1 full scale analog output (OUTPUT1) value is determined by the AO1 RANGE setting within the SETUP menu.

5.6.6 Locking the Configuration Settings
The GTM108 transmitter configuration settings can be locked at one of three security levels within the SECURITY submenu using the LOCK SEC= item.

When LOW security level is selected (LOCK SEC=LOW) the last 4 digits of the board serial number are automatically assigned as the lock code. To see the board serial number, navigate to DIAGNOSTICS menu in SERIAL NUMBERS item.

When the MED security level is selected (LOCK SEC=MED) the user enters a security code. In the event that this code is lost/misplaced, EBTRON can provide a key that is unique to the transmitter to unlock it. Contact EBTRON customer service for this code.

When the HIGH security level is selected (LOCK SEC=HIGH) the user enters a security code. In the event that this code is lost/misplaced, the transmitter must be returned to the factory in order to unlock it.

When LOCK SEC=HIGH is selected, the user defined setting can only be changed after entering the user defined code. STORE THE LOCK CODE IN A SAFE LOCATION! For security reasons, the HIGH level lock code can only be reset by returning the transmitter to the factory.
5.7 GTM108 - Alarm Features

Analog output AO2 (OUT2) of the GTM108 transmitter can be assigned to function instead as an alarm output. The OUT2 alarm output can be assigned in the SETUP menu to operate as an average alarm (AO2 ASGN=ALRM), as a fan alarm (AO2 ASGN=FA) or as a trouble alarm (AO2 ASGN=TRBL) for monitoring the status of the transmitter and sensors. The AO2 ASGN= setting is located in the ANALOG OUT submenu of the SETUP menu.

5.7.1 Average Alarm (AO2 ASGN=ALRM)
AO2 output is assigned as an average airflow alarm output. Useful for applications where a low flow alarm, a high flow alarm or an alarm for operation outside of a defined range (setpoint and tolerance) is required.

5.7.2 Fan Alarm (AO2 ASGN=FA)
AO2 output is assigned as a fan alarm output for multiple fan (fan array) applications. In fan arrays this is useful for indicating which fans are in alarm state by providing an analog output level proportional to the fan number. For example, if fan number 3 is in alarm, OUT2 will provide an output of 30% of the full scale analog range selected.

For fan arrays, the Fan Alarm can be set for one of 3 modes through the FA TYPE= setting in the FAN ALARM submenu:

- **FA TYPE=MIN:** Alarm actives if a fan flow falls below a minimum defined flow rate setpoint
- **FA TYPE=DEV:** Alarm actives if a fan flow deviates more than a defined percentage setpoint from the median flow of all fans
- **FA TYPE=%MAX:** Alarm actives if a fan flow deviates more than a defined percentage setpoint from its own maximum flow

In both AO2 ASGN=ALRM and AO2 ASGN=FA alarm modes, a delay feature can be specified to prevent nuisance alarms, and a zero-off feature can be engaged to prevent low flow alarms when the system is reading zero flow (i.e. when fans are off). In addition, a reset feature allows for the alarm to be reset either manually or automatically in the event that the alarm condition no longer exists.

5.7.3 Trouble Alarm (AO2 ASGN=TRBL)
AO2 output is assigned as a transmitter trouble alarm indicating a fault within the transmitter or a sensor of the airflow measurement system. The transmitter LCD will indicate a trouble code and a brief description of the trouble. Contact EBTRON customer service for additional information or assistance with trouble codes.

The transmitter LCD display will indicate the Alarm status for 2 seconds, and will cycle through any other alarms if multiple alarm events are active for 2 seconds each, and then display the current actual flow for 2 seconds.

Detailed set up of the Alarm features is shown in the Setup menu.

5.7.4 FA Remove (FA REMOVE=YES)
This setting determines whether a fan that is in alarm should be removed from the transmitter calculated average.

5.7.5 No Fault (NO FAULT=HI)
When AO2 output is assigned as an alarm, this setting configures the normal output condition to be HI or LO relative to the full scale analog output level selected when no fault condition exists.

5.8 Alarm Indications

Table 9 details the alarm types, LCD indications and AO2 alarm outputs available from the GTM108. User can select either of the two Average Alarms, one of the three Fan Alarms or the Trouble Alarm:

5.8.1 Average Low Alarm - “LO ALRM= ON”
The Low Alarm is activated when the average airflow falls to a defined level below the SETPNT= value. The defined level is equal to the SETPNT= value minus the calculated value of (TOL= value) x (SETPNT= value). Once active, the alarm can be cleared when the average airflow rises above the set point minus calculated tolerance value.
5.8.2 Average High Alarm - “HI ALRM= ON”
The High Alarm is activated when the average airflow rises above a defined level above the SETPNT= value. The defined level is equal to the SETPNT= value plus the calculated value of (TOL= value) x (SETPNT= value). Once active, the alarm can be cleared when the average airflow falls below the set point + calculated tolerance value.

5.8.3 Fan Alarm - “FA TYPE= MIN”
The Fan Alarm Minimum alarm is activated when the airflow of any of the fans in the fan array falls below the selected set point (SETPNT=) value. Once active, the alarm can be cleared when the airflow rises above the set point value. The magnitude of the fault signal is proportional to the (lowest) fan number that is in alarm state.

5.8.4 Fan Alarm - “FA TYPE= DEV”
The Fan Alarm Deviation alarm is activated when the airflow of any of the fans in the fan array exceeds the median airflow by the percentage specified by the (SETPNT=) value. Once active, the alarm can be cleared when the airflow returns within the specified percentage of median airflow. The magnitude of the fault signal is proportional to the (lowest) fan number that is in alarm state. If only 2 fans, the highest flow will be used for median comparison.

5.8.5 Fan Alarm - “FA TYPE= %MAX”
The Fan Alarm Maximum alarm is activated when the airflow of the any of the fans deviates from its highest stored value by the percentage specified by the (SETPNT=) value. Once active, the alarm can be cleared when the airflow returns within the range specified by the set point value. The magnitude of the fault signal is proportional to the (lowest) fan number that is in alarm state.

5.8.6 Trouble Alarm - “AO2 ASGN=TRBL”
The Sensor Trouble alarm is selected in the ANALOG OUT submenu (AO2 ASGN=TRBL) and provides trouble codes useful for isolating setup issues or problems within the transmitter or sensors. The transmitter LCD will indicate TROUBLE! The Diagnostic submenu can be engaged for the error code and a brief description of the trouble. Contact EBTRON customer service for information on troubleshooting using the Trouble error codes.

Table 9. GTM108 Alarm Types and Notifications

<table>
<thead>
<tr>
<th>ALARM OUTPUT ASSIGNMENT TYPE</th>
<th>LOCAL LCD DISPLAY OF ALARM TYPE AND NOTIFICATION</th>
<th>ALARM (OUT2) INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOW ALARM</strong> (Average Alarm)</td>
<td>Display alternates between <strong>LOW ALARM</strong> (then any other alarms) and actual reading for 2 seconds each.</td>
<td>On alarm, OUT2 is active high (or active low) relative to the full scale maximum (or minimum) analog value as determined by SETUP Menu “NO FAULT=” selection. Individual sensor velocities can be viewed using the Diagnostics submenu.</td>
</tr>
<tr>
<td><strong>HIGH ALARM</strong> (Average Alarm)</td>
<td>Display alternates between <strong>HIGH ALARM</strong> (then any other alarms) and actual reading for 2 seconds each.</td>
<td>For multiple fan array applications, the alarm output is proportional to the (lowest) fan number that is in alarm. For example, if fan number 3 is in alarm, OUT2 will provide an output of 30% of the full scale analog range selected. Individual fan velocities can be viewed using the Diagnostics submenu.</td>
</tr>
<tr>
<td><strong>FAN n MIN</strong> (Fan Alarm)</td>
<td>Display alternates between <strong>FAN n MIN</strong> (then any other alarms) and actual reading for 2 seconds each.</td>
<td>n = fan number. If multiple fans are in alarm, n = lowest fan number in alarm.</td>
</tr>
<tr>
<td><strong>FAN n DEV</strong> (Fan Alarm)</td>
<td>Display alternates between <strong>FAN n DEV</strong> (then any other alarms) and actual reading for 2 seconds each.</td>
<td></td>
</tr>
<tr>
<td><strong>FAN n %MAX</strong> (Fan Alarm)</td>
<td>Display alternates between <strong>FAN n %MAX</strong> (then any other alarms) and actual reading for 2 seconds each.</td>
<td></td>
</tr>
<tr>
<td>TROUBLE! (Trouble Alarm)</td>
<td>Display indicates TROUBLE! (Refer to DIAGNOSTIC menu to obtain a brief description of the error and any other alarms).</td>
<td>On alarm, OUT2 is active high (or active low) relative to the full scale maximum (or minimum) analog value as determined by SETUP Menu “NO FAULT=” selection. Individual sensor velocities and temperatures can be viewed using the Diagnostics sub-menu.</td>
</tr>
</tbody>
</table>
5.9 GTM108 - Analog Output Type Selection and Setup

The analog output signal type at OUT1 (airflow) and OUT2 (temperature/alarm) can be set for mA or VDC output by setting switches SW1/SW2 (Figure 8). SW1/SW2 settings enable the appropriate 4-20mA, 0-5 VDC or 0-10VDC menu ranges in Setup menu options for \*AO1 RNGE= / \*AO2 RNGE= settings (Appendix B). The transmitter is shipped from the factory with SW1/SW2 and Setup menu options \*AO1 SGNL= and \*AO2 SGNL= set for 4-20mA.

5.9.1 GTM108 - Converting Analog Output Signal Values to Airflow and Temperature

Since the accuracy of the GTM108 is “percent of reading” there should be no need to reconfigure the default output scales listed inside of the transmitter cover. However, factory default settings can be easily reconfigured in the field (see: CHANGING FACTORY DEFAULT SETTINGS).

The equivalent volumetric flow full scale reading can easily be determined by multiplying the full scale reading by the free area where the airflow measuring station is located (free area x 1000 for S.I. scaling when the area is calculated in square meters). For GF1/GF2 sensors, the free area must be determined after the units are installed. Table 10 lists specific conversion factors for analog voltage or current output options.

5.9.2 GTM108 - OUTPUT TEST - Sending a Test Output Signal to the Host Control System

A test output signal between 0 and 100% of the full scale output (4-20 mA or 0-5VDC/0-10VDC) can be provided by the GTM108 transmitter to verify proper conversion of the output signals from the transmitter at the host control system. To set a fixed output signal for airflow and temperature, navigate to the TOOLS sub menu to access OUTPUT TEST. OUT1 and OUT2 tests are independently accessed, and the output will maintain the % shown until the “ESC” button is pressed and normal operation is resumed.

### Table 10. GTM108 Analog Output Conversion Factors

#### When OUTPUT 1 is Configured as Linear Airflow (FPM, MPS):

<table>
<thead>
<tr>
<th>TO CONVERT TO</th>
<th>ANALOG OUTPUT SCALING AND TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airflow (FPM, MPS)</td>
<td>Output Voltage/10 x FS1 / Output Voltage/5 x FS1 / (Output Current-4)/16 x FS1</td>
</tr>
<tr>
<td>Airflow (CFM)</td>
<td>Area (SQF) x Output/10 x FS1 / Area (SQF) x Output/5 x FS1 / Area (SQF) x (Output - 4)/16 x FS1</td>
</tr>
<tr>
<td>Airflow (LPS)</td>
<td>Area (SQM) x Output/10 x FS1 x 1000 / Area (SQM) x Output/5 x FS1 x 1000 / Area (SQM) x (Output - 4)/16 x FS1 x 1000</td>
</tr>
</tbody>
</table>

#### When OUTPUT 1 is Configured as Volumetric Airflow (CFM, LPS):

<table>
<thead>
<tr>
<th>TO CONVERT TO</th>
<th>ANALOG OUTPUT SCALING AND TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airflow (CFM, LPS)</td>
<td>Output Voltage/10 x FS1 / Output Voltage/5 x FS1 / (Output Current - 4)/16 x FS1</td>
</tr>
</tbody>
</table>

#### When OUTPUT 2 is Configured as Temperature (°F, °C):

<table>
<thead>
<tr>
<th>TO CONVERT TO</th>
<th>ANALOG OUTPUT SCALING AND TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp (°F, °C)</td>
<td>Output Voltage/10 x (FS2 - MS2) + MS2 / Output Voltage/5 x (FS2 - MS2) + MS2 / (Output Current - 4)/16 x (FS2 - MS2) + MS2</td>
</tr>
</tbody>
</table>

**NOTES:**

FS1 is AO1 full scale analog output value from ANALOG OUT MENU.

FS2 is AO2 full scale analog output value from ANALOG OUT MENU.

MS2 is AO2 minimum scale analog output value from ANALOG OUT MENU.
5.10 Viewing Sensor Data

5.10.1 Viewing Sensor Data on the Local LCD Display
Airflow and temperature of individual fan sensors can be displayed on the local LCD display by entering the Diagnostic Menu. Simultaneously depress the up ↑ and down ↓ arrows to enter the GTx108 Setup Menu, and then navigate to the Diagnostic Menu as shown (Appendix B).

5.10.2 Viewing Sensor Data over BACnet or Modbus Networks or through the EB-Link Reader
Airflow and temperature of individual sensors can be read across BACnet or Modbus networks, or downloaded directly to an EB-Link Reader if the infra-red EB-Link option has been installed. Refer to the following Sensor Addressing and Probe Positioning paragraph for the suggested probe installation configuration. Tables 5 and 6 provide BACnet objects and register addressing information for individual sensor data.

6 SETUP MENUS
Appendix A details the various setup menus and submenus.

7 WIRING DIAGRAM
Appendix B is the wiring diagram for the GTM108 transmitter.
APPENDIX A - ADVANTAGE 3 FAN ARRAY
FAN INLET SENSOR SETUP MENUS

SETUP WIZARD
Launched at initial power-up, and if Setup Wizard was not completed.

Enter (move ←) Esc (normal op.))

SET AREA METH
AREA METH=AREA
- Enter area
AREA METH=Calc
- Enter diameter where probes are located

SET SHAPE
SHAPE=Round
SHAPE=SQUARE

SET FAN AREA
Note: input in ft² and m²
SHAPE= selection will determine menu text
Items in parentheses are associated when SHAPE=Square is selected.

SET SENS DISTR
SENS/FAN=1
SENS/FAN=2

SET FAN TYPE
FAN TYPE=SWSI
FAN TYPE=DWDI
FAN TYPE=ARRAY

SET FANS
FAN 1=1
FAN 2=2
...
FAN n=2

SET AREA DISTR
AREAS=Equal
AREAS=VAR

SET FAN AREA
- AREA only

SET AREA METH
- AREA METH=AREA
- AREA METH=Calc

SET FAN AREA
AREA=1.00ft²
AREA=1.00m²
**SYSTEM OF UNITS MENU**
Simultaneously depress/release ENTER + ESC keys during normal operation to select

<table>
<thead>
<tr>
<th>ACTION</th>
<th>* Factory Default/Current Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET IP/SISYS</td>
<td>IP/SI SYS ↓</td>
</tr>
<tr>
<td>SET SI SYS</td>
<td>IP/SI SYS ↑</td>
</tr>
</tbody>
</table>

**SETUP**
Simultaneously depress/release ↑ + ↓ keys during normal operation to select

<table>
<thead>
<tr>
<th>ACTION</th>
<th>* Factory Default/Current Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>USE SETUP WIZ</td>
<td>SET NAME ?</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>*NAME={unit serial#}</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>*ALT=0 SET ALT?</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>SET IP/SI ?</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>SET LCD INTG ?</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>SET LCD DSPL ?</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>DISPLAY</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>LCD UM=ACFM</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>%CD UNH=ACPN</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>%CD DSPL=6OTH</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>%LCD INTG=100</td>
</tr>
<tr>
<td>USE SETUP WIZ</td>
<td>%LCD TRBL=ON</td>
</tr>
</tbody>
</table>

**SET TEMPERATURE METHOD**
Set the temperature output for various methods.

<table>
<thead>
<tr>
<th>ACTION</th>
<th>* Factory Default/Current Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMP METH=WGT</td>
<td>TEMP METH=WGT</td>
</tr>
<tr>
<td>TEMP METH=AVG</td>
<td>TEMP METH=AVG</td>
</tr>
</tbody>
</table>

**SET LCD DISPLAY**
Set the LCD display configuration.

<table>
<thead>
<tr>
<th>ACTION</th>
<th>* Factory Default/Current Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD DSPL=OFF</td>
<td>LCD DSPL=OFF</td>
</tr>
<tr>
<td>LCD DSPL=FLOW</td>
<td>LCD DSPL=FLOW</td>
</tr>
<tr>
<td>LCD DSPL=TEMP</td>
<td>LCD DSPL=TEMP</td>
</tr>
<tr>
<td>LCD DSPL=6OTH</td>
<td>LCD DSPL=6OTH</td>
</tr>
<tr>
<td>LCD INTG=100</td>
<td>LCD INTG=100</td>
</tr>
<tr>
<td>LCD TRBL=OFF</td>
<td>LCD TRBL=OFF</td>
</tr>
<tr>
<td>LCD TRBL=6OTH</td>
<td>LCD TRBL=6OTH</td>
</tr>
</tbody>
</table>
FROM PART 2

GTC only

- **NETOUT**=BACNET
  - SET NETOUT?
  - NETOUT=BACNET
    - NETOUT=MODBUS

- **NETADDRESS**=21
  - SET NETADDRESS?
  - NETADDRESS=21

- **NETBAUD**=76800
  - SET NETBAUD?
  - NETBAUD=76800
    - NETBAUD=38400
    - NETBAUD=19200
    - NETBAUD=9600

Option for MODBUS only

- **PARITY**=EVEN
  - SET PARITY?
  - PARITY=EVEN
    - PARITY=OBD
    - PARITY=NONE

Option for BACNET only

- **NETDI**=2
  - SET NETDI?
  - NETDI=2

GT M only

- **DHCP**=OFF
  - SET DHCP?
  - DHCP=OFF
    - DHCP=ON

- **IP=10.0.0.1**
  - SET IP?
  - IP=10.0.0.1
    - IP=10.0.0.1

- **MASK=255.255.255.0**
  - SET MASK?
  - MASK=255.255.255.0

- **GATE=10.0.0.1**
  - SET GATEWAY?
  - GATE=10.0.0.1
    - GATE=10.0.0.1

- **BACNET=IP**
  - SET BACNET?
  - BACNET=IP
    - BACNET=ETH

- **NETDI=2**
  - SET NETDI?
  - NETDI=2

TO PART 4

- **EB-LINK INTOG=300**
  - SET EB-LINK INTOG?
  - EB-LINK INTOG=300

Set network protocol type.

Enter network address.

Set network baud rate.

Set MODBUS parity type.

Set network device instance number.

Set DHCP to ON or OFF.

Enter IP address, use (up/down arrow) buttons to select value and press ENT to move to right and ESC to move to left.

Enter subnet mask, use (up/down arrow) buttons to select value and press ENT to move to right and ESC to move to left.

Enter gateway IP address, use (up/down arrow) buttons to select value and press ENT to move to right and ESC to move to left.

Set BACnet IP or Ethernet protocol.

Set network device instance number.

EB-Link integration samples.
**Gold Series GTM108 Transmitter**

**From Part 3**

1. **Alarm**
   - **Lo Alrm=Off**
     - **Set Lo Alrm**
       - **Lo Alrm=Off**
       - **Lo Alrm=On**
     - **Hi Alrm=Off**
       - **Set Hi Alrm**
         - **Hi Alrm=Off**
         - **Hi Alrm=On**
     - **Alarm UM=Afpm**
       - **Set Alarm UM**
         - **Alarm UM=Afpm**
         - **Alarm UM=Acfm**
     - **Set Spnt**
       - **Set Tol**
         - **Set Delay**
           - **Zero Off=No**
             - **Set Zero Off**
               - **Zero Off=Yes**
             - **Reset=Auto**
               - **Reset=M Manual**

2. **Fan Alarm**
   - **Fa Type=None**
     - **Set Fa Type**
       - **Fa Type=None**
         - **Fa Type=Min**
         - **Fa Type=Dev**
         - **Fa Type=%Max**
     - **Fa Remove=Yes**
       - **Set Fa Remove**
         - **Fa Remove=Yes**
         - **Fa Remove=No**

3. **Further Settings**
   - **Fa Type=Min**
     - **Alarm UM=Afpm**
       - **Set Alarm UM**
         - **Alarm UM=Afpm**
         - **Alarm UM=Acfm**
     - **Set Spnt**
       - **Set Tol**
         - **Set Delay**
           - **Zero Off=No**
             - **Set Zero Off**
               - **Zero Off=Yes**
             - **Reset=Auto**
               - **Reset=M Manual**

4. **Further Settings**
   - **Fa Type=Dev**
     - **Alarm UM=Afpm**
       - **Set Alarm UM**
         - **Alarm UM=Afpm**
         - **Alarm UM=Acfm**
     - **Set Spnt**
       - **Set Tol**
         - **Set Delay**
           - **Zero Off=No**
             - **Set Zero Off**
               - **Zero Off=Yes**
             - **Reset=Auto**
               - **Reset=M Manual**

**To Part 5 'B'**

**Configure**

- **Enable/Disable Lo Alarm**
- **Enable/Disable Hi Alarm**
- **Set Alarm Units of Measure**
- **Set Alarm Spnt Value**
- **Set Alarm Tolerance**
- **Set Alarm Delay**
- **Set Alarm Zero Off**
- **Set Alarm Reset**
- **Set Fan Alarm Type**
- **Alarm on Aboslute Minimum Fan Velocity Value**
- **Alarm on % Deviation from Median of All Fans**
- **Alarm on % Deviation from Maximum Velocity of Individual Fan**
- **This Setting Determines Whether a Fan that is in an Alarm Condition Should be Removed from the Average**

**Note:**
- When **ZERO OFF=YES**, this setting is used to inhibit the LO ALRM condition when the unit is reading 0. This is dependent on the low limit setting.
- When **ZERO OFF=NO**, this setting is used to inhibit the LO ALRM condition when the unit is reading 0. This is dependent on the low limit setting.
- When **FA TYPE=MIN**, sets Alarm units of measure to FPM or CFM (Note: A if ACT or S if STD measurement prefix set by AIRFLOW= setting above).
- When **FA TYPE=DEV or %MAX**, sets Alarm setpoint value.
- When **FA TYPE=%MAX**, alarm on % deviation from maximum velocity of individual fan.
- When **FA TYPE=Dev**, alarm on % deviation from median of all fans.
- When **FA TYPE=MIN**, alarm on absolute minimum fan velocity value.
- When **FA TYPE=NONE**, set Fan Alarm type.
- When **FA TYPE=MIN**, sets Alarm units of measure.
- When **FA TYPE=MIN**, sets Alarm setpoint value.
- When **FA TYPE=Dev**, sets Alarm setpoint value.

**Set**

- **Set Fan Alarm Type**
- **Set Fan Alarm Delay**
- **Set Fan Alarm Reset**
- **Set Fan Alarm Low Limit**
- **Set Fan Alarm High Limit**
- **Set Fan Alarm Sensitivity**
- **Set Fan Alarm Recovery Time**
- **Set Fan Alarm Enable/Disable**

**Note:**
- When **ZERO OFF=YES**, this setting is used to inhibit the LO ALRM condition when the unit is reading 0. This is dependent on the low limit setting.
- When **ZERO OFF=NO**, this setting is used to inhibit the LO ALRM condition when the unit is reading 0. This is dependent on the low limit setting.
- When **FA TYPE=MIN**, sets Alarm units of measure to FPM or CFM (Note: A if ACT or S if STD measurement prefix set by AIRFLOW= setting above).
- When **FA TYPE=DEV or %MAX**, sets Alarm setpoint value.
- When **FA TYPE=%MAX**, alarm on % deviation from maximum velocity of individual fan.
- When **FA TYPE=Dev**, alarm on % deviation from median of all fans.
- When **FA TYPE=MIN**, alarm on absolute minimum fan velocity value.
- When **FA TYPE=NONE**, set Fan Alarm type.
- When **FA TYPE=MIN**, sets Alarm units of measure.
- When **FA TYPE=MIN**, sets Alarm setpoint value.
- When **FA TYPE=Dev**, sets Alarm setpoint value.

**Alarm**

- **Enable/Disable Lo Alarm**
- **Enable/Disable Hi Alarm**
- **Set Alarm Units of Measure**
- **Set Alarm Spnt Value**
- **Set Alarm Tolerance**
- **Set Alarm Delay**
- **Set Alarm Zero Off**
- **Set Alarm Reset**

**Note:**
- When **ZERO OFF=YES**, this setting is used to inhibit the LO ALRM condition when the unit is reading 0. This is dependent on the low limit setting.
- When **ZERO OFF=NO**, this setting is used to inhibit the LO ALRM condition when the unit is reading 0. This is dependent on the low limit setting.
- When **FA TYPE=MIN**, sets Alarm units of measure to FPM or CFM (Note: A if ACT or S if STD measurement prefix set by AIRFLOW= setting above).
- When **FA TYPE=DEV or %MAX**, sets Alarm setpoint value.
- When **FA TYPE=%MAX**, alarm on % deviation from maximum velocity of individual fan.
- When **FA TYPE=Dev**, alarm on % deviation from median of all fans.
- When **FA TYPE=MIN**, alarm on absolute minimum fan velocity value.
- When **FA TYPE=NONE**, set Fan Alarm type.
- When **FA TYPE=MIN**, sets Alarm units of measure.
- When **FA TYPE=MIN**, sets Alarm setpoint value.
- When **FA TYPE=Dev**, sets Alarm setpoint value.
**GOLD SERIES GTM108 TRANSMITTER**

**FROM PART 1 TO PART 6**

---

**FROM PART 1**

1. **ADJUSTMENTS**
   - "FLOW ADJ=OFF" ➔ **SET FLOW ADJ** ➔ "FLOW ADJ=OFF"
   - "GAIN=1.000" ➔ **SET GAIN** ➔ "GAIN=1.000"
   - "OFF=0" ➔ **SET OFF** ➔ "OFF=0"

2. **OUTPUT TEST**
   - **OUT1 TEST** ➔ **SET OUT1 TEST** ➔ OUT1 TEST%=0
   - **OUT2 TEST** ➔ **SET OUT2 TEST** ➔ OUT2 TEST%=0

3. **FIELD ADJUST**
   - **RUN FA WIZARD** ➔ **SET FAW INT** ➔ FAW INT=300

4. **SECURITY**
   - **LOCK SEC=LOW** ➔ **SET LOCK SEC** ➔ LOCK SEC=LOW
   - **LOCK SEC=MED** ➔ **SET LOCK SEC** ➔ LOCK SEC=MED
   - **LOCK SEC=HIGH** ➔ **SET LOCK SEC** ➔ LOCK SEC=HIGH

5. **RESET**
   - **RESET ALL** ➔ **ARE YOU SURE** ➔ RESET ALL=YES
   - **RESET SENS** ➔ **ARE YOU SURE** ➔ RESET SENS=YES
   - **RESET ADJ** ➔ **ARE YOU SURE** ➔ RESET ADJ=YES
   - **RESET NET** ➔ **ARE YOU SURE** ➔ RESET NET=YES

**FROM PART 4**

1. **ADJUSTMENTS**
   - **FLOW ADJ=OFF** ➔ **SET FLOW ADJ** ➔ "FLOW ADJ=OFF"
   - **GAIN=1.000" ➔ **SET GAIN** ➔ "GAIN=1.000"
   - **OFF=0" ➔ **SET OFF** ➔ "OFF=0"

2. **OUTPUT TEST**
   - **OUT1 TEST" ➔ **SET OUT1 TEST** ➔ OUT1 TEST%=0
   - **OUT2 TEST" ➔ **SET OUT2 TEST** ➔ OUT2 TEST%=0

3. **FIELD ADJUST**
   - **RUN FA WIZARD** ➔ **SET FAW INT** ➔ FAW INT=300

4. **SECURITY**
   - **LOCK SEC=LOW** ➔ **SET LOCK SEC** ➔ LOCK SEC=LOW
   - **LOCK SEC=MED** ➔ **SET LOCK SEC** ➔ LOCK SEC=MED
   - **LOCK SEC=HIGH** ➔ **SET LOCK SEC** ➔ LOCK SEC=HIGH

5. **RESET**
   - **RESET ALL** ➔ **ARE YOU SURE** ➔ RESET ALL=YES
   - **RESET SENS** ➔ **ARE YOU SURE** ➔ RESET SENS=YES
   - **RESET ADJ** ➔ **ARE YOU SURE** ➔ RESET ADJ=YES
   - **RESET NET** ➔ **ARE YOU SURE** ➔ RESET NET=YES

---

**TO PART 6**

**DESCRIPTIONS**

1. Enable/disable flow adjustments.
2. Enter gain applied to airflow reading.
3. Enter offset applied to airflow reading.
4. Enable/disable SETUP WIZARD. See SETUP WIZARD at beginning of SETUP menus.
5. Enter gain applied to airflow reading.
6. Enter offset applied to airflow reading.
7. Start field adjustment wizard and enter number of integration samples to use.
8. Dashed lines indicate Menus when # OF FLOWS=2
9. Sets security level to LOW. In this mode, there is no prompt for a lock code. The last 4 digits of the board serial are used to unlock.
10. Sets security level to MED. In this mode, a user-defined code is specified. In the event of loss of code, contact EBTRON for a unique code for this transmitter to unlock and reset code.
11. Sets security level to HIGH. In this mode, a user-defined code is specified. In the event of loss of code, transmitter must be returned to EBTRON for unlock / reset.
12. Enable/disable security lock.
13. Enter code and confirm code (NOTE: IF LOCK SEC=HIGH, DO NOT lose code!)
14. Reset ALL changes back to factory defaults. Transmitter resets after completion.
15. Reset sensor data. Transmitter resets after completion.
16. Reset network settings to factory default.

**NOTES**

- "Wait..." indicates progress while the Field Adjustment Wizard acquires a large number of samples of airflow rate and averages all of the readings. Display indicates "ADJUSTMENT COMPLETE" when adjustment is complete.
- If you wish to review the adjustment made, simply navigate back to the SETUP menu and view the ADJUSTMENTS section.
FROM PART 5

DIAGNOSTICS

TRBL CODES

1: NO PROBES
(example shown)

DSBL TRBL CODE

DSBL TRBL=NO

DSBL TRBL=YES

Displays trouble code and their descriptions. Contact EBTRON customer service for recommended service information.

Set DSBL TRBL= YES to ignore currently displayed TRBL alarm. To disable all trouble codes, see SETUP -> DISPLAY -> LCD TRBL.

TRBL HISTORY

1: NO PROBES
(example shown)

Displays historical list of last 5 trouble codes encountered and their descriptions. Note that spurious trouble codes may self-clear during normal operation, and this feature permits viewing them even after they have resolved.

UNIT #######

BRD WWW T

C1 ###### T

C1 ###### F

C2 ###### F

C3 ###### T

C4 ###### F

C5 ###### T

C6 ###### F

C7 NC T

C8 NC T

ARRAY #######

ARRAY FW 1.00 T

Serial numbers followed by a T if connected and functioning properly, and then followed by an F if not connected or not functioning properly.

Note: On 8 connector board only

SENS VELOCITY 1

SENS TEMP 1

SENS VOLTS 1

FAN VELOCITY 1

FAN VOLUME T

For sensors =1 to 8

For fans 1 to 8

For fans 1 to 8

For fans 1 to 8

For fans 1 to 8

Displays unit serial number.

Displays main PCB serial number.

Displays probe serial numbers followed by a T if connected and functioning properly, and then followed by an F if not connected or not functioning properly.

Displays active trouble codes and their descriptions. Contact EBTRON customer service for recommended service information.
APPENDIX B -
GTM108 WIRING DIAGRAM

NOTES:
1. OUTPUT 2 CAN BE SET AS TEMPERATURE, ALARM, FAN ALARM OR TROUBLE ALARM. ALARM CAN BE SET AS ACTIVE HIGH OR ACTIVE LOW.
2. CONNECT OUTPUT SIGNAL CABLE DRAINS TO EARTH GROUND AT ONE END OF EACH CABLE ONLY.
3. ON MULTIPLE TRANSMITTER INSTALLATIONS WITH A COMMON 24VAC SOURCE, WIRE 24 VAC POWER IN-PHASE TO THE SAME TERMINALS ON ALL TRANSMITTERS (e.g.: L1 to L1, L2 to L2).