

# Instructions

Electrochemical Gas Detector  
GT3000 Series

Includes Transmitter (GTX)  
and Sensor Module (GTS)



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## Electrochemical Gas Detector

### GT3000 Series

#### Includes Transmitter (GTX) and Sensor Module (GTS)



#### **IMPORTANT**

*Be sure to read and understand the entire instruction manual before installing or operating the gas detection system. This product is intended to provide early warning of the presence of a toxic or explosive gas mixture, or of oxygen depletion. Proper device installation, operation, and maintenance are required to ensure safe and effective operation. If this equipment is used in a manner not specified in this manual, safety protection may be impaired.*

## **DESCRIPTION**

The GT3000 Electrochemical Gas Detector is an intelligent stand-alone industrial gas detector, designed to provide continuous monitoring of the atmosphere for hazardous gas leaks or oxygen depletion. Refer to Appendix E for individual gas specifications.

The GT3000 Gas Detector consists of a replaceable sensor module (Model GTS) connected to a transmitter module (Model GTX). A single transmitter is compatible with all GTS sensor modules. A variety of electrochemical sensor models are available in various concentration ranges.

The GT3000 is a 2-wire device that generates a 4–20 mA output signal with HART communication that is proportional to the concentration of the target gas.

The GT3000 is compatible with FlexVu® Model UD10, UD20 and UD30 Universal Display Units, as well as other devices that are able to monitor a linear 4–20

mA dc signal. All alarm functions are provided by the monitoring device.

The GT3000 is designed and approved as a stand alone unit for use in hazardous locations. It is suitable for outdoor applications that require IP66 rating and uses a hydrophobic filter that is easily replaced without opening the device or use of tools. The GT3000 is available as either explosion-proof or intrinsically safe.

The GT3000 supports local one-person calibration with the use of a magnet and on-board LED.

## **GTS SENSOR MODULE**

The GTS's electrochemical sensor cell uses capillary diffusion barrier technology for monitoring gas concentrations in ambient air.

## **Live Maintenance**

The hot swappable GTS sensor module is intrinsically safe and allows live maintenance while under power, without de-classifying the hazardous area. When the sensor is removed, the transmitter generates a fault output. If a new sensor of the same type and range is installed, the fault self-clears. However, if the type or range of the new sensor module does not match the old, the transmitter generates a fault until a successful calibration or acceptance of the new sensor type is completed. For additional information regarding Live Maintenance, refer to "Sensor Module Replacement" in the "Maintenance" section of this manual.

Automatic Sensor Module Recognition

The transmitter provides automatic gas sensor recognition, allowing the operator to access the following information via HART, or a UD10 or UD20 Universal display:

- Sensor module serial number
- Gas type
- Measurement range

The sensor module is factory programmed for the gas type and measurement range. When the sensor module powers up, the transmitter reads and acknowledges the gas type and measurement range.

NOTE

*The UD30 does not provide automatic sensor module recognition. The UD30 Setup Wizard must be used to configure the GTS sensor.*

GTX TRANSMITTER

The transmitter output is a linear 4-20 mA dc signal with HART communication that directly corresponds to 0-100% full scale.

A 3.8 mA output indicates sensor calibration in progress (17.3 mA for O<sub>2</sub> sensor). The GT3000 comes with one of two pre-programmed fault output levels: 2.45 mA or 3.5 mA.

Priority of output signals from highest to lowest is:

1	Calibration (In progress)
2	Fault
3	Gas Level

Transmitter Wiring

The GTX transmitter is a two-wire loop powered device that uses a three-wire cable (power, signal, and earth ground) for connecting to a controller or monitoring device. The use of shielded cable is required.

REAL TIME CLOCK (RTC)

The GTX transmitter has a real time clock with battery back-up, that is used for time stamping the event logs. The time and date are set and read using a UD10/UD20 Universal Display Unit, a HART communication device, or AMS software. The time stamp on the logs will not be correct if the RTC in the transmitter is not set correctly.

NOTE

*The UD30 does not read/set the GTX Real Time Clock.*

HISTORY/EVENT LOGS

Both the transmitter and sensor are able to store 256 history logs, which are saved in non-volatile memory and retained through power cycles. A UD10/UD20 Universal Display Unit, a HART communication device, or AMS software is required to view the history logs.

NOTE

*The UD30 does not read the GT3000 logs.*

Sensor Logging Capability

The sensor module logs the following operating parameters in non-volatile memory:

- **Running Hours** - The sensor module maintains the total operating hours, and cannot be reset.
- **Min/Max Temperature** - The sensor module maintains the minimum and maximum temperatures with a date and time stamp.
- **Calibration** - The sensor module logs the calibration history with a date and time stamp, along with the success or cause of failure codes. See Table 1. The zero and span values (AD converter values recorded at the time of calibration) are also saved. This allows the logs to follow the sensor module when it is calibrated separately from the transmitter. (Calibration data is available via a UD10/UD20, a HART communication device, or AMS software.)

NOTE

*GT3000 Calibration data cannot be read via a UD30.*

The sensor module gets the current time and date from the transmitter and provides calibration log information to the transmitter. See Figure 1.

Table 1—Calibration Status Codes

Number	Definition
0	EMPTY LOG
1	NOT USED
2	NOT USED
3	ZERO CAL
4	SPAN CAL
5	ABORT CAL
6	FAILED CAL
7	NOT USED
8	NOT USED
9	INIT CAL LOG
10	NOT USED
11	CLR CAL FAULTS

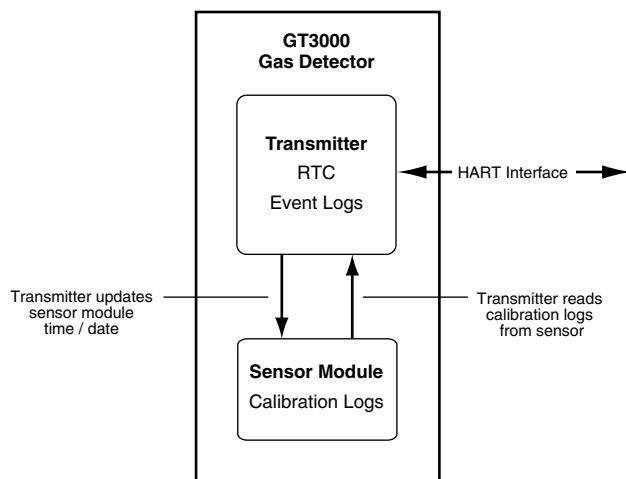


Figure 1—GT3000 Logging

### Transmitter Logging Capability

The transmitter logs the following events with a time and date stamp:

- Power-up
- Sensor change
- All Faults.

### HART COMMUNICATION

The transmitter supports HART communication on the 4-20 mA loop. This allows for configuration capability and provides device status information, calibration, and diagnostics capabilities. The GT3000 is compatible with HART interface devices such as a HART handheld communicator, the Det-Tronics UD10 or UD20 Display Unit, or an AMS system. (See Appendix F for HART menu structure.)

#### NOTE

*The UD30 does not have HART communication.*

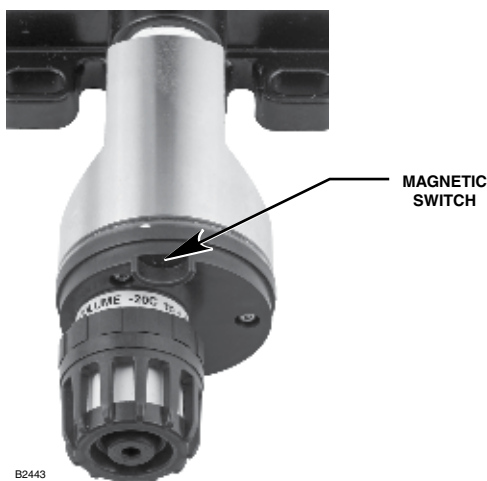


Figure 2—Location of Magnetic Switch on GT3000 Detector



Figure 3—Location of LEDs on GT3000 Gas Detector

### MAGNETIC SWITCH

The GT3000 is furnished with an internal magnetic reed switch as part of the user interface. The magnetic switch allows the user to initiate calibration by momentarily placing a magnet against the housing at the designated location. See Figure 2.

### LEDs

The GT3000 has one green and one yellow LED (See Figure 3). The LEDs are used to signal normal, calibration, and fault conditions. See Table 2.

#### NOTE

*The GT3000 does not have alarm setpoints and, therefore, does not have a red LED.*

Table 2—LEDs and Analog Output During Various Operating Conditions

Function	Green LED	Yellow LED	Analog 4-20 Signal Output
Warm-up*	Single Flash	On	3.5***
Normal Operation	Steady On	Off	4-20
Fault Condition	Off	On	3.5***
Calibration	Off	See Table 5	3.8**
No Power	Off	Off	0

\*Warm-up time can last up to 150 seconds.

\*\*O<sub>2</sub> sensor generates 17.3 mA during calibration.

\*\*\*2.45 for TYPE OUTPUT "29," reference GTX Model Matrix .

## SPECIFICATIONS

### SENSOR AND TRANSMITTER

#### AVAILABLE SENSORS—

Refer to Appendix E.

#### CROSS SENSITIVITY—

See Appendix E for Cross Sensitivity information.

#### CALIBRATION—

Sensors are calibrated at the factory. Gas type and range are read by the transmitter. Field calibration is initiated at the detector, at the UD10/UD20 Universal Display Unit, or by some other HART interface device. NOTE: Calibration cannot be initiated via the UD30.

#### OPERATING VOLTAGE—

24 volts dc nominal. (12 Vdc minimum, 30 Vdc maximum). Maximum ripple is 2 volts peak-to-peak. If using the HART function, the installation must comply with the HART power standard.

#### POWER CONSUMPTION—

0.8 watt maximum @ 30 Vdc.

#### CURRENT OUTPUT—

- 4–20 mA (Normal operating mode).
- 3.8 mA indicates calibrate mode.
- 3.5 mA or less indicates a fault condition (2.45 mA option available).

#### MAXIMUM LOOP RESISTANCE—

300 ohms at 18 Vdc, 600 ohms at 24 Vdc.

#### WIRING—

The transmitter has flying leads, 20" long, 600V insulation.

Colors: Red = V+  
Black = V-  
Green = earth ground

Gauge: 22 AWG (red and black)  
16 AWG (green).

#### WARM-UP—

Warm-up time can last up to 150 seconds.

#### OPERATING TEMPERATURE—

See Appendix E.

#### STORAGE TEMPERATURE—

Transmitter: -55°C to +75°C / -67°F to +167°F.  
Sensor: 0°C to +20°C / +32°F to +68°F.  
Ideal: +4°C to +10°C / +39°F to +50°F.

#### EXPECTED STORAGE LIFE—

6 months in factory-sealed packaging

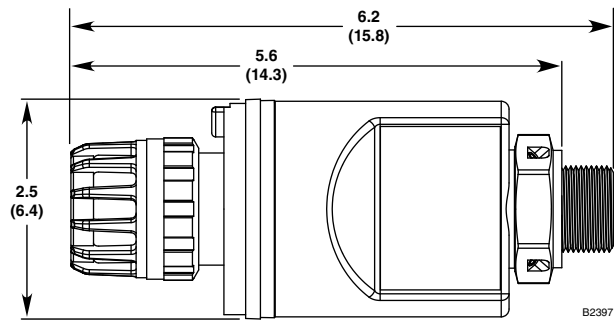


Figure 4—Dimensions of GT3000 Gas Detector in Inches (CM)

#### HUMIDITY RANGE—

15 to 90% RH.

#### PRESSURE RANGE—

Atmospheric  $\pm 10\%$ .

#### INGRESS PROTECTION—

IP66.

#### THREAD OPTIONS—

3/4" NPT or M25.

#### ENCLOSURE MATERIAL—

GTX Transmitter: 316 Stainless Steel  
GTS Sensor Module: PPA (30% carbon filled).

#### DIMENSIONS—

See Figure 4.

#### EXPECTED OPERATING LIFE—

2 years in an open air environment.

#### WARRANTY—(For the GTX and GTS)

12 months from date of installation or 18 months from date of shipment, whichever occurs first.

#### CERTIFICATIONS—



For complete approval details, refer to the appropriate Appendix:

- Appendix A - FM
- Appendix B - CSA
- Appendix C - IECEx
- Appendix D - Other Approvals

## IMPORTANT SAFETY NOTES



### CAUTION

*The wiring procedures in this manual are intended to ensure proper functioning of the device under normal conditions. However, because of the many variations in wiring codes and regulations, total compliance to these ordinances cannot be guaranteed. Be certain that all wiring complies with all local codes. If in doubt, consult the authority having jurisdiction before wiring the system. Installation must be done by a properly trained person.*



### CAUTION

*This product has been tested and approved for use in hazardous areas. However, it must be properly installed and used only under the conditions specified within this manual and the specific approval certificates. Any device modification, improper installation, or use in a faulty or incomplete configuration will render warranty and product certifications invalid.*



### CAUTION

*The GT3000 contains no field repairable components. User performed service is limited to replacement of the gas sensor module.*



### CAUTION

*Hazardous location temperature limits exceed the product operational temperature limits. If the sensor is exposed to temperatures beyond the operational temperature limits listed in Appendix E, then the sensor module (GTS) should be replaced or a response test, as described in the GT3000 Safety Manual (95-8685), shall be performed.*

## LIABILITIES

*The manufacturer's warranty for this product is void, and all liability for proper function of the detector is irrevocably transferred to the owner or operator in the event that the device is serviced or repaired by personnel not employed or authorized by Detector Electronics Corporation, or if the device is used in a manner not conforming to its intended use.*



### CAUTION

*Observe precautions for handling electrostatic sensitive devices.*

### NOTE

*The sensor housing is made of Polyphthalamide (PPA), 30% carbon filled (Material Manufacturer RTP). Questions regarding chemical resistance should be addressed to:*

*[www.det-tronics.com](http://www.det-tronics.com)*

*US toll free 800-468-3244 or 952-941-5665*

## INSTALLATION

The gas detector can be installed either in a stand-alone configuration as a loop powered device, or it can be connected to a UD10/UD20/UD30 Universal Display Unit.

### NOTE

*The gas detector housing must be electrically connected to earth ground. A dedicated earth ground wire is provided on the transmitter for connection to earth ground or to a grounded housing.*

The detector must always be installed per local installation code.

Before installing the gas detector, define the following application details:

### IDENTIFICATION OF VAPOR(S) TO BE DETECTED

It is necessary to always identify the vapor(s) of interest at the job site. In addition, the fire hazard properties of the vapor, such as vapor density, flashpoint, and vapor pressure should be identified and used to assist in selecting the optimum detector mounting location within the area.

### IDENTIFICATION OF DETECTOR MOUNTING LOCATIONS

Identification of the most likely leak sources and leak accumulation areas is typically the first step in identifying the best detector mounting locations. In addition, identification of air current/wind patterns within the protected area is useful in predicting gas leak dispersion behavior. This information should be used to identify optimum sensor installation points.

If the vapor of interest is lighter than air, place the sensor above the potential gas leak. Place the sensor close to the floor for gases that are heavier than air. Note that air currents may cause a gas that is slightly heavier than air to rise under some conditions. Heated gases may also exhibit the same phenomenon.

The most effective number and placement of detectors varies depending on the conditions on site. The individual designing the installation must often rely on experience and common sense to determine the detector quantity and best locations to adequately protect the area. Note that it is typically advantageous to locate detectors where they are accessible for maintenance. Locations near excessive heat or vibration sources should be avoided if possible.

Final suitability of possible gas detector locations should be verified by a site survey. If any questions arise regarding installation, please contact the factory.

### DEVICE MOUNTING ORIENTATION

The gas detector must be mounted in a vertical position only, with the sensor pointing down (See Figure 5).

### IMPORTANT

*The sensor should be oriented with the LEDs facing forward so they are easily visible to personnel within the area. To ensure correct orientation (the LEDs are not visible when power is off), position the GND lug on the left hand side and the calibration notch to the front. Note that the LEDs are located directly above the calibration notch.*



Figure 5—Correct Mounting Orientation for the GT3000



## DETECTOR INSTALLATION

### 3/4" NPT Models

3/4" NPT models have Tapered Threads and no Lock Nut. Install the sensor as follows:

1. Screw the detector into the appropriate entry on the termination box. Ensure a **minimum** of 5 fully engaged threads. Use of teflon tape on NPT threads is recommended to prevent thread damage.
2. When the detector gets tight, note the position of the LEDs, GND lug and calibration notch and adjust the detector as required so that the LEDs will be easily visible.

### M25 Models

M25 models have Straight Threads and a Lock Nut. Install the detector as follows:

1. Screw the detector lock nut as far back as it will go, then screw the detector into the appropriate entry on the termination box. Ensure a **minimum** of 7 fully engaged threads.
2. With the detector in the desired position (LEDs visible as shown in Figure 5), tighten the lock nut against the termination box to hold the detector securely in place.
3. Tighten the set screws (minimum of two) to prevent movement of the lock nut. See Figure 6.

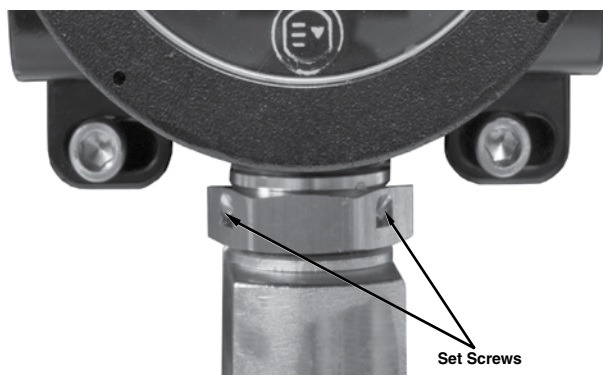


Figure 6—Location of Lock Nut and Set Screws (Metric Models Only)

## SENSOR TERMINATION BOX

A Det-Tronics sensor termination box (Model STB) is required for installing the sensor in a stand alone configuration, or for installing the GT3000 remotely from the UD10/UD20/UD30 Universal Display Unit.

When installing the GT3000 remotely from a UD10/UD20/UD30, two-conductor shielded cable is required to prevent possible nuisance EMI/RFI. The maximum cable length between the GT3000 and the UD10/UD20/UD30 is 2000 ft.

## WIRING

### POWER SUPPLY REQUIREMENTS

Calculate the total gas detection system power consumption rate in watts from cold start-up. Select a power supply with adequate capability for the calculated load. Ensure that the selected power supply provides sufficient regulated and filtered output power for the entire system. If a back-up power system is required, a float-type battery charging system is recommended. If an existing source of power is being utilized, verify that system requirements are met.

#### NOTE

*The power supply must also meet the noise requirements for HART systems.*

### WIRING CABLE REQUIREMENTS

Always use proper cabling type and diameter for input power as well as output signal wiring. 22 to 14 AWG shielded stranded copper wire is recommended.

Always install a properly sized, master power fuse or breaker on the system power circuit.

#### NOTE

*The use of shielded cable in conduit or shielded armored cable is highly recommended. In applications where the wiring is installed in conduit, dedicated conduit is recommended. Avoid low frequency, high voltage, and non-signaling conductors to prevent nuisance EMI problems.*

#### CAUTION

*The use of proper conduit installation techniques, breathers, glands, and seals is required to prevent water ingress and/or maintain the explosion-proof rating.*

## INTRINSIC SAFETY BARRIERS

When the GT3000 is used in an intrinsically safe installation, care must be taken when selecting an I.S. barrier to ensure proper function of the device. The GT3000 has been tested with the types of barriers listed in Tables 3 and 4.

Table 3 lists zener barriers.

Table 4 lists isolating barriers that provide a wider range of input power supply voltages and are less dependent on voltage drops in the loop. When using IS Barriers, the user must ensure a minimum of 10.5 VDC across the GTX transmitter Red and Black Wires, for proper operation of the GT3000.

For additional information regarding proper IS installation, refer to the Control Drawings in Appendix G of this manual.

## WIRING PROCEDURE

Wire the transmitter as shown in Figures 7 through 12.



### CAUTION

*If ripple on the main power source causes interference with the HART function, the use of an isolated power source (Figure 12) is recommended for best HART performance.*

Table 3—Acceptable Intrinsic Safety Barriers  
for use with GT3000 – Zener Barriers

Manufacturer	P/N
Turck	MZB87PX
MTL	MTL7787P+
Pepperl & Fuchs	Z787.h

Table 4—Acceptable Intrinsic Safety Barriers  
for use with GT3000 – Isolating Barriers

Manufacturer	P/N
Turck	IM33-11Ex-Hi
MTL	5541
Pepperl & Fuchs	KCD2-STC-Ex1
Stahl	9160/13-10-11

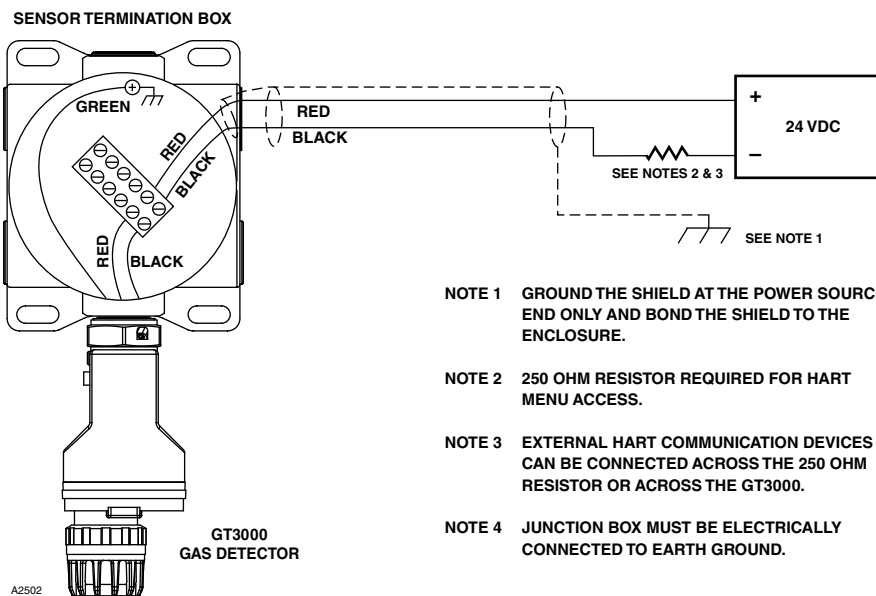


Figure 7—GT3000 Wired to Sensor Termination Box in Stand-Alone Configuration (Explosion-Proof)

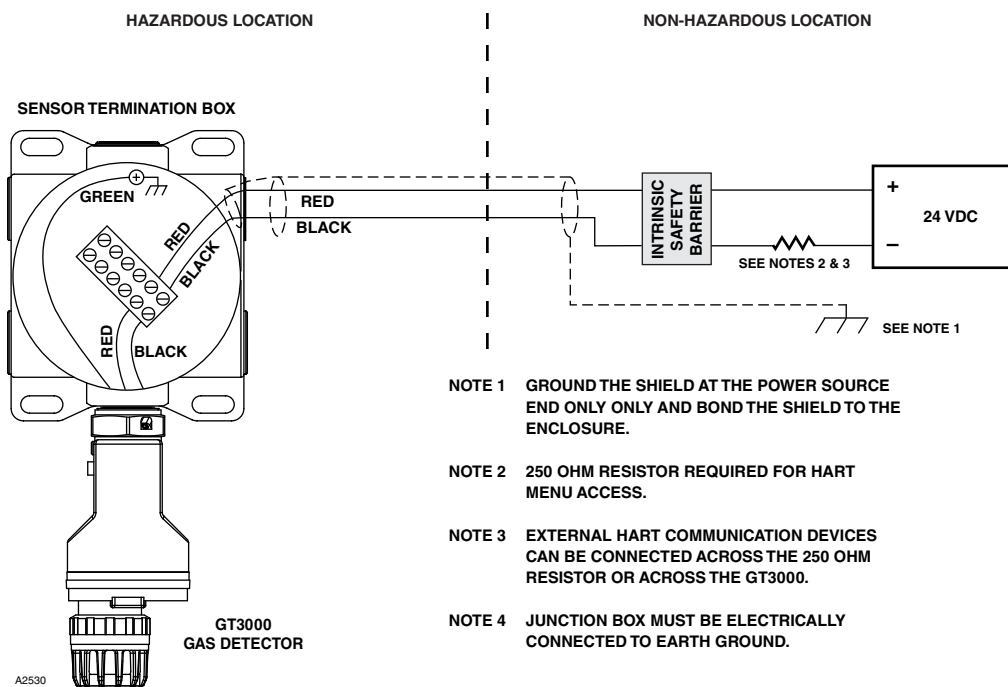


Figure 8—GT3000 Wired to Sensor Termination Box in Stand-Alone Configuration (Intrinsically Safe)

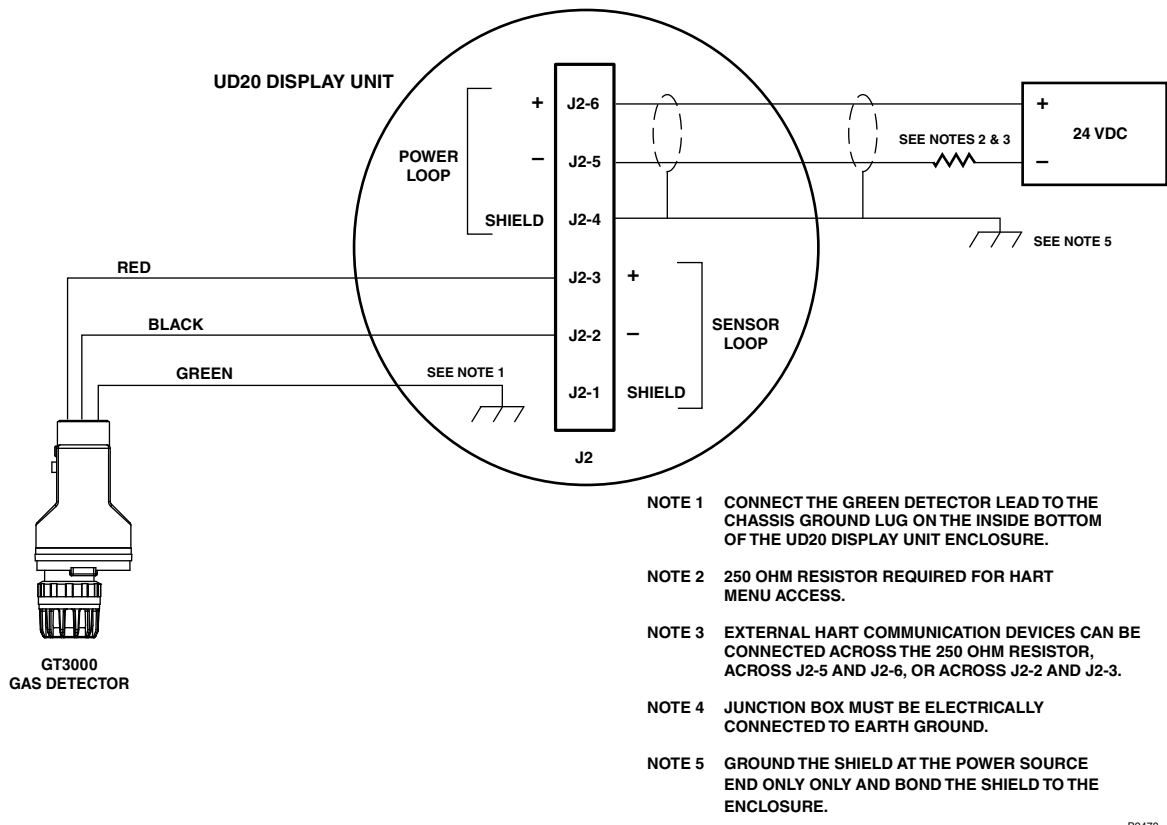


Figure 9—GT3000 Wired Directly to UD20 Display Unit (Explosion-Proof)

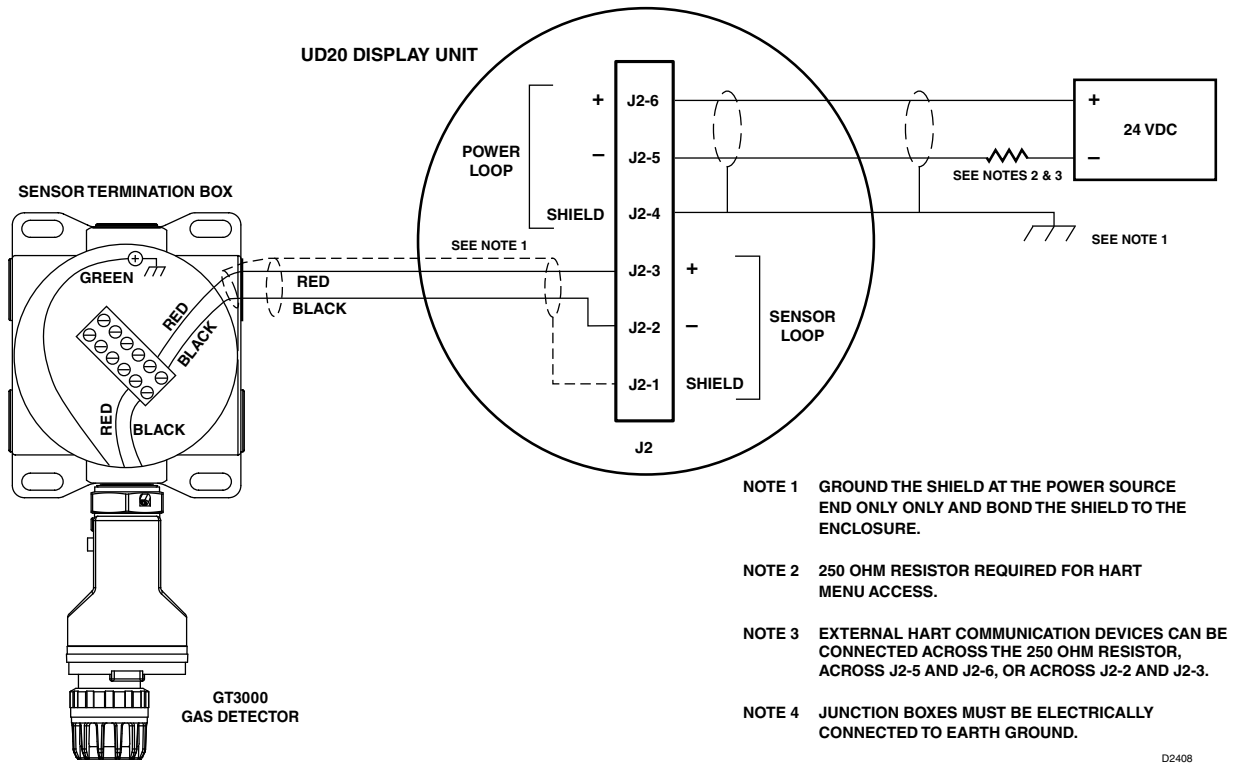


Figure 10—GT3000 with Sensor Termination Box Wired to UD20 Display Unit (Explosion-Proof)

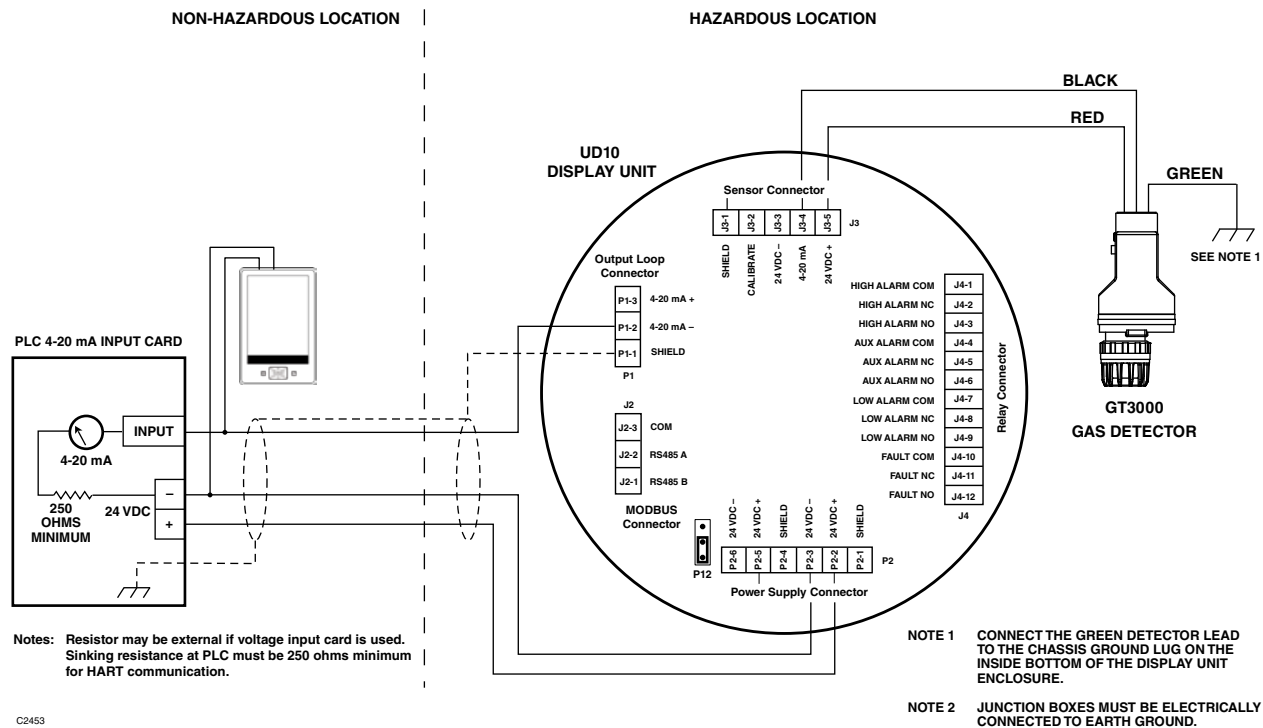


Figure 11—GT3000 Wired Directly to the UD10 Display Unit / UD10 Wired to PLC with 4-20 mA Non-Isolated Sourcing Output

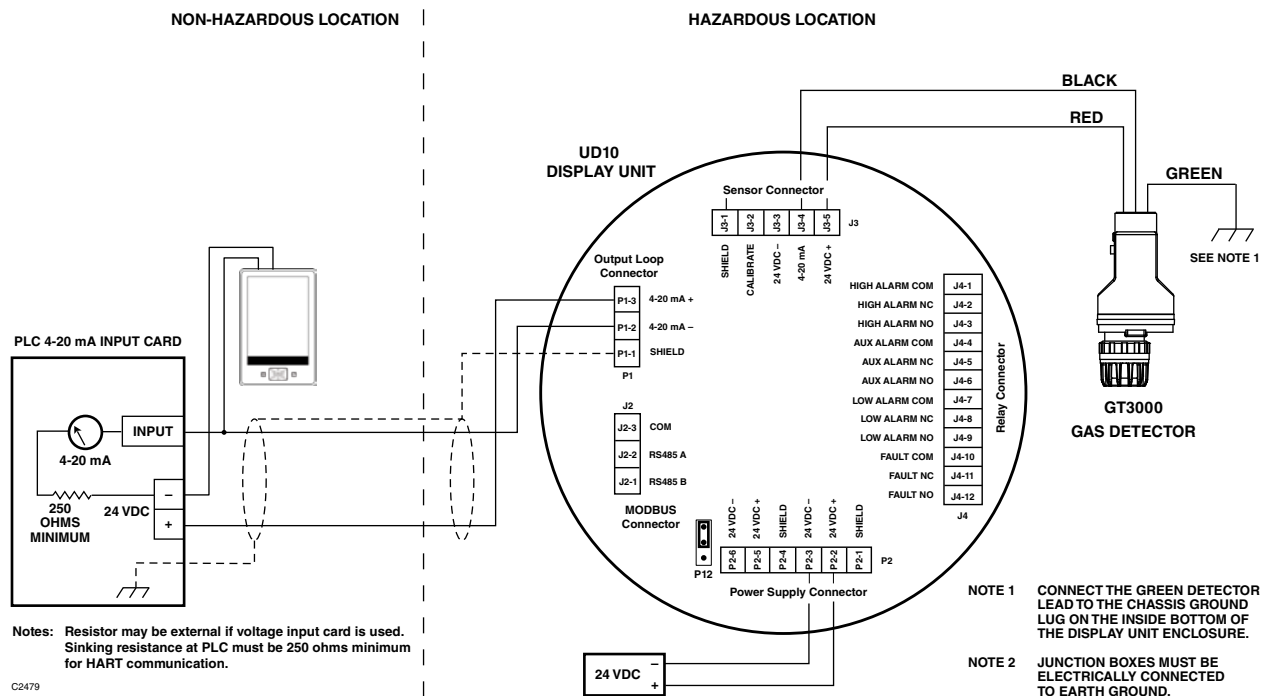


Figure 12—GT3000 Wired Directly to the UD10 Display Unit / UD10 Wired to PLC with 4-20 mA Isolated Sourcing Output

CALIBRATION

GT3000 CALIBRATION

The GT3000 supports one person calibration, which can be initiated locally using a calibration magnet, or remotely with a command from the HART interface. The calibration process is automatic, with the exception of gas delivery. LEDs on the transmitter guide the operator when to apply and remove the calibration gas. See Table 5.

NOTE

*The HART interface allows the operator to adjust the calibration gas concentration within the range of 30 to 90% full scale. The default value for all gas sensors except oxygen is 50% full scale. Oxygen sensors use a default value of 20.9%.*

All GT3000 gas detectors require a two-point calibration — zero and span. The calibration process can be initiated using the magnetic switch or through a HART interface, such as the UD10/UD20. All sensors, including oxygen, should be in clean air (20.9% oxygen) when the calibration sequence is initiated.

NOTE

*The GT3000 calibration cannot be initiated from the UD30.*

Table 5— LEDs During Calibration

Calibration Step	Yellow LED
Waiting for Zero	Steady
Waiting for Gas	Blinking
Waiting for Span	Blinking
Remove Cal Gas	Off

The calibration process proceeds automatically after initiation. Onboard LEDs signal the operator when to apply the calibration gas and inform of the progress.

The calibration can be aborted by activating the magnetic switch or with a command from the HART communication device in lieu of applying the calibration gas.

If the calibration process takes longer than 10 minutes, the detector will time-out and signal a calibration fault.

If the calibration sequence is aborted or not completed successfully, the detector reverts back to the previous calibration values and signals a calibration fault. The calibration fault can be cleared by activating the magnetic switch for one second or by performing a successful calibration.

The calibration process can fail for the following causes:

- Zero is out of range
- Span is out of range
- Time-Out.

The time and date of calibration events are logged in non-volatile memory along with the calibration outcome. Possible calibration scenarios include the following:

- Successful Calibration
- Aborted Calibration
- Failed Calibration and the Cause

The Sensor Module stores calibration data in non-volatile memory to allow the sensor to be calibrated off-site and installed in the field without the need for re-calibration.

## CALIBRATION PROCEDURE

### NOTE

When attaching or removing the calibration cup, push or pull the cup with a slight **clockwise** twist. Turning counterclockwise can cause the filter assembly on the GT3000 to loosen. If the filter assembly is inadvertently loosened, tighten it by hand (no tools required).

## Toxic and Hydrogen Sensors

1. Clean air must be present at the GT3000 sensor module prior to initiating calibration. The use of bottled air is recommended.
2. Initiate calibration by momentarily holding the calibration magnet against the designated location on the sensor module (see Figure 13) until the green LED turns off and the yellow LED turns on steady (approximately one second). Remove the magnet when the green LED turns off. The detector immediately begins taking zero readings. Calibration can also be initiated via HART interface (see Appendix F) or the UD10 (see manual number 95-8618).
3. When the zero calibration is complete, the yellow LED changes from steady to blinking. Apply the calibration gas to the sensor.

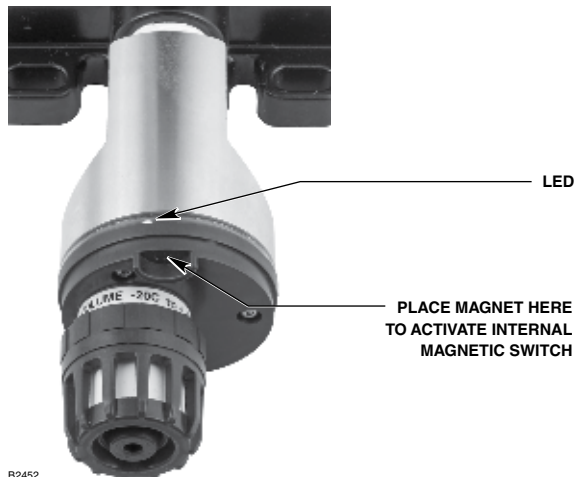


Figure 13—Location of Magnetic Switch on GT3000 Detector

4. When the yellow LED turns off, remove the calibration gas. The gas level at the sensor gradually returns to zero. The green LED turns on steady to indicate that the device has returned to normal operation, using the new calibration data.

### NOTE

The calibration procedure must be completed within a ten minute period. If the calibration is not completed, a calibration fault will be generated and the transmitter will continue to use the previous calibration data.

### NOTE

To ensure reliable detection performance, calibration should be performed at regularly scheduled intervals. Various factors affect the time interval between periodic calibrations (typically 30, 60, or 90 day intervals), depending on the ambient conditions and/or gas exposure.

### NOTE

Calibration of ammonia sensor is recommended any time the sensor has been exposed to 90 ppm ammonia.

## Oxygen Sensor

1. Using the magnet, activate the magnetic calibration switch on the GT3000. The green LED turns off and the yellow LED turns on steady.
2. The device automatically performs the zero calibration.
3. When the yellow LED on the GT3000 flashes, the device automatically performs the span calculation. If using bottled 20.9% oxygen, apply immediately.
4. After successful calibration, the yellow LED turns off and the green LED turns on steady to indicate that the device has returned to normal operation, using the new calibration data. Remove calibration gas (if used).

## MAINTENANCE

### NOTE

Refer to the GT3000 Safety Manual (number 95-8685) for specific requirements and recommendations applicable to the proper installation, operation, and maintenance of all certified SIL 2 capable GT3000 gas detectors.

### ROUTINE INSPECTION

The gas inlet to the sensor should be inspected periodically, or during scheduled maintenance, to ensure that external obstructions such as plastic bags, litter, heavy oil and tar, paint, mud, snow, or other materials do not block the flow of gas to the sensor, thereby impairing the performance of the device.

To replace a dirty or damaged filter, simply grasp the filter assembly and twist counterclockwise to remove. Screw the new filter in place on the sensor module. Do not overtighten. See Figure 14.

To ensure reliable protection, it is important to check and calibrate the detection system on a regularly scheduled basis. The frequency of these checks is determined by the requirements of the particular installation – typically 30, 60, or 90 day intervals, depending on the ambient conditions.

### SENSOR MODULE REPLACEMENT (Live Maintenance)

The hot swappable, intrinsically safe sensor module can be replaced in the field without removing power or de-classifying the hazardous area.

To replace the sensor module, locate the three captive screws on the front of the module as shown in Figure 15. Loosen these screws and remove the old sensor module. Install the new sensor module onto the transmitter, and tighten the screws. To ensure proper moisture ingress protection and grounding of the plastic nosepiece, tighten the screws to 70-100 oz-in (0.5-0.7 N-m).

### IMPORTANT



Figure 14—GT3000 with Replaceable Filter Removed

Always exercise caution when working in combustible gas areas. Follow replacement instructions explicitly.

### NOTE

Removing the sensor module with power applied will result in a fault condition until a new sensor module of the same type is installed. When replacing an oxygen sensor, this action will result in an alarm condition as the decreasing 4–20 mA signal passes through the alarm range. Inhibit response devices to prevent unwanted actuation.

### NOTE

Oxygen (O<sub>2</sub>) electrochemical sensors contain lead (Pb). Observe all local waste management requirements when disposing of exhausted O<sub>2</sub> electrochemical sensors.

### NOTE

Electrochemical sensors are highly sensitive to antiseptic wipes and/or cleaning products that contain alcohol and antibacterial/antiviral agents. Antiseptic products should be removed from areas where sensors are stored, handled, or used. If antiseptic products are being used on workers' hands, sufficient time should be allowed for the alcohol to evaporate before handling sensors.

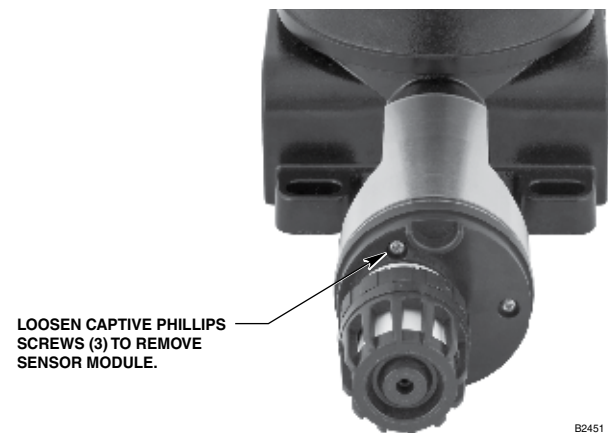


Figure 15—Location of Screws for Sensor Module Replacement



## DEVICE REPAIR AND RETURN

Prior to returning devices, a Return Materials Authorization (RMA) number must be obtained. The process for obtaining this number can be found here ([www.det-tronics.com/Products/repair-and-warranty-services](http://www.det-tronics.com/Products/repair-and-warranty-services)). You may also contact your authorized local sales representative or Det-Tronics Technical Support for assistance:

+1 800.765.3473, ext.3  
+1 952.941.5665  
M-F, 8 AM - 5 PM, Central Prevailing Time, US  
RMA@Det-Tronics.com

Pack the unit properly. Always use sufficient packing material. Where applicable, use an antistatic bag as protection from electrostatic discharge.

### NOTE

*Inadequate packaging that ultimately causes damage to the returned device during shipment will result in a service charge to repair the damage incurred during shipment.*

Return all equipment transportation prepaid to the factory in Minneapolis.

### NOTE

*It is highly recommended that a complete spare be kept on hand for field replacement to ensure continuous protection.*

## ORDERING INFORMATION

Sensor module (GTS) and transmitter (GTX) must be ordered separately. Refer to the Transmitter and Sensor Model Matrix on next page for ordering details.

### GTS GAS SENSORS

Gas	Concentration
Hydrogen Sulfide (H <sub>2</sub> S)	0-20 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0-50 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0-100 ppm
Oxygen (O <sub>2</sub> )*	1-25% V/V
Carbon Monoxide (CO)	0-100 ppm
Carbon Monoxide (CO)	0-500 ppm
Ammonia (NH <sub>3</sub> )	0-100, or 0-500 ppm
Sulfur Dioxide (SO <sub>2</sub> )	0-20 ppm
Sulfur Dioxide (SO <sub>2</sub> )	0-100 ppm
Chlorine (Cl <sub>2</sub> )	0-10 ppm
Hydrogen (H <sub>2</sub> )	0-1000 ppm
Nitrogen Dioxide (NO <sub>2</sub> )	0-20 ppm

\*Oxygen detector for O<sub>2</sub> depletion (< 21% V/V) only. Oxygen sensor will indicate a fault if <1% volume oxygen is detected.

### CALIBRATION KITS FOR GAS SENSORS

Part Number	Gas / Concentration
010274-001	H <sub>2</sub> S / 10 ppm
010274-002	H <sub>2</sub> S / 25 ppm
010274-003	H <sub>2</sub> S / 50 ppm
010274-008	H <sub>2</sub> / 500 ppm
010274-009	O <sub>2</sub> / 20.9%
010274-010	CO / 50 ppm
010274-011	CO / 250 ppm
010274-005	NH <sub>3</sub> / 50 ppm
010274-006	NH <sub>3</sub> / 250 ppm
010274-013	SO <sub>2</sub> / 10 ppm
010274-014	SO <sub>2</sub> / 50 ppm
010274-004	Cl <sub>2</sub> / 5 ppm
010274-016	NO <sub>2</sub> / 10 ppm

Replacement gas cylinders for all calibration kits are available.

### PARTS & ACCESSORIES

Part Number	Description
009700-001	Magnetic Tool
009737-001	Calibration Cup
107427-059	Calibration Cup O-ring
101678-007	3 Foot Tubing
162552-001	Regulator, 1 LPM
009640-001	Replacement Filter
012509-001	Q312 Sample Draw without Fittings
012509-002	Q312 Sample Draw with Fittings
010780-003	GT3000 Remote Calibration Adaptor
010783-001	GT3000 Remote Calibration Filter
012513-XXX*	Q912 Duct Mount Enclosure, M25
012514-XXX*	Q912 Duct Mount Enclosure, 3/4"

\*Refer to the Product Catalog for a list of options.

## GTS Sensor Model Matrix

MODEL	DESCRIPTION		
GTS	Gas Sensor Module		
	TYPE	GAS / RANGE	
	H2S	Hydrogen Sulfide (certified SIL 2 capable)	
		20P	0 - 20 PPM
		50P	0 - 50 PPM
		100P	0 - 100 PPM
	H2S+	Hydrogen Sulfide (certified SIL 2 capable)	
		20P	0 - 20 PPM
		50P	0 - 50 PPM
		100P	0 - 100 PPM
	CL2	Chlorine	
		10P	0 - 10 PPM
	NH3	Ammonia	
		100P	0 - 100 PPM
		500P	0 - 500 PPM
	H2	Hydrogen	
		1000P	0 - 1000 PPM
	O2	Oxygen (certified SIL 2 capable)	
		25V	0 - 25 % by Vol
	CO	Carbon Monoxide	
		100P	0 - 100 PPM
		500P	0 - 500 PPM
	SO2+	Sulfur Dioxide	
		20P	0 - 20 PPM
		100P	0 - 100 PPM
	NO2	Nitrogen Dioxide	
		20P	0 - 20 PPM
		TYPE	SAFETY INTEGRITY LEVEL
		S	SIL 2
		N	NON-SIL
		TYPE	LABEL
		C	CHINESE
		E	ENGLISH
		K	KAZAKH
		P	PORTUGUESE (Brazil)
		R	RUSSIAN
		TYPE	HOUSING
		S	STANDARD
		E	ENHANCED SHIELDING

## GTX Transmitter Model Matrix

MODEL	DESCRIPTION		
GTX	Gas Transmitter		
	TYPE	MATERIAL	
	S	Stainless Steel (316)	
		TYPE	THREAD SIZE
		N	3/4" NPT
		M	Metric M25
		TYPE	OUTPUTS
		26	4-20 mA, HART (3.5 mA FAULT)
		29	4-20 mA, HART (2.45 mA FAULT)
		TYPE	APPROVALS
		B	INMETRO (Brazil)
		C	CSA
		F	FM
		I	IECEX
		K	KAZAKH
		N	FM/CSA/IECEX
		R	RUSSIA
		Y	China
		TYPE	CLASSIFICATION (Division/Zone)
		4	Intrinsically Safe
		5	Explosion-Proof

## **APPENDIX A**

### **FM APPROVAL DESCRIPTION**

The following items, functions, and options describe the FM approval.

#### **APPROVAL**

Electrochemical Gas Detector, GT3000 Series.

#### **Explosion Proof Model**

Class I, Div. 1, Groups A, B, C, & D (T4).

Class I, Div. 2, Groups A, B, C, & D (T4).

Class I, Zone 1, AEx db mb [ia Ga] IIC T4 Gb.

IP66.

Conduit seal not required.

Acidic atmospheres excluded.

#### **Intrinsically Safe Model**

IS Class I, Div. 1, Groups A, B, C, & D (T4).

Class I, Zone 0, AEx ia IIC T4 Ga.

IP66.

Install according to Control Drawing 009803-001 (See Appendix G)

#### **Special Conditions of Safe Use:**

The GTX Toxic Gas Module shall be connected to an UD10, UD20, STB or U9500 enclosure supplied by the manufacture and rated to maintain the type of protection specified on this certification.

Performance verified per ANSI/ISA 92.00.01 and FM6340.

## APPROVED ACCESSORIES

Part Number	Description
010274-001	Gas Calibration Kit, 10 ppm H <sub>2</sub> S
010274-002	Gas Calibration Kit, 25 ppm H <sub>2</sub> S
010274-003	Gas Calibration Kit, 50 ppm H <sub>2</sub> S
010274-008	Gas Calibration Kit, 500 ppm H <sub>2</sub>
010274-009	Gas Calibration Kit, 20.9% O <sub>2</sub>
010274-010	Gas Calibration Kit, 50 ppm CO
010274-011	Gas Calibration Kit, 250 ppm CO
010274-005	Gas Calibration Kit, 50 ppm NH <sub>3</sub>
010274-006	Gas Calibration Kit, 250 ppm NH <sub>3</sub>
010274-013	Gas Calibration Kit, 10 ppm SO <sub>2</sub>
010274-014	Gas Calibration Kit, 50 ppm SO <sub>2</sub>
010274-004	Gas Calibration Kit, 5 ppm Cl <sub>2</sub>
010274-016	Gas Calibration Kit, 10 ppm NO <sub>2</sub>
009700-001	Magnetic Tool
009737-001	Calibration Cup
107427-059	Calibration Cup O-ring
101678-007	3 Foot Tubing
162552-001	Regulator, 1 LPM
009640-001	Replaceable Filter

## **APPENDIX B**

### **CSA CERTIFICATION DESCRIPTION**

The following items, functions, and options describe the CSA approval.

#### **APPROVAL**

Electrochemical Gas Detector, GT3000 Series.

#### **Explosion Proof Model**

Class I, Div. 1, Groups A, B, C, & D (T4).

Class I, Div. 2, Groups A, B, C, & D (T4).

IP66.

Conduit seal not required.

Acidic atmospheres excluded.

#### **Intrinsically Safe Model**

Class I, Div. 1, Groups A, B, C, & D (T4).

IP66.

Install according to Control Drawing 009803-002 (See Appendix G)

## **APPENDIX C**

### **IECEX APPROVAL DESCRIPTION**

The following items, functions, and options describe the IECEx approval.

#### **APPROVAL**

Electrochemical Gas Detector, GT3000 Series.

#### **Explosion Proof Model**

Ex db mb [ia Ga] IIC T4 Gb IP66.

IECEX FMG 10.0003X.

#### **Specific Conditions of Use:**

1. The GTS Gas Sensor Module, IECEx CoC IECEx FMG 08.005X, shall be installed on to the GTX Transmitter to complete the enclosure and the intrinsically safe circuit.
2. The GTX Gas Transmitter module shall be connected directly to a junction box or instrument suitable for the area of installation to provide protection for the flying leads.
3. The GTX Toxic Gas Module shall be connected to an IECEx suitably certified UD10, UD20, UD30, STB or U9500 enclosure supplied by the manufacturer and rated to maintain the type of protection specified on this certification.

#### **Intrinsically Safe Model**

Ex ia IIC T4 Ga IP66.

IECEX FMG 08.0005X.

$U_i = 30 \text{ V}$ ,  $I_i = 200 \text{ mA}$ ,  $P_i = 1.0 \text{ W}$ ,  $C_i = 4.4 \text{ nF}$ ,  $L_i = 0$

#### **Specific Conditions of Use:**

1. The GT3000 Detector Head shall be connected directly to a junction box suitable for the area of installation to provide protection for the flying leads.
2. The GTX Transmitter shall be installed with a GTS Toxic Sensor to form the GT3000 gas detector

## APPENDIX D

### OTHER APPROVALS

The following items, functions, and options describe various other approvals applicable to the GT3000.

#### SIL APPROVAL

IEC 61508

Certified SIL 2 Capable.

SIL Certification includes H<sub>2</sub>S and O<sub>2</sub> GTS models only. For specific information regarding SIL models, refer to the GT3000 Safety Reference Manual, form 95-8685.

#### INMETRO (BRAZIL)

##### Explosion Proof Model

UL-BR 15.0752X

Ex db mb [ia Ga] IIC T4 Gb IP66

Tamb -40°C to +60°C

##### Applicable Standards

ABNT NBR IEC 60079-0:2020 Versão Corrigida: 2024

ABNT NBR IEC 60079-1:2016 Versão Corrigida: 2020

ABNT NBR IEC 60079-11:2013 Versão Corrigida: 2017

ABNT NBR IEC 60079-18: 2020

##### Specific Conditions of Use:

1. A GTS Toxic Gas Sensor Module, separately certified, shall be installed on to the GTX Transmitter to complete the enclosure and the intrinsically safe circuit.
2. The GTX Toxic Gas Transmitter module shall be connected directly to a junction box or instrument suitable for the area of installation to provide protection for the flying leads.
3. The GTX Toxic Gas Module shall be connected to a suitably rated UD10, UD20, STB or U9500 enclosure, separately certified, supplied by the manufacturer and rated to maintain the type of protection specified on this certification.

##### Intrinsically Safe Model

UL-BR 15.0404X

Ex ia IIC T4 Ga IP66

Tamb -40°C to +50°C (H<sub>2</sub>S)

Tamb -40°C to +55°C (H<sub>2</sub>S+)

Tamb -20°C to +40°C (NH<sub>3</sub>)

Tamb -20°C to +50°C (other)

Ui = 30 V, Ii = 200 mA, Pi = 1.0 W, Ci = 4.4 nF, Li = 0

##### Applicable Standards

ABNT NBR IEC 60079-0:2020 Versão Corrigida: 2024

ABNT NBR IEC 60079-11:2013 Versão Corrigida: 2017

##### Specific Conditions of Use:

1. The GT3000 Detector Head shall be connected directly to a junction box suitable for the area of installation to provide protection for the flying leads.
2. The GTX Transmitter shall be installed with a GTS Toxic Sensor to form the GT3000 Gas Detector.



## **DNV**

Type Approval Certificate TAA000002D (O2);  
TAA000002F (CO & H2S)

## **RUSSIA / KAZAKHSTAN / INDIA**

Contact Det-Tronics for details.

## **LANGUAGE KEY**

Languages indicated within the declaration of conformity are delineated by a two-letter code as indicated in the list below:

<b>Code</b>	<b>Language</b>
BG	Bulgarian
ES	Spanish
CS	Czech
DA	Danish
DE	German
ET	Estonian
EL	Greek
EN	English
FR	French
HR	Croatian
IT	Italian
LV	Latvian
LT	Lithuanian
HU	Hungarian
MT	Maltese
NL	Dutch
PL	Polish
PT	Portuguese
RO	Romanian
SK	Slovak
SL	Slovenian
FI	Finnish
SV	Swedish

## APPENDIX E

### SENSOR COMPARISON/CROSS SENSITIVITY

#### Electrochemical Gas Sensors

Gas	Range	Response Time <sup>1</sup>	Operating Temperature Range	Accuracy of Reading (Whichever is greater)	Performance Approved Standard	Zero Drift
Hydrogen Sulfide+ (H <sub>2</sub> S+)	0-20 PPM	T20 = ≤10 Sec., T50 = ≤13 Sec., T90 = ≤30 Sec.	For -10°C to +55°C, ±2 ppm or ±10% of Reading <sup>6</sup> , ISA 92.00.01 <sup>4</sup> . For -20°C to -10°C, ±3 ppm ±15% of Reading <sup>6</sup> , Det-Tronics Verified. For -40°C to -20°C, ±3 ppm ±30% of Reading <sup>6</sup> , Det-Tronics Verified.			± 1 ppm/Mo.
Hydrogen Sulfide+ (H <sub>2</sub> S+)	0-50 PPM					± 1 ppm/Mo.
Hydrogen Sulfide+ (H <sub>2</sub> S+)	0-100 PPM					± 2 ppm/Mo.
Ammonia (NH <sub>3</sub> )	0-100 PPM <sup>2</sup>	T50 = 24 Sec. T90 = 65 Sec.	For +20°C to +40°C, ±4ppm or ±15% of Reading <sup>6</sup> , Det-Tronics Verified. For -10°C to +20°C, ±4ppm or -20% to +50% of Reading <sup>6</sup> , Det-Tronics Verified. For -20°C to -10°C, ±4ppm or -20% to +60% of Reading <sup>6</sup> , Det-Tronics Verified.			± 2 ppm/Mo.
Ammonia (NH <sub>3</sub> )	0-500 PPM <sup>2</sup>	T50 = 30 Sec. T90 = 120 Sec.	For +20°C to +40°C, ±4ppm or ±15% of Reading <sup>6</sup> , Det-Tronics Verified. For -20°C to +20°C, ±4ppm or -15% to +50% of Reading <sup>6</sup> , Det-Tronics Verified.			± 10 ppm/Mo.
Oxygen (O <sub>2</sub> ) <sup>5</sup>	0-25% V/V <sup>3</sup>	T20 = 7 Sec. T90 = 30 Sec.	-20°C to +50°C	< 0.5% V/V <sup>7</sup>	FM6340 <sup>4</sup>	< 2 %/Mo.
Carbon Monoxide (CO)	0-100 PPM	T50 = 15 Sec. T90 = 40 Sec.	For +20°C to +50°C, ±5ppm or ±10% of Reading <sup>6</sup> , Det-Tronics Verified. For -20°C to +20°C, ±6ppm or ±25% of Reading <sup>6</sup> , Det-Tronics Verified.			± 2 ppm/Mo.
Carbon Monoxide (CO)	0-500 PPM	T50 = 12 Sec. T90 = 25 Sec.				± 9 ppm/Mo.
Sulfur Dioxide+ (SO <sub>2</sub> +)	0-20 PPM	T50 = 12 Sec. T90 = 30 Sec.	For -40°C to +55°C, ±0.6ppm or ±15% of Reading <sup>6</sup> , Det-Tronics Verified.			± 0.4 ppm/Mo.
Sulfur Dioxide+ (SO <sub>2</sub> +)	0-100 PPM	T50 = 15 Sec. T90 = 35 Sec.	For -40°C to +55°C, ±0.6ppm or ±15% of Reading <sup>6</sup> , Det-Tronics Verified.			± 0.4 ppm/Mo.
Chlorine (Cl <sub>2</sub> )	0-10 PPM	T50 = ≤14 Sec. T90 = ≤34 Sec.	For +20°C to +50°C, ±0.6ppm or ±30% of Reading <sup>6</sup> , Det-Tronics Verified. For -20°C to +20°C, ±0.6ppm or -40% to +60% of Reading <sup>6</sup> , Det-Tronics Verified.			< 0.2 ppm/Mo.
Hydrogen (H <sub>2</sub> )	0-1,000 PPM	T50 = 8 Sec. T90 = 60 Sec.	For +20°C to +40°C, ±50ppm or ±10% of Reading <sup>6</sup> , Det-Tronics Verified. Operating range is down to -20°C.			± 20 ppm/Mo.
Nitrogen Dioxide (NO <sub>2</sub> )	0-20 PPM	T50 = 7 Sec. T90 = 31 Sec.	For +20°C to +40°C, ±2ppm or ±10% of Reading <sup>6</sup> , Det-Tronics Verified. Operating range is down to -20°C.			± 0.1 ppm/Mo.

<sup>1</sup> Time to reach percentage of final reading when gas concentration equal to full scale is applied to sensor (per ISA 92.00.01).

<sup>2</sup> Background concentrations of ammonia may shorten lifetime of sensor.

<sup>3</sup> Sensor approved for oxygen depletion (< 21% V/V) only.

<sup>4</sup> Performance approved by FM Approvals.

<sup>5</sup> Oxygen sensor will indicate a fault if <1% volume oxygen is detected.

<sup>6</sup> Accuracies only apply to initial gas exposure and temperature-range testing at 50% of full scale (per ISA 92.00.01).

<sup>7</sup> Accuracies only apply to temperature-range testing at 20.9 percent Oxygen (per FM 6340).

Typical Cross Sensitivity of H<sub>2</sub>S Sensor (0-20 ppm / 0-50 ppm / 0-100 ppm)

Gas	Concentration	Reading	
		H <sub>2</sub> S	H <sub>2</sub> S+
Carbon monoxide	300 ppm	≤ 2 ppm	≤ 2 ppm
Sulfur dioxide	5 ppm	~ 1 ppm	~ 0 ppm
Nitric oxide	35 ppm	< 0.7 ppm	~ 0 ppm
Hydrogen	10000 ppm	≤ 10 ppm	
Ammonia	50 ppm		~ 0 ppm
Nitrogen dioxide	5 ppm	~ -1 ppm	~ 0 ppm
Methanol	200 ppm	~ 0 ppm	~ 0 ppm

Typical Cross Sensitivity of NH<sub>3</sub> Sensor (0-100 ppm)

Gas	Concentration	Reading
Alcohols	1000 ppm	0 ppm
Carbon dioxide	5000 ppm	0 ppm
Carbon monoxide	100 ppm	0 ppm
Hydrocarbons	% Range	0 ppm
Hydrogen	10000 ppm	0 ppm
Hydrogen sulfide	20 ppm	~ 2 ppm <sup>1</sup>

<sup>1</sup> Short time gas exposure in minute range.

Typical Cross Sensitivity of NH<sub>3</sub> Sensor (0-500 ppm)

Gas	Concentration	Reading
Alcohols	1000 ppm	0 ppm
Carbon monoxide	100 ppm	0 ppm
Chlorine	5 ppm	0 ppm
Nitrogen dioxide	10 ppm	0 ppm
Sulfur dioxide	20 ppm	-40 ppm
Hydrogen	3000 ppm	0 ppm
Hydrogen sulfide	20 ppm	2 ppm

Typical Cross Sensitivity of CO Sensor (0-100 ppm / 0-500 ppm)

Gas	Concentration	Reading
		CO
Hydrogen sulfide	15 ppm	~ 45 ppm
Sulfur dioxide	5 ppm	~ 2.5 ppm
Nitric oxide	35 ppm	~ 10 ppm
Chlorine	1 ppm	-1 ppm
Hydrogen	100 ppm	< 40 ppm
Nitrogen dioxide	5 ppm	~ -3 ppm

Typical Cross Sensitivity of SO<sub>2</sub> Sensor (0-20 ppm / 0-100 ppm)

Gas	Concentration	Reading
Carbon monoxide	300 ppm	< 1 ppm
Nitric oxide	50 ppm	0-5 ppm
Nitrogen dioxide	6 ppm	< -10 ppm
Hydrogen Sulfide	25 ppm	< 0.1 ppm
Chlorine	5 ppm	< -2 ppm
Ammonia	20 ppm	0 ppm
Hydrogen	400 ppm	< 1 ppm
Hydrogen Cyanide	10 ppm	< 5 ppm
Acetylene	10 ppm	< 30 ppm
Ethene	50 ppm	< 45 ppm

Typical Cross Sensitivity of Cl<sub>2</sub> Sensor (0-10 ppm)

Gas	Concentration	Reading
Carbon monoxide	300 ppm	0 ppm
Hydrogen sulfide	15 ppm	~ -7.5 ppm
Sulfur dioxide	5 ppm	0 ppm
Nitric oxide	35 ppm	0 ppm

Typical Cross Sensitivity of NO<sub>2</sub> Sensor (0-20 ppm)

Gas	Concentration	Reading
Alcohols	1000 ppm	0 ppm
Carbon dioxide	5000 ppm	0 ppm
Chlorine	1 ppm	≤ 1 ppm
Nitric oxide	100 ppm	0.4 ppm
Sulfur dioxide	20 ppm	5 ppm
Hydrogen	3000 ppm	0 ppm

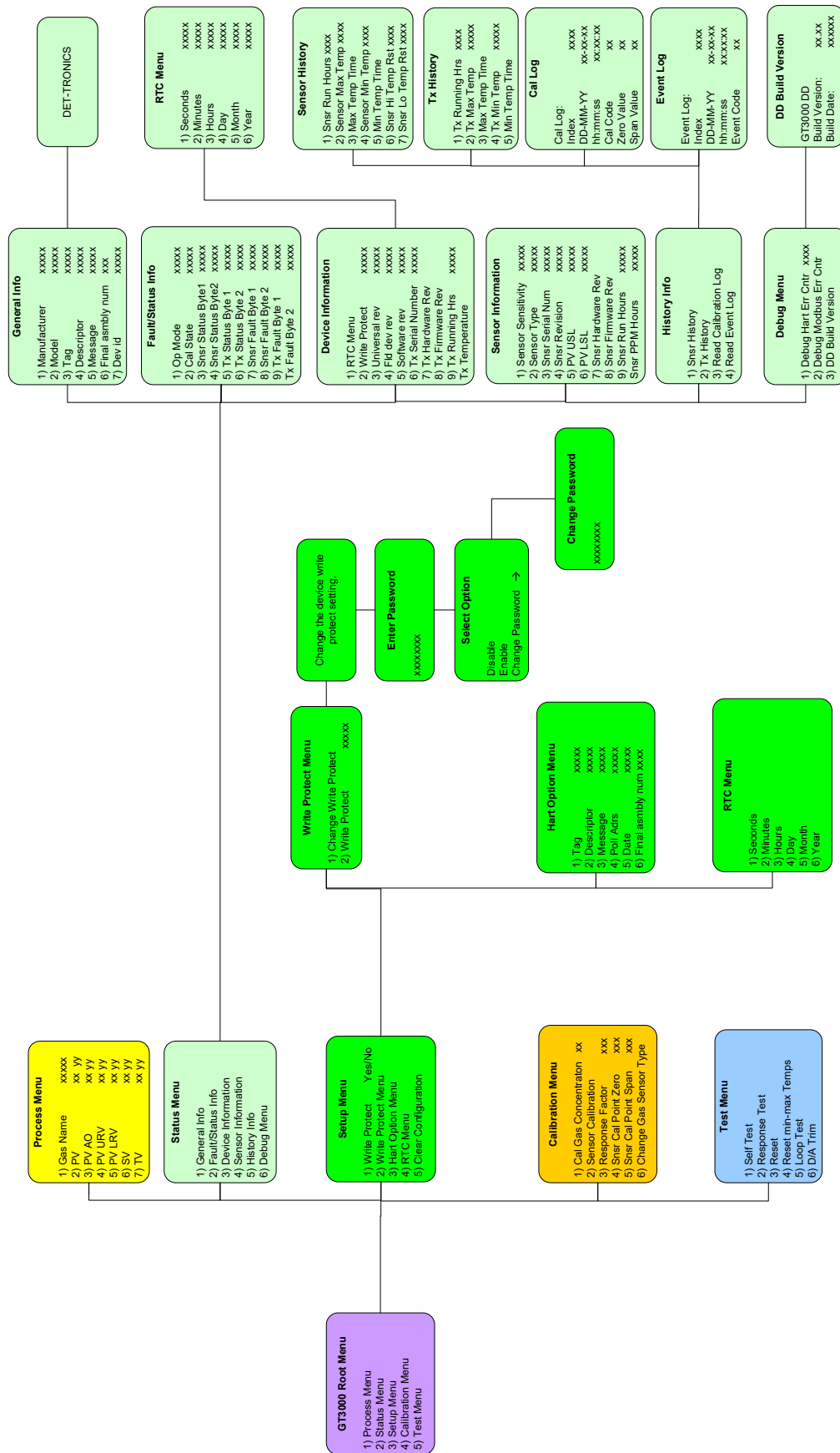
For details on other interfering gases, please contact Detector Electronics Corp.

## **APPENDIX F**

### **HART COMMUNICATION**

#### **HART MENU STRUCTURE**

This section displays the menu tree for the GT3000. The menu tree shows the primary commands and options available when using menu selections of a HART handheld communicator.

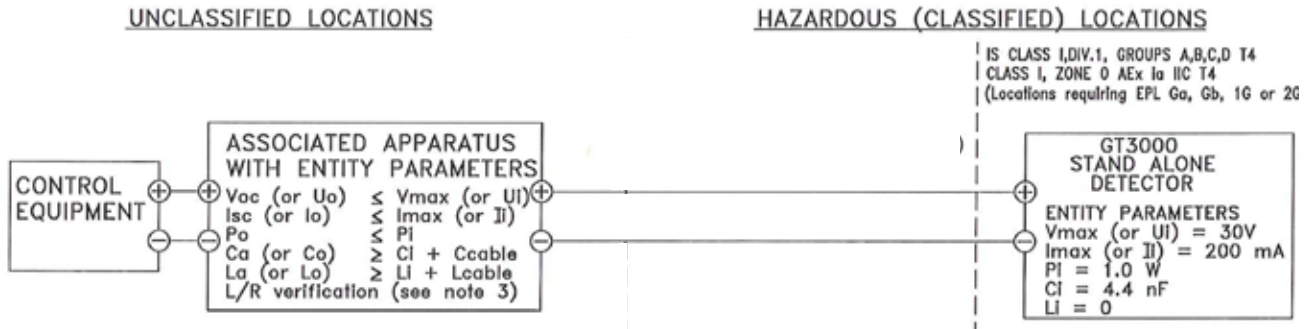


GTX Firmware Version 1.04  
DD Version 0.10

Detector Electronics		
GT3000 HART	March 16, 2009	

## APPENDIX G

### INTRINSIC SAFETY CONTROL DRAWING — FM 009803-001 Rev. D



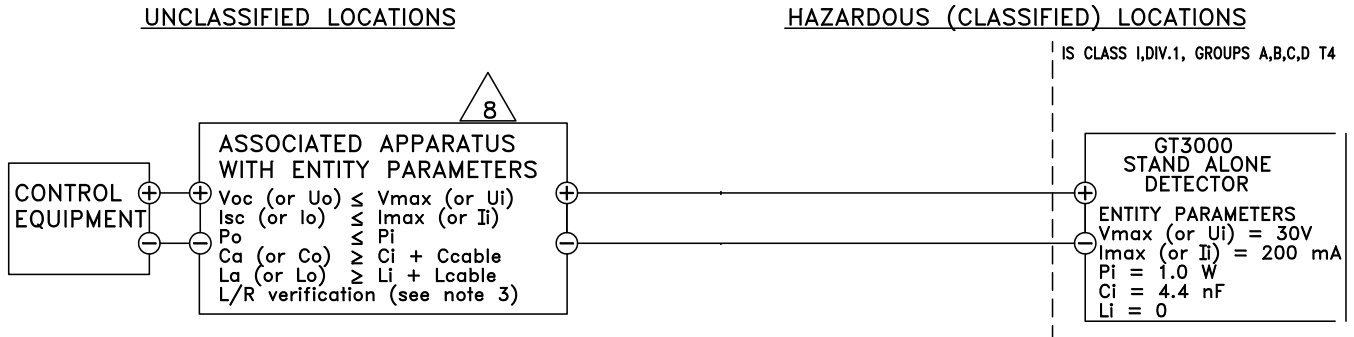
#### NOTES:

1. INSTALL IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NFPA 70), ANSI/ISA-RP12.06.01, CANADIAN ELECTRICAL CODE (CEC) CSA 22.1, PART 1 APPENDIX F, EN60079-14 OR IEC60079-14 AS APPLICABLE.
2. THE GTX SERIES TRANSMITTERS AND UD20 UNIVERSAL DISPLAY UNITS ARE APPROVED FOR CLASS I, ZONE 0. APPLICATIONS AS A Ex ia. IF CONNECTING A Ex [ib] ASSOCIATED APPARATUS TO THE GTX SERIES TRANSMITTERS, THE I.S. CIRCUIT IS ONLY SUITABLE FOR CLASS I, ZONE 1 OR CLASS I, ZONE 2 AND NOT SUITABLE FOR CLASS I, ZONE 0 OR CLASS I, DIVISION I HAZARDOUS (CLASSIFIED) LOCATIONS.
3.  $L_i$  MAYBE GREATER THAN  $L_a$  AND THE CABLE LENGTH RESTRICTIONS DUE TO CABLE INDUCTANCE ( $L_{cable}$ ) CAN BE IGNORED IF BOTH THE FOLLOWING CONDITIONS ARE MET:  

$$\frac{L_a}{R_a} \text{ (or } \frac{L_o}{R_o}) \geq \frac{L_i}{R_i}$$

$$\frac{L_a}{R_a} \text{ (or } \frac{L_o}{R_o}) \geq \frac{L_{cable}}{R_{cable}}$$
4. THE INTRINSIC SAFETY ENTITY CONCEPT ALLOWS THE INTERCONNECTION OF TWO FM APPROVED (CSA CERTIFIED WHEN INSTALLED IN CANADA) INTRINSICALLY SAFE DEVICES WITH ENTITY PARAMETERS AND NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM WHEN:  
 $V_{oc} \text{ or } U_o \text{ or } V_t \leq V_{max}$ ,  $I_{sc} \text{ or } I_o \text{ or } I_t \leq I_{max}$ ,  $C_a \text{ or } C_o \geq C_i + C_{cable}$ ,  $L_a \text{ or } L_o \geq L_i + L_{cable}$ ,  $P_o \leq P_i$
5. DUST-TIGHT CONDUIT SEAL MUST BE USED WHEN INSTALLED IN CLASS II AND CLASS III ENVIRONMENTS.
6. CONTROL EQUIPMENT CONNECTED TO THE ASSOCIATED APPARATUS MUST NOT USE OR GENERATE MORE THAN 250 Vrms OR Vdc.
7. INSTALLATION IN THE U.S. SHOULD BE IN ACCORDANCE WITH ANSI/ISA RP12.06.01 "INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL ELECTRICAL CODE® (ANSI/NFPA 70) SECTIONS 504 AND 505.
8. THE CONFIGURATION OF ASSOCIATED APPARATUS MUST BE FM APPROVED (CSA CERTIFIED WHEN INSTALLED IN CANADA) UNDER ENTITY CONCEPT.
9. ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.
10. NO REVISION TO DRAWING WITHOUT PRIOR AUTHORIZATION FROM FM APPROVAL AND CSA INTERNATIONAL.
11. GT3000 LIVE MAINTENANCE IS PERMISSIBLE. SEE INSTRUCTION MANUAL.
12. WHEN INSTALLING THE UD20, THE  $C_{cable}$  AND  $L_{cable}$  SHALL BE THE SUMMATION OF THE CABLE PARAMETERS BETWEEN THE ASSOCIATED APPARATUS TO THE UD20 AND THE CABLE BETWEEN THE UD20 AND THE GT3000.

**INTRINSIC SAFETY CONTROL DRAWING — CSA**  
**009803-002 Rev. B**

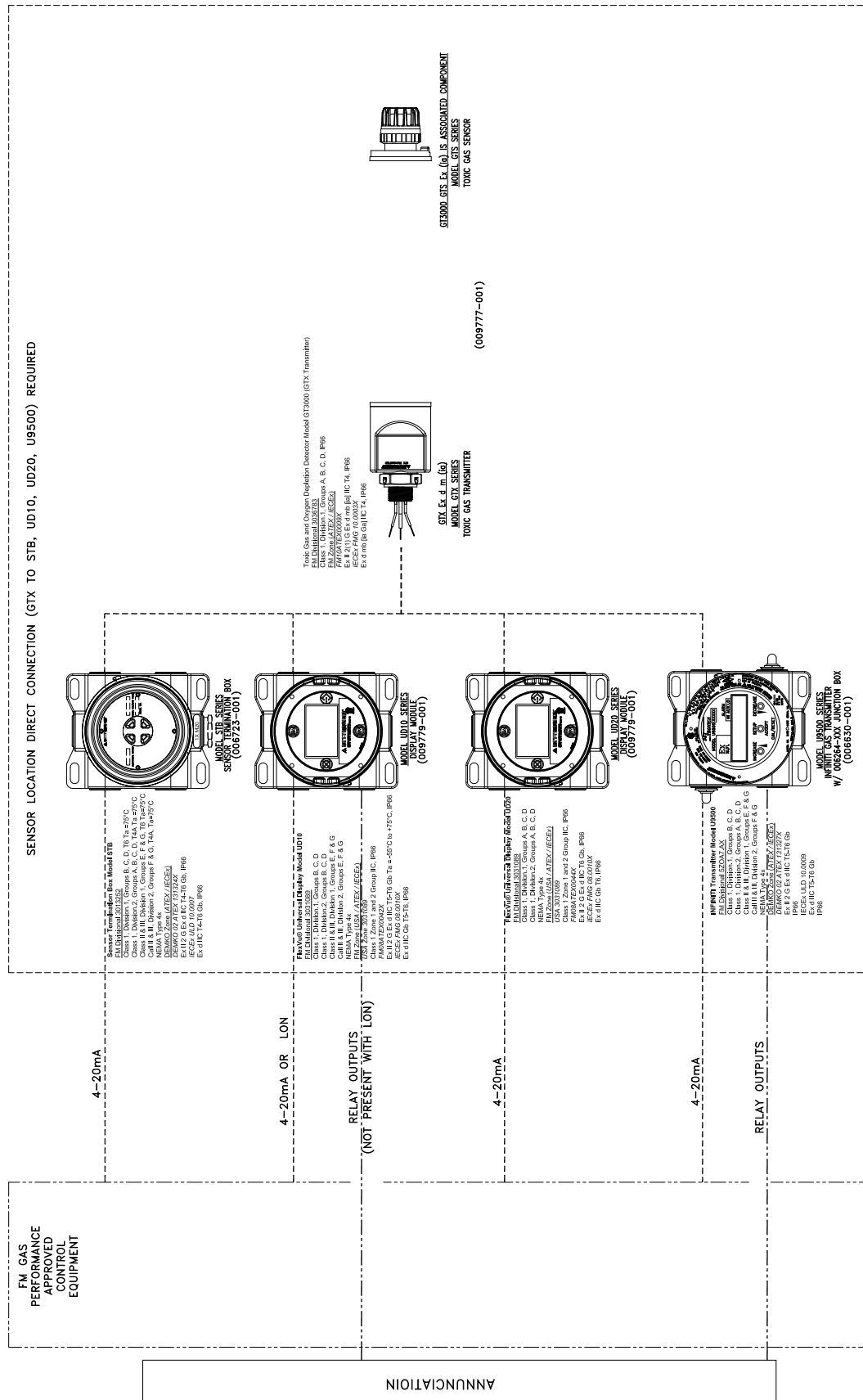


**NOTES:**

1. INSTALL IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NFPA 70), ANSI/ISA-RP12.06.01, CANADIAN ELECTRICAL CODE (CEC) CSA C22.1, PART 1 APPENDIX F, EN60079-14 OR IEC60079-14 AS APPLICABLE.
2.  $L_i$  MAYBE GREATER THAN  $L_a$  AND THE CABLE LENGTH RESTRICTIONS DUE TO CABLE INDUCTANCE ( $L_{cable}$ ) CAN BE IGNORED IF BOTH THE FOLLOWING CONDITIONS ARE MET:  
 $L_a/R_a \text{ (or } L_o/R_o) \geq L_i/R_i$   
 $L_a/R_a \text{ (or } L_o/R_o) \geq L_{cable}/R_{cable}$
3. DUST-TIGHT CONDUIT SEAL MUST BE USED WHEN INSTALLED IN CLASS II AND CLASS III ENVIRONMENTS.
4. CONTROL EQUIPMENT CONNECTED TO THE ASSOCIATED APPARATUS MUST NOT USE OR GENERATE MORE THAN 250 Vrms OR Vdc.
5. ASSOCIATED APPARATUS MUST BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS.
6. NO REVISION TO DRAWING WITHOUT PRIOR AUTHORIZATION FROM CSA INTERNATIONAL.
7. GT3000 HOT SWAPPABLE SENSOR, LIVE MAINTENANCE IS PERMISSIBLE. SEE INSTRUCTION MANUAL.

8 THE ASSOCIATED APPARATUS AND DISPLAY UNIT MUST BE CSA CERTIFIED.

**EXPLOSION PROOF CONTROL DRAWING — FM**  
**012555-001 Rev. A**







95-8616



FlexSonic™ Acoustic  
Leak Detector



X3301 Multispectrum  
IR Flame Detector



PointWatch™ Eclipse® IR  
Combustible Gas Detector



FlexVu® Universal Display  
with GT3000 Toxic Gas Detector



Eagle Quantum Premier®  
Safety System

