

Instructions

Electrochemical Gas Detector
GT3000 Series
Includes Transmitter (GTX)
and Sensor Module (GTS)



Table of Contents

DESCRIPTION	1	CALIBRATION	12
GTS Sensor Module	1	GT3000 Calibration	12
GTX Transmitter	2	Calibration Procedure	13
Real Time Clock	2		
History/Event Logs	2	MAINTENANCE	14
HART Communication	3	Routine Inspection	14
Magnetic Switch	3	Sensor Module Replacement	14
LEDs	3		
		DEVICE REPAIR AND RETURN	15
SPECIFICATIONS	4		
		ORDERING INFORMATION	15
IMPORTANT SAFETY NOTES	5	GTS Gas Sensors	15
		Calibration Kits for Gas Sensors	15
INSTALLATION	6	Parts & Accessories	15
Identification of Vapor(s) to be Detected	6		
Identification of Detector Mounting Locations	6	APPENDIX A — FM APPROVAL DESCRIPTION	18
Device Mounting Orientation	6	APPENDIX B — CSA CERTIFICATION DESCRIPTION	20
Detector Installation	7	APPENDIX C — ATEX APPROVAL DESCRIPTION	21
Sensor Termination Box	7	APPENDIX D — IECEx APPROVAL DESCRIPTION	22
		APPENDIX E — OTHER APPROVALS	23
WIRING	7	APPENDIX F — DECLARATION OF CONFORMITY	24
Power Supply Requirements	7	APPENDIX G — SENSOR COMPARISON / CROSS SENSITIVITY	25
Wiring Cable Requirements	7	APPENDIX H — HART COMMUNICATION	27
Intrinsic Safety Barriers	8	APPENDIX I — CONTROL DRAWINGS	29
Guidelines for Intrinsic Safety Wiring	8		
Wiring Procedure	8		

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. It is fully performance tested and approved by Factory Mutual. Refer to Appendix F 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 and UD20 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 furnished 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:

- Date of manufacture of the sensor module
- 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.

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 O₂ 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.

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.

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.)

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

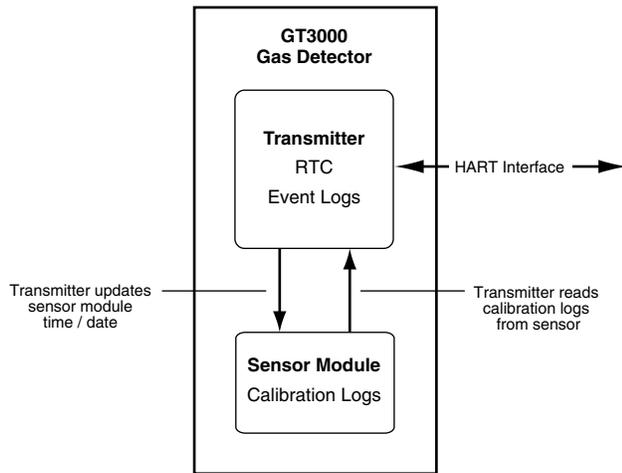


Figure 1—GT3000 Logging

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 G for HART menu structure.)

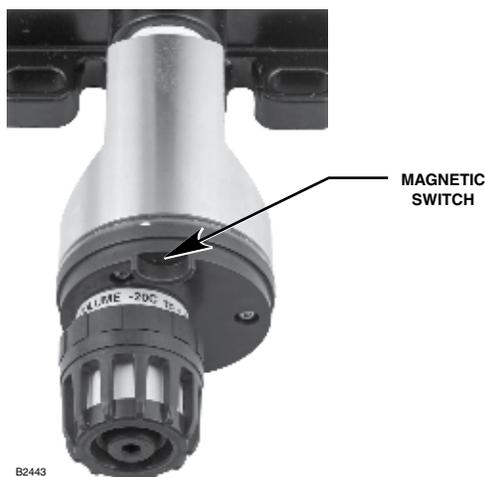


Figure 2—Location of Magnetic Switch on GT3000 Detector



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.

**O₂ 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 F.

CROSS SENSITIVITY—
See Appendix F 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.

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 F.

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).

HUMIDITY RANGE—
15 to 90% RH.

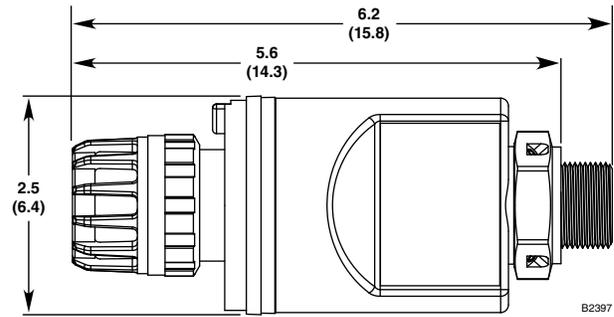


Figure 4—Dimensions of GT3000 Gas Detector in Inches (CM)

PRESSURE RANGE—
Atmospheric $\pm 10\%$.

INGRESS PROTECTION—
IP66.

ELECTRO-MAGNETIC COMPATIBILITY—
EMC Directive 2004/108/EC
EN55011 (Emissions)
EN50270 (Immunity).

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.

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 - ATEX
Appendix D - IECEx
Appendix E - 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 the NEC as well as 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 F, 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

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 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.

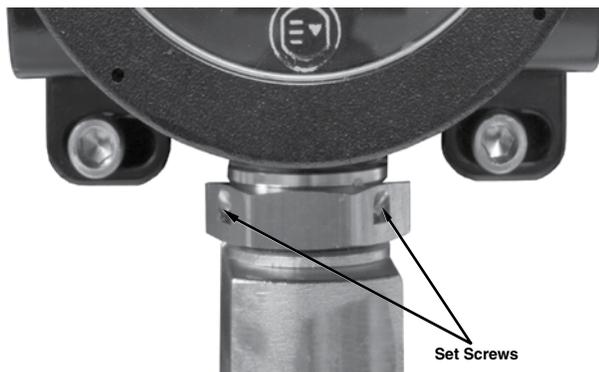


Figure 6—Location of Lock Nut and Set Screws (Metric Models Only)

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 Universal Display Unit.

When installing the GT3000 remotely from a UD10/UD20, two-conductor shielded cable is required to prevent possible nuisance EMI/RFI. The maximum cable length between the GT3000 and the UD10/UD20 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. The third column gives the range of input voltage to the barrier. The upper limit is set by the barrier. The lower limit is limited by voltage drops in the 4-20 mA loop with a maximum of 10 Ohms of resistance in each leg of the loop.

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. Input voltage to the barrier is specified by the barrier manufacturer.

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

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

GUIDELINES FOR INTRINSIC SAFETY WIRING

Intrinsically safe systems must be installed in accordance with the approved control drawings for the field equipment and the intrinsic safety barriers. Capacitance and inductance of interconnecting wiring must always be included in wiring calculations.

Shielded twisted pair cables with at least 18 AWG conductors are recommended to ensure circuit performance.

The intrinsically safe conductors must be separated from all other wiring by placing them in separate conduits or raceways, or by an airspace of at least 2 inches (50 mm). When located within an enclosure, the conductors can be separated by a grounded metal or insulated partition. Wires must be tied down to prevent loosening and/or shorting.

Intrinsically safe wiring must be identified. Raceways, cable trays, open wiring, and terminal boxes must be labeled as Intrinsically Safe. Intrinsically safe wiring may be light blue in color when no other conductors colored light blue are used.

Wiring enclosures should be located as close as possible to the hazardous area to minimize cable runs and reduce total capacitance of the wiring.

A high quality intrinsic safety ground is required. Some general rules for grounding intrinsically safe systems are:

- The maximum impedance of the grounding conductor between the barrier ground terminal and the main ground point must be less than 1 ohm.
- The grounding conductor must be a minimum of 12 AWG.
- Redundant grounding conductors are recommended to facilitate testing of the ground connection.
- The grounding conductor should be insulated and protected from the possibility of mechanical damage.

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.

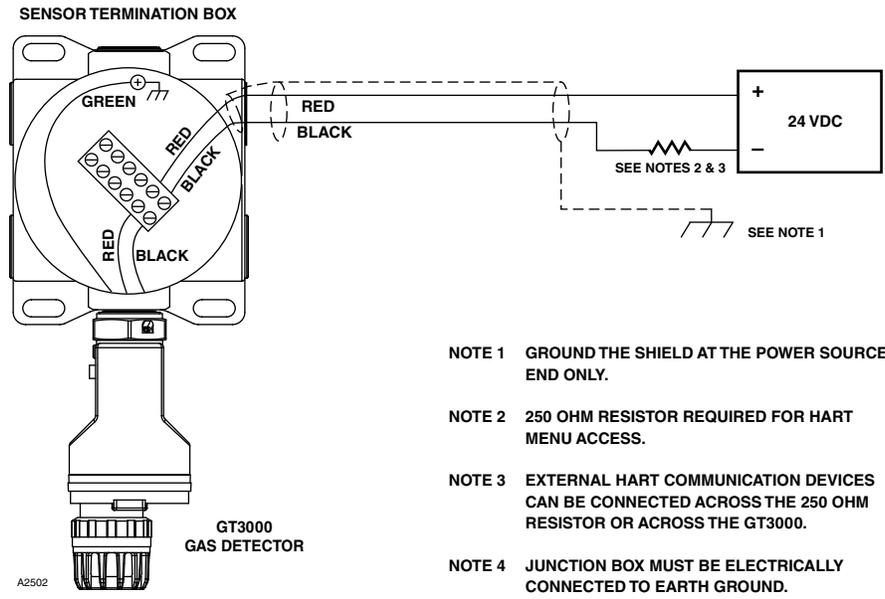


Figure 7—GT3000 Wired to Sensor Termination Box in Stand-Alone Configuration (Explosion-Proof)

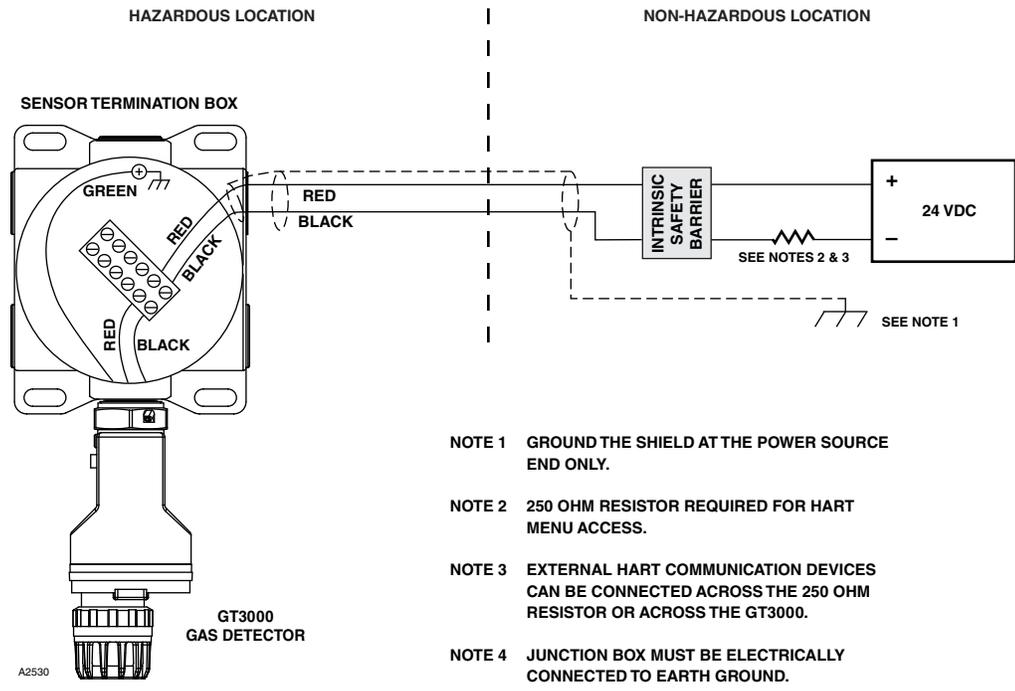


Figure 8— GT3000 Wired to Sensor Termination Box in Stand-Alone Configuration (Intrinsically Safe)

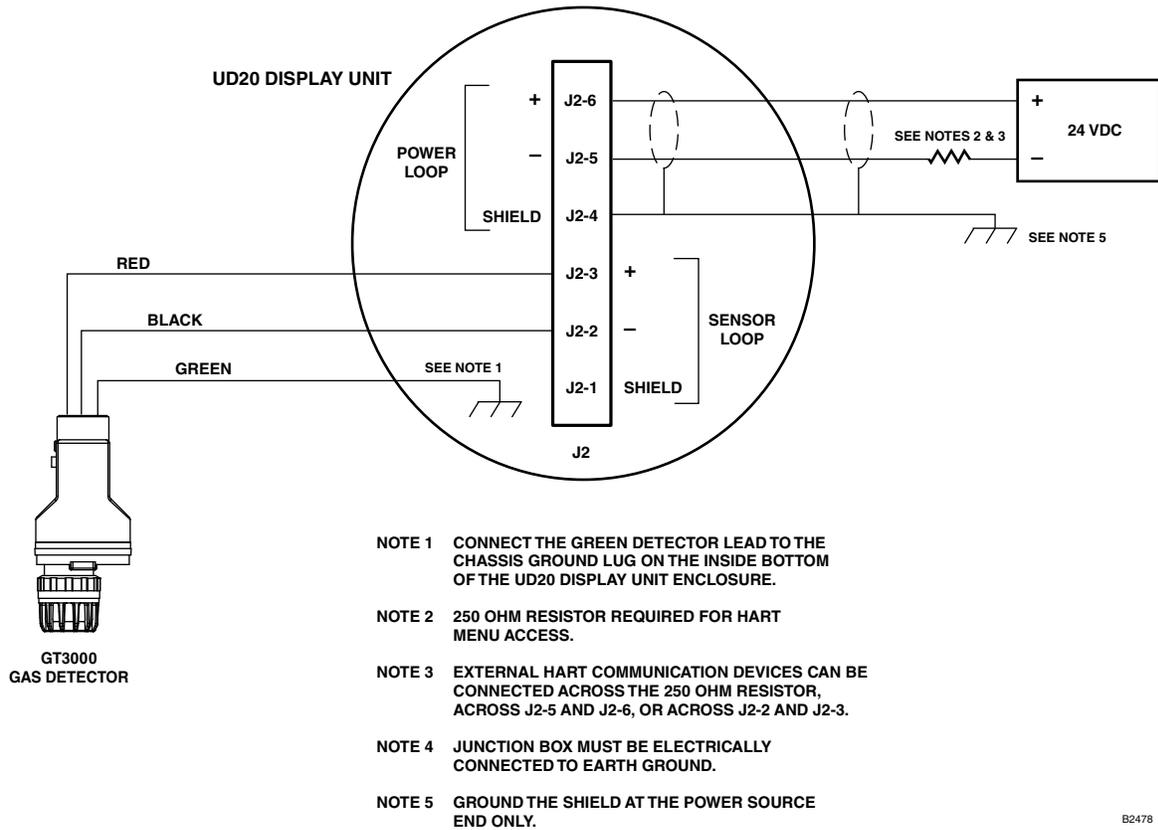


Figure 9—GT3000 Wired Directly to UD20 Display Unit (Explosion-Proof)

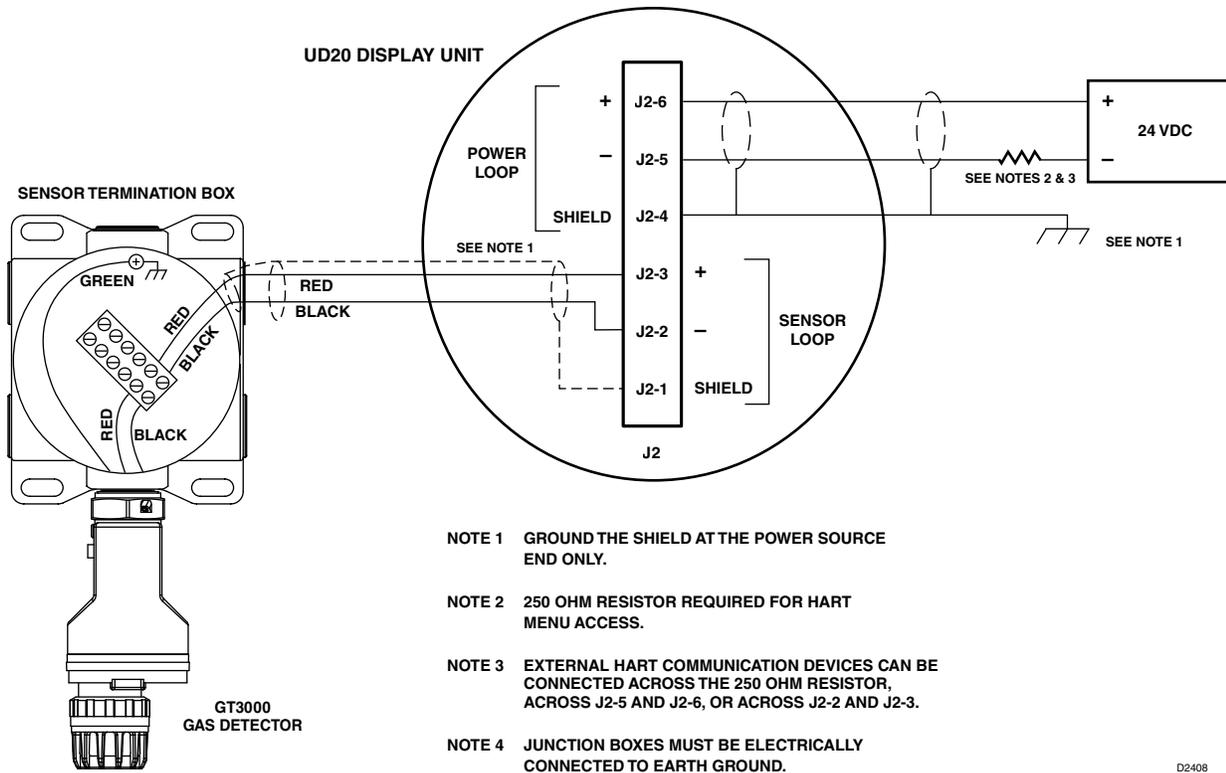


Figure 10—GT3000 with Sensor Termination Box Wired to UD20 Display Unit (Explosion-Proof)

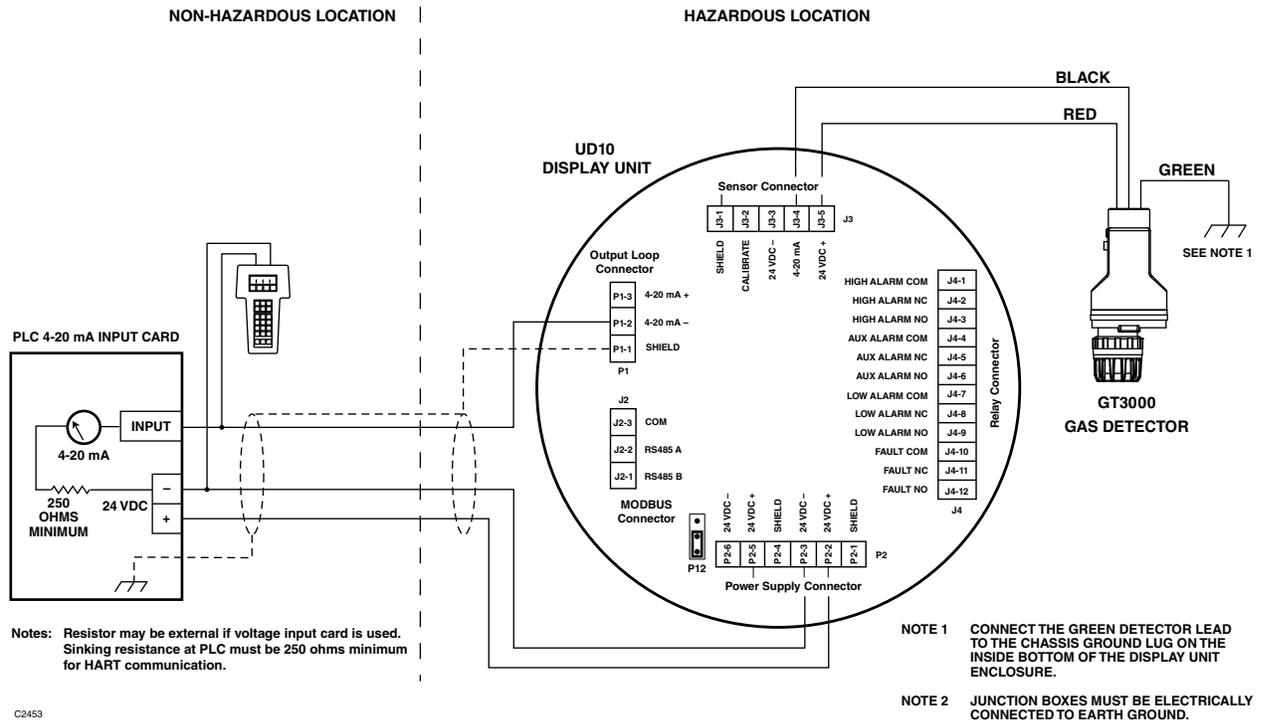


Figure 11—GT3000 Wired Directly to the UD10 Display Unit / UD10 Wired to PLC with 4-20 mA Non-Isolated Sourcing Output

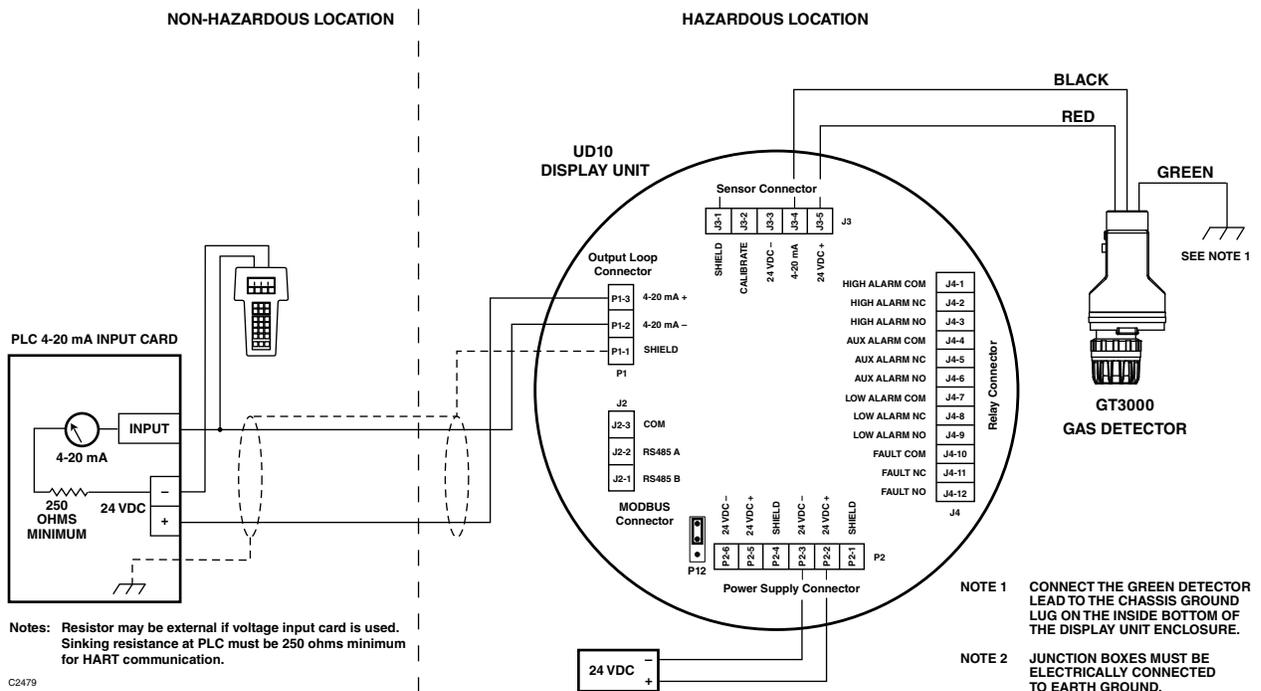


Figure 12—GT3000 Wired Directly to the UD10 Display Unit / UD10 Wired to PLC with 4-20 mA Isolated Sourcing Output

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.

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 G) 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.
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.

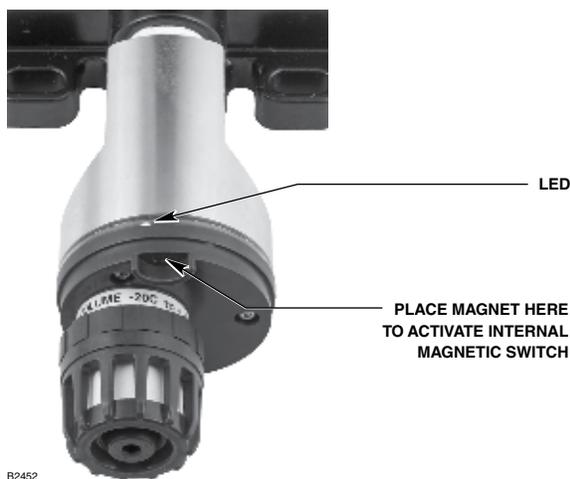


Figure 13—Location of Magnetic Switch on GT3000 Detector

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).

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 SIL-Certified 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).



Figure 14—GT3000 with Replaceable Filter Removed

IMPORTANT

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 (O₂) electrochemical sensors contain lead (Pb). Observe all local waste management requirements when disposing of exhausted O₂ 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.

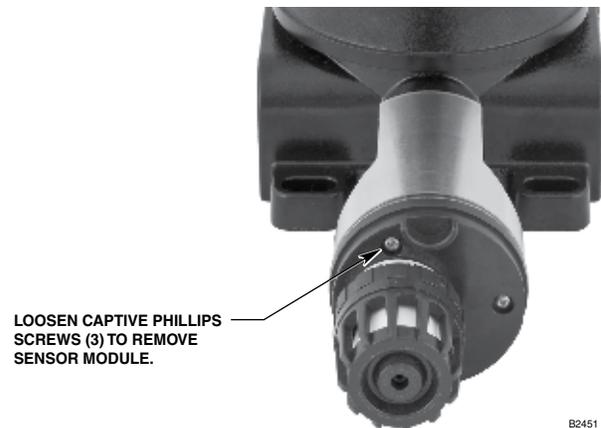


Figure 15—Location of Screws for Sensor Module Replacement

DEVICE REPAIR AND RETURN

Prior to returning devices, contact the nearest local Detector Electronics office so that a Return Material Identification (RMI) number can be assigned. **A written statement describing the malfunction must accompany the returned device or component to assist and expedite finding the root cause of the failure.**

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

*Oxygen detector for O₂ depletion (< 21% V/V) only.

CALIBRATION KITS FOR GAS SENSORS

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

ASSISTANCE

For assistance in ordering a system to meet the needs of a specific application, contact:

Detector Electronics Corporation
6901 West 110th Street
Minneapolis, Minnesota 55438 USA
Operator: (952) 941-5665 or (800) 765-FIRE
Customer Service: (952) 946-6491
Fax: (952) 829-8750
Web site: www.det-tronics.com
E-mail: det-tronics@det-tronics.com

GTS Sensor Model Matrix

MODEL	DESCRIPTION	
GTS	Gas Sensor Module	
	TYPE	GAS / RANGE
	H2S	Hydrogen Sulfide
		20P 0 - 20 PPM
		50P 0 - 50 PPM
		100P 0 - 100 PPM
	H2S+	Hydrogen Sulfide
		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
		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 APPROVAL*
		B INMETRO (Brazil)
		C CSA
		D DNV
		R Russia
		S SIL
		T SIL/FM/CSA/ATEX/CE/IECEX
		W FM/CSA/ATEX/CE/IECEX

* Type Approval can use one or more letters to designate the Approvals on the product.

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)
	R	Russia
	W	FM/CSA/ATEX/CE/IECEX
TYPE	CLASSIFICATION (Division/Zone)	
4	Intrinsically Safe	
5	Explosion-Proof	

Note: Approvals Type W and B are SIL 2 Capable when used with an H₂S or O₂ GTS sensor module.

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 d mb [ia Ga] IIC T4.
IP66.
Conduit seal not required.
Acidic atmospheres excluded.

NOTE

The GTX Gas Transmitter module shall be connected directly to a junction box suitable for the area of installation to provide protection for the flying leads.

Intrinsically Safe Model

IS Class I, Div. 1, Groups A, B, C, & D (T4).
Class I, Zone 0, AEx ia IIC (T4).
IP66.

NOTE

In order to maintain the intrinsically safe rating of the transmitter, the device must be powered through an approved I.S. barrier.

For a list of recommended barrier models, refer to Tables 3 and 4. For additional information regarding proper I.S. installation, refer to the Control Drawings in Appendix H of this manual.

Performance verified per ANSI/ISA 92.00.01, FM6340/41 and EN50104.

APPROVED ACCESSORIES

Part Number	Description
010274-001	Gas Calibration Kit, 10 ppm H ₂ S
010274-002	Gas Calibration Kit, 25 ppm H ₂ S
010274-003	Gas Calibration Kit, 50 ppm H ₂ S
010274-008	Gas Calibration Kit, 500 ppm H ₂
010274-009	Gas Calibration Kit, 20.9% O ₂
010274-010	Gas Calibration Kit, 50 ppm CO
010274-011	Gas Calibration Kit, 250 ppm CO
010274-005	Gas Calibration Kit, 50 ppm NH ₃
010274-006	Gas Calibration Kit, 250 ppm NH ₃
010274-013	Gas Calibration Kit, 10 ppm SO ₂
010274-014	Gas Calibration Kit, 50 ppm SO ₂
010274-004	Gas Calibration Kit, 5 ppm Cl ₂
010274-016	Gas Calibration Kit, 10 ppm NO ₂
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).

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

IP66.

Conduit seal not required.

Acidic atmospheres excluded.

NOTE

The GTX Gas Transmitter module shall be connected directly to a junction box suitable for the area of installation to provide protection for the flying leads.

Intrinsically Safe Model

Class I, Div. 1 & 2, Groups A, B, C, & D (T4).

IP66.

NOTE

In order to maintain the intrinsically safe rating of the transmitter, the device must be powered through an approved I.S. barrier.

For a list of recommended barrier models, refer to Tables 3 and 4. For additional information regarding proper I.S. installation, refer to the Control Drawings in Appendix H of this manual.

APPENDIX C

ATEX APPROVAL DESCRIPTION

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

APPROVAL

Electrochemical Gas Detector, GT3000 Series.

Explosion Proof Model

CE 0539 Ex II 2(1)G.
Ex d mb [ia Ga] IIC T4 Gb IP66.
FM10ATEX0009X.

NOTE

The GTX Gas Transmitter module shall be connected directly to a junction box suitable for the area of installation to provide protection for the flying leads.

Intrinsically Safe Model

CE 0539 Ex II 1 G Ex ia IIC T4 Ga IP66.
FM08ATEX0045X.

NOTE

In order to maintain the intrinsically safe rating of the transmitter, the device must be powered through an approved I.S. barrier.

For a list of recommended barrier models, refer to Tables 3 and 4. For additional information regarding proper I.S. installation, refer to the Control Drawings in Appendix H of this manual.

APPENDIX D

IECEX APPROVAL DESCRIPTION

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

APPROVAL

Electrochemical Gas Detector, GT3000 Series.

Explosion Proof Model

Ex d mb [ja Ga] IIC T4 Gb IP66.

IECEX FMG 10.0003X.

NOTE

The GTX Gas Transmitter module shall be connected directly to a junction box suitable for the area of installation to provide protection for the flying leads.

Intrinsically Safe Model

Ex ia IIC T4 Ga IP66.

IECEX FMG 08.0005X.

NOTE

In order to maintain the intrinsically safe rating of the transmitter, the device must be powered through an approved I.S. barrier.

For a list of recommended barrier models, refer to Tables 3 and 4. For additional information regarding proper I.S. installation, refer to the Control Drawings in Appendix H of this manual.

APPENDIX E

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 H₂S and O₂ 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 d mb [ia Ga] IIC T4 Gb IP66

Tamb -40°C to +50°C (H₂S)

Tamb -20°C to +50°C (other)

NOTE

The GTX Gas Transmitter module shall be connected directly to a junction box suitable for the area of installation to provide protection for the flying leads.

NOTE

Consideration must be given to overall Gas System Performance Requirements.

Intrinsically Safe Model

UL-BR 15.0404X

Ex ia IIC T4 Ga IP66

Tamb -40°C to +50°C

NOTE

In order to maintain the intrinsically safe rating of the transmitter, the device must be powered through an approved I.S. barrier.

For a list of recommended barrier models, refer to Tables 3 and 4. For additional information regarding proper I.S. installation, refer to the Control Drawings in Appendix H of this manual.

DNV

Type Approval Certificate No. A-12358.

MED

Certificate No. MED-B-6708.

RUSSIA / KAZAKHSTAN / INDIA

Contact Det-Tronics for details.

APPENDIX F

DECLARATION OF CONFORMITY

[1]		European Union	
<h3>Declaration of Conformity</h3>			
[2]	It is declared that the following product(s): <hr/> Model GT3000 Series (Toxic Gas Detector), Includes Model GTX Transmitter and GTS sensor <hr/>		
[3]	Manufactured by: Detector Electronics Corporation (Det-Tronics) 6901 West 110 th Street Minneapolis, MN 55348 USA		
[4]	Compliance with the Essential Health and Safety Requirements has been assured by compliance with: ATEX Directive: 94/9/EC Certificate No.: FM08ATEX0045X (GTX/GTS: Ex ia) Certificate No.: FM10ATEX0009X (GTX: Ex d mb [ia]) Marine Equipment Directive 96/98/EC (Oxygen Only) Certificate No.: MED-B-6708 (Oxygen Only) Certificate No.: MED-D-1515 EMC Directive: 2004/108/EC Low Voltage Directive: 2006/95/EC WEEE Directive: 2002/96/EC EN 60079-0:2012 EN 60079-1:2007 EN 60079-11:2012 EN 60079-18:2009 EN 60529:1991/A1:2001 EN 50271:2010 EN 50104:2010 EN 60945:2002 Annex A.1 and Annex B, Module B, Solas 74, Regulation II-2/4 & V1/3 and FSS Code 15 EN 50270:2006 EN 61010-1:2010		
[5]	Production QAN Issued by: UL International DEMKO A/S, NB. No. 0539 Borupvang 5A, 2750 Ballerup, Denmark		
[6]	The Marking of the equipment or protective system shall include the following:  		
For a copy of the original document, please contact the factory.			
<hr/> <p>8901 West 110th Street, Minneapolis, MN 55348 USA Toll Free: 800 785 3473 Fax: 952 829 8750 www.det-tronics.com</p>			

APPENDIX G

SENSOR COMPARISON/CROSS SENSITIVITY

Electrochemical Gas Sensors

Gas	Range	Response Time ¹	Accuracy of Reading (Whichever is Greater)	Operating Temperature Range	Zero Drift	Performance Approved Standard
Hydrogen Sulfide (H ₂ S)	0-20 PPM	T20 = ≤7 Sec T50 = ≤10 Sec. T90 = ≤16 Sec.	±2 ppm or ±10% of Reading	-40°C to +50°C	± 1 ppm/Mo.	ISA 92.00.01 ⁴
Hydrogen Sulfide (H ₂ S)	0-50 PPM	T20 = ≤4 Sec T50 = ≤7 Sec. T90 = ≤16 Sec.	±2 ppm or ±10% of Reading	-40°C to +50°C	± 1 ppm/Mo.	ISA 92.00.01 ⁴
Hydrogen Sulfide (H ₂ S)	0-100 PPM	T20 = ≤5 Sec T50 = ≤8 Sec. T90 = ≤21 Sec.	±2 ppm or ±10% of Reading	-40°C to +50°C	± 2 ppm/Mo.	ISA 92.00.01 ⁴
Hydrogen Sulfide+ (H ₂ S+)	0-20 PPM	T20 = ≤10 Sec T50 = ≤13 Sec. T90 = ≤23 Sec.	±2 ppm or ±10% of Reading	-40°C to +55°C	± 1 ppm/Mo.	ISA 92.00.01 ⁴
Hydrogen Sulfide+ (H ₂ S+)	0-50 PPM	T20 = ≤6 Sec T50 = ≤9 Sec. T90 = ≤15 Sec.	±2 ppm or ±10% of Reading	-40°C to +55°C	± 1 ppm/Mo.	ISA 92.00.01 ⁴
Hydrogen Sulfide+ (H ₂ S+)	0-100 PPM	T20 = ≤6 Sec T50 = ≤8 Sec. T90 = ≤15 Sec.	±2 ppm or ±10% of Reading	-40°C to +55°C	± 2 ppm/Mo.	ISA 92.00.01 ⁴
Ammonia (NH ₃)	0-100 PPM ²	T50 = 24 Sec. T90 = 65 Sec.	±4 ppm or ±10% of Reading	-20°C to +40°C	± 2 ppm/Mo.	FM6340 ⁴
Ammonia (NH ₃)	0-500 PPM ²	T50 = 30 Sec. T90 = 120 Sec.	±4 ppm or ±10% of Reading	-20°C to +40°C	± 10 ppm/Mo.	Det-Tronics Verified (CSA Exd)
Oxygen (O ₂)	0-25% V/V ³	T20 = 7 Sec. T90 = 30 Sec.	< 0.5% V/V	-20°C to +50°C	< 2 %/Mo.	BS EN 50104 ⁴
Carbon Monoxide (CO)	0-100 PPM	T50 = 15 Sec. T90 = 40 Sec.	±5 ppm or ±10% of Reading	-20°C to +50°C	± 2 ppm/Mo.	ISA 92.00.01 ⁴
Carbon Monoxide (CO)	0-500 PPM	T50 = 12 Sec. T90 = 25 Sec.	±5 ppm or ±10% of Reading	-20°C to +50°C	± 9 ppm/Mo.	ISA 92.00.01 ⁴
Sulfur Dioxide+ (SO ₂ +)	0-20 PPM	T50 = 12 Sec. T90 = 30 Sec.	±0.6 ppm or ±10% of Reading	-40°C to +55°C	± 0.4 ppm/Mo.	Det-Tronics Verified (CSA Exd)
Sulfur Dioxide+ (SO ₂ +)	0-100 PPM	T50 = 15 Sec. T90 = 35 Sec.	±0.6 ppm or ±10% of Reading	-40°C to +55°C	± 0.4 ppm/Mo.	Det-Tronics Verified (CSA Exd)
Chlorine (Cl ₂)	0-10 PPM	T50 = ≤14 Sec. T90 = ≤34 Sec.	±0.6 ppm or ±10% of Reading	-20°C to +50°C	< 0.2 ppm/Mo.	FM6340 ⁴
Hydrogen (H ₂)	0-1,000 PPM	T50 = 8 Sec. T90 = 60 Sec.	±50 ppm or ±10% of Reading	-20°C to +40°C	± 20 ppm/Mo.	Det-Tronics Verified (CSA Exd)
Nitrogen Dioxide (NO ₂)	0-20 PPM	T50 = 7 Sec. T90 = 31 Sec.	±2 ppm or ±10% of Reading	-20°C to +40°C	± 0.1 ppm/Mo.	Det-Tronics Verified (CSA Exd)

¹ Time to reach percentage of final reading when gas concentration equal to full scale is applied to sensor.

² Background concentrations of ammonia may shorten lifetime of sensor.

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

⁴ Factory Mutual Performance Approved.

Typical Cross Sensitivity of H₂S Sensor (0-20 ppm / 0-50 ppm / 0-100 ppm)

Gas	Concentration	Reading	
		H ₂ S	H ₂ 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 NH₃ 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 ¹

¹ Short time gas exposure in minute range.

Typical Cross Sensitivity of NH₃ 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 SO₂ 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 Cl₂ 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 NO₂ 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.

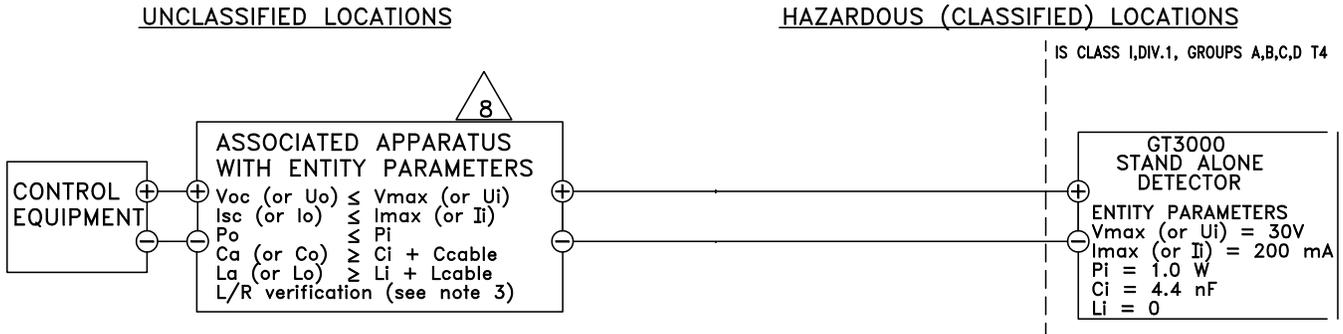
APPENDIX H

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.

**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 V_{rms} OR V_{dc} .
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.



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

Corporate Office

6901 West 110th Street
Minneapolis, MN 55438 USA
www.det-tronics.com

Phone: 952.946.6491
Toll-free: 800.765.3473
Fax: 952.829.8750
det-tronics@det-tronics.com

All trademarks are the property of their respective owners.
© 2015 Detector Electronics Corporation. All rights reserved.

Det-Tronics manufacturing system is certified to ISO 9001—
the world's most recognized quality management standard.

