BRASCH
ENVIRONMENTAL TECHNOLOGIES

TRNS Generation 2

Installation / Operation Manual

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Introduction

General Description

The Brasch Environmental Technologies TRNS Generation 2 Gas Transmitter is designed to function as a gas sensor and signal transmitter. The transmitter consists of a sensor and digital control circuitry. A linear proportional output circuit is able to provide analog signals to a customer-supplied building management controller or a variable-frequency drive. An RS-485 circuit is able to provide two-way digital communication using Modbus RTU. A microprocessor monitors the signal from the sensor and transmits that signal to the output as either an analog or digital signal.

The sensor used in the transmitter operates on the electrochemical principle. A current is produced when the target gas reacts chemically with an electrode inside the sensor. This small current is changed to a voltage by the transmitter's circuitry, amplified, and converted to the proper output signal. This signal is proportional to the target gas concentration present at the sensor.

The transmitter's circuitry consists of a printed circuit board mounted inside a polycarbonate housing. The housing has a NEMA 3R rating. Vents are located on the bottom and side of the housing to allow the sensor access to ambient air.

Features and Benefits

- Comprehensive Monitoring
  - Detects CO and/or NO_2
- Greater Coverage
  - Monitors up to 9,000 sq. ft.
- Enhanced Durability
  - Rainproof Water Resistance
  - Simple Service and Maintenance
- Simplified Installation
  - Preconfigured Wiring
  - Factory Calibration
  - Customized Programming
- Versatile Communication
  - Analog Output via User-Selectable Current or Voltage Loop
  - Digital Output via Modbus RTU Communication Protocol
- Effortless Upgrade
  - Works with New and Existing Building Controls Systems
  - Fully Backwards Compatible with TRNS Generation 1

Technical Specifications

Product Specifications

Input Power (Single)	24 VAC, 50/60 Hz, 0.1 A
Input Power (Dual)	24 VAC, 50/60 Hz, 0.2 A
Installation Category	II (local level, over-voltage transients less than 500V)
Storage Temperature	-50°C to 120°C (-58°F to 248°F)
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Humidity	10% to 90% (non-condensing)
Ventilation Control Relays	None
Internal Alarm	None
Front Panel Indicators	Power (green LED) Fault (yellow LED)
Display	None
Selectable Fan Settings	None
Alert Levels	None
Delay Times	None
Dimensions (Single)	4.98” W x 4.98” H x 2.18” D (12.6 cm W x 12.6 cm H x 5.5 cm D)
Dimensions (Dual)	4.98” W x 9.96” H x 2.18” D (12.6 cm W x 25.2 cm H x 5.5 cm D)
Weight (Single)	1 lbs (0.5 kg)
Weight (Dual)	2 lbs (1 kg)
Housing	Gray, NEMA 3R, polycarbonate plastic
Compliance	ANSI/ISA 92.00.01-2010 (R2015) EN 50270 FCC Part 15 Subpart B RoHS

Target Gas Specifications

This Brasch Gas Transmitter is available for monitoring carbon monoxide and/or nitrogen dioxide as target gases. Regulatory agencies have determined the threshold concentrations at which the gases become dangerous. Brasch Environmental Technologies, LLC has designed their transmitters so that the measurement ranges for each target gas meet the agencies' requirements. Each target gas, for which Brasch currently produces a transmitter, is listed below along with the relevant concentration specifications.

Carbon Monoxide

Full Scale Span:	200 PPM
Resolution:	1 PPM
Minimum Accuracy*:	± 10% or 6 PPM
Expected Lifespan	10 years
Recommended Recalibration Time	2 years

Nitrogen Dioxide

Full Scale Span:	10 PPM
Resolution:	0.1 PPM
Minimum Accuracy*:	± 15% or 0.8 PPM
Expected Lifespan	10 years
Recommended Recalibration Time	2 years

*Allowable tolerance for accuracy and repeatability criteria as defined in Annex A, Item 2 of ANSI/ISA 92.00.01-2010 (R2015)

Description of Front Panel Indicators

The front panel indicators convey to the user the operational status of the transmitter. The following table describes the function of each indicator. Please refer to the transmitter's front panel label for the indicator's location.

Front Panel Indicators

Indicator	Color	Description
Power	Green	Glows whenever power is on
Fault	Yellow	Glows when expected end-of-life is reached

Operation Safety Notice

Certain procedures and operations detailed in this manual require that specific precautions be taken prior to beginning the procedure or operation. When precautions are required, a notice will be printed in an appropriate location in the manual. The user is urged to read and understand all such notices.

Types of Notices

Three types of notices may be used in this manual to describe the severity of the situation encountered.

WARNING:	This notice indicates that conditions exist that could cause personal injury or loss of life.
CAUTION**:**	Conditions exist that could cause damage to the equipment or other property.
Note:	Special consideration should be given to the procedure or operation, otherwise an unexpected operational result could occur.

Quick Start Guide

Please read this entire manual before attempting to install and operate this gas transmitter. This guide is only intended to provide the basic steps necessary for installation and operation. Each step will reference the portion of the manual where more complete information can be obtained.

Step 1 – Mounting

Determine the location for mounting your transmitter(s). The location(s) may be indicated on the architectural drawing. Also, the owner or designer of the facility may be consulted. Mounting guidelines can be found on page 12 of this manual.

Step 2 – Input Wiring

WARNING

This transmitter may require the use of voltage levels high enough to cause fatal injuries. Proper procedures must be followed any time work is performed on this unit.

Only qualified personnel should attempt to install, maintain, or service this equipment.

Provide a dedicated circuit at the required 24 VAC and 2.4 VA at each transmitter mounting location. Follow all national and local wiring codes. The wiring should be at least 14 AWG. A conductor connected to earth ground should also be provided. The circuit must include a disconnect switch located within easy reach of the transmitter.

CAUTION

Operating this transmitter with the incorrect voltage and power requirements can cause internal electrical components to overheat and fail. Operation with the wrong power requirement will void the manufacturer's warranty and the installer will be responsible for any damage that occurs.

Contact Brasch Environmental Technologies, LLC before connecting power to the transmitter if you are unsure of the correct power requirement.

Color-coded wires exiting the transmitter housing through the top conduit connector are provided for connecting the operating voltage to the transmitter. Therefore, it should not be

necessary to remove the front cover from the transmitter when connecting the voltage supply. Connect the hot power conductor to the black wire and the neutral conductor to the white wire.

Refer to page 13 for further information.

Step 3 – Output Wiring

The transmitter conveys its sensor signal over two wires. Use a two-conductor shielded cable for each transmitter in the system. As with the input power connections, color-coded wires exit the transmitter housing through the top conduit fitting so removal of the front cover should not be necessary. When using the analog output, the positive conductor connects to the red wire and the reference conductor connects to the green wire. When using the digital output, the positive conductor connects to the brown wire and the negative conductor connects to the blue wire.

See figures 1 and 2 on page 16 for wiring diagrams.

Step 4 – Applying Power

Once you are sure that the wiring connections are correct, apply power to the transmitter circuit. When power is first applied, the green power indicator will glow, indicating the transmitter is active. The unit will begin transmitting its signal through the output immediately; however, you should wait at least 2.5 minutes before taking any gas measurements as the sensor will still be warming up.

See page 15 for more information concerning the initial startup.

At this point, the transmitter is now ready to monitor for the presence of the target gas.

Installation

Mounting the Transmitter

The ability of the transmitter to sense the target gas depends greatly upon proper selection of the mounting location. This transmitter monitors the area around it by sampling the air that passes by the sensor. Since the sensor is mounted inside a housing, air must diffuse through the intake vent and pass by the sensor on its way out the exhaust vent. Therefore, the transmitter should be positioned where it can sample air that contains a target gas concentration representative of the average value in that area.

When determining the mounting location, give special consideration to the following guidelines.

- Use one sensor per target gas for each area to be covered.
- Always prioritize locations with the highest occupation density.
- The types of gases each unit is designed to monitor have densities approximately equal to that of air. For maximum safety, mount the unit at the average breathing height – approximately 5 to 7 feet from the floor.
- Avoid mounting locations that would not be representative of the average gas value in that area. These include but are not limited to locations near doorways, fans, ventilation inlets and outlets, and areas with air velocities in excess of 3.3 ft/s (1 m/s).
- Avoid locations that would allow direct contact with water. Mounting the unit near outside garage doors may allow rain to hit the unit when the door is open.
- Avoid locations that are directly in the outlet air vents of heaters or air conditioners.
- Avoid mounting locations with normal ambient temperatures below -4°F (-20°C) or above 122°F (50°C).
- Do not allow exhaust from engines to flow directly on the unit. Each unit is designed to sense gas concentrations that are 300 to 1000 times less concentrated than the gas levels found in engine exhaust. Also, engine exhaust contains high levels of other components. These components can shorten the useful life of the sensor if they contact the sensor before being diluted by the room air volume.
- Avoid mounting locations where the unit may be hit by passing vehicles. If the unit must be mounted in these locations, provide a shielding cage around the unit for protection.
- Do not restrict the air flow to the unit housing.
- Do not mount the unit in a corner.

- Do not mount the unit near containers of chemicals such as gasoline, kerosene, alcohol, or other cleaning fluids. High level concentrations of these chemicals may be mistaken as the target gas by the sensor and cause false readings. Also, some welding gases may cause false readings.

The transmitter is attached in the mounting position in one of three ways.

- Attach the housing to conduit using appropriate conduit fittings. If you use this method, make sure that the conduit is securely attached to a solid support. Firmly tighten the threaded nuts on the conduit fittings inside the transmitter housing so they will not loosen over time.
- Attach the housing to a four inch square conduit box using the ½ inch fitting provided with the transmitter. Make sure that the conduit box is firmly fastened to the mounting surface with screws. Securely tighten the fitting nut on the inside of the conduit box so it will not loosen over time.
- Attach the housing to a solid support base using screws through the internal housing mounting holes. This method requires removal of the housing cover to gain access to the mounting holes. A mounting hole is located at the top and bottom of each housing end wall.

  Find a flat area at least 6 inches high by 6 inches long and place the back of the open housing flat against it. Using a pencil or other slender marking tool, mark the location of the four mounting holes using the housing as a template. Start the screws without the housing in place to avoid any possibility of damage to the housing or circuit boards. Remove the screws, place the housing in position, and install the mounting screws. Do not over-tighten the screws as this may crack the plastic housing. Be careful not to damage the printed circuit board. Carefully replace the housing cover and securely tighten all four of the cover retaining screws.

Connecting the Power Supply

WARNING

This detector may require the use of voltage levels high enough to cause fatal injuries. Proper procedures must be followed any time work is performed on this unit.

Only qualified personnel should attempt to install, maintain, or service this equipment.

While this transmitter does not require much power to operate, it is usually located near machines that do consume large amounts of power. When these large machines operate, they

cause large voltage spikes to appear on the AC wiring. These spikes can interfere with the proper operation of the transmitter. The easiest way to avoid much of this interference is by providing power to the transmitter through a dedicated circuit from the service panel. In some very noisy situations, a line filter can be connected in the power supply circuit just ahead of the wiring connections at the transmitter.

> Note
>
> Do not operate the transmitter on the same AC circuit with the ventilation components. Doing this will almost always cause improper transmitter operation.

Provide a dedicated circuit at the required operating voltage at each transmitter mounting location. Follow all national and local wiring codes. The wiring should be at least 14 AWG. A conductor connected to Earth ground should also be provided. The circuit must include a disconnect switch located within easy reach of the transmitter.

Be sure that the step-down transformer provides 24 VAC and has at least a 2.4 VA rating. The power requirements for the transmitter are also listed on the label on the left side of the unit.

> CAUTION
>
> Operating this transmitter with the incorrect voltage and power requirement can cause internal electrical components to overheat and fail. Operation with the wrong power requirements will void the manufacturer's warranty, and the installer will be responsible for any damage that occurs.
>
> Contact Brasch Environmental Technologies, LLC before connecting power to the transmitter if you are unsure of the correct power requirement.

Color-coded wires exiting the transmitter housing through the top conduit connector are provided for connecting the operating voltage to the transmitter. Therefore, it should not be necessary to remove the front cover from the transmitter when connecting the voltage supply. Connect the hot power conductor to the black wire and the neutral conductor to the white wire.

Connecting the Voltage or Current Proportional Output

The Brasch Gas Transmitters include circuits that provide either a current loop or voltage proportional output for each gas sensor. Each output produces a linear response over the full scale range of the sensor. A detailed description of these outputs can be found starting on page 18.

The transmitter conveys its sensor signal over two wires. Use a two-conductor shielded cable for each transmitter in the system. As with the input power connections, color-coded wires exit the transmitter housing through the top conduit fitting so removal of the front cover should not be necessary. At each transmitter, the positive conductor connects to the red wire and the reference conductor connects to the green wire.

See figure 1 on page 16 for a wiring diagram.

Connecting the Modbus Output

The Brasch Gas Transmitters also include a circuit that provides digital communication via Modbus RTU protocol. This output allows a client device to read the firmware version, gas sensor type, gas sensor value, and any error codes associated with the transmitter. Color-coded wires exit the transmitter housing through the top conduit fitting so removal of the front cover should not be necessary. At each transmitter, the positive conductor connects to the brown wire and the negative conductor connects to the blue wire.

See figure 2 on page 16 for a wiring diagram. A more complete description, including instructions on setting up the client, is available in the dedicated Modbus Setup Guide.

Applying Power For the First Time

Once all the wiring connections are complete, the transmitter is ready for power to be applied. The green power LED will glow immediately and the output will begin transmitting. However, the first 2.5 minutes after the power is applied should be considered a warm-up period as the sensor readings will not be fully stabilized yet. After this time, the transmitter is ready to monitor the area for target gas.

Installation Diagrams

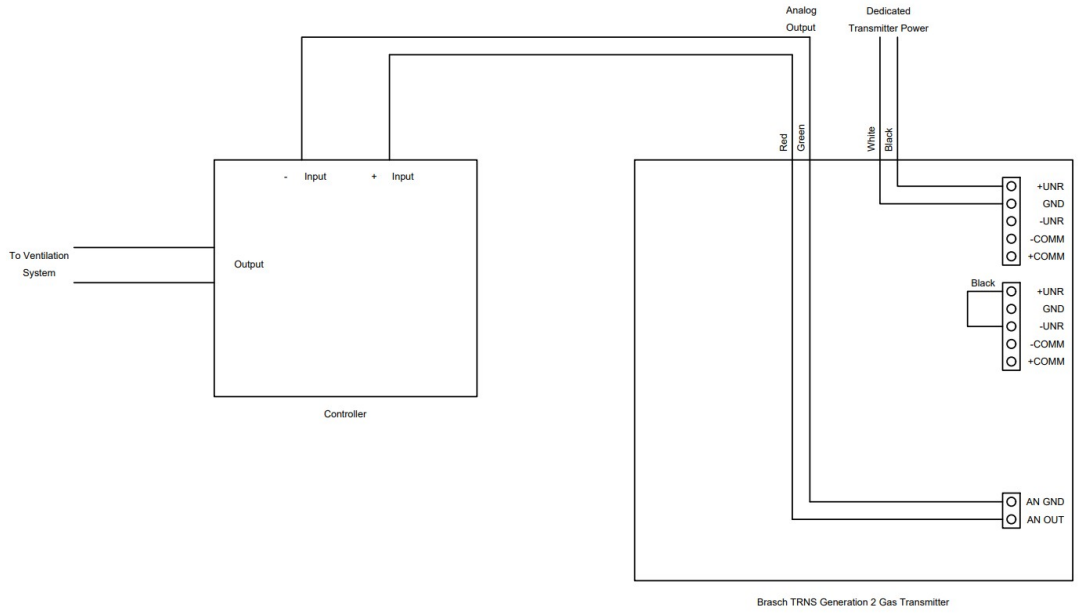

Figure 1: Wiring – Analog Output Configuration

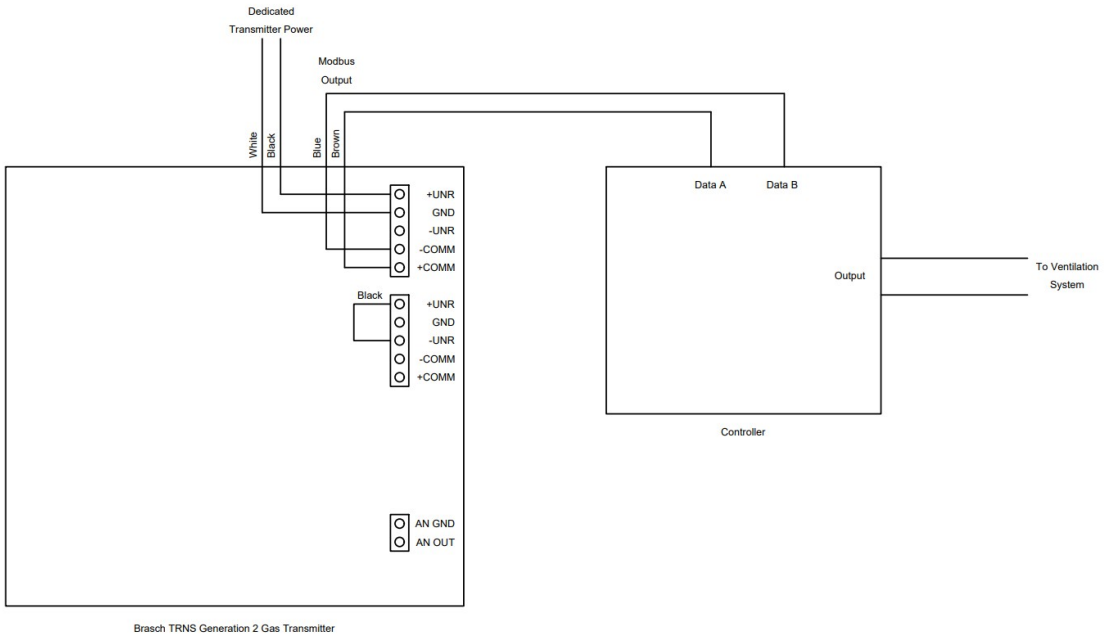

Figure 2: Wiring – Digital Output Configuration

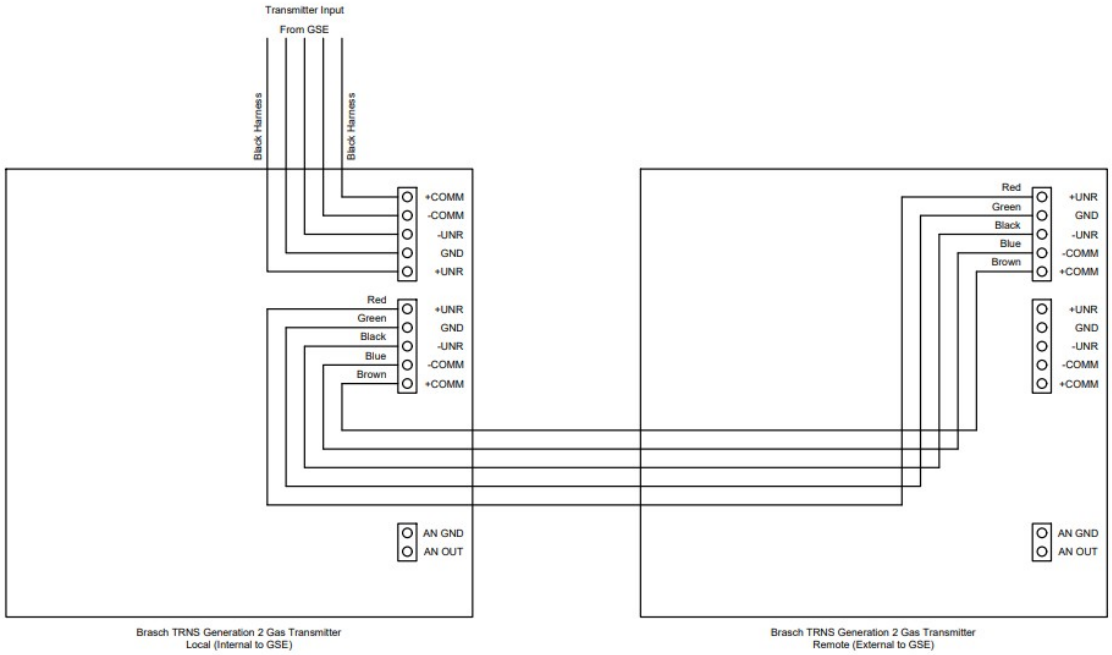

Figure 3: Wiring – Remote Sensor Configuration

Operation

How the Transmitter Senses the Target Gas

Ambient air surrounding the transmitter housing diffuses inside the housing where it comes into contact with the sensor. Although the transmitter's circuitry dissipates very little power, a small amount of heat is produced inside the housing. This heat causes air to rise up through the bottom vent, past the sensor, and out the upper vent. Any target gas present in this air causes a response from the sensor. If the transmitter is located properly, the sensor will respond to the average amount of the target gas present in the area. For help in properly locating the transmitter, please read the mounting guidelines on page 12. This transmitter monitors the actual concentration of the target gas exposed to the sensor. This actual value may be different than the time-weighted-average values displayed by many personal gas monitors. Please take this difference into account when comparing the response of the two units.

Factory Default Settings

Unless otherwise specified on the order form, the following settings will be used to configure the analog proportional output of the transmitter.

Setting	**Default**
Analog Proportional Output Units	mA
Analog Proportional Output Signal	4-20 mA

Using the Analog Proportional Output

This Brasch Gas Transmitter is supplied with a linear proportional output that can be connected to a building management controller or variable-frequency drive. This output can produce either a current or voltage signal that is proportional to the concentration of the target gas present at the sensor. By moving jumpers, located on the bottom, right corner of the printed circuit board, the user can select from 4-20 mA, 2-10 VDC, 1-5 VDC, and 0.2-1 VDC signals. This signal is available at the terminal strip TS3, located at the bottom, right corner of the board. See figure 6 on page 26 for the terminal strip locations and signal mode selection jumpers.

Unless otherwise specified, the transmitter is shipped from the factory with the selection jumpers set in the 4-20 mA current loop mode. To change the mode to one of the voltage modes, the JP2 selection jumper must be moved to the "Volts" pins. After this, the JP3 jumper

may be moved to the desired output. To return to the 4-20 mA mode, replace the JP3 jumper on the “mA” pins and the JP2 jumper to the “4-20 mA” pins. Ensure that power to the transmitter is off before attempting to change these settings.

The output signal is connected using a two-conductor shielded cable. The resistance of the total cable length must be less than 250 Ω if the 4-20 mA current loop mode is selected. For the voltage modes, the input impedance of the controller must be greater than 100 kΩ.

Ground the shield of the signal cable at an earth grounding point only to avoid noise conditions created by ground loops. Although the positive signal lead can be shorted to ground without causing damage, this condition should be avoided. Also, do not route the signal cable in conduit containing other wiring to avoid unwanted noise pickup.

The linear outputs produce a signal based on the full scale response of the transmitter. As an example, a Brasch Carbon Monoxide Transmitter has a full scale output of 200 PPM CO. For the 4-20 mA output mode, 0 PPM CO would equal 4 mA while 200 PPM CO would equal 20 mA. Follow the instructions supplied with your controller to adjust the controller’s input for the proper scaling of the signal. Consider a 0 mA or 0 VDC output as a fault condition. See figure 7 on page 27 for details.

Adjusting the Proportional Output

Note
Power to the transmitter must be turned off in order for any changes made to take effect.

To adjust the output, set the jumper at JP2 on the bottom, right of the sensor board to the desired unit – “Volts” or “mA”. Then set the jumper at JP3, just above JP2, to the desired output signal – 2-10 V, 1-5 V, 0.2-1 V, or 4-20 mA. Be sure to follow the instructions on page 18 to ensure proper functionality of the proportional output.

Obtaining the Best Operation

Carbon Monoxide and/or Nitrogen Dioxide Transmitters

These transmitters are placed in areas to monitor for a rising concentration of the target gas. No two installations will be exactly the same. The number of gas producing sources, air flow patterns inside the room, the total room volume, and the exact location of the transmitter(s) influence how effective each is in sensing the target gas concentration.

With most installations, the only variable that can be changed is the location of the transmitter. In some cases, you may find that a target gas source is too close to the transmitter. Consider other mounting locations for the transmitter or move the gas source farther away.

Maintenance

Testing the Response to the Target Gas

Carbon Monoxide or Nitrogen Dioxide Transmitters

Testing these transmitters requires that the target gas be applied to the sensor using one of two methods. Gas can be applied from a tank of air containing a known concentration of the target gas or from the exhaust of an operating engine to produce a level of target gas sufficient to activate the control system. For the latter method, use a gasoline or petrol engine to produce CO and a diesel engine to produce NO_2.

Of the two methods of obtaining test gas, the simplest is operating an engine in the vicinity of the transmitter under test. The engine should be placed about 10 feet away from the transmitter so that exhaust gases will not contact the transmitter directly.

CAUTION
Allowing the transmitter to come in direct contact with undiluted exhaust gases will decrease the expected useful lifetime of the sensor. The high concentration of acids and other components in the exhaust gas will overload the activated carbon filter inside the sensor and will increase the effects of interfering gases on the accuracy of the sensor. If the sensor becomes damaged, it must be replaced with a new sensor calibrated at the factory.

The engine should be allowed to operate until a level of the target gas is sufficient to activate the ventilation system. Depending upon the volume of the area where the transmitter is located, this may take from 10 to 30 minutes.

Using test gas applied from a tank has the advantage of speed as well as assurance that the transmitter is responding accurately to the target gas. However, the gas must be applied directly to the sensor if the response is to be close to the value present in the tank. The test gas cannot be allowed to become diluted by the air in the room before it comes in contact with the sensor. This reduces the concentration to a level too low to give the desired result.

While test gas is readily available for CO, gas containing low PPM levels of NO_2 is not as easy to find. Check with your local environmental or chemical supply store for more information.

To test the sensor response using test gas from a tank, remove the four retaining screws from the cover. Gently lift the cover off the housing and apply gas to the sensor. Allow approximately 5 minutes for the sensor to respond to the test gas. If the response time is too slow or the concentration measured is outside of acceptable tolerance, the sensor should be recalibrated.

Alternatively, seal the vents and let the gas flow through a flexible hose into the transmitter housing. Allow 10 to 15 minutes for the test gas to completely replace the air inside the transmitter housing. If the test gas has the required concentration, the controller should respond by displaying the correct concentration and activating the appropriate ventilation component(s).

Because of the uncontrolled conditions in the test area, the transmitter may not indicate a concentration equal to that of the test gas. However, sufficient response can be obtained to determine that the transmitter is working.

Brasch Environmental Technologies recommends testing the detector once every six months to ensure proper response and accuracy.

Replacing the Sensor

The sensor's useful lifetime depends greatly upon its operating conditions. Continuous operation around large or numerous gas sources may shorten the sensor's useful life. A recommended recalibration date is recorded on the front panel label.

Because each sensor requires individual calibration, the sensor is replaced by installing a new, factory-calibrated sensor board assembly. This procedure can be accomplished in the field. The old sensor board assembly may be discarded.

To replace a sensor board assembly, disconnect any power sources from the sensor board. Remove the four retaining screws in the cover and set the cover aside. Unplug any connections to the sensor board and remove the four screws securing the sensor board to the housing. Place the old sensor board aside. After making sure that all jumpers and switches on the new sensor board match the old sensor board, place the new sensor board into the housing. Replace the four screws to secure the sensor board to the housing and return and connections to their original locations. Carefully replace the cover, making sure to align the indicator LEDs. Firmly tighten the four cover retaining screws. Restore the sensor power sources and check for proper operation.

Suggested Repair Parts

This Brasch Gas Transmitter contains few field serviceable parts. However, the fuses are replaceable in the field. While an open fuse may indicate problems with the circuitry, fuses may also open because of power surges or ventilation component failure. Therefore, Brasch recommends that the following fuses be available for replacement.

Qty	Description	Location	Part Number
1	Fuse, TR5, time-lag, 0.250 A, 250 VAC	Sensor Board Negative Fuse	TR5-0.250
1	Fuse, TR5, time-lag, 1.0 A, 250 VAC	Sensor Board Positive Fuse	TR5-1.0

A package containing the proper quantities of fuses can be purchased through your Brasch distributor.

Troubleshooting

Fault

The yellow LED on the front panel will glow to indicate a fault condition with the sensor. This is activated upon the sensor reaching the expected end of its useful lifetime. This will be approximately 10 years from the original manufacturing date for both Carbon Monoxide and Nitrogen Dioxide sensors.

The signal is triggered by a clock in the sensor board. In the event that the unit loses power, a supercapacitor will maintain the clock for up to three weeks. While this fault is being displayed, the area covered by the transmitter will be unmonitored. A signal of 0 mA or 0 V will be sent to the controller depending on the output settings.

When this error appears, replace the sensor board.

Checking and Replacing Fuses

The circuitry of all the transmitters are protected by time-lag TR5 fuses. They are UL rated at 250 VAC, and manufactured by Littelfuse, series 374.

There are two TR5 time-lag fuses protecting the input circuitry of the sensor board. The fuse located at FH1 is rated at 1.0 Amp while the fuse located at FH2 is rated at 0.250 Amps. Test each fuse for resistance and replace if the reading is not near 0 Ω. Always replace fuses with one having the same rating and characteristics.

Common Installation/Operation Mistakes

Proportional Output Connected Incorrectly

The proportional output uses a red wire for the positive analog output and a green wire for the reference analog ground. Reversing these connections will result in inaccurate readings or no readings at all.

Setting the Proportional Output Incorrectly

If the controller connected to the proportional output is expecting a certain output signal, the jumpers on JP2 and JP3 must be configured to output that type of signal. A common mistake is leaving JP2 set to mA while moving JP3 to the desired voltage output. This causes the unit to read between 12 and 15 VDC with the output not changing proportional to the sensor's gas readings.

Using Improper Resistance/Impedance

If using the 4-20 mA current loop mode, the resistance of the cable connecting the output to the controller must be less than 250 Ω. If using one of the voltage modes, the input impedance of the controller must be greater than 100 kΩ. If these requirements are not adhered to, the proportional output will not accurately reflect the concentration of gas measured by the sensor.

Transmitter Mounted in an Unsatisfactory Location

For reliable operation, the transmitter(s) must be mounted in the proper locations. Please read "Mounting the Transmitter" on page 12 for guidelines on choosing locations.

Common mistakes include mounting a transmitter too close to a garage door. When the door is open, rain may blow through the doorway and onto the transmitter housing. Another common mistake is to mount the transmitter in a location where it comes in direct contact with engine exhaust. The large amount of contaminates in engine exhaust can shorten the useful life of the sensor.

One more common mistake is to choose a mounting location that places the transmitter too near the outlet of air conditioners or heaters. Quick, drastic changes in ambient temperature can cause erratic shifts in the transmitter readings.

By following the mounting guidelines, many of the problems caused by improper mounting locations can be eliminated.

Limited Warranty

Warranty Statement

Brasch Environmental Technologies, LLC warrants gas transmitters, gas detectors, control panels, and accessories for a period of two years from the date of shipment against defects in material or workmanship. Should any evidence of defects in material or workmanship occur during the warranty period, Brasch Environmental Technologies will repair or replace the affected product, at its own discretion, without charge. The company shall not be held responsible for any charges incurred with removal or replacement of allegedly defective equipment, nor for incidental or consequential damages. If any equipment has not been installed per Brasch instructions, this warranty is void. The cost to repair, replace, or service any component is not the responsibility of Brasch. Any replacement parts or service necessary must be paid in full prior to shipment or performance.

Service and Repair Procedures

Our goal at Brasch Environmental Technologies is to produce products that constantly exceed the requirements and expectations of our customers. One of the ways of meeting that goal is to produce products that never fail or require service. However, when we are notified of a problem with one of our products, it is our intention to address the problem as quickly and efficiently as possible.

Many problems that appear at first to be associated with the product can be solved without returning the product. If you experience a problem and would like to discuss it with a factory service technician, you may call the number listed on the product label. You will be transferred to a technician specially trained to service that product. This technician will help you determine the most efficient way of solving the problem.

If service or repair of your Brasch product becomes necessary, an authorization request for returning the product to the Brasch factory must be obtained from our sales office. If you are an end user, please contact your Brasch distributor to initiate this request. The distributor, after obtaining a description of the problem, will contact the factory and request a Return Goods Tag (RGT) number. This number must be placed in a conspicuous location on the outside of the shipping package. Without this RGT number, Brasch will not accept the shipment. A brief description of the reason for returning the product should be included in the package. Without this description, repair may take longer than necessary.

You may, at the time you request service, request an estimate on the time it will take for repair. The Brasch representative will give you an estimate based upon the information you provide. Although Brasch Environmental Technologies, LLC will repair and return your product in as short a time as possible, Brasch cannot be held responsible for meeting repair estimates.

Appendix

Model Numbers and Descriptions

Each Brasch Gas Transmitter is given a model number that describes the type of target gas. This model number appears on the label on the front panel.

Use the following list to completely identify a transmitter once you know the model number.

Transmitter Model Number and Description

Output Type	Target Gas		
	CO	NO_2	CO/NO_2
Analog	TRNS2-CM-Analog	TRNS2-ND-Analog	TRNS2-NCM-Analog
Digital	TRNS2-CM-Digital	TRNS2-ND-Digital	TRNS2-NCM-Digital

Figures and Diagrams

Figure 4: Front Cover Layout

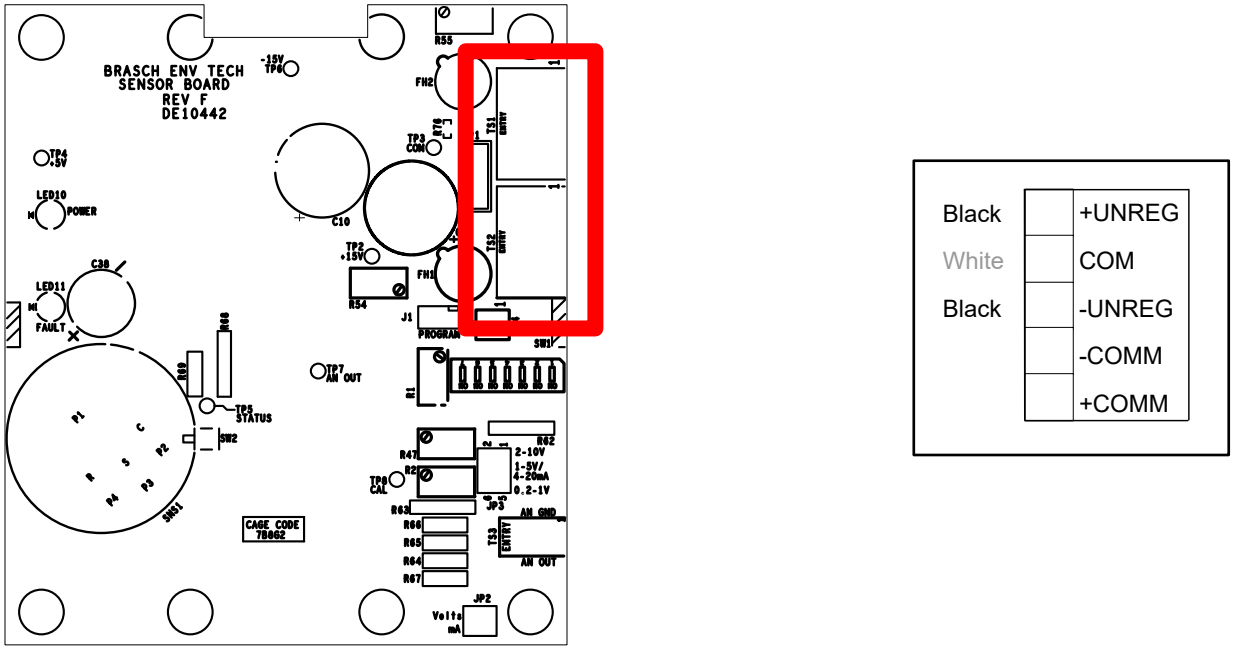

Figure 5: Input Power Connections

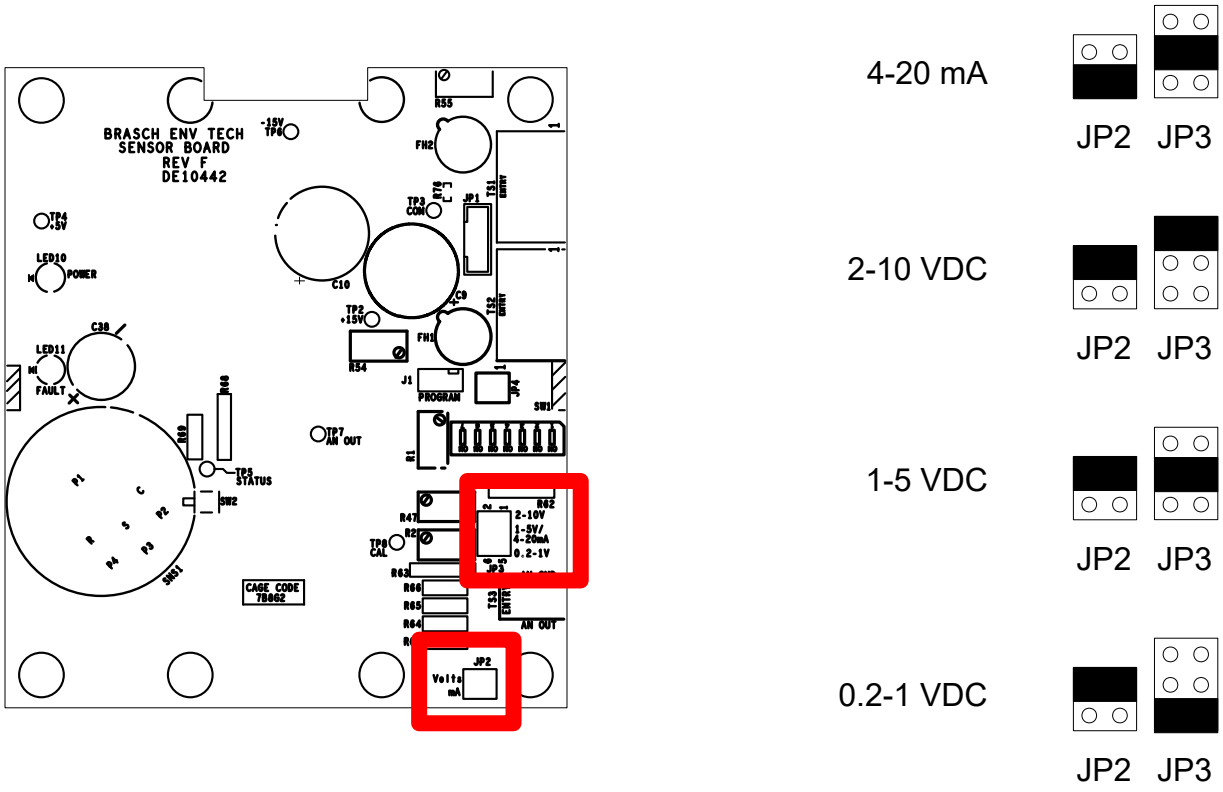

Figure 6: Proportional Output Settings

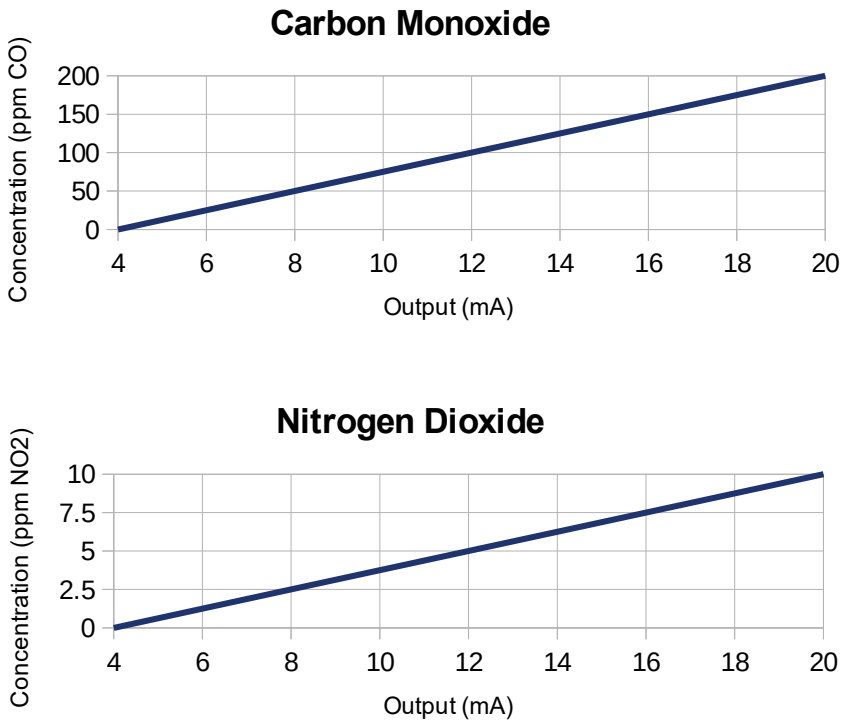

Figure 7: Proportional Output Graphs

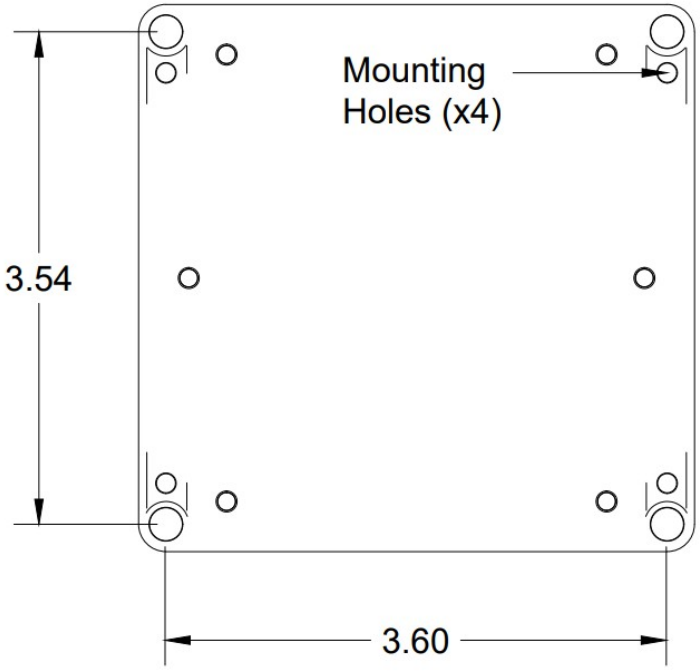

Figure 8: Mounting Dimensions (Not to Scale)

Filter Capacity	ppm-hours	H_2S	250,000
Filter Capacity	ppm-hours	NO_2	120,000
Filter Capacity	ppm-hours	NO	120,000
Filter Capacity	ppm-hours	SO_2	160,000
Sensitivity	% measured @ 20 ppm	H_2S	< 0.1
Sensitivity	% measured @ 10 ppm	NO_2	< 0.1
Sensitivity	% measured @ 10 ppm	Cl_2	< 0.1
Sensitivity	% measured @ 50 ppm	NO	< 25
Sensitivity	% measured @ 20 ppm	SO_2	< 0.1
Sensitivity	% measured @ 400 ppm	H_2	< 65
Sensitivity	% measured @ 400 ppm	C_2H_4	< 65
Sensitivity	% measured @ 20 ppm	NH_3	< 0.1

Figure 9: Cross-Sensitivity Characteristics – Carbon Monoxide

Sensitivity	% measured @ 20 ppm	H_2S	< -100
Sensitivity	% measured @ 50 ppm	NO	< 0.5
Sensitivity	% measured @ 10 ppm	Cl_2	< 100
Sensitivity	% measured @ 20 ppm	SO_2	< -2
Sensitivity	% measured @ 400 ppm	CO	< 0.1
Sensitivity	% measured @ 400 ppm	H_2	< 0.1
Sensitivity	% measured @ 400 ppm	C_2H_4	< 0.1
Sensitivity	% measured @ 20 ppm	NH_3	< 0.1
Sensitivity	% measured @ 5% (Vol)	CO_2	0

Figure 10: Cross-Sensitivity Characteristics – Nitrogen Dioxide

Note

The above figures are not complete lists of all possible desensitizing or contaminating gases or substances. Take caution to evaluate the probable effect of a contaminant not included in the above list. Contact Brasch Environmental Technologies technical support to learn more.

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