

Brasch Manufacturing Company, Inc.

Gas Testing Kit for

Model GSE Carbon Monoxide Gas Detectors

Serial Numbers S-6000 and Above

Model GSE Carbon Monoxide Gas Transmitters

Serial Numbers P-4468 and Above

Assembly and Operating Instructions

IOM #I-691

July, 2004

Introduction:

Brasch model GSE gas detectors/transmitters are used in applications for automatic control of toxic and other nuisance gases. Many of our detectors/transmitters include a sensor that monitors for the presence of carbon monoxide and, when a preset concentration is exceeded, operate ventilating equipment that exhausts the contaminated air away from the protected area. Once the carbon monoxide level drops below this preset concentration, the equipment returns to its off (normal) condition.

Although the detectors/transmitters are designed to be highly reliable, periodic checks should be performed to determine the operational status of the detector/transmitter. All model GSE detectors include software that allows the testing of the display, relay contacts and various indicator lamps during the first five minutes after power is applied. However, the status of the sensor can only be determined by actually exposing the sensor to a known concentration of carbon monoxide gas and then noting the response to the gas on the detector's display. This is the only type of test necessary for the transmitters.

This **Gas Testing Kit** gives the user the capability of exposing the sensor to selected concentrations of carbon monoxide within the range of the detector/transmitter. In this manner, tests can be made to determine the sensor's response to the gas and if the ventilating equipment is operating correctly. The kit includes enough test gas to complete approximately 100 tests at various concentrations. Replacement tanks of test gas are available from your nearest Brasch distributor.

What this kit can do:

Using this kit, the volume inside the Brasch model GSE gas detector housing is exposed to a controlled quantity of gas containing 1000 PPM of carbon monoxide. The quantity of gas mixes with the air contained inside the detector housing, and the volume of carbon monoxide is diluted to a final value within the 0 to 200 PPM range of the detector. By controlling the amount of time that the test gas flows into the detector housing, various concentrations of carbon monoxide are produced providing several test points within the detector's range. A test bracket supplied with the kit both seals the housing, by covering the housing vents, and provides a hose fitting through which the test gas is injected.

Testing of the transmitter is accomplished in nearly the same manner except that a test chamber is placed over the sensing port of the transmitter. This test chamber is then filled with a small volume of the 1000 PPM test gas. Once the gas is diluted by the volume of the

chamber, its final concentration is with the 0-200 PPM range of the transmitter.

Test kit parts list:

This test kit consists of the following components:

1. Gas tank, 1000 PPM carbon monoxide in air. The tank contains approximately 17 Liters of gas at a pressure, when new, of around 500 psig. This amount of gas will provide about 100 single test points before the tank is empty.
2. Gas regulator, fixed at 0.3 LPM. The regulator screws onto the outlet of the gas tank and controls the flow of test gas into the detector housing. The regulator is equipped with an on-off valve that gives the operator control over the amount of time the gas is flowing.
3. Test gas injection bracket, with inlet fitting and venting screen seals. This bracket slips over the front of the GSE detector housing and seals both the top and bottom venting screens. An inlet fitting, attached to the bottom, right hand side, directs the flow of the test gas into the detector housing through the right hand, bottom vent screen.
4. Test gas chamber for the GSE-CM-TRNS transmitter. This chamber mounts to the front of the transmitter and allows the test gas to be applied directly to the sensor. An inlet fitting, attached to the lid, directs the flow of the test gas into the test chamber.
5. Gas inlet tubing, ¼" latex rubber. This tubing connects the outlet of the gas regulator to the inlet fitting installed in the test gas injection bracket or test gas chamber.
6. Stopwatch used for timing the test gas flow into the detector housing. The final concentration of carbon monoxide is determined by the amount of test gas injected inside the detector housing. Since the test gas flows at a predetermined rate, the amount of carbon monoxide that enters the housing is determined by varying the time the test gas is allowed to flow.
7. Reusable putty used to seal the spaces between wiring and the inside of the conduit fittings. Sealing these spaces assures that the test gas will not be diluted by air flowing back through these openings.

8. Instructions detailing what the kit can do, the parts contained in the kit, and the use of the kit to test the Brasch carbon monoxide detectors/transmitters.
9. A convenient carrying case that protects the kit's components.

Testing the Brasch GSE stand alone detectors:

Assembling and installing the test gas kit:

NOTICE

This testing kit is designed to produce a controlled concentration of carbon monoxide within the range of the Brasch gas detector. Any concentration produced is meant only for testing the Brasch gas detector's response to the presence of carbon monoxide.

Under no circumstances should the concentration of carbon monoxide produced be used as a calibration standard. Calibration of the Brasch gas detector requires the use of controlled procedures carried out in a laboratory environment.

WARNING

DANGEROUS VOLTAGE LEVELS may exist inside the detector and any electrical housing associated with it. ONLY QUALIFIED, PROPERLY TRAINED PERSONNEL SHOULD PERFORM WORK ON THIS DETECTOR.

First, prepare the detector housing for testing by sealing the opening between all wiring and the inside of the conduit fittings. Use the putty supplied with the kit. Use only enough to fill the opening. If the detector is mounted using a four inch square conduit box, the lid of the box can be removed to allow access to the fittings. The putty can be left in place to provide a seal for future tests.

Next, prepare the gas test kit by removing the tank of gas from the carrying case and remove the plastic cap over the tank fitting. **DO NOT DISCARD THE PLASTIC CAP. REPLACE THE CAP ON THE TANK FITTING WHEN THE TANK IS STORED IN THE CARRYING CASE.** Remove the regulator from the case and, after making sure that the **ON/OFF** valve of the regulator is in the **OFF** position, attach the regulator to the fitting on the top of the tank. After making sure that the threads on the regulator fitting are not cross-threaded on the tank

fitting threads, using your hands only, secure the regulator to the tank by turning it in a clockwise direction until tight. **DO NOT OVERTIGHTEN THE FITTING CONNECTIONS OR USE ANY TOOLS OTHER THAN YOUR HANDS. DO NOT USE ANY THREAD SEALING COMPOUND OR TAPE ON THE FITTINGS.** Place the tank in the upright position on a table or on the floor.

Remove the gas injection bracket from the carrying case and attach the length of ¼" tubing to the barbed fitting on the bottom, right side of the bracket. Referring to **Fig. 1**, find the bracket tension adjustment knob on the center, top portion of the bracket. Turn this knob clockwise until the bracket springs are completely compressed. Again referring to **Fig. 1**, slip the injection bracket over the front of the Brasch gas detector's housing. Align the positioning holes in the front of the bracket so that the center top and bottom housing cover screws are visible through the alignment holes. While holding the bracket firmly against the housing, turn the tension adjustment knob counter-clockwise until the knob is slightly loose on its threaded rod. Inspect the portions of the bracket that cover the top and bottom venting screens for a proper fit. If necessary, adjust the bracket until the screens are evenly covered and until the seals on the underside of the bracket are in complete contact with the rim of each screen.

Once the gas injection bracket is in place, attach the loose end of the ¼" tubing to the barbed fitting on the tank regulator. Place the tank in the upright position on a stable surface. Make sure that the tank/bracket setup looks like the picture in **Fig. 2**.

When you are satisfied that the test kit parts are correctly assembled and installed, you are ready to introduce test gas into the Brasch gas detector.

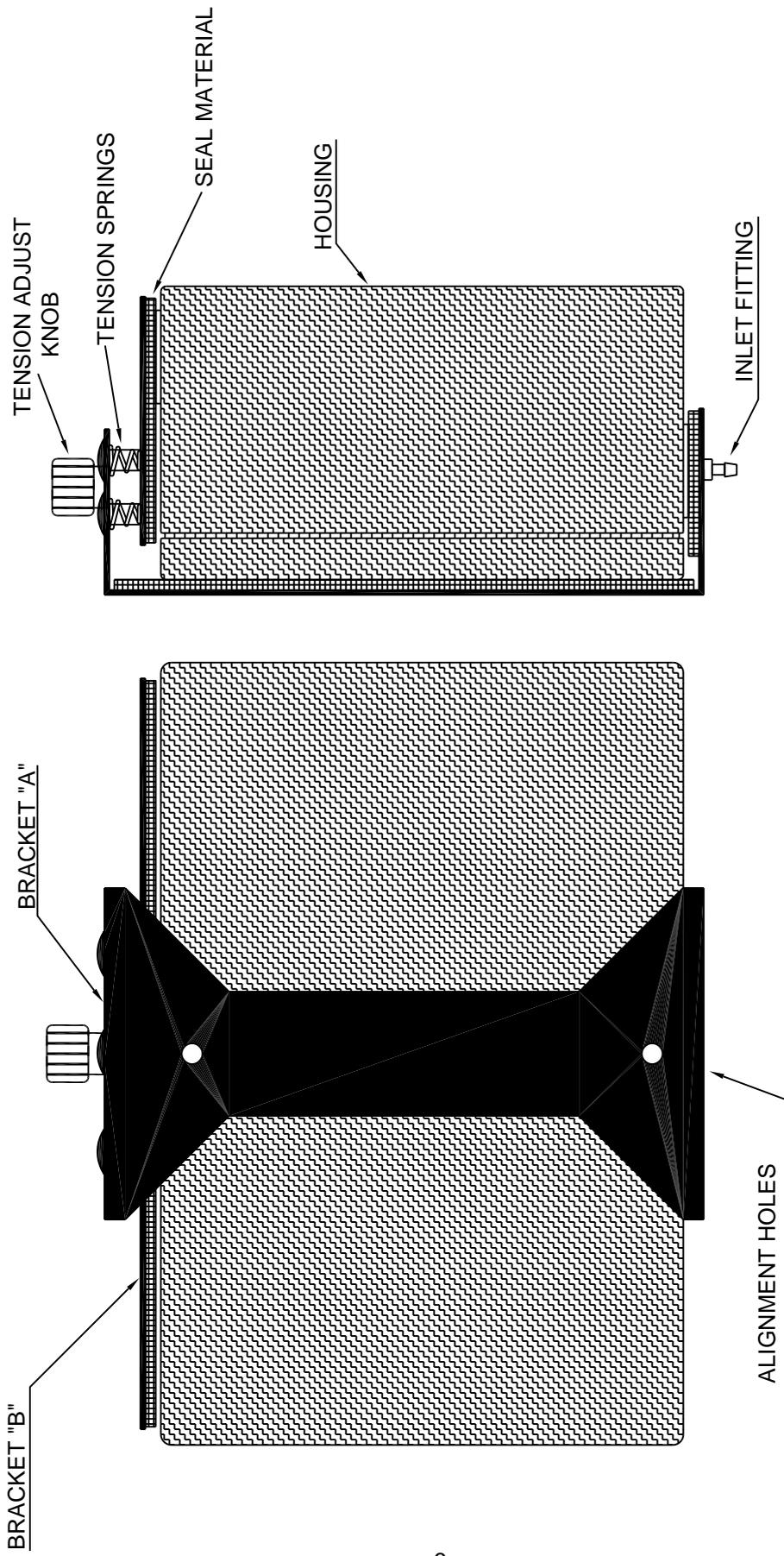


Fig 1: Gas injection bracket mounted on GSE detector housing.

Testing the detector's response to carbon monoxide:

To properly assess the detector's performance, make sure that the display is indicating a carbon monoxide reading at, or near, zero PPM. If the display indicates an elevated level of carbon monoxide, remove the test gas injection bracket and operate the ventilating fans until the level indicated drops to near zero. If you cannot obtain a near zero reading, the detector or ventilation system may be faulty. Determine the reason for the elevated carbon monoxide level and correct the problem before continuing the response tests.

The test concentration of carbon monoxide is produced by varying the time, in seconds, that the gas is allowed to flow into the detector housing. Refer to **Table 1**, and choose the concentration of carbon monoxide that you wish to use for response testing. The bottom row of the table lists the approximate final concentration of carbon monoxide. The top row indicates the required seconds of gas flow to obtain the concentration. You may want to copy the table and use it to record your test results in the available empty rows.

Once you have determined a test concentration, remove the stopwatch from the carrying case and use it to time the duration of gas flow. If you have someone to help you during the test, one person may operate the watch while the second person operates the regulator **ON/OFF** valve. If you are performing the response test alone, it is recommended that you start the watch in the stopwatch mode, and turn the **ON/OFF** valve **on** when the time passes a selected reading. Continue to monitor the watch and turn the **ON/OFF** valve to the **off** position when the reading shows an elapsed time, in seconds, as determined from **Table 1**. Allow the gas time to diffuse throughout the housing and come to a stable reading. This will usually take about three minutes. If the concentration of carbon monoxide chosen is higher than the low alert setting, you will see the LOW ALERT indicator lamp begin to flash. This lamp will continue to flash until the delay period is over, and the low alert condition is set. **See the detector I/O manual for a complete description of the alert conditions.** If the carbon monoxide concentration exceeds the 100 PPM high alert setting, the HIGH ALERT indicator lamp will flash and the high alert condition will be set at the end of the delay period. In either instance, the 4-digit display should indicate a value close to the value chosen as the carbon monoxide concentration from **Table 1**. A value that is markedly higher or lower than the expected value indicates a faulty detector, an incorrectly installed gas injection bracket or an empty test gas tank. Check the pressure gauge on the test gas tank for sufficient pressure to give the correct gas flow. If the pressure is near the zero indication on the gauge, replace the tank. If the pressure indication on the regulator gauge is within the proper range, remove the injection bracket from the detector housing by first turning the tension adjusting knob clockwise until the springs are completely compressed. Grasp the front of the bracket and pull the bracket towards you until it is completely off the housing. Allow the reading on the detector display to return to zero.

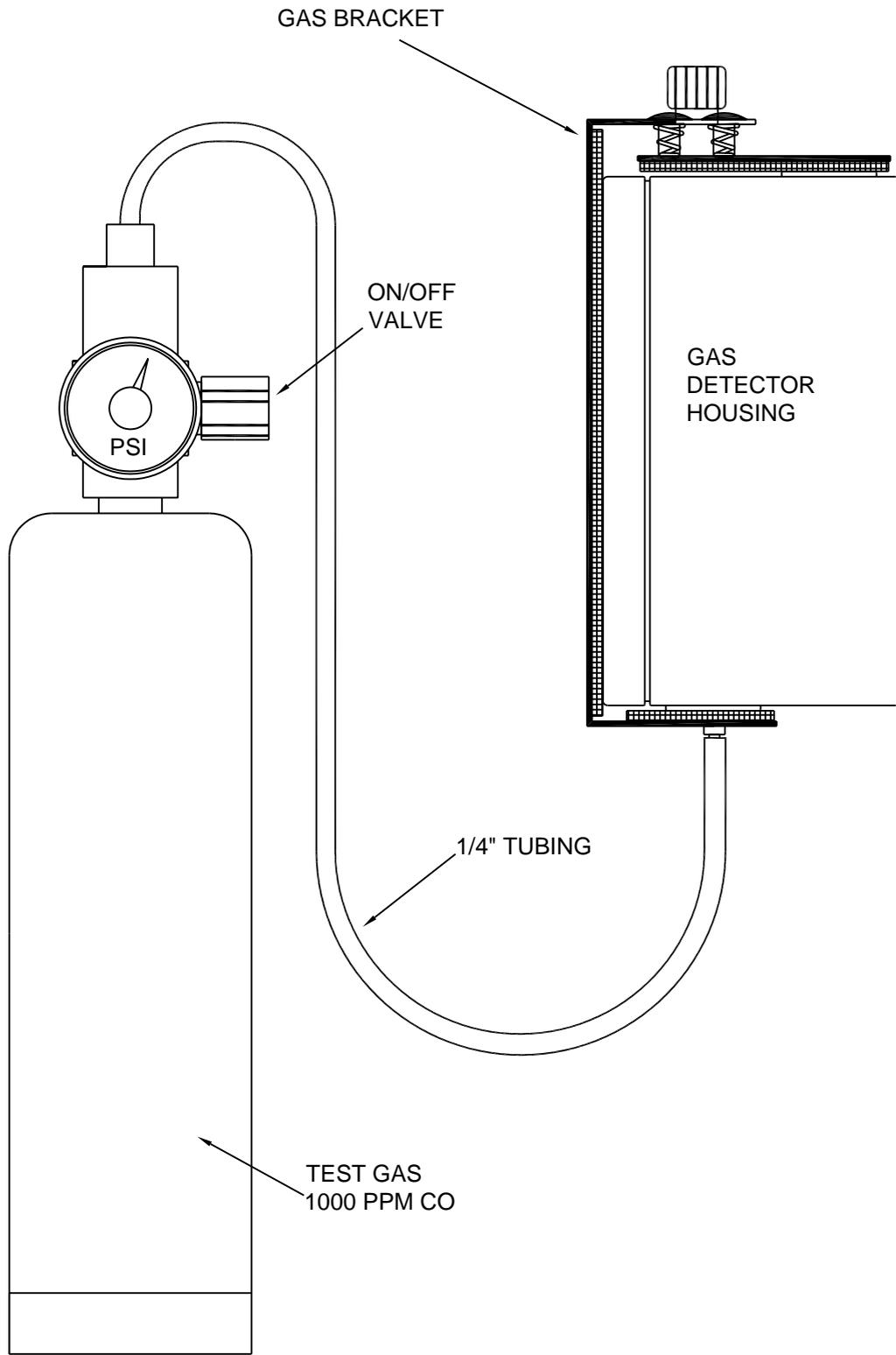


FIG. 2: View of gas bracket installed on gas detector with test gas tank attached.

TABLE 1: Carbon Monoxide response, PPM, vs. seconds of test gas flow.

Brasch Models GSE-CM-L0, GSE-CM-L1, GSE-NCM-LL0 and GSE-NCM-LL1 gas detectors.

| | | | | | | | | | | | |
|-----------------|------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|
| | Seconds of Flow | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| | Expected PPM Response | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |
| Ser. Num. _____ | | | | | | | | | | | |
| | Seconds of Flow | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| | Measured PPM Response | | | | | | | | | | |
| Ser. Num. _____ | | | | | | | | | | | |
| | Seconds of Flow | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| | Measured PPM Response | | | | | | | | | | |
| Ser. Num. _____ | | | | | | | | | | | |
| | Seconds of Flow | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| | Measured PPM Response | | | | | | | | | | |

NOTES:

1. All readings taken 3 minutes after start of gas flow.
2. Test bracket was removed between each sample injection and detector reading was allowed to return to zero PPM before next injection of sample gas.
3. Expected readings are approximate based upon calculated volume of detector housing and accuracy of test gas.
4. **Readings are meant for testing the detector's response to CO and are not to be used as a calibration standard.**
5. Test gas is composed of 1000 PPM CO, +/- 5%, in air.
6. Flow rate is approximately 300 ml per minute.

Place the injection bracket back on the housing and release the tension adjustment knob. Check the injection bracket for the correct position as shown in **Fig. 1**. Repeat the test and note the display indication. An unexpected reading may indicate that the sensor has reached the end of its useful lifetime and requires replacement. Check the information label on the upper, right corner of the detector housing for the recommended re-calibration date. If the detector has been in operation beyond this date, contact your distributor for information on obtaining a sensor replacement. If the date has not been exceeded, your detector may be faulty. Contact your distributor about obtaining service and repair information.

Test results:

It is recommended that the tests results obtained when using this kit be recorded in a journal or notebook for comparison at a later testing date. These test results will be especially helpful when trying to troubleshoot any future abnormal testing indications.

Testing the Brasch GSE-CM-TRNS transmitter:

Assembling and installing the test kit:

NOTICE

This testing kit is designed to produce a controlled concentration of carbon monoxide within the range of the Brasch gas transmitter. Any concentration produced is meant only for testing the Brasch transmitter's response to the presence of carbon monoxide.

Under no circumstances should the concentration of carbon monoxide produced be used as a calibration standard. Calibration of the Brasch gas transmitter requires the use of controlled procedures carried out in a laboratory environment.

WARNING

DANGEROUS VOLTAGE LEVELS may exist inside the transmitter and any electrical housing associated with it. **ONLY QUALIFIED, PROPERLY TRAINED PERSONNEL SHOULD PERFORM WORK ON THIS DETECTOR.**

First, prepare the transmitter housing for testing by sealing the opening between all wiring and the inside of the conduit fittings. Use the putty supplied with the kit. Use only enough to fill the opening. If the transmitter is mounted using a four inch square conduit box, the lid of the box can be removed to allow access to the fittings. The putty can be left in place to provide a seal for future tests.

Next, prepare the gas test kit by removing the tank of gas from the carrying case and remove the plastic cap over the tank fitting. **DO NOT DISCARD THE PLASTIC CAP. REPLACE THE CAP ON THE TANK FITTING WHEN THE TANK IS STORED IN THE CARRYING CASE.** Remove the regulator from the case and, after making sure that the **ON/OFF** valve of the regulator is in the **OFF** position, attach the regulator to the fitting on the top of the tank. After making sure that the threads on the regulator fitting are not cross-threaded on the tank fitting threads, using your hands only, secure the regulator to the tank by turning it in a clockwise direction until tight. **DO NOT OVERTIGHTEN THE FITTING CONNECTIONS OR USE ANY TOOLS OTHER THAN YOUR HANDS. DO NOT USE ANY THREAD SEALING COMPOUND OR TAPE ON THE FITTINGS.** Place the tank in the upright position on a table or on the floor.

Remove the gas injection chamber from the pocket in the top foam insert of the carrying case. Remove the lid from the chamber. Attach the length of ¼” tubing to the barbed fitting on the center of the chamber lid and place the lid in a safe area to be used later. Referring to **Fig. 3**, loosen the required two cover securing screws on the front of the transmitter.

NOTICE

If you find that the transmitter cover screws are too short, replace them with two of the longer screws that come with the test kit. Leave these screws in place for future testing.

Additional screws can be obtained from you Brasch representative, or directly from the factory.

Slip the **metal chamber mounting bracket** between the screws and the transmitter’s cover. Center the opening in the bottom of the chamber over the **sensing port** of the transmitter. Tighten the two screws tight enough to firmly secure the chamber to the transmitter cover. Obtain the chamber lid with the attached ¼” tubing, and firmly seat it on the test gas chamber. The lid must snap over the lip of the chamber on all four sides.

Once the gas test chamber is in place, attach the loose end of the ¼” tubing to the barbed fitting on the tank regulator. Place the tank in the upright position on a stable surface. Make sure that the chamber/transmitter setup looks like the picture in **Fig. 3**.

When you are satisfied that the test kit parts are correctly assembled and installed, you are ready to introduce test gas into the Brasch gas transmitter.

Testing the transmitter’s response to carbon monoxide:

To properly assess the transmitter’s performance, make sure that the transmitter is indicating a carbon monoxide reading at, or near, zero PPM. If the transmitter is part of a Brasch GDCP control panel system, you will have to read the transmitter’s output at the panel’s display. Use the panel’s “STATUS” feature to display the correct transmitter number and its current concentration. If the transmitter connects directly to a building management controller, consult the controller’s manual to determine how to read the transmitter’s current CO value. If the transmitter indicates an elevated level of carbon monoxide, remove the test gas injection chamber lid and operate the ventilating fans until the level indicated drops to near zero. If you cannot obtain a near zero reading, the transmitter or ventilation system may be faulty. Determine the reason for the elevated carbon monoxide level and correct the problem before continuing the response tests.

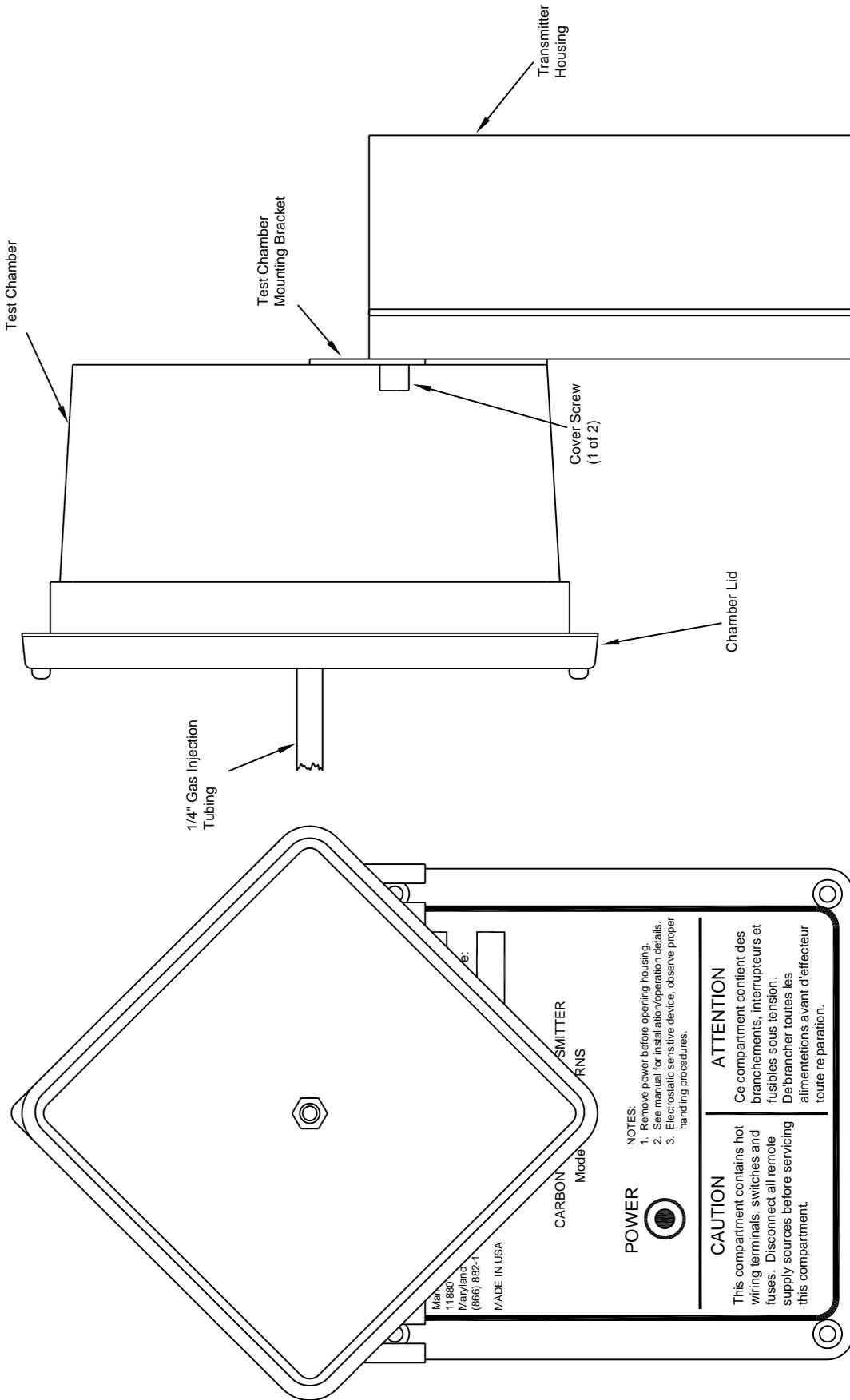


Fig. 3: View of test gas chamber mounted on Brasch GSE transmitter.

The test concentration of carbon monoxide is produced by varying the time, in seconds, that the gas is allowed to flow into the test chamber. Refer to **Table 2**, and choose the concentration of carbon monoxide that you wish to use for response testing. The bottom row of the table lists the approximate final concentration of carbon monoxide. The top row indicates the required seconds of gas flow to obtain the concentration.

Once you have determined a test concentration, remove the stopwatch from the carrying case and use it to time the duration of gas flow. If you have someone to help you during the test, one person may operate the watch while the second person operates the regulator **ON/OFF** valve. If you are performing the response test alone, it is recommended that you start the watch in the stopwatch mode, and turn the **ON/OFF** valve **on** when the time passes a selected reading. Continue to monitor the watch and turn the **ON/OFF** valve to the **off** position when the reading shows an elapsed time, in seconds, as determined from **Table 2**. Allow the gas time to diffuse throughout the chamber and come to a stable reading. This will usually take about three minutes. Read the concentration of CO on the GDCP panel using the “STATUS” feature, or on the building management controller as instructed by its manual. A value that is markedly higher or lower than the expected value indicates a faulty transmitter, an incorrectly installed gas injection chamber or an empty test gas tank. Check the pressure gauge on the test gas tank for sufficient pressure to give the correct gas flow. If the pressure is near the zero indication on the gauge, replace the tank. If the pressure indication on the regulator gauge is within the proper range, remove the injection chamber from the transmitter housing by first loosening the two cover screws. Allow the reading on the detector display to return to zero. Place the injection chamber back on the housing and tighten the two cover screws. Check the injection chamber for the correct position as shown in **Fig. 3**. Repeat the test and note the CO indication. An unexpected reading may indicate that the sensor has reached the end of its useful lifetime and requires replacement. Check the shipping date on the transmitter’s label. If the transmitter has been in operation for longer than five years, contact your distributor for information on obtaining a sensor replacement. If the date has not been exceeded, your transmitter may be faulty. Contact your distributor about obtaining service and repair information.

TABLE 2: Carbon Monoxide response, PPM vs. seconds of test gas flow.

Brasch Models GSE-CM-TRNS, and GSE-NCM-TRNS gas transmitters.

| | | | | | | | | | | |
|-----------------|------------------------------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|
| | Seconds of Flow | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| | Expected PPM Response | 20 | 41 | 61 | 81 | 102 | 122 | 142 | 163 | 183 |
| Ser. Num. _____ | | | | | | | | | | |
| | Seconds of Flow | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| | Measured PPM Response | | | | | | | | | |
| Ser. Num. _____ | | | | | | | | | | |
| | Seconds of Flow | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| | Measured PPM Response | | | | | | | | | |
| Ser. Num. _____ | | | | | | | | | | |
| | Seconds of Flow | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| | Measured PPM Response | | | | | | | | | |

NOTES:

1. All readings taken 3 minutes after start of gas flow.
2. Test chamber lid was removed between each sample injection and transmitter reading was allowed to return to zero PPM before next injection of sample gas.
3. Expected readings are approximate based upon calculated volume of transmitter housing and accuracy of test gas.
4. **Readings are meant for testing the transmitter's response to CO and are not to be used as a calibration standard.**
5. Test gas is composed of 1000 PPM CO, +/- 5%, in air.
6. Flow rate is approximately 300 ml per minute.

Kit assembly and storage:

When the testing is complete, the test kit components should be stored inside the carrying case. Store the components according to the following procedure.

1. Remove the ¼" tubing from the barbed fitting on the tank regulator. Grab the tubing with your fingers and gently pull it from the fitting while rotating the tubing.
2. Remove the regulator from the tank by turning it in a counter-clockwise direction. Once the regulator has been removed from the tank, store it inside the case in the space provided. Place the stopwatch in the pocket provided in the bottom foam insert.
3. **Place the protective plastic cap over the tank's fitting to keep out any foreign objects, and place the tank in the space provided inside the case.**
4. Remove the test bracket or test chamber.

Remove the gas injection bracket and the ¼" tubing from the gas detector by turning the tension adjustment knob in the clockwise direction until the tension springs are completely compressed. Gently remove the bracket from the detector housing.

Remove the test chamber from the transmitter by loosening the two cover screws and sliding the chamber mounting bracket off the screws. Tighten the transmitter's two cover screws securely.

5. Remove the ¼" tubing from the injection fitting on the bottom of the injection bracket, or from the fitting in the center of the test chamber's lid. Roll the tubing into a small coil and place it inside the case in the space provided.
6. Completely release the tension on the test injection bracket springs by turning the tension adjustment knob in the counter-clockwise direction. If the tension is left on the springs over a long period of time, the springs may lose some of their ability to apply sufficient force upon the detector venting screens. This condition will cause erroneous results when testing caused by the test gas leaking past the bracket sealing material.
7. Place the bracket in the case in the space provided at the left end of the bottom foam insert.

8. Place the transmitter test chamber in the pocket provided in the top foam insert, and place the foam insert in the case.
9. Place the assembly/operating instructions and all other parts inside the case and close the lid. Securely fasten all the case latches.
10. Store the case and its contents in a safe location.