



INSTRUMENTS

65-2302/65-2303
CT-7 Series Toxic Detector
Operator's Manual

Part Number: 71-0422

Revision: L

Released: 2/5/25

WARNING

Read and understand this instruction manual before operating instrument. Improper use of the gas monitor could result in bodily harm or death.

Periodic calibration and maintenance of the gas monitor is essential for proper operation and correct readings. Please calibrate and maintain this instrument regularly! Frequency of calibration depends upon the type of use you have and the sensor types. For most applications, typical calibration frequencies are between 3 and 6 months but can be more often or less often based on your usage.

Product Warranty

RKI Instruments, Inc. warrants gas alarm equipment sold by us to be free from defects in materials, workmanship, and performance for a period of one year from date of shipment from RKI Instruments, Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced on a routine basis. Examples of such items are:

- Absorbent cartridges
- Pump diaphragms and valves
- Fuses
- Batteries
- Filter elements

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repair procedures not in accordance with the operator's manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF RKI INSTRUMENTS, INC. INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RKI INSTRUMENTS, INC. BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold to users by authorized distributors, dealers, and representatives as appointed by RKI Instruments, Inc.

We do not assume indemnification for any accident or damage caused by the operation of this gas monitor, and our warranty is limited to the replacement of parts or our complete goods.

Table of Contents

Overview	5
Specifications	5
Description	7
65-2302 Toxic Detector	7
Junction Box.....	8
Installation	9
Mounting the Toxic Detector	9
Wiring the Toxic Detector to a Controller	10
Startup	11
Introducing Incoming Power	11
Setting the Zero (Fresh Air) Signal.....	12
Maintenance	13
Preventive Maintenance	13
Troubleshooting	13
Replacing Components of the Toxic Detector	15
Calibration Frequency	17
Calibration	18
Special Note About Calibrating a ClO ₂ Detector	18
Preparing for Calibration	18
Setting the Zero (Fresh Air) Reading	19
Setting the Response Reading (Span) for Detectors Other Than HCl	19
Setting the Response Reading (Span) for an HCl Detector	20
Returning to Normal Operation	20
Parts List	21

Overview

This manual describes the 65-2302 and 65-2303 toxic detectors. This manual also describes how to install, start up, maintain, and calibrate the toxic detector when used with a gas monitoring controller. A parts list at the end of this manual lists replacement parts and accessories for the toxic detector.

The 65-2303 toxic detector includes the 65-2302 toxic detector and a junction box.

The 65-2302 toxic detector does not include a junction box and is normally mounted in one of a controller's conduit hubs. If you are using a 65-2302 toxic detector, disregard all references to the junction box and junction box terminal strip.

The 65-2302 and 65-2303 detectors can be used for various target gases which are listed in Table 1 below.

Specifications

WARNING: Do not use this product in a manner not specified in this instruction manual.

Table 1: Specifications

Target Gas and Detection Range	Ammonia (NH ₃) 0 - 75 ppm	<ul style="list-style-type: none"> • 65-2302-NH3-75 • 65-2303-NH3-75 • 65-2302-NH3-75L • 65-2303-NH3-75L
	Ammonia (NH ₃) 0 - 100 ppm	<ul style="list-style-type: none"> • 65-2302-NH3-1 • 65-2303-NH3-1
	Ammonia (NH ₃) 0 - 200 ppm	<ul style="list-style-type: none"> • 65-2302-NH3-2 • 65-2303-NH3-2
	Ammonia (NH ₃) 0 - 500 ppm	<ul style="list-style-type: none"> • 65-2302-NH3-5 • 65-2303-NH3-5
	Chlorine (Cl ₂) 0 - 3.00 ppm	<ul style="list-style-type: none"> • 65-2302-CL2-3 • 65-2303-CL2-3
	Chlorine (Cl ₂) 0 - 5.00 ppm	<ul style="list-style-type: none"> • 65-2302-CL2-5 • 65-2303-CL2-5
	Chlorine (Cl ₂) 0 - 10.0 ppm	<ul style="list-style-type: none"> • 65-2302-CL2-10 • 65-2303-CL2-10 • 65-2302-CL2-10A • 65-2303-CL2-10A
	Chlorine (Cl ₂) 0 - 200 ppm	<ul style="list-style-type: none"> • 65-2302-CL2-200 • 65-2303-CL2-200

Table 1: Specifications

Target Gas and Detection Range (cont.)	Chlorine Dioxide (ClO ₂) 0 - 1.00 ppm	<ul style="list-style-type: none"> • 65-2302-CLO2-1 • 65-2303-CLO2-1
	Chlorine Dioxide (ClO ₂) 0 - 3.00 ppm	<ul style="list-style-type: none"> • 65-2302-CLO2-3 • 65-2303-CLO2-3
	Chlorine Dioxide (ClO ₂) 0 - 5.00 ppm	<ul style="list-style-type: none"> • 65-2302-CLO2-5 • 65-2303-CLO2-5
	Hydrogen Chloride (HCl) 0 - 20 ppm	<ul style="list-style-type: none"> • 65-2302-HCL • 65-2303-HCL
	Hydrogen Cyanide (HCN) 0 - 15 ppm	<ul style="list-style-type: none"> • 65-2302-HCN-15 • 65-2303-HCN-15
	Nitric Oxide (NO) 0 - 100 ppm	<ul style="list-style-type: none"> • 65-2302-NO • 65-2303-NO
	Nitrogen Dioxide (NO ₂) 0 - 15 ppm	<ul style="list-style-type: none"> • 65-2302-NO2 • 65-2303-NO2
	Sulfur Dioxide (SO ₂) 0 - 10 ppm	<ul style="list-style-type: none"> • 65-2302-SO2-10 • 65-2303-SO2-10
Sampling Method	Diffusion	
Accuracy	± 10% of reading or ± 5% of full scale (whichever is greater)	
Response Time	T90 in 60 seconds	
Operating Temperature & Humidity	-4°F to 104°F (-20°C to 40°C)	

WARNING: When using the 65-2302/65-2303, you must follow the instructions and warnings in this manual to assure proper and safe operation of the 65-2302/65-2303 and to minimize the risk of personal injury. Be sure to maintain and periodically calibrate the 65-2302/65-2303 as described in this manual.

Description

This section describes the components of the 65-2302 and 65-2303. The 65-2303 includes the 65-2302 toxic detector and a junction box. The 65-2302 does not include a junction box. Figure 1 below shows the components of the 65-2303.

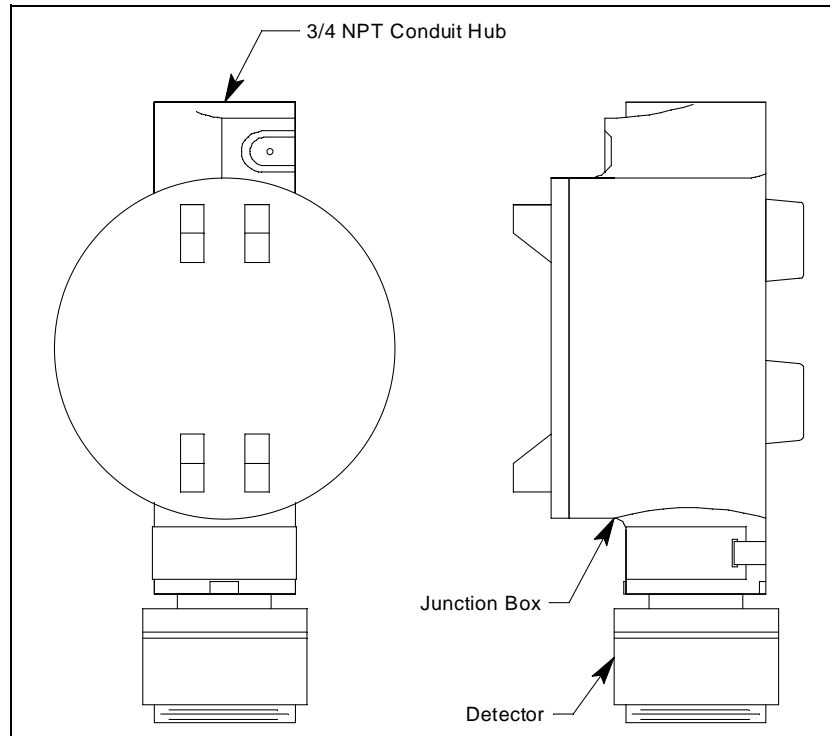


Figure 1: 65-2303 Component Location

65-2302 Toxic Detector

The 65-2302 toxic detector consists of the detector housing body, detector housing cap, cap gasket, and the plug-in sensor.

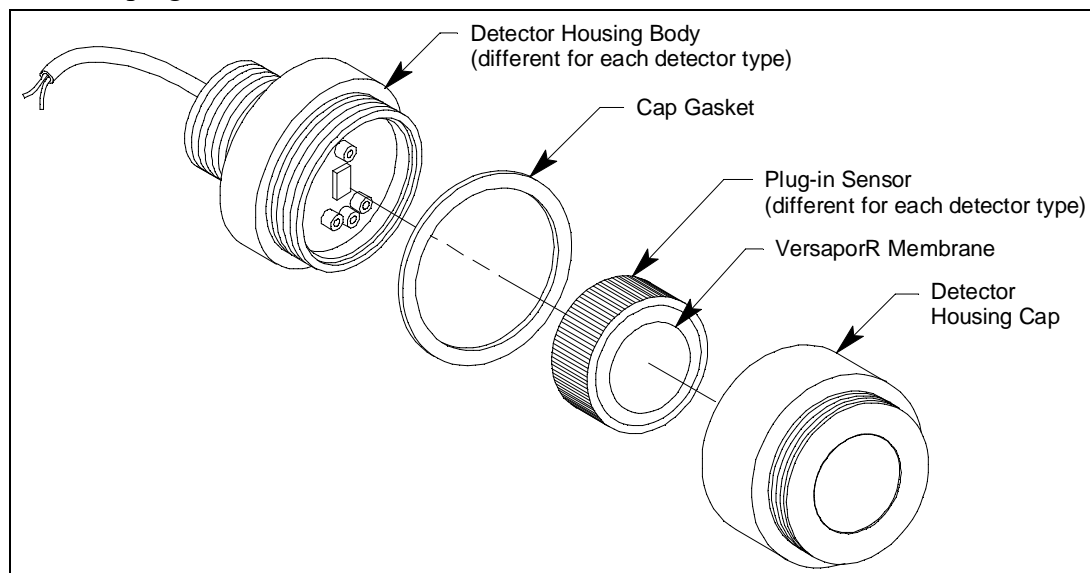


Figure 2: 65-2302 Toxic Detector Component Location

Detector Housing Body

The detector housing body protects the electronic components within the housing. Use the mounting threads at the top of the housing to screw the detector into a 3/4 NPT hub. Two wires extend from the top of the detector housing body. Use these wires to connect the detector to a controller. One of the wires is black and the other wire is color coded and may have a colored band of shrink tubing. See Figure 4 on page 11 for the color code assignments.

The housing body includes a four-socket pattern at the bottom of the housing body. The plug-in sensor mates to this socket pattern. A pre-amplifier located between the sockets and the two wires conditions the sensor's signal before the signal reaches the controller. Each plug-in sensor type (Cl₂ for example) requires a different pre-amplifier, so there is a different detector housing body for each gas type.

Housing Cap and Cap Gasket

The housing cap screws onto the detector housing. It retains the sensor and protects it from damage. A foam gasket inside the housing cap seals against the face of the sensor when the cap is screwed on the housing body. Unscrew the detector cap to access the sensor for replacement. A cap gasket seals the interface between the housing and cap.

Plug-in Sensor

The plug-in sensor is secured in the detector assembly by the housing cap. There is a different sensor for each target gas. Through a series of chemical and electrical reactions, the sensor produces an electrical output that corresponds to the detection range of the sensor. A VersaporR membrane is installed on the sensor face for protection from water and debris.

Junction Box

The junction box protects the detector wiring connections and allows you to install the toxic detector at a mounting site that is remote from a controller. Two conduit hubs allow you to mount the toxic detector to the junction box and connect the wiring from the detector to a controller. Three spacers installed on the back of the junction box control the distance of the junction box from a mounting surface and ensure that there is enough room to install a calibration cup on the detector during calibration. A terminal block within the junction box facilitates the wiring connections. A cover on the front of the junction box allows access to the interior of the junction box.

Installation

This section describes procedures to mount the toxic detector in the monitoring environment and wire the detector to a controller.

Mounting the Toxic Detector

NOTE: If you are installing a 65-2302, it does not include a junction box and is usually factory installed in one of a controller's conduit hubs or may be field installed using the 3/4 NPT threads on the end with the wires. The 65-2303 includes a junction box as shown in Figure 3 below.

1. Select a mounting site that is representative of the monitoring environment. Consider the following when you select the mounting site.
 - Select a site where the detector is not likely to be bumped or disturbed. Make sure there is sufficient room to perform start-up, maintenance, and calibration procedures.
 - Select a site where the target gas is likely to be found first.

NOTE: If your application does not require a specific mounting site, mount the detector at approximately breathing level.

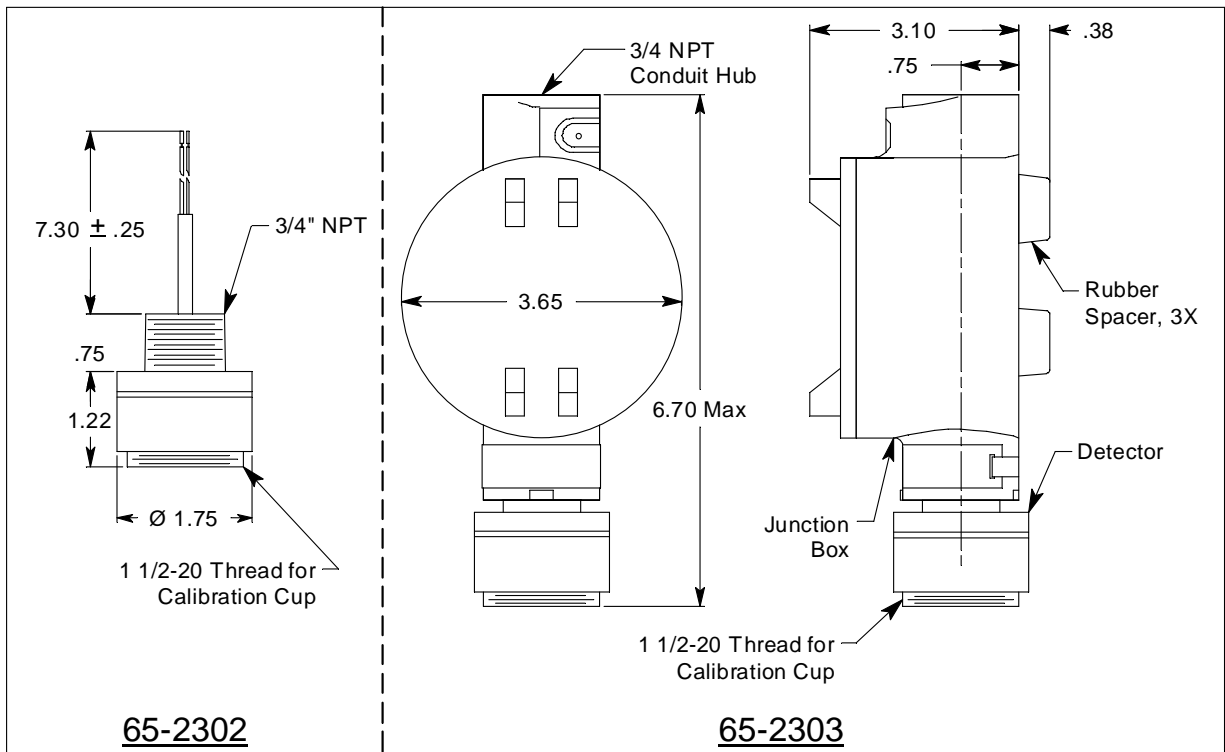


Figure 3: Outline and Mounting Dimensions

2. At the mounting site you select, hang or mount the junction box with the detector facing down (see Figure 3).

CAUTION: *Mount the toxic detector with the detector facing down (see Figure 3).*

Wiring the Toxic Detector to a Controller

WARNING: *Always verify that power to the controller is OFF before you make wiring connections.*

1. Turn off the controller.
2. Turn off or unplug power to the controller.
3. If the detector is mounted remotely from a controller using the junction box, proceed to step 4. If the detector is mounted directly to a controller, connect the detector's color-coded and black wires to the appropriate controller detector terminals (see Figure 4 for the color coding of the non-black wire) and skip to the Startup Section.
4. Remove the junction box cover.
5. Guide a two-conductor, shielded cable or two wires in conduit through the unused conduit hub of the junction box. Use appropriate conduit fittings and construction technique for the environmental rating of the junction box. The junction box is rated NEMA 4X.
6. Connect the two wires to the detector using the terminal block.

CAUTION: *If using shielded cable, leave the drain wire insulated and disconnected at the detector. You will connect the opposite end of the cable's drain wire at the controller.*

7. Secure the junction box cover to the junction box.
8. Route the cable or wires leading from the toxic detector through one of the conduit hubs at the controller housing. Use appropriate conduit fittings and construction technique for the environmental rating of the controller. RKI controllers are typically rated NEMA 4X.

CAUTION: *Do not route power and detector wiring through the same conduit hub. The power cable may disrupt the transmission of the detector signal to the controller.*

- Connect the wires to the applicable controller terminal strip. See the controller operator's manual and the controller's detector head specification sheet for the 65-2302 or 65-2303 detector.

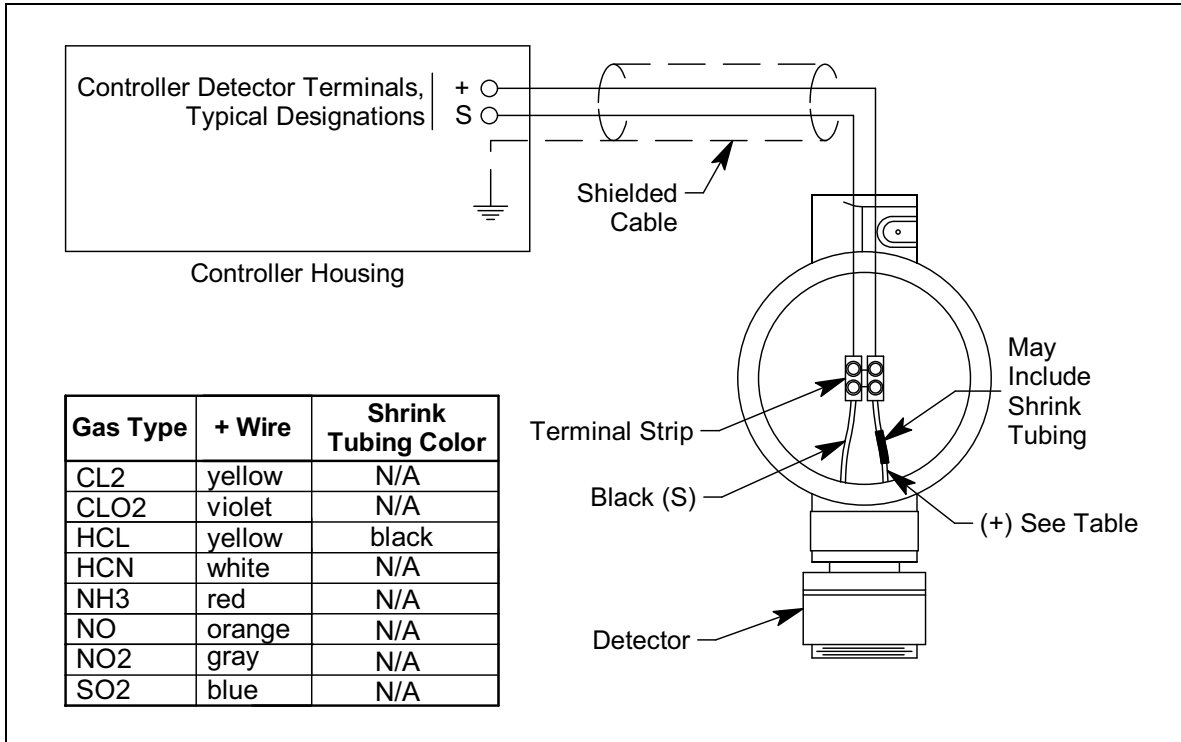


Figure 4: Wiring to a Controller

- If using shielded cable, connect the cable's drain wire to an available chassis ground at the controller. RKI controllers typically have a ground stud that is a convenient grounding location.
- Reinstall the junction box cover.

Start Up

This section describes procedures to start up the toxic detector and place the detector into normal operation.

Introducing Incoming Power

- Complete the installation procedures described earlier in this manual.
- Verify that the power wiring to the controller is correct and secure. Refer to the controller operator's manual.
- Turn on or plug in the incoming power, then turn on the controller.

4. Verify that the controller is on and operating properly. Refer to the controller operator's manual.

CAUTION: *For all gases except ClO₂, allow the detector to warm up for 15 minutes before you continue with the next section, Setting the Zero (Fresh Air) Reading.*

For ClO₂, allow the detector to warm up for 2-3 hours before you continue with the next section, Setting the Zero (Fresh Air) Reading.

Setting the Zero (Fresh Air) Reading

CAUTION: *If you suspect the presence of the target gas in the monitoring environment, use the calibration kit and a zero air calibration cylinder to introduce "fresh air" to the toxic detector and verify an accurate zero setting.*

CAUTION: *For all gases except ClO₂, allow the detector to warm up for 15 minutes before setting the zero reading.*

For ClO₂, allow the detector to warm up for 2-3 hours before setting the zero reading.

1. Verify a reading of 0 ppm at the controller. If the display reading is 0 ppm, start up is complete. The toxic detector is in normal operation.
If the display reading is not 0 ppm, continue with step 2 or step 3, depending on the type of environment the detector is installed in.
2. For a fresh air environment (an environment known to be free of toxic and combustible gases, and of normal oxygen content, 20.9%), set the zero reading according to the controller operator's manual.
3. For a non-fresh air environment:
 - a. Screw the calibration cup onto the bottom of the detector.
 - b. Screw the regulator into the zero air calibration cylinder.
 - c. Use the sample tubing to connect the regulator to the calibration cup.
 - d. Follow the instructions in the controller operator's manual for setting the zero reading.
 - e. When the instructions call for applying zero air to the detector, turn the regulator's on/off knob counterclockwise to open it. Gas will begin to flow.
 - f. Allow the gas to flow for two minutes.
 - g. Set the fresh air reading according to the controller operator's manual.
 - h. Turn the regulator's on/off knob clockwise to close it.
 - i. Unscrew the regulator from the calibration cylinder.
 - j. Unscrew the calibration cup from the detector. For convenience, leave the sample tubing connected to the calibration cup and the regulator.

Maintenance

This section describes maintenance procedures. It includes preventive maintenance, troubleshooting, and component replacement procedures.

Preventive Maintenance

This section describes a preventive maintenance schedule to ensure the optimum performance of the toxic detector. It includes daily and quarterly procedures.

Daily

Verify a display reading of 0 ppm at the controller. Investigate significant changes in the display reading.

Quarterly

Calibrate the toxic detector as described in “Calibration” on page 18.

Troubleshooting

The troubleshooting guide describes symptoms, probable causes, and recommended action for problems you may encounter with the toxic detector.

NOTE: This troubleshooting guide describes detector problems only. See the controller operator’s manual for problems you may encounter with the controller.

Fail Condition

Symptoms

- The controller indicates a fail condition.

Probable causes

- The detector wiring is disconnected or misconnected.
- The plug-in sensor is not properly plugged into the socket in the detector housing body.

NOTE: It could take up to 40 minutes for a disconnected NH₃ plug-in sensor to trigger a fail condition.

- The detector’s zero reading is low enough to cause a fail condition.
- The detector is malfunctioning.

Recommended action

- Verify that the detector wiring is correct and secure.
- Confirm that the plug-in sensor is installed properly.
- Perform a zero (fresh air) adjustment. A full calibration is recommended.
- If the fail condition continues, replace the plug-in sensor as described later in this section.

- If the fail condition continues, contact RKI for further instruction.

Slow or No Response/Difficult or Unable to Calibrate

Symptoms

- Unable to accurately set the zero or response reading during the calibration procedure.
- The detector requires frequent calibration.

NOTE: Under “normal” circumstances, the detector requires calibration once every three months. Some applications may require a more frequent calibration schedule. See page 17 for a discussion of the calibration frequency.

Probable causes

- The plug-in sensor has been replaced and the shorting jumper has not been removed.
- The calibration cylinder is low, out-dated, or defective.
- The incorrect calibration cup or regulator is being used.
- The VersaporR membrane on the plug-in sensor face is blocked with dirt or some other particulate contamination.
- The detector is malfunctioning.

Recommended action

1. Confirm that the shorting jumper on the plug-in sensor pins has been removed.
2. Verify that the calibration cylinder contains an adequate supply of gas.
3. Confirm that you are using the correct calibration cup and regulator. See “Parts List” on page 21 for the required calibration cup and regulator.
4. Check the plug-in sensor face and remove any particulate contamination from the VersaporR membrane if necessary. If the membrane appears saturated with contamination or damaged, replace the membrane as described in “Replacing the VersaporR Membrane” on page 16.
5. If the calibration/response difficulties continue, replace the plug-in sensor as described later in this section.
6. If the calibration/response difficulties continue, contact RKI Instruments, Inc. for further instruction.

Replacing Components of the Toxic Detector

This section includes a procedure to replace the plug-in toxic sensor, the VersaporR membrane, and the entire toxic detector assembly. In most cases, it is not necessary to replace the entire detector assembly.

Replacing the Plug-in Toxic Sensor

CAUTION: *The plug-in sensor contains electrolyte which is a dilute acid. Do not disassemble the sensor when replacing it with a new one. If sensor electrolyte comes in contact with your skin, wash affected area thoroughly with soap and water.*

1. Turn off the controller.
2. Turn off or unplug power to the controller.
3. Unscrew the detector housing cap from the detector housing body. Make sure not to lose the cap gasket.
4. Unplug and remove the toxic sensor.
5. Remove the replacement sensor from its packaging and remove the wire jumper. This wire jumper is installed on the sensor pins for shipment or storage but must be removed for the sensor to operate properly when installed in a detector.

WARNING: *The toxic sensor will not operate properly if the wire jumper is not removed.*

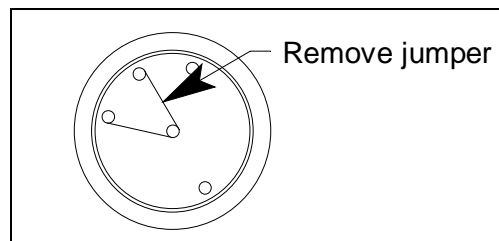


Figure 5: Plug-In Sensor Jumper Removal

6. Carefully plug the replacement sensor into the four-socket pattern located in the detector housing body.

WARNING: *You must replace the plug-in sensor with the same type of sensor that is installed. A detector cannot be converted from one type of detector to another by using a different plug-in sensor. For example, if you are replacing a Cl₂ sensor, you must replace it with a Cl₂ sensor.*

7. Make sure the cap gasket is in place and screw the detector housing cap back onto the detector housing body.
8. Turn on power to the controller.

9. Turn on the controller.

CAUTION: For all gases except ClO_2 , allow the replacement sensor to warm up for 15 minutes before you continue with the next step.

For ClO_2 , allow the replacement sensor to warm up for 2-3 hours before you continue with the next step.

10. Calibrate the detector as described in “Calibration” on page 18.

Replacing the VersaporR Membrane

1. Turn off the controller.
2. Turn off or unplug incoming power to the controller.
3. Unscrew the detector housing cap from the detector housing body.
4. Unplug the plug-in sensor from the four-socket pattern in the detector housing body.
5. Gently pry up the edge of the white VersaporR membrane from the sensor face with a small flat blade screwdriver or a similar tool.
6. Peel off the VersaporR membrane. It may be necessary to clean off the sensor face to remove any residue left from the adhesive backed membrane.
7. Install the new membrane on the face of the plug-in sensor.
8. Plug the sensor back into the four-socket pattern in the detector housing body.
9. Make sure the cap gasket is in place and screw the detector housing cap back onto the detector housing body.
10. Turn on power to the controller.
11. Turn on the controller.

Replacing the Toxic Detector

NOTE: In most cases, it is only necessary to replace the plug-in sensor.

1. Turn off the controller.
2. Turn off or unplug incoming power to the controller.
3. If the detector is installed directly on a controller, open the controller door.
If the detector is installed remotely from a controller in a junction box, remove the junction box cover.
4. If the detector is installed directly on a controller, disconnect the detector leads from the detector terminal strip in the controller. Note the position of the color-coded leads as you remove them.

If the detector is installed remotely from a controller in a junction box, disconnect the detector leads from the terminal block in the junction box. Note the position of the color-coded leads as you remove them.

5. Unscrew the detector from the controller conduit hub or junction box conduit hub.
6. Guide the detector leads of the replacement detector through the controller conduit hub or junction box conduit hub, then screw the mounting threads of the detector into the hub. If necessary for environmental conditions, apply thread sealant or Teflon tape to the hub and/or detector threads to seal them.
7. If the detector is installed directly on a controller, connect the detector leads to the appropriate detector terminal strip terminals. See Figure 4 on page 11 for wiring to a generic controller. See the controller operator's manual and the controller's detector head specification sheet for the 65-2302 or 65-2303 detector for wiring specific to your controller.

If the detector is installed remotely from a controller in a junction box, connect the detector leads to the terminal block the same way the old detector was wired (see Figure 4 on page 11). See the controller operator's manual and the controller's detector head specification sheet for the 65-2302 or 65-2303 to verify the connections to the controller are correct.

8. If the detector is installed remotely from a controller in a junction box, reinstall the junction box cover.
9. Turn on or plug in power to the controller.
10. Turn on the controller.

CAUTION: *For all gases except ClO₂, allow the replacement detector to warm up for 15 minutes before you continue with the next step.*

For ClO₂, allow the replacement detector to warm up for 2-3 hours before you continue with the next step.

11. Calibrate the replacement detector as described in "Calibration" on page 18.

Calibration Frequency

Although there is no particular calibration frequency that is correct for all applications, a calibration frequency of every 3 months is adequate for most toxic detector applications. Unless experience in a particular application dictates otherwise, RKI Instruments, Inc. recommends a calibration frequency of every 3 months for the toxic detector.

If an application is not very demanding, for example detection in a clean, temperature controlled environment where toxic gas is not normally present, and calibration adjustments are minimal at calibration, then a calibration frequency of every 6 months is adequate.

If an application is very demanding, for example if the environment is not well controlled or if toxic gas is often present, then more frequent calibration than every 3 months may be necessary.

Calibration

This section describes how to calibrate the toxic detector. It includes procedures to prepare for calibration, set the fresh air reading, set the response reading, and return to normal operation. It describes calibration using a calibration kit that includes a calibration cup, calibration gas, sample tubing, and a fixed flow regulator with an on/off knob. RKI Instruments, Inc. recommends using a 0.5 LPM (liters per minute) fixed flow regulator.

WARNING: *RKI Instruments, Inc. recommends that you dedicate a regulator for use with chlorine (Cl₂) gas and that you do not use that dedicated regulator for any other gases, particularly hydrogen sulfide (H₂S).*

WARNING: *Not using the recommended calibration cup and sample flowrate will result in an inaccurate calibration. See “Parts List” on page 21 for the required calibration cup and regulator.*

Special Note About Calibrating a ClO₂ Detector

There are two ways to calibrate a ClO₂ detector: using a ClO₂ generator or using a Cl₂ cylinder and a 0.4 factor.

- If a Cl₂ cylinder is used for calibration, RKI Instruments, Inc. recommends using 2 ppm of Cl₂ and setting the ClO₂ reading to 0.8 ppm.
- If a ClO₂ generator is being used, the generator’s flow rate should be set to 0.5 LPM. RKI Instruments, Inc. recommends that 0.5 ppm ClO₂ be used. The steps related to use of a calibration gas cylinder in the following instructions can be disregarded.

Preparing for Calibration

CAUTION: *For all gases except ClO₂, confirm that the detector has been running for 15 minutes before performing a calibration.*

For ClO₂, confirm that the detector has been running for 2-3 hours before performing a calibration.

1. Screw the calibration cup onto the bottom of the detector.
2. Screw the regulator into the zero air calibration cylinder.
3. Use the sample tubing to connect the regulator to the calibration cup.

NOTE: If you can verify that the toxic detector is in a fresh air environment, you do not need to apply zero air to the detector before adjusting the fresh air reading.

4. Put the controller into its calibration program. See the controller operator's manual for instructions to enter the calibration program.

Setting the Zero (Fresh Air) Reading

1. Follow the instructions in the controller operator's manual for setting the zero reading.
2. When the instructions call for applying zero air to the detector, turn the regulator's on/off knob counterclockwise to open it. Gas will begin to flow.
3. Allow the gas to flow for two minutes.
4. Set the fresh air reading according to the controller operator's manual.
5. Turn the regulator's on/off knob clockwise to close it.
6. Unscrew the regulator from the zero air calibration cylinder. Leave the sample tubing connected to the regulator and the calibration cup.

NOTE: Depending on the size of your zero air cylinder, it is possible that you will have a different regulator for the zero air cylinder and toxic gas cylinder. If necessary to fit the calibration toxic gas cylinder, change the regulator.

Setting the Response Reading (Span) for Detectors Other Than HCl

1. Follow the directions in the controller operator's manual for setting the response (span) reading.
2. For toxic gas cylinders (like Cl₂, NH₃, etc.), it is important to vent the regulator while installing it onto the cylinder. Venting the regulator during installation helps prevent air from getting into the cylinder and degrading the gas. When the directions call for exposing the detector to gas, open the regulator by turning the knob counterclockwise and then install it onto the cylinder (or start the flow of gas from a generator).

WARNING: *When calibrating with a 20 ppm Cl₂ cylinder, it is important to wear a breathing apparatus to prevent inhalation of toxic gas.*

3. Allow the gas to flow to the detector for 2 minutes.
4. Set the response reading according to the controller operator's manual.
 - If calibrating a ClO₂ detector with a Cl₂ cylinder, multiply the Cl₂ concentration by 0.4 and set the controller to that value (i.e. 2 ppm Cl₂ x 0.4 = 0.8 ppm ClO₂).
5. After setting the response reading, turn the regulator's on/off knob clockwise to turn it off (or stop the flow of gas from a generator).
6. Unscrew the regulator from the cylinder.

7. Unscrew the calibration cup from the detector. Make sure that you do not loosen the detector housing cap when you unscrew the calibration cup.

NOTE: For convenience, leave the regulator and calibration cup connected by the sample tubing.

Setting the Response Reading (Span) for an HCl Detector

1. Follow the directions in the controller operator's manual for setting the response (span) reading.
2. Disconnect the regulator from the calibration tubing.
3. For toxic gas cylinders like HCl, it is important to vent the regulator while installing it onto the cylinder. Venting the regulator during installation helps prevent air from getting into the cylinder and degrading the gas. When the directions call for installing the regulator onto the cylinder, open the regulator by turning the knob counterclockwise and then install it onto the cylinder.
4. Install the regulator onto the gas cylinder.
5. Allow gas to flow for **5 minutes** to condition the regulator.
6. Reconnect the calibration tubing to the regulator and allow the gas to flow to the detector for 5 minutes.
7. Set the response reading according to the controller operator's manual.
8. After setting the response reading, turn the regulator's on/off knob clockwise to turn it off.
9. Unscrew the regulator from the cylinder.
10. Unscrew the calibration cup from the detector. Make sure that you do not loosen the detector housing cap when you unscrew the calibration cup.

NOTE: For convenience, leave the regulator and calibration cup connected by the sample tubing.

Returning to Normal Operation

1. Allow about 45 seconds for the gas reading to decrease below the alarm points and then return the controller to normal operation.

NOTE: If you do not allow the gas reading to decrease below the alarm points, then unwanted alarms may occur.

2. Verify that the controller display reading decreases and stabilizes at 0 ppm.
3. Store the components of the calibration kit in a safe and convenient place.

Parts List

Table 2 lists replacement parts and accessories for the toxic detector.

Table 2: Parts List

Part Number	Description
06-1283RK	Calibration kit sample tubing, 3 foot Teflon w/flexible tubing on ends
07-0039RK	Detector housing cap gasket
18-0400RK-01	Junction box with rubber spacers
33-0157RK	VersaporR membrane for plug-in sensor face
65-2015-01	Replacement plug-in sensor, 0 - 100 ppm NO, with membrane
65-2024-01	Replacement plug-in sensor, 0 - 10.0 ppm SO ₂ , with membrane
65-2049-01	Replacement plug-in sensor, 0 - 15.0 ppm HCN, with membrane
65-2051-01	Replacement plug-in sensor, 0 - 3.00 ppm, 0 - 5.00 ppm, and 0 - 10.0 ppm Cl ₂ , with membrane
65-2052-01	Replacement plug-in sensor, 0 - 1.00 ppm, 0 - 3.00 ppm, and 0 - 5.00 ppm ClO ₂ , with membrane
65-2053-01	Replacement plug-in sensor, 0 - 500 ppm NH ₃ , with membrane
65-2054-01	Replacement plug-in sensor, 0 - 75 ppm, 0 - 100 ppm, and 0 - 200 ppm NH ₃ , with membrane
65-2055-01	Replacement plug-in sensor, 0 - 75 ppm NH ₃ , long-life/humidity-resistant with membrane
65-2056-01	Replacement plug-in sensor, 0 - 10.0 ppm Cl ₂ , with membrane, for low background gas applications
65-2057-01	Replacement plug-in sensor, 0 - 200 ppm Cl ₂ , with membrane
65-2058-01	Replacement plug-in sensor, 0 - 15 ppm NO ₂ , with membrane
65-2060-01	Replacement plug-in sensor, 0 - 20.0 ppm HCl, with membrane
65-2302-CL2-3	Replacement detector assembly, Cl ₂ , 0 - 3.00 ppm range (includes plug-in sensor)
65-2302-CL2-5	Replacement detector assembly, Cl ₂ , 0 - 5.00 ppm range (includes plug-in sensor)
65-2302-CL2-10	Replacement detector assembly, Cl ₂ , 0 - 10.0 ppm range (includes plug-in sensor)
65-2302-CL2-10A	Replacement detector assembly, Cl ₂ , 0 - 10.0 ppm range (includes plug-in sensor), for low background gas applications
65-2302-CL2-200	Replacement detector assembly, Cl ₂ , 0 - 200 ppm range (includes plug-in sensor)
65-2302-CLO2-1	Replacement detector assembly, ClO ₂ , 0 - 1.00 ppm range (includes plug-in sensor)
65-2302-CLO2-3	Replacement detector assembly, ClO ₂ , 0 - 3.00 ppm range (includes plug-in sensor)

Table 2: Parts List

Part Number	Description
65-2302-CLO2-5	Replacement detector assembly, ClO ₂ , 0 - 5.00 ppm range (includes plug-in sensor)
65-2302-HCL	Replacement detector assembly, HCl, 0 - 20.0 ppm range (includes plug-in sensor)
65-2302-HCN-15	Replacement detector assembly, HCN, 0 - 15 ppm range (includes plug-in sensor)
65-2302-NH3-1	Replacement detector assembly, NH ₃ , 0 - 100 ppm range (includes plug-in sensor)
65-2302-NH3-2	Replacement detector assembly, NH ₃ , 0 - 200 ppm range (includes plug-in sensor)
65-2302-NH3-5	Replacement detector assembly, NH ₃ , 0 - 500 ppm range (includes plug-in sensor)
65-2302-NH3-75	Replacement detector assembly, NH ₃ , 0 - 75 ppm range (includes plug-in sensor)
65-2302-NH3-75L	Replacement detector assembly, NH ₃ , 0 - 75 ppm range (includes plug-in sensor), long-life/humidity-resistant
65-2302-NO	Replacement detector assembly, NO, 0 - 100 ppm range (includes plug-in sensor)
65-2302-NO2	Replacement detector assembly, NO ₂ , 0 - 15 ppm range (includes plug-in sensor)
65-2302-SO2-10	Replacement detector assembly, SO ₂ , 0 - 10 ppm range (includes plug-in sensor)
71-0422	65-2302/65-2303 Operator's Manual (this document)
81-0076RK	Zero air calibration cylinder, 17 liter
81-0076RK-01	Zero air calibration cylinder, 34 liter steel
81-0076RK-03	Zero air calibration cylinder, 103 liter
81-0170RK-02	Calibration cylinder, 5 ppm SO ₂ in nitrogen, 58 liter
81-0170RK-04	Calibration cylinder, 5 ppm SO ₂ in nitrogen, 34 liter aluminum
81-0176RK-02	Calibration cylinder, 25 ppm NH ₃ in nitrogen, 58 liter
81-0176RK-04	Calibration cylinder, 25 ppm NH ₃ in nitrogen, 34 liter aluminum
81-0180RK-02	Calibration cylinder, 10 ppm NO ₂ in air, 58 liter
81-0180RK-04	Calibration cylinder, 10 ppm NO ₂ in air, 34 liter aluminum
81-0181RK-02	Calibration cylinder, 25 ppm NO in nitrogen, 58 liter
81-0181RK-04	Calibration cylinder, 25 ppm NO in nitrogen, 34 liter aluminum
81-0190RK-02	Calibration cylinder, 5 ppm Cl ₂ in nitrogen, 58 liter
81-0190RK-04	Calibration cylinder, 5 ppm Cl ₂ in nitrogen, 34 liter aluminum
81-0192RK-02	Calibration cylinder, 2 ppm Cl ₂ in nitrogen, 58 liter (can be used to calibrate all Cl ₂ ranges)
81-0192RK-04	Calibration cylinder, 2 ppm Cl ₂ in nitrogen, 34 liter aluminum (can be used to calibrate all Cl ₂ ranges)
81-0194RK-02	Calibration cylinder, 10 ppm HCl in nitrogen, 58 liter

Table 2: Parts List

Part Number	Description
81-0194RK-04	Calibration cylinder, 10 ppm HCl in nitrogen, 34 liter aluminum
81-0196RK-02	Calibration cylinder, 10 ppm HCN in nitrogen, 58 liter
81-0196RK-04	Calibration cylinder, 10 ppm HCN in nitrogen, 34 liter aluminum
81-1050RK	Regulator with gauge and knob, 0.5 LPM, for 17 liter and 34 liter steel calibration cylinders (cylinders with external threads)
81-1051RK	Regulator with gauge and knob, 0.5 LPM, for 34 liter aluminum, 58 liter, and 103 liter calibration cylinders (cylinders with internal threads)
81-1117RK	Calibration cup
81-9029RK-02	Calibration cylinder, 100 ppm NH ₃ in nitrogen, 58 liter
81-9082RK-02	Calibration cylinder, 20 ppm Cl ₂ in nitrogen, 58 liter
81-F504RK25	Calibration kit, includes regulator, calibration cup, tubing, and 58 liter calibration cylinder of 25 ppm NH ₃ in nitrogen
81-F504RK25-LV	Calibration kit, includes regulator, calibration cup, tubing, and 34 liter aluminum calibration cylinder of 25 ppm NH ₃ in nitrogen
81-F605	Calibration kit, includes regulator, calibration cup, tubing, and 58 liter calibration cylinder of 2 ppm Cl ₂ in nitrogen
81-F605-LV	Calibration kit, includes regulator, calibration cup, tubing, and 34 liter aluminum calibration cylinder of 2 ppm Cl ₂ in nitrogen
81-F608	Calibration kit, includes regulator, calibration cup, tubing, and a 58 liter calibration cylinder of 20 ppm Cl ₂ in nitrogen
81-F703RK	Calibration kit, includes regulator, calibration cup, tubing, and 58 liter calibration cylinder of 5 ppm SO ₂ in nitrogen
81-F703RK-LV	Calibration kit, includes regulator, calibration cup, tubing, and 34 liter aluminum calibration cylinder of 5 ppm SO ₂ in nitrogen
81-F819RK	Calibration kit, includes regulator, calibration cup, tubing, and 58 liter calibration cylinder of 10 ppm HCl in nitrogen
81-F819RK-LV	Calibration kit, includes regulator, calibration cup, tubing, and 34 liter aluminum calibration cylinder of 10 ppm HCl in nitrogen
81-F821RK	Calibration kit, includes regulator, calibration cup, tubing, and 58 liter calibration cylinder of 25 ppm NO in nitrogen
81-F821RK-LV	Calibration kit, includes regulator, calibration cup, tubing, and 34 liter aluminum calibration cylinder of 25 ppm NO in nitrogen
81-F822RK	Calibration kit, includes regulator, calibration cup, tubing, and a 58 liter calibration cylinder of 10 ppm HCN in nitrogen

Table 2: Parts List

Part Number	Description
81-F824RK	Calibration kit, includes regulator, calibration cup, tubing, and a 58 liter calibration cylinder of 10 ppm NO ₂ in air
81-F824RK-LV	Calibration kit, includes regulator, calibration cup, tubing, and a 34 liter calibration cylinder of 10 ppm NO ₂ in air