

RKI Model GX-2003 Training Program

AIR

Prepared for TransCanada Pipeline







Lower Explosive Limit (LEL)

- Minimum concentration of gas in air to sustain combustion provided there is a source of ignition
 - Potential for Explosion
 - If the LEL is exceeded
 - Potential Toxic Hazard
 - Depending on the gas or vapor present
 Unsafe for Entry or Work
 - If levels exceed 10% LEL

Upper Explosive Limit (UEL)

- Concentration of gas in air which is too rich to sustain combustion
 - Possible asphyxiation hazard
 - Due to displacement of oxygen
 - Potential for explosion with the addition of oxygen
 - May be extremely toxic



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RK **Combustible Sensor Poisons** and Inhibitors

Poisons

 Lead containing compounds (especially tetraethyl lead)

Sulfur containing compounds

Silicones

Phosphates and phosphorus containing

Inhibitors

- Hydrogen sulfide
- Halogenated
- hydrocarbons (Freon, trichloroethylene,

- substances
- methylene chloride)



Symptoms of O₂ Deficiency

20.9%

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- Oxygen content in normal air
- 19.5 12%
- Increased pulse and respiration
- 12 10%
- Disturbed respiration, fatigue, faulty judgment 10-6%
- Nausea, vomiting, inability to move, loss of consciousness and death
- 6 0%
 - Convulsions, cardiac arrest and death





RKI Effects of Hydrogen Sulfide

- 0.01 10 ppm
 Rotten egg smell
- 11 20 ppm Rotten egg smell, irritation to eyes and throat
- 100 200 ppm Loss of sense of smell in 2 - 5 minutes 250-400 PPM
- Eye and throat irritation, loss of consciousness in 5-15 minutes 450-600 PPM
- Eye and throat irritation, respiratory distress, unconscious in 1-15 minutes
- 650-900 PPM Respiratory distress and unconsciousness in 1-3 minutes 950-1000 PPM
- Unconscious with one breath

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Carbon Monoxide (CO)

- Formed by the incomplete combustion of carbon
- Found in automobile exhaust
- Colorless
- Odorless
- Poisonous
- Slightly less dense than air

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Effects of CO Exposure

- 25 PPM
- 8 hour time weighted average
- 200 PPM
- Slight headache, discomfort within 3 hours 600 PPM - Headache, discomfort within 1 hour
- 1000 2000 PPM
- Confusion, headache, nausea within 2 hours
- 2000 2500 PPM - Unconsciousness within 30 minutes
- 4000 PPM
 - Fatal in less than one hour

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Why use the GX-2003?

- Protection when entering confined spaces
 - Combustible atmospheres
 - Oxygen deficient
 - atmospheres
 - Toxic Hydrogen Sulfide gas
- Survey work on the pipeline looking for presence H₂S



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Let's Get Started!

 Preparing the GX-2003 for use

 Remove the GX-2003 from its case keeping it close by for storage

- Store instrument in closed case when not in use
 Do not store instrument if
- damp or wet
- Never store in vehicle overnight or for extended period of time



Removing the Rubber Boot

- Grasp the GX-2003 in your hands pulling the boot down exposing the battery compartment latch
- Pull the GX-2003 towards you to remove boot



 Turn GX-2003 over to view latch. Move lever from right to left. The indicator dot will move from close to open



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Opening Battery Compartment

 Lift battery lid straight up to expose battery compartment



Ni-MH Battery Pack

 Orientation of the battery pack is important to ensure proper operation

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 Note the polarity and removal tab



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 Hold Ni-MH battery pack with pull tab facing you. Place top of battery pack into battery compartment, push forward and press down to snap battery pack in place



Ni-MH Battery Installation

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- As an option, three alkaline AA batteries can be substituted in place of the Ni-MH battery pack.
- Please note the proper orientation for the batteries as indicated in the battery compartment



Alkaline Batteries

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Closing & Locking

- Slide top of battery compartment lid under retaining tab locking it in place
- Press down closing lid Move latch from left to
- right locking lid in place





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Charging the Battery

- The GX-2003 Ni-MH battery pack will recharge in 90 minutes
- A fully charged Ni-MH battery pack will run the GX-2003 for 10 hours Drop GX-2003 into charging stand to recharge
- A red light will illuminate at the beginning of a charge and will turn off after charging is complete



Charge Ni-MH Battery Pack

You may also charge the battery pack by itself in the charging unit

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 Note the orientation by matching polarity and arrows between charger and pack



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- Attaching Rubber Boot
- Insert top of GX-2003 into rubber boot pressing it tight
- Pull bottom of rubber boot over battery latch securing in place



Remote Sampling – Confined Space

- Drawing samples from remote locations will require the use of a hose and probe
- The GX-2003 comes with a standard 10' hose and 10" probe with filter.
- Hose lengths of up to 40' can be provided if needed

RK Attaching the Sampling Probe

 Screw probe on hose and tighten



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Attaching the Hose

- Remove rubber probe tip from inlet fitting if attached
- Slide collar of quick disconnect fitting onto inlet fitting of GX-2003
- You can also use the sample line without the probe and filter



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GX-2003 Remote Sampling

- Drawing a sample from a confined space must be performed prior to entry
- It is required to measure gas concentration at multiple levels in the space because of different gas densities
- Allow 1 second per foot for sample time to evaluate the possibility of multiple gases present







Warming up the GX-2003

- If USER ID / STATION ID is turned on, you will see the ID screen briefly then NEXT CAL DATE
- If the instrument is due for calibration, a CAL DATE PAST - CAL IS REQUIRED message will appear
- Do not use instrument, re-calibrate.

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 If the above features are activated they will appear at instrument start up

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Warming up the GX-2003

- If the GX-2003 is not due for calibration, the NEXT CAL DATE will be displayed and the days remaining during start up
- Next screen will be the Date, Time and Battery power remaining
- Recharge batteries if battery power icon displays one bar or less

Warming up the GX-2003

What if I get a FAIL SENSOR message

- <u>DO NOT</u> use the instrument
- Return the instrument for service, calibration or replacement of unit

Why Perform an AIR Adjustment

- Zeroing instrument to current gas free environment
- Extreme temp change (<-10 C and >30 C) can cause an Oxygen sensor alarm
- When the instrument returns to current environment temperature, perform AIR adjustment

Performing an AIR Adjustment

- Press and HOLD AIR key to set GX-2003 for fresh air values
- Release AIR key when RELEASE AIR KEY is displayed



Always turn on and AIR adjust the GX-2003 in a fresh air area!

Performing an AIR Adjustment

- When completed, the
 GX-2003 should display:
 CH₄ 0%LEL
 - OXY 20.9VOL%
 - H₂S 0.0ppm (if equipped)
 - CO 0ppm (if equipped)



Flow Integrity Test

- Testing the flow system is necessary to ensure correct gas readings. Leaks in the hose or probe can adversely affect the accuracy of the GX-2003
- Check instrument without hose first and then check again hose/probe assembly if used for confined space entry

Flow Integrity Test

 Place finger over end of rubber nozzle or end of 10" probe

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Flow Integrity Test

- The GX-2003 should indicate FAIL LOW FLOW LEVEL
 - Audible, visual and vibratory alarm will activate
 - If no response do not use unit, return for repair or replacement



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Press RESET SILENCE to clear pump

Flow Integrity Test

alarms and restart

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Performance Checks

- Bump Test prior to use
- Verification Test monthly
- Calibration Test quarterly

See TCPL TOP's for protocol for performance checks

Performing a daily "Bump" Test

- TCPL TOP's requires a "Bump" test prior to each use of the GX-2003
- Expose the GX-2003 to Calibration Gas and confirm sensor response for all sensors found in the unit

2K | Performing a Verification Test

- TCPL TOP's requires a Verification Test monthly
- Performing a verification test on the GX-2003 builds confidence in its operation and tests the following:
 - Pump flow
 - Visual, Audible and Vibratory alarms
 - Sensor response to a known concentration of gas

Performance Test Components

- Required Items
 - Multi-gas blend cylinder (50% LEL CH₄, 12% O₂, 25 ppm H₂S, 50 ppm CO (if equipped)
 - 50%Vol Methane gas cylinder
 - Deman Flow Regulator
 - Tubing

Conducting a Performance Test

- Assemble the test kit
- Cylinder needs to be in the vertical position Connect one end of tubing from gas test kit
- to the inlet fitting of the GX-2003 Connect the other end of the tubing to the
- regulator
- Twist gas cylinder onto the regulator

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Performing a Verification Test

- Allow gas to flow for 60 seconds or until the readings stabilize
- Readings should be within the following range: 40 to 60% LEL (using 50% LEL CH₄)
 9.6% to 14.4Vol % O₂ (using 12% O2)
 20 to 30 ppm H2S (using 25 ppm H₂S)

- 40 to 60 ppm CO (using 50 ppm CO)
- 40 to 60Vol % CH_4 (using 50%Vol CH_4)
- If readings are outside the above parameters, return instrument for calibration or service

 Most confined space entry deaths are due to oxygen deficient atmospheres!

Breath Test

- A quick and convenient way to test the operation of the oxygen sensor is to perform a "Breath Test"
- This test quickly verifies the operation of the oxygen sensor, pump and alarm circuits
- Breath Test can be done at any time!

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Performing a Breath Test

- Turn the GX-2003 ON
- Attach rubber probe tip or hose and probe assembly to inlet fitting
- Press and hold the AIR button to perform a Demand Zero in a Fresh Air Atmosphere
- The Breath Test will confirm that the oxygen sensor is functioning

Breath Test

- Exhale over the inlet of the probe
- Verify that the oxygen reading falls below 19.5% and activates the alarm
- Press reset switch if necessary to reset alarm





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GX-2003 Alarms

- Flow Alarm
 - Activates in the event of a flow blockage or pump malfunction
 - · Fail Low Flow Level is displayed, alarm sounds, unit vibrates intermittently Remove blockage, change filters



- Press RESET / SILENCE to restart pump If unable to clear, do not use instrument, return for servicing

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GX-2003 Alarms - CAUTION

- Failed Sensor Alarm - If a sensor should fail a "FAILED SENSOR"
 - message will be displayed
 - The display will indicate the sensor that has failed in brackets. Example: <H₂S>
 - The instrument will alarm and vibrate to indicate failure
 - Press the RESET SILENCE button to silence alarm. Reading for failed sensor will be XXX
 - Do not use instrument with failed sensor. Return instrument for servicing

RUMENTS	Gas A	larms l	Matrix -	- TCPI Value:
Gas Type	Alarm 1	Alarm 2	STEL Alarm	TWA Alarm
Oxygen	19.5% Decreasing	23.5% Increasing	N/A	N/A
% Vol Gas	None	None	N/A	N/A
% LEL Comb	10% LEL	40% LEL	N/A	N/A
Hydrogen Sulfide	10 ppm	15 ppm	15.5 ppm	10.0 ppm
Carbon Monoxide	35 ppm	70 ppm	N/A	25 ppm

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Low Battery Alarm

- When battery power is low, the battery icon blinks
- When Ni-MH batteries are dead, display will indicate "Recharge Ni-MH Batteries'
- When Alkaline batteries are dead, the display will indicate "Change the Batteries"
- Alarm LED's will flash and buzzer will sound a rapid pulsing tone with vibration – Continuous Alarm Warning

ONLY CHANGE OR CHARGE BATTERIES IN NON HAZARDOUS AREAS

TWA or STEL Alarm

- TWA (Time Weighted Average) or STEL (Short Term Exposure Limit) alarm will activate if the concentration of H₂S or CO rises above the TWA or STEL alarm point setting.
 - TWA- 8 hour exposure for H₂S is 10 ppm

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- TWA 8 hour exposure for CO is 25 ppm
- STEL- 15 minute exposure limit for H_2S is 15 ppm
- STEL not available for CO but RKI uses the ceiling value of 200 ppm as established by NIOSH, for this alarm

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Warming up the GX-2003

- If Lunch break feature is turned on, press the AIR button to resume data logging or press DISPLAY button to reset measurements
- This applies to the use of the TWA or STEL application



Resetting Alarms

- If GX-2003 is configured for Alarm Latching the alarm condition will not be cleared until user presses the RESET SILENCE button
- Press the RESET SILENCE button to reset alarms once gas conditions have cleared
- When alarm latching is set to off, the unit is self resetting (TCPL does not recommend)



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Responding to Alarms

- Determine which gas has been detected
- Follow established TCPL procedure for an increasing gas condition or decreased oxygen condition
- If necessary, reset the alarm using the RESET SILENCE button once the alarm condition has been cleared

Protocol for Pipeline Testing

- CAUTION if not in VOL% of HC range you will damage catalytic combustible sensor
- Repeated exposure of the catalytic combustible gas sensor to gas concentrations exceeding 100% LEL (5% vol CH₄) may shorten the life of the combustible gas sensor

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HC range selection for VOL%

- See TCPL Sampling procedure
- Direct hydrocarbon gas measurement using GX-2003 – non PPE application
- To minimize the possibility of premature sensor failure, select ONLY VOL% from the HC Range menu
- This turns off the LEL sensor protecting it from damage due to over exposure

Selecting the HC Range

Press the DISPLAY (ADJ) button and release.

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- HC RANGE to select -YES: AIR, NO: DISPLAY
 Press the AIR button, AUTO RANGE %LEL/VOL% is
- displayed
- Press the AIR button again to select ONLY VOL% (NO ALARM)
- Press the POWER ENTER button to select ONLY VOL%
 Press the DISPLAY button repeatedly to scroll to the
- normal gas measuring screen

 The normal gas reading will appear with NO ALARM
 - flashing

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User Maintenance

Charging Batteries

- Turn GX-2003 OFF
- Remove instrument from rubber boot
- Set GX-2003 into charging stand
- The red charging LED will illuminateWhen red LED turns off, batteries are
- fully charged (90 min)
- Applies to plug in charger and car charger



Battery Pack Replacement

- Ni-MH batteries can be charged hundreds of times, however, if the battery fails to accept a charge or if the run-time of the instrument does not meet specifications, then replacement of the battery pack is required
 - Complete cycling of the battery will extend life
- Always replace the battery pack in a non-hazardous location!

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Battery Pack Replacement

- Remove GX-2003 from rubber boot
- Unlatch battery compartment and remove lid
- Lift up on tab on battery pack and remove
- Place new battery pack into GX-2003 battery compartment noting polarity and lock into place
- Attach battery compartment door and close latch
- Recharge GX-2003 as required before use NOTE: Dispose of old Ni-MH battery pack in an environmentally friendly manner

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Alkaline Batteries

- The GX-2003 can operate on Ni-MH's or Alkaline batteries
- In situations when the Ni-MH battery is low and no charger is available, remove discharged Ni-MH pack and install three AA alkaline batteries
- Recommend carrying three alkaline batteries for emergency back-up

Use only high quality alkaline batteries!

K STRUMENTS

Probe Filter Replacement

- Unscrew probe from hose
- Unscrew clear plastic body from probe
- Remove soiled cotton ball from probe body and discard
- Replace cotton filter using about 1/3 of a cotton ball
- Place cotton loosely into probe
- Screw plastic body back on probe and attach to hose

KI Instrument Filter Replacement

- The instrument filter consists of a cotton particulate filter and two hydrophobic filters separated by a wire mesh screen
- Change filters when they become discolored or if liquid is sampled into the inlet
- Failure to install the filters will damage the GX-2003!



Replacement Instrument Filter Replacement

- Verify the the GX-2003 is OFF
- Locate the clear plastic filter holder at the top of the GX-2003
- Grasp the filter holder and turn it about 1/8 of a turn counterclockwise
- Pull the filter holder away from the case. Inspect the cotton dust filter and replace if dirty

Instrument Filter Replacement

- The hydrophobic disk filters and wire mesh disk are located in the case and are retained by a rubber gasket. Pull out the rubber gasket with needle nose pliers.
- Remove the old hydrophobic filters and wire mesh disk from the gasket. A hydrophobic filter is located on either side of the wire mesh disk.
- Install the new hydrophobic filters and /or wire mesh disk making sure a hydrophobic filter is located on each side of the wire mesh disk.

Instrument Filter Replacement

- Reinstall the filter holder with the cotton dust filter
- Align the two wide tabs on the bottom of the filter holder with the two wide slots in the case where the filter holder fits. Push the filter holder into the case and turn it about 1/8 of a turn clockwise until it snaps into place

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Cleaning the GX-2003

- Keeping your GX-2003 clean will help to prolong the useful life of the instrument
- Never use solvents such as acetone to clean the GX-2003 as it will damage the plastic
- Only use warm soapy water or household cleaning products to keep the instrument and accessories clean
- Keep instrument and accessories in case when not in use

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Turning GX-2003 OFF

 Press and hold the POWER ENTER button until "Good-Bye" is displayed



K Assembling the Calibration Kit

- Check to make sure the Calibration Gas has not expired from date of manufacture
- Attach the tubing to the regulator
- Attach the other end of the tubing to the inlet
- Connect the demand flow regulator to the multigas blend cylinder
- Verify that the cylinder has sufficient pressure
- CAUTION –H2S Cylinders have only one year shelf life

GX-2003 AUTO Calibration LEL / O2 / H2S / CO

- Turn the GX-2003 ON by pressing the POWER ENTER button
- Allow the instrument to warm up for two minutes
- Press and hold the AIR button to perform a Demand Zero

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Auto Calibration Continued

- Remove rubber probe tip and attach tubing to the inlet fitting of the GX-2003
- Press the SHIFT and DISPLAY buttons to enter into the calibration mode
- Using the AIR or SHIFT buttons, place cursor next to AUTO CALIBRATION if necessary

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Auto Calibration Continued

- Press the POWER ENTER button to enter calibration screen
 - The display should indicate expected values for CH4 (methane), OXY (oxygen), H2S (Hydrogen Sulfide) and CO (Carbon Monoxide)
 - CH4 50% LEL OXY 12.0 VOL%
 - H2S 25.0 ppm CO 50 ppm
- These gas values should agree with the gas label composition as marked on the multi-gas blended cylinder

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Auto Calibration Continued

- - Change value by pressing the AIR (up) or SHIFT (down) button to match the value as listed on the cylinder
 Once value is set, press the POWER ENTER button to set
- Continue to set other gas values if necessaryPress the ENTER button to continue.
- CAL will begin to flash indicating that GX-2003 is ready to calibrate

Auto Calibration Continued

- Attach tubing from gas regulator to inlet fitting of the GX-2003
- Allow gas to flow for one minute or until readings stabilize
- Press and release the POWER button to set calibration
- Auto Calibration END will briefly be displayed if all sensors calibrate

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Auto Calibration Continued

- Remove the calibration gas from the GX-2003
- Display will return to Menu with cursor next to AUTO CALIBRATION
- Press the SHIFT (down) button to place cursor next to NORMAL OPERATION
- Press the POWER ENTER button to return to normal operation

K % Gas VOL Calibration (Single Calibration Mode)

- Press and hold the SHIFT then DISPLAY buttons to enter into the calibration mode
- Press the SHIFT button to move cursor to the SINGLE CALIBRATION menu
- PRESS the POWER/ENTER button to display the single calibration menu
- Use the SHIFT button to move the cursor to CH4 VOL%
- Press the POWER/ENTER button to select

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% Gas VOL Calibration (Single Calibration Mode)

- Attach tubing to regulator and screw regulator to cylinder
- Attach opposite end of tubing to instrument inlet fitting
- Allow instrument to draw gas for one minute or until the reading stabilizes

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% Gas VOL Calibration

- Adjust reading to 50% using the AIR or SHIFT buttons
- Press the POWER ENTER button to set reading
- Remove tube from inlet fitting and turn off gas regulator
- Press the SHIFT button to scroll to NORMAL OPERATION, press the POWER button to return to gas measuring mode

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Clearing the Calibration Req<mark>uired Message</mark>

- All sensors must be calibrated for the "Calibration Required" message and date to reset. This includes:
 - LEL & Vol% - H2S
 - H2S
 - CO (if supplied)

What if a Sensor Fails **Calibration?**

- A failed sensor on the GX-2003 will indicate FAIL PUSH AIR KEY and will list the failed sensor(s) in brackets: <H2S>
- Verify age of calibration gas and try to calibrate again with fresh gas. If calibration still fails,
- Replace sensor as required and recalibrate before use
- Check sensor date code (details covered in the TCPL TOP's)

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Sensor Replacement

- Verify that the Model GX-2003 is OFF
- Remove the GX-2003 from the rubber boot
- Unscrew and remove the three screws that secure the flow chamber to the back of the GX-2003
- Lift off the flow chamber exposing the sensors



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Sensor Replacement

- Remove and replace sensor as required
- H₂S sensor is keyed for proper orientation
- NOTE: After replacing the H₂S sensor, allow the sensor to stabilize for 15 minutes before turning on instrument and calibrating



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Sensor Replacement

- The Vol% Combustible Gas sensor is identified by black and yellow markings
- The oxygen sensor must be installed with the opening facing up
- Exam the filters on the underside of the sensor chamber cap replace if dirty
- Place flow chamber back on the GX-2003 and secure with the 3 Phillips screws when completed
- Calibrate as required



HC/CO Filter Replacement

- To protect the LEL combustible gas sensor from poisoning from H₂S exposure, special filters are used
- If filters are dirty or not present the meter can fail



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- The HC (combustibles filter) is Yellow for easy identification
- It is recommended that the HC filter be replaced when contaminated
- Remove filter holder from flow chamber using a quarter to unscrew holder
- The CO filter, colour coded red is changed in the same way see above

HC/CO Filter Replacement



HC Filter Replacement

- Pull old filter assembly from holder and snap a new filter in place
- Reinstall filter unit back into GX-2003



RKI Changing the USER/STATION ID

- The GX-2003 can store one USER ID and one STATION ID
- These ID's are used to identify user and location of exposure during a data logging session
 In portion of the DISPLAN
- In normal operating mode, press the DISPLAY button to enter into DISPLAY MENU – Press the DISPLAY button again access the USER ID, STATION ID screen
- To change the USER ID, press the SHIFT button and hold, then press the DISPLAY button

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Changing User ID

- The first character under USER ID flashes (* is default)
- Press the AIR and SHIFT buttons to scroll through the available characters. (Asterisk, dash and blank space are between the set of letters and numbers
- When the desired character displays, press and release the POWER ENTER button to enter the character and
- the POWER ENTER button to enter the character and go to the next character
- Repeat above steps for the remaining 9 characters for USER ID
- Press the POWER ENTER button to move to the STATION ID

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Changing STATION ID

- Use the AIR and SHIFT buttons to select the characters for the STATION ID pressing the ENTER button when completed
- Once all STATION ID characters are entered press the DISPLAY button to advance to the PEAK screen
- Continue pressing the DISPLAY button to return to normal measuring screen

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Basic Set-up Mode

- With the GX-2003 OFF, press the AIR and SHIFT buttons, then press the POWER button
- When the Set-up mode Menu appears, release the buttons



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Basic Set-up Mode - TCPL

- The following selections can be changed or viewed:
 Alarm Points to be set prior to delivery
 - Lunch Break OFF
 - Alarm Latching ON
 - Alarm Silence ON
 - Confirmation Beep OFF
 - Interval Time 3 minutesDatalog Overwrite ON
 - Date/Time Regionally Set
 - Cal. Interval 255 days
 - Cal. Time Remaining ON
 - Cal. Expired Action Confirm to use
 - Contrast Default

Basic Set Up Mode – TCPL The following selections can be changed or viewed: Serial Number User/Station ID - Enable

- Auto Calibration
- Single Calibration
- LCD Back Light Time
- Password ON/OFF
- Start Measurement

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Making a Change

- Using the AIR or SHIFT buttons select the item you would like to view or change. Press the ENTER button to select
- When completed, use the SHIFT button to scroll to START MEASUREMENT, then press the ENTER button to return to normal mode

Advanced Set-up Mode –

- Consult OSI before making any adjustments
- This set up mode has many of the same selections as in the basic set-up mode. The differences are:
 - Requires Password to enter into this mode
 - Gas Combination
 - HC Mode
 - Zero Follower
 - Flow Adjustment
 - Default



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Software Installation

- Launch Windows®
- Exit from all applications and open windows
- Insert the GX-2003 Data Logging Software Installation CD in your computer's CD-ROM drive
- Installation program will automatically launch

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Software Installation

- Make sure that your version of Windows® operating system has the minimum required service pack, MDAC module and Internet Explorer.
 - Use the scroll bar on the right side to move up and down
- Move to the Install Images section

Software Installation

- Select the appropriate installation item for your operating system:
 - GX-2003 datalogger Windows® 98 version
 - GX-2003 datalogger Windows® 2000/XP version

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Software Installation

- Installation process will begin
 If a File Download window appears asking if you want to open or save a file, select Open
- The GX-2003 InstallShield Wizard screen appears
 - Follow the on-screen instructions to install the software
 - If your computer finds newer versions of files on your computer than those in the installation CD, it will ask you to keep the newer files. Click Yes.

IrDA Downloading Cable

- There are two cables that can be used:
- IrDA Serial or IrDA USB
- Make sure that the cable is compatible with your Windows® operating system
- Install your IrDA cable to the appropriate port and software if required

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Launching the Software

- Click Start on the Windows® Icon Tray
 Select Programs, then select GX-2003
 - You may also click on the GX-2003 Icon in the Start window.
- Allow the program to start up
 The GX-2003 Station Utility screen will appear

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Connecting the GX-2003

- Place the IrDA cable a few inches away from the Ir port on the side of the GX-2003
- Turn-on the GX-2003
 - The Connect indicator on the Download status bar will turn green indicating that the connection is successful
 - Click the Complete Download button to transfer data from the computer

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Viewing Data

- Click the Data button to bring up the individual Data records
 - Open the appropriate file to view data
 - Interval Trend
 - Alarm Trend
 - Alarm Events



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- Features and Benefits
- Simple Set Up
- PC Software Overview
- Detailed Record Keeping





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Features & Benefits

- Single button calibration and / or bump test
 Quick and easy performance verification
- Stand alone system
- System functions without the need of a computerCharge Instrument
- No need for additional hardware
- Alkaline Recognition
 - Smart charger recognizes alkaline powered instruments (GX-2003)

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Features & Benefits

- USB flash drive included
 - Download data any time or place
 - 64 MB flash drive stores up to 200,000 records
- Easy to use software
 Simple to install
 - View, print, and export calibration & bump test records
 - Manage instrument records by serial #, user ID, or location ID

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Features & Benefits

- Three operating modes
 - Bump only
 - Calibration only
 - Bump with autocalibration (if bump fails)
- User adjustable bump test times and tolerances
 - Customize the system to meet your service requirements

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- Connect gas cylinder
- Plug in power cord
- Insert instrument
- Attach instrument adaptor or tubing

Simple Set Up



















RKI Instruments B		st and Cal Report					
Single button reporting	Control of the second sec	Durp test 6 Galication Report Ext 18 378716 -Beartrol Galication Model Date Time Judge 00 379010 Model Model Date Time Judge 00 379010 Model Model Date Time Judge 00 379010 Model Model Date Time Judge 00 379010 Model Model Date Time Judge					
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TransCanada GX-2003 Exam

- 1. The following can poison the combustible sensor:
 - a. Lead
 - b. Phosphate compounds
 - c. Silicones
 - d. All of the above
 - e. None of the above
- 2. When remote sampling you must allow time for sample tube length and sensor response.
 - **T**rue
 - □ False
- 3. When the message appears "CAL DATE PASSED, CAL IS REQUIRED " do the following:
 - a. Clear the message with the reset button and continue using
 - b. Do not use, re-calibrate
 - c. Perform a verification test
 - d. All of the above
 - e. None of the above
- 4. A Fresh Air adjustment is required when:
 - a. Before calibration
 - b. After Calibration
 - c. When temperature changes
 - d. a & c
 - e. a & b
- 5. Flow test is important because leaks can affect the accuracy of the gas readings.
 - TrueFalse
- 6. When performing a fresh air adjustment press and hold the AIR key until RELEASE is displayed.

This must always be performed in ______.

- 7. You can use alkaline batteries as a backup if the re-chargeable battery goes dead.
 - **T**rue
 - □ False



- 8. Repeated exposure to high concentrations to either H₂S or combustible gas in Auto-Range mode may cause decrease in life of the combustible gas sensor.
 - **T**rue
 - □ False
- 9. Turn off the GX2003 by holding the POWER/ENTER button until is says "Good-bye".
 - True
 - □ False
- 10. Keeping the GX2003 clean will prolong the life of the instrument. Warm soapy water or household cleaning products can be used to clean to clean the GX2003.
 - **T**rue
 - □ False
- 11. When calibrating the %VOL combustible gas sensor, what method of operation is required?
 - a. Demand Zero
 - b. Auto Calibration
 - c. Multi Gas Calibration
 - d. Single Calibration
- 12. The filters in the GX-2003 are used to protect against liquids and debris. The instrument's internal components can be damaged if it is used without filters.
 - □ True □ False
- 13. The gas values on the cylinder must match the values set up in the instrument in order to use the AUTO CALIBRATION function.
 - **T**rue
 - □ False
- 14. Auto Calibration performs the following:
 - a. Zero's the Oxygen
 - b. Sets all alarm values
 - c. Adjusts each sensor to pre-programmed values
 - d. All of the above



- 15. The %VOL sensor can be calibrated in the AUTO CALIBRATION mode.
 - TrueFalse
- 16. Circle the combination of buttons used to enter the basic set up menu in order to perform a calibration.

SHIFT & DISPLAY	AIR & DISPLAY	POWER & DISPLAY
RESET & SHIFT	DISPLAY & SHIFT & RESET	

- 17. To replace a sensor you must first remove the flow chamber and remove the old sensor. When installing a new sensor you must note the orientation of each sensor and install the new one in the appropriate orientation prior to putting the flow chamber back.
 - True
 - □ False
- 18. If filters look dirty they need to be replaced.
 - **T**rue
 - □ False
- 19. How much cotton should be used when replacing the probe filter?
 - a. One cotton ball
 - b. Two cotton balls
 - c. About 1/3 of a cotton ball loosely packed
 - d. Use as much cotton as can be tightly packed into the end of the probe
- 20. To get into basic setup mode you must start with the unit turned on or off? (circle)
 - ON OFF