Notices

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CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.
This operation guide applies to the following products:

- Agilent Low Gas Alarm System, Standalone 50 mm / 2” model
  Product No. G7311A
- Agilent Low Gas Alarm System, Wireless 50 mm / 2” model
  Product No. G3374A
- Agilent Low Gas Alarm System, Wireless with Laboratory Network Controller 50 mm / 2” model
  Product No. G3376A
- Agilent Low Gas Alarm System, Standalone 64 mm / 2.5” model
  Product No. G3377A
- Agilent Low Gas Alarm System, Wireless 64 mm / 2.5” model
  Product No. G3378A
- Agilent Low Gas Alarm System, Wireless with Laboratory Network Controller 64 mm / 2.5” model
  Product No. G3379A
- Agilent Laboratory Network Controller
  Product No. G3387A
- 7.5 V 15 W DC Adapter
  Product No. 5190-1454
- 3 V Replacement Battery
  Product No. 5190-1453
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Setup and Warnings

Low Gas Alarm System (Low GAS) and Laboratory Network Controller (LNC)
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Low Gas Alarm System (Low GAS) and Laboratory Network Controller (LNC) Setup

Please read through this entire manual to familiarize yourself with the operation of the Low GAS before beginning setup. Use the same degree of care as you would with any precision instrument.

Remove the Low GAS and battery from the package. If there is any visible damage, please contact Agilent or your authorized Agilent Distributor immediately.

Warnings

**Battery**

Do not change the battery while the Low GAS is in a hazardous location.

Never attempt to charge the battery.

Do not heat, disassemble or dispose of the Low GAS in fire. Do not short circuit. Keep out of children’s reach.

Replace battery with Agilent Part No. 5190-1453 3 V Coin Cell Battery, (Renata CR2450N/Sanyo CR2450) batteries only. Use of another battery may present a risk of fire or explosion.

See the EC-Type Examination Certificate for ATEX compliance.
Low Gas Alarm System

For use in hazardous locations see the EC-Type Examination Certificate.
Take anti-static precautions when using the Low GAS in hazardous locations.

Laboratory Network Controller (LNC)

Do not use LNC in hazardous locations.
Use only the optional Agilent 7.5 V DC Power Supply (Part No. 5190-1454) or USB port to power LNC.

Limits

Temperature 10 to 35 °C
Pressure Sea level to 15,000 feet, or 0.46 psi to atmosphere
Humidity 5 to 95% noncondensing
Light level No sunlight or bright incandescent light

Locations for Low Gas Alarm System

• Indoor Use Only
• Do not use in direct sunlight or near bright, direct incandescent light
• Laboratory Environment
• Class I Div 2

Locations for Laboratory Network Controller

• Indoor Use Only; Laboratory Environment
• Nonhazardous locations only

Safety critical materials

Battery must be Agilent Part No. 5190-1453 3 V Coin Cell Battery, (Renata CR2450N/Sanyo CR2450).
Compatibility and Quick Reference

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Compatibility of the Low GAS with Different Gauge Configurations

The 2-inch and 2.5-inch Low GAS units are compatible with current gauges on Agilent Gas Cylinder Regulators. There are certain gauge configurations that are known to be incompatible with the Low GAS units.

Incompatible gauge configurations include:

• Those that do not have a threaded, removable lens cover.
• Gauges that are liquid filled.
• Gauges that are mounted from a stem that is not at the bottom (e.g., back-mount).
• Digital gauges.
• Other incompatibilities may exist.
## Quick Reference Guide for the Low GAS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turn On</strong></td>
<td>Press and hold button until green LED appears (~3 seconds)</td>
</tr>
<tr>
<td><strong>Turn Off</strong></td>
<td>Press and hold button until red LED appears (1 time briefly)</td>
</tr>
<tr>
<td><strong>Set alarm in pause mode</strong></td>
<td>If Low GAS is in alarm condition, press button briefly</td>
</tr>
<tr>
<td><strong>Reset alarm</strong></td>
<td>If Low GAS is in alarm condition or in Pause Condition, press and hold button until LED blinks green 2 times.</td>
</tr>
<tr>
<td><strong>Test transmission</strong></td>
<td>Press button briefly to force transmission. The Receive and Send lights on the LNC will blink briefly to acknowledge.</td>
</tr>
<tr>
<td><strong>Low battery warning</strong></td>
<td>Sound: 1 beep; LED: Red blink; Repeating</td>
</tr>
<tr>
<td><strong>Excessive lighting/IR interference warning</strong></td>
<td>Sound: 2 beeps; LED: Red blink; Repeating</td>
</tr>
<tr>
<td><strong>Low gas warning</strong></td>
<td>Sound: 3 beeps; LED: Red blink; Repeating</td>
</tr>
<tr>
<td><strong>Low gas warning quiet mode</strong></td>
<td>Sound: Chirp; LED: Red blink; Repeating</td>
</tr>
</tbody>
</table>
3

Installation

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Connecting a Wireless Low Gas Alarm System to a Laboratory Network Controller  21
Using a Laboratory Network Controller (LNC) as a Relay Device  23
Installing the Low Gas Alarm System (Low GAS) on a Regulator Gauge

**WARNING** If installing in a hazardous location, antistatic precautions must be taken.

**NOTE** For compatibility of the Low GAS to various gauges, see "Compatibility of the Low GAS with Different Gauge Configurations".

**NOTE** The Wireless version of the Low Gas Alarm System should first be set up with its controlling LNC. See "Installing the Laboratory Network Controller (LNC)" and "Connecting a Wireless Low Gas Alarm System to a Laboratory Network Controller".
1 Open the back of the Low GAS by lifting the back catch slightly.

2 Insert the battery into the battery holder, pressing it firmly into position.
3 Remove the clear plastic cover from the high-pressure gauge on the gas regulator.

4 Remove the alignment sleeve from the Low GAS by pulling back the retaining tabs one at a time. Slide the alignment sleeve over the gas gauge from the back side. The slot in this sleeve fits around the stem of the gauge.
5 From the front side of the gauge, slide the main body of the Low GAS over the alignment sleeve. Fully opening the back will lock it in the upright position and facilitate sliding the main body over the alignment sleeve and gauge.

6 By pushing firmly on the back of the alignment sleeve, snap the two plastic retaining tabs into the retaining groove in the main body.
7 Close the back of the Low GAS. Both tabs of the bottom latch should snap securely into position.

NOTE When using the Low GAS in standalone mode, no further installation is necessary.
Installing the Laboratory Network Controller (LNC)

**WARNING** The LNC is not intended for operation in hazardous locations.

**WARNING** The LNC can be powered only by a powered USB port or by the optional 7.5 V DC power supply (Agilent Part No. 5190-1454).

1. The LNC can function in standalone mode or connected to a compatible computer. The LNC can serve as a remote alarm for a group of Low Gas Alarm Systems. With the software provided, it can display more-detailed information about the group of Low Gas Alarm Systems on the computer.

2. If the LNC is to be connected to a computer, insert the CD containing the operational software into the computer and follow the installation instructions included on the CD.

3. Connect the USB cable to the computer and the LNC.

4. It may be necessary to install the USB device driver at this point. The "New Hardware Found" dialog appears. Follow the instructions on the CD to install the USB driver.

If the LNC is to be operated in standalone mode, simply connect it to the 7.5 V DC power supply (Agilent Part No. 5190-1454).
5 An LNC may be used as a booster to relay signals that would otherwise be out of range. In this mode of operation, use the optional power supply (Agilent Part No. 5190-1454) and mount the LNC in a suitable, nonhazardous location.

6 If the LNC is serving as a controller for one or more Low Gas Alarm Systems, then the association needs to be established as described in “Connecting a Wireless Low Gas Alarm System to a Laboratory Network Controller”.
Connecting a Wireless Low Gas Alarm System to a Laboratory Network Controller

1 Up to 12 Low Gas Alarm Systems can be connected to a single LNC.

**NOTE** If an attempt is made to connect more than 12 Low Gas Alarm Systems to an LNC, then one of the connected devices will be displaced.

2 Place the Low GAS (with its power off) within 2 meters of its controlling LNC. (After connection, the Low GAS will operate up to 20 m away from the LNC, depending upon conditions.)

3 If the LNC has been connected to a computer, it is easiest to connect each Low GAS to the LNC using the functions in the provided software (refer to the software manual on the CD). Access the LNC tab and click on the Connect Low GAS button.

After pressing the Connect Low GAS button, the LNC will begin blinking to show that it is waiting for a new connection. If connected using a computer, skip to step 5.
4 If the LNC will not be connected to a computer, it must be put into Connection Mode manually. To do this, hold down the Reset button on the LNC while connecting power (either USB power or the optional power supply). The LNC will begin blinking to show that it is waiting for a new connection.

5 Turn on the Low GAS by pressing its button. The LNC should stop blinking after a few seconds, showing that the connection has been established. Remember that this has also caused the Low GAS to calibrate its sensors under the current conditions. The Low GAS should be recalibrated when installed in its final position on the gauge. To do this, cycle power on the Low GAS. (See "Operating and Maintaining the Low Gas Alarm System".)

6 The connection can be verified by pressing the button on the Low GAS to force a radio transmission. The LNC transmit and receive lights will blink in acknowledgement.

7 After communication is verified, install the Low GAS on the desired regulator (final operation distance is up to 20 m).

8 When the connected Low GAS is in operation, it will transmit status information to the LNC at intervals of several minutes.
Using a Laboratory Network Controller (LNC) as a Relay Device

1. After a Low GAS is connected to an LNC it might be necessary to operate it at distance greater than the transmission range of the battery-powered radio. In this case an additional LNC can be used as a relay. With an additional LNC (used as a relay device), operating range for the Low GAS may extend up to 30 m, depending upon conditions.

2. When a Low GAS goes through its power-up cycle it attempts to connect to its associated LNC. If this connection fails, it surveys other LNCs within range to try to establish a relay connection. The connection will be established automatically if successful. The connection can be verified by the LNC Monitor program on the PC, or by triggering an alarm event on the Low GAS.
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Operating and Maintaining the Low Gas Alarm System

1 Turning the Low GAS On and Off:
   a If the Low GAS is off, it can be turned on by pressing and holding the button until the LED turns green (approximately 3 seconds).
   b If the Low GAS is on, it can be turned off by pressing and holding the button down until the LED turns red (approximately 3 seconds). It will flash green twice before turning red.

2 Startup and Calibration:
   a Make sure the Low GAS is off before starting. The Low GAS detects the gauge needle as it passes the sensor arm. The sensor arm is placed at the desired alarm set-point by rotating the Low GAS body. Make sure that the gauge needle is not under the sensor arm.

   NOTE Although the Low GAS works well in total darkness or intense fluorescent light, the sensors may be saturated when used in bright incandescent or natural light.
b Hold down the button for about 2 seconds to turn on the Low GAS. The green LED will light and remain on until the button is released. This will cause the Low GAS to go into setup mode and self-calibrate.

c After the calibration is complete the Low GAS will blink green several times per minute to signal that it is in operation.

d To verify operation at any time, the button can be pressed briefly, and the LED will respond by blinking green.

e The alarm function can be verified by closing the valve on the gas cylinder upstream of the pressure regulator and then bleeding off the gas. As the needle reaches the sensor arm the alarm will sound.
3 Operation of the Standalone Low Gas Alarm System:
   a. The Low GAS will sound an audible alarm (3 beeps) and flash the red LED when the needle is detected by the sensors. To quiet the alarm, press the button briefly. The audible alarm will be reduced to a chirp and the LED will continue to flash red until the Low GAS is reset.
   b. The Low GAS can be reset by pressing the button and holding it down for about 2 seconds. Two green LED flashes indicate a successful reset. The green LED will blink to signal resumed operation. If the button is held too long (more than 2 seconds), the red LED will light until the button is released. This indicates that the Low GAS has been powered off.
   c. In order to conserve battery power the frequency of the alarm will decrease if it is left on for a long period of time. If you believe that the alarm has been left on for a long time (over multiple days), be sure to check the battery status.

4 Operation of the Low Gas Alarm System with Wireless Connection to an LNC:
   a. The Low GAS will sound an audible alarm (3 beeps) and flash the red LED when the needle is detected by the sensors. The associated LNC will sound an audible alarm at the same time with multiple beeps and a red LED. To quiet the alarm, press the Low GAS button briefly. The audible alarm on the Low GAS is reduced to a chirp and the LED will continue to flash red until the Low GAS is reset. The audible alarm on the LNC is silenced and the red LED begins flashing.
   b. The Low GAS and associated LNC can be reset by pressing the Low GAS button and holding it down for about 2 seconds. Two green LED flashes indicate a successful reset of the Low GAS. Reset of the LNC is indicated by stopping both visual and audible alarms. The green LED of the Low GAS will blink to signal resumed operation. If the Low GAS button is held too long (more than 2 seconds), the red LED will light until the button is released. This indicates that the Low GAS has been powered off.

   **NOTE**

   The software provided with the LNC provides more detailed information about the status of the LNC and its associated Low GAS units.
5 Other Low GAS Alarm States:

a In the event of low battery voltage, the Low GAS sounds a 1 beep repeated signal and the LED flashes red. This indicates that it is time to replace the battery. See “Replacing the Battery in the Low Gas Alarm System”.

b To warn of high background lighting causing IR interference with the sensors, the Low GAS sounds a 2-beep repeated signal and the LED flashes red. This indicates that the Low GAS should be turned away from the light source or moved to a location with lower levels of incandescent or natural lighting.
Replacing the Battery in the Low Gas Alarm System

**WARNING**
The Low GAS must be removed to a nonhazardous location before changing the battery.

Only approved coin batteries may be used with the Low GAS; use Agilent Part No. 5190-1453. See Appendix A, “Markings” for batteries approved for use in Hazardous Locations.

Open the back of the case by lifting the latch. The coin battery is in a holder on the circuit board. Lift out the battery and replace.

Cleaning Procedures

The Low GAS and LNC may be cleaned by wiping with a damp cloth. Do not use solvents.
Removing the Low Gas Alarm System from a Gauge

1 Open the back of the Low GAS by lifting the latch. Rotate the Low GAS so that the latch is accessible.
2 Rotate the Low GAS until the slot at the bottom lines up with the gas gauge stem.

3 Lift the two retaining tabs, one at a time, out of the grooves in the outer case.
4 Make sure the lid is fully open and slide off the Low GAS body first, then slide the alignment sleeve off the gas gauge.
The ability of Low GAS to give a low gas alarm can be tested at any time by closing the main valve of the gas cylinder and allowing gas to bleed out slowly through the regulator.

### Table 1 Error conditions, possible causes, and recommendations

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible cause</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low GAS will not turn on</td>
<td>Low battery</td>
<td>Replace battery.</td>
</tr>
<tr>
<td></td>
<td>Loose battery</td>
<td>Press battery firmly into holder.</td>
</tr>
<tr>
<td></td>
<td>Loose contact</td>
<td>Make sure tabs are bent to contact battery.</td>
</tr>
<tr>
<td>Low GAS will not connect to LNC</td>
<td>Low battery</td>
<td>Replace battery.</td>
</tr>
<tr>
<td></td>
<td>Loose battery</td>
<td>Press battery firmly into holder.</td>
</tr>
<tr>
<td></td>
<td>Loose contact</td>
<td>Make sure tabs are bent to contact battery.</td>
</tr>
<tr>
<td>Connection not established</td>
<td></td>
<td>Repeat procedure “Connecting a Wireless Low Gas Alarm System to a Laboratory Network Controller”.</td>
</tr>
<tr>
<td>Radio or processor error</td>
<td></td>
<td>Remove and replace battery to force full reboot of firmware.</td>
</tr>
</tbody>
</table>
### Table 1  Error conditions, possible causes, and recommendations (continued)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible cause</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio not functional on LNC or Low GAS</td>
<td>Contact Agilent or your Authorized Agilent Distributor for support.</td>
<td></td>
</tr>
<tr>
<td>LNC will not come on.</td>
<td>Power not connected</td>
<td>Check that LNC is connected either to a powered USB port or to the Agilent 7.5 V DC power supply (Part No. 5190-1454).</td>
</tr>
<tr>
<td>Failure to alarm</td>
<td>Jerky needle motion</td>
<td>The Low GAS sensors are read approximately every 2 seconds. If the gauge needle is unsteady in its motion or is moving very quickly (as with a large leak), it could skip past the sensors, causing a failure to alarm.</td>
</tr>
<tr>
<td></td>
<td>Needle moving too fast</td>
<td>The Low GAS sensors are read approximately every 2 seconds. If the gauge needle is unsteady in its motion or is moving very quickly (as with a large leak), it could skip past the sensors, causing a failure to alarm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The pressure gauge could need maintenance or replacement.</td>
</tr>
<tr>
<td>Undetectable needle</td>
<td>Position the Low GAS body so that the sensor arm is as close to the center of the gauge as possible.</td>
<td></td>
</tr>
<tr>
<td>Improper calibration</td>
<td>The sensors are calibrated against the gauge background each time the gauge is turned on. If the gauge is turned on and calibrated when the sensors are over the needle (front or back of the needle), the alarm will not function.</td>
<td></td>
</tr>
</tbody>
</table>
False alarm  Condensation  If moisture has condensed on the sensors they will have to dry out before the gauge can resume operation. After the sensors are thoroughly dry, recalibrate the Low GAS by turning it off and on.

Improper calibration  The sensors are calibrated against the gauge background each time the gauge is turned on. If the gauge is turned on when the sensors are over the needle (front or back of the needle), the alarm will not function.

Alarm was triggered during pressurization  Even though the sensors are reading at widely spaced intervals, it is sometimes possible to trigger the alarm while the needle is moving rapidly past the Low GAS during pressurization. Reset the alarm.

Gauge face too far from sensors  Press the back of the alignment sleeve firmly into the Low GAS body so the tabs click into place. Close the cover securely.

Repeated beeping  Low battery alarm  Change battery.

---

### Table 1  Error conditions, possible causes, and recommendations (continued)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible cause</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>False alarm</td>
<td>Condensation</td>
<td>If moisture has condensed on the sensors they will have to dry out before the</td>
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<td></td>
<td></td>
<td>gauge can resume operation. After the sensors are thoroughly dry, recalibrate</td>
</tr>
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<td></td>
<td>the Low GAS by turning it off and on.</td>
</tr>
<tr>
<td>Improper calibration</td>
<td></td>
<td>The sensors are calibrated against the gauge background each time the gauge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is turned on. If the gauge is turned on when the sensors are over the needle (</td>
</tr>
<tr>
<td></td>
<td></td>
<td>front or back of the needle), the alarm will not function.</td>
</tr>
<tr>
<td>Alarm was triggered during</td>
<td></td>
<td>Even though the sensors are reading at widely spaced intervals, it is sometimes</td>
</tr>
<tr>
<td>pressurization</td>
<td></td>
<td>possible to trigger the alarm while the needle is moving rapidly past the Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GAS during pressurization. Reset the alarm.</td>
</tr>
<tr>
<td>Gauge face too far from sensors</td>
<td></td>
<td>Press the back of the alignment sleeve firmly into the Low GAS body so the tabs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>click into place. Close the cover securely.</td>
</tr>
<tr>
<td>Repeated beeping</td>
<td>Low battery alarm</td>
<td>Change battery.</td>
</tr>
</tbody>
</table>
### Table 1  Error conditions, possible causes, and recommendations (continued)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible cause</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High background light alarm</td>
<td></td>
<td>Shield or turn the Low GAS away from bright natural light and from incandescent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lights. The sensors are sensitive to excess IR radiation.</td>
</tr>
<tr>
<td>LNC not receiving a Low GAS Signal</td>
<td>LNC error</td>
<td>Try disconnecting and reconnecting power on the LNC.</td>
</tr>
<tr>
<td>Low battery</td>
<td></td>
<td>Replace battery.</td>
</tr>
<tr>
<td>Loose battery</td>
<td></td>
<td>Press battery firmly into holder.</td>
</tr>
<tr>
<td>Loose contact</td>
<td></td>
<td>Make sure tabs are bent to contact battery.</td>
</tr>
<tr>
<td>Distance too great or obstacles in path</td>
<td></td>
<td>Try rearranging the spacing of the LNC and Low GAS. Putting the LNC at a higher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>level might improve transmission.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Also see “Using a Laboratory Network Controller (LNC) as a Relay Device”.</td>
</tr>
<tr>
<td>Connection not established</td>
<td></td>
<td>Repeat procedure “Connecting a Wireless Low Gas Alarm System to a Laboratory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Network Controller”.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Also see “Low GAS will not connect to LNC” in this section.</td>
</tr>
</tbody>
</table>

Agilent Low Gas Alarm System
Support and Repair

If the Low GAS is still in the warranty period, please contact Agilent or your authorized Agilent distributor for support. The warranty period is tracked using the product serial number.

In cases where the Low Gas Alarm System and Laboratory Network Controller were purchased together (G3376A and G3379A), use the serial number from the Low Gas Alarm System for warranty requests.
Appendix A

Markings

1 The Low Gas Alarm System carries the following markings:

which references the following standards for use in hazardous locations:

- Conforms to ANSI/ISA 12.12.01
- Certified to CSA STD C22.2 No. 213
- Class I Div 2 Groups A - D

which references the following standard for use in hazardous locations:

- Ex nL IIC T4
- ITS08ATEXN6041X

The X mark references the Exception that Anti-Static precautions must be taken in the use of the Low GAS Alarm in hazardous locations. See “Warnings”.

which references the following standards in the Declaration of Conformity:

- Low Voltage Directive 2006/95/EC
- ATEX Directive 94/9/EC

Battery Replace battery only with Agilent Part No. 5190-1453
3 V coin cell battery, (Renata CR2450/N/Sanyo CR2450) batteries.
In addition, the wireless version of the Low Gas Alarm System carries the following markings:

Contains FCC ID: OUR-XBEE  The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i) this device may not cause harmful interference and (ii) this device must accept any interference received, including interference that may cause undesired operation.

The Laboratory Network Controller carries the following markings:

which references the following standards in the Declaration of Conformity:

Low Voltage Directive 2006/95/EC

Contains FCC ID: OUR-XBEE  The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i) this device may not cause harmful interference and (ii) this device must accept any interference received, including interference that may cause undesired operation.

The Laboratory Network Controller is not certified for use in hazardous locations.
For additional product information and to view a demo visit www.agilent.com/chem/lowgas
To order, go to: www.agilent.com/chem/store
Contact your local Agilent sales representative or authorized Agilent distributor www.agilent.com/chem/contactus

Our measure is your success.