



Automation Components, Inc.  
**CO2 Gas Detection**

# CO2 Safety

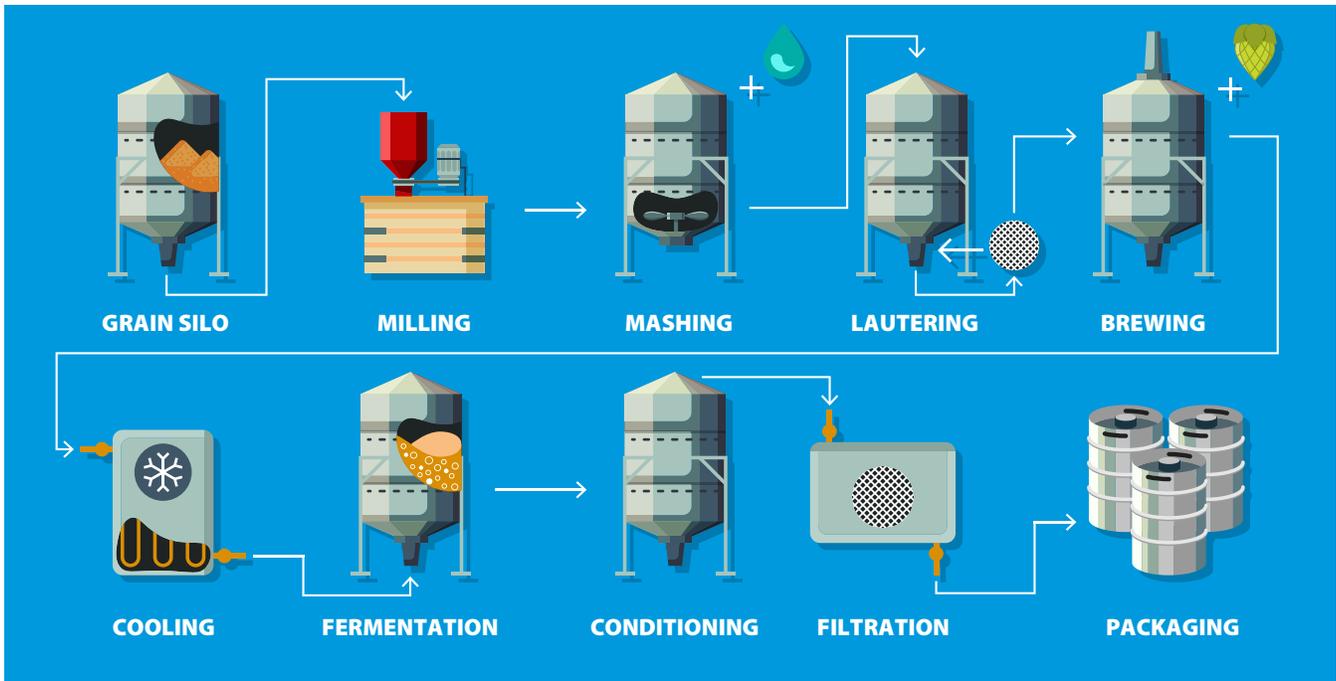
## ACI Gas Detection, with the brewer in mind

Carbon Dioxide (CO<sub>2</sub>) is a natural by-product of the fermentation process in breweries. This happens when yeast reacts with sugar in the alcohol and creates CO<sub>2</sub>. Since it is heavier than air, any CO<sub>2</sub> released into the indoor environment will buildup in large amounts at the floor level, which reduces overall oxygen levels in the space making it difficult to breathe.

**Automation Components, Inc. (ACI)** is ready to assist you with Gas Detection requirements. Visit ACI's website, [workaci.com](http://workaci.com) or call **1-888-967-5224** for more information.



# The Brewing Process



## Gas Monitoring in Breweries

Outdoor air typically has an Oxygen (O<sub>2</sub>) level of 20.9% by volume with a minimum indoor O<sub>2</sub> level of 19.5% by volume as defined by OSHA guidelines. Without taking the proper precautions, brew masters and other workers are placed at risk for CO<sub>2</sub> poisoning or asphyxiation due to high concentrations of CO<sub>2</sub>. This is where controlling and monitoring air quality for employees and patrons can not only ensure a healthy, productive environment, but can actually help save lives.

# Occupational Safety & Health Standard

Per the Occupational Safety and Health Standard (OSHA) 1910.1000 TABLE Z1 Subpart Z, titled "Toxic and Hazardous Substances," OSHA states that the PEL (Permissible Exposure Limit) is 5000 ppm over an 8 hour Time Weighted Average (TWA) while the National Institute of Occupational Safety & Health (NIOSH) guidelines has established the permissible limits for CO2 exposure at a TWA of 10,000 ppm and a STEL (Short Term Exposure Limit) of 3% or 30,000 ppm over a 15 minute time period. In summary, the OSHA, NIOSH, and ACGIH occupational exposure standards for CO2 are 0.5% by volume (5,000 ppm) averaged over a 40 hour work week, 0.3% by volume (30,000 ppm) for a short term exposure limit of 15 minutes (STEL), and 4% by volume (40,000 ppm) as the maximum instantaneous limit considered immediately dangerous to health and safety. All three of the above exposure limits must be maintained to meet the requirements of the standard.

GAS	FORMULA	NIOSH (IDLH)	ACGIH (TLV)	OSHA (PEL)	SENSOR POSITION
Carbon Dioxide	CO2	4% by vol.	0.50%	0.50%	Floor to Chest
Oxygen	O2	≤ 18%	≤ 19.5%	≤ 19.5%	Chest to Face
Ammonia	NH3	300 ppm	25 ppm	50 ppm	High or Face Level
Chlorine	Cl2	10 ppm	0.5 ppm	0.5 ppm	Floor to Knees
Chlorine Dioxide	ClO2	5 ppm	0.1 ppm	0.1 ppm	Floor to Knees
Methane	CH4	Explosive Alarm @ 10-20% and 40-50% LEL			Near Ceiling
Hydrogen Sulfide	H2S	100 ppm	10 ppm	10 ppm	Chest to Face
Ozone	O3	5 ppm	0.1 ppm	0.1 ppm	Chest to Face
Sulfide Dioxide	SO2	100 ppm	2 ppm	5 ppm	Floor to Knees

[1] IDLH: "Immediately Dangerous to Life and Health," A NIOSH value defined as the maximum exposure concentration in the workplace

[2] ACGIH: American Council of Governmental Industrial Hygienists; TLV, Threshold Limit Value, the average concentration in ppm for an 8-hour

[3] 29 CFR 1910.1000, OSHA Table Z1; PEL, Permissible Exposure Limit, expressed as an 8 hour TWA, Time Weighted Average.

## The Solution for Gas Monitoring in Breweries

What is the best way to monitor increased levels of CO2 in breweries? With an ACI/QEL Q5 Series Gas Detection/Monitoring System. With over 30 years of experience detecting both toxic and combustible gases, ACI/QEL provides an affordable, comprehensive and highly reliable solution for monitoring CO2, toxic gases, oxygen deficiency, and alcohol in facilities brewing and distributing beer, wine and spirits.



## Q5 & B5 Sensor

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The Q5/B5 is a microprocessor based “smart” gas transmitter. It is paired with either an electrochemical gas sensor for toxic gases, or a catalytic bead sensor for combustible gases. Pre-calibrated sensors can be purchased and installed by the user, thereby reducing calibration costs and minimizing downtime. The user can select from numerous display options, including relay status, time, TWA, STEL, concentration, or nothing at all. All programming and calibration is nonproprietary and is accessed through a user selectable password which protects system integrity.

## M-Controller

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The M-Controller is a multi-channel controller and alarm unit. It utilizes both digital and analog communications to interface with a maximum of 32 remote digital transmitter/sensors, and 8 analog transmitter/sensors. Range and alarm setpoints are set either through the front keypad or through software that is downloaded to the controller from a PC or laptop computer. An additional feature includes 24 VDC transistor outputs for a horn and strobe.

A RS-422 responds as a RTU Slave using MODBUS protocol which allows the controller to provide read status information only.

The RS-232 interface uses a RJ-11 telephone jack. This is primarily used for uploading and downloading a large configuration database. Also available is an analog output card that includes eight 4-20mA analog outputs.

## Q-Controller

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The Q-Controller system uses an RS-485 communication protocol that accommodates 128 channels through four digital ports. In addition, there are 128 analog inputs from any 4-20mA device and 128 4-20mA outputs as well. There are also up to 128 binary inputs and 128 binary outputs. The system communicates wirelessly for programming and downloading of data through your smartphone or tablet device. A touch screen graphic display is used for programming. All relevant gas detection data, such as relay status, historical data, location and addresses of sensors are displayed by

scrolling through multiple screens. The controller has a scheduler that can be programmed to activate relays and deactivate relays (4, 10 Amp SPDT relays on main board) several times a day based on a frequency of day, weekday or weekend only. As the unit can accept any 4-20mA signal, it is ideal for additional monitoring such as temperature, humidity and other parameters.

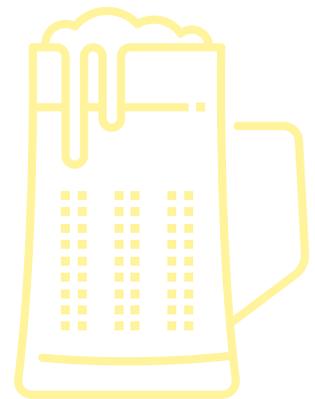
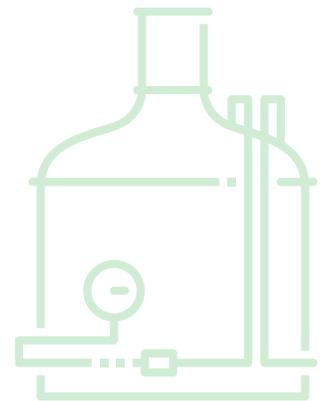
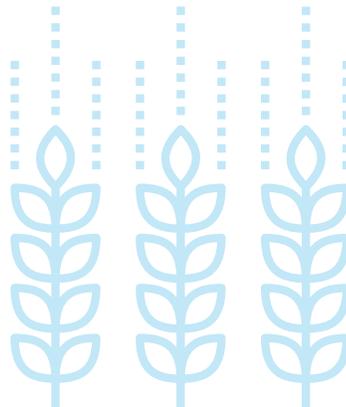


## Q5 Features

- Uses Electrochemical, Catalytic Bead and Infrared Sensors
- Pre-calibrated sensors available for easy replacement without calibration
- Three on-board user-programmable relays
- Non-proprietary set-up and calibration procedures
- Digital display of TWA, STEL, concentration and relay status
- Stand-alone operation
- Analog communication to BAS or through RS-485 digital protocols
- Integral buzzer with three tones
- NEMA 4X enclosure with knock-outs
- Sensor housing sealed from electronics
- Duct mount available
- Splash guard available
- Flow through/calibration cap available
- 24 VAC/VDC operation
- On board and remote annunciation

## Q-Controller Features

- Modbus and BACnet outputs
- Seven-inch touchscreen display
- Data-logging
- 4 x10 Amp DPDT relays on main board up to 124 remote
- E-mail alarms, configuration and data-logging files



## Who is ACI?

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Automation Components, Inc. (ACI) has been a high-quality manufacturer of sensors to the HVAC Industry since 1991. This is exemplified by our company motto of "Engineering a Better Sensor Solution." Since our inception we have been honored with a list of State and Industry related awards proving that invention and communication go hand in hand. We have invested substantially in new product developments as well as existing product enhancements which can be seen in our Gas Detection line. Our technical service department has over 40 years of combined experience in the HVAC industry and continually stays up-to-date on control system applications through

research, communication with our OEM partners, and addressing questions from our existing customers. Two major driving forces behind gas sensor selection are demand control ventilation and concerns over air quality. ACI has been supplying Carbon Dioxide sensors for years and is well versed in their application and technical support. We also carry a comprehensive line of CO, NO<sub>2</sub>, toxic, combustible and refrigerant sensors for all your gas detection needs.

ACI is a ISO9001 certified company. ACI's certification ensures that our products and services will consistently exceed your expectations. As an ISO9001 certified company, we have proven that our processes are consistent, efficient, and productive. ACI's top priority is to manufacture a high quality product for our customers; being recognized as ISO9001 certified serves as verification of this commitment.



**1-888-967-5224**

**[workaci.com](http://workaci.com)**





**Automation Components, Inc.**  
**CO2 Gas Detection**



**SUNBURY CONTROLS, INC.**



**What's your application?**

**What gas detection/monitoring system is best for your needs?**

To speak with an application expert, please contact:

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