selas®
The Heat Technology Company

COMPLETE-MIX QUAL-O-RIMETER®

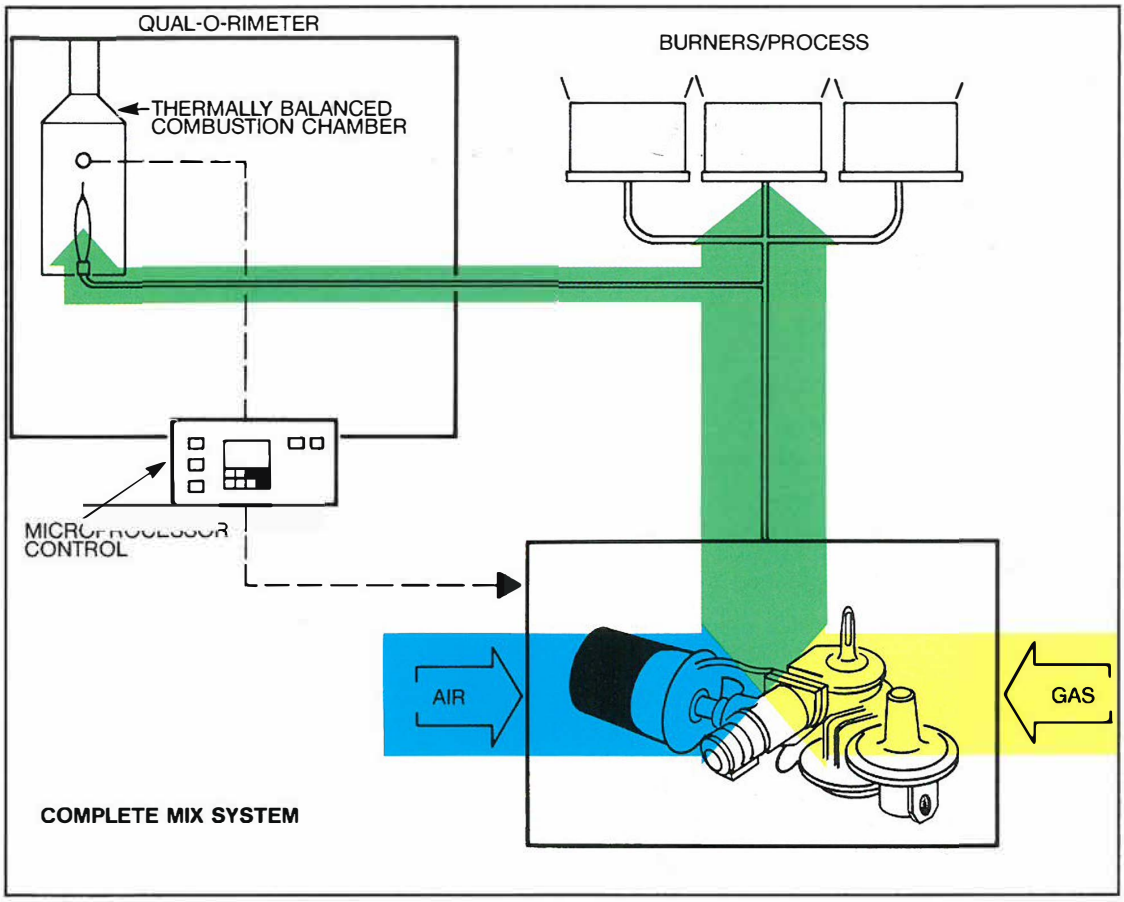
for Air/Gas Premixing Systems

Monitors and adjusts combustible premix by sensing all the variables

- Better than oxygen analyzers for temperature sensitive process
- Recognizes changes in fuel quality before production is affected
- Maintains uniform heat release and flame shape
- Maximizes fuel efficiency
- Uses fast-acting microprocessor circuitry for control of fuel gas quality
- Pushbutton control with backlit indication
- Easy-to-read digital display
- Incorporates self-contained visual and audible alarm
- Alarm prevents false movement of mixing valve
- Outputs for optional recorder and remote alarm device
- Control panel can be remotely mounted from sensing unit

Variations in fuel gas composition that cause deviations in heating quality are common. Even stable natural gases vary because of the well source, method of extraction and later mixing with other source gases in the distribution system.

Some gases are stored in caverns, mixed with so-called interchangeable mixtures or both. The Selas Qual-O-Rimeter guards critical heating applications against such fuel gas variations.

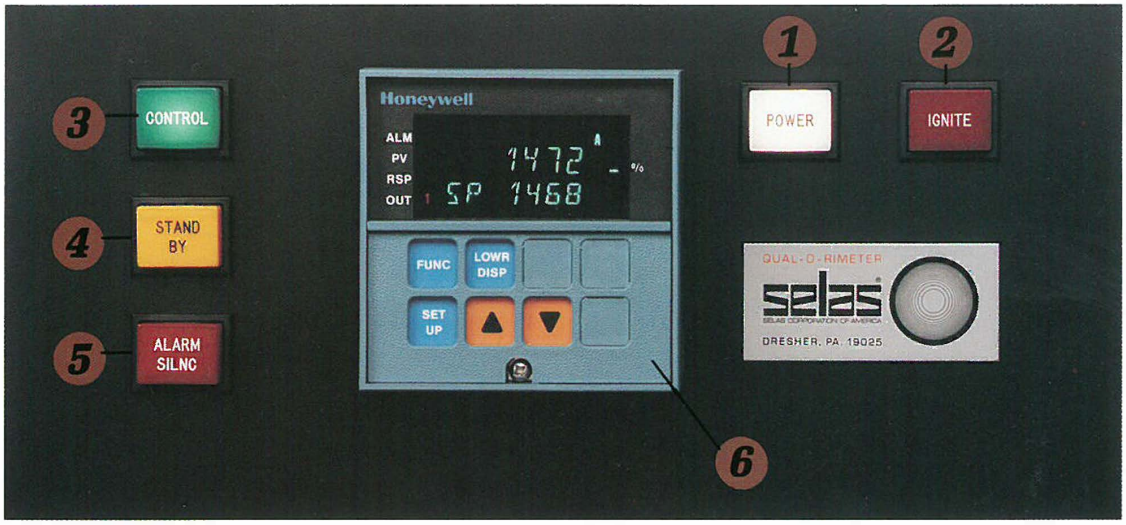


Maintaining constant heat on the work surface The temperature of the flame in a gas-fired process depends on several independent variables. Air/gas ratio is one of them. The others include the composition and Btu content of the gas, air temperature and humidity. All these variables must be monitored to maintain a constant flame temperature. That is why the Qual-O-Rimeter has gained wide acceptance in hundreds of installations for over 30 years for applications that include glass processing, tempering, brazing and food processing.

Now, microprocessor control The original Qual-O-Rimeter which used analog controls has now been replaced with Model Q-O-R/CM III. This new model uses the same time-proven method of thermal analysis plus the many user benefits made possible by microprocessor control.

Digital displays All readouts on the Model Q-O-R/CM III are digital, so that settings can be made more precisely and read more quickly. A built-in alarm is supplied in the unlikely event that a system problem occurs. Terminals for a remote alarm are provided.

Remote control and recording When remote control is required, the control panel can easily be installed away from the sensor unit. The unit can be provided with a recorder to maintain a permanent temperature record.



Precision Combustion Monitoring and Control The Selas Complete-Mix Qual-O-Rimeter monitors and automatically corrects the air/gas mixture to maintain user-set requirements. It does so by duplicating in miniature, within the instrument, an actual heating system. As shown in the system diagram, the Q-O-R monitors the actual heating system within this instrument. A continuous sample of air/gas mixture passes through a pressure regulator and control orifice. It is burned in a thermally balanced combustion chamber. The flow of the mixture and the combustion temperature is affected by any change in the combustion variables such as gas chemistry, heating value of the gas, air temperature, pressure and humidity.

When the Q-O-R senses a change in the flame temperature, the Q-O-R will adjust the blend. A microprocessor signals the external ratio control valve which adjusts the blend of gas in the mix blend system until the flame sample returns to its preset condition.

Easy-to-use controls

1. **POWER** — Turns on instrument. Power is 115 or 230 VAC, 50/60 Hz.

2. **IGNITER** — Ignites the sample flame in the thermally balanced combustion chamber.

3. **CONTROL** — Indicates and switches the instrument to automatic control mode.

4. **STAND-BY** — Indicates and switches instrument to manual mode.

5. **ALARM-SILNC** — Indicates and silences alarm. The alarm is actuated when the fuel quality deviates from a user-set value or if thermocouple burnout occurs. An alarm automatically switches the instrument to stand-by mode to prevent false movement of the remote air/gas ratio controller.

6. **MICROPROCESSOR CONTROLLER** — Digitally displays setpoint and chamber temperature and positions remote air/gas ratio controller. Internal electronic limit switches limit output or setpoint within a safety band. A security lockout feature prevents unauthorized changes in configuration. It utilizes standard PID controller type process control tuning. Process setpoint can be changed by the Up/Down arrow keys.

Specifications of CM III Qual-O-Rimeter

Fuel: Combustible gas mixture of natural gas, propane, butane or manufactured gas containing not more than 55% hydrogen by volume. Mixture must contain 80% to 100% of the air required for complete combustion. (Call factory for special conditions.)

Inlet Pressure: Premixed fuel from 16 inches w.c. to 5 psig (400mm to 0.3 ATM).

Fuel Consumption: 2000 Btu per hour (500 Kcal/hr.)

Power Supply: 115/230 VAC, 50/60 Hz

Controller: Honeywell UDC-3000
Position proportional output with slide wire feedback — 100 to 1000 ohms

Remote Actuator Interfacing: Field selectable: direct drive such as Foxboro Jordan — standard with Selas mixing valve; or sliding winding type such as Barber Coleman, EA Medium Torque Series.

Contacting Rating of Relay for External Load: 3 Amps

Ignition: By electric spark, ignition transformer mounted within the instrument cabinet

Inlet Connection: 1/4-inch NPT internal thread (U.S. Std.)

Measurement Characteristics: Based on a complete mixture of air and natural gas; other conditions in relative proportions.

Sensitivity... ±2 Btu per cu. ft. (±18 Kcal/m³) of fuel gas.
±0.5% air by volume in air/gas mixture.

Reproducibility...20 Btu per cu. ft. (180 Kcal/m³) of fuel gas, and 2% air/gas ratio, over extended periods of operation, without recheck of zero.

Control Capability...Based on a complete mixture of air and natural gas; other conditions in relative proportions.

Btu (fuel gas)... ±10 Btu per cu. ft. of natural gas (or equivalent) (±90 Kcal/m³)

Btu (mixture)... ±1 Btu per cu. ft. (±9 Kcal/m³)

Combustibles... ±0.70%

Excess Air... ±1.25%

Oxygen... ±0.25%

Response...90% in approximately one minute

Warm-Up: 30 minutes

Ambient Temperature Compensation: ±2% of scale between 45°F and 110°F (7°C and 44°C)

Mounting: Wall, surface or flush on panel, such that cooling air circulates through louvres from lower outside through top of instrument case.

Dimensions: 14⅜ in. wide x 20¾ in. high x 10 in. deep (365mm wide x 527mm high x 250mm deep) including door latch. Panel cut-out is 12¼ in. wide x 19 in. high (311mm wide x 483mm high)

Shipping Weight:
Approximately 75 lbs (34 kg)

Ordering Information

Please specify fuel gas, specific gravity, heating value, and degree of blend.

	Ordering Code
Complete-Mix Qual-O-Rimeter	**Q-O-R/CM III**
Automatic Ratio Adjuster For use with Automatic CM Qual-O-Rimeter when CM Qual-O-Rimeter will be used to monitor a Selas Combustion Controller or Mixing Valve. Please specify Combustion Controller model, number, serial number, and valve serial number.	**ARA**
Circular Chart Recorder	**CMA-CCR**

selas®
The Heat Technology Company

Selas Corporation of America
P.O. Box 200, Dresher, PA 19025, U.S.A.
Tel: (215) 646-6600, Toll Free (800) 523-6500
in Pennsylvania (800) 562-5389
Telex: 244472, Telefax: (215) 646-3536

Selas S.A.
71, rue Rivay
92300 Levallois-Perret
Tél.: (1) 47.37.56.60
Telex: 610269
Fax: (1) 47.37.88.21
FRANCE

Selas Wärmetechnik GmbH
Schlüterstrasse 95
4000 Düsseldorf 1
Tel.: (02 11) 23 72 21
Telex: 8 584 638
Fax: (02 11) 23 74 75
GERMANY

Selas Italiana S.R.L.
Via delle Tuberose 14
20146 Milano
Tel.: (02) 4158497
Telex: 353472
Fax: (02) 483 02211
ITALY

Nippon Selas Co., Ltd.
4—3 Arakawa 7-Chome
Arakawa-Ku Tokyo 116
Tel.: (03) 807-9591
Telex: 2655466
Fax: (03) 807-9594
JAPAN

R9010M690

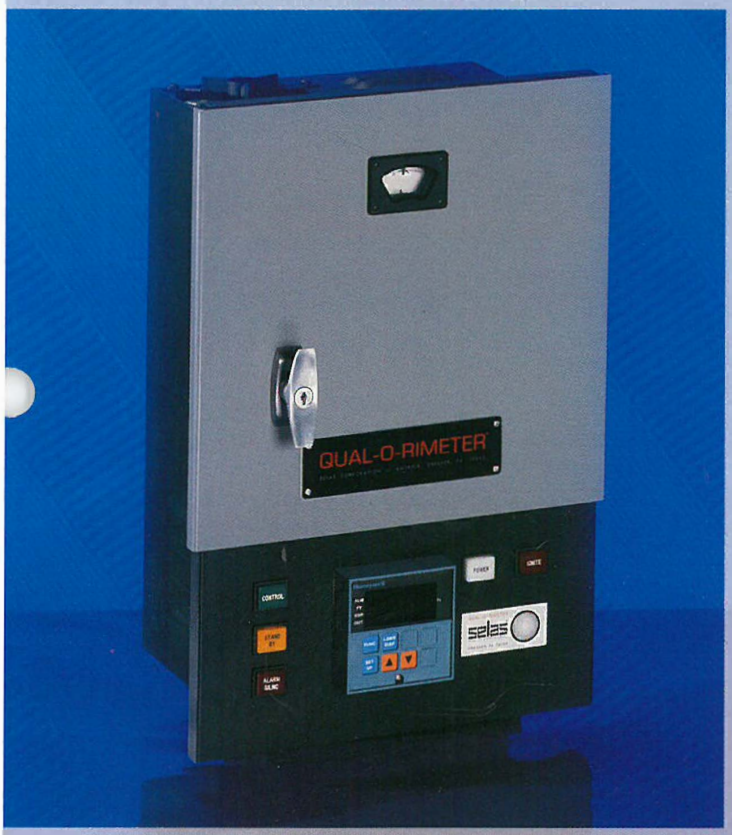
Printed in USA

selas®
The Heat Technology Company

RAW-GAS QUAL-O-RIMETER®

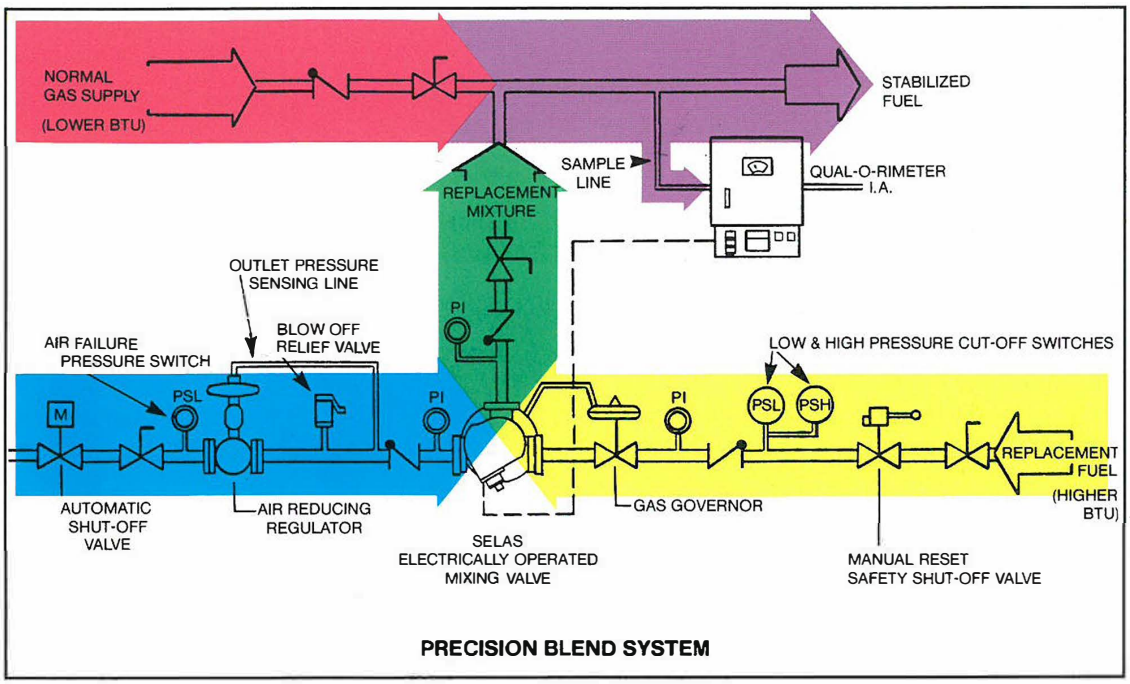
for Gas Blending Systems and Fuel Monitoring

Monitors and adjusts raw fuel gas quality for processes that depend on fuel stabilization



- Recognizes changes in fuel composition before production is affected
- Maintains uniform heat release and flame shape
- Maximizes fuel efficiency
- Uses fast-acting microprocessor circuitry for control of fuel gas quality
- Pushbutton control with backlit indication
- Easy-to-read digital display
- Incorporates self-contained visual and audible alarm
- Alarm indicates excessive movement of mixing valve
- Outputs for optional recorder and remote alarm device
- Control panel can be remotely mounted from sensing unit

The Selas Qual-O-Rimeter is used to eliminate deviations in heating quality caused by common deviations in fuel gas composition. Fuel gas variations are normal. Even stable natural gases vary upon the well source, method of extraction and subsequent mixing with other source gases in the major distribution systems. Some gases are stored in caverns and/or mixed with so called interchangeable mixtures. As a result, many critical heating applications are affected by deviations in fuel gas composition.



PRECISION BLEND SYSTEM

Now, microprocessor control
The original Qual-O-Rimeter which used analog controls has now been replaced with Model Q-O-R/RG III. This new model uses the same time-proven method of thermal analysis plus the many user benefits made possible by microprocessor control.

Digital displays
All readouts on the Model Q-O-R/RG III are digital, so that settings can be made more precisely and read more quickly.
A built-in alarm is supplied in the unlikely event that a system problem occurs. Terminals for a remote alarm are provided.

Fuel Stabilization
Accurately mixes a higher Btu fuel with air to make a replacement for lower Btu fuel such as propane/air to produce a natural gas replacement.

When product quality depends upon precise blending
The composition and Btu content of raw gas can vary for several reasons. But, whatever the reason, when the gas is being used to fuel a temperature-sensitive process, such changes can adversely affect product quality. That's why the Selas Raw-Gas Qual-O-Rimeter precision combustion monitor has found wide acceptance in industries using gas-fired temperature-sensitive processes for over 30 years.

Remote control and recording
When remote control is required, the control panel can easily be installed away from the sensor unit. The unit can be provided with a recorder to maintain a permanent temperature record.

Precision Combustion Monitoring and Control The Selas Raw-Gas Qual-O-Rimeter monitors and automatically corrects fuel gas quality to user requirements. The Q-O-R continuously burns a small sample of blended gas and instrument air in a thermally balanced combustion chamber. The temperature of the sample flame is affected by a change in the blend ratio.

When equipped with an automatic ratio adjuster (see system diagram), the Q-O-R will adjust the blend. A microprocessor signals the external ratio control valve which adjusts the blend of gas in the mix blend system until the flame sample returns to the preset condition.

Easy-to-use controls

1. **POWER** — Turns on instrument. Power is 115 or 230 VAC, 50/60 Hz.
2. **IGNITER** — Ignites the sample flame in the thermally balanced combustion chamber.
3. **CONTROL** — Indicates and switches the instrument to automatic control mode.
4. **STAND-BY** — Indicates and switches instrument to manual mode.
5. **ALARM-SILNC** — Indicates and silences alarm. The alarm is actuated when the fuel quality deviates from a user-set value or if thermocouple burnout occurs. The actuated alarm automatically switches the instrument to stand-by mode to prevent false movement of the remote air/gas ratio controller.
6. **MICROPROCESSOR CONTROLLER** Digitally displays setpoint and flame temperature and automatically positions remote air/gas blender valve. Internal electronic limit switches limit output or setpoint within a safety band. A security lockout feature prevents unauthorized changes in configuration. It utilizes standard PID controller type process control tuning. Process setpoint can be changed by the Up/Down arrow keys.

Specifications of RG III Qual-O-Rimeter

Fuel: Combustible gas mixture of natural gas, propane, butane or manufactured gas containing not more than 55% hydrogen by volume.

Inlet Pressure:
Raw Gas: 3 inches (77mm) w.c. minimum and 10 inches (254mm) w.c. maximum

Fuel Consumption:
For natural gas: 2 cfh (.06m³/H) Raw Gas
18 cfh (.51m³/H) Inst. Air

Power Supply: 115/230 VAC, 50/60 Hz

Controller: Honeywell UDC-3000
Position proportional output with slide wire feedback — 100 - 1000 ohms

Remote Actuator Interfacing: Field selectable: direct drive such as Foxboro Jordan — standard with Selas mixing valve; or sliding winding type such as Barber Coleman, EA Medium Torque Series.

Contacting Rating of Relay for External Load: 3 Amps

Ignition: By electric spark, ignition transformer mounted within the instrument cabinet.

Inlet Connection: 1/4-inch NPT internal thread (U.S. Std.)

Measurement Characteristics: Based on a complete mixture of air and natural gas; other conditions in relative proportions.

Sensitivity...±0.2% of higher heating value ±0.5% air by volume in air/gas mixture

Reproducibility...20 Btu per cu. ft. of natural gas (or equivalent) (180 Kcal/m³) over extended periods of operation without recheck of zero.

Control Capability...Based on a complete mixture of air and natural gas; other conditions in relative proportions.

Btu (fuel gas)...±10 Btu per cu. ft. of natural gas (or equivalent) (±90 Kcal/m³)

Response...90% in approximately one minute

Warm-Up: 30 minutes

Ambient Temperature Compensation: ±2% of scale between 45°F and 110°F (7°C and 44°C)

Mounting: Wall, surface or flush on panel, such that cooling air circulates through louvres from lower outside through top of instrument case.

Dimensions: 14⅜ in. wide x 20¾ in. high x 10 in. deep (365mm wide x 527mm high x 250mm deep) including door latch. Panel cut-out is 12¼ in. wide x 19 in. high (311mm wide x 483mm high)

Shipping Weight:
Approximately 75 lbs (34 kg)

Ordering Information

Please specify fuel gas, specific gravity, heating value, and degree of blend.

	Ordering Code
Raw-Gas Qual-O-Rimeter	**Q-O-R/RG III**
Automatic Ratio Adjuster For use with Automatic RG Qual-O-Rimeter when RG Qual-O-Rimeter will be used to monitor a Selas Blender Valve. Please specify Combustion Controller model, number, serial number, and valve serial number.	**ARA**
Circular Chart Recorder	**RGA-CCR**

selas®
The Heat Technology Company

Selas Corporation of America
P.O. Box 200, Dresher, PA 19025, U.S.A.
Tel: (215) 646-6600, Toll Free (800) 523-6500
in Pennsylvania (800) 562-5389
Telex: 244472, Telefax: (215) 646-3536

Selas S.A.
71, rue Rivay
92300 Levallois-Perret
Tél.: (1) 47.37.56.60
Telex: 610269
Fax: (1) 47.37.88.21
FRANCE

Selas Wärmetechnik GmbH
Schlüterstrasse 95
4000 Düsseldorf 1
Tel.: (02 11) 23 72 21
Telex: 8 584 638
Fax: (02 11) 23 74 75
GERMANY

Selas Italiana S.R.L.
Via delle Tuberose 14
20146 Milano
Tel.: (02) 4158497
Telex: 353472
Fax: (02) 483 02211
ITALY

Nippon Selas Co., Ltd.
4—3 Arakawa 7-Chome
Arakawa-Ku Tokyo 116
Tel.: (03) 807-9591
Telex: 2655466
Fax: (03) 807-9594
JAPAN

R9010M690

Printed in USA