BGA244 Advanced REL Modes

Two additional REL modes have been added to the BGA244 to improve local calibration accuracy and performance. These new REL modes are only available for the Binary Gas Instrument Mode. Gas Purity mode has the previously existing single point REL.

New Modes

In addition to the existing REL correction (1 Point REL), a two-point REL (2 Point REL) and a table-based correction (Multi Point REL) have been added.

2 Point REL

2 calibration points are used. Measured values will be adjusted using a slope/offset equation. When active, "2REL" will appear on the Binary Gas Home Home page where REL currently appears.
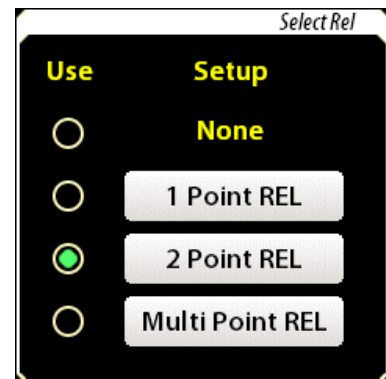
Multi Point REL

Multiple calibration points will be used (up to 20). Measured values will be adjusted using linear interpolation between calibration points. Values above or below the highest and lowest calibration points will be calculated based on the slopes of the adjacent points. When active, "MREL" will appear on the Binary Gas Home page where REL currently appears.

Navigation and Control

At most, only one of the REL methods can be active at a time. However, all parameters can to be set at any time. The GUI interface for the REL functions is different for the new modes.
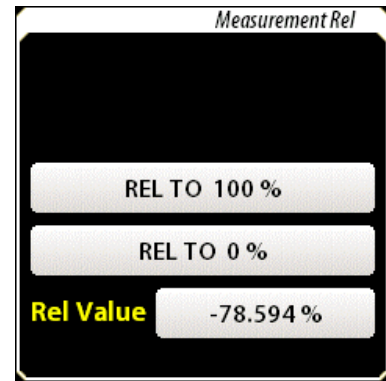
Select REL

Pressing the REL button on the Setup page will take you to a page with 4 radio buttons and 3 navigation keys. The radio buttons select which REL mode is active, or "None" if none are active. Pressing the navigation keys takes you to the entry pages where the different parameters are set.
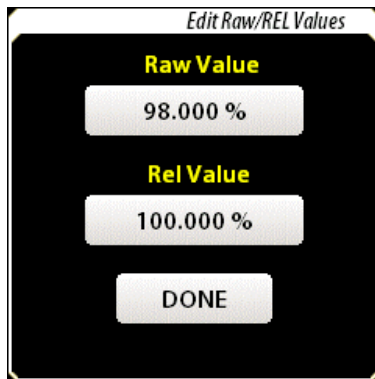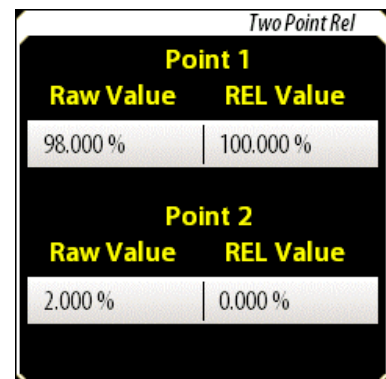
1 Point REL

1 Point REL acts the same as the previous Binary Gas REL function.

2 Point REL

The 2 Point REL page consists of 2 pairs of Raw/REL values. Raw values are the measurements from the BGA244 with no REL active. REL values are the expected value for a given Raw value.

Clicking on either pair of values will open the EDIT Raw/REL value page for that point, where the values can be changed.

Click on either the Raw or Rel values to open the entry screen and then enter the appropriate values. Click [DONE] to load the values & return to the previous page or ← to return to the previous screen.

Using 2 Point REL

The values for 2 Point REL can be determined by either measuring a reference gas or by knowledge from previous measurements. Any measurements used to calculate the Raw/REL values must be made with the REL Mode set to None.

To determine a value by measuring a reference gas
Flow the reference gas thru the unit until readings have completely stabilized. Unless the cell is first evacuated, this will require flowing at least 1 liter of gas over 5-10 minutes to completely turn over the original gas inside the BGA244. Record the Raw value (the measurement with no REL active) and the expected value.

After you have obtained the measured (Raw) values and the expected (REL) values for both Points 1 & 2, edit their entries.

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Multipoint REL

The Multi Point REL page consists of a list of Raw/REL value pairs. There can be up to 20 value pairs. Use PAGE up and PAGE down to navigate the entire list. While there can be duplicate REL values, each Raw value must be unique.

Existing entries are selected by clicking on the Raw/REL value pair, which will highlight that pair. Clicking on the value a second time, deselects the pair.

To add a new value to the table, press the ADD key, which will open the EDIT Raw/REL value box (described previously). When DONE is pressed (assuming a valid value), the new value is added to the list and the list is sorted in order of ascending Raw values.

Multi Point Rel - Page 1	
Raw Value	**REL Value**
0.000 %	0.000 %
75.000 %	0.000 %
76.000 %	1.000 %
77.000 %	2.000 %
80.000 %	5.000 %
83.000 %	8.000 %
85.000 %	10.000 %

To edit a value, select the desired Raw/REL value, then press EDIT. This will open the Edit Raw/REL value box for that selection. When DONE is pressed (assuming a valid value), the new value is entered to the list and the list is re-sorted in order of ascending Raw values.

To delete a value, select the desired Raw/REL value, then press DELETE. A warning "Delete Multi Point Entry   Are you sure?" with Yes/Cancel buttons will appear. Clicking Yes will delete that entry and re-sort the list in order of ascending Raw values. Clicking No will revert to the list window without deleting the entry.

Using Multipoint REL

Multipoint REL is normally used for blended gas mixtures, gases not contained in the Factory Gas Table, or where the behavior of the gas mixture depends on something besides just the molar ratio. Creating Raw/REL values for multipoint REL typically requires multiple reference gases or the ability to create mixtures of different concentrations.

As with 2 Point REL, values can be determined by either measuring a reference gas or by knowledge from previous measurements. Any measurements used to calculate the Raw/REL values must be made with the REL Mode set to None. Use the procedures described for 2 Point REL to determine the Raw & REL values. After you have obtained the measured (Raw) values and the expected (REL) values, edit the table entries.

Remote Commands

For the updated REL commands, parameters can be set regardless of the REL modes, but may depend on the Instrument mode.

Previously Existing Commands

These are commands that have been modified.

RELM(?){i}   REL Mode (existing command)

Set (query) the REL Mode {to i}

For the GPA Mode: i=0 for no REL; i=1 for REL

For the BGA Mode: i=0 for no REL; i=1 for 1 Point REL; i=2 for 2 Point REL; i=3 for Multipoint Point REL

RELV(?){r}[u]   Set REL Value (existing command)

Set (query) the REL value {to r}. If omitted, units default to the global ratio units.

If the unit is in GPA Mode, the GPA REL value is set. If the unit is in BGA Mode, the 1 Point REL value is set. If the unit is in Physical Measurement Mode, an Error 11 (Illegal Mode) will be generated.

RELH   REL to 100% (existing command)

Set the REL value so the measured value reads 100%.

If the unit is in BGA Mode, the 1 Point REL value is set. If the unit is in GPA or Physical Measurement Mode, an Error 11 (Illegal Mode) will be generated.

RELZ   REL to 0% (existing command)

Set the REL value so the measured value reads 0%.

If the unit is in GPA Mode, the GPA REL value is set. If the unit is in BGA Mode, the 1 Point REL value is set. If the unit is in Physical Measurement Mode, an Error 11 (Illegal Mode) will be generated.

New Commands

These are new commands for the two new REL modes.

Note for Multipoint Table Commands: The table is re-sorted each time an entry is added, edited or deleted.

RTW1(?) {r1, r2} [u]   2 Point REL Point 1 values

Set (query) the Point 1 Raw/REL value pair {to r1, r2}. If omitted, units default to global ratio units.

RTW2(?) {r1, r2} [u]   2 Point REL Point 2 values

Set (query) the Point 1 Raw/REL value pair {to r1, r2}. If omitted, units default to global ratio units.

RTBC   Clear multipoint table

Clears the entire Multipoint REL Table.

RTBA r1, r2 [u]   Add Multipoint REL entry

Add a new Raw/REL value pair r1, r2 to the Multipoint Table. If omitted, units default to global ratio units.

RTBN?   Query the number of entries in the Multipoint Table

Returns the number of Raw/REL values pairs in the Multipoint REL table.

RTBR? i [u]   Query Multipoint Table entry

Returns r1, r2 for the ith Raw/REL value pair. If omitted, units default to global ratio units. $0 \le i \le$ (max table entry)

RTBE i, r1, r2 [u]   Edit Multipoint REL entry

Update the ith Raw/REL value pair in the Multipoint Table to r1, r2. If omitted, units default to global ratio units. $0 \le i \le$ (max table entry)

RTBD i   Delete Multipoint Table entry

Delete the ith entry in the Multipoint Table. $0 \le i \le$ (max table entry)