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Service Note

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CALCULATING PMT MV ON M200A ANALYZERS

Scope:

When TPC is ON, a different formula for calculating PMT mV must be used when performing the Factory Cal (Quick Cal) on the M200A. This formula will compensate for differences in the Rcell pressure and Sample pressure when calculating PMT mV. This allows the user to achieve slopes of 1.0 +-.1 as per the Factory Cal procedure when TPC is enabled.

Background:

In the M200A manual, the formula for calculation of PMT mV is given as 2 mV * PPB = PMT mV when the range is 5-2000 PPB. It is .2 mV * PPB = PMT mV when the range is 2001-20000 PPB. This will achieve slopes of 1.0 +-.1 only when TPC is off, or when TPC is on and Rcell pressure = 5.0 and Sample pressure = 30.0. If the analyzer is used at altitudes substantially higher than sea level, or as the pump ages and the Rcell pressure increases, this formula will not produce correct slopes in an analyzer with TPC enabled.

Tools:

Phillips head screwdriver.
Potentiometer adjustment tool.

Procedure:

1. Press SETUP-MORE-VARS-ENTR-EDIT. Verify TPC is "on". If you are operating the analyzer with TPC off, disregard this procedure.

NOTE: TURNING OFF TPC MAY INVALIDATE DATA! API DOES NOT RECOMMEND TURNING TPC OFF. PLEASE CONSULT YOUR LOCAL AUTHORITIES PRIOR TO OPERATING THE ANALYZER WITH TPC OFF!

A. Scroll through the test features by pressing the TST button on the front panel until you find the NO_X SLOPE. Verify the value is 1.0 +-.1.
B. Repeat step 2A for the NO SLOPE.

C. If both slopes are within spec. you will not need to recal the analyzer at this time. Proceed directly to step 7.

3. Calculate the correct PMT mV for your analyzer using the following formulae:
   A. If sample pressure is 29.9 +- 1 In-Hg-A, use one of the two following formulae:
      1. For ranges of 5-2000 PPB, the formula is:
         5/Rcell press * 2 * span gas conc = PMT mV.
      2. For ranges of 2001 - 20000 PPB, the formula is:
         5/Rcell press * .2 * span gas conc - PMT mV.
   B. If sample pressure is outside the range of 29.9 +- 1 In-Hg-A, use one of the two following formulae:
      1. For ranges of 5-2000 PPB the formula is:
         Sample Press - Rcell Press / 25 * 2 * conc = PMT mV.
      2. For ranges of 2001 - 20000 PPB the formula is:
         Sample Press - Rcell Press / 25 * 2 * conc = PMT mV.
4. Perform the Factory Calibration (Quick Cal) procedure listed in section 9 of the M200A user manual, substituting the PMT mV value you calculated in step 2 above for the value calculated in the procedure.
5. After completing the Factory Calibration, verify that slopes are 1.0 +-.1 for the NOx and NO channels.
6. If the slope values are outside the 1.0 +-.1 range, contact API customer service for assistance.
7. Turn to the Factory Cal procedure in your user manual (Quick Cal in the training manual).
8. Find the formula for calculating the PMT mV and add the correct formulae for TPC from this procedure. When calibrating in the future, always use the correct formula.
9. Contact API customer if you have questions.