TOTALFLOW
Technical Bulletin 123

BTU8000/8100 Noisy baseline caused by defective or damaged detector beads

Totalflow Technical Bulletin

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Purpose
To describe a potential noise issue with the Model BTU8000 or BTU8100 Gas Chromatograph. This issue has been identified on a small percentage of customer chromatographs.

Description
ABB has identified a small number of GC modules (ABB part# 2013902-002 (non-EFR) or 2100622-002 (EFR)) with defective or damaged detector beads. This issue can show up as a noisy baseline and unknown peaks. Fig. 1 and table 1 below show a typical chromatogram and peak table. The described noise can have the following symptoms:

- Noisy baseline usually found on one half of chromatogram is an indication that one bead is noisy (Fig. 2)
- Noisy baseline sometimes seen on both halves of chromatogram (Fig. 3) but is prevalent on one half.
- A peak table with 13 reported peaks. Thirteen is the maximum number of peaks that can be displayed in a Peak Table report (See Table 2). Noise from a detector bead is causing the peak table to be filled up before the end of cycle. Notice in table #2 the last peak has a Peak Time of 89.05 seconds. Also, notice the peak area of most of the peaks is small.
- An overrun peak table can cause task start failure fault alarms. If left long enough, the memory can be come corrupted. Cold boot will fix the corruption once detector bead problem is fixed.
- Lower voltage levels (12-13 Vdc) can exaggerate problem of poor performing beads
- Beads may worsen over time

To determine if this problem is occurring in your particular chromatograph follow these steps:

1. Compare your collected chromatogram with the one below in Fig. 2 and Fig. 3
2. Compare noise floor and determine if the noise appears to be coming exclusively or predominantly from one detector and not the other (Fig. 2 or Fig. 3)
3. Compare the resistance of bead pairs. This should be done as close as possible to the GC module operating temperature. Make sure you power down the unit before attempting to disassemble and measure the bead resistance. The resistance of each bead at operating temperature should be approximately 9.3kohms but may range from 9.0-10kohms. Pairs of beads (Reference and Detect) should measure within a few hundred ohms of each other. Section 4 in the BTU transmitter manual is included below. In Step 3 below a female 9 pin D connector with solder cup connections on the back will help in making these measurements.

Caution

Removing the GC Module cover will void the warranty for this item. The recommended path for repair is to have the GC module factory serviced.

The following procedures test Detector Bridge components using a volt-ohm-meter. Each type of test is provided in the following sections. Inputs to GC Module originate on Analog Controller Board connector J12 and terminate on Detector Bridge connection J1.

Resistance Measurement

It is not necessary to remove GC Module from its Upper Platform mounting position.

Step	Procedure
1.	To test thermistor beads, first turn Btu/CV Transmitter power OFF.
2.	Disconnect cable connection at Analog Controller Board connector J12. When making the following resistance measurements, refer to Figure 4-1 for connector pin orientation.
3.	Measures resistance of each thermistor bead by connecting ohmmeter leads across connector J12 pin connections. The following readings are taken on Analog Controller Board P2 (GC Module Temperature @ 140°F). DET 1 Pins 4 & 8 ≈9.3K Ohms REF 1 Pins 5 & 9 ≈9.3 K Ohms DET 2 Pins 1 & 6 ≈9.3K Ohms REF 2 Pins 2 & 3 ≈9.3K Ohms Thermistor bead resistance is dependent on carrier gas flow and temperature of gas chromatograph oven. With gas chromatograph oven at 140°F (60°C), nominal resistance of thermistor beads is 9.3 K ohms.
4.	If measured thermistor bead resistance is zero or infinite, bead is defective and GC module must be replaced.
5.	Measure resistance to ground for all P2 pins. Ohmmeter should measure infinite resistance. If zero resistance is measured, the lead is defective. A short circuit is the probable cause. Correct the fault.

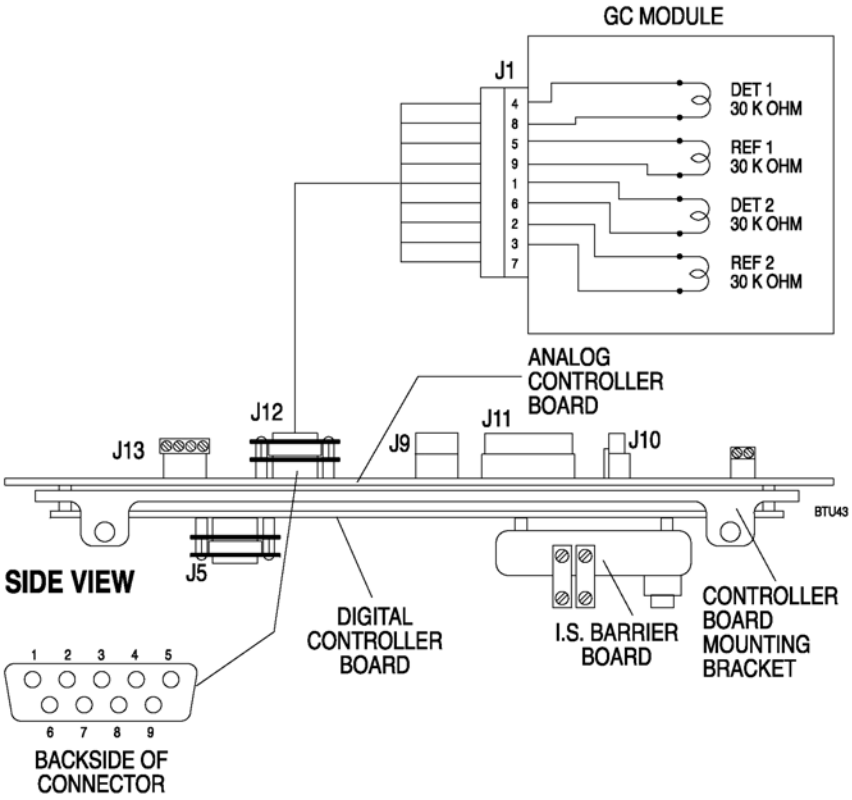

Figure 4-1. GC Module Detector Bridge

Workaround

In some cases a GC module with marginal detector beads can still be used.

- Increase supply voltage if possible to 15-16.5Vdc. (as measured at the input terminals on the GC) then run a single cycle on calibration gas and check the base line for noise again.

Conclusion

To help ensure most efficient handling of any such situation, please refer to this bulletin (number 123) when asking for assistance from our technical staff.

ABB will upgrade any GC module or replace the detector beads on any module experiencing the noise as described above. The customer will be required to ship ABB the GC Module assembly Part # 2013902-002 (non-EFR) or 2100622-002 (EFR) for the upgrade. If a refurbished GC module is available ABB may provide this as an exchange. Please call our technical service staff at (800) 442-3097 option 1,2 or Order Entry (800) 442-3097 option 1,1 for upgrade information.

Fig. 1 Typical Chromatogram

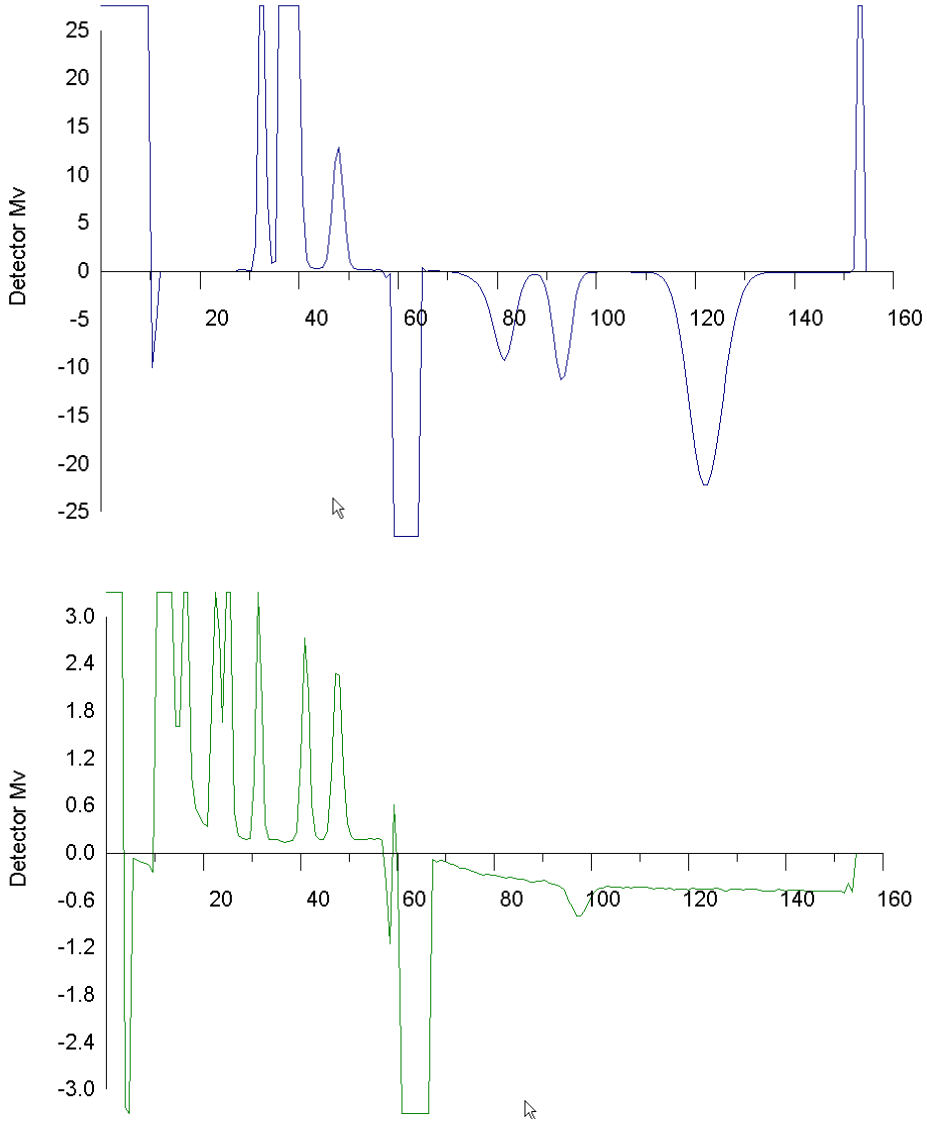

Table 1 Typical Peak Table

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Peak	F Time	F Height	P Time	P Height	B Time	B Height	P Area
1	30.50	87	32.55	4097	35.05	190	1120764
2	35.05	190	36.35	74310	42.50	283	34604912
3	44.75	253	47.90	1101	51.35	213	556532
4	72.40	-197	81.75	-7798	87.90	-266	852301
5	88.20	-259	93.55	-9547	99.25	-129	784747
6	111.3	-134	122.7	-1876	134.0	-269	3147423

<< Detector >> Detector 1 - Lights << Peak >> Previous Peak Close Help

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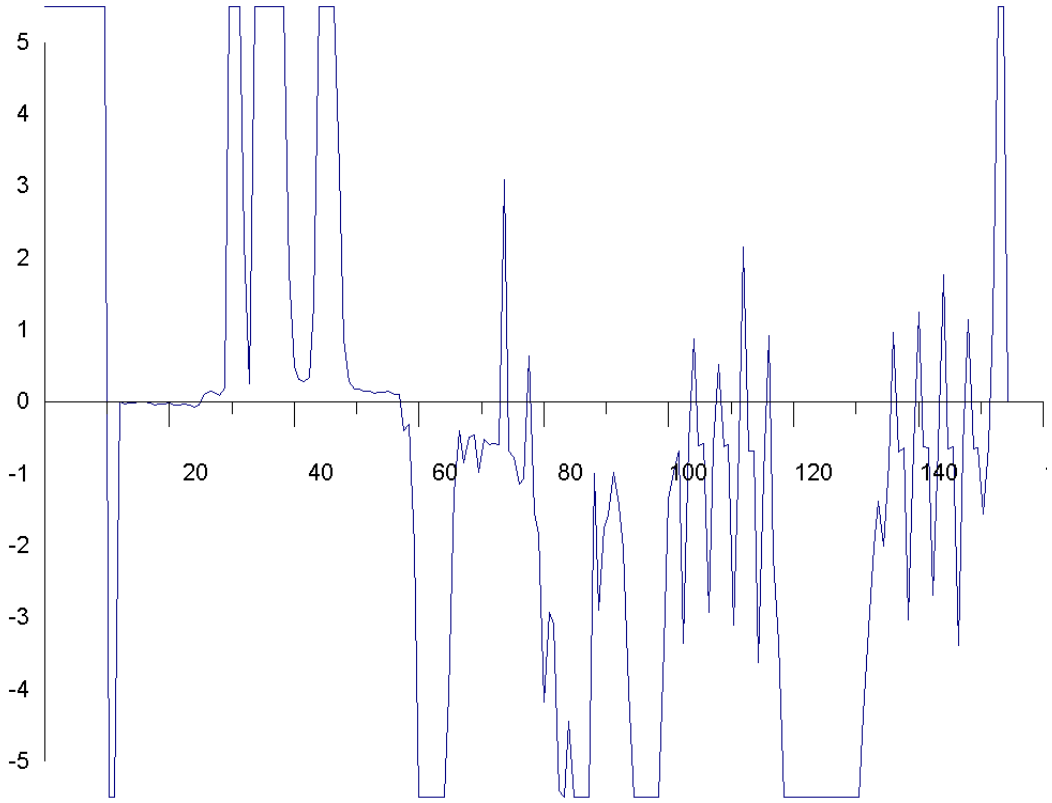
Peak	F Time	F Height	P Time	P Height	B Time	B Height	P Area
1	9.75	-231	10.70	10848	12.10	10067	18906855
2	15.10	1024	16.05	4064	19.00	402	623663
3	20.95	281	22.45	1110	23.75	754	209285
4	23.80	754	24.95	9933	27.15	205	205589
5	29.55	146	31.40	2924	33.65	145	79226
6	38.70	122	41.05	2347	43.30	171	80091
7	44.10	116	47.65	2100	50.05	200	80648
8	85.00	-284	97.70	-689	110.0	-379	38355

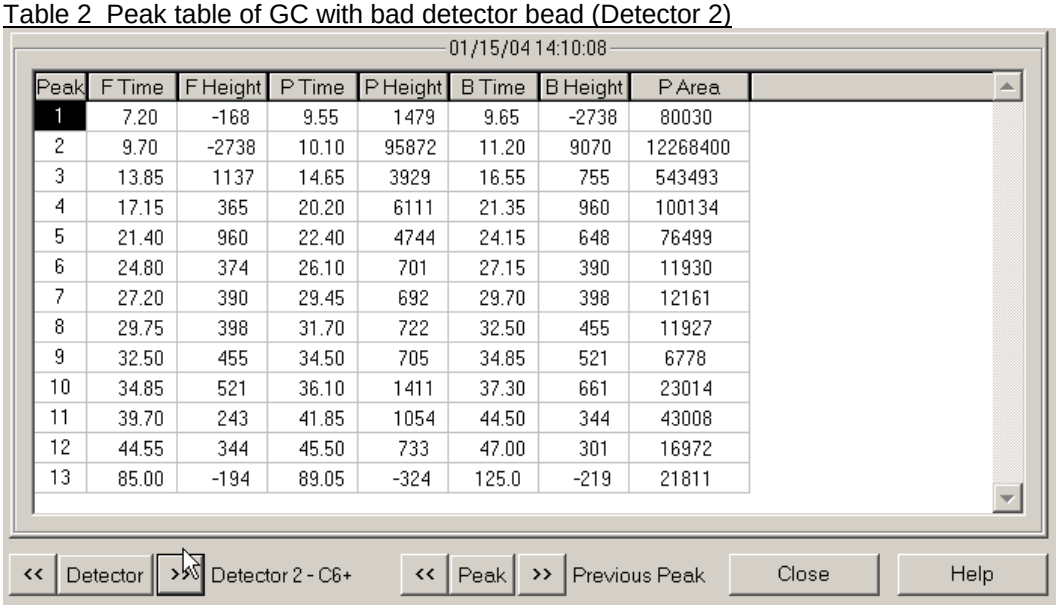
<< Detector >> Detector 2 - C6+ << Peak >> Previous Peak Close Help

Fig. 2 Chromatogram of bad bead on Det 1



The chromatogram above is an example of a GC module that has one bad detector bead on the lights side (Detector1).

Table 2 Peak table of GC with bad detector bead (Detector 2)



The peak table above is an example of a GC module that has bad detector beads on Detector 2. In this case the entire peak table has filled up (13 peaks) with some noise and some real peaks and may not have enough room to hold the peaks that we are interested in.