



03-010C
10 Feb, 2011

MAXIMIZING M300E ENERGY

I. PURPOSE:

This service note provides troubleshooting information for M300E analyzers when the detector signal strength is too low.

II. TOOLS:

2 Channel Oscilloscopes
#2 Phillips Head Screwdriver
Pot Tweaker

III. PARTS:

N/A

IV. PROCEDURE:

MAXIMIZING M300E ENERGY – The mirrors used in the optical system of the M300E are designed to have their alignment set permanently during the manufacturing process and no adjustment is normally needed. If the optical system is disassembled or if failure of any of the optical components is suspected, the instrument can be checked for proper optical alignment as follows:

1. Connect a source of zero air to the analyzer.
2. Allow the analyzer to warm up for 60 minutes.
3. Confirm the Optical System energy throughput by:
 - a. Press the TST buttons on the front panel until the COMEAS value is displayed.
 - b. Increase the gain of the Synch-Demod circuit by turning Pot VR1 on the Synch-Demod board (located under the metal cover on top of the bench).
 - c. If a COMEAS of 5000mV can be obtained, then energy throughput is acceptable. Adjust VR1 as needed to produce a COMEAS signal of 4500mV \pm 300mV. Recalibrate the analyzer, and the task is finished.
4. Verify that D1 and D2 of the Synch-Demod board are flickering. D1 should be flickering much more slowly than D2. If either of them are not flickering, then the wheel may not be turning, the wheel may be dirty, or the sensor board may not be working. Contact the factory.
5. Connect an O'scope to TP4 and TP2 of the Opto-Schmidt Trigger Board. This board is located on the front end of the bench. The test points are not plastic. They are folded strips of metal. When using the scope, be sure to ground it. You can place the ground lead on the metal of the chassis or bench.
6. Verify that the signals are square waves with 50% duty cycles. These are the Wheel Position and Segment LED outputs (See Figure 1).
7. Synch the O'scope on TP5 of the Synch-Demod card. This is the M/R square wave.
8. Use the second channel to look at TP4 of the Synch-Demod card. This is the raw detector signal. Adjust the input/output mirrors for maximum signal at TP4. Pay attention to the shape of the wave. Sometimes a larger signal can be had, but at the cost of poor symmetry in the shape of the waveform. Try to get the largest signal you can achieve while

maintaining good symmetry. Also try increasing the signal even further by adjusting the position of the IR source. The CO detector signal must be > 0.3 V P-P. If you cannot achieve $> .3$ V P-P then the source is likely bad. Replace the source. Reference Figure 2. In order to better view the shape of the wave, it is recommended that you change the time base of the scope to look at only 1 or 2 cycles of the detector waveform (See Figure 3).

9. If you are able to get the signal strength above .3V P-P, then look at the COMEAS signal on the front panel and you should be able to adjust VR1 to get a COMEAS signal of 4500 ± 300 mV. If you cannot, contact the factory.

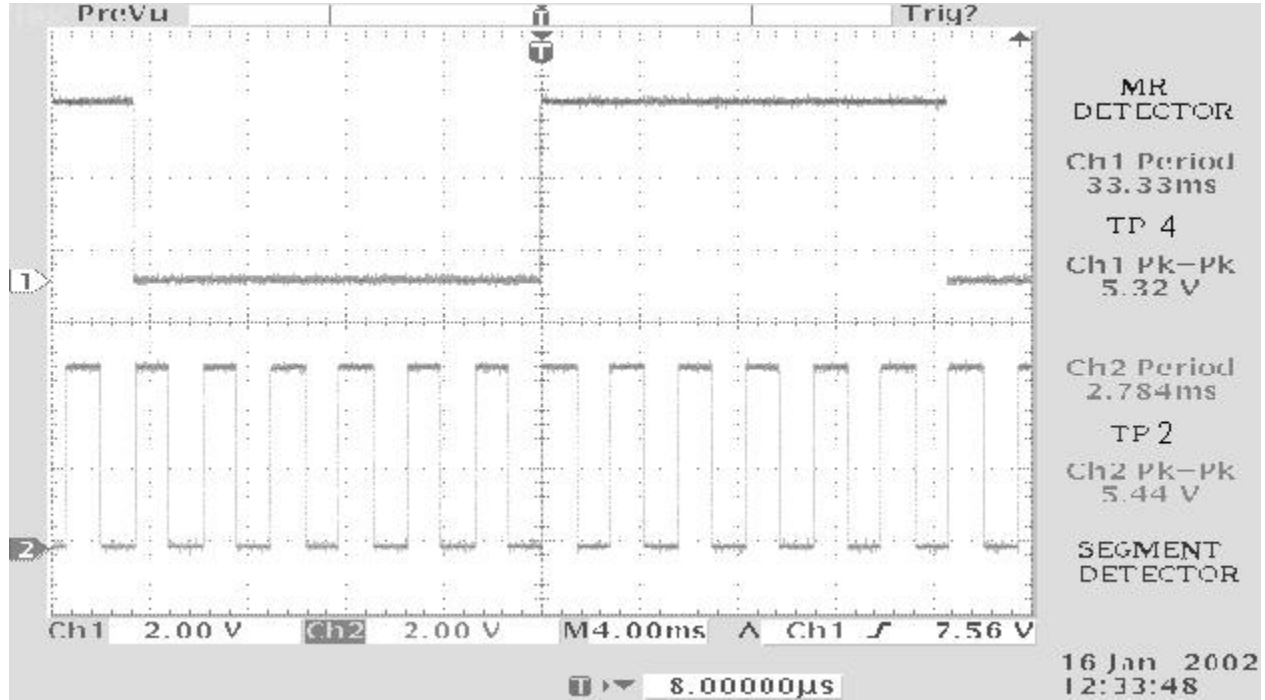


Figure 1.

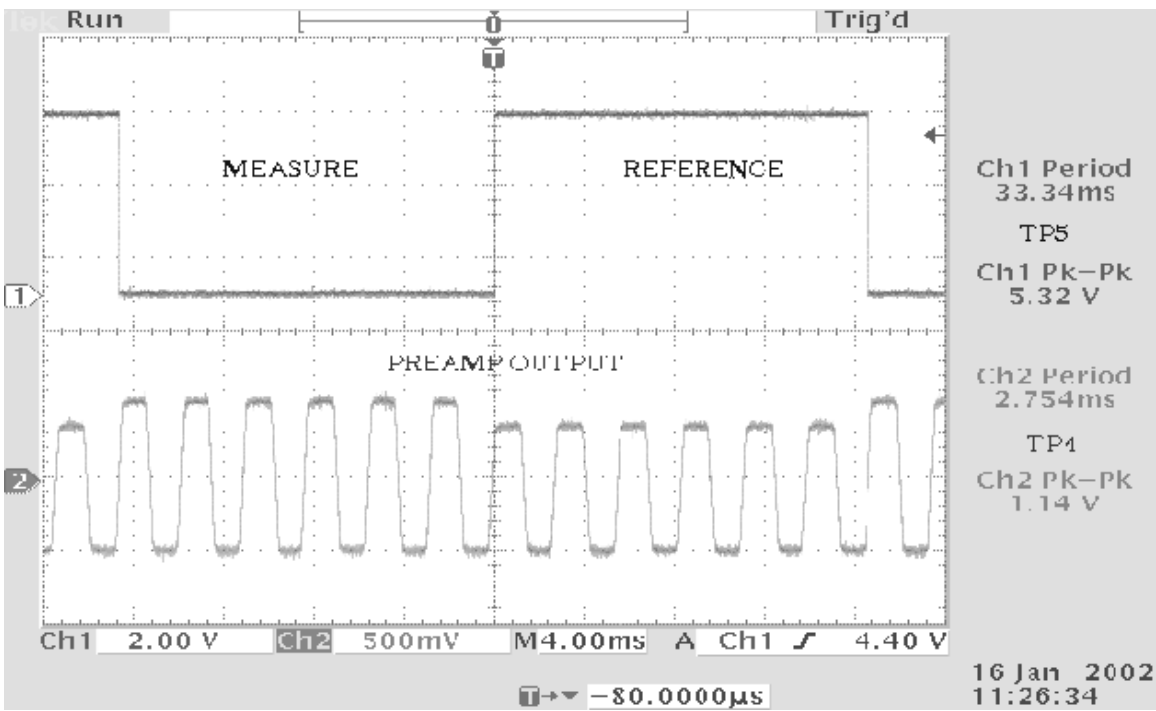


Figure 2.

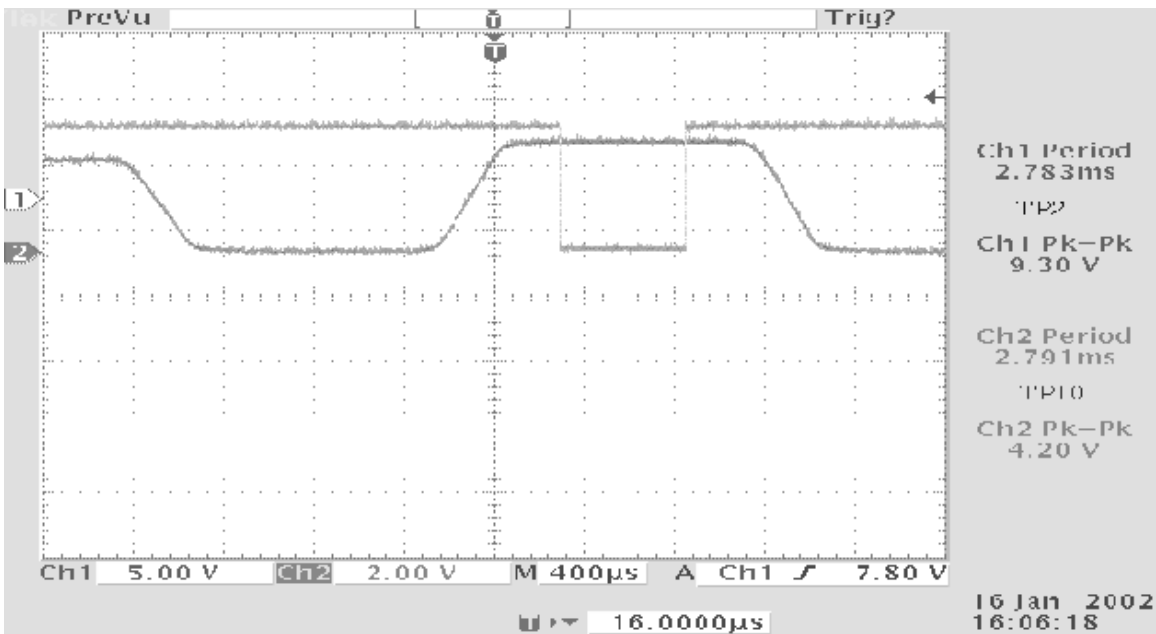


Figure 3.