

Investigation report for torque spike at Cell #1 in GM NVH Milford BLD#94

Feb 16th 2004

MEIDENSHA Dynamometer Div.

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1. Job# & Rating

Dynamometer :8Q5378/85LA

PCDY 220kw 5500/8000rpm 360v 730A 2p

Drives :8F5885A,8Q6851A (Manufactured year 2000)

VT310DY H4700 470kva 440v 730A 60Hz

2. Status

At the steady state speed control mode, unexpected torque spike on the Input Dynamometer occurred during the Dynamometer was running even as well as it occurred 0 rpm.

We were reported this issue from GM on middle of December and had an investigation on December 23 by Sasaki of MEIDEN America Inc.

We restarted on site investigation from February 5th to 16th.

3. Investigation

Spike Noise, on the torque current command signals of 16 bits and trigger for command reading, was coming through MTS controller and was cause of spike torque.

(Please refer to picture 1 and 2)

We considered the recorder data that was taken by Sasaki on December and it shown that torque current command had spike and torque current detection was followed it.

We assumed that the timer setting of the trigger, that we added this function at last trouble shooting on December 2002 at Cell #1, was inappropriate.

We attempted to adjust timer setting to double of original setting but it did not effect.

We checked trigger signal and certain bit signals at parallel connector in MEIDEN parallel - serial interface unit. Then it appeared spike noise simultaneously on all 16 bits and trigger signal.

(Please refer to picture 1)

We disconnected parallel connector at the MEIDEN box then noise did not appear on signals.

4. Cause

As showing picture 1, deep spike noise on the trigger and all bits allowed to create unexpected current command so that MEIDEN box grabbed bit status when the trigger was low level to high level.

For the torque current command, noise did not interfere frequently so that it was narrow width, random frequency and amplitude.

5. Countermeasure

To eliminate noise, we put capacitors (0.01micro F) on 16 bits in MEIDEN Box.

(Please refer to drawing 1)

MEIDEN asked GM to change trigger timer from 10micro sec to 50 micro sec so that time constant of bit signal from L to H became longer.

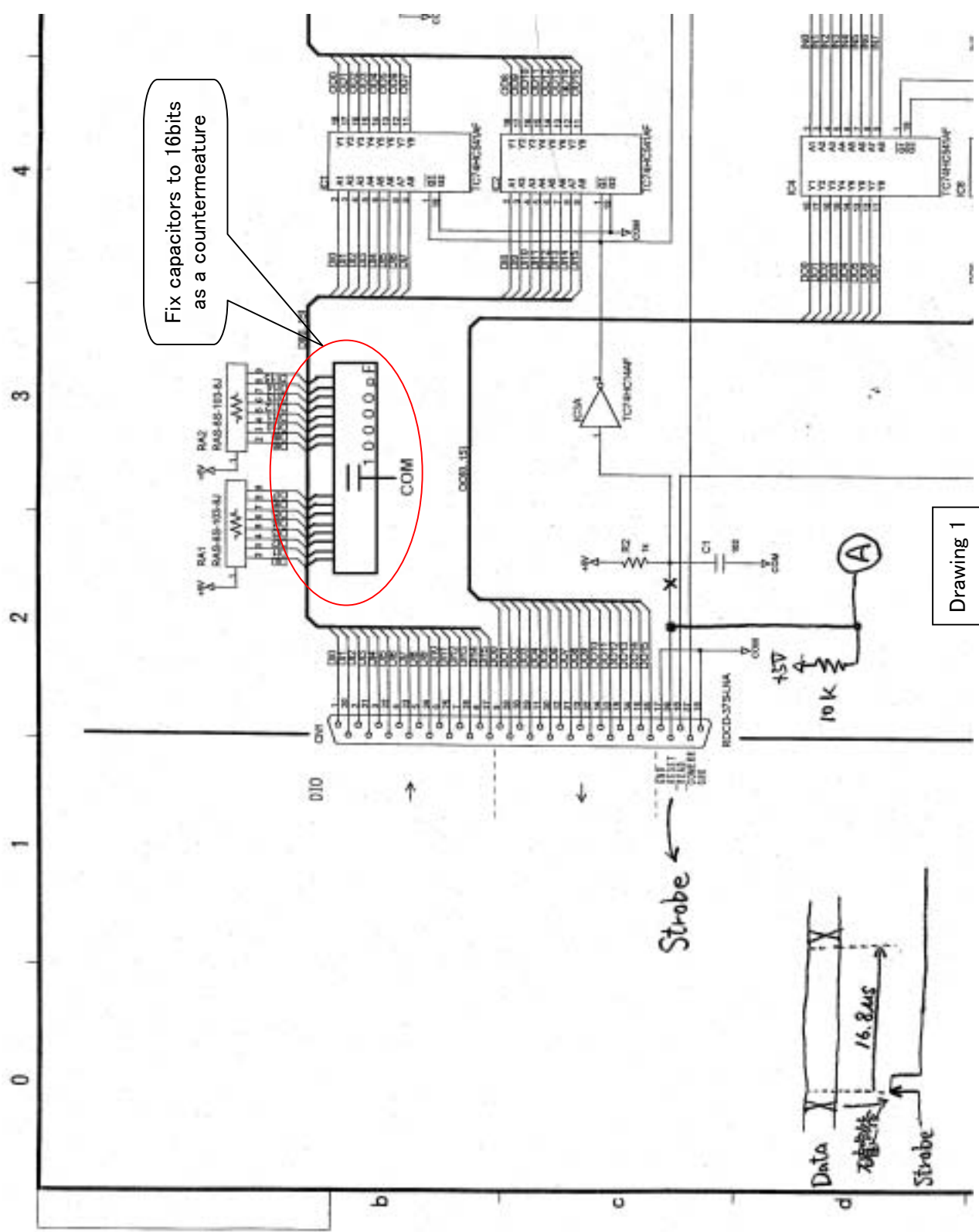
6. Confirmation

After putting on capacitors, we confirmed signal status that noise was eliminated to all 16 bits for both Cell#1 and #3.

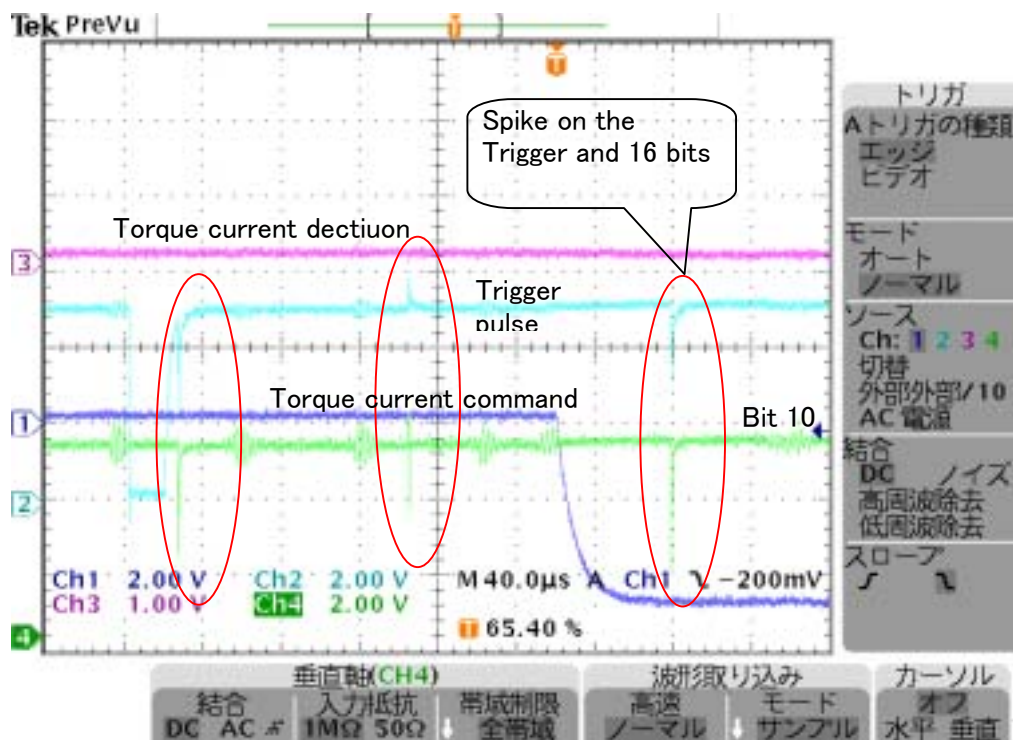
(Please refer to picture 3)

We confirmed that the Input Dynamometer could run correctly for both Cells.

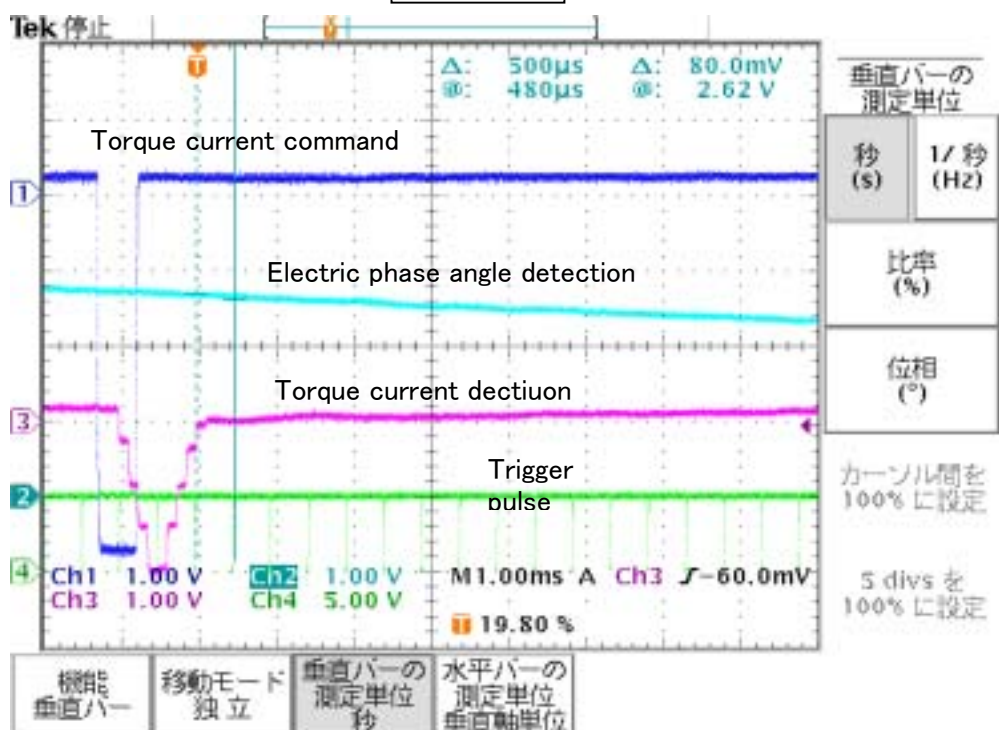
We confirmed that unexpected torque spike did not occur.



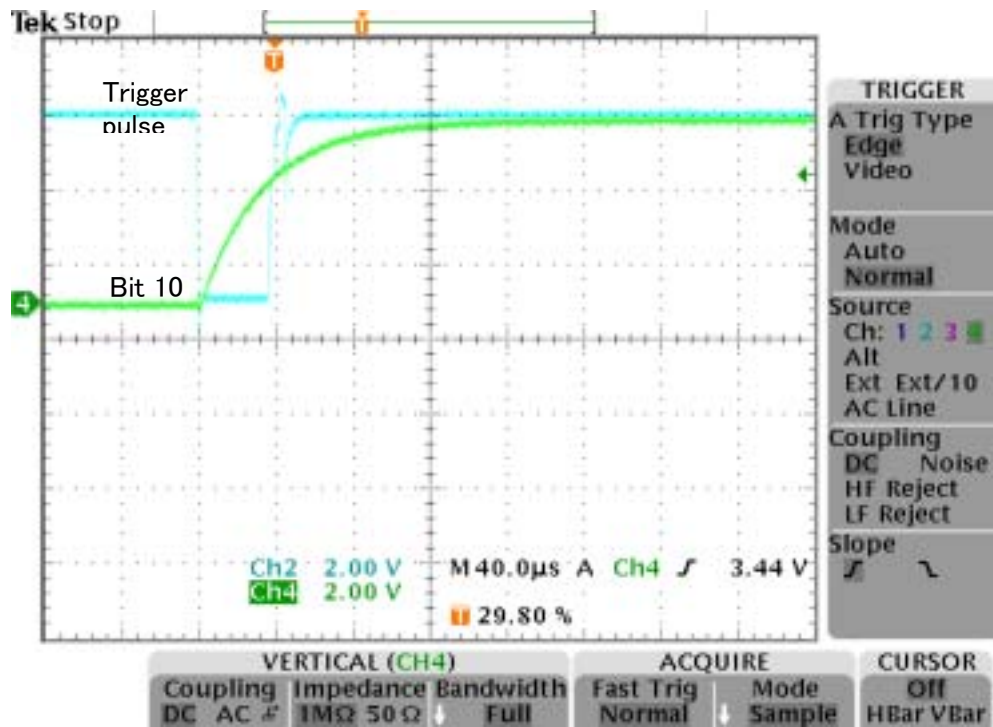
Drawing 1



Picture 1



Picture 2



Picture 3