

Technical Advisory Bulletin (TAB)

Bulletin #: TBMELCO22A

December 19, 2017

Product: EMT16 PLUS, BRAVO II

Implementation: ☐ Urgent ☐ Mandatory ☒ As Required ☐ Info Only

Reference: EC3374

Subject: 34799 and 34800 Control Board Failures

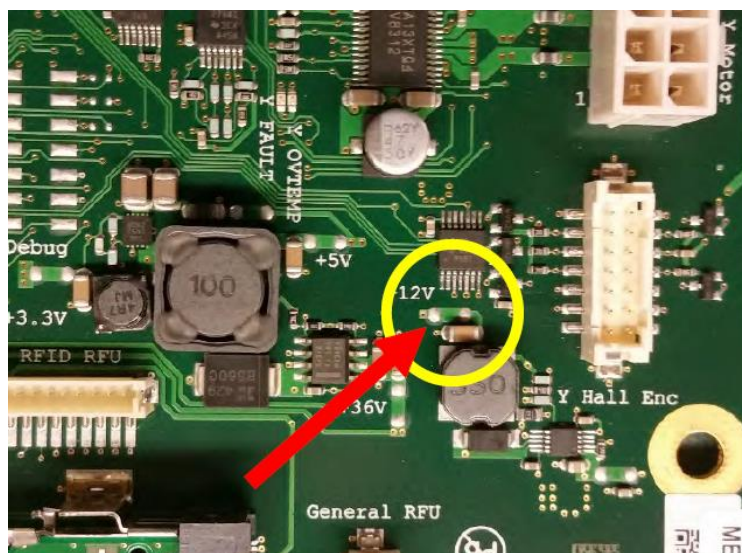
SITUATION:

We have been experiencing Control Board, P/N 34799 and 34800, failures for some time now with symptoms being that machines stop to move in x (left to right) or mainly y (front to back) direction. This can happen during machine operation, and also during the machine boot up process.

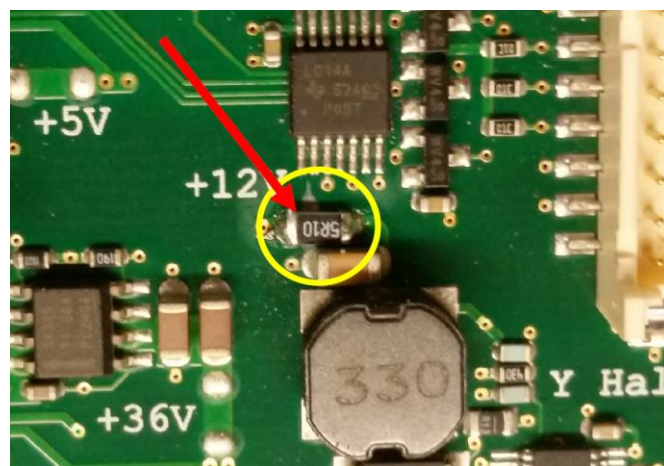
After considerable analysis the root cause is believed to be inrush current spikes that damage the motor driver chip, in most cases related to the y driver circuit.

SOLUTION:

For existing Control Boards on new EMT16 PLUS and BRAVO II machines, as well as refurbished Control Boards, a 5 Ohm resistor has been added to lower inrush currents, see example in pictures 1 and 2 below.



Pic. 1: Original PCBA



Pic. 2: Reworked PCBA with 5 Ohm Resistor

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Control Board rework (addition of the 5 Ohm resistor) started on September 6, 2017, and all spare boards and machines shipped after this date have this rework implemented. These PCBAs are marked with a red dot as shown in image below.



Pic. 3: PCBA reworked by Melco – Addition of 5 Ohm Resistor

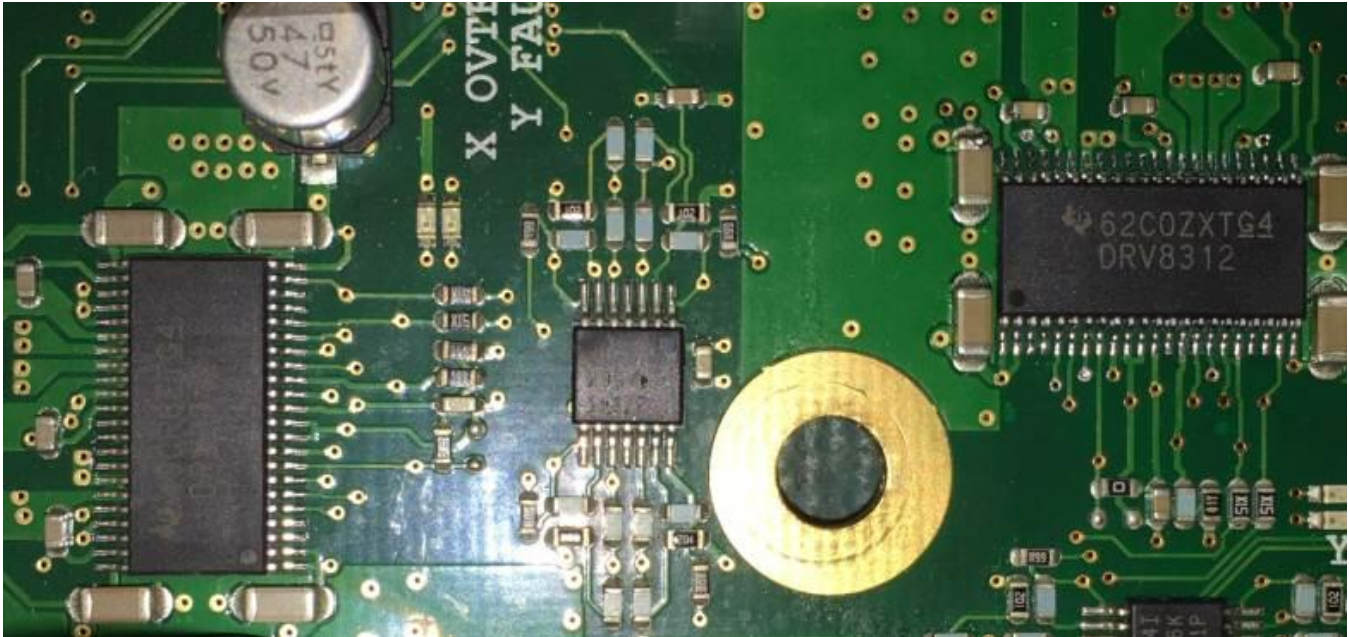
The Supplier started reworking brand new Control Boards on September 25, 2017, and new reworked Control Boards started to be assembled into machines with EMT16 PLUS SN 405632 and BRAVO SN 340361728. These boards are marked with an “R” label as shown in image below.



Pic. 4: PCBA reworked by PCBA supplier

Unfortunately we have seen some of the reworked boards fail with the same symptoms. It is believed that the reason for these repeated failures is the fact that the driver chip had been somewhat compromised prior to the resistor rework being applied to boards that had already been run in machines.

For this reason Melco started to replace the y-motor driver chip, in addition to adding the resistor, on all refurbished boards, starting on November 8, 2017. These boards are also marked with a red dot but can be distinguished by the somewhat irregular solder distribution around the y-motor chip pins, see picture below. Due to the quality of the rework, and therefore the fact that it is hard to tell whether the motor driver chip had been replaced, in case one of these second wave reworked boards fails in the field, the board in question needs to be sent back to Melco for final determination/analysis.



Pic. 5: Original Driver Chip on the left and re-soldered new driver chip on the right

Boards that have a replaced y-motor driver chip and the added resistor, with ship dates from Melco starting on December 7, are marked with two (2) red dots.

In a further step Melco started to replace both the y-motor and x-motor driver chips, in addition to adding the 5 Ohm resistor, on refurbished boards with ship date starting on December 12. These boards are marked with three (3) red dots.

A circuit board design change has been implemented with the manufacturer of the bare PCB that will add four (4) 5 Ohm resistors each to both the x-motor and y-motor driver circuits. We expect these boards to go into production machines roughly by the beginning of February, 2018.

Melco Engineering continues to further analyze board failures and circuit design optimization. Additional changes might be implemented based on future findings.

RECOMMENDED ACTION:

Machines that fail with a symptom listed under "Situation" will need to get a replacement Control Board. It is recommended that, in case a replaced board fails again, to replace the board plus the related motor (x or y) at the same time.