



**Component testing at Mooney International, Kerrville, Texas on behalf of the NTSB
Reference WPR18FA210
Mooney M20J N56039 SN 24-1358**

The following components were received from Stephen Stein, NTSB IIC on or about November 28, 2018 for testing at Mooney International in Kerrville, Texas:

- Elevator trim servo, Model KS 179, P/N 065-0052-03
- Elevator electric trim switch, PN 200-2960-00
- Lower trim gear box assembly (with the trim jackscrew), PN 740085-011



Packing as received at Mooney



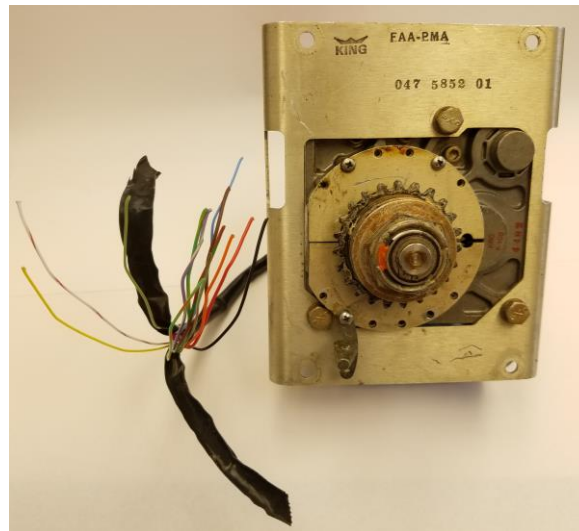
Components as received at Mooney



Mooney was given the go-ahead to commence testing on August 5, 2019. The unpacking and testing of the components was witnessed by Randall Kaser of the San Antonio FSDO.

Elevator Trim Servo

The wiring cable to the elevator trim servo had been cut during removal of the unit from the wreckage and Mooney does not have the resources to determine which of the 13 exposed wire threads are needed to properly test the functionality of the servo. Mooney suggest that the unit be sent to the manufacturer of the unit for proper testing.



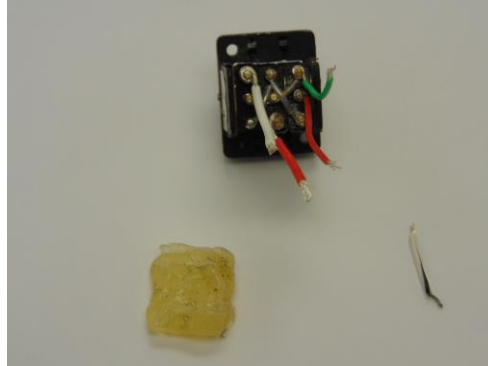
Elevator trim servo

Elevator Electric Trim Switch

After removing the potting on the back of the elevator electric trim switch, the wiring that was attached to it was checked against Mooney drawing 810202 and found to be correct. The white wire with black stripe broke free during continuity testing. Upon close examination, the end of the wire was securely soldered to the switch post but it appeared that only a portion of the wire strands had been intact prior to breaking while being moved for testing. The red wire with white stripe also came loose at the switch post while being moved for the testing. The switch is worn from use and no longer has the same sharp detents as a newer switch but was otherwise deemed to be functional as intended.



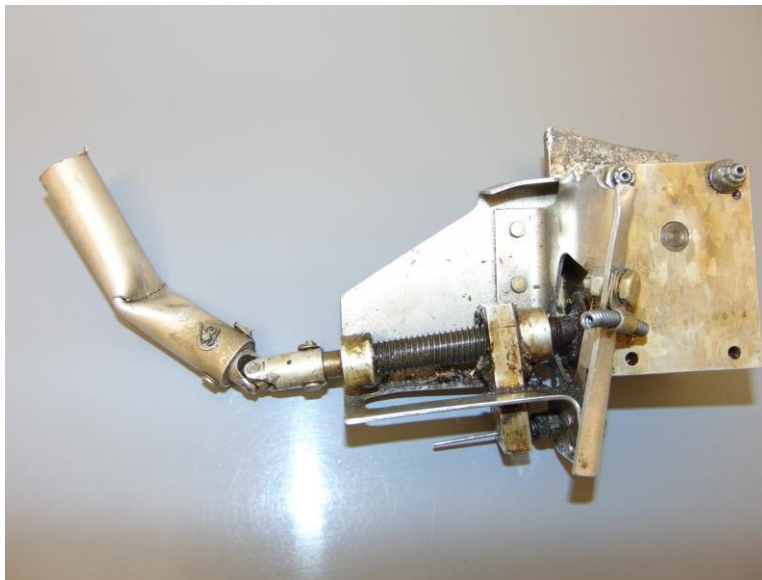
Elevator electric trim switch (front)
with removed potting and detached wire



Elevator electric trim switch (rear)

Lower trim gear box assembly

The component of the longitudinal pitch trim assembly that was received is from the lower portion of the Stabilizer Assembly, Trim Control 740085-011 (reference Figure 1 of the M20J Illustrated Parts Catalog section 27-40-00). The assembly was tested on August 22, 2019, again witnessed by Randall Kaser.



Lower portion of the stabilizer assembly, trim control

During the visual examination, it was noted that the two lower bolts on the gear box housing were missing as received. It was also noted that the rectangle traveling block was all the way up against the forward stop nut.



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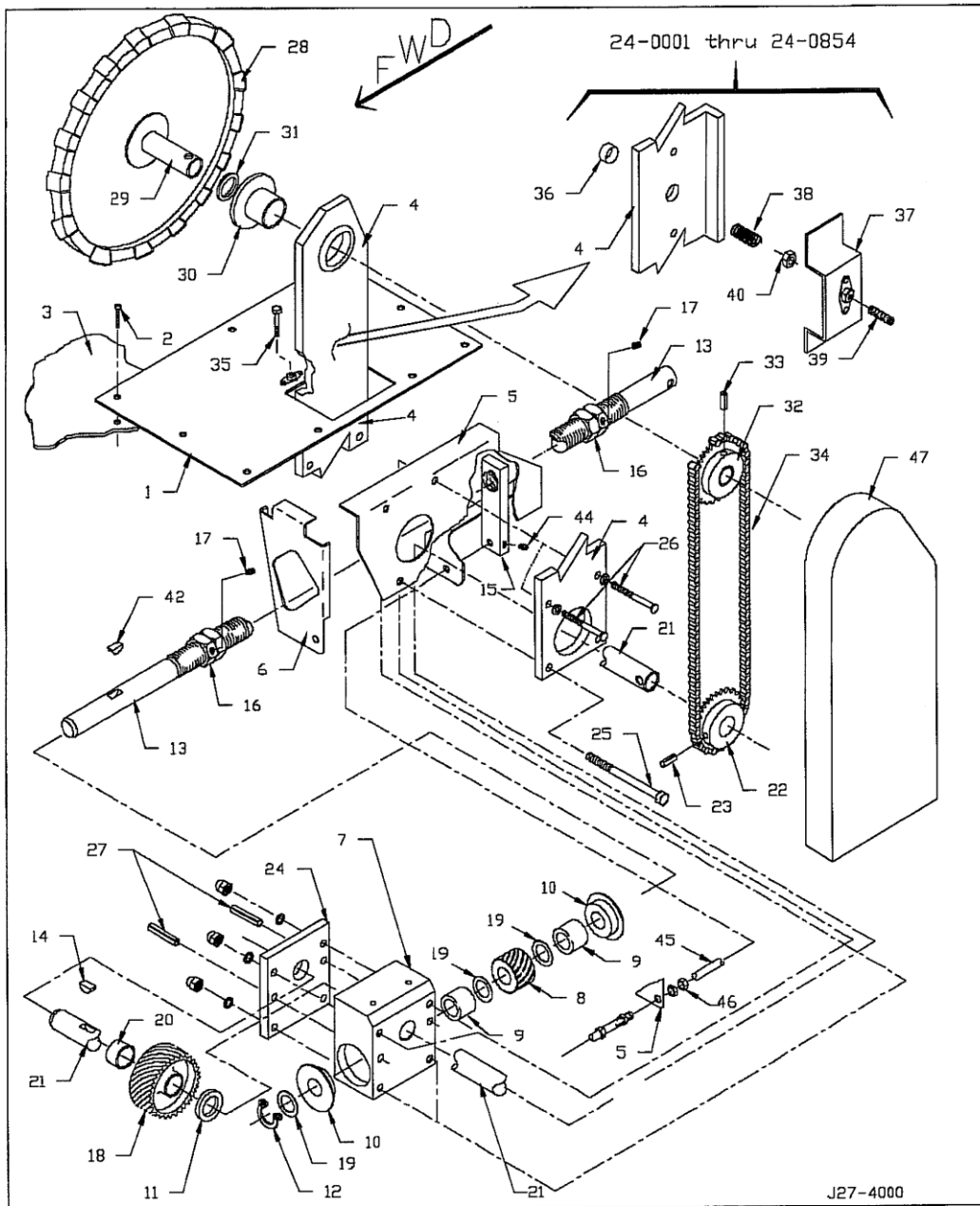


FIGURE - 1 STABILIZER TRIM CONTROL SYSTEM, FWD

Page 0
2003 **27-40-00**



The assembly was supported in a vice in order to measure the torque required to back the traveling block away from the stop nut but as one of the connecting pins at the universal joint and torque tube was being removed to accommodate a torque wrench for the test, the jack screw rotated freely backing the traveling block away from the stop nut. Further rotation the jack screw showed that the jack screw was bent inside the gear box housing consistent with damage that would be expected during crash impact. Due to the damage and partial disassembly of the unit as received, no other testing was done.




Lower portion of the stabilizer assembly, trim control mounted for testing



Universal joint and remaining piece of torque tube. The black dots were added as a reference of the alignment.



All testing that can be done at Mooney is completed and the components have been boxed up for shipment back to Stephen Stein, NTSB


Robert Collier, Jr.
Mooney ASI