Gust Lock Actuator

S/N 0075 Inspection

Meeting
ANSV_Embraer_Umbra
June 16th, Foligno

AGENDA

- Gust Lock Actuator (GLA) functionality vs. nature of damage;
- GLA S/N 0075: ATP reports;
- Transfer to EMA assembly plant;
- Check of pin to pin distance;
- Installation of the GLA into the test bench and execution of the operational tests (para. 6,3 and 6,4 of the ATP0807 rev. E);
- GLA disassembly and verification of components integrity;
- Inspection Report

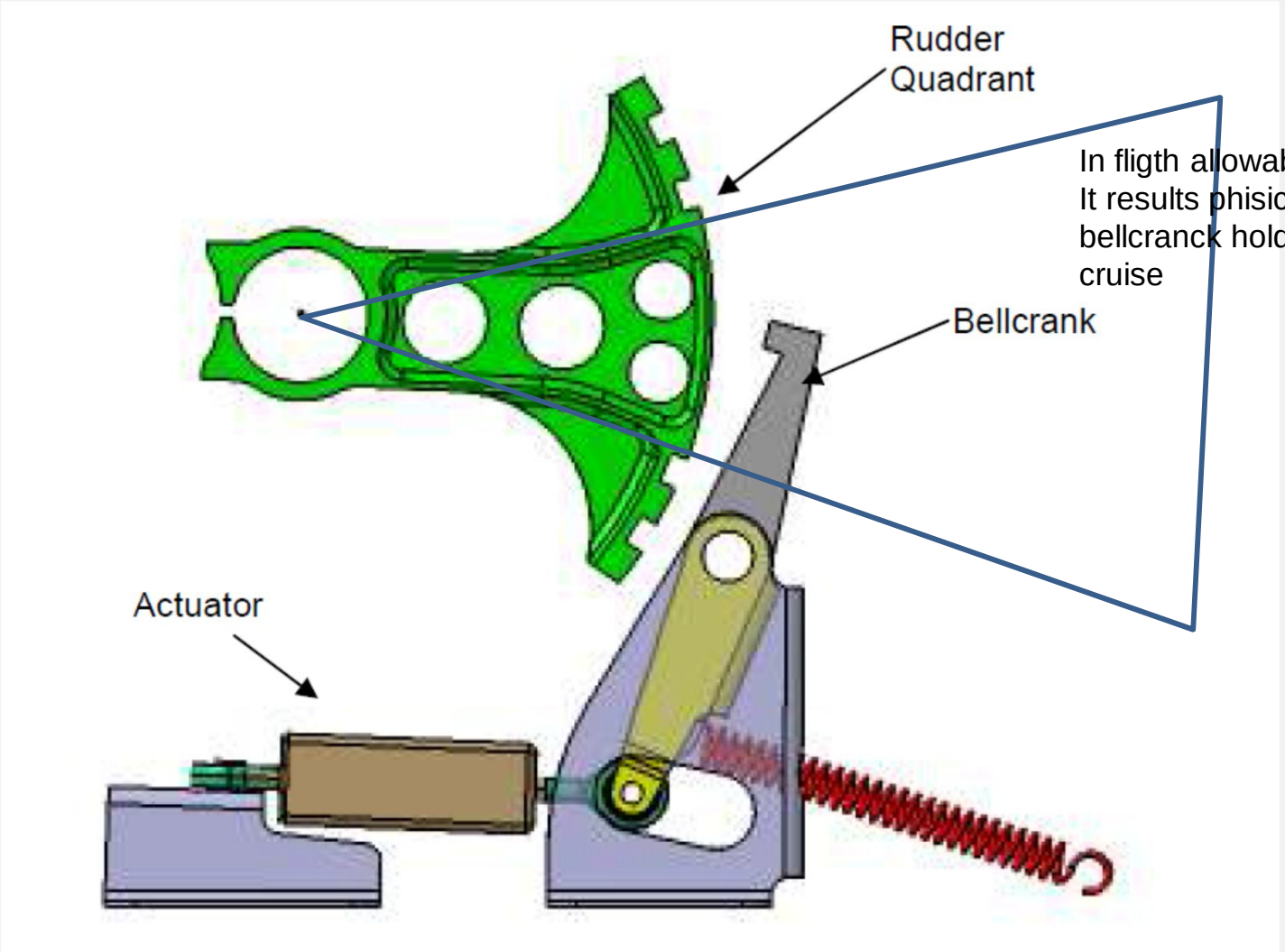
Gust Lock Actuator (GLA) functionality vs. nature of damage

- Nature of damage

i) Nature of the accident and the extent of damage to the aircraft so far as it is known:
Pilot reported an uncommanded, severe right yaw immediately after takeoff. Requested return to airport. On final approach had to use differential thrush to keep airplane aligned with runway. Subsequent to landing the airplane went off the side of ruwway. Minor damage only to left wing.

- GLA functionality
  - ✓ GLA does not operate the rudder but looks it into parking position when the A/C is on ground;
  - ✓ Parking position is outside the range allowed during the flight;
  - ✓ No safety requirements are specified for the GLA.

Gust Lock Actuator (GLA) functionality vs. nature of damage

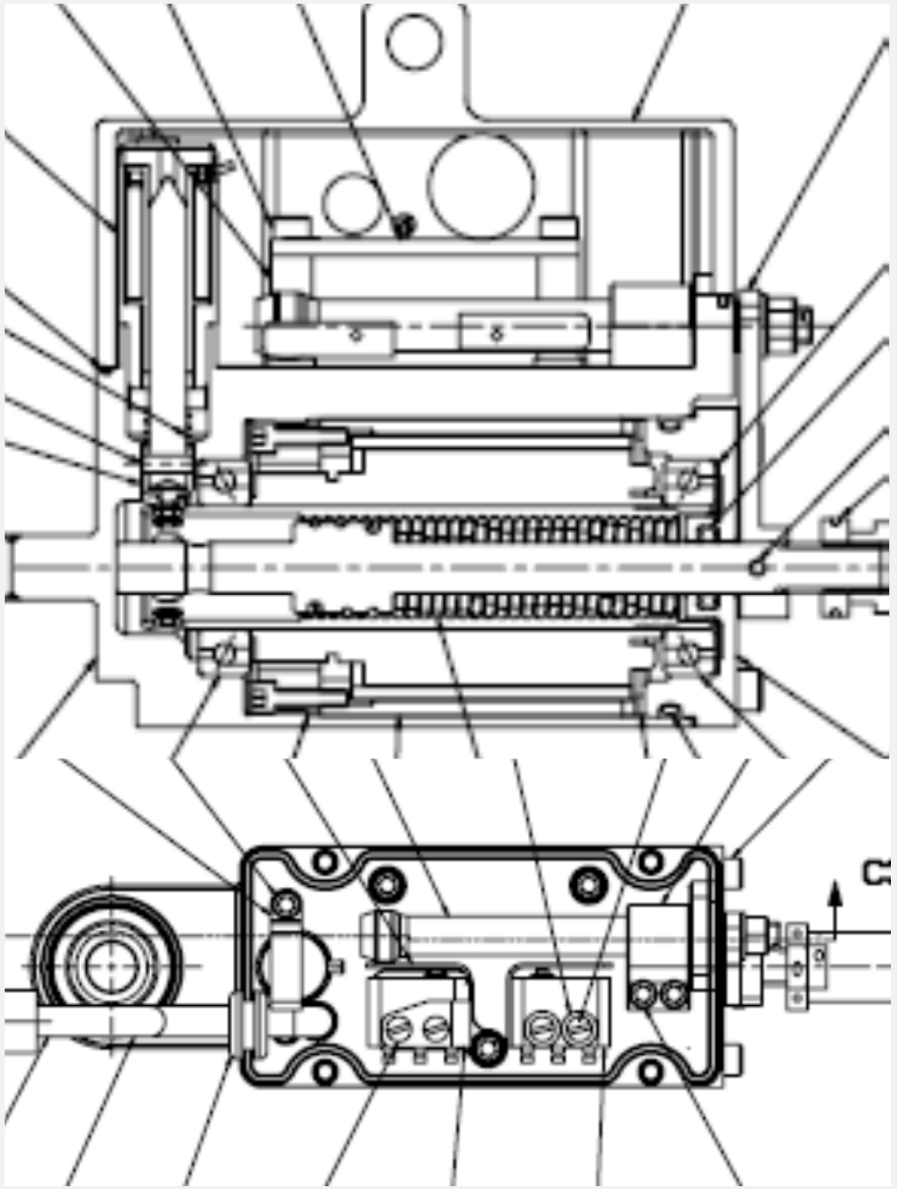


When the Rudder Gust Lock Actuator extends, the bellcrank touches the rudder quadrant with a spring load.

If the rudder moves (as a result of a ground gust, for example), the bellcrank engages into the detents on the rudder quadrant to hold the rudder on a fixed position.

Gust Lock Actuator (GLA) functionality vs. nature of damage

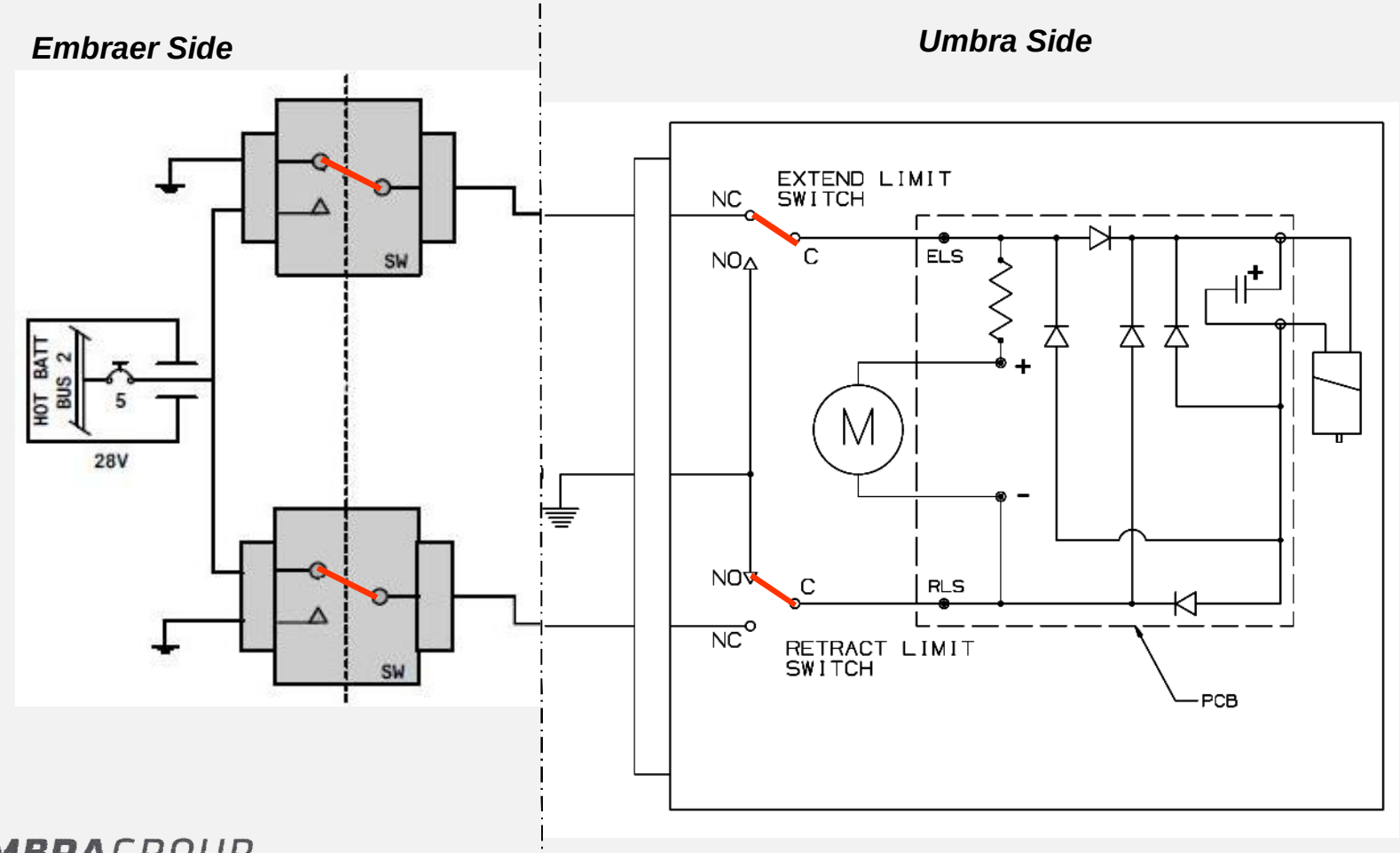
- The screw, direct driven by the motor, moves the rod end;
- The ballnut, and in turn the screw, is held in position through a pin actuated by the solenoid;
- The motor and solenoid are supplied at the same time; the microswitches cut the electric power when actuated at the stroke end.
- The cam which operates the microswitches is linked to the screw and provides the ballscrew antirotation as well.



Gust Lock Actuator (GLA) functionality vs. nature of damage

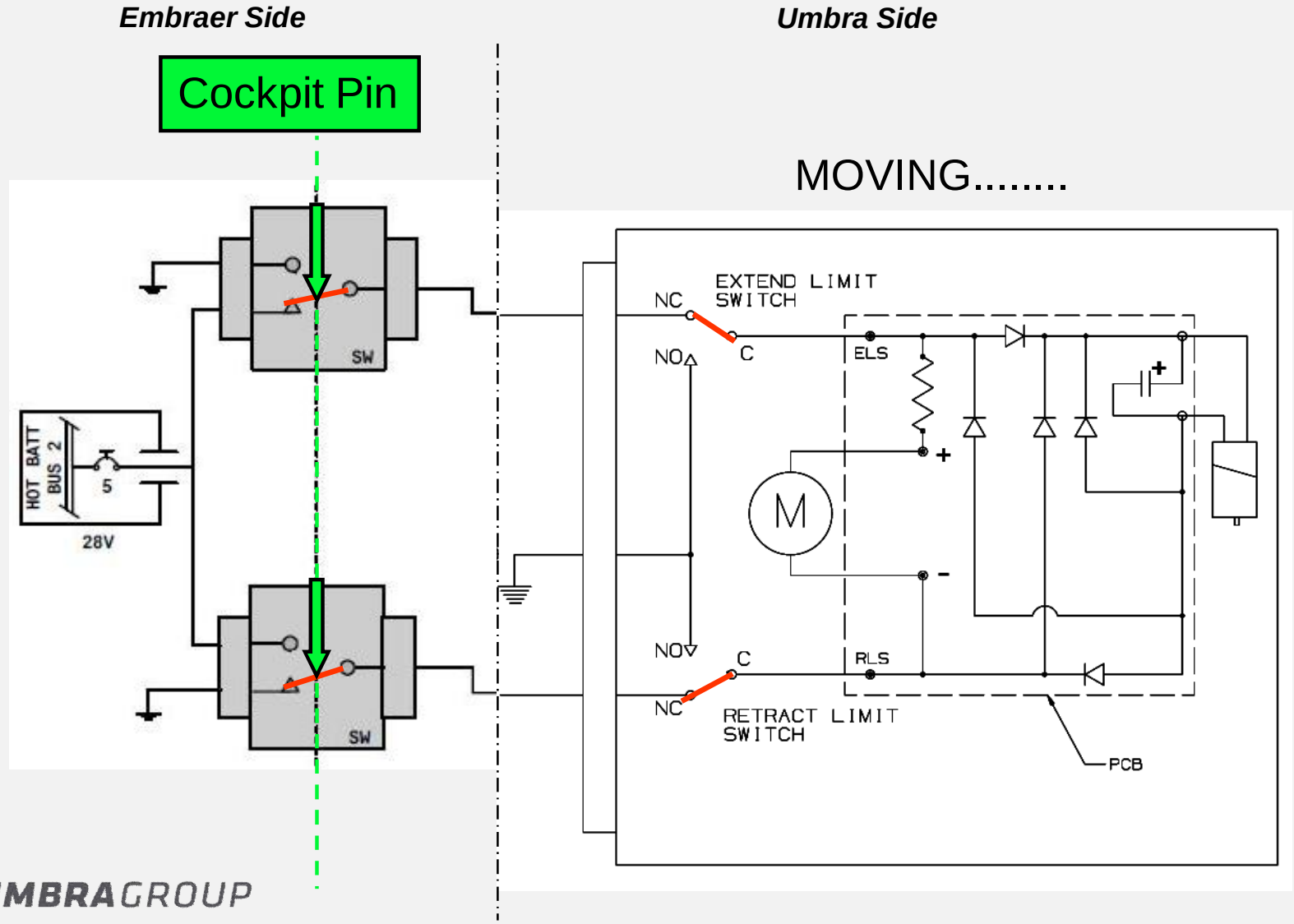
Initial condition:

- Actuator retracted (rudder free to move)
- GLA depowered



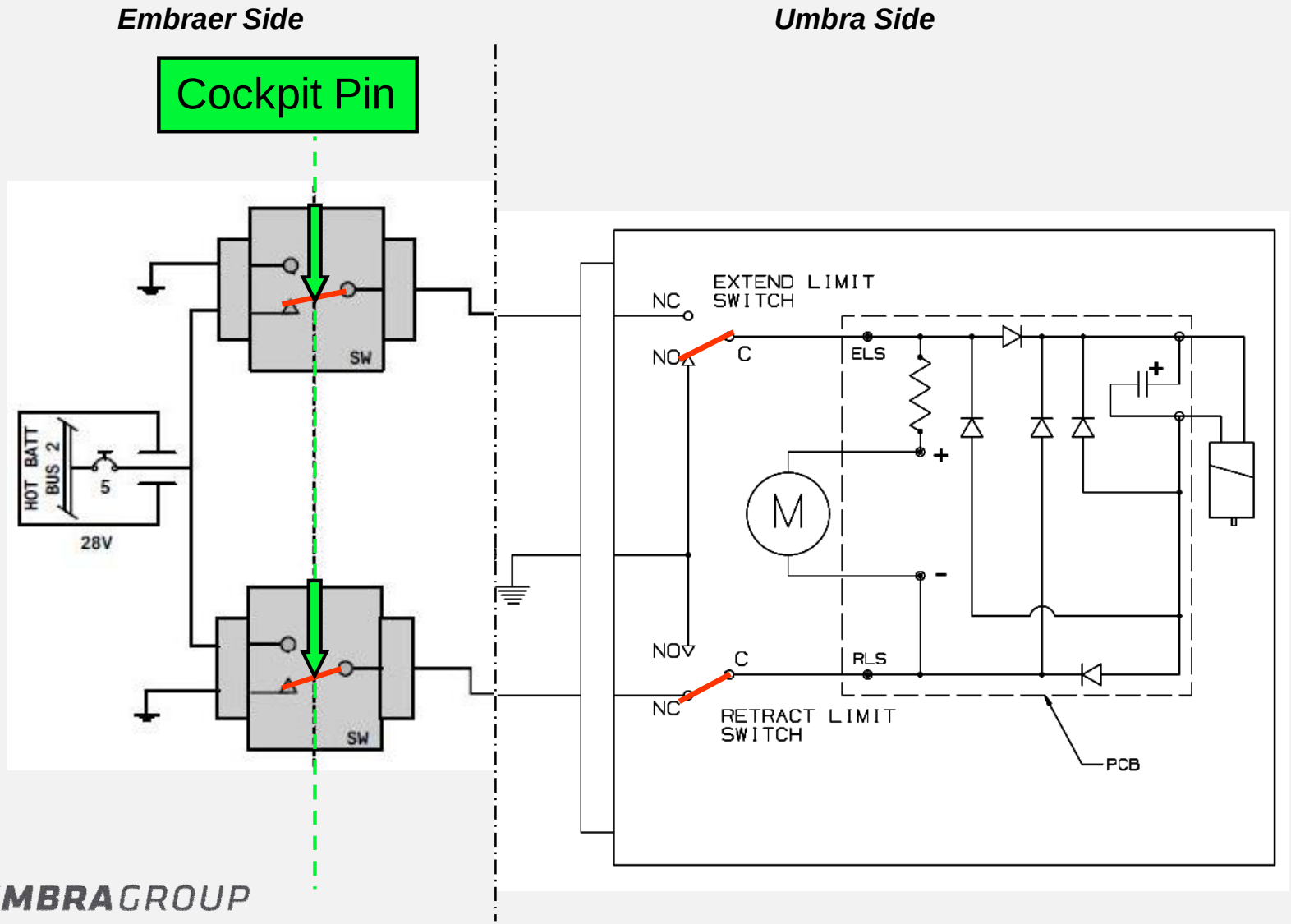
Gust Lock Actuator (GLA) functionality vs. nature of damage

Action: Pin insertion followed by actuator movement



Gust Lock Actuator (GLA) functionality vs. nature of damage

Final condition: Actuator rod extends, extend SW at “N.O.”, finish. OK!



GLA S/N 0075 ATP report - NEW

UMBRAGROUP	ACCEPTANCE TEST REPORT EMBRAER RUDDER GUST LOCK ACTUATOR	ATP0807 Rev. E 05/03/2010

Inspected by: HASOH. P

Date : 28/02/2011

UC CQ 66

Approved by : .....

Embraer Phenom Rudder Gust Lock Actuator

UMBRA P/N : 09762P000-03

S/N : 00075

ATP0807 Sec.	Test	Requirements	Test Result
6.1	Product check Stroke check	>25.4 mm	Accept ✓ Reject ____ Stroke: 27.4 mm
6.2	Weight	≤ 0.41±0.030 kg	Accept ✓ Reject ____ Weight: 0,416 kg

GLA S/N 0075 ATP report - NEW

6.3	Extension /Retraction	28 Vdc	*Extending stroke 0 – 25.4 mm* Actuation time ≤ 2 s Current < 2 A *Retracting stroke 25.4 - 0 mm* Actuation time ≤ 2 s Current < 2 A	Actuation time 0,26 s Current. 1,4 A Actuation time 0,34 s Current. 1,8 A
		18 Vdc	*Extending stroke 0 – 25.4 mm* Actuation time ≤ 2 s Current < 2 A *Retracting stroke 25.4 - 0 mm* Actuation time ≤ 2 s Current < 2 A	Actuation time 0,39 s Current. 1,0 A Actuation time 0,56 s Current. 1,5 A
6.4	Solenoid test			Accept √ Reject
6.5	Electrical Bonding	Resistance bonding lug – external point of the actuator ≤ 10 mΩ.		Accept √ Reject
6.6	Dielectric strength			Accept √ Reject
6.7	Insulation	Resistance mutually insulated terminals > 20 MΩ. Resistance short-circuited terminals – frame > 100 MΩ.		Resistance: OVER MΩ Accept √ Reject Resistance: OVER MΩ Accept √ Reject

GLA S/N 0075 ATP report - REPAIRED

UMBRAGROUP	ACCEPTANCE TEST REPORT EMBRAER RUDDER GUST LOCK ACTUATOR	ATP0807 Rev. H 25/08/2011 Page 1/1

Date : 28/11/11 369

Inspected: NASONI P. [redacted]
Stamp Signature

Approved by : UC CQ 66 [redacted]
Stamp Signature

Embraer Phenom Rudder Gust Lock Actuator

UMBRA P/N : 09762P000-03

S/N : 0075

ATP0807 Sec.	Test	Requirements	Test Result
6.1	Product check Stroke check	>25.4 mm	Accept X Reject Stroke: 26,6 mm
6.2	Weight	≤ 0.41±0.030 kg	Accept Reject Weight: kg

GLA S/N 0075 ATP report - REPAIRED

6.3	Extension /Retraction	*28 Vdc*	*Extending stroke 0 – 25.4 mm* Actuation time ≤ 2 s Current < 2 A *Retracting stroke 25.4 - 0 mm* Actuation time ≤ 2 s Current < 2 A	Actuation time 0,25 s Current. 1,1 A Actuation time 0,32 s Current. 1,5 A
		18 Vdc	*Extending stroke 0 – 25.4 mm* Actuation time ≤ 2 s Current < 2 A *Retracting stroke 25.4 - 0 mm* Actuation time ≤ 2 s Current < 2 A	Actuation time 0,35 s Current. 0,8 A Actuation time 0,50 s Current. 1,4 A
6.4	Solenoid test			Accept ✓ Reject
6.5	Continuous Cycles			Accept ✓ Reject
6.6	Electrical Bonding	Resistance bonding lug – external point of the actuator ≤ 10 mΩ.		Accept ✓ Reject
6.7	Dielectric strength			Accept ✓ Reject
6.8	Insulation	Resistance mutually insulated terminals > 20 MΩ. Resistance short-circuited terminals – frame > 100 MΩ.		Resistance: OVER MΩ Accept ✓ Reject Resistance: OVER MΩ Accept ✓ Reject

GRAZIE PER L'ATTENZIONE
THANK YOU FOR YOUR ATTENTION