

TROTTER CONTROLS FORT WORTH, TEXAS	PROCESS SPECIFICATION	NUMBER	REVISION
		PS-0024	
FRDS DIGITAL SERVO CARD SETUP	BY	MODEL	
	CLG	209G500-1	
	CHK'D	SERIAL	
	JF	ALL	
DATE	PAGE	OF	
10/03/08	1	4	

Overview

This Process Specification outlines the procedure for setting up the digital servo card that replaces the old style analog card used on legacy FRDS units.

References

Item	Document	Company
1		
2		
3		
4		

Table of Contents

Overview..... 1

References..... 1

Table of Contents 1

Objectives 2

Procedure 2

 Set up / Set "Home" Position 2

Technical Support..... 4

TROTTER CONTROLS FORT WORTH, TEXAS	PROCESS SPECIFICATION	NUMBER	REVISION
		PS-0024	
TITLE FRDS DIGITAL SERVO CARD SETUP	BY	CHK'D	
	CLG	JF	
	DATE	10/03/08	
		MODEL	209G500-1
		SERIAL	ALL
		PAGE	OF
		2	4

Objectives

To provide the necessary information needed to set up the digital servo card used on legacy FRDS units. To provide information pertaining to system errors and recovery from same.

Procedure

Set up / Set "Home" Position

1. Apply Master power to the aircraft.
2. Set Pilot Interface POWER switch to MANUAL.
3. Arm the Manual Control Panel (MCP).
4. Toggle the CLOSE GATE switch to close the doors all the way against the mechanical hard stops inside the actuator.
5. Press and hold switch B1 and switch B3 simultaneously.
6. LED's #3, #4 and #5 will flash independently then begin to flash in unison. When this occurs release switch B3 while continuing to hold switch B1.
7. Release switch B1.
8. LED #3 located beside switch B1 should begin to flash. Press switch B1 and hold for approximately 1 second then release. LED #3 should go out when switch B1 is pressed then turn on again after releasing the switch.
9. LED #4 located beside switch B2 should now begin to flash. Press switch B2 and hold for approximately 1 second then release. LED #4 should go out when switch B2 is pressed then turn on again after releasing the switch.
10. LED #5 located beside switch B3 should now begin to flash. Press switch B3 and hold for approximately 1 second then release. LED #5 should go out when switch B3 is pressed then turn on again after releasing the switch.
11. LED #4 should begin to blink at about 1 Hz indicating you are in Set Up mode. Home position is the only option you can modify during Set Up.
12. Press and hold switch B2 for approximately 1 - 2 seconds then release. LED #4 should go out when switch B2 is pressed then turn on again after releasing the switch.
13. Home position is now set. LED #4 should continue to blink at about a 1 Hz rate indicating you are still in Set Up mode.
14. Cycle Master power using the key / toggle switch or by pulling and reseating the E-Dump breaker.

TROTTER CONTROLS FORT WORTH, TEXAS	PROCESS SPECIFICATION	NUMBER	REVISION
		PS-0024	
TITLE FRDS DIGITAL SERVO CARD SETUP	BY	CHK'D	
	CLG	JF	
	DATE	10/03/08	
		MODEL	209G500-1
		SERIAL	ALL
		PAGE	OF
		3	4

15. The servo card should flash LED's #3, #4 and #5 individually then all three simultaneously then LED #3 will begin to flash at about a 1 Hz rate to indicate the program is running and no errors are present.
16. LED's #7 and #8 illuminate for about a second then LED #7 turns off.
17. Verify error recovery.

System will recover from the following errors:

1. Encoder disconnected then connected.
2. Encoder connected, disconnected then connected.
3. Brownout voltage ~, If the voltage falls below 3.9 volts, the processor will reset.
4. A Watchdog timer error due to an incorrect branch in software or a memory problem.
5. The analog voltage is out of range.
6. The servo card can recover from all limp modes except EPROM invalid.

Heartbeat:

An approximately 1 Hz heartbeat is output on the OUT1 & OUT2 fault outputs and on one of the LED's. The LED stops and the fault output slows considerably when a fault is detected.

Define the number of LED flashes to display when a specific fault is detected.

```
#define UI_FAULT_ENCODER_RANGE      2    ; Goes into analog "limp" mode
#define UI_FAULT_ENCODER_BUSY       4    ; Goes into analog "limp" mode
#define UI_FAULT_ENCODER_MISSING    6    ; Goes into analog "limp" mode
#define UI_FAULT_ENCODER_NOTLOW     8    ; Goes into analog "limp" mode
#define UI_FAULT_EEPROM_INVALID    10   ; Goes into analog "limp" mode
#define UI_FAULT_VOLTAGE_RANGE     12   ; Sets output current to open the doors
Default: No error detected          16   ; No fault display during recovery
```

Limp Mode ~ Servo Card:

The doors can be opened and closed by the servo system even with the encoder disconnected. Unplug the encoder on both the servo card and encoder upgrade and verify that the doors open & close correctly. The doors slam hard on the encoder upgrade but the servo card should move them slowly to prevent the doors from slamming against the actuator hard stop.

TROTTER CONTROLS FORT WORTH, TEXAS	PROCESS SPECIFICATION	NUMBER	REVISION
		PS-0024	
TITLE FRDS DIGITAL SERVO CARD SETUP	BY	MODEL	
	CLG	209G500-1	
	CHK'D	SERIAL	
	JF	ALL	
DATE	PAGE	OF	
10/03/08	4	4	

Note: Limp mode can be caused by any of the faults listed. The operation of the system when in limp mode is discussed below:

If analog command ≤ 0.7 volts ; always try to open the doors (-10mA constant current)
 If $0.7V < \text{analog command} \leq 1.5$ volts ; try to close the doors (+10mA current)
 If $1.5V \leq \text{analog command} \leq 5$ volts ; try to open the doors (-10mA current)

The success of the brownout configuration can be checked by varying the main power voltage to the unit. It should automatically reset at a voltage between 3.6 & 4 volts.

The success of the watchdog can be checked by pressing and holding buttons 1 & 3 for the servo card and buttons 1 & 2 for the encoder upgrade. The unit should lock up when the buttons are pressed and then reset from the start (since the watchdog doesn't get reloaded).

The home position has to be set in order to check the watchdog timer.

Technical Support

Please contact Trotter Controls for additional support. Contact information for Trotter Controls, Inc. personnel is as follows;

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