RUDDER MANUAL AND AUTO SHUTOFF - ADJUSTMENT/TEST

EFFECTIVITY: ALL

1. General

A. This section gives the procedures to do the operational check of the Rudder Autoshutoff Through Speed Trip/Messages and the Rudder Pedal Manual/Auto Shutoff functions.

B. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	*DESCRIPTION*	*EFFECTIVITY*
27-25-00-700-801-A ♦	RUDDER PEDALS AUTOSHUTOFF AND RUDDER MANUAL SHUTOFF FUNC-TIONS- OPERATIONAL CHECK	ALL

TASK 27-25-00-700-801-A
EFFECTIVITY: ALL

2. RUDDER PEDALS AUTOSHUTOFF AND RUDDER MANUAL SHUTOFF FUNCTIONS-OPERATIONAL CHECK

A. General

(1) This task gives the procedures to do:

- A check of the Rudder System Autoshutoff Logical Circuit, Electrical Hardware, and related EICAS Messages with the two systems on and then with one system on at a time.
- A check of the microswitches of the rudder pedals.

(2) This task also gives the procedures to do the operational check of the Rudder Pedal Autoshutoff and Rudder Manual Shutoff functions.

B. References

REFERENCE	*DESIGNATION*
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE
AMM TASK 29-10-00-860-801-A/200	HYDRAULIC SYSTEM - PRESSURIZATION WITH HTS
AMM TASK 29-10-00-860-802-A/200	HYDRAULIC SYSTEM - PRESSURIZATION WITH EMDP
CMM 27-25-00	-
FIM 27-22-00/301	-

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

ITEM	*DESCRIPTION*	*PURPOSE*	*QTY*
GSE 075	Rudder Electric Test Set	To do the operational check of the manual and automatic shutoff of the rudder system	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	*FUNCTION*	*PLACE*
2	Do the task	Cockpit

I. Preparation

SUBTASK 841-002-A

(1) Make sure that the aircraft is safe for maintenance.

(2) Energize the aircraft with the External DC Power Supply (AMM TASK 20-40-01-860-801-A/200).

(3) Make sure that hydraulic systems 1 and 2 are off.

(4) Make sure that the RUDDER 1, RUDDER 2, ADC 1, and ADC 2 circuit breakers are closed on the Circuit Breaker Panel.

(5) Make sure that the FADEC 1A, FADEC 2A, FADEC 1B, and FADEC 2B circuit breakers are closed on the Circuit Breaker Panel.

(6) Make sure that the N2 SIGNAL 1A, N2 SIGNAL 2A, N2 SIGNAL 1B, and N2 SIGNAL 2B circuit breakers are closed on the Circuit Breaker Panel.

J. Operationally Check Rudder Pedal Autoshutoff and Rudder Manual Shutoff Functions (Figure 501)

SUBTASK 710-002-A

(1) Do a check of the rudder EICAS message.

Table 501

Steps		The EICAS display shows the message(s):	Comments
(a)	Make sure that rudder systems 1 and 2 are off, on the Flight Control Panel.	. RUDDER SYS 1-2 INOP . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)	On the Flight Control Panel, the pushbutton lights are on.
(b)	Turn on Electric Motor-Driven Pump 1 (EMDP 1) (AMM TASK 29-10-00-860-802-A/200).	. RUDDER SYS 1-2 INOP . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)	
(c)	Turn on Electric Motor-Driven Pump 2 (EMDP 2) (AMM TASK 29-10-00-860-802-A/200).	. RUDDER SYS 1-2 INOP	
(d)	On the Circuit Breaker Panel, open the RUDDER 1 and RUDDER 2 circuit breaker.	. RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)	
(e)	On the Circuit Breaker Panel, close the RUDDER 1 and RUDDER 2 circuit breaker.	. RUDDER SYS 1-2 INOP	

Table 501 (Continued)

Steps		The EICAS display shows the message(s):	Comments
(f)	On the Flight Control Panel, push the RUDDER SHUTOFF SYS 1 and RUDDER SHUTOFF SYS 2 pushbuttons to turn on rudder systems 1 and 2.	No rudder message is shown	. The pushbutton lights are off.
(g)	On the Flight Control Panel, push the RUDDER SHUTOFF SYS 1 pushbutton to turn off rudder system 1	. RUDDER SYS 1 INOP	
(h)	On the Flight Control Panel, push the RUDDER SHUTOFF SYS 1 pushbutton to turn on rudder system 1	No rudder message is shown	

(2) Do a check of the rudder autoshutoff through speed trip.

Table 502

Steps		The EICAS display shows the message(s)
(a)	On the Circuit Breaker Panel, open the RUDDER 1 and RUDDER 2 circuit breakers.	. RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(b)	On the Maintenance Panel, operate the ADC 1 and ADC 2 test switches and keep them on.	. RUDDER OVERBOOST . RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(c)	Keep the ADC 1 and ADC 2 test switches on and close the RUDDER 2 circuit breaker, on the Circuit Breaker Panel.	. RUDDER SYS 2 INOP
(d)	Keep the ADC 1 and ADC 2 test switches on and push the RUDDER SHUTOFF SYS 1 pushbutton, on the Flight Control Panel, to turn off rudder system 1.	. RUDDER OVERBOOST
(e)	Keep the ADC 1 and ADC 2 test switches on and push the RUDDER SHUTOFF SYS 1 pushbutton, on the Flight Control Panel, to turn on rudder system 1.	. RUDDER SYS 2 INOP
(f)	Keep the ADC 1 and ADC 2 test switches on and close the RUDDER 1 circuit breaker, on the Circuit Breaker Panel.	No rudder message is shown.

Table 502 (Continued)

Steps		The EICAS display shows the message(s)
(g)	Keep the ADC 1 and ADC 2 test switches on and open the RUDDER 2 circuit breaker, on the Circuit Breaker Panel.	. RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(h)	Keep the ADC 1 and ADC 2 test switches on and push the RUDDER SHUTOFF SYS 2 pushbutton, on the Flight Control Panel, to turn off rudder system 2.	. RUDDER OVERBOOST . RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(i)	Keep the ADC 1 and ADC 2 test switches on and close the RUDDER 2 circuit breaker, on the Circuit Breaker Panel.	. RUDDER SYS 2 INOP
(j)	Keep the ADC 1 and ADC 2 test switches on and push the RUDDER SHUTOFF SYS 2 pushbutton, on the Flight Control Panel, to turn on rudder system 2.	No rudder message is shown.
(l)	Keep the ADC 1 and ADC 2 test switches on and open the RUDDER 1 and RUDDER 2 circuit breakers, on the Circuit Breaker Panel.	. RUDDER OVERBOOST . RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(m)	On the Maintenance Panel, release the ADC 2 and keep the ADC 1 test switch on.	. RUDDER OVERBOOST . RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(n)	On the Maintenance Panel, release the ADC 1 test switch and operate the ADC 2 test switch only.	. RUDDER OVERBOOST . RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(o)	On the Maintenance Panel, release the ADC 2 test switch.	. RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(p)	On the Circuit Breaker Panel, open the ADC 1 and ADC 2 circuit breakers.	. RUDDER OVERBOOST . RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)

Table 502 (Continued)

Steps		The EICAS display shows the message(s)
(q)	On the Circuit Breaker Panel, close the ADC 1 circuit breaker.	. RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(r)	On the Circuit Breaker Panel, open the ADC 1 circuit breaker.	. RUDDER OVERBOOST . RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)
(s)	On the Circuit Breaker Panel, close the ADC 2 circuit breaker.	. RUD HDOV PROT FAIL . RUD STOP DISAGREE (only on aircraft equipped with Rudder Movable Primary Stop Mechanism)

(3) On the Flight Control Panel, push the RUDDER SHUTOFF SYS 1 to turn off rudder system 1 and push RUDDER SHUTOFF SYS 2 to turn off rudder system 2.

(4) Turn off the Electric Motor-Driver Pumps 1 and 2 (EMDP 1 and 2) (AMM TASK 29-10-00-860-802-A/200).

(5) On the Circuit Breaker Panel, close the ADC 1, RUDDER 1, and RUDDER 2 circuit breakers.

(6) Make sure that the YAW TRIM circuit breaker is closed on the Circuit Breaker Panel.

(7) Make sure that the YAW TRIM indication is in the neutral position, on the EICAS.

(8) Install GSE 075. See Figure 502.

(9) On the Circuit Breaker Panel, open the STEER circuit breaker and attach a DO-NOT-CLOSE tag to it.

(10) On GSE 075, operate the LED test switch to do a test of the LEDs.

(11) Do these procedures as specified in the table of Figure 503.

NOTE:
- The table of Figure 503 shows the actions related to these columns: STEP, N2 SIGNAL CBs, PEDALS, RUDDER SHUTOFF, and SWITCHES.
- The table of Figure 503 shows the results related to these columns: LEDs on/off, EICAS.
- When you do steps 1 thru 48 of the table of Figure 503, you must change the actions to get the results specified in the table of Figure 503.
- In the “pedals” column:

- Where there is an asterisk (*), move the rudder pedal against the stop and use force to operate the spring-loaded cartridge.
- Where there is no asterisk, only keep the rudder pedals against the stop but do not use force for the spring-loaded cartridge operation. Do not remove your foot from the rudder pedal.
- The (1P) symbol stands for pilot, the (2P) symbol stands for copilot, and the (X) stands for pilot and copilot.

- On the “EICAS” message column:
  M1 is RUDDER SYS 1-2 INOP caution message.
  M2 is RUD HDOV PROT FAIL caution message.
  M3 is RUDDER SYS 2 INOP caution message.
- Do steps 1 thru 28 with the hydraulic system depressurized.
  For aircraft with the Rudder Movable Primary Stop Mechanism installed, the EICAS display will show the RUD STOP DISAGREE caution message. Ignore this message.
- Do steps 29 thru 48 with the hydraulic system pressurized (AMM TASK 29-10-00-860-801-A/200).
- On the LED column, the black mark means that the LED is on.
- On the LED column, the white mark means that the LED is off.
- On the LED column, from L1 to L5 and from R1 to R5 relates to LH and RH Rudder Position Microswitches. Refer to CMM 27-25-00.

(12) If the information on the GSE 075 is different from the information available on Figure 503, correct the problem as shown in the comments column in the tables of figure 305 of FIM 27-22-00/301.

K. Follow-on

SUBTASK 842-002-A

(1) On the Flight Control Panel, push the RUDDER SHUTOFF SYS 1 and RUDDER SHUTOFF SYS 2 pushbuttons to turn off rudder systems 1 and 2.

(2) On the Circuit Breaker Panel, close the N2 SIGNAL 1A, N2 SIGNAL 2A, N2 SIGNAL 1B, and N2 SIGNAL 2B circuit breakers.

(3) On the Circuit Breaker Panel, close the STEER circuit breaker and remove the DO-NOT-CLOSE tag from it.

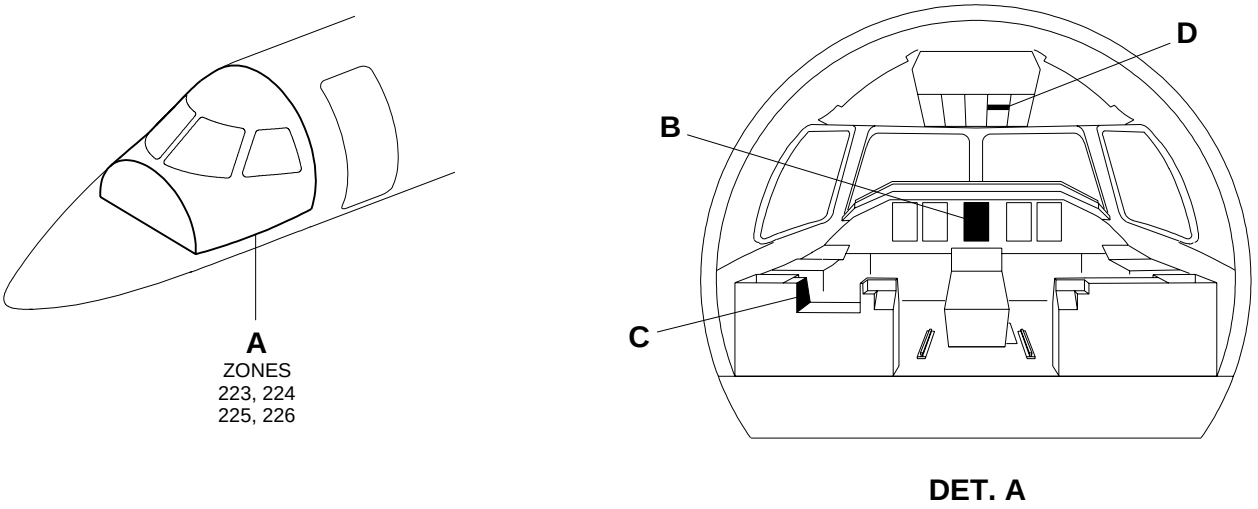
(4) Release the pressure of the hydraulic system (AMM TASK 29-10-00-860-801-A/200).

(5) Remove GSE 075.

(6) Deenergize the aircraft (AMM TASK 20-40-01-860-801-A/200).

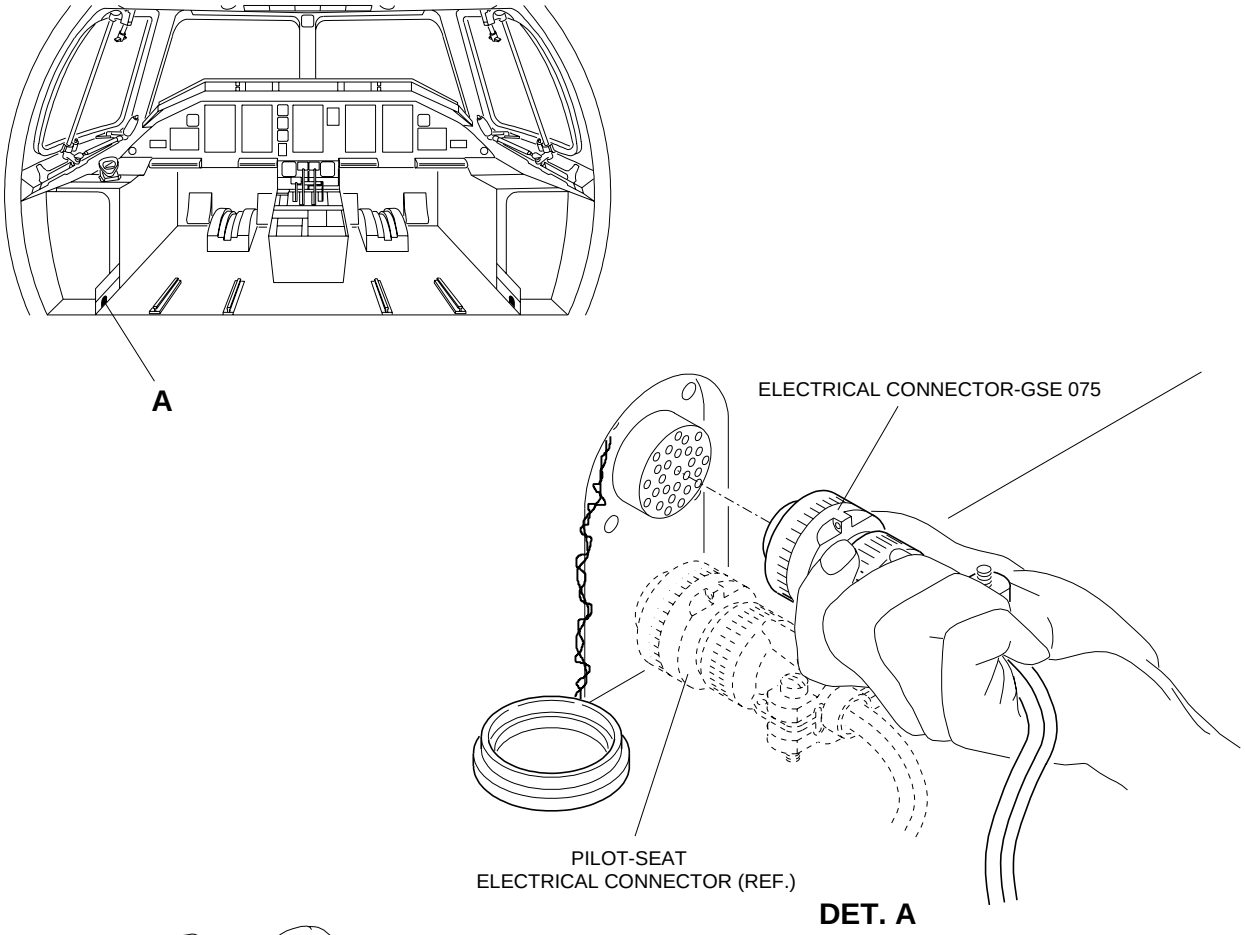
EFFECTIVITY: ALL

Flight Control and Maintenance Panels and EICAS Display - Location
Figure 501



145AMM270203.MCE B

EFFECTIVITY: ALL
GSE 075 - Location
Figure 502



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EFFECTIVITY: ALL

Matrix Format of the Procedure
Figure 503 - Sheet 1

	AIRCRAFT									GSE					EICAS
	N2 CB's				PEDALS			RUD SHUTOFF SW		SWITCHES				LEDS	
	1A	2A	1B	2B	left	Neutral	right	SYS 1	SYS 2	S1	S2	SL3	SR3	L1 L2 L3 L4 L5 R1 R2 R3 R4 R5 SYS1 SYS2	MESSAGE
1	Open	Open	Open	Open		x		Off	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
2	Open	Open	Open	Open		x		Off	Off	On	Off	Off	Off	○ ○ ○ ● ● ○ ○ ○ ● ● ○ ○	M1
3	Open	Open	Open	Open		x		Off	Off	Off	On	Off	Off	○ ○ ○ ○ ● ○ ○ ○ ○ ● ○ ○	M1
4	Open	Open	Open	Open		x		Off	Off	On	On	Off	Off	○ ○ ● ● ● ○ ○ ● ● ● ○ ○	M1 M2
5	Open	Closed	Open	Open		x		Off	Off	On	On	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1 M2
6	Open	Closed	Open	Closed		x		Off	Off	On	On	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
7	Open	Open	Open	Open		x		Off	Off	On	On	Off	Off	○ ○ ● ● ● ○ ○ ● ● ● ○ ○	M1 M2
8	Closed	Open	Open	Open		x		Off	Off	On	On	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1 M2
9	Closed	Open	Closed	Open		x		Off	Off	On	On	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
10	Closed	Open	Closed	Open	x			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
11	Closed	Closed	Closed	Closed	x			Off	Off	Off	Off	On	Off	○ ○ ● ○ ● ○ ○ ○ ○ ○ ○ ○	M1
12	Closed	Closed	Closed	Closed	x			Off	Off	Off	Off	Off	On	○ ○ ○ ○ ○ ○ ○ ● ○ ○ ○ ○	M1

M1=RUDDER SYS 1−2 INOP caution message.
M2=RUD HDOV PROT FAIL caution message.
M3=RUDDER SYS 2 INOP caution message.
X=PILOT AND COPILOT

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EFFECTIVITY: ALL

Matrix Format of the Procedure
Figure 503 - Sheet 2

	AIRCRAFT									GSE					EICAS
	N2 CB's				PEDALS			RUD SHUTOFF SW		SWITCHES				LEDS	
	1A	2A	1B	2B	left	Neutral	right	SYS 1	SYS 2	S1	S2	SL3	SR3	L1 L2 L3 L4 L5 R1 R2 R3 R4 R5 SYS1 SYS2	MESSAGE
13	Closed	Closed	Closed	Closed			x	Off	Off	Off	Off	Off	On	○ ○ ○ ○ ○ ○ ○ ● ○ ● ○ ○	M1
14	Closed	Open	Closed	Closed			x	Off	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ● ● ○ ○ ○ ○ ○	M1 M2
15	Open	Open	Closed	Closed	1P			Off	Off	Off	Off	Off	Off	● ● ● ● ● ○ ○ ○ ○ ○ ○ ○	M1 M2
16	Closed	Open	Closed	Closed	1P			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1 M2
17	Closed	Open	Closed	Closed	1P *			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ● ○ ○ ○ ○	M1 M2
18	Closed	Open	Closed	Open	1P *			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
19	Closed	Open	Closed	Closed	1P			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1 M2
20	Open	Open	Closed	Closed			1P	Off	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ● ● ● ● ● ○ ○	M1 M2
21	Closed	Open	Closed	Closed			1P	Off	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ● ● ○ ○ ○ ○ ○	M1 M2
22	Closed	Open	Closed	Closed			1P*	Off	Off	Off	Off	Off	Off	○ ○ ● ○ ○ ● ● ○ ○ ○ ○ ○	M1 M2
23	Closed	Open	Closed	Closed			1P	Off	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ● ● ○ ○ ○ ○ ○	M1 M2
24	Closed	Open	Closed	Closed			2P*	Off	Off	Off	Off	Off	Off	○ ○ ● ○ ○ ● ● ○ ○ ○ ○ ○	M1 M2

M1=RUDDER SYS 1−2 INOP caution message.
M2=RUD HDOV PROT FAIL caution message.
M3=RUDDER SYS 2 INOP caution message.
1P=PILOT
2P=COPILOT
X=PILOT AND COPILOT

145AMM270187E.MCE

EFFECTIVITY: ALL

Matrix Format of the Procedure
Figure 503 - Sheet 3

	AIRCRAFT									GSE					EICAS
	N2 CB's				PEDALS			RUD SHUTOFF SW		SWITCHES				LEDS	
	1A	2A	1B	2B	left	Neutral	right	SYS 1	SYS 2	S1	S2	SL3	SR3	L1 L2 L3 L4 L5 R1 R2 R3 R4 R5 SYS1 SYS2	MESSAGE
25	Closed	Open	Closed	Closed			2P	Off	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ● ● ○ ○ ○ ○ ○	M1 M2
26	Closed	Open	Closed	Closed	2P			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1 M2
27	Closed	Open	Closed	Closed	2P*			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ● ○ ○ ○ ○	M1 M2
28	Closed	Open	Closed	Closed	2P			Off	Off	Off	Off	Off	Off	● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1 M2
29[1]	Open	Open	Open	Open		x		Off	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
30	Open	Open	Open	Open		x		On	Off	Off	Off	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ● ○	M3
31	Open	Open	Open	Open		x		On	On	Off	Off	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ● ●	–
32	Open	Open	Open	Open			1P	On	On	Off	Off	On	Off	○ ○ ● ○ ○ ● ● ● ● ● ● ●	M2
33	Open	Open	Open	Open			1P*	On	On	Off	Off	On	Off	○ ○ ● ○ ○ ● ● ● ● ● ○ ○	M1 M2
34	Open	Open	Open	Open		x		Off	On	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
35	Open	Open	Open	Open		x		On	On	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
36	Open	Open	Open	Open		x		On	Off	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○	M1

M1=RUDDER SYS 1−2 INOP caution message.
M2=RUD HDOV PROT FAIL caution message.
M3=RUDDER SYS 2 INOP caution message.
(1) Pressurize the hidraulic system (TASK 29−10−00−860−801−A).
1P=PILOT
2P=COPILOT
X=PILOT AND COPILOT

145AMM270188D.MCE

EFFECTIVITY: ALL

Matrix Format of the Procedure
Figure 503 - Sheet 4

	AIRCRAFT									GSE					EICAS
	N2 CB's				PEDALS			RUD SHUTOFF SW		SWITCHES				LEDS	
	1A	2A	1B	2B	left	Neutral	right	SYS 1	SYS 2	S1	S2	SL3	SR3	L1 L2 L3 L4 L5 R1 R2 R3 R4 R5 SYS1 SYS2	MESSAGE
37	Open	Open	Open	Open		x		On	On	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
38	Open	Open	Open	Open		x		Off	Off	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
39	Open	Open	Open	Open		x		On	On	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ● ●	–
40	Open	Open	Open	Open	1P*			On	On	Off	Off	Off	On	● ● ● ● ● ○ ○ ● ○ ○ ○ ○	M1 M2
41	Open	Open	Open	Open		x		Off	Off	Off	Off	Off	On	○ ○ ○ ○ ○ ○ ○ ● ○ ○ ○ ○	M1
42	Open	Open	Open	Open		x		On	On	Off	Off	Off	On	○ ○ ○ ○ ○ ○ ○ ● ○ ○ ● ●	–
43	Open	Open	Open	Open	2P*			On	On	Off	Off	Off	On	● ● ● ● ● ○ ○ ● ○ ○ ○ ○	M1 M2
44	Open	Open	Open	Open		x		Off	Off	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
45	Open	Open	Open	Open		x		On	On	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ● ●	–
46	Open	Open	Open	Open			2P*	On	On	Off	Off	On	Off	○ ○ ● ○ ○ ● ● ● ● ● ○ ○	M1 M2
47	Open	Open	Open	Open		x		Off	Off	Off	Off	On	Off	○ ○ ● ○ ○ ○ ○ ○ ○ ○ ○ ○	M1
48	Open	Open	Open	Open		x		On	On	Off	Off	Off	Off	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ● ●	–

M1=RUDDER SYS 1−2 INOP caution message.
M2=RUD HDOV PROT FAIL caution message.
M3=RUDDER SYS 2 INOP caution message.
1P=PILOT
2P=COPILOT
X=PILOT AND COPILOT

145AMM270189D.MCE