

# **CHAPTER**

# **27**

# **FLIGHT CONTROLS**

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FLIGHT CONTROLS

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				3	Jan 11/2006	ALL
<b><u>AILERON AND TAB</u></b>						
AILERON - ROLL CONTROL	27-10-01		101	1	Jun 30/2009	ALL
				2	Jan 11/2006	ALL
<b><u>AILERON TRIM CONTROL SYSTEM</u></b>						
AILERON TRIM CONTROL	27-11-11		101		Jun 30/2009	YD001-YD006
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RUDDER	27-20-01		101	1	Jan 11/2006	YD001-YD006
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<b><u>RUDDER TRIM CONTROL SYSTEM</u></b>						
RUDDER TRIM CONTROL	27-21-11		101		Jun 30/2009	YD001-YD006
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<b><u>RUDDER AND ELEVATOR CONTROL AND INDICATING</u></b>						
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FLIGHT CONTROL SYS "A" AND SYS "B" LOW PRESSURE INDICATION	27-23-14		101		May 09/2011	YD001-YD005
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<b><u>WHEEL-TO-RUDDER INTERCONNECT SYSTEM</u></b>						
WHEEL TO RUDDER INTERCONNECT SYSTEM	27-24-11		101		Jan 11/2006	ALL
<b><u>RUDDER DAMPING</u></b>						
RUDDER AUTHORITY LIMITER	27-25-11		101		Jun 30/2009	YD001-YD002 YD005
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RUDDER TRIM AND POSITION INDICATION	27-28-11		101		May 02/2008	ALL
<b><u>ELEVATOR AND TAB</u></b>						
ELEVATOR	27-30-01		101		Jan 11/2006	ALL
<b><u>ELEVATOR AND TAB CONTROL SYSTEM</u></b>						
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STALL WARNING SYSTEM 1 DIGITAL INTERFACE	27-32-12		101		Jan 11/2006	YD001-YD006
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STALL WARNING SYSTEM 2 POWER AND ANALOGS	27-32-21		101		May 02/2008	ALL
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<b><u>ELEVATOR POSITION INDICATING SYSTEM</u></b>						
ELEVATOR POSITION INDICATION	27-38-11		101		Jan 11/2006	ALL
<b><u>HORIZONTAL STABILIZER</u></b>						
HORIZONTAL STABILIZERS	27-40-01		101		May 02/2008	ALL
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HORIZONTAL STABILIZER TRIM CONTROL	27-41-11		101	1	Jun 30/2009	YD001-YD006
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TRAILING EDGE FLAP SKEW DETECTION	27-53-21		101	1	May 02/2008	ALL
				2	Oct 05/2011	ALL
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TE FLAP LOAD RELIEF	27-54-11		101		Jan 11/2006	ALL
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FLIGHT CONTROL AND GROUND SPOILER	27-60-01		101	1	Jan 11/2006	ALL
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				101.1	1	Jun 30/2009	YD005-YD007
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SPOILER POSITION INDICATION	27-62-14		101		Jan 11/2006	ALL	
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SPEEDBRAKE AUTOSTOW	27-62-41		101.1		Jun 30/2009	YD005	
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LEADING EDGE DRIVE AND INDICATION	27-80-01		101	1	Jan 11/2006	ALL	
				2	Jan 11/2006	ALL	
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<b><u>LEADING EDGE FLAP AND SLAT CONTROL SYSTEM</u></b>							
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LEFT LEADING EDGE SLAT POSITION INDICATION	27-81-12		101		May 02/2008	ALL	
RIGHT LEADING EDGE FLAP POSITION INDICATION	27-81-21		101		May 02/2008	ALL	
RIGHT LEADING EDGE SLAT POSITION INDICATION	27-81-22		101		May 02/2008	ALL	
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27-53-11	ALTERNATE TRAILING AND LEADING EDGE FLAP DRIVE
27-62-11	AUTOMATIC GROUND SPEEDBRAKE CONTROL
27-83-11	AUTOSLAT SYSTEM NO. 1
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27-81-41	DFDAU AND TEST CONNECTOR INTERFACE
27-30-01	ELEVATOR
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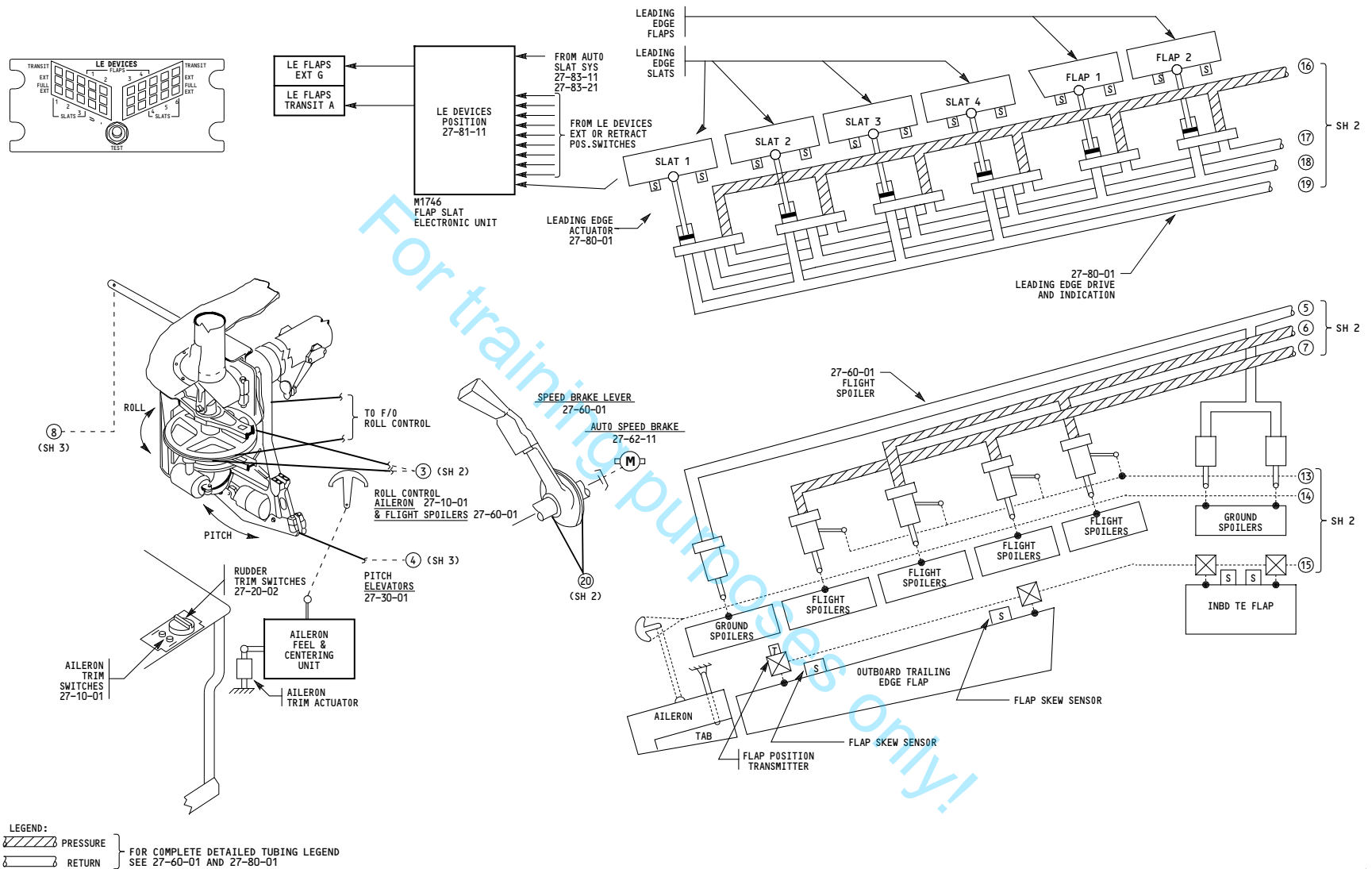


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27-32-11	STALL WARNING SYSTEM 1 POWER AND ANALOGS		
27-32-22	STALL WARNING SYSTEM 2 DIGITAL INTERFACE		
27-32-21	STALL WARNING SYSTEM 2 POWER AND ANALOGS		
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27-53-12	TRAILING EDGE ALTERNATE FLAP DRIVE		
27-52-11	TRAILING EDGE FLAP POSITION INDICATION		
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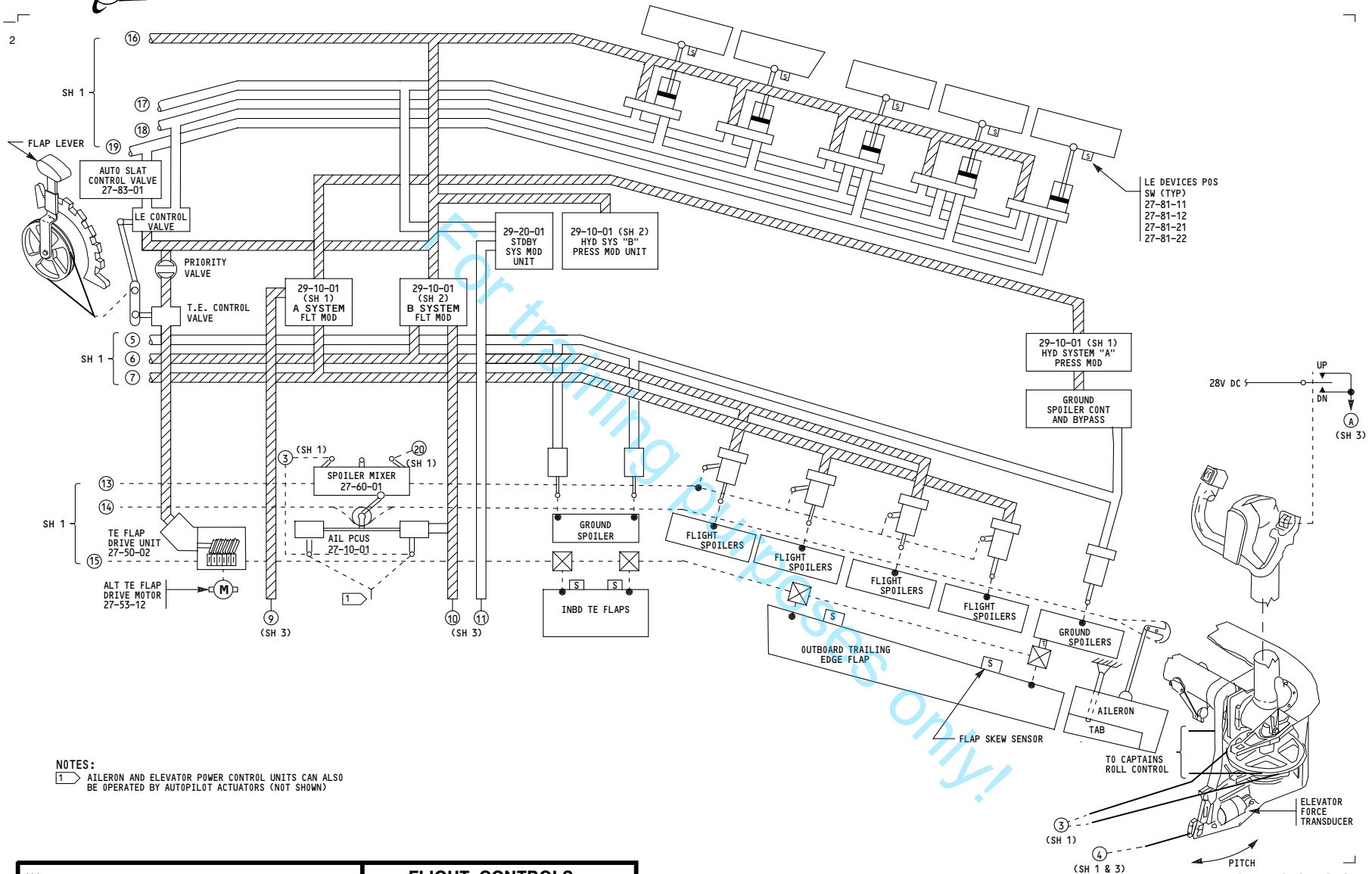
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## FLIGHT CONTROLS - SIMPLIFIED

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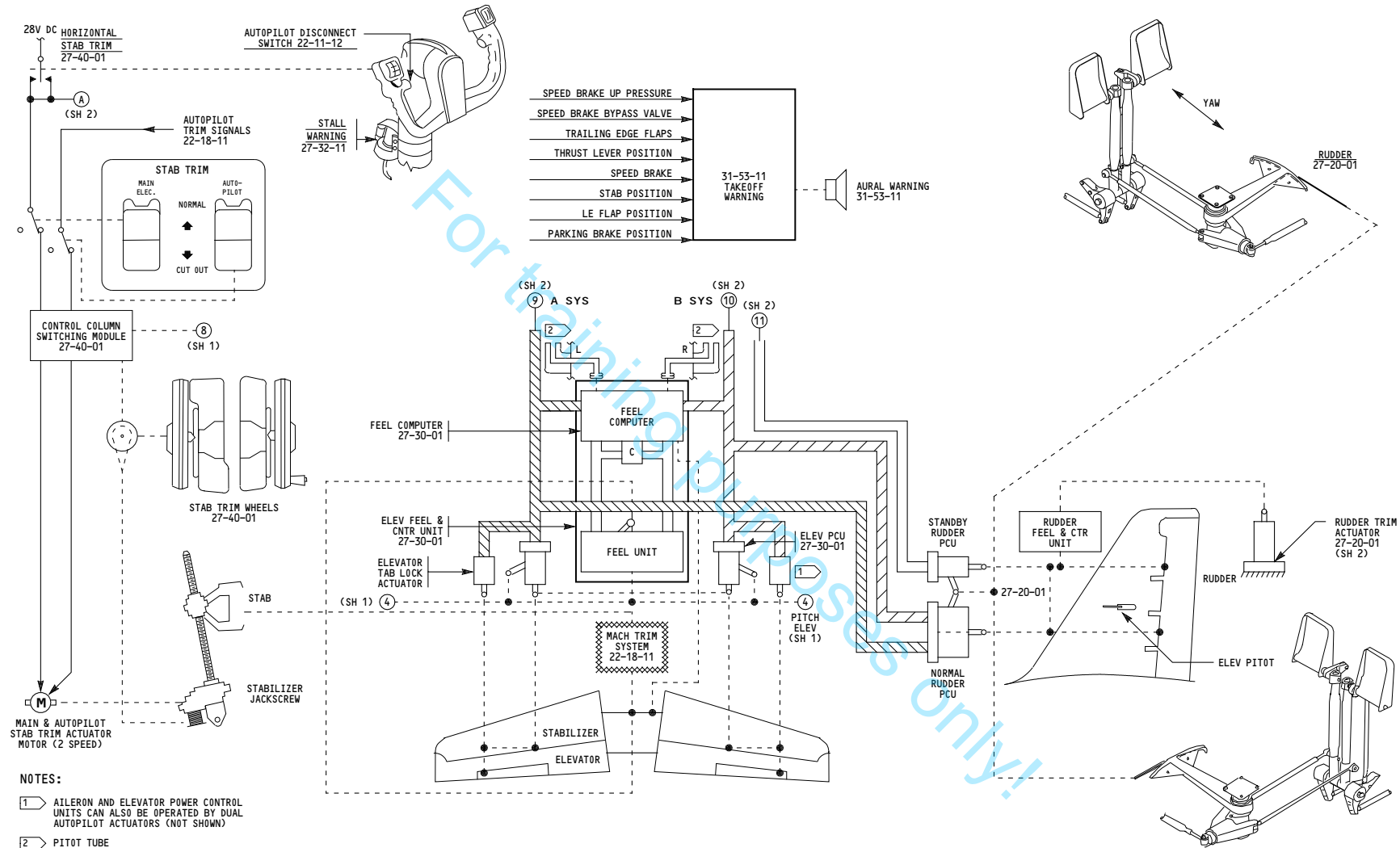
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SIMPLIFIED**

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**FLIGHT CONTROLS -  
SIMPLIFIED**

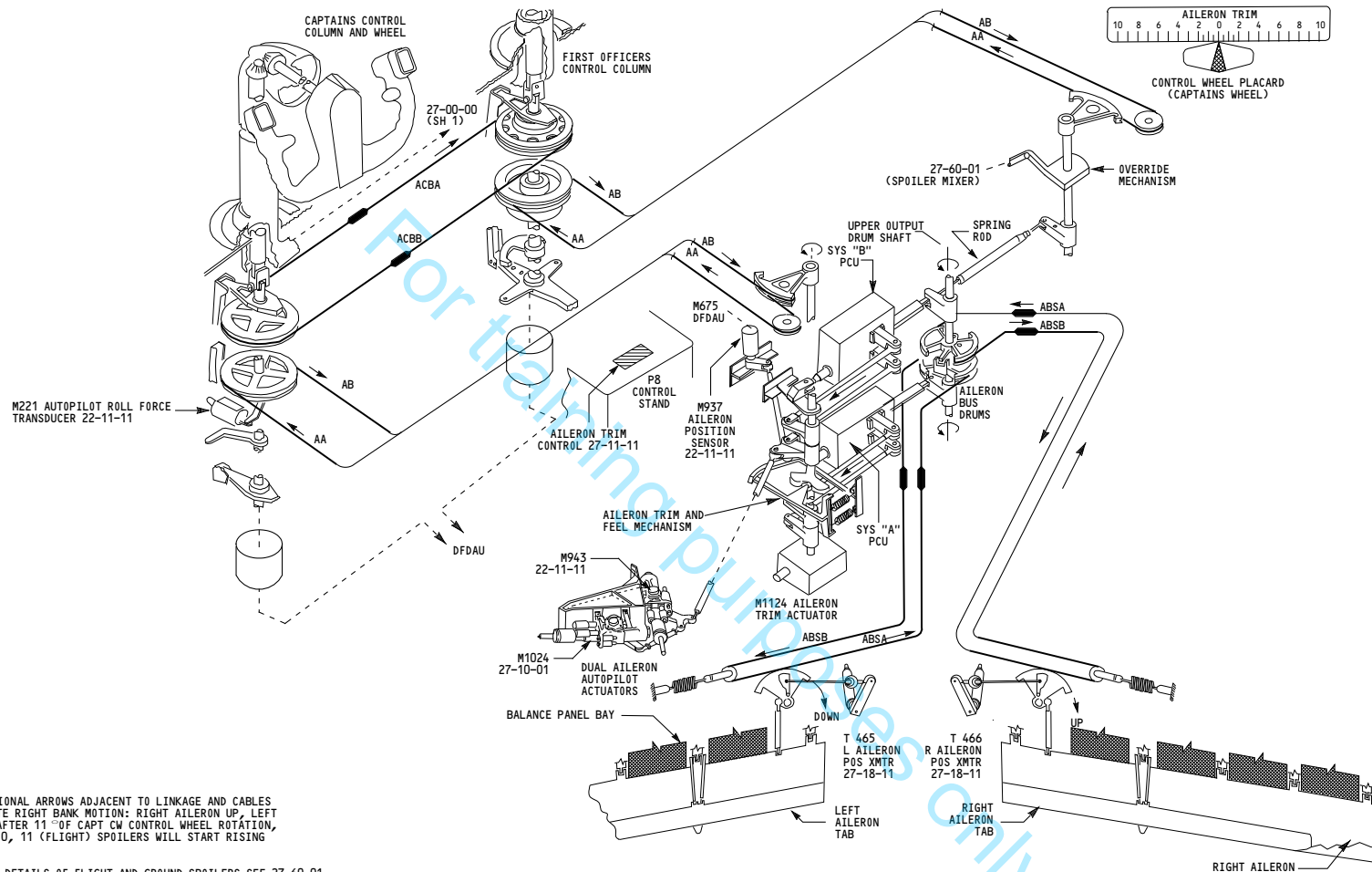
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**NOTES:**

1. DIRECTIONAL ARROWS ADJACENT TO LINKAGE AND CABLES INDICATE RIGHT BANK MOTION: RIGHT AILERON UP, LEFT DOWN, AFTER 11° OF CAPT CW CONTROL WHEEL ROTATION, 8, 9, 10, 11 (FLIGHT) SPOILERS WILL START RISING
2. FOR DETAILS OF FLIGHT AND GROUND SPOILERS SEE 27-60-01
3. AILERON TRIM ACTUATOR REPOSITIONS CAM ROLLER ARM AND CENTERING SPRING. PILOTS CONTROL WHEEL NEUTRAL WILL SHIFT AS A FUNCTION OF ACTUATOR POSITION.

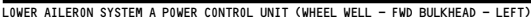
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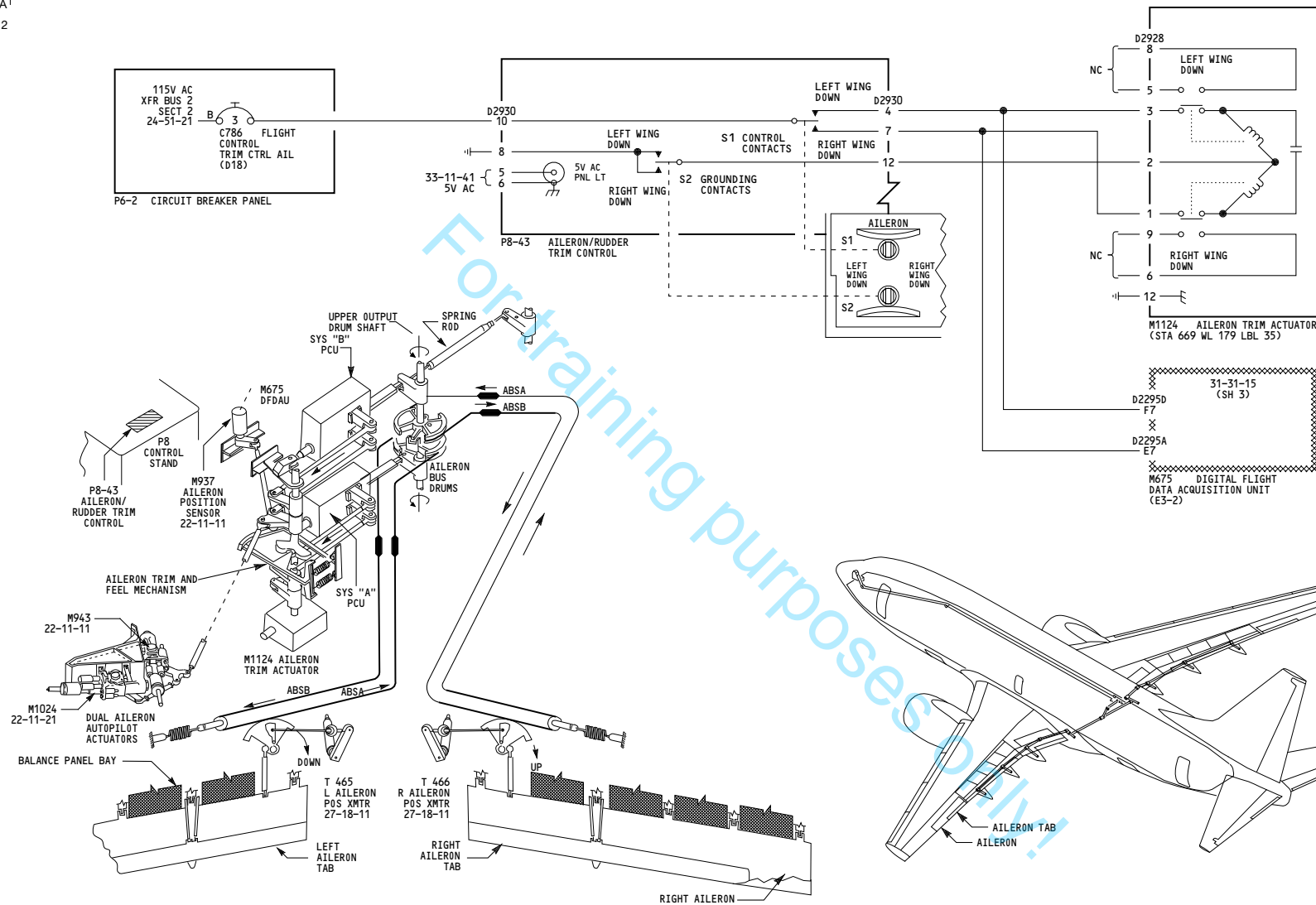


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## WIRING DIAGRAMS

YD001-YD006

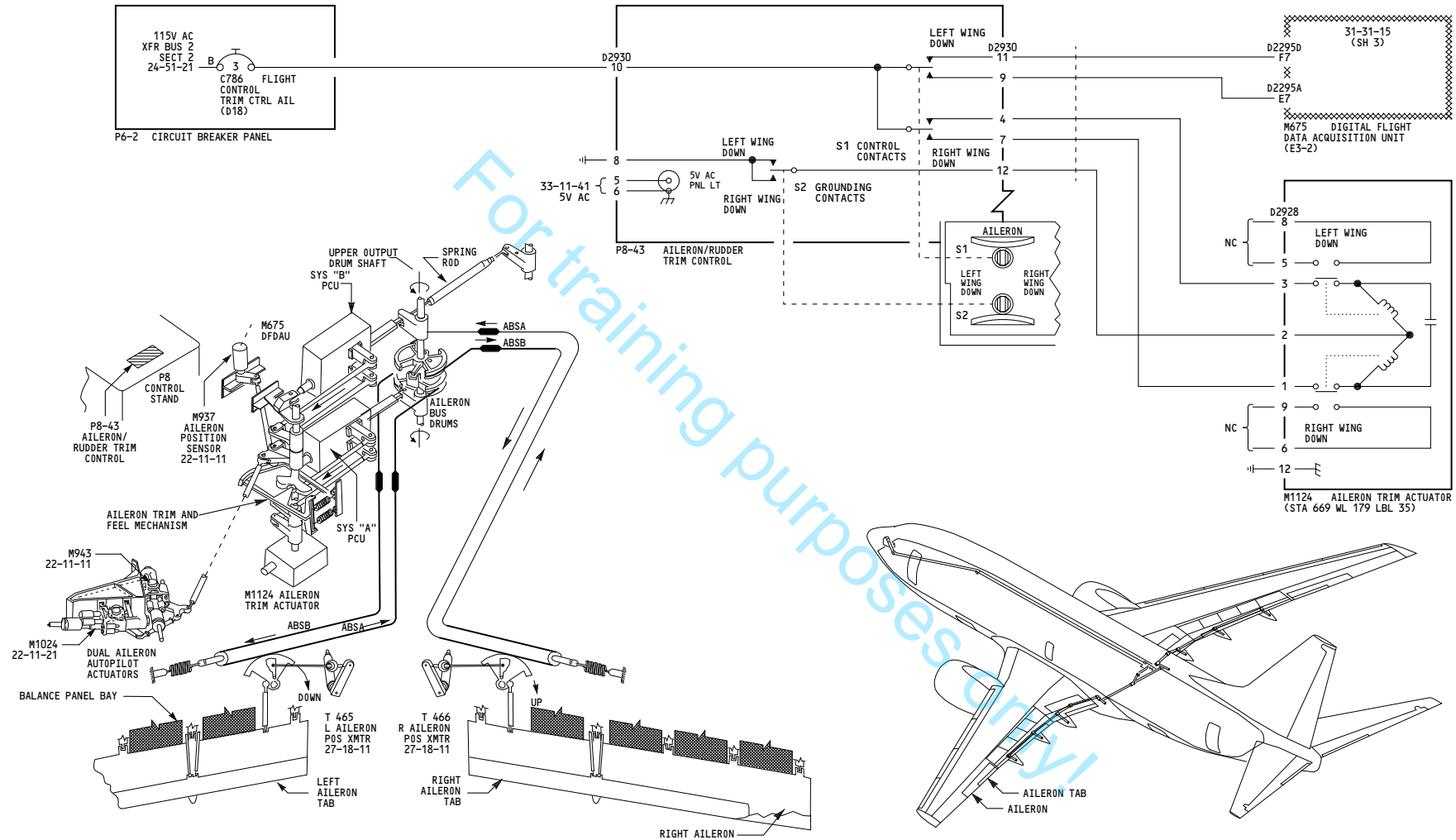
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YD007-YD020

**AILERON TRIM CONTROL**

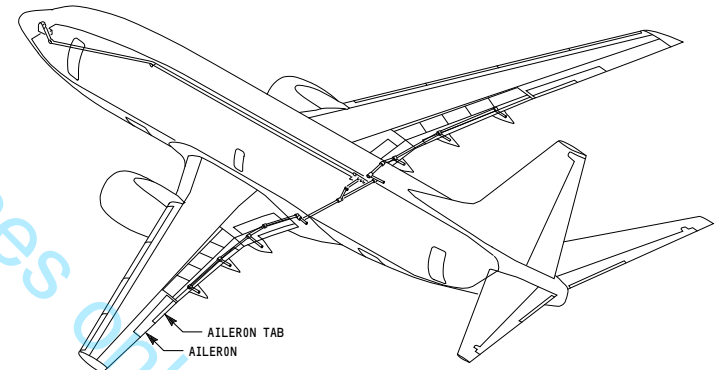
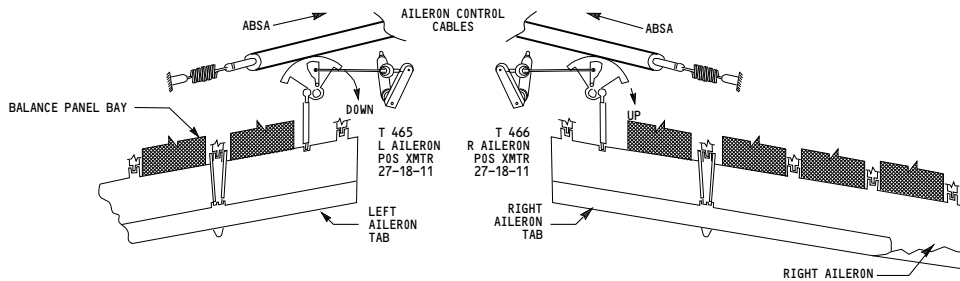
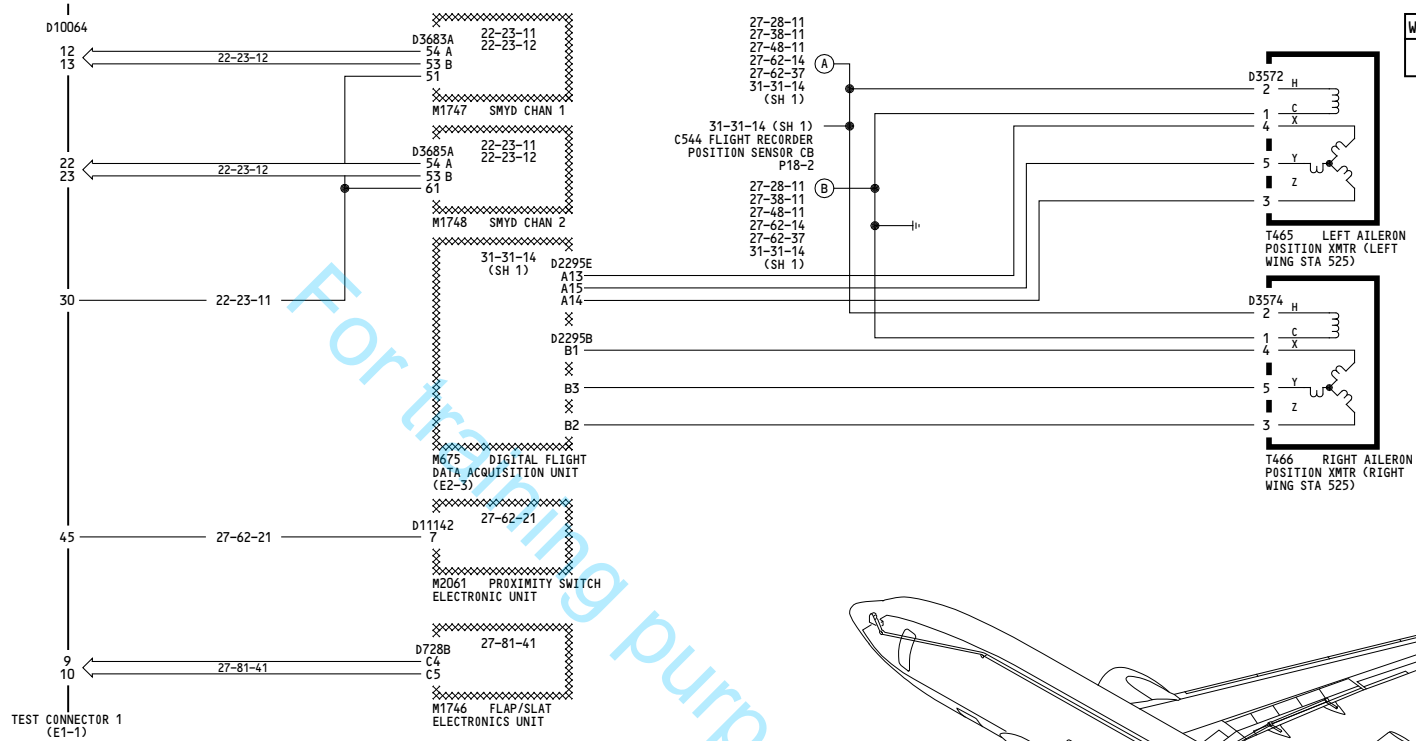
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**AILERON POSITION INDICATION**

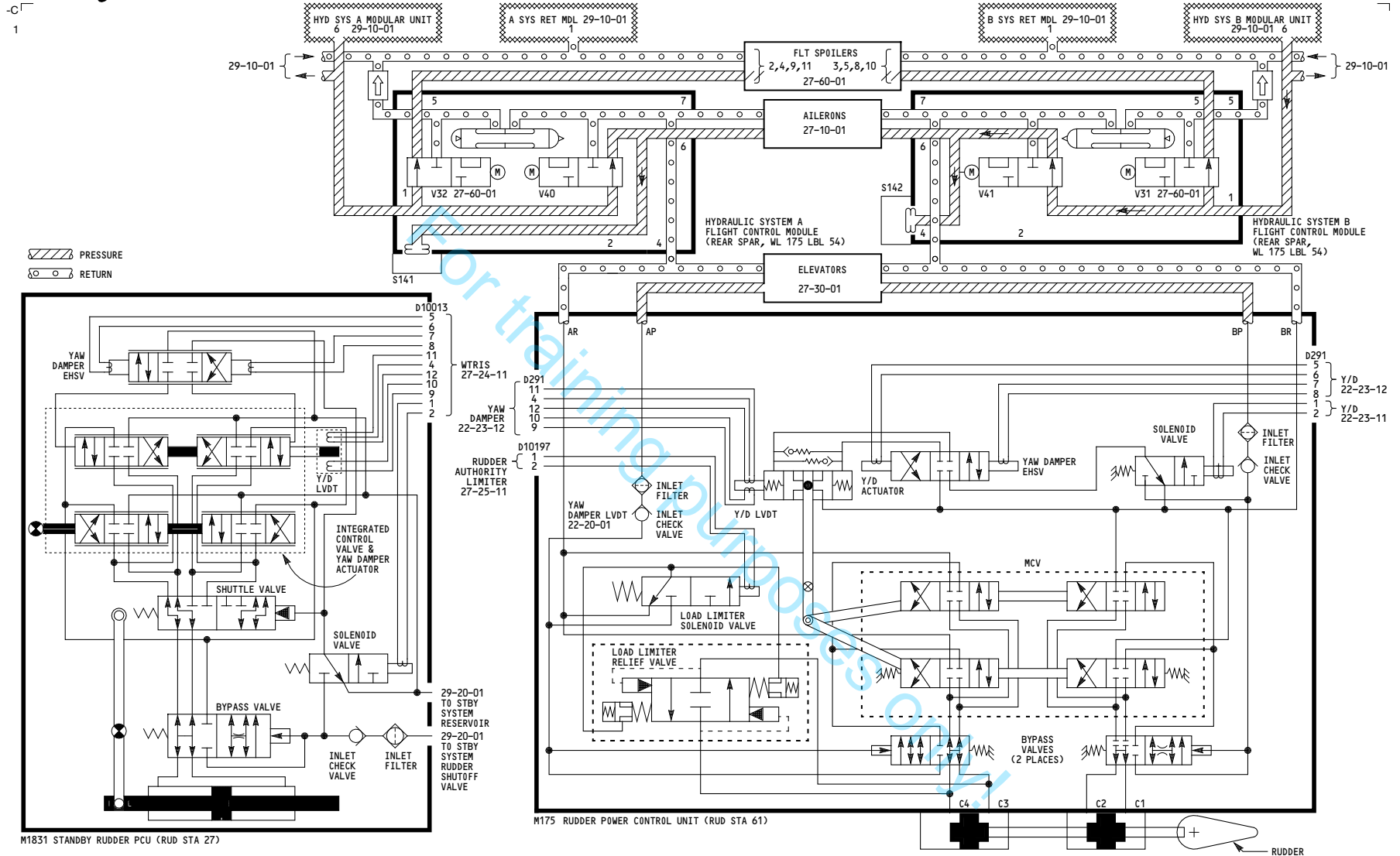
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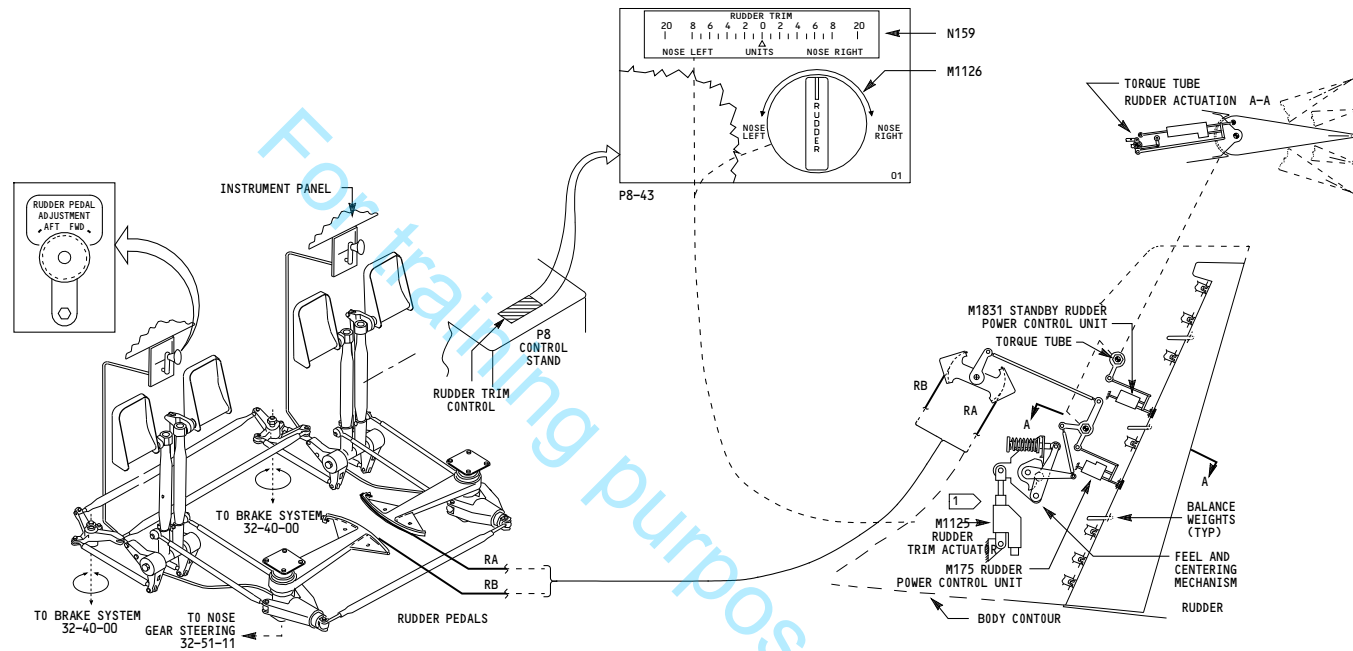
YD001-YD006

**RUDDER**

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**NOTES:**

1. FOR ELECTRICAL CONNECTION DETAILS SEE:  
27-21-11 FOR M1125, M1126  
27-28-11 FOR M159  
22-23-12 FOR M175

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**RUDDER**

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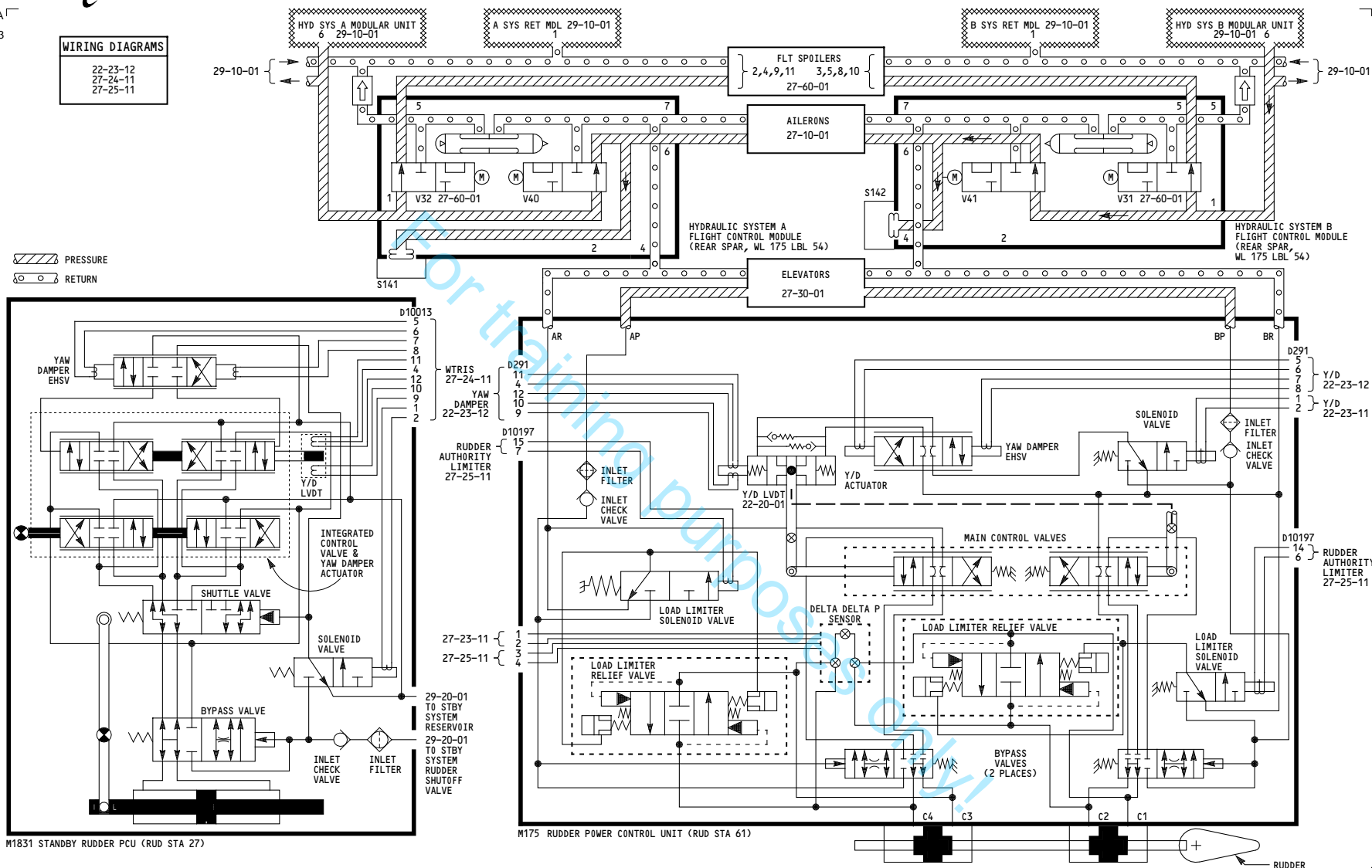
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**WIRING DIAGRAMS**

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▨ PRESSURE  
○ RETURN



M1831 STANDBY RUDDER PCU (RUD STA 27)

M175 RUDDER POWER CONTROL UNIT (RUD STA 61)

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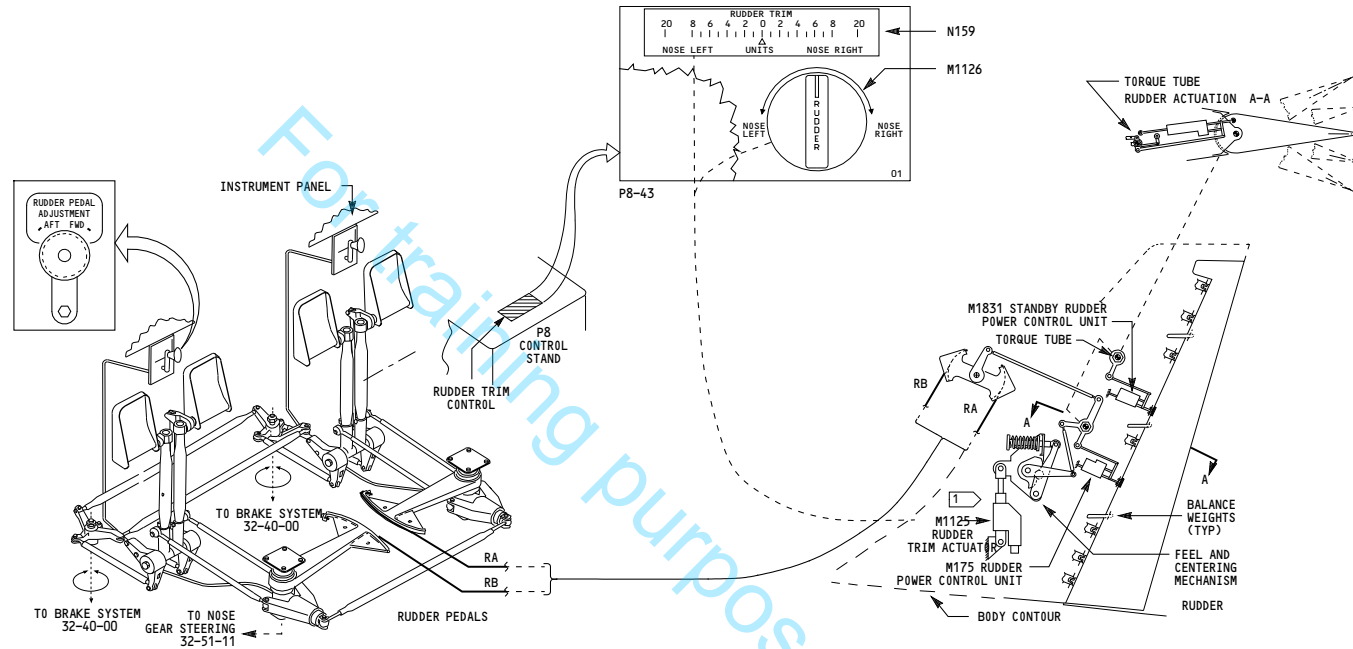
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**NOTES:**

1. FOR ELECTRICAL CONNECTION DETAILS SEE:  
27-21-11 FOR M1125, M1126  
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**RUDDER**

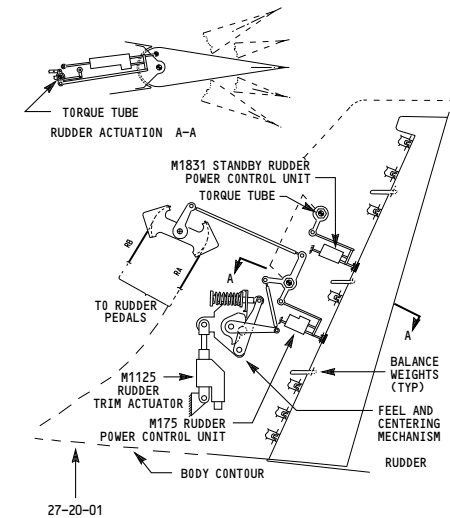
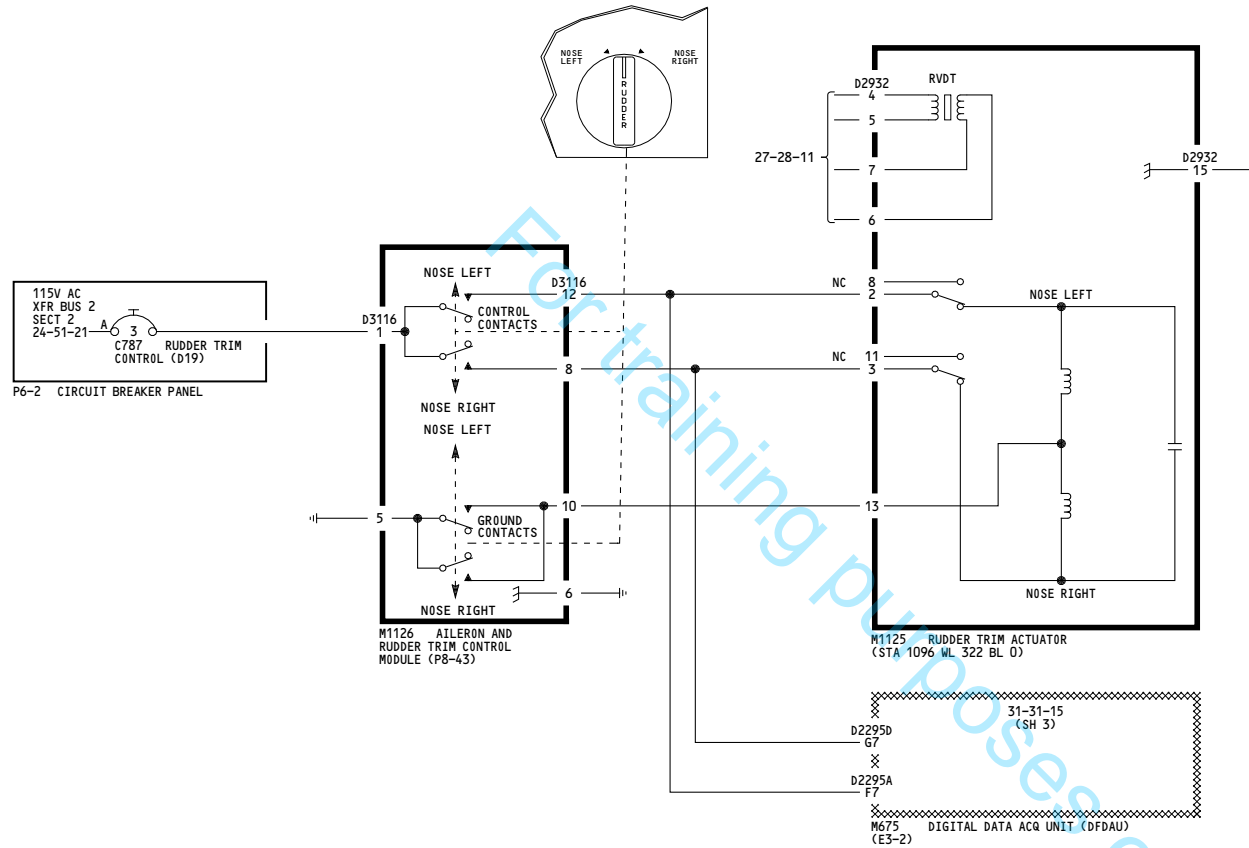
D280A238

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Sheet 2  
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YD001-YD006

**RUDDER TRIM CONTROL**

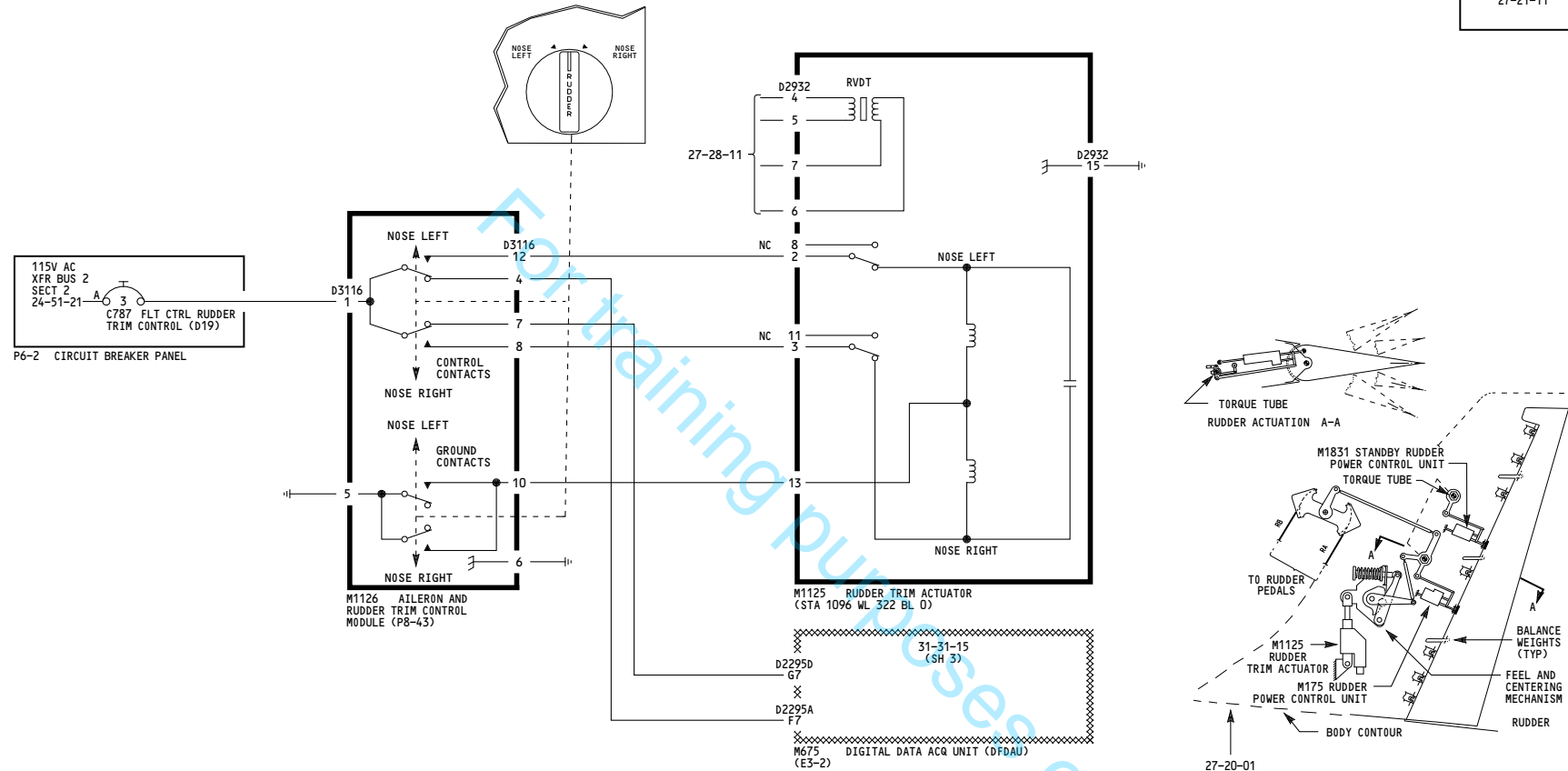
D280A238

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3



YD007-YD020

**RUDDER TRIM CONTROL**

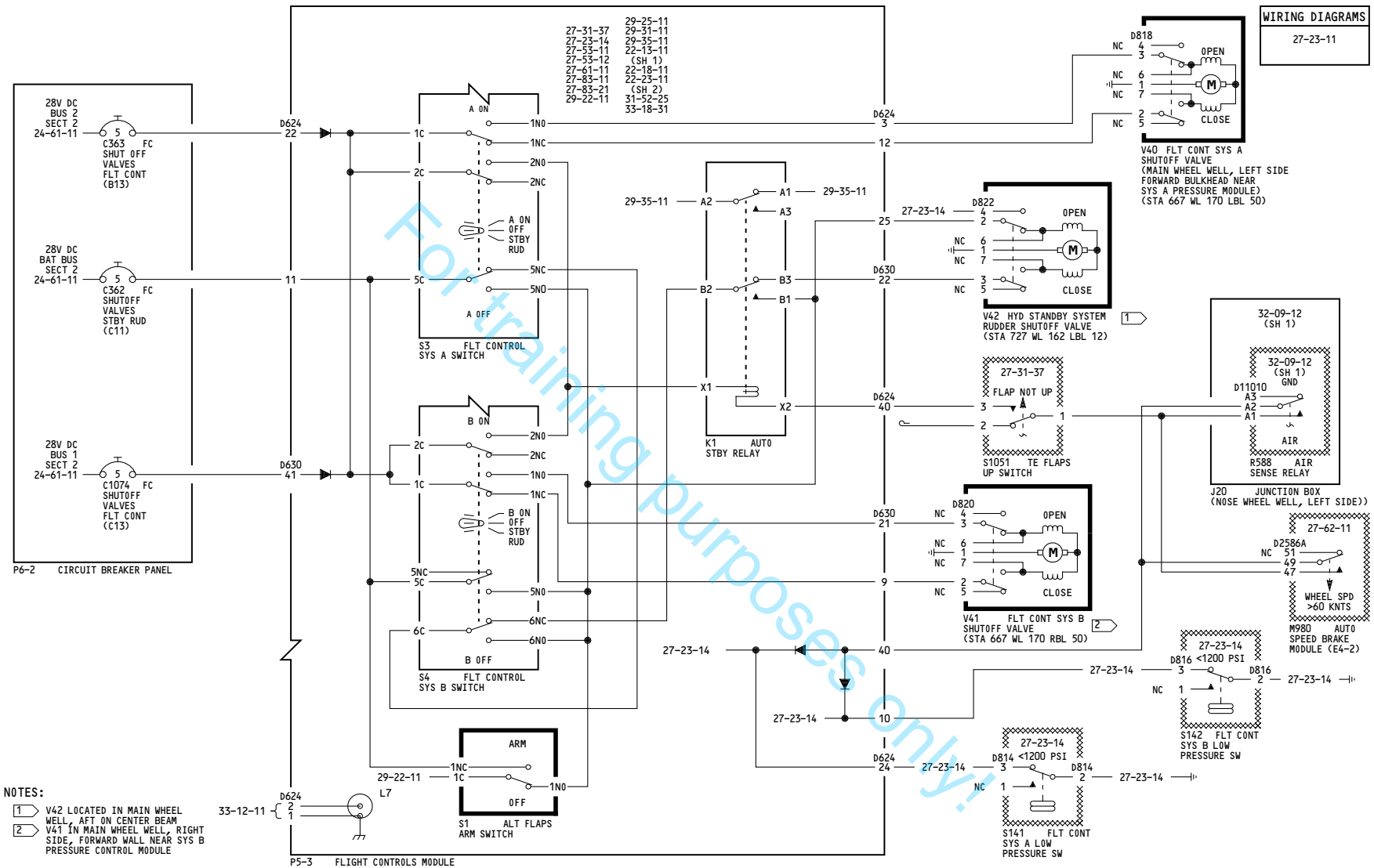
D280A238

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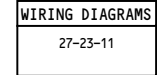
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NOTES:

- 1 V42 LOCATED IN MAIN WHEEL WELL, AFT ON CENTER BEAM
- 2 V41 IN MAIN WHEEL WELL, RIGHT SIDE, FORWARD WALL NEAR SYS B PRESSURE CONTROL MODULE

**FLIGHT CONTROL SYS "A"  
SYS "B", AND STANDBY  
RUDDER CONTROL**

	<u>Incorporates</u>
▶ 27-1247 R01	
▶ 27-1253 R03	

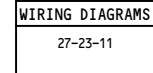
**27-23-11**

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YD001-YD002, YD005

D280A238



- 1 V42 LOCATED IN MAIN WHEEL WELL, AFT ON CENTER BEAM
- 2 V41 IN MAIN WHEEL WELL, RIGHT SIDE, FORWARD WALL NEAR SYS B PRESSURE CONTROL MODULE

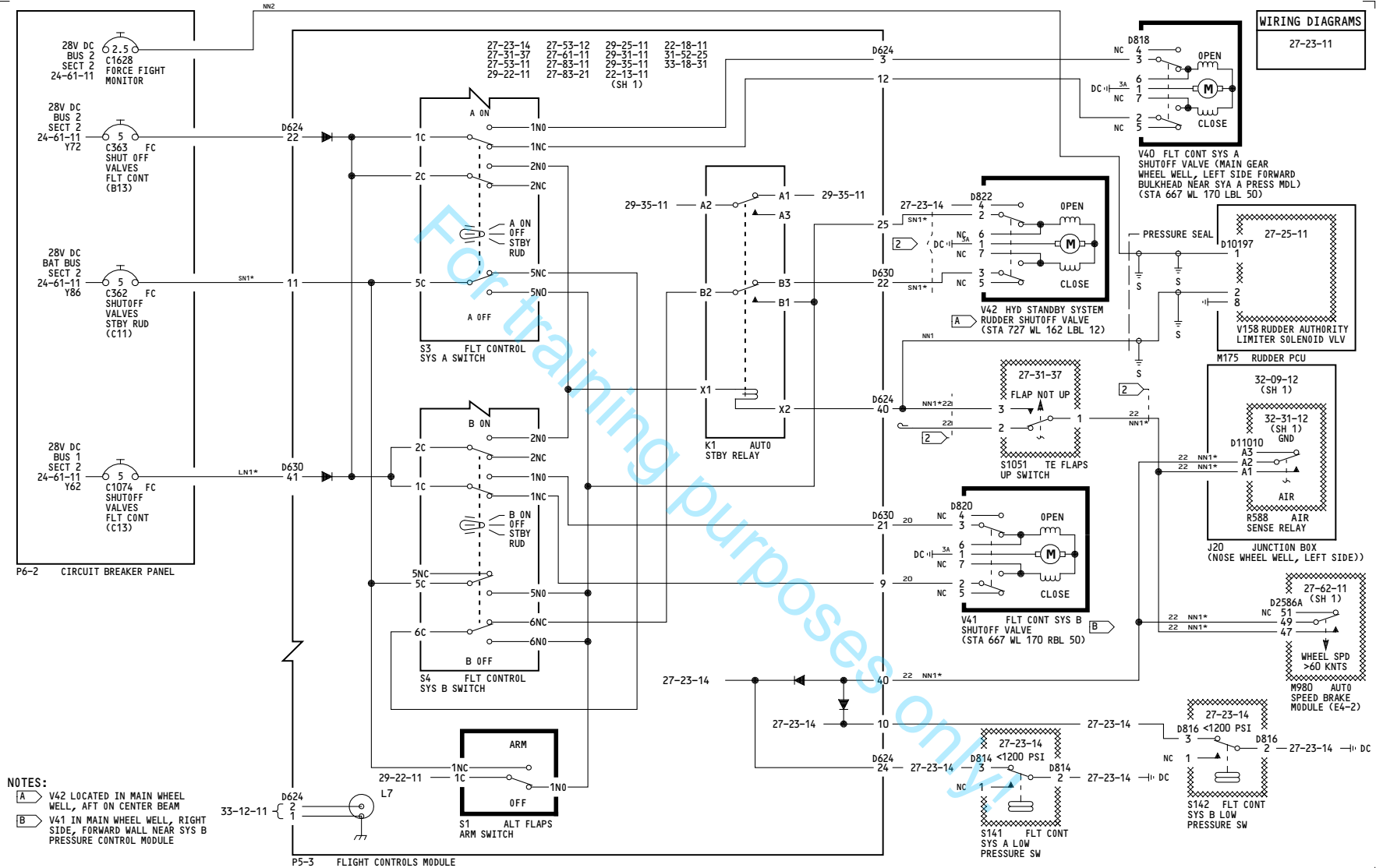
Incorporates  
▶ 27-1253 R03

**27-23-11**

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**NOTES:**  
 [A] V42 LOCATED IN MAIN WHEEL WELL, AFT ON CENTER BEAM  
 [B] V41 IN MAIN WHEEL WELL, RIGHT SIDE, FORWARD WALL NEAR SYS B PRESSURE CONTROL MODULE

YD006

**FLIGHT CONTROL SYS "A"  
 SYS "B", AND STANDBY  
 RUDDER CONTROL**

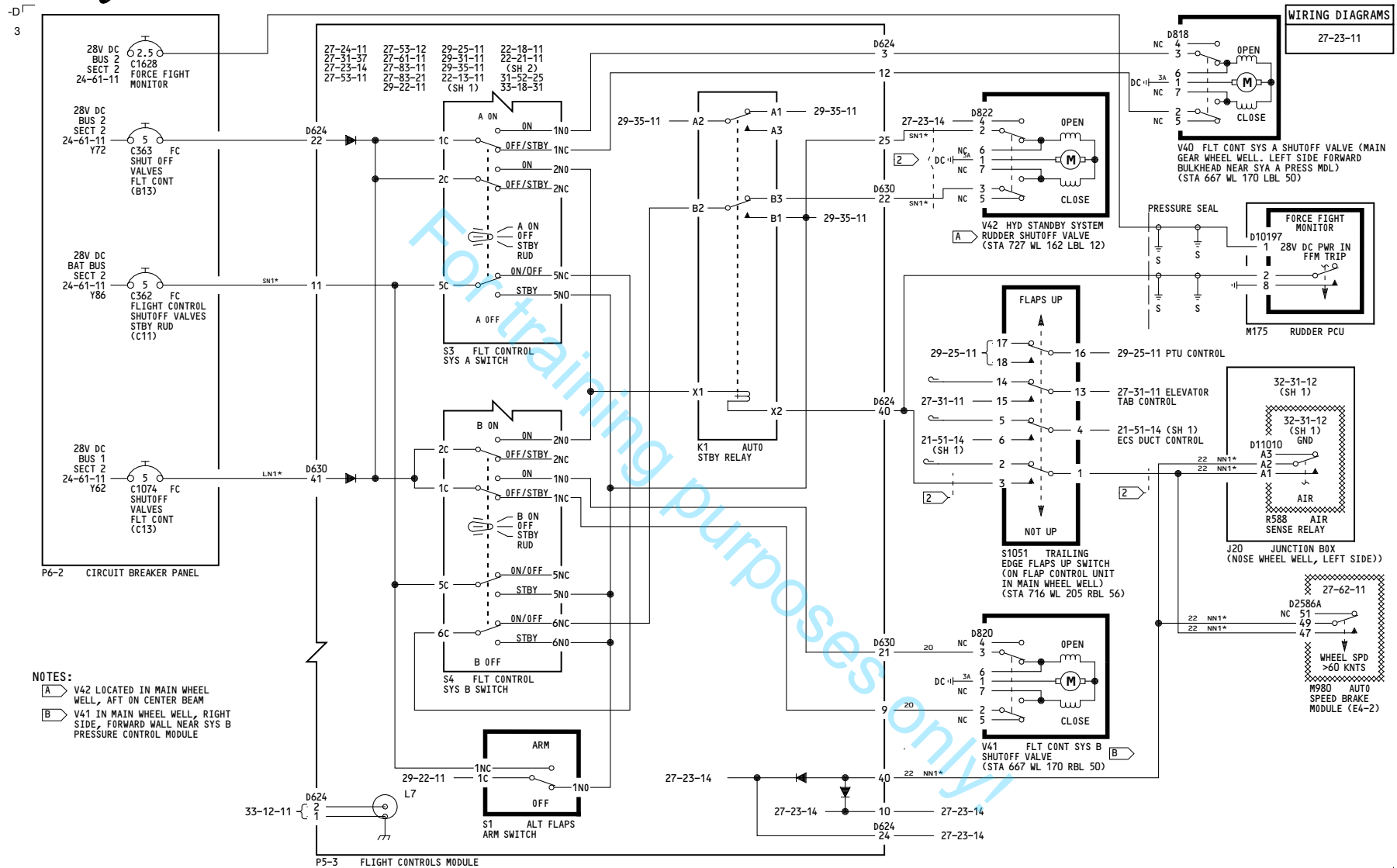
Incorporates  
 27-1253 R03

D280A238

**27-23-11**

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YD007-YD020

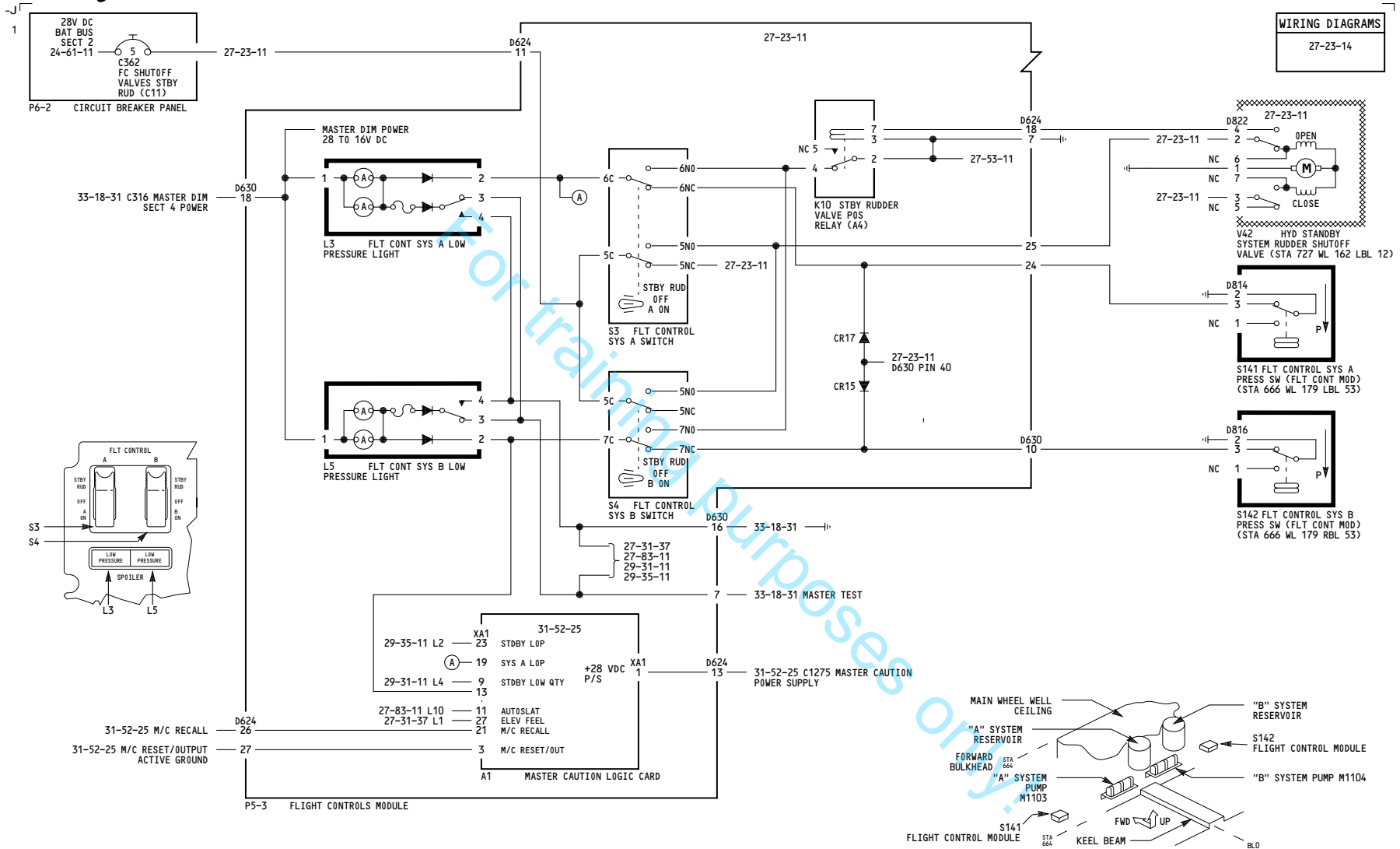
**FLIGHT CONTROL SYS "A"  
SYS "B", AND STANDBY  
RUDDER CONTROL**

D280A238

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YD001-YD005

**FLIGHT CONTROL SYS "A"  
AND SYS "B" LOW PRESSURE  
INDICATION**

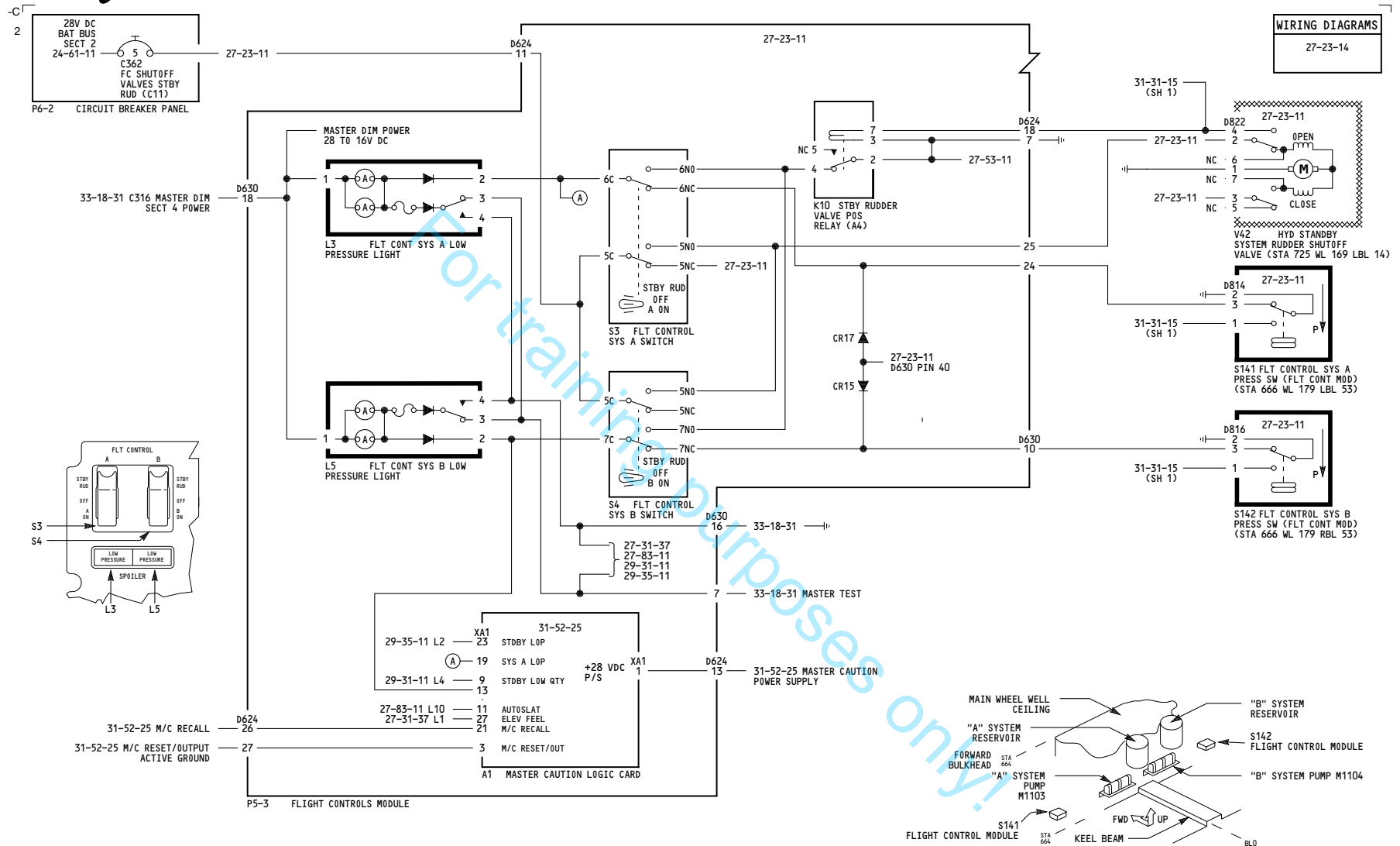
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YD006-YD020

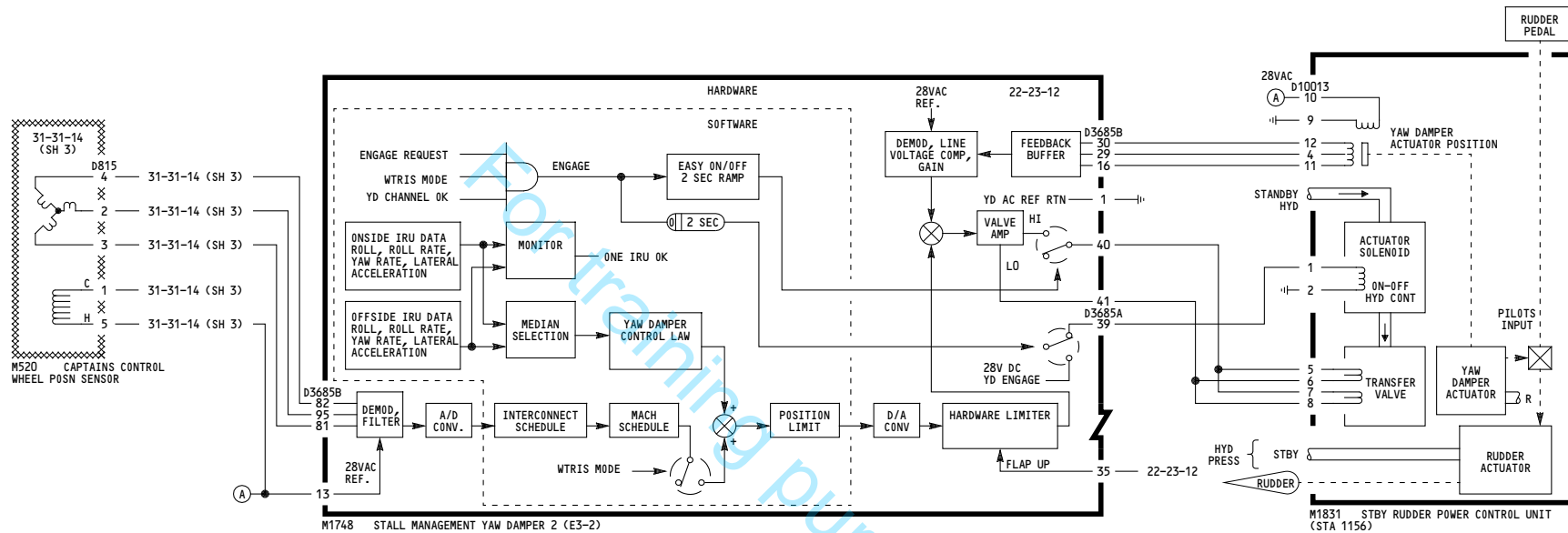
**FLIGHT CONTROL SYS "A"  
AND SYS "B" LOW PRESSURE  
INDICATION**

D280A238

**27-23-14**

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ALL

**WHEEL TO RUDDER  
INTERCONNECT SYSTEM**

D280A238

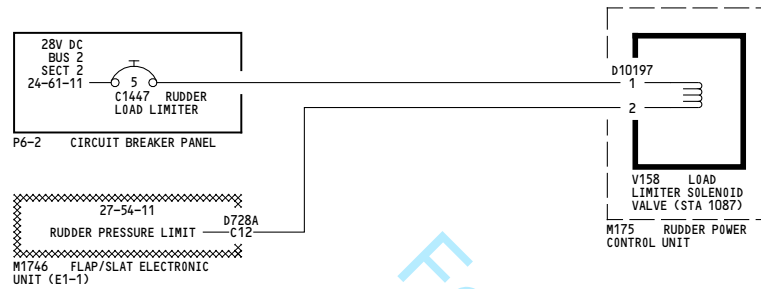
**27-24-11**

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WIRING DIAGRAMS  
27-25-11



For training purposes only!

YD001-YD002, YD005

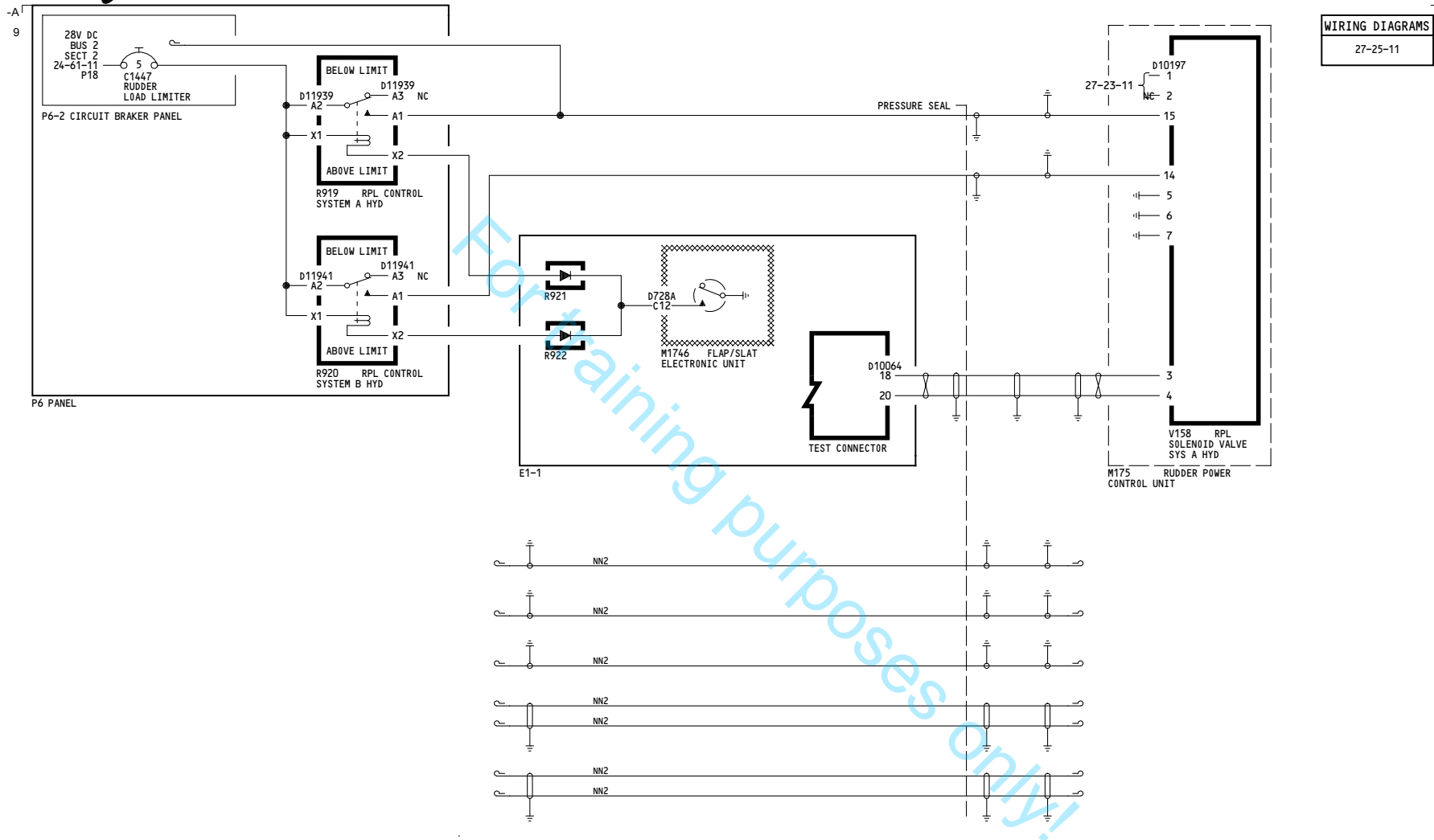
**RUDDER AUTHORITY LIMITER**

D280A238

**27-25-11**

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YD001-YD002, YD005

**RUDDER AUTHORITY LIMITER**

Incorporates  
 27-1247 R01  
 27-1253 R03

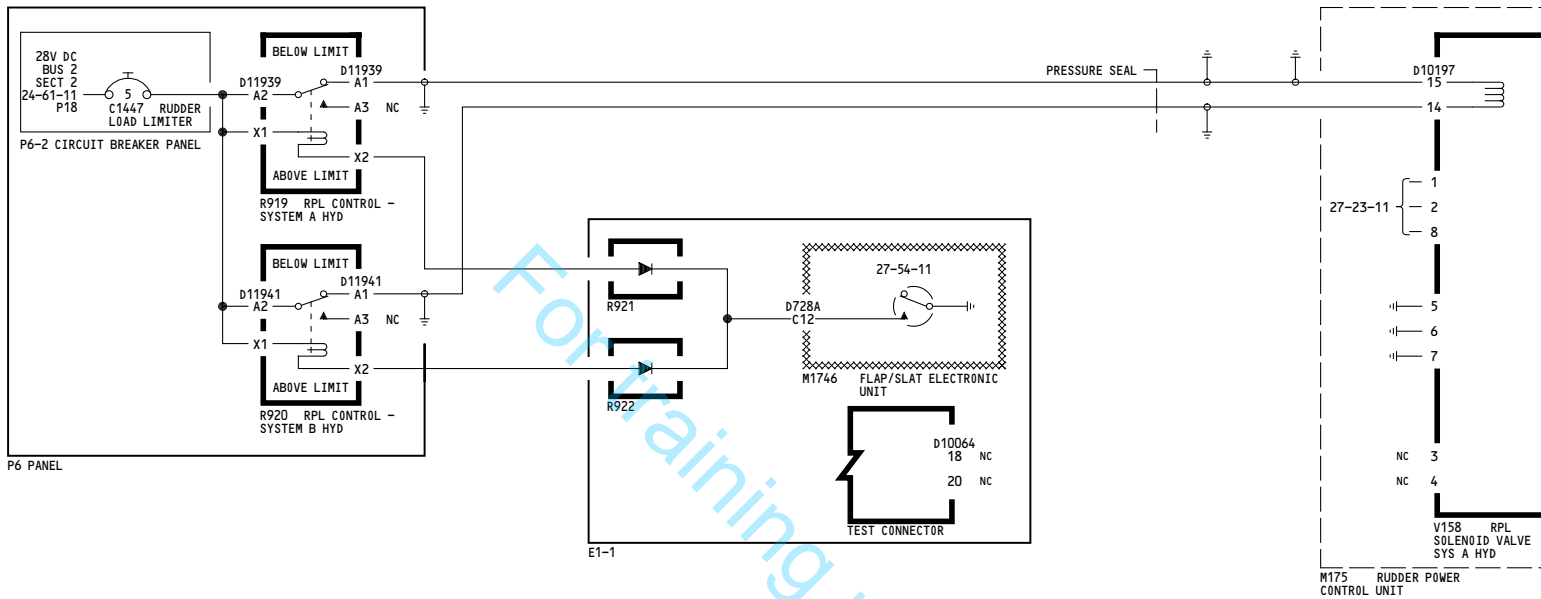
D280A238

**27-25-11**

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WIRING DIAGRAMS  
27-25-11

YD003-YD004

**RUDDER AUTHORITY LIMITER**

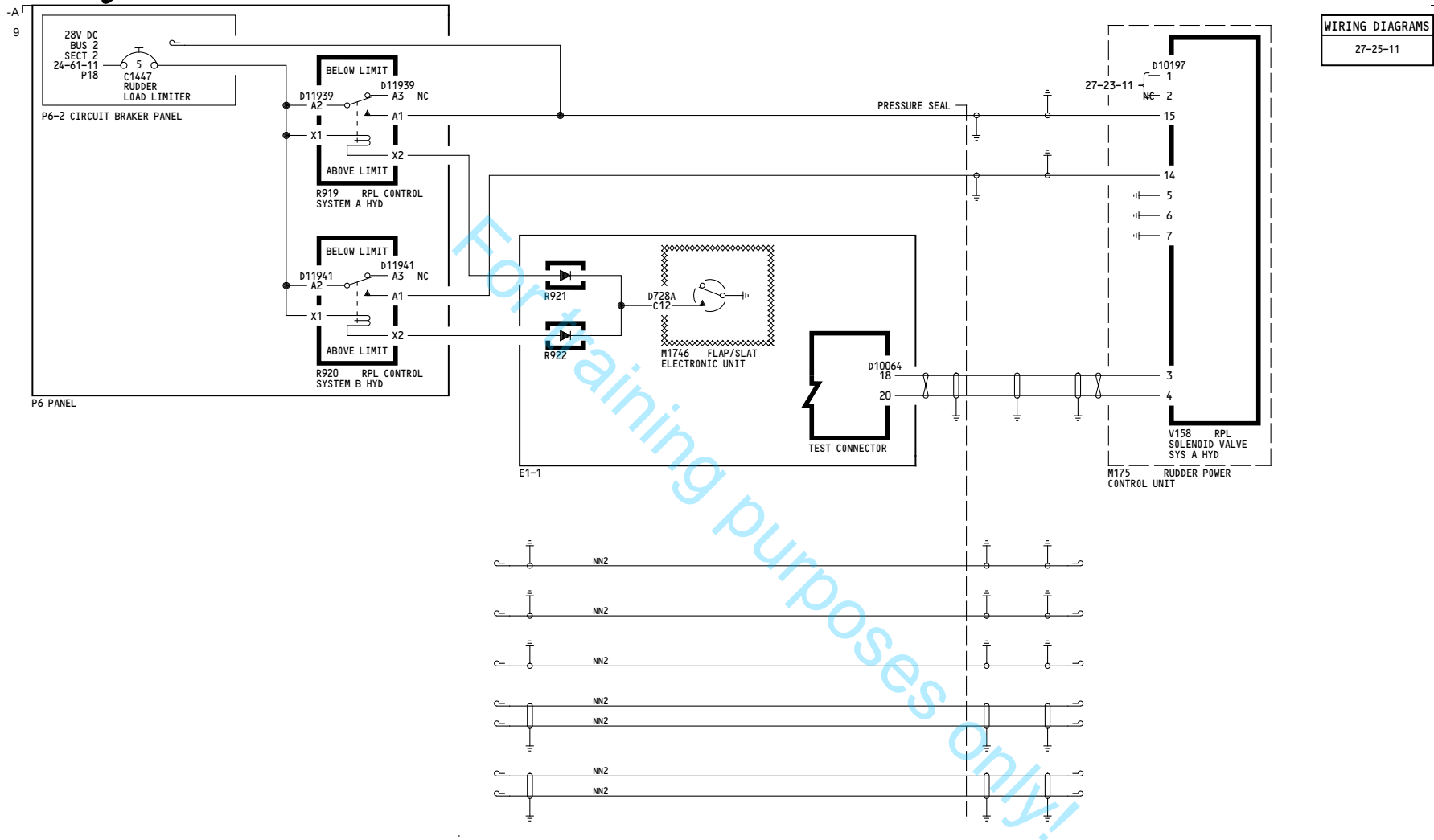
Incorporates  
27-1253 R03

D280A238

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YD006

**RUDDER AUTHORITY LIMITER**

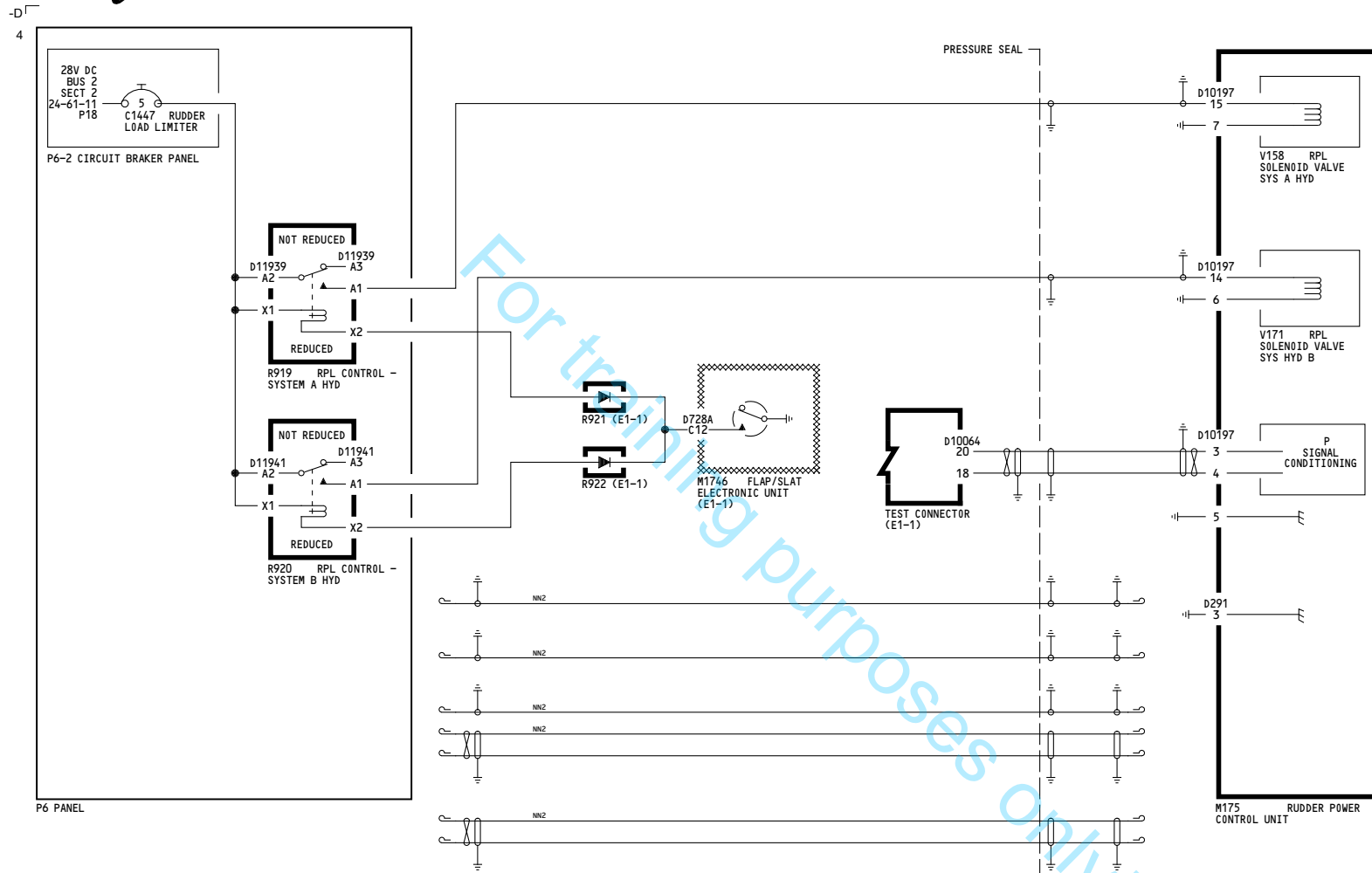
**Incorporates**  
27-1253 R03

D280A238

**27-25-11**

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YD007-YD020

**RUDDER AUTHORITY LIMITER**

D280A238

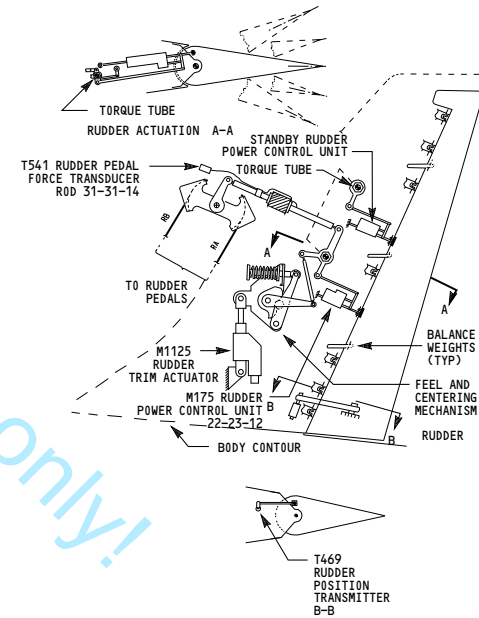
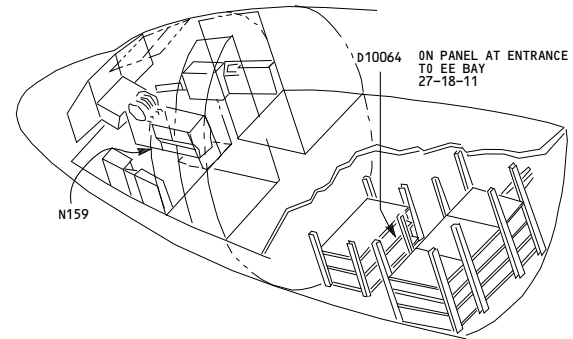
**27-25-11**

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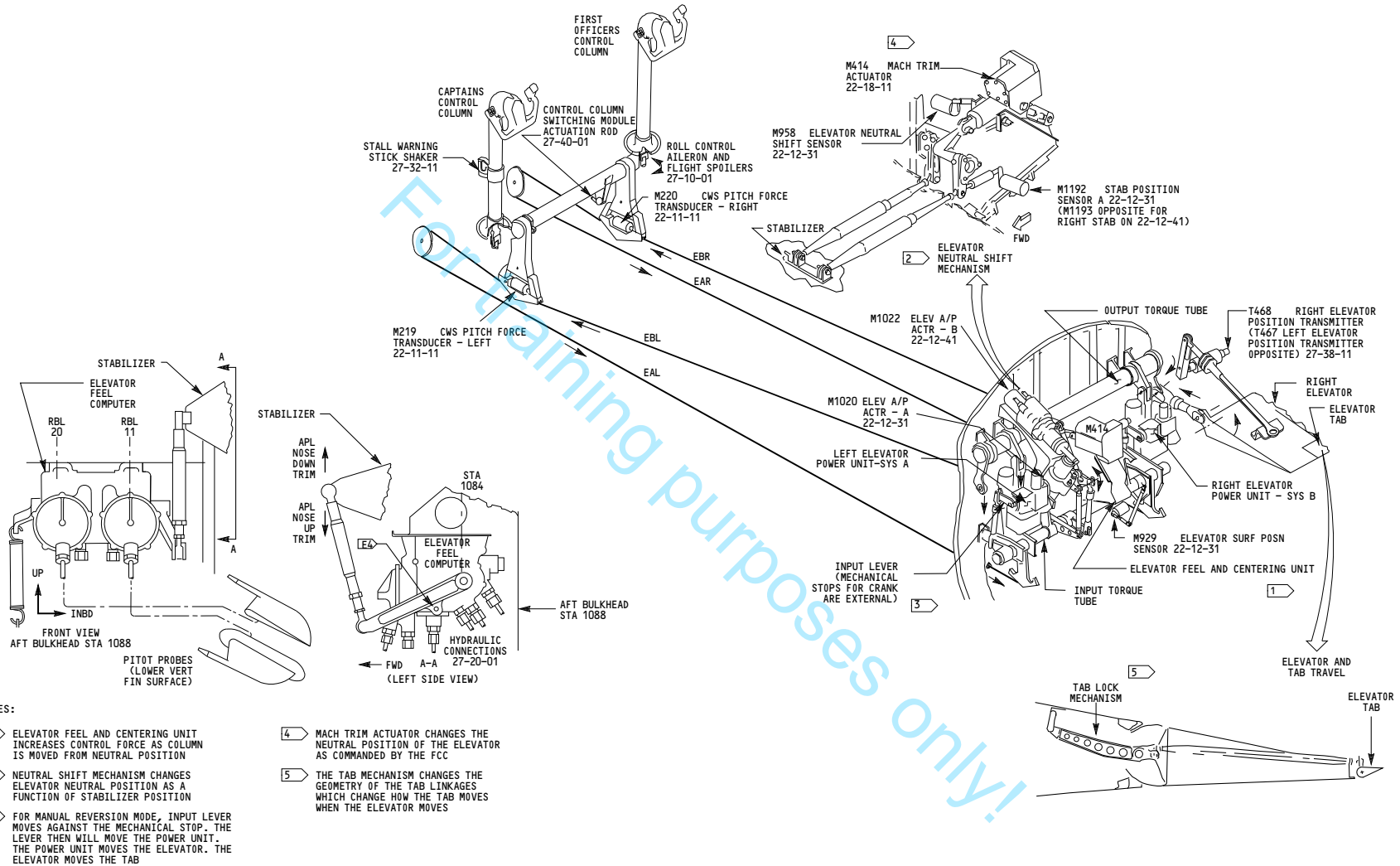
## WIRING DIAGRAMS



**27-28-11**



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ALL	ELEVATOR
	D280A238

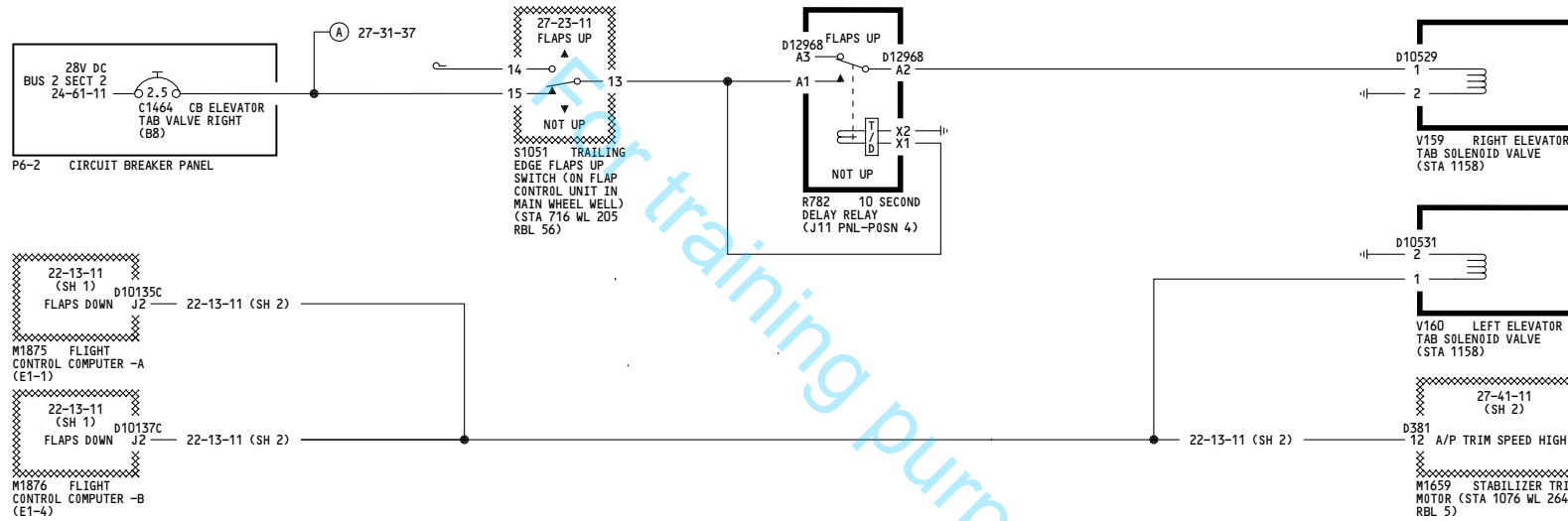
**27-30-01**

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WIRING DIAGRAMS  
27-31-11



ALL

**ELEVATOR TAB CONTROL**

D280A238

**27-31-11**

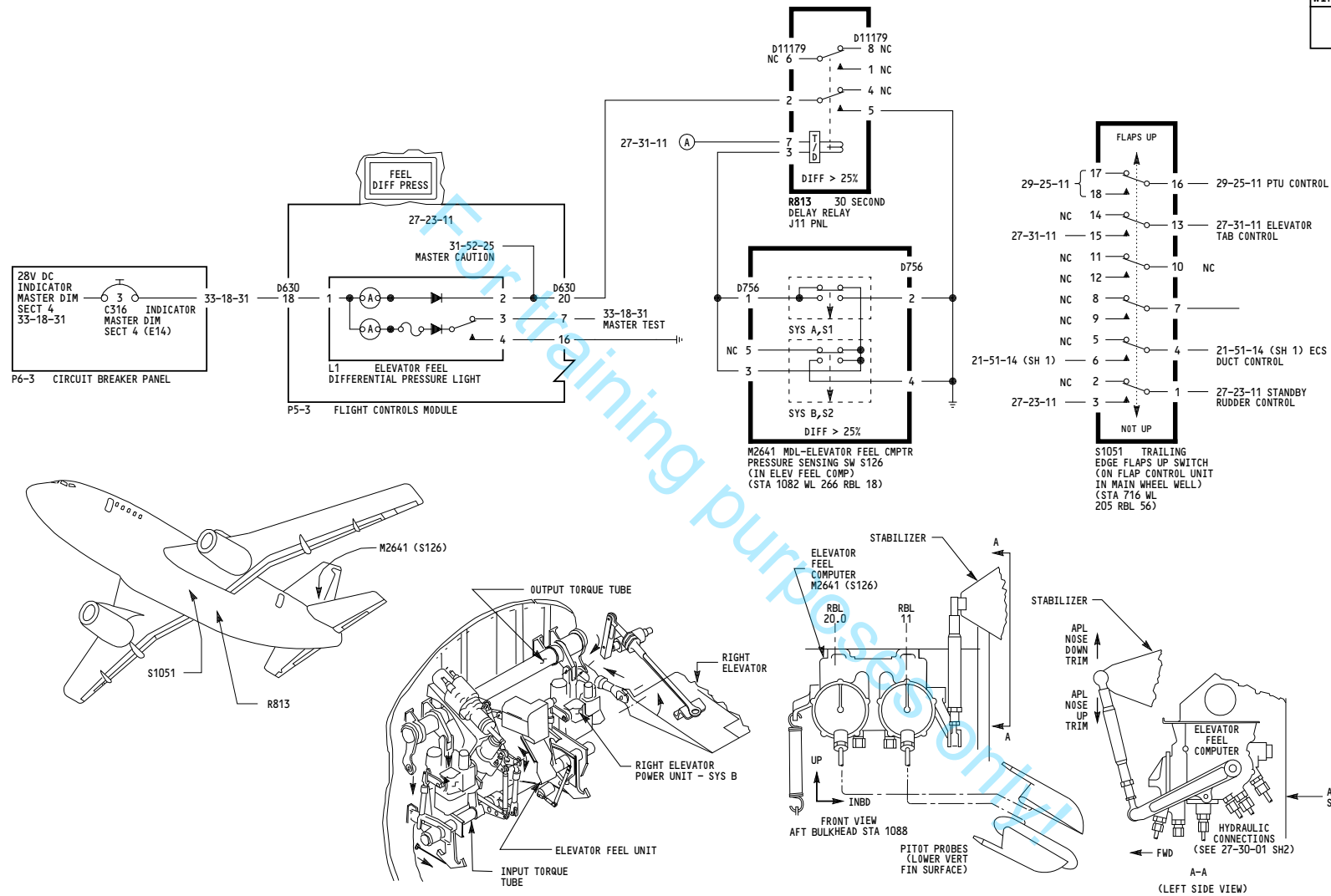
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## WIRING DIAGRAMS

27-31-11  
27-31-37



ALL

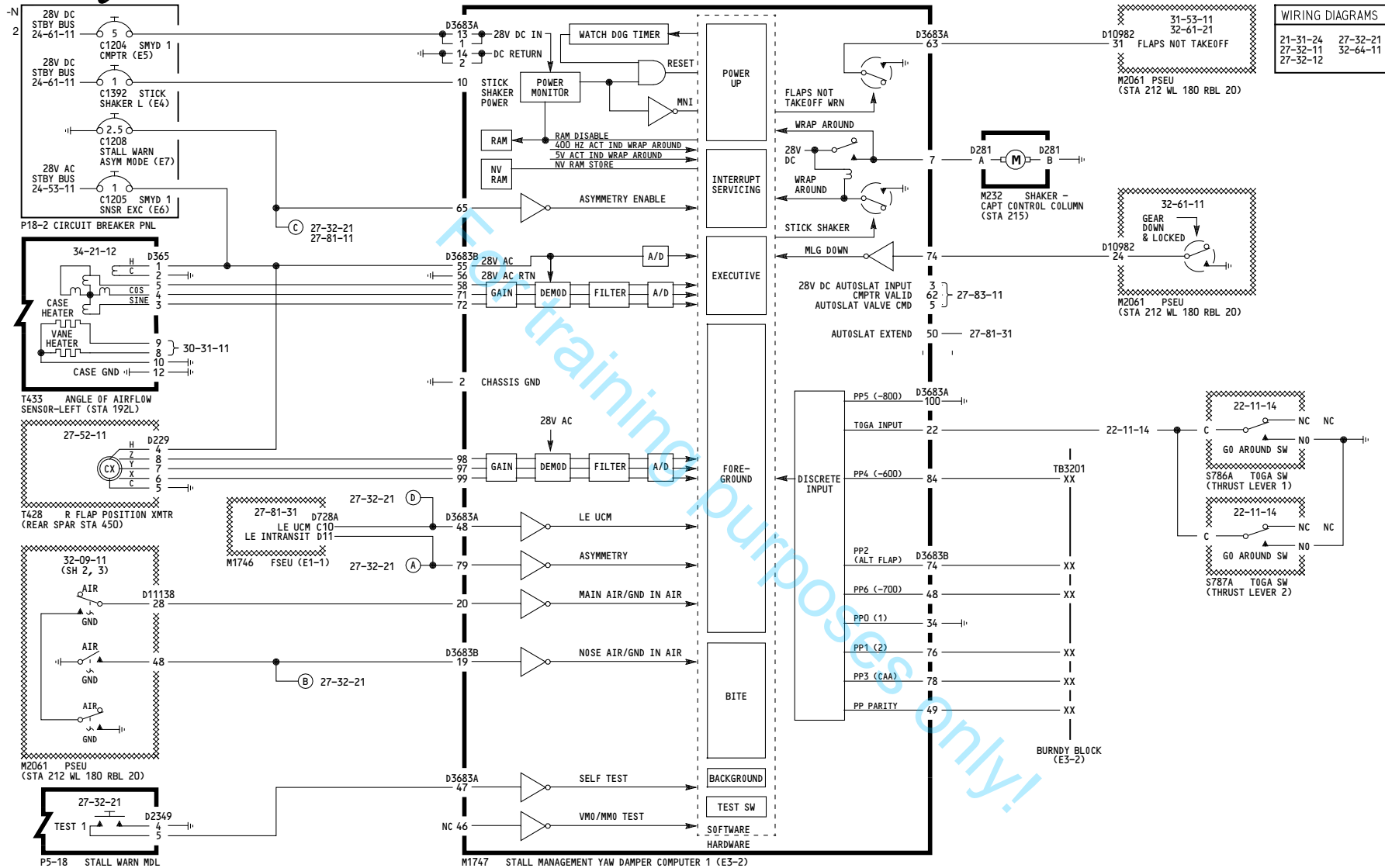
## ELEVATOR FEEL DIFFERENTIAL PRESSURE

D280A238

**27-31-37**

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WIRING DIAGRAMS	
21-31-24	27-32-21
27-32-11	32-64-11
27-32-12	

YD001-YD007

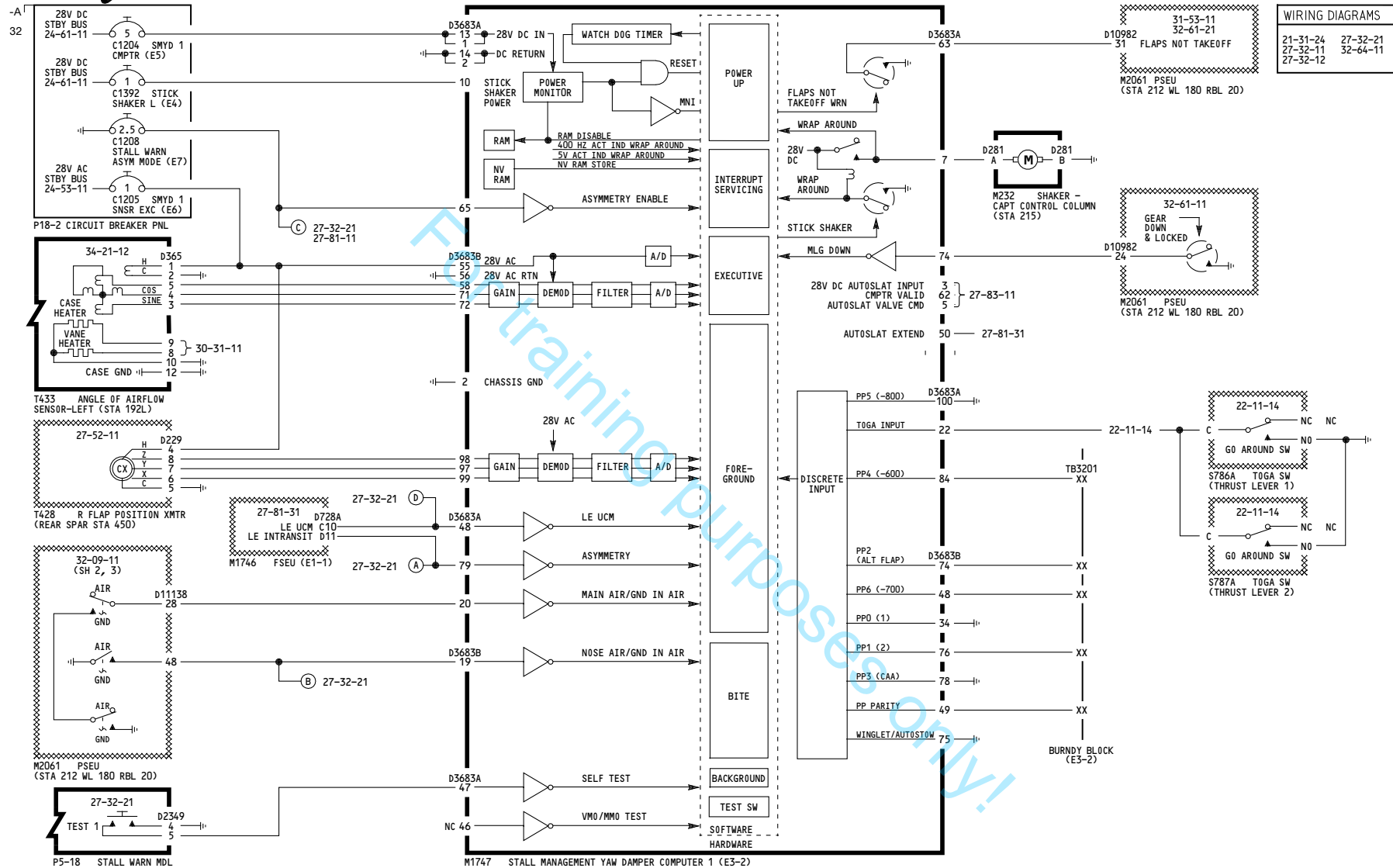
## STALL WARNING SYSTEM 1 POWER AND ANALOGS

D280A238

27-32-11

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YD005

## STALL WARNING SYSTEM 1 POWER AND ANALOGS

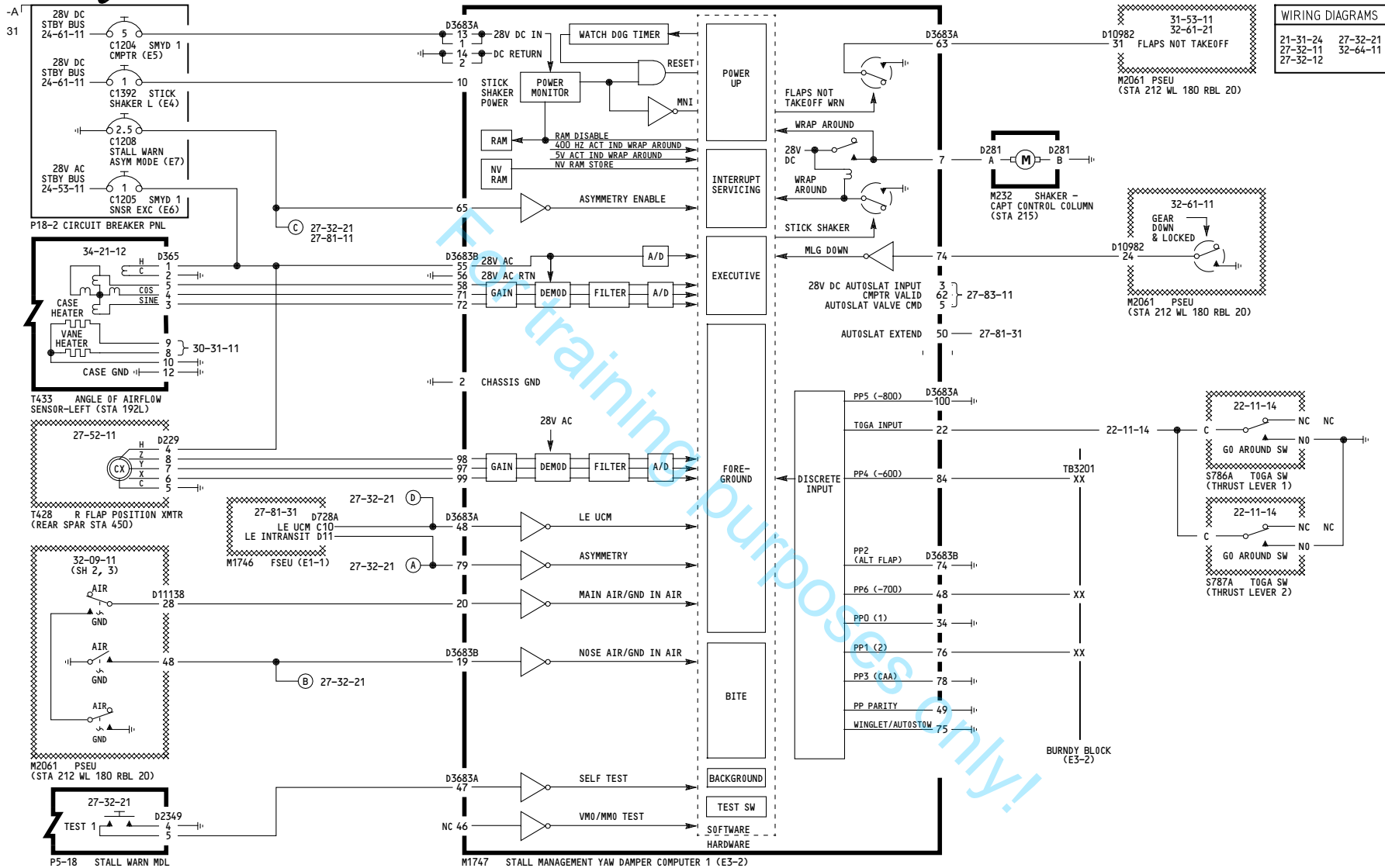
 Incorporates  
PD 0802664

**27-32-11**

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D280A238



YD006-YD007

## STALL WARNING SYSTEM 1 POWER AND ANALOGS

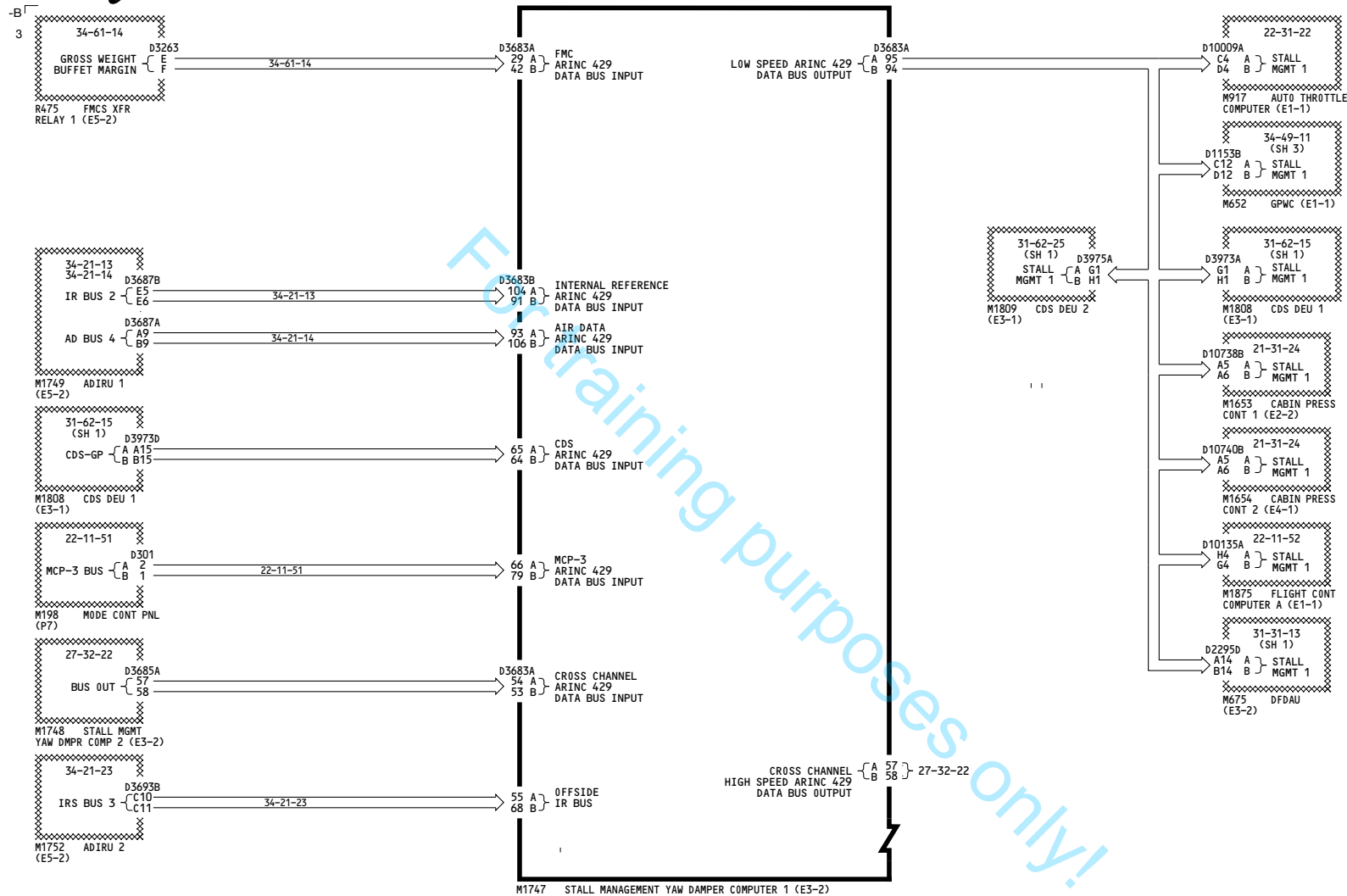
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▶ PD 0802664

**27-32-11**

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D280A238



YD001-YD006

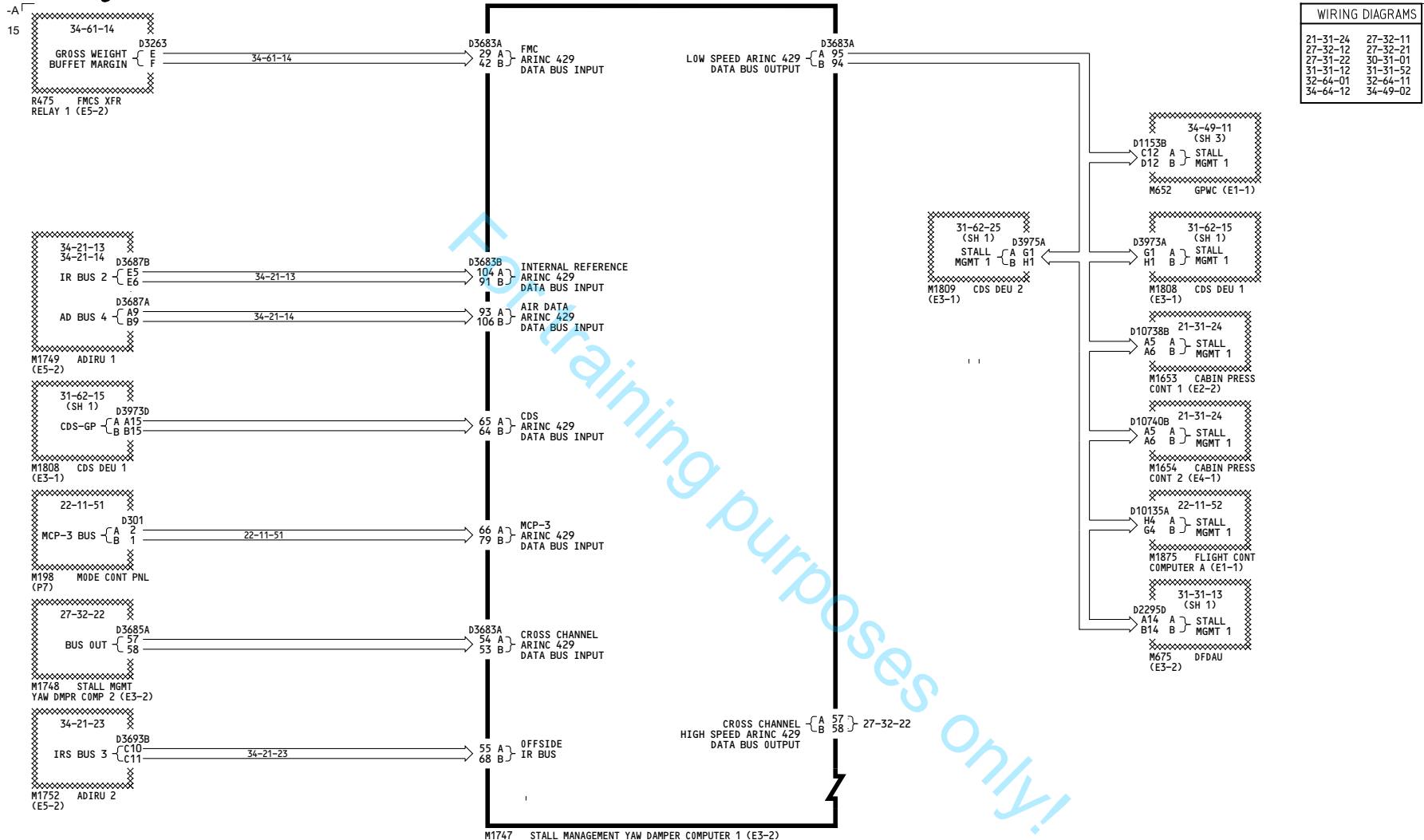
STALL WARNING SYSTEM 1  
DIGITAL INTERFACE

D280A238

27-32-12

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YD007

## STALL WARNING SYSTEM 1 DIGITAL INTERFACE

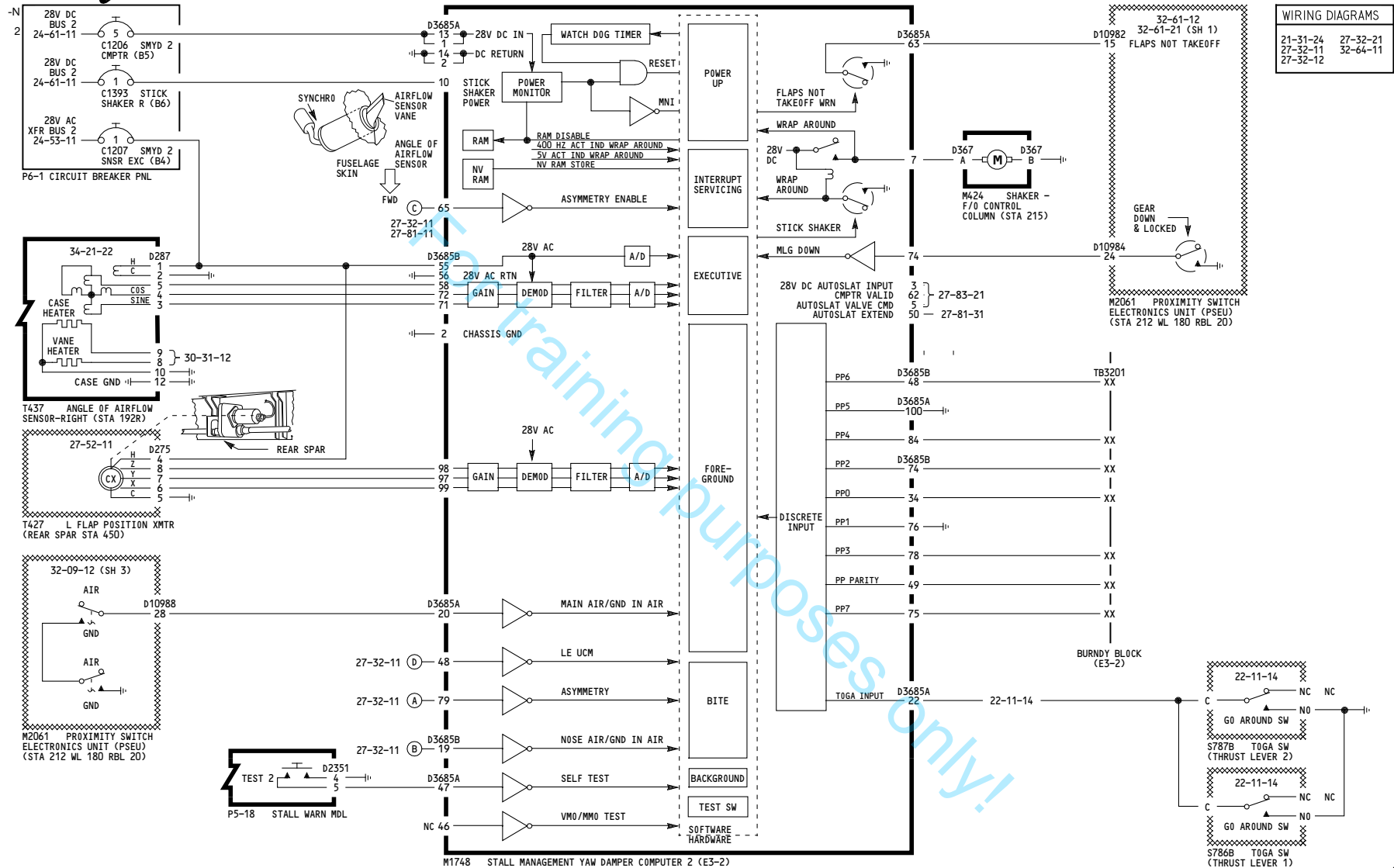
D280A238

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WIRING DIAGRAMS	
21-31-24	27-32-21
27-32-11	32-64-11
27-32-12	

ALL

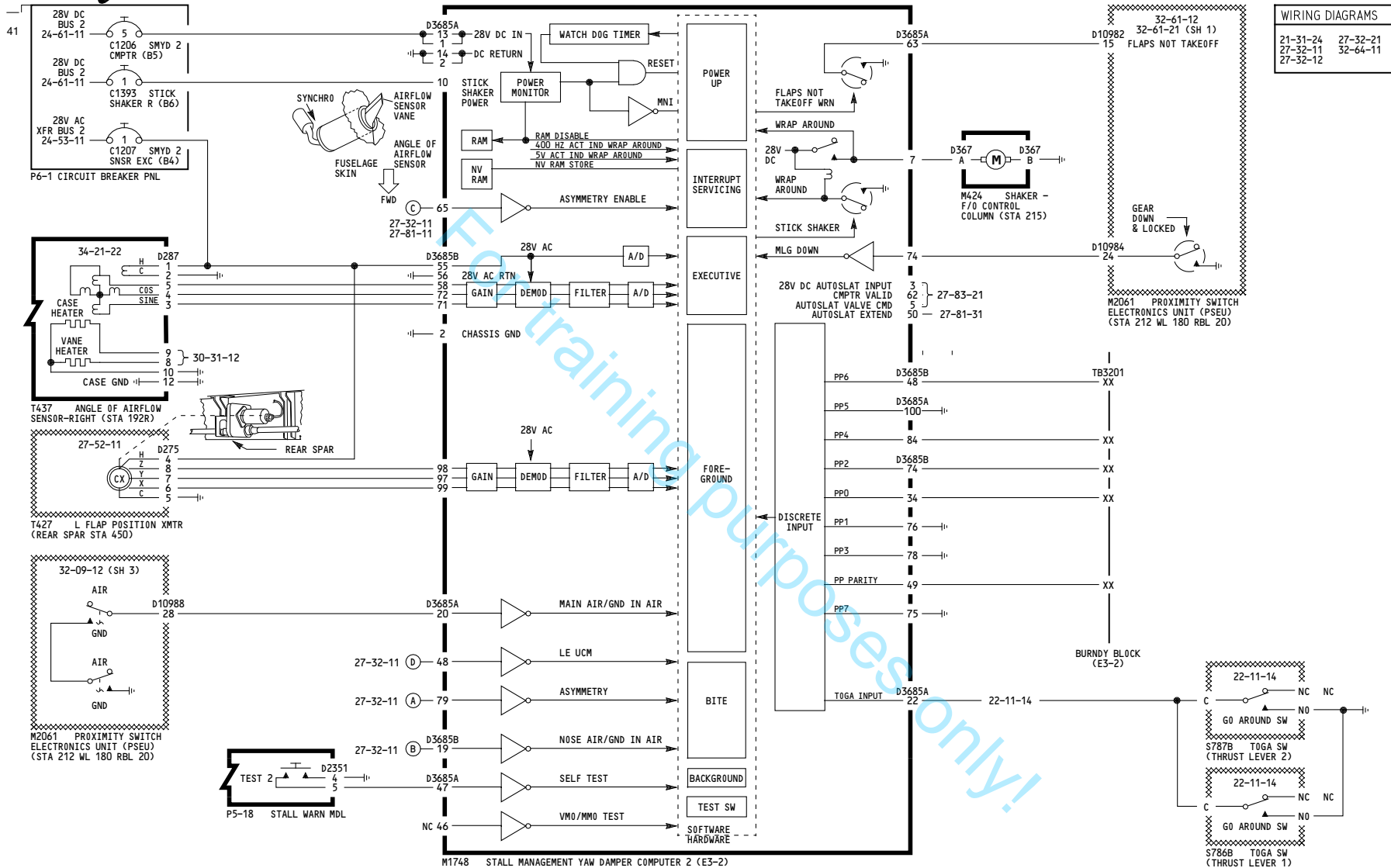
## STALL WARNING SYSTEM 2 POWER AND ANALOGS

D280A238

27-32-21

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YD005

## STALL WARNING SYSTEM 2 POWER AND ANALOGS

Incorporates  
PD 0802664

D280A238

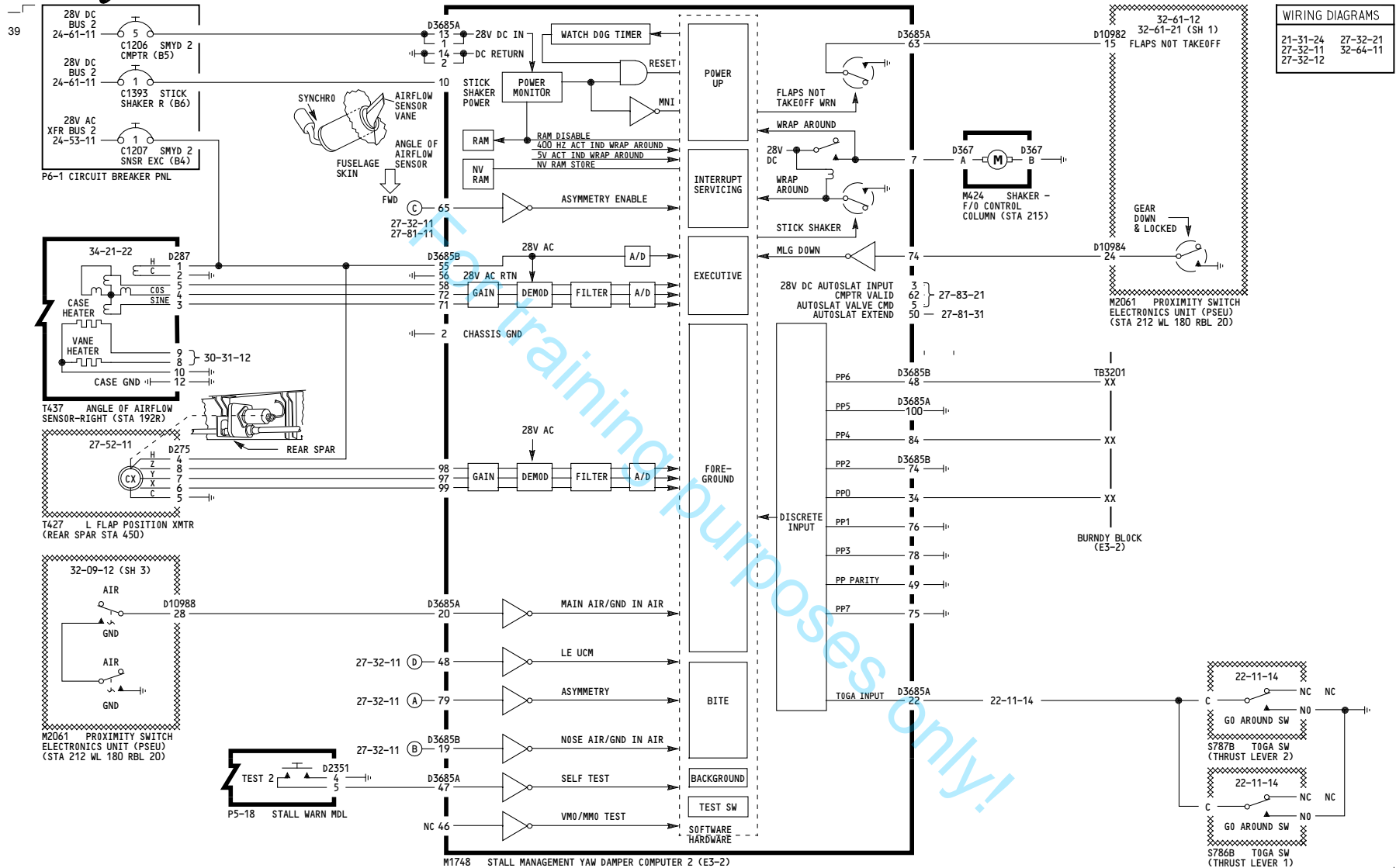
27-32-21

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## 737-800 SYSTEM SCHEMATIC MANUAL



YD006-YD007

### STALL WARNING SYSTEM 2 POWER AND ANALOGS

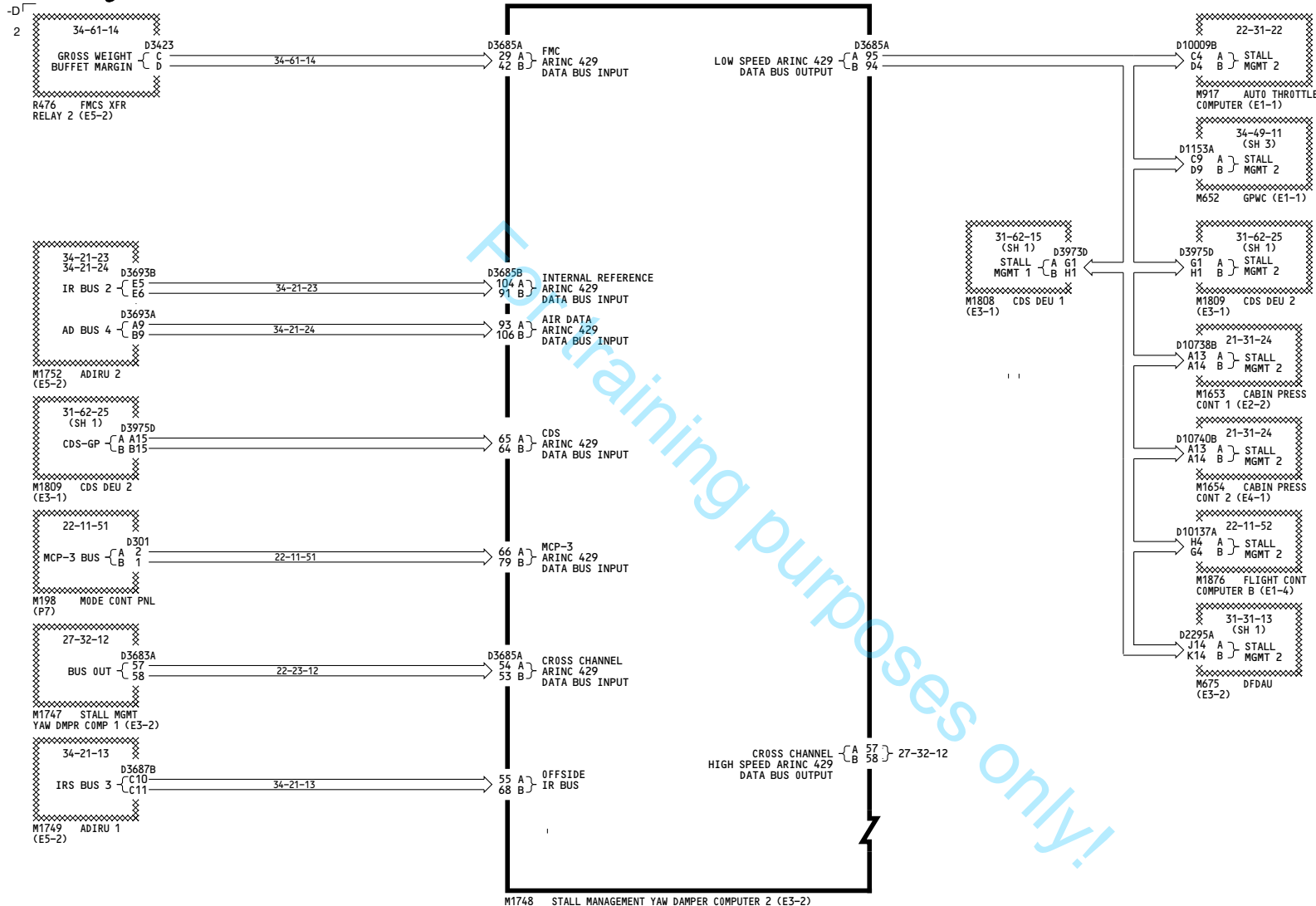
Incorporates  
PD 0802664

D280A238

27-32-21

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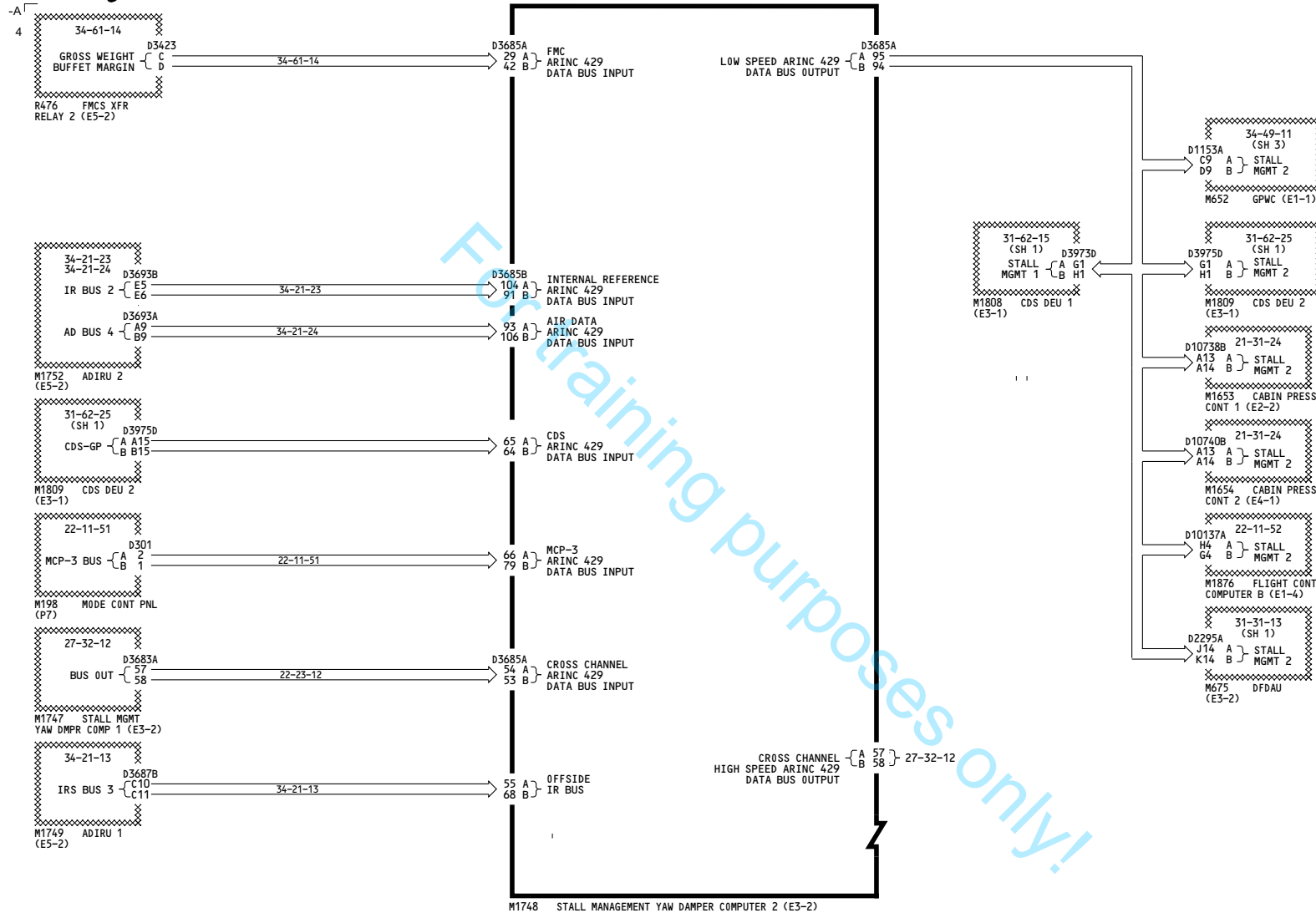
WIRING DIAGRAMS			
21-31-24	27-32-11		
27-32-12	27-32-21		
27-31-22	30-31-01		
31-31-12	31-31-52		
32-64-01	32-64-11		
34-64-12	34-49-02		

YD001-YD006

**STALL WARNING SYSTEM 2  
DIGITAL INTERFACE**

D280A238

WIRING DIAGRAMS			
21-31-24	27-32-11		
27-32-12	27-32-21		
27-31-22	30-31-01		
31-31-12	31-31-52		
32-64-01	32-64-11		
34-64-12	34-49-02		



YD007

**STALL WARNING SYSTEM 2  
DIGITAL INTERFACE**

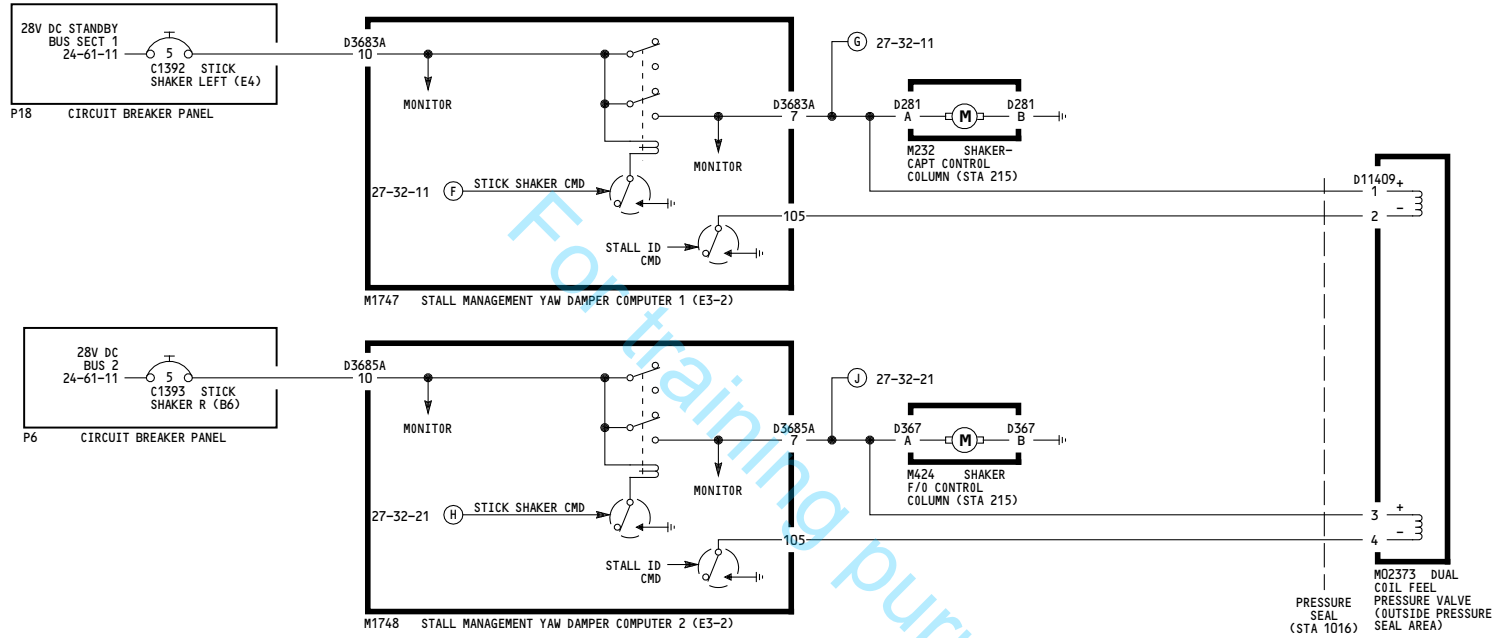
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**27-32-22**

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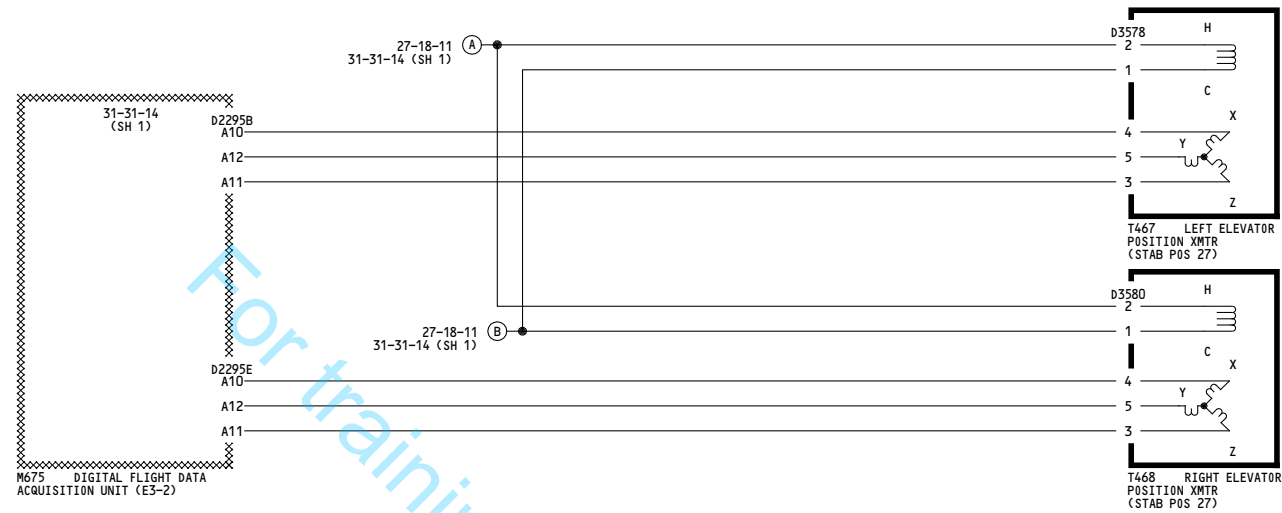
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	D280A238

**27-32-31**

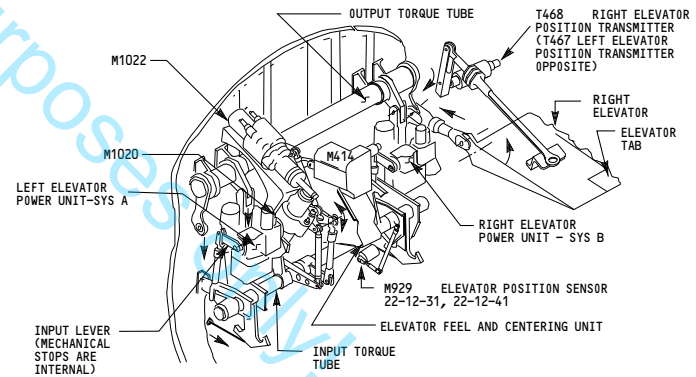
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**WIRING DIAGRAMS**  
27-38-11



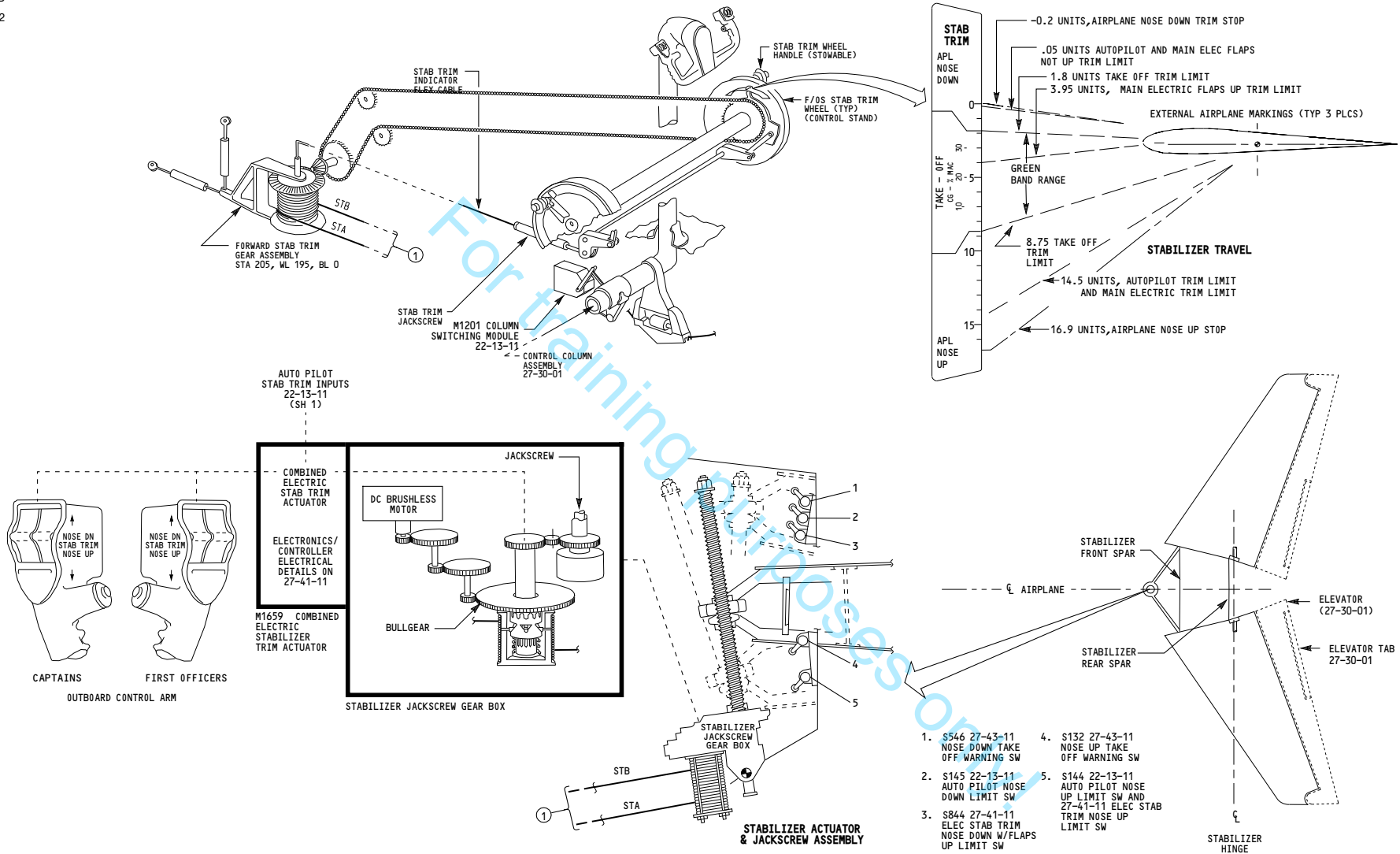
ALL	<b>ELEVATOR POSITION INDICATION</b>
	D280A238

**27-38-11**

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ALL

**HORIZONTAL STABILIZERS**

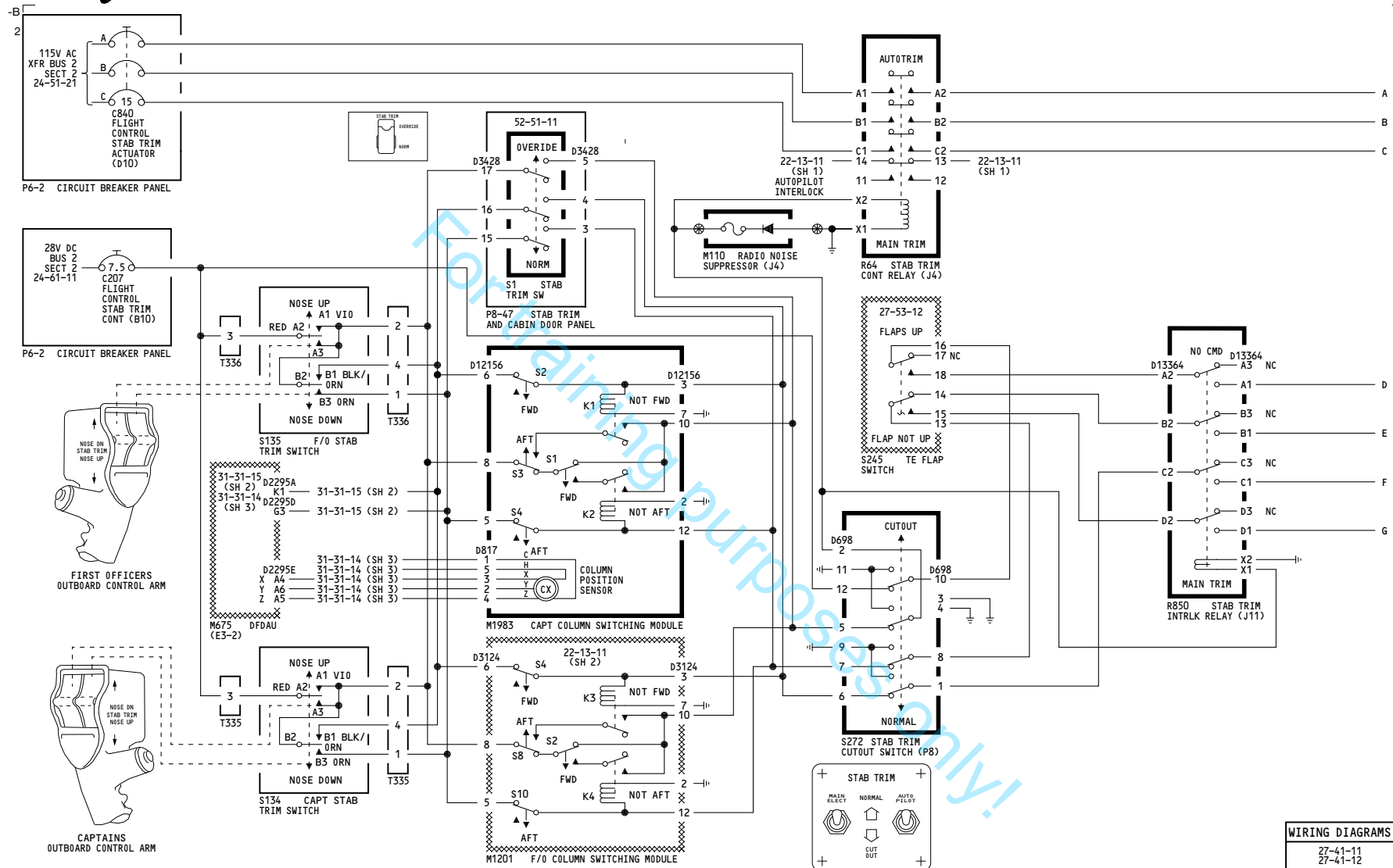
D280A238

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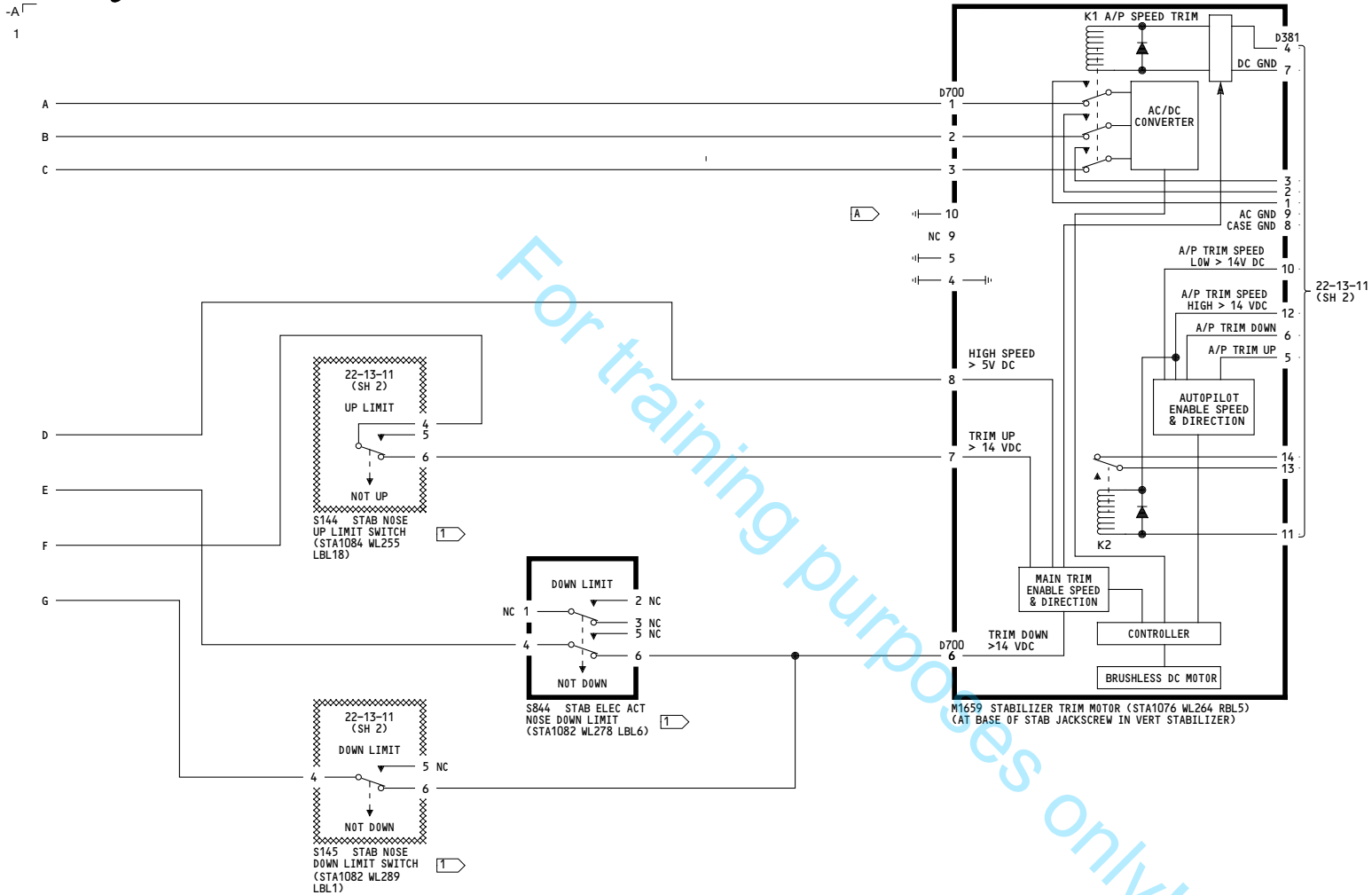
YD001-YD006

## HORIZONTAL STABILIZER TRIM CONTROL

D280A238

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**WIRING DIAGRAMS**  
27-41-11  
27-41-12

**NOTES:**

1 SWITCHES LOCATED NEAR STABILIZER JACKSCREW IN VERTICAL STABILIZER

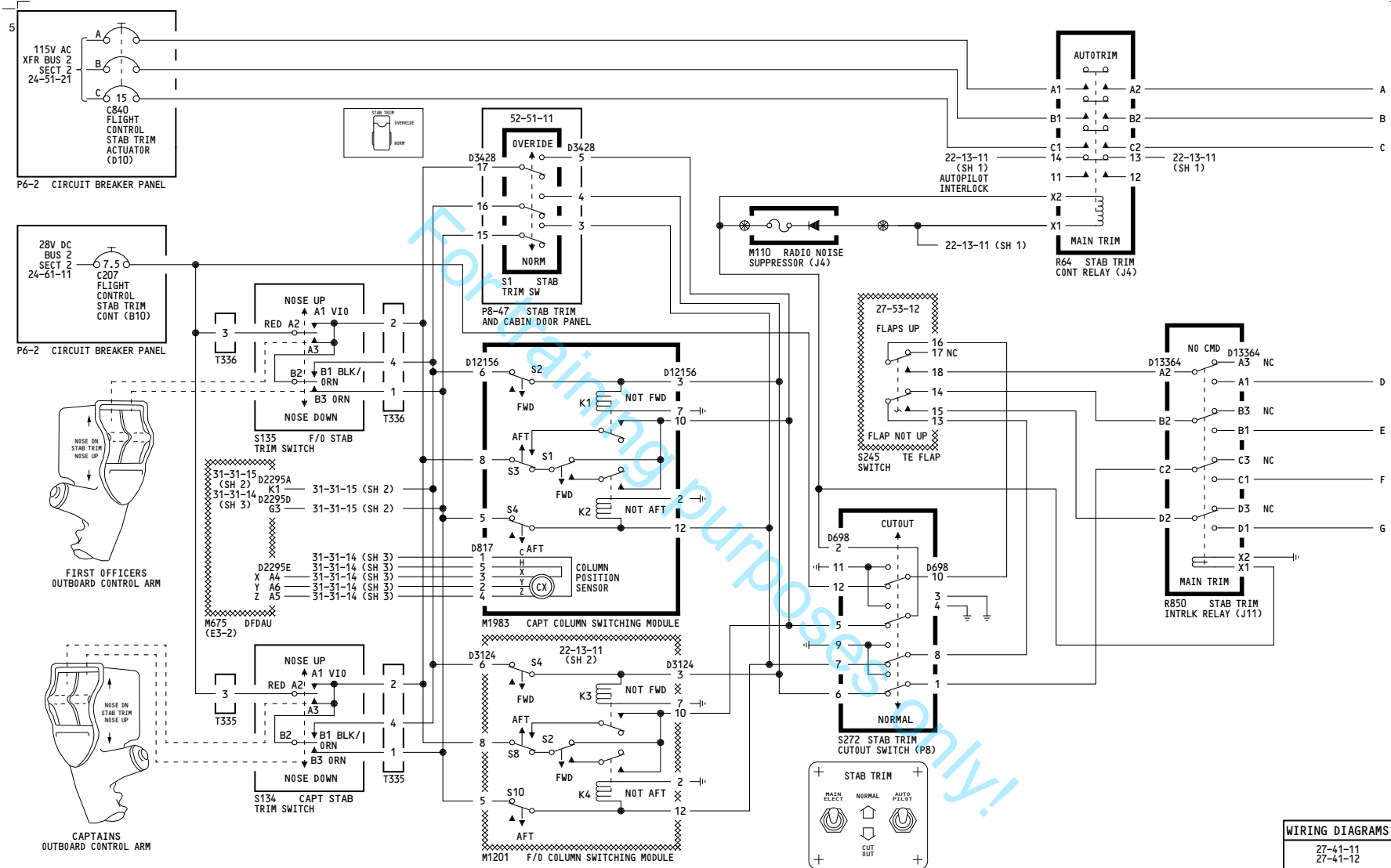
YD001-YD006

**HORIZONTAL STABILIZER TRIM CONTROL**

D280A238

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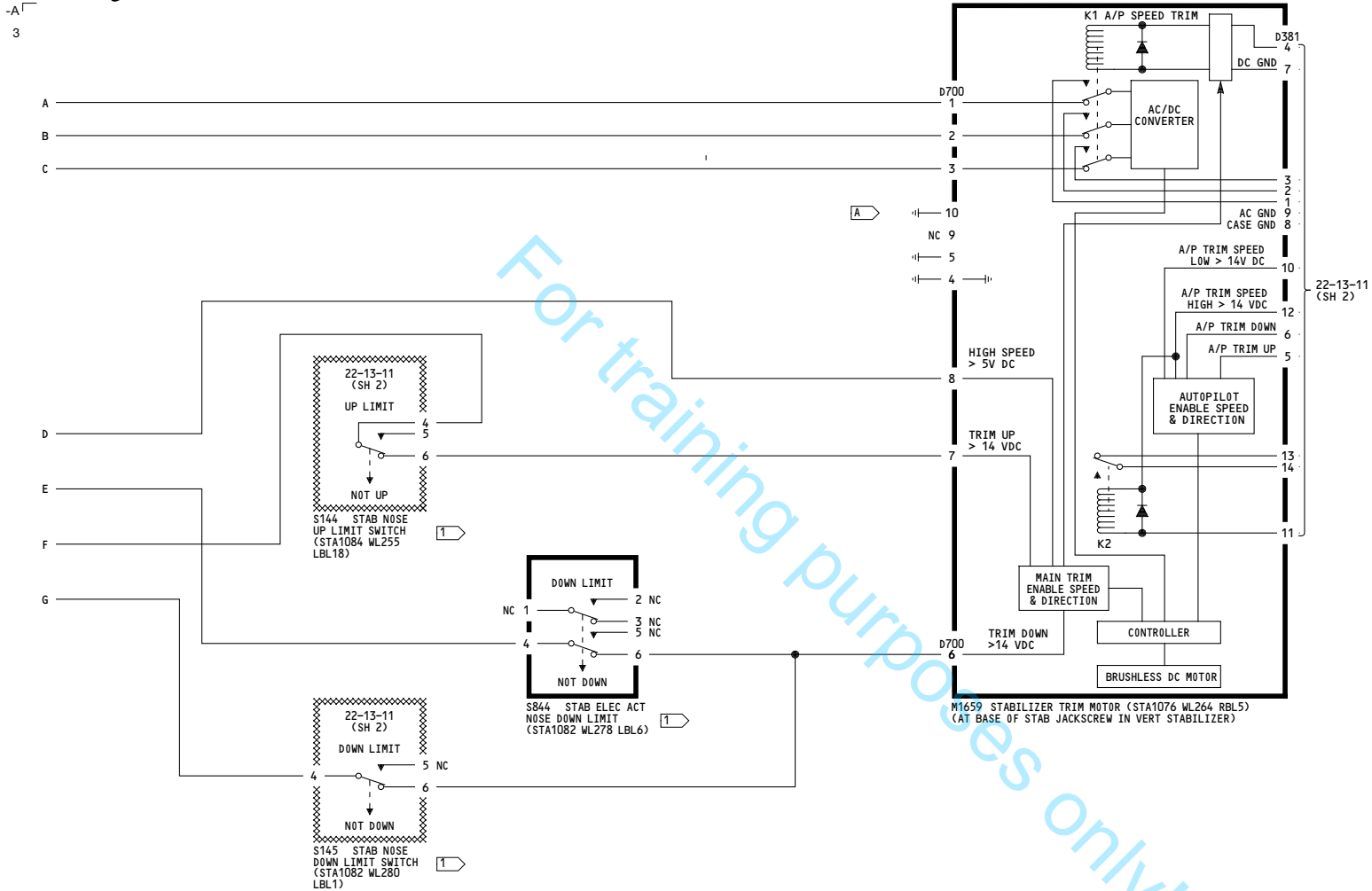
YD007-YD020

**HORIZONTAL STABILIZER  
TRIM CONTROL**

D280A238

**27-41-11**

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**WIRING DIAGRAMS**  
27-41-11  
27-41-12

**NOTES:**

1 SWITCHES LOCATED NEAR STABILIZER JACKSCREW IN VERTICAL STABILIZER

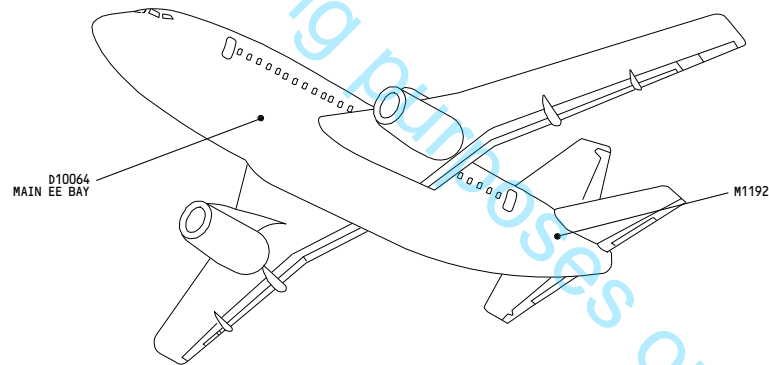
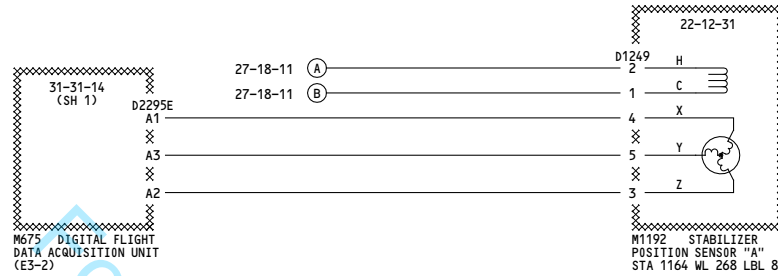
YD007-YD020

**HORIZONTAL STABILIZER TRIM CONTROL**

D280A238

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ALL

**HORIZONTAL STABILIZER  
TRIM INDICATION**

D280A238

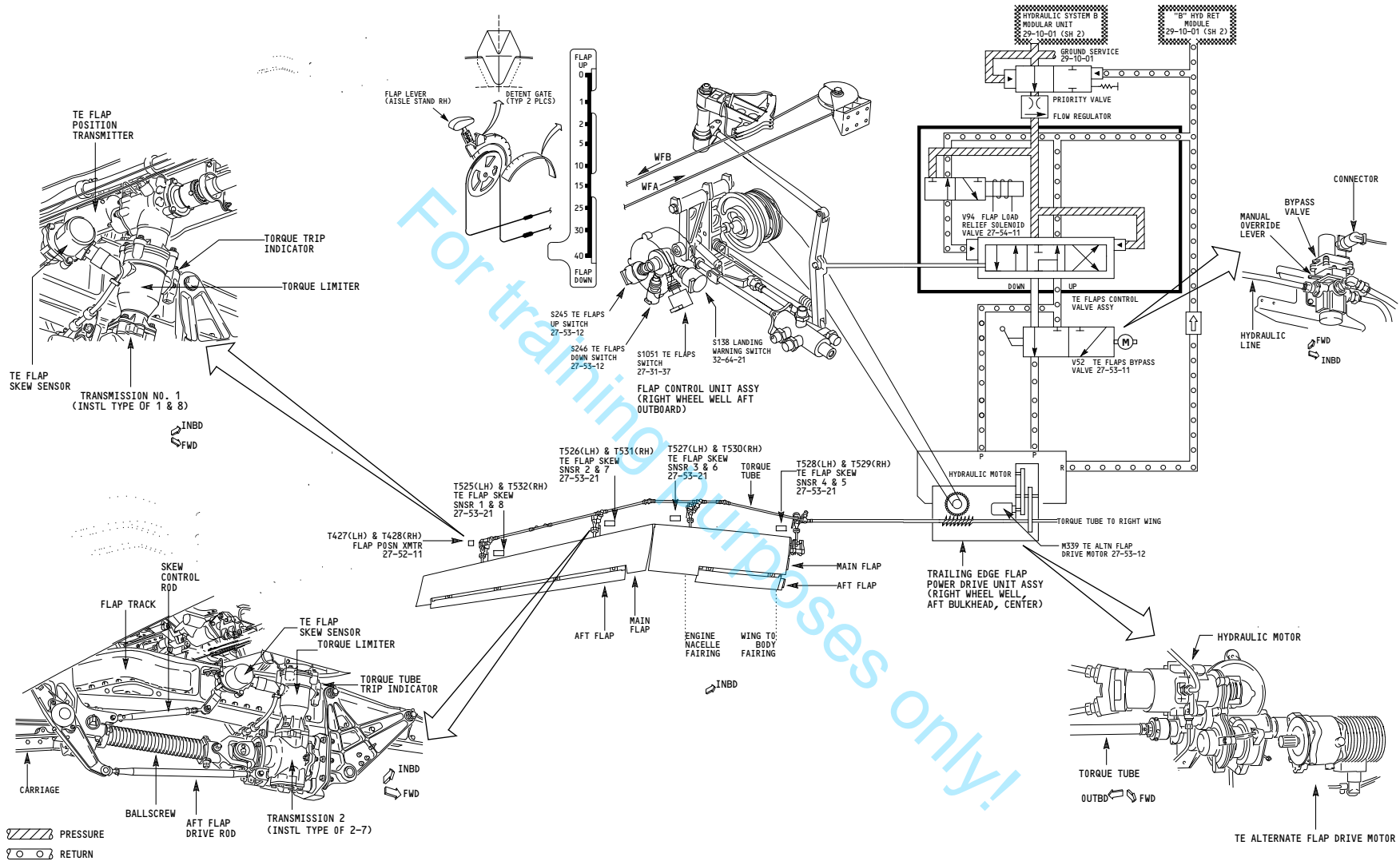
**27-48-11**

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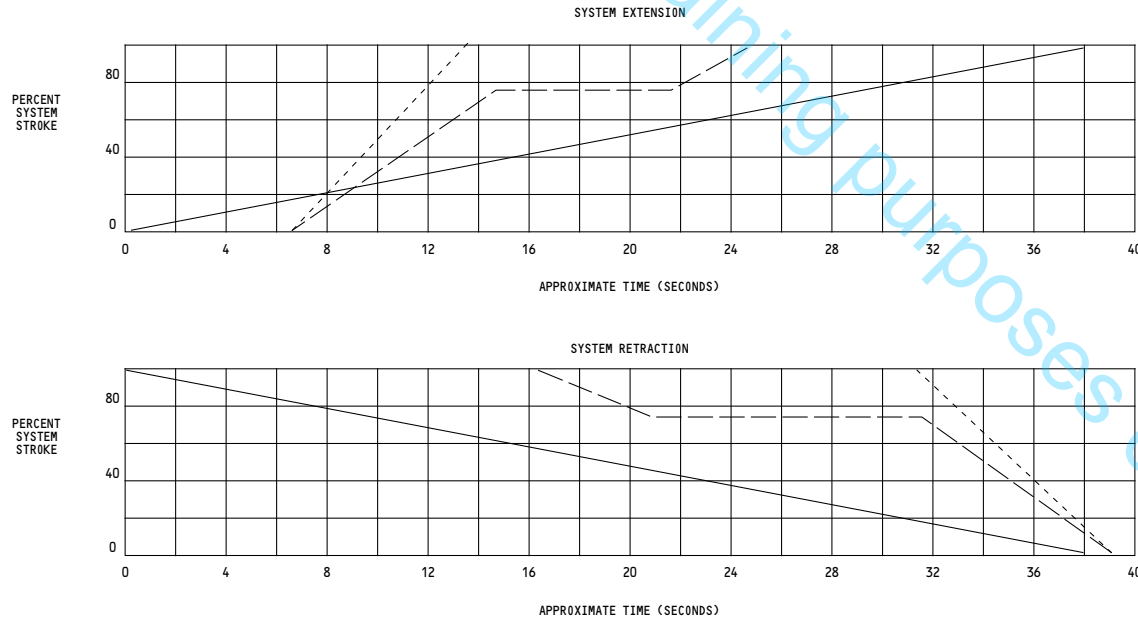
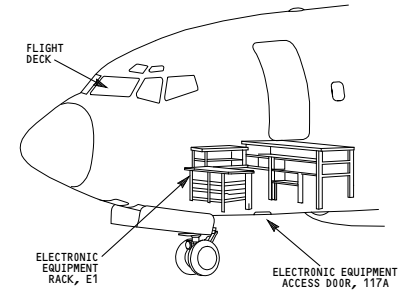
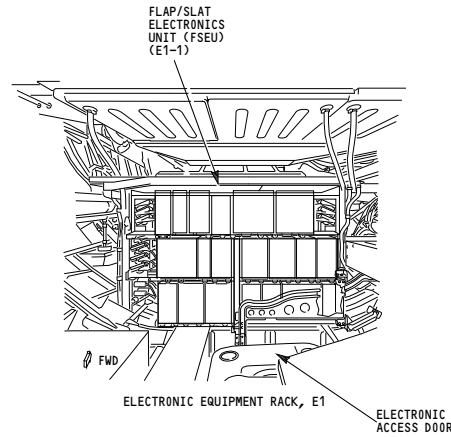
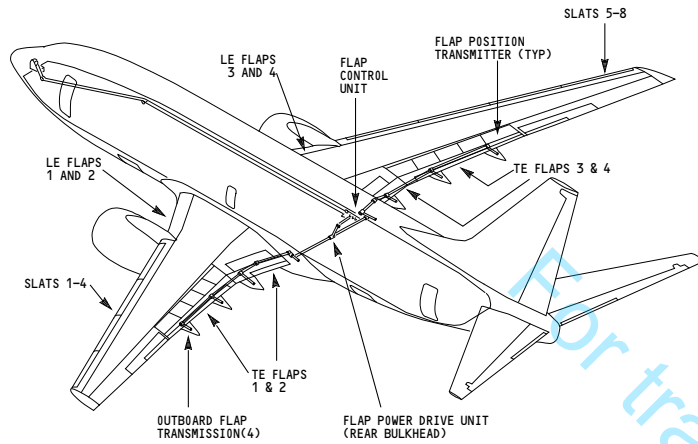
## HIGHLIFT SYSTEM OVERVIEW

D280A238

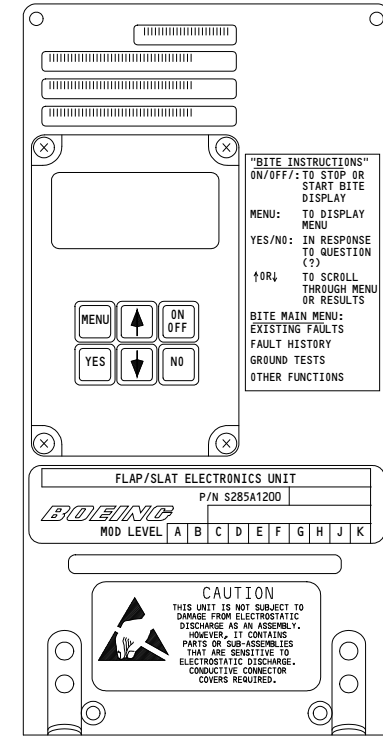
**27-50-01**

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— T.E. FLAPS  
- - - L.E. FLAPS  
- - - L.E. SLATS



M1746 FLAP/SLAT ELECTRONICS UNIT (FSEU)

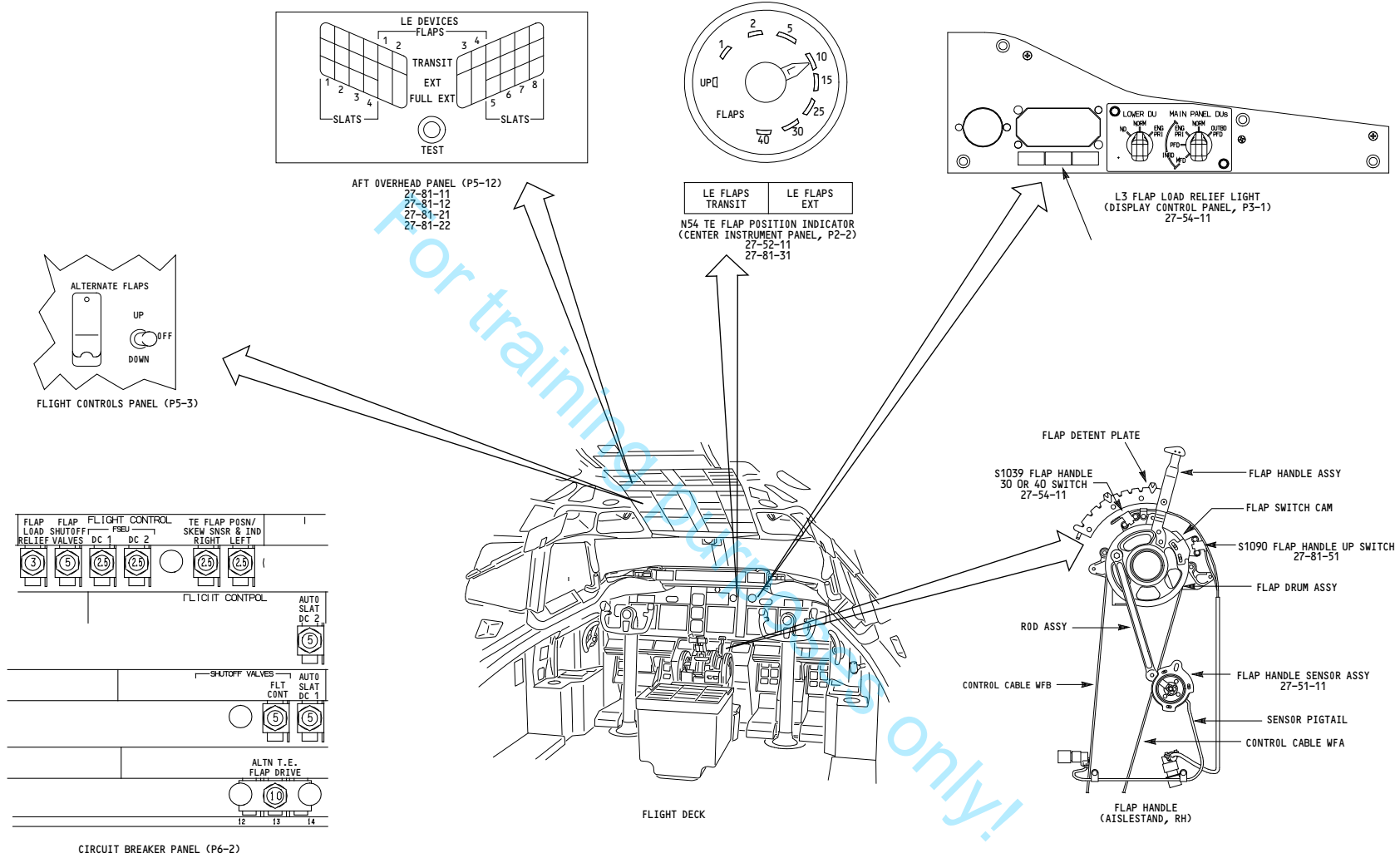
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	D280A238

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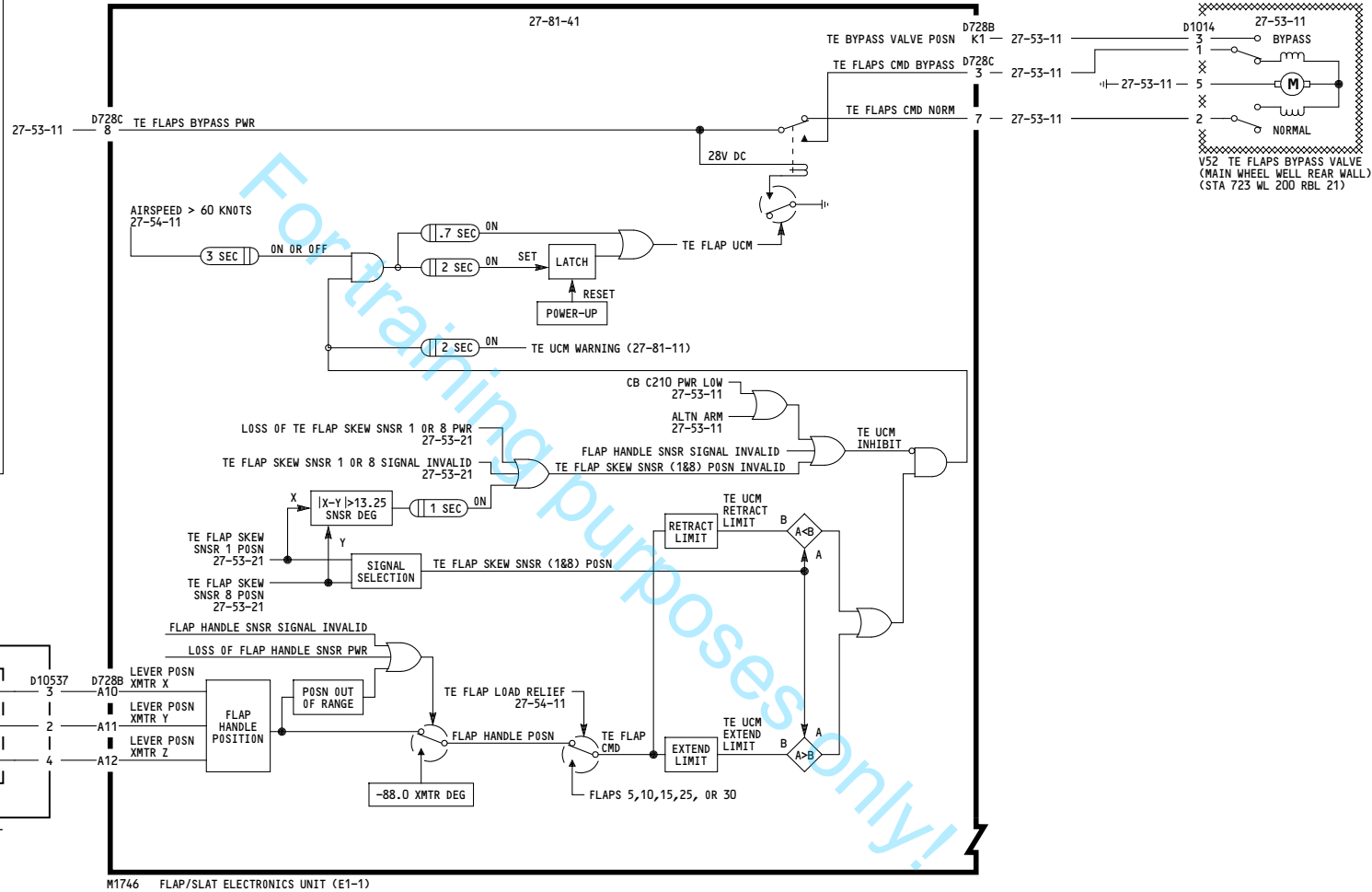
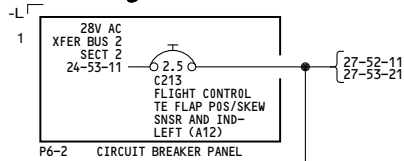
ALL

**HIGHLIFT SYSTEM OVERVIEW**

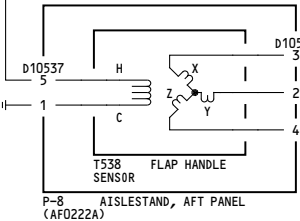
D280A238

**27-50-01**

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WIRING DIAGRAMS
27-51-11



ALL

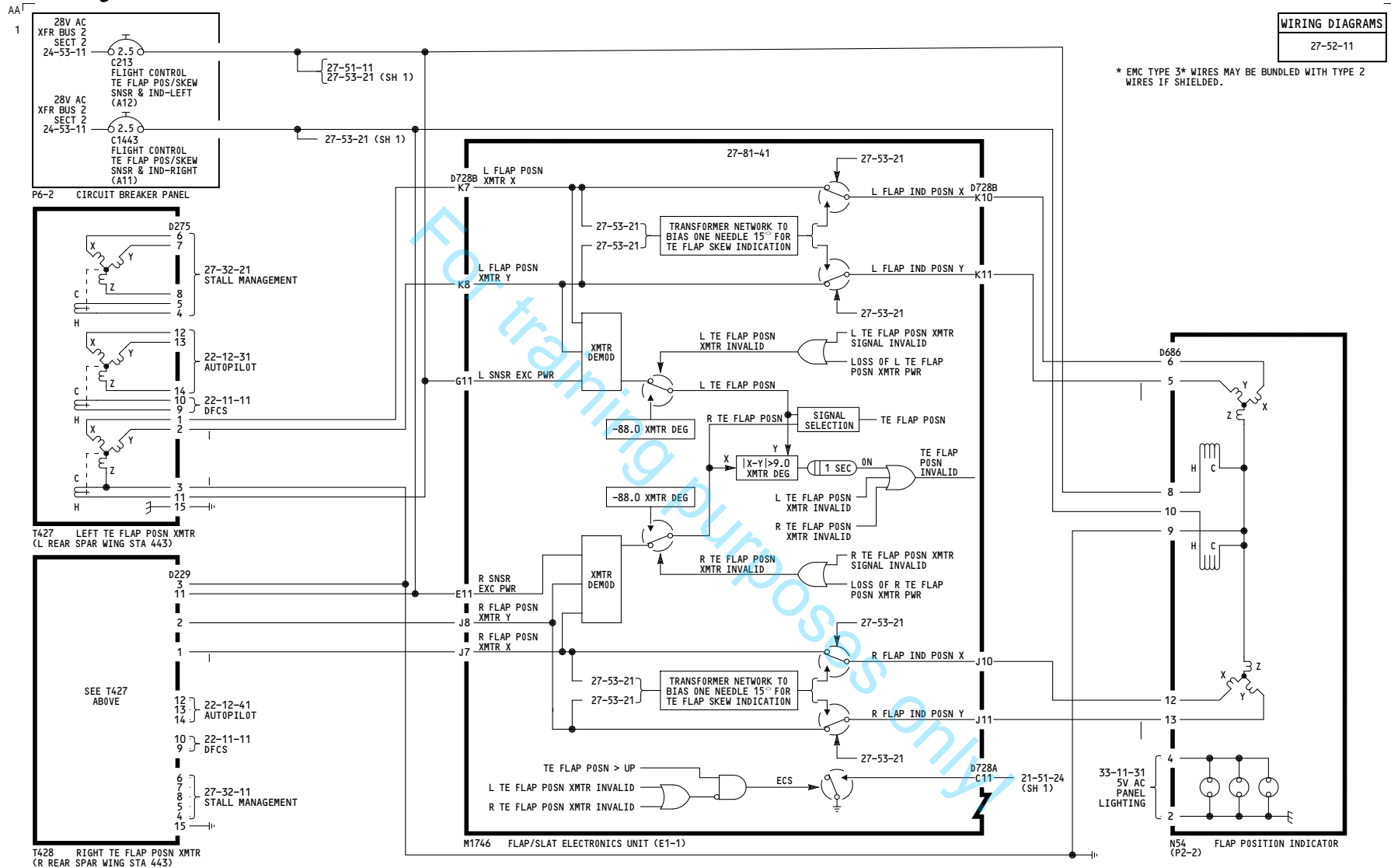
## TRAILING EDGE UNCOMMANDED MOTION PROTECTION

D280A238

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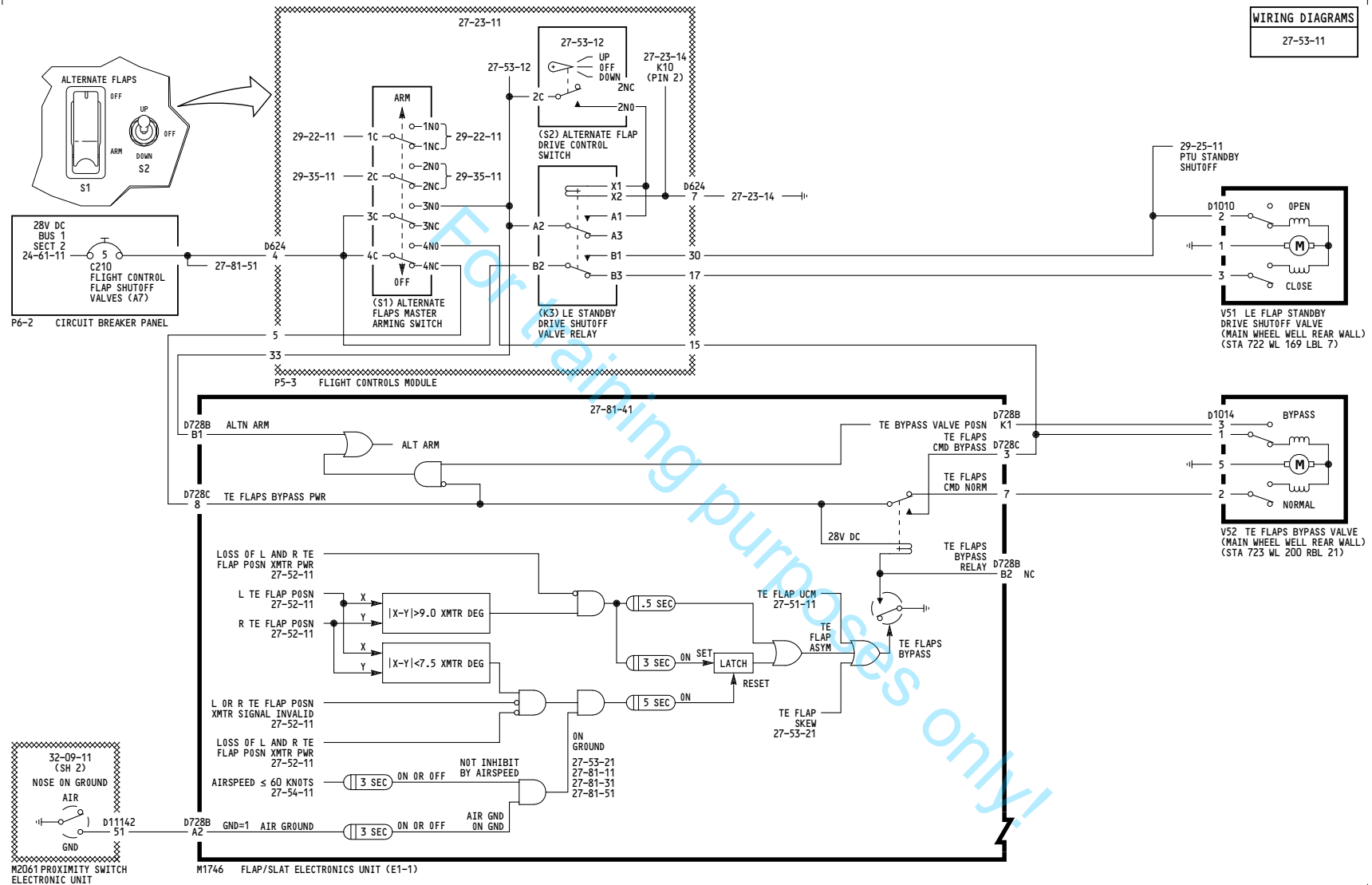
### TRAILING EDGE FLAP POSITION INDICATION

D280A238

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$$-\frac{G}{3}$$


ALL

## ALTERNATE TRAILING AND LEADING EDGE FLAP DRIVE

D280A238

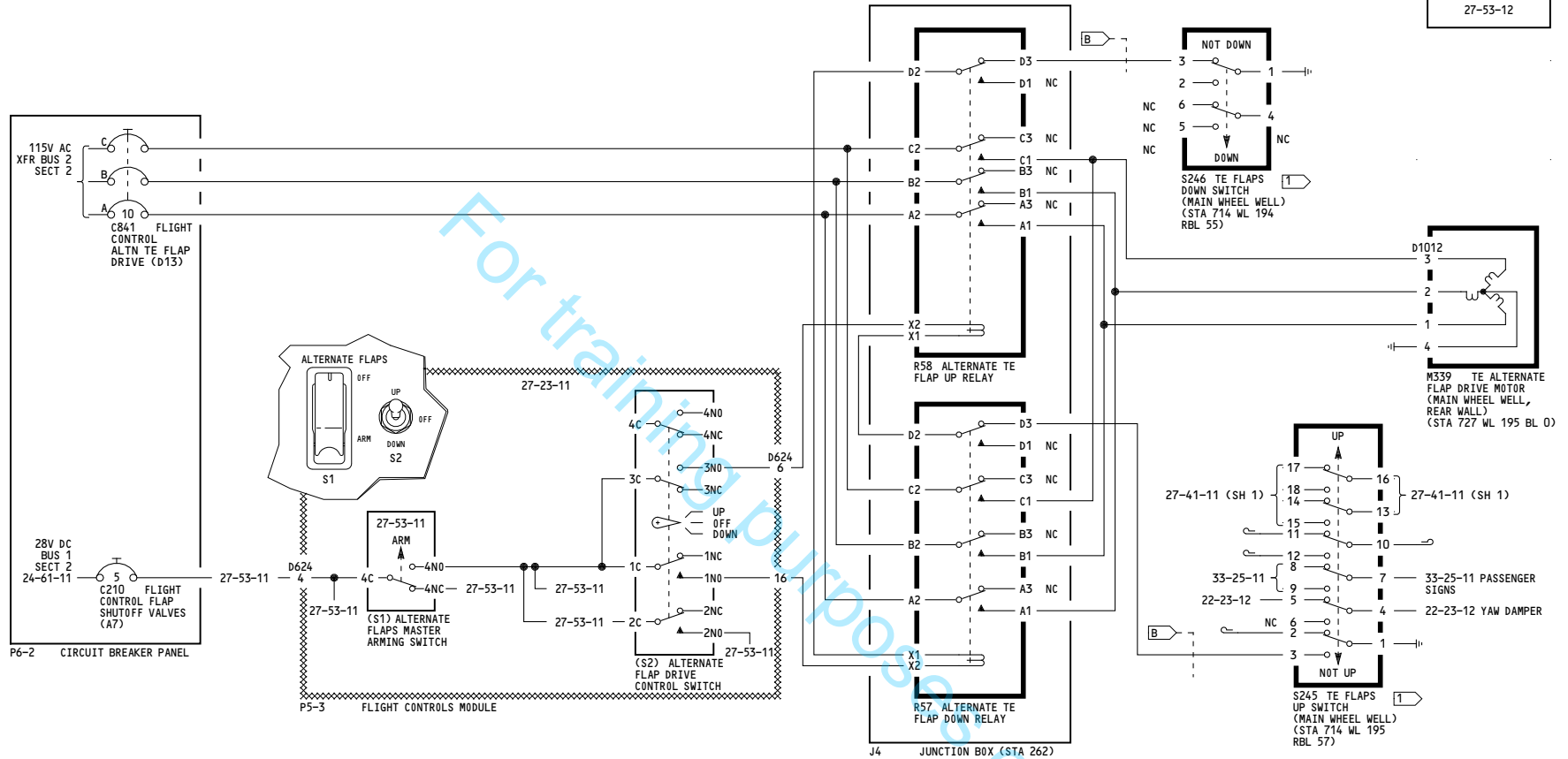
**27-53-11**

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1

WIRING DIAGRAMS  
27-53-12



## NOTES:

1 SWITCHES LOCATED ON FLAP CONTROL UNIT ASSEMBLY IN MAIN WHEEL WELL, REAR WALL, RIGHT SIDE NEAR CEILING. (27-50-01)

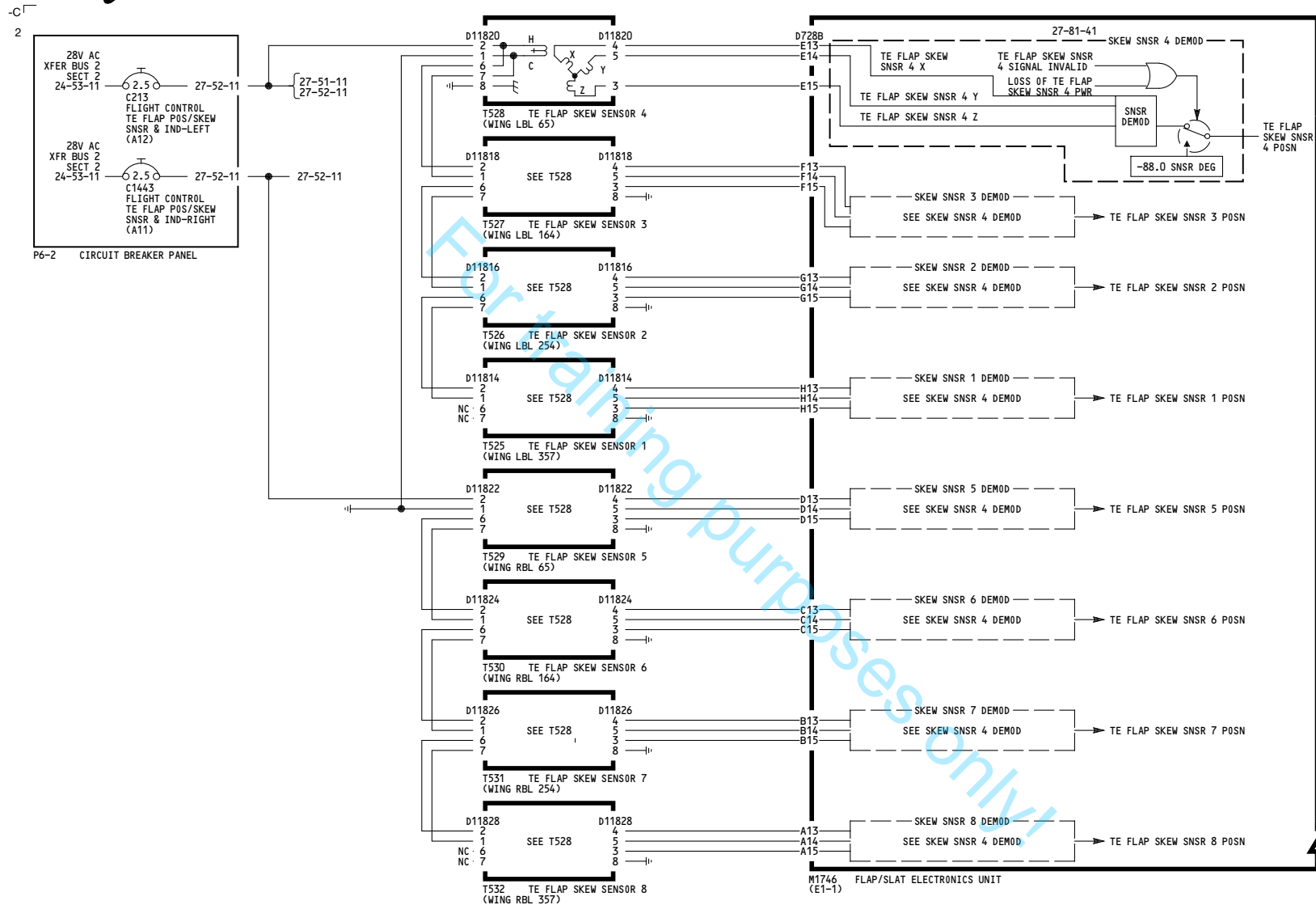
ALL	TRAILING EDGE ALTERNATE FLAP DRIVE
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## 27-53-12

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WIRING DIAGRAMS  
27-53-21

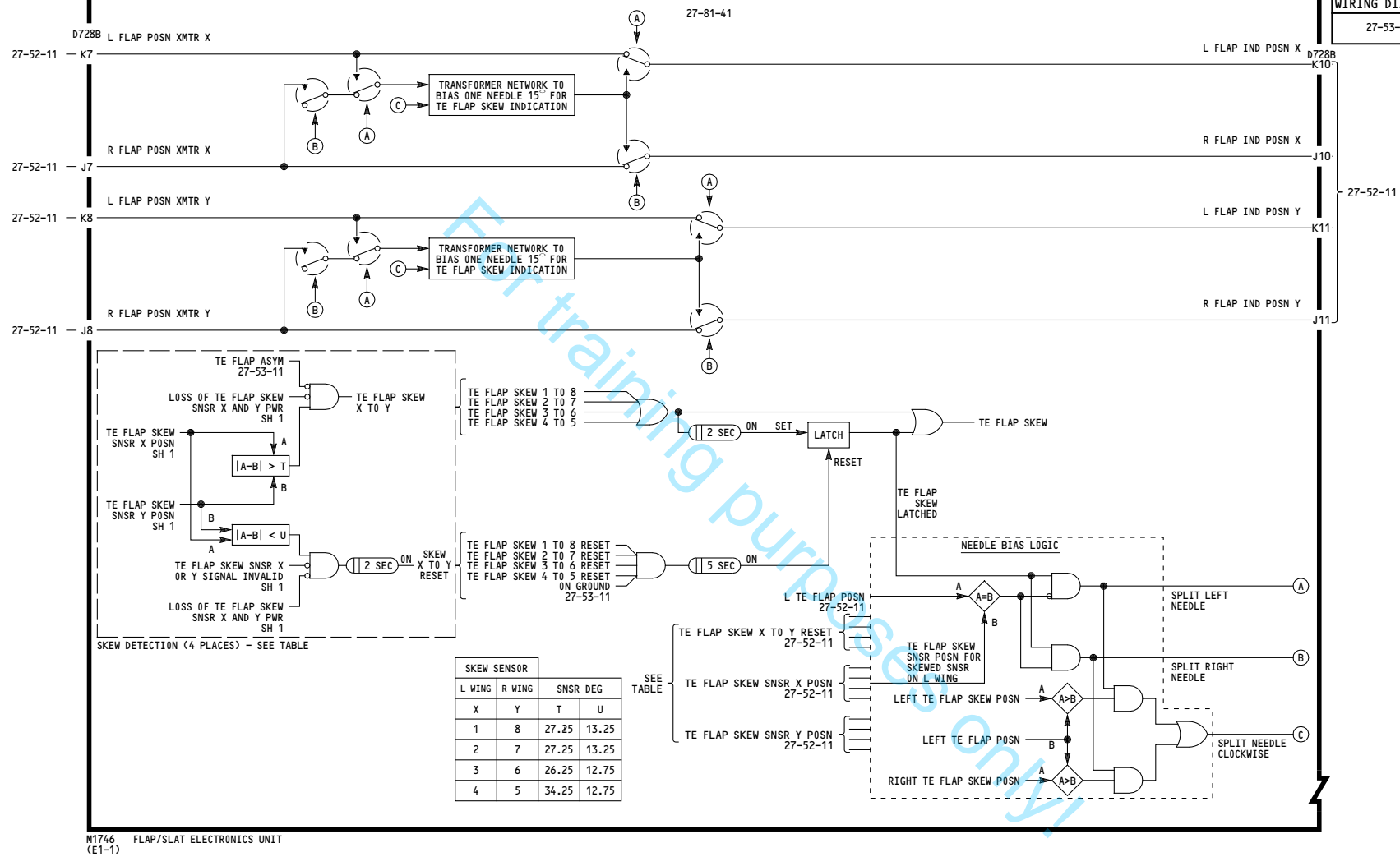
ALL

**TRAILING EDGE FLAP SKEW  
DETECTION**

D280A238

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## TRAILING EDGE FLAP SKEW DETECTION

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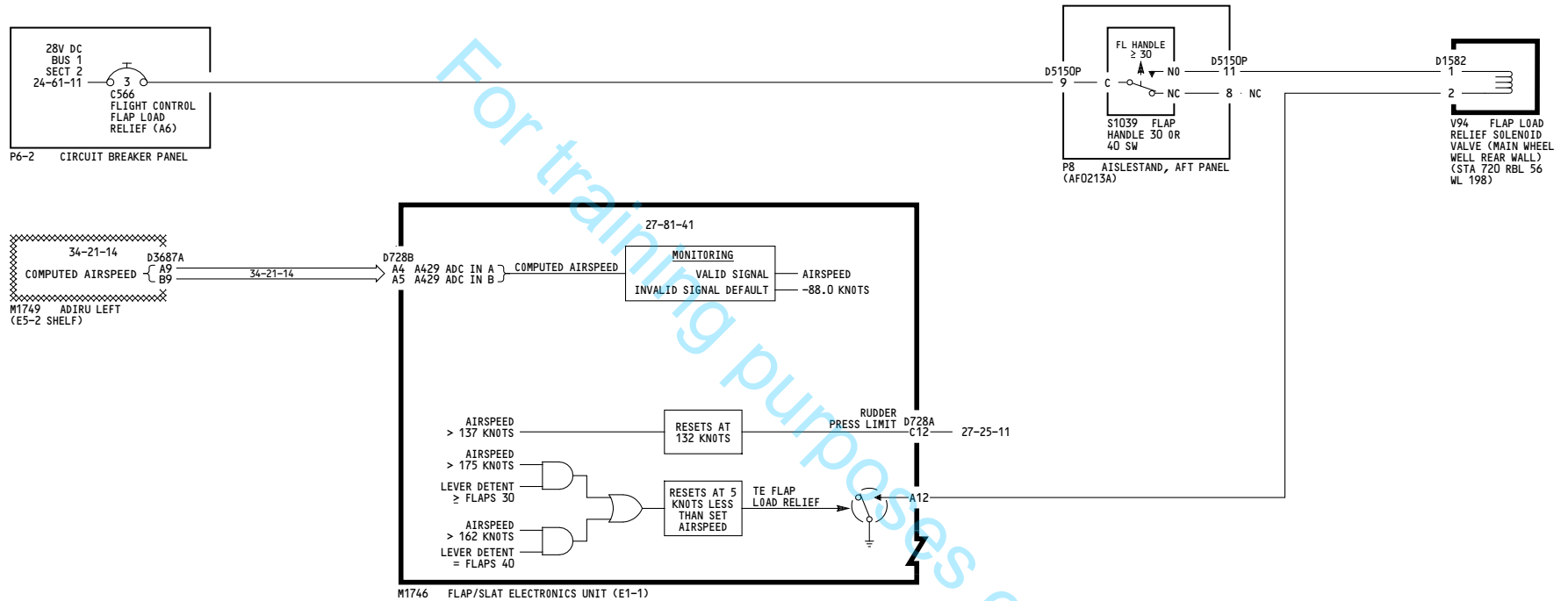
**27-53-21**

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WIRING DIAGRAMS  
27-54-11



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**TE FLAP LOAD RELIEF**

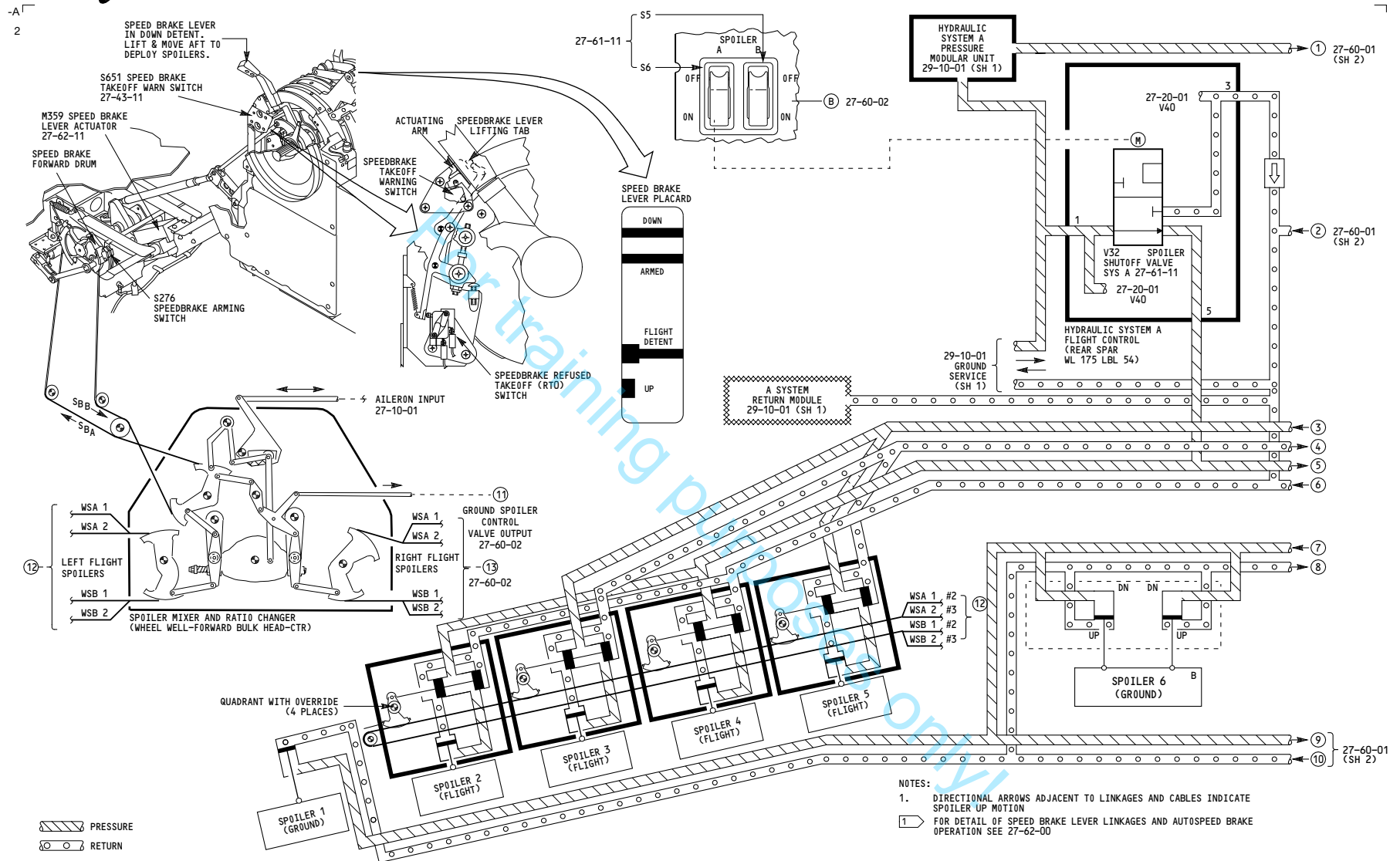
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## FLIGHT CONTROL AND GROUND SPOILER

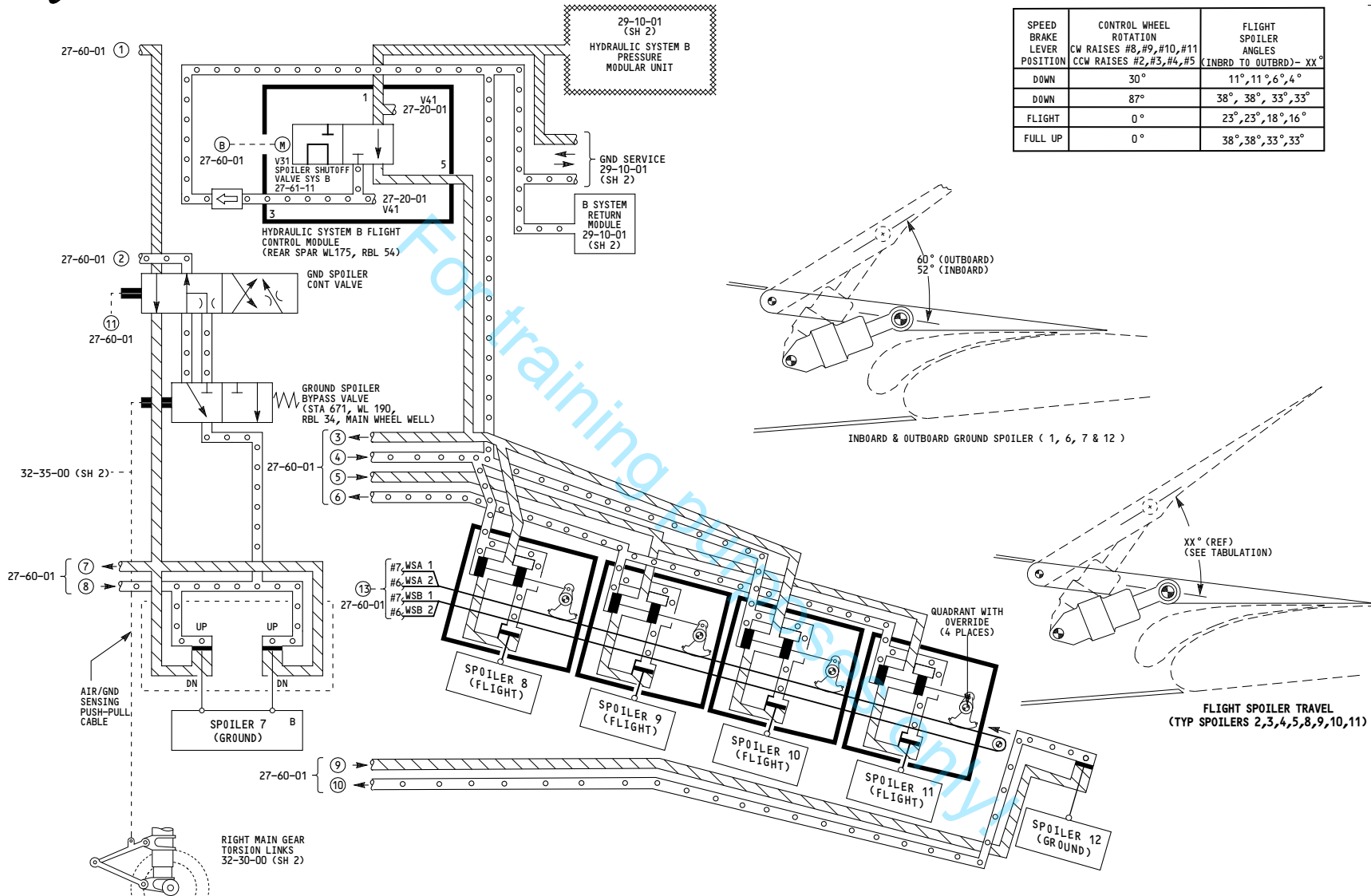
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SPEED BRAKE LEVER POSITION	CONTROL WHEEL ROTATION CW RAISES #8,#9,#10,#11 CCW RAISES #2,#3,#4,#5	FLIGHT SPOILER ANGLES (INBRD TO OUTBRD) - XX°
DOWN	30°	11°, 11°, 6°, 4°
DOWN	87°	38°, 38°, 33°, 33°
FLIGHT	0°	23°, 23°, 18°, 16°
FULL UP	0°	38°, 38°, 33°, 33°



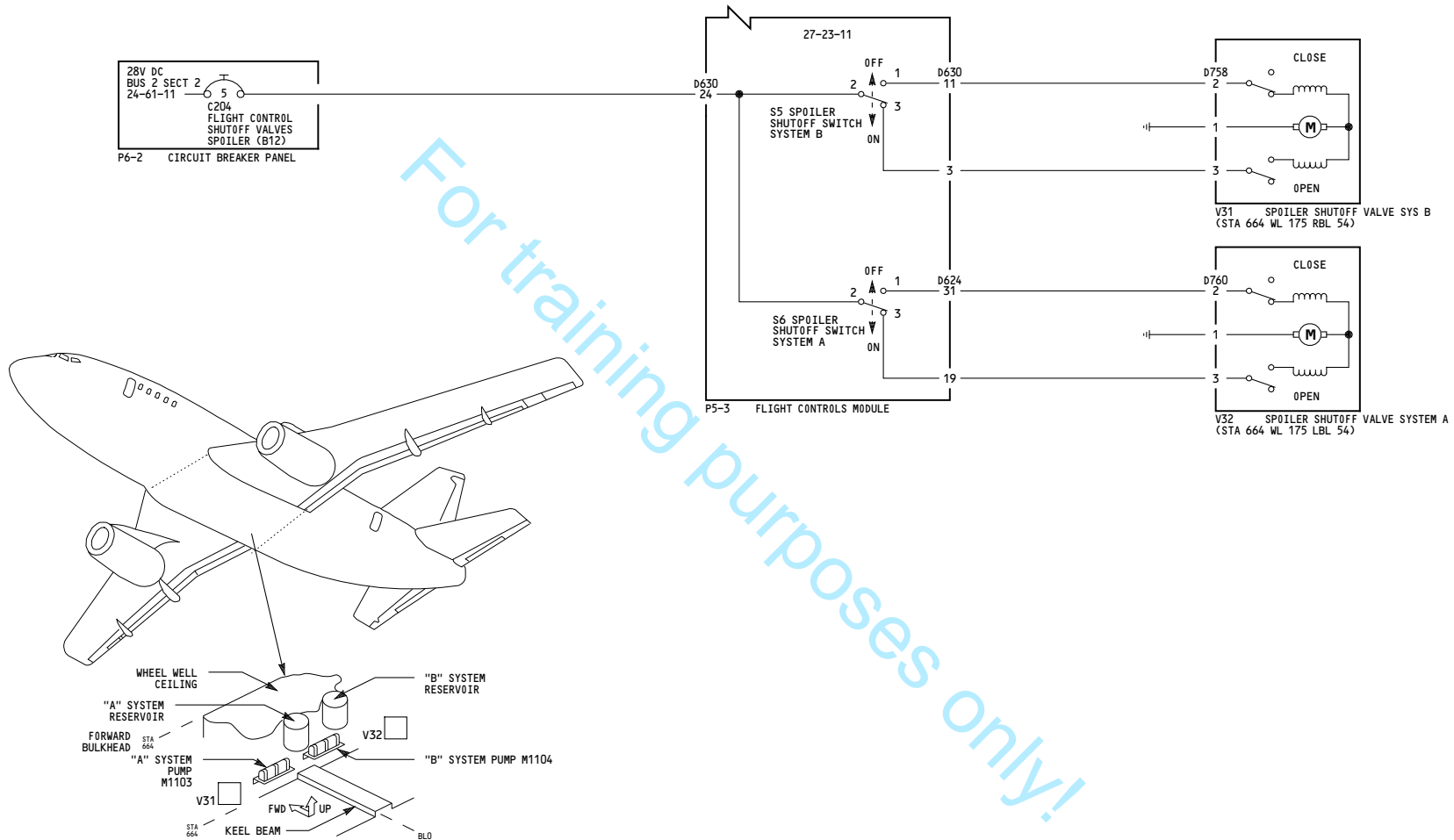
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**FLIGHT CONTROL AND  
GROUND SPOILER**

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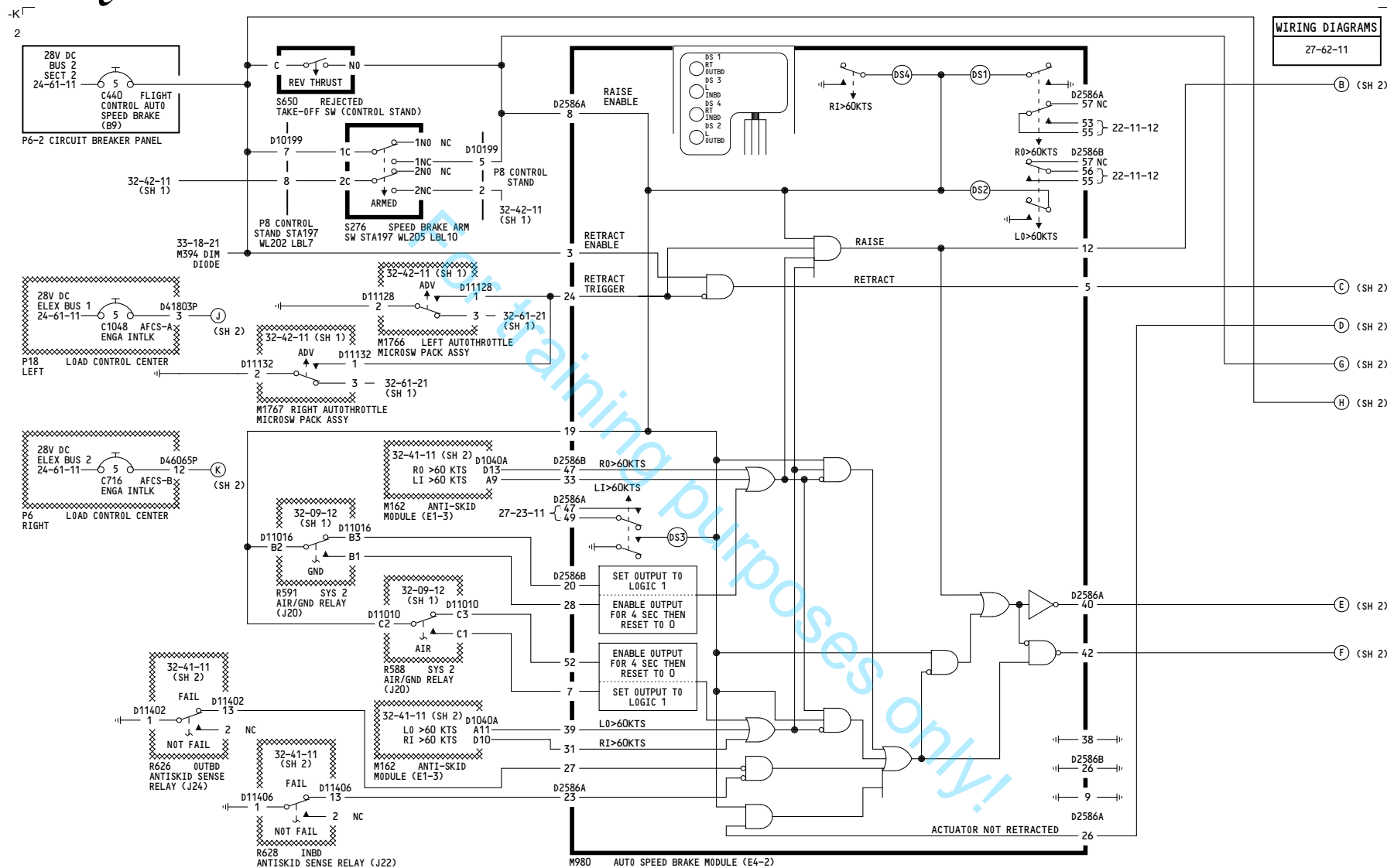
ALL	<b>SPOILER SHUTOFF VALVES</b>
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The diagram illustrates the electrical circuit for the RAISE function. Key components and connections include:

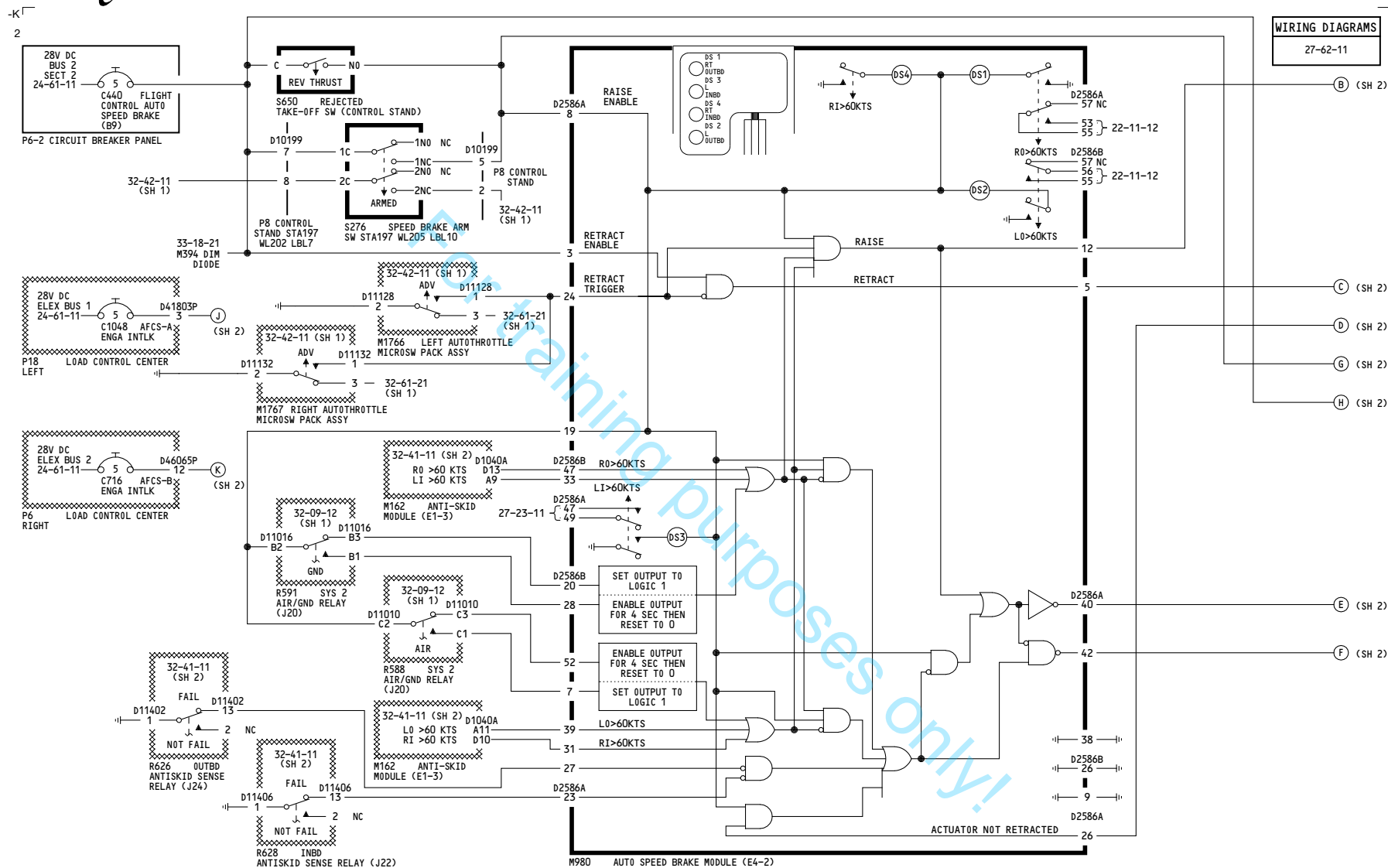
- RAISE ENABLE:** The primary input signal, connected to the RAISE line.
- Relays and Actuators:**
  - R713:** 3 SEC SHUTOFF RELAY (J20).
  - R712:** LATCH RELAY (J20).
  - R711:** ASB ARMED RELAY (J20).
  - R709:** R/A <10FT B RELAY (J22).
  - R710:** R/A <10FT A RELAY (J20).
  - R708:** SPDBRK ACTUATOR ENABLE RELAY (J20).
- Time Delays:**
  - M2033:** ASB WARN TIME DELAY (J20).
- Switches and Contacts:**
  - D10579, D10577, D10581, D10569, D10571, D10573, D10575:** Various switches and contacts connecting the RAISE signal to the relays and actuators.
- Actuators and Motors:**
  - M675:** DIGITAL FLIGHT DATA ACQ UNIT (E3-2).
  - M359:** MASTER DIM POWER.
  - M1876:** FCC B (E1-4).
  - M1875:** FCC A (E1-1).
  - M1766, M1766, M1766:** J20, J22, J24.
  - M980, M162:** SPEED BRAKES (FLIGHT SPOILERS).
- Other Components:**
  - D2295D, D2295A:** C5, B5.
  - D1084:** NC, NC.
  - D895:** 5, 7.
  - P1-3:** CAPTAINS INSTRUMENT PANEL.
  - D895:** 6, 14.
  - 33-18-21:** MASTER GROUND.

The diagram is divided into sections labeled (SH 1) and (SH 2), indicating different parts of the system or different levels of detail.

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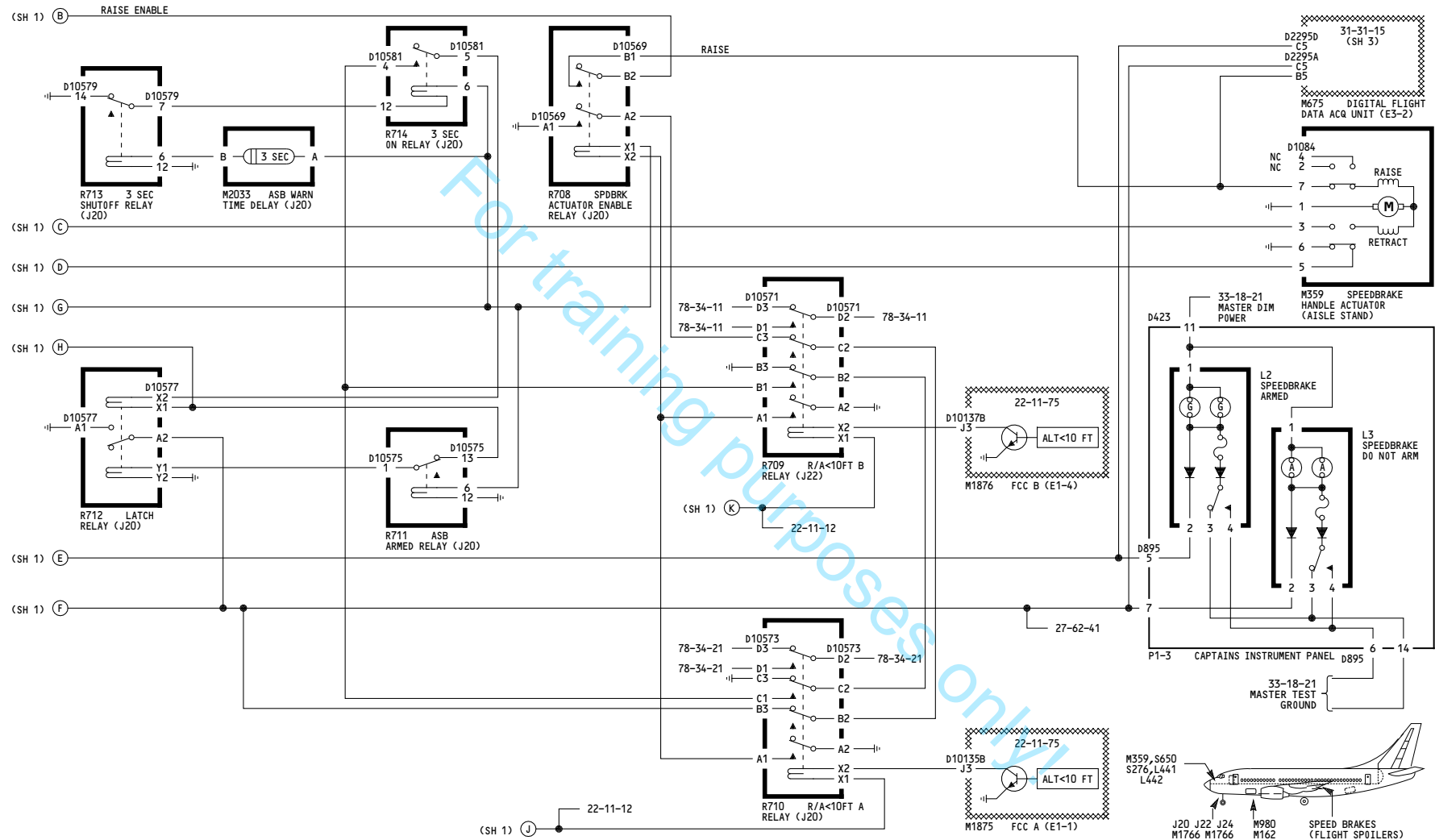
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YD005-YD007

## AUTOMATIC GROUND SPEEDBRAKE CONTROL

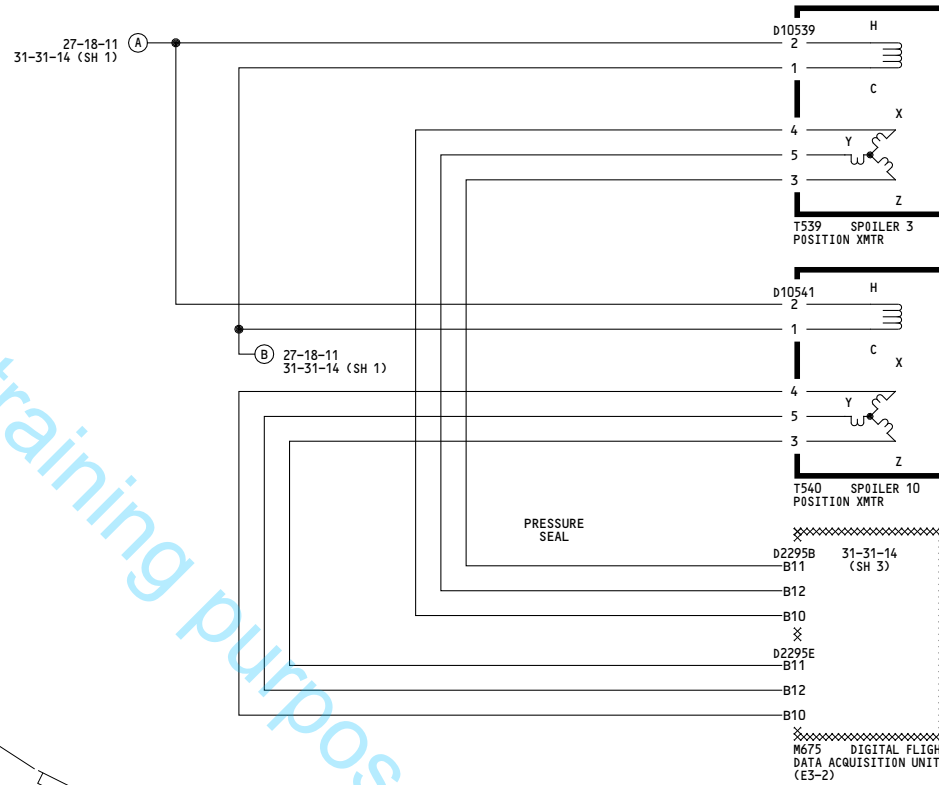
 Incorporates  
PD 0802664

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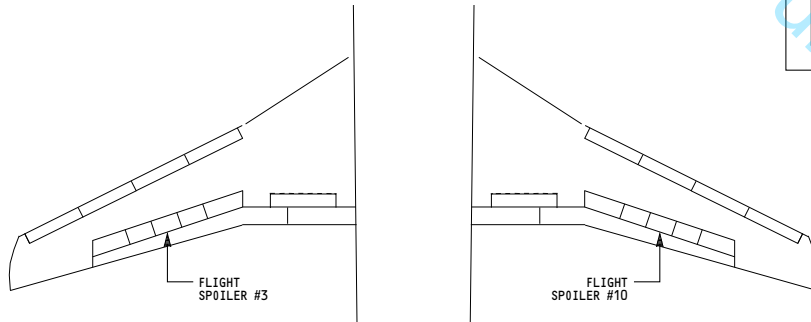
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**WIRING DIAGRAMS**  
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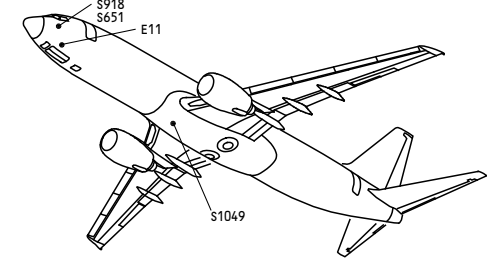
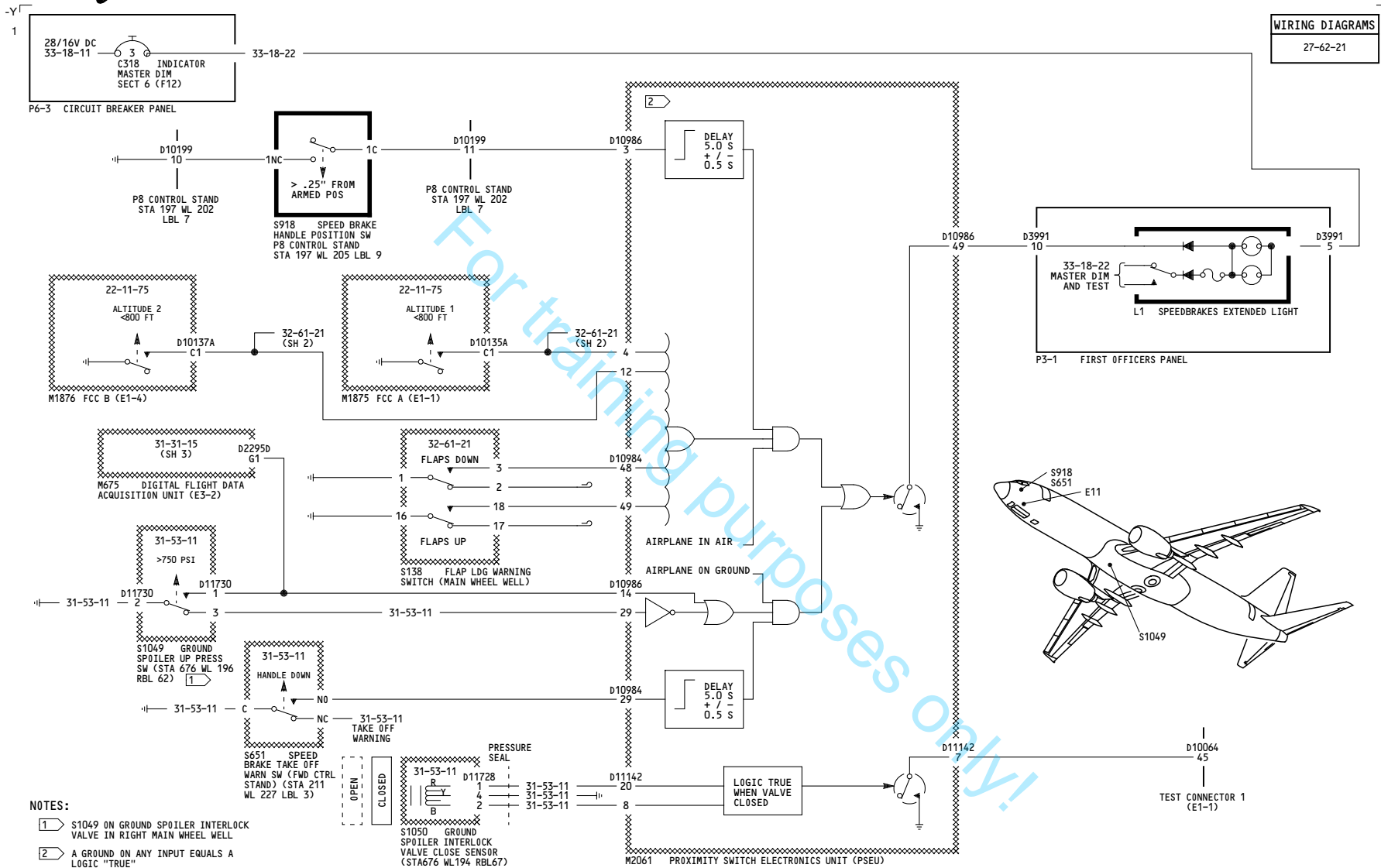


ALL	<b>SPOILER POSITION INDICATION</b>
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YD001-YD007

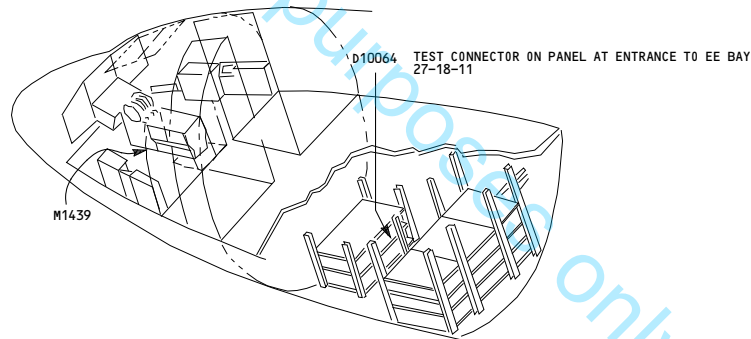
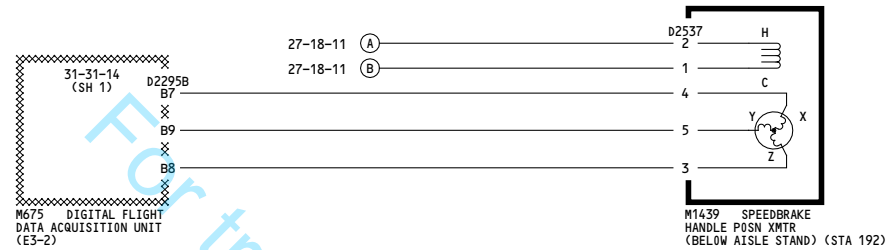
**SPEEDBRAKE DEPLOYED INDICATION**

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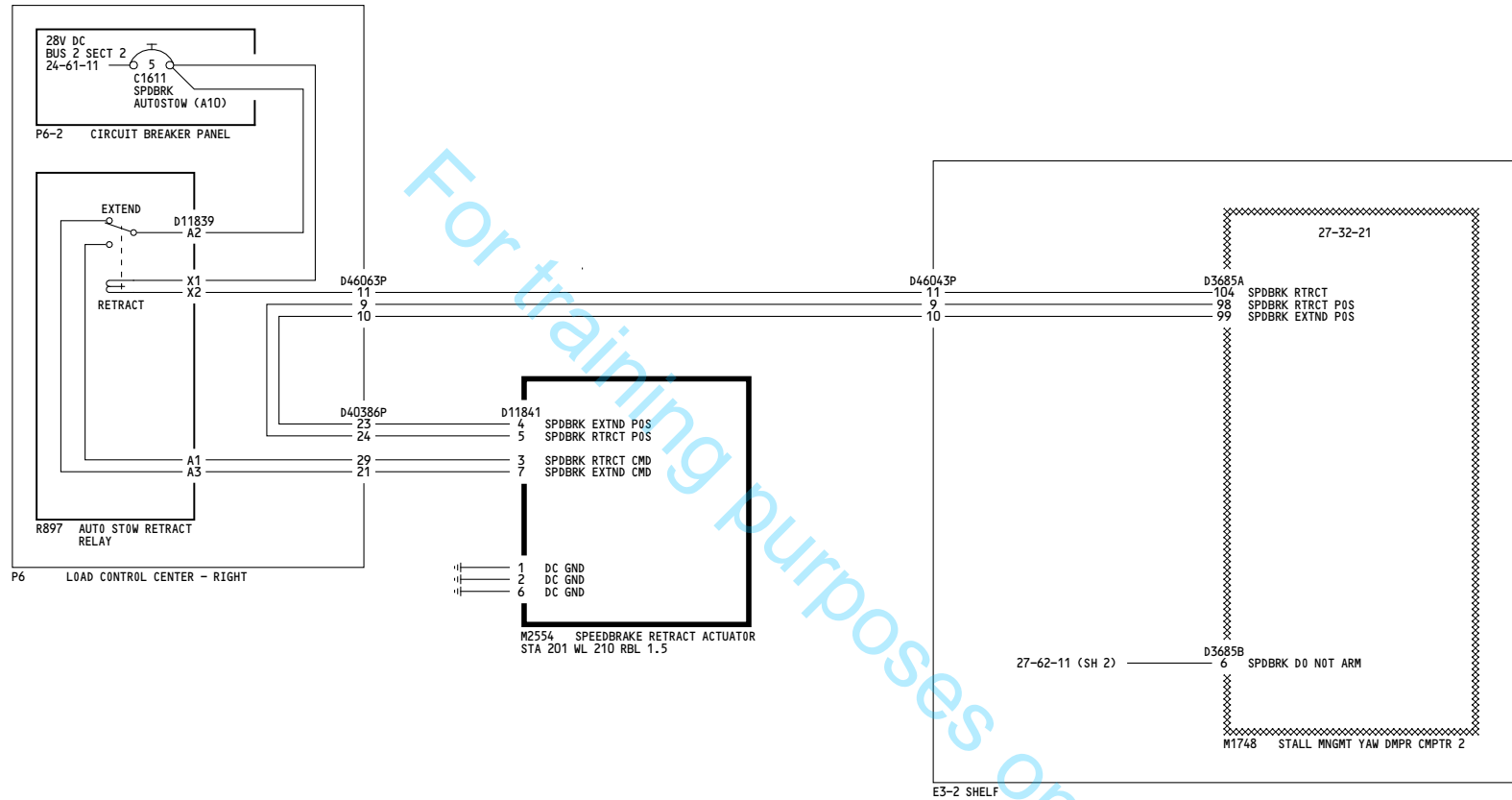


ALL	<b>SPEEDBRAKE HANDLE POSITION INDICATION</b>
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YD005

**SPEEDBRAKE AUTOSTOW**

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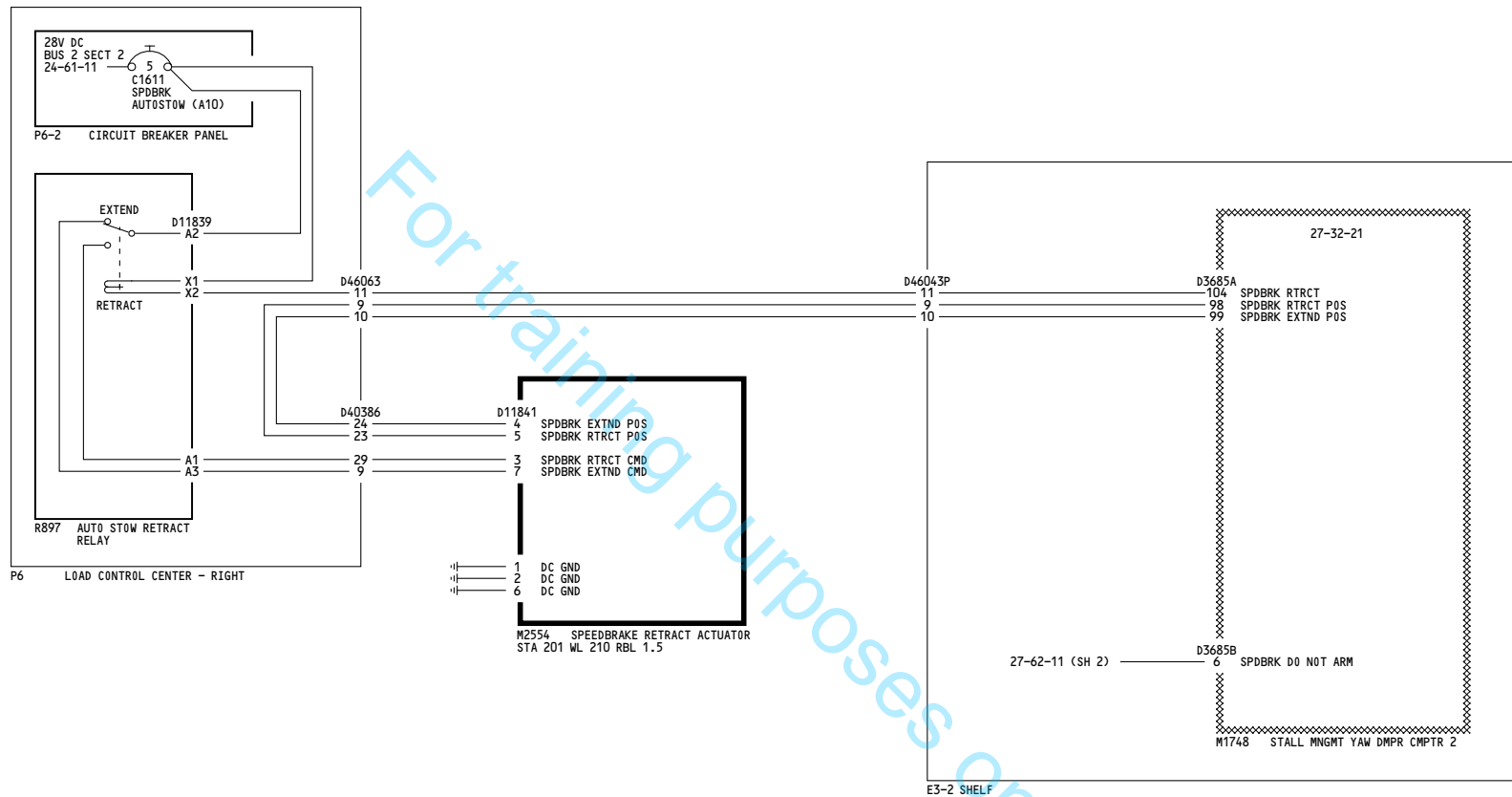
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WIRING DIAGRAMS  
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YD006-YD007

**SPEEDBRAKE AUTOSTOW**

Incorporates  
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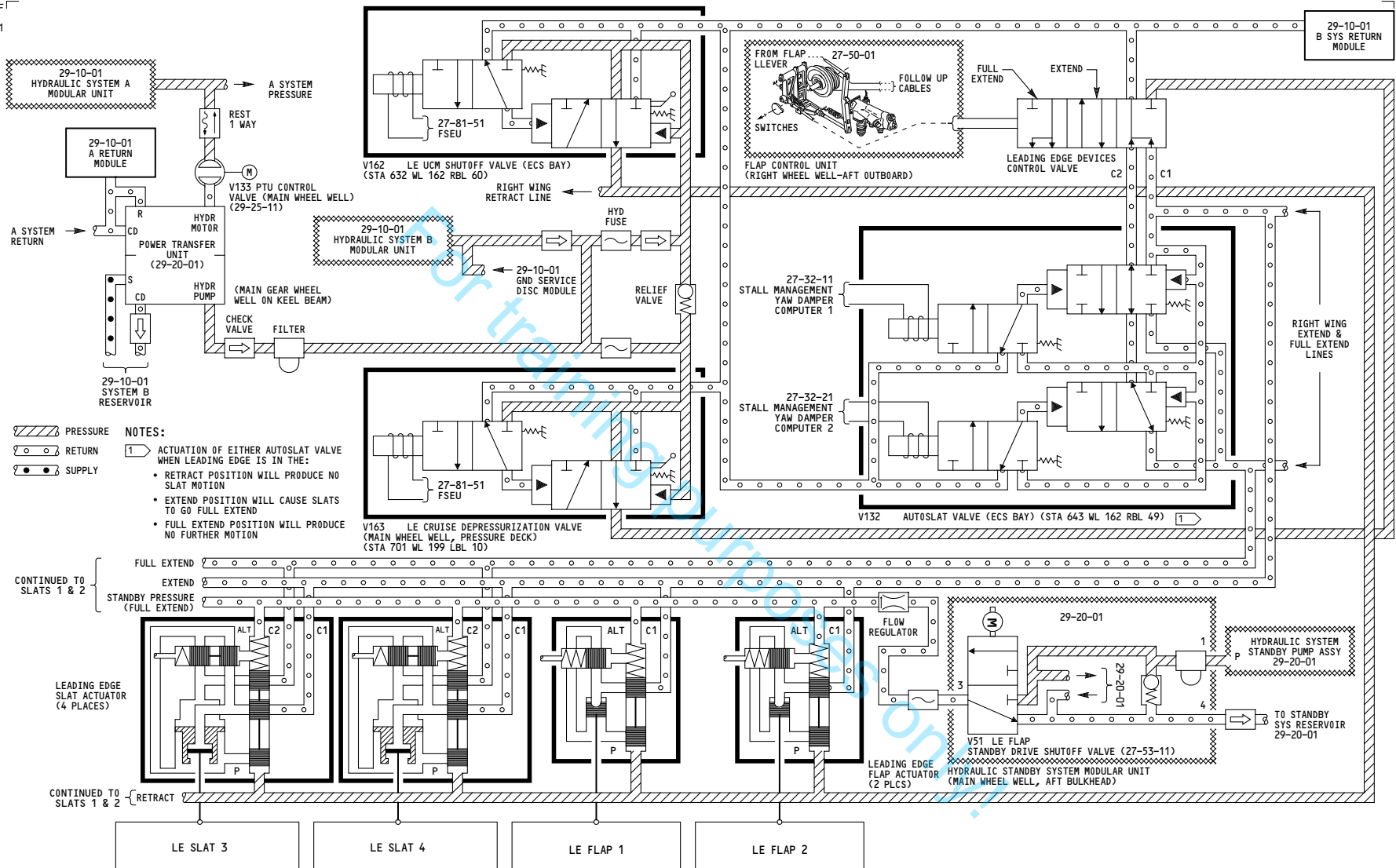
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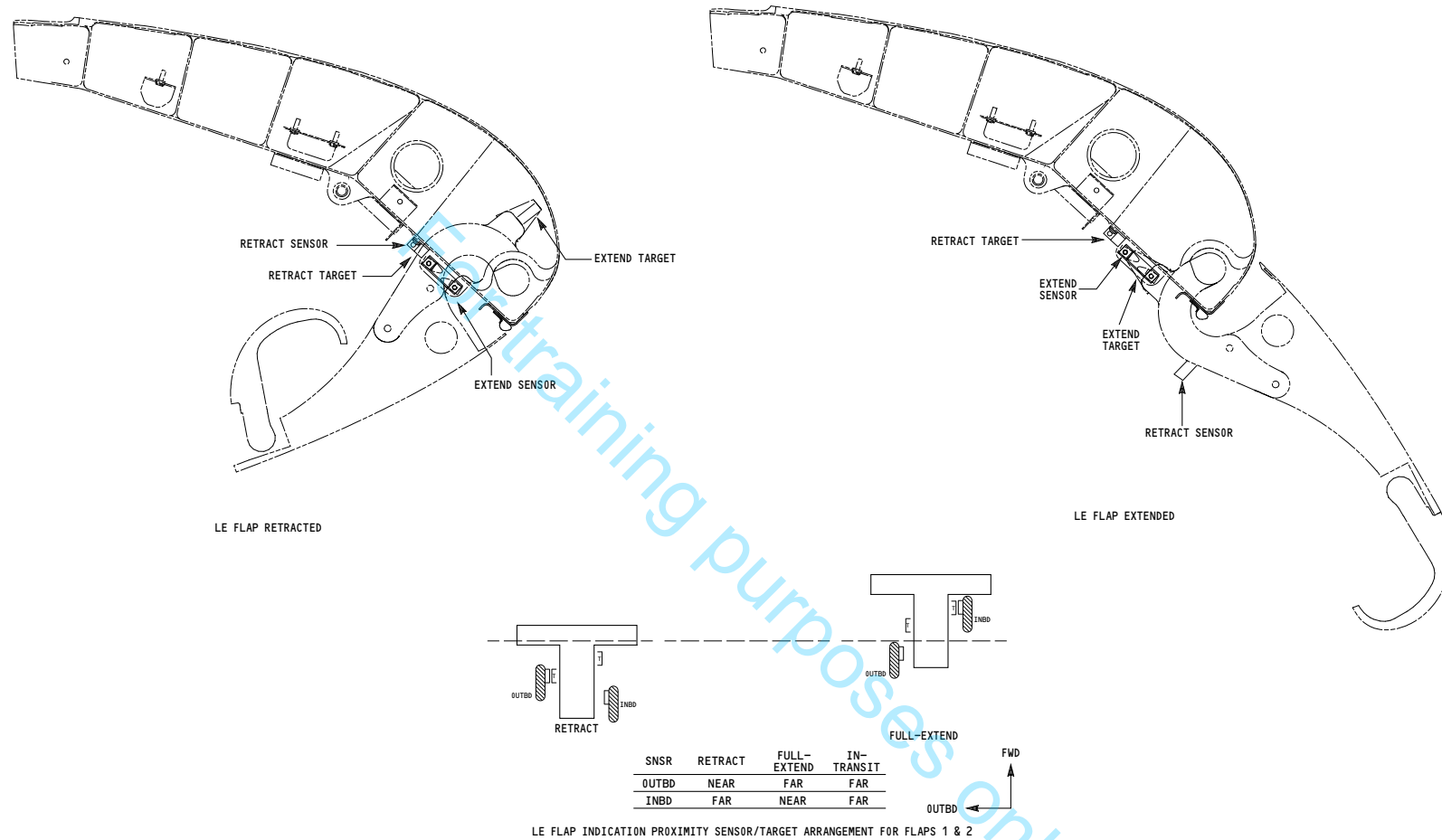
## LEADING EDGE DRIVE AND INDICATION

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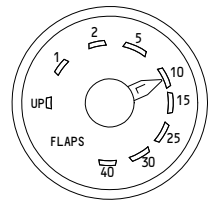
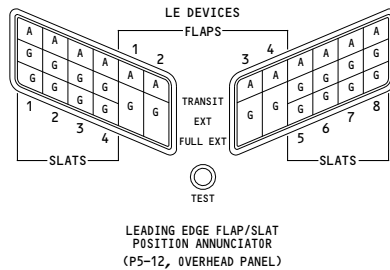
NOTE:  
NORMAL LEADING EDGE DEVICES OPERATION IS  
CONTROLLED BY THE TRAILING EDGE FLAP POSITION.  
A. AS THE TRAILING FLAPS START TO RETRACT:  
THE LEADING EDGE FLAPS WILL EXTEND

ALL	LEADING EDGE DRIVE AND INDICATION
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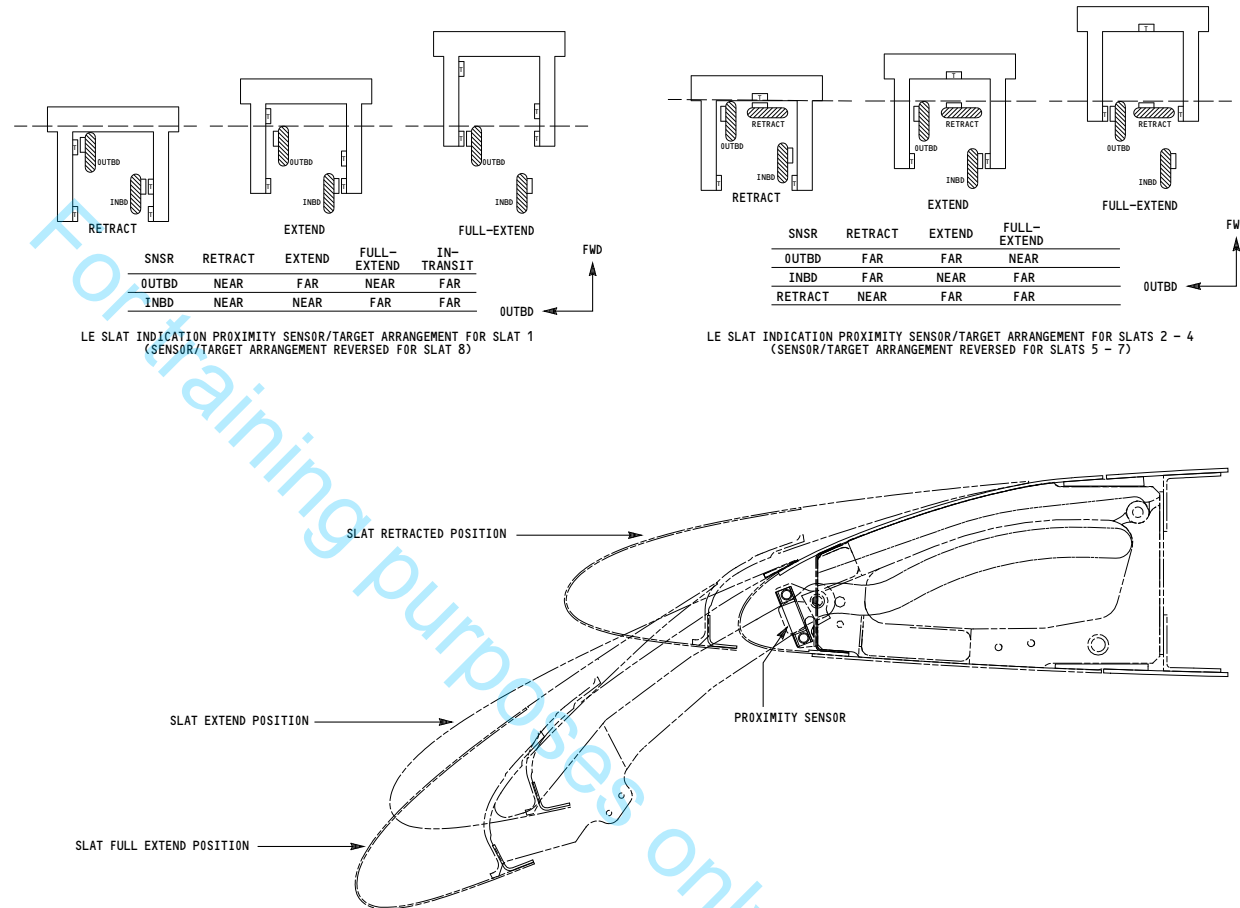
LE FLAPS TRANSIT	LE FLAPS EXT
27-52-11	27-81-31

TE FLAP POSITION INDICATOR  
CENTER INSTRUMENT PANEL (P2-2)  
27-52-11  
27-81-31

**NOTE:**

NORMAL LEADING EDGE DEVICES OPERATION IS  
CONTROLLED BY THE TRAILING EDGE FLAP POSITION.

- AS THE TRAILING EDGE FLAPS REACH 17% OF STROKE TO THE RETRACT POSITION:  
THE LEADING EDGE FLAPS WILL FULLY EXTEND  
THE LEADING EDGE SLATS WILL EXTEND
  - AS THE TRAILING EDGE FLAPS LEAVE THE "5" POSITION:  
THE LEADING EDGE SLATS WILL GO TO THE FULL EXTEND POSITION.
- THIS SEQUENCE IS REVERSED UPON RETRACTION.



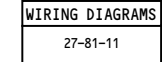
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**LEADING EDGE DRIVE  
AND INDICATION**

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**27-80-01**

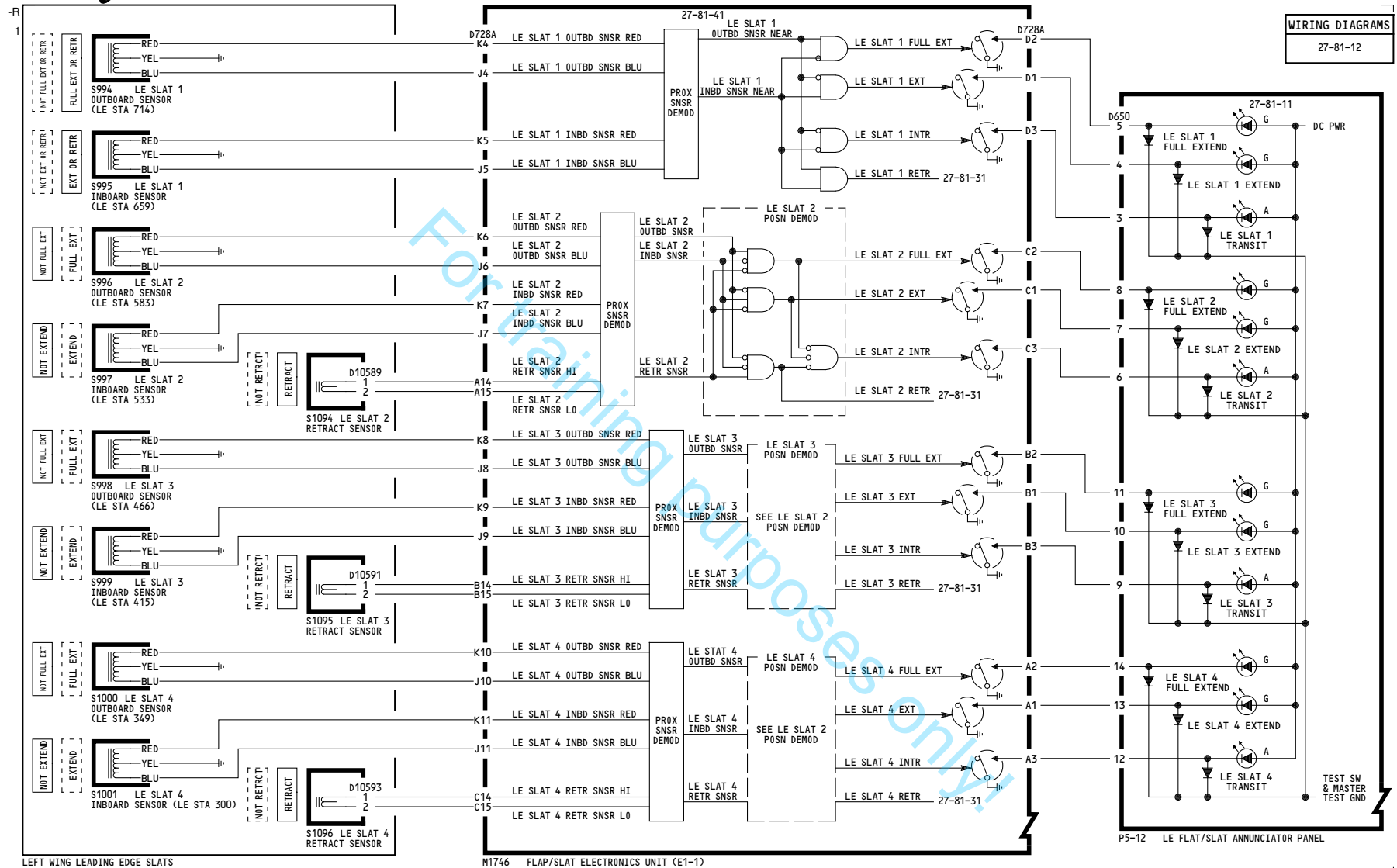
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**27-81-11**

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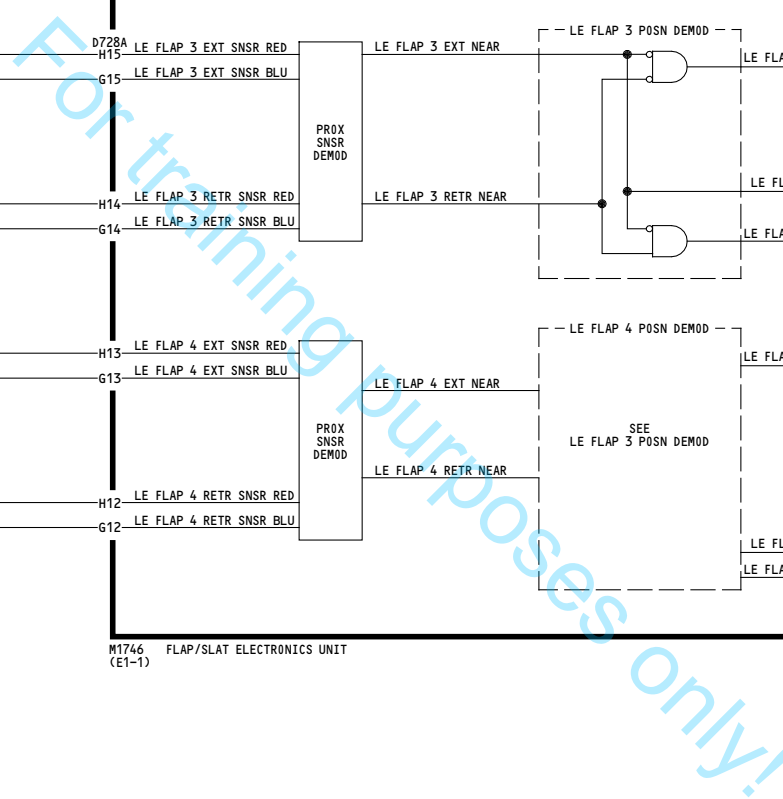
### LEFT LEADING EDGE SLAT POSITION INDICATION

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**27-81-12**

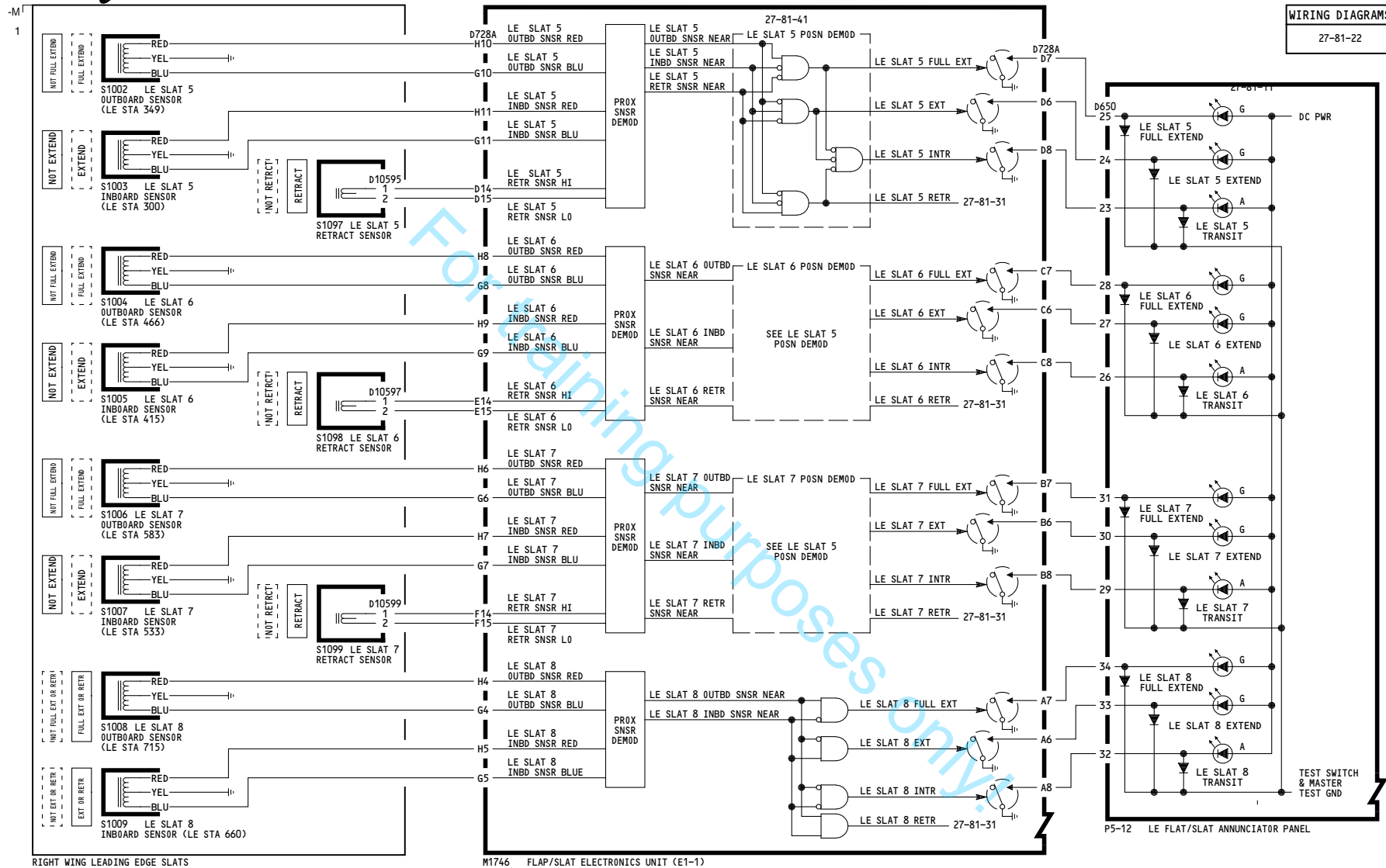
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### RIGHT LEADING EDGE SLAT POSITION INDICATION

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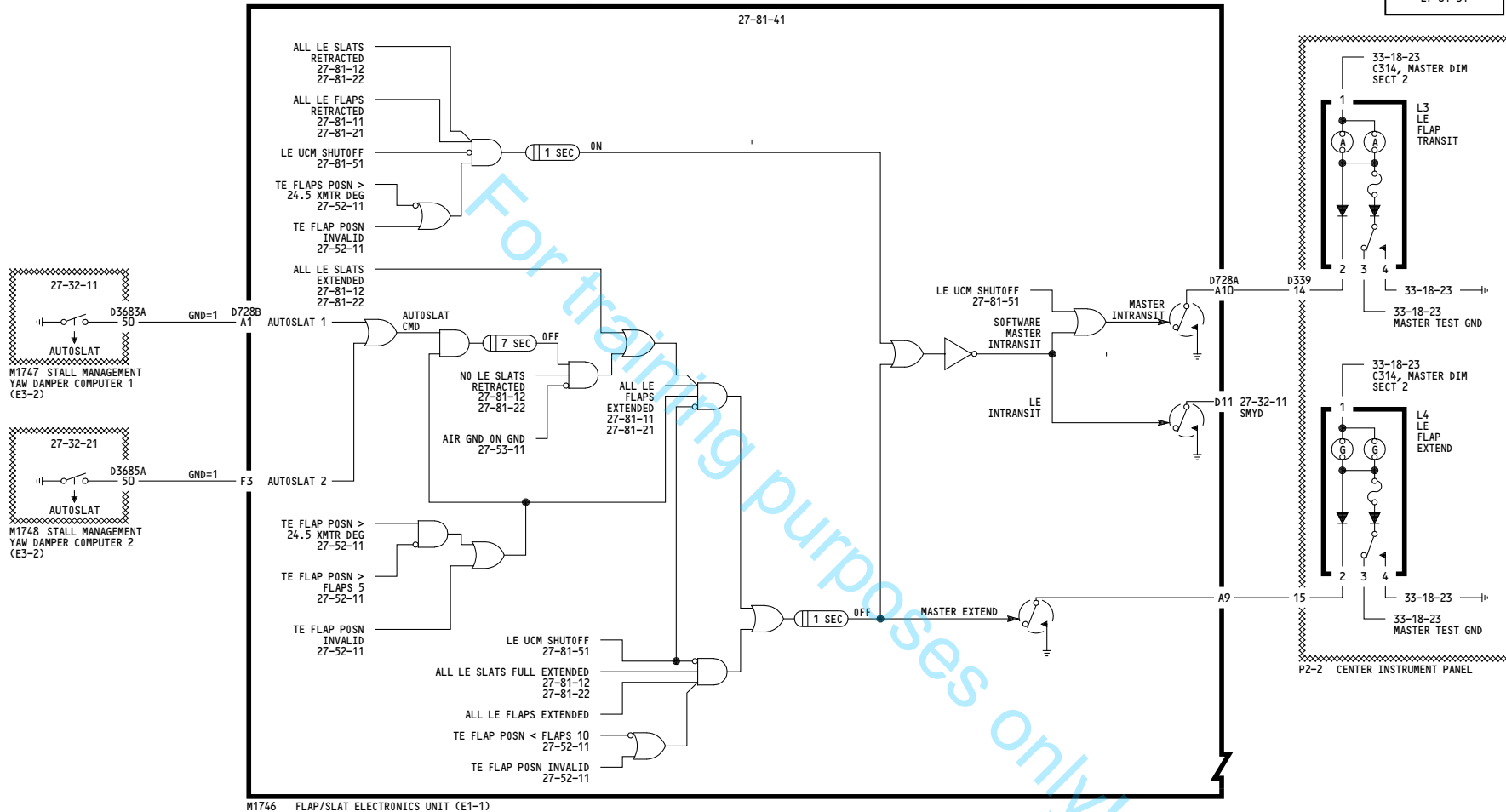
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**WIRING DIAGRAMS**  
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**LEADING EDGE FLAPS AND  
SLATS MASTER INDICATION**

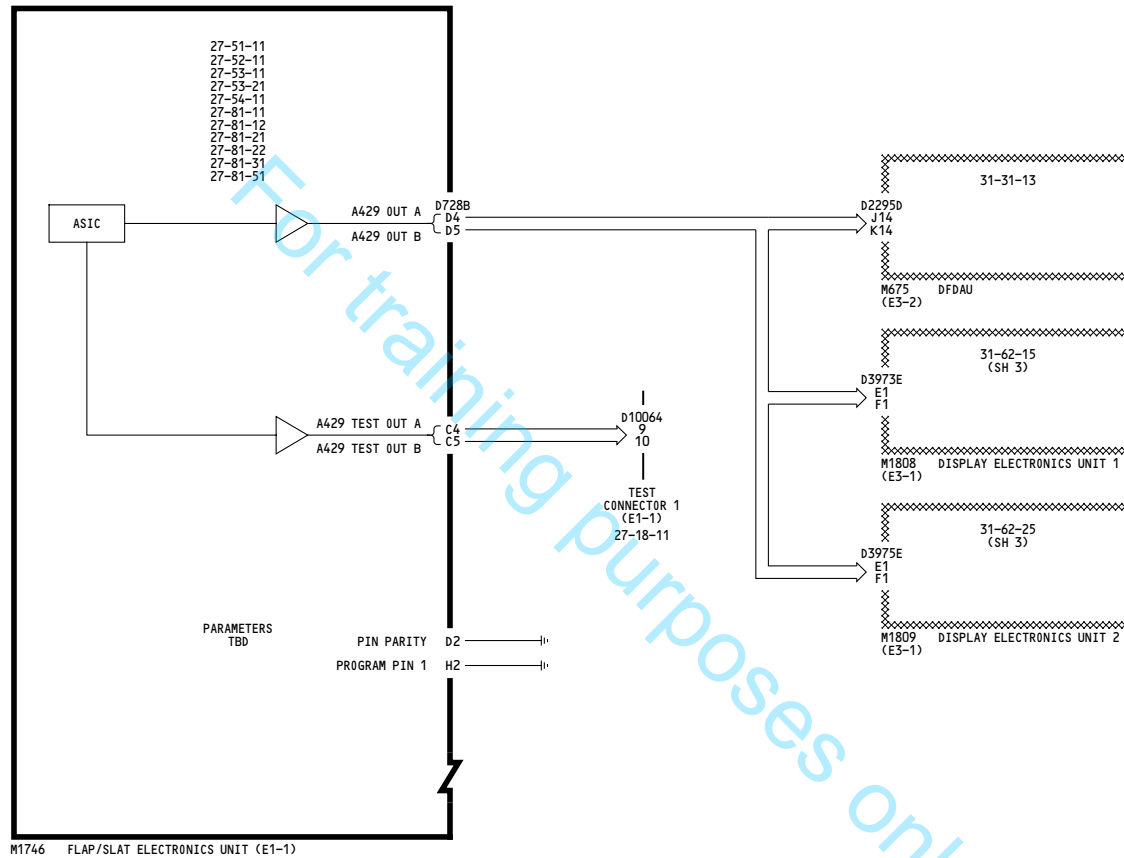
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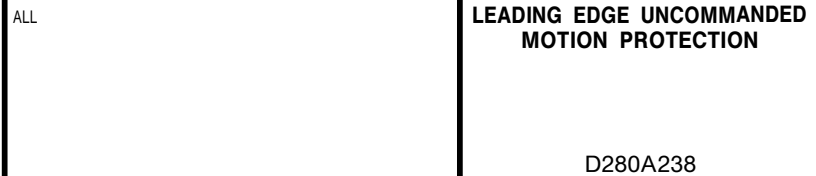
**DFDAU AND TEST  
CONNECTOR INTERFACE**

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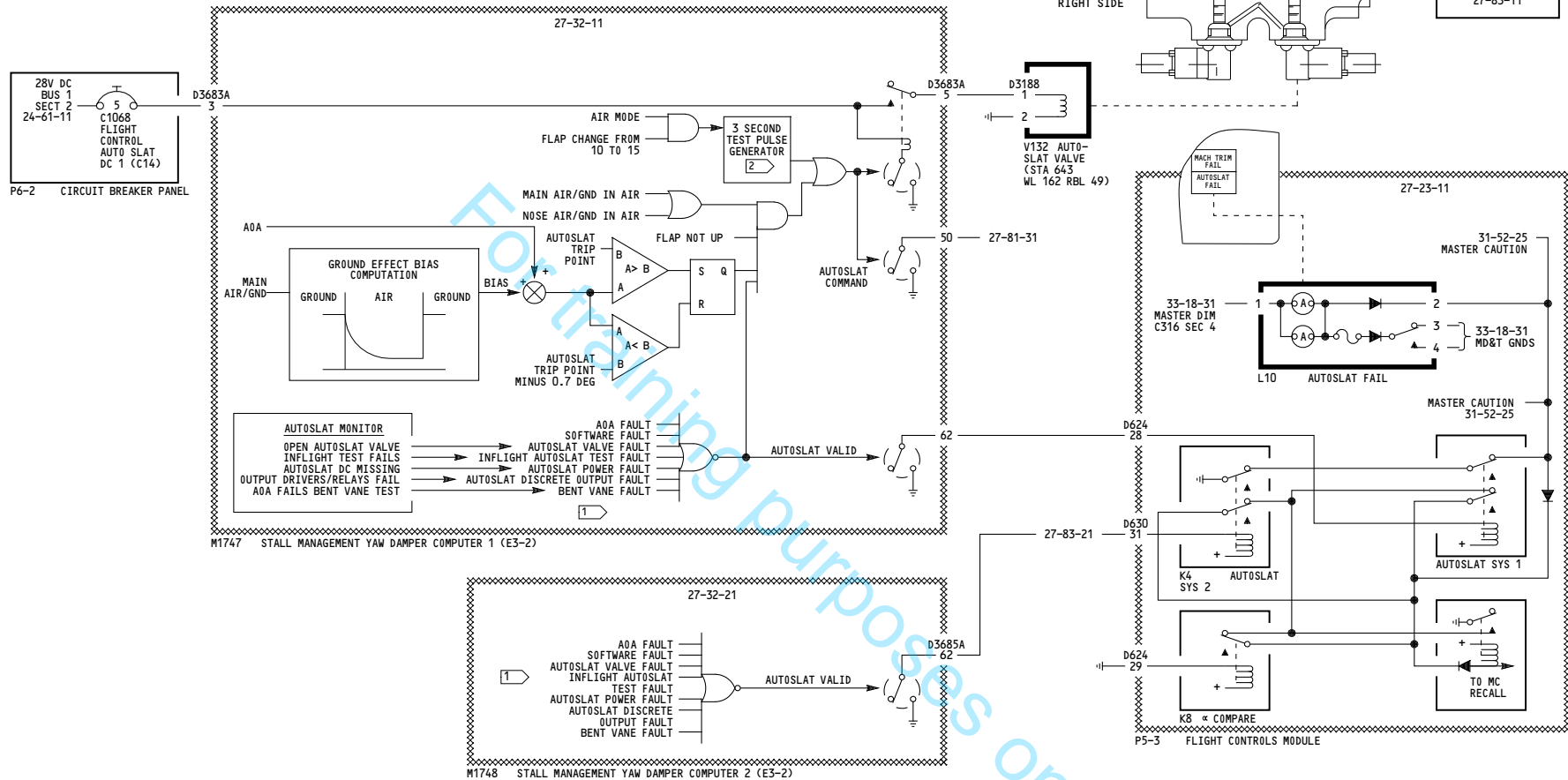
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**NOTES:**

- 1 INFLIGHT AUTOSLAT TEST FAULT AND BENT VANE FAULT ARE LATCHED IN NVRAM. USE CLEAR AND RETEST MENU OF BITE TO CLEAR THE LATCHES.
- 2 INFLIGHT AUTOSLAT TEST PULSE. THIS TRIGGERS THE INFLIGHT TEST DURING WHICH AUTOSLAT DISCRETE OUTPUT CIRCUITRY IS CHECKED. FAILURE WILL SET "IN FLIGHT AUTOSLAT TEST FAULT."

ALL	<b>AUTOSLAT SYSTEM NO. 1</b>
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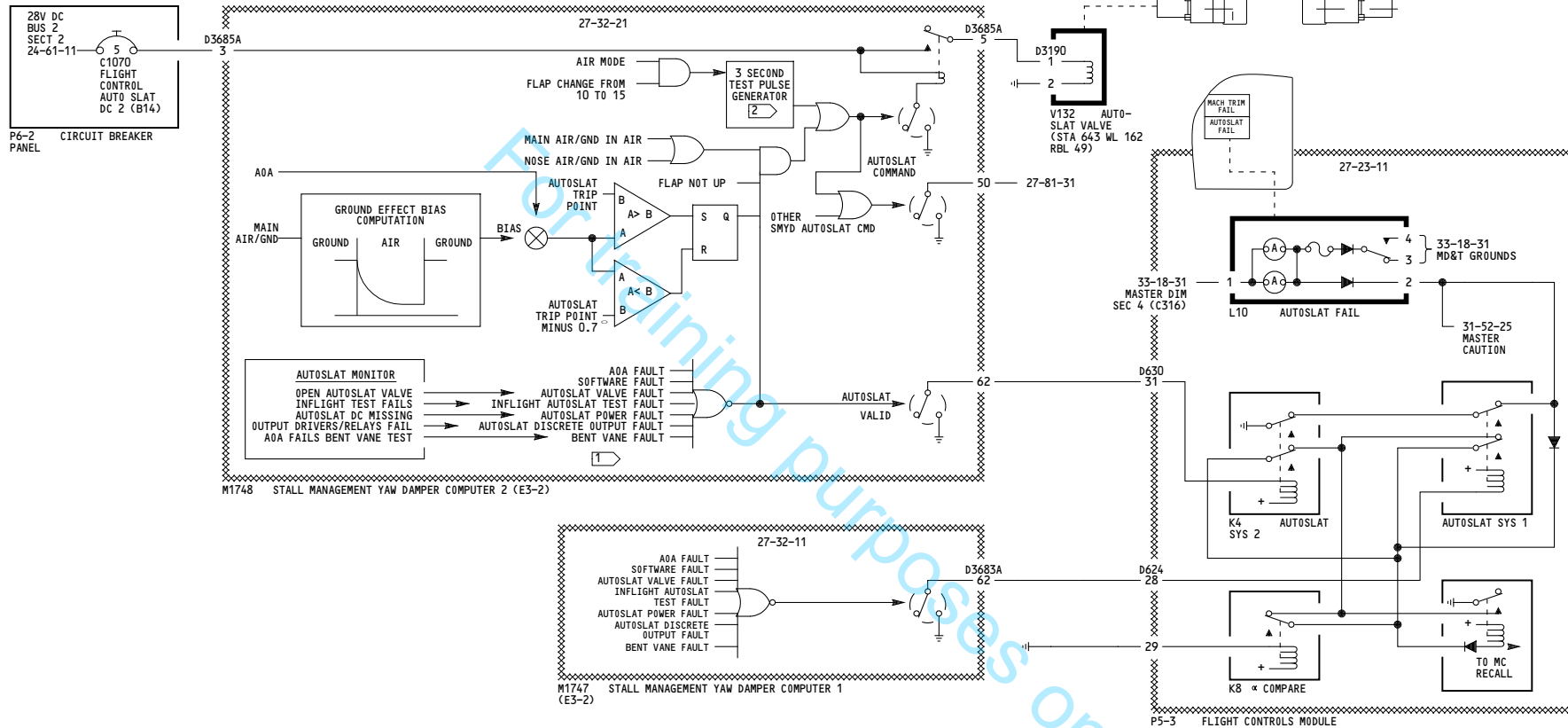
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**WIRING DIAGRAMS**  
27-83-21



**NOTES:**

- 1 INFLIGHT AUTOSLAT TEST FAULT AND BENT VANE FAULT ARE LATCHED IN NVRAM. USE CLEAR AND RETEST MENU OF BITE TO CLEAR THE LATCHES.
- 2 INFLIGHT AUTOSLAT TEST PULSE THIS TRIGGERS THE INFLIGHT TEST DURING WHICH AUTOSLAT DISCRETE OUTPUT CIRCUITRY IS CHECKED. FAILURE WILL SET "INFLIGHT AUTOSLAT TEST FAULT."

ALL

**AUTOSLAT SYSTEM NO. 2**

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