

LEARJET 35/35A/36/36A MAINTENANCE MANUAL

FLAP SYSTEM - DESCRIPTION AND OPERATION

1. Description

- A. The flap system is electrically controlled and hydraulically operated and provides lift to the wing when partially extended and increases drag to reduce speed when fully extended.
- B. On Aircraft 35-417, 35-419, 35-477, 35-479, 35-483 and Subsequent and 36-051 and Subsequent are equipped with a gated flap control system. (Refer to [27-51-00](#) for coverage of the gated flap control system.)
- C. The single-slotted flaps are attached to the inboard rear wing spar by tracks, rollers and hinges. The dual actuator flap system is electrically controlled and hydraulically operated. A flap switch is located on the cockpit center pedestal and a flap position indicator is located on the center instrument panel. An aural warning system is electrically connected to alert the pilot that the flaps have been fully extended without the landing gear being extended.
- D. On Aircraft 35-002 thru 35-059 and 36-002 thru 36-017, the flap system consists of two flaps, two flap actuators, a control valve, a check valve, a restrictor, a flap blowup relief valve, a flap load-limiting relief valve, an airspeed switch and a solenoid-actuated load-limiting valve.
- E. On Aircraft 35-060 thru 35-416, 35-418, 35-420 thru 35-476, 35-478, 35-480 thru 35-482, and 36-018 thru 36-050, the flap system consists of two flaps, two flap actuators, a control valve, a check valve, a restrictor, and a flap blowup relief valve.
- F. Maximum flap extension is 40 (+5/-0) degrees down. Flaps should travel from maximum up to maximum down in 6 seconds or less.
- G. When the flaps are extended below 25 degrees, the spoilers (in the augmentation mode) work independently to assist the ailerons. During the aileron augmentation mode, the spoilers are controlled by an electrical aileron monitoring system. (Refer to [27-60-00](#).)

2. Operation (See Figures 1 thru 3.)

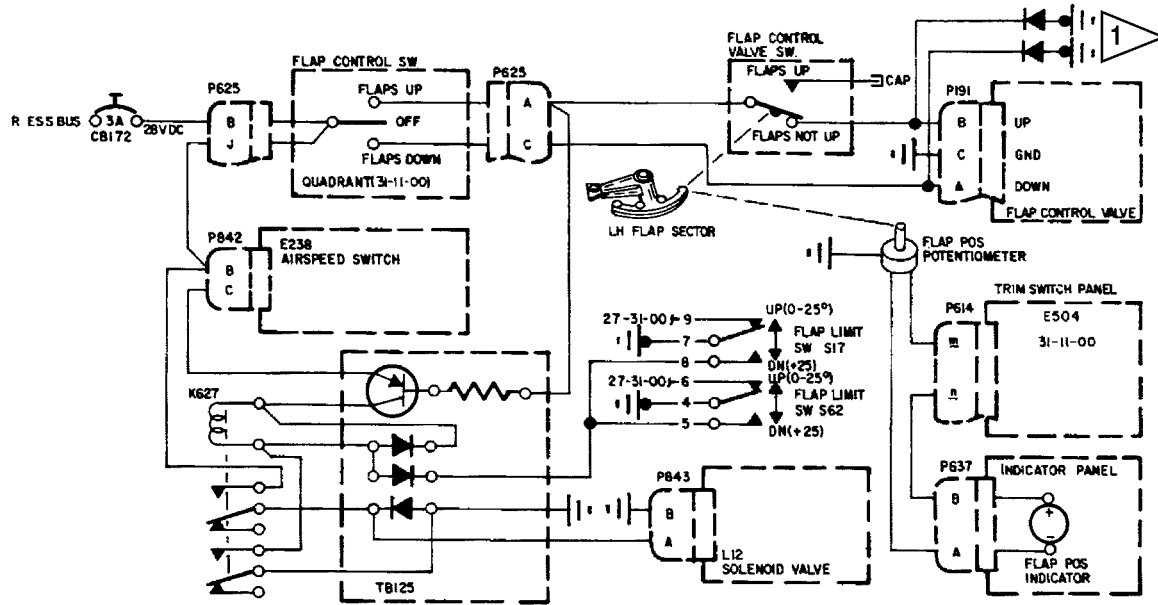
- A. Setting the Flap Switch on the center pedestal to the DN position energizes a solenoid which positions the flap control valve to direct hydraulic fluid to the down port of the flaps actuators. The actuators rotate sectors connected to the flap push-pull tube and extends flaps. Interconnecting control cables attached to flap sectors ensure synchronized flap travel.
- B. When the Flap Switch is returned to the off position, the solenoid is de-energized and the flap control valve returns to neutral. This cuts off all hydraulic flow to the actuators and stops the flaps at the desired position.
- C. Setting the Flap Switch to UP energizes the solenoid and positions the flap control valve selector to direct hydraulic fluid to the up port of the flap actuators. This rotates the flap sectors which retract the flaps. On Aircraft 35-002 thru 35-531 and 36-002 thru 36-053 not modified per SB35/36-27-15A, "Inspect Flap Sector Mounting Brackets for Cracks and Flap System for Interference," when the flaps are fully retracted, the flap control valve switch (516) is contacted. This breaks the electrical circuit to

**LEARJET 35/35A/36/36A
MAINTENANCE MANUAL**

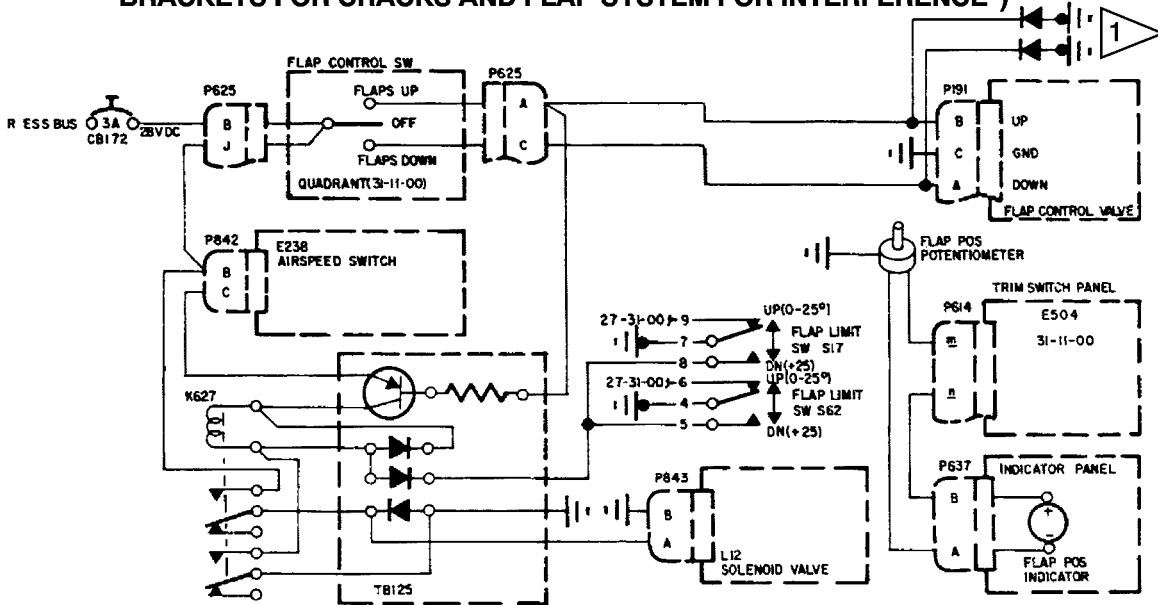
de-energize the solenoid and allows the flap control valve to return to the neutral position and stop hydraulic flow.

- D. An aural warning system is electrically connected to the flaps and landing gear. With the flaps extended beyond 25 degrees, an aural warning horn will sound until the landing gear is fully extended and locked.
- E. After extended parking time with power shut off, the flaps can droop and spoilers rise. This is normal. On starting either the engines or the auxiliary hydraulic pump, the flaps and spoilers will return to the position prior to shutoff provided the control switch settings have not been changed.
- F. A check valve, installed in the pressure inlet to the flap control valve, will prevent the flaps from retracting in the event of hydraulic system failure upstream of the flap control valve when the flaps are extended.
- G. A 1650 psi [11376.35 kPa] pressure relief valve, installed in the flap down line, relieves pressure to prevent excessive structural loads.
- H. On Aircraft 35-002 thru 35-059 and 36-002 thru 36-017, a solenoid-operated flap load-limiting valve is installed in the flap down line. The solenoid is electrically controlled by an airspeed switch when the aircraft speed exceeds the aircraft flap placard speed with the flaps extended below 25 degrees. The solenoid, when energized allows the load-limiting valve to block the flap pressure line through a 1000 psi [6894.757 kPa] load-limiting relief valve.
- I. On Aircraft 35-002 thru 35-066 and 36-002 thru 36-017, not equipped with AAK 76-4 (Reduced Approach Speed System), there are four cam-operated position switches adjacent to the sectors. The 25 degrees position switch at the RH flap sector provides flap position information to the stall warning bias box, gear aural warning, and aileron augmentation systems. The 25 degrees position switch at the LH flap sector provides flap position information to the stall warning bias box and (on 35-002 thru 35-059 and 36-002 thru 35-017) the flap load-limiting system. Both 13 degrees position switches, one located at each flap sector, provide flap position information to the stall warning bias box and spoiler warning system.
- J. On Aircraft 35-067 thru 35-416, 35-418, 35-420 thru 35-476, 35-478, 35-480 thru 35-482, 36-018 thru 36-050, and earlier Aircraft equipped with AAK 76-4 (Reduced Approach Speed System), there are two, three-layer, rotary-type position switches, one connected to each flap sector. Each switch provides 3 degrees, 13 degrees, and 25 degrees flap position signals. All three layers of each switch provide flap position information to the stall warning computer. The 25 degrees and 13 degrees layers of both switches provide flap position information to the gear aural warning system. The 13 degrees layer of each switch also provides flap position information to the autopilot electric box.

LEARJET 35/35A/36/36A MAINTENANCE MANUAL



(ON AIRCRAFT 35-002 THRU 35-059 AND 36-002 THRU 36-017
NOT MODIFIED PER SB 35/36-27-15A, "INSPECT FLAP SECTOR MOUNTING
BRACKETS FOR CRACKS AND FLAP SYSTEM FOR INTERFERENCE")



(ON AIRCRAFT 35-002 THRU 35-059 AND 36-002 THRU 36-017
MODIFIED PER SB 35/36-27-15A, "INSPECT FLAP SECTOR MOUNTING
BRACKETS FOR CRACKS AND FLAP SYSTEM FOR INTERFERENCE")

NOTE

1 On Aircraft 36-002, diode not effective.

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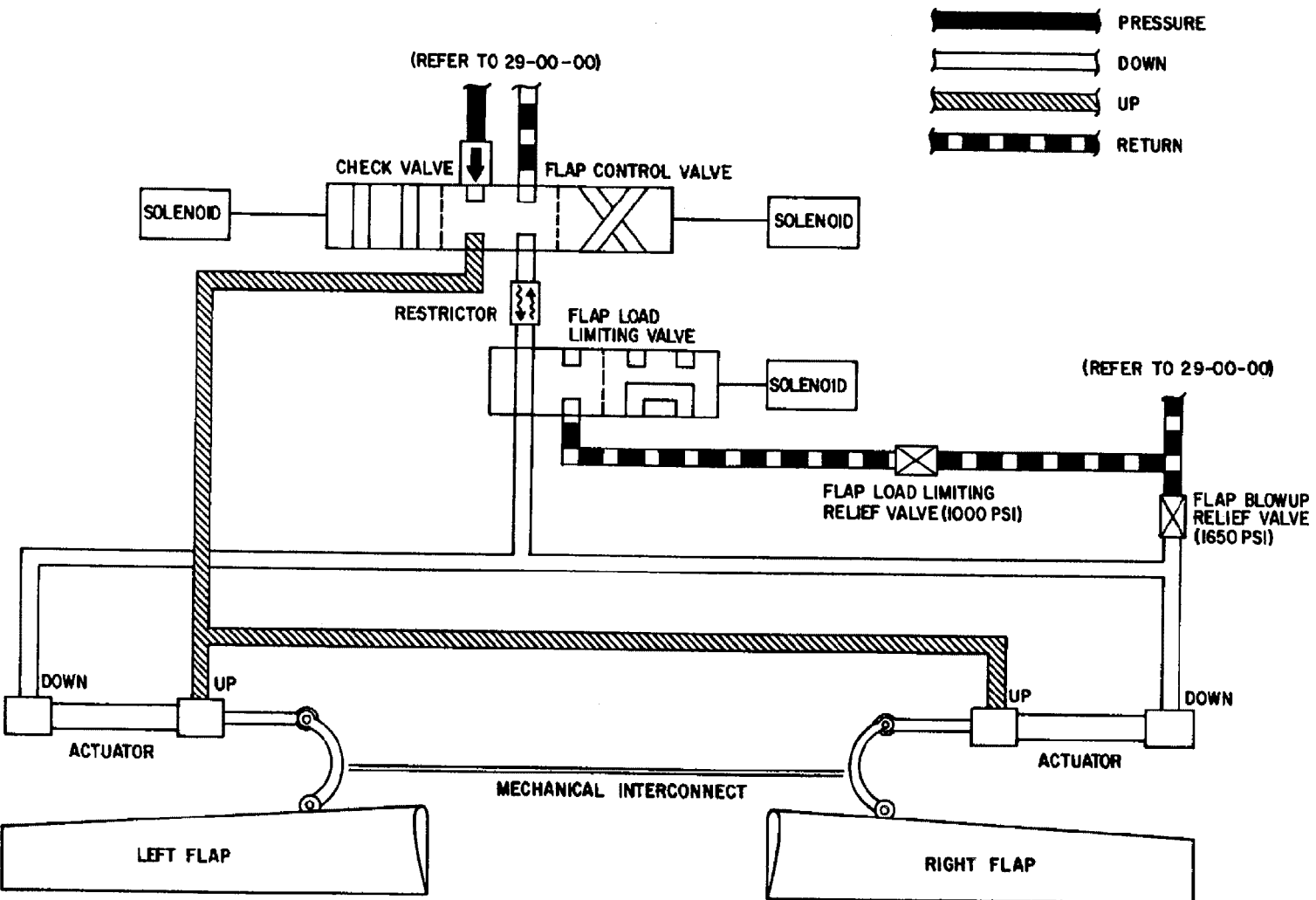
Flap Electrical Control Schematic
Figure 1 (Sheet 1 of 2)

Wiring diagram for the flap control system. The diagram shows the electrical connections from the 28VDC bus through various switches and relays to the flap control valve and a position indicator. Key components include the Flap Control Switch (Quadrant 31-11-00), the Flap Control Valve Switch, the LH Flap Sector, the Flap Position Potentiometer, the Trim Switch Panel (E504, 31-11-00), and the Indicator Panel (P657) with a Flap Position Indicator. The diagram is labeled with component names and terminal numbers (P625, P651, P654, P657) and includes a note about the 28VDC supply.

The diagram illustrates the electrical control system for the flap position. It begins with the **ESS BUS** (3A, CB172) providing 28VDC to relay **P625** (B). This relay is connected to the **FLAP CONTROL SW**, which has three positions: **FLAPS UP**, **OFF**, and **FLAPS DOWN**. The switch is labeled **QUADRANT (31-11-00)**. The output of the switch goes to relay **P625** (A and C). Relay **P625** (A) is connected to the **FLAP POS POTENTIOMETER**. The potentiometer is connected to the **FLAP POS INDICATOR** on the **INDICATOR PANEL** (P637). The potentiometer is also connected to the **TRIM SWITCH PANEL** (P614, ESO4, 31-11-00). The **FLAP POS POTENTIOMETER** is also connected to the **FLAP CONTROL VALVE** (P191). The valve has three terminals: **UP**, **GND**, and **DOWN**. The **FLAP CONTROL VALVE** is connected to the **FLAP POS INDICATOR** and the **TRIM SWITCH PANEL**.

M35-275000-001-02

27-50-00 Page 4
Mar 25/13



M3536-275000-002-01

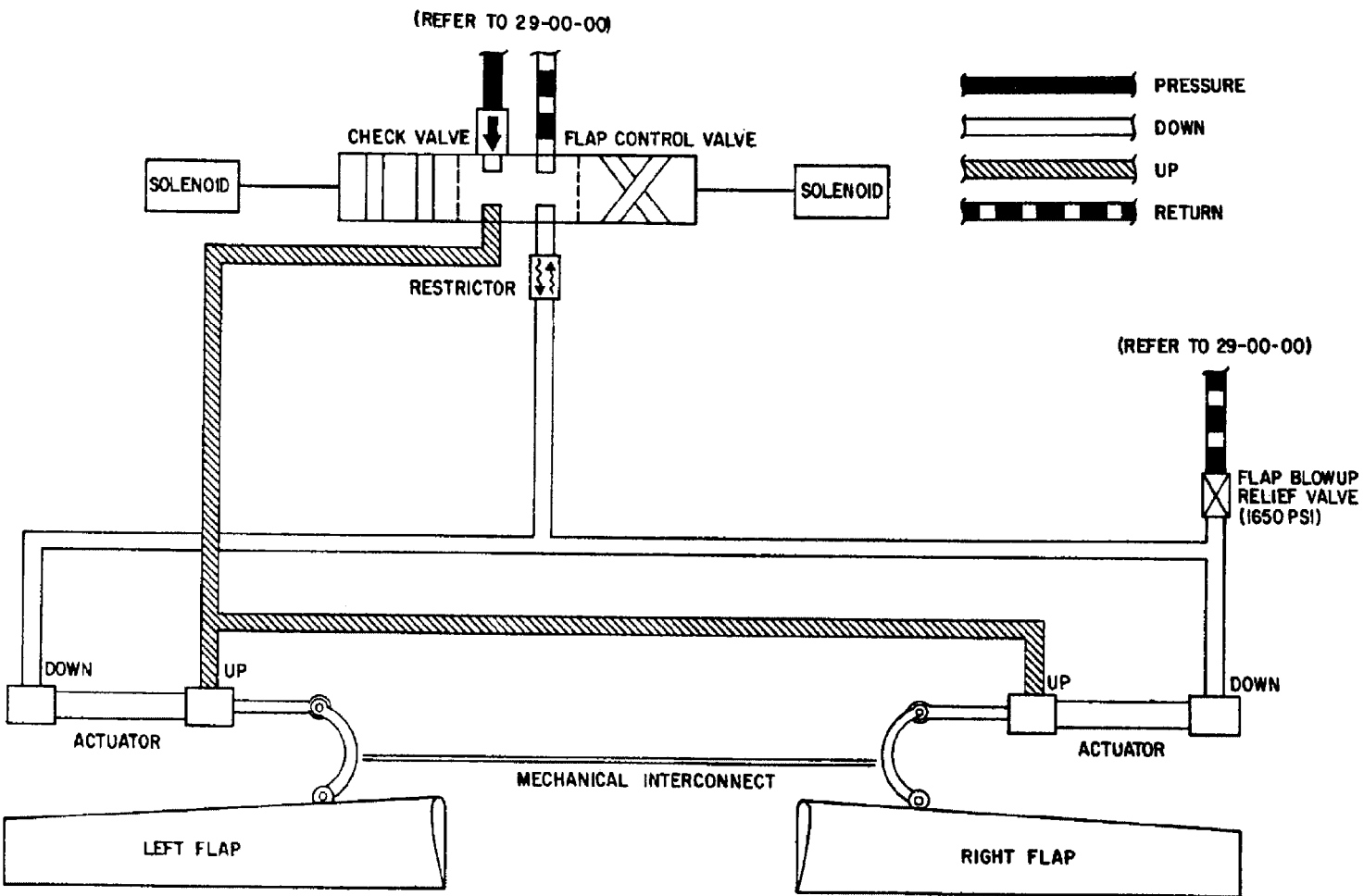
Flap System Hydraulic Schematic
Figure 2 (Sheet 1 of 2)

EFFECTIVITY: 35-002 THRU 35-059, AND
36-002 THRU 36-017

MM-99

27-50-00

Page 5
Mar 25/13



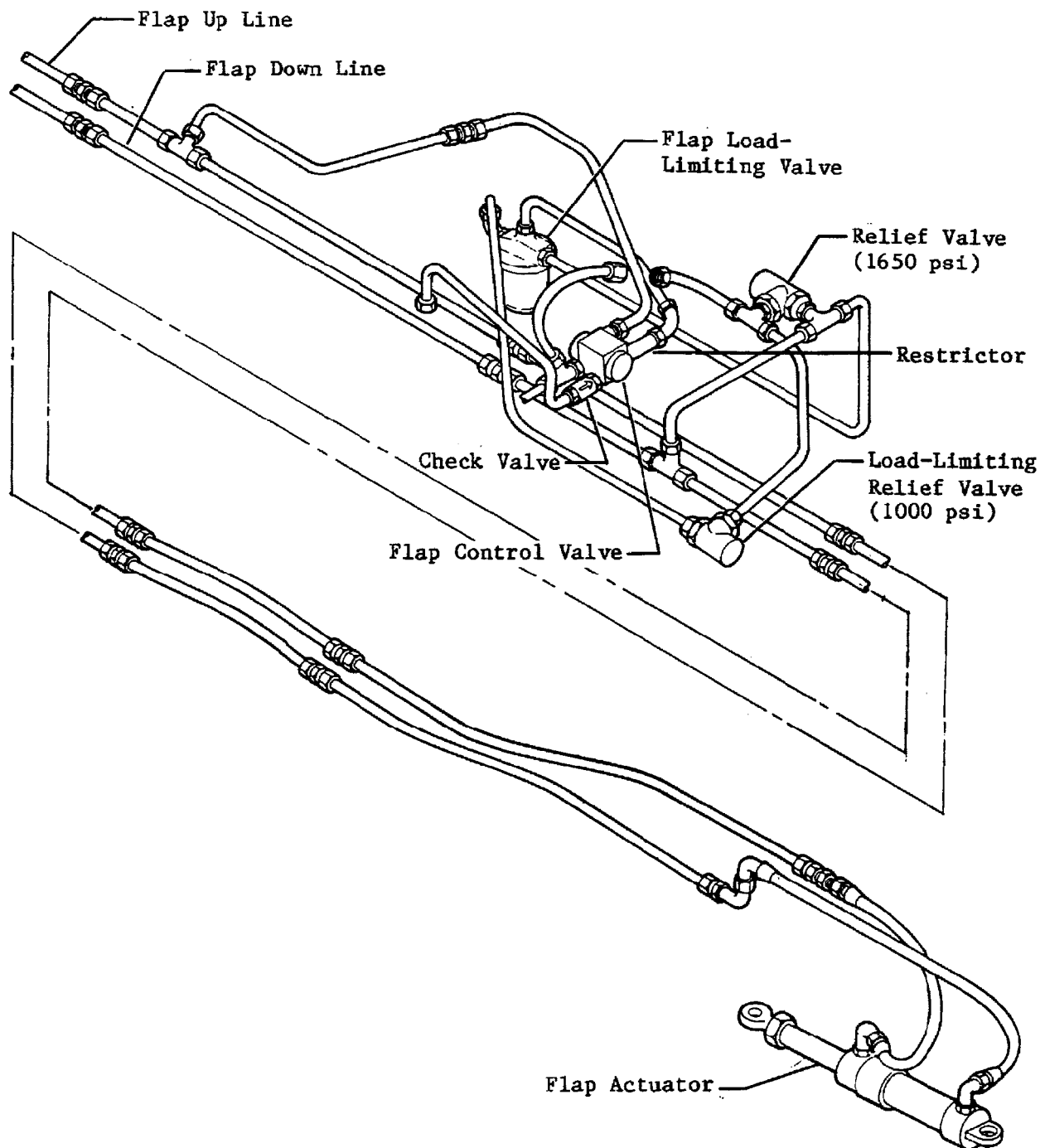
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Flap System Hydraulic Schematic
Figure 2 (Sheet 2 of 2)

EFFECTIVITY: 35-060 THRU 35-416, 35-418, 35-420 THRU
35-476, 35-478, 35-480 THRU 35-482, AND
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27-50-00

LEARJET 35/35A/36/36A
MAINTENANCE MANUAL



M3536-275000-003-01

Flap Hydraulic System Components Installation
Figure 3 (Sheet 1 of 2)

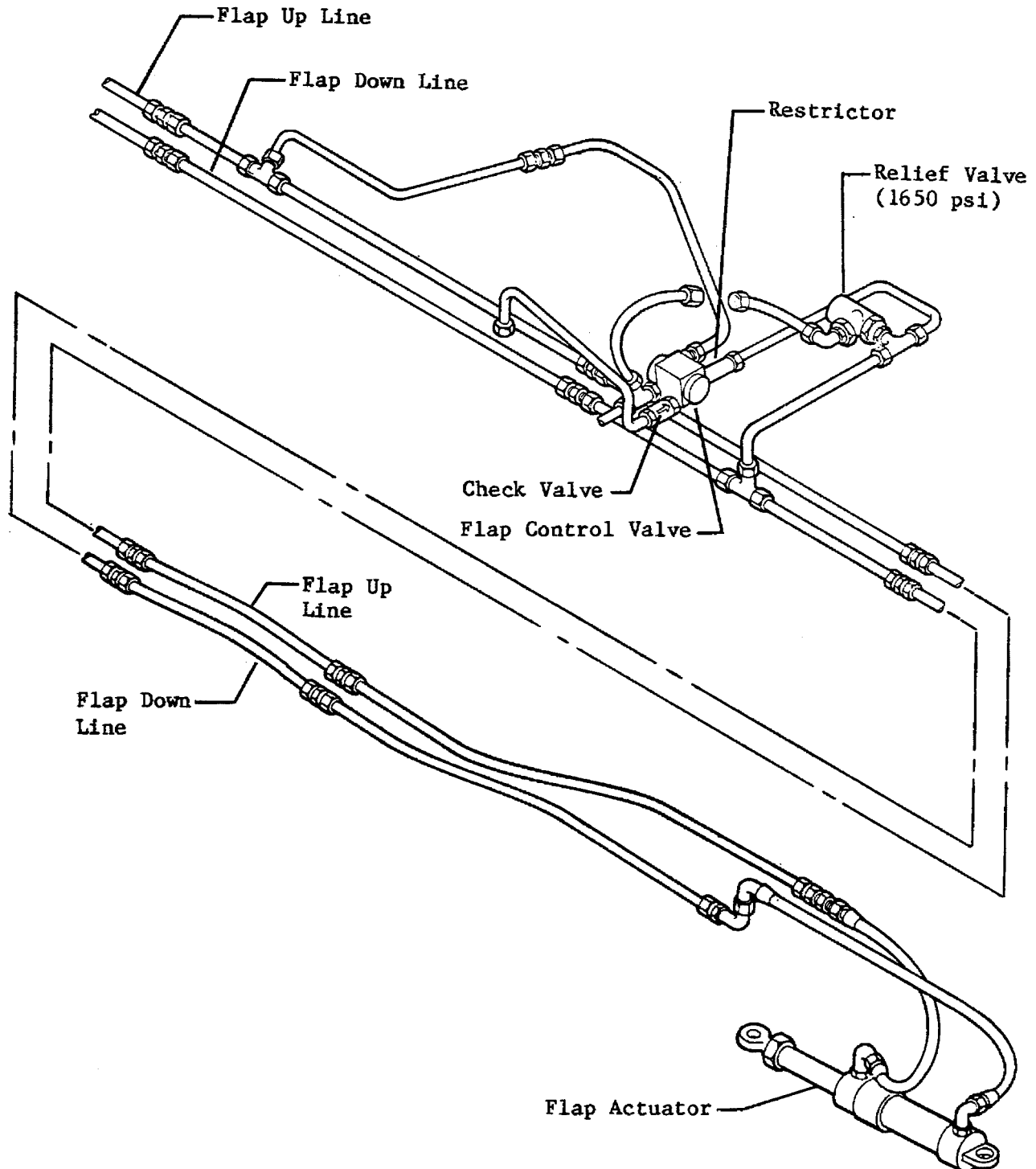
EFFECTIVITY: 35-002 THRU 35-059, AND
36-002 THRU 36-017

MM-99

27-50-00

Page 7
Mar 25/13

LEARJET 35/35A/36/36A
MAINTENANCE MANUAL



M3536-275000-003-02

Flap Hydraulic System Components Installation
Figure 3 (Sheet 2 of 2)

EFFECTIVITY: 35-060 THRU 35-416, 35-418, 35-420 THRU
35-476, 35-478, 35-480 THRU 35-482, AND
36-018 THRU 36-050

MM-99

27-50-00

Page 8
Mar 25/13