

Service Information Letter - Fuel Systems

SUBJECT: Service Information for RSA-10ED1 Fuel Injection Servo Parts List 2549038-4

PURPOSE: To provide repair shops with flow bench limits and service information for RSA-10ED1 fuel injection servo parts list 2549038-4.

- A. **EFFECTIVITY:** This Service Information Letter is applicable to all RSA-10ED1 fuel injection servos, parts list 2549038 issue -1 through -3. These servos are installed on Lycoming TIO-540-AE2A engines in Piper Malibu Mirage (PA46-350P) and Piper Malibu Matrix (PA46-350-T) aircraft.
- B. **REASON:** Product improvement. Compliance is recommended at overhaul.
- C. **DESCRIPTION:** The service information found in manual 15-458G Change 1 (12/15/90) for parts list 2549038-2 is applicable to parts list 2549038-4 except as follows:

1. Reference manual 15-458G Change 1 IPL, Figure 1:

| Item Number | Old Part Number | New Part Number | Description |
|-------------|-----------------|-----------------|-----------------------|
| 1V | 2549038-2 | 2549038-4 | Fuel Injection Servo |
| 115M | 2549041-A | 2549041-C | Servo, Basic Assembly |

2. Reference manual 15-458G Change 1, IPL, Figure 3:

| Item Number | Old Part Number | New Part Number | Description |
|-------------|-----------------|-----------------|------------------------|
| 40 | 2521757 | 2541326 | Plate, Mixture Control |
| 115 | 2538396 | 2577002 | Idle Lever Assembly |
| 160 | 2538321 | 2577001 | Idle Valve Stem |
| 180E | 2541438 | 2577201-1512 | Valve, Lower Idle |

3. Reference manual 15-458G Change 1 IPL, Figure 4:

| Item Number | Old Part Number | New Part Number | Description |
|-------------|-----------------|-----------------|-----------------------------|
| 70 | 2538420 | 2577125 | Diaphragm Assembly, Air |
| 100 | 2539561 | 2577245 | Seal, Servo Stem |
| 105 | 2539560 | Not Used | Spring, Helical Compression |

4. Reference manual 15-458G Change 1, Calibration and Service Limits:

| Applicable Figure | Specification Type | Old Test Specification | New Test Specification * |
|-------------------|--------------------|------------------------|--------------------------|
| Figure 1320 | Calibration | 30023-03 | 30023-04 |
| Figure 1321 | Service | 30024-02 | 30024-04 |

*These Specifications are included with this service information letter; see pages 3 & 4.

5. Reference manual 15-458G Change 1, History of Changes

| Date | IC Number | Description |
|----------|-----------|--|
| Issue 3 | | |
| 11-9-93 | 2 | Basic Assy 25409041-B was 2549041-A Idle Lever Assy 2577002 was 2538396 Calibration TS 30023-01 was 30002 Service Limits TS 30024-01 was 30003 |
| 4-27-94 | 4 | Added optional constant head springs 2520625, 2541439, 2537779 & 2523155 Removed constant effort springs |
| 4-7-97 | 7 | Idle valve 2542172 was 2541438 |
| 5-19-97 | 8 | Idle valve 2541438 was 2542172 |
| 6-26-97 | 9 | Venturi 2542034 was 2523969 Idle valve 2577006 was 2542172 |
| 9-11-97 | 9 | Idle valve 2539612 was 2577006 |
| 12-21-98 | 12 | Idle Lever 2577103 was 2577002 |
| 8-30-04 | 14 | Added optional regulator cover 2577230 |
| 7-11-07 | 14 | Calibration TS 30023-02 was 30023-01 |
| 8-22-07 | 14 | Calibration TS 30023-03 was 30023-02 Service Limits TS 30024-02 was 30024-01 |
| 10-3-08 | 16 | Gasket 2577258 was 365533 |
| 12-19-08 | 16 | Service Limits TS 30024-03 was 30024-02 |
| Issue 4 | | |
| 2-3-09 | 17 | Basic Assy 2549041-C was 2549041-B Idle lever assy 2577002 was 2577103 Idle valve 2577201-1512 was 2539612 Center body seal 2577245 was 2539560 & Spring 2539561 Air diaphragm assy 2577125 was 2538420 Mixture plate 2541326 was 2521757 Added constant effort springs 2523688, 2520652, 2523247, 2537968 or 2539512 Calibration limits TS 30023-04 was 30023-03 |
| 3-11-09 | 17 | Service limits TS 30024-04 was 30024-03 |

30023-04
J. J. J. 2/3/09

TEST SPECIFICATION
CALIBRATION LIMITS
 PRECISION AIRMOTIVE LLC - FUEL CONTROLS - MARYSVILLE, WASHINGTON

INSTALLATION PARTS LIST: _____ MODEL: RSA-10ED1 SERIAL NUMBER: _____

OPERATOR: _____ DATE: _____

BASIC PARTS LISTS: 2549041 FUEL PRESSURE: 25-27 PSI FUEL SP. GRAV. _____ @ _____ OF

| TEST POINT NUMBER | 1 | 2 | 3 | 4 | 5 |
|--|------|----------|------|-------|-------|
| METERING SUCTION (INCHES OF WATER) | 0 | 0 | 2.6 | 6.6 | 24.0 |
| CORRESPONDING AIRFLOW (LBS/HR) | 0 | 0 | 700 | 1100 | 2075 |
| MIXTURE CONTROL POSITION | RICH | ICO | RICH | RICH | RICH |
| THROTTLE POSITION | W/O | W/O | W/O | W/O | W/O |
| FLOWMETER LIMITS | | | | | |
| MINIMUM OBSERVED (LBS/HR) | 39.0 | 0 | 64.0 | 113.0 | 228.0 |
| MAXIMUM OBSERVED (LBS/HR) | 43.0 | 5 cc/min | 72.0 | 119.0 | 235.0 |
| BURETTE TIME LIMITS (Using MIL-PRF-7024 Type II STODDARD) | | | | | |
| BURETTE VOLUME (cc) | 2.00 | | 5.00 | 8.50 | 20.00 |
| MINIMUM OBSERVED (SECONDS) | 28.4 | | 42.4 | 43.6 | 51.9 |
| MAXIMUM OBSERVED (SECONDS) | 31.3 | | 47.7 | 45.9 | 53.5 |
| METERING HEAD AVG OBSERVED (" STODDARD) | 0 | | 3.0 | 11.6 | 52 |

PROCEDURE FOR SPLIT HEAD CHECK

1. Close throttle to .006" shim in bore.
2. Adjust idle fuel flow to 9.5 - 10.5 lbs/hr with wheel centered. Observe metering head. Energize boost pump to provide 35 - 40 psi. After stabilizing, fuel flow must be within $\pm .5$ lbs/hr of value observed at specified fuel inlet pressure. Turn boost pump off.
3. Remove .006" shim.
4. Close throttle to 7.0 - 8.0 lbs/hr fuel flow. Observe metering head. Metering head shall be no more than 5" above value observed in step 2.

30024-04
Don't sign 3/11/09

TEST SPECIFICATION
SERVICE LIMITS
 PRECISION AIRMOTIVE LLC - FUEL CONTROLS - MARYSVILLE, WASHINGTON

INSTALLATION PARTS LIST: _____ MODEL: RSA-10ED1 SERIAL NUMBER: _____

OPERATOR: _____ DATE: _____

BASIC PARTS LISTS: 2549041 FUEL PRESSURE: 25-27 PSI FUEL SP. GRAV. _____ @ _____ °F

| TEST POINT NUMBER | 1 | 2 | 3 | 4 | 5 |
|-------------------|---|---|---|---|---|
|-------------------|---|---|---|---|---|

| | | | | | |
|------------------------------------|------|-----|------|------|------|
| METERING SUCTION (INCHES OF WATER) | 0 | 0 | 2.6 | 6.6 | 24.0 |
| CORRESPONDING AIRFLOW (LBS/HR) | 0 | 0 | 700 | 1100 | 2075 |
| MIXTURE CONTROL POSITION | RICH | ICO | RICH | RICH | RICH |
| THROTTLE POSITION | W/O | W/O | W/O | W/O | W/O |

FLOWMETER LIMITS

| | | | | | |
|---------------------------|------|----------|------|-------|-------|
| MINIMUM OBSERVED (LBS/HR) | 37.0 | 0 | 62.0 | 111.0 | 226.0 |
| MAXIMUM OBSERVED (LBS/HR) | 45.0 | 5 cc/min | 74.0 | 121.0 | 237.0 |

BURETTE TIME LIMITS (Using MIL-PRF-7024 Type II STODDARD)

| | | | | |
|----------------------------|------|------|------|------|
| BURETTE VOLUME (cc) | 200 | 500 | 850 | 2000 |
| MINIMUM OBSERVED (SECONDS) | 27.1 | 41.2 | 42.9 | 51.5 |
| MAXIMUM OBSERVED (SECONDS) | 33.0 | 49.2 | 46.7 | 54.0 |

METERING HEAD AVG

| | | | | |
|-----------------------|---|-----|------|----|
| OBSERVED (" STODDARD) | 0 | 3.0 | 11.6 | 52 |
|-----------------------|---|-----|------|----|

PROCEDURE FOR SPLIT HEAD CHECK

1. Close throttle to .006" shim in bore.
2. Adjust idle fuel flow to 9.0 – 11.0 lbs/hr with wheel centered. Observe metering head. Energize boost pump to provide 35 - 40 psi. After stabilizing, fuel flow must be within ± .5 lbs/hr of value observed at specified fuel inlet pressure. Turn boost pump off.
3. Remove .006" shim.
4. Close throttle to 7.0 – 8.0 lbs/hr fuel flow. Observe metering head. Metering head shall be no more than 5" above value observed in step 2.