

INCIDENT INVESTIGATION REPORT

Component Inspection and Flow Check - RSA Fuel Injection

PAC Work Order Number: _____
Aircraft Type: PA-32RT-300
Engine Model Number: IO-540
Incident Location: Bardstown, KY

Investigation Date: 1-23-08
Aircraft Registration #: N3887M
Incident Date/
PAC File Number: 112106

Component Type: Servo
Model: RSA-10ED1
Parts List Number: 2524273-11 On Consolidated Fuels data plate
Serial Number: .66343

Location:

Precision Airmotive LLC

Attendees:

Tom Little – NTSB
Peter Nielson - PA

I) External Condition:

1) Throttle Rotation?

OK

2) Mixture Control Rotation?

OK

3) Fittings/Levers:

OK, no caps on fittings.

4) Throttle Body/Regulator Body:

OK

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5) Letters on Coiloc Seal:

Unit had carburetor type lead seal rather than standard crimp seal. "285-2" on one side and "M" on the other.

6) Additional Observations:

Idle mixture link center to center length – 2.54".

II) Flow Test Results:

See attached flow sheet.

III) Tear down Results:

1) Fuel Inlet Screen:

OK, mostly clear.

2) Manual mixture control valve/plate/lever assy:

Some light colored, grease like material outside O-ring on lever assembly bushing. Brass mixture valve, P/N 2525196. Shaft assembly is too short, Bendix Service Bulletin RS-65 not complied with, creating minimal pre-load on valve assembly.

3) Idle Plug/Main Metering Orifice:

OK, P/N 2537665.

4) Idle valve plate/lever assy:

Light colored grease like material outside O-ring on bushing, "AN", other OK.

5) Fuel Section O-rings:

OK

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6) Regulator Adjustments:

A) Position of outer regulator nut (# of turns out from inner nut):

3 ¾ turns out.

B) Constant Head Spring/Shims:

No color on spring, no shims.

C) Position of inner regulator nut (# of turns out from bottom):

0 turns out.

D) Constant Effort Spring:

No color on spring.

7) Regulator Components

A) Brass Plug:

OK

B) Regulator Nuts:

OK, silver.

C) Air Diaphragm:

OK, P/N CF 2538420.

D) Center Body Bellows/Seal:

OK, P/N CF 2540538, "FAA PMA", "05604".

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E) Fuel Diaphragm:

OK, P/N 2541803.

F) Servo Seat:

OK, .065" shims, did not remove.

8) Venturi

OK, some brown grease on bolt and O-ring.

A) O-rings (If Applicable)

NA

9) AMC (If Applicable)

NA

10) Other Observations:

Loosely reassembled to protect components.

TEST SPECIFICATION AIR BOX LIMITS

30017-03
ASST 4/8/98

PRECISION AIRMOTIVE CORPORATION - FUEL CONTROLS - EVERETT, WASHINGTON

ENGINEERING SPECIFICATION: PES-1120

MODEL: RSA-10ED1

SERIAL NUMBER: 66343

OPERATOR: OW

DATE: 1-23-08

INSTALLATION PARTS LIST: 2524273-11

BASIC PARTS LIST: 2524648

INTERNAL CHANGE: 36
INTERNAL CHANGE: 42

CUSTOMER: TEXTRON LYCOMING

CUSTOMER TEST SPEC: 13048-D

AIRFLOW: STANDARD BOARD (29.92 @60°F)

FUEL PRESSURE: 25-27 PSI

FUEL: PES-2010 or PES-2150 @ 70-80°F

VIBRATOR PERMISSABLE

AIR BOX NUMBER: 4004

FUEL SP. GRAV: 7.16 @ 68.5 °F

BAROMETRIC PRESSURE

30.00 "Hg @ 65.4 °F

TEST POINT NUMBER	1	2	3	4	5	6	7	8	9	10
AIRFLOW (LBS/HR)	0	100	100	A/R*	300	800	1000	1000	1200	1700
CARB LOSS ("Hg)	W/O	17.2	17.2	A/R*	14.7	11.9	9.9	9.9	9.4	W/O

MIXTURE CONTROL POSITION

MIN ALLOWABLE FUEL FLOW

OBSERVED FUEL FLOW (LBS/HR)

MAX ALLOWABLE FUEL FLOW

METERING SUC ("H₂O) AVG

OBSERVED METERING
SUCTION

METERING HEAD ("NAP) AVG

OBSERVED METERING HEAD

	RICH	RICH	ICO	RICH	RICH	RICH	RICH	RICH	FROM RICH	RICH	RICH
	34.5	9.5	0	*CLOSE	75	91	110.5	156.8	40°		
THROTTLE TO 6.0 LBS/HR	51.6	15.5	Ø	29.2	79.9	99.8	54.8	119.6	165.3		
FUEL FLOW	42.7	10.5	0.5	80	97	115.4	163.2				

MAX +5.0	0.5	3.6	5.5	7.9	15.8
	4	3.3	5.2	7.8	15.5

6.8	5.0	15.5	37.8
5.5	3.1	8.2	12.6
	18.7	36.8	

EXTERNAL LEAKAGE - NONE PERMITTED

1. METERING HEAD AND METERING SUCTION ARE TO BE RECORDED AS REQUIRED FOR A GUIDE IN TROUBLESHOOTING.

PRECISION AIRMOIVE CORPORATION FUEL CONTROLS

COMPONENT MAINTENANCE MANUAL

MODEL RSA-10ED1 SERVO FUEL INJECTOR ASSEMBLY CALIBRATION AND SERVICE LIMITS

THE ALLIED/BENDIX CORPORATION, TEST SPECIFICATION DATE: 18-APR-85
ENERGY CONTROLS DIVISION, SOUTH BEND, INDIANA, U. S. A.
MODEL RSA-10ED1 SERIAL NO. 114-1911 11277-01 (20-2511)
PARTS LIST (1-13) DATE (12-31) PAGE CODE 1
RELEASED: PAGE 1 OF 1

PARTS LIST 252464B
FUEL INLET PRESSURE: 26 P.S.I. $\pm$ 1
NOZZLE PRESSURE: 0
LIMITS BASED ON 0.734 SPECIFIC (GRAVITY AT 75 DEG F $\pm$ 5 DEG F
INJECTOR MODEL: RSA-10ED1
DATE ISSUED: -----

TEST POINT NO.	1	2	3	4
METERING SUCTION	0	0	3.6	15.8
INCHES OF WATER				
CORRESPONDING				
AIR FLOW LBS/HR.	0	0	800	1700
MIXTURE CONTROL	R			
LEVER POSITION	W.O.	I.C.O.	W.O.	R
THROTTLE POSITION	200	W.O.	500	W.O.
BURETTE VOLUME	27.3	37.8	30.4	850
TIME MIN.	33.8	41.0	31.6	30.4
LIMITS				
IN				
SECONDS				
FLOWMETER	34.5	71.0	156.8	156.8
LIMITS	42.7	5CC	77.0	163.2
IN				
LBS./HR.				
METERING				
HEAD				
INCHES OF				
FUEL				

- PROCEDURE FOR SPLIT HEAD CHECK
1. CLOSE THRO. TO .006" SHIM IN BORE.
 2. ADJ. IDLE FUEL TO 9. - 11. #/HR. WHEEL CENTERED, OBS MET. HEAD. ENERGIZE BOOST PUMP WHICH WILL INCREASE FUEL INLET PRESS. TO 35-40 P.S.I. AFTER STABILIZING, FUEL FLOW MUST BE WITHIN $\pm$.5 LBS/HR OF VALUE SET AT SPEC. FUEL INLET PRESS. TURN BOOST PUMP OFF.
 3. REMOVE .006" SHIM.
 4. CLOSE THRO. TO 7. - 8. #/HR. F.F., MET. HEAD INCR. FROM (2) 5" FUEL MAX.

Calibration Test Sheet
Figure 1301.

PRECISION AIRMOTIVE CORPORATION FUEL CONTROLS

COMPONENT MAINTENANCE MANUAL

MODEL RSA-10ED1 SERVO FUEL INJECTOR ASSEMBLY CALIBRATION AND SERVICE LIMITS

DATE: 19-MAR-81

TEST SPECIFICATION

THE BENDIX CORPORATION, ENERGY CONTROLS DIVISION, SOUTH BEND, INDIANA, U. S. A.

MODEL: RSA-10ED1 SERIAL NO. 10171-01 (20-2511)
PARTS LIST (1-13) DATE (32-37) PAGE CODE

PAGE 1 OF 1

PARTS LIST 2524648

ENGINE MFR: LYCOMING FUEL INLET PRESSURE: 26 P.S.I. ± 1 INJECTOR MODEL: RSA-10ED1
NOZZLE PRESSURE: 0 NOZZLE PRESSURE: 0
LIMITS BASED ON 0.734 SPECIFIC (GRAVITY AT 75 DEG F ± 5 DEG F DATE ISSUED: 06-12-80
(NAPHTHA)

TEST POINT NO.	1	2	3	4
METERING SUCTION	0	0	3.6	15.8
INCHES OF WATER				
CORRESPONDING				
AIR FLOW LBS/HR.	0	0	800	1700
MIXTURE CONTROL				
LEVER POSITION	N	I.C.O.	R	R
THROTTLE POSITION	W.O.	W.O.	W.O.	W.O.
BURETTE VOLUME	200	500	500	850
TIME MIN.	27.3	37.0	29.1	33.0
LIMITS MAX	33.8	42.0	42.0	33.0
IN				
SECONDS OBS				
FLOWMETER MIN.	34.5	69.5	150.5	170.0
LIMITS MAX.	42.7	5CC	78.9	170.0
LBS./HR. OBS.				
METERING				
HEAD				
INCHES OF FUEL				

Calibration Test Sheet
Figure 1302.