

EO 10A-1-2Q

ROYAL CANADIAN AIR FORCE



DESCRIPTION AND MAINTENANCE INSTRUCTIONS

CYLINDER PRESSURE TEST PISTON TYPE ENGINES

REVISION
NOTICE

LATEST REVISED PAGES SUPERSEDE
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Insert revised pages into basic publication.
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LIST OF RCAF REVISIONS

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PART 1

CYLINDER PRESSURE TEST PISTON TYPE ENGINES

1 As an aid in reducing the number of unscheduled removal of engines before time expired, and to improve engine serviceability and general operating efficiency the Motorstat engine condition Tester Class 4920-21-803-2016 (Formerly Sec/Ref. 35/10135) is available, see Figure 1-1. This tool is mandatory in performing tests required by applicable -7A EOs. This tool is a cylinder leakage tester, not a compression tester.

2 With the use of this equipment as part of the normal inspection schedule, or when any faulty cylinder operation is suspected, defective cylinders may be discovered and replaced before they progress to the degree of causing engine failure, and possible unscheduled engine removal. The prime function of this test is to indicate valve condition. Only under exceptional circumstances will faulty rings or cracks in pistons and/or cylinders be revealed. The test is required IN ADDITION TO all other inspection procedures.

3 Cylinder assembly removal and replacement will be governed by Figure 1-3.

METHOD OF GAUGE CALIBRATION BY USER UNITS

4 The gauge is to be dead weight tested to ensure when fifty psi is applied, the gauge reads zero percent leakage. If a deviation is evident, the gauge hand is to be positioned at zero with fifty psi dead weight pressure applied, see Figure 1-2 gauges are to be calibrated in this method every 30 days. During usage of tester a maximum applied air pressure at source is not to exceed eighty psi. If this pressure is exceeded, the needle is brought in contact with the stop, which results in moving of the needle on the pivot. To prevent over maximum pressures being applied the regulator adjusting screw is to be backed off before air pressure is applied, and each time the tester is connected to the air supply. The air supply is to be passed through a transformer air (4940-21-804-9060 or 4940-21-802-1484) before application to the tester. Check for leaks at fittings and at hose connection, if any leakage occurs incorrect readings are obtained. Testers found unserviceable

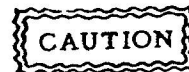
other than for calibration, and found beyond unit repair capacity to be reported to AMC in accordance with CAP 16, Vol. 1, Chapter 12.2

METHOD FOR QUICK CHECK MOTORSTAT SERVICEABILITY

5 Back off pressure regulating screw, see Figure 1-2, connect motorstat to required air supply, adjust pressure regulating screw to read zero percent loss and depress plunger. The gauge should then read eighty percent loss plus or minus five percent.

6 The engine condition test is to be carried out as follows:

(a) To prevent over maximum pressure being applied, the regulator adjusting screw is to be backed off before air pressure is applied and each time the tester is connected to the air supply, see Figure 1-2.



Air pressure applied to the tester is not to exceed 80 psi, use air transformer Class 4940-21-804-9060 or 4940-21-802-1484, pressure regulator.

(b) Attach the Motorstat to a suitable compressed air supply of 70 to 80 psi and adjust the tester to read zero percent by turning the pressure adjusting screw, see Figure 1-2.

(c) Prevent the propeller or engine crankshaft from turning.

WARNING

Air pressure used with the motorstat tester is sufficient to swing the propeller if the piston is not exactly at TDC. To prevent an accident one man is to be detailed to hold the propeller at all time during the test.

(d) With one spark plug removed and the piston at TDC on the compression stroke, insert the motorstat operating valve in the spark

plug hole, press down on the body of the motorstat tester and record the percentage of cylinder pressure loss on Appendix "A". This information is to be transcribed to the relevant L14-7 for record purposes and the Appendix "A" destroyed, or if desired may be retained for local purposes. Appendix "A" to this EO is to be made up locally, see Figure 1-2, for motorstat operation.

(e) Continue through the normal engine firing sequence until all cylinders have been tested.

7 When a cylinder registers a pressure leakage percentage greater than listed as normal, see Figure 1-3, a further test is to be carried out as follows:

(a) Ensure valve clearances are within the specified limits.

(b) Spray a small amount, not more than one ounce (29.57 cu. cm.) of clean engine oil into the cylinder through the spark plug hole, rotate the crankshaft through a firing cycle and retest.

(c) If this fails to bring the cylinder leakage within limits, see Figure 1-3, depress the valve off the valve seat several times, rotate the crankshaft through a further firing cycle and retest.

(d) No further testing is required and cylinder removal will be governed as indicated in Figure 1-3.

8 When a cylinder assembly is replaced due to excessive leakage, a new set of readings must be taken following installation of the replacement cylinder and prior to engine operation. The readings to be recorded on the Appendix "A" in red ink.

9 The quantity of cylinders that will be replaced is outlined in Figure 1-4. If the number of cylinders requiring replacement exceeds the quantity outlined in Figure 1-4 the engine may be replaced. There is no limit to the total number of cylinders that can be replaced during the life of the engine.

10 Engine overhaul facilities are to maintain the maximum cylinder pressure leakage for repaired or overhauled engine as indicated in Figure 1-5.

11 Overhaul contractors are to record the cylinder pressure leakage on form L14-7. The completed L14-7 is to be forwarded to the consignee unit. Completed L14-7s received with engines for overhaul are to be retained in the contractor's or TSD's file for the relevant engine.

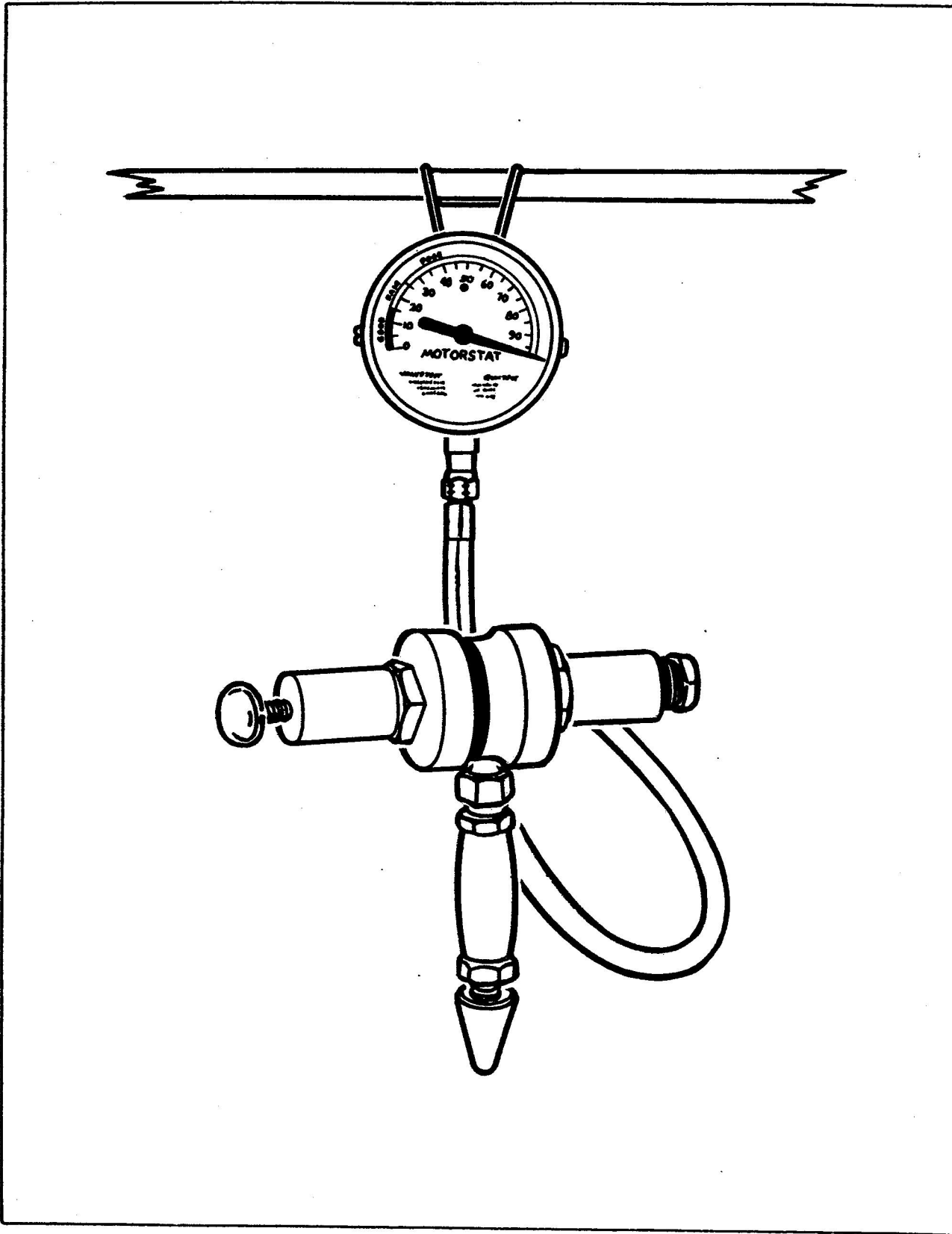


Figure 1-1

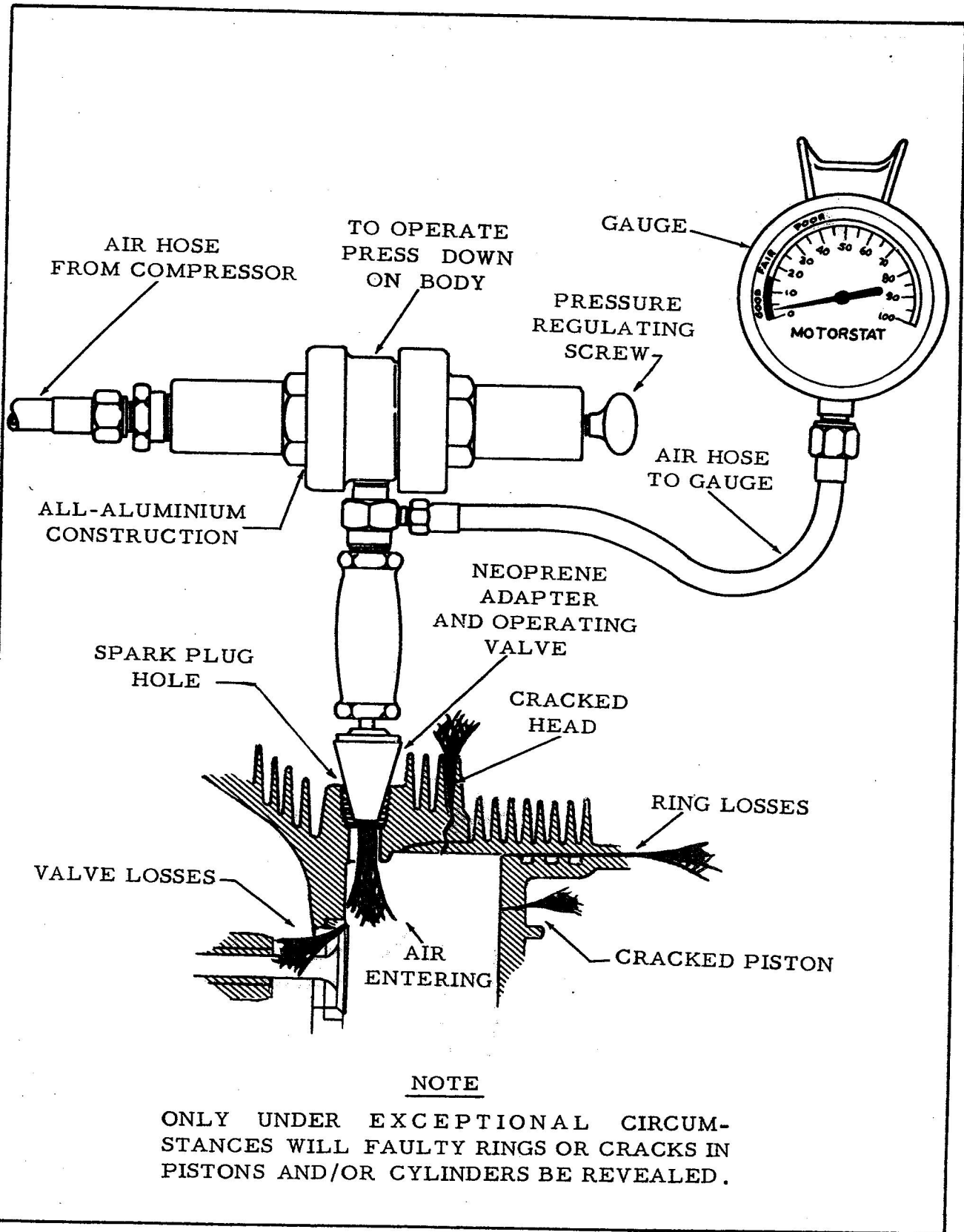


Figure 1-2 (Issue 1)

Engine Type	Remove
P&W R985	Over 30%
P&W R1340	Over 30%
P&W R1830	Over 30%
P&W R2000	Over 30%
P&W R2800	Over 30%
Wright R2600	Over 40%
Wright R3350	Over 50%
Wright R1820	Over 50%
Continental	Over 30%
Lycoming	Over 30%
Gipsy	Over 30%

Figure 1-3 (Issue 3)

Total Number Of Cylinders On Engine	Number Of Cylinders To Be Replaced At Any One Time Up To 1/2 Engine Life	Number Of Cylinders To Be Replaced At Any One Time Up To 3/4 Engine Life	Number of Cylinders To Be Replaced At Any One Time From 3/4 Engine Life To Engine Time Expiry
9	9	5	3
14	14	7	4
18	18	9	5
6	6	3	2
4	4	2	1

Figure 1-4 (Issue 1)

Engine Type	Maximum Percentage Of Cylinder Loss
P&W R985	10%
P&W R-1340	10%
P&W R-1830	10%
P&W R2000	10%
P&W R2800	10%
Wright R1820	15%
Wright R2600	15%
Wright R3350	15%
Continental	10%
Lycoming	10%
Gipsy	10%

Figure 1-5 (Issue 2)

PART 2

PART LIST

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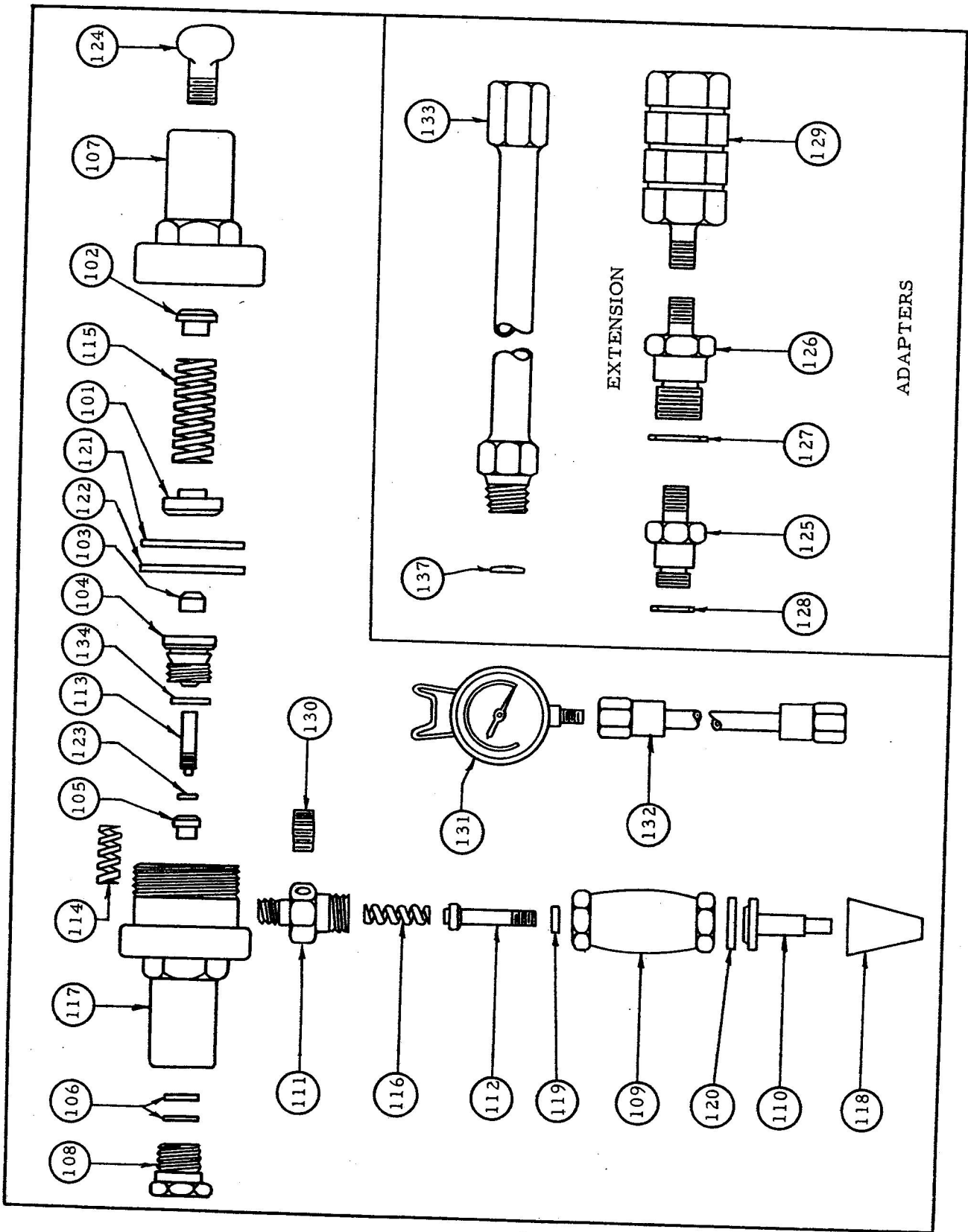


Figure 2-1

MANUFACTURES PART NUMBER	DESCRIPTION	RCAI SEC/R.
108-124A	Pressure Regulator Assembly (Complete)	35/102
111-118A	Plunger Assembly (Complete)	35/102
101	Diaphragm Head	NP
102	Thumb Screw Head	NP
103	Valve Head	NP
104	Plug	NP
105	Valve Head	NP
106	Strainer	NP
107	Regulator Cap	NP
108	Strainer Plug	NP
109	Sleeve	NP
110 A & B	Annular Valve	NP
111	Nipple	NP
112 A & B	Plunger	NP
113	Valve Stem	NP
114	Spring	NP
115	Spring	NP
116	Spring	NP
117	Block	NP
118	Cone	NP
119	Seal	NP
120	Seal	NP
121	Diaphragm	NP
122	Gasket	35/1013
123	Seal	NP
124	Thumb Screw	NP
125	Adapter 14MM	35/1012
126	Adapter 18MM	35/1013
127	Washer 18MM	NP
128	Washer 14MM	NP
129	Adapter Extension	35/1021
130	Nipple	NP
131	Guage	35/1013
132	Hose	35/1013
133	Extension 12" & Coupling	35/1023
134	Gasket Rubber	NP
135	Strainer Assembly (Part 108 & 106)	NP
136	Valve Assembly (Part 105, 113 & 123)	NP
137	Spring Retainer	NP

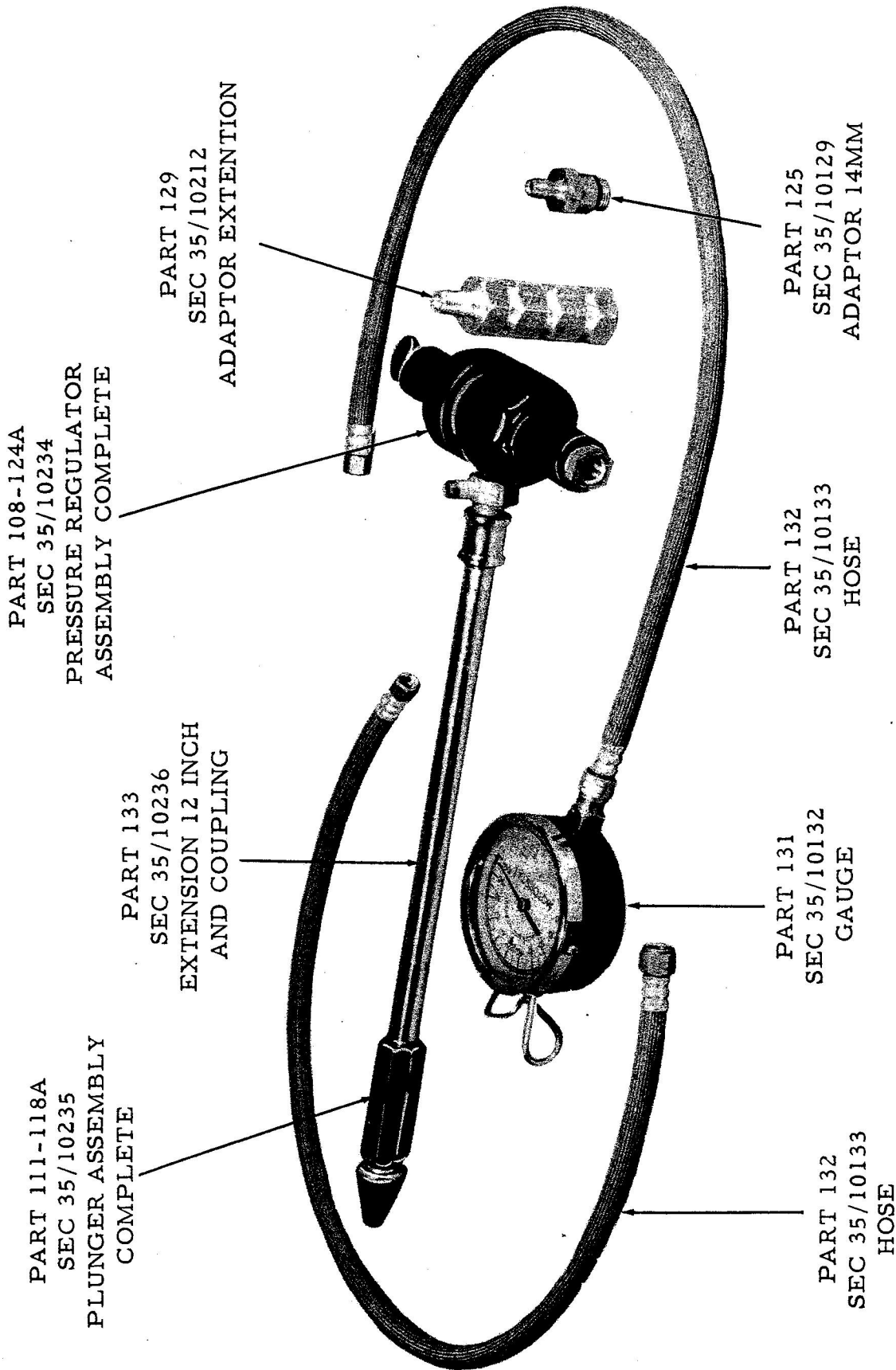


Figure 2-2

