CHECK OUT PROCEDURES FOLLOWING INSTALLATION

After the supercharger has been installed, the over-all system must be checked out for correct functioning if engine performance benefits are to be realized. The check out procedure is simple and, if followed, will assure the system is functioning correctly.

When checking the supercharger boost pressure a 0 - 10 psi (minimum scale) pressure gage must be used.

NOTE

A combination vacuum - pressure gauge, suitable for installation in the driver compartment of the automobile, is available from your **McCulloch** Supercharger Dealer. Once installed, the gauge will provide means of constantly **checking** supercharger and engine performance.

The following list briefly describes the function of each major component of the installation.

SUPERCHARGER - A centrifugal-type air pump designed to provide usable boost pressure to the **carburetion** system at all engine speeds in excess of 1500 rpm, as required.

SOLENOID REGULATOR - A solenoid operated valve, located in the bearing housing of the supercharger, that controls the flow of boost pressure into the air chamber of the supercharger. The solenoid regulator also serves to regulate maximum boost pressure output of the supercharger.

VACUUM SWITCH (or THROTTLE KICK-DOWN SWITCH) - A single pole switch used to either open or close the solenoid regulator circuit.

When a throttle kick-down switch is used, it is generally **linked** to the foot accelerator to close at approximately 75% of full throttle.

BELT TENSIONING ARM - A functional component of the installation, designed and geometrically installed as a source of opposing force in the supercharger belt drive system. Free movement of the arm on its pivot shaft is essential for a good shifting pattern.

VACUUM ADVANCE UNIT - This special unit replaces the stock vacuum advance unit on car engines utilizing the vacuum advance principle of spark control. It differs from the stock unit only in that a pressure nipple is installed in the case to provide a means of pressurizing the back side of the diaphragm.

ELECTRICAL FUEL PUMP - Installed at the fuel tank end of the fuel line, the electric fuel pump is energized only when the solenoid regulator is energized. In operation, the electric fuel pump provides an adequate flow of fuel to the mechanical fuel pump and carburetor when the supercharger is operating in the "high blower" range.

NOTE

Fuel pressure, measured at the carburetor, should always be two pounds greater (minimum) than the supercharger boost pressure (measured at the. supercharger discharge throat).

Failure or malfunction of any one of the system components will result in unsatisfactory engine performance relative to the supercharger installation.

CHECK OUT PROCEDURES

After the supercharger has been installed, a complete check should be made to insure correct functioning of all components. The following check list fully covers all procedures for such checking.

1. Turn on ignition switch but do not start engine.

2. Using a short length of wire as a jumper, short the two terminals of the vacuum switch (or kick-down switch). A sharp click should be heard as the solenoid regulator valve closes.

   Also, as the electric fuel pump is now energized, a whirring sound should be heard at the rear of the car. Repeat the test several times, making sure the solenoid valve closes and the electric fuel pump starts each time.

NOTE

Should the solenoid regulator and electric fuel pump be energized when the ignition switch is turned on and before the terminals of the vacuum switch are shorted out, it indicates the diaphragm in the vacuum switch was left in the closed position following testing. This is not serious as the diaphragm will open the switch contacts as soon as the engine is started. However, to prevent possible carburetor flooding, do not leave the ignition switch on for too long a period before starting engine.

3. Check the fuel line from tank to engine to be sure all fittings are secure and are not leaking under pressure.

4. Start and warm up. the car engine.

5. Advance throttle until engine is turning approximately 1500 rpm. The rear flange of the supercharger input pulley should start closing to the front flange, moving the drive belt to the outer edge of the pulley sheave. (At idle engine speed, the flanges of the input pulley are separated and the drive belt is riding at the bottom of the pulley.)

WARNING

Avoid overspeeding of the engine under no-load conditions, as such operation can result in engine failure with or without a supercharger.

6. Advance throttle until engine is turning approximately 1500 rpm, and short out terminals of vacuum (or kick-down) switch with jumper wire. The rear flange of the supercharger input pulley should move away from the front flange and the drive belt should drop to the bottom of the pulley.

7. (Vacuum switch installations only.)
Remove hose from fitting at bottom of vacuum switch and plug free end of hose. After attaching a long length of hose to the vacuum switch fitting, advance the engine speed to approximately 1500 rpm. Blowing into the hose will cause the vacuum switch contacts to close and the supercharger input pulley should function as described in Step 6. Sucking on the hose will open the vacuum switch contacts and the pulley should start to close, with the drive belt moving to the outside edge of the pulley. After testing, reconnect the manifold hose to the vacuum switch.

8. If car engine is equipped with vacuum-type spark advance control check the functioning of the special vacuum advance unit, using a standard timing light. With the vacuum line to the distributor disconnected, there should be no fluctuation of the timing pip when the engine is accelerated.

Reconnect the vacuum line and again check with the timing light. The timing pip should now indicate advance and retard action as the engine is accelerated. Do not alter the basic distributor setting at this time.

CHECKING SUPERCHARGER AND FUEL PRESSURES

To insure maximum performance (and also check the setting of the solenoid regulator) it is necessary to measure the discharge pressure of the supercharger, and the fuel pressure at the carburetor. These measurements require the utilization of two, 0 - 10 psi gauges; one connected at the supercharger discharge throat, and the second connected in the fuel line at the carburetor. Figure 4 shows the suggested method of connecting the two gauges in the system. So connected, one gauge will indicate the output pressure of the supercharger, while the second gauge will indicate fuel pressure.

As the checks require engine speeds in excess of 2900 rpm under load, the car must either be road or dynamometer tested.

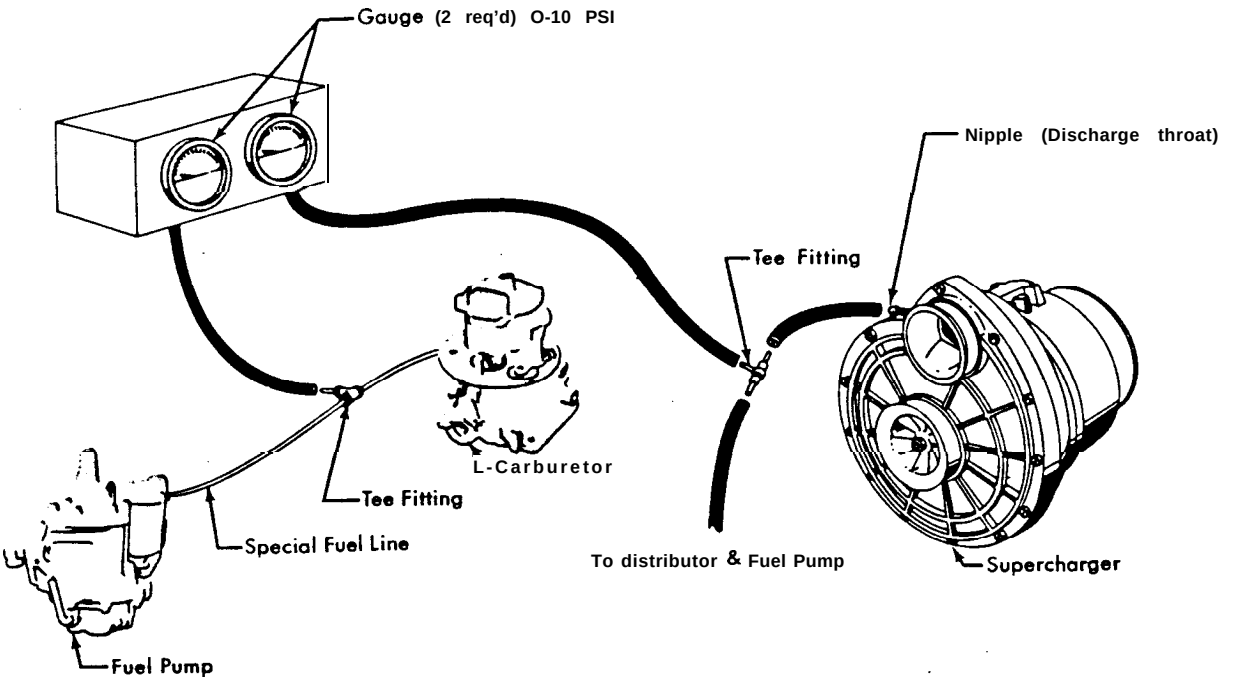


Figure 4

WARNING

Do not attempt to make the following checks by "no load" engine operation. To do so can, and possibly will, cause severe engine damage.

1. Attach pressure gauges as shown in Figure 4, with instruments in driver compartment. Use care not to crush the hose leads when closing hood.

2. Road test the car, using full throttle. Under sustained running, with the engine turning in excess of 2900 rpm, the supercharger discharge pressure should indicate 5 psi maximum.

When making the road test, full throttle must be used if a vacuum switch is used to close the solenoid regulator circuit. At less than full throttle there is sufficient vacuum in the intake manifold to hold the vacuum switch open and the supercharger will not be caused to shift into "high blower".

During the test, as road speed and engine rpm increase, the maximum indicated supercharger discharge pressure (which should not exceed 5 psi) should remain constant.

NOTE

If a McCulloch Pressure - Vacuum Gauge was installed and connected to the intake manifold, it will indicate approximately one pound less than does the instrument connected to the supercharger. This is normal as there is a pressure drop across the carburetor.

3. At the same time the supercharger discharge pressure is being checked, fuel pressure at the carburetor should be checked. Provided the electric fuel pump has been correctly wired into the supercharger control system, the pump will be energized at the same time the supercharger is shifted to "high blower". At the instant of shifting (electrical circuits energized) the fuel pressure should start to increase from a normal 2 to 3 psi reading. The fuel pressure should then increase until it reaches a pressure higher than the indicated supercharger discharge pressure.

SOLENOID REGULATOR

The solenoid regulator is accessible by removing the medallion from the bearing housing of the supercharger.

CAUTION

Do not misplace the small coil-spring that will be freed when the medallion is removed. As the spring serves to both retain the regulator and ground it, do not fail to replace the spring when reassembling the medallion to the bearing housing.

ADJUSTMENT OF SOLENOID REGULATOR

If previous testing indicates that only adjustment of the regulator is required, it is not necessary to remove the regulator from the supercharger. After removing the medallion, carefully dig out the sealing compound from the top, center hole of the regulator. A 5/64 inch Allen wrench can then be used to turn the adjusting screw.

Turning the screw in (clockwise) will increase the spring pressure on the diaphragm and a higher level of discharge pressure, in psi, will be required before regulation becomes effective.

WARNING

Do not exceed a setting that results in a discharge pressure greater than 5 psi at the supercharger discharge throat, as material damage may result.

When the screw is backed out (counter-clockwise) spring tension on the diaphragm is relieved, and a lesser discharge pressure will initiate regulation.

CAUTION

After adjusting the regulator and before testing, both the spring and medallion must be replaced. If the spring is not replaced the regulator will fail to function as the ground circuit is incomplete. Failure to replace the medallion can result in the regulator being blown from its well in the bearing housing, as the medallion also serves as a retainer.

Road test the car under full throttle operation to obtain a maximum discharge pressure reading. Either a too high or a too low pressure reading should be corrected by resetting the adjusting screw. When the correct adjustment has been determined, use sealing compound to hold the adjusting screw at the correct setting.

REMOVAL OF SOLENOID REGULATOR

When necessary, the solenoid regulator can be easily removed from the supercharger without use of special tools. After removing the medallion and retaining spring, disconnect the regulator electrical lead at the bullet connector. Grasp the solid, upper portion of the regulator with pliers and-work back and forth while pulling straight up and the regulator will be freed.

As the regulator cannot be repaired, defective regulator must be replaced-with a new unit. Before installing a regulator, pull the "O" rings from the well and check for Cuts. If necessary; replace the "O" rings to prevent blow-by and leakage.

To replace regulator and "O" rings, first, lightly oil the rings before positioning in the upper and lower grooves of the well. The solenoid should then be pushed into place, making certain it bottoms in the well. Reassemble electrical connector, spring, and medallion.

NOTE

Always test the supercharger for discharge pressure after replacing the solenoid regulator. If necessary, readjust the regulator as outlined.

TROUBLE SHOOTING

For maximum gained performance after installation of the supercharger, the engine should be in top mechanical condition. As the mechanical condition of the engine is the responsibility of the individual, such condition cannot be covered in this manual. However, it must be pointed out that engine deficiencies, normally unnoticed before supercharging, will possibly be aggravated by operation of the supercharger. Because of this the supercharger will often be blamed for malfunctioning when such is not the case.

Therefore, in such instances the functioning of the supercharger and control system should be checked out for correct operation. If malfunctioning does exist, the source of trouble can be rapidly located through use of the following trouble shooting charts.

NOTE

The Trouble Shooting Chart covers only the possible sources of trouble that are directly traceable to the supercharger control system and component assemblies. Possible sources of mechanical malfunction of the supercharger are covered in a separate manual. Therefore, if malfunction continues after checking per the Trouble Shooting Chart, it can be assumed the trouble is of internal mechanical nature.'

TROUBLE SHOOTING - GENERAL

Maximum performance of the engine with supercharger installed depends upon the proper functioning of all system components. The following list of trouble symptoms can be used to rapidly determine sources of possible system failures. (See Diagram **A.)**

Supercharger does not shift	A- Defective solenoid. B- Broken wire or poor connections. C- Defective vacuum switch.
Low fuel pressure.	D- Electric fuel pump inoperative. E- Mechanical fuel pump defective. F- Restrictions in fuel line. G- Wrong float level in carburetor. H- Hose split or off fittings.
Flooding of engine.	G- Float level set too high. G- Needle valve not seating. G- Loose jets or power valve.
Spark advance (vacuum type) inoperative.	H- Hose split or off fittings. I- Slit diaphragm in vacuum advance unit. I- Arm binding.
Engine cuts out when supercharger shifts to "high blower".	Lead to vacuum switch attached to secondary binding post instead of primary binding post. Main lead wire from switch to coil too small for extra current demand of solenoid and electric fuel pump. (Replace lead with larger size wire to correct.) Short in supercharger control system wiring.

Poor Engine Performance (Surging or erratic)

Test Procedure

ROAD OR DYNAMOMETER TESTING REQUIRED

SUPERCHARGER BOOST PRESSURE Too LOW (5# MAX AT DISCHARGE THROAT

- SOLENOID OUT OF ADJUSTMENT. ADJUST TO 5# MAX. AT DISCHARGE THROAT.
- BOOST PRESSURE OKEH
- DEFECTIVE SOLENOID OR VACUUM SWITCH.
- BOOST PRESSURE OKEH

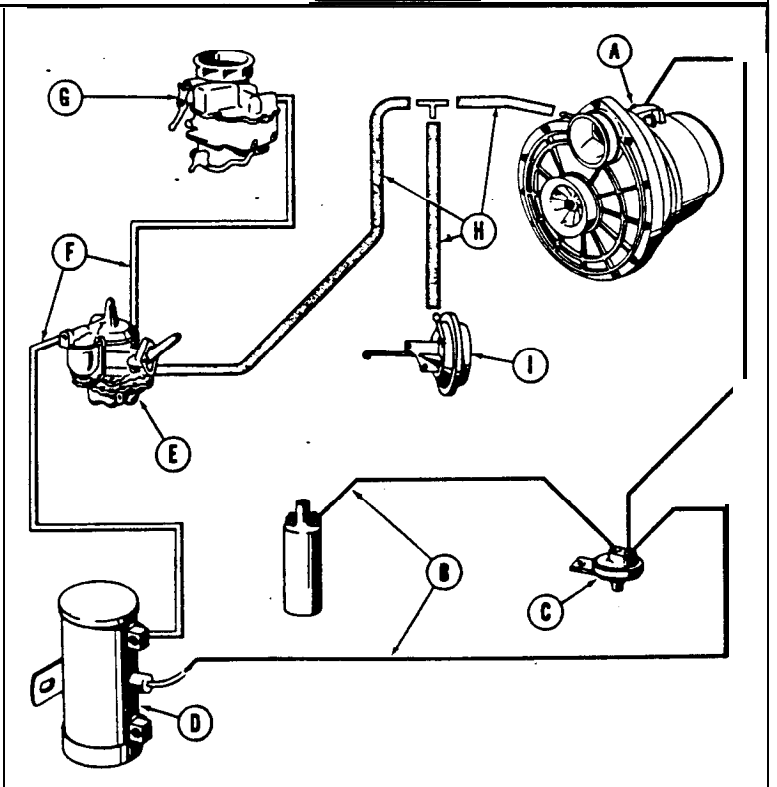
MECHANICAL MALFUNCTION OF SUPERCHARGER. PROCEED WITH TESTING AFTER REPAIR.

ROAD TEST

SUPERCHARGER BOOST PRESSURE OKEH

IGNITION	VACUUM SPARK ADVANCE	CARBURETION
(1) TIMING	(4) SPLIT HOSE	(7) LOW FUEL PRESSURE
(2) POINTS	(5) LEAKING DIAPHRAGM	(8) INCORRECT MAT LEVEL
(3) SPARK PLUGS	(6) ACTUATING ARM BINDING	(9) JETS LOOSE OR WRONG SIZE
		*(10) SECONDARY BUTTERFLY LINKAGE BINDING

DIAGRAM A



1 SET FOR MINIMUM DETONATION.

2 SET TO MANUFACTURER'S RECOMMENDATION.

3 As RECOMMENDED

4 REPLACE HOSE.

5 REPLACE VACUUM ADVANCE UNIT.

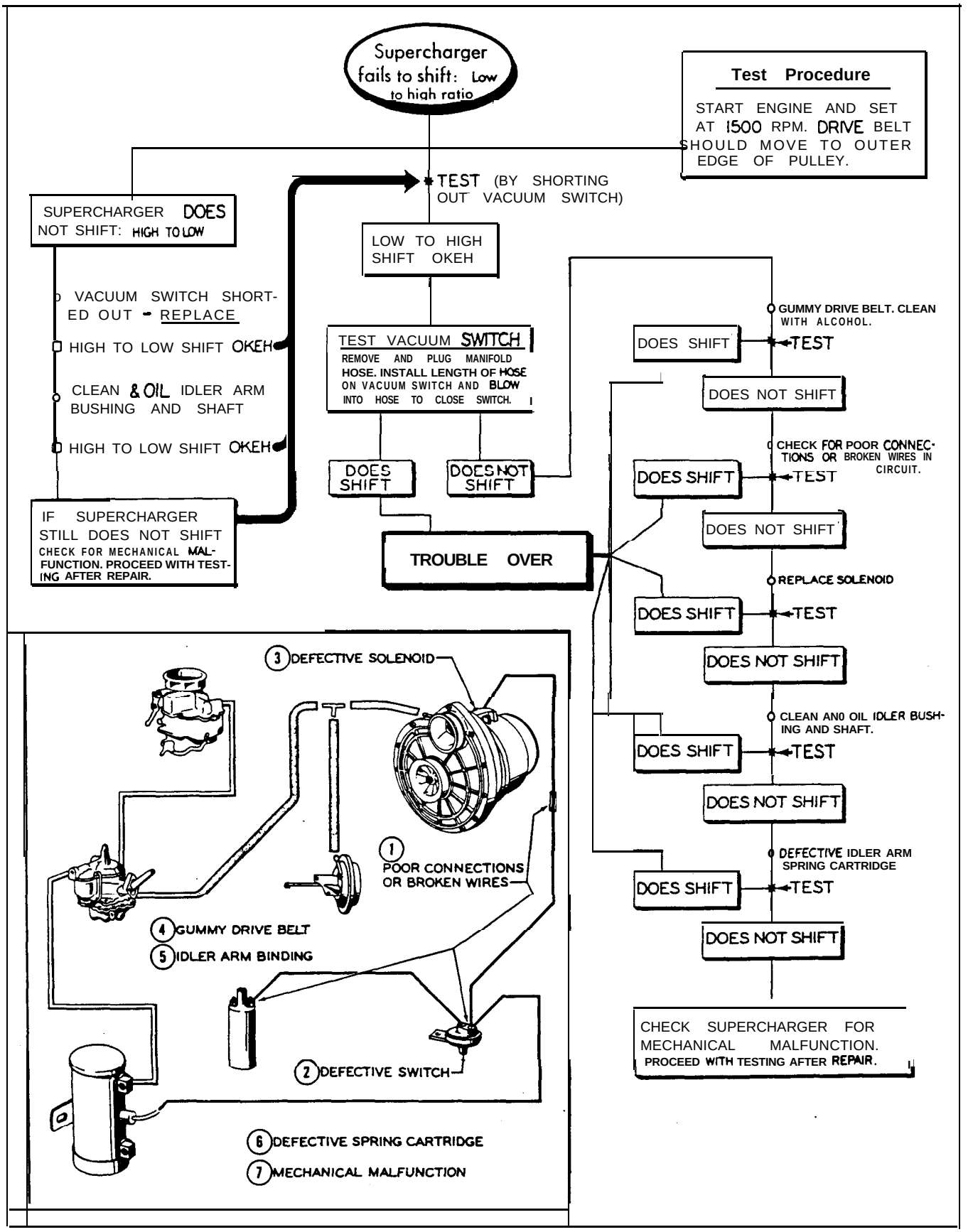
6 DETERMINE CAUSE AND CORRECT.

7 2# HIGHER THAN SUPERCHARGER PRESSURE (MIN.)

8 SET TO MANUFACTURER% RECOMMENDATION.

9 TIGHTEN OR REPLACE AS REQUIRED.

10 *VELOCITY CONTROUED ONLY. CHECK ANO CORRECT IF NECESSARY.


Supercharger fails to shift: Low to high ratio
Test Procedure
START ENGINE AND SET AT 1500 RPM. DRIVE BELT SHOULD MOVE TO OUTER EDGE OF PULLEY.
TEST (BY SHORTING OUT VACUUM SWITCH)
SUPERCHARGER DOES NOT SHIFT: HIGH TO LOW
LOW TO HIGH SHIFT OKEH
VACUUM SWITCH SHORTED OUT - REPLACE
HIGH TO LOW SHIFT OKEH
CLEAN & OIL IDLER ARM BUSHING AND SHAFT
HIGH TO LOW SHIFT OKEH
TEST VACUUM SWITCH
REMOVE AND PLUG MANIFOLD HOSE. INSTALL LENGTH OF HOSE ON VACUUM SWITCH AND BLOW INTO HOSE TO CLOSE SWITCH.
DOES SHIFT
DOES NOT SHIFT
IF SUPERCHARGER STILL DOES NOT SHIFT CHECK FOR MECHANICAL MALFUNCTION. PROCEED WITH TESTING AFTER REPAIR.
TROUBLE OVER
GUMMY DRIVE BELT. CLEAN WITH ALCOHOL.
DOES SHIFT
TEST
DOES NOT SHIFT
CHECK FOR POOR CONNECTIONS OR BROKEN WIRES IN CIRCUIT.
DOES SHIFT
TEST
DOES NOT SHIFT
REPLACE SOLENOID
DOES SHIFT
TEST
DOES NOT SHIFT
CLEAN AND OIL IDLER BUSHING AND SHAFT.
DOES SHIFT
TEST
DOES NOT SHIFT
DEFECTIVE IDLER ARM SPRING CARTRIDGE
DOES SHIFT
TEST
DOES NOT SHIFT
CHECK SUPERCHARGER FOR MECHANICAL MALFUNCTION. PROCEED WITH TESTING AFTER REPAIR.
3 DEFECTIVE SOLENOID
1 POOR CONNECTIONS OR BROKEN WIRES
4 GUMMY DRIVE BELT
5 IDLER ARM BINDING
2 DEFECTIVE SWITCH
6 DEFECTIVE SPRING CARTRIDGE
7 MECHANICAL MALFUNCTION

McCULLOCH SUPERCHARGER MODEL VS - 57A

INDEX NO.	PART NO.	1 2 3 4 5 6 7 NOMENCLATURE	UNITS REQD.
	37000A	Supercharger Assembly	
1	101948	. Screw, flat hd. mach. 10-24 x .875	2
2	37086A	. Medallion	1
3	37149	. Spring, retaining	1
4	101229	. Grommet	1
5	37295	. Solenoid Regulator Assembly	1
6	102462	. "O" ring	2
7	37025	. Oil Level Gauge Assembly	1
8	37027	. . Spring, oil level gauge	1
9	102225	. "O" ring, oil level gauge	1
10	102549	. Screw, socket hd. 5/16-24 x 1.25	1
11	102550	. Lockwasher	1
12	37203	. Retainer, driven pulley	1
13	37079B	. Driven Pulley Assembly (fixed flange)	1
14	37080A	. . Hub, driven pulley	1
15	37204	. . Washer, driven pulley	1
16	37075A	. . Flange, fixed - driven pulley	1
17	37076A	. Sliding Pulley Assembly	1
18	102373	. . Pin - .125" dia. x .34 lg.	3
19	37074A	. . Bushing, splined	1
20	102375	. . Ball bearing	1
21	37077	. . Flange, sliding - driven pulley	1
22	37081	. Ring, retaining - air cylinder cover	2
23	37082	. Cover, air cylinder	1
24	37078A	. Air Cylinder Piston Assembly	1
25	37083	. . Ring, outer - air cylinder piston	1
26	37072A	. . Piston, air cylinder	1
27	37087	. Spring, piston - air cylinder	1
28	102 134	. Screw, fil hd. mach. 10-24 x .88	13
29	100436	. Lockwasher - #10	1
30	100003	. Washer - plain	13
	37129	. Scroll Cover Assembly	1
31	102436	. . Hose connection	1
32	37023A	. . Cover, scroll	1
33	102199	. Screw, hex hd. 5/16-24 x 1.25	1
-34	100271	. Lockwasher 5/16 SAE med.	1
35	100350	. Washer, retaining - impeller	1
36	37021	. Impeller	1
37	37018	. Shim (Dulite black) (. 026 - .028)	As Reqd.
	37018A	. Shim (Cadmium) (.030 - .032)	As Reqd.
	37018B	. Shim (Blue) (.034 - .036)	As Reqd.
	37018C	. Shim (Red) (.038 - .040)	As Reqd.
	37018D	. Shim (Green) (.042 - .044)	As Reqd.
	370183	. Shim (Brown) (.019 - .021)	As Reqd.
	37018F	. Shim (Yellow) (.006 - .007)	As Reqd.

INDEX NO.	PART NO.	NOMENCLATURE	UNITS REQD.
38	100822	Screw, hex hd. 1/4-20 x 1.25	6
39	100246	Lockwasher 1/4 SAE med.	6
40	100005	Washer - plain 1/4 (AN960-416)	6
41	101254	"O" ring 6 1/2" I.D.	2
42	37090	Decal	1
	37056A	Bearing Housing Assembly	1
43	37084	Ring, inner - air cylinder	1
44	102430	Seal - input shaft	1
45	37024	Sleeve - oil level gauge	1
46	37085A	Housing, bearing	1
47	37073	Key, pulley hub	1
48	37094	Spacer, shaft seal	1
	37052A	Oil Pump and Input Shaft Assembly	1
49	102 197	Ball bearing (ND 3205-X1A)	1
	37054B	Oil Pump Assembly	1
50	37019	Retainer - oil pump screen	1
51	37026	Screen - oil pump	1
52	37197	Plug - oil pump	1
53	37015	Spring, plunger - oil pump	1
54	37007B	Plunger - oil pump	1
	37055B	Oil Pump Body Assembly	1
55	100549	Ball - 3/16" dia (Stainless Steel-Grade 1)	1
56	37006	Bushing	1
57	37309	Body, oil pump	1
58	102198	Ball bearing (ND 3206-X1A)	1
59	37012	Screw, input shaft	5
60	37011	Driver, ball (retainer)	1
	37053	Input Shaft Assembly	1
61	37010	Bushing, input shaft	1
62	37009	Shaft, input	1
63	37004A	Race Load Assembly	1
64	37064	Ring, snap	1
65	37062	Cage, spring - race load (rear)	1
66	37063A	Spring - race load	12
67	37061	Cage, spring - race load (front)	1
68	37088	Disc, clutch - ball race	2
69	37008	Race, ball	2
70	102 194	Ball, drive 1.0625" dia. - steel	5
71	37051A	Output Shaft Assembly	1
72	37206	Ring, labyrinth	2
73	37003A	Slinger, oil	1
74	101556	Pin, roll	2
75	37002A	Shaft, output	1
	37050A	Scroll Assembly	1
76	102 196	Pin, Dowel	2
77	37001A	Scroll, Supercharger	1

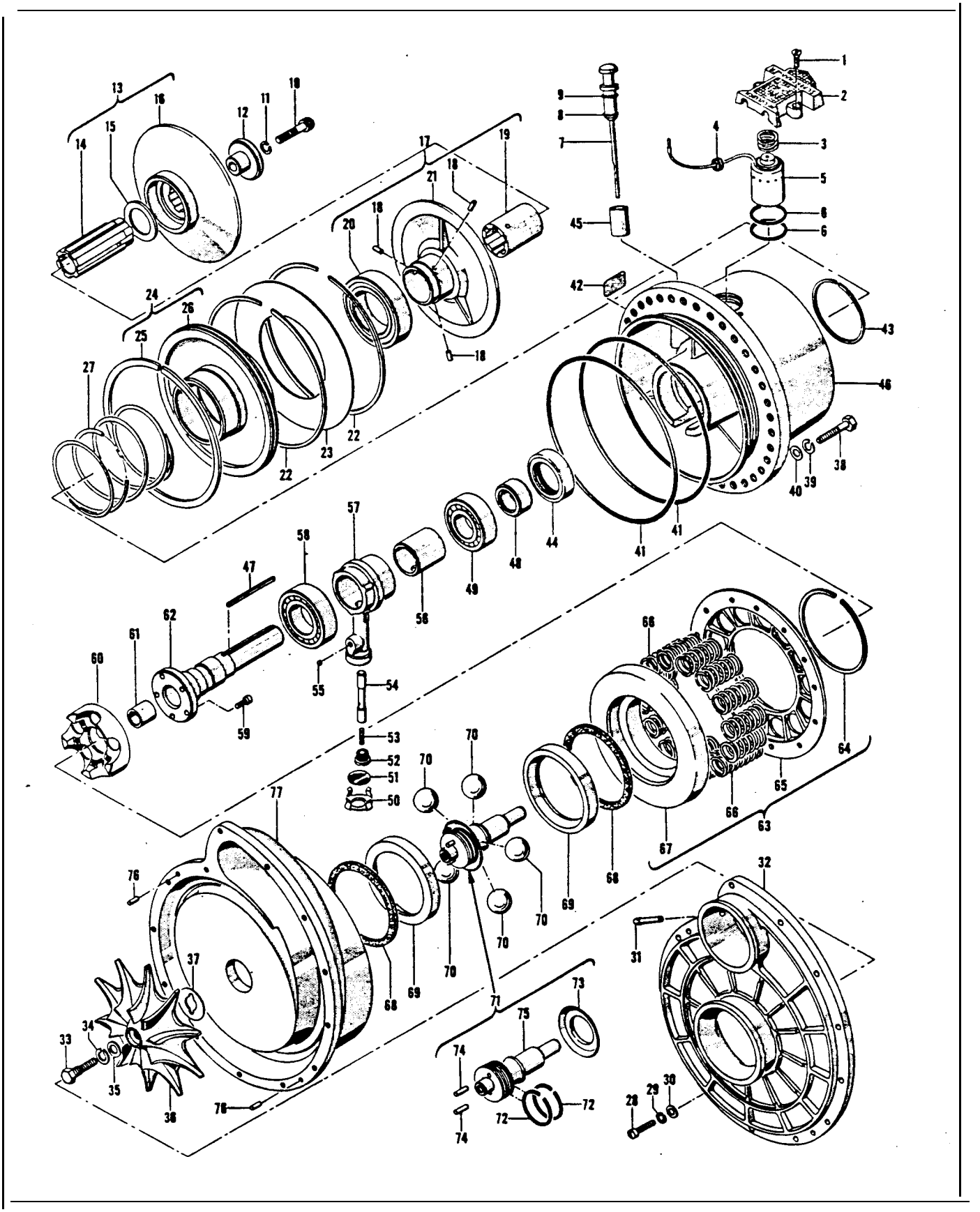


Figure 11

NUMERICAL PARTS - PRICE LIST

McCulloch Supercharger

Model VS-57 Series

February 1955

Part Number	Nomenclature	List Price
37001A	Scroll - Supercharger	14.50
37002A	shaft - output	13.40
37003A	Oil Slinger - Output Shaft	.25
37004A	Race Load Assembly	9.50
37006	Bushing - Gil Pump	.30
37007B	Plunger - Oil Pump	1.65
37008	Race - Ball	3.00
37009	Input shaft	Order 37053
37010	Bushing - Input Shaft	.80
37011	Retainer - Ball	8.70
37012	Screw - Input Shaft	.16
37015	Spring	.08
37018	Shim - Impeller (.026 - .028)	.15
37018A	Shim - Impeller (.030 - .032)	.15
37018B	Shim - Impeller (. 034 - .036)	.15
37018C	Shim - Impeller (.038 - .040)	.15
370180	Shim - Impeller (. 042 - .044)	.15
370183	Shim - Impeller (. 019 - .021)	.15
37018F	Shim - Impeller (. 006 - .007)	.15
37019	Retainer - Gil Pump Screen	.15
37021	Impeller	7.95
37023A	Cover	Order 37129
37023B	Cover	9.95
37024	Sleeve - Gil Level Gauge	.80
37025	Gauge - Gil Level	2.00
37026	Screen - Oil Pump	. 10
37027	Spring - Oil Gauge Retainer	.15
37050B	Scroll Housing Assembly	14.60
37051B	Output Shaft Assembly	14.75
37052A	Input & Oil Pump Shaft Assembly	51.05
37053	Input Shaft Assembly	21.80
37054B	Oil Pump Assembly	16.50
37055B	Oil Pump Body Assembly	14.30
37056C	Bearing Housing (Complete with Seal #102430, Oil Gauge Sleeve #37024 and Inner Ring 837084. See #37406 for service bearing housing.)	26.20
37061	Cage - Race Load Spring (Front)	2.10
37062	Cage - Race Load Spring (Rear)	2.15
37063A	Spring - Race Load	.35
37064	Snap Ring	.25
37072A	Piston - Air Cylinder	4.70
37073	Key - Pulley Hub	.10
37074A	Bushing - Splined Driven Pulley	3.05
37075B	Pulley - Fixed Driven	7.10
37076B	Pulley Assembly - Sliding Driven	16.00
37077A	Pulley - Sliding Driven	6.10
37079C	Fixed Driven Pulley Assembly	16.40
37080A	Hub - Fixed Driven Pulley	9.10

Part Number	Nomenclature	List Price
37081	Ring - Air Cylinder Cover Retaining	.80
37082A	Cover - Air Cylinder	.36
37083	Ring - Air Cylinder (Outer)	1.00
37084	Ring - Air Cylinder (Inner)	.85
37085C	Housing - Bearing	25.00
37086A	Medallion	.95
37087	Spring Air Cylinder Piston	.90
37088	Disc - Ball Race Clutch	.95
37090	Decal	.25
37094	Sleeve - Seal	1.35
37129	Cover Assembly	9.95
37149	Spring - Solenoid Valve Hold-Down	.25
37197	Plug - Oil Pump Body	.25
37203	Retainer - Fixed Driven Pulley	1.05
37264	Washer - Fixed Driven	.20
37283	Gasket - Cover	.10
37286	Cover - Scroll Air Hole	.05
37309	Body Oil Pump	Order 37055B
37406	Bearing Housing - Service (With Oil Gauge Sleeve 4137024 and Decal 837090 only.)	26.05
37442A	Universal Solenoid #4.5 Setting	21.25
37504	Ring and Labyrinth	.35
37505	Washer and Stop	.05
100003	Washer Plain #10	.01
100005	Washer Plain 1/4"	.01
100246	Lock Washer 1/4"	.01
100271	Lock Washer 5/16"	.01
100350	Washer - Plain .31	.20
100436	Lock Washer #10	.01
101254	"O" Ring	1.05
101948	Screw - Flat Head	.02
102128	Screw Hex Head	.03
102134	Screw Fil. Head	.02
102175	Groov-Pin 1/8" x .50" Type 4	.03
102194	Ball - Drive	.65
102196	Pin - Dowel	
102197	Ball Bearing	1 : :
102198	Ball Bearing	2.55
102199	Screw Hex Head	.06
102224	Screw Fil. Head Machine	Order 102134
102225	"O" Ring - Gil Level Gauge	.20
102373	Pin	.05
102375	Ball Bearing	3.90
102430	Seal Input Shaft	.75
102436	Hose Connection	.25
102462	"O" Ring - Solenoid	.18
102549	Screw Socket Head	.20
102550	Lock Washer	.01

Paxton Products
827 West Olive Street
Inglewood, California

Prices quoted f. o. b. Los Angeles, California and subject to change without notice.