10. CHOKE OPENER SYSTEM

CONTENTS

10. CHOKE OPENER SYSTEM

DESCRIPTION

If a cold engine is started and the vehicle is driven off immediately, the automatic choke will have the choke valve closed so that rich mixture will be drawn in, resulting in larger discharge of HC (hydrocarbon) and CO (Carbon monoxide). For this reason, the choke valve is forcibly held open to allow sufficient supply of air and prevent the mixture from becoming too rich. In the 4M engine, the fast idle breaker mechanism serves the same purpose.

OPERATION

1. Choke Opener System Operation (2T-C engine for California, and 20R engine)

["ON" condition]

- When the vehicle speed, coolant temperature, and CCo temperature (only for 20R engine passenger car for California) all enter the "ON" range, the computer turns the VSV "ON".
- With the VSV "ON", the intake manifold vacuum acts on the choke opener diaphragm.
- The diaphragm is drawn in by the vacuum, resulting in pulling the link connected to the choke valve and forcibly opening the choke valve.

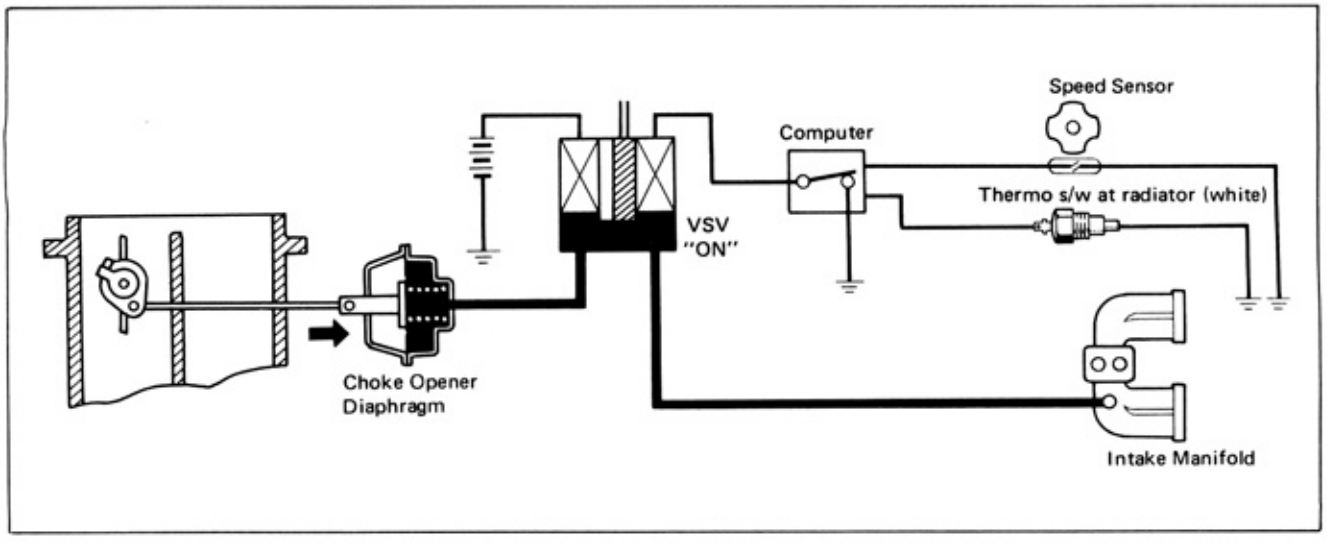


Fig. 10-1 Choke Opener System Operation ("ON" Condition) 2T-C Engine for California

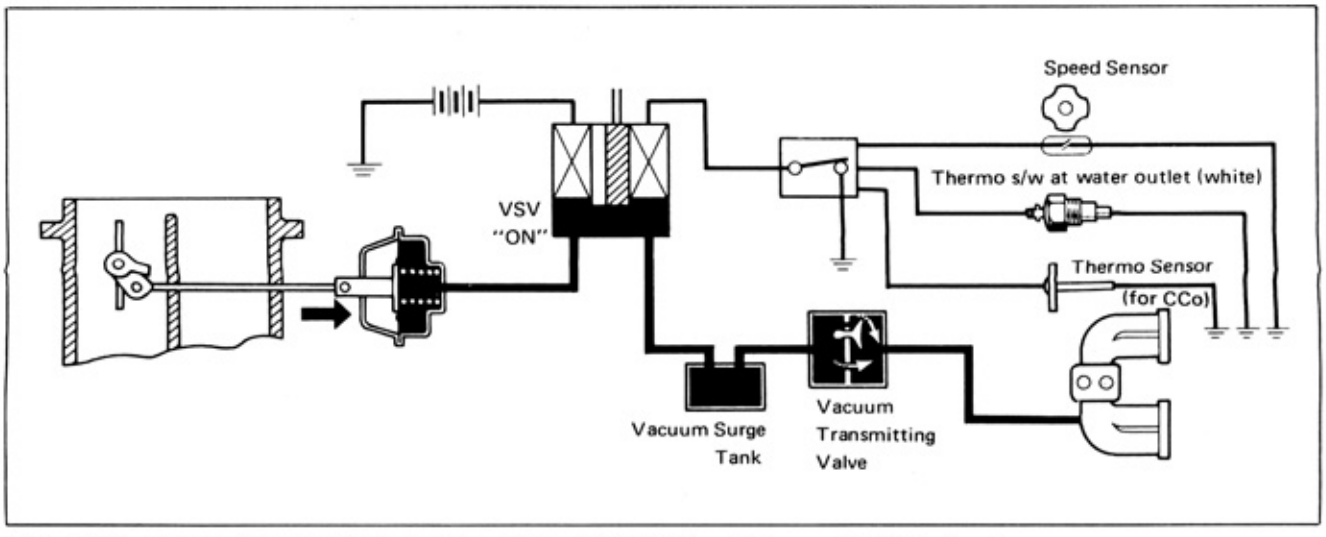


Fig. 10-2 Choke Opener System Operation ("ON" Condition – 20R Engine)

["OFF" Condition]

- If any one of the conditions above enters the "OFF" range, the computer turns the VSV "OFF".
- With the VSV "OFF", the atmosphere acts on the choke opener diaphragm.
- The diaphragm is returned by spring tension, resulting in releasing the forcible opening of the choke valve and allowing it to open or close in accordance with the automatic choke mechanism and the throttle valve opening.

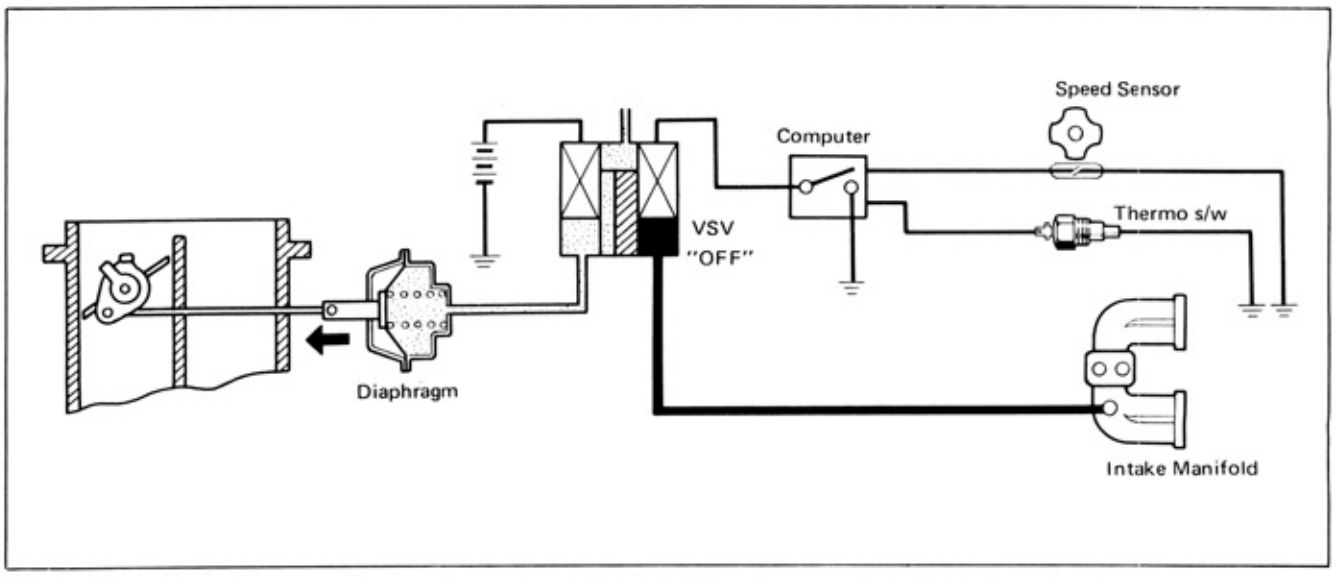


Fig. 10-3 Choke Opener System Operation ("OFF" Condition) – 2T-C Engine for California

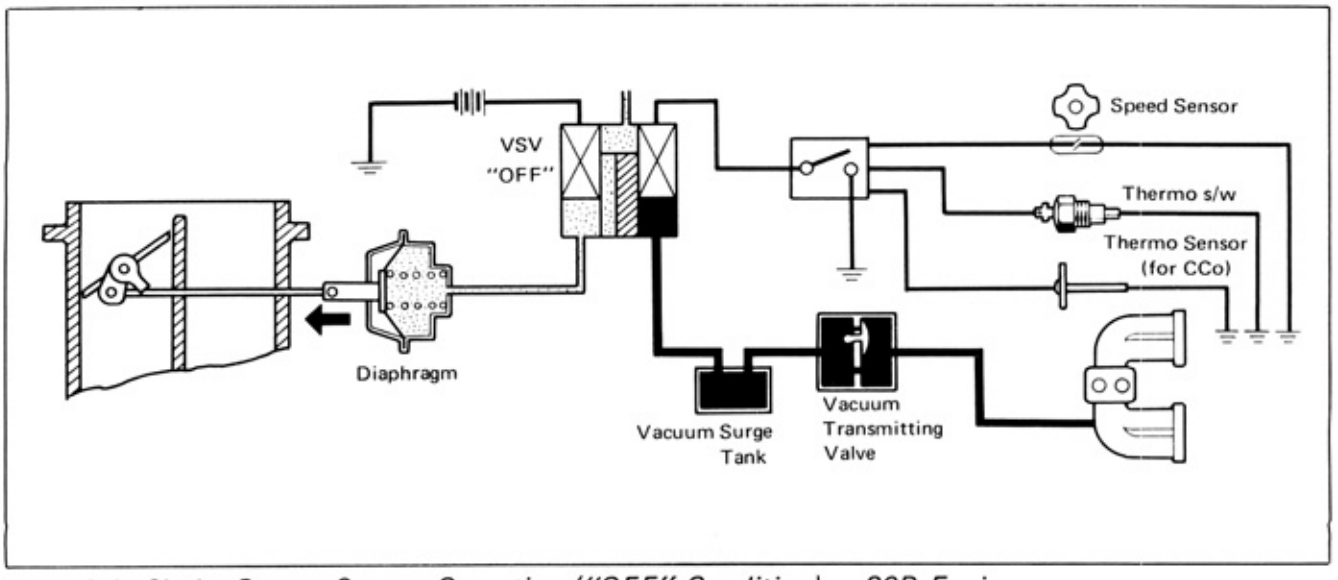


Fig. 10-4 Choke Opener System Operation ("OFF" Condition) – 20R Engine

2. Fast Idle Breaker (Choke Opener) System Operation (4M Engine)

["ON" condition]

- When the vehicle speed and coolant temperature (A) both enter the "ON" range, or when coolant temperature (B) enters the "ON" range, the computer turns the VSV "ON".
- With the VSV "ON", the intake manifold vacuum acts on the fast idle breaker diaphragm.
- The diaphragm is drawn in by the vacuum, resulting in the choke valve being forcibly opened by the link mechanism.

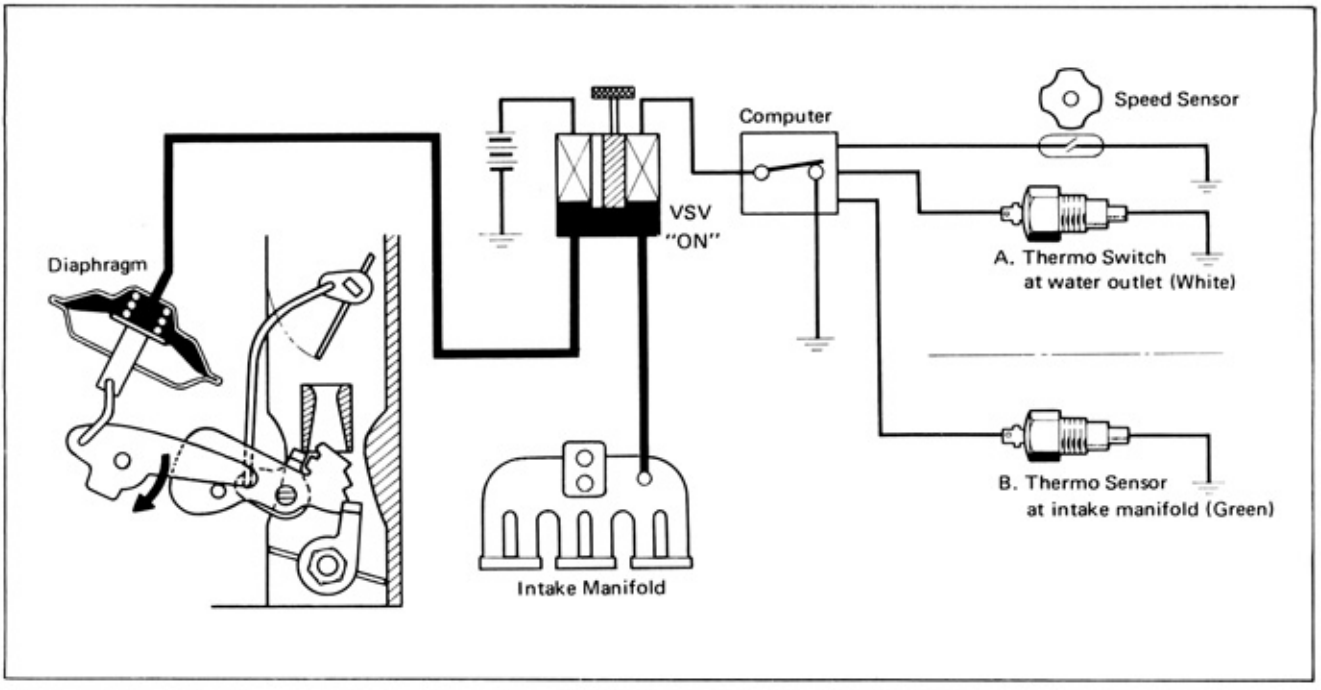


Fig. 10-5 Choke Opener System Operation ("ON" Condition)–4M Engine

["OFF" Condition]

- When the coolant temperature (B) is in the "OFF" range and either the vehicle speed or coolant temperature (A) enters the "OFF" range, the computer turns the VSV "OFF".
- With the VSV "OFF", the atmosphere acts on the fast idle breaker diaphragm.
- The diaphragm is returned by spring tension, resulting in releasing the forcible opening of the choke valve and allowing it to operate in accordance with the automatic choke mechanism and throttle valve opening.

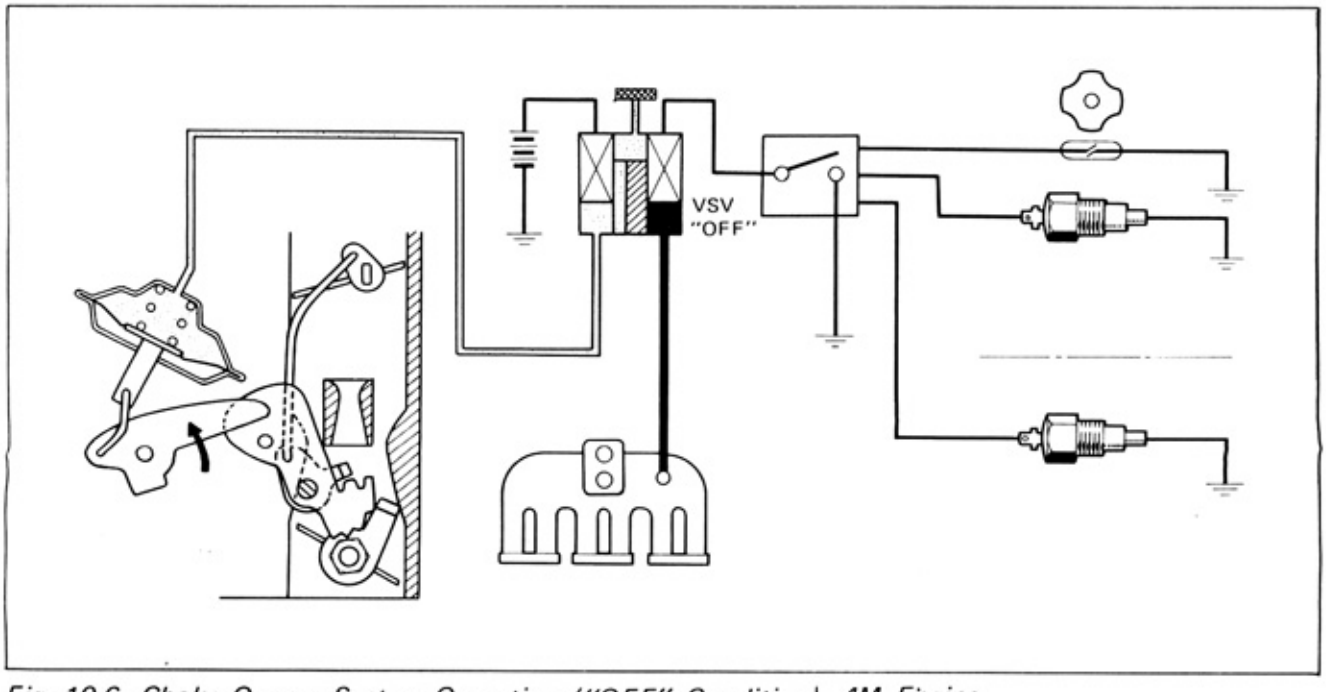
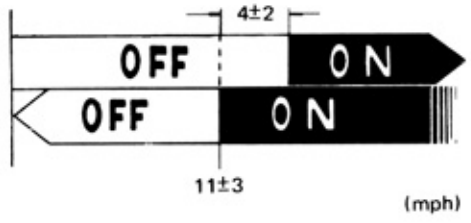
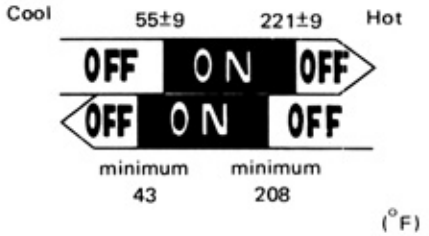


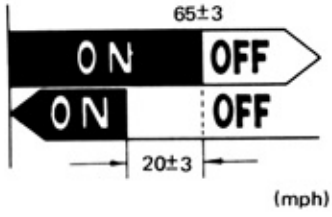
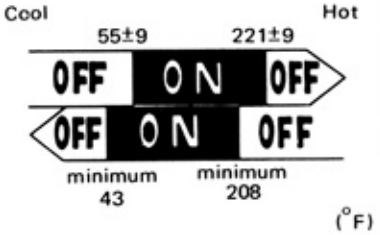
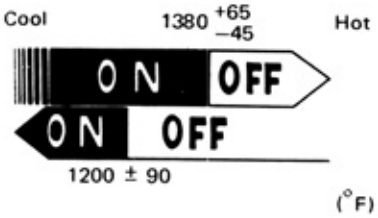
Fig. 10-6 Choke Opener System Operation ("OFF" Condition)–4M Engine

3. Choke Opener System Operating Range

(1) 2T-C engine for California and 20R engine

Choke opener system "ON" – When all following conditions are "ON"
Choke opener system "OFF" – When any one of the following conditions is "OFF"

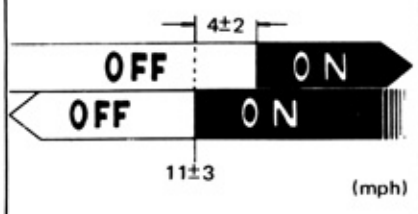
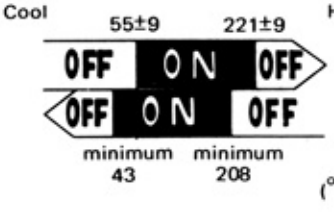
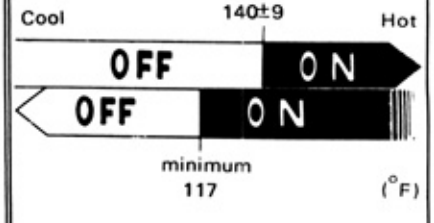
	Vehicle Speed-Speed Sensor	Coolant Temp.– Thermo s/w (at Radiator)
2T-C Engine		

	Vehicle Speed-Speed Sensor	Coolant Temp.– Thermo s/w (at Water Outlet)	CCo Temp.–Thermo Sensor
20R Engine			

(2) 4M engine (Fast idle breaker system)

Fast idle breaker system "ON"
(1) When vehicle speed and coolant temperature (A) are both "ON"
(2) When coolant temperature (B) is "ON"

Fast idle breaker system "OFF" — When the coolant temperature (B) is in the "OFF" range, and moreover, either vehicle speed or coolant temperature (B) is "OFF".

	Vehicle Speed-Speed Sensor	Coolant Temp.(A)– Thermo s/w (at Water Outlet)	Coolant Temp.(B)– Thermo Sensor (at Intake Manifold)
4M Engine			

CHOKE OPENER SYSTEM INSPECTION PROCEDURE (2T-C Engine for California)

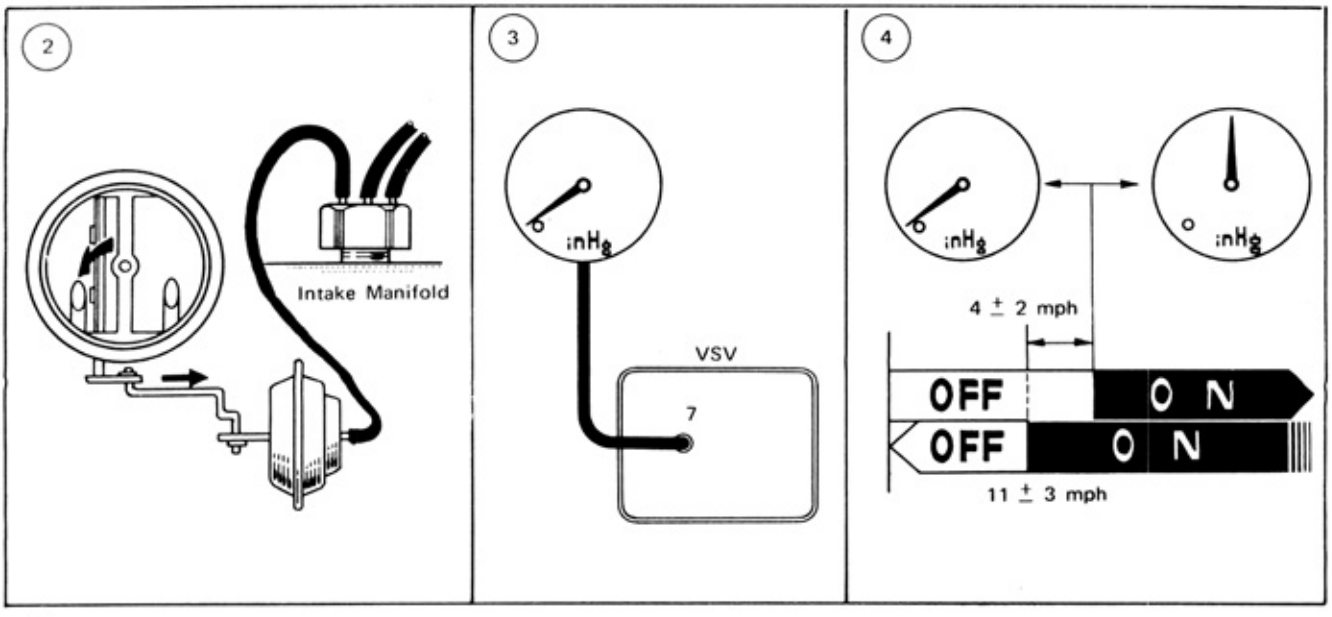
1. Visually check all hoses and wiring for incomplete or incorrect connections and for damages, and correct any defect found.

2. Disconnect hose between choke opener diaphragm and VSV at VSV side and connect it to intake manifold vacuum on hose. Does choke valve open?
   - No → Repair choke linkage or replace diaphragm.
   - Yes ↓

3. Connect vacuum gauge to VSV #7 pipe and make road test. At cold engine, is system "OFF" at both "ON" and "OFF" range speeds?
   - No → Check thermo s/w. (P1 6)
     - Bad → Replace thermo s/w.
     - OK ↓ Check VSV power source.(P1-12)
       - Bad → Repair or replace fuse or wiring.
       - OK ↓ Check VSV. (P1-7 ~ P1-9)
         - Bad → Replace VSV.
         - OK ↓ Check speed sensor. (P1-4)
           - Bad → Replace speedometer.
           - OK → Replace computer.
   - Yes ↓

4. After warming up, does system turn "ON" at "ON" range speed and "OFF" at "OFF" range speed?
   - No → Check VSV. (P1-7 ~ P1-9) (see above)
   - Yes ↓

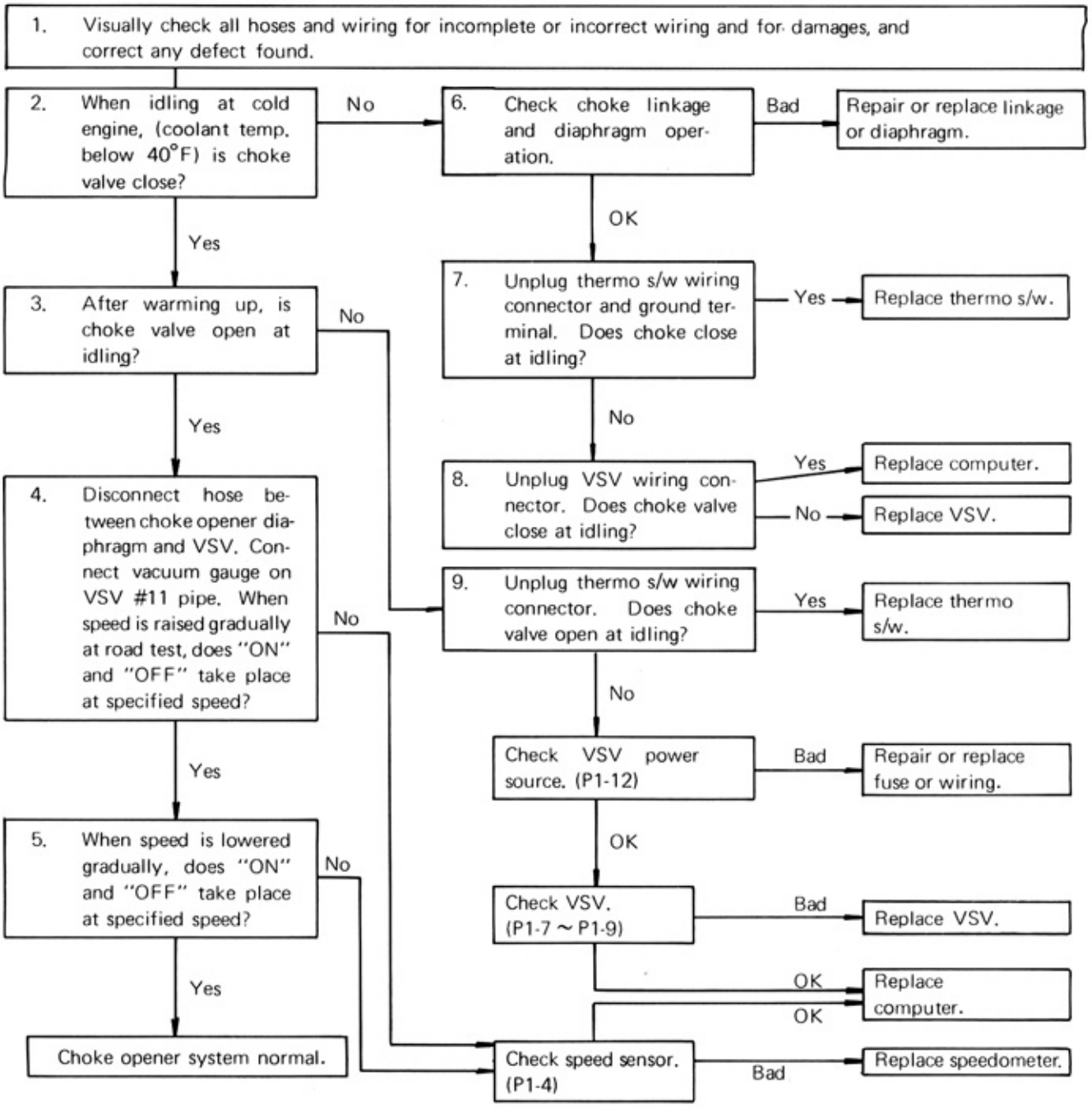
Choke opener system normal.



Note

Test 3 cannot be performed if the coolant temperature does not drop below 40°F even if the vehicle is left out in the shade for more than one hour. In such case, perform test 3 by grounding the thermo switch connector terminal and forcibly assuming cold condition. Unit test of the thermo switch will be required later (P-6).

CHOKE OPENER SYSTEM INSPECTION PROCEDURE (20R Engine)

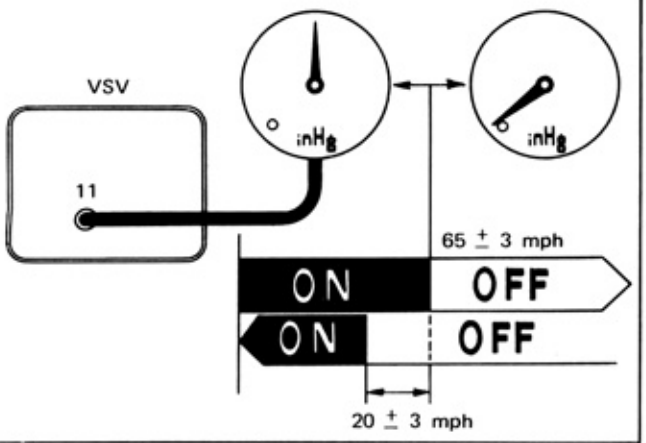


Note

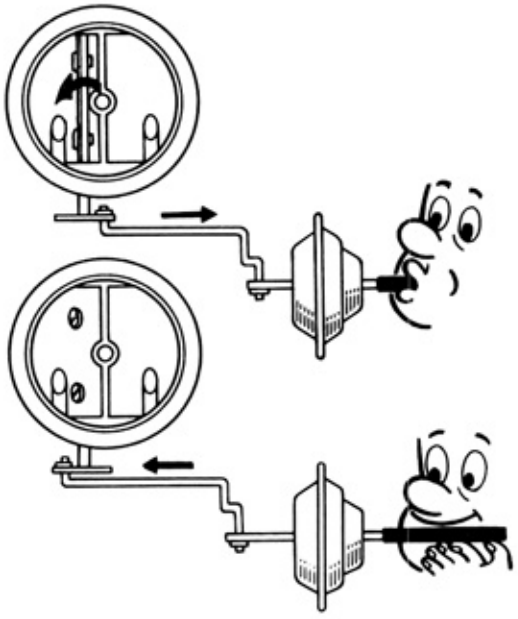
Test 2 cannot be performed if the coolant temperature does not drop below 40°F even if the vehicle is left out in the shade for more than one hour. In such case, perform test 2 by grounding the thermo switch connector terminal and forcibly assuming cold condition.

Unit test of the thermo switch will be required later (P1-6).

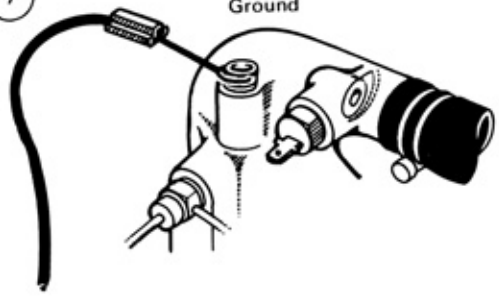
4 5


VSV
11
inHg
inHg
65 ± 3 mph
ON
OFF
ON
OFF
20 ± 3 mph

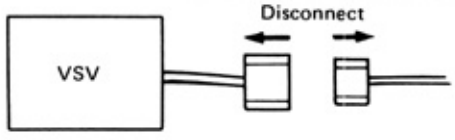
6



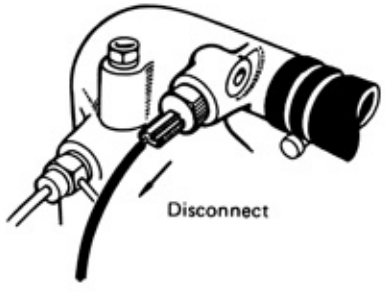
7


Ground

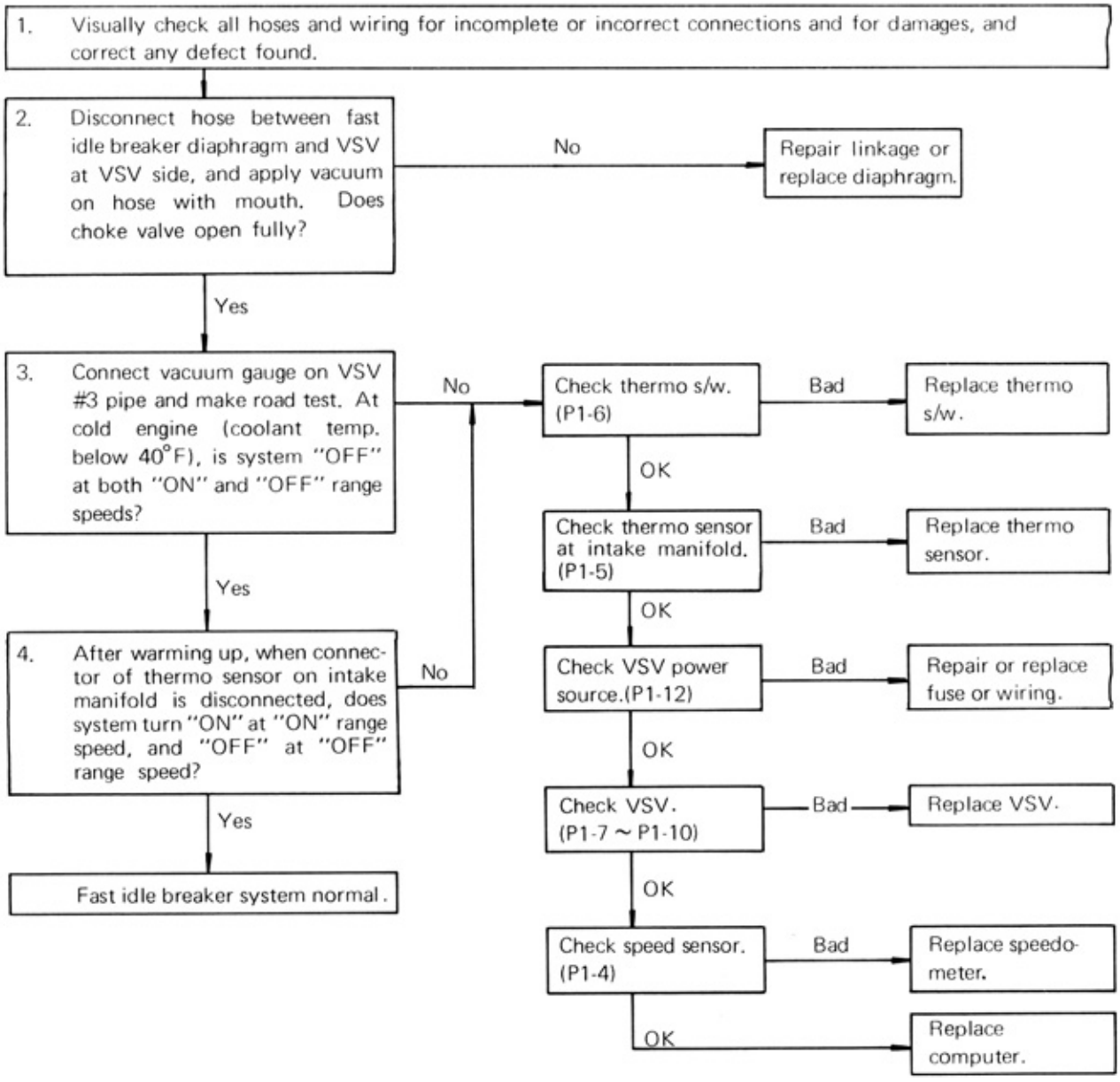
8


Disconnect
VSV

9


Disconnect

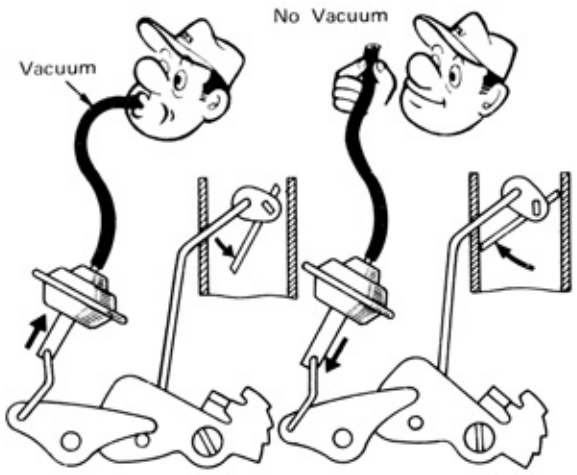
FAST IDLE BREAKER SYSTEM INSPECTION PROCEDURE (4M Engine)



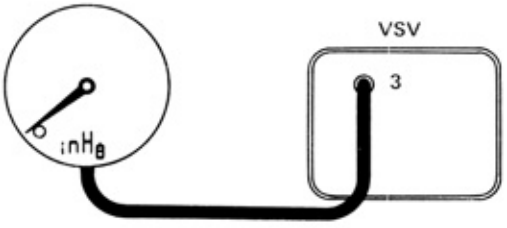
Note

Test 3 cannot be performed if the coolant temperature does not drop below 40°F even if the vehicle is left out in the shade for more than one hour. In such case, perform test 3 by grounding the thermo switch connector terminal and forcibly assuming cold condition.
Unit test of the thermo switch will be required later (P1-6).

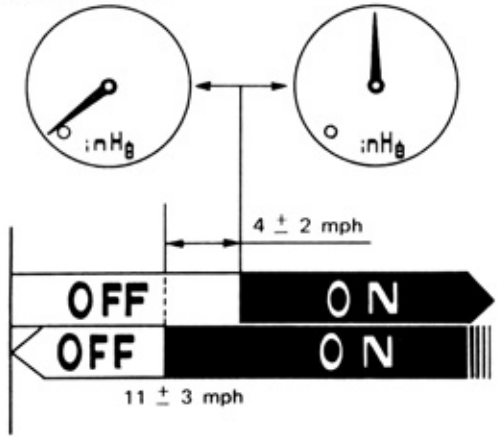
(2)



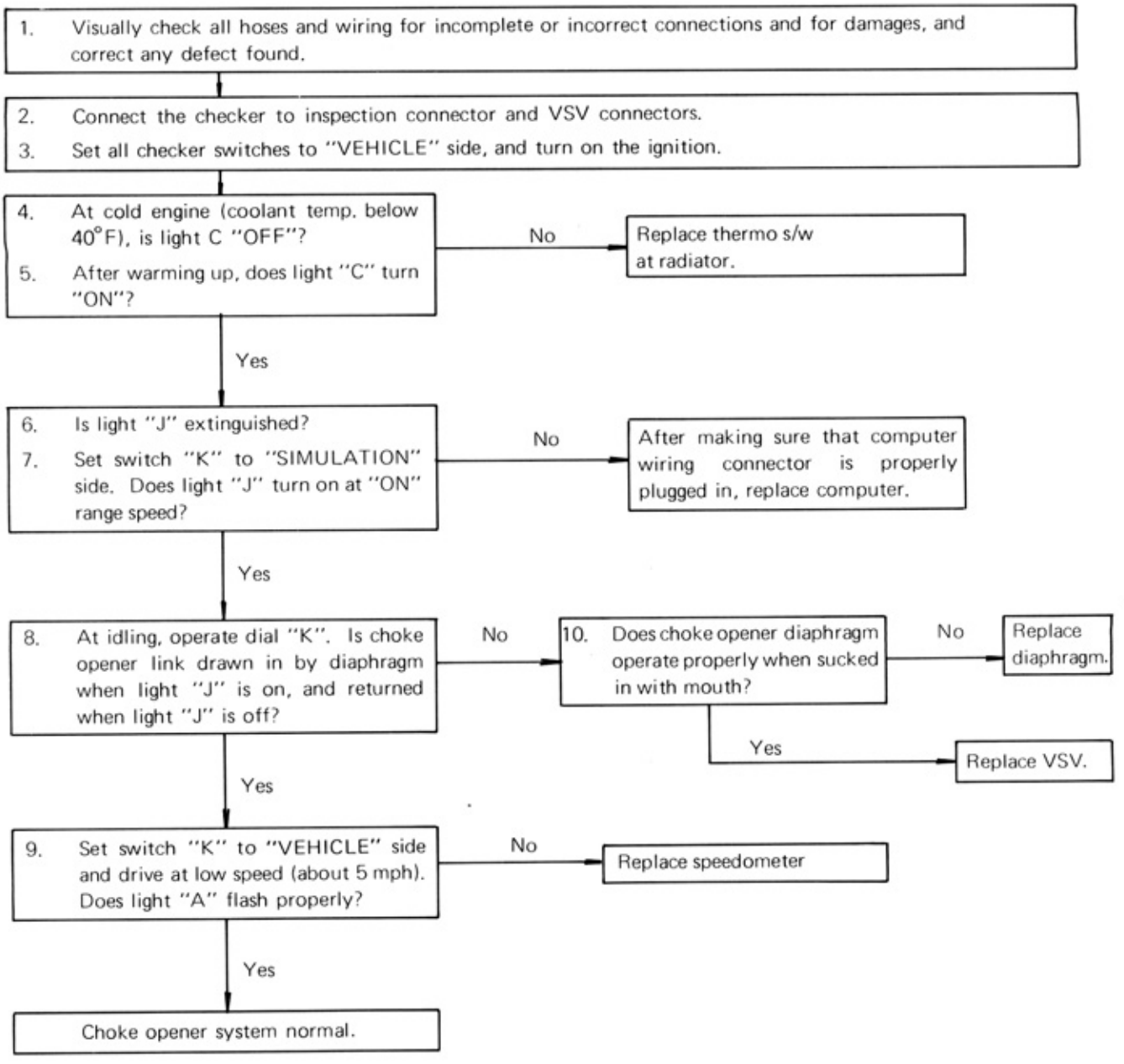
(3) Coolant Temp. : below 40°F



(4) after Warming-up



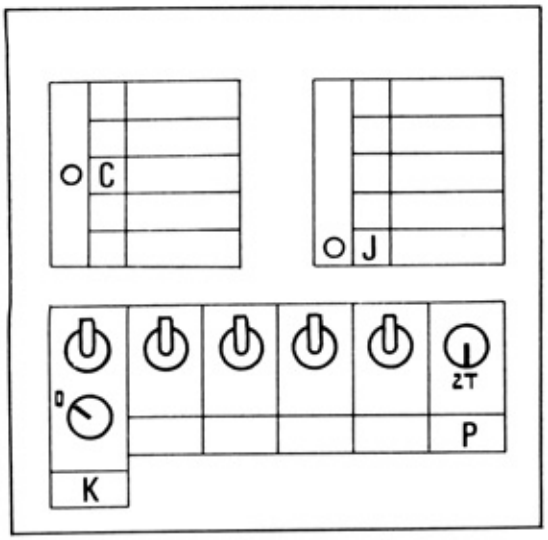
CHOKE OPENER SYSTEM INSPECTION PROCEDURE (Using Checker – 2T-C Engine for Calif.)



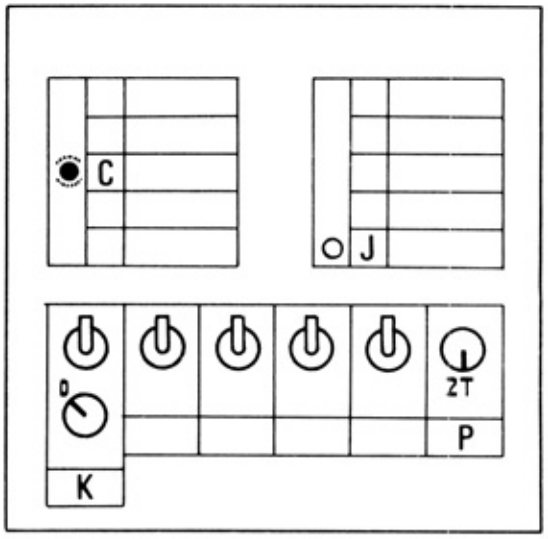
Note

After removing checker, have the VSV connector plugged in properly.

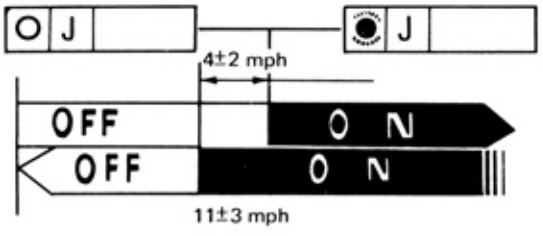
(4) Coolant Temp.: below 40°F

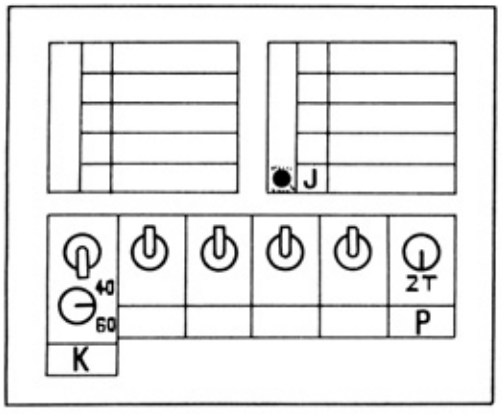


(5) (6) after Warming-up

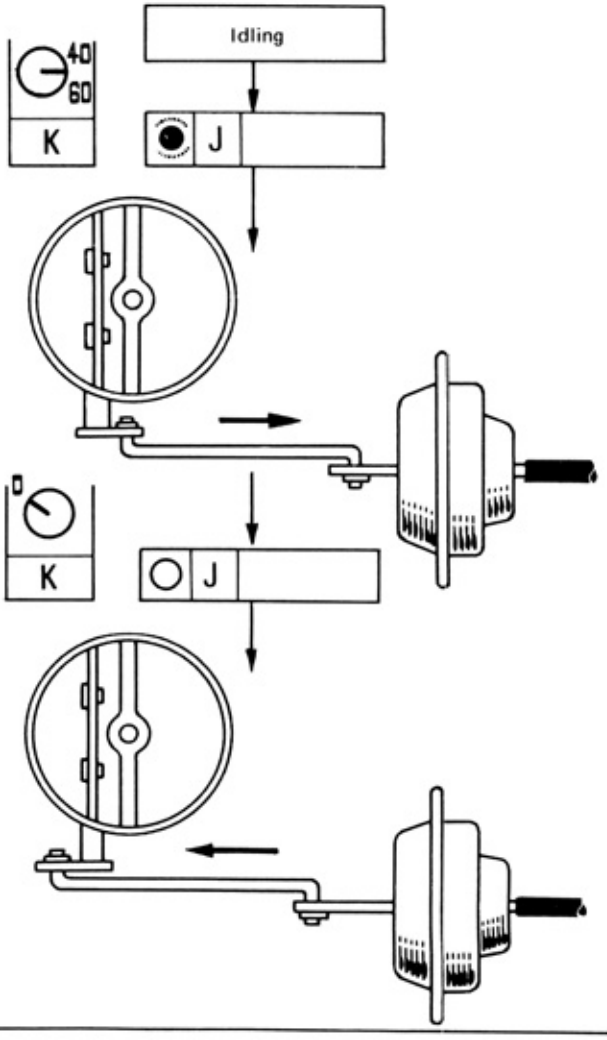


(7)

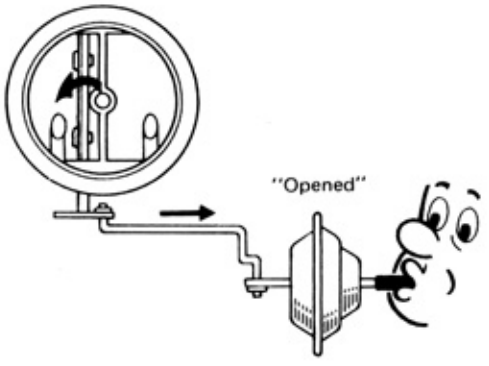




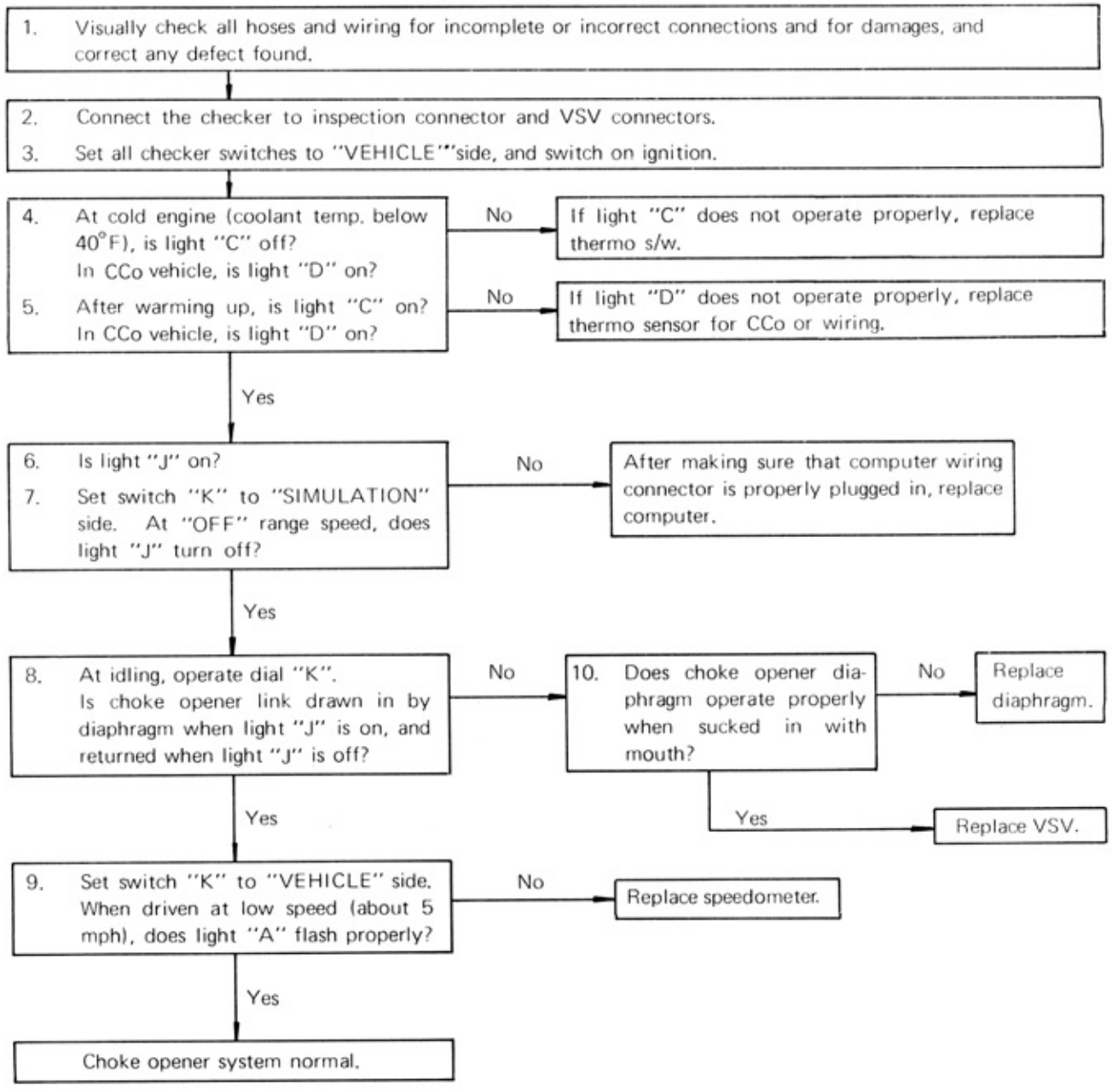
(8)



(10)

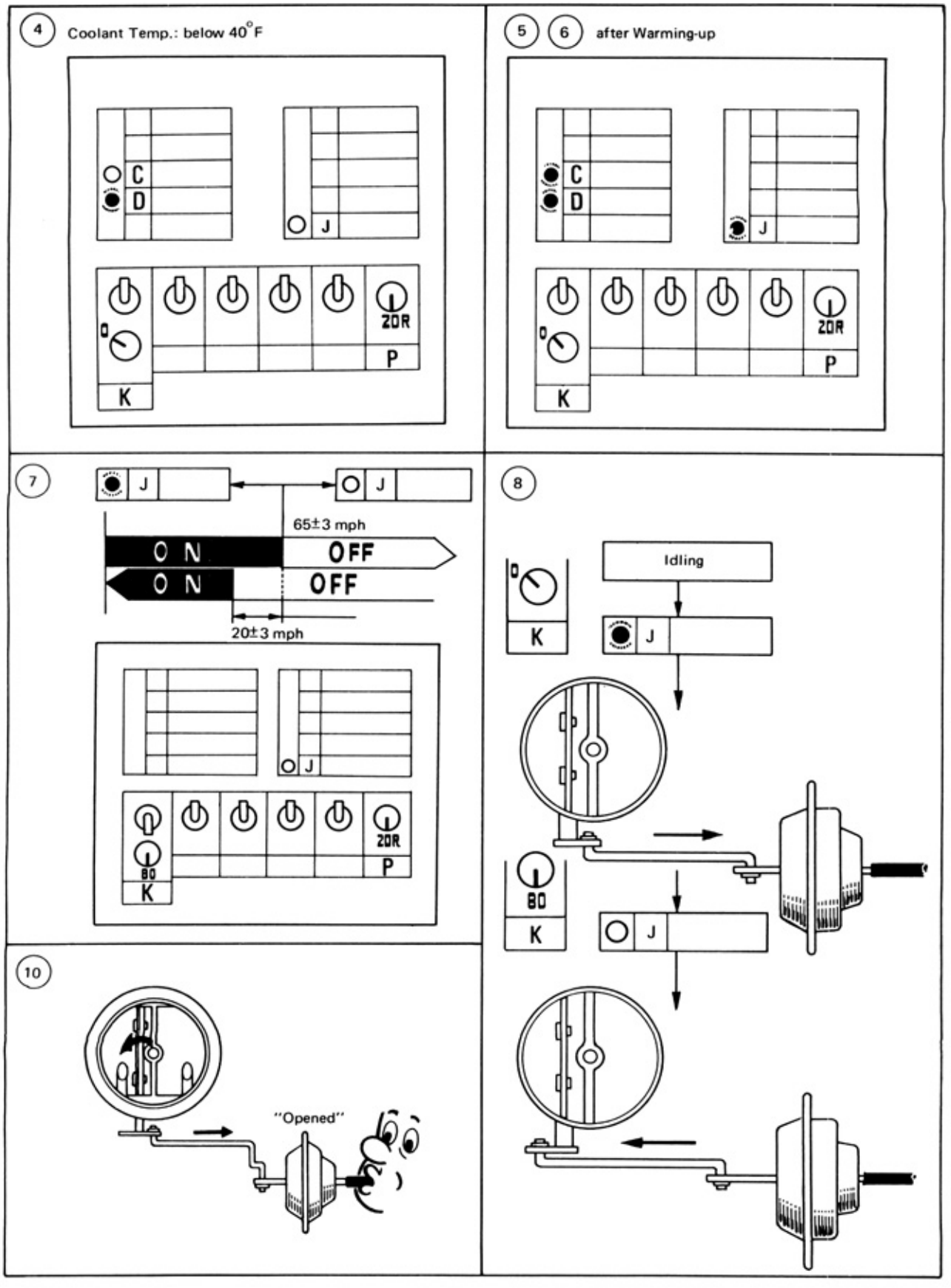


CHOKE OPENER SYSTEM INSPECTION PROCEDURE (Using Checker – 20R Engine)

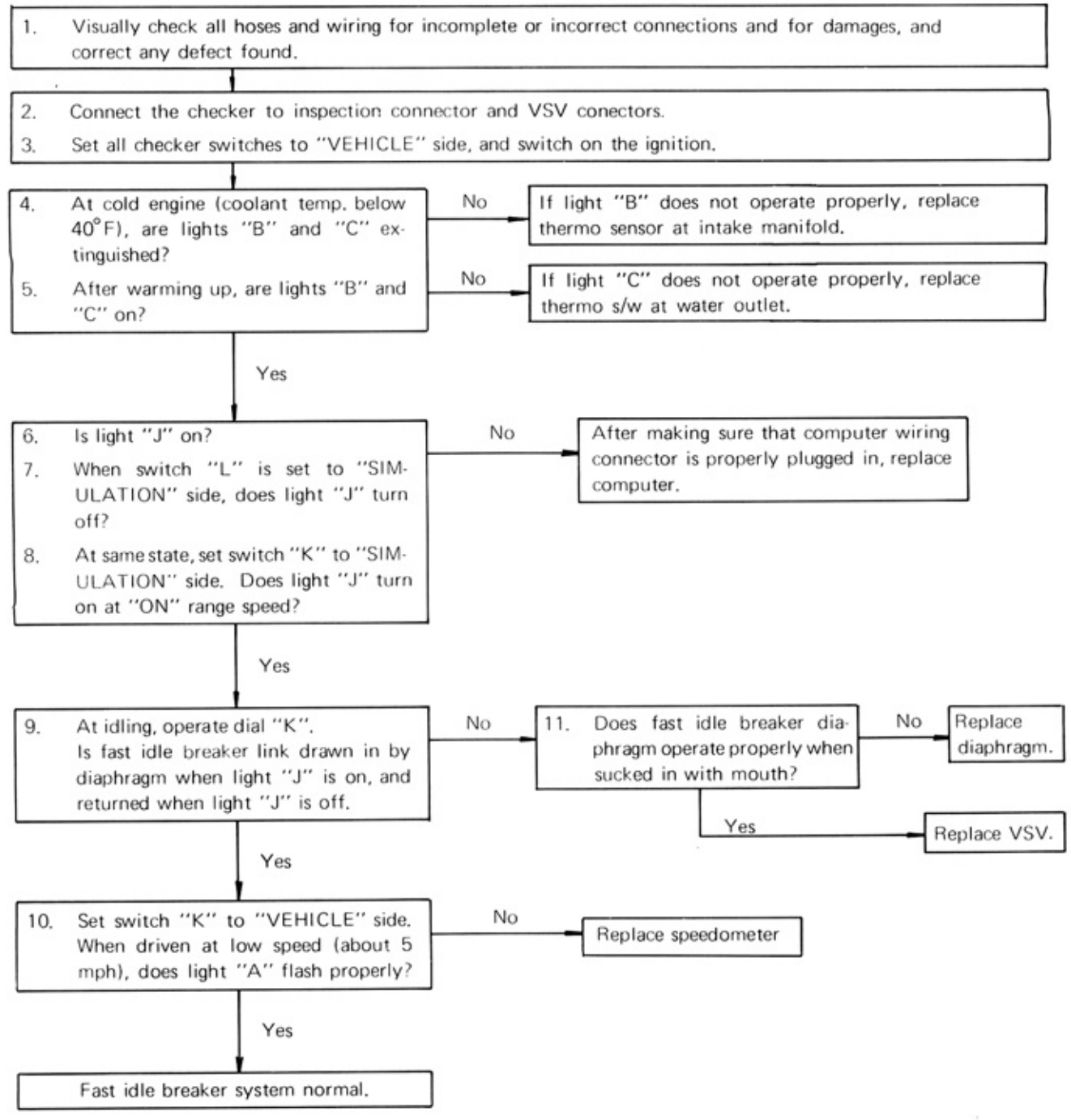


Note

After removing checker, have the VSV connector plugged in properly.


4
Coolant Temp.: below 40°F
C
D
J
2DR
P
K
5
6
after Warming-up
7
65±3 mph
ON
OFF
ON
OFF
20±3 mph
80
8
Idling
10
"Opened"

FAST IDLE BREAKER SYSTEM INSPECTION PROCEDURE (Using Checker – 4M Engine)



Note

After removing checker, have the VSV connector plugged in properly.