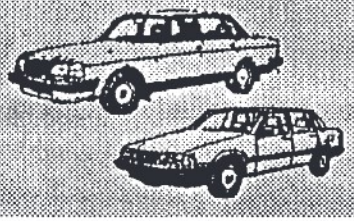
VOLVO

Service Bulletin

Fault Tracing
Repairs
Maintenance



MODEL	GROUP	NUMBER
200/700/900	25	202 / 704

TITLE

THROTTLE SWITCH / MECHANISM - ADJUSTMENT, CENTERING/ CLEANING
200/700/900

T JA

MARKET	DATE
US and Canada	May 1991

REFERENCE: TP 31347/1 (ENGLISH); 01/89; REGINA FUEL SYSTEM B230F
TP 31354/2 (ENGLISH); 09/90; LH-JETRONIC 2.4 B230F/FT, B234F
TP 31361/1 (ENGLISH); 12/88; LH-JETRONIC 2.4 B230F
This bulletin supersedes SB 23-137; 11/90.

Throttle Housing, Switch and Mechanism - Applies to All Cars Equipped with Regina or LH2.2/2.4-Jetronic Fuel Injection Systems (with idling contacts in throttle switch)

This service bulletin describes fault-tracing procedures, corrective action, and a number of standard measures to be used when evaluating customer reports of rough engine running. The procedures cover conditions related to incorrect adjustment of the throttle housing, switch or mechanism, or some other fault in these components.

The following conditions must be satisfied to ensure that the problems are not attributable to sources other than the throttle housing, switch or mechanism:

- Faults (if any) indicated by faults codes storcd in the diagnostic system must be corrected and no new codes displayed.
- The engine can be started and the car can be driven, both with the engine cold and hot.
- The throttle cable is not too tight. The throttle pulley must be free to return fully to its stopped position.
- There must be no air leakage into the intake manifold.
- The ignition and fuel injection systems (and the EGR system if applicable) must be operating satisfactorily. Otherwise, faults in these systems can cause uneven idling.
- Connectors and wiring must be properly connected and free of faults.

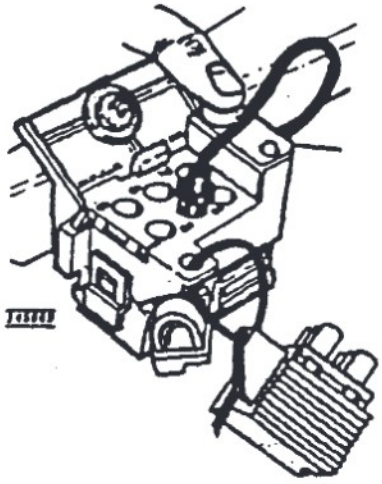
Note: The throttle housing and plate will become dirty after a period of operation. This is normal and does not call for cleaning. Cleaning of the throttle housing and plate should be carried out only if the plate requires centering.

The corrective action procedures listed in the following table and on pages 3-7 are shown in order of priority. The engine should be tested to verify that the problem has been solved when a fault has been found and corrected. If the problem is still present, proceed to the next measure. If the fault still persists after all the measures listed have been carried out, continue fault tracing on the wiring and control units as described in the service literature.

Fault symptom	Corrective action
A). Engine will not idle.	See pages 3,4.
B). Warm idle speed above specification (1200-1400 rpm) - applies only to LH2.4.	Carry out basic adjustment (see pages 7-11).
C). Idling speed varies between 600-1500 rpm.	Check throttle switch (see pages 12,13).
D). Idle speed above specification with cold engine.	1) Check throttle switch (pgs. 12,13). 2) Use test mode 3 in diagnostic system to check that idling valve operates. 3) Carry out basic adjustments (pgs. 7-11).
E). Idle speed 'hangs up' above specification.	1) Check that throttle cable is not sticking. 2) Check throttle switch (pgs. 12,13). 3) Carry out basic adjustment (pgs. 7-11).
F). Insufficient AC compensation - idle speed drops with compressor engagement.	See pages 5,6.
G). Engine speed fluctuates with fuel shutoff function, slow driving, coasting downhill.	See pages 6,7.
H). Hard starting with Regina fuel system.	Check throttle switch (see pages 12,13).

REMEMBER TO ERASE THE DIAGNOSTIC SYSTEM MEMORY BEFORE RETURNING THE CAR TO THE CUSTOMER ON COMPLETION OF SERVICE.

Switch on ignition.



Read fault code again.

Press and hold test button for at least 5 seconds, then release. LED should light after 3 more seconds.

Press and hold test button for at least 5 seconds, then release. LED should go out.

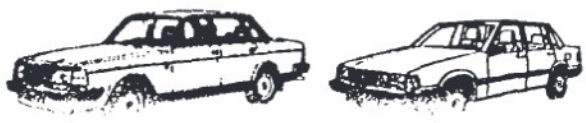
Check that fault code has been cleared by pressing button once for more than 1 second (but not more than 3 seconds).

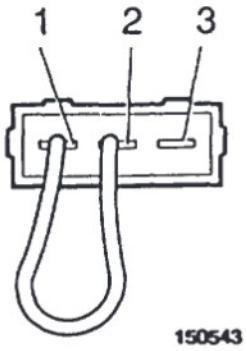
Display of flashing code 1-1-1 indicates that fault code has been cleared.

A). ACTION IF ENGINE WILL NOT IDLE:

- **Check throttle switch** (see pages 12,13).
- **Use diagnostic system test mode 3 to check operation of idling valve.**
- *If no fault is found, use the following method of increasing the throttle air flow.*

Note: *This will, however, also increase the normal deposits on the throttle plate; in time, air flow will be reduced correspondingly and the problems can recur.*





Connect a jumper lead between terminals 1 and 2 in the throttle switch wiring connector (see illustration).

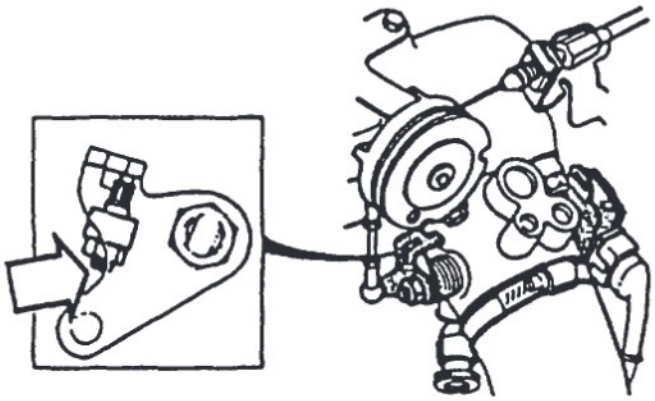
Note: Ensure good contact is made between the pins. If no signal is obtained, control unit will enter "LIMP-HOME" mode (applies to LH 2.4 only).

Loosen throttle switch by loosening screws slightly.

Idle engine at working temperature with gear selector lever in neutral and AC system off.

Disconnect hose to idling (CIS) valve as follows:

- **LH fuel systems:** Disconnect idling valve hose at air hose connection. Plug both idling valve hose and hole in air hose, ensuring that both are fully sealed.
- **Regina fuel systems:** Disconnect idling valve hose at air cleaner. Plug hose.



Adjust speed to 500 ± 20 rpm using throttle adjusting screw.

Note: It is important to maintain speed within these limits.

Switch off engine.
Tighten adjusting screw locknut while holding screw to prevent it rotating.

Remove throttle switch connector jumper.

IMPORTANT:
- **Check throttle switch** (see pages 12,13).
- **Check throttle lever clearance** (see item F, page 12).

F). ACTION WHEN AC COMPENSATION IS INSUFFICIENT AND ENGINE SPEED DROPS WITH COMPRESSOR ENGAGEMENT:

- **Check throttle switch** (see pages 12,13).

- **Use diagnostic system to check:**

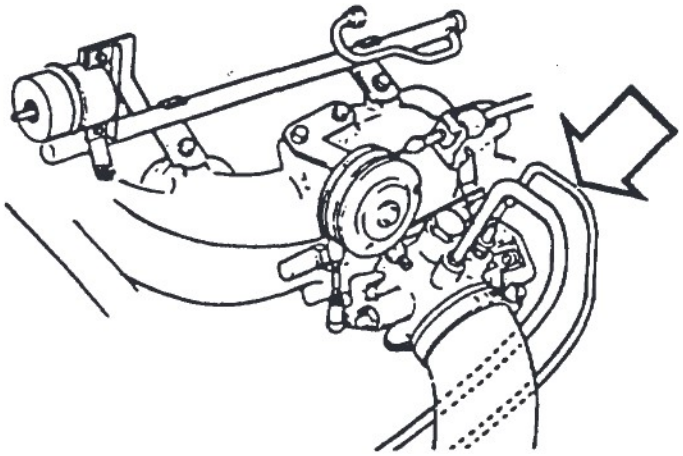
  - that idling (CIS) valve is operating. Use test mode 1 to check that fault code 2-2-3 is not present and test mode 3 to ensure that valve is operating.

  - AC compressor on/off function. Use test mode 2 to check that acknowledgment codes 1-1-4 and 1-3-4 are displayed.

    (See also TP 31354/2, pages 46 and 47.)

for Regina, early system:
Insufficient AC compensation:

Symptom may be noticed during extremely hot weather. In this case, additional bypass air is required. Proceed as follows:

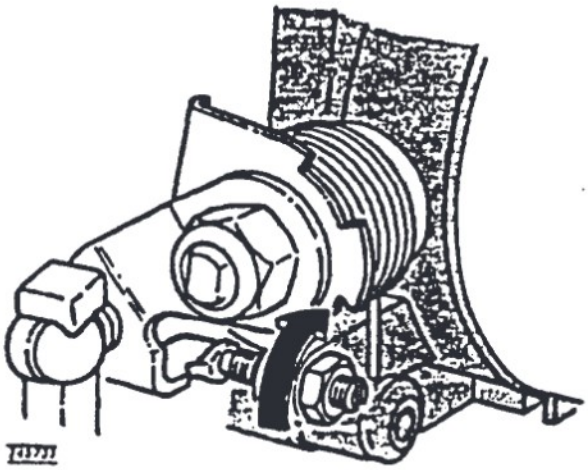


- Disconnect the hose (arrow) from the throttle housing to the EVAP control and connect a vacuum gauge to the connection.

- Idle the engine.
- Measure the vacuum. (Normally, no vacuum should be present at this point.)

- Open the throttle with the adjusting screw until the gauge begins to read a vacuum. Then, close the throttle until the vacuum is again zero.
- Tighten the adjusting screw locknut (holding the screw to prevent it rotating).

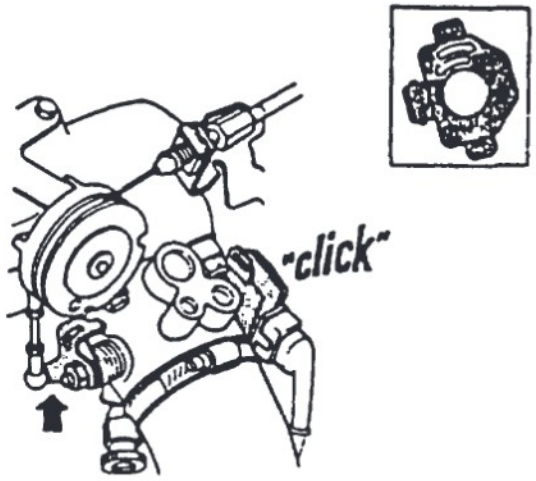
- Check the throttle switch (see pages 12,13).
- Check the throttle lever clearance (see item F, page 12).



Note: If the 'Check engine' (or Lambda-symbol) warning lamp lights during engine braking (particularly at high altitude), the bypass air flow may be excessive. In this event, close the throttle gradually with the adjusting screw until the lamp no longer lights under these conditions.

Note: Remember to clear the 1-2-1 code in the diagnostic system memory after each test (see page 3).

G). ACTION IN EVENT OF ENGINE SPEED FLUCTUATION DURING FUEL SHUTOFF FUNCTION, OR COASTING DOWNHILL:

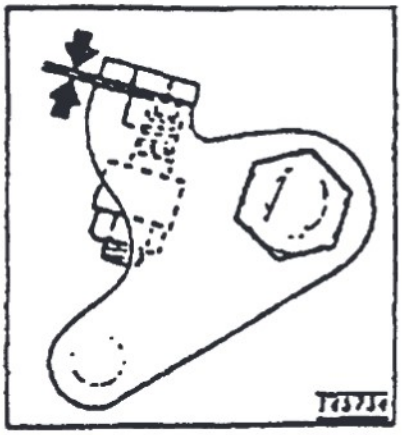


- **Center throttle plate** (see item 1.2, pages 8 and 9).

- **Adjust throttle switch:**
  Install throttle switch without tightening screws.

  Turn switch clockwise. Place 0.15 mm feeler gauge between throttle lever and adjusting screw. Turn switch slowly counterclockwise until "click" is heard. Hold switch in this position and tighten mounting screws (torque: 1.6 ± 0.4 Nm = 14 ± 4 in.lb).

Note: If the throttle switch is of VDO manufacture, apply medium grade locking fluid when tightening the throttle switch screws.



- **Recheck operation:**
  Open throttle slightly, insert feeler gauge between lever and adjusting screw, and check as follows:

  With 0.25 mm gauge, click **should not** be heard from switch when throttle is closed.

  With 0.15 mm gauge, click **should** be heard from switch when throttle is closed.

- **Adjust throttle mechanism** (see item 1.4, pages 11,12).

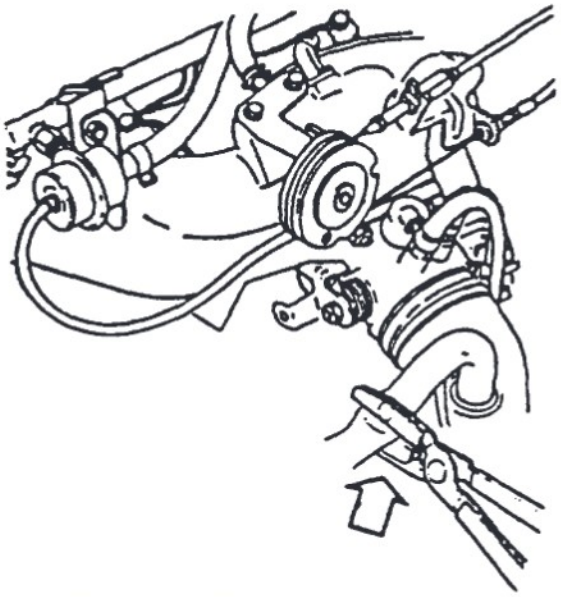
Note: *The following operations on pages 7-12 describe standard operations which may be required when adjusting throttle housing and throttle mechanism.*

1. BASIC ADJUSTMENT OF THROTTLE HOUSING AND MECHANISM

1.1) CHECKING NEED FOR ADJUSTMENT

Run engine up to working temperature.

Connect accurate tachometer to engine.
Allow engine to idle.



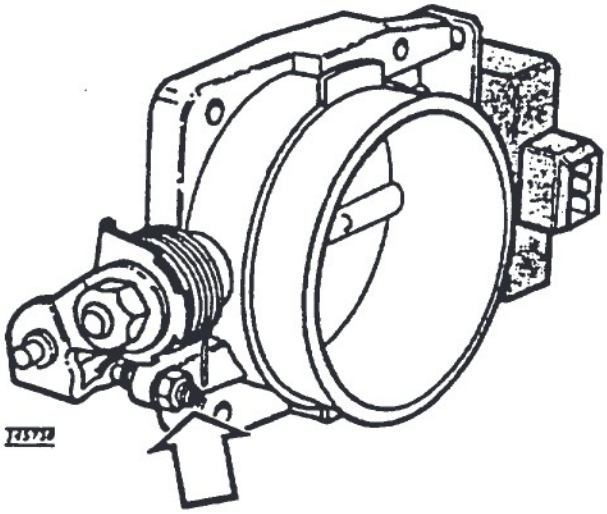
Clamp idling valve (CIS) hose with pliers (arrow).

If engine stops or speed falls below 470 r/min, basic adjustment is acceptable.

Also check throttle switch as described on pages 12,13 (if not already carried out).

Proceed to next step.

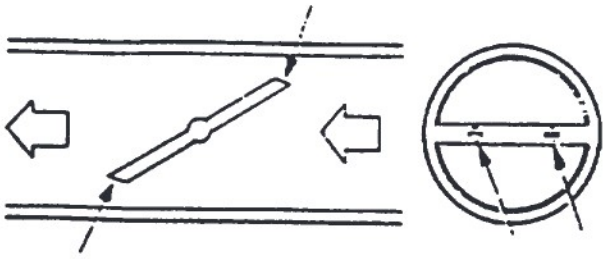
1.2) CENTERING THROTTLE PLATE



Remove throttle switch from throttle housing.
Remove throttle housing from intake manifold.

Clean throttle housing thoroughly.

Loosen adjusting screw (arrow) so that throttle closes fully.



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Loosen throttle plate (by loosening the two retaining screws slightly).

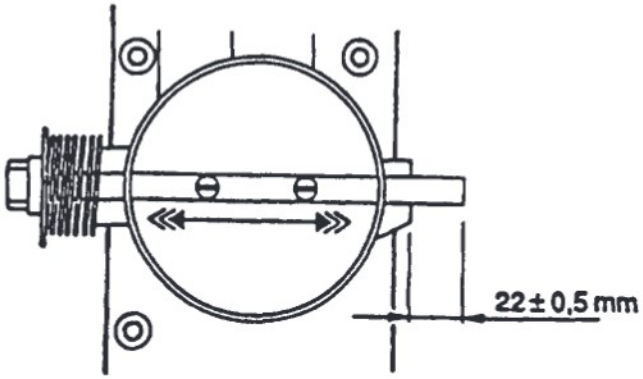
Note: Check that plate is correctly installed, i.e., is facing in the right direction. Since edge of plate is thin, careful inspection is needed to see chamfered edge.

Hold throttle housing with plate horizontal.

Use lever to open and close throttle a few times until plate centers itself in throat of opening. (Open to approx. one-third on each occasion.)

Check that throttle spindle can be moved in and out with slight resistance.

Examine throttle housing against light.
Opening around plate should be even and as small as possible. If opening is uneven, try moving plate slightly in either direction with fingers to obtain optimum clearance with housing wall.



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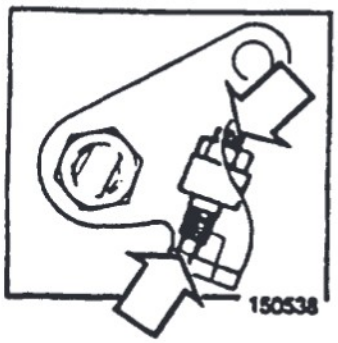
Adjust spindle until end projects 22 ± 0.5 mm beyond throttle housing as illustrated.

Note: Specified maximum dimension of 22.5 mm must not be exceeded, otherwise spindle may bottom against throttle switch.

Tighten plate retaining screws (Torque: 0.6 ± 0.1 Nm = 5 ± 1 in.lb).



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Turn adjusting screw until it is just in contact with lever. Screw in a further quarter turn.

Tighten locknut while holding adjusting screw.

- more -

1.3 ADJUSTMENT OF THROTTLE SWITCH

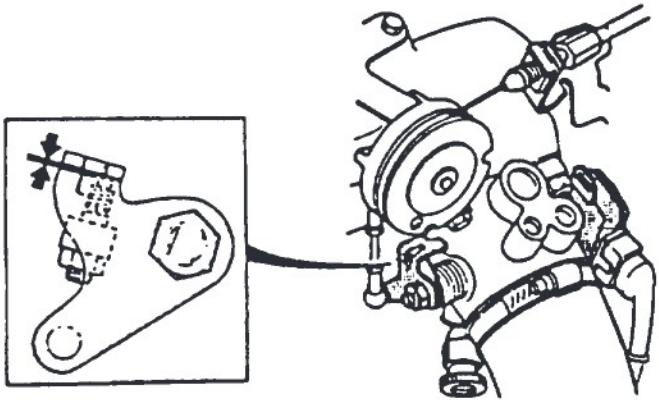
Install throttle switch without tightening screws.

(Two makes of throttle switch - BOSCH and VDO - are used. The manufacturer's name is shown on the rounded section of the cover. Proceed as follows depending on which make of switch is installed).

Turn switch clockwise.

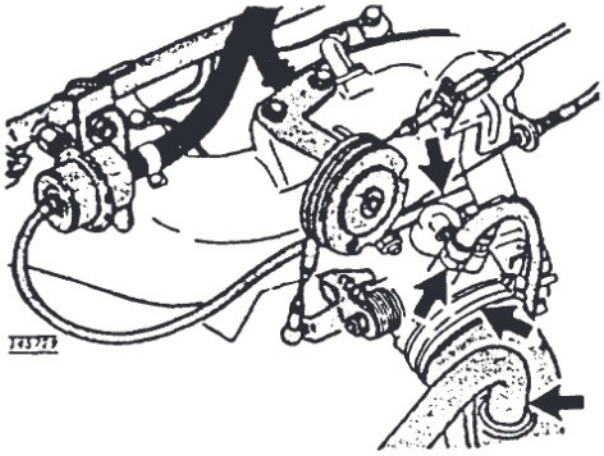
BOSCH: Turn switch counterclockwise until "click" is heard. Continue until stop is reached but no further. Since throttle must not begin to open, plate may be held closed with finger. Hold switch in this position and tighten screws (torque: 1.6 $\pm$ 0.4 Nm = 14 $\pm$ 4 in.lb).

VDO: Place 0.25 mm feeler gauge between throttle lever and adjusting screw. Turn switch slowly counterclockwise until "click" is heard. Hold switch in this position and tighten mounting screws (torque: 1.6 $\pm$ 0.4 Nm = 14 $\pm$ 4 in.lb). Apply medium grade locking fluid to screws before tightening.



Recheck operation:
Open throttle slightly, insert feeler gauge between lever and adjusting screw, and check as follows:

- With 0.45 mm gauge, click **should not** be heard from switch when throttle is closed.
- With 0.15 mm gauge, click **should** be heard from switch when throttle is closed.

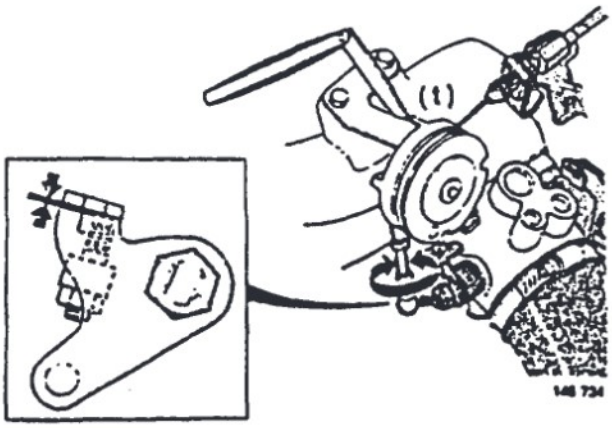


1.4 ADJUSTMENT OF THROTTLE MECHANISM

A) Mount throttle housing on intake manifold. Connect all hoses and connectors.

B) Install link.

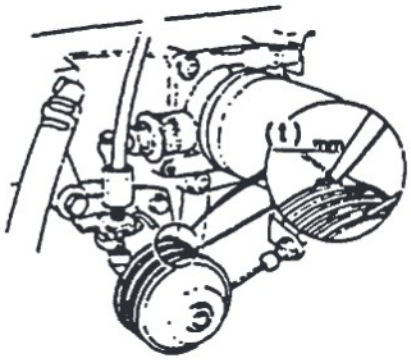
C) Secure ball joints on link with "caps".



D) Place a feeler gauge of thickness (t) (see table below) at throttle pulley stop. Thickness will vary depending on engine type.

ENGINE	(t)
B230FS (700/900 only), B230FT, B280	**2.5 mm**
B230FS (240 only)	**2.0 mm**
B234FS manual B234FS automatic with 1989 engine version nos. 1289321 and 1289407, produced prior to week 914.	**3.3 mm**
B234FS automatic with other engine version nos., produced after week 914.	**1.6 mm**

E) Turn mid-section of link until the lever leaves adjusting screw and throttle switch clicks. Turn link in opposite direction until return click is heard from switch. Tighten link locknut in this position, first by hand and then by wrench (torque: 0.6 $\pm$ 0.15 Nm = 5 $\pm$ 1 in.lb). Hold link to prevent rotation while tightening nut.



Feeler gauge can even be placed like this

F) Check lever clearance

Place feeler gauge of proper thickness (t) at throttle pulley stop.

Check:
- that 0.50 mm feeler gauge **cannot** be inserted between lever and adjusting screw.
- that 0.10 mm feeler gauge **can** be inserted between lever and adjusting screw.

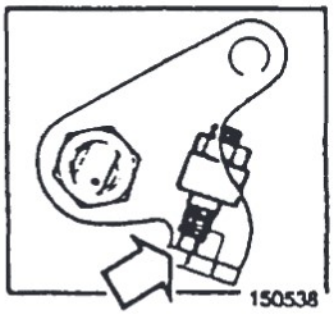
If clearance is not between these limits, undo locknuts on link and repeat procedure from E on.

G) Remove feeler gauge at pulley stop when adjustment has been completed.

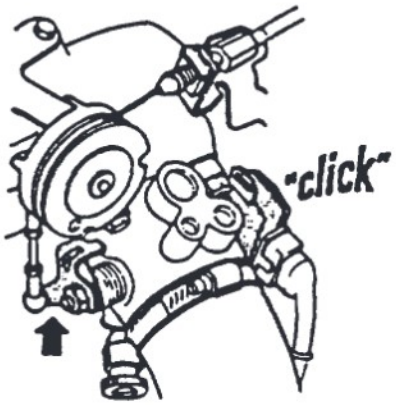
1.5 FINAL CHECK

Check that basic adjustment is OK by carrying out procedure **1.1** on page 7.

2. CHECKING THROTTLE SWITCH



Check that lever rests (arrow) against adjusting screw. If not, loosen link at **lever.**



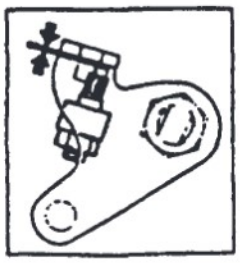
Open throttle slightly by operating lever or pulley. Insert feeler gauge between lever and adjusting screw, and check as follows:

- With 0.45 mm gauge, click **should not** be heard from switch when throttle is closed.

- With 0.15 mm gauge, click **should** be heard from switch when throttle is closed.

If return click is not within above limits, loosen switch mounting screws and adjust as per item **1.3** on page 10.

Check lever clearance
See item **F**, page 12.



Check that throttle switch "clicks" when 0.15 mm feeler gauge is inserted between adjusting screw and lever, even when engine is idling. Use test mode 2 in diagnostic system to detect click. Acknowledgment code 3-3-2 should be displayed when throttle switch is opened and closed.

- more -

WARRANTY STATEMENT: Adjust and clean throttle may only be submitted under the terms of the 5yr./ 50,000 mi. Emission Limited Warranty.

Oper. No.	Labor Description	Time Allowance
	Troubleshoot according to following operations:	
256503	A	0.2 hr
256513	B	0.4
256523	C	0.2
256533	D	0.6
256543	E	0.5
256553	F	0.1
256563	G	0.3
256573	H	0.1