RENAULT R10 & R16 ENGINE MODIFICATION

R10 (1968-71)
R16 (1968-72)

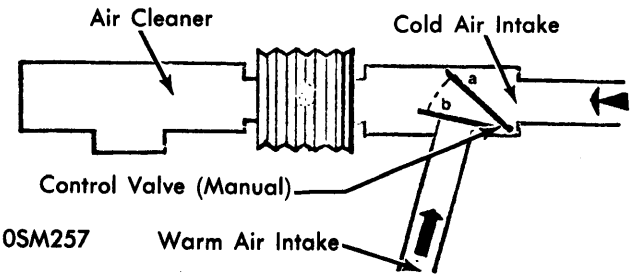
DESCRIPTION

Renault DCS exhaust emission control system uses a double barrel carburetor with vacuum controlled progressive linkage, distributor with a special centrifugal advance curve, retarded ignition timing and engine modifications. Engine modifications include pistons with reduced top clearance, special head and intake manifold with separate ports. Carburetor uses an accelerated idle system that operates upon deceleration and contains a vacuum diaphragm unit, solenoid valve, RPM switch, neutral switch and vacuum controlled progressive linkage. All these units combine to reduce amount of carbon monoxide and unburned hydrocarbons.

OPERATION

Pistons with reduced top clearance are designed to reduce hydrocarbon emissions. Intake manifold and cylinder head have separate ports which give a better distribution of air/fuel mixture to cylinders. Accelerated idle system maintains a partial opening of primary throttle plate when decelerating to maintain exhaust emissions within specified range. Operation of this system is controlled by several units.

Carburetor Air Intake (1970-72) – Air intake for carburetor air cleaner incorporates a manually controlled two position flap. When air temperature is below 50°F, flap should be positioned to shut off cold air intake. With flap in this position, inlet air then passes around exhaust manifold and is heated before entering carburetor.



A – Winter Setting B – Summer Setting

CARBURETOR AIR INTAKE

Carburetor (1970-71 R10 Man. Trans.) – Automatic opening of secondary barrel of carburetor is suppressed.

Ignition Timing (1970-71 R16 Auto. Trans.) – When manual choke lever is pulled out, a relay on choke control energizes an electro valve. Electro valve shuts off normal vacuum circuit between intake manifold and distributor. Distributor vacuum advance unit is then controlled by vacuum from intake manifold through a dampening tank. This allows better acceleration with a leaner mixture during engine warm up.

Vacuum Diaphragm Unit – This unit operates on intake manifold vacuum. When vacuum is applied, unit pulls on clevis rod and through other linkages rotates throttle plate into a slightly open position. Amount of opening is controlled by travel of clevis rod which is limited by travel adjustment screw. As long as vacuum is applied to diaphragm unit, partial opening of throttle plate is maintained when accelerator pedal is released, and accelerated idle is obtained.

Solenoid Valve – Solenoid valve is located between intake manifold vacuum outlet and vacuum diaphragm unit. Its purpose is to open and close vacuum line connected to vacuum diaphragm unit, thereby causing vacuum diaphragm unit to pull on the carburetor accelerated idle linkage and to release accelerated idle linkage when required.

RPM Switch (R10 Only) – This switch is located on left side of radiator. Basically it is a small electronic tachometer which reads engine RPM and closes and opens a set of contact points according to engine RPM. Contact points close when engine slows down to a speed which is from 1400-1500 RPM. When closed, current flows to solenoid valve and valve shuts off vacuum which actuates vacuum diaphragm unit. When engine speed rises above RPM at which they close, contacts open. When open, current flow stops to solenoid valve, valve opens and vacuum is permitted to exert pull on diaphragm of vacuum unit.

Centrifugal Switch (1968-70 Models) – On R16 models, switch is located on speedometer cable in engine compartment. On R10 models, switch is located on speedometer cable under bottom left hand side of car body. This switch is driven by speedometer cable and opens and closes a set of contact points according to road speed of vehicle. Contact points close when road speed drops down to 16 MPH, this allows current to flow to solenoid valve, shutting off vacuum which actuates vacuum diaphragm unit. As a result, vacuum diaphragm unit stops pulling on accelerator idle linkage and engine is free to slow down to normal idle. Contact points open when road speed increases to 23 MPH, opening solenoid valve and allowing vacuum to pull on diaphragm of vacuum unit. This prevents throttle plate of primary barrel from closing fully when accelerator pedal is released.

Centrifugal Switch (1971-72) – Switch is located on speedometer cable (under bottom left hand side of vehicle on R10, in engine compartment on R16). Switch is driven by speedometer cable and opens and closes a set of contact points according to road speed of vehicle. Contact points close when road speed of vehicle increases to 23 MPH and remain closed until vehicle decelerates to 16 MPH. When points close, current flows to solenoid valve, valve opens and permits intake manifold vacuum to pull on diaphragm of vacuum unit. Vacuum unit pulls on accelerated idle linkage to prevent throttle valve of primary barrel from closing fully when accelerator pedal is released.

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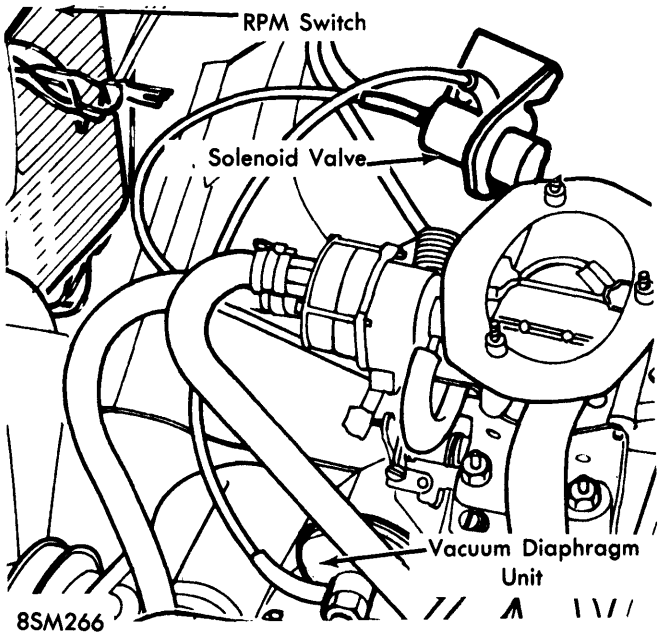
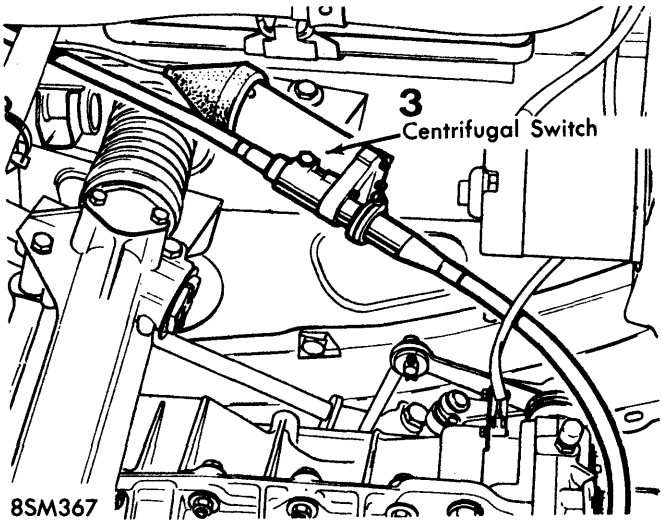


ACCELERATED IDLE SYSTEM COMPONENTS



CENTRIFUGAL SWITCH

Neutral Switch – A neutral switch is fitted to transaxle on vehicles with standard transmission (there is no neutral switch on cars equipped with automatic transmission). When transaxle is in neutral, switch is automatically turned on. Current flows to solenoid valve which is energized and shuts off accelerated idle. This device is used to make sure the accelerated idle is cut out and engine returns to normal idle.

Vacuum Controlled Progressive Linkage – Progressive linkage makes use of a vacuum diaphragm unit. Its purpose is to insure that second barrel of carburetor comes into action at proper time to satisfy engine requirements and air pollution control requirements. Vacuum, which actuates diaphragm, is taken from venturis of the two barrels. In venturis, vacuum decreases when throttle plates are opened, and vacuum increases as RPM increases. Action of diaphragm is progressive and provides a smooth transition from first to second barrel.

Electronic Computer Unit – Unit which is installed on 1970 R16 models with automatic transmission uses a green junction plug and completes circuit to solenoid valve in order to obtain accelerated idle. Unit which is installed on 1971-72 R16 models with automatic transmission uses a blue junction plug and grounds solenoid valve to obtain accelerated idle. If function is not normal, unit must be replaced. *NOTE – 1970 unit (green plug) is not interchangable with 1971-72 unit (blue plug).*

SERVICE PROCEDURES

To maintain efficiency of DCS system, periodic maintenance, checking and adjustments are necessary. Particular stress should be placed on areas regarding Tune-up items.

Ignition Timing – Correct initial timing of ignition distributor is obtained by indexing tooth (without a hole) of pointer on timing chain cover with notch on crankshaft pulley, rotating ignition distributor so that contact points begin to open, and locking distributor in this position.

Normal Idle – Be sure ignition system is in good operating condition and that adjustments are within specifications. Make sure that warm air intake lever is on "summer" position (if equipped) and connect tachometer. Run engine until it reaches normal operating temperature. *NOTE – Particular care must be taken to insure that this adjustment is performed with precision, because level of exhaust emissions depends largely upon its accuracy.*

1) Adjust air adjustment screw until 700 RPM is obtained (825 RPM on R16 with auto. trans. in "Park"). Adjust mixture screw to obtain maximum idle speed. Continue above adjustments until maximum idle speed obtainable with mixture screw is 25 RPM over specified idle speed.

2) Lean out mixture by turning mixture screw clockwise to lower idle speed by 25 RPM.

NOTE – On 1970-72 models check that CO is to following specifications:

Model	Idle CO%
R10 Manual Transmission	2±.5
R10 Automatic Transmission	2.5±.5
R16 Manual Transmission	2±.5
R16 Automatic Transmission	2.5±.5

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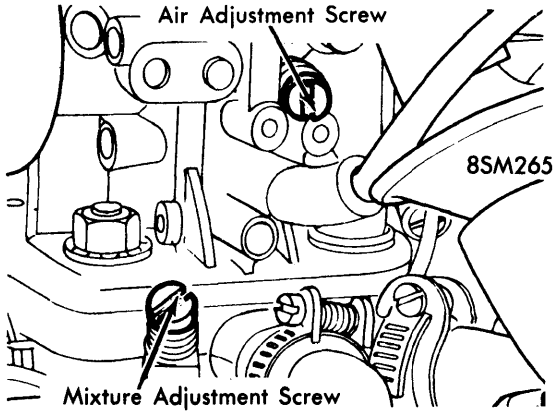


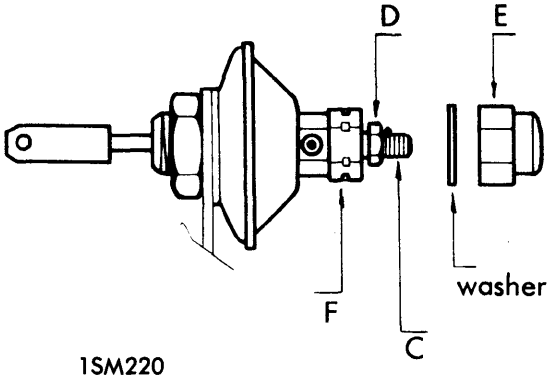
CARBURETOR NORMAL IDLE ADJUSTING SCREWS

Accelerated Idle – With engine at normal operating temperature, idling at correct normal idle speed and with transaxle in neutral, proceed as follows:

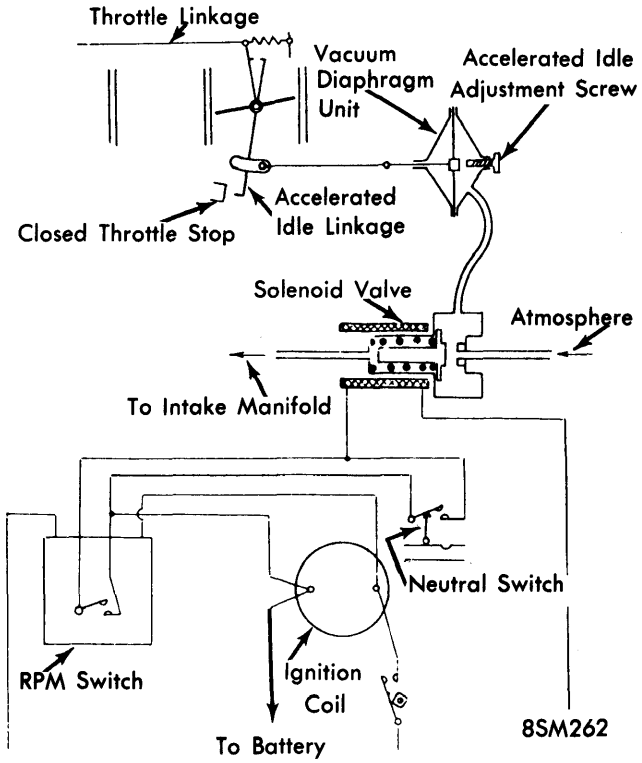
1) Connect an electronic tachometer which is designed to read engine RPM with specified accuracy. Disconnect gray wire which feeds solenoid valve.

2) Remove cap nut (E) and hold nut (F) while loosening lock nut (D). Use Allen wrench to turn set screw (C) and adjust to 1500 ± 50 RPM (1350 ± 50 RPM on R16). Retighten nut and replace cap screw. Reconnect solenoid wire.

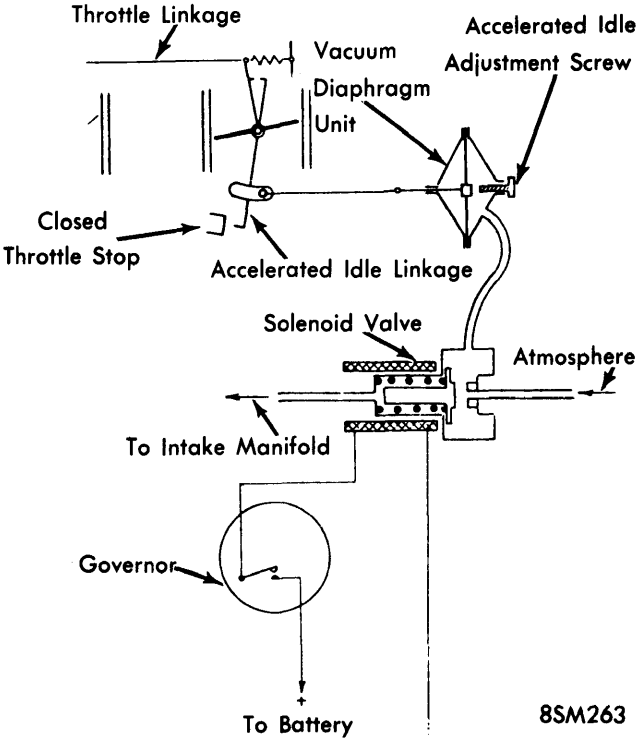
Solenoid Valve, RPM Switch and Neutral Switch – Solenoid valve, RPM switch and neutral switch cannot be adjusted. If they are not operating properly, they must be replaced.



ACCELERATED IDLE ADJUSTMENT & VACUUM DIAPHRAGM



R10 WITH STANDARD TRANSMISSION



R10 WITH AUTOMATIC TRANSMISSION

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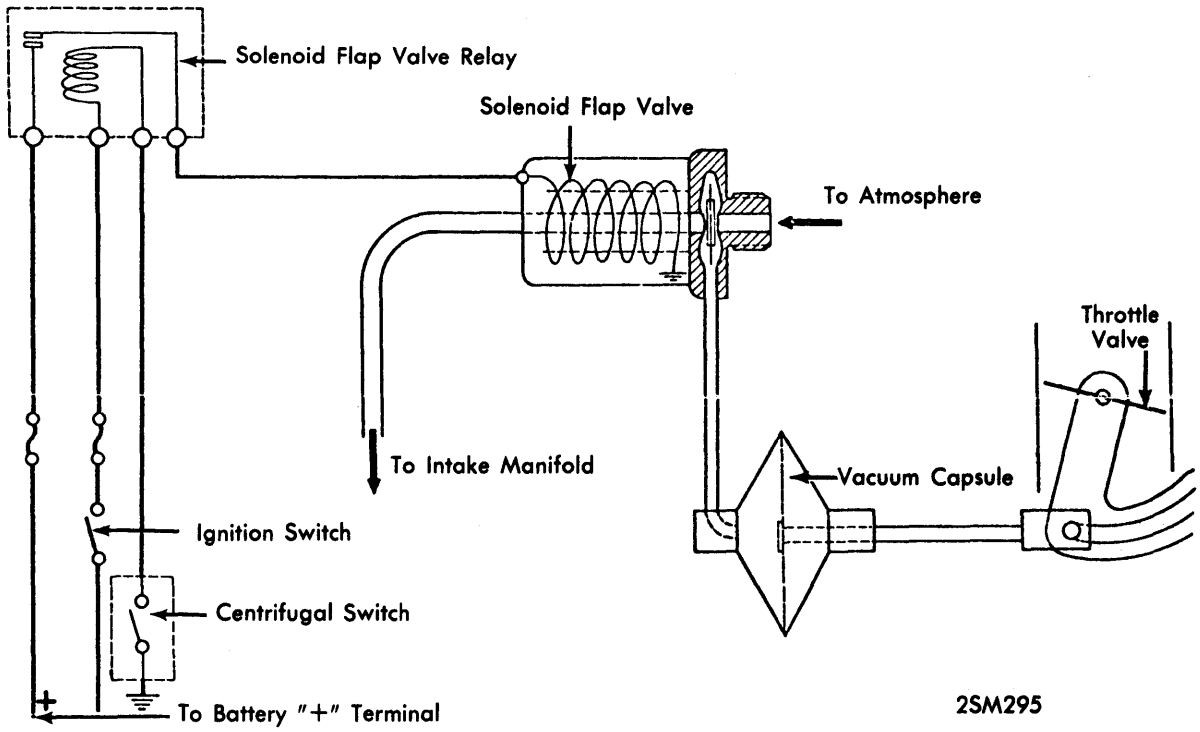

ACCELERATED IDLE CONTROL SYSTEM DIAGRAM