

# 1974-79 EXHAUST EMISSION SYSTEMS

## Honda Ignition Timing Control

### Civic

## DESCRIPTION

### TEMPERATURE/TRANSMISSION CONTROLLED SPARK

The 1974 models use a temperature/transmission controlled spark system. The 1975-76 manual transmission equipped models use a transmission controlled spark system. Both systems are designed to reduce oxides of nitrogen (NOx) emissions during normal engine operation. Systems consist of transmission sensor, coolant temperature sensor (1974 models only), and solenoid valve.

### IGNITION TIMING RETARD

All 1974 models and 1975-76 automatic transmission equipped models use an ignition timing retard system. System consists of vacuum hose between carburetor and retard diaphragm. System only operates during periods of high vacuum. Base ignition timing is retarded 5 degrees.

### IGNITION TIMING CONTROL SYSTEM

On 1977 manual transmission equipped models, the ignition timing control system uses a transmission sensor controls the amount of spark retard during normal operation in 1st, 2nd and 3rd gears when thermo sensor in system is in the on position (warm engine) to minimize the emission of oxides of nitrogen (NOx).

On 1977 automatic transmission equipped models, the ignition timing control system controls the amount of spark retard by sensing vacuum in intake manifold and engine coolant temperature to minimize the emission of oxides of nitrogen (NOx).

The 1978-79 ignition timing control system controls the amount of spark retard by sensing intake manifold vacuum and coolant temperature. Spark retard is necessary to minimize oxides of nitrogen (NOx) emissions. The system eliminates spark retard when engine is cold, allows full retard during hot idling, and reduces retard during hot cruising. The system consists of a distributor vacuum diaphragm, an ignition solenoid valve, a delay valve and a thermo sensor.

## OPERATION

### TEMPERATURE/TRANSMISSION CONTROLLED SPARK

On 1974 models, system operates only when coolant temperature is 122°F (50°C) or higher. See Fig. 1. The temperature/transmission controlled spark system cuts off vacuum to distributor advance diaphragm (via solenoid valve) when transmission is in 1st, 2nd, or 3rd gear. Vacuum advance is restored when 4th gear is selected.

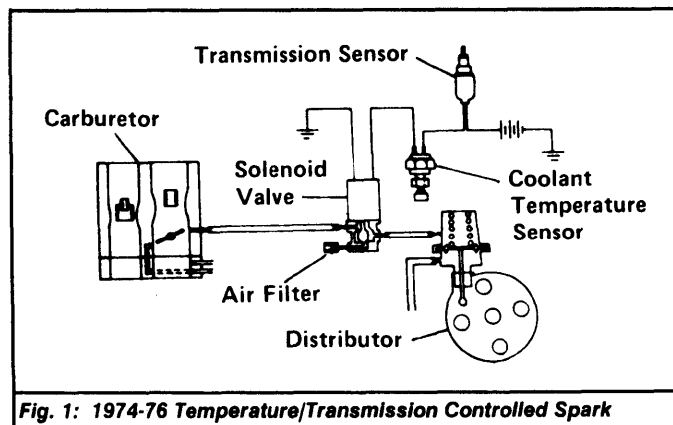


Fig. 1: 1974-76 Temperature/Transmission Controlled Spark

### IGNITION TIMING CONTROL SYSTEM

On 1977 manual transmission equipped models, when 4th gear is engaged or the thermo sensor is closed, manifold vacuum at the ignition timing solenoid valve is blocked and no vacuum retard is available. When 1st, 2nd or 3rd gear is engaged and the thermo sensor is open, the air filter passage of the ignition solenoid valve is blocked and manifold vacuum acts on the distributor vacuum diaphragm to retard ignition timing.

On 1977 automatic transmission equipped models, when manifold vacuum is preset value of vacuum switch "B" or the thermo sensor is closed, manifold vacuum at the ignition timing solenoid valve is blocked and no vacuum retard is available. When manifold vacuum is below preset value of vacuum switch "B" and thermo sensor is open, the air filter passage of the ignition solenoid valve is blocked and manifold vacuum acts on the distributor vacuum diaphragm to retard ignition timing.

On 1978-79 models, when engine is cold, the thermo sensor switch is open and no vacuum flows through ignition solenoid valve to the retard side of distributor diaphragm. During cold cruising, carburetor vacuum is applied on the advance side of distributor diaphragm through the delay valve.

When engine is hot, thermo sensor switch closes, energizing the ignition solenoid valve and allowing manifold vacuum to be applied on the retard side of distributor diaphragm. During hot cruising, the amount of retard is decreased by vacuum being applied on the advance side of distributor diaphragm through the delay valve.

## TESTING

### TEMPERATURE/TRANSMISSION CONTROLLED SPARK

**1974 Models - 1)** Disconnect vacuum hose at distributor advance diaphragm and connect vacuum gauge to it. With engine cold and running at 2000 RPM, vacuum gauge should read normal vacuum. Vacuum reading should drop to zero (0) as engine temperature rises.

**2)** If no vacuum is available with engine cold, stop engine. Disconnect and plug vacuum hose from idle cut-off valve at charcoal canister. Start engine and set at fast idle speed. If vacuum is not available, check idle cut-off valve. Replace if necessary.

**3)** If vacuum is still not available, stop engine. Disconnect vacuum hose to solenoid valve and connect vacuum gauge to it. If vacuum is present, solenoid valve is defective. Replace solenoid valve and recheck system. If no vacuum is present, clean manifold vacuum port.

**4)** Stop engine. If vacuum is available in 1st, 2nd or 3rd gear with engine above 122°F (50°C), but below normal operating temperature at fast idle. Check continuity between coolant temperature switch terminals.

**5)** If no continuity exists, replace defective coolant temperature switch. If continuity exists, check for battery voltage at solenoid valve with engine running.

**1975-76 Manual Transmission Equipped Models - 1)** Disconnect vacuum hose at distributor diaphragm and connect vacuum gauge to it. With transmission in Neutral and engine at 2000 RPM, vacuum gauge should read zero (0).

**2)** If vacuum is present, check voltage at solenoid with ignition on. If voltage is present, replace solenoid valve. If voltage is not present, check transmission sensor and Yellow wire.

**3)** With transmission in 4th gear and engine at 2000 RPM, vacuum gauge should read 3 in. Hg and increase as throttle is opened. If no vacuum is present, check transmission sensor. Sensor should be open in 4th gear, closed in all other gear positions.

**4)** If vacuum is below 3 in. Hg, disconnect vacuum hose from solenoid valve and install vacuum gauge in line. If vacuum is still low, plug vacuum line to charcoal canister from idle cut-off valve. If vacuum remains low, check engine mechanical condition.

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## Honda Ignition Timing Control (Cont.)

### IGNITION TIMING RETARD

**1974 Models** - 1) Check for loose, disconnected, or damaged vacuum hoses and replace as necessary. Remove distributor cap and check that diaphragm rod is properly connected and breaker point base plate moves freely. Reinstall distributor cap.

2) Connect tachometer and timing light to engine. Start and run engine at idle. Disconnect vacuum hose from distributor vacuum retard diaphragm and connect vacuum gauge to hose.

3) Vacuum gauge reading should be greater than 12 in Hg. If reading is low, clean carburetor vacuum port. If vacuum remains low, check engine mechanical condition.

4) Set ignition timing to 5 degrees BTDC. Reconnect vacuum hose to retard unit and check ignition timing. Timing should be TDC (zero degrees). If not, replace distributor vacuum advance/retard unit.

**1975-76 Manual Transmission Equipped Models** - Connect tachometer and timing light to engine. Start and run engine at idle. Disconnect vacuum hose from distributor vacuum retard diaphragm. If timing does not advance, check vacuum hose for damage or for defective vacuum diaphragm.

### IGNITION TIMING CONTROL SYSTEM

**1977 Manual Transmission Equipped Models** - 1) With engine cold, start engine and check for vacuum at distributor retard vacuum unit. There should be no vacuum present. If vacuum is present, disconnect thermo sensor. If vacuum remains, replace ignition solenoid valve. If vacuum drops slightly, replace thermo sensor. See Fig. 2.

2) With engine idling at normal operating temperature, there should be vacuum to distributor vacuum retard unit. If no vacuum is present, check for vacuum at ignition solenoid valve. If no vacuum is present at solenoid valve, clean intake manifold vacuum port.

3) If there is still no vacuum at solenoid valve, check voltage at solenoid valve. If voltage is present, replace solenoid valve. If no voltage is present, check for continuity across thermo sensor Yellow and Black/Yellow terminals. If no continuity exists, replace thermo sensor.

4) If continuity exists, check for battery voltage at center terminal (Black/Yellow wire) of male connector. If no voltage is present, check wiring and fuses. Repair as necessary. If voltage is present, replace transmission sensor.

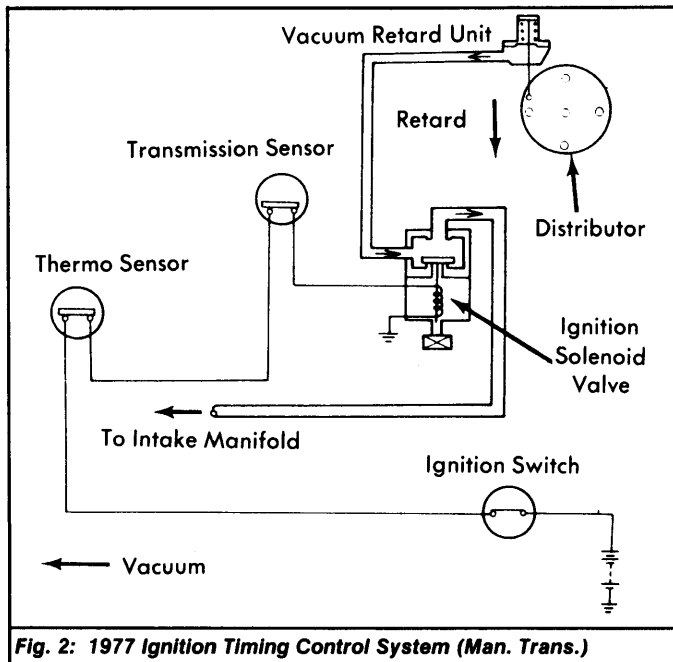


Fig. 2: 1977 Ignition Timing Control System (Man. Trans.)

**1977 Automatic Transmission Equipped Models** - 1) With engine cold, start engine and check for vacuum at distributor retard vacuum unit. There should be no vacuum present. If vacuum is present, disconnect thermo sensor. If vacuum remains, replace ignition solenoid valve. If vacuum drops slightly, replace thermo sensor. See Fig. 3.

2) With engine idling at normal operating temperature, there should be vacuum to distributor vacuum retard unit. If no vacuum is present, check for vacuum at ignition solenoid valve. If no vacuum is present at solenoid valve, clean intake manifold vacuum port.

3) If there is still no vacuum at solenoid valve, check voltage at solenoid valve. If voltage is present, replace solenoid valve. If no voltage is present, check for defective delay valve, delay chamber, or vacuum switch.

4) Raise engine speed to 3500 RPM. Check that vacuum to distributor vacuum retard unit is cut off within 10-40 seconds. If not, replace delay valve and recheck. If vacuum cut off time is still incorrect, replace vacuum switch.

5) If vacuum to distributor vacuum retard unit is not cut off at all, disconnect ignition solenoid valve. Vacuum to distributor retard unit should be cut off. If not, replace ignition solenoid valve.

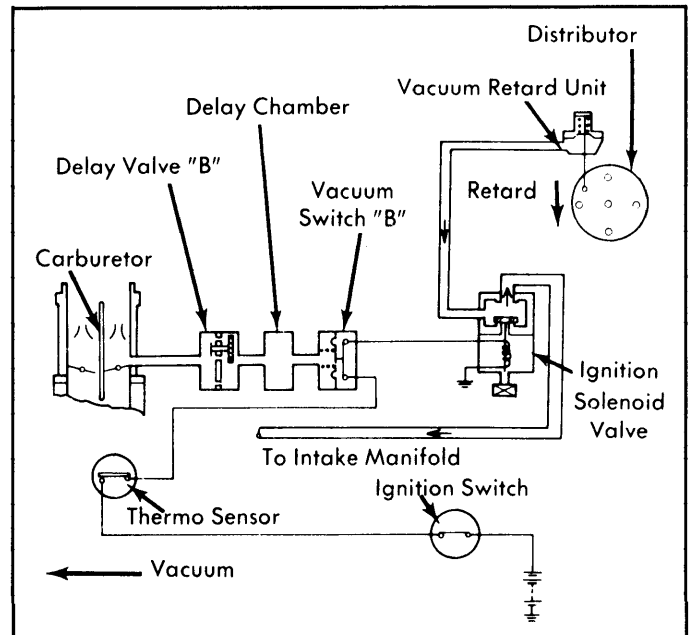


Fig. 3: 1977 Ignition Timing Control System (Auto. Trans.)

**1978-79 Models** - 1) With engine cold, start engine and check for vacuum at distributor vacuum retard unit. There should be no vacuum present. If vacuum is present, disconnect thermo sensor. If vacuum remains, replace ignition solenoid valve. If vacuum drops slightly, replace thermo sensor. See Fig. 4.

2) With engine idling at normal operating temperature, there should be vacuum to distributor vacuum retard unit. If no vacuum is present, check for vacuum at ignition solenoid valve. If no vacuum is present at solenoid valve, clean intake manifold vacuum port.

3) If there is still no vacuum at solenoid valve, check voltage at solenoid valve. If voltage is present, replace solenoid valve. If no voltage is present, check for continuity across thermo sensor. If continuity exists, check wiring and fuses. Repair as necessary. If no continuity exists, replace thermo sensor.

4) Raise engine speed to 3000 RPM. Check for vacuum on carburetor side of delay valve. If no vacuum is present, clean carburetor port or hose as necessary. Pull off other hose and remove delay valve. Connect hand-held vacuum pump to one end of delay valve. Cover other end with finger, apply vacuum, and check for leaks.

5) Attach hand-held vacuum pump to distributor side of delay valve. Apply vacuum and make sure there is no restriction. Attach hand-held vacuum pump to carburetor side of delay valve and apply vacuum. Vacuum should decrease from 15 to 5 in. Hg in 5-10 seconds for the Black/Yellow delay valve or in 15-25 seconds for the Black/Green delay valve.

6) After reinstalling delay valve, attach vacuum pump to advance side of distributor diaphragm and start engine. Apply vacuum and make sure distributor advances and diaphragm does not leak. Repeat procedure on retard side of diaphragm.

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## Honda Ignition Timing Control (Cont.)

