Engine idle speed high

** Disconnect battery when servicing electrical components

Check vacuum leaks:
Intake manifold
Throttle body
Throttle adapter
PCV valve

OK

Does engine idle at 500 – 650 RPM with actuator unplugged?

NO

Back out Idle stop screw one turn

OK

YES

Does idle speed drop

NO

Binding or stuck throttle

YES

Engine idle above 500 – 650 RPM with actuator connected

Adjacent idle stop to specifications
SEE: Operating spec.

YES

With ECT above 161 deg. F allow engine to idle for 2 – 5 1/2 min.
to self learn idle speed
SEE operating specifications
Engine speed “spikes” at idle

Does engine idle at 500 – 650 RPM with actuator unplugged

YES

NO

Back out Idle stop screw one turn

YES

NO

Repair ground

Does idle speed drop

YES

NO

Binding or stuck throttle

Engine idle above 500 – 650 RPM with actuator connected

YES

NO

Adjust idle stop to specifications
SEE: Operating spec.

With ECT above 161 deg. F allow engine to idle for 2 – 5 ½ min. to self learn idle speed

SEE operating specifications
Engine runs erratically poor governor performance

DIAGNOSTIC PROCEDURES

Engine speed surges

Correct charging system fault

YES

Charging system voltage surges?

NO

Repair ground

ECU ground?

YES

SEE engine diagnostics

System fuel pressures low?

NO

Correct CKP sensor polarity

YES

Voltage reversed on CKP sensor?

NO

Set timing to manufactures specifications

NO

SEE engine diagnostics

Vacuum leaks?

YES

SEE engine idle speed high

NO

Throttle plate sticking?

YES

Replace throttle body

NO
Engine runs but will not accelerate

1. Fuel level?
   - NO: See: Engine runs low power, lean or misfires diagnosis
   - YES: Map Sensor?

2. Map Sensor?
   - NO: Replace
   - YES: APP sensor or speed select output OK?

3. APP sensor or speed select output OK?
   - NO: Repair or replace accelerator pedal position sensor or speed select switch
   - YES: Governor actuator input OK?

4. Governor actuator input OK?
   - NO: Repair wiring or replace ECU
   - YES: Governor actuator continuity?

5. Governor actuator continuity?
   - NO: Replace throttle body
   - YES: Check throttle plate rotation
DIAGNOSTIC PROCEDURES

Engine won’t start – gasoline

 Fuel level?  

Add fuel

NO

See pump diagnosis

YES

NO

Fuel pressure w/ crank?

Tach. signal to ECU?

NO

Correct ignition system. repair or replace ECU

YES

Repair wiring or voltage source

NO

YES

12V at injector?

Injector light flashes?

Check ground or replace ECU

YES

NO

Injector sprays?

Fuel press 9 – 11 psi.?

16 psi restricted return line

NO

YES

Replace fuel press. regulator

Replace injector or o-rings

Unhook inj. & crank for 15 sec to unflood

Injector leaks?

Are plugs fouled?

Clean or replace plugs

NO

YES

Adjust Fuel pres. 9 – 11 psi.

YES

NO

NO

YES

Replace fuel filter and or pump

ZENITH FUEL SYSTEMS
**DIAGNOSTIC PROCEDURES**

**Gasoline fuel pump diagnosis**

- **Momentary 12v at pump when key is turned on?**
  - YES: Ground continuity to frame?
  - NO: Repair wire to pump

- **Momentary 12v from ECU when key is turned on?**
  - YES: Repair or replace pump
  - NO: 12v to ECU?

- **12v to ECU?**
  - YES: Repair 12v source to ECU
  - NO: Ground continuity?

- **Ground continuity**?
  - YES: Replace ECU
  - NO: Repair ground wire
DIAGNOSTIC PROCEDURES

Check fuel in both tanks → Check fuel selector switch position → OK

Go to gasoline no start diagnostic → NO GAS

LPG YES

Starts in alternate fuel? → NO LPG

GAS YES

Go to LPG no start diagnostic

Neither fuel starts

Momentary 12v at lock-off or gas pump when key is on → YES

Go to no start diagnostic

NO

Momentary 12v from ECU when key is turned on? → YES

Replace defective pump and lock-off

NO

12v to ECU? → NO

Repair 12v source to ECU

YES

Replace ECU

NO

Ground continuity? → NO

YES

Repair ground wire

NO
Engine runs low power, lean or misfires – gasoline

Check vacuum leaks:
- Intake manifold
- Throttle body
- Throttle adapter
- PCV valve

OK

System voltage 13.5 / 14.7v ?

NO

Repair charging system

YES

Replace fuel pressure regulator

NO

Fuel pressure 9 – 11 psi ?

YES

Replace fuel pump and or filter

NO

16 psi restricted fuel line

Map Sensor OK ?

NO

Replace map sensor

YES

Set ignition timing
- See engine service manual

Ignition timing OK ?

NO

Replace module or ECU
- DIS ignition module in ECU

YES

Ignition module OK?

NO

Tune engine

OK

Continued
DIAGNOSTIC PROCEDURES

Engine runs low power, lean or misfires – gasoline

2

Continued

Repair wiring or CKP sensor

Tach. Signal input to ECU?

YES

Check restrictions:
Air filter
Exhaust
Engine runs low power, lean or misfires – LPG

1. Fuel level?
   - YES
     - Tank oriented in correct position?
       - YES
         - Service valve on liquid withdrawal side of tank?
           - YES
             - Regulator freeze-up?
               - YES
                 - Engine coolant level and circulation?
                   - YES
                     - Check restriction filter or lock-off
                   - NO
                     - Repair charging system
               - NO
                 - Fuel pressure OK?
                   - YES
                     - Check vacuum leaks:
                       - Intake manifold
                       - Throttle adapter
                       - Throttle body
                       - PCV valve
                   - NO
                     - Repair charging system
             - NO
               - Change tanks
           - NO
             - Secondary regulator Pressure 24 psi Static?
               - NO
                 - Replace or fill tank?
               - YES
                 - Primary regulator Pressure 28 psi Static?
                   - NO
                     - Adjust pressure or replace regulator
                   - YES
                     - Engine coolant level and circulation?
                       - YES
                         - Check restriction filter or lock-off
                       - NO
                         - Repair charging system

Continued
Engine runs low power, lean or misfires – LPG

Continued

Map sensor OK?

NO → Replace map sensor

YES

Ignition timing OK?

NO → Set ignition timing

SEE engine service manual

YES

Ignition Module OK?

NO → Replace module

or ECU

DIS ignition

module in ECU

YES

Tune engine

OK

Tach. signal input To ECU?

NO → Repair

Wiring or

CKP sensor

YES

Check restrictions:

Exhaust Air filter

OK

Check

Valve clearances
As with any no start symptom, always check fuel level first.

**Engine Will Not Start**

- Check wire connections. 12V+ from main power relay. Ground to Engine Ground
- With Key on, check for 12V+ at ECU white connector pin # 22 & 23. Verify Ground at ECU white connector pin #20 &21
- Check power supply from fuel select relay, pump or lock-off operation
- Does LP Lock-off (fuel pump) activate when engine is cranking?
- While engine is cranking, is injector connector receiving an electrical “pulse”? A Noid light will verify signal. (Alternative check is with test light)
- Check Wiring at Distributor to ECU. Digital signal is at Blue wire to ECU White connector, Pin #19.
- Clean Injector. Replace injector
- Check Normal Engine diagnosis for No spark condition.
- Does injectors spray fuel?
- Do spark plugs fire?
- Does Throttle Plate open? Visual check through air intake (using mirror) will tell.
- Recommend inspection of wire harness for correct operation. Replace Throttle Body and/or ECU after harness verification.
- With key on, check voltage to governor motor. (Voltage is pulse width modulated and could vary between 2.3 and 6.2 volts with power on).

**Replace Throttle Body**

**Measure resistance of governor motor. 3 to 4.5 ohms?**

YES

NO

YES

Replace Throttle Body

YES

YES

With key on, check voltage to governor motor. (Voltage is pulse width modulated and could vary between 2.3 and 6.2 volts with power on).
Engine Will Not Start

As with any no start symptom, always check fuel level first. Be sure that fuel selector switch is not in the center (or "off") position.

Check wire connections. 12V+ from main power source. Ground to Engine

With Key on, check for 12V+ at ECU white connector pin # 22 & 23. Verify Ground at ECU white connector pin #20 &21

YES

Does fuel pump activate for 2 seconds once power is applied to ECU?

YES

While engine is cranking, is injector connector receiving an electrical "pulse"? A Noid light will verify signal. (Alternative check is with test light)

YES

Does fuel pump activate for 2 seconds once power is applied to ECU?

YES

Does injector spray fuel? Visual check through air intake will tell. (Fuel injector test)

YES

Replace injector

NO

Check Wiring at Distributor to ECU. Digital signal is at Blue wire to ECU White connector, Pin #19. Replace ECU if wiring is correct

NO

Check power supply from ECU to Pump. Replace pump if voltages are correct

NO

Check Normal Engine diagnosis for No spark condition.

YES

Replace Throttle Body

NO

Measure resistance of governor motor. 3 to 4.5 ohms?

YES

With key on, check voltage to governor motor. (Voltage is pulse width modulated and could vary between 2.3 and 6.2 volts with power on).
Engine Will Not Start
As with any no start symptom, always check fuel level first.
Be sure that fuel selector switch is not in the center (or “off”) position.

Check wire connections. 12V+ from main power relay. Ground to Engine Ground

With Key on, check for 12V+ at ECU white connector pin # 22 & 23. Verify Ground at ECU white connector pin #20 &21

Does fuel pump (or LP Lock-off) activate for 2 seconds once power is applied to ECU?

Check Wiring at Distributor (or coil) to ECU. Digital signal is at Blue wire to ECU White connector, Pin #19.

While engine is cranking, is injector connector receiving an electrical “pulse”? A Noid light will verify signal. (Alternative check is with test light)

Replace injector

Does injector spray fuel? Visual check through air intake will tell.

Check Normal Engine diagnosis for No spark condition.

Do spark plugs fire?

Does Throttle Plate open? Visual check through air intake (using mirror) will tell.

Replace Throttle Body

Measure resistance of governor motor. 3 to 4.5 ohms?

Recommend inspection of wire harness for correct operation. Replace Throttle Body and/or ECU after harness verification.

With key on, check voltage to governor motor. (Voltage is pulse width modulated and could vary between 2.3 and 6.2 volts with power on).