Fuel Injection System

This chapter covers the location and servicing of the fuel system components for the KYMCO XCITING 400i.

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SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Scooter services can be done with the engine installed in the frame.
- Be sure to relieve the fuel pressure before fuel pump or fuel hose removal.
- Bending or twisting the control cables will affect operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a fully ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- Do not apply the Carburetor Cleaners to the inside of the throttle body, which is coated with molybdenum.
- Do not snap the throttle valve from fully open to fully close after the throttle cable has been removed; it may cause incorrect idle speed.
- Do not loosen or tighten the painted bolts and screws of the throttle body. Loosening or tighten them can cause throttle and idle valve synchronization failure.
- Seal the cylinder head intake ports with tape or a clean towel to prevent dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Do not take the fuel pump on the ground downward.
Air box

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Loosen the air box connecting hose clamp screw at the throttle body with a #2 Phillips.

Remove the breather hose from the air box.
Disconnect the drain hose.

Remove the two air box bolts with an 8 mm socket.

Remove the air box.
Installation

Fit the air box into the frame and guide the boot over the mouth of the throttle body.

Tighten the air box connecting hose clamp screw at the throttle body with a #2 Phillips screwdriver.
Install the two air box bolts and tighten securely with an 8 mm socket.

Connect the drain hose from the air box.

Connect the breather hose to the air box.
Fuel Tank

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Gas is extremely flammable! Do not work around an open flame or a source of sparks.

Removal

In order to drain the fuel from the fuel pipe and release the fuel pressure unplug the fuel pump connector. Start the engine and let it run until it dies of fuel starvation. Turn the ignition switch off.

To clip the fuel hose with a special tool A120F00031 and loosen the clamp with a special tool A120F00030.

Remove the fuel hose with a plier. Slide back the clamp and free the injector fuel hose from the fuel pump pipe. Clean up any remaining fuel immediately.
Remove the left fuel tank mounting nuts.

Remove the left fuel tank mounting bolts and brackets.

Remove the bracket.
Remove the front fuel tank mounting nuts.

Remove the fuel tank from the bottom of the frame.

**Installation**

Fit the fuel tank into place.
Install the brackets and nuts/bolts. Tighten the nuts/bolts securely.

Connect the fuel hose to the outlet pipe on the fuel pump. Tighten the clamp securely with a special tool A120F00030.
Plug in the fuel pump connector.
Fuel Pump

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Gas is extremely flammable! Do not work around an open flame or a source of sparks.

Input Voltage Inspection

Turn the ignition switch off.

The side stand must be up

Place the scooter on its main stand and put the side stand up.
Set the engine stop switch to the “RUN” position.

Unplug the fuel pump connector.

Set the multi meter to read battery voltage.

Touch the multi meter leads to the harness side of the fuel pump connector, with the positive lead touching the red/black wire terminal and the negative lead touching the green wire terminal.

Turn the ignition switch on. The battery voltage should show for a few seconds. Replace the fuel pump if it is not functioning and the input voltage is correct.

If the battery voltage is not present check the following:

- Fuse B (10 A)
- Fuel cut-off relay
- ECU
Removal

In order to drain the fuel from the fuel pipe and release the fuel pressure unplug the fuel pump connector. Start the engine and let it run until it dies of fuel starvation. Turn the ignition switch off.

Loosen the fuel hose clamp with a special tool A120F00030. Slide back the clamp and free the injector fuel hose from the fuel pump pipe. Clean up any remaining fuel immediately.

Remove the 6 fuel pump bolts with a 7 mm socket or #2 Phillips screwdriver.
Lift the fuel pump out of the tank.

Discard the fuel pump O-ring, and replace it with a new item on assembly.
Fuel Level Gauge Inspection

Using a digital multi meter set to ohms of resistance (Ω), measure the resistance between the fuel pump/level gauge connector terminals (green and yellow/white) with the float raised to the positions indicated below.
Fuel Level Float Position Resistance

<table>
<thead>
<tr>
<th>Full Position</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>1100 ± 33 Ω</td>
</tr>
<tr>
<td>Empty</td>
<td>100 ± 3 Ω</td>
</tr>
</tbody>
</table>

Replace the fuel level float unit with a new part if the resistance is out of specification.
Fuel Output Pressure

Turn the key to the OFF position.

Use a fuel hose clamp A120F00031 as shown.

Disconnect the fuel hose from the fuel injector. Connect the fuel pressure gauge. Remove the fuel hose clamp. Turn the key to the ON position. Check the fuel pressure.

If the fuel output pressure is less than 3.0 bar, may fail to start the engine or in trouble in case of riding.
Turn the key to the OFF position and use the fuel hose clamp to block the fuel hose. Return the fuel line to the injector.

**Installation**

Replace the O-ring with new item and apply a small amount of fresh engine oil to the new O-ring.

Carefully insert the fuel pump into the tank. Avoid damaging the fuel pump wire. The fuel delivery pipe should face to the rear.
Insert the 6 fuel pump mounting bolts. Tighten the bolts to specification with a 7 mm socket or #2 Phillips screwdriver.

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Pump Bolts</td>
<td>6</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Connect the fuel hose to the outlet pipe on the fuel pump. Tighten the clamp securely with a special tool A120F00030.

Plug in the fuel pump connector.
Throttle Body Removal and Installation

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Inspection

Throttle Body /MAP/ISC/TPS

- Turn off the ignition switch during removal/installation.
- Check and confirm if the voltage is over 12V with a voltmeter after replacement.
- Check and confirm if the other connectors are installed correctly after replacement.
- Do not damage the throttle body, it may cause the throttle and idle valve to fail synchronization.
- The throttle body is preset in KYMCO factory, do not disassemble it incorrectly.
- Do not loosen or tighten the painted bolts and screws for the throttle body. Loosening or tightening them can cause the throttle and idle valve synchronization to fail.
- TPS and ISC have to be reset after the throttle body MAP, TPS, ISC or ECU has been reinstalled.

MAP Inspection

Support the scooter on a level surface.

Put the side stand up and engine stop switch is at “RUN”.

Turn the ignition switch to “ON” position.
Measure if the ECU voltage outputs to the MAP between the following terminals of the MAP connector.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet/Red (+) – Green/Pink (-)</td>
<td>5 V</td>
</tr>
</tbody>
</table>

TPS Inspection

Support the scooter on a level surface.

Put the side stand up and engine stop switch is at “RUN”.

Turn the ignition switch to “ON”.

7-21
Measure if the ECU voltage outputs to TPS between the following terminals of the TPS connector.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violet/Red (+) – Green/Pink (-)</td>
<td>5 V</td>
</tr>
<tr>
<td>Throttle Position Sensor (TPS) resistance (at 20°C/68°F)</td>
<td>3500 - 6500 Ω</td>
</tr>
</tbody>
</table>
Removal

Throttle Cables

Free the throttle cables from the throttle drum.
Fuel Injector

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Gas is extremely flammable! Do not work around an open flame or a source of sparks.

Disconnect the Fuel Pump Relay or Fuel Pump Connector.

In order to release fuel pressure from the fuel pipe when removing the fuel injector, unplug the fuel pump connector. Start the engine and let it run until it dies of fuel starvation. Turn the ignition switch off.

Inspect the fuel hose for signs of deterioration or damaged. Replace the fuel hose as needed.
Remove the fuel injector mounting bolt with a 10 mm socket.

Unplug the fuel injector connector.
Lift the fuel injector out of the intake pipe.

Loosen the fuel hose clamp with a special tool A120F00030. Slide back the clamp and free the injector fuel pipe from the fuel hose.
Lift the fuel pipe off the top of the injector.

Sensors

Unplug the MAP sensor.
Unplug the ISC connector.

Throttle Body

Unplug the throttle position sensor (TPS) connector.
Loosen the air box hose clamp screw at the throttle body with a #2 Phillips.

Loosen the intake hose clamp screw at the throttle body with a flat blade screwdriver.

Remove the throttle out of the air box and intake boots.
Installation

Throttle Body

Fit the throttle body into the air box and intake boots.

Tighten the intake hose clamp securely with a flat blade screwdriver.
**Throttle Cables**

Connect the throttle cables to the throttle drum.

Adjust the throttle cable free play with 12 mm wrenches.
Sensors

Plug in the TPS connector.

Plug in the ISC connector.
Plug in the MAP sensor.

Fuel Injector

Apply a light coat of fresh engine oil to a new fuel injector O-ring.
Fit the fuel injector pipe onto the top of the injector. The tab on the injector must fit into the pipe.

Fit the fuel hose onto the fuel injector pipe. Secure the hose to the fuel injector with the clamp. Tighten the clamp securely with a special tool A120F00030.
Fit the injector into the intake pipe as shown.

Plug in the fuel injector connector and thread in the mounting bolt.

Tighten the fuel injector bolt securely with a 10 mm socket. Connect the Fuel Pump Relay or Fuel Pump Connector.

The throttle position sensor (TPS) and idle air bypass valve (ISC) have to be reset when the throttle body MAP, TPS, ISC or ECU have been reinstalled.
Throttle Body

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Disassembly

The throttle position sensor (TPS) and idle air bypass valve (ISC) have to be reset when the throttle body MAP, TPS, ISC or ECU have been reinstalled.

MAP Sensor
Fuel Injector

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Warning: Gas is extremely flammable! Do not work around an open flame or a source of sparks.

Removal

In order to release fuel pressure from the fuel pipe when removing the fuel injector, unplug the fuel pump connector. Start the engine and let it run until it dies of fuel starvation. Turn the ignition switch off.

Inspect the fuel hose for signs of deterioration or damaged. Replace the fuel hose as needed.
Remove the fuel injector mounting bolt with a 10 mm socket.

Unplug the fuel injector connector.
7. Fuel System > Fuel Injector

Lift the fuel injector out of the intake pipe.

Loosen the fuel hose clamp with a special tool A120F00030. Slide back the clamp and free the injector fuel pipe from the fuel hose.
Lift the fuel pipe off the top of the injector.

**Inspection**

A digital multi meter is needed to test the fuel injector.

Measure the resistance between the fuel injector terminals

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel injector resistance (at 20°C/68°F)</td>
<td>11.7 ± 0.6 Ω</td>
</tr>
</tbody>
</table>
Inspect the seals on both sides of the fuel injector. Replace the injector if the seals are in poor condition. Check for signs of clogging. Set the multi meter to read ohms of resistance (Ω).

Cleaning

PROBLEM

1. Fuel Injector cannot output the fuel.
2. The Injector injection time (ms) is shorter or longer.
   Standard: 2.25 – 3.25 ms

ANALYSIS

Injector block (With some carbons).

TROUBLESHOOTING

1. Use the specified injector cleaner.
2. Pouring the liquid of carburetor cleaner until half container.
3. Connect the battery as picture.
4. The injector cleaner with the flash relay.
5. Keeping the fuel Injector operation.
6. Waiting for 20-30 minutes.
7. Cleaning the carbons completely.
7. Fuel System > Fuel Injector

- Battery
- Injector Cleaner
- Container
- Flash Relay
Installation

Apply a light coat of fresh engine oil to the fuel injector O-ring seals.

Fit the fuel injector pipe onto the top of the injector. The tab on the injector must fit into the pipe.
Fit the fuel hose onto the fuel injector pipe. Secure the hose to the fuel injector with the clamp. Tighten the clamp securely with a special tool A120F00030.

Fit the injector into the intake pipe as shown.

Plug in the fuel injector connector and thread in the mounting bolt.
Tighten the fuel injector bolt securely with a 10 mm socket.

Plug in the fuel pump connector.
Self-Diagnosis

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Note: No matter when the CELP illuminated while riding condition, should find out the cause of the problem as soon as possible.

The check engine lamp (CELP) or Fi indicator is located next to the battery warning indicator.

If the ECM connectors, or battery leads are disconnected the stored malfunction codes will be lost.
Without Diagnostic Special Tool

SELF-DIAGNOSTIC PROCEDURES

The “CELP” denotes the failure codes. When the indicator lights for one second is equal to ten.

For example: one longer blink illumination and two shorter blinks (0.5 second x 2) of the indicator are equal to 12 blinks. Follow code 12.

If more than a damaged part has occurred, the “CELP” begins blinking in order.

For example: If the indicator blinks six times, then shows one second illumination and two blinks, so there are two failures have occurred. Follow code 6 and 12.
Fuel Injection Diagnostic Tool

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

OPERATION INSTRUCTIONS

Diagnostic tool Part Number: 3620A-LEB2-E00

This tool has been developed by KYMCO and for KYMCO vehicles only. The tool software can be updated for new models with a computer via the USB cable.

Please refer to the specifications when serving this vehicle.

This tool does not have an internal battery. The power for the tool is provided by the vehicle when connected. The vehicle should have a fully charged battery when using the diagnostic tool.
Throttle Cable

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Removal

Adjust the throttle cables for maximum free play at the throttle body.

Free the throttle cables from the throttle drum.
Remove the two right switch housing mounting screws with a #2 Phillips screwdriver. Disconnect the switch.

Separate the switch housing from the handlebar.

Disconnect the throttle cables and free the right switch housing from the handlebar.
Guide the throttle cables out towards the handlebar side.

Installation

Route the throttle body end of the cables through the opening in the lower handlebar cover.
Route the cables through the guide.

Route the cables down the inside of the left side of the frame.
Route the cables to the throttle body as shown.

Connect the throttle cables to the throttle drum.
Slide the throttle grip onto the right side of the handlebar.

Install the right switch and throttle housing. The post on the housing should fit into the hole in the bar.

Lubricate the end of the throttle in grease. Fit the ends of the throttle cables into the throttle tube.

Adjust the throttle cable free play with 12 mm wrenches.
TPS ISC Reset Procedure

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

- When opening and closing the throttle grip randomly, the ECU may record the incorrect TPS reading when the ECU or the throttle body has been reinstalled. It can cause hard to start engine or idling speed is not smooth when engine installation.

- ISC has a motor inside, which controls the ISC valve to obtain a smooth idling speed. The ECU may record the incorrect ISC position when the engine is running because the ECU or the throttle body has been reinstalled. It can cause engine to stop, hard to start engine or rough idling speed.

- The throttle position sensor (TPS) and idle air bypass valve (ISC) have to be reset when throttle body, MAP, TPS, ISC or ECU have been reinstalled.

TPS/ISC RESET PROCEDURE

1. Put the side stand up and engine stop switch is at “RUN”.

2. Turn the key to the "OFF" position.

3. Fully open the throttle.

4. Turn the key to the "ON" position.

5. Release the throttle after waiting for eight seconds.

6. Turn the key to the "OFF" position.

7. Turn the key to the "ON" position.

8. TPS and ISC have been reset successfully.

If the procedure fails, repeat the steps from 1 to 8.
### 7. Fuel System > Diagnostic Report

#### XCITING 400i

**SF:**

**Customer:**

**Eng. No.:**

**Production Date:**

**Service Date:**

**Mileage:**

**Reason of repair:** □ maintenance □ breakdown

<table>
<thead>
<tr>
<th>Item</th>
<th>Reference</th>
<th>Data</th>
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<tr>
<td>ECU No</td>
<td>39200-LKF5-E000</td>
<td></td>
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<td>Software Ver</td>
<td>C-2441</td>
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<td>Calibration Ver</td>
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<td></td>
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<td>History</td>
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</tr>
<tr>
<td>DTC Number</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Throttle Position(%)</td>
<td>&lt; 1.00%</td>
<td>Full Throttle: &gt;93%</td>
<td></td>
</tr>
<tr>
<td>Throttle Position Voltage (V)</td>
<td>0.60±0.1 V</td>
<td>Full Throttle Voltage: &gt;3.38V</td>
<td></td>
</tr>
<tr>
<td>Engine Temp.(°C)</td>
<td>environ.temp ± 1.6 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atom. Pressure(Kpa)</td>
<td>10.3 ± 3 kPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery Voltage(V)</td>
<td>&gt;12 V</td>
<td></td>
<td></td>
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<tr>
<td>O2 Sensor Voltage(V)</td>
<td>5±0.1 V</td>
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<td></td>
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<tr>
<td>Roll Sensor State</td>
<td>ON(stand)</td>
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<td></td>
</tr>
<tr>
<td>Spark plug Type</td>
<td>CR7E</td>
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<td>CO Set</td>
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<td>(Cold Engine) Before Repair</td>
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<td>Engine speed (rpm)</td>
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<td>Engine Temp. &gt; 80°C</td>
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<tr>
<td>Intake Pressure(Kpa)</td>
<td>34.0±40.0 kpa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine Temp.(°C)</td>
<td>2.25~3.25°C</td>
<td>Engine Temp. &gt; 80°C</td>
<td></td>
</tr>
<tr>
<td>Ignition Timing(°)</td>
<td>8°~12° BTDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery Voltage(V)</td>
<td>&gt;12 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O2 Sensor Voltage(V)</td>
<td>0.05~0.90 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISC Step (step)</td>
<td>90±15</td>
<td>Engine Temp. &gt; 80°C</td>
<td></td>
</tr>
<tr>
<td>IDLE CO(% )</td>
<td>0.3~1.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO Set</td>
<td>0</td>
<td>Adjust recommended: -5 ~ +5</td>
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</tr>
<tr>
<td>(Hot Engine) After Repair</td>
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<td></td>
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<tr>
<td>Engine speed (rpm)</td>
<td>1420 ± 100 rpm</td>
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<td></td>
</tr>
<tr>
<td>CO Set</td>
<td>0</td>
<td>Adjust recommended: -5 ~ +5</td>
<td></td>
</tr>
</tbody>
</table>

**Repair description**

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**Report ID:**

**Report Version:** Oct/31/2012

7-56