

## Holley High Performance Intake System\* For 1974-1978 4-Port 13B Engines (Includes 1984-85 13B 6-Port engines converted to 4-Port)

### Installation Instructions

**Note: These instructions assume:**

- The original intake and emission controls have been removed from the engine.
- The intake gasket surface has been thoroughly cleaned.
- Header has been or will be installed.
- A 6 PSI fuel pump with a minimum flow rate of 20 GPH has been installed. (See recommendations on Page 6)
- This is a manual transmission equipped vehicle.
- The installation of a choke linkage is optional. A choke linkage can be obtained through Racing Beat, or a local source.
- No provision for the operation of Cruise Control is provided with this kit.
- If your engine has fuel injectors in the intermediate housing, you should remove them and plug the openings with injector plugs, available separately (PN 18147).

1. Note the model of throttle cable you are using and choose the appropriate instructions:

A. Throttle cable from 1985 and earlier non-6-port:

Using (2) of the 5/16-18 x 1.5" long all-thread bolts supplied, attach the large throttle cable housing bracket to the intake manifold from the underside of the portion of the carburetor mounting flange which extends toward the engine. Do not use washers. Install (2) more of these bolts along with (2) flat washers in the remaining holes. (See Photo 1)

B. Throttle cable from 6-port:

Using (2) of the 5/16-18 x 1.5" long all-thread bolts supplied, attach the rectangular throttle cable housing bracket adapter to the intake manifold from the underside of the portion of the carburetor mounting flange which extends toward the engine. Do not use washers. Install (2) more of these bolts along with (2) flat washers in the remaining holes in the manifold. Now add the main throttle cable housing bracket on top of the adapter using the 8mm x 20mm long bolts with flat washers under their heads and the flange nuts provided. (See Photo 2)

2. Install the carburetor gasket and carburetor to the manifold using the flat washers, lock washers, and nuts provided. Before



**Photo 1 - Throttle cable bracket for use with throttle cables from 1985 and earlier non-6 port engines.**



**Photo 2 - Throttle cable housing bracket for use with a throttle cable from a 6 port engine.**

\* Legal in California only for racing vehicles which may never be used upon a highway.

proceeding, check primary and secondary throttle shafts for freedom of operation at full throttle. Install the air cleaner stud into the carburetor air horn and secure it with the nut supplied. Install the air cleaner with air horn gasket and the wing nut supplied. Install this assembly on the engine with the gasket (and O-rings, if appropriate) supplied and the original engine intake manifold attachment hardware. Do not overtighten - 12 ft/lbs maximum torque.

3. Metering Oil Pump - note the appropriate pump configuration and use one of the following instructions:

**A. Four (4) Outlet Pump**

The aft two (2) metering oil pump tubes coming out of the metering oil pump (MOP) previously supplied oil to the lower intake manifold. This oil must now be directed to the Holley primary float bowl. Cut the aft (2) tubes about 2 to 3 inches from the MOP. "T" their outlets together using 1.5" long pieces of hose (cut from the small diameter hose provided) into a provided small plastic "T" (See Photo 3). Use a portion of one of the plastic tubes that was cut off and (2) more 1.5" long pieces of hose to connect the plastic "T" to the aluminum fitting on the primary float bowl. (See Photo 4)

Clean vent air must be supplied to the (2) metering oil injection fittings still located in the rotor housings. Replace the "1 into 4" stock air distributor with another small plastic "T". This "T" will be connected later. (See Photo 5)

**B. Two (2) Outlet Pump**

Remove both plastic metering oil pump oil tubes, the rubber connecting hoses, and the brass check valves from the metering oil pump as assemblies. Remove both rubber connecting hoses from the longer plastic tube. Using the parts removed from the longer plastic tube, all of the short tube assembly, and the plastic "T" supplied, re-connect the metering oil tubes as shown.

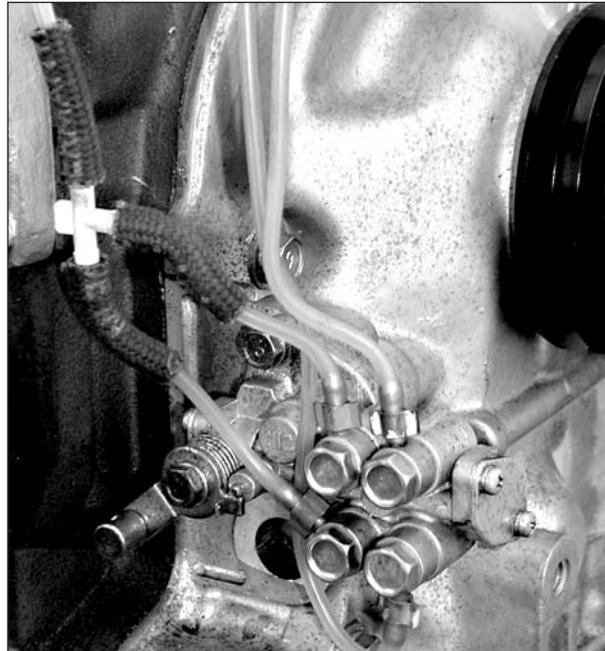
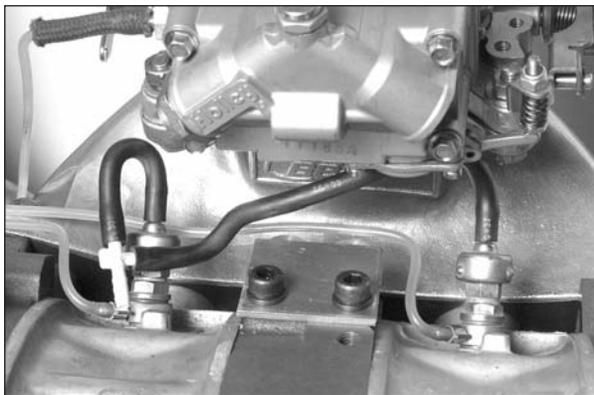
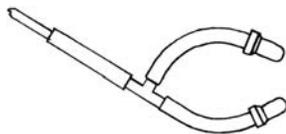


Photo 3 - Cut aft tubes and "T" together as shown.



Photo 4 - Oil lines routed to primary float bowl.

Photo 5 - Replace air distributor with plastic "T".

#### 4. Metering Oil Pump Linkage

Of the (2) MOP rods supplied with the kit, select the one that best fits your engine/MOP model.

1984-1985 GSL-SE (converted to 4-port) engines: Insert the metering oil pump rod into the pump arm, then attach it to the carburetor arm just below the choke linkage with the black linkage clip provided. Slip one small flat washer onto the rod from the lower end and hold it in place with the cotter pin. Do not spread the cotter pin yet. Bend the rod slightly to just eliminate the clearance between the bottom of the pump arm and the washer. Check the throttle for smooth operation with the rod installed, then recheck the clearance and spread the cotter pin to retain it.

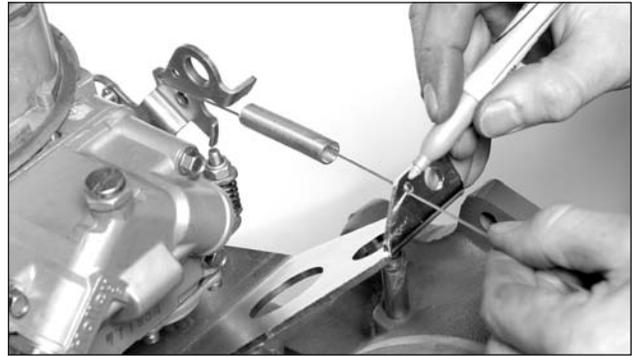
1974-78 engines: Insert the metering oil pump rod into the pump arm, then attach it to the carburetor arm just below the choke housing using the black linkage clip supplied. Slip (3) small flat washers onto the rod from the lower end, and hold them in position with the cotter pin. Do not spread the cotter pin yet. Check the distance from the top of the (3) washers to the underside of the round portion of the pump arm. The initial setting distance for the RX-4 & Rotary P.U. is 3/16" plus/minus 1/32". Add or remove washers as necessary to obtain this clearance, then spread the cotter pin. This setting is approximate, so it is desirable to set the flow to the recommended rate as soon as possible.

5. Insert the throttle cable housing into its bracket (on some models, it may be necessary to remove the rubber grommets and/or trim the edge of the washer next to the nut to allow the cable housing to sit properly at 90 degrees to the bracket). Now insert the cylindrical cable end into the holes in the links attached to the carburetor throttle arm so that the cable is situated between the links. Tighten the bolt that holds the links to the throttle lever so that the links are just able to rotate on the lever.

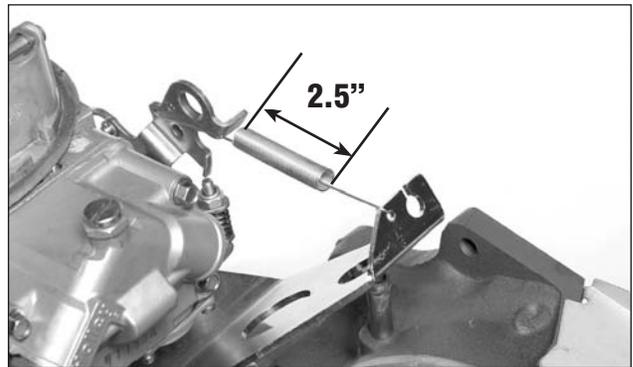
6. Connect the "curled" end of the throttle return spring into the upper hole on the upper portion of the primary throttle lever. The other (straight) end should pass through the small hole in the throttle cable housing bracket.

Pull gently on the straight end of the spring, then mark it where it passes through the small hole. (See Photo 7) Remove the spring and bend a 180 degree loop at a point 1/2" short of the mark. Install the spring and measure the length of the coiled portion. It should measure 2.5" (0.5" stretched from its rest length). (See Photo 8) Adjust the bend if necessary, then cut off the excess length. Finally, adjust the nuts on the cable housing to remove slack in the throttle cable, then verify that full throttle on the pedal gives full open on the carburetor.

7. Use the provided 5/16" plastic cap and small hose clamp to close the tube that was used to return the fuel to the tank.



**Photo 7 - Pull spring and mark as instructed.**



**Photo 8 - Completed spring assembly.**

8. Connect the fuel supply (see pump recommendations on Page 6) to the carburetor using the (2) inlet tubes and "T" fitting and the 3/8" fuel line and clamps. (Due to clearance issues with the linkage, the Holley fuel lines are not compatible with this carburetor.) See Photo 9.

9. Connect the fuel tank vent tube to the short tube just below the oil filler cap with the hose provided (if the fuel tank is vented elsewhere, place a plastic cap over the short tube on the oil filler neck).

10. Use the 5/16" hose to connect the tube on the air-oil separator to the grommet in the bottom of the air cleaner, then push the short copper tube provided into the air-cleaner end of the hose to retain it in the grommet. (See Photo 10) Now observe the relationship between the hose you just installed and the plastic "T" you installed to supply air to the two metering oil pump injectors in the rotor housings. Connect a piece of small hose to the "T" and choose a position on the 5/16" hose where it can be connected with the help of the large plastic "T" supplied. Cut the hoses and assemble the parts. (See Photo 11)

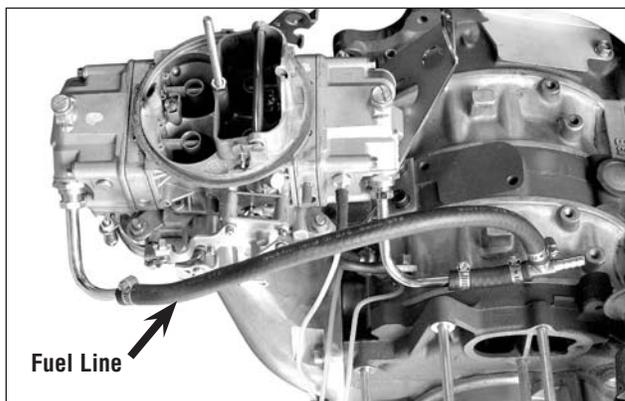
11. If you intend on installing a manual choke linkage, install the cable onto the choke mechanism and adjust as necessary. (With the choke "off", the choke plate should be positioned vertically.) If needed, a Holley choke cable kit can be purchased from Racing Beat (Part No. 16645) .

12. Connect the power brake vacuum line to the fitting on the intake manifold with the large hose clamps supplied. (If power brakes are not used, remove the fitting and plug the hole with a 1/4" NPT pipe plug.) This fitting is not shown in any of the photos.

13. Review the "Special Notes" on page 5, for installation information for specific chassis.

14. Check the float bowl levels. (See "Float Level Adjustment" on page 6 and use test method 1.) Re-check the throttle for smooth operation and full opening, and for fuel leaks.

15. After cold starting, idle on the choke should be approximately 1100 rpm. When warm, idle should be 800 to 900 rpm. The cold idle speed can be adjusted with the fast idle screw, accessible below the choke linkage. Once the engine is warm, adjust the idle mixture by turning each adjusting screw "in" until RPM peaks, then backing off the screw about 3/8 turn. Reset the idle RPM and repeat this procedure if necessary. Re-check the float level with the engine running (Use test method 2 on page 6). Conduct the "Metering Oil Pump Flow Test" (see page 5).



**Photo 9 - Use the (2) inlet tubes, hose, and "T"-fitting to install the fuel lines.**



**Photo 10 - Connect the hose from the air filter to the air-oil separator.**



**Photo 11 - Cut the hose and install a plastic "T", complete the connection to the metering oil injectors.**

## Special Notes - (Specific to chassis)

### 1980 RX-7 Chassis

Disconnect the 2-wire quick disconnect (green with orange stripe and black with red stripe) coming from the ignition "igniter" box (near coils). This will keep the trailing ignition on all the time and prevent the leading ignition from retarding.

### 1984-85 GSL-SE

At the top of the engine near the oil filler neck are (2) black wires with round terminal ends which were grounded by one of the bolts holding the valve assemblies in place. Use one of the original bolts to re-attach these grounds.

### All 6-Port engines

The right forward area of the engine compartment near the point where the wiring harness plugs into the air meter (below the F.I. Air Filter), you will find two plastic electrical connectors. One is green, the other yellow (located inside the rubber cover). Take a short jumper wire supplied and install it on the yellow connector between the two terminals in the connector. This will allow the fuel pump to operate when the ignition key is turned on. However, you must not use the stock fuel injection pump with a carburetor because the pressure is too high!

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## Metering Oil Pump Flow Test

If you have a mechanical linkage input to the metering oil pump (MOP), perform two tests - one at the "low flow" MOP arm position and one at the "high flow" position. To hold the arm in the "high flow" position, with the engine OFF, move the carburetor linkage to full throttle, then hold the MOP arm in that position and return the throttle to idle before starting it. If your MOP has been mechanically preset at the "high flow" position, obviously only that test need be performed. If your MOP is electronically controlled, use only the "low flow" test.

To determine the flow, disconnect all 4 MOP tubes from the pump, then arrange to collect the output into the red plastic cap (6 cc) provided. Use either a small funnel or form a small funnel out of cooking foil. Run the engine for a couple of minutes for the flow to stabilize before you begin collecting the oil in the red cap. See Photo 12.

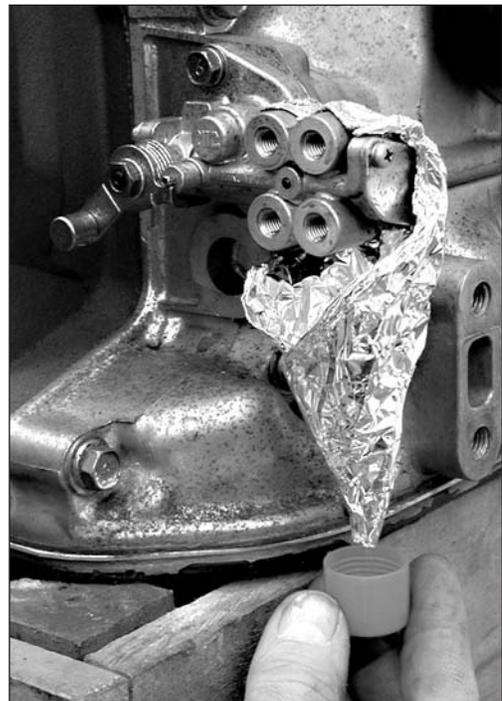
Although it is undesirable to run the engine with no oil flow to the carburetor, it will cause no real damage for the short time of the test under "no load" conditions.

Conditions for flow test - warm engine, 2000 RPM

Required flow:

"Low Flow" Position - Red cap 1/3 full (2 cc) in 6 Min.

"High Flow" Position - Red cap full (6 cc) in 6 Min.



**Photo 12 - Measuring oil flow from metering oil pump.**

# Recommendations

**Fuel Pump:** Must deliver a minimum of 20 GPH at 6 PSI (i.e. Mallory 4070M) - see recommendations on page 6.  
**Fuel Filter:** Fram G-12

## Timing recommendations:

### 1984-85 GSL-SE w/stock (OEM) distributor

- Use stock advance settings
  - Leading -Yellow (5° ATC at idle)
  - Trailing -Red (20° ATC at idle)
  - Vacuum advance is not used.
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- Set timing at 5000 RPM
  - Leading: 23° BTC (some engines tolerate up to 27° BTC)
  - Trailing: 8° BTC (some engines tolerate up to 17° BTC)
  - Vacuum advance is not used.

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## Float Level Adjustment

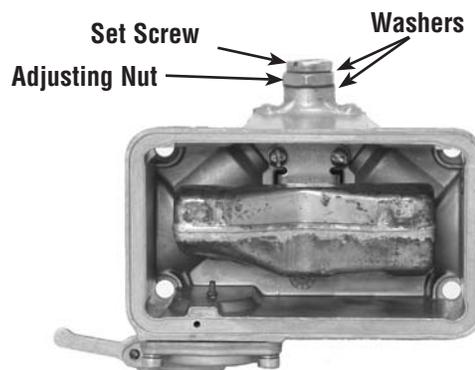
With the car on a level surface, use the following process to adjust the primary and secondary float bowl levels.

### Method 1 - Engine not running

Turn the ignition key to the “on” position and allow the fuel pump to fill the float bowls. Turn “off” the ignition and check the float level. The correct level is achieved when fuel seeps from the sight plug (or MOP oil line fitting) on the bowl. Remove the oil line, or sight plug fitting to monitor the fuel seeping from these openings. If required, make adjustments to the needle valve, then repeat the above process. To raise the float level, turn the adjusting nut counter clockwise. To lower the float level, turn the adjusting nut clockwise.

### Method 2 - Engine running

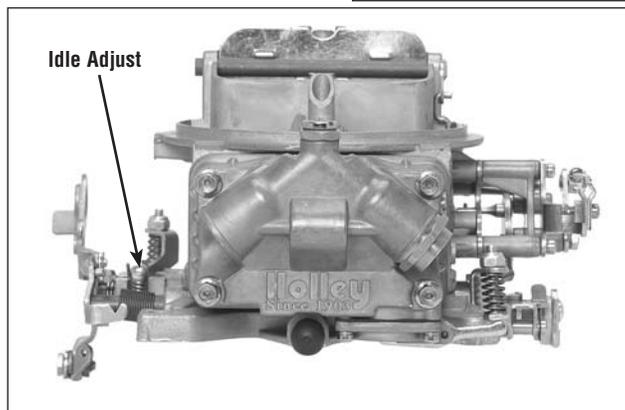
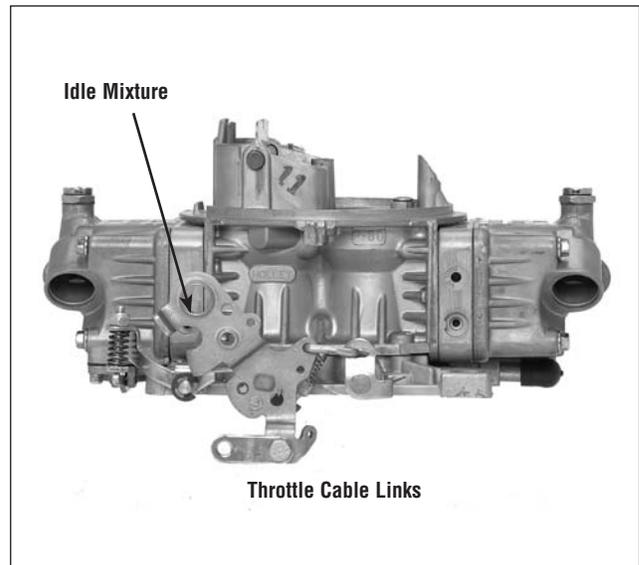
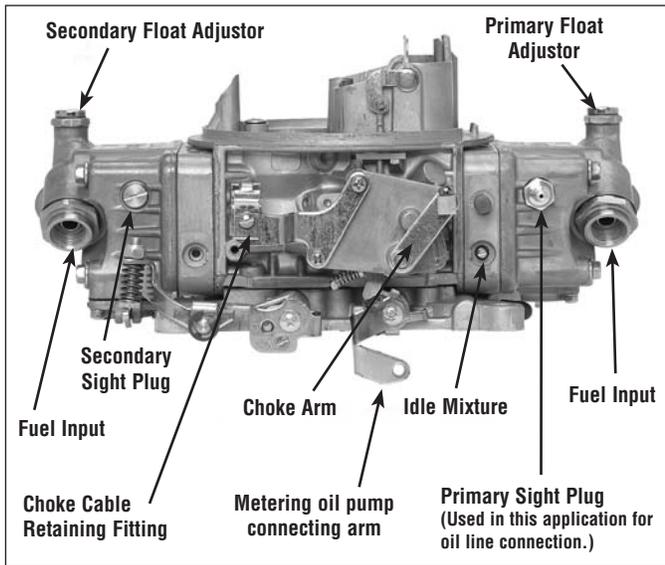
With the engine running, slightly loosen the set screw on top of the adjustment needle. (The object is to keep just enough pressure on the washers to prevent fuel from flowing out the top of the needle assembly, but loose enough for the adjusting nut to be turned.) After turning the adjusting nut, tighten (or loosen) the set screw to keep pressure on the washers. The correct level is achieved when fuel seeps from the sight plug (or MOP oil line fitting) on the bowl. Remove the oil line, or sight plug fitting to monitor the fuel seeping from these openings. (Take necessary precautions to collect any fuel that may seep from the carburetor during this adjustment process.)



Rotating the collared adjusting nut raises, or lowers the needle assembly. When performing the “engine running” adjustment method, care must be taken to keep pressure on the washers to prevent fuel from leaking from the valve. (Adjusting nut shown without set screw for illustration purposes only.)



## Carburetor Overview



## Fuel Pumps & Regulators

There are at least (3) different pump/fuel regulator combinations that can be adapted to carbureted engines. Each has positive and negative features which you can evaluate for your specific application.

**Option 1** - Acceptable for most street use - At the rear of the car, install a pump with an internal regulator (i.e. Mallory 4070M) set to 6 PSI.

Positive: Simple set-up

Negative: Pressure falls and rises with acceleration/deceleration and with flow rate (power).

**Option 2** - High performance/racing applications- At the rear of the car install a pump without a regulator (i.e. Mallory 4140 without the internal bypass). Install a non-return regulator (included in the Mallory kit) near the carburetor (but after the filter) set to 6 PSI.

Positive: Reasonably simple, much improved pressure control.

Negative: Pressure still changes some with flow, pump is larger than required.

**Option 3** - High performance/racing applications- At the rear of the car install a pump without a regulator (i.e. Mallory 4070M with the internal bypass blocked off - see Mallory instructions). Install a return regulator (i.e. Mallory 4309) near the carburetor, which will bypass fuel back to the tank through a fuel line at least 3/8" OD.

Positive: Most accurate pressure regulation

Negative: Most complex option

## **Trouble Shooting**

If you encounter a problem with the engine performance, your first step should be to review the instructions and verify that all procedures have been correctly completed. Should your problem persist, the following list may assist you in determining the source of the trouble.

### **Problem**

### **Possible Cause**

#### **Rough Idle**

- Incorrectly adjusted idle mixture
- Fuel pressure too high
- Fuel inlet needle valve held open by foreign material
- Idle fuel jets clogged
- Incorrect float level

#### **High Idle**

- Incorrectly adjusted idle speed
- Air leak through manifold gasket

#### **Hesitation or Stumble on Acceleration**

- Accelerator pump linkage incorrectly adjusted
- Accelerator pump passages clogged by foreign material
- Idle mixture too lean
- Low float level

#### **Poor High RPM Power**

- Low fuel pressure
  - A. Inadequate fuel pump
  - B. Dirty fuel filter
  - C. Fuel line damaged or crimped
  - D. Faulty wiring
- Incorrect float level