Throttle Positioning Sensor & Throttle Body Synchronization
Suzuki TL1000s ’97 – ‘01

By CJ’s Garage march 2016

Throttle positioning sensor & Throttle body synchronization

Bike condition:

- ☐ Tappet clearance should be set according to the correct clearance
- ☐ New sparkplugs fitted
- ☐ Throttle cable play must be correct
- ☐ Correct amount and type of engine oil.
- ☐ Dealer mode installed, this is a little switch installed in the rear of the bike. Prices vary around $17,- online. It is officially called: “EFI test mode selector switch”.
- ☐ Air box should be removed but all the hoses should be kept on the bike.
- ☐ Air temperature sensor must be removed from the air box (don’t lose the small washer) en plugged in to the connector. Let it rest carefully on the frame, you could use the wire clamp.
- ☐ The tank should keep lifted, but be careful to remove all loose parts. Any parts that fall into the throttle body will cause serious engine damage! Be careful of the tank mounting bushings, they could easily fall out because of the vibrations!
- ☐ Use the correct fuel, about 5 liter in the tank is more than enough.

Tools needed:

- ☐ Additional cooling fan positioned in front of the radiator to maintain the spec temperature.
- ☐ Security-Torque screwdriver (for TBS)
- ☐ Long regular screwdriver (diameter <6 mm)
- ☐ Regular Philips screwdriver, no bits!! Could fall in!

- ☐ Synchronization unit with two gauges, hoses and a T-joint to calibrate the unit before use.
- ☐ Fire extinguisher at hand, just in case.
- ☐ Paddock stand, or something else to keep the bike leveled.
- ☐ Feeler gauge **0,25mm.**

Note that during the checkup the standard operating values are:
Engine: **1200RPM**
Temperature: **71^{0}C - 89^{0}C (160^{0}F - 190^{0}F)**

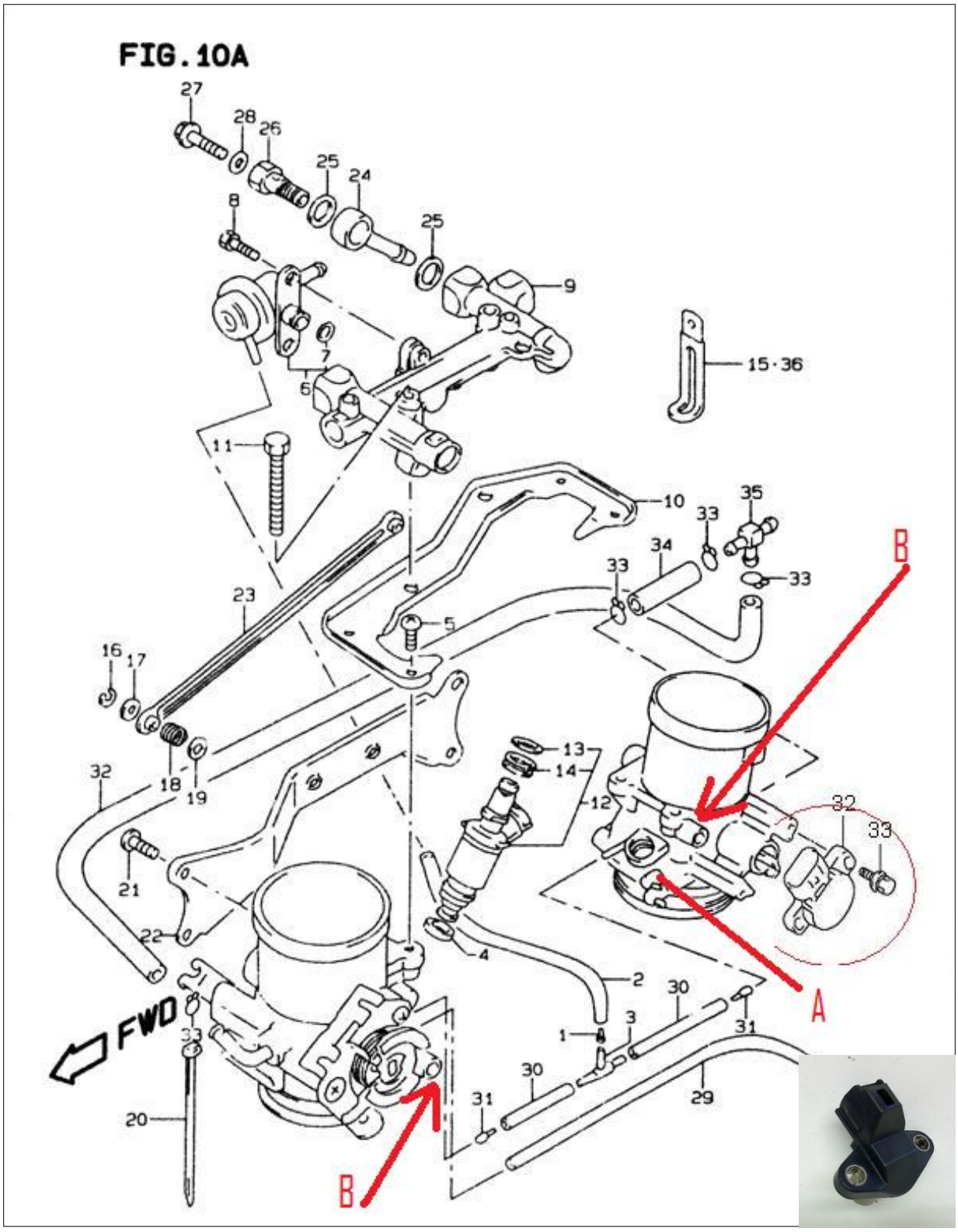
Procedures:

1. Preparation .
2. Warm-up.
3. TPS (throttle positioning sensor).
4. Calibration of the synchronizer.
5. TBS (throttle body synchronization.
6. Check TPS again.
7. Throttle level gap.
8. Reinstall parts and hoses to normal setting.

FIG.11

The nr 33 should be removed from the air box, but stay connected to the hoses.

The nr 35 should also be removed from the air box and connected to the plug. Make sure that this sensor doesn't touch the frame of metal parts of the throttle body!! You can use the wire clamp.



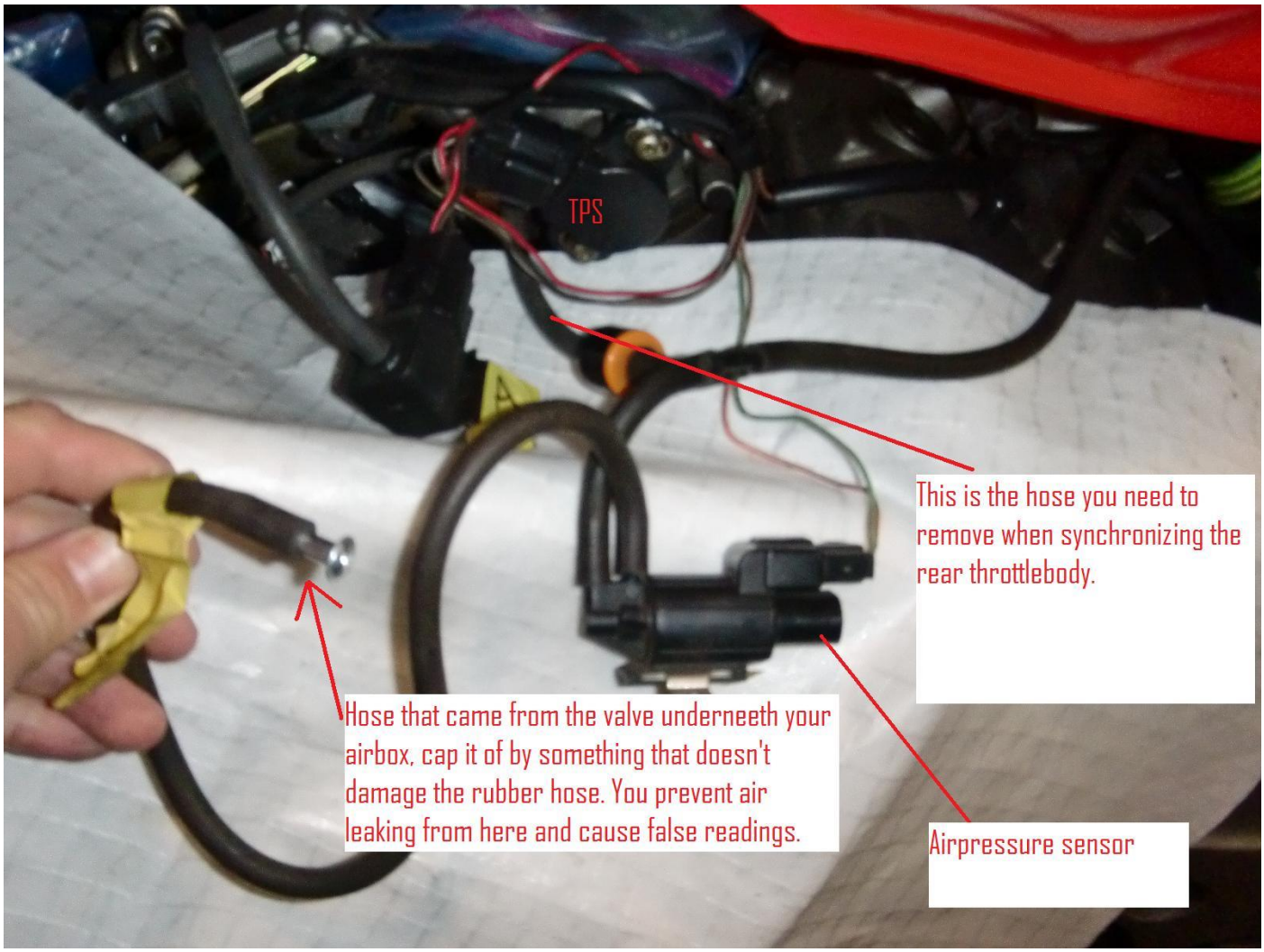
A: Is where your hose of your synchronizer for cylinder 2 should be placed while performing the TBS part.

B: Is where the " air screw" is located. These should be carefully turned inwards (clockwise) while counting the turns. While its is seated slightly, you should turn it **out 1,5 turn.**
This is the standard setting to start with during TBS.

Nr 32 is the actual Throttle Positioning Sensor.

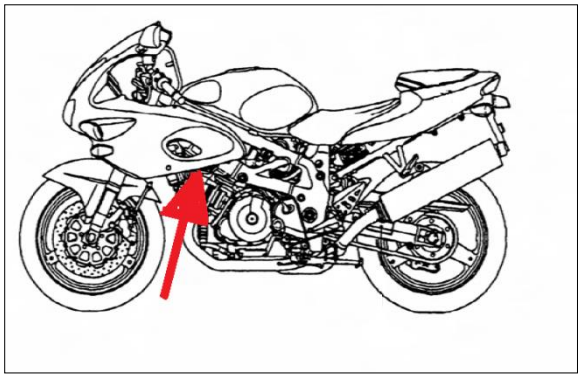
2. Warm-up

Shut off the hose that came from under the air box that was attached to the valve and plug it so there's no air leak. Let the engine warm-up to operating temperature @1200RPM with the temperature between **71^{0}C – 89^{0}C (160^{0}F – 190^{0}F).**



3. TPS (Throttle Positioning Sensor)

This is the part to start of with, the engine is warmed up to the correct temperature and the correct idle of 1200rpm and the temperature between **71^{0}C – 89^{0}C (160^{0}F – 190^{0}F).** U can change the idle speed with the idles crew positioned below.



Now switch on the DEALER MODE SWITCH, this will show **C00** in the display meaning there is no failure in the software of any kind. Also you see a small bar appearing in the display.

In the picture above the bar is in the highest position, there are three positions (low, middle and high)

Now its time to loosen the torque screws slightly on the TPS so you can adjust it carefully.
Adjust the TPS by slightly tapping the sensor carefully so the bar will move to the middle of the display.
Turn the TPS clockwise and the bar will go up, turn counterclockwise and the bar will drop. Do this carefully with light pressure because it's really sensitive. You can gently tap the sensor in the right direction with your fingers, it has a delay of a second so don't be too quick.
While doing this, check that the temperature and the rpm is correct!
When the bar is in the middle position tighten the torque screws of the TPS carefully, don't move the sensor.
When tighten check the bar if it is still in the middle.

Rev the engine a couple of times , to about **2000 /3000 rpm** shortly and check the bar again.
If the bar in the display isn't in the right position (in the middle) re-position the TPS again.

If the bar is correct, use the choke handle to rise the engine idle to **1400rpm,** the bar should be in the "high position" .

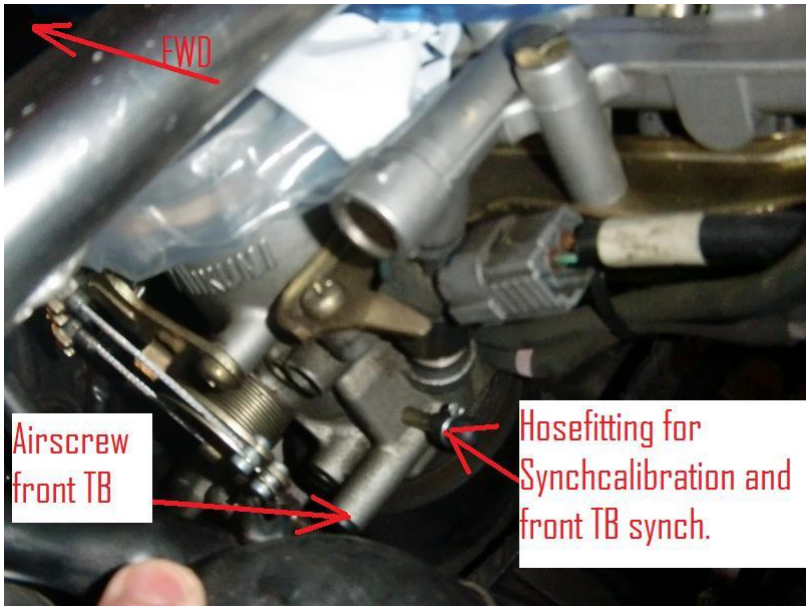
Go back to the normal idle at **1200RPM** and check the bar.

!You completed the TBS procedure, well done!

4. Calibration of the synchronizer.

Synchronizers come with different types like gauges, fluids or with floating steel balls in a tube.
They all should be calibrated before use.
Therefore we use the front cylinder to calibrate the synchronizer, see #B at the overlay picture and use the front cylinder.

Hose connection for calibrating the synchronizer



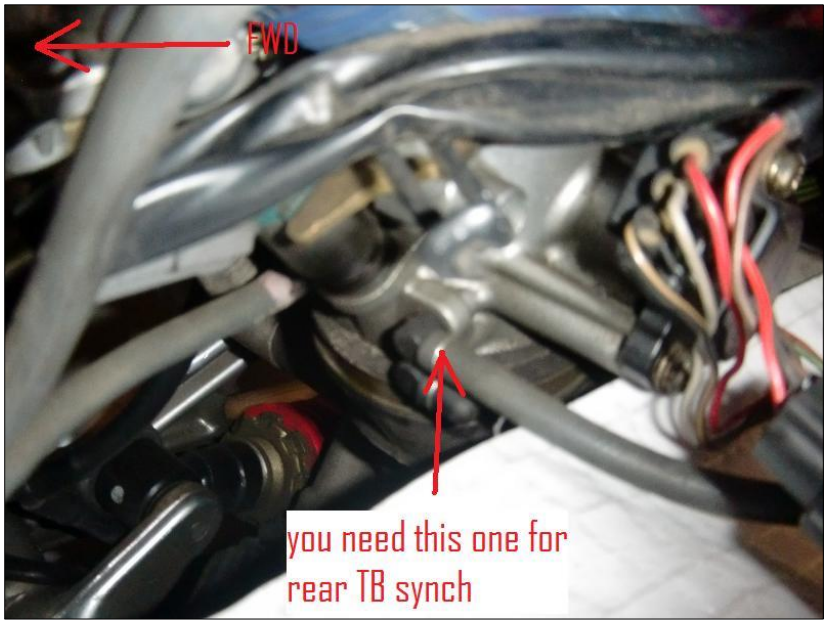
You should put the combined hose on the hose fitting of the front Throttle body.

The engine should be on temperature and warmed up running at **1200RPM**.
Now adjust the two meters so they give the same reading. The best is if they are somewhere between the lowest and highest reading possible with your calibration tool. If you use needles, make sure they still vibrate a littlebit. If they are static, it could be that you shut of the vacuum hose tot the meter completely.

If they give the same reading you're finished with the calibration.

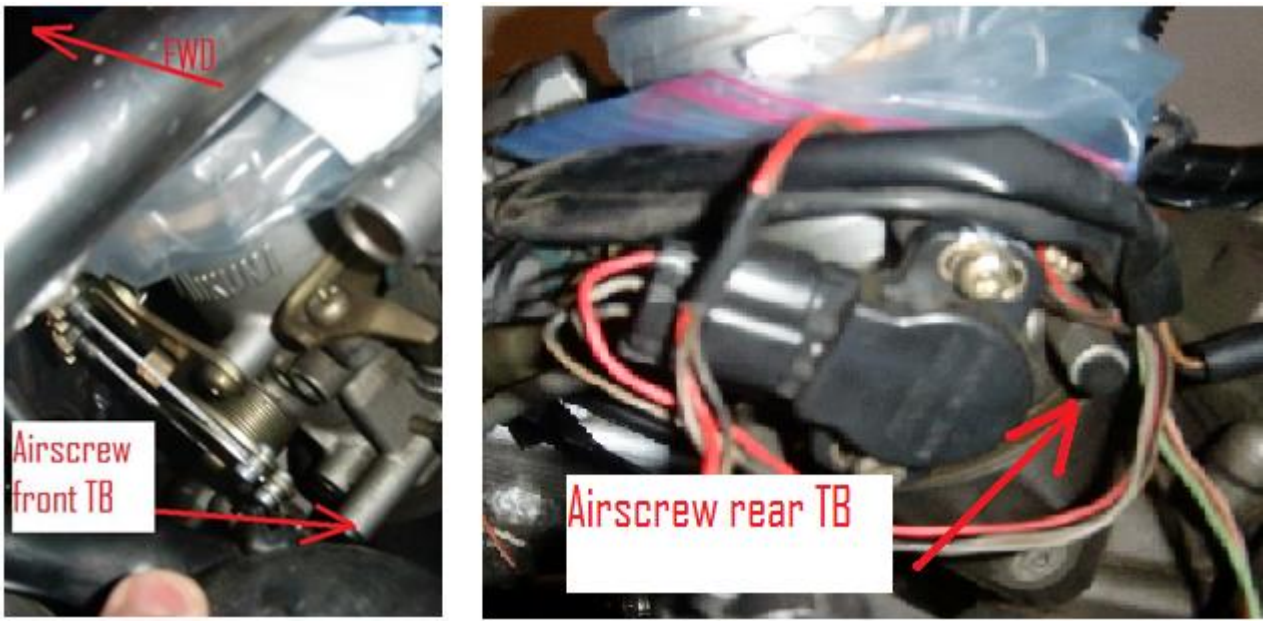
5. TBS (Throttle body synchronization).

Turn off the engine, remove the T-joint with the hose and route the hose from meter #1 directly to the front throttle body connection. Remove the original OEM hose that is shown below on the picture and replace it with the hose that is connected directly with meter#2.



Where to put the hose of meter #2, it's on the rear throttle body.

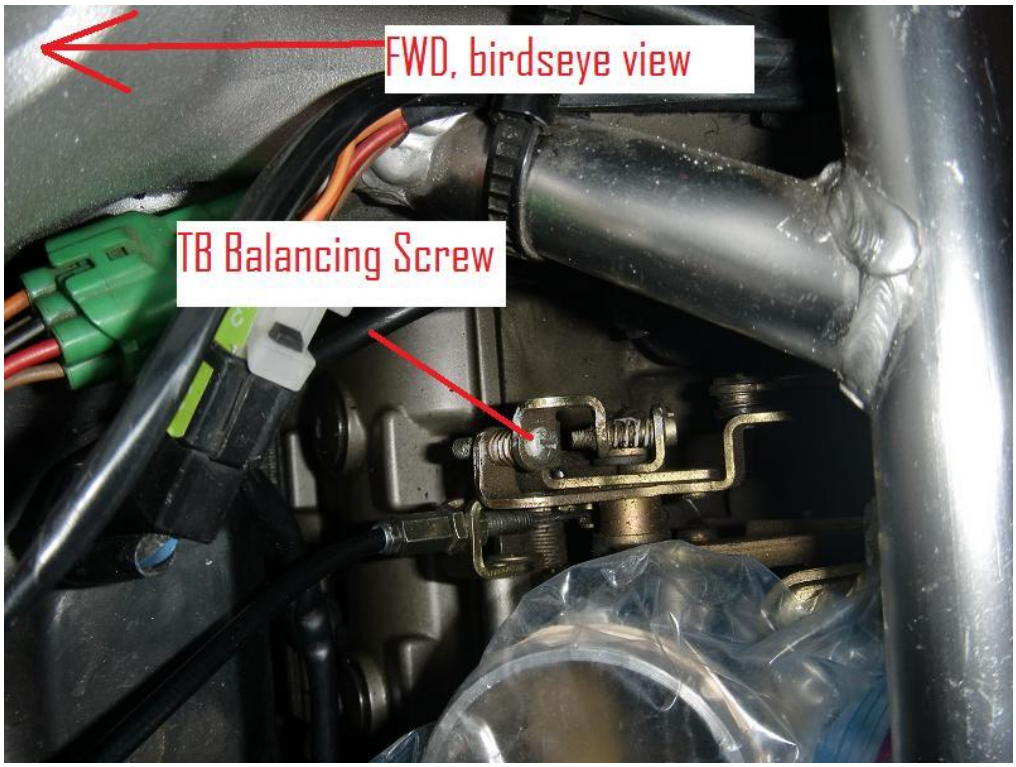
Now for the airscrews on the throttle bodies, turn them inwards (clockwise) until seated and count the turns!
Front TB: ……. Turns
Rear TB: ……. Turns.
Now turn both throttle bodies **1 ½ turn out, this is the factory setting to start with.**



Location of the airscrews of the front and rear throttlebodies.

Start the engine and let it run on idle @ **1200RPM** and keep the temperature between **71^{0}C – 89^{0}C (160^{0}F – 190^{0}F).**
Use the lower screw on the picture shown below, it's called the balancing screw.

If you turn the balancing screw IN (clockwise), the meter of the front TB goes up!
If you turn the balancing screw OUT(counter clockwise) the meter of the rear TB goes up!



Picture balancing screw used to synchronize the TB's

@ **1200rpm** adjust the screw to keep the both meters aligned at the same vacuum.
Now rev the engine a couple of times and check the meters @**1200rpm** idle again, there is a chance you have to adjust the idle again to put it back @ **1200rpm** with the idle screw.

Now use the choke handle to let the engine rev @ **2000rpm** and synchronize the meters again with the balancing screw a little bit

Go back @ **1200 rpm** and let the engine idle and rev it a few times.
Check the meters again @ **1200 rpm**.
If good proceed to step 6.

If the meters aren't aligned at idle anymore use the airscrew **of the rear throttle body** to align the meters @ **1200RPM.**

Rev the engine a few times to be sure they are synchronized @ **1200rpm.**

6. Re-check the Throttle body Positioning Sensor.
Just turn on the dealer mode selector switch.
The bar should be in the middle .
If not restart from step #3.

7. Throttle lever gap.
To prevent the throttle from sticking we adjust the throttle lever gap to **0,25mm**. Use a feeler gauge to measure this. It should be measured with the throttle closed and you should not push the feeler gauge, it should slide through easily.

Picture throttle lever gap

8. Reinstall the hoses and parts
If so, shut the engine of and re-route all the hoses and put all the caps on where needed.
Replace the air temperature sensor back in the air box, don't forget about the little plastic insulating washer that should be placed with the sensor!
Connect all the cables, hoses and re-install the air box.
Turn off the dealer mode switch.

!You're done!

Bibliography

Photo's:

Video's

Suzuki TPS TBS Adjustment/Tuning on an TL1000S: https://www.youtube.com/watch?v=oJaheyRorsw

TL1000S TPS and TB sync: https://www.youtube.com/watch?v=AvK-5aQuhNs

Manuals:

Suzuki TL1000s Service Manual 688pages 99500 39144-03E
http://www.carlsalter.com/suzuki-service-manuals.asp