# Quick guide CS02

**Preparation for mobile phone side and CS02.**

- First fully Charge the device.
- Once fully charged, the device should work autonomously for around 30 minutes. If necessary, a power bank can also be connected in parallel. You may look to the charging LEDs through the small opening in the housing. Red = charging, blue = fully charged.
- One-time only: Switch on CS02. Go to the WLAN menu on your cell phone via "Settings" and wait until CS02 appears as an available network.
- A one-time password is required: **ADK-2023**.
- The cell phone/tablet should then be connected to the CS02 network.
- In some cases you have to configure your firewall to allow the access to the new network CS02.
- Enter the IP address **10.4.5.58** into the browser (e.g. chrome).
- Then the gauge appears directly on the screen.
- The data traffic between CS02 and the end device can be recognized by the flashing green bubble (see also page 11).
- It is important that Mobile/Tablet and CS02 are not too far away from each other. In an open environment the range should be around 5m.

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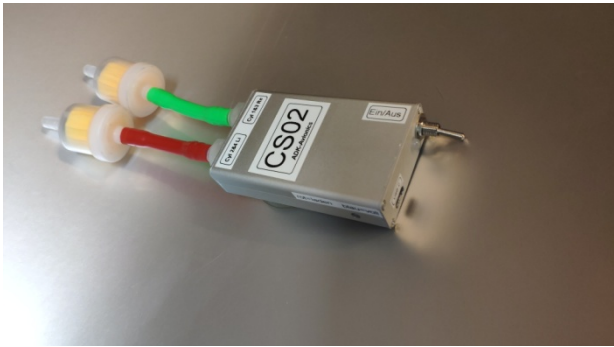
# Quick guide CS02

## Preparation on the engine side

- On the engine side, the bridge between the two carburetors must be removed. (picture 1)

- Connect the open left nipple to the red hose (Cyl 2 and 4). Connect the right nipple to the green hose (Cyl1 & 3). Note: Hose color corresponds to ACL color.

- While the green LED on the CS02 flashes, the sensors are in the process of trimming. This can take up to one minute.  The engine should only be started when a continuous green is visible.

- If the engine is warmed up, synchronization can begin. When the engine is cold, measurement errors can occur due to rough running.

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**Synchronization has two phases:**

**Phase 1:**

1. The target of synchronization phase 1 is that the two throttle valves have exact the same opening angle in every throttle position – except idle,this is phase2.
2. If this is true, an identical intake manifold pressure (MAP) is achieved when the system is intact. The engine will run as smoothly as possible because the left and right sides of the engine produces the same power.
3. A deviation in the opening angle of the throttle has the greatest effect in the partial load range. It is therefore best to choose a engine speed of 2000-2500rpm.
4. It is important that the idlescrew must be free of contact to the throtlelever.
5. At full throttle the ambient pressure is approximately equal to MAP.
6. Full throttle position is not adjustable. The only thing that needs to be checked is whether both flaps are fully at the opening stop position. See also slide 8 with correlations of: throttle cable/throttle valve/pressure
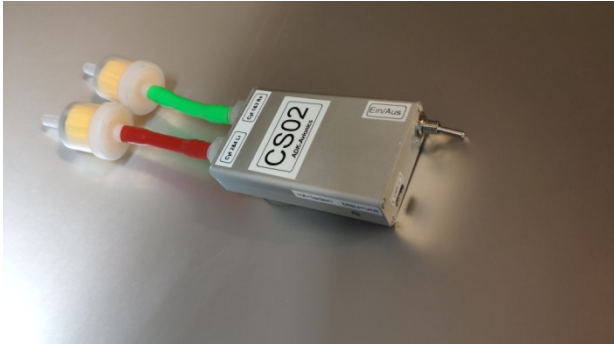
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**Phase 1: Measure and adjust in the range outside idle speed area**

• The position of the throttle cable is adjusted using two nuts (see also slide 8)
• Action: Run the engine at 2000rpm or 2500rpm for 15-20 seconds. A stable result should then be visible – also called DeltaP.
• This value represents the average differential pressure of the two carburetors.
• The target is to get this value to less than +/-10mBar.
• If DeltaP is greater than +/-10mBar, the device gives a suggestion A) or B)
    • A) Open throttle valve Cyl1&3 (right side in flight direction)
    • B) Open throttle valve Cyl2&4 (left side in flight direction)
    • This suggestion can also be inverted. Depending on how the cables are already positioned, this can make sense.
    • So instead of A) = opening throttle valve Cyl1&3, you can also close throttle valve Cyl2&4 to equalize the pressure conditions.

• Note/Tip:The spring at the throttle lever always tries to open the throttle to give full throttle. This is a safety feature against Bowden cable errors. I.e. for orientation: increasing pressure always goes in the direction in which the spring pulls.

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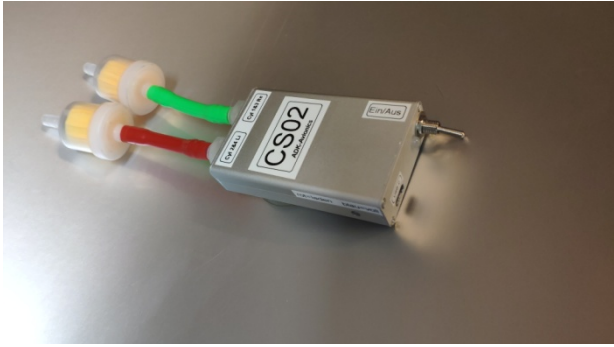
# Quick guide CS02

Phase 2: Equality of the two idle positions

- When idling, the throttle valve lever should come in contact with the idle adjustment screw.

- The target is to adjust the two contactpoints of the two carburetors so that the speed corresponds to the desired idle speed and the differential pressure is reduced to a minimum (<10mbar).

- We were even able to set a differential pressure of 0 mbar on several engines.

- This significantly improves smooth running even at low speeds.See also image 2 and slide 11
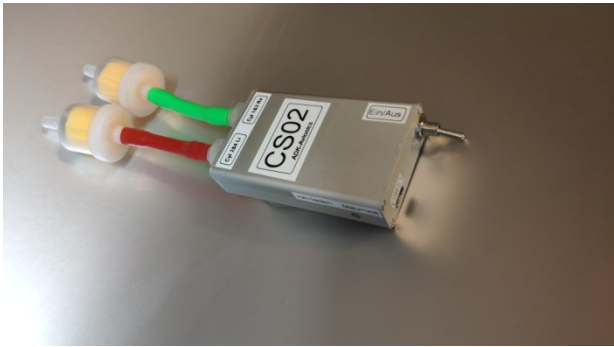
# Quick guide CS02

Phase 2: Adjusting the idle position screws

• Set the throttle to idle and wait 10-15 seconds until the measurement has stabilized.
• If the deviation is greater than 10mBar, adjustment is required.
• The adjustment is done using the idle adjustment screws (Figure 2).Turned clockwise increases the pressure and thus the speed.
• Follow the setting suggestion of CS02 – the inversion applies equally:The suggestion of opening on one side can also be implemented by closing the other side.
• On some engines we reached stable values at 0 mBar after 2-3 settings.
•Here CS02 works far better than the known mechanical systems.

The whole procedure sounds much more complicated than it is in practice. By the second use at the latest, you can reach your synchronization much faster and more accurately. A well-synchronized engine protects the engine, propeller, airframe, avionics and the pilot. It's more fun to fly with a well-synchronized engine.
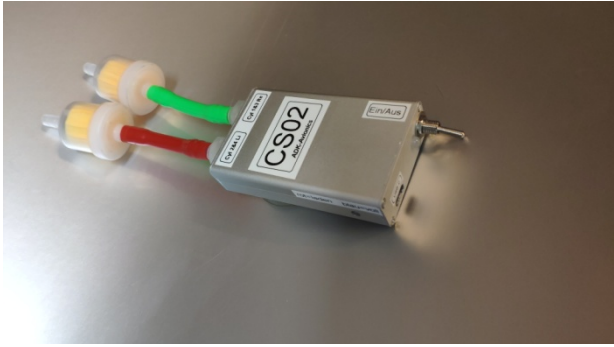
# Quick guide CS02
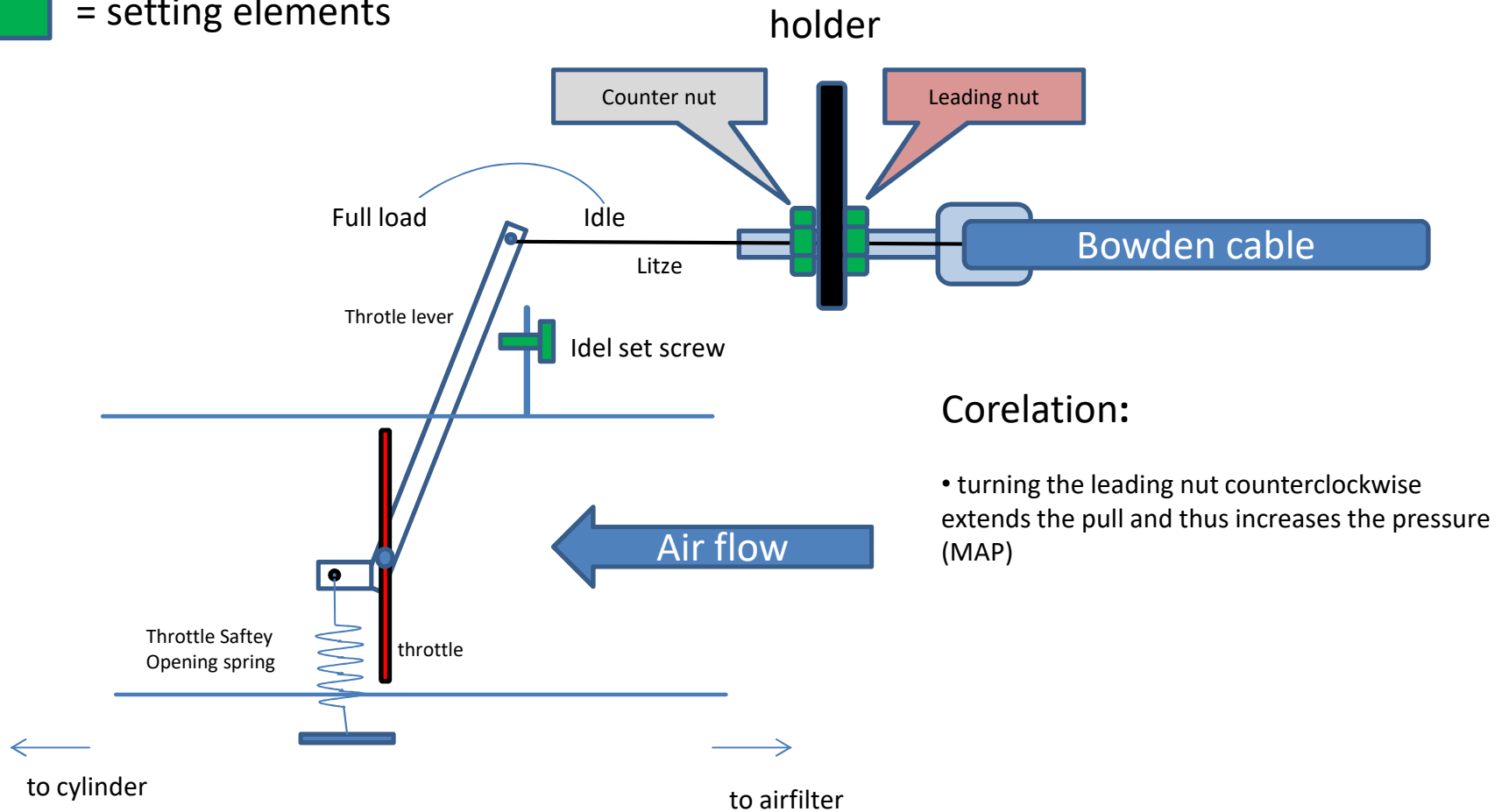
## Notes/Experiences:

Note1: There should be direct visual contact between the mobile device and CS02. A windshield is not a problem, but e.g. if the firewall is in between, it might become difficult. You can check whether the data traffic is running smoothly by the flashing green bubble.

Note 2: If carburetor icing occurs under the known conditions during adjustment work, this will manifest itself in sudden unexplained pressure deviations and rough running of the engine. The observed effect was more than 100mBar differential pressure.

Note 3: Phase1 can actually occur at a single selected speed. Recommended engine speeds are either: 2000, 2500, (3500 rpm for control). The best experiences were made at 2000 rpm. If the propeller speed is displayed on the plane, the speed must of course be recalculated according to the installed gearbox (Rotax80PS e.g. 2.21 = 2000/2.21 = 904 propeller revolutions/min)

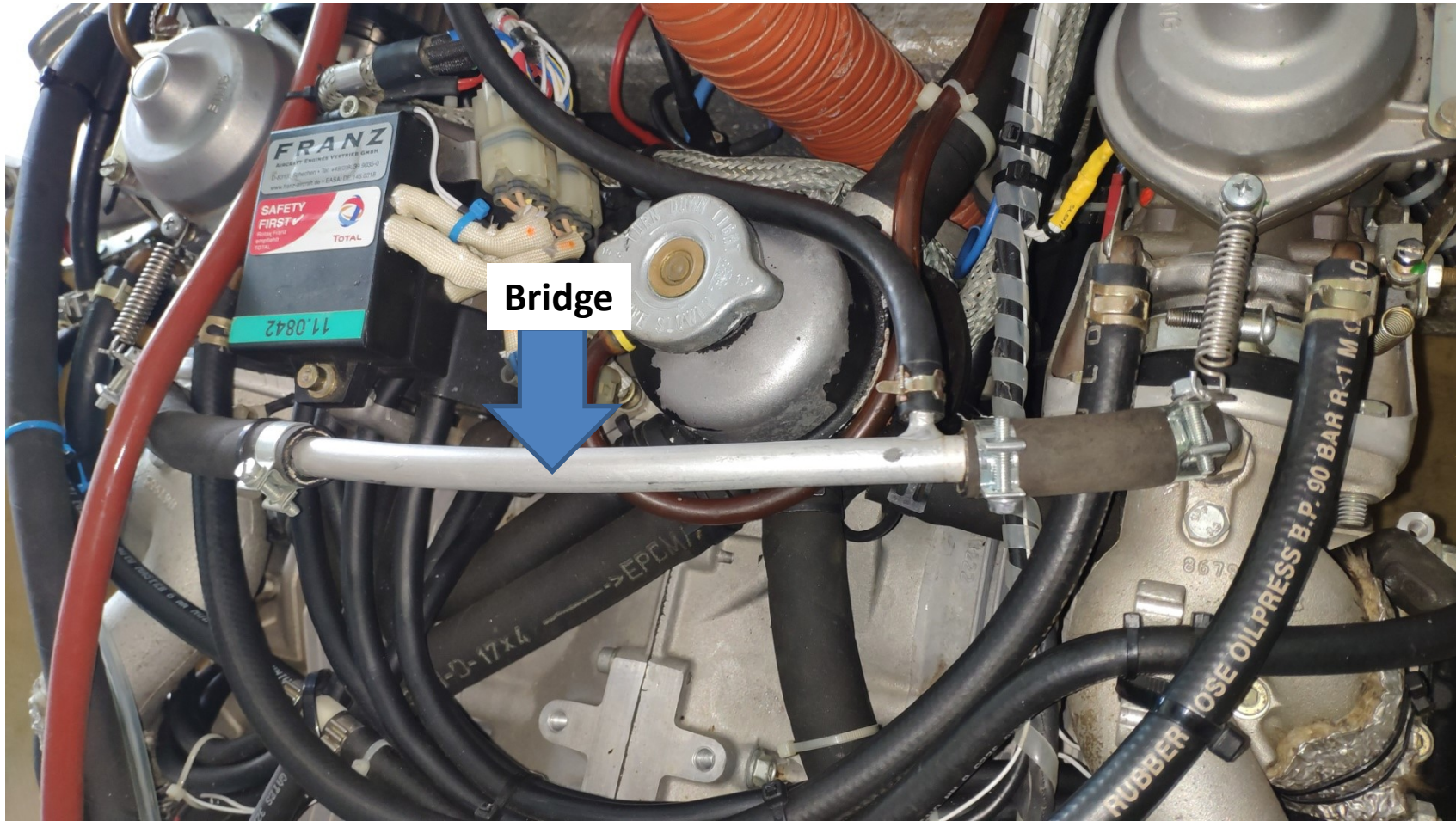# Corelations: throttle cable/throttle valve/pressure
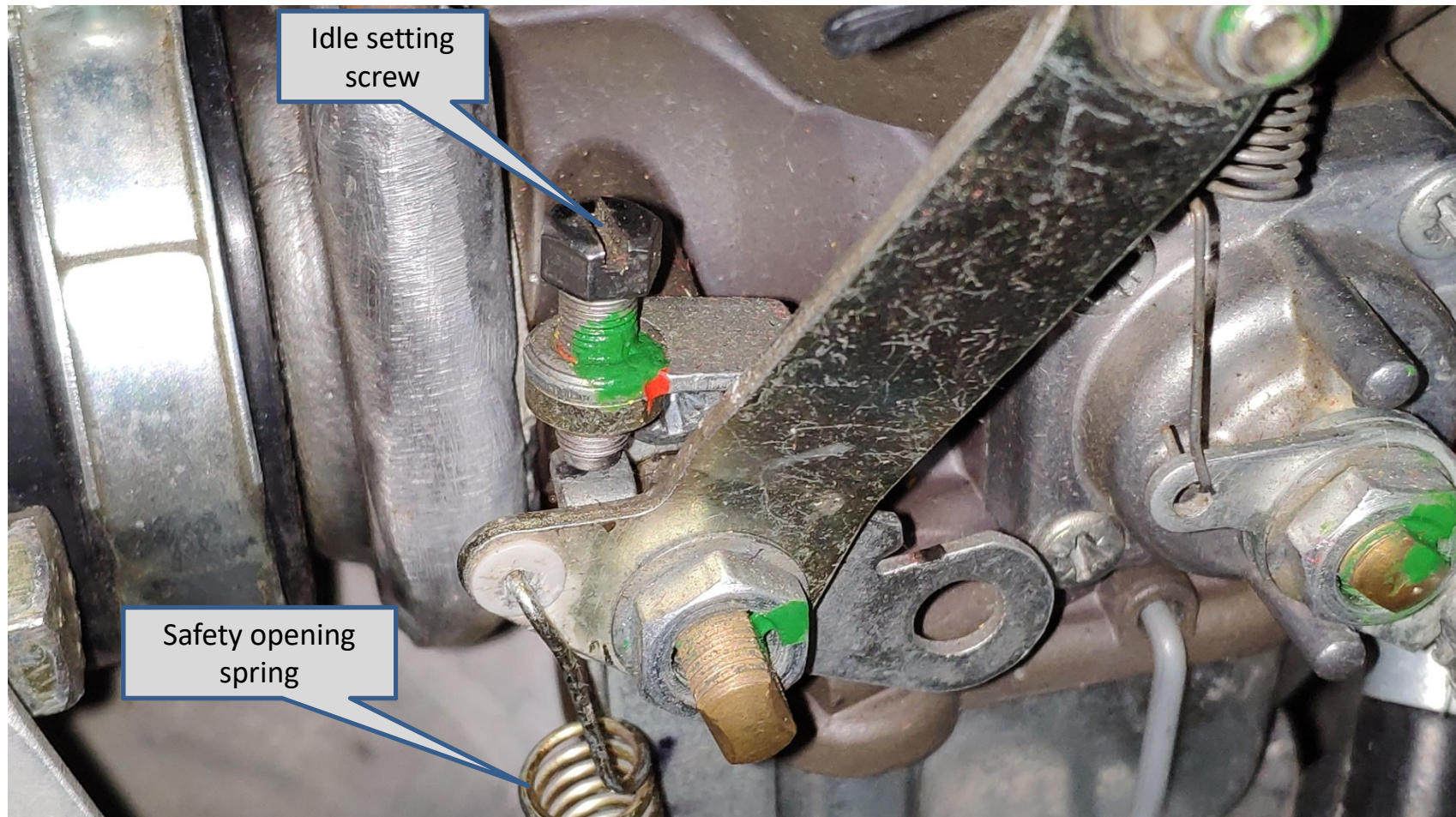
□ = setting elements

## holder

Counter nut

Leading nut

Full load          Idle

Litze

Bowden cable

Throtle lever

Idel set screw

### Corelation:

• turning the leading nut counterclockwise extends the pull and thus increases the pressure (MAP)

Air flow

Throttle Saftey Opening spring

throttle

to cylinder

to airfilter

# Picture 1



Bridge

# Picture 2



Idle setting screw

Safety opening spring

# The Gauge