Synchronization of the carburetors on the 912 and 914

.... This is how **I** synchronize the carburetors on the Rotax 912 and 914

First of all, let's assume that the carburetors are cleanly installed and mechanically in order.
This also means that the throttle valves are correctly centered.
In the following, I am talking about an idling speed of 1700 rpm. This is not a fixed value and should be adapted to the requirements of the aircraft. This is only about the idle speed.

In order to synchronize the carburetors and also to adjust the Idle mixture, the engine should be at operating temperature - ideally after a workshop flight.
So the engine is warm, idles reasonably well and the cowling is removed.
Now I connect the synchronization connections. To do this, I fit 6 mm hose connections to the intake manifolds (anyone who doesn't know **where** I mean should keep their hands off the work).
These are included with the Louis carburetor synchronizer tester [1)].

Now plug in the clocks and run the engine....

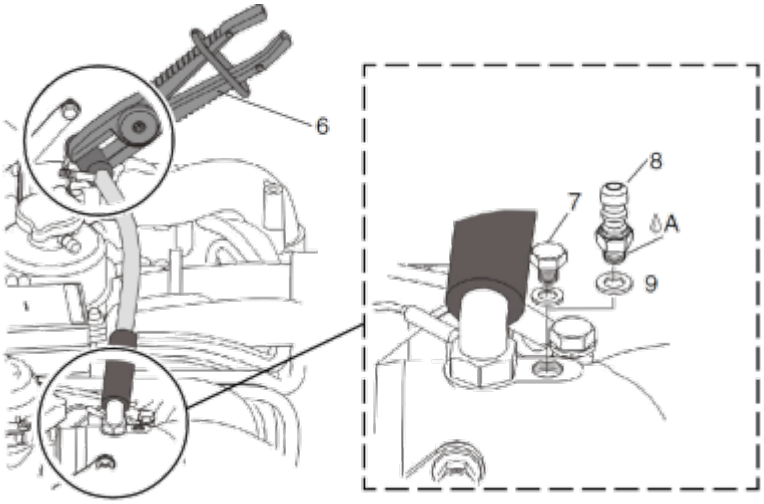
Preparation

Halt, there is still something missing: most mechanics install other auxiliary devices, because intake manifolds connected to the balance pipe do not allow proper synchronization. Franz has a connecting hose with shut-off valve and connections for the clocks. A very useful tool, but I don't use it (explanation in the text).

Before I start the **previously warmed up** engine - or, more sensibly, have the pilot start it - I move the throttle valve springs so that the throttle valve is pulled to the idle stop. I also loosen the two throttle cable adjusters on the carburetors until there is clear play. If the cable is secured to the adjusting screws with wire or shrink tubing, I remove this. Now we have the exact idling speed of the engine as set at the throttle stop screws. The throttle lever should now be left at the idle stop if possible.

Idle

Now you can set the idle speed quite comfortably:
Initially, the engine runs as it would in normal operation - i.e. with the intake manifolds connected by the balance pipe.
The clocks do not show the actual values of the individual sides.
To check the synchronization, I now briefly clamp the rubber hose on one side of the balance tube with narrow flat pliers or hose clamp pliers and read the values of the clocks.



Only at this moment do I notice how the two sides differ from each other.
I memorize which throttle stop screw I have to turn where and remove the pliers from the hose again and put them in my trouser pocket to be on the safe side.
I can now turn the corresponding stop screw with the screwdriver.
It also makes sense to take this opportunity to set the mixture correctly

Once the process is completed to your satisfaction and the engine is running perfectly at 1700 rpm, it is time to move the throttle valve springs back to their intended position - with the engine switched off, of course - and now synchronize the two throttle cables.

Adjust the cables

To do this, I proceed as follows:
First make sure that the throttle lever in the cockpit is in the idle position. Then set the cables to ZERO play with the engine not yet running. To do this, simply pull the cable at the adjusting screw to the rear (towards the carburetor inlet / airbox / air filter) (the throttle levers are thus pulled to the previously set idle stop), turn the rear lock nut with your fingers as far as the holder and lock it with the front nut. Check the cable to ensure that there is no play in the adjusting screw, but that the throttle stop is not yet loaded. This can be seen by a possible movement of the adjusting screw.

Now start the engine and increase the speed to just over 2000 rpm with the throttle lever.
As a result, both throttle cables are slightly taut and the throttle valves are slightly open.

If you now separate the connection between the two intake manifolds with the flat nose pliers by clamping a hose to the equalizer pipe, you will see which throttle cable is set too tight. This can be seen from the lower intake manifold pressure - i.e. which pointer is further down.

The following „task of patience“ is now to set both throttle cables equally tight and still maintain the previously set idle speed of 1700 rpm.
It is important that you no longer turn the throttle stop screws.

To check after each adjustment process, give a short burst of throttle, check the synchronization at idle and slowly accelerate again.
The reason for this is that after moving the throttle cables, they are in their „working position“.

If the clocks always remain nicely synchronized with the compensating tube clamped and finally the idle speed at 1700 rpm, the work is almost done.

At the very end, you should **secure the cables at the adjusting screws**.
I recommend doing this with a safety wire, as you can check at any time whether the throttle cable housing is correctly seated in the adjusting screw. This is not possible with a sheath with shrink tubing.

Caution: Danger to life!

Working with the propeller running is life-threatening !
Anyone working on a running aircraft engine should always be aware of this and work with extreme concentration.
It has proven to be a good idea to only ever have one tool in your hand and to stow all others away safely.
If in doubt, never work on a running propeller!

[1)]
hereinafter only called clocks

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