

Gauges on 2T Engines

The setup described here has been used to put 10K miles (including the Scooter Cannonball Run) on a highly tuned Vespa as well as nurse a stock Lambretta that was prone to seizing through 800 miles of the Moto Melee. The limits posted here have worked well for me but are certainly not the “limit” to which things can be pushed.

I'm using the Westach dual gauge that includes both exhaust gas temp (EGT) and cylinder head temp (CHT). The exhaust probe clamps on around the header and requires a 1/8" hole for the probe to pass through. This places the tip of the probe in the center of the exhaust gas stream 6in from the cylinder wall. The CHT sender has a ring that goes under the spark plug and is completely reversible. On my vespa I mounted the sender on the cylinder stud instead of around the sparkplug. This seems to not respond as quickly but does make plug changes easier.



When trying to find info on gauges and what limits to use I encountered a fair amount of debate about whether to use an EGT or CHT. I opted to follow the advice given for ultra-light aircraft to use the EGT to tune the engine and the CHT while “flying.” After some experience I've found that both are really useful while riding.



I think of the EGT as how much heat I'm generating or what kind of temperatures the piston is exposed to. The EGT tends to go up with RPM and can quickly be brought down by rolling off the throttle completely. The limits I use are 600-675C (1100-1250F) though I've seen other recommendations of 650-700C. On a Mikuni carb a change in main jet size seems to amount to a change of 25C.

I think of the CHT as how much heat I'm building up, like a sink with a slow drain. The limits I use for CHT are 175-225C (350-450F) though I have run as high as 250C without things coming apart. In city riding or on winding roads where you tend to be on and off the gas, the heat input (EGT) is not constant. You will see the CHT climb while at WOT but then when you roll off for a corner it will cool back down. However when holding WOT for long periods of time (~5min or more) the cooling of the cylinder needs to be sufficient to balance





the constant heat input. With forced air cooling as found on scooters the cooling ability tends to rise with RPM. When pulling a hill at lower RPM you can see the CHT climb even when the EGT is well below its limit. Downshifting will see the CHT drop and EGT climb. I generally try and tune things so that I'm in the middle of the range of both EGT and CHT when I'm at max HP.

A final note about CHT is that when you roll off the throttle the CHT tends to go up before it comes down. It's not uncommon for two strokes to seize when rolling off the throttle after a hard run. This is due to running too close to the thermal limits of the oil and then reducing the lubrication. It's a tricky situation when you know that holding WOT will push you over the limit AND rolling off it likely to as well. I try to avoid this by setting a lower limit for the CHT so that even if it creeps over the limit I've set it doesn't go over the thermal limits of the engine.

Finally, there are plenty of things that need your attention while riding so make the gauges as easy to read as possible. I place lines on my gauges to make it a "go-no go" check. With a quick glance I know if I'm above or below the limit and even a qualitative "how much room do I have." This is much better than trying to actually read the gauge, remember what the limit is, and determine the relation of the two.

MotoBi Ardizio Results

For the Giro d'California I installed the setup above on my Ardizio. I was not sure the CHT would behave the same on an air cooled motorcycle as it does on a forced air cooled scooter, but it does. The head of the Ardizio does get very hot and got as high as 375C on the first day of the giro. After up-jetting the head settled around 300C. While this caused me a fair amount of worry the bike didn't really complain about it.



Parts List

I ordered directly from westach.com but I've seen the gauges other places as well. Ordering direct you can customize with things like a white face, chrome bezel and metric scale.

Gauge: 2DC1
EGT Sender: 712-20DWK
CHT Sender: 712-4WK
Patch Cable: 41.5-SS-SS

