

LAP 31 — WATCH YOUR GAUGES

Good instrumentation is the key to successfully operating complicated mechanical systems. Identifying important parameters and then building an environment that measures them allows operators to interpret the health of the machine. Your Mustang is exactly the same because the gauges mounted in your dash are there to provide essential information about the condition of your system and to provide the feedback necessary to make adjustments and possibly avoid catastrophe. That is, provided you read and believe them.

Aircraft pilots learning to fly on instruments are taught to believe their gauges in spite of what all external references are telling them and race car drivers should do the same. After all, what is the point of having instruments if you are not going to believe them? They might as well not be in the dash panel! Think about this the next time you feel the urge to keep pushing it for another lap while the oil temperature is rising. The majority of the time your instruments are a far better indicator of a condition than your instincts. It is imperative that you install gauges that give you the confidence to believe them. This is why many racers use only mechanical gauges for critical applications like the measurement of temperature and pressure. Mechanical gauges use rugged and reliable bourdon tubes to convert a rise in pressure to mechanical needle movement without being susceptible to voltage fluctuations or poor electrical connections. Yes, mechanical gauges can be more difficult to install because of the need to route tubing from the dash to the pickup point instead of just running a wire but the rugged, direct nature of the resulting connection is justified in a race car. I have several racer friends that use electrical gauges and honestly they really never trust them compared to the guys running the mechanical stuff. Use a mechanical gauge if you can. Besides, it's convenient to lean inside the cockpit and read the temperature of your oil or coolant several minutes after shutdown without having to flip a switch to provide power because mechanical gauges are always on.

Which gauges do you really need? The two most critical are oil pressure and tachometer, followed by coolant temperature, oil temperature, fuel pressure, and a voltmeter. With these gauges, located in the correct locations, you are set to go racing. So what are the correct locations? Start by sitting in the car and looking at the dash through the steering wheel. At a minimum, you must have an unobstructed view of the critical tachometer, oil pressure, coolant temperature and oil temperature gauges. An "unobstructed view" means, all your safety gear on including fire suit, helmet (visor down), HANs device, gloves and hands at 10 and 2 you can see all these critical gauges without moving your head to see them. Moving your eyes is OK, just not your head. I like to group my gauges with the tachometer in the center, the pressure gauges on the left and temperature gauges to the

right. I also prefer to have the most critical gauges the closest to the tachometer. For me, that means the tachometer in the center, oil pressure to the left, and coolant temperature on the right. Outside the oil pressure on the left I place the fuel pressure gauge and on the right, outside of coolant temperature gauge I place the oil temperature gauge. It's just a matter of personal preference; there is no "right way."

Now that we have our gauges selected and located we need to orient them. You see, you really won't be reading your gauges because you won't have the time. You're only going to be scanning them because you're supposed to be looking far down the track! This is why we rotate the gauges, to allow us to easily scan them. Once you've determined maximum RPM and normal operating pressure and temperature rotate your gauges such that the needles are pointing straight up at that pressure or temperature. Now you won't have to read and interpret your gauges before making the determination that all is good to go. If all are pointing straight up, then its hammer down, if not, read and interpret, make a decision and take action.

It's very important in the heat of battle to watch your gauges. Temperatures can suddenly rise, pressures can drop, and expensive engines can be quickly ruined. Developing the habit of constantly scanning the road ahead, then your mirrors, and lastly your gauges will save you money and make you a better driver. Remembering to scan your gauges is easy to forget when in hot pursuit or close traffic and jockeying for position. After time, you'll develop a feel for how your temperatures and pressures respond to ambient conditions. Developing this feel will better prepare you to catch problems before they get too serious. A good example is a common rapid loss of coolant caused by hose failure that can be difficult to recognize without a good feel for gauge response. When a rapid loss of coolant occurs, the coolant temperature gauge can actually drop as the sender loses contact with the fluid. Soon afterwards, a slight increase in oil temperature may be seen followed by a slight drop in oil pressure. Knowing the signs and stopping at this point can save an engine but it can't be done without watching your gauges.

Onwards!

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