

SR-1 GSXS-1000 Engine philosophy

There are several reasons that we selected the GSXS-1000 engine for use in the RUSH SR-1 over other engines that have typically been used for BEC's.

Long term engine parity

In any spec series parity between engines are a critical issue. Keeping the power output of all engines within a few Hp of each other is essential if a series is to be widely accepted as a true spec series. While the GSXR and other engines perhaps produce more power, these engines are used in motorcycle race applications and go through a redesign every 3-4 years. This would make long term parity difficult to maintain. The GSXS engine was a new engine developed in 2017 for the street bike. Suzuki have stated that this engine will be used for at least 10 years. The GSXS is a redesign of one of their best engines ever built, the K-5 / K-6 which was used in the 2005 and 2006 GSXR motorcycles.

Engine reliability

Many people have asked why we did not go with the GSXR, after all, in stock for it makes 204Hp at the wheel. Many reasons! 200Hp in the SR-1 would be insane, the car would be enormously quick, it would also become very hard to drive with close to 500Hp / MT! The GSXR engine also hits the rev limiter at 15,400 rpm instead of the 11,400 of the GSXS engine, so engine wear is greatly increased when used in the powerband constantly. Engine life would be in the region of 50-60 hrs rather than the 150 we will reliably get with the GSXS.

Engine oil system & cost considerations

The GSXR and most engines people fit to BEC's are motorcycle race engines! They are designed to be ridden at high angles of inclination. To keep the bike fast, they want the CG as low as possible. When the bike is at an angle, the forces on the bike are pushing the oil into the sump. The result is that the manufacturers can use a small and shallow sump, that allows them to get the engine as low as possible in the bike frame. The GSXS however is a street bike, although it banks in the corners, it is driven at a far less angle than the race bikes. Subsequently the manufacturers raise the engine and use a larger deeper oil sump. The result of this is very beneficial to us, as most people who are familiar with BEC's know that oil starvation can be an issue. Indeed, if we used a GSXR engine it would be necessary to add a dry sump system along with the added cost. The sump on the GSXS engine is almost 3 times deeper, 3 times the length, and has a steep sidewall. This prevents the oil from moving out of the sump when the engine is in a constant horizontal position and is subject to high lateral loads. Our testing has confirmed this through no oil starvation scenarios being exhibited during skid pad testing.

Pictured are the sump diagrams of the GSXS and GSXR engines, and the difference in the size and shape of the sump can be clearly seen.

