HOLINGER AMERICA

HOLINGER Advanced Differentials

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Holinger's Advanced Limited Slip Differential for Porsche G96, G50

Holinger has spent many years supplying Porsche Motorsport with O.E. sequential gearbox parts and have been involved in officially servicing their racing transmissions. We have become very familiar with the weaknesses in the non-Holinger-supplied differentials and have created the ultimate solution.
We are proud to release our dedicated racing LSD for the Porsche G96 and G50.

Design Intent

Our design intent was to address the fatigue cracking in the diff housing spline and radius under the crownwheel, and then to apply the Holinger ethos of ultimate reliability, light weight, simple maintenance and precise adjustability.

Adjustability

The differential is adjustable in the familiar and predictable way – with ramp angles and adjustable preload. However, we have simplified the procedure. Rather than re-shimming the diff each time the preload is adjusted, it's as straight forward as swapping the spring with another one with a different rate.
The ramp angles are more cost effective to adjust also, as each pressure ring is cut with an integral alternative set; we keep many in stock and can gladly accommodate your special order.
The clutch plates are special materials whose friction characteristics are not sensitive to ordinary wear. The differential's clutch has 20 friction faces to reduce wear, but also allows the customer to further extend the adjustability by reordering the plates and hence changing the number of active friction faces.

Installation

Installation is also simplified allowing quicker crownwheel and pinion setup. We have taken great care to precisely grind bearing journal sizes where bearings can be fitted by hand without a puller or press. And the surface that the bearing shim rests against is continuous and smooth, with no cut outs which could leave marks or lead to damage on the shims.

Design Execution

The differential housing splits at a new location away from the major load paths, strengthening and stiffening the area under the crownwheel. These housings are made from the same steel and case hardened heat treatment process from which we make our racing gears, giving it a superb fatigue life. The diff's end cover is held captive with the world's best ARP® fasteners utilizing fine threads, allowing maximum clamping capacity.
We have provided billet CNC milled tooth forms on the side and pinion gears with carefully chosen root radii and pressure angles. These features resist extreme shock loading and provide ultimate fatigue life.

The clutch plates are a "fine spline" design which eliminates the cracking which occurred commonly on the factory inner plates. The fine spline outer plates allow the housing to be more compact and lightweight, and its spline is specially shaped to remove stress concentration which was a problem in the old factory design. Unique laser-cut oil passages are cut into the clutch plates allowing excess oil to escape with a clear pathway. They also act as lubrication pockets to ensure the wet clutch is always offered the correct amount of oil resulting in predictable friction characteristics.
The cross is precision ground with a specially shaped hub for extra rigidity.
We have incorporated specially shaped positive oil capture and lubrication feed holes on the outside of the housings, taking advantage of its centrifugal force. And the stub axles are lubricated with quad helix grooves.

Holinger's Advanced Limited Slip Differential for Porsche 991 Cup and GT3

The sequential gearbox used in 991 GTA, Cup, and GT3 cars was our next successful differential application, and has proven itself in professional competition. In 2014, professional racing customers were looking for improvements to the factory differentials and Holinger again delivered.
The Holinger HDC991 leveraged the technical advantages it had already pioneered in the G96 application: moving the housing separation point away from the highly loaded crown gear, which was now integral in the factory design, was the first priority (one year later, factory units have now mimicked this feature).
Because of the integral crown gear on the differential, the factory pinion shaft (crossshaft) had specially shaped teeth to compensate for the distortion of their diff housings under load. Since Holinger housings do not distort like the factory ones, Holinger also supplies pinion shafts that are optimized to its differential, creating a stable package.

GTD teams were looking for performance improvements, increased durability, and importantly, the ability to tune the diff not only to different tracks, but also to their own unique chassis setup preferences. This became our goal: implementing the proven features of the Holinger HDC into this new package: precision components that work together to create a highly tunable, more versatile and more durable alternative. The Holinger HDC991 has become the differential of choice for premier teams in the IMSA Tudor United Sportscar Championship GTD class.

Winning Races

Congratulations and thank you to all our customers, on their way to a highly successful 2015 Campaign.
Here are a few notable results:

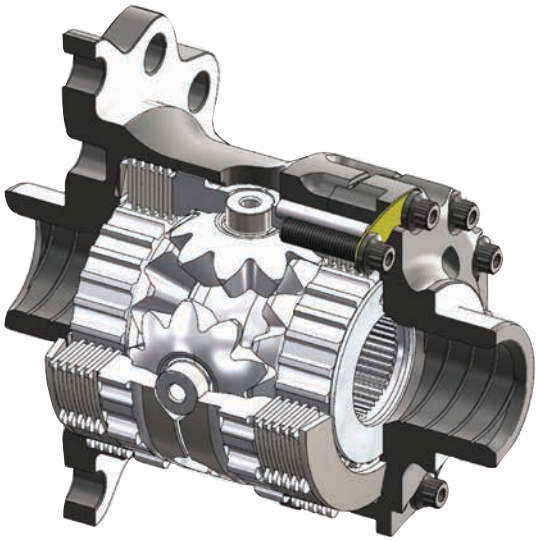
- 12 Hours of Sebring 2015: 1st Place #23 Team Seattle/Alex Job Racing
- Monterey Grand Prix 2015: 1st Place #73 Park Place Motorsports; 2nd Place #23 Team Seattle/Alex Job Racing
- Detroit Belle Isle 2015: 1st Place #23 Team Seattle/Alex Job Racing

The inclusion of so many advanced features makes the Holinger differential a superior solution. Take the mystery out - put Holinger winning precision in.

This and cover photo courtesy of Alex Job Racing

HOLINGER's limited slip differentials are designed in-house to perform precisely under the harshest racing conditions. Accuracy in manufacture and high grade materials are crucial to performance. This newest addition to our Cup car range is built to outperform the competition while simultaneously solving the shortfalls of the original Cup car's LSD.
As with all Holinger designs, this differential was built to be an heirloom, not a consumable.
You'll find quality at every turn.

- **Ramp and Plate design capable of a wide range of preloads**
- **Disc Springs produced in-house available in a wide range of rates and designs to suit customer requirements.**
- **Strength-optimized housing adds fatigue resistance in critical areas**
- **Gears made from finest Vacuum Arc Remelt (VAR) alloy steel**
- **Clutch plates from hardened CrMo and spring steels**
- **Reversible ramps feature large contact areas at crosses**
- **ARP2000® fasteners**



Holinger Advanced Limited Slip Applications

In addition to Porsche, we have added differential solutions for the popular Audi R8 LMS GT3 and a Ford 9-inch solution, which is standard equipment in Holinger's HFD complete IRS Final Drive, utilized in the thundering Reiter/SaReNi Camaro GT3.

40.309.HDC	**Porsche G50/G96/G97**
40.309.HDC991K	**Porsche 991 GTA/GT3/Cup, including Pinion Cross Shaft**
18.309.HDCR8LM	**Audi R8 LMS GT3**
56.309.HDC933	**Ford 9-inch 33T, Holinger HFD**