

Responsive SIS Shifting: Gear Changing Reduced to the Pure Essentials.

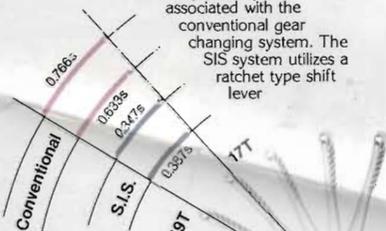
WHY S.I.S. (Shimano Index System)?

Shimano took a good look at the conventional racing bicycle's gear changing system and saw that there was still much room for improvement. Shimano found that the gear change system is the one group of components whose function most completely depends on a certain skill developed by the rider. An improved shifting system would take much of the burden of shifting off of the rider and integrate it into the function of the components where it really belongs. If the gear shifting system could provide more precise shifting with less input from the rider, the rider would be able to concentrate more on winning the race. It's worth stressing that the goal of the bicycle racer is simply to win races—not to develop a smooth shifting technique. Gear changing is merely a means to an end. Racers have been forced to become skilled at shifting the conventional system simply because it has been the only gear change system available until now.

As a result of these factors, Shimano developed the Shimano Index System which delivers fast, smooth, precise gear changing that's almost automatic. Gears are changed accurately with minimal input and attention from the rider. This means racers can devote more time to pure racing—not shifting. But first let's take a look at why shifting problems exist. While the freewheel gears are placed at set intervals, the derailleur is positioned among these gears in a smooth movement with an infinite number of positions. Derailleur position and movement (which determine shifting performance) are controlled through a cable that the rider adjusts in a continuous, stepless manner. Gears must be searched for and "felt out." As a result, shifting performance is directly related to the rider's skill at manipulating

the lever in a series of very fine adjustments. This presents no problem during training (or touring) when there's enough time to devote to searching for the right gear and fine tuning the system. But in the heat of competition it's a different story. No racer can shift his bike with the same accuracy and precision that he does during training. In a real race there simply isn't time. The racer needs to be in the right gear at the right time—instantly—in order to sprint, deal with sudden changes in terrain, or respond quickly to constantly changing race conditions.

The Shimano Index System has solved many of the problems associated with the conventional gear changing system. The SIS system utilizes a ratchet type shift lever



and doesn't need further tuning. One quick movement of the lever and "click"—you're in gear. SIS coordinates the operation

that's coordinated with the position of the rear derailleur in relation to the freewheel gears. The spaces between the audible click-stops at the lever correspond exactly to the spaces between the gears on the freewheel. This means that gears are changed by simply moving the lever to the next click-stop. The rear derailleur is automatically adjusted at that gear position

and functions of the derailleur, freewheel, chain, cable and lever to form an integrated shifting "system." SIS frees racers to concentrate on racing—not shifting—and makes a great contribution to the racing bicycle's overall performance.



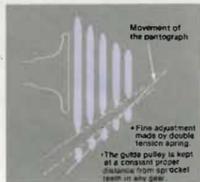
THE UNLIMITED CHALLENGE



Features of the Rear Derailleur

1. Improvement in shifting performance

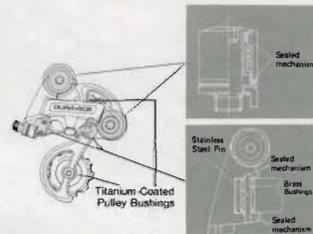
• Double servo-panta mechanism: The "Double Servo-Panta Mechanism" with the pantograph at an appropriate angle, and at the same time using double tension springs for greatly improved shifting performance.



• Centeron guide pulley: The self-centering mechanism that automatically keeps the chain on the right gear if it is shifted improperly.

2. Upgraded durability

• Sealed mechanism: Shimano uses sealed mechanisms for the pivots, which keep out water, mud, sand, etc., and reduces wear of the pivots to a minimum, upgrading their durability.



• Sintered alloy guide pulley: New DURA-ACE employs Sintered Alloy for the tips of the guide pulley teeth, minimizing friction with the chain and thereby assuring a longer period of high shifting performance.

• Brass bushings and stainless steel pins
• Play reduced
• Titanium-coated pulley bushings employed

3. Safety feature

• Double spoke barrier: Special-shaped left pulley cage plate is provided to prevent the rear derailleur from being caught in the spoke.

4. Simple and compact design

• Built-in inner cable fixing bolt
• Inlaid epoxy finish: "Inlaid Epoxy Finish", which is often found in fine jewelry is used in the name plate link.

Features of the Shifting Lever

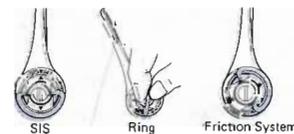
Revolutionary shifting system

• Shimano index system: Shimano has introduced the "Index Mechanism" into the shifting system for the racer achieving "shortened shifting time", "eliminating mis-shifting" and "force", and thereby saving time and energy.

• The built-in "Index Mechanism" of the lever

transmits a click to the fingertips, which means the gearshift has just been completed.

• The SIS lever can switch to either "Shimano Index System (SIS)" or "Friction System" with one-touch operation even while riding, which is designed to readily cope with unexpected trouble.



Features of the Front Derailleur

1. Improvement in shifting performance

• Special shape of the chain guide: The inner plate is "Dished-Out" so that shifting to high gear is performed, smoothly and quickly, without "slipping"

• Enhanced rigidity of the chain guide: The front end of the chain guides is "bridged" and rigidity of the chain guide is enhanced so that the shifting performance is improved.

• Upgraded durability of the return spring: Adoption of a sealed mechanism on the return spring not only upgraded durability of the spring itself but also stabilized shifting performance of the front derailleur.

2. Upgraded durability

• Sealed mechanism provided for the return spring
• Enhanced machining precision of sliding part of the links

3. Safety feature

• A heli-coil insertion in right link for cable fixing screw: The New DURA-ACE, just like New Shimano 600 EX, provides a "Heli-coil" insertion (specially-processed stainless steel) on the right link to prevent it from being destroyed. The screw is also provided with a hard-surface heat treatment.



4. Easy maintenance

• Adjusting bolts turned outward by 5°: The adjusting bolts are turned outward by 5° from the seat tube so that a screwdriver can be easily used for adjustment.



5. Designed for Italian type bracket brazed-on

NEW DURA-ACE