

One-Way Starter Clutch for Two-Wheel Vehicles

A reliable product for easy use

SCHAEFFLER



Your systems partner

Schaeffler is a renowned supplier to the automotive industry with an in-depth understanding of systems. The two-wheeler market also benefits from this systems expertise. With our network of interconnected R&D centers, we are represented on all markets worldwide and are thus always close to our customers. This allows us to fulfill specific requirements at all times, both flexibly and efficiently. The development of our one-way starter clutch for two-wheelers is one example.

FRAX series

INA roller clutches are overrunning clutches consisting of needle or cylindrical rollers and formed ramps in the raceway. The established HF and HFL series are now supplemented by the FRAX series for high-torque applications. FRAX roller clutches are designed for universal usage in different applications. The motorcycle starter drive train is one of these applications and is explained in this brochure.



**Economical
Reliable
Compact**



Start-up function

Using the FRAX one-way clutch in motorcycle applications allows the internal combustion engine to be started by an electric motor.

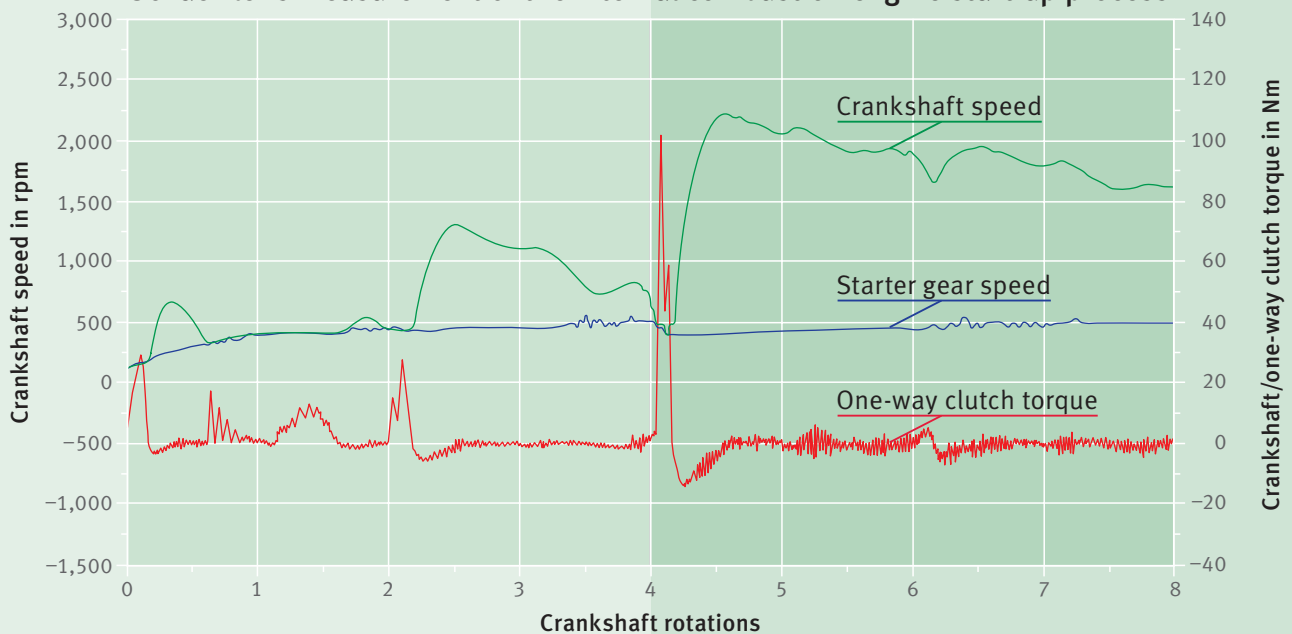
Internal combustion engine ignition



Idling function

After the electric starter has started the internal combustion engine, the one-way clutch automatically goes into idling mode.

Schaeffler's measurement of the internal combustion engine start-up process



Product Structure

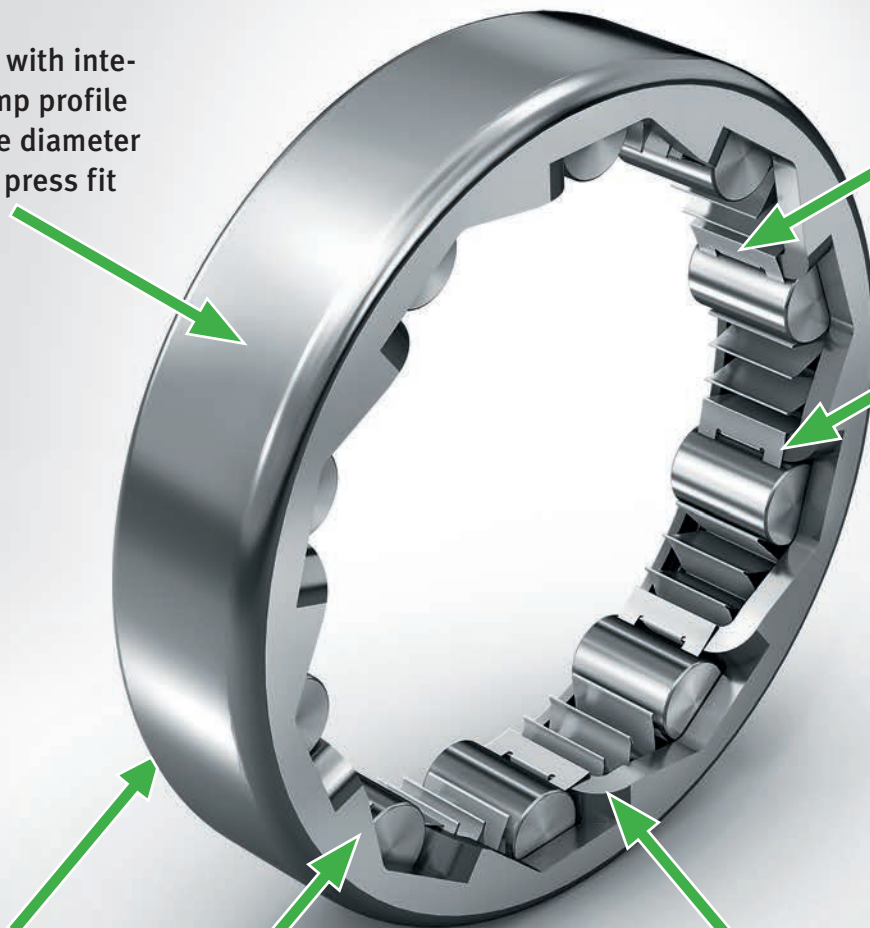
Drawn cup with integrated ramp profile and outside diameter ready for press fit

Spring fixed to the spring retainer

Spring with integrated roller retention

Hardened and flanged ribs

Integrated spring retainer



FRAX one-way clutch: Features and benefits

Product features

Manufactured using forming methods



Sleeve outside diameter similar to that of a drawn cup roller bearing



Torque transferred to the housing via interference fit assembly



High performance



Roller clutch concept



Customer benefits

High reliability in volume production

Easy to install due to press fit

Housing can be produced as a turned part

Less space required

High functional reliability

Schaeffler – your engineering partner

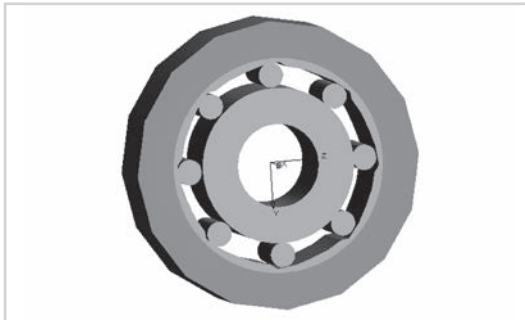
The most effective solution in terms of function, design envelope, and system costs is obtained by adjusting the power density to suit the requirements of the individual application. Schaeffler's team of engineers provides support worldwide – throughout the development cycle right up to volume production readiness.



The benefit for you: Tested quality

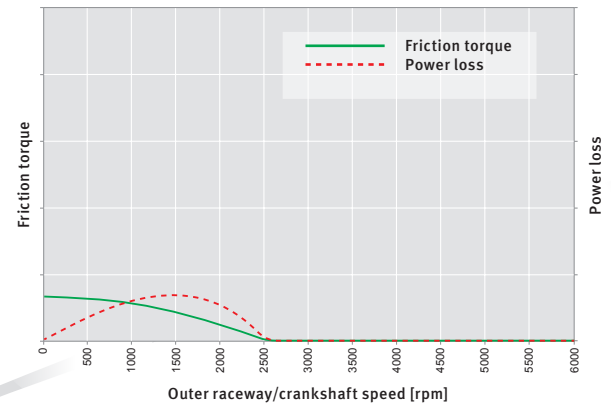
Our R&D centers mean that we are represented on all markets worldwide and always in close customer proximity. We develop roller one-way clutches using state-of-the-art calculation and simulation methods. The analyses include all FRAX one-way clutch components and all of the adjacent parts from the customer's application.

1. BEARINX calculation



Basic calculations are done in our tool BEARINX, which is recognized for being one of the leading calculation programs for bearing products.

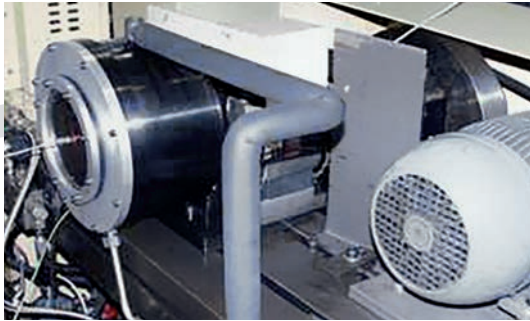
2. Idling function



The increasing requirements for reduced fuel consumption and CO₂ emissions mean that friction losses in the engine must also be continuously reduced. This is why the spring forces in the roller one-way clutch are designed to be at a minimum in the idling speed range. When the engine speed increases, the centrifugal force allows the rollers to lift off from the shaft, and the level of friction in the one-way clutch drops to zero.



3. Durability testing



To analyze their operating life, the one-way clutches are tested in the clamping direction using special test rigs. These tests are carried out using the original adjacent parts from the customer's application.

5. Volume production



4. Vehicle testing



Schaeffler carries out vehicle starting tests in order to inspect the function in the application itself.

The combination of the forming technology that is used and Schaeffler's quality system produces outstanding reliability in volume production.

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