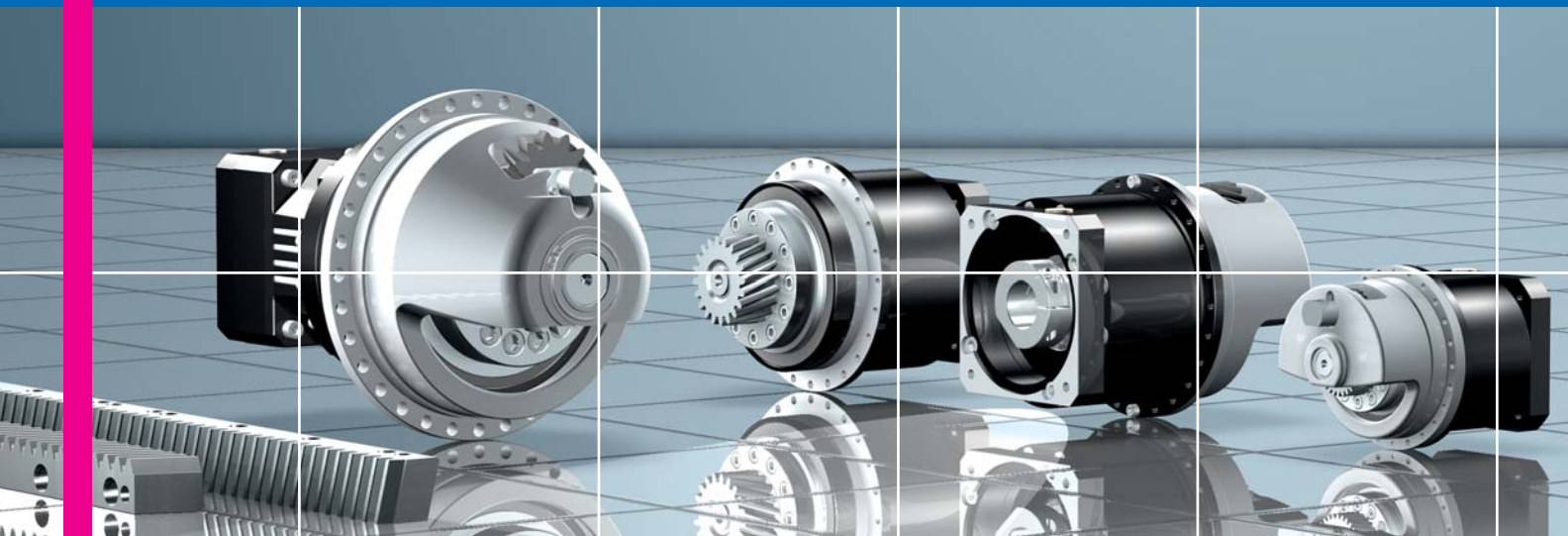


## HighForce rack and pinion drives



New, high efficiency  
rack and pinion drives with  
innovative pinion bearing



# Drive optimisation for machine tool manufacture

## A new compact solution for more efficiency

In the past it was normal on rack and pinion drives to fit the pinion directly to a gear unit's flange shaft.

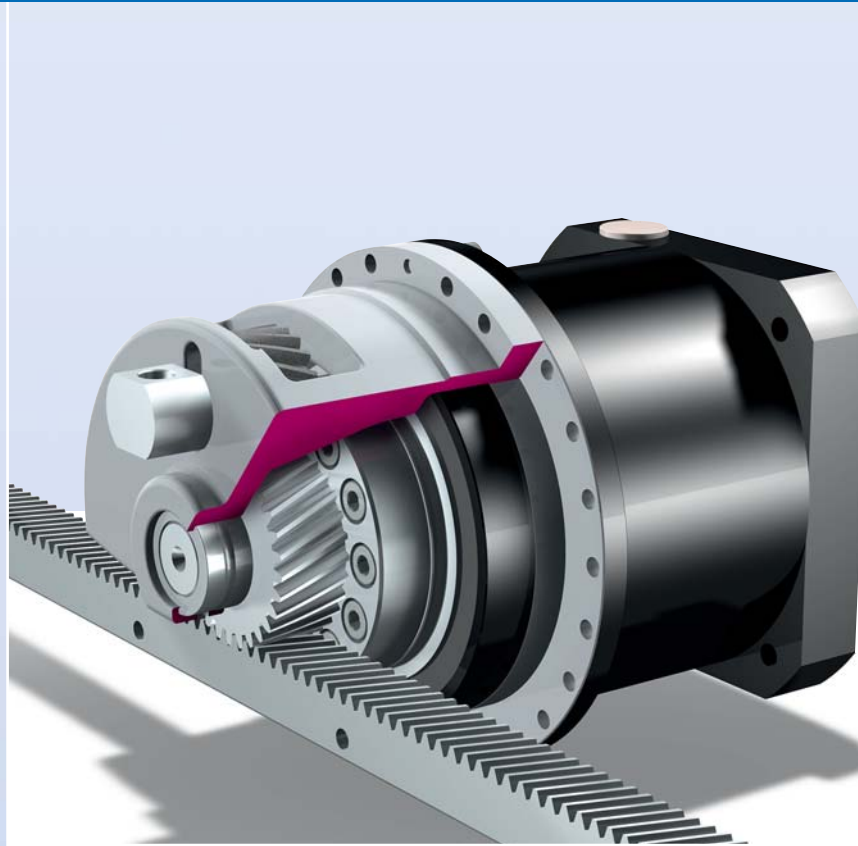
As a result of this single-sided pinion mounting, the very high tilting moment had to be absorbed by the bearings in the planetary gear unit. With the result that 'over-dimensioned' gear units with an abundant 'excess of torque' were required.

To be able to use smaller gear units with the torque actually required, the highly stiff supporting bearing module with integrated ZTRS pinion was developed.

This practical innovation resulted from the close cooperation of the application experience at STÖBER ANTRIEBSTECHNIK and at the manufacturer of ATLANTA precision gear racks.



The underside of the supporting bearing cover shows the enclosed safety design



Rack and pinion drive ZTRS-PHA721

Cast supporting bearing cover with ribbed internal contour for highest torsional stiffness

The supporting bearing permits maximum feed forces, minimizes bending and increases the service life

Housing cut-away above with optional felt lubrication pinion for the connection of a central lubrication system or an electronically regulated lubrication cup

## Highly stiff rack and pinion drive with supporting bearing

The internal contour of the cast supporting bearing cover is designed with stiffening ribs to provide a highly stiff supporting assembly for the rack and pinion drive. Pinion and cover are bolted to the housing and shaft flange of the PH(A) or PHV(A)/PHQ(A) gear unit series.

Due to the additional supporting bearing, very high drive tilting stiffness is achieved. The load is reduced on the bearings in the planetary gear unit.

At the same time the cover serves as a protective housing and is used for mounting the optional lubrication device comprising a felt lubrication pinion running in parallel.

## New power densities for high dynamic performance, smaller envelope, less costs

Due to this highly stiff design with reduced tilting moment, the tilting moment is no longer the key parameter on defining the drive (motor and gear unit) as in the past. The crucial criterion for defining the rack and pinion drive can now be orientated on the torque or the feed force actually required.

Because of these design enhancements a smaller gear unit, typically one size down, can be used compared to traditional designs with unilateral pinion bearings.

Along with the significantly increased power densities, a whole series of other positive factors impress:

- Pinion concentricity adjusted to  $\leq 0.01$  mm (optional)
- Linear backlash reduced to  $\sim 50\%$
- Linear stiffness increased by  $\sim 100\%$
- Optimized adaptation of the mass moment by means of a large variety of gear unit ratios and numbers of pinion teeth

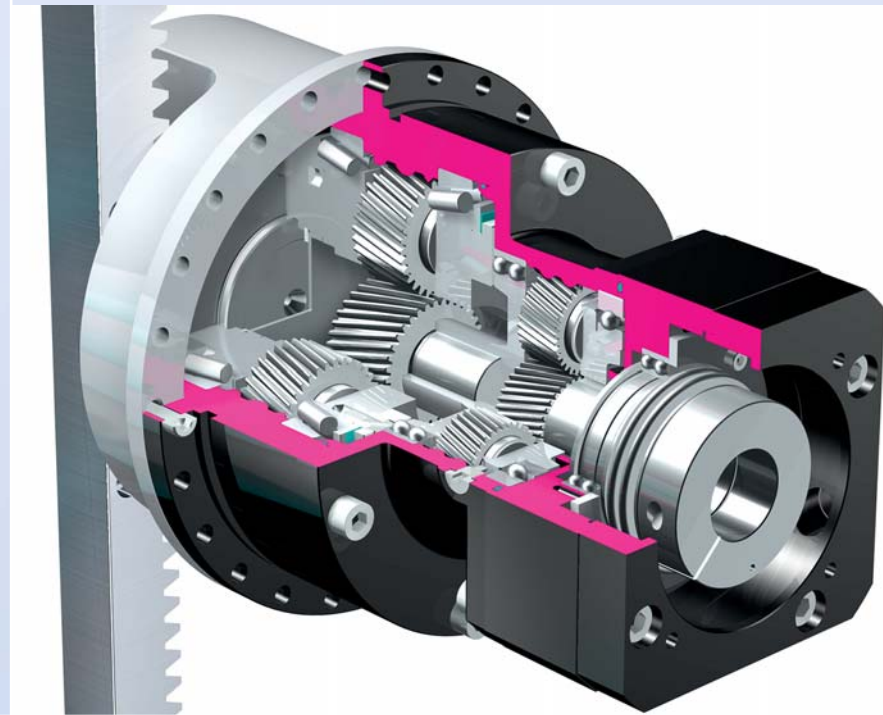
# Specific rack and pinion drives as complete, ready-to-use units

## With helical geared planetary gear units

The ZTRS drives are based on the ServoFit® precision planetary gear units that are designed for very high requirements on torque as well as on torsional and tilting stiffness. The ratios range from  $i = 4$  to  $i = 121$  (up to 3 gear unit stages).



ME motor adapter for ZTRS-PH units with balanced EasyAdapt® motor coupling



To see an animated film on HighForce ZTRS-PH features go to [mediacenter.stoeber.de](http://mediacenter.stoeber.de)

ZTRS-PHA822 rack and pinion drive, two stage, with MF motor adapter

Balanced FlexiAdapt® clamp coupling for large motor shaft diameter with integrated thermal length compensation

## Helical geared rack drives for highest requirements. Feed force up to 124 kN

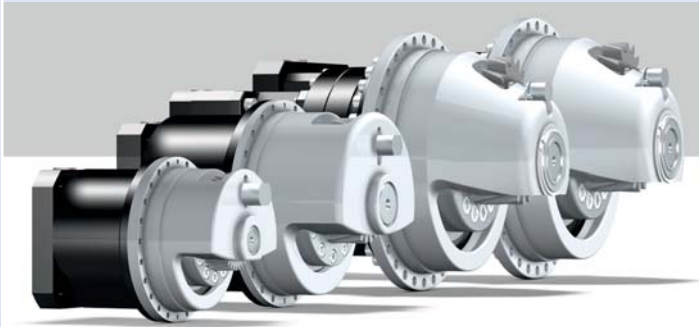
Due to the variability of gear unit types, sizes, ratios, number of pinion teeth and gear rack modulus, perfectly optimized rack and pinion drives for **machine tools** and **automation systems** are achieved. STOBBER application consultants are of course available for optimal design.

### Overview rack and pinion drives

Designation	Gear unit types	Features	Feed forces
ZTRS	PH(A)7 – 10 PHV(A)9 + 10 PHQ(A)10	Torque reducer pinion with supporting bearing cover helical geared and straight-cut, module $m=2$ to $m=10$ hardened and ground to quality level 5	16 kN to 124 kN
ZTR	PH(A)4 – 10 PHV(A)9 + 10	Torque reducer pinion helical geared and straight-cut, module $m=2$ to $m=8$ hardened and ground to quality level 5	5.5 kN to 56 kN
ZR	PH(A)3 – 7	Large pinion with bolt circle holes helical geared, module $m=2$ to $m=4$ hardened and ground to quality level 5	1.7 kN to 12 kN



# Ready-to-install solutions



ZTRS-PH721  
1 stage

ZTRS-PH821  
1 stage

ZTRS-PH932  
2 stage

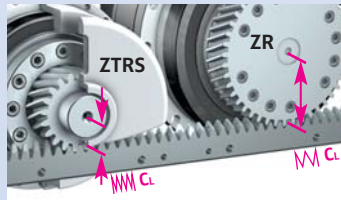
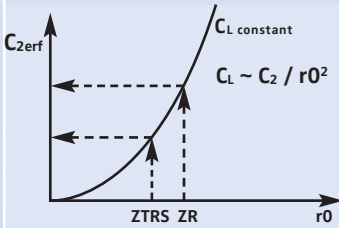
ZTRS-PH1032  
2 stage

## Large or small pinion is no longer a question of mounting options

During the choice of the pinion size, the size of the pitch circle on the gear unit flange shaft no longer needs to be taken into account. Now flanged pinion with the lowest possible number of teeth can be used.

As a result the linear stiffness of the rack and pinion drive is increased by up to 100 %.

## The pinion size affects the linear stiffness



ZTR-PH with straight-cut flanged pinion



Flanged pinion hardened and ground to quality level 5 acc. to DIN3960/3961

Helical geared and straight-cut flanged pinions for use without and with output bearing housing

## The complete range for rack and pinion drives

For the ZTRS-PH(A)/PHV(A)/PHQ(A) and ZTR-PH(A)/PHV(A) HighForce rack and pinion drive STOBBER also supplies straight-cut flanged pinions.

If the requirements for quality are not as exacting, the ZTR-PH version can be used with spur or helical-toothed flanged pinions without shaft end.

Additionally, large-size helical-toothed pinions for bolt mounting without flange are available



# With perfectly matched components

## The complete solution from a single source

Due to the close co-operation with the world market leader and manufacturer of ATLANTA precision gear racks, STOBER can offer comprehensive and uncompromisingly configured complete solutions.

The synergy effect of quality, precision and interaction of all components results in optimum functionality. As a result these rack and pinion drives are also suitable for the highest requirements.



## ATLANTA series 29

Gearing:  
Right-hand 19°31'42"  
meshing angle 20°

Modulus 2 / 3 / 4 / 5 / 6 / 8 / 10 / 12  
Quality 5 and 6  
Teeth hardened and ground  
All sides ground

## ATLANTA series 48

Gearing:  
Right-hand 19°31'42"  
meshing angle 20°

Modulus 5 / 6 / 8 / 10 / 12  
Quality 4  
Teeth hardened and ground  
All sides ground



Precision gear racks  
for assembly in series,  
helical geared  
Series 29  
Modulus 2 / 3 / 4 / 5 / 6 / 8 / 10 / 12

All precision racks are  
also available in  
straight-cut versions



Precision gear racks  
for assembly in series,  
helical geared  
Series 48  
Modulus 5 / 6 / 8 / 10 / 12



### STOBER offers consistent solutions

As a system supplier STOBER has a complete product range for digital drive technology. The MC6 motion controller uses the CODESYS programming software to keep up with the trend towards open systems in the world of automation.

In combination with digital servo axes, STOBER solutions can be used for small or more extensive drive applications.

### Note on the design of axes and drives

For optimum axis design, it makes sense to focus primarily on the gear units or geared motors. A useful aid is the design software SERVOfsoft®.

For an overall approach, use the specific expertise of the STOBER application consultants.

Contact and advice:  
applications@stober.de

### Service

The STOBER service system comprises 38 expert partners in Germany and more than 80 companies in the STOBER SERVICE NETWORK worldwide.

This service concept guarantees local expertise and availability when needed.

In general, the service specialists can be reached at any time via a 24/7 service hotline.

When necessary, a problem can be addressed immediately.

**24/7 service hotline**  
**+49 180 5 786323**

**STOBER AUSTRIA**  
www.stober.at  
+43 7613 7600-0  
sales@stober.at

**STOBER CHINA**  
www.stober.cn  
+86 10 6590 7391  
sales@stober.cn

**STOBER FRANCE**  
www.stober.fr  
+33 4 78.98.91.80  
sales@stober.fr

**STOBER GERMANY**  
www.stober.de  
+49 7231 582-0  
sales@stober.de

**STOBER ITALY**  
www.stober.it  
+39 02 93909570  
sales@stober.it

**STOBER JAPAN**  
www.stober.co.jp  
+81 3 5395 6788  
sales@stober.co.jp

**STOBER SOUTH EAST ASIA**  
www.stober.sg  
+65 65112912  
sales@stober.sg

**STOBER SWITZERLAND**  
www.stober.ch  
+41 56 496 96 50  
sales@stober.ch

**STOBER UNITED KINGDOM**  
www.stober.co.uk  
+44 1543 458 858  
sales@stober.co.uk

**STOBER USA**  
www.stober.com  
+1 606 759 5090  
sales@stober.com

