

THE FIRST FAMILY OF RACK & PINION DEDICATED REDUCERS

Only a handful of manufacturers in the world are able to offer planetary reducers with extremely high precision achieving less than 1 arc-minute of backlash without mechanical preload. Out of this already-small group of manufacturers, only Redex-Andantex makes a family of high precision planetary reducers specifically designed for use with racks on linear axes and ring gears on rotary axes for machine tools and automation equipment.

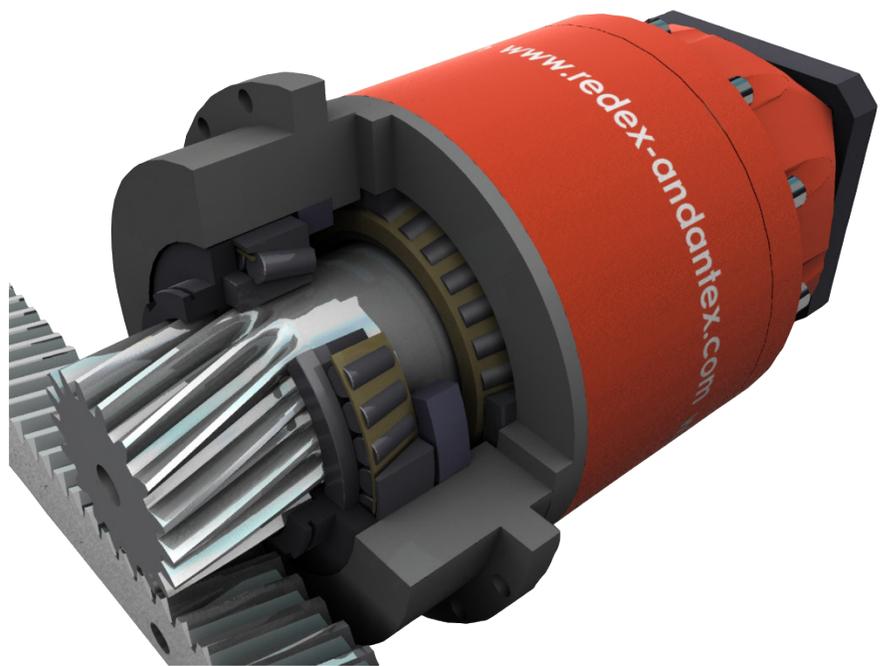
What is a rack & pinion dedicated reducer?

A rack and pinion dedicated reducer has a pinion as the output, and is optimized to position within microns while moving large loads and providing smooth motion for in process operations (i.e. machining parts, carbon fiber placement, robot axes etc.). The parameters that the reducer design must meet in order to achieve this performance are:

- Extremely high compound stiffness
- Minimum transmission error for smooth operation and low noise during high speed operation
- Compact footprint to easily integrate into machine designs
- High efficiency
- Minimum to ZERO-BACKLASH

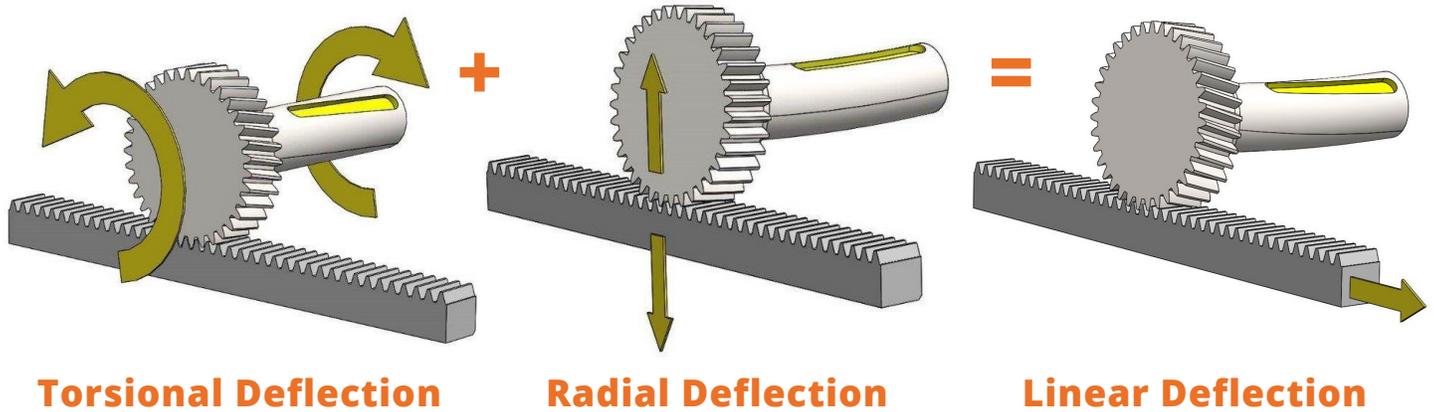
The Redex-Andantex family of rack and pinion dedicated reducers achieves all of these objectives through unique design. The most important parameter in a rack and pinion drive is stiffness to provide excellent position repeatability during high accelerations and avoid resonant frequencies that make servo-control difficult. So, we

have optimized the output stiffness to minimize deflection in all planes (radial, torsional, and axial) through a patented integration of the output pinion onto the output shaft.



RP Range Output Pinion Design

COMPOUND STIFFNESS MINIMIZES LINEAR DEFLECTION



The pinion pitch diameter is kept small, and is perfectly matched to the torsional stiffness of the planetary gear train, thereby ensuring high torsional stiffness. Large, preloaded tapered roller bearings go over the pinion and provide the radial and axial stiffness of the system. This compound stiffness minimizes the linear deflection of the drive system. The small pinion provides several additional advantages:

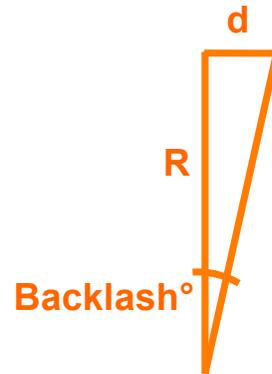
- Output torque is minimized, allowing smaller servo-motors.
- Resonant frequency, which is defined as the square root of stiffness/inertia, is increased because it is a function of the pinion pitch diameter squared.
- Installation is simplified, thanks to the accessible pinion.

As previously mentioned, the planetary gear train provides high torsional stiffness. But, it also offers additional advantages:

- High torque density due to the sharing of load between planet gears. This translates into a compact footprint.
- High efficiency > 92%
- Minimum transmission error from years of experience manufacturing hardened & ground planetary gearing.

What about backlash?

Backlash is measured at the output pinion and is defined as an angle $\arctan d/R$ where d is the amount of free motion at radius R .



The standard reducer backlash is 3 arc-minutes ($3/60^\circ$). Reducers can also be provided with 1 arc-minute on request. This number must be combined with the rack and pinion backlash, which is normally 8 – 10 arc-minutes. In certain applications, this level of backlash is acceptable, however, many instances require ZERO-BACKLASH so that the control can accurately predict axis position within microns. The RP range offers two solutions that completely eliminate backlash from the motor to the driven rack:

TwinDRIVE uses two motors in a master-slave arrangement to preload the axis and cancel the backlash.

DualDRIVE uses one motor, with the two units mechanically preloaded using a patented user friendly method.



TwinDRIVE electric preload



DualDRIVE Mechanical Preload

Both solutions provide the same performance with respect to the reducers, racks and pinions. The TwinDRIVE solution offers more flexibility in control, because the two motors can work together in certain instances. The DualDRIVE only requires one motor and simplifies control. The final choice depends on the customer's preference and global cost.

What products are in the Redex-Andantex RP family?

The RP range of products is available in different configurations, offering the designer a library of products to choose from to easily integrate into specific machine designs. All units can be provided as SingleDRIVE, TwinDRIVE or DualDRIVE.

KRP+ – Front Flange Mount

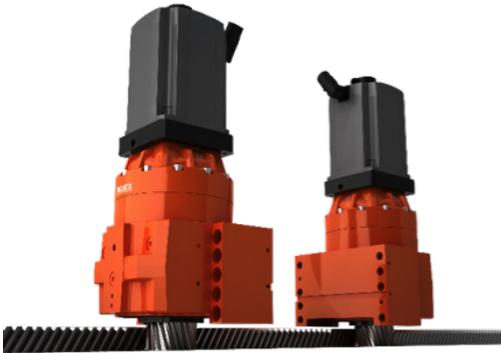


KRP + M IN-LINE SingleDRIVE

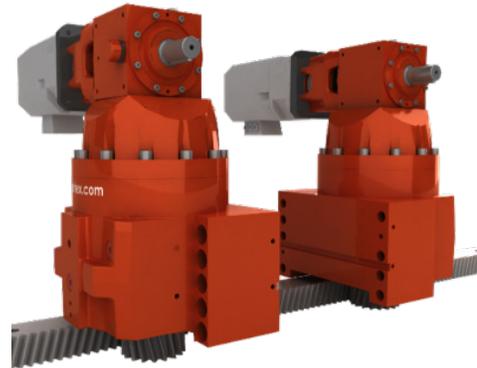


KRP+R RIGHT ANGLE SingleDRIVE

KRPX+ – SIDE MOUNT



KRPX+M IN-LINE TwinDRIVE

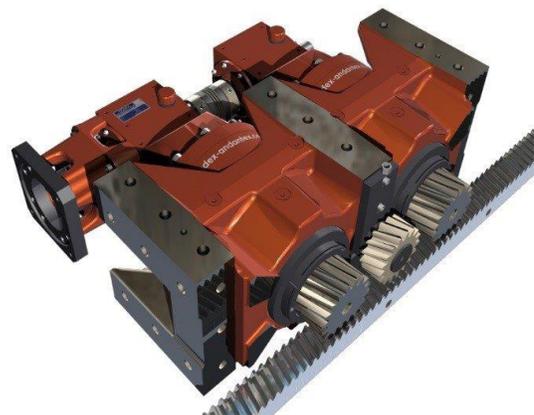


KRPX+R RIGHT ANGLE TwinDRIVE

DRP+ – UNIVERSAL HOUSING



DRP+M IN-LINE TwinDRIVE



DRP+R RIGHT ANGLE DualDRIVE

Get Expert Guidance

Redex-Andantex RP products meet all of the requirements of a high-performance rack and pinion or rotary axis drive system as detailed above. There is no other solution on the market that incorporates all of this performance in one range of dedicated reducers. Please contact Andantex for application solutions to:

LINEAR AXES DRIVES

OR

ROTARY AXIS DRIVES

