



Q&A Session for Planetary Gearheads 101: Basics for Design Engineers

Q: Can the gear boxes be made submersible for clean water applications?

A: The best IP rating that we can provide is IP65, based on modifications to the existing UltraTRUE product line. Any greater IP rating would have to be reviewed based on requirements and quantities.

Q: Is there any axial force within the helical planetary gear sets?

A: Yes, Micron helical planetary gearheads use a pair of tapered roller bearings at the output to support this, as opposed to competitors who may use ball bearings.

Q: Is a right angle gearbox the same as a worm gear? If not, what is a worm gear?

A: Our right angle gearheads use PowerTRUE crown gearing to make the right angle turn. Worm gearing is an entirely different older technology that we do not support.

Q: What are the disadvantages of helical gears? Is the efficiency reduced?

A: Disadvantage is that they will produce an axial force. Micron helical planetary gearheads use a pair of tapered roller bearings at the output to support this, as opposed to competitors who may use ball bearings. Efficiency of these gearheads is still 95% per stage. They also are more expensive to manufacture.

Q: How are these forces managed (i.e. bearings?)

A: Micron helical planetary gearheads use a pair of tapered roller bearings at the output to support this, as opposed to competitors who may use ball bearings.

Q: What is dwell time?

A: Dwell time is the period in a motion profile where the motor shaft is not moving.

Q: 4 arc-min precision is the same for UT & UTR, how is this measured?

A: Backlash is measured at 2% of the rated torque, at all points throughout a rotation, and is the maximum value throughout the life of the gearhead.

Q: Can I backdrive a planetary gearhead into a slip clutch to amplify the slip clutch's torque for motor testing?

A: Yes, Micron planetary gearheads are fully backdriveable. The backdrive torque is dependant on gearhead size, style, and ratio, and will vary.

Q: How would you calculate the reflected inertia back on the motor? Why would I be concerned about that?

A: Reflected inertia is based on the application loads, as well as the small inertia that the gearhead has on the motor shaft, which is specified in our catalog. This is critical for proper motor performance.

Q: I think Thomson's backlash was listed at 2% of rated torque. Are there other standard % T ratings, and how do we make a comparison?

A: Unfortunately, there is no way to compare. Everyone tends to measure differently and there are no standards.

Q: Why would someone use a 1:1 (non right angle) gearbox? Examples?

A: This would not be a gearbox, rather a housing with a shaft and coupling. Only possible application might be to change a mounting surface to a more standard one.

Q: What is the typical friction/backdriving torque of your 2 or 3 stage (~ 60:1) planetary gearheads?

A: Every gearhead that is shipped out of the Micron facility is tested for input friction (torque to drive the input hub), not the other directions which would be the backdrive torque. This can be

done upon request. Both measurements would depend on the frame size and product line. The typical input friction on a double stage, size 90mm gearhead would be 10-16 oz-in.

Q: How do you calculate the unit life?

A: Gearhead life can be calculated based on a specific application. The motion profile, duty cycles, exterior forces, and environmental issues all need to be considered. Catalog life ratings are based on the speed and torque indicated and a duty cycle under 1000 cycles per hour.

Q: Do you have any information on friction losses?

A: As mentioned in the question above, Micron tests the input friction of every gearhead before it is shipped. The friction losses depend on many variables such as frame size, ratio, product line etc. Any of this information is available upon request.

Q: What is the trade-off for increased helix angle? As the angle increases, the transmitted torque is increased and noise is reduced, but what is the limiting factor of increased helix angle?

A: Helical gears produce an axial force. Micron helical planetary gearheads use a pair of tapered roller bearings at the output to support this, as opposed to competitors who may use ball bearings. Higher helix angles may produce far greater axial loads that could not be effectively supported.

Q: Does the ValuTrue have the integral ring gear in the housing like the UltraTrue?

A: Yes it does have the same internally cut ring gear.

Q: Does the XTRUE use straight gearing?

A: Yes, the XTRUE uses straight planetary gear stages.

Q: Does the motioneering tool handle 2nd stages gearbox if application warrants it?

A: Yes, the new tool handles all catalog gearheads.

Q: What is your smallest size you have available? Do you have anything comparable to RC servo sizes?

A: The smallest gearheads available are the NT17 and XT040... these are equivalent to NEMA size 17, or about 1.7 inches square.

Q: Can you cover the AcuTrue gearbox please? Also, why is the AcuTrue the best solution for a right angle over the UltraTrue? Thanks.

A: The AccuTRUE gearheads are still available as replacement units, but are not supported for new applications. They were replaced by the UltraTRUE product line more than 5 years ago. The UltraTRUE right angle (UTR) is what should be used for all new applications.

Q: Do you offer viton orings or rubber?

A: Viton o-rings and seals can be quoted as a special for applications that require it.

Q: Can the new Micron Motioneering tool cross reference competitor PNs for gearboxes to your gearboxes (for a replacement)?

A: The tool will not offer any competitive cross reference details. This should be handled directly with your Thomson/Micron Sales Engineer.

Q: When you enter the dimensions manually, will the program generate a Redi-Mount part number?

A: Yes, the tool will generate a complete gearhead model number, including the appropriate RediMount kit.

Q: I notice that backlash seems important in the selection of a gearhead, is there somewhere in your catalog that talks about this very subject and how to determine the required backlash for the customers application?

A: Backlash is completely application dependant. The backlash needed will be a result of the performance that the end user requires.

Q: Does the redi mounts 3d cad data download with its own part number?

A: The tool will only generate models for complete part numbers, including and gearhead and RediMount kit. "RediMount kit only" models are not available.

Q: What is the best way to determine if a rt. angle 3:1 gearbox is bad or not?

A: If it is less than four years old, it should be evaluated at the factory through our standard RMA process.

Q: How does the "high pressure" water in a waterjet application come in contact with the gearbox? The high pressure water comes out of the tip to cut the material.

A: The gearhead is typically above the "wet" area along with the servo motors and controls, moving the various axis' that control the cutting head.

Q: How do you find out what your torque requirements are (when sizing a gearbox) if you have no way to measure torque?

A: You should consult with a Danaher Field Sales Engineer, who can assist in sizing the system from the outlet to the load.

Q: Efficiency range of the precision gearbox?

A: UltraTRUE and ValueTRUE helical planetary gearheads are rated at 95% efficient per stage.

Q: Can I backdrive a planetary gearhead into a slip clutch to amplify the slip clutch's torque for motor testing?

A: Yes, Micron planetary gearheads are fully backdriveable. The backdrive torque is dependant on gearhead size, style, and ratio, and will vary.

Q: What is the most common ratio used in industrial application?

A: Ratios are completely dependant on the motor sizing and required performance of the application. We have standard ratios from 1:1 to 500:1.

Q: Is it common that huge gearbox fails from its bearing? Then cracks appear in teeth.

A: Gearhead failure is totally application dependant and can have any number of forms. Gear wear and bearing failure are most typical.

Q: Are nickel plated or stainless housings available & economic?

A: Nickel plating will be more economic than a fully stainless unit, pricing of course is dependant on specific gearhead and volume. All gearheads have aluminum anodized input housings.

Q: When making a two stage gearbox, do you always have the second stage pinion floating?

A: No, the second stage pinion gear is supported by the first stage bearings. The first stage planet carrier and the second stage pinion are one solid piece, bearing supported.

Q: What type of grease is typically used?

A: Several different gear greases are used, depending on the style and size of the gearhead.

Q: What are some ways to reduce the noise a planetary gearbox makes?

A: Some noise is inherent to size and ratio.
Careful gearhead mounting and suppressing machine vibrations is always helpful.

Q: What type of grease is used?

A: Several different gear greases are used, depending on the style and size of the gearhead.

Q: Do you do anything in Ft / lbs.?

A: All catalog specifications are listed in Nm and in-lbs. Gearheads are available up to 22000 in-lbs continuous torque (1800+ ft-lbs)

Q: How does % of rated torque affect the backlash measurement?

A: The backlash measured is dependant on the torque applied when testing. Use a lower torque when testing, and the result is a lower backlash rating.

Q: Do your designs support high vacuum and extreme temperature (-40C) environments (e.g. Space applications)?

A: Yes, we can custom design gearheads for vacuum applications as well as extreme temperature applications.

Q: What are the disadvantages of helical cut gears (vs straight cut)?

A: Disadvantage is that they will produce an axial force. Micron helical planetary gearheads use a pair of tapered roller bearings at the output to support this, as opposed to competitors who may use ball bearings. They also are more expensive to manufacture.

Q: Do these motors operate on 24 VDC?

A: These are mechanical gearheads that require no direct power. They are driven by any number of electrical motors that are supplied separately.

Q: How does the efficiency of your gearboxes compare with competitors?

A: UltraTRUE and ValueTRUE helical planetary gearheads are rated at 95% efficient per stage, this is typical of most high performance servo gearheads.

Q: What is your highest available nominal torque for in-line gear reducer?

A: Our UT022 gearhead is rated at around 2500 Nm continuous. This is the highest rating in the catalog.
