AUSTRALIA
Melbourne (Victoria)
Tel + 61 (03) 9262 3333
Fax + 61 (03) 9561 8561
also at: Sydney, Brisbane, Adelaide, Perth, Newcastle, Wollongong, Townsville.

AUSTRIA
Vienna
Tel + 43 (0) 13303484-0
Fax + 43 (0) 13303484-5
also at: Kiskörös (Hungary), Jaroslavice (Czech Republic).

BELGIUM
Brussels
Tel + 32 (0) 2 201 1262
Fax + 32 (0) 2 203 2210

CANADA
Brantford (Ontario)
Tel + 1 519 756 6118
Fax + 1 519 756 1767
also at: Montreal.

CHINA
Shanghai
Tel + 21 5046 2696
Fax + 21 5046 2695

DENMARK
Bröndby (Copenhagen)
Tel + 45 43 45 26 11
Fax + 45 43 45 65 92

FRANCE
Seclin
Tel + 33 (0) 320 16 29 29
Fax + 33 (0) 320 16 29 00

GERMANY
Einbeck
Tel + 49 (0) 5562 81163
Fax +49 (0) 5562 81102
also at: Bielefeld, Düsseldorf, Kornwestheim.

KOREA
Seoul
Tel + 822 783 6829
Fax +822 784 9322

MALAYSIA
Selangor Darul Ehsan
Tel + 60 3-5191 9880
Fax + 60 3-5191 9881
also at: Johor Bharu, Ipoh, Penang.

NETHERLANDS
Amsterdam
Tel + 31 206 146661
Fax + 31 206 146391

NEW ZEALAND
Auckland
Tel + 64 9 828 5018
Fax + 64 9 828 5019
also at: Christchurch.

SINGAPORE
Singapore
Tel + 65 6760 2422
Fax + 65 6760 1507

SOUTH AFRICA
Benoni
Tel + 27 11 747 9500
Fax + 27 11 747 9505
also at: Witbank.

SWEDEN
Bröndby (Copenhagen)
Tel + 45 43 45 26 11
Fax + 45 43 45 65 92

SWITZERLAND
Dübendorf (Zürich)
Tel + 41 (0) 44 824 84 84
Fax + 41 (0) 44 824 84 11
email: duebendorf@renold.com
also at: Crissier (Lausanne).

UK
Renold Gears, Rochdale
Tel + 44 (0) 1706 751000
Fax + 44 (0) 1706 751001
e-mail : gears.sales@renold.com

USA
Westfield NY
Tel + 1 716 326 3121
Fax + 1 716 326 6121

WEB
www.renold.com

E-MAIL
e-mail : gears.sales@renold.com

For other country distributors please contact Renold UK.

RENOLD
Superior Gear Technology

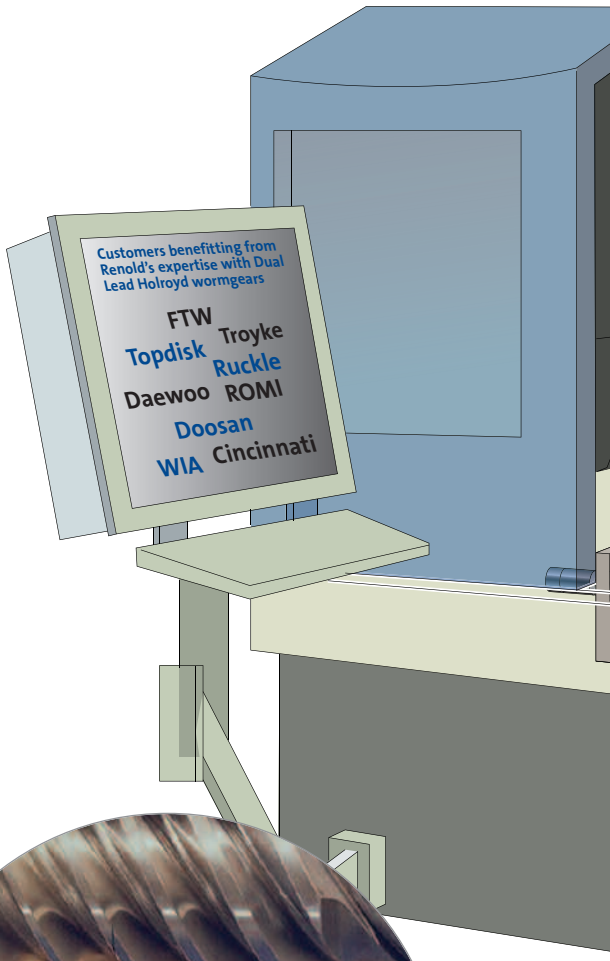
Holroyd

Precision Machine Tool Worm Gears

RENOLD

Superior Gear Technology

Precision Dual lead worm gears



Over 125 Years of Excellence

Over 125 years have elapsed since John Holroyd & Co. Ltd started to produce machine tools and gears and throughout this period the name Holroyd has been associated with the highest quality in both of these fields.

In the production of worm gearing the unique Holroyd gear form is widely respected for its performance and reliability in a wide variety of drives, ranging from the screw down mechanisms in steel mills to the motion actuators of robots used in the construction of microchips.

To improve the performance of wormwheel hobbing machines, Renold developed the Precision Dual Lead Backlash Adjustable Wormgear Form which is now widely used in rotary tables, cutter drives and machine tool positioning mechanisms.

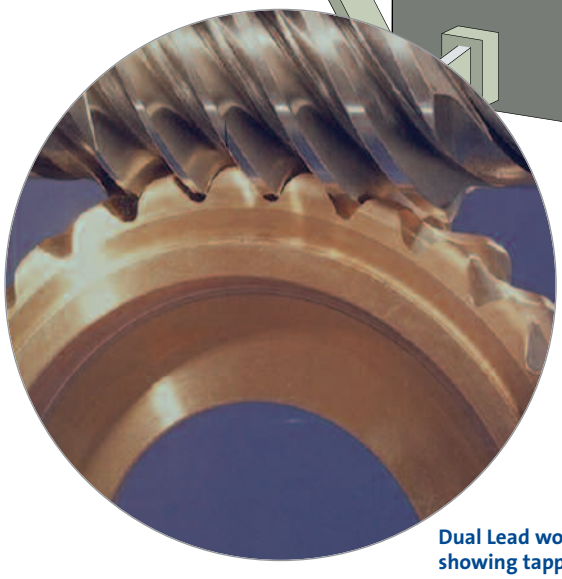
Dual lead gears

Dual lead wormgears are constructed with two leads. One flank of the thread and its mating sides of the wheel teeth are manufactured with one lead, and the other flank and its mating wheel teeth are manufactured to a slightly different lead.

As far as the worm is concerned this has the effect of producing a worm thread which increases in thickness from one end of the worm to the other.

If the worm is therefore moved in an axial direction when in mesh with the wormwheel, backlash between the pair can be adjusted to the required amount.

In practice the gears are manufactured so that the initial backlash is achieved at a certain distance relative to a datum plane on the worm. The worm can then be adjusted from this point as and when necessary during the life of the gears.



Dual Lead worm gears showing tappered worm threads

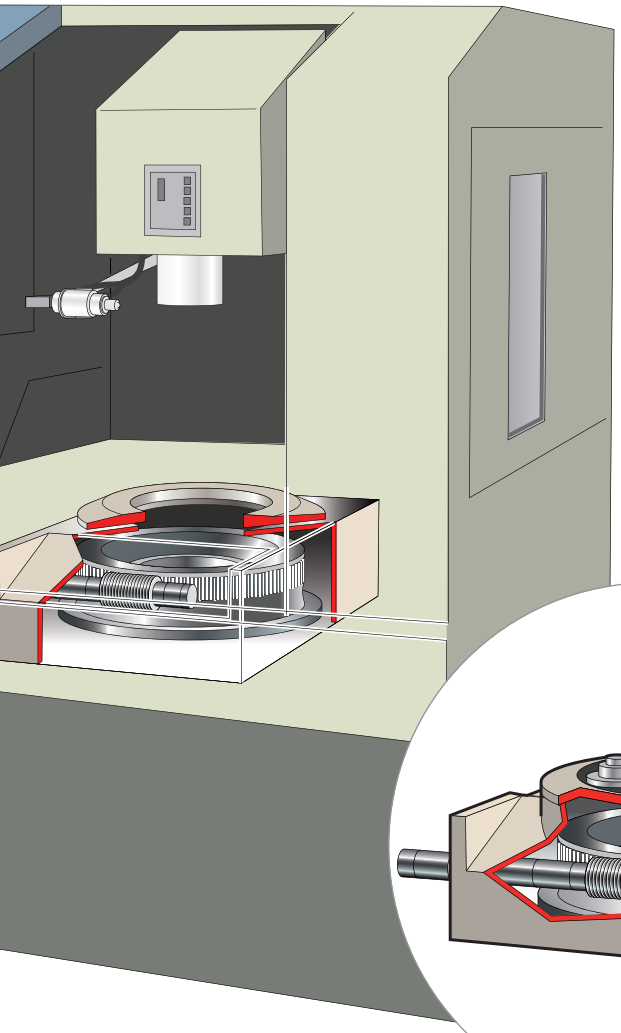
Accuracy Checking of Dual Lead Gears

The accuracy of a set of gears takes account of the tolerances of concentricity, profile, adjustment, accumulative pitch errors and centre distance. When assessing a requirement for a dual lead worm gear it is necessary to confirm that the distance of the supporting case can be held within plus 0.05 mm (0.002”) and minus 0.00 mm.

There are various national standards covering the accuracy and classification of wormgear sets which stipulate maximum allowable errors of adjacent and cumulative pitch and profile. Holroyd have the manufacturing capability to achieve closer tolerances than are stated in the majority of these standards with the necessary equipment for their checking and verification.

In addition, Holroyd have unique equipment for carrying out single flank or transmission testing. This comprises of a continuous measurement of the angular position of the driven wormwheel, relative to where it should be with a perfect gear set, as the driving worm rotates at a uniform rate. The test both measures and records actual pitch and eccentricity, and also the profile.

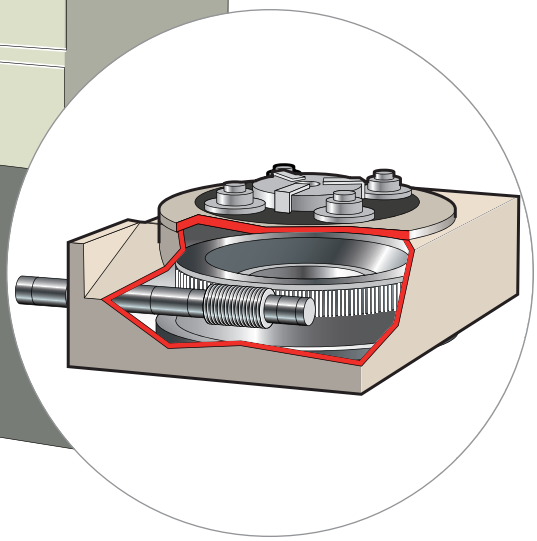
Accuracy checking of a Machine Assembly

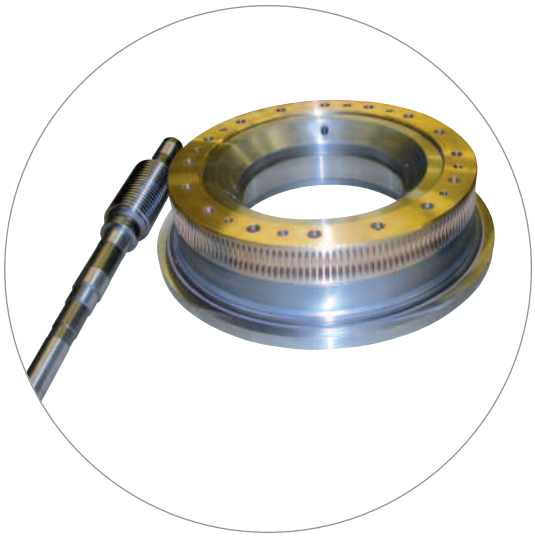


Precision Machine Tool worm gears Assemblies

Dual lead assemblies

Renold has also developed complete machine tool gears. These are high precision, dual lead wormgears, manufactured in conjunction with the mounting assembly for the wheel. The mounting assembly is manufactured to customers' specific requirements and is therefore designed to bolt straight to the rotary table spindle of the machine tool.





Comparable accuracy of Holroyd Dual lead against split type

Split Wormshaft Type

With this arrangement the worm is produced as a two-piece item, the design being split at the gearing centreline. One worm may be integral with the shaft, the other keyed or splined to the shaft but axially adjustable, the position being fixed by a spacer positioned at the centreline between the two components.

There are a number of disadvantages with this method. Firstly, the gap required by the spacer can cause an interruption of the line of contact. Secondly there will be increased friction and therefore reduction in efficiency due to the applied pressure to both sides of the wormwheel teeth.

Dual Lead Wormgear

The Dual Lead wormgear does not suffer from any of the above disadvantages. It provides a kinematically correct gear, which can run in either direction of rotation and on which the backlash is infinitely adjustable from an acceptable maximum to zero. In addition, the dual lead wormshaft is a one-piece unit that is less expensive and more accurate than split worms, including Class 1 types.

The graph shows test results comparing two split type wormshafts classifications to a Holroyd Dual Lead type worm gear, it shows that both split designs are microns less accurate. In one case half as accurate.