

Infinit-Indexer® Phase Adjuster

HDI Series



Total Motion Control

Harmonic Drive® gear

P r e c i s i o n G e a r i n g a n d M o t i o n C o n t r o l

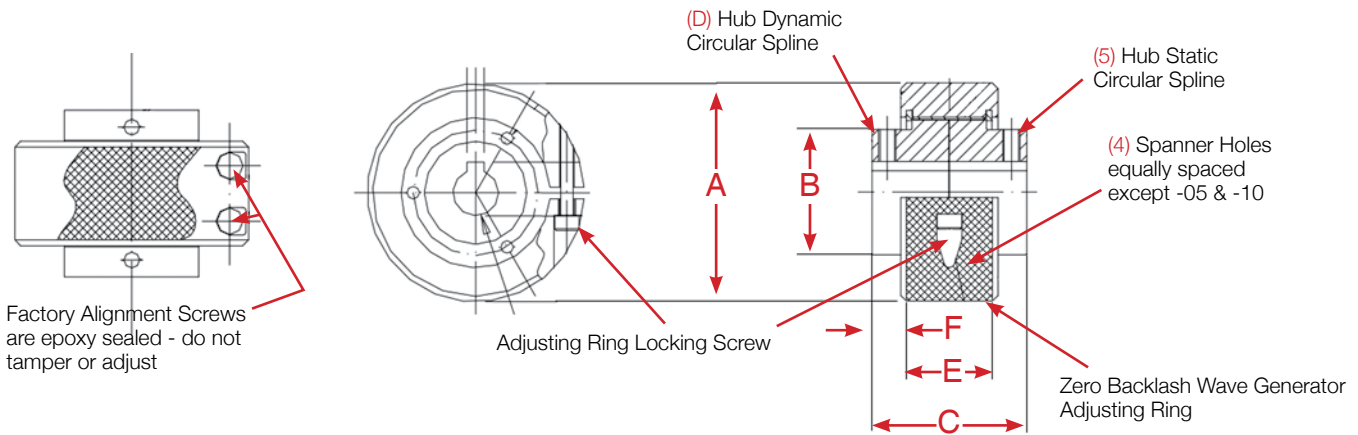


HDI Infinit-Indexer® Phase Adjusters

HDI's are shaft mounted gear reducers. They provide hand adjustable, precise, static phase adjustment. On rotating shafts the HDI functions as rigid shaft coupling. Phase adjustment is accomplished when the drive system is stopped. Adjustments are made by hand in either direction by adjusting the knurled outer ring producing infinitely variable relative rotation of the hubs through a 100:1 reduction ratio. With the "D" hub fixed, rotation of the "S" hub is opposite to the direction of nut rotation. With the "S" hub fixed, rotation at the "D" hub is in the same direction as nut rotation.

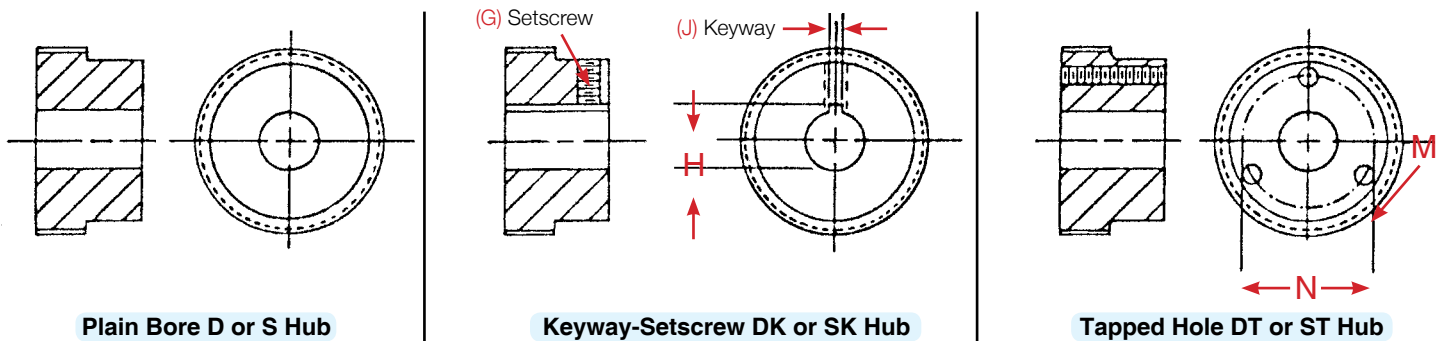
HDI reducers are available in 6 sizes and have torque ratings from 500-20,000 inch pounds. There are two ways to purchase HDI phase adjusters; from our stocking program or by special order from a customer request.

Infini-Indexer® *Built-to-Order*



Basic HDI Size	A	B	C	E	F	*Torque Rating lb.-in.	Approximate Weight lbs.
-05	2.00	0.99	1.43	0.91	.26	500	1.2
-10	2.38	1.38	1.69	1.06	.31	1,000	1.5
-25	3.00	1.75	2.19	1.38	.40	2,500	3.0
-50	3.75	2.17	2.37	1.63	.37	5,000	5.0
-100	4.75	2.94	3.29	2.06	.61	10,000	11.0
-200	6.50	3.75	4.05	2.38	.84	20,000	24.0

*Torque rating is for continuous one direction of rotation. For reversing torque systems, the tabulated rating is the sum of the CW & CCW torque.

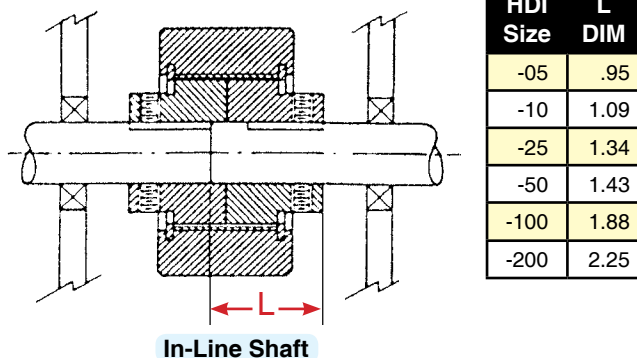


Basic HDI Size	Bore Size	D Hub	S Hub	D Hub	S Hub	G	H	J	D Hub	S Hub	M* UN-2B	N
-05	.250 .375 .500	2D 3D 4D	2S 3S 4S	2DK 3DK 4DK	2SK 3SK 4SK	8-32 8-32 8-32	— .409 .561	— .062 .125	2DT 3DT 4DT	2ST 3ST 4ST	6-32 6-32 6-32	.750 .750 .750
-10	.500 .625 .750	4D 5D 6D	4S 5S 6S	4DK 5DK 6DK	4SK 5SK 6SK	1/4-20 1/4-20 1/4-20	.585 .710 .837	.187 .187 .187	4DT 5DT 6DT	4ST 5ST 6ST	8-32 8-32 8-32	1.125 1.125 1.125
-25	.750 .875 1.000	6D 7D 8D	6S 7S 8S	6DK 7DK 8DK	6SK 7SK 8SK	1/4-20 1/4-20 1/4-20	.863 .988 1.114	.250 .250 .250	6DT 7DT 8DT	6ST 7ST 8ST	10-32 10-32 10-32	1.500 1.500 1.500
-50	1.000 1.250	8D 10D	8S 10S	8DK 10DK	8SK 10SK	1/4-20 1/4-20	1.114 1.368	.250 .250	8DT 10DT	8ST 10ST	1/4-20 1/4-20	1.750 1.750
-100	1.250 1.625 1.750	10D 13D 14D	10S 13S 14S	10DK 13DK 14DK	10SK 13SK 14SK	3/8-16 3/8-16 3/8-16	1.418 1.793 1.918	.375 .375 .375	10DT 13DT 14DT	10ST 13ST 14ST	5/16-18 5/16-18 5/16-18	2.500 2.500 2.500
-200	1.750 2.000 2.500	14D 16D 20D	14S 16S 20S	14DK 16DK 20DK	14SK 16SK 20SK	1/2-13 1/2-13 1/2-13	2.026 2.276 2.778	.625 .625 .625	14DT 16DT 20DT	14ST 16ST 20ST	3/8-16 3/8-16 3/8-16	3.125 3.125 3.125

*Six holes equally spaced. True position .015 diameter except sizes -05 and -10 three holes. **To order:** specify the basic size and desired D and S hub configuration. Example: HDI 10-6D-6SK specifies a size -10 with D hub .750 diameter plain bore and S hub .750 diameter bore with keyway and setscrew.

Installation

Figure 1



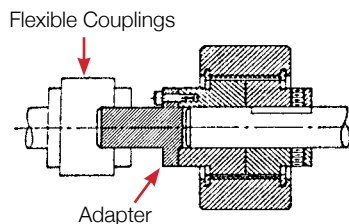
The Inifit-Indexer® phase adjuster can be installed in a machine system either as an in-line shaft coupling or a concentric shaft coupling.

In-Line Shaft (Fig. 1 & Fig. 2)

In order to properly align shafts concentric to one another, either the driven or driving shaft should pass completely through one hub and engage the other by an amount determined by the (L) dimension. The hubs are symmetrical; therefore, the (L) length applies to a piloting shaft length entering from either hub face.

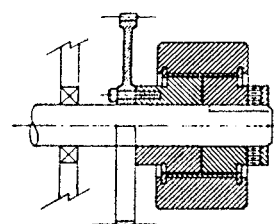
The coupling is designed to transmit pure torque only. Radial reaction loads generated by gears, sprockets,

Figure 2



In-Line Shaft

Figure 3



Concentric Shaft

shaft misalignment, etc., must be isolated from the unit by appropriate shaft bearing supports.

When it is not possible to maintain good shaft concentricity, it is recommended that the Inifit-Indexer be mounted in conjunction with a flexible coupling and adapter as in Fig. 2.

Concentric Shaft (Fig. 3)

The shaft should pass completely through the attached sprocket, gear, etc., and the Inifit-Indexer at a uniform diameter with a tight running fit.

It is recommended that the region of the shaft under the gear, sprocket, etc., and connected hub be lightly lubricated with a multi-purpose grease at assembly.

Adjusting Ring

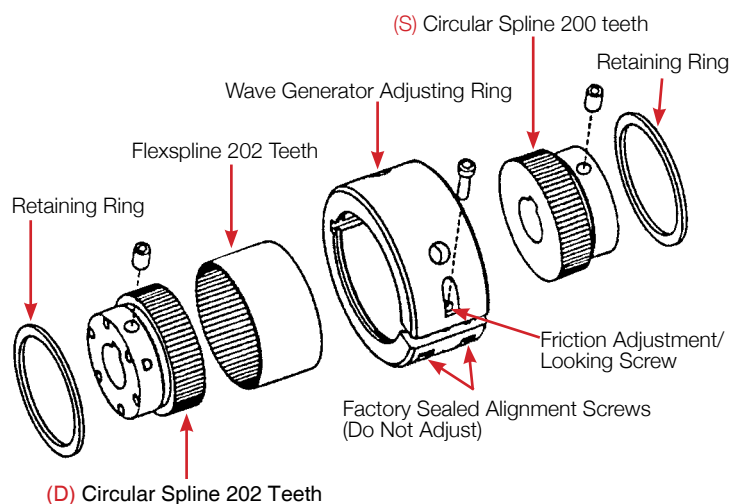
One revolution of the knurled outer adjusting ring results in 3.6° of shaft phase adjustment. With the (D) hub fixed, rotation of the (S) hub is opposite to the direction of adjustment ring rotation. Conversely, with the (S) hub fixed, rotation at the (D) hub is in the same direction as adjusting ring rotation.

The coupling is essentially self-locking and applications requiring frequent adjustment can be investigated for the possibility of operating without having to seat the locking screw. However, those applications in which the coupling is subjected to typical motor start up accelerations, sudden stops and/or a vibratory environment will require use of the screw to maintain a phase setting.

The coupling during adjustment is not intended to drive against any significant reaction load that may exist between the connected shafts. However, some adjusting ring torque amplification results to provide a hub drive torque capability within recommended limits noted to below:

Unit Size	Adjusting Ring Torque (lb. in.) Ref.	Hub Drive Torque (lb. in.)
-05	4	20
-10	8	40
-25	16	80
-50	32	160
-100	76	380
-200	150	750

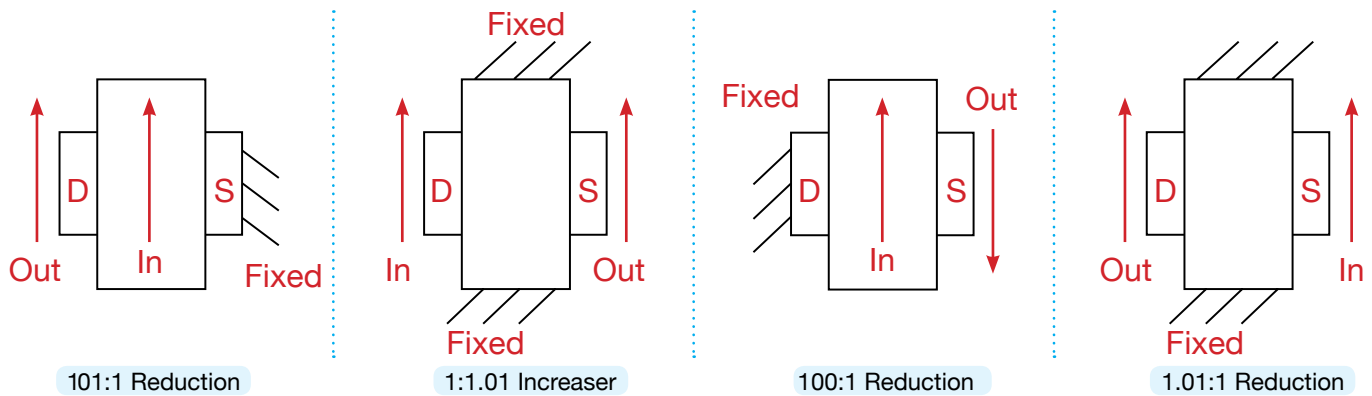
Spanner wrench holes are provided on the O.D. of the adjusting ring in sizes 50, 100, 200, and 300.



Lubrication and Disassembly

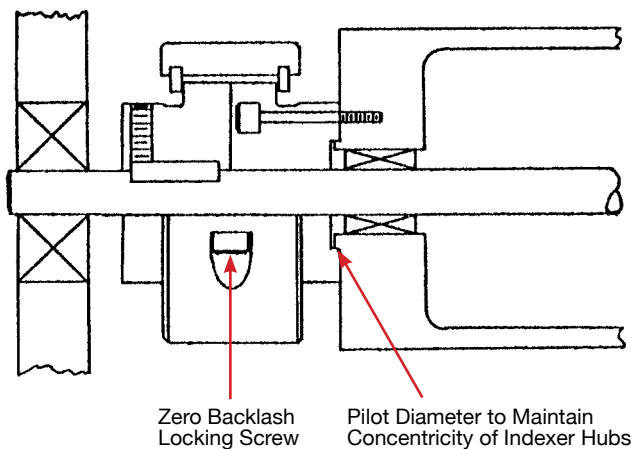
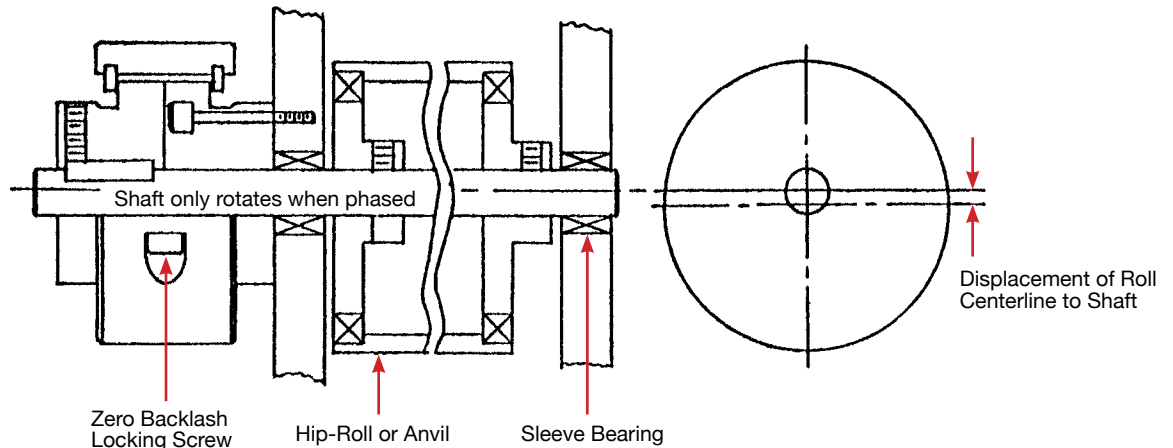
The coupling is factory lubricated and will not require further maintenance under normal conditions. Nevertheless, periodic maintenance should be performed when the coupling is subject to frequent adjustment, dirty or other abnormal conditions, or when the adjusting ring torque becomes higher than normal.

Loosen the adjusting ring locking screw (it is not necessary to remove the locking screw) and remove one retaining ring. All parts will then slide out in one direction. Do not tamper with or remove the two factory alignment screws. Clean the parts and re-lubricate with a multipurpose EP 2 (NLGI #2) grease, such as TEXACO Multifak EP 2. It is recommended that the region of the shaft under the gear, sprocket, etc., and connected hub (shown in figure 3) be lightly lubricated with the above type grease.



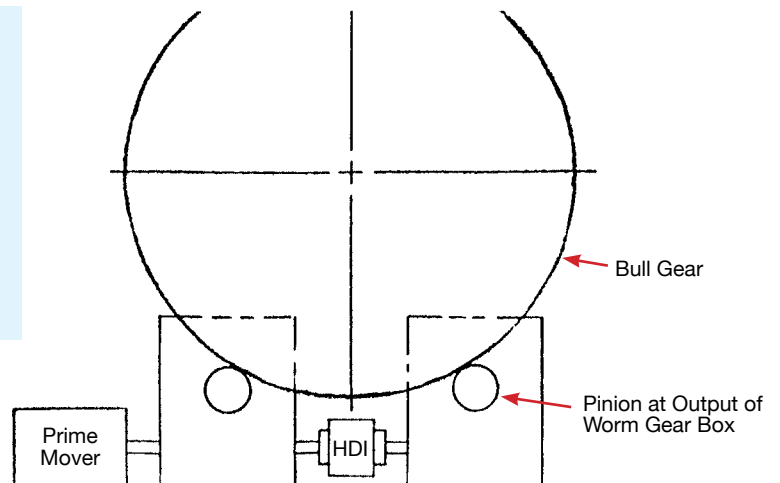
If any two elements are locked together, the indexer will not phase and the unit will rotate in a 1:1 mode.

Precise manual displacement of roll centerline to adjust nip-roll pressure or depth-of-cut using HDI Infnit-Indexer® phase adjuster



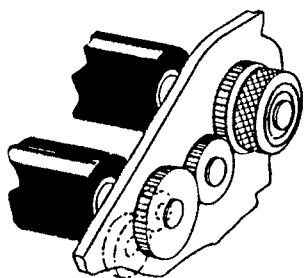
HDI Infnit-Indexer phase adjuster to manually phase a hollow roll to a solid through-shaft

HDI for removal of backlash from a worm gear drive system. Two pinions, each mounted on the output shaft of separate, identical worm gear reducers, mate with a common bull gear. Adjusting the HDI causes one pinion to preload the bull gear against the other pinion. At set-up, the assembler finds the loosest mesh point of the system and adjusts-out the backlash at that point. Any other position of the bull gear will result in a preloaded system.

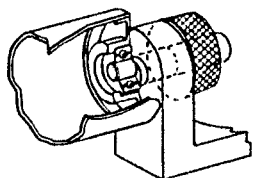


Applications

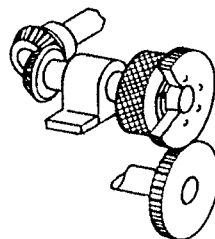
The Infinit-Indexer® phase adjuster provides the designer with a simple component which will solve an almost limitless variety of design problems through precise shaft phase adjustment.



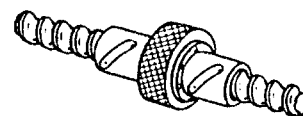
Adjusting Printing Rolls



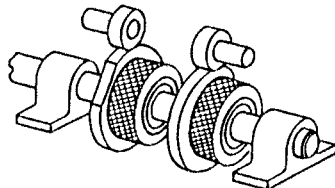
Adjusting an Eccentric



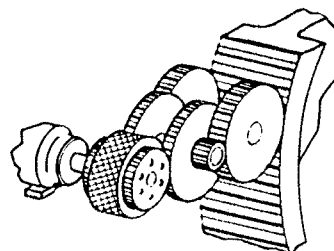
Phasing Gears



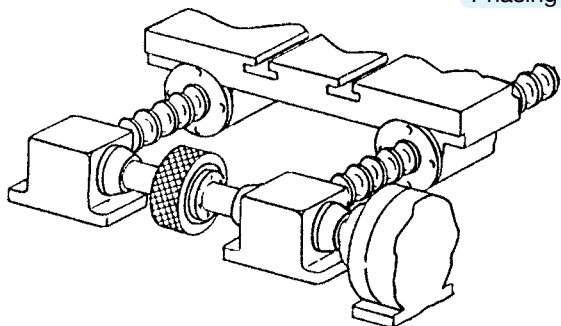
Adjustable Backlash on Ball Nuts



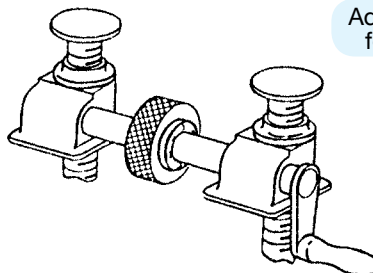
Phasing Cams



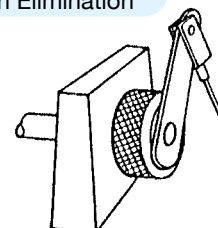
Adjusting a Dual Gear Train for Backlash Elimination



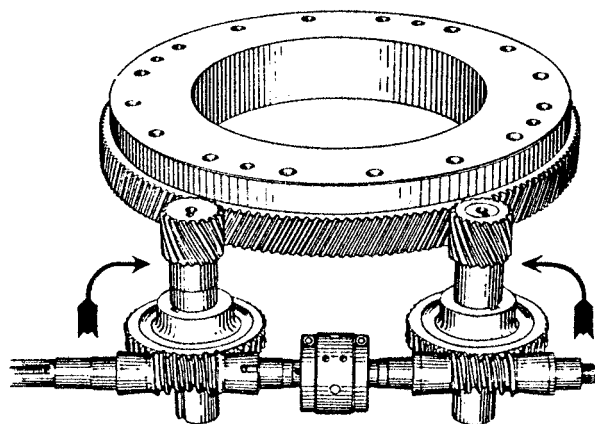
Aligning Part of a Machine Tool



Aligning Leveling Jacks

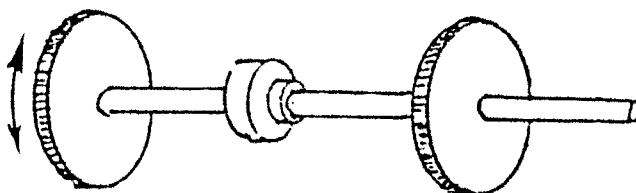


Adjusting Linkage



HDI-25-8SK-8DK

The rotary feed tables are driven by dual pinions which engage the ring gear. This unique design affords the ability to "take up" lost motion in the drive train and to actually preload the mechanism producing the "stiffness" necessary for rotary machining.



Aligning Teeth of Gears or Sprockets

Notes



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