



STERLING INSTRUMENT offers a wide choice of Standard Gearheads and Speed Reducers in three standard sizes. However, in many applications a special unit is required. Below is a listing of some of the Special Applications Gearheads and Speed Reducers that **Sterling Instrument** can produce and for which designs exist:

- **Zero-Backlash Gearheads and Speed Reducers** for applications which require absolutely no lost motion throughout the Gear Train. Consult **Sterling Instrument** Engineering for the Gearhead & Speed Reducer sizes, ratios, and output loads where Zero Backlash is applicable.
- **Splined Shaft Gearheads and Speed Reducers** for applications which require direct meshing with other component parts of the Gear Train. Consult **Sterling Instrument** Engineering for the applicable Diametral Pitches and numbers of teeth.
- **Low-Backlash Gearheads and Speed Reducers** for applications which do not require Zero Backlash, but do require lower Backlash than standard units. Consult **Sterling Instrument** Engineering for the applicable Backlash Specifications and output loads.
- **Tandem Gearheads and Speed Reducers** for applications which require reduction ratios higher than shown in the tables of this catalog.
- **Exact Ratio Gearheads and Speed Reducers** for applications which require reduction ratios which are even integers.
- **Integral Slip Clutch Gearheads and Speed Reducers** for applications which require a built-in Torque Limiting Device.
- **Heavy-Duty Gearheads and Speed Reducers** for applications which require two to three times the available output Torque of standard Gearheads and Speed Reducers, available as a special order.

Sterling Instrument also builds Speed Increaseers.



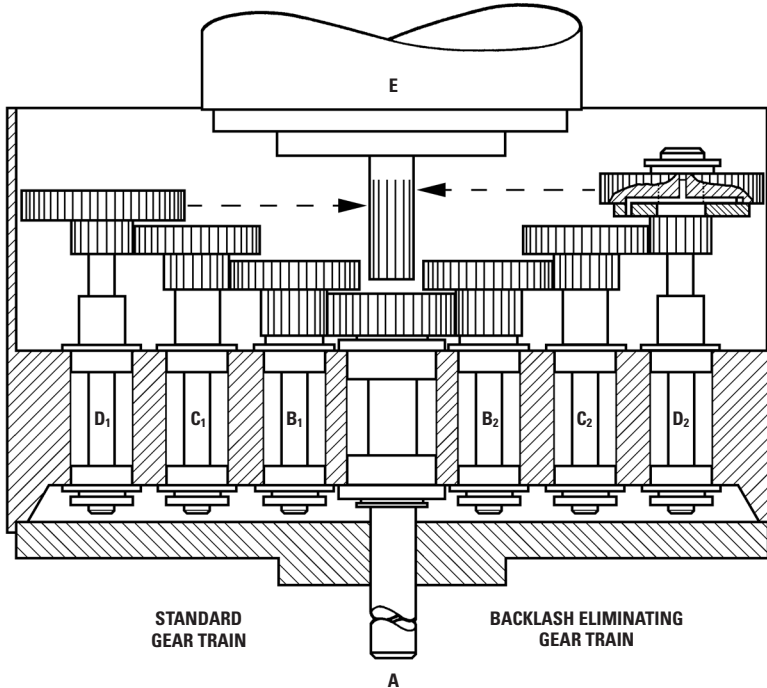
Speed Reducers
MGX T-Series 1.4375" O.D.
S9115A-T6...

For entire product line, technical information, 3D models and online buying, visit <https://shop.sdp-si.com/catalog/>



In many electromechanical instruments it is often necessary to use, as a component part of a system, a gear train which contributes a minimum amount of backlash or lost motion to the system in order to obtain maximum system accuracy. With this need in mind, **STERLING INSTRUMENT** has designed a gear train arrangement which completely eliminates backlash and lost mo-

tion from the entire gear train. At the same time, this gear system allows unusually high torque loads at the gear train output without overriding the spring loading of the system. The drawing below illustrates the application of this zero-backlash system to a gearhead or speed reducer.



The standard gear train (A, B₁, C₁, D₁, E) is identical to that which is found in our standard catalog gearheads & speed reducers. Pinion & gear clusters B₂ & C₂, in the backlash eliminating gear train, are duplicates of pinion & gear clusters B₁ & C₁, in the standard gear train. The pinion of pinion & gear cluster D₂ is identical to the pinion of pinion & gear cluster D₁ with the addition of the torsion spring retaining slot in the end of the D₂ pinion. As per normal practice, the gear & pinion on the D₁ cluster are fastened together via press fitting & staking. The gear on the D₂ cluster is a slip fit on the mounting diameter of the D₂ pinion and axially retained on the mounting diameter by the torsion spring. Input pinion E and output gear A are common to both halves of the train.

In assembling the gearhead to a servomotor or to the input pinion of a speed reducer, the gear of cluster D₁ is restrained from rotation by inserting a wedge of a soft material (e.g., aluminum, nylon, etc.) thru the access

hole provided in the housing and into a tooth space. The gear of cluster D₂ is then rotated, in a direction which winds the torsion spring the desired number of teeth and restrained from rotating, using a second wedge thru the second access hole. Since all speed reducer input pinions and motor pinions have an odd number of teeth, it is easier to install the motor pinion or input pinion, if the D₁ & D₂ gears are held by the wedges in a position where a tooth space on one of the gears is opposite a tooth on the other gear. Once the pinion is meshed with the D₁ & D₂ gears and the pilot diameter of the motor or speed reducer input is seated within the gearhead shell, the wedges are released, completing the zero-backlash path.

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STERLING INSTRUMENT gearheads and speed reducers are made to the highest exacting standards of craftsmanship. The gearheads are attachable to the U.S. Bureau of Ordnance (Bu-Ord for short) frame size servomotors without modifications to the input pinions and without complicated adapters, screw threads, etc. by the versatile mounting clamps supplied. Mounting dimensions are identical to Bu-Ord OP 1755 motor dimensions.



INCH COMPONENT

Catalog Series	O.D. in.	Input Pinion		Description		Max. Weight oz.
		D.P.	Teeth	Backlash	Shaft Orientation	
Gearhead Selection Guide						
S9105A-T608	.50	120	13	LOW	IN-LINE OUTPUT	.5
S9108A-T612	.75					.95
S9111A-T617	1.0625			ZERO		1.5
S9111A-T619				2.5		
S9115A-T623	1.4375	96	15	LOW	4.0	
S9118A-T628	1.75					

Catalog Series	O.D. in.	Description			Max. Weight oz.
		Backlash	Shaft Termination	Shaft Orientation	
Speed Reducer Selection Guide					
S9105A-T6008	.50	LOW	DOUBLE-ENDED	IN-LINE OUTPUT	1.2
S9111A-T6017	1.0625				ZERO
S9111A-T6019		4.0			
S9115A-T6023	1.4375	LOW			5.5
S9118A-T6028	1.75				

Catalog Series	Design Style	Integrated Position Error
Transducer Gearhead Selection Guide		
S9111A-T640	Standard	40 arc minutes maximum
S9111A-T641	Anti-Backlash	30 arc minutes maximum
S9111A-T642	Zero-Backlash	15 arc minutes maximum

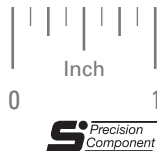


STANDARD BACKLASH T640 SERIES
1.0625" OUTSIDE DIAMETER
U.S. PAT. #2,892,357

PHONE: 516.328.3300 • FAX: 516.326.8827 • WWW.SDP-SI.COM

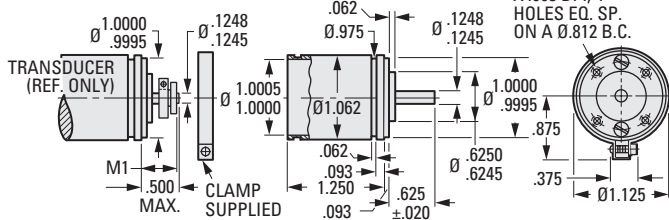
► SPECIFICATIONS:

- Maximum Operating Torque:** 20 ozf in.
- Maximum Backlash:** 20 arc minutes
- Maximum Total Transmission Error:** 20 arc minutes
- Breakaway Torque:** .02 ozf in.
- Maximum Integrated Position Error:** 40 arc minutes
- Lubrication:** Oil per MIL-L-6085
- Maximum Shaft End Play With 1 lbf Gage Load:** .001 in.
- Maximum Shaft Radial Play with 4 ozf Gage Load:** .001 in./in.

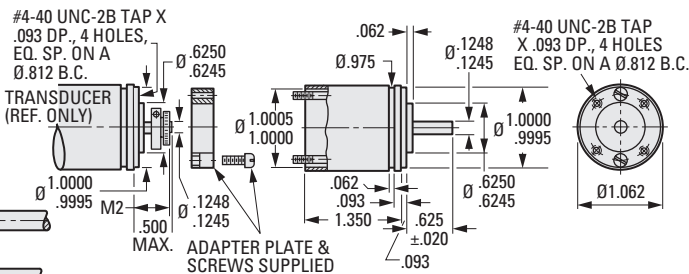


This **S** series is for use in applications that can tolerate a moderate amount of backlash. Examples of this type of application are velocity feedback systems or systems that are unidirectional in nature.

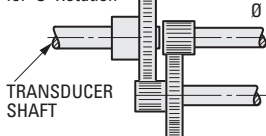
Mounting Type C (Attach to Transducer using Clamp)



Mounting Type A (Attach to Transducer using Adapter Plate and Screws)



Schematic Representation for "S" Rotation



INCH COMPONENT		INCH COMPONENT		Rotation**	Output Gear 120 D.P.* No. of Teeth	Ratio To 1			
Catalog Number Mounting Type C	Type C Mounting Dist. M1	Catalog Number Mounting Type A	Type A Mounting Dist. M1						
S9111A-T640C02S	.540 Max.	S9111A-T640A02S	.640 Max.	S	33	2			
S9111A-T640C03S		S9111A-T640A03S			39	3			
S9111A-T640C04S		S9111A-T640A04S			44	4			
S9111A-T640C06S		S9111A-T640A06S			48	6			
S9111A-T640C08S		S9111A-T640A08S			52	8			
S9111A-T640C09S		S9111A-T640A09S			48	9			
S9111A-T640C10S		S9111A-T640A10S			50	10			
S9111A-T640C12S		S9111A-T640A12S			52	12			
S9111A-T640C12R		S9111A-T640A12R				12			
S9111A-T640C15R		S9111A-T640A15R				15			
S9111A-T640C16R	S9111A-T640A16R		16						
S9111A-T640C20R	.410 Max.	S9111A-T640A20R	.510 Max.	R	50	20			
S9111A-T640C24R		S9111A-T640A24R			52	24			
S9111A-T640C30R		S9111A-T640A30R			50	30			
S9111A-T640C32R		S9111A-T640A32R				32			
S9111A-T640C36R					S9111A-T640A36R			52	32
								36	

* Supplied with gear clamp.

** "S" indicates output rotates in the same direction as input; "R" denotes reverse rotation.

Δ For transducer shaft Ø.1200/.1195 add "2" to the end of the part number. Example: S9111A-T640C30R2.

Other ratios and sizes available on special order.

