



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.



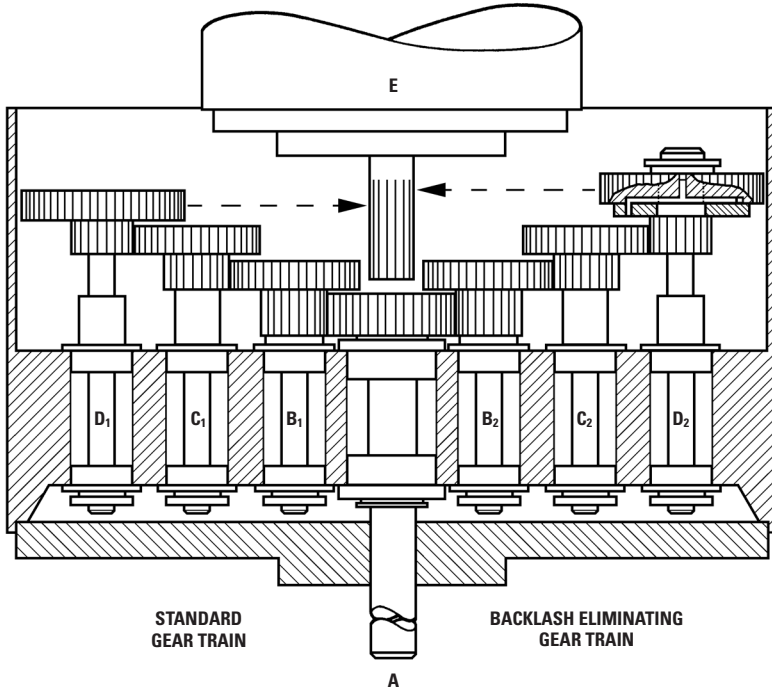
Speed Reducers
MGX T-Series 1.4375" O.D.
S9115A-T6...

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
S9115A-T623	1.4375			LOW		2.5
S9118A-T628	1.75	96	15		4.0	

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		LOW			4.0
S9115A-T6023	1.4375				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



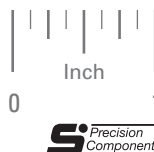
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ZERO-BACKLASH T642 SERIES
1.0625" OUTSIDE DIAMETER
U.S. PAT. #2,892,357, #3,396,594

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

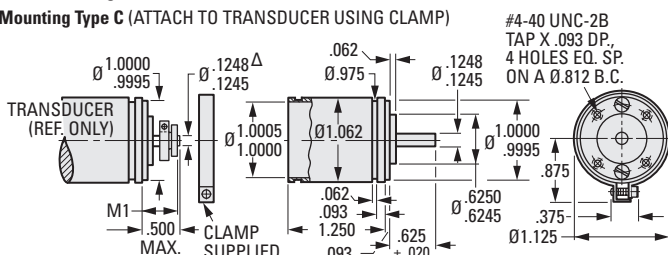
> SPECIFICATIONS:

- Maximum Operating Torque:** 20 ozf in.
- Maximum Anti-Backlash Torque:** 5 ozf in.
- Maximum Backlash:** <1 arc minutes
- Maximum Total Transmission Error:** 15 arc minutes
- Breakaway Torque:** .15 ozf in.
- Maximum Integrated Position Error:** 15 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.

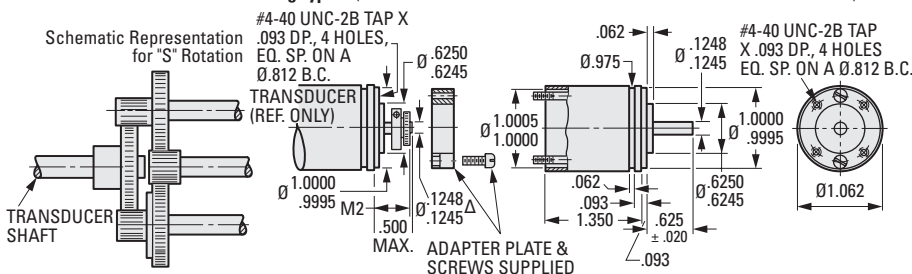


This **S** series is for use in applications that require that the backlash from all sources be as close to zero as possible. Typically, the backlash is less than 1 arc minute. This series of units is widely used in aircraft and satellite systems that require the utmost in performance.

Mounting Type C (ATTACH TO TRANSDUCER USING CLAMP)



Mounting Type A (ATTACH TO TRANSDUCER USING ADAPTER PLATE AND SCREWS)



INCH COMPONENT		INCH COMPONENT		Rotation**	Output Gear 120 D.P.* No. of Teeth	Ratio To 1		
Catalog Number	Type C Mounting Dist. M1	Catalog Number	Type A Mounting Dist. M2					
S9111A-T642C02S	.540 Max.	S9111A-T642A02S	.640 Max.	S	33	2		
S9111A-T642C03S		S9111A-T642A03S			39	3		
S9111A-T642C04S		S9111A-T642A04S			44	4		
S9111A-T642C06S		S9111A-T642A06S			48	6		
S9111A-T642C08S		S9111A-T642A08S			52	8		
S9111A-T642C09S		S9111A-T642A09S			48	9		
S9111A-T642C10S		S9111A-T642A10S			50	10		
S9111A-T642C12S		S9111A-T642A12S			52	12		
S9111A-T642C12R		S9111A-T642A12R			.510 Max.	R	48	12
S9111A-T642C15R		S9111A-T642A15R						15
S9111A-T642C16R	S9111A-T642A16R	16						
S9111A-T642C20R	S9111A-T642A20R	50	20					
S9111A-T642C24R	S9111A-T642A24R	52	24					
S9111A-T642C30R	S9111A-T642A30R	50	30					
S9111A-T642C32R	S9111A-T642A32R	52	32					
S9111A-T642C36R	S9111A-T642A36R		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-T642C30R2.

Other ratios and sizes available on special order.