

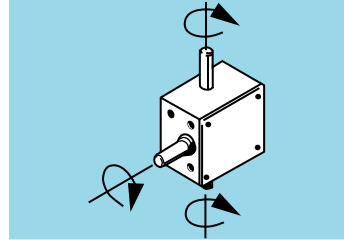
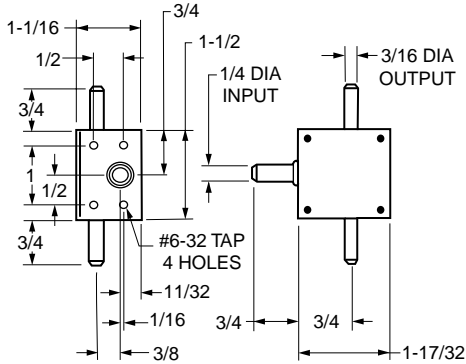


INCH

Right Angle Worm Gear Drives

■ INPUT SPEEDS UP TO 2000 RPM

■ MULTIPLE RATIOS



MATERIAL:

Housing – Aluminum Alloy, Iridite Finish
Shafts – Stainless Steel
Bearings – Sintered Bronze
Worm Gear – Bronze
Worm – Steel

Catalog Number	Ratio
A 2Z 4-050	5:1
A 2Z 4-100	10:1
A 2Z 4-200	20:1

SPECIFICATIONS:

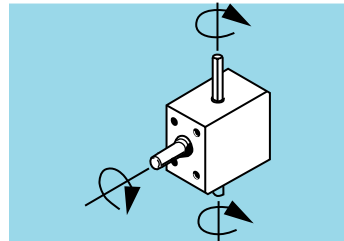
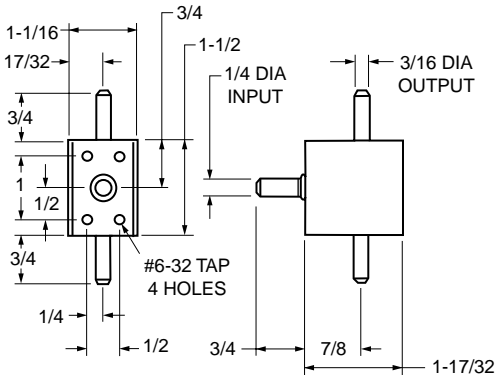
Breakaway Torque – 10 oz. in.
Output Torque – 200 oz. in.
Maximum Backlash – 5°
Max. Input Speed – 2000 rpm

S INCH

Right Angle Bevel Gear Drives

■ INPUT SPEEDS UP TO 2000 RPM

■ MULTIPLE RATIOS



MATERIAL:

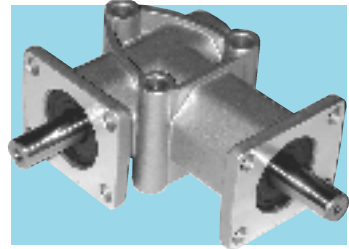
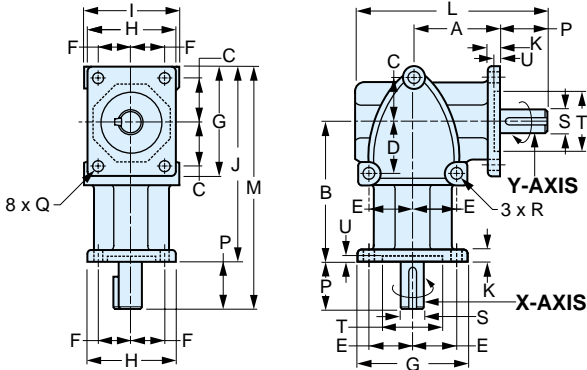
Housing – Aluminum Alloy, Iridite Finish
Shafts – Stainless Steel
Bearings – Sintered Bronze
Bevel Gears – Brass

Catalog Number	Ratio
S9914Y-G1566-01	1:1
S9914Y-G1566-02	2:1
S9914Y-G1566-03	3:1

SPECIFICATIONS:

Breakaway Torque – 10 oz. in.
Output Torque – 200 oz. in.
Maximum Backlash – 5°
Max. Input Speed – 2000 rpm

- LOW NOISE & HIGH EFFICIENCY
- EASY INSTALLATION
- COMPACT DESIGN
- 1:1 OR 2:1 RATIOS
- MAINTENANCE-FREE
- REVERSIBLE
- RATED SPEEDS UP TO 3600 RPM



The projections shown are per ISO convention.

MATERIAL:

- Gears:** Spiral Bevel, Case-Hardened Alloy Steel
- Case:** Aluminum Die-Cast
- Shafts:** Alloy Steel

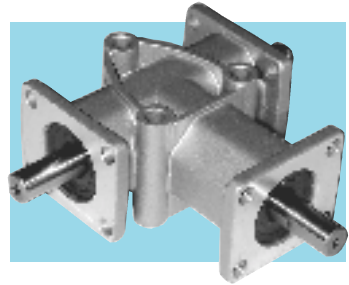
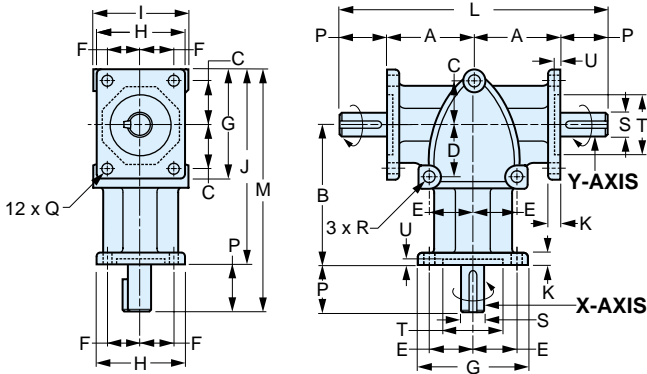
TEMP: -10°C to 40°C

Catalog Number	Ratio	A	B	C	D	E	F	G	H	I	J	K	L
S991LYM10A	1:1	37	58	18	18	18	14	46	38	40	82	5	82
S991LYM10B	1:2												
S991LYM15A	1:1	66	100	31	36	31	22	80	62	66	140	8	137
S991LYM15B	1:2												
S991LYM20A	1:1	80	120	36	36	36	26	92	72	76	166	10	168
S991LYM20B	1:2												

Catalog Number	M	P	Q Dia.	R Dia.	S h7 Dia.	T H7 Dia.	U	Key	Backlash of Shaft Rotation	Weight (kg)
S991LYM10A	102	20	5.5	6.5	10	26	2	1 mm deep Flat 15 /	16'...44'	0.4
S991LYM10B									30'...1°23'	
S991LYM15A	170	30	8.5	8.5	15	42	3	5 x 5 x 27 /	10'...37'	1.8
S991LYM15B									19'...1°09'	
S991LYM20A	206	40	8.5	8.5	20	52	4	6 x 6 x 35 /	8'...33'	3.1
S991LYM20B									15'...60'	

See page 5-28 for performance data.

- LOW NOISE & HIGH EFFICIENCY
- EASY INSTALLATION
- COMPACT DESIGN
- 1:1 OR 2:1 RATIOS
- MAINTENANCE-FREE
- REVERSIBLE
- RATED SPEEDS UP TO 3600 RPM



The projections shown are per ISO convention

MATERIAL:

- Gears:** Spiral Bevel, Case-Hardened Alloy Steel
- Case:** Aluminum Die-Cast
- Shafts:** Alloy Steel

TEMP: -10°C to 40°C

Catalog Number	Ratio	A	B	C	D	E	F	G	H	I	J	K	L
S991TYM10A S991TYM10B	1:1 1:2	37	58	18	18	18	14	46	38	40	82	5	114
S991TYM15A S991TYM15B	1:1 1:2	66	100	31	36	31	22	80	62	66	140	8	192
S991TYM20A S991TYM20B	1:1 1:2	80	120	36	36	36	26	92	72	76	166	10	240

Catalog Number	M	P	Q Dia.	R Dia.	S h7 Dia.	T H7 Dia.	U	Key	Backlash of Shaft Rotation	Weight (kg)
S991TYM10A S991TYM10B	102	20	5.5	6.5	10	26	2	1 mm deep Flat 15 /	16'...44' 30'...1°23'	0.5
S991TYM15A S991TYM15B	170	30	8.5	8.5	15	42	3	5 x 5 x 27 /	10'...37' 19'...1°09'	2.2
S991TYM20A S991TYM20B	206	40	8.5	8.5	20	52	4	6 x 6 x 35 /	8'...33' 15'...60'	3.4

See page 5-28 for performance data.

1:1 RATIO

Catalog Number	Ratio	Specification	X-Axis (rpm)												Allowable Thrust Load N (lbf)	
			50	100	200	300	400	600	900	1200	1500	1800	2500	3600	X-Axis	Y-Axis
S991TYM10A S991LYM10A	1:1	Allowable Power kW	0.01	0.02	0.05	0.07	0.09	0.14	0.20	0.26	0.31	0.35	0.38	0.44	59 (13.3)	69 (15.5)
		X-Y Axis Torque N • m (kgf • m) [lb • ft]	2.35 (0.24) [1.73]	2.35 (0.24) [1.73]	2.25 (0.23) [1.66]	2.25 (0.23) [1.66]	2.16 (0.22) [1.59]	2.16 (0.22) [1.59]	2.06 (0.21) [1.52]	2.06 (0.21) [1.52]	1.96 (0.20) [1.45]	1.86 (0.19) [1.37]	1.47 (0.15) [1.08]	1.18 (0.12) [0.87]		
S991TYM15A S991LYM15A		Allowable Power kW	0.05	0.09	0.18	0.27	0.35	0.51	0.75	0.96	1.16	1.30	1.44	1.66	98 (22.0)	118 (26.5)
		X-Y Axis Torque N • m (kgf • m) [lb • ft]	8.82 (0.90) [6.51]	8.82 (0.90) [6.51]	8.62 (0.88) [6.36]	8.53 (0.87) [6.29]	8.33 (0.85) [6.14]	8.13 (0.83) [6.00]	7.94 (0.81) [5.86]	7.64 (0.78) [5.63]	7.35 (0.75) [5.42]	6.86 (0.70) [5.06]	5.49 (0.56) [4.05]	4.41 (0.45) [3.25]		
S991TYM20A S991LYM20A		Allowable Power kW	0.09	0.18	0.36	0.52	0.68	0.95	1.38	1.78	2.15	2.50	2.55	2.95	196 (44.1)	274 (61.6)
		X-Y Axis Torque N • m (kgf • m) [lb • ft]	17.6 (1.80) [13.0]	17.6 (1.80) [13.0]	17.2 (1.75) [12.7]	16.7 (1.70) [12.3]	16.2 (1.65) [11.9]	15.2 (1.55) [11.2]	14.7 (1.50) [10.8]	14.2 (1.45) [10.4]	13.7 (1.40) [10.1]	13.2 (1.35) [9.7]	9.80 (1.00) [7.2]	7.84 (0.80) [5.8]		

2:1 RATIO

S991TYM10B S991LYM10B	1:2	Allowable Power kW	0.005	0.01	0.02	0.03	0.04	0.06	0.09	0.12	0.14	0.16	0.17	0.20	59 (13.3)	69 (15.5)
		Y-Axis Torque N • m (kgf • m) [lb • ft]	2.06 (0.21) [1.52]	2.06 (0.21) [1.52]	2.06 (0.21) [1.52]	1.96 (0.20) [1.45]	1.96 (0.20) [1.45]	1.96 (0.20) [1.45]	1.86 (0.19) [1.37]	1.86 (0.19) [1.37]	1.76 (0.18) [1.30]	1.67 (0.17) [1.23]	1.27 (0.13) [0.94]	1.08 (0.11) [0.80]		
S991TYM15B S991LYM15B		Allowable Power kW	0.02	0.04	0.08	0.13	0.17	0.25	0.36	0.46	0.55	0.62	0.69	0.80	98 (22.0)	118 (26.5)
		Y-Axis Torque N • m (kgf • m) [lb • ft]	8.43 (0.86) [6.22]	8.43 (0.86) [6.22]	8.23 (0.84) [6.07]	8.13 (0.83) [6.00]	8.04 (0.82) [5.93]	7.84 (0.80) [5.78]	7.55 (0.77) [5.57]	7.25 (0.74) [5.35]	7.06 (0.72) [5.21]	6.57 (0.67) [4.85]	5.29 (0.54) [3.90]	4.21 (0.43) [3.11]		
S991TYM20B S991LYM20B		Allowable Power kW	0.05	0.10	0.19	0.28	0.37	0.53	0.77	0.99	1.15	1.31	1.40	1.57	196 (44.1)	274 (61.6)
		Y-Axis Torque N • m (kgf • m) [lb • ft]	19.6 (2.00) [14.5]	19.6 (2.00) [14.5]	18.6 (1.90) [13.7]	18.1 (1.85) [13.3]	17.6 (1.80) [13.0]	17.0 (1.73) [12.5]	16.4 (1.67) [12.1]	15.7 (1.60) [11.6]	14.7 (1.50) [10.8]	13.9 (1.42) [10.3]	10.8 (1.10) [7.97]	8.33 (0.85) [6.14]		

NOTE: When the 2:1 ratio is used as a speed increaser (from the Y-Axis to the X-Axis), the X-Axis torque becomes one half of the Y-Axis torque shown in the table.

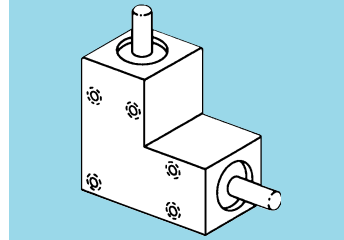
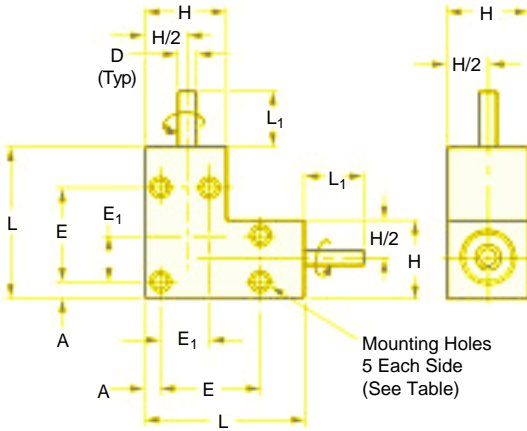


■ PRECISION 1:1 RATIO

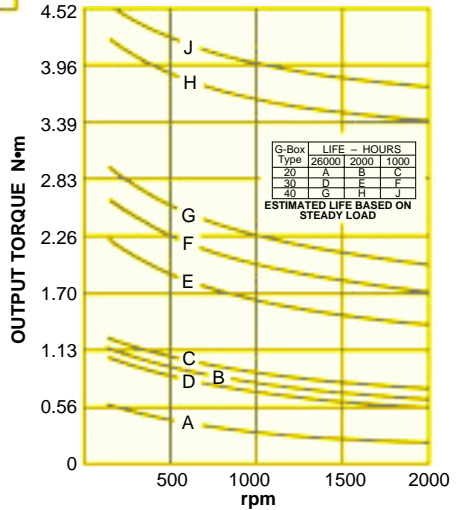
■ UP TO 1 HP

■ INPUT SPEEDS UP TO 3000 RPM

■ MEDIUM-DUTY



TORQUE/SPEED DATA
Gearbox Sizes 20, 30 & 40



QUALITY CLASS

MATERIAL: Housing – Aluminum Alloy, Black Anodized
All Surfaces Machined
Gears – Miter, SAE 4340 Steel
Shafts – Type 18-8 Stainless Steel
Bearings – Ball, Sealed
Lubrication – Grease-Packed for Life

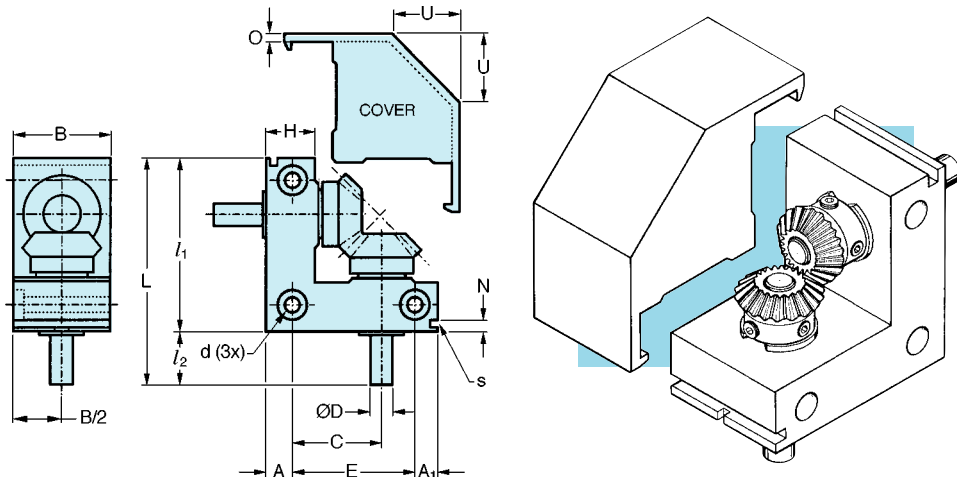
SPECIFICATIONS: Gear Ratio – 1:1
Backlash – 1° Max.
Input Speed – Max. recommended 3000 rpm
Temp. Range – -20°C to +150°C

Catalog Number	Size	D Shaft Dia. -0.013	L ±0.25	H ±0.25	A	E	E ₁	L ₁	Mounting Holes		Weight grams
									Size	Depth	
A 2Z27MC1010	20	4	40	20	4	25	12	15	M4	5	80
A 2Z28MC1010	30	8	60	30	5	40	20	20	M5	7	265
A 2Z29MC1010	40	12	80	40	5	55	30	25	M6	9	665

Catalog Number	1800 rpm Input	
	Output Torque Max. N·m	Output Power Max.
A 2Z27MC1010	0.3	149W (0.2 HP)
A 2Z28MC1010	1.3	336W (0.45 HP)
A 2Z29MC1010	3.8	746W (1 HP)

S METRIC Low-Cost Right Angle Bevel Gear Drives

- 1:1 RATIO
- ECONOMY SERIES
- RATED SPEEDS UP TO 500 RPM



MATERIAL: Gears – AISI 1045 Steel Cover – Black Plastic
 Shafts – 303 Stainless Steel Housing – Aluminum, Black Anodized
 Bearings – Layers of special resin and bronze with steel backing

The projections shown are per ISO convention.

Catalog Number	Gear Module	No. of Teeth	Gear Ratio	L Overall Length	l_1 Housing Length	H Housing Width	D* Shaft Dia. h8	l_2 Shaft Length	A	A_1	E
S99RD1MBE40L-1	0.5	20	1:1	40	30	10	4	10	5	4.5	20.5
S99RD1MBE55L-1	0.8			55	40	13	5	15	6.5	5	28.5
S99RD1MBE70L-1A	1			70	50	16	6	20	8	6	36
S99RD1MBE70L-1B				8							
S99RD1MBE88L-1A	1.5			88	63	20	10	25	10	7	46
S99RD1MBE88L-1B		12									

Catalog Number	C	B Housing Depth	d			N	S Slot		O Cover Thickness	U Chamfer	Wt. (gm.)
			Mtg. Hole	Hole C'bore	C'bore Depth		Width	Depth			
S99RD1MBE40L-1	15	18	3.4	6.5	3.5	2.5	1.5	1.7	1.7	13	30
S99RD1MBE55L-1	21.5	25				4	2.5	2	1.9	16	85
S99RD1MBE70L-1A or B	27	30	4.3	8	4.5	4.5	2.5	2.5	2.1	20	170
S99RD1MBE88L-1A or B	33	40	5.2	9.5	5.5	5				27	380

PERFORMANCE DATA

Input (rpm)	Output Torque (N • m)			
	S99RD1MBE40L-1	S99RD1MBE55L-1	S99RD1MBE70L-1A or B	S99RD1MBE88L-1A or B
50	0.14	0.553	1.035	
100	0.139	0.544	1.017	
250	0.135	0.524	0.968	
500	0.129	0.491	0.896	

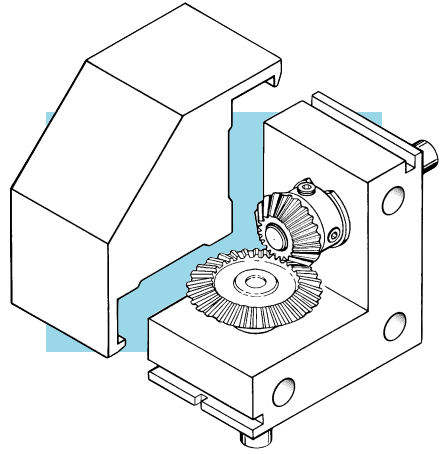
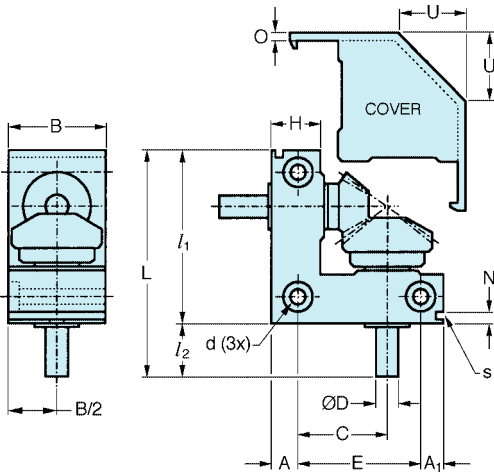
*Shaft Tolerance: 4, 5 & 6 mm - 0.018
 8 & 10 mm - 0.022
 12 mm - 0.027

S METRIC Low-Cost Right Angle Bevel Gear Drives

■ 2:1 RATIO

■ ECONOMY SERIES

■ RATED SPEEDS UP TO 500 RPM



MATERIAL: Gears – AISI 1045 Steel

Cover – Black Plastic

The projections shown are per ISO convention.

Shafts – 303 Stainless Steel

Housing – Aluminum, Black Anodized

Bearings – Layers of special resin and bronze with steel backing

Catalog Number	Gear Module	No. of Teeth	Gear Ratio	L Overall Length	l_1 Housing Length	H Housing Width	D* Shaft Dia. h8	l_2 Shaft Length	A	A ₁	E
S99RD1MBE55L-2	0.6	28/14	2:1	55	40	13	5	15	65	5	28.5
S99RD1MBE70L-2A S99RD1MBE70L-2B	0.8	26/13		70	50	16	6 8	20	8	6	36
S99RD1MBE88L-2A S99RD1MBE88L-2B	1.25			88	63	20	10 12	25	10	7	46

Catalog Number	C	B Housing Depth	d			N	s Slot		O Cover Thickness	U Chamfer	Wt. (gm.)
			Mtg. Hole	Hole C'bore	C'bore Depth		Width	Depth			
S99RD1MBE55L-2	21.5	25	3.4	6.5	3.5	4	2.5	2	1.9	16	80
S99RD1MBE70L-2A or B	27	30	4.3	8	4.5	4.5	2.5	2.5	2.1	20	165
S99RD1MBE88L-2A or B	33	40	5.2	9.5	5.5	5					

PERFORMANCE DATA

Input (rpm)	Output Torque (N • m)		
	S99RD1MBE55L-2	S99RD1MBE70L-2A or B	S99RD1MBE88L-2A or B
50	0.152	0.298	1.061
100	0.15	0.296	1.047
250	0.147	0.288	1.005
500	0.142	0.276	0.942

*Shaft Tolerance: 5 & 6 mm - 0.018
8 & 10 mm - 0.022
12 mm - 0.027

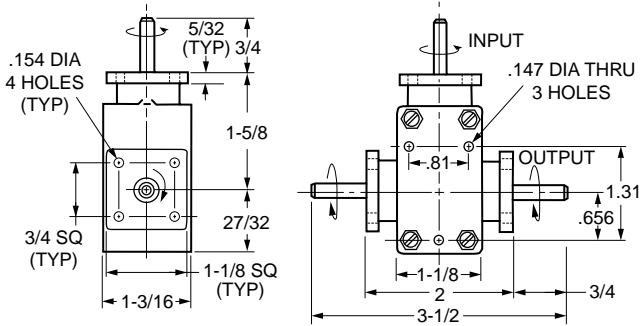


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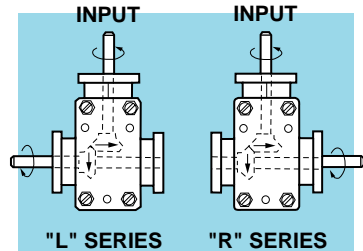
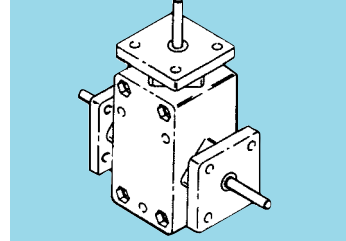
Right Angle Bevel Gear Drives

- RATED SPEEDS UP TO 1800 RPM
- BALL AND BRONZE BEARINGS

- METAL GEARS
- MULTIPLE RATIOS



"U" SERIES



"L" SERIES

"R" SERIES

MATERIAL:

Housing – PTMT Polyester 30% Glass Filled

Shafts – Precision Ground 303 Stainless Steel

Bearings – Input Shaft — Precision Grade Steel Ball

– Output Shaft — Sintered Bronze

Gears – Case-Hardened Steel

BACKLASH: 3°

Catalog Number	Shaft Dia. +.0000 -.0002	Gear Ratio	1800 rpm Input		Approx. Weight oz.
			Output Torque (Max.)	Output HP (Max.)	
A 2Z21-UC101006 A 2Z21-LC101006 A 2Z21-RC101006	.1872	1:1	3 lb. in.	.08	3-1/2
A 2Z21-UC101008 A 2Z21-LC101008 A 2Z21-RC101008	.2497				4
A 2Z21-UC201006 A 2Z21-LC201006 A 2Z21-RC201006	.1872				2:1
A 2Z21-UC201008 A 2Z21-LC201008 A 2Z21-RC201008	.2497	4			
A 2Z21-UC301006 A 2Z21-LC301006 A 2Z21-RC301006	.1872	3:1	4 lb. in.	.03	
A 2Z21-UC301008 A 2Z21-LC301008 A 2Z21-RC301008	.2497				4

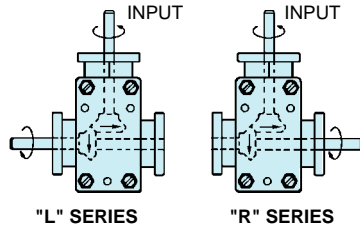
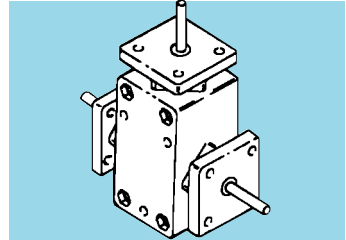
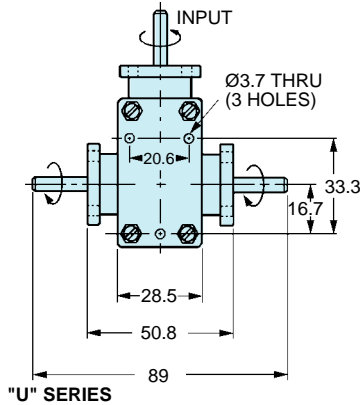
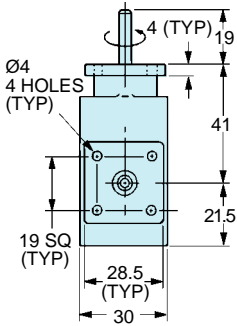


■ METAL GEARS

■ BALL AND BRONZE BEARINGS

■ MULTIPLE RATIOS

■ RATED SPEEDS UP TO 1800 RPM



MATERIAL:

Housing – PTMT Polyester 30% Glass Filled

Shafts – Precision Ground Type 303 S.S.

Bearings – Input Shaft — Precision Grade Steel Ball

– **Output Shaft** — Sintered Bronze

Gears – Case-Hardened Steel

BACKLASH: 3°

Catalog Number	Shaft Dia. -0.025	Gear Ratio	1800 rpm Input		Approx. Weight grams
			Output Torque (Max.)	Output Power (Max.)	
A 2Z21MUC101004 A 2Z21MLC101004 A 2Z21MRC101004	4	1:1	0.35 N • m	59.7W (0.08 HP)	100
A 2Z21MUC101006 A 2Z21MLC101006 A 2Z21MRC101006	6				120
A 2Z21MUC201004 A 2Z21MLC201004 A 2Z21MRC201004	4				2:1
A 2Z21MUC201006 A 2Z21MLC201006 A 2Z21MRC201006	6	120			
A 2Z21MUC301004 A 2Z21MLC301004 A 2Z21MRC301004	4	3:1	0.46 N • m	22.4W (0.03 HP)	
A 2Z21MUC301006 A 2Z21MLC301006 A 2Z21MRC301006	6				120



INCH

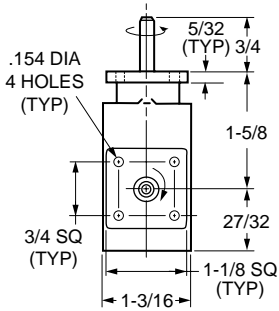
Right Angle Bevel Gear Drives

■ MOLDED GEARS

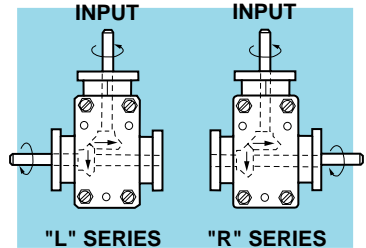
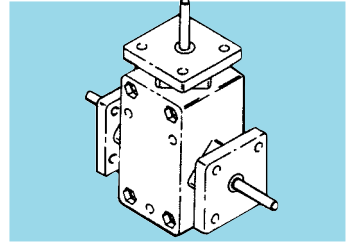
■ SINTERED BRONZE BEARINGS

■ 1:1 OR 2:1 RATIOS

■ RATED SPEEDS UP TO 1800 RPM



"U" SERIES



"L" SERIES

"R" SERIES

MATERIAL:

Housing – PTMT Polyester 30% Glass Filled

Shafts – Precision Ground 303 Stainless Steel

Bearings – Sintered Bronze

Gears – Molded Nylon

BACKLASH: 5°

Catalog Number	Shaft Dia. +.0000 -.0002	Gear Ratio	1800 rpm Input		Approx. Weight oz.
			Output Torque (Max.)	Output HP (Max.)	
A 2Z21-UM101006	.1872	1:1	1 lb. in.	.03	3-1/2
A 2Z21-LM101006					
A 2Z21-RM101006					
A 2Z21-UM201006	.1872	2:1	2-1/2 lb. in.	.03	3-1/2
A 2Z21-LM201006					
A 2Z21-RM201006					

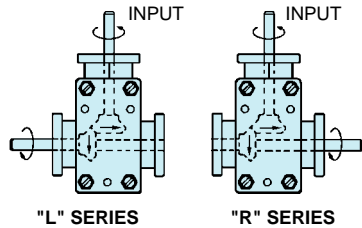
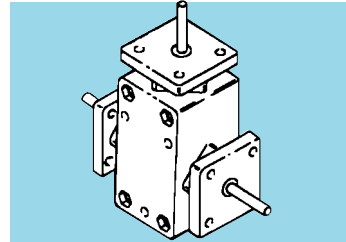
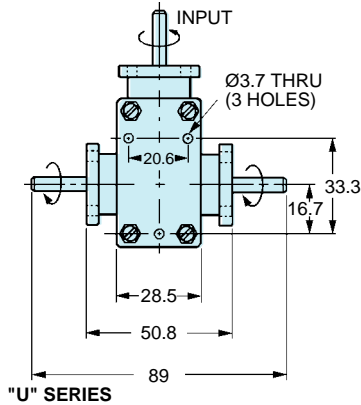
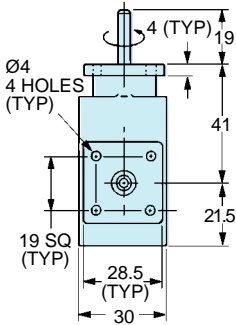


■ MOLDED GEARS

■ SINTERED BRONZE BEARINGS

■ 1:1 OR 2:1 RATIOS

■ RATED SPEEDS UP TO 1800 RPM



MATERIAL:

Housing – PTMT Polyester 30% Glass Filled

Shafts – Precision Ground Type 303 S.S.

Bearings – Sintered Bronze

Gears – Molded Nylon

BACKLASH: 5°

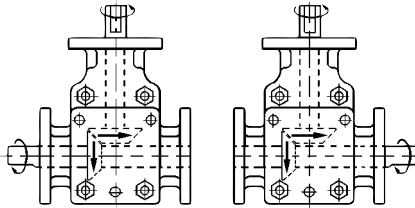
Catalog Number	Shaft Dia. -0.025	Gear Ratio	1800 rpm Input		Approx. Weight grams
			Output Torque (Max.)	Output Power (Max.)	
A 2Z21MUM101004	4	1:1	0.12 N • m	22.4W (0.03 HP)	100
A 2Z21MLM101004					
A 2Z21MRM101004					
A 2Z21MUM201004	4	2:1	0.29 N • m	22.4W (0.03 HP)	100
A 2Z21MLM201004					
A 2Z21MRM201004					



INCH

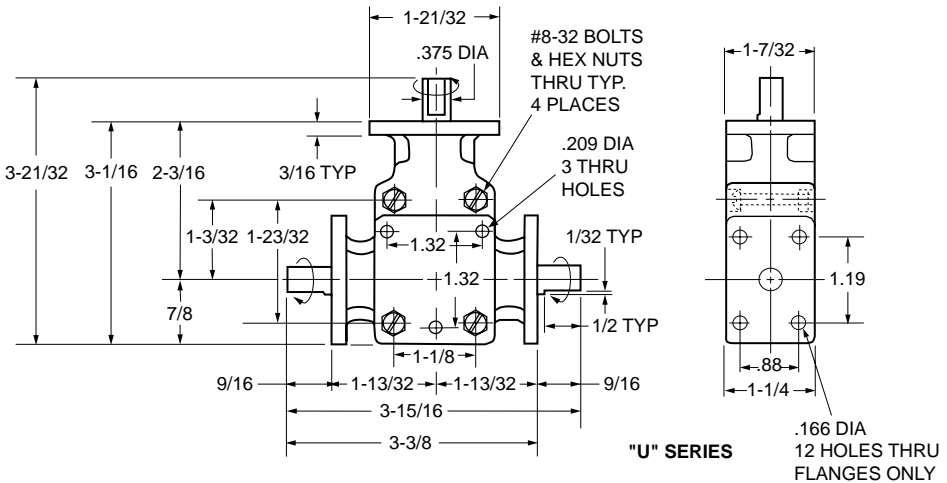
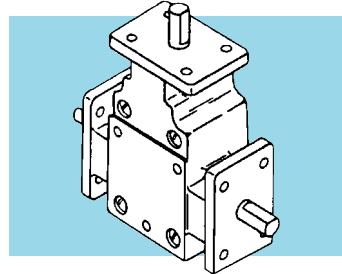
Right Angle Bevel Gear Drives

- LARGE
- METAL GEARS
- BALL BEARINGS
- 1:1 RATIO
- INPUT SPEEDS UP TO 3000 RPM



"L" SERIES

"R" SERIES



MATERIAL:

Housing – Fiberglass Reinforced Plastic

Gears – Steel, Hardened — Coniflex Type

Shafts – High-Tensile Steel

Bearings – Steel Ball

Lubrication – Permanently Lubricated with Lithium-Based Grease

Catalog Number	Shaft Dia. +.000 -.001	Gear Ratio	Approx. Weight oz.
A 2Z20-UC101012	.375	1:1	12
A 2Z20-LC101012			
A 2Z20-RC101012			

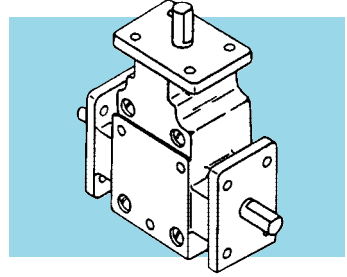
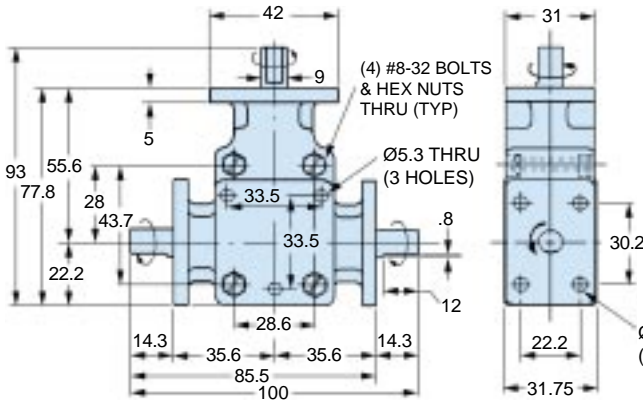
NOTE: Rated at 1/3 HP at 1800 rpm. Maximum speed is 3000 rpm.



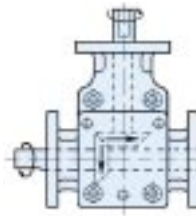
METRIC

Right Angle Bevel Gear Drives

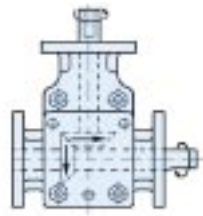
- LARGE
- METAL GEARS
- BALL BEARING
- 1:1 RATIO
- INPUT SPEEDS UP TO 3000 RPM



"U" SERIES



"L" SERIES



"R" SERIES

MATERIAL:

Housing – Fiberglass reinforced plastic

Gears – Steel, Hardened — Coniflex Type

Shafts – High Tensile Steel

Bearings – Steel Ball

Lubrication – Permanently Lubricated with Lithium-Base Grease

Catalog Number	Shaft Dia. -0.025	Gear Ratio	Approx. Weight kg
A 2Z20MUC101009	9	1:1	0.34
A 2Z20MLC101009			
A 2Z20MRC101009			

NOTE: Rated at 249W (1/3 HP) at 1800 rpm.
Maximum speed is 3000 rpm.