



Precision. Motion Control. Technology.



Cone Drive is a world leader in precision motion control technology.

We work with our customers every step of the way – from design specs to the final solution – to create highly precise, highly specific products that keep our customers’ technology at the forefront of their industry. Cone Drive offers engineering support, unique solutions, and innovative technology across a breadth of markets and products to drive your company forward.

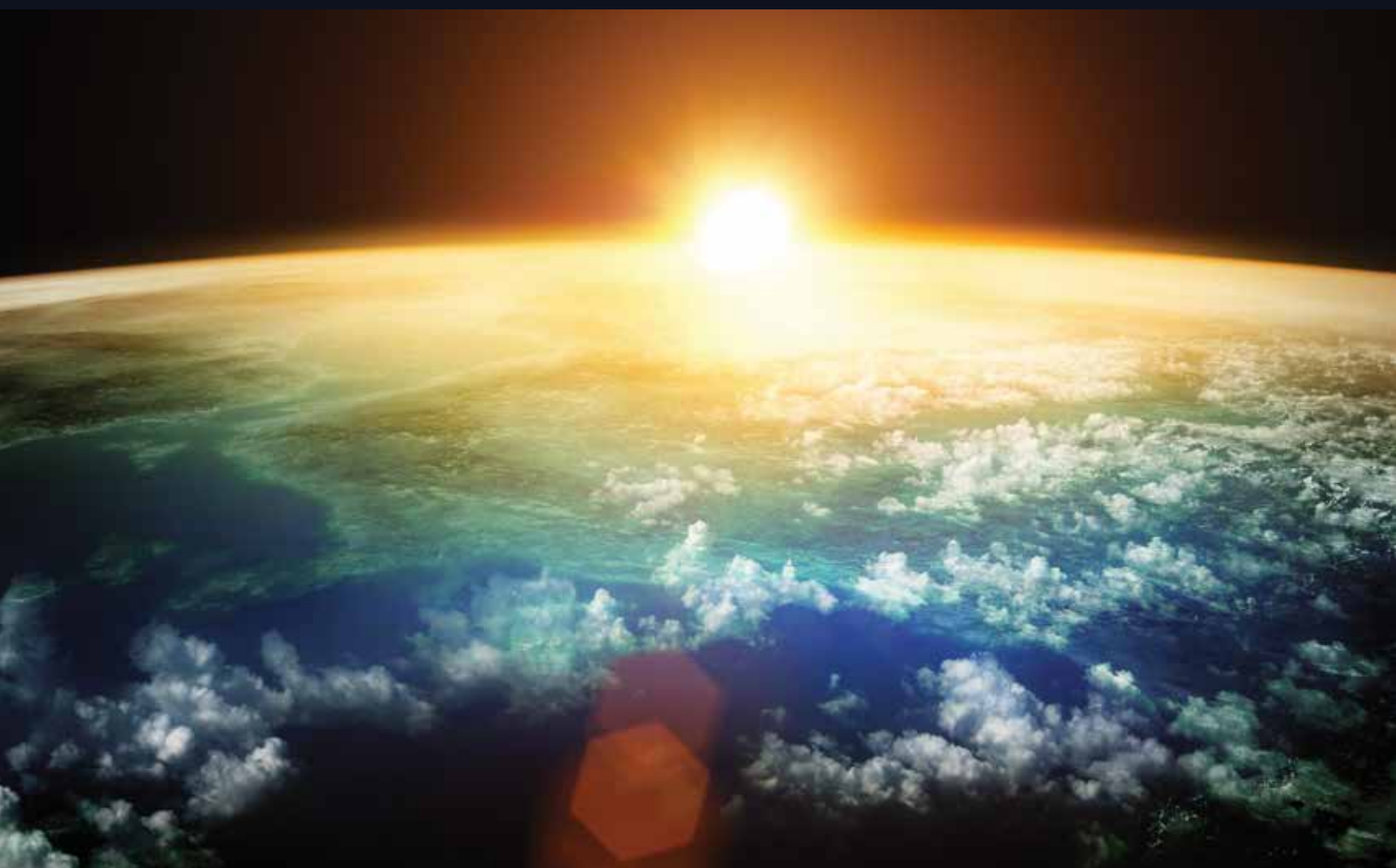


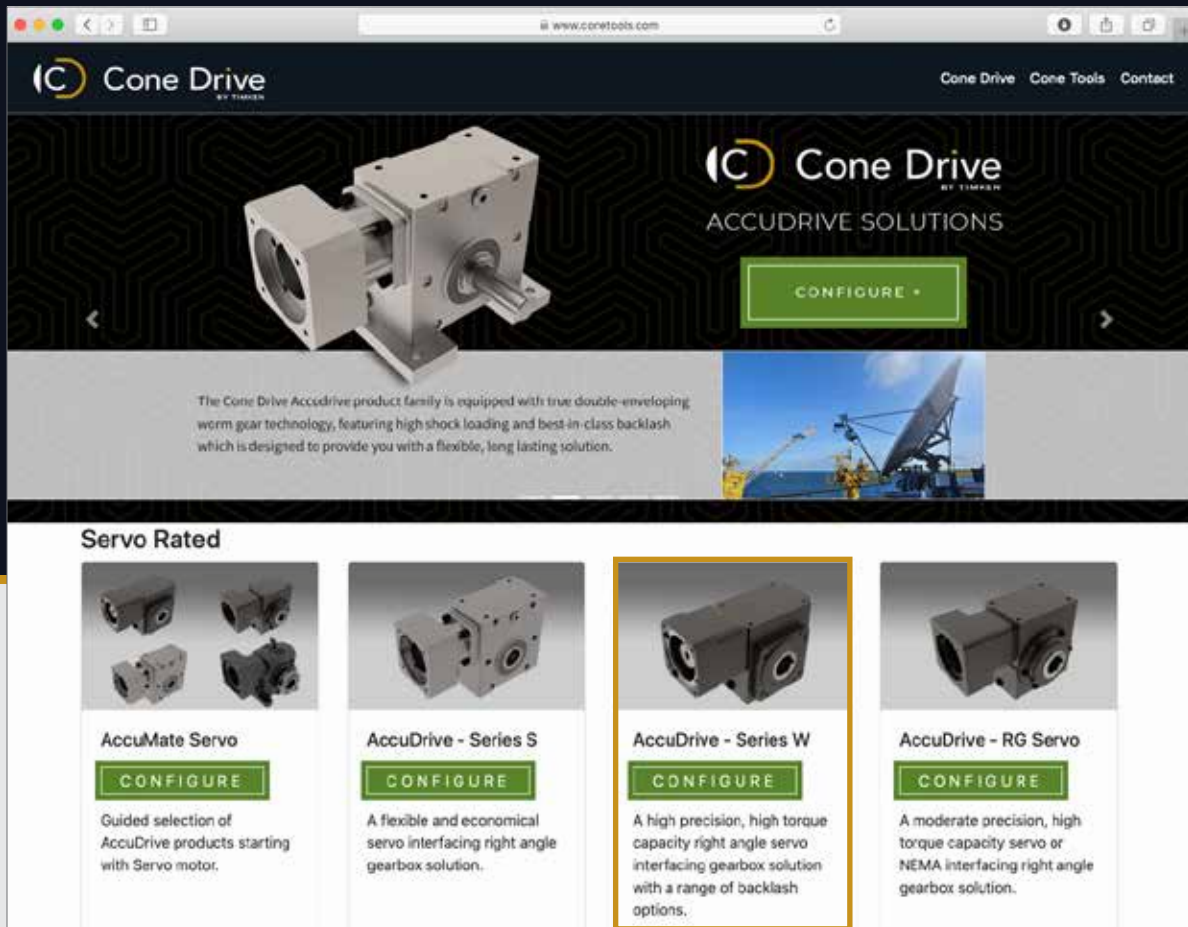
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Configure Your Accudrive Online

www.ConeTools.com



The Cone Drive Accudrive product family is equipped with true double-enveloping worm gear technology, featuring high shock loading and best-in-class backlash which is designed to provide you with a flexible, long lasting solution.

Servo Rated

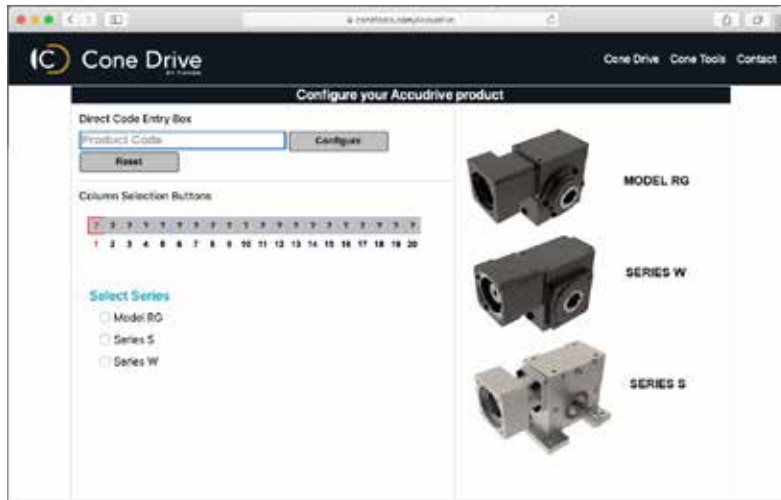
- AccuMate Servo**
CONFIGURE
Guided selection of AccuDrive products starting with Servo motor.
- AccuDrive - Series S**
CONFIGURE
A flexible and economical servo interfacing right angle gearbox solution.
- AccuDrive - Series W**
CONFIGURE
A high precision, high torque capacity right angle servo interfacing gearbox solution with a range of backlash options.
- AccuDrive - RG Servo**
CONFIGURE
A moderate precision, high torque capacity servo or NEMA interfacing right angle gearbox solution.



Visit ConeTools.com
and Click
"AccuDrive - Series W"

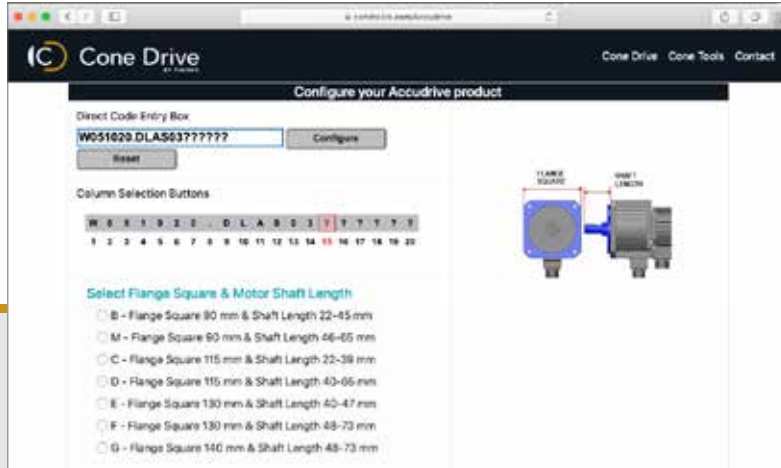
AccuMate[®]
SERVO GEARHEAD SELECTION PROGRAM

Our AccuMate[®] program helps you select the right servo gearhead for your application.



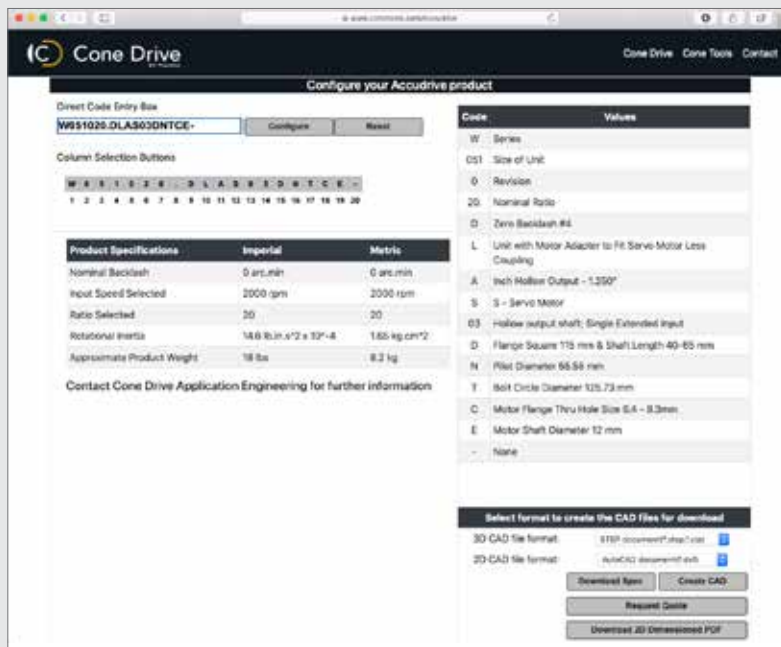
2

Start configuring your AccuDrive product by selecting Series W or entering in the direct code in the entry box



3

Select your motor information and proceed through the additional selections



4

On the final screen review the product specifications and click to create a CAD file, download the specs or request a quote.

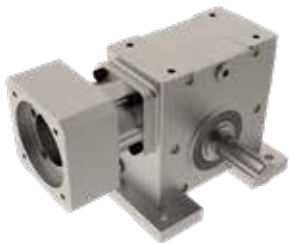
Design flexibility and lasting performance with our complete family of AccuDrive Precision Products.

MODEL RG RIGHT ANGLE GEARHEAD



- Output torque capacity up to 8,500 lb.in. (960 Nm)
- Motor sizes (standard), adapters to fit servo motors, NEMA and IEC
- Center distance 1.5 to 3.5 inches
- Input power ratings up to 27 H.P, speed range up to 4,000 RPM
- Sizes available 15, 20, 25, 30 and 35
- Universal mounting with shaft mount and flange mount standard in single reduction type
- Gear ratios from 5:1 to 60:1

SERIES S SERVO GEARHEAD



- Economical servo solution
- Output torque up to 7,540 lb.in. (852 Nm)
- Motor adapters to fit servo motors
- Center distance from 1.33 inch up to 3.54 inch
- Speed range up to 4,000 RPM
- Flexible mounting (hollow output standard with plug in solid shaft)
- Ratios from 5:1 to 60:1

SERIES P IN-LINE PLANETARY SERVO GEARHEAD



- Output torque capacity up to 21,240 lb.in. (2,400 Nm)
- Speed range up to 6,000 RPM input
- Sizes available 42, 60, 90, 120, 140, 180, 220 (S-Type)
- Sizes available 60, 75, 100, 140, 180, 210, 240 (P-Type)
- Gear ratios from 3:1 to 100:1 available from stock (S-Type & P-Type)
- Universal Mounting with shaft mount and flange mount standard
- 3 arc-minutes backlash or better

SERIES LE IN-LINE PLANETARY SERVO GEARHEAD



- Output torque capacity up to 7,080 lb.in. (800 Nm)
- Speed range up to 6,000 RPM input
- Sizes 40, 60, 90, 115, 512 and 160 (Series E)
- Gear ratios from 3:1 to 64:1 (Series E)
- Sizes 50, 70, 90, 120, 155, 205, 235 (Series LE)
- Gear ratios from 3:1 to 100:1 (Series LE)
- Universal Mounting with shaft mount and flange mount standard
- Backlash as low as 8 arc-minutes (Series E) and 5 arc-minutes (Series LE)

ABSOLUTE ZERO BACKLASH ACCUDRIVE GEARING



- Unique design captures both sides of the gear tooth to completely eliminate backlash. Automatically compensates for wear-guaranteed zero backlash for the life of the gear. Available for single, double and triple reduction types, gear sets, special designs and the Series W.

Serving an entire spectrum of mechanical drive applications from food, energy, mining and metal; to automotive, aerospace and marine propulsion, we are your source for drive solutions.

INDUSTRIAL SOLUTIONS

MODEL HP

Worm gearbox with double-enveloping worm gearing. Available in single, double and triple reductions



MODEL HP-A

Universal metric housing featuring double-enveloping gearing & drywell feature



SERIES B

Industrial duty worm gearbox featuring Conex gearing



DUO DRIVE

Dual gears on parallel output shafts



SLEWING SOLUTIONS

Versatile slew bearings and slew drives featuring external, internal and without teeth options in a low profile, ready-to-install package



STAINLESS

Right angle, IP-69K rated for the food processing market



DOUBLE-ENVELOPING WORM GEAR SET

Available in standard sizes, ratios and backlash options along with custom worm gear sets.



PRECISION MOTION SOLUTIONS

SERIES W

Precision right angle servo gearbox



MODEL RG

Moderate precision right angle servo gearbox



SERIES S

Value engineered right angle servo gearbox



SERIES LE / P

In-line helical geared motors & reducers and precision planetary servo gearbox



HARMONIC

Cone Drive Harmonic Solutions® offer the ultimate in precision motion control technology



STAINLESS SERVO

Smooth, contoured stainless steel housing (316), IP69K rated right angle gearbox



HP SERVO

This double-enveloping worm gearing, high torque gearbox meets the most demanding needs as servo motor capacities increase



We can create custom engineered transmission solutions of any size and configuration.



PACKAGING | FOOD & BEVERAGE | SATELLITE COMMUNICATION | PHARMACEUTICAL | AUTOMATION



HIGH PRECISION RIGHT ANGLE DRIVE.

The Series W right angle drive is Cone Drive's highest precision servo product offering. Packaged in a compact anodized aluminum housing, the Series W has high torsional rigidity, and is available in three levels of backlash (standard, low, and zero). Quiet and smooth running, the Series W is capable of operating at input speeds up to 6,000 rpm while still incorporating Cone Drive's robust double-enveloping worm gear technology.

Proven reliability.

The Accudrive Series W high precision servo gear heads are ideal for your most demanding motion control applications. Inside the Accudrive Series W is Cone Drive's true double-enveloping worm gear set. Offered in standard, low and zero backlash versions, you can always find the right solution for your application.



S P E C I F I C A T I O N S

PRODUCT FEATURES

Sizes (Center Distance-mm): 38, 51, 64, 76, 89

Standard Reduction Stages: Single

Interface: Inch or metric

Output Torque: Up to 10,000 lb. in. (1,130 Nm)

Gear Ratios: 5:1 to 60:1; custom ratios available

Ingress Protection: IP65

Input Options: Solid shaft, NEMA + Servo motor interfaces

Output Shaft Options: Solid, hollow shaft, shrink disc; end mount

Backlash Options: Standard, low, zero

Mounting Options: Universal mount

SERIES W PRECISION RIGHT ANGLE SERVO GEARHEAD

Three Levels of Precision

- Zero Backlash - absolute zero backlash for life
- Low Backlash - as low as 3 arcminutes
- Standard Backlash - long lasting ruggedness for less demanding applications

Anodized Aluminum Universal Housing

- Compact cube design saves space
- Machined pilots on output shaft caps
- Universal housing mounts in any orientation
- Lightweight aluminium reduces weight

Hollow Shaft Standard

- Compact mounting saves space
- No coupling required saves cost
- Zero backlash shrink disc hollow shaft option
- Single and double extended solid shaft options provide mounting flexibility

Maintenance Free

- Factory filled with synthetic gear oil
- No lubrication service throughout unit life
- Anodized housing, double oil seals and O-rings provide IP65 protection, ensure worry-free operation and protection against harsh environments

Cone Drive Gearing

- High torque capacity
- High efficiency
- Quiet and smooth running
- Exact ratios 5:1 through 60:1 in a single stage
- High torsional rigidity

Easy Motor Mounting

- Integrated zero backlash bellows type coupling provides fast, error-free alignment
- Integrated motor flange mounts directly to your servomotor, NEMA motor, or IEC motor

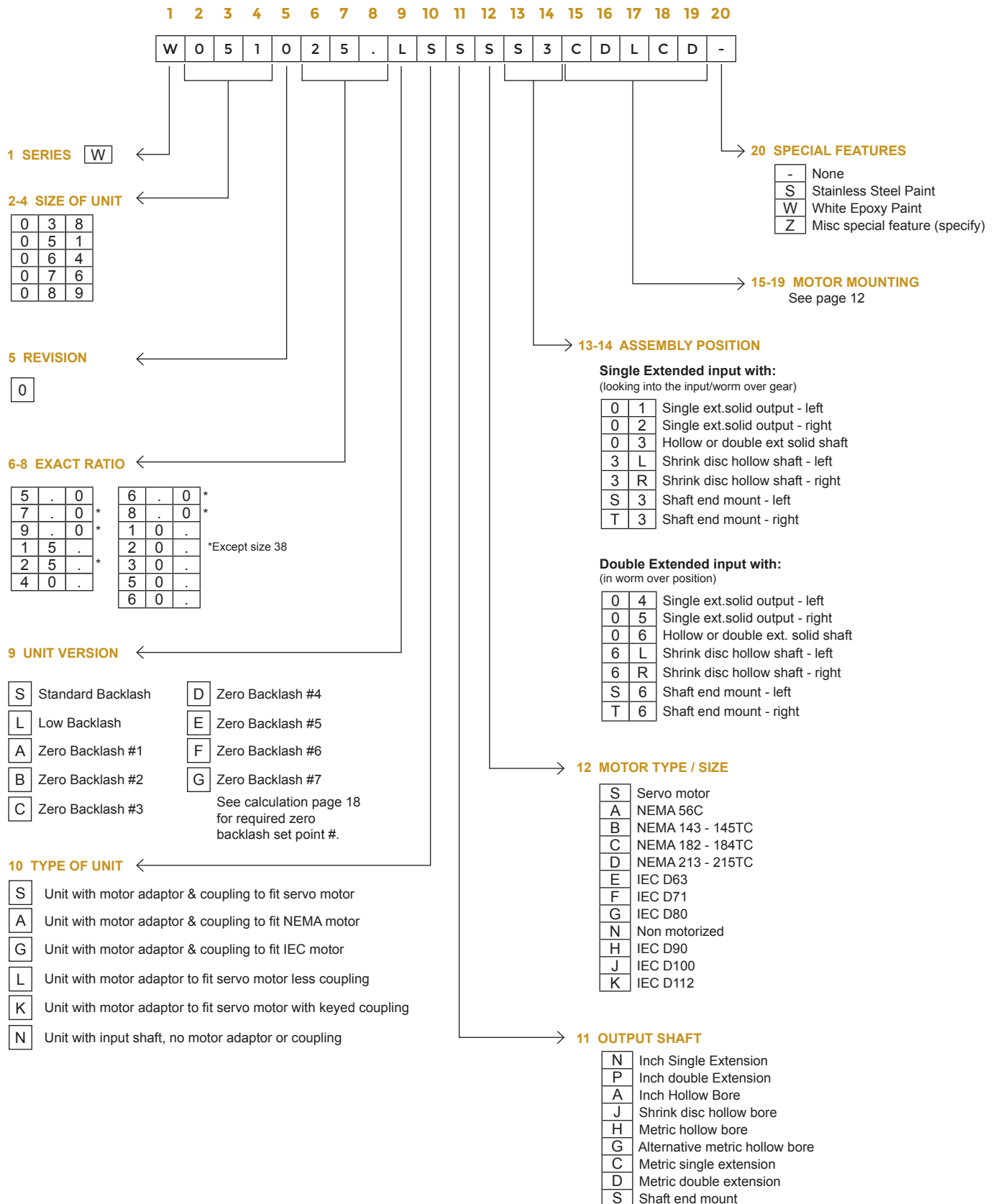
Application Assistance

To ensure optimum performance, our Application Engineers can help you design the ideal servo mechanical drive system for your particular application.

We are available to further discuss the Series W design characteristics and help with specifying backlash, gear ratios, and speeds.

Contact us about your application.
TEL: 1-888-994-2663
EMAIL: orders@conedrive.com





We reserve the right to improve or change product design and specifications without notice.

Servo Motor Flange Selection

1. Go to the appropriate table for the unit size you have selected.
2. Select the appropriate codes for columns 15 - 19 to match the dimensions on your servo motor flange.
3. Make sure your motor length fits the range accommodated by flange square for the size unit you're specifying.
4. If you can't locate the appropriate code for your motor or need assistance, please contact us.

W38 & W51

MOTOR FLANGE SQUARE

Column 15	Flange Square (mm)		90		115		130		140		NEMA or IEC
	Acceptable Motor Shaft Length		22 - 45	46 - 65	22 - 39	40 - 65	40 - 47	48 - 73	48 - 73		
	Unit Size	W38 & W51	B	M	C	D	E	F	G		

MOTOR PILOT DIAMETER

Column 16	Motor Pilot Diameter (mm)												NEMA or IEC
	38.15	40	50	55.55	60	70	73.07	80	95	110	114.3	130	
	A	B	C	N	D	E	F	G	H	J	K	L	

BOLT CIRCLE DIAMETER

Column 17	Bolt Circle Diameter (mm)															NEMA or IEC		
	63	65	66.68	70	75	80	85	90	95	98.43	100	115	125.73	130	145		149	165
	A	B	C	D	E	F	U	G	H	J	K	L	T	M	N		P	Q

MOTOR MOUNTING BOLT SIZE

Column 18	Motor Flange Thru Hole Size	4.5 - 5.2		5.3 - 6.3		6.4 - 8.3		8.4 - 10.3		10.4 - 12.4		12.5 - 15.0		NEMA or IEC	
		A		B		C		D		E		F			-
	Motor Flange Tapped Holes	M4	M5	M6	M8	M10	M12	1/4 - 20	3/8 - 16	1/2 - 13	NEMA or IEC		-		

MOTOR SHAFT DIAMETER

Column 19	Motor Shaft Diameter (mm)														NEMA or IEC
	9.525	11	12	12.7	14	15.875	16	19	19.05	22	22.225	24	25.4	28	
	B	D	E	F	G	H	J	K	L	M	N	P	Q	R	

W64, W76 & W89

MOTOR FLANGE SQUARE

Column 15	Flange Square (mm)		115		140		190		NEMA or IEC
	Acceptable Motor Shaft Length		20-32	33-60	38-68	69-89	38-68	58-87	
	Unit Size	W64, W76 & W89	C	D	G	H	K	L	

MOTOR PILOT DIAMETER

Column 16	Motor Pilot Diameter (mm)						NEMA or IEC
	80	95	110	114.3	130	180	
	G	H	J	K	L	M	

BOLT CIRCLE DIAMETER

Column 17	Bolt Circle Diameter (mm)							NEMA or IEC	
	100	115	130	145	149.23	165	200		215
	K	L	M	N	P	Q	R		S

MOTOR MOUNTING BOLT SIZE

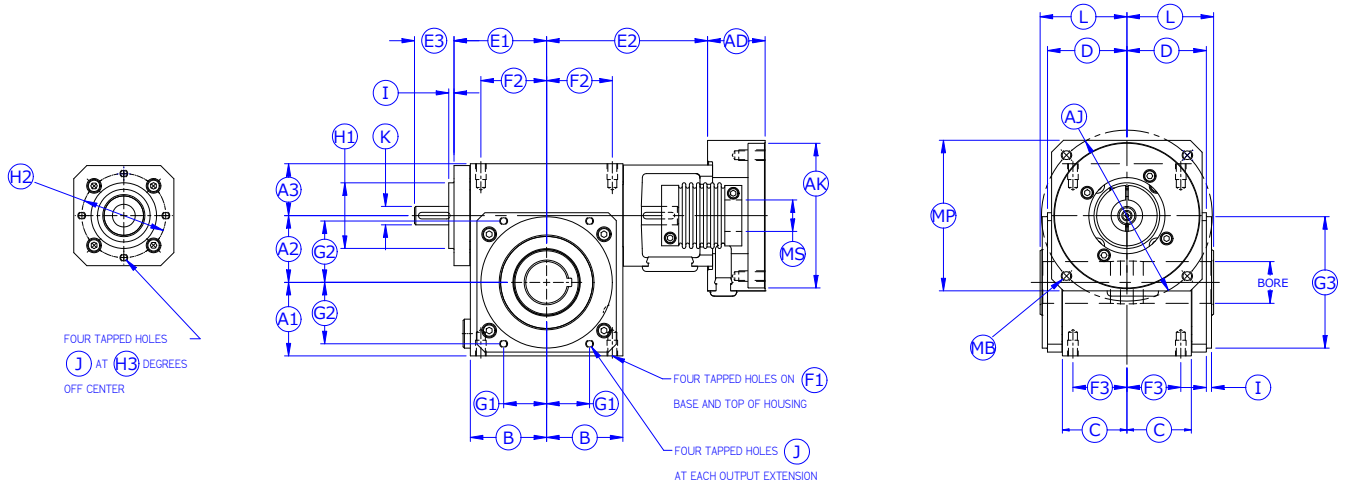
Column 18	Motor Flange Thru Hole Size	6.4 - 8.3		8.4 - 10.3		10.4 - 12.4		12.5 - 15.0		NEMA or IEC	
		C		D		E		F			-
	Motor Flange Tapped Holes	M6	M8	M10	M12	1/4 - 20	3/8 - 16	1/2 - 13	Q		

MOTOR SHAFT DIAMETER

Column 19	Motor Shaft Diameter (mm)																NEMA or IEC	
	14	15.875	16	19	19.05	22	22.225	24	25.4	28	28.575	31.75	32	34.925	35	38*		42*
	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X		Y

*Size 89 ONLY

Series W Standard Hollow Shaft Dimensions



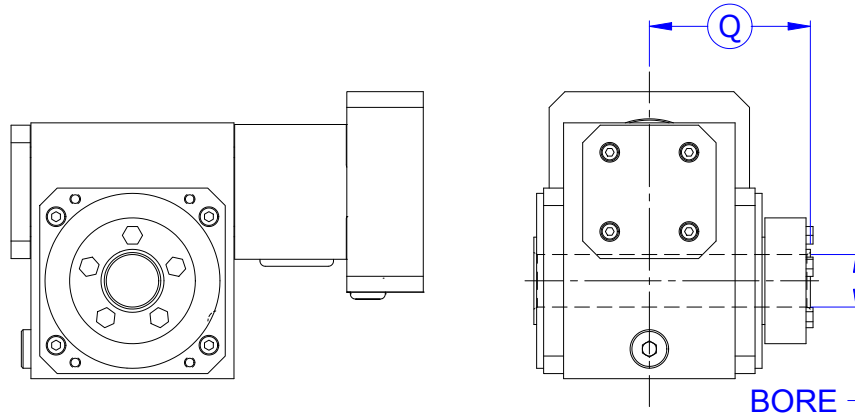
Hollow Shaft Dimensions

SIZE	A1		A2 (CD)		A3		B		C		D		E1		E2		E3	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
38	1.772	45	1.500	38.1	1.378	35.0	1.988	50.5	1.535	39.0	2.004	50.9	2.484	63.1	4.520	114.80	1.189	30.2
51	2.205	56	2.000	50.8	1.555	39.5	2.283	58.0	1.929	49.0	2.378	60.4	2.732	69.4	4.815	122.30	1.224	31.1
64	2.874	73	2.500	63.5	1.752	44.5	3.110	79.0	2.126	54.0	2.752	69.9	3.697	93.9	5.986	152.00	1.461	37.1
76	3.228	82	3.000	76.2	2.197	55.8	3.524	89.5	2.894	73.5	3.697	93.9	4.327	109.9	6.478	164.55	1.323	33.6
89	3.937	100	3.500	88.9	2.484	63.1	4.134	105	3.543	90.0	4.382	111.3	4.937	125.4	7.795	198.00	2.031	51.6

SIZE	F1	F2		F3		G1		G2		G3		H1		H2		H3		I	
	tap	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	deg.	in	mm	
38	M8	1.654	42.0	1.260	32	0.721	18.31	1.356	34.43	2.520	64	1.811	46	2.205	56	0	0.157	4	
51	M8	1.969	50.0	1.614	41	1.287	32.69	1.838	46.69	3.937	100	1.969	50	2.520	64	0	0.157	4	
64	M8	2.697	68.5	1.732	44	1.581	40.15	2.257	57.34	4.724	120	2.362	60	3.071	78	25	0.157	4	
76	M10	3.110	79.0	2.480	63	1.785	45.34	2.548	64.73	5.276	134	2.756	70	3.622	92	25	0.157	4	
89	M10	3.740	95.0	3.150	80	1.831	46.50	3.171	80.54	5.709	145	3.543	90	4.331	110	25	0.157	4	

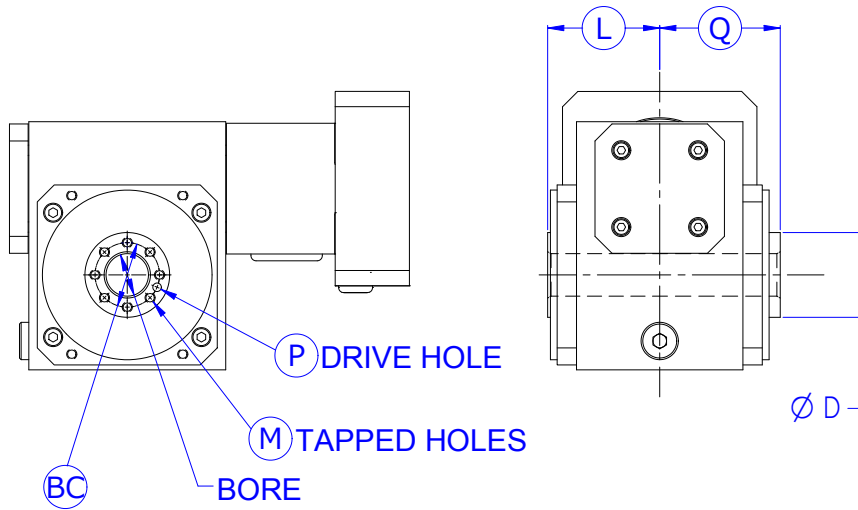
SIZE	J	K		L		Standard Bore		Alternative Bore		Alternative Bore		
		in	mm	in	mm	length	keyway	length	keyway	length	keyway	
		tap	keyway	keyway	keyway	in	mm	in	mm	in	mm	
38	M6	0.551	14	5 x 2.3 x 25	2.205	56	0.875	3/16 x 3/32	25	8 x 3.3	22	6 x 2.8
51	M6	0.551	14	5 x 2.3 x 24	2.598	66	1.250	1/4 x 1/8	30	8 x 3.3	-	-
64	M8	0.748	19	6 x 2.8 x 25	2.913	74	1.688	3/8 x 3/16	35	10 x 3.3	38	10 x 3.3
76	M10	0.945	24	8 x 3 x 28	3.937	100	1.938	1/2 x 1/4	45	14 x 3.8	48	14 x 3.8
89	M10	1.102	28	8 x 4 x 40	4.606	117	2.438	5/8 x 5/16	60	18 x 4.4	-	-

SIZE	AD Max		AK	AJ	MP	MB	MS
	in	mm					
38	2.64	67.0	Motor Plate Dimensions are made to fit your servo motor. Refer to page 12 for available dimensions.				
51	2.64	67.0					
64	3.11	79.0					
76	3.11	79.0					
89	3.11	79.0					



Optional Shrink Disc Hollow Shaft

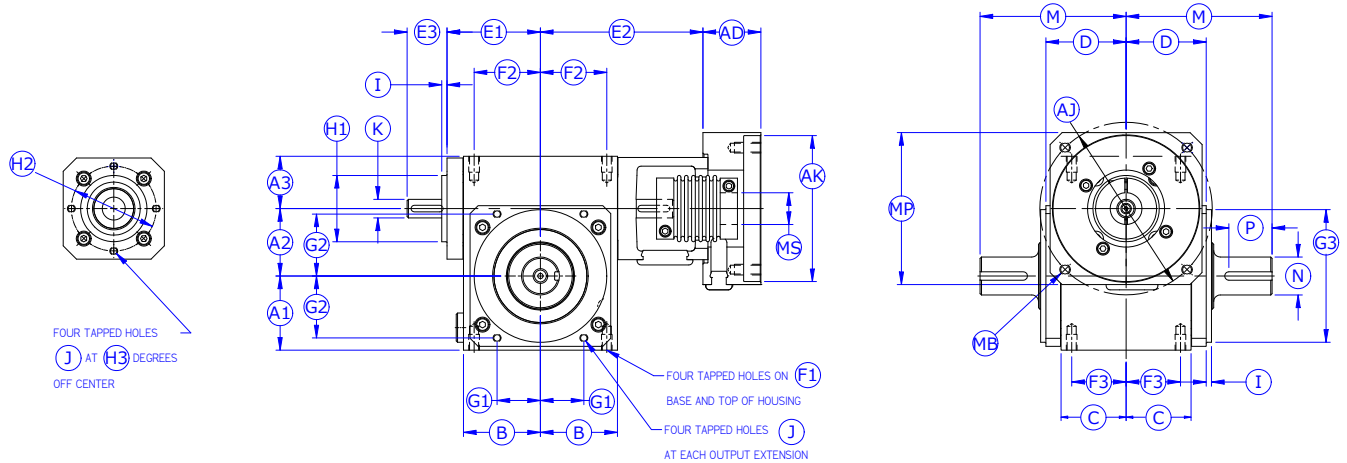
SIZE	Q		BORE (mm)		Customer Mating Shaft Diameter		
	inch	mm	mm	+/-	mm	+	-
38	3.15	80	25.005	0.005	25	0	0.010
51	3.62	92	30.005	0.005	30	0	0.010
64	4.29	109	35.008	0.008	35	0	0.016
76	5.32	135	45.008	0.008	45	0	0.016
89	6.06	154	60.010	0.010	60	0	0.020



Optional Shaft End Mount

SIZE	BC	L	M	P	Q	BORE	Ø D
38	28	56	4 x M6 x 1, 12 Deep	5 H9, 10 Deep	61	16 H8	40 h11
51	38	66	8 x M6 x 1, 12 Deep	5 H9, 10 Deep	71	25 H7	50 h11
64	50	74	8 x M8 x 1.25, 16 Deep	6 H9, 10 Deep	79	30 H7	65 h11
76	60	100	8 x M8 x 1.25, 16 Deep	8 H9, 10 Deep	105	35 H7	80 h11
89	70	117	8 x M10 x 1.5, 20 Deep	8 H9, 10 Deep	122	45 H7	90 h11

Series W Solid Shaft Option Dimensions



Solid Shaft Dimensions

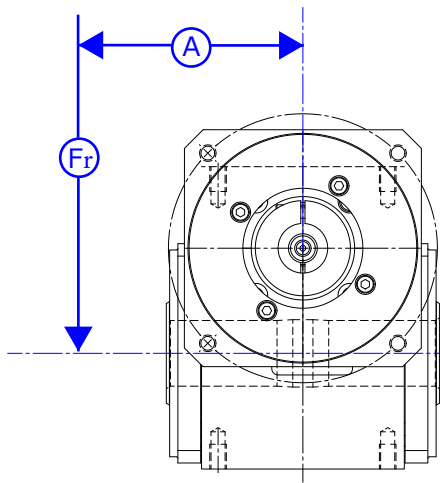
SIZE	A1		A2 (CD)		A3		B		C		D		E1		E2		E3	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
38	1.772	45	1.500	38.1	1.378	35.0	1.988	50.5	1.535	39.0	2.004	50.9	2.484	63.1	4.520	114.80	1.189	30.2
51	2.205	56	2.000	50.8	1.555	39.5	2.283	58.0	1.929	49.0	2.378	60.4	2.732	69.4	4.815	122.30	1.224	31.1
64	2.874	73	2.500	63.5	1.752	44.5	3.110	79.0	2.126	54.0	2.752	69.9	3.697	93.9	5.986	152.00	1.461	37.1
76	3.228	82	3.000	76.2	2.197	55.8	3.524	89.5	2.894	73.5	3.697	93.9	4.327	109.9	6.478	164.55	1.323	33.6
89	3.937	100	3.500	88.9	2.484	63.1	4.134	105	3.543	90.0	4.382	111.3	4.937	125.4	7.795	198.00	2.031	51.6

SIZE	F1	F2		F3		G1		G2		G3		H1		H2		H3		I	
	tap	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	deg.	in	mm	
38	M8	1.654	42.0	1.260	32	0.721	18.31	1.356	34.43	2.520	64	1.811	46	2.205	56	0	0.157	4	
51	M8	1.969	50.0	1.614	41	1.287	32.69	1.838	46.69	3.937	100	1.969	50	2.520	64	0	0.157	4	
64	M8	2.697	68.5	1.732	44	1.581	40.15	2.257	57.34	4.724	120	2.362	60	3.071	78	25	0.157	4	
76	M10	3.110	79.0	2.480	63	1.785	45.34	2.548	64.73	5.276	134	2.756	70	3.622	92	25	0.157	4	
89	M10	3.740	95.0	3.150	80	1.831	46.50	3.171	80.54	5.709	145	3.543	90	4.331	110	25	0.157	4	

SIZE	J	K					M		N		P		N		P ¹		
		in	mm	keyway		in	mm	in	mm	length	keyway	in	mm	length	keyway	offset	
				in	mm												in
38	M6	0.551	14	5 x 2.3 x 25		3.386	86	0.750	0.875	3/16 x 3/32		20	22	6 x 3.5			
51	M6	0.551	14	5 x 2.3 x 24		4.331	110	1.125	1.250	1/4 x 1/8		25	36	8 x 4			
64	M8	0.748	19	6 x 2.8 x 25		4.682	124	1.250	1.625	1/4 x 1/8		30	40	8 x 4			
76	M10	0.945	24	8 x 3 x 28		6.417	165	1.500	2.000	3/8 x 3/16		35	50	10 x 5			
89	M10	1.102	28	8 x 4 x 40		7.874	200	1.875	2.625	1/2 x 1/4		45	63	14 x 5.5			

1 P (mm) is length of pocket-style keyway and offset from shaft end

SIZE	AD Max		AK	AJ	MP	MB	MS
	in	mm					
38	2.64	67.0	Motor Plate Dimensions are made to fit your servo motor. Refer to page 12 for available dimensions.				
51	2.64	67.0					
64	3.11	79.0					
76	3.11	79.0					
89	3.11	79.0					



		SIZE					
		W38	W51	W64	W76	W89	
Emergency Stop		T_{2MAX} (see expanded rating tables)					
Maximum Radial Load ¹	lb	700	1500	2000	2500	3500	
	N	3110	6670	8890	11110	15560	
Dimension to Radial Load ²	mm	71	88	100	135	164	
Maximum Axial Load	lb	400	410	420	950	900	
	N	1780	1820	1860	4220	4000	
Average Lifetime	Hours	25,000					
Weight	lbs	9	18	32	56	110	
	kg	4.1	8.2	14.5	25.4	49.9	
Operating Temperature	°F	-13 to +210 °F					
	°C	-25 to +100 °C					
Degree of Protection		IP 65					
Lubrication		Synthetic Gear Oil – Factory Filled					
Mounting Position		Any					
Nominal Backlash	Zero	arcmin		0	0	0	0
	Low	arcmin	8	6	5	4	3
	Standard	arcmin	24	15	12	10	10
Torsional Rigidity		lb-in/min	34	67	155	341	628
		Nm/min	3.8	7.6	17.5	38.5	71

- 100% duty cycle and applied at referenced distance (A)
- Applies to both solid shaft and hollow options
- Maximum input speed allowed for continuous or longer duration acceleration cycles
- Ratios 30:1 and above can be self-locking. It is important to review the input torque applied during stopping and reversing. This is of particular importance when unrestrained high inertia loads are involved. Please contact our sales department to review your application.

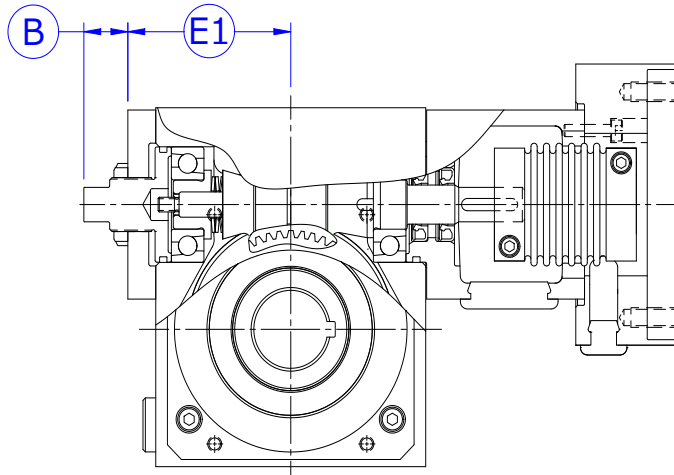
	RATIO		SIZE				
			W38	W51	W64	W76	W89
Moment of Inertia ¹	5	lb.in. s ² 10 ⁻⁴	11.1	20.4	74.2	127	220
		kg cm ²	1.26	2.31	8.38	14.40	24.8
	6	lb.in. s ² 10 ⁻⁴	-	18.6	69.2	111	180
		kg cm ²	-	2.10	78.5	12.5	20.3
	7	lb.in. s ² 10 ⁻⁴	-	17.5	66.0	100	156
		kg cm ²	-	1.97	7.45	11.3	17.6
	8	lb.in. s ² 10 ⁻⁴	-	16.8	64.3	93.9	140
		kg cm ²	-	1.90	7.26	10.6	15.8
	9	lb.in. S ² 10 ⁻⁴	-	16.3	63.0	89.4	129
		kg cm ²	-	1.84	7.11	10.1	14.6
	10	lb.in. s ² 10 ⁻⁴	9.66	15.9	62.0	86.2	122
		kg cm ²	1.09	1.80	7.00	9.73	13.8
	15	lb.in. s ² 10 ⁻⁴	9.38	15.1	59.8	78.5	104
		kg cm ²	1.06	1.71	6.75	8.87	11.7
	20	lb.in. s ² 10 ⁻⁴	9.30	1.48	59.0	75.9	97.3
		kg cm ²	1.05	1.68	6.67	8.57	11.0
	25	lb.in. s ² 10 ⁻⁴	-	14.7	58.7	74.6	94.4
		kg cm ²	-	1.66	6.62	8.43	10.7
	30 ²	lb.in. s ² 10 ⁻⁴	9.22	14.6	58.4	74.0	92.7
		kg cm ²	1.04	1.65	6.60	8.35	10.5
	40 ²	lb.in. s ² 10 ⁻⁴	9.20	14.6	58.3	73.3	91.2
		kg cm ²	1.40	1.64	6.58	8.28	10.3
	50 ²	lb.in. s ² 10 ⁻⁴	9.20	14.5	58.2	73.0	90.4
		kg cm ²	1.04	1.64	6.57	8.24	10.2
60 ²	lb.in. s ² 10 ⁻⁴	9.20	14.5	58.1	72.8	90.0	
	kg cm ²	1.04	1.64	6.56	8.22	10.2	

1 The moment of inertia values reflected at the input shaft and includes coupling

2 Maximum input speed allowed for short acceleration cycles

The Accudrive Series W zero backlash units achieve zero backlash by applying a firm, yet moveable clamping force to both sides of the gear teeth. The clamping force is set based on the output torque required for your application.

Series W zero backlash units also include an external adjustment feature that allows the clamping force to be easily optimized or adjusted if the requirements of your application change.



Zero Backlash Features

- Self-compensating design maintains zero backlash for life
- Factory set based on output torque required for your application
- External adjustment maximizes operating efficiency.

Dimensions	UNIT SIZE							
	W51		W64		W76		W89	
	in	mm	in	mm	in	mm	in	mm
ⓑ (max)	0.87	22	0.87	22	1.26	32	1.42	36
ⓔ1	2.80	71	3.78	96	4.37	111	5.16	131

Product Specifications

- Available in size 51,64,76 & 89 only
- Single extended input only
- Maximum input speed 3,000 rpm
- All other specifications and dimensions remain the same.

Zero Backlash Setpoint #	OUTPUT TORQUE							
	W51		W64		W76		W89	
	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm
1	83	9	81	9	218	25	202	23
2	102	12	124	14	272	31	448	51
3	147	17	206	23	301	34	694	78
4	245	28	255	29	350	40	1075	121
5	374	42	399	45	770	87	1737	196
6	490	55	666	75	1237	140	2470	279
7	612	69	952	108	1695	142	3094	350

Zero Backlash Output Torque Setpoints

- Select the closest zero backlash setpoint number where the output torque for the size unit you have selected exceeds the required output torque for your application.
- Use the setpoint number to select the appropriate Series W unit designation code in column 9, on page 11.
- Zero Backlash Series W units require more motor torque than standard and low backlash units. For support in sizing motors for zero backlash units, contact our Application Engineers.

W38 Single Reduction

i : 1	Ratings	Units	$N_{1\text{NOM}}$ (rpm)					$N_{1\text{PK}}$ rpm	$T_{2\text{MAX}}$	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
5	$P_{1\text{TH}}$	hp	0.99	1.74	1.82	1.67	1.54	6,000	1,610	182
		kW	0.74	1.30	1.36	1.24	1.15			
	$T_{2\text{ME}}$	lb-in	548	488	374	306	264			
		Nm	61.9	55.1	42.3	34.6	29.8			
	$T_{2\text{ACC}}$	lb-in	593	548	488	427	374			
		Nm	67.0	61.9	55.1	48.2	42.3			
η	%	88	89	89	88	87				
10	$P_{1\text{TH}}$	hp	0.68	1.22	1.54	1.43	1.33	6,000	1,890	214
		kW	0.51	0.91	1.15	1.07	0.99			
	$T_{2\text{ME}}$	lb-in	720	670	530	434	374			
		Nm	81.4	75.7	59.9	49.0	42.3			
	$T_{2\text{ACC}}$	lb-in	774	720	670	597	530			
		Nm	87.5	81.4	75.7	67.5	59.9			
η	%	84	87	87	86	85				
15	$P_{1\text{TH}}$	hp	0.55	0.99	1.33	1.25	1.18	6,000	1,890	214
		kW	0.41	0.74	0.99	0.93	0.88			
	$T_{2\text{ME}}$	lb-in	848	798	636	520	451			
		Nm	95.8	90.2	71.9	58.8	51.0			
	$T_{2\text{ACC}}$	lb-in	896	848	798	715	636			
		Nm	101	95.8	90.2	80.8	71.9			
η	%	81	85	85	84	83				
20	$P_{1\text{TH}}$	hp	0.42	0.76	1.11	1.05	1.00	6,000	1,820	206
		kW	0.32	0.57	0.83	0.78	0.75			
	$T_{2\text{ME}}$	lb-in	835	776	629	514	445			
		Nm	94.3	87.7	71.1	58.1	50.3			
	$T_{2\text{ACC}}$	lb-in	869	835	776	704	629			
		Nm	98.2	94.3	87.7	79.5	71.1			
η	%	78	81	82	81	80				
30	$P_{1\text{TH}}$	hp	0.29	0.51	0.82	0.83	0.80	6,000	1,670	189
		kW	0.21	0.38	0.61	0.62	0.60			
	$T_{2\text{ME}}$	lb-in	768	739	598	488	423			
		Nm	86.8	83.5	67.6	55.1	47.8			
	$T_{2\text{ACC}}$	lb-in	807	768	739	669	598			
		Nm	91.2	86.8	83.5	75.6	67.6			
η	%	71	76	77	76	75				
40	$P_{1\text{TH}}$	hp	0.22	0.39	0.62	0.71	0.69	6,000	1,500	169
		kW	0.16	0.29	0.46	0.53	0.51			
	$T_{2\text{ME}}$	lb-in	730	704	570	465	403			
		Nm	82.5	79.5	64.4	52.5	45.5			
	$T_{2\text{ACC}}$	lb-in	732	730	704	639	570			
		Nm	82.7	82.5	79.5	72.2	64.4			
η	%	67	72	73	72	71				
50	$P_{1\text{TH}}$	hp	0.17	0.31	0.50	0.62	0.63	6,000	1,320	149
		kW	0.13	0.23	0.37	0.46	0.47			
	$T_{2\text{ME}}$	lb-in	710	676	549	446	387			
		Nm	80.2	76.4	62.0	50.4	43.7			
	$T_{2\text{ACC}}$	lb-in	706	710	676	614	549			
		Nm	79.8	80.2	76.4	69.4	62.0			
η	%	65	69	70	69	68				
60	$P_{1\text{TH}}$	hp	0.14	0.26	0.42	0.51	0.53	6,000	1,300	147
		kW	0.11	0.19	0.31	0.38	0.39			
	$T_{2\text{ME}}$	lb-in	668	648	526	428	354			
		Nm	75.5	73.2	59.4	48.4	40.0			
	$T_{2\text{ACC}}$	lb-in	672	668	648	589	526			
		Nm	75.9	75.5	73.2	66.6	59.4			
η	%	61	66	67	66	62				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W51 Single Reduction

i : 1	Ratings	Units	N_{1NOM} (rpm)					N_{1PK} rpm	T_{2MAX}	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
5	P_{1TH}	hp	1.95	3.00	3.00	2.67	2.40	6,000	3,320	375
		kW	1.46	2.24	2.24	1.99	1.79			
	T_{2ME}	lb-in	1120	960	711	577	490			
		Nm	127	108	80.3	65.2	55.4			
	T_{2ACC}	lb-in	1,210	1,120	960	812	711			
		Nm	137	127	108	91.7	80.3			
η	%	91	92	92	91	90				
6	P_{1TH}	hp	1.84	3.00	2.67	2.40	2.40	6,000	3,600	407
		kW	1.37	2.24	1.99	1.79	1.79			
	T_{2ME}	lb-in	1250	1090	805	654	561			
		Nm	141	123	91.0	73.9	63.4			
	T_{2ACC}	lb-in	1,350	1,250	1,090	923	805			
		Nm	153	141	123	104	91.0			
η	%	90	92	91	90	90				
7	P_{1TH}	hp	1.68	2.67	2.67	2.40	2.18	6,000	3,720	420
		kW	1.25	1.99	1.99	1.79	1.63			
	T_{2ME}	lb-in	1320	1160	864	701	601			
		Nm	149	131	97.6	79.2	67.9			
	T_{2ACC}	lb-in	1,430	1,320	1,160	989	864			
		Nm	162	149	131	112	97.6			
η	%	89	91	91	90	89				
8	P_{1TH}	hp	1.56	2.67	2.67	2.18	2.18	6,000	3,870	437
		kW	1.16	1.99	1.99	1.63	1.63			
	T_{2ME}	lb-in	1400	1240	930	761	649			
		Nm	158	140	105	86.0	73.3			
	T_{2ACC}	lb-in	1,510	1,400	1,240	1,070	930			
		Nm	171	158	140	121	105			
η	%	89	91	91	89	89				
9	P_{1TH}	hp	1.44	2.40	2.40	2.18	2.00	6,000	3,900	441
		kW	1.08	1.79	1.79	1.63	1.49			
	T_{2ME}	lb-in	1440	1280	960	786	671			
		Nm	163	145	108	88.8	75.8			
	T_{2ACC}	lb-in	1,550	1,440	1,280	1,100	960			
		Nm	175	163	145	124	108			
η	%	88	90	90	89	88				
10	P_{1TH}	hp	1.35	2.35	2.40	2.18	2.00	6,000	3,910	442
		kW	1.01	1.75	1.79	1.63	1.49			
	T_{2ME}	lb-in	1480	1330	994	815	694			
		Nm	167	150	112	92.1	78.4			
	T_{2ACC}	lb-in	1,580	1,480	1,330	1,140	994			
		Nm	179	167	150	129	112			
η	%	87	90	90	89	88				
15	P_{1TH}	hp	1.10	1.90	2.00	1.85	1.71	6,000	3,930	444
		kW	0.82	1.42	1.49	1.38	1.28			
	T_{2ME}	lb-in	1740	1580	1200	981	839			
		Nm	197	179	136	111	94.8			
	T_{2ACC}	lb-in	1,840	1,740	1,580	1,370	1,200			
		Nm	208	197	179	155	136			
η	%	84	88	88	87	86				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W51 Single Reduction

i : 1	Ratings	Units	$N_{1\text{NOM}}$ (rpm)					$N_{1\text{PK}}$ rpm	$T_{2\text{MAX}}$	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
20	$P_{1\text{TH}}$	hp	0.84	1.46	1.60	1.50	1.41	6,000	3,800	429
		kW	0.63	1.09	1.19	1.12	1.05			
	$T_{2\text{ME}}$	lb-in	1720	1550	1190	971	832			
		Nm	194	175	134	110	94.0			
	$T_{2\text{ACC}}$	lb-in	1,780	1,720	1,550	1,360	1,190			
		Nm	201	194	175	154	134			
η	%	81	84	85	84	83				
25	$P_{1\text{TH}}$	hp	0.67	1.19	1.50	1.41	1.33	6,000	3,620	409
		kW	0.50	0.88	1.12	1.05	0.99			
	$T_{2\text{ME}}$	lb-in	1720	1550	1180	967	829			
		Nm	194	175	133	109	93.7			
	$T_{2\text{ACC}}$	lb-in	1,750	1,720	1,550	1,350	1,180			
		Nm	198	194	175	153	133			
η	%	81	83	84	83	82				
30	$P_{1\text{TH}}$	hp	0.56	0.99	1.20	1.14	1.09	6,000	3,480	393
		kW	0.42	0.74	0.89	0.85	0.81			
	$T_{2\text{ME}}$	lb-in	1580	1480	1130	925	792			
		Nm	179	167	128	105	89			
	$T_{2\text{ACC}}$	lb-in	1,660	1,580	1,480	1,290	1,130			
		Nm	188	179	167	146	128			
η	%	74	79	80	79	78				
40	$P_{1\text{TH}}$	hp	0.43	0.75	1.00	0.96	0.92	6,000	3,140	355
		kW	0.32	0.56	0.75	0.72	0.69			
	$T_{2\text{ME}}$	lb-in	1510	1410	1080	883	756			
		Nm	171	159	122	99.8	85.4			
	$T_{2\text{ACC}}$	lb-in	1,510	1,510	1,410	1,240	1,080			
		Nm	171	171	159	140	122			
η	%	70	75	76	75	74				
50	$P_{1\text{TH}}$	hp	0.34	0.60	0.89	0.86	0.83	6,000	2,780	314
		kW	0.26	0.45	0.66	0.64	0.62			
	$T_{2\text{ME}}$	lb-in	1470	1360	1040	850	728			
		Nm	166	154	118	96.0	82.3			
	$T_{2\text{ACC}}$	lb-in	1,460	1,470	1,360	1,190	1,040			
		Nm	165	166	154	134	118			
η	%	68	72	73	72	71				
60	$P_{1\text{TH}}$	hp	0.29	0.50	0.76	0.77	0.69	6,000	2,740	310
		kW	0.21	0.37	0.56	0.58	0.51			
	$T_{2\text{ME}}$	lb-in	1390	1300	1000	816	668			
		Nm	157	147	113	92.2	75.5			
	$T_{2\text{ACC}}$	lb-in	1,390	1,390	1,300	1,150	1,000			
		Nm	157	157	147	130	113			
η	%	64	69	70	69	65				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W64 Single Reduction

i : 1	Ratings	Units	$N_{1\text{NOM}}$ (rpm)					$N_{1\text{PK}}$ rpm	$T_{2\text{MAX}}$	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
5	$P_{1\text{TH}}$	hp	3.56	4.00	4.00	3.56	3.20	6,000	6,570	742
		kW	2.65	2.98	2.98	2.65	2.39			
	$T_{2\text{ME}}$	lb-in	2160	1770	1280	1030	840			
		Nm	244	200	145	116	94.9			
	$T_{2\text{ACC}}$	lb-in	2,370	2,160	1,770	1,470	1,280			
		Nm	268	244	200	166	145			
η	%	91	92	92	91	90				
6	$P_{1\text{TH}}$	hp	3.20	4.00	3.56	3.20	3.20	6,000	7,140	807
		kW	2.39	2.98	2.65	2.39	2.39			
	$T_{2\text{ME}}$	lb-in	2410	2000	1450	1160	963			
		Nm	272	226	164	131	109			
	$T_{2\text{ACC}}$	lb-in	2,640	2,410	2,000	1,660	1,450			
		Nm	298	272	226	188	164			
η	%	90	92	91	90	90				
7	$P_{1\text{TH}}$	hp	2.91	3.56	3.56	3.20	2.91	6,000	7,400	836
		kW	2.17	2.65	2.65	2.39	2.17			
	$T_{2\text{ME}}$	lb-in	2560	2140	1560	1250	1040			
		Nm	289	242	176	141	118			
	$T_{2\text{ACC}}$	lb-in	2,790	2,560	2,140	1,770	1,560			
		Nm	315	289	242	200	176			
η	%	89	91	91	90	89				
8	$P_{1\text{TH}}$	hp	2.91	3.56	3.56	2.91	2.91	6,000	7,690	869
		kW	2.17	2.65	2.65	2.17	2.17			
	$T_{2\text{ME}}$	lb-in	2720	2300	1670	1350	1130			
		Nm	307	260	189	153	128			
	$T_{2\text{ACC}}$	lb-in	2,950	2,720	2,300	1,920	1,670			
		Nm	333	307	260	217	189			
η	%	89	91	91	89	89				
9	$P_{1\text{TH}}$	hp	2.67	3.20	3.20	2.91	2.67	6,000	7,710	871
		kW	1.99	2.39	2.39	2.17	1.99			
	$T_{2\text{ME}}$	lb-in	2790	2380	1730	1400	1170			
		Nm	315	269	195	158	132			
	$T_{2\text{ACC}}$	lb-in	3,020	2,790	2,380	1,980	1,730			
		Nm	341	315	269	224	195			
η	%	88	90	90	89	88				
10	$P_{1\text{TH}}$	hp	2.46	3.20	3.20	2.91	2.67	6,000	7,770	878
		kW	1.84	2.39	2.39	2.17	1.99			
	$T_{2\text{ME}}$	lb-in	2860	2460	1790	1450	1210			
		Nm	323	278	202	164	137			
	$T_{2\text{ACC}}$	lb-in	3,090	2,860	2,460	2,050	1,790			
		Nm	349	323	278	232	202			
η	%	87	90	90	89	88				
15	$P_{1\text{TH}}$	hp	2.00	2.67	2.67	2.46	2.29	6,000	7,790	880
		kW	1.49	1.99	1.99	1.84	1.70			
	$T_{2\text{ME}}$	lb-in	3380	2950	2150	1740	1460			
		Nm	382	333	243	197	165			
	$T_{2\text{ACC}}$	lb-in	3,580	3,380	2,950	2,470	2,150			
		Nm	405	382	333	279	243			
η	%	84	88	88	87	86				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W64 Single Reduction

i : 1	Ratings	Units	$N_{1\text{NOM}}$ (rpm)					$N_{1\text{PK}}$ rpm	$T_{2\text{MAX}}$	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
20	$P_{1\text{TH}}$	hp	1.63	2.00	2.13	2.00	1.88	6,000	7,540	852
		kW	1.22	1.49	1.59	1.49	1.40			
	$T_{2\text{ME}}$	lb-in	3330	2880	2130	1720	1450			
		Nm	376	325	241	194	164			
	$T_{2\text{ACC}}$	lb-in	3,480	3,330	2,880	2,440	2,130			
		Nm	393	376	325	276	241			
η	%	81	84	85	84	83				
25	$P_{1\text{TH}}$	hp	1.31	1.88	2.00	1.88	1.78	6,000	7,180	811
		kW	0.98	1.40	1.49	1.40	1.33			
	$T_{2\text{ME}}$	lb-in	3340	2880	2120	1720	1450			
		Nm	377	325	240	194	164			
	$T_{2\text{ACC}}$	lb-in	3,410	3,340	2,880	2,430	2,120			
		Nm	385	377	325	275	240			
η	%	81	83	84	83	82				
30	$P_{1\text{TH}}$	hp	1.10	1.52	1.60	1.52	1.45	6,000	6,900	780
		kW	0.82	1.14	1.19	1.14	1.08			
	$T_{2\text{ME}}$	lb-in	3070	2750	2040	1640	1390			
		Nm	347	311	230	185	157			
	$T_{2\text{ACC}}$	lb-in	3,240	3,070	2,750	2,330	2,040			
		Nm	366	347	311	263	230			
η	%	74	79	80	79	78				
40	$P_{1\text{TH}}$	hp	0.83	1.28	1.33	1.28	1.23	6,000	6,220	703
		kW	0.62	0.95	0.99	0.95	0.92			
	$T_{2\text{ME}}$	lb-in	2930	2630	1950	1570	1320			
		Nm	331	297	220	177	149			
	$T_{2\text{ACC}}$	lb-in	2,950	2,930	2,630	2,230	1,950			
		Nm	333	331	297	252	220			
η	%	70	75	76	75	74				
50	$P_{1\text{TH}}$	hp	0.67	1.12	1.19	1.14	1.10	6,000	5,520	624
		kW	0.50	0.83	0.88	0.85	0.82			
	$T_{2\text{ME}}$	lb-in	2850	2530	1870	1510	1270			
		Nm	322	286	211	171	143			
	$T_{2\text{ACC}}$	lb-in	2,860	2,850	2,530	2,150	1,870			
		Nm	323	322	286	243	211			
η	%	68	72	73	72	71				
60	$P_{1\text{TH}}$	hp	0.56	0.93	1.07	1.03	0.91	6,000	5,430	614
		kW	0.41	0.69	0.80	0.77	0.68			
	$T_{2\text{ME}}$	lb-in	2690	2430	1800	1450	1170			
		Nm	304	275	203	164	132			
	$T_{2\text{ACC}}$	lb-in	2,720	2,690	2,430	2,060	1,800			
		Nm	307	304	275	233	203			
η	%	64	69	70	69	65				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W76 Single Reduction

i : 1	Ratings	Units	$N_{1\text{NOM}}$ (rpm)					$N_{1\text{PK}}$ rpm	$T_{2\text{MAX}}$	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
5	$P_{1\text{TH}}$	hp	4.22	4.75	4.75	4.22	3.80	6,000	11,600	1311
		kW	3.15	3.54	3.54	3.15	2.83			
	$T_{2\text{ME}}$	lb-in	3730	2920	2100	1630	1340			
		Nm	421	330	237	184	151			
	$T_{2\text{ACC}}$	lb-in	4,200	3,730	2,920	2,420	2,100			
		Nm	475	421	330	273	237			
η	%	91	92	92	91	90				
6	$P_{1\text{TH}}$	hp	3.80	4.75	4.22	3.80	3.80	6,000	12,600	1424
		kW	2.83	3.54	3.15	2.83	2.83			
	$T_{2\text{ME}}$	lb-in	4170	3310	2390	1870	1520			
		Nm	471	374	270	211	172			
	$T_{2\text{ACC}}$	lb-in	4,660	4,170	3,310	2,750	2,390			
		Nm	527	471	374	311	270			
η	%	90	92	91	90	90				
7	$P_{1\text{TH}}$	hp	3.45	4.22	4.22	3.80	3.45	6,000	13,100	1480
		kW	2.58	3.15	3.15	2.83	2.58			
	$T_{2\text{ME}}$	lb-in	4440	3570	2560	2030	1650			
		Nm	502	403	289	229	186			
	$T_{2\text{ACC}}$	lb-in	4,920	4,440	3,570	2,960	2,560			
		Nm	556	502	403	334	289			
η	%	89	91	91	90	89				
8	$P_{1\text{TH}}$	hp	3.45	4.22	4.22	3.45	3.45	6,000	13,700	1548
		kW	2.58	3.15	3.15	2.58	2.58			
	$T_{2\text{ME}}$	lb-in	4780	3930	2850	2260	1850			
		Nm	540	444	322	255	209			
	$T_{2\text{ACC}}$	lb-in	5,240	4,780	3,930	3,260	2,850			
		Nm	592	540	444	368	322			
η	%	89	91	91	89	89				
9	$P_{1\text{TH}}$	hp	3.17	3.80	3.80	3.45	3.17	6,000	13,800	1559
		kW	2.36	2.83	2.83	2.58	2.36			
	$T_{2\text{ME}}$	lb-in	4920	4080	2960	2350	1920			
		Nm	556	461	334	266	217			
	$T_{2\text{ACC}}$	lb-in	5,370	4,920	4,080	3,380	2,960			
		Nm	607	556	461	382	334			
η	%	88	90	90	89	88				
10	$P_{1\text{TH}}$	hp	2.92	3.80	3.80	3.45	3.17	6,000	13,800	1559
		kW	2.18	2.83	2.83	2.58	2.36			
	$T_{2\text{ME}}$	lb-in	5040	4210	3060	2430	1990			
		Nm	569	476	346	275	225			
	$T_{2\text{ACC}}$	lb-in	5,500	5,040	4,210	3,490	3,060			
		Nm	621	569	476	394	346			
η	%	87	90	90	89	88				
15	$P_{1\text{TH}}$	hp	2.38	3.17	3.17	2.92	2.71	6,000	13,900	1571
		kW	1.77	2.36	2.36	2.18	2.02			
	$T_{2\text{ME}}$	lb-in	5950	5070	3680	2940	2420			
		Nm	672	573	416	332	273			
	$T_{2\text{ACC}}$	lb-in	6,380	5,950	5,070	4,210	3,680			
		Nm	721	672	573	476	416			
η	%	84	88	88	87	86				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W76 Single Reduction

i : 1	Ratings	Units	$N_{1\text{NOM}}$ (rpm)					$N_{1\text{PK}}$ rpm	$T_{2\text{MAX}}$	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
20	$P_{1\text{TH}}$	hp	2.00	2.38	2.53	2.38	2.24	6,000	13,500	1525
		kW	1.49	1.77	1.89	1.77	1.67			
	$T_{2\text{ME}}$	lb-in	5880	4950	3640	2910	2400			
		Nm	664	559	411	329	271			
	$T_{2\text{ACC}}$	lb-in	6,190	5,880	4,950	4,160	3,640			
		Nm	699	664	559	470	411			
η	%	81	84	85	84	83				
25	$P_{1\text{TH}}$	hp	2.00	2.24	2.38	2.24	2.11	6,000	12,800	1446
		kW	1.49	1.67	1.77	1.67	1.57			
	$T_{2\text{ME}}$	lb-in	5910	4960	3630	2900	2400			
		Nm	668	560	410	328	271			
	$T_{2\text{ACC}}$	lb-in	6,080	5,910	4,960	4,140	3,630			
		Nm	687	668	560	468	410			
η	%	81	83	84	83	82				
30	$P_{1\text{TH}}$	hp	1.46	1.81	1.90	1.81	1.73	6,000	12,300	1390
		kW	1.09	1.35	1.42	1.35	1.29			
	$T_{2\text{ME}}$	lb-in	5430	4740	3480	2770	2290			
		Nm	614	536	393	313	259			
	$T_{2\text{ACC}}$	lb-in	5,780	5,430	4,740	3,960	3,480			
		Nm	653	614	536	447	393			
η	%	74	79	80	79	78				
40	$P_{1\text{TH}}$	hp	1.27	1.52	1.58	1.52	1.46	6,000	11,100	1254
		kW	0.94	1.13	1.18	1.13	1.09			
	$T_{2\text{ME}}$	lb-in	5170	4530	3320	2640	2190			
		Nm	584	512	375	298	247			
	$T_{2\text{ACC}}$	lb-in	5,260	5,170	4,530	3,790	3,320			
		Nm	594	584	512	428	375			
η	%	70	75	76	75	74				
50	$P_{1\text{TH}}$	hp	1.18	1.36	1.41	1.36	1.31	6,000	9,860	1114
		kW	0.88	1.01	1.05	1.01	0.98			
	$T_{2\text{ME}}$	lb-in	5040	4360	3200	2550	2110			
		Nm	569	493	362	288	238			
	$T_{2\text{ACC}}$	lb-in	5,090	5,040	4,360	3,650	3,200			
		Nm	575	569	493	412	362			
η	%	68	72	73	72	71				
60	$P_{1\text{TH}}$	hp	0.98	1.23	1.27	1.23	1.09	6,000	9,700	1096
		kW	0.73	0.91	0.94	0.91	0.81			
	$T_{2\text{ME}}$	lb-in	4750	4190	3080	2440	1930			
		Nm	537	473	348	276	218			
	$T_{2\text{ACC}}$	lb-in	4,850	4,750	4,190	3,510	3,080			
		Nm	548	537	473	397	348			
η	%	64	69	70	69	65				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W89 Single Reduction

i : 1	Ratings	Units	N_{1NOM} (rpm)					N_{1PK} rpm	T_{2MAX}	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
5	P_{1TH}	hp	8.33	9.38	9.38	8.33	7.50	6,000	21,400	2418
		kW	6.21	6.99	6.99	6.21	5.59			
	T_{2ME}	lb-in	6710	5080	3610	2750	2280			
		Nm	758	574	408	311	258			
	T_{2ACC}	lb-in	7,720	6,710	5,080	4,220	3,610			
		Nm	872	758	574	477	408			
η	%	91	92	92	91	90				
6	P_{1TH}	hp	7.50	9.38	8.33	7.50	7.50	6,000	23,300	2633
		kW	5.59	6.99	6.21	5.59	5.59			
	T_{2ME}	lb-in	7530	5780	4130	3130	2600			
		Nm	851	653	467	354	294			
	T_{2ACC}	lb-in	8,570	7,530	5,780	4,800	4,130			
		Nm	968	851	653	542	467			
η	%	90	92	91	90	90				
7	P_{1TH}	hp	6.82	8.33	8.33	7.50	6.82	6,000	24,200	2734
		kW	5.08	6.21	6.21	5.59	5.08			
	T_{2ME}	lb-in	8020	6220	4450	3410	2810			
		Nm	906	703	503	385	317			
	T_{2ACC}	lb-in	9,080	8,020	6,220	5,170	4,450			
		Nm	1026	906	703	584	503			
η	%	89	91	91	90	89				
8	P_{1TH}	hp	6.82	8.33	8.33	6.82	6.82	6,000	25,300	2859
		kW	5.08	6.21	6.21	5.08	5.08			
	T_{2ME}	lb-in	8650	6840	4910	3810	3120			
		Nm	977	773	555	430	353			
	T_{2ACC}	lb-in	9,640	8,650	6,840	5,660	4,910			
		Nm	1089	977	773	640	555			
η	%	89	91	91	89	89				
9	P_{1TH}	hp	6.25	7.50	7.50	6.82	6.25	6,000	25,400	2870
		kW	4.66	5.59	5.59	5.08	4.66			
	T_{2ME}	lb-in	8880	7080	5080	3960	3250			
		Nm	1003	800	574	447	367			
	T_{2ACC}	lb-in	9,890	8,880	7,080	5,860	5,080			
		Nm	1117	1003	800	662	574			
η	%	88	90	90	89	88				
10	P_{1TH}	hp	5.77	7.50	7.50	6.82	6.25	6,000	25,500	2881
		kW	4.30	5.59	5.59	5.08	4.66			
	T_{2ME}	lb-in	9110	7320	5250	4100	3340			
		Nm	1029	827	593	463	377			
	T_{2ACC}	lb-in	10,100	9,110	7,320	6,030	5,250			
		Nm	1141	1029	827	681	593			
η	%	87	90	90	89	88				
15	P_{1TH}	hp	4.69	6.25	6.25	5.77	5.36	6,000	25,600	2893
		kW	3.50	4.66	4.66	4.30	3.99			
	T_{2ME}	lb-in	10800	8800	6340	4970	4050			
		Nm	1220	994	716	562	458			
	T_{2ACC}	lb-in	11,700	10,800	8,800	7,290	6,340			
		Nm	1322	1220	994	824	716			
η	%	84	88	88	87	86				

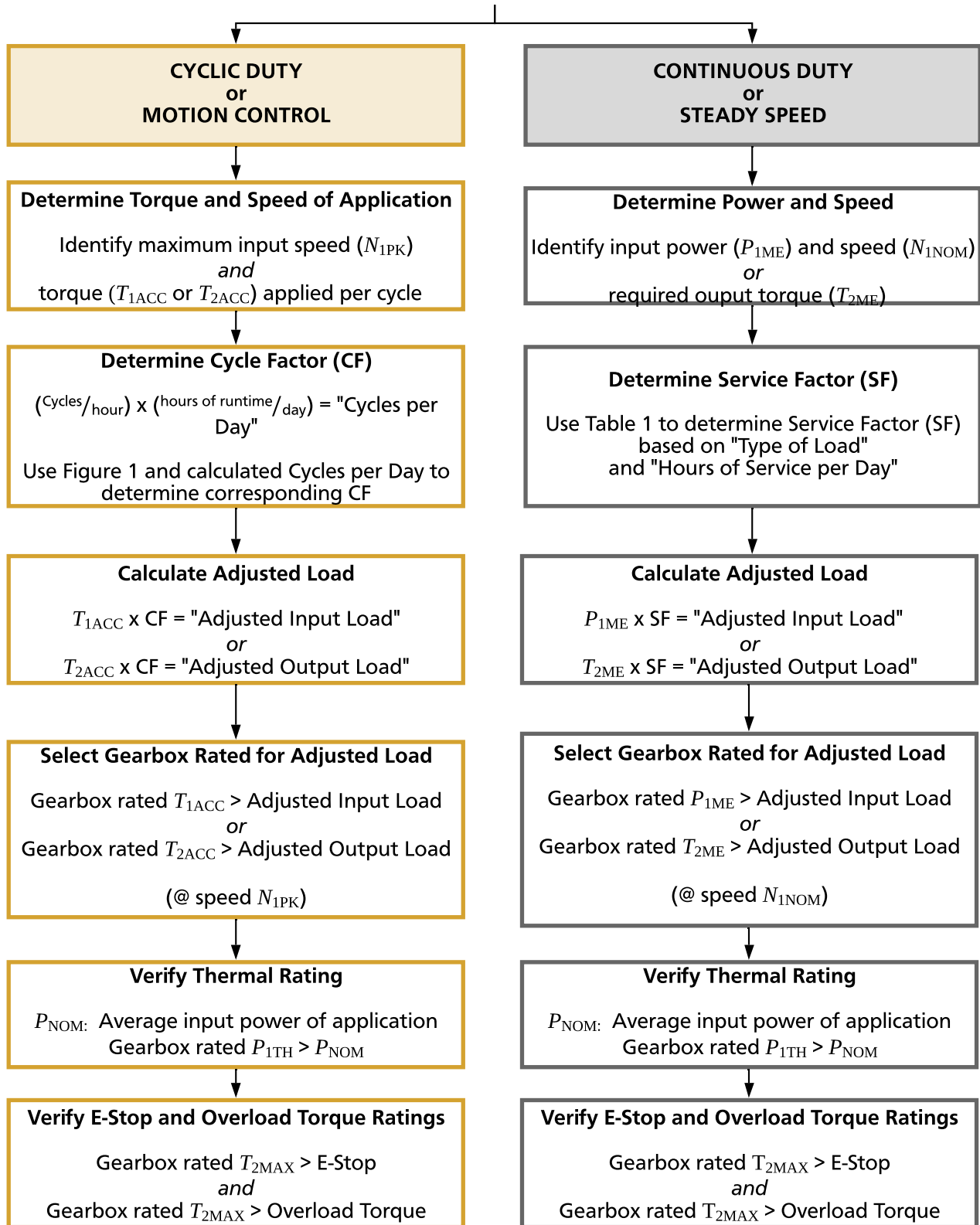
Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

W89 Single Reduction

i : 1	Ratings	Units	$N_{1\text{NOM}}$ (rpm)					$N_{1\text{PK}}$ rpm	$T_{2\text{MAX}}$	
			500	1,000	2,000	3,000	4,000		lb-in	Nm
20	$P_{1\text{TH}}$	hp	3.95	4.69	5.00	4.69	4.41	6,000	24,800	2802
		kW	2.94	3.50	3.73	3.50	3.29			
	$T_{2\text{ME}}$	lb-in	10700	8600	6270	4930	4020			
		Nm	1209	972	708	557	454			
	$T_{2\text{ACC}}$	lb-in	11,400	10,700	8,600	7,210	6,270			
		Nm	1288	1209	972	815	708			
η	%	81	84	85	84	83				
25	$P_{1\text{TH}}$	hp	3.95	4.41	4.69	4.41	4.17	6,000	23,600	2667
		kW	2.94	3.29	3.50	3.29	3.11			
	$T_{2\text{ME}}$	lb-in	10700	8610	6260	4920	4000			
		Nm	1209	973	707	556	452			
	$T_{2\text{ACC}}$	lb-in	11,200	10,700	8,610	7,190	6,260			
		Nm	1265	1209	973	812	707			
η	%	81	83	84	83	82				
30	$P_{1\text{TH}}$	hp	2.88	3.57	3.75	3.57	3.41	6,000	22,700	2565
		kW	2.15	2.66	2.80	2.66	2.54			
	$T_{2\text{ME}}$	lb-in	9830	8220	5990	4710	3820			
		Nm	1111	929	677	532	432			
	$T_{2\text{ACC}}$	lb-in	10,600	9,830	8,220	6,870	5,990			
		Nm	1198	1111	929	776	677			
η	%	74	79	80	79	78				
40	$P_{1\text{TH}}$	hp	2.50	3.00	3.13	3.00	2.88	6,000	20,500	2316
		kW	1.86	2.24	2.33	2.24	2.15			
	$T_{2\text{ME}}$	lb-in	9370	7860	5720	4500	3650			
		Nm	1059	888	646	508	412			
	$T_{2\text{ACC}}$	lb-in	9,670	9,370	7,860	6,580	5,720			
		Nm	1093	1059	888	743	646			
η	%	70	75	76	75	74				
50	$P_{1\text{TH}}$	hp	2.13	2.68	2.78	2.68	2.59	6,000	18,200	2056
		kW	1.59	2.00	2.07	2.00	1.93			
	$T_{2\text{ME}}$	lb-in	9120	7570	5510	4330	3520			
		Nm	1030	855	623	489	398			
	$T_{2\text{ACC}}$	lb-in	9,340	9,120	7,570	6,330	5,510			
		Nm	1055	1030	855	715	623			
η	%	68	72	73	72	71				
60	$P_{1\text{TH}}$	hp	1.78	2.42	2.50	2.42	2.14	6,000	17,900	2023
		kW	1.33	1.80	1.86	1.80	1.60			
	$T_{2\text{ME}}$	lb-in	8610	7280	5290	4160	3230			
		Nm	973	823	598	470	365			
	$T_{2\text{ACC}}$	lb-in	8,910	8,610	7,280	6,080	5,290			
		Nm	1007	973	823	687	598			
η	%	64	69	70	69	65				

Additional ratios are available. Please contact Cone Drive for ratios and ratings.
See page 29 for rating definitions.

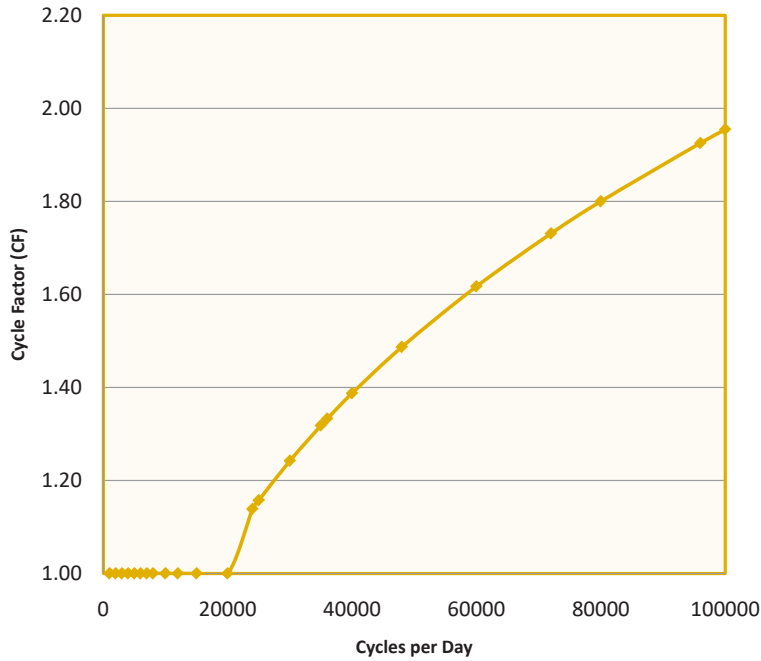
APPLICATION TYPE



See appendix on next page for referenced nomenclature and conversions

CYCLE FACTOR

FOR CYCLIC DUTY OR MOTION CONTROL APPLICATIONS



SERVICE FACTOR FOR CONTINUOUS DUTY OR STEADY SPEED APPLICATIONS

Hours of Service per Day	TYPE OF LOAD			
	Uniform	Moderate	Heavy	Extreme
0.5	0.8	0.9	1.0	1.2
2	0.9	1.0	1.2	1.3
10	1.0	1.3	1.5	1.7
24	1.3	1.5	1.7	2.0

Appendix

REFERENCED NOMENCLATURE

SYMBOL	UNITS	PRODUCT RATING DEFINITIONS
i	—	Ratio
$N_{1\text{NOM}}$	RPM	Nominal input speed
$N_{1\text{PK}}$	RPM	Maximum cyclic input speed permissible
$P_{1\text{ME}}$	HP	Mechanical input power rating (SF = 1.0)
$P_{1\text{TH}}$	HP	Continuous average thermal input power rating
$T_{1\text{ME}}$	lb-in	Mechanical input torque rating (SF = 1.0)
$T_{1\text{ACC}}$	lb-in	Cyclic operation input torque rating
$T_{2\text{ME}}$	lb-in	Mechanical output torque rating (SF = 1.0)
$T_{2\text{ACC}}$	lb-in	Cyclic operation output torque rating
$T_{2\text{MAX}}$	lb-in	Maximum E-stop output torque
η	%	Efficiency

CONVERSION EQUATIONS

$$1. \quad T_2 = T_1 \times i \times \eta$$

$$2. \quad P_1 = \frac{(T_2 \times N_1)}{(63,000 \times i \times \eta)}$$

Lubrication

Series W Servo gearboxes are factory filled with synthetic lubricant. They require no lubrication service throughout the life of the unit. Series W Servo gearboxes are built for universal mounting; ready to mount in any position.

Installation

MOTOR ON GEARBOX:

1. Clean motor shaft and mating surfaces of the motor and gearbox to ensure they are dust free.
2. Slide the motor shaft into the coupling clamp ring until the gearbox and motor flanges are seated together. Install bolts to clamp the gearbox and motor flanges together.
3. Tighten the clamp ring screw through the access slot in the gearbox flange to the following torque settings:

	UNIT SIZE				
	W38	W51	W64	W76	W89
lb. in.	90	90	160	160	350
Nm.	10	10	18	18	40

4. Replace the urethane plug in the access slot.

HOLLOW SHAFT UNITS:

1. Place key in driven shaft.
2. Slide hollow shaft unit onto the driven shaft.
3. Secure unit to machine base using either a mounting base or torque arm.

SOLID SHAFT UNITS:

1. The gearbox must be securely mounted to a rigid flat foundation or base plate. If necessary, shim under the gearbox to provide a flat mounting surface.
2. Four mounting bolts are required to mount all gearboxes. If the gearbox will be subjected to heavy overhung load or thrust loading, heat treated mounting bolts must be used to prevent stretching and loosening of the bolts.
3. The output shaft of the gearbox should be coupled to the driven shaft with a flexible coupling and the gearbox aligned with the shaft, within ± 0.001 ". Solid or rigid couplings should be avoided. Failure to properly align shafts and the use of solid couplings can result in excessive coupling and bearing wear, shaft deflection and eventual failure of one or more of the components.

ANCILLARY COMPONENTS:

1. Couplings, sheaves and sprockets should be mounted on the reducer shafts carefully. Do not pound or hammer them onto the shafts as this will damage bearings and oil seals.
2. Sprockets and sheaves should be mounted as close to the gearbox as possible and "V" belts and chains adjusted to the proper tension to keep bearing loading and shaft deflection to a minimum. Too much tension in belts and improper location of sheaves and sprockets will lead to excessive overhung load, bearing wear and shaft deflection. For specific information on overhung load capacity, shaft stress, and bearing life, please contact Cone Drive.

Start-Up

1. After the gearbox has been properly mounted and aligned, it is ready for start-up.
2. Make sure driven machine is clear of all obstructions and all safety guards and covers are in place. If possible, turn motor shaft by hand to confirm drive system is operating freely and in correct direction of rotation.
3. Jog motor to confirm proper rotation.
4. Operate gearbox with minimum load for approximately 15 minutes (in both directions if applicable) to seal gears, bearings, and oil seals.

Operation

1. All gearboxes require a "run-in" period under load to achieve optimum efficiency. During this initial run-in the gearbox will probably run warmer than normal and draw more current than after the run-in period. Gearboxes operating at a very low load or speed will take much longer to run-in and even if operated continuously at low load or speed may never achieve the efficiency that they would if operated at or near their catalog rating.
2. IMPORTANT: Normal gearbox operating temperature measured at the oil sump area of the housing should not exceed 100°F above ambient temperature or 210°F maximum. If the gearbox operating temperature exceeds these limits, shut down the unit and contact Cone Drive. Excessive oil sump temperature is indicative of overloading, misalignment, or improper or marginal lubrication. Continuous operation of the gearbox with the oil sump temperature above will result in failure of the gearbox.

Maintenance

1. If a gearbox has to be repaired, contact Cone Drive for detailed instruction, blueprints, parts lists, etc. If necessary, field service is available.
2. If a gearbox is to be returned, contact Cone Drive for instructions and a returned material authorization (RMA) number.
3. Please have model number information from the unit name plate recorded.

SAFETY PRECAUTIONS

IMPORTANT: In any applications of Cone Drive Products where breakage, damage, disconnection, any other malfunction of any drive train component, or excessive wear could result in personal injury or property damage, a fail-safe device capable of stopping and holding the load in the event of such an occurrence must be incorporated after the drive train.

THE FOLLOWING INFORMATION IS FOR YOUR PROTECTION. DO NOT ATTEMPT TO INSTALL OR OPERATE THIS GEARBOX UNTIL ALL OF THESE INSTRUCTIONS ARE READ AND THOROUGHLY UNDERSTOOD.

SELF-LOCKING

It is a common misconception that all worm gears are self-locking or non-overhauling. Actually, worm gear ratios up to 15:1 will overhaul quite freely. Ratios from 20:1 to 40:1 can generally be considered as overhauling with difficulty (particularly from rest). Ratios above 40:1 may or may not overhaul depending on loading, lubrication, and the amount of vibration present. Cone Drive cannot guarantee any worm gear ratio to be self-locking. There have been instances where single reduction ratios as high as 100:1 have overhauled. Therefore, it is not acceptable to rely on a worm gear to prevent movement in a system. Whenever a load must be stopped or held in place, a positive mechanical device must be incorporated into the system to prevent rotation of the gear set.

BACKDRIVING OR OVERHAULING

Applications such as wheel drives that require a brake on the motor or input shaft to decelerate a high inertial load require special attention to brake selection. Whenever possible, these applications should utilize freely overhauling ratios (15:1 or less). If self-locking ratios are used with a brake, the gear set can, under certain conditions, lock-up during decelerations and impose severe shock loading on the gearbox and driven equipment. Each reduction should be limited to 15:1 or less to allow the gearbox to overhaul. Contact Cone Drive for specific information on backdriving efficiency and brake selection.

RATINGS & SERVICE FACTORS

The horsepower or output torque capacity of this gearbox and the service factor (maximum allowable operating cycle) are documented in the product catalog. These values are not to be exceeded as overloading can result in gearbox failure. Exceeding the rating and duty cycle will void the warranty. Please contact Cone Drive with any questions regarding rating and service factors.

ALTERATION

Do not alter the gearbox without approval from Cone Drive.

OPERATION & REPAIR

This gearbox has moving mechanical components and may have connected electrical devices operating under high voltage. Operation and repair should only be done by qualified personnel.

PROTECTIVE GUARDING

Cone Drive products are furnished without guard covers. It is the responsibility of the purchase or user to provide guards for all exposed shafting, couplings, sprockets, sheaves, belts, chains, clutches, and any other moving parts in accordance with current local, state, and federal requirements.

LOCK-OUT/TAG-OUT

Before servicing a gearbox, the main electrical disconnect or other input power sources must be moved to and locked in the off-position. The person performing the work should post on that disconnect a warning to others not to turn on the power. Loads on the input and output shafts should be disconnected prior to working on the gearbox.

GEARBOX SURFACE IS HOT

It is normal for the gearbox to operate at temperatures up to and exceeding 200°F. To prevent burns, proper personal protective equipment, guards, or shields should be provided by the purchaser or user to prevent personnel from touching the gearbox.



GLOBAL LOCATIONS

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