

*Helical Servo Gearheads  
High Torque Series*

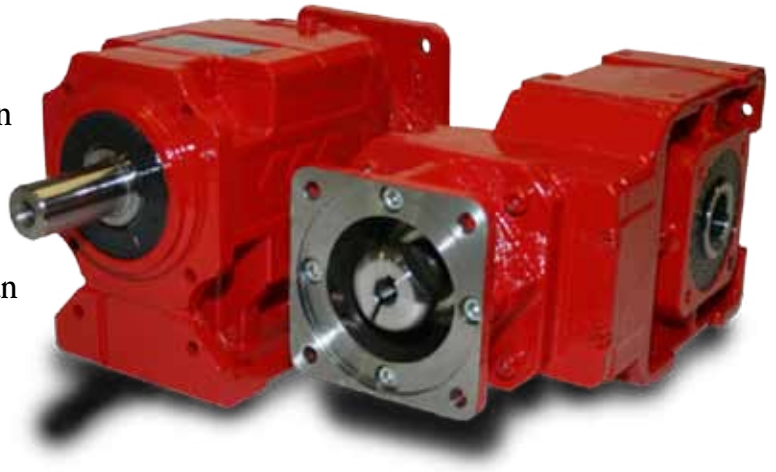
**DIEQUA**  
Corporation

***www.diequa.com***  
***630-980-1133***

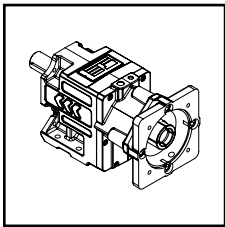
## Precision - Power - Price

The WATT Drive series provides economical motion control with a variety of inline and right angle helical, helical bevel, and helical worm designs.

Offering low backlash, higher torque capacities than traditional planetaries, and attractive prices, these gearheads are ideal for general purpose servo applications.

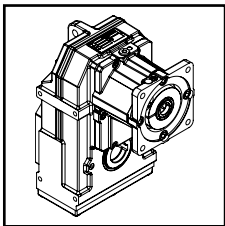


## Models Available



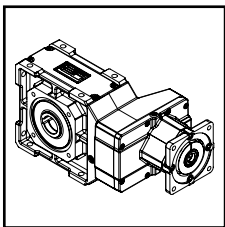
### Standard Inline

An extremely precise and rugged design that can be foot mounted or face mounted on the integral pilot or to a larger bolt on flange.



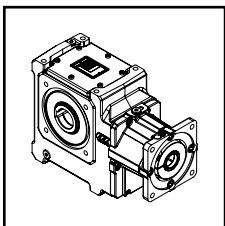
### Parallel Shaft

This model can be shaft mounted and fixed with a torque arm, base mounted using provided tapped holes, or face mounted with an optional bolt-on flange.



### Helical Bevel

High efficiency, a compact design, and high torque capacity make this a very cost effective solution for high torque right angle requirements.



### Helical Worm

With a lower cost than smaller helical bevels, but higher efficiency than standard worms, this model is ideal for speed control applications.

## Benefits

- High Torque Capacities
- Low backlash for precise motion
- Right angle and inline designs
- Shaft, flange, or foot mount
- High efficiency
- Highly rigid cast iron housings
- Wide range of ratios
- Flanges for all Servo Motors
- Environmental Protection Options
- Food Grade Coating Available
- Stainless Steel Components Available

## Specifications:

- Torque capacities to 14,000 Nm
- Backlash down to 5 arc min.
- Hundreds of ratios
- Inch or metric output shafts

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# Torque Capacities in Nm

1 Nm = 8.85 in.lbs.

Standard Inline	
Model	Torque Capacities
H.40	100
H.50	180
H.60	400
H.70	800
H.80	1400
H.85	2000
H.110	3000
H.130	5000
H.133	8000
H.136	14000

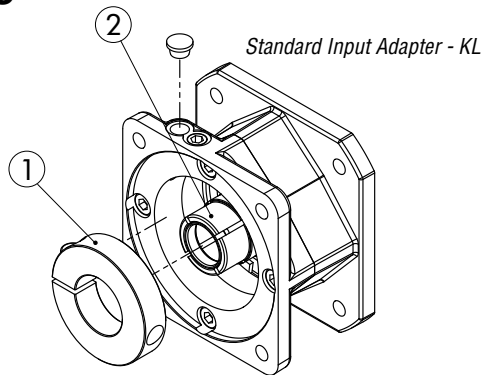
Helical Bevel	
Model	Torque Capacities
K.40	100
K.50	200
K.60	400
K.70	800
K.75	1250
K.77	1500
K.80	2700
K.85	4600
K.110	8000
K.136	14000

Helical Worm	
Model	Torque Capacities
S.454	110
S.455	205
S.506	400
S.507	550
S.608	800
S.609	1085

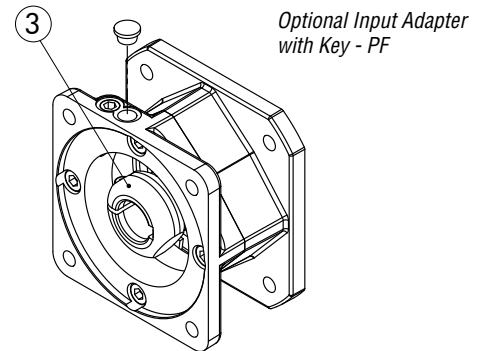
Parallel Shaft	
Model	Torque Capacities
A.46	220
A.56	400
A.66	800
A.76	1500
A.86	2800
F.111	5000
F.131	8000
F.137	14000

Note: Approximate nominal torque in Nm. varies by ratio.

## Input Options

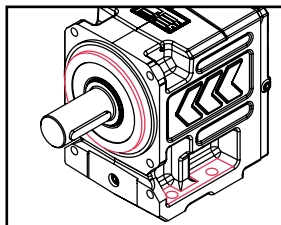


Motors without keys are connected via a clamping ring (1). Different motor shaft diameters are accommodated with slotted bushings (2).

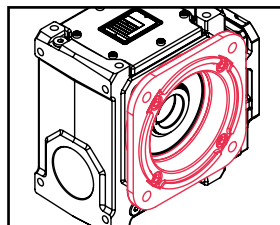


If motors with keys are used, a customized input shaft with keyway and clamp (3) is available at extra cost.

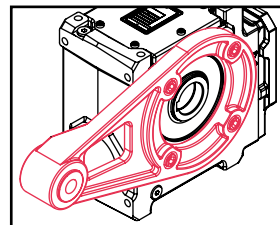
## Mounting Options



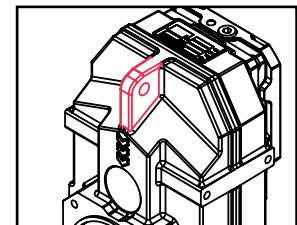
Foot or Face Mount



Flange Mount

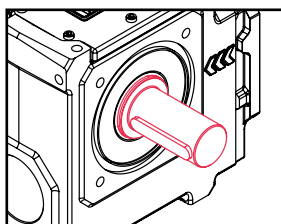


Torque Arm

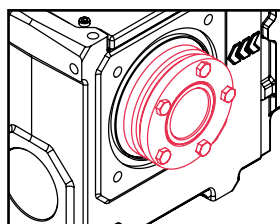


Buffer Mount

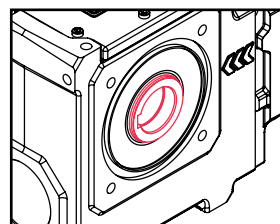
## Output Shaft Options



Output Shaft



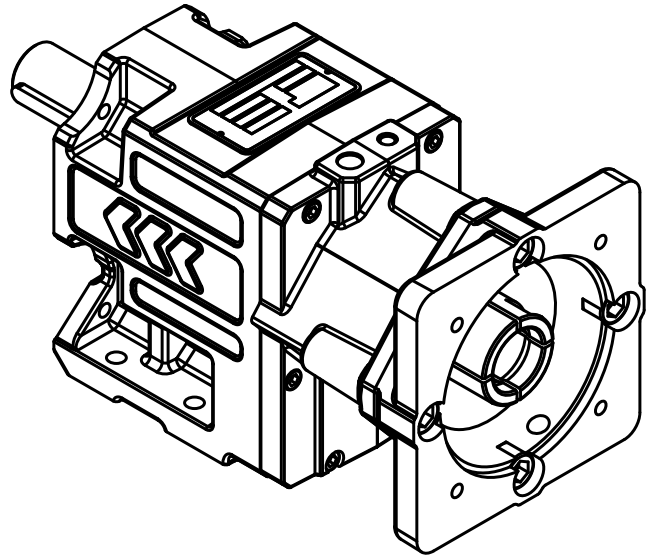
Shrink Disc



Hollow Bore

The WATT Drive H Series of helical servo gearheads provide high performance in an economical inline configuration. Outstanding motion and speed control can be achieved with this highly efficient gearhead.

Offering good backlash levels and higher torque capacities that traditional planetary designs, these gearheads are ideal for both general purpose and high cycle applications.



### Design Benefits

- High torque capacities
- High efficiency
- Face or foot mounting
- Low backlash
- High rigidity housings
- Wide range of ratios
- Corrosion protection options
- Design customization options
- Explosion proof options

### Technical Notes

#### **Backlash:**

Published data represents maximum values. Actual backlash could be as little as half these amounts. Reduced backlash option is available upon request.

#### **Radial Loads:**

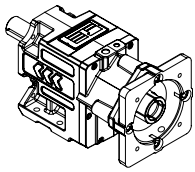
Capacities are a function of shaft rotation, direction of radial load, output speed, and output torque. Consult DieQua for more details.

#### **Input Speeds:**

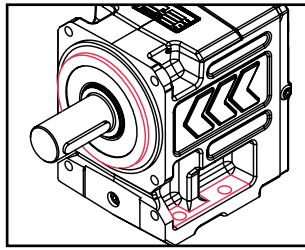
Maximum continuous motor input speeds are a function of gearbox size, ratio, and mounting position. Consult selection charts for speed limits.

#### **Thermal Limits:**

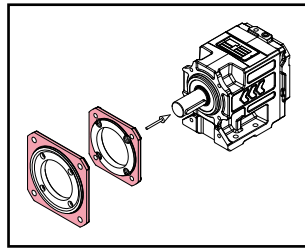
Ambient conditions may alter the power capacities of these gearboxes. For higher and lower temperature applications, please consult DieQua.



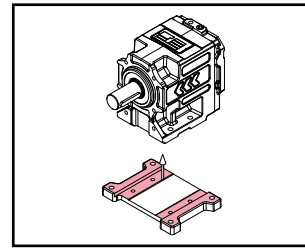
**Mounting Options**



HU - Uniblock



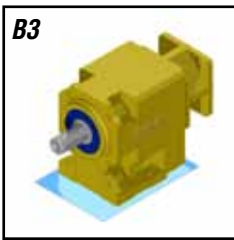
HF - Bolt On Flanges



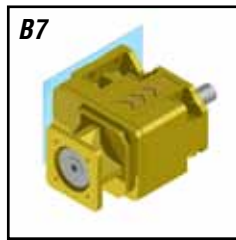
HG - Bolt On Feet

**Mounting Positions**

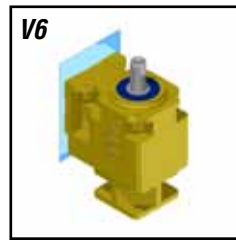
Different mounting positions require different oil quantities. Please specify when ordering.



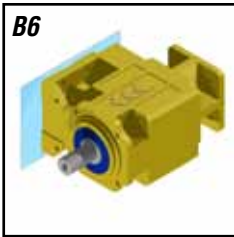
B3



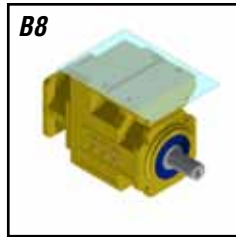
B7



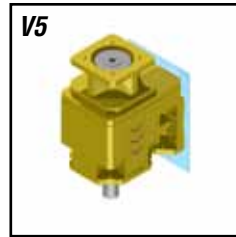
V6



B6

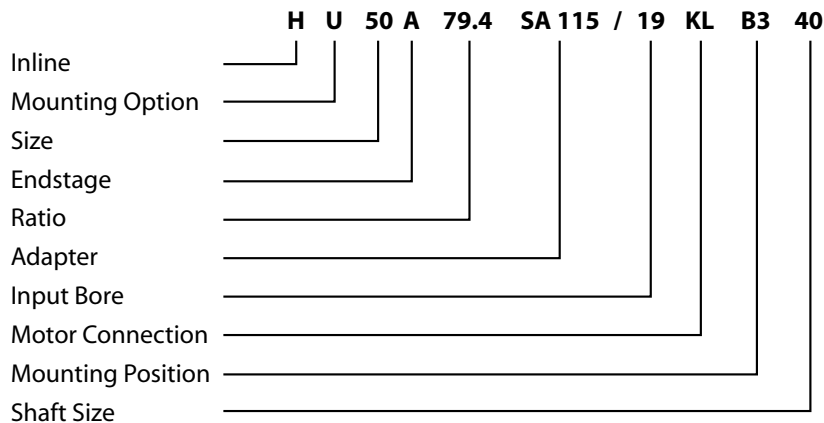


B8



V5

**Ordering Example**



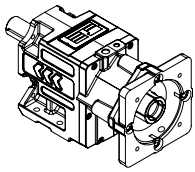
KL = Clamp (Standard)  
 PF = Clamp with Keyway (Optional)

# Series H - Standard Inline Selection Tables

**Gear Type** = Model, Size, Endstage  
**Nom. Ratio** = approximate ratio  
**Exact Ratio** = exact fractional ratio  
**Servo Adapter** = adapter size (pg. 44)  
**T<sub>2N</sub>** = continuous torque (Nm)  
**T<sub>2B</sub>** = peak torque < 5% duty (Nm)  
**T<sub>2E</sub>** = emergency stop torque (Nm)

**Inertia** = inertia at input - per adapter size  
**n1 mp** = continuous speed vertical input  
**n1 max** = continuous speed horizontal input  
**n1 cyc** = intermittent peak speed  
**Max. Backlash** = max. backlash in arc minutes  
*(estimate based on component tolerance calculations)*  
**Effic. %** = efficiency % at max torque  
**Rigidity** = torsional rigidity

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
<b>Size H.40</b>													
H.40S	5.5	1188/217	A	100	110	200	5.8	2100	2800	3600	25	95	1.7
H.40S	6.6	1287/196	A	100	110	200	5.7	2300	3100	4000	25	95	1.7
H.40S	9.2	55/6	A	100	110	200	5.5	2900	3900	5000	24	95	1.7
H.40S	10.9	1221/112	A	100	110	200	5.5	3300	4400	5000	24	95	1.7
H.40S	12.6	88/7	A	100	110	200	5.5	3600	4800	5000	24	95	1.7
H.40A	13.6	245/18	A	100	110	200	5.5	2900	3900	5000	23	95	2
H.40A	16.2	259/16	A	100	110	200	5.5	3300	4400	5000	23	95	2
H.40A	21.5	280/13	A	100	110	200	5.4	4100	5000	5000	23	95	2
H.40A	23.9	287/12	A	100	110	200	5.4	4400	5000	5000	22	95	2
H.40A	29.1	378/13	A	100	110	200	5.4	5000	5000	5000	22	95	2
H.40A	32.1	385/12	A	100	110	200	5.3	5000	5000	5000	22	95	2
H.40A	35.6	392/11	A	100	110	200	5.3	5000	5000	5000	22	95	2
H.40A	40.9	532/13	A	100	110	200	5.3	5000	5000	5000	22	95	2
H.40A	44.9	539/12	A	100	110	200	5.3	5000	5000	5000	22	95	2
H.40A	49.6	546/11	A	100	110	200	5.3	5000	5000	5000	22	95	2
H.40A	55.3	553/10	A	100	110	200	5.3	5000	5000	5000	22	95	2
H.40A	62.2	560/9	A	100	110	200	5.3	5000	5000	5000	22	95	2
<b>Size H.50</b>													
H.50S	3.6	2257/765	A/C	180	198	360	6.7/9.3	2000	2600	3400	23	95	3.1
H.50S	5.1	1464/289	A/C	180	198	360	6.3/8.9	2300	3100	4000	22	95	3.1
H.50S	5.9	183/31	A/C	180	198	360	6.1/8.7	2600	3400	4400	22	95	3.1
H.50S	6.9	1647/238	A/C	180	198	360	5.9/8.5	2800	3700	4800	21	95	3.1
H.50S	9.4	2867/306	A/C	180	198	360	5.7/8.3	3500	4700	5000	21	95	3.1
H.50S	11	2989/272	A/C	180	198	360	5.6/8.2	3900	5000	5000	21	95	3.1
H.50S	12.6	427/34	A/C	180	198	360	5.6/8.2	4400	5000	5000	21	95	3.1
H.50A	15.3	153/10	A/C	180	198	360	5.7/8.3	3200	4200	5000	19	95	3.6
H.50A	17.8	799/45	A/C	180	198	360	5.6/8.2	3500	4700	5000	19	95	3.6
H.50A	20.8	833/40	A/C	180	198	360	5.5/8.1	3900	5000	5000	19	95	3.6
H.50A	23.8	119/5	A/C	180	198	360	5.5/8.1	4400	5000	5000	19	95	3.6
H.50A	27.2	136/5	A/C	180	198	360	5.5/8.1	4800	5000	5000	19	95	3.6
H.50A	30	901/30	A/C	180	198	360	5.4/8	5000	5000	5000	19	95	3.6
H.50A	36.1	2346/65	A/C	180	198	360	5.4/8	5000	5000	5000	18	95	3.6
H.50A	39.7	119/3	A/C	180	198	360	5.4/8	5000	5000	5000	18	95	3.6
H.50A	43.9	2414/55	A/C	180	198	360	5.4/8	5000	5000	5000	18	95	3.6
H.50A	50.2	3264/65	A/C	180	198	360	5.4/8	5000	5000	5000	18	95	3.6
H.50A	55	1649/30	A/C	180	198	360	5.4/8	5000	5000	5000	18	95	3.6



# Series H - Standard Inline Selection Tables

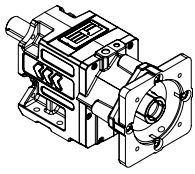
Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
H.50A	60.6	3332/55	A/C	180	198	360	5.3/7.9	5000	5000	5000	18	95	3.6
H.50A	67.3	1683/25	A/C	180	198	360	5.3/7.9	5000	5000	5000	18	95	3.6
H.50A	75.6	680/9	A/C	180	198	360	5.3/7.9	5000	5000	5000	18	95	3.6
H.50C	83.3	33337/400	A	180	198	360	5.4	3300	4400	5000	18	93	3.6
H.50C	96.1	7208/75	A	180	198	360	5.4	3600	4800	5000	18	93	3.6
H.50C	110.9	7208/65	A	180	198	360	5.4	4100	5000	5000	18	93	3.6
H.50C	123.1	36941/300	A	180	198	360	5.4	4400	5000	5000	18	93	3.6
H.50C	149.7	48654/325	A	180	198	360	5.4	5000	5000	5000	18	93	3.6
H.50C	165.2	9911/60	A	180	198	360	5.3	5000	5000	5000	18	93	3.6
H.50C	183.5	50456/275	A	180	198	360	5.3	5000	5000	5000	18	93	3.6
H.50C	210.7	68476/325	A	180	198	360	5.3	5000	5000	5000	18	93	3.6
H.50C	231.3	69377/300	A	180	198	360	5.3	5000	5000	5000	18	93	3.6
H.50C	255.6	70278/275	A	180	198	360	5.3	5000	5000	5000	18	93	3.6
H.50C	284.7	71179/250	A	180	198	360	5.3	5000	5000	5000	18	93	3.6
H.50C	320.4	14415/45	A	180	198	360	5.3	5000	5000	5000	18	93	3.6
<b>Size H.60</b>													
H.60S	4.1	589/144	A/C	336	370	672	9.6/12.2	1700	2200	2900	19	95	14
H.60S	4.9	1271/261	A/C	351	386	702	8.5/11.1	1800	2400	3100	18	95	14
H.60S	5.8	682/117	A/C	367	404	734	7.7/10.3	2000	2700	3500	18	95	14
H.60S	7	1457/207	A/C	378	416	756	7.1/9.7	2300	3000	3900	18	95	14
H.60S	9.3	527/57	A/C	393	432	786	6.5/9.1	2800	3700	4800	17	95	14
H.60S	11	496/45	A/C	400	440	800	6.2/8.8	3200	4200	5000	17	95	14
H.60A	12.8	141/11	A/C	400	440	800	6.8/9.4	2300	3000	3900	14	95	16
H.60A	14.6	161/11	A/C	400	440	800	6.5/9.1	2500	3300	4300	14	95	16
H.60A	20.1	1104/55	A/C	400	440	800	6.1/8.7	3200	4200	5000	14	95	16
H.60A	23	23/1	A/C	400	440	800	6/8.6	3500	4700	5000	14	95	16
H.60A	26.7	1173/44	A/C	400	440	800	5.8/8.4	3900	5000	5000	14	95	16
H.60A	30.3	667/22	A/C	400	440	800	5.8/8.4	4400	5000	5000	14	95	16
H.60A	34.3	4899/143	A/C	400	440	800	5.7/8.3	4800	5000	5000	14	95	16
H.60A	37.6	414/11	A/C	400	440	800	5.6/8.2	5000	5000	5000	14	95	16
H.60A	44.4	6348/143	A/C	400	440	800	5.6/8.2	5000	5000	5000	14	95	16
H.60A	48.6	2139/44	A/C	400	440	800	5.6/8.2	5000	5000	5000	14	95	16
H.60A	53.6	6486/121	A/C	400	440	800	5.5/8.1	5000	5000	5000	14	95	16
H.60A	61.3	8763/143	A/C	400	440	800	5.5/8.1	5000	5000	5000	14	95	16
H.60A	66.9	736/11	A/C	400	440	800	5.5/8.1	5000	5000	5000	14	95	16
H.60A	73.6	8901/121	A/C	375	413	750	5.5/8.1	5000	5000	5000	14	95	16
H.60C	88	3519/40	A	400	440	800	5.5	2600	3500	4600	14	93	16
H.60C	103.7	13685/132	A	400	440	800	5.5	2900	3900	5000	14	93	16
H.60C	123.3	43401/352	A	400	440	800	5.5	3300	4400	5000	14	93	16
H.60C	142.2	1564/11	A	400	440	800	5.4	3600	4800	5000	14	93	16
H.60C	164.1	23460/143	A	400	440	800	5.4	4100	5000	5000	14	93	16
H.60C	182.2	16031/88	A	400	440	800	5.4	4400	5000	5000	14	93	16
H.60C	221.5	31/671/143	A	400	440	800	5.4	5000	5000	5000	14	93	16

1 Nm = 8.85 in-lb

# Series H - Standard Inline Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
H.60C	244.4	1955/8	A	400	440	800	5.3	5000	5000	5000	14	93	16
H.60C	271.4	32/844/121	A	400	440	800	5.3	5000	5000	5000	14	93	16
H.60C	311.7	44574/143	A	400	440	800	5.3	5000	5000	5000	14	93	16
H.60C	342.1	2737/8	A	400	440	800	5.3	5000	5000	5000	14	93	16
H.60C	378.1	45747/121	A	400	440	800	5.3	5000	5000	5000	14	93	16
H.60C	421.2	92667//220	A	400	440	800	5.3	5000	5000	5000	14	93	16
H.60C	473.9	15640/33	A	400	440	800	5.3	5000	5000	5000	14	93	16
<b>Size H.70</b>													
H.70S	3.8	2881/756	B/C	397	437	794	24/24	1400	1900	2500	18	95	28
H.70S	4.6	3149/684	B/C	479	527	958	20.3/20.3	1600	2100	2700	17	95	28
H.70S	5.3	335/63	B/C	554	609	1108	18.1/18.1	1700	2300	3000	17	95	28
H.70S	6.2	3551/576	B/C	641	705	1282	16.4/16.4	1900	2500	3300	17	95	28
H.70S	7.2	1876/261	B/C	705	776	1410	14.9/14.9	2100	2800	3600	17	95	28
H.70S	8.5	3953/468	B/C	725	798	1450	13.8/13.8	2300	3100	4000	17	95	28
H.70S	10	2077/207	B/C	743	817	1486	12.8/12.8	2600	3500	4600	16	95	28
H.70S	12.9	737/57	B/C	768	845	1536	11.8/11.8	3200	4300	4700	16	95	28
H.70A	16.4	2263/138	B/C	800	880	1600	12.2/12.2	2600	3500	4600	14	95	32
H.70A	18.5	1168/63	B/C	800	880	1600	11.8/11.8	2900	3900	4700	13	95	32
H.70A	21.1	803/38	B/C	800	880	1600	11.5/11.5	3200	4300	4700	13	95	32
H.70A	25.3	6059/240	B/C	800	880	1600	11.1/11.1	3700	4700	4700	13	95	32
H.70A	28.7	6205/216	B/C	800	880	1600	10.8/10.8	4100	4700	4700	13	95	32
H.70A	33.1	2117/64	B/C	800	880	1600	10.6/10.6	4600	4700	4700	13	95	32
H.70A	37	5329/144	B/C	800	880	1600	10.4/10.4	4700	4700	4700	13	95	32
H.70A	42.1	1095/26	B/C	800	880	1600	10.3/10.3	4700	4700	4700	13	95	32
H.70A	46.1	6643/144	B/C	800	880	1600	10.2/10.2	4700	4700	4700	13	95	32
H.70A	53.8	8395/156	B/C	800	880	1600	10.1/10.1	4700	4700	4700	13	95	32
H.70A	58.8	2117/36	B/C	800	880	1600	10/10	4700	4700	4700	13	95	32
H.70A	64.7	2847/44	B/C	800	880	1600	39364	4700	4700	4700	13	95	32
H.70C	80.1	2482/31	A/C	800	880	1600	5.9/8.5	2600	3400	4400	13	93	32
H.70C	93.9	657/7	A/C	800	880	1600	5.8/8.4	2800	3700	4800	13	93	32
H.70C	109.5	219/2	A/C	800	880	1600	5.7/8.3	3200	4200	5000	13	93	32
H.70C	127.1	3431/27	A/C	800	880	1600	5.6/8.2	3500	4700	5000	13	93	32
H.70C	149	3577/24	A/C	800	880	1600	5.5/8.1	3900	5000	5000	13	93	32
H.70C	170.3	511/3	A/C	800	880	1600	5.5/8.1	4400	5000	5000	13	93	32
H.70C	214.9	3869/18	A/C	800	880	1600	5.4/8	5000	5000	5000	13	93	32
H.70C	258.3	3358/13	A/C	800	880	1600	5.4/8	5000	5000	5000	13	93	32
H.70C	283.9	2555/9	A/C	800	880	1600	5.4/8	5000	5000	5000	13	93	32
H.70C	314.1	10366/33	A/C	800	880	1600	5.4/8	5000	5000	5000	13	93	32
H.70C	359.4	4672/13	A/C	800	880	1600	5.4/8	5000	5000	5000	13	93	32
H.70C	393.4	7081/18	A/C	800	880	1600	5.4/8	5000	5000	5000	13	93	32
H.70C	433.6	14308/33	A/C	800	880	1600	5.3/7.9	5000	5000	5000	13	93	32
H.70C	481.8	2409/5	A/C	800	880	1600	5.3/7.9	5000	5000	5000	13	93	32





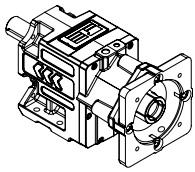
# Series H - Standard Inline Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
<b>Size H.80</b>													
H.80A	6.6	152/23	D	1400	1540	2800	66.6	1500	2000	2600	9	95	56
H.80A	7.8	304/39	D	1400	1540	2800	62.4	1700	2200	2900	9	95	56
H.80A	10.5	684/65	D	1400	1540	2800	57	2000	2700	3500	8	95	56
H.80A	12.1	627/52	D	1400	1540	2800	55.2	2200	2900	3500	8	95	56
H.80A	13.9	5244/377	D	1400	1540	2800	53.7	2400	3200	3500	8	95	56
H.80A	16.2	2736/169	D	1400	1540	2800	52.4	2700	3500	3500	8	95	56
H.80A	19.1	5700/299	D	1400	1540	2800	51.2	3000	3500	3500	8	95	56
H.80A	21.4	836/39	D	1400	1540	2800	50.5	3300	3500	3500	8	95	56
H.80A	24.3	316/13	D	1400	1540	2800	49.8	3500	3500	3500	8	95	56
H.80A	28.4	1843/65	D	1400	1540	2800	49.1	3500	3500	3500	8	95	56
H.80A	31.5	5320/169	D	1400	1540	2800	48.8	3500	3500	3500	8	95	56
H.80A	34.6	1349/39	D	1400	1540	2800	48.4	3500	3500	3500	8	95	56
H.80A	41.4	1615/39	D	1400	1540	2800	48	3500	3500	3500	8	95	56
H.80A	46.8	608/13	D	1400	1540	2800	47.8	3500	3500	3500	8	95	56
H.80C	64	30780/481	A/C	1400	1540	2800	6.4/9	2100	2800	3600	8	93	56
H.80C	74.3	16416/221	A/C	1400	1540	2800	6.2/8.8	2300	3100	4000	8	93	56
H.80C	86.6	34884/403	A/C	1400	1540	2800	6/8.6	2600	3400	4400	8	93	56
H.80C	101.5	9234/91	A/C	1400	1540	2800	5.9/8.5	2800	3700	4800	8	93	56
H.80C	118.4	1539/13	A/C	1400	1540	2800	5.7/8.3	3200	4200	5000	8	93	56
H.80C	137.4	1786/13	A/C	1400	1540	2800	5.7/8.3	3500	4700	5000	8	93	56
H.80C	161.1	8379/52	A/C	1400	1540	2800	5.6/8.2	3900	5000	5000	8	93	56
H.80C	184.2	2394/13	A/C	1400	1540	2800	5.5/8.1	4400	5000	5000	8	93	56
H.80C	210.5	2736/13	A/C	1400	1540	2800	5.5/8.1	4800	5000	5000	8	93	56
H.80C	232.4	3021/13	A/C	1400	1540	2800	5.5/8.1	5000	5000	5000	8	93	56
H.80C	279.3	47196/169	A/C	1400	1540	2800	5.4/8	5000	5000	5000	8	93	56
H.80C	306.9	3990/13	A/C	1400	1540	2800	5.4/8	5000	5000	5000	8	93	56
H.80C	339.6	48564/143	A/C	1400	1540	2800	5.4/8	5000	5000	5000	8	93	56
H.80C	388.5	65664/169	A/C	1400	1540	2800	5.4/8	5000	5000	5000	8	93	56
H.80C	425.3	5529/13	A/C	1400	1540	2800	5.4/8	5000	5000	5000	8	93	56
H.80C	468.8	67032/143	A/C	1400	1540	2800	5.3/7.9	5000	5000	5000	8	93	56
<b>Size H.85</b>													
H.85S	5.3	858/161	D	1130	1243	2260	78	1500	2000	2600	9	95	70
H.85S	6.3	44/7	D	1334	1467	2668	70.6	1700	2200	2900	9	95	70
H.85S	7.4	990/133	D	1502	1652	3004	64.9	1800	2400	3100	9	95	70
H.85A	9.9	2070/209	D	2000	2200	4000	60.2	1800	2400	3100	8	95	80
H.85A	11.3	621/55	D	2000	2200	4000	57.9	2000	2700	3500	7	95	80
H.85A	12.9	207/16	D	2000	2200	4000	55.9	2200	2900	3500	7	95	80
H.85A	14.9	4761/319	D	2000	2200	4000	54.2	2400	3200	3500	7	95	80
H.85A	17.4	2484/143	D	2000	2200	4000	52.7	2700	3500	3500	7	95	80
H.85A	20.5	225/11	D	2000	2200	4000	51.4	3000	3500	3500	7	95	80
H.85A	23	23/1	D	2000	2200	4000	50.7	3300	3500	3500	7	95	80
H.85A	26.1	5451/209	D	2000	2200	4000	50	3500	3500	3500	7	95	80

1 Nm = 8.85 in-lb

# Series H - Standard Inline Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
H.85A	30.4	6693/220	D	2000	2200	4000	49.3	3500	3500	3500	7	95	80
H.85A	37.1	1633/44	D	2000	2200	4000	48.5	3500	3500	3500	7	95	80
H.85A	44.4	1955/44	D	2000	2200	4000	48	3500	3500	3500	7	95	80
H.85A	50.2	552/11	D	2000	2200	4000	47.8	3500	3500	3500	7	95	80
H.85C	68.7	27945/407	A/C	2000	2200	4000	6.4/9	2100	2800	3600	7	93	80
H.85C	79.7	14904/187	A/C	2000	2200	4000	6.2/8.8	2300	3100	4000	7	93	80
H.85C	92.9	31671/341	A/C	2000	2200	4000	6/8.6	2600	3400	4400	7	93	80
H.85C	108.9	16767/154	A/C	2000	2200	4000	5.9/8.5	2800	3700	4800	7	93	80
H.85C	127	5589/44	A/C	2000	2200	4000	5.7/8.3	3200	4200	5000	7	93	80
H.85C	147.4	3243/22	A/C	2000	2200	4000	5.7/8.3	3500	4700	5000	7	93	80
H.85C	172.9	30249/176	A/C	2000	2200	4000	5.6/8.2	3900	5000	5000	7	93	80
H.85C	197.6	4347/22	A/C	2000	2200	4000	5.5/8.1	4400	5000	5000	7	93	80
H.85C	225.8	2484/11	A/C	2000	2200	4000	5.5/8.1	4800	5000	5000	7	93	80
H.85C	249.3	10971/44	A/C	2000	2200	4000	5.5/8.1	5000	5000	5000	7	93	80
H.85C	299.6	42849/143	A/C	2000	2200	4000	5.4/8	5000	5000	5000	7	93	80
H.85C	329.3	7245/22	A/C	2000	2200	4000	5.4/8	5000	5000	5000	7	93	80
H.85C	364.4	44091/121	A/C	2000	2200	4000	5.4/8	5000	5000	5000	7	93	80
H.85C	416.9	59616/143	A/C	2000	2200	4000	5.4/8	5000	5000	5000	7	93	80
<b>Size H.110</b>													
H.110A	9.7	1207/124	D	2062	2268	4124	122.9	1500	2000	2600	6	95	165
H.110A	11.4	639/56	D	2419	2661	4838	111	1700	2200	2900	6	95	165
H.110A	12.7	497/39	D	2700	2970	5400	103.6	1800	2400	3100	6	95	165
H.110A	14.3	2059/144	D	3000	3300	6000	97	2000	2600	3200	6	95	165
H.110A	16.1	355/22	D	3000	3300	6000	91.3	2200	2900	3200	6	95	165
H.110A	21	568/27	D	3000	3300	6000	81.5	2600	3200	3200	6	95	165
H.110A	24.4	781/32	D	3000	3300	6000	77.4	2900	3200	3200	6	95	165
H.110A	28.7	1207/42	D	3000	3300	6000	74.5	3200	3200	3200	6	95	165
H.110A	34.5	2485/72	D	3000	3300	6000	70.6	3200	3200	3200	6	95	165
H.110A	38.2	5041/132	D	3000	3300	6000	69.1	3200	3200	3200	6	95	165
H.110A	42.6	213/5	D	3000	3300	6000	67.8	3200	3200	3200	6	95	165
H.110A	47.8	2485/52	D	3000	3300	6000	66.7	3200	3200	3200	6	95	165
H.110A	52.3	3763/72	D	3000	3300	6000	65.9	3200	3200	3200	6	95	165
H.110A	62.1	497/8	D	3000	3300	6000	64.6	3200	3200	3200	6	95	165
H.110A	69.6	3621/52	D	2810	3091	5620	64	3200	3200	3200	6	95	165
H.110C	79.6	347687/4368	B/C	3000	3300	6000	13.3/13.3	2300	3100	4000	5	93	165
H.110C	94.6	182683/1932	B/C	3000	3300	6000	12.5/12.5	2600	3500	4600	5	93	165
H.110C	106.9	47144/441	B/C	3000	3300	6000	12/12	2900	3900	4700	5	93	165
H.110C	121.9	64823/532	B/C	3000	3300	6000	11.6/11.6	3200	4300	4700	5	93	165
H.110C	145.6	489119/3360	B/C	3000	3300	6000	11.2/11.2	3700	4700	4700	5	93	165
H.110C	165.6	500905/3024	B/C	3000	3300	6000	10.9/10.9	4100	4700	4700	5	93	165
H.110C	190.7	170897/896	B/C	3000	3300	6000	10.7/10.7	4600	4700	4700	5	93	165
H.110C	213.4	430189/2016	B/C	3000	3300	6000	10.5/10.5	4700	4700	4700	5	93	165
H.110C	242.8	88395/364	B/C	3000	3300	6000	10.4/10.4	4700	4700	4700	5	93	165



# Series H - Standard Inline Selection Tables

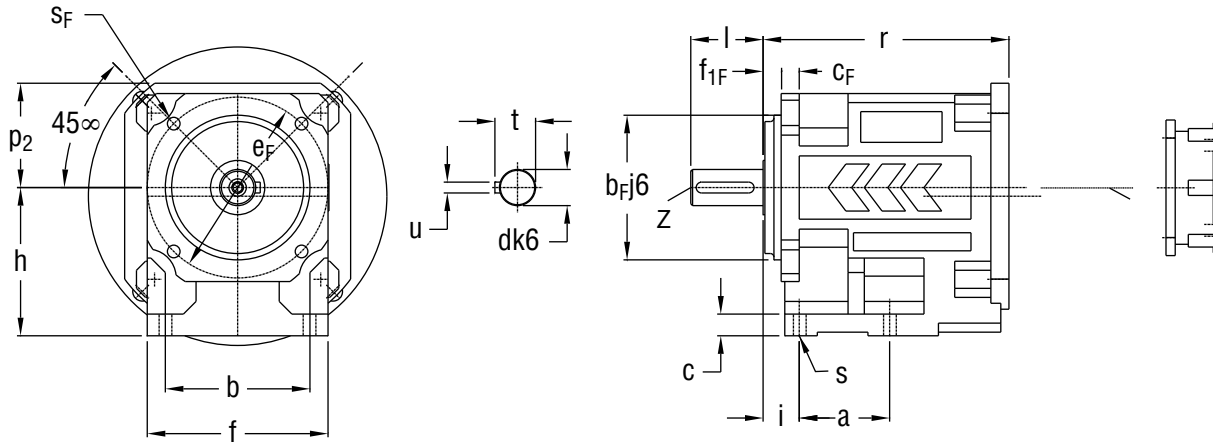
Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
H.110C	266	76609/288	B/C	3000	3300	6000	10.3/10.3	4700	4700	4700	5	93	165
H.110C	310.3	677695/2184	B/C	3000	3300	6000	10.1/10.1	4700	4700	4700	5	93	165
H.110C	339.1	170897/504	B/C	3000	3300	6000	10.1/10.1	4700	4700	4700	5	93	165
H.110C	373.1	229827/616	B/C	3000	3300	6000	10/10	4700	4700	4700	5	93	165
<b>Size H.130</b>													
H.130A	14.9	2135/143	D	3956	4352	7913	134.5	2000	2700	3200	7	95	275
H.130A	18.7	2257/121	D	4943	5437	9886	114.9	2400	3200	3200	7	95	275
H.130A	24.0	793/33	D	5000	5500	10000	98.4	2900	3200	3200	7	95	275
H.130A	32.5	2501/77	D	5000	5500	10000	84.7	3200	3200	3200	6	95	275
H.130A	38.8	427/11	D	5000	5500	10000	78.8	3200	3200	3200	6	95	275
H.130A	47.7	2623/55	D	5000	5500	10000	73.7	3200	3200	3200	6	95	275
H.130A	58.2	1281/22	D	5000	5500	10000	70.2	3200	3200	3200	6	95	275
H.130C	70.4	22448/319	D	5000	5500	10000	68.6	2400	3200	3500	7	93	275
H.130C	96.4	24400/253	D	5000	5500	10000	65.8	3000	3500	3500	7	93	275
H.130C	123.0	77104/627	D	5000	5500	10000	64.3	3500	3500	3500	7	93	275
H.130C	159.3	68320/429	D	5000	5500	10000	63.1	3500	3500	3500	7	93	275
H.130C	209.5	20740/99	D	5000	5500	10000	62.3	3500	3500	3500	7	93	275
<b>Size H.133</b>													
H.133A	20.2	222/11	D	5348	5883	10696	123.1	2400	3200	3200	7	95	440
H.133A	26.0	26/1	D	6890	7579	13780	103.3	2900	3200	3200	7	95	440
H.133A	30.0	30/1	D	7950	8745	15900	94.9	3200	3200	3200	7	95	440
H.133A	42.0	42/1	D	8000	8800	16000	80.7	3200	3200	3200	7	95	440
H.133A	51.6	258/5	D	7152	7867	14304	74.9	3200	3200	3200	7	95	440
H.133C	76.1	2208/29	D	8000	8800	16000	69.2	2400	3200	3500	7	93	440
H.133C	104.3	2400/23	D	8000	8800	16000	66.1	3000	3500	3500	7	93	440
H.133C	155.2	776/5	D	8000	8800	16000	63.6	3500	3500	3500	7	93	440
H.133C	256.0	256/1	D	8000	8800	16000	62.1	3500	3500	3500	7	93	440
<b>Size H.136</b>													
H.136C	39.2	33184/847	D	10382	11420	20764	161.0	1900	2500	3200	6	93	980
H.136C	54.3	72224/1331	D	14000	15400	28000	122.9	2400	3200	3200	6	93	980
H.136C	69.9	25376/363	D	14000	15400	28000	103.3	2900	3200	3200	6	93	980
H.136C	94.5	80032/847	D	14000	15400	28000	87.3	3200	3200	3200	6	93	980
H.136C	124.7	169920/1331	D	14000	15400	28000	77.7	3200	3200	3200	6	93	980
H.136C	155.1	244000/1573	D	14000	15400	28000	72.7	3200	3200	3200	6	93	980
H.136D	204.7	718336/3509	D	14000	15400	28000	69.2	2400	3200	3500	6	90	980
H.136D	280.6	780800/2783	D	14000	15400	28000	66.1	3000	3500	3500	6	90	980
H.136D	357.7	2467328/6897	D	14000	15400	28000	64.5	3500	3500	3500	6	90	980

1 Nm = 8.85 in-lb

# Series H - Schematics

We have provided basic dimensions only. For complete drawings, please visit [cat4cad.com](http://cat4cad.com) or contact your DieQua representative.

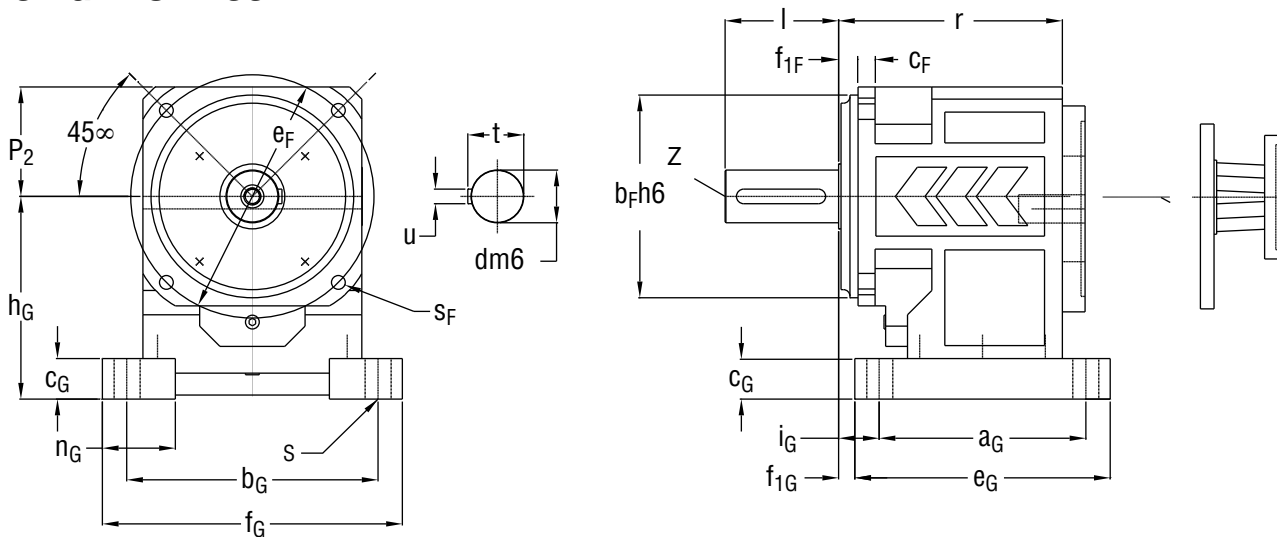
## Size HU 40 - 85



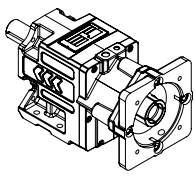
Note: Additional bolt-on flanges and feet are available upon request.

See page 44 for motor adapter dimensions.

## Size HG 110 - 136



Note: Additional bolt-on output flanges are available upon request. Standard mounting feet are removable.



## Size HU 40 - 85

Type	Main Dimensions (in mm)													
	a	b	b <sub>F</sub>	c	c <sub>F</sub>	e <sub>F</sub>	f	f <sub>1f</sub>	h	i	P <sub>2</sub>	r <sup>(1)</sup>	s	s <sub>f</sub>
H.40A,S	50	80	80	12	10	100	100	10	82	20	59	116	8.5	7
H.50A,S	50	90	80	15	10	100	115	10	100	40	70	143	8.5	7
H.50C											82	176		
H.60A,S	55	115	110	18	12	130	135	14	124	45	71	158	10.5	11
H.60C											91	192		9
H.70A,S	65	140	130	23	14	165	165	16	151	50	93	184	13	11
H.70C											96	225		
H.80A	80	160	180	26	17	215	190	20	175	60	113	223	17	13
H.80C											97	268		
H.85A,S	80	200	180	28	17	215	215	20	187	215	102	225	17	13
H.85C		185									60	88		

## Size HG 100 - 136

Type	Main Dimensions (in mm)															
	a <sub>G</sub>	b <sub>G</sub>	b <sub>F</sub>	c <sub>F</sub>	c <sub>G</sub>	e <sub>F</sub>	f <sub>1F</sub>	f <sub>G</sub>	f <sub>1G</sub>	h <sub>G</sub>	i <sub>G</sub>	n <sub>G</sub>	P <sub>2</sub>	r <sup>(1)</sup>	s	s <sub>F</sub>
H.110A, S	255	310	250	20	47	300	24	370	20	250	50	87	137	276	M20x30	18
H.110C														352		
H.130A, S	280	360	250	20	52	300	24	420	20	290	50	97	155	313	M24x36	18
H.130C														406		
H.133A	358	480	350	20	52	300	24	510	20	315	50	97	132	360	M24x36	17
H.133C														453		
H.136C	358	480	380	22	57	400	24	560	21	360	61	117	210	492	M24x38	17
H.136D									24					585		

## Size H.40 - 136

Type	Solid Shaft Dimensions							
	d <sup>(2)</sup>	d <sup>(3)</sup>	l	t <sup>(2)</sup>	t <sup>(3)</sup>	u <sup>(2)</sup>	u <sup>(3)</sup>	Z
H.40	0.750	20	40	0.83	22.5	0.187	6	M6
H.50	1.000	25	50	1.11	28	0.250	8	M10
H.60	1.375	30	70	1.51	33	0.313	8	M12
H.70	1.625	40	80	1.79	43	0.375	12	M16
H.80	2.125	50	100	2.345	53.5	0.500	14	M16
H.85	2.375	60	120	2.65	64	0.625	18	M20
H.110	2.375	65	140	2.65	69	0.625	18	M20
H.130	2.875	75	140	3.92	79.5	0.787	20	M20
H.133	3.625	90	170	4.01	95	0.875	25	M24
H.136	4.375	110	210	4.817	116	1.000	28	M24

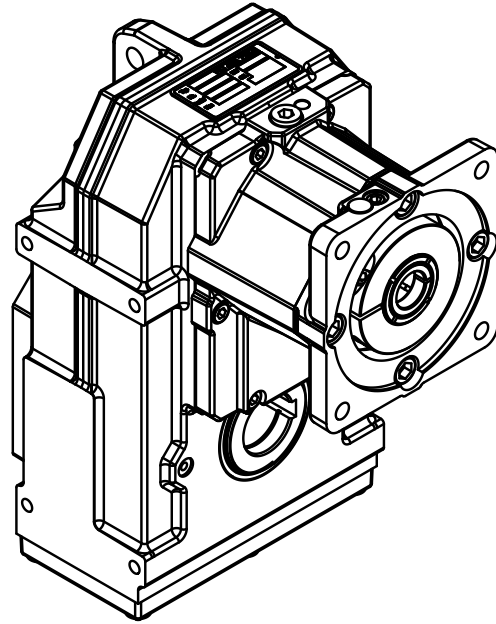
Note: (1) r value is maximum dimension, actual length might vary.  
 (2) Inch shaft option dimensions  
 (3) Metric shaft option dimensions  
 Input and output not co-axial

Dimensions are subject to change without notice.

# Series A/F - Parallel Shaft

The WATT Drive A/F Series of helical servo gearheads provide high performance in a parallel inline configuration. While typically shaft mounted, they can also be flange or base mounted. Output options include external shaft, hollow bore with keyway and hollow bore with shrink disc.

Offering low backlash, precise motion control, and high torque capacity, these unique gearheads are ideal for both general purpose and high cycle applications.



## Design Benefits

- High torque capacity
- High efficiency
- Shaft, flange, or base mounting
- Low backlash
- High rigidity
- Wide range of ratios
- Corrosion protection options
- Customization options
- Explosion proof options

## Technical Notes

### Backlash:

Published data represents maximum values. Actual backlash could be as little as half these amounts. Reduced backlash option is available upon request.

### Radial Loads:

Capacities are a function of shaft rotation, direction of radial load, output speed, and output torque. Consult DieQua for more details.

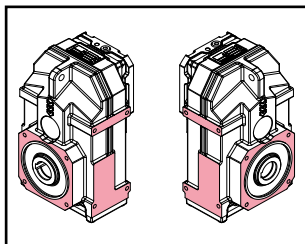
### Input Speeds:

Maximum continuous motor input speeds are a function of gearbox size, ratio, and mounting position. Consult selection charts for speed limits.

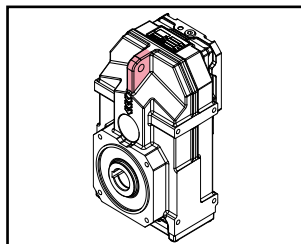
### Thermal Limits:

Ambient conditions may alter the power capacities of these gearboxes. For higher and lower temperature applications, please consult DieQua.

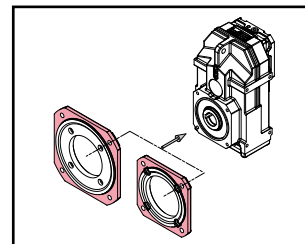
## Mounting Options



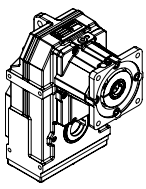
Uniblock



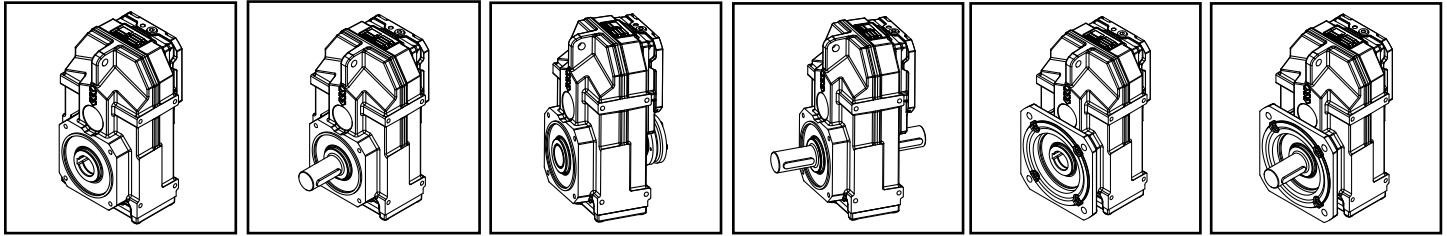
Support



Bolt-On Flange



## Output Options



ASA - Shaft Mounted

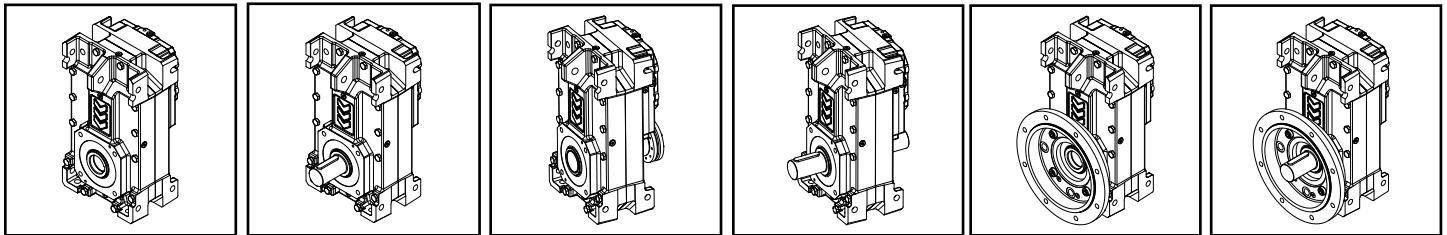
AS - Output Shaft

ASS - Shrink Disc

ASZ - Dual Output

AFA - Shaft Mounted

AF - Output Shaft



FSA - Shaft Mounted

FS - Output Shaft

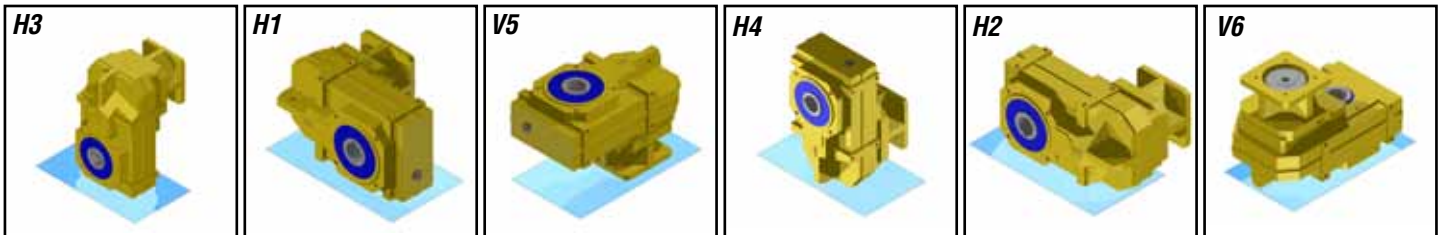
FSS - Shrink Disc

FSZ - Dual Output

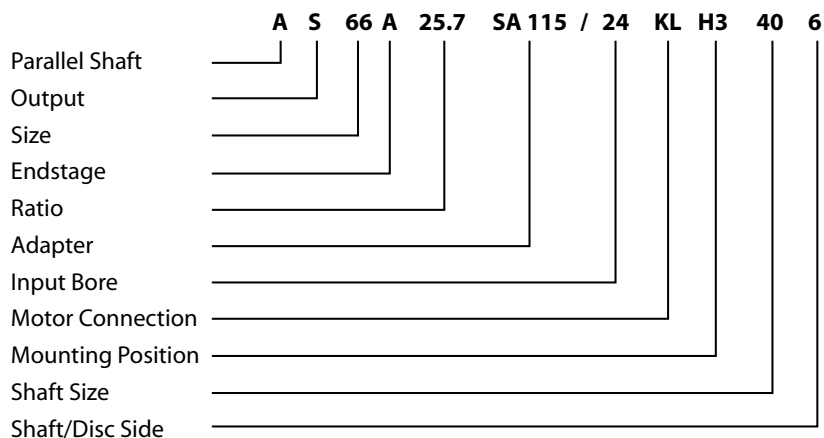
FFA - Shaft Mounted

FF - Output Shaft

## Mounting Positions



## Ordering Example



KL = Clamp (Standard)  
 PF = Clamp with Keyway (Optional)

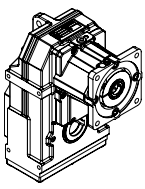
# Series A/F - Parallel Shaft Selection Tables

**Gear Type** = Model, Size, Endstage  
**Nom. Ratio** = approximate ratio  
**Exact Ratio** = exact fractional ratio  
**Servo Adapter** = adapter size (pg. 44)  
**T<sub>2N</sub>** = continuous torque (Nm)  
**T<sub>2B</sub>** = peak torque < 5% duty (Nm)  
**T<sub>2E</sub>** = emergency stop torque (Nm)

**Inertia** = inertia at input - per adapter size  
**n1 mp** = continuous speed vertical input  
**n1 max** = continuous speed horizontal input  
**n1 cyc** = intermittent peak speed  
**Max. Backlash** = max. backlash in arc minutes  
*(estimate based on component tolerance calculations)*  
**Effic. %** = efficiency % at max torque  
**Rigidity** = torsional rigidity

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
<b>Size A.46</b>													
A.46S	5.1	390/77	A	82	90	164	6.4	2300	3100	4000	16	95	16
A.46S	7.1	700/99	A	100	110	200	5.9	2900	3900	5000	16	95	16
A.46S	9.7	320/33	A	102	112	204	5.7	3600	4800	5000	16	95	16
A.46A	12.5	4248/341	A	220	242	440	5.9	2100	2800	3600	15	95	20
A.46A	14.9	2301/154	A	220	242	440	5.7	2300	3100	4000	14	95	20
A.46A	20.9	2065/99	A	220	242	440	5.6	2900	3900	5000	14	95	20
A.46A	28.6	944/33	A	220	242	440	5.5	3600	4800	5000	14	95	20
A.46A	36.7	2419/66	A	220	242	440	5.4	4400	5000	5000	14	95	20
A.46A	44.6	6372/143	A	220	242	440	5.4	5000	5000	5000	13	95	20
A.46A	49.2	295/6	A	220	242	440	5.4	5000	5000	5000	13	95	20
A.46A	62.7	8968/143	A	220	242	440	5.3	5000	5000	5000	13	95	20
A.46A	68.8	413/6	A	220	242	440	5.3	5000	5000	5000	13	95	20
A.46A	76.1	9204/121	A	220	242	440	5.3	5000	5000	5000	13	95	20
A.46A	84.8	4661/55	A	220	242	440	5.3	5000	5000	5000	13	95	20
A.46A	95.4	9440/99	A	220	242	440	5.3	5000	5000	5000	13	95	20
<b>Size A.56</b>													
A.56S	5.3	100/19	A/C	250	275	500	7.8/10.5	2000	2600	3400	16	95	32
A.56S	7.4	2400/323	A/C	264	290	528	6.9/9.5	2300	3100	4000	15	95	32
A.56S	10.2	1350/133	A/C	276	304	552	6.2/8.8	2800	3700	4800	15	95	32
A.56A	13.9	2592/187	A/C	400	440	800	6.3/8.9	2300	3100	4000	13	95	36
A.56A	16.2	5508/341	A/C	400	440	800	6.1/8.7	2600	3400	4400	13	95	36
A.56A	18.9	1458/77	A/C	400	440	800	5.9/8.5	2800	3700	4800	13	95	36
A.56A	22.1	243/11	A/C	400	440	800	5.8/8.4	3200	4200	5000	12	95	36
A.56A	25.6	282/11	A/C	400	440	800	5.7/8.3	3500	4700	5000	12	95	36
A.56A	30.1	1323/44	A/C	400	440	800	5.6/8.2	3900	5000	5000	12	95	36
A.56A	34.4	378/11	A/C	400	440	800	5.6/8.2	4400	5000	5000	12	95	36
A.56A	39.3	432/11	A/C	400	440	800	5.5/8.1	4800	5000	5000	12	95	36
A.56A	43.4	477/11	A/C	400	440	800	5.5/8.1	5000	5000	5000	12	95	36
A.56A	52.1	7452/143	A/C	400	440	800	5.4/8	5000	5000	5000	12	95	36
A.56A	63.4	7668/121	A/C	400	440	800	5.4/8	5000	5000	5000	12	95	36
A.56A	72.5	10368/143	A/C	400	440	800	5.4/8	5000	5000	5000	12	95	36
A.56A	79.4	873/11	A/C	400	440	800	5.4/8	5000	5000	5000	12	95	36
A.56A	87.5	10584/121	A/C	400	440	800	5.3/7.9	5000	5000	5000	12	95	36
A.56A	109.1	1200/11	A/C	262	288	524	5.3/7.9	5000	5000	5000	12	95	36
A.56C	160.1	22896/143	A	400	440	800	5.4	4100	5000	5000	13	93	36
A.56C	177.8	19557/110	A	400	440	800	5.4	4400	5000	5000	13	93	36





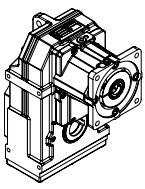
# Series A/F - Parallel Shaft Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
A.56C	216.2	154548/715	A	400	440	800	5.4	5000	5000	5000	13	93	36
A.56C	264.9	160272/605	A	400	440	800	5.3	5000	5000	5000	13	93	36
A.56C	304.2	217512/715	A	400	440	800	5.3	5000	5000	5000	13	93	36
A.56C	369	223236/605	A	400	440	800	5.3	5000	5000	5000	13	93	36
A.56C	411.1	113049/275	A	400	440	800	5.3	5000	5000	5000	13	93	36
A.56C	462.6	5088/11	A	400	440	800	5.3	5000	5000	5000	13	93	36
<b>Size A.66</b>													
A.66S	5.4	107/20	A/C	582	640	1164	14.5/17	1500	2000	2600	13	95	64
A.66S	7.6	4387/580	A/C	545	600	1090	11/13.6	1800	2400	3100	12	95	64
A.66S	10.9	5029/460	A/C	587	646	1174	8.3/10.9	2300	3000	3900	12	95	64
A.66S	12.5	749/60	A/C	600	660	1200	7.7/10.3	2500	3300	4300	12	95	64
A.66S	14.4	5457/380	A/C	610	671	1220	7.2/9.8	2800	3700	4800	12	95	64
A.66A	19.6	235/12	A/C	800	880	1600	6.2/8.8	2300	3000	3900	10	95	72
A.66A	25.7	1955/76	A/C	800	880	1600	5.9/8.5	2800	3700	4800	10	95	72
A.66A	30.7	92/3	A/C	800	880	1600	5.7/8.3	3200	4200	5000	10	95	72
A.66A	35.1	1265/36	A/C	800	880	1600	5.7/8.3	3500	4700	5000	10	95	72
A.66A	40.7	1955/48	A/C	800	880	1600	5.6/8.2	3900	5000	5000	10	95	72
A.66A	46.3	3335/72	A/C	800	880	1600	5.5/8.1	4400	5000	5000	10	95	72
A.66A	57.5	115/2	A/C	800	880	1600	5.4/8	5000	5000	5000	10	95	72
A.66A	67.8	2645/39	A/C	800	880	1600	5.4/8	5000	5000	5000	10	95	72
A.66A	81.9	5405/66	A/C	800	880	1600	5.4/8	5000	5000	5000	10	95	72
A.66A	93.6	14605/156	A/C	800	880	1600	5.4/8	5000	5000	5000	10	95	72
A.66C	113.5	25415/224	A	800	880	1600	5.6	2300	3100	4000	7	93	72
A.66C	158.4	68425/432	A	800	880	1600	5.5	2900	3900	5000	7	93	72
A.66C	188.4	72335/384	A	800	880	1600	5.5	3300	4400	5000	7	93	72
A.66C	217.2	1955/9	A	800	880	1600	5.4	3600	4800	5000	7	93	72
A.66C	250.6	9775/39	A	800	880	1600	5.4	4100	5000	5000	7	93	72
A.66C	278.3	80155/288	A	800	880	1600	5.4	4400	5000	5000	7	93	72
A.66C	338.4	17595/52	A	800	880	1600	5.4	5000	5000	5000	7	93	72
A.66C	373.4	107525/288	A	800	880	1600	5.3	5000	5000	5000	7	93	72
A.66C	476.2	37145/78	A	800	880	1600	5.3	5000	5000	5000	7	93	72
<b>Size A.76</b>													
A.76S	6.5	2209/342	B/C	672	739	1344	26.9/26.9	1600	2100	2700	11	95	120
A.76S	7.5	470/63	B/C	776	854	1552	23/23	1700	2300	3000	11	95	120
A.76S	10.1	2632/261	B/C	989	1088	1978	17.6/17.6	2100	2800	3600	10	95	120
A.76S	11.9	2773/234	B/C	1017	1119	2034	15.7/15.7	2300	3100	4000	10	95	120
A.76A	15.2	5353/352	B/C	1500	1650	3000	16.4/16.4	1900	2500	3300	9	95	135
A.76A	20.8	5959/286	B/C	1500	1650	3000	13.8/13.8	2300	3100	4000	9	95	135
A.76A	24.8	6262/253	B/C	1500	1650	3000	12.9/12.9	2600	3500	4600	9	95	135
A.76A	31.9	606/19	B/C	1500	1650	3000	11.8/11.8	3200	4300	4700	9	95	135
A.76A	38.1	8383/220	B/C	1500	1650	3000	11.4/11.4	3700	4700	4700	8	95	135
A.76A	49.9	8787/176	B/C	1500	1650	3000	10.8/10.8	4600	4700	4700	8	95	135
A.76A	63.6	9090/143	B/C	1500	1650	3000	10.4/10.4	4700	4700	4700	8	95	135

1 Nm = 8.85 in-lb

# Series A/F - Parallel Shaft Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia $\text{kgm}^2 \times 10^{-4}$	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
A.76A	69.6	9191/132	B/C	1500	1650	3000	10.3/10.3	4700	4700	4700	8	95	135
A.76A	88.8	2929/33	B/C	1500	1650	3000	10.1/10.1	4700	4700	4700	8	95	135
A.76C	103.7	19392/187	A/C	1500	1650	3000	6/8.6	2300	3100	4000	9	93	135
A.76C	120.8	41208/341	A/C	1500	1650	3000	5.9/8.5	2600	3400	4400	9	93	135
A.76C	141.7	10908/77	A/C	1500	1650	3000	5.8/8.4	2800	3700	4800	9	93	135
A.76C	165.3	1818/11	A/C	1500	1650	3000	5.7/8.3	3200	4200	5000	9	93	135
A.76C	191.8	18988/99	A/C	1500	1650	3000	5.6/8.2	3500	4700	5000	9	93	135
A.76C	225	4949/22	A/C	1500	1650	3000	5.5/8.1	3900	5000	5000	9	93	135
A.76C	257.1	2828/11	A/C	1500	1650	3000	5.5/8.1	4400	5000	5000	9	93	135
A.76C	293.8	3232/11	A/C	1500	1650	3000	5.5/8.1	4800	5000	5000	9	93	135
A.76C	389.9	55752/143	A/C	1500	1650	3000	5.4/8	5000	5000	5000	8	93	135
A.76C	474.1	57368/121	A/C	1500	1650	3000	5.4/8	5000	5000	5000	8	93	135
<b>Size A.86</b>													
A.86S	7.8	132/17	D	1645	1810	3290	84.6	1700	2200	2900	8	95	224
A.86S	10.5	891/85	D	1907	2098	3814	69.2	2000	2700	3500	8	95	224
A.86S	12	3267/272	D	1959	2155	3918	64.5	2200	2900	3500	8	95	224
A.86S	16.1	3564/221	D	2050	2255	4100	57.5	2700	3500	3500	8	95	224
A.86A	19.7	315/16	D	2800	3080	5600	58.6	2200	2900	3500	7	95	258
A.86A	26.4	3780/143	D	2800	3080	5600	54.2	2700	3500	3500	7	95	258
A.86A	31.1	7875/253	D	2800	3080	5600	52.5	3000	3500	3500	7	95	258
A.86A	35	35/1	D	2800	3080	5600	51.5	3300	3500	3500	7	95	258
A.86A	39.7	8295/209	D	2800	3080	5600	50.7	3500	3500	3500	7	95	258
A.86A	46.3	2037/44	D	2800	3080	5600	49.7	3500	3500	3500	7	95	258
A.86A	51.4	7350/143	D	2800	3080	5600	49.2	3500	3500	3500	7	95	258
A.86A	56.5	2485/44	D	2800	3080	5600	48.9	3500	3500	3500	7	95	258
A.86A	67.6	2975/44	D	2800	3080	5600	48.3	3500	3500	3500	7	95	258
A.86A	76.4	840/11	D	2800	3080	5600	48	3500	3500	3500	7	95	258
A.86C	104.5	42525/407	A/C	2800	3080	5600	6.5/9.1	2100	2800	3600	7	93	258
A.86C	121.3	22680/187	A/C	2800	3080	5600	6.3/8.9	2300	3100	4000	7	93	258
A.86C	141.3	48195/341	A/C	2800	3080	5600	6.1/8.7	2600	3400	4400	7	93	258
A.86C	165.7	3645/22	A/C	2800	3080	5600	5.9/8.5	2800	3700	4800	7	93	258
A.86C	193.3	8505/44	A/C	2800	3080	5600	5.8/8.4	3200	4200	5000	7	93	258
A.86C	224.3	4935/22	A/C	2800	3080	5600	5.7/8.3	3500	4700	5000	7	93	258
A.86C	263.1	46305/176	A/C	2800	3080	5600	5.6/8.2	3900	5000	5000	7	93	258
A.86C	300.7	6615/22	A/C	2800	3080	5600	5.6/8.2	4400	5000	5000	7	93	258
A.86C	343.6	3780/11	A/C	2800	3080	5600	5.5/8.1	4800	5000	5000	7	93	258
A.86C	379.4	16695/44	A/C	2800	3080	5600	5.5/8.1	5000	5000	5000	7	93	258
A.86C	456	65205/143	A/C	2800	3080	5600	5.4/8	5000	5000	5000	7	93	258
<b>Size F.111</b>													
F.111A	10.24	1515/148	D	2713	2984	5425	160.1	1300	1700	2200	7	95	550
F.111A	11.9	202/17	D	3149	3464	6298	136.5	1400	1800	2300	7	95	550
F.111A	16.2	909/56	D	4302	4732	8603	104.5	1700	2200	2900	7	95	550
F.111A	29.9	808/27	D	5000	5500	10000	69.6	2600	3200	3200	6	95	550



# Series A/F - Parallel Shaft Selection Tables

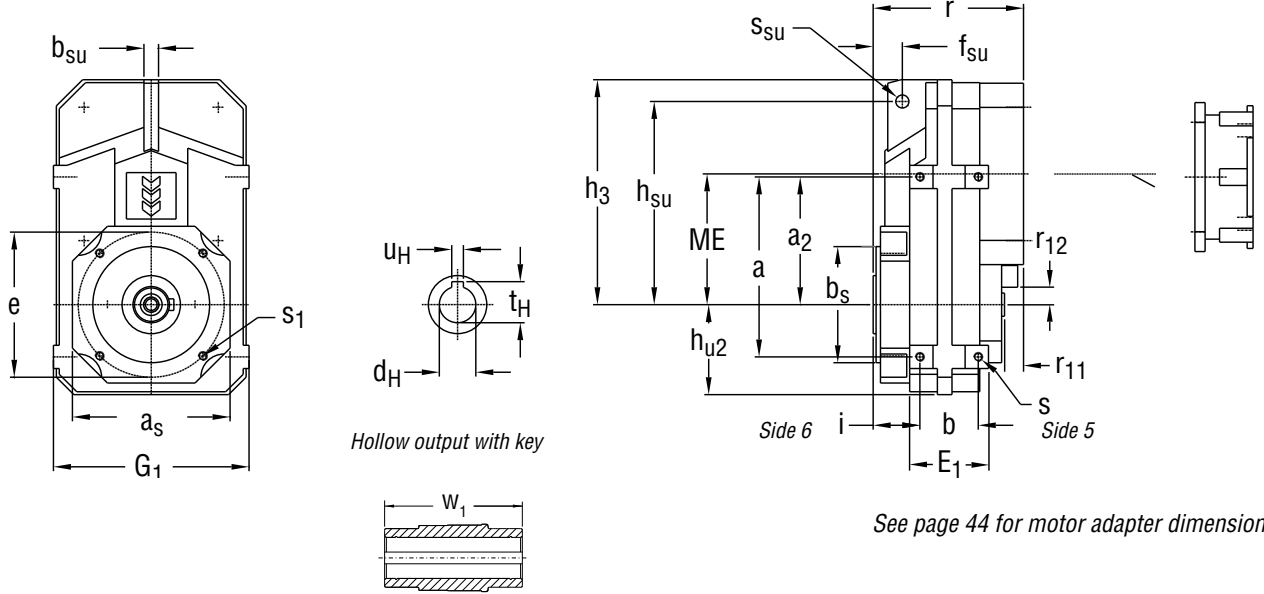
Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia $\text{kgm}^2 \times 10^{-4}$	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
F.111A	40.9	1717/42	D	5000	5500	10000	62	3200	3200	3200	6	95	550
F.111A	54.3	7171/132	D	5000	5500	10000	55.6	3200	3200	3200	6	95	550
F.111A	68.0	3535/52	D	5000	5500	10000	53	3200	3200	3200	6	95	550
F.111A	99.1	5151/52	D	3998	4398	7996	50	3200	3200	3200	6	95	550
F.111C	152.1	67064/441	B/D	5000	5500	10000	12.1/12.1	2900	3900	4700	7	93	550
F.111C	207.1	695789/3360	B/D	5000	5500	10000	11.4/11.4	3700	4700	4700	7	93	550
F.111C	271.3	24107/896	B/D	5000	5500	10000	10.7/10.7	4600	4700	4700	7	93	550
F.111C	345.5	125745/364	B/D	5000	5500	10000	10.4/10.4	4700	4700	4700	7	93	550
F.111C	441.4	964045/2184	B/D	5000	5500	10000	10.1/10.1	4700	4700	4700	7	93	550
<b>Size F.131</b>													
F.131A	21.3	3045/143	D	5643	6207	11286	131.5	2000	2700	3200	6	95	880
F.131A	30.1	1653/55	D	7964	8761	15929	97.8	2600	3200	3200	6	95	880
F.131A	39.5	435/11	D	8000	8800	16000	80.3	3200	3200	3200	6	95	880
F.131A	55.4	609/11	D	8000	8800	16000	66.3	3200	3200	3200	6	95	880
F.131A	68.0	3741/55	D	8000	8800	16000	60.6	3200	3200	3200	6	95	880
F.131A	83.0	1827/22	D	7355	8091	14710	56.7	3200	3200	3200	6	95	880
F.131C	100.4	1140/11	D	8000	8800	16000	54.9	2400	3200	3500	6	93	880
F.131C	154.7	464/3	D	8000	8800	16000	51	3300	3500	3500	6	93	880
F.131C	204.6	11252/55	D	8000	8800	16000	49.4	3500	3500	3500	6	93	880
F.131C	249.6	8236/33	D	8000	8800	16000	48.6	3500	3500	3500	6	93	880
F.131C	298.8	9860/33	D	8000	8800	16000	48.1	3500	3500	3500	6	93	880
<b>Size F.137</b>													
F.137A	29.4	60512/2057	D	7796	8575	15591	199	1600	2100	2700	6	93	980
F.137A	39.2	33184/847	D	10382	11420	20764	146.8	1900	2500	3200	6	93	980
F.137A	54.3	72224/1331	D	14000	15400	28000	108.8	2400	3200	3200	6	93	980
F.137A	69.9	25376/363	D	14000	15400	28000	89.1	2900	3200	3200	6	93	980
F.137A	94.5	80032/847	D	14000	15400	28000	73.1	3200	3200	3200	6	93	980
F.137A	124.7	165920/1331	D	14000	15400	28000	63.5	3200	3200	3200	6	93	980
F.137A	155.1	244000/1573	D	14000	15400	28000	58.5	3200	3200	3200	6	93	980
F.137C	204.7	718336/3509	D	14000	15400	28000	55	2400	3200	3500	6	90	980
F.137C	238.3	374784/1573	D	14000	15400	28000	53.3	2700	3500	3500	6	90	980
F.137C	315.5	31232/88	D	14000	15400	28000	55	3300	3500	3500	6	90	980
F.137C	417.3	757376/1815	D	14000	15400	28000	49	3500	3500	3500	6	90	980

1 Nm = 8.85 in-lb

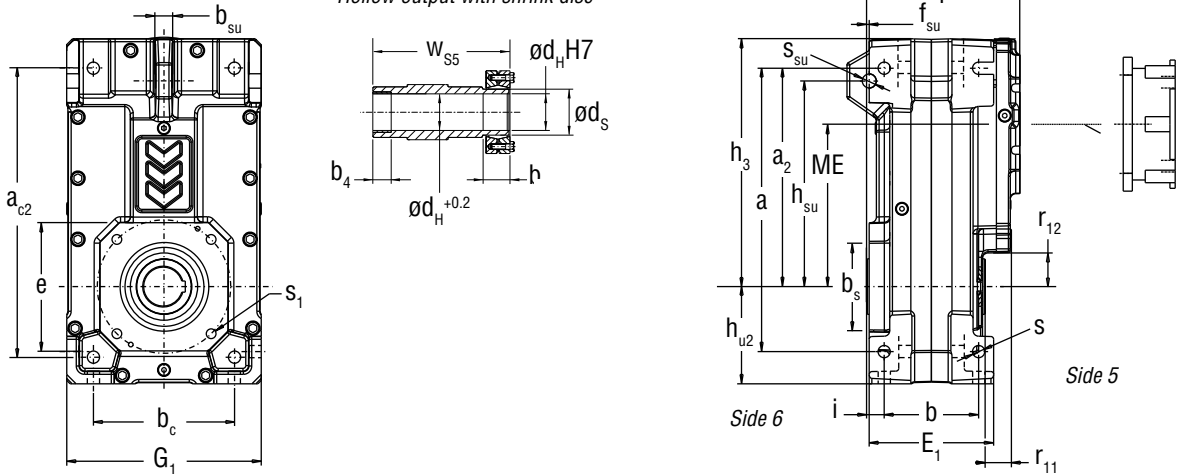
# Series A/F - Schematics

We have provided basic dimensions only. For complete drawings, please visit [cat4cad.com](http://cat4cad.com) or contact your DieQua representative.

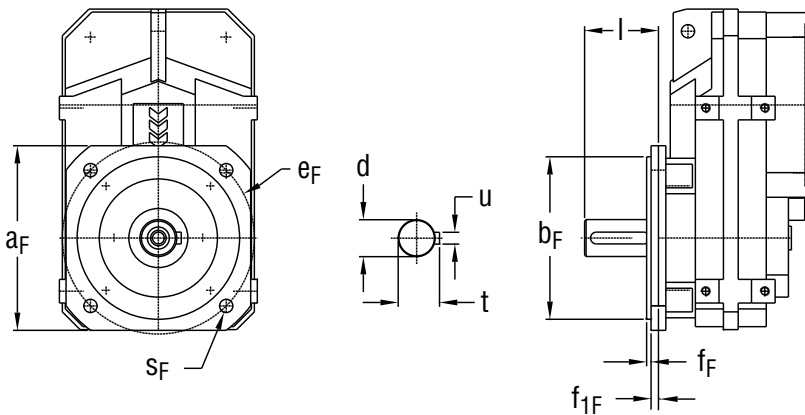
## Size A.46 - 86



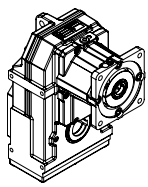
## Size F.111 - 137



## Optional Output Flange, Optional Output Shaft



Type	Output Flange Dimensions					
	a <sub>F</sub>	b <sub>F</sub>	e <sub>F</sub>	f <sub>1F</sub>	f <sub>F</sub>	s <sub>F</sub>
A.46	125	110	130	5	3	9.0
	150	130	165			11
A.56	150	130	165	9	3	11
	200	180	215			14
A.66	200	180	215	11	3.5	14
	250	230	265			4
A.76	250	230	265	15	4	14
	280	250	300			18
A86	250	230	265	15	4	14
F.111	450	350	400	69	5	18
F.131	450	350	400	69	5	18
F.137	550	450	500	74		18



## Size A.46 - 86

Type	Main Dimensions (in mm)																				
	a	a <sub>2</sub>	a <sub>s</sub>	b	b <sub>SU</sub>	e	E <sub>1</sub>	f <sub>SU</sub>	G <sub>1</sub>	h <sub>3</sub>	h <sub>U2</sub>	h <sub>SU</sub>	i	ME	r	r <sup>(1)</sup>	r <sub>12</sub>	s	S <sub>1</sub>	S <sub>SU</sub>	
A.46A,S	140	95	100	62	12	100	78	31.5	150	173	74	158	27	104.0	102	18	25	M8x12	M6x10	11	
A.56A,S	157	105	130	66	12	130	82	32	160	195	85	170	32	122.8	119	25	27	M8x12	M8x14	11	
A.56C														147.4	153	27					
A.66A,S	190	130	150	90	17	165	108	41	200	238	103	218	42	157.1	150	21	38	M10x17	M10x17	14	
A.66C														185.5	184	24					
A.76A,S	240	170	195	96	20	215	118	50	250	304	122	278	42	187.8	163	26	45	M12x20	M12x20	16	
A.76C														218.5	204	28					
A.86A,S	310	210	196	121	25	215	149	62	310	372	155	346	40	232.0	189	28	70	M16x20	M16x20	22	
A.86C														268.0	234						

## Size F.111 - 137

Type	Main Dimensions (in mm)																				
	a	a <sub>2</sub>	a <sub>3</sub>	b	b <sub>SU</sub>	e	E <sub>1</sub>	f <sub>SU</sub>	G <sub>1</sub>	h <sub>3</sub>	h <sub>U2</sub>	h <sub>SU</sub>	i	ME	r <sup>(1)</sup>	r <sub>11</sub>	r <sub>12</sub>	s	S <sub>1</sub>	S <sub>SU</sub>	
F.111A,S	510	393	230	170	28	240	244	5	350	446	175	370	32	292.3	234	47	60	22	M20x35	25	
F.111C														337	310	65					
F.131A,S	615	465	270	190	34	270	250	5	400	516	200	420	35	338.6	260	32	71	22	M24x36	25	
F.131C														385.6	353	50					
F.137A,S	710	555	340	290	40	300	338	6	450	607	225	520	40	430.0	490	37	162	26	M24x36	25	
F.137C													30	477	448						

## Output Options - Hollow Shaft, Solid Shaft, Shrink Disc

Type	Hollow Shaft							Solid Shaft <sup>(*)</sup>								Shrink Disc				
	d <sup>(2)</sup>	d <sup>(3)</sup>	t <sub>H</sub> <sup>(2)</sup>	t <sub>H</sub> <sup>(3)</sup>	u <sub>H</sub> <sup>(2)</sup>	u <sub>H</sub> <sup>(3)</sup>	W <sub>1</sub>	d <sup>(2)</sup>	d <sup>(3)</sup>	l	t <sup>(2)</sup>	t <sup>(3)</sup>	u <sup>(2)</sup>	u <sup>(3)</sup>	z	b <sub>4</sub>	b <sub>5</sub>	d <sub>H</sub> <sup>(3)</sup>	D <sub>S</sub>	W <sub>SS</sub>
A.46A,S	1.250	30	1.367	33.3	0.250	8	100	1.00	30	60	1.109	33.0	0.250	8	M10	20	21	30	72	145
A.56A,C,S	1.375	35	1.518	38.3	0.313	10	109	1.250	35	70	1.362	38.0	0.250	10	M12	20	24	35	80	163
A.66A,C,S	1.500	40	1.669	43.3	0.375	12	144	1.625	40	80	1.791	43.0	0.375	12	M16	20	27	40	90	199
A.76A,C,S	2.000	50	2.223	53.8	0.500	14	154	2.000	50	100	2.218	53.5	0.500	14	M16	30	28	50	110	215
A.86A,C,S	2.375	60	2.651	64.4	0.625	18	182	2.375	60	120	2.646	64.0	0.625	18	M20	50	29	65	138	244
F.111A,C,S	2.750	70	2.938	74.9	0.625	20	214	2.875	70	140	3.200	74.5	0.750	20	M20	60	40	75	155	323
F.131A,C,S	3.625	90	4.014	95.4	0.875	25	260	3.625	90	170	4.009	95.0	0.875	25	M24	60	45	90	185	365
F.137A,C	4.000	100	4.441	106.4	1.000	28	350	4.375	110	210	4.817	116.0	1.000	28	M24	60	50	105	215	408

- Notes: (1) r value is maximum dimension, actual length might vary.  
 (2) Inch shaft option dimensions  
 (3) Metric shaft option dimensions  
 (\*) Dual Output Option Available

Drawings Available On:



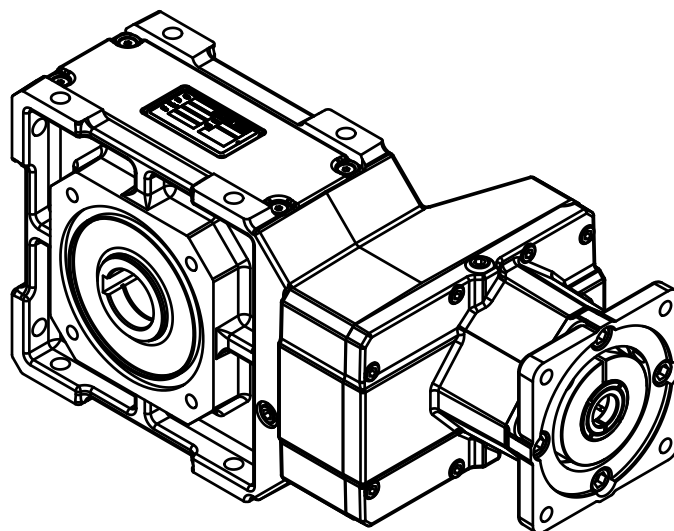
Dimensions are subject to change without notice.

www.diequa.com  
630-980-1133

# Series K - Helical Bevel

The WATT Drive K Series of helical bevel servo gearhead provides high performance in an economical right angle configuration. They can be either shaft, flange, or base mounted. Output options include external shafts and hollow bores with shrink disc or keyway.

Offering low backlash, precise motion control, and high torque capacity, these unique gearheads are ideal for both general purpose and high-cycle applications.



## Design Benefits

- High torque capacity
- High efficiency
- Shaft, flange, or base mounting
- Low backlash
- High rigidity
- Wide range of ratios
- Corrosion protection options
- Customization options
- Explosion proof options

## Technical Notes

### Backlash:

Published data represents maximum values. Actual backlash could be as little as half these amounts. Reduced backlash option is available upon request.

### Radial Loads:

Capacities are a function of shaft rotation, direction of radial load, output speed, and output torque. Consult DieQua for more details.

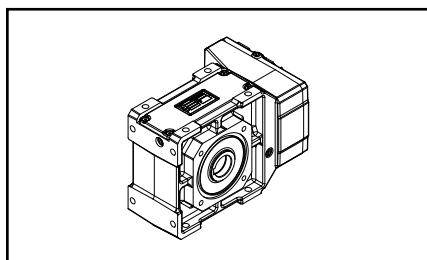
### Input Speeds:

Maximum continuous motor input speeds are a function of gearbox size, ratio, and mounting position. Consult selection charts for speed limits.

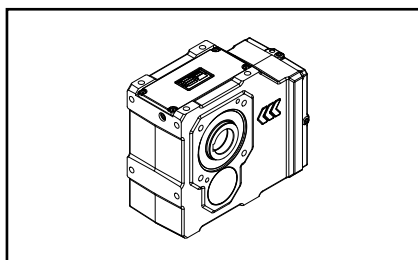
### Thermal Limits:

Ambient conditions may alter the power capacities of these gearboxes. For higher and lower temperature applications, please consult DieQua.

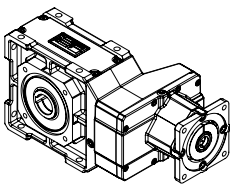
## Housing Designs



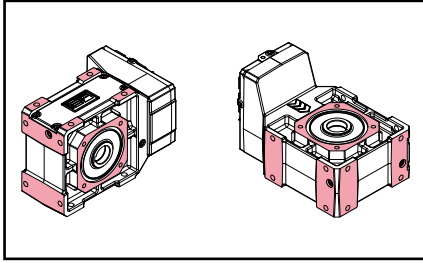
Sizes K40 - K75



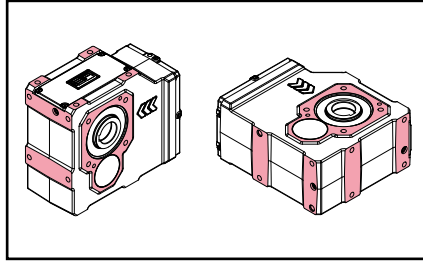
Sizes K77 - K110



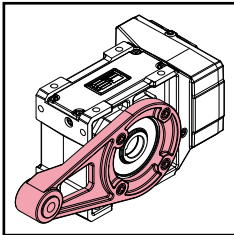
**Mounting Options**



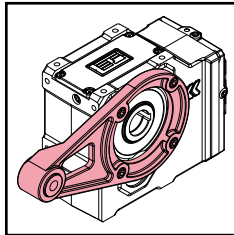
*Uniblock K40 - K75*



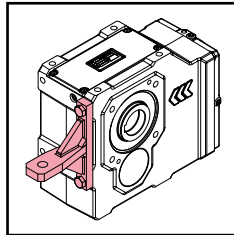
*Uniblock K77 - K136*



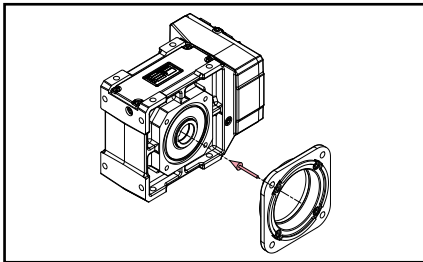
*Support K40 - K75*



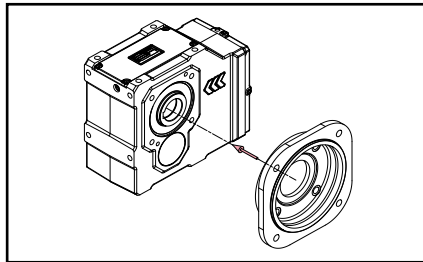
*Support K77*



*Support K80 - K136*

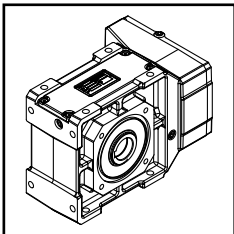


*Bolt-On Flange K40 - K75*

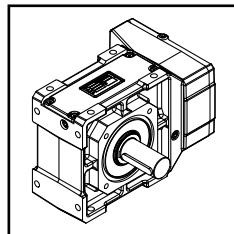


*Bolt-On Flange K77 - K136*

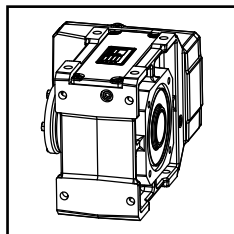
**Output Options**



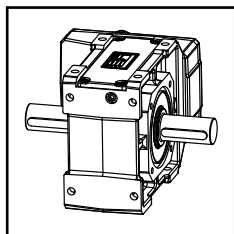
*KUA - Shaft Mounted*



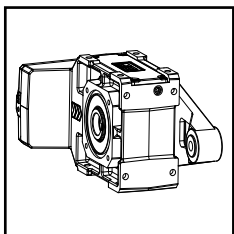
*KU - Output Shaft*



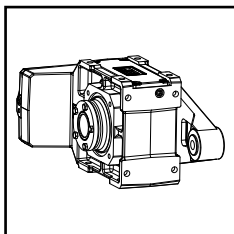
*KUS - Shrink Disc*



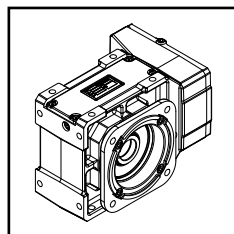
*KUZ - Dual Output*



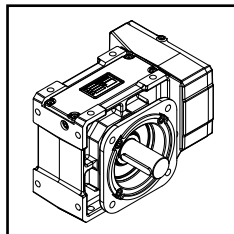
*KSA - Shaft Mounted*



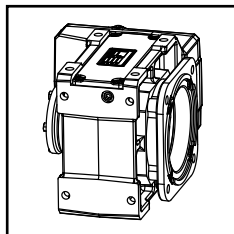
*KSS - Shrink Disc*



*KFA - Shaft Mounted*



*KF - Output Shaft*

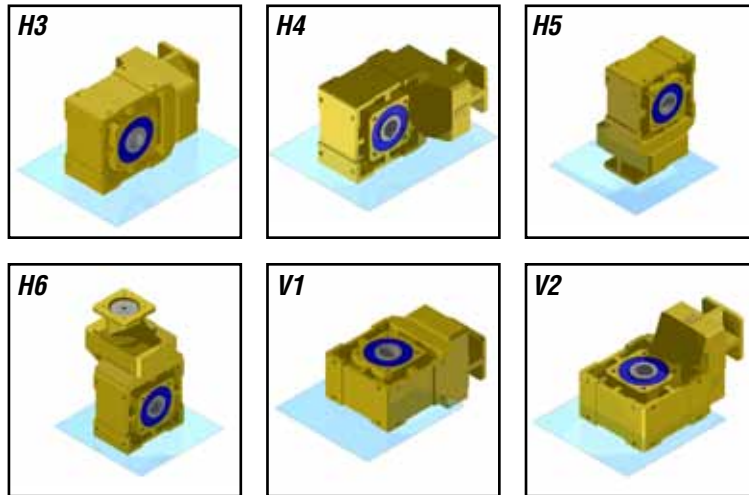


*KFS - Shrink Disc*

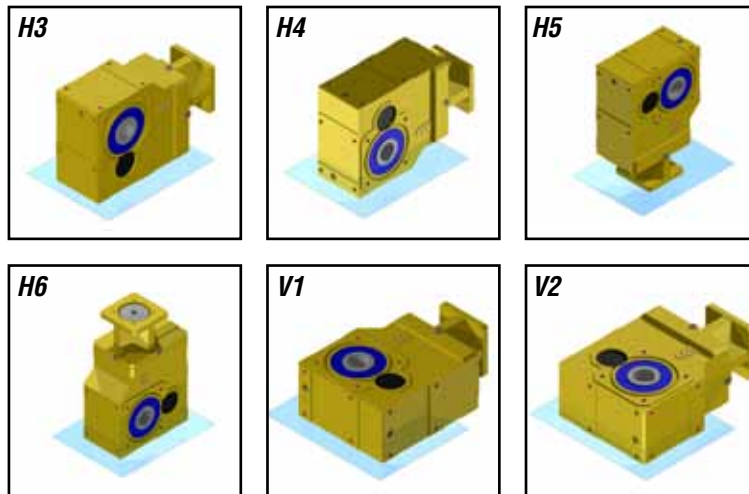
# Series K - Helical Bevel

## Mounting Positions

Sizes K.40 - K75

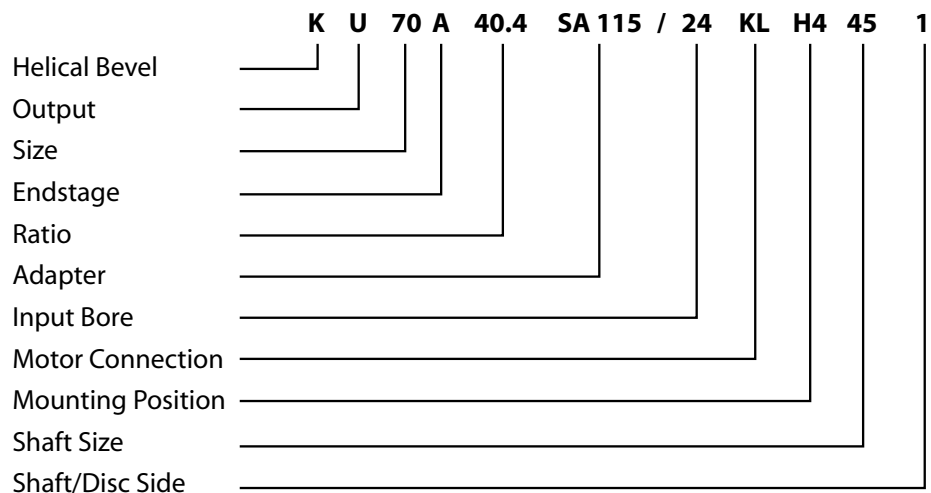


Sizes K.77 - K110

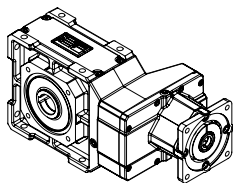


## Ordering Example

KL = Clamp (Standard)  
PF = Clamp with Keyway (Optional)







# Series K - Helical Bevel Selection Tables

**Gear Type** = Model, Size, Endstage  
**Nom. Ratio** = approximate ratio  
**Exact Ratio** = exact fractional ratio  
**Servo Adapter** = adapter size (pg. 44)  
**T<sub>2N</sub>** = continuous torque (Nm)  
**T<sub>2B</sub>** = peak torque < 5% duty (Nm)  
**T<sub>2E</sub>** = emergency stop torque (Nm)

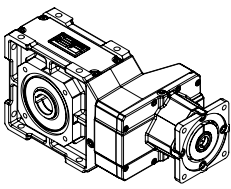
**Inertia** = inertia at input - per adapter size  
**n1 mp** = continuous speed vertical input  
**n1 max** = continuous speed horizontal input  
**n1 cyc** = intermittent peak speed  
**Max. Backlash** = max. backlash in arc minutes  
*(estimate based on component tolerance calculations)*  
**Effic. %** = efficiency % at max torque  
**Rigidity** = torsional rigidity

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
<b>Size K.40</b>													
K.40A	8.8	2988/341	A	61	67	122	6	2100	2800	3600	9	95	3.5
K.40A	10.5	3237/308	A	66	73	132	5.8	2300	3100	4000	9	95	3.5
K.40A	12.5	249/20	A	70	77	140	5.7	2600	3500	4600	9	95	3.5
K.40A	14.7	2905/198	A	75	83	150	5.6	2900	3900	5000	9	95	3.5
K.40A	17.5	3071/176	A	80	88	160	5.5	3300	4400	5000	9	95	3.5
K.40A	20.1	664/33	A	84	92	168	5.5	3600	4800	5000	8	95	3.5
K.40A	23.2	3320/143	A	92	101	184	5.5	4100	5000	5000	8	95	3.5
K.40A	25.8	3403/132	A	95	105	190	5.4	4400	5000	5000	8	95	3.5
K.40A	31.3	4482/143	A	100	110	200	5.4	5000	5000	5000	8	95	3.5
K.40A	34.6	415/12	A	100	110	200	5.4	5000	5000	5000	8	95	3.5
K.40A	38.4	4648/121	A	100	110	200	5.4	5000	5000	5000	8	95	3.5
K.40A	44.1	6308/143	A	100	110	200	5.3	5000	5000	5000	8	95	3.5
K.40A	48.4	581/12	A	100	110	200	5.3	5000	5000	5000	8	95	3.5
K.40A	53.5	6474/121	A	100	110	200	5.3	5000	5000	5000	8	95	3.5
K.40A	59.6	6557/110	A	100	110	200	5.3	5000	5000	5000	8	95	3.5
K.40A	67.1	6640/99	A	100	110	200	5.3	5000	5000	5000	8	95	3.5
<b>Size K.50</b>													
K.50A	6.9	69/10	A/C	200	220	400	7.4/10	2000	2600	3400	8	95	7
K.50A	8.4	621/74	A/C	200	220	400	6.9/9.5	2100	2800	3600	8	95	7
K.50A	9.7	828/85	A/C	200	220	400	6.5/9.1	2300	3100	4000	8	95	7
K.50A	11.4	3519/310	A/C	200	220	400	6.2/8.8	2600	3400	4400	7	95	7
K.50A	13.3	1863/140	A/C	200	220	400	6/8.6	2800	3700	4800	7	95	7
K.50A	15.5	621/40	A/C	200	220	400	5.9/8.5	3200	4200	5000	7	95	7
K.50A	18	1081/60	A/C	200	220	400	5.8/8.4	3500	4700	5000	7	95	7
K.50A	21.1	3381/160	A/C	200	220	400	5.6/8.2	3900	5000	5000	7	95	7
K.50A	24.2	483/20	A/C	200	220	400	5.6/8.2	4400	5000	5000	7	95	7
K.50A	27.6	138/5	A/C	200	220	400	5.5/8.1	4800	5000	5000	7	95	7
K.50A	30.5	1219/40	A/C	200	220	400	5.5/8.1	5000	5000	5000	7	95	7
K.50A	36.6	4761/130	A/C	200	220	400	5.4/8	5000	5000	5000	7	95	7
K.50A	40.3	161/4	A/C	200	220	400	5.4/8	5000	5000	5000	7	95	7
K.50A	44.5	4899/110	A/C	200	220	400	5.4/8	5000	5000	5000	7	95	7
K.50A	51	3312/65	A/C	200	220	400	5.4/8	5000	5000	5000	7	95	7
K.50A	55.8	2231/40	A/C	200	220	400	5.4/8	5000	5000	5000	7	95	7
K.50A	61.5	3381/55	A/C	200	220	400	5.4/8	5000	5000	5000	7	95	7
K.50A	68.3	6831/100	A/C	200	220	400	5.3/7.9	5000	5000	5000	7	95	7
K.50A	76.7	230/3	A/C	184	202	368	5.3/7.9	5000	5000	5000	7	95	7

1 Nm = 8.85 in-lb

# Series K - Helical Bevel Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
K.50C	84.6	135309/1600	A	200	220	400	5.5	3300	4400	5000	8	93	7
K.50C	97.5	2438/25	A	200	220	400	5.4	3600	4800	5000	8	93	7
K.50C	112.5	7314/65	A	200	220	400	5.4	4100	5000	5000	8	93	7
K.50C	125	49979/400	A	200	220	400	5.4	4400	5000	5000	8	93	7
K.50C	151.9	98739/650	A	200	220	400	5.4	5000	5000	5000	8	93	7
K.50C	167.6	13409/80	A	200	220	400	5.3	5000	5000	5000	8	93	7
K.50C	186.2	51198/275	A	200	220	400	5.3	5000	5000	5000	8	93	7
K.50C	213.8	69483/325	A	200	220	400	5.3	5000	5000	5000	8	93	7
K.50C	234.7	93863/400	A	200	220	400	5.3	5000	5000	5000	8	93	7
K.50C	259.3	142623/550	A	200	220	400	5.3	5000	5000	5000	8	93	7
K.50C	288.9	288903/1000	A	200	220	400	5.3	5000	5000	5000	7	93	7
K.50C	325.1	4876/15	A	200	220	400	5.3	5000	5000	5000	7	93	7
<b>Size K.60</b>													
K.60A	6.6	72/11	A/C	400	440	800	11.7/14.7	1500	2000	2600	6	95	14
K.60A	7.8	171/22	A/C	400	440	800	10.8/13.4	1700	2200	2900	6	95	14
K.60A	9.3	2952/319	A/C	400	440	800	9.4/12	1800	2400	3100	5	95	14
K.60A	11.1	144/13	A/C	400	440	800	8.3/10.9	2000	2700	3500	5	95	14
K.60A	13.4	3384/253	A/C	400	440	800	7.5/10.1	2300	3000	3900	5	95	14
K.60A	15.3	168/11	A/C	400	440	800	7.1/9.7	2500	3300	4300	5	95	14
K.60A	17.6	3672/209	A/C	400	440	800	6.7/9.3	2800	3700	4800	5	95	14
K.60A	21	1152/55	A/C	400	440	800	6.4/9	3200	4200	5000	5	95	14
K.60A	24	24/1	A/C	400	440	800	6.2/8.8	3500	4700	5000	5	95	14
K.60A	27.8	306/11	A/C	400	440	800	6/8.6	3900	5000	5000	5	95	14
K.60A	31.6	348/11	A/C	400	440	800	5.9/8.5	4400	5000	5000	5	95	14
K.60A	35.8	5112/143	A/C	400	440	800	5.8/8.4	4800	5000	5000	5	95	14
K.60A	39.3	432/11	A/C	400	440	800	5.7/8.3	5000	5000	5000	5	95	14
K.60A	46.3	6624/143	A/C	400	440	800	5.6/8.2	5000	5000	5000	5	95	14
K.60A	50.7	558/11	A/C	400	440	800	5.6/8.2	5000	5000	5000	5	95	14
K.60A	55.9	6768/121	A/C	400	440	800	5.6/8.2	5000	5000	5000	5	95	14
K.60A	63.9	9144/143	A/C	400	440	800	5.5/8.1	5000	5000	5000	5	95	14
K.60A	69.8	768/11	A/C	400	440	800	5.5/8.1	5000	5000	5000	5	95	14
K.60A	76.8	9288/121	A/C	391	430	782	5.5/8.1	5000	5000	5000	5	95	14
K.60C	91.8	459/5	A	400	440	800	5.6	2600	3500	4600	5	93	14
K.60C	108.2	1190/11	A	400	440	800	5.5	2900	3900	5000	5	93	14
K.60C	128.7	5661/44	A	400	440	800	5.5	3300	4400	5000	5	93	14
K.60C	148.4	1632/11	A	400	440	800	5.4	3600	4800	5000	5	93	14
K.60C	171.2	24480/143	A	400	440	800	5.4	4100	5000	5000	5	93	14
K.60C	190.1	2091/11	A	400	440	800	5.4	4400	5000	5000	5	93	14
K.60C	231.1	33048/143	A	400	440	800	5.4	5000	5000	5000	5	93	14
K.60C	255	255/1	A	400	440	800	5.3	5000	5000	5000	5	93	14
K.60C	283.2	34272/121	A	400	440	800	5.3	5000	5000	5000	5	93	14
K.60C	325.3	46512/143	A	400	440	800	5.3	5000	5000	5000	5	93	14
K.60C	357	357/1	A	400	440	800	5.3	5000	5000	5000	5	93	14



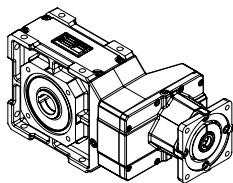
# Series K - Helical Bevel Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia $\text{kgm}^2 \times 10^{-4}$	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
K.60C	394.5	47736/121	A	400	440	800	5.3	5000	5000	5000	5	93	14
K.60C	439.5	24174/55	A	400	440	800	5.3	5000	5000	5000	5	93	14
K.60C	494.6	5440/11	A	400	440	800	5.3	5000	5000	5000	5	93	14
<b>Size K.70</b>													
K.70A	6.8	3139/462	B/C	706	777	1412	26.4/26.4	1400	1900	2500	5	95	28
K.70A	8.2	3431/418	B/C	800	880	1600	22/22	1600	2100	2700	5	95	28
K.70A	9.5	730/77	B/C	800	880	1600	19.4/19.4	1700	2300	3000	5	95	28
K.70A	11	3869/352	B/C	800	880	1600	17.3/17.3	1900	2500	3300	5	95	28
K.70A	12.8	4088/319	B/C	800	880	1600	15.6/15.6	2100	2800	3600	4	95	28
K.70A	15.1	4307/286	B/C	800	880	1600	14.3/14.3	2300	3100	4000	4	95	28
K.70A	17.9	4526/253	B/C	800	880	1600	13.2/13.2	2600	3500	4600	4	95	28
K.70A	20.2	4672/231	B/C	800	880	1600	12.6/12.6	2900	3900	4700	4	95	28
K.70A	23.1	438/19	B/C	800	880	1600	39427	3200	4300	4700	4	95	28
K.70A	27.5	6059/220	B/C	800	880	1600	11.5/11.5	3700	4700	4700	4	95	28
K.70A	31.3	6205/198	B/C	800	880	1600	11.1/11.1	4100	4700	4700	4	95	28
K.70A	36.1	6351/176	B/C	800	880	1600	10.8/10.8	4600	4700	4700	4	95	28
K.70A	40.4	5329/132	B/C	800	880	1600	10.6/10.6	4700	4700	4700	4	95	28
K.70A	45.9	6570/143	B/C	800	880	1600	10.5/10.5	4700	4700	4700	4	95	28
K.70A	50.3	6643/132	B/C	800	880	1600	10.4/10.4	4700	4700	4700	4	95	28
K.70A	58.7	8395/143	B/C	800	880	1600	10.2/10.2	4700	4700	4700	4	95	28
K.70A	64.2	2117/33	B/C	800	880	1600	10.1/10.1	4700	4700	4700	4	95	28
K.70A	70.6	8541/121	B/C	800	880	1600	39364	4700	4700	4700	4	95	28
K.70C	87.3	29784/341	A/C	800	880	1600	5.9/8.5	2600	3400	4400	4	93	28
K.70C	102.4	7884/77	A/C	800	880	1600	5.8/8.4	2800	3700	4800	4	93	28
K.70C	119.5	1314/11	A/C	800	880	1600	5.7/8.3	3200	4200	5000	4	93	28
K.70C	138.6	13724/99	A/C	800	880	1600	5.6/8.2	3500	4700	5000	4	93	28
K.70C	162.6	3577/22	A/C	800	880	1600	5.6/8.2	3900	5000	5000	4	93	28
K.70C	185.8	2044/11	A/C	800	880	1600	5.5/8.1	4400	5000	5000	4	93	28
K.70C	212.4	2336/11	A/C	800	880	1600	5.5/8.1	4800	5000	5000	4	93	28
K.70C	234.5	7738/33	A/C	800	880	1600	5.4/8	5000	5000	5000	4	93	28
K.70C	281.8	40296/143	A/C	800	880	1600	5.4/8	5000	5000	5000	4	93	28
K.70C	309.7	10220/33	A/C	800	880	1600	5.4/8	5000	5000	5000	4	93	28
K.70C	342.7	41464/121	A/C	800	880	1600	5.4/8	5000	5000	5000	4	93	28
K.70C	392.1	56064/143	A/C	800	880	1600	5.4/8	5000	5000	5000	4	93	28
K.70C	429.2	14162/33	A/C	800	880	1600	5.4/8	5000	5000	5000	4	93	28
K.70C	473	57232/121	A/C	800	880	1600	5.3/7.9	5000	5000	5000	4	93	28
K.70C	525.6	2628/5	A/C	800	880	1600	5.3/7.9	5000	5000	5000	4	93	28
<b>Size K.75</b>													
K.75A	6.9	1591/231	B/C	716	788	1432	37.2/37.2	1400	1900	2500	4	95	50
K.75A	8.3	1739/209	B/C	865	952	1730	29.4/29.4	1600	2100	2700	4	95	50
K.75A	9.6	740/77	B/C	1000	1100	2000	24.9/24.9	1700	2300	3000	4	95	50
K.75A	11.1	1961/176	B/C	1160	1276	2320	21.4/21.4	1900	2500	3300	4	95	50
K.75A	13	4144/319	B/C	1250	1375	2500	18.6/18.6	2100	2800	3600	4	95	50

1 Nm = 8.85 in-lb

# Series K - Helical Bevel Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
K.75A	15.3	2183/143	B/C	1250	1375	2500	16.5/16.5	2300	3100	4000	4	95	50
K.75A	18.1	4588/253	B/C	1250	1375	2500	14.7/14.7	2600	3500	4600	4	95	50
K.75A	20.5	4736/231	B/C	1250	1375	2500	13.8/13.8	2900	3900	4700	4	95	50
K.75A	23.4	444/19	B/C	1250	1375	2500	13/13	3200	4300	4700	3	95	50
K.75A	27.9	3071/110	B/C	1250	1375	2500	12.1/12.1	3700	4700	4700	3	95	50
K.75A	31.8	3145/99	B/C	1250	1375	2500	11.6/11.6	4100	4700	4700	3	95	50
K.75A	36.6	3219/88	B/C	1250	1375	2500	11.2/11.2	4600	4700	4700	3	95	50
K.75A	40.9	2701/66	B/C	1250	1375	2500	10.9/10.9	4700	4700	4700	3	95	50
K.75A	46.6	6660/143	B/C	1250	1375	2500	10.7/10.7	4700	4700	4700	3	95	50
K.75A	51	3367/66	B/C	1250	1375	2500	10.6/10.6	4700	4700	4700	3	95	50
K.75A	59.5	8510/143	B/C	1204	1324	2408	10.3/10.3	4700	4700	4700	3	95	50
K.75A	65	2146/33	B/C	1109	1220	2218	10.2/10.2	4700	4700	4700	3	95	50
K.75A	71.6	8658/121	B/C	945	1040	1890	10.1/10.1	4700	4700	4700	3	95	50
K.75C	88.5	30192/341	A/C	1238	1362	2476	6/8.6	2600	3400	4400	4	93	50
K.75C	103.8	7992/77	A/C	1238	1362	2476	5.8/8.4	2800	3700	4800	4	93	50
K.75C	121.1	1332/11	A/C	1238	1362	2476	5.7/8.3	3200	4200	5000	4	93	50
K.75C	140.5	13912/99	A/C	1238	1362	2476	5.6/8.2	3500	4700	5000	4	93	50
K.75C	164.8	1813/11	A/C	1238	1362	2476	5.6/8.2	3900	5000	5000	4	93	50
K.75C	188.4	2072/11	A/C	1238	1362	2476	5.5/8.1	4400	5000	5000	4	93	50
K.75C	215.3	2368/11	A/C	1238	1362	2476	5.5/8.1	4800	5000	5000	4	93	50
K.75C	237.7	7844/33	A/C	1238	1362	2476	5.5/8.1	5000	5000	5000	4	93	50
K.75C	285.7	40848/143	A/C	1238	1362	2476	5.4/8	5000	5000	5000	4	93	50
K.75C	313.9	10360/33	A/C	1238	1362	2476	5.4/8	5000	5000	5000	4	93	50
K.75C	347.4	42032/121	A/C	1238	1362	2476	5.4/8	5000	5000	5000	4	93	50
K.75C	397.4	56832/143	A/C	1238	1362	2476	5.4/8	5000	5000	5000	4	93	50
K.75C	435	14356/33	A/C	1238	1362	2476	5.4/8	5000	5000	5000	4	93	50
K.75C	479.5	58016/121	A/C	1238	1362	2476	5.3/7.9	5000	5000	5000	4	93	50
<b>Size K.77</b>													
K.77A	13.4	1032/77	B/C	1500	1650	3000	24.6/24.6	1400	1900	2500	11	93	90
K.77A	16.2	3384/209	B/C	1500	1650	3000	20.7/20.7	1600	2100	2700	10	93	90
K.77A	18.7	1440/77	B/C	1500	1650	3000	18.4/18.4	1700	2300	3000	10	93	90
K.77A	21.7	477/22	B/C	1500	1650	3000	16.6/16.6	1900	2500	3300	10	93	90
K.77A	25.3	8064/319	B/C	1500	1650	3000	15.1/15.1	2100	2800	3600	9	93	90
K.77A	29.7	4248/143	B/C	1500	1650	3000	13.9/13.9	2300	3100	4000	9	93	90
K.77A	35.3	8928/253	B/C	1500	1650	3000	12.9/12.9	2600	3500	4600	9	93	90
K.77A	39.9	3072/77	B/C	1500	1650	3000	12.4/12.4	2900	3900	4700	9	93	90
K.77A	45.5	864/19	B/C	1500	1650	3000	11.9/11.9	3200	4300	4700	9	93	90
K.77A	54.3	2988/55	B/C	1500	1650	3000	11.4/11.4	3700	4700	4700	9	93	90
K.77A	61.8	680/11	B/C	1500	1650	3000	11.1/11.1	4100	4700	4700	9	93	90
K.77A	71.2	783/11	B/C	1500	1650	3000	10.8/10.8	4600	4700	4700	9	93	90
K.77A	79.6	876/11	B/C	1500	1650	3000	10.6/10.6	4700	4700	4700	9	93	90
K.77A	90.6	12960/143	B/C	1500	1650	3000	10.4/10.4	4700	4700	4700	9	93	90
K.77A	99.3	1092/11	B/C	1500	1650	3000	10.3/10.3	4700	4700	4700	9	93	90



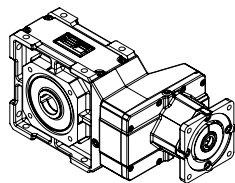
# Series K - Helical Bevel Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
K.77A	115.8	16560/143	B/C	1500	1650	3000	10.2/10.2	4700	4700	4700	9	93	90
K.77A	126.6	1392/11	B/C	1500	1650	3000	10.1/10.1	4700	4700	4700	9	93	90
K.77A	139.2	16848/121	B/C	1500	1650	3000	39364	4700	4700	4700	9	93	90
K.77C	147.9	27648/187	A/C	1500	1650	3000	6.1/8.7	2300	3100	4000	8	90	90
K.77C	172.3	58752/341	A/C	1500	1650	3000	5.9/8.5	2600	3400	4400	8	90	90
K.77C	202	15552/77	A/C	1500	1650	3000	5.8/8.4	2800	3700	4800	8	90	90
K.77C	235.6	2592/11	A/C	1500	1650	3000	5.7/8.3	3200	4200	5000	8	90	90
K.77C	273.5	3008/11	A/C	1500	1650	3000	5.6/8.2	3500	4700	5000	8	90	90
K.77C	320.7	3528/11	A/C	1500	1650	3000	5.6/8.2	3900	5000	5000	8	90	90
K.77C	366.6	4032/11	A/C	1500	1650	3000	5.5/8.1	4400	5000	5000	8	90	90
K.77C	418.9	4608/11	A/C	1500	1650	3000	5.5/8.1	4800	5000	5000	8	90	90
K.77C	462.6	5088/11	A/C	1500	1650	3000	5.4/8	5000	5000	5000	8	90	90
<b>Size K.80</b>													
K.80A	13.1	1209/92	D	2700	2970	5400	82	1500	2000	2600	10	93	162
K.80A	15.5	31/2	D	2700	2970	5400	73.4	1700	2200	2900	9	93	162
K.80A	18.4	1395/76	D	2700	2970	5400	66.9	1800	2400	3100	9	93	162
K.80A	20.9	837/40	D	2700	2970	5400	63.1	2000	2700	3500	9	93	162
K.80A	24	3069/128	D	2700	2970	5400	59.8	2200	2900	3500	9	93	162
K.80A	27.7	6417/232	D	2700	2970	5400	57.2	2400	3200	3500	9	93	162
K.80A	32.2	837/26	D	2700	2970	5400	54.9	2700	3500	3500	9	93	162
K.80A	37.9	6975/184	D	2700	2970	5400	53	3000	3500	3500	9	93	162
K.80A	42.6	341/8	D	2700	2970	5400	51.9	3300	3500	3500	9	93	162
K.80A	48.3	7347/152	D	2700	2970	5400	51	3500	3500	3500	9	93	162
K.80A	56.4	9021/160	D	2700	2970	5400	50	3500	3500	3500	8	93	162
K.80A	62.6	3255/52	D	2700	2970	5400	49.4	3500	3500	3500	8	93	162
K.80A	68.8	2201/32	D	2700	2970	5400	49	3500	3500	3500	8	93	162
K.80A	82.3	2635/32	D	2700	2970	5400	48.4	3500	3500	3500	8	93	162
K.80A	93	93/1	D	2700	2970	5400	48.1	3500	3500	3500	8	93	162
K.80C	127.3	37665/296	A/C	2700	2970	5400	6.6/9.2	2100	2800	3600	7	90	162
K.80C	147.7	2511/17	A/C	2700	2970	5400	6.3/8.9	2300	3100	4000	7	90	162
K.80C	172.1	1377/8	A/C	2700	2970	5400	6.1/8.7	2600	3400	4400	7	90	162
K.80C	201.8	22599/112	A/C	2700	2970	5400	5.9/8.5	2800	3700	4800	7	90	162
K.80C	235.4	7533/32	A/C	2700	2970	5400	5.8/8.4	3200	4200	5000	7	90	162
K.80C	273.2	4371/16	A/C	2700	2970	5400	5.7/8.3	3500	4700	5000	7	90	162
K.80C	320.4	41013/128	A/C	2700	2970	5400	5.6/8.2	3900	5000	5000	7	90	162
K.80C	366.2	5859/16	A/C	2700	2970	5400	5.6/8.2	4400	5000	5000	7	90	162
K.80C	418.5	837/2	A/C	2700	2970	5400	5.5/8.1	4800	5000	5000	7	90	162
K.80C	462.1	14787/32	A/C	2700	2970	5400	5.5/8.1	5000	5000	5000	7	90	162
<b>Size K.85</b>													
K.85A	15.5	2496/161	D	3285	4744	8626	103.7	1500	2000	2600	6	93	276
K.85A	18.3	128/7	D	3877	5060	9200	89	1700	2200	2900	6	93	276
K.85A	21.7	2880/133	D	4600	5060	9200	78.1	1800	2400	3100	6	93	276
K.85A	24.7	864/35	D	4600	5060	9200	71.6	2000	2700	3500	6	93	276

1 Nm = 8.85 in-lb

# Series K - Helical Bevel Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
K.85A	28.3	198/7	D	4600	5060	9200	66.4	2200	2900	3500	6	93	276
K.85A	32.6	6624/203	D	4600	5060	9200	62.1	2400	3200	3500	6	93	276
K.85A	38	3456/91	D	4600	5060	9200	58.5	2700	3500	3500	5	93	276
K.85A	44.7	7200/161	D	4600	5060	9200	55.6	3000	3500	3500	5	93	276
K.85A	50.3	352/7	D	4600	5060	9200	54	3300	3500	3500	5	93	276
K.85A	57	7584/33	D	4600	5060	9200	52.6	3500	3500	3500	5	93	276
K.85A	66.5	2328/35	D	4600	5060	9200	51.1	3500	3500	3500	5	93	276
K.85A	73.9	960/13	D	4600	5060	9200	50.4	3500	3500	3500	5	93	276
K.85A	109.7	768/7	D	4456	4901	8912	48.5	3500	3500	3500	5	93	276
K.85C	150.1	38880/259	A/C	4600	5060	9200	6.8/9.4	2100	2800	3600	5	90	276
K.85C	174.3	20736/119	A/C	4600	5060	9200	6.5/9.1	2300	3100	4000	5	90	276
K.85C	203.1	44064/217	A/C	4600	5060	9200	6.2/8.8	2600	3400	4400	5	90	276
K.85C	238	11664/49	A/C	4600	5060	9200	6/8.6	2800	3700	4800	5	90	276
K.85C	277.7	1944/7	A/C	4600	5060	9200	5.8/8.4	3200	4200	5000	5	90	276
K.85C	322.3	2259/7	A/C	4600	5060	9200	5.7/8.3	3500	4700	5000	5	90	276
K.85C	378	378/1	A/C	4600	5060	9200	5.6/8.2	3900	5000	5000	5	90	276
K.85C	432	432/1	A/C	4600	5060	9200	5.6/8.2	4400	5000	5000	5	90	276
K.85C	493.7	3456/7	A/C	4600	5060	9200	5.5/8.1	4800	5000	5000	5	90	276
<b>Size K.110</b>													
K.110A	14.2	567/40	D	3138	3452	6276	217.4	1200	1600	2100	5	93	480
K.110A	16.4	1215/74	D	3481	3829	6912	184.2	1300	1700	2200	5	93	480
K.110A	19.1	324/17	D	4040	4444	8080	158.1	1400	1800	2300	5	93	480
K.110A	22.2	1377/62	D	4710	5181	9420	138.9	1500	2000	2600	5	93	480
K.110A	26	729/28	D	5520	6072	11040	122.6	1700	2200	2900	5	93	480
K.110A	29.1	378/13	D	6165	6782	12330	112.9	1800	2400	3100	5	93	480
K.110A	32.6	261/8	D	6918	7610	13836	104.5	2000	2600	3200	5	93	480
K.110A	36.8	405/11	D	7805	8585	15610	97.1	2200	2900	3200	5	93	480
K.110A	41.9	837/20	D	8000	8800	16000	90.6	2300	3100	3200	5	93	480
K.110A	48	48/1	D	8000	8800	16000	84.9	2600	3200	3200	5	93	480
K.110A	55.7	891/16	D	8000	8800	16000	80	2900	3200	3200	5	93	480
K.110A	65.6	459/7	D	8000	8800	16000	77.1	3200	3200	3200	5	93	480
K.110A	78.8	315/4	D	8000	8800	16000	71.8	3200	3200	3200	5	93	480
K.110A	87.1	1917/22	D	8000	8800	16000	70.2	3200	3200	3200	5	93	480
K.110A	97.2	486/5	D	8000	8800	16000	68.6	3200	3200	3200	5	93	480
K.110A	109	2835/26	D	8000	8800	16000	67.4	3200	3200	3200	5	93	480
K.110A	119.3	477/4	D	8000	8800	16000	66.4	3200	3200	3200	5	93	480
K.110A	141.8	567/9	D	7992	8791	15984	65	3200	3200	3200	5	93	480
K.110A	158.9	4131/26	D	6413	7054	12825	64.3	3200	3200	3200	5	93	480
K.110C	181.6	132219/728	B/C	8000	8800	16000	13.5/13.5	2300	3100	4000	5	90	480
K.110C	215.8	69471/322	B/C	8000	8800	16000	12.6/12.6	2600	3500	4600	5	90	480
K.110C	243.9	11952/49	B/C	8000	8800	16000	12.1/12.1	2900	3900	4700	5	90	480
K.110C	278	73953/266	B/C	8000	8800	16000	11.7/11.7	3200	4300	4700	5	90	480
K.110C	332.2	186003/560	B/C	8000	8800	16000	11.3/11.3	3700	4700	4700	5	90	480



# Series K - Helical Bevel Selection Tables

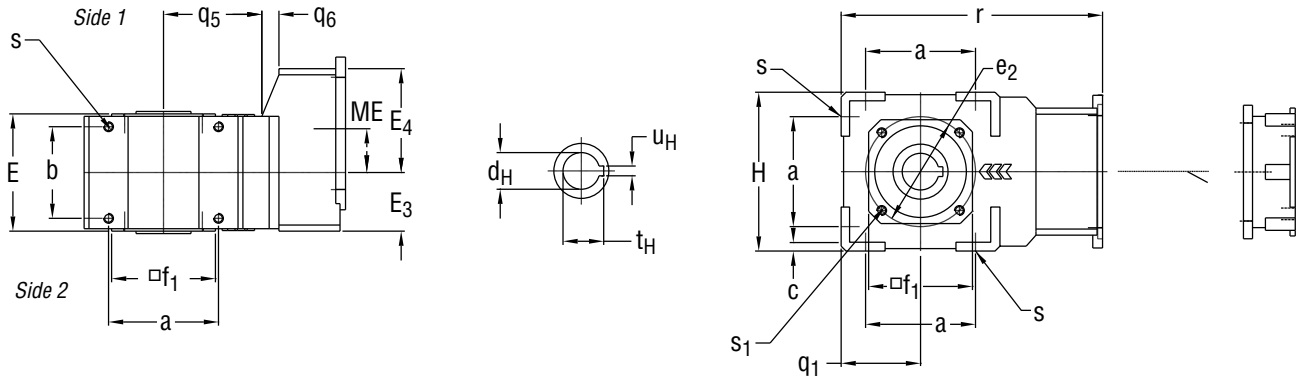
Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia $\text{kgm}^2 \times 10^{-4}$	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
K.110C	378	21165/56	B/C	8000	8800	16000	11/11	4100	4700	4700	5	90	480
K.110C	435.2	194967/448	B/C	8000	8800	16000	10.7/10.7	4600	4700	4700	5	90	480
K.110C	486.9	54531/112	B/C	8000	8800	16000	10.5/10.5	4700	4700	4700	5	90	480
<b>Size K.136</b>													
K.136A	19.07	25376/1331	D	5052	5558	10105	423.4	3500	3500	3500	5	90	980
K.136A	25.72	115168/4477	D	6817	7499	13634	284.8	3300	3500	3500	5	90	980
K.136A	29.42	60512/2057	D	7796	8575	15591	242.3	2700	3500	3500	5	90	980
K.136A	39.18	33184/847	D	10382	11420	20764	177.5	2400	3200	3500	5	90	980
K.136A	54.26	72224/1331	D	14000	15400	28000	131.5	3200	3200	3200	5	93	980
K.136A	69.91	25376/363	D	14000	15400	28000	108.4	3200	3200	3200	5	93	980
K.136A	94.49	80032/847	D	14000	15400	28000	90.1	3200	3200	3200	5	93	980
K.136A	124.66	165920/1331	D	14000	15400	28000	79.3	2900	3200	3200	5	93	980
K.136A	155.12	244000/1573	D	14000	15400	28000	73.8	2400	3200	3200	5	93	980
K.136C	204.71	718336/3509	D	14000	15400	28000	69.8	1900	2500	3200	5	93	980
K.136C	238.26	374784/1573	D	14000	15400	28000	68.0	1600	2100	2700	5	93	980
K.136C	315.47	31232/99	D	14000	15400	28000	65.5	1400	1900	2500	5	93	980
K.136C	417.29	757376/1815	D	14000	15400	28000	63.8	1200	1600	2100	5	93	980

1 Nm = 8.85 in-lb

# Series K - Schematics

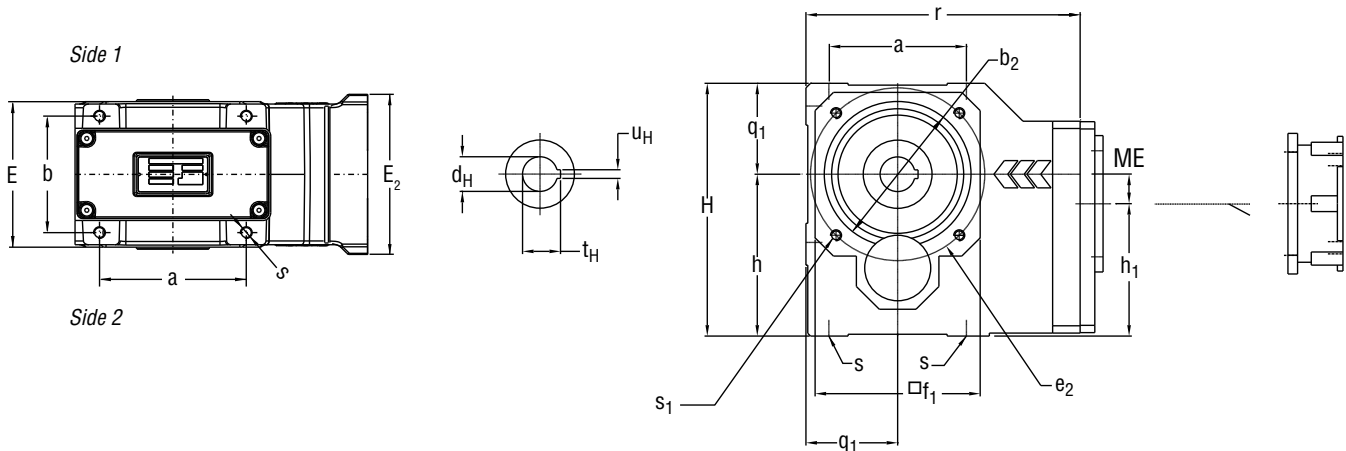
We have provided basic dimensions only. For complete drawings, please visit [cat4cad.com](http://cat4cad.com) or contact your DieQua representative.

## Size K.40 - 75

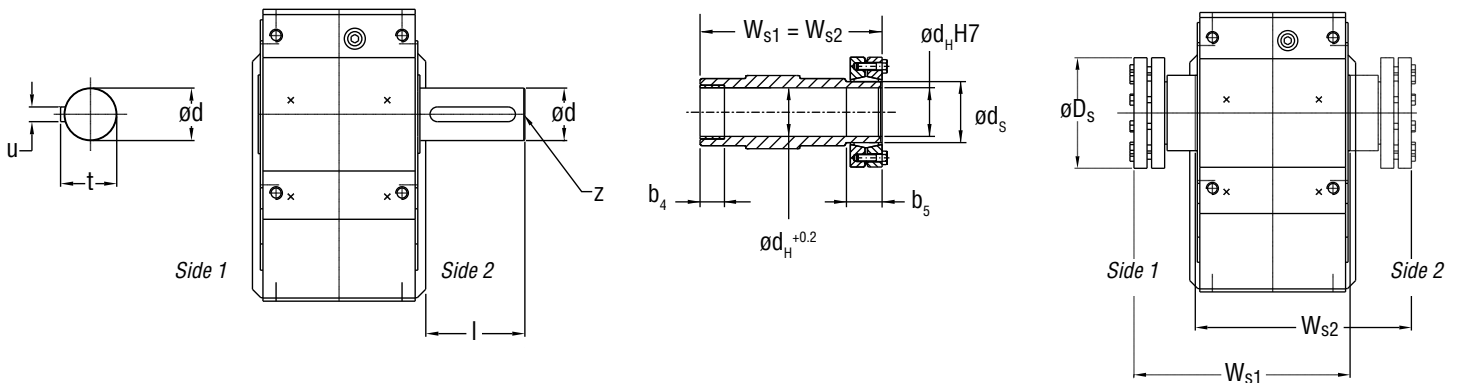


## Size K.77 - 136

See page 44 for motor adapter dimensions.



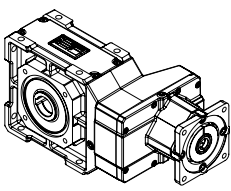
## Solid Shaft or Shrink Disc



Note: See output flange and torque arm schematics on page 34.

Drawings Available On:





## Size K.40 - 75

Type	Main Dimensions (in mm)															
	a	b	c	E	e <sub>2</sub>	E <sub>3</sub>	E <sub>4</sub>	f <sub>1</sub>	H	ME	r <sup>(1)</sup>	q <sub>1</sub>	q <sub>s</sub>	q <sub>6</sub>	S	S <sub>1</sub>
K.40A	90	75	-	96	90	48	85	85	130	32	214	65	81	14	M8x16	M8x16
K.50A	110	80	10	105	110	53.5	106	105	170	40.3	233	85	88	19	9	M10x16
K.50C											267					
K.60A	140	95	12	120	130	68	126	125	200	51.1	278	100	101	24	11	M10x16
K.60C											312					
K.70A	170	110	14	140	165	77	157	160	240	66.4	334	120	150	28	13	M12x20
K.70C											375					
K.75A	200	120	16	150	190	81	155	200	280	65	388	140	178	25	13	M12x20
K.75C											429					

## Size K.77 - 136

Type	Main Dimensions (in mm)															
	a	b	b <sub>2</sub>	E	E <sub>2</sub>	e <sub>2</sub>	f <sub>1</sub>	H	h	h <sub>1</sub>	ME	r <sup>(1)</sup>	q <sub>1</sub>	S <sup>1</sup>	S <sub>1</sub> <sup>2</sup>	
K.77A	150	120	160	150	165	190	180	278	178	145.5	32.5	299	100	M12x18	M12x18	
K.77C										176.2	1.8	340				
K.80A	190	140	150	174	190	190	185	335	210	169	41	366	125	M16x25	M16x25	
K.80C										205	5	411				
K.85A	220	160	-	204	196	240	235	425	270	191	79	434	155	M20x30	M20x30	
K.85C										227	43.2	479				
K.110A	260	190	-	250	270	240	235	475	300	244.8	55.4	512	175	M24x36	M20x30	
K.110C										289.5	10.7	589				
K.136A	340	260	-	338	310	300	340	560	335	275.4	59.6	677	225	M30x45	M24x36	
K.136C										322.4	12.6	770				

## Output Options - Hollow Shaft, Solid Shaft, Shrink Disc

Type	Hollow Shaft							Solid Shaft <sup>(*)</sup>								Shrink Disc				
	d <sup>(2)</sup>	d <sup>(3)</sup>	t <sub>H</sub> <sup>(2)</sup>	t <sub>H</sub> <sup>(3)</sup>	u <sub>H</sub> <sup>(2)</sup>	u <sub>H</sub> <sup>(3)</sup>	W <sub>1</sub>	d <sup>(2)</sup>	d <sup>(3)</sup>	l	t <sup>(2)</sup>	t <sup>(3)</sup>	u <sup>(2)</sup>	u <sup>(3)</sup>	Z	b <sub>4</sub>	b <sub>s</sub>	d <sub>H</sub> <sup>(3)</sup>	D <sub>s</sub>	W <sub>s1</sub>
K.40	1.250	20.0	1.367	22.8	0.25	6.0	100	1.000	20	50	1.109	22.5	0.25	6.0	M10	20	21	30	72	126
K.50	1.375	35.0	1.518	38.3	0.313	10.0	109	1.250	35	60	1.362	38.0	0.25	10.0	M12	20	24	35	80	138
K.60	1.500	40.0	1.669	43.3	0.375	12.0	124	1.375	40	80	1.514	43.0	0.31	12.0	M12	20	25	40	90	155
K.70	1.500	45.0	1.669	48.8	0.375	14.0	144	1.625	45	90	1.791	48.5	0.38	14.0	M16	30	26	50	110	177
K.75	2.000	50.0	2.223	53.8	0.500	14.0	154	2.000	50	100	2.218	53.5	0.50	14.0	M20	30	28	50	110	215
K.77	2.000	50.0	2.223	53.8	0.500	14.0	154	2.000	50	100	2.218	53.5	0.50	14.0	M20	30	28	50	110	215
K.80	2.375	60.0	2.651	64.4	0.625	18.0	182	2.375	60	120	2.646	64.0	0.63	18.0	M20	30	29	65	138	214
K.85	2.750	70.0	2.938	74.9	0.625	20.0	214	2.875	70	140	3.200	74.5	0.75	20.0	M20	40	36	75	155	255
K.110	3.625	90.0	4.014	95.4	0.875	25.0	260	3.625	90	170	4.009	95.0	0.88	25.0	M24	60	45	90	185	365
K.136	4.000	100.0	4.441	106.4	1.000	28.0	350	4.375	110	210	4.817	116.0	1.00	28.0	M24	60	55	105	215	408

Note: (1) r value is maximum dimension, actual length might vary.

(2) Inch shaft option dimensions

(3) Metric shaft option dimensions

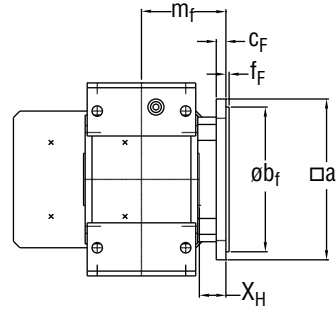
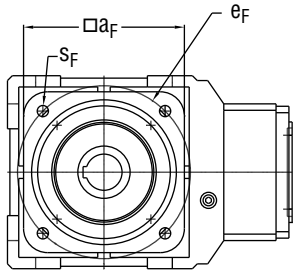
(\*) Dual output options available

Dimensions are subject to change without notice.

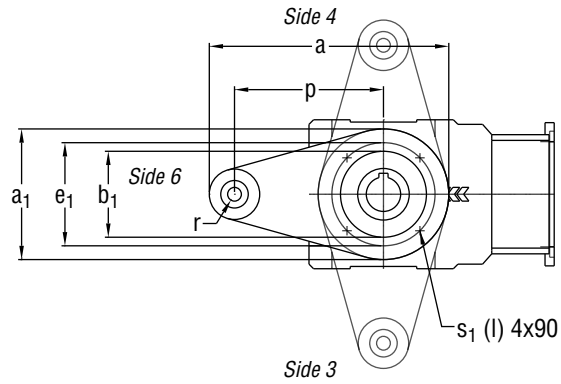
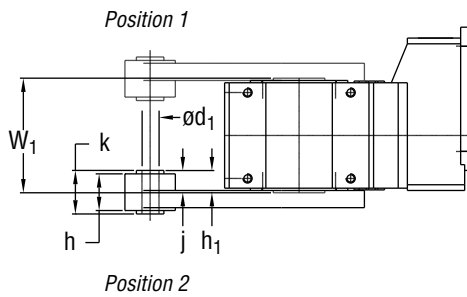
# Series K - Flange Schematics

We have provided basic dimensions only. For complete drawings, please visit [cat4cad.com](http://cat4cad.com) or contact your DieQua representative.

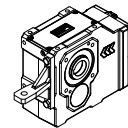
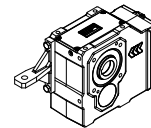
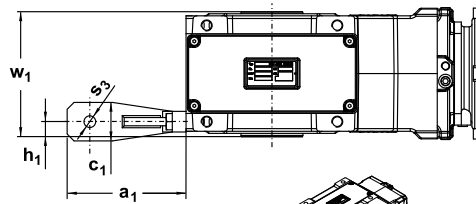
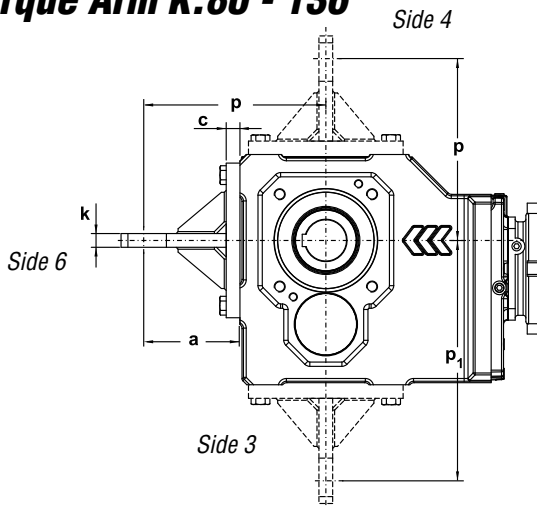
## Output Flange



## Torque Arm K.40 - 77



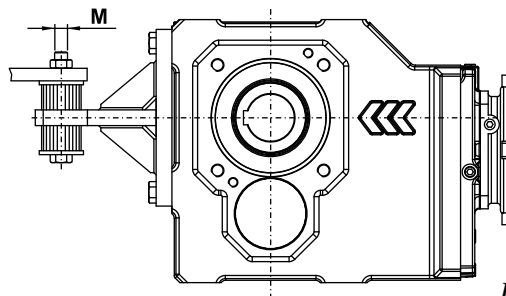
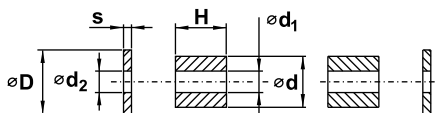
## Torque Arm K.80 - 136



Position 1

Position 2

## Rubber Buffer Set, Size K.80 - 136 Only



Drawings Available On:





## Optional Output Flange Dimensions (in mm)

Type	a <sub>F</sub>	b <sub>F</sub>	c <sub>F</sub>	e <sub>F</sub>	f <sub>F</sub>	m <sub>F</sub>	s <sub>F</sub>	x <sub>H</sub>
K.40	130	110	10	130	3	80	9	30
K.50	150	130	10	165	3.5	84.5	11	30
K.60	150	130	10	165	3.5	102	11	40
K.70	200	180	12	215	4	105	14	33
K.75	250	230	14	265	4	130	14	53
K.77	250	230	14	265	4	130	14	53
K.80	300	250	16	300	5	142	18	50
K.85	450	350	24	400	5	176	18	69
K.110	450	350	24	400	5	199	18	69
K.136	550	450	24	500	5	249	18	75

## Size K.40 - 77 Torque Arm Dimensions (in mm)

Type	a	a <sub>1</sub>	c	d <sub>1</sub>	E	e <sub>2</sub>	h	h <sub>1</sub>	j	k	l	p	r	S <sub>1</sub>	W <sub>1</sub>	Kit <sup>(1)</sup>
K.40	209	114	15	12	96	90	32	19	17	38	M8x20	130	22	8.5	100	GMDS090
K.50	250	136	17	12	105	110	32	19.5	17.5	38	M10x25	160	22	10.5	109	GMDS110
K.60	302	160	19	12	120	130	32	19	17	38	M10x25	200	22	10.5	124	GMDS130
K.70	385	200	23	20	140	165	56	31.5	29.5	62.5	M12x30	250	35	12.5	144	GMDS165
K.75	393	216	23	20	150	190	56	31.5	29.5	62.5	M12x30	250	35	12.5	154	GMDS190
K.77	393	216	23	20	150	190	56	31.5	29.5	62.5	M12x30	250	35	12.5	154	GMDS190

## Size K.80 - 136 Torque Arm Dimensions (in mm)

Type	a	a <sub>1</sub>	c	c <sub>1</sub>	h <sub>1</sub>	k	p	p <sub>1</sub>	S <sub>3</sub>	W <sub>1</sub>	Kit <sup>(2)</sup>
K.80	140	173	28	56	21	22	265	350	22	182	GMDSK80
K.85	140	195	36	100	27	28	295	410	26	214	GMDSK85
K.110	180	230	50	100	35	32	355	480	26	260	GMDSK110
K.136	180	240	68	120	45	40	405	515	26	350	GMDSK135

## Size K 80 - 136 Rubber Buffer Dimensions (in mm)

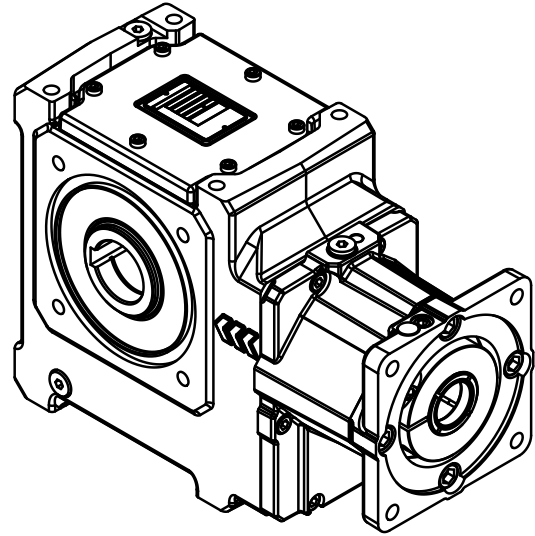
Type	d	d <sub>1</sub>	d <sub>2</sub>	D	H	M	s	Kit <sup>(3)</sup>
K.80	50	17	17.0	56	32	M16	5	GMPSD050
K.85	80	21	20.5	100	32	M20	8	GMPSD080
K.110	80	21	20.5	100	32	M20	8	GMPSD080
K.136	100	21	21.0	120	32	M20	8	GMPSD100

- Note: (1) 1 Kit: torque arm with 4 screws and flexible bushing  
 (2) 1 Kit: torque arm with 2 screws  
 (3) 1 Kit: 2 rubber buffer, 2 metal discs

# Series S - Helical Worm

The WATT Drive S Series of helical worm servo gearhead is an economical right angle solution offering increased efficiency over standard worm designs. Outstanding performance and a compact design assure highly reliable operation in a small package.

Offering good backlash levels and a wide variety of mounting and connection options, the design is ideal for general purpose cyclic and continuous speed control applications.



## Design Benefits

- High torque capacity
- Excellent efficiency
- Multiple mounting options
- Multiple output options
- High rigidity
- Wide range of ratios
- Corrosion protection options
- Customization options
- Explosion proof options

## Technical Notes

### Backlash:

Published data represents maximum values. Actual backlash could be as little as half these amounts. Reduced backlash option is available upon request.

### Radial Loads:

Capacities are a function of shaft rotation, direction of radial load, output speed, and output torque. Consult DieQua for more details.

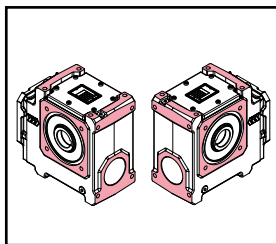
### Input Speeds:

Maximum continuous motor input speeds are a function of gearbox size, ratio, and mounting position. Consult selection charts for speed limits.

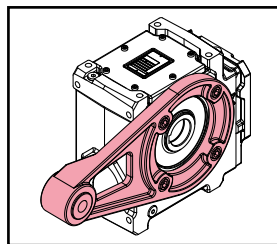
### Thermal Limits:

Ambient conditions may alter the power capacities of these gearboxes. For higher and lower temperature applications, please consult DieQua.

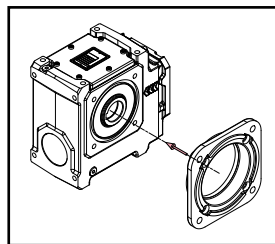
## Mounting Options



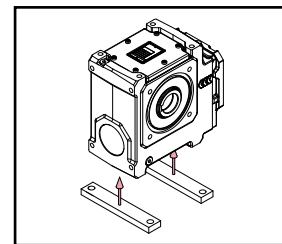
Uniblock



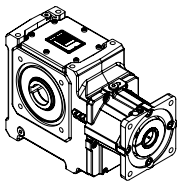
Support



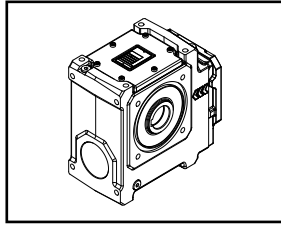
Bolt-On Flange



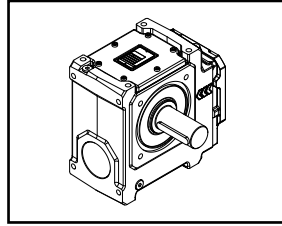
Foot



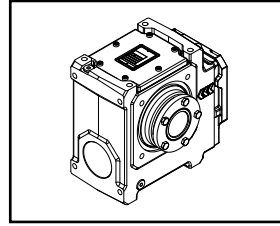
**Output Options**



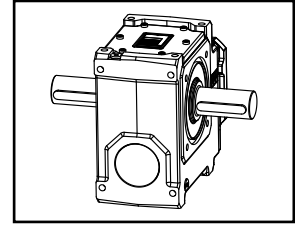
SUA - Shaft Mount



SU - Output Shaft

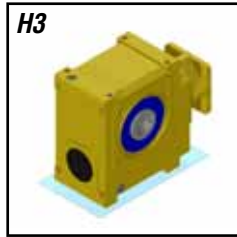


SUS - Shrink Disc

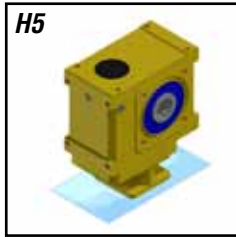


SUZ - Dual Output

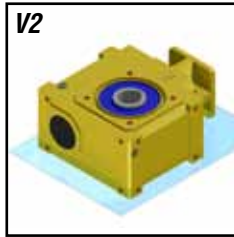
**Mounting Positions**



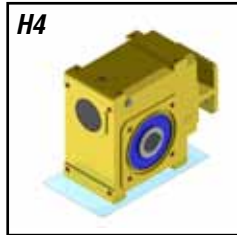
H3



H5



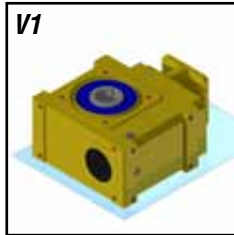
V2



H4

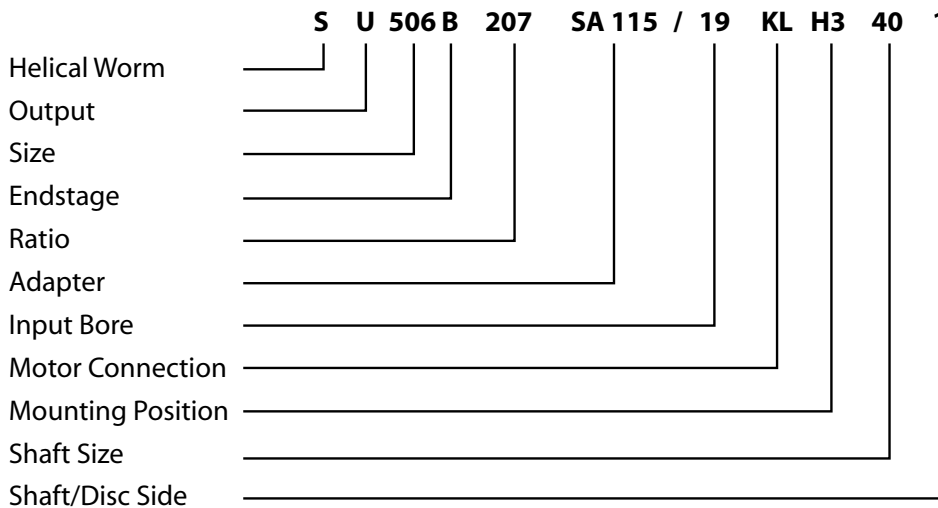


H6



V1

**Ordering Example**



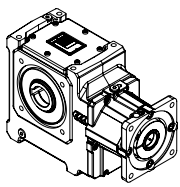
KL = Clamp (Standard)  
 PF = Clamp with Keyway (Optional)

# Series S - Helical Worm Selection Tables

**Gear Type** = Model, Size, Endstage  
**Nom. Ratio** = approximate ratio  
**Exact Ratio** = exact fractional ratio  
**Servo Adapter** = adapter size (pg. 44)  
**T<sub>2N</sub>** = continuous torque (Nm)  
**T<sub>2B</sub>** = peak torque < 5% duty (Nm)  
**T<sub>2E</sub>** = emergency stop torque (Nm)

**Inertia** = inertia at input - per adapter size  
**n1 mp** = continuous speed vertical input  
**n1 max** = continuous speed horizontal input  
**n1 cyc** = intermittent peak speed  
**Max. Backlash** = max. backlash in arc minutes  
*(estimate based on component tolerance calculations)*  
**Effic. %** = efficiency % at max torque  
**Rigidity** = torsional rigidity

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
<b>Size S.454</b>													
S.454S	5.1	143/28	A	66	72	131	6	2300	3100	4000	29	91	3
S.454S	7.1	385/54	A	71	78	142	5.7	2900	3900	5000	28	91	3
S.454A	9.3	288/31	A	72	79	144	6	2100	2800	3600	23	86	3.36
S.454A	11.1	78/7	A	75	82	150	5.8	2300	3100	4000	23	86	3.36
S.454A	15.6	140/9	A	81	89	162	5.6	2900	3900	5000	22	86	3.36
S.454A	21.3	64/3	A	87	96	174	5.5	3600	4800	5000	22	85	3.36
S.454A	24.6	320/13	A	90	99	180	5.4	4100	5000	5000	22	85	3.36
S.454A	33.2	432/13	A	96	105	192	5.4	5000	5000	5000	22	84	3.36
S.454A	40.7	448/11	A	100	110	200	5.4	5000	5000	5000	22	83	3.36
S.454A	46.8	608/13	A	103	113	205	5.3	5000	5000	5000	22	83	3.36
S.454A	51.3	154/3	A	105	115	209	5.3	5000	5000	5000	22	82	3.36
S.454A	63.2	316/5	A	109	120	218	5.3	5000	5000	5000	22	81	3.36
S.454A	71.1	640/9	A	111	122	222	5.3	5000	5000	5000	22	81	3.36
S.454B	89.2	1160/13	A	112	123	224	5.4	4100	5000	5000	19	57	4
S.454B	99.1	1189/12	A	114	125	228	5.4	4400	5000	5000	19	57	4
S.454B	120.5	1566/13	A	117	129	234	5.4	5000	5000	5000	19	55	4
S.454B	147.6	1624/11	A	121	133	242	5.3	5000	5000	5000	19	54	4
S.454B	169.5	2204/13	A	123	135	246	5.3	5000	5000	5000	19	53	4
S.454B	205.6	2262/11	A	126	139	252	5.3	5000	5000	5000	19	51	4
S.454B	257.8	2320/9	A	129	142	258	5.3	5000	5000	5000	19	49	4
<b>Size S.455</b>													
S.455A	15.3	429/28	A	141	155	282	5.8	2300	3100	4000	17	86	6.2
S.455A	21.4	385/18	A	152	168	305	5.6	2900	3900	5000	16	86	6.2
S.455A	25.4	407/16	A	158	174	316	5.5	3300	4400	5000	16	86	6.2
S.455A	29.3	88/3	A	163	180	326	5.5	3600	4800	5000	16	85	6.2
S.455A	37.6	451/12	A	172	189	344	5.4	4400	5000	5000	16	85	6.2
S.455A	45.7	594/13	A	179	197	358	5.4	5000	5000	5000	16	84	6.2
S.455A	50.4	605/12	A	182	201	365	5.4	5000	5000	5000	16	84	6.2
S.455A	56	56/1	A	186	205	372	5.4	5000	5000	5000	16	83	6.2
S.455A	70.6	847/12	A	194	214	388	5.3	5000	5000	5000	16	82	6.2
S.455A	86.9	869/10	A	201	221	402	5.3	5000	5000	5000	16	81	6.2
S.455A	97.8	880/9	A	205	225	410	5.3	5000	5000	5000	16	81	6.2
S.455B	120	120/1	A	207	228	414	5.4	4100	5000	5000	14	64	7.3
S.455B	162	162/1	A	216	237	431	5.4	5000	5000	5000	14	62	7.3
S.455B	198.6	2184/11	A	221	243	442	5.3	5000	5000	5000	14	61	7.3
S.455B	250.3	1001/4	A	227	250	454	5.3	5000	5000	5000	14	60	7.3



# Series S - Helical Worm Selection Tables

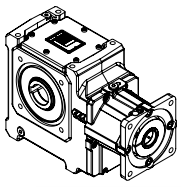
Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
S.455B	308.1	3081/10	A	231	255	463	5.3	5000	5000	5000	14	58	7.3
S.455B	346.7	1040/3	A	234	257	468	5.3	5000	5000	5000	14	57	7.3
<b>Size S.506</b>													
S.506S	7.8	288/37	A/C	246	270	492	7.7/10.3	2100	2800	3600	19	92	12
S.506S	9	768/85	A/C	255	280	509	7.1/9.7	2300	3100	4000	19	92	12
S.506A	12.7	216/17	A/C	280	308	561	6.9/9.5	2300	3100	4000	17	89	13
S.506A	14.8	459/31	A/C	290	320	581	6.5/9.1	2600	3400	4400	17	89	13
S.506A	20.3	81/4	A/C	312	343	624	6/8.6	3200	4200	5000	17	88	13
S.506A	23.5	47/2	A/C	322	355	645	5.9/8.5	3500	4700	5000	17	88	13
S.506A	27.6	441/16	A/C	334	367	668	5.7/8.3	3900	5000	5000	17	88	13
S.506A	31.5	63/2	A/C	343	378	687	5.7/8.3	4400	5000	5000	17	87	13
S.506A	36	36/1	A/C	353	389	706	5.6/8.2	4800	5000	5000	17	87	13
S.506A	39.8	159/4	A/C	360	397	721	5.5/8.1	5000	5000	5000	17	87	13
S.506A	47.8	621/13	A/C	374	411	748	5.5/8.1	5000	5000	5000	16	86	13
S.506A	58.1	639/11	A/C	388	427	777	5.4/8	5000	5000	5000	16	85	13
S.506A	72.8	291/4	A/C	405	445	809	5.4/8	5000	5000	5000	16	84	13
S.506B	87.8	351/4	A/C	402	442	804	5.9/8.5	3200	4200	5000	12	68	15
S.506B	101.8	611/6	A/C	412	453	823	5.8/8.4	3500	4700	5000	12	67	15
S.506B	119.4	1911/16	A/C	422	464	844	5.7/8.3	3900	5000	5000	12	67	15
S.506B	156	156/1	A/C	438	482	876	5.5/8.1	4800	5000	5000	12	65	15
S.506B	172.3	689/4	A/C	444	488	887	5.5/8.1	5000	5000	5000	12	64	15
S.506B	207	207/1	A/C	453	499	907	5.5/8.1	5000	5000	5000	12	63	15
S.506B	251.7	2769/11	A/C	463	510	926	5.4/8	5000	5000	5000	12	62	15
S.506B	288	288/1	A/C	469	516	939	5.4/8	5000	5000	5000	12	61	15
S.506B	347.5	3822/11	A/C	477	525	955	5.4/8	5000	5000	5000	11	59	15
S.506B	433.3	1300/3	A/C	486	534	971	5.3/7.9	5000	5000	5000	11	58	15
<b>Size S.507</b>													
S.507S	9.2	342/37	A/C	348	383	697	7.8/10.4	2100	2800	3600	16	92	16
S.507S	10.7	912/85	A/C	361	397	722	7.2/9.8	2300	3100	4000	16	92	16
S.507A	13	480/37	A/C	383	421	765	7.5/10.1	2100	2800	3600	15	90	17
S.507A	15.1	256/17	A/C	396	436	792	7/9.6	2300	3100	4000	15	90	17
S.507A	20.6	144/7	A/C	425	468	850	6.3/8.9	2800	3700	4800	14	89	17
S.507A	24	24/1	A/C	440	484	880	6/8.6	3200	4200	5000	14	89	17
S.507A	32.7	98/3	A/C	470	517	940	5.7/8.3	3900	5000	5000	14	88	17
S.507A	37.3	112/3	A/C	483	532	967	5.7/8.3	4400	5000	5000	14	87	17
S.507A	47.1	424/9	A/C	507	557	1013	5.5/8.1	5000	5000	5000	14	87	17
S.507A	62.2	560/9	A/C	534	588	1068	5.4/8	5000	5000	5000	14	86	17
S.507A	68.9	2272/33	A/C	544	598	1088	5.4/8	5000	5000	5000	14	85	17
S.507A	86.2	776/9	A/C	508	559	1017	5.4/8	5000	5000	5000	14	84	17
S.507B	103.5	207/2	A/C	563	620	1127	5.9/8.5	3200	4200	5000	10	68	20
S.507B	120.1	1081/9	A/C	576	634	1153	5.8/8.4	3500	4700	5000	10	68	20
S.507B	161	161/1	A/C	600	660	1201	5.6/8.2	4400	5000	5000	10	66	20
S.507B	203.2	1219/6	A/C	618	680	1235	5.5/8.1	5000	5000	5000	10	64	20

1 Nm = 8.85 in-lb

# Series S - Helical Worm Selection Tables

Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia $\text{kgm}^2 \times 10^{-4}$	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
S.507B	244.2	3174/13	A/C	630	693	1261	5.5/8.1	5000	5000	5000	10	63	20
S.507B	296.9	3266/11	A/C	634	698	1269	5.4/8	5000	5000	5000	10	62	20
S.507B	339.7	4416/13	A/C	634	698	1269	5.4/8	5000	5000	5000	10	61	20
S.507B	409.8	4508/11	A/C	634	698	1269	5.4/8	5000	5000	5000	10	59	20
S.507B	455.4	2277/5	A/C	634	698	1269	5.3/7.9	5000	5000	5000	10	58	20
<b>Size S.608</b>													
S.608A	10.7	171/16	A/C	551	606	1101	11.6/14.2	1700	2200	2900	16	91	25
S.608A	12.7	369/29	A/C	574	631	1147	9.9/12.5	1800	2400	3100	16	91	25
S.608A	15.2	198/13	A/C	598	658	1196	8.7/11.3	2000	2700	3500	16	90	25
S.608A	21	21/1	A/C	643	707	1286	7.3/9.9	2500	3300	4300	16	90	25
S.608A	24.2	459/19	A/C	663	730	1327	6.9/9.5	2800	3700	4800	16	89	25
S.608A	33	33/1	A/C	709	780	1419	6.3/8.9	3500	4700	5000	16	88	25
S.608A	43.5	87/2	A/C	751	826	1502	5.9/8.5	4400	5000	5000	16	88	25
S.608A	54	54/1	A/C	783	862	1567	5.8/8.4	5000	5000	5000	16	87	25
S.608A	63.7	828/13	A/C	808	889	1616	5.7/8.3	5000	5000	5000	15	86	25
S.608A	69.8	279/4	A/C	821	903	1643	5.6/8.2	5000	5000	5000	15	86	25
S.608B	79.7	1833/23	A/C	844	928	1688	7.6/10.2	2300	3000	3900	12	71	31
S.608B	91	91/1	A/C	863	949	1726	7.1/9.7	2500	3300	4300	12	70	31
S.608B	104.7	1989/19	A/C	882	971	1765	6.8/9.4	2800	3700	4800	12	69	31
S.608B	124.8	624/5	A/C	906	997	1812	6.4/9	3200	4200	5000	12	68	31
S.608B	165.8	663/4	A/C	942	1036	1884	6/8.6	3900	5000	5000	12	66	31
S.608B	213	213/1	A/C	971	1068	1942	5.8/8.4	4800	5000	5000	12	64	31
S.608B	234	234/1	A/C	981	1079	1962	5.7/8.3	5000	5000	5000	12	63	31
S.608B	276	276/1	A/C	998	1098	1996	5.6/8.2	5000	5000	5000	12	62	31
S.608B	302.3	1209/4	A/C	1006	1107	2013	5.6/8.2	5000	5000	5000	12	62	31
S.608B	381	381/1	A/C	1027	1129	2053	5.5/8.1	5000	5000	5000	12	60	31
S.608B	457.4	5031/11	A/C	1040	1144	2081	5.5/8.1	5000	5000	5000	12	58	31
<b>Size S.609</b>													
S.609A	12.3	589/48	A/C	769	846	1538	12/14.6	1700	2200	2900	14	91	35
S.609A	14.6	1271/87	A/C	801	881	1601	10.2/12.8	1800	2400	3100	14	91	35
S.609A	21.1	1457/69	A/C	871	958	1741	7.9/10.5	2300	3000	3900	14	90	35
S.609A	27.7	527/19	A/C	924	1017	1849	7/9.6	2800	3700	4800	14	89	35
S.609A	37.9	341/9	A/C	987	1086	1974	6.3/8.9	3500	4700	5000	13	89	35
S.609A	49.9	899/18	A/C	1043	1148	2086	6/8.6	4400	5000	5000	13	88	35
S.609A	62	62/1	A/C	1087	1196	2174	5.8/8.4	5000	5000	5000	13	87	35
S.609A	73.1	2852/39	A/C	1028	1131	2057	5.7/8.3	5000	5000	5000	13	86	35
S.609B	92	2115/23	A/C	1168	1285	2336	7.6/10.2	2300	3000	3900	10	71	42
S.609B	105	105/1	A/C	1193	1312	2386	7.1/9.7	2500	3300	4300	10	70	42
S.609B	120.8	2295/19	A/C	1219	1341	2438	6.8/9.4	2800	3700	4800	10	69	42
S.609B	144	144/1	A/C	1250	1375	2499	6.4/9	3200	4200	5000	10	68	42
S.609B	191.3	765/4	A/C	1296	1426	2592	6/8.6	3900	5000	5000	10	66	42
S.609B	245.8	3195/13	A/C	1298	1428	2596	5.8/8.4	4800	5000	5000	10	64	42
S.609B	318.5	4140/13	A/C	1298	1428	2596	5.6/8.2	5000	5000	5000	10	62	42





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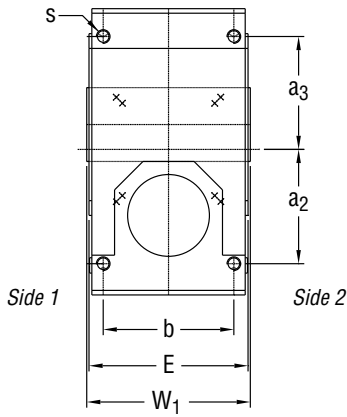
Gear Type	Nom. Ratio	Exact Ratio	Servo Adapter	Torque Capacity Nm			Inertia kgm <sup>2</sup> x10 <sup>-4</sup>	Speed			Max. Backlash	Effic. %	Rigidity Nm/min
				T <sub>2N</sub>	T <sub>2B</sub>	T <sub>2E</sub>		n1 mp	n1 max	n1 cyc			
S.609B	384.6	4230/11	A/C	1298	1428	2596	5.6/8.2	5000	5000	5000	10	61	42
S.609B	480	480/1	A/C	1298	1428	2596	5.5/8.1	5000	5000	5000	10	59	42

1 Nm = 8.85 in-lb

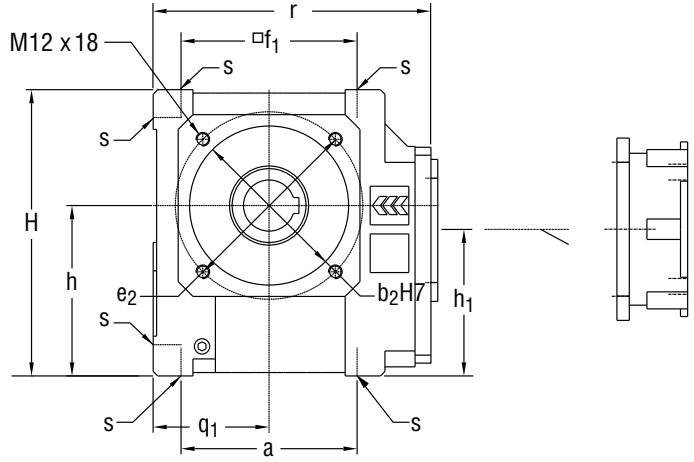
# Series S - Schematics

We have provided basic dimensions only. For complete drawings, please visit [cat4cad.com](http://cat4cad.com) or contact your DieQua representative.

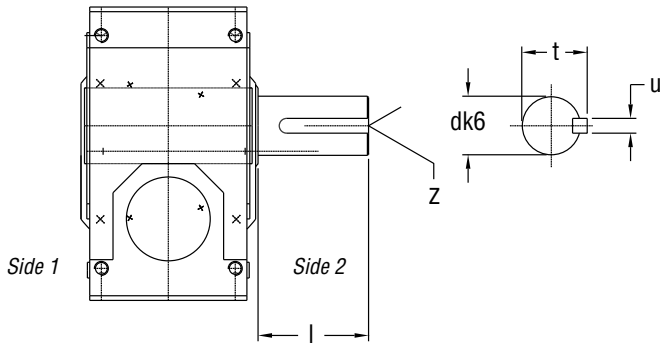
## Size S.454 - 609



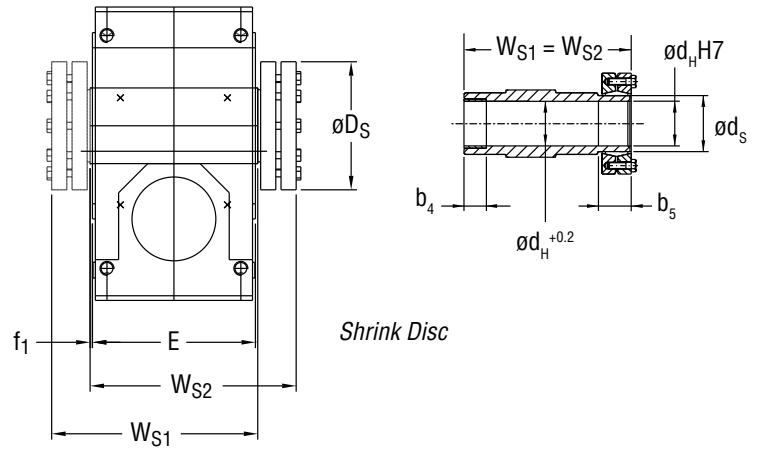
Hollow Shaft



See page 44 for motor adapter dimensions.

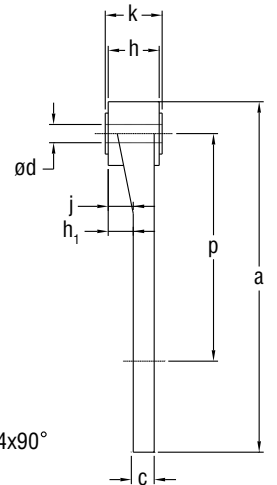
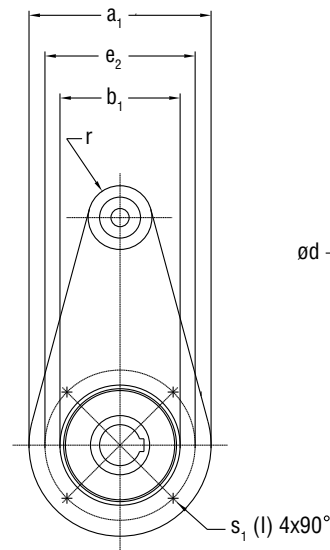
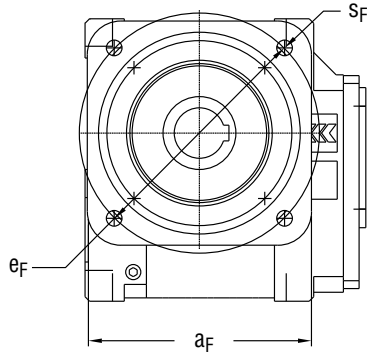
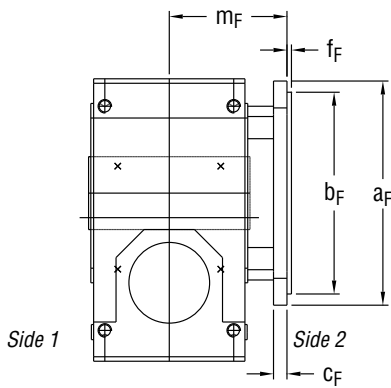


Output Shaft

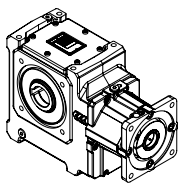


Shrink Disc

## Optional Output Flange or Torque Arm



Drawings Available On:



## Size S.454 - 609

Type	Main Dimensions (in mm)													
	a	a <sub>2</sub>	a <sub>3</sub>	b	b <sub>2</sub>	E	e <sub>2</sub>	f <sub>1</sub>	H	h	h <sub>1</sub>	q <sub>1</sub>	r <sup>(1)</sup>	s
S.454 A,B,S	70	70	34	70	75	96	90	85	140	88	85	52	150	M8x12
S.455 A,B,S	100	85	50	80	90	105	110	105	175	105	92	70	168	M10x15
S.506 A,B,S	125	99.5	62.5	95	110	120	130	125	202	120	102.4	82	228	M10x15
S.507 A,B,S	140	105	65	95	120	120	145	140	220	130	104.4	90	202	M12x18
S.608 A,B,S	155	122.5	77.5	115	140	140	165	160	252	150	128.1	102	231	M12x18
S.609 A,B,S	170	130	80	120	160	150	190	180	270	160	128.1	110	239	M12x18

## Output Options - Hollow Shaft, Solid Shaft, Shrink Disc

Type	Hollow Shaft							Solid Shaft <sup>(*)</sup>							Shrink Disc					
	d <sup>(2)</sup>	d <sup>(3)</sup>	t <sub>H</sub> <sup>(2)</sup>	t <sub>H</sub> <sup>(3)</sup>	u <sub>H</sub> <sup>(2)</sup>	u <sub>H</sub> <sup>(3)</sup>	W <sub>t</sub>	d <sup>(2)</sup>	d <sup>(3)</sup>	l	t <sup>(2)</sup>	t <sup>(3)</sup>	u <sup>(2)</sup>	u <sup>(3)</sup>	Z	b <sub>4</sub>	b <sub>5</sub>	d <sub>H</sub>	D <sub>S</sub>	W <sub>S1</sub>
S.454	1.250	30	1.367	33.3	0.250	8	100	1.000	30	50	1.109	33.0	0.250	8	M10	20	21	36	62	126
S.455	1.375	35	1.518	38.3	0.313	10	109	1.250	35	60	1.362	38.0	0.250	10	M12	20	24	44	80	138
S.506	1.500	40	1.669	43.3	0.375	12	124	1.375	40	70	1.514	43.0	0.313	12	M16	20	25	50	90	155
S.507	1.750	45	1.922	48.8	0.375	14	124	1.750	45	90	1.917	48.5	0.375	14	M16	20	25	50	90	162
S.608	2.000	45	2.098	48.8	0.500	14	144	2.000	45	100	2.218	48.5	0.500	14	M16	30	26	62	110	177
S.609	2.000	50	2.223	53.8	0.500	14	154	2.000	50	100	2.218	53.5	0.500	14	M16	30	28	62	110	215

Note: (1) r value is maximum dimension, actual length might vary.  
 (2) Inch Shaft Option Dimensions  
 (3) Metric Shaft Option Dimensions  
 (\*) Dual output options available

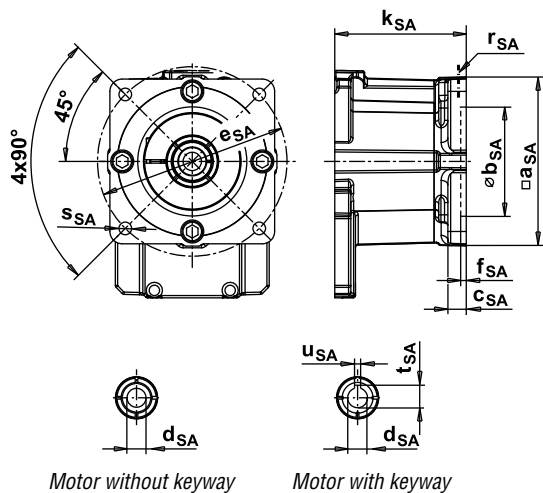
## Optional Output Flange and Torque Arm Dimensions

Type	Optional Output Flange							Optional Torque Arm								
	a <sub>f</sub>	b <sub>F</sub>	c <sub>F</sub>	e <sub>F</sub>	f <sub>F</sub>	m <sub>F</sub>	s <sub>F</sub>	a	a <sub>1</sub>	b <sub>1</sub>	c	d <sub>1</sub>	e <sub>2</sub>	k	p	r
S.454	130	110	10	130	3	80	9	209	114	75	15	12	90	38	130	22
S.455	150	130	10	165	3.5	84.5	11	250	136	92	17	12	110	38	160	22
S.506	150	130	10	165	3.5	102	11	302	160	108	19	12	130	38	200	22
S.507	200	180	12	215	4	102	14	310	176	122	21	12	145	38	200	22
S.608	200	180	12	215	4	105	14	385	200	132	23	20	165	62.5	250	35
S.609	250	230	14	265	4	130	14	393	216	152	23	20	190	62.5	250	35

# Input Adapter Instructions - All Series

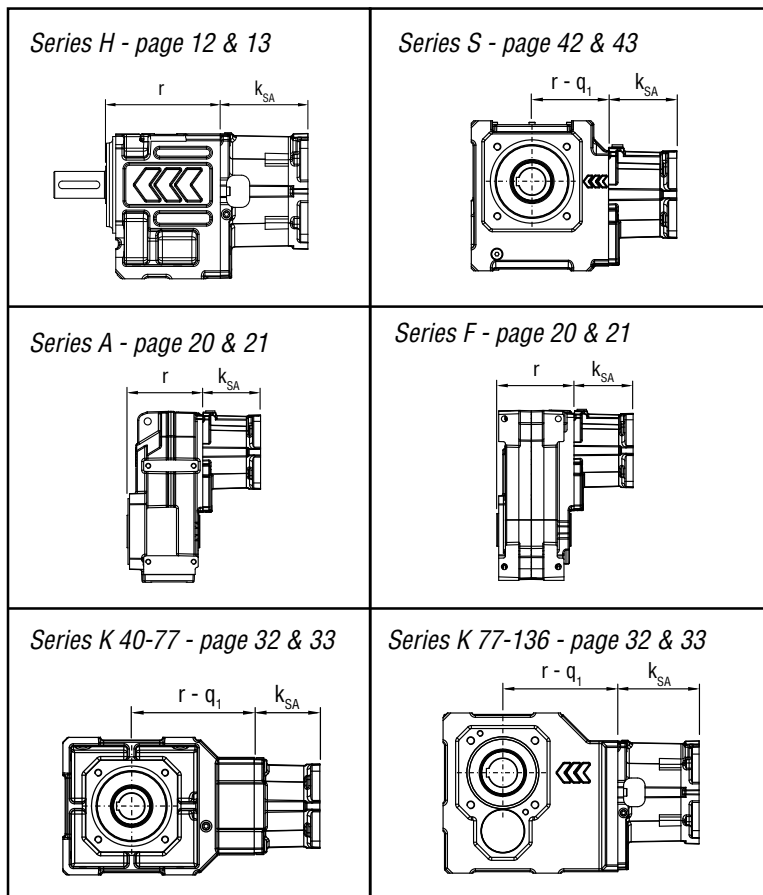
## Adapter Schematic

Select adapter size from gearhead selection tables.



For drawings, please visit [cat4cad.com](http://cat4cad.com) or contact your DieQua representative.

## Overall Gearbox Length



## Adapter Dimensions

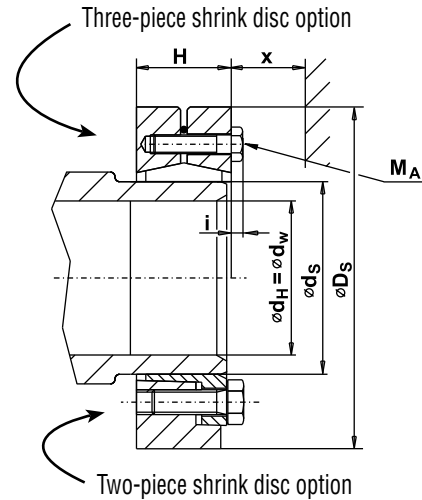
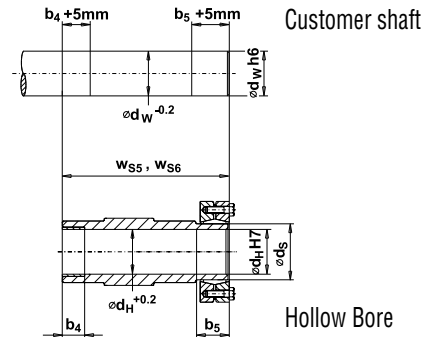
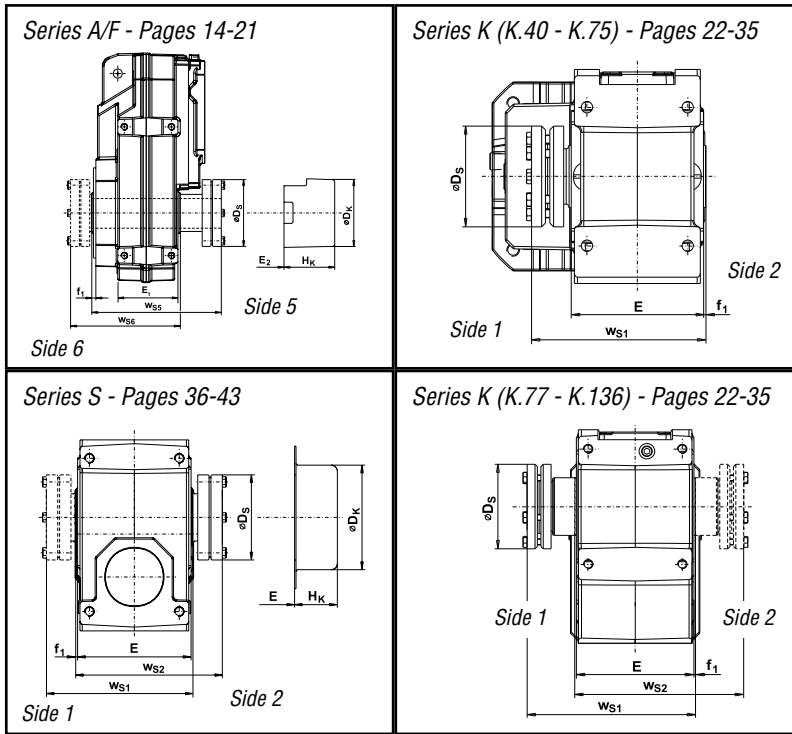
Motor Adapter		Dimensions (in mm)										Motor Shaft Options (in mm)				
		a <sub>SA</sub>	b <sub>SA</sub>	c <sub>SA</sub>	e <sub>SA</sub>	f <sub>SA</sub>	k <sub>SA</sub>	r <sub>KL</sub> <sup>1</sup>	r <sub>PF</sub> <sup>2</sup>	M <sub>A, KI</sub> <sup>3</sup>	M <sub>A, PI</sub> <sup>4</sup>	s <sub>SA</sub>	d <sub>SA</sub>	d x l <sup>5</sup> for motor	t <sub>SA</sub>	u <sub>SA</sub>
A	SA92	116	80H7	11	100	5	92	SW6	SW5	20	9.5	M6	14	14x30	16.3	5
	SA105		95H7		115		92					M8	16	16x40	18.3	5
	SA115		110H7		130		92					M8	19	19x40	21.3	6
	SA130	130	145	7	106	9	22	22x40	24.8	6						
												24	24x50	27.3	8	
B	SA105	143	95H7	16	115	5	118.5	SW8	SW5	48	9.5	M8	19	19x40	21.3	6
	SA115		110H7		130		118.5					M8	24	24x50	27.3	8
													28	28x60	31.3	8
													32	32x58	31.5	10
C	SA142	143	130H7	16	165	6	118.5	SW8	SW5	48	9.5	11	19	19x40	21.3	6
	SA180	190	114,3H7	14	200	5	118.5					13	24	24x50	27.3	8
	SA190	190	180H7		215		118.5					14	28	28x60	31.3	8
													32	32x58	35.3	10
												35	35x79	38.3	10	
													38	38x80	41.3	10
													42*	42x110	-	-
D	SA115	190	110H7	16	130	5	160.5	SW10	SW6	94	20	M8	24	24x50	27.3	8
	SA142		130H7		165		170					M10	28	28x60	31.3	8
	SA190		180H7		215		170					M14	32	32x58	35.3	10
							38					38x80	41.3	10		
													42	42x110	45.3	12
													48*	48x110	-	-
													55*	55x110	-	-

- 1) r<sub>KL</sub> Allen wrench size for motors with smooth shafts.
- 2) r<sub>PF</sub> Allen wrench size for motors with keyed shafts.
- 3) M<sub>A, KI</sub> Tightening torque for motors with smooth shafts in Nm.
- 4) M<sub>A, PI</sub> Tightening torque for motors with keyed shafts in Nm.
- 5) d x l Allowable motor shaft dimensions.

Other motor adapters available upon request



## Shrink Disc Dimensions, by Side 1 or 2



Type	Dimensions (in mm)																						
	b <sub>4</sub>	b <sub>5</sub>	E	E <sub>1</sub>	E <sub>3</sub>	f <sub>1</sub>	f <sub>3</sub>	W <sub>S1</sub> W <sub>S2</sub>	W <sub>S5</sub>	W <sub>S6</sub>	d <sub>H</sub> d <sub>W</sub>	d <sub>S</sub>	D <sub>S</sub>	H	i	M <sub>smax</sub> (Nm)	Ma (Nm)						
A.46	20	21	-	78	92	5	-	-	145	126	30	36	72	24	4	570	12						
A.56		24		82	101				163	138		35	44	80		26		940					
A.66		27		108	136				199	174		40	50	90		28		1440					
A.76		28		118	144				215	187		50	62	110		31		2620					
A.86	30	29	-	149	170	5	-	-	244	214	65	75	138	33	5	3950	30						
A.85				170												7250							
F.111	50	40	-	224	204	5	-	-	323	255	75	90	155	39	6	13000	59						
F.131	60	45		250	250				365	312	90	110	185	50		10		24000	121				
F.137		50		338	338				408	408	105	130	215	53		10		24000	121				
K.40	20	21	96	-	-	2	-	-	126	-	30	36	72	24	4	570	12						
K.50		24	105						138			35	44	80		26		940					
K.60		25	120						155			40	50	90		28		1440					
K.70		26	140						177			50	62	110		31		2620					
K.75	28	150	215																				
K.77	30	150	-	-	-	-	-	-	214	65	75	138	33	5	3950	30							
K.80		29													150		255	75	90	155	39	7250	
K.85	40	36	204	5	-	-	-	-	365	-	90	110	185	50	6	13000	59						
K.110	60	45	250						408							105		130	215	53	10	24000	121
K.136		55	338						105							130		215	53	10	24000	121	
S.454	20	21	96	92	-	-	2	-	126	-	30	36	72	24	4	570	12						
S.455		24	105	100					138			35	44	80		26		940					
S.506		25	120	115					155			40	50	90		28		1440					
S.507		25	120	115					162			50	62	110		31		2620					
S.608	30	26	140	135	177																		
S.609		28	150	145	215	105	130	215	53	10	24000	121											

1 M<sub>a</sub> Required tightening torque.  
 2 M<sub>smax</sub> Maximum permissible output torque in Nm.  
 3 (1) 2 piece shrink disc only.

Dimensions are subject to change without notice.

## Washdown and Corrosion Resistance

Watt Drive offers a wide variety of protection options. Along with 5 different levels of paint protection, including standard primer to multi part epoxies, stainless steel paint and plating options are also available.

Standard shafts can be replaced with stainless steel as a special design at extra cost and delivery time. Chrome plating is an intermediate option for less caustic environments.

Seal protection can be achieved with a variety of materials and designs for special temperature, chemical and washdown applications. Optional shields to deflect direct water spray are also available.

## Explosion-Proof Requirements

Watt Drive servo gearheads can comply with the stipulations contained in EU Directive 94/9/EC for equipment that is intended for use in hazardous locations.

Please contact your DieQua representative for capabilities, instructions and ordering procedures for explosion-proof requirements.

## Custom Designs

Watt Drive offers a wide variety of standard options, customized dimensions and mountings, and in some cases complete special designs.

the application. Special materials, such as ductile iron or stainless steel may be possible for individual components, depending on gearhead model, size, and configuration.

Housing dimensions can be modified, special adapters and flanges can be fabricated, and shaft bores or diameters and lengths can be altered to meet the specific needs of

Contact your DieQua representative to request a customized solution for any special performance or design needs you may have.

## Complete Repair Services

DieQua Corporation is a certified factory service center for all WATT Drive gearboxes and gearheads. DieQua maintains a staff of highly skilled technicians along with a large inventory of spare parts.

After receipt our technicians will inspect and evaluate the unit free of charge. A repair or replacement quote will be generated and sent to your attention. Extensive failure analysis beyond a standard evaluation may require additional costs.

Should a WATT gearhead experience a failure or performance issue in the field, contact your DieQua representative to obtain a Return Material Authorization (RMA) number and return the gearbox freight prepaid to our Bloomingdale IL. factory.

Upon authorization and completion of the repair, the gearbox is inspected to ensure that it meets original factory specifications.

## Gearbox Weights

Notes: (1 kg = 2.20 lbs.)

*Gearbox weight is the estimated maximum value. The actual weight will vary based on ratio, motor adapter size, and lubrication level.*

Standard Inline	
Model	Weight - kg
H.40	7.1
H.50	17.5
H.60	26.5
H.70	32.5
H.80	31.5
H.85	69
H.110	148
H.130	218
H.133	292
H.136	433

Helical Bevel	
Model	Weight - kg
K.40	6
K.50	19
K.60	27.5
K.70	47
K.75	64
K.77	54
K.80	87
K.85	145
K.110	239
K.136	446

Parallel Shaft	
Model	Weight - kg
A.46	12.5
A.56	19
A.66	34
A.76	59
A.86	99
F.111	310
F.131	485
F.137	481

Helical Worm	
Model	Weight - kg
S.454	13
S.455	13
S.506	27
S.507	26
S.608	36.5
S.609	44.5



## Reducer Selection

- 1 - Determine output torque requirement
  - For continuous operation  
 $T_{2N} = \text{input torque} \times \text{ratio} \times \text{efficiency}$
  - For cyclic operation  
 $T_{2N} = \text{input torque} \times \text{ratio} \times \text{efficiency} \times \text{cycle factor}$
- 2 - Verify input speed and motion profile
- 3 - Consider mounting position
- 4 - Provide motor dimensions
- 5 - Determine any radial or axial loads

Cycles/Hr.	Cycle Factor
0 - 1000	1 - 1.25
1000 - 2500	1.25 - 1.5
2500 - 5000	1.5 - 2
Over 5000	2 - 2.5

$T_{2N}$  = continuous torque  
 $T_{2B}$  = peak torque < 5% duty  
 $T_{2E}$  = emergency stop torque

## Input Speeds

The input speed capacities highlighted in this catalog will vary by ratio, size, and actual motion profile. Shaft orientation can also affect input speed. Vertical shafts require higher lubrication levels, reducing speed capacity.

$n_{1mp}$  = continuous speed with vertical input  
 $n_{1max}$  = continuous speed with horizontal input  
 $n_{1cyc}$  = intermittent peak speed (reference only)

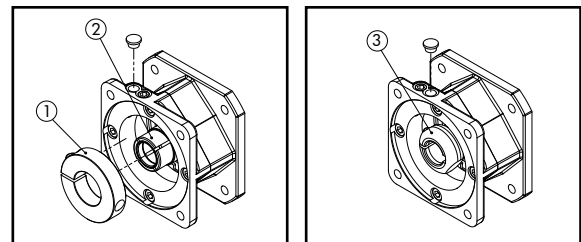
## Gearhead Mounting

The gearheads in this catalog are offered in a wide variety of mounting configurations. All shafts horizontal is the preferred orientation. Vertical shafts require additional lubrication. When rigidly mounting, pilot and shaft alignments are critical.

Series	Mounting Options
H	Face - Foot - Flange
A	Face - Foot - Flange - Shaft - Shrink Disc
K	Face - Foot - Flange - Shaft - Shrink Disc
S	Face - Foot - Flange - Shaft - Shrink Disc

## Motor Mounting

Motor flanges are available for virtually all servo motors. In some instances an adapter plate to accommodate unusual dimensions may be necessary, at additional cost. The standard connection is for motors with smooth bore. An optional connection for motors with keys is available.



For tightening torque, see page 44

## Radial Capacity

The radial load capacity is a function of reducer size ratio, and location of force. When radial loads are present, please consult your representative.

## Drawings and Data Sheets

2D and 3D drawings are available for all models. These can be accessed online at [www.cat4cad.com](http://www.cat4cad.com) Data sheets which include performance, capacity, and inertia specifications can also be created and downloaded from this site.

# Other Servo Gearhead Products

## ServoFoxx



Precision Planetary  
& Bevel Gearheads

## Planetdrive



Economy Inline  
Planetary Gearheads

## Dynabox



Right Angle Precision &  
Economy Gearheads

## Servo Max



Zero Backlash  
Shaft Couplings

## The DieQua Advantage

DieQua Corporation has been a manufacturer and supplier of precision motion control components for over 25 years. We offer the widest range of servo gearhead and speed reducing solutions available from a single source. Featuring right angle and inline designs with multiple backlash precision levels, the largest number of ratios, and several mounting and output options, we have the drive that meets your needs.

### Engineering Support

DieQua Corporation has several decades of combined experience specifying power transmission and motion control components. This assures the proper selection of components and systems for your unique requirements.



### Assembly

DieQua Corporation has a team of factory trained technicians that assemble the majority of the drives we provide. This allows prompt delivery of your production requirements or service repairs.



### Warehousing

DieQua Corporation maintains an extensive inventory of common speed reducer and motor components for quick delivery of small orders, prototypes and spare parts.



### Manufacturing

DieQua Corporation's manufacturing capabilities allow production of many of the components used in the drives we provide. Mounting components and design modifications are also available from our full service machine shop.



**DIEQUA**  
Corporation

Motion Components and Engineering Services

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