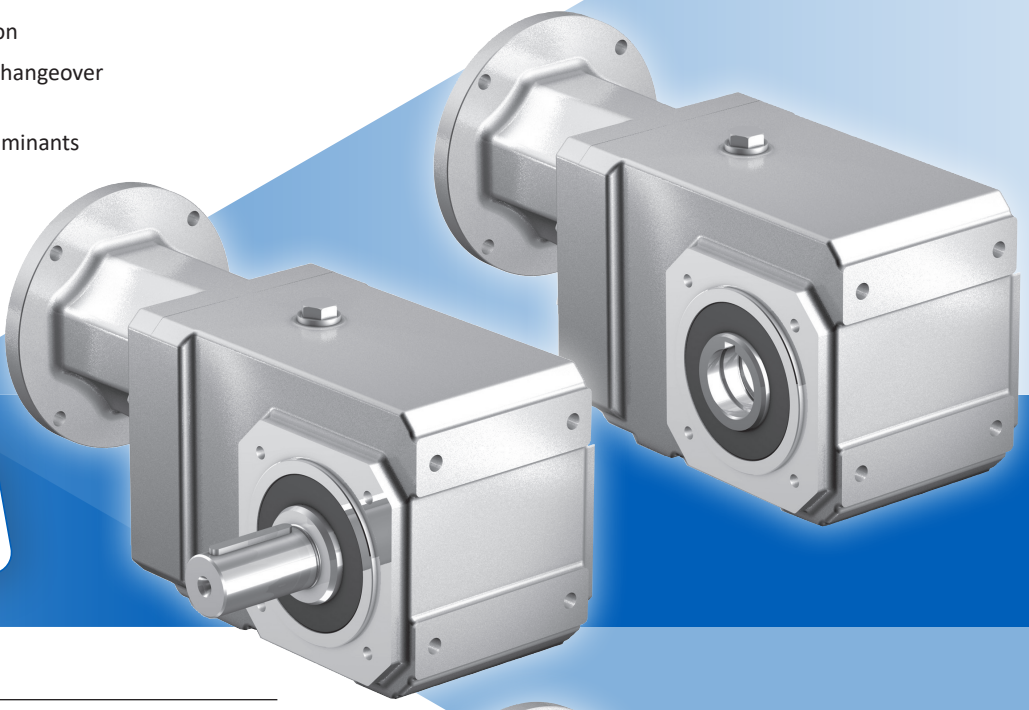
KSS Series: RIGHT ANGLE — Solid Shaft/Hollow Output

KSS Features

- 4:1 to 55:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<53dB(A))
- Extra seal between motor and reducer to prevent ingress
- Totally enclosed – no breather to allow contaminates in or oil out
- Mounting flexibility to fit the application
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

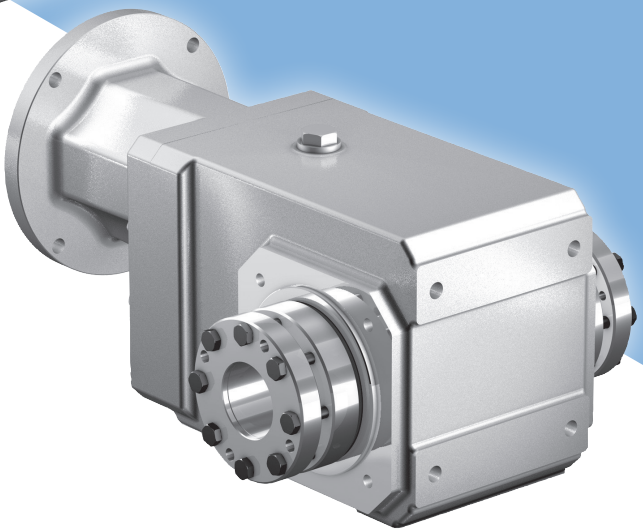
The KSS is the stainless steel version of our K gearbox. Capable of handling the harshest washdowns and requiring zero maintenance, the KSS is ideal for your caustic environments. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

General Specifications

Ambient Temperature	0°C to +40°C (104°F) [Unit temperature <80°C Max]
Backlash	≤10 standard arcmins (see performance overview chart, (page 274)
Coating	Stainless steel housing
Degree of Protection	IP69K
Direction of Rotation	Input and output rotate the SAME direction, see page 275
Efficiency	97%
Input RPM	Up to 6,000 RPM
Installation	Requires 10.9 fasteners for tapped holes housing. See page 288, for more information
Lubrication	Lubricated for life - food grade Mobil SHC CIBUS 220 standard
Mounting Position	Must be specified, see page 275
Warranty	3 year standard warranty



Lubricated for life* - standard Mobil 600XP200, option food grade Mobil SHC CIBUS 220

KSS Series Ordering Options At-a-Glance

Using the **Selection Data** table later in this section, select the KSS Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

Part Number Examples:

1	2	3	4	5	6	7	8		
KSS	1	0	2	V	F	0040	MS1R	E12	*

	Design Option	Part Number Code	Description
1	**Series**	KSS	Stainless steel housing; right angle helical/bevel
2	**Size**	1 2 3	3 sizes of gearhead
3	**Generation**	0	Version of gearhead
4	**# of Stages**	2	Two stage
5	**Output**	V A W	Shaft output (side 3 or 4 only, please specify) Hollow output Double wobble-free bushing
6	**Housing**	F G NG	Round output flange (side 3 or 4 only, please specify) Pitch Circle Diameter (PCD) tapped holes Foot mounting (side 1 or 5 only)
7	**Ratio**	0040	Ratios range from 4:1 to 272:1 (0040=4:1; 0272=272:1)
8	**Motor Adapter**	MS1R MS2R MS3R	3 input sizes (see also motor mounting plate option) (See “Motor Mounting Plate Option”, page 275)
*	**Mounting Position**	E12, E34 EL5, EL6	Please specify. Required special instruction for all units (See “KSS Mounting Position Options”, page 275)

Options

Lubrication

- KSS Series comes standard with food grade lubrication; optional synthetic available. Contact STOBER for details.

KSS Performance Overview

KSS Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

			Size/Generation	KSS10	KSS20	KSS30
			# of Stages	2	2	2
Acceleration Torque M_{2BMAX}			Nm	135	220	385
Output Torque Nom. M_{2N}			Nm	119	200	350
Torsional Stiffness C_2			Nm/arcmin	≤5.8	≤8.1	≤9.6
Torsional Backlash [1] $\Delta\phi$			arcmin	≤12	≤10	≤10
Input Speed Max. n_{1MAX}	Continuous		EL1, 2, 5, 6	4000	4000	3500
			EL3, 4	4000	3900	3500
	Cyclic			6000	5500	5000
Efficiency (@nom torque)			%	97	97	97
Weight			kg lbs	13.1 29	18.1 40	30.4 67
Noise [2]			dB(A)	≤53		
Axial Load Max. F_{2AMAX}			N	1900	2100	2400
Radial Load Max. [3] F_{2RMAX}			N	5000	6000	7000
Tilting Moment Max. [3] M_{2KMAX}	Solid Shaft		Nm	360.	430	525
	Hollow Bore		Nm	240	310	380

[1] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[2] *Measurement at one (1) meter distance with input speed (n_1) of 2000 RPM.*

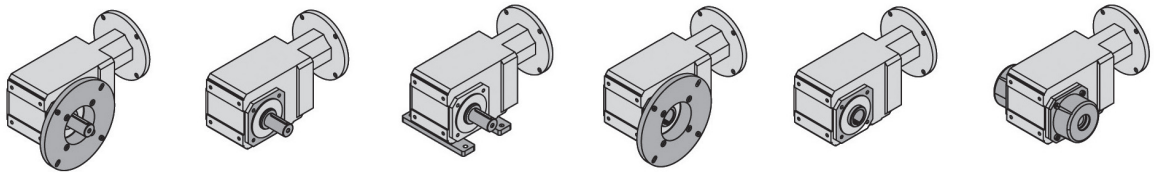
[3] *Rating based on output speed (n_2) of 20 RPM. For values at other speeds see page 276*

KSS Series Output Options

Diameters in **BOLD BLUE** are configurations readily available from inventory. Contact STOBER for delivery on other output sizes.

	"V" Solid Shaft (Stainless Steel – Inches)	"A" Hollow Bore (Stainless Steel – Inches)	"WFBSS" Double Side Bushings Stock Bore (Stainless Steel – Inches)
KSS1	**1.000**	**1.000**	**1.000**
KSS2	**1.250**	**1.250**	1.000 1.1875 **1.250** 1.375 **1.4375** **1.500**
KSS3	**1.250**	**1.375**	1.000 1.1875 **1.250** 1.375 **1.4375** **1.500**

** Stainless steel options are ideal for food and corrosion resistant, harsh washdown environments.*



Design Option						
Output	**V** Solid Shaft	**V** Solid Shaft	**V** Solid Shaft	**A** Hollow	**A** Hollow	**W** Double Bushing
Housing	**F** Round Flange	**G** Tapped Holes	**NG** Foot Mount	**F** Round Flange	**G** Tapped Holes	**G** Tapped Holes

KSS Series Motor Mounting Plate Option (Motor information required with Motor Adapter option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

NOTE: When ordering a gearhead:

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

Customer Required Dimensions for Properly Sized Motor Mounting Plate

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

d2	Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.)	s6	Bolt Diameter
		l5	Motor Shaft Length
b6	Pilot Diameter	f6	Pilot Length
e6	Bolt Circle Diameter	a6	Square Flange (Optional – motor plate will typically be made to match this dimension.)

Overhung Load Calculations

Pulling forces or overhung load of pulleys, sheaves, sprockets, etc. on the reducer output shaft must not exceed the allowable limits shown in the load/life/speed calculations, page page 276.

Note: Overhung load is measured at the center of the shaft extension. No overhung load is encountered when a reducer is flange mounted and/or coupling connected to another unit. However, the shafts of all components must be accurately aligned and secured to prevent pre-loading of the bearings and premature bearing failure.

Use the following formula to determine actual overhung load for a given drive:

$$\text{Imperial OHL (lbs)} = \frac{126{,}000 \times HP \times K}{D \times n}$$

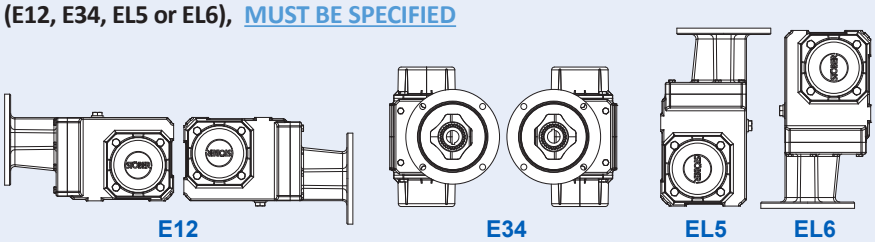
$$\text{Metric OHL (N)} = \frac{19{,}100 \times kW \times K}{D \times n}$$

Where:

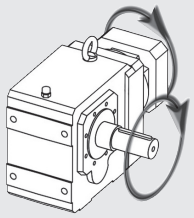
OHL	Overhung load (N or lbs)
HP	Horsepower
kW	Transmitted Kilowatt
D	Pitch Diameter (inches or meters) of Sprocket, Gear, Sheave, Pulley, etc.
n	Maximum Shaft RPM
K	1.00 Single Chain Drive; 1.25 Timing Belt Drive; 1.25 Spur or Helical Gear Drive; 1.50 V-Belt Drive; 2.50 Flat Belt Drive

KSS Mounting Position Options

When ordering, the mounting position (E12, E34, EL5 or EL6), MUST BE SPECIFIED

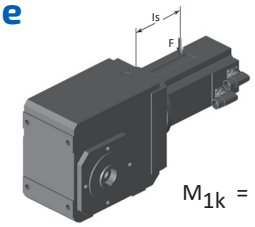


KSS Direction of Rotation



Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "l_S" of the motor.



$$M_{1k} = F \times l_S \leq M_{1K}$$

M_{1K}	MS1R	MS2R	MS3R
Nm	25	60	125

Permissible Output Shaft Load and Tilting Moments*

	V Solid Shaft Output [1]				A, S, W Hollow Output [2]		
Unit	Z_2 mm	F_{2A} N	F_{2R} N	M_{2K} Nm	Z_2 mm	F_{2A} N	M_{2K} Nm
KSS1	40	1900	5000	360	40	1900	240
KSS2	42	2100	6000	430	42	2100	310
KSS3	45	2400	7000	525	45	2400	380

** Refer to illustration and definitions below.*

[1] For DOUBLE output shaft: F_{2R} x 0.7

[2] Values shown for "W" Style are for double bushings. For single bushings use value M_{2K} x 0.5 and F_{2A} x 0.5

[3] Solid Shaft unit with a Flange – Z_2 value is 132mm/5.20"; F_{2R} value is 64,000N/14,400 lbs.

KSS Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 20 RPM. For higher speeds the following applies, where n_2 is the desired speed:

$$F_{2AX} = \frac{F_{2A}}{\sqrt[3]{\frac{n_2}{20}}} \qquad F_{2RX} = \frac{F_{2R}}{\sqrt[3]{\frac{n_2}{20}}} \qquad M_{2KX} = \frac{M_{2K}}{\sqrt[3]{\frac{n_2}{20}}}$$

The application output tilting moment should be determined by the following formula:

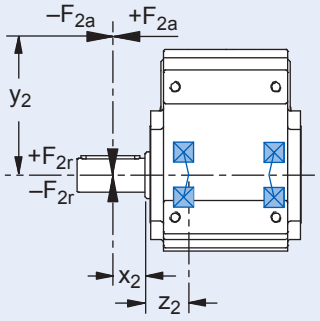
$$M_{2A} = \frac{2 \bullet F_{2a} \bullet y_2 + F_{2rb} \bullet (x_2 + Z_2)}{1000} \leq M_{2K}$$

Where:

Z_2	Distance of Shaft Shoulder to Center of Output Bearing	$F_{2rad100}$	Permitted Radial Force ≤100RPM
n_2	Actual Average Output Speed	$F_{2rad,acc}$	Radial Acceleration Force
X_2	Distance of the Shaft Shoulder to the Force Application Point	$F_{2rad,acc*}$	Radial Acceleration Force at Gear Unit Output
Y_2	Distance of the Shaft Axis to the Axial Force Application Point	M_{2K100}	Permitted Tilting Torque ≤100RPM
F_{2ax*}	Actual Axial Force at Gear Unit Output	$M_{2K,acc}$	Permitted Acceleration Tilting Torque
F_{2ax100}	Permitted Axial Force	$M_{2k,acc*}$	Permitted Acceleration Tilting Torque at Gear Unit Output
		C_{2K}	Tilting Stiffness

All formulas shown are based on METRIC values

Upper case letters are permissible values. Lower case letters are for existing values.



Reducer Ratio (i)		Output Torque			Backlash	Part Number* (Gearhead + Input)	Max. Input Speed RPM (n1)			Input Inertia	Tors. Stiffness
		Nom. [1] M_{2N}	Accel. M_{2acc}	Peak [2] M_{2NOT}	$\Delta\phi_2$		Continuous		Cyclic	J_1	C_2
Nom.	Exact	Nm	Nm	Nm	arcmin		EL 1,2	EL 3,4,5,6	All	kgcm²	Nm/ arcmin
KSS1											
4.000	4/1	42	42	52	≤12	KSS102_0040 MS1R	3300	2800	4500	1.4	2.8
5.568	1520/273	58	58	72	≤12	KSS102_0056 MS1R	3300	2800	4500	1.3	4.3
6.644	299/45	64	64	80	≤12	KSS102_0066 MS1R	3600	3300	5000	1.0	3.5
9.249	1748/189	76	90	112	≤12	KSS102_0092 MS1R	3600	3300	5000	0.9	5.2
10.14	507/50	79	91	114	≤12	KSS102_0100 MS1R	4000	3800	5500	0.8	3.8
14.11	494/35	88	127	158	≤12	KSS102_0140 MS1R	4000	3800	5500	0.8	5.5
16.71	117/7	93	125	172	≤12	KSS102_0165 MS1R	4000	4000	6000	0.7	4.0
20.15	403/20	99	125	199	≤12	KSS102_0200 MS1R	4000	4000	6000	0.7	4.0
23.27	1140/49	104	135	239	≤12	KSS102_0230 MS1R	4000	4000	6000	0.7	5.7
25.22	1261/50	96	115	192	≤12	KSS102_0250 MS1R	4000	4000	6000	0.6	4.0
28.05	589/21	111	135	240	≤12	KSS102_0280 MS1R	4000	4000	6000	0.7	5.7
33.71	4719/140	73	88	146	≤12	KSS102_0340 MS1R	4000	4000	6000	0.6	4.0
35.11	3686/105	119	135	240	≤12	KSS102_0350 MS1R	4000	4000	6000	0.6	5.8
40.30	403/10	61	74	96	≤12	KSS102_0400 MS1R	4000	4000	6000	0.6	4.1
46.92	2299/49	102	122	203	≤12	KSS102_0470 MS1R	4000	4000	6000	0.6	5.8
56.10	1178/21	86	103	133	≤12	KSS102_0560 MS1R	4000	4000	6000	0.6	5.8
KSS2											
4.000	4/1	103	171	245	≤10	KSS202_0040 MS2R	3000	2600	4000	3.7	3.9
5.177	2107/407	113	190	308	≤10	KSS202_0052 MS2R	3000	2600	4000	2.9	4.7
7.118	2107/296	125	211	400	≤10	KSS202_0071 MS2R	3000	2600	4000	2.6	6.4
8.397	2494/297	132	220	400	≤10	KSS202_0084 MS2R	3500	3100	4500	2.0	5.7
10.07	2881/286	141	220	400	≤10	KSS202_0100 MS2R	3500	3500	5000	1.8	6.0
11.55	1247/108	147	220	400	≤10	KSS202_0115 MS2R	3500	3100	4500	1.9	7.4
12.71	559/44	152	220	400	≤10	KSS202_0125 MS2R	3500	3500	5000	1.6	6.2
13.85	2881/208	156	220	400	≤10	KSS202_0140 MS2R	3500	3500	5000	1.7	7.6
17.47	559/32	169	220	400	≤10	KSS202_0175 MS2R	3500	3500	5000	1.6	7.8
20.33	1118/55	178	220	400	≤10	KSS202_0200 MS2R	3500	3500	5000	1.4	6.5
25.13	1935/77	191	220	400	≤10	KSS202_0250 MS2R	3500	3500	5000	1.3	6.5
27.95	559/20	197	220	400	≤10	KSS202_0280 MS2R	3500	3500	5000	1.4	8.0
33.62	1849/55	154	185	308	≤10	KSS202_0340 MS2R	3500	3500	5000	1.3	6.6
34.55	1935/56	200	220	400	≤10	KSS202_0350 MS2R	3500	3500	5000	1.3	8.1
46.23	1849/40	200	220	400	≤10	KSS202_0460 MS2R	3500	3500	5000	1.3	8.1

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*

[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*

* *Motor adapter code (shaft diameter max - mm): MS1R (19), MS2R (24), MS3R (28)*

Reducer Ratio (i)		Output Torque			Backlash	Part Number* (Gearhead + Input)	Max. Input Speed RPM (n1)			Input Inertia	Tors. Stiffness
		Nom. [1]	Accel.	Peak [2]			Continuous		Cyclic		
		M_{2N}	M_{2acc}	M_{2NOT}	$\Delta\phi_2$					J_1	C_2
Nom.	Exact	Nm	Nm	Nm	arcmin		EL 1,2	EL 3,4,5,6	All	kgcm²	Nm/ arcmin
KSS3											
4.000	4/1	155	171	253	≤10	**KSS302_0040 MS3R**	2700	2300	3800	6.4	4.5
5.375	43/8	200	229	326	≤10	**KSS302_0054 MS3R**	2700	2300	3800	4.5	5.7
7.391	473/64	222	315	448	≤10	**KSS302_0074 MS3R**	2700	2300	3800	3.9	7.5
8.444	2322/275	232	360	479	≤10	**KSS302_0084 MS3R**	3200	2800	4200	2.8	7.1
10.14	3010/297	247	385	554	≤10	**KSS302_0100 MS3R**	3500	3100	5000	2.4	7.4
11.61	1161/100	258	385	659	≤10	**KSS302_0115 MS3R**	3200	2800	4200	2.6	8.6
12.58	3182/253	265	385	661	≤10	**KSS302_0125 MS3R**	3500	3100	5000	2.1	7.8
13.94	1505/108	274	385	700	≤10	**KSS302_0140 MS3R**	3500	3100	5000	2.3	8.9
16.94	559/33	293	385	700	≤10	**KSS302_0170 MS3R**	3500	3500	5000	1.7	8.1
17.29	1591/92	295	385	700	≤10	**KSS302_0175 MS3R**	3500	3100	5000	2.0	9.2
20.28	3569/176	311	385	700	≤10	**KSS302_0200 MS3R**	3500	3500	5000	1.6	8.2
23.29	559/24	325	385	700	≤10	**KSS302_0230 MS3R**	3500	3500	5000	1.7	9.4
25.26	3612/143	334	385	489	≤10	**KSS302_0250 MS3R**	3500	3500	5000	1.5	8.3
27.88	3569/128	346	385	700	≤10	**KSS302_0280 MS3R**	3500	3500	5000	1.6	9.5
33.62	1849/55	250	300	501	≤10	**KSS302_0340 MS3R**	3500	3500	5000	1.4	8.3
34.73	903/26	350	385	672	≤10	**KSS302_0350 MS3R**	3500	3500	5000	1.5	9.5
40.51	4902/121	193	231	376	≤10	**KSS302_0410 MS3R**	3500	3500	5000	1.3	8.4
46.23	1849/40	344	385	688	≤10	**KSS302_0460 MS3R**	3500	3500	5000	1.4	9.6
55.71	2451/44	265	318	517	≤10	**KSS302_0560 MS3R**	3500	3500	5000	1.3	9.6

[1] Maximum torque for continuous input 1500 RPM - horizontal output position.

[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)

** Motor adapter code (shaft diameter max - mm): MS1R (19), MS2R (24), MS3R (28)*