

Strain Wave Gear

Product Catalog





Elitewave

Elitewave is the core sub-brand under flag of **KOFON** Motion Group. The Elitewave focuses on the strain wave gear technology and manufacturing. It is dedicated to serve global automation customers with high level strain wave gear products and professional motion technical service.

- The strain wave gears are the unique gearing playing important roles in the industrial and scientific technologies field like robots, semiconductor manufacturing systems, medical equipment, factory automation equipment, measuring equipment, printing machines
- Furthermore, the strain wave gears also offer many advantages in various applications of electro-mechanical products units that require high precision motion control.
- Kofon Motion Technology is dedicated to offering global customers high precision motion mechanical gearing solutions.

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The History

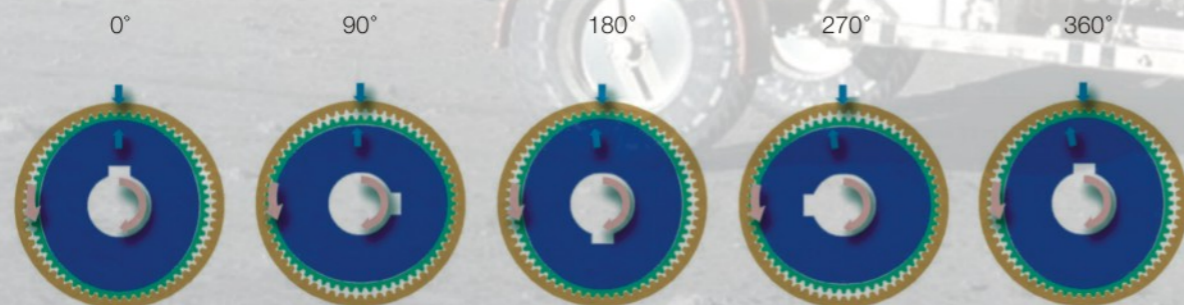
The strain wave gear was invented by Walton Musser in 1957. It was firstly applied in the electrically-driven wheels of the Apollo Lunar Rover. Through 60 years development, now in various applications in high level industry.

The Operational Principle

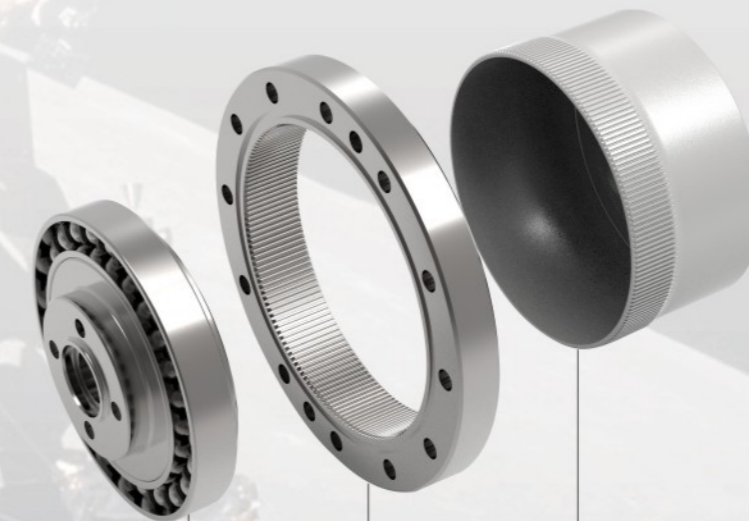
The flex-spline is slightly smaller in diameter than the circular-spline resulting in it having two fewer teeth on its circumference. It is held in an elliptical shape by the wave-generator and its teeth engage with the teeth of the circular-spline across the major axis of the ellipse.

When the wave-generator starts to rotate clockwise, the zone of tooth engagement travels with the major elliptical axis. When the wave-generator has turned through 180 degrees clockwise the flex-spline has regressed by one tooth relative to the circular-spline. Each turn of the wave-generator moves the flex-spline two teeth anti-clockwise relative to the circular-spline.

As its unique operational principle applying elastodynamics of metals, the strain wave gear tooth behavior can achieve free backlash motion and high positioning repeat-ability. More than 30% of all teeth engages in two locations in 180° symmetry to reach high efficiency and high torque capability.



The Components



Wave-Generator

The wave-generator is a thin-raced ball bearing fitted onto an elliptical cam. Normally it is mounted onto the input shaft. The output cam can be customized as per the specific application request.

Flex-Spline

The flex-spline is a non-rigid, thin cylindrical cup with external teeth on a slightly smaller diameter than the circular-spline. It fits over and is held in an elliptical shape by the wave-generator.

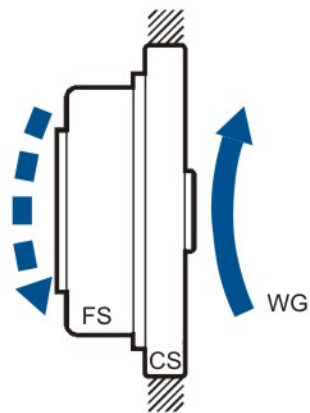
Circular-Spline

The circular-spline is a rigid ring with internal teeth, engaging the teeth of the flex-spline across the major axis of the wave-generator. The circular-spline has two more teeth than the flex-spline and is mounted onto housing.

Driving Arrangement

Numerous differential functions can be obtained by combinations of the speed and rotational direction of the three basic elements.

Reduction Gearing System

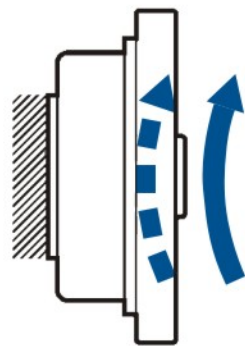


- 1) Reduction Gearing System
Wave-Generator (WG): Input
Circular-Spline (CS) : Fixed
Flex-Spline (FS): Output

$$i = \frac{-1}{R} = \frac{Z_r - Z_g}{Z_r} = \frac{-2}{Z_r}$$

i: ratio
Z_r: FS teeth number
Z_g: CS teeth number

Input and output rotate in opposite directions.

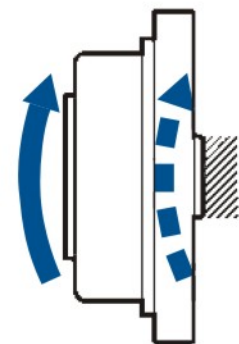


- 2) Reduction Gearing System
Wave-Generator (WG): Input
Circular-Spline (CS) : Output
Flex-Spline (FS): Fixed

$$i = \frac{1}{R+1} = \frac{1}{0.5Z_r + 1}$$

i: ratio
Z_r: FS teeth number
Z_g: CS teeth number

Input and output rotate in the same direction.



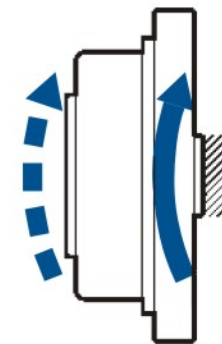
- 3) Reduction Gearing System
Wave-Generator (WG): Fixed
Circular-Spline (CS) : Output
Flex-Spline (FS): Input

$$i = \frac{R}{R+1} = \frac{0.5Z_r}{0.5Z_r + 1}$$

i: ratio
Z_r: FS teeth number
Z_g: CS teeth number

Input and output rotate in the same direction.

Speed Increaser Gearing System

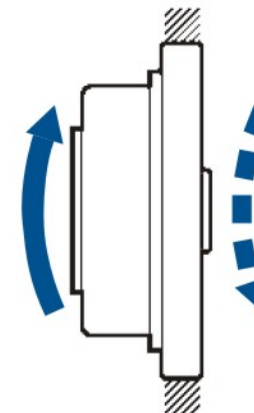


- 1) Speed Increaser Gearing System
Wave-Generator (WG): Fixed
Circular-Spline (CS) : Input
Flex-Spline (FS): Output

$$i = \frac{R+1}{R} = \frac{0.5Z_r + 1}{0.5Z_r}$$

i: ratio
Z_r: FS teeth number
Z_g: CS teeth number

Input and output rotate in the same direction.

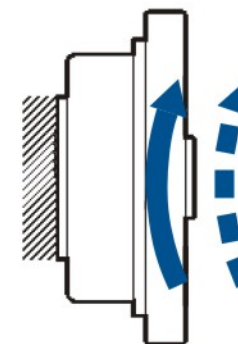


- 2) Speed Increaser Gearing System
Wave-Generator (WG): Output
Circular-Spline (CS) : Fixed
Flex-Spline (FS): Input

$$i = -R = 0.5Z_r$$

i: ratio
Z_r: FS teeth number
Z_g: CS teeth number

Input and output rotate in opposite directions.



- 3) Speed Increaser Gearing System
Wave-Generator (WG): Output
Circular-Spline (CS) : Input
Flex-Spline (FS): Fixed

$$i = R + 1 = 0.5Z_r + 1$$

i: ratio
Z_r: FS teeth number
Z_g: CS teeth number

Input and output rotate in same directions.

The Advantages

Since power is transmitted through multiple tooth engagement, strain wave gear offers high output torque capacity.

Strain wave gears exhibit very high torsional stiffness over the whole torque range, as well as almost linear hysteresis behaviour.

Strain wave gear are backlash-free. Positioning accuracy can be within one arc-min. Repeatability accuracy can be within 5 arc-sec.

Strain wave gearing the teeth come in contact with an almost pure-radial motion, and have essentially zero sliding velocity, even at high input speeds. This results in minimal wear and long operating life.

Strain wave gear units are reversible and can be used for speed increase as well as speed reduction.

High efficiency is available up to 85 %.

With only three elements high single stage reduction ratios ranging from 50:1 to 320:1 can be achieved.

The strain wave gears can provide the option of a central hollow shaft which can be used to pass cables, shafts through the centre of the gear.

Industrial Applications

Robots



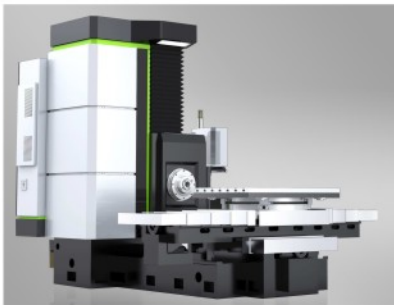
Machine

- Industrial robots
- Robot peripheral equipment
- Collaborative robots
- Scara robots

Applications

- Indirect drive
- Hand drive
- Traveling shaft drive
- Precision joint drive

Metal Tooling Machines



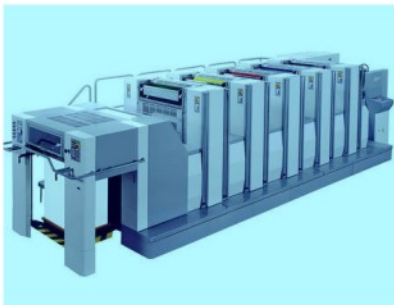
Machine

- Machining center
- Grinding machine
- EDM systems

Applications

- Tool revolver drive
- Tool change drive
- Tool Magazine drive
- Work positioning drive
- Rotary table drive
- Tool positioning device drive
- Direct transmission shaft drive
- Other shaft drive

Printing and Paper Processing Machines



Machine

- Printing machine
- Folding machine
- Paper changing machine

Applications

- Tension controller
- Cutting blade positioning device
- Phase adjusting device
- Paper surface/back controlling device
- Roller position adjusting device
- Roller height adjustment device

Semiconductor Manufacturing Systems



Machine

- Mask manufacturing equipment
- Reticule manufacturing equipment
- Wafer fabrication system
- Wafer processing system
- Assembly system
- Inspection system
- Work transfer system

Applications

- Transfer system
- Positioning drive
- Indexing table
- Direct transmission table
- Work reversing device
- Tension controller device
- Hatch open/close drive

Measurement, Analytical and Test Systems



Machine

- Photometric equipment
- Three dimensional measuring instrument
- Metal tensile test machine

Applications

- Transfer system
- Positioning drive
- Prism positioning drive
- Indexing table
- Work reversing device

Medical Equipments



Machine

- Medical Equipments
- Three-dimensional manipulator
- X-ray photography system
- CT system
- X-ray film developing machine
- X-ray film take-off machine
- Surgical operation assistant robot

Applications

- Precision joint drive
- Bed lifting drive
- Bed inclination drive
- Positioning table drive

Optical Machines



Machine

- X-ray analytical system
- Optical component inspection system
- Laser oscillation machine
- Optical measuring instrument
- Surface inspection system
- Optical disc manufacturing system
- Laser marker machine

Applications

- Positioning table drive
- Lens positioning drive
- Laser mirror drive
- Prism drive
- Probe drive
- Sensor positioning drive

Crating and Packing Machines



Machine

- Sealing machine
- Label printing machine
- Label attaching machine
- Packing robot
- Work transfer system

Applications

- Shaft synchronizing drive
- Roll synchronizing drive
- Joint drive
- Trolley drive

Wood, Light Metal and Plastic Tooling Machine



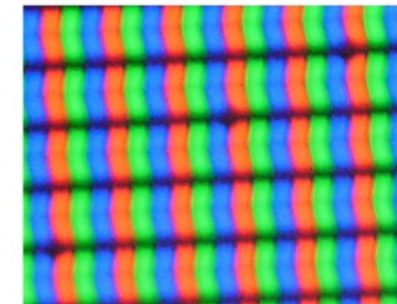
Machine

- Wood working machine
- 5 axis machining center
- Large 3D processing machine
- Work transfer system

Applications

- Milling head drive
- Tool revolver drive
- Tool changer drive
- Tool magazine drive
- Work positioning device
- Rotray table drive
- Tool positioning device drive
- Direct transmission shaft drive
- Other shaft drive

Flat Panel Display Manufacturing Systems



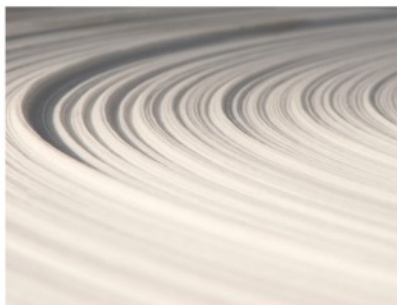
Machine

- Array process equipment
- Cell process equipment
- Assembly process equipment
- Work transfer system

Applications

- Transfer system
- Parts positioning drive
- Indexing table
- Direct transmission table
- Work reversing device
- Tension controller
- Hatch open/close drive
- Joint drive
- Trolley drive

Paper Making Machine



Machine

- Paper making machine
- Corrugated fiberboard box making machine
- Corrugated fiberboard box printing machine

Applications

- Coating process roller positioning drive
- Paper thickness adjusting mechanism drive
- Cutter knife positioning
- Cutter knife traveling drive

PCB (Printed Circuit Board) Manufacturing Machines



Machine

- Electronic component insertion machine
- Cream solder printing machine
- Dispensers
- Board inspection systems
- Transfer system

Applications

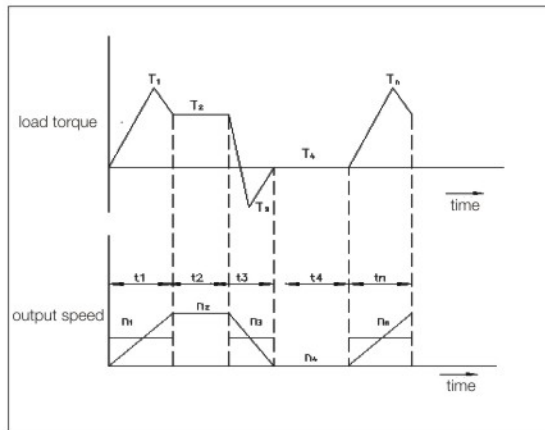
- Milling head drive
- Tool revolver drive
- Tool changer drive
- Tool magazine drive
- Work positioning device
- Rotray table drive
- Tool positioning device drive
- Direct transmission shaft drive
- Other shaft drive

Selection Guide

Large torque applies at the starting and stopping moment of the gear. In addition, during normal operation, there might be unexpected impact torque. In order to confirm gear size and ratio, those dynamic load torques have to be converted to an average torque.

Load Torque Characteristics

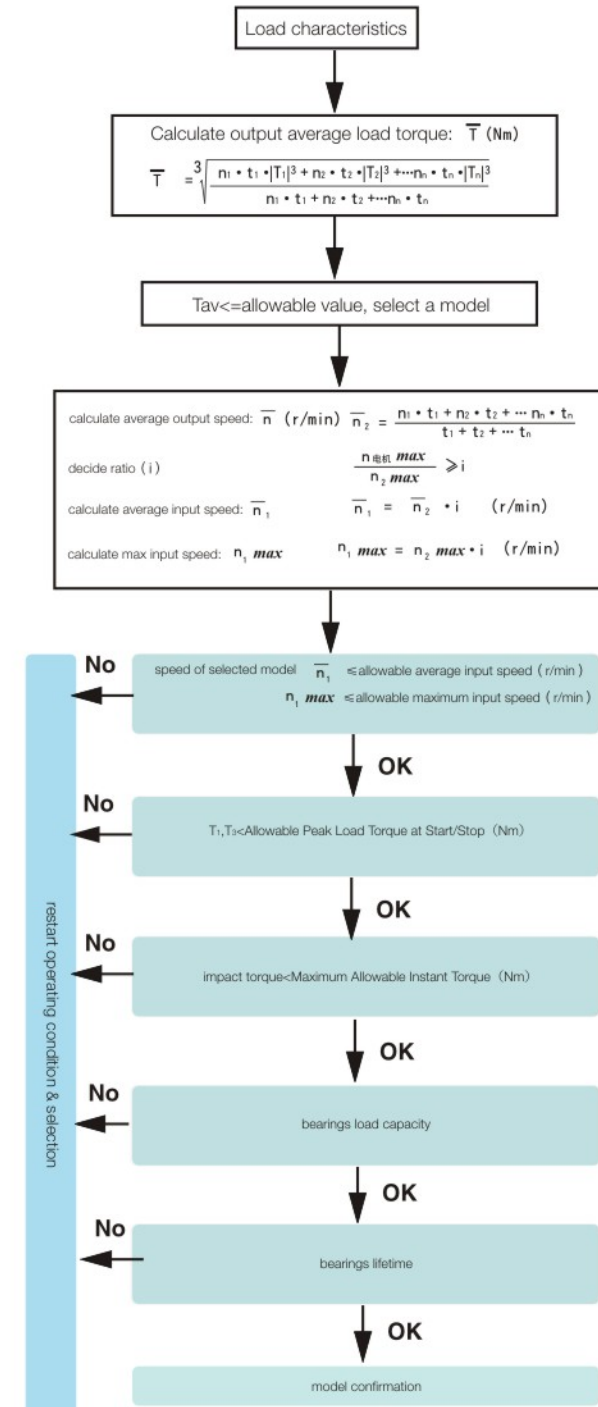
Calculation of average load torque and average output speed.



Flow Chart of Selection

Please use the chart below for size selection.

Any parameter exceeding rated performance results in a different size or changing load torque.



Calculation Instruction

Parameters:
Load Torque T_n (Nm)
Time t_n (sec)
Output Speed n_n (r/min)

Symbols:
Acceleration T_1, t_1, n_1
Normal Operation T_2, t_2, n_2
Deceleration T_3, t_3, n_3
Dwell T_4, t_4, n_4

Max output speed $n_2 \text{ max}$
Max input speed $n_1 \text{ max}$
Reduction ratio i

Terms and Definitions

Rated Speed

Allowable continuous load torque at rated input speed of 2000r/min.

Allowable Peak Load Torque at Start/Stop

During acceleration and deceleration, due to moment of inertia of loads, additional loads larger than normal torque could apply to the gear. The allowable value of this peak torque is indicated in performance table.

Maximum Allowable Average Load Torque

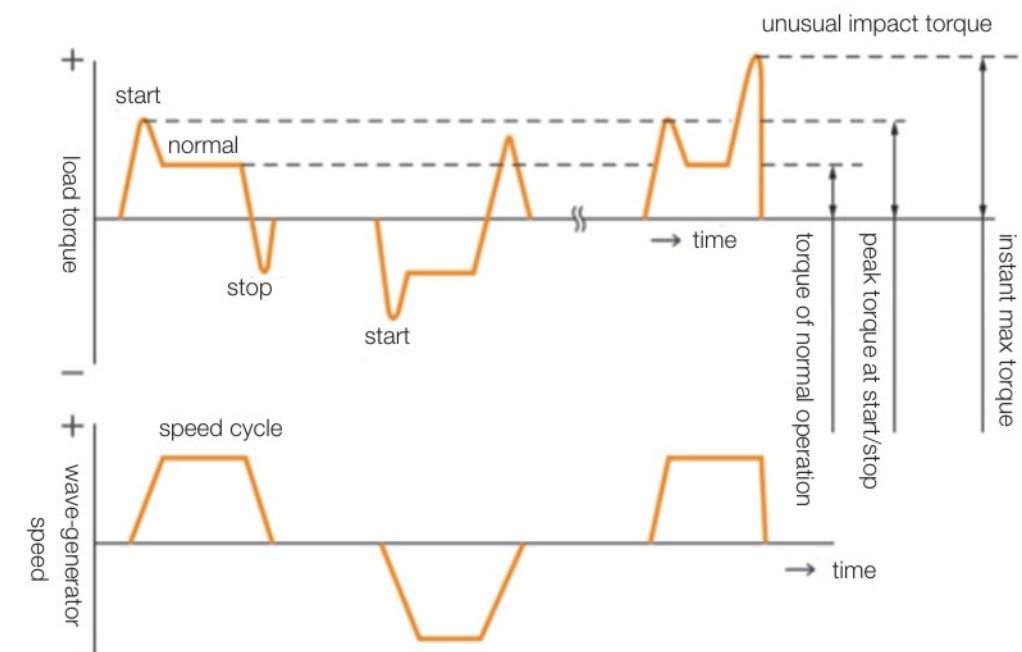
As of various load torque and input speed, an average value has to be calculated. Allowable value is indicated in performance table. Please be careful, as grease deterioration and gear wear may occur due to heat, if average value exceeds allowable maximum value.

Maximum Allowable Instant Torque

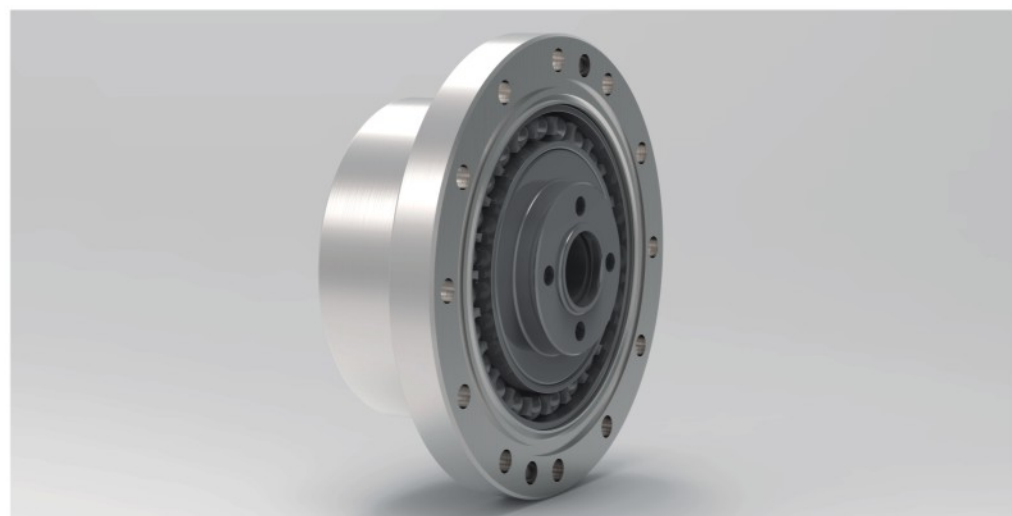
There might be external unexpected impact torque. Allowable value of this torque is indicated in performance table. Also, there is a limit of applying frequency of impact torque.

Allowable Maximum Input/Average Speed

Please note that input speed must not exceed the allowable value indicated in the performance table.



Strain Wave Gear KC-MC Series Component Kit Motor shaft closed flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

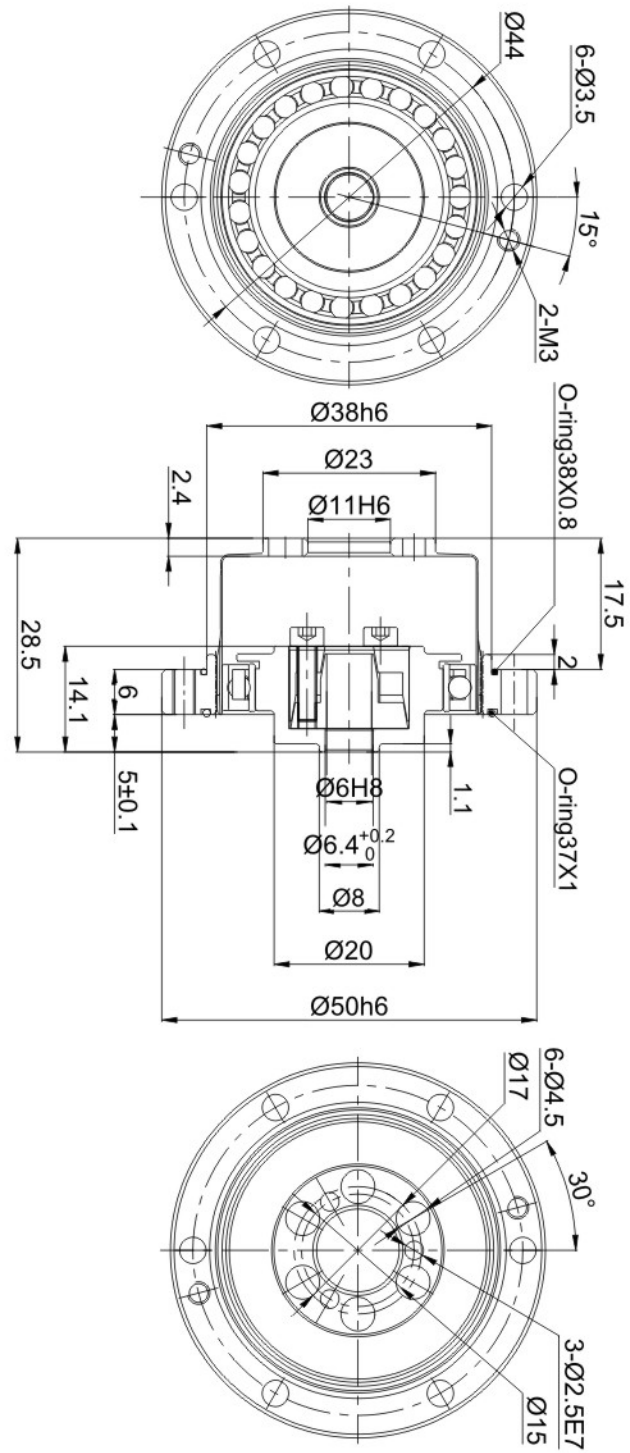
Gear Series	Transmission Type	Gear Size	Ratios				Special Design	
KC	MC	14	50	80	100		as per customers' special requirements	
		17	50	80	100	120		
		20	50	80	100	120		160
		25	50	80	100	120		160
		32	50	80	100	120		160
Ordering Code								
KC-MC		-	25	-	100	-	SP	

Technical Specifications

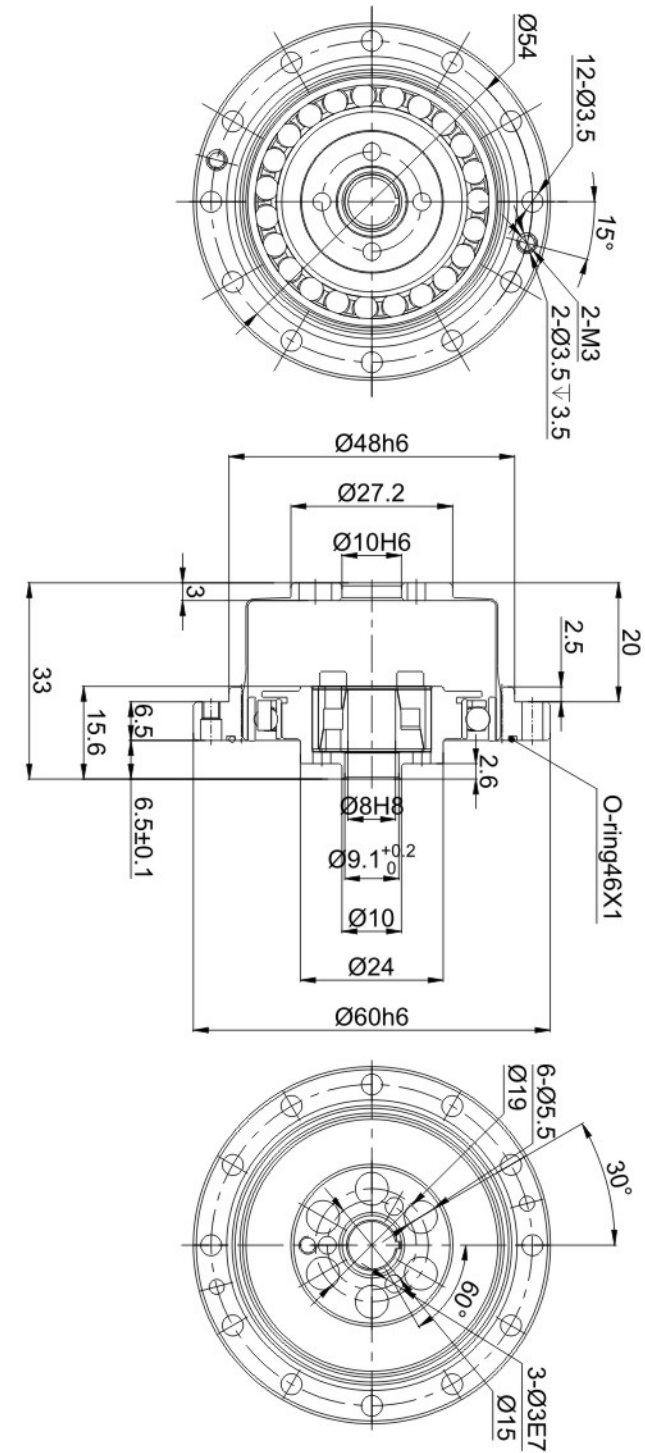
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KC-MC	14	50	18	6,9	5,4	35	8500	3500	0.33x10 ⁻⁴	0.09
		80	23	11	7,8	47				
		100	28	11	7,8	54				
	17	50	34	26	16	70	7300	3500	0.79x10 ⁻⁴	0.14
		80	43	27	22	87				
		100	54	39	24	108				
		120	54	39	24	86				
	20	50	56	34	25	98	6500	3500	0.193x10 ⁻⁴	0.23
		80	74	47	34	127				
		100	82	49	40	147				
		120	87	49	40	147				
	25	160	92	49	40	147	5600	3500	0.413x10 ⁻⁴	0.38
50		98	55	39	186					
80		137	87	63	255					
100		157	108	67	284					
120		167	108	67	304					
32	160	176	108	67	314	4800	3500	1.69x10 ⁻⁴	0.87	
	50	216	108	76	382					
	80	304	167	118	568					
	100	333	216	137	647					
	120	353	216	137	686					
40	160	372	216	137	686	4000	3000	4.5x10 ⁻⁴	1.35	
	50	402	196	137	686					
	80	519	284	206	980					
	100	568	372	265	1080					
	120	617	451	294	1180					
	160	647	451	294	1180					

Gear Dimensions

Component Kit KC-MC-14

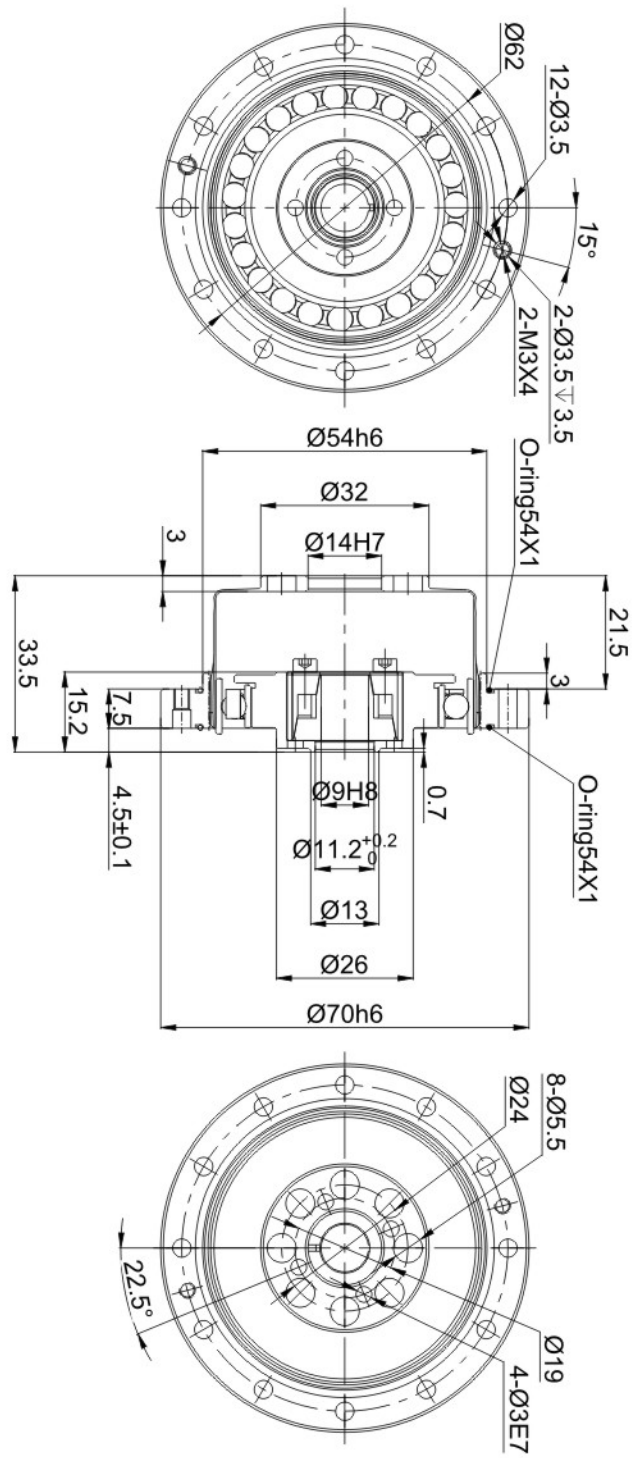


Component Kit KC-MC-17

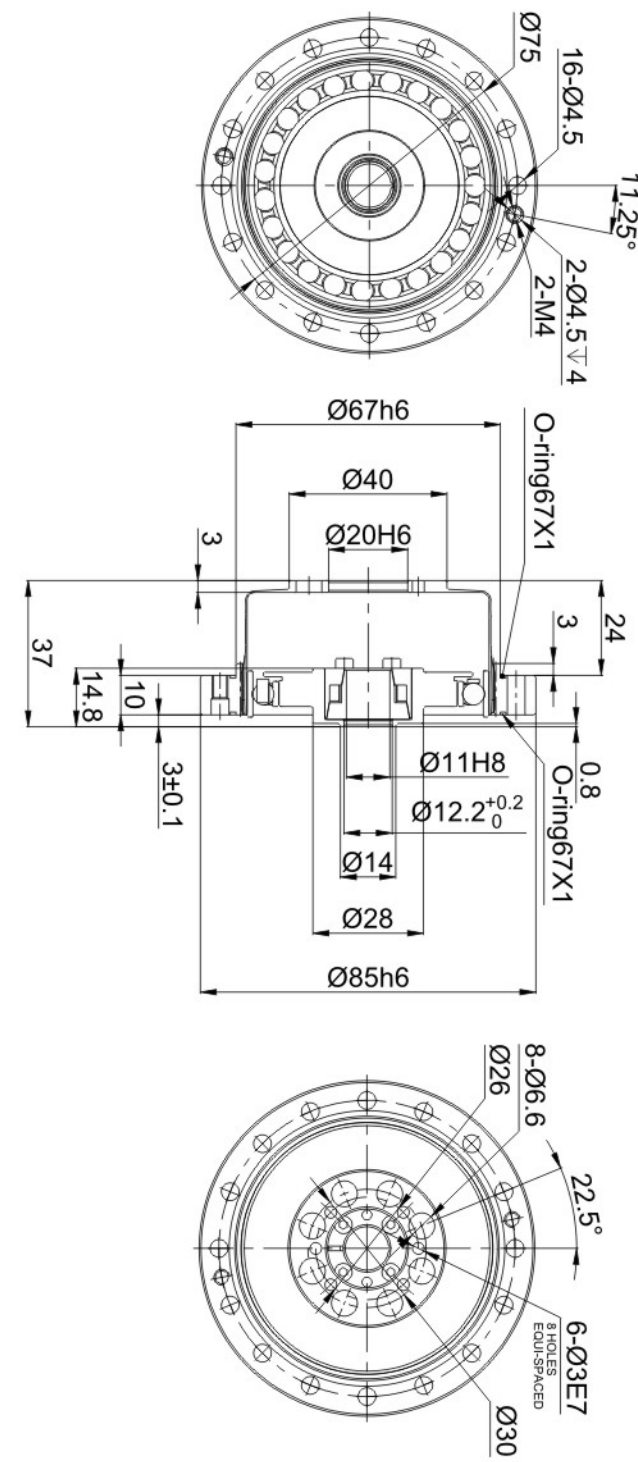


Gear Dimensions

Component Kit KC-MC-20

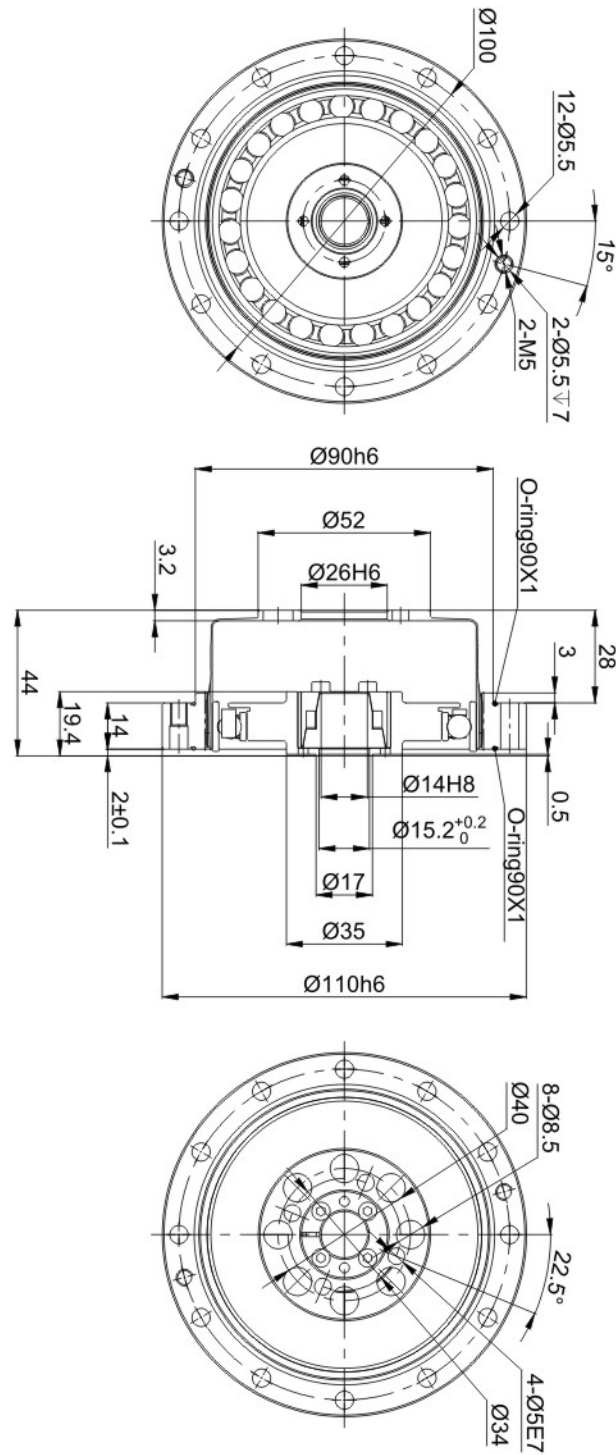


Component Kit KC-MC-25

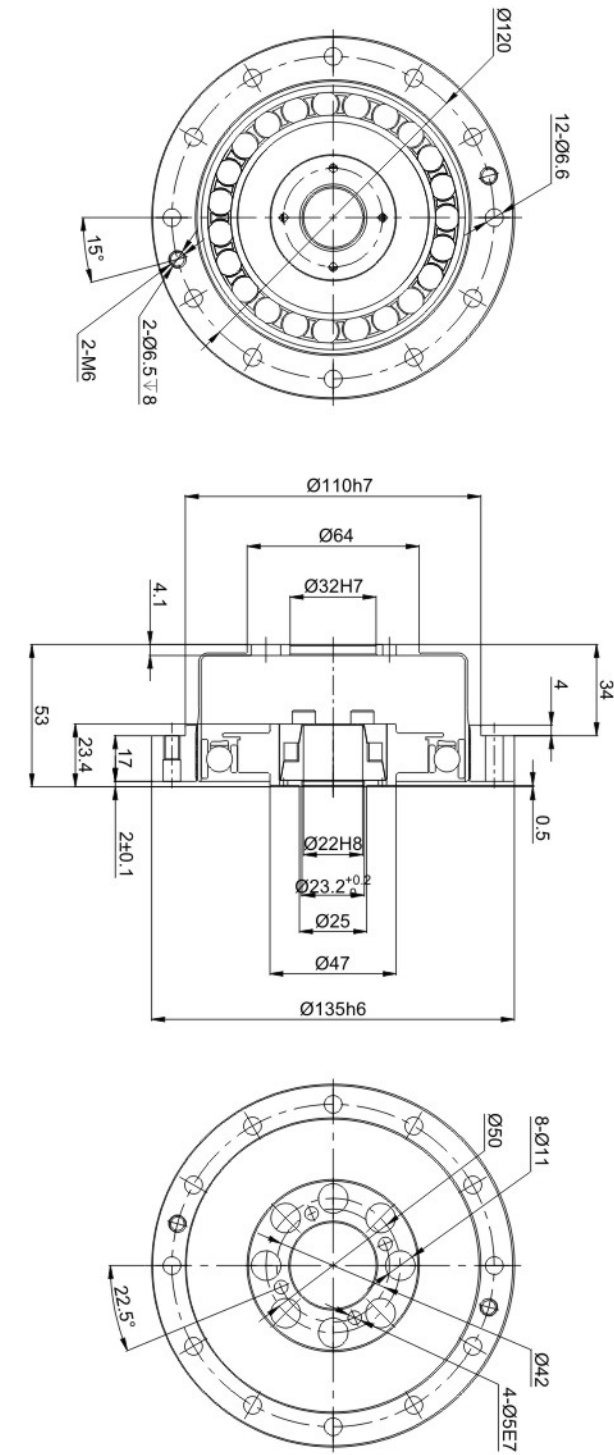


Gear Dimensions

Component Kit KC-MC-32



Component Kit KC-MC-40



Strain Wave Gear KB-MC Series Box Unit Motor shaft closed flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

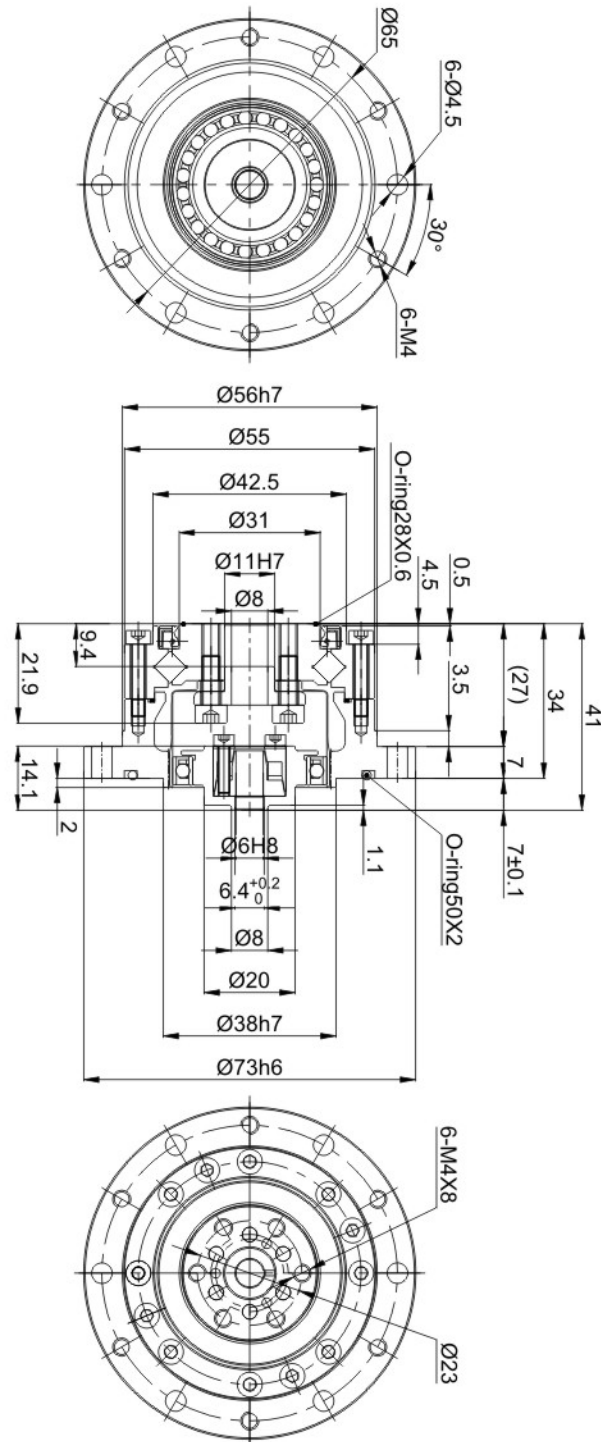
Gear Series	Transmission Type	Gear Size	Ratios				Special Design	
KB	MC	14	50	80	100		as per customers' special requirements	
		17	50	80	100	120		
		20	50	80	100	120		160
		25	50	80	100	120		160
		32	50	80	100	120		160
Ordering Code								
KB-MC		-	25	-	100	-	SP	

Technical Specifications

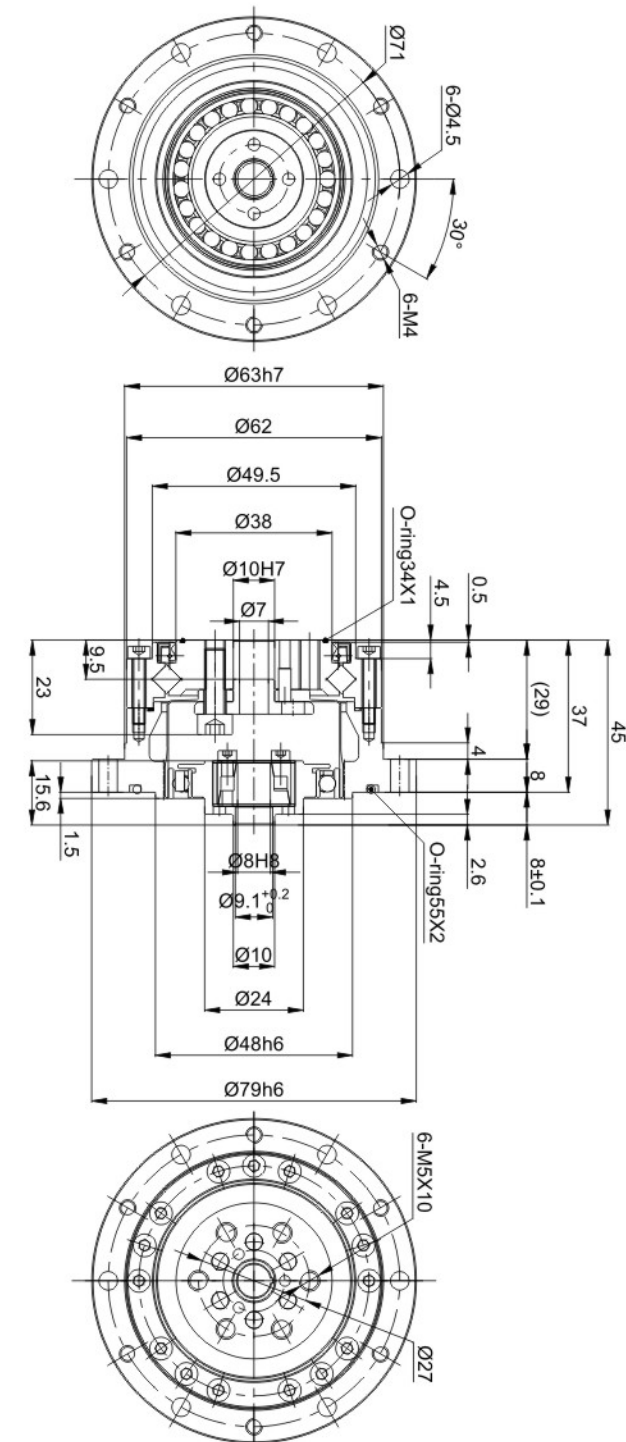
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KB-MC	14	50	18	6,9	5,4	35	8500	3500	0.33x10 ⁻⁵	0.49
		80	23	11	7,8	47				
		100	28	11	7,8	54				
	17	50	34	26	16	70	7300	3500	0.79x10 ⁻⁵	0.62
		80	43	27	22	87				
		100	54	39	24	108				
		120	54	39	24	86				
	20	50	56	34	25	98	6500	3500	0.193x10 ⁻⁴	0.89
		80	74	47	34	127				
		100	82	49	40	147				
		120	87	49	40	147				
	25	160	92	49	40	147	5600	3500	0.413x10 ⁻⁴	1.39
		50	98	55	39	186				
		80	137	87	63	255				
		100	157	108	67	284				
		120	167	108	67	304				
	32	160	176	108	67	314	4800	3500	1.69x10 ⁻⁴	3.02
		50	216	108	76	382				
		80	304	167	118	568				
		100	333	216	137	647				
120		353	216	137	686					
40	160	372	216	137	686	4000	3000	4.5x10 ⁻⁴	4.95	
	50	402	196	137	686					
	80	519	284	206	980					
	100	568	372	265	1080					
	120	617	451	294	1180					
	160	647	451	294	1180					

Gear Dimensions

Box Unit KB-MC-14

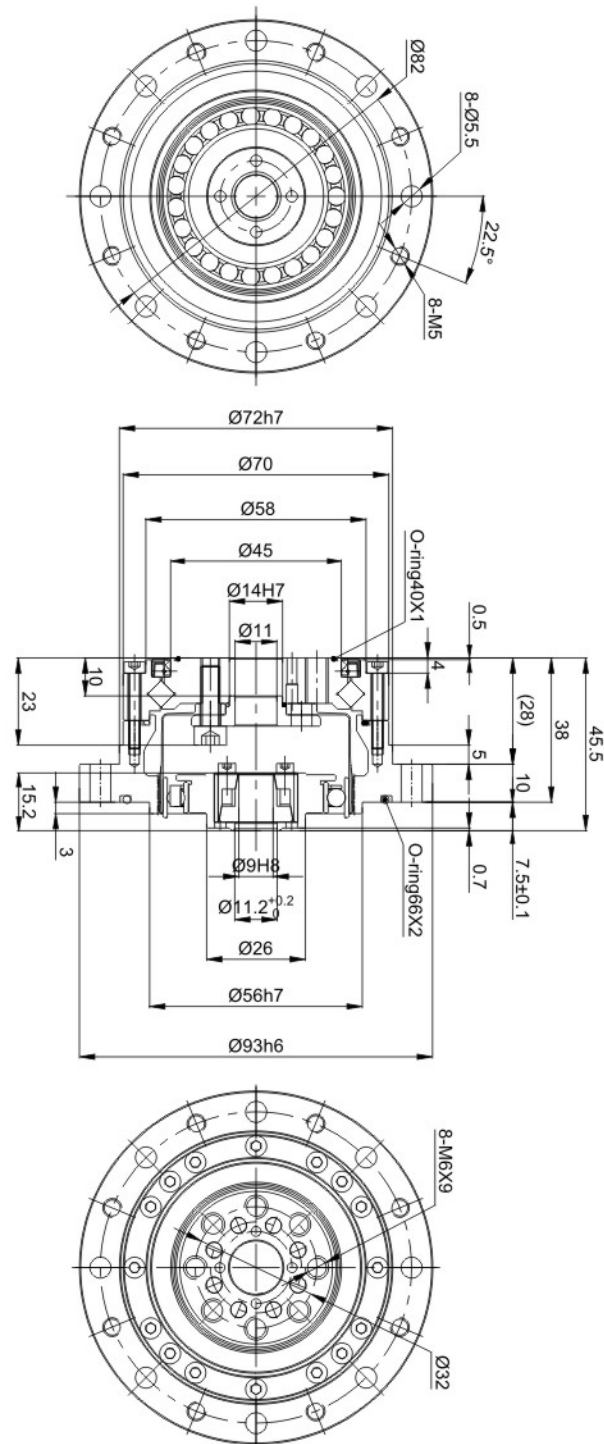


Box Unit KB-MC-17

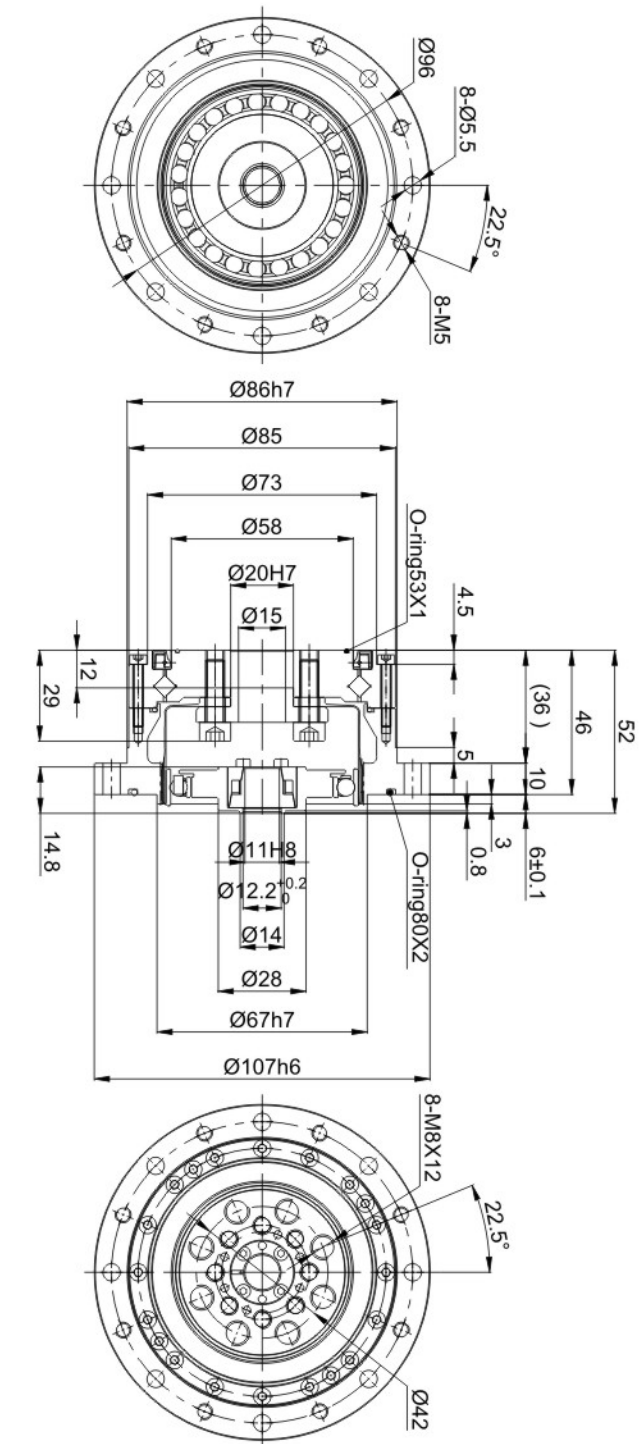


Gear Dimensions

Box Unit KB-MC-20

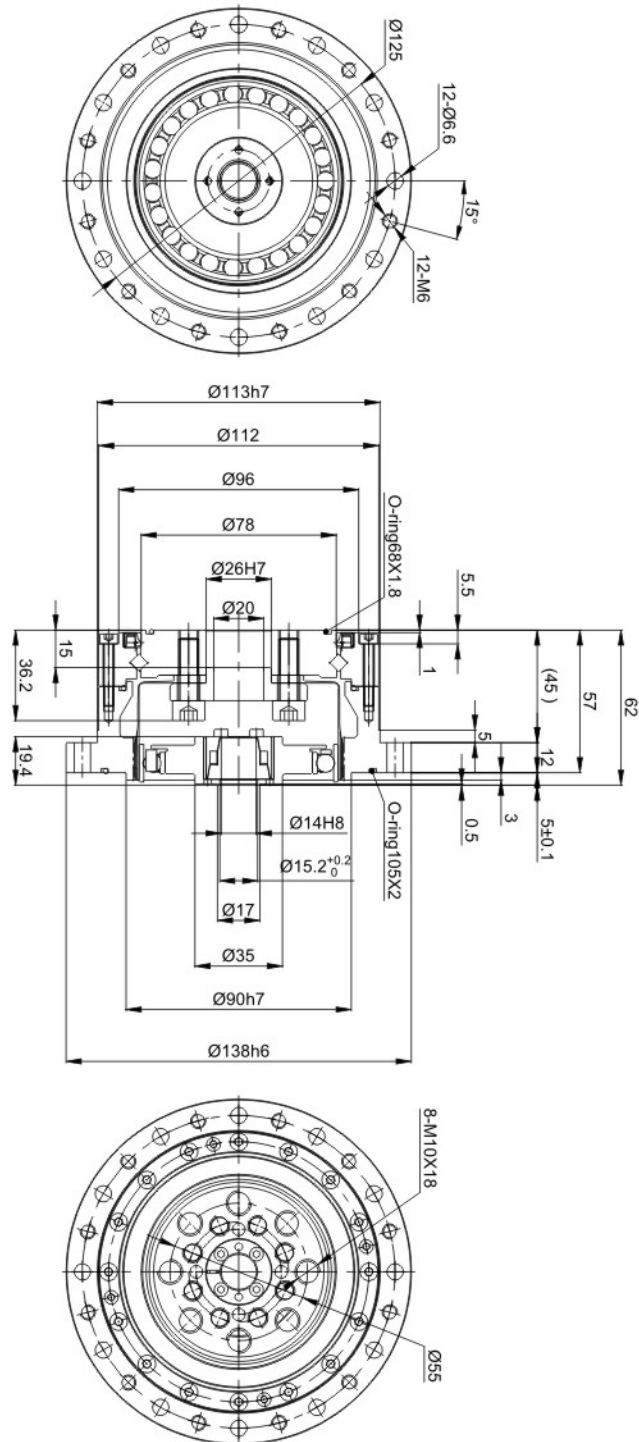


Box Unit KB-MC-25

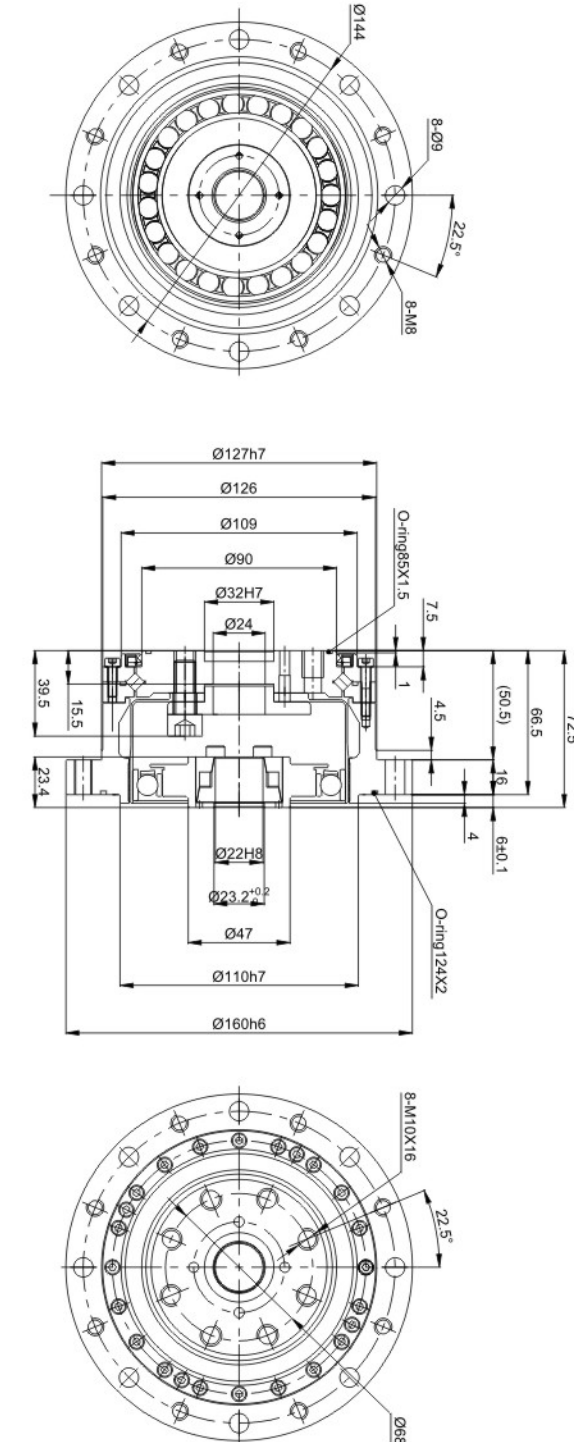


Gear Dimensions

Box Unit KB-MC-32



Box Unit KB-MC-40



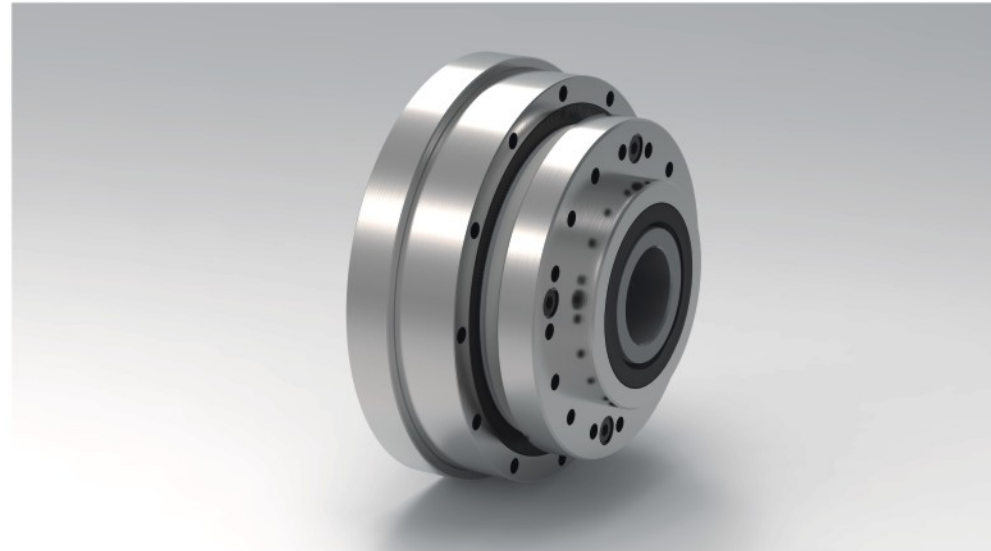
Technical Memo

A large grid area for technical notes, consisting of approximately 28 columns and 35 rows of small squares.

Technical Memo

A large grid area for technical notes, consisting of approximately 28 columns and 35 rows of small squares.

Strain Wave Gear KB-HO Series Box Unit
Hollow shaft open Flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

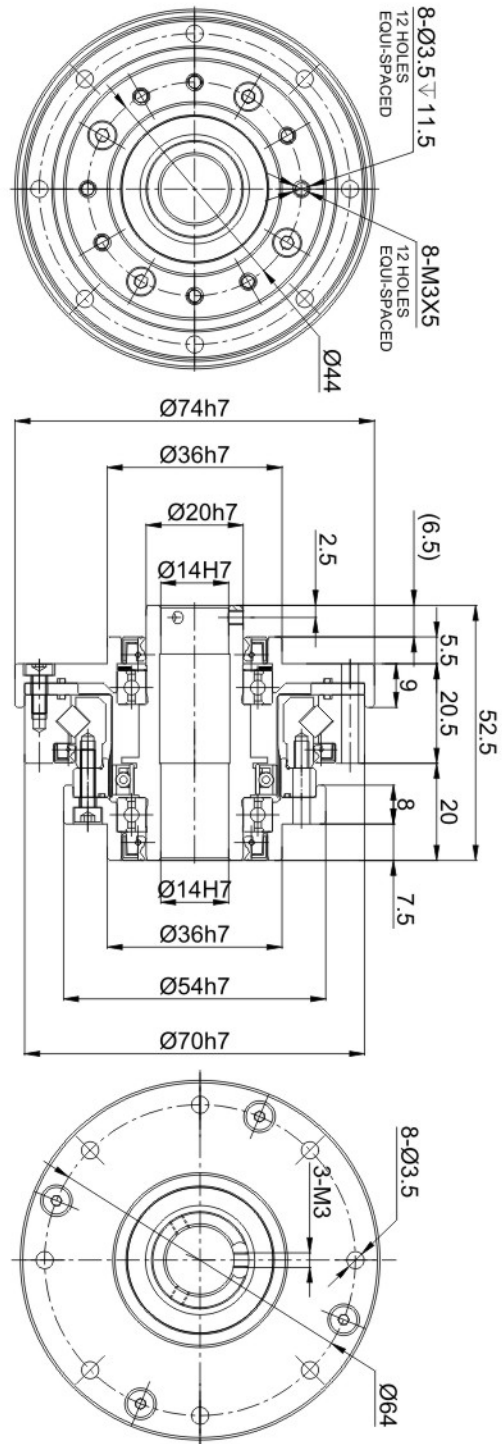
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		20	50	80	100	120	160		
		25	50	80	100	120	160		
		32	50	80	100	120	160		
		40	50	80	100	120	160		
Ordering Code									
		KB-HO	-	25	-	100		-	SP

Technical Specifications

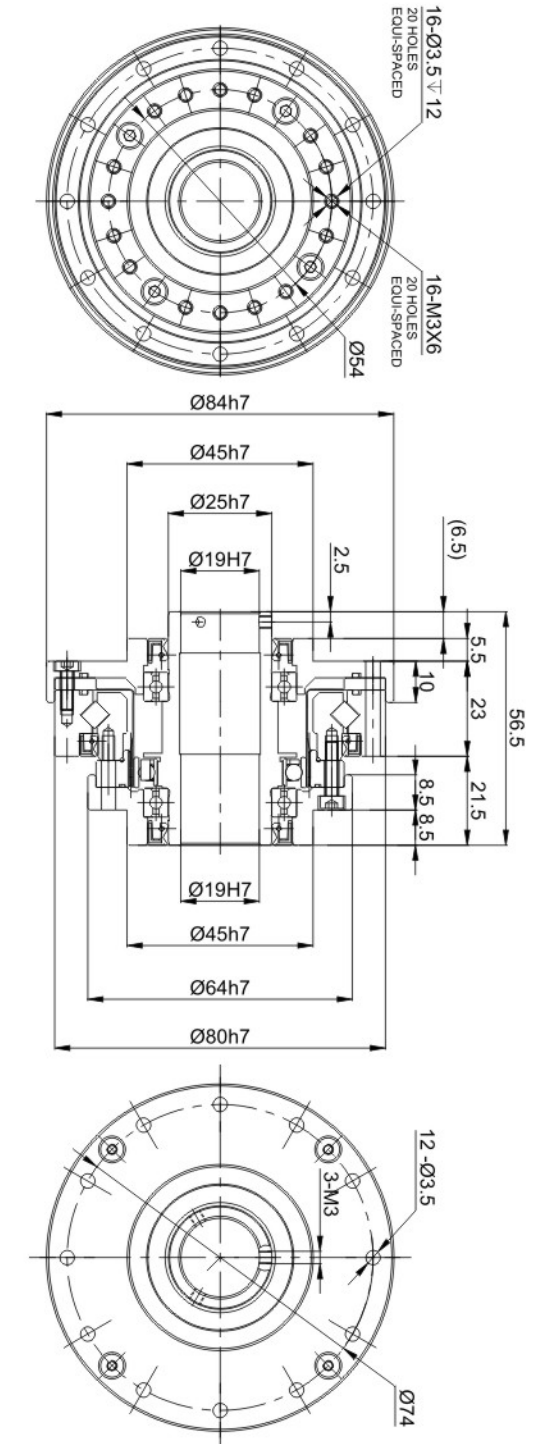
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			Nm	Nm	Nm	Nm	rpm	rpm	kgm²	kg
KB-HO	14	50	18	6,9	5,4	35	8500	3500	0.091x10⁻⁴	0.71
		80	23	11	7,8	47				
		100	28	11	7,8	54				
	17	50	34	26	16	70	7300	3500	0.193x10⁻⁴	1.00
		80	43	27	22	87				
		100	54	39	24	110				
		120	54	39	24	86				
	20	50	56	34	25	98	6500	3500	0.404x10⁻⁴	1.38
		80	74	47	34	127				
		100	82	49	40	147				
		120	87	49	40	147				
		160	92	49	40	147				
	25	50	98	55	39	186	5600	3500	1.07x10⁻⁴	2.1
		80	137	87	63	255				
		100	157	108	67	284				
		120	167	108	67	304				
		160	176	108	67	314				
	32	50	216	108	76	382	4800	3500	2.85x10⁻⁴	4.5
		80	304	167	118	568				
		100	333	216	137	647				
		120	353	216	137	686				
		160	372	216	137	686				
	40	50	402	196	137	686	4000	3000	9.28x10⁻⁴	7,7
		80	519	284	206	980				
		100	568	372	265	1080				
		120	617	451	294	1180				
		160	647	451	294	1180				

Gear Dimensions

Box Unit KB-HO-14

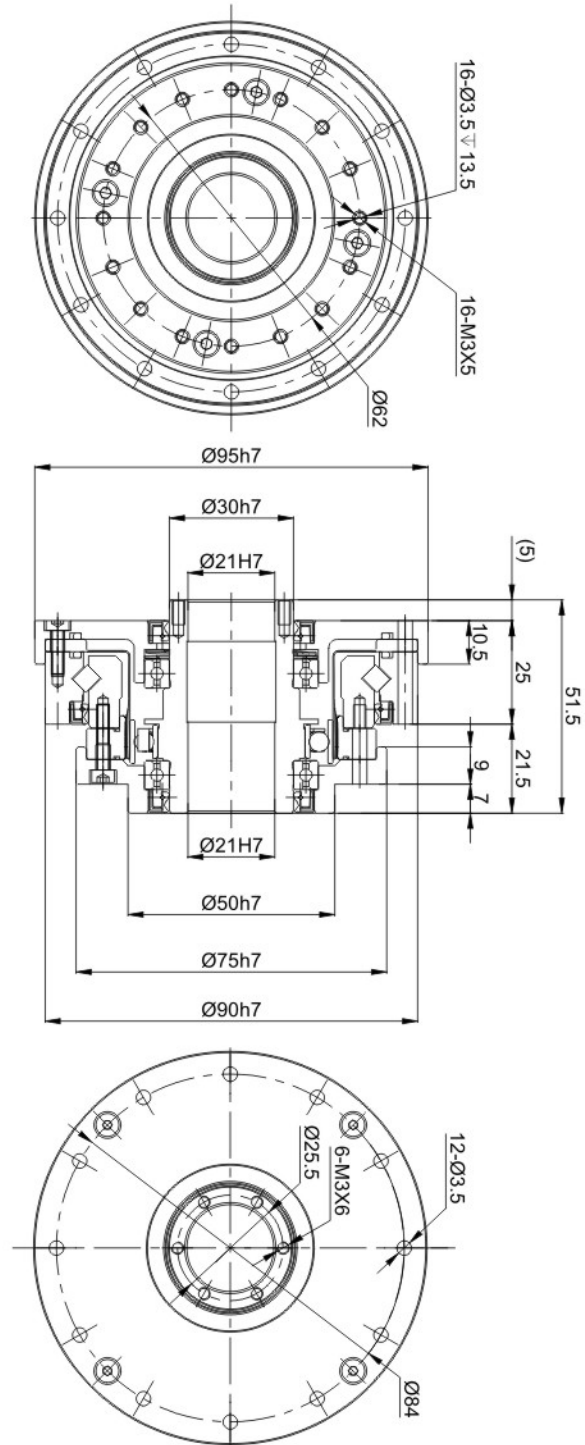


Box Unit KB-HO-17

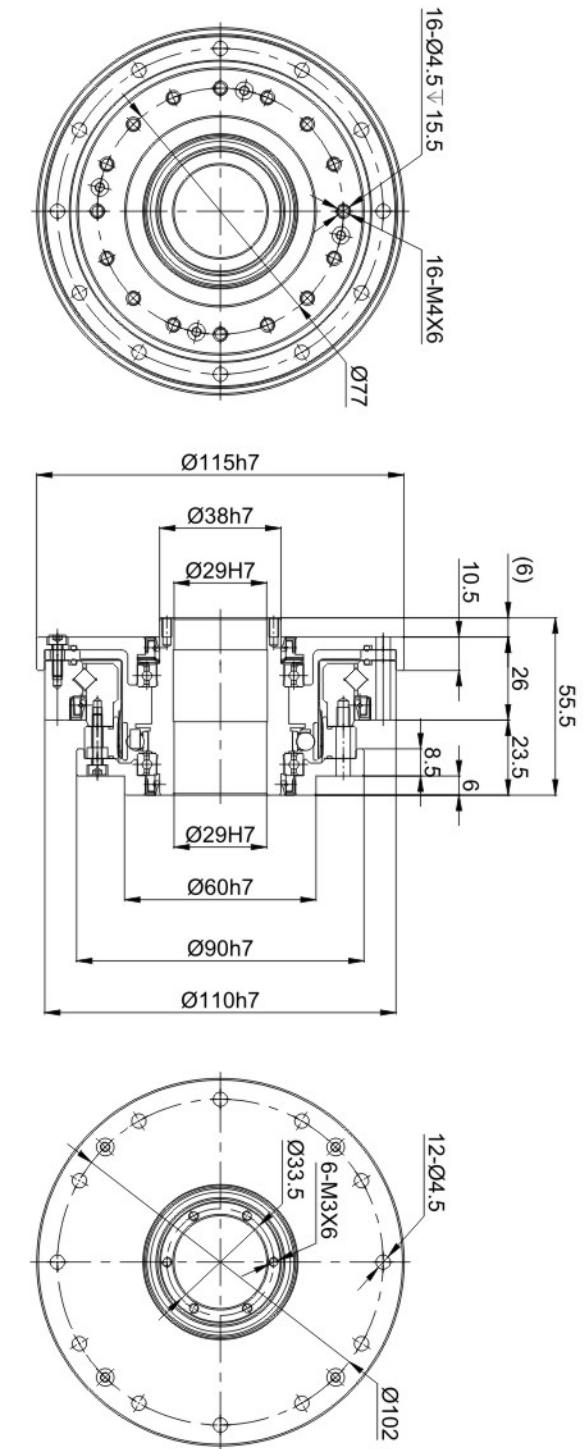


Gear Dimensions

Box Unit KB-HO-20

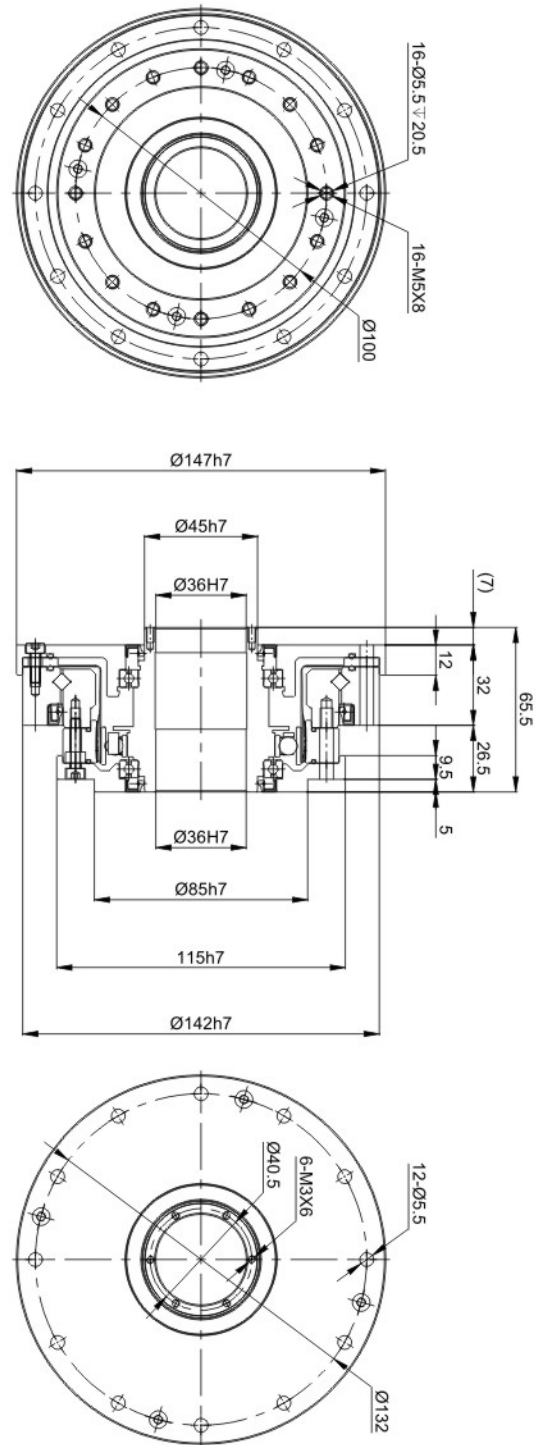


Box Unit KB-HO-25

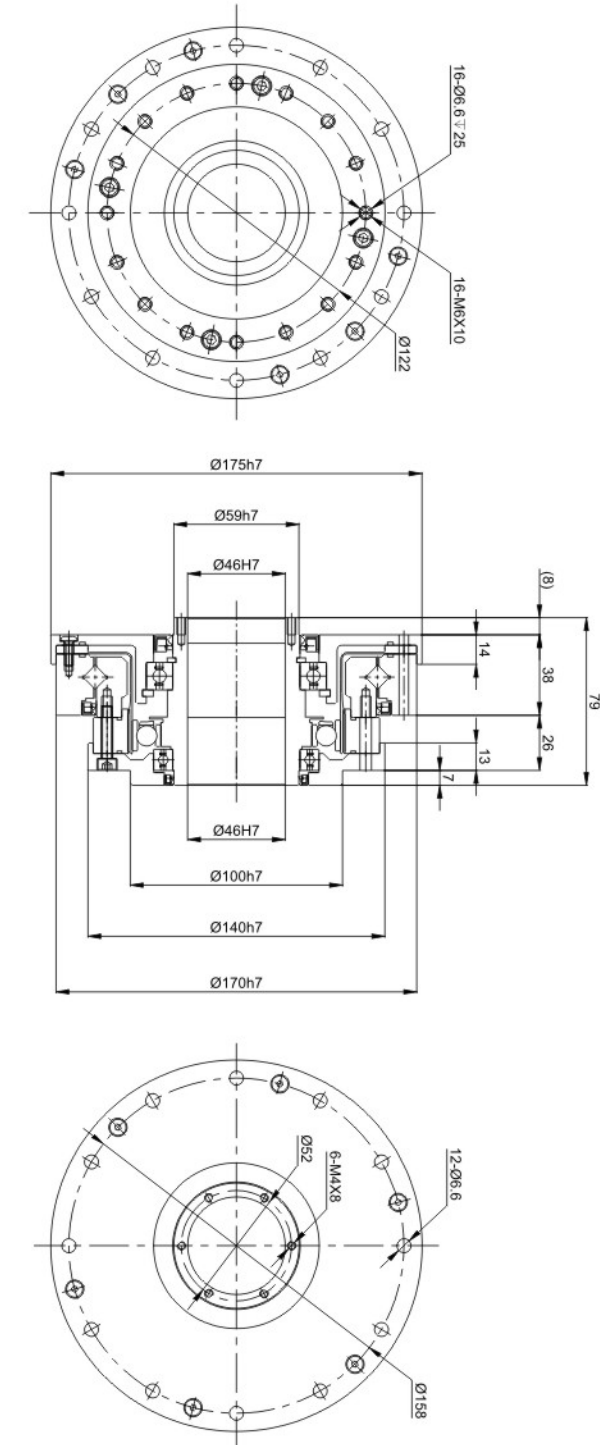


Gear Dimensions

Box Unit KB-HO-32



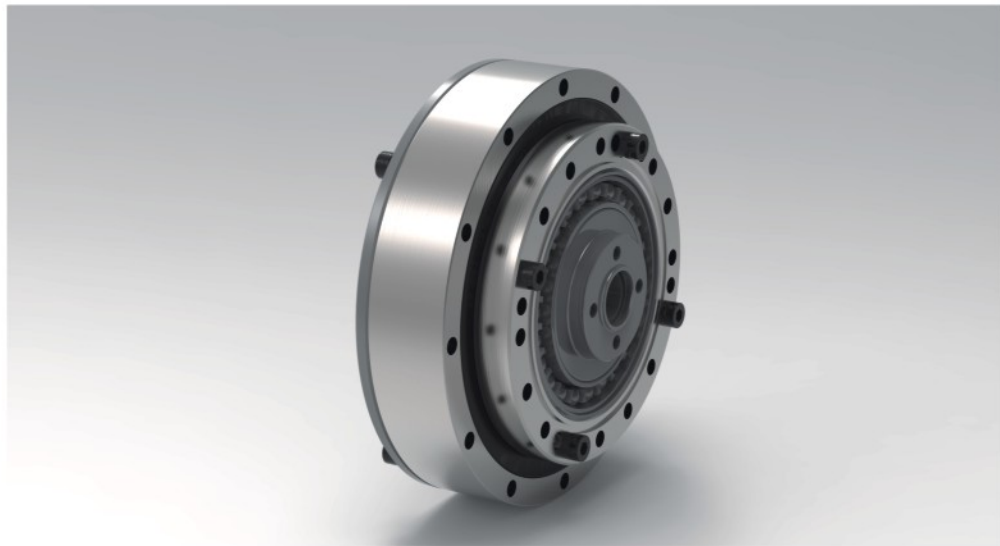
Box Unit KB-HO-40



Technical Memo

Technical Memo

Strain Wave Gear KSB-MO Series Simplicity Box
Motor shaft open flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

Gear Series	Transmission Type	Gear Size		Ratios			Special Design		
KSB	MO	14	50	80	100		as per customers' special requirements		
		17	50	80	100	120			
		20	50	80	100	120		160	
		25	50	80	100	120		160	
		32	50	80	100	120		160	
Ordering Code		KSB-MO		-	25	-	100	-	SP

Technical Specifications

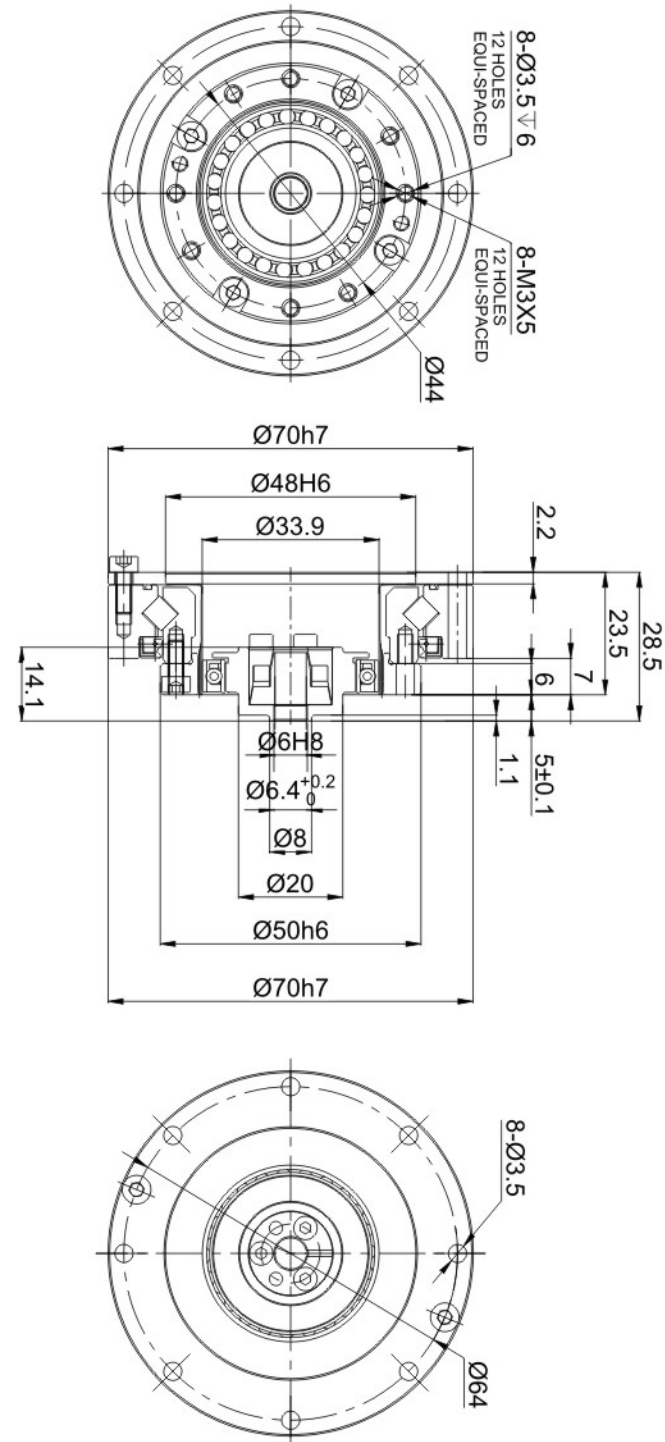
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KSB-MO	14	50	18	6,9	5,4	35	8500	3500	0.27x10 ⁻⁵	0.37
		80	23	11	7,8	47				
		100	28	11	7,8	54				
	17	50	34	26	16	70	7300	3500	0.66x10 ⁻⁵	0.51
		80	43	27	22	87				
		100	54	39	24	110				
		120	54	39	24	86				
	20	50	56	34	25	98	6500	3500	0.16x10 ⁻⁴	0.72
		80	74	47	34	127				
		100	82	49	40	147				
		120	87	49	40	147				
	25	160	92	49	40	147	5600	3500	0.36x10 ⁻⁴	1.19
		50	98	55	39	186				
		80	137	87	63	255				
		100	157	108	67	284				
	32	120	167	108	67	304	4800	3500	1.35x10 ⁻⁴	2.53
		160	176	108	67	314				
		50	216	108	76	382				
		80	304	167	118	568				
	40	100	333	216	137	647	4000	3000	4.5x10 ⁻⁴	4.96
		120	353	216	137	686				
		160	372	216	137	686				
		50	402	196	137	686				
		80	519	284	206	980				
100		568	372	265	1080					
120		617	451	294	1180					
160		647	451	294	1180					

Strain Wave Gear KSB-MO Series Simplicity Box Motor shaft open flexspline

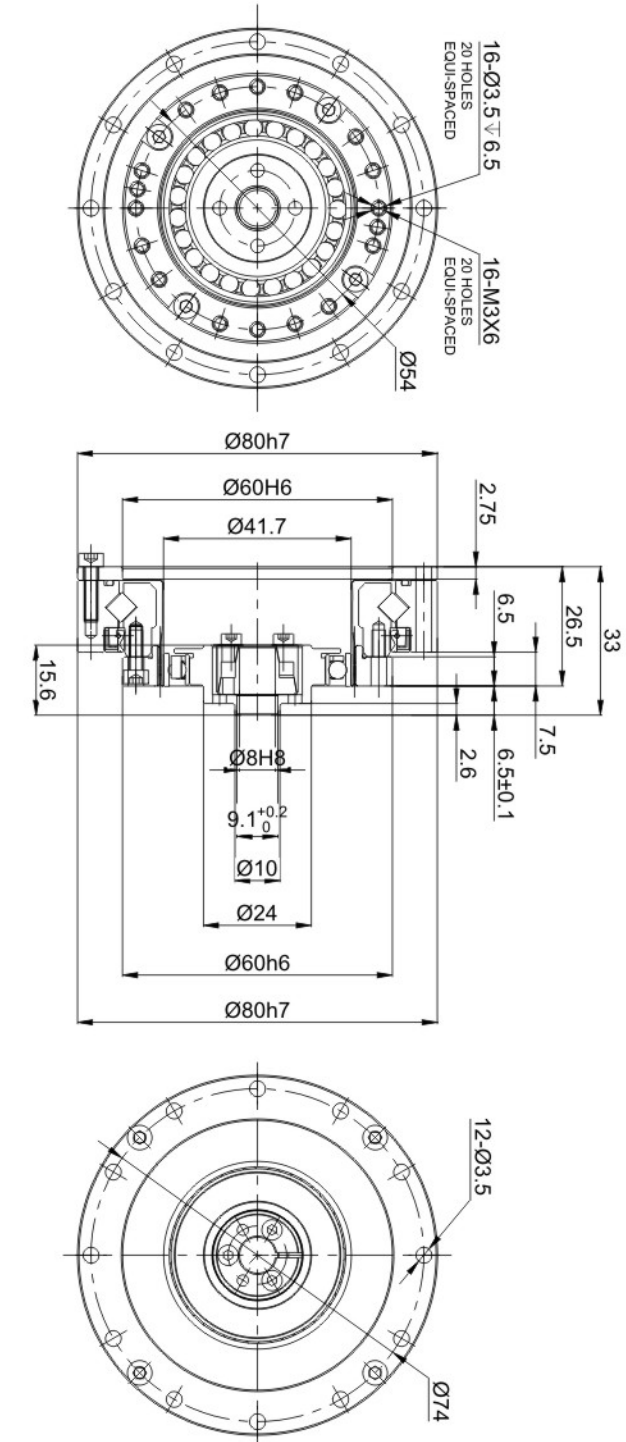
Strain Wave Gear KSB-MO Series Simplicity Box Motor shaft open flexspline

Gear Dimensions

Simplicity Box KSB-MO-14



Simplicity Box KSB-MO-17

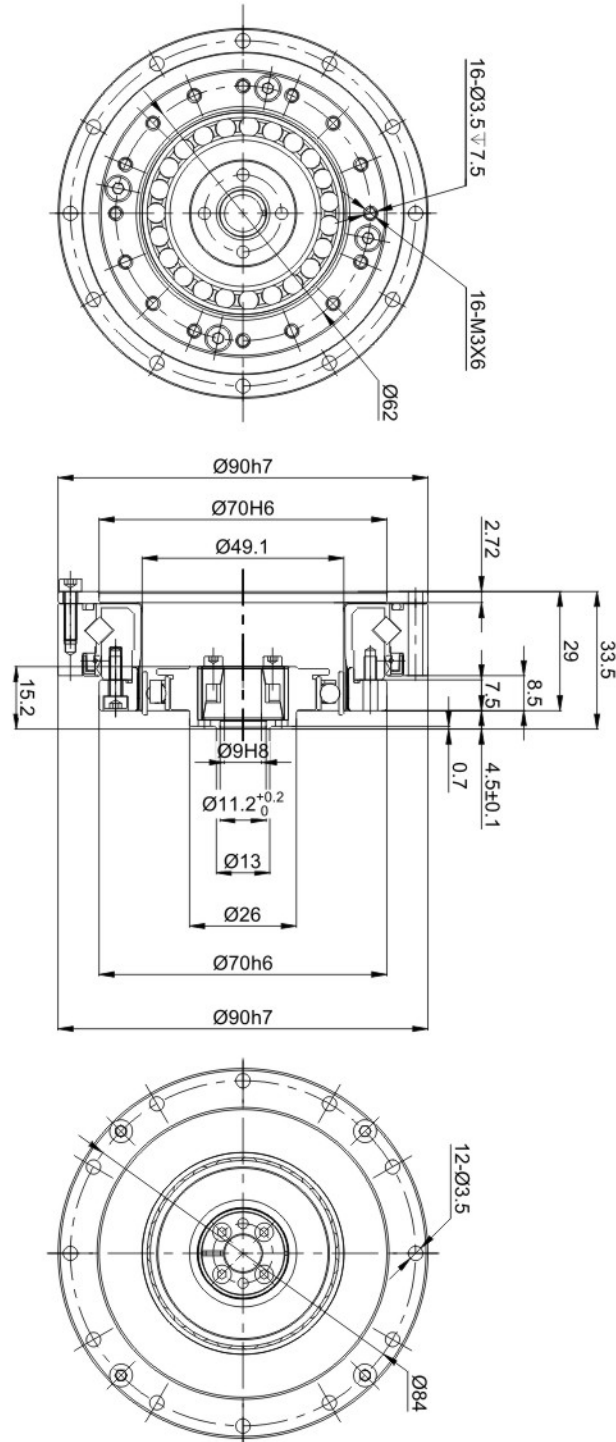


Strain Wave Gear KSB-MO Series Simplicity Box Motor shaft open flexspline

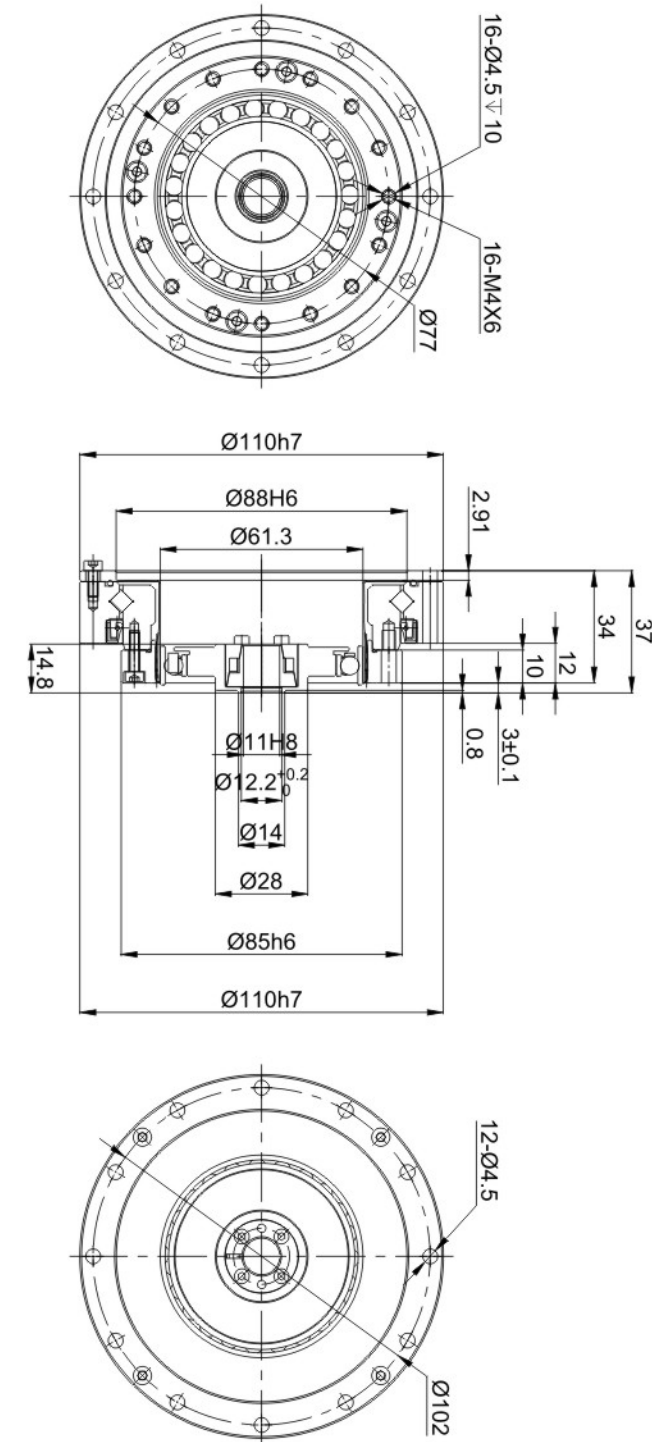
Strain Wave Gear KSB-MO Series Simplicity Box Motor shaft open flexspline

Gear Dimensions

Simplicity Box KSB-MO-20



Simplicity Box KSB-MO-25

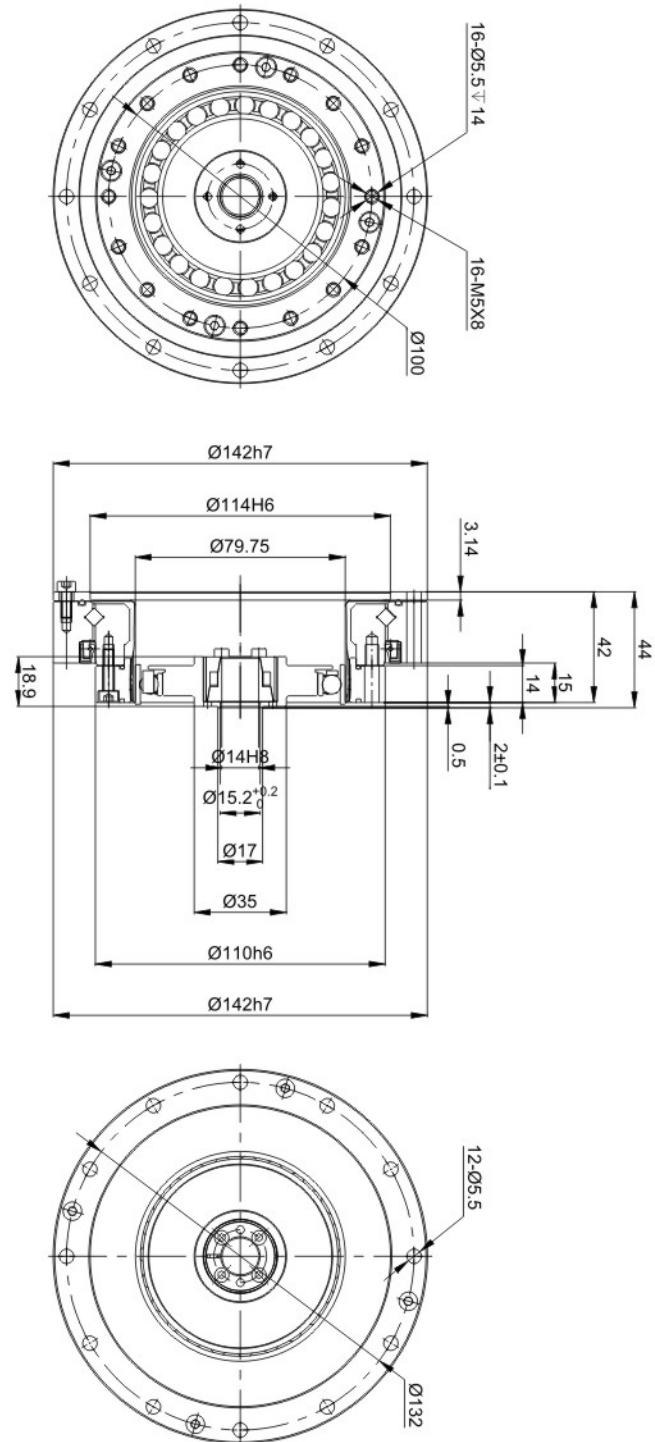


Strain Wave Gear KSB-MO Series Simplicity Box
Motor shaft open flexspline

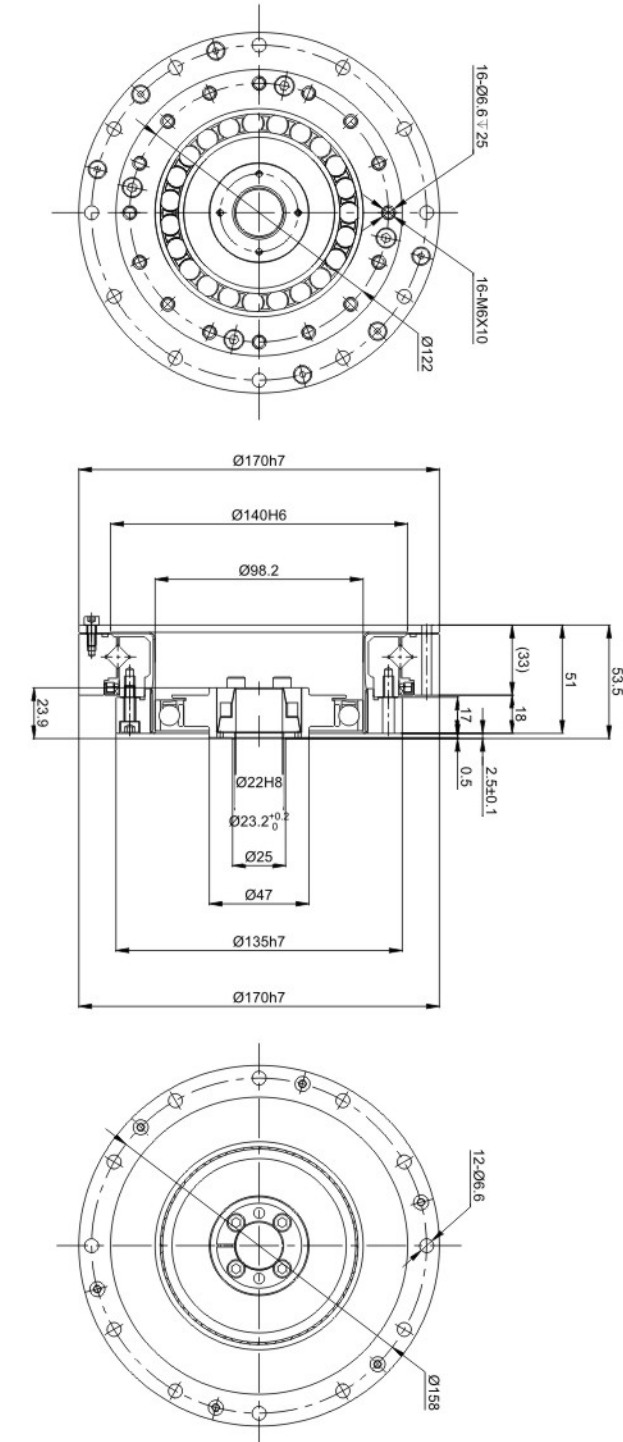
Strain Wave Gear KSB-MO Series Simplicity Box
Motor shaft open flexspline

Gear Dimensions

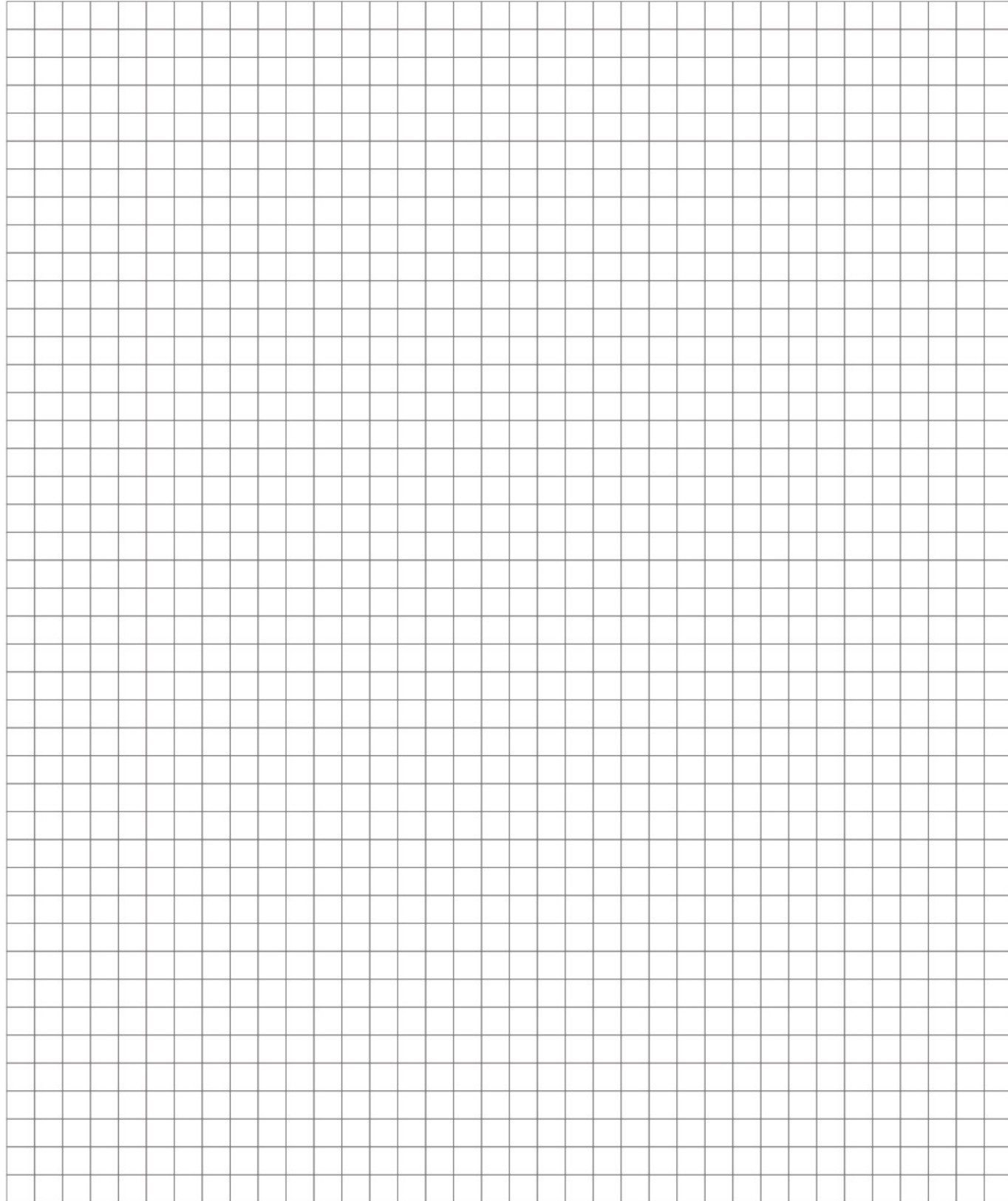
Simplicity Box KSB-MO-32



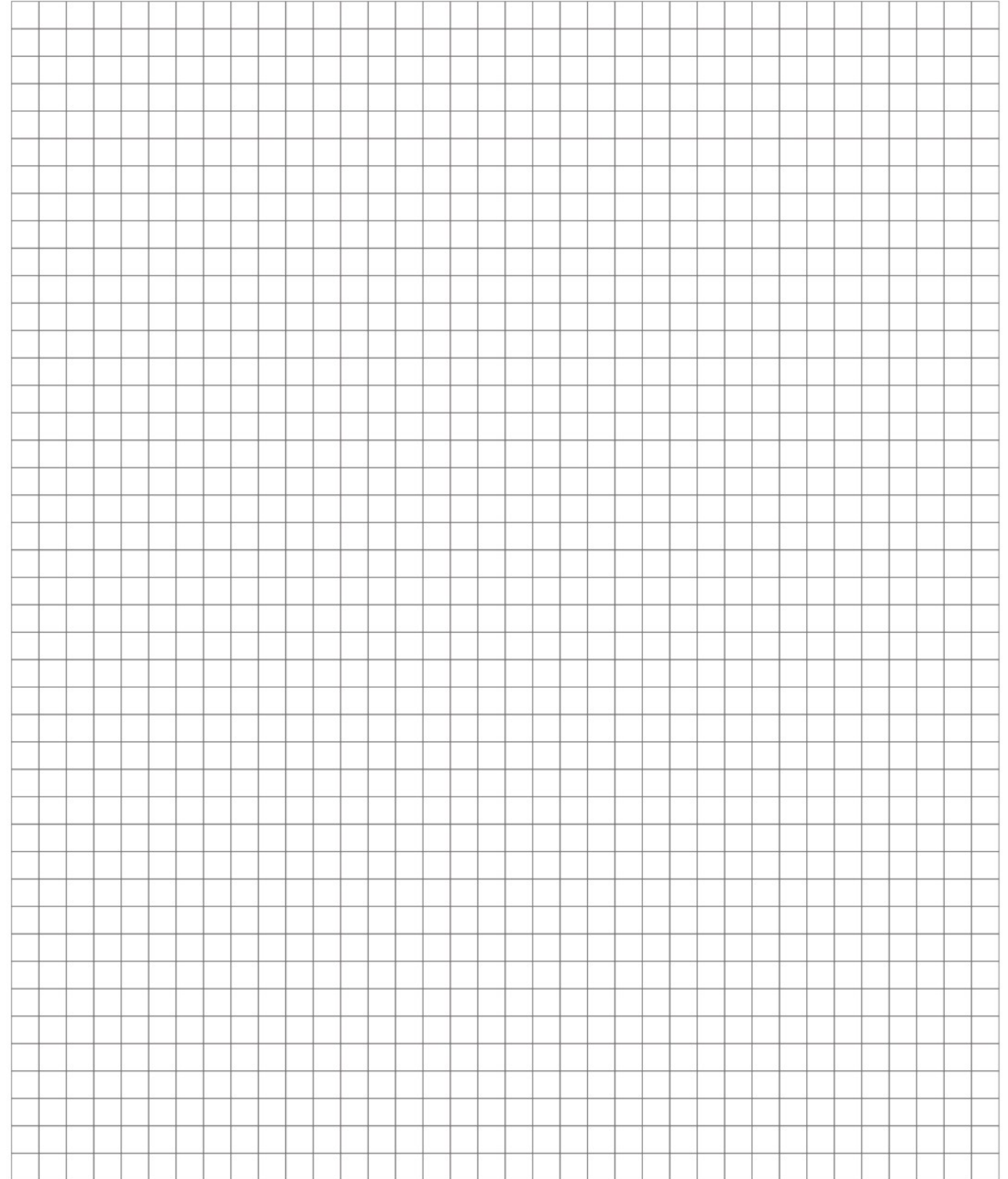
Simplicity Box KSB-MO-40



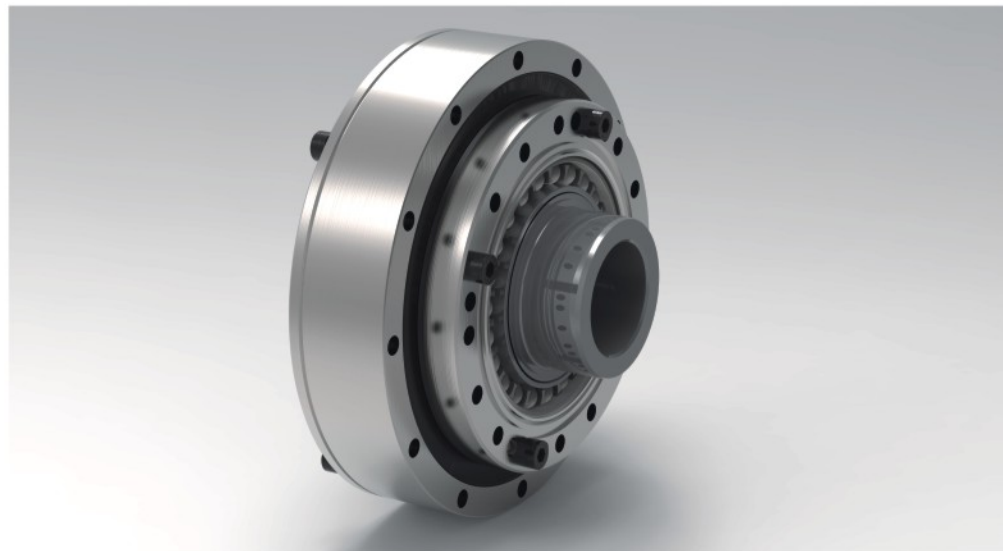
Technical Memo



Technical Memo



Strain Wave Gear KSB-HO Series Simplicity Box Hollow shaft open flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

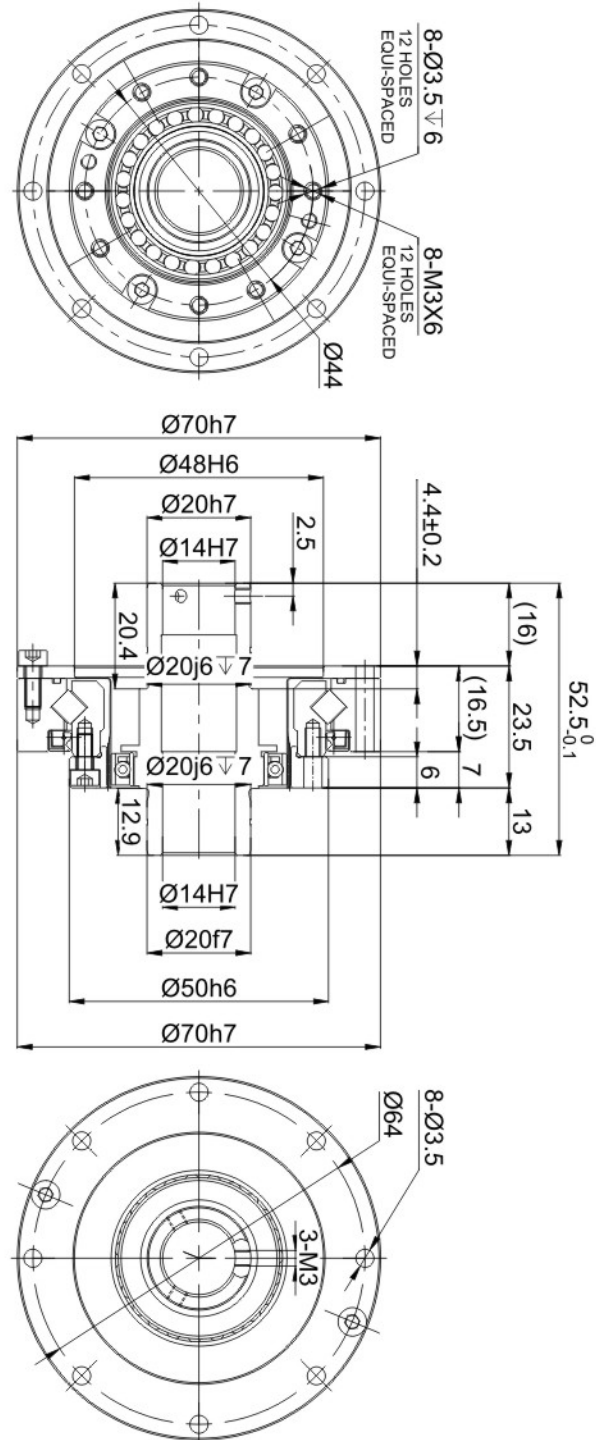
Gear Series	Transmission Type	Gear Size	Ratios				Special Design	
KSB	HO	14	50	80	100		as per customers' special requirements	
		17	50	80	100	120		
		20	50	80	100	120		160
		25	50	80	100	120		160
		32	50	80	100	120		160
		40	50	80	100	120	160	
Ordering Code								
KSB-HO		-	25	-	100	-	SP	

Technical Specifications

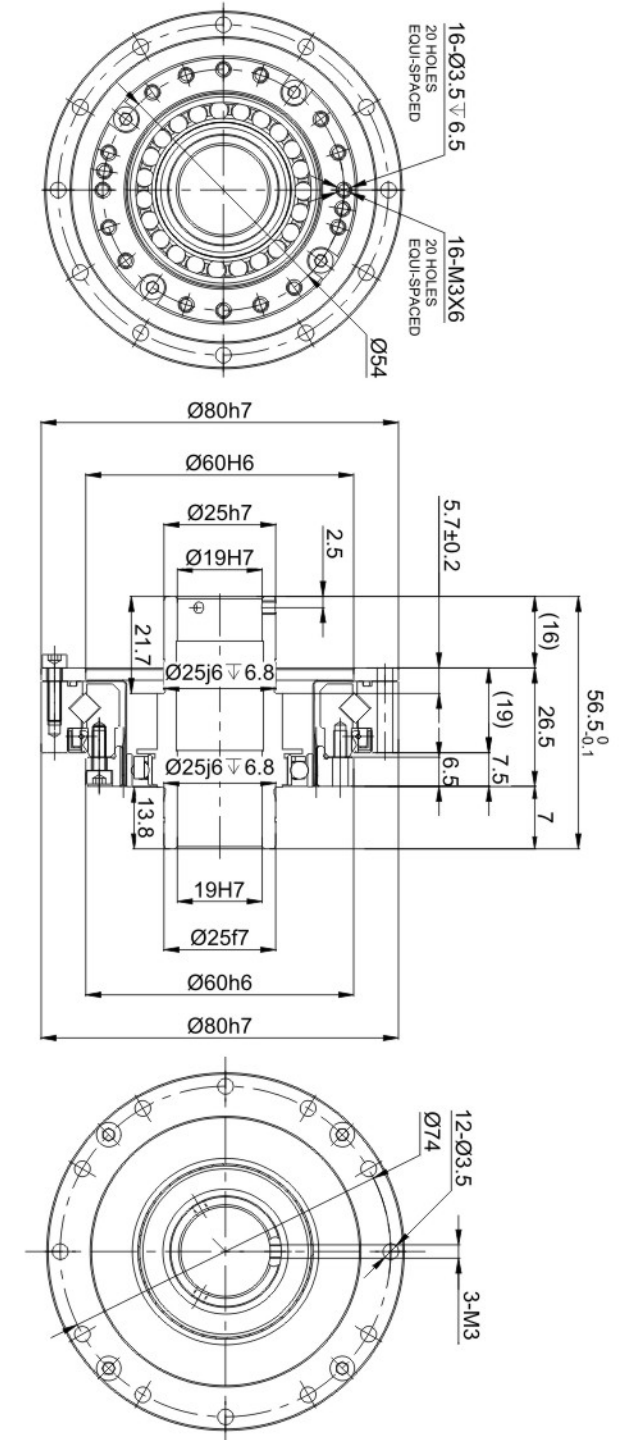
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KSB-HO	14	50	18	6,9	5,4	35	8500	3500	0.18x10 ⁻⁴	0.41
		80	23	11	7,8	47				
		100	28	11	7,8	54				
	17	50	34	26	16	70	7300	3500	0.34x10 ⁻⁴	0.59
		80	43	27	22	87				
		100	54	39	24	110				
		120	54	39	24	86				
	20	50	56	34	25	98	6500	3500	0.58x10 ⁻⁴	0.83
		80	74	47	34	127				
		100	82	49	40	147				
		120	87	49	40	147				
		160	92	49	40	147				
25	50	98	55	39	186	5600	3500	1.23x10 ⁻⁴	1.39	
	80	137	87	63	255					
	100	157	108	67	284					
	120	167	108	67	304					
	160	176	108	67	314					
32	50	216	108	76	382	4800	3500	3.66x10 ⁻⁴	2.87	
	80	304	167	118	568					
	100	333	216	137	647					
	120	353	216	137	686					
	160	372	216	137	686					
40	50	402	196	137	686	4000	3000	9.28x10 ⁻⁴	5.35	
	80	519	284	206	980					
	100	568	372	265	1080					
	120	617	451	294	1180					
	160	647	451	294	1180					

Gear Dimensions

Simplicity Box KSB-HO-14



Simplicity Box KSB-HO-17

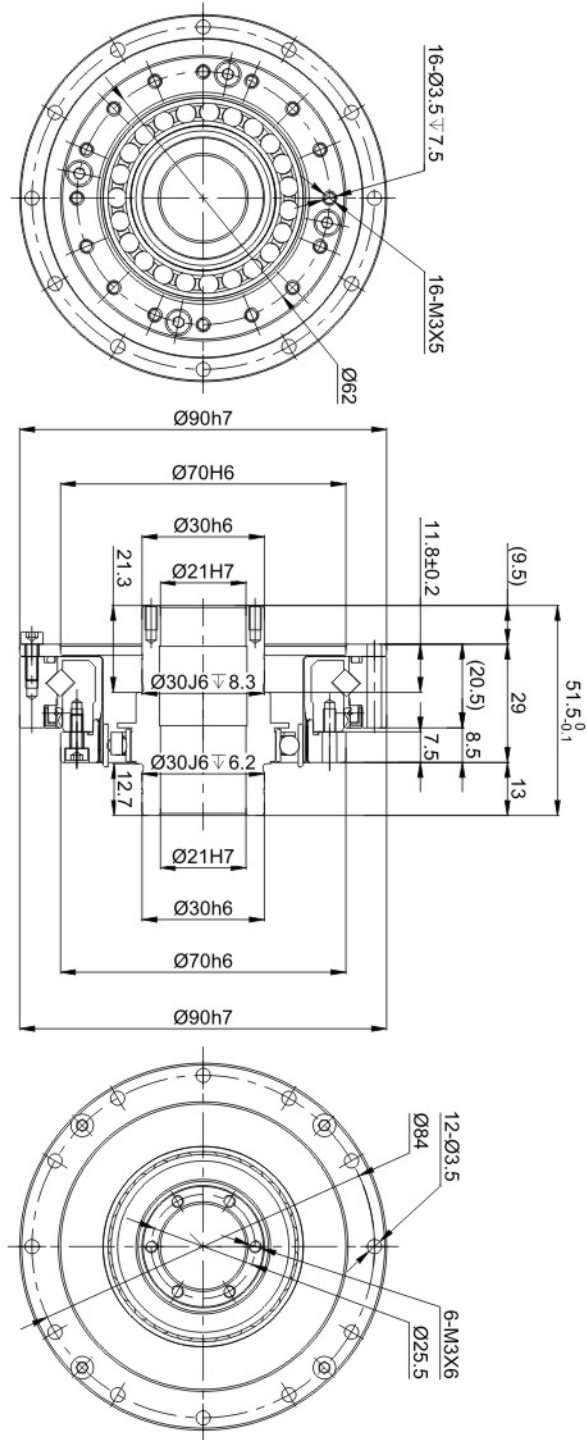


Strain Wave Gear KSB-HO Series Simplicity Box
Hollow shaft open flexspline

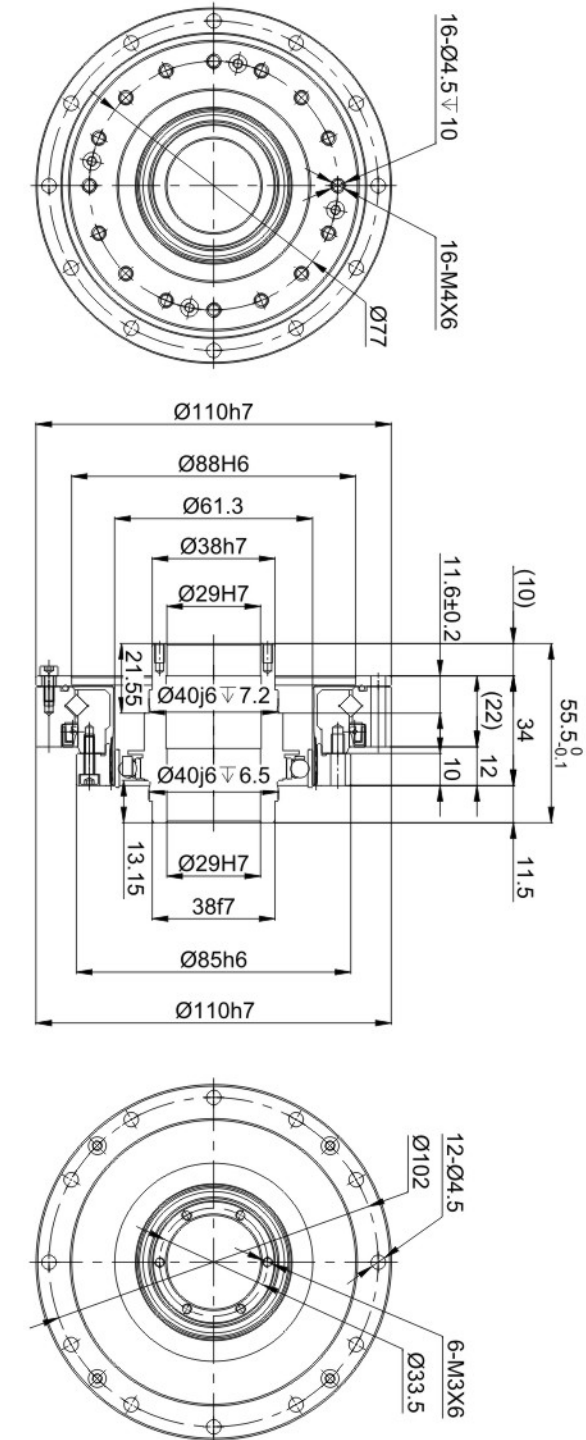
Strain Wave Gear KSB-HO Series Simplicity Box
Hollow shaft open flexspline

Gear Dimensions

Simplicity Box KSB-HO-20

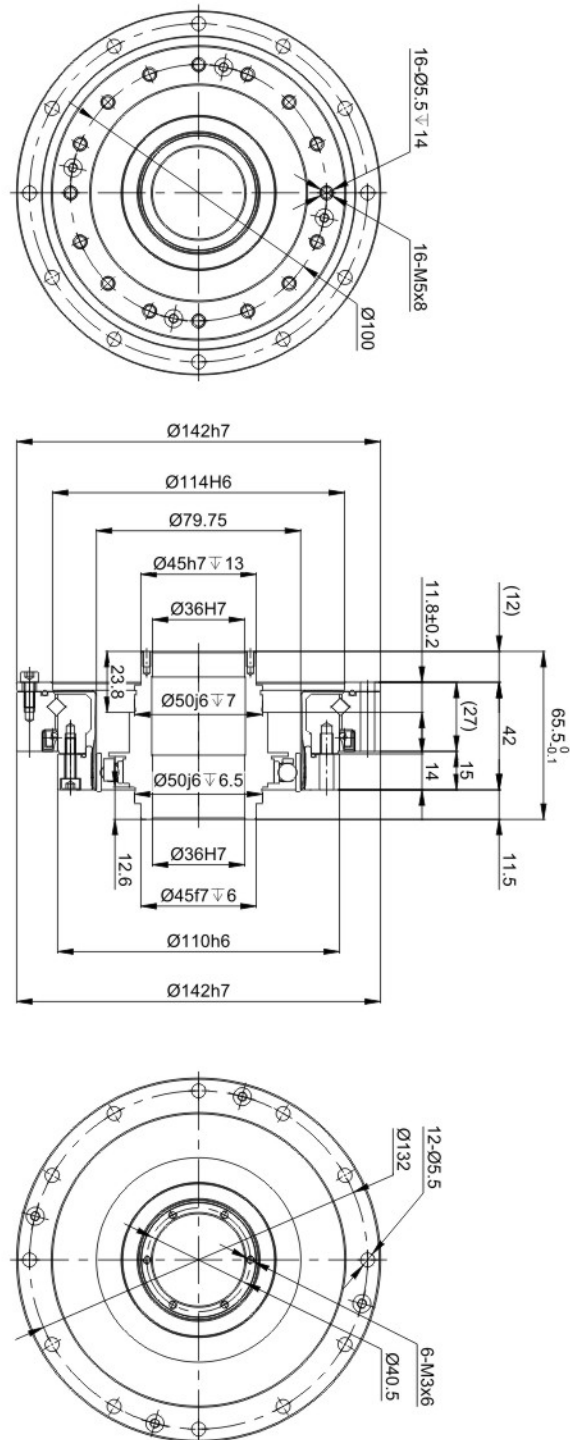


Simplicity Box KSB-HO-25

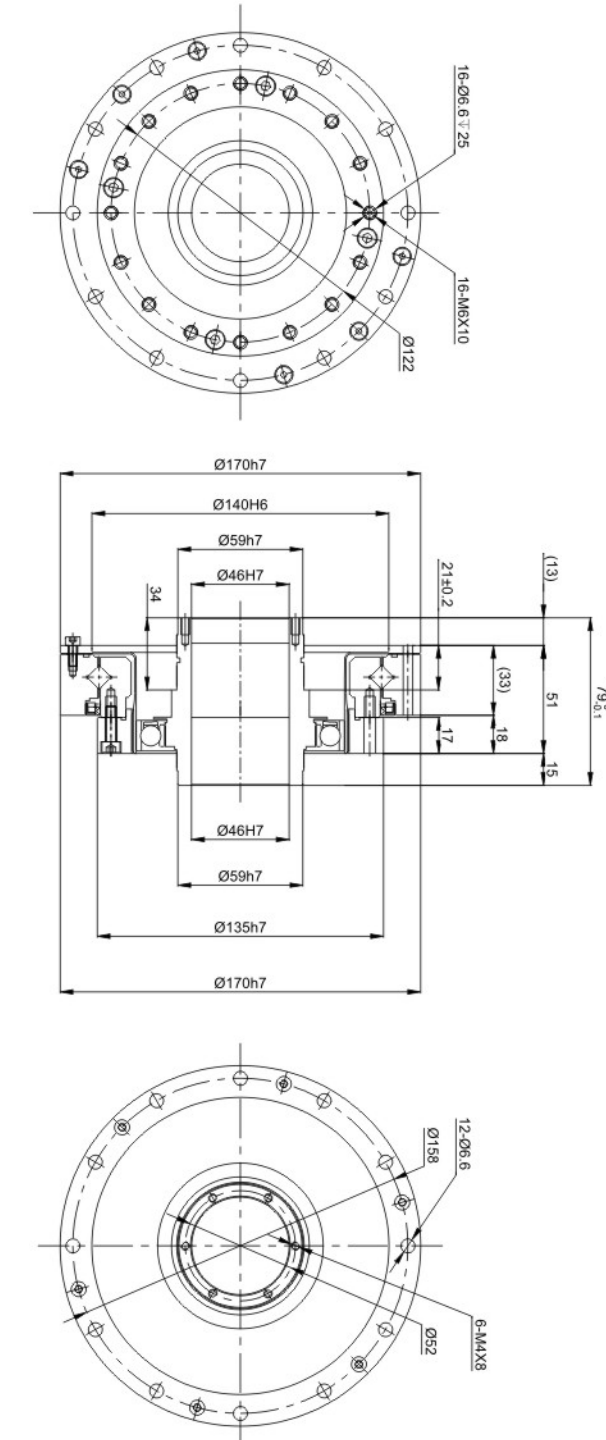


Gear Dimensions

Simplicity Box KSB-HO-32



Simplicity Box KSB-HO-40



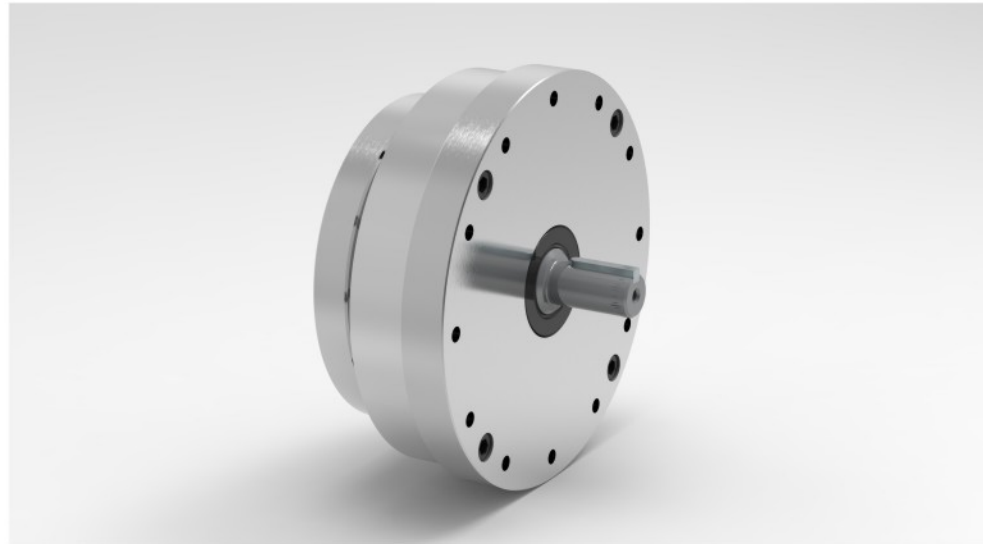
Technical Memo

A large grid area for technical notes, consisting of approximately 30 columns and 40 rows of small squares.

Technical Memo

A large grid area for technical notes, consisting of approximately 30 columns and 40 rows of small squares.

Strain Wave Gear KB-SO Series Box Unit Solid Shaft Open Flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

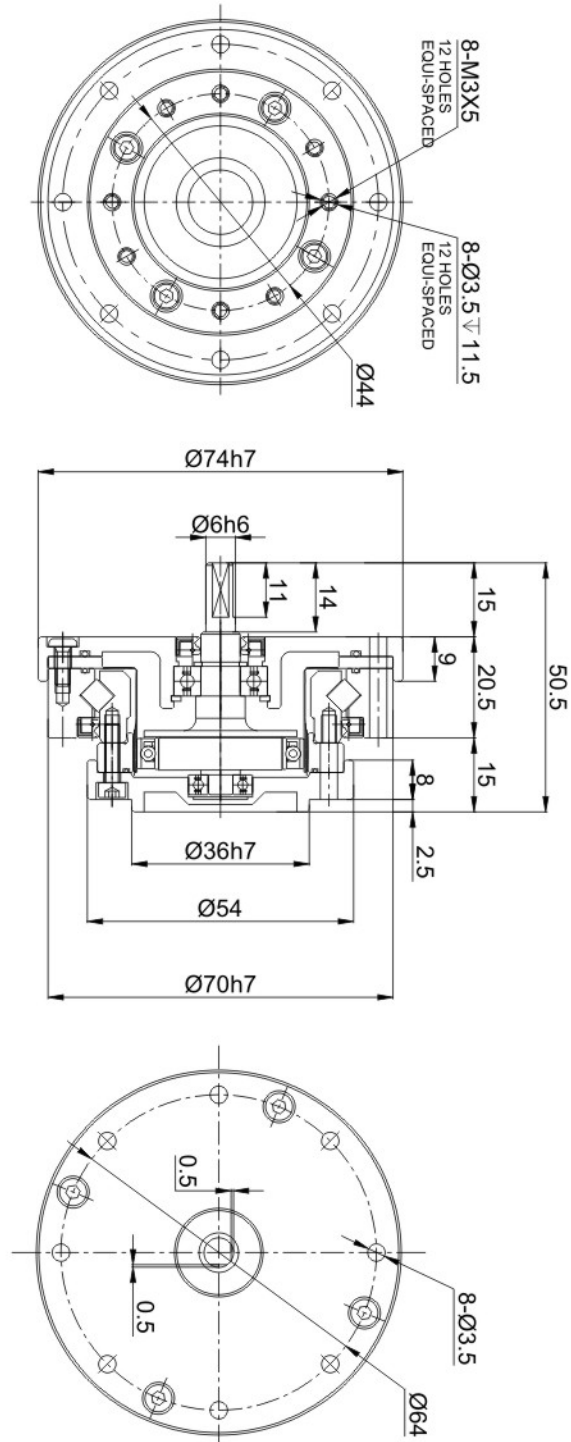
Gear Series	Transmission Type	Gear Size	Ratios				Special Design	
KB	SO	14	50	80	100		as per customers' special requirements	
		17	50	80	100	120		
		20	50	80	100	120		160
		25	50	80	100	120		160
		32	50	80	100	120		160
Ordering Code								
KB-SO		-	25	-	100	-	SP	

Technical Specifications

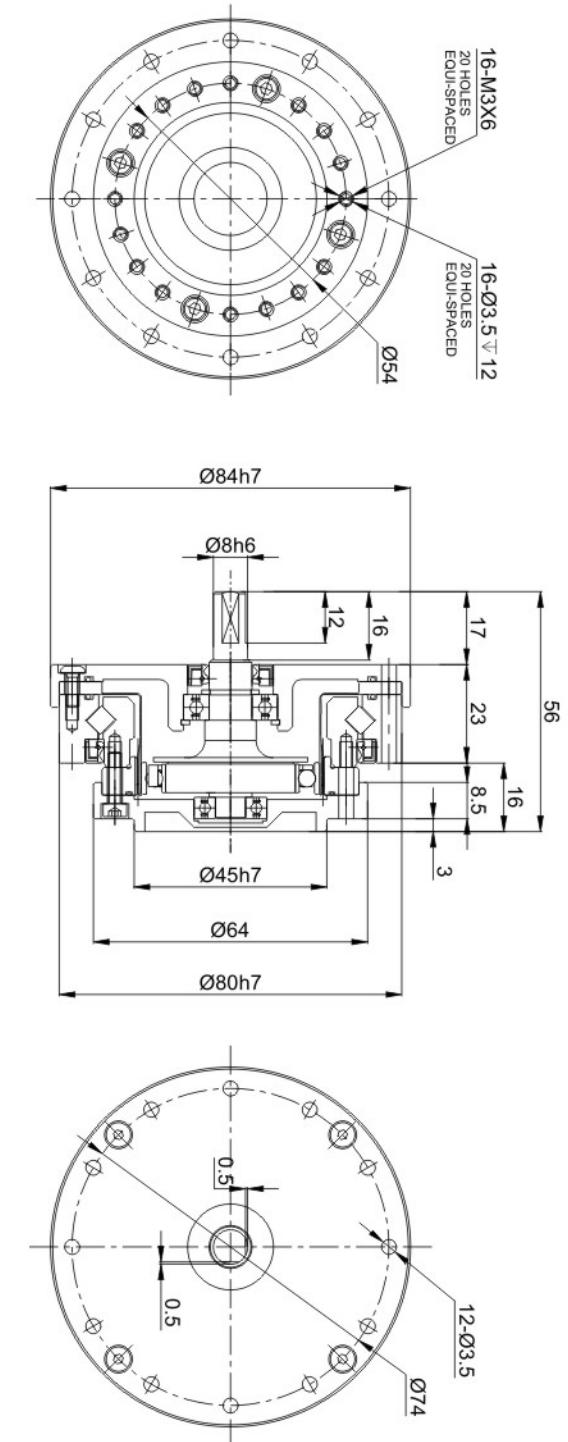
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KB-SO	14	50	18	6,9	5,4	35	8500	3500	0.25x10 ⁻⁵	0.67
		80	23	11	7,8	47				
		100	28	11	7,8	54				
	17	50	34	26	16	70	7300	3500	0.59x10 ⁻⁵	0.82
		80	43	27	22	87				
		100	54	39	24	110				
		120	54	39	24	86				
	20	50	56	34	25	98	6500	3500	0.14x10 ⁻⁴	1.09
		80	74	47	34	127				
		100	82	49	40	147				
		120	87	49	40	147				
	25	160	92	49	40	147	5600	3500	0.32x10 ⁻⁴	2.05
50		98	55	39	186					
80		137	87	63	255					
100		157	108	67	284					
32	120	167	108	67	304	4800	3500	1.20x10 ⁻⁴	3.89	
	160	176	108	67	314					
	50	216	108	76	382					
	80	304	167	118	568					
40	100	333	216	137	647	4000	3000	3.41x10 ⁻⁴	7.7	
	120	353	216	137	686					
	160	372	216	137	686					
	50	402	196	137	686					
	80	519	284	206	980					
	100	568	372	265	1080					
	120	617	451	294	1180					
	160	647	451	294	1180					

Gear Dimensions

Box Unit KB-SO-14

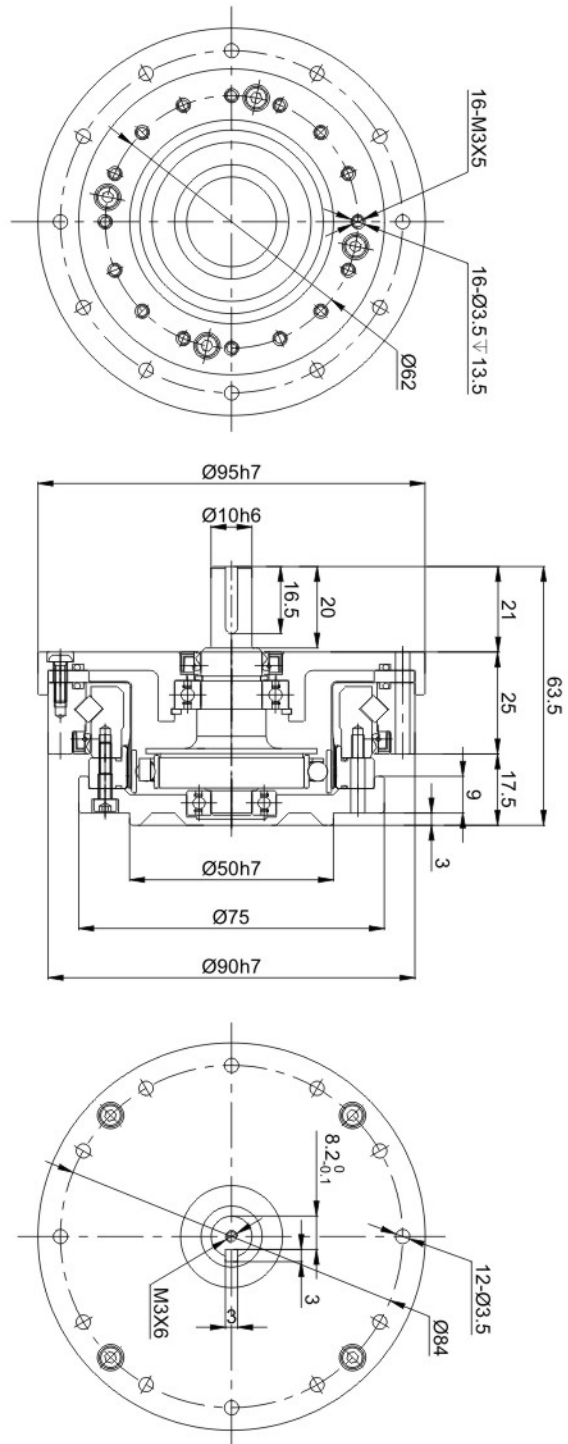


Box Unit KB-SO-17

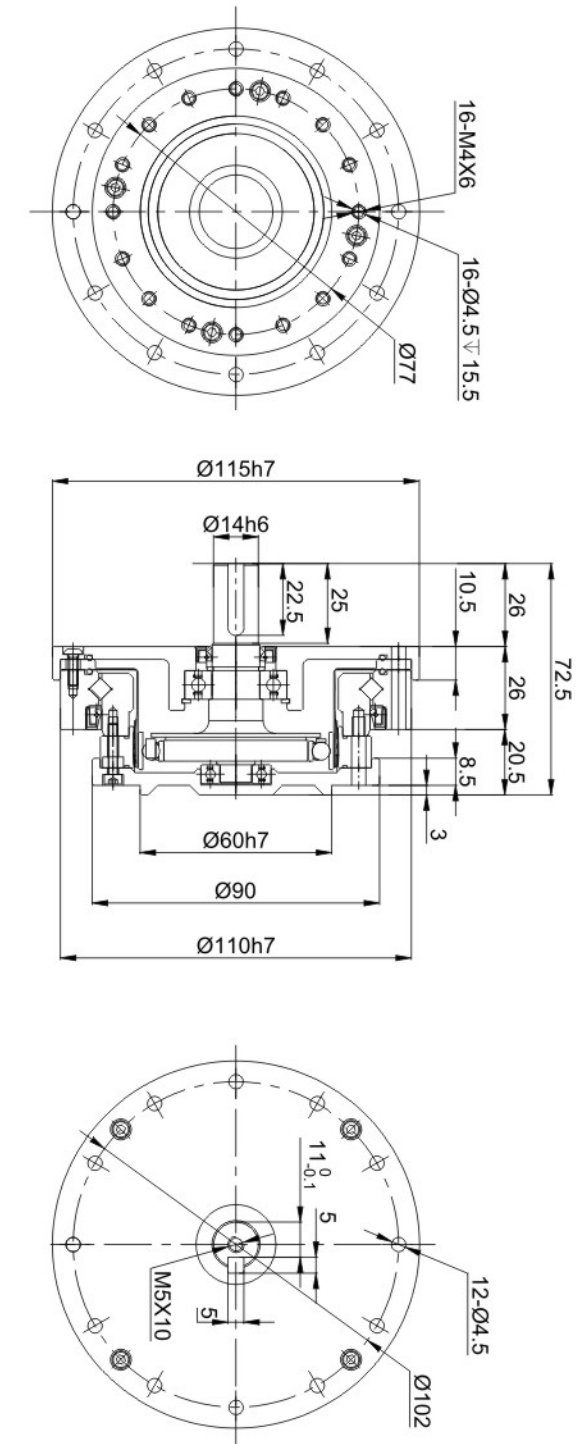


Gear Dimensions

Box Unit KB-SO-20

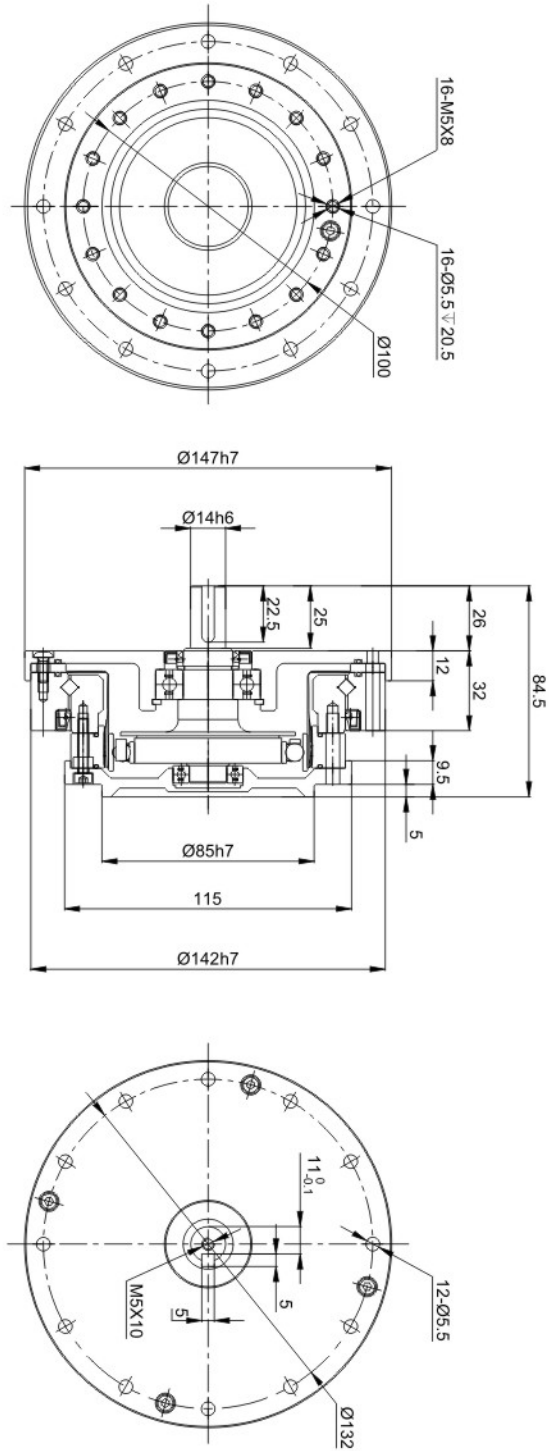


Box Unit KB-SO-25

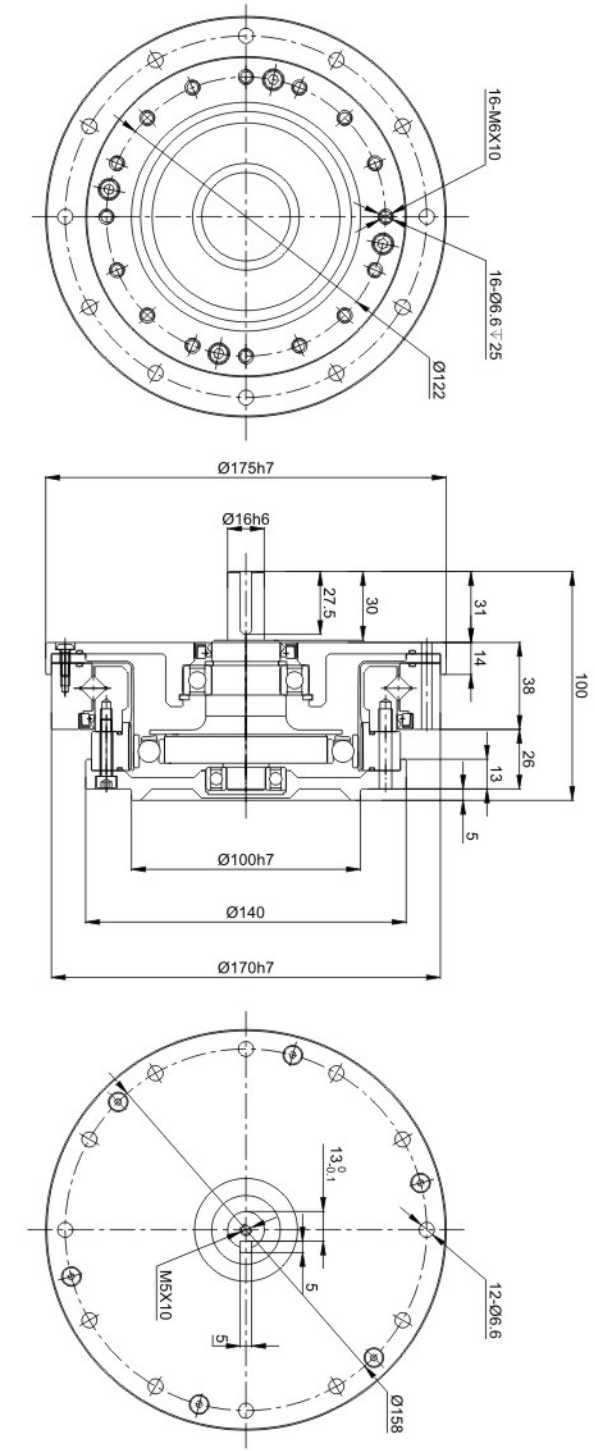


Gear Dimensions

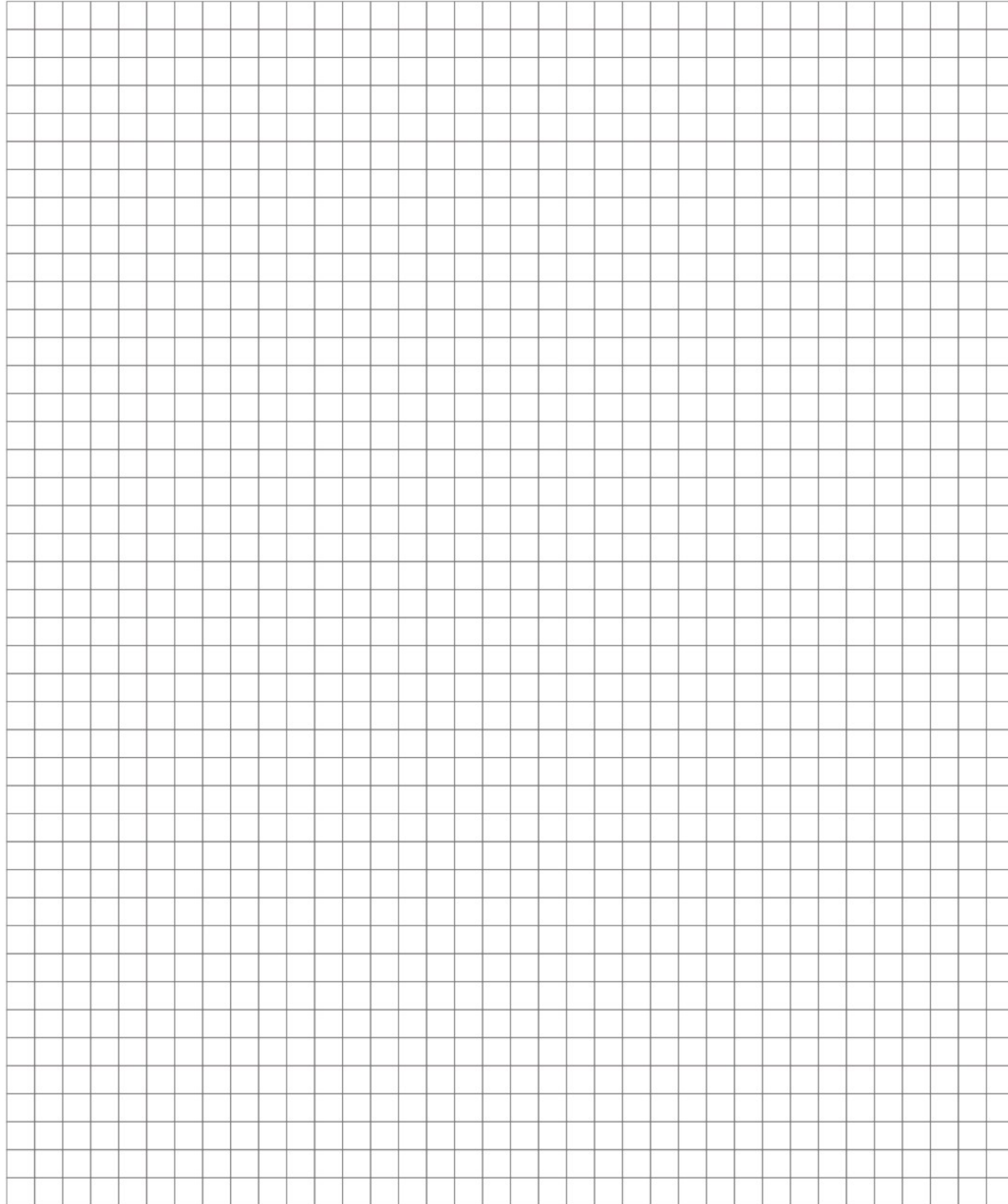
Box Unit KB-SO-32



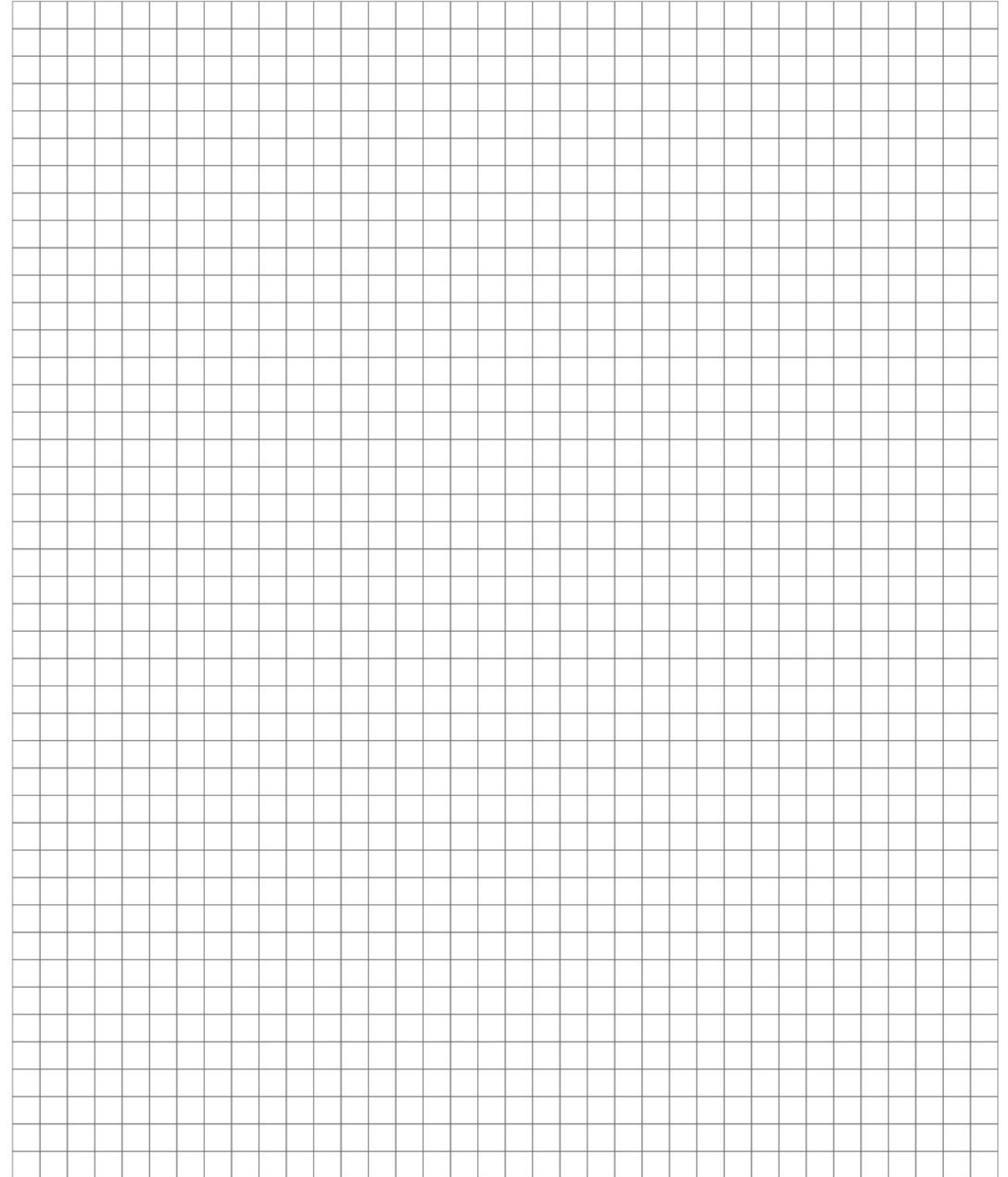
Box Unit KB-SO-40



Technical Memo



Technical Memo



Strain Wave Gear KBG-MC Series Box Unit Motor shaft closed flexspline



Ordering Code

Gear Series	Transmission Type	Gear Size		Ratios				Special Design
KBG	MC	14	50	80	100			as per customers' special requirements
		17	50	80	100	120		
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
Ordering Code		KBG-MC	-	25	-	100	-	SP

Technical Specifications

Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KBG-MC	14	50	23	9	7	46	8500	3500	0.27x10 ⁻⁵	0.49
		80	30	14	10	58				
		100	36	14	10	58				
	17	50	44	34	21	91	7300	3500	0.66x10 ⁻⁵	0.62
		80	56	35	29	109				
		100	70	51	31	109				
		120	70	51	31	109				
	20	50	73	44	33	127	6500	3500	0.16x10 ⁻⁴	0.89
		80	96	61	44	165				
		100	107	64	52	191				
		120	113	64	52	191				
		160	120	64	52	191				
	25	50	127	72	51	242	5600	3500	0.36x10 ⁻⁴	1.39
		80	178	113	82	332				
		100	204	140	87	369				
		120	217	140	87	395				
		160	229	140	87	408				
	32	50	281	140	99	497	4800	3500	1.35x10 ⁻⁴	3.02
		80	395	217	153	738				
		100	433	281	178	841				
		120	459	281	178	842				
		160	484	281	178	842				
	40	50	523	255	178	892	4000	3000	4.5x10 ⁻⁴	4.95
		80	675	369	268	1270				
100		738	484	345	1400					
120		802	586	382	1510					
160		841	586	382	1510					

Advantages

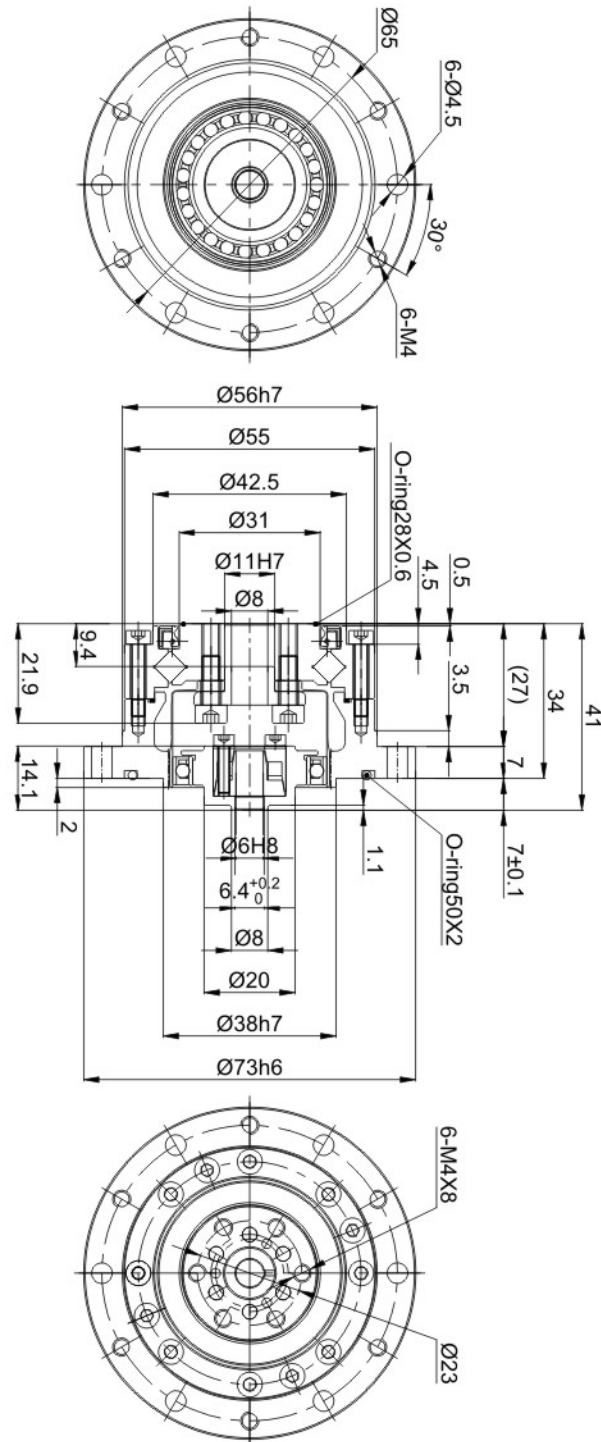
- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

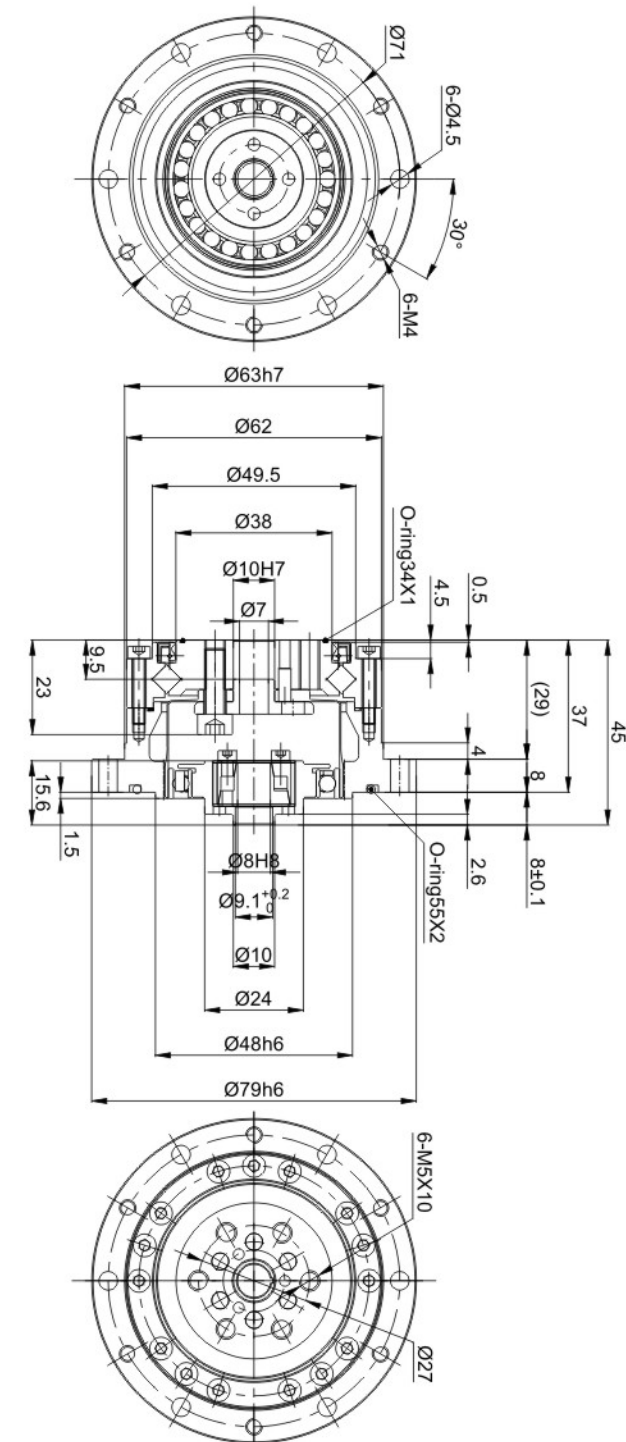
- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Gear Dimensions

Box Unit KBG-MC-14



Box Unit KBG-MC-17

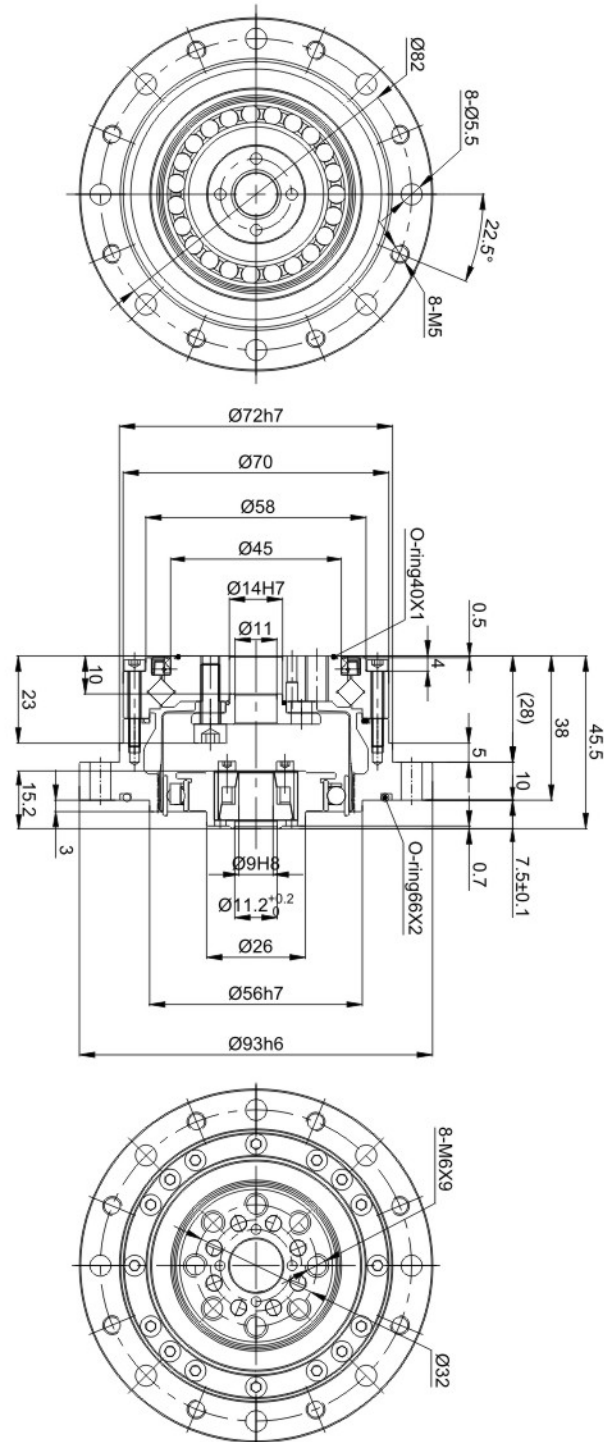


Strain Wave Gear KBG-MC Series Simplicity Box Motor shaft closed flexspline

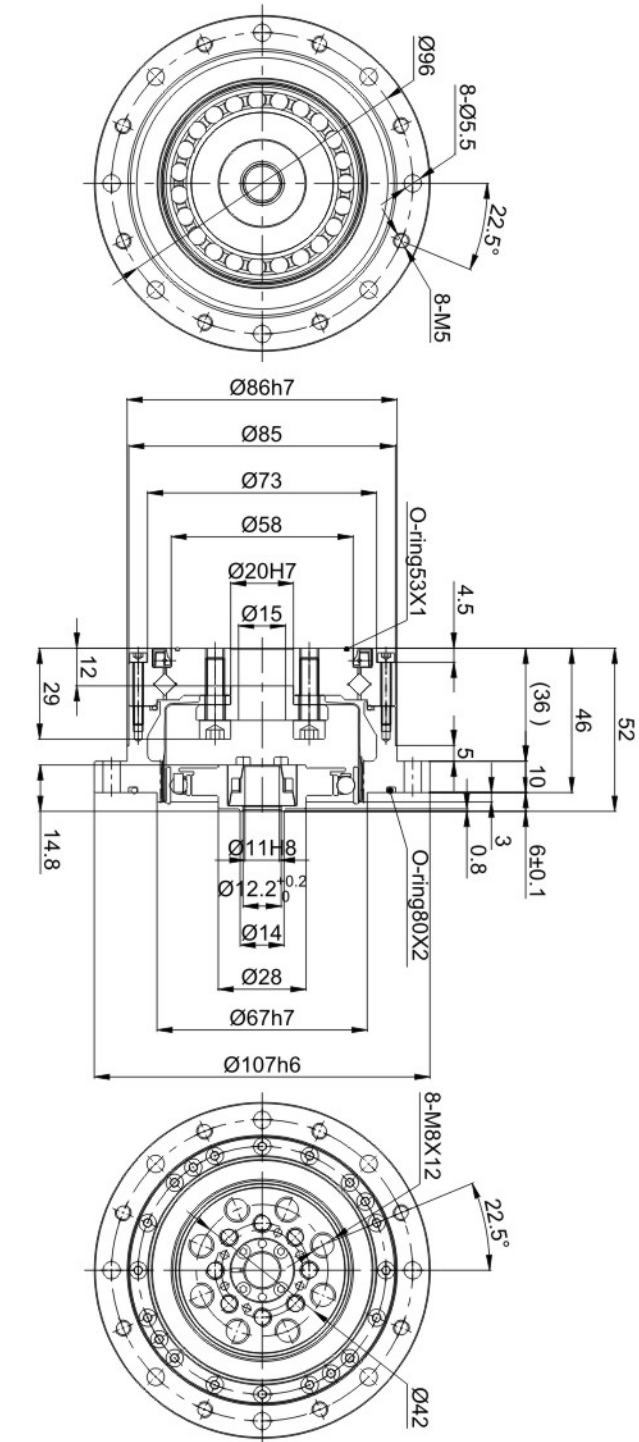
Strain Wave Gear KBG-MC Series Simplicity Box Motor shaft closed flexspline

Gear Dimensions

Box Unit KBG-MC-20

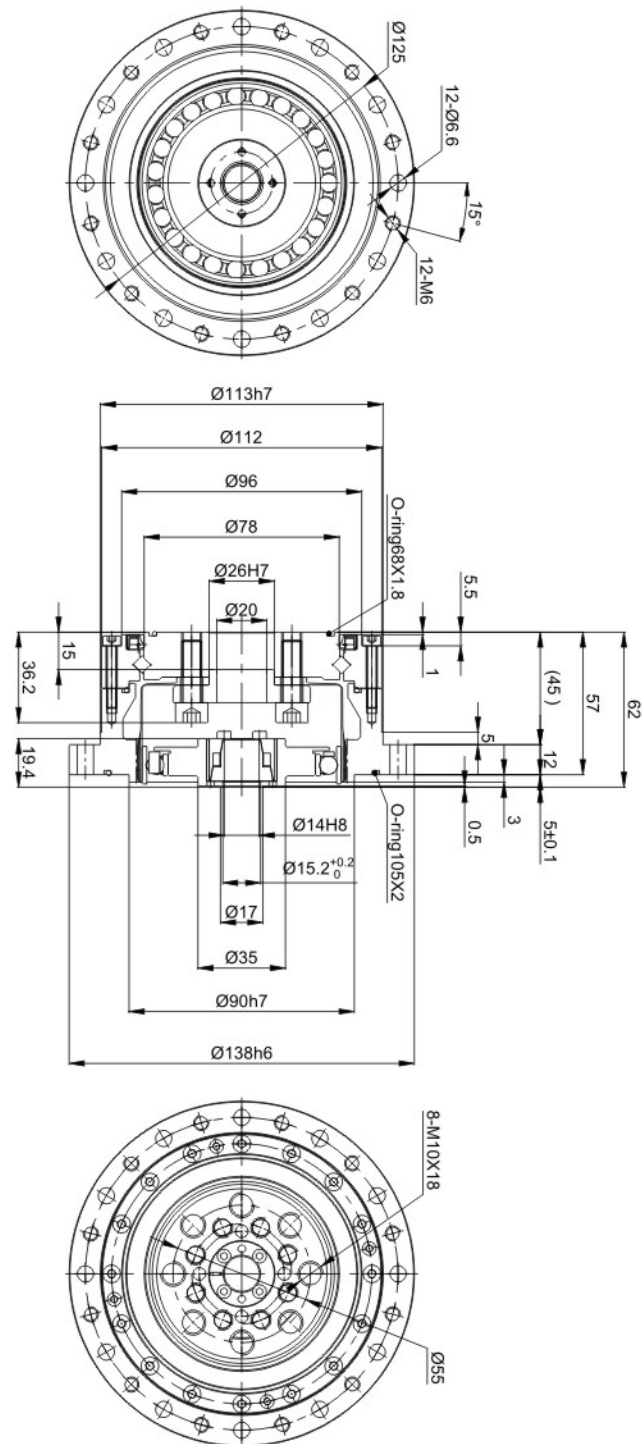


Box Unit KBG-MC-25

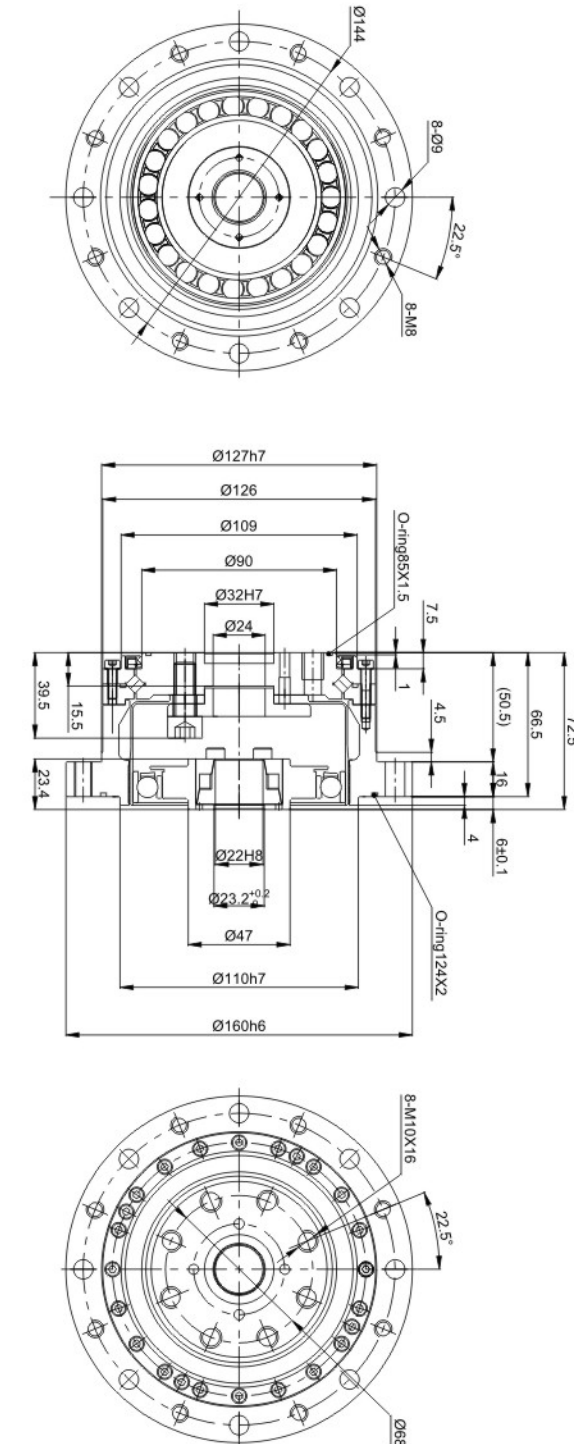


Gear Dimensions

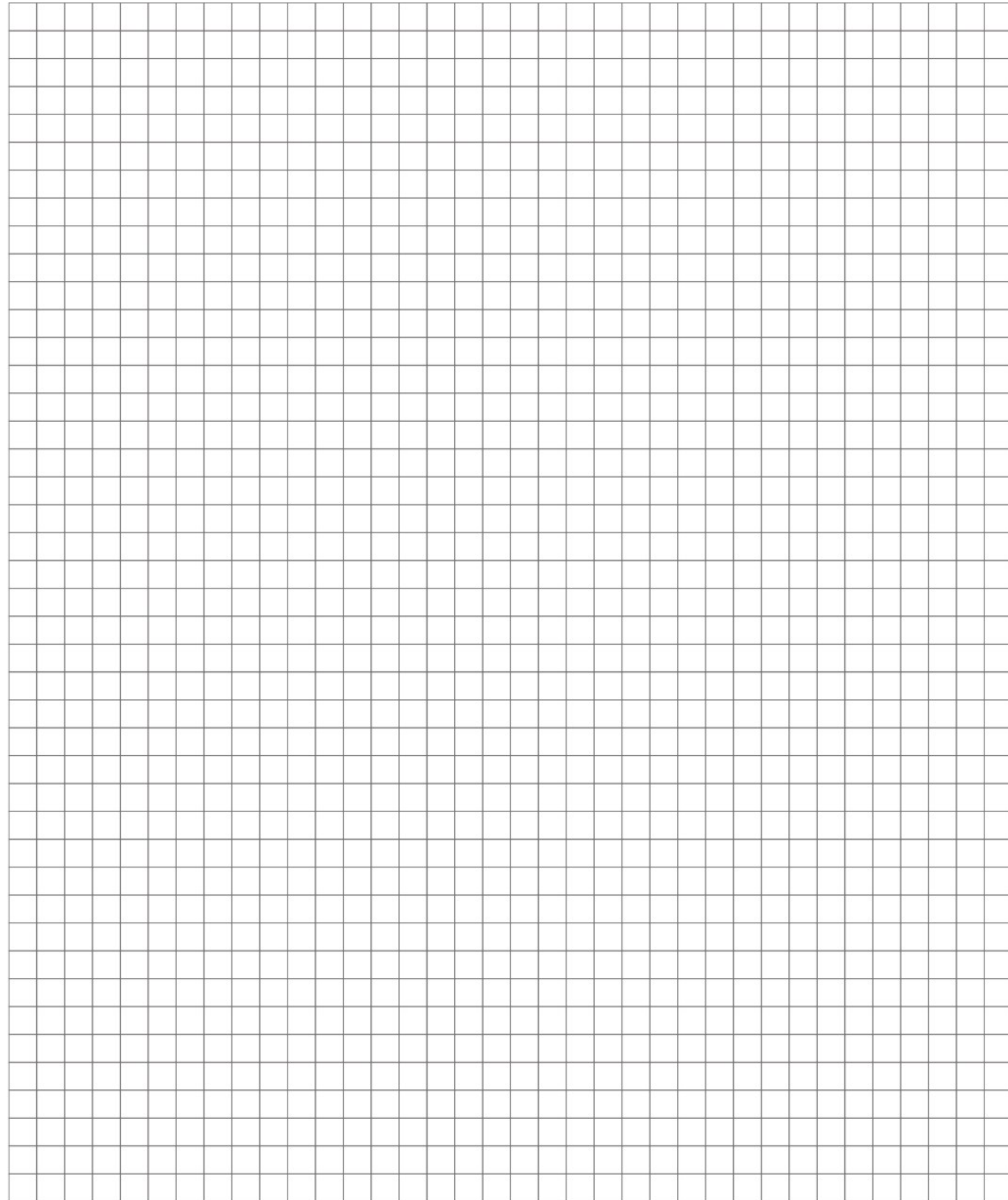
Box Unit KBG-MC-32



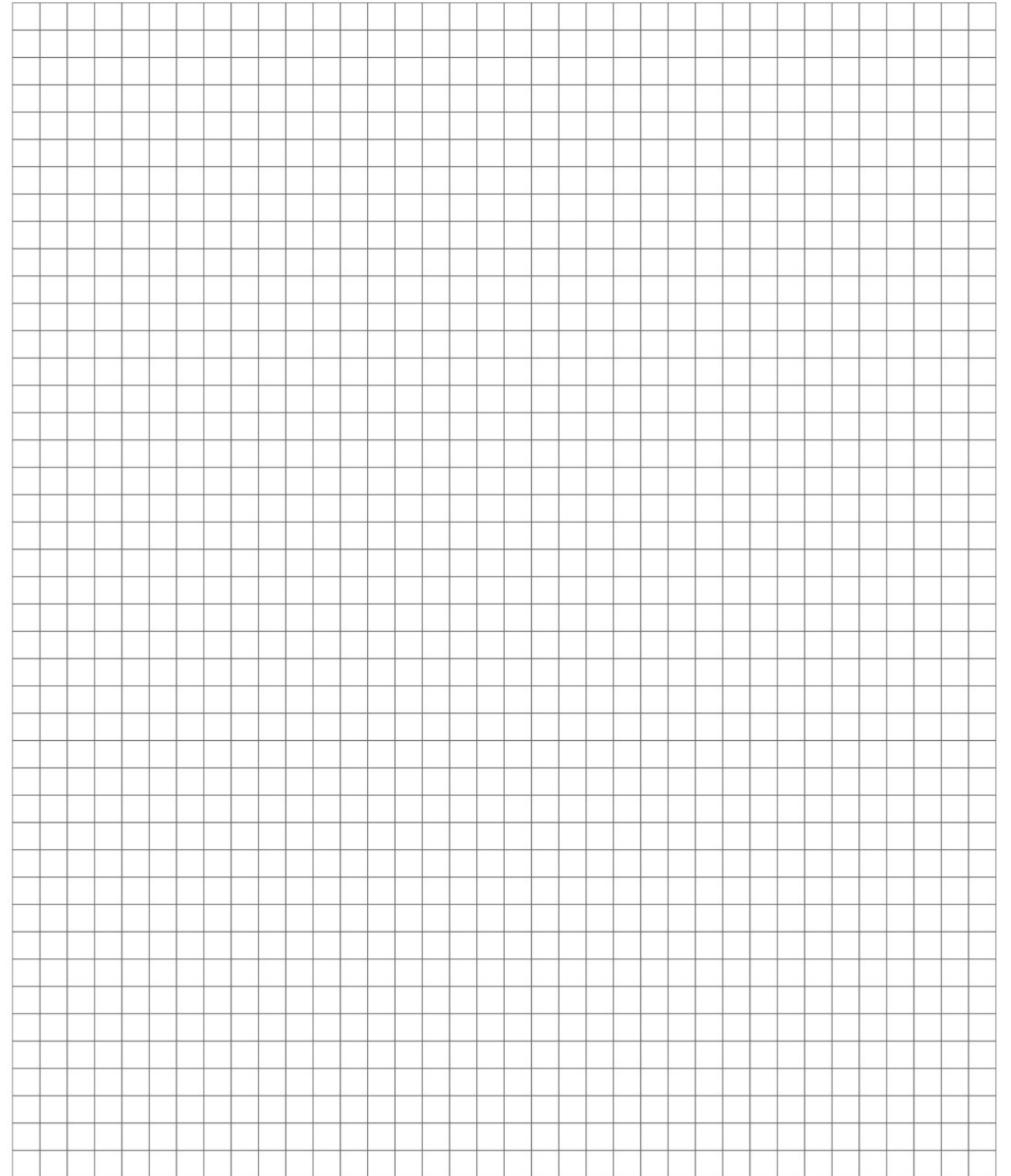
Box Unit KBG-MC-40



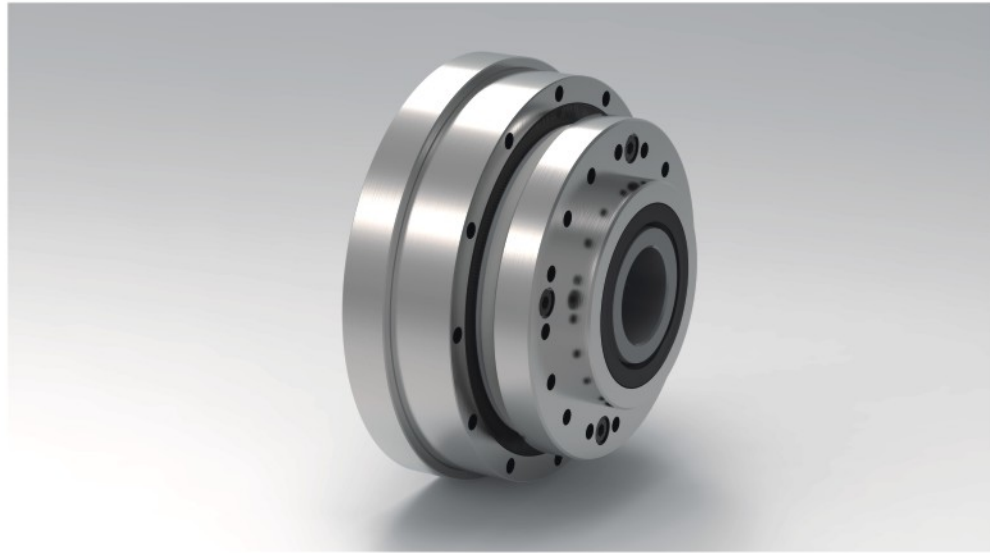
Technical Memo



Technical Memo



Strain Wave Gear KBG-HO Series Box Unit Hollow shaft open Flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

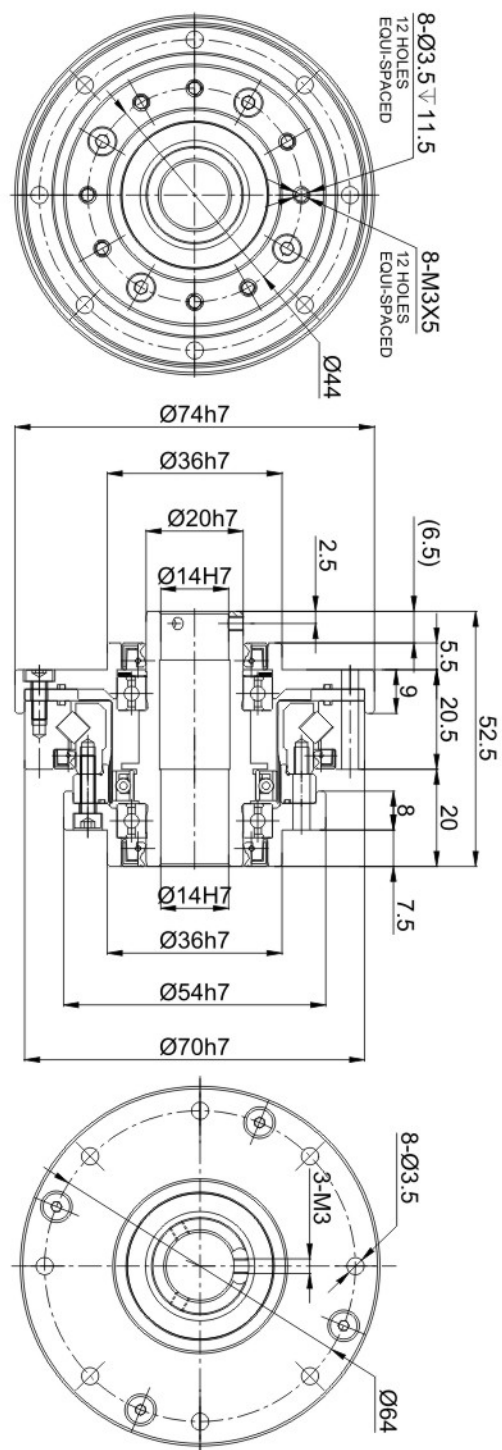
Gear Series	Transmission Type	Gear Size	Ratios				Special Design	
KBG	HO	14	50	80	100		as per customers' special requirements	
		17	50	80	100	120		
		20	50	80	100	120		160
		25	50	80	100	120		160
		32	50	80	100	120		160
Ordering Code								
KBG-HO		—	25	—	100	—	SP	

Technical Specifications

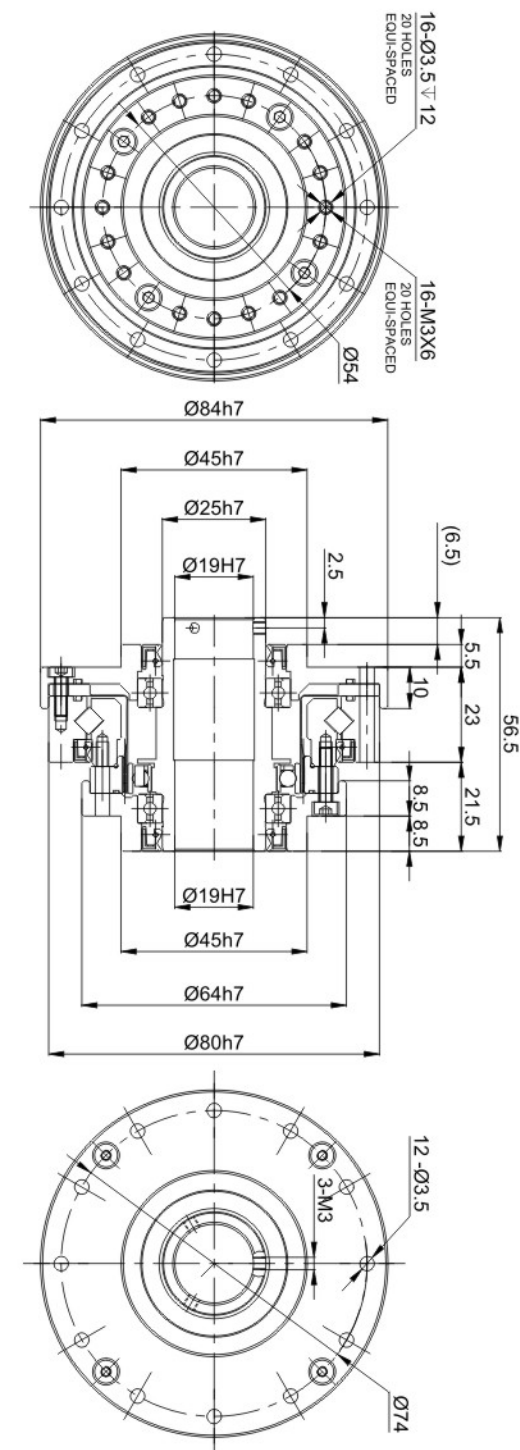
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight				
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg				
KBG-HO	14	50	23	9	7	46	8500	3500	0.18x10 ⁻⁴	0.71				
		80	30	14	10	61								
		100	36	14	10	70								
	17	50	44	34	21	91	7300	3500	0.34x10 ⁻⁴	1.00				
		80	56	35	29	113								
		100	70	51	31	143								
		120	70	51	31	112								
	20	50	73	44	33	127	6500	3500	0.58x10 ⁻⁴	1.38				
		80	96	61	44	165								
		100	107	64	52	191								
		120	113	64	52	191								
		160	120	64	52	191								
25	50	127	72	51	242	5600	3500	1.23x10 ⁻⁴	2.1					
	80	178	113	82	332									
	100	204	140	87	369									
	120	217	140	87	395									
32	50	281	140	99	497	4800	3500	3.66x10 ⁻⁴	4.5					
	80	395	217	153	738									
	100	433	281	178	841									
	120	459	281	178	892									
	160	484	281	178	892									
40	50	523	255	178	892	4000	3000	9.28x10 ⁻⁴	7.7					
	80	675	369	268	1270									
	100	738	484	345	1400									
	120	802	586	382	1530									
										160	841	586	382	1530

Gear Dimensions

Box Unit KBG-HO-14

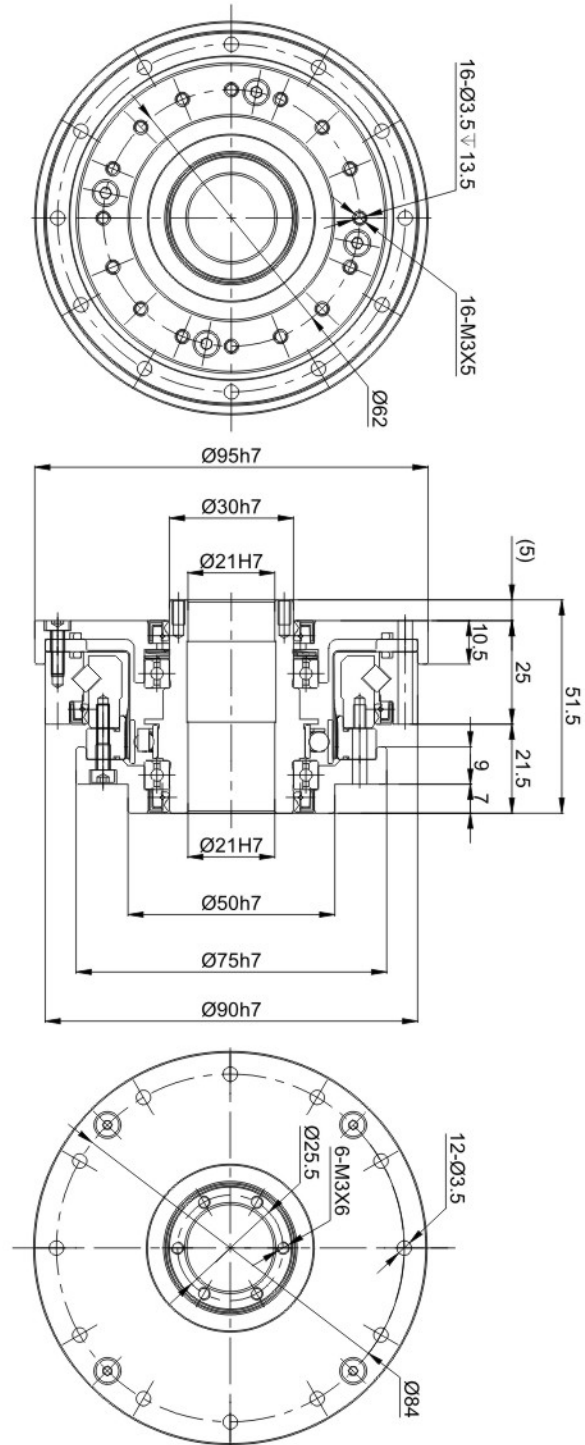


Box Unit KBG-HO-17

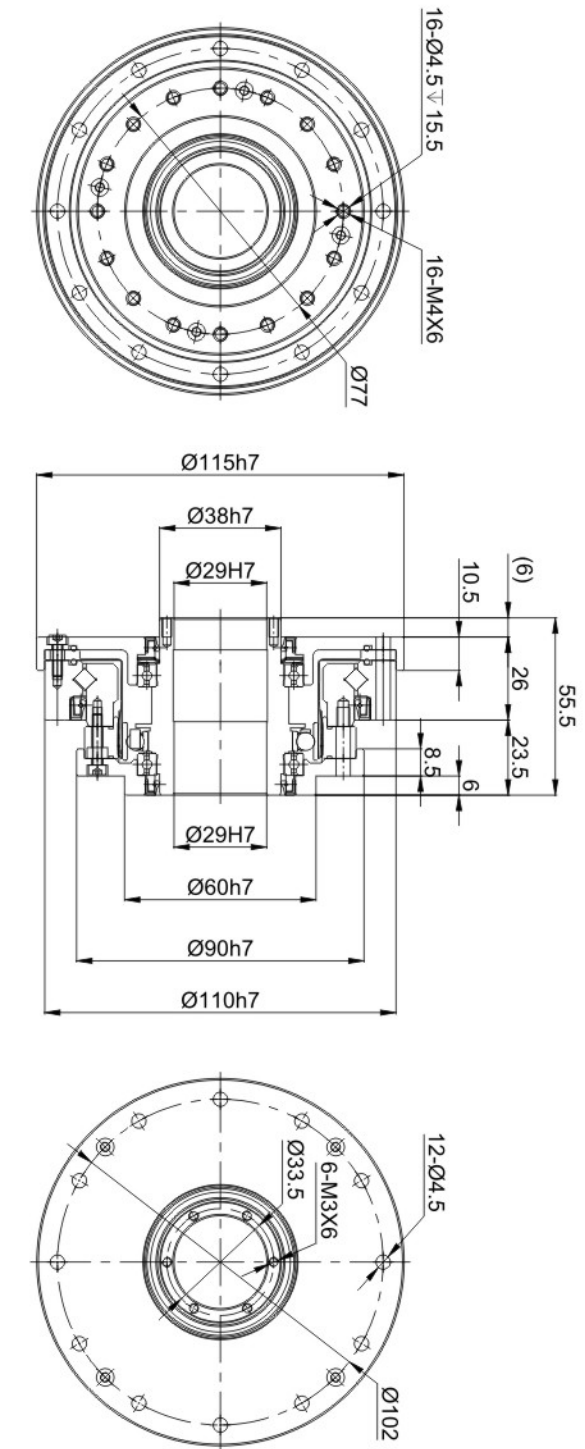


Gear Dimensions

Box Unit KBG-HO-20



Box Unit KBG-HO-25

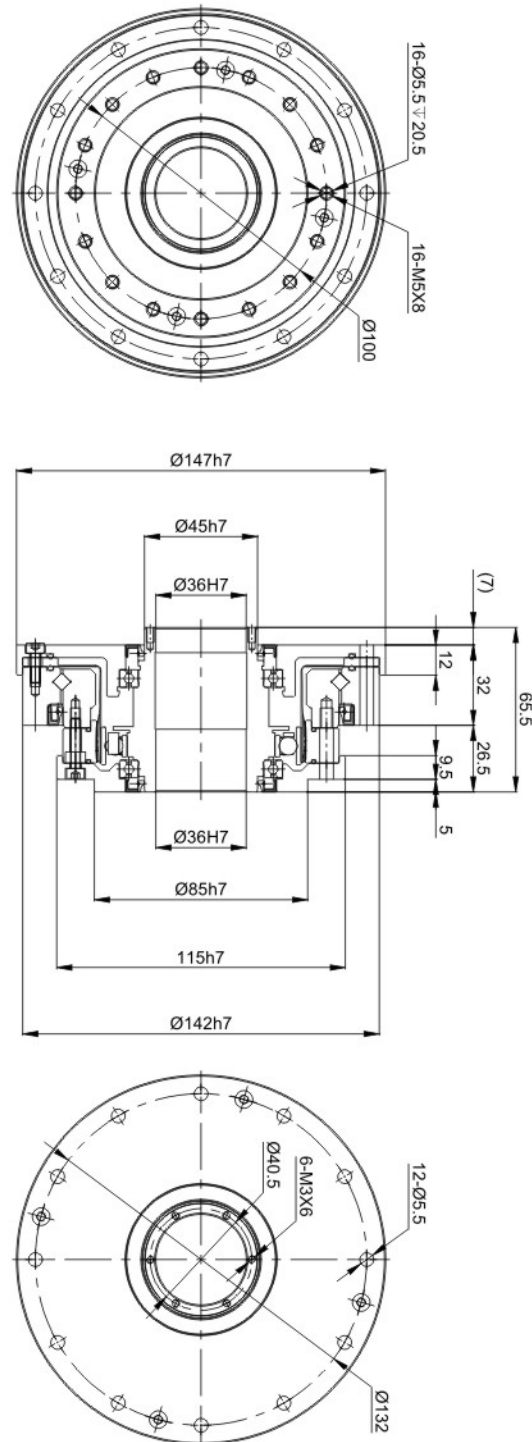


Strain Wave Gear KBG-HO Series Component Kit
Hollow shaft open Flexspline

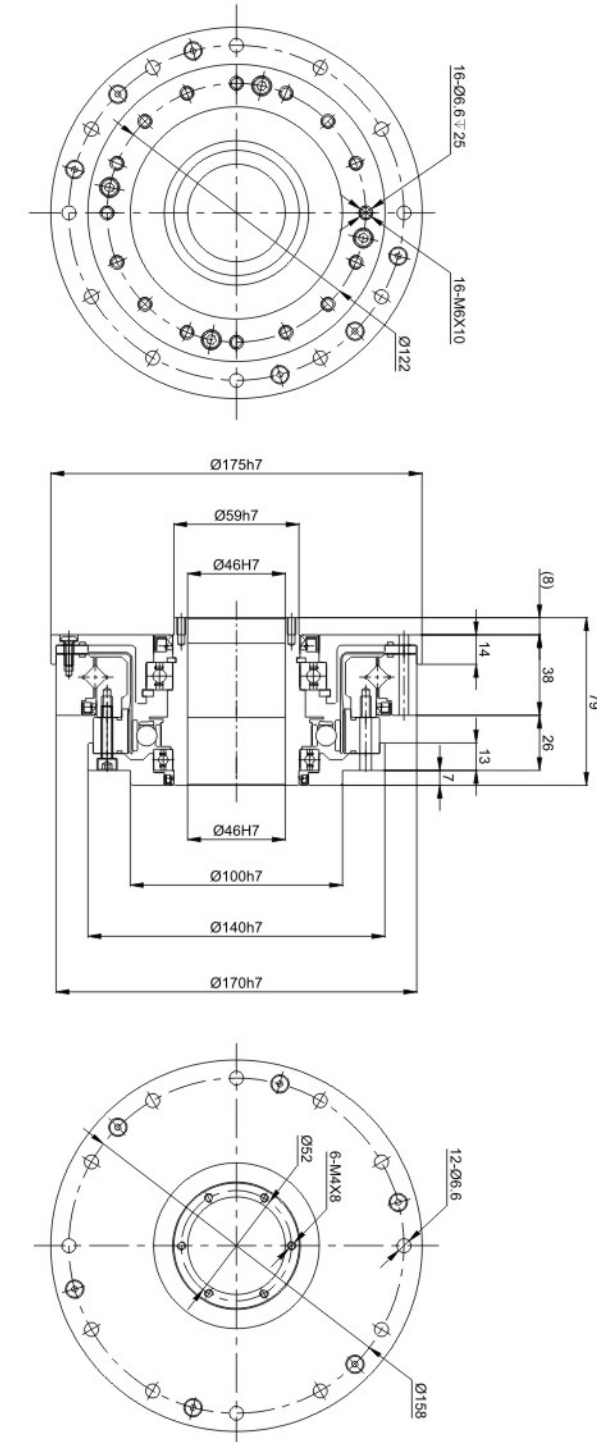
Strain Wave Gear KBG-HO Series Component Kit
Hollow shaft open Flexspline

Gear Dimensions

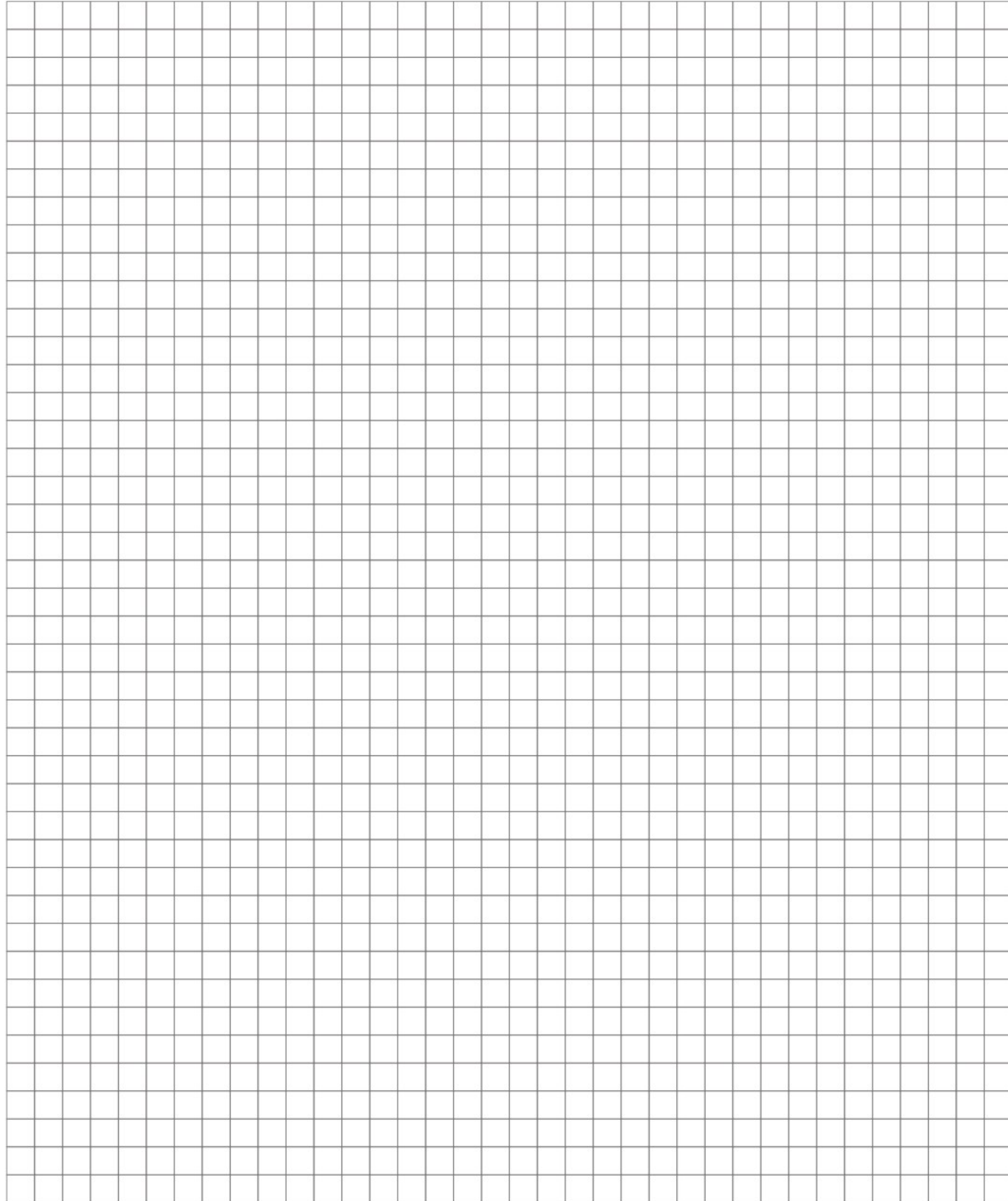
Box Unit KBG-HO-32



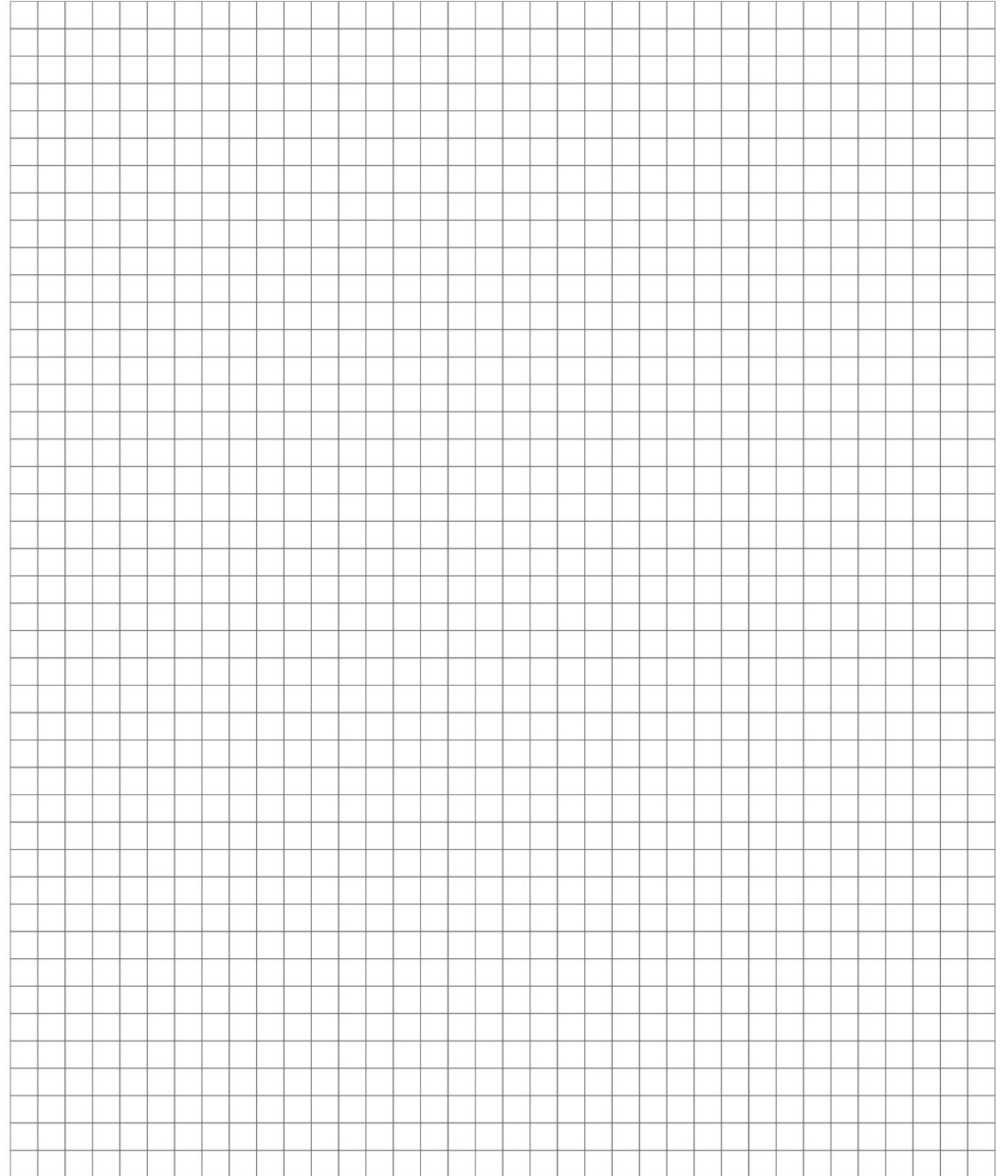
Box Unit KBG-HO-40



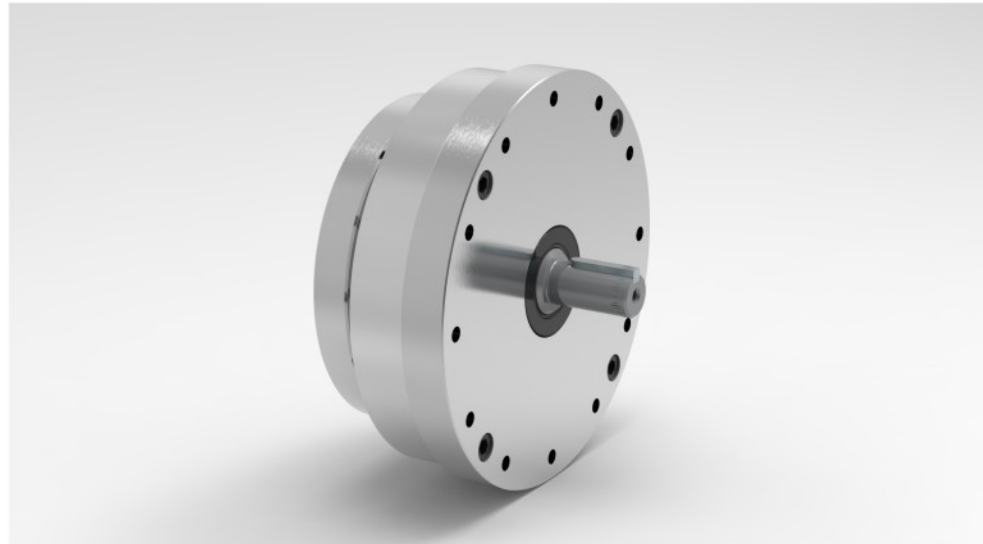
Technical Memo



Technical Memo



Strain Wave Gear KBG-SO Series Box Unit Solid Shaft Open Flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

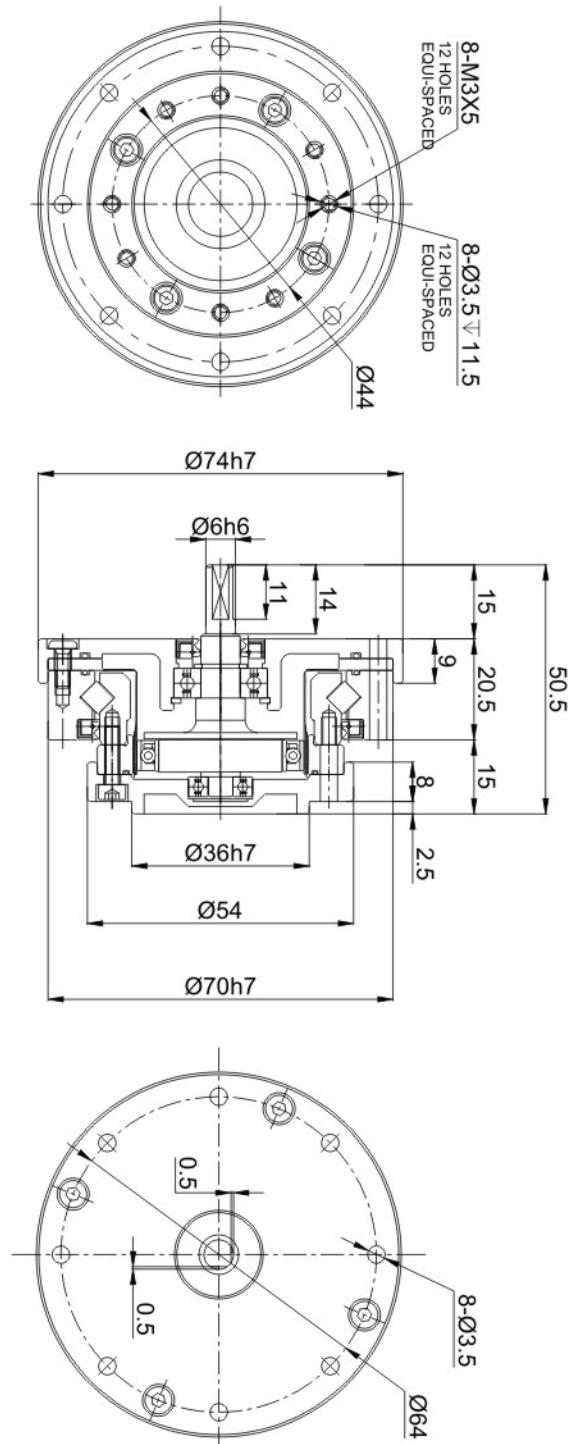
Gear Series	Transmission Type	Gear Size		Ratios				Special Design
KBG	SO	14	50	80	100			as per customers' special requirements
		17	50	80	100	120		
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
Ordering Code								
KBG-SO		-	25	-	100			SP

Technical Specifications

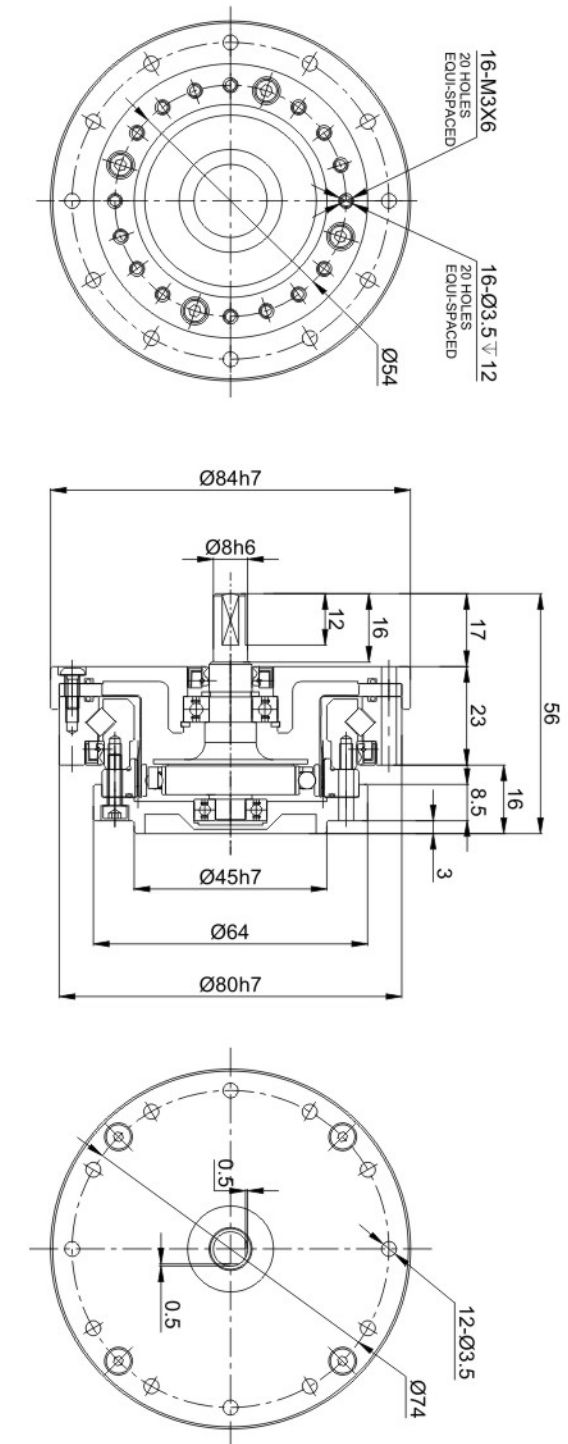
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm				
KBG-SO	14	50	23	9	7	46	8500	3500	0.25x10 ⁻⁵	0.49
		80	30	14	10	61				
		100	36	14	10	70				
	17	50	44	34	21	91	7300	3500	0.59x10 ⁻⁵	0.62
		80	56	35	29	113				
		100	70	51	31	143				
		120	70	51	31	112				
	20	50	73	44	33	127	6500	3500	0.14x10 ⁻⁴	0.89
		80	96	61	44	165				
		100	107	64	52	191				
		120	113	64	52	191				
		160	120	64	52	191				
25	50	127	72	51	242	5600	3500	0.32x10 ⁻⁴	1.39	
	80	178	113	82	332					
	100	204	140	87	369					
	120	217	140	87	395					
	160	229	140	87	408					
32	50	281	140	99	497	4800	3500	1.20x10 ⁻⁴	3.02	
	80	395	217	153	738					
	100	433	281	178	841					
	120	459	281	178	892					
	160	484	281	178	892					
40	50	523	255	178	892	4000	3000	3.41x10 ⁻⁴	4.95	
	80	675	369	268	1270					
	100	738	484	345	1400					
	120	802	586	382	1530					
	160	841	586	382	1530					

Gear Dimensions

Box Unit KBG-SO-14

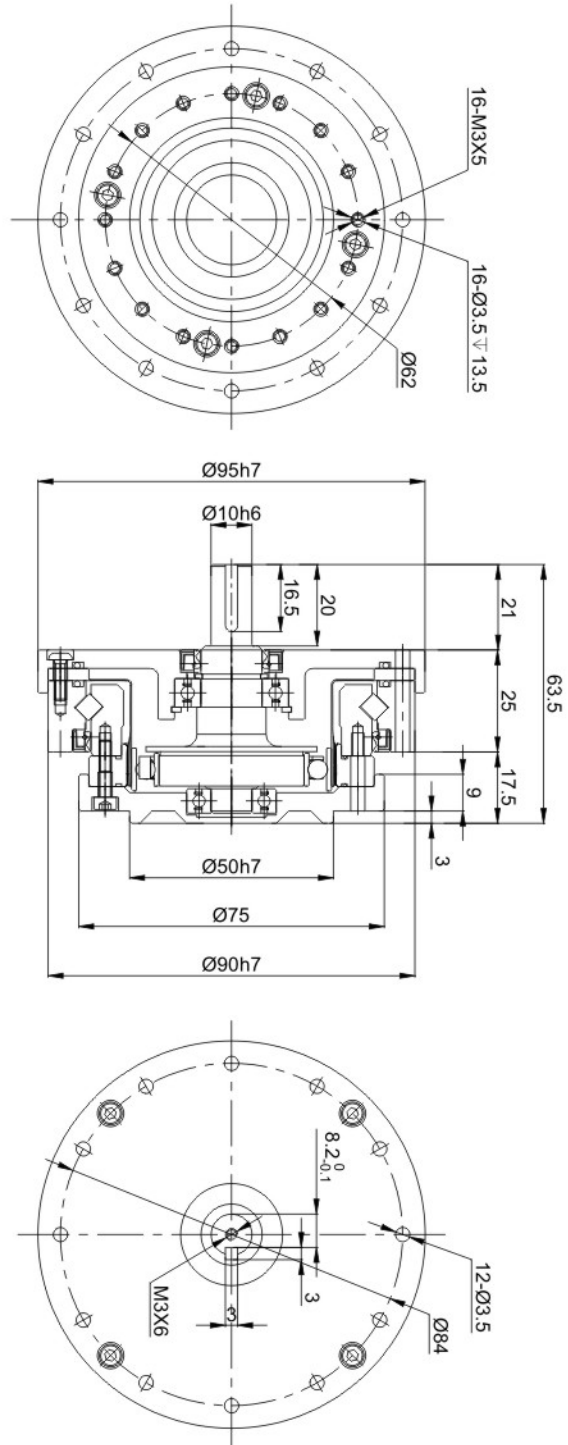


Box Unit KBG-SO-17

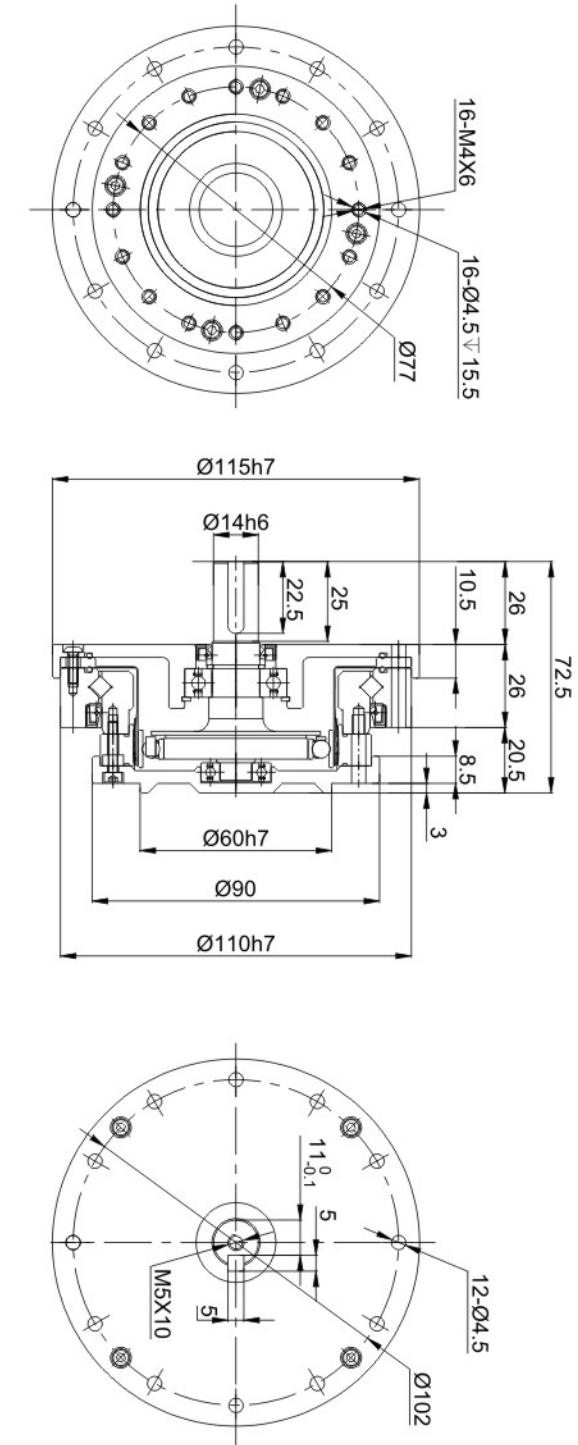


Gear Dimensions

Box Unit KBG-SO-20

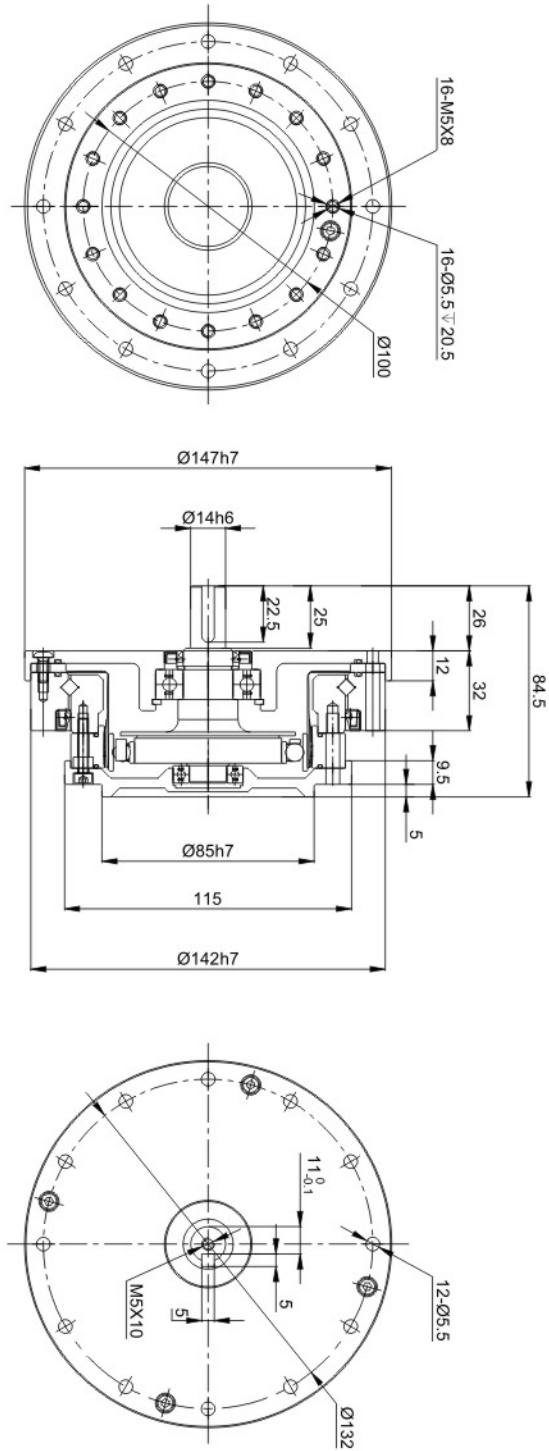


Box Unit KBG-SO-25

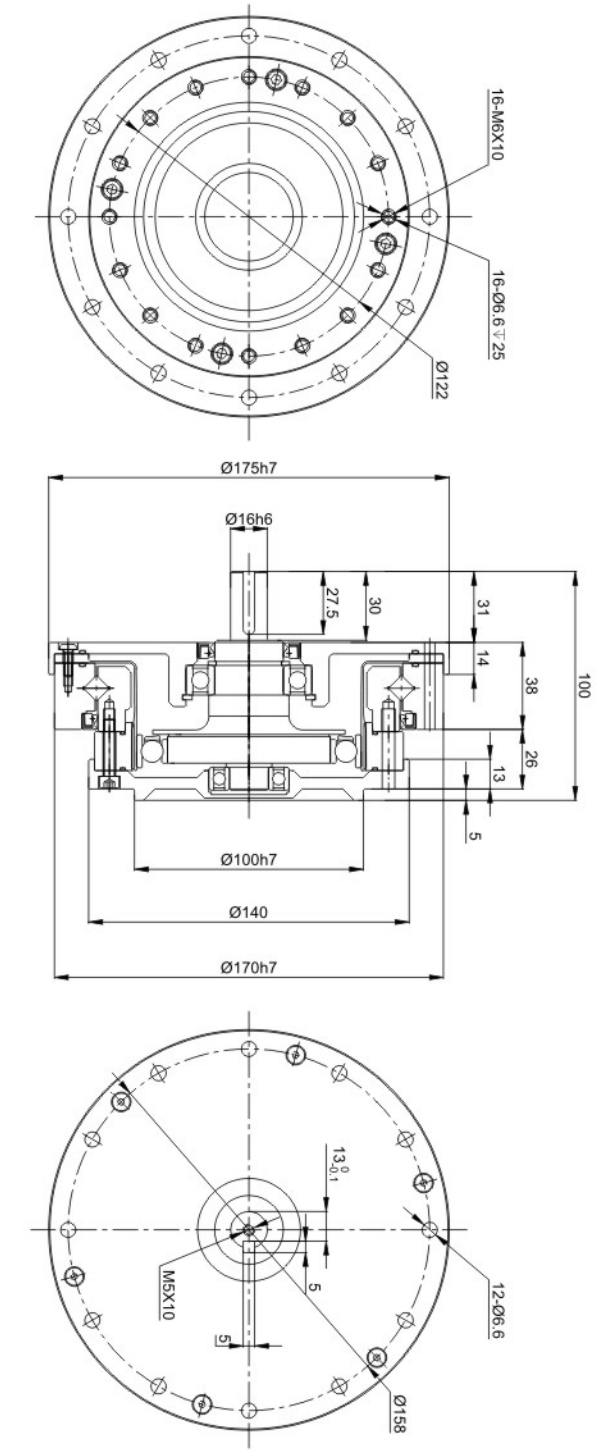


Gear Dimensions

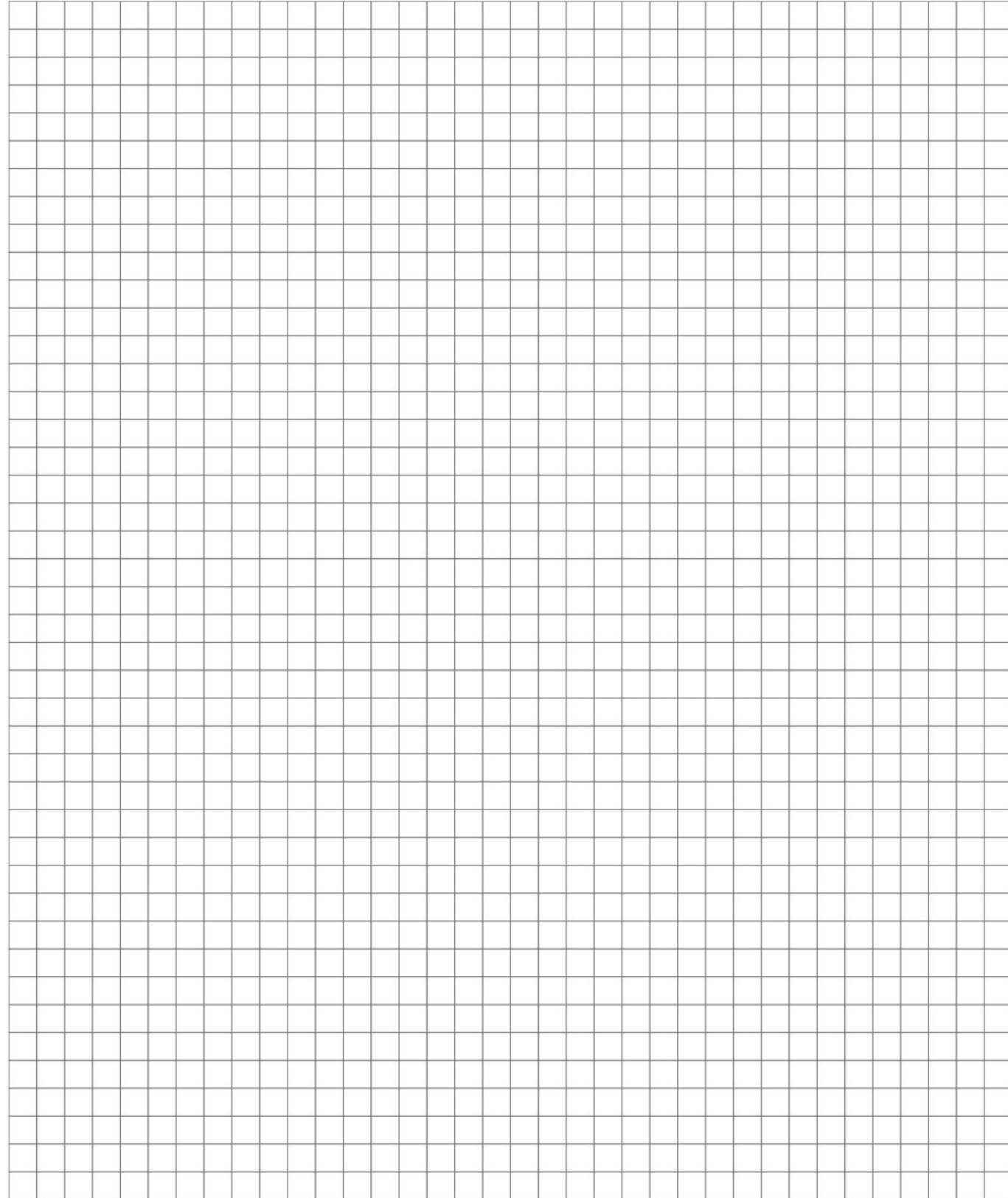
Box Unit KBG-SO-32



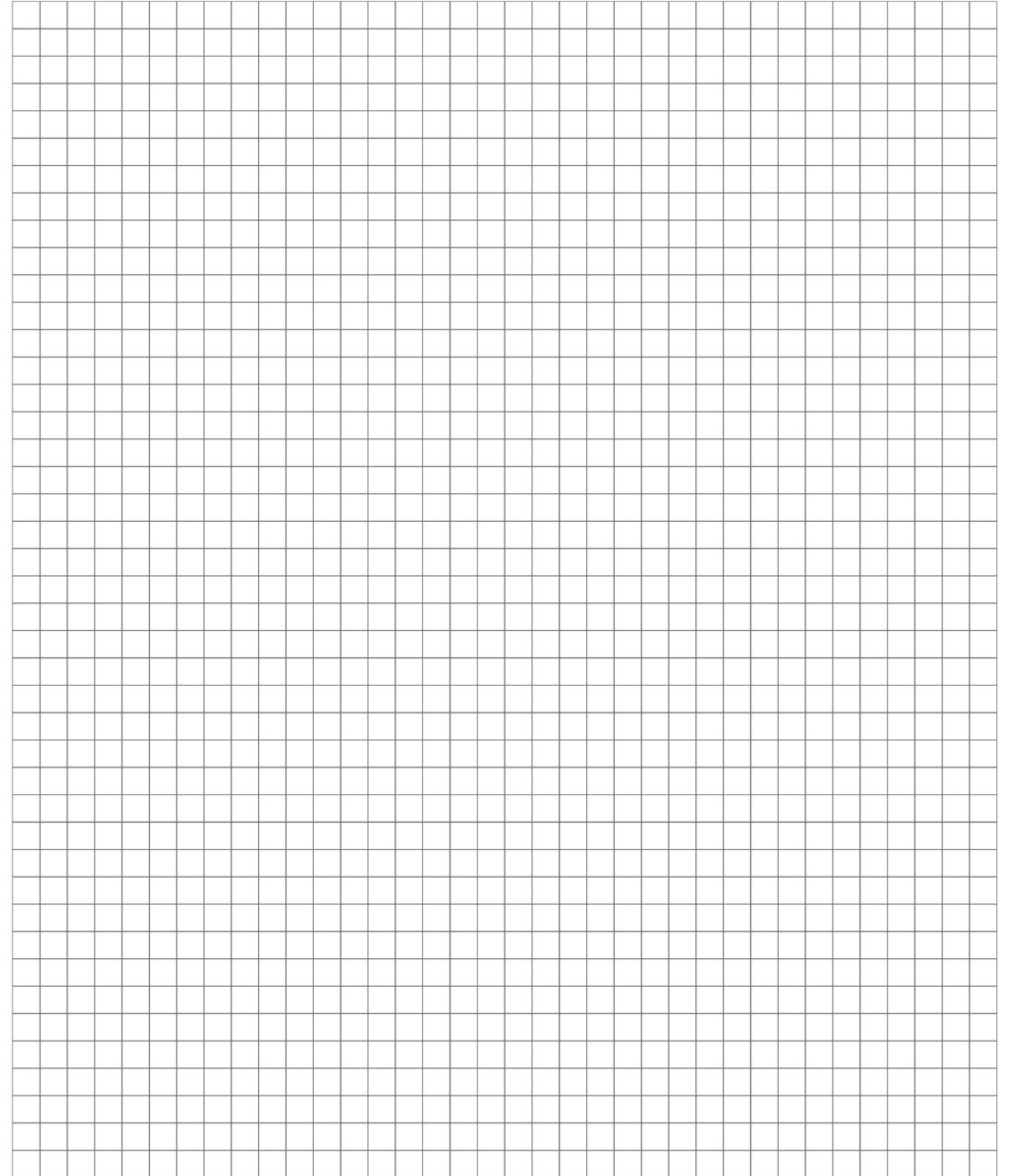
Box Unit KBG-SO-40



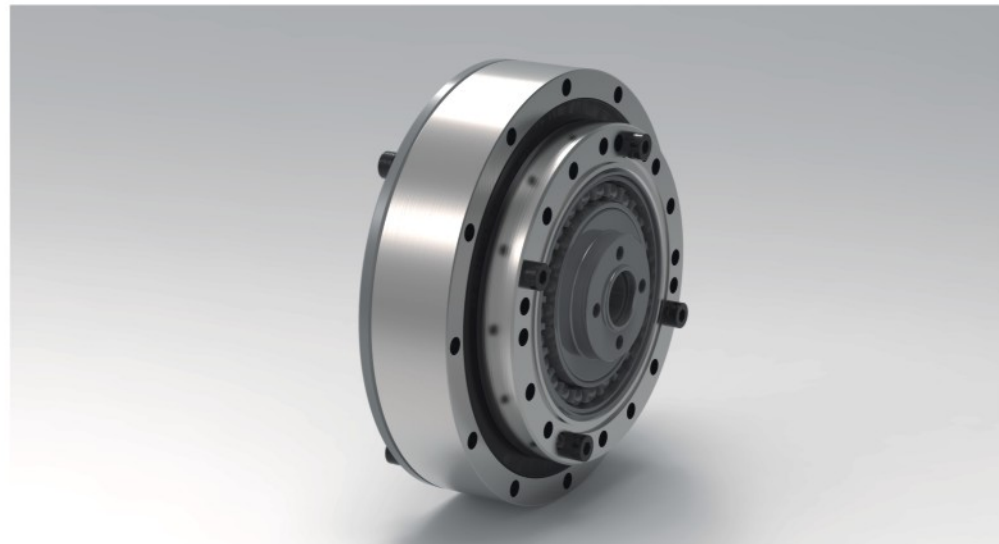
Technical Memo



Technical Memo



Strain Wave Gear KSBG-MO Series Simplicity Box Motor shaft open flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

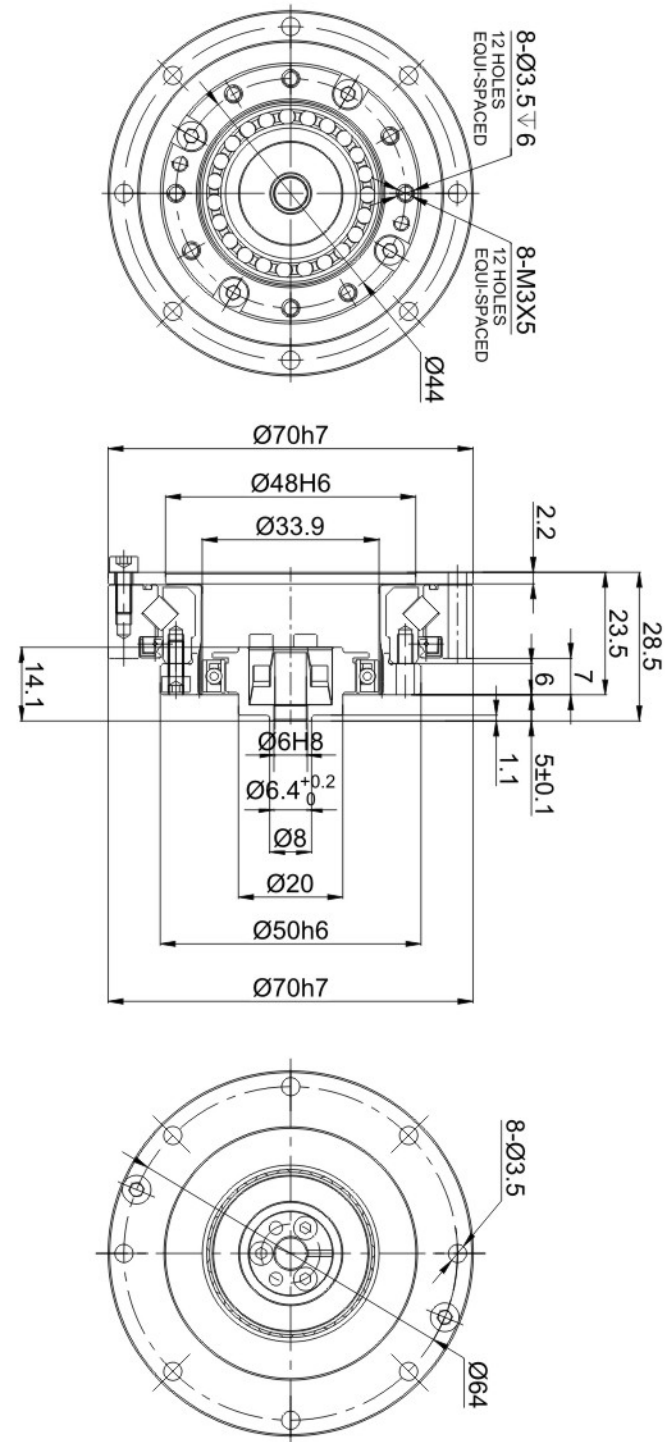
Gear Series	Transmission Type	Gear Size	Ratios				Special Design	
KSBG	MO	14	50	80	100		as per customers' special requirements	
		17	50	80	100	120		
		20	50	80	100	120		160
		25	50	80	100	120		160
		32	50	80	100	120		160
Ordering Code								
KSBG-MO		-	25	-	100	-	SP	

Technical Specifications

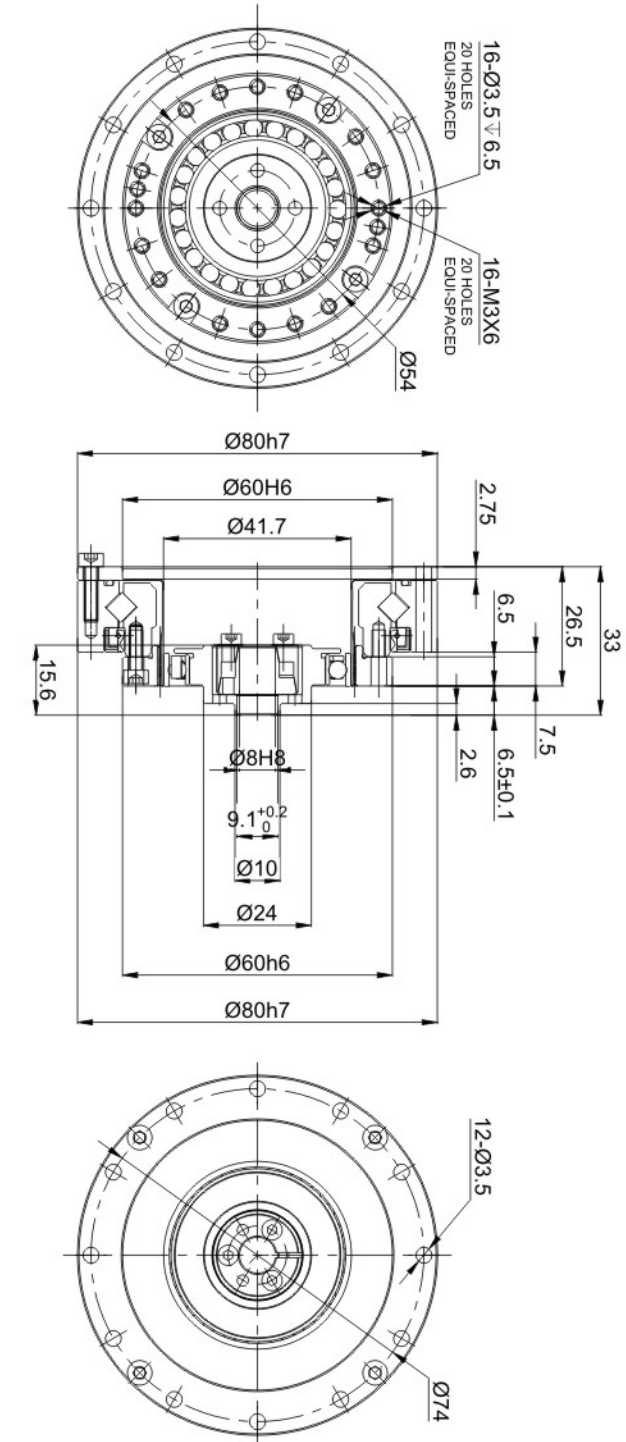
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KSBG-MO	14	50	23	9	7	46	8500	3500	0.27x10 ⁻⁵	0.49
		80	30	14	10	61				
		100	36	14	10	70				
	17	50	44	34	21	91	7300	3500	0.66x10 ⁻⁵	0.62
		80	56	35	29	113				
		100	70	51	31	143				
		120	70	51	31	112				
	20	50	73	44	33	127	6500	3500	0.16x10 ⁻⁴	0.89
		80	96	61	44	165				
		100	107	64	52	191				
		120	113	64	52	191				
		160	120	64	52	191				
25	50	127	72	51	242	5600	3500	0.36x10 ⁻⁴	1.39	
	80	178	113	82	332					
	100	204	140	87	369					
	120	217	140	87	395					
	160	229	140	87	408					
32	50	281	140	99	497	4800	3500	1.35x10 ⁻⁴	3.02	
	80	395	217	153	738					
	100	433	281	178	841					
	120	459	281	178	892					
	160	484	281	178	892					
40	50	523	255	178	892	4000	3000	4.5x10 ⁻⁴	4.95	
	80	675	369	268	1270					
	100	738	484	345	1400					
	120	802	586	382	1530					
	160	841	586	382	1530					

Gear Dimensions

Simplicity Box KSBG-MO-14

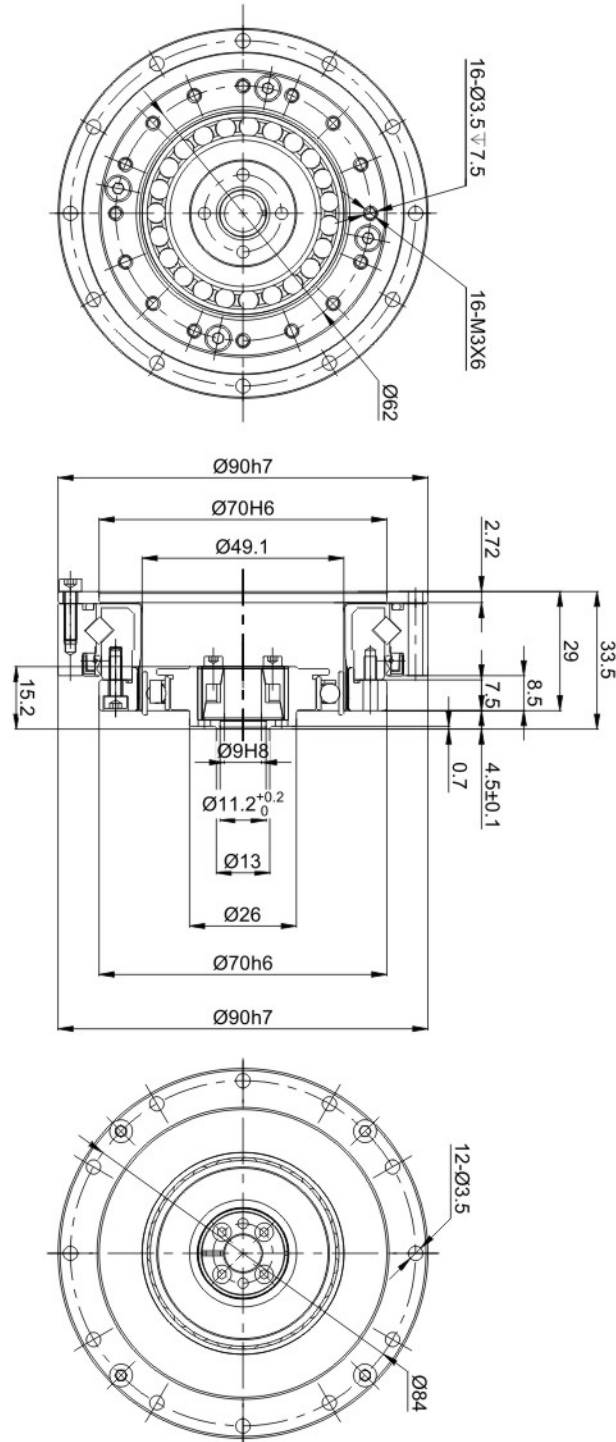


Simplicity Box KSBG-MO-17

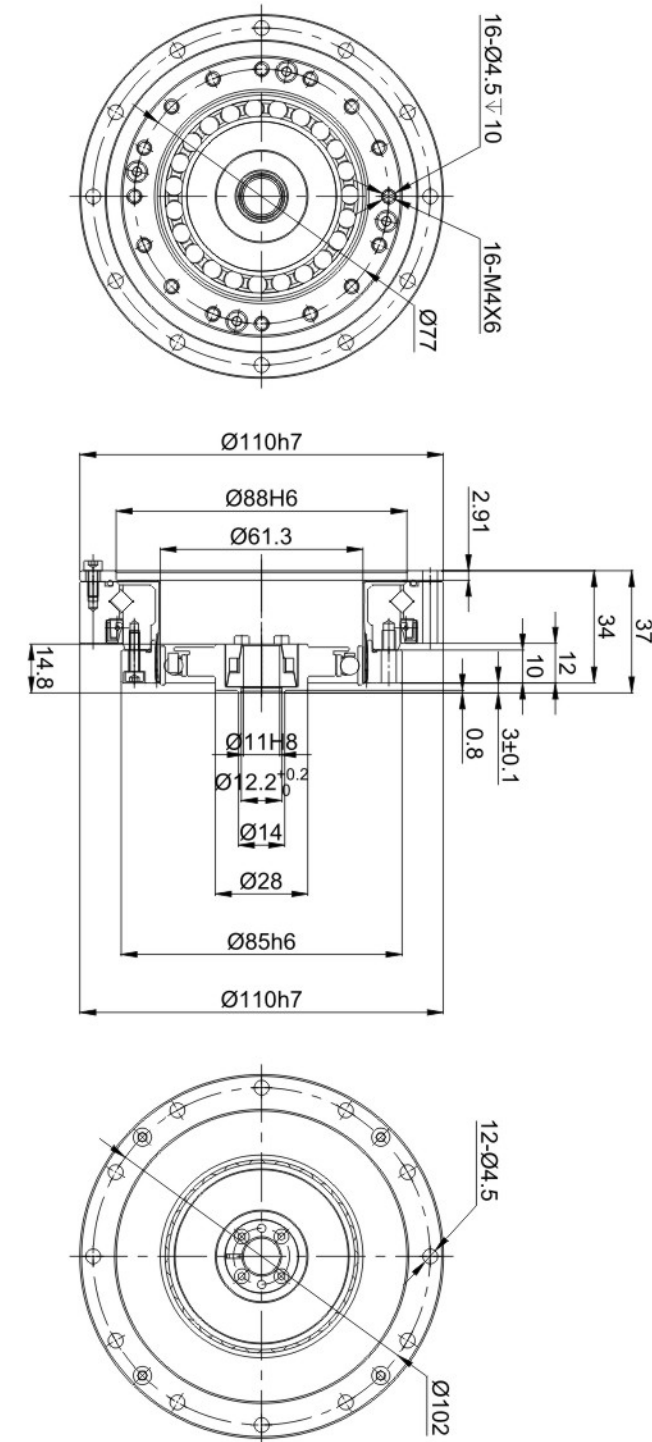


Gear Dimensions

Simplicity Box KSBG-MO-20



Simplicity Box KSBG-MO-25

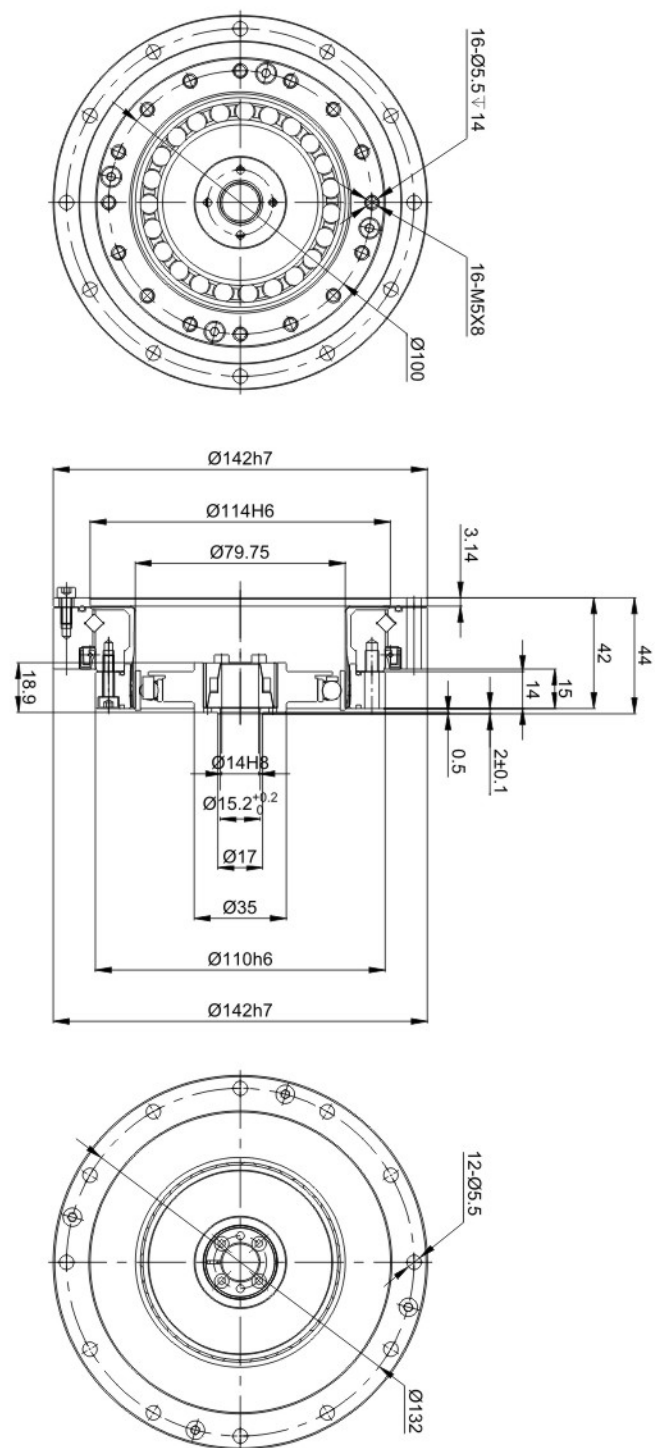


Strain Wave Gear KSBG-MO Series Simplicity Box
Motor shaft closed flexspline

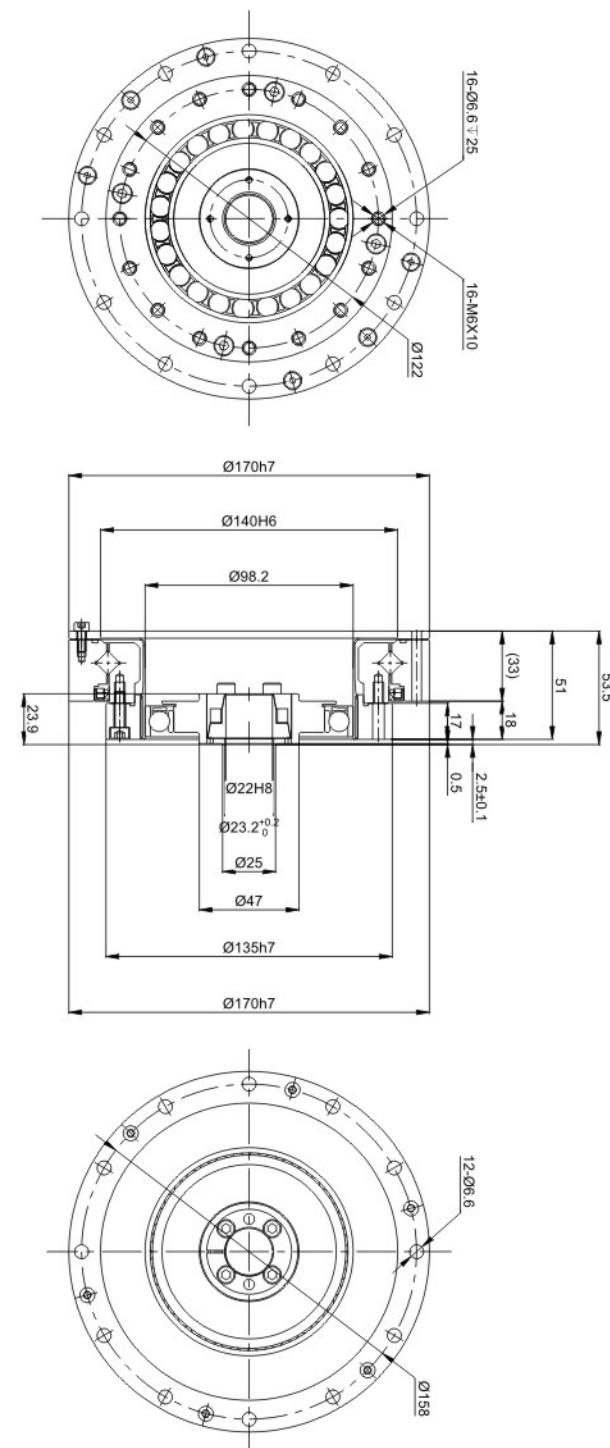
Strain Wave Gear KSBG-MO Series Simplicity Box
Motor shaft closed flexspline

Gear Dimensions

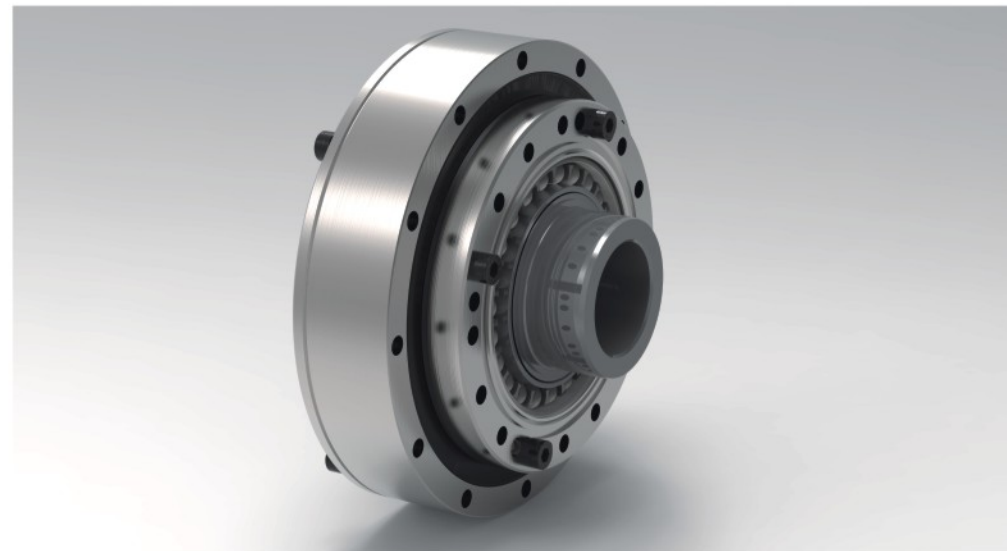
Simplicity Box KSBG-MO-32



Simplicity Box KSBG-MO-40



Strain Wave Gear KSBG-HO Series Simplicity Box Hollow shaft open flexspline



Advantages

- High positioning and rotational accuracy
- High repeatability accuracy
- High torque
- Super compact design
- Backlash free
- Long service life
- High torsional stiffness
- High efficiency
- Simple installation
- Flexible for application design

Main Applications

- Robots
- High Precision Tooling Machine
- High Precision Testing Equipment
- Medical Equipment
- Optical Equipment
- Analytical and Testing Equipment
- Semiconductor Manufacturing Systems
- Packing Machines

Ordering Code

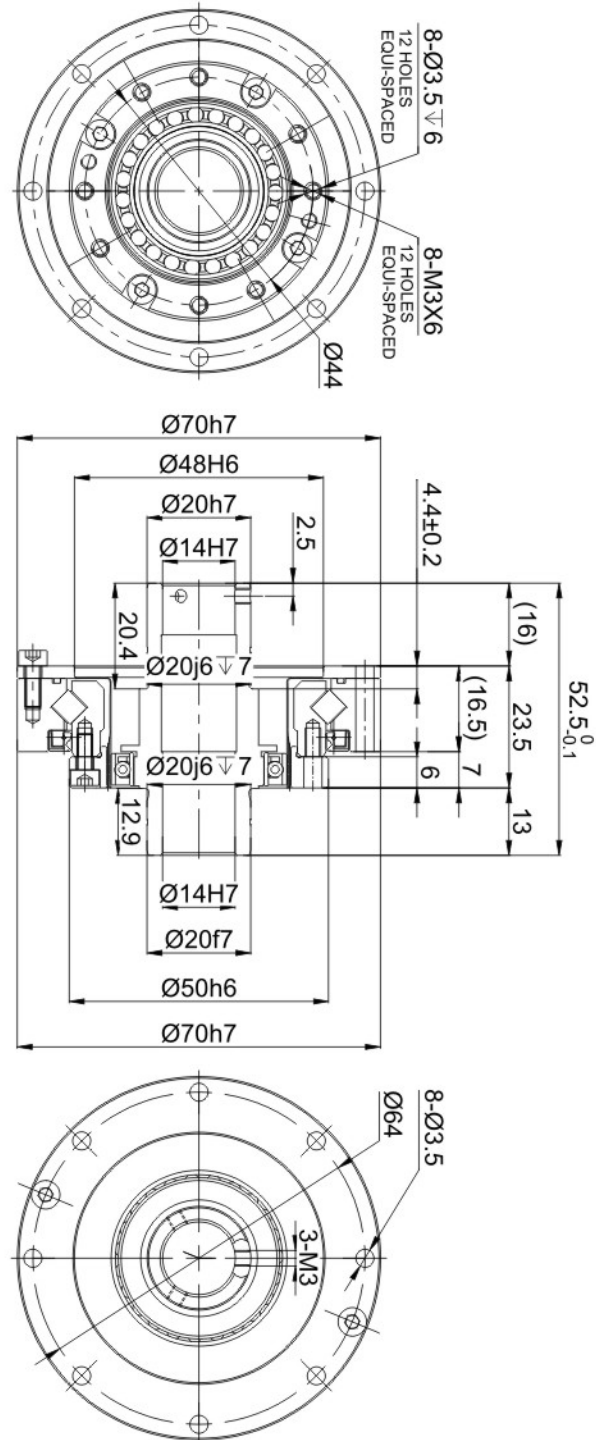
Gear Series	Transmission Type	Gear Size		Ratios				Special Design
KSBG	HO	14	50	80	100			as per customers' special requirements
		17	50	80	100	120		
		20	50	80	100	120	160	
		25	50	80	100	120	160	
		32	50	80	100	120	160	
Ordering Code								
KSBG-HO		-	25	-	100	-	SP	

Technical Specifications

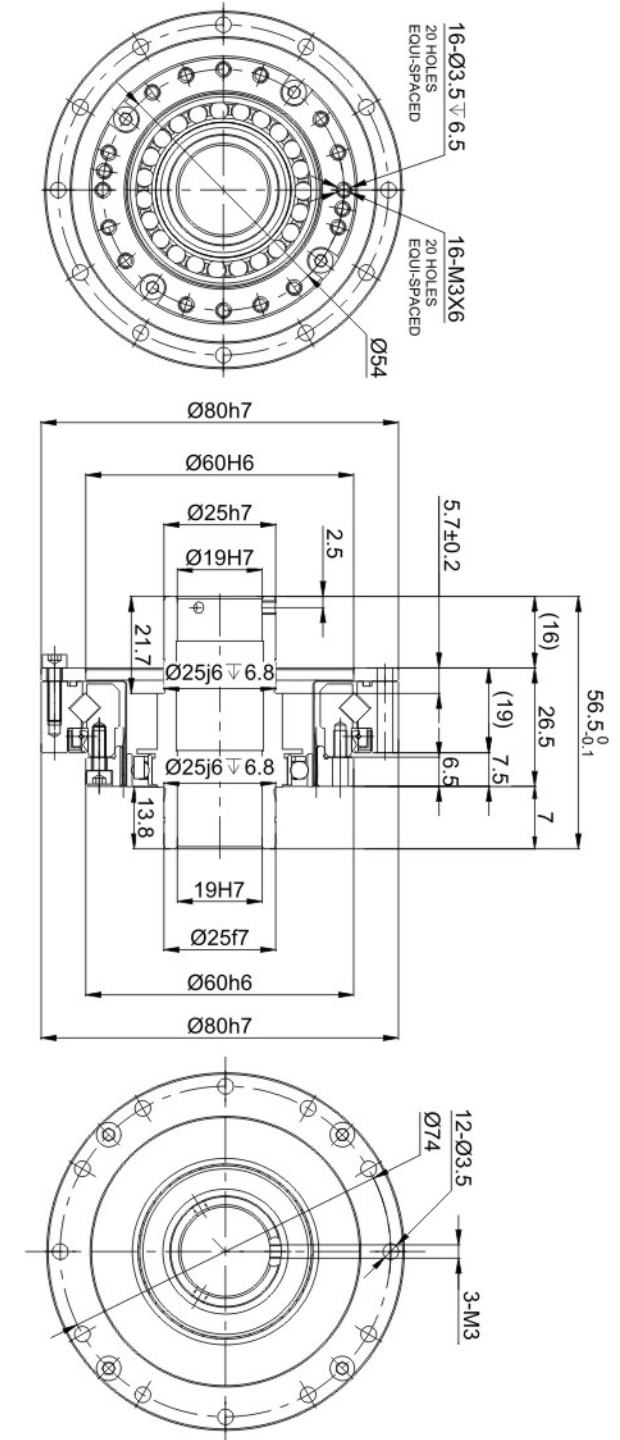
Series	Size	Ratio	Max Output Torque	Average Output Torque	Rated Output Torque at rated speed 2000 rpm	Emergency Stop Torque	Max Input Speed	Average Input Speed	Moment of Inertia	Weight
			Nm	Nm	Nm	Nm	rpm	rpm	kgm ²	kg
KSBG-HO	14	50	23	9	7	46	8500	3500	0.18x10 ⁻⁴	0.49
		80	30	14	10	61				
		100	36	14	10	70				
	17	50	44	34	21	91	7300	3500	0.34x10 ⁻⁴	0.62
		80	56	35	29	113				
		100	70	51	31	143				
		120	70	51	31	112				
	20	50	73	44	33	127	6500	3500	0.58x10 ⁻⁴	0.89
		80	96	61	44	165				
		100	107	64	52	191				
		120	113	64	52	191				
		160	120	64	52	191				
25	50	127	72	51	242	5600	3500	1.23x10 ⁻⁴	1.39	
	80	178	113	82	332					
	100	204	140	87	369					
	120	217	140	87	395					
	160	229	140	87	408					
32	50	281	140	99	497	4800	3500	3.66x10 ⁻⁴	3.02	
	80	395	217	153	738					
	100	433	281	178	841					
	120	459	281	178	892					
	160	484	281	178	892					
40	50	523	255	178	892	4000	3000	9.28x10 ⁻⁴	4.95	
	80	675	369	268	1270					
	100	738	484	345	1400					
	120	802	586	382	1530					
	160	841	586	382	1530					

Gear Dimensions

Simplicity Box KSBG-HO-14

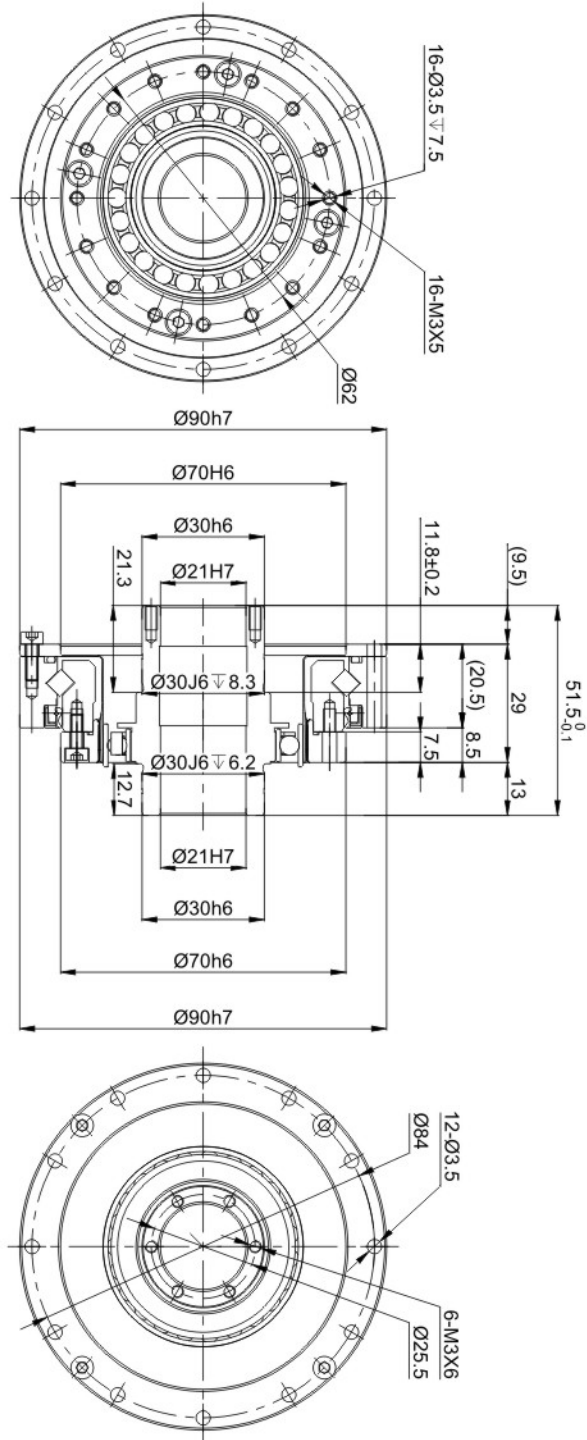


Simplicity Box KSBG-HO-17

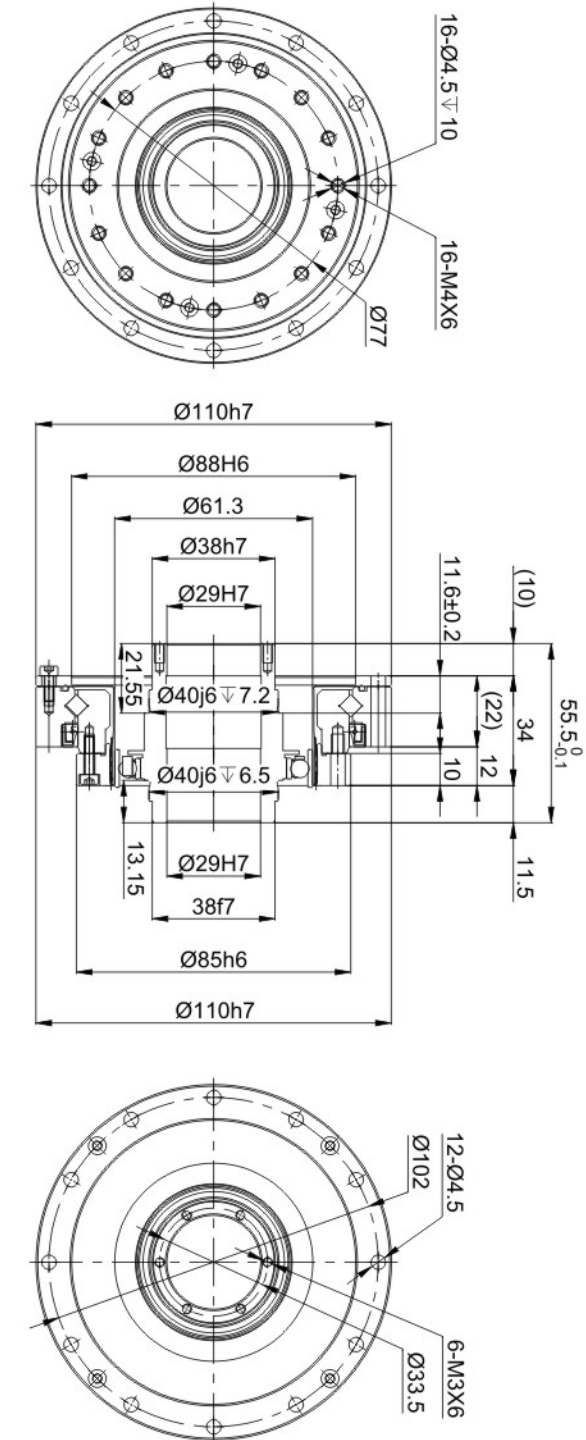


Gear Dimensions

Simplicity Box KSBG-HO-20

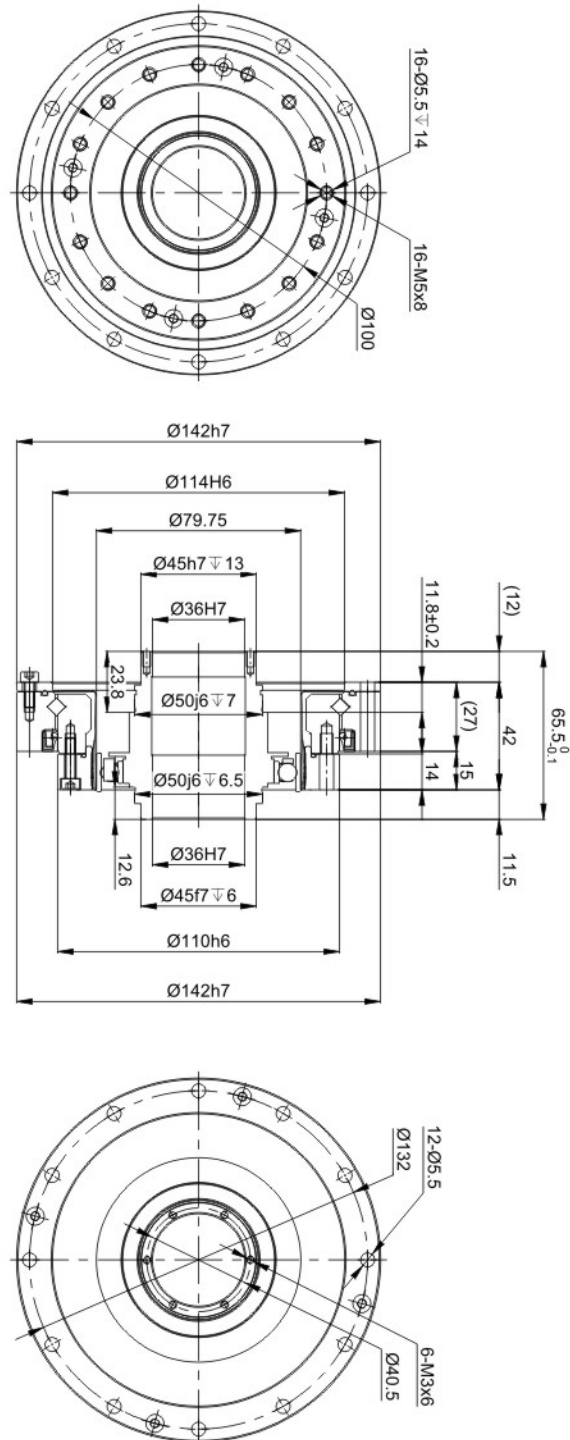


Simplicity Box KSBG-HO-25

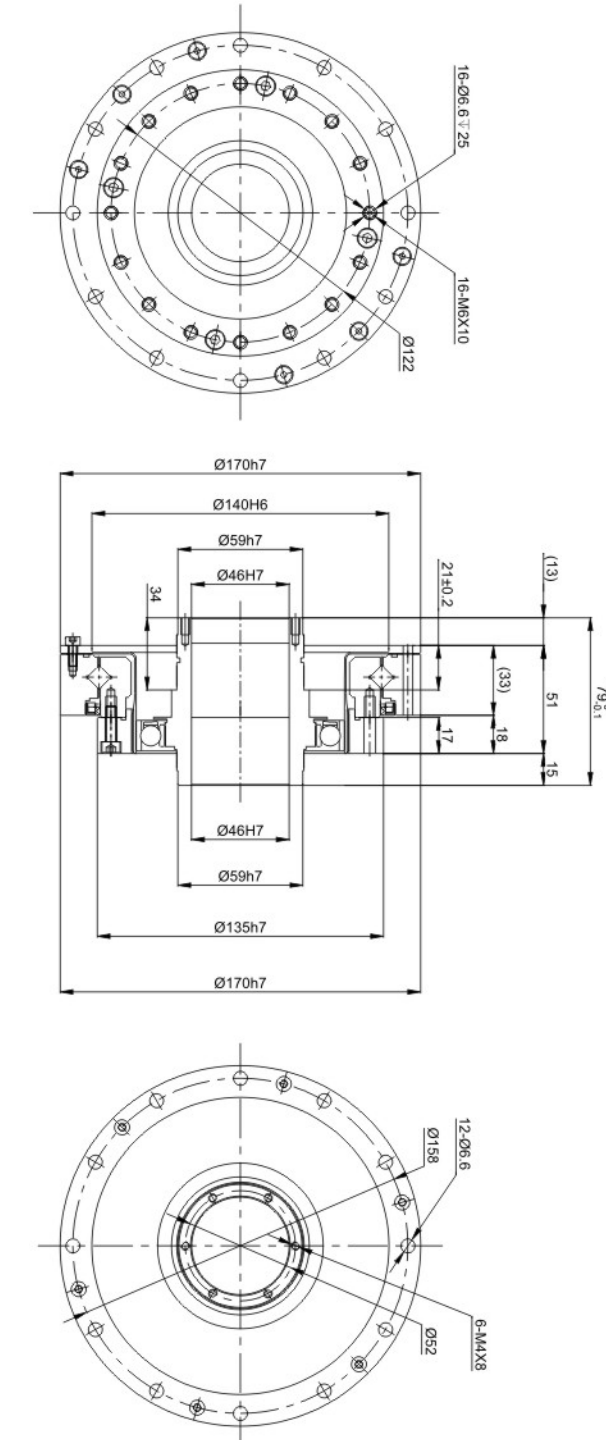


Gear Dimensions

Simplicity Box KSBG-HO-32

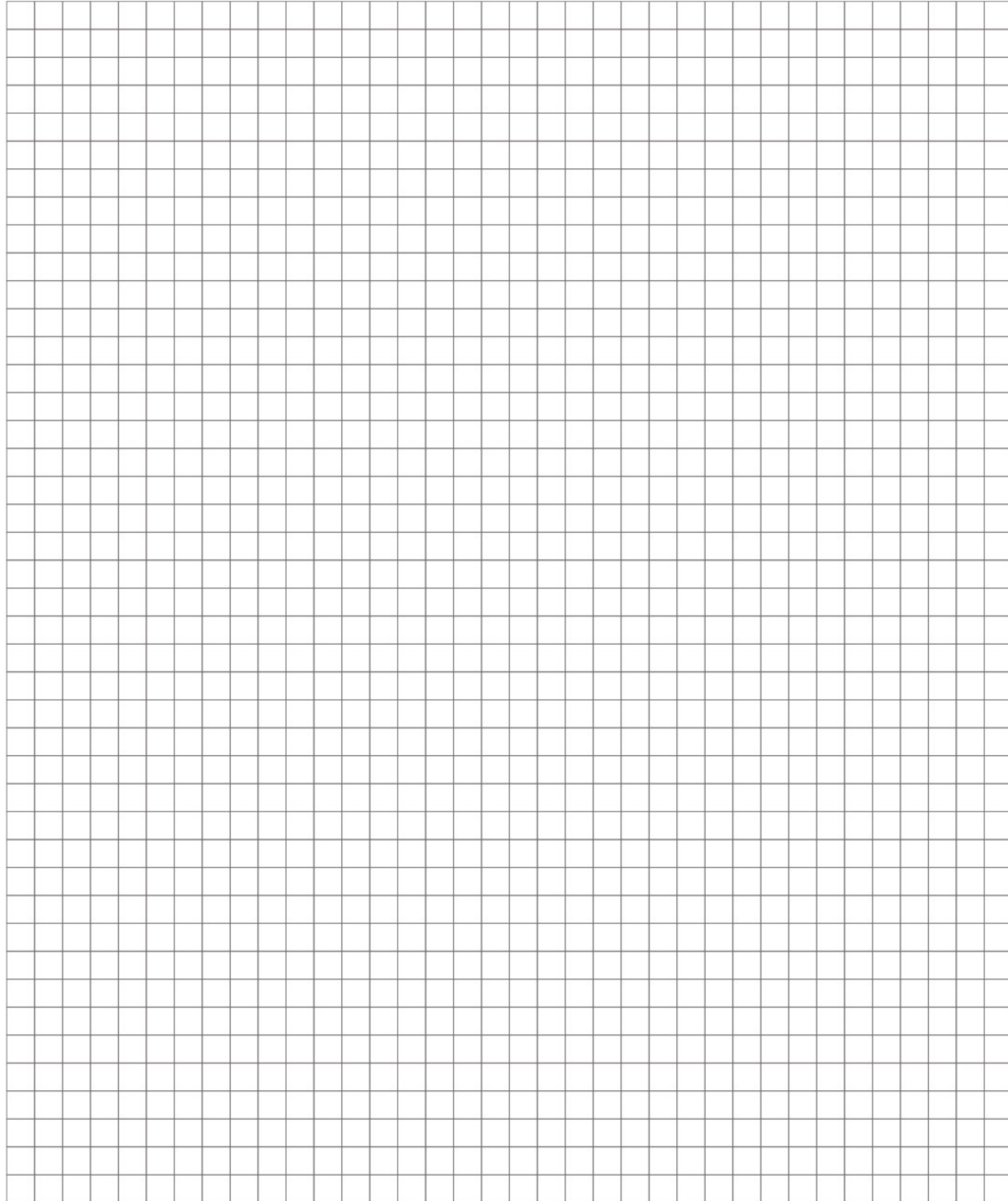


Simplicity Box KSBG-HO-40

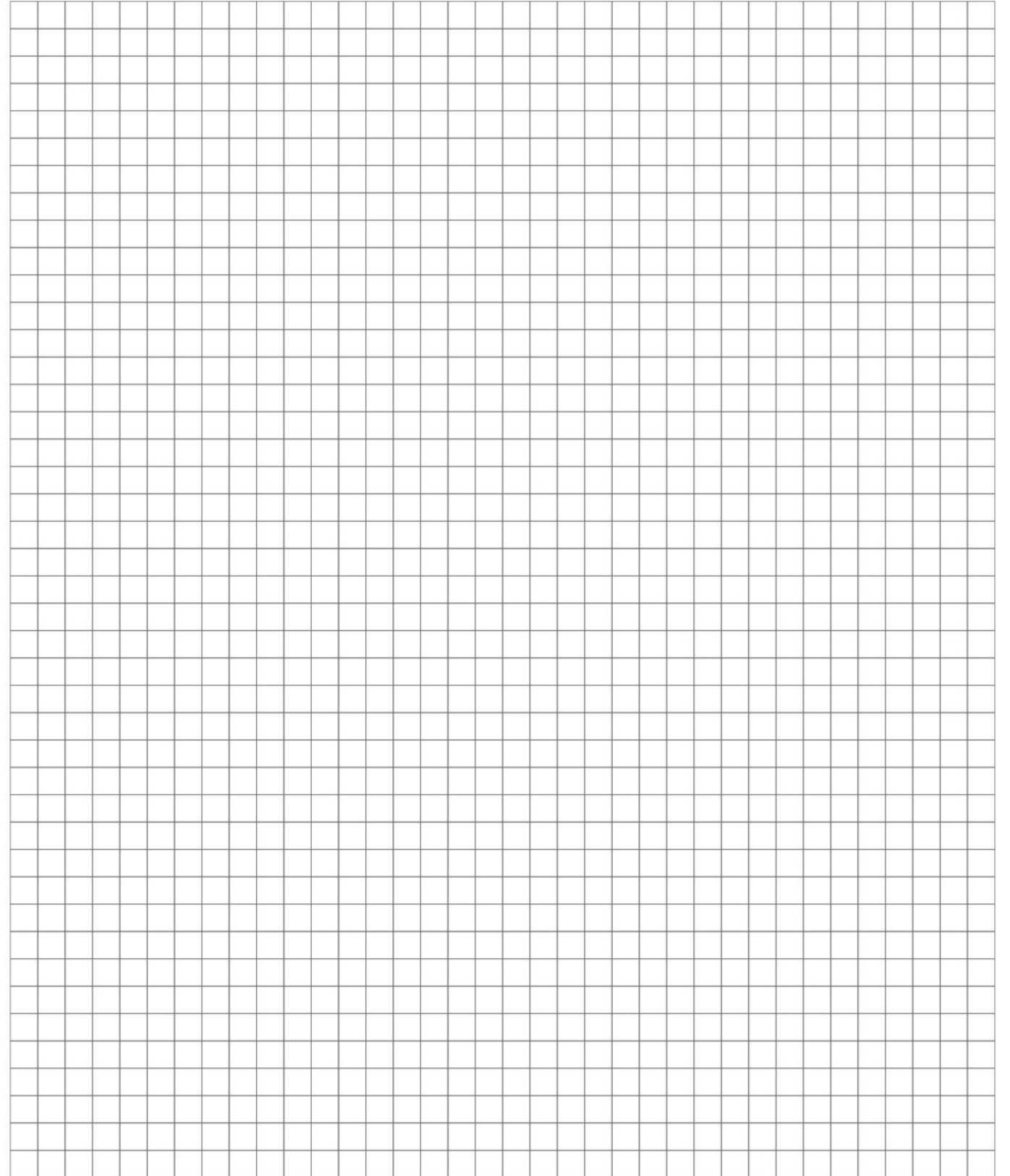




Technical Memo

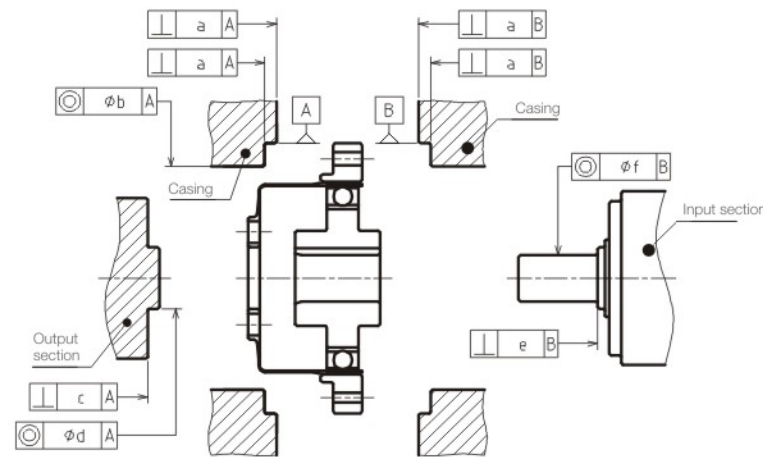


Technical Memo



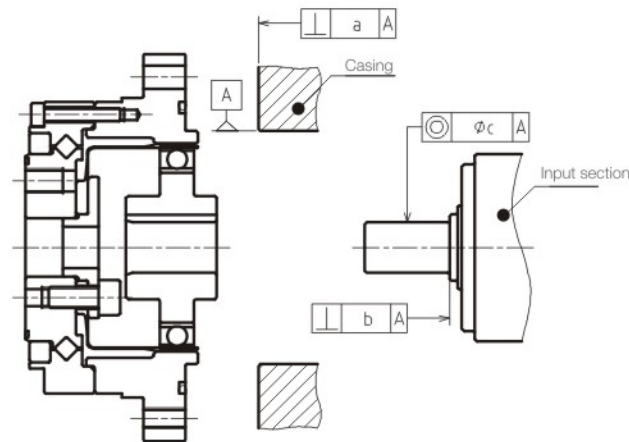
Assembly Instructions

KC-MC Component Kit



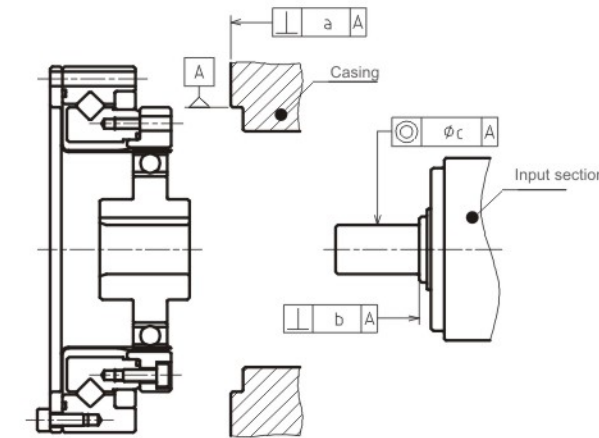
KC-MC	[mm]				
Size	14	17	20	25	32
a	0.015	0.015	0.018	0.018	0.023
b	0.016	0.020	0.020	0.024	0.024
c	0.010	0.012	0.014	0.016	0.020
d	0.013	0.013	0.015	0.018	0.020
e	0.012	0.012	0.014	0.016	0.016
f	0.016	0.020	0.024	0.024	0.024

KSB Simplicity box



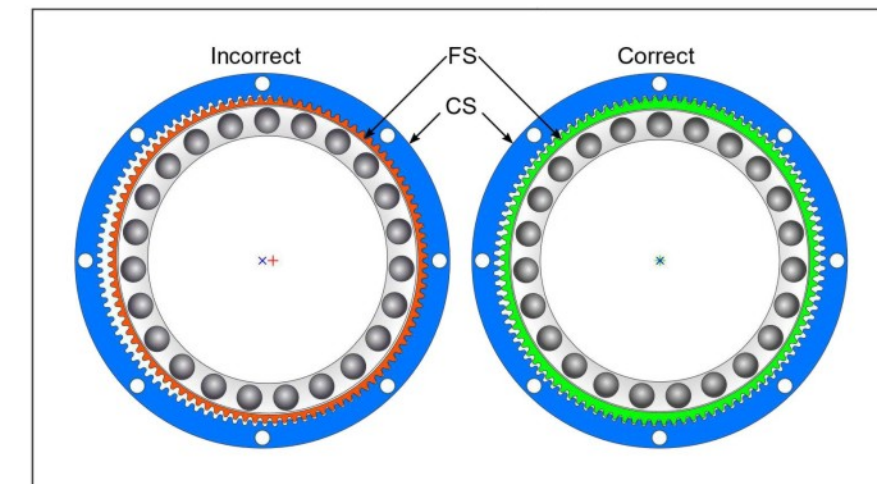
KSB Simplicity box	[mm]				
Size	14	17	20	25	32
a	0.020	0.020	0.020	0.025	0.025
b	0.012	0.012	0.014	0.016	0.016
c	0.016	0.020	0.024	0.024	0.024

KB Box Unit



KB Box Unit	[mm]				
Size	14	17	20	25	32
a	0.020	0.020	0.020	0.025	0.025
b	0.012	0.012	0.014	0.016	0.016
c	0.016	0.020	0.024	0.024	0.024

Caution During Installation

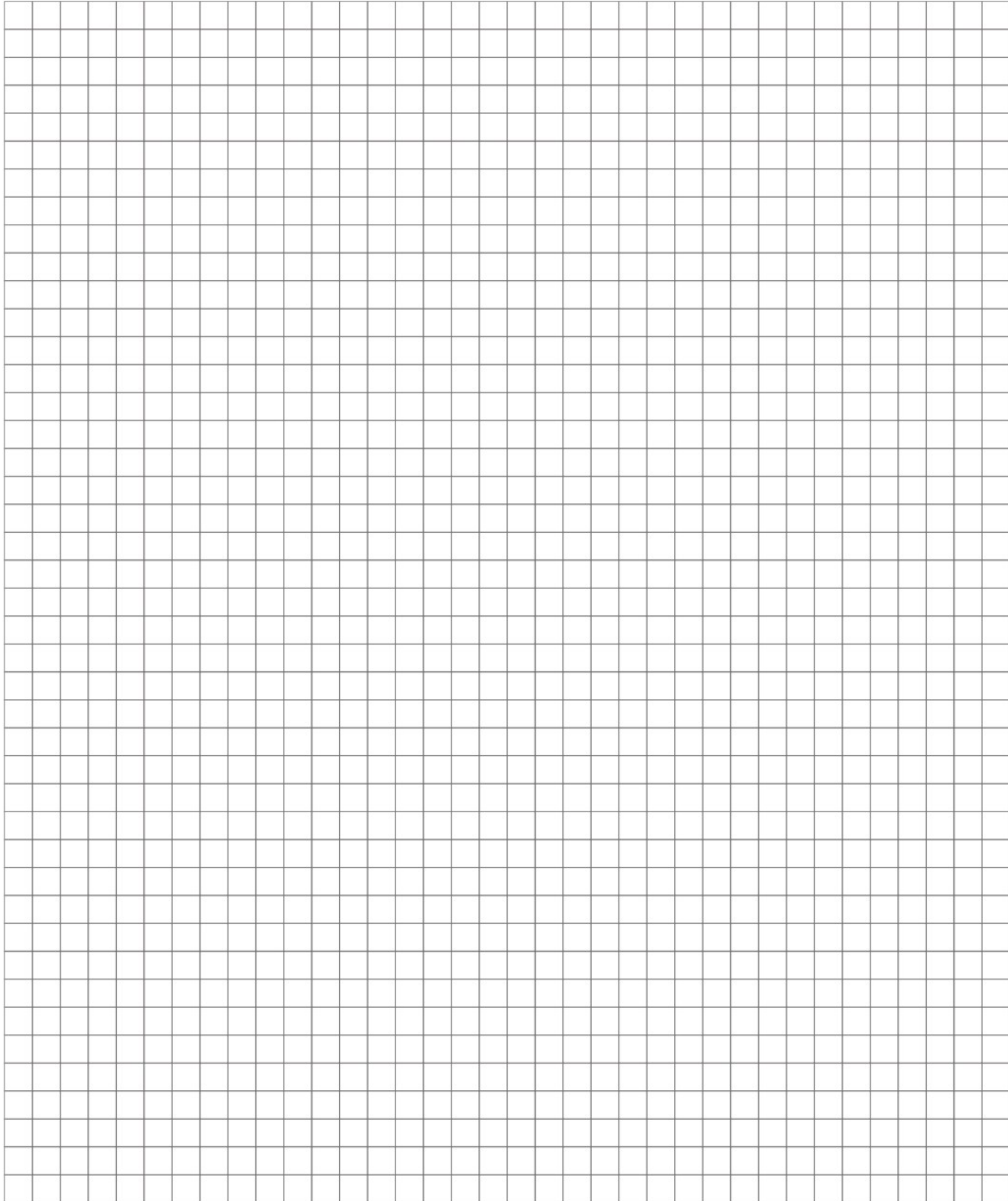


Bei der Montage des Getriebes ist darauf zu Achten, dass der FS mittig im CS sitzt. Es kann passieren, dass der FS auf einer Seite einen Zahn überspringt.

Man spricht hierbei vom sogenannten Dedoidal. Hierbei kann es zu einer Vielzahl von Problemen bis hin zum Ausfall des gesamten Getriebes kommen.

When installing the gearbox, make sure that the FS is seated in the center of the CS. It can happen that the FS skips a tooth on one side. This is called the so-called dedoidal. This can lead to a variety of problems, including failure of the entire transmission.

Technical Memo



Technical Memo

