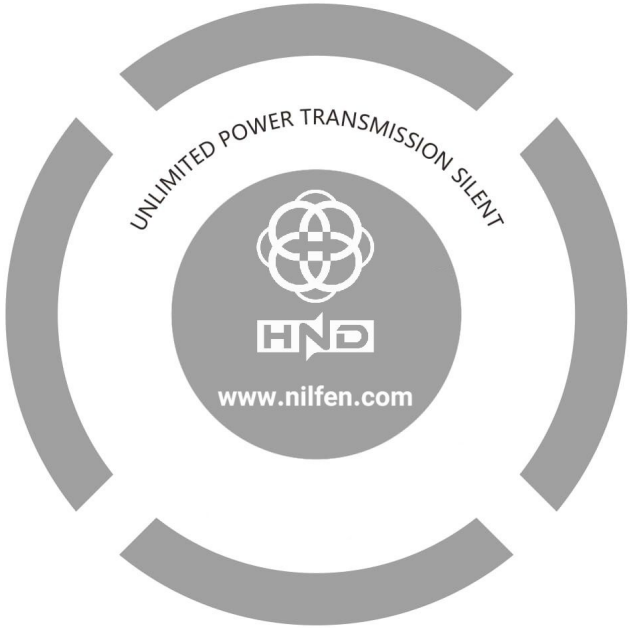
PLANETARY GEARBOX 2019



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PLANETARY GEARBOX

BAB / BAD / BAE / BAF

PLANETARY GEARBOX

PROFESSIONAL MANUFACTURER OF POWER TRANSMISSION

DESIGN PHILOSOPHY: To follow the law, but always beyond.

BUSINESS PHILOSOPHY: Design for customer demand , dedication for customer satisfaction

CONTENT

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BAB

BABR

BAD

BADR

BAE

BAF

BPG/BPGA

DIRECTIONS FOR USE

PRODUCT SERIES INTRODUCTION

BAB Series

7 Sices		42mm–220mm
Output torque		14Nm–2000Nm
Raton	1-stage	3/4/5/6/7/8/9/10
	2-stage	15/20/25/30/35/40 45/50/60/70/80/90/100
Backlash	1-stage	≤1,≤3,≤5 arcmin
	2-stage	≤3,≤5,≤7 arcmin

BABR Series

7 Sices		42mm–220mm
Output torque		9Nm–2000Nm
Raton	1-stage	3/4/5/6/7/8/9/10 14/20
	2-stage	15/20/25/30/35/40/45/50 60/70/80/90/100/120/140 160/180/200
Backlash	1-stage	≤2,≤4,≤6 arcmin
	2-stage	≤4,≤7,≤9 arcmin

BAD Series

7 Sices		47mm–255mm
Output torque		14Nm–2000Nm
Raton	1-stage	4/5/6/7/8/10
	2-stage	20/25/30/35/40/50 60/70/80/100
Backlash	1-stage	≤1,≤3,≤5 arcmin
	2-stage	≤3,≤5,≤7 arcmin

BADR Series

7 Sices		47mm–255mm
Output torque		14Nm–2000Nm
Raton	1-stage	4/5/6/7/8/10/14/20
	2-stage	20/25/30/35/40/50 60/70/80/100/140/200
Backlash	1-stage	≤2,≤4,≤6 arcmin
	2-stage	≤4,≤7,≤9 arcmin

BAE Series

7 Sices		42mm–220mm
Output torque		14Nm–2000Nm
Raton	1-stage	3/4/5/6/7/8/9/10
	2-stage	15/20/25/30/35/40/45 50/60/70/80/90/100
Backlash	1-stage	≤5 arcmin
	2-stage	≤8 arcmin

BAF Series

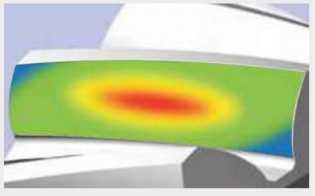
7 Sices		70mm–235mm
Output torque		14Nm–2000Nm
Raton	1-stage	3/4/5/6/7/8/9/10
	2-stage	15/20/25/30/35/40/45 50/60/70/80/90/100
Backlash	1-stage	≤5 arcmin
	2-stage	≤8 arcmin

BPG/BPGA Series

10 Sices		40mm–160mm
Output torque		9Nm–423Nm
Raton	1-stage	3/4/5/7/8/10
	2-stage	12/15/20/25/30 35/40/50/70/100
Backlash	1-stage	≤6,≤8 arcmin
	2-stage	≤8,≤10 arcmin

PRODUCT FEATURES

Gears are made of alloy metal with premium quality, applied with surfacs hardness treatment,uses the hard tooth face habbing machining, enhance the capacity of gear impact, reducing gear noise, improve the service life of gear.



Using the ANSYS technology,the gear strength is analyzed by finite element method,the tooth profile and Lead trimming are done on the tooth surface. In order to reduce gear meshing impact and noise,increase the service life of the gear train.

BAB

One piece planet carrier with extended bearing design. Provides maximum radial load capacity and increases system reliability and stiffness. Using the complete process in one time,Improve the whole planet carrier output shaft and high precision,high rigidity.

Gear box and the inner gear adopts the integration of design and manufacturing,is made of high qualified steel box ,by hot forging process, has a higher strength, rigidity and toughness,make internal tooth,further improve the precision and intensity.

Input terminal connected to the motor of the collet type locking mechanism, and the dynamic analysis,so ensure that under the high speed joint concentricity and zero backlash power transmission.

PRODUCT OVERVIEW

Product features

Precision planetary gear reducer is a new-generation of product developed by our company,with a compromise
of advanced technology both at home and abroad,its main features are as follows:
1.Low Noise: Under 65db.
2.Low Backlash: Backlash is under 3 arcmin.Backlash for 2-stage speed reduction is within 5 arcmin.
3.High Efficiency: Efficiency for 1-stage model exceeds 95% ,For 2-stage model exceeds 92%.
4.High Input Speed: Input speed allows for up to 8000 RPM.
5.High Torque: Higher torque output than that of conventional planetary gear reducers.
6.High Stability: Employs high tensile strength alloy steel.Gear hardening is made for the entire gear instead of only surface hardening,which extends gear service life and maintain high accuracy as new after a long period of operation.
7.High Speed Reduction Ratio: The gear reducer is a modular deign.The planetary gear box can be connected.
Speed reduction ratio is over 1/1000.

Precision usage

Precision Planetary Gear Reducer is widely used in the following domain:
1. Aerospace, military industry.
2. Medical health, electronic information industry.
3. Industrial robots, Production automation, CNC machine tool manufacturing industry.
4. Motor, textile, printing, food, metallurgical, environmental protection engineering, warehouse logistics industr.

Exterior color

Shell + back cover:
1. Champagne gold + black.
2. Innovative blue + pearl silver.

GEAR UNIT SELECTION & ANNOUNCEMENTS

Planetary reducer selection

The principle of combining practicability with economy should be followed in selecting planetary reducer,the indicators of planetary reducer,not only meets the requirements of equipment,but also saves costs." over"and "under"bring cost waste.Improper selection is the main cause of gear reducer failure,So it is very important to choose planetary reducer correcty.

The selection of reducer should take into account its structural type,bearing capacity,deceleration ratio,output speed,axial force, radial force,torsional rigidity,backlash and other performance indicators.External factors such as installation form and working condition should also be fully considered.For convenience,please refer to the following steps to achieve and rapid selection.

Load classifications

Type of load:
A. Uniform ,permitted mass acceleration factor Fa≤0.2
B. Moderate shock load,permitted mass acceleration factor Fa≤3
C. Heavy shock load,permitted mass acceleration factor Fa≤10
(See P58-P59 for details)

Mass acceleration factor

The mass acceleration factor is calculated as follows:

Fa=Jc/Jm

Fa Mass acceleration factor
Jc All external mass moments of inertia(kgm^2)
Jm Mass moment of inertia on the motor end(kgm^2)
If mass acceleration factors fa>10,please call our Technical Service.

To keep the service-life of gear units,use factor fs selected from the catalogue must be equal or slightly higher than the calculated use factor fs.

GEAR UNIT SELECTION & ANNOUNCEMENTS

Step1: Determination of Reducer Specifications

step	instructions	Code	Parameter calculation						
			Loadaing classification	Running per hour	Using fs				
					Running per day(h)				
					h < 4	4 < h < 8	8 < h < 12	12 < h < 16	16 < h < 24
1	Equipment usage factor	fs	Uniform	Z < 10	0.85	0.95	1.00	1.20	1.60
				10 < Z < 30	0.90	1.10	1.15	1.40	1.80
				30 < Z < 100	1.00	1.20	1.30	1.60	2.00
			Medium shock	Z < 10	1.00	1.20	1.30	1.60	2.00
				10 < Z < 30	1.10	1.35	1.45	1.80	2.20
				30 < Z < 100	1.20	1.45	1.60	2.00	2.40
			Heavy shock	Z < 10	1.20	1.45	1.60	2.00	2.40
				10 < Z < 30	1.30	1.55	1.75	2.20	2.50
				30 < Z < 100	1.40	1.65	1.90	2.40	2.80
2	Determination of Torque	T_{2N}	$T_{2N} > T_{C2}$ T_{C2}, $T_{C2} = T_2 \times f_s$ The rated torque(T_{2N})of the selected reducer must be greater than the calculated torque(T_{C2})						
3	Rated input speed	n_1	Permissible maximum output speed refer to reducer performance data						
4	Determination ratio	i	$i = n_1 / n_2$						
5	Reducer dfficiency	η	L1≥95%、L2≥92%						
6	Torque or power required by the driven device,Calculating Input Power of Reducer	P_1	$P_1 = (T_2 \times n_1) / (9550 \times i \times \eta)$ 或 $P_1 = P_2 \div \eta$						
7	Detemining Specification of Reducer Based on Calculated Driving Force Meter	T_{2N}、P_{1N}	$T_{2N} \geq T_3 \times f_1 \times f_2$ $P_{1N} \geq P_1 \times f_1 \times f_2$						
8	Calibration of Output Axis Radial Force and Axis Force and Axis Force	Fr、Fa	Check the Performance Data Sheet of the Product Manual,The maximum radial force and axialforce of the reducer shuold be less than that of the reducer.Frequent start-upand shutdown should be strengthened						
9	Confirmation of usage environment		Protection grade,working temperature,chemical environment,etc.						
10	Confirm installation mode according to space		90° Coaxial Installation and Right Angle Installation						
11	Confirmation of reducer type		Specific series,models, specifications and accessories are determined according to performancedatasheets, input and output modes,etc						

Explain : n_2、p_2 Speed and power of the driven equipment;T_2 Torque required for driven equipment ;
P_{1N}、T_{2N} Power and Torque Required for Actual Reducer

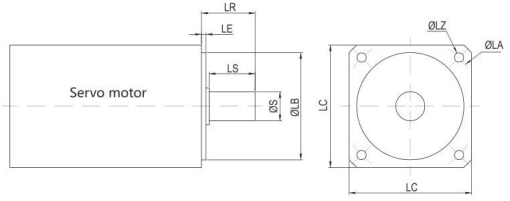
GEAR UNIT SELECTION & ANNOUNCEMENTS

Step2:

Definite motor.Determination of motor manufacturers, specificatiaons,models, performance indicators and dimensions

Motor Model:90ST-M04025

Output	1	kw
Rated Torque	4	NM
Max.Torque	12	NM
Rated Speed	2500	RPM
Inertia	3.7kg/cm2	
Shaft Dia	Ø16	mm
Diameter	□90	mm
Boss	Ø80	mm
Center distance	Ø100	mm

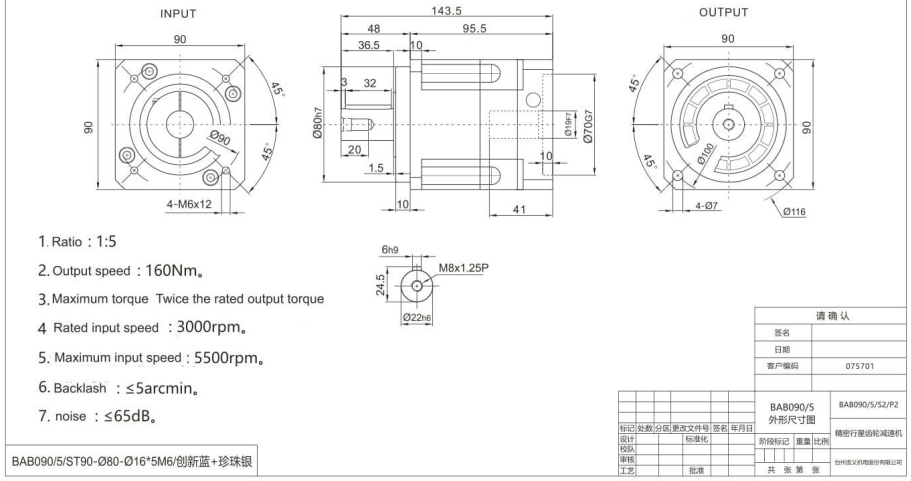


Notice for ordering

Motor's type & measurement	Ratio:
Planetary gearbox's type:	Torque:
Mounting position&others requir:	Backlash:

Step3:

Determine the specified specifications and models of planetary reducer and the CAD or PDF drawings given by the factory,Correct writing model.
For example:BAB090/5/S2/P2/T1/90ST-M04025



PLANETARY GEAR REDUCER +SERVO MOTOR POSSIBLE COMBINATIONS(N1=3000R/MIN)

Type	Power	3	4	5	6	7	8	9	10	15	20	25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
BAB042 BABR042 BAD047 BADR047 BAF042 BPG040 BPGA040	50w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
	100w	■	■	■	■	■	■	■	■	■	■	■	■	■	■												

BAB060 BABR060 BAD064 BADR064 BAE070 BAF060 BPG060 BPGA060	50w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
	100w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
	200w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
	400w	■	■	■	■	■	■	■	■	■	■	■															

BAB090 BABR090 BAD090 BADR090 BAE090 BAF090 BPG080 BPGA080	50w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	100w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	200w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	400w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
	750w	■	■	■	■	■	■	■	■	■	■	■	■														
	1000w	■	■	■	■	■	■	■	■	■	■																
	1500w	■	■	■	■	■	■	■	■	■																	
	2000w	■	■	■	■	■	■	■	■	■																	
	2500w	■	■	■	■	■	■	■																			

BAB115 BABR115 BAD110 BADR110 BAE120 BAF115 BPG120 BPGA120	400w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	750w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	1000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	1500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	2000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	2500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	3000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	3500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	4000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	4500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	5000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	5500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

PLANETARY GEAR REDUCER +SERVO MOTOR POSSIBLE COMBINATIONS(N1=3000R/MIN)

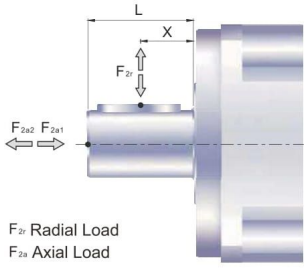
Type	Power	3	4	5	6	7	8	9	10	15	20	25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
BAB142 BABR142 BAD140 BADR140 BAE155 BAF142 BPG160 BPGA160	1000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
	1500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
	2000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■									
	2500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■										
	3000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
	3500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■												
	4000w	■	■	■	■	■	■	■	■	■	■	■	■	■													
	4500w	■	■	■	■	■	■	■	■	■	■	■	■														
	5000w	■	■	■	■	■	■	■	■	■	■	■	■														
	5500w	■	■	■	■	■	■	■	■	■	■	■															
	6000w	■	■	■	■	■	■	■	■	■	■	■															
	7000w	■	■	■	■	■	■	■	■	■																	

BAB180 BABR180 BAD200 BADR200 BAE205 BAF180	2000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	2500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
	3000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
	3500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
	4000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■									
	4500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■										
	5000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
	5500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
	6000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
	7000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■												
	11000w	■	■	■	■	■	■	■	■	■																	

BAB220 BABR220 BAD255 BADR255 BAE235 BAF220	3500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	4000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
	4500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
	5000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
	5500w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
	6000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■									
	7000w	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■										
	11000w	■	■	■	■	■	■	■	■	■	■	■	■														
	15000w	■	■	■	■	■	■	■	■	■	■	■															

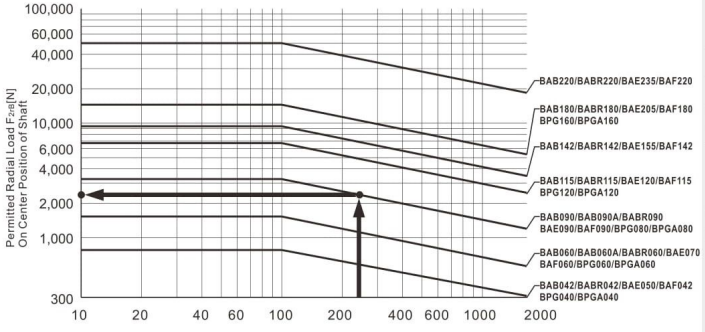
NOTE: The gray part means allowable configuration, while the blank part means not allowable configuration.

REDUCER OUTPUT SHAFT OF THE PERMISSIBLE RADIAL FORCE AND SHAFT AND FORCE



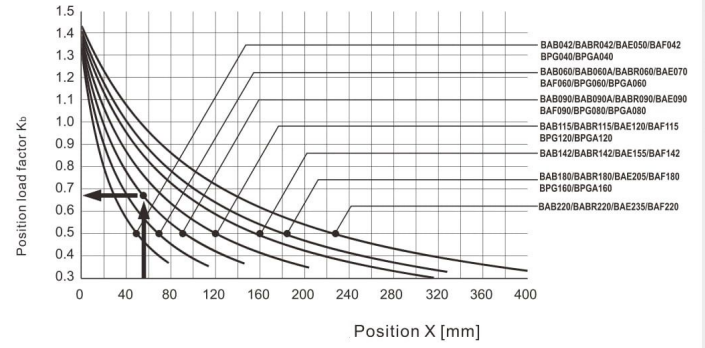
F_{2r} Radial Load
F_{2a} Axial Load

The permitted radial and axial loads on output shaft of gearbox depend onthe design of the gearbox supporting bearings.Gearbox use the extension straddle oversized ball bearing design.It can take heavy load from both axes.



If radial force F_{2r} exert on the center of the output shaft X=1/2xL.
Under various operating condition the lifetime is over 20,000*hours.
The permitted radial load is given on left diagram.

$F_{2a1B}=0.2xF_{2rB}$
$F_{2a2B}=0.1xF_{2rB}$



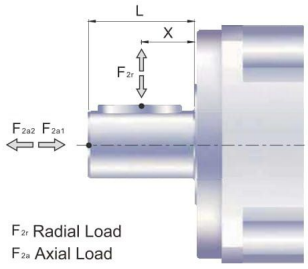
If radial force F_{2r} not exert on the center of the output shaft X<1/2 xL or X>1/2x L.
The permitted radial and axial load can be calculated by the position load factor K_b on the left diagram.

$F_{2rB}=K_bxF_{2RB}$

$F_{2a1B}=0.2xF_{2rB}$
$F_{2a2B}=0.1xF_{2rB}$

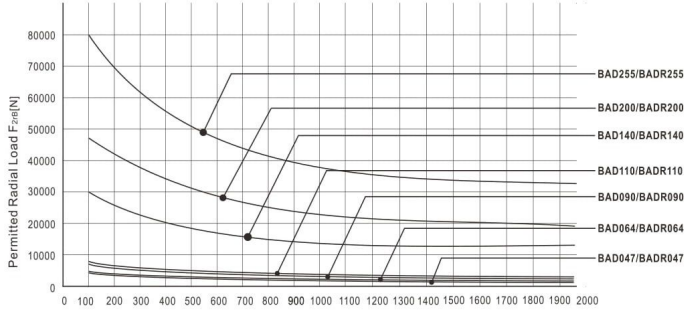
*Continuous running reduces service life by 50%

REDUCER OUTPUT SHAFT OF THE PERMISSIBLE RADIAL FORCE AND SHAFT AND FORCE



F_{2r} Radial Load
F_{2a} Axial Load

The permitted radial and axial loads on output shaft of gearbox depend on the design of the gearbox supporting bearings.Gearbox use the extension straddle oversized ball bearing design.It can take heavy load from both axes.



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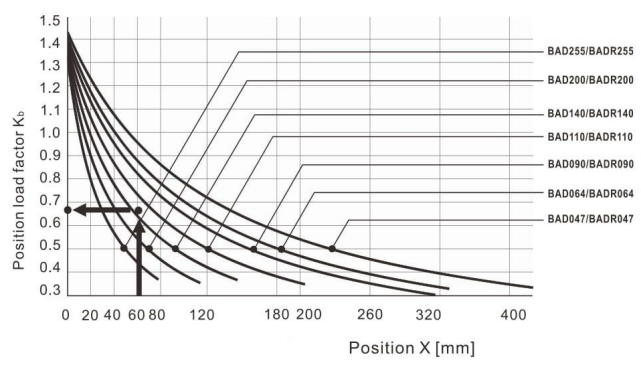


If radial force F_{2r} not exert on the center of the output shaft X<1/2 xL or X>1/2x L.
The permitted radial and axial load can be calculated by the position load factor K_b on the left diagram.

*Continuous running reduces service life by 50%

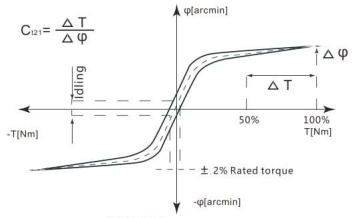
GEAR UNIT SELECTION & ANNOUNCEMENTS

Basic concepts of precision planetary gear boxes

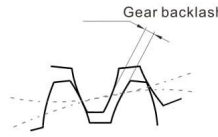
Ratio	Input speed/Output speed
Rated input speed n_1[rpm]	The gearbox driving speed.If gearbox and motor connected directly,the speed value is the same with the motor speed.The rated speed in the book is tested at an ambient temperature of 20°C, please reduce speed when the ambient temperature is higher.
Output speed n_2 [rpm]	The output speed is calculated in accordance with the following formula from the input speed n_1 and the transmission ratio I.
Poles	The number of set of planetary gear. Oweing to one set planetary gear can'tsatisfy bigger transmission ratio, two or three sets can meet Users'requirements of bigger transimission ratio.Since increasing the gear quantity, the length of two or three poles motor will increase accordingly, of course,the efficiency will reduce accordingly.
Efficiency	If refers to the gearing efficiency of the gearboxes in the case of the largest load.
Average lifetime	Refers to the continuous working time of the gear boxes of the highestinputrev.
Precise positioning	In high-speed reciprocating mechanical movement achieve precise positioning is the key to minimizing the movement through the angular deviation,positioning accuracy depends on the two values,with a load of thedeflection angle,involving a return to space with torsion stiffness,and the other is control of the movement and rotation angle,involving partial synchronization the problem worse.
Backlash jt[arcmin]	Refers to the gearbox maximum deviation angle between the output shaft and input shaft.The first gear input shaft should be fixed when measuring,and then load a certain moment torque(2%T_{2B}) to output shaft with torque meter,in order to overcome the gearbox friction.

GEAR UNIT SELECTION & ANNOUNCEMENTS

Basic concepts of precision planetary gear boxes



Picture 1



Picture 2

Hysteretic curves	Hysteretic Detection is to come to the gearbox torsion stiffness.By detecting been Hysteretic curve.The first gear input shaft should be fixed when measuring,and then the output shaft of the two rotation directions are continuously loaded to T_{2B} maximum acceleration torque,and then gradually unloading,recording the moment of the imitation of with instrument,the curve obtained is a closed curve,from which backlash(j_t)and reverse stiffnedd(C_{i21})can be calculated.
Arc minutes [arcmin]	Once divided into 60arcmin(1°/60 arcmin),as the backlash is 1 arcmin,which means that gearbox turn a round,the angular deviation of output shaft is 1°/60.
Reverse stiffness Ct21 [Nm/Arcmin]	Defined by the ratio between the twist angle of the load torque and angle of torsion,$C_{i21}=\Delta T/\Delta \psi$ .It means how much can torque output shaft rotational an arc minutes.
Moment of Inertia J[Kgcm²]	Moment of the rotary inertiain this description refers to that at the input terminal.Said an object strive to maintain their rotational state(or a stationary of rotating)characteristics of a value.
The proportion of inertia	Refer to the ration of load inertia and inertia drive system(motor with gearbox).This ratio determines the controllable of the λ value,the greater is the moment of inertia greater margin,high-dynamic action on the more dfficult processof precision control.The values can be control in 5,gearboxes can be used to reduce load $1/i^2$.

$$\lambda = \frac{\text{Load inertia} \cdot \frac{1}{i^2}}{\text{Motor+gearbox}}$$

GEAR UNIT SELECTION & ANNOUNCEMENTS

Basic concepts of precision planetary gear boxes

Noise

The unit is decibel(dB).The value is measured when the input rev is 3000r/m without load and at the distance ofone meter from the gearboxes.

Operating conditions

Operating temp	-10℃~+90℃
Degree of protection	IP54/IP65
Lubrication	Life time lubrication
Mounting position	Any

Rated output torque T_{2N}[Nm]

Refers to the gearbox loaded torque(no wear)for a long time(continuous duty),and should meet the conditions of uniform load,the safety factor S=1,theoretical life is 20,000h hours

Maximum torque T_{2B}[Nm]

Refers to the gearbox output torque can be loaded under static conditions or frequent starts conditions,usually refers to the peak load or the start load.

The actual torque T_2[Nm]

The required torque depends on the actual conditions of the applications,to be selected rated torque Tn must begreater than the required torque.

Accelerating torque [Nm]

Refers to the maximum torque loading to the output short time allowed when the work cycle of less than 1000 times per hour.when the work cycle of more than 1000 times per hour,you have to consider the coeffocemtat load. The maximum accelerating torque is equal toemer gency stop torque by 60%.

Emergency stop torque T_{2NOT}[Nm]

Refers to the gearbox the maximum torque of output that can be loaded.The torque can be loaded 1000 times during the lifetime of gearbox,which must not exceed 1000 times.

Computational Torque T_{C2}[Nm]

It will be used when choosing reducer, According to the actual required torques (T_2)and coefficients(fs), the following formulas are used for calculation $T_{C2}=T_2*f_S \leq T_N$

GEAR UNIT SELECTION & ANNOUNCEMENTS

Basic concepts of precision planetary gear boxes

Tilting torque [Nm]

Torque of radial force acting on radial force point of output bearing, The formula is M2kmax=…

Axial force Fa[N]

Forces parallel to the axis, When there is a certain axial deviation(Y_2) between its action point and the output shaft end, a bending moment will be formed, When the axial force exceeds the rated value shown in the sample, Coupling is needed to counteract this bending moment.

Radial force Fr[N]

It is the force acting vertically on the axial force. There is a certain axial distance(X_2) between the acting point of the radial force and the axial end of the outpu tshaft,This point becomes a lever point, and the transverse force forms a bending moment.

Service factor fs

Application Characteristics of Reducer by service factor, It takes into account the load type of the reducer and the daily working hours

Special Notice

You can only refer to the input terminal dimension given in this book,special dimension is depend on the shaft extensi on terminal of chosen motor,practical object' s dimension will be difference with these in book, the practical is depend on the finished product,the output terminal dimension is according to these given in thisbook if not sign.The weight of reduce motor given in this book is approximation,the practical is depend on the finished product.

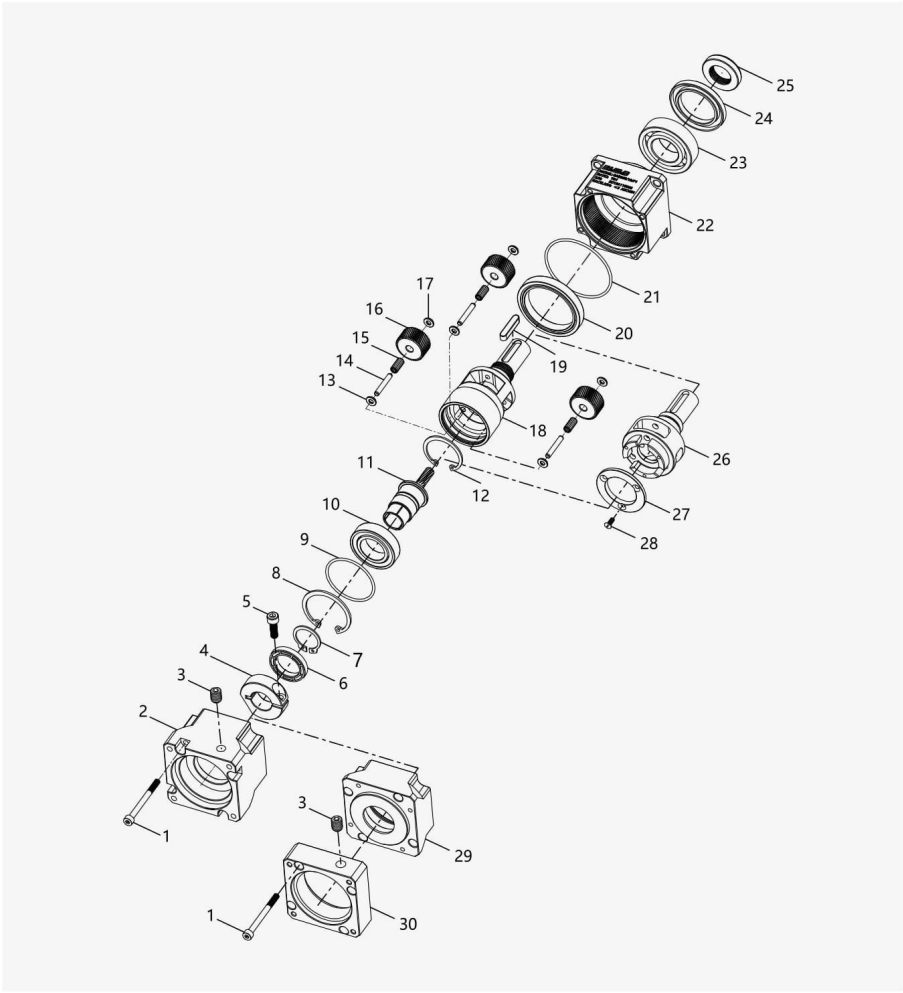
BAB SERIES

PROFESSIONAL MANUFACTURER OF POWER TRANSMISSION

PROFESSIONAL MANUFACTURER OF POWER TRANSMISSION

DESIGN PHILOSOPHY: To follow the law, but always beyond.

BUSINESS PHILOSOPHY: Design for customer demand , dedication for customer satisfaction



1	Inner hex screw	11	Sun wheel	21	O-ring
2	Back cover	12	Hole-circlip	22	Internal gear
3	Plug	13	Washer	23	Bearing
4	Locking ring	14	Roller	24	Oil seal
5	Inner hex scewv	15	Kingpin	25	Lock nut
6	Oil seal	16	Planet gear	26	Planet carier
7	Shaft-circlip	17	Washer	27	Washer
8	Hole-circlip	18	Planet crrier	28	Countersunk head screw
9	O-ring	19	Key	29	Back cover
10	Bearing	20	Bearing	30	Connecting plate

MODEL ILLUMINATE

BAB 090 / 10 / S2 / P2 / T1 / MOTOR

① ② ③ ④ ⑤ ⑥ ⑦

NO	Description
1	Code for gear units series: BAB
2	Specification code of gear units : 042、060、060A、090、090A、115、142、180、220
3	Speed ratio of reducer i 1-stage : 3、4、5、6、7、8、9、10 2-stage : 15、20、25、30、35、40、45、50、60、70、80、90、100
4	output shaft type : S1 : Smooth output shaft S2 : Output shaft with key
5	Backlash: P0 : Micro backlash P1 : Reduced backlash P2 : Standard backlash
6	Motor manufacturer (P53-P54)
7	Motor type

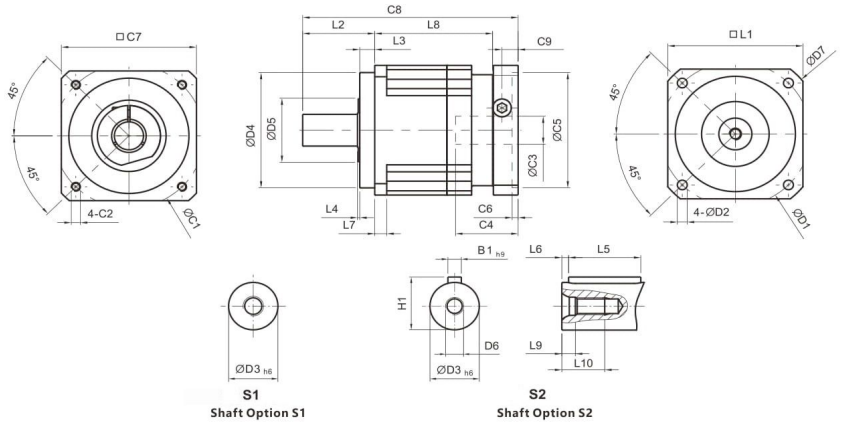
Example: **BAB090 / 10 / S2 / P2 / T1/ 90ST-M02430**

GEARBOX PERFORMANCE INFORMATION

Model NO		Stage	Ratio	BAB042	BAB060	BAB060A	BAB090	BAB090A	BAB115	BAB142	BAB180	BAB220
(Mominal Output Torque T_{2N})	Nm	1	3	20	55	—	130	—	208	342	588	1,140
			4	19	50	—	140	—	290	542	1,050	1,700
			5	22	60	—	160	—	330	650	1,200	2,000
			6	20	55	—	150	—	310	600	1,100	1,900
			7	19	50	—	140	—	300	550	1,100	1,800
			8	17	45	—	120	—	260	500	1,000	1,600
			9	14	40	—	100	—	230	450	900	1,500
			10	14	40	—	100	—	230	450	900	1,500
		2	15	20	55	55	130	130	208	342	588	1,140
			20	19	50	50	140	140	290	542	1,050	1,700
			25	22	60	60	160	160	330	650	1,200	2,000
			30	20	55	55	150	150	310	600	1,100	1,900
			35	19	50	50	140	140	300	550	1,100	1,800
			40	17	45	45	120	120	260	500	1,000	1,600
			45	14	40	40	100	100	230	450	900	1,500
			50	22	60	60	160	160	330	650	1,200	2,000
			60	20	55	55	150	150	310	600	1,100	1,900
			70	19	50	50	140	140	300	550	1,100	1,800
			80	17	45	45	120	120	260	500	1,000	1,600
			90	14	40	40	100	100	230	450	900	1,500
			100	14	40	40	100	100	230	450	900	1,500
(Emergency Stop Torque F_{2NOT})[B]	Nm	1,2	3~100	(3 Times of Mominal Output Torque)								
(Nominal Input Speed N_1)	rpm	1,2	3~100	5,000	5,000	5,000	4,000	4,000	4,000	3,000	3,000	2,000
(Nominal Input Speed N_{1B})	rpm	1,2	3~100	10,000	10,000	10,000	8,000	8,000	8,000	6,000	6,000	4,000
(Micro Backlash P0)	arcmin	1	3~10	—	—	—	≤1	—	≤1	≤1	≤1	≤1
		2	15~100	—	—	—	—	—	≤3	≤3	≤3	≤3
(Redduced Backlash P1)	arcmin	1	3~10	≤3	≤3	—	≤3		≤3	≤3	≤3	≤3
		2	15~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5
(Standard Backlash P2)	arcmin	1	3~10	≤5	≤5	—	≤5	—	≤5	≤5	≤5	≤5
		2	15~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Torsion rigidity	Nm/arcmin	1,2	3~100	3	7	7	14	14	25	50	145	225
(Allowable radial force F_{2rB})[C]	N	1,2	3~100	780	1,530	1,530	3,250	3,250	6,700	9,400	14,500	50,000
(Allowable radial force F_{2aB})[C]	N	1,2	3~100	390	765	765	1,625	1,625	3,350	4,700	7,250	25,000
(Service life)	hr	1,2	3~100	20,000								
η (Efficiency)	%	1	3~10	≥97%								
		2	15~100	≥94%								
(Weight)	kg	1	3~10	0.6	1.3	—	3.7	—	7.8	14.5	29	48
		2	15~100	0.8	1.5	1.9	4.1	5.3	9	17.5	33	60
(Operating Tenp)	℃	1,2	3~100	-10℃~90℃								
(Lubrication)				Synthetic lubrication oils								
(Degree of Gearbox Protection)		1,2	3~100	IP65								
(Mounting Position)		1,2	3~100	All directions								
Noise (n1=3000rpm i=10, No load)[E]	dB(A)	1,2	3~100	≤56	≤58	≤60	≤60	≤63	≤63	≤65	≤67	≤70
Mass Moments of Inertia J_1	kg·cm²	1	3	0.03	0.16	—	0.61	—	3.25	9.21	28.98	69.61
			4	0.03	0.14	—	0.48	—	2.74	7.54	23.67	54.37
			5	0.03	0.13	—	0.47	—	2.71	7.42	23.29	53.27
			6	0.03	0.13	—	0.45	—	2.65	7.25	22.75	51.72
			7	0.03	0.13	—	0.45	—	2.62	7.14	22.48	50.97
			8	0.03	0.13	—	0.44	—	2.58	7.07	22.59	50.84
			9	0.03	0.13	—	0.44	—	2.57	7.04	22.53	50.63
			10	0.03	0.13	—	0.44	—	2.57	7.03	22.51	50.56
		2	15	0.03	0.03	0.13	0.13	0.47	0.47	2.71	7.42	23.29
			20	0.03	0.03	0.13	0.13	0.47	0.47	2.71	7.42	23.29
			25	0.03	0.03	0.13	0.13	0.47	0.47	2.71	7.42	23.29
			30	0.03	0.03	0.13	0.13	0.47	0.47	2.71	7.42	23.29
			35	0.03	0.03	0.13	0.13	0.47	0.47	2.71	7.42	23.29
			40	0.03	0.03	0.13	0.13	0.47	0.47	2.71	7.42	23.29
			45	0.03	0.03	0.13	0.13	0.47	0.47	2.71	7.42	23.29
			50	0.03	0.03	0.13	0.13	0.44	0.44	2.57	7.03	22.51
			60	0.03	0.03	0.13	0.13	0.44	0.44	2.57	7.03	22.51
			70	0.03	0.03	0.13	0.13	0.44	0.44	2.57	7.03	22.51
			80	0.03	0.03	0.13	0.13	0.44	0.44	2.57	7.03	22.51
			90	0.03	0.03	0.13	0.13	0.44	0.44	2.57	7.03	22.51
			100	0.03	0.03	0.13	0.13	0.44	0.44	2.57	7.03	22.51

BAB / OUTLINE DIMENSION SHEET

1-stage Ratio i=3~10



[单位unit: mm]

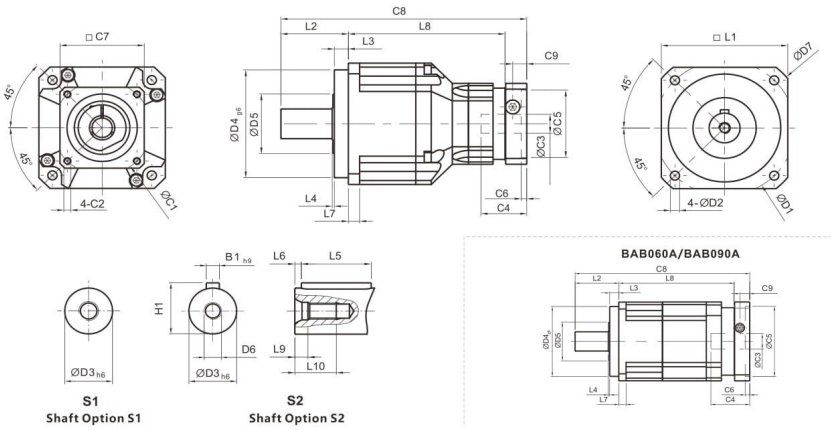
尺寸 Dimension	BAB042	BAB060	BAB090	BAB115	BAB142	BAB180	BAB220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.6	9	11	13	17
D3 h6	13	16	22	32	40	55	75
D4 g6	35	50	80	110	130	160	180
D5	22	45	65	95	75	95	115
D6	M4x0.7P	M5×0.8P	M8×1.25P	M12×1.75P	M16×2P	M20x2.5P	M20x2.5P
D7	56	80	116	152	185	240	292
L1	42	60	90	115	142	180	220
L2	26	37	48	65	97	105	138
L3	5.5	7	10	12	15	20	30
L4	1	1.5	1.5	2	3	3	3
L5	16	25	32	40	65	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	10	12	15	20
L8	31	61	78.5	102	104	154	163. 5
L9	4.5	4.8	7.2	10	12	15	15
L10	10	12.5	19	28	36	43	42
C1[1]	46	70	100	130	165	215	235
C2[1]	M4x0.7Px10	M5x0.8Px12	M6x1Px12	M8x1.25Px25	M10x1·5Px25	M12x1.75Px28	M12x1.75Px28
C3[1] G7	≤11/≤12[2]	≤14/≤16[2]	≤19/≤24	≤32	≤38	≤48	≤55
C4[1]	25	34	40	50	60	85	116
C5[1] G7	30	50	80	110	130	180	200
C6[1]	3. 5	4	6	5	6	6	6
C7[1]	42	60	90	115	142	190	220
C8[1]	86. 5	117	143.5	186.5	239	288	364. 5
C9[1]	8. 75	13.5	10.75	13	15	20. 75	53
B1 h9	5	5	6	10	12	16	20
H1	15	18	24.5	35	43	59	79. 5

1.C1~C9 are motor specific dimensions(metric std shown).Refer to www.china-bmemb.com and Design Tool to view your specific motor mounting system.

2.BAB042 ratio 5,10 offers C3≤ 12 option,BAB060 ratio 5,10 offers C3≤ 16 option

BAB / OUTLINE DIMENSION SHEET

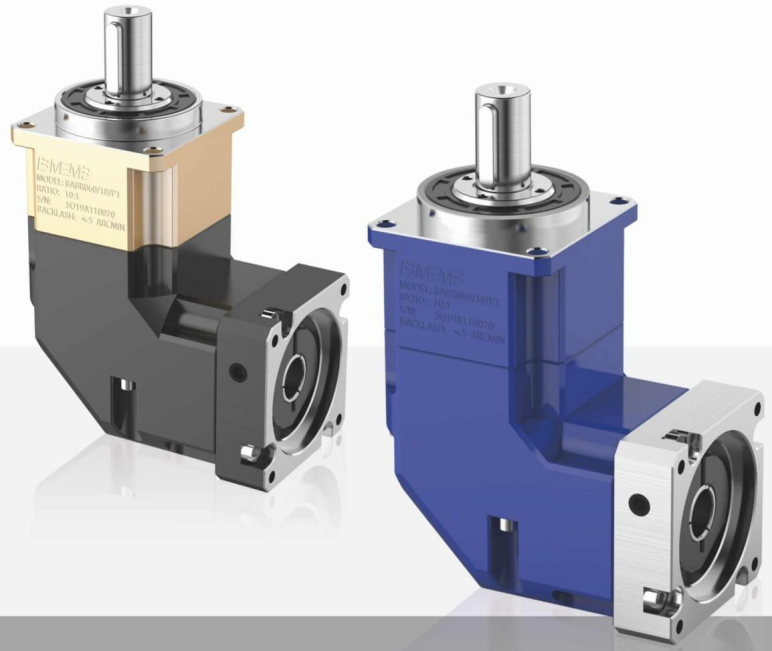
2-stage Ratio i=15~100



[unit: mm]

尺寸 Dimension	BAB042	BAB060	BAB060A	BAB090	BAB090A	BAB115	BAB142	BAB180	BAB220
D1	50	70		100		130	165	215	250
D2	3.4	5.5		6.6		9	11	13	17
D3 h6	13	16		22		32	40	55	75
D4 g6	35	50		80		110	130	160	180
D5	22	45		65		95	75	95	115
D6	M4x0.7P	M5×0.8P		M8×1.25P		M12×1.75P	M16×2P	M20x2.5P	M20x2.5P
D7	56	80		116		152	185	240	292
L1	42	60		90		115	142	180	220
L2	26	37		48		65	97	105	138
L3	5.5	7		10		12	15	20	30
L4	1	1.5		1.5		2	3	3	3
L5	16	25		32		40	65	70	90
L6	2	2		3		5	5	6	7
L7	4	6		8		10	12	15	20
L8	58. 5	72	98	111.5	126.5	143.5	176	209.5	248
L9	4.5	4.8		7.2		10	12	15	15
L10	10	12.5		19		28	36	42	42
C1[1]	46	46	70	70	100	100	130	165	215
C2[1]	M4x0.7Px10	M4x0.7Px10	M5x0.8Px12	M5x0.8Px12	M6x1Px12	M6x1Px12	M8x1.25Px25	M10x1.5Px28	M12x1.75Px28
C3[1] G7	≤11/≤12	≤11/≤12	≤14/≤16	≤14/15.875/≤16	≤19/≤24	≤19/≤24	≤32	≤38	≤48
C4[1]	25	25	34	34	40	40	50	60	85
C5[1] G7	30	30	50	50	80	80	110	130	180
C6[1]	3. 5	3. 5	4	6	4	4	5	6	6
C7[1]	42	42	60	60	90	90	115	142	190
C8[1]	114	138.5	154	178.5	191.5	225.5	292.5	337	415
C9[1]	8. 75	8. 75	13.5	13.5	10.75	10.75	13	15	20.75
B1 h9	5	5		6		10	12	16	20
H1	15	18		24.5		35	43	59	79. 5

1.C1~C9 are motor specific dimensions(metric std shown).Refer to www.china-bmemb.com and Design Tool to view your specific motor mounting system.



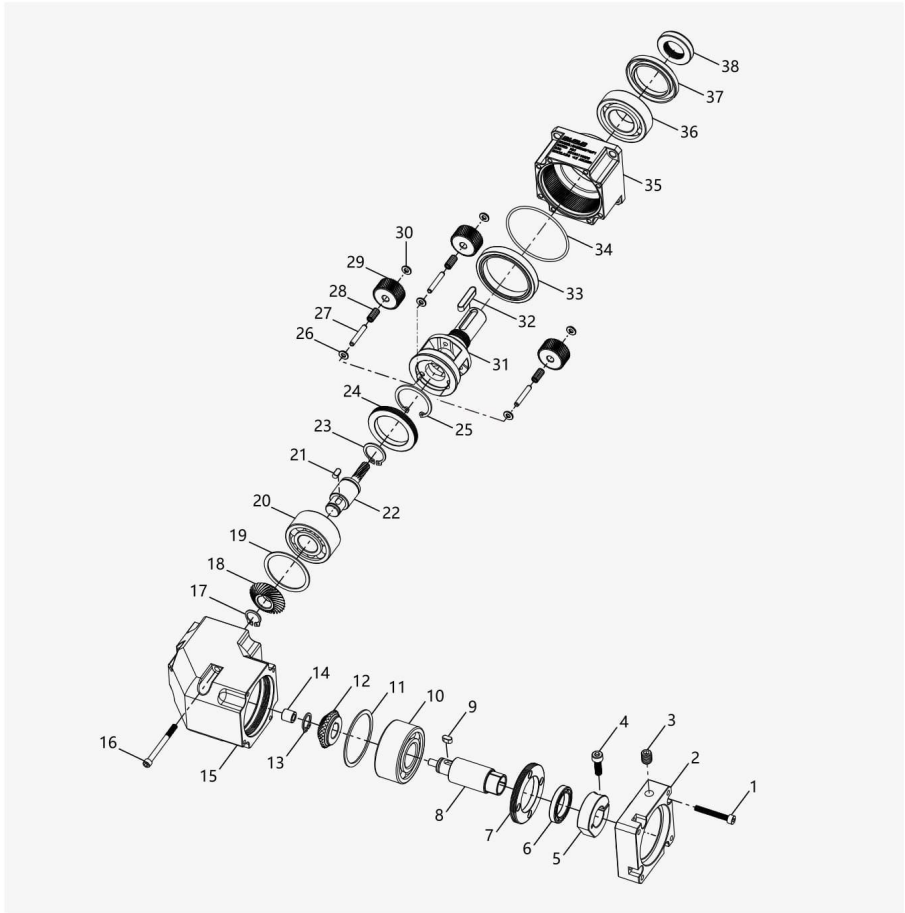
BABR SERIES

PROFESSIONAL MANUFACTURER OF POWER TRANSMISSION

PROFESSIONAL MANUFACTURER OF POWER TRANSMISSION

DESIGN PHILOSOPHY: To follow the law, but always beyond.

BUSINESS PHILOSOPHY: Design for customer demand , dedication for customer satisfaction



1	Inner hex screw	14	Axle sleeve	27	Roller
2	Back cover	15	Gearcase	28	Kingpin
3	Plug	16	Inner hex screw	29	Planet gear
4	Inner hex scewv	17	Shaft-circlip	30	Washer
5	Locking ring	18	Gear	31	Planet carrier
6	Oil seal	19	Shim ring	32	Key
7	Adjusting ring	20	Bearing	33	Bearing
8	Intput shaft	21	Key	34	O- ring
9	Key	22	Sun wheel	35	Internal gear
10	Bearing	23	Shaft-circlip	36	Bearing
11	Shim ring	24	Adjusting ring	37	Oil seal
12	Pinion	25	Hole-circlip	38	Lock nut
13	Shaft-circlip	26	Washer		

MODEL ILLUMINATE

BABR 090 / 10 / S2 / P2 / T1 / MOTOR

① ② ③ ④ ⑤ ⑥ ⑦

Description
Code for gear units series: BABR
Specification code of gear units : 042、060、090、115、142、180、220
Speed ratio of reducer i 1-stage : 3、4、5、6、7、8、9、10、14、20 2-stage : 15、20、25、30、35、40、45、50、60、70、80、90、100、120、140、160、180、200
output shaft type : S1 : Smooth output shaft S2 : Output shaft with key
Backlash: P0 : Micro backlash P1 : Reduced backlash P2 : Standard backlash
Motor manufacturer (P53-P54)
Motor type

Example: **BABR090 / 10 / S2 / P2 / T1/90ST-M02430**

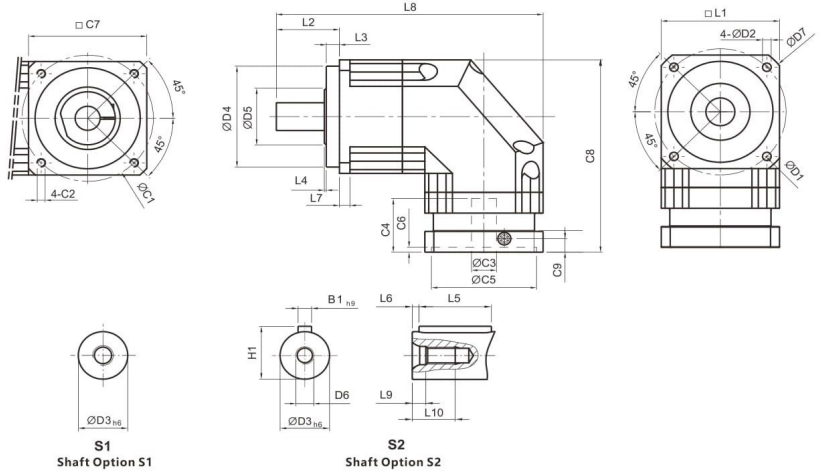
GEARBOX PERFORMANCE INFORMATION

Model NO		Stage	Ratio	BABR042	BABR060	BABR090	BABR115	BABR142	BABR180	BABR220
(Mominal Output Torque T_{2N})	Nm	1	3	9	36	90	195	342	588	1,140
			4	12	48	120	260	520	1,040	1,680
			5	15	60	150	325	650	1,200	2,000
			6	18	55	150	310	600	1,100	1,900
			7	19	50	140	300	550	1,100	1,800
			8	17	45	120	260	500	1,000	1,600
			9	14	40	100	230	450	900	1,500
			10	14	60	150	325	650	1,200	2,000
			14	–	42	140	300	550	1,100	1,800
			20	–	40	100	230	450	900	1,500
		2	15	14	–	–	–	–	–	–
			20	14	–	–	–	–	–	–
			25	15	60	150	325	650	1,200	2,000
			30	20	55	150	310	600	1,100	1,900
			35	19	50	140	300	550	1,100	1,800
			40	17	45	120	260	500	1,000	1,600
			45	14	40	100	230	450	900	1,500
			50	14	60	100	230	650	1,200	2,000
			60	20	55	150	310	600	1,100	1,900
			70	19	50	140	300	550	1,100	1,800
			80	17	45	120	260	500	1,000	1,600
			90	14	40	100	230	450	900	1,500
			100	14	40	150	325	650	1,200	2,000
			120	–	–	150	310	600	1,100	1,900
			140	–	–	140	300	550	1,100	1,800
			160	–	–	120	260	550	1,000	1,600
			180	–	–	100	230	450	900	1,500
			200	–	–	100	230	450	900	1,500
(Emergency Stop Torque F_{2NOT})[B]		1,2	3~200	(3 Times of Mominal Output Torque)						
(Nominal Input Speed N_{1i})	rpm	1,2	3~200	5,000	5,000	4,000	4,000	3,000	3,000	2,000
(Nominal Input Speed N_{1N})	rpm	1,2	3~200	10,000	10,000	8,000	8,000	6,000	6,000	4,000
(Micro Backlash P0)	arcmin	1	3~20	–	–	≤ 2	≤2	≤2	≤2	≤2
		2	12~200	–	–	≤ 4	≤4	≤4	≤4	≤4
(Redduced Backlash P1)	arcmin	1	3~20	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		2	12~200	≤7	≤7	≤7	≤7	≤7	≤7	≤7
(Standard Backlash P2)	arcmin	1	3~20	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		2	12~200	≤9	≤9	≤9	≤9	≤9	≤9	≤9
Torsion rigidity	Nm/arcmin	1,2	3~200	3	7	14	25	50	145	225
(Allowable radial force F_{2rB})[C]	N	1,2	3~200	780	1,530	3,250	6,700	9,400	14,500	50,000
(Allowable radial force F_{2aB})[C]	N	1,2	3~200	390	765	1,625	3,350	4,700	7,250	25,000
(Service life)	hr	1,2	3~200	20,000						
(Efficiency)	%	1	3~20	≥ 95%						
		2	12~200	≥ 92%						
(Weight)	kg	1	3~20	0.9	2.1	6.4	13	24.5	51	83
		2	12~200	1.2	1.5	7.8	14.2	27.5	54	95
(Operating Tenp)	℃	1,2	3~200	0℃~+90						
(Lubrication)		1,2	3~200	Synthetic lubrication oils						
(Degree of Gearbox Protection)		1,2	3~200	IP65						
(Mounting Position)		1,2	3~200	All directions						
Noise (n1=3000rpm i=10, No load)[E]	dB(A)	1,2	3~200	≤61	≤63	≤65	≤68	≤70	≤72	≤74
Mass Moments of Inertia J_1	kg · cm²	1	3~10	0.09	0.35	2.25	6.84	23.4	68.9	135.4
			14	–	0.07	1.87	6.25	21.8	65.6	119.8
			20	–	0.07	1.87	6.25	21.8	65.6	119.8
		2	15	0.09	–	–	–	–	–	–
			20	0.09	–	–	–	–	–	–
			25~100	0.09	0.09	0.35	2.25	6.84	23.4	68.9
			120~200	–	–	0.31	1.87	6.25	21.8	65.6

A.Ratio($i=N_{1i}/N_{out}$)
B.Max.acceleration torque T_{2B}=60% of T_{2NOT}
C.Applied to the output shaft center at 100rpm
D.For continuous operation.the service life time is less than 10000hrs
E.These values are measured by gearbox with ratio=10(1-stage)or ratio=100(2-stage)at 3000rpm without load

BABR / OUTLINE DIMENSION SHEET

1-stage Ratio i=3~20



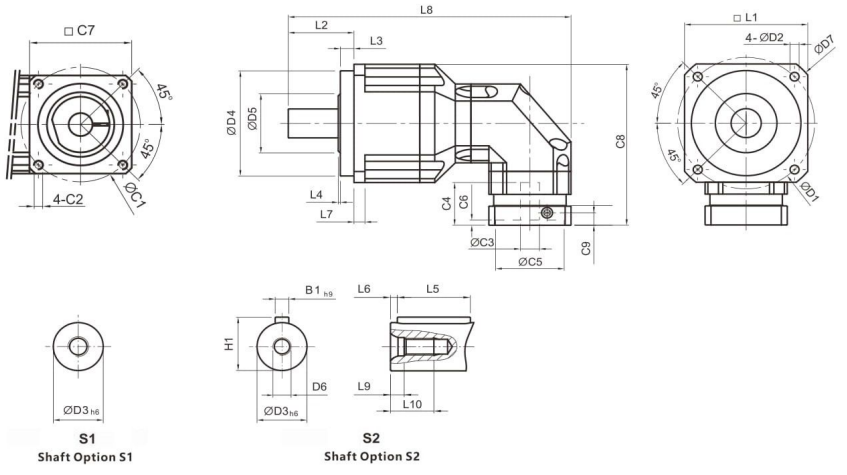
[unit: mm]

尺寸 Dimension	BABR042	BABR060	BABR090	BABR115	BABR142	BABR180	BABR220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.6	9	11	13	17
D3 h6	13	16	22	32	40	55	75
D4 g6	35	50	80	110	130	160	180
D5	22	45	65	95	75	95	115
D6	M4 x 0.7P	M5 x 0.8P	M8 x 1.25P	M12 x 1.75P	M16 x 2P	M20 x 2.5P	M20 x 2.5P
D7	56	80	116	152	185	240	292
L1	42	60	90	115	142	180	220
L2	26	37	48	65	97	105	138
L3	5.5	7	10	12	15	20	30
L4	1	1.5	1.5	2	3	3	3
L5	16	25	32	40	63	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	10	12	15	20
L8	111.5	145	203	259	333	394	484
L9	4.5	4.8	7.2	10	12	15	15
L10	10	12.5	19	28	36	42	42
C1[1]	46	70	100	130	165	215	235
C2[1]	M4x0.7Px10	M5x0.8Px12	M6x1Px12	M8x1.25Px25	M10x1.5Px25	M12x1.75Px28	M12x1.75Px28
C3[1] G7	⩽11 / ⩽12	⩽14 / ⩽16	⩽19 / ⩽24	⩽32	⩽38	⩽48	⩽55
C4[1]	25	34	40	50	60	85	116
C5[1] G7	30	50	80	110	130	180	200
C6[1]	3.5	4	6	5	6	6	6
C7[1]	42	60	90	115	142	190	220
C8[1]	90.5	111.5	152.5	191.5	235.5	303.5	378.5
C9[1]	8.75	13.5	10.75	13	15	20.75	53
B1 h9	5	5	6	10	12	16	20
H1	15	18	24.5	35	43	59	79.5

1.C1~C9 are motor specific dimensions(metric std shown).Refer to www.china-bmemb.com and Design Tool to view your specific motor mounting system.

BABR / OUTLINE DIMENSION SHEET

2-stage, Ratio i=15~200



[unit: mm]

Dimension	BABR042	BABR060	BABR090	BABR115	BABR142	BABR180	BABR220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.6	9	11	13	17
D3 h6	13	16	22	32	40	55	75
D4 g6	35	50	80	110	130	160	180
D5	22	45	65	95	75	95	115
D6	M4 x 0.7P	M5 x 0.8P	M8 x 1.25P	M12x1.75P	M16x2P	M20x2.5P	M20x2.5P
D7	56	80	116	152	185	240	292
L1	42	60	90	115	142	180	220
L2	26	37	48	65	97	105	138
L3	5.5	7	10	12	15	20	30
L4	1	1.5	1.5	2	3	3	3
L5	16	25	32	40	63	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	10	12	15	20
L8	139	163.5	206.5	285	365	431	521
L9	4.5	4.8	7.2	10	12	15	15
L10	10	12.5	19	28	36	42	42
C1[1]	46	46	70	100	130	165	215
C2[1]	M4x0.7Px10	M4x0.7Px10	M5x0.8Px12	M6x1Px12	M8x1.25Px25	M10x1.5Px28	M12x1.75Px28
C3[1] G7	⩽11 / ⩽12	⩽11 / ⩽12	⩽14/⩽15.875/⩽16	⩽19 / ⩽24	⩽32	⩽38	⩽48
C4[1]	25	25	34	40	50	60	85
C5[1] G7	30	30	50	80	110	130	180
C6[1]	3.5	3.5	4	6	5	6	6
C7[1]	42	42	60	90	115	142	190
C8[1]	90.5	99.5	126.5	165	205	254.5	323.5
C9[1]	8.75	8.75	13.5	10.75	13	15	20.75
B1 h9	5	5	6	10	12	16	20
H1	15	18	24.5	35	43	59	79.5

1.C1~C9 are motor specific dimensions(metric std shown).Refer to www.china-bmemb.com and Design Tool to view your specific motor mounting system.

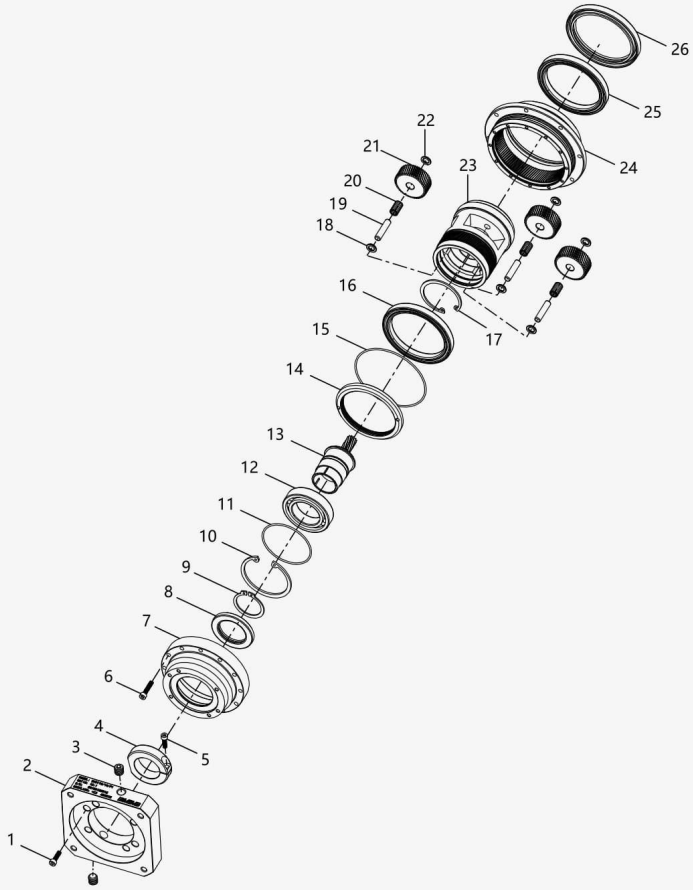
BAD SERIES

PROFESSIONAL MANUFACTURER OF POWER TRANSMISSION

PROFESSIONAL MANUFACTURER OF POWER TRANSMISSION

DESIGN PHILOSOPHY: To follow the law, but always beyond.

BUSINESS PHILOSOPHY: Design for customer demand , dedication for customer satisfaction



1	Inner hex screw	11	0- ring	21	Planet gear
2	Back cover	12	Bearing	22	Washer
3	Plug	13	Sun wheel	23	Planet carrier
4	Locking ring	14	Lock nut	24	Internal gear
5	Inner hex screw	15	0- ring	25	Bearing
6	Inner hex screw	16	Bearing	26	Oil seal
7	Connenting flange	17	Hole-circlip		
8	Oil seal	18	Washer		
9	Shaft-circlip	19	Roller		
10	Hole-circlip	20	Kingpin		

MODEL ILLUMINATE

BAD 090 / 10 / P2 / T1 / MOTOR

① ② ③ ④ ⑤ ⑥

Description
Code for gear units series: BAD
Specification code of gear units:047、064、090、110、140、200、255
Speed ratio of reducer i 1-stage:4、5、6、7、8、10 2-stage:20、25、30、35、40、50、60、70、80、100
Backlash: P0 : Micro backlash P1 : Reduced backlash P2 : Standard backlash
Motor manufacturer (P53-P54)
Motor type

Example: **BAD090 / 10 / P2 /T1/ 90ST-M02430**

GEARBOX PERFORMANCE INFORMATION

Model NO		Stage	Ratio	BAD047	BAD064	BAD090	BAD110	BAD140	BAD200	BAD255
(Mominal Output Torque T_{2N})	Nm	1	4	19	48	130	270	560	1,100	1,700
			5	22	60	160	330	650	1,200	2,000
			6	20	55	150	310	600	1,100	1,900
			7	19	50	140	300	550	1,100	1,800
			8	17	45	120	260	500	1,000	1,600
			10	14	40	100	230	450	900	1,500
		2	20	19	48	130	270	560	1,100	1,700
			25	22	60	160	330	650	1,200	2,000
			30	20	55	150	310	600	1,100	1,900
			35	19	50	140	300	550	1,100	1,800
			40	19	48	130	270	560	1,100	1,700
			50	22	60	160	330	650	1,200	2,000
			60	20	55	150	310	600	1,100	1,900
			70	19	50	140	300	550	1,100	1,800
			80	17	45	120	260	500	1,000	1,600
			100	14	40	100	230	450	900	1,500
(Emergency Stop Torque F_{2NOT})[B]	Nm	1,2	4~100	(3 Times of Mominal Output Torque)						
(Nominal Input Speed N_{1})	rpm	1,2	4~100	5,000	5,000	4,000	4,000	3,000	3,000	2,000
(Nominal Input Speed N_{1B})	rpm	1,2	4~100	10,000	10,000	8,000	8,000	6,000	6,000	4,000
(Micro Backlash P0)	arcmin	1	4~10	-	-	≤1	≤1	≤1	≤1	≤1
		2	20~100	-	-	-	≤3	≤3	≤3	≤3
(Redduced Backlash P1)	arcmin	1	4~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
(Standard Backlash P2)	arcmin	2	20~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		1	4~10	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	20~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Torsion rigidity	Nm/arcmin	1,2	4~100	7	13	31	82	151	440	1,006

A.Ratio($i=N_{1}/N_{2A}$)
B.Max.acceleration torque T_{2B}=60% of T_{2NOT}
C.Applied to the output shaft center at 100rpm
D.For continuous operation.the service life time is less than 15000hrs
E.These values are measured by gearbox with ratio=10($_{1\text{-stage}}$)or ratio=100($_{2\text{-stage}}$)at 3000rpm without load

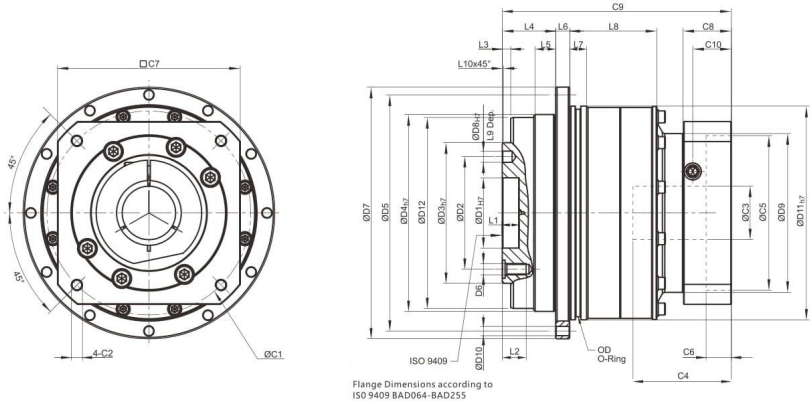
GEARBOX PERFORMANCE INFORMATION

Model NO		Stage	Ratio	BAD047	BAD064	BAD090	BAD110	BAD140	BAD200	BAD255
(Maximum bending moment M_{2KB}) C	Nm	1,2	4~100	42.5	125	235	430	1,300	3,064	5,900
(Allowable radial force F_{2aB}) C	N	1,2	4~100	990	1,050	2,850	2,990	10,590	16,660	29,430
(Service life)	hr	1,2	4~100	30,000						
(Efficiency)		1	4~10	≥97%						
	%	2	20~100	≥94%						
(Weight)		1	4~10	0.7	1.2	3.0	5.6	11.9	31.6	56.1
	kg	2	20~100	1.0	1.6	3.7	7.3	15.9	36.9	70.4
			16~91	1.0	1.4	3.5	6.5	15.5	34.2	67.2
(Operating Tenp)	℃	1,2	4~100	-10℃~90℃						
(Lubrication)				Synthetic lubrication oils						
(Degree of Gearbox Protection)		1,2	4~100	IP65						
(Mounting Position)		1,2	4~100	All directions						
Noise (n1=3000rpm i=10, No load) E	dB(A)	1,2	4~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70
Mass Moments of Inertia J_1	kg·cm²	1	4	0.03	0.14	0.51	2.87	7.54	25.03	58.31
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	20	0.03	0.13	0.13	0.47	2.71	7.42	23.29
			25	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			30	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			35	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			40	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			50	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			60	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			70	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			80	0.03	0.03	0.13	0.44	2.57	7.03	22.51
			100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

A.Ratio(i=N_{IN}/N_{OUT})
B.Max.acceleration torque T_{2B}=60% of T_{2NOT}
C.Applied to the output shaft center at 100rpm
D.For continuous operation.the service life time is less than 15000hrs
E.These values are measured by gearbox with ratio=10(1-stage)or ratio=100(2-stage)at 3000rpm without load

BAD / OUTLINE DIMENSION SHEET

1-stage Ratio i=4~10



Flange Dimensions according to ISO 9409 BAD064-BAD255

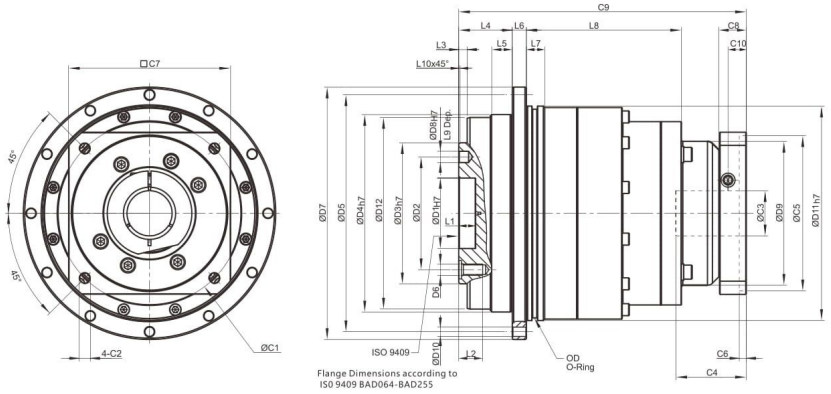
[unit:mm]

Dimension	BAD047	BAD064	BAD090	BAD110	BAD140	BAD200	BAD255
D1 H7	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3 h7	28	40	63	80	100	160	180
D4 h7	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	4 x M3 x 0.5P	7 x M5 x 0.8P	7 x M6 x 1P	11 x M6 x1P	11 x M8 x 1.25P	11 x M10 x 1.5P	12 x M16 x 2P
D7	72	86	118	145	179	247	300
D8 H7	3	5	6	6	8	10	12
D9	45.5	55	77	90	113	138	175
D10	8 x 3.4	8 x 4.5	8 x 5.5	8 x 5.5	12 x 6.6	12 x 9	16 x 13.5
D11 h7	60	70	95	120	152	212	255
D12	46.2	63.2	89.2	109.2	139.2	199.2	254.2
L1	4	8	12	12	12	16	20
L2	6.5	8	13.5	13.5	17	22.5	30.5
L3	3	3	6	6	6	8	12
L4	19.5	19.5	30	29	38	50	66
L5	7	7	10	10	14.6	15	20
L6	4	4	7	8	10	12	18
L7	5	7.7	8	10	12	15	20
L8	18.5	28.5	27	37	62	69.5	82
L9	4	6	7	7	7	10	10
L10	0.5	0.5	1	1	1	1	1
C1[1]	46	70	100	130	165	215	235
C2[1]	M4x0.7Px10	M5x0.8Px12	M6x1Px12	M8x1.25Px25	M10x1.5Px25	M12x1.75Px28	M12x1.75Px28
C3[1] G7	≤11 / ≤12[2]	≤14 / ≤16[2]	≤19 / ≤24	≤32	≤38	≤48	≤55
C4[1]	30	34	40	50	60	85	116
C5[1] G7	30	50	80	110	130	180	200
C6[1]	3.5	8	4	5	6	6	6
C7[1]	48	60	90	115	142	190	220
C8[1]	19.5	19	17	19.5	22.5	29	63
C9[1]	70	82.5	99.5	121.5	151	199.5	256.5
C10[1]	13.25	13.5	10.75	13	15	20.75	53.5
OD	56 x 2	66 x 2	90 x 3	110 x 3	145 x 3	200 x 5	238 x 5

1.C1~C10 are motor specific dimensions(metric std shown).Refer to www.china-bmemb.com and Design Tool to view your specific motor mounting system.
2.BAD047 ratio 5,10 offers C3≤ 12 option,BAD064 ratio 5,10 offers C3≤ 16 option

BAD/ OUTLINE DIMENSION SHEET

2-stage Ratio i=20~100



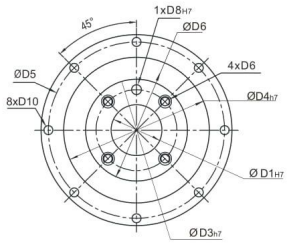
[unit:mm]

Dimension	BAD047	BAD064	BAD090	BAD110	BAD140	BAD200	BAD255
D1 H7	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3 h7	28	40	63	80	100	160	180
D4 h7	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	4 x M3 x 0.5P	7 x M5 x 0.8P	7 x M6 x 1P	11 x M6 x1P	11 x M8 x 1.25P	11 x M10 x 1.5P	12 x M16 x 2P
D7	72	86	118	145	179	247	300
D8 H7	3	5	6	6	8	10	12
D9	45.5	45.5	53.4	77	102	125	160
D10	8 x 3.4	8 x 4.5	8 x 5.5	8 x 5.5	12 x 6.6	12 x 9	16 x 13.5
D11 h7	60	70	95	120	152	212	255
D12	46.2	63.2	89.2	109.2	139.2	199.2	254.2
L1	4	8	12	12	12	16	20
L2	6.5	8	13.5	13.5	17	22.5	30.5
L3	3	3	6	6	6	8	12
L4	19.5	19.5	30	29	38	50	66
L5	7	7	10	10	14.6	15	20
L6	4	4	7	8	10	12	18
L7	5	7.7	8	10	12	15	20
L8	54.5	65	60	87.5	110	132.5	148
L9	4	6	7	7	7	10	10
L10	0.5	0.5	1	1	1	1	1
C1[1]	46	46	70	100	130	165	215
C2[1]	M4x0.7Px10	M4x0.7Px10	M5x0.8Px12	M6x1Px12	M8x1.25Px25	M10x1.5Px28	M12x1.75Px28
C3[1] G7	≤11 / ≤12	≤11 / ≤12	≤14 / ≤15.875 / ≤16	≤19 / ≤24	≤32	≤38	≤48
C4[1]	30	30	34	40	50	60	85
C5[1] G7	30	30	50	80	110	130	180
C6[1]	3.5	3.5	8	4	5	6	6
C7[1]	48	48	60	90	115	142	190
C8[1]	19.5	19.5	19	17	19.5	22.5	29
C9[1]	97.5	108	134	160	204	248	311.5
C10[1]	13.25	13.25	13.5	10.75	13	15	20.75
OD	56 x 2	66 x 2	90 x 3	110 x 3	145 x 3	200 x 5	238 x 5

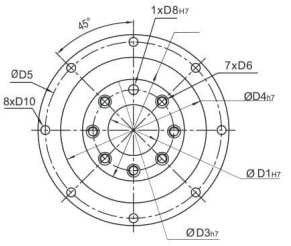
1.C1~C10 are motor specific dimensions(metric std shown).Refer to www.china-bmemb.com and Design Tool to view your specific motor mounting system.

OUTLINE DIMENSION SHEET

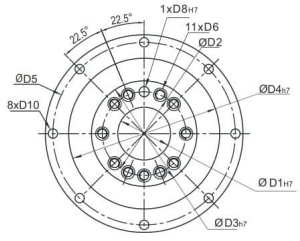
BAD047
BADR047



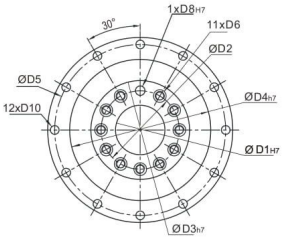
BAD064/AD090
BADR064/ADR090



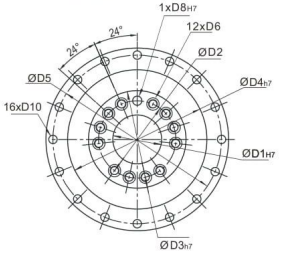
BAD110
BADR110



BAD140/AD200
BADR140/ADR200



BAD255
BADR25



[unit: mm]

Dimension	BAD047	BAD064	BAD090	BAD110	BAD140	BAD200	BAD255
	BADR047	BADR064	BADR090	BADR110	BADR140	BADR200	BADR255
D1H7	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3h7	28	40	63	80	100	160	180
D4h7	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	M3X0.5P	M5X0.8P	M6X1P	M6X1P	M8X1.25P	M10X1.5P	M16X2P
D8H7	3	5	6	6	8	10	12
D10	3.4	4.5	5.5	5.5	6.6	9	13.5