DSK
GEARED MOTOR
DAESUNG INDUSTRIAL CO., LTD.

DSK
GEARED MOTOR
HELICAL BEVEL
B-Series

대성산업주식회사
DAESUNG INDUSTRIAL CO.,LTD.

기계사업부
Machinery Division

영 업 본 부 서울시 구로구 신도림동 692번지 대성디큐브시티 오피스 14층
Tel : 02-3408-1348 Fax : 02-462-5925

부산영업소 경상남도 양산시 유산동 289-22
Tel : 055-385-4053~7 Fax : 055-371-9780

대구영업소 대구시 북구 칠성동 2가 67-1
Tel : 053-668-51 61 Fax : 053-354-5846

공 장 강원도 춘천시 퇴계동 863-4
Tel : 033-261-2561 Fax : 033-261-2564

Headquarter 14F, D-CUBE CITY, OFFICE TOWER #692
SINDORIM-DONG, GURO-GU, SEOUL, 152-888, KOREA

Factory Toegye-dong, Chunchon city, Kangwon-do Korea

▣ 판매대리점

DSK GEARED MOTOR 사양은 제품의 품질 향상을 위하여사전통보없이 변경될 수 있습니다.
The DSK GEARED MOTOR' s specification is able to change for improving a products quality without prior notice.

대성산업주식회사
DAESUNG INDUSTRIAL CO.,LTD.

History

1968. 07	체인과로 발족
1981. 02	부산영업소 신설
1986. 03	일본 SEIKI社와 Geared Motor 생산 기술제휴
1987. 01	대구 영업소 신설
1990. 06	SKK와 기술제휴
1990. 08	감속기용 Motor 국산 개발 (Knock Down 방식)
1991. 08	DSK공장 준공 초도 생산 (0.4kW ~ 3.7kW)
1995. 03	CNC SKIVING (HOBBING 겸용)기 업계 최초 도입 스위스 Micron社 Gear & Pinion 국산 개발
1996. 02	0.2kW 국산화
1997. 03	전동 Motor 성능 개량 (G/M 전용 Motor 개발)
2001. 08	0.75kW CE MARK 인증 획득
2003. 06	공장 확장 이전 (안산 ➡ 춘천)
2004. 12	CE MARK 전사양 인증 획득
2005. 06	CCC MARK 전사양 인증 획득
2006. 07	5.5kW, 7.5kW 사양 개발
2007. 04	고효율인증 획득
2007. 05	0.4kW New Model 개발
2007. 12	CNC SKIVING(HOBBING) P90 도입
2008. 07	IEC FLANGE 0.4kW ~ 5.5kW 개발 완료
2009. 12	HELICAL BEVEL G/M B-Series 개발 완료

DSK
GEARED MOTOR

1968. 07	Establishment of Daesung Co., Ltd Chain Manufacturing departmen
1981. 02	Establishment of Sales department in Busan
1986. 03	Technical collaboration with SEIKI Co., Ltd (JAPAN) over Geared Motor production line
1987. 01	Establishment of Sales department in Daegu
1990. 06	Technical collaboration with SKK Co., Ltd (JAPAN)
1990. 08	Developed the motor specially used for the reducer (Knock Down type)
1991. 08	Establishment of DSK factory line in Chuncheon and Started production of parallel shaft geared motor. (0.4 kW ~ 3.7 kW)
1995. 03	Introduced CNC SKIVING Technic for the first time in domestic field
1996. 02	Localized 0.2 kW geared motor
1997. 03	Improved the performance of the motor
2001. 08	Obtained CE certification for 0.75kW geared motor
2003. 06	Moved Factory line to Chuncheon
2004. 12	Obtained CE certification for all models
2005. 06	Obtained CCC certification for all models
2006. 07	Developed 5.5kW, 7.5kW types
2007. 04	Obtained high efficiency certification
2007. 05	Developed 0.4 kW new model
2007. 12	Adopted CNC SKIVING(HOBBING) P90
2008. 07	Completed the development of IEC Flange 0.4kW ~ 5.5kW types
2009. 12	Completed the development of HELICAL BEVEL G/M B-Series

Highly advanced DSK Geared Motor

made a break through in its quality and price

고품질에 성공한 DSK 기어드모터의 가격과 성능은 확실히 앞서갑니다.

당사는 항상 급변하는 세계화에 맞추어 고객만족을 실현하기 위해 창의적인 마인드를 추구하며 선진 기술력과 자본을 바탕으로 최첨단 가공 설비와 우수한 인력 확충으로 최상의 품질을 자랑하는 기어드모타를 생산, 판매하고 있습니다.
지속적인 개발을 통해 완벽한 기술력을 보유한 당사는 새로운 제품을 개발하여 세계화로 나아갈 발판을 만들었습니다.

개발 초기부터 3D를 통한 전산구조해석 및 실물 완제품 test를 실시하여 높은 신뢰성을 확보하여 대성이 개발한 HELICAL-BEVEL 기어드모터는 초정밀, 초정숙, 고효율화, 고강도화를 실현하여 고객만족을 충족시킬 자신감을 가지고 있습니다.
또한 다양한 감속비와 설치 형태 설계로 어떤 환경에서도 설치 가능하도록 하였습니다. 고객에 대한 사랑과 기술에 대한 열정 그리고 환경 및 사회에 대한 책임감을 바탕으로 대성은 동력전달 장치 분야의 최상의 품질과 서비스를 제공해 드릴 것입니다.

Daesung Industrial Co., Ltd pursues a creative mind to customers' satisfaction. We have been manufacturing and selling G/M based on advanced technology, cutting edge of processing equipments and top level human resources. Through high technology from long term R&D effort, we are developing new products and stepping into globalization. Through the early development of HELICAL-BEVEL G/M, we ensure high reliability by using 3D computerized structural analysis. Daesung HELICAL-BEVEL G/M has confidence to satisfy customers with high precion, intensity, efficiency and noise-free motor quality.

The design of a wide range of reduction ratio and series makes our products installed under any environments. With confidence for custormers' satisfaction, a passion for new technology, environmental and social responsibility, we will provide the best quality and services in power transmission field.

감 속 부 Gear Head

초경량, 저소음, 고효율, 설치각도 자유자재!

Wide variation, Grade-up gearing, compact, grease packed,
maintenance free universal installation at any style and position.

GEAR BOX

전산 구조 해석을 통해 어떠한 설치 형태에도 강도 유지 가능, 일체형 GEAR BOX 채택으로 가공 정도를 향상 시켜 우수한 품질 수준 유지

Through computerized structural analysis high strength remains steady Using uni-gearbox processing accuracy is improved

BEARING

레디얼 하중 및 기어의 구동 특성을 고려한 최적의 베어링 선정

Considering radial, the output and characteristics of the gears, the most suitable bearing is chosen

MOTOR

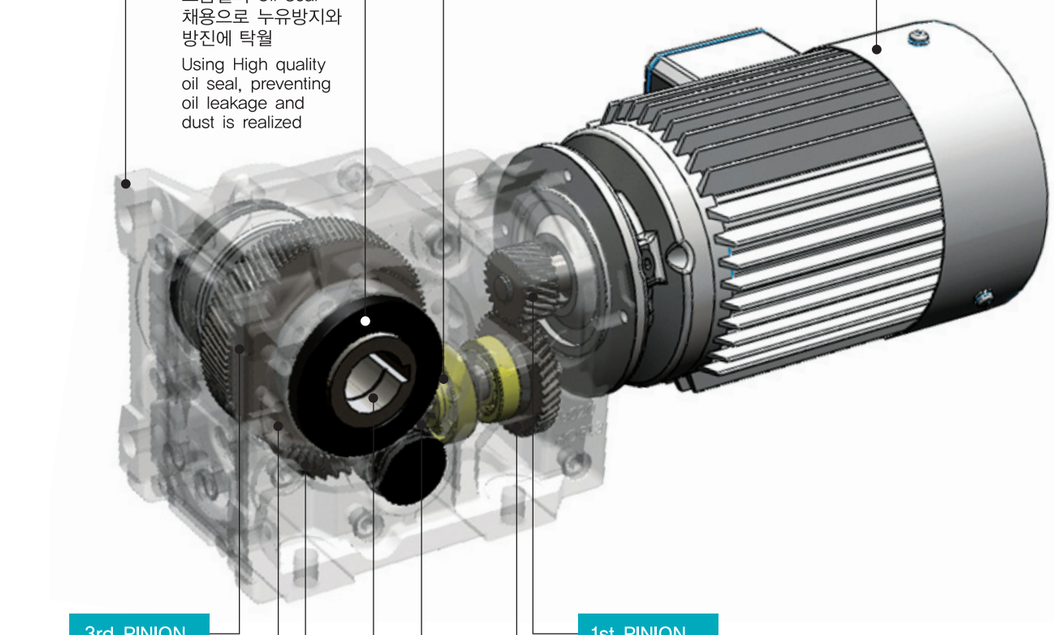
전 사양 고효율모터 적용이 가능하며 Diecasting frame 적용으로 미려한 외관 및 경량화 실현

High efficiency motor for all models. Applying diecasting frame, light and stylish exterior is achieved

OIL SEAL

고품질의 Oil Seal 채용으로 누유방지와 방진에 탁월

Using High quality oil seal, preventing oil leakage and dust is realized



특 징 Character

1 풍부한 기종, 폭넓은 감속비 Versatile type, wide speed reduction ratio

사용조건 , 목적에 맞게 폭넓은 감속비
Wide range of reduction ratio based on different applications and uses

2 저소음, 원활한 운전 Low noise, quiet operation

저소음 저진동 실현하기위해 소음의 원인을 해석 하였으며, 치차는 이상 치차에 근접하도록
2차 가공 (Skiving & Lapping) 실시, GEAR BOX 의 가공 정도 향상을 통해 저소음 및 원활한 운전 실현

Operation with low noise and vibration is achieved with analysis of the noise cause and the design which consists of superb pinions, 2nd process (Skiving & Lapping), highly precise gears and gear cases.

3 설치방식의 다양화 Various installation type

전기종을 다양한 설치 형태 및 설치 TYPE 실현으로 어떤 형태의 취부 구조라도 설치 가능
All models practicable in various mounting positions and mounting types

4 견고한 주물 하우징 Solid robust heavy cast iron housing

동역학적 해석및 전산구조해석(유한요소)을 통한 모든 설치 형태의 강도 분석을 실시하였으며 일체형
주물 GEAR BOX 적용

Strength analysis was carried out for various mounting positions with dymanic simulation and data processing structural analysis

5 GEAR BOX의 일체형 설계로 정밀도 향상 Unigearbox design

GEAR BOX 일체형 제작 및 동시가공으로 인한 가공 정밀도 향상
High-precision processing was realized with unigearbox design

6 최적설계를 통한 경량화 Lightweight by optimal design

3D 설계 적용으로 인해 최적의 설계 실현, 전산 구조해석 적용으로 인해 최적의 강도 확보 및 경량화

Optimized strength and lightweight was achieved with high reliability by using 3D computerized data processing structural analysis

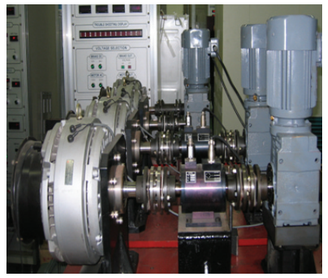
7 에너지 절감형 Energy saving

전사양 모타 프레임을 DIECASTING으로 적용하여 경량화, 베벨기어 사용으로 고효율 실현
고효율모터 적용하여 에너지 절감

Applying diecasting motor, reducing weight is achieved / high efficiency using bevel gear applying high efficiency motor, energy saving comes true

신 뢰 성 Reliability

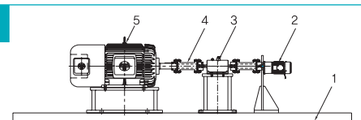
1 신뢰성 평가 Reliability Test



평가항목

종합성능시험 General Performance Test

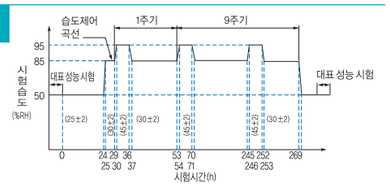
ⓐ 온도상승 Temperature Test
ⓑ 효율시험 Efficiency Test
ⓒ 최대토크시험 Maximum Torque Test
ⓓ 소음측정시험 Noise Measurement Test



1.베드 2.기어드 모터 3.토크미터 4.커플링 5.다이나모미터
기어드 모터의 시험 장비 구성도

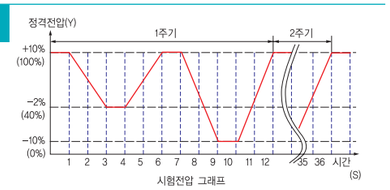
내환경성시험 Inner Environment Test

ⓐ 운용가진시험 Operating Test
ⓑ 저온시험 Low Temperature Test
ⓒ 고온시험 High Temperature Test
ⓓ 습도시험 Humidity Test
ⓔ 침전먼지시험 Precipitation Test



안정성시험 Safety Test

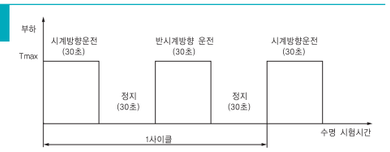
ⓐ 절연저항시험 Insulation Resistance Test
ⓑ 내전압시험 Inner Voltage Test
ⓒ 전원전압변동시험 Power Supply Voltage Fluctuation Test
ⓔ 서지전압내성시험 Surge Voltage Tolerance Test



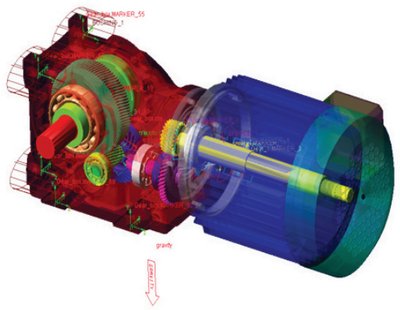
시험전압 그래프

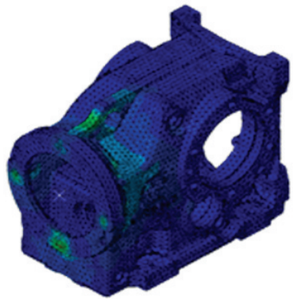
내구성시험 Durability Test

ⓐ 최초종합성능시험 Inital General Performance Test
ⓑ 중간대표시험 General Performance Test in the Middle
ⓒ 최종종합성능시험 Final General Perfomance Test



2 전산 구조 해석 Analysis of Computerized Structure





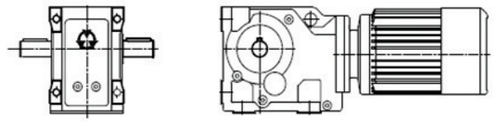
유한 요소 해석을 통한 안정성 평가
Safety Test Through Finite Element Discretization

1. 기어드모터 모듈의 동역학적모델을 구성
2. 기어의 유한요소해석을 수행하여 굽힘강도 및 면압강도의 안정성 평가
3. 기어드모터의 사용조건 및 모터의 급가속, 급제동시 기어박스의 구조 안전성에 미치는 영향을 파악하는 구조해석을 실시하여 구조적 안전성 평가

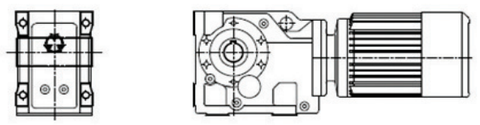
1. Construct the dynamic model of geared motor module
2. Applying finite element discretization, test strength against bending and safety of surface pressure strength
3. Applying structural analysis figuring out the influence of structural safety for gearbox and usage condition when quick acceleration or brake, Test safety level

형식분류 Classification

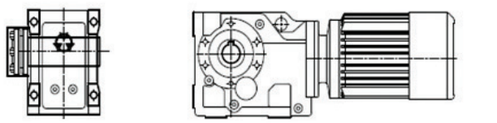
DAESUNG



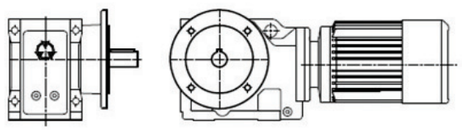
B...Type
_ Foot 설치 Type
_ Foot mounting position



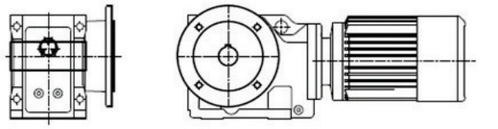
BA...Type
_ 중공축 Foot 설치 Type
_ Hollow shaft / Foot mounting position



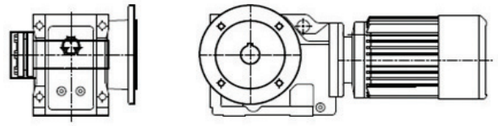
BH...Type
_ Shrink disk축 Foot 설치 Type
_ Shrink disk Shaft / Foot mounting position



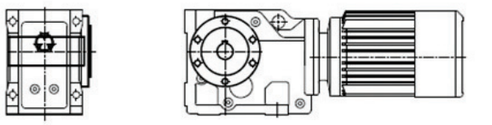
BF...Type
_ B5 Flange 설치 Type
_ B5 Flange mounting position



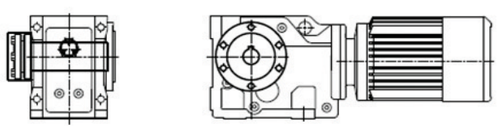
BAF...Type
_ 중공축 B5 Flange 설치 Type
_ Hollow shaft / B5 Flange mounting position



BHF...Type
_ Shrink disk축 B5 Flange 설치 Type
_ Shrink disk Shaft / B5 Flange mounting position



BAZ...Type
_ 중공축 B14 Flange 설치 Type
_ Hollow shaft / B14 Flange mounting position

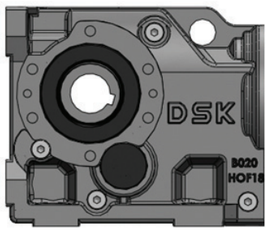


BHZ...Type
_ Shrink disk축 B14 Flange 설치 Type
_ Shrink disk Shaft / B14 Flange mounting position

형식표시 How to model No.

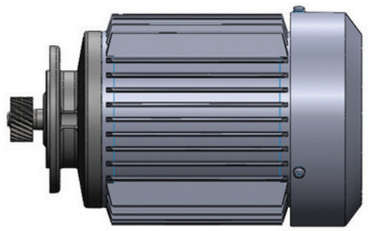
BAF - 020 - 20.19 (*-*) / 0.75 - 220V - 50Hz (*-*) / AC-B (*)

- 형식표시 (Type)
- 형번표시 (Frame no)
- 감속비 표시 (Reduction Ratio)
- 감속부 Option 표시 (축방향 , TORQUE ARM 등) Gearhead Option (Shaft direction,TORQUE ARM)
- Motor 용량 (Motor Capasity)
- Motor 전압 (Voltage)
- Motor 주파수
- Motor Option 표시 (POLE, Ø, IP등급 (Class), INV 등)
- Brake 표시
- Brake Option 표시 (수동해방 등)



- 플랜지 Type
- 감속기 형번
- 감속비
- 저속축
- T/A

- Flange Type
- Gear Box Size
- Reduction Ratio
- Low Speed Shaft
- T/A



- 용량
- 전압, 주파수
- Brake

- Capacity
- Voltage, Frequency
- Brake

예 시

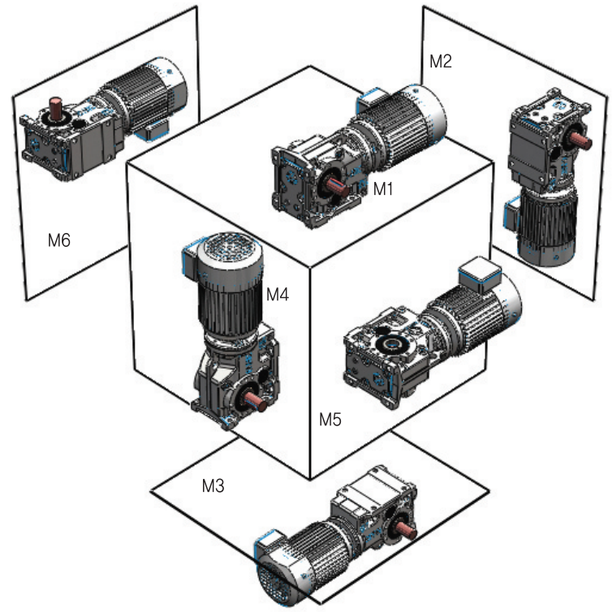
BAF-020-24.99(B) / 0.75-220V- 50Hz(INV) / DC-B	**BH-060-30.28(A-T) / 2.2- 440V-50Hz / AC-B(HA)**
감 속 부 ① 헬리컬 베벌 감속기 중공축 B5 Flange 부착형 ② Gear Box는 020 형번이며 감속비는 1/24.99 ③ Flange B방향 부착	감 속 부 ① 헬리컬 베벨 감속기 S/D축 부착형 ② Gear Box는 060 형번이며 감속비는 1/30.28 ③ S/D A방향,TORQUE ARM 부착형
MOTOR ① MOTOR는 0.75kW ② 전압 220V, 주파수 50Hz ③ INVERTER 전용 MOTOR	MOTOR ① MOTOR는 2.2kW ② 전압 440V, 주파수 60Hz
기 타 ① DC-B BRAKE 부착형	기 타 ① AC-B BRAKE 부착(수동해방)
Gear Head ① Helical Bevel G/M hollow shaft B5 flange attached type ② The size of Gear Box is 020 and reduction ratio is 1/24.99 ③ Flange attachment is B type	Gear Head ① Helical Bevel G/M S/D shaft attached type ② The size of Gear Box is 060 and reduction ratio is 1/30.28 ③ S/D A type, Torque Arm attachment type
Motor ① 0.75 kW Motor ② Voltage 220V, Frequency 50Hz ③ Used for inverter motor	Motor ① 2.2 kW Motor ② Voltage 440V, Frequency 60Hz
Etc ① DC-B Brake attached	Etc ① AC-B Brake attached (Manual Operation type)

주요선정 정보 Major Information for Selection

1 설치 형태 Mounting Position

설치 형태 (Mounting Position)은 M1 ~ M60이며, 각각의 설치 형태에 따라 윤활유 양, Breather Valve 위치, Overhang road 등이 다를 수 있습니다.

Mountion positions are M1~M6. Please note the amount of lubricant, the location of Breather Valve and Overhang road depends on the mounting position.



2 단자 Box & Cable 출구 위치 Position of Terminal Box & Cable

단자 BOX 위치 (Position of terminal Box)

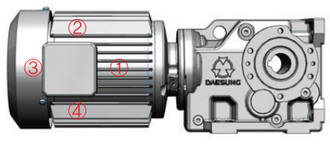
- R – (0°)
- B – 90°
- L – 180° (Standard)
- T – 270°

단자 BOX STANDARD 위치 L–180°
(The Location of Standard Terminal Box is L–180°)

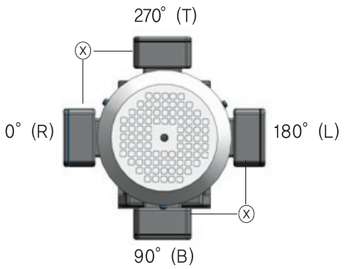
CABLE 출구 위치 (Position of Cable)

- ① – GEAR BOX 방향 (Direction to Gear Box)
- ② – ⓧ 반대 방향 (Opposite Direction)
- ③ – FAN COVER 방향 (Direction to Fan Cover)
- ⓧ – 별도 지정 (FIG–1) STANDARD

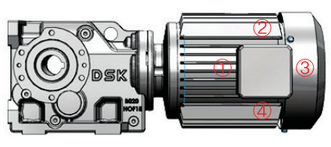
CABLE 출구 STANDARD 방향 ⓧ
(Cable Exit–Standard Direction)



180° (L)



90° (B)

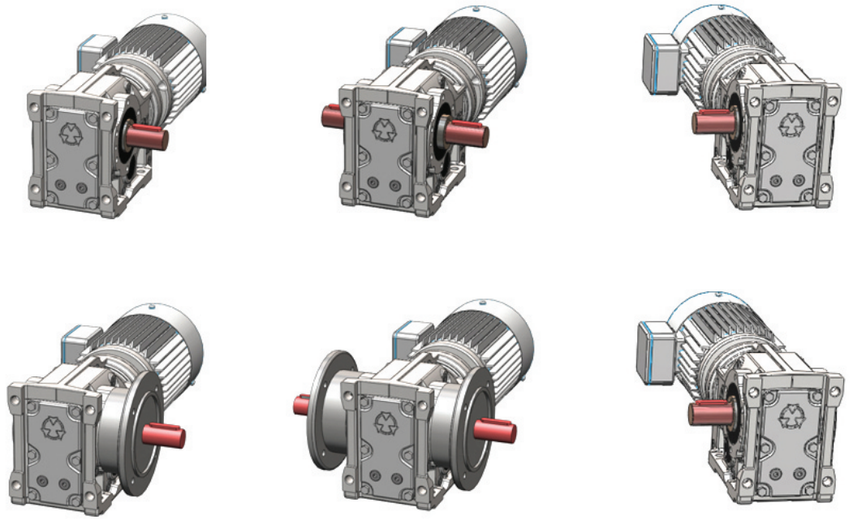


0° (R)

③ 출력축과 Flange 위치 Position of output shaft and Flange

출력축 (중공축 & 중실축) & FLANGE (B5 & B14) 위치

- A – 정면기준 오른쪽 By the front–right
- B – 정면기준 왼쪽 By the front–left
- AB – 양축형 Double output shaft

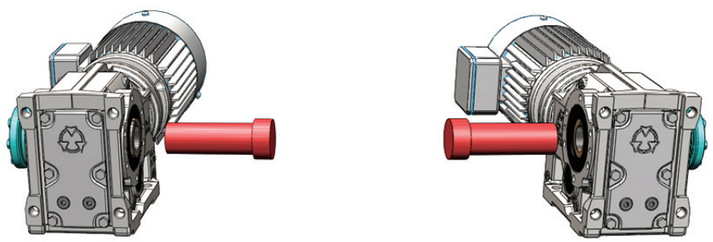


④ Shrink Disk의 위치 Position of Shrink Disk

SHRINK DISK의 위치

- A – 출력축 (중공축) 사용 방향 Direction for Output Hollow Shaft Use
- B – 출력축 (중공축) 사용 방향 Direction for Output Hollow Shaft Use

실제 사용시 아래 그림 참조 : EX) SHRINK DISK "A" 설치면 (출력축) ➡ 오른쪽 (정면기준)
SHRINK DISK ➡ 왼쪽 (정면기준)



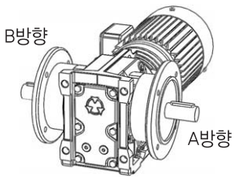
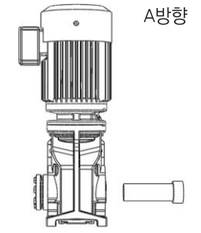
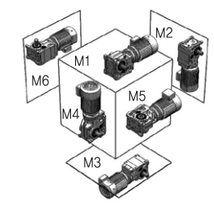
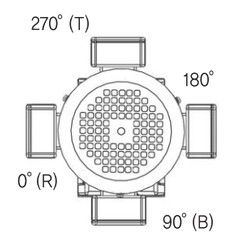
A B

주 문 서
Order Sheet

DATE :　　**주문업체** Company Name :

MODEL :　　**수 량** Quantity :

* 다음 해당사항에 V표시를 해 주십시오.

	주 문 사 항								설 치 자 료
GEAR BOX	SERIES	Helical Bevel G / M			☐				 *저속축 및 Flange방향 *Flange Position
	형 번 Frame	020	☐	040	☐	060	☐	080 ☐	
	감속비 Ratio	1 / ( )							
	FLANGE TYPE	×	☐	B5(BF)	☐	B14(BZ)	☐		
	FLANGE 방향 FLANGE Direction	×	☐	A	☐	B	☐	AB ☐	
	저속축 TYPE Shaft Type	중실단축 Single Solid Shaft	☐	중실양축 Double Solid Shaft	☐	중공축 Hollow Shaft	☐	S/D 축 S/D Shaft ☐	
	저속축 방향 OutPut Shaft	×	☐	A	☐	B	☐	AB ☐	
	TORQUE ARM	×	☐	○	☐	기타 Etc. ( )			
	설치위치 Mounting	M1	☐	M2	☐	M3	☐	M4 ☐	
		M5	☐	M6	☐	기타 Etc. ( )			
	기타사항 Etc								
MOTOR	용 량 Capacity	0.4kW	☐	0.75kW	☐	1.5kW	☐	2.2kW ☐	
		3.7kW	☐	5.5kW	☐	기타 Etc. ( )			
	전 압 Voltage	220/380V	☐	220V	☐	380V	☐	440V ☐	
		415V	☐	400V	☐	460V	☐	기타 Etc.( )	 *설치위치 Mounting Position
	주 파 수 Hz	60Hz	☐	50Hz	☐	50/60Hz	☐	기타 Etc.( )	
	PHASE	삼상	☐	단상	☐				
	보호형식 Safety Type	IP44	☐	IP54	☐	기타 Etc. ( )			
	BRAKE 형식 BRAKE Type	AC–B	☐	DC–B	☐	기타 Etc.	☐	( )	
	INVERTER	×	☐	Inverter	☐				
	단자BOX 위치 Terminal Box	0°	☐	90°	☐	180°	☐	270° ☐	 *단자BOX 위치 *Terminal Box Position
	기타사항 Etc								

보전방법 Maintenance

DAESUNG

❶ 도면 Table Drawing Table

Symbol	Meaning
	Breather Valve
	Oil Level Plug
	Oil Drain Plug

❷ Gear Box 윤활유 Gear Box Lubricant

본제품에 사용된 윤활유는 Gs caltax Meropa 220 (–10℃ ~ 40℃)으로서 주문자의 특별한 요구가 없는 한 주문시 명기된 설치 위치에 따라 충진된 상태로 출고된다.
그러므로 만약 사용자가 설치 위치를 변경할 시에는 설치 위치에 따른 급유량을 확인하고 이를 준수하여야 한다.

Before delivery, the gear units will be greased with Gs caltax Meropa 220 (–10℃ ~ 40℃) with standard mounting positions unless customers place a special order.
Thus it is important to specify the mounting positions and quantity of lubricant before order.

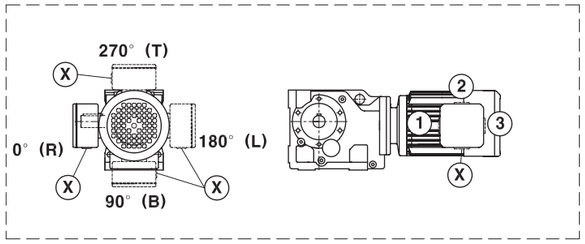
°C –50 0 +50 +100	DIN (ISO)	ISO, NLGI	Mobil®	Shell	KLÜBER	ARAL	GS 칼텍스	Tribol	TEXACO	Optimol	FUCHS
–10℃ 40℃	CLP (cc)	VG 220	Mobilgear 600 xp220	Shell Omala 220	Kluberoil GEM 1–220N	Aral Degol BG 220	Meropa 220	Tribol 1100/220	Meropa 220	BM 220	Renolin CLP 220

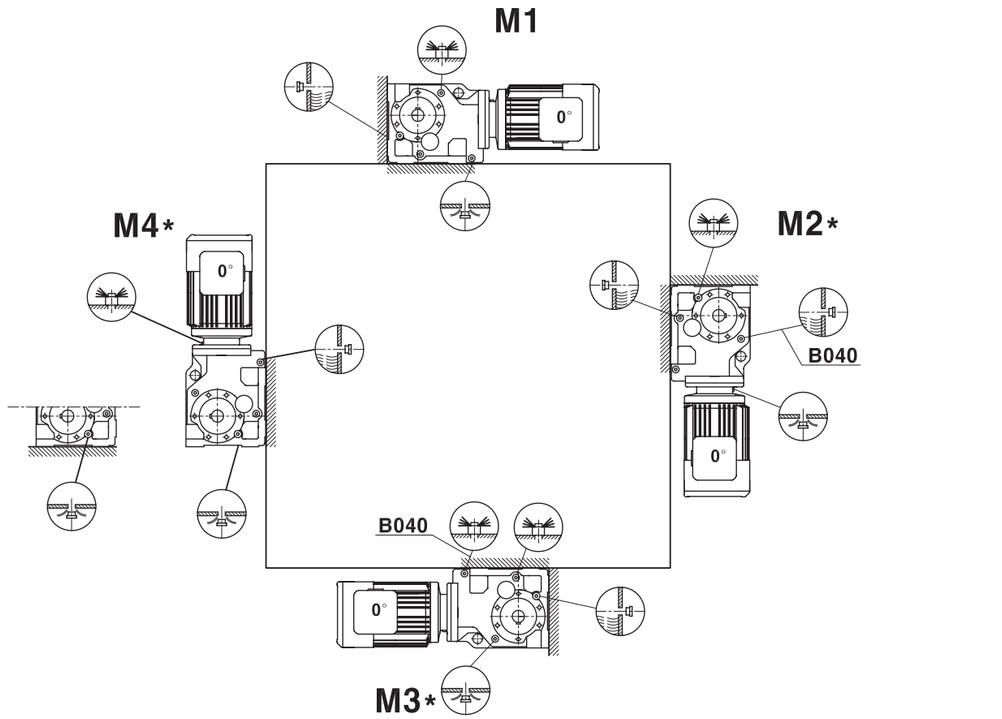
❸ Mounting Position에 따른 윤활유 충진량(ℓ) Mounting Positions and Quantity of Lubricant

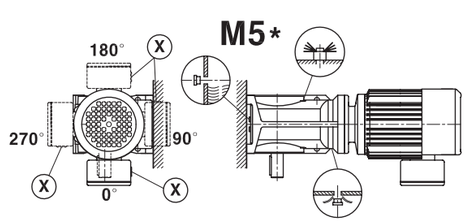
Gear Unit	M1	M2	M3	M4	M5	M6
B020	0.50	1.00	1.00	1.25	0.95	0.95
B040	0.80	1.30	1.50	2.00	1.60	1.60
B060	1.20	2.30	2.50	2.80	2.60	2.40
B080	1.10	2.40	2.60	3.45	2.60	2.60

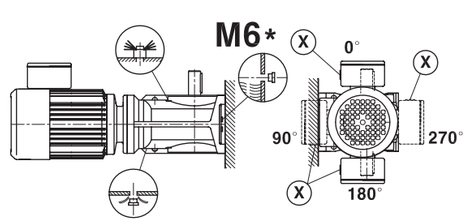
Mounting Position for Helical–Bevel Gearmotors

B / BA 020 – 080



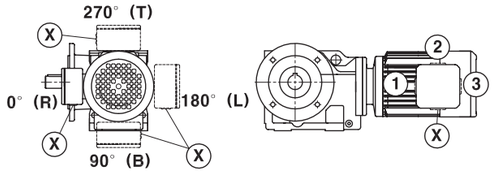


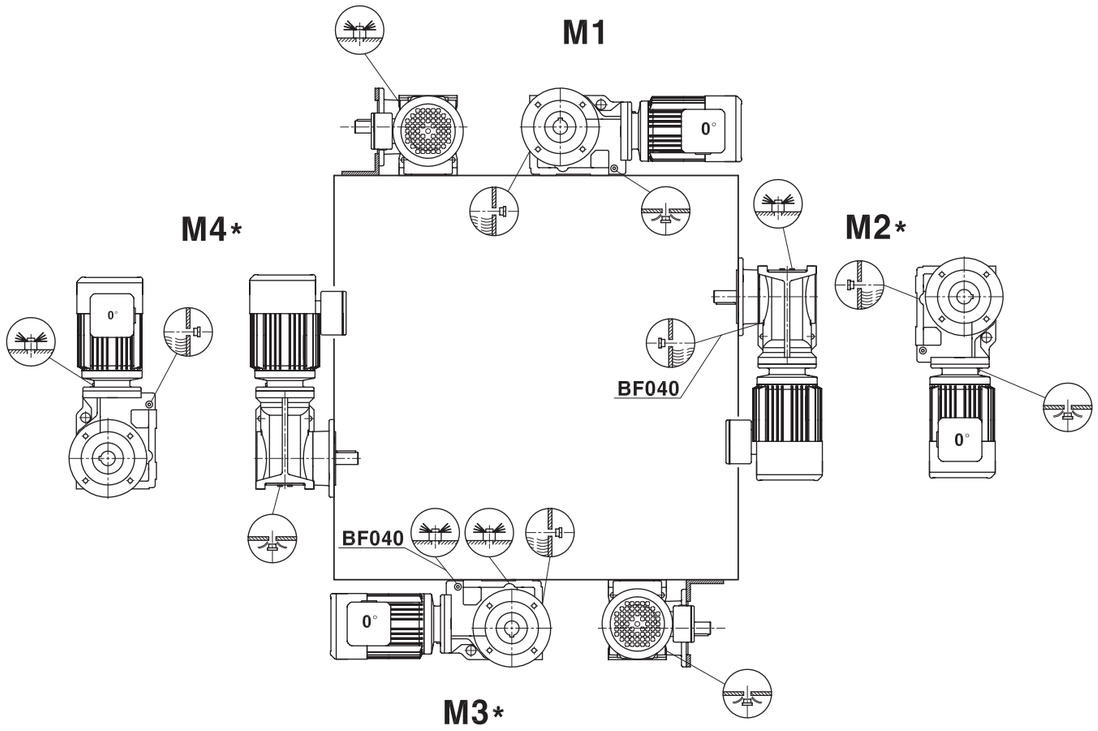




Mounting Position for Helical–Bevel Gearmotors

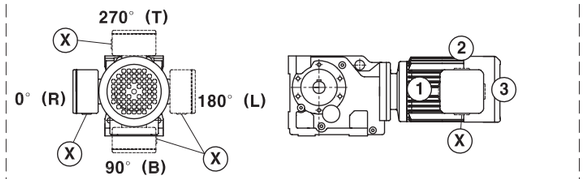
BF / BAF / BHF / BAZ / BHZ 020 – 080

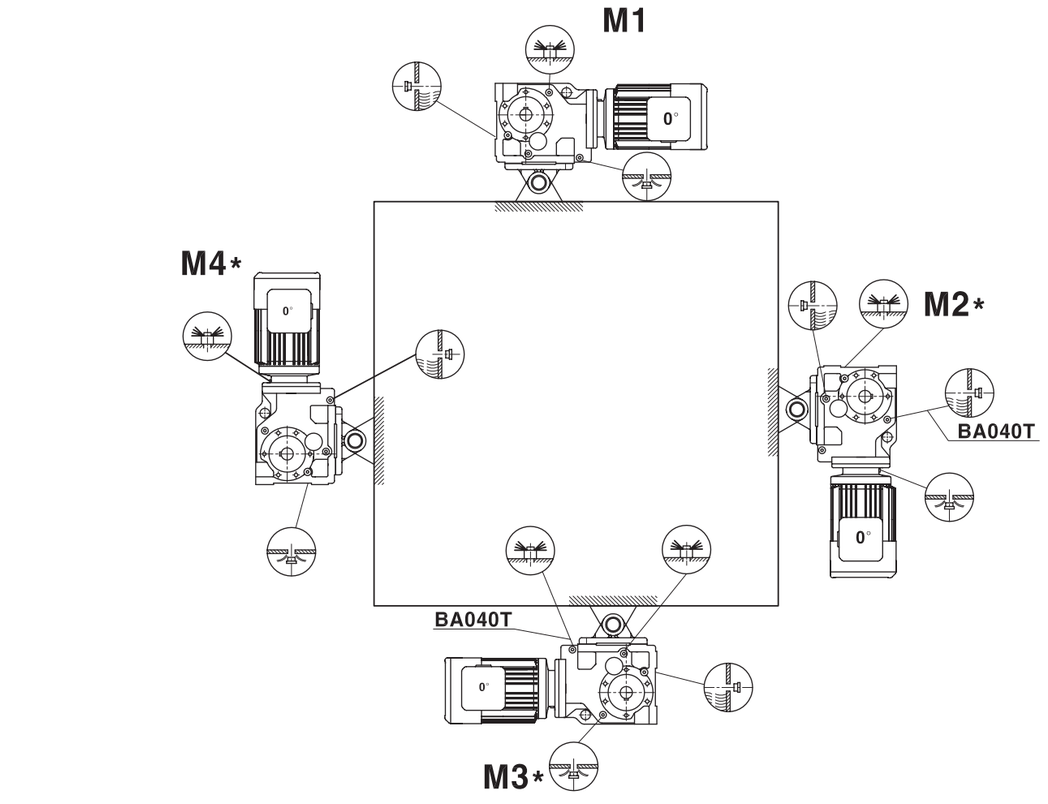




Mounting Position for Helical–Bevel Gearmotors

BA...T / BH ...T 020–080

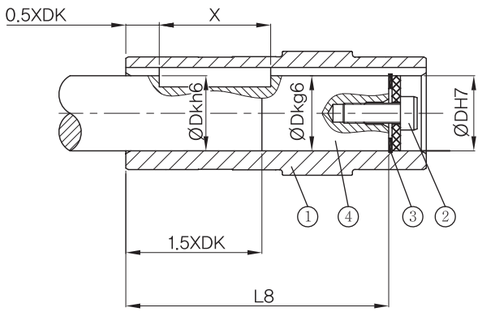




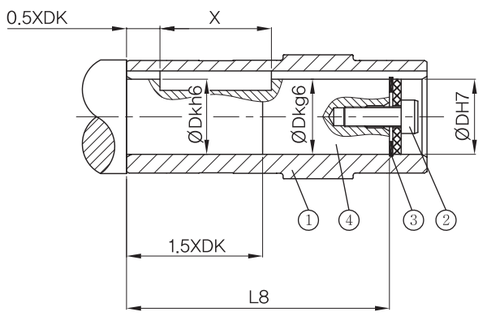
④ 중공축 제품의 설치 Installation with Hollow Shaft

- 중공축 Type 제품의 설치 시에는 반드시 접촉 부식 방지제(G6)를 사용하여 보전에 원활성을 기하여야 합니다.
- 사용자의 축 key size(X)는 도시된 그림의 DK보다 커야 합니다
- 당사의 표준 체결 방식
  - _ 당사는 Retaining screw with washer(2) 와 Circlip(3)을 표준 부품으로 공급합니다.
  - _ Contact Shoulder가 있는 사용자의 shaft의 길이는 그림(B)에서 L8-1mm 이어야 합니다.
  - _ Contact Shoulder가 없는 사용자의 shaft의 길이는 그림(A)에서 L8과 같아야 합니다.

- Before the installation of hollow shaft type, G6 (Corrosion protective material) must be used for Long-term use
- Users' Key size(X) must be larger than DK on below figure
- D.S.K Standard fastening
  - _ We supply retaining screw with washer(2) and circlip(3)
  - _ The installation length of customer shaft with contact shoulder(A) must be L8-1mm
  - _ The installation length of customer shaft without contact shoulder(B) must be equal to L8



(A) User Shaft without Contact Shoulder



(B) User Shaft with Contact Shoulder

① Hollow Shaft ② Retaining Screw with Washer ③ Circlip ④ Customer Shaft

⑤ 치수와 체결 Troque Dimension and Tightening Torque

Retaining Screw는 아래 Table MS에 주어진 Torque로 체결되어야 합니다.
Retaining screw must be tightened to the tightening torque MS given in the following table.

형 번	DH7(mm)	DK(mm)	L8(mm)	MS(mm)
B020	30	30	105	20
B040	35	35	132	20
B060	40	40	142	40
B080	40	40	156	40

Geared Motor를 제어하는 장치로서 안전성과 밀접한 관련이 있으니 주의를 바랍니다.
Because Brake controlling G/M is closely related to the safety matter, you must pay special attention

① Brake 특징 Brake Features

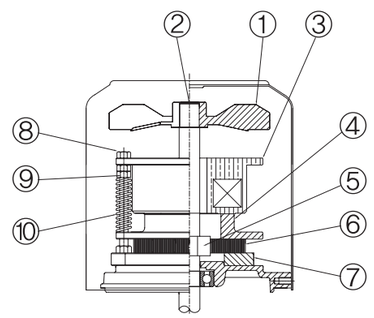
종류(Type) / 특징(Features)	AC-B TYPE	DC-B TYPE	
	SHB SERIES	SHB SERIES	HBV SERIES
출 력 Output(kW) 4p	0.2 ~ 5.5	0.2 ~ 5.5	0.2 ~ 3.7
전 원 Power Source of Brake	교류 AC	직류 DC	직류 DC
제어방식 Operation	스프링 제동형 Spring Actuated Type	스프링 제동형 Spring Actuated Type	스프링 제동형 Spring Actuated Type
치 수 Size	표준모터에 축 연장 Extended Motor Hood	표준모터에 축 연장 Extended Motor Hood	표준모터와 동일 Same as General Motor
토크조정 Tor que Adjustment	Yes	Yes	No
전원장치 Power Supply Box	No	Yes	Yes
응 답 성 Response Time	◎	◎	◎
라이닝 수명 Life of Lining	△	△	△

*5.5kW SBB Series of DC-B Type HBV Series Apply
*Sam Whan(Korea) / Han Sin(Korea) / SANKI(Japan) Brake Applicable

Best Fittness : ◎ Fittness : △ Bad : ×

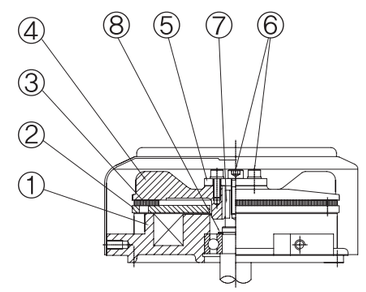
② Brake 구조 Brake Structure

AC-B TYPE (SHB SERIES)



1	Fan	6	Lining
2	Shaft	7	Disc Flange
3	Stator	8	Nut
4	Armature	9	Stud Bolt
5	Hub	10	Spring

DC-B TYPE (HBV SERIES)

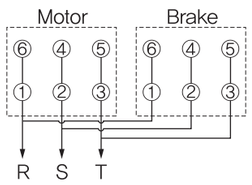
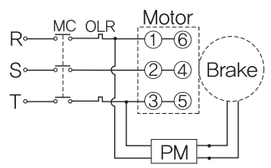
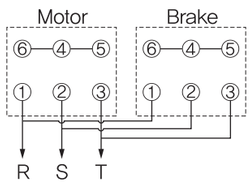
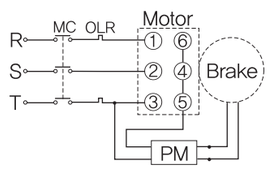
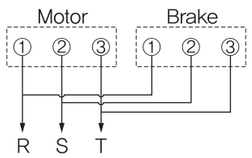
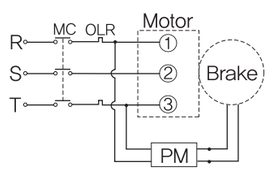
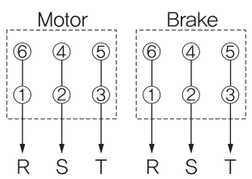
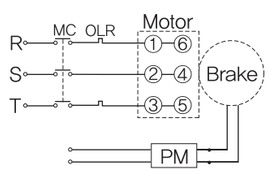
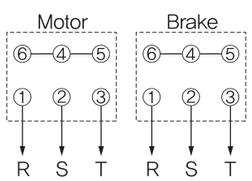
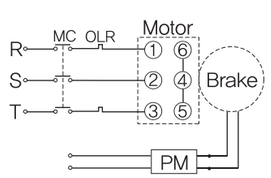
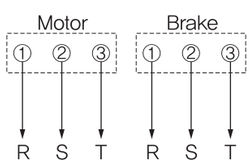
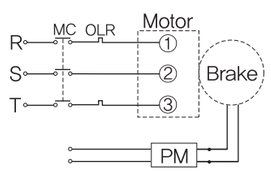


1	Stator	5	Washer
2	Armature	6	Bolt
3	Fan	7	Key
4	Lining	8	Snap Ring

선정시 주의사항 Important Matters for the Choice of G/M

DAESUNG

❸ Brake 결선도 How to make a brake circuit

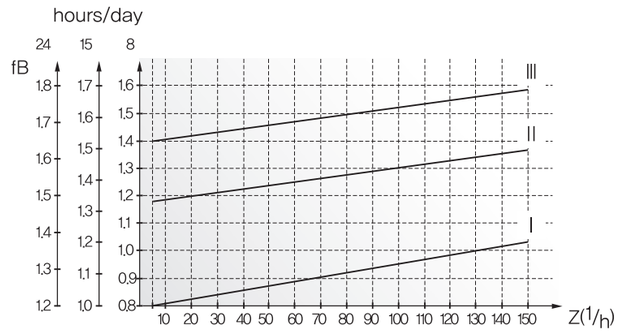
제어방법 Control Method	전 압 Voltage		BRAKE TYPE AC-B	BRAKE TYPE DC-B
동시제어 Synchronous Control	220/380V	220V		
		380V		
	440V			
별도제어 Asynchrouous Control	220/380V	220V		
		380V		
	440V			

❶ 안전계수 Service Factor

1) 안전계수 선정 (Selection of Service Factor)

기어드모터 선정에 있어 필요 Torque 외에도 충분한 안전계수가 고려 되어야 합니다. 정확한 안전계수 fB를 선정하기 위해서 구동기계의 특성을 고려해야 합니다. 이 안전계수는 기동빈도와 운전 시간에 의해 결정되며 부하 종류는 질량관성비에 의해서 결정됩니다. 오른쪽 그림으로 부터 안전계수를 구할 수 있습니다. 이 안전계수는 제품 특성표에 있는 안전계수보다 작아야 합니다.

For the right selection for G/M both Torque and Service factor must be considered. To select adequate service factor the correct characteristics of the machine must be considered. This sellected service factor is determined by operation frequency and driving time; Load is determined by Load Factor. With following figure service factor can be decided. This service factor should be lower than service factor specified on characteristic table.



2) 부하종류 (Class of Load)

(Ⅰ) 균일한 부하, 질량관성계수 ≤ 0.2
Uniform Load, S(Load characteristic value) ≤ 0.2

(Ⅱ) 규칙적인 충격 부하, 질량관성계수 ≤3
Alternative type Load with medium impact S ≤ 3

(Ⅲ) 강한 충격 부하, 질량관성계수 ≤10
Large Load with heavy impact S ≤ 10

3) 질량관성비 (Load Factor)

질량관성계수 = 부하 질량관성모멘트 / 모터 질량관성 모멘트
Load Factor = Load moment of inertia / Motor moment of inertia

부하 질량관성 모멘트는 모터 입력축으로 환산합니다.
모터 축 환산 수식은 아래 공식을 사용하며 모터의 질량관성 모멘트는 아래 표와 같습니다.
Motor moment of inertia can be converted by input of motor.
Mass moment of inertia of the motor can be calculated by below equations.

$$J_X = J \times (n / n_M)^2$$

J_X : 모터 축 환산 부하질량관성 모멘트
Mass Moment of inertia of the motor
J : Gear unit의 출력 회전수 기준 질량관성모멘트
Mass Moment of inertia of the gear unit
n : Gear unit의 출력 회전수
output speed of the gear unit
n_M : Motor의 회전수
speed of motor

모터 질량관성모멘트는 모터의 값이며 브레이크부착의 경우 브레이크를 고려 해주십시오.
Table below is Motor moment of inertia value (The Case of attaching the brake the moment of brake must be considered)

용량(kW) Capacity	모터 질량관성 모멘트 JMot (10–3kgm2) Motor moment of inertia value	
	모터 Motor	브레이크 부착 Including Brake
0.4	1.98	2.03
0.75	2.30	2.37
1.5	4.35	4.48
2.2	8.78	9.13
3.7	15.00	15.60
5.5	26.50	27.56

높은 Overhang load나 전달장치의 backlash가 큰 경우 질량 관성 모멘트 커지며 안전계수 fB는 증가 합니다.
이 경우 당사에 문의 해 주십시오.

If Overhang load is high or backlash is large, the Motor moment of inertia becomes larger and Service Factor(fB) increases

4)안전계수 fB (Service Factor)

최대 허용 토크는 Mamax는 fB = Mamax / Ma 에서 유도됩니다.
Maximum allowing torque can be calculated by equation fB = Mamax / Ma

예) 그림에서 질량관성계수 2.5(부하종류 II), 14시간/일 운전, 100cycles/hour인 경우
안전계수 fB = 1.44.
특성표에서 안전계수 fB가 1.44보다 크거나 같은 기어드모터를 선택합니다.

Ex) The Case of figure Load Factor 2.5(class of load II), operating hour 14hrs/day, 100cycles/hour
Service Factor fB = 1.44.
Choose G/M which Service Factor(fB) is lager than 1.44 using characteristic table

② Overhang Load와 축하중 Overhang load and Axial load

1) Overhang load 결정 (Dicision of Overhang load)

Overhang load는 출력축에 부착된 전달장치에 대한 고려가 필요합니다. 전달장치에 대한 계수 fz는 아래 표와 같습니다.

Considering Overhang load, the delivery devices attached to the output shaft must be considered.
fz factor for delivery devices is shown in the following table.

전달장치 Delivery Devices	계수 fz fz Factor	비고 Remarks
Gears	1.15	〈 17 teeth
Chain sprockets	1.4	〈 13 teeth
Chain sprockets	1.25	〈 20 teeth
Narrow V–belt pulleys	1.75	Pre–tensioning influence
Flat belt pulleys	2.5	Pre–tensioning influence
Toothed belt pulleys	1.5	Pre–tensioning influence

기어드모터 출력축에 작용하는 Overhang load는 아래와 같습니다.
Overhang load on the output shaft of G/M is shown below.

$$F_R = M_d \times 2000 / d_0 \times fz$$

F_R : 실제 전달되는 Overhang load [N]
M_d : Torque [Nm]
d_0 : 출력축에 연결되는 전달장치의 PCD [mm]
fz : 전달장치 계수

F_R : Realistically delivered overhang load
M_d : Torque [Nm]
d_0 : outside diameter output shaft attached to the delivery device [mm]
fz : Factor of the Devices

특성표에 명기된 허용 Overhang load는 베어링의 정정격 수명 L_{10H}에 근거를 두고 있으며 Foot mount이며 중실축의 일때 출력축 A 방향이고 축 중앙에서의 값입니다. 전면 벽부착 M1의 경우 허용 Overhang load는 50%이하로 합니다.

Overhang load stated on characteristic table is based on Bearin gs L_{10H} the case of foot mounting and hollow shaft, the direction is to the output shaft and the value is for the center of the shaft Overhang load must be less than 50% for M1 position

2) 허용 축하중

Overhang load가 없는 경우 축하중 FA는 특성표에 주어진 Overhang load값의 50%이내로 합니다.
If no OHL, axial load (FA) is to be within 50% of the OHL value given from characteristic table

3) Overhang load 작용점이 축 중앙이 아닌 경우 (Overhang load is not on the center–line)

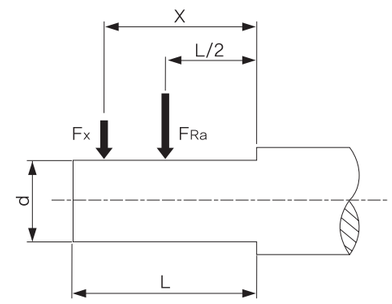
특성표에 주어진 값은 작용 하중이 축 중앙인 경우이며 축 중앙이 아닌 경우 아래 식에 따라 계산합니다.

The value given on characteristic table is for the case that Overhang load is on the center–line and if not, below equation should be followed

$$F_x = F_{Ra} \times a / (b + X)$$

F_{Ra} : 허용 Overhang load [N]
F_X : 작용점 x에서 허용 Overhang load [N]
X : 하중 작용점 [mm]
a, b : Gear unit overhang load 상수 [mm]

F_{Ra} : Allowable OHL [N]
F_X : Distance between the point in which the load is applied [N]
X : Radial load applies at distance [mm]
a, b : G ear unit overhang load constants [mm]



Overhang load 변환을 위한 Gear unit 상수

Gear unit constants for conversion Overhang load

Gear unit type	a(mm)	b(mm)	d(mm)	L(mm)
B020	123.5	98.5	25	50
B040	153.5	123.5	30	60
B060	169.7	134.7	35	70
B080	181.3	141.3	40	80

특성표-1 Characteristics table

B020

표준품 특수품

i	na [1/min]		Mamax [N]	FRA [N]	0,4	0,75	1,5	2,2
	50Hz	60Hz			kW			
106,38	13	16	200	5640				
97,81	14	17	200	5640				
83,69	17	20	200	5640				
72,54	19	23	200	5520				
67,80	21	25	200	5360				
58,60	24	29	200	5020				
49,79	28	34	200	4660				
44,46	31	28	200	4420				
37,97	37	45	200	4100				
35,57	39	48	200	3970				
29,96	47	57	200	3650				
28,83	49	59	200	3580				
24,99	56	68	200	3330				
23,36	60	73	195	3260				
20,19	69	84	185	3110				
17,15	82	99	180	2900				
15,31	91	111	175	2780				
13,08	107	130	165	2650				
12,14	115	140	160	2600				
10,49	133	162	160	2410				
8,91	157	191	160	2200				
7,96	176	214	155	2110				
6,80	206	250	150	1980				
6,37	220	267	145	1950				
5,36	261	317	140	1810				
3,98	352	427	125	1660				

B040

표준품 특수품

i	na [1/min]		Mamax [N]	FRA [N]	0,4	0,75	1,5	2,2
	50Hz	60Hz			kW			
131,87	11	13	400	5920				
121,48	12	14	400	5920				
104,37	13	16	400	5920				
90,86	15	19	400	5920				
85,12	16	20	400	5920				
75,20	19	23	400	5920				
69,84	20	24	400	5920				
63,30	22	27	400	5920				
56,83	25	30	400	5920				
48,95	29	35	400	5920				
46,03	30	37	400	5920				
39,61	35	43	400	5920				
35,39	40	48	400	5920				
31,30	45	54	400	5700				
29,32	48	58	400	5520				
25,91	54	66	400	5170				
24,06	58	71	400	4970				
21,81	64	78	400	4710				
19,58	72	87	400	4440				
16,86	83	101	380	4230				
15,86	88	107	380	4080				
13,65	103	125	360	3890				
12,19	115	139	350	3720				
11,77	119	144	280	4060				
10,56	133	161	280	3830				
9,10	154	187	280	3540				
8,56	164	199	270	3500				
7,36	190	231	250	3390				
6,58	213	258	240	3270				
5,81	241	293	230	3140				
4,64	302	366	205	2980				

B060

표준품 특수품

i	na [1/min]		Mamax [N]	FRA [N]	0,4	0,75	1,5	2,2	3,7
	50Hz	60Hz			kW				
145,14	10	12	600	7630					
123,85	11	14	600	7630					
108,29	13	16	600	7630					
102,88	14	17	600	7630					
90,26	16	19	600	7630					
76,56	18	22	600	7630					
69,12	20	25	600	7630					
60,81	23	28	600	7630					
57,42	24	30	600	7630					
48,89	29	35	600	7630					
44,43	32	38	600	7630					
38,49	36	44	600	7630					
35,70	39	48	600	7630					
30,28	46	56	600	7310					
27,34	51	62	600	6930					
24,05	58	71	600	6480					
22,71	62	75	600	6280					
19,34	72	88	575	5910					
17,57	80	97	555	5740					
15,22	92	112	535	5430					
13,25	106	128	510	5190					
11,92	117	143	415	5150					
11,26	124	151	415	4990					
9,59	146	177	405	4650					
8,71	161	195	390	4520					
7,55	185	225	365	4360					
6,57	213	259	345	4190					
4,69	299	362	300	3800					

B080

표준품 특수품

i	na [1/min]		Mamax [N]	FRA [N]	0,4	0,75	1,5	2,2	3,7	5,5
	50Hz	60Hz			kW					
144,79	10	12	820	10300						
123,54	11	14	820	10300						
108,03	13	16	820	10300						
102,62	14	17	820	10300						
90,04	16	19	820	10300						
76,37	18	22	820	10300						
68,95	20	25	820	10300						
60,66	23	28	820	10300						
57,28	24	30	820	10300						
48,77	29	35	820	10300						
44,32	32	38	820	10300						
38,39	36	44	820	10300						
35,62	39	48	820	10300						
30,22	46	56	820	10300						
27,28	51	62	820	10300						
24,00	58	71	800	10500						
22,66	62	75	780	10700						
19,30	73	88	760	10800						
17,54	80	97	740	11000						
15,19	92	112	700	11300						
13,22	106	129	670	11500						
12,48	112	136	530	12300						
10,63	134	160	500	11800						
9,66	145	176	480	11500						
8,37	167	203	440	11100						
7,28	192	234	420	10700						
5,20	269	327	350	9870						

특성표-2 Characteristics table

DAESUNG

P(kW)	i	50Hz			60Hz			FRa[N]	Gear Unit	
		na[rpm]	M a[N.m]	f B	na[rpm]	M a[N.m]	f B			
0.4	144,79	9,5	401	2,05	12	325	2,50	12900	B	080
	123,54	11	342	2,40	14	278	2,90	13000	BF	080
	108,03	13	299	2,80	16	243	3,40	13000	BA	080
	90,04	15	249	3,35	19	202	4,05	13000	BAF	080
	76,37	18	212	3,90	22	172	4,75	13000		
	145,14	9,5	402	1,50	12	326	1,80	9000	B	060
	123,85	11	343	1,75	14	278	2,15	9220	BF	060
	108,29	13	300	2,05	16	243	2,50	9370	BA	060
	102,88	13	285	2,15	17	231	2,60	9420	BAF	060
	90,26	15	250	2,40	19	203	2,90	9530		
	76,56	18	212	2,85	22	172	3,45	9650		
	69,12	20	191	3,15	25	155	3,85	9700		
	131,87	10	365	1,10	13	296	1,35	6690	B	040
	121,48	11	336	1,20	14	273	1,45	696	BF	040
	104,37	13	289	1,40	16	235	1,70	7330	BA	040
	90,86	15	252	1,55	19	204	1,90	7580	BAF	040
	85,12	16	236	1,70	20	191	2,05	7670		
	75,20	18	208	1,95	23	169	2,35	7810		
	69,84	20	193	2,05	24	157	2,50	7880		
	63,30	22	175	2,30	27	142	2,80	7960		
	97,81	14	271	0,75	17	220	0,90	5220	B	020
	83,69	16	232	0,90	20	188	1,10	5470	BF	020
	72,54	19	201	1,00	23	163	1,20	5690	BA	020
	67,80	20	188	1,05	25	152	1,30	5630	BAF	020
	58,60	24	162	1,25	29	132	1,50	5510		
	49,79	28	138	1,45	34	112	1,75	5350		
	44,46	31	123	1,60	38	100	1,95	5230		
	37,97	36	105	1,95	45	85	2,35	5060		
	35,57	39	99	2,05	48	80	2,50	4990		
	29,96	46	83	2,40	57	67	2,90	4800		
	28,83	48	80	2,50	59	65	3,05	4750		
	24,99	55	69	2,85	68	56	3,45	4590		
	23,36	59	65	3,05	73	53	3,70	4510		
	20,19	68	56	3,35	84	45	4,05	4350		
	17,15	80	47	3,80	99	39	4,61	4160		
	15,31	90	42	4,15	111	34	5,05	4040		
	13,08	105	36	4,55	130	29	5,55	3860		
	12,14	114	34	4,7	140	27	5,71	3780		
	10,49	132	29	5,55	162	24	6,75	3630		
	8,91	155	25	6,50	191	20	7,90	3460		
	7,96	173	22	7,05	214	18	8,55	3350		
	6,80	203	19	7,95	250	15	9,65	3190		
	6,37	217	18	8,25	267	14	10,00	3130		
	5,36	257	15	9,25	317	12	11,25	2970		

DAESUNG

P(kW)	i	50Hz			60Hz			FRa[N]	Gear Unit
		n_a[rpm]	M_a[N.m]	f_B	n_a[rpm]	M_a[N.m]	f_B		
0.75	123.54	11	640	1.30	14	521	1.60	11700	B 080
	108.03	13	560	1.45	16	455	1.75	12100	BF 080
	90.04	15	465	1.75	19	379	2.15	12600	BA 080
	76.37	18	395	2.10	22	322	2.55	12800	BAF 080
	68.95	20	360	2.30	25	291	2.80	13000	
	60.66	23	315	2.60	28	256	3.15	13000	
	57.28	24	295	2.80	30	241	3.40	13000	
	123.85	11	645	0.95	14	522	1.15	7130	B 060
	108.29	13	560	1.05	16	456	1.30	7940	BF 060
	102.88	13	535	1.10	17	434	1.35	8160	BA 060
	90.26	15	470	1.30	19	380	1.60	8570	BAF 060
	76.56	18	395	1.50	22	323	1.80	8890	
	69.12	20	360	1.65	25	291	2.00	9060	
	60.81	23	315	1.90	28	256	2.30	9230	
	57.42	24	300	2.00	30	242	2.45	9290	
	48.89	28	255	2.40	35	206	2.90	9450	
	44.43	31	230	2.60	38	187	3.15	9530	
	75.20	18	390	1.00	23	317	1.20	6060	B 040
	69.84	20	365	1.10	24	294	1.35	6410	BF 040
	63.30	22	330	1.20	27	267	1.45	6790	BA 040
	56.83	24	295	1.35	30	239	1.65	7110	BAF 040
	48.95	28	255	1.55	35	206	1.90	7430	
	46.03	30	240	1.65	37	194	2.00	7540	
	39.61	35	205	1.95	43	167	2.35	7740	
	35.39	39	184	2.20	48	149	2.65	7760	
	31.30	44	162	2.50	54	132	3.05	7550	
	44.46	31	230	0.85	38	187	1.05	4170	B 020
	37.97	36	199	1.00	45	160	1.20	4150	BF 020
	35.57	39	185	1.10	48	150	1.35	4140	BA 020
	29.96	46	156	1.30	57	126	1.60	4080	BAF 020
	28.83	48	150	1.35	59	121	1.65	4060	
	24.99	55	130	1.55	68	105	1.90	3990	
	23.36	59	121	1.60	73	98	1.95	3950	
	20.19	68	105	1.75	84	85	2.15	3860	
	17.15	80	89	2.00	99	72	2.45	3750	
	15.31	90	80	2.20	111	65	2.65	3670	
	13.08	105	68	2.40	130	55	2.90	3550	
	12.14	114	63	2.50	140	51	3.05	3500	
	10.49	132	54	2.90	162	44	3.50	3380	
	8.91	155	46	3.50	191	38	4.25	3250	
	7.96	173	41	3.80	214	34	4.60	3160	
	6.80	203	35	4.30	250	29	5.20	3030	
	6.37	217	33	4.40	267	27	5.35	2980	
	5.36	257	28	5.00	317	23	6.05	2840	
	3.98	347	21	6.00	427	17	7.30	2620	

P(kW)	i	50Hz			60Hz			FRa[N]	Gear Unit
		n_a[rpm]	M_a[N.m]	f_B	n_a[rpm]	M_a[N.m]	f_B		
1.5	90.04	16	910	0.90	19	759	1.10	9370	B 080
	76.37	18	775	1.05	22	644	1.30	10700	BF 080
	68.95	20	700	1.15	25	581	1.40	11300	BA 080
	60.66	23	615	1.35	28	511	1.65	11800	BAF 080
	57.28	25	580	1.40	30	483	1.70	12000	
	48.77	29	495	1.65	35	411	2.00	12400	
	44.32	32	450	1.80	38	374	2.20	12600	
	38.39	37	390	2.10	44	324	2.55	12800	
	35.62	40	360	2.30	48	300	2.80	12900	
	30.22	47	305	2.70	56	255	3.30	13000	
	27.28	52	275	3.00	62	230	3.65	13000	
	24.00	59	245	3.30	71	202	4.00	13000	
	60.81	23	620	0.95	28	513	1.15	7480	B 060
	57.42	25	585	1.05	30	484	1.30	7770	BF 060
	48.89	29	495	1.20	35	412	1.45	8430	BA 060
	44.43	32	450	1.35	38	374	1.65	8650	BAF 060
	38.49	37	390	1.55	44	324	1.90	8920	
	35.70	39	365	1.65	48	301	2.00	9040	
	30.28	47	310	1.95	56	255	2.35	9190	
	27.34	52	280	2.20	62	230	2.65	9010	
	24.05	59	245	2.50	71	203	3.05	8780	
	22.71	62	230	2.60	75	191	3.15	8670	
	19.34	73	196	2.90	88	163	3.50	8360	
	39.61	36	400	1.00	43	334	1.20	5890	B 040
	35.39	40	360	1.10	48	298	1.35	6360	BF 040
	31.30	45	320	1.25	54	264	1.50	6310	BA 040
	29.32	48	300	1.35	58	247	1.65	6270	BAF 040
	25.91	54	265	1.50	66	218	1.80	6190	
	21.81	65	220	1.80	78	184	2.20	6050	
	19.58	72	199	2.00	87	165	2.45	5950	
	16.86	84	171	2.20	101	142	2.65	5800	
	15.86	89	161	2.40	107	134	2.90	5730	
	13.65	103	139	2.60	125	115	3.15	5560	
	12.19	116	124	2.80	139	103	3.40	5430	
	11.77	120	120	2.30	144	99	2.80	5340	
	23.36	60	235	0.80	73	197	0.95	2860	B 020
	20.19	70	205	0.90	84	170	1.10	2920	BF 020
	17.15	82	174	1.05	99	145	1.30	2940	BA 020
	15.31	92	156	1.10	111	129	1.35	2950	BAF 020
	13.08	108	133	1.25	130	110	1.50	2930	
	12.14	116	123	1.30	140	102	1.60	2920	
	10.49	134	107	1.50	162	88	1.80	2880	
	8.91	158	91	1.75	191	75	2.15	2820	
	7.96	177	81	1.90	214	67	2.30	2770	
	6.80	207	69	2.20	250	57	2.65	2700	
	6.37	221	65	2.20	267	54	2.65	2670	
	5.36	263	55	2.60	317	45	3.15	2580	
	3.98	354	40	3.10	427	34	3.75	2420	

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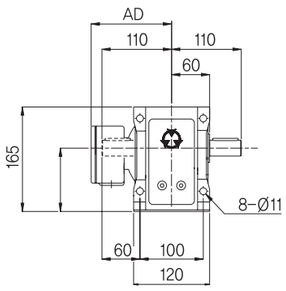
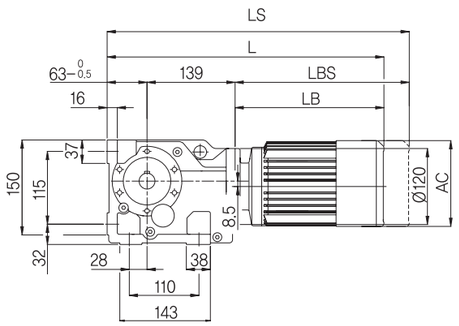
P(kW)	i	50Hz			60Hz			FRa[N]	Gear Unit
		n_a[rpm]	M_a[N.m]	f_B	n_a[rpm]	M_a[N.m]	f_B		
2.2	60.66	23	900	0.90	28	750	1.10	9490	B 080
	57.28	25	850	0.95	30	708	1.15	10000	BF 080
	48.77	29	725	1.15	35	603	1.40	11100	BA 080
	44.32	32	660	1.25	38	548	1.50	11500	BAF 080
	38.39	37	570	1.40	44	475	1.70	12100	
	35.62	40	530	1.55	48	440	1.90	12300	
	30.22	47	450	1.80	56	374	2.20	12600	
	27.28	52	405	2.00	62	337	2.45	12800	
	24.00	59	360	2.20	71	297	2.65	13000	
	22.66	62	340	2.30	75	280	2.80	13000	
	19.30	73	285	2.60	88	239	3.15	13000	
	17.54	80	260	2.80	97	217	3.40	13000	
	15.19	93	225	3.10	112	188	3.75	13000	
	13.22	107	197	3.40	129	163	4.15	13000	
	12.48	113	186	2.90	136	154	3.50	13000	
	10.63	133	158	3.20	160	131	3.90	13000	
	9.66	146	144	3.30	176	119	4.00	13000	
	8.37	169	125	3.50	203	103	4.25	13000	
	7.28	194	109	3.90	234	90	4.75	12700	
	5.20	271	78	4.50	327	64	5.45	11700	
	44.43	32	660	0.90	38	549	1.10	5100	B 060
	38.49	37	575	1.05	44	476	1.30	7850	BF 060
	35.70	39	530	1.15	48	441	1.40	8180	BA 060
	30.28	47	450	1.35	56	374	1.65	8250	BAF 060
	27.34	52	405	1.45	62	338	1.75	8160	
	24.05	59	360	1 65	71	297	2.00	8030	
	22.71	62	340	1.75	75	281	2.15	7970	
	19.34	73	290	2.00	88	239	2.45	7760	
	17.57	80	260	2.10	97	217	2.55	7630	
	15.22	93	225	2.40	112	188	2.90	7430	
	13.25	106	197	2.60	128	164	3.15	7220	
	11.92	118	178	2.30	143	147	2.80	6890	
	11.26	125	168	2.50	151	139	3.05	6810	
	25.91	54	385	1.05	66	320	1.30	5260	B 040
	21.81	65	325	1.25	78	270	1.50	5260	BF 040
	19.58	72	290	1.35	87	242	1.65	5240	BA 040
	16.86	84	250	1.50	101	208	1.80	5190	BAF 040
	15.86	89	235	1.60	107	196	1.95	5160	
	13.65	103	205	1.75	125	169	2.15	5070	
	12.19	116	182	1.95	139	151	2.35	4990	
	11.77	120	175	1.60	144	145	1.95	4890	
	10.56	133	157	1.80	161	131	2.20	4810	
	9.10	155	136	2.10	187	112	2.55	4690	
	8.56	165	127	2.15	199	106	2.60	4650	
	7.36	191	110	2.25	231	91	2.75	4540	
	6.58	214	98	2.50	258	81	3.05	4470	
	5.81	242	87	2.65	293	72	3.20	4370	
	4.64	304	69	3.00	366	57	3.65	4180	
	13.08	108	195	0.85	130	162	1.05	2370	B 020
	10.49	134	156	1.00	162	130	1.20	2430	BF 020
	8.91	158	133	1.20	191	110	1.45	2440	BA 020
	7.96	177	119	1.30	214	98	1.60	2430	BAF 020
	6.80	207	101	1.50	250	84	1.80	2410	
	6.37	221	95	1.55	267	79	1.90	2400	
	5.36	263	80	1.75	317	66	2.15	2350	
	3.98	354	59	2.10	427	49	2.55	2250	

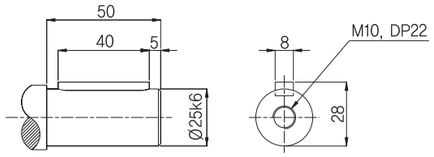
P(kW)	i	50Hz			60Hz			FRa[N]	Gear Unit
		n_a[rpm]	M_a[N.m]	f_B	n_a[rpm]	M_a[N.m]	f_B		
3.7	30.22	47	752	1.10	56	628	1.30	10400	B 080
	27.28	52	680	1.20	62	567	1.45	11000	BF 080
	24.00	59	599	1.35	71	499	1.65	11600	BA 080
	22.66	63	561	1.40	75	471	1.70	11800	BAF 080
	19.30	74	478	1.55	88	401	1.90	12300	
	17.54	81	436	1.70	97	365	2.05	12500	
	15.19	94	376	1.85	112	316	2.25	12800	
	13.22	107	330	2.05	129	275	2.50	13000	
	12.48	114	310	1.75	136	259	2.10	13000	
	10.63	134	264	1.90	160	221	2.30	13000	
	9.66	147	240	2.00	176	201	2.45	12900	
	8.37	170	208	2.10	203	174	2.55	12500	
	7.28	195	181	2.25	234	151	2.75	12100	
	5.20	273	129	2.70	327	108	3.30	11200	
	24.05	59	599	1.05	71	500	1.25	6120	B 060
	22.71	63	561	1.10	75	472	1.30	6160	BF 060
	19.34	73	484	1.20	88	402	1.45	6220	BA 060
	17.57	81	436	1.25	97	365	1.50	6230	BAF 060
	15.22	93	380	1.40	112	316	1.70	6210	
	13.25	107	330	1.55	128	275	1.90	6150	
	11.92	119	297	1.40	143	248	1.70	5810	
	11.26	126	280	1.45	151	234	1.75	5790	
	9.59	148	239	1.70	177	199	2.05	5700	
	8.71	163	217	1.80	195	181	2.15	5640	
	7.55	188	188	1.95	225	157	2.35	5530	
	6.57	216	164	2.10	259	137	2.55	5400	
	4.69	303	117	2.60	362	98	3.15	5070	

P(kW)	i	50Hz			60Hz			FRa[N]	Gear Unit
		n_a[rpm]	M_a[N.m]	f_B	n_a[rpm]	M_a[N.m]	f_B		
5.5	24.00	60	880	0.90	71	742	1.10	9720	B 080
	22.66	63	830	0.95	75	700	1 15	10200	BF 080
	19.30	74	710	1.05	88	596	1.30	11200	BA 080
	17.54	82	645	1.15	97	542	1.40	11600	BAF 080
	15.19	94	560	1.25	112	469	1.50	12100	
	13.22	108	485	1.40	129	409	1.70	12500	
	12.48	115	460	1.15	136	386	1.40	12600	
	10.63	135	390	1.30	160	328	1.60	12400	
	9.66	148	355	1.35	176	299	1.65	12200	
	8.37	171	305	1.45	203	259	1.75	11900	
	7.28	196	265	1.55	234	225	1.90	11600	
	5.20	275	191	1.85	327	161	2.25	10800	

B 020

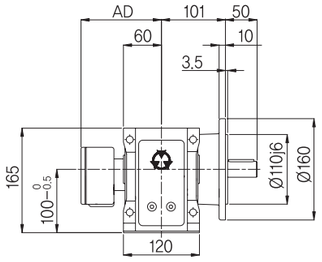


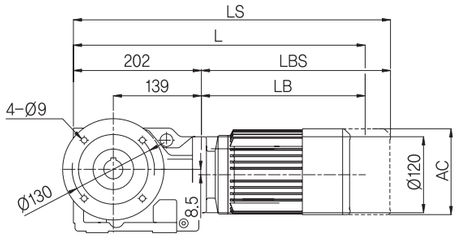


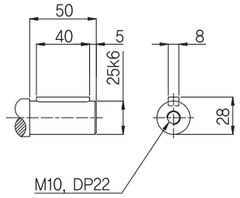


	0.4kW	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	442	456	530	579		
LS	532	546	630	689		
LB	240	254	328	377		
LBS	330	344	428	487		

BF 020







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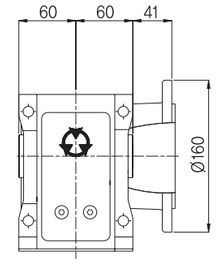

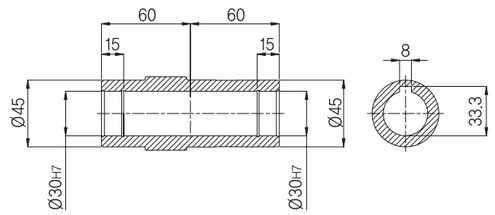

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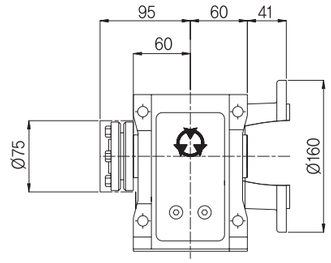
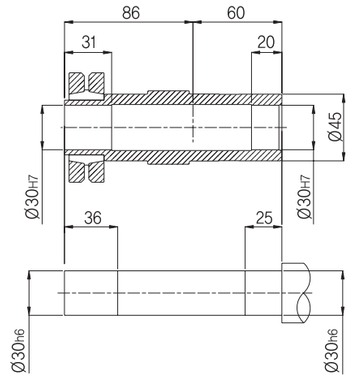
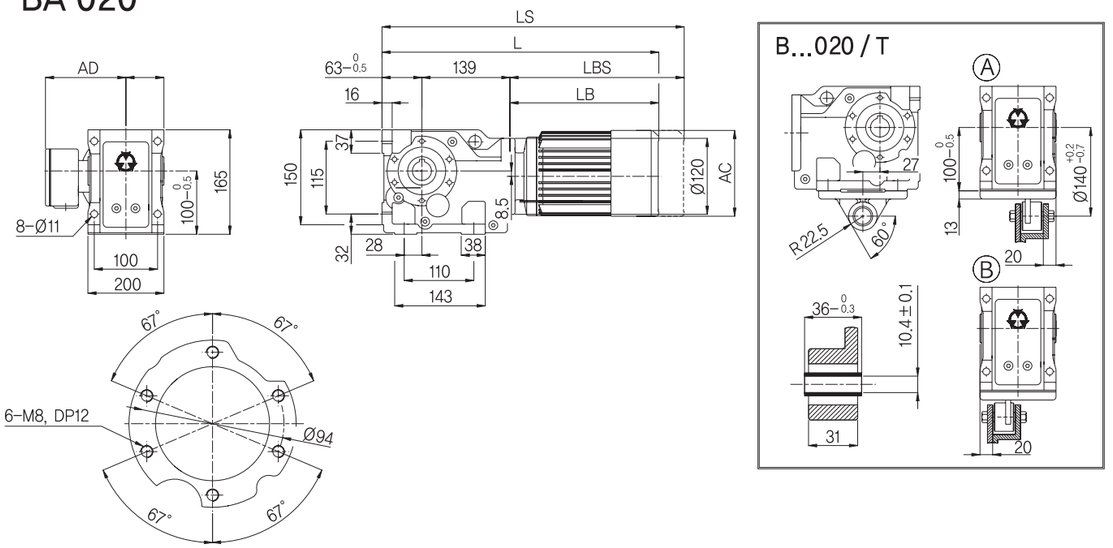




	0.4kW	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	442	456	530	579		
LS	532	546	630	689		
LB	240	254	328	377		
LBS	330	344	428	487		

BA 020



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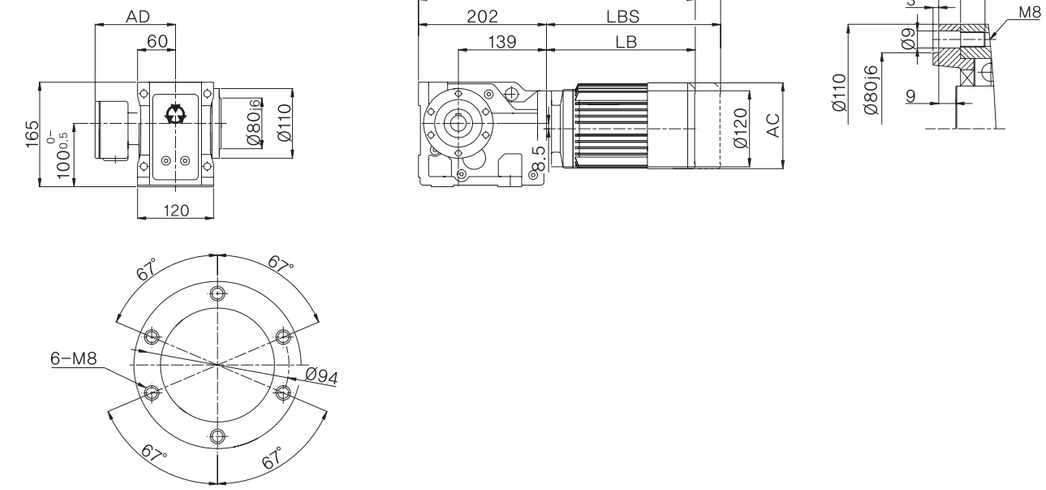

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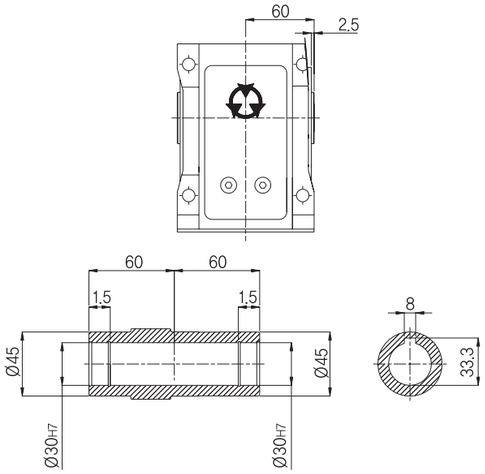

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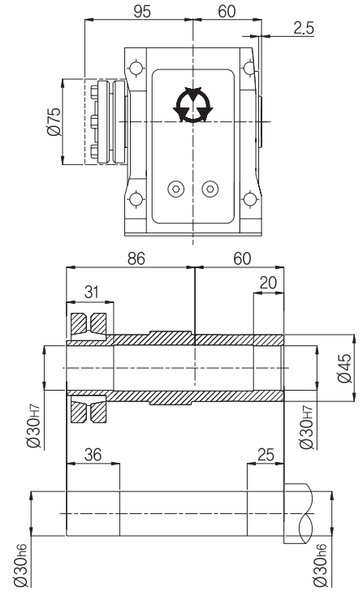

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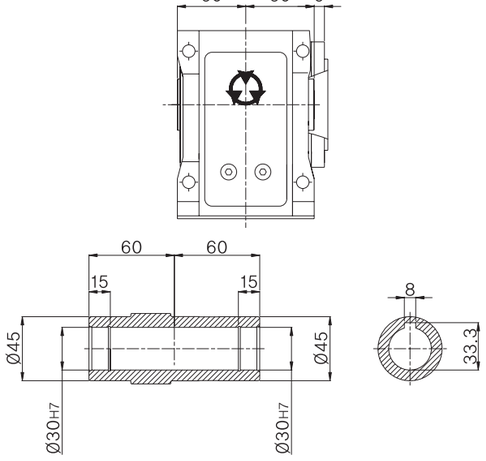

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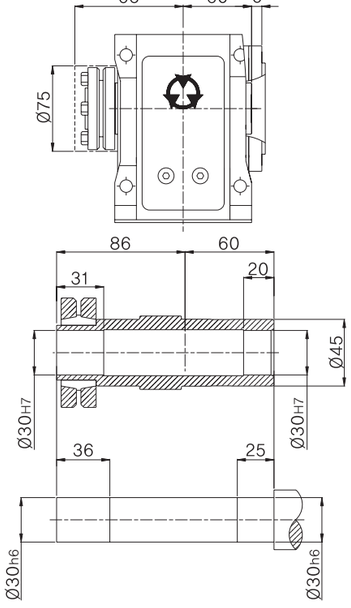
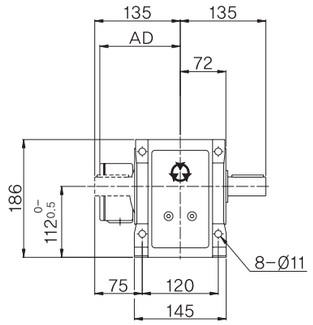
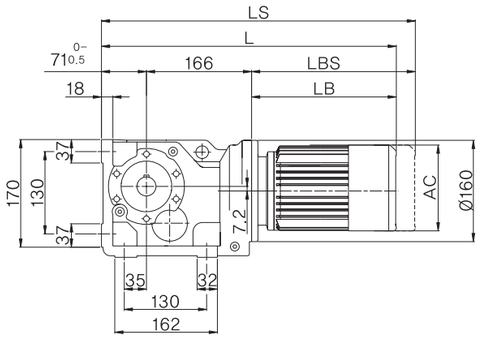


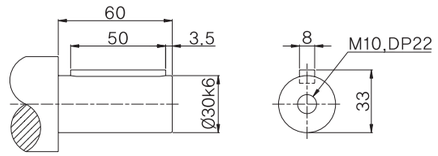
	0.4kW	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	442	456	530	579		
LS	532	546	630	689		
LB	240	254	328	377		
LBS	330	344	428	487		

	0.4kW	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	442	456	530	579		
LS	532	546	630	689		
LB	240	254	328	377		
LBS	330	344	428	487		

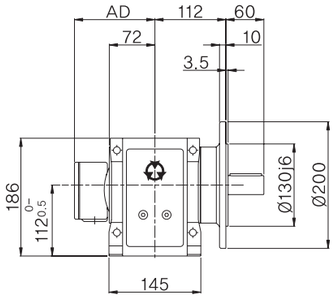
B 040

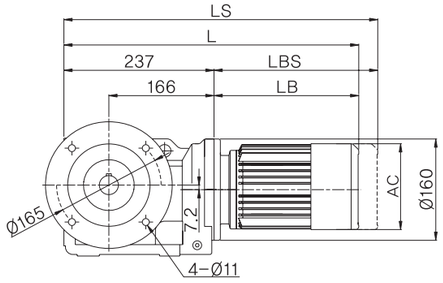


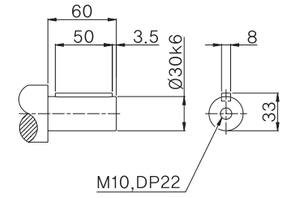




BF 040







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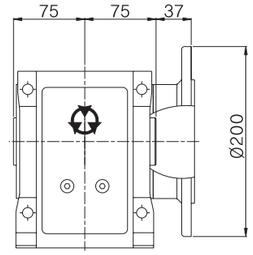

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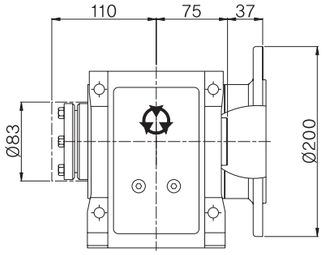
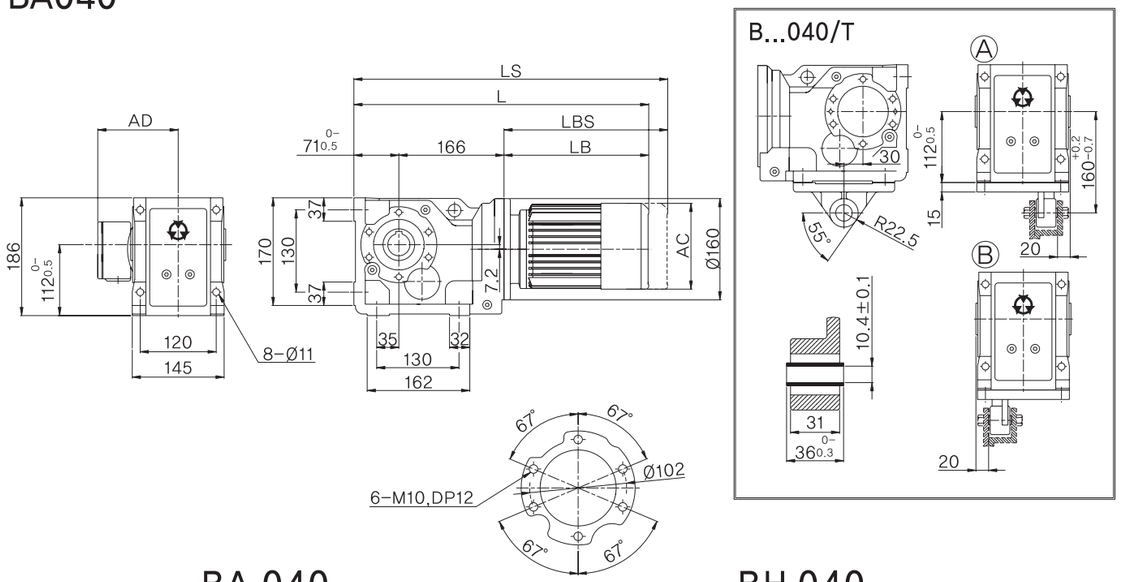


	0.4kW	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	466	485	558	605		
LS	556	575	658	715		
LB	229	248	321	368		
LBS	319	338	421	478		

	0.4kW	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	466	485	558	605		
LS	556	575	658	715		
LB	229	248	321	368		
LBS	319	338	421	478		

BA040



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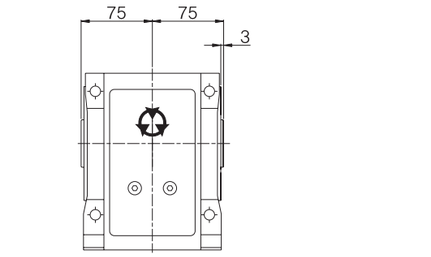

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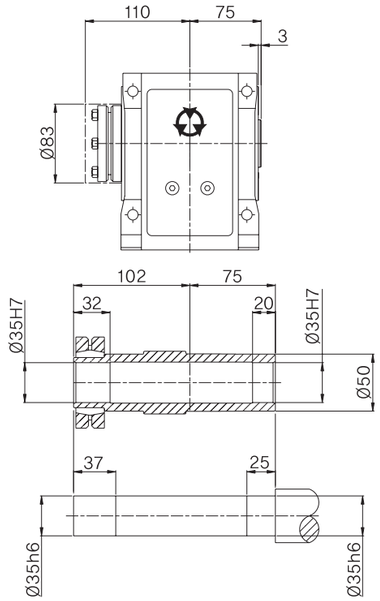
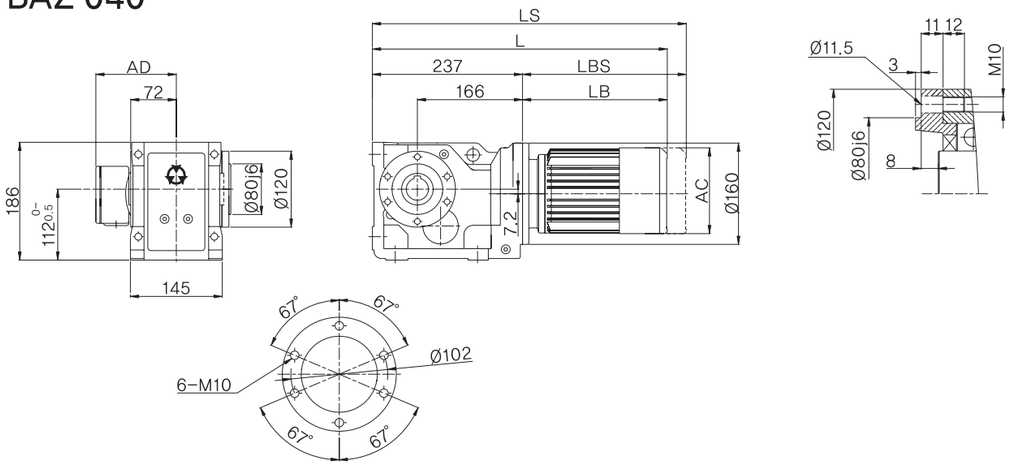


	0.4kW	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	466	485	558	605		
LS	556	575	658	715		
LB	229	248	321	368		
LBS	319	338	421	478		

BAZ 040



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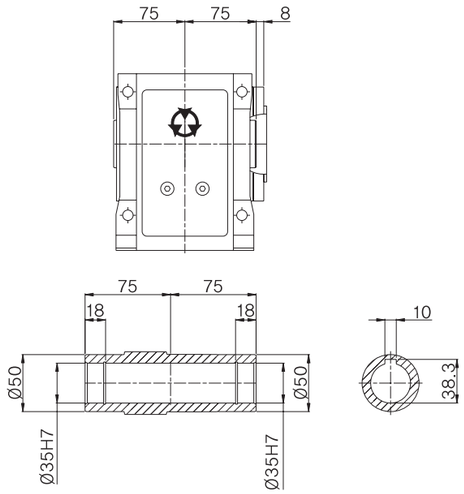

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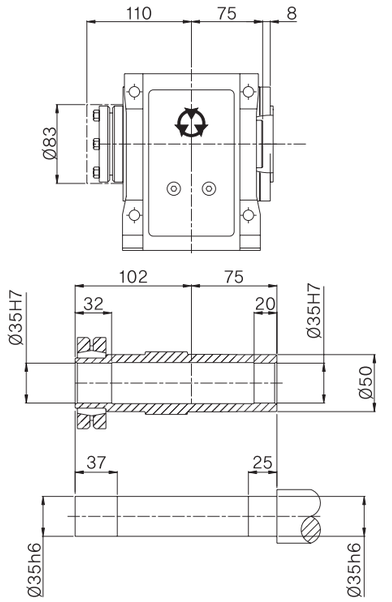
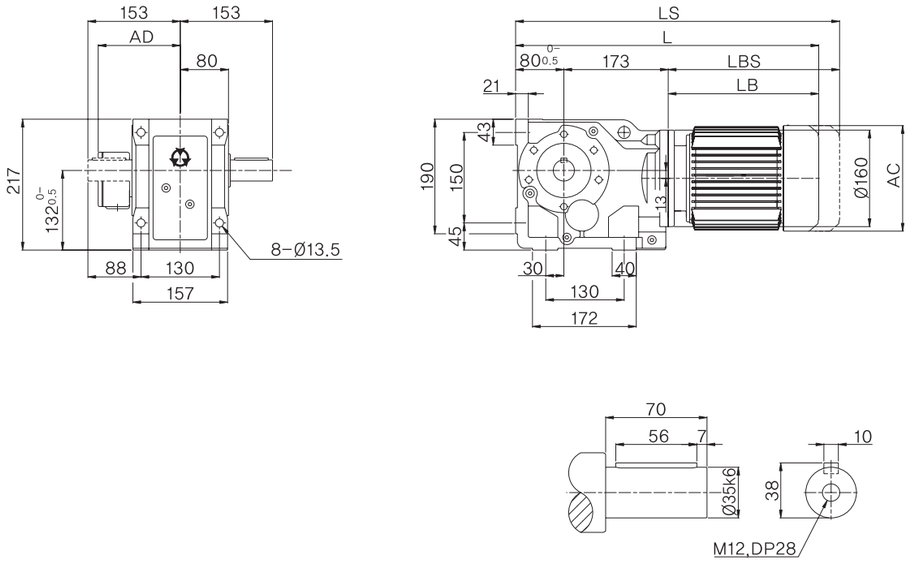


	0.4k W	0.75kW	1.5kW	2.2kW		
AC	145	175	193	236		
AD	126	135	147	202		
L	466	485	558	605		
LS	556	575	658	715		
LB	229	248	321	368		
LBS	319	338	421	478		

B 060



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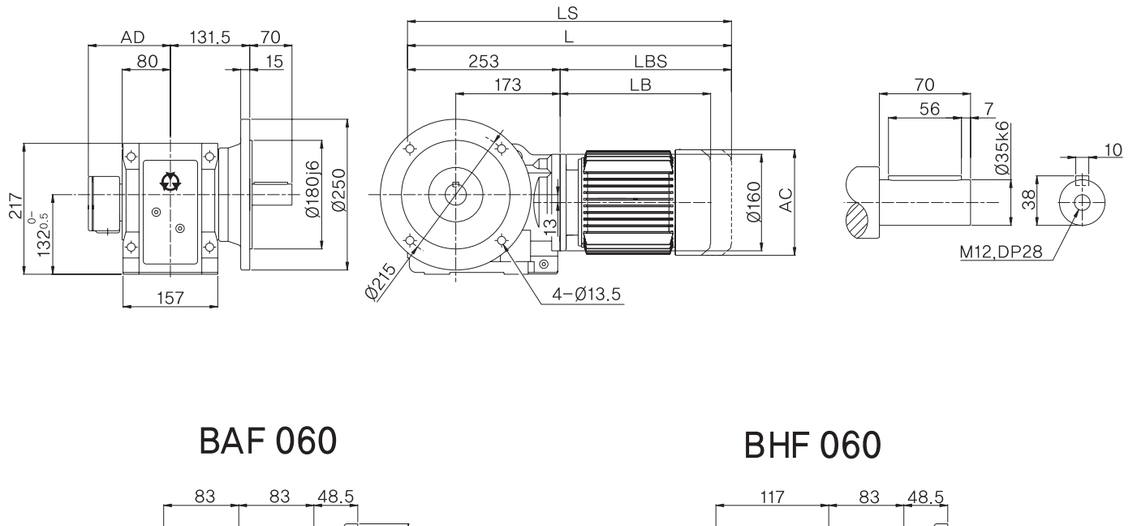

BAF 060

BHF 060

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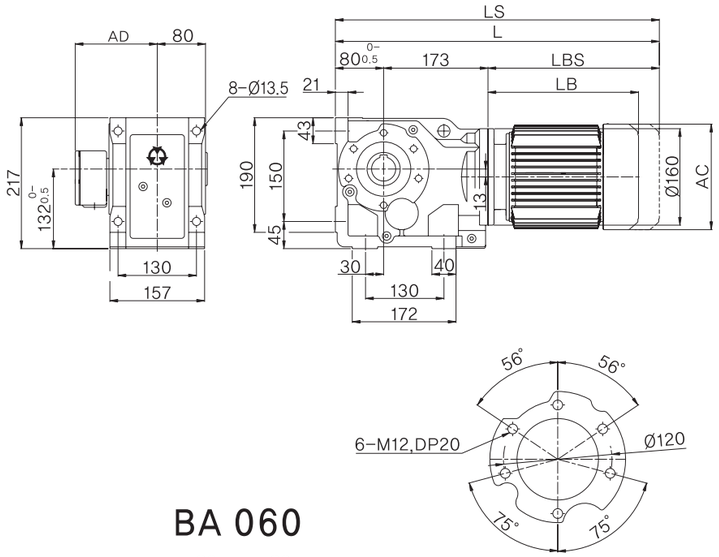
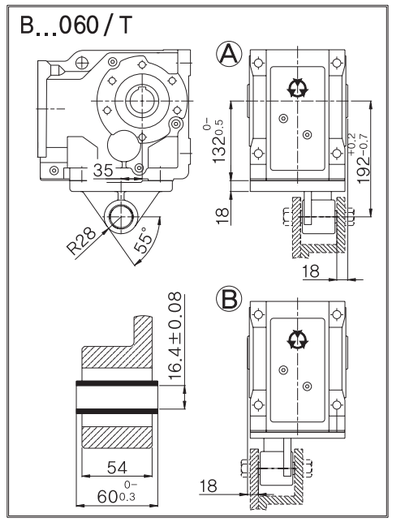
AC	145	175	193	236	236	
AD	126	135	147	202	202	
L	482	501	574	621	625	
LS	572	591	674	731	735	
LB	229	248	321	368	372	
LBS	319	338	421	478	482	

	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	
AC	145	175	193	236	236	
AD	126	135	147	202	202	
L	482	501	574	621	625	
LS	572	591	674	731	735	
LB	229	248	321	368	372	
LBS	319	338	421	478	482	

BA 060



B...060 / T



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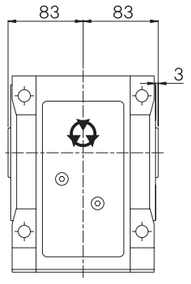

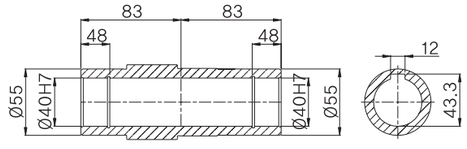

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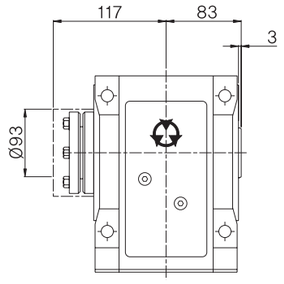
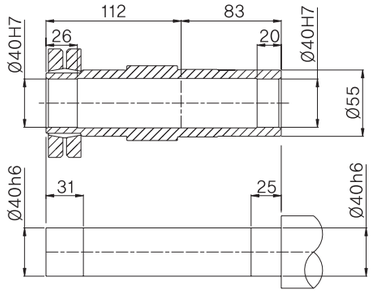
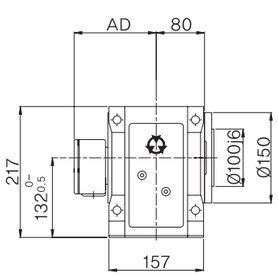
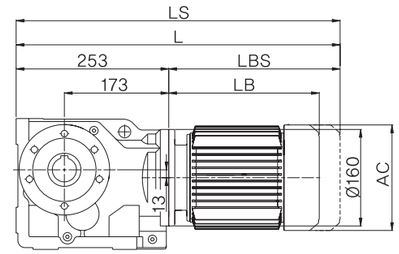


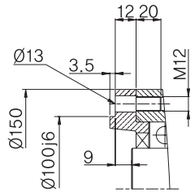


	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	
AC	145	175	193	236	236	
AD	126	135	147	202	202	
L	482	501	574	621	625	
LS	572	591	674	731	735	
LB	229	248	321	368	372	
LBS	319	338	421	478	482	

BAZ 060







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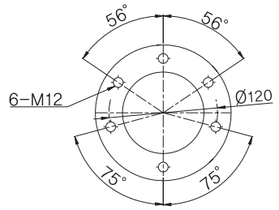

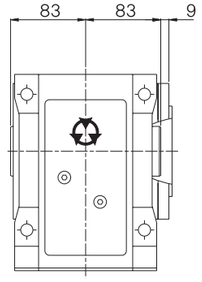

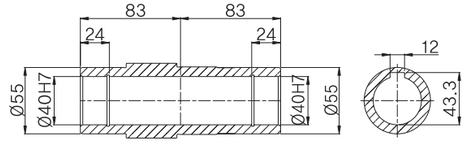

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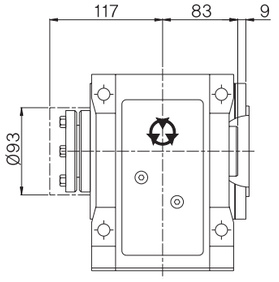
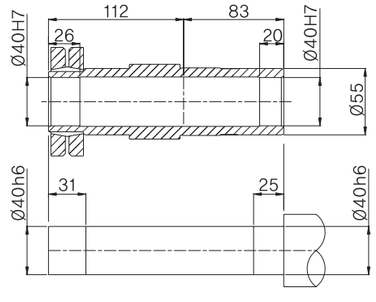
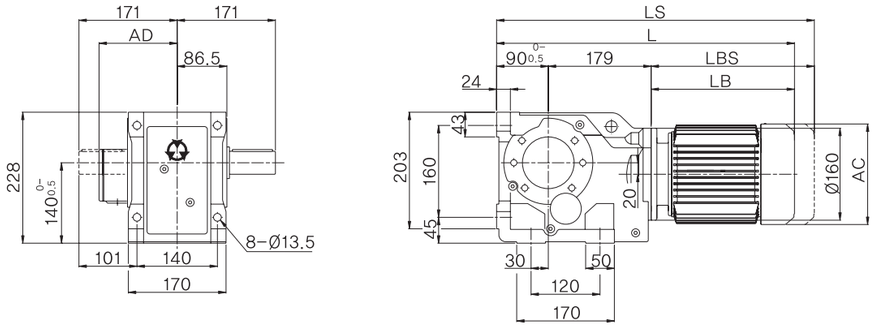




	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW
AC	145	175	193	236	236	274
AD	126	135	147	202	202	222
L	498	517	590	637	641	696
LS	588	607	690	747	751	826
LB	229	248	321	368	372	427
LBS	319	338	421	478	482	557

B 080



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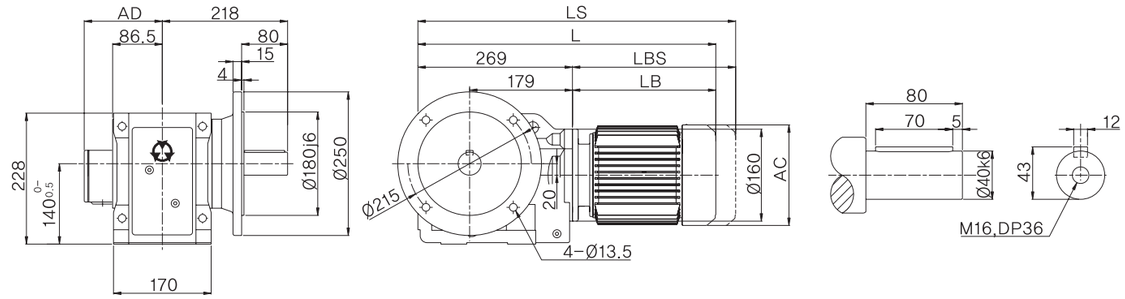

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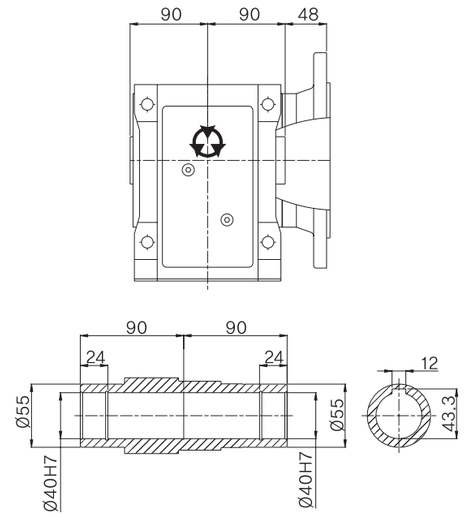

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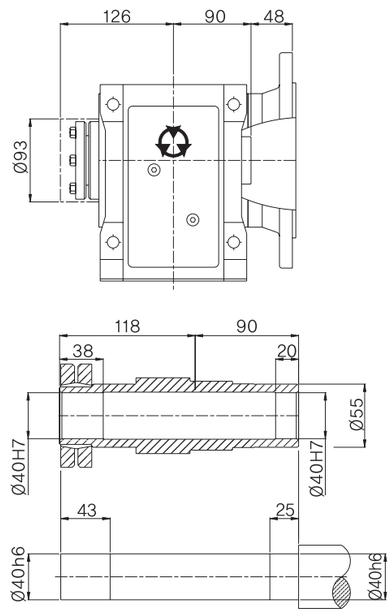

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AC	145	175	193	236	236	274
AD	126	135	147	202	202	222
L	498	517	590	637	641	696
LS	588	607	690	747	751	826
LB	229	248	321	368	372	427
LBS	319	338	421	478	482	557

	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW
AC	145	175	193	236	236	274
AD	126	135	147	202	202	222
L	498	517	590	637	641	696
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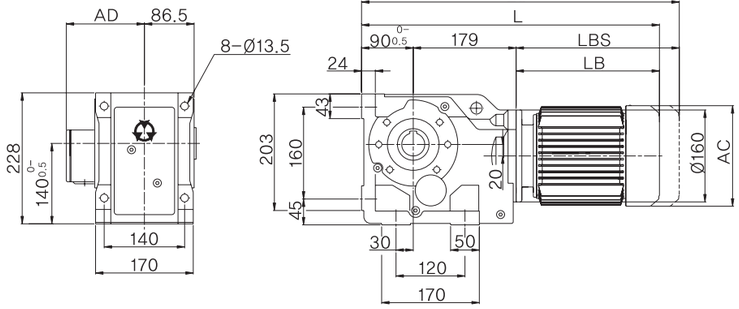
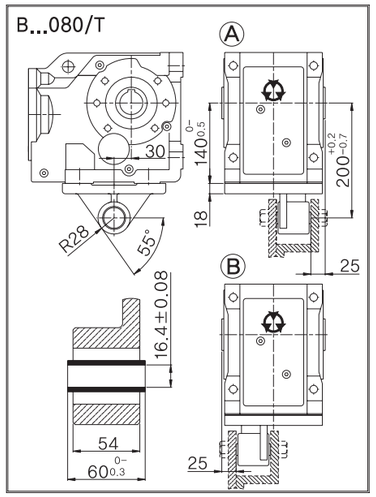
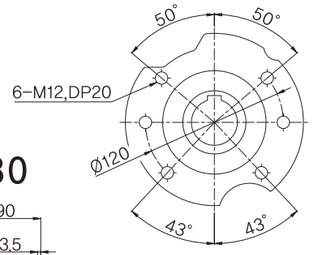
BA 080







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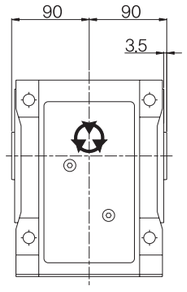

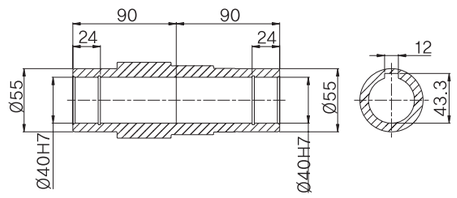

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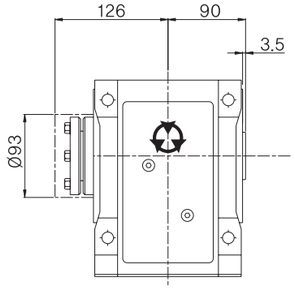

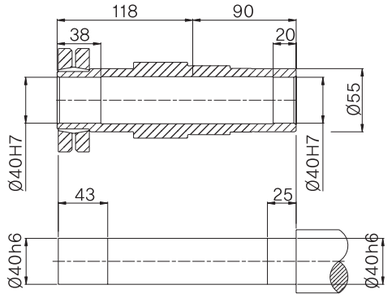

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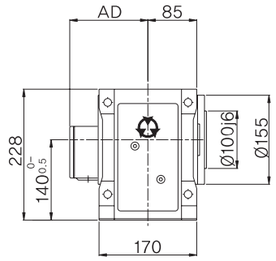
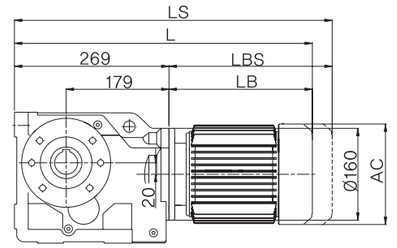
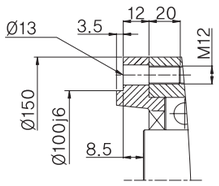
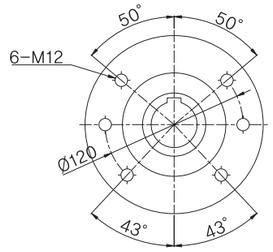
AC	145	175	193	236	236	274
AD	126	135	147	202	202	222
L	498	517	590	637	641	696
LS	588	607	690	747	751	826
LB	229	248	321	368	372	427
LBS	319	338	421	478	482	557

BAZ 080









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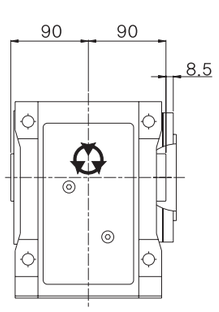

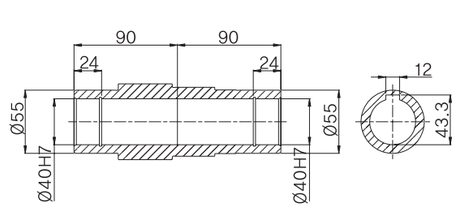

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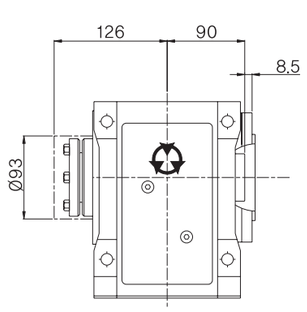

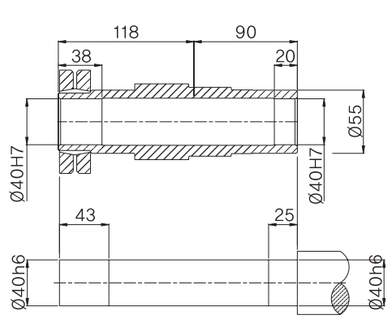

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AC	145	175	193	236	236	274
AD	126	135	147	202	202	222
L	498	517	590	637	641	696
LS	588	607	690	747	751	826
LB	229	248	321	368	372	427
LBS	319	338	421	478	482	557