



# SJ AUTOMATION

## Company Catalog





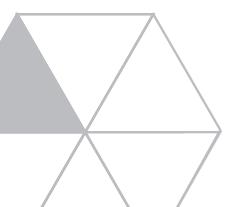
SJ AUTOMATION Company Catalog

# CONTENTS



■ <b>SJC series</b>	5
SJC series Vacuum Lid Door	5
Vacuum Lid Equipment (SJC3)	8
Vacuum LidScrew Cylinder(SJC4~SJC5)	9
도어개폐기 code	10
Dimension	11
Attachment	12
Calculation and Selection	13
Product code	14
Screw Jack (SJT)	16
■ <b>SJT series</b>	16
Dimension	18
Calculations	20
■ <b>웜기어 스크류잭(NEFF)</b>	22
General Technical data	23
치수 : 버전 N, V	24
치수 : 버전 R	25
사다리꼴 스크류 RPTS	26
플렌지 볼 너트 KGF-D	27
플렌지 볼 너트 KGF-N	28
원통형 볼 너트 KGM-D	29
원통형 볼 너트 KGM-N	30
사다리꼴 스크류	31
사다리꼴 너트	32

요청 구동 토크	34
볼 스크류	35
웜 기어 스크류 잭 시스템	36
■ <b>Spiral Bevel Gear Boxes (BG)</b>	38
선정	40
구조형식	41
Dimension of type A	42
Dimension of type AH	44
Dimension of type DR	46
Dimension of type MA	48
멀티 샤프트 베벨 기어박스	49
SHAFT	51
■ <b>더블 디스크 샤프트 SJWDS</b>	52
Disk Flexible Shaft	53
Connection Shaft	55
Wormgear BOX	57
특수형 베벨감속기 알루미늄 하우징	58
일반형 베벨감속기 감속비 1/2,3,5,10	60
베벨실린더	61
특수형 베벨감속기	62
베벨실린더	63
JVL MAC MOTOR	64
JVL Servo Step	66



## SJ AUTOMATION STORY

2014 ~  
2015

- 2014 평판디스플레이 양산라인 공급 (더블디스트샤프트)  
SJWDS 42~100
- 2014 LGD 대면적 OLED향 전공정 구동모듈
- 2014 SDS 중국향 OHCV OHS용 구동모듈
- 2014 해외협력사와 협업
- 2015 비동기모터의 동기화 개발적용
- 2015 (볼스크류잭) SJT 1차개발
- 2015 사내제어용 JVL사 서보모터적용

2016 ~  
2018

- 2016 SJT완성개발
- 2016 반도체장비 서보구동제어
- 2016 (진공용 도어개폐장치) SJC개발1톤 미만용
- 2016 SIMTOS 전시참가
- 2017 벤처인증
- 2018 SJT볼스크류잭 특허
- 2018 SJC특허

2019 ~  
2021

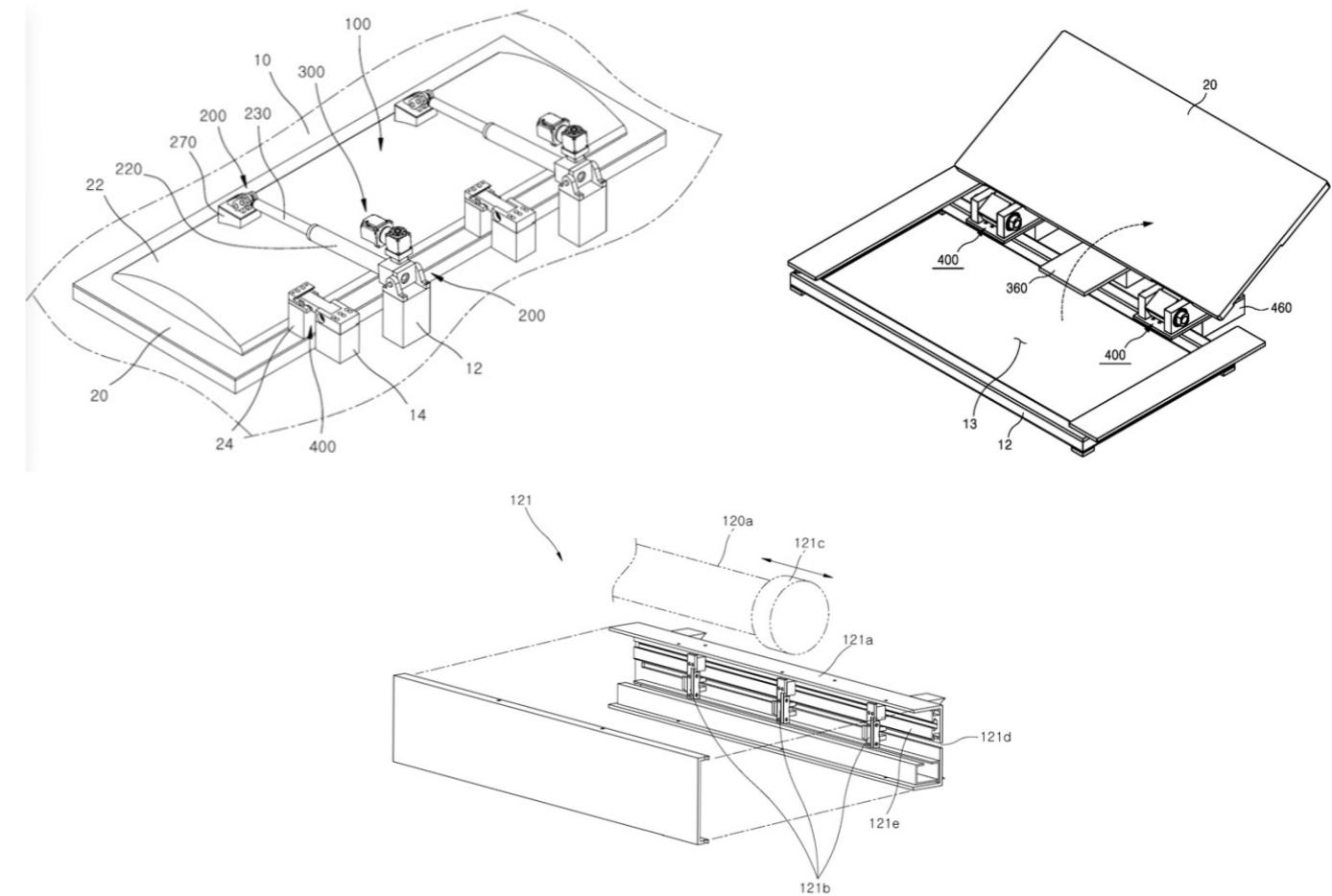
- 2019 SJC개발 3톤 미만용
- 2019 연구개발전담부서
- 2020 삼성반도체 생산기술원 공급
- 2020 소부장 전문기업
- 2020 IP특례보증 기술보증기금
- 2021 ISO9001 + LG Display향 공급

2022

- 2022 ISO14001
- 2022 SJR외 특허등록
- 2022 디스플레이 핵심유닛협의체 등록



소부장 전문기업,  
연구개발 전담부서,  
디스플레이 핵심유닛협의체

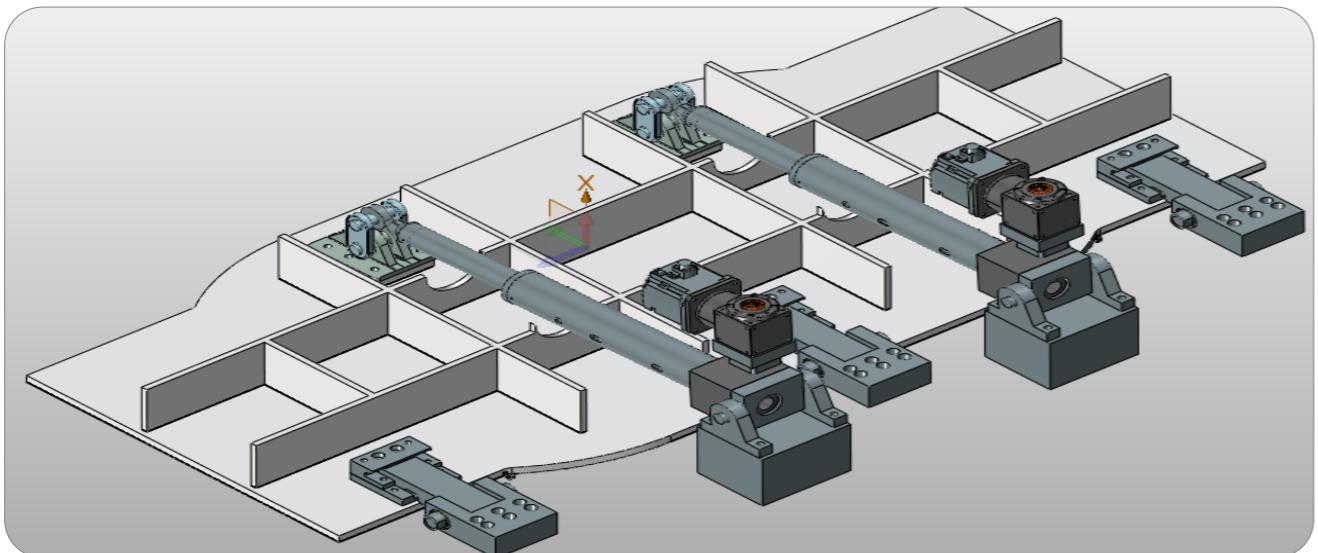
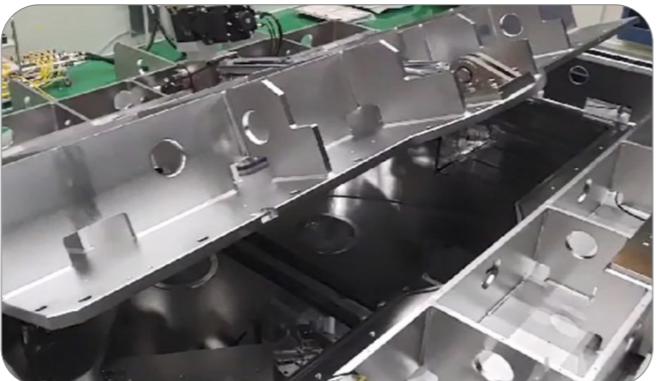
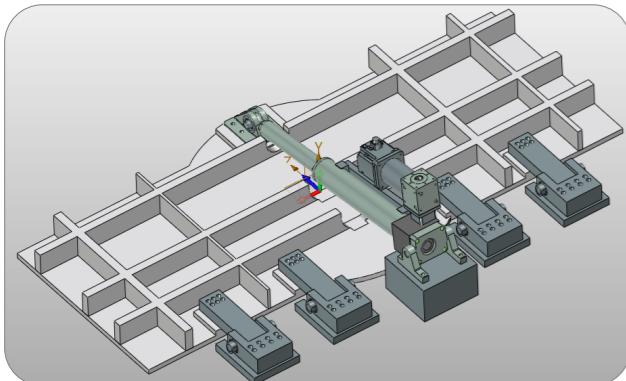
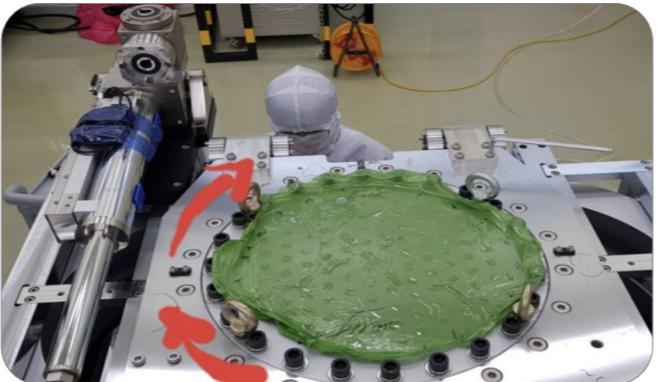
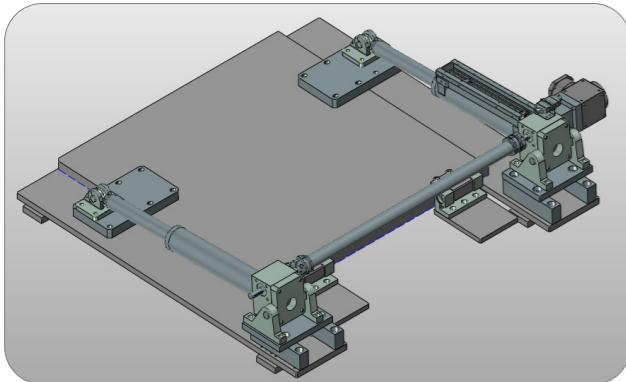


챔버와 리드를 힌지로 고정하고 스크류실린더의 길이를 압축 신장하여 리드를 여닫는 장치

- 도어개폐로봇과 대차 유지보수용 리프트
- 진공압에 대응하는 장치
- 110도 오픈이 가능한 컨셉
- 2개의 스크류실린더를 정밀하게 연결하는 샤프트

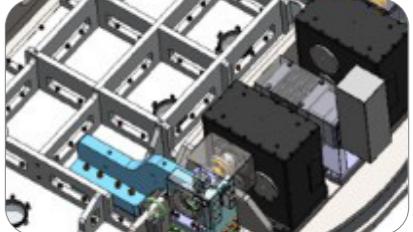
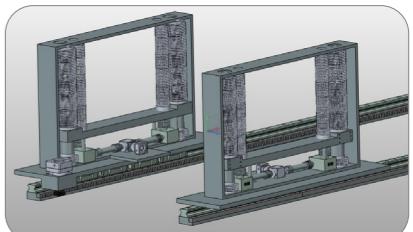
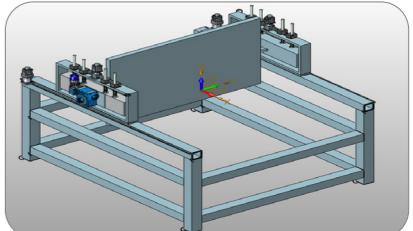
# SJC series Vacuum Lid Door

## Door opening and closing device for semiconductor and OLED display manufacturing facility



### ■ 타사적용 사례

1. 하중에 관계없이 적용가능
2. 대형, 정밀감속기를 사용한 외팔보 회전방식대신 스크류 당 김힘을 적용하여 슬림한 구성
3. 스크류, 웜, 베벨의 복합으로 구동 중 안정적인 셀프락 기능
4. 둔각 오픈 - 챔버와 리드형태에 맞춤설계방식
5. Lid를 포함한 모듈로 공급가능
6. 설계에서 설치, AS까지 공정/인력/비용의 최소화



### ■ Description

1. 조립이 용이하지 않음
2. 기술인력의 숙련도가 낮지 않아야 함
3. 제어와 기계 전문인력이 지속되기 어려움
4. 조립업체, 테스트업체, 셋업업체와 사용자간의 업무연결을 위한 메뉴얼의 빠른 체계화가 곤란하고 현장 대응이 우선시 됨
5. 조립업체, 테스트업체, 셋업업체와 사용자간의 업무연결을 위해 업무의 부피, 시간 등에 보이지 않는 비용 발생

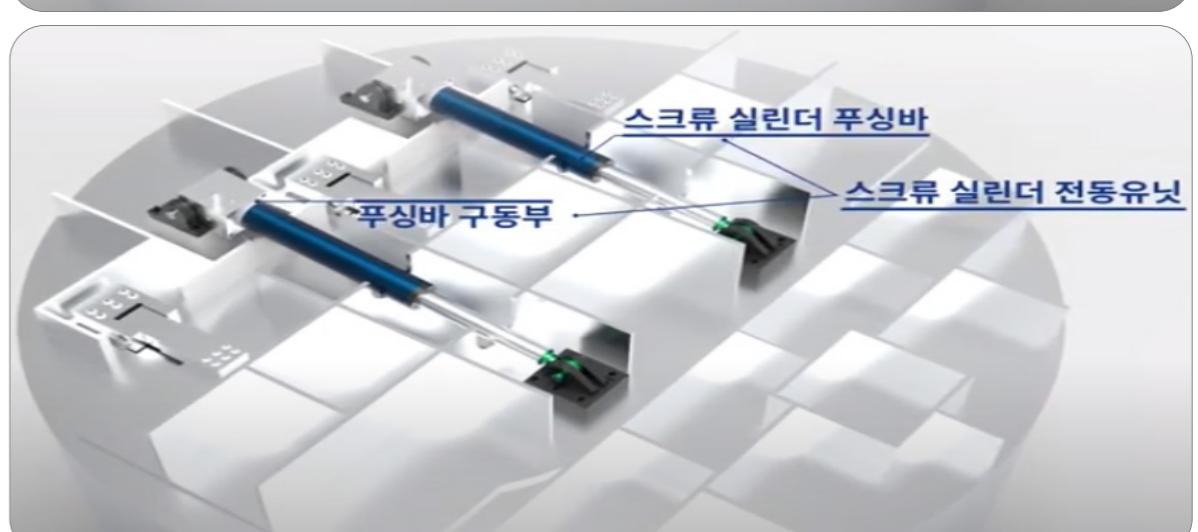
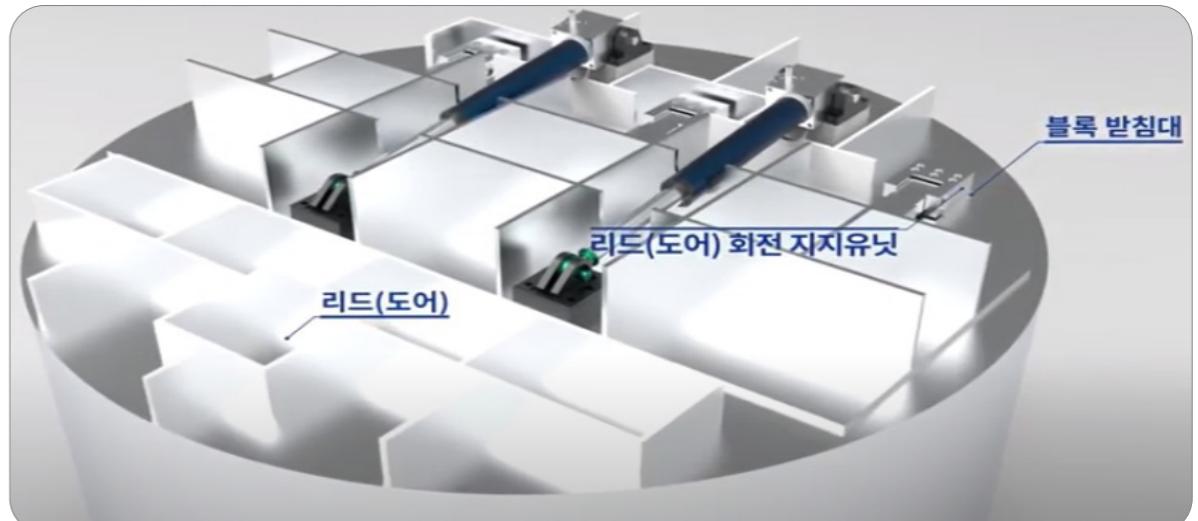
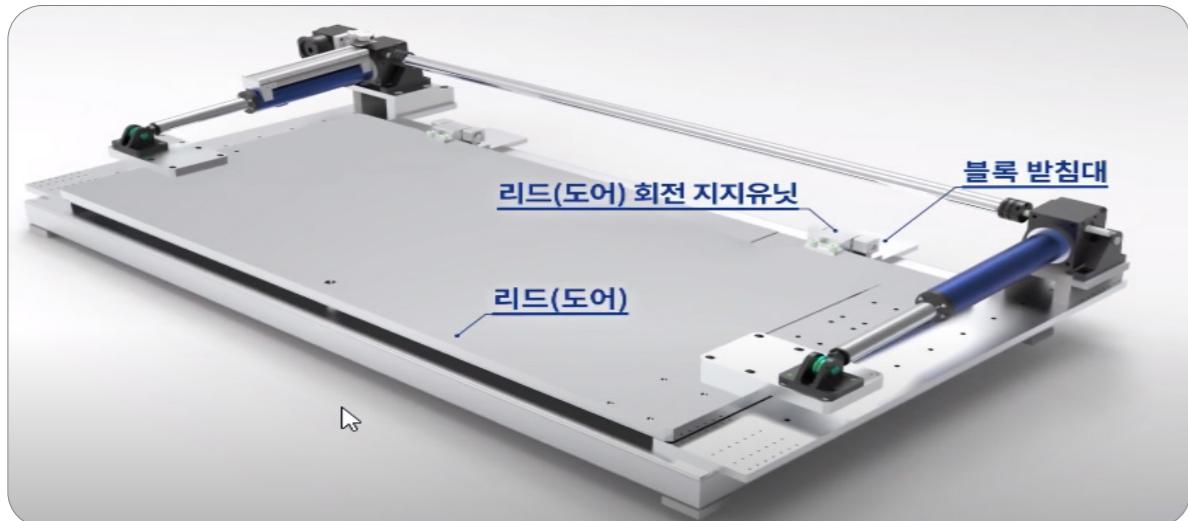
타공정사  
(예시)

SJ  
AUTOMATION  
Company



# Vacuum Lid Equipment (SJC3)

# Vacuum Lid Screw Cylinder (SJC4~SJC5)



## ■ Product code

NO.	Designation	Code	Description
1	Size	SJC3, SJC4, SJC5	
2		6:1 / 24:1	for SJC3
2		7:1 / 28:1	for SJC4
2		9:1 / 36:1	for SJC5
3	Type of spindle	T	Trapezoidal screw
4	Spindle dimension	K	Ball screw
5			ex. 3205 = diameter 30mm, lead 5mm
6	Front Pivot	RB	Rod end Bearing
6		FP	Front Pivot including RB
6		FB	Front Base
6		1	According to specification, description or drawing
7	Rear Pivot	RP	Rear Pivot
7		0	None
8	Shaft end	A	Shaft end on side LEFT
8		B	Shaft end on side RIGHT
8		0	On both side LEFT, RIGHT
9	Hinge	nH	Hinge (n = 1 2 3 ...)
9		0	None
10	Special requirements	1	None
10			According to specification, description or drawing

Order code example) 2x SJC5- 36- K5010- 522- FP- RP- B- 4HNG-BG3214

## ■ Technical table SJC3

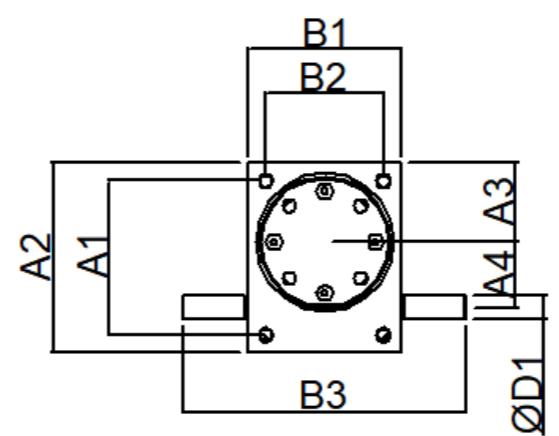
Rated power (kN)	25	21.5	33.4	29.7
Size of spindle	Tr 30x6	KGS 32x5	KGS 32x10	KGS 32x20
Gear Ratio	6:1	24:1	6:1	24:1
Efficiency (%)	29	23	55	43
Input Max torque (Nm)			18	
Bevel ratio			2:1 ~ 6:1	
Duty	< 10% / hr		< 30% / hour	
Grease	GS-Golden pearl 2		For ball screw	

## SJC4

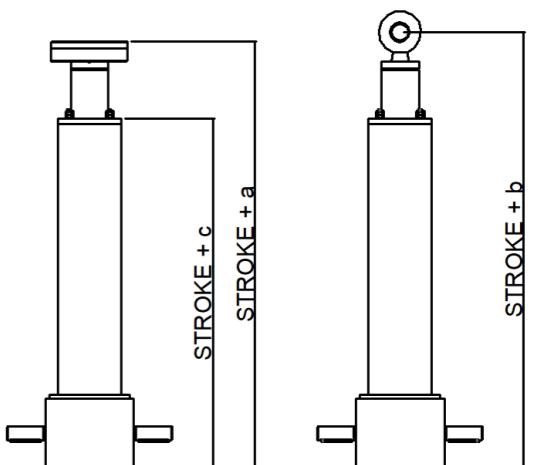
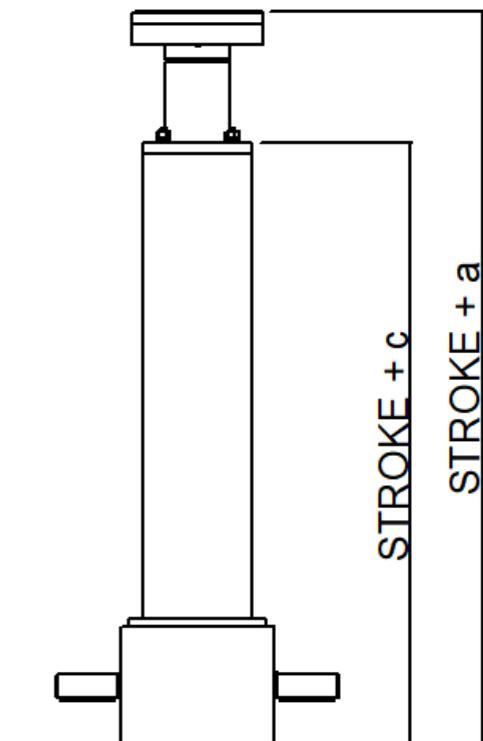
Rated power (kN)	50	23.8	38	33.3
Size of spindle	Tr 40x7	KGS 40x5	KGS 40x10	KGS 40x20
Gear Ratio	7:1	28:1	7:1	28:1
Efficiency (%)	26	21	53	43
Input Max torque (Nm)			38	
Bevel ratio			2:1 ~ 6:1	
Duty	< 10% / hr		< 30% / hour	
Grease	GS-Golden pearl 2		For ball screw	

## SJC5

Rated power (kN)	100	68.7	60
Size of spindle	Tr 55x9	KGS 50X10	KGS 50X20
Gear Ratio	9:1	36:1	9:1
Efficiency (%)	24	19	47
Input Max torque (Nm)			93
Bevel ratio			2:1 ~ 6:1
Duty	< 10% / hr		< 30% / hour
Grease	GS-Golden pearl 2		For ball screw



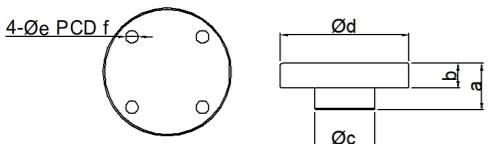
	a	b	e
SJC3	Tr 30x6	265	284
	KGS 25x05	201	217
	KGS 25x10	214	233
	KGS 25x20	214	233
SJC4	Tr 40x7	371	392
	KGS 40x5	355	376
	KGS 40x10	369	390
	KGS 40x20	378	399
SJC5	Tr 55x9	550	562.5
	KGS 50X10	448	560.5
	KGS 50X20	448	560.5



SIZE	A1	A2	A3	A4	B1	B2	B3	D1
SJC3	106	130	54	45	105	81	195	16
SJC4	150	180	78	63	145	115	240	20
SJC5	166	200	83	71	165	131	300	25

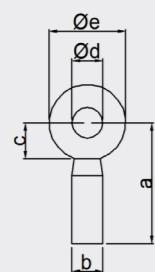
## ■ Aligning base plate - ABP

### ■ Front Base - FB



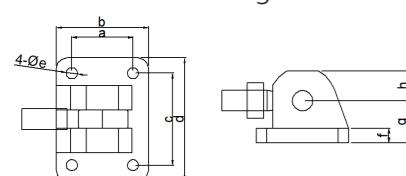
	SJC3	SJC4	SJC5
a	34.5	43	55
b	17.5	22	30
c	42	57	85
d	90	110	150
e	9	11	17
f	70	85	117

### ■ Rod end bearing - RB



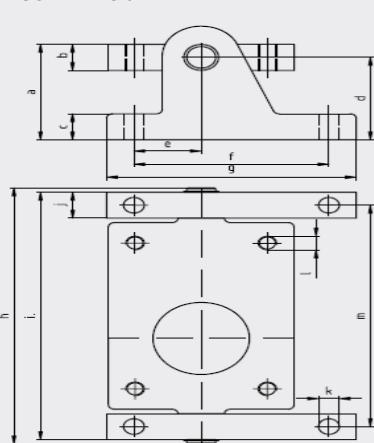
	SJC3	SJC4	SJC5
a	34.5	43	55
b	17.5	22	30
c	42	57	85
d	90	110	150
e	9	11	17
f	70	85	117

### ■ Front Pivot including RB - FP



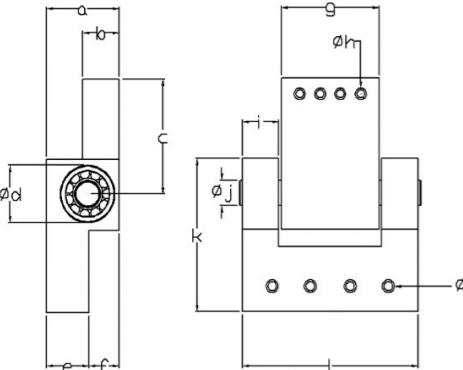
	SJC3	SJC4	SJC5
a	60	90	135
b	90	135	203
c	90	135	203
d	120	180	270
e	11	16.5	22
f	14	21	31.5
g	41	61.5	92.5
h	29	43.5	65

### ■ Rear Pivot - RP



	SJC3	SJC4	SJC5
a	90	110	110
b	25	30	35
c	20	30	30
d	77.5	95	92.5
e	50	58	60
f	135	168	180
g	165	215	225
h	205	265	285
i	195	255	275
j	25	30	30
k	13	18	18
l	11	13	21
m	170	225	245

### ■ Hinge

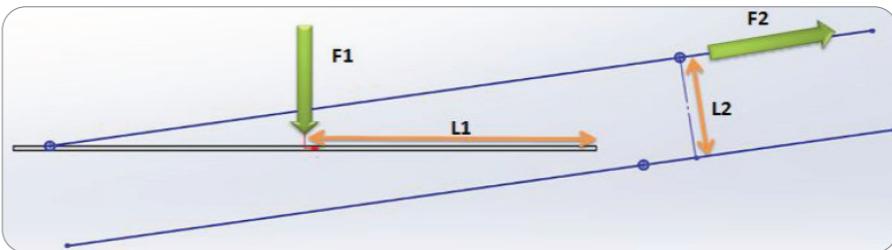


	SJC3	SJC4	SJC5
a	60	80	120
b	30	40	60
c	90	120	180
d	42	62	90
e	35	47	70
f	25	33.5	50
g	80	108	161
h	for M10	for M10	for M12
i	30	40	60
j	15	25	40
k	120	160	240
l	145	194	290

## ■ Calculation and Selection

### 1. Cylinder Sizing about only Tilting movement including hinge

$$F1 \times L1 < F2 \times L2 \Rightarrow \frac{F1 \times L1}{L2} \times Sf < F2 \text{ (실린더 용량 Rated power kN)} \quad * \text{ Safety factor : } \geq 2.0$$



## ■ Symbols

s = dynamic load

m = weight

F (kN)

g = 9.8 m<sup>2</sup>/s

F1

L1 = Hinge에서 LID 무게 중심까지 거리

F2

L2 = 두개의 Pivot과 Hinge간 평행선 거리

Sf = Safety factor

## ■ Ratio and Reducer Sizing

RPM = revolutions/min at the worm

s (mm) = spindle lead

i = worm gear reduction

i<sub>b</sub> = bevel gear reduction

$$\frac{RPM * s}{60 * i * ib} =$$

## ■ Motor Sizing

F (kN) = dynamic load

s (mm) = spindle lead

i

i<sub>b</sub> = bevel gear reduction

= worm gear reduction η(total)

Sf P = factor for spindle load torque

= Efficiency of the system M

= Power rating

$$M = \{(F \times s) \times Sf\} / (2 \times \phi \times i \times i_b \times \eta)$$

$$P = (M \times n) / (9550)$$

Driving power

$$P = \frac{M * RPM}{9550}$$

## ■ Temperature and Duty

At an ambient temperature higher than +20°C the operating factor must be reduced in correspondence with the following table.

Ambient temperature (°C)	50	60	70	80
max. permissible Duty (%/h)	18	15	10	5
max. permissible Duty (%/10min)	27	22	15	8

\* Redesign available on request

# Product code

## ■ Product code

NO.	Designation	Code	Description
1	Size	SJM3, SJM4, SJM5	
2	Ratio	6:1 / 24:1 7:1 / 28:1 9:1 / 36:1	for SJM3 for SJM4 for SJM5
3	Type of spindle	T K	Trapezoidal screw Ball screw
4	Spindle dimension		ex. 3205 = diameter 30mm, lead 5mm
5	Stroke		
6	Front Pivot	RB FP FB 1	Rod end Bearing Front Pivot including RB Front Base According to specification, description or drawing
7	Rear Pivot	RP 0	Rear Pivot None
8	Shaft end	A B 0	Shaft end on side LEFT Shaft end on side RIGHT On both side LEFT, RIGHT
9	Hinge	nH 0	Hinge (n = 1 2 3 ...) None
10	Special requirements	0 1	None According to specification, description or drawing

Order code example) 4 x SJM3- 24 - K2510 - 250 - 1 - 0 - 0 - 0 - 0

## ■ Technical table

### SIM3

Rated power (kN)	25	21.5	33.4	29.7
Size of spindle	Tr 30x6	KGS 32x5	KGS 32x10	KGS 32x20
Gear Ratio	6:1	24:1	6:1	24:1
Efficiency (%)	29	23	55	43
Input Max torque (Nm)		18		
Bevel ratio		2:1 ~ 6:1		
Duty	< 10% / hr		< 30% / hour	
Grease	GS-Golden pearl 2		For ball screw	

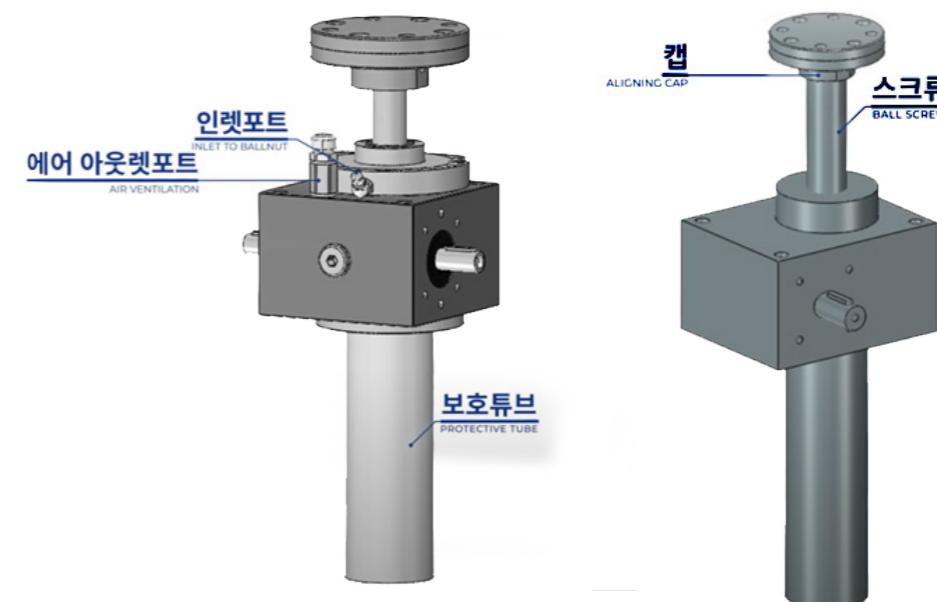
### SIM4

Rated power (kN)	50	23.8	38	33.3
Size of spindle	Tr 40x7	KGS 40X5	KGS 40X10	KGS 40X20
Gear Ratio	7:1	28:1	7:1	28:1
Efficiency (%)	26	21	53	43
Input Max torque (Nm)		38		
Bevel ratio		2:1 ~ 6:1		
Duty	< 10% / hr		< 30% / hour	
Grease	GS-Golden pearl 2		For ball screw	

### SIM5

Rated power (kN)	100	68.7	60
Size of spindle	Tr 55x9	KGS 50X10	KGS 50X20
Gear Ratio	9:1	36:1	9:1
Efficiency (%)	24	19	47
Input Max torque (Nm)		93	37
Bevel ratio		2:1 ~ 6:1	
Duty	< 10% / hr		< 30% / hour
Grease	GS-Golden pearl 2		For ball screw

## ■ 편하증재용과 높이보정 볼스크류잭 SJT Series



## Product code

NO.	Designation	Code	Description
1	Maker	SJ	
2	Design	T	Traveling Screw
		R	Traveling Nut
3	Size	30	
		40	
		55	
4	Ratio	1:05	Fast
		1:10	Normal
		1:30	Slow
5	Type of spindle	T	Trapezoidal screw
		K	Ball screw
		KH	High load ball screw
6	Spindle dimension		ex. 3205 = diameter 30mm, lead 5mm
7	Stroke		Specification of the stroke length
8	Thread length		Thread length at full stroke
9	Grease Nipple	NP	Nut plug for grease inlet for ball screw
		0	None for Tr screw
10	Spindle cover	0	None
		BL	With bellows
		SC	Spiral cover
11	Spindle end	0	None
		BP	With Base Plate
		ABP	With Aligning Base Plate
12	Anti-unscrewing device	0	None
		AS	Stop collar
13	Shaft end	A	Shaft end on side LEFT
		B	Shaft end on side RIGHT
		0	On both side LEFT, RIGHT
14	Special requirements	0	None
		1	Screw end machining and other on request

SJT40-1:10-KH40X20-140-290-NP-BL-ABP-AS-0-1

## Preselection table

### SJT / SJR 20

Rated power (kN)	10		10.5		11.6	
Size of spindle	Tr 20x4		KGS 20x05		KGS 20x20	
Gear Ratio	1 : 5	1 : 10.5	1 : 30	1:5	1:10.5	1:30
Efficiency (%)	0.32	0.29	0.21	0.6	0.51	0.36
Max driving torque in input shaft (Nm)				7.1		
Grease	NEFF GREASE 2, NEFF FOOD GREASE 2			NEFF Grease 2/3, Agip GR SLL 00, AFF		
Relubrication cycle	Dozens times		Min. 3months			
Relubrication position	Tr screw		Nipple to inlet to Ball nut			

### SJT / SJR 30

Rated power (kN)	25		33.4		29.7	
Size of spindle	Tr 30x6		KGS 32x10		KGS 32x20	
Gear Ratio	1:5	1:10	1:30	1:5	1:10	1:30
Efficiency (%)	0.32	0.27	0.19	0.6	0.51	0.36
Max driving torque in input shaft (Nm)				18		
Grease	NEFF GREASE 2, NEFF FOOD GREASE 2			NEFF Grease 2/3, Agip GR SLL 00, AFF		
Relubrication cycle	Dozens times		Min. 3months			
Relubrication position	Tr screw		Nipple to inlet to Ball nut			

### SJT / SJR 40

Rated power (kN)	50		38		33.3	
Size of spindle	Tr 40x7		KGS 40x10		KGS 40x20	
Gear Ratio	1:5	1:10	1:30	1:5	1:10	1:30
Efficiency (%)	0.29	0.26	0.19	0.6	0.51	0.36
Max driving torque in input shaft (Nm)				38		
Grease	NEFF GREASE 2, NEFF FOOD GREASE 2			NEFF Grease 2/3, Agip GR SLL 00, AFF		
Relubrication cycle	Dozens times		Min. 3months			
Relubrication position	Tr screw		Nipple to inlet to Ball nut			

### SJT / SJR 55

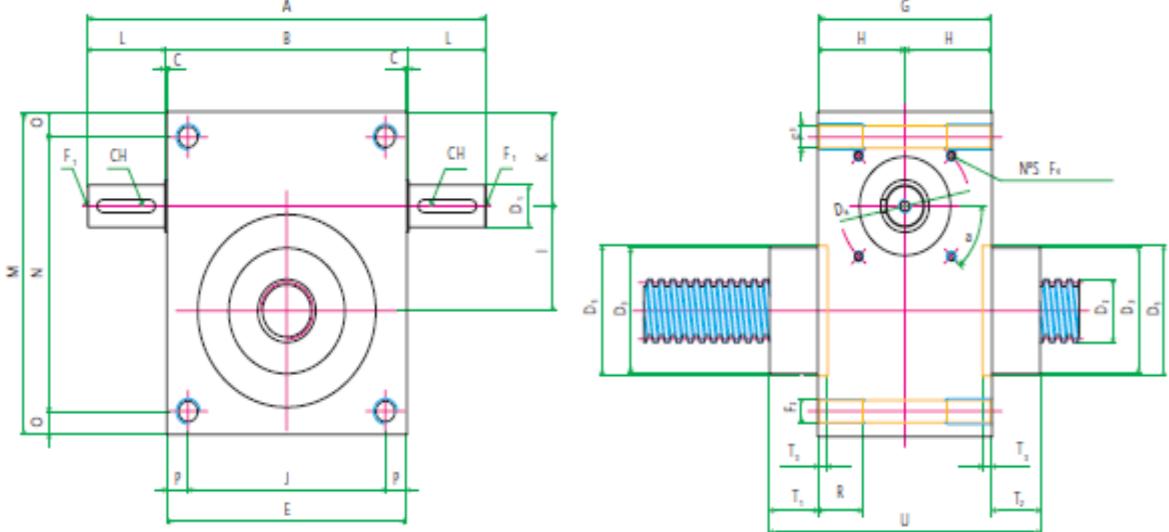
Rated power (kN)	100		68.7		76	
Size of spindle	Tr 55x9		KGS 50x10		KGS 50x20	
Gear Ratio	1:5	1:10	1:30	1:05	1:10	1:30
Efficiency (%)	0.26	0.22	0.18	0.6	0.51	0.36
Max driving torque in input shaft (Nm)				93		
Grease	NEFF GREASE 2, NEFF FOOD GREASE 2			NEFF Grease 2/3, Agip GR SLL 00, AFF		
Relubrication cycle	Dozens times		Min. 3months			
Relubrication position	Tr screw		Nipple to inlet to Ball nut			

### SJT / SJR 70

Rated power (kN)	200		76		130 *	
Size of spindle	Tr 70x10		KGS 63x10		KGS 63x20	
Gear Ratio	1:5.2	1:10	1:30	1:5.2	1:10	1:30
Efficiency (%)	0.23	0.21	0.14	0.6	0.51	0.36
Max driving torque in input shaft (Nm)				148		
Grease	NEFF GREASE 2, NEFF FOOD GREASE 2			NEFF Grease 2/3, Agip GR SLL 00, AFF		
Relubrication cycle	Dozens times		Min. 3months			
Relubrication position	Tr screw		Nipple to inlet to Ball nut			

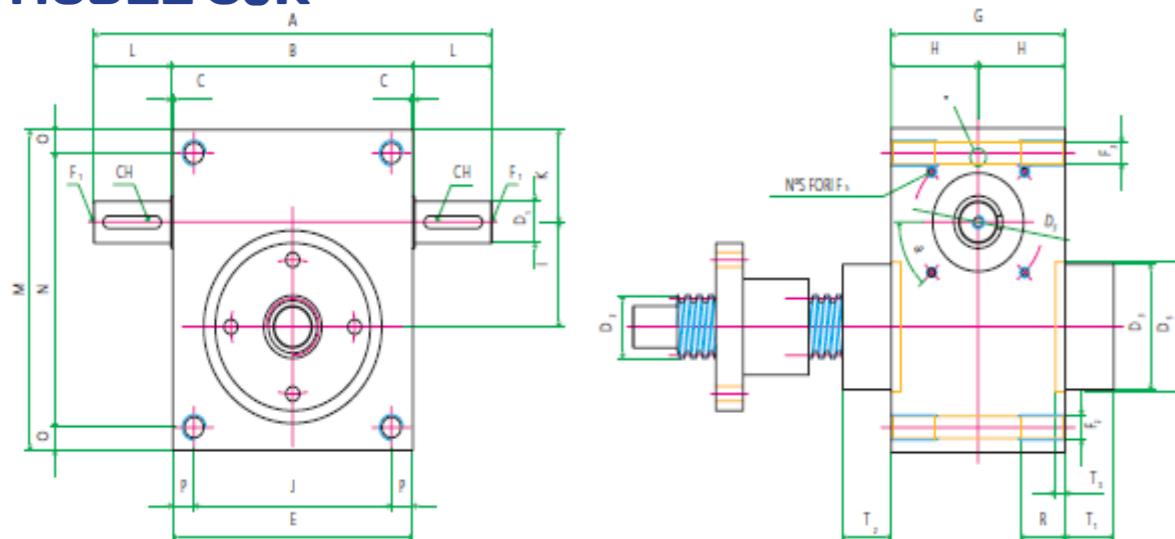
# Dimension

## ■ MODEL SJT



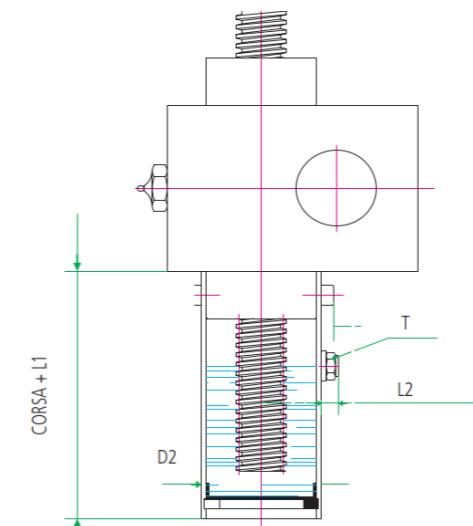
Size	A	B	C	D	D	D2	D3	D4	E	F1	F2	F3	F4	G	H	U
18	118	70	-	9	18x3	30	-	-	M4x8	M10	8.5	-	50	50	25	75
20	150	100	-	12	20x4	44	52	-	M4x8	M10	8.5	M5x10	70	70	35	110
30	206	126	-	20	30x6	60	68	-	M6x12	M12	10.5	M6x12	90	90	45	140
40	270	160	-	25	40x7	69	70	70	M8x16	M14	12.5	M8x16	120	120	60	190
55	270	170	-	25	55x9	90	70	90	M8x16	M20	17.5	M8x16	150	150	75	230
70	350	230	-	30	70x10	120	74	120	M10x18	M30	26.5	M8x15	176	176	88	256
80	350	230	-	30	80x10	120	74	120	M10x18	M30	26.5	M8x15	176	176	88	256

## ■ MODEL SJR



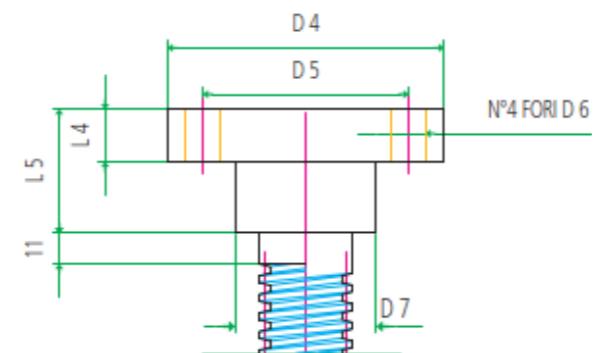
Size	K	I	J	L	M	N	O	P	R	S	T1	T2	T3	a	CH
18	29	30	56	24	94	80	7	7	15	-	10	15	-	-	3x3x15
20	32.5	30	80	25	100	85	7.5	10	15	4	20	20	-	45°	4x4x20
30	45	50	102	40	155	131	12	12	20	4	25	25	-	45°	6x6x30
40	50	70	130	55	195	165	15	15	25	5*	35	35	7	30°	8x7x40
55	63	70	134	50	211	175	18	18	30	6	40	40	10	60°	8x7x40
70	75	90	180	60	280	230	25	25	45	6	40	40	10	60°	8x7x50
80	75	90	180	60	280	230	25	25	45	6	40	40	10	60°	8x7x50

## ■ AI cover



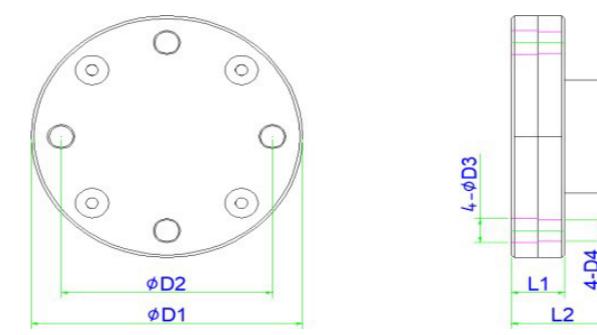
	SJT30	SJT40	SJT55
D2	65	69	95
L1	45	45	55

## ■ BP - Base Plate



	SJT30	SJT40	SJT55
D4	89	109	149
D5	67	85	117
D6	11	13	17
D7	46	60	85
L4	10	15	20
L5	23	30	50

## ■ ABP - Aligning Base Plate



※ 공통 사항 : 요청 또는 필요에 따른 치수 변경 가능

	SJT30	SJT40	SJT55
D1	90	110	130
D2	70	85	100
D3	9	12	14
D4	M8	M10	M12
L1	17.7	22	30
L2	34.4	43	55

# Calculations

## Formular

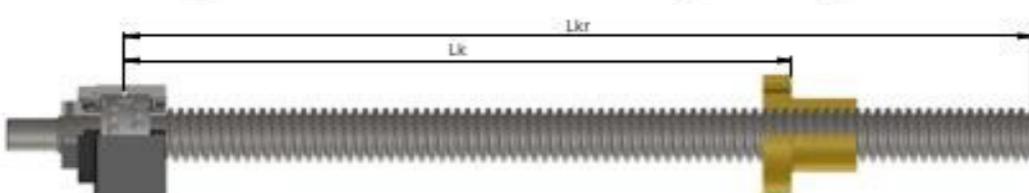
$$F_k = \frac{d_2^4}{L_k^2} * 10^5 / 1000 \quad F_{zul} = F_k * f_k * \frac{1}{S_f}$$

## Symbols

- $F_k$ : Theoretically critical buckling force in [kN]
- $F_{zul}$ : Maximum permissible axial force in [kN]
- $f_k$ : Correction factor that takes into account
  - the type of spindle bearing
  - Core diameter of the spindle [mm]
- $L_k$ : Unsupported length on which the force acts on the spindle [mm]
- $S_f$ : Safety factor (specified by the user)

## SJT - Types of bearing Bearing case I

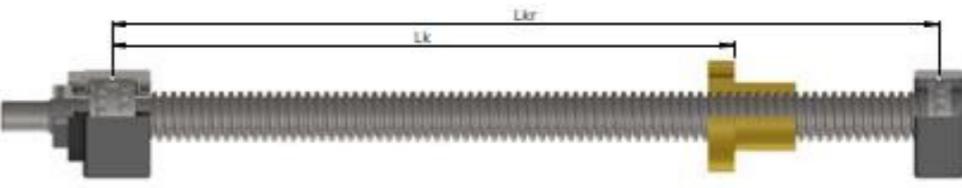
Fixed bearing – loose end, correction factor  $f_k=0,25$  /  $f_{kr}=0,43$



- Example 1)** SJT40-1:10-T40X07-640-750-NP-BL-ABP-AS-0-1     $F_k = \frac{d_2^4}{L_k^2} * 10^5 / 1000 = \frac{30.5^4}{900^2} * 10^5 / 1000 = 106.84$  [kN]
- |          |          |  |      |
|----------|----------|--|------|
| Screw :  | Tr 40x07 | d2 :   | 30.5 |
| Length : | 900 mm   | Lk :   | 900  |
|          |          | $F_{zul} = F_k * f_k * \frac{1}{S_f} = 106.84 * 0.25 * \frac{1}{2} = 13.36$ [kN] |      |
|          |          | $S_f$ :  | 2    |

## SJR - Types of bearing Bearing case III

Fixed bearing – movable bearing, correction factor  $f_k=2,05$  /  $f_{kr}=1.89$



**Example 2)** SJR55-1:30-T55x09-1100-1716-0-0-0-0-FK30     $F_k = \frac{d_2^4}{L_k^2} * 10^5 / 1000 = \frac{43.6^4}{1800^2} * 10^5 / 1000 = 111.53$  [kN]

Screw :	Tr55x09	d2 :	43.6	
Length :	1800	Lk :	1800	
		$F_{zul} = F_k * f_k * \frac{1}{S_f} = 111.53 * 2.05 * \frac{1}{2} = 114.31$ [kN]	$S_f$ :	2

### Example 3)

SJR40-1:30-T40X07-1032-1701-0-0-0-0-FK25

Specification of equipment :

Weight : 6,000 kg  
Stroke : 1,032 mm  
Speed : 7 mm/s

$$F_{ax} = \text{Weight} * 9.8 \text{ m/s}^2 = 6,000 \text{ kg} * 9.8 = 58,800 \text{ N}$$

P =	7 mm
$\eta$ =	0.19

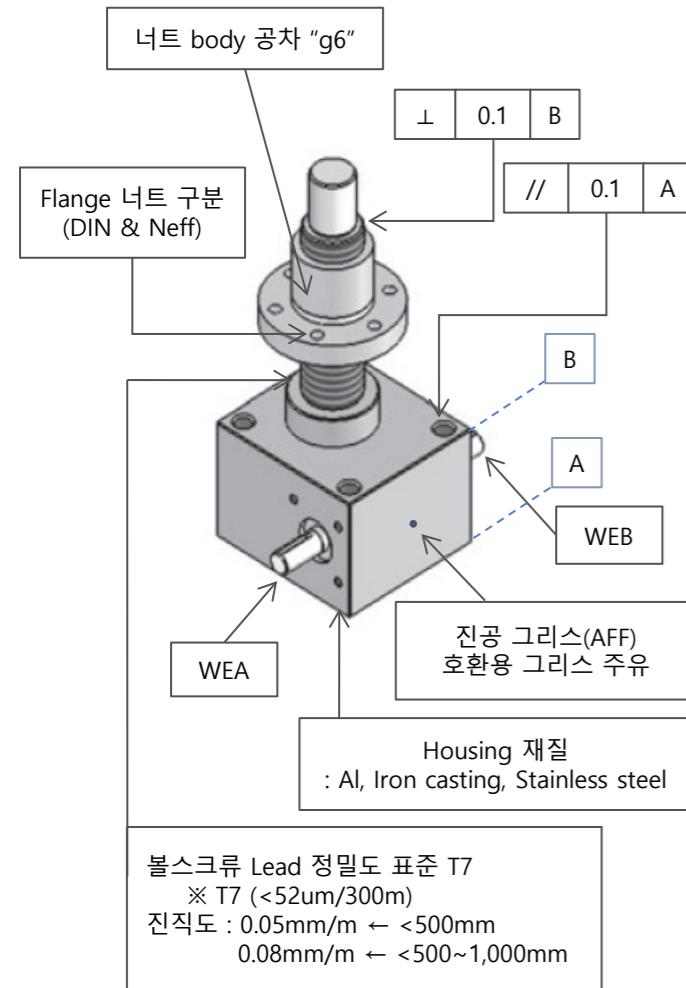
Required drive torque [Nm]

$$M_d = \frac{F_{ax} * P}{2000 * \pi * \eta_A * i} = \frac{58,800 * 7}{2000 * 3.14 * 0.19 * 30} = 11.49 \text{ Nm}$$

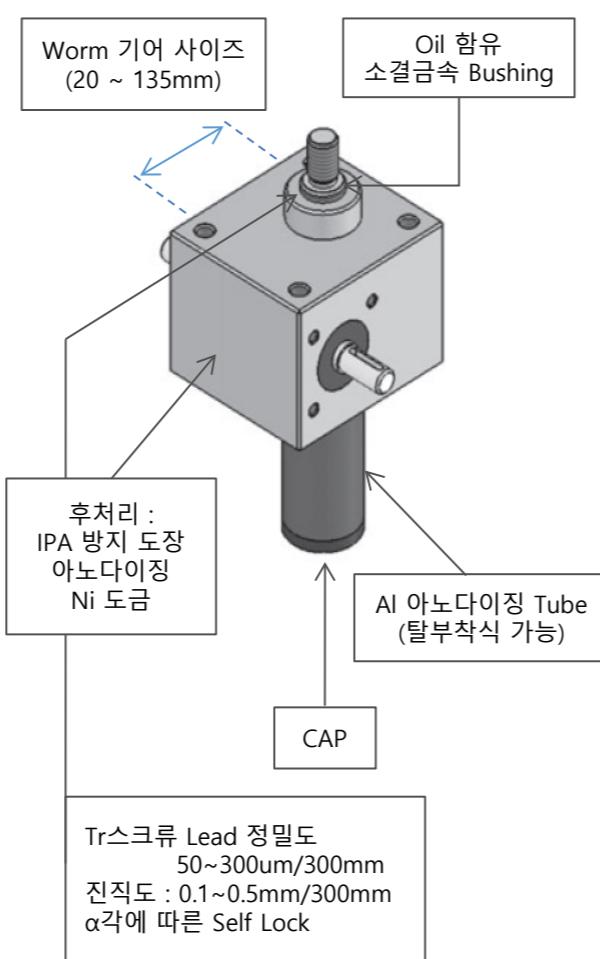
Required drive power [kW]

$$P_a = \frac{M_d * n}{9550} = \frac{11.49 * 2000}{9550} = 2.4 \text{ kW}$$

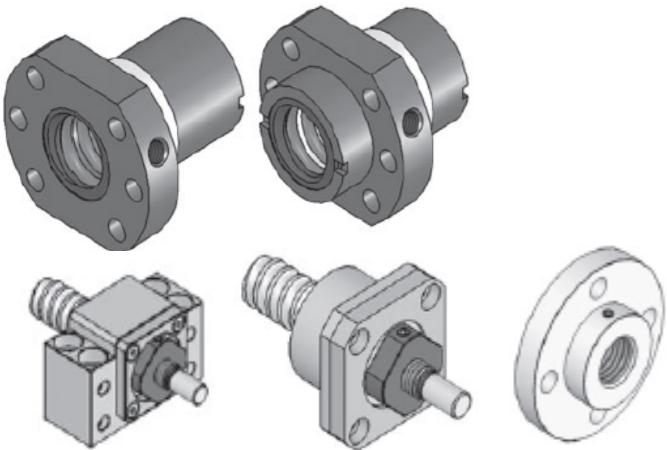
## R type



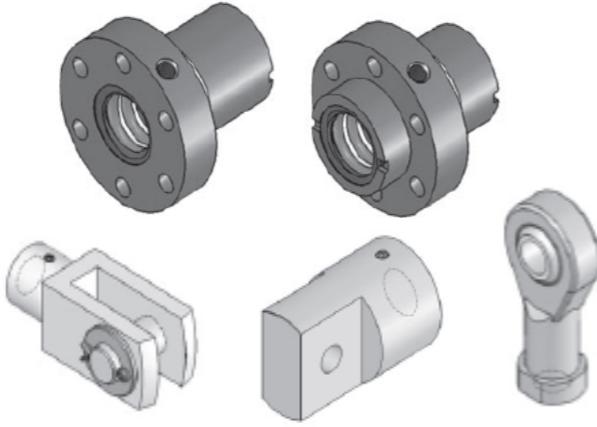
## N type



## KGF-D



## KGF-N

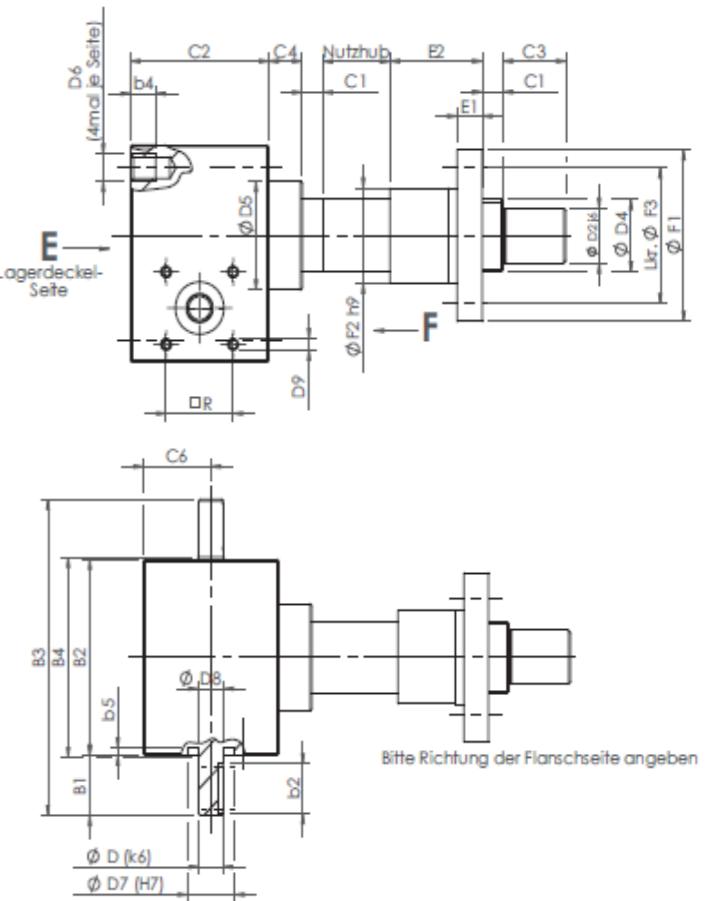
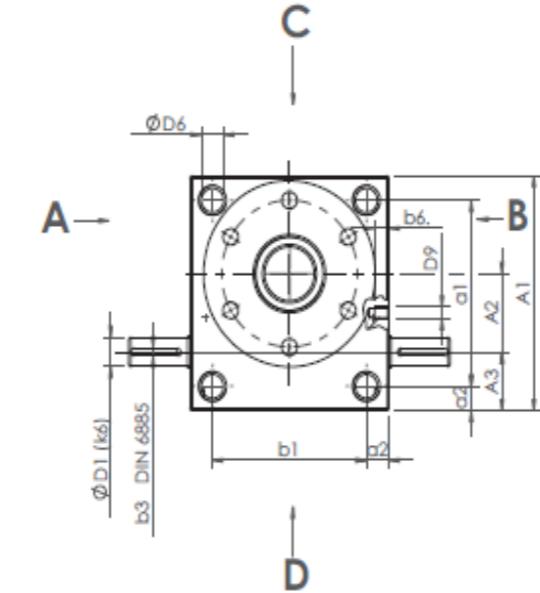
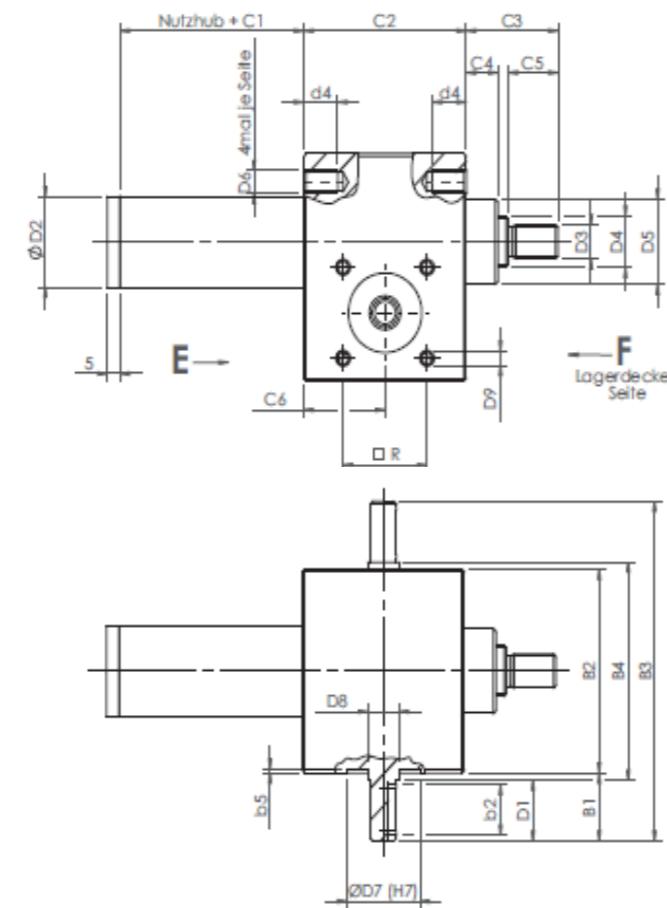
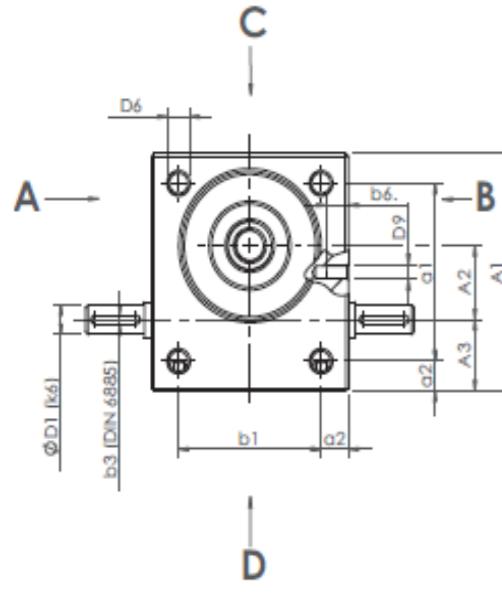


## Trapezoidal screw

	M0	M1	M2	M3	M4	M5	J1	J2	J3	J4	J5
Maximum lifting capacity[kN]1)	2.5	5	10	25	50	100	150	200	250	350	500
Screw diameter and lead[mm]	14x4	18x4	20x4	30x6	40x7	55x9	60x9	70x10	80x10	100x10	120x14
Stroke in mm per full turn of the drive shaft[mm]	Ratio H 2)	1	1	1	1	1	1	1	1	1	1
Gear ratio	Ratio L 2)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Efficiency[%] 3)	Ratio H 2)	35	31	29	29	26	24	23	22	20	19
	Ratio L 2)	27	25	23	23	21	19	18	17	15	15
Weight [kg] (zero stroke)	0.6	1.2	2.1	6	17	32	41	57	57	85	160
Weight [kg per 100 mm stroke]	0.1	0.26	0.42	1.14	1.67	3.04	3.1	4.45	6.13	7.9	11.5
Idling torque [Nm]	H	0.02	0.04	0.11	0.15	0.35	0.84	0.88	1.28	1.32	1.62
	L	0.016	0.03	0.1	0.12	0.25	0.51	0.57	0.92	0.97	1.1
Housing material	G-AL GGG-40										

## Ball screws

	M0	M1	M2	M3	M4		M5	J3
Maximum lifting capacity[kN] 1)	2	5	10	12.5	22	42	65	78
Screw diameter and lead[mm]	1205	1605	2005	2505	4005	4010	5010	8010
Stroke in mm per full turn of the drive shaft[mm]	Ratio H 2)	1.25	1.25	1.25	0.83	0.71	1.43	1.1
Gear ratio	Ratio L 2)	0.31	0.31	0.31	0.21	0.18	0.36	0.28
Efficiency[%] 3)	Ratio H 2)	40:1	40:1	40:1	6:01	7:01		
	Ratio L 2)	48	46	44	43	43	45	37
Weight [kg] (zero stroke)	0.6	1.3	2.3	7	19		35	63
Weight [kg per 100 mm stroke]	0.09	0.26	0.42	1.14	1.67		3.04	6.13
Idling torque [Nm]	H	0.02	0.04	0.11	0.15	0.35	0.84	1.32
	L	0.016	0.03	0.1	0.12	0.25	0.51	0.97
Housing material	G-AL GGG-40							

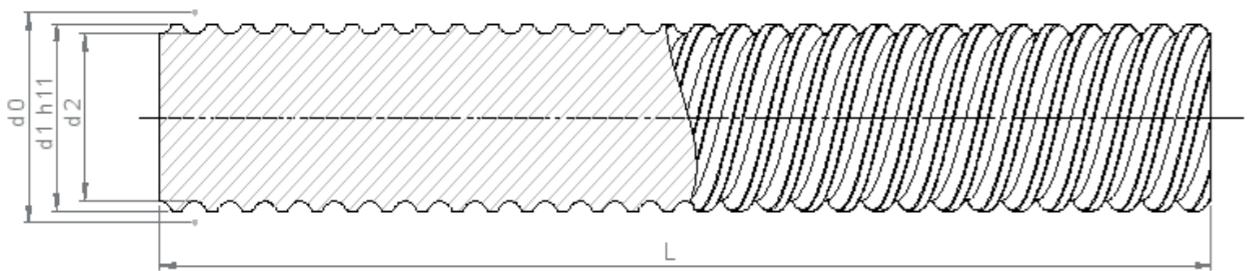


Type	Dimensions(mm)															
	A1	A2	A3	a1	a2	B1	B2	B3	B4	b1	b2	b3	b5	C1	C2	C3
M0	60	20	18	48	6	21	50	92	52	38	14	3	1.5	20	50	27
M1	80	25	24	60	10	24	72	120	77	52	18	3	1.5	20	32	35
M2	100	32	28	78	11	27.5	85	140	90	63	20	5	1.5	30	75	45
M3	130	45	31	106	12	45	105	195	110	81	36	5	2	35	82	50
M4	180	63	39	150	15	47.5	145	240	150	115	36	6	2	40	117	65
M5	200	71	46	166	17	67.5	165	300	170	131	56	8	2.5	55	160	95
J1	210	71	49	170	20	65	195	325	200	155	56	8	8	55	175	95
J2	240	80	60	190	25	67.5	220	355	225	170	56	8	8	60	165	110
J3(M6)	240	80	60	190	25	67.5	220	355	225	170	56	8	8	60	165	110
J4(M7)	290	100	65	230	30	65	250	380	255	190	56	10	8	65	220	140
J5(M8)	360	135	75	230	35	100	300	500	305	230	90	14	8	100	266	200

Type	Dimensions(mm)														
	C4	C5	C6	D1k5	D2	D3	d4	D4Tr	D4KGT	D5	D6	D7H7	D8	D9 x b6	TK□R
M0	12	12	25	9x20	28	M8	12	Tr14x4	1205	26	M6	22	10	(M5x6)*	24
M1	12	19	31	10x21.5	32	M12	13	Tr18x4	1605	30	M8	32	12	(M5x6)	32
M2	18	20	37.5	14x25	40	M14	15	Tr20x4	2005	38.7	M8	35	15	M6x10	35
M3	23	22	41	16x42.5	50	M20	15	Tr30x6	2505	46	M10	40	17	M8x10	44
M4	32	29	58.5	20x45	65	M30	16	Tr40x7	4005/4010	60	M12	52	25	M10x14	55
M5	40	48	80	25x65	90	M36	30	Tr55x9	5010	85	M20	62	28	M12x16	70
J1	40	48	87.5	25x62.5	95	M48x2	40	Tr60x9	-	90	M24	72	28	M12x16	70
J2	40	58	82.5	30x65	110	M56x2	45	Tr70x10	-	105	M30	80	32	M12x18	-80
J3(M6)	40	58	82.5	30x65	125	M64x3	45	Tr80x10	8010	120	M30	80	32	M12x18	-80
J4(M7)	50	78	110	35x62.5	150	M72x3	54	Tr100x10	-	145	M36	85	40	M16x30	-80
J5(M8)	60	118	133	48x97.5	180	M100x3	80	Tr120x14	-	170	M42	90	50	M16x40	-115

Type	Dimensions(mm)															
	D1k6	D2j6	D4TR	D4KGT	D5	D6	D7 H7	D8	D9 x b6	□R	E1	E2	F1	F2	F3	F4
M0	9x20	8	Tr14x4	1205	26	M6	22	10	(M5x6)*	24	12	35	48	28	38	6
M1	10x21.5	12	Tr18x4	1605	30	M8	32	12	(M5x6)*	32	12/12	44/44	48/48	28/28	38/38	6/6
M2	14x25	15	Tr20x4	2005	36.1	M8	32	15	M6x10	35	12/12	44/44	55/55	32/32	45/45	7/7
M3	16x42.5	20	Tr30x6	2505	46	M10	40	17	M8x10	44	14/14	46/46	62/62	38/38	50/50	7/7
M4	20x45	25	Tr40x7	4005/4010	60	M12	52	25	M10x14	55	16/16	73/59	95/80	63/53	78/68	9/7
M5	25x65	40	Tr55x9	5010	85	M20	62	28	M12x16	70	18/18	97/97	110/110	72/72	90/90	11/11
J1	25x62.5	45	Tr60x9	-	90	M24	72	28	M12x16	70	20	99	125	85	105	11
J2	30x65	55	Tr70x10	-	105.2	M30	80	32	M12x18	-80	30	100	180	95	140	17
J3(M6)	30x65	60	Tr80x10	8010	120	M30	80	32	M12x18	-80	30/22	110/101	190/145	105/105	150/125	17/14
J4(M7)	35x62.5	80	Tr100x10	-	145	M36	85	40	M16x30	-80	35	130	240	130	185	25
J5(M8)	48x97.5	95	Tr120x14	-	170	M42	90	50	M16x40	-80	40	160	300	160	230	28

■ 볼 스크류 KGS

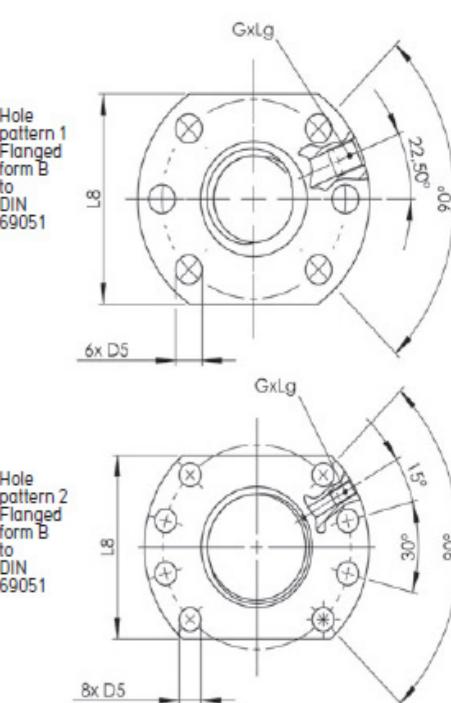
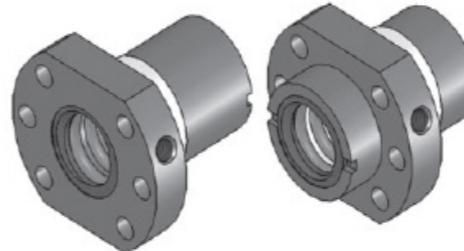
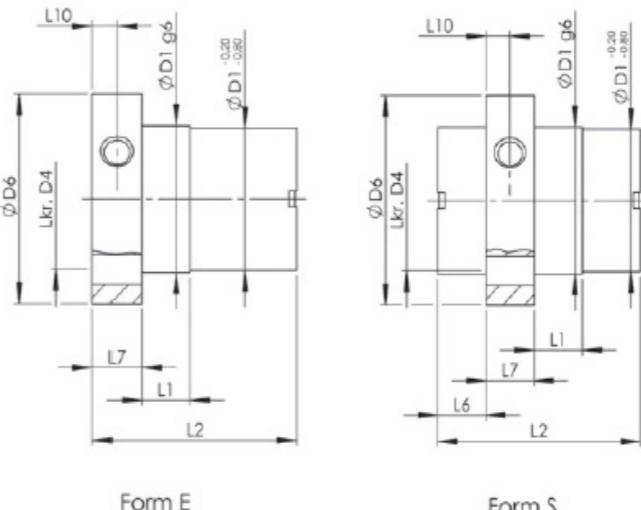


■ 기술 자료 : 볼 스크류 KGS

- 나사산 : 고딕 프로필 (뾰족한 프로파일)
- 리드(pitch) : 기준 : 5~50mm
- 나사산 : 오른 스크류, KGS 2005 + 3205 왼쪽 스레드
- 진직도 : L < 500 MM : 0.05 mm / m  
L = 500~1000mm : 0.08 mm / m  
L > 1000mm : 0.1 mm / m
- 직경 : 기준 : 12~63mm
- 나사산수 : 1~5
- 길이 : 표준 : 5,600mm, KGS 1205 : 2,000mm
- 왼쪽 및 오른쪽 스크류 : KGS 2005 + 3205
- 끝단 가공 : 고객의 요청에 맞춰 드립니다.
- 소재 : 1.1213 (CF 53) 볼 트랙 열처리 및 연마, 스크류 끝단 풀림 후 가공 (자체 열처리)

Type Diameter[mm] Lead[mm] Right hand thread	Accuracy class [μm/300mm]	Dimensions[mm]				Distributed loadWKGS [kg/m]	Geometrical Planar moment of inertia [10 <sup>4</sup> mm <sup>4</sup> ]	Moment of resistance 1 [10 <sup>3</sup> mm <sup>3</sup> ]
		d0	d1	d2	L max.			
KGS-1205	50	12	11.5	10.1	2000	0.75	0.051	1.101
KGS-1605	50	16	15.5	12.9	5600	1.26	0.136	0.211
KGS-1610	50	16	15.4	13	5600	1.26	0.14	0.216
KGS-2005	50	20	19.5	16.9	5600	2.04	0.4	0.474
KGS-2020	50	20	19.5	16.9	5600	2.04	0.4	0.474
KGS-2050	50	20	19.1	16.5	5600	2.04	0.364	0.441
KGS-2505	50	25	24.5	21.9	5600	3.33	1.129	1.031
KGS-2510	50	25	24.5	21.9	5600	3.33	1.129	1.031
KGS-2520	50	25	24.6	22	5600	3.33	1.15	1.045
KGS-2025	50	25	24.5	22	5600	3.33	1.15	1.045
KGS-2550	50	25	24.1	21.5	5600	3.33	1.049	0.976
KGS-3205	50	32	31.5	28.9	5600	5.63	3.424	2.37
KGS-3210	50	32	32.7	27.3	5600	5.63	2.727	1.998
KGS-3220	50	32	31.7	27.9	5600	5.63	2.974	2.132
KGS-3240	50	32	30.9	28.3	5600	5.63	3.149	2.225
KGS-4005	50	40	39.5	36.9	5600	9.01	9.101	4.933
KGS-4010	50	40	39.5	34.1	5600	8.35	6.737	3.893
KGS-4020	50	40	39.7	35.9	5600	9.01	8.154	4.542
KGS-4040	50	40	38.9	36.3	5600	9.01	8.523	4.696
KGS-5010	50	50	49.5	44.1	5600	13.5	18.566	8.42
KGS-5020	50	50	49.5	44.1	5600	13.5	18.566	8.42
KGS-6310	50	63	62.5	57.1	5600	22.03	52.181	18.28
Left hand thread								
KGS-2005 LH	50	20	19.5	16.9	5600	2.04	0.4	0.474

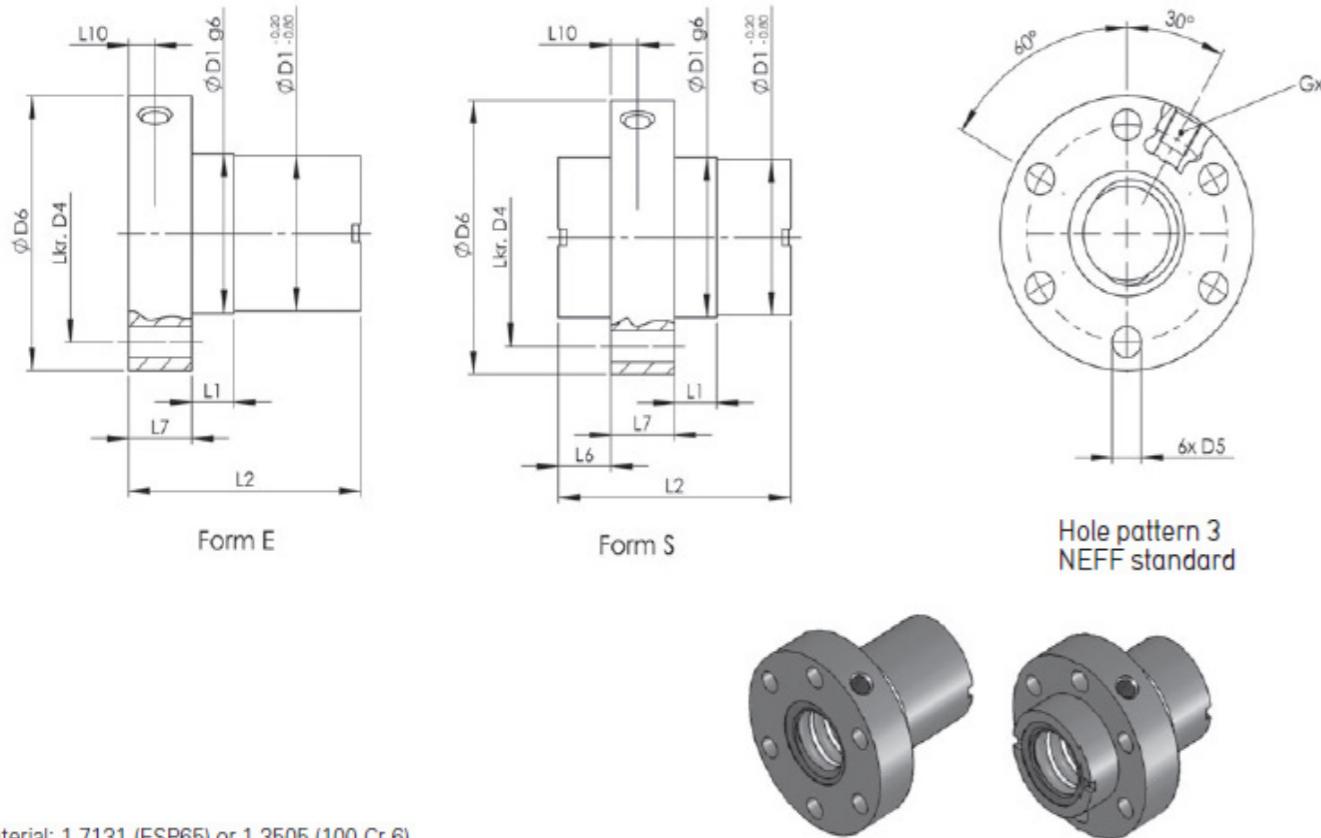
■ DIN 69051규격에 따른 너트



Material : 1.7131 (ESP65) or 1.3505 (100 Cr 6).

유형 직경 [mm] 리드 [mm] 오른 나사	모양 구멍 형태	치수 [mm]											나사 산수	정격 하중 [[kn]]			
		D <sub>1</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>6</sub>	L <sub>7</sub>	L <sub>8</sub>	L <sub>9</sub>	L <sub>10</sub>		C <sup>2)</sup>	C <sup>3)</sup>	C <sub>0</sub> -C <sub>0a</sub>	
KGF-D 1605 RH-EE	E 1	28	38	5.5	48	10	42	-	10	40	10	5	M6	3	12	9.3	13.1
KGF-D 1610 RH-EE	E 1	28	38	5.5	48	10	55	-	10	40	10	5	M6	6	23	15.4	26.5
KGF-D 2005 RH-EE	E 1	36	47	6.6	58	10	42	-	10	44	10	5	M6	3	14	10.5	16.6
KGF-D 2505 RH-EE	E 1	40	51	6.6	62	10	42	-	10	48	10	5	M6	3	15	12.3	22.5
KGF-D 2510 RH-EE	S 1	40	51	6.6	62	16	55	-	10	48	10	5	M6	3	17.5	13.2	25.3
KGF-D 2520 RH-EE	S 1	40	51	6.6	62	4	35	10.5	10	48	8	5	M6	4	19	13	23.3
KGF-D 2525 RH-EE	S 1	40	51	6.6	62	9	35	8	10	48	8	5	M6	5	21	16.7	32.2
KGF-D 2550 RH-EE	E 1	40	51	6.6	62	10	58	10	10	48	8	5	M6	5	22.5	15.4	31.7
KGF-D 3205 RH-EE	E 1	50	65	9	80	10	55	-	12	62	10	6	M6	5	24	21.5	49.3
KGF-D 3210 RH-EE	E 1	53	65	9	80	16	69	-	12	62	10	6	M8X1	3	44	33.4	54.5
KGF-D 3220 RH-EE	E 1	53	65	9	80	16	80	-	12	62	10	6	M6	4	42.5	29.7	59.8
KGF-D 4005 RH-EE	E 2	63	78	9	93	10	57	-	14	70	10	7	M6	5	26	23.8	63.1
KGF-D 4010 RH-EE	E 2	63	78	9	93	16	71	-	14	70	10	7	M8X1	3	50	38	69.1
KGF-D 4020 RH-EE	E 2	63	78	9	93	16	80	-	14	70	10	7	M8X1	4	44.5	33.3	76.1
KGF-D 4040 RH-EE	S 2	63	78	9	93	16	85	7.5	14	-	10	7	M8X1	8	42	35	101.9
KGF-D 5010 RH-EE	E 2	75	93	11	110	16	95	-	16	85	10	8	M8X1	5	78	68.7	155.8
KGF-D 5020 RH-EE	E 2	85	103	11	125	22	95	-	18	95	10	9	M8X1	4	82	60	136.3
원 나사																	
KGF-D 2005 LH-EE	E 1	36	47	6.6	58	10	42	-	10	44	10	5	M6	3	16.5	10.5	16.6

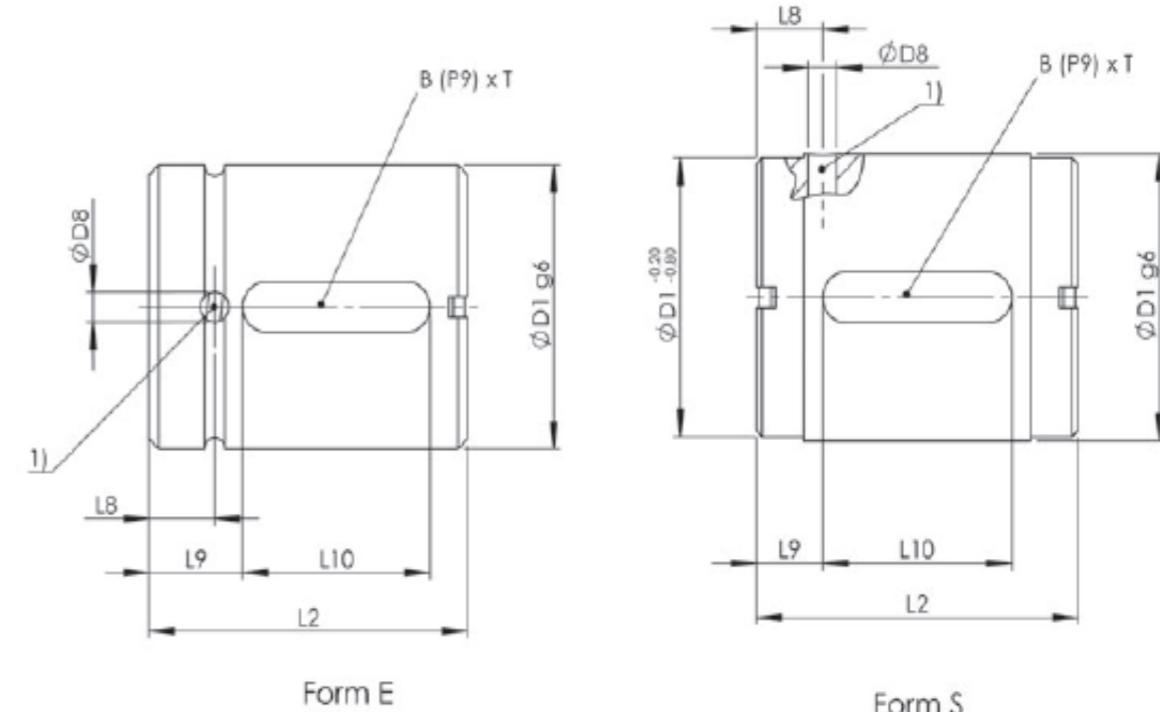
■ NEFF 규격에 따른 너트



Material: 1.7131 (ESP65) or 1.3505 (100 Cr 6).

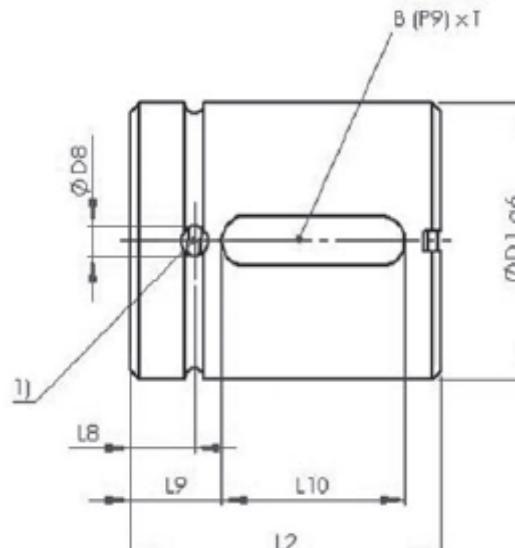
유형 직경 [mm] 리드 [mm] 오른 나사	모양	치수 [mm]										나사 산수	정격 하중 [[kn]]			
		D <sub>1</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>6</sub>	L <sub>7</sub>	L <sub>9</sub>	L <sub>10</sub>		C <sup>2)</sup>	C <sup>3)</sup>	C <sub>0</sub> =C <sub>0a</sub>	
KGF-N 1605 RH-EE	E	28	38									M6	3	12	9.3	13.1
KGF-N 2005 RH-EE	E	32	45	7	55	8	44	-	12	8	6	M6	3	14	10.5	16.6
KGF-N 2020 RH-EE	S	35	50	7	62	4	30	8	10	8	5	M6	4	12	11.6	18.4
KGF-N 2050 RH-EE	S	35	50	7	62	10	56	9	10	8	5	M6	5	18	13	24.6
KGF-N 2505 RH-EE	E	38	50	7	62	8	46	-	14	8	7	M6	3	15	12.3	22.5
KGF-N 3205 RH-EE	E	45	58	7	70	10	59	-	16	8	8	M6	5	24	21.5	49.3
KGF-N 3210 RH-EE	E	53	68	7	80	10	73	-	16	8	8	M8X1	3	44	33.4	54.5
KGF-N 3240 RH-EE	S	53	68	7	80	14	45	7.5	16	10	8	M6	4	17	14.9	32.4
KGF-N 4005 RH-EE	E	53	68	7	80	10	59	-	16	8	8	M6	5	26	23.8	63.1
KGF-N 4010 RH-EE	E	63	78	9	95	10	73	-	16	8	8	M8X1	3	50	38	69.1
KGF-N 5010 RH-EE	E	72	90	11	110	10	97	-	18	8	9	M8X1	5	78	68.7	155.8
KGF-N 6310 RH-EE	E	85	105	11	125	10	99	-	20	8	10	M8X1	5	86	76	197

■ DIN 69051에 따른 너트

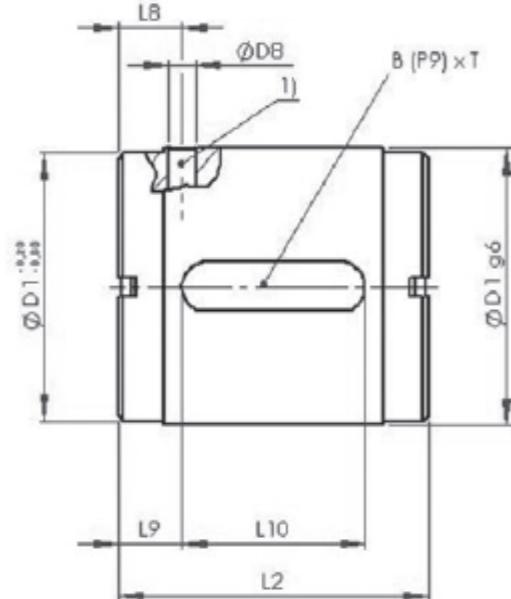


유형 직경 [mm] 리드 [mm] 오른 나사	모양	치수 [mm]							나사 산수	정격 하중 [[kn]]		
		D <sub>1</sub>	D <sub>8</sub>	L <sub>2</sub>	L <sub>8</sub>	L <sub>9</sub>	L <sub>10</sub>	BxT		C <sup>2)</sup>	C <sup>3)</sup>	C <sub>0</sub> =C <sub>0a</sub>
KGM-D 1605 RH-EE	E	28	3	34	7	7	20	5X2	3	12.5	9.3	13.1
KGM-D 1610 RH-EE	E	28	3	50	7	15	20	5X2.2	6	23	15.4	26.5
KGM-D 2005 RH-EE	E	36	3	34	7	7	20	5X2	3	14	10.5	16.6
KGM-D 2505 RH-EE	E	40	3	34	7	7	20	5X2	3	15	12.3	22.5
KGM-D 2510 RH-EE	E	40	3	45	7.5	12.5	20	5X2	3	17.5	13.2	25.3
KGM-D 2520 RH-EE	S	40	1.5	35	14	11.5	12	5X3	4	19	13	23.3
KGM-D 2525 RH-EE	S	40	1.5	35	11.5	11	13	5X3	5	21	16.7	32.2
KGM-D 2550 RH-EE	S	40	1.5	58	17	19	20	5X3	5	22.5	15.4	31.7
KGM-D 3205 RH-EE	E	50	3	45	7.5	8	30	6X2.5	5	24	21.5	49.3
KGM-D 4005 RH-EE	E	63	3	45	7.5	8	30	6X2.5	5	26	23.8	63.1
KGM-D 4010 RH-EE	E	63	4	60	10	15	30	6X2.5	3	50	38	69.1
KGM-D 4020 RH-EE	E	63	3	70	7.5	20	30	6X2.5	4	44.5	33.3	76.1
KGM-D 4040 RH-EE	S	63	1.5	85	15	27.5	30	6X3.5	8	42	35	101.9
원나사												
KGM-D 2005 RH-EE	E	36	3	34	7	7	20	5X2	3	16.5	10.5	16.6

■ NEFF 규격에 따른 너트



Form E

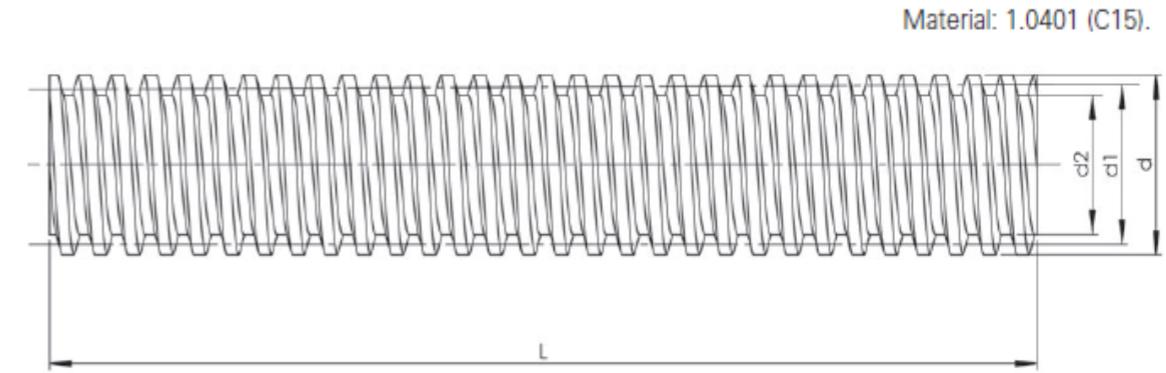


Form S

유형 직경 [mm] 리드 [mm] 오른 나사	모양	치수 [mm]							나사 산수	정격 하중 [[kn]]		
		D <sub>1</sub>	D <sub>8</sub>	L <sub>2</sub>	L <sub>8</sub>	L <sub>9</sub>	L <sub>10</sub>	BxT		C <sup>2)</sup>	C <sup>3)</sup>	C <sub>0</sub> =C <sub>0a</sub>
KGM-N 1205 RH-OO	E	204)	-	24	-	5	14	3x1.8	3	6	4.4	6.8
KGM-N 2005 RH-EE	E	32	3	34	7	7	20	5x2	3	14	10.5	16.6
KGM-N 2020 RH-EE	S	35	1.5	30	11.5	9	12	5x3	4	12	11.6	18.4
KGM-N 2050 RH-EE	S	35	1.5	56	16	18	20	5x2.2	5	18	13	24.6
KGM-N 2505 RH-EE	E	38	3	34	7	7	20	5x2	3	15	12.3	22.5
KGM-N 3205 RH-EE	E	45	3	45	7.5	8	30	6x2.5	5	24	21.5	49.3
KGM-N 3210 RH-EE	E	53	4	60	10	15	30	6x2.5	3	44	33.4	54.5
KGM-N 3220 RH-EE	E	53	3	70	7.5	20	30	6x2.5	4	42.5	29.7	59.8
KGM-N 3240 RH-EE	S	535)	1.5	45	13	10	25	6x4	4	17	14.9	32.4
KGM-N 4005 RH-EE	E	53	3	45	7.5	8	30	6x2.5	5	26	23.8	63.1
KGM-N 5010 RH-EE	E	72	4	82	11	23	36	6x2.5	5	78	68.7	155.8
KGM-N 5020 RH-EE	E	85	4	82	10	23	36	6x2.5	4	82	60	136.3
KGM-N 6310 RH-EE	E	85	4	82	11	23	36	6x2.5	5	86	76	197

■ 압연정밀 사다리꼴 스크류

표준길이 3,000mm, Ø 20mm에서 가능한 길이는 최대 6,000mm입니다. 치수 L은 고객맞춤길이입니다.

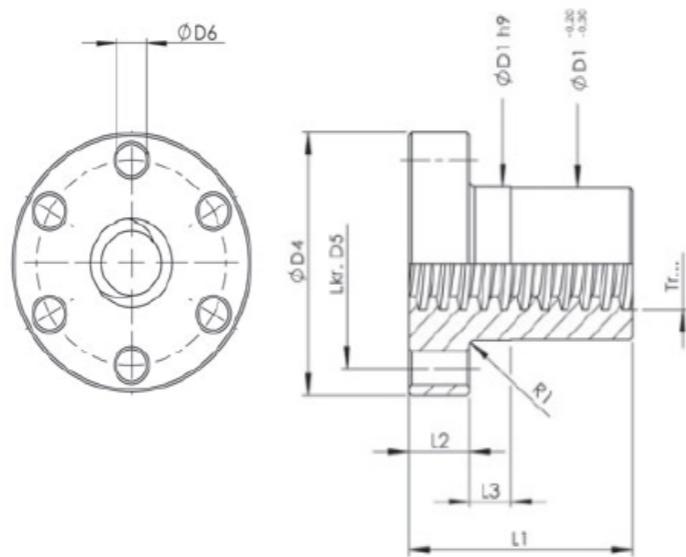


Type	Diameter [mm]	Dimensions [mm]					Accuracy class [µm/300mm]	Straightness [mm/300mm]	α	η	Distributed load [kg/m]	Planar moment of inertia [cm <sup>4</sup> ]	Moment of resistance [cm <sup>3</sup> ]
		d	d <sub>1min</sub>	d <sub>1max</sub>	d <sub>2</sub>	H <sub>1</sub>							
RPTS Tr 10x2	10	8.793	8.929	6.89	1	300	0.5				0.5	0.011	0.032
RPTS Tr 10x3		8.191	8.415	5.84	1.5	300	0.5				0.446	0.0057	0.02
RPTS Tr 12x3	12	10.191	10.4	7.84	1.5	300	0.5				0.68	0.019	0.047
RPTS Tr 12x6 P3	12	10.165	10.415	7.84	1.5	300	0.5	10°18'	0.62	0.68	0.019	0.047	
RPTS Tr 14x3	14	12.191	12.415	9.84	1.5	300	0.5	4°22'	0.42	0.96	0.046	0.094	
RPTS Tr 14x4		11.64	11.905	8.8	2	300	0.5	6°3'	0.5	0.888	0.029	0.067	
RPTS Tr 16x2	16	14.729	14.929	12.89	0	50	0.1	2°36'	0.28	1.39	1.36	0.21	
RPTS Tr 16x4	16	13.64	13.905	10.8	2	50	0.1	5°11'	0.46	1.21	0.067	0.124	
RPTS Tr 16x8 P4	16	13.608	13.905	10.8	2	300	0.3	10°18'	0.62	1.21	0.067	0.124	
RPTS Tr 18x4	18	15.64	15.905	12.8	2	50	0.1	4°32'	0.43	1.58	0.132	0.206	
RPTS Tr 20x4	20	17.64	17.905	14.8	2	50	0.1	4°2'	0.4	2	0.236	0.318	
RPTS Tr 20x8 P4		17.608	17.905	14.8	2	200	0.2	8°3'	0.57	2	0.236	0.318	
RPTS Tr 20x16 P4		17.608	17.905	14.8	2	200	0.2	15°47'	0.71	2	0.236	0.318	
RPTS Tr 22x5	22	19.114	19.394	15.5	2.5	50	0.1	4°39'	0.43	2.34	0.283	0.366	
RPTS Tr 22x24 P4 S		19.14	19.505	16.5	2.5	200	0.2	21°34'	0.75	2.34	0.364	0.441	
RPTS Tr 24x5	24	21.094	21.394	17.5	2.5	50	0.1	4°14'	0.41	2.85	0.46	0.526	
RPTS Tr 24x10 P5		21.058	21.394	17.5	2.5	200	0.2	8°25'	0.58	2.85	0.46	0.526	
RPTS Tr 26x5	26	23.094	23.394	19.5	2.5	50	0.1	3°52'	0.39	3.4	0.71	0.728	
RPTS Tr 28x5	28	25.094	25.394	21.5	2.5	50	0.1	3°34'	0.37	4.01	1.05	0.976	
RPTS Tr 30x6	30	26.547	26.882	21.9	3	50	0.1	4°2'	0.4	4.5	1.13	1.03	
RPTS Tr 30x12 P6		26.507	26.882	21.9	3	200	0.2	8°3'	0.57	4.5	1.13	1.03	
RPTS Tr 32x6	32	28.547	28.882	23.9	3	50	0.1	3°46'	0.38	5.19	1.6	1.34	
RPTS Tr 36x6	36	32.547	32.882	27.9	3	50	0.1	3°18'	0.35	6.71	2.97	2.13	
RPTS Tr 40x7	40	36.02	36.375	30.5	3.5	50	0.1	3°29'	0.37	8.21	4.25	2.79	
RPTS Tr 40x14 P7		35.978	36.375	30.5	3.5	200	0.2	6°57'	0.53	8.21	4.25	2.79	
RPTS Tr 44x7	44	40.02	40.275	34.5	3.5	50	0.1	3°8'	0.34	10.1	6.95	4.03	
RPTS Tr 48x8	48	43.468	43.868	37.8	4	100	0.1	3°18'	0.35	12	10	5.3	
RPTS Tr 50x8	50	45.468	45.868	39.3	4	100	0.1	3°10'	0.34	13.1	11.7	5.96	
RPTS Tr 60x9	60	54.935	55.36	48.15	4.5	200	0.3	2°57'	0.33	19	26.4	11	
RPTS Tr 70x10	70	64.425	64.85	57	5	200	0.3	2°48'	0.32	26	51.8	18.2	
RPTS Tr 80x10	80	74.425	74.85	67	5	200	0.3	2°25'	0.29	34.7	98.9	29.5	

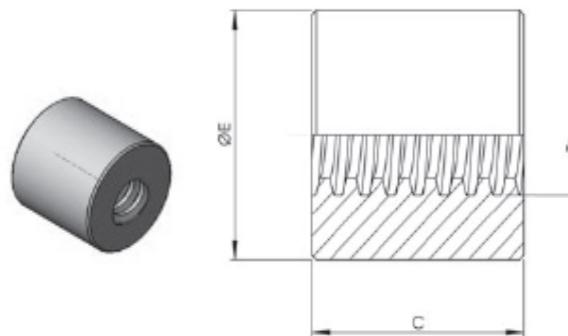
## 첨동 너트 EFM

壞속 작동에서 모션 드라이브를 위해 좋은 마모 특성을 가져 안전 너트로 사용하기에 적합합니다. EFM 너트는 KON과 KAR 어댑터가 설치 될 수 있습니다.

소재 : 2.1090 (G-CuSn 7Zn Pb (Rg7))

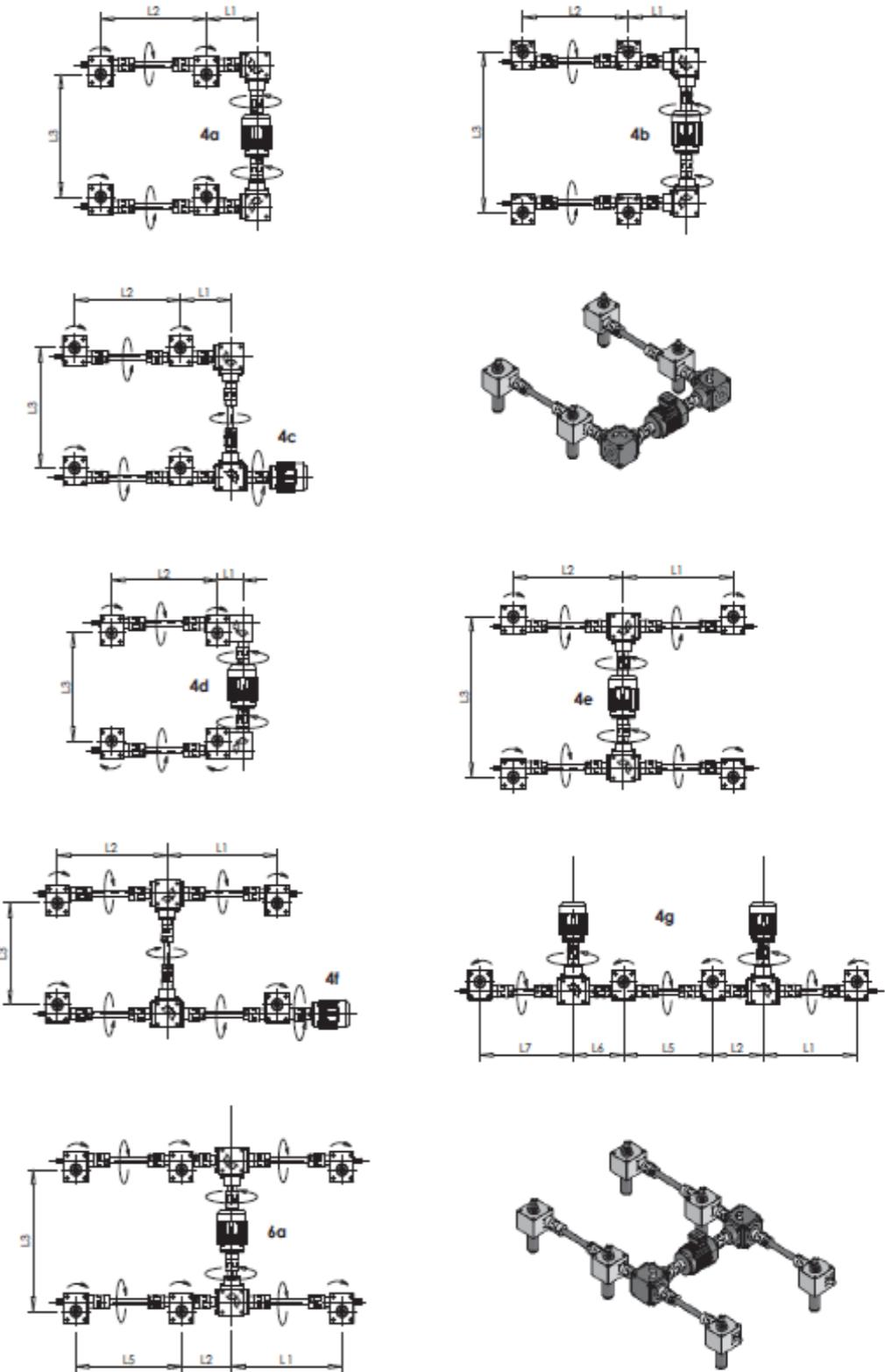


Type	Dimensions(mm)							Weight [kg]	Bearing surface [mm²]
	A1	A2	A3	a1	a2	B1	B2		
EFM Tr 12x3	24	40	32	4.5	28	12	10	0.11	520
EFM Tr 16x4	28	48	38	6	44	12	8	0.25	670
EFM Tr 18x4	28	48	38	6	44	12	8	0.25	770
EFM Tr 20x4	32	55	45	7	44	12	8	0.3	870
EFM Tr 24x5	32	55	45	7	44	12	8	0.3	1040
EFM Tr 30x6	38	62	50	7	46	14	8	0.4	1370
EFM Tr 36x6	45	70	58	7	59	16	10	0.6	2140
EFM Tr 40x7	63	95	78	9	73	16	10	1.7	2930
EFM Tr 50x8	72	110	90	11	97	18	10	2.6	4900
EFM Tr 60x9	85	125	105	11	99	20	10	3.7	6040
EFM Tr 70x10	95	140	180	17	100	30	16	7.8	8250
EFM Tr 80x10	105	150	190	17	110	30	16	8.9	10890



Type	E E[mm]	D [mm]	Weight [kg]	Bearing surface [mm²]
LKM Tr 12x3	26	24	0.012	280
LKM Tr 12x6 P3	26	24	0.012	280
LKM Tr 16x4	36	32	0.032	490
LKM Tr 16x8 P4	36	32	0.032	490
LKM Tr 20x4	45	40	0.06	790
LKM Tr 20x8 P4	45	40	0.06	790
LKM Tr 24x5	50	48	0.088	1130
LKM Tr 30x6	60	60	0.15	1780
LKM Tr 30x12 P6	60	60	0.15	1780
LKM Tr 36x6	75	72	0.3	2610
LKM Tr 40x7	80	80	0.37	3210
LKM Tr 50x8	90	100	0.55	5060

## 배치 및 회전 방향의 예



## ■ 최대 구동 토크

장애물과 접촉하여 월 기어 스크류 잭이 걸린 경우에도 입력축 기어는 다음의 최대 토크 값 MT를 흡수 할 수 있습니다. 스크류 잭들이 연쇄적으로 연결된 경우, 모터에 가장 가까운 스크류 잭이 다음의 최대 토크 값 MT를 흡수합니다.

Size	MT max [Nm]	Size	MT max [Nm]
M 0	1.5	J 1	148
M 1	3.4	J 2	178
M 2	7.1	J 3	240
M 3	18	J 4	340
M 4	38	J 5	570
M 5	93		

## ■ 입력축에 작용하는 힘 및 토크 값

월 기어 스크류 잭은 모터 축에 연결하여 체인 및 벨트로 구동되는 경우, 입력축에 radial방향이 FR max를 넘지 않도록 주의해야 합니다.

Size	MT max [Nm]	Size	MT max [Nm]
M 0	0.07	J 1	0.8
M 1	0.1	J 2	1.3
M 2	0.2	J 3	1.3
M 3	0.3	J 4	2.1
M 4	0.5	J 5	3.1
M 5	0.8		

## ■ 잭 스크류 너트 토크

잭 스크류 너트 토크 (M)은 마운팅 플레이트 BP(V을 제외한 N 버전)와 너트(R 버전)의 수직구동에 인가되는 토크입니다. 이것은 위의 스크류 잭 입력 구동 토크 (MT)과 혼동해서는 안 됩니다.

$M [\text{Nm}] = F_{\text{eff}} \text{ 하중 } [\text{kN}] \cdot f_M$  (중 · 고부하 영역에서 적용)

$F_{\text{eff}}$  : 실제 지지하고 있는 축하중 [ $\text{kN}$ ].

$f_M$  : 나사 모양과 마찰을 설명하는 변환 계수.

아래 값은 일반 윤활 조건에서 적용됩니다. 건조 마찰 및 정지 마찰에서는 더 큰 값이 사용될 필요가 있습니다. 그러나 볼 나사 구동의 경우에는  $f_M$ 이 일정합니다.

Size	$f_M$ (사다리꼴 나사)	$f_M$ (볼 나사)	Size	$f_M$ (사다리꼴 나사)	$f_M$ (볼 나사)
M 0	1.4	1.2	J 1	5.5	-
M 1	1.6	1.6	J 2	6.4	-
M 2	1.8	1.6	J 3	7.2	3.2
M 3	2.7	1.6	J 4	8	-
M 4	3.4	1.6/3.2	J 5	10.6	-
M 5	4.6	3.2			

## ■ 설치

볼 스크류 드라이브는 정밀 기계부품입니다. 설치에는 전문 지식과 적절한 측정 시설을 필요로 합니다. 나사 구동을 손으로 시킬 때는 낮은 마찰 때문에 Aligning error를 느낄 수 없습니다. 레이디얼 또는 편심 힘은 외부 가이드에서 지지되어야 합니다. 볼 나사 구동의 손상을 방지하기 위해 리미크 스위치와 End stop이 설치되어야 합니다.

## ■ 커버

설치 중에 발생한 먼지 등은 파라핀, 기름 등으로 제거되어야 합니다. Cold cleaner와 페인트 솔벤트는 허용되지 않습니다. 볼너트에 와이퍼가 장착 되어있는 경우에도 먼지, 칩 등으로부터 보호되어야 합니다.

그래서 다음과 같은 보호 대책이 포함됩니다

- 벨로우즈
- 나선형 스프링 커버.

## ■ 윤활

적절한 윤활은 과도한 열을 방지하고 부드러운 정숙성을 확보하기 위해 특히 볼 나사 구동의 계산 된 수명을 달성하기 위해 중요합니다. 동일한 윤활제가 볼 나사와 베어링에 공통으로 사용됩니다.

## ■ 오일 미스트 윤활

오일 미스트로 윤활하는 경우 와이퍼 없는 볼나사 너트가 사용될 수 있습니다..

## ■ 오일 윤활

오일 공급은 와이퍼를 통한 손실이 크면 안됩니다. 그렇지 않은 경우는 순환 오일 윤활을 사용합니다.

오일 타입 : 100°C에서 점도 25 ~ 100 / s

## ■ 그리스 윤활

와이퍼를 통해 손실된 양만큼의 그리스 추가(정상 작동 조건에서 200~300 시간마다 윤활제를 추가 권장)

## ■ 그리스 윤활

Lithium soap complex의 Thickener로 구성된 롤러 베어링용 ARAL사 MKL2 구리스가 충전됩니다.

## ■ 작동 온도

볼 스크류 드라이브의 허용 동작 온도 범위는  $-30^{\circ}\text{C} \sim +80^{\circ}\text{C}$  사이 인 최대  $+110^{\circ}\text{C}$ 의 짧은 기간만 허용합니다. 이를 위한 전제 조건은 올바른 윤활입니다.

# 웜 기어 스크류 잭 시스템

## ■ 회전 방향

설치 작업을 시작하기 전에 모든 웜 기어 스크류 잭, 베벨 기어 박스 및 구동 모터의 회전 방향은 배치 및 회전방향의 예를 참고하시기 바랍니다.

## ■ 정렬 오류 (Aligning Error)

모든 구성 요소는 설치시 신중하게 정렬되어야 합니다. 정렬 오류와 Stress(응력)은 필요한 모터용량의 증가와 모터 과열 및 기구물의 빠른 마모를 증가시킵니다.

그러므로 구동 장치가 장착 되기 전에 각 웜 나사 잭은 무부하상태에서 손으로 전체 구간에 걸쳐 회전시키므로서 웜기어 스크류 잭과 추가장착된 가이드 사이의 구간내에서 힘의 변화에 따른 정렬 오류를 확인할 수 있습니다. 이 경우 해당 볼트를 풀고 웜 나사 잭은 다시 손으로 회전되어야 합니다.

전체 구간에서 필요한 힘의 양이 일정하게 되면 구성품들을 정렬시킬 필요가 있습니다. 그렇지 않으면 정렬 오류 (Aligning error)는 추가로 볼트를 풀고 구간별 힘의 변화가 없게 해야 합니다.

## ■ 시운전

전체 시스템의 회전방향과 리미트 스위치의 정확한 동작이 구동 모터를 장착하기 전에 다시 확인되어야 합니다. 버전 N (스크류 승강)의 경우 나사가 기어박스의 내부에서 그리스로 윤활 되어 있는지 확인하고 필요에 따라 다시 주유합니다.

버전 R (너트 승강)의 경우에는 스크류를 적절한 그리스로 도포할 필요가 있습니다.

첫 번째 시운전은 부하 없이 테스트하시기 바랍니다.

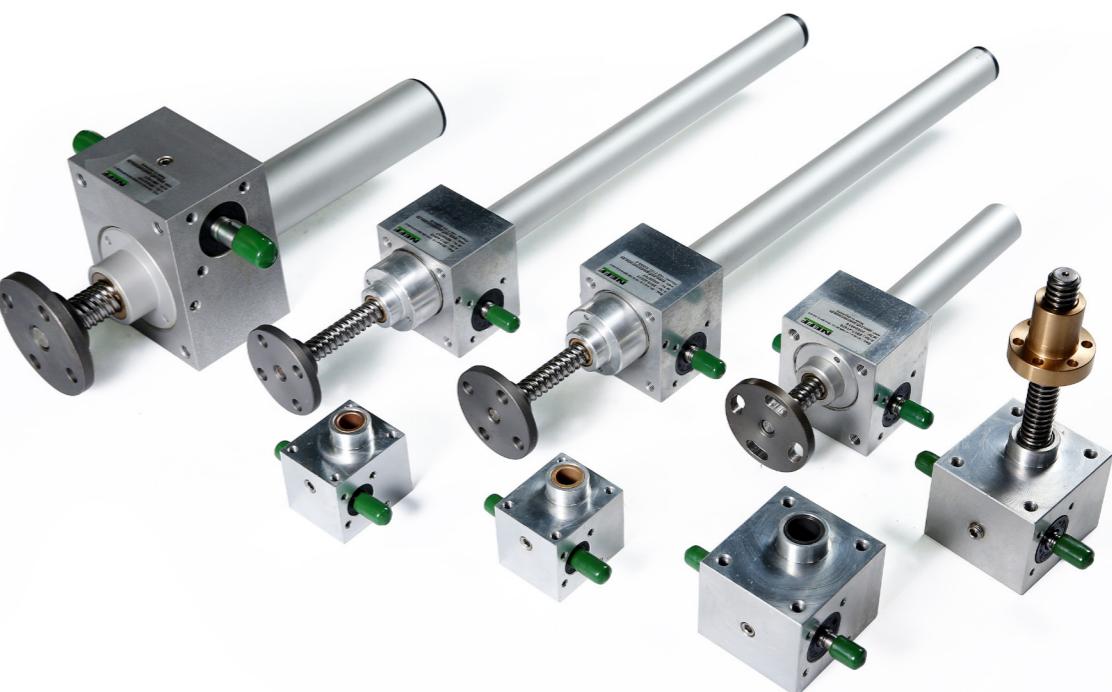
사다리꼴 나사(Tr screw)를 장착한 경우는 30 %이하의 작동 시간(Duty <30%)에서 시운전하시기 바랍니다.

## ■ 작업

웜기어 스크류 잭과 모든 동력전달요소들에 부하, 속도, 구동조건 들이 초과하면 안됩니다. 구동모듈의 보증을 받고 싶으시다면, 전체 구동모듈에 대해 당사와 상의하여 주십시오.

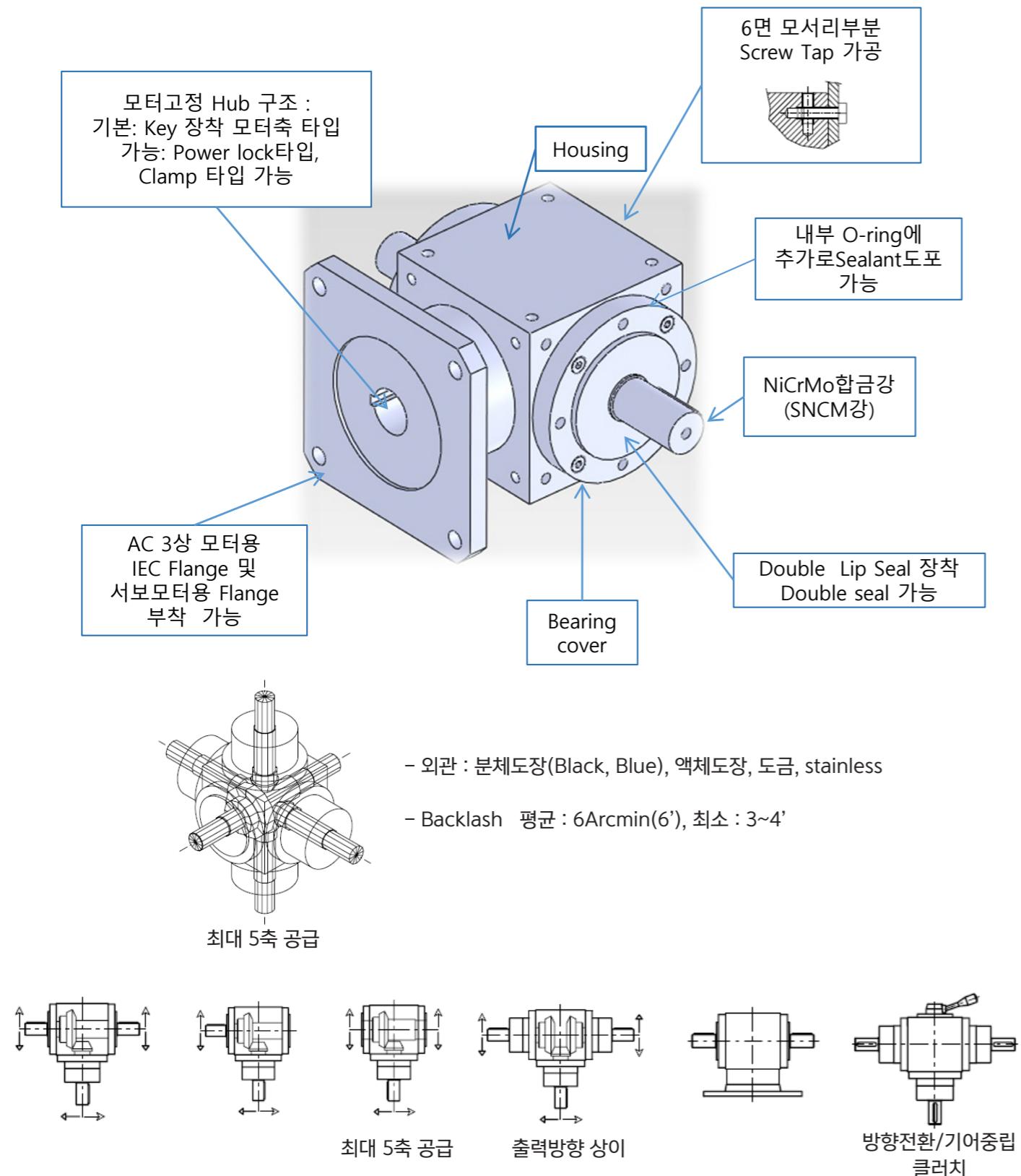
## ■ 스크류 잭 윤활 금유량

Size	kg	Size	kg
M 0	0.03	J 1	1.5
M 1	0.06	J 2	2
M 2	0.14	J 3	2
M 3	0.24	J 4	2.7
M 4	0.8	J 5	3.2
M 5	1.1		



# Spiral Bevel Gear Boxes (BG)

선정



아래의 도표는 다음 조건들을 전제로 하고 있습니다.

- 구동모터 TYPE : 전기 모터
- LOAD TYPE : 일정한 하중
- 회전 : 우회전 또는 좌회전 (한방향 구동)
- 운전 시간(H) : 하루에 8시간 (SERVICE FACTOR : 1)
- 기계 수명(L) : 20,000시간 (SERVICE FACTOR : 1)
- Duty factor(C) : 1시간에 1번 기동 (SERVICE FACTOR : 1)
- 주변조건 : 온도 20도
- 고도 1,000m이하일 때

UNIT SIZE	input rpm	RATIO 1:1		RATIO 1:1.5		RATIO 1:2		RATIO 1:3		RATIO 1:4		RATIO 1:5	
		Power input kW	Torque output Nm										
BG12	2800	4	13.1	--	--	2.09	13.7	0.77	7.5	--	--	--	--
	2000	2.99	13.8	--	--	1.55	14.1	0.6	8.1	--	--	--	--
	1500	2.44	14.9	--	--	1.22	14.9	0.49	8.9	--	--	--	--
	1000	1.76	15.2	--	--	0.88	16.2	0.35	9.7	--	--	--	--
	800	1.52	17.4	--	--	0.77	17.4	0.3	10.5	--	--	--	--
	600	1.22	18.7	--	--	0.61	18.7	0.25	11.1	--	--	--	--
	400	0.87	20	--	--	0.44	20	0.17	11.5	--	--	--	--
	100	0.23	21.8	--	--	0.12	21.7	0.04	11.2	--	--	--	--
	50	0.13	23.6	--	--	0.07	23.6	0.03	12.7	--	--	--	--
	10	0.026	24.9	--	--	0.01	24.9	0.01	13.1	--	--	--	--
BG19	2800	21.15	69.2	9.57	46.9	8.46	55.3	3.12	30.6	2.69	35.2	1.72	28
	2000	15.52	71.1	6.99	48.1	6.15	56.4	2.28	31.2	1.5	27.5	1.25	28.4
	1500	11.92	72.9	5.36	49	4.68	57.2	1.74	31.8	1.13	27.6	0.94	28.7
	1000	8.13	74.6	3.65	50.1	3.2	58.6	1.18	32.3	0.77	28.3	0.64	29.2
	800	6.59	75.5	2.95	50.7	2.59	59.4	0.95	32.6	0.62	28.5	0.51	29.3
	600	5.01	76.4	2.25	51.4	1.96	59.9	0.72	33	0.47	28.8	0.39	29.6
	400	3.41	78	1.51	52	1.33	60.7	0.48	33.5	0.32	29	0.26	29.7
	100	0.9	81.7	0.39	53.9	0.35	63.4	0.13	34.3	0.08	29.7	0.07	30.4
	50	0.46	82.8	0.2	54.6	0.17	64	0.07	34.5	0.04	29.9	0.04	30.6
	10	0.09	83.9	0.04	55.2	0.04	64.6	0.01	34.8	0.01	30.2	0.01	30.9
BG24	2800	23.24	76.1	15.82	77.7	10.6	69.4	4.58	44.9	5.07	66.4	3.47	56.8
	2000	17.39	79.6	11.54	79.4	7.79	71.3	3.35	46	3.69	67.6	2.61	59.9
	1500	13.48	82.4	8.83	80.8	5.92	72.4	2.55	46.8	2.81	68.6	1.99	60.8
	1000	9.35	85.8	6.05	83	4.02	73.5	1.73	47.5	1.91	69.9	1.35	61.7
	800	7.62	87.3	4.88	83.8	3.25	74.3	1.4	48.3	1.53	70.3	1.09	62.4
	600	5.86	89.5	3.72	85.4	2.46	75.1	1.07	48.6	1.17	71.1	0.85	64.2
	400	4	91.7	2.52	86.7	1.66	76.1	0.72	49.4	0.78	71.8	0.57	64.8
	100	1.07	97.8	0.65	89.8	0.42	76.5	0.18	50.5	0.2	72.9	0.14	66.8
	50	0.55	100.1	0.33	91	0.21	76.8	0.09	50.7	0.1	74.1	0.08	67.3
	10	0.12	103.3	0.07	92.4	0.04	77.3	0.01	50.9	0.03	74.8	0.01	68.6
BG32	2800	53.04	173.4	30.55	149.7	20.15	132.3	9.53	93.6	7.05	92.3	4.58	74.8
	2000	39.52	180.9	22.88	157.3	14.95	137.2	7.49	102.9	5.38	98.5	3.43	78.6
	1500	30.68	187.2	17.81	162.8	11.44	139.7	5.72	104.7	4.08	99.8	2.61	79.8
	1000	21.19	194.7	12.22	168.4	7.8	142.2	3.87	106.7	2.76	101.1	1.77	81.1
	800	17.29	198.3	10.14	174	6.37	144.8	3.16	108.5	2.24	102.3	1.44	82.4
	600	13.26	203.4	7.8	177.8	4.81	147.2	2.41	110.5	1.69	103.6	1.11	84.2
	400	9.1	208.3	5.33	183.4	3.25	149.7	1.64	112.3	1.14	104.7	0.74	85.5
	100	2.47	222.1	1.3	187.2	0.78	154.7	0.42	116	0.3	109.8	0.2	87.3
	50	1.17	227.1	0.65	190.9	0.39	159.7	0.21	117.9	0.16	112.3	0.09	88.6
	10	0.26	234.6	0.13	194.7	0.13	162.2	0.04	119.8	0.03	114.7	0.03	89.8
BG38	2800	113.36	371.2	75.01	355.5	38.87	254.8	19.6	192.4	15.99	209.3	12.87	210.6
	2000	83.33	382.2	53.3	366.6	28.6	261.3	14.3	197.6	11.7	213.2	9.36	215.1
	1500	64.22	392.6	40.82	374.4	21.97	267.8	10.9	200.2	8.84	217.1	7.15	219
	1000	43.94	403	27.82	381.9	15.08	275.6	7.49	205.4	5.98	221	4.81	222.3
	800	35.88	411.4	22.62	390	12.22	279.15	6.06	208	4.81	222.3	3.9	224.9
	600	27.43	419.9	17.29	396.5	9.23	283.4	4.62	211.2	3.64	225.5	2.99	227.5
	400	18.85	430.3	11.7	404.3	6.24	288.6	3.12	221.6	2.47	229.4	1.95	229.4
	100	4.94	453.7	3.12	423.1	1.69	300.3	0.81	223.6	0.65	236.6	0.52	236.6
	50	2.47	462.1	1.56	432.1	0.78	304.2	0.4	227.5	0.33	238.5	0.26	239.2
	10	0.52	477.1	0.26	442	0.17	310.7	0.08	228	0.07	241.8	0.05	241.8

UNIT SIZE	input rpm	RATIO 1:1		RATIO 1:1.5		RATIO 1:2		RATIO 1:3		RATIO 1:4		RATIO 1:5	
		Power input kW	Torque output Nm										
BG42	2800	133.3	437	81.2	399	45.7	299	23.1	228	17.8	234	12.8	211
	2000	98	450	59.8	412	33.5	308	16.9	231	13	238	9.3	216
	1500	75.5	461	45.8	421	25.7	316	12.8	335	9.8	243	7.1	219
	1000	51.7	474	31.5	434	17.6	324	8.8	242	6.7	248	4.8	222
	800	42.2	484	25.6	441	14.3	329	7.1	244	5.4	251	3.9	225
	600	32.3	494	19.5	447	10.9	334	5.4	248	4.1	254	2.9	228
	400	22.1	507	13.3	459	7.4	339	3.6	252	2.8	257	1.9	230
	100	5.85	534	3.5	481	1.9	354	0.9	261	0.7	265	0.5	237
	50	2.99	546	1.8	489	0.9	361	0.48	264	0.33	268	0.26	239
	10	0.65	562	0.4	498	0.2	365	0.09	268	0.07	272	0.05	242
BG55	1500	162.5	992	115.3	1057	57.5	706	26	481	25.3	621	19.5	595
	1000	111.8	1023	78.9	1086	39.7	729	18	497	17.2	636	13.2	607
	800	91	1040	64.2	1105	32.2	738	14.6	502	14	644	10.6	614
	600	68.9	1053	49	1123	24.4	749	11	508	10.6	651	8.1	621
	400	47.5	1092	34	1161	16.7	768	7.5	517	7.2	662	5.4	629
	100	12.6	1161	8.9	1235	4.4	803	1.95	541	1.8	688	1.4	654
	50	6.5	1186	4.5	1264	2.2	822	1.04	547	0.9	694	0.78	660
	10	1.3	1223	0.9	1300	0.46	836	0.21	556	0.2	706	0.13	670
	1500	344	2109	191	1754	142	1723	96	1772	60	1466	42	1278
	1000	240	2202	133	1817	98	1778	66	1823	42	1505	29	1309
BG75	800	196	2264	108	1847	79	1808	53	1850	34	1525	23	1323
	600	151	2301	82	1888	60	1841	42	1881	25	1547	18	1342
	400	104	2371	56	1937	42	1884	27	1918	17	1576	12	1364
	100	27	2552	14	2061	10	1992	7.8	2015	3.9	1645	2.6	1418
	50	14	2612	8	2102	5	2028	3.9	2046	2.6	1667	1.3	1435
	10	3	2700	1.5	2161	1.1	2076	0.7	2088	0.5	1698	0.26	1457

정회전과 역회전의 혼합구동시 상기 값의 30% 감소

#### 선정절차

- 동작 조건이 상기 선정표와 다른 경우에는 서비스인자(SERVICE FACTOR)를 고려해야 합니다.

서비스 인자는 다음과 같습니다.

H : 운전 시간

hours/days	24	18	12	8	4	2	1
H	1.25	1.18	1.1	1	0.9	0.8	0.7

L : 기계 수명 (HOURS)

theoric time	60,000	40,000	20,000	15,000	10,000	5000	3000
L	1.3	1.15	1	0.95	0.9	0.85	0.8

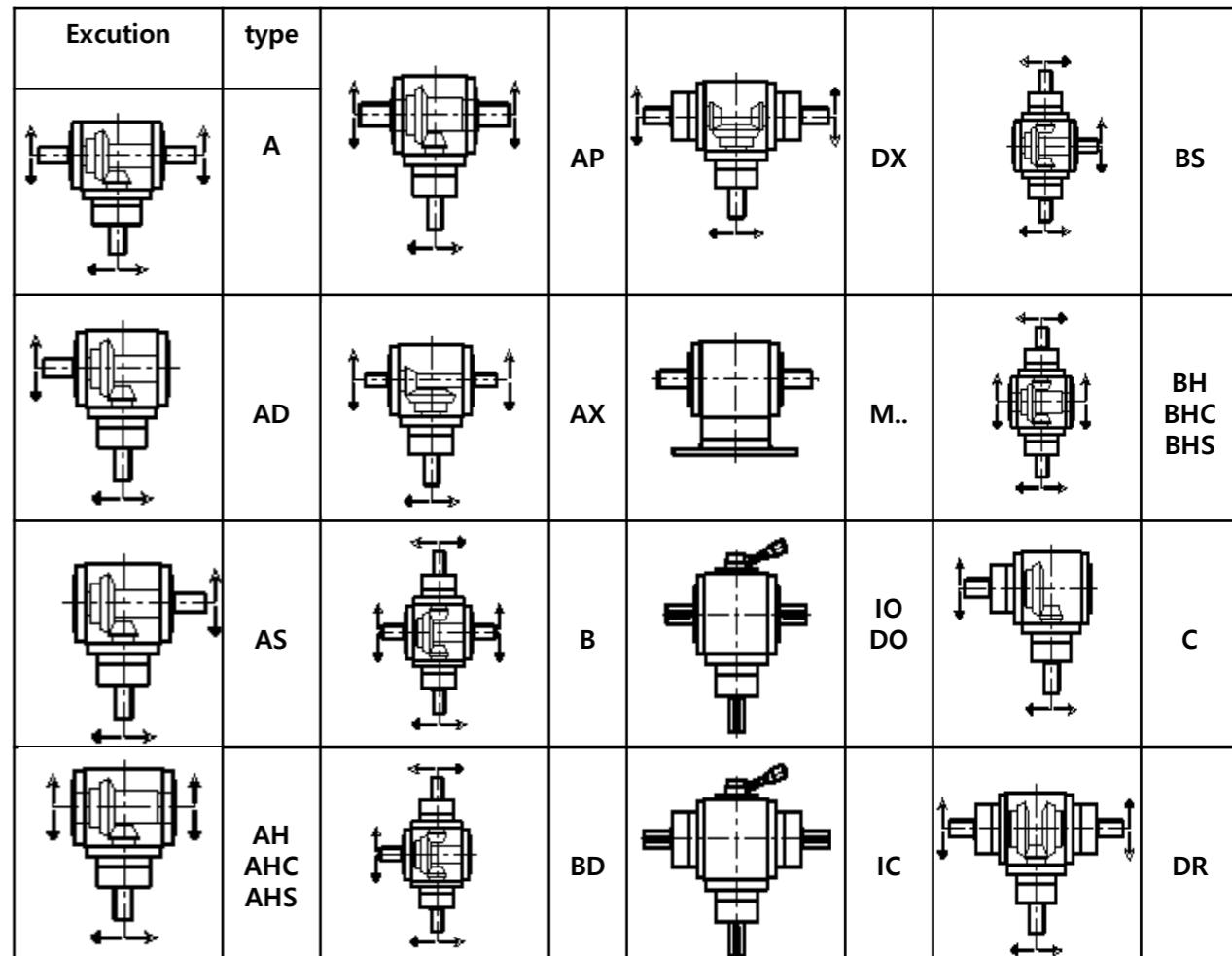
C : Duty factor

		No. of starts(시동회수)/hour					
		irregular	1	5	20	60	120
uniform		1	1	1.4	1.8	2.2	2.7
moderate shock		1	1.4	1.8	2.2	2.7	3.2
heavy shock		1.4	1.8	2.2	2.7	3.2	3.8

요구 토크 (M)은 적당한 크기의 SPIRAL BEVEL GEARBOX(BG시리즈)를 선택하는 데 사용하는 산출 토크값 (MU)를 얻기 위해 위에서 언급한 서비스인자를 곱합니다.

\* 요구 토크(M)값의 선정이 필요하면 문의해 주시기 바랍니다.

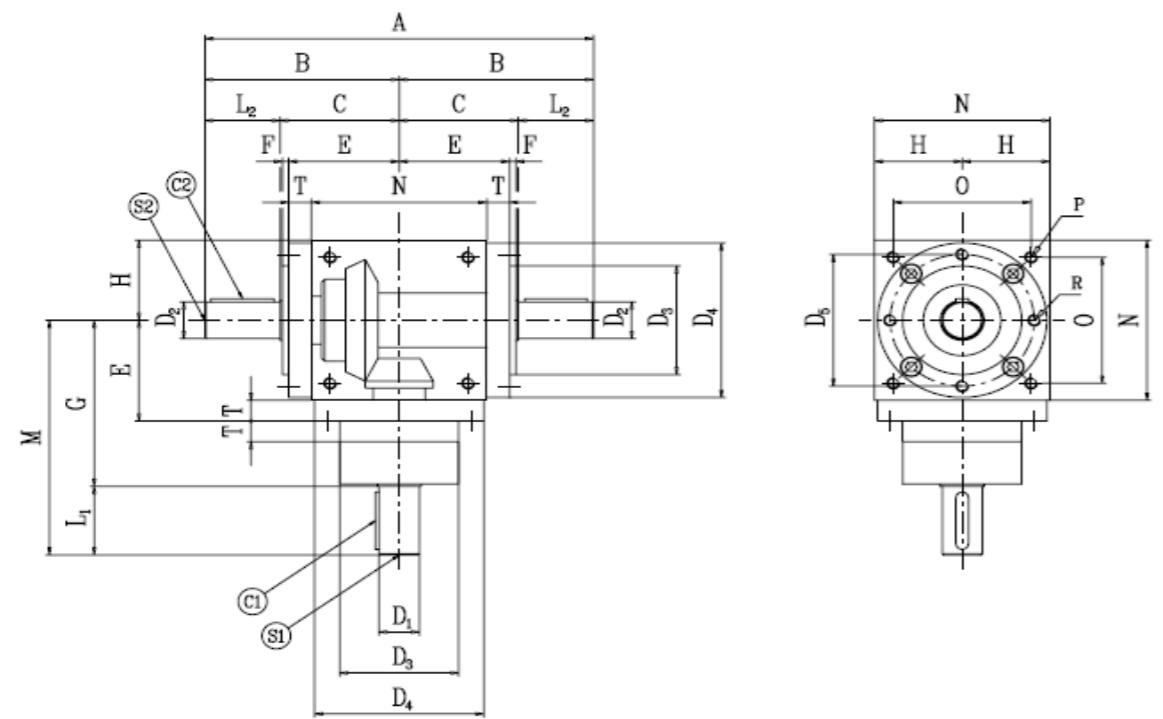
$$MU = M \times (H \times L \times C)$$



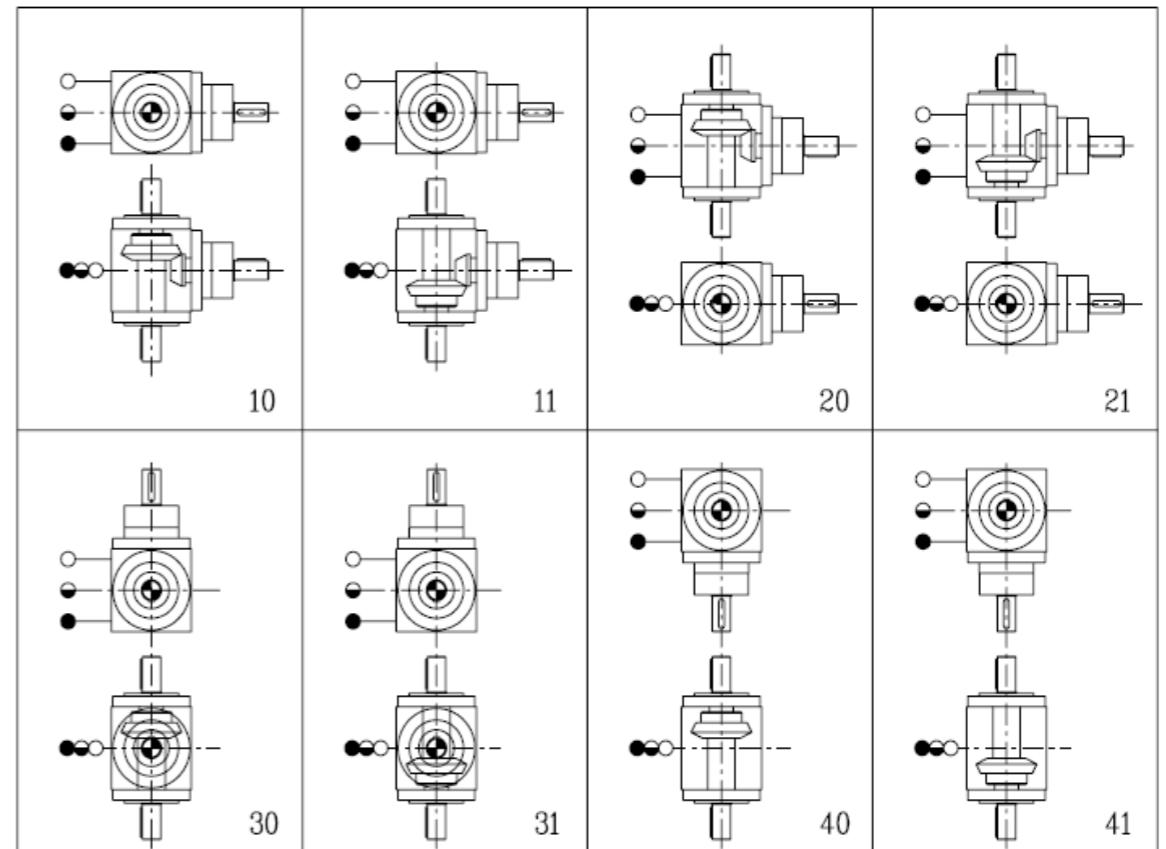
#### 윤활

- BG spiral bevel 감속기는 입력 1,000rpm미만인 구동에서 Grease로 충전됩니다.
- 에어빼기 플러그, 유량확인 플러그, 배출 플러그는 기본 장착되며, 요청에 따른 검토 후 해당 플러그와 PT탭 가공없이도 공급 가능합니다.
- 매우 높은 속도와 온도환경에서는 외부냉각기를 장착하여 공급합니다.

# Dimension of type A



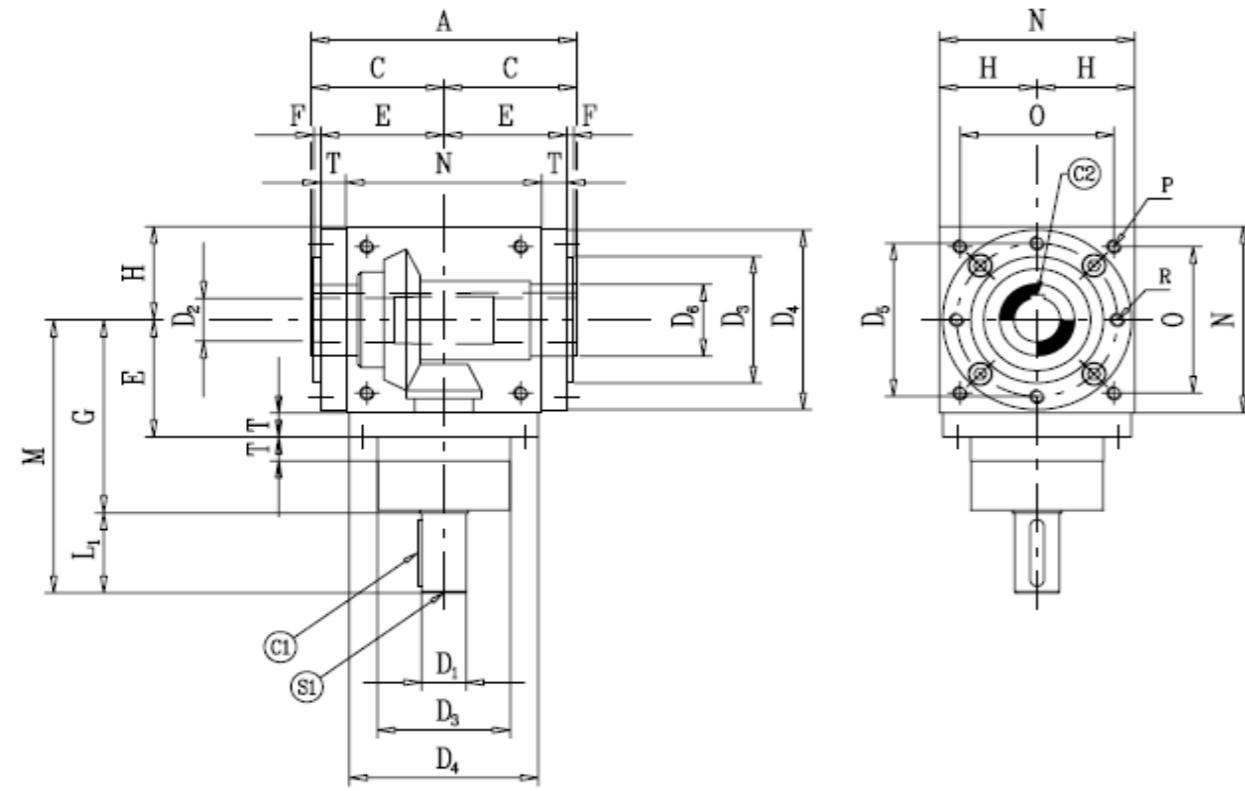
○ : 환기 플러그   ● : 레벨 플러그   ● : 배출 플러그



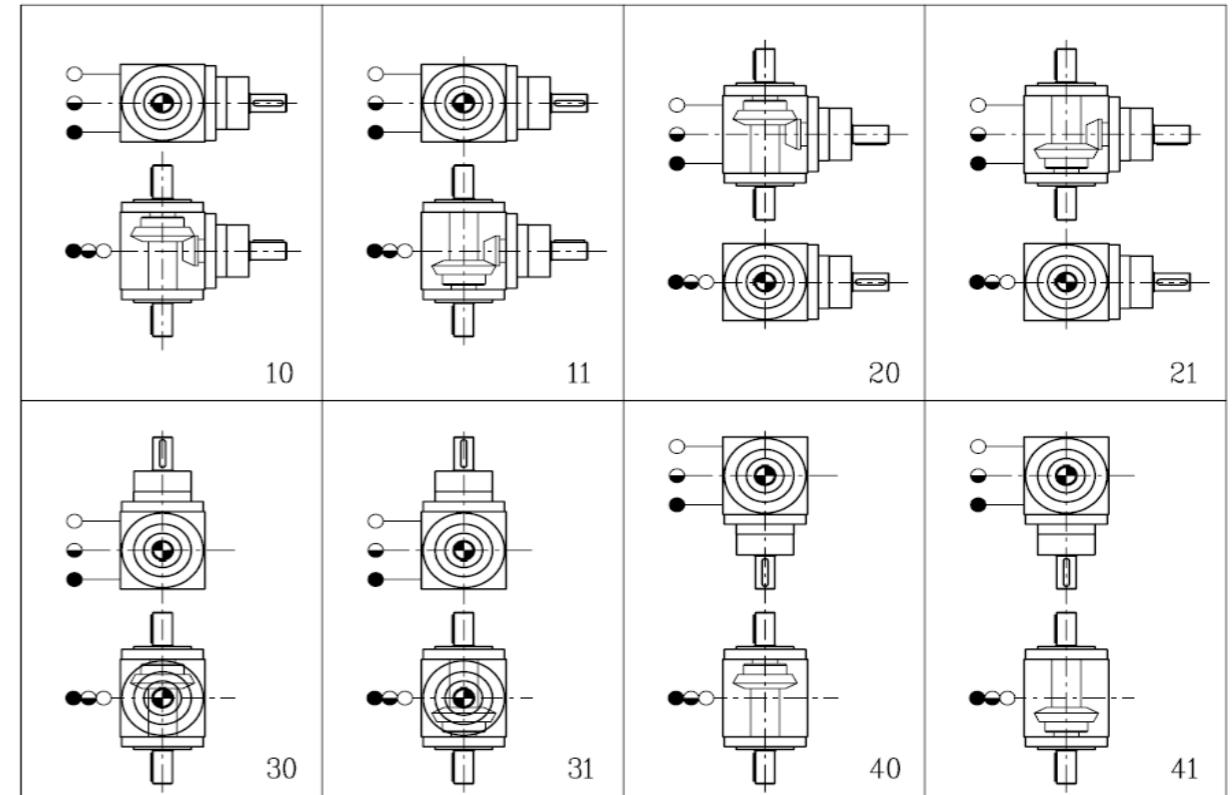
SIZE	Ratio : 1	A	B	C	D <sub>1</sub> (j6)	D <sub>2</sub> (j6)	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	E	F	G	H	L <sub>1</sub>	L <sub>2</sub>
BG12	1,2,3	144	72	46	12	12	44		54	42	2	74	32.5	26	26
BG19	1,2,3	210	105	65	19	19	60	86	72	59	4	100	45	40	40
	4,5													30	40
BG24	1,2,3	260	130	80	24	24	70	105	88	73	5	115	55	50	50
	4,5				19									40	50
BG32	1,2,3	310	155	95	32	32	95	135	115	88	5	145	70	60	60
	4,5				24									50	60
BG38	1,2,3	360	180	110	38	38	120	165	145	103	5	170	85	70	70
	4,5				28									60	70
BG42	1,2,3	410	205	125	42	42	135	190	165	118	5	195	100	80	80
	4,5				32									60	80
BG55	1,2,3	520	260	150	55	55	170	230	205	143	5	245	120	110	110
	4,5				42									80	110
BG75	1,2,3	750	375	225	75	75		300		195		350	165	150	150
	4,5				55									110	150

SIZE	Ratio : 1	M	N(h7)	O	P	R	S1	S2	C1	C2	T
BG12	1,2,3	100	65	45	M6	M6	M4x8	M4x8	20x4x4	20x4x4	
BG19	1,2,3	140	90	70	M6	M6	M6x12	M6x12	35x6x6	35x6x6	14
	4,5	130					M5x10				
BG24	1,2,3	165	110	88	M8	M8	M8x16	M8x16	40x8x7	40x8x7	18
	4,5	155					M6x12				
BG32	1,2,3	205	140	110	M10	M10	M10x20	M10x20	50x10x8	50x10x8	18
	4,5	195					M8x16				
BG38	1,2,3	240	170	136	M12	M12	M12x24	M12x24	60x10x8	60x10x8	18
	4,5	230					M10x20				
BG42	1,2,3	275	200	155	M12	M12	M12x24	M12x24	70x12x8	70x12x8	18
	4,5	255					M10x20				
BG55	1,2,3	355	240	190	M14	M14	M14x28	M14x28	100x16x10	100x16x10	23
	4,5	325					M12x24				
BG75	1,2,3	500	330	248	M16	M16	M16x32	M16x32	140x22x14	140x22x14	30
	4,5	460					M14x28				

# Dimension of type AH



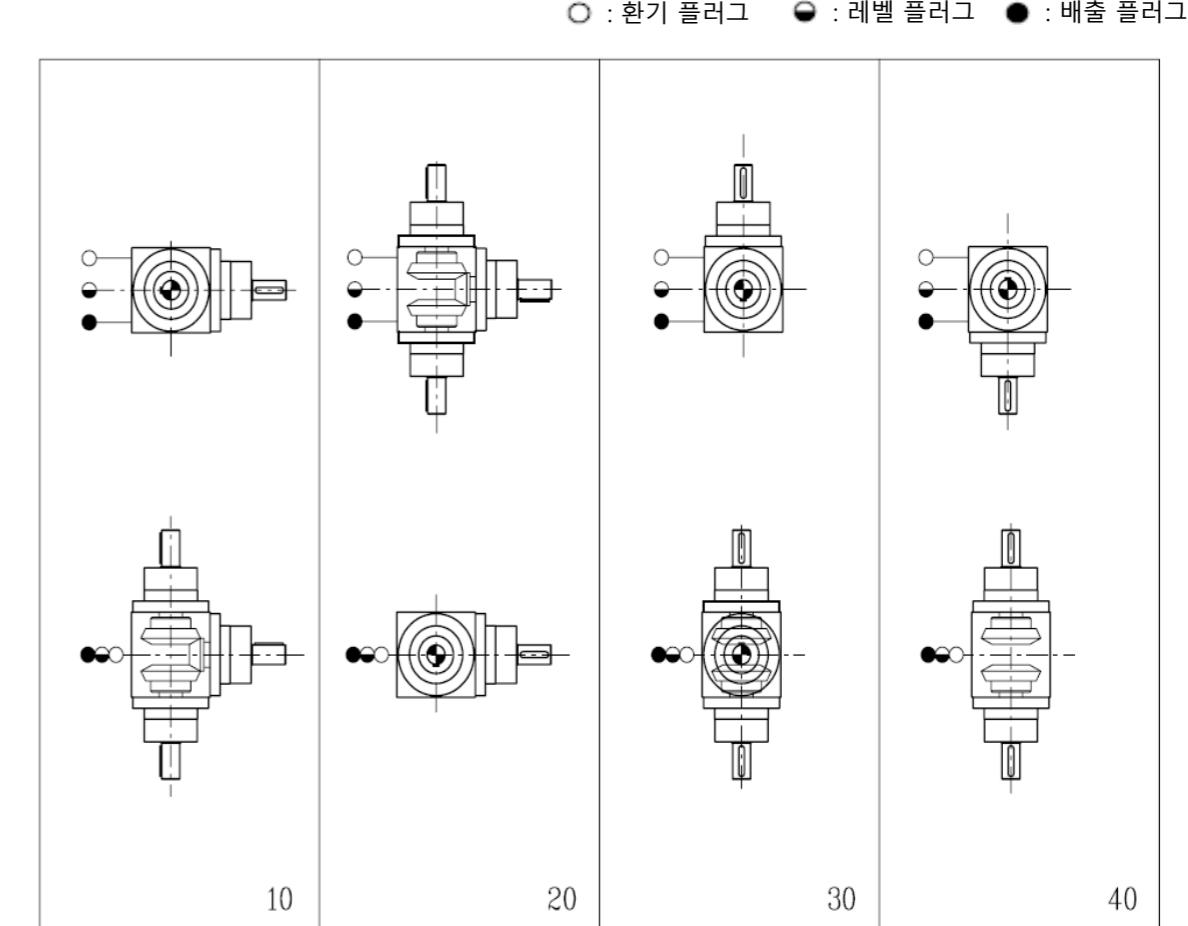
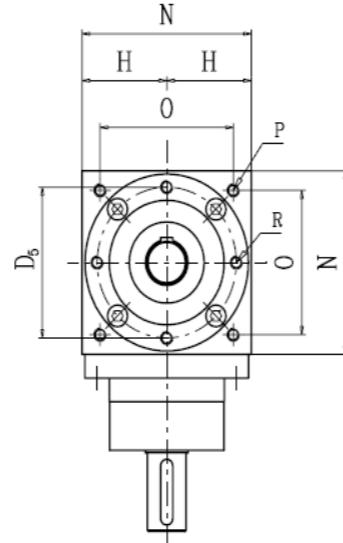
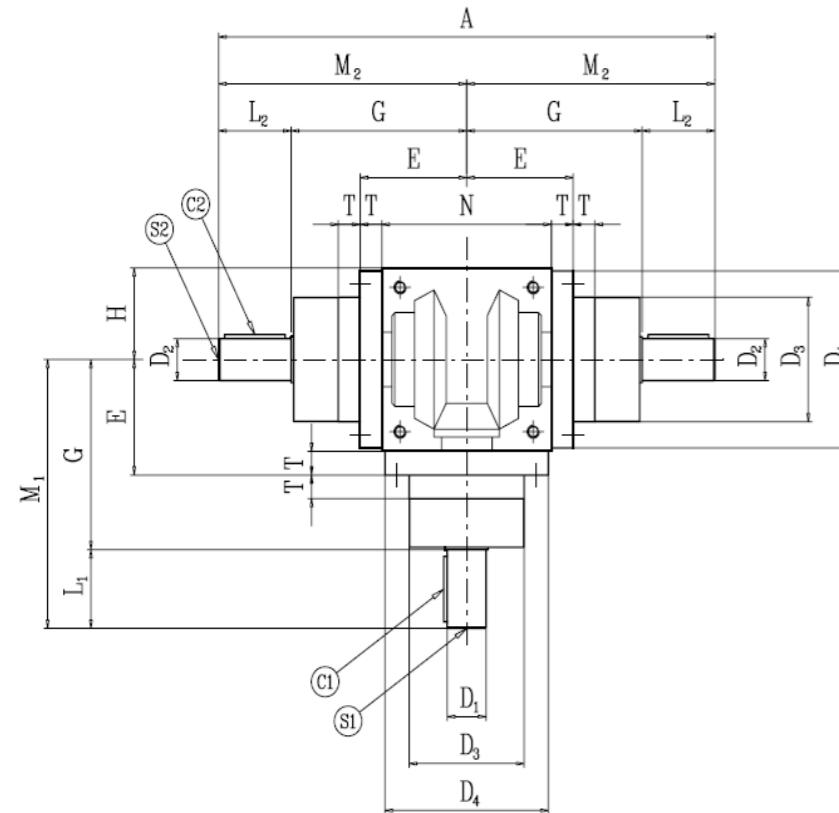
○ : 환기 플러그   ● : 레벨 플러그   ● : 배출 플러그



SIZE	Ratio : 1	A	C	D <sub>1(j6)</sub>	D <sub>2(j6)</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	E	F	G	H	L <sub>1</sub>
BG12	1,2,3	92	46	12	12	12		54	20	42	2	74	32.5	26
BG19	1,2,3	130	65	19	19	60	86	72	30	59	4	100	45	40
	4,5			14										30
BG24	1,2,3	160	80	24	24	70	105	88	35	73	5	115	55	50
	4,5			19										40
BG32	1,2,3	190	95	32	32	95	135	115	50	88	5	145	70	60
	4,5			24										50
BG38	1,2,3	220	110	38	38	120	165	145	60	103	5	170	85	70
	4,5			28										60
BG42	1,2,3	250	125	42	42	135	190	165	60	118	5	195	100	80
	4,5			32										60
BG55	1,2,3	300	150	55	55	170	230	205	75	143	5	245	120	110
	4,5			42										80
BG75	1,2,3	450	225	75	75	300		120	195		350	165	150	
	4,5			55									110	

SIZE	Ratio : 1	M	N(h7)	O	P	R	S1	C1	C2	T
BG12	1,2,3	100	90	65	45	M6	M6	M4x8	20x4x4	4x4
BG19	1,2,3	140		70	M6	M6	M6x12	35x6x6	6x6	14
	4,5	130		70	M6	M6	M5x10	25x5x5		
BG24	1,2,3	165	140	88	M8	M8	M8x16	40x8x7	8x7	18
	4,5	155		88	M8	M8	M6x12	35x6x6		
BG32	1,2,3	205	110	110	M10	M10	M10x20	50x10x8	10x8	18
	4,5	195		110	M10	M10	M8x16	40x8x7		
BG38	1,2,3	240	170	136	M12	M12	M12x24	60x10x8	10x8	18
	4,5	230		136	M12	M12	M10x20	50x8x7		
BG42	1,2,3	275	200	155	M12	M12	M12x24	70x12x8	12x8	18
	4,5	255		155	M12	M12	M10x20	50x10x8		
BG55	1,2,3	355	240	190	M14	M14	M14x28	100x46x10	16x10	23
	4,5	325		190	M14	M14	M12x24	70x12x8		
BG75	1,2,3	500	330	248	M16	M16	M16x32	140x22x14	22x14	30
	4,5	460		248	M16	M16	M14x28	100x16x10		

# Dimension of type DR

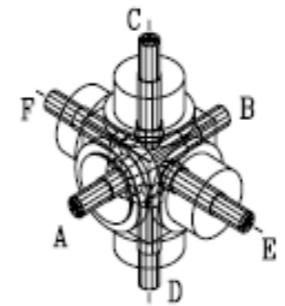
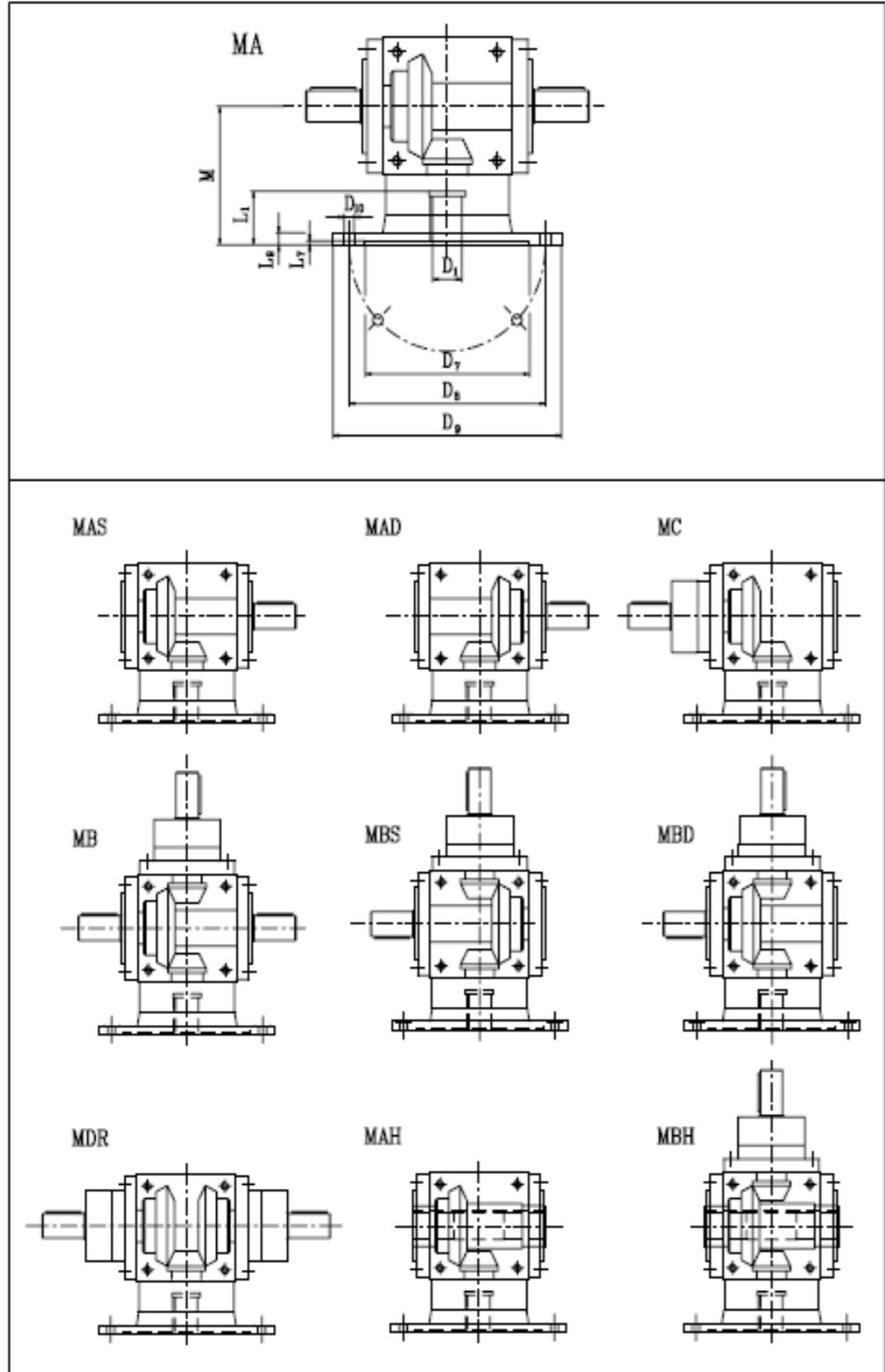


SIZE	Ratio : 1	A	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	E	G	H	L <sub>1</sub>	L <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>
BG12	1, 2, 3	200	12	12	44	/	54	42	74	32.5	26	26	100	100
BG19	1, 2, 3	280	19	19	60	86	72	59	100	45	40	40	140	140
	4, 5		14		86	72	59		100		30		130	
	1, 2, 3		330	24	24	70	105	88	73	115	55	50	165	
BG24	4, 5	330	19	19	70	105	88	73	115	55	40	155	165	
	1, 2, 3		410	32	32	95	135	115	88	145	70	60	205	205
	4, 5		24	24	95	135	115	88	145	70	50	195		
BG32	1, 2, 3	480	38	38	120	165	145	103	170	85	70	70	240	240
	4, 5		28		38	120	165	145	103	170	85	60	230	
	1, 2, 3		550	42	42	135	190	165	118	195	100	80	275	275
BG42	4, 5		550	42		135	190	165	118	195	100	60	255	
	1, 2, 3	710	55	55	170	230	205	143	245	120	110	110	355	355
	4, 5		42		170	230	205	143	245	120	80	110	325	
BG55	1, 2, 3	1000	75	75	/	300	/	195	350	165	150	150	500	500
	4, 5		55		75	300	/	195	350	165	110	150	460	

SIZE	Ratio : 1	N	O	P	R	S1	S2	C1	C2	T
BG12	1, 2, 3	65	45	M6	M6	M4 x 8	M4 x 8	20x4x4	20x4x4	/
BG19	1, 2, 3	90	70	M6	M6	M6 x 12	M6 x 12	35x6x6	35x6x6	14
	4, 5					M5 x 10		25x5x5		
BG24	1, 2, 3	110	88	M8	M8	M8 x 16	M8 x 16	40x8x7	40x8x7	18
	4, 5					M6 x 12		35x8x7		
BG32	1, 2, 3	140	110	M10	M10	M10 x 20	M10 x 20	50x10x8	50x10x8	18
	4, 5					M8 x 16		40x8x7		
BG38	1, 2, 3	170	136	M12	M12	M12 x 24	M12 x 24	60x10x8	60x10x8	18
	4, 5					M10 x 20		50x8x7		
BG42	1, 2, 3	200	155	M12	M12	M12 x 24	M12 x 24	70x12x8	70x12x8	18
	4, 5					M10 x 20		50x10x8		
BG55	1, 2, 3	240	190	M14	M14	M14 x 28	M14 x 28	100x16x10	100x16x10	23
	4, 5					M12 x 24		70x12x8		
BG75	1, 2, 3	330	248	M16	M16	M16 x 32	M16 x 32	140x22x14	140x22x14	30
	4, 5					M14 x 28		100x16x10		

# Dimension of type MA

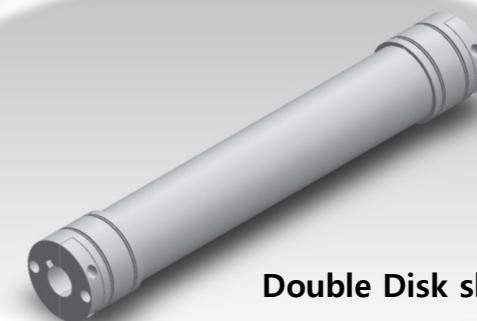
# 멀티 사프트 베벨 기어박스



Execution	Possible Combinations	Gear positions and rotations	
		Speed reducers	Speed increasers
A 90			
A 180			
A 270			
AS 90			



Disk shaft (SJDS)



Double Disk shaft (SJWDS)

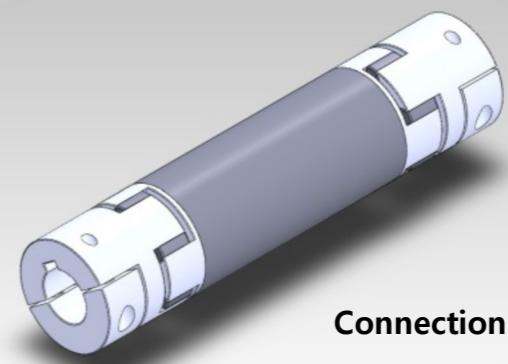
**Shaft-end of reducer between B and C**

클램프 분리, 2개의 스크류로 감속기 축 고정, STS 재질 가능

편심과 편각 보정 능력이 좋음, Key 위치 변경 가능한 구조

조립시 tension 최소화 협소한 공간에 적용할 경우, 감속기의 축 끝부분의 위치를 B와 C 사이에 배치할 수 있음

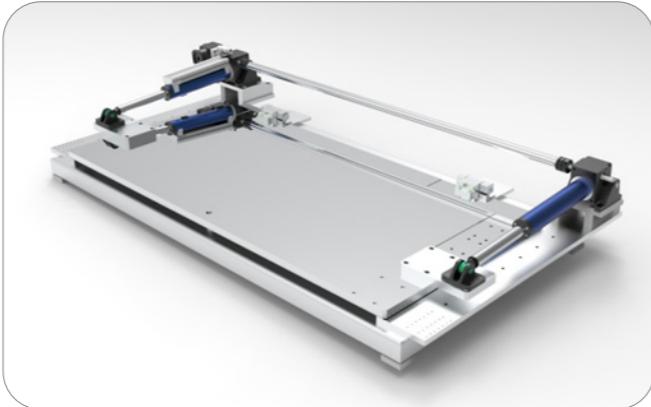
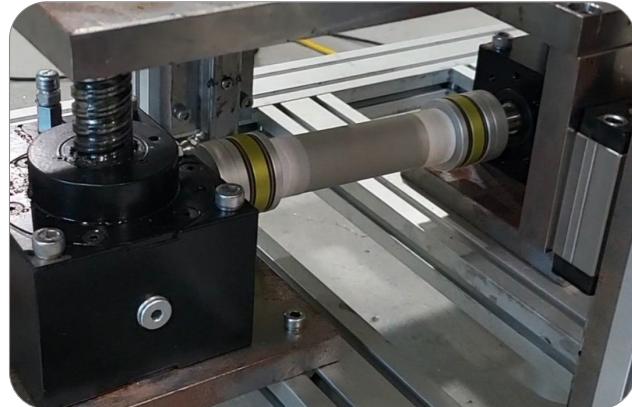
양쪽 모두에 더블 디스크를 사용할 수 있으며, 그 경우 편심, 편각은 2배 이상 허용됨.



Connection shaft (SJS)

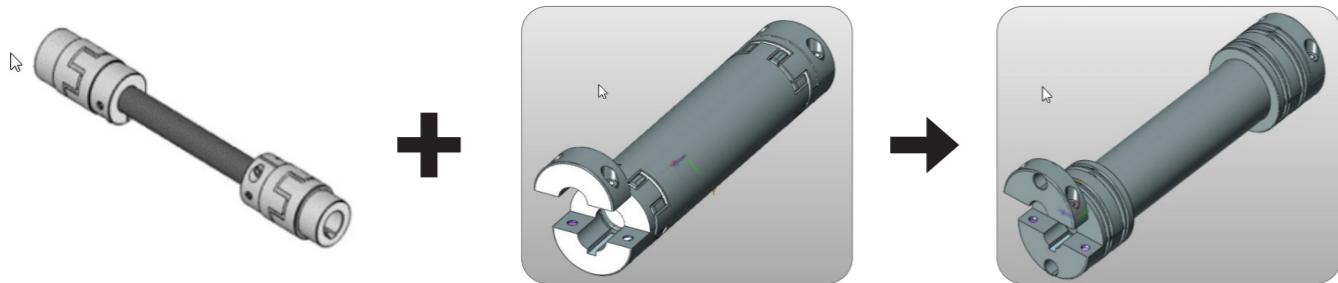
축을 고정하는 Hub (Bk 길이에 해당) 틸착과 keyway 가공은 표준 사양임.

Poly Urethane 중 경도가 높은 재질을 사용하여, 외경대비 토크 성능이 매우 좋음



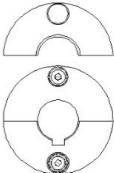
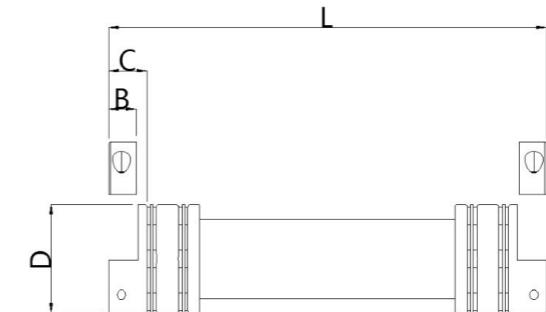
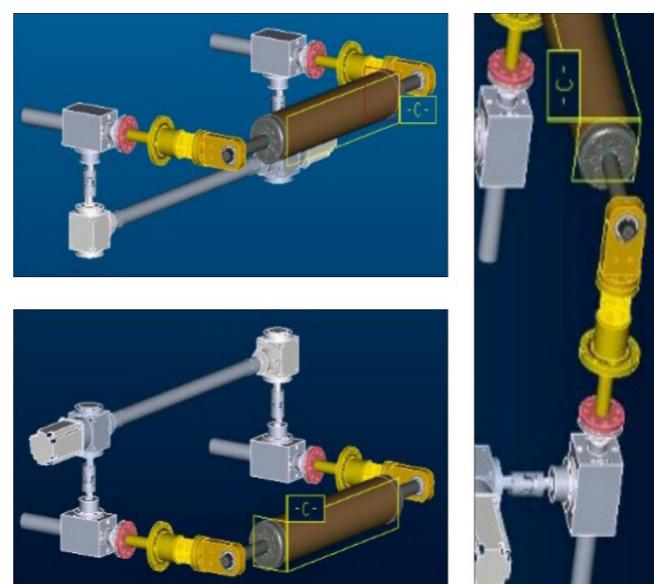
부하의 평행도 얼라이닝과 조립 이후

최종조립단계에서 변동이 없는 연결이 가능하게 함



1. 부하의 수평을 잡고 맨 나중에 볼팅하여서 조립 편의성을 높입니다.
2. 2개의 더블디스크커플링 장착을 통해 편심 편각 앤 드플레이 최소1.5~3배 상승
3. 커플링과 파이프 분리형
4. 키홀 있음 (x2) 분리형 클램프를 2개의 볼트로 고정
5. 조립시 비틀림 최소화가 가능하기 위한 파이프 조립형 구조
6. 편심과 편각 보정능력이 좋음
7. 양쪽 키에 커플링 삽입 후 오차15도 미만

Flexible OLED 클래스 롤러  
Aligning用 구동모듈



## 특징 :

클램프 분리, 2개의 스크류로 감속기 축 고정, STS 재질 가능

편심과 편각 보정 능력이 좋음, Key 위치 변경 가능한 구조

조립시 tension 최소화 협소한 공간에 적용할 경우, 감속기의 축 끝부분의 위치를 B와 C 사이 배치 가능

양쪽 모두에 더블 디스크를 사용할 수 있으며, 그 경우 편심, 편각은 2배 이상 허용

Dimension [mm]

TYPE	B	C	D	L min	Screw
SJDS-42	10	13.6	42.5	45	M4
SJWDS-42	10	13.6	42.5	91	
SJDS-47	11	16.5	47	49	
SJWDS-47	11	16.5	47	99	
SJDS-54	13	19	54	52	M5
SJWDS-54	13	19	54	105	
SJDS-64	16	26	64	74	
SJWDS-64	16	26	64	148	
SJDS-80	20	30	80	82	M6
SJWDS-80	20	30	80	164	
SJDS-100	20	30.6	100	102.5	
SJWDS-100	20	30.6	100	205	

Technical data

TYPE	Rated torque for continuos transmission with smallest bore - Ø	Rated torque for continuos transmission with largest bore - Ø	Inertia moment of 1coupling in	2 Screws tightening torque [Nm/rad]	Max parallel error [mm]	Max. Angle [°]
SJDS-42	Ø 6-7 Nm	Ø 18-12 Nm	0.032	8	0	2
SJWDS-42	Ø 6-7 Nm	Ø 18-12 Nm	0.033	8	0.3	4
SJDS-47	Ø 8-12 Nm	Ø 18-20 Nm	0.054	8	0	2
SJWDS-47	Ø 8-12 Nm	Ø 18-20 Nm	0.055	8	0.3	4
SJDS-54	Ø 10-22 Nm	Ø 24-29 Nm	0.098	16	0	2
SJWDS-54	Ø 10-22 Nm	Ø 24-29 Nm	0.12	16	0.6	4
SJDS-64	Ø 12-31 Nm	Ø 32-40 Nm	0.23	30	0	2
SJWDS-64	Ø 12-31 Nm	Ø 32-40 Nm	0.35	30	0.6	4
SJDS-80	Ø 15-70 Nm	Ø 42-97.5 Nm	0.75	60	0	2
SJWDS-80	Ø 15-70 Nm	Ø 42-97.5 Nm	0.84	60	1	4
SJDS-100	Ø 20-220 Nm	Ø 50-320 Nm	2.2	60	0	2
SJWDS-100	Ø 20-220 Nm	Ø 50-320 Nm	2.9	60	1	4

## Order code :

**SJWDS47-1000L-20K6X24K8**

**SJWDS 47** Shaft 외경  
**1000L** 샤프트 길이  
**20 K6** 내경 키홀  
**x 24 k8** 내경 키홀

## 1. Levelling

상판(부하가 올라갈 BASE)의 레벨을 맞춰 줍니다.



## 2. Unfastening bolts

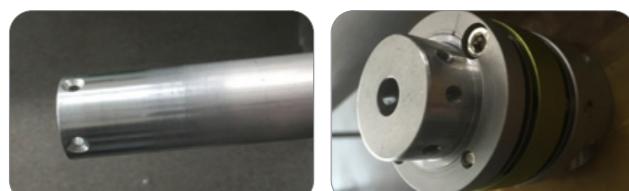
접시머리 볼트를 풀어 줍니다.



\* 샤프트와 함께 동봉되는 스티커는 허용 편심과 편각 보다 커질 경우, 접시머리볼트의 이탈을 방지합니다.

## 3. Dividing coupling and pipe

볼트를 풀어서 파이프와 커플링을 분리합니다.



## 4. Inserting keyed shaft into coupling

커플링의 클램프가 분리됨을 확인하고, 키 홈에 맞추어 축에 삽입될 수 있는 한 최대로 밀어넣습니다.



반대쪽 커플링도 키홈에 맞추어 밀어 넣습니다.

## 5. Assembling pipe and couplings

두개의 커플링을 파이프에 삽입하고 샤프트의 거리를 동일하게 맞춥니다.



먼저 한 쪽 커플링에 파이프를 끼워줍니다.

커플링을 당겨서 반대쪽 커플링에도 파이프를 끼웁니다.

\* 커플링의 클램프분리 부분까지 축에 넣어주도록 설계 되어 있습니다.

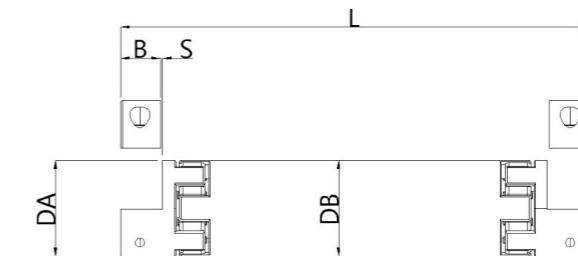
디스크 부근까지 삽입할 수 있도록 설계가 가능하나 이 경우 조립 및 분해시 End-play에 의한 변형을 최소화해야 합니다.

## 6. Fastening bolts at optimised position

파이프의 홀과 가장 가깝고 Level의 변화가 최소화될 최적위치에 커플링 탭을 맞춥니다.

양쪽의 커플링 탭의 위치를 확인합니다

\*록타이트243을 사용추천



특징 :

축을 고정하는 Hub(Bk길이에 해당)탈착과 keyway가공은 표준사양임.

Poly Urethane중 경도가 높은 재질을 사용하여, 외경대비 토크성능이 매우 좋음.

TYPE	Dimension [mm]						
	DA	DB	B	S	L min	Screw	Fastening torque [Nm]
SJS-30	30	30	11	1.5	99	M4	8
SJS-40	40	40	17	2	133	M5	16
SJS-55	55	55	21	2	177	M6	26
SJS-65	65	65	26	2.5	212	M8	60
SJS-80	80	78	30	3	249	M8	60
SJS-100	100	98	40	3.5	283	M12	180
SJS-120	120	110	65	4	320	M12	180
SJS-135	135	115	75	4.5	370	M16	640
SJS-160	160	135	85	5	420	M16	640

TYPE	Technical data					
	Rated torque for continuos transmission with smallest bore - Ø	Rated torque for continuos transmission with largest bore - Ø	Couplings inertia moment in	Dynamic torsion stiffness per sleeve [Nm/rad]	Max parallel error [mm]	Max. Angle [°]
SJS-30	Ø 6-12 Nm	Ø 16-15 Nm	0.0075	130	0.1	1
SJS-40	Ø 8-17 Nm	Ø 22-20 Nm	0.039	1200	0.1	1
SJS-55	Ø 12-40 Nm	Ø 32-70 Nm	0.16	2600	0.1	1
SJS-65	Ø 15-100 Nm	Ø 35-160 Nm	0.38	4900	0.1	1
SJS-80	Ø 15-160 Nm	Ø 45-380 Nm	1.1	11000	0.1	1
SJS-100	Ø 20-450 Nm	Ø 60-600 Nm	4.6	30000	0.1	1
SJS-120	Ø 20-825 Nm	Ø 60-1650 Nm	20.6	107920	0.27	1

Order code :

**SJS55C-1000L-20K6X24K8**

SJS 55 C 1000L 20 K6 X 24 K8  
Shaft 외경 미분리형 조커플링 샤프트 길이 내경 키홀름 내경 키홀름

## 7. Taping Sticker

스티커를 붙여줍니다.

\* 샤프트와 함께 동봉되는 스티커는 허용 편심과 편각보다 커질 경우, 접시머리볼트의 이탈을 방지합니다.



그리스 보존을 위한 2개의 Nilos ring은 월샤프트의 2개의 bearing에 장착되고, BOX75 이상은 Taper roller bearing을 사용한다. 그래서 V5와 V6 position에서도 사용 가능하다.



특히 등록된 BOX시리즈는 BOX25에서 90 까지는 다이 캐스팅 알루미늄으로, BOX110 부터는 주철로 만들어진다.

BOX90 까지는 합성오일, BOX110 부터는 미네랄 오일이 주유되어 공급하며, 공급 전 전량 누유(Leak) 테스트하고 level gage, filler, break plug와 여분의 plug가 제공된다.



안착부위의 면가공

운반 중 중공 출력물을 보호하는  
2개의 플라스틱 안전커버



1. Hollow shaft and cone packing ring : Suitable for heavy load applications.
2. Suitable for : wheel agencies, transportation handling mechanism, cam mechanism tilting mechanism LCD panel, rack and pinion mechanism and any other industry bodies.



1. Hollow shaft rotary flange : Suitable for heavy load applications.
2. Suitable for : rotating mechanism, CNC lathes mechanical arm of the tilting mechanism.



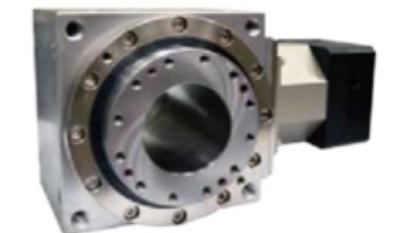
1. Hollow shaft (clamp type), single and dual hollow shaft hollow shaft
2. Suitable for : conveyor transporting mechanism



1. Hollow shaft clamping plus keyway : Suitable for heavy load applications.
2. Suitable for : Roller agencies, transportation handling mechanism, cam mechanism tilting mechanism LCD panel, rack and pinion mechanism.



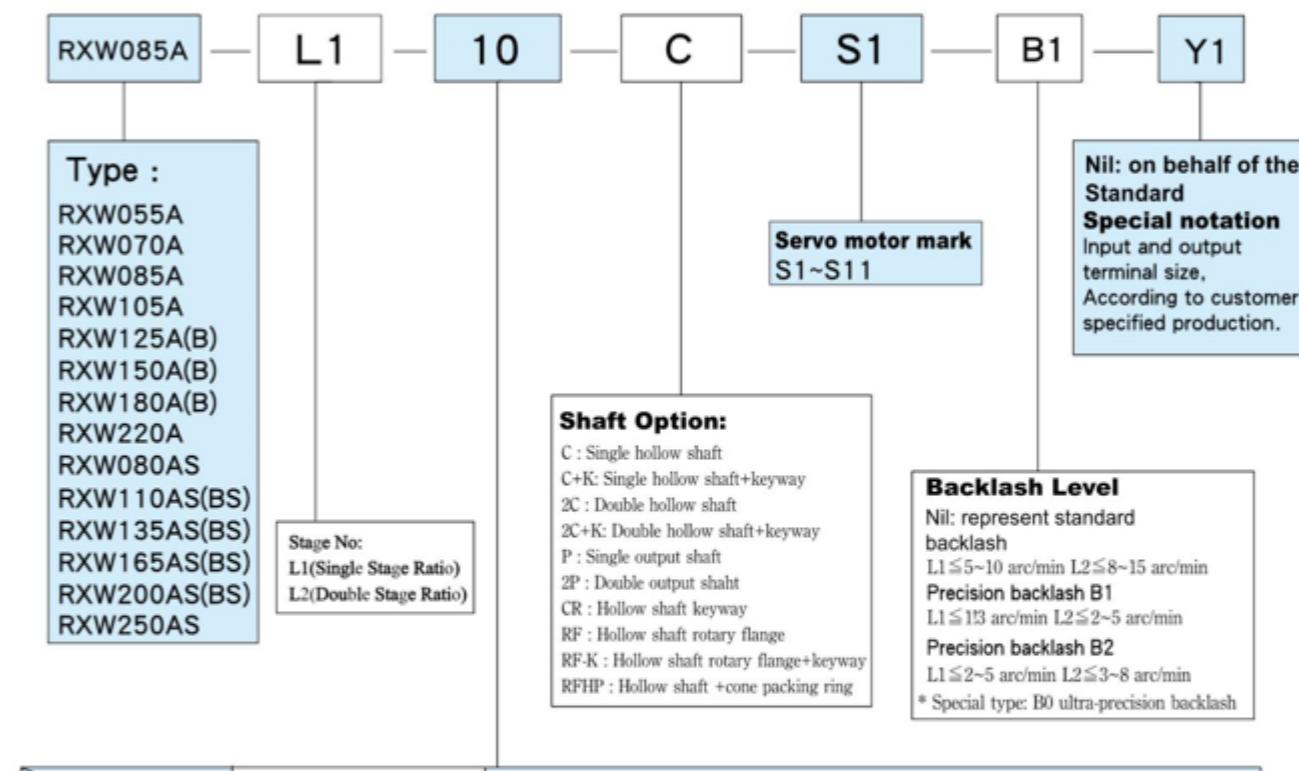
1. Hollow shaft with keyway : The new supplement stops payment the tooth hole
2. General transport mechanism.



1. Large hollow shaft rotary flange : Suitable for heavy load applications.
2. Suitable for : roller mechanism, flame cutting machine mechanical arm rotary mechanism, cam mechanism, LCD panel flip agencies, rack and pinion mechanism.

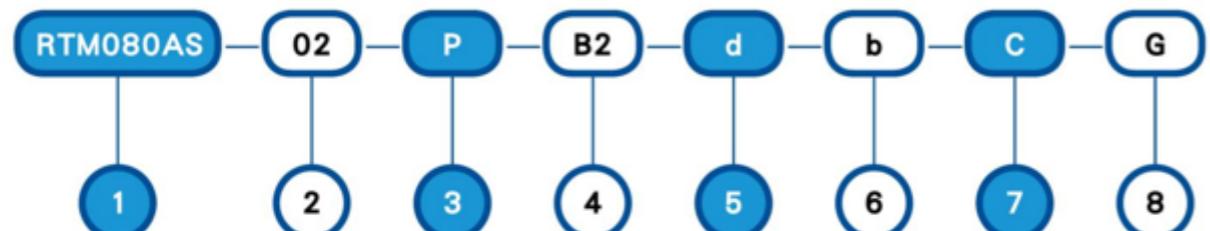
## ■ RXW Series

### Model Establishing:



Stage No Specifications	Single Stage Ratio(L1)	Double Stage Ratio(L2)
RXW055A	1,3,4,5,7,10	12,15,16,20,25,28,30,35,40,50
RXW070A	1,3,4,5,6,7,10	12,15,16,20,25,28,30,35,40,50,60,70,100
RXW085A	1,3,4,5,6,7,10	12,15,16,20,25,28,30,35,40,50,60,70,100
RXW105A	1,3,4,5,6,7,10	12,15,16,20,25,28,30,35,40,50,60,70,100
RXW125A(B)	1,3,4,5,6,7,10	12,15,16,20,25,28,30,35,40,50,60,70,100
RXW150A(B)	1,3,4,5,6,7,8,9,10	12,15,16,20,25,28,30,35,40,50,60,70,80,90,100
RXW180A(B)	3,4,5,6,7,10	12,15,16,20,25,28,30,35,40,50,60,70,100
RXW220A	3,4,5,6,7,10	12,15,16,20,25,28,30,35,40,50,60,70,100
RXW080AS	2,6,8,10,12,14,16,20	24,30,32,40,42,50,56,60,70,80,100,120,140,160,200
RXW110AS(BS)	2,6,8,10,12,14,16,20	24,30,32,40,42,50,56,60,70,80,100,120,140,160,200
RXW135AS(BS)	2,6,8,10,12,14,16,20	24,30,32,40,42,50,56,60,70,80,100,120,140,160,200
RXW165AS(BS)	2,6,8,10,12,14,16,20	24,30,32,40,42,50,56,60,70,80,100,120,140,160,200
RXW200AS(BS)	2,6,8,10,12,14,16,20	24,30,32,40,42,50,56,60,70,80,100,120,140,160,200
RXW250AS	2,6,8,10,12,14,16,20	24,30,32,40,42,50,56,60,70,80,100,120,140,160,200

■ RTM-AS series: 1/2 – 1/10



1. Model (type of input with flange) :

RTM045AS / RTM070AS / RTM080AS / RTM110AS /

RTM135AS / RTM135BS / RTM165AS / RTM200BS / RTM250AS

2. Gear ratios: 1/2, 1/3, 1/5, 1/10

3. Types of output shaft: as Fig. 1

4. Precision: as Fig. 2

5. Diameter of input flange ( $\phi$  d): as Fig. 3

6. Lead of input flange ( $\phi$  B): as Fig. 3

7. Screw hole distance in input flange ( $\phi$  C): as Fig. 3

8. Screw holes in input flange (G): as Fig. 3

Grade of backlash:

No marks: stand for standard backlash  
 $\leq 6$  arc

Precision backlash B2  
 $\leq 4$  arc

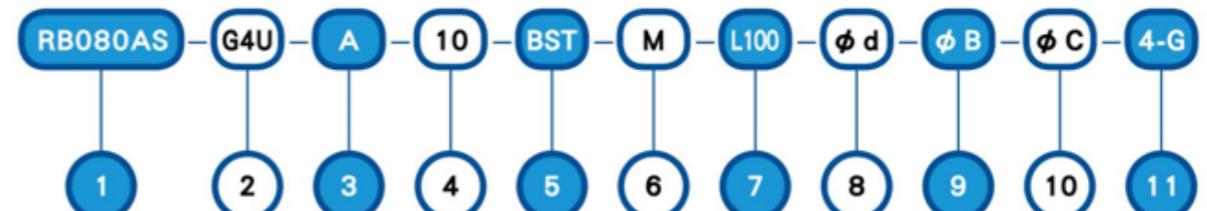
\*Fig. 2

CR: Hollow shaft with keyway  
 HP: Single hollow shaft without keyway (clamping set)  
 HP-K: Single hollow shaft with keyway (clamping set)  
 2HP: Double hollow shafts without keyway (clamping set)  
 2HP-K: Double hollow shafts with keyway (clamping set)  
 P: Single solid output shaft with keyway  
 2P: Double solid output shafts with keyway  
 RF: Hollow shaft and rotating flange  
 RF-K: Hollow shaft and rotating flange with keyway

\*RTM045AS (only P/2P available)

\*Fig. 1

■ RB series – Synchronous screw lifts:



1. Models: RB080AS / RB110AS / RB135AS / RB165AS / 200BS

2. Numbers of screw shaft: as Fig. 1

3. Type of transmission:

Middle-located motor drive

4. Gear ratios: 1/3 – 1/50

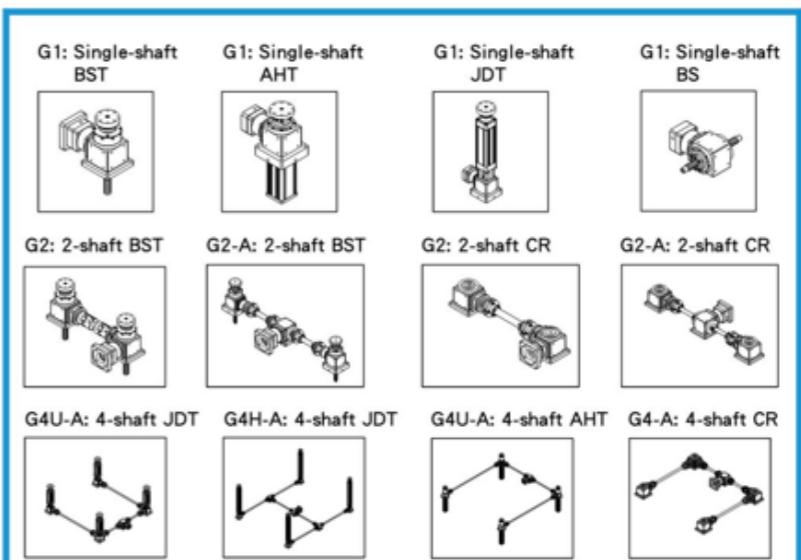
5. Ways of movement: as Fig. 2

6. Flexible covering tube

7. Effective length: as Fig. 3

8-11. Bore of input shaft  $\phi$  d,  
 Flange  $\phi$  B,  
 screw hole  $\phi$  C/4-G: as Fig. 4

BS: Screw (horizontal/Rise & descend)  
 BST: Rise & descend with screw + Pushing plate  
 JDT: Rise & descend with electric cylinder +Pushing plate  
 AHT: Rise & descend with piston + flexible covering tube  
 BHT: Rise & descend with screw + flexible covering tube  
 CR: Multi-point rise & descend (move with nut)



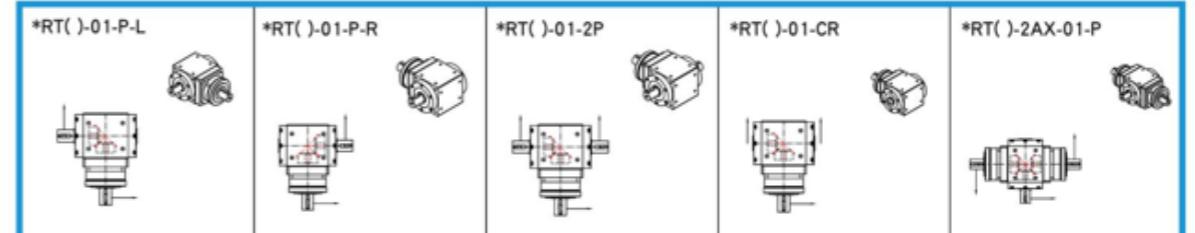
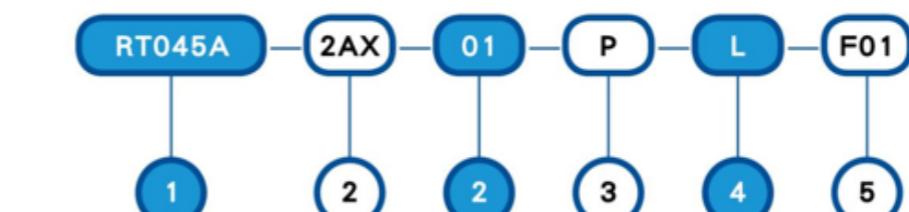
\*Fig. 1

\*Fig. 2

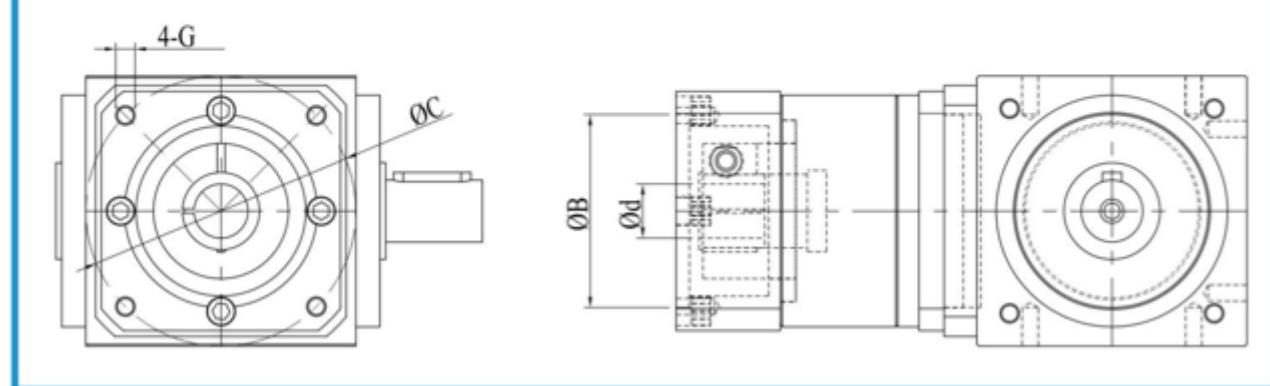
L100:100(mm)  
 producible range 20 – 600(mm)

\*Fig. 3

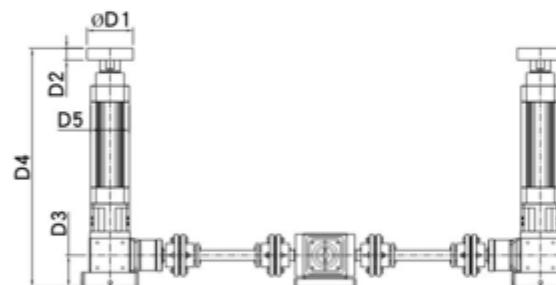
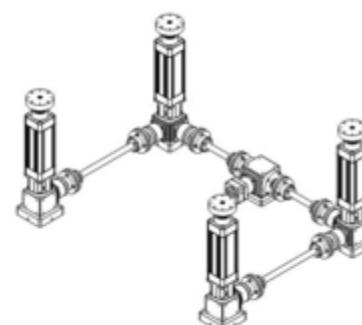
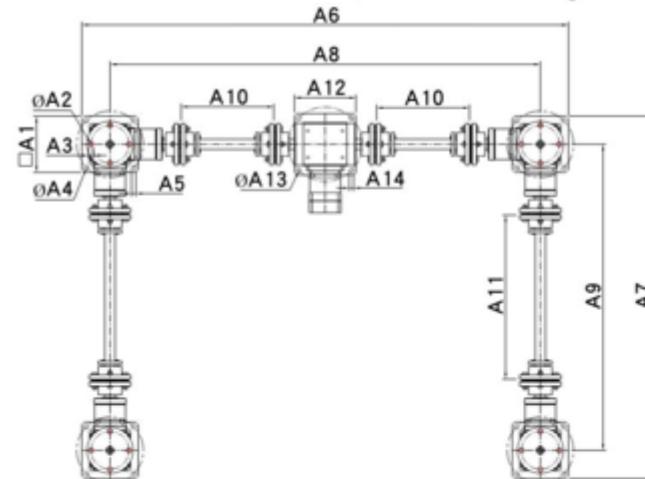
■ RT series (for Bevel gear boxes):  
 Helical bevel gears (gear ratio): 1/1 – 1/5



Dimensions of input flange :



## 4-shaft screw lift, Electric cylinder type – Dimensions



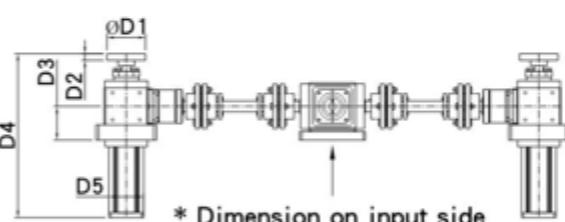
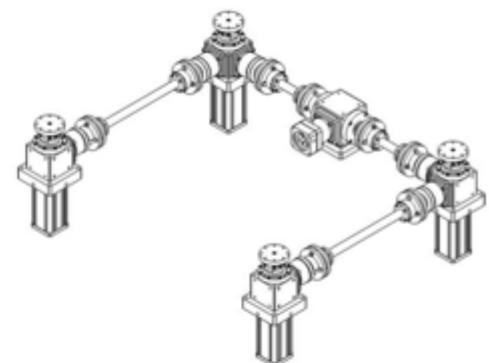
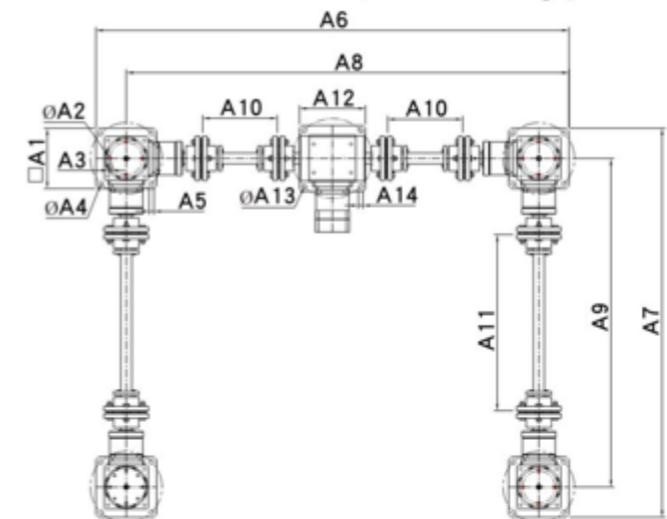
\* Dimension on input side (depending on the selected motor)

Notes: Electric cylinder type (linear guide incorporated)

1. Diameter of ball screw (16/20/25/32)
2. Lead of ball screw (5/10/20/25/32)
3. Correct dimensions are according to 2D/3D drawings.

Spec	D1	D2	D3	D4	D5	A1	A2	A3	A4	A5	A6	A7	A8
RB080AS-G4U-JDT75	90	23	61.5	Per the actual stroke (mm)	75	110	74	4-M10	130	4- $\phi$ 8.5	* Depending on screw span		
RB110AS-G4U-JDT97	90	23	61.5/65		97	142	74	4-M10	170	4- $\phi$ 8.5			

## 4-shaft screw lift, Piston type – Dimensions



\* Dimension on input side (depending on the selected motor)

Notes: Piston type (linear guide incorporated)

1. Diameter of ball screw (16/20/25)
2. Lead of ball screw (5/10/20/25)
3. Correct dimensions are according to 2D/3D drawings.

Spec	D1	D2	D3	D4	D5	A1	A2	A3	A4	A5	A6	A7	A8
RB080AS-G4U-AHT	70	12	61.5	Per the actual stroke (mm)	63	110	59	4-M6	130	4- $\phi$ 8.5	* Depending on screw span		
RB110AS-G4U-AHT	90	23	61.5/65		75	142	74	4-M10	170	4- $\phi$ 8.5			



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## MAC motor®

All-in-one integrated servo motors with ePLC™, brake, multiturn encoder and support for all Ethernet protocols



### Benefits of integrated motors

The benefits of integrated motors are that they do not take up space in the control cabinet, and are all-in-one units. All electronics are combined in the same metal housing for high EMC safety.

### ePLC™ embedded PLC

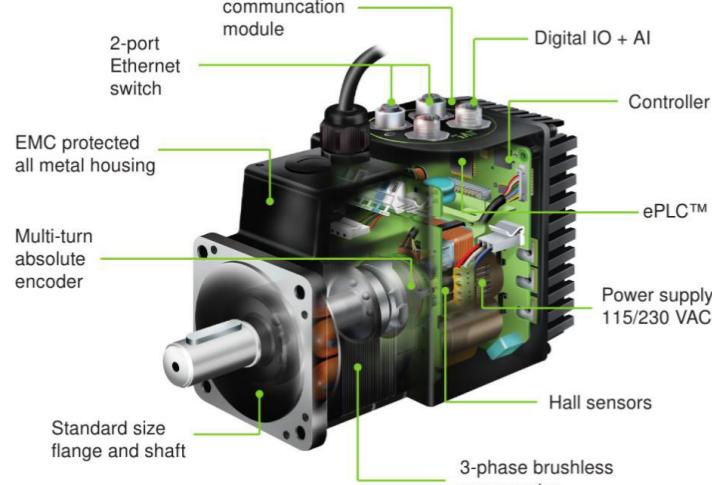
All JVL motors have ePLC™ built-in with up to 13 IO points. It enables <1 ms reaction times and can work together with a master PLC running Ethernet. Graphical point-n-click programming.

### Ethernet with protocol change

This unique feature gives you the flexibility to change protocol between Profinet, EtherNet/IP, Sercos, EtherCAT, Powerlink and Modbus TCP/UDP on any JVL motor. It is easy with JVL's MacTalk® software.



**Technology Partner**  
A ROCKWELL AUTOMATION PARTNER



JVL A/S is a Danish manufacturer founded in 1986 and is the inventor of the integrated servo motor concept. Our focus is on developing state-of-the-art products for motion control. We are proud to be a certified supplier to the aerospace and automotive industries. We offer two all-in-one ranges: Servo motors from 50 to 4500 W and ServoStep™ motors from 0.36 to 25 Nm. All motors are designed for IIoT and are Industry 4.0 ready.

intelligent motors



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Intelligent motors

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## JVL – your global partner

JVL A/S is a Danish company with subsidiaries in Germany, UK, USA and Turkey. We have distributors and partner companies in more than 30 countries world-wide – sales and support are always nearby.

MAC motor® Integrated Servo Motor	DC		New		AC		AC		Unit	
	MAC050-A	MAC095-A	MAC140-A	MAC140-F	MAC141-F	MAC402-D	MAC400-D	MAC800-D	MAC1200-D	
Technical specifications	MAC050-A	MAC095-A	MAC140-A	MAC140-F	MAC141-F	MAC402-D	MAC400-D	MAC800-D	MAC1200-D	
Supply voltage	12-48 VDC					115/230 VAC	115/230 VAC	115/230 VAC	115/230 VAC	
Speed range (nominal)	0-4000	0-4000	0-4000	0-4000	0-2700	0-3000	0-3000	0-3000	0-3000	RPM
Rated power	46	92	134	134	134	400	400	746	1182	Watt
Continuous torque	0.11 (15.6)	0.22 (31.2)	0.32 (45.3)	0.32 (45.3)	0.48 (68)	1.28 (184.1)	1.28 (184.1)	2.38 (337.1)	3.82 (538.1)	Nm (oz-in)
Peak torque	0.32 (45.3)	0.62 (88)	0.9 (127.5)	0.9 (127.5)	1.59 (225.2)	3.8 (538)	3.8 (538)	6.8 (963)	11.46 (1614)	Nm (oz-in)
Rotor inertia	0.075 (0.0010)	0.119 (0.0017)	0.173 (0.0025)	0.173 (0.0025)	0.227 (0.0032)	0.34 (0.0048)	0.34 (0.0048)	0.91 (0.0129)	1.6 (0.0225)	kgcm² (oz-in-s²)
Encoder resolution (std.)	4096	4096	4096	8192	4096	8192	8000/8192	8000/8192	8000/8192	CPR
Abs. encoder (Single/Turns)	-	-	-	8192 ±62143 rev	8192 ±62143 rev	8192 ±8178 rev	8192 ±8178 rev	8192 ±8178 rev	8192 ±8178 rev	CPR ±rev.
Dimensions WxHxL [mm]	57.7x57.7x111	57.7x57.7x131.5	57.7x57.7x150.5	57.7x57.7x150.5	57.7x57.7x172	63x115x191	63x115x191	84x120x174	84x120x203	mm
Dimensions WxHxL [inch]	2.27x2.27x4.37	2.27x2.27x5.18	2.27x2.27x5.93	2.27x2.27x5.93	2.27x2.27x6.77	2.48x4.53x7.52	2.48x4.53x7.52	3.31x4.72x7.99	3.31x4.72x8.65	inch
Length with brake	Optional external brake: MAB23X +54 (2.26)					224 (8.82)	224 (8.82)	209 (8.23)	239 (9.41)	mm (inch)
Flange	57.7x57.7 (2.27x2.27) NEMA23					60x60 (2.36x2.36)	60x60 (2.36x2.36)	80x80 (3.15x3.15)	mm (inch)	mm (inch)
Shaft	Ø6.35 (0.25)	Ø6.35 (0.25)	Ø6.35 (0.25)	Ø6.35 (0.25)	Ø6.35 (0.25)	Ø14 (0.55)	Ø14 (0.55)	Ø19 (0.75)	Ø19 (0.75)	mm (inch)
Weight w/o module	0.55 (1.21)	0.83 (1.83)	1.1 (2.43)	1.1 (2.43)	1.32 (2.91)	2.05 (4.52)	2.3 (5.07)	2.9 (6.39)	4.0 (8.82)	kg (lb)
Weight with brake	-	-	-	-	-	2.5 (5.51)	2.8 (6.17)	3.7 (8.16)	5.0 (11.02)	kg (lb)
Protection class	IP42 (IP67 Optional)					IP55 (IP66 Optional)				



MAC motor® Integrated Servo Motor	AC		
	MAC1500-D	MAC3000-G	MAC4500-G
Technical specifications	Unit	Unit	Unit
Supply voltage	3x400	3x400	3x400
Speed range (nominal)	0-3000	0-3000	0-3000
Rated power	1500	3000	4500
Continuous torque	4.78 (677)	9.55 (1352.4)	14.3 (2025)
Peak torque	15 (2025)	28.6 (4050)	52.3 (7406)
Rotor inertia	13.96 (0.0886)	27.83 (0.1719)	27.83 (0.394)
Encoder resolution (std.)	8192	8192	8192
Abs. encoder (Single/Turns)	8192 ±8178 rev	8192 ±8178 rev	8192 ±8178 rev
Dimensions WxHxL [mm]	134x205x250	134x205x330	134x205x330
Dimensions WxHxL [inch]	5.28x8.07x9.84	5.28x8.07x12.99	5.28x8.07x12.99
Length with brake	306 (12.05)	391 (15.39)	391 (15.39)
Flange	130x130 (5.12x5.12)		
Shaft	Ø24/0.94	Ø24 (0.94)	Ø24 (0.94)
Weight w/o module	10.2 (22.49)	17.0 (37.48)	18.63 (41.07)
Weight with brake	13.2 (29.1)	20 (44.09)	21.63 (47.63)
Protection class	IP55 (IP66 optional)		

Software integration on all major platforms

**SIEMENS**  
TIA Portal

**Rexroth**  
Bosch Group

**Rockwell**  
Automation  
Studio 5000

**BECKHOFF**  
TwinCAT®

**OMRON**  
LabVIEW

**BECKHOFF**



MAC motor® Plugin modules	Protocol									
	EtherNet/IP	Profinet	EtherCAT	Modbus TCP/UDP	Sercos	Powerlink	CANopen	Serial	Serial	WiFi
Part number	MAC00-E14	MAC00-EP4	MAC00-EC4	MAC00-EM4	MAC00-ES4	MAC00-EL4	MAC00-FC41	MAC00-B41	MAC00-B42	MAC00-EW4
Ethernet switch ports	2 ports									
IO	1DI + 1DO + 1AI									
Specs	CIP / DLR	Profinet IO	CANopen	TCP/IP or UDP/IP	Line, Ring	CANopen	DSP402	RS485/RS232	RS485/RS232	802.11b/g
Extended IO Part number	MAC00-E41	MAC00-EP41	MAC00-EC41	MAC00-EM41	MAC00-ES41	MAC00-EL41	4DI + 2DO + 2AI			

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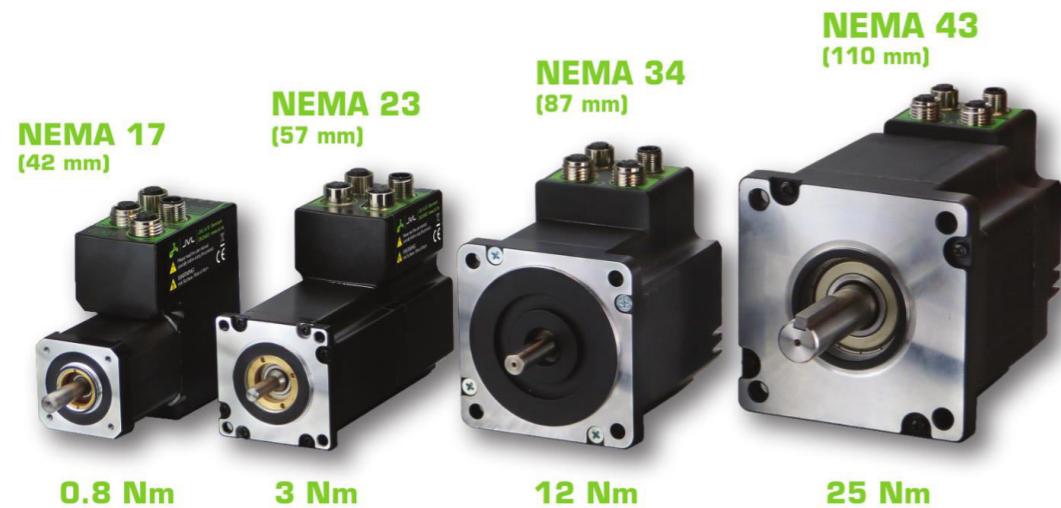
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## ServoStep®

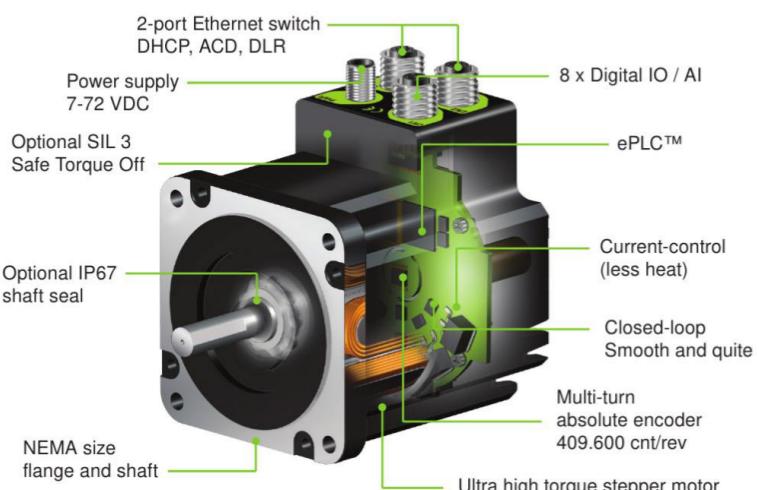
All-in-one integrated stepper motors with closed-loop, ePLC, multturn encoder and support for all Ethernet protocols



**Benefits of integrated motors**  
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**ePLC™ embedded PLC**  
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## JVL – your global partner



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NEMA 17		NEMA 23														
Main motor type*	MIS171	MIS173	MIS176	MIS21S	MIS23S	MIS234S	MIS231T	MIS232T	SMC66							
Holding torque	0.18 [25]	0.40 [56]	0.78 [110]	0.97 [137]	1.97 [279]	3.08 [462]	1.16 [164]	2.53 [358]	6 A	Nm [Oz-In]						
Resolution	409600	409600	409600	409600	409600	409600	409600	409600	409600	Counts per rev.						
Supply voltage Driver	7-72	7-72	7-72	7-72	7-72	7-72	7-72	7-72	7-72	VDC						
Supply: Control + I/O	7-28	7-28	7-28	7-28	7-28	7-28	7-28	7-28	7-28	VDC						
Max supply current Driver @24 / 48 / 72 VDC	2.9 / 2.0 / 1.3	3.3 / 3.2 / 2.7	2.8 / 3.0 / 3.2	5.1 / 5.2 / 5.1	4.4 / 4.6 / 4.8	3.5 / 4.1 / 4.1	6.7 / 6.3 / 5.6	5.9 / 6.1 / 6.2	6.7 / 6.3 / 6.2	ADC RMS						
Nominal speed range	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	RPM						
Max mechanical power**	100	142	135	177	221	212	198	316	316	W						
Rotor inertia	0.02 [0.0003]	0.054 [0.0008]	0.1 [0.00144]	0.3 [0.0042]	0.48 [0.0068]	0.65 [0.0092]	0.3 [0.0042]	0.48 [0.0068]	0.48 [0.0068]	kg·cm²/oz-in²						
Flange dimensions	42x42 [1.7]	42x42 [1.7]	42x42 [1.7]	57x57 [2.3x2.3]	mm [Inch]											
Length	73.5 [2.89]	85.2 [3.35]	106 [4.17]	103 [4.06]	124 [4.88]	161 [6.34]	103 [4.06]	124 [4.88]	124 [4.88]	mm [inch]	59.5	mm [inch]				
Shaft diameter***	Ø5 [0.197]	Ø5 [0.197]	Ø8 [0.315]	Ø6.35 [0.25]	Ø6.35 [0.25]	Ø10 [0.3937]	Ø6.35 [0.25]	Ø10 [0.3937]	Ø10 [0.3937]	mm [inch]						
Weight	0.54 [1.19]	0.68 [1.50]	0.90 [1.98]	1.1 [2.43]	1.4 [3.09]	2.0 [4.41]	1.1 [2.43]	1.4 [3.09]	1.4 [3.09]	kg [lb]						
Protection class	IP42 (IP65 Optional)															

\* Rear end connectors available

\*\* Peak power @ 72 VDC

\*\*\* Other shaft types also available

NEMA 34		NEMA 43														
Main motor type	MIS340	MIS341	MIS342	MIS343	MIL34	MIS430	MIS431	MIS432	SMC85							
Holding torque	3.0 [425]	5.1 [722]	9.0 [1274]	12.0 [1699]	2300 N	10.0 [1416]	18.7 [2648]	25.0 [3539]	9 A	Nm [Oz-In]						
Resolution	409600	409600	409600	409600	409600	409600	409600	409600	409600	Counts per rev.						
Supply voltage Driver	7-72	7-72	7-72	7-72	7-72	7-72	7-72	7-72	7-72	VDC						
Supply: Control + I/O	7-28	7-28	7-28	7-28	7-28	7-28	7-28	7-28	7-28	VDC						
Max supply current Driver @24 / 48 / 72 VDC	5.0 / 5.2 / 5.4	5.6 / 5.3 / 5.9	6.0 / 5.4 / 6.1	6.3 / 5.7 / 6.6	5.6 / 5.3 / 5.6	6.6	6.6	6.6	6.6	ADC RMS						
Nominal speed range	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	0.01 - 3000	RPM						
Max mechanical power**	260	288	367	296	288	240	323	245	245	W						
Rotor inertia	1.4 [0.0198]	2.7 [0.0382]	4.0 [0.0564]	5.3 [0.0750]	5.3 [0.0750]	5.5 [0.0778]	10.9 [0.154]	16.2 [0.2292]	16.2 [0.2292]	kg·cm²/oz-in²						
Flange dimensions	87x87 [3.4x3.4]	87x87 [3.4x3.4]	87x87 [3.4x3.4]	87x87 [3.4x3.4]	87x87 [3.4x3.4]	110x110 [4.3x4.3]	110x110 [4.3x4.3]	110x110 [4.3x4.3]	110x110 [4.3x4.3]	mm [Inch]	51x116	mm [inch]				
Length	95.0 [3.74]	125.0 [4.92]	155.0 [6.10]	185.0 [7.28]	185.0 [7.28]	145.5 [5.73]	196.5 [7.74]	247.5 [9.74]	247.5 [9.74]	mm [inch]	117	mm [inch]				
Shaft diameter***	Ø9.53 [0.3752]	Ø9.53 [0.3752]	Ø14.0 [0.5512]	Ø14.0 [0.5512]	Ø14.0 [0.5512]	Ø19 [0.748]	Ø19 [0.748]	Ø19 [0.748]	Ø19 [0.748]	mm [inch]						
Weight	2.1 [4.5]	3.1 [6.9]	4.3 [9.5]	5.3 [11.7]	5.3 [11.7]	5.1 [11.2]	8.9 [19.6]	11.8 [26.0]	11.8 [26.0]	kg [lb]	0.6 [1.3]	kg [lb]				
Protection class	IP42 (IP65 Optional)															

\*\* Peak power @ 72 VDC

\*\*\* Other shaft types also available

## Software integration on all major platforms

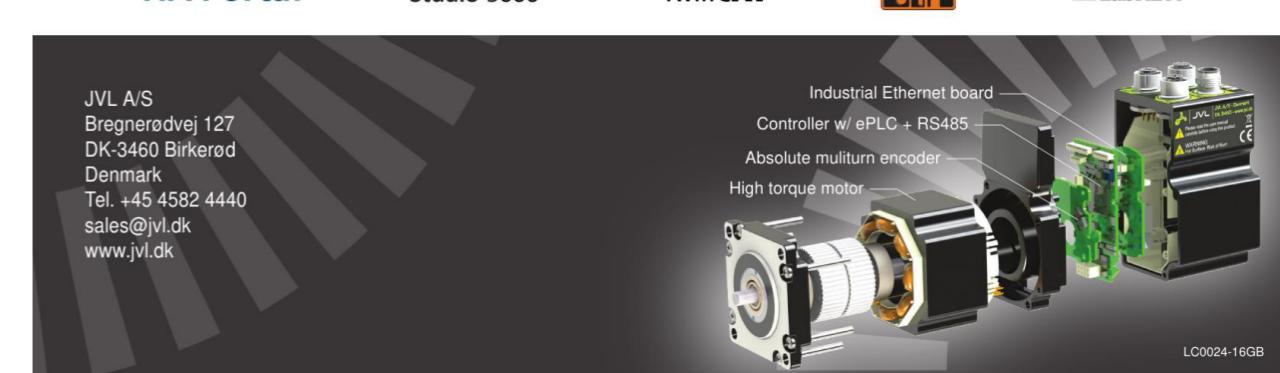
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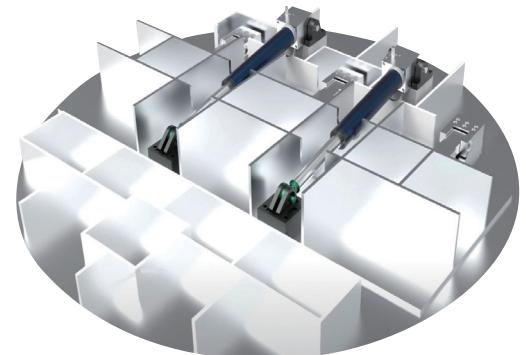
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Tel: 070-7019-2514 Fax: 070-7016-2513 Email: [sales@sjautomation.kr](mailto:sales@sjautomation.kr)

Address: 경기도 파주시 장명산길 36-23 2층(오도동)