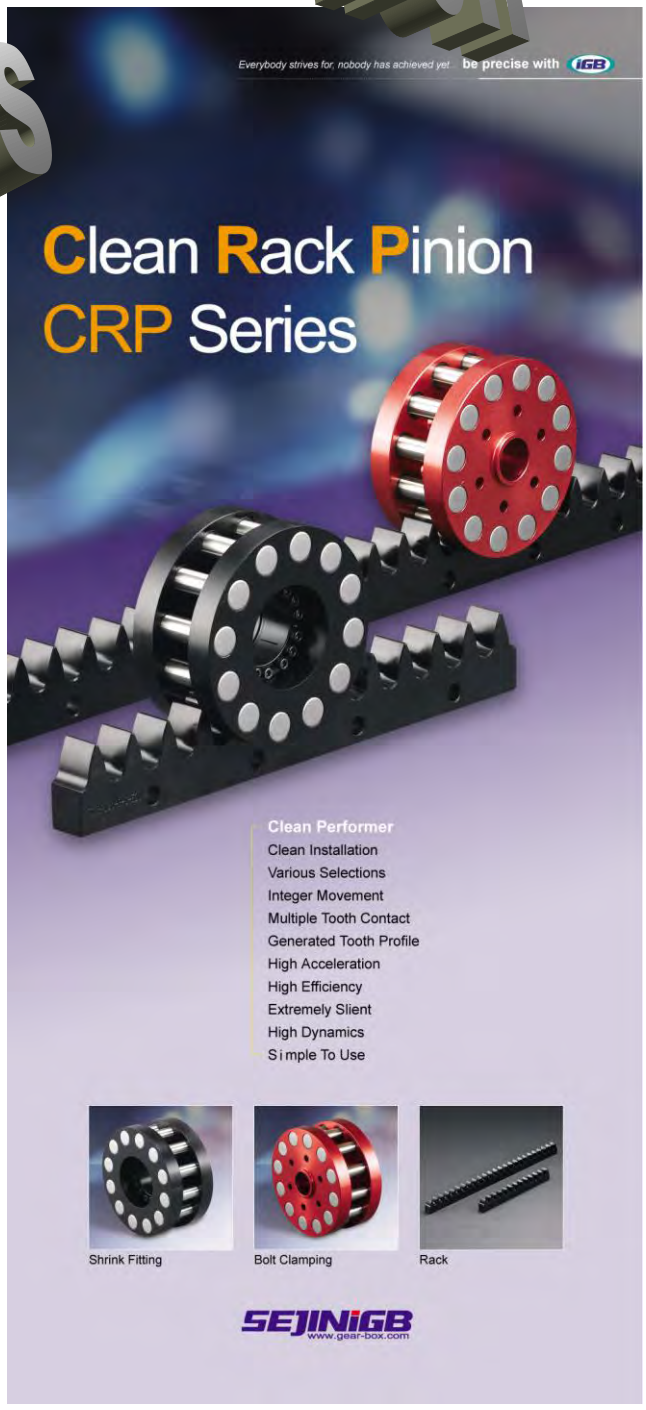
Clean Rack Pinion CRP series



Clean Performer

Clean Installation
Various Selections
Integer Movement
Multiple Tooth Contact
Generated Tooth Profile
High Acceleration
High Efficiency
Extremely Silent
High Dynamics
Simple To Use

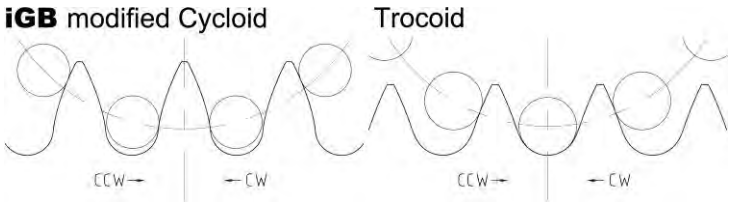
Why?

공학적 도전

✓ ***청정 설치 및 운전*** *(미끄럼 및 윤활 최소화)*
✓ ***다양한 선정*** *(다양한 용량 및 적용 길이 무제한)*
✓ ***정수 이송*** *(누적오차제거)*
✓ ***저소음 구동*** *(불규칙 운동의 최소화)*
✓ ***급가감속*** *(치접촉률의 극대화)*
✓ ***고효율*** *(미끄럼마찰 최소화 및 온전한 구름 접촉)*
✓ ***고정밀*** *(고효율, 백래쉬 및 진동 억제)*
✓ ***고생산성*** *(저관성, 고강성, 고추력)*
✓ ***고속화*** *(저관성, 내부윤활의 극대화)*
✓ ***경박단소*** *(상대적으로 높은 부하 대응성)*
✓ ***유지보수 최소화*** *(고강성, 높은 내충격성)*
✓ ***손쉬운 사용*** *(사용자 준비품 최소화, 부동소수 이동배제)*
✓ ***고객원가절감*** *(간단구조의 장비설계)*

Engineering Challenges

✓ ***Clean Installation*** *(Minimize slippage & lubrication)*
✓ ***Various Selection*** *(Diverse size & Unlimited length)*
✓ ***Integer Movement*** *(Eliminate accumulated error)*
✓ ***Extremely Silent*** *(Minimize irregular motion)*
✓ ***High Acceleration*** *(Maximize tooth contact ratio)*
✓ ***High Efficiency*** *(Minimize slippage & Full rolling contact)*
✓ ***High Precision*** *(High efficiency, Non-backlash & vibration)*
✓ ***High Productivity*** *(Low inertia, High rigidity, High thrust)*
✓ ***High Speed*** *(Low inertia, Maximize internal lubrication)*
✓ ***Compactness*** *(Relatively high load capacity)*
✓ ***Trouble free*** *(High rigidity, High shock resistance)*
✓ ***Easy to use*** *(Minimize user preparation, No floating feed)*
✓ ***Customer cost down*** *(Simple structure of machine)*



How?

진보된 해법

iGB **치 프로파일의 재정의**
- **일반적인 해법 ⇨ 인벌루트 치형**
  ☺ 손쉬운 생산, 높은 호환성
  ☹ 높은 치 면압 (볼록접촉), 미끄럼율이 일정하지 않음 (이끝 및 이뿌리 취약)
- **진보된 해법 ⇨ 개선된 사이클로이드 치형**
  ☺ 낮은 치 면압 (오목접촉), 일정한 미끄럼율 (마모가 되더라도 균일 하게 진행)
  ☹ 설계 및 생산에 난이도가 높음

iGB **높은 치 접촉율**
- iGB 표준=1.75, iGB 특주=2 (일반적으로 최대=1.5)

iGB **최적화된 압력각** (고효율, 응역집중 완화)
iGB **정수이송** (부동소수 π 제거, 1회전당 정수이송 구현)
iGB **소음감소** (온전한 구름접촉, 미끄럼 접촉의 최소화)
iGB **탁월한 정밀도** (백래쉬 및 진동 최소화, 예압적용가능)
iGB **급가감속** (치 접촉률 극대화 및 피니언 관성의 최소화)
iGB **궁극의 속도** (표준 6m/s 구현, 요청에 따라 10m/s가능)
iGB **알루미늄 합금 피니언 적용 가능** (저관성, 고반응성)
iGB **청정설치 및 운전** (랙 윤활의 최소화)
- **3~4m/s 까지 무윤활 구동 가능** (필요시 표면보호 피막 정도의 양으로 충분)
- **피니언 구조:**높은 보호등급 (IP54~IP67), 내부 윤활, 양단지지베어링 구름핀 (HRC58↑)
- **마모 최소화로 분진발생 최소화**

Advanced Solutions

iGB **Redefine tooth profile**
- Conventional solution ⇨ Involute profile
  ☺ Easy to manufacture, High compatibility
  ☹ High tooth surface pressure (Convex contact), Variant slippage rate (weak addendum & dedendum)
- **Advanced solution ⇨ Modified Cycloidal profile**
  ☺ Low tooth surface pressure (Concave contact), Constant slippage rate (Homogeneous wear, if there is)
  ☹ Specialized manufacturing and design

iGB **High tooth contact ratio**
- Conventional max.=1.5, *iGB Standard=1.75, iGB Customized=2*

iGB **Optimized pressure angle** (High efficiency, Low stress concentration)
iGB **Integer movement** (Eliminate floating number π, Integer feeding rate)
iGB **Noise control** (Full rolling contact, Minimize slippage)
iGB **Unsurpassed accuracy** (Minimize backlash & vibration, preloadable)
iGB **High acceleration** (Maximum tooth contact & Minimum pinion inertia)
iGB **Ultimate speed** (Up to 6m/s as standard, Up to 10m/s on request)
iGB **Applicable aluminum alloy pinion** (Low inertia, High responsiveness)
iGB **Clean Installation** (Minimize rack lubrication)
- No rack lubrication up to 3~4m/s (only surface coating amount, if it is necessary)
- Completely sealed (IP54~IP67) pinion with self-lubricating internal structure, with both-end support bearing for each rolling pin (HRC58↑)
- Minimized debris, due to minimized wear

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*CRP 정격일람 [**C**lean **R**ack **P**inion series ratings at a glance]*

랙 사 양 [Rack Specifications]		단위 [Unit]	CRP001	CRP002	CRP004	CRP008	CRP015	CRP020	CRP040	CRP060	CRP080	CRP120	CRP180
허용법선력 vs. 피니언회전수 [Permitted tangential force vs. Pinion rpm]	720rpm [630rpm]	N	1.44m/s	1.8m/s	2.16m/s	2.88m/s	3.6m/s	4.32m/s	5.04m/s	[5.04m/s]	[5.67m/s]	-	-
			263	426	702	789	1137	1368	2075	[2882]	[3778]	-	-
	600rpm [510rpm]		1.2m/s	1.5m/s	1.8m/s	2.4m/s	3.0m/s	3.6m/s	4.2m/s	4.8m/s	5.4m/s	5.1m/s	-
			279	468	737	816	1200	1439	2180	2934	3836	[5000]	-
주) 6m/s 이상의 경우, ㈜세진아이지비로 문의바랍니다. [Note; Please contact SEJINiGB for faster than 6m/s]	480rpm [420rpm]		0.96m/s	1.2m/s	1.44m/s	1.92m/s	2.4m/s	2.88m/s	3.36m/s	3.84m/s	4.32m/s	4.8m/s	[5.04m/s]
			295	511	772	868	1284	1544	2331	3132	4105	5084	[7842]
	360rpm		0.72m/s	0.9m/s	1.08m/s	1.44m/s	1.8m/s	2.16m/s	2.52m/s	2.88m/s	3.24m/s	3.6m/s	4.32m/s
			316	553	842	947	1389	1684	2541	3408	4468	5547	8211
	240rpm		0.48m/s	0.6m/s	0.72m/s	0.96m/s	1.2m/s	1.44m/s	1.68m/s	1.92m/s	2.16m/s	2.4m/s	2.88m/s
			363	596	912	1053	1579	1895	2872	3855	5041	6263	9271
	120rpm		0.24m/s	0.3m/s	0.36m/s	0.48m/s	0.6m/s	0.72m/s	0.84m/s	0.96m/s	1.08m/s	1.2m/s	1.44m/s
			447	638	947	1447	2105	2632	4060	5263	6199	8421	10526
최대가감속허용법선력 [Max. acc./dec. tangential force]		N	526	851	1403	2105	3158	3509	6015	7895	9357	12632	15789
순간허용최대법선력(비상정지) [Peak tangential force (E-stop)]		N	1053	1702	2807	4210	6316	7018	12030	15789	18713	25263	31579
치간거리 [Pitch]		mm	12	12.5	15	20	25	30	35	40	45	50	60
단위질량 [Unit mass]		kg/m		2.6	4.4	5.8	7.3	8.9	11.3	14.9	17.5	23.8	30.1
표준길이 [Standard length]		mm	480	475	480	520	500	540	560	560	630	700	720
			600	925	930	1000	950	1020	980	1040	1170	1100	1200
길이지정최소단위(최소길이) [Min. length variation (Min. length)]		mm	60 (120)	75 (100)	75 (105)	80 (120)	75 (125)	60 (120)	70 (140)	80 (160)	90 (180)	100 (200)	120 (240)
단일최대길이 [Unit max. length]		mm	600	1225	1230	1320	1250	1260	1260	1360	1350	1300	1440
랙 폭 [Rack width]		mm	10	15	18	21	24	27	32	37	42	52	56
이끝 높이 (랙 높이) [Addendum (Rack) height]		mm	28.5	28.5	39	47	53	60.5	66	75.5	80	87.5	105
이뿌리 높이 [Dedendum height]		mm	18.5	19	27	30	31	35	35.5	40	42	43.5	51
피치 높이 [Pitch height]		mm	21	22	31	35	37	43	44.5	50	54.5	56	66
피니언 조립높이 [Pinion installation height]		mm	40	45.5	59.5	73	84.5	100	111	126	140	151	180
표준길이 이 수 [Standard length no. of teeth]		teeth	40	38	32	26	20	18	16	14	14	14	12
			-	74	62	50	38	34	30	26	26	26	22
최소길이 이 수 [Minimum length no. of teeth]		teeth	10	8	7	6	5	4	4	4	4	4	4
단일최대길이 이 수 [Unit max. length no. of teeth]		teeth	45	116	97	74	59	48	42	36	32	30	26
피니언 사양 [Pinion Spec.]			CRP001	CRP002	CRP004	CRP008	CRP015	CRP020	CRP040	CRP060	CRP080	CRP120	CRP180
허용토크 vs. 피니언회전수 [Permitted torque vs. Pinion rpm]	720rpm [630rpm]	Nm	5	10	20	30	54	78	138	[219]	[323]	-	-
	600rpm [510rpm]		5.3	11	21	31	57	82	145	223	328	[475]	-
	480rpm [420rpm]		5.6	12	22	33	61	88	155	238	351	483	[894]
	360rpm		6	13	24	36	66	96	169	259	382	527	936
	240rpm		6.9	14	26	40	75	108	191	293	431	595	1057
	120rpm		8.5	15	27	55	100	150	270	400	530	800	1200
최대가감속허용토크 [Maximum acc./dec. torque]		Nm	10	20	40	80	150	200	400	600	800	1200	1800
순간허용최대토크 (비상정지) [Peak torque (E-stop)]		Nm	20	40	80	160	300	400	800	1200	1600	2400	3600
1회전당 이동거리 [Feeding rate per revolution]		mm/rev	120	150	180	240	300	360	420	480	540	600	720
피치원직경 [Pitch circle diameter]		mm	38	47	57	76	95	114	133	152	171	190	228
관성1) [Inertia]1)	알루미늄 [Aluminum]	$\times 10^{-4}$ $kg{\cdot}m^2$	0.67	1.56	4.23	11.5	32.7	74.8	160.6	307.5	671	993.5	2626
	탄소강 [Steel]		1.16	2.71	7.08	20.5	57.6	125	274.7	537.3	1043	1748	4690
질량1) [Mass]1)	알루미늄 [Aluminum]	kg	0.2	0.3	0.56	0.9	1.6	2.7	4.2	6.3	10.6	13	23.8
	탄소강 [Steel]		0.4	0.6	1.1	1.9	3.4	5.3	8.4	12.8	17.3	24.1	45.5
위치정밀도 [Positioning accuracy]		㎛	±30	±30	±30	±25	±25	±25	±25	±20	±20	±20	±20
롤러 수 [No. of roller]		rollers	10	12	12	12	12	12	12	12	12	12	12
모듈 [Module]		mm	3.8	3.92	4.75	6.33	7.92	9.5	11.1	12.7	14.25	15.83	19
최대 압력각 [Max. pressure angle]		deg.	30	27	27	27	27	27	27	27	27	27	27
롤러간 원호거리 [Arc distance between roller]		mm	12	12.5	15	20	25	30	35	40	45	50	60
기준수명2) [Lifetime basis]2) (L_{10})		hrs.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000

1) 표준 피니언일 때 참고값 입니다. [Reference value only for standard pinion.]
2) 평균부하토크 ≤ 허용토크 [Average load torque ≤ Permitted torque]

Clean **R**ack **P**inion 형식표시 **[C**lean **R**ack **P**inion **Ordering Information]**

랙	**CRP**	□□□	- R -	S	-	□□□□□
[Rack]	①	②				④
피니언	**CRP**	□□□	- P -	(A/S)	-	□□□□□
[Pinion]	①	②		③		④

① **형명 [Model Name]: C**lean **R**ack **P**inion

② **형번 [Model Number]:** 최대가감속허용토크 [Maximum acc./dec. torque]

③ **피니언 재질 [Pinion Material]:**

A : 알루미늄 (Aluminum) – 볼트 체결형 [Bolt clamping]

S : 탄소강 (Steel) – 수축형 체결구 또는 평행키 적용 [Shrink fitting or Feather keyway]

④ **지정사항 [Indication]:**

랙 [Rack] : 랙길이 [Rack length]

피니언 [Pinion] : 피니언 형상코드 또는 지정 감속기 [Pinion shape code or applied gearbox]

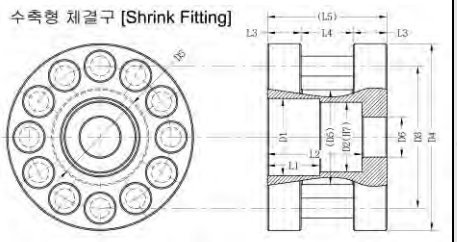
- 피니언 형상코드는 아래표를 참조하십시오. [Please refer below table for Pinion shape code.]
- 지정 감속기에 상응하는 피니언의 적용성 및 세부치수는 ㈜세진아이지비로 문의바랍니다.
  [In case of 'applied gearbox', please contact SEJINIGB for availability and detail dimensions.]

Ex.) CRP008-R-S-1000, CRP004-P-A-B06M05018, CRP002-P-S-K1431, CRP002-P-S-S1023, CRP002-P-A-MM065

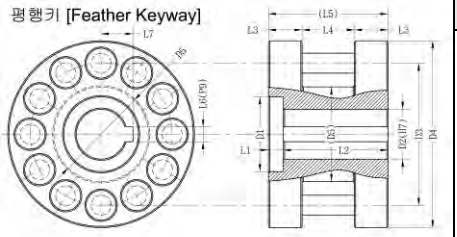
CRP 피니언 형상코드 **[CRP Pinion Shape Code]**

표준 피니언 [Standard Pinion]

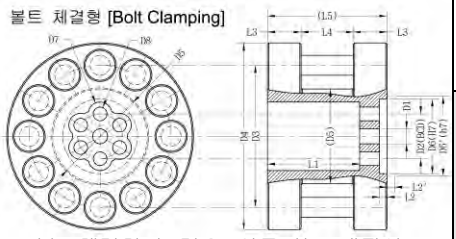
수축형 체결구 [Shrink Fitting]



평행키 [Feather Keyway]



볼트 체결형 [Bolt Clamping]



- 볼트체결형의 경우 알루미늄 재질이 표준, 탄소강재질은 준표준입니다.
- 도표의 수축형체결구는 자동조심형 적용의 경우입니다. 대구경 수축체결형은 외형도를 참조하십시오.

[- In case of bolt clamping shape, aluminum material is standard, steel is optional.
- Self-centering shrink fitting applied in the list, please refer external dimensions for bigger diameter shrink fittings]

피니언 형번 및 형상코드 [Pinion Model Number & Shape Code]

		CRP001	CRP002	CRP004	CRP008	CRP015	CRP020	CRP040	CRP060	CRP080	CRP120	CRP180
수축형 체결구 [Shrink Fitting]	D1	대구경 외형도 참조 [Please refer external drawings for big diameter shrink fittings.]	26	31	43	48	55	68	76	86	96	116
	D2		23	28	38	43	50	62	70	85	95	115
	D3		47	57	76	95	114	133	152	171	190	228
	D4		62	75	97	120	144	166	188	216	238	280
	D5		31	38	49	60	75	86	97	116	123	146
	D6		10	14	20	25	32	40	48	55	65	75
	L1		22	21	18	18	25	31	34.5	23	30	30
	L2		38	38	41	43	51	60	64.5	65	87	99
	L3		11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4		18	21	24	27	31	36	41	46	56	60
	L5		41	48	51	61	64	77	90	95	117	149
평행키 [Feather Keyway]	D1	15	22	30	30	35	35	52	52	76	76	120
	D2	10	14	20	20	25	25	40	40	55	55	85
	D3	38	47	57	76	95	114	133	152	171	190	228
	D4	50	62	75	97	120	144	166	188	216	238	280
	D5	22	31	38	49	60	75	86	97	116	123	146
	L1	12	9.5	6	9	8.5	12	40	17	7.5	29.5	18
	L2	24	31.5	42	42	52.5	52	73	73	87.5	87.5	131
	L3	11.5	11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4	13	18	21	24	27	31	36	41	46	56	60
	L5	36	41	48	51	61	64	77	90	95	117	149
	L6	3	6	6	6	8	8	12	12	16	16	22
	L7	6.4	9.3	12.8	12.8	15.8	15.8	23.3	23.3	31.8	31.8	47.9
볼트 체결형 [Bolt Clamping]	D1	-	6	6	15	18	18	20	-	60	70	70
	D2	12	18	18	30	37	37	45	75	90	100	120
	D3	38	47	57	76	95	114	133	152	171	190	228
	D4	50	62	75	97	120	144	166	188	216	238	280
	D5	22	31	38	49	60	75	86	97	117	123	146
	D6	20	30	30	45	58	58	70	50	-	-	-
	D6'	-	-	-	-	-	-	-	-	107	120	80
	D7	6X6	6X 9.5	6X 9.5	8X 11	8X 14	8X 14	8X 17.5	12X 17.5	12X 17.5	12X 17.5	12X 17.5
	D8	6X 3.5	6X 5.5	6X 5.5	8X 6.6	8X9	8X9	8X 11	12X 11	12X 11	12X 11	12X 11
	L1	25	30	37	39.5	49	52	57	10	77	104	123
	L2	3	3	3	3	3	3	3	3	-	-	-
	L2'	-	-	-	-	-	-	-	-	4.5	5	8
	L3	11.5	11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4	13	18	21	24	27	31	36	41	46	56	60
	L5	36	41	48	51	61	64	77	90	95	117	149
		B06M03012	B06M05018	B06M05018	B08M06030	B08M08037	B08M08037	B08M10045	B12M10075	B12M10090	B12M08100	B12M10120
		K1024	K1431	K2042	K2042	K2552	K2552	K4073	K4073	K5587	K5587	K85130
		S1023	S1428	S2038	S2543	S3250	S4062	S4870	S5585	S6595	S75115	

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[Customized rack & pinion is available on request. Please contact SEJINiGB for more detail.]

CRP 형번별 적용가능 iGB감속기 일람 [CRP & iGB gearbox combination at a glance]

CRP 형번 [CRP Model]		CP series (축형상/Shaft)	MM series (편평축/Flange)	XP series (편평축/Flange)	SS series (편평축/Flange)	Cubic series (편평축/Flange)	RPM series (편평축/Flange)	PQ series (편평축/Flange)
CRP001	수축형체결구 [Shrink Fitting]	CP050						
	평행키 [Feather Key]	CP050 (K1024)						
	볼트 체결형 [Bolt Clamping]		MM050 (B06M03012)	XP07A	SS03A		RPM08A RPM001	PQ001
CRP002	수축형체결구 [Shrink Fitting]	CP050 (S1023) CP065						
	평행키 [Feather Key]	CP065 (K1431)						
	볼트 체결형 [Bolt Clamping]		MM065 (B06M05018)	XP015	SS001	Cubic 001 (B08M03020)	RPM001 RPM002	PQ001 PQ002
CRP004	수축형체결구 [Shrink Fitting]	CP065 (S1428) CP085						
	평행키 [Feather Key]	CP085 (K2042)						
	볼트 체결형 [Bolt Clamping]		MM065 (B06M05018)	XP015	SS001	Cubic 002 (B08M04028)	RPM002 RPM004	PQ002 PQ003
CRP008	수축형체결구 [Shrink Fitting]	CP085 (S2038) CP120						
	평행키 [Feather Key]	CP085 (K2042)						
	볼트 체결형 [Bolt Clamping]		MM085 (B08M06030)	XP045	SS003	Cubic 003 (B08M05032)	RPM004 RPM008	PQ004 PQ007
CRP015	수축형체결구 [Shrink Fitting]	CP120 (S2543) CP150						
	평행키 [Feather Key]	CP120 (K2552)						
	볼트 체결형 [Bolt Clamping]		MM120 (B08M08037)	XP090	SS006	Cubic 006 (B08M06043)	RPM008, 009, 012, 015	PQ009
CRP020	수축형체결구 [Shrink Fitting]	CP120 (S2543) CP150						
	평행키 [Feather Key]	CP120 (K2552)						
	볼트 체결형 [Bolt Clamping]		MM120 (B08M08037)	XP090 (B06M08080)	SS010	Cubic 010 (B08M08054)	RPM012, 015, 023	PQ013
CRP040	수축형체결구 [Shrink Fitting]	CP150 (S4062)						
	평행키 [Feather Key]	CP150 (K4073)						
	볼트 체결형 [Bolt Clamping]		MM150 (B08M10045)	XP180 (B06M10090)	SS030	Cubic 020 (B08M10070)	RPM023 RPM035	PQ017 PQ030
CRP060	수축형체결구 [Shrink Fitting]	CP150 (S4062)						
	평행키 [Feather Key]	CP150 (K4073)						
	볼트 체결형 [Bolt Clamping]		MM150 (B08M10045)	XP180 (B06M10090)	SS030	Cubic 035 (B08M10086)	RPM044 RPM054	PQ030 PQ040
CRP080	수축형체결구 [Shrink Fitting]							
	평행키 [Feather Key]							
	볼트 체결형 [Bolt Clamping]			XP500	SS030	Cubic 035 (B08M10086)	RPM054 RPM080	PQ050 PQ060
CRP120	수축형체결구 [Shrink Fitting]							
	평행키 [Feather Key]							
	볼트 체결형 [Bolt Clamping]			XP500	SS060	Cubic 050 (B08M10130)	RPM080 RPM110	PQ060 PQ090
CRP180	수축형체결구 [Shrink Fitting]							
	평행키 [Feather Key]							
	볼트 체결형 [Bolt Clamping]						RPM110, 150, 200	PQ090 PQ120

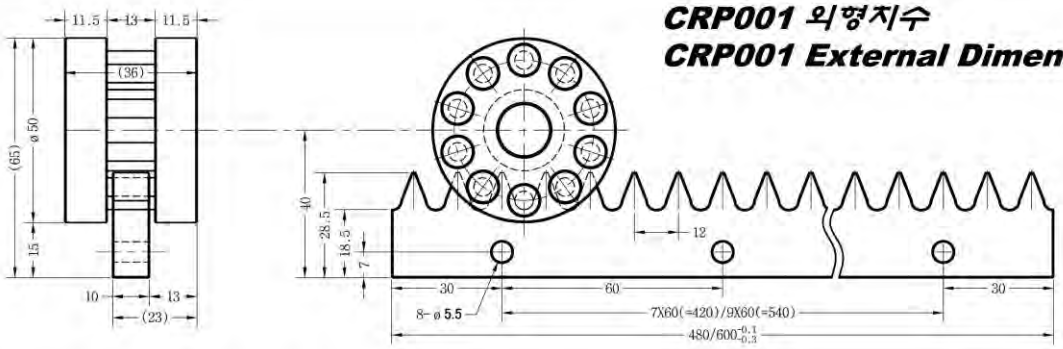
iGB 실제 적용가능 허용법선력 또는 출력토크는 정격일람을 참조바랍니다.
[Please refer rating at a glance for actual available tangential force or torque range.]

iGB 상기 표는 참고용이며, 사용자의 설계에 따라 다양한 조합이 가능합니다.
[Listed combination is only reference. Unlimited combination is possible, depends on design.]

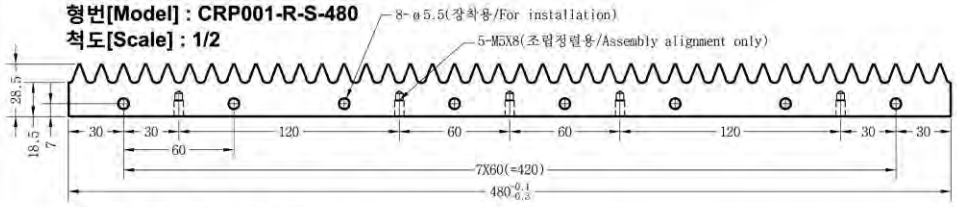
iGB 피니언 형상코드가 없는 경우는 장착용 구조물이 추가될 수 있습니다. 세부사항은 ㈜세진아이지비로 문의바랍니다.
[In case of no pinion shape code on the list, it may need adaptor for installation. Please contact SEJINiGB for details.]

CRP 외형치수 [CRP External Dimensions] (mm)

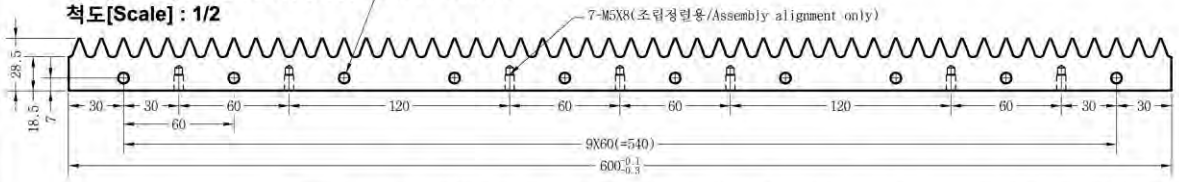
CRP001 외형치수
CRP001 External Dimensions



형번[Model] : CRP001-R-S-480
척도[Scale] : 1/2



형번[Model] : CRP001-R-S-600
척도[Scale] : 1/2



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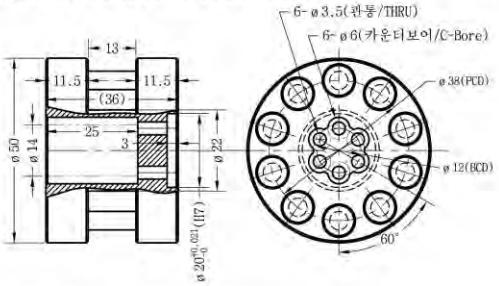
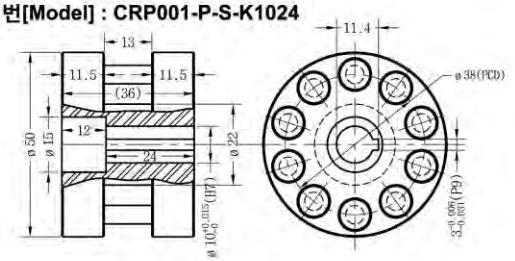
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

[Standard Pinions] 규격품 피니언

형번[Model] : CRP001-P-A-B06M03012

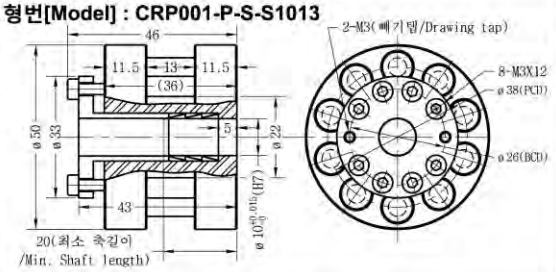


형번[Model] : CRP001-P-S-K1024

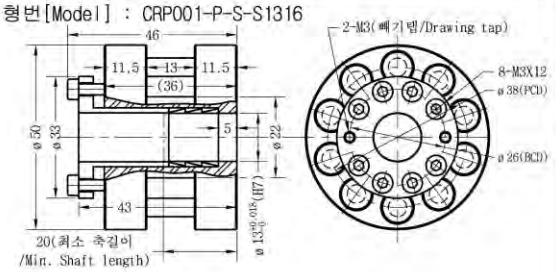


[Optional Shrink Fitting Pinions] 주문품 수축체결형 피니언

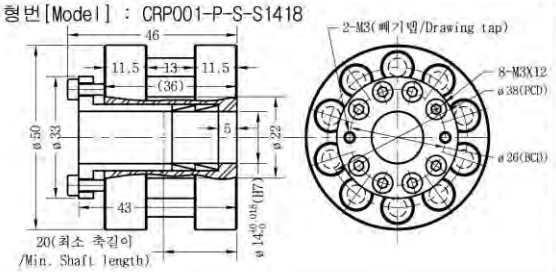
형번[Model] : CRP001-P-S-S1013



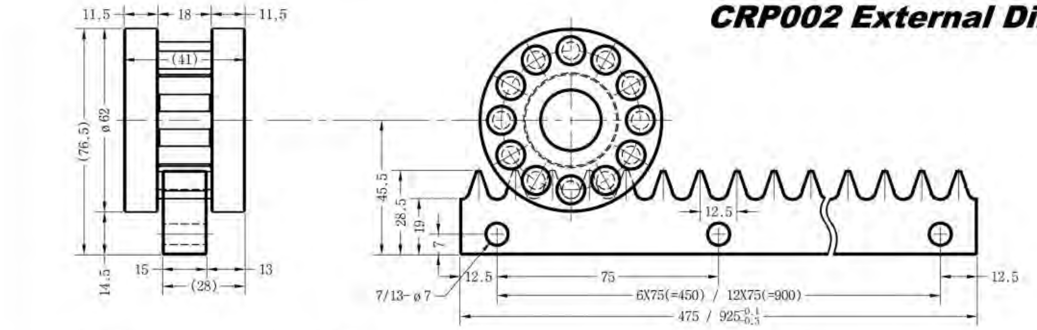
형번[Model] : CRP001-P-S-S1316



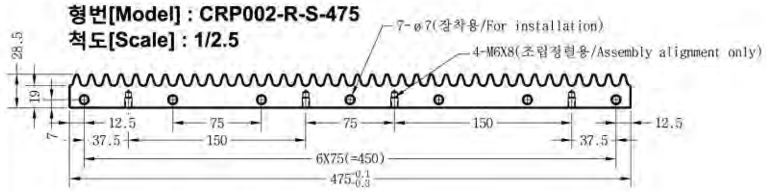
형번[Model] : CRP001-P-S-S1418



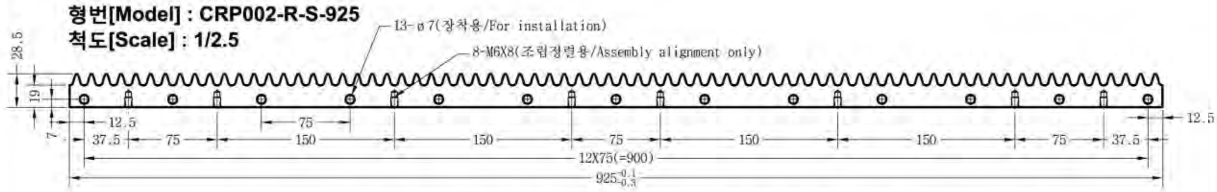
CRP002 외형치수
CRP002 External Dimensions



형번[Model] : CRP002-R-S-475
척도[Scale] : 1/2.5



형번[Model] : CRP002-R-S-925
척도[Scale] : 1/2.5



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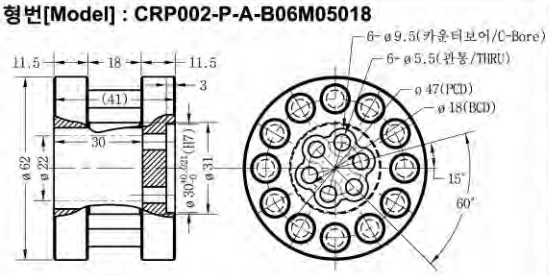
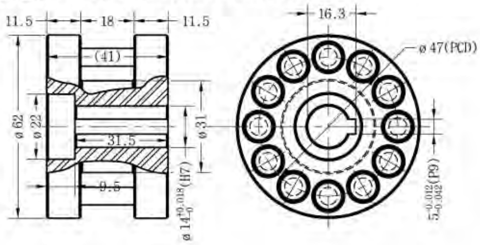
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

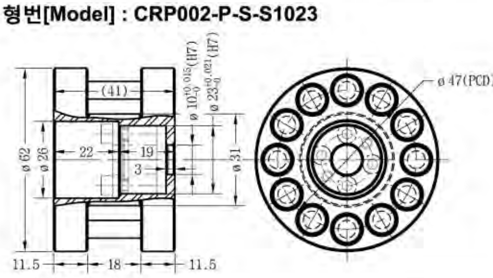
형번[Model] : CRP002-P-A-B06M05018



형번[Model] : CRP002-P-S-K1431

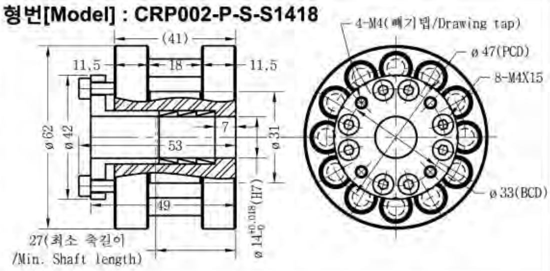


형번[Model] : CRP002-P-S-S1023

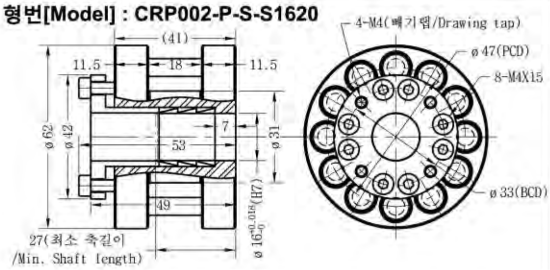


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

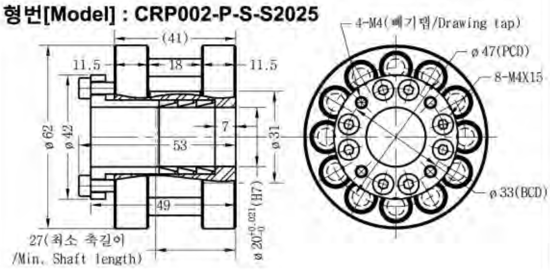
형번[Model] : CRP002-P-S-S1418



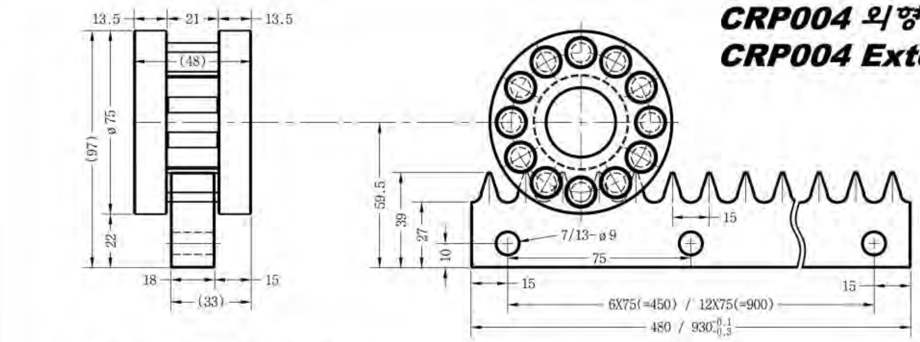
형번[Model] : CRP002-P-S-S1620



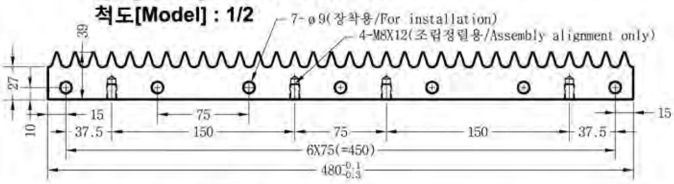
형번[Model] : CRP002-P-S-S2025



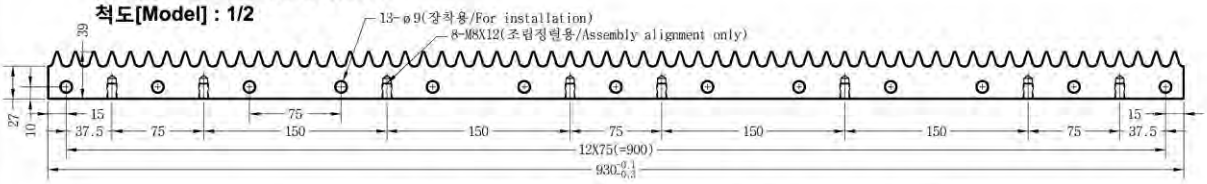
CRP004 외형치수
CRP004 External Dimensions



형번[Model] : CRP004-R-S-480
척도[Model] : 1/2



형번[Model] : CRP004-R-S-930
척도[Model] : 1/2



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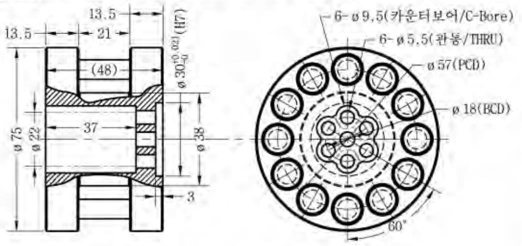
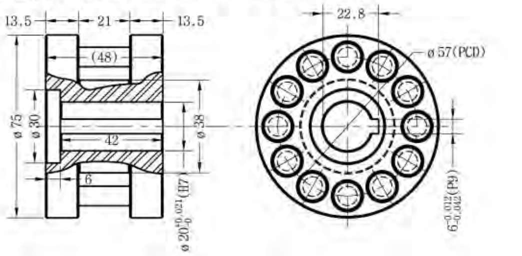
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

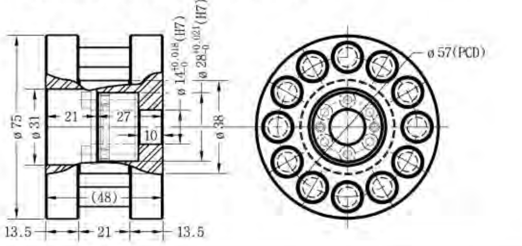
형번[Model] : CRP004-P-A-B06M05018



형번[Model] : CRP004-P-S-K2042

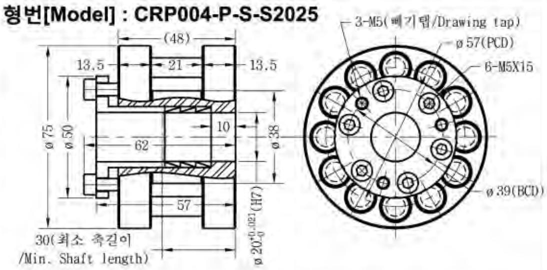


형번[Model] : CRP004-P-S-S1428

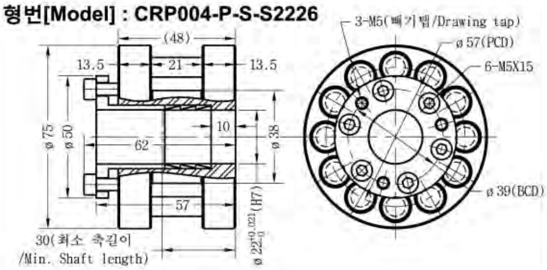


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

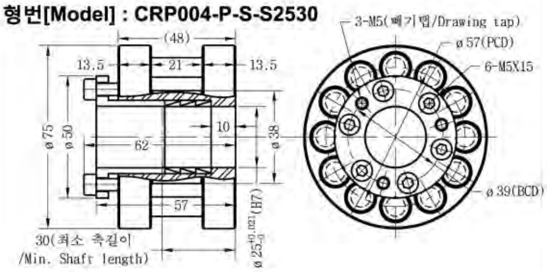
형번[Model] : CRP004-P-S-S2025



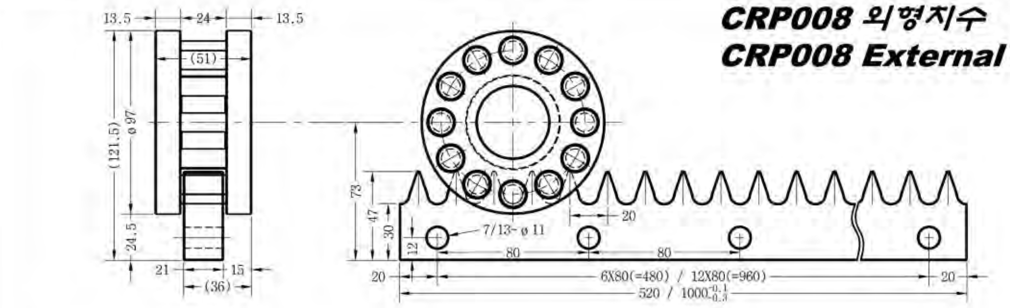
형번[Model] : CRP004-P-S-S2226



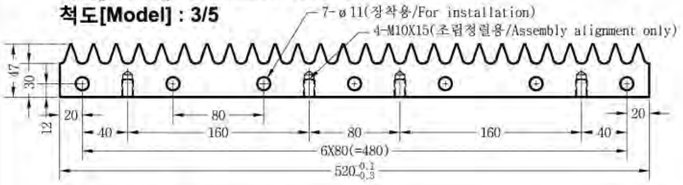
형번[Model] : CRP004-P-S-S2530



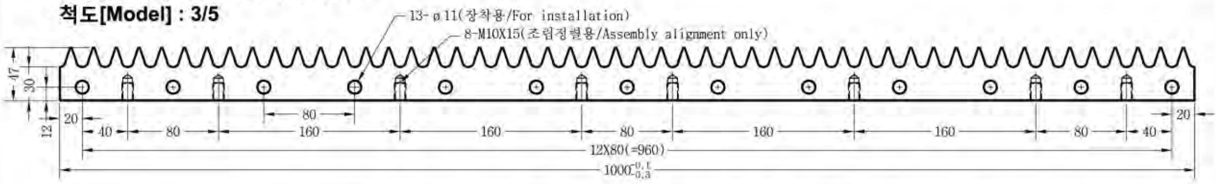
CRP008 외형치수
CRP008 External Dimensions



형번[Model] : CRP008-R-S-520
척도[Model] : 3/5



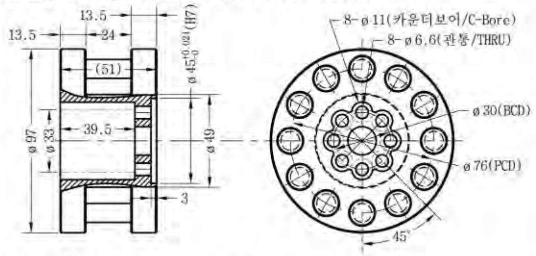
형번[Model] : CRP008-R-S-1000
척도[Model] : 3/5



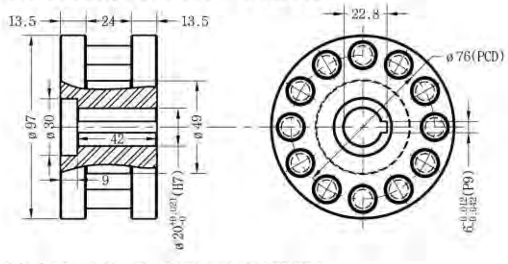
사용자 정의 랙과 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

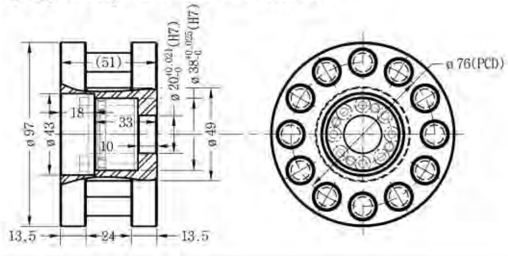
형번[Model] : CRP008-P-A-B08M06030



형번[Model] : CRP008-P-S-K2042

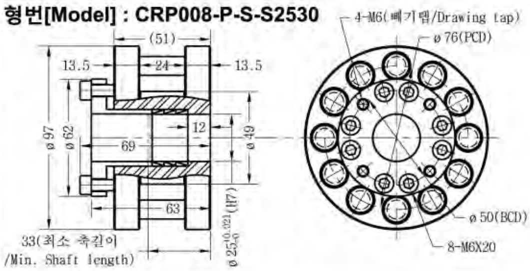


형번[Model] : CRP008-P-S-S2038

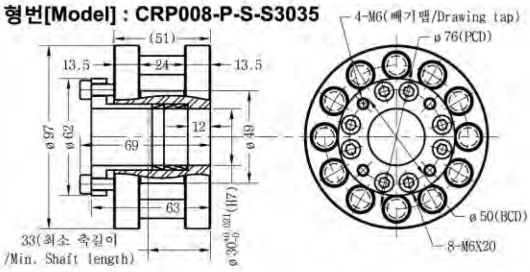


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

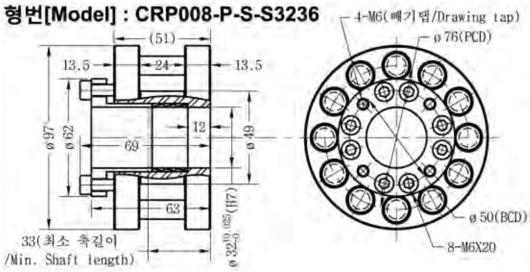
형번[Model] : CRP008-P-S-S2530



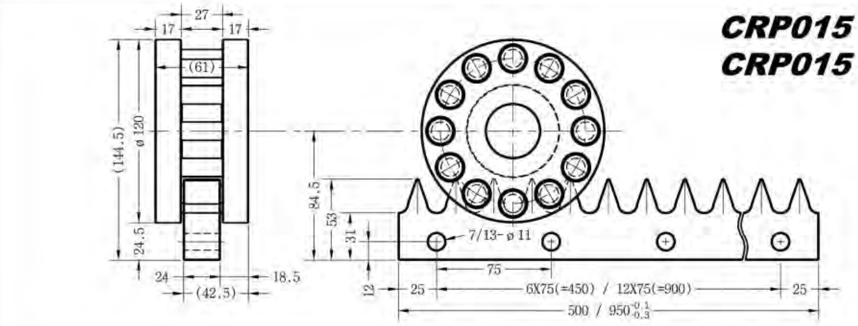
형번[Model] : CRP008-P-S-S3035



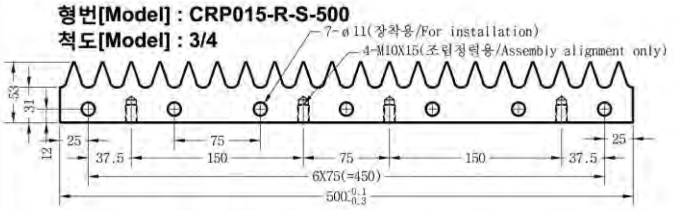
형번[Model] : CRP008-P-S-S3236



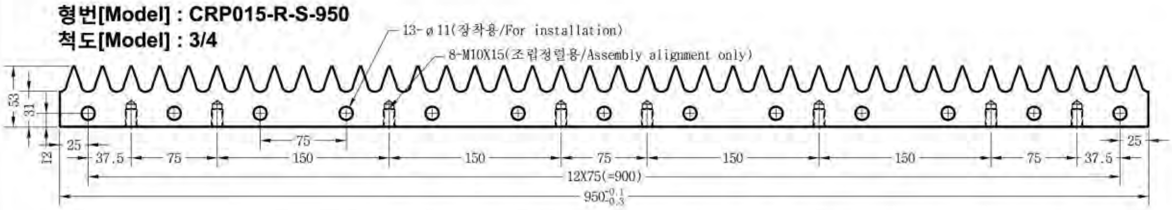
CRP015 외형치수
CRP015 External Dimensions



형번[Model] : CRP015-R-S-500
척도[Model] : 3/4



형번[Model] : CRP015-R-S-950
척도[Model] : 3/4



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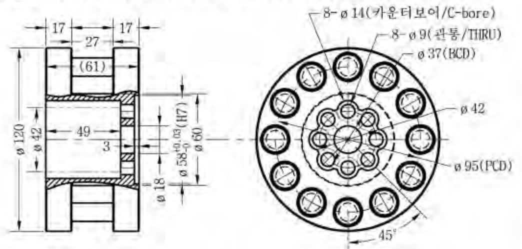
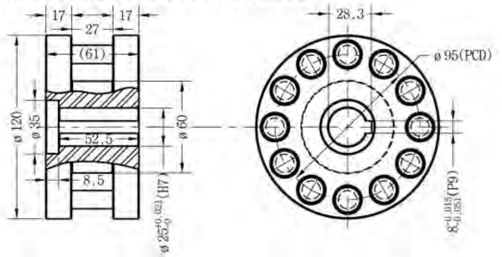
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

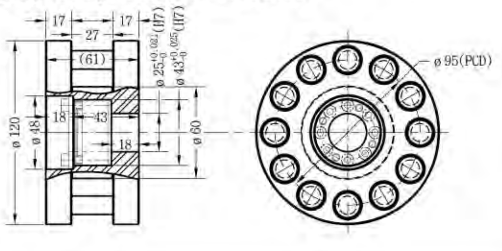
형번[Model] : CRP015-P-A-B08M08037



형번[Model] : CRP015-P-S-K2552

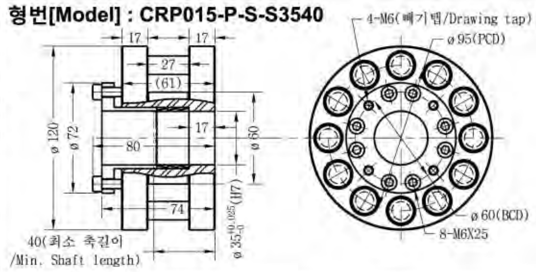


형번[Model] : CRP015-P-S-S2543

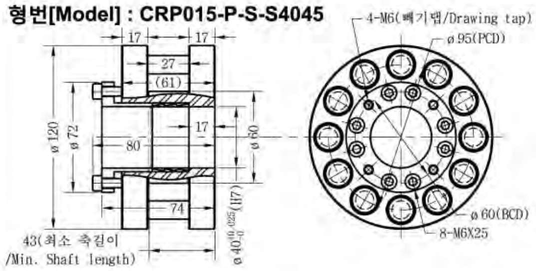


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

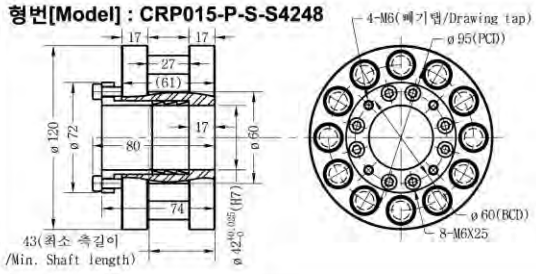
형번[Model] : CRP015-P-S-S3540



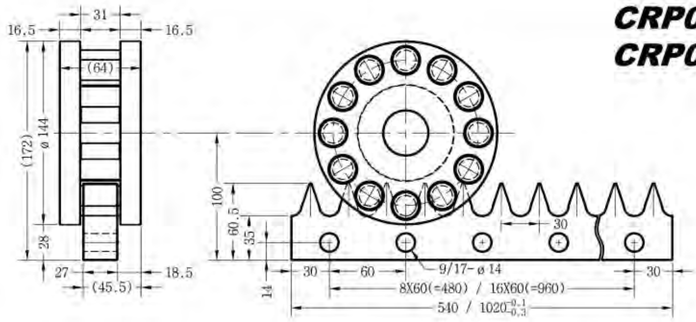
형번[Model] : CRP015-P-S-S4045



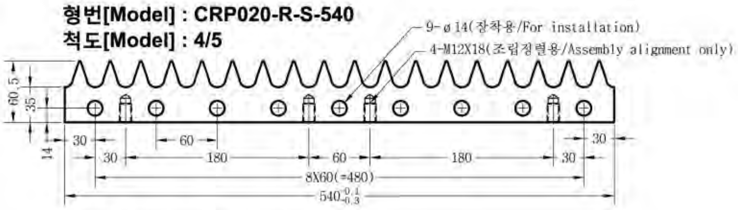
형번[Model] : CRP015-P-S-S4248



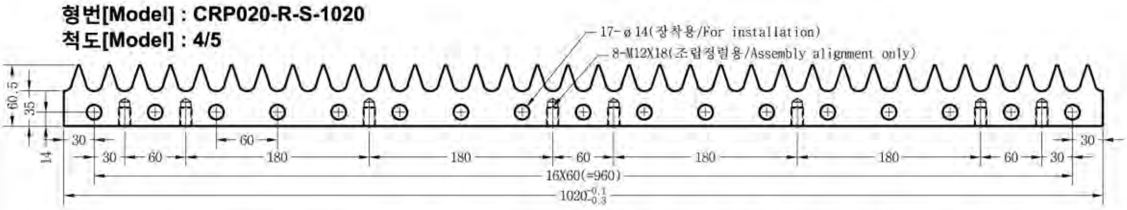
CRP020 외형치수
CRP020 External Dimensions



형번[Model] : CRP020-R-S-540
척도[Model] : 4/5



형번[Model] : CRP020-R-S-1020
척도[Model] : 4/5



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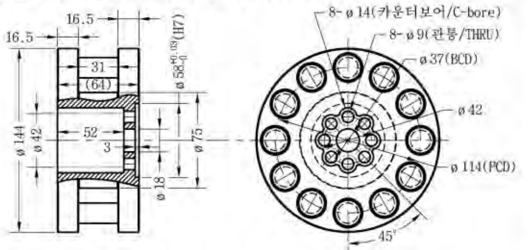
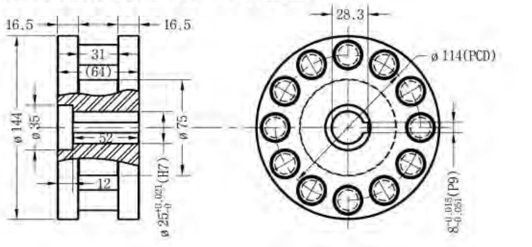
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

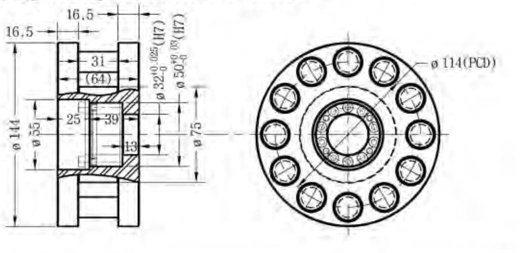
형번[Model] : CRP020-P-A-B08M08037



형번[Model] : CRP020-P-S-K2552

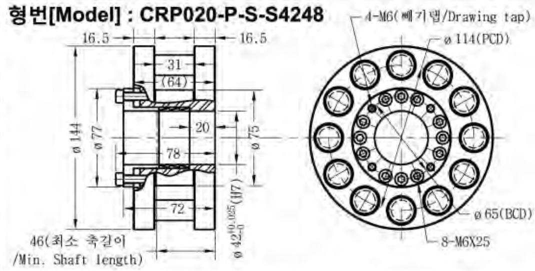


형번[Model] : CRP020-P-S-S3250

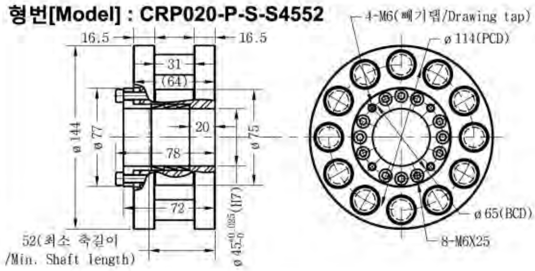


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

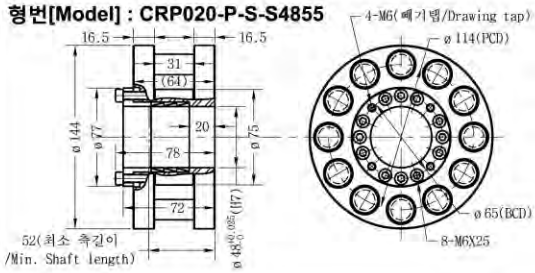
형번[Model] : CRP020-P-S-S4248



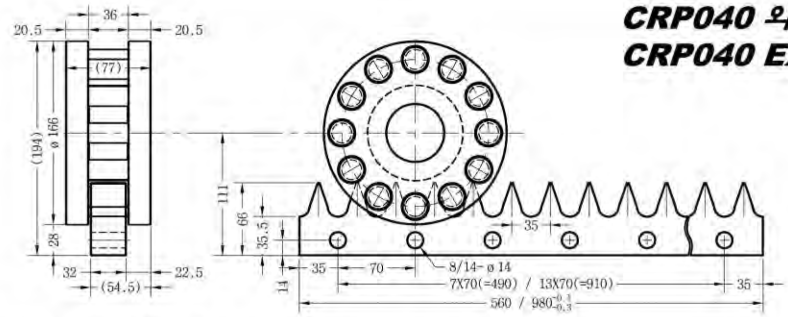
형번[Model] : CRP020-P-S-S4552



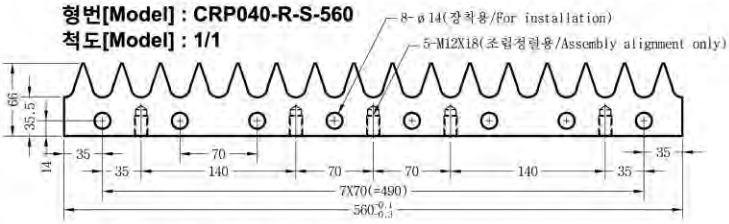
형번[Model] : CRP020-P-S-S4855



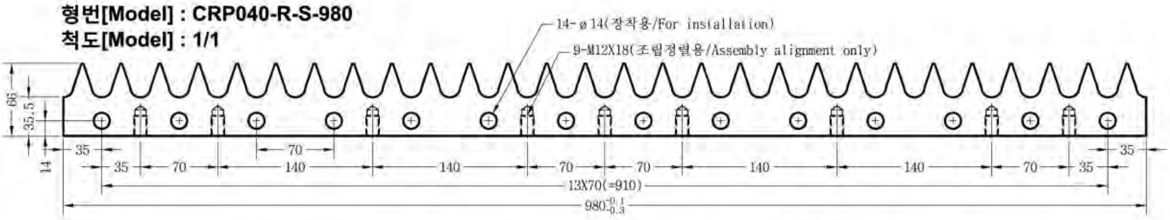
CRP040 외형치수
CRP040 External Dimensions



형번[Model] : CRP040-R-S-560
척도[Model] : 1/1



형번[Model] : CRP040-R-S-980
척도[Model] : 1/1



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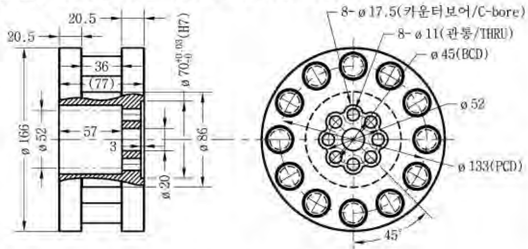
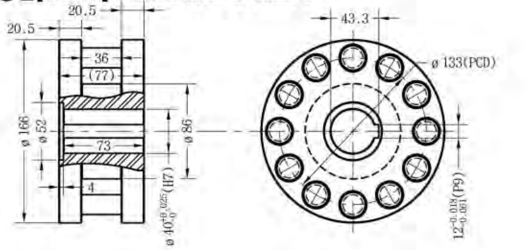
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

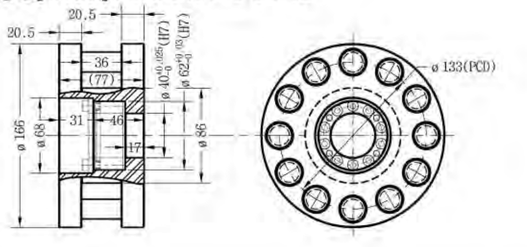
형번[Model] : CRP040-P-A-B08M10045



형번[Model] : CRP040-P-S-K4073

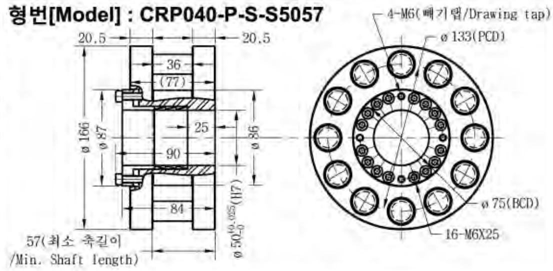


형번[Model] : CRP040-P-S-S4062

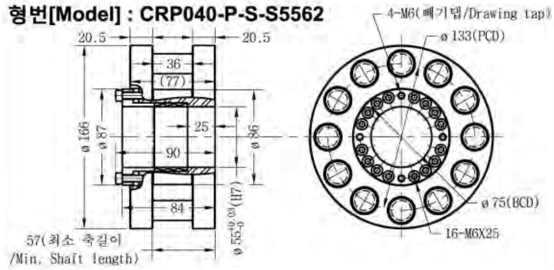


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

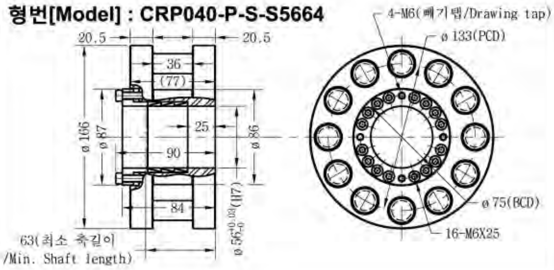
형번[Model] : CRP040-P-S-S5057



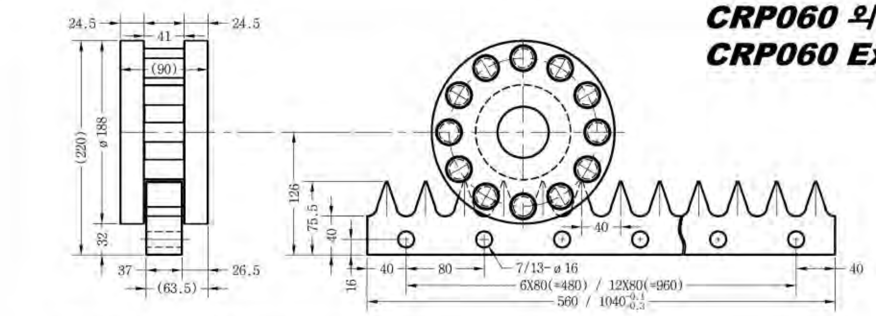
형번[Model] : CRP040-P-S-S5562



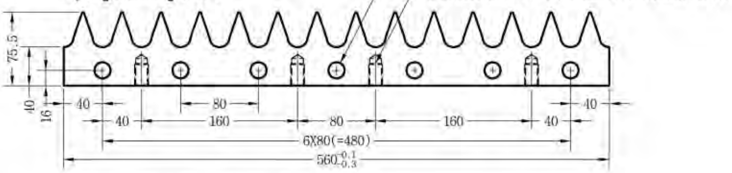
형번[Model] : CRP040-P-S-S5664



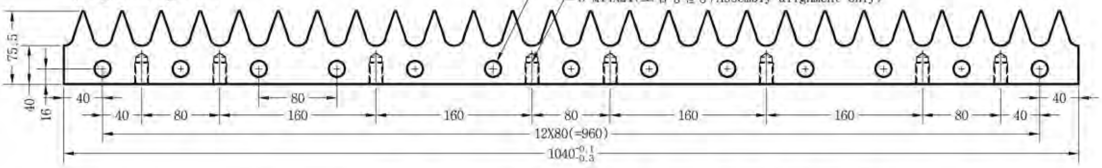
CRP060 외형치수
CRP060 External Dimensions



형번[Model] : CRP060-R-S-560
척도[Model] : 1/1



형번[Model] : CRP060-R-S-1040
척도[Model] : 1/1



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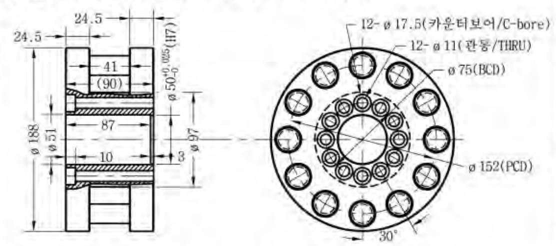
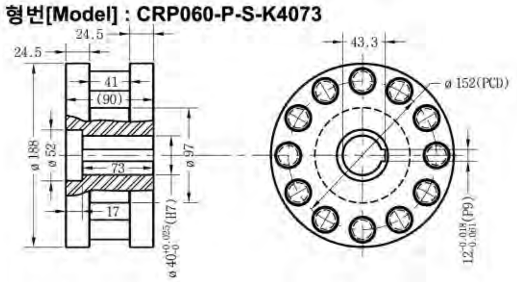
표준형 피니언 [Standard Pinions]

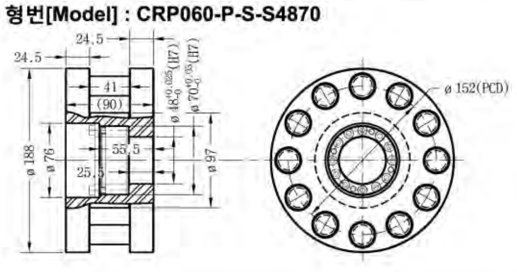
형번[Model] : CRP060-P-A-B12M10075



형번[Model] : CRP060-P-S-K4073

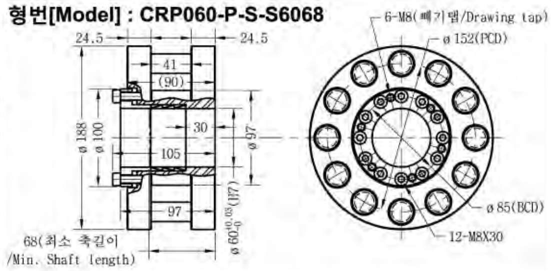


형번[Model] : CRP060-P-S-S4870

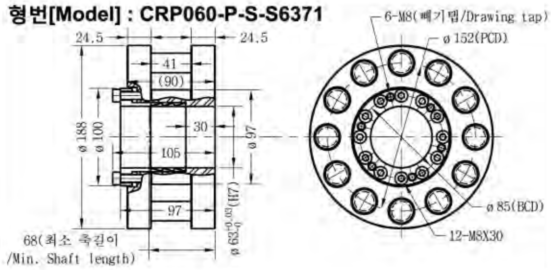


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

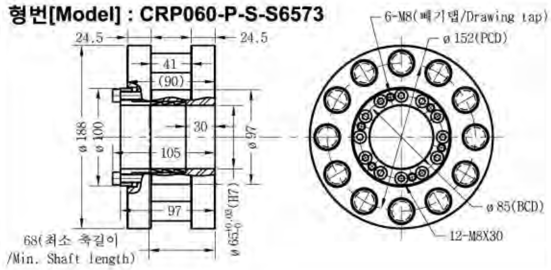
형번[Model] : CRP060-P-S-S6068



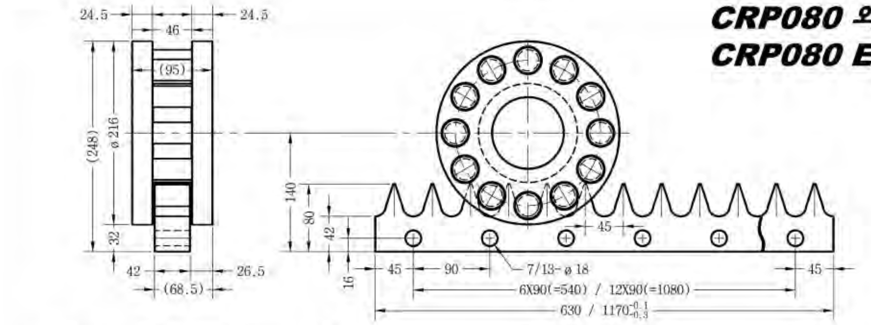
형번[Model] : CRP060-P-S-S6371



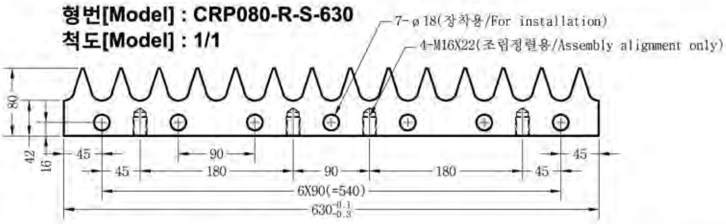
형번[Model] : CRP060-P-S-S6573



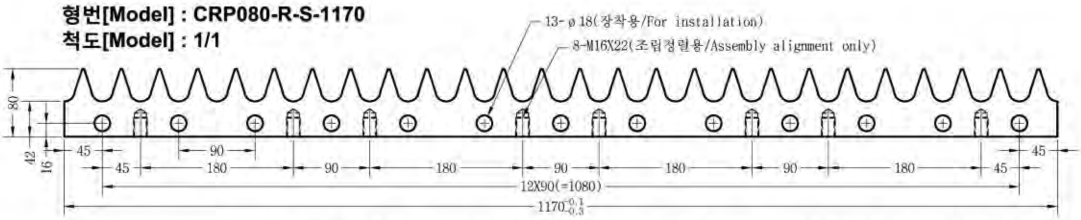
CRP080 외형치수
CRP080 External Dimensions



형번[Model] : CRP080-R-S-630
척도[Model] : 1/1



형번[Model] : CRP080-R-S-1170
척도[Model] : 1/1



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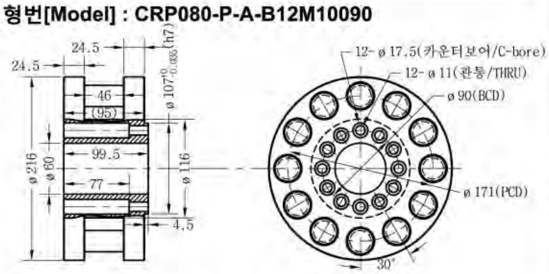
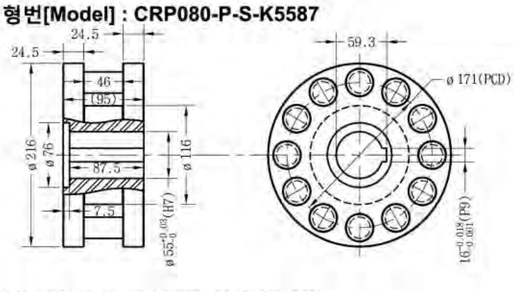
표준형 피니언 [Standard Pinions]

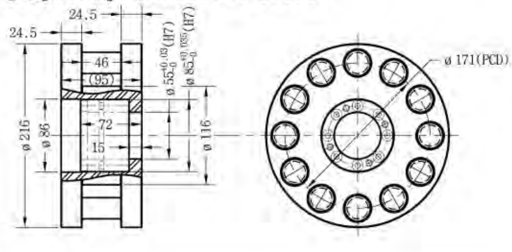
형번[Model] : CRP080-P-A-B12M10090



형번[Model] : CRP080-P-S-K5587

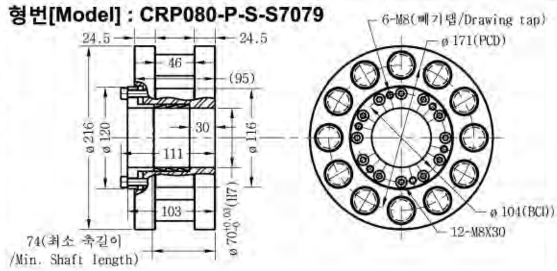


형번[Model] : CRP080-P-S-S5585

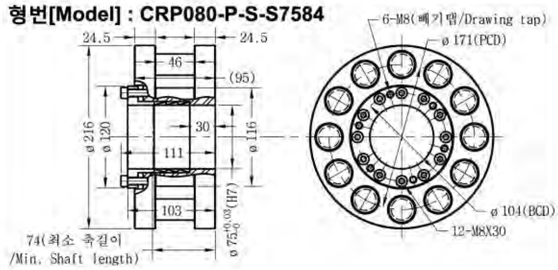


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

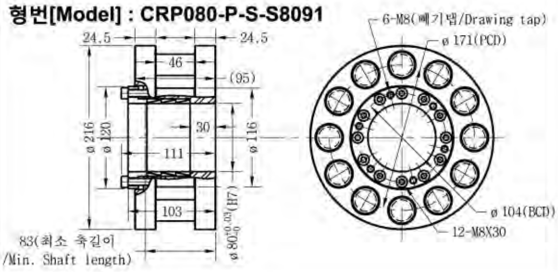
형번[Model] : CRP080-P-S-S7079



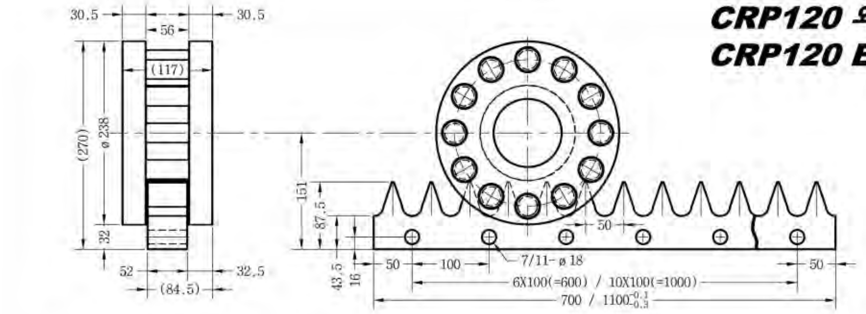
형번[Model] : CRP080-P-S-S7584



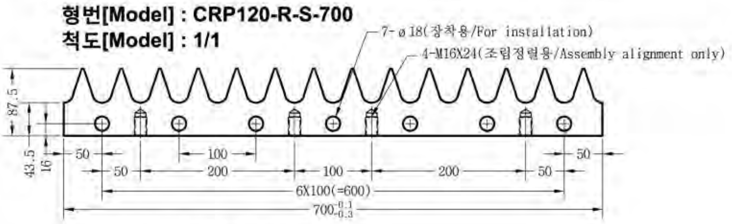
형번[Model] : CRP080-P-S-S8091



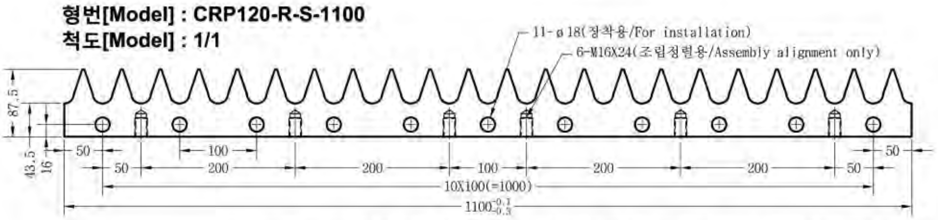
CRP120 외형지수
CRP120 External Dimensions



형번[Model] : CRP120-R-S-700
척도[Model] : 1/1



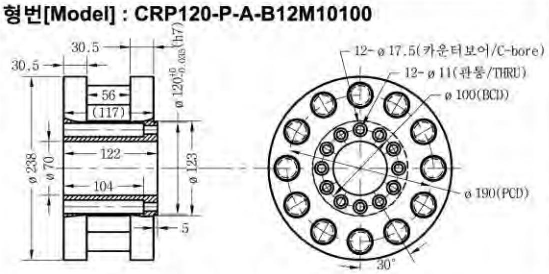
형번[Model] : CRP120-R-S-1100
척도[Model] : 1/1



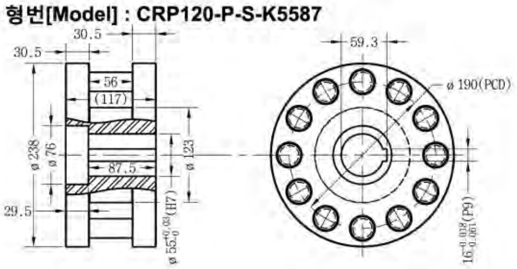
사용자 정의 랙과 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

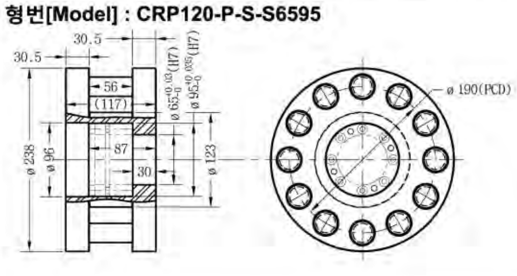
형번[Model] : CRP120-P-A-B12M10100



형번[Model] : CRP120-P-S-K5587

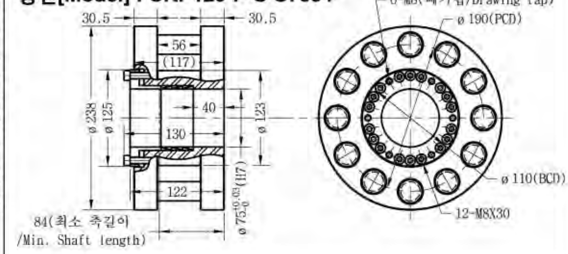


형번[Model] : CRP120-P-S-S6595

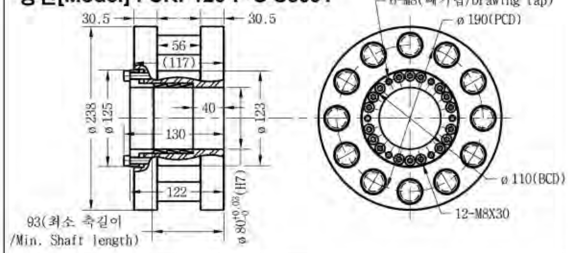


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

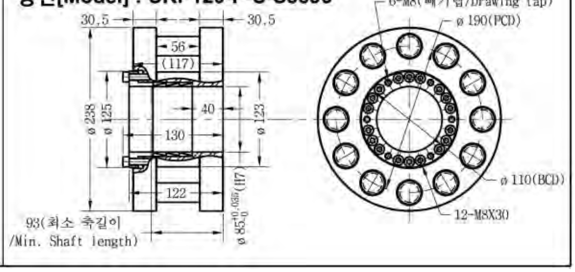
형번[Model] : CRP120-P-S-S7584



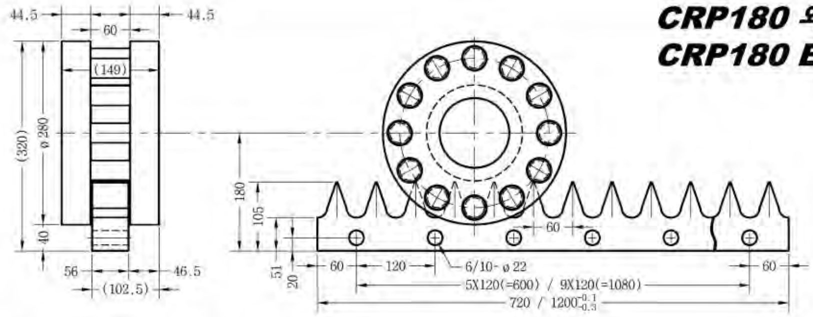
형번[Model] : CRP120-P-S-S8091



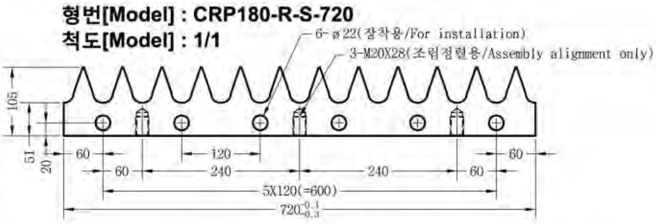
형번[Model] : CRP120-P-S-S8596



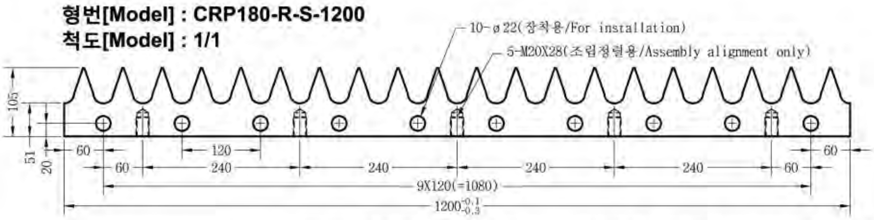
CRP180 외형치수
CRP180 External Dimensions



형번[Model] : CRP180-R-S-720
척도[Model] : 1/1



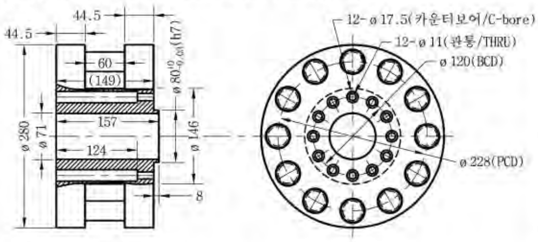
형번[Model] : CRP180-R-S-1200
척도[Model] : 1/1



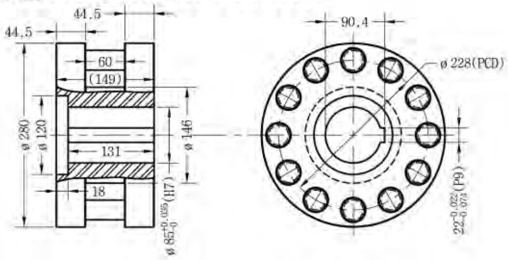
사용자 정의 랙과 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized rack & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

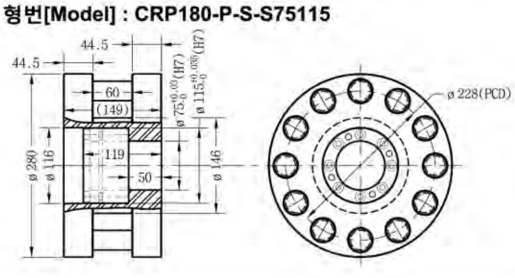
형번[Model] : CRP180-P-A-B12M10120



형번[Model] : CRP180-P-S-K85130

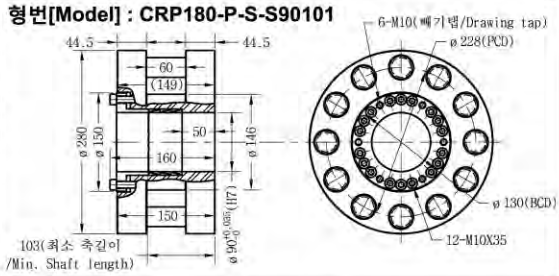


형번[Model] : CRP180-P-S-S75115

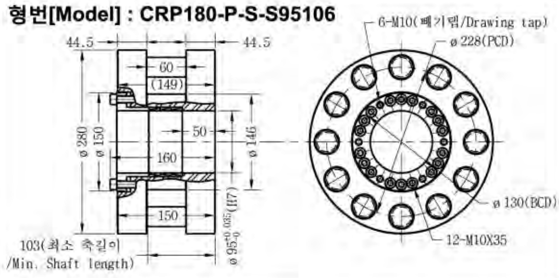


옵션 수축체결형 피니언 [Optional Shrink Fitting Pinions]

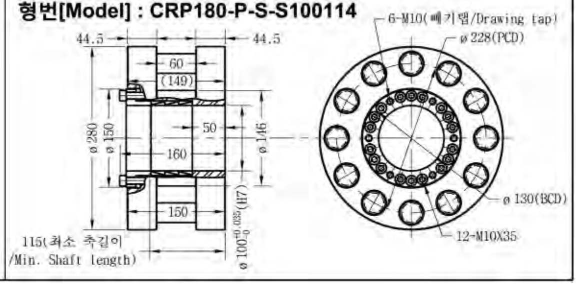
형번[Model] : CRP180-P-S-S90101



형번[Model] : CRP180-P-S-S95106



형번[Model] : CRP180-P-S-S100114



성능 검증 [Performance experiments]

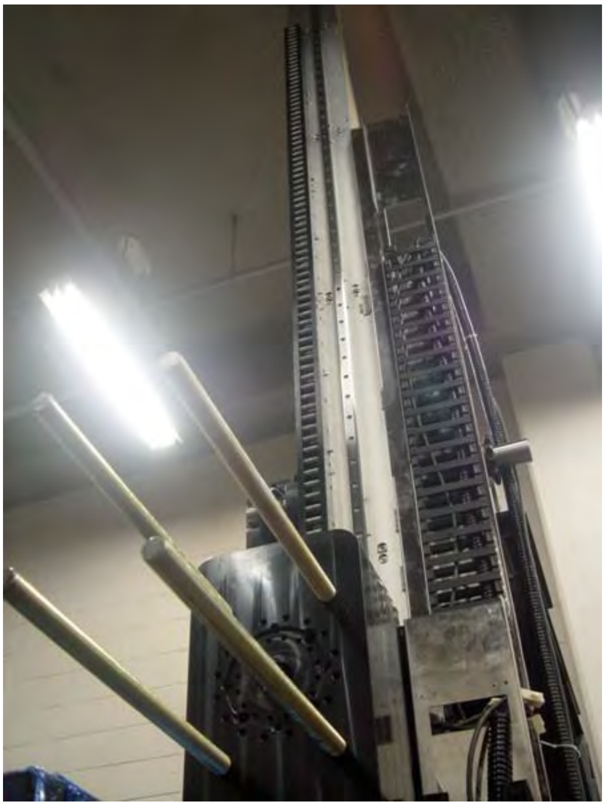


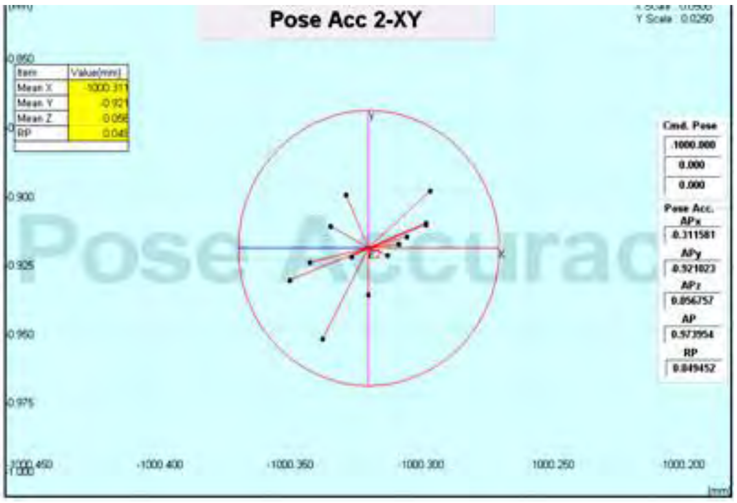
그림 1. 신뢰성 및 비상정지 실험

Figure 1. Reliability & emergency impact test

그림 2. 정밀도 실험

Figure 2. Accuracy test

정밀도 실험 [Accuracy test]



■ 절대정도 [Absolute accuracy]

측정형번 [Specimen model no.] :

피니언 [Pinion] : CRP004-P-A-B06M05018

랙 [Rack] : CRP004-R-S-930

이송거리 [Traveling range] : 5m

측정온도 [Ambient temperature] : 20℃

측정장비 [Measuring equipment] :

레이저 트랙커 [Laser tracker]

측정결과 [Results] : ±0.03mm

▷ 임의의 원점기준 절대위치를 측정, 누적오차 없음.

▷ Measuring absolute positioning from arbitrary origin / No accumulated error

■ 직선전달 (위치) 정밀도(부하조건) [Linear transmission (positioning) accuracy (with load)]

측정형번 [Specimen model no.] :

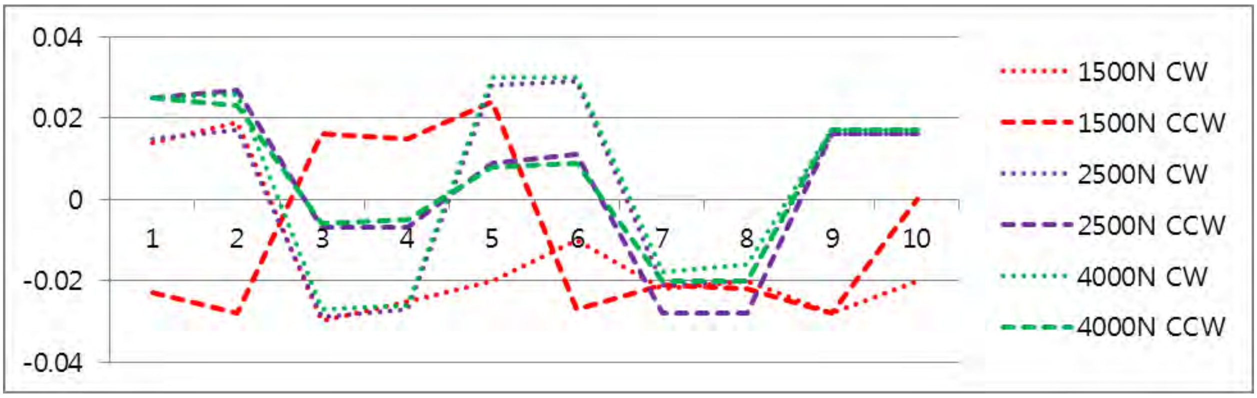
피니언 [Pinion] : CRP060-P-A-B08M10045

랙 [Rack] : CRP060-R-S-1040

이송거리 [Traveling range] : 0~2m

측정온도 [Ambient temperature] : 20℃

측정장비 [Measuring equipment] : 리니어 엔코더 [Linear Encoder]



측정결과 [Results] : ±0.03mm

▷ 피니언 회전대비 랙 직선이동거리 오차 측정

백래쉬 없음. (정역변환시 오차값이 동일방향회전 오차값 이내에 있음.)

부하변화에 의한 위치정밀도 변화없음.

누적오차 없음.

▷ One revolution of pinion vs. linear motion of rack error measurements

No backlash (Error in direction change < error in the same direction)

Maintain the same poisoning accuracy under different load condition

No accumulated error

■ 반복정밀도 (부하조건) [Repeatability (with load)]

측정형번 [Specimen model no.] :

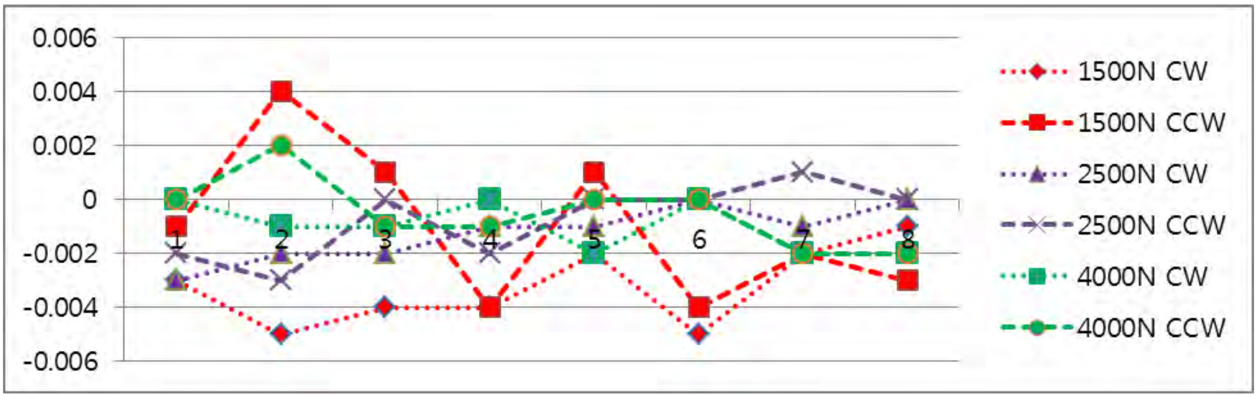
피니언 [Pinion] : CRP060-P-A-B08M10045

랙 [Rack] : CRP060-R-S-1040

이송거리 [Traveling range] : 0~2m

측정온도 [Ambient temperature] : 20℃

측정장비 [Measuring equipment] : 리니어 엔코더 [Linear Encoder]



측정결과 [Results] : ±0.005mm

▷ 임의의 위치에 대한 반복 위치결정 정밀도(위치 재현성)를 측정

백래쉬 없음. (정역변환시 오차값이 동일방향회전 오차값 이내에 있음.)

부하변화에 의한 반복정밀도 변화없음.

누적오차 없음.

▷ Repetitive positioning accuracy at arbitrary position

No backlash (Error in direction change < error in the same direction)

Maintain the same repeatability under different load condition

No accumulated error

■ 소 음 / Noise Level

측정형번 [Specimen model no.] :

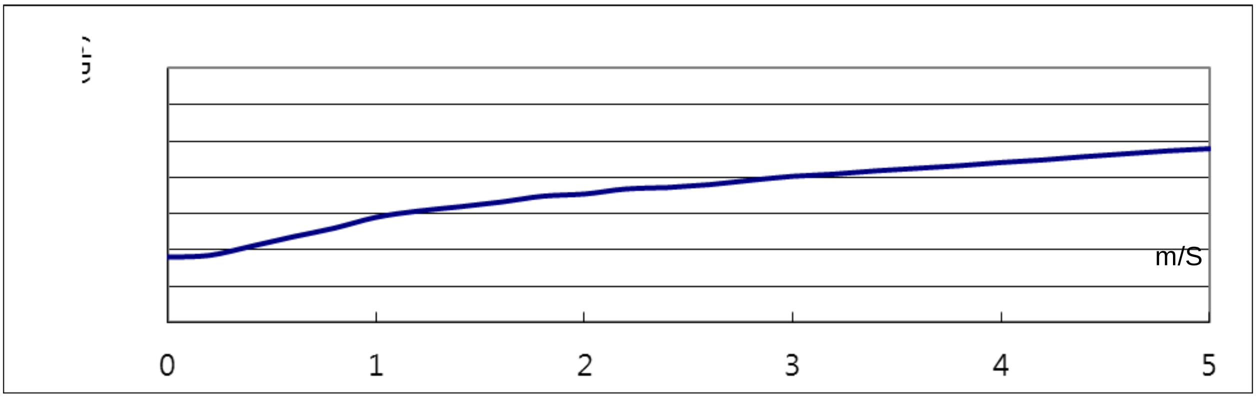
피니언 [Pinion] : CRP004-P-A-B06M05018

랙 [Rack] : CRP004-R-S-930

이송거리 [Traveling range] : 5m

측정온도 [Ambient temperature] : 20℃

측정장비 [Measuring equipment] : 마이크로폰 및 데시벨메타 [Micro phone & decibel meter]



▷ 피니언 회전구동에 의한 서로 다른 속도에서 측정된 소음

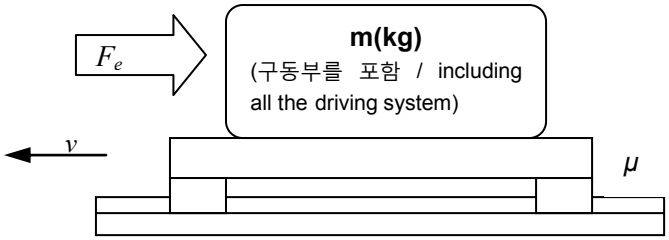
모터, 감속기, 직선베어링, 케이블베이어 등의 연관소음 포함.

▷ Noise is measured at each linear velocity when the pinion is driven to rotate

Including related-noise (e.g., noise caused from motor, LM guide, gearbox, cablevayor etc.)

※ 위의 측정값은 실제 측정치이며, 관련부품, 주변조건, 조립정도, 작업자의 숙련도에 따라 차이가 있을 수 있습니다. 참고값으로만 사용가능하며, 선정에 필요한 정보는 카다록의 사양표를 참조바랍니다. [Each measurement values are based on practical measurement. It depends on related elements, ambient condition, assembly accuracy, workmanship and so on. The measurement value can be used as reference only. Please refer specifications on catalogue for selections.

CRP 선정 및 수명계산 [CRP Selection & lifetime calculation]



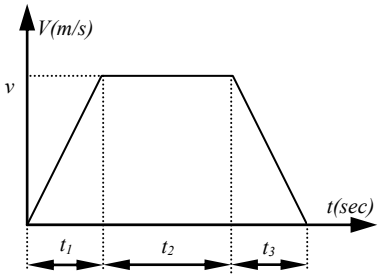


표1. 마찰계수(μ) [Table 1. Friction coefficient (μ)]

구름접촉 [Rolling contact]	0.005~0.02
미끄럼접촉 [Sliding contact]	0.1~0.2

표2. 안전계수(S_f) [Table 2. Safety factor (S_f)]

무충격원활운전 [Operations without impact]	1.2 ~ 1.5
보통운전 [General operations]	1.5 ~ 2
충격이 있는 구동 [Operations with impact]	2 ~ 3

1. 평균선속도 계산

가속거리 계산: $S_1 = \frac{1}{2} \times v \times t_1$

등속거리 계산: $S_2 = v \times t_2$

감속거리 계산: $S_3 = \frac{1}{2} \times v \times t_3$

평균선속도 계산: $v_m = \frac{S_1 + S_2 + S_3}{t_1 + t_2 + t_3}$

2. 평균법선력 계산

가속부하 계산:

$F_{a1} = m \cdot (a_1 + g\sin\theta) = m \times [(v/t_1) + g\sin\theta]$

마찰부하 계산: $F_r = \mu \cdot m \cdot g\cos\theta$

여기서, μ는 마찰계수, g는 중력가속도, θ는 수평면과 운동방향 사이각 (예, 수평방향 운동일 때 θ=0°, 중력방향운동일 때 θ=90°)

감속부하 계산:

$F_{a3} = m \cdot (a_3 + g\sin\theta) = m \times [(v/t_3) + g\sin\theta]$,

운전중 작용 외력: F_e

가속시 전체법선력: $F_1 = F_{a1} + F_r + F_e$

등속시 전체법선력: $F_2 = F_r + F_e$

감속시 전체법선력: $F_3 = F_{a3} - (F_r + F_e)$

평균법선력 계산:

$$F_m = \sqrt[\frac{10}{3}]{\frac{t_1 F_1^{\frac{10}{3}} + t_2 F_2^{\frac{10}{3}} + t_3 F_3^{\frac{10}{3}}}{t_1 + t_2 + t_3}}$$

1. Linear mean speed calculation

Acceleration distance: $S_1 = \frac{1}{2} \times v \times t_1$

Constant speed distance: $S_2 = v \times t_2$

Deceleration distance: $S_3 = \frac{1}{2} \times v \times t_3$

Linear mean speed: $v_m = \frac{S_1 + S_2 + S_3}{t_1 + t_2 + t_3}$

2. Tangential mean force calculation

Load @ acc. period:

$F_{a1} = m \cdot (a_1 + g\sin\theta) = m \times [(v/t_1) + g\sin\theta]$

Friction load: $F_r = \mu \cdot m \cdot g\cos\theta$

where, μ is friction coefficient, g is gravitational acceleration, θ is angle between horizontal surface and moving direction (Ex. θ=0° when horizontal direction, θ=90° when gravitational direction)

Load @ dec. period:

$F_{a3} = m \cdot (a_3 + g\sin\theta) = m \times [(v/t_3) + g\sin\theta]$,

External force: F_e

Total force @ acc. period: $F_1 = F_{a1} + F_r + F_e$

Total force @ constant speed period: $F_2 = F_r + F_e$

Total force @ dec. period: $F_3 = F_{a3} - (F_r + F_e)$

Tangential mean force:

$$F_m = \sqrt[\frac{10}{3}]{\frac{t_1 F_1^{\frac{10}{3}} + t_2 F_2^{\frac{10}{3}} + t_3 F_3^{\frac{10}{3}}}{t_1 + t_2 + t_3}}$$

요구평균법선력 계산:

$$F_{dm} = \frac{F_m}{\cos\alpha} \times S_f\,(N)$$

여기서,

F_m =평균법선력, S_f =안전계수, α =압력각

요구평균반경하중 계산:

$$F_{dr} = F_{dm} \times \sin\alpha (N)$$

3. 수명 계산

$$L_{10} = 10000 \times \frac{v_o}{v_m} \times \left(\frac{F_o}{F_{dm}}\right)^{\frac{10}{3}}$$

여기서,

v_m = 평균선속도 (*m/s*),

F_{dm} = 평균법속력(F_m)X안전계수(S_f)(*N*),

v_o = 정격선속도 (*m/s*),

F_o = 정격법선력 (*N*).

► 정격선속도, 정격법선력은 정격일람의 피니언 회전수 360rpm일 때의 값.

► 허용요구최대평균법선력은, 정격일람의 피니언회전수 120rpm일 때의 값을 초과하지 않도록 할 것.

► 직선베어링, 구동기 지지구조물 등은 요구평균반경하중보다 클 것.

■ 선정 예

► 구동조건

요구정보

질량 (m)	200kg	
선속도 (*v*)	2m/s	
가감속시간 (t_1, t_3)	0.5sec	
등속시간 (t_2)	4sec	
외부 힘 (F_e)	100N	
수평과 운동방향 사이각 (θ)	0°	
마찰계수 (μ)	0.01	표1 참조
중력가속도 (*g*)	9.81m/s^2	
안전계수 (S_f)	1.5 (보통운전)	표2 참조

1. 가속도: $a_1 = a_3 = v/t_1 = 2/0.5 = 4\,m/s^2$

2. 가속부하:

$$F_{a1} = F_{a3} = m \cdot a_1 = 200 \times 4 = 800N$$

3. 마찰부하:

$$F_r = \mu \cdot m \cdot g = 0.01 \times 200 \times 9.81 = 19.62N$$

Desired tangential mean force:

$$F_{dm} = \frac{F_m}{\cos\alpha} \times S_f\,(N)$$

where, α =Pressure angle,

F_m =Tangential mean force, S_f =Safety factor

Desired radial mean load:

$$F_{dr} = F_{dm} \times \sin\alpha (N)$$

3. Lifetime calculation

$$L_{10} = 10000 \times \frac{v_o}{v_m} \times \left(\frac{F_o}{F_{dm}}\right)^{\frac{10}{3}}$$

where,

v_m = Linear mean speed (*m/s*),

F_{dm} = Tangential mean force (F_m) X Safety factor (S_f) (*N*),

v_o = Rated linear speed (*m/s*),

F_o = Rated tangential force (*N*).

► Rated linear speed & rated tangential speed, refer the value where pinion rpm 360, at 'Rating at a glance'.

► Permitted maximum desired tangential mean force should not exceed the value where pinion rpm 120, at 'Rating at a glance'.

► Linear bearing, and actuator supporting structure etc. should bigger than desired radial mean load.

■ Selection example

► Operating conditions

Required data

Mass (m)	200kg	
Linear speed (*v*)	2m/s	
Acc./Dec. time (t_1, t_3)	0.5sec	
Constant speed time (t_2)	4sec	
External force (F_e)	100N	
Angle between horizon & motion (θ)	0°	
Friction coefficient (μ)	0.01	Table 1
Gravitational acceleration (*g*)	9.81m/s^2	
Safety factor (S_f)	1.5 (General)	Table 2

1. Acceleration: $a_1 = a_3 = v/t_1 = 2/0.5 = 4\,m/s^2$

2. Acceleration load:

$$F_{a1} = F_{a3} = m \cdot a_1 = 200 \times 4 = 800N$$

3. Frictional load:

$$F_r = \mu \cdot m \cdot g = 0.01 \times 200 \times 9.81 = 19.62N$$

4. 가속시 전체법선력:

$$F_1 = F_{a1} + F_r + F_e$$
$$= 800 + 19.62 + 100 = 919.62N$$

5. 등속시 전체법선력:

$$F_2 = F_r + F_e = 19.62 + 100 = 119.62N$$

6. 감속시 전체법선력:

$$F_3 = F_{a3} - (F_r + F_e)$$
$$= 800 - (19.62 + 100) = 680.38N$$

7. 평균법선력:

$$F_m = \sqrt[\frac{10}{3}]{\frac{t_1 F_1^{\frac{10}{3}} + t_2 F_2^{\frac{10}{3}} + t_3 F_3^{\frac{10}{3}}}{t_1 + t_2 + t_3}}$$

$$= \sqrt[\frac{10}{3}]{\frac{0.5 \times 919.62^{\frac{10}{3}} + 4 \times 119.62^{\frac{10}{3}} + 0.5 \times 680.38^{\frac{10}{3}}}{0.5 + 4 + 0.5}}$$

$$\cong 507N$$

8. 평균선속도:

$$v_m = \frac{S_1 + S_2 + S_3}{t_1 + t_2 + t_3} = \frac{0.5 + 8 + 0.5}{0.5 + 4 + 0.5} = 1.8m/s$$

9. 선정

가속시 요구법선력:

$$F_{d1} = S_f \times \frac{F_1}{\cos\alpha} = 1.5 \times \frac{919.62}{\cos 27} = 1548.2N$$

요구평균법선력:

$$F_{dm} = S_f \times \frac{F_m}{\cos\alpha} = 1.5 \times \frac{507}{\cos 27} = 853.5N$$

요구평균반경하중:

$$F_{dr} = F_{dm} \times \sin\alpha = 853.5 \times \sin 27 = 387.5N$$

결과로부터 CRP008 선정,

$F_{d1} = 1548.2N < 2105N$ ←CRP008가감속허용법선력

$F_{dm} = 853.5N < 868N$ ←CRP008 허용법선력 @1.92m/s

10. 수명계산

$$L_{10} = 10000 \times \frac{v_o}{v_m} \times \left(\frac{F_o}{F_{dm}}\right)^{\frac{10}{3}}$$

$$= 10000 \times \frac{1.44}{1.8} \times \left(\frac{947}{853.5}\right)^{\frac{10}{3}} \cong 11313hrs$$

4. Total tangential force @ acc. period:

$$F_1 = F_{a1} + F_r + F_e$$
$$= 800 + 19.62 + 100 = 919.62N$$

5. Total tangential force @ constant speed period:

$$F_2 = F_r + F_e = 19.62 + 100 = 119.62N$$

6. Total tangential force @ dec. period:

$$F_3 = F_{a3} - (F_r + F_e)$$
$$= 800 - (19.62 + 100) = 680.38N$$

7. Tangential mean force:

$$F_m = \sqrt[\frac{10}{3}]{\frac{t_1 F_1^{\frac{10}{3}} + t_2 F_2^{\frac{10}{3}} + t_3 F_3^{\frac{10}{3}}}{t_1 + t_2 + t_3}}$$

$$= \sqrt[\frac{10}{3}]{\frac{0.5 \times 919.62^{\frac{10}{3}} + 4 \times 119.62^{\frac{10}{3}} + 0.5 \times 680.38^{\frac{10}{3}}}{0.5 + 4 + 0.5}}$$

$$\cong 507N$$

8. Linear mean speed

$$v_m = \frac{S_1 + S_2 + S_3}{t_1 + t_2 + t_3} = \frac{0.5 + 8 + 0.5}{0.5 + 4 + 0.5} = 1.8m/s$$

9. Selection

Desired tangential force @ acc. period:

$$F_{d1} = S_f \times \frac{F_1}{\cos\alpha} = 1.5 \times \frac{919.62}{\cos 27} = 1548.2N$$

Desired tangential mean force:

$$F_{dm} = S_f \times \frac{F_m}{\cos\alpha} = 1.5 \times \frac{507}{\cos 27} = 853.5N$$

Desired radial mean load:

$$F_{dr} = F_{dm} \times \sin\alpha = 853.5 \times \sin 27 = 387.5N$$

As a result, CRP008 is selected.

$F_{d1} = 1548.2N < 2105N$ ←CRP008 Max.acc./dec. tan. force

$F_{dm} = 853.5N < 868N$ ←CRP008 Permitted tan. force @1.92m/s

10. Lifetime calculation

$$L_{10} = 10000 \times \frac{v_o}{v_m} \times \left(\frac{F_o}{F_{dm}}\right)^{\frac{10}{3}}$$

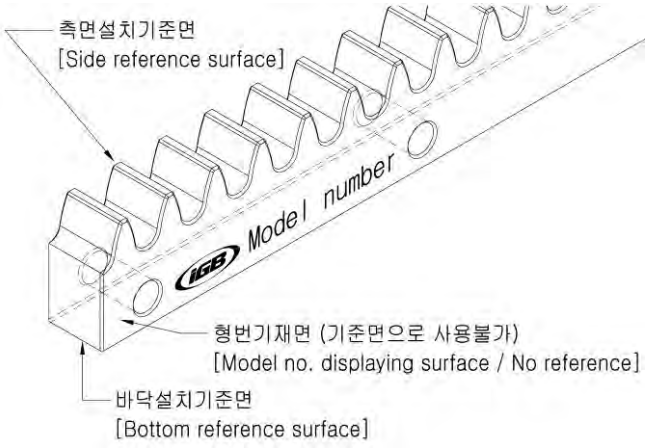
$$= 10000 \times \frac{1.44}{1.8} \times \left(\frac{947}{853.5}\right)^{\frac{10}{3}} \cong 11313hrs$$

CRP 설치 및 취급요령 [CRP general design & installation guideline]

■ 충분한 강성의 기준면에 밀착 고정

각각의 랙(rack)의 틀어짐을 교정하기 위해서는 충분한 강성의 곧은 설치면에 단단히 고정해야 한다. 랙 기어면의 높이가 일정하지 않을 경우 동력전달 및 위치결정 오차 등의 발생원인이 되므로, 랙 기어면의 높이가 일정하도록 설치해야 한다.

CRP는 형번 기재면 이외의 면을 기준면으로 사용할 수 있지만, 절단면은 제외되며, 주로 사용되는 기준면은 그림과 같다. **사용자 임의의 절단면은 반드시 구동범위의 끝에 위치하도록 하여야 한다**.



■ 설치요령

랙(rack) 설치 기준면과 평행한 곧은 면에 직선베어링을 설치한다. 피니언 회전축은 랙과 평행하게, 진행방향과 수직으로 그림 3과 같이 설치하여야 한다. 피니언 축이 랙에 대해서 기울어져 있으면 피니언의 구름핀이 랙 기어면에 한쪽으로 편중되어, 고른 접촉을 이루지 못하고, 정밀도, 소음, 진동, 수명 등에 악영향을 미칠 수 있다. 또한, 큰 부하의 경우에는 휘어져 들뜨는 일이 있음으로 피니언 축은 양단지지 또는 충분한 처짐강성을 갖는 구동기가 이상적이며, 랙의 바닥기준면은 최소한 랙 두께의 절반이상이 지지되어야 한다.

■ Secure the rack at rigid & straight surface

The CRP can maintain zero mechanical clearance and requires proper system assembly accuracy. This assembly accuracy must remain relatively consistent over the entire run to obtain optimal system performance. To achieve this it is crucial that the guiding system be as parallel as possible to the CRP. The main consideration is that the guiding system and the CRP system are rising or falling at the same place in the run so the pinion assembly accuracy remains within specifications. The best way to minimize the variance between the guiding system and the CRP system is to machine their mounting locations in a single machining operation.

Five sides of the CRP rack are reference surfaces. The side displaying the model no., or ends that have been cut (not factory full or half sections) are non-reference surfaces. The side displaying the model no. should not be mounted against the machine bed and **cut rack ends must be at the end of the run**.

■ Installation guideline

In order to minimize backlash, obtain the highest positional accuracy, and minimize wear on the rack, the CRP system must be installed on a rigid, straight, flat mounting surface with the tolerances shown in below Figure 3.

The following requirements must be met to ensure proper CRP operation:

① Mount a linear guide rail on a surface parallel to the CRP rack mounting surface with the same flatness as the rack mounting surface.

② The pinion shaft must be parallel (±0.02 mm) to the rack mounting surface opposite the rack teeth and the angle between the pinion shaft and the face of the rack must be 90° ±0.1°.

피니언과 피니언 구동축은 가능한 한「동심」에 설치하여야 한다. 피니언의 편심회전은 이송정도가 고르지 못하게 하거나 백래시를 발생시키는 원인이 될 수 있다. 특히 수축형 체결구(메카록) 등의 적용이 필요한 경우는 자동조심형을 사용하는 것이 좋다. 참고로 CRP는 직선베어링과 함께 임의의 경사로 설치, 운전 가능하다.

■ 랙의 길이

표준길이보다 짧은 길이가 필요한 경우는 절단하여 사용할 수 있다. 절단은 바닥 기준면에서부터 시작하여야 하며, 담금질이 되어 있으므로 주의를 기울여야 한다. 소정의 실비를 지급할 경우, 사용자 요청에 따른 랙 길이, 잔공, 카운터보어, 바닥면 (또는 측면) 탭 형상의 랙 공급도 가능하다.

③ The pinion shaft must be supported adequately to ensure full contact of the pinion rollers along the face of rack teeth.

④ The rack must sit on a step at least one half the width of the rack for proper support. The rack should not be supported by fasteners alone. Pinning the rack to its mounting surface is not recommended.

⑤ Systems may be mounted at any angle as long as the rack, guiding system and mounting surface remain parallel with the shaft at a 90° angle from the rack.

■ Rack modification

CRP rack can be cut, if it is necessary. Cutting should be start from the bottom reference surface of rack. iGB can provide additional tapped, untapped or countersunk holes in the side or bottom of the rack or cut the rack to a specific length for an additional charge.

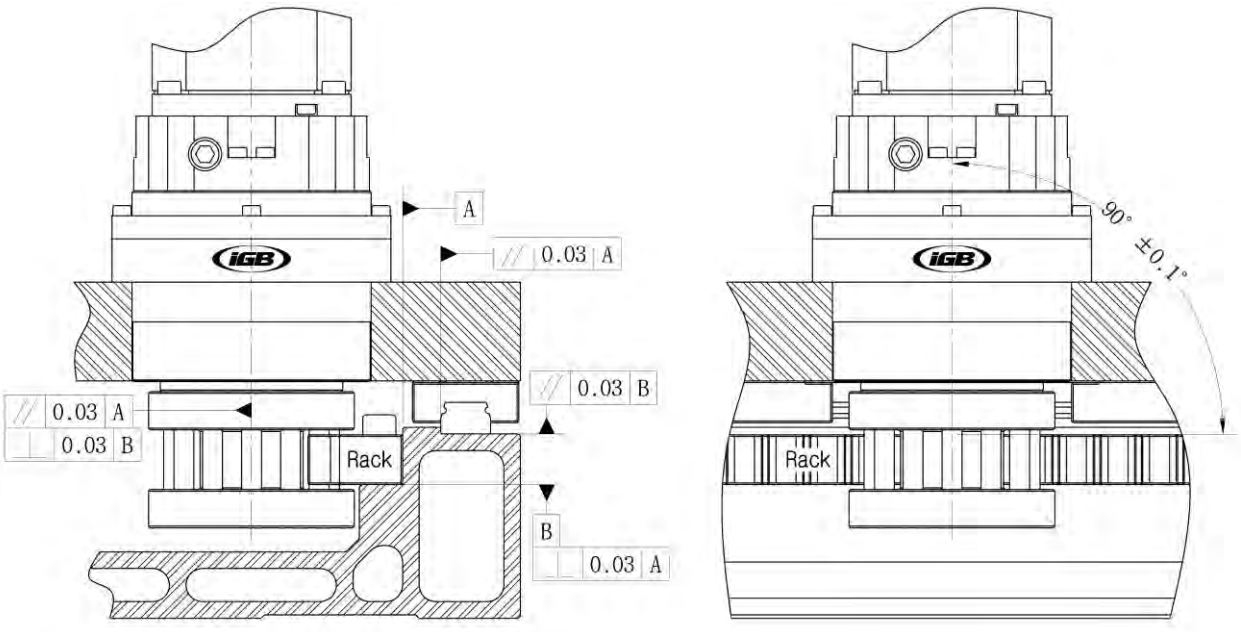
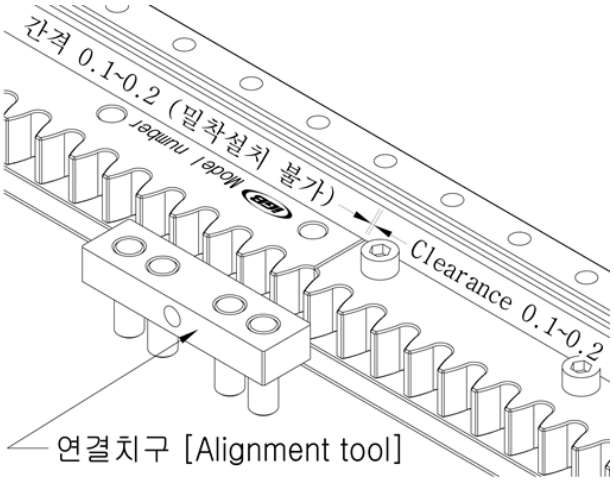


그림 3. CRP 설치 예 [Figure 3. CRP installation examples]

■ 복수개 랙

긴 주행거리를 확보하기 위하여 복수개의 랙을 연결할 경우는 인접 랙과의 피치를 확정할 필요가 있다. 이 경우에는 재사용이 가능한 전용 연결치구의 사용이 추천된다. 즉, 첫번째 랙을 설치한 후, 기준면을 원점으로 해서 두번째 이후의 랙들은 전용 연결치구를 사용해 접속한다. 이 때, 랙의 사용자 임의 절단면은 주행거리의 맨 끝에 설치한다. (랙의 사용자 임의 절단면을 1번째 또는 중간에 설정하지 않는다.) 랙의 사용자 임의 절단면을 첫번째 또는 중간에 설정해야만 하는 경우에는 절단 길이 허용공차의 검토가 필요하다. (이 경우는 ㈜세진아이지비로 문의 바랍니다.)

복수개의 랙 연결에 필요한 세부정보는 '랙의 추가설치' 절을 참조한다.



■ 설치전 랙의 정도

설치 전 자연상태에서의 랙 정도는 다음의 그림과 같다. 이 정도는 랙의 길이, 두께, 형번 등에 따라 다소 차이가 있을 수 있으나, 소재의 탄성범위내에 있는 값으로 추천된 조립 방법에 의해 본래의 정밀도를 유지할 수 있으므로 참고값으로만 고려한다. 다만, 자연상태의 보관이 불량할 경우 단품 랙자체의 소송변형을 유발할 수 있으므로 주의를 요한다. 특히, 장기간 세워서 보관하거나 랙의 일부분만 걸쳐서 보관하는 경우는 반드시 피해야 하며, 편평한 바닥면 등에 눕혀서 보관해야 한다.

■ Multiple rack

When joining multiple sections of rack it is recommended that the alignment tool should be used whenever possible.

The alignment tool can be clamped or bolted in place by placing the alignment tool in position across the rack joint and laying a flat steel bar across the pins and clamping against the steel bar.

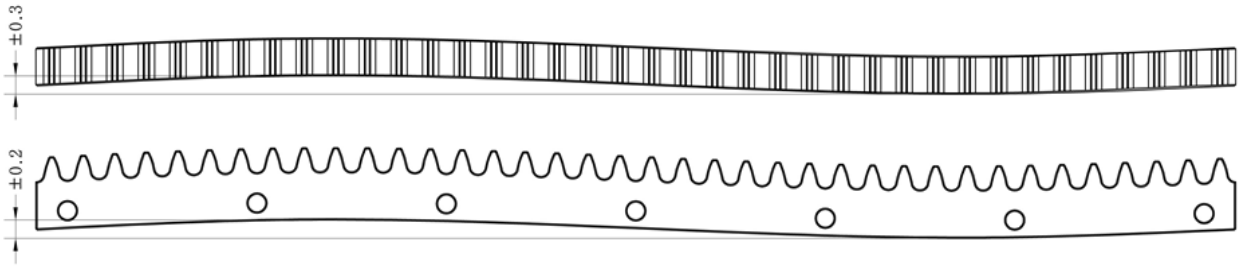
If clamping is not possible then the alignment tool can be manually seated across the rack joint while pressing the pins forcefully into the rack teeth. When the adjoining rack section is properly spaced, no movement should be felt when alternately pushing down on opposite ends of the alignment tool.

Note: Lightly clamping down the alignment tool is the recommended method, using the bolting or manually seating procedures may result in reduced CRP system positional accuracy and cumulative error when crossing rack joints.

Refer 'Additional rack installations' section for further information.

■ Natural Flatness of rack

Natural flatness of CRP rack alone, before installation, is shown in below figure. This flatness depends on length, thickness, model and so on. This deformation can be restored to original accuracy by proper installation. Therefore, this value can use as reference only. However, it is possible to occurring permanent deformation without proper storing. Do not store the rack vertically or hang on part of rack only. It must store flat floor with entire rack length support to maintain natural flatness.



■ 랙 설치

CRP 랙과 직선베어링의 설치면은 그림 3에 제시된 평행도를 유지하여야 하며, 이 평행도를 유지하기 위해 랙과 직선베어링 설치면의 동시 가공이 권장된다. 또한, 먼지, 분진 등의 점척에 의한 구동불량을 최소화 하기 위하여 랙의 치차는 측면 또는 아래를 향하도록 설치하는 것이 바람직하다.

랙의 형번이 기재되어 있는 면과 사용자 임의 절단면은 기준면으로 사용할 수 없으므로, 형번 표시면이 외부를 향하도록 설치되어야 하며, 사용자 임의 절단면은 반드시 구동의 종점부위에 설치하여, 피니언이 사용자 임의 절단부위를 지나가지 않도록 설치되어야 한다

랙의 설치는 다음의 순서를 따른다.

1. 설치면과 랙의 청결상태를 확인한다. 특히, 설치면과 랙의 밀착을 해할 수 있는 이물질 또는 설치면의 기복여부를 확인해야 한다.

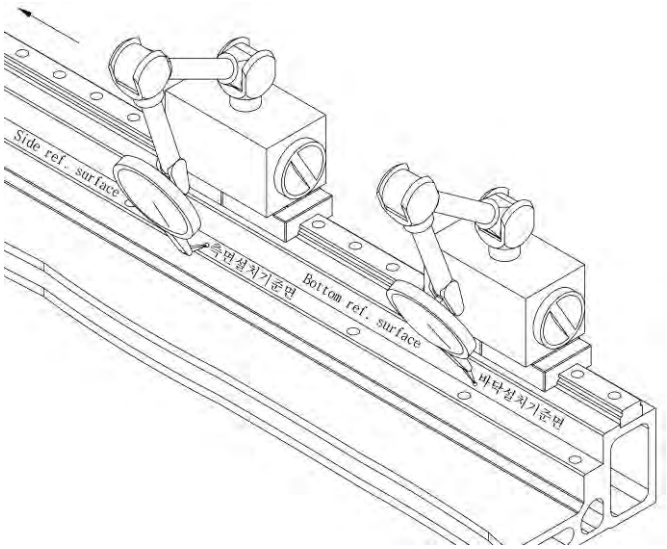


그림 4 [Figure 4]

■ RACK INSTALLATION

The mounting surface for both the rack and the linear guiding system must be parallel within the specifications shown in Figure 3. This parallelism requirement is best achieved by machining the mounting locations for both the guiding system and rack in the same machining operation.

iGB recommends orienting the rack teeth downward or to the side so it minimizes the possibility of debris collecting on the teeth and causing meshing interference. The model number displaying surface and arbitrary cut surface cannot be used as reference surface. And any rack ends that have been cut must be located at the end of the run; the pinion must not cross cut rack ends.

Rack installation sequence

1. Ensure that the mounting surface and rack are completely clean, free of burrs, or anything that could interfere with full contact with the mounting surfaces.

2. With the guiding system in place mount a dial indicator on the carriage and measure the perpendicularity and parallelism variance on the two rack mounting surfaces by moving the carriage down the run and monitoring the dial indicator readings. Verify they meet specified tolerance of ±0.03 mm as shown in Figure 4. Mark the location of the high point in the mounting surface the rack bottom sits on.

3. Start rack installation at the high point in the mounting surface the rack bottom sits on. Additional sections of rack will be shimmed as required throughout the rest of the run to bring the rack tooth peak variance into recommended tolerance (0.03mm) relative to the first rack section.

2. 직선베어링에 그림4와 같이 다이얼 게이지를 장착하고, 이를 운동방향으로 움직이면서 랙이 설치될 두 면의 직각도와 평행도를 측정하여 권장공차 (±0.03 mm) 범위내에 있는지를 확인하다. 또한, 랙의 바닥설치기준면이 안착될 면의 상사점을 표시한다.

3. 첫번째 랙을 표시한 상사점에서부터 설치를 시작한다. 이 후에 조립되는 랙들은, 필요시 심(Shim)처리하여 랙 치차 이끝의 높이 편차가 첫번째 랙과 상대적으로 추천된 조립공차 (0.03mm) 이내에 들어오도록 조절한다.

4. 상사점에 위치 시킨 첫번째 랙을 길이방향으로, 육각구멍붙이볼트를 이용하여 가볍게 고정한 후, 랙의 바닥면 밀착볼트 또는 클램프 등을 이용하여 랙의 바닥기준면과 설치면을 단단히 밀착한다. 클램프를 이용할 경우는 클램프의 누르는 힘이 복수개의 치끝에 분산될 수 있도록, 치끝과 클램프 사이에 반드시 두꺼운 부가 철판을 덧대야 하며 랙의 장착볼트에 가능한 한 가까이 설치해야 한다. 이때 랙의 형번기재면이 장비의 설치면을 향하지 않도록 주의한다. (그림 5 참조)

5. 장착된 첫번째 랙의 중심으로부터 양 끝쪽으로 표3. 권장체결토크의 25%, 50% 순으로 양쪽을 번갈아 가면서 체결한 후 랙의 설치볼트 (측면 또는 바닥면) 모두를 표3의 권장체결토크로 단단히 체결한다.

6. 첫번째 랙의 모든 장착볼트를 단단히 체결한 후 랙 이끝의 높이편차가 0.03mm (또는 바닥장착기준면의 높이편차가 0.05mm) 이내에 있는지, 그림6과 같이 다이얼 게이지를 이용하여, 랙 길이 전체를 검수한다. 만약 장비의 랙 설치면이 추천공차내에 있음에도 이끝의 높이편차가 권장공차를 초과할 경우는, 설치된 랙을 분해하여 장착면의 이물질 여부를 재확인한다. 랙 설치면이 추천공차대역을 벗어난 경우는, 랙 설치면의 상사점을 기준으로 심(Shim)작업을 수행하여야 한다. 이 때는 장착볼트 주변뿐만 아니라 가능한 한 넓은 면적에 심(Shim)작업을 수행하는 것이 바람직하다.

4. Apply mounting bolts, lightly secure the first rack length to the mounting surface and clamp it with additional thick steel plate to protect the rack teeth by distributing the clamp load over several teeth. Make sure the clamps are close to each bolt as they are tightened to ensure full rack to mounting surface contact. See Figure 5. Hexa-socket head cap screws are recommended for maximum pinion shoulder clearance. Make sure the side of the rack with the model number on it is not against the mounting surface.

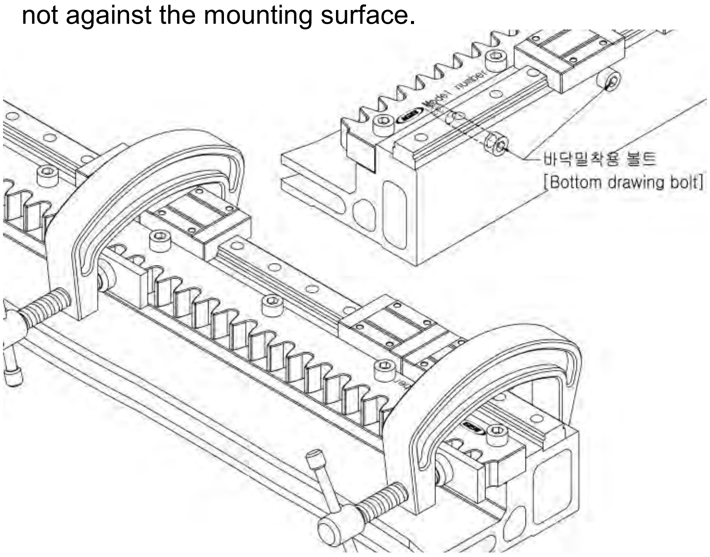


그림 5 랙 바닥설치기준면 두 가지 밀착 예
Figure 5 Two way to securing rack

5. Tighten the mounting bolts on the first rack alternately and incrementally 25%, 50%, then fully torque, working from the center of the rack towards the ends. Refer to Table 3 for recommended tightening torques.

6. Once the rack mounting bolts are fully torqued, verify tooth peak variance is less than 0.03mm (or the rack bottom reference surface peak variance less than 0.05mm) by placing a dial indicator on the movable carriage with the indicator tip on the tooth peaks. (or the rack bottom reference surface) Measure the tooth peak variance (or the rack bottom reference surface) at points throughout the entire rack section as shown in Figure 6. If the tooth peak variance (or rack bottom reference surface) is out of recommended tolerances and the mounting surface was in recommended tolerances, then dismount the rack and inspect for dirt, burs, or anything that would prevent proper rack to mounting surface seating.

표 3. 권장체결토크

Table 3. Recommended tightening torque

볼트[Bolt] Class 10.9~12.8 (단위:Nm)				
재질 [Material]		강철 [Steel]	주철 [Cast Iron]	알루미늄 [Aluminum]
볼트크기 [Bolt Size]	M6	15	10	8
	M8	37	25	13
	M10	73	51	36
	M12	128	89	64
	M14	204	142	102
	M16	318	222	159
	M20	622	435	311
볼트[Bolt] Class 6.9~8.8 (단위:Nm)				
재질 [Material]		강철 [Steel]	주철 [Cast Iron]	알루미늄 [Aluminum]
볼트크기 [Bolt Size]	M6	10	10	8
	M8	25	25	13
	M10	51	51	36
	M12	89	89	64
	M14	142	142	102
	M16	222	222	159
	M20	435	435	311

■ 랙의 추가설치

※ 참 고 : 보다 간편한 복수개의 CRP랙 연결을 위하여, 각 CRP기종별로 재사용이 가능한 전용 연결치구를 구비한다.

7. 완전히 고정된 첫번째 랙에 두번째 랙을 맞대고, 장착면에 접촉되도록 장착용 볼트를 이용하여 가볍게 고정한다. 이 때, 랙이 장착용 나사와 랙의 장착용 구멍공차 내에서 가볍게 움직일 수 있을 정도로 임시로 조인다.

8. 이미 고정된 랙과 고정할 랙의 연결 부위에, 그림 7과 같이 연결치구를 클램프를 이용 고정한다. 이 때, **클램프의 누르는 힘이 복수개의 치면에 분산될 수 있도록, 연결치구와 클램프 사이에 반드시 두꺼운 부가 철판을 덧대야 하며, 과도한 힘으로 클램핑하지 않도록 주의한다**. 과도한 클램핑은 치면 손상 등으로 인하여 성능저하를 유발한다. 클램핑은 랙이나 연결치구가 쉽게 움직이지 않는 정도이면 충분하다.

If the mounting surface is out of recommended tolerances, then shimming between the rack bottom reference surface and the mounting surface will be required. Locate the high point within the rack section and shim all other points to meet recommended tolerances. When shimming, it is preferred to support the rack as much as possible, not just short pieces near mounting bolts.

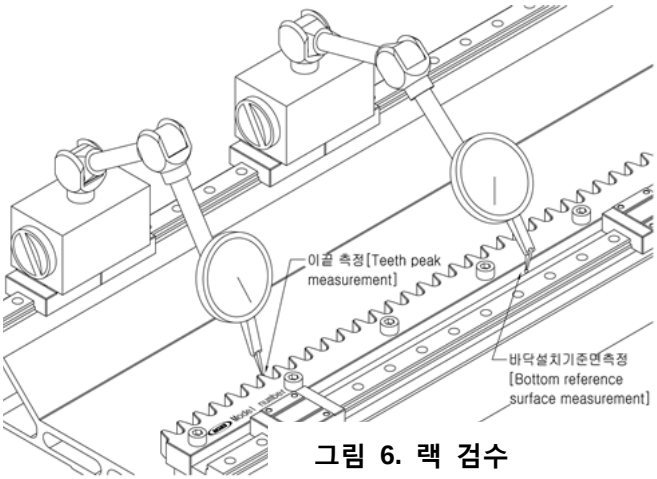


그림 6. 랙 검수

Figure 6. Rack verification

■ Additional rack installations

NOTE: Alignment Tools for each CRP size are required and available for purchase from iGB. This tool is required for proper installation of multiple rack segment runs.

7. Butt the second rack segment against the first fully secured rack on the mounting surface and lightly secure it with fasteners with serviceable thread locking compound applied so it is in full contact with the mounting surface but still moveable within the rack mounting hole tolerances.

8. Clamp the alignment tool between the two racks utilizing the two adjacent tooth roots of each rack while being careful not to damage the rack or alignment tool as shown in Figure 7. When clamp it, **placing additional thick steel plate over all 4 pins in between alignment tool and clamp**, to protect the rack teeth by distributing the clamp load over several teeth. **Do not apply excessive force clamp the alignment tool.** Lightly clamp it until rack or clamp itself is not move easily is enough.

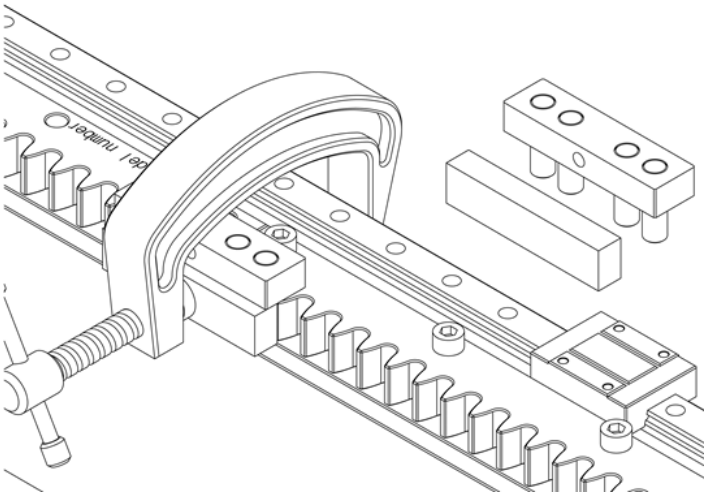


그림 7. 연결치구 고정방법
Figure 7. Clamping the alignment tool

9. 장착된 두번째 랙의 중심으로부터 양 끝쪽으로 표3. 권장체결토크의 25%, 50% 순으로 양쪽을 번갈아 가면서 체결한 후 랙의 설치볼트(측면 또는 바닥면) 모두를 표3의 권장체결토크로 단단히 체결한다.

10. 연결치구를 조심스럽게 떼어낸다.

11. 두번째 랙을 완전히 고정한 후, 순서6의 과정을, 첫번째 랙에서 두번째 랙까지 확장하여 검수한다. 만약, 두번째 랙의 상사점이 권장설치공차대역을 벗어날 경우, 첫번째 랙과 일치하도록 심(Shim)작업을 수행한다.

12. 두개 이상의 랙을 설치할 경우는 이상의 7~11순서를 반복한다. 이 때, 항상 첫번째 랙을 기준으로 조립상태를 검수한다.

■ 피니언의 설치 요구조건

피니언은 가능한 한 구동기의 출력축 지지베어링에 가까이 설치되어 출력축 처짐 변형과, 출력축에 작용하는 반경하중을 최소화하여야 한다.

출력축에 작용하는 반경하중(또는 직선베어링 추가작용하중)은 다음 식으로 구할 수 있다.

$$F_r = F_t \cdot \sin\theta$$

여기서, F_r은 반경하중, F_t는 실제 작용하는 법선력, θ는 최대압력각 이다.

CRP 적용을 위한 구동기를 선정할 때는 출력토크뿐만 아니라 상기의 식으로 계산된 반경하중을 고려하여야 한다.

If clamping is not possible then the alignment tool can be manually seated across the rack joint while pressing its pins forcefully into the rack tooth roots. When the adjacent rack section is properly spaced, no movement should be felt when alternately pushing down on opposite ends of the tool. Lightly clamping the alignment tool in place is the preferred method and will give the best results, using manual methods may reduce the CRP system accuracy.

9. Tighten the mounting bolts on the second rack alternately and incrementally 25%, 50%, then fully torque, working from the center of the rack towards the ends. Refer to Table 3 for recommended tightening torques.

10. Carefully remove the alignment tool.

11. Starting on the first rack perform the tooth peak variance check and extend it to the second rack as covered in step 6. If the tooth peak variance on the second rack is out of recommended tolerances shim it to match the first rack.

12. Repeat Steps 7 through 11 for any additional rack sections. Always reference the runout of additional rack sections against the first.

■ Pinion installation requirements

Pinion should be mounted as close to a shaft supporting bearing as possible to minimize shaft deflection, radial load.

Exerted radial load to actuator output shaft (or add on linear bearing load) can be calculated by using equation below;

$$F_r = F_t \cdot \sin\theta$$

where, F_r is radial load, F_t is actual tangential force, θ is maximum pressure angle.

When selecting actuator for CRP, not only 'Output torque' but also 'Applicable radial load' has to be considered. Also, in most of application, pinion cannot be supported both ends, therefore, this radial load can be exerted into actuator output support bearing as a tilting moment with actuator output bearing support span. This tilting moment may cause tilting deflection of actuator output shaft. This tilting deflection may cause poor engagement of CRP pinion and rack.

또한, 대부분의 경우 피니언이 양단지지될 수 없으므로, 이 반경하중은 구동기 출력축 지지거리와 더불어 구동기출력축 지지베어링에 모멘트 형태로 작용하게 되며, 이 모멘트는 구동기의 출력축 및 출력축지지베어링의 처짐 변형을 유발한다. 이 처짐 변형이 과다하면, 피니언이 랙으로부터 들뜨는 결과를 초래할 수 있다.

최적의 CRP성능 보장을 위해서는 처짐강성을 갖는 구동기의 사용이 권장되며, 필요한 처짐강성은 다음의 식으로부터 구할 수 있다.

구동기 처짐강성
≥반경하중작용거리(m)×반경하중(N)

구동기의 처짐하중(또는 모멘트하중)과 반경하중 용량이 충분하더라도 처짐강성이 불분명할 경우, 사용조건에 따라 피니언이 들뜰 수 있으며, 이 경우 CRP의 수명, 소음, 정밀도 등에 악영향을 미칠 수 있다.

구동기의 출력축은 표4의 사양을 만족할 수 있어야 한다.

피니언과 피니언 구동축은 가능한 한「동심」에 설치하여야 한다. 피니언의 편심회전은 이송정도가 고르지 못하게 하거나 백래시를 발생시키는 원인이 될 수 있다. 특히 수축형 체결구(메카록) 등의 적용이 필요한 경우는 자동조심형을 사용하는 것이 좋다.

피니언을 구동기의 출력축에 설치한 후, 다이얼게이지를 이용하여 피니언과 구동기 출력축의 동심도, 또는 흔들림 정도를 반드시 검수해야 한다. 피니언은 최소한 1회전 이상을 회전시키면서, 피니언의 몸체가 아닌 피니언의 각각의 핀의 상사점 변화가, '< 0.03mm' 이내임을 확인한다.

■ 피니언과 랙의 조립거리

그림8은 CRP 랙과 피니언 조립시 조립거리조절을 용이하게 하기 위한 참조도이다. 즉, 피니언의 핀 한 개만 랙치차의 이뿌리 부분에 위치하도록 한 후, 약 50N(5kg) 정도로 가볍게 피니언을 누르면, 랙치차와 피니언 핀의 조립거리가

To obtain maximum performance of CRP, it is recommended that select actuator with tilting rigidity (or stiffness) specifications. Desired tilting rigidity can be calculated by using following equation;

Actuator tilting rigidity
≥Radial load distance(m)×Radial load(N)

Even though tilting moment load and radial load of actuator is sufficient, if tilting rigidity is not clear, then it is possible to have a poor engagement between pinion and rack, depends on operating condition. In this case, it may reduce the performance of CRP, such as noise, lifetime, and accuracy etc.

Actuator output shaft specifications should satisfy requirement in Table 4.

표 4. 구동기 출력축 요구사양
Table 4. Desired actuator specifications

	진원도 [Circularity]	흔들림 [Runout]
축 형상 [Shaft type]	< 0.02mm	< ±0.01mm
편평축 형상 [Flange type]	< 0.02mm	< ±0.01mm

Pinion and actuator shaft rotary axis must align as close as possible. Eccentric alignment of pinion cause poor accuracy. In case of shrink fitting, between actuator output shaft and CRP pinion, self-centered products are recommended.
After install the pinion on the actuator output shaft, it is necessary to check the runout of pinion. Pinion must rotate at least one revolution, and ensure peak value of each pin (not pinion frame) remain within '<0.03mm'.

■ Pinion and rack engagement

Figure 7 shows how to adjust CRP pinion and rack engagement distance. Place the pinion as

0.005~0.015mm 이내에 머무르도록 조립할 수 있다. 그림7의 우측과 같이 핀 두개가 이뿌리 부근에 위치한 상태에서의 조립은 치면간섭에 의한 치면손상 또는 외부지지구조물(직선베어링) 조기파손의 우려가 있어 바람직하지 못하다. CRP는 높은 치형접촉률과 조립거리 유지가 용이한 구조로 고안된 특허치형을 장착하고 있어 손쉽게 우수한 특성을 구현할 수 있다.

CRP의 정밀도를 유지하기 위해서는 적절한 조립거리 조절을 위한 구동부 구조물의 설계가 필수적이다. 그림9은 적용 가능한 설계 예를 간략히 표현한 것이다. 스프링 등에 의한 피니언의 랙 밀착 방법은, 스프링 힘에 의한 추가 분력(피니언을 랙에서 분리시키려는 힘)으로 피니언 내부의 니들베어링 수명단축과 소음증가 등을 이유로 추천되지 않는다.

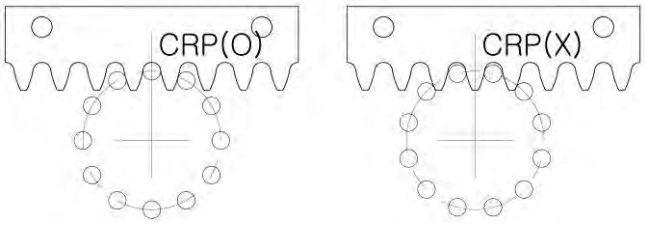


그림 8. 손쉬운 조립을 위한 피니언의 위상

Figure 8. Pinion positioning for assembly

only one pin on pinion locate at dedendum (root) of rack tooth. Gently press the pinion (approximately 50N or 5kg), then pinion and rack engagement distance become 0.005~0.015mm. If two pin of pinion locate at dedendum (root) of rack tooth, which is shown in right side of Figure 7, it may damage the teeth and (or) linear guide, by interference. CRP has patented tooth profile, which allow easier assembly and high teeth contact ratio to obtain maximum performance.

The CRP system requires a mechanism to achieve proper system assembly accuracy. The recommended method is to mount the iGB servo drive system on a sliding bracket that has an adjustment to push it into the rack. Another possible adjusting pinion location method utilizes a bracket with eccentric mounting slot pattern. General design concept for pinion installation, which allows teeth engagement adjustment shows in Figure 9. Spring loaded locating pinion mechanisms shall not be used since the spring force required to counteract the extra separation forces in between pinion and rack, and would cause a reduction in pinion needle bearing life and increase system noise.

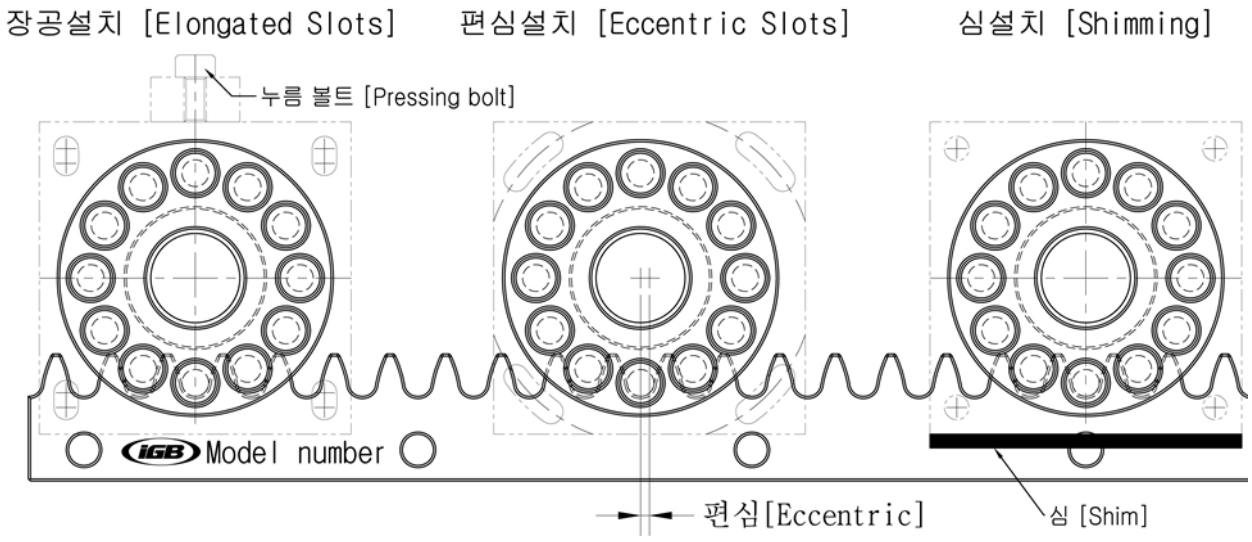


그림 9. 조립거리 조절이 가능한 피니언 설치 예

Figure 9. Pinion installation examples for teeth engagement adjustment

■ 윤 활

대부분의 경우에 CRP는 방청 및 마찰 최소화를 위한 주기적인 윤활을 필요로 한다. (표준품의 경우는 초기 방청을 위한 흑착색이 되어 있다.) 최대속도가 1m/s를 초과하지 않는 한, (부하 및 응용분야 조건에 따라 최대 2m/s도 가능) 윤활이 없는 건식 윤활로 사용도 가능하다. 이런 경우는 주변의 분진발생 빈도가 높아 분진의 윤활제 점착에 의한 시스템의 수명단축이 우려되거나, (이 경우는 분진이나 먼저에 강한 특성을 갖고 있는 iGB의 BRP 직선운동 시스템을 고려할 수 있습니다. 자세한 사항은 ㈜세진아이지비로 문의 바랍니다.) 의약, 식료품 분야와 같이 윤활제에 의한 이송 대상물의 오염이 우려되는 응용분야이다. 이 경우는 응용분야 및 부하 조건에 따라 시스템의 수명이 단축될 수도 있다. CRP는 구름마찰을 수행하므로, 미끄럼 마찰을 하는 기존의 랙피니언에 비하여 마찰감소를 위한 윤활목적은 현저히 낮지만, 방청을 위한 윤활은 필수적이다.

■ 방진 대책

랙의 이뿌리 부분에 먼지나 분진 등이 침투, 흡착되면 작동 불량의 원인이 될 수 있으므로, 가능한 한 랙의 치차가 측면 또는 아래를 향하도록 장착하여야 한다. 만약 랙의 치차가 위를 향하도록 설치할 수 밖에 없는 경우는 반드시 전면 커버를 설치해야 한다.

■ Lubrication

Under most circumstances, the CRP system requires (minimized) periodic lubrication for anti-corrosion. (Standard CRP rack has ‘galvanic’ treatment for initial moderate corrosion resistance.) In special cases, CRP can be operated lubrication free on request, if the maximum speed does not exceed 1m/sec (Maximum speed 2m/sec, depends on load conditions an applications). Typically this will involve dirty environments where contaminates will be attracted/stick to the lubricant on the rack creating mechanical interference or an abrasive paste that can accelerate wear. (In this case consider alternative linear motion solution from iGB, so called BRP, which has dust resistance characteristics. If you have an application with any of these characteristic consult iGB.) Other applications where no rack lubrication may be beneficial include food processing, clean rooms, coating, and others where low particle emissions are desirable. If the CRP system is operated lubrication free there may be some reduction in life which could vary depending on the applications. CRP system needs lubrication mainly for anti-corrosion. iGB recommend that CRP should have periodic lubrication for anti-corrosion. Consult iGB for more information regarding alternative lubrication options or lubrication-free applications.

■ Shield

Avoid mounting the rack teeth up since debris could collect on the rack and interfere with the meshing of the CRP system. If the teeth must be mounted up, shield the CRP system from debris or install an air knife just ahead of the pinion or consider iGB BRP system.

■ 기 타

✓ CRP설치 구조물은 변형에 의해 조립정밀도에 영향을 주지 않을 정도의 충분한 강성을 갖고 있어야 한다.

✓ 랙의 바닥설치 기준면은 적어도 랙 두께의 절반이상을 단차에 의해 지지해야 하며, 핀이나 볼트만으로 지지하는 것은 피해야 한다.장거리 이송의 경우, 설치 구조물을 일체형으로 유지하기 어려운 경우는 구조물을 연결 설치할 수 밖에 없다. 이런 경우는 CRP랙의 연결부위와 직선베어링의 연결부위 그리고 구조물의 연결부위가 가능한 한 멀리 떨어지도록 설계하여야 한다.

✓ CRP는 구동시 피니언과 랙을 서로 밀어내는 분력이 작용하고, 이는 이송 하중이외에 추가로 직선베어링에 작용하게 된다. 이 분력은 직선베어링 선정시 반드시 고려되어야 한다.(피니언의 설치 요구조건 참조)

✓ 열팽창에 의한 정밀도저하의 우려가 있으므로 -5~40℃이외의 범위나, 심한 온도차가 발생하는 응용의 경우에는 적용할 수 없다. (㈜세진아이지비로 문의바랍니다.)

✓ 사용자 요청에 의해 스테인레스 재질 적용 등으로 적절한 방청효과를 가질 수 있다. 그러나, 피니언의 롤러는 그 성격상, 베어링과 동일한 재질을 적용할 수 밖에 없으므로, 피니언 롤러의 방청은 필수적이다. (피니언 롤러가 녹이 쓸 경우는 피니언 내의 니들베어링을 손상시킬 수 있습니다. ㈜세진아이지비는 CRP의 방청을 보장하지 않습니다.)

✓ 사용자 요청에 따라, 추가 관통구멍, 탭, 지정길이의 랙 등도 공급 가능하다.

■ Remarks

✓ Make sure that the machine bed and guiding system are rigid enough to prevent deflection that will affect CRP system assembly accuracy.

✓ The bottom of the rack and one side must be supported by a step in the machine bed at least half the rack thickness. The rack should not be supported only by fasteners or pins.

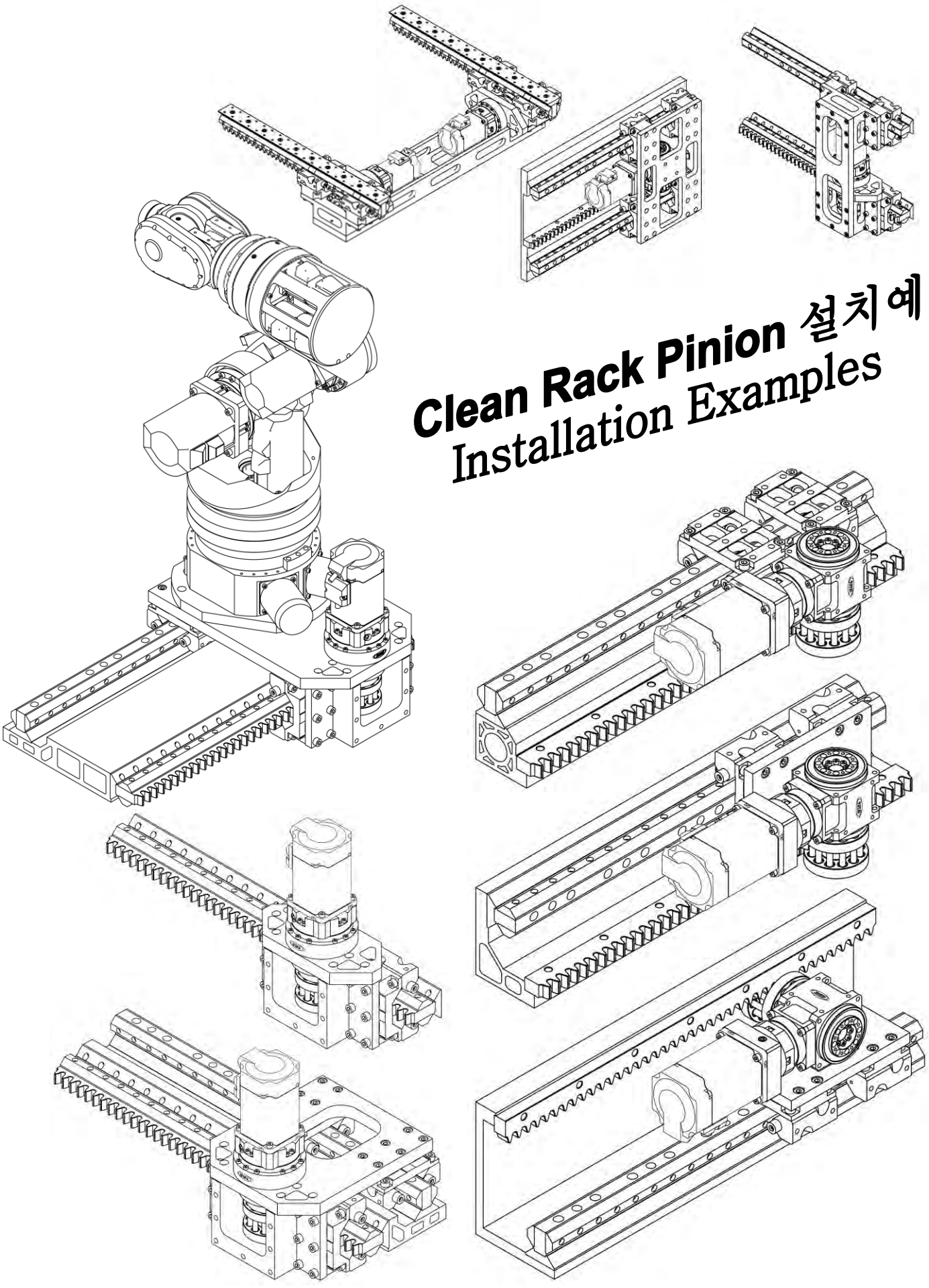
✓ Over long distances a single piece machine bed will become impractical requiring a segmented bed. When installing the guiding system and the CRP rack, their joints should not be located near the machine bed joints but span them as much as possible.

✓ The CRP system generates a separation force between the pinion and rack. Make sure this is accounted for when selecting the guiding system. Refer ‘Pinion installation requirement’ section.

✓ Do not use the CRP system in environments with temperatures outside of a -5~40°C range, or with wide temperature variations since thermal expansion can affect the assembly accuracy and meshing of the system. If you have an application with any of these characteristics consult iGB.

✓ On request CRP systems made out of stainless steel, on request (with the exception of the pinion rollers that consist of bearing grade steel, and pinion housing with aluminum alloy as an option), and will have moderate corrosion resistance. Pinion roller corrosion will lead to pinion needle bearing damage and then system failure. Always protect the pinion from adverse conditions. iGB makes no claims for CRP corrosion resistance in any applications.

✓ iGB can provide additional tapped, untapped or countersunk holes in the side or bottom of the rack or cut the rack to a specific length for an additional charge.



Clean Rack Pinion 설치예
Installation Examples

CGE 정격일람 [Clean Gearing External series ratings at a glance]

피니언 사양 [Pinion Specifications]			CRP 001	CRP 002	CRP 004	CRP 008	CRP 015	CRP 020	CRP 040	CRP 060	CRP 080	CRP 120	CRP 180
허용토크 vs. 피니언회전수 [Permitted torque vs. Pinion rpm]	720rpm [630rpm]	Nm	5	10	20	30	54	78	138	[219]	[323]	-	-
	600rpm [510rpm]		5.3	11	21	31	57	82	145	223	328	[475]	-
	480rpm [420rpm]		5.6	12	22	33	61	88	155	238	351	483	[894]
	360rpm		6	13	24	36	66	96	169	259	382	527	936
	240rpm		6.9	14	26	40	75	108	191	293	431	595	1057
	120rpm		8.5	15	27	55	100	150	270	400	530	800	1200
최대가감속허용토크 [Maximum acc./dec. torque]		Nm	10	20	40	80	150	200	400	600	800	1200	1800
순간허용최대토크 (비상정지) [Peak torque (E-stop)]		Nm	20	40	80	160	300	400	800	1200	1600	2400	3600
피치원직경 [Pitch circle diameter]		mm	38	47	57	76	95	114	133	152	171	190	228
관성3) [Inertia]3)	알루미늄 [Aluminum]	$\times 10^{-4}$ $kg \cdot m^2$	0.67	1.56	4.23	11.5	32.7	74.8	160.6	307.5	671	993.5	2626
	탄소강 [Steel]		1.16	2.71	7.08	20.5	57.6	125	274.7	537.3	1043	1748	4690
질량3) [Mass]3)	알루미늄 [Aluminum]	kg	0.2	0.3	0.56	0.9	1.6	2.7	4.2	6.3	10.6	13	23.8
	탄소강 [Steel]		0.4	0.6	1.1	1.9	3.4	5.3	8.4	12.8	17.3	24.1	45.5
롤러 수 [No. of roller]		rollers	10	12	12	12	12	12	12	12	12	12	12
모듈 [Module]		mm	3.8	3.92	4.75	6.33	7.92	9.5	11.1	12.7	14.25	15.83	19
치접촉압력각 [Max. pressure angle of tooth engagement]		deg.	23	20	20	20	20	20	20	20	20	20	20
기준수명4) [Lifetime basis]4) (L_{10})		hrs.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000

외치차 사양 [External Ring Gear Spec.]	감속비 i [Ratio i]	단위 [Unit]	형 번 [Model] CGE 001	CGE 002	CGE 004	CGE 008	CGE 015	CGE 020	CGE 040	CGE 060	CGE 080	CGE 120	CGE 180
정격출력토크 [Rated output torque]	2 [180rpm]	Nm	12	26	48	72	132	192	338	518	764	1054	1872
	3 [120rpm]		18	39	72	108	198	288	507	777	1146	1581	
주) 정격출력회전수 =(피니언회전수 360rpm / 감속비)일 때의 값입니다. 피니언 회전수 720rpm 이상은 ㈜세진아이지비로 문의바랍니다.	4 [90rpm]		24	52	96	144	264	384	676	1036			
[Note; @ Rated output speed = (Pinion speed 360rpm / ratio) Please contact SEJINiGB for pinion speed higher than 720rpm.]	5 [72rpm]		30	65	120	180	330	480					
	6 [60rpm]		36	78	144	216	396						
	7 [51rpm]		42	91	168	252							
	8 [45rpm]		48	104	192	288							
	9 [40rpm]		54	117	216								
	10 [36rpm]		60	130	240								
최대가감속허용토크 [Maximum acc./dec. torque]	2	Nm	20	40	80	160	300	400	800	1200	1600	2400	3600
	3		30	60	120	240	450	600	1200	1800	2400	3600	
	4		40	80	160	320	600	800	1600	2400			
	5		50	100	200	400	750	1000					
	6		60	120	240	480	900						
	7		70	140	280	560							
	8		80	160	320	640							
	9		90	180	360								
	10		100	200	400								
순간허용최대토크 (비상정지) [Peak torque (E-stop)]		Nm	최대가감속허용토크의 2배 [2 times of Maximum acc./dec. torque]										
질량 [Mass]	2	kg	0.38	0.95	1.5	3.3	5.1	8.1	12.3	18	24	34.6	46.5
	3		0.7	1.9	3.3	6.5	8.7	14.1	21	30	40.2	57.4	
	4		1	2.7	4.9	9.7	13	20.5	29.6	42.4			
	5		1.3	3.8	6.4	13.6	16.8	26.1					
	6		1.6	5.4	8.1	17.6	20.7						
	7		1.9	5.3	9.7	20							
	8		2.2	6	11.3	23							
	9		2.5	6.8	13								
	10		2.9	7.5	14.6								
관성모멘트 [Moment of inertia]	2	$\times 10^{-4}$ $kg \cdot m^2$	3.85	13.4	32.3	128	327	738	1593	3126	5302	9996	20544
	3		17.5	62.7	164	587	1421	3160	6885	13177	22402	41100	
	4		48.2	176	477	1667	4001	8649	18448	35175			
	5		104	401	1052	3812	8492	18131					
	6		190	814	1993	7326	15628						
	7		318	1206	3378	11970							
	8		493	1861	5305	18577							
	9		723	2706	7850								
	10		1016	3756	11100								

3) 표준 피니언일 때 참고값 입니다. [Reference value only for standard pinion.]

4) 평균부하토크 ≤ 정격출력토크 [Average load torque ≤ Rated output torque]

Clean Gearing External 형식표시 [Clean Gearing External Ordering Information]

외치차 [External Ring Gear]	CGE ①	□□□ ②	-	S	-	i□□ ③	- □□□ ④
피니언 [Pinion]	CRP ①	□□□ ②	-	P	-	(A/S) ③	- □□□□□ ④

① 형명 [Model Name]: Clean Gearing External / Clean Rack Pinion

② 형번 [Model Number]: CRP 피니언 최대가감속허용토크 [CRP pinion maximum acc./dec. torque]

③ 외치차 [External Ring Gear]: 감속비[Ratio]

피니언 [Pinion]: 재질 [Material]

A : 알루미늄 (Aluminum) – 볼트 체결형 [Bolt clamping]

S : 탄소강 (Steel) – 수축형 체결구 또는 평행키 적용 [Shrink fitting or Feather keyway]

④ 지정사항 [Indication]:

외치차 [External Ring Gear]: 피니언과 외치차의 중심거리 [Center distance between pinion and external ring gear]

피니언 [Pinion] : 피니언 형상코드 또는 지정 감속기 [Pinion shape code or applied gearbox]

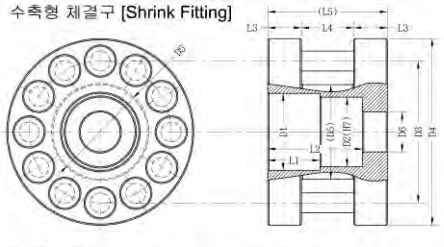
- 피니언 형상코드는 아래표를 참조하십시오. [Please refer below table for Pinion shape code.]
- 지정 감속기에 상응하는 피니언의 적용성 및 세부치수는 ㈜세진아이지비로 문의바랍니다. [In case of 'applied gearbox', please contact SEJINIGB for availability and detail dimensions.]

Ex.) CGE002--S-i2-74, CRP004-P-A-B06M05018, CRP002-P-S-K1431, CRP002-P-S-S1023, CRP002-P-A-MM065

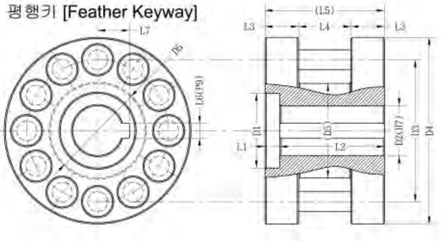
CRP 피니언 형상코드 [CRP Pinion Shape Code]

표준 피니언 [Standard Pinion]

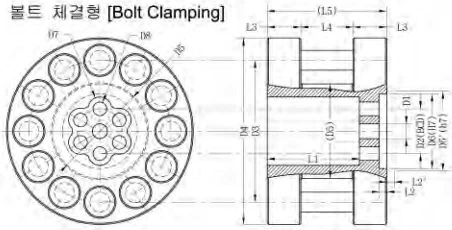
수축형 체결구 [Shrink Fitting]



평행키 [Feather Keyway]



볼트 체결형 [Bolt Clamping]



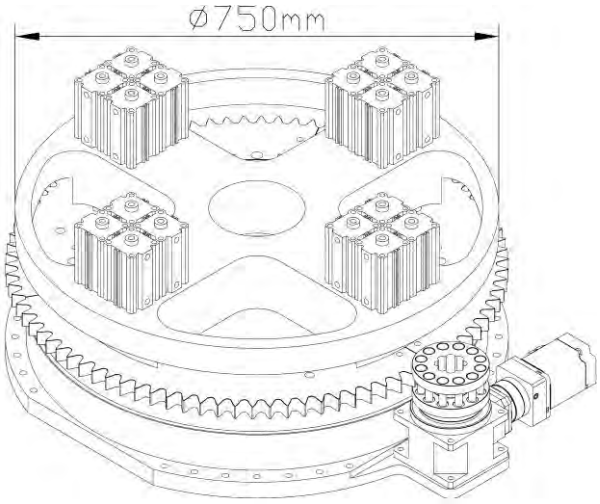
- 볼트체결형의 경우 알루미늄 재질이 표준, 탄소강재질은 준표준입니다.
- 도표의 수축형체결구는 자동조심형 적용의 경우입니다. 대구경 수축체결형은 외형도를 참조하십시오.

[- In case of bolt clamping shape, aluminum material is standard, steel is optional.
- Self-centering shrink fitting applied in the list, please refer external dimensions for bigger diameter shrink fittings]

		피니언 형번 및 형상코드 [Pinion Model Number & Shape Code]										
		CRP001	CRP002	CRP004	CRP008	CRP015	CRP020	CRP040	CRP060	CRP080	CRP120	CRP180
수축형체결구 [Shrink Fitting]	형상코드	대구경 외형도 참조 [Please refer external drawings for big diameter shrink fittings.]	S1023	S1428	S2038	S2543	S3250	S4062	S4870	S5585	S6595	S75115
	D1		26	31	43	48	55	68	76	86	96	116
	D2		23	28	38	43	50	62	70	85	95	115
	D3		47	57	76	95	114	133	152	171	190	228
	D4		62	75	97	120	144	166	188	216	238	280
	D5		31	38	49	60	75	86	97	116	123	146
	D6		10	14	20	25	32	40	48	55	65	75
	L1		22	21	18	18	25	31	34.5	23	30	30
	L2		38	38	41	43	51	60	64.5	65	87	99
	L3		11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4		18	21	24	27	31	36	41	46	56	60
	L5		41	48	51	61	64	77	90	95	117	149
평행키 [Feather Keyway]	형상코드	K1024	K1431	K2042	K2042	K2552	K2552	K4073	K4073	K5587	K5587	K85130
	D1	15	22	30	30	35	35	52	52	76	76	120
	D2	10	14	20	20	25	25	40	40	55	55	85
	D3	38	47	57	76	95	114	133	152	171	190	228
	D4	50	62	75	97	120	144	166	188	216	238	280
	D5	22	31	38	49	60	75	86	97	116	123	146
	L1	12	9.5	6	9	8.5	12	40	17	7.5	29.5	18
	L2	24	31.5	42	42	52.5	52	73	73	87.5	87.5	131
	L3	11.5	11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4	13	18	21	24	27	31	36	41	46	56	60
	L5	36	41	48	51	61	64	77	90	95	117	149
	L6	3	6	6	6	8	8	12	12	16	16	22
	L7	6.4	9.3	12.8	12.8	15.8	15.8	23.3	23.3	31.8	31.8	47.9
볼트 체결형 [Bolt Clamping]	형상코드	B06M03012	B06M05018	B06M05018	B08M06030	B08M08037	B08M08037	B08M10045	B12M10075	B12M10090	B12M08100	B12M10120
	D1	-	6	6	15	18	18	20	-	60	70	70
	D2	12	18	18	30	37	37	45	75	90	100	120
	D3	38	47	57	76	95	114	133	152	171	190	228
	D4	50	62	75	97	120	144	166	188	216	238	280
	D5	22	31	38	49	60	75	86	97	117	123	146
	D6	20	30	30	45	58	58	70	50	-	-	-
	D6'	-	-	-	-	-	-	-	-	107	120	80
	D7	6X6	6X 9.5	6X 9.5	8X 11	8X 14	8X 14	8X 17.5	12X 17.5	12X 17.5	12X 17.5	12X 17.5
	D8	6X 3.5	6X 5.5	6X 5.5	8X 6.6	8X9	8X9	8X 11	12X 11	12X 11	12X 11	12X 11
	L1	25	30	37	39.5	49	52	57	10	77	104	123
	L2	3	3	3	3	3	3	3	3	-	-	-
	L2'	-	-	-	-	-	-	-	-	4.5	5	8
	L3	11.5	11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4	13	18	21	24	27	31	36	41	46	56	60
	L5	36	41	48	51	61	64	77	90	95	117	149

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 ㈜세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more detail.]

CGE 선정 및 수명계산 [CGE Selection & lifetime calculation]



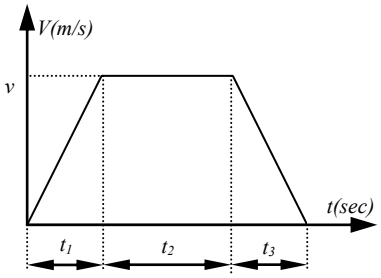


표5. 마찰계수(μ) [Table 5. Friction coefficient (μ)]

개방형 베어링 [Bearing w/o sealing]	0.02~0.05
시일드 베어링 [Bearing with sealing]	0.1~0.2

표6. 안전계수(S_f) [Table 6. Safety factor (S_f)]

무충격원활운전 [Operations without impact]	1.2 ~ 1.5
보통운전 [General operations]	1.5 ~ 2
충격이 있는 구동 [Operations with impact]	2 ~ 3
고충격 구동 [Operations with high impact]	3 ~ 4

■ 선정 예

► 구동조건

요구정보

질량 (m)	30 kg	
부하관성모멘트 (I_l)	2.1 kgm^2	
구동부하 직경 (D)	0.75 m	
요구출력회전수 (N_m)	80 rpm	
가감속시간 (t_1, t_3)	0.4 sec	
등속시간 (t_2)	2 sec	
외부회전력 (T_e)	0 Nm	
마찰계수 (μ)	0.2	(표5 참조)
중력가속도 (g)	9.81 m/s^2	
안전계수 (S_f)	2 (보통운전)	(표6 참조)

1. 요구각속도:

$$\omega = (N_m \times 2\pi)/60$$
$$= (80 \times 2 \times 3.14)/60 = 8.9 rad/s$$

2. 요구각가속도:

$$\alpha = \dot{\omega} = \omega / t_1 = 8.9/0.4 = 22.25 rad/s^2$$

3. 가속시 요구회전력:

$$T_a = I_l \alpha = 2.1 \times 22.25 = 46.73 Nm$$

4. 마찰부하 회전력:

$$T_f = \mu \cdot m \cdot g \cdot D$$
$$= 0.2 \times 30 \times 9.81 \times 0.75 = 44.2 Nm$$

■ Selection example

► Operating conditions

Required Data

Mass (m)	30 kg	
Load moment of inertia (I_l)	2.1 kgm^2	
Load Diameter (D)	0.75 m	
Desired output speed (N_m)	80 rpm	
Acc./Dec. time (t_1, t_3)	0.4 sec	
Constant speed time (t_2)	2 sec	
External torque (T_e)	0 Nm	
Friction coefficient (μ)	0.2	(Table 5)
Gravitational acceleration (g)	9.81 m/s^2	
Safety factor (S_f)	2 (General)	(Table 6)

1. Desired angular velocity:

$$\omega = (N_m \times 2\pi)/60$$
$$= (80 \times 2 \times 3.14)/60 = 8.9 rad/s$$

2. Desired angular acceleration:

$$\alpha = \dot{\omega} = \omega / t_1 = 8.9/0.4 = 22.25 rad/s^2$$

3. Desired accelerative torque:

$$T_a = I_l \alpha = 2.1 \times 22.25 = 46.73 Nm$$

4. Frictional torque:

$$T_f = \mu \cdot m \cdot g \cdot D$$
$$= 0.2 \times 30 \times 9.81 \times 0.75 = 44.2 Nm$$

5. 전체요구회전력:

$$T_d = S_f(T_a + T_f + T_e)$$
$$= 2 \times (46.73 + 44.2 + 0) = 182Nm$$

요구회전수 80rpm부근에서 정격출력토크가 182Nm이상인 형번을 가선정하면, CGE015 (264Nm @ 90rpm, 감속비 4)

6. 가선정 외치차 관성을 포함한 요구회전력:

$$T_{aG} = (I_l + I_G)\alpha$$
$$= (2.1 + 4001 \times 10^{-4}) \times 22.25 = 55.63Nm$$
$$T_{fG} = \mu \cdot (m + m_G) \cdot g \cdot D$$
$$= 0.2 \times (30 + 13) \times 9.81 \times 0.75 = 63.3Nm$$
$$\therefore T_{dG} = S_f(T_{aG} + T_{fG} + T_e)$$
$$= 2 \times (55.63 + 63.3 + 0) = 238Nm$$

238 Nm **< 264**Nm이므로, **CGE015 감속비4 선정**

7. 요구지지반경하중:

CRP015 피니언에 작용하는 요구회전력은,

$$T_{dP} = T_{dG} / i = 238/4 = 59.5Nm$$

CRP015 피니언의 피치반경은,

$$PCR = (95mm/2) \times 10^{-3} = 0.0475m$$

CRP015 피니언에 작용하는 요구법선력은,

$$F_{dT} = T_{dP} / PCR = 59.5/0.0475 = 1253N$$

요구법선력에 의한 요구반경하중은,

$$F_{dR} = F_{dT} \times \sin\theta = 1253 \times \sin 20 = 429N$$

(여기서, θ는 CGE015 치접촉 압력각)

8. 수명계산:

$$L_{10} = 10000 \times \frac{N_o}{N_m} \times \left(\frac{T_o}{T_{dG}}\right)^{\frac{10}{3}}$$
$$= 10000 \times \frac{90}{80} \times \left(\frac{264}{238}\right)^{\frac{10}{3}} \cong 15894hrs$$

여기서, N_o는 정격출력회전수, N_m은 요구출력회전수, T_o는 정격출력회전수(N_o)에서의 정격출력토크, T_{dG}는 외치차 및 모든 운동체의 관성과 마찰이 포함된 요구회전력.

응용분야나 사용조건에 따라서, 비수평면-비칭회전운동일 때 중력영향, 스프링, 균형추(Counter balance), 유체점성, 풍력저항 등을 고려해야 할 수도 있습니다.

5. Total desired torque:

$$T_d = S_f(T_a + T_f + T_e)$$
$$= 2 \times (46.73 + 44.2 + 0) = 182Nm$$

Temporary selection for rated torque higher than 182Nm, at nearby desired speed 80rpm, CGE015 (264Nm @ 90rpm, Ratio 4)

6. Total desired torque with CGE ring gear inertia:

$$T_{aG} = (I_l + I_G)\alpha$$
$$= (2.1 + 4001 \times 10^{-4}) \times 22.25 = 55.63Nm$$
$$T_{fG} = \mu \cdot (m + m_G) \cdot g \cdot D$$
$$= 0.2 \times (30 + 13) \times 9.81 \times 0.75 = 63.3Nm$$
$$\therefore T_{dG} = S_f(T_{aG} + T_{fG} + T_e)$$
$$= 2 \times (55.63 + 63.3 + 0) = 238Nm$$

238 Nm **< 264**Nm**, as a result, CGE015 ratio 4 is selected.**

7. Desired radial load support:

Desired torque applied at CRP015 pinion is,

$$T_{dP} = T_{dG} / i = 238/4 = 59.5Nm$$

Pitch radius of CRP015 pinion is,

$$PCR = (95mm/2) \times 10^{-3} = 0.0475m$$

Desired tangential force applied at CRP015 pinion is,

$$F_{dT} = T_{dP} / PCR = 59.5/0.0475 = 1253N$$

Desired radial load support caused by desired tangential force is,

$$F_{dR} = F_{dT} \times \sin\theta = 1253 \times \sin 20 = 429N$$

(where, θ is maximum pressure angle of CGE015 tooth engagement)

8. Life time calculation:

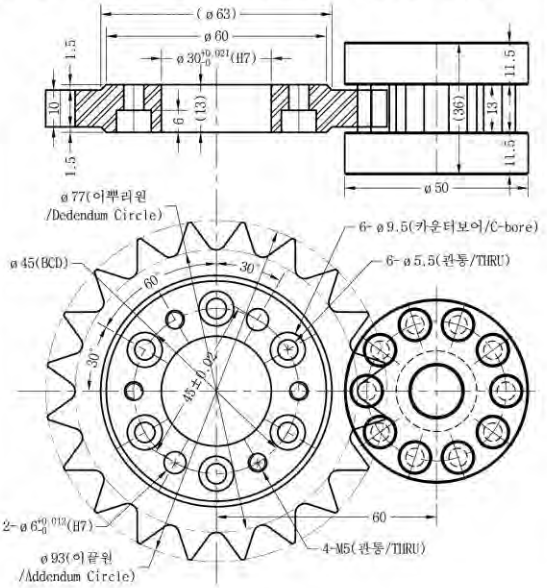
$$L_{10} = 10000 \times \frac{N_o}{N_m} \times \left(\frac{T_o}{T_{dG}}\right)^{\frac{10}{3}}$$
$$= 10000 \times \frac{90}{80} \times \left(\frac{264}{238}\right)^{\frac{10}{3}} \cong 15894hrs$$

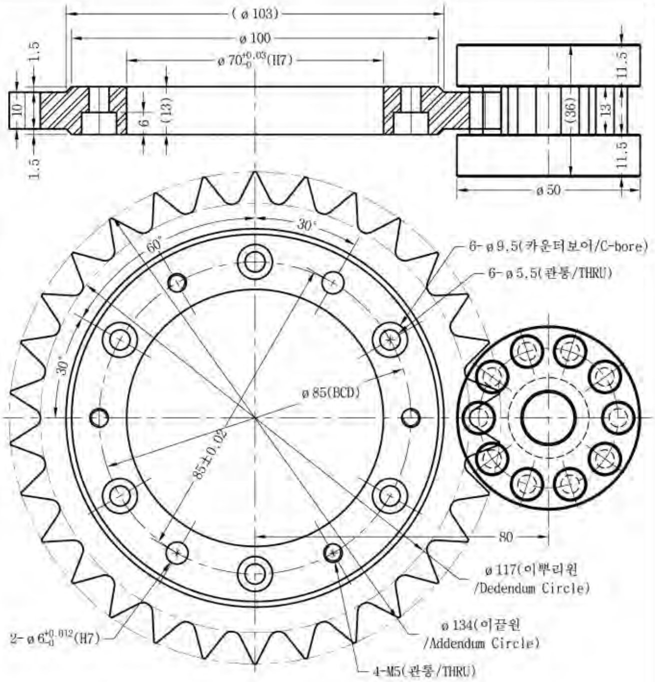
where, N_o is rated output speed, N_m is desired output speed, T_o is rated output torque at rated output speed N_o, T_{dG} is desired torque including CGE ring gear inertia, inertia of everything in motion, and frictional torque etc.

Other Forces may need to be included gravitational forces if rotation is not in the horizontal plane with imbalanced loads, springs, counter-balances, fluid dampening systems, wind resistance etc.

CGE 외형치수 [CGE External Dimensions] (mm)

CGE001 외형치수 I
CGE001 External Dimensions I





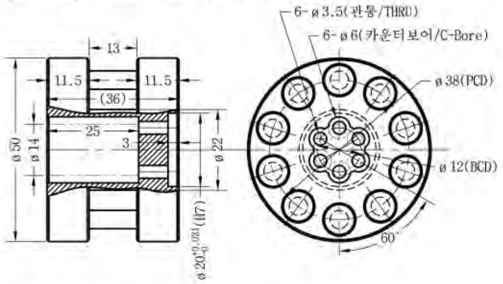
외치차 형번 [External Ring Gear Model]	: CGE001-S-i2-60
감속비 [Ratio]	: 2
척도[Scale]	: 1/1

외치차 형번 [External Ring Gear Model]	: CGE001-S-i3-80
감속비 [Ratio]	: 3
척도[Scale]	: 1/1

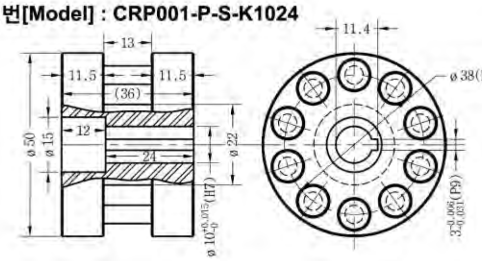
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

형번[Model] : CRP001-P-A-B06M03012

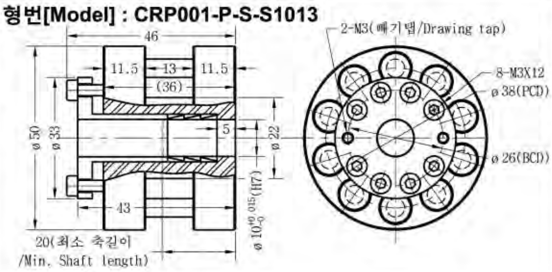


형번[Model] : CRP001-P-S-K1024

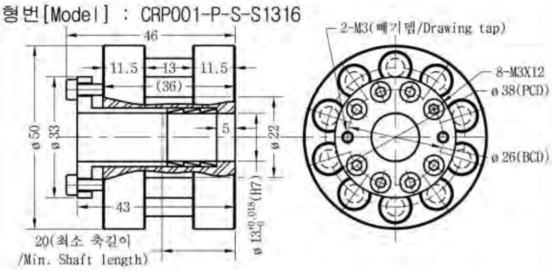


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

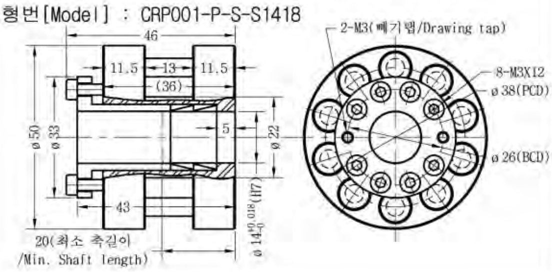
형번[Model] : CRP001-P-S-S1013



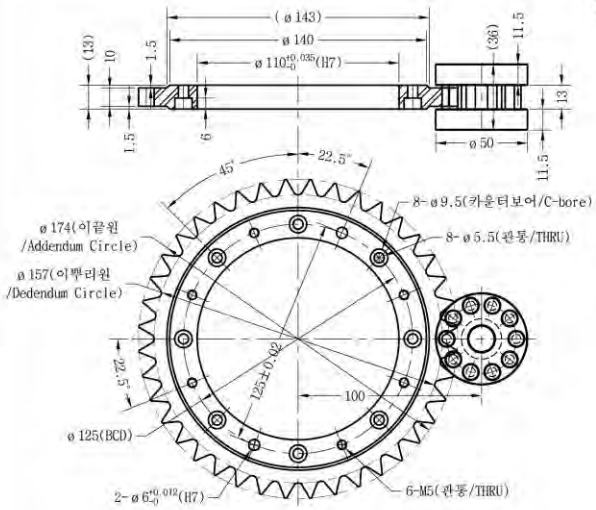
형번[Model] : CRP001-P-S-S1316



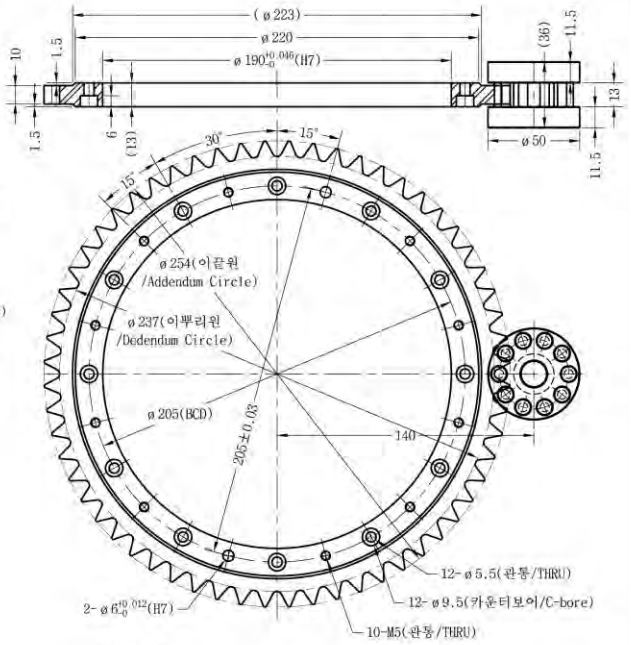
형번[Model] : CRP001-P-S-S1418



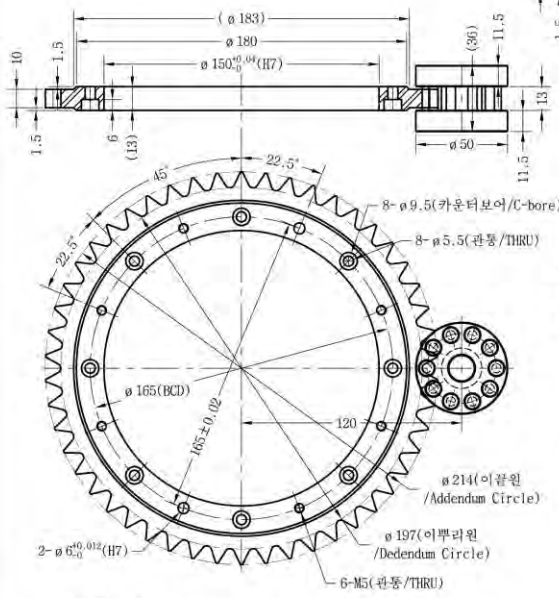
CGE001 외형치수 II
CGE001 External Dimensions II



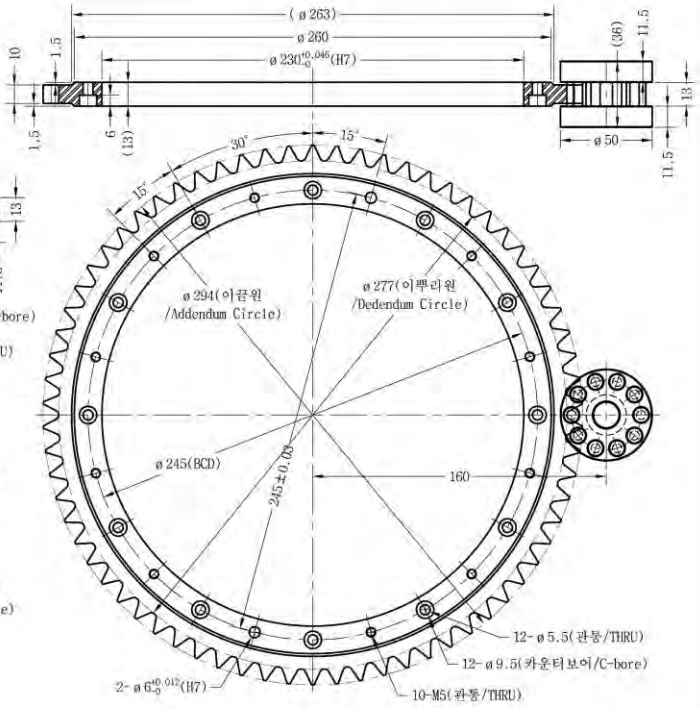
외치차 형번 [External Ring Gear Model] : CGE001-S-i4-100
감속비 [Ratio] : 4
척도[Scale] : 1/2



외치차 형번 [External Ring Gear Model] : CGE001-S-i6-140
감속비 [Ratio] : 6
척도[Scale] : 1/2



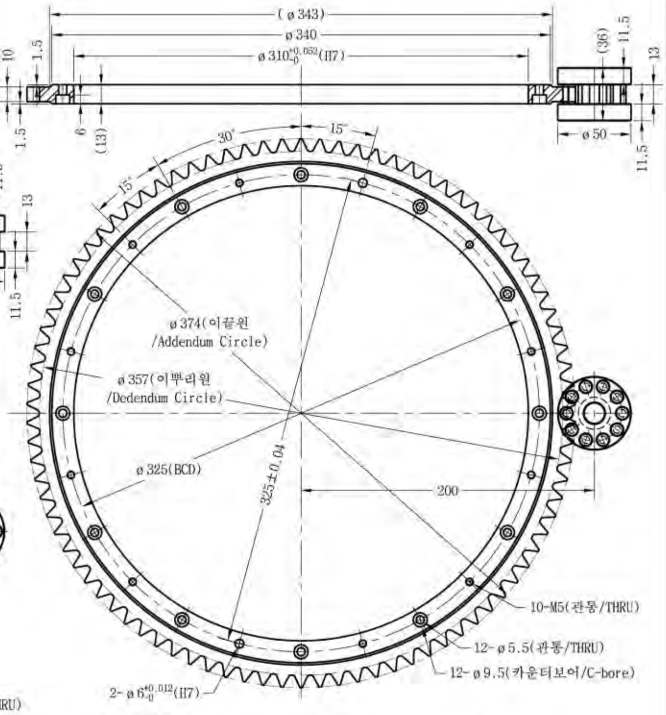
외치차 형번 [External Ring Gear Model] : CGE001-S-i5-120
감속비 [Ratio] : 5
척도[Scale] : 1/2



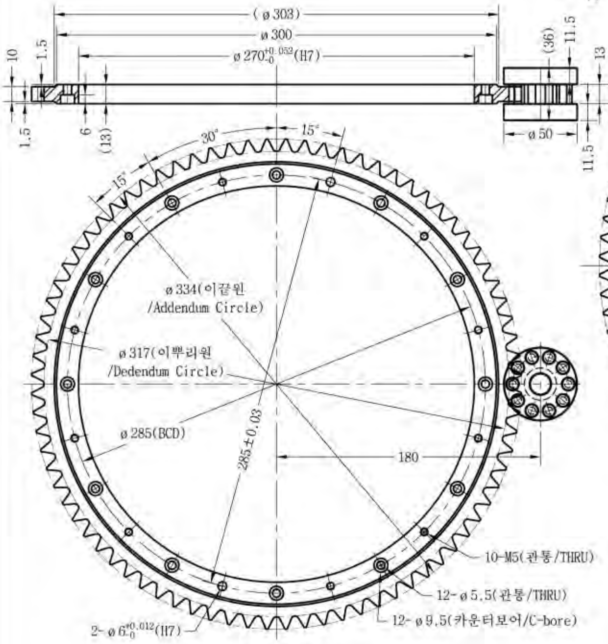
외치차 형번 [External Ring Gear Model] : CGE001-S-i7-160
감속비 [Ratio] : 7
척도[Scale] : 1/2

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

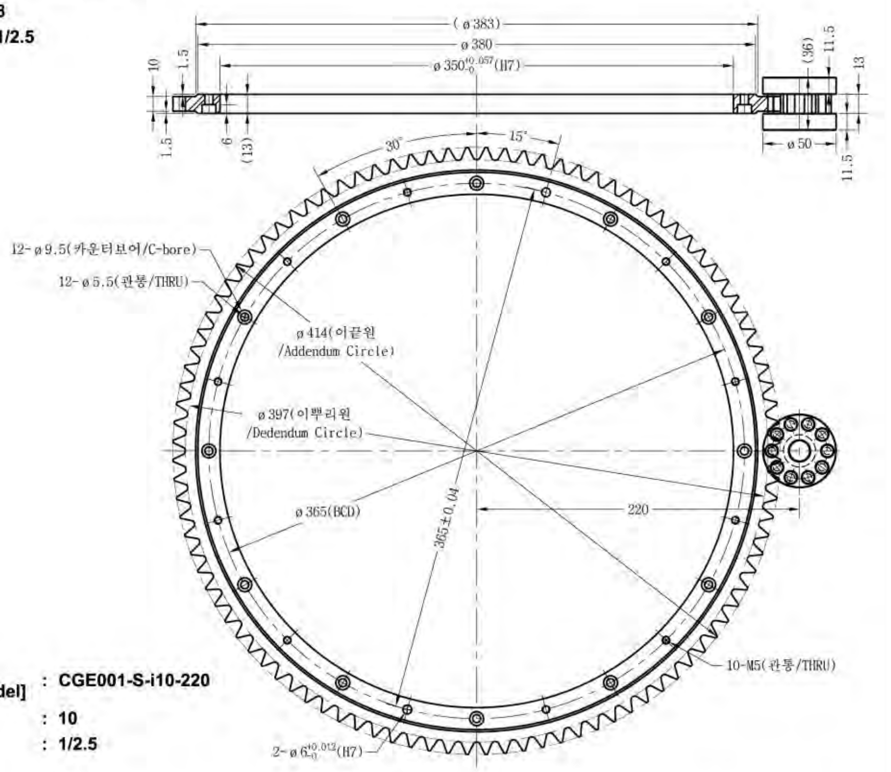
CGE001 외형치수 III
CGE001 External Dimensions III



외치차 형번
[External Ring Gear Model] : CGE001-S-i9-200
감속비 [Ratio] : 9
척도[Scale] : 1/2.5



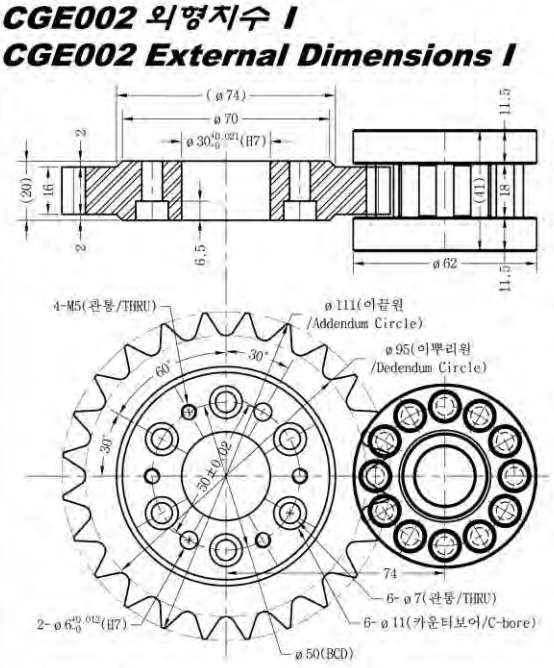
외치차 형번
[External Ring Gear Model] : CGE001-S-i8-180
감속비 [Ratio] : 8
척도[Scale] : 1/2.5

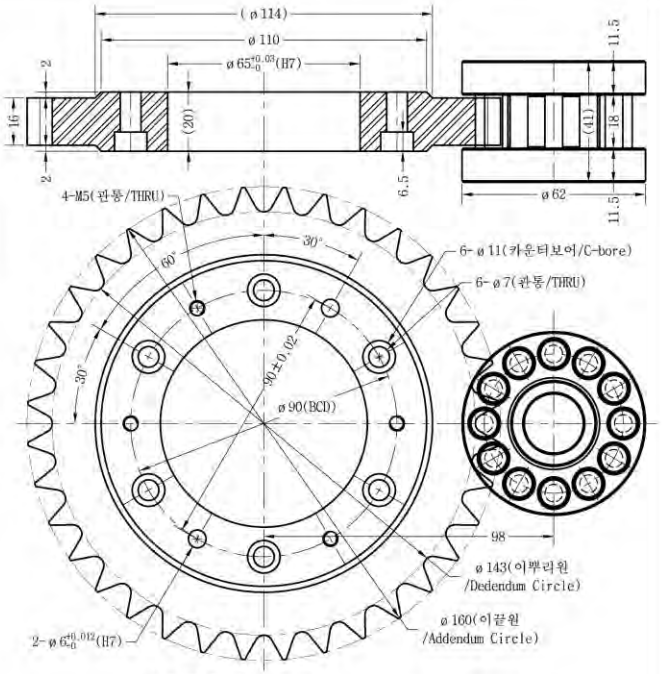


외치차 형번
[External Ring Gear Model] : CGE001-S-i10-220
감속비 [Ratio] : 10
척도[Scale] : 1/2.5

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE002 외형치수 I
CGE002 External Dimensions I





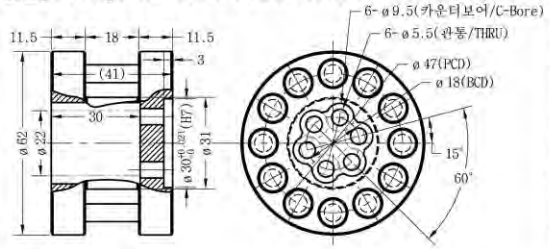
외치차 형번 [External Ring Gear Model]	: CGE002-S-i2-74
감속비 [Ratio]	: 2
척도[Scale]	: 1/1

외치차 형번 [External Ring Gear Model]	: CGE002-S-i3-98
감속비 [Ratio]	: 3
척도[Scale]	: 1/1

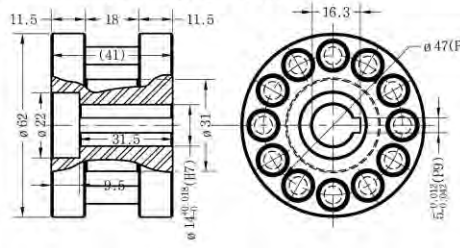
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

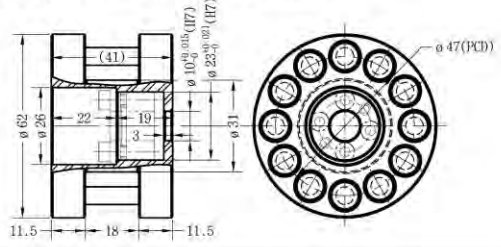
형번[Model] : CRP002-P-A-B06M05018



형번[Model] : CRP002-P-S-K1431

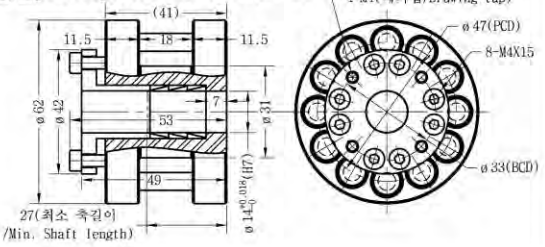


형번[Model] : CRP002-P-S-S1023

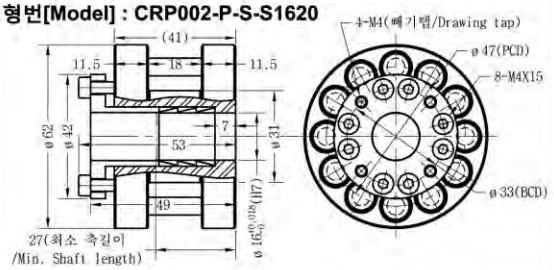


표준형 수축체결형 피니언 [Optional Shrink Fitting Pinions]

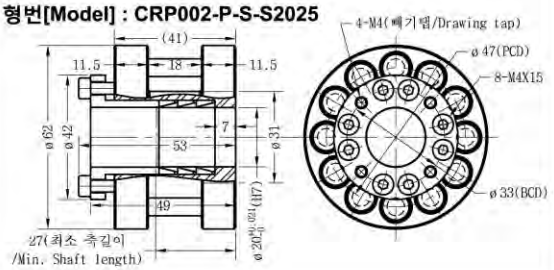
형번[Model] : CRP002-P-S-S1418



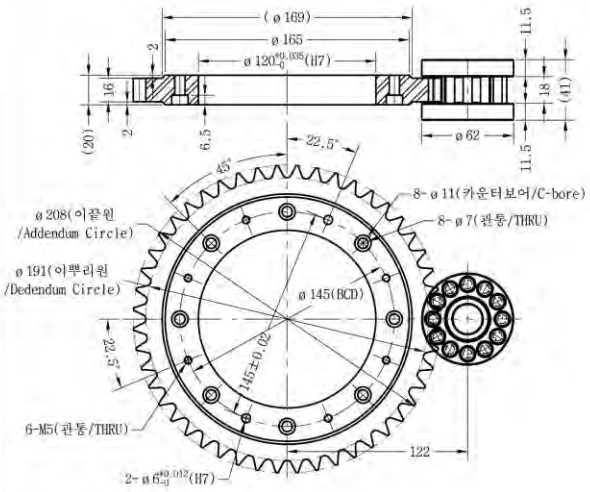
형번[Model] : CRP002-P-S-S1620



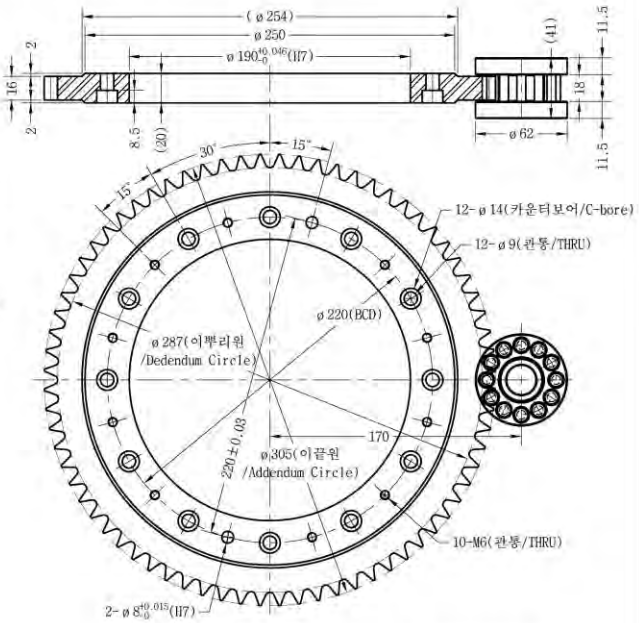
형번[Model] : CRP002-P-S-S2025



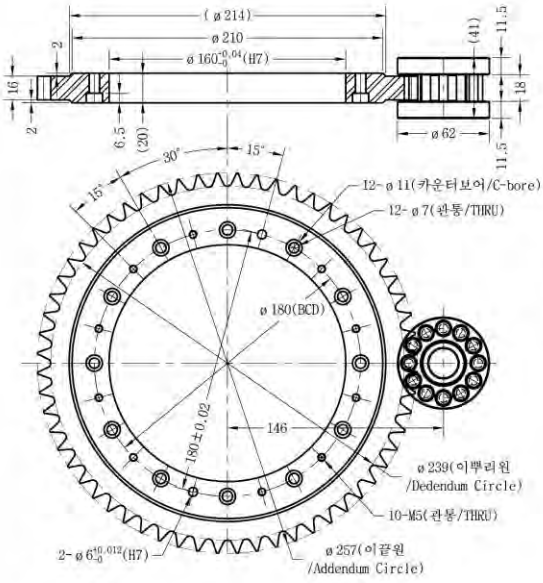
CGE002 외형치수 II
CGE002 External Dimensions II



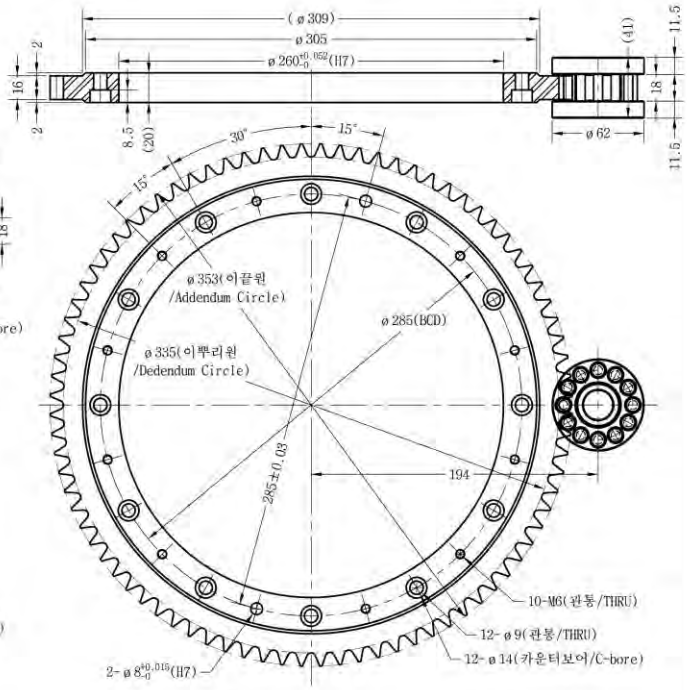
외치차 형번 [External Ring Gear Model] : CGE002-S-i4-122
감속비 [Ratio] : 4
척도[Scale] : 1/2



외치차 형번 [External Ring Gear Model] : CGE002-S-i6-170
감속비 [Ratio] : 6
척도[Scale] : 1/2



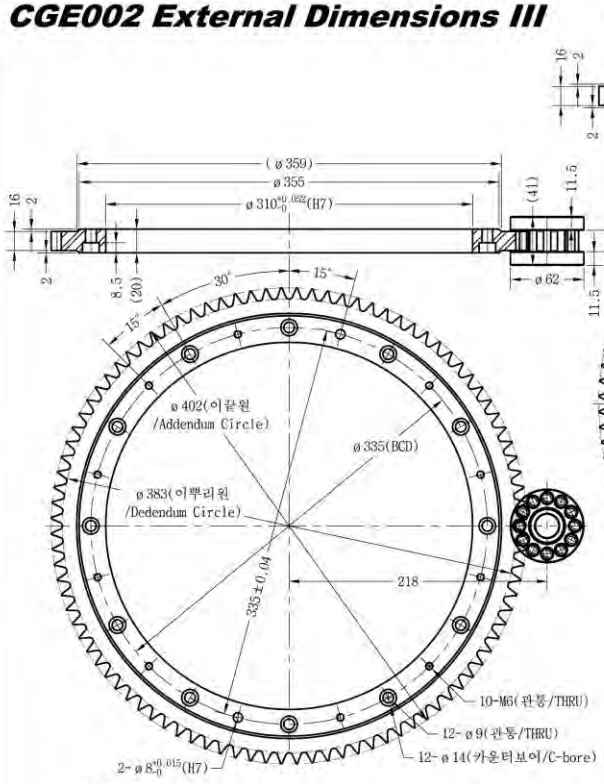
외치차 형번 [External Ring Gear Model] : CGE002-S-i5-146
감속비 [Ratio] : 5
척도[Scale] : 1/2



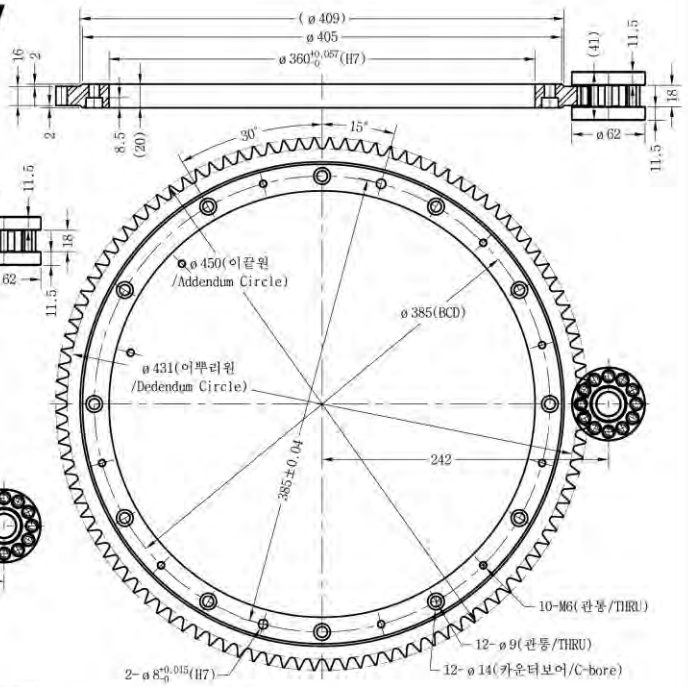
외치차 형번 [External Ring Gear Model] : CGE002-S-i7-194
감속비 [Ratio] : 7
척도[Scale] : 1/2

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

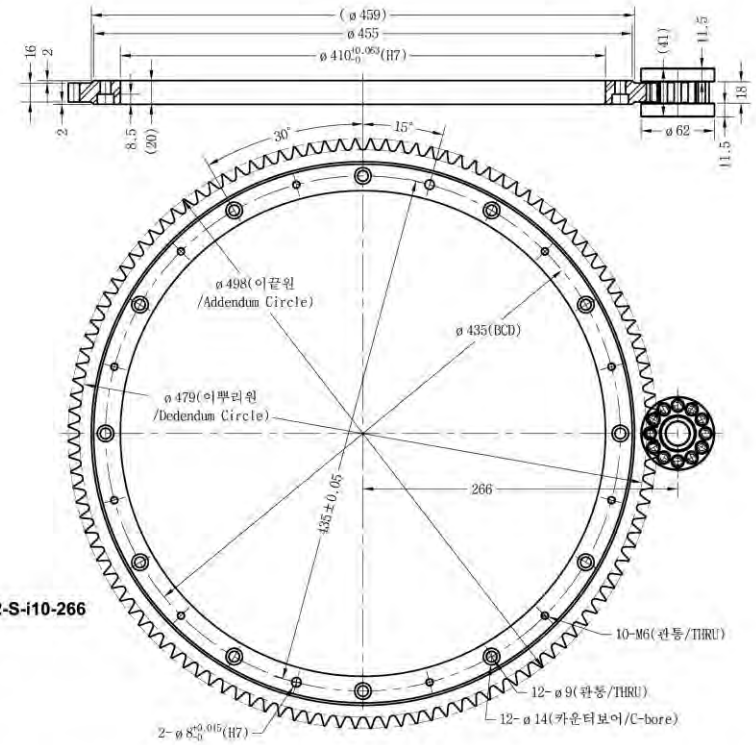
CGE002 외형치수 III
CGE002 External Dimensions III



외치차 형번
[External Ring Gear Model] : CGE002-S-i8-218
감속비 [Ratio] : 8
척도[Scale] : 1/2.5



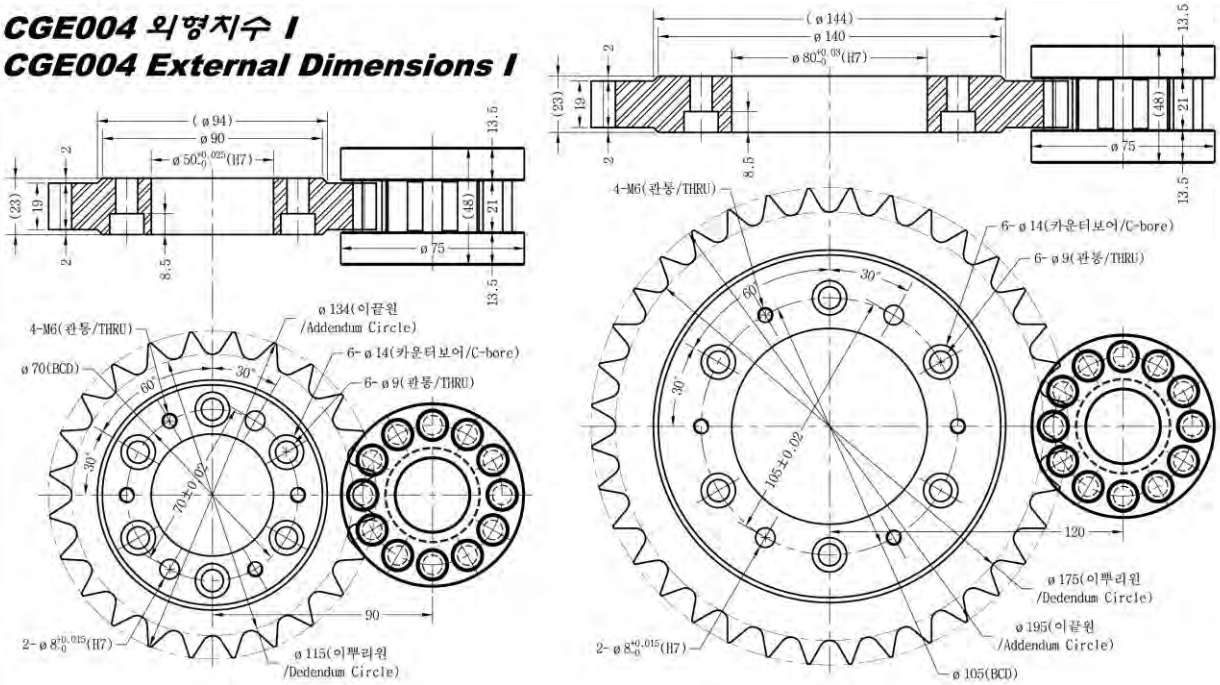
외치차 형번
[External Ring Gear Model] : CGE002-S-i9-242
감속비 [Ratio] : 9
척도[Scale] : 1/2.5



외치차 형번
[External Ring Gear Model] : CGE002-S-i10-266
감속비 [Ratio] : 10
척도[Scale] : 1/2.5

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE004 외형치수 I
CGE004 External Dimensions I

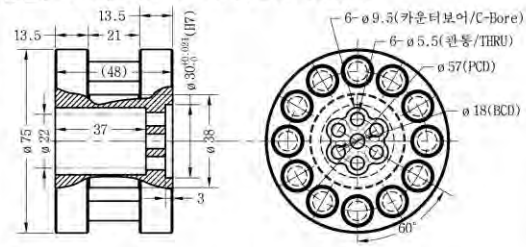


외치차 형번 [External Ring Gear Model]	: CGE004-S-i2-90	외치차 형번 [External Ring Gear Model]	: CGE004-S-i3-120
감속비 [Ratio]	: 2	감속비 [Ratio]	: 3
척도[Scale]	: 1/1	척도[Scale]	: 1/1

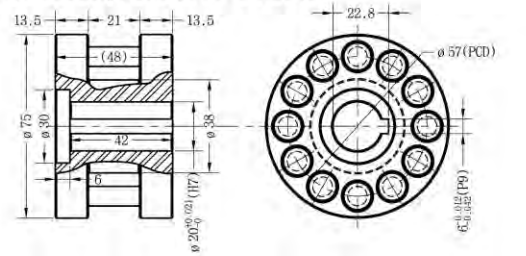
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

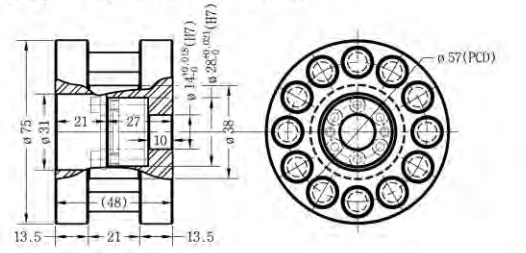
형번[Model] : CRP004-P-A-B06M05018



형번[Model] : CRP004-P-S-K2042

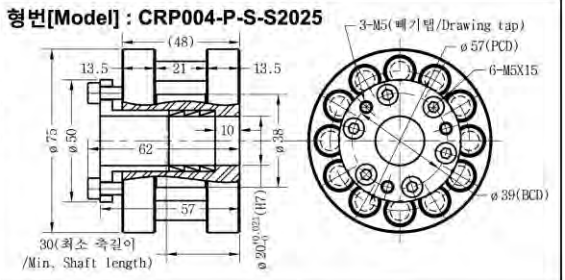


형번[Model] : CRP004-P-S-S1428

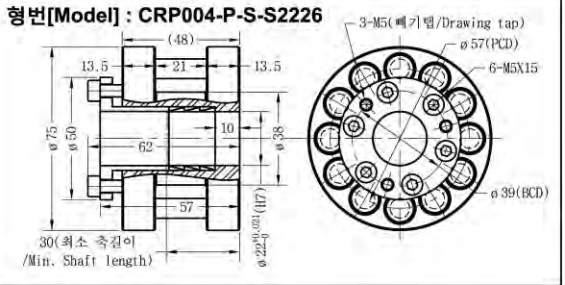


축표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

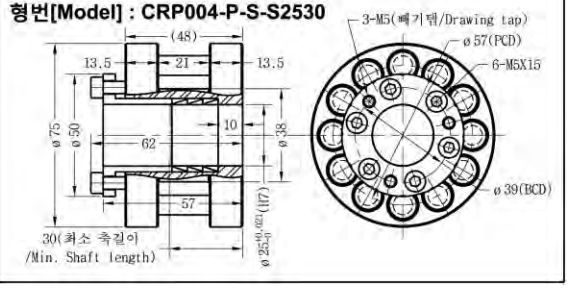
형번[Model] : CRP004-P-S-S2025



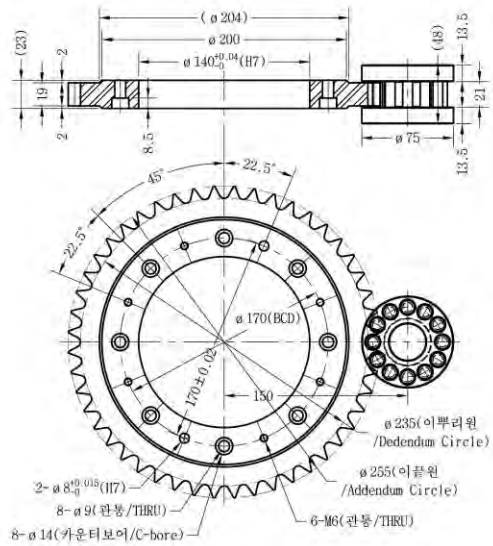
형번[Model] : CRP004-P-S-S2226



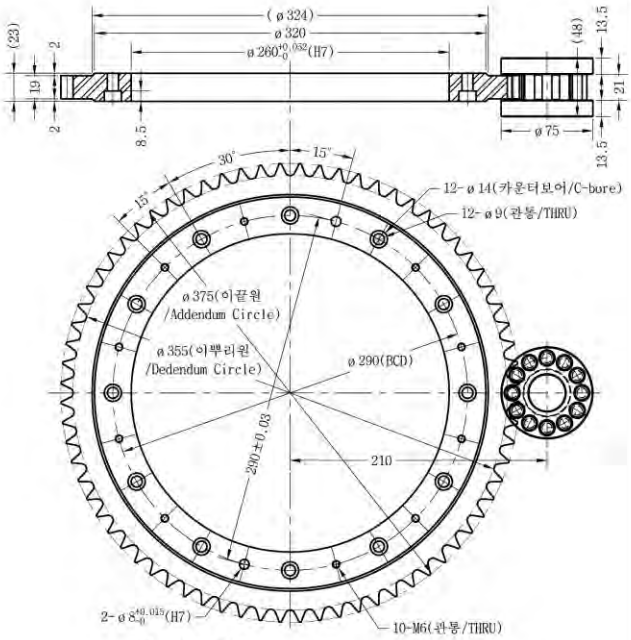
형번[Model] : CRP004-P-S-S2530



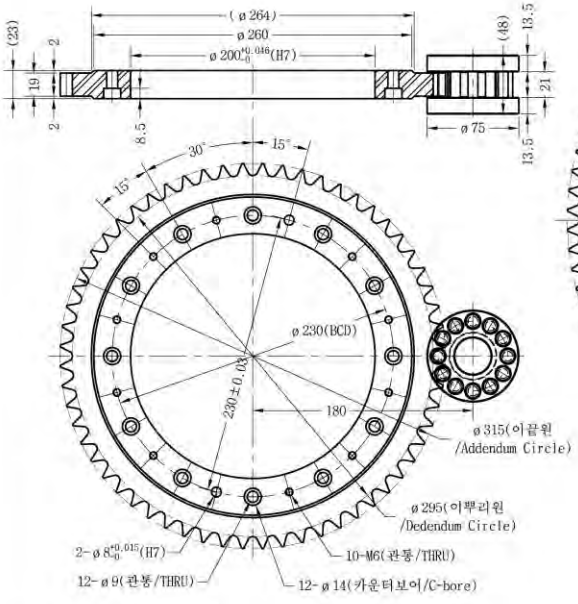
CGE004 외형치수 II
CGE004 External Dimensions II



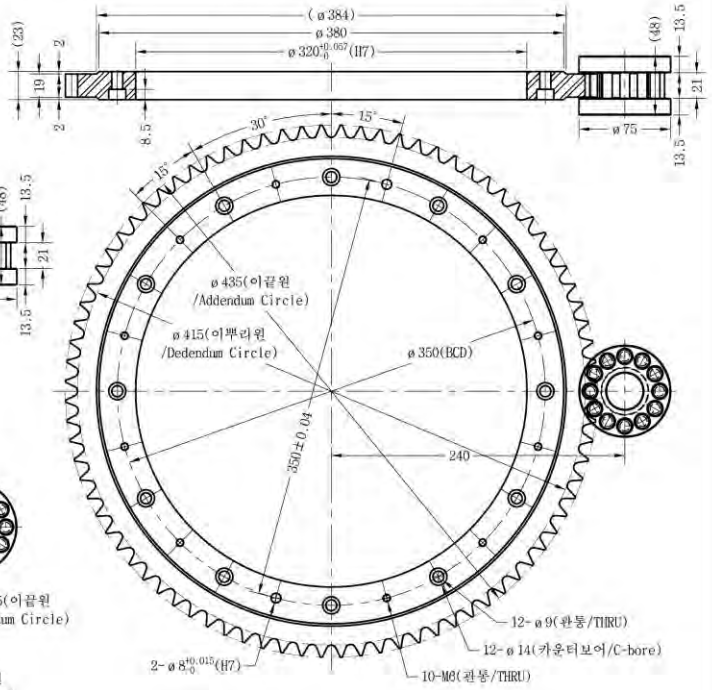
외치차 형번 [External Ring Gear Model] : CGE004-S-i4-150
감속비 [Ratio] : 4
척도[Scale] : 1/2



외치차 형번 [External Ring Gear Model] : CGE004-S-i6-210
감속비 [Ratio] : 6
척도[Scale] : 1/2



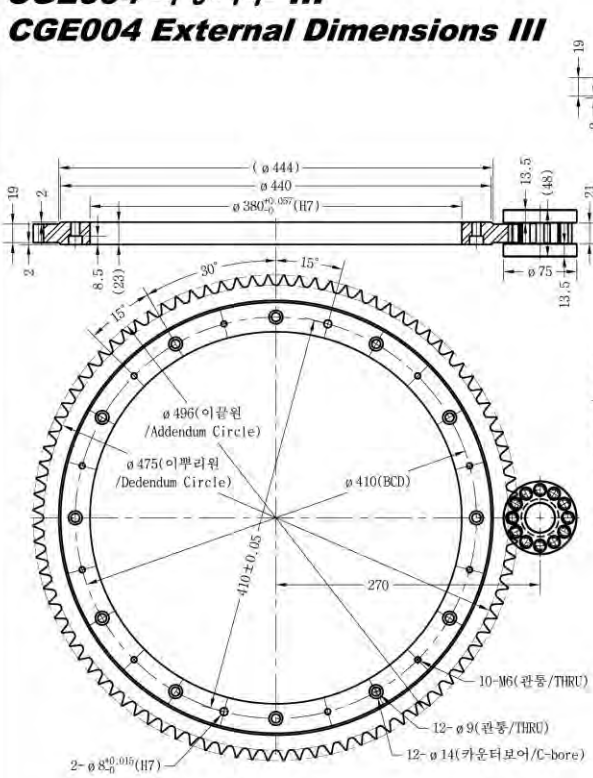
외치차 형번 [External Ring Gear Model] : CGE004-S-i5-180
감속비 [Ratio] : 5
척도[Scale] : 1/2



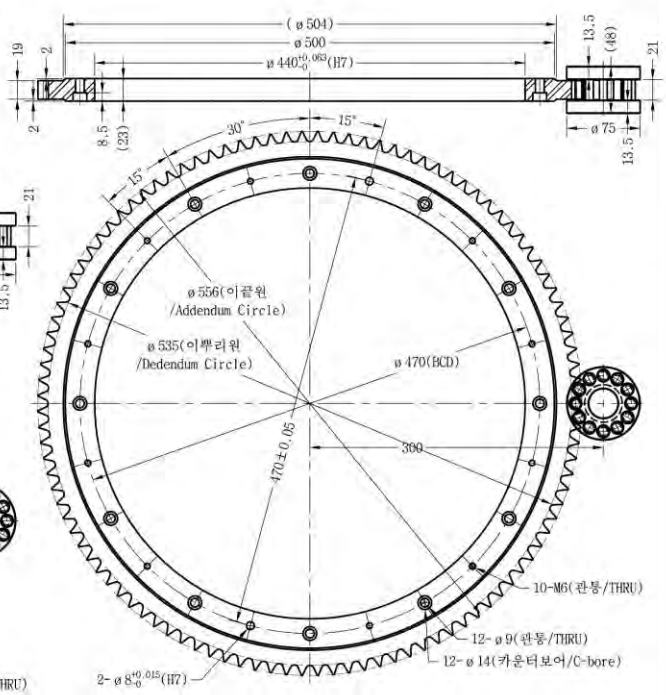
외치차 형번 [External Ring Gear Model] : CGE004-S-i7-240
감속비 [Ratio] : 7
척도[Scale] : 1/2

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE004 외형치수 III
CGE004 External Dimensions III



외치차 형번
[External Ring Gear Model] : CGE004-S-i8-270
감속비 [Ratio] : 8
척도[Scale] : 1/2.5

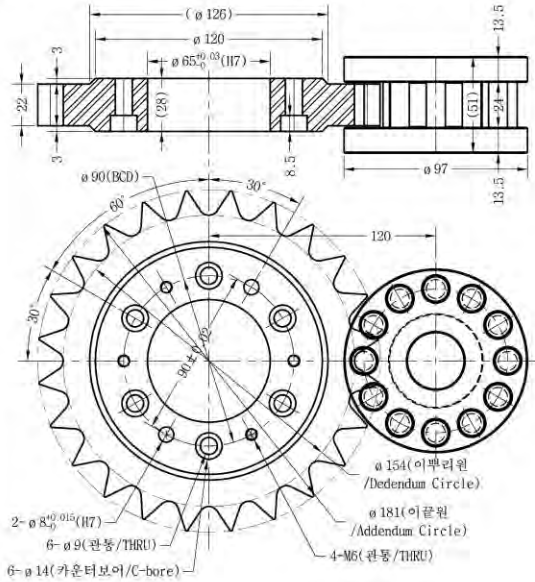


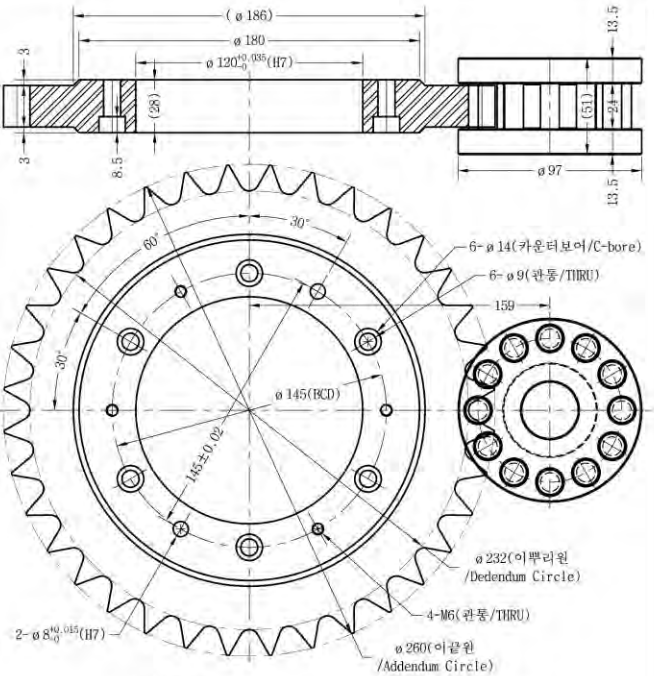
외치차 형번
[External Ring Gear Model] : CGE004-S-i9-300
감속비 [Ratio] : 9
척도[Scale] : 1/2.5

외치차 형번
[External Ring Gear Model] : CGE004-S-i10-330
감속비 [Ratio] : 10
척도[Scale] : 1/2.5

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE008 외형치수 I
CGE008 External Dimensions I



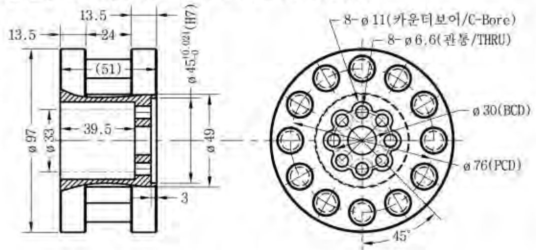


외치차 형번 [External Ring Gear Model]	: CGE008-S-i2-120		외치차 형번 [External Ring Gear Model]	: CGE008-S-i3-159
감속비 [Ratio]	: 2		감속비 [Ratio]	: 3
척도[Scale]	: 1/1		척도[Scale]	: 1/1

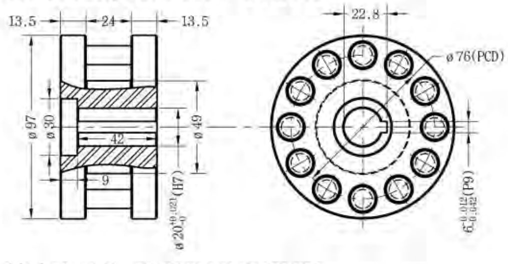
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

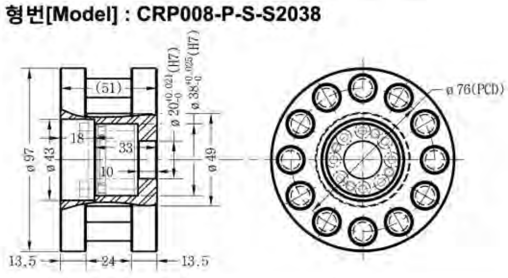
형번[Model] : CRP008-P-A-B08M06030



형번[Model] : CRP008-P-S-K2042

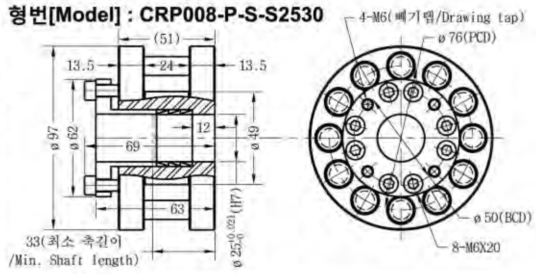


형번[Model] : CRP008-P-S-S2038

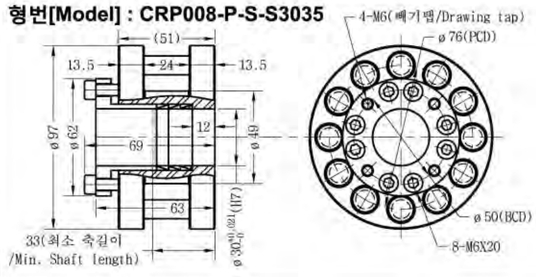


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

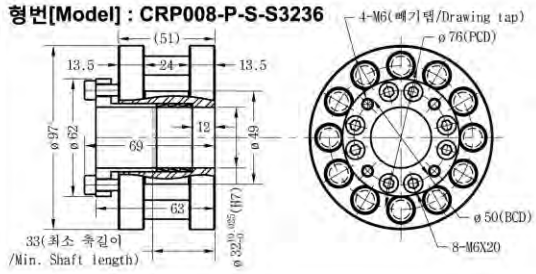
형번[Model] : CRP008-P-S-S2530



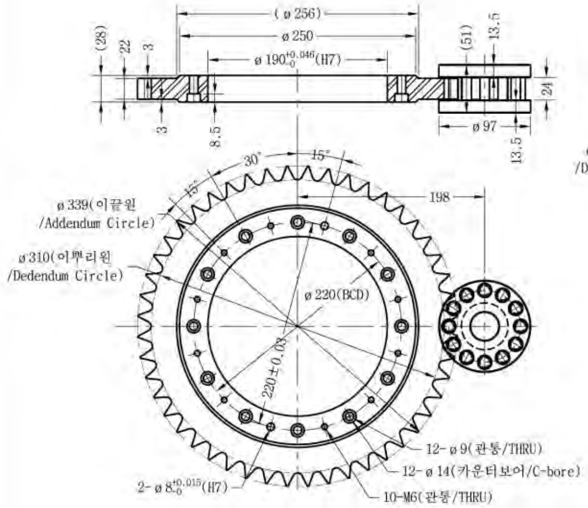
형번[Model] : CRP008-P-S-S3035



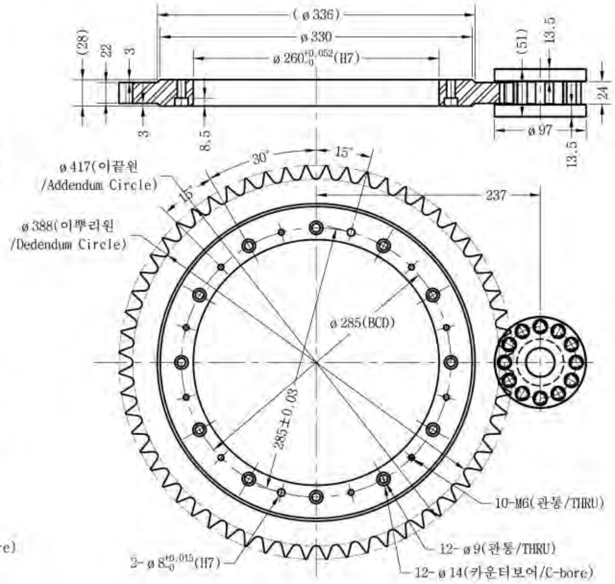
형번[Model] : CRP008-P-S-S3236



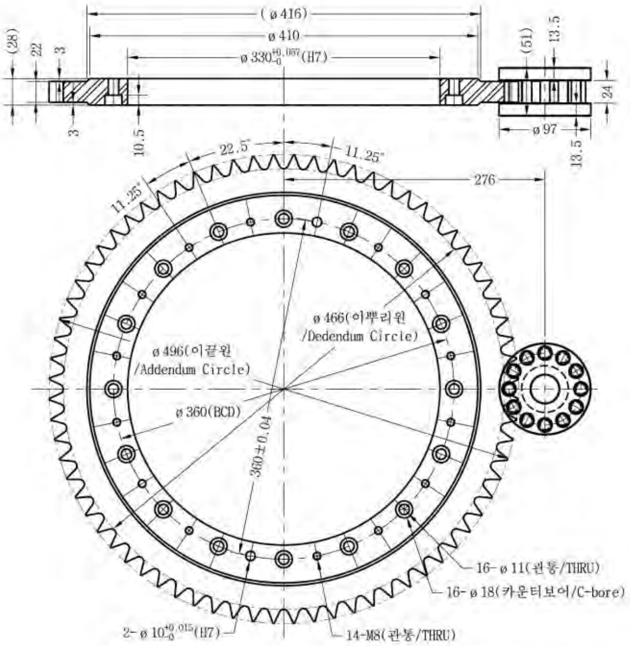
CGE008 외형치수 II
CGE008 External Dimensions II



외치차 형번
[External Ring Gear Model] : **CGE008-S-i4-198**
감속비 [Ratio] : **4**
척도[Scale] : **1/2**



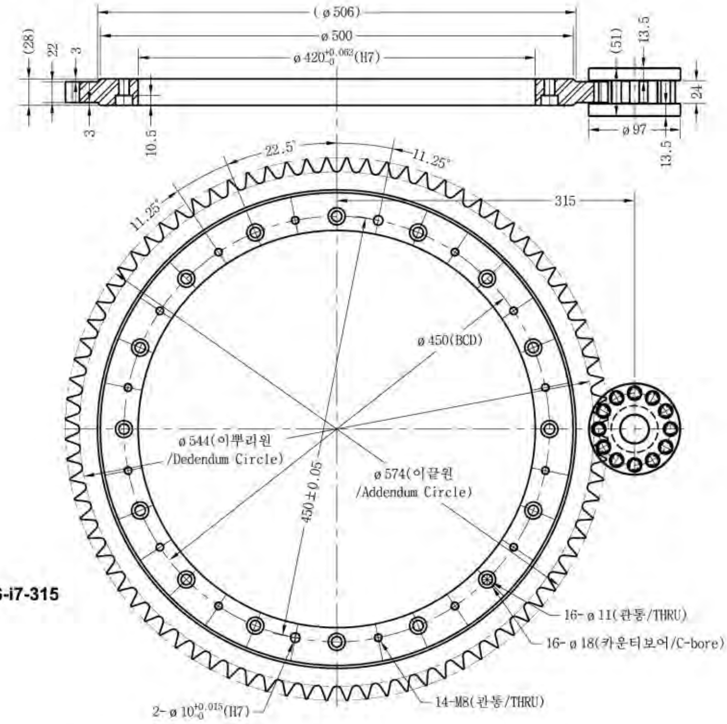
외치차 형번
[External Ring Gear Model] : **CGE008-S-i5-237**
감속비 [Ratio] : **5**
척도[Scale] : **1/2**



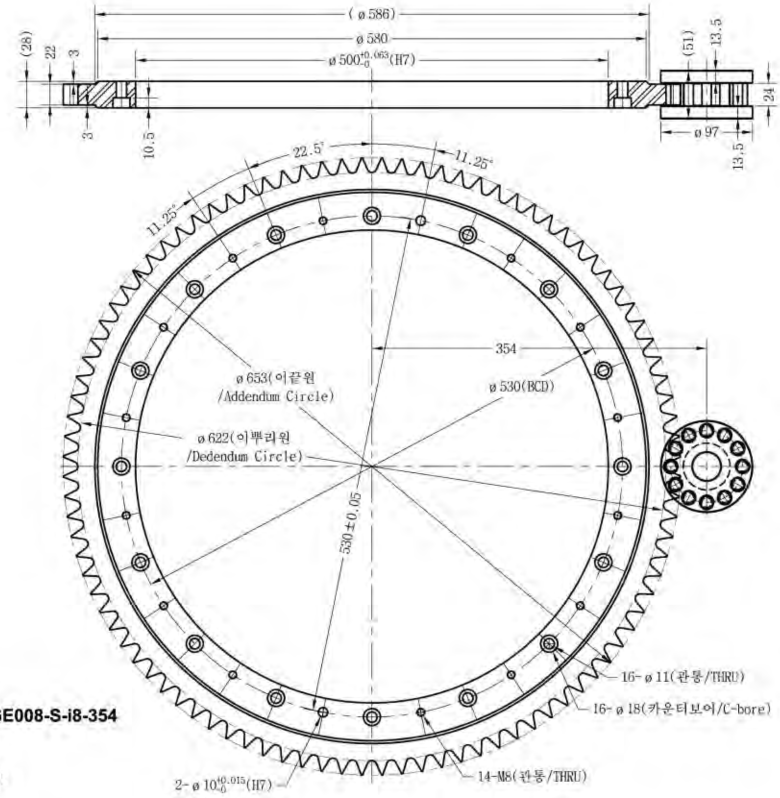
외치차 형번
[External Ring Gear Model] : **CGE008-S-i6-276**
감속비 [Ratio] : **6**
척도[Scale] : **1/2**

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINIGB for more details.]

CGE008 외형치수 III
CGE008 External Dimensions III



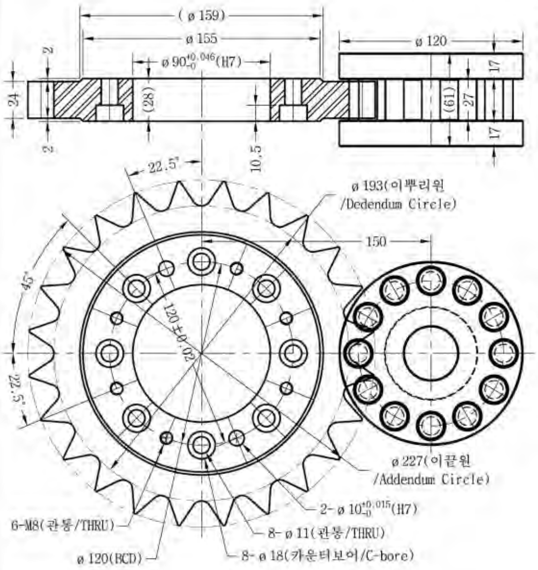
외치차 형번
[External Ring Gear Model] : **CGE008-S-i7-315**
감속비 [Ratio] : **7**
척도[Scale] : **1/2**

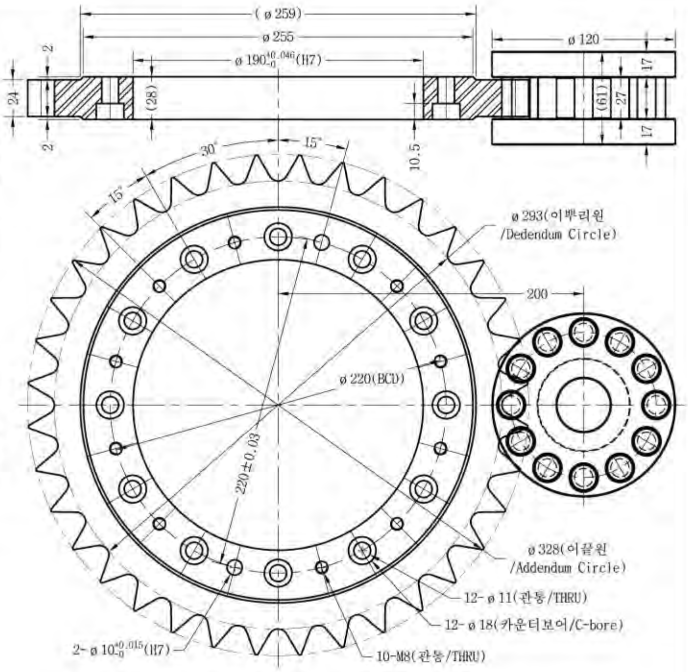


외치차 형번
[External Ring Gear Model] : **CGE008-S-i8-354**
감속비 [Ratio] : **8**
척도[Scale] : **1/2**

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE015 외형치수 I
CGE015 External Dimensions I



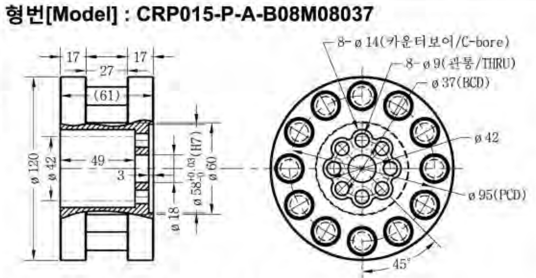


외치차 형번 [External Ring Gear Model]	: CGE015-S-i2-150	외치차 형번 [External Ring Gear Model]	: CGE015-S-i3-200
감속비 [Ratio]	: 2	감속비 [Ratio]	: 3
척도[Scale]	: 1/1	척도[Scale]	: 1/1

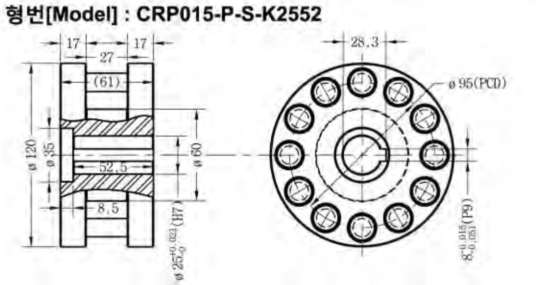
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

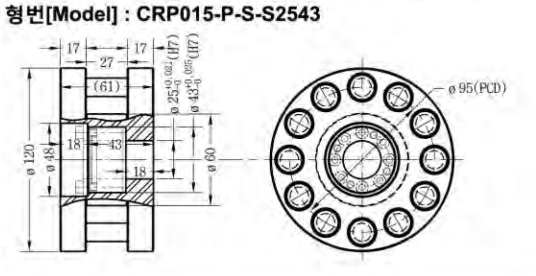
형번[Model] : CRP015-P-A-B08M08037



형번[Model] : CRP015-P-S-K2552

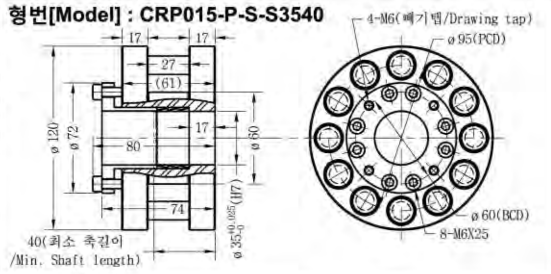


형번[Model] : CRP015-P-S-S2543

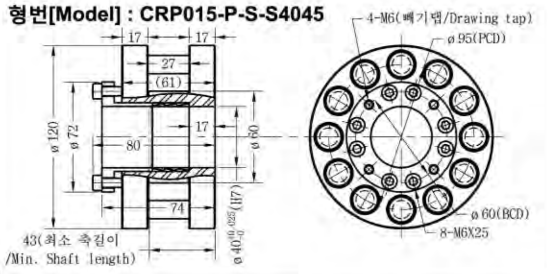


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

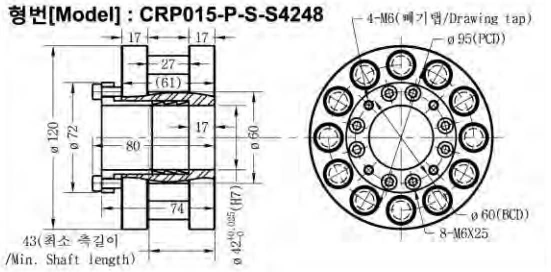
형번[Model] : CRP015-P-S-S3540



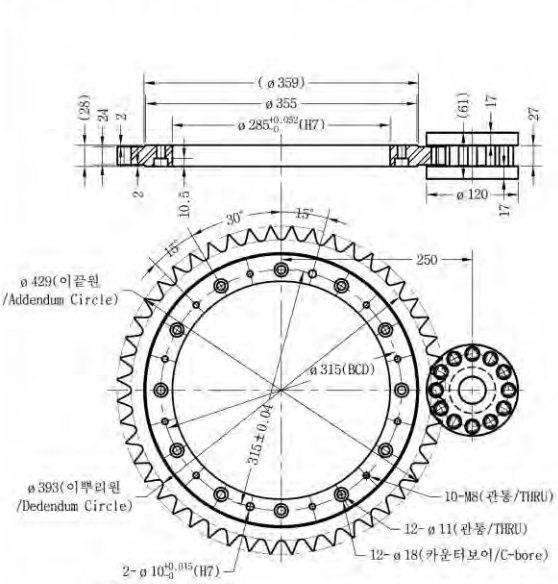
형번[Model] : CRP015-P-S-S4045



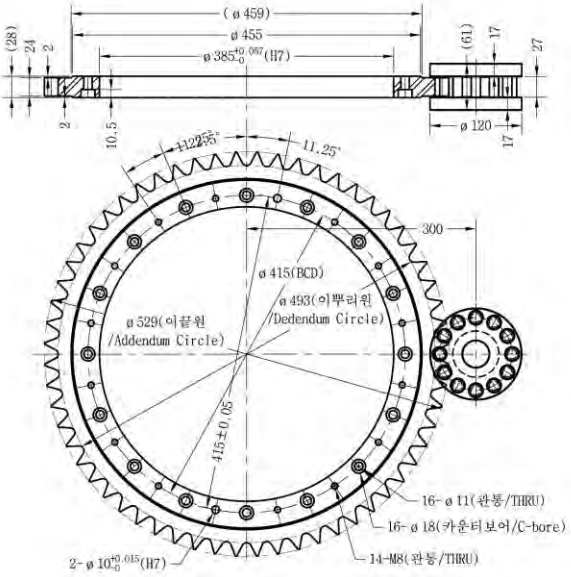
형번[Model] : CRP015-P-S-S4248



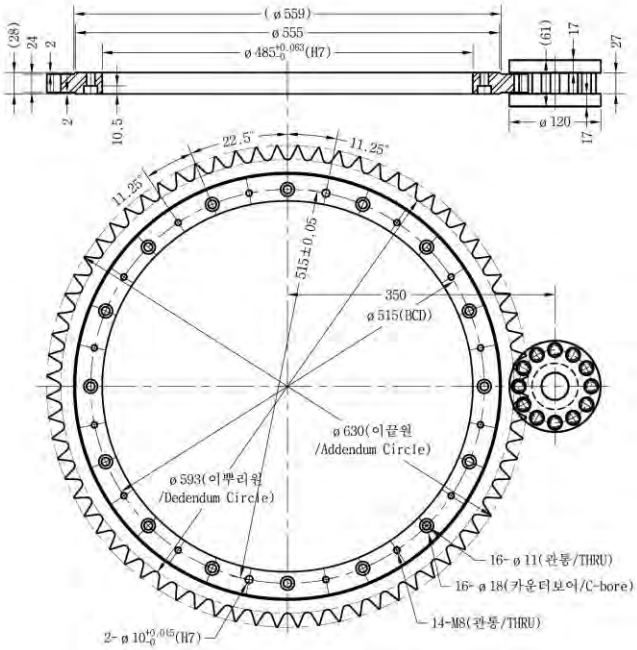
CGE015 외형치수 II
CGE015 External Dimensions II



외치차 형번
[External Ring Gear Model] : CGE015-S-i4-250
감속비 [Ratio] : 4
척도[Scale] : 1/2



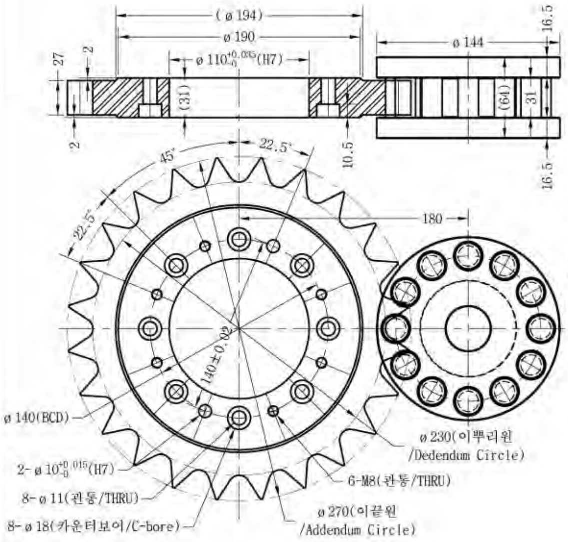
외치차 형번
[External Ring Gear Model] : CGE015-S-i5-300
감속비 [Ratio] : 5
척도[Scale] : 1/2

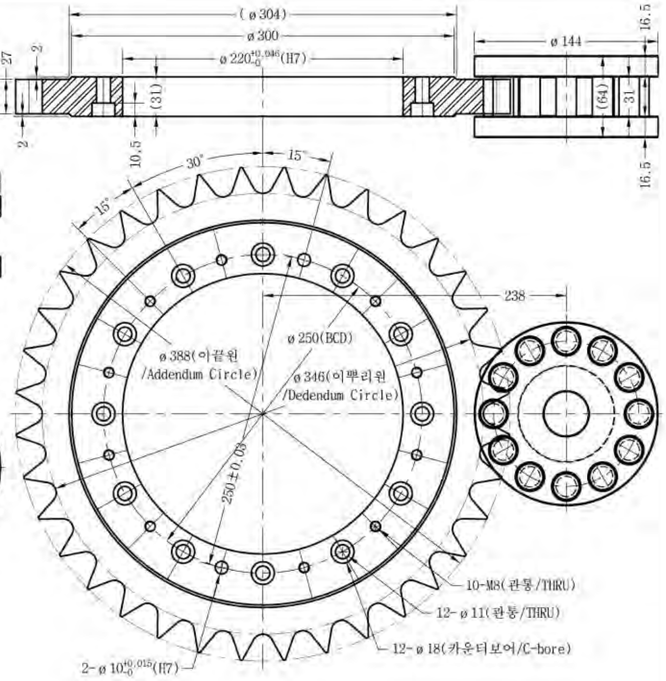


외치차 형번
[External Ring Gear Model] : CGE015-S-i6-350
감속비 [Ratio] : 6
척도[Scale] : 1/2

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE020 외형치수 I
CGE020 External Dimensions I



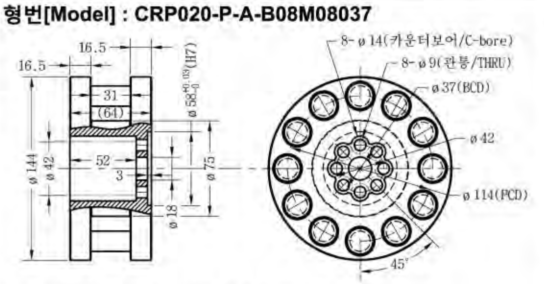


외치차 형번 [External Ring Gear Model]	: CGE020-S-i2-180		**외치차 형번 [External Ring Gear Model]**	: CGE020-S-i3-238
감속비 [Ratio]	: 2		**감속비 [Ratio]**	: 3
척도[Scale]	: 1/1		**척도[Scale]**	: 1/1

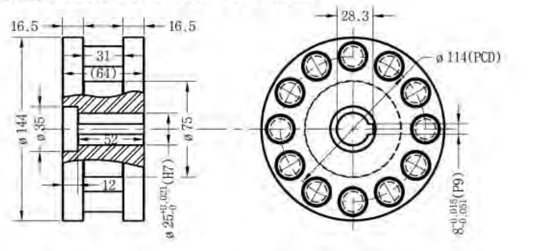
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

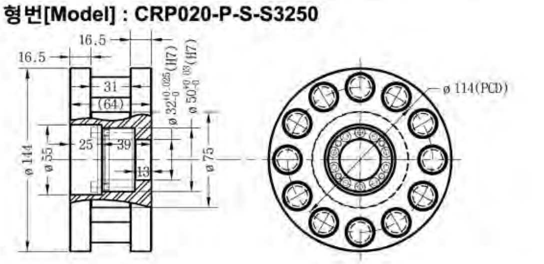
형번[Model] : CRP020-P-A-B08M08037



형번[Model] : CRP020-P-S-K2552

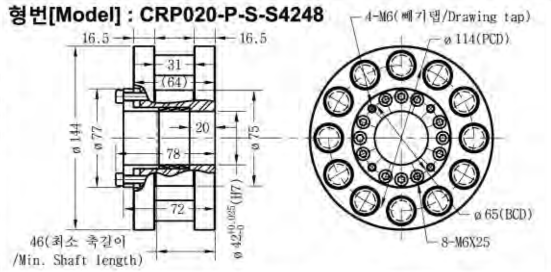


형번[Model] : CRP020-P-S-S3250

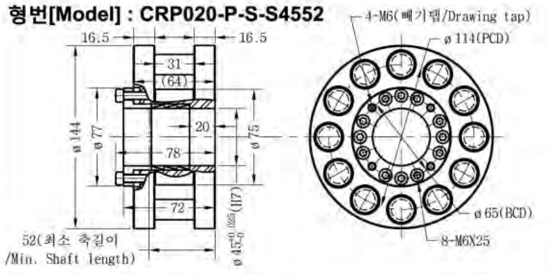


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

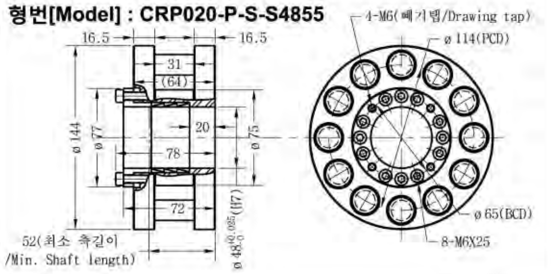
형번[Model] : CRP020-P-S-S4248



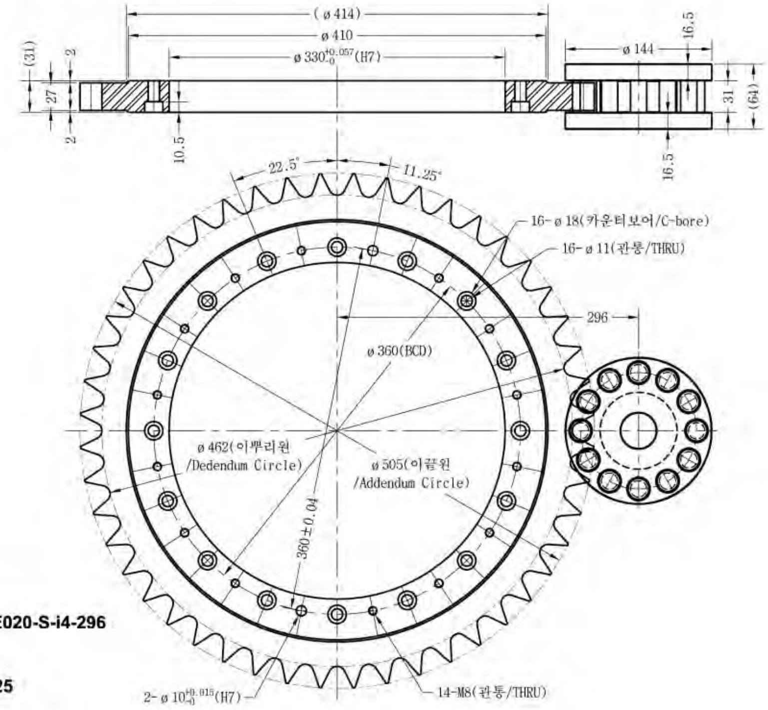
형번[Model] : CRP020-P-S-S4552



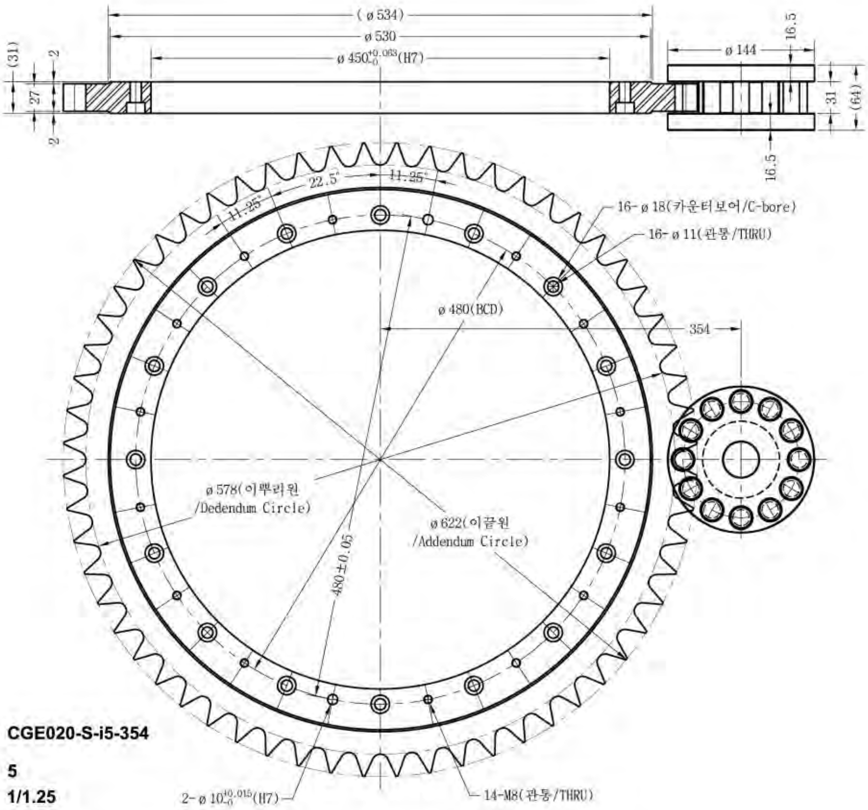
형번[Model] : CRP020-P-S-S4855



CGE020 외형치수 II
CGE020 External Dimensions II



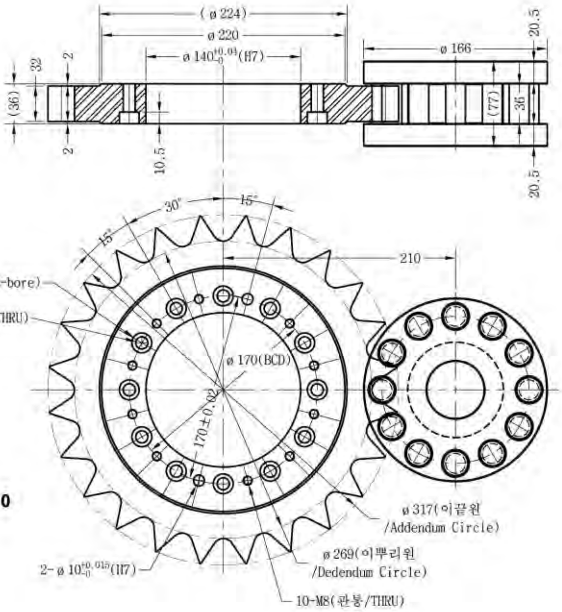
외치차 형번 [External Ring Gear Model] : CGE020-S-i4-296
감속비 [Ratio] : 4
척도[Scale] : 1/1.25



외치차 형번 [External Ring Gear Model] : CGE020-S-i5-354
감속비 [Ratio] : 5
척도[Scale] : 1/1.25

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE040외형치수 I
CGE040 External Dimensions I

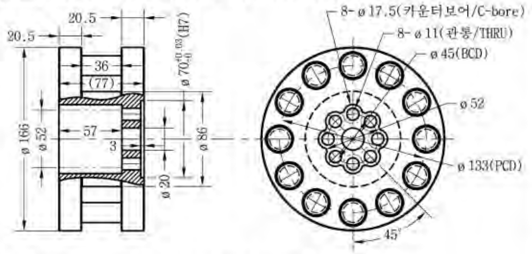


외치차 형번
[External Ring Gear Model] : **CGE040-S-i2-210**
감속비 [Ratio] : **2**
척도[Scale] : **1/1**

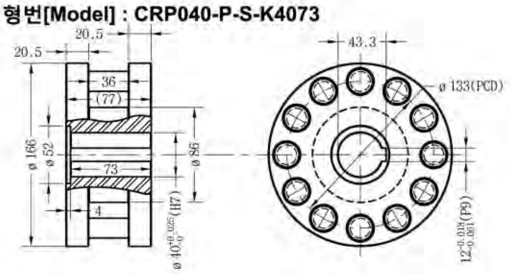
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

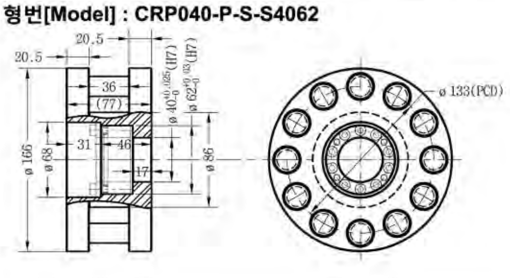
형번[Model] : CRP040-P-A-B08M10045



형번[Model] : CRP040-P-S-K4073

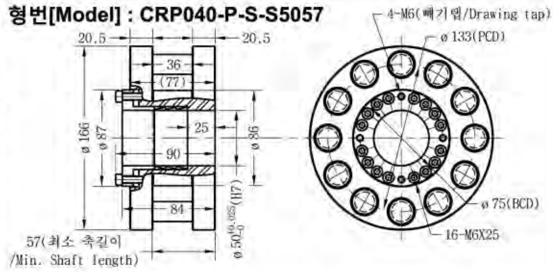


형번[Model] : CRP040-P-S-S4062

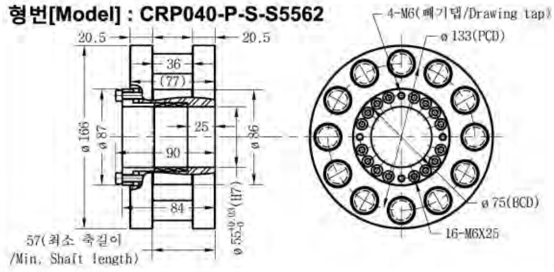


주문형 수축체결형 피니언 [Optional Shrink Fitting Pinions]

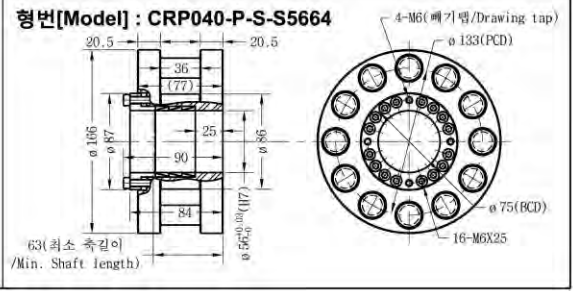
형번[Model] : CRP040-P-S-S5057



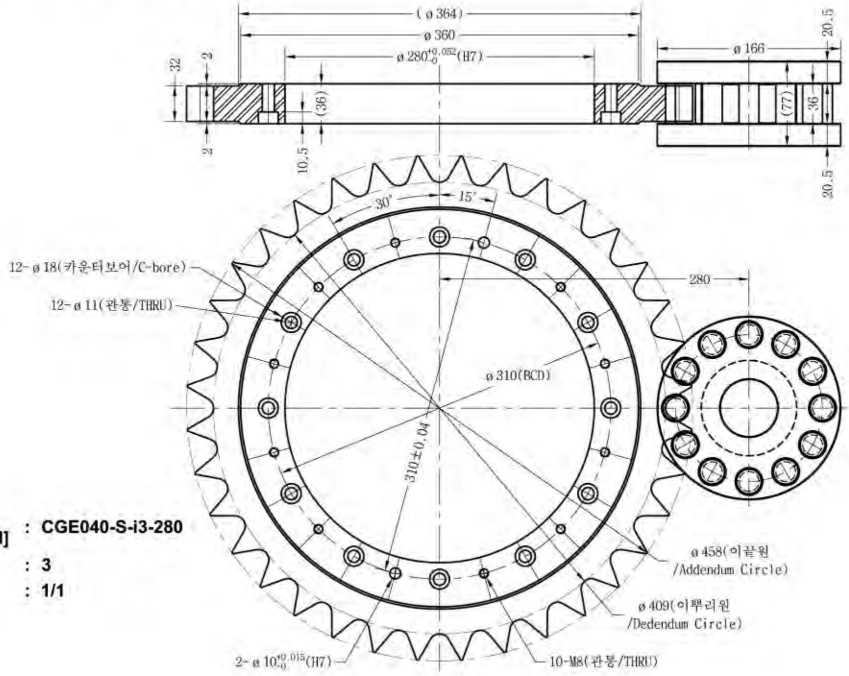
형번[Model] : CRP040-P-S-S5562



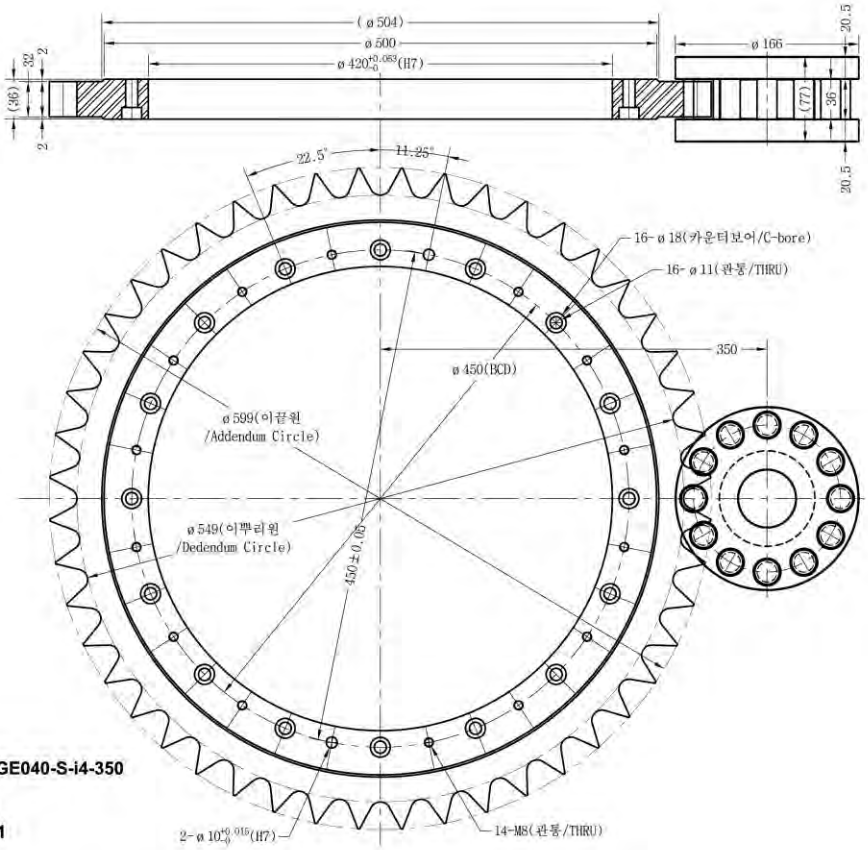
형번[Model] : CRP040-P-S-S5664



CGE040 외형치수 II
CGE040 External Dimensions II



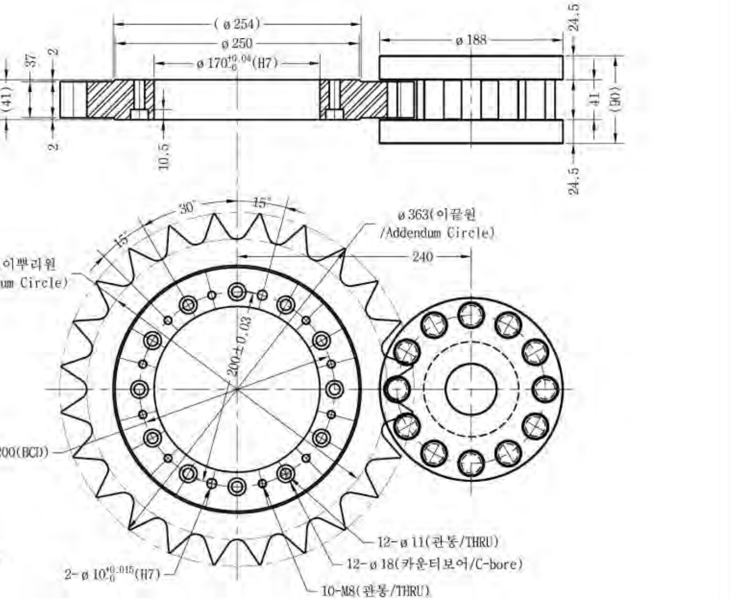
외치차 형번 [External Ring Gear Model] : CGE040-S-i3-280
감속비 [Ratio] : 3
척도[Scale] : 1/1



외치차 형번 [External Ring Gear Model] : CGE040-S-i4-350
감속비 [Ratio] : 4
척도[Scale] : 1/1

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE060 외형치수 I
CGE060 External Dimensions I

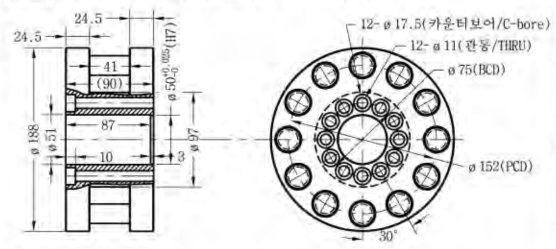


외치차 형번 [External Ring Gear Model]	:	CGE060-S-i2-240
감속비 [Ratio]	:	2
척도[Scale]	:	1/1

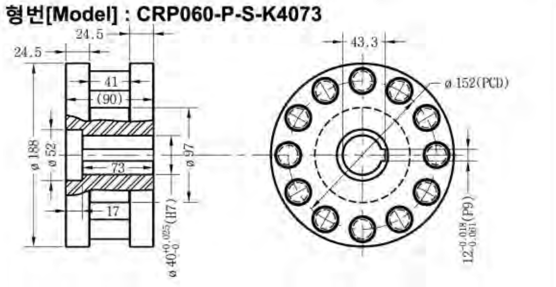
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

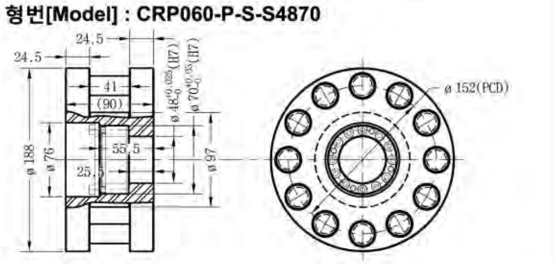
형번[Model] : CRP060-P-A-B12M10075



형번[Model] : CRP060-P-S-K4073

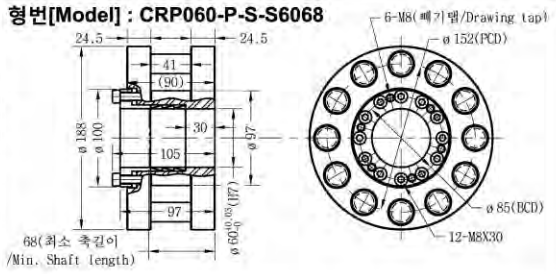


형번[Model] : CRP060-P-S-S4870

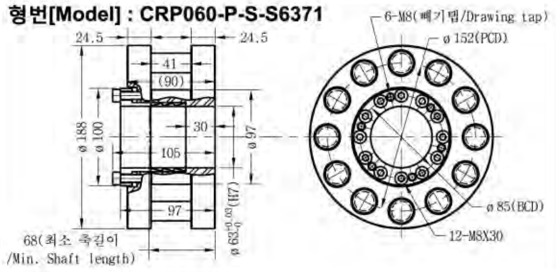


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

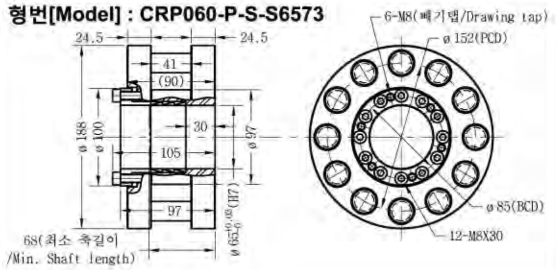
형번[Model] : CRP060-P-S-S6068



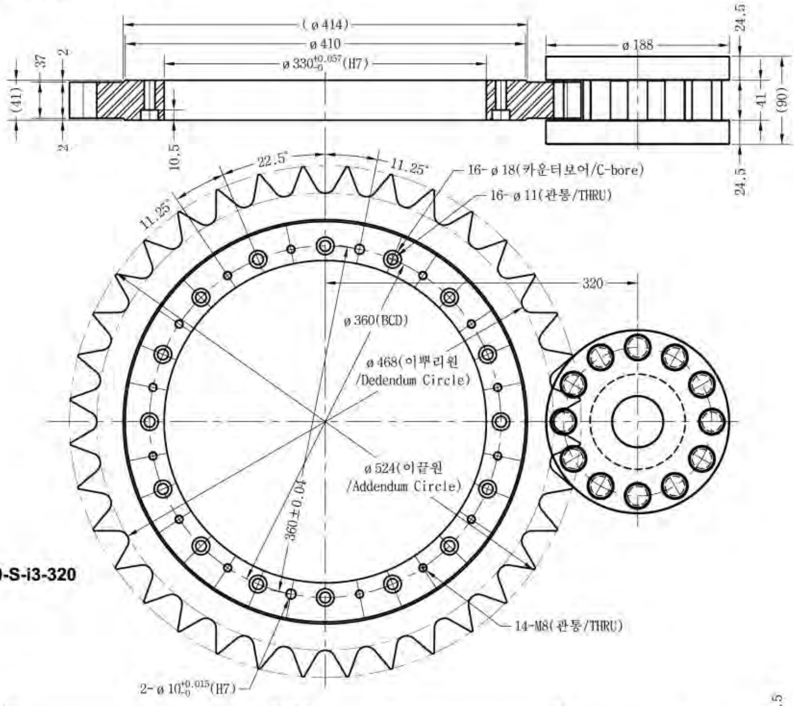
형번[Model] : CRP060-P-S-S6371



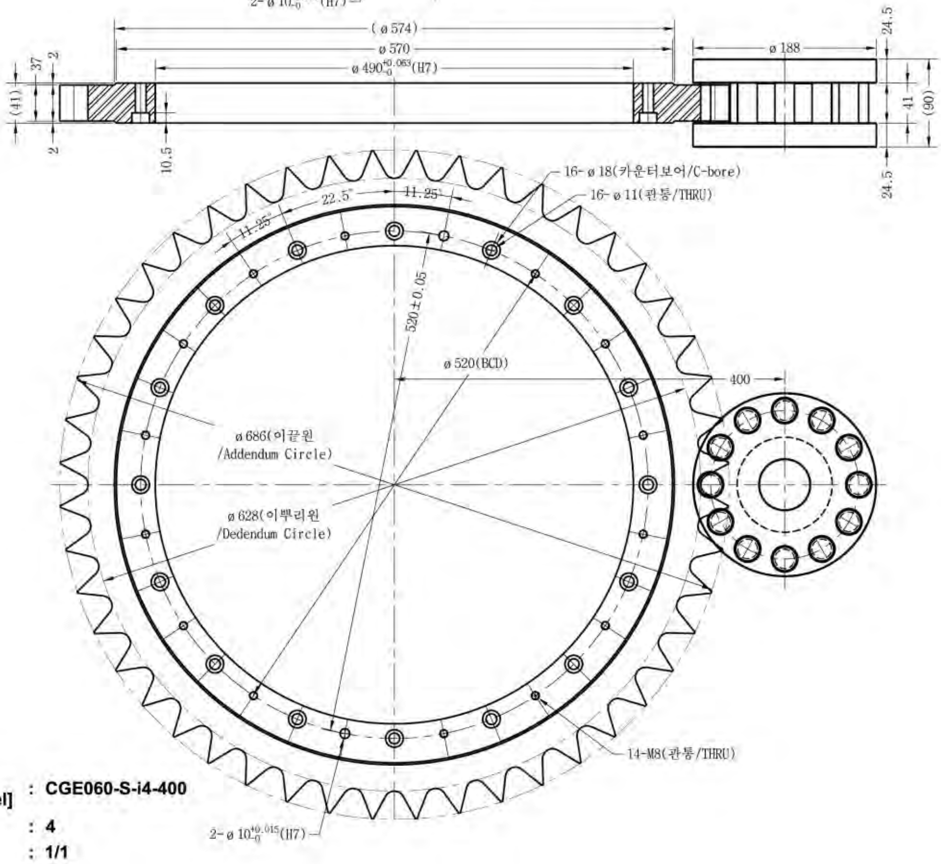
형번[Model] : CRP060-P-S-S6573



CGE060 외형치수 II
CGE060 External Dimensions II



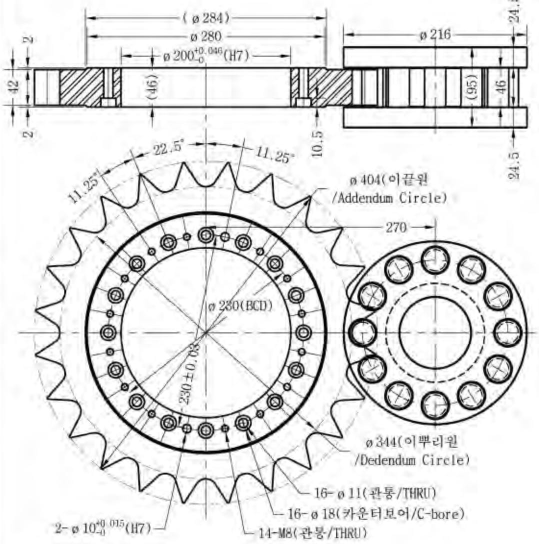
외치차 형번
[External Ring Gear Model] : CGE060-S-i3-320
감속비 [Ratio] : 3
척도[Scale] : 1/1

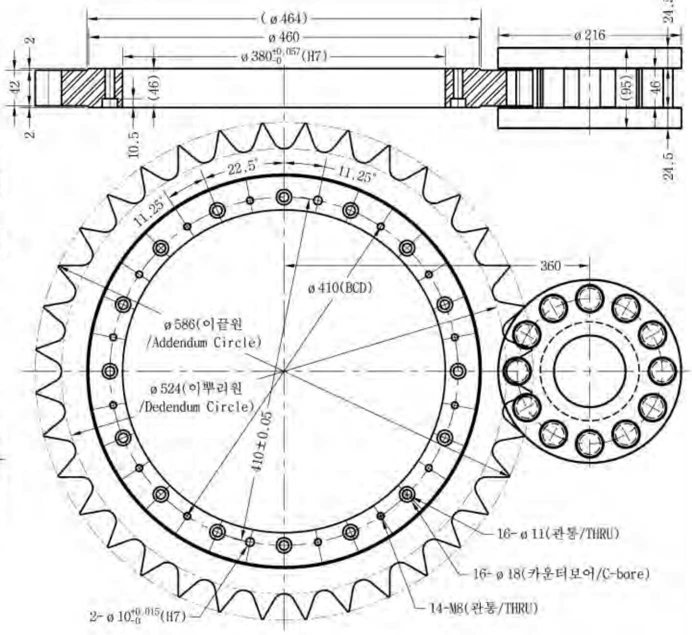


외치차 형번
[External Ring Gear Model] : CGE060-S-i4-400
감속비 [Ratio] : 4
척도[Scale] : 1/1

사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGE080 외형치수 I
CGE080 External Dimensions I





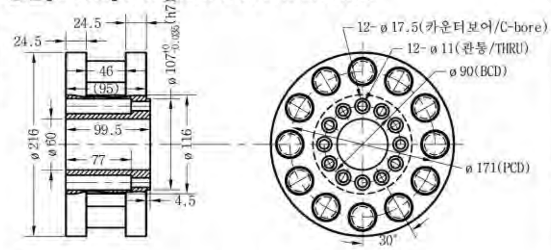
외치차 형번 [External Ring Gear Model]	: CGE080-S-i2-270
감속비 [Ratio]	: 2
척도[Scale]	: 1/1

외치차 형번 [External Ring Gear Model]	: CGE080-S-i3-360
감속비 [Ratio]	: 3
척도[Scale]	: 1/1

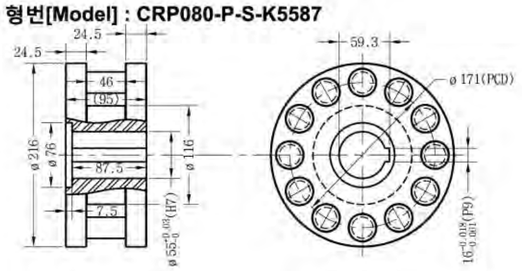
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

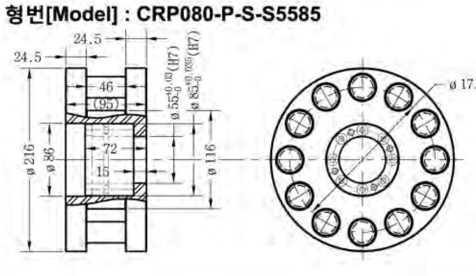
형번[Model] : CRP080-P-A-B12M10090



형번[Model] : CRP080-P-S-K5587

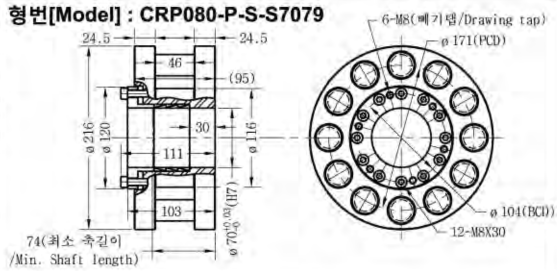


형번[Model] : CRP080-P-S-S5585

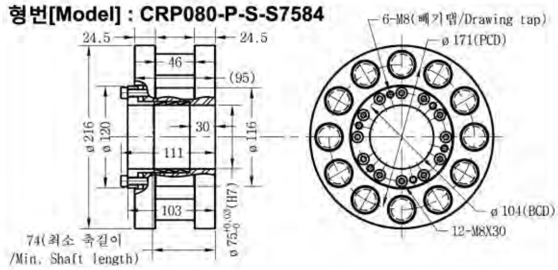


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

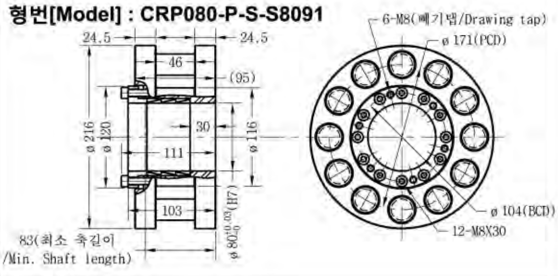
형번[Model] : CRP080-P-S-S7079



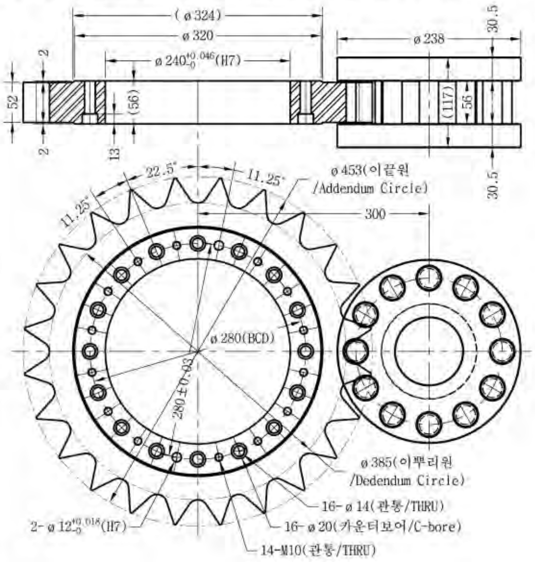
형번[Model] : CRP080-P-S-S7584

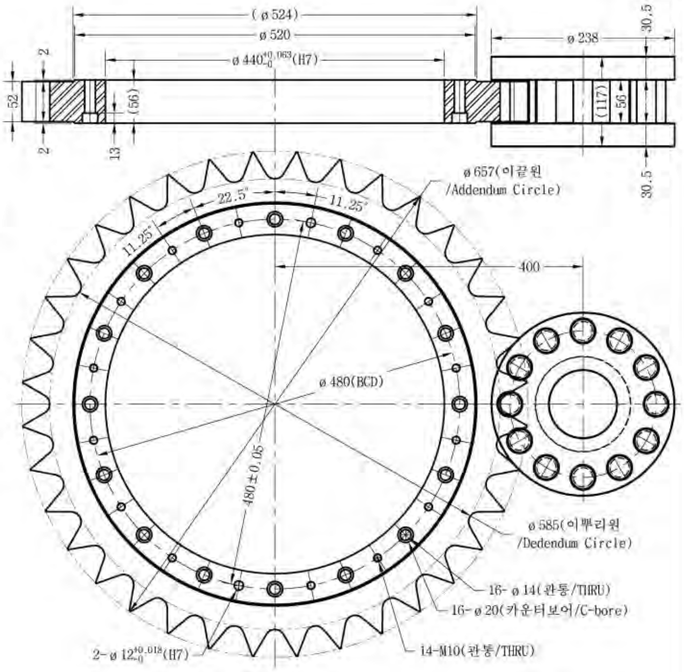


형번[Model] : CRP080-P-S-S8091



CGE120 외형치수 I
CGE120 External Dimensions I



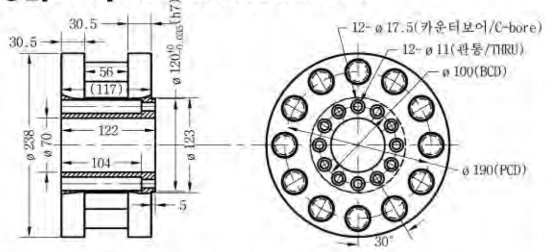


외치차 형번 [External Ring Gear Model]	: CGE120-S-i2-300	외치차 형번 [External Ring Gear Model]	: CGE120-S-i3-400
감속비 [Ratio]	: 2	감속비 [Ratio]	: 3
척도[Scale]	: 1/1	척도[Scale]	: 1/1

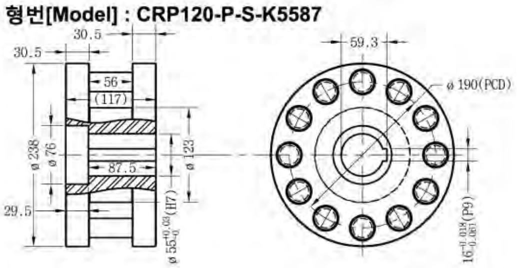
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

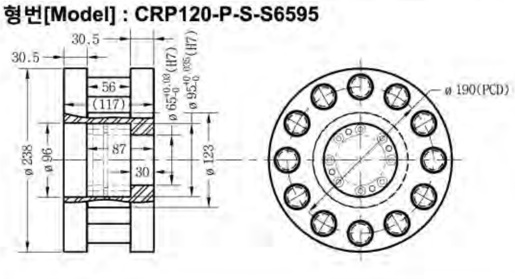
형번[Model] : CRP120-P-A-B12M10100



형번[Model] : CRP120-P-S-K5587

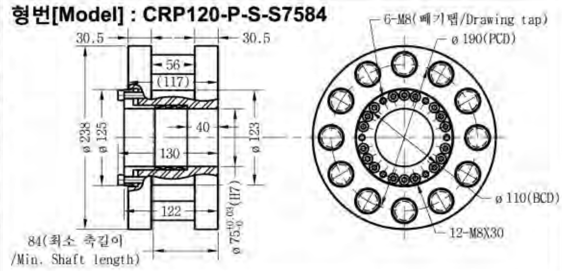


형번[Model] : CRP120-P-S-S6595

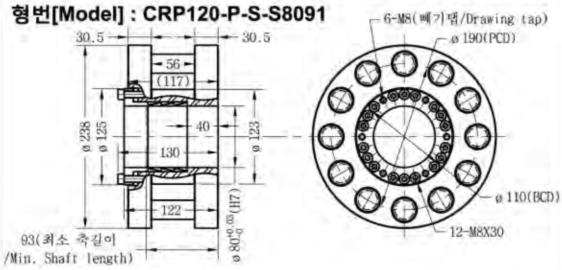


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

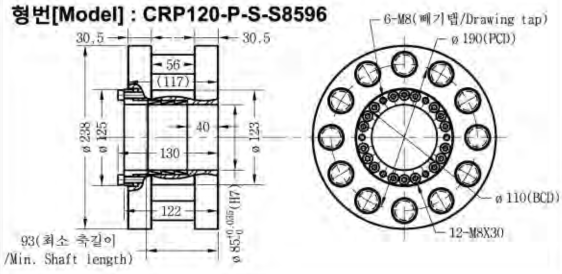
형번[Model] : CRP120-P-S-S7584



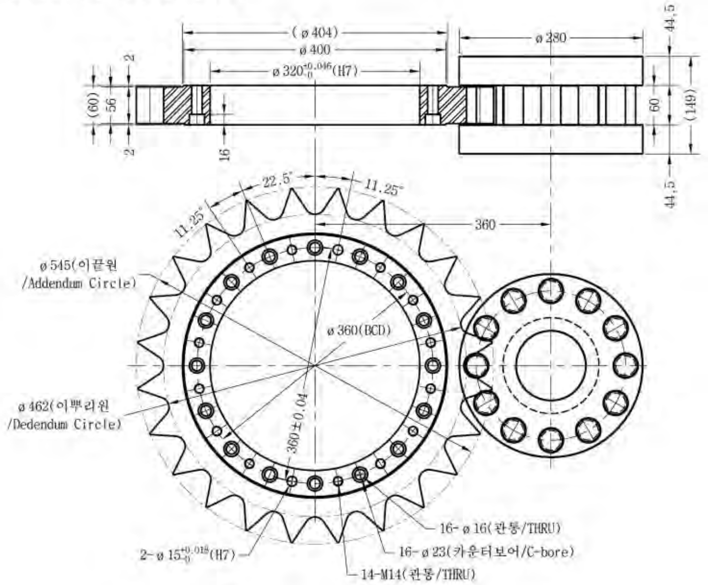
형번[Model] : CRP120-P-S-S8091



형번[Model] : CRP120-P-S-S8596



CGE180 외형치수 I
CGE180 External Dimensions I

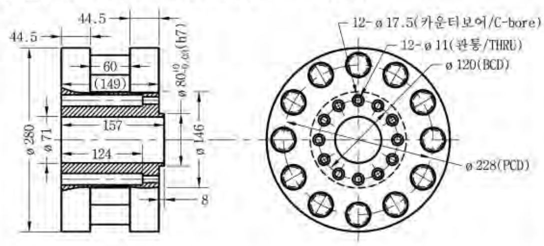


외치차 형번 [External Ring Gear Model]	:	CGE180-S-i2-360
감속비 [Ratio]	:	2
척도[Scale]	:	1/1

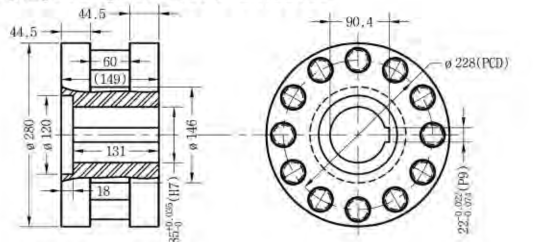
사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

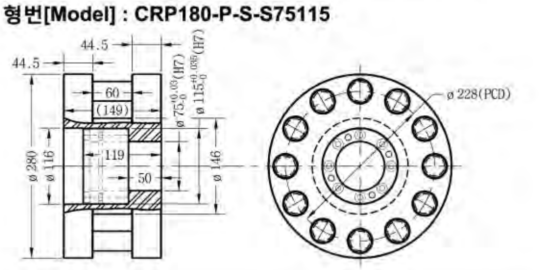
형번[Model] : CRP180-P-A-B12M10120



형번[Model] : CRP180-P-S-K85130

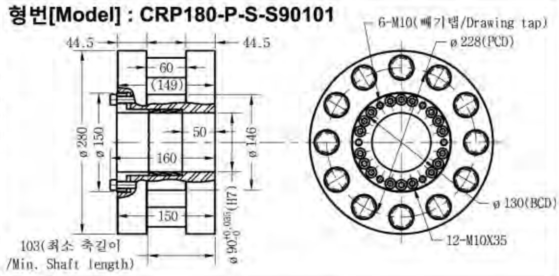


형번[Model] : CRP180-P-S-S75115

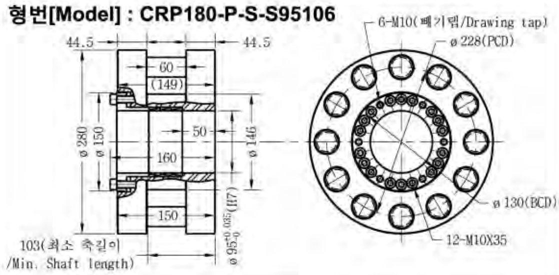


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

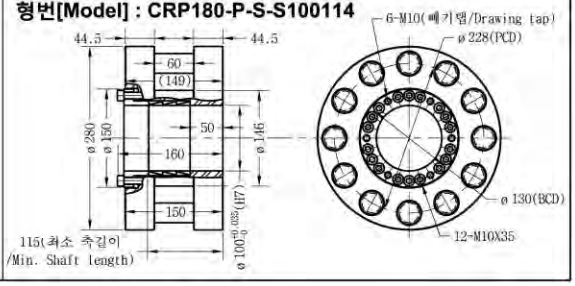
형번[Model] : CRP180-P-S-S90101



형번[Model] : CRP180-P-S-S95106



형번[Model] : CRP180-P-S-S100114



CGI 정격일람 [Clean Gearing Internal series ratings at a glance]

피니언 사양 [Pinion Specifications]			CRP 001	CRP 002	CRP 004	CRP 008	CRP 015	CRP 020	CRP 040	CRP 060	CRP 080	CRP 120	CRP 180
허용토크 vs. 피니언회전수 [Permitted torque vs. Pinion rpm]	720rpm [630rpm]	Nm	5	10	20	30	54	78	138	[219]	[323]	-	-
	600rpm [510rpm]	Nm	5.3	11	21	31	57	82	145	223	328	[475]	-
	480rpm [420rpm]	Nm	5.6	12	22	33	61	88	155	238	351	483	[894]
	360rpm	Nm	6	13	24	36	66	96	169	259	382	527	936
	240rpm	Nm	6.9	14	26	40	75	108	191	293	431	595	1057
	120rpm	Nm	8.5	15	27	55	100	150	270	400	530	800	1200
최대가감속허용토크 [Maximum acc./dec. torque]		Nm	10	20	40	80	150	200	400	600	800	1200	1800
순간허용최대토크 (비상정지) [Peak torque (E-stop)]		Nm	20	40	80	160	300	400	800	1200	1600	2400	3600
피치원직경 [Pitch circle diameter]		mm	38	47	57	76	95	114	133	152	171	190	228
관성[3] [Inertia][3]	알루미늄 [Aluminum]	$\times 10^{-4}$ kg·m^2	0.67	1.56	4.23	11.5	32.7	74.8	160.6	307.5	671	993.5	2626
	탄소강 [Steel]	$\times 10^{-4}$ kg·m^2	1.16	2.71	7.08	20.5	57.6	125	274.7	537.3	1043	1748	4690
질량[3] [Mass][3]	알루미늄 [Aluminum]	kg	0.2	0.3	0.56	0.9	1.6	2.7	4.2	6.3	10.6	13	23.8
	탄소강 [Steel]	kg	0.4	0.6	1.1	1.9	3.4	5.3	8.4	12.8	17.3	24.1	45.5
롤러 수 [No. of roller]		rollers	10	12	12	12	12	12	12	12	12	12	12
모듈 [Module]		mm	3.8	3.92	4.75	6.33	7.92	9.5	11.1	12.7	14.25	15.83	19
치접촉압력각 [Max. pressure angle of tooth engagement]		deg.	23	20	20	20	20	20	20	20	20	20	20
기준수명[4] [Lifetime basis][4] (L_{10})		hrs.	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000

내치차 사양 [Internal Ring Gear Spec.]	감속비 *i* [Ratio *i*]	단위 [Unit]	형 번 [Model] CGI 001	CGI 002	CGI 004	CGI 008	CGI 015	CGI 020	CGI 040	CGI 060	CGI 080	CGI 120	CGI 180
정격출력토크 [Rated output torque]	2 [180rpm]	Nm	12	26	48	72	132	192	338	518	764	1054	1872
	3 [120rpm]	Nm	18	39	72	108	198	288	507	777	1146		
주) 정격출력회전수 =(피니언회전수 360rpm / 감속비)일 때의 값입니다. 피니언 회전수 720rpm 이상은 ㈜세진아이지비로 문의바랍니다.	4 [90rpm]	Nm	24	52	96	144	264	384	676				
[Note; @ Rated output speed = (Pinion speed 360rpm / ratio) Please contact SEJINiGB for pinion speed higher than 720rpm.]	5 [72rpm]	Nm	30	65	120	180	330	480					
	6 [60rpm]	Nm	36	78	144	216	396						
	7 [51rpm]	Nm	42	91	168	252							
	8 [45rpm]	Nm	48	104	192								
	9 [40rpm]	Nm	54	117	216								
	10 [36rpm]	Nm	60	130	240								
최대가감속허용토크 [Maximum acc./dec. torque]	2	Nm	20	40	80	160	300	400	800	1200	1600	2400	3600
	3	Nm	30	60	120	240	450	600	1200	1800	2400		
	4	Nm	40	80	160	320	600	800	1600				
	5	Nm	50	100	200	400	750	1000					
	6	Nm	60	120	240	480	900						
	7	Nm	70	140	280	560							
	8	Nm	80	160	320								
	9	Nm	90	180	360								
	10	Nm	100	200	400								
순간허용최대토크 (비상정지) [Peak torque (E-stop)]		Nm	최대가감속허용토크의 2배 [2 times of Maximum acc./dec. torque]										
질량 [Mass]	2	kg	0.8	2	2.7	6.4	8.2	10.6	19.8	26	37	51.3	65.5
	3	kg	1.1	2.8	3.9	9	11.6	15.2	27.9	36.7	52.2		
	4	kg	1.4	3.6	5	11.6	15.1	19.7	36				
	5	kg	1.7	4.3	6.2	14.3	18.5	24.3					
	6	kg	2	5.1	7.3	16.9	22						
	7	kg	2.3	5.8	8.5	19.5							
	8	kg	2.6	6.6	9.6								
	9	kg	3	7.4	10.7								
	10	kg	3.3	8.2	11.9								
관성모멘트 [Moment of inertia]	2	$\times 10^{-4}$ kg·m^2	22.6	92.7	169	722	1271	2216	5883	9478	17479	28201	48388
	3	$\times 10^{-4}$ kg·m^2	58.9	238	454	1919	3535	6330	16333	26929	49177		
	4	$\times 10^{-4}$ kg·m^2	121	486	957	4016	7583	13770	35006				
	5	$\times 10^{-4}$ kg·m^2	218	860	1738	7265	13939	25525					
	6	$\times 10^{-4}$ kg·m^2	352	1405	2861	11926	23109						
	7	$\times 10^{-4}$ kg·m^2	539	2143	4383	18240							
	8	$\times 10^{-4}$ kg·m^2	783	3102	6373								
	9	$\times 10^{-4}$ kg·m^2	1091	4312	8889								
	10	$\times 10^{-4}$ kg·m^2	1471	5806	11993								

5) 표준 피니언일 때 참고값 입니다. [Reference value only for standard pinion.]

6) 평균부하토크 ≤ 정격출력토크 [Average load torque ≤ Rated output torque]

Clean Gearing Internal 형식표시 [Clean Gearing Internal Ordering Information]

내치차 [Internal Ring Gear]	CGI	□□□	- S	-	i□□	-	□□□
	①	②			③		④
피니언 [Pinion]	CRP	□□□	- P	-	(A/S)	-	□□□□□
	①	②			③		④

① **형명 [Model Name]:** **C**lean **G**earing **I**nternal / **C**lean **R**ack **P**inion

② **형번 [Model Number]:** CRP 피니언 최대가감속허용토크 [CRP pinion maximum acc./dec. torque]

③ **내치차 [Internal Ring Gear]:** 감속비[Ratio]

피니언 [Pinion]: 재질 [Material]

A : 알루미늄 (Aluminum) – 볼트 체결형 [Bolt clamping]

S : 탄소강 (Steel) – 수축형 체결구 또는 평행키 적용 [Shrink fitting or Feather keyway]

④ **지정사항 [Indication]:**

내치차 [Internal Ring Gear]: 피니언과 내치차의 중심거리 [Center distance between pinion and internal ring gear]

피니언 [Pinion] : 피니언 형상코드 또는 지정 감속기 [Pinion shape code or applied gearbox]

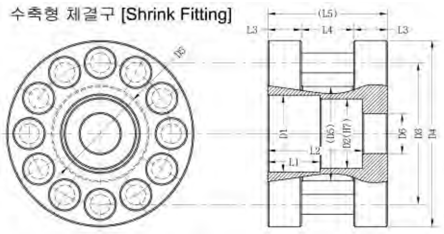
- 피니언 형상코드는 아래표를 참조하십시오. [Please refer below table for Pinion shape code.]
- 지정 감속기에 상응하는 피니언의 적용성 및 세부치수는 ㈜세진아이지비로 문의바랍니다. [In case of ‘applied gearbox’, please contact SEJINIGB for availability and detail dimensions.]

Ex.) CGI002--S-i2-74, CRP004-P-A-B06M05018, CRP002-P-S-K1431, CRP002-P-S-S1023, CRP002-P-A-MM065

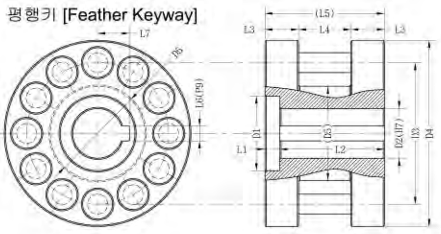
CRP 피니언 형상코드 [CRP Pinion Shape Code]

표준 피니언 [Standard Pinion]

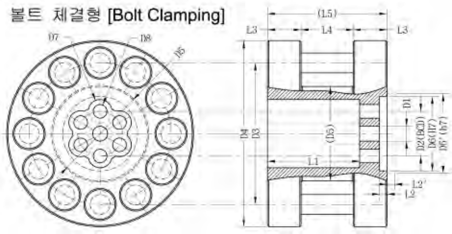
수축형 체결구 [Shrink Fitting]



평행키 [Feather Keyway]



볼트 체결형 [Bolt Clamping]



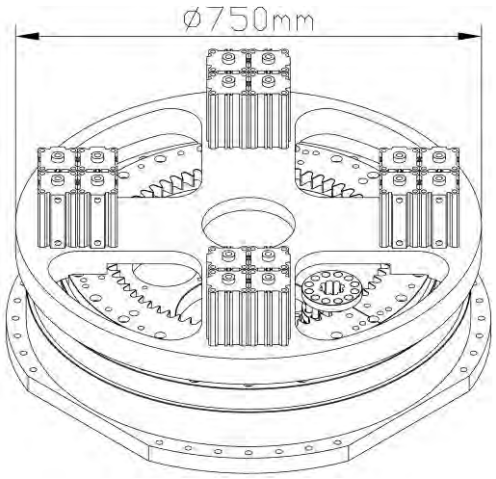
피니언 형번 및 형상코드 [Pinion Model Number & Shape Code]		CRP001	CRP002	CRP004	CRP008	CRP015	CRP020	CRP040	CRP060	CRP080	CRP120	CRP180
수축형 체결구 [Shrink Fitting]	Code	대구경 외형도 참조 [Please refer external drawings for big diameter shrink fittings.]	S1023	S1428	S2038	S2543	S3250	S4062	S4870	S5585	S6595	S75115
	D1		26	31	43	48	55	68	76	86	96	116
	D2		23	28	38	43	50	62	70	85	95	115
	D3		47	57	76	95	114	133	152	171	190	228
	D4		62	75	97	120	144	166	188	216	238	280
	D5		31	38	49	60	75	86	97	116	123	146
	D6		10	14	20	25	32	40	48	55	65	75
	L1		22	21	18	18	25	31	34.5	23	30	30
	L2		38	38	41	43	51	60	64.5	65	87	99
	L3		11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4		18	21	24	27	31	36	41	46	56	60
	L5		41	48	51	61	64	77	90	95	117	149
평행키 [Feather Keyway]	Code	K1024	K1431	K2042	K2042	K2552	K2552	K4073	K4073	K5587	K5587	K85130
	D1	15	22	30	30	35	35	52	52	76	76	120
	D2	10	14	20	20	25	25	40	40	55	55	85
	D3	38	47	57	76	95	114	133	152	171	190	228
	D4	50	62	75	97	120	144	166	188	216	238	280
	D5	22	31	38	49	60	75	86	97	116	123	146
	L1	12	9.5	6	9	8.5	12	40	17	7.5	29.5	18
	L2	24	31.5	42	42	52.5	52	73	73	87.5	87.5	131
	L3	11.5	11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4	13	18	21	24	27	31	36	41	46	56	60
	L5	36	41	48	51	61	64	77	90	95	117	149
	L6	3	6	6	6	8	8	12	12	16	16	22
	L7	6.4	9.3	12.8	12.8	15.8	15.8	23.3	23.3	31.8	31.8	47.9
볼트 체결형 [Bolt Clamping]	Code	B06M03012	B06M05018	B06M05018	B08M06030	B08M08037	B08M08037	B08M10045	B12M10075	B12M10090	B12M08100	B12M10120
	D1	-	6	6	15	18	18	20	-	60	70	70
	D2	12	18	18	30	37	37	45	75	90	100	120
	D3	38	47	57	76	95	114	133	152	171	190	228
	D4	50	62	75	97	120	144	166	188	216	238	280
	D5	22	31	38	49	60	75	86	97	117	123	146
	D6	20	30	30	45	58	58	70	50	-	-	-
	D6’	-	-	-	-	-	-	-	-	107	120	80
	D7	6X6	6X 9.5	6X 9.5	8X 11	8X 14	8X 14	8X 17.5	12X 17.5	12X 17.5	12X 17.5	12X 17.5
	D8	6X 3.5	6X 5.5	6X 5.5	8X 6.6	8X9	8X9	8X 11	12X 11	12X 11	12X 11	12X 11
	L1	25	30	37	39.5	49	52	57	10	77	104	123
	L2	3	3	3	3	3	3	3	3	-	-	-
	L2’	-	-	-	-	-	-	-	-	4.5	5	8
	L3	11.5	11.5	13.5	13.5	17	16.5	20.5	24.5	24.5	30.5	44.5
	L4	13	18	21	24	27	31	36	41	46	56	60
	L5	36	41	48	51	61	64	77	90	95	117	149

- 볼트체결형의 경우 알루미늄 재질이 표준, 탄소강재질은 준표준입니다.
- 도표의 수축형체결구는 자동조심형 적용의 경우입니다. 대구경 수축체결형은 외형도를 참조하십시오.

[- In case of bolt clamping shape, aluminum material is standard, steel is optional.
- Self-centering shrink fitting applied in the list, please refer external dimensions for bigger diameter shrink fittings]

iGB 사용자 정의 외치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 ㈜세진아이지비로 문의해 주십시오.
[Customized external ring gear & pinion is available on request. Please contact SEJINiGB for more detail.]

CGI 선정 및 수명계산 [CGI Selection & lifetime calculation]



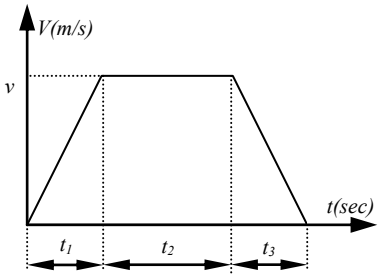


표7. 마찰계수(μ) [Table 7. Friction coefficient (μ)]

개방형 베어링 [Bearing w/o sealing]	0.02~0.05
시일드 베어링 [Bearing with sealing]	0.1~0.2

표8. 안전계수(S_f) [Table 8. Safety factor (S_f)]

무충격원활운전 [Operations without impact]	1.2 ~ 1.5
보통운전 [General operations]	1.5 ~ 2
충격이 있는 구동 [Operations with impact]	2 ~ 3
고충격 구동 [Operations with high impact]	3 ~ 4

■ 선정 예

► 구동조건

요구정보

질량 (m)	30 kg	
부하관성모멘트 (I_l)	2.1 kgm^2	
구동부하 직경 (D)	0.75 m	
요구출력회전수 (N_m)	80 rpm	
가감속시간 (t_1, t_3)	0.4 sec	
등속시간 (t_2)	2 sec	
외부회전력 (T_e)	0 Nm	
마찰계수 (μ)	0.2	(표7 참조)
중력가속도 (g)	9.81 m/s^2	
안전계수 (S_f)	2 (보통운전)	(표8 참조)

1. 요구각속도:

$$\omega = (N_m \times 2\pi)/60$$
$$= (80 \times 2 \times 3.14)/60 = 8.9 rad/s$$

2. 요구각가속도:

$$\alpha = \dot{\omega} = \omega / t_1 = 8.9/0.4 = 22.25 rad/s^2$$

3. 가속시 요구회전력:

$$T_a = I_l \alpha = 2.1 \times 22.25 = 46.73 Nm$$

4. 마찰부하 회전력:

$$T_f = \mu \cdot m \cdot g \cdot D$$
$$= 0.2 \times 30 \times 9.81 \times 0.75 = 44.2 Nm$$

■ Selection example

► Operating conditions

Required Data

Mass (m)	30 kg	
Load moment of inertia (I_l)	2.1 kgm^2	
Load Diameter (D)	0.75 m	
Desired output speed (N_m)	80 rpm	
Acc./Dec. time (t_1, t_3)	0.4 sec	
Constant speed time (t_2)	2 sec	
External torque (T_e)	0 Nm	
Friction coefficient (μ)	0.2	(Table 7)
Gravitational acceleration (g)	9.81 m/s^2	
Safety factor (S_f)	2 (General)	(Table 8)

1. Desired angular velocity:

$$\omega = (N_m \times 2\pi)/60$$
$$= (80 \times 2 \times 3.14)/60 = 8.9 rad/s$$

2. Desired angular acceleration:

$$\alpha = \dot{\omega} = \omega / t_1 = 8.9/0.4 = 22.25 rad/s^2$$

3. Desired accelerative torque:

$$T_a = I_l \alpha = 2.1 \times 22.25 = 46.73 Nm$$

4. Frictional torque:

$$T_f = \mu \cdot m \cdot g \cdot D$$
$$= 0.2 \times 30 \times 9.81 \times 0.75 = 44.2 Nm$$

5. 전체요구회전력:

$$T_d = S_f(T_a + T_f + T_e)$$
$$= 2 \times (46.73 + 44.2 + 0) = 182Nm$$

요구회전수 80rpm부근에서 정격출력토크가 182Nm이상인 형번을 가선정하면, CGI015 (264Nm @ 90rpm, 감속비 4)

6. 가선정 내치차 관성을 포함한 요구회전력:

$$T_{aG} = (I_l + I_G)\alpha$$
$$= (2.1 + 7583 \times 10^{-4}) \times 22.25 = 63.6Nm$$
$$T_{fG} = \mu \cdot (m + m_G) \cdot g \cdot D$$
$$= 0.2 \times (30 + 15.1) \times 9.81 \times 0.75 = 66.4Nm$$
$$\therefore T_{dG} = S_f(T_{aG} + T_{fG} + T_e)$$
$$= 2 \times (63.6 + 66.4 + 0) = 260Nm$$

260 Nm **< 264**Nm이므로, **CGI015 감속비4 선정**

7. 요구지지반경하중:

CRP015 피니언에 작용하는 요구회전력은,

$$T_{dP} = T_{dG} / i = 260/4 = 65Nm$$

CRP015 피니언의 피치반경은,

$$PCR = (95mm/2) \times 10^{-3} = 0.0475m$$

CRP015 피니언에 작용하는 요구법선력은,

$$F_{dT} = T_{dP} / PCR = 65/0.0475 = 1368N$$

요구법선력에 의한 요구반경하중은,

$$F_{dR} = F_{dT} \times \sin\theta = 1368 \times \sin 20 = 468N$$

(여기서, θ는 CGI015 치접촉 압력각)

8. 수명계산:

$$L_{10} = 10000 \times \frac{N_o}{N_m} \times \left(\frac{T_o}{T_{dG}}\right)^{\frac{10}{3}}$$
$$= 10000 \times \frac{90}{80} \times \left(\frac{264}{260}\right)^{\frac{10}{3}} \cong 11837hrs$$

여기서, N_o는 정격출력회전수, N_m은 요구출력회전수, T_o는 정격출력회전수(N_o)에서의 정격출력토크, T_{dG}는 내치차 및 모든 운동체의 관성과 마찰이 포함된 요구회전력.

응용분야나 사용조건에 따라서, 비수평면-비칭회전운동일 때 중력영향, 스프링, 균형추(Counter balance), 유체점성, 풍력저항 등을 고려해야 할 수도 있습니다.

5. Total desired torque:

$$T_d = S_f(T_a + T_f + T_e)$$
$$= 2 \times (46.73 + 44.2 + 0) = 182Nm$$

Temporary selection for rated torque higher than 182Nm, at nearby desired speed 80rpm, CGI015 (264Nm @ 90rpm, Ratio 4)

6. Total desired torque with CGI ring gear inertia:

$$T_{aG} = (I_l + I_G)\alpha$$
$$= (2.1 + 7583 \times 10^{-4}) \times 22.25 = 63.6Nm$$
$$T_{fG} = \mu \cdot (m + m_G) \cdot g \cdot D$$
$$= 0.2 \times (30 + 15.1) \times 9.81 \times 0.75 = 66.4Nm$$
$$\therefore T_{dG} = S_f(T_{aG} + T_{fG} + T_e)$$
$$= 2 \times (63.6 + 66.4 + 0) = 260Nm$$

260 Nm **< 264**Nm**, as a result, CGI015 ratio 4 is selected.**

7. Desired radial load support:

Desired torque applied at CRP015 pinion is,

$$T_{dP} = T_{dG} / i = 260/4 = 65Nm$$

Pitch radius of CRP015 pinion is,

$$PCR = (95mm/2) \times 10^{-3} = 0.0475m$$

Desired tangential force applied at CRP015 pinion is,

$$F_{dT} = T_{dP} / PCR = 65/0.0475 = 1368N$$

Desired radial load support caused by desired tangential force is,

$$F_{dR} = F_{dT} \times \sin\theta = 1368 \times \sin 20 = 468N$$

(where, θ is maximum pressure angle of CGE015 tooth engagement)

8. Life time calculation:

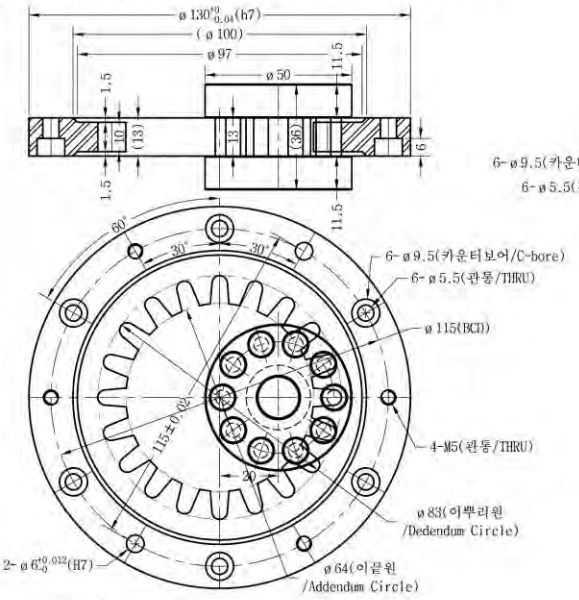
$$L_{10} = 10000 \times \frac{N_o}{N_m} \times \left(\frac{T_o}{T_{dG}}\right)^{\frac{10}{3}}$$
$$= 10000 \times \frac{90}{80} \times \left(\frac{264}{260}\right)^{\frac{10}{3}} \cong 11837hrs$$

where, N_o is rated output speed, N_m is desired output speed, T_o is rated output torque at rated output speed N_o, T_{dG} is desired torque including CGI ring gear inertia, inertia of everything in motion, and frictional torque etc.

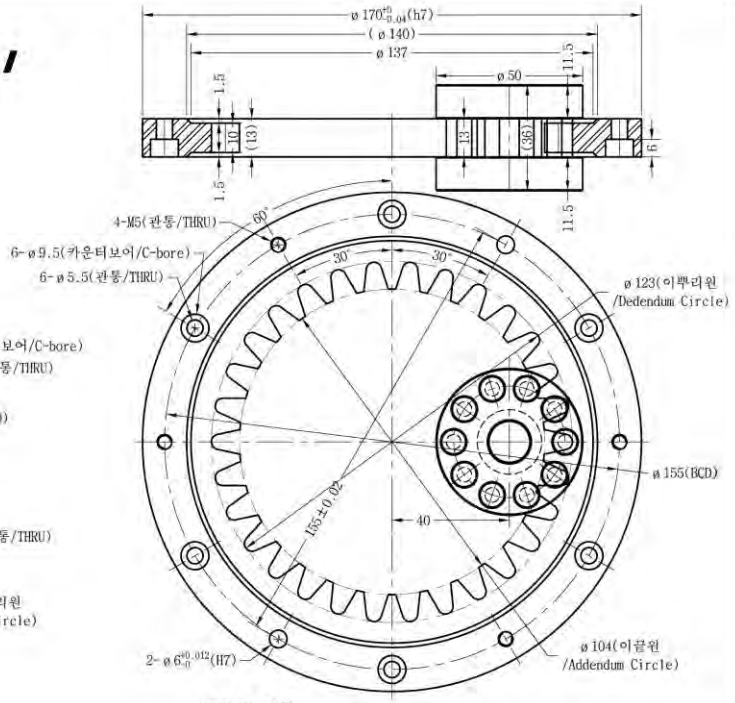
Other Forces may need to be included gravitational forces if rotation is not in the horizontal plane with imbalanced loads, springs, counter-balances, fluid dampening systems, wind resistance etc.

CGI 외형치수 [CGI External Dimensions] (mm)

CGI001 외형치수 I
CGI001 External Dimensions I



내치차 형번 [Internal Ring Gear Model] : CGI001-S-i2-20
감속비 [Ratio] : 2
척도[Scale] : 1/1.25



내치차 형번 [Internal Ring Gear Model] : CGI001-S-i3-40
감속비 [Ratio] : 3
척도[Scale] : 1/1.25

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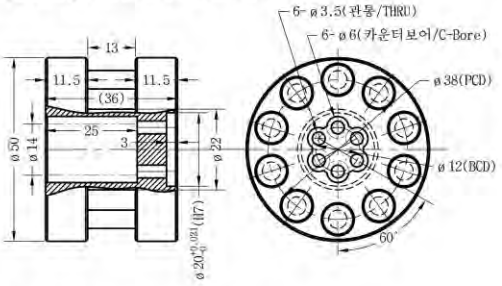
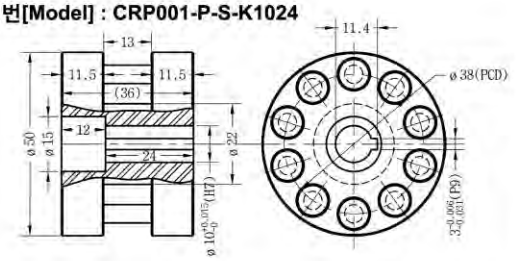
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

형번[Model] : CRP001-P-A-B06M03012

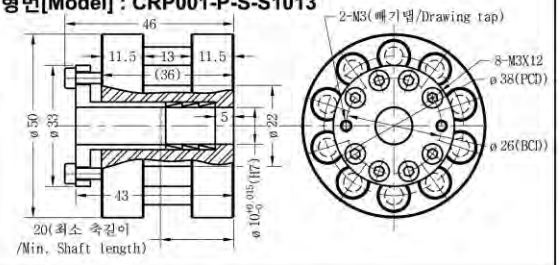


형번[Model] : CRP001-P-S-K1024

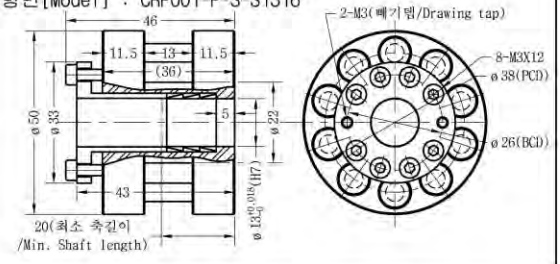


표준형 수축체결형 피니언 [Optional Shrink Fitting Pinions]

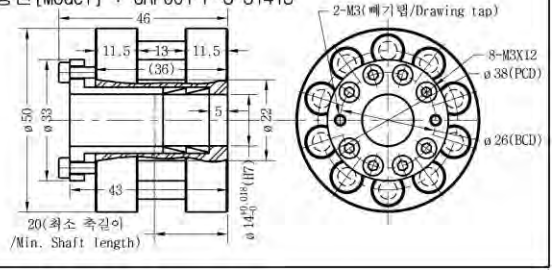
형번[Model] : CRP001-P-S-S1013



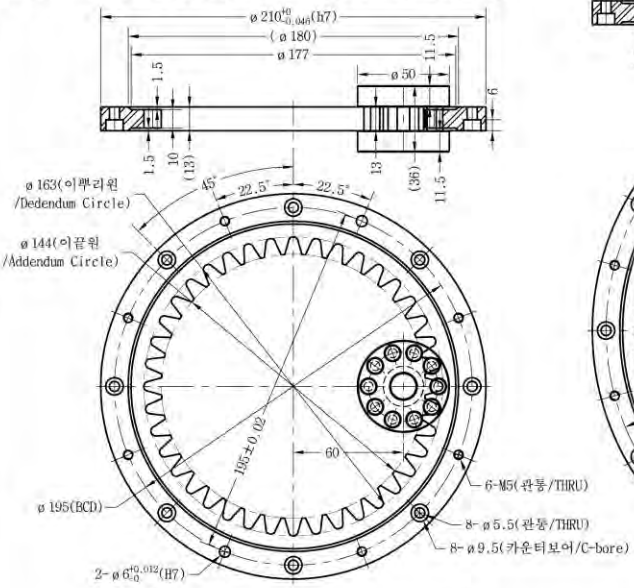
형번[Model] : CRP001-P-S-S1316



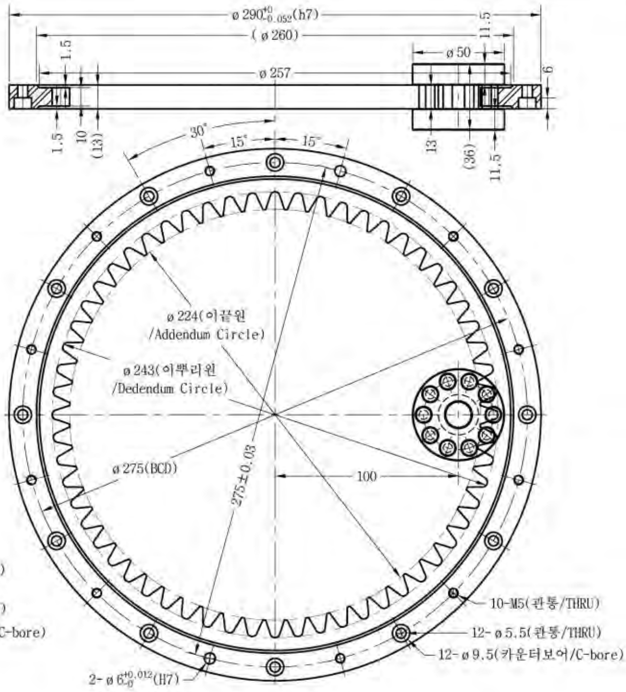
형번[Model] : CRP001-P-S-S1418



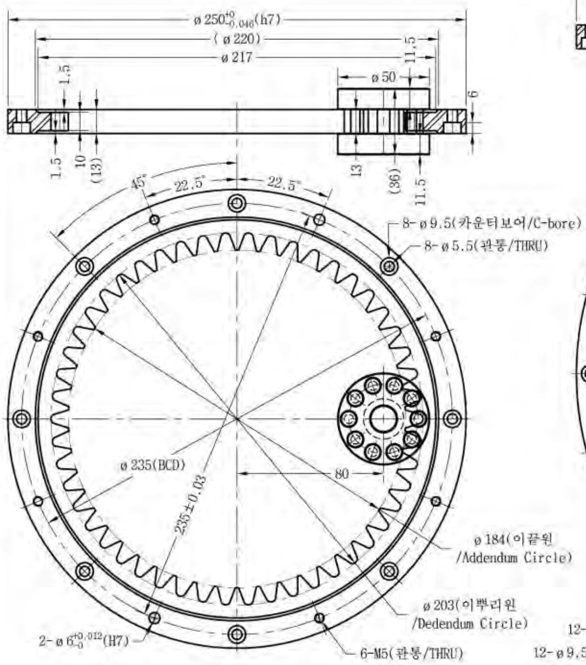
CGI001 외형치수 II
CGI001 External Dimensions II



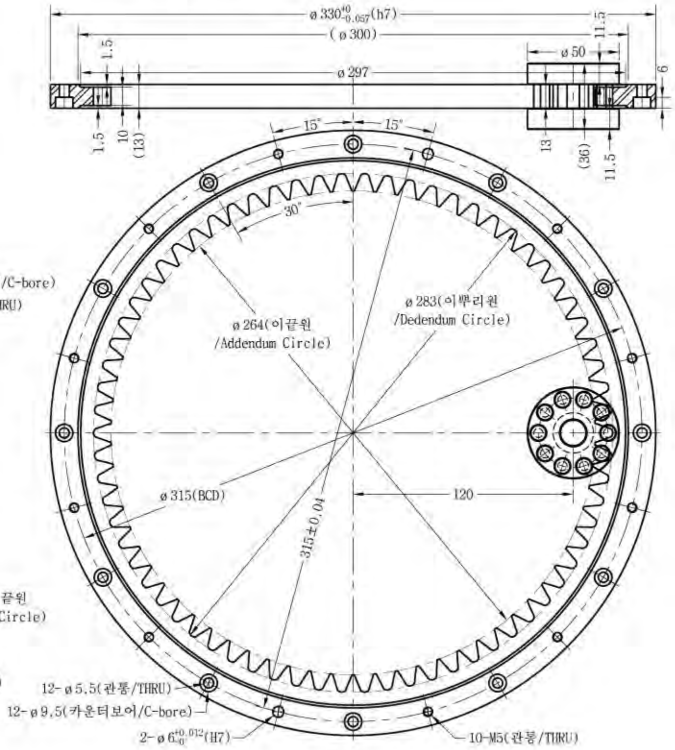
내치차 형번 [Internal Ring Gear Model]	:	CGI001-S-i4-60
감속비 [Ratio]	:	4
척도[Scale]	:	1/2



내치차 형번 [Internal Ring Gear Model]	:	CGI001-S-i6-100
감속비 [Ratio]	:	6
척도[Scale]	:	1/2



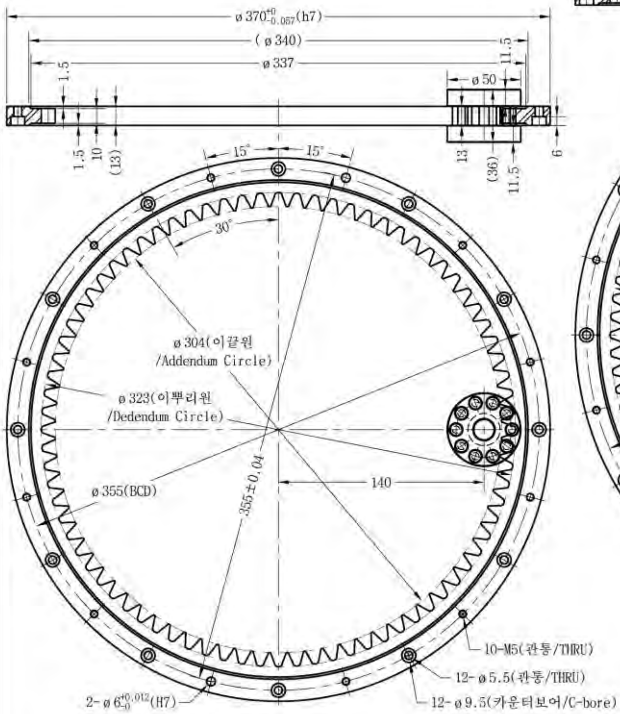
내치차 형번 [Internal Ring Gear Model]	:	CGI001-S-i5-80
감속비 [Ratio]	:	5
척도[Scale]	:	1/2



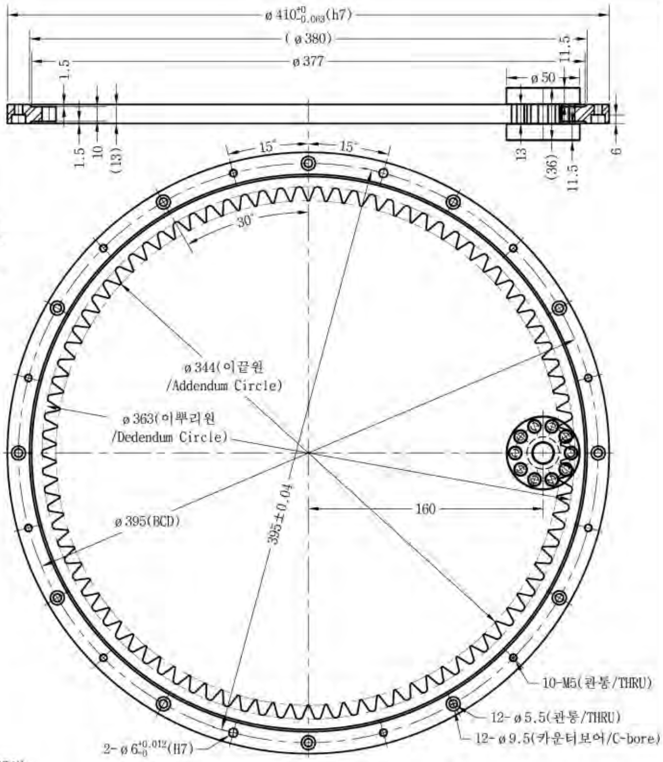
내치차 형번 [Internal Ring Gear Model]	:	CGI001-S-i7-120
감속비 [Ratio]	:	7
척도[Scale]	:	1/2

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

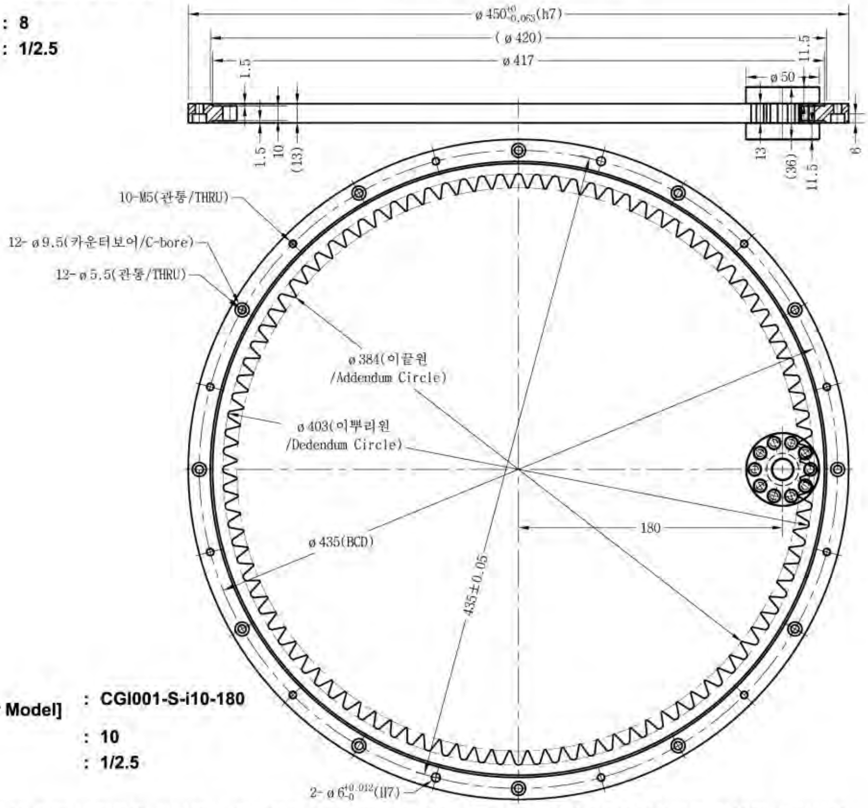
CGI001 외형치수 III
CGI001 External Dimensions III



내치차 형번 [Internal Ring Gear Model]	: CGI001-S-i8-140
감속비 [Ratio]	: 8
척도[Scale]	: 1/2.5



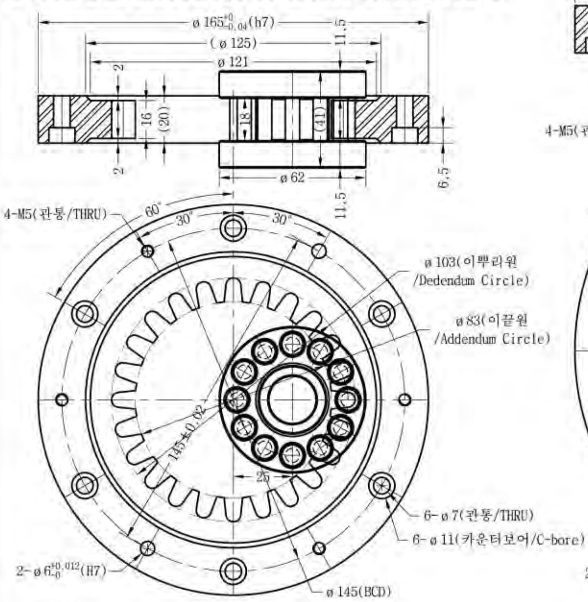
내치차 형번 [Internal Ring Gear Model]	: CGI001-S-i9-160
감속비 [Ratio]	: 9
척도[Scale]	: 1/2.5

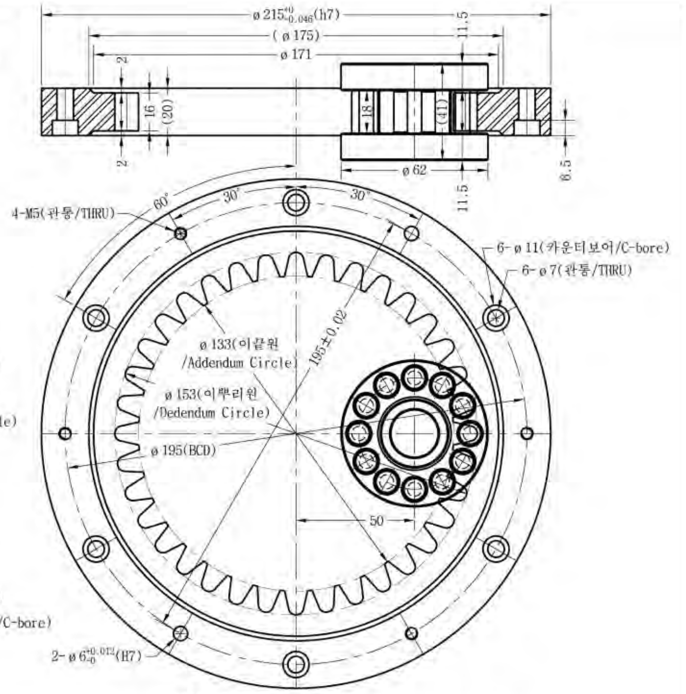


내치차 형번 [Internal Ring Gear Model]	: CGI001-S-i10-180
감속비 [Ratio]	: 10
척도[Scale]	: 1/2.5

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI002 외형치수 I
CGI002 External Dimensions I



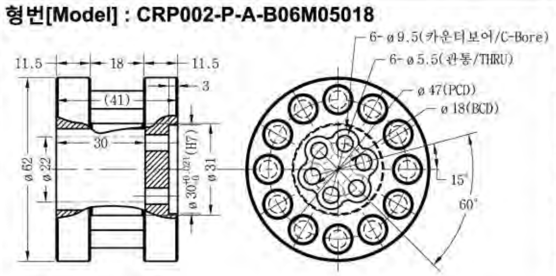


내치차 형번 [Internal Ring Gear Model]	**: CGI002-S-i2-25**	**내치차 형번 [Internal Ring Gear Model]**	**: CGI002-S-i3-50**
감속비 [Ratio]	**: 2**	**감속비 [Ratio]**	**: 3**
척도[Scale]	**: 1/1.25**	**척도[Scale]**	**: 1/1.25**

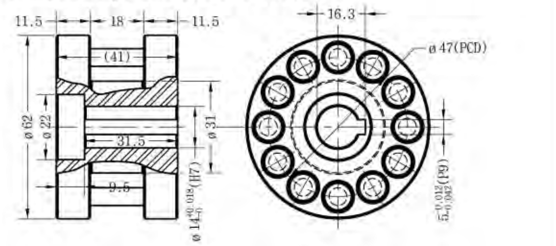
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

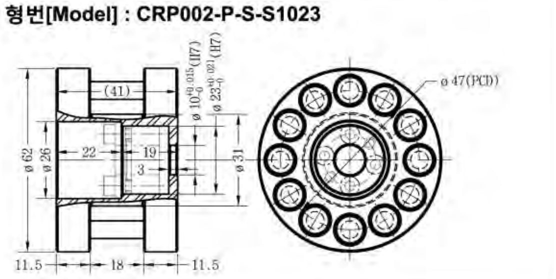
형번[Model] : CRP002-P-A-B06M05018



형번[Model] : CRP002-P-S-K1431

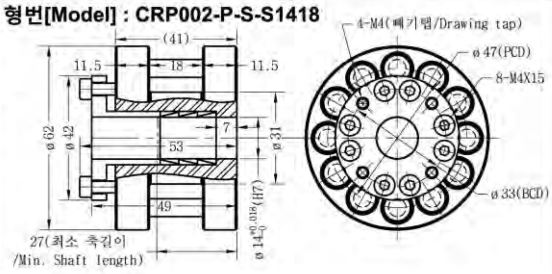


형번[Model] : CRP002-P-S-S1023

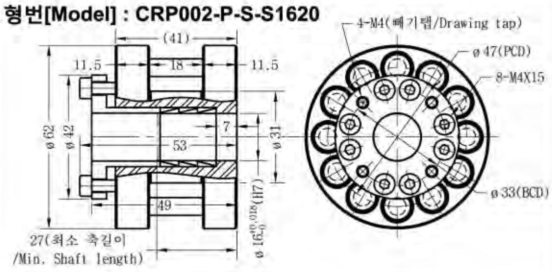


주문형 수축체결형 피니언 [Optional Shrink Fitting Pinions]

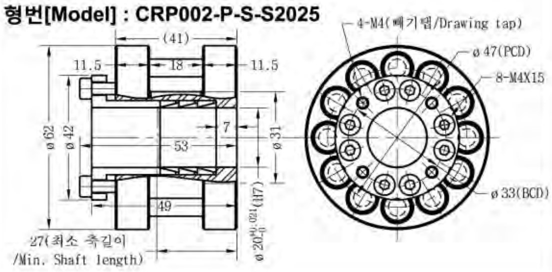
형번[Model] : CRP002-P-S-S1418



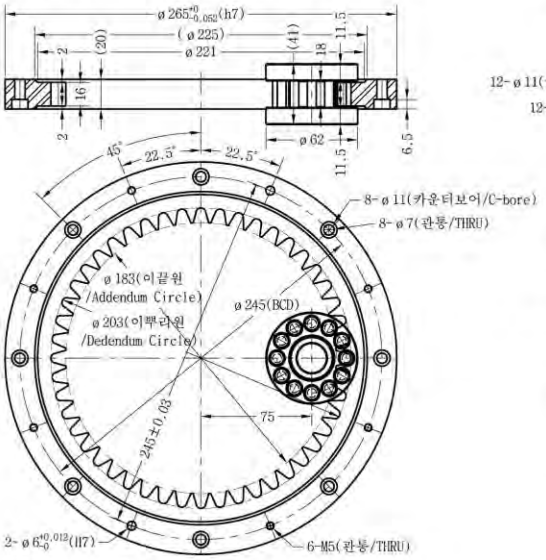
형번[Model] : CRP002-P-S-S1620



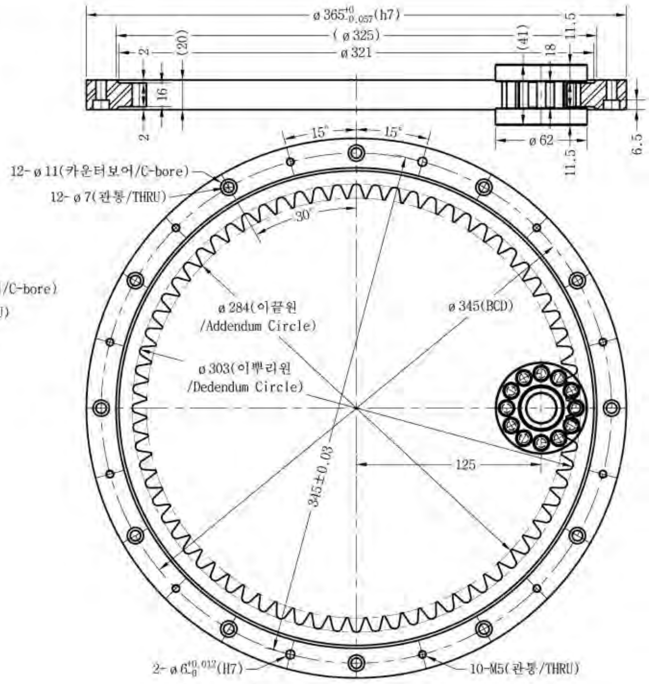
형번[Model] : CRP002-P-S-S2025



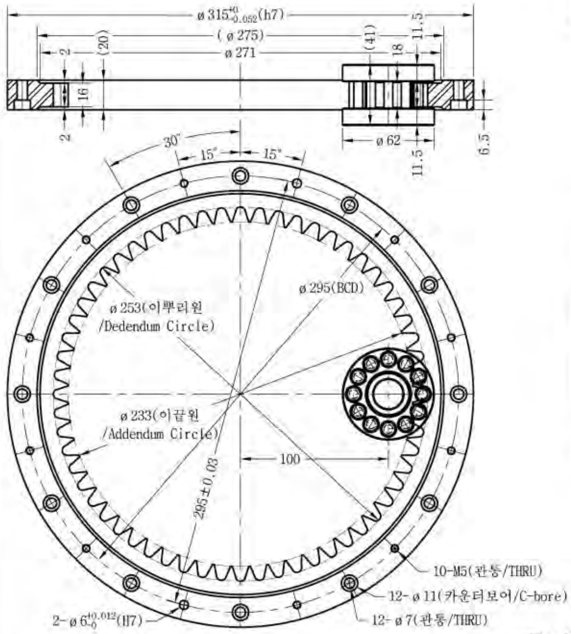
CGI002 외형치수 II
CGI002 External Dimensions II



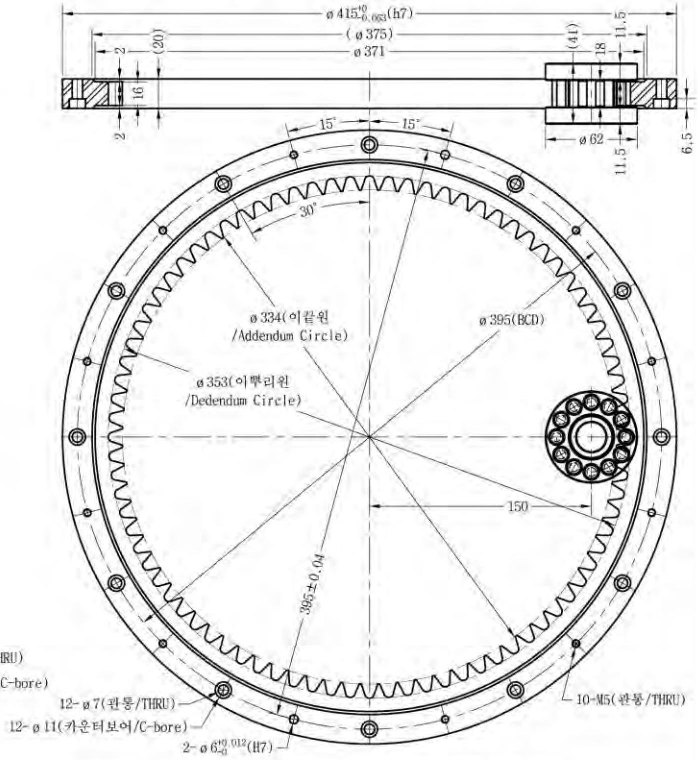
내치차 형번
[Internal Ring Gear Model] : **CGI002-S-i4-75**
감속비 [Ratio] : **4**
척도[Scale] : **1/2**



내치차 형번
[Internal Ring Gear Model] : **CGI002-S-i6-125**
감속비 [Ratio] : **6**
척도[Scale] : **1/2**



내치차 형번
[Internal Ring Gear Model] : **CGI002-S-i5-100**
감속비 [Ratio] : **5**
척도[Scale] : **1/2**



내치차 형번
[Internal Ring Gear Model] : **CGI002-S-i7-150**
감속비 [Ratio] : **7**
척도[Scale] : **1/2**

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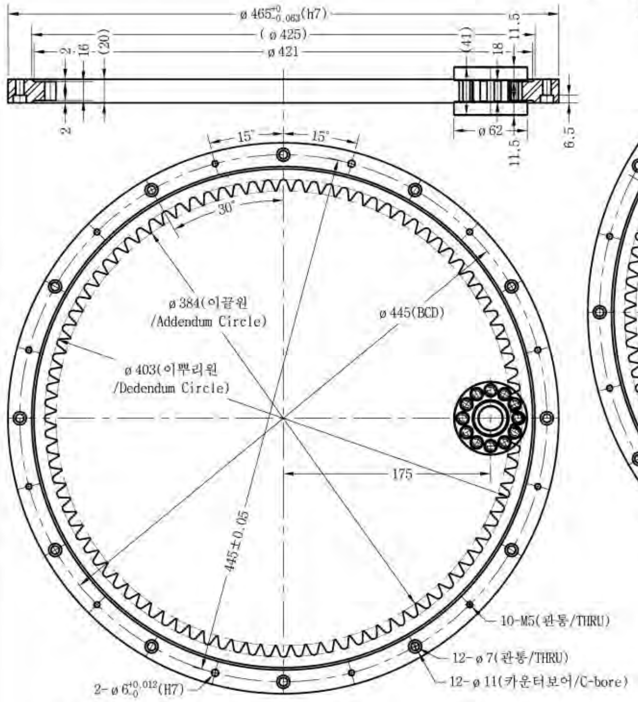
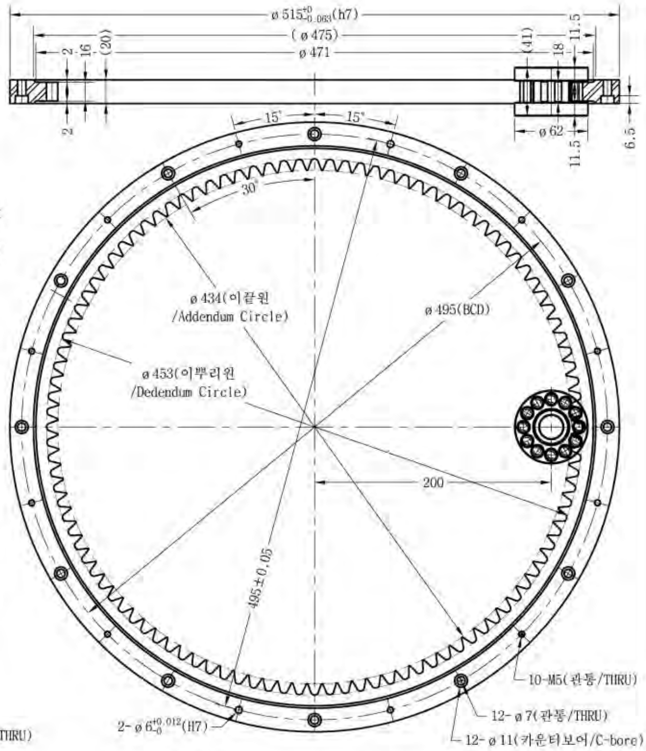
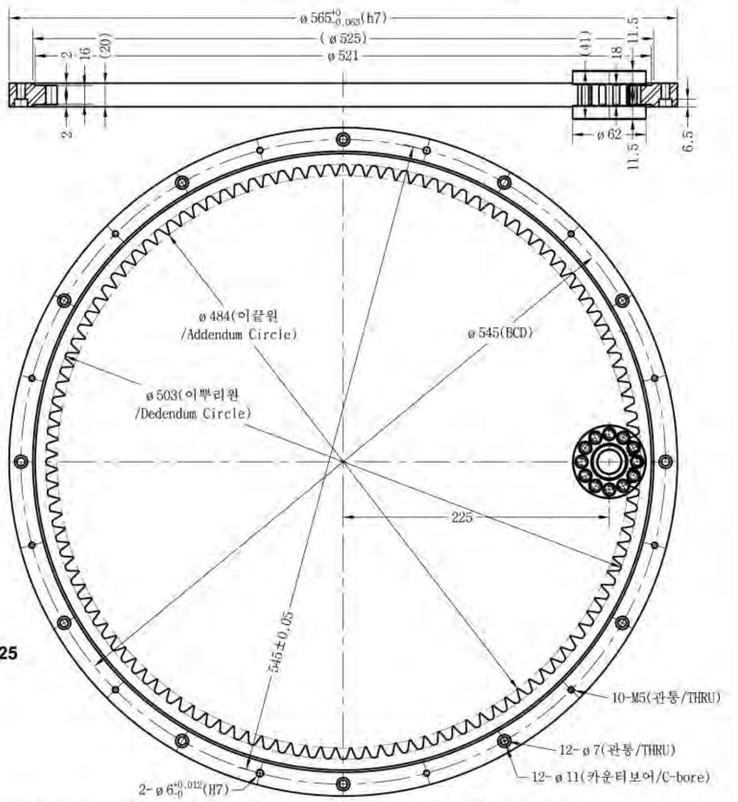
CGI002 외형치수 III
CGI002 External Dimensions III



내치차 형번
[Internal Ring Gear Model] : CGI002-S-i8-175
감속비 [Ratio] : 8
척도[Scale] : 1/2.5



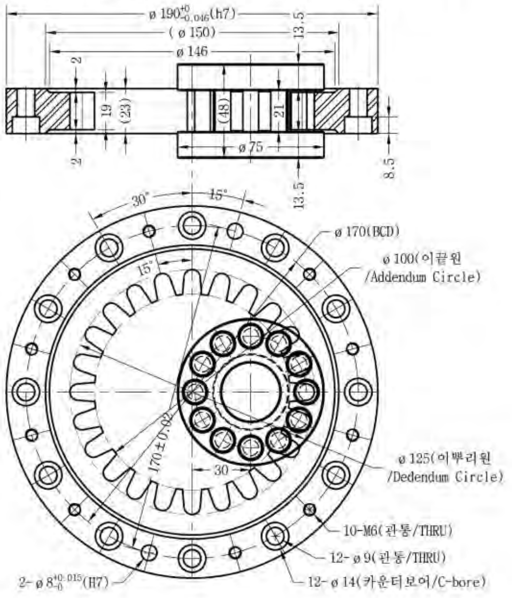
내치차 형번
[Internal Ring Gear Model] : CGI002-S-i9-200
감속비 [Ratio] : 9
척도[Scale] : 1/2.5

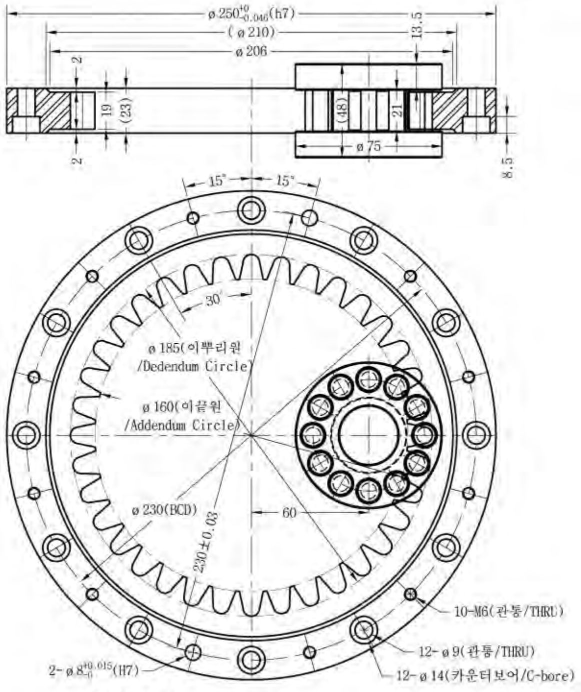


내치차 형번
[Internal Ring Gear Model] : CGI002-S-i10-225
감속비 [Ratio] : 10
척도[Scale] : 1/2.5

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI004 외형치수 I
CGI004 External Dimensions I





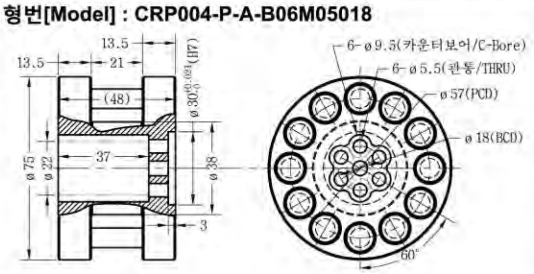
내치차 형번 [Internal Ring Gear Model]	: CGI004-S-i2-30
감속비 [Ratio]	: 2
척도[Scale]	: 1/1.25

내치차 형번 [Internal Ring Gear Model]	: CGI004-S-i3-60
감속비 [Ratio]	: 3
척도[Scale]	: 1/1.25

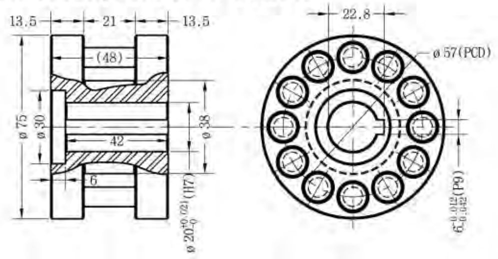
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

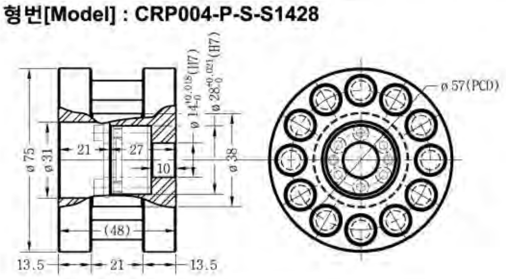
형번[Model] : CRP004-P-A-B06M05018



형번[Model] : CRP004-P-S-K2042

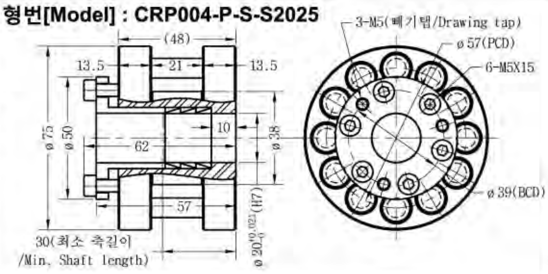


형번[Model] : CRP004-P-S-S1428

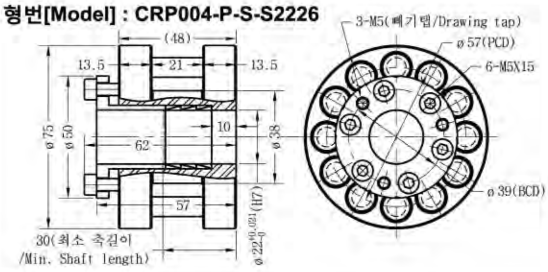


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

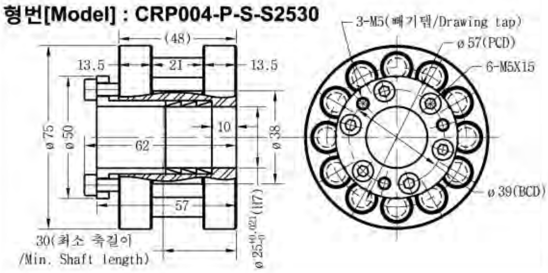
형번[Model] : CRP004-P-S-S2025



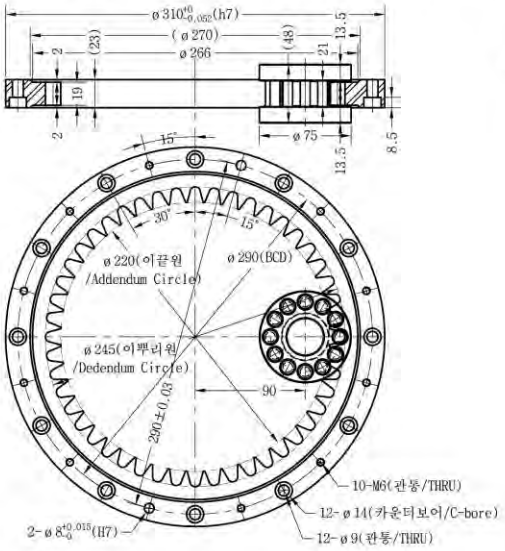
형번[Model] : CRP004-P-S-S2226



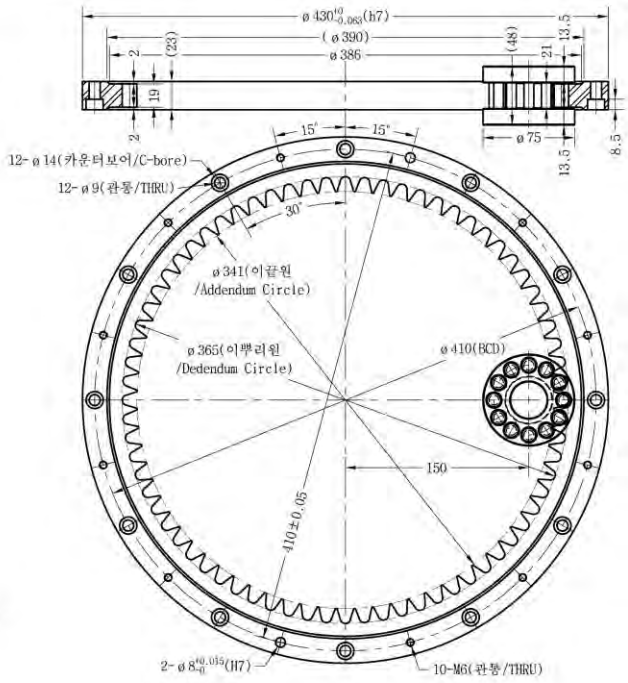
형번[Model] : CRP004-P-S-S2530



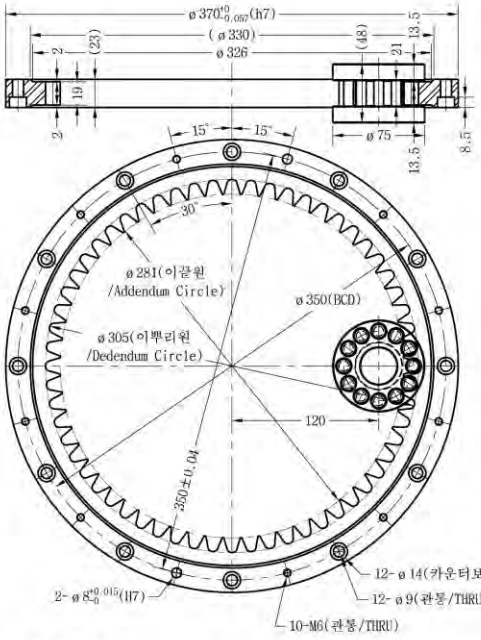
CGI004 외형치수 II
CGI004 External Dimensions II



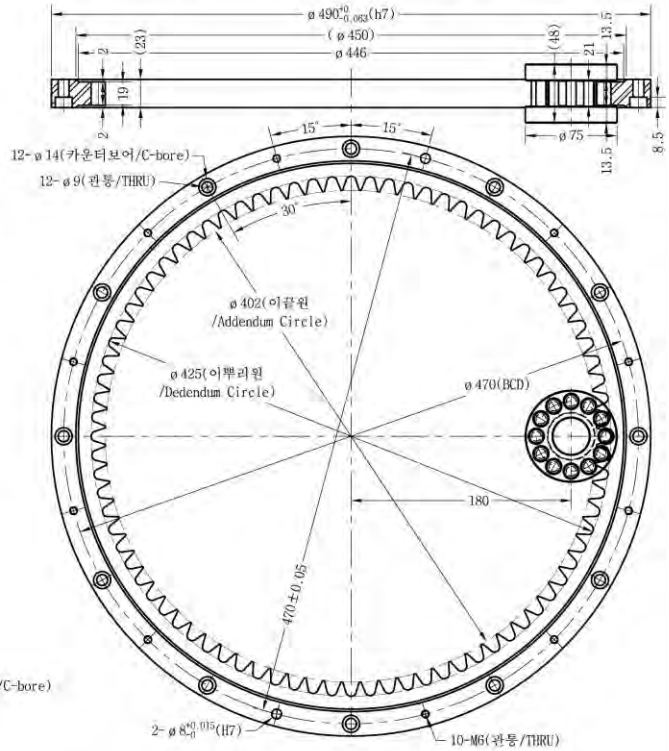
내치차 형번
[Internal Ring Gear Model] : CGI004-S-i4-90
감속비 [Ratio] : 4
척도[Scale] : 1/2



내치차 형번
[Internal Ring Gear Model] : CGI004-S-i6-150
감속비 [Ratio] : 6
척도[Scale] : 1/2



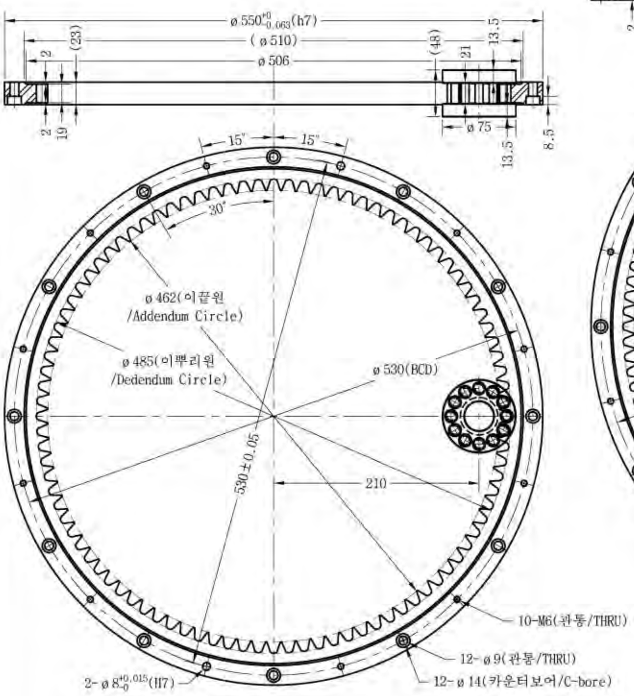
내치차 형번
[Internal Ring Gear Model] : CGI004-S-i5-120
감속비 [Ratio] : 5
척도[Scale] : 1/2



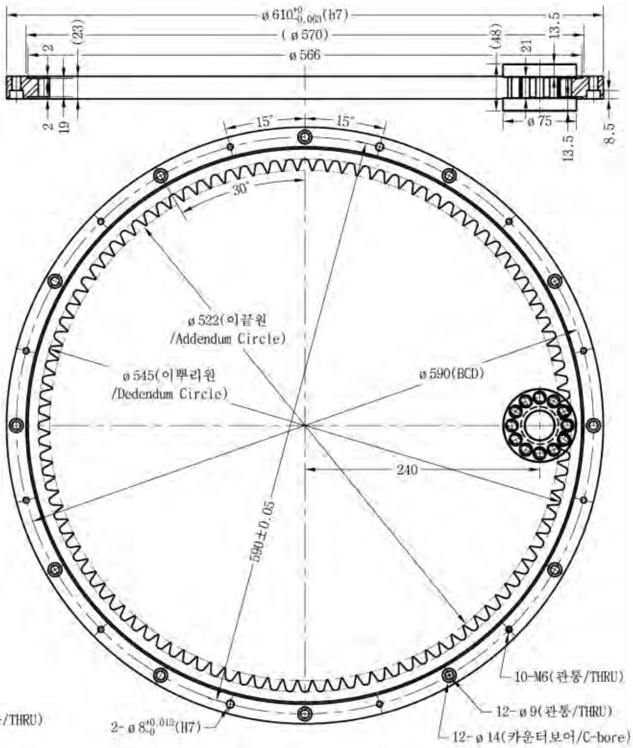
내치차 형번
[Internal Ring Gear Model] : CGI004-S-i7-180
감속비 [Ratio] : 7
척도[Scale] : 1/2

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

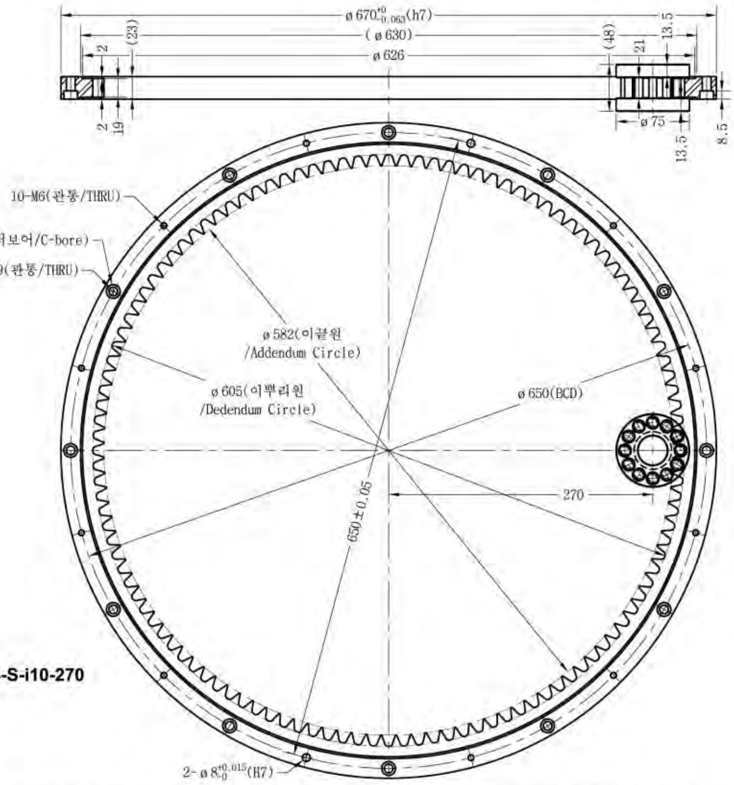
CGI004 외형치수 III
CGI004 External Dimensions III



내치차 형번 [Internal Ring Gear Model]	:	CGI004-S-i8-210
감속비 [Ratio]	:	8
척도[Scale]	:	1/2.5



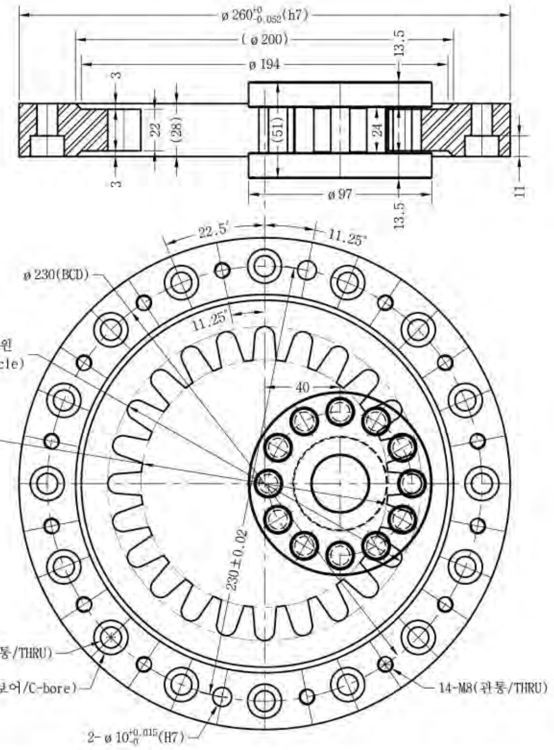
내치차 형번 [Internal Ring Gear Model]	:	CGI004-S-i9-240
감속비 [Ratio]	:	9
척도[Scale]	:	1/2.5



내치차 형번 [Internal Ring Gear Model]	:	CGI004-S-i10-270
감속비 [Ratio]	:	10
척도[Scale]	:	1/2.5

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI008 외형치수 I
CGI008 External Dimensions I

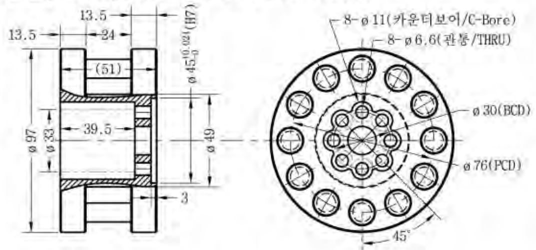


내치차 형번
[Internal Ring Gear Model] : CGI008-S-i2-40
감속비 [Ratio] : 2
척도[Scale] : 1/1

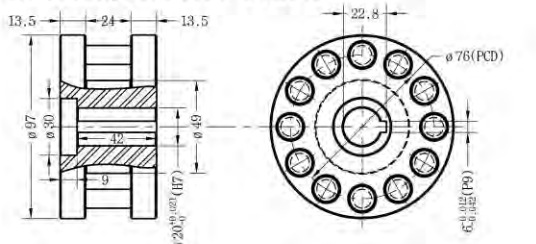
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

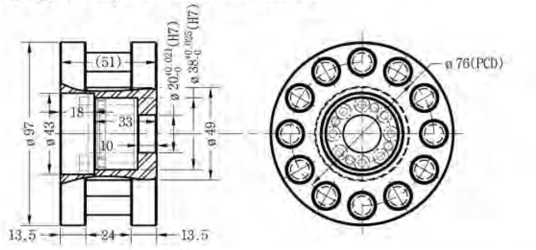
형번[Model] : CRP008-P-A-B08M06030



형번[Model] : CRP008-P-S-K2042

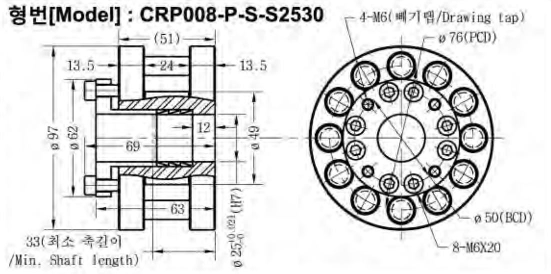


형번[Model] : CRP008-P-S-S2038

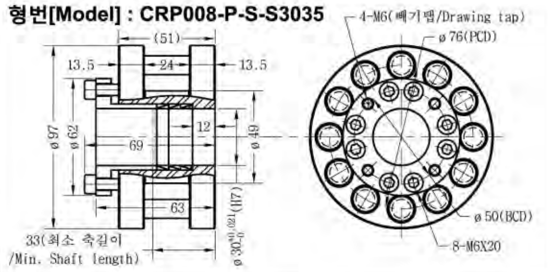


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

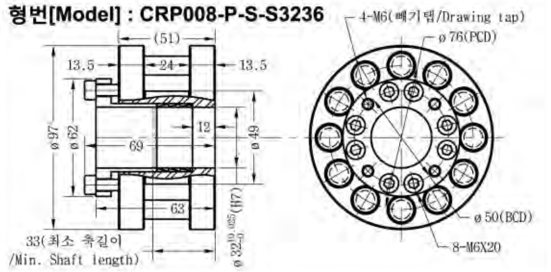
형번[Model] : CRP008-P-S-S2530



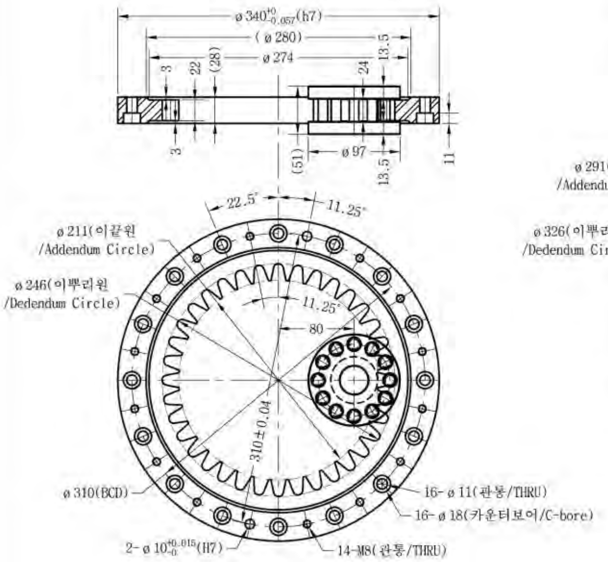
형번[Model] : CRP008-P-S-S3035

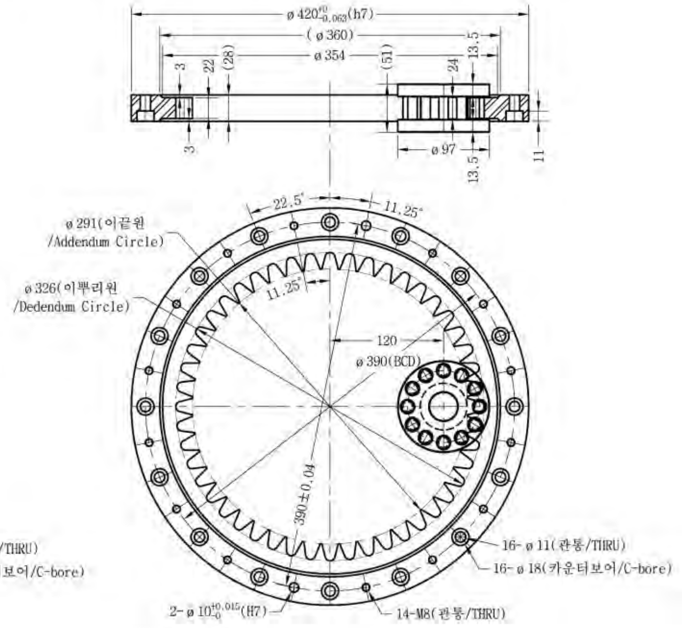


형번[Model] : CRP008-P-S-S3236



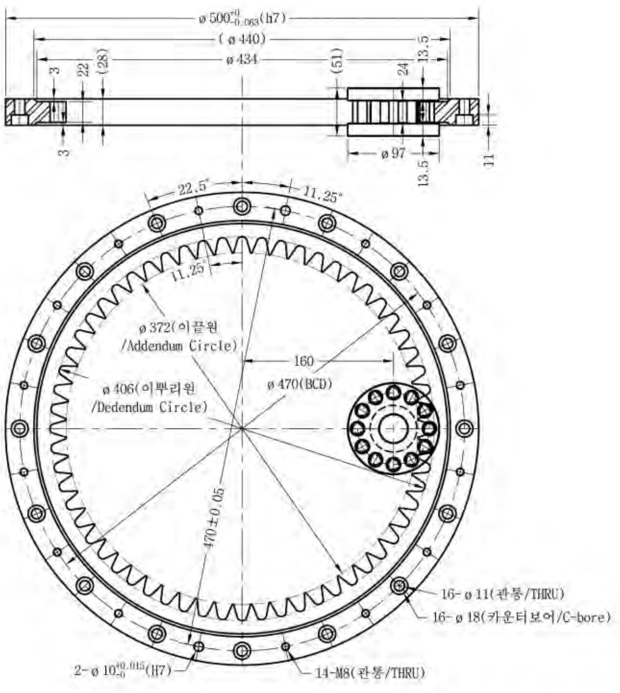
CGI008 외형치수 II
CGI008 External Dimensions II





내치차 형번 [Internal Ring Gear Model] : CGI008-S-i3-80
감속비 [Ratio] : 3
척도[Scale] : 1/2

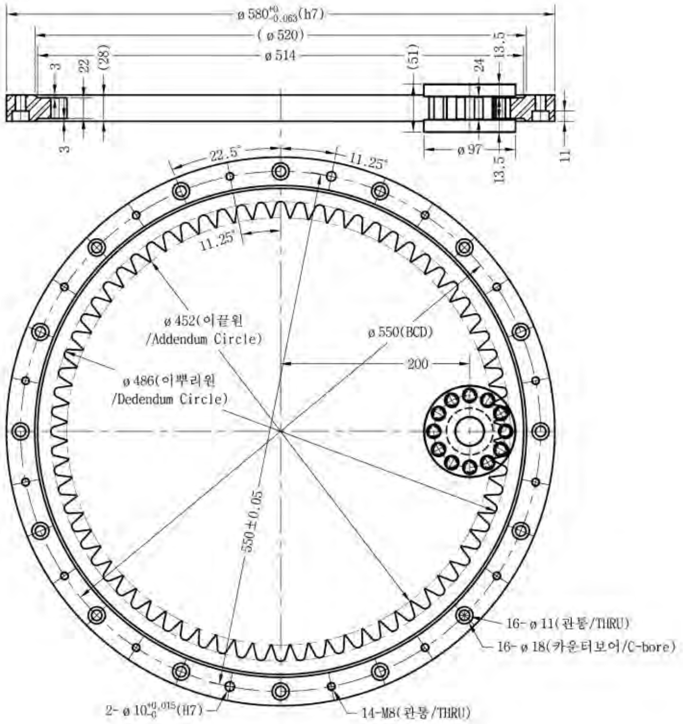
내치차 형번 [Internal Ring Gear Model] : CGI008-S-i4-120
감속비 [Ratio] : 4
척도[Scale] : 1/2



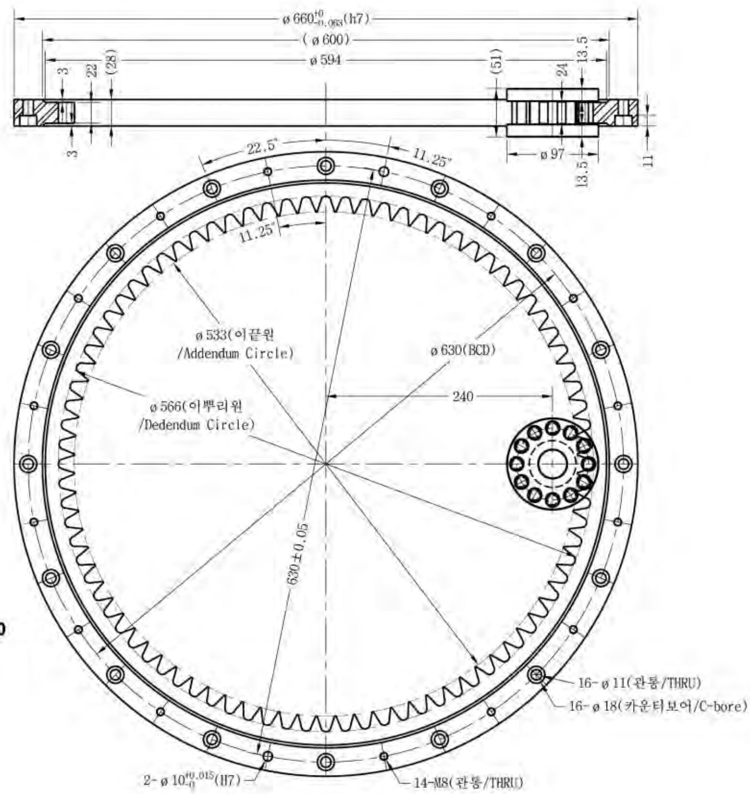
내치차 형번 [Internal Ring Gear Model] : CGI008-S-i5-160
감속비 [Ratio] : 5
척도[Scale] : 1/2

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI008 외형치수 III
CGI008 External Dimensions III



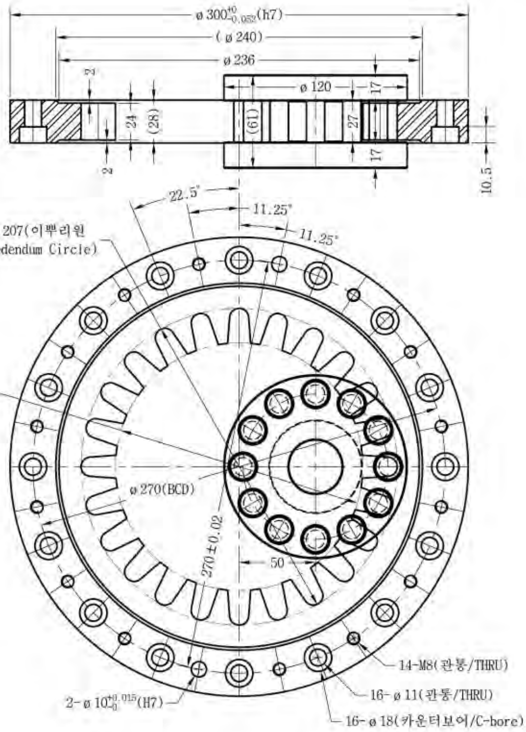
내치차 형번 [Internal Ring Gear Model]	: CGI008-S-i6-200
감속비 [Ratio]	: 6
척도[Scale]	: 1/2



내치차 형번 [Internal Ring Gear Model]	: CGI008-S-i7-240
감속비 [Ratio]	: 7
척도[Scale]	: 1/2

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI015 외형치수 I
CGI015 External Dimensions I

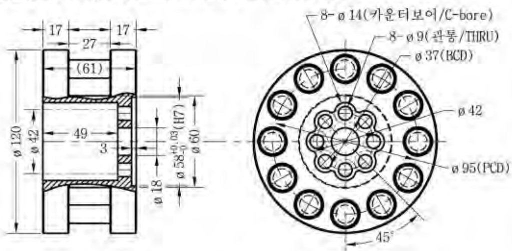


내치차 형번 [Internal Ring Gear Model]	: CGI015-S-i2-50
감속비 [Ratio]	: 2
척도[Scale]	: 1/1

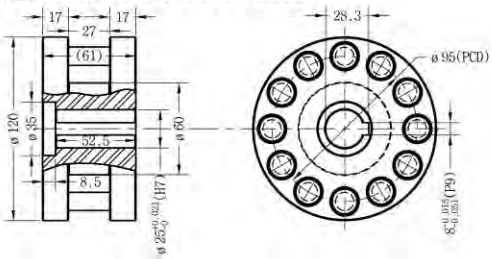
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

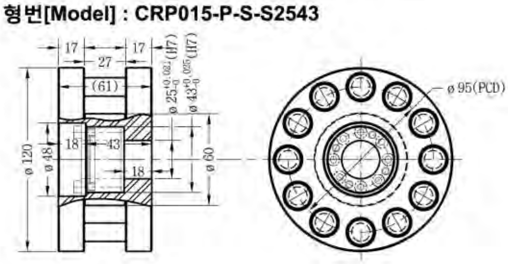
형번[Model] : CRP015-P-A-B08M08037



형번[Model] : CRP015-P-S-K2552

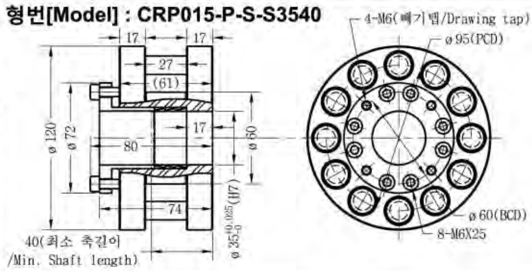


형번[Model] : CRP015-P-S-S2543

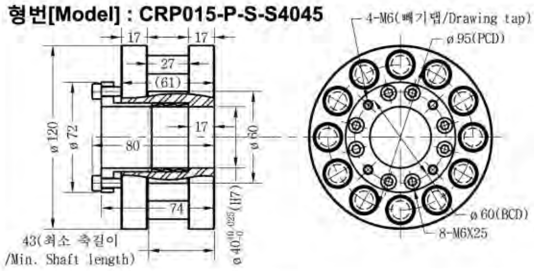


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

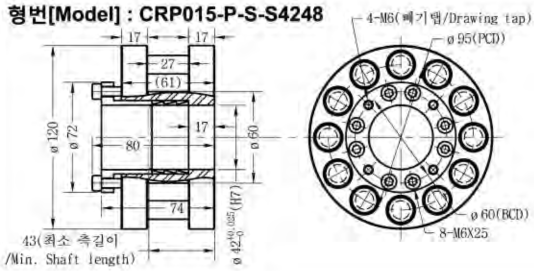
형번[Model] : CRP015-P-S-S3540



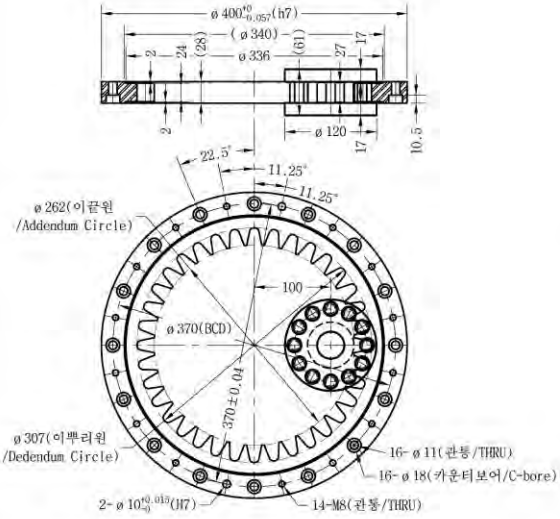
형번[Model] : CRP015-P-S-S4045



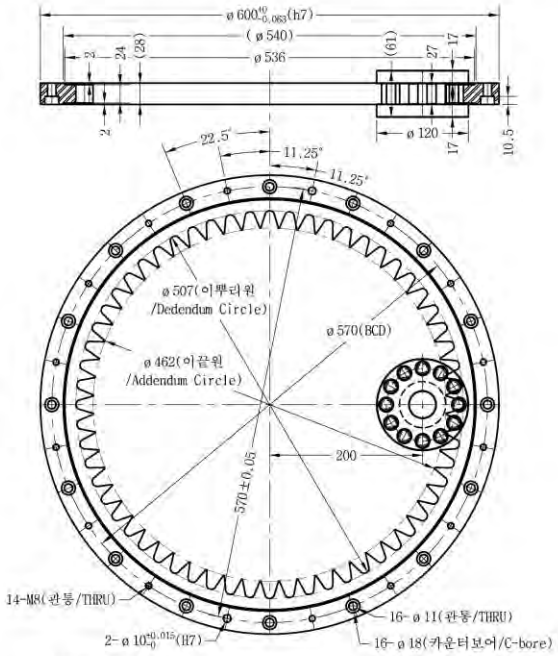
형번[Model] : CRP015-P-S-S4248



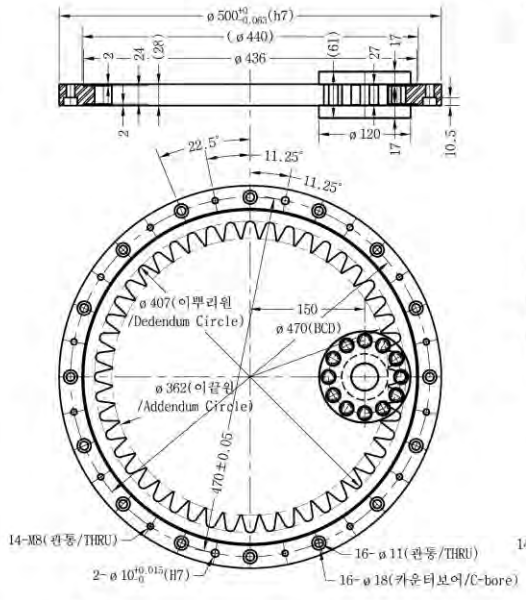
CGI015 외형치수 II
CGI015 External Dimensions II



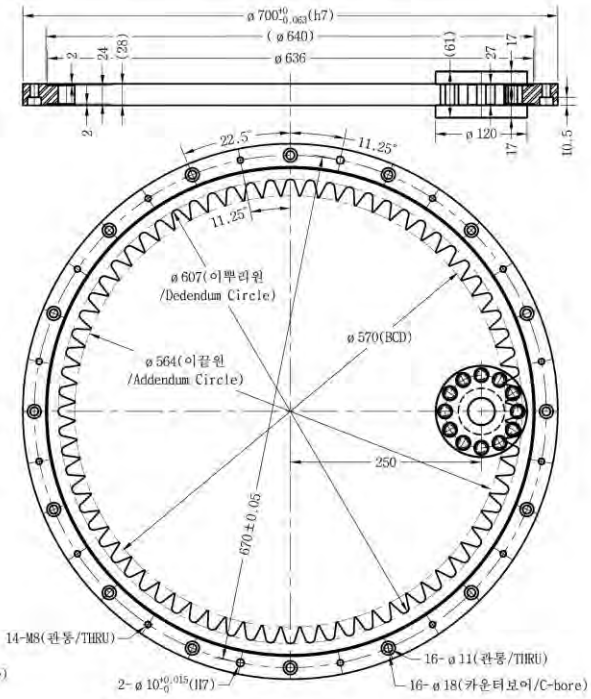
내치차 형번 **[Internal Ring Gear Model]** : **CGI015-S-i3-100**
감속비 [Ratio] : **3**
척도[Scale] : **1/2**



내치차 형번 **[Internal Ring Gear Model]** : **CGI015-S-i5-200**
감속비 [Ratio] : **5**
척도[Scale] : **1/2**



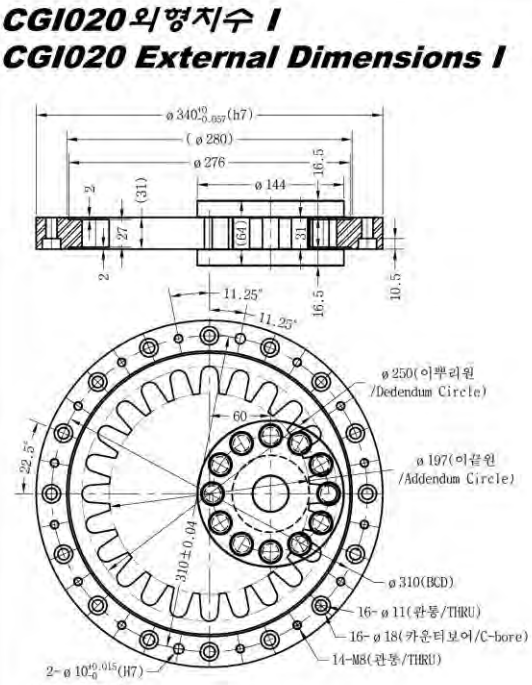
내치차 형번 **[Internal Ring Gear Model]** : **CGI015-S-i4-150**
감속비 [Ratio] : **4**
척도[Scale] : **1/2**



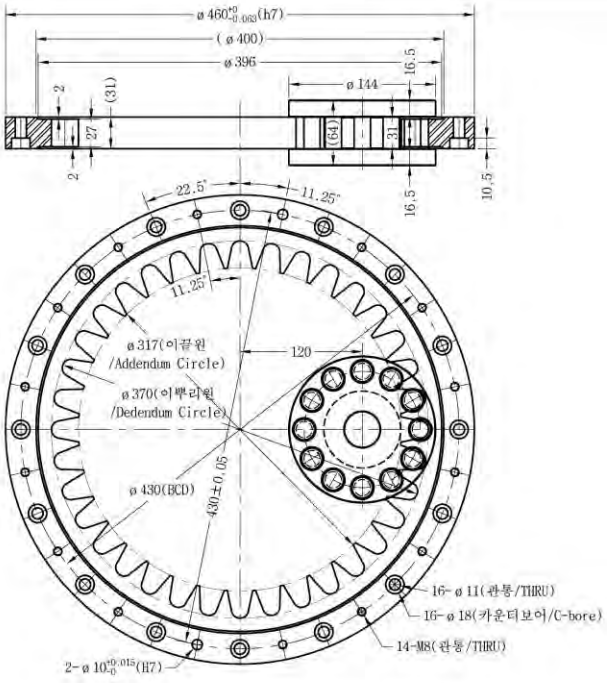
내치차 형번 **[Internal Ring Gear Model]** : **CGI015-S-i6-250**
감속비 [Ratio] : **6**
척도[Scale] : **1/2**

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI020 외형치수 I
CGI020 External Dimensions I



내치차 형번 [Internal Ring Gear Model] : CGI020-S-i2-60
감속비 [Ratio] : 2
척도[Scale] : 1/1.25

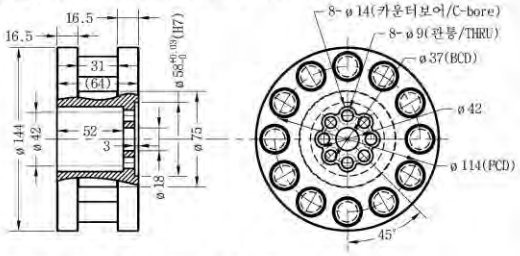


내치차 형번 [Internal Ring Gear Model] : CGI020-S-i3-120
감속비 [Ratio] : 3
척도[Scale] : 1/1.25

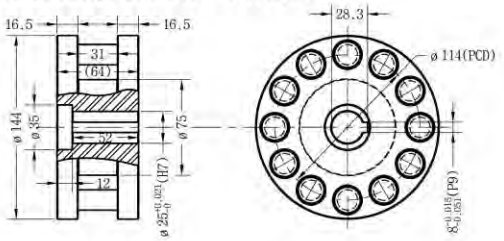
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

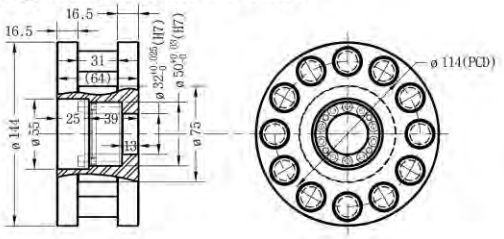
형번[Model] : CRP020-P-A-B08M08037



형번[Model] : CRP020-P-S-K2552

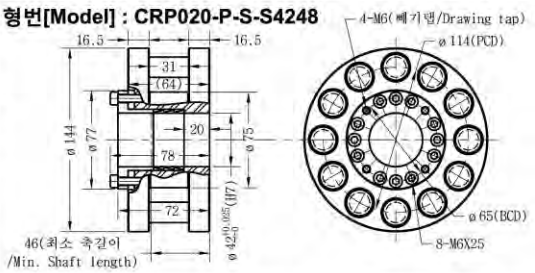


형번[Model] : CRP020-P-S-S3250

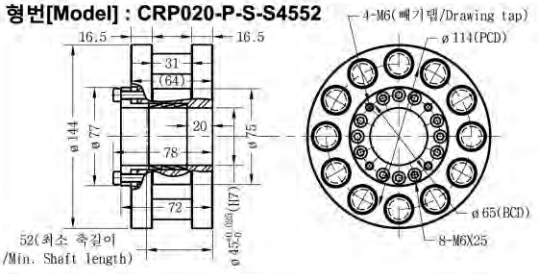


수축체결형 피니언 [Optional Shrink Fitting Pinions]

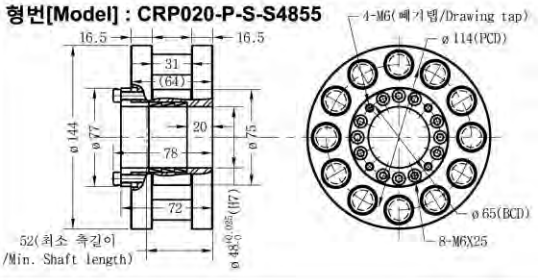
형번[Model] : CRP020-P-S-S4248



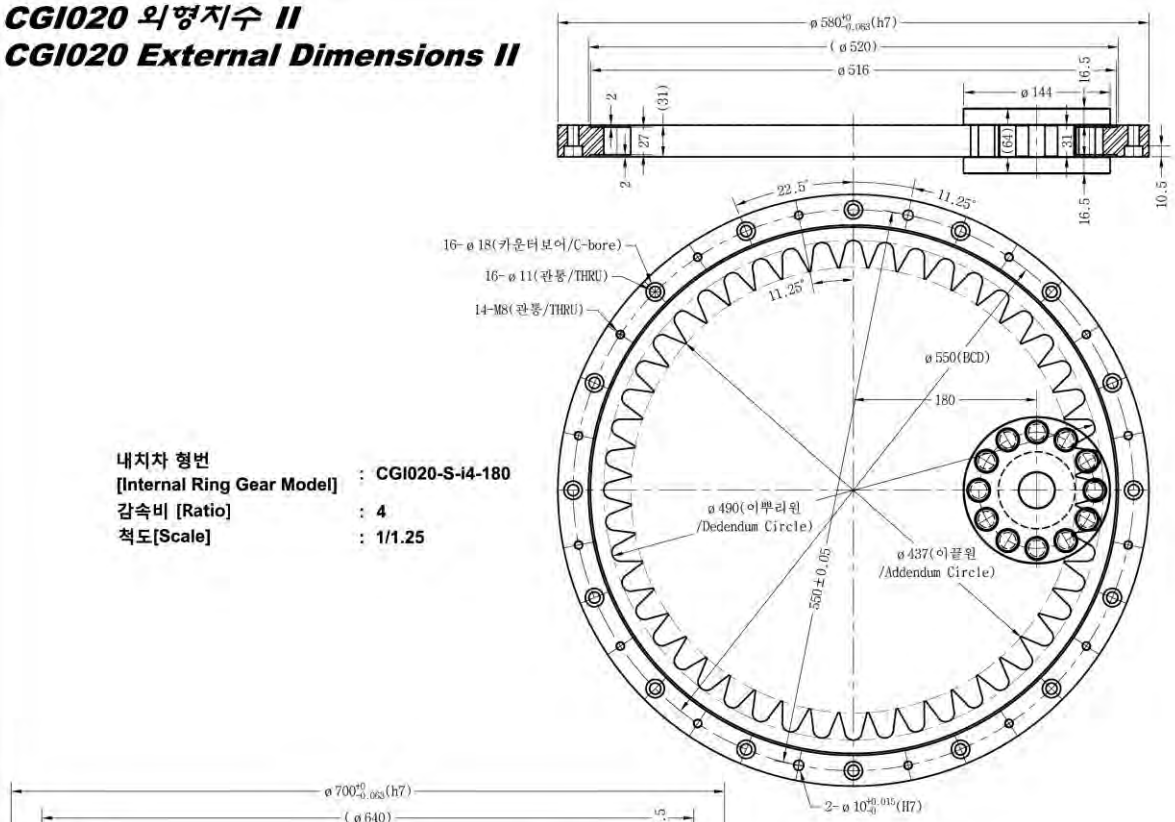
형번[Model] : CRP020-P-S-S4552



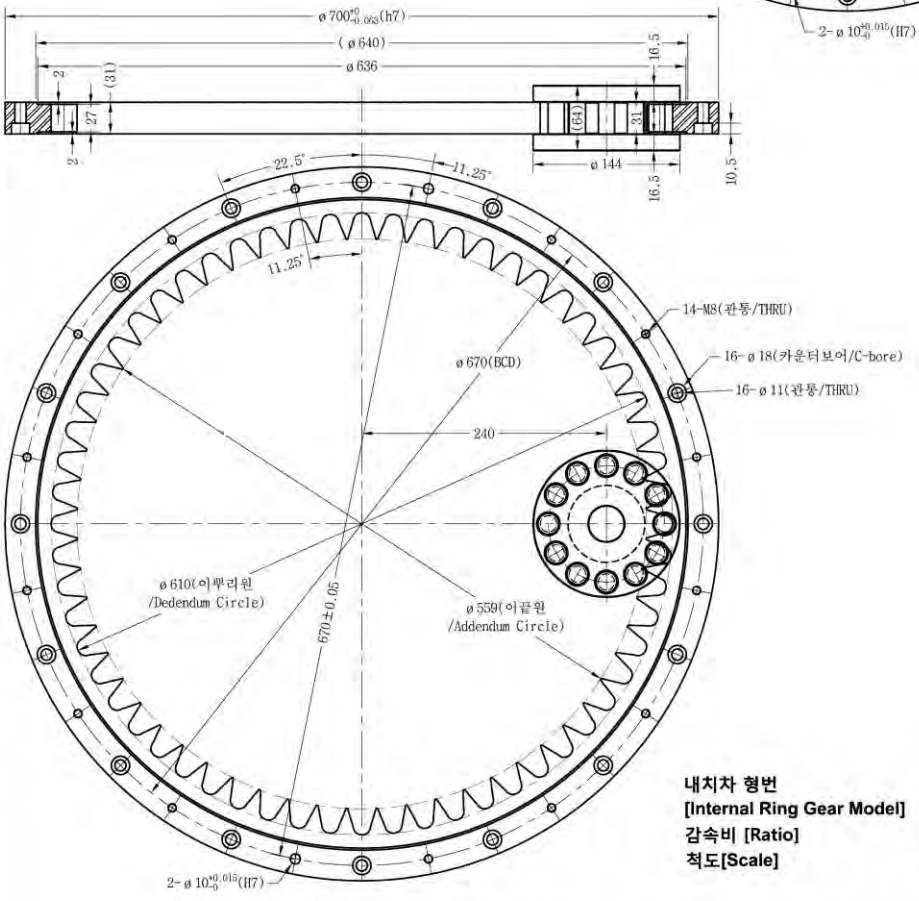
형번[Model] : CRP020-P-S-S4855



CGI020 외형치수 II
CGI020 External Dimensions II



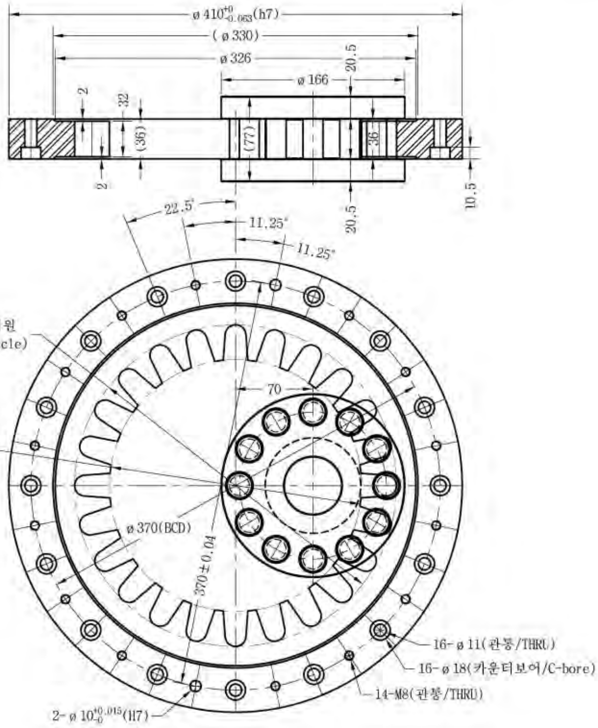
내치차 형번 : CGI020-S-i4-180
[Internal Ring Gear Model]
감속비 [Ratio] : 4
척도[Scale] : 1/1.25



내치차 형번 : CGI020-S-i5-240
[Internal Ring Gear Model]
감속비 [Ratio] : 5
척도[Scale] : 1/1.25

사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI040외형치수 I
CGI040 External Dimensions I

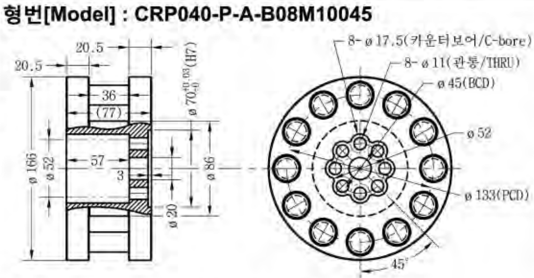


내치차 형번 [Internal Ring Gear Model]	:	CGI040-S-i2-70
감속비 [Ratio]	:	2
척도[Scale]	:	1/1

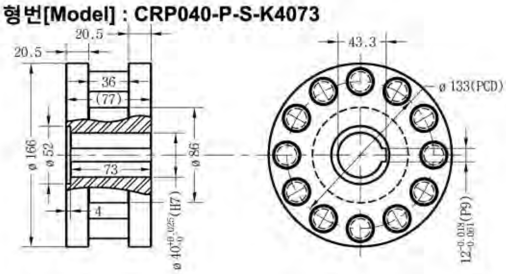
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

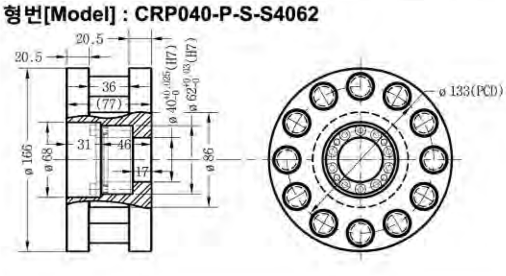
형번[Model] : CRP040-P-A-B08M10045



형번[Model] : CRP040-P-S-K4073

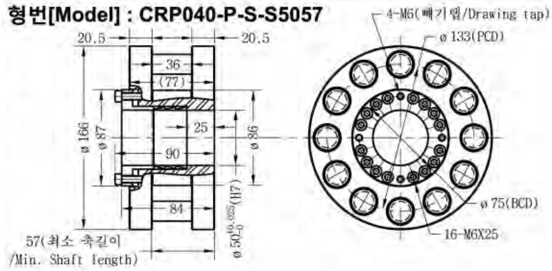


형번[Model] : CRP040-P-S-S4062

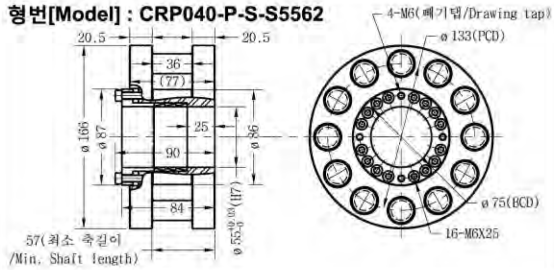


옵션품 수축체결형 피니언 [Optional Shrink Fitting Pinions]

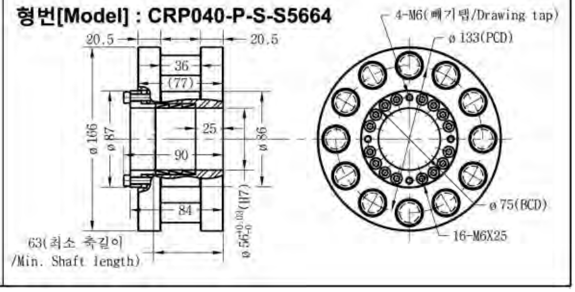
형번[Model] : CRP040-P-S-S5057



형번[Model] : CRP040-P-S-S5562



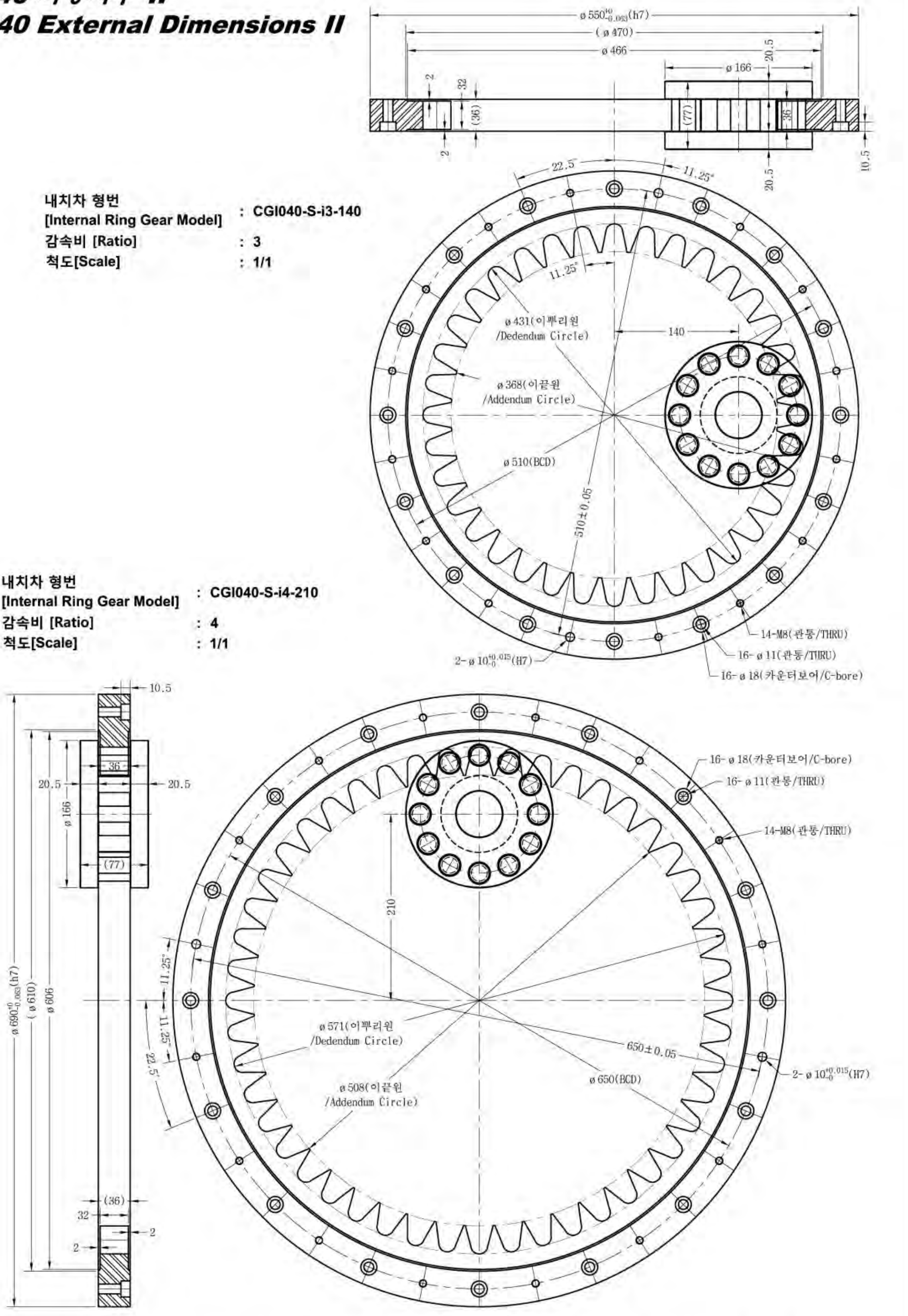
형번[Model] : CRP040-P-S-S5664



CGI040 외형치수 II
CGI040 External Dimensions II

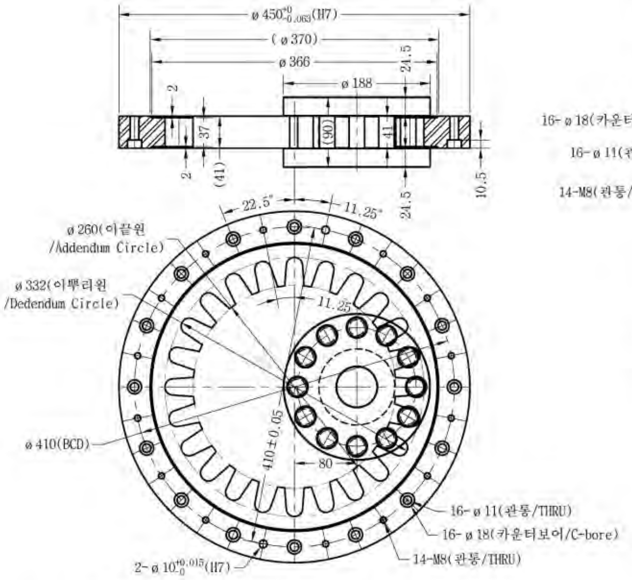
내치차 형번
[Internal Ring Gear Model] : CGI040-S-i3-140
감속비 [Ratio] : 3
척도[Scale] : 1/1

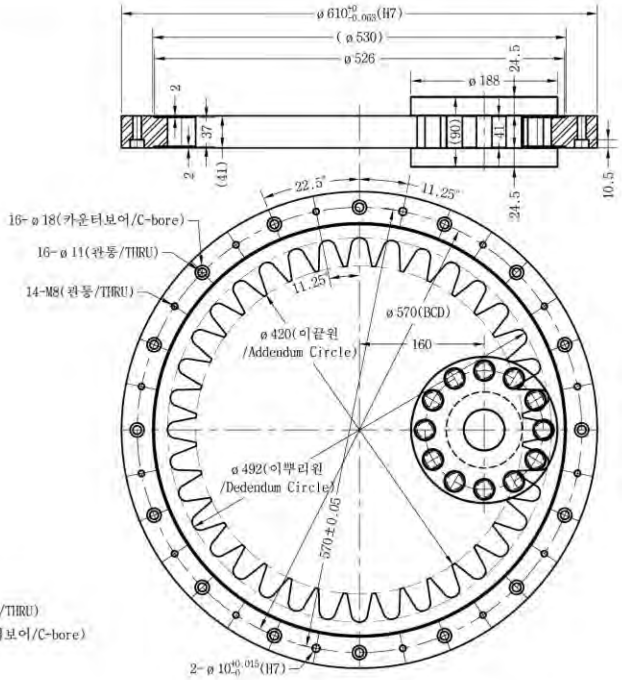
내치차 형번
[Internal Ring Gear Model] : CGI040-S-i4-210
감속비 [Ratio] : 4
척도[Scale] : 1/1



사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

CGI060 외형치수 I
CGI060 External Dimensions I





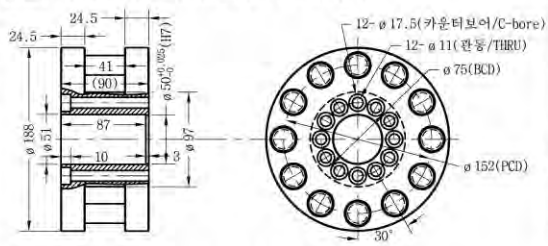
내치차 형번 [Internal Ring Gear Model] : CGI060-S-i2-80
감속비 [Ratio] : 2
척도[Scale] : 1/1.25

내치차 형번 [Internal Ring Gear Model] : CGI060-S-i3-160
감속비 [Ratio] : 3
척도[Scale] : 1/1.25

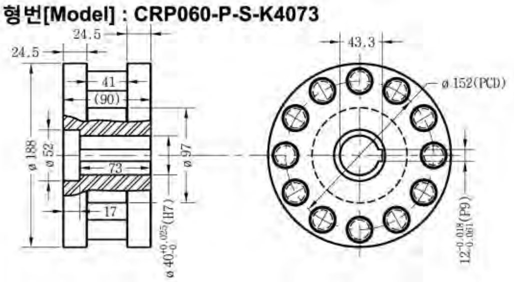
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

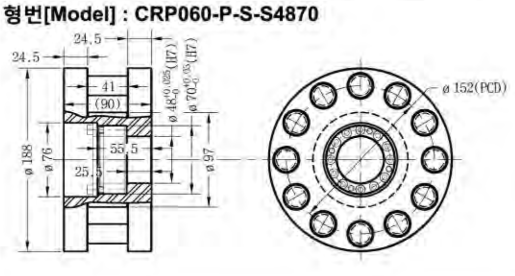
형번[Model] : CRP060-P-A-B12M10075



형번[Model] : CRP060-P-S-K4073

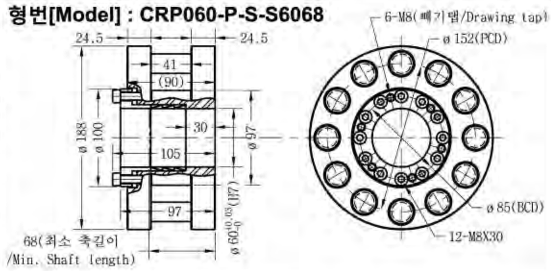


형번[Model] : CRP060-P-S-S4870

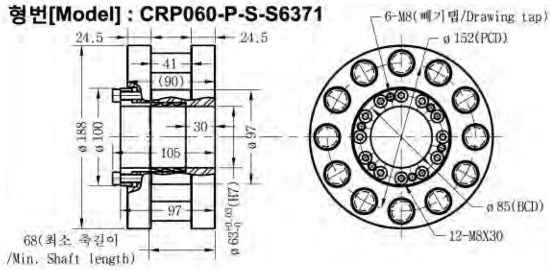


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

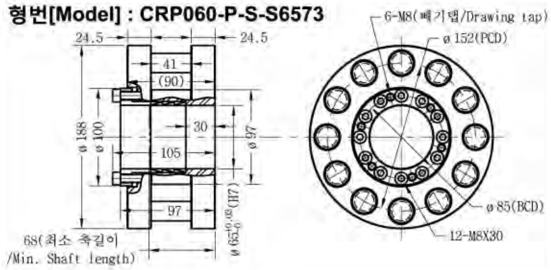
형번[Model] : CRP060-P-S-S6068



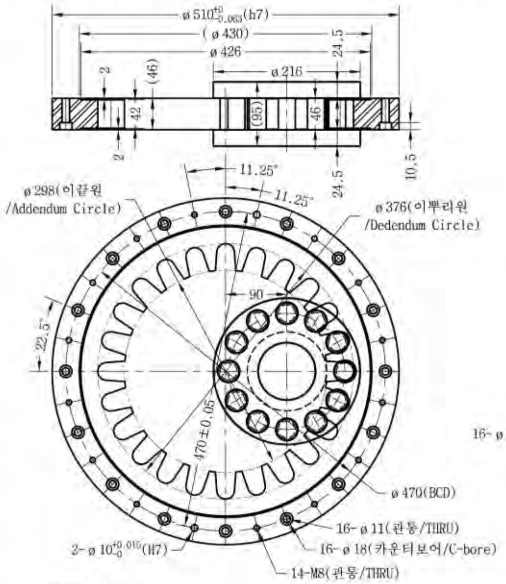
형번[Model] : CRP060-P-S-S6371

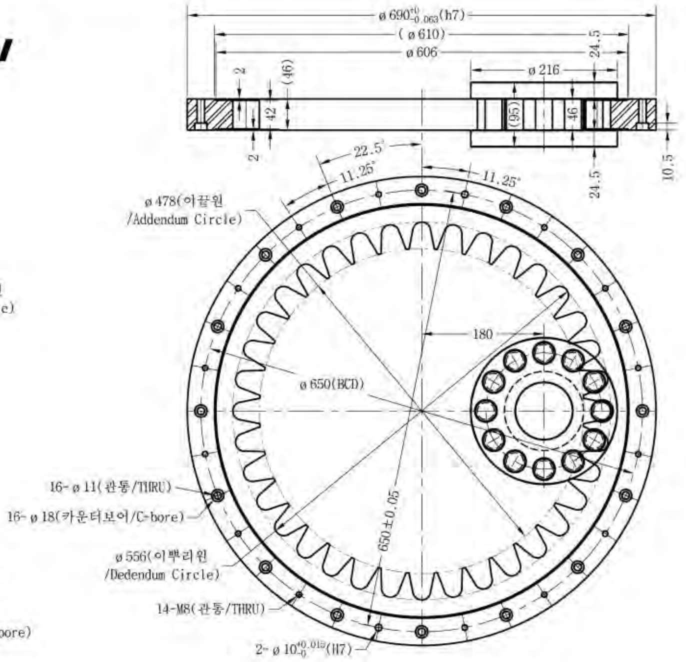


형번[Model] : CRP060-P-S-S6573



CGI080 외형치수 I
CGI080 External Dimensions I



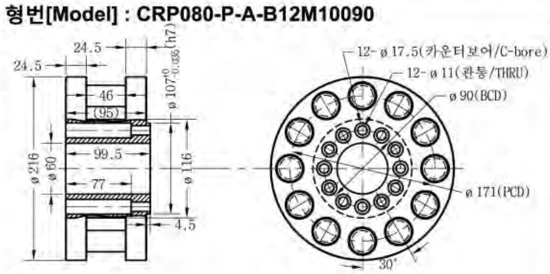


내치차 형번 [Internal Ring Gear Model]	: CGI080-S-i2-90	내치차 형번 [Internal Ring Gear Model]	: CGI080-S-i3-180
감속비 [Ratio]	: 2	감속비 [Ratio]	: 3
척도[Scale]	: 1/1.25	척도[Scale]	: 1/1.25

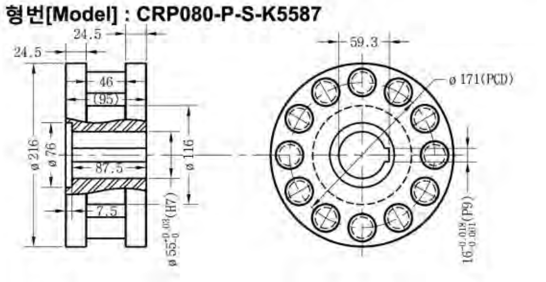
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

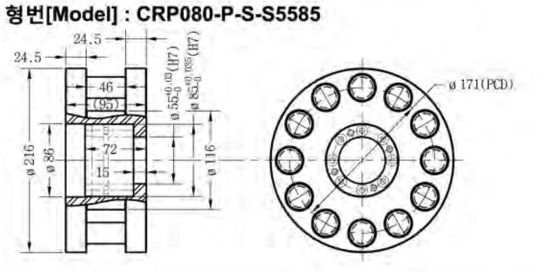
형번[Model] : CRP080-P-A-B12M10090



형번[Model] : CRP080-P-S-K5587

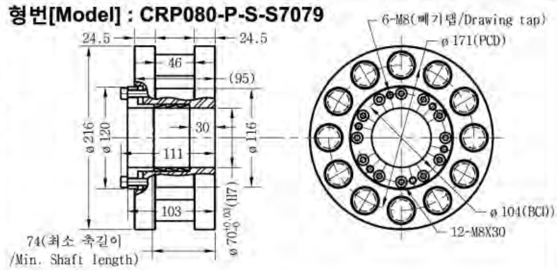


형번[Model] : CRP080-P-S-S5585

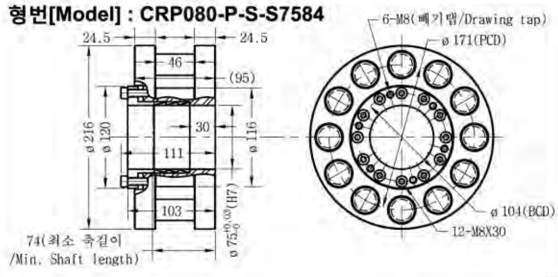


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

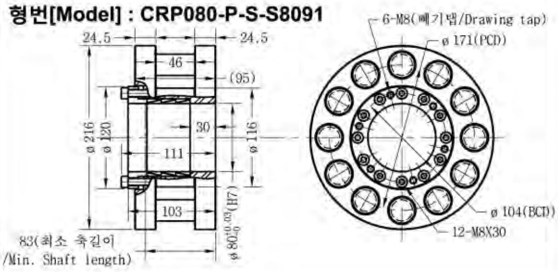
형번[Model] : CRP080-P-S-S7079



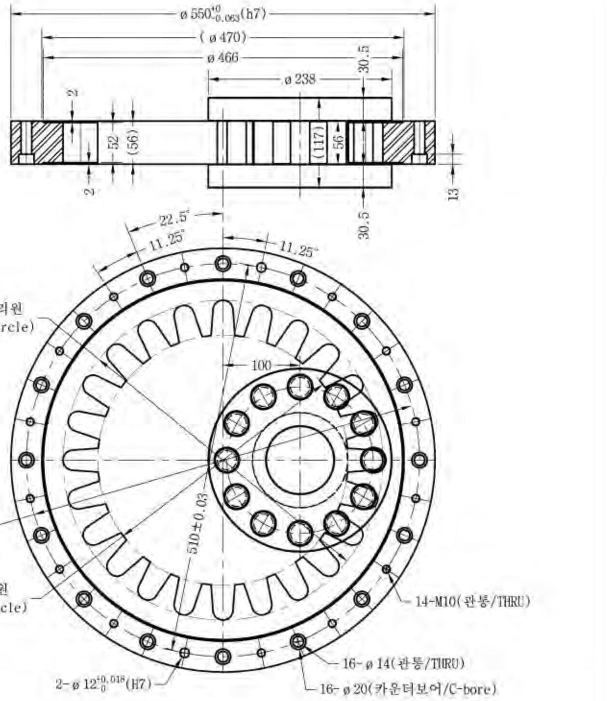
형번[Model] : CRP080-P-S-S7584



형번[Model] : CRP080-P-S-S8091



CGI120외형치수 I
CGI120 External Dimensions I

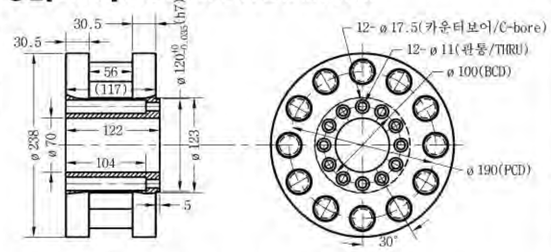


내치차 형번 [Internal Ring Gear Model]	:	CGI120-S-i2-100
감속비 [Ratio]	:	2
척도[Scale]	:	1/1

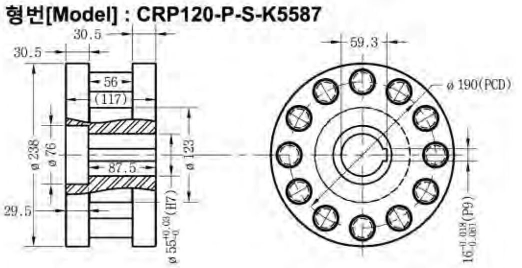
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

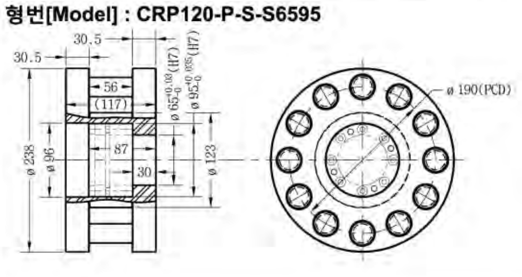
형번[Model] : CRP120-P-A-B12M10100



형번[Model] : CRP120-P-S-K5587

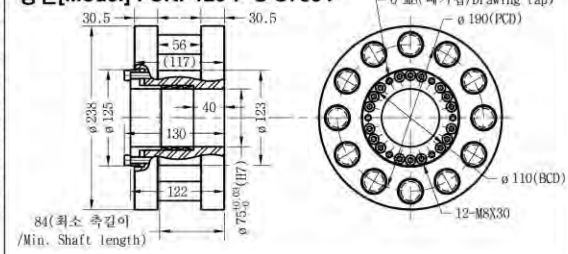


형번[Model] : CRP120-P-S-S6595

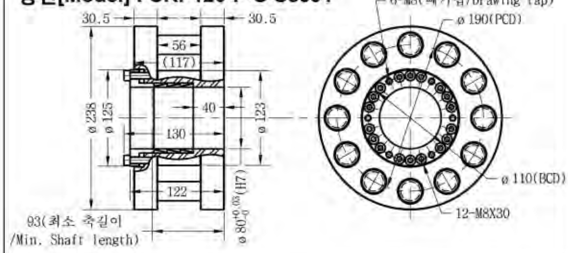


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

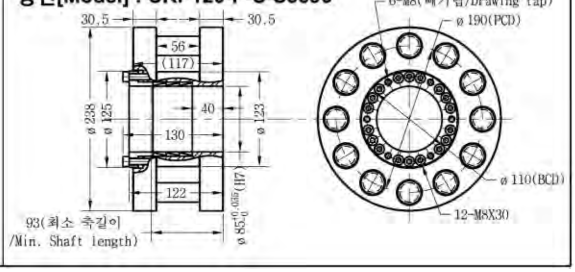
형번[Model] : CRP120-P-S-S7584



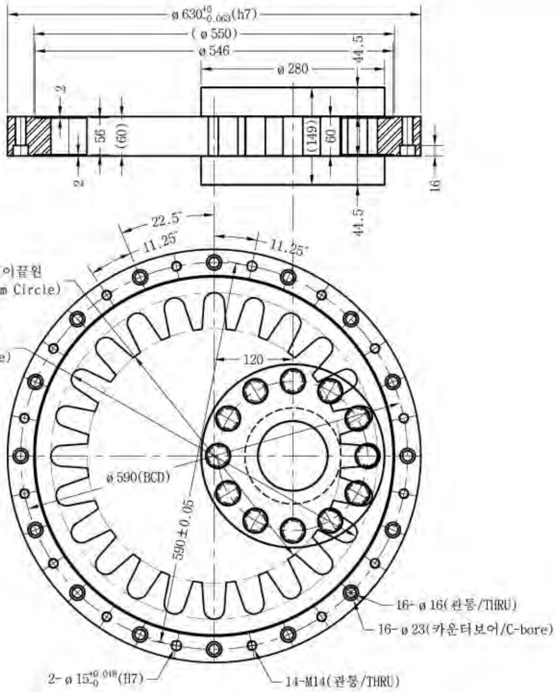
형번[Model] : CRP120-P-S-S8091



형번[Model] : CRP120-P-S-S8596



CGI180 외형치수 I
CGI180 External Dimensions I

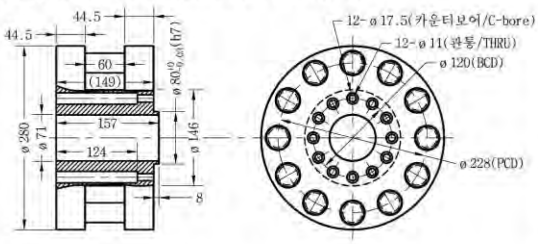


내치차 형번 [Internal Ring Gear Model]	:	CGI180-S-i2-120
감속비 [Ratio]	:	2
척도[Scale]	:	1/1

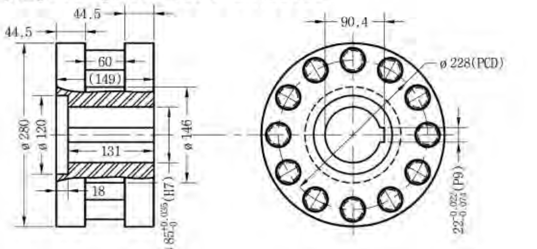
사용자 정의 내치차와 피니언도 이용하실 수 있습니다. 상세한 내용은 (주)세진아이지비로 문의해 주십시오.
[Customized internal ring gear & pinion is available on request. Please contact SEJINiGB for more details.]

표준형 피니언 [Standard Pinions]

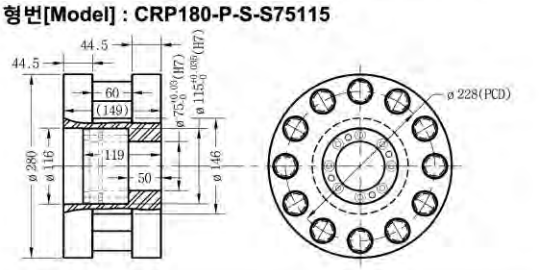
형번[Model] : CRP180-P-A-B12M10120



형번[Model] : CRP180-P-S-K85130

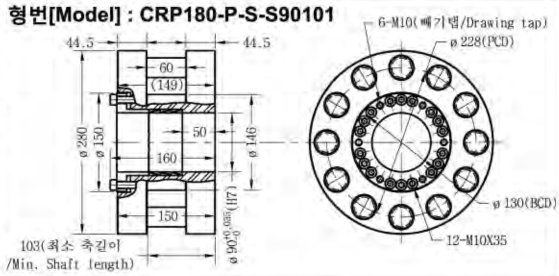


형번[Model] : CRP180-P-S-S75115

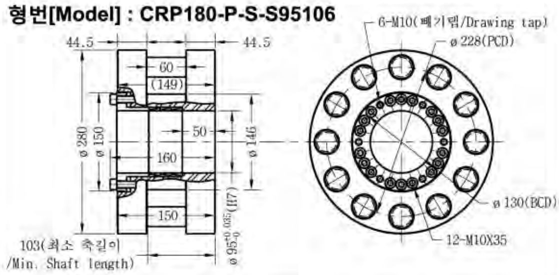


준표준 수축체결형 피니언 [Optional Shrink Fitting Pinions]

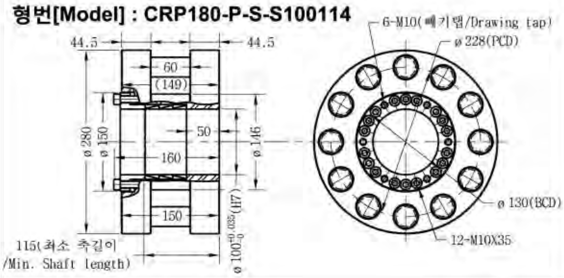
형번[Model] : CRP180-P-S-S90101



형번[Model] : CRP180-P-S-S95106



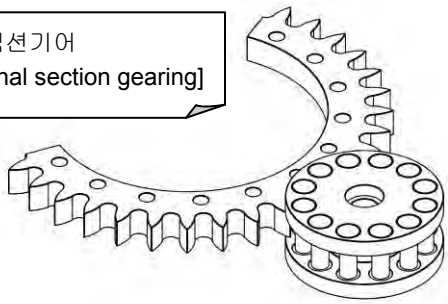
형번[Model] : CRP180-P-S-S100114



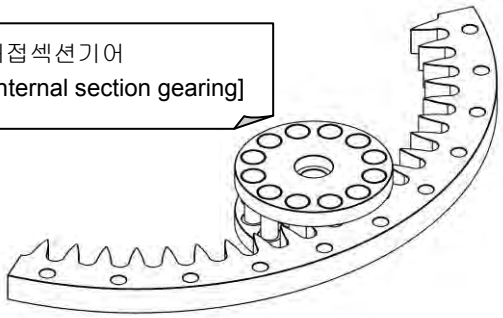
사용자 요청에 따른 건식윤할 동력전달체계 해법들...

[Dry lubrication transmission solutions on request]

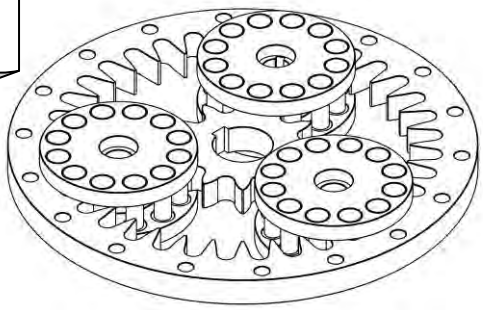
외접섹션기어
[External section gearing]



내접섹션기어
[Internal section gearing]



유성치차
[Planetary gearing]



먼지에 강하다. [Dust Resistance]

Bearing Rack & Pinion (BRP Series)