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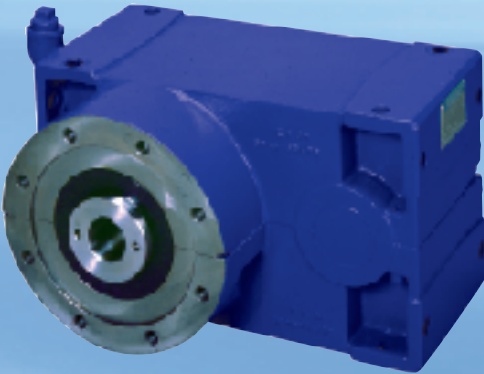
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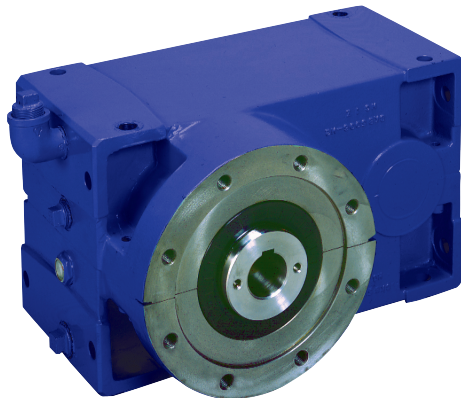
Sumitomo Drive Technologies
Always on the Move

PARAMAX[®] SEC Series Extruder Drives



Extruder Drives

The exclusive optimal design for extruders



Motor (kW)	Screw Diameter (mm)										
	25	30	40	45	50	55	65	75	90	100	115
3.7											
5.5											
7.5											
11											
15											
18.5											
22											
30											
37											
45											
55											
75											
90											
110											

Gearbox Size 005 010 020 030 040 050

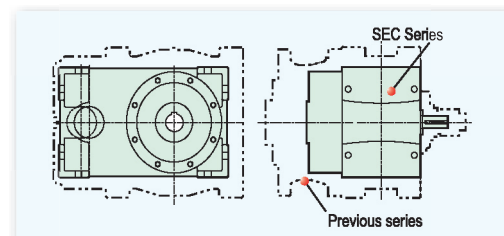
Thrust Bearing Number 29412E 29415E 29417E 29420E 29424E 29430E

- SEC Series reducers are specifically designed for screw drive extruders.
- SEC Series reducers can accommodate a wide range of screw diameters.
- Each size in the SEC Series has the optimal size thrust bearing for its operating range.

Space Saving Design

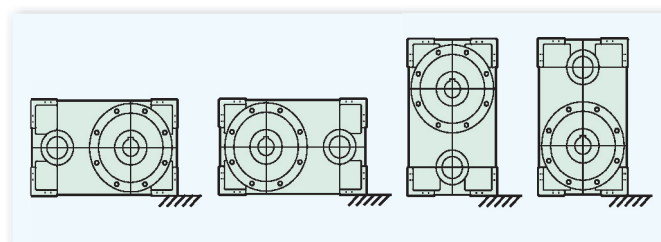
1 Compact

SEC series is more compact than our previous series.



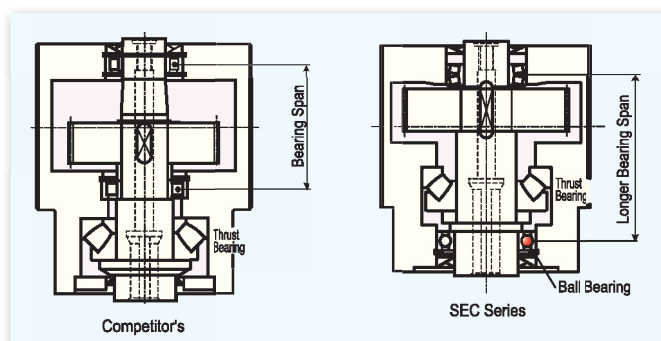
2 Universal mounting

New design housing is made universal mounting possible.



Improved Screw Attachment Accuracy

- A longer bearing span reduces mounting face deflection.
- Shaft run-out is minimized using precision ball bearings.



Large Reduction Ratio

With a maximum reduction ratio of 1:31.5, SEC Series Reducers also take into account the requirements for direct motor connection.

The Variety of options

We prepare following options.
See P.12 "Options".

Options

- Cooling Coil
- Oil Cooler Unit
- Auxiliary Shaft for Tachometer
- Motor Adapter
- Adapter Flange
- Drain Valve

Inverter & Motor Drives

The inverter with high output, high function and high performance and the motor exclusively used for the inverter can realize operation with stable high torque, stable speed and good maintenance.

Inverter



HF-430 Series 5.5kW~55kW 200V/400V class

- Sensorless vector control method (In sensorless operation, speed change ratio : $\pm 0.5\%$)
- High torque is realized : torque 200% at start and torque 150 or more during operation in 0.5Hz.
- Standard in the world
Conformed to the overseas standard (CE/UL/C-UL).
- Overtorque can be detected (continuous operation) is possible in 6Hz ~60Hz.
Because of the multi-functional output (open collector output), you can set torque in the 0~200% range.

Motor



AF motor series 0.4kW~75kW (with foot) 0.1kW~75kW (flange)

- Constant torque operation (continuous operation) is possible in 6Hz~60Hz
Basis frequency : 60Hz In 60Hz or more, constant output operation is done.
Maximum frequency : 80Hz~120Hz (This is changed depending on capacity.)
- Because of a fully closed motor, maintenance is excellent.

Table of Contents

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Standard Specification

Nomenclature

SEC 010 P2 T — RL — 10							
Series	Size	Torque (kNm)	Number of Gear Stages	Thrust Bearing	Shaft Arrangement	Mounting	Nominal Ratio
SEC	005	(2.1)	P2 Parallel Double Reduction	T Normal Thrust		(Blank)	6.3
	010	(3.0)					* 7.1
	020	(4.0)				*W	8
	030	(5.9)					* 9
	040	(9.1)				*WR	10
	050	(13.8)					* 11.2
							12.5
							* 14
							16
							* 18
							* 20
							* 22.4
							* 25
							* 28
							* 31.5

Note: 1. * marks are optional.

2. Shaft arrangement RJL and LJR are Motor adapter type.

3. For W and WR mounting, shaft arrangement only RL, RR, and RJL are available.

Thrust Bearing Number

	Size of Reducer					
	005	010	020	030	040	050
Bearing No.	29412E	29415E	29417E	29420E	29424E	29430E
Basic Dynamic Load Rating (kN)	345	518	633	863	1,170	1,610

Standard Specification

Item		Standard Specification
Gearbox	Gear	All gears are manufactured from vacuum degassed alloy steel and are finished to high accuracy after carburizing.
	Bearings	High capacity spherical roller thrust bearing. Shafts supported on taper roller, spherical roller and deep groove ball bearings of ample capacity for all radial loads.
	Hollow Shaft	Hollow shafts are manufactured from chrome molybdenum steel to withstand the increased thrust loads.
	Housing	Housings are manufactured from high quality cast iron and designed to maximize rigidity and durability.
	Seal	Machined surfaces of housing and covers are finished to a close tolerance and are completely sealed with liquid packing. Oil seals with dust lips are used on rotating shafts.
	Paint	Paint color is Mansel 6.5PB 3.6/8.2 .
External Conditions	Ambient Temperature	-10°C~50°C
	Environment	Not designed for corrosive or explosive gas environments.
	Altitude	Designed for altitudes of 1000m or less.

Lubrication

The oil bath lubrication method is used for all models.
Forced lubrication is used when additional cooling is required.

Lubricant

The table on the right shows appropriate viscosity of oil based on ISO and AGMA for respective ambient temperatures.
When the ambient temperature is lower than -10°C or higher than +50°C, a heating or cooling unit is usually necessary.

Lubricant viscosity

	Ambient temperature		
	-10°C~ +15°C	0°C~ 30°C	10°C~ 50°C
ISO* AGMA	VG100 3EP	VG220 5EP	VG320 6EP

* ISO: Kinetic viscosity (cSt) at 40°C

Recommended lubricants

	Brand	ARAL	BP	CASTROL	CHEVRON	ELF	EXXONMOBIL		FINA	GULF	SHELL	SUNOCO	TEXACO	TOTAL	WINTER-SHALL
Gear oil	ISO VG100 AGMA 3EP	DEGOL BG100	ENERGOL GR-XP-100	ALPHA SP100	NL GEAR COM- POUND 100	REDUC- TOLF SP100	SPARTAN EP100	MOBIL- GEAR 627	GIRAN 100	EP LUBRI- CANT HD100	OMARA 100	SUNEP 1055 ISO100	MEROPA 100	CARTER EP100	WIOLAN IT100
	ISO VG220 AGMA 5EP	DEGOL BG220	ENERGOL GR-XP-220	ALPHA SP220	NL GEAR COM- POUND 220	REDUC- TOLF SP220	SPARTAN EP220	MOBIL- GEAR 630	GIRAN 220	EP LUBRI- CANT HD220	OMARA 220	SUNEP 1070 ISO220	MEROPA 220	CARTER EP220	WIOLAN IT220
	ISO VG320 AGMA 6EP	DEGOL BG320	ENERGOL GR-XP-320	ALPHA SP320	NL GEAR COM- POUND 320	REDUC- TOLF SP320	SPARTAN EP320	MOBIL- GEAR 632	GIRAN 320	EP LUBRI- CANT HD320	OMARA 320	SUNEP 1070 ISO320	MEROPA 320	CARTER EP320	WIOLAN IT320

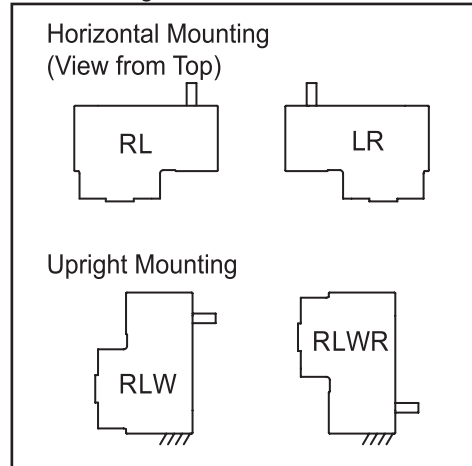
Selection Procedure

The following should be specified to select a speed reducer for extruder.

● Operating condition

Raw material	
Acutual transmission power or motor power	kW
Input speed	r/min
Screw speed	r/min
Direction of rotation	Clock-wise when viewing from screw side
Pressure	MPa
Thrust load	kN
Shaft arrangement	
Ambient temperature	°C
Overhung member (High speed shaft)	
Actual radial load (High speed shaft)	kN

Shaft Arrangement



1) Selection Procedure

Service factor (S.F)	S.F = 1.5							
Reduction ratio and Input speed	$\text{Reduction Ratio } i = \frac{\text{Input Speed}}{\text{Output Speed}}$ $\text{Input Speed} = \text{Output Speed} \times \text{Exact Ratio}$	See P.8 "Exact Ratio". The input speed should be less than 1800r/min.						
Size	$\text{Equivalent Transmission Power} = \frac{\text{Acutual Transmission Power or Motor Power}}{\text{Service Factor}}$ $\text{Equivalent Transmission Power} \leq \text{Rated Transmission Power} \dots\dots\dots \text{OK}$ Select the size of reducer that will satisfy the above.	See P.7 "Mechanical power rating P".						
Thrust load	$\text{Thrust Load} \leq \text{Allowable Thrust Load}$	See P.9 "Allowable thrust load".						
Shaft arrangement	Select the shaft arrangement from RL,LR,RLW,RLWR.	See P.11 "Dimension".						
Thermal rating	$\frac{\text{Acutual Transmission Power or Motor Power}}{\text{Thermal Rating}} \leq \text{Tempearture Correction Factor} \dots\dots\dots \text{OK}$	See P.7 "Thermal power rating Pr". Consult us when thermal rating is less than Normal transmission power . We can supply cooling coil or oil cooling unit.						
Overhung load	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Overhung Factor</td> <td>Overhung Member</td> <td>Overhung Factor</td> </tr> <tr> <td></td> <td>V - Belt</td> <td>1.5</td> </tr> </table> $\text{Equivalent Radial Load} = \text{Actual Radial Load} \times \text{Overhung Factor}$ $\text{Equivalent Radial Load} \leq \text{Allowable Radial Load} \dots\dots\dots \text{OK}$	Overhung Factor	Overhung Member	Overhung Factor		V - Belt	1.5	See P.10 "High speed shaft allowable radial load"
Overhung Factor	Overhung Member	Overhung Factor						
	V - Belt	1.5						

Selection Procedure

2) Selection Example

Operating condition

Raw material	: Plastic
Actual transmission power	: 22kW
Input speed	: Approx. 1000r/min
Screw speed	: 100r/min
Thrust load on LSS	: 120kN
Shaft arrangement	: RL
Ambient temperature	: 40°C
	Temperature Correction Factor=0.7
Overhung member	: V belt
	Overhung Factor=1.5
Actual radial load on high speed shaft	: 4.5kN

Selection

1. Determine service factor SF=1.5
 2. Determine unit size Size 020
Check the size with reduction ratio =10
at the input speed of 1000r/min
Equivalent transmission power =22kW × 1.5=33kW < 44kW
 3. Check thrust load on LSS
Thrust Load =120kN < 183kN (Bearing Life 40,000hr)
 4. Check thermal rating
Actual transmission power =22kW < 37kW × 0.7=25.9kW
 5. Check overhung load on high speed shaft
Equivalent radial load =4.5kN × 1.5=6.75kN < 9.3kN
- According to the above, model SEC020P2T-RL-10 is selected.

Supplementary Data

1. How to determine thrust loads on extruders

This thrust load can be obtained by the following expression;

$$F = p \cdot \frac{\pi \cdot d^2}{4000}$$

F: Thrust load (kN)
p: Pressure (MPa)
d: Screw diameter (mm)

2. How to determine thrust bearing life and allowable thrust load

Serviceable life

The rated serviceable life (L10 hrs) can be obtained by the following expression;

$$L_h = \left(\frac{C}{F} \right)^{\frac{10}{3}} \cdot \frac{33.3 \times 500}{n_2} \cdot a_2 a_3 \text{ (hr)}$$

Allowable thrust load

The allowable thrust load (F_{al}) can be obtained by the following expression;

$$F_{al} = \left(\frac{33.3}{n_2} \right)^{\frac{3}{10}} \cdot \left(\frac{500}{L_h} \cdot a_2 a_3 \right)^{\frac{3}{10}} \cdot C \text{ (kN)}$$

The allowable thrust load on P.9 shows values when the rated serviceable life L10=40,000 (h) or 20,000 (h).

n_2 : Output speed (r/min)

C: Basic dynamic load rating (kN)

F: Thrust load (kW)

$a_2 a_3$: Life adjustment factor 1.5

3. Radial load by V-belt drive

On many speed reducers for extruders, a V-belt is used to drive the input shaft. This drive generates a radial load. Therefore, be sure to check the radial load.

The following is a single expression to obtain the radial load generated by a V-belt.

$$R = \frac{9.56 \times Q}{n_1} \cdot \frac{2000}{D} \cdot f \cdot 1.5$$

R: Radial load (kN)

Q: Actual transmission power or motor power (kW)

n_1 : Input speed (r/min)

D: High speed shaft pulley diameter (mm)

f: Compensation factor

f	Pulley ratio
1.00	1 ~ 1.1
1.03	1.2 ~ 1.6
1.05	1.7 ~ 2.5

Rating Table

Mechanical Power Rating (kW) :P Thermal Power Rating (kW) :P_T

Nominal Reduction Ratio	Input Speed r/min	Output Speed r/min	Size of Reducer											
			005		010		020		030		040		050	
			P	P _T	P	P _T	P	P _T	P	P _T	P	P _T	P	P _T
6.3	1800	286	60	25	79	32	114	34	170	47	252	64	348	104
	1500	238	50	28	68	34	99	38	147	53	218	77	300	120
	1200	190	40	29	57	36	82	41	121	57	180	85	249	130
	1000	159	33	29	49	36	70	42	101	58	155	89	213	134
	900	143	30	29	44	35	63	42	91	58	141	90	195	135
	750	119	25.4	29	37	34	53	41	76	57	121	89	167	134
* 7.1	1800	254	54	25	79	31	106	36	158	46	227	66	317	109
	1500	211	45	27	68	33	88	40	132	51	196	76	273	123
	1200	169	36	28	55	34	71	43	106	55	162	84	227	132
	1000	141	30	28	46	34	59	43	89	56	135	86	194	135
	900	127	27.4	28	41	33	53	43	80	56	122	87	178	136
	750	106	22.9	28	34	32	45	42	67	55	102	86	149	134
8	1800	225	49	26	68	33	97	34	145	49	207	71	291	109
	1500	188	41	27	59	34	83	37	123	53	177	79	250	120
	1200	150	33	28	48	34	68	39	99	56	147	84	207	127
	1000	125	27.6	28	40	34	57	39	83	56	126	86	178	129
	900	113	24.8	28	36	33	51	39	74	55	115	86	162	129
	750	94	20.7	27	30	32	42	38	62	54	97	84	139	127
* 9	1800	200	43	25	65	31	86	36	129	48	184	71	269	112
	1500	167	36	27	54	32	72	39	108	51	157	78	230	122
	1200	133	29.0	27	43	32	58	40	87	53	127	82	191	128
	1000	111	24.2	27	36	32	48	41	72	53	106	83	161	130
	900	100	21.9	27	33	31	43	40	65	53	95	83	145	129
	750	83	18.3	26	27.6	30	36	39	55	51	80	81	121	127
10	1800	180	39	25	56	32	79	35	118	49	175	73	238	112
	1500	150	32	26	47	32	66	37	99	52	150	78	204	119
	1200	120	26.1	26	37	32	53	38	79	53	124	81	169	122
	1000	100	21.7	26	31	31	44	37	66	52	106	81	145	122
	900	90	19.6	25	28.4	31	40	36	60	51	95	81	133	121
	750	75	16.3	24	23.7	29	33	35	50	50	80	79	114	118
*11.2	1800	161	33	25	51	30	67	37	104	47	154	71	220	114
	1500	134	28.3	25	42	31	56	38	87	50	129	76	188	120
	1200	107	22.7	25	34	30	45	39	70	50	104	79	151	123
	1000	89	18.9	25	28.7	29	37	38	58	50	87	79	127	122
	900	80	17.2	24	25.8	29	34	38	52	49	78	78	114	121
	750	67	14.3	23	21.6	27	28.4	36	44	47	65	76	95	117
12.5	1800	144	31	24	45	30	65	35	92	49	134	74	190	114
	1500	120	26.4	24	38	30	54	36	77	51	115	78	163	118
	1200	96	21.1	24	30	29	43	36	62	51	95	79	135	119
	1000	80	17.6	23	25.6	28	36	36	52	50	81	78	116	118
	900	72	15.8	23	23.0	28	32	35	46	49	73	76	106	116
	750	60	13.2	22	19.2	26	27.5	33	39	47	61	74	91	112
*14	1800	129	27.1	23	41	28	55	37	81	47	118	72	179	115
	1500	107	22.7	24	34	28	46	38	68	49	99	75	153	119
	1200	86	18.2	23	27.5	28	37	38	54	49	79	76	122	119
	1000	71	15.2	22	23.0	27	31	37	45	47	66	75	102	118
	900	64	13.7	22	20.7	26	28.0	36	41	47	60	73	92	116
	750	54	11.4	21	17.3	24	23.4	35	34	45	50	71	77	112
16	1800	113	25.4	24	32	30	50	33	71	45	112	70	152	107
	1500	94	21.2	24	27.5	30	42	34	59	46	96	72	130	109
	1200	75	16.9	24	22.1	29	34	33	48	45	78	72	108	108
	1000	63	14.1	23	18.5	28	28.4	32	40	44	65	70	93	105
	900	56	12.7	22	16.6	27	25.6	31	36	43	59	69	85	103
	750	47	10.6	21	13.9	25	21.4	30	30	40	49	66	72	99
*18	1800	100	21.7	23	32	28	43	35	63	43	95	68	140	108
	1500	83	18.2	23	27.5	28	36	35	53	44	80	70	117	109
	1200	67	14.6	23	22.1	27	28.9	34	42	43	64	69	94	108
	1000	56	12.2	22	18.4	26	24.1	33	35	42	53	67	78	105
	900	50	11.0	21	16.6	25	21.8	32	32	41	48	66	71	103
	750	42	9.1	20	13.9	23	18.2	31	26.9	39	40	63	59	98
*20	1800	90	20.8	22	25.4	28	35	33	52	44	89	68	122	109
	1500	75	17.3	22	21.2	27	29.8	33	44	44	77	69	105	109
	1200	60	13.8	21	16.9	26	24.0	32	35	43	62	68	87	107
	1000	50	11.5	20	14.1	24	20.1	30	29.7	42	52	65	74	104
	900	45	10.4	20	12.7	24	18.1	30	26.8	40	46	64	68	101
	750	38	8.6	18	10.6	22	15.1	28	22.4	38	39	61	58	97

Rating Table

Mechanical Power Rating (kW) :P Thermal Power Rating (kW) :P_T

Nominal Reduction Ratio	Input Speed r/min	Output Speed r/min	Size of Reducer											
			005		010		020		030		040		050	
			P	P _T	P	P _T	P	P _T	P	P _T	P	P _T	P	P _T
*22.4	1800	80	17.7	22	25.4	26	34	34	52	42	76	66	113	109
	1500	67	14.8	21	21.2	25	29.0	34	43	42	63	66	94	109
	1200	54	11.8	20	16.9	24	23.3	33	35	41	51	65	76	107
	1000	45	9.9	19	14.1	23	19.4	31	29.2	40	42	63	63	104
	900	40	8.9	19	12.7	22	17.5	31	26.3	39	38	61	57	101
	750	33	7.4	18	10.6	21	14.6	29	22.0	36	32	58	47	96
*25	1800	72	16.3	20	22.6	25	30	32	46	40	71	67	102	101
	1500	60	13.6	20	18.9	24	25.5	31	38	40	60	67	88	100
	1200	48	10.9	19	15.2	23	20.4	30	31	39	48	65	73	97
	1000	40	9.1	18	12.7	22	17.1	29	26.0	37	40	63	62	93
	900	36	8.2	18	11.4	21	15.4	28	23.5	36	36	61	56	91
	750	30	6.8	16	9.6	19	12.8	26	19.6	34	30	58	47	86
*28	1800	64	12.7	22	18.3	27	25.4	33	37	43	62	65	92	101
	1500	54	10.6	21	15.3	26	21.2	33	31	43	51	65	76	100
	1200	43	8.5	20	12.3	25	17.0	32	24.9	41	41	63	61	97
	1000	36	7.1	19	10.2	23	14.2	31	20.8	40	34	60	51	93
	900	32	6.4	19	9.2	23	12.8	30	18.7	39	31	59	46	91
	750	27	5.3	18	7.7	21	10.7	28	15.6	36	26.1	55	38	86
*31.5	1800	57	11.7	21	16.9	25	22.3	31	34	40	52	67	80	99
	1500	48	9.7	20	14.1	25	18.6	31	28.4	40	44	66	67	99
	1200	38	7.8	19	11.3	23	14.9	30	22.8	39	35	64	54	95
	1000	32	6.5	18	9.4	22	12.5	29	19.0	37	29.5	62	45	92
	900	29	5.9	18	8.5	21	11.2	28	17.2	36	26.6	60	40	89
	750	24	4.9	16	7.1	20	9.4	26	14.3	34	22.2	57	34	84

- The values P are indicated with the service factor=1.0 . We recommend service factor 1.5 for extruder drives.
- The values PT are applicable to continuous operation at ambient temperatures of 20°C or less.
When the temperature is out of the range, refer to the temperature correction factor.
- Consult us when thermal rating is less than Normal transmission power .
We prepare cooling coil or oil cooling unit.
- Consult us for thermal rating of W and WR mounting.
- When input speed is not shown in the table, find it by the interpolation method.
- Consult us when input speed is over 1800 r/min.
- When input speed (N) is lower than 750 r/min, find the mechanical power rating (P_N) according to the following formula. $P_N = P(750) \times N/750$
- Reduction ratio with * marks are optional.

Exact Reduction Ratio

Nominal Reduction Ratio r/min	Size of Reducer					
	005	010	020	030	040	050
6.3	6.213	6.483	6.260	6.410	6.049	6.470
* 7.1	7.192	7.239	7.032	6.978	6.903	7.366
8	7.820	8.160	7.750	7.889	7.778	7.956
* 9	9.053	9.112	8.706	8.588	8.875	9.057
10	10.040	10.476	9.993	9.861	9.528	10.156
*11.2	11.622	11.698	11.226	10.735	10.872	11.563
12.5	12.565	13.111	12.179	12.710	12.485	12.594
*14	14.545	14.641	13.681	13.837	14.247	14.338
16	15.717	16.400	15.728	16.304	15.556	16.504
*18	18.194	18.313	17.668	17.749	17.750	18.789
*20	19.392	20.235	19.579	19.969	19.688	20.526
*22.4	22.449	22.596	21.994	21.739	22.465	23.368
*25	24.406	24.567	25.093	23.761	24.248	25.391
*28	27.675	27.655	27.046	27.844	27.669	28.906
*31.5	30.088	30.067	30.858	30.433	30.810	31.667

Note: Reduction ratio with * marks are optional.

Temperature Correction Factor

Ambient Temperature °C	Temperature Correction Factor T _a
20	1.00
30	0.85
40	0.70
50	0.55

Allowable Thrust Load on Low Speed Shaft

Bearing Life: 40,000 Hr

Unit: kN

Output Speed r/min	Size of Reducer					
	005	010	020	030	040	050
250	57	85	104	142	193	266
200	61	91	112	152	207	285
160	65	98	119	163	221	304
125	70	105	129	176	238	328
100	75	112	138	188	255	351
80	80	120	147	201	272	375
63	86	129	158	216	293	403
≤ 50	92	139	169	231	314	432

Bearing Life: 20,000 Hr

Unit: kN

Output Speed r/min	Size of Reducer					
	005	010	020	030	040	050
250	70	105	129	176	238	328
200	75	112	138	188	255	351
160	80	120	147	201	272	375
125	86	130	158	216	293	404
100	92	139	169	231	314	432
80	99	148	181	247	335	462
63	106	159	195	266	360	496
≤ 50	114	171	209	285	386	532

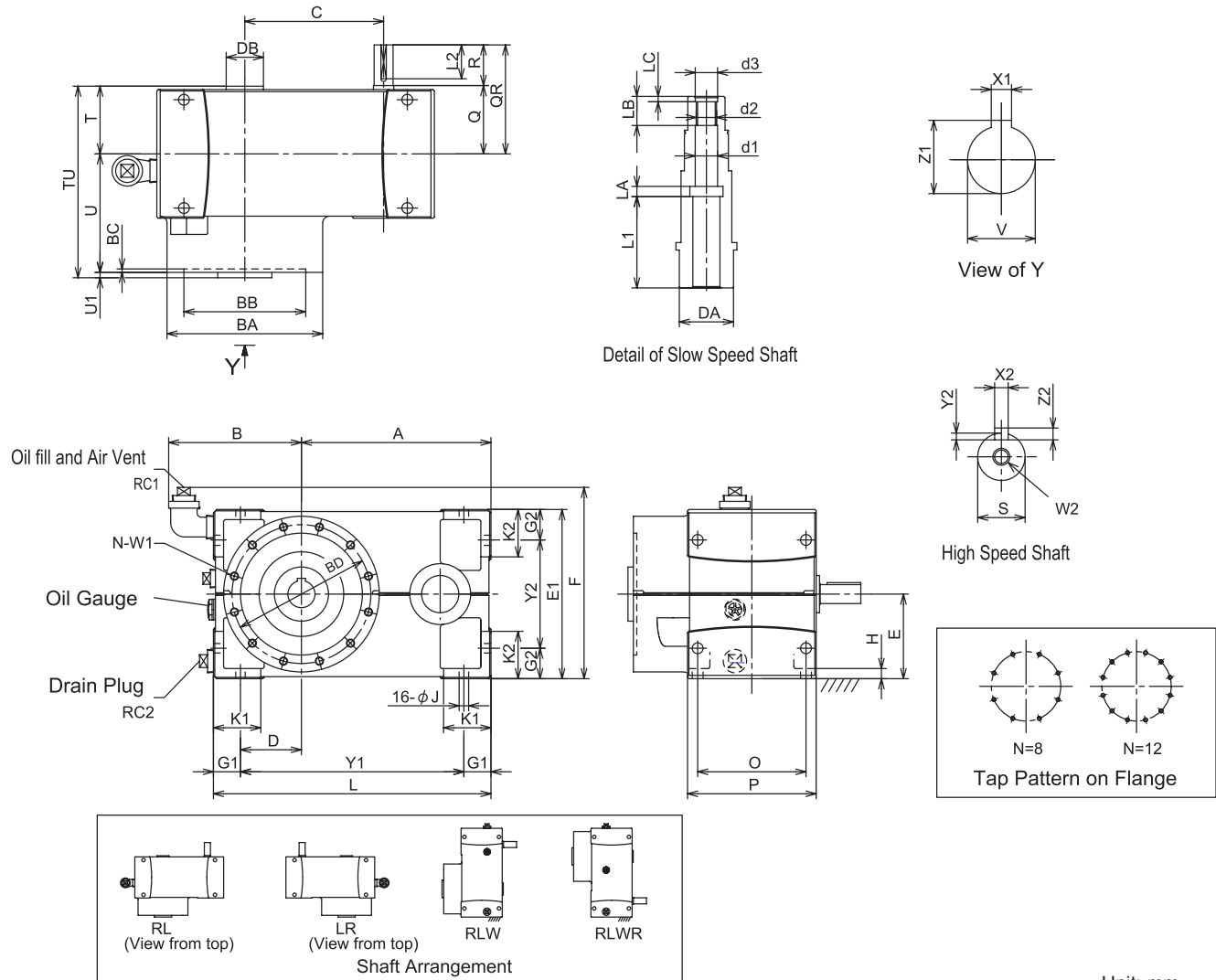
Allowable Radial Load on High Speed Shaft

Unit: kN

Nominal Reduction Ratio	Input Speed r/min	Size of Reducer						Nominal Reduction Ratio	Input Speed r/min	Size of Reducer					
		005	010	020	030	040	050			005	010	020	030	040	050
6.3	1800	*	*	5.1	5.5	1.7	*	16	1800	3.5	3.0	2.5	4.2	5.2	7.8
	1500	*	*	5.0	5.6	1.9	1.3		1500	3.5	3.0	2.5	4.1	5.7	8.7
	1200	*	*	4.9	5.5	2.4	2.7		1200	3.5	3.0	2.4	4.1	6.6	9.5
	1000	*	*	4.9	5.5	2.8	3.2		1000	3.5	3.0	2.4	4.1	7.7	10.3
	900	*	1.3	4.9	5.5	2.8	3.3		900	3.5	3.0	2.4	4.0	8.2	10.4
	750	*	1.7	4.9	5.5	2.9	3.4		750	3.5	3.0	2.4	4.0	9.1	11.2
7.1	1800	2.1	*	5.2	5.8	4.3	5.0	18	1800	3.6	3.0	3.6	5.1	8.4	10.3
	1500	2.1	*	5.2	5.8	4.5	5.5		1500	3.6	3.0	3.6	5.1	9.4	12.0
	1200	2.0	2.1	5.2	5.8	5.2	6.3		1200	3.6	3.0	3.6	5.1	10.0	12.5
	1000	2.0	2.1	5.2	5.8	6.2	6.9		1000	3.6	3.0	3.6	5.1	10.0	12.5
	900	2.0	2.1	5.2	5.8	6.7	7.0		900	3.6	3.0	3.6	5.0	10.0	12.5
	750	1.9	2.1	5.2	5.8	7.5	8.2		750	3.6	3.0	3.5	5.0	10.0	12.5
8	1800	2.7	*	5.3	5.9	2.9	4.0	20	1800	2.2	*	1.0	2.6	5.4	9.3
	1500	2.6	*	5.2	5.9	3.2	4.8		1500	2.2	*	*	2.6	4.8	10.2
	1200	2.6	1.7	5.2	5.8	3.7	5.5		1200	2.2	*	*	2.5	4.6	9.5
	1000	2.6	2.3	5.2	5.8	4.1	6.1		1000	2.2	*	*	2.5	4.5	8.6
	900	2.6	2.3	5.2	5.8	4.2	6.2		900	2.2	*	*	2.5	4.5	8.1
	750	2.6	2.3	5.2	5.8	4.7	6.4		750	2.2	*	*	2.4	4.5	7.5
9	1800	3.2	1.9	5.4	6.1	5.5	6.7	22.4	1800	3.5	*	1.1	2.7	8.7	11.6
	1500	3.2	2.5	5.4	6.1	6.0	7.5		1500	3.4	*	1.1	2.7	8.6	12.6
	1200	3.2	2.5	5.4	6.0	7.3	8.4		1200	3.4	*	1.1	2.6	8.5	12.6
	1000	3.2	2.5	5.4	6.0	8.4	9.7		1000	3.4	*	1.1	2.6	8.5	12.6
	900	3.2	2.5	5.4	6.0	8.4	10.4		900	3.4	*	1.1	2.6	8.5	12.6
	750	3.2	2.5	5.4	6.0	8.4	11.5		750	3.3	*	1.0	2.6	8.4	12.6
10	1800	3.3	*	5.4	6.1	3.6	4.8	25	1800	3.6	1.1	*	4.3	6.7	9.5
	1500	3.3	2.2	5.4	6.1	4.0	5.6		1500	3.6	1.1	*	4.2	6.6	10.4
	1200	3.3	2.6	5.4	6.1	4.5	6.4		1200	3.6	1.0	*	4.1	6.5	11.4
	1000	3.3	2.6	5.4	6.1	5.1	7.0		1000	3.6	*	*	4.1	6.4	12.2
	900	3.3	2.6	5.4	6.1	5.6	7.1		900	3.6	*	*	4.1	6.4	12.5
	750	3.3	2.6	5.4	6.1	6.4	7.3		750	3.6	*	*	4.0	6.3	12.5
11.2	1800	3.4	2.7	5.6	6.2	6.4	7.4	28	1800	3.7	2.9	2.7	4.8	9.4	12.6
	1500	3.4	2.7	5.6	6.2	7.4	8.3		1500	3.7	2.9	2.7	4.8	9.3	12.6
	1200	3.4	2.7	5.6	6.2	8.6	10.1		1200	3.7	2.8	2.7	4.7	9.2	12.6
	1000	3.4	2.7	5.6	6.2	8.5	11.7		1000	3.7	2.8	2.7	4.7	9.2	12.6
	900	3.4	2.7	5.6	6.2	8.5	12.1		900	3.7	2.8	2.7	4.7	9.2	12.6
	750	3.4	2.7	5.6	6.2	8.5	12.1		750	3.7	2.8	2.6	4.7	9.2	12.6
12.5	1800	3.4	2.8	5.6	6.3	4.9	7.7	31.5	1800	3.7	3.2	3.0	6.7	10.1	12.7
	1500	3.4	2.8	5.6	6.3	5.3	8.6		1500	3.7	3.2	2.9	6.7	10.1	12.7
	1200	3.4	2.8	5.6	6.3	5.9	9.4		1200	3.7	3.2	2.9	6.7	10.1	12.7
	1000	3.4	2.8	5.6	6.3	6.6	10.2		1000	3.7	3.2	2.9	6.7	10.1	12.7
	900	3.4	2.8	5.6	6.3	7.1	10.3		900	3.7	3.2	2.8	6.7	10.1	12.7
	750	3.4	2.8	5.5	6.3	8.0	10.6		750	3.7	3.2	2.8	6.6	10.1	12.7
14	1800	3.5	2.9	5.7	6.4	7.5	9.6								
	1500	3.5	2.9	5.7	6.4	8.6	10.7								
	1200	3.5	2.9	5.7	6.4	9.9	12.3								
	1000	3.5	2.9	5.7	6.4	9.9	12.3								
	900	3.5	2.9	5.7	6.4	9.9	12.3								
	750	3.5	2.9	5.7	6.4	9.9	12.3								

- The value shown in table is allowable radial load when it is applied to the center of shaft.
Consult us when the radial load is not in the center.
- Consult us for * marks in the table.

Dimensions



Size	A	B	C	D	E	E1	F	G1	G2	H	J	K1	K2	L	O	P	Y1	Y2	RC1	RC2	Weight kg	Oil Qty. L
005	263	183	193	79	112	224	253	38	42	15	14	65	60	380	142	170	304	140	1"	1"	69	3
010	280	196	205	90	125	250	283	40	45	15	14	70	70	410	160	190	330	160	1"	1"	95	4
020	315	210	230	99	140	280	310	46	48	15	18	80	80	460	178	212	368	184	1"	1"	132	5
030	355	226	260	109	160	320	349	51	50	15	18	90	90	515	200	236	413	220	1"	1"	185	7
040	416	256	306	130	180	360	391	60	60	20	22	110	110	606	250	295	486	240	1"	1"	310	13
050	495	296	358	160	225	450	481	70	70	20	22	127	127	725	295	340	585	310	1"	1"	435	25

Size	Low Speed Shaft																Flange					
	TU	T	U	U1	V	X1	Z1	L1	LA	LB	LC	DA	DB	d1	d2	d3	BA	BB	BC	BD	N	W1/Depth
005	258	90	160	8	32H7	10D10	35.3	95	15	25	8	70	40	23	M20×2.5	23	200	150H7	5	170	8	M12/25
010	283	100	175	8	40H7	12D10	43.3	120	15	35	8	80	55	33	M30×3.5	33	230	180H7	5	205	12	M12/25
020	312	111	193	8	45H7	14D10	48.8	135	15	35	8	95	60	33	M30×3.5	33	270	200H7	5	230	8	M16/30
030	364	123	224	17	55H7	16D10	59.3	160	20	35	8	110	70	33	M30×3.5	33	300	230H7	6	260	12	M16/30
040	440	152.5	270.5	17	65H7	18D10	69.4	180	20	45	10	130	90	48	M42×4.5	48	350	260H7	6	300	12	M20/40
050	518	175	325	18	80H7	22D10	85.4	210	20	45	10	160	100	48	M42×4.5	48	400	310H7	6	350	12	M20/50

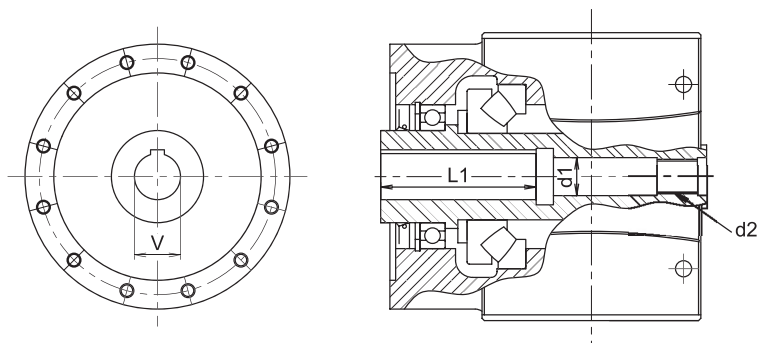
Size	High Speed Shaft						Key			
	QR	Q	R	S	W2/Depth		X2	Y2	Z2	L2
005	141	91	50	24k6	M10/22		8	4	7	40
010	161	101	60	28k6	M10/22		8	4	7	50
020	193	113	80	35k6	M12/28		10	5	8	70
030	238	128	110	40k6	M12/28		12	5	8	100
040	281	161	120	50k6	M16/36		14	5.5	9	95
050	297.5	177.5	120	55m6	M20/42		16	6	10	95

- Key and Keyways of High speed shaft are based on ISO R773-1969 Close keys.
(JIS B 1301-1996 Parallel key in fastening type).
- Keyways of Low speed shaft are based on ISO R773-1969 Free keys.
(JIS B 1301-1996 Parallel key in sliding type)
- The oil quantity is approximate. Oil shall be supplied within the range shown on the oil gauge.
- Consult us for dimensions not shown in these drawings.

Dimensions

Dimension Range of Output Shaft Bore

Unit: mm



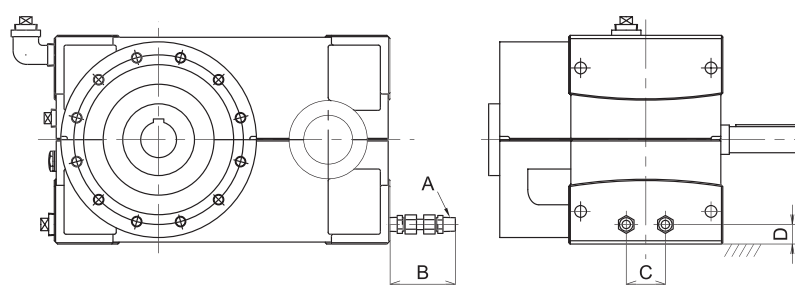
Size	V _{H7}	L1 max.	d1	d2
005	25 ~ 32	95	23	M20
010	35 ~ 45	135	33	M30
020	35 ~ 55	145	33	M30
030	35 ~ 68	160	33	M30
040	50 ~ 78	180	48	M42
050	50 ~ 97	210	48	M42

Notes

1. L1/V should be less than 3.
2. Consult us out of dimension range above.
3. Barrel connection dimensions can be changed with an adapter flange. Consult us with details.

Options

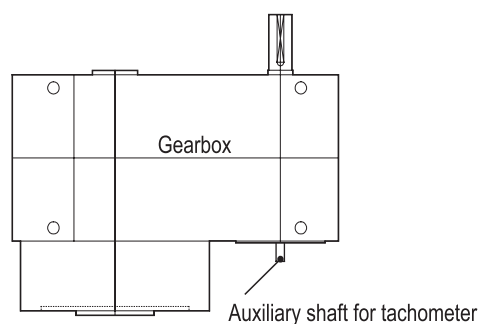
● Cooking coil



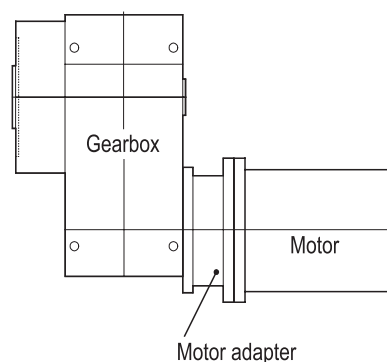
Unit: mm

Size	A	B	C	D
005	R 1/2"	100	50	30
010	R 1/2"	100	50	33
020	R 1/2"	100	60	35
030	R 1/2"	100	60	40
040	R 1/2"	100	80	45
050	R 1/2"	100	100	60

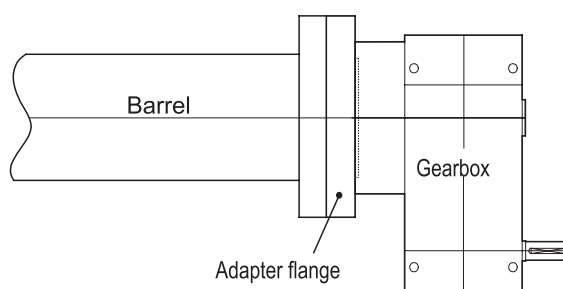
● Auxiliary shaft for tachometer



● Motor adapter



● Adapter flange



※ Consult us for the dimensions of "auxiliary shaft for tachometer", "Motor adapter" and "Adapter flange".

Warranty

Warranty Period	The warranty period for the Product shall be 18 months after the shipment of the Product from the Seller's works or 12 months after the Product comes into operation, whichever comes first.
Warranty Condition	In the event that any problem or damage to the Product arises during the "Warranty Period" from defects in the Product whenever the Product is properly installed and combined with the Buyer's equipment or machines, maintained as specified in the maintenance manual, and properly operated under the conditions described in the catalog or as otherwise agree upon in writing between the Seller and the Buyer or its customers; the Seller will provide, at its sole discretion, appropriate repair or replacement of the Product without charge, except as stipulated in the "Exception for Warranty" as described below. However, if the Product is installed or integrated into the Buyer's equipment or machines, the Seller shall not reimburse the cost of: removal or re-installation of the Product or other incidental costs related thereto, any lost opportunity, any profit loss or other incidental or consequential losses or damages incurred by the Buyer or its customers.
Exception for Warranty	Notwithstanding the above warranty, the warranty as set forth herein shall not apply to any problem or damage to the Product that is caused by: 1. installation, connection, combination or integration of the Product in or to the other equipment or machine that is rendered by any person or entity other than the Seller; 2. insufficient maintenance or improper operation by the Buyer or its customers, such that the Product is not maintained in accordance with the maintenance manual provided or designated by the Seller; 3. improper use or operation of the Product by the Buyer or its customers that is not informed to the Seller, including, without limitation, the Buyer's or its customers' operation of the Product not in conformity with the specifications, or use of lubrication oil in the Product that is not recommended by the Seller; 4. any problem or damage on any equipment or machine to which the Product is installed, connected or combined or on any specifications particular to the Buyer or its customers; 5. any changes, modifications, improvements or alterations to the Product or those functions that are rendered on the Product by any person or entity other than the Seller; 6. any parts in the Product that are supplied or designated by the Buyer or its customers; 7. earthquake, fire, flood, sea-breeze, gas, thunder, acts of God or any other reasons beyond the control of the Seller; 8. waste, exhaustion, normal wear and tear, or deterioration of the Product's parts, such as bearings, oil-seals; 9. any other troubles, problems or damages to the Product that are not attributable to the Seller.



SAFETY PRECAUTIONS

- Strictly observe the safety rules for the installation place and the equipment to use. (Industrial Safety and Health Law, Technical Standard for Electric Facilities, Extension Rules, Plant Explosion Guidelines, Building Standards Law, etc.)
- Carefully read the maintenance manual before use. If the maintenance manual is not on hand, make a request for one to the distributor at which you purchased the product or to our sales department. The maintenance manual should be sent to the actual user.
- Select an appropriate product that matches the operating environment and usage.
- Install a protective equipment on the machine side when the machine is used for transportation of passengers or for elevators, escalators, and dumbwaiters.
- When the machine is used for food processing equipment and others that are susceptible to oil, install an oil pan or other damage preventive devices in case of oil leakage due to failure or termination of service life.

