Nabtesco®

Precision Equipment Company

RV®

PRODUCT GUIDE

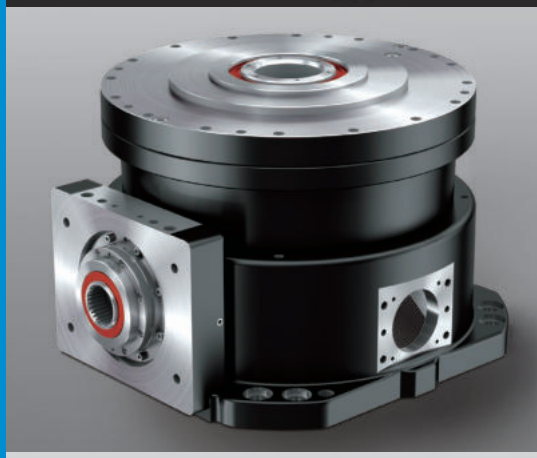
Precision Reduction Gear RV™ General Catalog

Innovation In Action

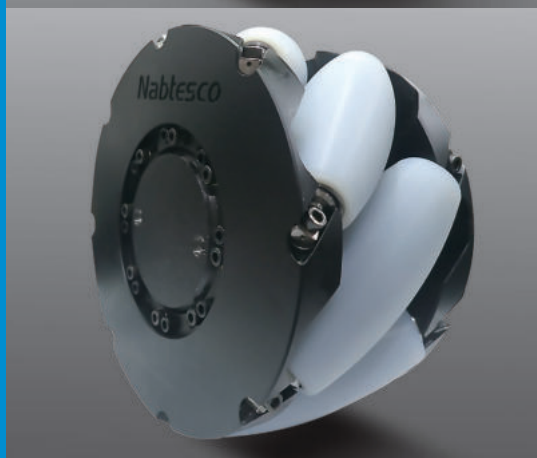
Vision 2030











Moving it. Stopping it.

Nabtesco®

With creative motion control technology,
we provide safety, security, and comfort in movement and living spaces.

Nabtesco Corporation was formed in 2003 by the merger of Nabco, Ltd. (founded in 1925), which specialized in fluid and air pressure control technology, and Teijin Seiki Co., Ltd. (founded in 1944), which specialized in cutting and assembly technology.
Since then, we have expanded the business and technological bases inherited from both companies, developing across a wide range of fields with motion control technology as our core.



*Based on our estimates.

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Nabtesco Precision Equipment Company

supports cutting-edge industries around the world

RV®

The Precision Reduction Gear RV™ is the keystone part realizing precise motion while underpinning strength in industrial robot joints. Nabtesco has a history of over 40 years in this field, holding a high world share with a total of some 14 million products shipped. Currently, we are steadily expanding our range of applications beyond industrial robots alone, supporting fields such as machine tools, liquid crystal manufacturing equipment, semiconductor manufacturing equipment, and more.

Global Business Network





Tsu Plant (since 1991)

Mother plant governing design, production, and quality
Facilities investment reinforcing production capacity in accordance with demand



Hamamatsu Plant (since 2024)

Aiming for the world No. 1 smart factory with manufacturing innovation and high SDGs ratings



China Plant (since 2016)

Ultra-modern plant aiming at local production and consumption, based on concepts of high-efficiency production and ecology

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Precision Reduction Gear RV™

Solid trust arising from accuracy and rigidity.

Power and precision in a small body.

Stable motion thanks to high rigidity.

That's why the whole world loves it.

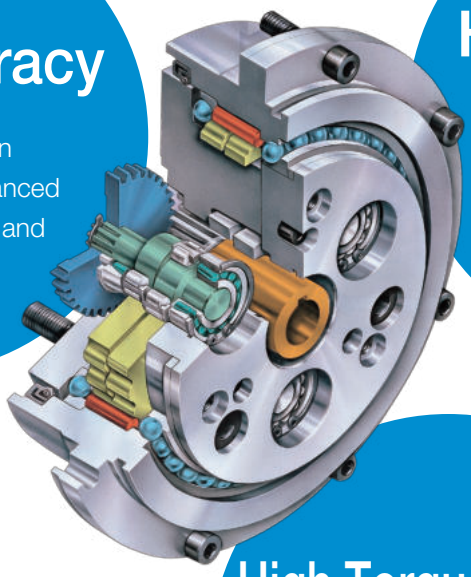
The Precision Reduction Gear RV™ is a high-precision control reduction gear using a planocentric reduction mechanism.
The large number of simultaneously engaging gears means that while compact and lightweight, its characteristics also include high rigidity and overload resistance. It also has low backlash, rotational vibration, and inertia, enabling good acceleration performance, smooth motion, and high-accuracy positioning. (For details on the operating principles and the mechanism, see p.9-10)

High Accuracy

Positioning deviation minimized through advanced machining technology and structural design

High Rigidity

Unlikely to deform even when high force is applied, shifting to the next movement without residual vibration



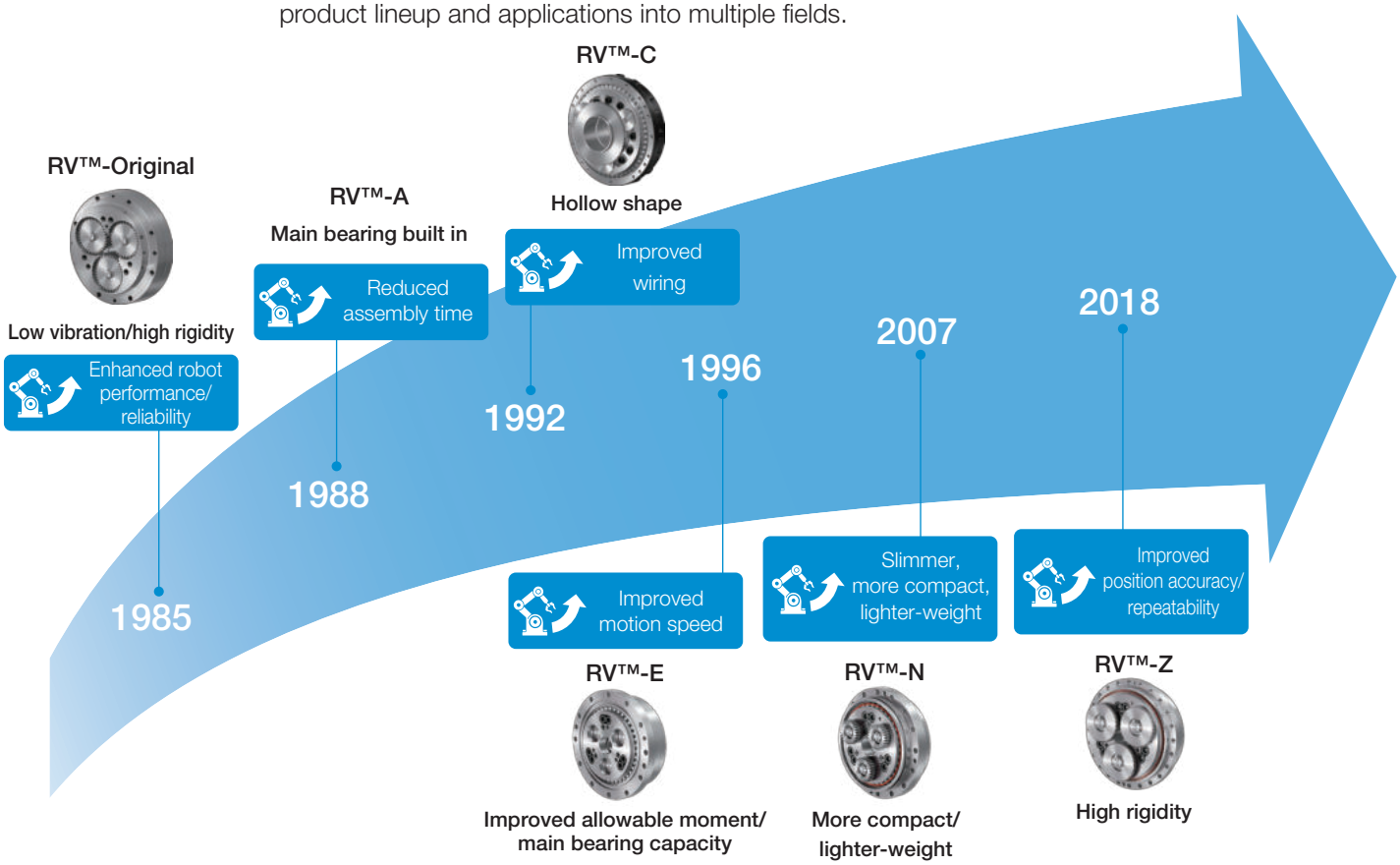
High Torque Density

High torque transmission capacity in a compact housing, saving space in design with high torque output

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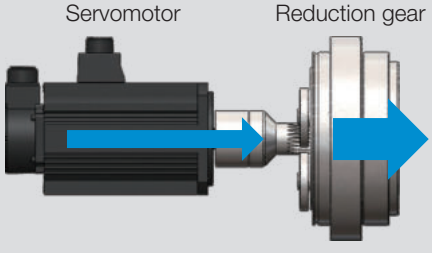
40 Years of History

In 1985, when the Precision Reduction Gear RV™ came into being, industrial robots had low impact resistance and wobbly arms. Then, in addition to the pursuit of accuracy and rigidity in the reduction gear, we have continued to evolve in response to customer needs, contributing to improved performance and assured reliability on the part of industrial robots. Currently we are making use of the technical capacity thus developed to expand our product lineup and applications into multiple fields.



What is a reduction gear?

A reduction gear is a device that uses multiple gears to lower rotation speed and raise torque. The drive power (number of rotations) gained from a motive power source such as a motor is reduced with the use of gears, etc., gaining torque proportional to the reduction ratio. Because reduction gears are used in combination with a wide variety of motors, they come in different types according to the application. Nabtesco's Precision Reduction Gear RV™ is classified as a reduction gear for precision control, making itself useful in applications calling for high-accuracy positioning, repeated movements, and low backlash.



Number of rotations: High ▶ Number of rotations: Low

Torque: Low ▶ Torque: High

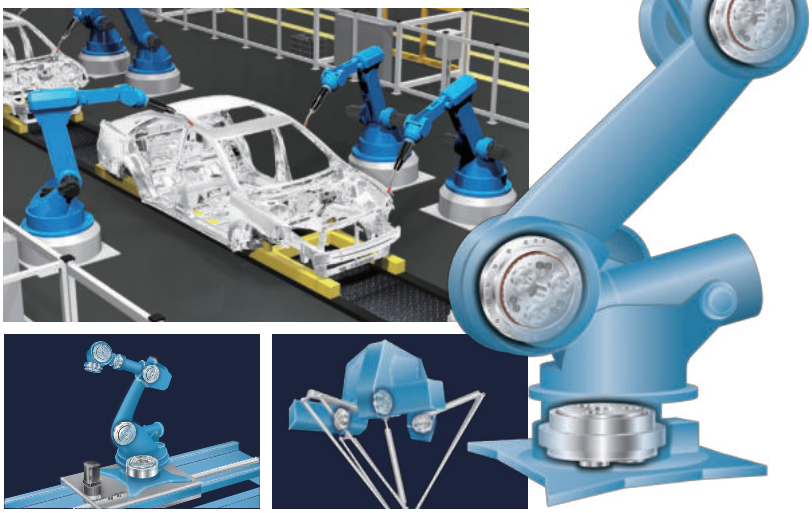
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Adoption results

Contributing to optimization in every kind of equipment.

Along with the applications, the main products used and their page numbers are listed.

Industrial robots



Sliders/gantries

GH … P.29-30

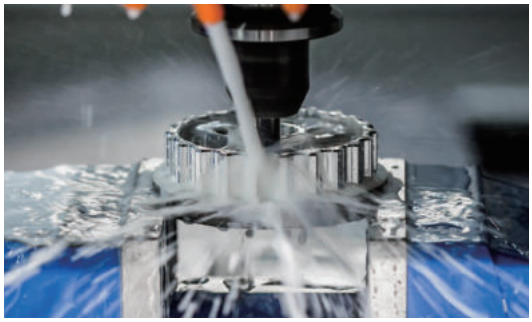
Parallel links

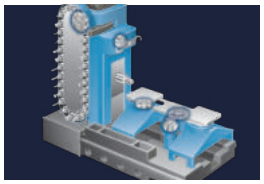
RF-P … P.21

Vertical multi-joint axis drive

RV™-N/E … P.15-16
RV™-C/CA … P.17-18
RV™-Z/ZC … P.19

Machine tools





Trunnion tables

RD2 … P.23-26

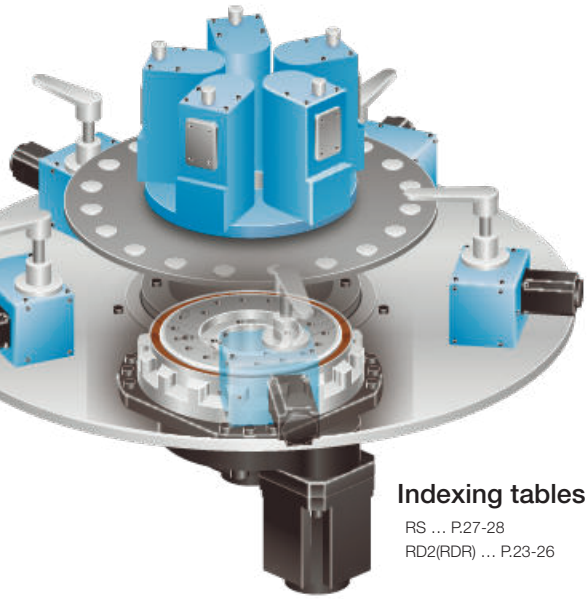


Roller rotation

GH … P.29-30

Roller indexing

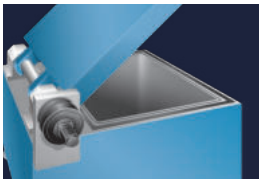
RD2(RDR)… P.23-26



Indexing tables

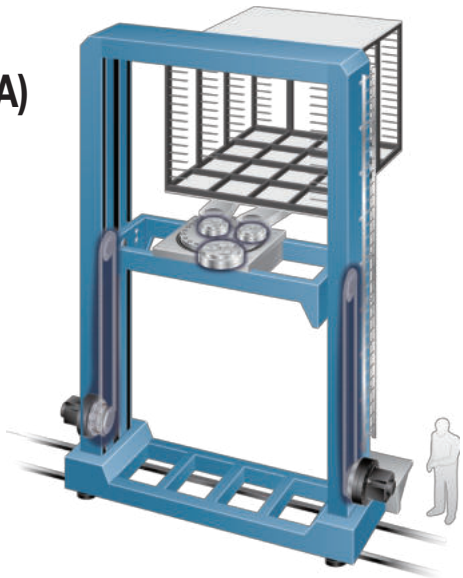
RS … P.27-28
RD2(RDR) … P.23-26

Transport equipment/ assembly equipment (FA)



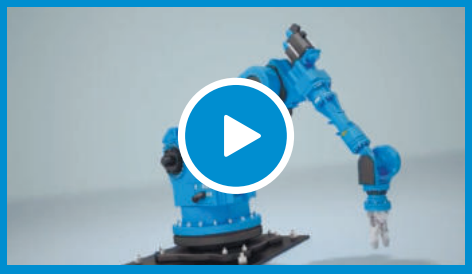
Heavyweight cantilever drive

RT-G … P.37 RT … P.43-44



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Video: Example of mounting to a vertical multi-joint robot



Video: Lithium-ion battery manufacturing equipment



Welding robots/equipment

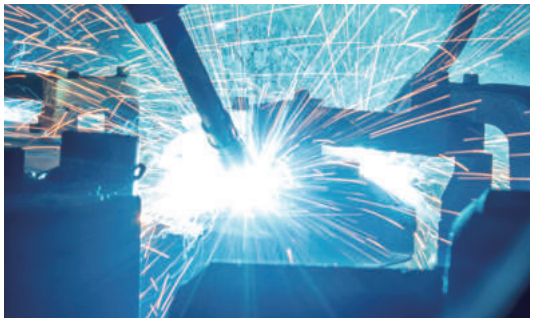


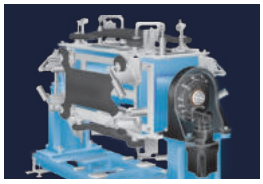
ATC

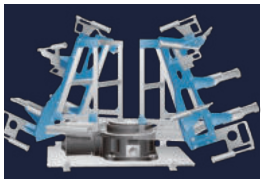
RV™-N … P.15-16
RA … P.35-36
AF … P.41-42

APC

RD2 … P.23-26
AF … P.41-42







Turntables

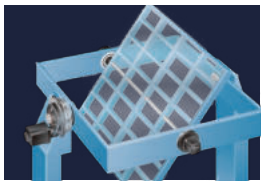
RVP-C … P.51-54 RS … P.27-28 RH Foot … P.33-34



Positioners

RVP-A … P.51-54 RVP-B … P.51-54
RD2 … P.23-26 RH-C … P.31-32

Semiconductor/ FPD manufacturing equipment



Inspection devices

RD2 … P.23-26 AF … P.41-42

Stackers

RV™-Original … P.20
RD2 … P.23-26
GH … P.29-30

Medical devices

Scanners

RD2 … P.23-26



Communication devices

Axis drive

RD2(RDS) … P.23-26



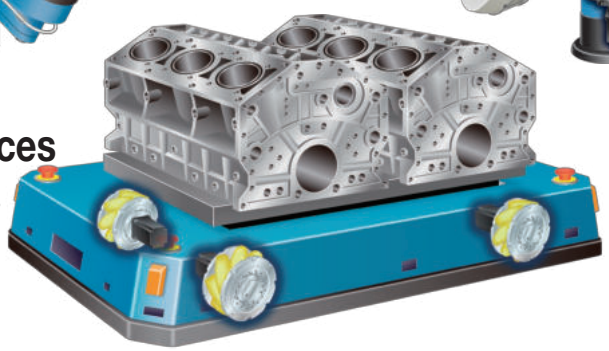
Transport devices

Mecanum wheel drive units

RVW … P.46-49

Wheel drive

RF-P … P.21 GH … P.29-30



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Lineup

Diverse product groups supporting work onsite.

Reduction gear single item products, enabling flexible design of flanges, etc. by customers

Components



Solid Type Basic Model

RV™-N/E

[Rated Torque] 58 ~ 28,000 Nm
[Structure] Solid

P.15-16



Hollow Type Basic Model

RV™-C/CA

[Rated Torque] 98 ~ 11,760 Nm
[Structure] Hollow

P.17-18



Compact x High-Rigidity Model

RV™-Z/ZC

[Rated Torque] 265 ~ 12,000 Nm
[Structure] Solid/Hollow

P.19



Model without Bearings

RV™-Original

[Rated Torque] 137 ~ 8,820 Nm
[Structure] Solid

P.20



High-Speed x High-Accuracy Model

RF-P

[Rated Torque] 100 ~ 350 Nm
[Structure] Solid

P.21

Equipped as standard with a motor flange, connection with major servomotors is possible

Gearheads



Gearhead Basic Model

RD2

[Rated Torque] 58 ~ 3,136 Nm
[Structure] Solid/Hollow

P.23-26



Model for Low-floor Indexing Table

RS

[Rated Torque] 490 ~ 8,820 Nm
[Structure] Hollow

P.27-28



High-Speed, High-Rigidity Model

GH

[Rated Torque] 69 ~ 980 Nm
[Structure] Solid

P.29-30



High Output Torque/High Reduction Ratio Model

RH

[Rated Torque] 4,900 ~ 8,820 Nm
[Structure] Solid/Hollow

P.31-32



Model with Feet for Positioners

RH Foot Type

[Rated Torque] 1,470 ~ 3,136 Nm
[Structure] Hollow

P.33-34



Flat, High-Accuracy Indexing Gearhead

RA

[Rated Torque] 167 ~ 1,568 Nm
[Structure] Solid

P.35-36



Ultra-High-Reduction Ratio Model with Brake Assist

RT-G

[Rated Torque] 9,310 ~ 17,500 Nm
[Structure] Solid

P.37



Vacuum Seal Unit

HR

P.38

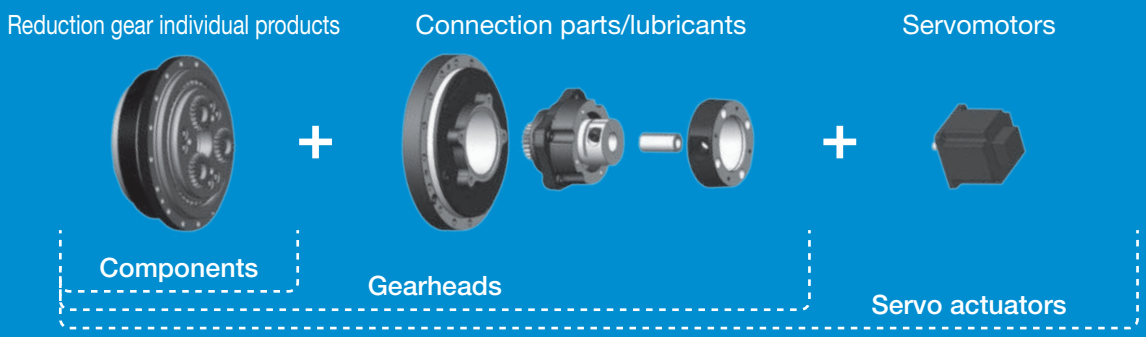


Gearhead Products

Examples of Customization

P.39

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Optimized design with integrated servomotor and reduction gear helps reduce design, manufacturing, and assembly processes

Servo Actuators



Compact Actuator Model

AF

[Rated Torque] 82 ~ 3,856 Nm
[Structure] Solid/Hollow

P.41-42



Ultra-High Reduction Ratio Model for Heavy Weight Open/Close Applications

RT

[Rated Torque] 1,960 ~ 46,000 Nm
[Structure] Solid

P.43-44

Unit products making high-accuracy, efficient transport and positioning possible

Unit Products



Mecanum Wheel Drive Units

RVW

P.45-49



Positioner Units

RVP

P.50-54

Lubricants maximizing the performance of the Precision Reduction Gear RV™

Lubricants



P.55-56

Dedicated Grease

RVGREASE™ LB00

Dedicated Grease

VIGOGREASE® RE0

Dedicated Grease

MOLYWHITE RE No.00

Dedicated Oil

RVOIL™ SB150

Introducing initiatives in dedicated product development for special applications



Breakdown Detection Sensor

RVSR

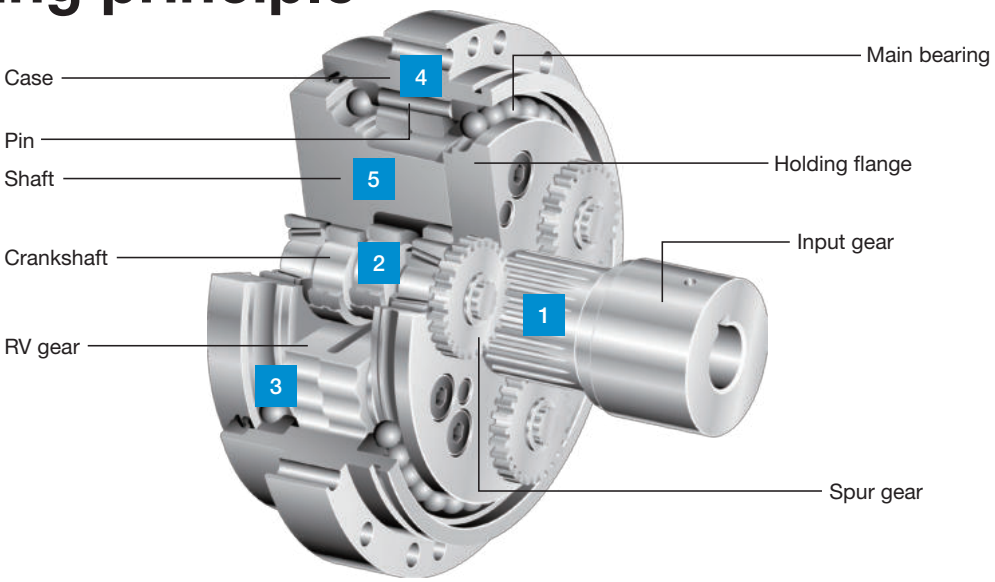
P.57-58

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Technology

Reliable technology makes precision happen.

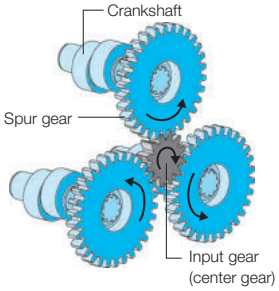
Operating principle



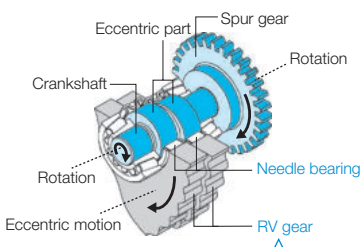
1st reducer

1 The servomotor rotation is transmitted to the input gear and reduced by the gear ratio of the input gear and spur gear.

2 The crankshaft directly connected to the spur gear rotates.



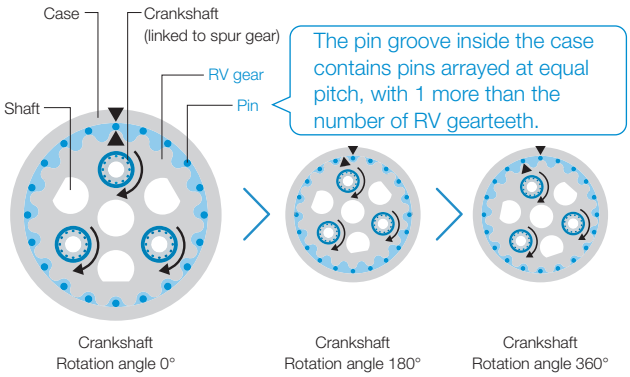
3 The crankshaft rotation leads to eccentric motion (crank motion) in the two RV gears.



The crankshaft eccentric part has two RV gears mounted via needle bearings. (There are two RV gears in order to balance the force.)

2nd reducer

4 When the crankshaft goes through 1 rotation, the RV gears perform 1 eccentric (crank) movement, in contact with the pin, and rotate 1 geartooth worth backward.



5 By transmitting the RV gear rotation through the crankshaft to the shaft (output shaft), the number of crankshaft rotations can be reduced by the number of pins.

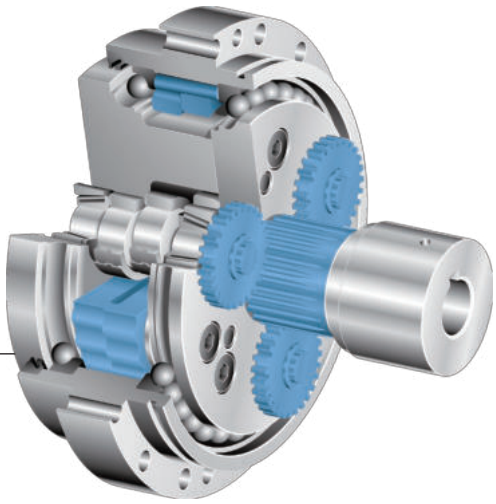
1st reducer × **2nd reducer** = **Total reduction ratio**

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Video: Precision Reduction Gear RV™ structure and operating principles



Main mechanism



Reduction ratio can be changed just by changing the spur gear (1st stage)
Input part (input gear) can be made smaller
RV gear revolving speed is slow

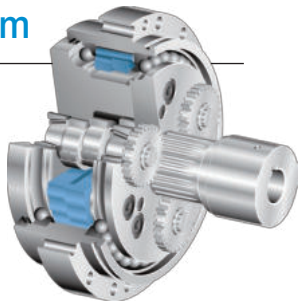
2-stage reduction structure

Reduction at spur gear (1st stage) and pin & gear (2nd stage)

- Wide ratio range at same outer diameter (low to high reduction)
- Low inertia
- Low vibration

High number of simultaneously engaged gear teeth between RV gears and pin

Pin & gear mechanism



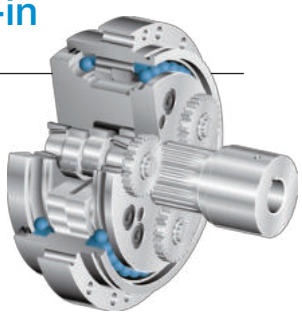
Reduction is created by the engagement between the pins arrayed equidistantly inside the case and the RV gear teeth, 1 fewer in number than the pins

- High accuracy (backlash and lost motion within 1 min)
- Resistant to impacts (withstands impacts 5 times the rated torque)

* Excluding some models

Supports large loads

Main bearing built-in mechanism

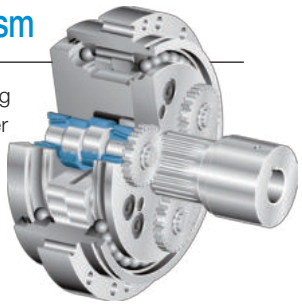


Angular ball bearings
(our proprietary design) built in

Ex. RS-900A
Allowable thrust force: 88,200 N
Allowable moment: 44,100 Nm

Low friction and wear

Rolling contact mechanism

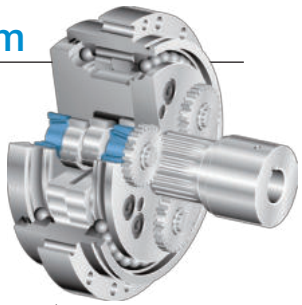


The 2-stage reduction part uses rolling contact via bearings throughout, other than the contact part between the case pinholes and pins

- Excellent start efficiency
- Low backlash and lost motion
- Minimum aging deterioration

Resistant to bending

Double column support mechanism



Both ends of the crankshaft are supported by the shaft and holding flange through bearings

- High torsional rigidity
- Low vibration
- Resistant to impacts
  (withstands impacts 5 times the rated torque)

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Online contents

Find more detailed and diverse information.

Search online

Nabtesco Precision Equipment Company

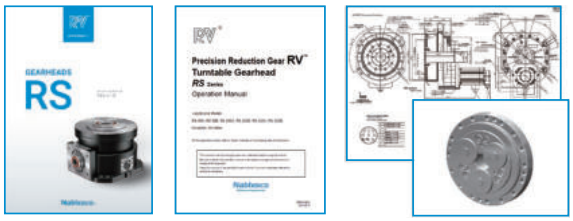
Precision reduction gear RV™ Promotion Site

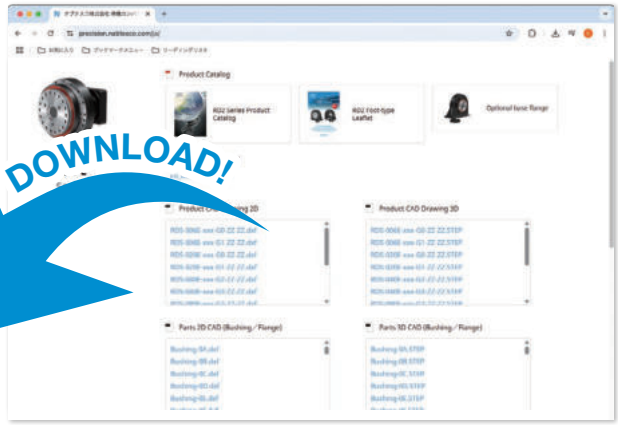
In addition to product information, the site is also full of useful functions such as materials to download and a product selection tool.
Make good use of it when considering adoption.

Product Catalogs | **Instruction Manuals** | **2D/3D CAD Drawings**

Materials download

Useful for considering design and confirming specifications





* Membership registration is required for downloads.

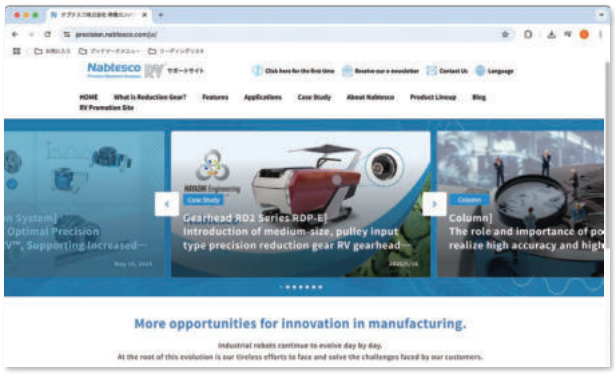
Search online

Nabtesco Support Site

Support Site

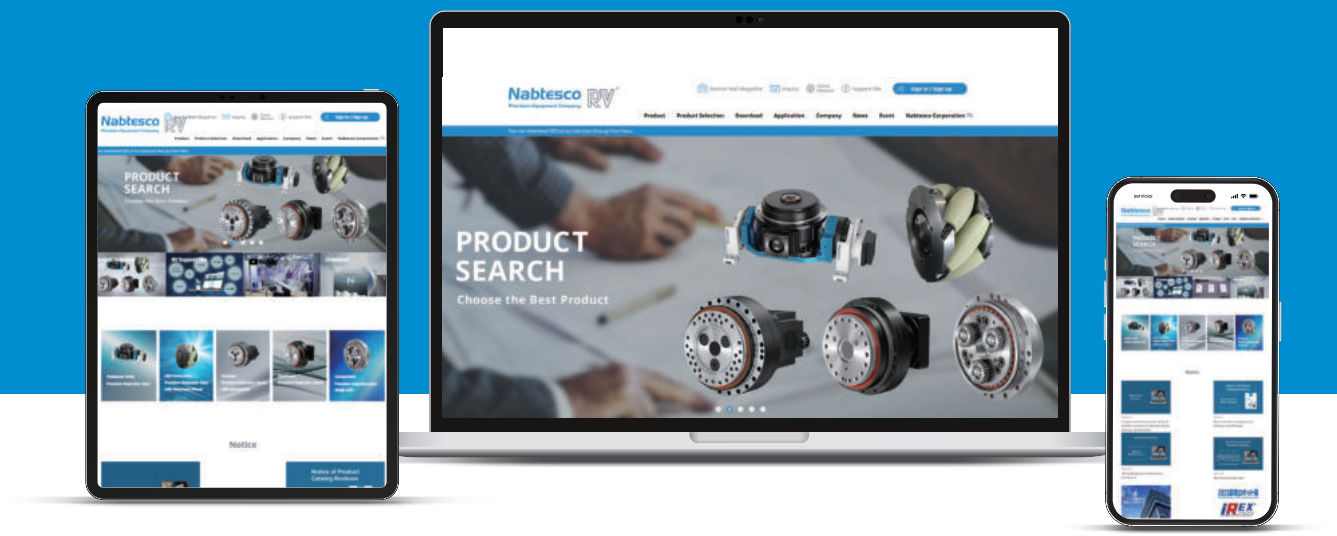
Helpful columns | **Materials download** | **Customer Case Studies**

Offering a wide range of useful information, including basic knowledge about reduction gears, columns, case studies, detailed product explanations, and more.



* The website screen pictured is as of the time of publication. Contents may be subject to change without notice.

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Simple Selection

Detailed Selection

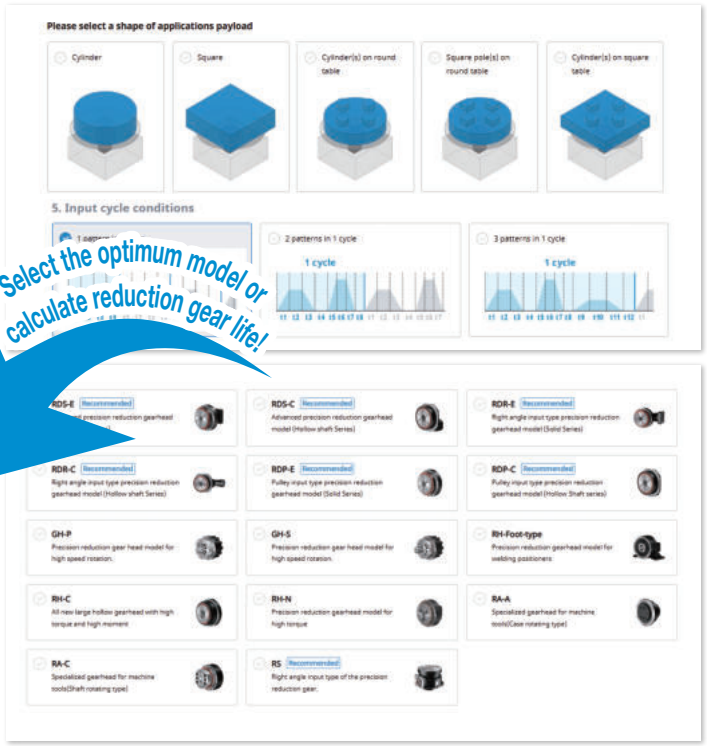
Product Selection Tools

In addition to Simple Selection, which enables selection of the optimal product based on mounting method and motor to be used, we also offer tools including Detailed Selection, with which customers can select models and calculate life based on load conditions and operation pattern.

Calculation results can be saved as a PDF or viewed from MyPage at any time.



* Membership registration is required to use product selection tools.



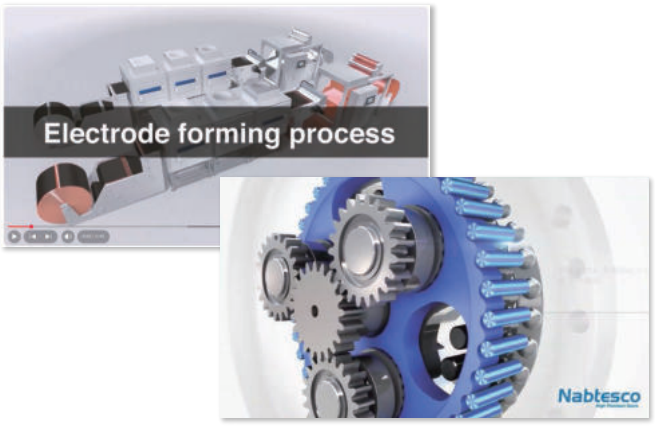
Search on YouTube

Nabtesco Precision Equipment Company

Official YouTube channel

Case Study Videos | **Application videos** | **Function introduction videos**

Straightforward introductions of the Precision Reduction Gear RV™ mechanism and operating principles as well as various product applications.

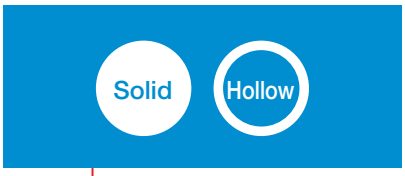


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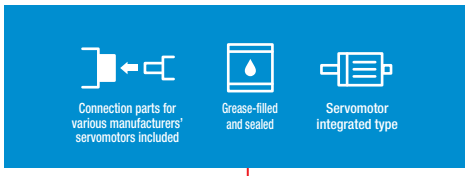
How to read product pages

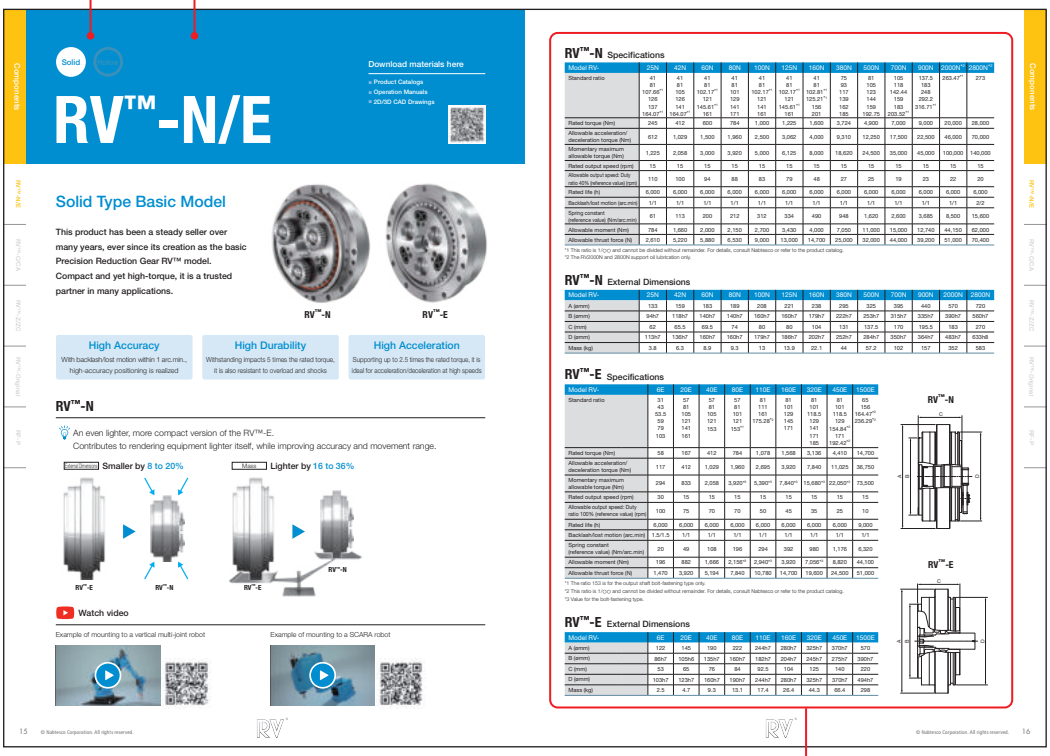
- Icons indicate information such as structure and included items.

Shows the relevant structure (solid/hollow).



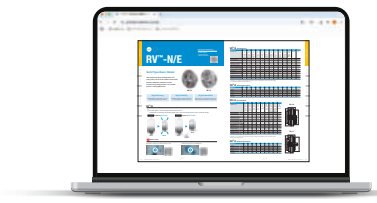
Shows other included items, configuration specifications, etc.





- For terminology, see the Glossary on p.59-60.
- For more detailed specifications, see the catalogs/leaflets for each product. (Available for download on the website)





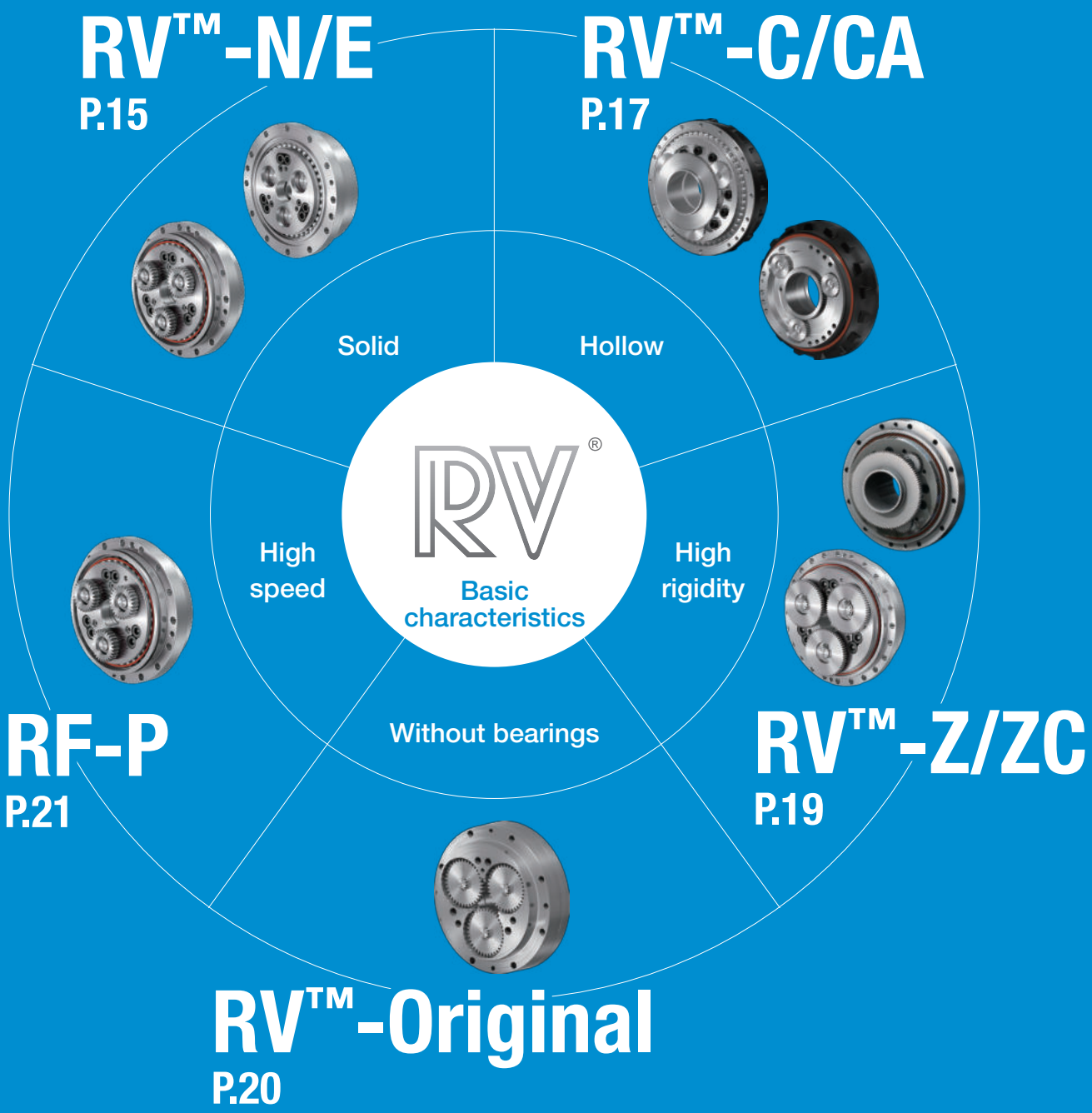
The digital version of this catalog is available on our website. In addition to helpful functions like text search and memos, it offers smooth access to product pages and related videos. Don't miss it!

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COMPONENTS

Recommended for customers considering flexible design with flanges, etc., using reduction gear individual products.





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Solid Hollow

RV™-N/E

Download materials here

- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

Solid Type Basic Model

This product has been a steady seller over many years, ever since its creation as the basic Precision Reduction Gear RV™ model. Compact and yet high-torque, it is a trusted partner in many applications.



RV™-N



RV™-E

High Accuracy
With backlash/lost motion within 1 arc.min., high-accuracy positioning is realized

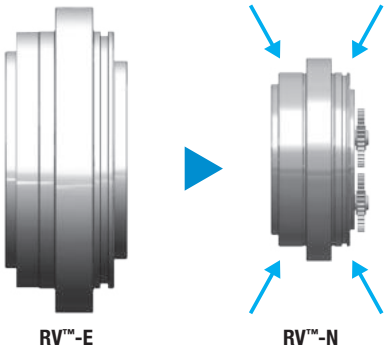
High Durability
Withstanding impacts 5 times the rated torque, it is also resistant to overload and shocks

High Acceleration
Supporting up to 2.5 times the rated torque, it is ideal for acceleration/deceleration at high speeds

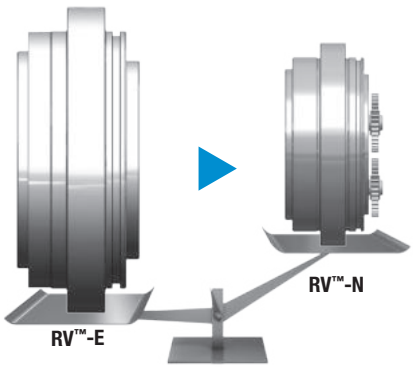
RV™-N

An even lighter, more compact version of the RV™-E.
Contributes to rendering equipment lighter itself, while improving accuracy and movement range.

External Dimensions **Smaller by 8 to 20%**

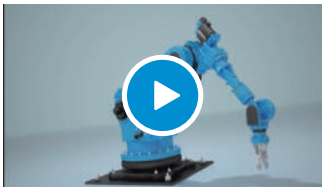


Mass **Lighter by 16 to 36%**

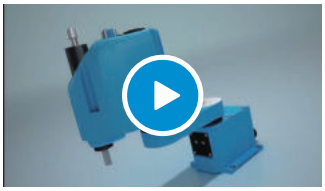


Watch video

Example of mounting to a vertical multi-joint robot



Example of mounting to a SCARA robot



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RV™-N Specifications

Model RV-	25N	42N	60N	80N	100N	125N	160N	380N	500N	700N	900N	2000N*2	2800N*2
Standard ratio	41 81 107.66*1 126 137 164.07*1	41 81 105 126 141 164.07*1	41 81 102.17*1 121 145.61*1 161	41 81 101 129 141 171	41 81 102.17*1 121 141 161	41 81 102.17*1 121 145.61*1 161	41 81 102.81*1 125.21*1 156 201	75 93 117 139 162 185	81 105 123 144 159 192.75	105 118 142.44 159 183 203.52*1	137.5 183 248 292.2 316.71*1	263.47*1	273
Rated torque (Nm)	245	412	600	784	1,000	1,225	1,600	3,724	4,900	7,000	9,000	20,000	28,000
Allowable acceleration/ deceleration torque (Nm)	612	1,029	1,500	1,960	2,500	3,062	4,000	9,310	12,250	17,500	22,500	46,000	70,000
Momentary maximum allowable torque (Nm)	1,225	2,058	3,000	3,920	5,000	6,125	8,000	18,620	24,500	35,000	45,000	100,000	140,000
Rated output speed (rpm)	15	15	15	15	15	15	15	15	15	15	15	15	15
Allowable output speed: Duty ratio 40% (reference value) (rpm)	110	100	94	88	83	79	48	27	25	19	23	22	20
Rated life (h)	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	2/2
Spring constant (reference value) (Nm/arc.min)	61	113	200	212	312	334	490	948	1,620	2,600	3,685	8,500	15,600
Allowable moment (Nm)	784	1,660	2,000	2,150	2,700	3,430	4,000	7,050	11,000	15,000	12,740	44,150	62,000
Allowable thrust force (N)	2,610	5,220	5,880	6,530	9,000	13,000	14,700	25,000	32,000	44,000	39,200	51,000	70,400

*1 This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.
*2 The RV2000N and 2800N support oil lubrication only.

RV™-N External Dimensions

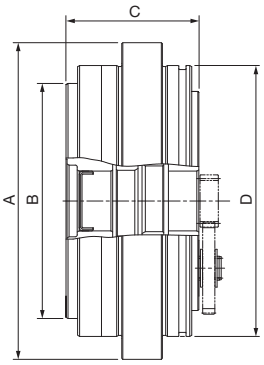
Model RV-	25N	42N	60N	80N	100N	125N	160N	380N	500N	700N	900N	2000N	2800N
A (ømm)	133	159	183	189	208	221	238	295	325	395	440	570	720
B (ømm)	94h7	118h7	140h7	140h7	160h7	160h7	179h7	222h7	253h7	315h7	335h7	390h7	560h7
C (mm)	62	65.5	69.5	74	80	80	104	131	137.5	170	195.5	183	270
D (ømm)	113h7	136h7	160h7	160h7	179h7	186h7	202h7	252h7	284h7	350h7	364h7	483h7	633h8
Mass (kg)	3.8	6.3	8.9	9.3	13	13.9	22.1	44	57.2	102	157	352	583

RV™-E Specifications

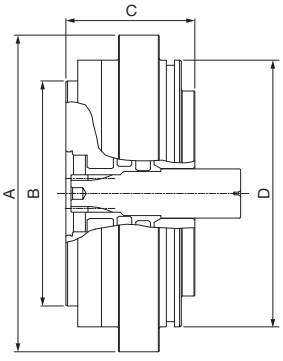
Model RV-	6E	20E	40E	80E	110E	160E	320E	450E	1500E
Standard ratio	31 43 53.5 59 79 103	57 81 105 121 141 161	57 81 105 121 153	57 81 101 121 153*1	81 111 161 175.28*2	81 101 129 145 171	81 101 118.5 129 141 171 185	81 101 118.5 129 154.84*2 171 192.42*2	65 156 164.47*2 236.29*2
Rated torque (Nm)	58	167	412	784	1,078	1,568	3,136	4,410	14,700
Allowable acceleration/ deceleration torque (Nm)	117	412	1,029	1,960	2,695	3,920	7,840	11,025	36,750
Momentary maximum allowable torque (Nm)	294	833	2,058	3,920*3	5,390*3	7,840*3	15,680*3	22,050*3	73,500
Rated output speed (rpm)	30	15	15	15	15	15	15	15	15
Allowable output speed: Duty ratio 100% (reference value) (rpm)	100	75	70	70	50	45	35	25	10
Rated life (h)	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	9,000
Backlash/lost motion (arc.min)	1.5/1.5	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	20	49	108	196	294	392	980	1,176	6,320
Allowable moment (Nm)	196	882	1,666	2,156*3	2,940*3	3,920	7,056*3	8,820	44,100
Allowable thrust force (N)	1,470	3,920	5,194	7,840	10,780	14,700	19,600	24,500	51,000

*1 The ratio 153 is for the output shaft bolt-fastening type only.
*2 This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.
*3 Value for the bolt-fastening type.

RV™-N



RV™-E



RV™-E External Dimensions

Model RV-	6E	20E	40E	80E	110E	160E	320E	450E	1500E
A (ømm)	122	145	190	222	244h7	280h7	325h7	370h7	570
B (ømm)	86h7	105h6	135h7	160h7	182h7	204h7	245h7	275h7	390h7
C (mm)	53	65	76	84	92.5	104	125	140	220
D (ømm)	103h7	123h7	160h7	190h7	244h7	280h7	325h7	370h7	494h7
Mass (kg)	2.5	4.7	9.3	13.1	17.4	26.4	44.3	66.4	298

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Solid Hollow

RV™-C/CA

Download materials here

- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

For RV™-CA, inquire with our sales or from the website.

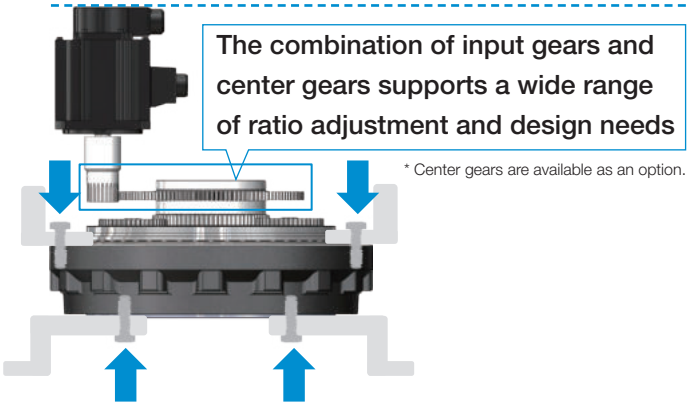
Hollow Type Basic Model

While maintaining the performance of the Precision Reduction Gear RV™, this model adopts a hollow structure ideal for passing piping and cables through, enhancing convenience.

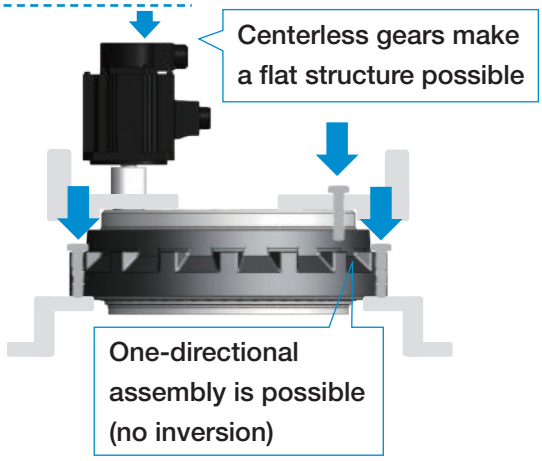


RV™-C RV™-CA

RV™-C



RV™-CA



Storing the cable in the robot arm interior, etc., prevents risks of damage and interference with the exterior, mitigating the influence of torsion and sag on movement accuracy.



Application 6-axis robot

Watch video

Example of mounting in medical devices



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RV™-C Specifications

Model RV-	10C	27C	35C	50C	60C	100C	120C	155C	200C	320C	400CS	500C	700CS	900C	1200C
Standard ratio*1	27	36.57*2	30.83*2	32.54*2	33.39*2	36.75	36.75	33.62*2	34.86*2	35.61*2	33.14*2	37.33*2	33.14*2	42.83*2	42.83*2
Rated torque (Nm)	98	265	343	490	588	980	1,176	1,470	1,960	3,136	3,920	4,900	6,860	8,820	11,760
Allowable acceleration/ deceleration torque (Nm)	245	662	858	1,225	1,470	2,450	2,940	3,675	4,900	7,840	9,800	12,250	17,150	22,050	29,400
Momentary maximum allowable torque (Nm)	490	1,323	1,715	2,450*3	2,940	4,900*3	5,880	7,350	9,800*3	15,680	19,600	24,500	34,300	44,100	58,800
Rated output speed (rpm)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Allowable output speed: Duty ratio 100% (reference value) (rpm)	80	60	45	50	40	40	39	30	30	25	15	20	15	10	9
Rated life (h)	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	47	147	176	255	343	510	588	735	980	1,960	2,940	3,430	4,375	4,900	5,880
Allowable moment (Nm)	686	980	1,470	1,764	2,205	2,450	3,920	7,056	8,820	20,580	24,500	34,300	29,400	44,100	44,100
Allowable thrust force (N)	5,880	8,820	10,780	11,760	11,760	13,720	15,680	17,640	19,600	29,400	34,330	39,200	37,000	51,000	51,000

*1 This ratio does not include the optional input gears.
*2 This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.
*3 Value for the bolt-fastening type.

RV™-C External Dimensions

Model RV-	10C	27C	35C	50C	60C	100C	120C	155C	200C	320C	400CS	500C	700CS	900C	1200C
A (ømm)	147	182	182	222.5	222.5	250.5	250.5	293	347	440h7	485	520	485	543	570
B (ømm)	110h7	140h7	140h7	176h7	176h7	199h7	199h7	234h7	260h7	340h7	347h7	390h7	386h7	390h7	390h7
C (mm)	49.5	57.5	57.5	68	68	72.6	72.6	89	102	101	124.4	130.5	124.4	144	162
D (ømm)	31	43	48	57	57	71	71	80	90	138	150	138	150	130	130
E (mm)	26.35±0.6	31.35±0.65	39.3±0.7	34.35±0.65	34.3±0.75	39.35±0.65	39.35±0.65	47±1.2	56.2±0.85	71.75±0.9	66.6±1.15	81.7 MAX	66.6±1.15	126.5±0.9	131.5±0.9
Mass (kg)	4.6	8.5	9	14.6	15	19.5	19.5	37	55.6	79.5	135	154	140	225	235

RV™-CA Specifications

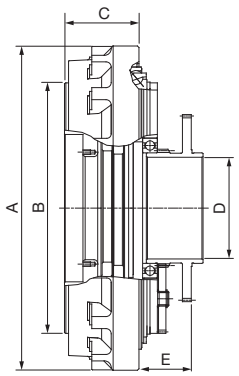
Model RV-	260CA	320CA	500CA
Standard ratio	138.75 148 158.57* 170.76*	184.61* 193.84* 210 229.09* 250.90*	221.53*
Rated torque (Nm)	2,548	3,136	5,000
Allowable acceleration/ deceleration torque (Nm)	6,370	7,840	12,500
Momentary maximum allowable torque (Nm)	12,740	15,680	25,000
Rated output speed (rpm)	15	15	15
Allowable output speed: Duty ratio 100% (reference value) (rpm)	21	25	10
Rated life (h)	6,000	6,000	6,000
Backlash/lost motion (arc.min)	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	1,540	1,960	3,380
Allowable moment (Nm)	12,740	20,580	30,000
Allowable thrust force (N)	24,500	29,400	37,750

* This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco.

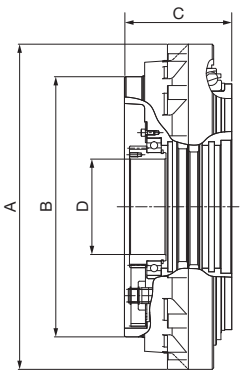
RV™-CA External Dimensions

Model RV-	260CA	320CA	500CA
A (ømm)	390h7	450	486
B (ømm)	315h7	360h7	386h7
C (mm)	148.5	148.5	179
D (ømm)	130 MIN	132 MIN	140 MIN
Mass (kg)	68.6	92.1	130

RV™-C



RV™-CA



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Solid Hollow

RV™-Z/ZC

* For details, inquire with our sales or from the website.

Compact x High-Rigidity Model

Thoroughly developed technology and CAE are put to good use to optimize the shape of each part. While keeping the size of the conventional model, torsional rigidity and moment rigidity have been improved. (Rigidity improved 10 to 20% from the RV™-N)

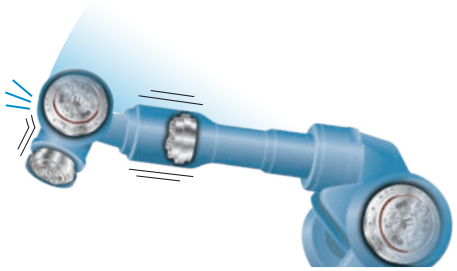


Solid Type
RV™-Z



Hollow Type
RV™-ZC

Contributes to damping during robot positioning and sag reduction against high reaction force. Improved vibration damping makes tip position control easier and helps reduce cycle time.



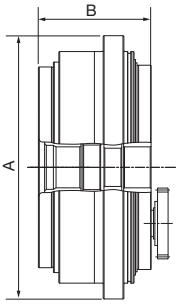
RV™-Z Specifications

Model RV-	265Z	430Z	600Z	1000Z	1300Z	1600Z	2200Z
Rated torque (Nm)	265	430	600	1,000	1,300	1,600	2,200
Allowable moment (Nm)	800	1,700	2,000	2,700	3,500	4,000	5,500
A (ømm)	135	161	184	212	223	238	259
B (mm)	61	63	69.5	78.5	81	100.9	111
Mass (kg)	3.8	5.9	8.7	12.7	15.5	20.5	28

Model RV-	2800Z	3800Z	5000Z	5500Z	7000Z	9000Z	12000Z (under development)
Rated torque (Nm)	2,800	3,800	5,000	5,500	7,000	9,000	12,000
Allowable moment (Nm)	6,000	7,200	11,000	13,000	15,000	20,000	40,000
A (ømm)	284	299	335	373	395	453	498
B (mm)	115	128	131.5	148.7	163	170	211
Mass (kg)	36	42.3	55.1	79.1	102.5	141	213

* Specifications for models under development may be changed.

RV™-Z

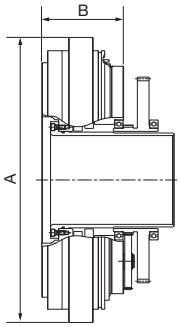


RV™-ZC Specifications

Model RV-	600ZC	2000ZC (under development)	2600ZC (under development)	3200ZC	5000ZC	9000ZC
Rated torque (Nm)	600	2,000	2,600	3,200	5,000	9,000
Allowable moment (Nm)	3,000	9,000	14,000	25,000	35,000	45,000
A (ømm)	224	335	-	440	485	543
B (mm)	79	108.5	-	142.5	168.5	189
Mass (kg)	13.4	43.2	-	88.4	130	208

* Specifications for models under development may be changed.

RV™-ZC



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Solid Hollow

RV™-Original

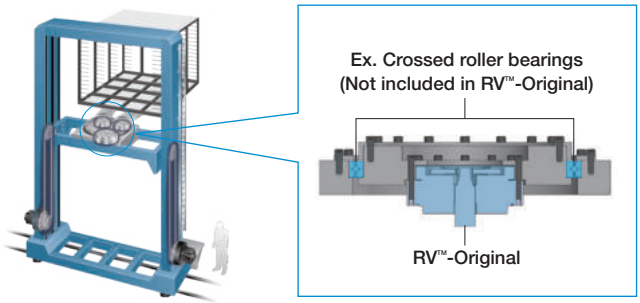
* For details, inquire with our sales or from the website.

Model Without Bearings

The structure without a main bearing keeps it lightweight and compact, enabling selection of bearings at will. Making the most of its external support accuracy, it contributes flexibly to customized design and large-moment equipment.



In combination with crossed roller bearings, it realizes large moment and high accuracy.



Application Stacker

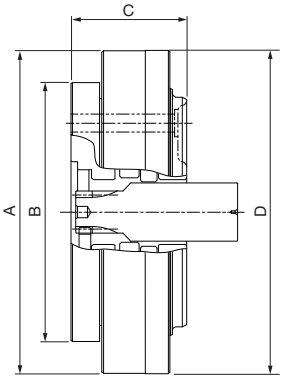
RV™-Original Specifications

Model RV-	15	30	60	160	320	450	550	900
Standard ratio	57 81 105 121 141	57 81 105 121 153	57 81 101 121 153	81 101 129 145 171	81 101 118.5 129 141 171 185	81 101 118.5 129 154.84* 171 192.42*	123 141 163.5 192.42*	31.42*
Rated torque (Nm)	137	333	637	1,568	3,136	4,410	5,390	8,820
Allowable acceleration/ deceleration torque (Nm)	274	833	1,592	3,920	7,840	11,025	13,475	22,050
Momentary maximum allowable torque (Nm)	686	1,666	3,185	6,615	12,250	18,620	26,950	44,100
Rated output speed (rpm)	15	15	15	15	15	15	15	15
Allowable output speed: Duty ratio 100% (reference value) (rpm)	60	50	40	45	35	25	20	7.5
Rated life (h)	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	39.2	98	196	392	980	1,176	1,666	5,923

* This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.

RV™-Original External Dimensions

Model RV-	15	30	60	160	320	450	550	900
A (ømm)	$129.9^{0}_{-0.05}$	159.5 ±0.2	199.5	239.5	289.5	324.5	369.5	550
B (ømm)	105h6	135h6	160h6	204h6	245h6	275h6	316h7	440h7
C (mm)	65	71.5	71.5	96	117.6	128.5	147	185
D (ømm)	130h7	160h7	200h7	$239.9^{0}_{-0.05}$	290h7	325h7	370h7	550h7
Mass (kg)	3.6	6.2	9.7	19.5	34	47	72	223



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Solid Hollow

RF-P

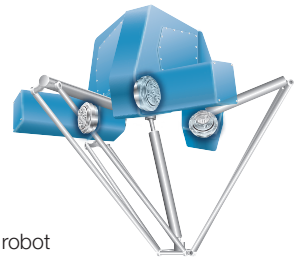
* For details, inquire with our sales or from the website.

High-Speed x High-Accuracy Model

This high-speed model enables high-speed rotation (up to 250 rpm) and high-frequency forward/reverse rotation switching, with long-life specifications at rated life of 20,000 hours. It is also compatible with food-grade oil.



Useful in equipment requiring high-speed, high-accuracy positioning such as SCARA robots and parallel link robots.



Application Parallel link robot

Watch video

Example of mounting to a parallel link robot



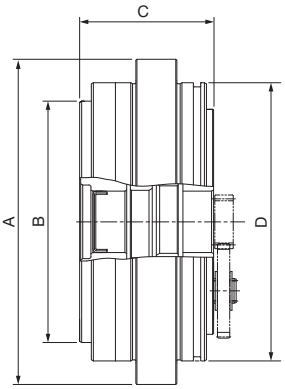
RF-P Specifications

Model RF-	10P	19P	35P
Standard ratio	22.6 35.73* 41 42.17* 51	19 26.2 31	20.55* 30 32.42*
Rated torque (Nm)	100	190	350
Allowable acceleration/ deceleration torque (Nm)	300	570	1,050
Momentary maximum allowable torque (Nm)	500	570	1,050
Rated output speed (rpm)	50	50	50
Allowable output speed: Duty ratio 50% (reference value) (rpm)	250	200	140
Rated life (h)	20,000	20,000	20,000
Backlash/lost motion (arc.min)	2/2	2/2	2/2
Spring constant (reference value) (Nm/arc.min)	42	66	149
Allowable moment (Nm)	460	960	1,100
Allowable thrust force (N)	2,200	3,000	4,000

* This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco.

RF-P External Dimensions

Model RF-	10P	19P	35P
A (ømm)	127	148	183
B (ømm)	94h7	110h7	140h7
C (mm)	64.5	71	80
D (ømm)	126.5h7	127h7	160h7
Mass (kg)	3.9	5.6	11

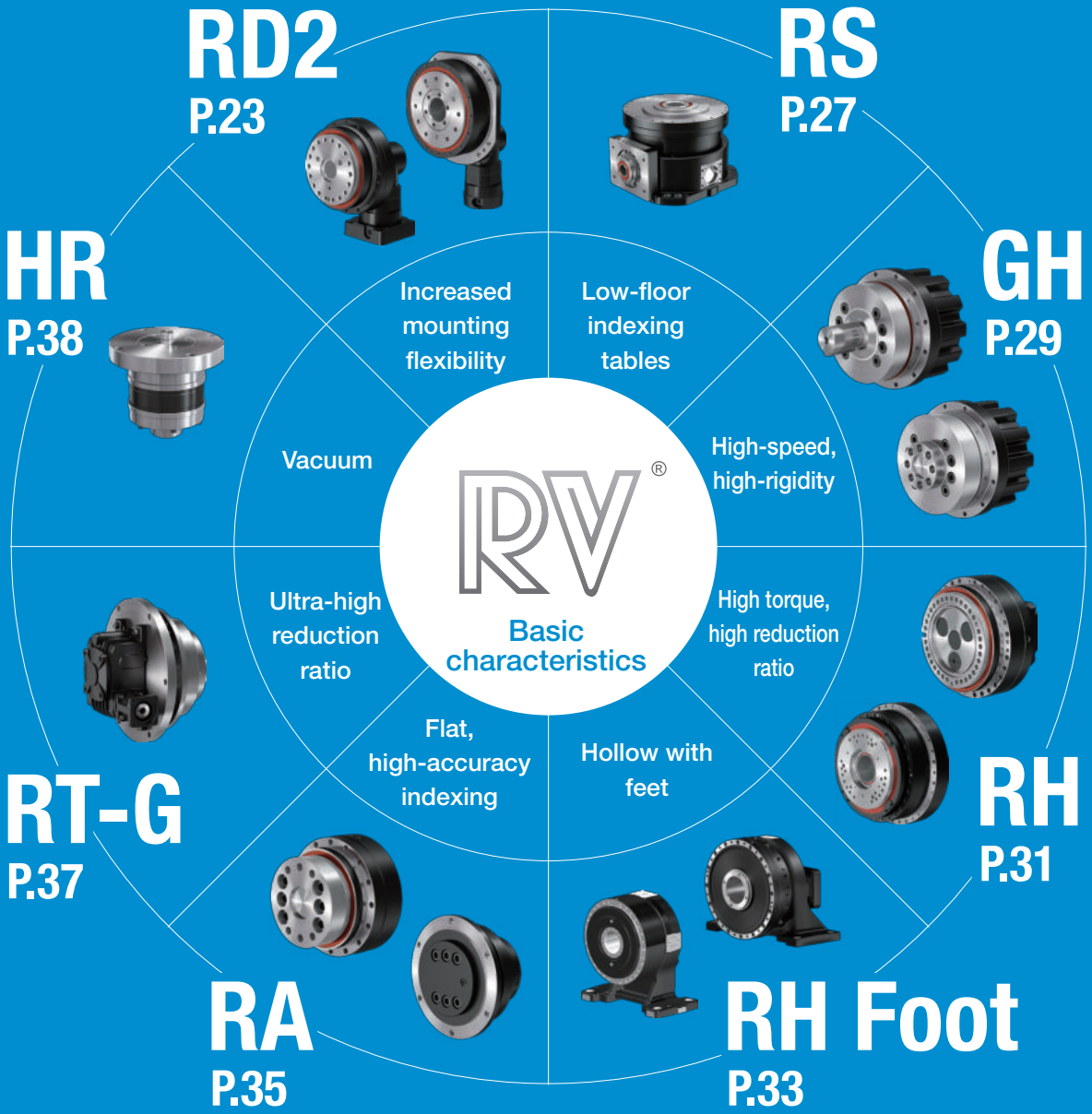


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GEARHEADS



Based on component products, motor flanges are equipped as standard; grease filling and sealing makes use more convenient. Connection parts supporting various manufacturers' servomotors (flanges, bushings, etc.) can also be selected.



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Solid Hollow

Connection parts for various manufacturers' servomotors included

Grease-filled and sealed

RD2

Download materials here

- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

Gearhead Basic Model

Select from two structural types (solid and hollow) and three types of input. Abundant lineup of 133 types supports diverse torque and size needs, effective in a wide range of applications.



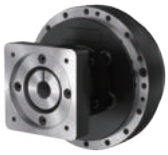
Solid Type
RD□-E



Hollow Type
RD□-C

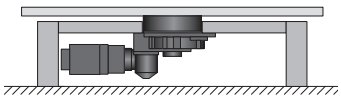
* The □ is filled in with S, R, or P depending on the input type.

With flanges and bushings selectable to suit the equipment, The number of parts and design/manufacturing processes can be reduced.

	Straight input	Right angle input	Pulley input
Solid Type	 RDS-E (35 types)	 RDR-E (35 types)	 RDP-E (5 types)
Hollow Type	 RDS-C (26 types)	 RDR-C (26 types)	 RDP-C (6 types)

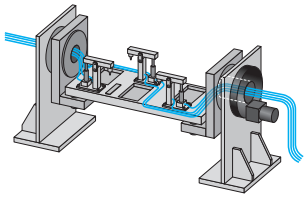
When equipment is high and workability is suffering...

Lower equipment floor with right angle input or pulley input



When cable wiring is a problem...

The hollow type makes it possible to pass cables through the reduction gear interior



Watch video

Case study: Lithium-ion battery manufacturing equipment



[Exhibited in showroom until 2022] Positioner BBQ



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RD□-E (Solid Type) Specifications

Model RDS- / RDR-		6E	20E	40E	80E	160E	320E
Standard ratio		31, 43, 53.5 79, 103	41, 57, 81 105, 121, 161	41, 57, 81 105, 121, 153	41, 57, 81 101, 121, 153	66, 81, 101 121, 145, 171	66, 81, 101 121, 141, 185
Rated torque (Nm)	RDS-E	58	167	412	784	1,568	3,136
	RDR-E*	58	108 i:41 151 i:57 167 i: 81,105,121,161	400 i:41 412 i: 57,81,105,121,153	400 i:41 556 i:57 784 i: 81,101,121,153	1,568	1,800 i: 66 2,209 i: 81 2,755 i: 101 3,136 i: 121,141,185
Acceleration/ deceleration allowable torque (Nm)	RDS-E	117	412	1,029	1,960	3,920	7,840
	RDR-E*	117	271 i:41 378 i:57 412 i: 81,105,121,161	1,000 i: 41 1,029 i: 57,81,105,121,153	1,000 i: 41 1,390 i: 57 1,960 i: 81,101,121,153	3,920	4,503 i: 66 5,527 i: 81 6,892 i: 101 7,840 i: 121,141,185
Momentary maximum allowable torque (Nm)	RDS-E	294	833	2,058	3,920	7,840	15,680
	RDR-E*	294	543 i:41 755 i:57 833 i: 81,105,121,161	2,000 i: 41 2,058 i: 57,81,105,121,153	2,000 i: 41 2,781 i: 57 3,920 i: 81,101,121,153	7,840	9,002 i: 66 11,048 i: 81 13,776 i: 101 15,680 i: 121,141,185
Rated output speed (rpm)		30	15	15	15	15	15
Allowable input speed (rpm)		3,500	3,500	3,000	3,000	2,000	2,000
Rated life (h)		6,000	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	RDS-E	1.5/1.5	1/1	1/1	1/1	1/1	1/1
	RDR-E	2/2	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5
Spring constant (reference value) (Nm/arc.min)		20	49	108	196	392	980
Allowable moment (Nm)		196	882	1,666	2,156	3,920	7,056
Allowable thrust force (N)		1,470	3,920	5,194	7,840	14,700	19,600

* "i: □□" indicates the supported ratio.

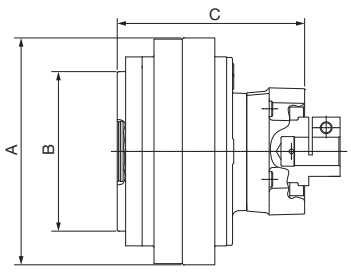
Model RDP-	6E	20E	40E	80E	160E	320E
Standard ratio	-	81	57	81	66	81
Rated torque (Nm)	-	167	412	784	1,568	3,136
Allowable acceleration/ deceleration torque (Nm)	-	412	1,029	1,960	3,920	7,840
Momentary maximum allowable torque (Nm)	-	833	2,058	3,920	7,840	15,680
Rated output speed (rpm)	-	15	15	15	15	15
Allowable input speed (rpm)	-	3,500	3,000	3,000	2,000	2,000
Rated life (h)	-	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	-	1/1	1/1	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	-	49	108	196	392	980
Allowable moment (Nm)	-	882	1,666	2,156	3,920	7,056
Allowable thrust force (N)	-	3,920	5,194	7,840	14,700	19,600

RD□-E (Solid Type) External Dimensions

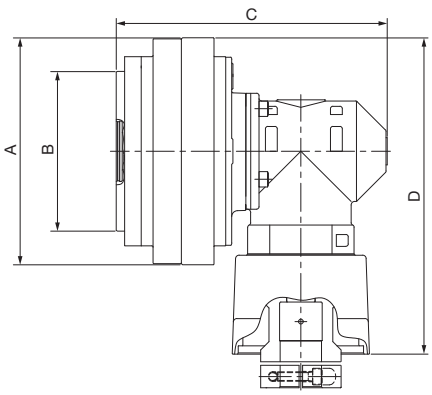
Model RD_-		6E	20E	40E	80E	160E	320E
A (ømm)		125.5	150	192	222	280	325
B (ømm)		86h7	105h6	135h7	160h7	204h7	245h7
C (mm)	RDS-E*	118.9/129.9	124.5/135.5	158.6/182.6	173/197	216.5/213.5	241/238
	RDR-E	178.4	184	229.1	243.5	352.5	377
	RDP-E	-	152	194.6	209	257	281.5
D (mm)	RDR-E*	170.55/182.55	182.8/194.8	243.5/267.5	259/283	362.5/353.5	385/376
Mass (kg)	RDS-E*	5.7/6.8	8.4/9.5	17.5/20	23.8/26.3	43.4/46.3	68.9/71.8
	RDR-E*	7.2/8.2	9.9/10.9	20.5/23.2	26.8/29.6	65.6/68.1	91.2/93.7
	RDP-E	-	8.3	16.4	22.8	41.9	67.3

* Values differ according to the motor used.

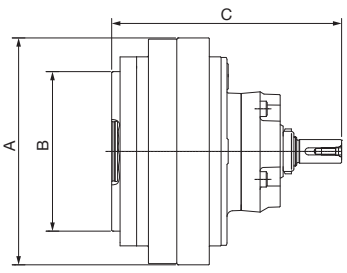
RDS-E (straight input)



RDR-E (right angle input)



RDP-E (pulley input)



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RD□-C (Hollow Type) Specifications

Model RDS- / RDR-		10C	27C	50C	100C	200C	320C
Standard ratio		81, 108, 153 189, 243	99.82, 141.68, 184 233.45	109, 152.6, 196.2 239.8	100.5, 150, 210 258	105.83, 155.96 206.09, 245.08	115, 157, 207 253, 356.5
Rated torque (Nm)		98	265	490	980	1,960	3,136
Allowable acceleration/ deceleration torque (Nm)		245	662	1,225	2,450	4,900	7,840
Momentary maximum allowable torque (Nm)		490	1,323	2,450	4,900	9,800	15,680
Rated output speed (rpm)		15	15	15	15	15	15
Allowable input speed (rpm)		3,500	3,500	3,000	3,000	2,000	2,000
Rated life (h)		6,000	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	RDS-C	1/1	1/1	1/1	1/1	1/1	1/1
	RDR-C	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5
Spring constant (reference value) (Nm/arc.min)		47	147	255	510	980	1,960
Allowable moment (Nm)		686	980	1,764	2,450	8,820	20,580
Allowable thrust force (N)		5,880	8,820	11,760	13,720	19,600	29,400

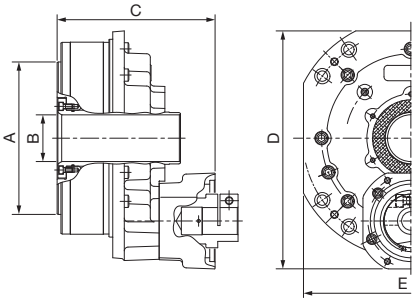
Model RDP-	10C	27C	50C	100C	200C	320C
Standard ratio	108	99.82	109	100.5	105.83	157
Rated torque (Nm)	98	265	490	980	1,960	3,136
Allowable acceleration/ deceleration torque (Nm)	245	662	1,225	2,450	4,900	7,840
Momentary maximum allowable torque (Nm)	490	1,323	2,450	4,900	9,800	15,680
Rated output speed (rpm)	15	15	15	15	15	15
Allowable input speed (rpm)	3,500	3,500	3,000	3,000	2,000	2,000
Rated life (h)	6,000	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	1/1	1/1	1/1	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	47	147	255	510	980	1,960
Allowable moment (Nm)	686	980	1,764	2,450	8,820	20,580
Allowable thrust force (N)	5,880	8,820	11,760	13,720	19,600	29,400

RD□-C (Hollow Type) External Dimensions

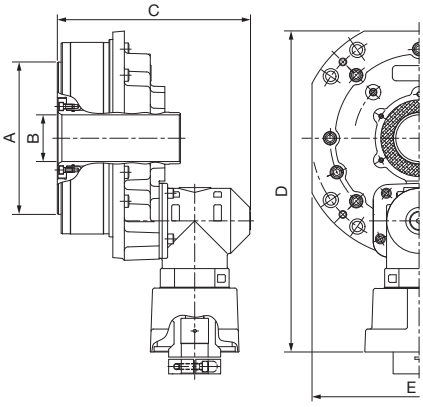
Model RD_-		10C	27C	50C	100C	200C	320C
A (ømm)		110h7	140h7	176h7	199h7	260h7	340h7
B (ømm)		25	36	48	61	75	120
C (mm)	RDS-C*1	132/143	141/152	177.5/201.5	182.1/206.1	246/243	256.5/253.5
	RDR-C	191.5	200.5	248	252.6	382	392.5
	RDP-C	159.5	168.5	213.5	218.1	286.5	297
D (mm)	RDS-C*1	187.2/197.7	227.2/237.7	270/278.5	302/310.5	403/413	478.5/488.5 (496.5/506.5)*2
	RDR-C*1	254.5/266.5	294.5/306.5	363.5/387.5	395.5/419.5	550.5/541.5	626/617 (644/635)*2
	RDP-C	187.2	227.2	268	300	402.7	478.5
E (mm)		172.4	207.4	252	280	368	447
Mass (kg)	RDS-C*1	10.4/11.5	16.5/17.6	29.9/32.3	37.9/40.4	95.5/98.4	141.4/144.3 (150/153)*2
	RDR-C*1	11.9/13.0	18.0/19.0	32.9/35.6	40.9/43.7	117.9/120.4	163.6/166.1 (172/175)*2
	RDP-C	10.3	16.4	28.8	36.9	93.8	139.7

*1 Values differ according to the motor used. *2 Values in parentheses are at ratio 356.5.

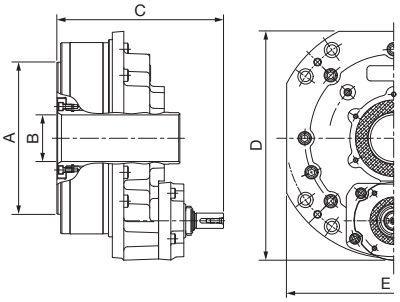
RDS-C (straight input)



RDR-C (right angle input)



RDP-C (pulley input)

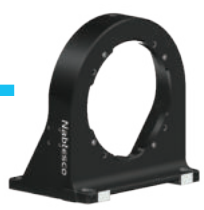


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Base Flange for RD2 (Option)

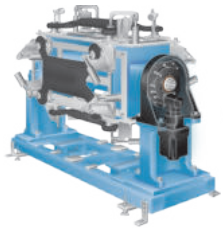
Deliverable with base flange assembled. Helps reduce equipment design, manufacture, and assembly processes.

RD2
(All models supported)





Example: Positioner





RD□-E (Solid Type) External Dimensions

Model RD_-		6E	20E	40E	80E	160E	320E
A (mm)		201.5	201.5	354	354	394	474.5
B (mm)		240	240	250	250	253	380
C (mm)	RDS-E*1	118.9/129.9	124.5/135.5	158.6/182.6	173/197	216.5/213.5	241/238
	RDR-E	178.4	184	229.1	243.5	352.5	377
	RDP-E	-	152	194.6	209	257	281.5
D (mm)		265	265	335	335	380	425
E (mm)		100	100	210	210	207	265
F (ømm)		86h7	105h6	135h7	160h7	204h7	245h7
G (mm)	RDR-E*1	107.8/119.8	107.8/119.8	147.5/171.5	147.5/171.5	222.5/213.5	222.5/213.5
H (pcs)		4	4	4	4	4	4
I (ømm)		17.5	17.5	17.5	17.5	22	22
J (pcs)		2	2	2	2	2	2
K (ømm)		10	10	10	10	10	10
L (ømm)		-	-	-	-	-	-
Mass (kg)*2		11.2	10.8	23.8	21.8	30.7	71.9

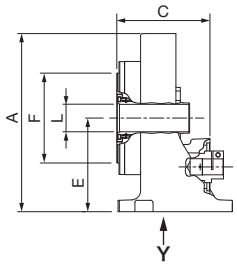
*1 Values differ according to the motor used. *2 Mass of base flange only.

RD□-C (Hollow Type) External Dimensions

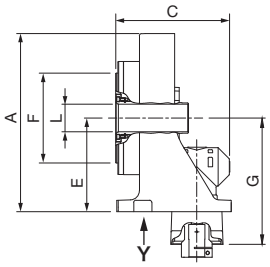
Model RD_-		10C	27C	50C	100C	200C	320C
A (mm)		354	354	394	394	557	634.5
B (mm)		250	250	253	253	390	405
C (mm)	RDS-C*1	132/143	141/152	177.5/201.5	182.1/206.1	246/243	256.5/253.5
	RDR-C	191.5	200.5	248	252.6	382	392.5
	RDP-C	159.5	168.5	213.5	218.1	286.5	297
D (mm)		335	335	380	380	550	645
E (mm)		210	210	207	207	295	315
F (ømm)		110h7	140h7	176h7	199h7	260h7	340h7
G (mm)	RDR-C*1	168.3/180.3	190.8/202.8	237.5/261.5	255.5/279.5	366.5/357.5	402.5/393.5 (420.5/411.5)*3
H (pcs)		4	4	4	4	8	8
I (ømm)		17.5	17.5	22	22	22	22
J (pcs)		2	2	2	2	2	2
K (ømm)		10	10	10	10	10	10
L (ømm)		25	36	48	61	75	120
Mass (kg)*2		23.7	21.9	29.9	30.2	119	171

*1 Values differ according to the motor used. *2 Mass of base flange only. *3 Values in parentheses are at ratio 356.5.

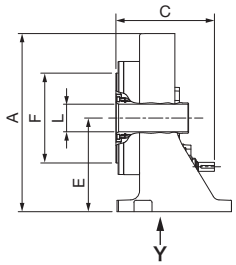
RDS (straight input)



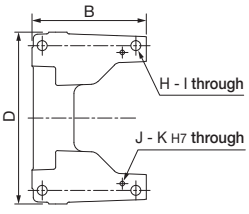
RDR (right angle input)



RDP (pulley input)



Arrow view Y



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Solid | Hollow

Connection parts for various manufacturers' servomotors included

Grease-filled and sealed

RS

Download materials here

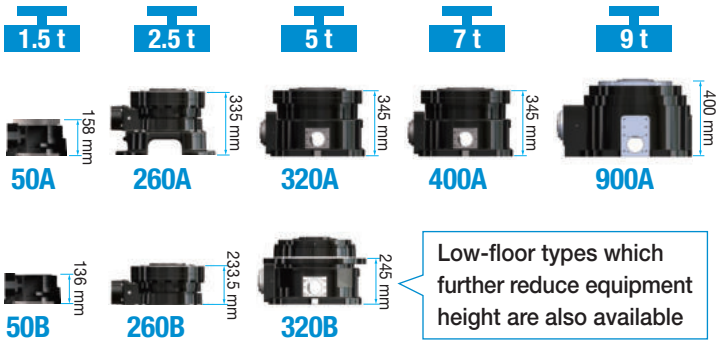
- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

Model for Low-floor Indexing Table

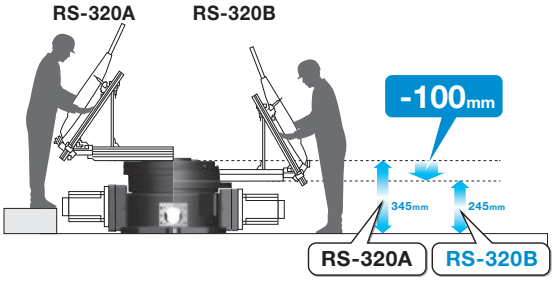
Supporting heavy weights of up to 9 tons, to realize high-accuracy rotation and positioning even under high load. Used in a wide variety of applications from welding and transport to packaging.



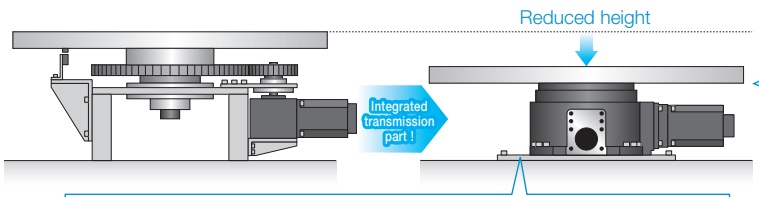
Lineup includes 5 types supporting 1.5 to 9 tons



Low-floor types which further reduce equipment height are also available



Because the table structure integrates gears, motor flange, and stand, parts and design/assembly processes are greatly reduced



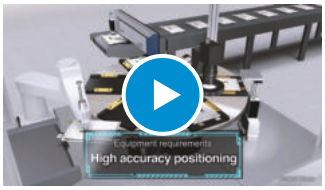
No need for stands as direct fixing to the floor is possible

Installation is easy, with just bolts and pins



Watch video

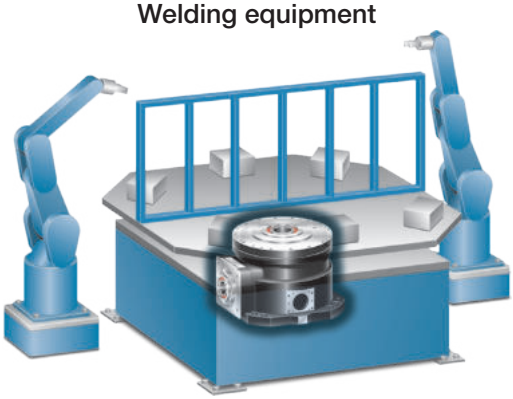
Case study: Lithium-ion battery manufacturing equipment



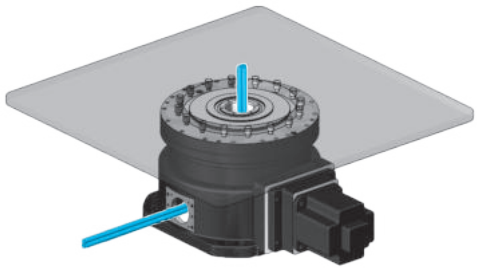
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Applications

Welding equipment



Indexing Table



RS Specifications

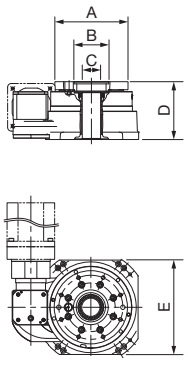
Model RS-	50A	50B	260A	260B	320A	320B	400A	900A
Standard ratio	65.4 130.8 163.5 300		120		170		170	193.6 240
Rated torque (Nm)	490		2,548		3,136		3,920	8,820
Allowable acceleration/ deceleration torque (Nm)	1,225		6,370		7,840		9,800	17,640
Momentary maximum allowable torque (Nm)	2,450		12,740		15,680		19,600	35,280
Rated output speed (rpm)	15		15		15		15	15
Allowable output speed: Duty ratio 100% (reference value) (rpm)	60		21.5		20		20	10
Rated life (h)	6,000		6,000		6,000		6,000	6,000
Backlash/lost motion (arc.min)	1.5/1.5		1/1		1/1		1/1	1/1
Spring constant (reference value) (Nm/arc.min)	255		1,540		1,570		2,450	4,900
Allowable moment (Nm)	1,764		12,740		20,580		24,500	44,100
Allowable thrust force (N)	14,700		24,500		49,000		72,000	88,200
Repeated positioning accuracy (reference value)	±5 arc.sec.		±5 arc.sec.		±5 arc.sec.		±5 arc.sec.	N/A
At radius of 500 mm	±0.012 mm		±0.012 mm		±0.012 mm		±0.012 mm	N/A

* The addition of an input shaft gearbox (option) realizes higher reduction. For details, see the RS Series catalog. (RS-50A/B are not supported)

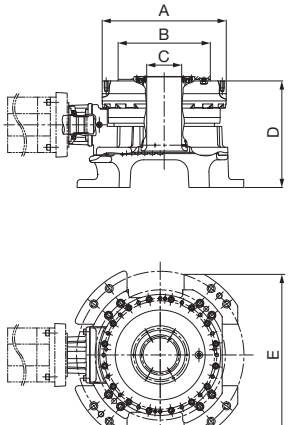
RS External Dimensions

Model RS-	50A	50B	260A	260B	320A	320B	400A	900A
A (ømm)	200	176	390		470	550	470	543
B (ømm)	95h7	93h7	290h7		300h7	440h7	300h7	390h7
C (ømm)	50		110		85		85	95
D (mm)	158	136	335	233.5	345	245	345	400
E (mm)	258		543	430	480		480	583
Mass (kg)	45	40	165	129	290		290	480

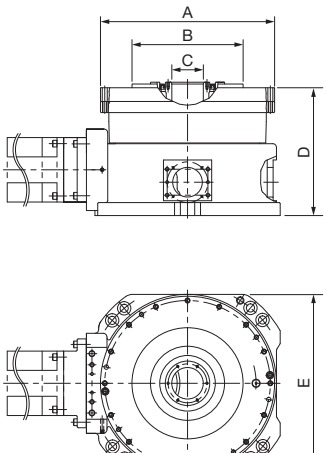
50A/50B



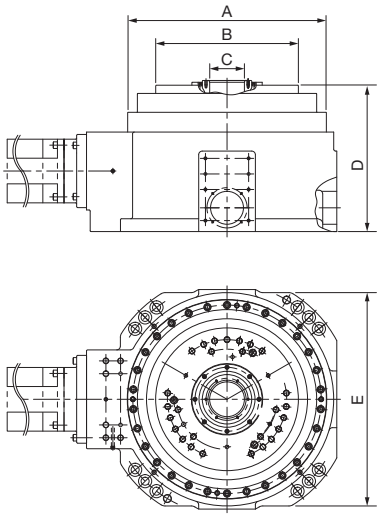
260A/260B



320A/320B/400A



900A



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Solid Hollow

Connection parts for various manufacturers' servomotors included

Grease-filled and sealed

GH

Download materials here

- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

High-Speed, High-Rigidity Model

Making the most of the Precision Reduction Gear RV™'s high-accuracy and high-rigidity characteristics, it supports high-speed rotation (up to 270 rpm).
With durability withstanding up to 7 times the rated torque, it is resistant to overload and shocks, improving equipment reliability.



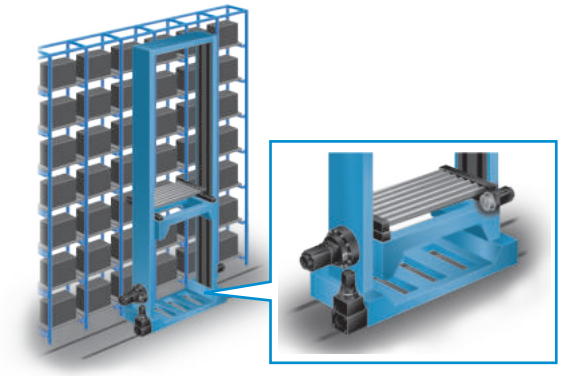
Output flange type
GH-P



Output shaft type
GH-S

Application Stacker crane

High rigidity reduces residual vibration at high-speed operation.
Rapid positioning becomes possible, helping shorten cycle time.

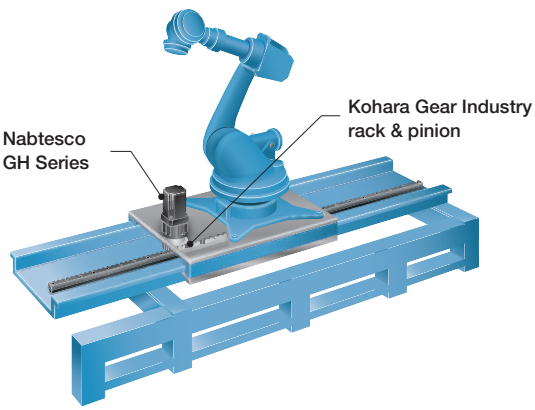


Watch video

Case study: Lithium-ion battery manufacturing equipment



Application Slider



Nabtesco RV® GH Series × KHK Rack gear & pinion

A collaboration between the Nabtesco Precision Reduction Gear RV™ and the Kohara Gear Industry Co., Ltd. (KHK) rack & pinion. Both companies' products are available as standard specifications, eliminating the need for custom design and enabling quick delivery.

For the rack & pinion details, see here.

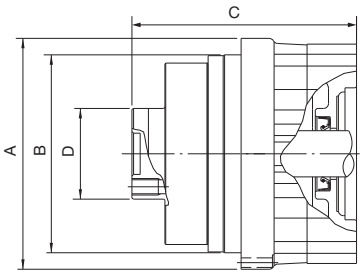
© Nabtesco Corporation. All rights reserved.

GH Specifications

Model GH-	7	17	24	40	100
Standard ratio	11.24* 21 30.6	11 21 31	11 21 31	10.74* 21 31.43*	20.375 31.4
Rated torque (Nm)	69	167	235	392	980
Allowable acceleration/ deceleration torque (Nm)	206	500	706	1,176	2,942
Momentary maximum allowable torque (Nm)	480	1,166	1,646	2,744	6,865
Rated output speed (rpm)	50	50	50	50	50
Allowable output speed: Duty ratio 30% (reference value) (rpm)	270	270	250	250	135
Rated life (h)	6,000	6,000	6,000	6,000	6,000
Backlash/lost motion (arc.min)	6/6	6/6	6/6	6/6	10/10
Spring constant (reference value) (Nm/arc.min)	20	45	65	108	382
Allowable moment (Nm)	460	804	843	1,823	4,900
Allowable thrust force (N)	1,372	1,960	2,940	2,940	5,586

* This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.

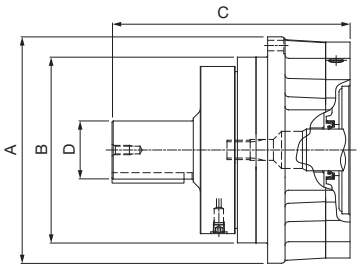
GH-P (output flange type)



GH External Dimensions

Model GH-		7	17	24	40	100
A (ømm)		140	180	195	240	382
B (ømm)		120h7	151h7	160h7	200h7	310h7
C (mm)	GH-P	136.2	157	146	202.2	237
	GH-S	158.2	200.2	205	281.2	-
D (ømm)	GH-P	55h7	72h7	42js6	108h7	144h7
	GH-S	28h6	38h6	50h6	60h6	-
Mass (kg)	GH-P	8	15.5	15.5	35.5	90
	GH-S	8.1	15.6	17	37.9	-

GH-S (output shaft type)



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Solid Hollow

Connection parts for various manufacturers' servomotors included

Grease-filled and sealed

RH

Download materials here

- Product Leaflets
- Operation Manuals
- 2D/3D CAD Drawings

High Output Torque/High Reduction Ratio Model

Supports the highest level of output torque even among our gearhead products, with a high reduction ratio enabling high torque to be output even with small motors. The allowable moment is also large, exhibiting high performance in positioner applications driving heavy weights.



Solid Type
RH-N

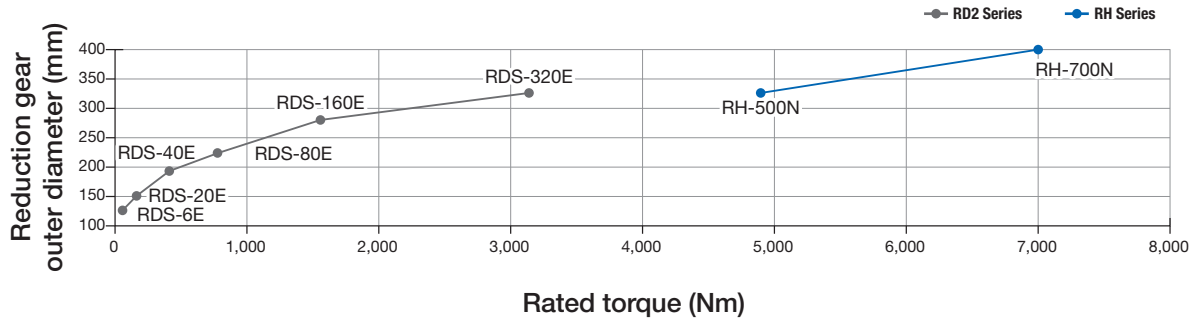


Hollow Type
RH-C

RH-N

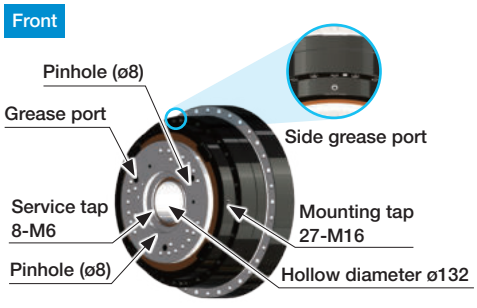
Based on the compact, lightweight RV™-N Series, it balances high output torque and compact design.

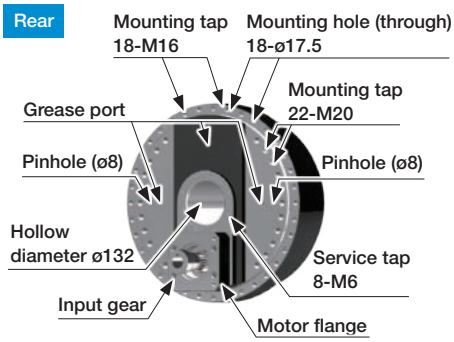
Comparison with RD2 Series



RH-C

With through holes for mounting taps, it enhances equipment design flexibility.





Watch video

[Exhibition] RH-900C drive model



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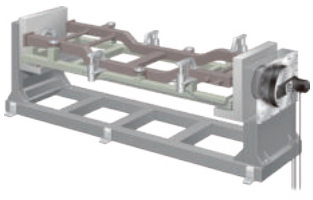
Applications



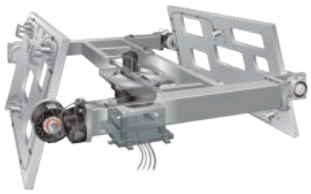
Pipe bending



Heavy weight cantilever drive/ cover open/close equipment



Supports large, long BBQ equipment which involves heavy weights



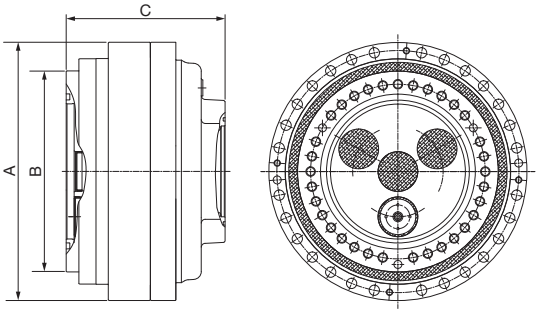
Large, ultra-low-floor indexing tables can be configured

RH Specifications

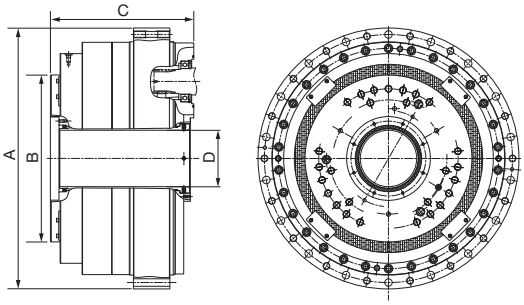
Model RH-	500N	700N	900C
Standard ratio*1	81 105 123 144 159 192.75 209 222	105 118 142.44 159 183 203.52*2 228.5 268.42*2 284.4	186 258 330
Rated torque (Nm)	4,900	7,000	8,820
Allowable acceleration/deceleration torque (Nm)	12,250	17,500	22,050
Momentary maximum allowable torque (Nm)	24,500	35,000	44,100
Rated output speed (rpm)	15	15	15
Allowable output speed: Duty ratio 40% (reference value) (rpm)	25	19	28
Rated life (h)	6,000	6,000	6,000
Backlash/lost motion (arc.min)	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	1,620	2,600	4,900
Allowable moment (Nm)	11,000	15,000	44,100
Allowable thrust force (N)	32,000	44,000	88,200

*1 Contact us when ratios other than the above are required.
*2 This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco.

RH-N (Solid Type)



RH-C (Hollow Type)



RH External Dimensions

Model RH-	500N	700N	900C
A (ømm)	325	398	610
B (ømm)	253h7	315h7	390h7
C (mm)	200	229.5	335
D (ømm)	-	-	132
Mass (kg)*	75	135	410

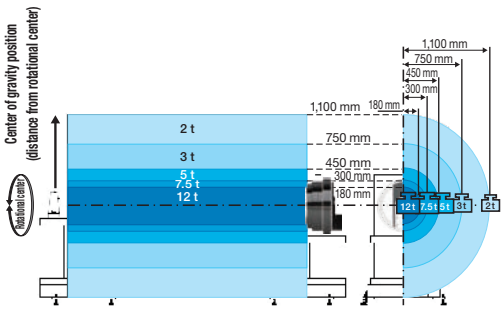
* Mass of motor flange and input gear is not included.

RH-C

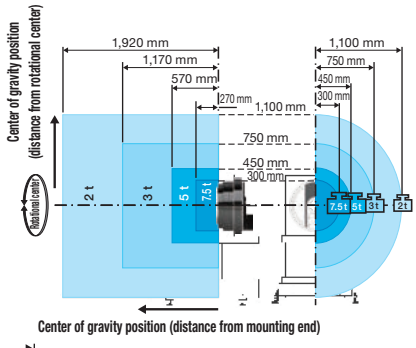
Allowable load range for each load center of gravity position

* Operation outside this usage range will exceed the allowable moment, possibly damaging the reduction gear.
* The load weight in this document is a reference value.

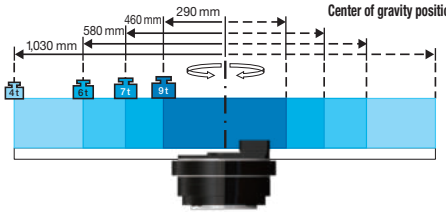
For double column



For cantilever



Turntable applications



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Solid | Hollow | Connection parts for various manufacturers' servomotors included | Grease-filled and sealed

RH Foot Type

Download materials here

- Product Leaflets
- Operation Manuals
- 2D/3D CAD Drawings

Model with Feet for Positioners

Optimized for positioners requiring high-accuracy rotation control. In addition to improving the flexibility of equipment design through a hollow structure with feet, it also contributes to reducing assembly processes.



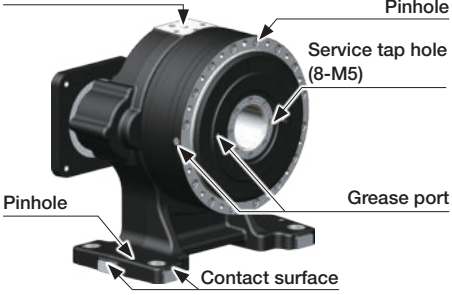
RH-155C



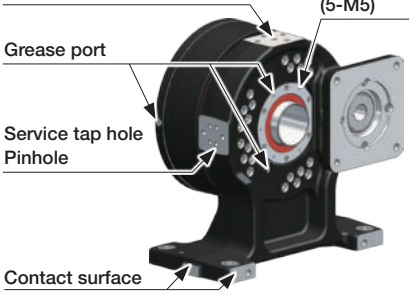
RH-320CA

RH-155C

Front



Rear

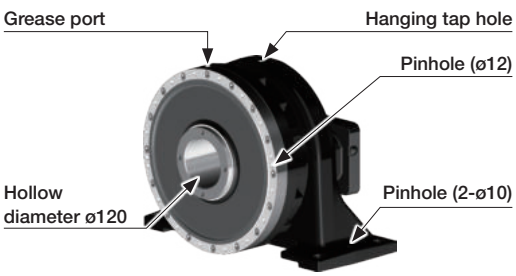


Bottom motor mounting is also available.

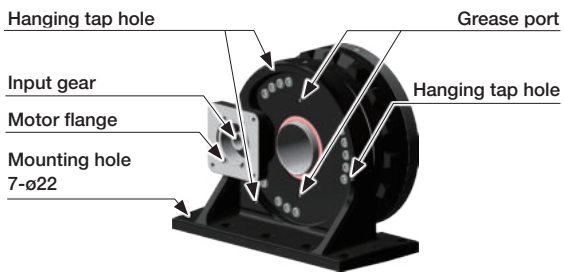


RH-320CA

Front



Rear



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RH Foot Type Specifications

Model RH-	155C	320CA
Standard ratio	78.3 104.4 120.46*	152
Rated torque (Nm)	1,470	3,136
Allowable acceleration/deceleration torque (Nm)	3,675	7,840
Momentary maximum allowable torque (Nm)	7,350	15,680
Rated output speed (rpm)	15	15
Allowable output speed: Duty ratio 35% (reference value) (rpm)	51	64
Rated life (h)	6,000	6,000
Backlash/lost motion (arc.min)	1/1	1/1
Spring constant (reference value) (Nm/arc.min)	735	1,960
Allowable moment (Nm)	4,000	20,580
Allowable thrust force (N)	16,000	29,400

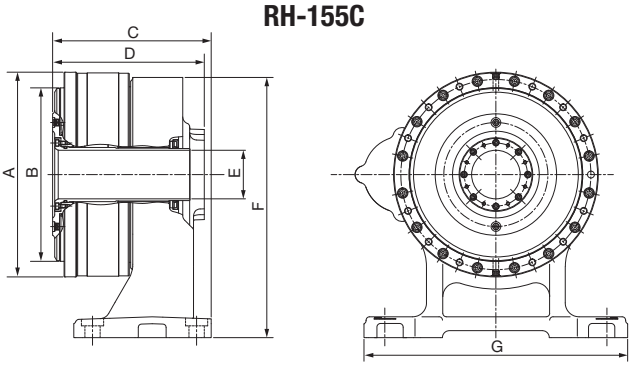
* This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco.

RH Foot Type External Dimensions

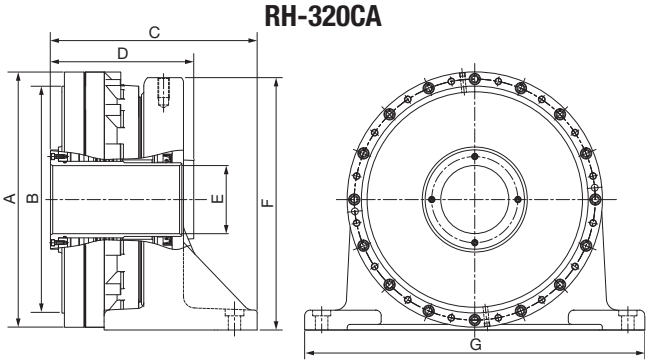
Model RH-	155C	320CA
A (ømm)	295	450
B (ømm)	250h7	400h7
C (mm)	228.5	364.5
D (mm)	218.5	252.5
E (ømm)	70	120
F (mm)	375	445
G (mm)	380	600
Mass (kg)*	90	212

* Mass of motor flange and input gear is not included.

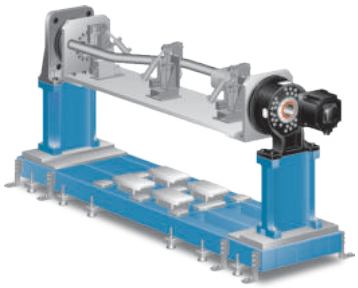
RH-155C



RH-320CA



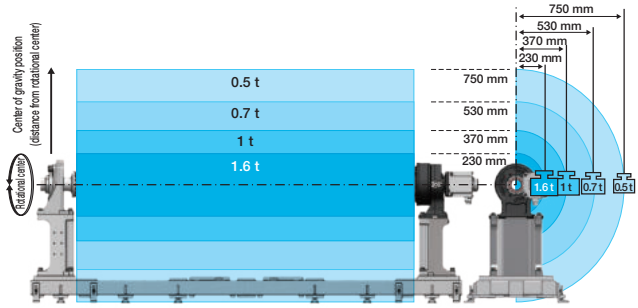
Application BBQ double column



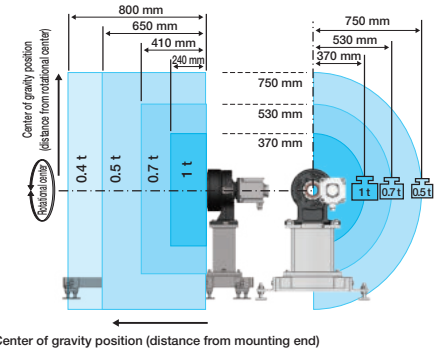
Allowable load range for each load center of gravity position

* Operation outside this usage range will exceed the allowable moment, possibly damaging the reduction gear.
* The load weight in this document is a reference value.

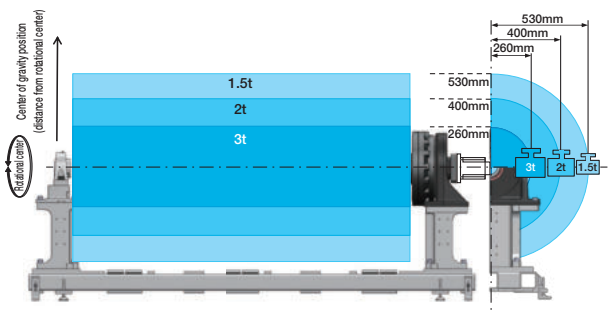
RH-155C for double column



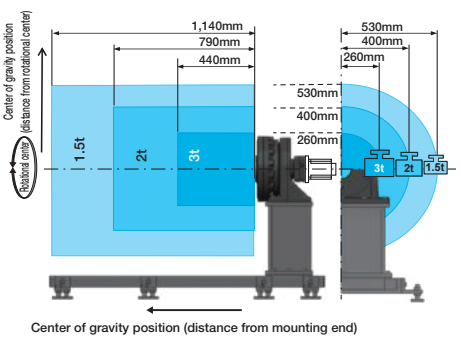
RH-320CA for cantilever



RH-320CA for double column



RH-320CA for cantilever



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Solid | Hollow

Connection parts for various manufacturers' servomotors included

Grease-filled and sealed

RA

Download materials here

- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

Flat, High-Accuracy Indexing Model

Characterized by a flat design and high-accuracy indexing performance, it has an excellent record in machine tool applications. Compact design is achieved with a motor connection structure without couplings, leading to increasing adoption in general industry fields as well.



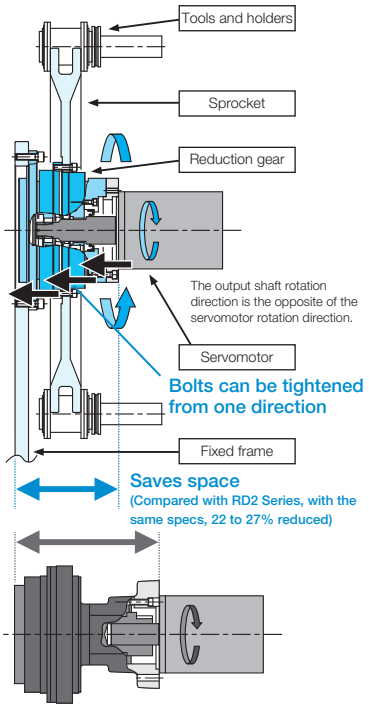
Case rotation type
RA-EA



Shaft rotation type
RA-EC

Lineup includes case rotation type and shaft rotation type

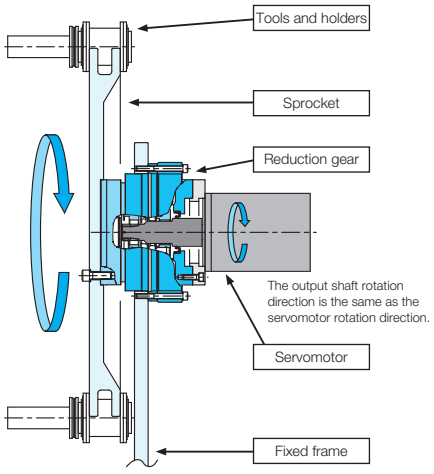
RA-EA (case rotation type)



Ex.: RD2 Series (straight input type)

Couplings are used for motor connection, increasing versatility.

RA-EC (shaft rotation type)

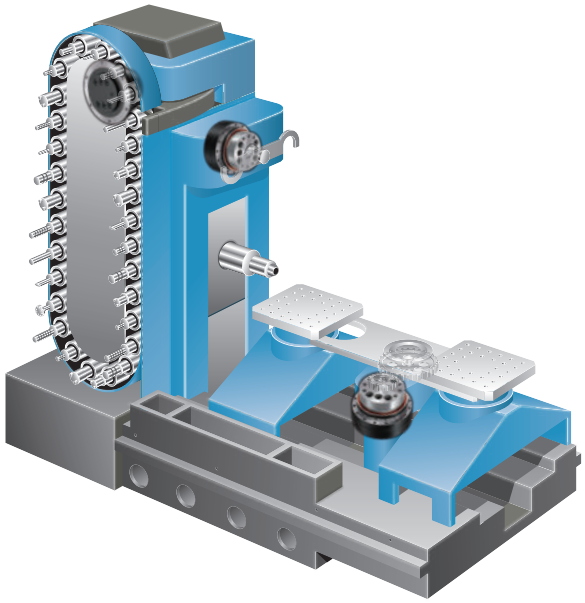


* Servomotor is to be provided by the customer.

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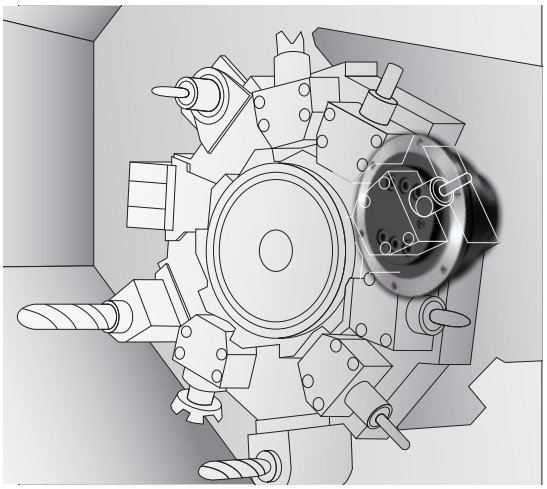
Machining centers

- ATC magazine drive
- ATC arm cam drive
- APC drive



NC lathes, multi-tasking lathes

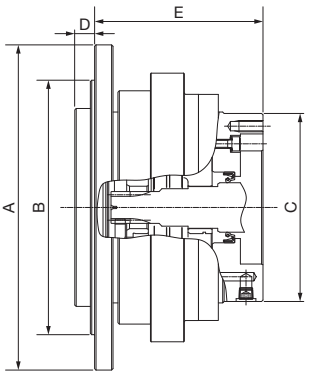
- Turret toolpost



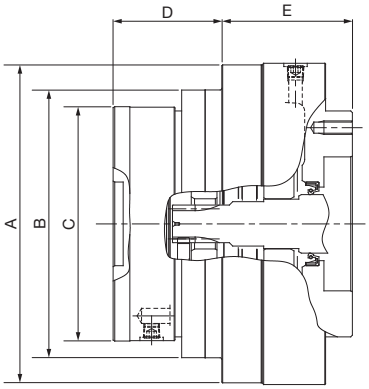
RA Specifications

Model RA-	20EA	20EC	40EA	40EC	80EA	80EC	160EA	160EC
Standard ratio	80, 104, 120, 140, 160	81, 105, 121, 141, 161	80, 104, 120, 152	81, 105, 121, 153	80, 100, 120, 152	81, 101, 121, 153	80, 100, 128, 144, 170	81, 101, 129, 145, 171
Rated torque (Nm)	167		412		784		1,568	
Allowable acceleration/ deceleration torque (Nm)	412		1,029		1,960		3,920	
Momentary maximum allowable torque (Nm)	833		2,058		3,920		7,840	
Rated output speed (rpm)	15		15		15		15	
Allowable output speed: Duty ratio 40% (reference value) (rpm)	75		70		70		45	
Rated life (h)	6,000		6,000		6,000		6,000	
Backlash/lost motion (arc.min)	1/1		1/1		1/1		1/1	
Spring constant (reference value) (Nm/arc.min)	49		108		196		392	
Allowable moment (Nm)	882		1,666		2,156		3,920	
Allowable thrust force (N)	3,920		5,194		7,840		14,700	

RA-EA (case rotation type)



RA-EC (shaft rotation type)



RA External Dimensions

Model RA-	20EA	20EC	40EA	40EC	80EA	80EC	160EA	160EC
A (ømm)	175	150	230	192	260	226	325	290
B (ømm)	140h7	124h7	180h7	160h7	210h7	190h7	270h7	240h7
C (ømm)	124h7	110h7	160h7	140h7	190h7	170h7	240h7	210h7
D (mm)	17	59.1	14	65	16	77	15	108
E (mm)	93.6	59	119.1	78	127	72	168	85.5
Mass (kg)	10	9.5	18.5	20	28	27	58	59

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Solid Hollow

Connection parts for various manufacturers' servomotors included

Grease-filled and sealed

RT-G

* For details, inquire with our sales or from the website.

Ultra-High-Reduction Ratio Model with Brake Assist

Fall-prevention function is provided by the combination of worm gears and Precision Reduction Gear RV™. Support for high reduction ratios enables the use of a small motor, contributing to reduced space with its right angle input structure as well.



The worm gear self-lock (non-reverse) property reduces the risk of heavy weights falling even when motive power is stopped, helping improve safety.

Applications

Large electric door open/close



Heavy weight cantilever drive/ cover open/close equipment



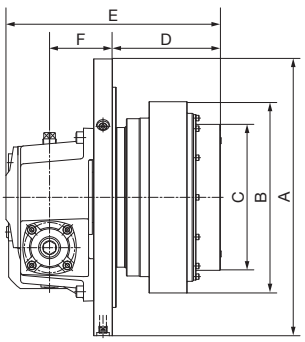
RT-G Specifications

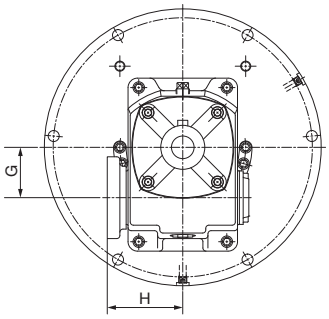
Model RT-G	380N	500N	700N
Standard ratio (case rotation)	6,900	6,100	12,512.5
Rated torque (Nm)	9,310	12,250	17,500
Maximum torque (Nm)	9,310	12,250	17,500
Allowable input speed (rpm)	1,800	1,800	1,800
Backlash/lost motion (arc.min)	1.5/1.5	1.5/1.5	1.5/1.5
Allowable moment (Nm)	7,050	11,000	15,000
Allowable thrust force (N)	25,000	32,000	44,000

RT-G External Dimensions

Model RT-G	380N	500N	700N
A (ømm)	410	460	480
B (ømm)	304	325	395
C (ømm)	232	256	310
D (mm)	165	168	197
E (mm)	365	338	367
F (mm)	130	100	100
G (mm)	80	80	80
H (mm)	120	120	120
Mass (kg)	110	125	176

* Specifications and dimensions may change, as this model is under development.





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HR

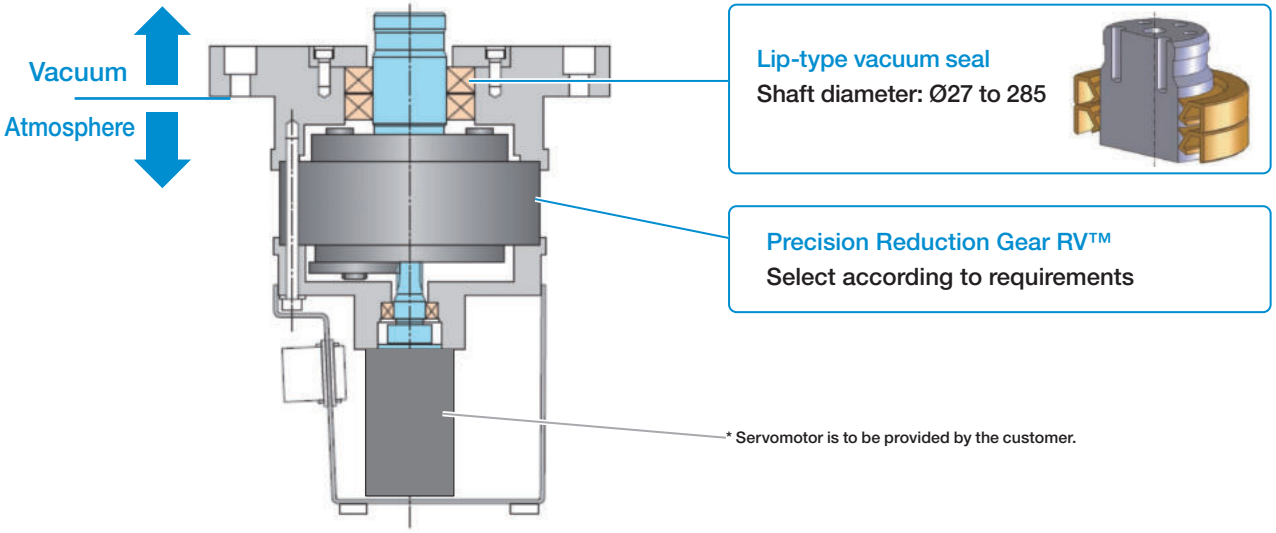
* For details, inquire with our sales or from the website.

Vacuum Seal Unit for Vacuum Chambers



Compact fusion of lip-type vacuum seal and Precision Reduction Gear RV™.
The use of a contact-type lip without burst contributes to reduced assembly time and increased safety in applications such as FPD transport robots and wafer transport equipment.

Gearhead unit supporting high vacuum



HR Specifications

Model HR	Specifications
Reference degree of vacuum (Pa)	1.0×10^{-5}
He leak rate (Pa·m^3/s)	1.0×10^{-10}
Withstand temperature (°C)*	80
Cleanliness class	Fed.Std-209E Class 10 (ISO14644-1 Class 4)
Recommended maintenance period	2.7 million rotations or 2.5 years, whichever comes first
Allowable rotation speed (rpm)*	20 (without exceeding the withstand temperature)

* Specifications for vacuum seal.

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Gearhead Products: Examples of Customization

Nabtesco offers customization for some current products in accordance with customer requests.
For details, consult our sales.

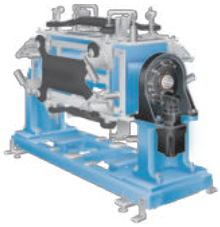
Example 1: Reduced surface runout

For a customer requiring higher accuracy during rotation, we applied precision machining to make the shaft surface of the reduction gear to be assembled to the base equipment smoother, enhancing surface runout accuracy during rotation.

Applications



5-axis machining center



Welding positioner

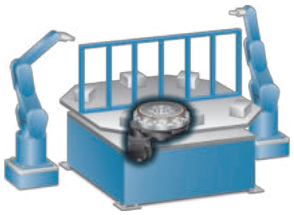


Antenna

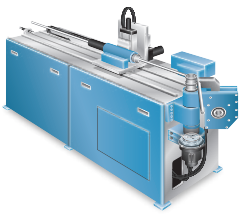
Example 2: Lost motion adjustment

For a customer requiring higher-accuracy positioning, we achieved higher repeated positioning accuracy with a product whose lost motion was adjusted to less than half of the normal value.

Applications



Welding robot



Machine tools

Example 3: High reduction ratio

For a customer requiring a higher reduction ratio, we added customization and an input gearbox (optional) to achieve a higher reduction ratio.

* The following is one example; we have numerous other support cases.

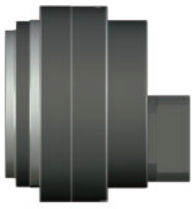
RS-320A



Input gearbox (option)

Standard ratio 170 → 255

RV-380N



Maximum standard ratio 185 → 996

* Provided as a gearhead product with motor flange included.

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SERVO ACTUATORS



Helps reduce equipment design, manufacture, and assembly processes through a structure integrating the servomotor and the reduction gear.

AF

P.41



Compact

RV®

Basic characteristics

Ultra-high reduction ratio



RT

P.43

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Solid Hollow

Grease-filled and sealed

Servomotor integrated type

AF

Equipped with Panasonic servomotor

Download materials here

- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

Compact Actuator Model

Compact fusion of Precision Reduction Gear RV™ and Panasonic servomotor. While resolving struggles with motor selection and design/assembly, the overall quality of the drive part as a whole provides safety and security to the customer.



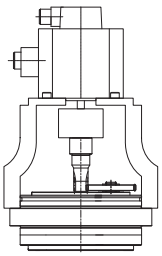
Solid Type
AF-N



Hollow Type
AF-C

Optimized design with a structure integrating servomotor and reduction gear, achieving compact size

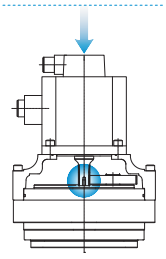
Before



Input gear and coupling increase overall length

With the AF Series

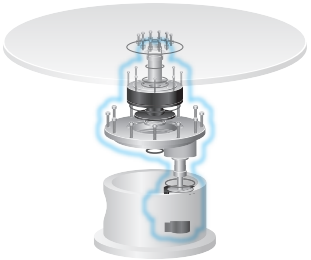
After



Motor shaft is machined for compactness (reduced by up to 23% of conventional product)

Helps reduce the number of parts and assembly processes

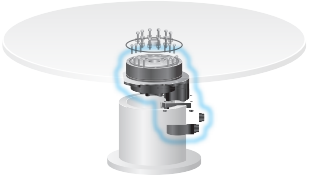
Before



Too many parts, making the design and assembly processes complicated

With the AF Series

After



Structure integrating reduction gear and motor renders assembly simple

Watch video

Case study:
Lithium-ion battery manufacturing equipment



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RV®

AF-N (Solid Type) Specifications

Model AF-		17N			42N		80N	125N	380N	500N
Motor	Manufacturer	Panasonic Co., Ltd.								
	Series	A6								
	Representative model	MHMF042L2		MDMF102L3	MDMF102L2	MDMF152L2	MDMF202L2	MHMF302L3	MDMF402SC	MDMF402L2
	Rated capacity (kW)	0.4		1.0	1.0	1.5	2.0	3.0	4.0	4.0
	Brake	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Encoder specifications	1-rotation: 23-bit absolute Multi-rotation: 16-bit (battery backup)								
	Power voltage	200 to 230 VAC +10%, -15% 50/60 Hz								
Standard ratio		81		126	126		129	102.18*1	217.86*1	252.33*1
Rated torque (Nm)		82		415	481	722	986	1,169	3,329	3,856
Momentary maximum torque (Nm)*2		289		415	1,029		1,960	3,062	9,310	11,567
Rated output speed (rpm)		37		15.9	15.9		15.5	19.6	9.2	7.9
Maximum output speed (rpm)		80.2		31.7	31.7		31	39.1	17.4	15.1
Brake holding torque (Nm)		-	130	1,726	1,726		1,767	2,554	5,447	6,308
Allowable load inertia moment (kgm^2)		11		117	117	164	221	473	2,472	3,311
Backlash/lost motion (arc.min)		1/1			1/1		1/1	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)		36			113		212	334	948	1,620
Allowable moment (Nm)		784			1,660		2,150	3,430	7,050	11,000
Allowable thrust force (N)		2,610			5,220		6,530	13,000	25,000	32,000

*1 This ratio is 1/○○ and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.
*2 Set the servo amp torque limit so as not to exceed the momentary maximum torque.

AF-N (Solid Type) External Dimensions

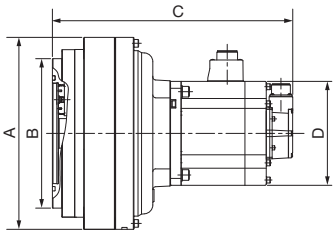
Model AF-	17N (0.4kW/ no brake)	17N (0.4kW/ with brake)	17N (1.0kW)	42N (1.0kW)	42N (1.5kW)	80N	125N	380N	500N
A (ømm)	133			159		189	221	295	325
B (ømm)	94h7			118h7		140h7	160h7	222h7	253h7
C (mm)	189	218.3	249.2	255	269	293.4	331.4	384.15	390
D (□mm)	60		130	130		130	176	176	176
Mass (kg)	6.8	7.2	15	16	17	26	39.7	75.1	91.1

AF-C (Hollow Type) Specifications

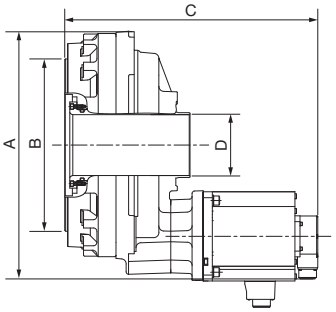
Model AF-		50C	120C	200C	320C
Motor	Manufacturer	Panasonic Co., Ltd.			
	Series	A6			
	Representative model	MDMF102L2	MDMF202L2	MHMF302L2	MHMF502L3
	Rated capacity (kW)	1.0	2.0	3.0	5.0
	Brake	No	No	Yes	Yes
	Encoder specifications	1-rotation: 23-bit absolute Multi-rotation: 16-bit (battery backup)			
	Power voltage	200 to 230 VAC +10%, -15% 50/60 Hz			
Standard ratio		120.47*1	120	155.96	157
Rated torque (Nm)		460	917	1,784	3,002
Momentary maximum torque (Nm)*2		1,225	2,746	4,900	7,840
Rated output speed (rpm)		16.6	16.7	12.8	12.7
Maximum output speed (rpm)		33.2	33.3	25.6	22.3
Brake holding torque (Nm)		-	-	3,899	6,924
Allowable load inertia moment (kgm^2)		84	158	1,057	1,763
Backlash/lost motion (arc.min)		1/1	1/1	1/1	1/1
Spring constant (reference value) (Nm/arc.min)		255	588	980	1,960
Allowable moment (Nm)		1,764	3,920	8,820	20,580
Allowable thrust force (N)		11,760	15,680	19,600	29,400

*1 This ratio is 1/○○ and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.
*2 Set the servo amp torque limit so as not to exceed the momentary maximum torque.

AF-N (Solid Type)



AF-C (Hollow Type)



AF-C (Hollow Type) External Dimensions

Model AF-	50C	120C	200C	320C
A (ømm)	284	317.5	418	491.5
B (ømm)	176h7	199h7	260h7	340h7
C (mm)	303	354.1	467.5	508.5
D (ømm)	48	61	75	120
Mass (kg)	32	43	113	164

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Solid Hollow

Grease-filled and sealed

Servomotor integrated type

RT

Equipped with Mitsubishi Electric servomotor

Download materials here

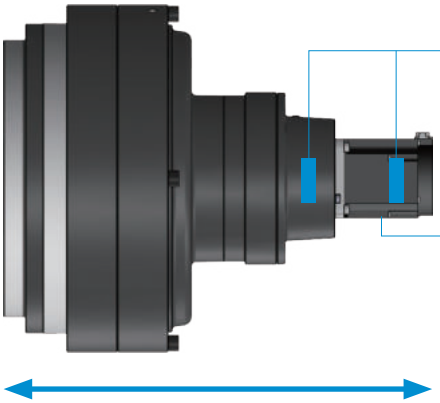
- Operation Manuals

Ultra-High Reduction Ratio Model for Heavy Weight Open/Close Applications



This ultra-high reduction ratio model was developed based on the concept of safe and efficient movement of heavy weights. Realizing a high reduction ratio at a standard of 5,000 or above, it enables control of heavy weights in slow, stabler movement.

Double brake structure



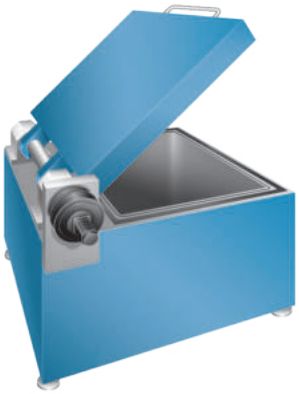
378.6mm (for RT-80E)

Each of the two equipped brakes can be independently controlled, increasing safety. An output side brake is no longer required.

The energy-efficient structure makes it possible to use a small motor. (Ex.: For RT-80E, an 0.4 kW motor is capable of moving heavy weights of 500 to 600 kg.)

Compact design helps keep equipment small-sized and enables installation in previously impossible narrow spaces.

Application Cover open/close / inverter



Even heavy covers can be retained at any angle.
The safety and reliability provided by the double brake is the key to widespread adoption.

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RT Specifications

Rotation shaft is mountable only in the horizontal direction (figure on page 43).

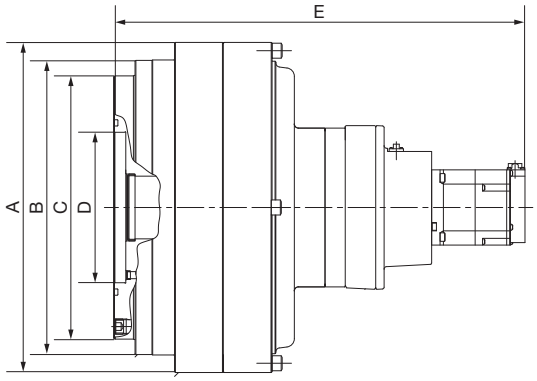
Model RT-		80E	160N	320E	450E	700N	900N	1500E	2000N
Motor	Manufacturer	Mitsubishi Electric Co., Ltd.							
	Model	HK-KT43UWBK		HK-KT7M3UWBK			HK-KT103UWBK	HK-KT153WBK	HK-KT203WBK
	Rated capacity (kW)	0.4		0.75			1.0	1.5	2.0
	Brake rated voltage (V)	24 VDC $^{0\ to}_{10\%}$							
Actuator brake rated voltage (V)		24 VDC ±10%							
Standard ratio		5,757	6,561	5,757	8,181	11,254.33*1	15,244.2	13,468.76*1	19,456.2
Rated torque (Nm)		1,960	4,000	7,840	11,025	17,286	22,500	36,366	46,000
Maximum torque (Nm)*2		1,960	4,000	7,840	11,025	17,500	22,500	36,750	46,000
Rated output speed (rpm)		0.521	0.457	0.521	0.367	0.266	0.197	0.223	0.154
Maximum output speed (rpm)		0.625	0.548	0.625	0.440	0.320	0.236	0.267	0.185
Brake holding torque (Nm)		1,960	4,000	7,840	11,025	17,500	22,500	36,750	46,000
Allowable load inertia moment (kgm^2)		28,636	37,192	81,200	163,975	310,317	1,073,622	1,284,365	3,401,215
Backlash/lost motion (arc.min)		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1/1	1 / 1	1/1
Allowable moment (Nm)		2,156	4,000	7,056	8,820	15,000	12,740	44,100	44,150
Allowable thrust force (N)		7,840	14,700	19,600	24,500	44,000	39,200	51,000	51,000

*1 This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco.

*2 Set the servo amp torque limit so as not to exceed the maximum torque.

RT External Dimensions

Model RT-	80E	160N	320E	450E	700N	900N	1500E	2000N
A (ømm)	222	238	325	370	395	440	570	570
B (ømm)	190h7	202 ±0.1	284h8	328h7	353h7	380 ±0.1	494h7	483 ±0.1
C (ømm)	170	179 ±0.1	$280^{0}_{-0.2}$	$326^{0}_{-0.2}$	315h7	$335^{+0.004}_{-0.057}$	$390^{+0.004}_{-0.057}$	$390^{+0.004}_{-0.057}$
D (ømm)	62h7	-	-	-	180h7	-	-	-
E (mm)	378.6	389.5	443.3	459.8	488.8	533.1	611.1	673.9
Mass (kg)	40	46	107	140	199	217	377	461



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Mecanum Wheel Drive Units

Unit products for AGVs (automated guided vehicles)/AMRs (autonomous mobile robots), integrating the Precision Reduction Gear RV™ and a mecanum wheel.
Enabling movement in all directions thanks to mecanum motion, they realize high-accuracy transport while saving space.
Making the most of the Precision Reduction Gear RV™'s characteristics of high torque, high rigidity, and high durability, they enable smooth and stable motion even with high loads.



RV®

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RVW

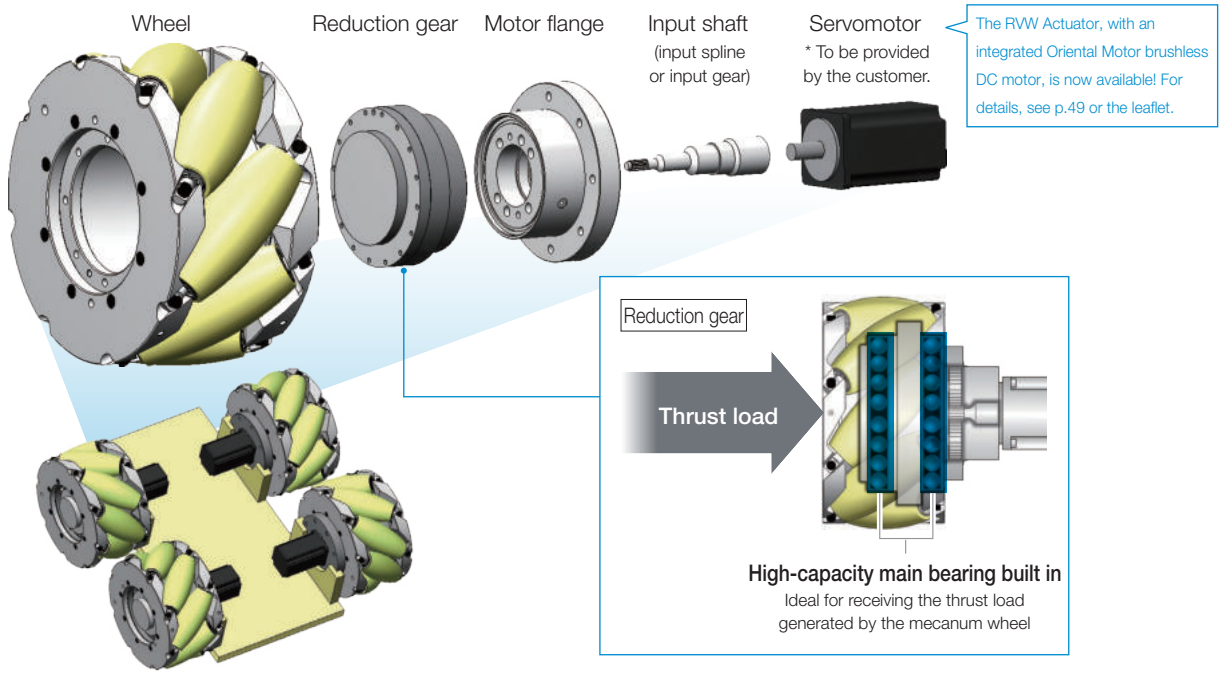
Download materials here

- Product Catalogs & Leaflets
- Operation Manuals
- 3D CAD Drawings

When you need this kind of mecanum wheel...

High withstand load and compact	High durability, unlikely to break	Few parts, making adoption easy

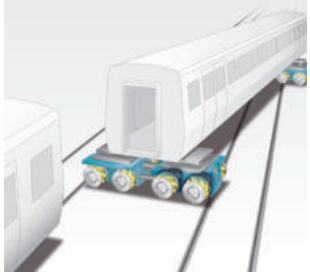
"The RVW Series" Mecanum Wheel Drive Units offer performance, reliability, and easy introduction



Applications



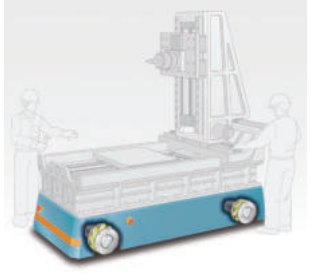
Autonomous Mobile Robot



Assembly/maintenance of railcars



Lifter/aerial work vehicle with movement in all directions



Transport within machine assembly process

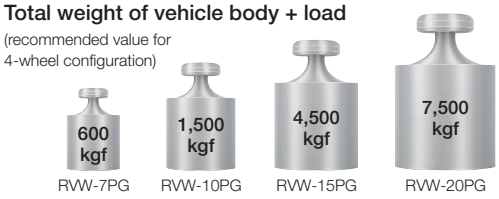
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Advantages of the RVW Series

ADVANTAGE 01

High loads supported

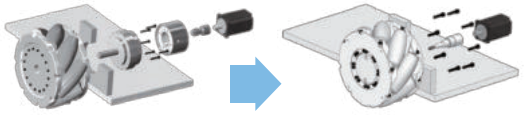
Flexible transport of heavy weights is possible!
Mecanum wheel supporting high loads



ADVANTAGE 02

Simple mounting

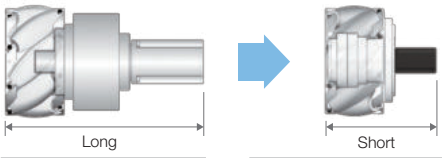
Easily mounted on AGV body!
Unitized products: just assemble into the frame



ADVANTAGE 03

Compact

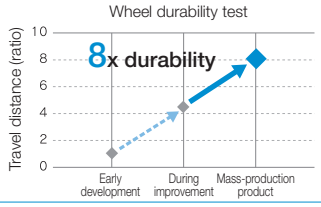
Keeps AGV body slimmer!
In-wheel structure adopted



ADVANTAGE 04

High durability

Shape and materials have been optimized through repeated CAE analysis and testing, realizing high durability

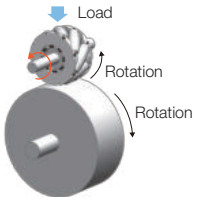


With load of 250 kgf on RVW-10PG, about 8,000 km travel was achieved at 60 m/min speed (reference values)

ADVANTAGE 05

High quality

Rolling resistance coefficient* measured for every product, shipping upon confirmation of values below threshold value



* Rolling resistance coefficient (Crr) is calculated by dividing the rotation torque (T) for 1 wheel rotation by the load.
Crr = (r: wheel radius, F: load)

Watch video

Mecanum AGV/AMR characteristics



Mecanum AGV/AMR case study



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RVW Specifications

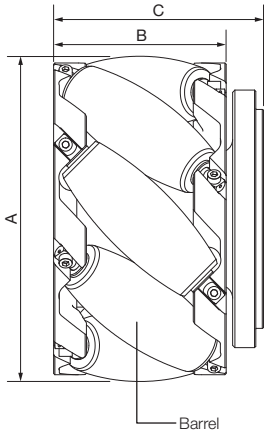
Model RVW-		7PG	10PG	15PG	20PG
Allowable withstand load/wheel	(kgf)*1	200	500	1,500	2,500
	(N)*1	1,960	4,900	14,700	24,500
Maximum speed (m/min)		60	60	30 (60*3)	30 (60*4)
Maximum rotation speed (rpm)		107.3	75.2	25.1 (50.1*3)	18.8 (37.6*4)
Standard ratio		30	34.73 60	52.8 98	80 160
Backlash (arc.min)*2		12	12	12	12
Lost motion (arc.min)*2		12	12	12	12
Rated torque (Nm)*2		7	100	350	1,225
Allowable acceleration/ deceleration torque (Nm)*2		27	300	1,050	2,000

*1 With consideration for load distribution fluctuations caused by road surfaces, etc., the total weight of the combined vehicle and load is recommended to be within "allowable withstand load per wheel x number of wheels x 3/4".
*2 Reduction gear part performance.
*3 Speed at load/wheel 750 kgf (7,350 N) or below.
*4 Speed at load/wheel 1,250 kgf (12,250 N) or below.

RVW External Dimensions

Model RVW-	7PG	10PG	15PG	20PG
A (ømm)	178	254	381	508
B (mm)	96	134	200	278
C (mm)*5	118	166	234	308
Mass (kg)*5	12	32	104	210

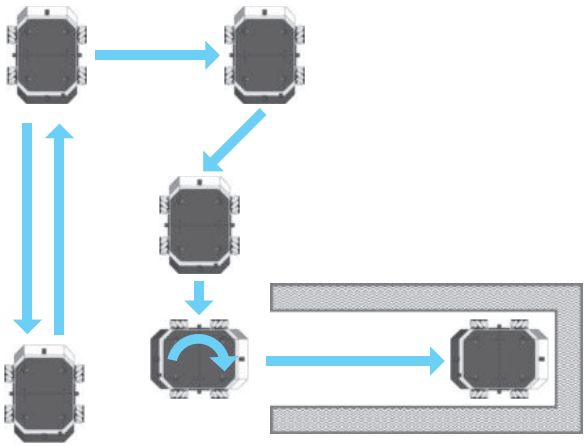
*5 Differs according to the motor used.



For customers purchasing the RVW Series, we offer replacement barrels (see figure at right) as individual products. For details, inquire with our sales or from the website.

What are the advantages of mecanum wheels?

Because they move smoothly in all directions and change direction freely, they are in demand for transport in narrow spaces and accurate positioning. Also, because movement in all directions is possible without changing the wheel orientation, they increase the space available around the wheel and motor for batteries, controllers, etc., making effective use of the AGV/AMR interior space.



Introduction of the RVW Series adoption examples

The website introduces examples of the RVW Series adoptions, including customer issues before adoption, reasons for selection, and effects upon adoption.

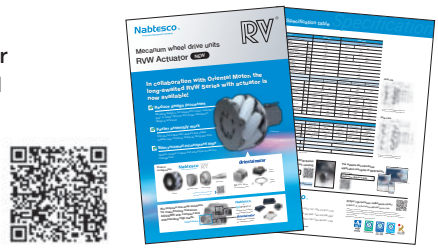


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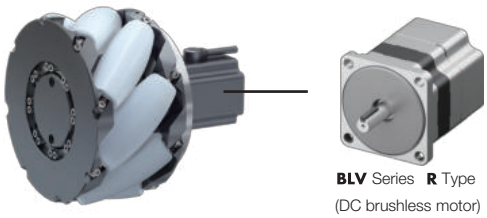
Introducing the RVW Actuator

The RVW Actuator, with an integrated Oriental Motor DC brushless motor, is now available. In addition to reducing design processes, the unit structure, filled with lubricant and sealed, enables easy mounting simply by fixing with bolts.

For details on the RVW Actuator specifications, dimensions, and more, see the leaflet.

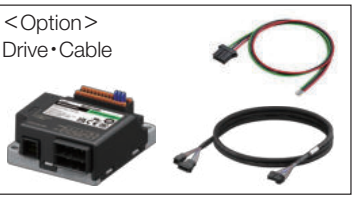


Oriental motor



BLV Series **R** Type
(DC brushless motor)

<Option>
Drive・Cable



Introducing Wireless Power Supply and Charging Systems

Nabtesco handles WiBotic wireless power supply and charging systems.
Compact and high-performance at the highest level in the industry, they are ideal as charging solutions supporting AGV/AMR autonomous operation. In combination with the RVW Series, they enable us to propose conveyance robot high-accuracy drive and smart charging as a one-stop service.

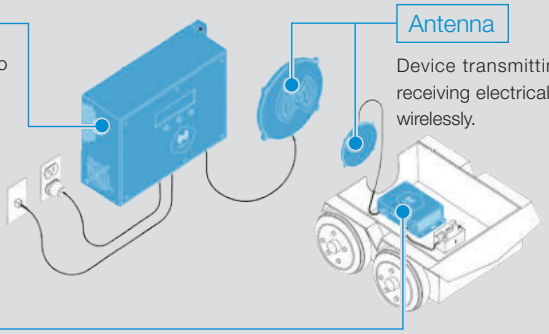
Nabtesco® × WIBOTIC™



Product configuration

Transmitter
Device converting AC power to high frequencies. Supports output of 300 W and 1000 W. Connection to a transmitting antenna enables wireless transmission to a receiving antenna.

Antenna
Device transmitting and receiving electrical power wirelessly.



Onboard charger
Device converting high frequencies into DC power to charge batteries, etc. Supports output of 150 W, 250 W, 300 W, and 1000 W; waterproof type (IP67) is also available.



WiBotic Control Panel



WiBotic Commander

For product details, see the website.

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Positioner Units

High-performance positioner units designed to realize accurate positioning in industrial robots and automated devices.
Enables mounting of various manufacturers' robot external shaft motors, supporting collaborative work with various robots.



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RVP

Download materials here

- Product Catalogs
- Operation Manuals
- 2D/3D CAD Drawings

2-axis Positioner Unit (rotary axis/tilting axis)

RVP-A Maximum carrying capacity: 600 kg



Pursue the optimal specifications for customer purposes with two reduction ratio types combined with numerous supported motors.

■ Examples of RVP-A and Motor Combinations

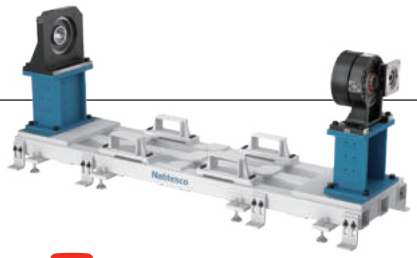
RVP-A Type / Motor Type	High reduction ratio type	Low reduction ratio type
Low speed/high torque	High torque/low-speed rotation	Medium torque/ medium-speed rotation
High speed/low torque	Medium torque/ medium-speed rotation	Low torque/high-speed rotation

Operation demonstration

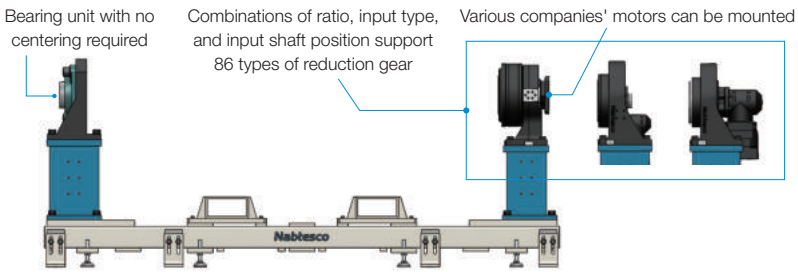


BBQ Positioner Unit

RVP-B Maximum carrying capacity: 1,000 to 1,600 kg



Select reduction gear specifications to enable flexible support for the required takt time.



Operation demonstration

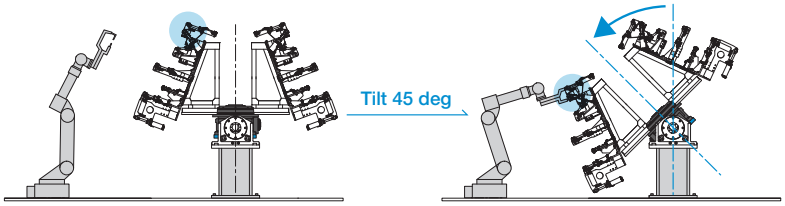


Turntable Unit with Tilting Mechanism

RVP-C Maximum carrying capacity: 4,000 kg



Table tilt also enables adjustment to reach places robots and humans can't get to.



Operation demonstration

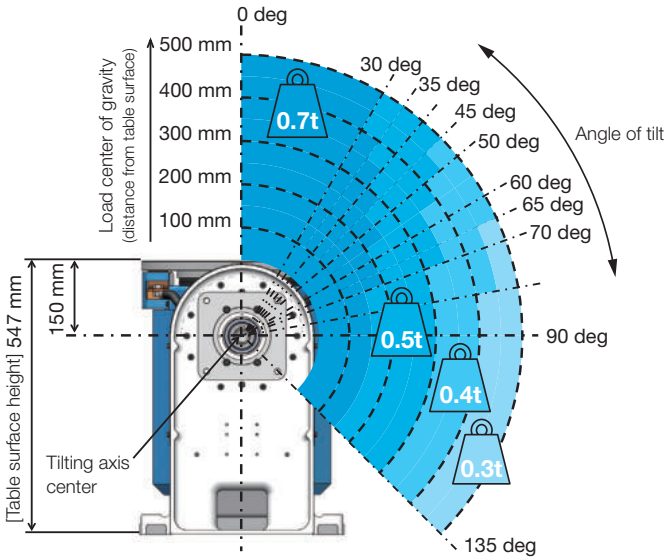


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RVP-A

Allowable load range for each load center of gravity position

* Operation outside this usage range will exceed the allowable acceleration/deceleration torque or allowable moment, possibly damaging the reduction gear.
* The load weight in this document is a reference value.



RVP-A Specifications

Model RVP-A		05E-S	05E-F
Type		High reduction ratio	Low reduction ratio
Standard ratio	Rotary axis	150	100.5
	Tilting axis	156	102.81*
Rated torque (Nm)	Rotary axis	980	
	Tilting axis	1,600	
Allowable acceleration/ deceleration torque (Nm)	Rotary axis	2,450	
	Tilting axis	4,000	
Momentary maximum allowable torque (Nm)	Rotary axis	4,900	
	Tilting axis	8,000	
Rated output speed (rpm)	Rotary axis	15	
	Tilting axis	15	
Allowable output speed (reference value) (rpm)	Rotary axis	20	30
	Tilting axis	48	48
Rated life (h)		6,000	
Backlash/lost motion (arc. min)	Rotary axis	1/1	
	Tilting axis		
Allowable moment (Nm)		2,450	
Hollow diameter (mm)	Rotary axis	ø61	
	Tilting axis	ø105	

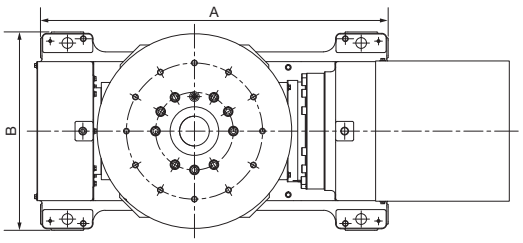
* This ratio is 1/OO and cannot be divided without remainder. For details, consult Nabtesco or refer to the product catalog.

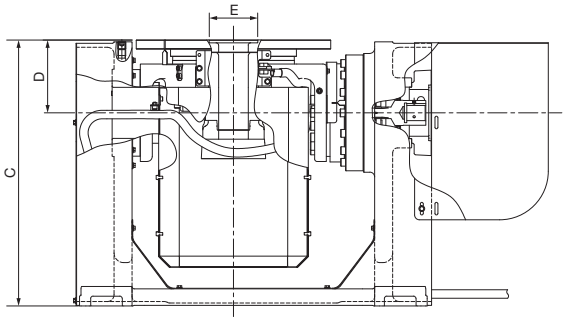
RVP-A External Dimensions

Model RVP-A	05E-S	05E-F
A (mm)	715	
B (mm)	408	
C (mm)	547	
D (mm)	150	
E (ømm)	100h7	
Mass (kg)*	232	

* Input spline and motor flange are not included.

RVP-A





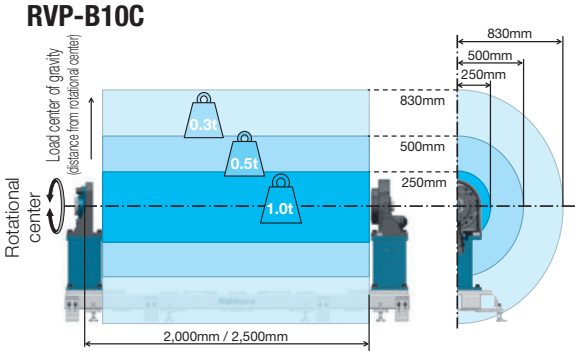
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RVP-B

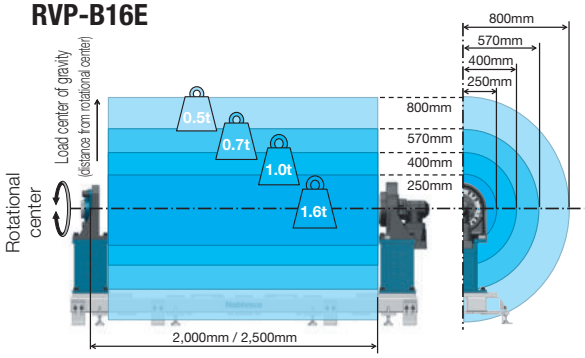
Allowable load range for each load center of gravity position

* Operation outside this usage range will exceed the allowable acceleration/deceleration torque or allowable moment, possibly damaging the reduction gear.
* The load weight in this document is a reference value.

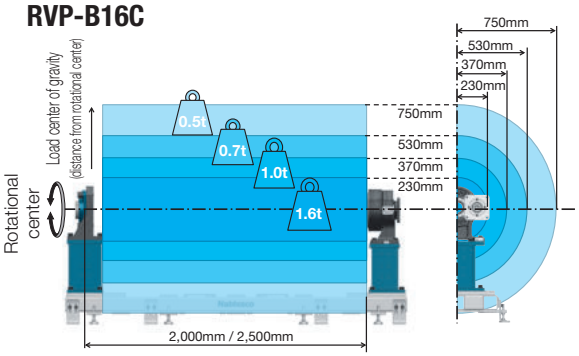
RVP-B10C



RVP-B16E



RVP-B16C



RVP-B Specifications

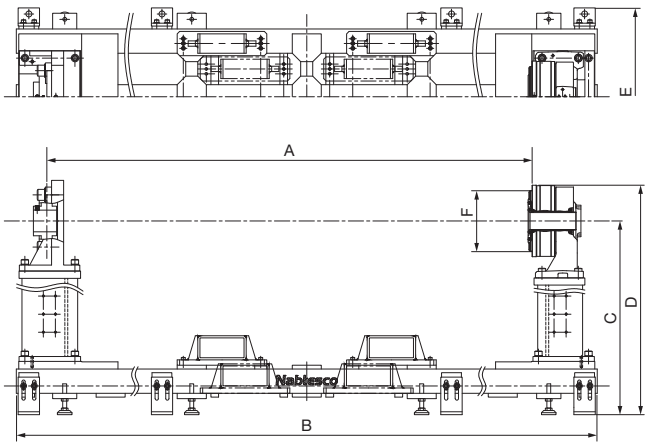
Model RVP-B		10C	16E	16C
Type		Hollow	Solid	Hollow
Standard ratio		100.5 150 210 258	66 81 101 121 145 171	78.3 104.4 120.46
Rated torque (Nm)		980	1,568	1,470
Allowable acceleration/deceleration torque (Nm)		2,450	3,920	3,675
Momentary maximum allowable torque (Nm)		4,900	7,840	7,350
Rated output speed (rpm)		15		
Allowable output speed (reference value) (rpm)		30		51
Rated life (h)		6,000		
Backlash/lost motion (arc.min)	With input axis not at right angle	1/1		
	With input axis at right angle	1.5 / 1.5		-
Hollow diameter (reduction gear side) (mm)		ø61 to 70	-	ø61 to 70
Bore total (pillow side) (mm)		ø90		

RVP-B External Dimensions

Model RVP-B	10C	16E	16C
A (mm)	2,000/2,500*1		
B (mm)	2,400/2,900		
C (mm)	800/1,000*1		
D (mm)	987/1,187		947.5/1,147.5
E (mm)	734		
F (ømm)	199h7	280h7	250h7
Mass (kg)*2	618 to 662	624 to 687	641 to 678

*1 Length between shafts and shaft height can be selected.
*2 Motor flange is not included.

RVP-B



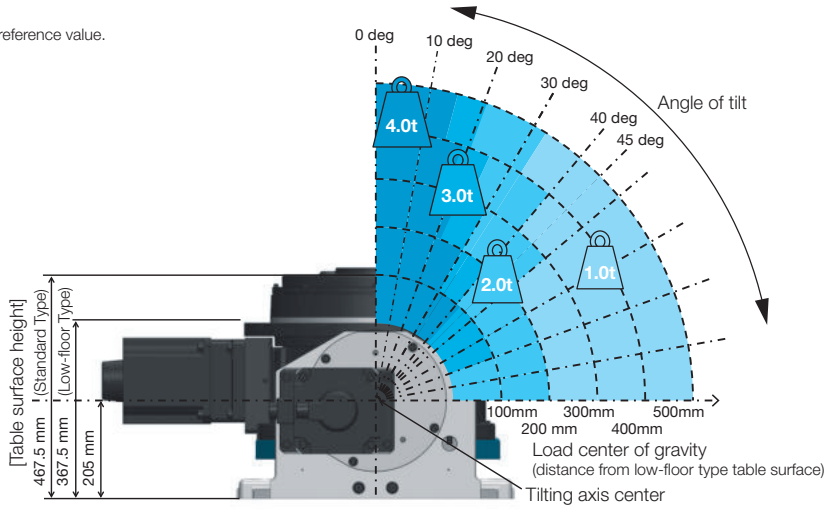
* Special shapes are also supported, such as frame width expansion to suit customer's jigs. For details, inquire with our sales or from the website.

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RVP-C

Allowable load range for each load center of gravity position

* Operation outside this usage range will exceed the allowable acceleration/deceleration torque or allowable moment, possibly damaging the reduction gear.
* The load weight in this document is a reference value.



RVP-C Specifications

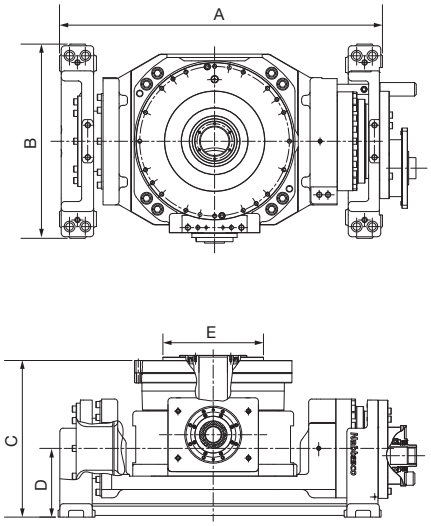
Model RVP-C		40-A	40-B
Type		Standard	Low-floor
Standard ratio	Rotary axis	170	
	Tilting axis	706.5	
Rated torque (Nm)	Rotary axis	3,136	
	Tilting axis	3,724	
Allowable acceleration/ deceleration torque (Nm)	Rotary axis	7,840	
	Tilting axis	9,310	
Momentary maximum allowable torque (Nm)	Rotary axis	15,680	
	Tilting axis	18,620	
Rated output speed (rpm)	Rotary axis	15	
	Tilting axis	15	
Allowable output speed (reference value) (rpm)	Rotary axis	20	
	Tilting axis	11.5	
Rated life (h)		6,000	
Backlash/lost motion (arc.min)	Rotary axis	1/1	
	Tilting axis	1/1	
Allowable moment (Nm)		9,310	

RVP-C External Dimensions

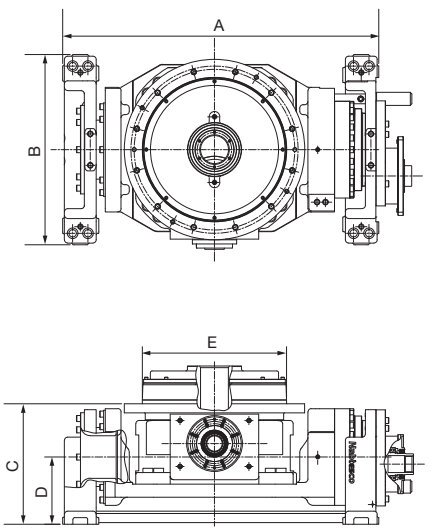
Model RVP-C	40-A	40-B
A (mm)	964	
B (mm)	580	
C (mm)	467.5	367.5
D (mm)	205	
E (ømm)	300h7	440h7
Mass (kg)*	221	

* Input spline and motor flange are not included.

RVP-C40-A (standard type)



RVP-C40-B (low-floor type)



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LUBRICANTS

Download materials here

- Product Leaflets
- Operation Manuals
- SDS (Safety Datasheets)

RVGREASE™ LB00



While retaining the durability and high efficiency of VIGOGREASE® RE0, this dedicated grease for the Precision Reduction Gear RV™ has further improved low-temperature properties. Sealing performance may not be realized in full during low-speed operation. Lubricant suited to high operation frequency at medium to high speeds.

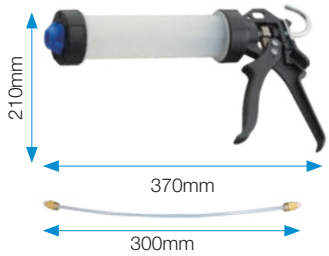
Available formats: Small 270 g pouch x 10 pcs / 16 kg pail / 170 kg drum can

Single-use size with no refilling available as a set with high-discharge force grease gun, increasing efficiency and reducing workload

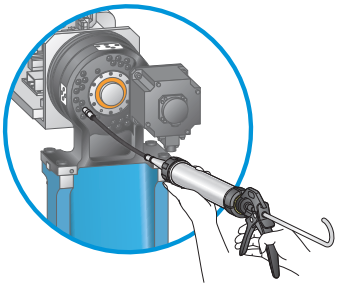
Available formats: Pouch 270g, sold as a 10-piece set



Dedicated starter kit



[Kit content] Grease gun + dedicated hose



Usage example

VIGOGREASE® RE0



A dedicated grease for the Precision Reduction Gear RV™, offering excellent durability and high start efficiency. While a knocking sound may be heard when starting at low temperatures, it can be eliminated by mixing during warm-up operation. Lubricant suited to use in relatively warm environments where the temperature does not fall below 10°C.

Available formats: 2 kg can / 16 kg pail / 170 kg drum can

MOLYWHITE RE No. 00

A dedicated grease for the Precision Reduction Gear RV™ offering excellent durability, high start efficiency, and the best low-temperature performance. Sealing performance may not be fully achieved during high-speed operation at high temperatures. Lubricant suited to low operation frequency in low-temperature environments.

Available formats: 2 kg can / 16 kg pail / 170 kg drum can

RVOIL™ SB150



Dedicated oil for the Precision Reduction Gear RV™, with excellent durability and maintainability. Because the used oil can be easily removed, this lubricant is suited to use in environments with severe operation conditions where the lubricant must be frequently replaced.

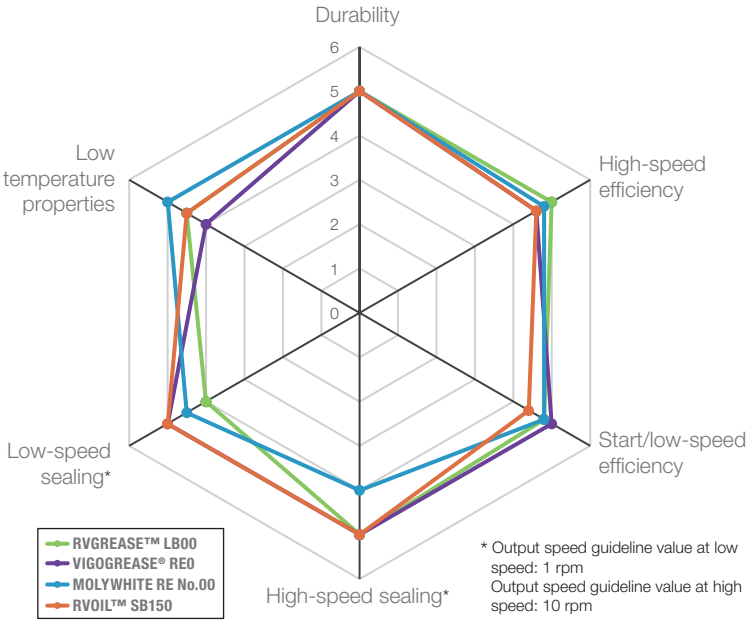
Available formats: 20 L can/200 L drum can

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Lubricant Selection

To maximize the performance of the Precision Reduction Gear RV™, Nabtesco recommends the use of our dedicated lubricants. Because each lubricant has different properties, select a product suited to the usage environment upon reference to the information on this page. For details regarding selection, inquire with our sales office or the Nabtesco website.

* Caution is required when mixing Nabtesco lubricants. Please contact us for more details.
* Lubricants have been developed for intended use with Nabtesco products. Avoid use with non-Nabtesco products.



RVGREASE™ LB00/VIGOGREASE® RE0/MOLYWHITE RE No.00 Specifications

Test item		Test method	RVGREASE ™ LB00	VIGOGREASE® RE0	MOLYWHITE RE No.00
Thickening agent		—	Lithium soap		
Base oil		—	Synthetic hydrocarbon oil, mineral oil		
Base oil kinematic viscosity (40°C) (mm^2/s)		JIS K 2220 23. ASTM D 445	71.8	81.3	32.3
Appearance		—	Yellow-brown viscous state		
Worked penetration		JIS K 2220 7. ASTM D 217	410	398	415
Drip point (°C)		JIS K 2220 8. ASTM D 566	188	190	193
Oxidation stability (99°C, 100h) (kPa)		JIS K 2220 12. ASTM D 942	10	20	20
Worked stability		JIS K 2220 15. FTMS 791C-313	427	406	415
Low-temperature torque (-30°C) (mN·m)	Acceleration torque	JIS K 2220 18.	140	270	110
	Rotation torque	ASTM D 1478-63	3	32	20
High-speed four-ball type withstand load performance (N)	L.N.S.L.	ASTM D 2596	1569	1236	1236
	W.P.		3089	3089	3089
	L.W.I.		647	549	569

Note: The listed values indicate representative status and are not guaranteed.

RVOIL™ SB150 Specifications

Test item		Test method	RVOIL™ SB150
Base oil		—	Synthetic hydrocarbon oil, mineral oil
Kinematic viscosity (40°C/100°C) (mm^2/s)		JIS K 2220 23. ASTM D 445	158(40°C), 19.4(100°C)
Viscosity index		JIS K 2283	140
Appearance		—	Green
Ignition point (°C)		JIS K 2265-4	260
Rustproofing performance (60°C, 24h)		ISO 7120, JIS K 2510	pass
Copper sheet corrosion (100°C, 3h)		ISO 2160, JIS K 2513	1a
Foamability (seq-I, 24°C) (mL/mL)		ISO 6247, JIS K 2518	0/0
High-speed four-ball type withstand load performance (N)	L.N.S.L. W.P. L.W.I.	ASTM D 2783	981 1961 410

Note: The listed values indicate representative status and are not guaranteed.

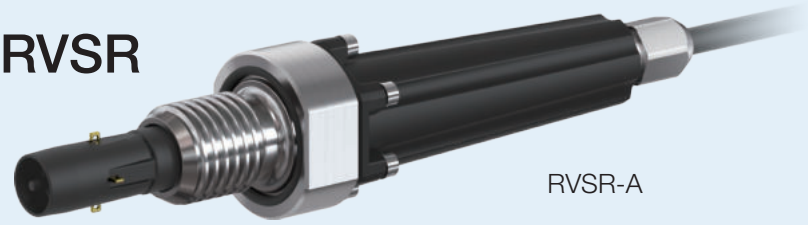
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NEW SOLUTION

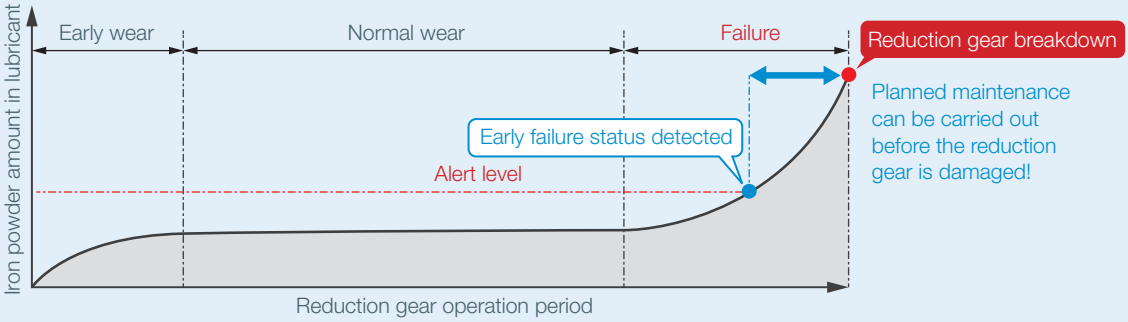
Introducing initiatives in dedicated product development for special applications

Failure Detection Sensor RVSR

Early failure status is detected by the changing amount of iron powder in the oil, enabling alerts to Precision Reduction Gear RV™ early failure status.
Planned maintenance can be carried out before the reduction gear is damaged.
The lineup also includes the Gearhead Series equipped with failure detection function.



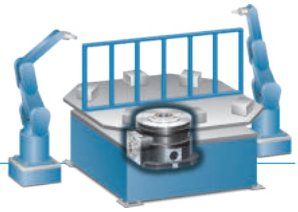
RVSR-A



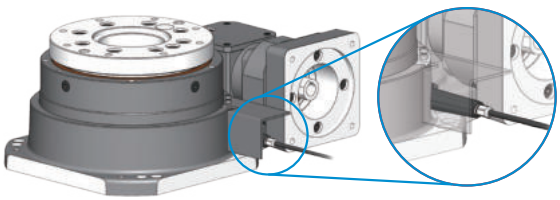
Lineup of failure detection function equipped products

* Support is also available for models not listed. For details, consult Nabtesco.

RS Series

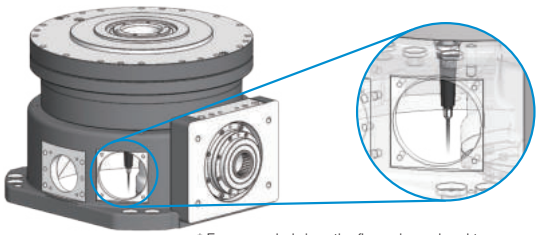


Sensor side model RS-50A RS-260A



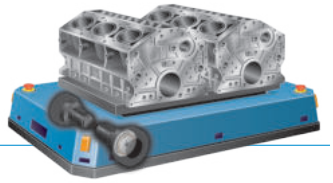
* For expanded view, the cover is rendered transparent.

Sensor bottom model RS-320A RS-400A RS-900A

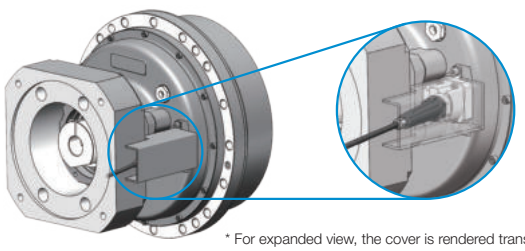


* For expanded view, the flange is rendered transparent.

RD2 Series

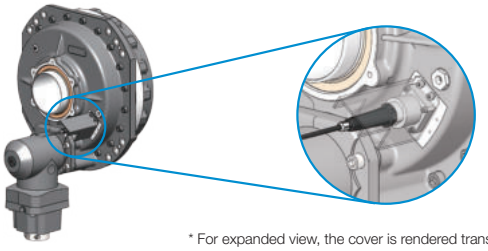


Solid Series RD□-160E RD□-320E



* For expanded view, the cover is rendered transparent.

Hollow Series RD□-100C RD□-200C RD□-320C



* For expanded view, the cover is rendered transparent.

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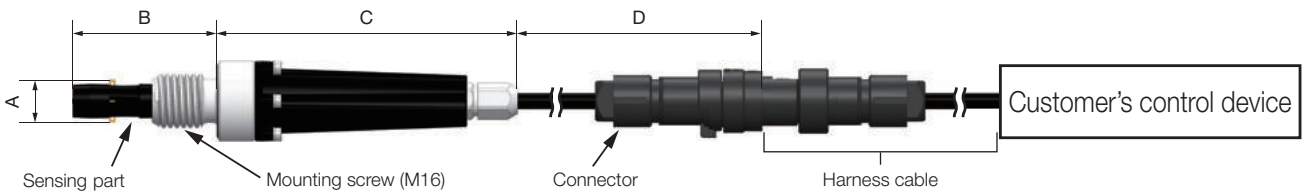
Failure Detection Sensor RVSR Specifications

Test item	Development specifications	
	RVSR-A (indoor specification)	RVSR-B (outdoor specification)
Alarm output	Relay contact method (Precision Reduction Gear RV™ normal: closed, abnormal: open) Maximum excitation voltage: 30 VDC; maximum conduction current: 50 mA	
Input power	24DC ±10%, 0.1A or below	
Usage environment	Ambient temperature: 0 to 65°C	Ambient temperature: -30 to 65°C
	Humidity: 20 to 80% (no condensation)	
Dustproof/waterproof	IP67	
Vibration-resistant	Maximum acceleration: 5G; frequency: 10 to 500 Hz	
Supported oils	RVOIL™ SB150	Bonnoc AX68*

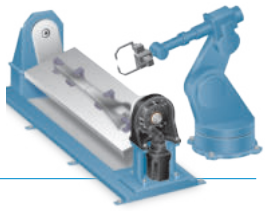
* The Bonnoc AX68 is an ENEOS Corporation product.

Failure Detection Sensor RVSR External Dimensions

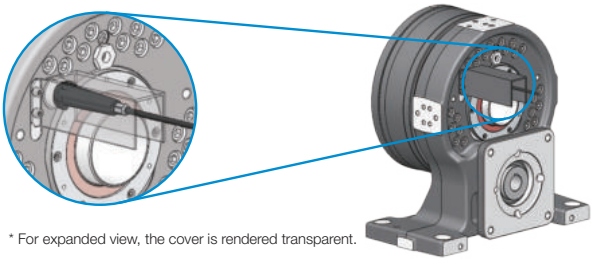
Model RVSR-	A (indoor specification)	B (outdoor specification)
A (ømm)	12.7	15.7
B (mm)	44	
C (mm)	87	95
D (mm)	300 ±30	



RH Foot Type Series

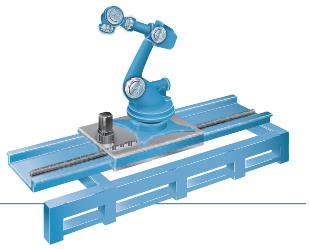


RH-155C-D RH-155C-R
RH-320CA

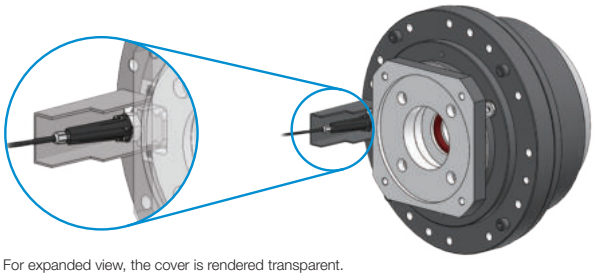


* For expanded view, the cover is rendered transparent.

GH Series



GH-100



* For expanded view, the cover is rendered transparent.

Oil-dedicated

Failure detection function available, while retaining lubrication performance Excellent lubricant replaceability, and even easier to use

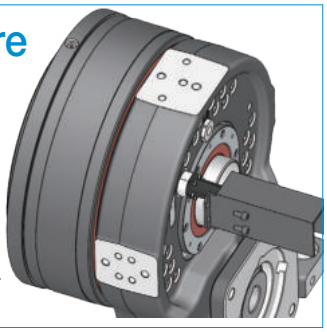
* RH Foot Type Series and GH Series are shipped without lubricant packed.
* Failure detection function will not function with lubricants other than those listed in the specification table above (MOLYWHITE RE No.00, VIGOGREASE® RE0, RVGREASE™ LB00 included).

Safe and secure

Equipped with sensor protective cover as standard

Protects the sensor just in case

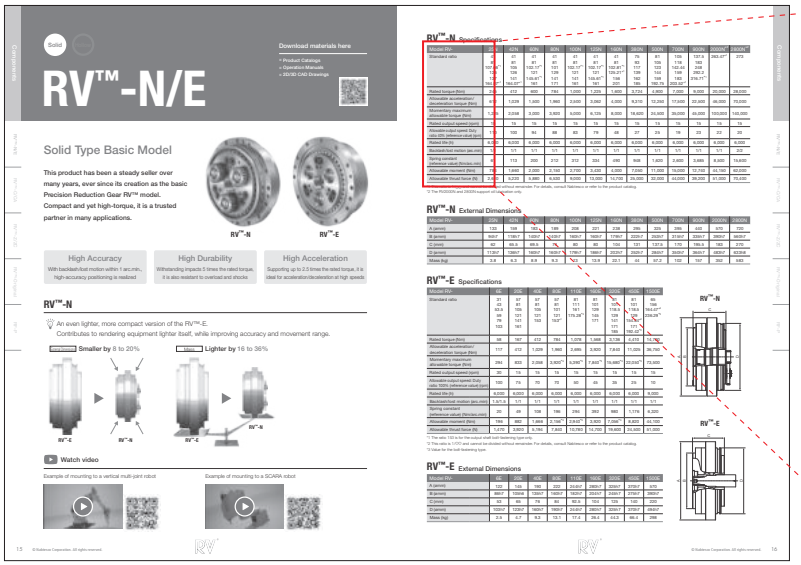
* Supported even without a cover.



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Glossary

Mainly includes the terms used in specification tables on product pages.



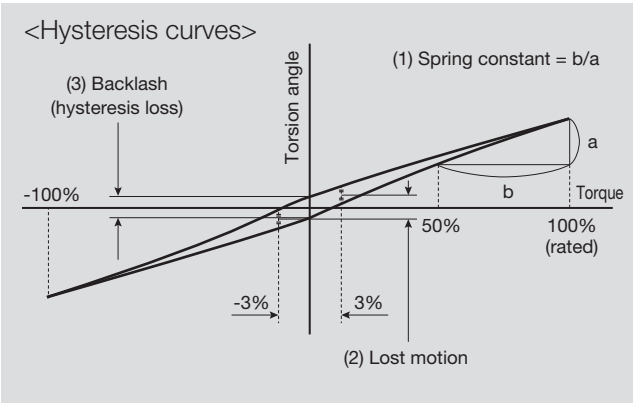
Model RV-	25N
Standard ratio	41 81 107.66*1 126 137 164.07*1
Rated torque (Nm)	245
Allowable acceleration/ deceleration torque (Nm)	612
Momentary maximum allowable torque (Nm)	1,225
Rated output speed (rpm)	15
Allowable output speed: Duty ratio 40% (reference value) (rpm)	110
Rated life (h)	6,000
Backlash/lost motion (arc.min)	1/1
Spring constant (reference value) (Nm/arc.min)	61
Allowable moment (Nm)	784
Allowable thrust force (N)	2,610

Common

Spring constant/lost motion/backlash (hysteresis loss)

Applying torque to the reduction gear output shaft with the input shaft fixed generates torsion. The shifts in torsion amount (torsion angle) and torque during forward and reverse rotation are represented with curves called hysteresis curves, which indicate the spring constant, lost motion, and backlash.

(1) Spring constant: Ratio of torque and torsion angle (b/a) within the range of rated torque 50 to 100%
(2) Lost motion: Torsion angle in the low-load area (±3% of rated torque)
(3) Backlash: The amount not returned when returning torsion angle/torque at load torque zero in the forward/reverse directions from rated value to zero



Allowable moment

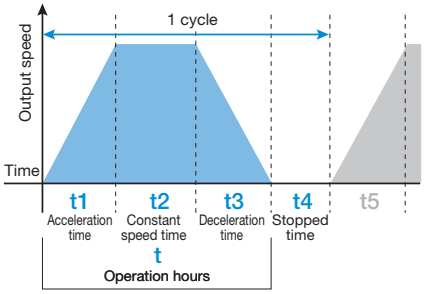
Indicates the allowable value which can be constantly withstood when bending/tilting load is applied from outside to the reduction gear.

Allowable thrust force

Indicates the allowable value which can be constantly withstood when pushing/pulling force is applied from outside in the axial direction to the reduction gear.

Duty ratio

Indicates the ratio of operation hours within 1 reduction gear or servo actuator cycle. In this catalog, “allowable output speed” is based on the duty ratio conditions listed.



$$\text{Duty ratio (\%)} = \frac{t}{t+t4} \times 100$$

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Components/Gearheads

Rated life

Indicates the time (L10 life) until life is reached due to interior wear and component deterioration, when the reduction gear is continuously operated in one direction at rated torque and rated output speed. Life changes according to the actual usage conditions and environment.

Rated torque/rated output speed

Indicates the torque and rotation speed used as a reference to calculate the reduction gear part life.

Allowable acceleration/deceleration torque

Large load torque may be applied to the reduction gear, depending on the start/stop inertia. Allowable acceleration/deceleration torque indicates the allowable value at these times.

Note: Use so that the load torque when starting and stopping does not exceed this value.

Momentary maximum allowable torque

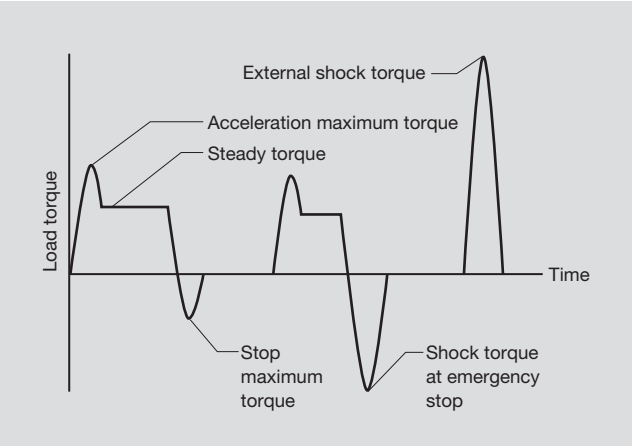
High momentary torque may be applied due to emergency stops or external impact. Indicates the limit torque at which this momentary torque will not damage the reduction gear.

Note: Design so as not to exceed the momentary maximum allowable torque.

Allowable output speed

Indicates the reduction gear allowable output speed value during operation without load. Exceeding this value may lead to heat generation and wear, affecting the reduction gear performance and life.

Note: Depending on usage conditions (duty ratio, load, ambient temperature), the reduction gear surface temperature may exceed 60°C even below the allowable output speed. In this case, use at a rotation speed such that the reduction gear surface temperature remains below 60°C, or apply cooling.



Servo actuators

Rated torque

The actuator rated torque is a value calculated with attention to the motor rated torque, reduction ratio, and reduction gear efficiency.

Rated output speed

The actuator rated output speed is a value calculated with attention to the motor rated rotation speed and reduction ratio.

Momentary maximum torque (maximum torque)

Indicates the value calculated with attention to the reduction ratio and reduction gear efficiency, based on the momentary maximum torque at motor torque limit.

Maximum output speed

Indicates a value calculated with attention to the motor rated rotation speed and reduction ratio.

Note: Make sure to apply cooling as needed such that the reduction gear surface temperature does not exceed 60°C.

Brake holding torque

Indicates the value calculated with attention to the reduction ratio and reduction gear efficiency, based on the motor brake holding torque.

Note: The motor built-in brake is for retention only, intended to maintain stopped status. Do not use it as a brake on moving loads.

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When Considering Purchase

These products are characterized by high accuracy and high rigidity; in order to make full use of these characteristics, various restrictions must be observed upon appropriate selection. To that end, read the technical materials here carefully and select for use the appropriate model based on the actual usage environment and method as well as the usage information.

Exports

When exporting these products, export restrictions as stipulated in the Foreign Exchange Management Act may apply if the end user is military-related or the application is to be the manufacture of weapons, etc.: check carefully in advance and take the necessary export measures.

Usage Applications

When using these products in equipment where a breakdown or malfunction may directly threaten human life or health (nuclear power facilities, aerospace equipment, transportation equipment, medical devices, safety equipment, etc.), specific consideration is required: consult our agent or nearest business office.

Safety Measures

While these products are manufactured under stringent quality control, misoperation or misuse may lead to breakdowns, property damage, or potentially fatal injury. Take thorough safety measures such as the installation of independent safety equipment.

Product Specifications in Catalog

The specifications in this catalog are based on our evaluation methods; customers are asked to use the products upon confirmation that they will not encounter problems under actual usage conditions with actual machines. Also, reference values are for reference only and do not guarantee performance.

Usage Environments

Use these products in the following environments.

- Ambient temperature within the range of -10 to 40°C (0 to 40°C for the AF Series)
- Humidity at or below 85%, no condensation (20 to 85% RH for the AF Series)
- No more than 1,000 m above sea level
- Good ventilation

Do not install these products in the following locations.

- Very dusty
- Outdoors, directly exposed to weather
- In atmospheres containing flammable, explosive, or corrosive gases, or near flammable materials
- Exposed to transmitted or radiant heat from surrounding devices or from direct sunlight
- Where motor performance may be affected by magnetic fields or vibration

Notes: 1. Consult with us in advance when the usage environment does not fulfill the conditions.
2. Consult with us in advance for use in special environments (cleanrooms, food product facilities, exposure to high alkalis or high-pressure steam, etc.).

Maintenance

Standard lubricant replacement time is 20,000 hours. However, when using with reduction gear surface temperature at or above 40°C, check the lubricant for deterioration or contamination and replace it sooner.

Usage Temperature

Use under operation conditions such that the reduction gear part surface temperature does not exceed 60°C. Use exceeding this temperature may lead to damage. Also, the AF Series has restrictions on the motor part surface temperature as well. For details, see the product catalog or the operation manual.

Output Rotation Angle

When the swivel angle range is small (within 10°), lubrication defects and internal part load are concentrated, potentially shortening the reduction gear rated life.

Note: Consult us when using with an output rotation angle within 10°.

Other Materials

Detailed product information, safety information, product handling methods and so on are listed in the product catalogs and operation manuals. They are available for download from the website below.

URL : https://precision.nabtesco.com/en/

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Warranty

1. When within the warranty period for these products (1 year after delivery of the product to the customer, or 2,000 hours after product operation starts, whichever comes first), upon confirmation by Nabtesco that the product has broken down due to design or manufacturing defects, we will repair or replace the product at our expense, based upon our judgment.
2. The scope of warranty for these products is limited to repair or replacement in the case of breakdowns as indicated in the previous paragraph; it does not cover other costs. However, this may not apply upon separate agreement in writing between Nabtesco and the customer with regard to the scope of the product warranty, etc.
3. When any of the below situations applies, the provisions above will not apply to the product malfunction, and payment will be required for support.
   (1) When caused by use of the product outside the usage conditions designated by Nabtesco or the range delineated in the specifications
   (2) When caused by dirt or adhered foreign matter (excluding situations for which Nabtesco is responsible)
   (3) When lubricants or consumables other than Nabtesco designated products have been used with the product
   (4) When lubricant leakage, product damage due to lubricant leakage, noisy operation of the product, etc. have occurred (excluding, in all cases, those caused by product design or manufacturing defects)
   (5) When the product has been used in special environments (high temperatures, high humidity, very dusty, atmospheres containing corrosive/volatile/flammable gases, pressurized or depressurized atmospheres, submerged, etc.) (excluding the range explicitly permitted by Nabtesco specifications, etc.)
   (6) When the product has been disassembled, reassembled, repaired, or modified by other than Nabtesco
   (7) When caused by devices other than the product
   (8) When caused by force majeure such as fires, earthquakes, lightning strikes, flooding, or other disasters
   (9) When not caused by other design or manufacture malfunctions in the product
4. When product malfunctions have been handled with repair or replacement as in Paragraph 1, the warranty period for the repaired or replaced product shall be the remaining product warranty period as of the malfunction.

For details, consult Nabtesco.

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