



Precision gears  
for highest demands

**Nabtesco**  
High Precision Gears

# Find the right gear solution for your individual application

## QUICKFINDER

### COMPONENT SETS



RV-N



RV-C



RF-P



RV

Solid shaft

T: 245–28,000 Nm  
i: 41–203.52

PAGE **12**

Hollow shaft

T: 98–11,760 Nm

**14**

Solid shaft  
High output speed

T: 190–320 Nm  
i: 31–56  
n: up to 200 rpm

**16**

Solid shaft  
Without bearing support

T: 137–5,390 Nm  
i: 57–192.4

**18**

### GEARHEADS



RH-N



RDR-E



RDS-E

Solid shaft

T: 245–7,000 Nm  
i: 41–203.52

**22**

Solid shaft

T: 58–3,136 Nm  
i: 31–185

**24**

Solid shaft

T: 58–3,136 Nm  
i: 31–185

**24**



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RDP-E	RDR-C	RDS-C	RDP-C	RS	RA-EA/EC	GH
Solid shaft	Hollow shaft	Hollow shaft	Hollow shaft	Hollow shaft Integrated rectangular gear	Solid shaft For magazines and change systems	Solid shaft High output speed
T: 167–3,136 Nm i: 57–81	T: 98–3,136 Nm i: 81–258	T: 98–3,136 Nm i: 81–258	T: 98–3,136 Nm i: 100–157	T: 480–8,820 Nm i: 100–240	T: 167–1,568 Nm i: 80–171	T: 69–980 Nm i: 10.74–31.43 n: up to 270 rpm
24	26	26	26	28	30	32

# More than 8 million references for excellent work

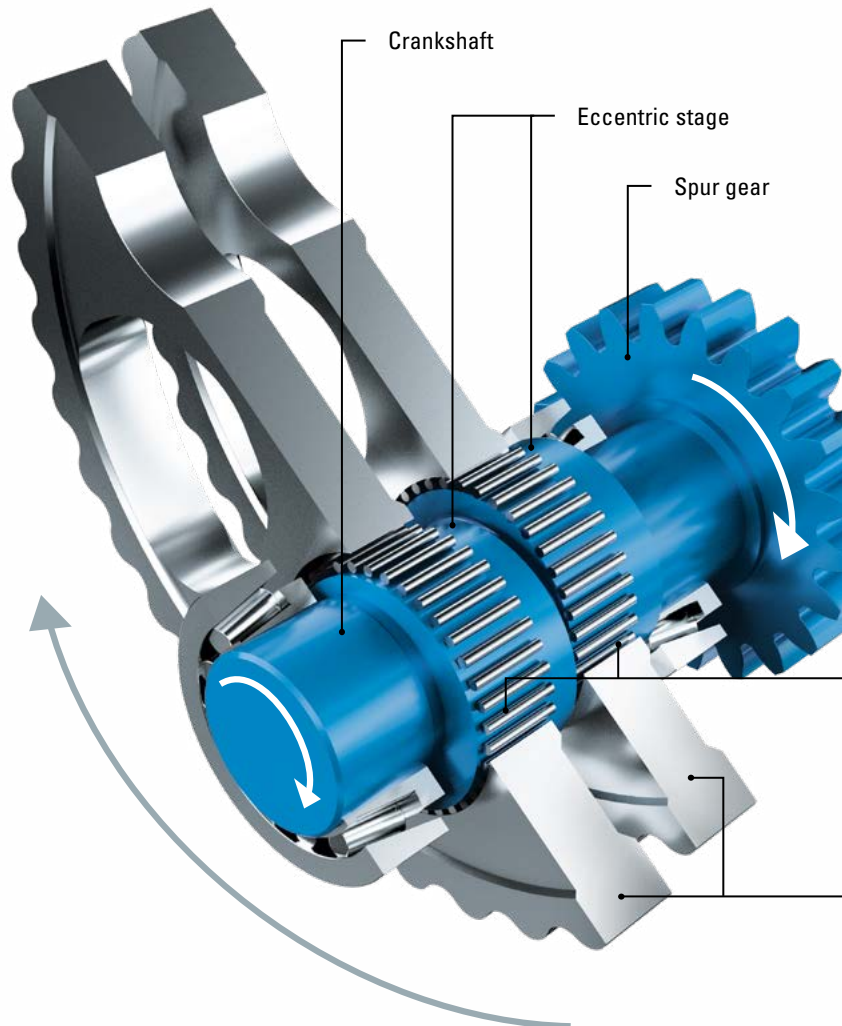
Nabtesco Precision Europe GmbH – part of the Nabtesco Group – is the world's largest and most recognised manufacturer of cycloidal gears. Thanks to their special technology, these precision gears are extremely robust and, simultaneously, highly precise. The combined engineering expertise of more than three decades is incorporated in these high-quality gears.

All of this makes them ideal for applications in many high-tech fields. More than 8 million gears from Nabtesco are in use around the world. They are used in more than 60% of the world's industrial robots.

Apart from its proven gear series, a special strength of Nabtesco lies in its engineering services, with special customer-specific products and finishes.



"RV" stands for our gear's "rotor vector" type of construction, and thus also for their extremely high resilience and precision.



# Cycloidal gears offer unbeatable advantages

## ADVANTAGES

- High rated torque of up to 14,715 Nm
- Minimum space requirement
- High shock-load capability (5 times the rated torque)
- High rigidity
- Extreme precision (hysteresis loss < 1 arcmin)
- Low inertia
- Insensitive to vibration
- Extremely low wear
- Long service life

The two-stage reduction of cycloidal gears makes solutions from Nabtesco Precision so successful. The reason is that the speed is reduced by the double cams. Vibration is reduced by the two-stage reduction principle and low inertia. The force is also distributed very evenly, thanks to the roller cam design, and this contributes to the minimum hysteresis loss and enormous resistance to shock loading. Consequently, cycloidal gears are as versatile as they are resilient.

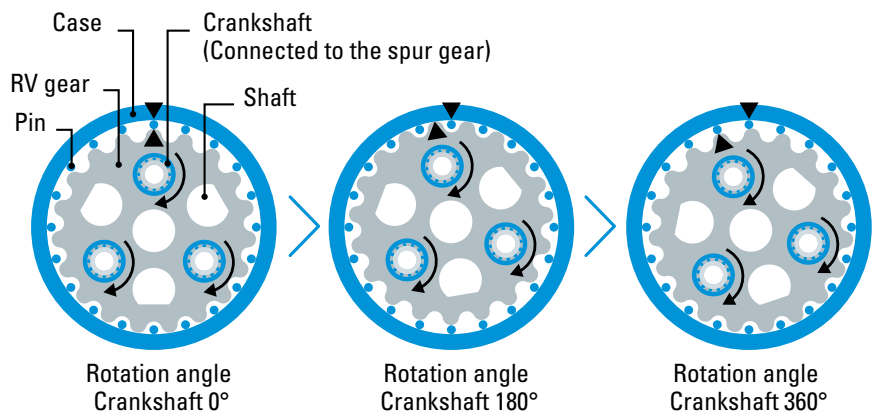
The drive or servomotor is connected to the spur gear stage of the gearbox via a pinion. The rotating speed reduces at this point relative to the reduction ratio between the pinion and planetary gear. The planetary gears are connected to crankshafts which drive the cams using needle bearings. These cams rotate inside the case which is lined with pins.

The cam has exactly one eccentric section less than the pin ring has pins. A 360° revolution of the crankshafts therefore causes the cams to rotate one pin farther, whereby practically all the gear teeth are in continuous contact with the pins. The rotating movement is then transmitted from the input shaft to the crankshafts via the spur gear stage, and these then shift the cams in the pin ring and, consequently, generate a reduced speed with high precision. This technology enables the RV gears to absorb 5 times the rated torque in emergency-stop situations without suffering any damage.

The resulting overall reduction is the same as the product of the two reduction ratios (spur gear stage and eccentric stage).



Needle bearing



RV gears

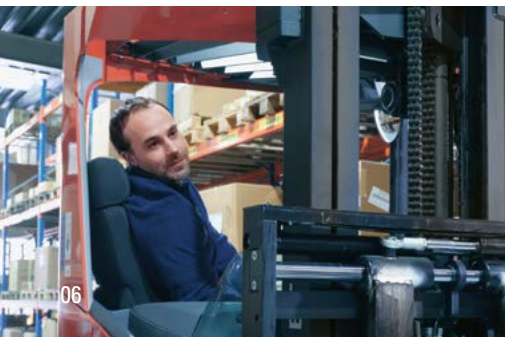


# Our service is similar to our gears: fast, resilient and effective

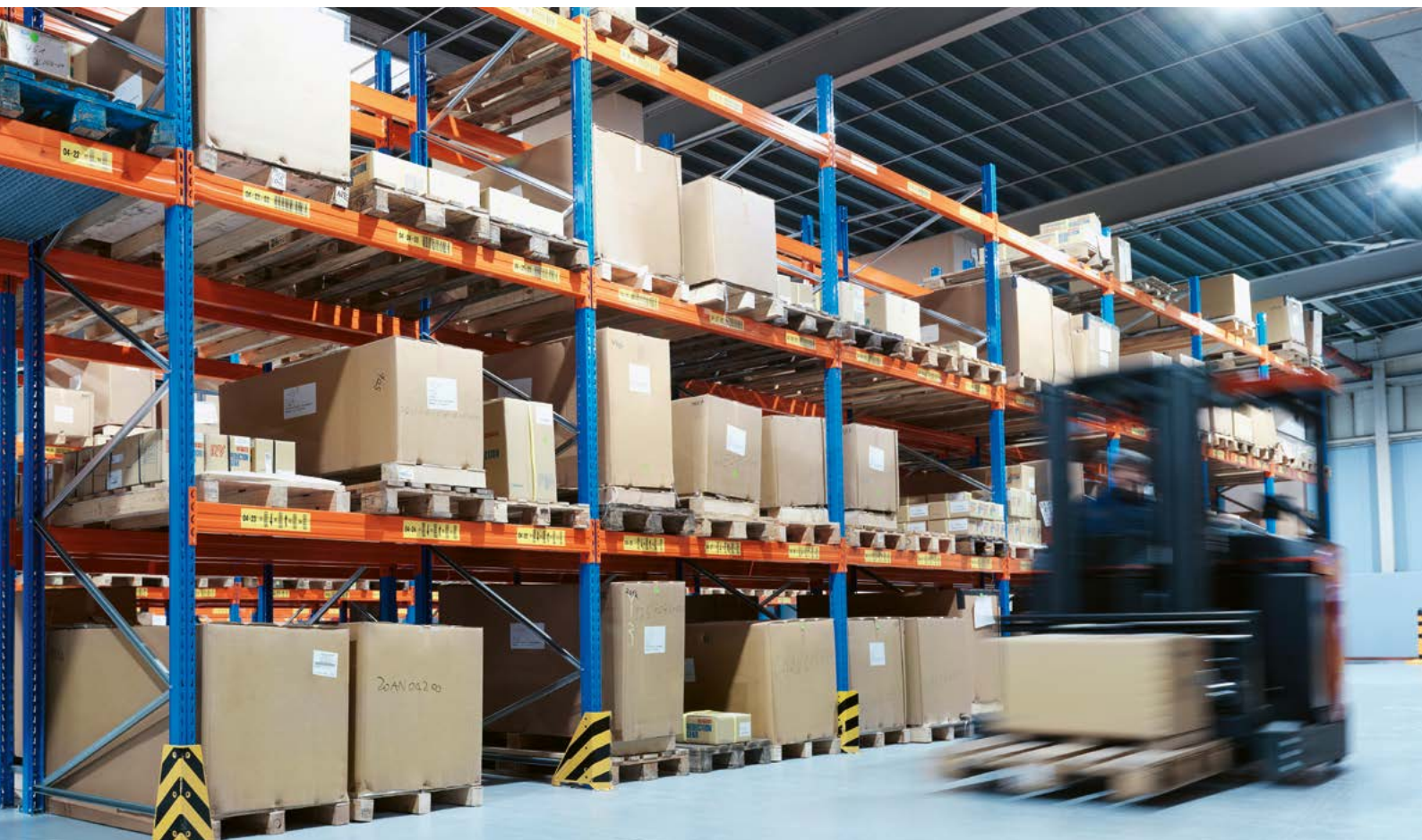
We have expanded our European centre in Düsseldorf to make it into a unique service hub for you.

- Large warehouse for the fastest deliveries possible
- Fast-response, professional service team
- Production shop for finishing, final assembly and custom products on location
- Prototype construction, test series and live demonstrations

With this range of services, we can help you with any questions which arise concerning drives and gears and the development of your application. Our specialists are capable of producing a prototype on location for your own test series or carrying out trials for you.







Precisely what  
you need,  
in the shortest  
of time frames







Developing special solutions and manufacturing custom products is something we have always done for our clients. Today, we are going even one step further with customising.

Whether it is a drive train or a cover, a motor flange or an input gear: there are many details which one can adapt in order to match our gears exactly to your application. With a team of experienced development engineers and our service team in Düsseldorf, we can implement all these requests professionally and quickly.

Often the right combination of existing components is all you need. In such cases, we can supply you with installation-ready configurations directly from our warehouse.

In other cases it is necessary to alter spurs, holding bores, covers or drives in order to satisfy the special requirements of your machine or robotics application. Here, our designers take responsibility for the engineering and develop a custom solution together with you.





# Fast and precise for heavy loads

Nabtesco component sets work with extreme precision, extremely low vibrations, and low inertia. Their special construction means they are particularly immune to shock loads and permit high levels of torque.



## **RV-N series**

The RV-N solid shaft gears with reduced weight at high output torques and high reduction ratios are optimally suited for smaller installation spaces.



## **RV-C series**

The RV-C series has a hollow shaft with a diameter of up to 138 mm which, for example, facilitates the routing of data and power supply cables.



## **RV series**

The RV series is the basic version and can be combined with different output supports.

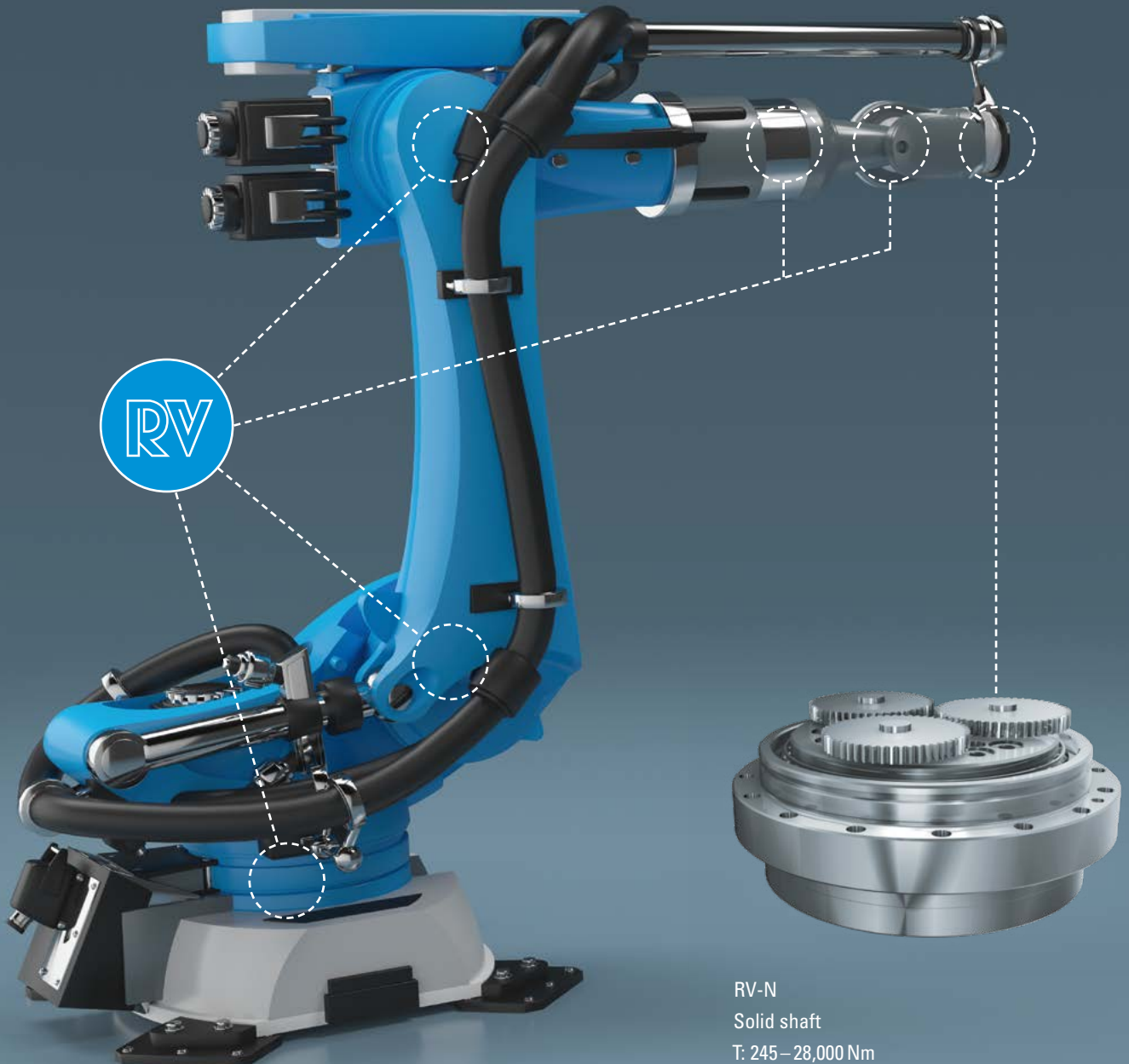
## **New: the RF-P series**

The completely newly developed gears of the RF-P series are particularly suitable for fast applications in very small installation spaces. They are eminently suitable for use in arm axes of delta or scara robots or in wheel drives of automated guided vehicles (AGV), for example.



# Compact construction, reduced weight: ideal for robotics

Nabtesco has developed especially compact, lightweight and powerful gear units: the RV-N series. They are used wherever high torque ratings are required, yet little space is available. The compact design is achieved by a main bearing with an integrated inner ring. The reinforcement of the crankshaft bearing produces a very high power density. In addition, all gear components have been optimised using FEM analysis and subjected to the latest manufacturing processes.



RV-N  
Solid shaft  
T: 245 – 28,000 Nm  
i: 41 – 203.52

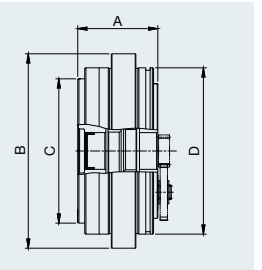


## SPECIFICATIONS

Model RV-	25N	42N	60N	80N	100N	125N	160N	380N	500N	700N	900N	1500E	2800N
Standard ratio	41	41	41	41	41	41	41	75	81	105	137.5	65	273
	81	81	81	81	81	81	81	93	105	118	248	156	211
	107.66	105	102.17	101	102.17	102.17	102.81	117	123	142.44	316.71	236.29	232.72
	126	126	121	129	121	121	125.21	139	144	159		564	
	137	141	145.61	141	141	145.61	156	162	159	183			
	164.07	164.07	161	171	161	161	201	185	192.75	203.52			
Rated torque (Nm)	245	412	600	784	1,000	1,225	1,600	3,724	4,900	7,000	9,000	14,700	28,000
Allowable acc./dec. torque (Nm)	612	1,029	1,500	1,960	2,500	3,062	4,000	9,310	12,250	17,500	22,500	36,750	70,000
Emergency stop torque (Nm)	1,225	2,058	3,000	3,920	5,000	6,125	8,000	18,620	24,500	35,000	45,000	73,500	140,000
Hysteresis loss (arcmin)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
Torsional rigidity (Nm/arcmin)	61	113	200	212	312	334	490	948	1,620	2,600	3,685	6,320	15,600
Main bearing capacity	Allowable moment (Nm)	784	1,660	2,000	2,150	2,700	3,430	4,000	7,050	11,000	15,000	12,740	62,000
	Axial load (N)	2,610	5,220	5,880	6,530	9,000	13,000	14,700	25,000	32,000	44,000	39,200	70,400

## DIMENSIONS

Model RV-	25N	42N	60N	80N	100N	125N	160N	380N	500N	700N	900N	1500E	2800N
Weight (kg)	3.8	6.3	8.9	9.3	13	13.9	22.1	44	57.2	102	157	280	544
A (mm)	62	65.5	69.5	74	80	80	104	131	137.5	170	195.5	220	270
B (ømm)	133	159	183	189	208	221	238	295	325	395	440	570	720
C h7 (ømm)	94	118	140	140	160	160	179	222	253	315	335	390	560
D (ømm)	113	136	160	160	179	186	202	252	284	350	364	483	633



### AREAS OF USE

- Robotics
- Medical technology
- Machine tools
- Positioning

### ADVANTAGES

- Efficiency level up to 85 %
- Shock load max. 5 times rated torque
- Extremely precise and low wear, hysteresis loss < 1 arcmin, long service life
- Finely graduated sizes rated torques from 245 Nm to 28,000 Nm



# The powerhouse with open centre

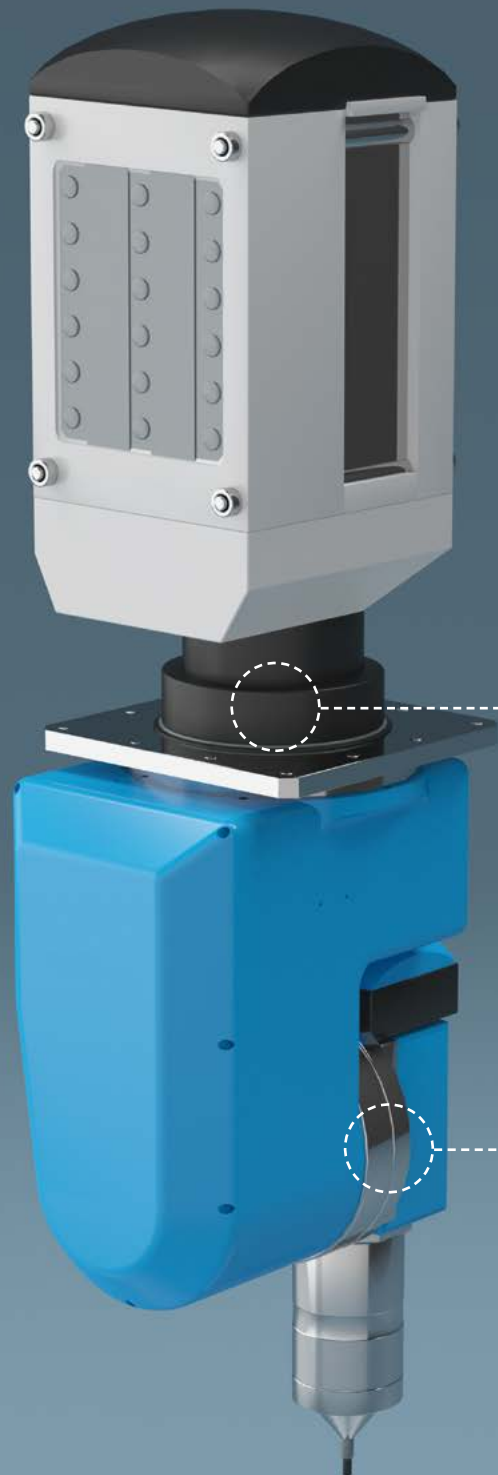
RV-C gears are your ideal choice for very demanding applications. They have a hollow shaft through which power supply cables, drive shafts, etc. can be fed. The RV-C component sets are compact, lightweight and offer high torsional and moment rigidity. Thus, the RV-C gear series reaches exceptional repeat and path accuracy.

## AREAS OF USE

- 5-axis CNC machining centers
- Robotics
- Medical technology
- Antenna systems

## ADVANTAGES

- Hollow shaft (for routing cables, etc.)
- High precision (hysteresis loss < 1 arcmin)
- Less vibration



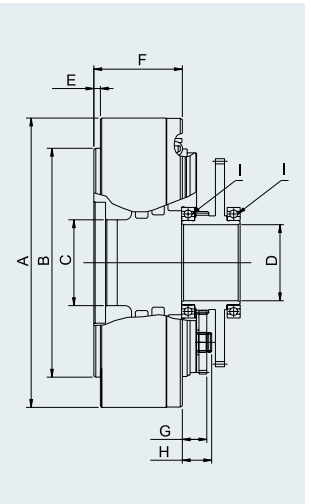


## SPECIFICATIONS

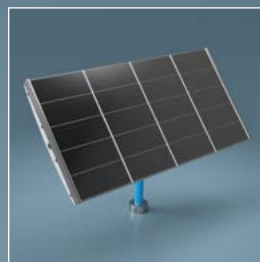
Model RV-	10C	27C	50C	100C	155C	200C	320C	400C	500C	900C	1200C	
Standard ratio	27	36.57 (1.390/38)	32.54 (1.985/61)	36.75	33.62	34.86 (1.499/43)	35.61 (2.778/78)	35.61 (2.778/78)	37.34 (3.099/83)	42.84	42.84	
Rated torque (Nm)	98	265	490	980	1,470	1,961	3,136	3,920	4,900	8,820	11,760	
Allowable acc./dec. torque (Nm)	245	662	1,225	2,450	3,675	4,900	7,840	9,800	12,250	22,050	29,400	
Emergency stop torque (Nm)	490	1,323	2,450	4,900	7,350	9,800	15,680	19,600	24,500	44,100	58,800	
Max. speed switching operation (rpm)	80	60	50	40	30	30	25	20	20	15	12	
Hysteresis loss (arcmin)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Torsional rigidity (Nm/arcmin)	47	147	255	510	735	980	1,960	2,450	3,430	4,900	5,880	
Moment rigidity (Nm/arcmin)	421	1,068	1,960	2,813	4,900	9,800	12,740	19,600	24,500	34,300	34,300	
Main bearing capacity	Allowable moment (Nm)	686	980	1,764	2,450	7,056	8,820	20,580	24,500	34,300	44,150	44,150
	Axial load (N)	5,880	8,820	11,760	13,720	15,680	19,600	29,400	34,300	39,200	51,000	51,000

## DIMENSIONS

Model RV-	10C	27C	50C	100C	155C	200C	320C	400C	500C	900C	1200C
Weight (kg)	4.6	8.5	15	19.5	37	57	80	108	154	225	235
A (∅mm)	147	182	222.5	250.5	293	347	438	485	520	543	570
B h7 (∅mm)	110	140	176	199	234	260	340	350	390	390	490
C H7 (∅mm)	34	47	66	73	90	100	140	140	150	135	135
D (∅mm)	31	43	57	71	80.5	90	138	138	138	—	—
E (mm)	4	5	5	5	6	7	5.5	6.5	7.5	22.5	—
F (mm)	49.5	57.5	68	72.6	89	102	101	111	130.5	144	136
G (mm)	17	16.6	20.2	19.9	28.6	31.2	38	39	47.5	80.8	105
H (mm)	19.2	19.5	23.8	21.15	32.5	33.2	43.5	43.5	50	82.6	—
I [no.]	6807	6810	6813	6816	6818	6820	6830	6830	6832	6828	6828



RV-C  
Hollow shaft  
T: 98 – 11,760 Nm



# High speed in the smallest of spaces

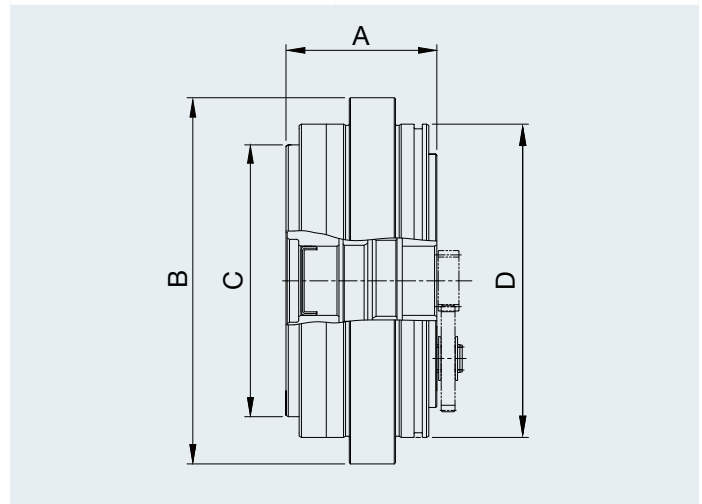
RF-P gears were developed for fast applications in small spaces. They are immune to high shock loads, are low-maintenance, and designed for high speeds. That makes them the ideal candidate for pick & place, handling or positioning applications.

## SPECIFICATIONS

Model RF-	19P	32P
Standard ratio	31	32.2 / 56
Rated torque (Nm)	190	320
Allowable acc./dec. torque (Nm)	570	960
Emergency stop torque (Nm)	570	960
Max. output speed (rpm)	200	92
Hysteresis loss (arcmin)	<2.0	<2.0
Torsional rigidity (Nm/arcmin)	66	149
Lifetime $L_{10}$ (h)	20,000	20,000
Allowable moment (Nm)	650	1,960
Momentary max. allowable moment (Nm)	1,300	3,920

## DIMENSIONS

Model RF-	19P	32P
Weight (kg)	5.6	9.5
A (mm)	71	78
B (∅mm)	148	183
C h7 (∅mm)	110	140
D (∅mm)	127	160



## AREAS OF USE

- Robotics (particularly delta and scara robots)
- Automated Guide Vehicle (AGV)
- Pick & place applications
- Handling and positioning systems

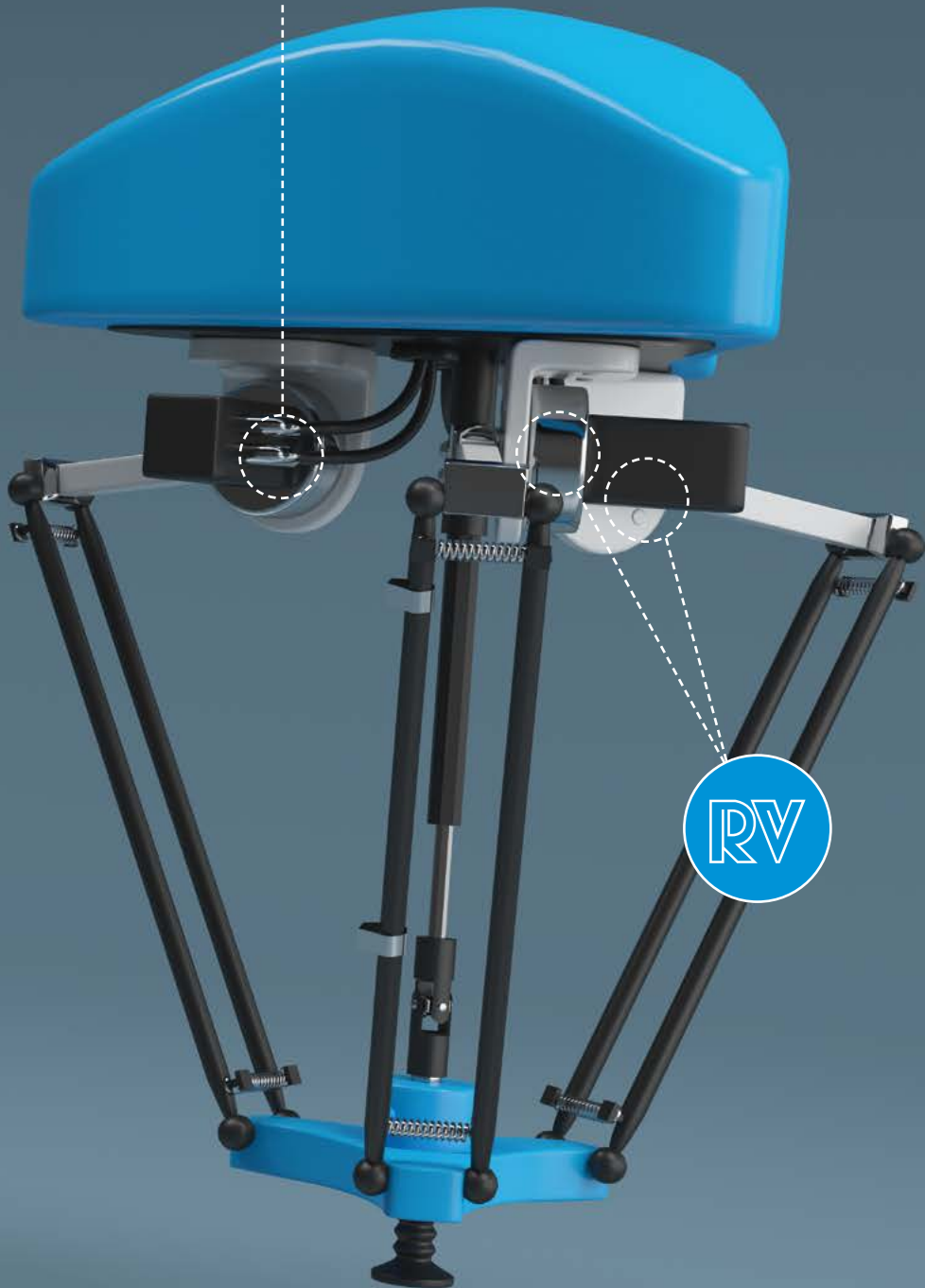
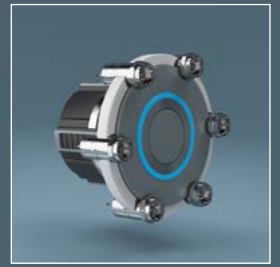
## ADVANTAGES

- High output speeds of up to 200 rpm
- Fast cycle times
- High precision (hysteresis loss <2 arc min.)
- Long service life 20,000 h





RF-P  
Solid shaft  
T: 190–320 Nm  
i: 31–56  
n: up to 200 rpm



# Minimal backlash and high reduction ratios

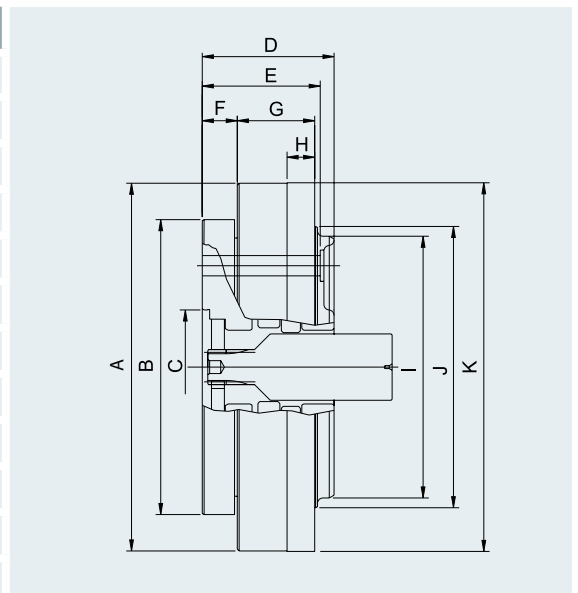
The RV series is the basic version of our precision gears. It enables the achievement of high reduction ratios. As the force is transmitted via rollers, RV gears are characterised by higher precision and low hysteresis loss. RV gears are especially compact, thanks to the external bearing support, and are capable of determining the output support themselves. This makes them the ideal solution for integrated applications which exactly reflect your specifications.

## SPECIFICATIONS

Model RV-	15	30	60	160	320	450	550
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	81 101 118.5 129 154.8 171 192.4	123 141 163.5 192.4
Rated torque (Nm)	137	333	637	1,568	3,136	4,410	5,390
Allowable acc./dec. torque (Nm)	274	833	1,592	3,920	7,840	11,025	13,475
Emergency stop torque (Nm)	686	1,666	3,185	6,615	12,250	18,620	26,950
Max. speed switching operation (rpm)	60	50	40	45	35	25	20
Hysteresis loss (arcmin)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Torsional rigidity (Nm/arcmin)	39	98	196	392	980	1,176	1,666

## DIMENSIONS

Model RV-	15	30	60	160	320	450	550
Weight (kg)	3.6	6.2	9.7	19.5	34	47	72
A (∅mm)	129.9	159.5	199.5	239.5	289.5	324.5	369.5
B h6 (∅mm)	105	135	160	204	245	275	316
C H6 (∅mm)	32	50	62	110	130	154	180
D (mm)	65	71.5	71.5	96	117.6	128.5	147
E (mm)	55	60	64	82	102	109.5	128
F (mm)	16	22	19	27	33	35	41
G (mm)	32	34	42	52	63	72.5	82
H (mm)	12	15	15	30	25	30	30
I (∅mm)	90	120	142	175	208	232	260
J (∅mm)	100	129	152.6	190	224	252	290
K h7 (∅mm)	130	160	200	239.9	290	325	370





## AREAS OF USE

- Robotics
- Machine tools
- Positioning
- Palletising
- Solar technology

## ADVANTAGES

- Extremely compact design
- High rigidity
- High precision (hysteresis loss < 1 arcmin)







# Quick start with installation-ready gears

Nabtesco gearheads are fully-enclosed, filled with lubricant and encapsulated. Because of the pre-installed motor adapter plate and the motor shaft coupling for servomotors, the amount of construction and assembly work required is reduced considerably.



## **RD-E**

The gearheads have a very lightweight and compact construction. They can also be run with a belt drive or with an attached rectangular pre-stage.



## **RD-C**

These gearheads have a large hollow shaft to run cable lines through. The hollow shaft rotates at the speed of the drive.



## **RS**

RS gears were developed specifically for reliable and precise positioning of heavy loads (up to 9t).



## **RA-EA/EC**

RA-EA/EC solid shaft gears were developed specifically for the exact positioning of chain or disc magazines.



## **GH**

These gearheads for high output speeds are ideal for the automation of robot travel axes, machine tools and conveyor systems.

## **New: the RH-N series**

The locally-produced, installation-ready gearheads already have an integrated drive pinion and motor flange for all current motor types. That is why they are especially suitable for use in machine tools, modern rotary positioners, and numerous handling applications.



# Highest flexibility and precision, the way you want it

The newest generation of Nabtesco gearheads is based on the compact RV-N component sets. They were developed specifically for the European market and are produced locally. The torque rating and precision of the gears is outstanding, but they are still very compact. Since the drive pinion and a motor flange for all current motor types are already integrated in the gearhead, it is possible to integrate them in the drive train quickly and simply. Plug & play!

## SPECIFICATIONS

Model RH-	25N	42N	60N	80N	125N	160N	380N	500N	700N	
Standard ratio	41	41	41	41	41	41	75	81	105	
	81	81	81	81	81	81	93	105	118	
	107.66	105	102.17	101	102.17	102.81	117	123	142.44	
	126	126	121	129	121	125.21	139	144	159	
	137	141	145.61	141	145.61	156	162	159	183	
	164.07	164.07	161	171	161	201	185	192.75	203.52	
Rated torque (Nm)	245	412	600	784	1,225	1,600	3,724	4,900	7,000	
Allowable acc./dec. torque (Nm)	612	1,029	1,500	1,960	3,062	4,000	9,310	12,250	17,500	
Emergency stop torque (Nm)	1,225	2,058	3,000	3,920	6,125	8,000	18,620	24,500	35,000	
Hysteresis loss (arcmin)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Torsional rigidity (Nm/arcmin)	61	113	200	212	334	490	948	1,620	2,600	
Main bearing capacity	Allowable moment (Nm)	784	1,660	2,000	2,150	3,430	4,000	7,050	11,000	15,000
	Axial load (N)	2,610	5,220	5,880	6,530	13,000	14,700	25,000	32,000	44,000

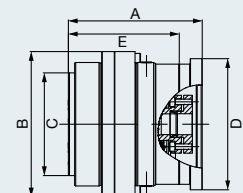
## DIMENSIONS

Model RH-	25N	42N	60N	80N	125N	160N	380N	500N	700N	
Weight *	7	11	16	17	23	33	On request	77	On request	
A (mm)	1FK703 □-... <sup>(1)</sup>	112.5	117.5	–	–	–	On request	–	On request	
	1FK704 □-... <sup>(1)</sup>	122.5	127.5	134	141	–		–		
	1FK706 □-... <sup>(1)</sup>	132.5	137.5	144	151	155.4		181.5		219
	1FK708 □-... <sup>(1)</sup>	–	145.5	152	159	163.4		189.5		227
	1FK710 □-... <sup>(1)</sup>	–	–	–	–	185.4		211.5		249
B (∅ mm)	133	159	183	189	221	238	On request	325	On request	
C h7 (∅ mm)	94	118	140	140	160	179	On request	253	On request	
D (mm)	1FK703 □-... <sup>(1)</sup>	∅90	∅90	–	–	–	On request	–	On request	
	1FK704 □-... <sup>(1)</sup>	∅120	∅120	□138	□138	–		–		
	1FK706 □-... <sup>(1)</sup>	□126	□126	□138	□138	□126		□126		□126
	1FK708 □-... <sup>(1)</sup>	–	□155	□155	□155	□175		□175		□175
	1FK710 □-... <sup>(1)</sup>	–	–	–	–	□192		□192		□192
E (mm) **	101.5	106.5	113	120	127.9	154	On request	191.5	On request	

\* Reference value unlubricated, dependent on model and choice of motor. Optional: aluminium flange design

\*\* Optional: gear without predefined motor flange with predefined interface for customer design

<sup>(1)</sup> This table was prepared based on Siemens servomotors. Combination with other servomotors possible on request.

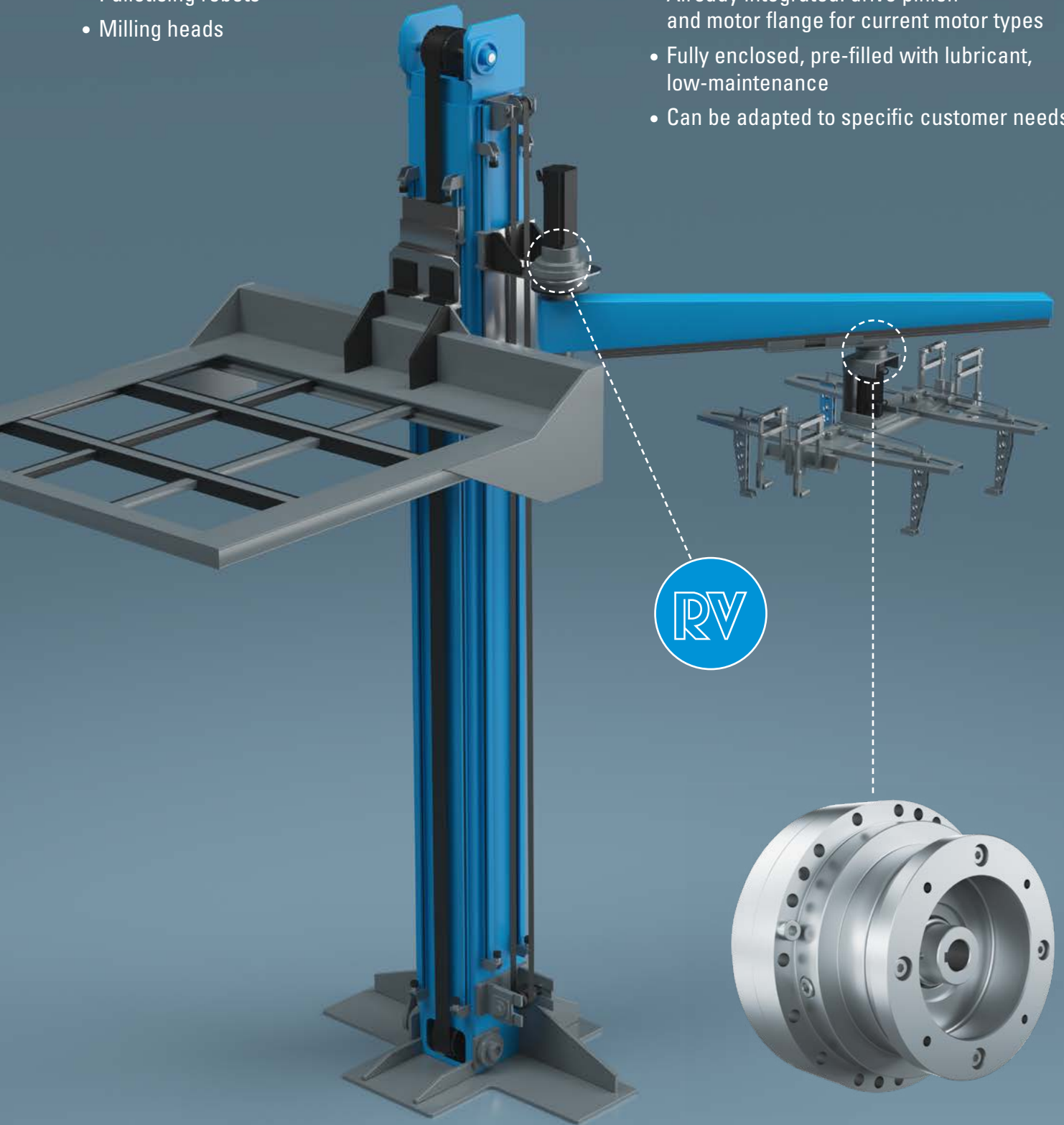


## AREAS OF USE

- Medical technology
- Palletising robots
- Milling heads

## ADVANTAGES

- Quick and low-cost installation
- Already integrated: drive pinion and motor flange for current motor types
- Fully enclosed, pre-filled with lubricant, low-maintenance
- Can be adapted to specific customer needs



RH-N  
Solid shaft  
T: 245 – 7,000 Nm  
i: 41 – 203.52





# Precise and flexible, straight from the construction kit

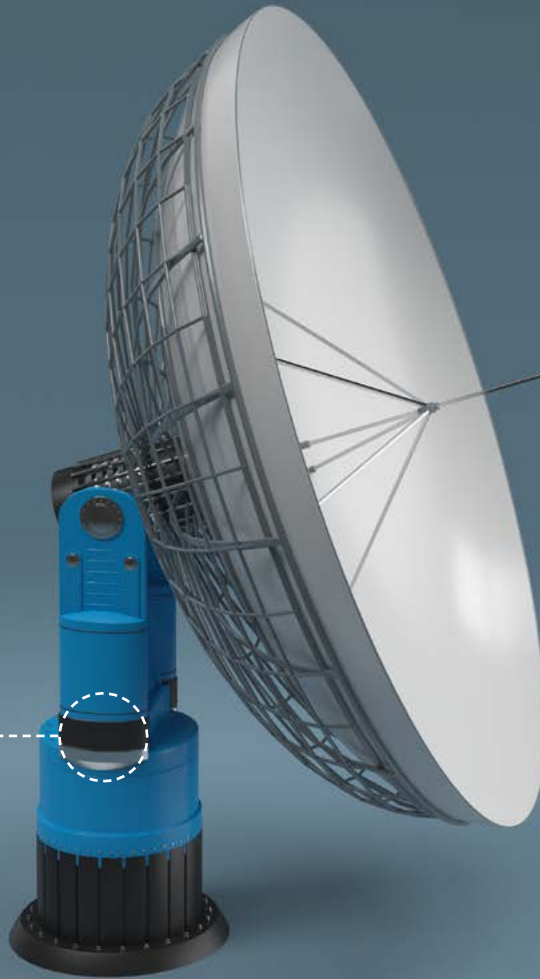
The gearheads of the RD\_-E series are more compact and versatile than ever. Three different models allow for numerous types of use, e. g. with the choice of the servomotor. A high-precision, extremely resistant and extra durable, latest-generation gearbox is concealed in the interior.

RDP-E

Solid shaft

T: 167–3,136 Nm

i: 57–81



## AREAS OF USE

- Machine tools
- Positioning
- Palletising
- Solar technology

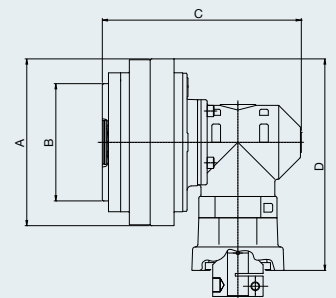
## ADVANTAGES

- Fast and cost-effective installation
- Three mounting options: straight, right angle, pulley
- Completely enclosed, pre-filled with lubricant
- The RD\_-E series delivery includes a motor coupling and motor flange for conventional servomotors

## DIMENSIONS RDR-E, RDS-E, RDP-E

Model RD_-		6E	20E	40E	80E	160E	320E
A (∅mm)		125.5	150	192	222	280	325
B h7 (∅mm)		86	105	135	160	204	245
C (mm)	RDR-E	178.4	184.1	229.1	243.5	352.5	377
	RDS-E	118.9 / 129.9	124.6 / 135.6	158.6 / 182.6	173 / 197	216.5 / 213.5	241 / 238
	RDP-E	–	152.1	194.6	209	257	281.5
D (mm)	RDR-E	182.55	194.8	243.5	258.5	353.5	376

RDR-E

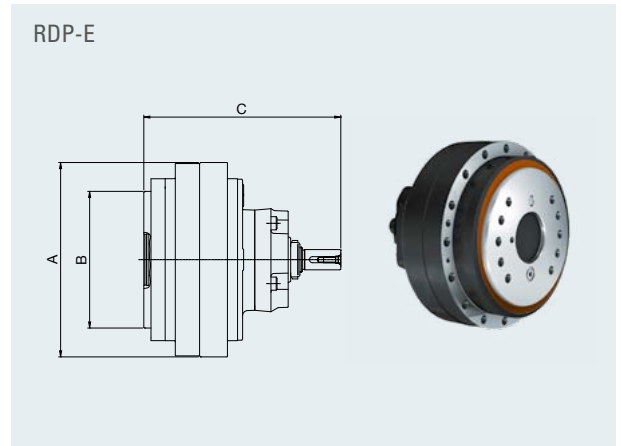
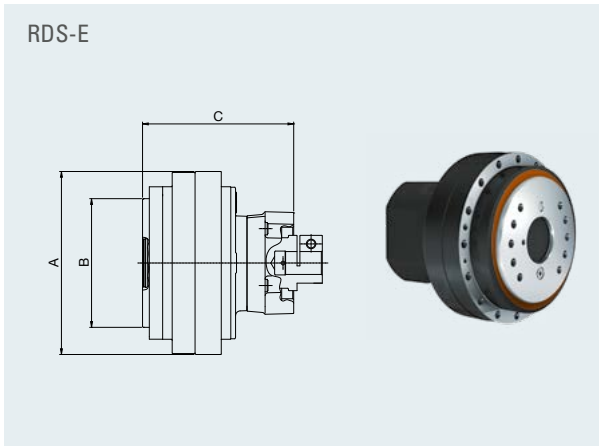
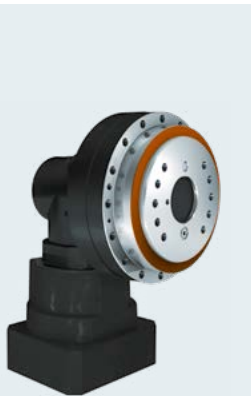


**SPECIFICATIONS RDR-E (RIGHT ANGLE INPUT) AND RDS-E (STRAIGHT INPUT)**

Model RDR- /RDS-		6E	20E	40E	80E	160E	320E
Standard ratio		31 / 43 / 54 / 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)	RDR-E	58	108 <sup>at i: 41</sup> 151 <sup>at i: 57</sup> 167 <sup>at i: 81, 105, 121, 161</sup>	400 <sup>at i: 41</sup> 412 <sup>at i: 57, 81, 105, 121, 153</sup>	400 <sup>at i: 41</sup> 556 <sup>at i: 57</sup> 784 <sup>at i: 81, 101, 121, 153</sup>	1,568	1,800 <sup>at i: 66</sup> 2,209 <sup>at i: 81</sup> 2,755 <sup>at i: 101</sup> 3,136 <sup>at i: 121, 141, 185</sup>
	RDS-E	58	167	412	784	1,568	3,136
Allowable acc./dec. torque (Nm)	RDR-E	117	271 <sup>at i: 41</sup> 378 <sup>at i: 57</sup> 412 <sup>at i: 81, 105, 121, 161</sup>	1,000 <sup>at i: 41</sup> 1,029 <sup>at i: 57, 81, 105, 121, 153</sup>	1,000 <sup>at i: 41</sup> 1,390 <sup>at i: 57</sup> 1,930 <sup>at i: 81, 101, 121, 153</sup>	3,920	4,503 <sup>at i: 66</sup> 5,527 <sup>at i: 81</sup> 6,892 <sup>at i: 101</sup> 7,840 <sup>at i: 121, 141, 185</sup>
	RDS-E	117	412	1,029	1,960	3,920	7,840
Emergency stop torque (Nm)	RDR-E	294	543 <sup>at i: 41</sup> 755 <sup>at i: 57</sup> 833 <sup>at i: 81, 105, 121, 161</sup>	2,000 <sup>at i: 41</sup> 2,058 <sup>at i: 57, 81, 105, 121, 153</sup>	2,000 <sup>at i: 41</sup> 2,781 <sup>at i: 57</sup> 3,920 <sup>at i: 81, 101, 121, 153</sup>	7,840	9,002 <sup>at i: 66</sup> 11,048 <sup>at i: 81</sup> 13,776 <sup>at i: 101</sup> 15,680 <sup>at i: 121, 141, 185</sup>
	RDS-E	294	833	2,058	3,920	7,840	15,680
Hysteresis loss (arcmin)	RDR-E	2	1.5	1.5	1.5	1.5	1.5
	RDS-E	1.5	1.0	1.0	1.0	1.0	1.0
Torsional rigidity (Nm/arcmin)		20	49	108	196	392	980
Main bearing capacity	Allowable moment (Nm)	196	882	1,666	2,156	3,920	7,056
	Axial load (N)	1,470	3,920	5,194	7,840	14,700	19,600

**SPECIFICATIONS RDP-E (PULLEY INPUT)**

Model RDP-		20E	40E	80E	160E	320E
Standard ratio		81	57	81	66	81
Rated torque (Nm)		167	412	784	1,568	3,136
Allowable acc./dec. torque (Nm)		412	1,029	1,960	3,920	7,840
Emergency stop torque (Nm)		833	2,058	3,920	7,840	15,680
Hysteresis loss (arcmin)		1.0	1.0	1.0	1.0	1.0
Torsional rigidity (Nm/arcmin)		49	108	196	392	980
Main bearing capacity	Allowable moment (Nm)	882	1,666	2,156	3,920	7,056
	Axial load (N)	3,920	5,194	7,840	14,700	19,600



# High performance design for supply lines

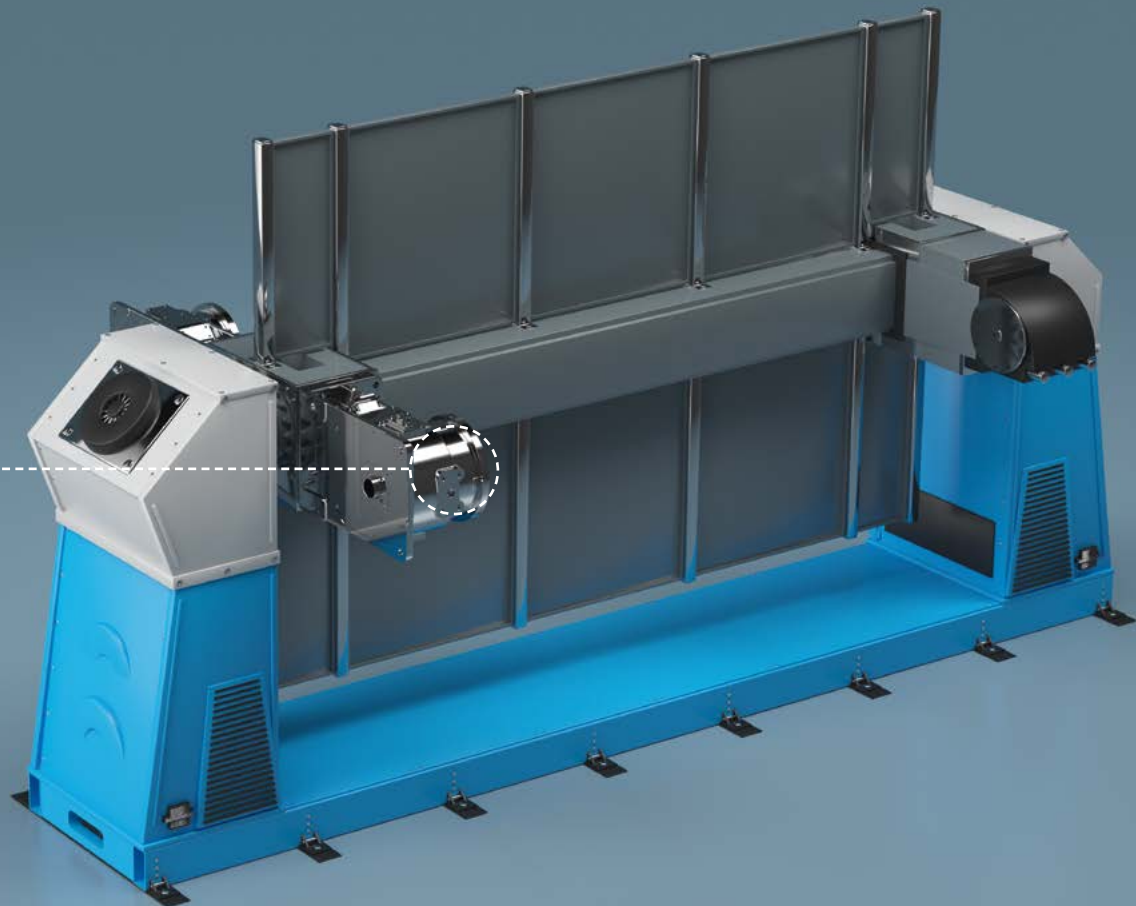
The gearheads of the new RD\_-C series have a hollow shaft for routing cables, hoses and lines. An extremely compact and efficient, state-of-the-art RV-C gearbox is concealed in the interior. RD\_-C gearheads offer three mounting options and have many different areas of use.

## AREAS OF USE

- Robotics
- Tool magazines
- Tool-change arms
- Welding table positioning
- Rotary tables
- Palletising robots
- Bending machinery
- Woodworking machinery

## ADVANTAGES

- Hollow shaft (for routing cables, etc.)
- Quick and cost-effective installation
- Three mounting options: straight, right angle, pulley
- Completely enclosed, pre-filled with lubricant



RDR-C  
Hollow shaft  
T: 98 – 3,136 Nm  
i: 81 – 258



**SPECIFICATIONS RDR-C (RIGHT ANGLE INPUT) AND RDS-C (STRAIGHT INPUT)**

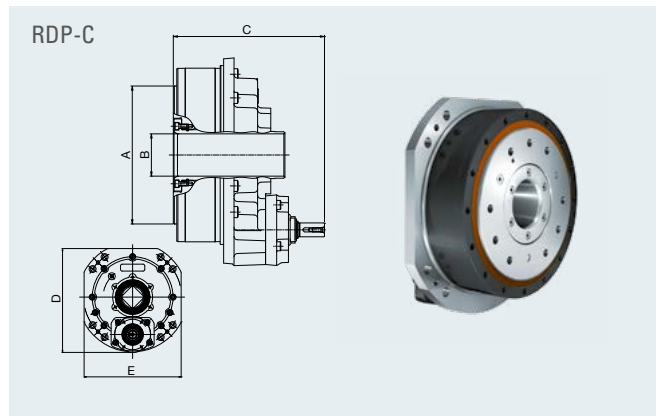
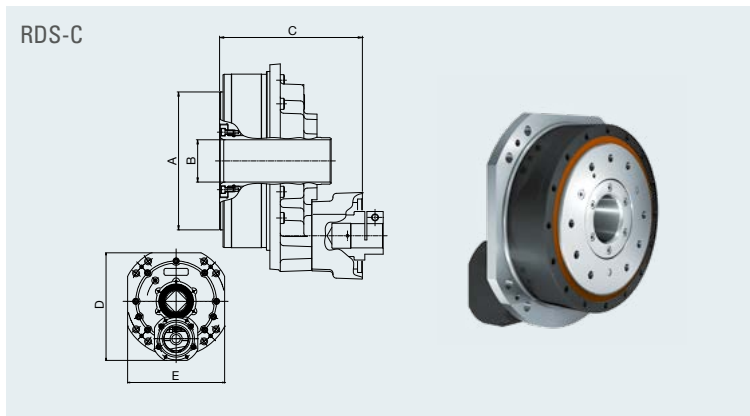
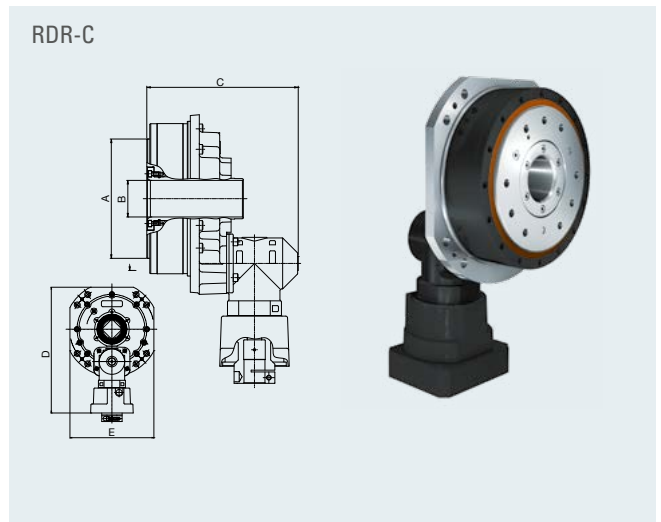
Model RDR-/RDS-		10C	27C	50C	100C	200C	320C
Standard ratio		81 / 108 / 153 / 189 / 243	100 / 142 / 184 / 233	109 / 153 / 196 / 240	101 / 150 / 210 / 258	106 / 156 / 206 / 245	115 / 157 / 207 / 253
Rated torque (Nm)		98	265	490	980	1,960	3,136
Allowable acc./dec. torque (Nm)		245	662	1,225	2,450	4,900	7,840
Emergency stop torque (Nm)		490	1,323	2,450	4,900	9,800	15,680
Hysteresis loss (arcmin)	RDR-C	1.5	1.5	1.5	1.5	1.5	1.5
Hysteresis loss (arcmin)	RDS-C	1.0	1.0	1.0	1.0	1.0	1.0
Torsional rigidity (Nm/arcmin)		47	147	255	510	980	1,960
Main bearing capacity	Allowable moment (Nm)	686	980	1,764	2,450	8,820	20,580
	Axial load (N)	5,880	8,820	11,760	13,720	19,600	29,400

**SPECIFICATIONS RDP-C (PULLEY INPUT)**

Model RDP-		10C	27C	50C	100C	200C	320C
Standard ratio		108	100	109	101	106	157
Rated torque (Nm)		98	265	490	980	1,960	3,136
Allowable acc./dec. torque (Nm)		245	662	1,225	2,450	4,900	7,840
Emergency stop torque (Nm)		490	1,323	2,450	4,900	9,800	15,680
Hysteresis loss (arcmin)		1.0	1.0	1.0	1.0	1.0	1.0
Torsional rigidity (Nm/arcmin)		47	147	255	510	980	1,960
Main bearing capacity	Allowable moment (Nm)	686	980	1,764	2,450	8,820	20,580
	Axial load (N)	5,880	8,820	11,760	13,720	19,600	29,400

**DIMENSIONS RDR-C, RDS-C, RDP-C**

Model RD_ -	10C	27C	50C	100C	200C	320C	
A h7 (ømm)	110	140	176	199	260	340	
B (ømm)	26	37	48	61	76	121	
C (mm)	RDR-C	191.5	200.5	229.1	243.5	382	392.5
	RDS-C	132 / 143	141 / 152	158.6 / 182.6	173 / 197	246 / 243	256.5 / 253.5
	RDP-C	159.5	168.5	194.6	209	286.5	297
D (mm)	RDR-C	253.3 / 265.3	294.5 / 306.5	363.5 / 387.5	395.5 / 419.5	550.5 / 541.5	626 / 617
	RDS-C	185 / 196.5	227.2 / 237.7	270 / 278.5	302 / 310.5	403 / 413	478.5 / 488.5
	RDP-C	186	227.2	268	300	402.7	478.4
E (mm)	170	207.5	252	280	368	447	



# High-precision positioning of even the heaviest loads

The RS gears series was developed specifically for the positioning of heavy loads. They have an integrated rectangular gear and a robust, durable construction. As such, they are designed for thrust loads of up to 9 t and in terms of positioning, they are clearly superior to conventional cam shaft or worm gears.

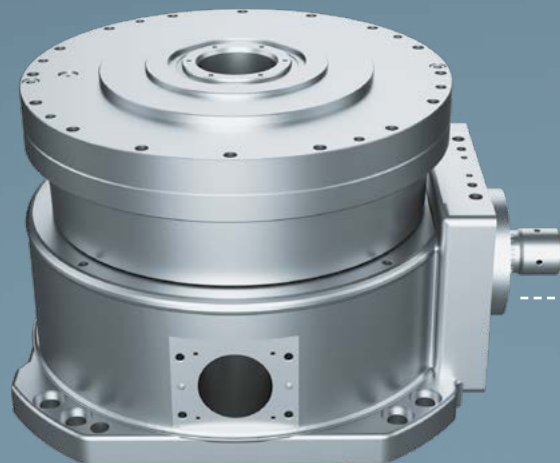
## AREAS OF USE

- Robotics
- Machine tools
- Welding table positioning
- Rotary tables

## ADVANTAGES

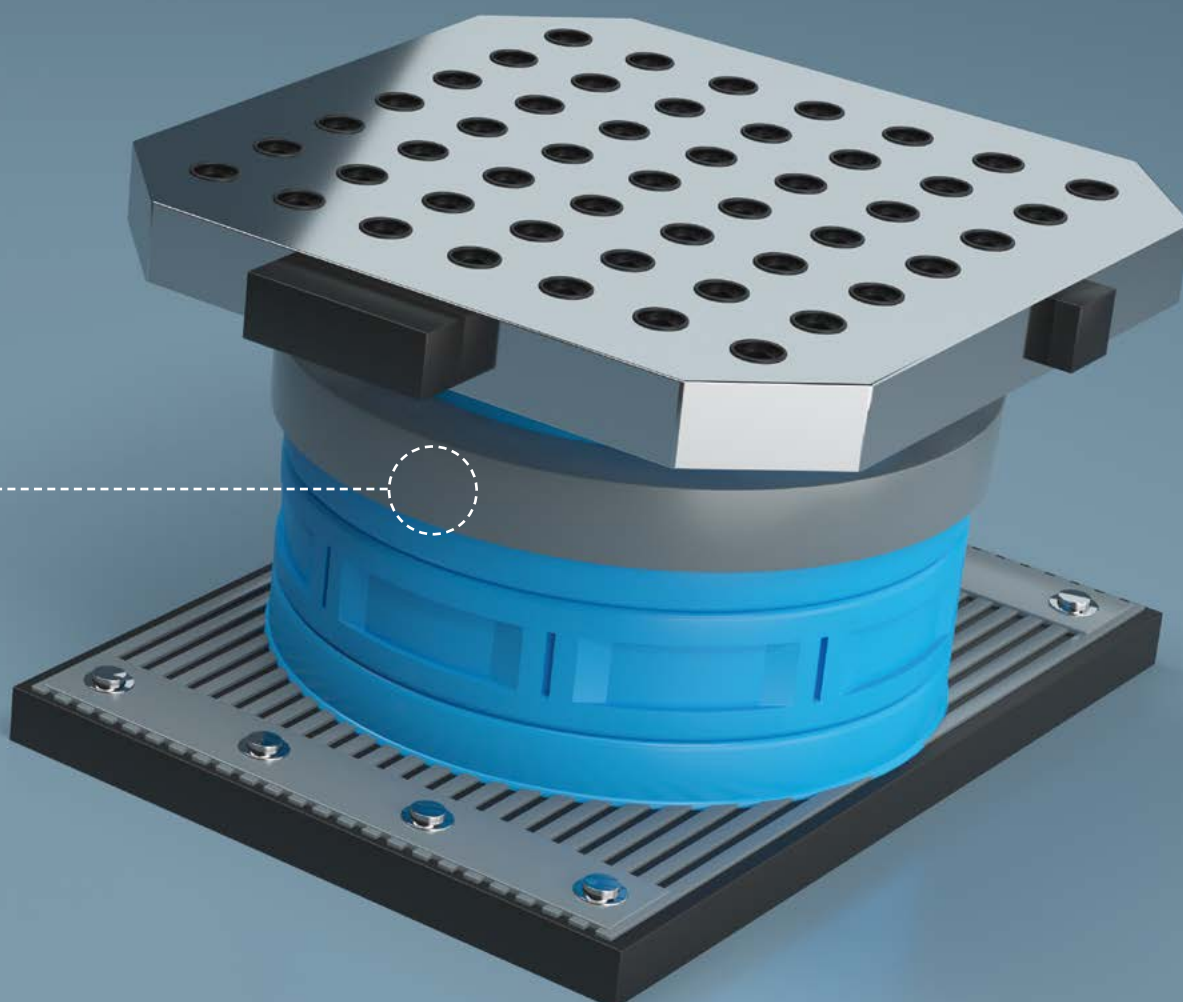
- Reliable and precise positioning of heavy loads
- Main bearing permits thrust loads of up to 1.5 t (RS-50A), 2.5 t (RS-260A), 5 t (RS-320A), 7 t (RS-400A) or up to 9 t (RS-900A)
- Hollow shaft (for placement of cables, etc.)
- Cast iron base for robust floor installation
- Easily accessible, right-angle attachment of motor

RS-A  
Hollow shaft  
T: 480 – 8,820 Nm  
i: 100 – 240



## SPECIFICATIONS

Model RS-	50A	260A	320A	400A	900A
Standard ratio	100	120	170	170	193.6 / 240
Max. axial load (kg)	1,000	2,500	5,000	7,340	9,000
Rated torque (Nm)	480	2,548	3,136	3,920	8,820
Allowable acc./dec. torque (Nm)	1,225	6,370	7,840	9,800	17,640
Emergency stop torque (Nm)	2,450	12,740	15,680	19,600	35,280
Max. output speed (rpm)	30	21.5	20	20	10
Hysteresis loss (arcmin)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Allowable moment (Nm)	2,480	12,740	20,580	24,500	44,100





# Powerhouse for machine tools

RA-EA and RA-EC gears are specially designed for positioning magazines in machine tools. A motor flange or pinion enables their rapid and simple integration in tool-changing systems for disc and chain magazines (ATC – Automatic Tool Changer).

## SPECIFICATIONS RA-EA, RA-EC

Model RA-		20EA / 20EC	40EA / 40EC	80EA / 80EC	160EA / 160EC
Standard ratio	EA <sup>1</sup>	80 / 104 / 120 / 160	80 / 104 / 120 / 152	80 / 100 / 120 / 152	80 / 100 / 128 / 144 / 170
	EC <sup>2</sup>	81 / 105 / 121 / 161	81 / 105 / 121 / 153	81 / 101 / 121 / 153	81 / 101 / 129 / 145 / 171
Rated torque (Nm)		167	412	784	1,568
Allowable acc./dec. torque (Nm)		412	1,029	1,960	3,920
Emergency stop torque (Nm)		833	2,058	3,920	7,840
Max. speed switching operation (rpm)		75	70	70	45
Hysteresis loss (arcmin)		< 1.0	< 1.0	< 1.0	< 1.0
Torsional rigidity (Nm/arcmin)		49	108	196	392
Moment rigidity (Nm/arcmin)		882	1,666	2,156	3,920
Main bearing capacity	Allowable moment (Nm)	1,764	3,332	4,312	7,840
	Axial load (N)	3,920	5,194	7,840	14,700

<sup>1</sup>EA = case rotation    <sup>2</sup>EC = shaft rotation

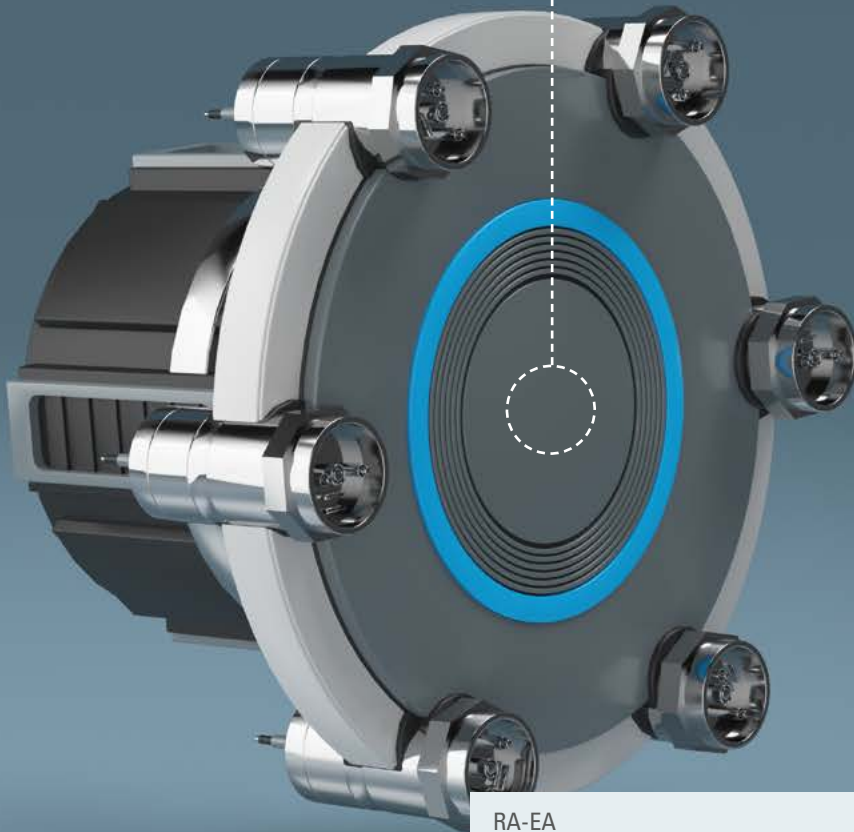
## DIMENSIONS RA-EA

Model RA-	20EA	40EA	80EA	160EA
Weight (kg)	14	25	35	77
A (∅mm)	175	230	260	325
B h7 (∅mm)	140	180	210	270
C (∅mm)	100	140	170	180
D (∅mm)	145	190	222	280
E h7 (∅mm)	124	160	190	240
F (mm)	17	14	16	15
G (mm)	93.6	119.1	127	171
H (mm)	47.5	63.5	55.2	59.9
I (mm)	24.5	24	37	60.5
J (mm)	10	13	14	18
K (mm)	20	24	15	38
L (mm)	10	10	10	15
M (°)	60	60	45	30
N (∅mm)	160	210	240	300
O (∅mm)	6 × ∅9	6 × ∅11	8 × ∅11	12 × ∅13

## DIMENSIONS RA-EC

Model RA-	20EC	40EC	80EC	160EC
Weight (kg)	14	25	35	71
A (∅mm)	150	192	226	290
B h7 (∅mm)	145	190	222	280
C (∅mm)	124	160	190	240
D (∅mm)	110	140	170	210
E h7 (∅mm)	40	50	80	100
F (mm)	59.1	65	77	108
G (mm)	59	78	72	88.5
H (mm)	32	37	33	42.5
I (mm)	24.5	24	37	60.5
J (mm)	20	24	15	20
K (mm)	25	38	40	33
L (mm)	10	10	10	10
M (mm)	10	10	10	15
N (mm)	6	6	6	8
O (°)	30	30	20	37.5
P (∅mm)	90	110	136	180
Q (∅mm)	4 × M10	6 × M12	9 × M12	6 × M16

RA-EA  
 Solid shaft  
 T: 167 – 1,568 Nm  
 i: 80 – 170



### AREAS OF USE

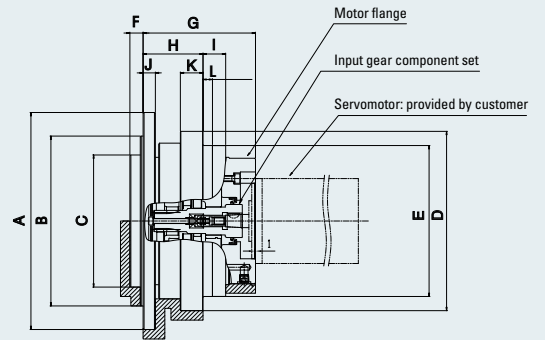
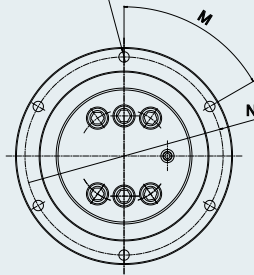
- Tool magazines
- Machine tools
- ATC – Automatic Tool Changer
- APC – Automatic Pallet Changer

### ADVANTAGES

- High shock-load capability (up to 5 times the rated torque)
- High rigidity
- High precision (hysteresis loss < 1 arcmin)
- Low inertia
- Installation is more cost-effective

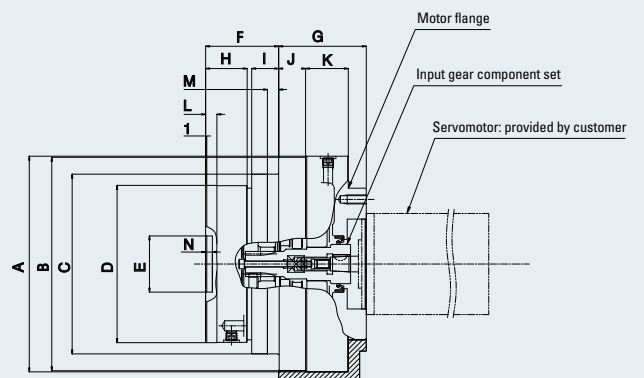
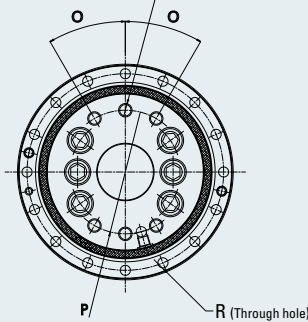
RA-EA

○ (Through hole)



RA-EC

Q (Output component)



# Gearheads for high output speeds

The gearheads of the GH series are the "easy-to-use" version of the RV series. They impress with drive rates of up to 270 rpm and a shock-load capacity of up to seven times the rated torque. These gears are typically used to automate robots in travel axes and conveyor systems.

## AREAS OF USE

- Machine tools
- Pallet magazines
- Gantry robots
- Robot periphery

## ADVANTAGES

- High output speeds (up to 270 rpm)
- High shock-load capability (up to 7 times the rated torque)
- High rigidity
- Completely enclosed, pre-filled with lubricant
- Installation is more cost-effective



GH  
Solid shaft  
T: 69–980 Nm  
i: 10.74–31.43  
n: up to 270 rpm



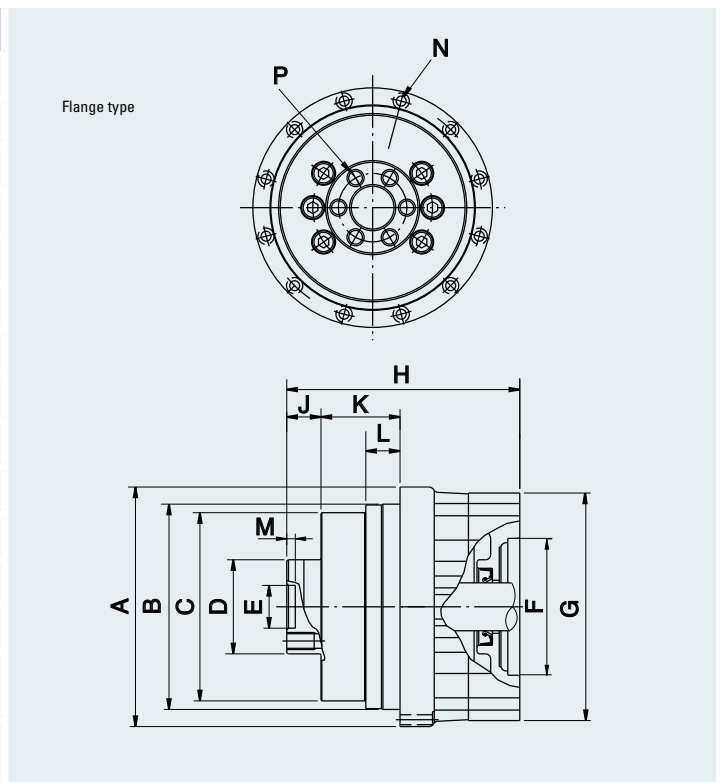


## SPECIFICATIONS

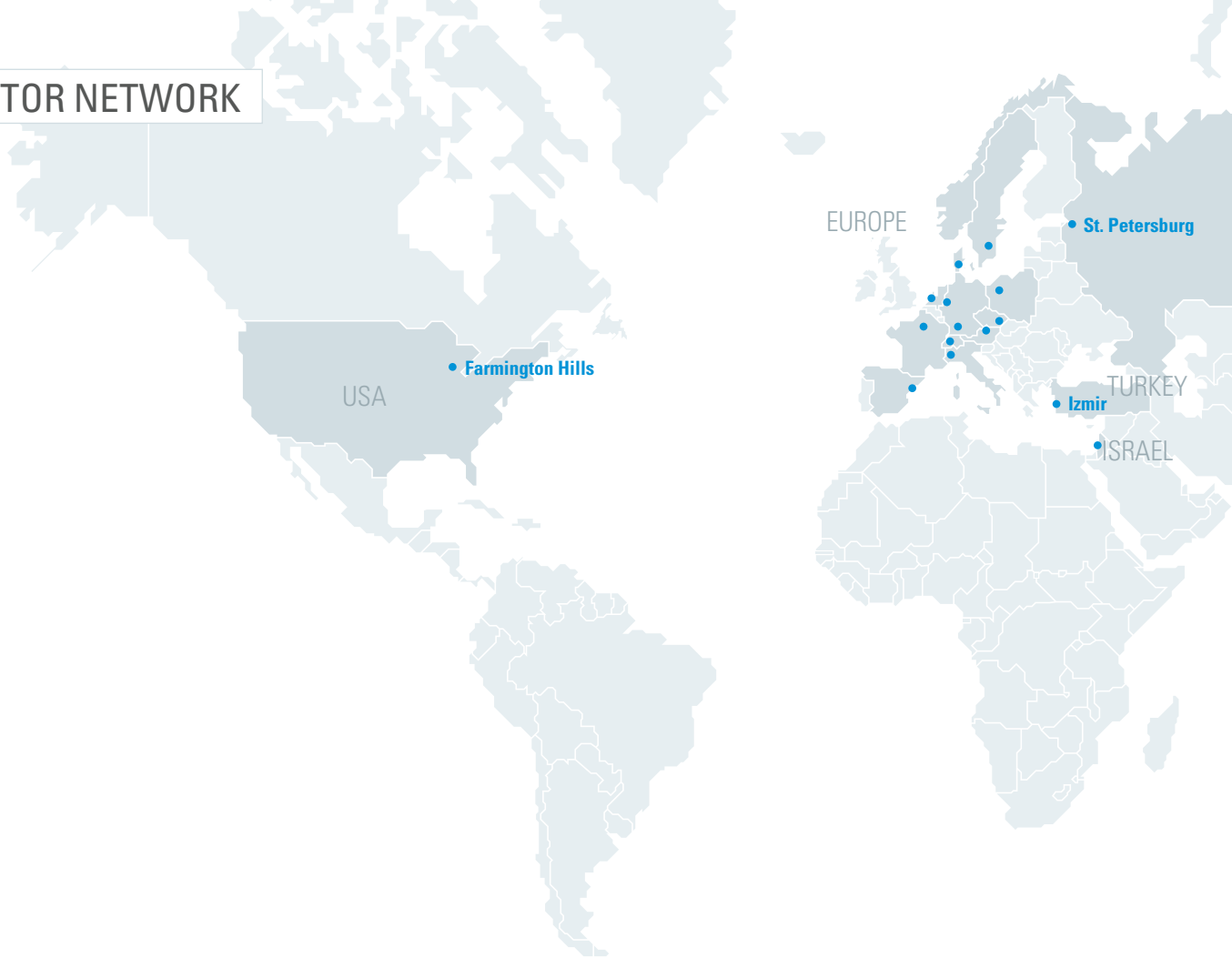
Model GH-	7	17	24	40	100	
Standard ratio	461/41 21 153/5	11 21 31	11 21 31	419/39 21 723/23	20.375 31.4	
Rated torque (Nm)	69	167	235	392	980	
Allowable acc./dec. torque (Nm)	206	500	706	1,176	2,942	
Emergency stop torque (Nm)	480	1,166	1,646	2,744	6,865	
Max. speed switching operation (rpm)	270	270	250	250	135	
Max. speed continuous operation (rpm)	150	150	150	150	65	
Hysteresis loss (arcmin)	<6	<6	<6	<6	<10	
Main bearing capacity	Allowable moment (Nm)	460	804	843	1,823	4,900
	Axial load (N)	1,372	1,960	2,940	2,940	5,586

## DIMENSIONS (FLANGE TYPE)

Model GH-	7	17	24	40	100
Weight (kg)	8	15.5	15.5	35.5	90
A (φmm)	140	180	195	240	384
B h7 (φmm)	120	151	160	200	310
C (φmm)	110	—	144	—	255
D h7 (φmm)	55	72	96	108	144
E H7 (φmm)	25	35	42	50	70
F h7 (φmm)	80	110	110	114.3	114
G (φmm)	133	170	186	229	290
H (mm)	136.2	157	146	202.2	237
J (mm)	20	19.8	13	27	25
K (mm)	46.2	52.2	65	63.7	123
L (mm)	20	17	26	23	18
M (mm)	5	5	10	6	8
N (φmm)	129 12×φ5.8	129 12×φ5.8	129 12×φ5.8	129 12×φ5.8	129 12×φ5.8
P (φmm)	40 6×M10	55 8×M12	72 8×M12	85 12×M12	115 8×M16



# DISTRIBUTOR NETWORK



GERMANY  
**Düsseldorf Headquarters**  
Tiefenbroicher Weg 15  
40472 Düsseldorf

Tel.: +49 211 173 790  
Fax: +49 211 364 677  
info@nabtesco.de  
www.nabtesco.de

**Office South**  
Leitzstraße 45  
70469 Stuttgart

Tel.: +49 711 490 66 299  
info@nabtesco.de  
www.nabtesco.de

AUSTRIA  
**ATP - Antriebstechnik Peissl GmbH**  
Carl-Auer-von-Weisbach-Straße 6 a  
4614 Marchtrenk

Tel.: +43 7243 514 72 0  
Fax: +43 7243 514 72 10  
office@atp-antriebstechnik.at  
www.atp-antriebstechnik.at

CZECH REPUBLIC  
**RAVEO s.r.o**  
Trida Tomase Bati 1851  
Otrokovice, 765 02

Tel.: +420 577 700 150  
Fax: +420 577 663 875  
info@raveo.cz  
www.raveo.cz

DENMARK  
**ServoTech A/S**  
Ulvehavevej 44 B  
7100 Vejle

Tel.: +45 79 42 80 80  
sales@servotech.dk  
www.servotech.dk

FRANCE  
**GAMMATIC S.A.R.L.**  
11 Burospace  
91572 Bièvres

Tel.: +33 160 191 119  
Fax: +33 160 190 090  
info@gammatic.fr  
www.gammatic.fr

ISRAEL  
**Delta Elkon Mechanical Products Ltd.**  
19 Yad Haharutzim Str., P.O. Box 8262  
South Netanya, 4250414

Tel.: +972 1 599 500 557  
Fax: +972 9 865 8492  
www.delta-elkon.co.il

ITALY  
**Chiaperotti S.r.l.**  
Via Ferrero 100  
10090 Rivoli Cascine Vica (Turin)

Tel.: +39 11 957 635 3  
informazioni@chiaperotti.com  
www.chiaperotti.com

POLAND  
**P.P.H. Wobit E.K.J. Ober S.C.**  
Dęborzyce 16  
62-045 Pniewy

Tel.: +48 61 2227 410  
Fax: +48 61 2227 439  
wobit@wobit.com.pl  
www.wobit.com.pl

RUSSIA  
**Drive Systems, Ltd.**  
Domodroitelnaya 4, office 305  
194292 St. Petersburg

Tel.: +7 (812) 408-1937  
info@drivemeh.ru  
www.drivemeh.ru

SPAIN  
**Tecnopower S.L.**  
Poligono Industrial Moli dels Frares,  
Calle C n° 10  
08620 Sant Vicenç dels Horts -  
Barcelona

Tel.: +34 93 656 80 50  
Fax: +34 93 656 80 26  
info@tecnopower.es  
www.tecnopower.es

SWEDEN  
**OEM Motor AB**  
Fredriksbergsgatan 2  
573 92 Tranås

Tel.: +46 75 242 44 00  
Fax: +46 75 242 44 49  
info@motor.oem.se  
www.oemmotor.se

EUROPE  
St. Petersburg  
Izmir  
TURKEY  
ISRAEL

SWITZERLAND  
**Balance Drive AG**  
Bodenmattstrasse 5  
3185 Schmitzen

Tel.: +41 26 497 92 92  
info@balance-drive.ch  
www.balance-drive.ch

THE NETHERLANDS  
**ABI b.v.**  
A. Hofmanweg 60  
2031 BL Haarlem

Tel.: +31 23 531 92 92  
Fax: +31 23 532 65 99  
info@abi.nl  
www.abi.nl

TURKEY  
**ENDO Endüstriyel Donanım ve Otomasyon Sistemleri San. ve Tic. Ltd. Şti.**  
1203/12 Sok. No: 2 / A  
Merkez Çarşı İş Merkezi  
35110/Yenişehir - Izmir

Tel.: +90 232 433 8515  
Fax: +90 232 433 8881  
Mobil: +90 532 794 8494  
ilker@endo.com.tr  
www.endo.com.tr



JAPAN

**Nabtesco Corporation Head Office**

JA Kyosai Bldg., 7-9, Hirakawacho 2-chome,  
Chiyoda-ku, Tokyo 102-0093

Tel.: +81 3 5213 1133

Fax: +81 3 5213 1171

info@nabtesco.com

www.nabtesco.com

CHINA

**Shanghai Nabtesco Motion-equipment  
Trading Co., Ltd.**

Rm. 1706, Hong Jia Tower  
No. 388 Fu Shan Road  
Pudang New Area Shanghai  
200122 Shanghai

Tel.: +86 21 3363 2200

Fax: +86 21 3363 2655

info@nabtesco-motion.cn

www.nabtesco-motion.cn

USA

**Nabtesco Motion Control, Inc.**

23976 Freeway Park Drive  
Farmington Hills, MI 48335

Tel.: +1 248 553 3020

Fax: +1 248 553 3070

info@nabtescomotioncontrol.com

www.nabtescomotioncontrol.com

INDIA

**Nabtesco India Private Limited**

No. 506, Prestige Meridian-II, No. 30/8,  
M.G. Road,  
Bangalore-560 001, Karnataka

Tel.: +91 80 4123 4901



TURKEY





## Nabtesco Precision Europe GmbH

Tiefenbroicher Weg 15  
40472 Düsseldorf  
Germany

Tel.: +49(0)211 173 790  
Fax: +49(0)211 364 677  
info@nabtesco.de  
www.nabtesco.de