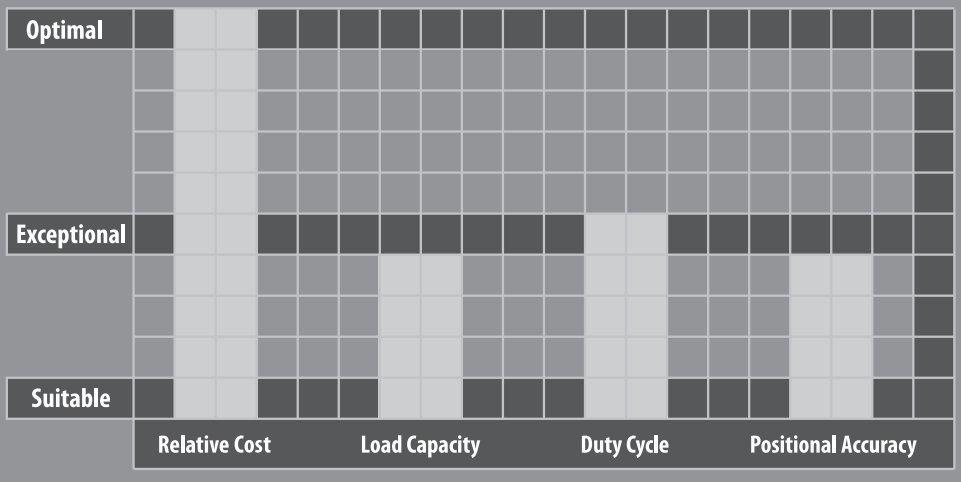
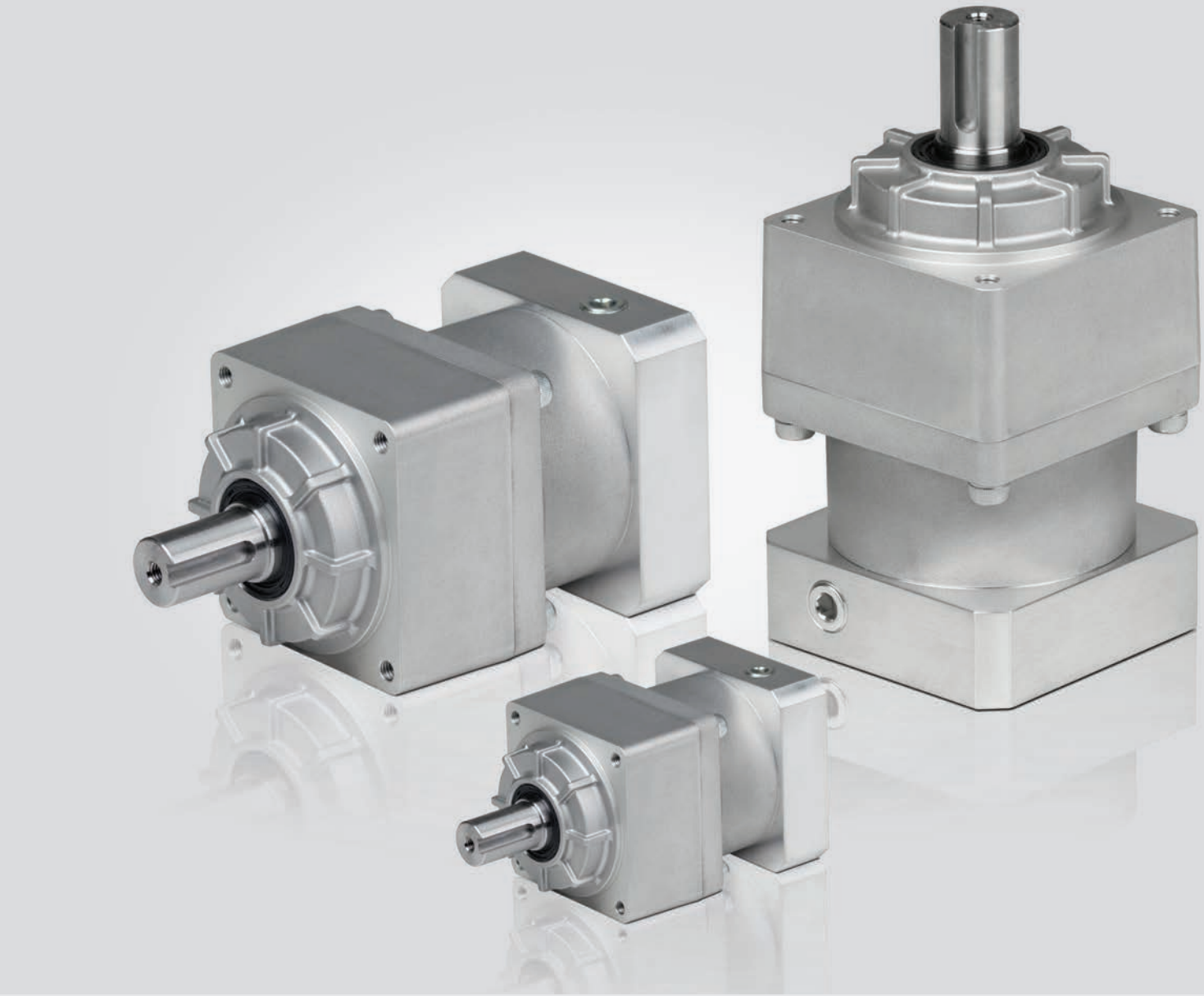
VRSF SERIES

The intelligent, value engineered selection for lower duty cycle servo and stepper motor applications. The VRSF utilizes a light-weight aluminum frame, making it optimal for traveling axes and end of arm tooling systems. Helical cut gearing allows the VRSF to operate much quieter than the industry standard economy products which rely on spur gearing. The VRSF comes standard with 15 arc-minutes of backlash, but can also be configured to higher accuracy levels.

The VRSF is available in four frame sizes, putting out a peak output torque of 274Nm across 9 reduction ratios. The VRSF is the ideal choice for OEMs producing high volume machines where cost is critical, accuracy relatively important and duty cycle not overly extreme. The VRSF's aluminum body has made it a popular choice in medical, food packaging and other harsh environments. The VRSF can be fitted with a NEMA output flange, for standardized connection to customer equipment.

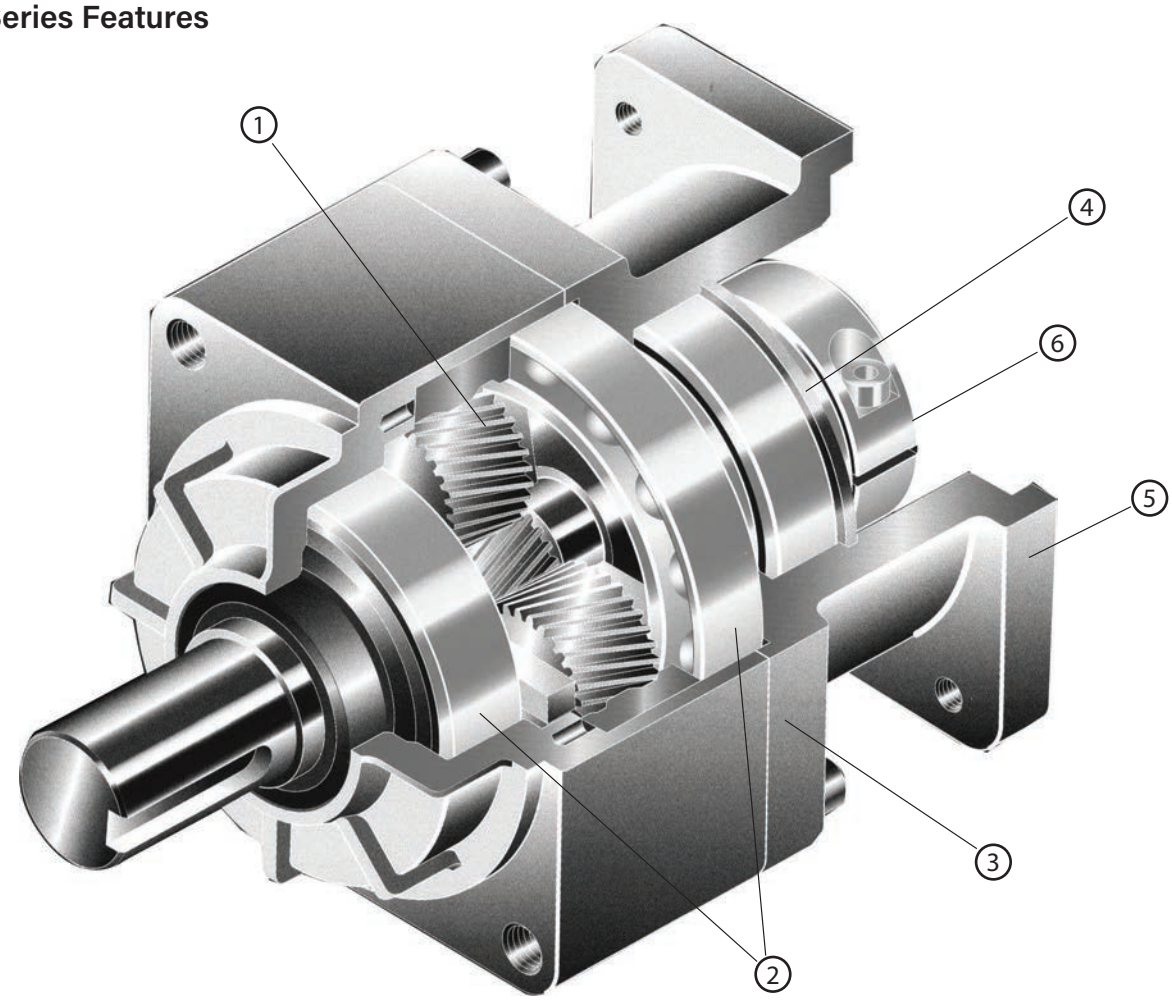




VRSF SERIES

- Value engineered solution for simple servo and stepper motor applications
- Quiet operation: Helical cut gears contribute to reduced vibration and noise
- Wide range of mounting adapters offer a simple, precise attachment to any motor
- Lightweight aluminum body reduces excess weight
- Aluminum body, combined with other wash-down features can be used in harsh environments
- Maintenance-free solution that is lubricated for life. High performance grease allows flexible mounting in any orientation

VRSF Series Features



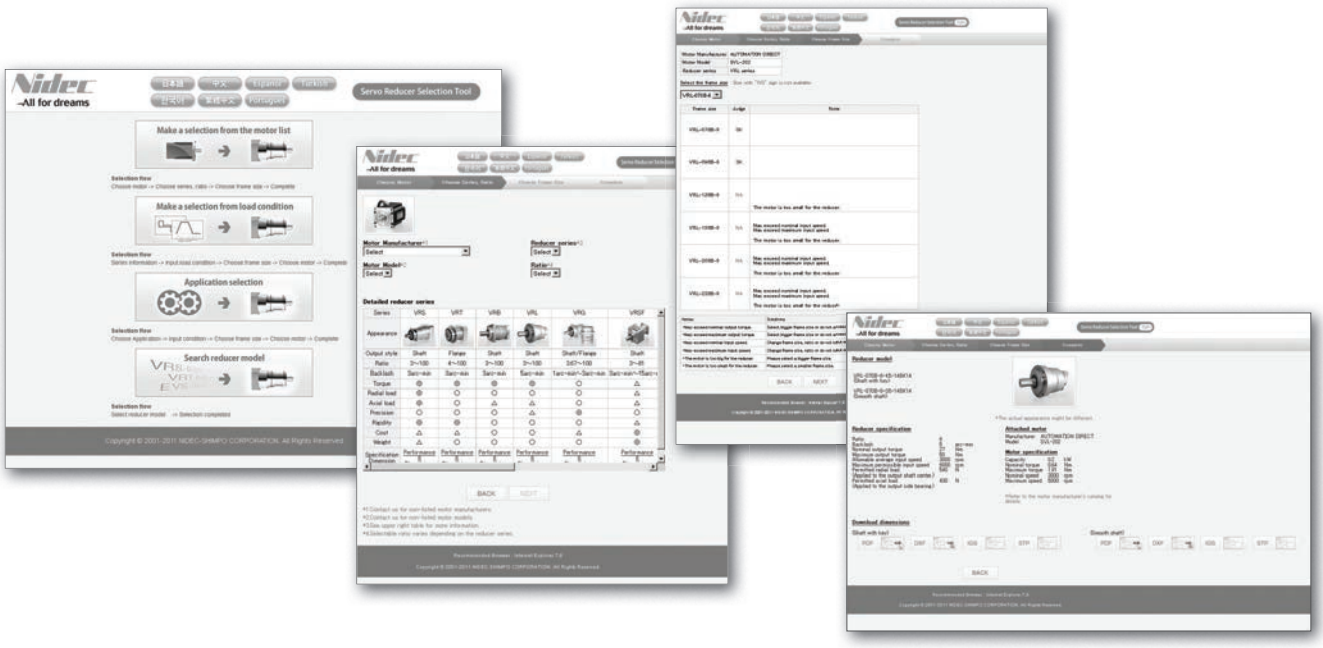
1. Carburized helical gears with proprietary secondary finishing process for higher accuracy and smooth, quiet operation
2. One piece output shaft and planet carrier with two bearings straddling the planet gears. Higher stiffness and safety factor, with guaranteed alignment of gearing
3. Aluminum body for a light weight solution, capable of withstanding corrosive environments
4. Input seal allows for IP65 ingress protection
5. Optimized mounting system with active centering on motor pilot diameter guarantees alignment of motor. Motor can be installed in any orientation
6. True concentric clamping connection, optimized for your motor. Reduced inertia for dynamic performance and balanced for high speed operation

VRSF Series Model Code

VRSF	—	LB	—	15	—	C	—	19HB16
Series Name		Backlash		Ratio		Frame Size		Motor Mounting Code
VRSF		No Code: Standard (15 arc-min) LB: Low (5 arc-min)		1 Stage: 3 5 S9 2 Stage: 15 20 25 35 45 81		B C D E		Motor mounting code varies depending on the motor

* Use the selection tool link below to configure the code

Contact us for additional information or refer to our online gearhead selection tool.
Selection tool https://www.nidec-drivetechnology.co.jp/selection/all/



VRSF B Frame 1 Stage and 2 Stage Specifications

Frame Size	B								
Stage	1 Stage					2 Stage			
Ratio	Units	Note	3	5	9	15	20	25	35
Nominal Output Torque	[Nm]	*1	3.43	2.84	2.35	4.02	5.00	6.27	3.84
Maximum Acceleration Torque	[Nm]	*2	10.3	8.53	7.25	12.2	15.0	19.0	11.5
Emergency Stop Torque	[Nm]	--	--	--	--	--	--	--	--
Nominal Input Speed	[rpm]	*3	3000			3000			
Maximum Input Speed	[rpm]	*4	5000			5000			
No Load Running Torque	[Nm]	*5	0.119			0.048			
Permitted Radial Load	[N]	*6	392	490	588	784	804	882	882
Permitted Axial Load	[N]	*7	196	245	294	392	402	441	441
Maximum Radial Load	[N]	*8	882N			882N			
Maximum Axial Load	[N]	*9	441N			441N			
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.081	0.059	0.052	0.057	0.056	0.056	0.052
Moment of Inertia (≤Ø 14)	[kgcm2]	--	0.150	0.130	0.120	0.130	0.130	0.130	0.120
Efficiency	[%]	*10	90			85			
Torsional Rigidity	[Nm/arcmin]	*11	0.8			0.8			
Backlash (Standard)	[Arc-min]	--	≤ 15			≤ 15			
Backlash (Low)	[Arc-min]	--	≤ 10			≤ 10			
Backlash (Precision)	[Arc-min]	--	≤ 3			≤ 3			
Noise Level	[dB]	*12	≤ 72			≤ 65			
Protection Class	--	*13	IP65			IP65			
Ambient Temperature	[°C]	--	0-40			0-40			
Permitted Housing Temperature	[°C]	--	90			90			
Weight (≤Ø 8)	[kg]	*14	0.58			0.75			
Weight (≤Ø 14)	[kg]	*14	0.7			0.86			

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation

*3 The average input speed

*4 The maximum intermittent input speed

*5 Torque at no load applied to the input shaft at nominal input speed

*6 At this load and nominal input speed, service life will be 20,000 hours. (The radial load applied to the output side shaft center)

*7 At this load and nominal input speed, service life will be 20,000 hours. (The axial load applied to the output side bearing)

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*14 The weight may vary slightly between models

VRSF C Frame 1 Stage and 2 Stage Specifications

Frame Size	C										
Stage	1 Stage					2 Stage					
Ratio	Units	Note	3	5	9	15	20	25	35	45	81
Nominal Output Torque	[Nm]	*1	6.86	11.5	9.7	16.2	21.1	26.4	15.5	9.5	9.7
Maximum Acceleration Torque	[Nm]	*2	20.6	34.3	29.2	48.6	63.3	79.2	46.6	28.6	29.2
Emergency Stop Torque	[Nm]	--	--	--	--	--	--	--	--	--	--
Nominal Input Speed	[rpm]	*3	3000			3000					
Maximum Input Speed	[rpm]	*4	5000			5000					
No Load Running Torque	[Nm]	*5	0.29			0.19					
Permitted Radial Load	[N]	*6	784	980	1180	1470	1570	1670	1670	1670	1670
Permitted Axial Load	[N]	*7	392	490	588	735	785	833	833	833	833
Maximum Radial Load	[N]	*8	1670N			1670N					
Maximum Axial Load	[N]	*9	833N			833N					
Moment of Inertia (≤Ø 8)	[kgcm2]	--	--	--	--	0.077	0.070	0.062	0.055	0.053	0.052
Moment of Inertia (≤Ø 14)	[kgcm2]	--	0.630	0.380	0.300	0.150	0.140	0.130	0.130	0.120	0.120
--	--	--	1.100	0.880	0.800	--	--	--	--	--	--
Efficiency	[%]	*10	90			85					
Torsional Rigidity	[Nm/arcmin]	*11	3			3					
Backlash (Standard)	[Arc-min]	--	≤ 15			≤ 15					
Backlash (Low)	[Arc-min]	--	≤ 5			≤ 5					
Backlash (Precision)	[Arc-min]	--	≤ 3			≤ 3					
Noise Level	[dB]	*12	≤ 72			≤ 65					
Protection Class	--	*13	IP 65			IP65					
Ambient Temperature	[°C]	--	0-40			0-40					
Permitted Housing Temperature	[°C]	--	90			90					
Weight (≤Ø 8)	[kg]	*14	--			1.8					
Weight (≤Ø 14)	[kg]	*14	1.8			1.9					
Weight (≤Ø 19)	--	*14	2.2			--					

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation

*3 The average input speed

*4 The maximum intermittent input speed

*5 Torque at no load applied to the input shaft at nominal input speed

*6 At this load and nominal input speed, service life will be 20,000 hours. (The radial load applied to the output side shaft center)

*7 At this load and nominal input speed, service life will be 20,000 hours. (The axial load applied to the output side bearing)

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*14 The weight may vary slightly between models

VRSF D Frame 1 Stage and 2 Stage Specifications

Frame Size	D										
Stage	1 Stage					2 Stage					
Ratio	Units	Note	3	5	9	15	20	25	35	45	81
Nominal Output Torque	[Nm]	*1	18.3	23.5	18.2	30.4	40.6	50.7	37	28.3	17.8
Maximum Acceleration Torque	[Nm]	*2	54.9	70.6	54.7	91.2	122	152	111	85.2	53.5
Emergency Stop Torque	[Nm]	--	--	--	--	--	--	--	--	--	--
Nominal Input Speed	[rpm]	*3	3000			3000					
Maximum Input Speed	[rpm]	*4	5000			5000					
No Load Running Torque	[Nm]	*5	0.51			0.26					
Permitted Radial Load	[N]	*6	882	1080	1470	1760	1910	2060	2060	2060	2060
Permitted Axial Load	[N]	*7	441	539	735	882	955	1030	1030	1030	1030
Maximum Radial Load	[N]	*8	2060N			2060N					
Maximum Axial Load	[N]	*9	1030N			1030N					
Moment of Inertia (≤Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--	0.10
Moment of Inertia (≤Ø 14)	[kgcm2]	--	1.30	0.59	0.38	0.37	0.35	0.34	0.30	0.29	0.29
Moment of Inertia (≤Ø 19)	[kgcm2]	--	1.80	1.10	0.90	0.86	0.84	0.83	0.79	0.78	0.77
Moment of Inertia (≤Ø 28)	[kgcm2]	--	3.60	2.90	2.70	2.70	2.70	2.70	--	--	--
Efficiency	[%]	*10	90			85					
Torsional Rigidity	[Nm/arcmin]	*11	6			6					
Backlash (Standard)	[Arc-min]	--	≤ 15			≤ 15					
Backlash (Low)	[Arc-min]	--	≤ 5			≤ 5					
Backlash (Precision)	[Arc-min]	--	≤ 3			≤ 3					
Noise Level	[dB]	*12	≤ 72			≤ 65					
Protection Class	--	*13	IP65			IP65					
Ambient Temperature	[°C]	--	0-40			0-40					
Permitted Housing Temperature	[°C]	--	90			90					
Weight (≤Ø 8)	[kg]	*14	--			2.8					
Weight (≤Ø 14)	[kg]	*14	2.8			3.3					
Weight (≤Ø 19)	[kg]	*14	3.2			3.7					
Weight (≤Ø 28)	[kg]	*14	4.0			4.8					

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation

*3 The average input speed

*4 The maximum intermittent input speed

*5 Torque at no load applied to the input shaft at nominal input speed

*6 At this load and nominal input speed, service life will be 20,000 hours. (The radial load applied to the output side shaft center)

*7 At this load and nominal input speed, service life will be 20,000 hours. (The axial load applied to the output side bearing)

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*14 The weight may vary slightly between models

VRSF E Frame 1 Stage and 2 Stage Specifications

Frame Size	E										
Stage	1 Stage					2Stage					
Ratio	Units	Note	3	5	9	15	20	25	35	45	81
Nominal Output Torque	[Nm]	*1	44.1	56.8	73.5	91.4	78.4	65.4	71	91.3	43.3
Maximum Acceleration Torque	[Nm]	*2	132	171	221	274	235	196	213	274	130
Emergency Stop Torque	[Nm]	--	--	--	--	--	--	--	--	--	--
Nominal Input Speed	[rpm]	*3	3000			3000					
Maximum Input Speed	[rpm]	*4	5000			5000					
No Load Running Torque	[Nm]	*5	1.12			0.62					
Permitted Radial Load	[N]	*6	1370	1670	1960	2350	2500	2650	3430	3520	3530
Permitted Axial Load	[N]	*7	686	833	980	1180	1250	1320	1715	1760	1765
Maximum Radial Load	[N]	*8	3530N			3530N					
Maximum Axial Load	[N]	*9	1765N			1765N					
Moment of Inertia (≤Ø 8)	[kgcm2]	--	--	--	0.61	0.63	0.56	0.53	0.40	0.35	0.34
Moment of Inertia (≤Ø 14)	[kgcm2]	--	4.40	1.90	1.20	1.10	1.10	1.00	0.90	0.85	0.84
Moment of Inertia (≤Ø 19)	[kgcm2]	--	6.20	3.70	2.90	3.30	3.20	3.20	2.80	2.70	2.70
Moment of Inertia (≤Ø 28)	[kgcm2]	--	14.00	11.00	11.00	11.00	11.00	11.00	--	--	--
Efficiency	[%]	*10	90			85					
Torsional Rigidity	[Nm/arcmin]	*11	20			20					
Backlash (Standard)	[Arc-min]	--	≤ 15			≤ 15					
Backlash (Low)	[Arc-min]	--	≤ 5			≤ 5					
Backlash (Precision)	[Arc-min]	--	≤ 3			≤ 3					
Noise Level	[dB]	*12	≤ 75			≤ 75					
Protection Class	--	*13	IP65			IP65					
Ambient Temperature	[°C]	--	0-40			0-40					
Permitted Housing Temperature	[°C]	--	90			90					
Weight (≤Ø 8)	[kg]	*14	6.1			7.1					
Weight (≤Ø 14)	[kg]	*14	6.5			7.5					
Weight (≤Ø 19)	[kg]	*12	7.4			9.3					
Weight (≤Ø 28)	[kg]	*12	9.8			11.7					

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation

*3 The average input speed

*4 The maximum intermittent input speed

*5 Torque at no load applied to the input shaft at nominal input speed

*6 At this load and nominal input speed, service life will be 20,000 hours. (The radial load applied to the output side shaft center)

*7 At this load and nominal input speed, service life will be 20,000 hours. (The axial load applied to the output side bearing)

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

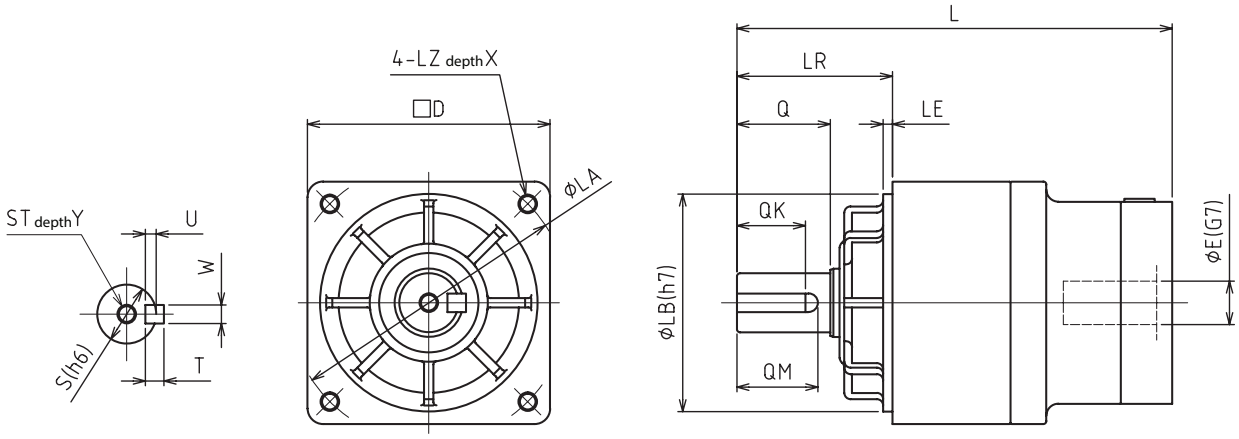
*11 This does not include lost motion

*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

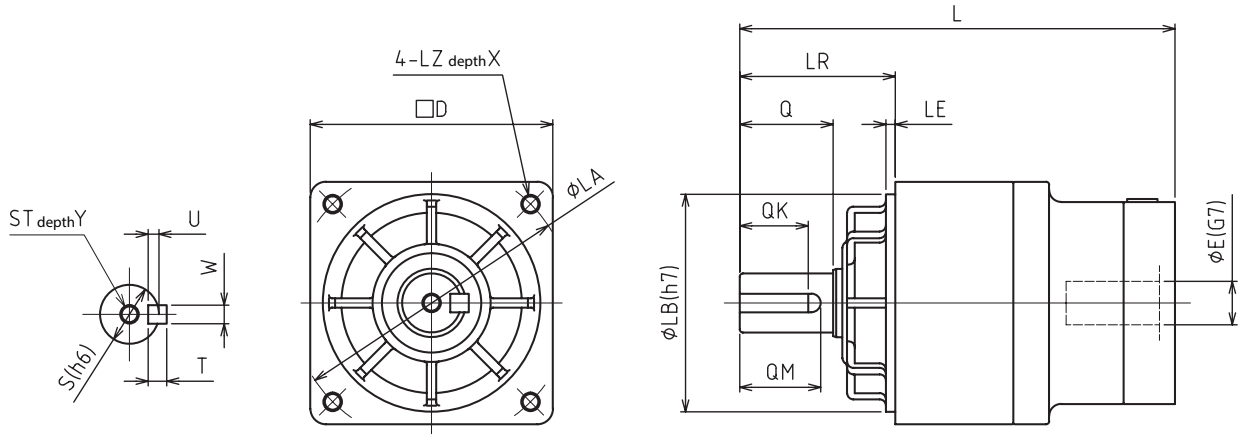
*14 The weight may vary slightly between models

VRSF B Frame 1 Stage and 2 Stage Dimensions



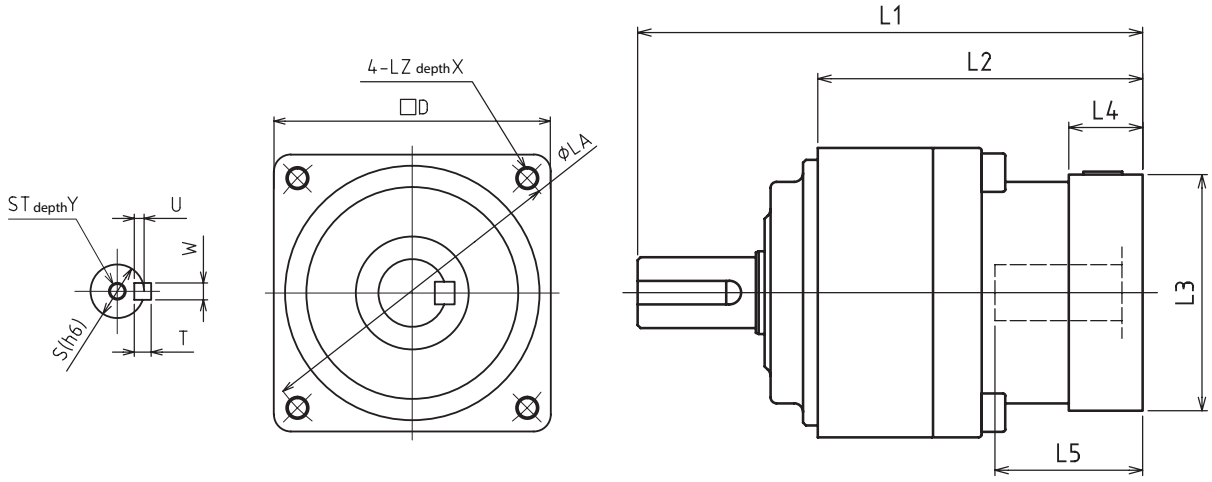
Frame Size	Ratio	Input Bore Dia. E	Dimensions															
			L	LR	S	ST	Y	Q	QM	QK	W×U	T	D	LB	LE	LA	LZ	X
B	1 Stage	≦ Ø8	104.5	32	12	M5	10	20	18	16	4×2.5	4	52	50	3	60	M5	
		≦ Ø14	107.5															
	2 Stage	≦ Ø8	115.5															
		≦ Ø14	118.5															

VRSF C Frame 1 Stage and 2 Stage Dimensions



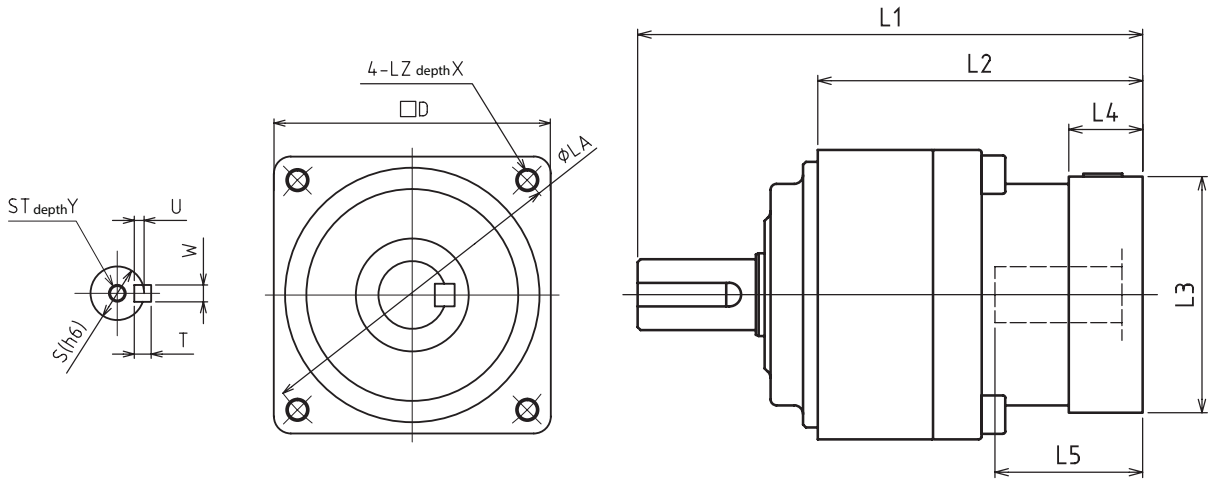
Frame Size	Ratio	Input Bore Dia. E	Dimensions															
			L	LR	S	ST	Y	Q	QM	QK	W×U	T	D	LB	LE	LA	LZ	X
C	1 Stage	≦ Ø14	140	50	19	M6	12	30	26	22	6×3.5	6	78	70	3	90	M6	20
		≦ Ø19	156															
	2 Stage	≦ Ø8	147.5															
		≦ Ø14	150.5															

VRSF D Frame 1 Stage and 2 Stage Dimensions



Frame Size	Ratio	Input Bore Dia. E	Dimensions														
			L	LR	S	ST	Y	Q	QM	QK	W×U	T	D	LB	LE	LA	LZ	X
D	1 Stage	≦Ø14	155	61	24	M8	16	40	35	30	8×4	7	98	90	5	115	M8	20
		≦Ø19	171															
		≦Ø28	186															
	2 Stage	≦Ø8	163															
		≦Ø14	169															
		≦Ø19	184															
		≦Ø28	200.5															

VRSF E-Frame 1 Stage and 2 Stage Dimensions

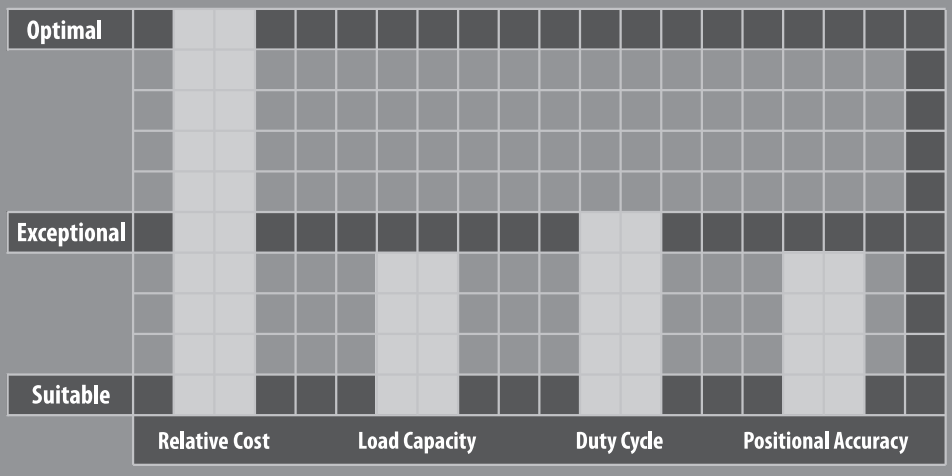


Frame Size	Ratio	Input Bore Dia. E	Dimensions															
			L	LR	S	ST	Y	Q	QM	QK	W×U	T	D	LB	LE	LA	LZ	X
E	1 Stage	≦ Ø14	189	75	32	M10	20	55	52	45	10×5	8	125	110	5	135	M10	20
		≦ Ø19	198.5															
		≦ Ø28	224															
		≦ Ø38	240															
	2 Stage	≦ Ø14	210															
		≦ Ø19	225															
		≦ Ø28	246.5															
		≦ Ø38	261.5															

PRE SERIES

PRE is part of the latest generation economy product family from Nidec Drive Technology Corporation. The PRE redefines the economy planetary gear reducer segment by featuring helical cut gearing and a robust internal structure. Our customers benefit from a cost-effective, flexible, reliable design that can be adapted into a wide range of servo and stepper motor axes.

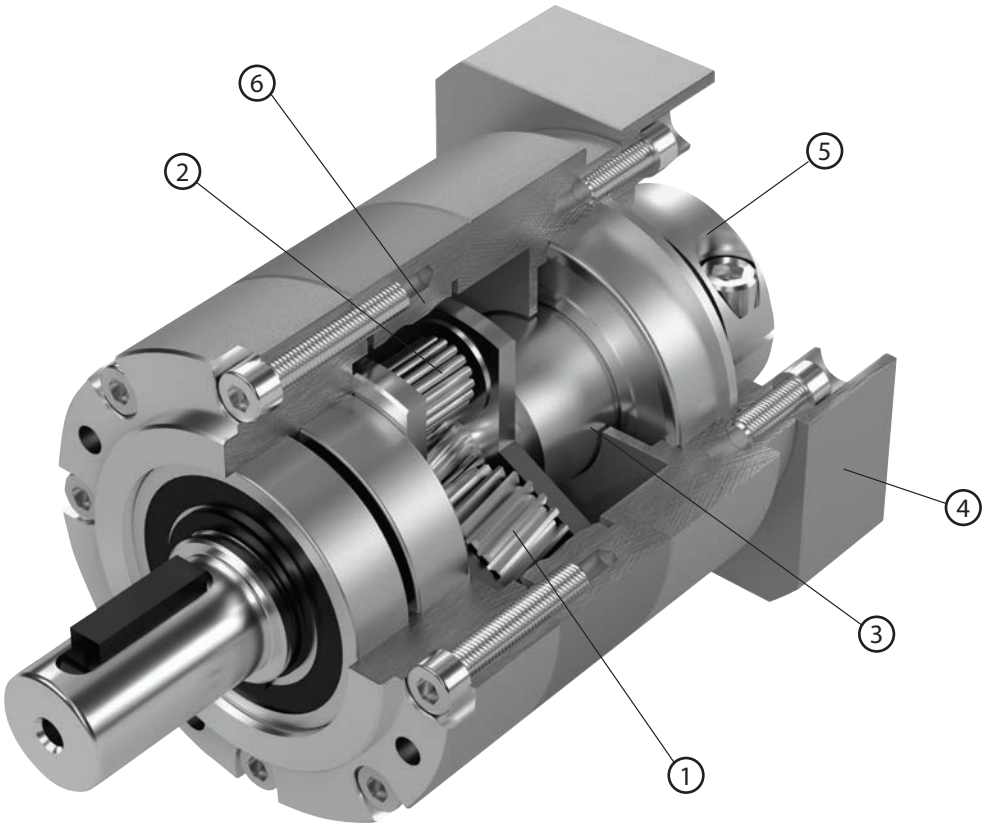
The PRE features industry-standard output mounting geometry with simple adaptation to any motor. Frame sizes from 062-160, along with ≤ 8-10 arc-minute backlash, allow the PRE to cover a broad range of application requirements where cost is a key consideration. As with all Nidec DTC planetary products, PRE is designed for maximum heat reduction and running efficiency through the use of special sealing and lubrication technology.



PRE SERIES

- Value engineered solution for low to mid-range motion control applications
- Low backlash, ≤ 8-10 arc-min
- Four frame sizes, from 062 to 160
- Broad range of mounting adapters offer a simple, precise attachment to any motor
- Maintenance-free solution that is lubricated for life. High performance grease allows flexible mounting in any orientation
- Industry standard mounting dimensions

PRE Series Features



1. Carburized helical gears for higher accuracy and smooth, quiet operation
2. Uncaged needle roller bearings provide excellent torque density and torsional rigidity
3. Unique labyrinth input design greatly reduces heat and increases system efficiency.
4. Optimized mounting system with active centering on motor pilot diameter guarantees alignment of motor. Motor can be installed in any orientation
5. True concentric motor shaft clamping connection, optimized for your specific motor. Reduced inertia for dynamic performance and balanced for high speed operation
6. Ring gear machined directly into the housing, not welded or pressed in. Provides greater concentricity and elimination of speed fluctuation

PRE Series Model Code

PRE	—	082	—	10	—	K	8	—	19HB16
Series Name		Frame Size		Ratio		Output Mounting Style	Backlash		Motor Mounting Code
PRE		062 082 120 160		1 Stage: 3 4 5 8 9 10 2 Stage: 12 15 16 20 25 32 40 50 80 100		K: Keyed Shaft	1 Stage: ≤8 arc-min 2 Stage: ≤10 arc-min		Motor mounting code varies depending on the motor

* Use the selection tool link below to configure the code

PRE 062 1-Stage Specifications

Frame Size	062							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	35	50	50	50	35	35
Maximum Output Torque	[Nm]	*2	55	79	79	76	55	55
Emergency Stop Torque	[Nm]	*3	80	90	90	90	80	80
Nominal Input Speed	[rpm]	*4	3000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	0.15					
Maximum Radial Load	[N]	*7	550					
Maximum Axial Load	[N]	*8	680					
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	-	-	-	-	-	-
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.19	0.16	0.15	0.14	0.14	0.14
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.40	0.37	0.36	0.35	0.35	0.35
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arcmin]	*10	2.3					
Maximum Torsional Backlash	[Arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤58					
Protection Class	--	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	1.0					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRE 062 2-Stage Specifications

Frame Size	062											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	35	35	50	50	50	50	50	46	46	35
Maximum Output Torque	[Nm]	*2	46	46	66	66	66	66	66	66	66	46
Emergency Stop Torque	[Nm]	*3	80	80	90	90	90	90	90	90	90	80
Nominal Input Speed	[rpm]	*4	3000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.04									
Maximum Radial Load	[N]	*7	550									
Maximum Axial Load	[N]	*8	680									
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.08	0.07	0.07	0.06	0.06	0.07	0.06	0.06	0.06	0.06
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.16	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.14
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	-	-	-	-	-	-	-	-	-	-
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arcmin]	*10	2.3									
Maximum Torsional Backlash	[Arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤58									
Protection Class	--	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	1.5									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

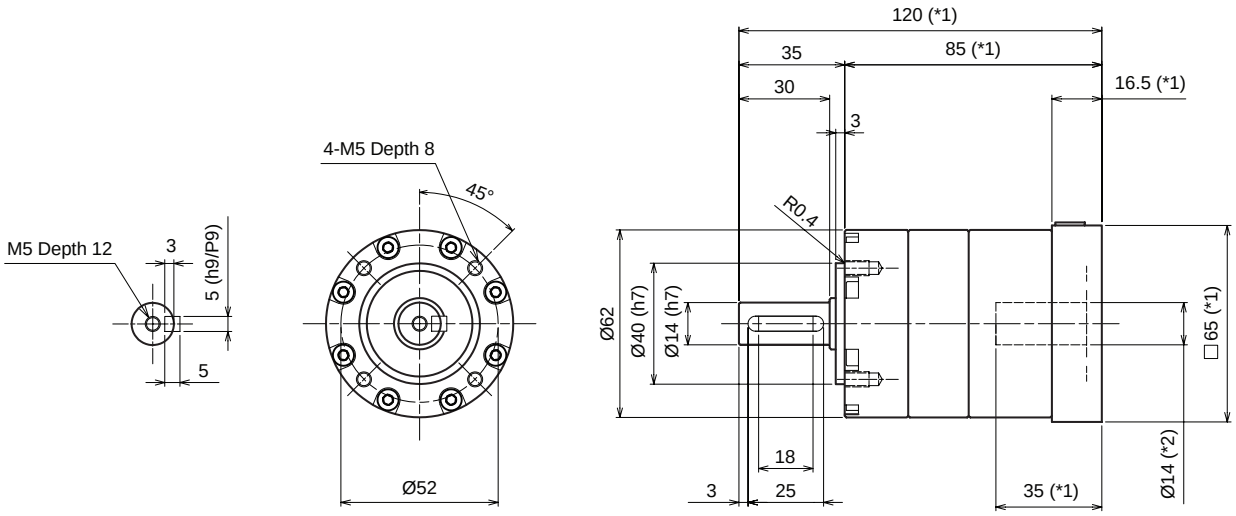
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

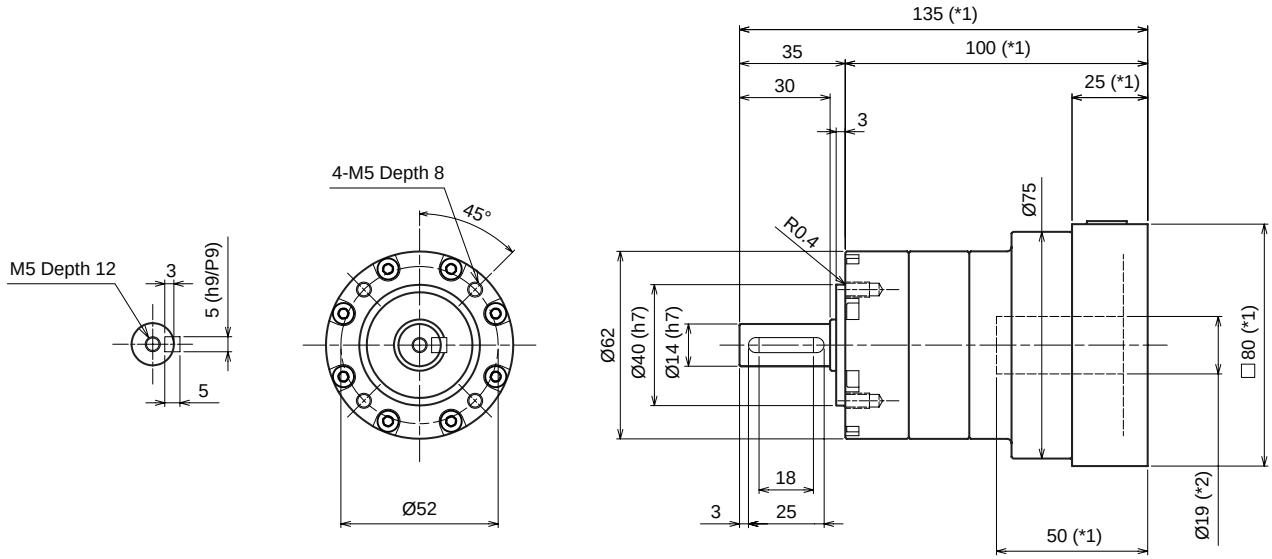
*12 Weight may vary slightly between models

PRE 062 1-Stage Dimensions

Input bore size ≦φ14 mm



Input bore size ≦φ19 mm

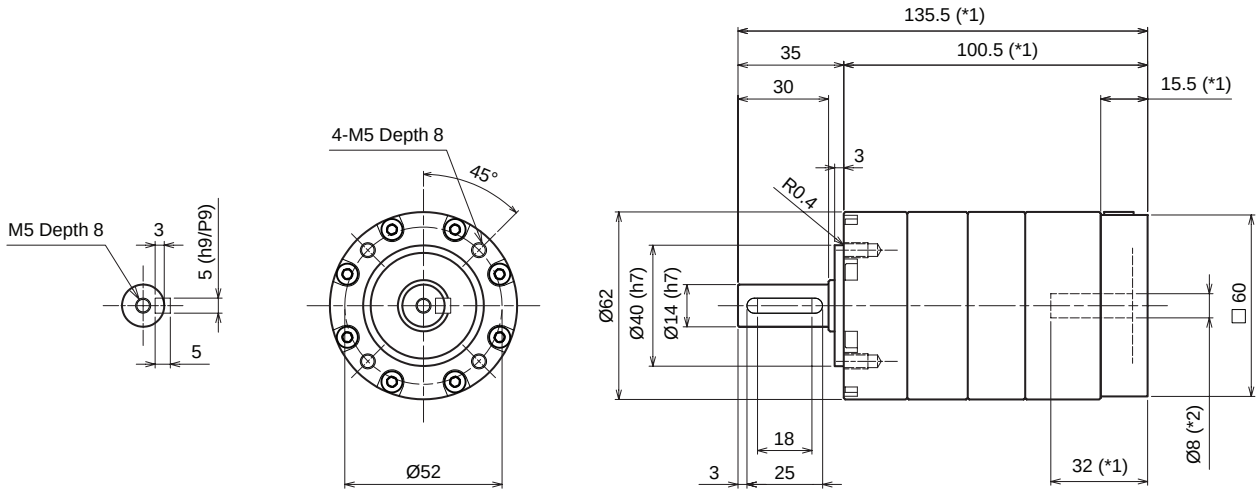


*1 Length will vary depending on motor

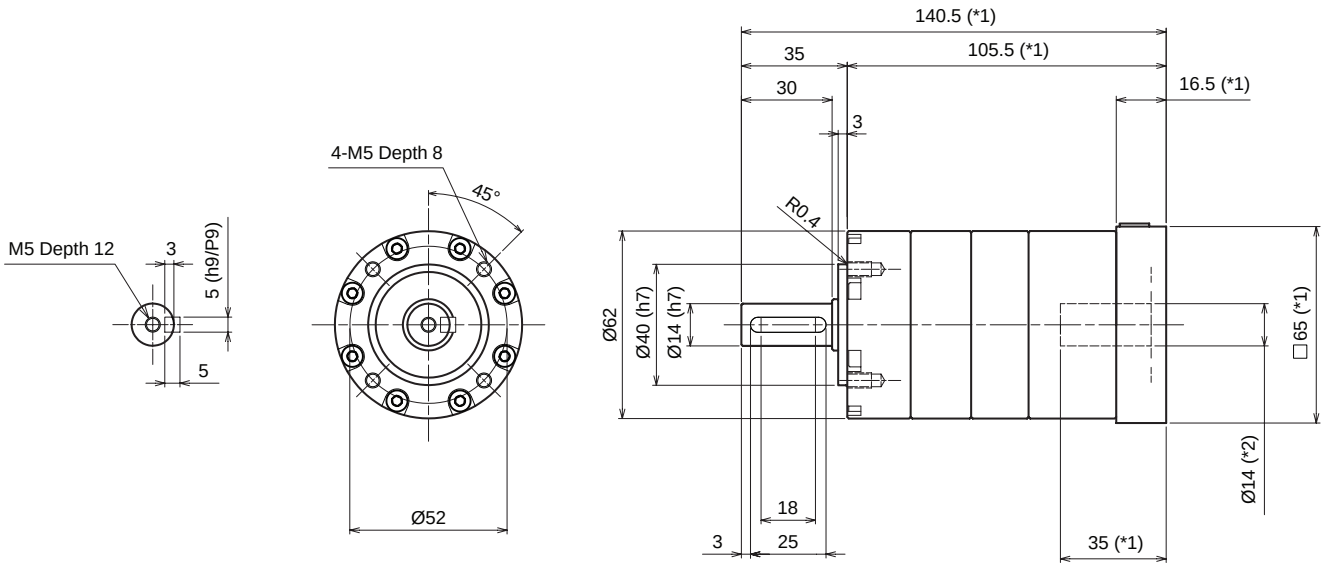
*2 Bushing will be inserted to adapt to motor shaft

PRE 062 2-Stage Dimensions

Input bore size ≦φ8 mm



Input bore size ≦φ14 mm



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

PRE 082 1-Stage Specifications

Frame Size	082							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	80	125	125	125	80	80
Maximum Output Torque	[Nm]	*2	135	200	200	190	145	145
Emergency Stop Torque	[Nm]	*3	200	210	210	210	200	200
Nominal Input Speed	[rpm]	*4	3000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	0.35					
Maximum Radial Load	[N]	*7	990					
Maximum Axial Load	[N]	*8	1500					
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.57	0.41	0.35	0.31	0.30	0.30
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.04	0.87	0.82	0.77	0.77	0.76
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	3.13	2.96	2.91	2.86	2.86	2.85
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arc-min]	*10	6					
Maximum Torsional Backlash	[arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤60					
Protection Class	--	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	2.5					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRE 082 2-Stage Specifications

Frame Size	082											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	80	80	125	125	125	125	125	120	120	80
Maximum Output Torque	[Nm]	*2	108	108	165	165	165	165	165	165	165	112
Emergency Stop Torque	[Nm]	*3	200	200	210	210	210	210	210	210	210	200
Nominal Input Speed	[rpm]	*4	3000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.06									
Maximum Radial Load	[N]	*7	990									
Maximum Axial Load	[N]	*8	1500									
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.39	0.33	0.33	0.32	0.32	0.32	0.28	0.29	0.28	0.28
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.84	0.78	0.78	0.77	0.77	0.78	0.73	0.74	0.74	0.74
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.91	2.85	2.85	2.84	2.83	2.84	2.79	2.81	2.81	2.81
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arc-min]	*10	6									
Maximum Torsional Backlash	[arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤60									
Protection Class	--	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	3.0									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

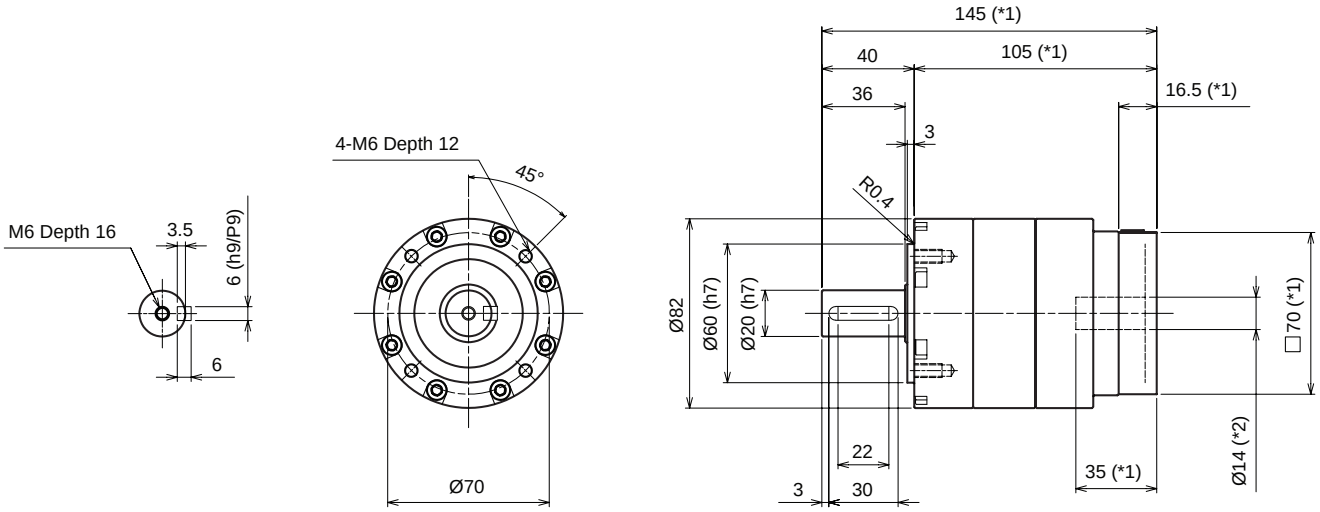
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

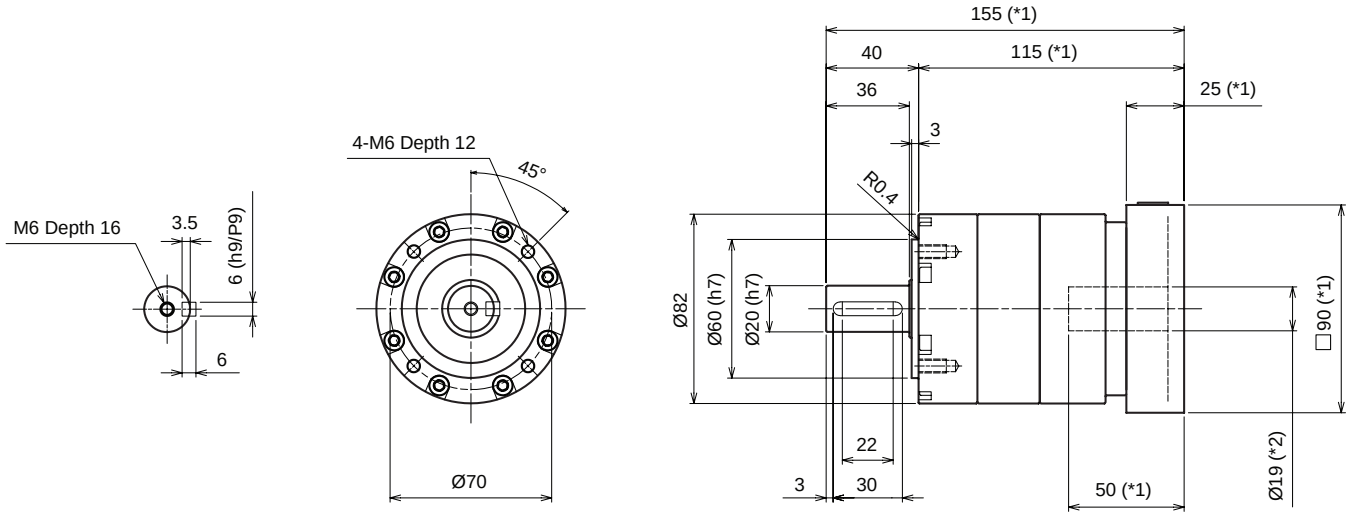
*12 Weight may vary slightly between models

PRE 082 1-Stage Dimensions

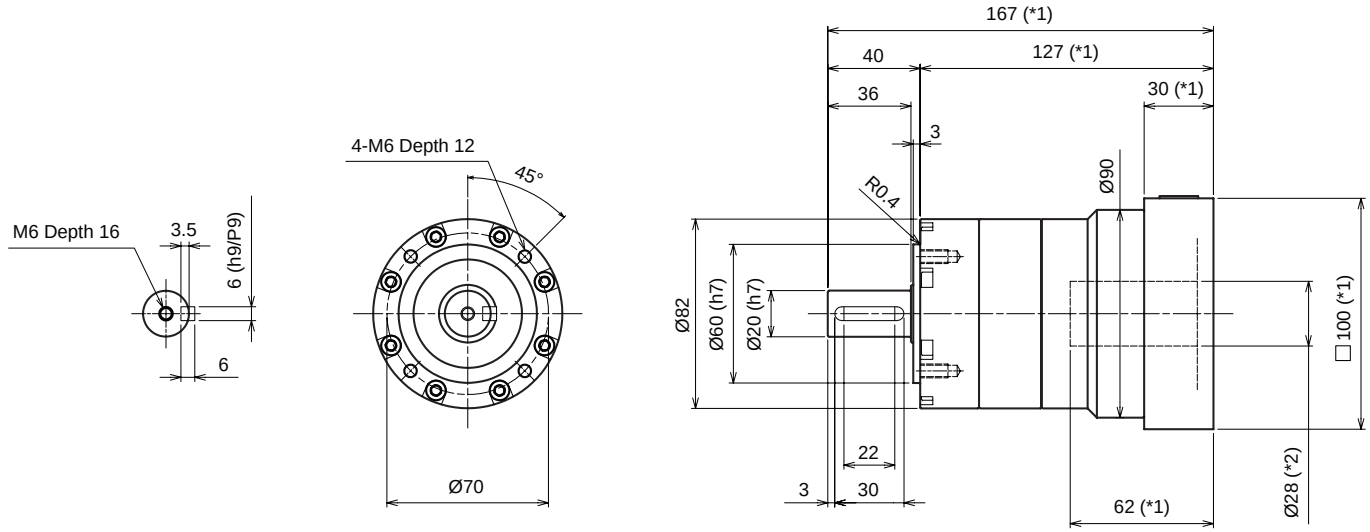
Input bore size ≦φ14 mm



Input bore size ≦φ19 mm



Input bore size ≦φ28 mm

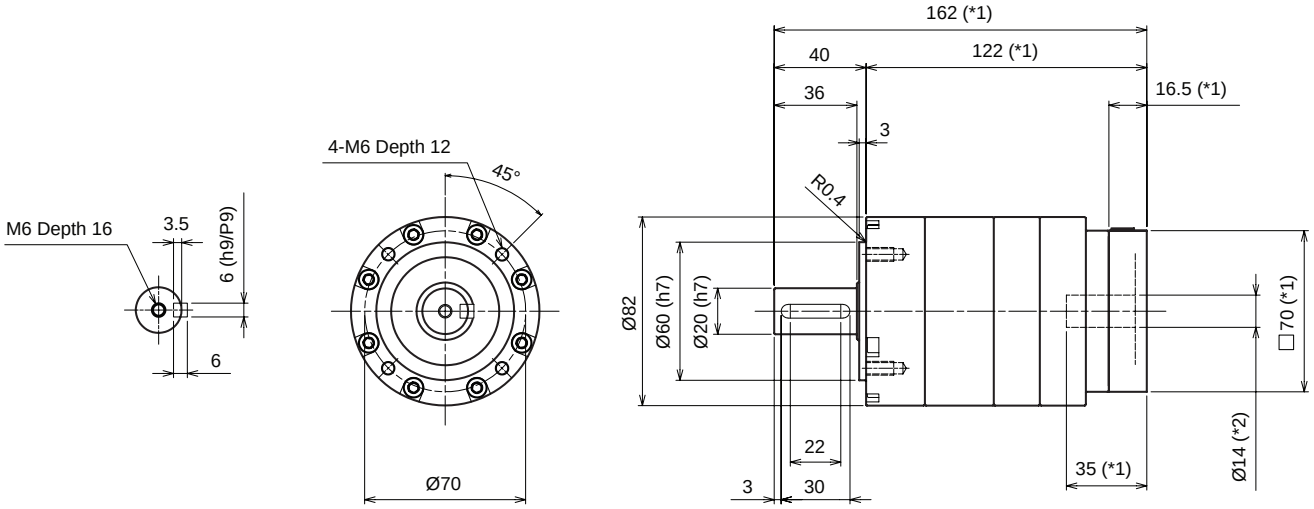


*1 Length will vary depending on motor

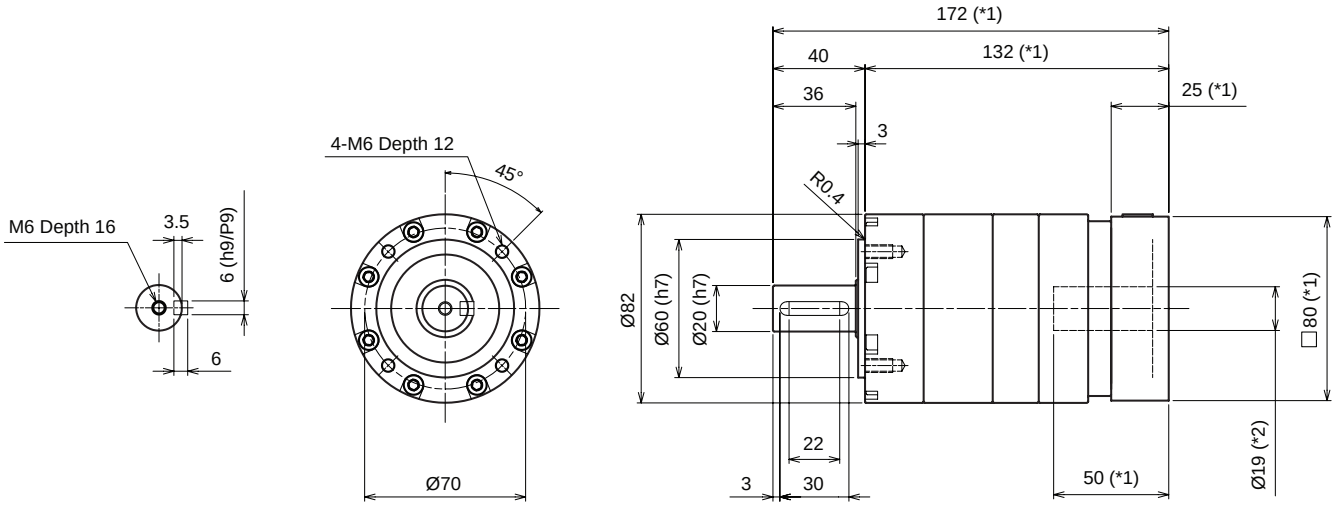
*2 Bushing will be inserted to adapt to motor shaft

PRE 082 2-Stage Dimensions

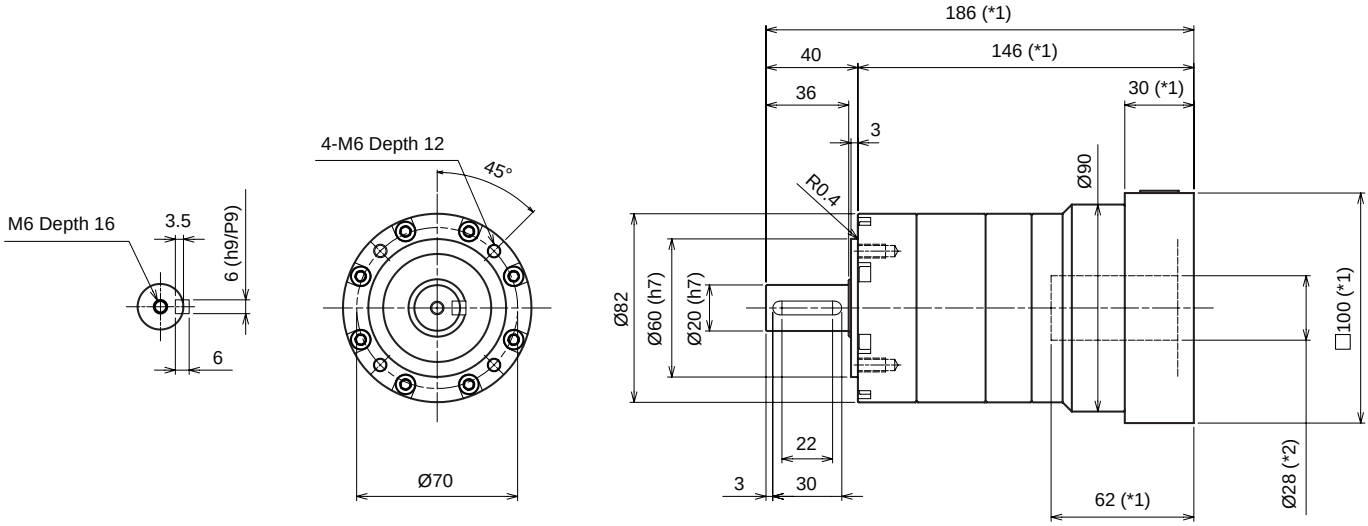
Input bore size ≦φ14 mm



Input bore size ≦φ19 mm



Input bore size ≦φ28 mm



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

PRE 120 1-Stage Specifications

Frame Size	120							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	225	330	330	330	225	225
Maximum Output Torque	[Nm]	*2	340	490	490	480	370	370
Emergency Stop Torque	[Nm]	*3	500	550	550	550	500	500
Nominal Input Speed	[rpm]	*4	3000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	1.30					
Maximum Radial Load	[N]	*7	2000					
Maximum Axial Load	[N]	*8	2800					
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.38	1.45	1.17	0.88	0.85	0.83
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.41	3.48	3.13	2.89	2.86	2.84
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	12.27	11.34	11.05	10.72	10.69	10.67
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arc-min]	*10	15					
Maximum Torsional Backlash	[arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤65					
Protection Class	*15	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	6.8					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRE 120 2-Stage Specifications

Frame Size	120											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	225	225	330	330	330	330	330	280	280	225
Maximum Output Torque	[Nm]	*2	270	270	390	390	390	390	390	390	390	292
Emergency Stop Torque	[Nm]	*3	500	500	550	550	550	550	550	550	550	500
Nominal Input Speed	[rpm]	*4	3000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.42									
Maximum Radial Load	[N]	*7	2000									
Maximum Axial Load	[N]	*8	2800									
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.32	1.08	1.07	0.93	0.92	1.03	0.76	0.80	0.79	0.79
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	3.31	2.97	3.06	2.93	2.91	3.03	2.75	2.78	2.78	2.78
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	-	-	-	-	-	-	-	-	-	-
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arc-min]	*10	15									
Maximum Torsional Backlash	[arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤65									
Protection Class	*15	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	8.8									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

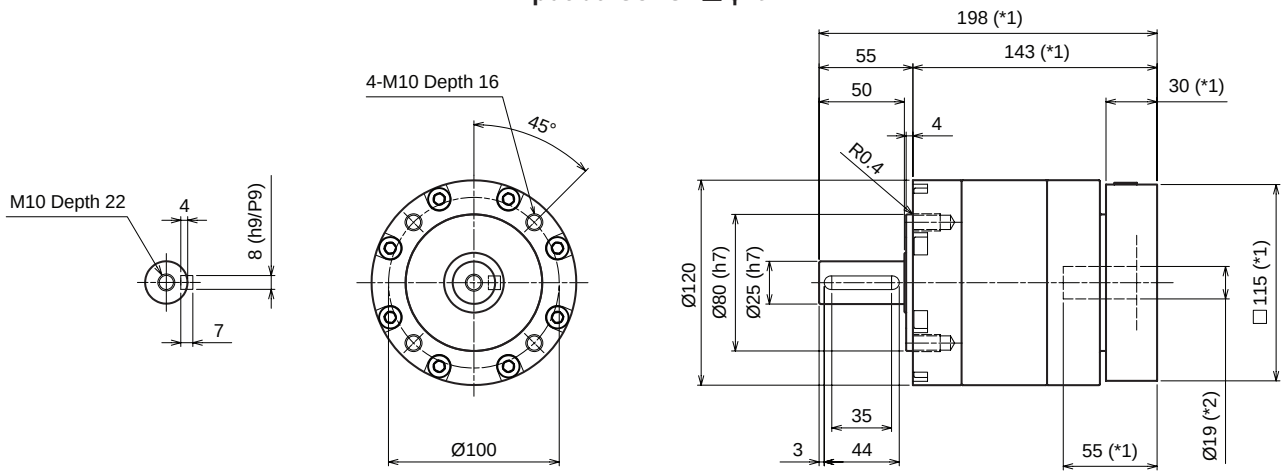
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

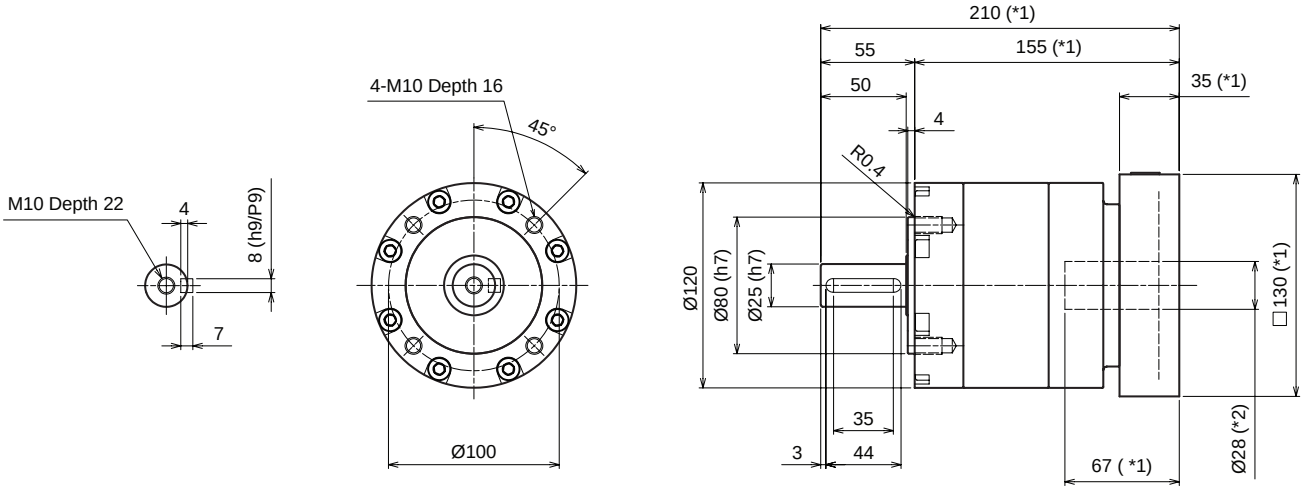
*12 Weight may vary slightly between models

PRE 120 1-Stage Dimensions

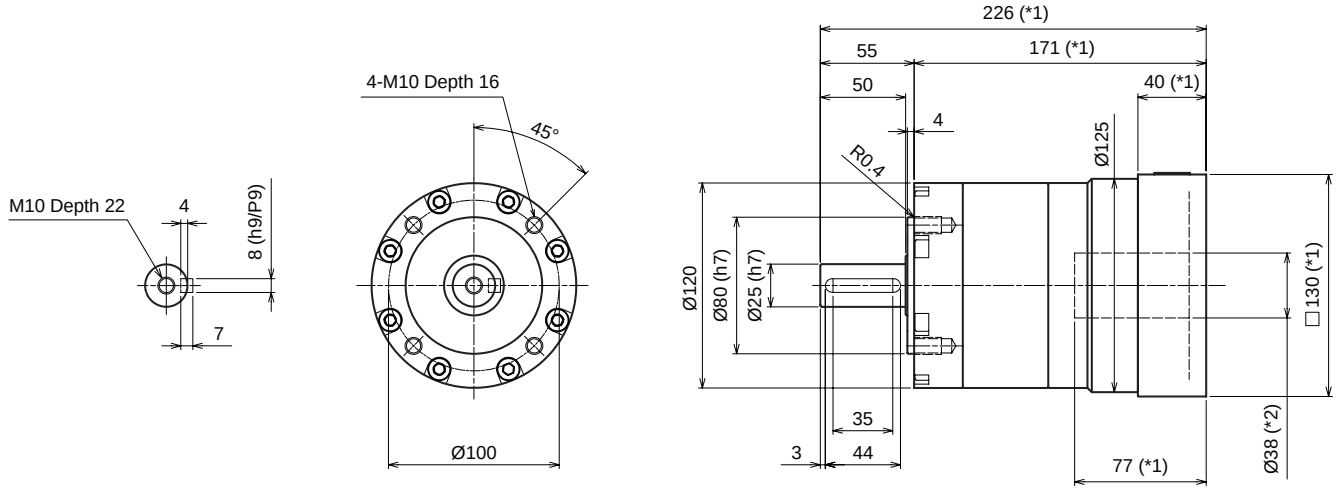
Input bore size ≦φ19 mm



Input bore size ≦φ28 mm



Input bore size ≦φ38 mm

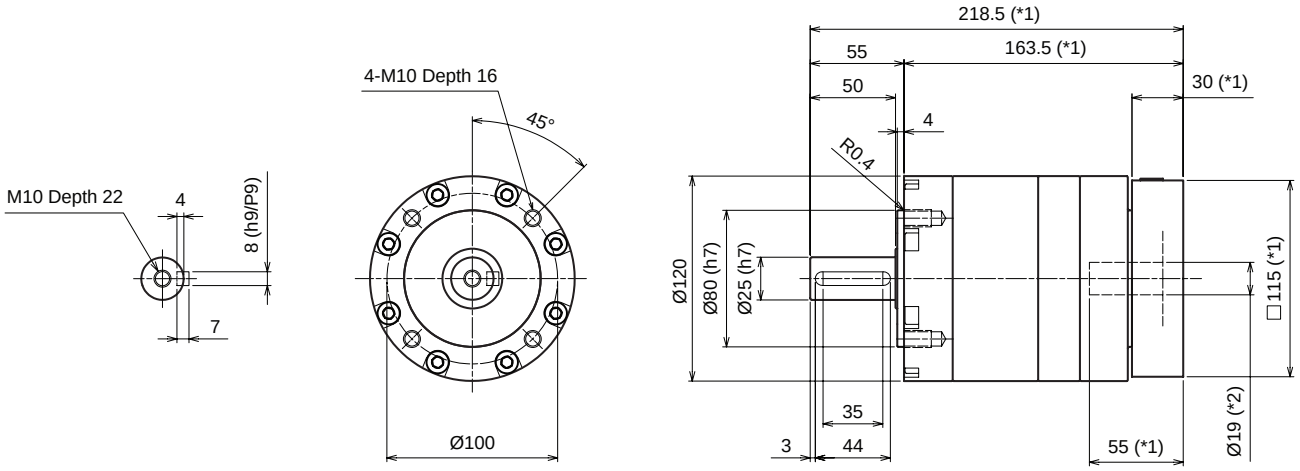


*1 Length will vary depending on motor

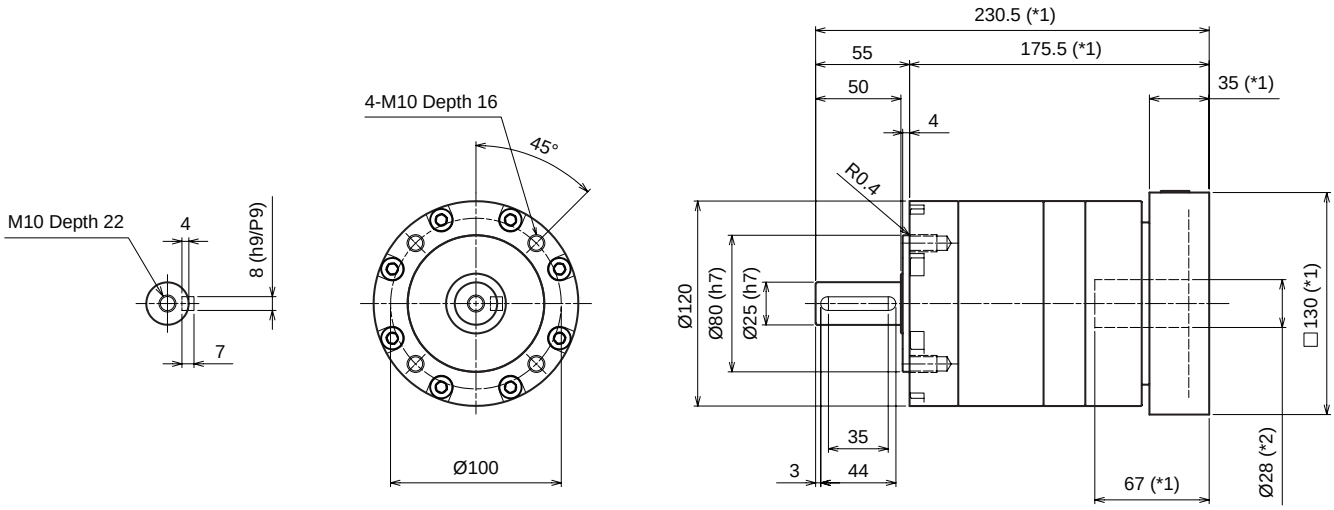
*2 Bushing will be inserted to adapt to motor shaft

PRE 120 2-Stage Dimensions

Input bore size ≦φ19 mm



Input bore size ≦φ28 mm



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

PRE 160 1-Stage Specifications

Frame Size	160							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	470	700	700	700	470	470
Maximum Output Torque	[Nm]	*2	630	1000	1000	950	730	730
Emergency Stop Torque	[Nm]	*3	1000	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*4	2000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	1.63					
Maximum Radial Load	[N]	*7	6100					
Maximum Axial Load	[N]	*8	9000					
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	7.17	3.67	2.62	1.60	1.50	1.43
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	17.03	13.51	12.46	11.36	11.26	11.19
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arc-min]	*10	45					
Maximum Torsional Backlash	[arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤70					
Protection Class	--	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	16.5					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRE 160 2-Stage Specifications

Frame Size	160											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	470	470	700	700	700	700	700	700	700	470
Maximum Output Torque	[Nm]	*2	560	560	840	840	840	840	840	840	840	610
Emergency Stop Torque	[Nm]	*3	1000	1000	1250	1250	1250	1250	1250	1250	1250	1000
Nominal Input Speed	[rpm]	*4	2000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.56									
Maximum Radial Load	[N]	*7	6100									
Maximum Axial Load	[N]	*8	9000									
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	5.41	2.50	2.55	1.94	1.89	2.42	1.23	3.11	3.09	3.09
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	14.00	12.09	12.54	11.92	11.87	12.41	11.17	11.90	11.90	11.90
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arc-min]	*10	43									
Maximum Torsional Backlash	[arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤70									
Protection Class	--	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	20.3									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

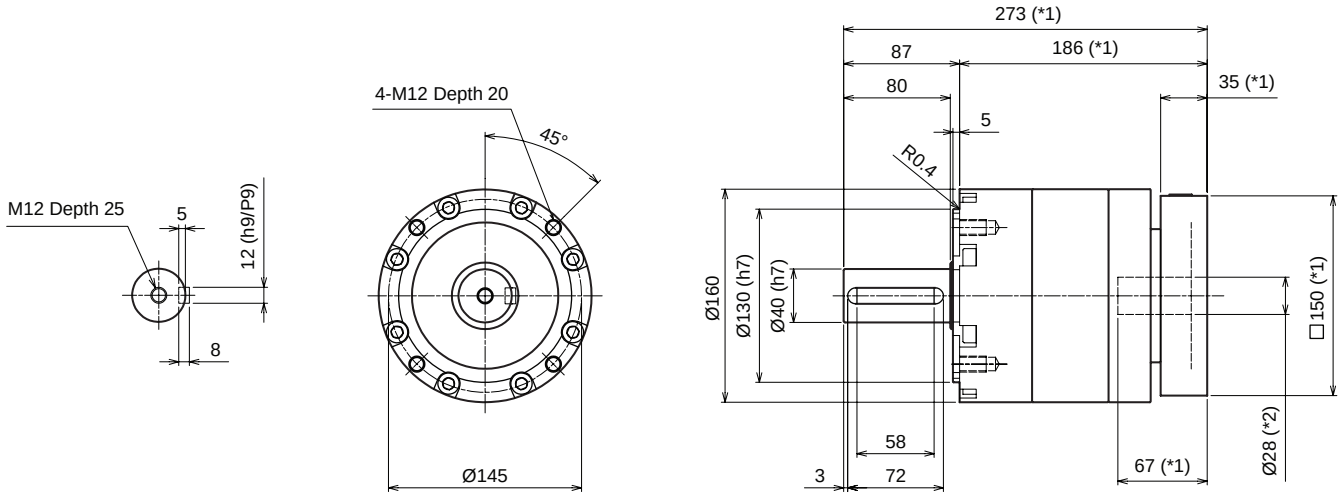
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

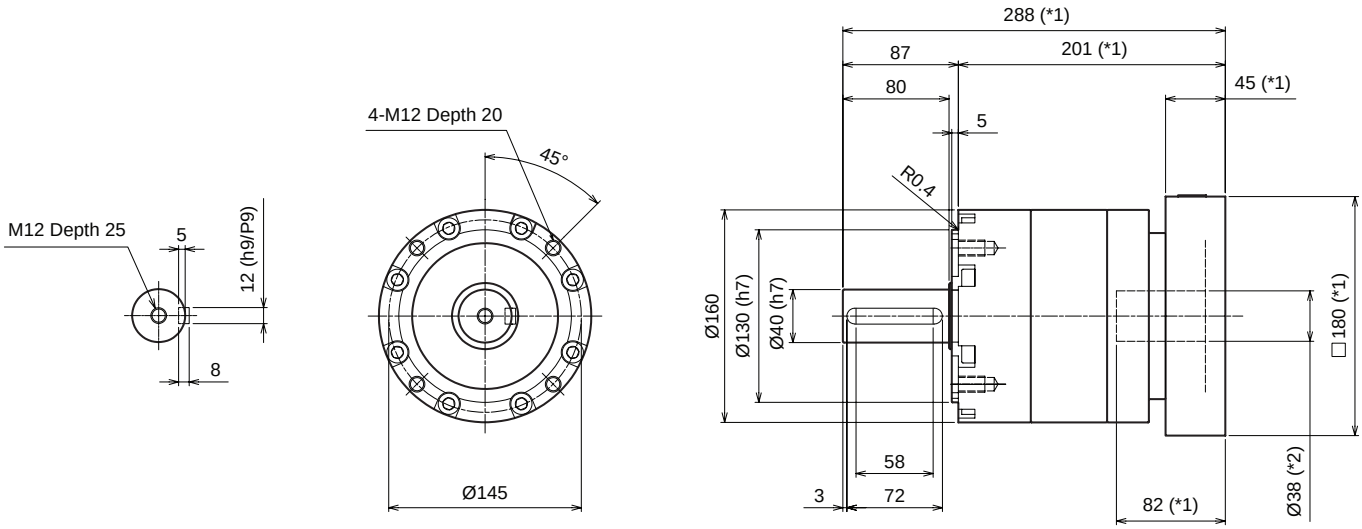
*12 Weight may vary slightly between models

PRE 160 1-Stage Dimensions

Input bore size ≦φ28 mm



Input bore size ≦φ38 mm

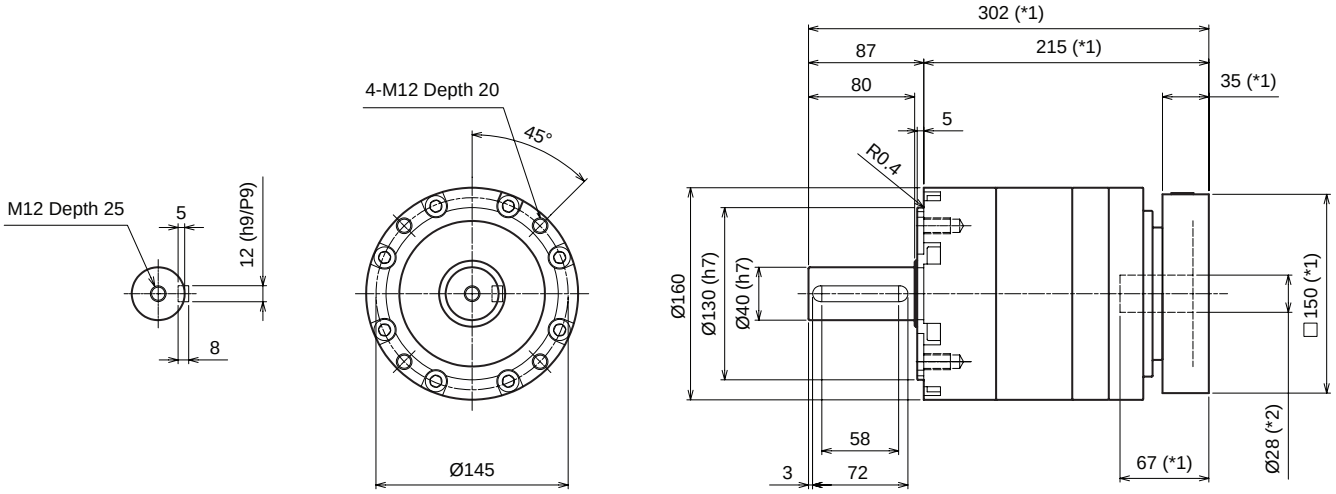


*1 Length will vary depending on motor

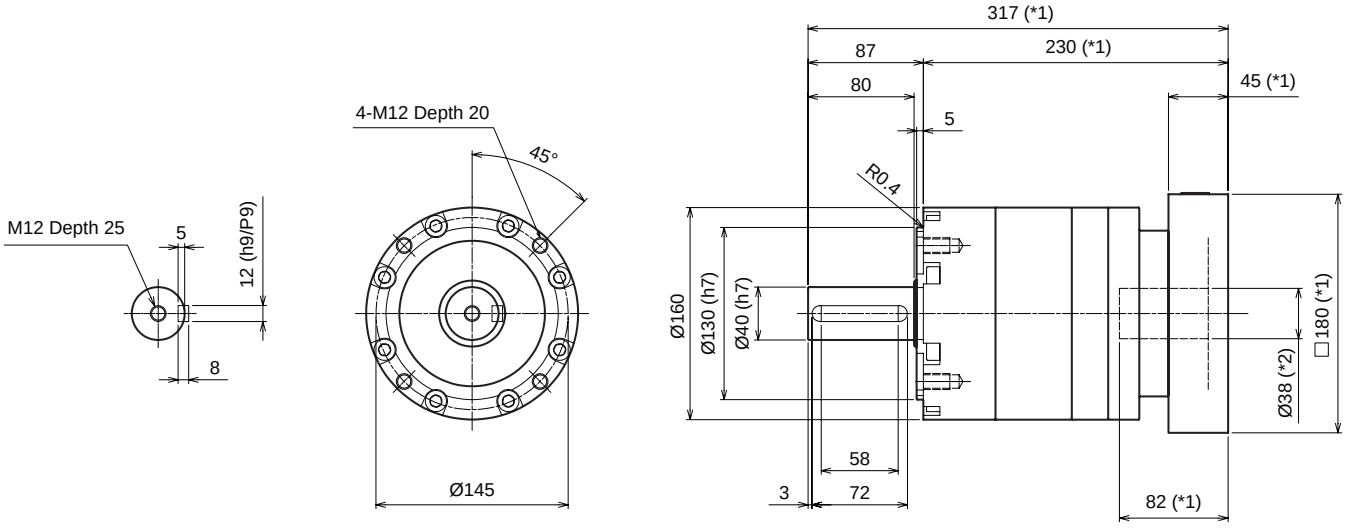
*2 Bushing will be inserted to adapt to motor shaft

PRE 160 2-Stage Dimensions

Input bore size ≦φ28 mm



Input bore size ≦φ38 mm



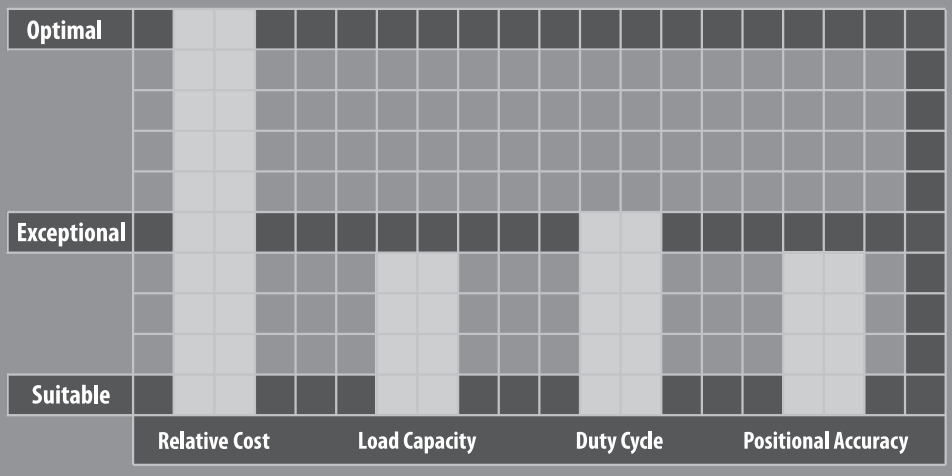
*1 Length will vary depending on motor

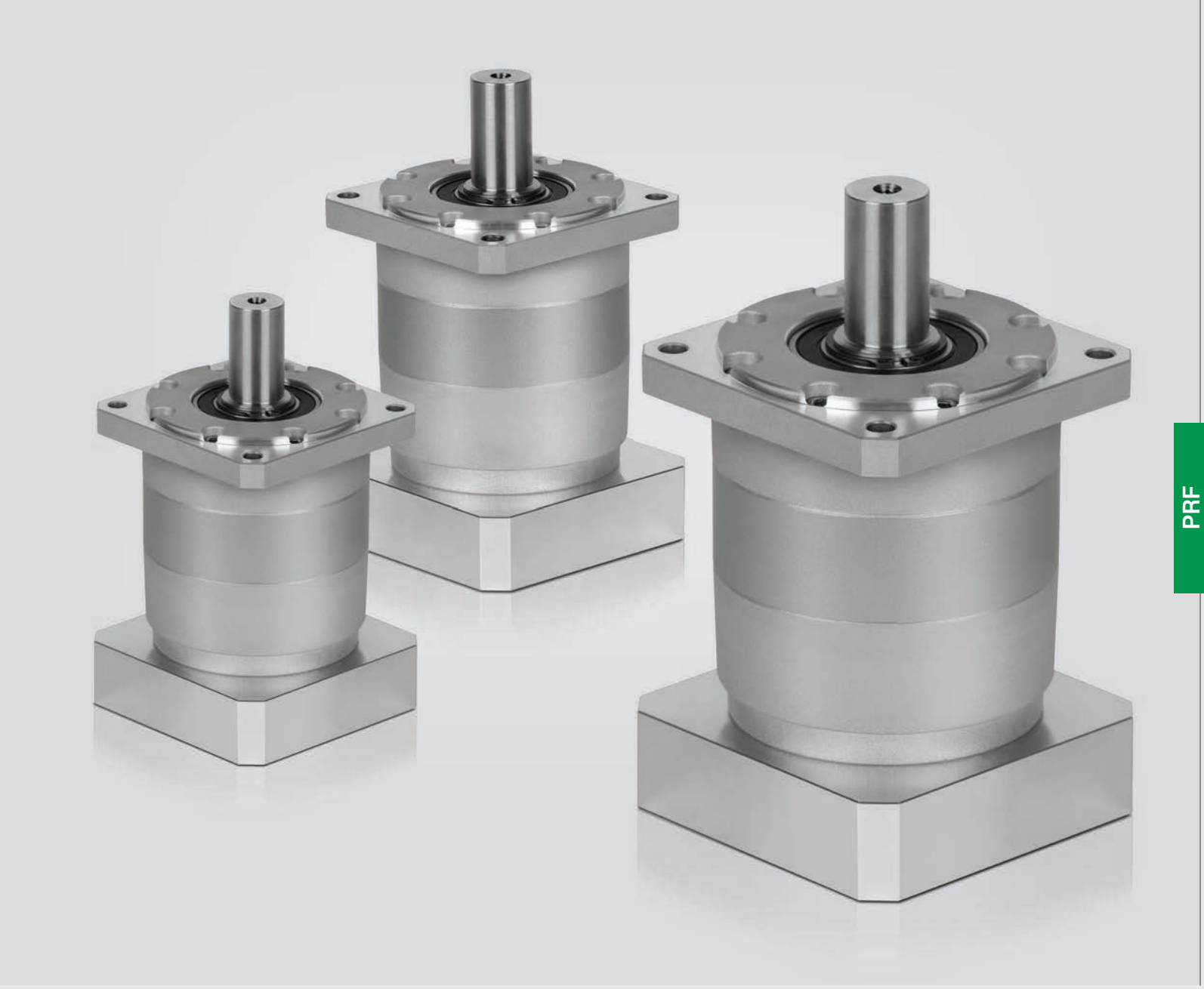
*2 Bushing will be inserted to adapt to motor shaft

PRF SERIES

PRF is part of the latest generation economy product family from Nidec Drive Technology Corporation. The PRF redefines the economy planetary gear reducer segment by featuring helical cut gearing and a robust internal structure. Our customers benefit from a cost-effective, flexible, reliable design that can be adapted into a wide range of servo and stepper motor axes.

The PRF features a B5 style square output flange for convenient mounting to machinery or linear actuators and can be easily adapted to any motor. Frame sizes from 062-160, along with ≤ 8-10 arc-minute backlash, allow the PRF to cover a broad range of application requirements where cost is a key consideration. As with all Nidec DTC planetary products, PRF is designed for maximum heat reduction and running efficiency through the use of special lubricants and seals.

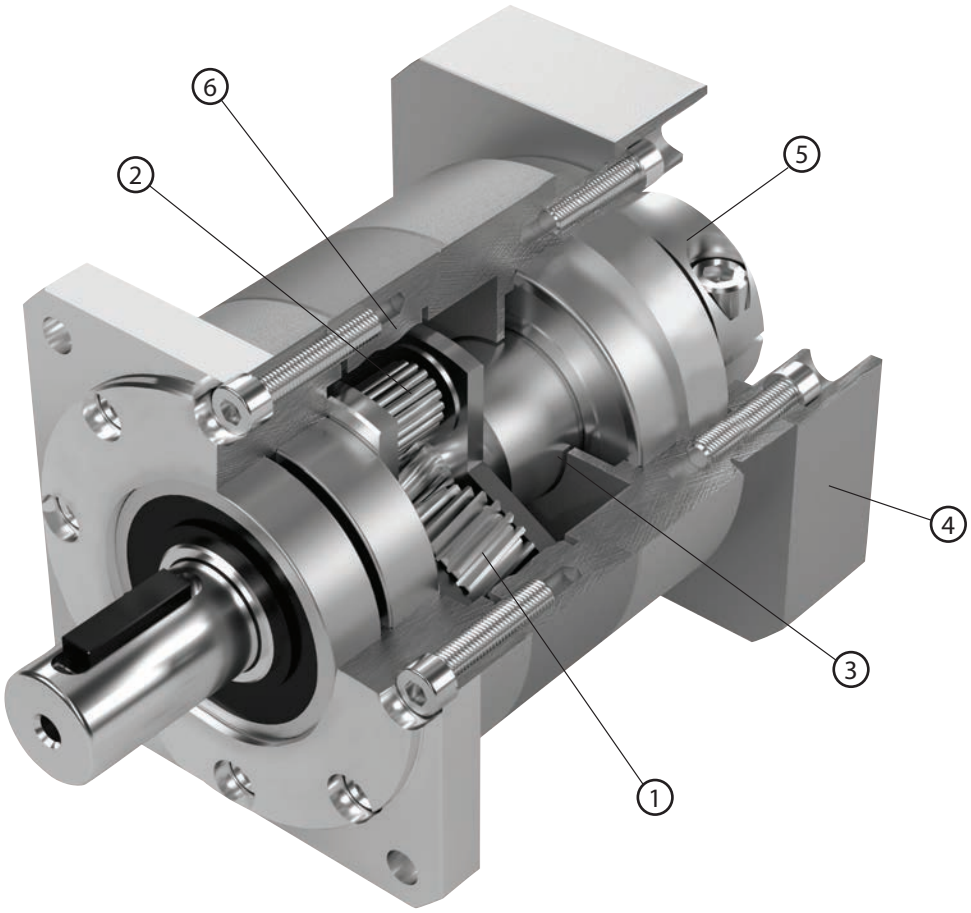




PRF SERIES

- Value engineered solution for low to mid-range motion control applications
- Low backlash, ≤ 8-10 arc-min
- Four frame sizes, from 062 to 160
- Broad range of mounting adapters offer a simple, precise attachment to any motor
- Maintenance-free solution that is lubricated for life. High performance grease allows flexible mounting in any orientation
- B5 style square output flange for convenient mounting to machinery or linear actuators

PRF Series Features



1. Carburized helical gears for higher accuracy and smooth, quiet operation
2. Uncaged needle roller bearings provide excellent torque density and torsional rigidity
3. Unique labyrinth input design greatly reduces heat and increases system efficiency.
4. Optimized mounting system with active centering on motor pilot diameter guarantees alignment of motor. Motor can be installed in any orientation
5. True concentric motor shaft clamping connection, optimized for your specific motor. Reduced inertia for dynamic performance and balanced for high speed operation
6. Ring gear machined directly into the housing, not welded or pressed in. Provides greater concentricity and elimination of speed fluctuation

PRF Series Model Code

PRF	–	082	–	10	–	K	8	–	19HB16
Series Name		Frame Size		Ratio		Output Mounting Style	Backlash		Motor Mounting Code
PRF		062 082 120 160		1 Stage: 3 4 5 8 9 10 2 Stage: 12 15 16 20 25 32 40 50 80 100		K: Keyed Shaft	1 Stage: ≤8 arc-min 2 Stage: ≤10 arc-min		Motor mounting code varies depending on the motor

* Use the selection tool link below to configure the code

PRF 062 1-Stage Specifications

Frame Size	062							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	35	50	50	50	35	35
Maximum Output Torque	[Nm]	*2	55	79	79	76	55	55
Emergency Stop Torque	[Nm]	*3	80	90	90	90	80	80
Nominal Input Speed	[rpm]	*4	3000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	0.15					
Maximum Radial Load	[N]	*7	550					
Maximum Axial Load	[N]	*8	680					
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	-	-	-	-	-	-
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.19	0.16	0.15	0.14	0.14	0.14
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.40	0.37	0.36	0.35	0.35	0.35
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arcmin]	*10	2.3					
Maximum Torsional Backlash	[Arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤58					
Protection Class	--	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	1.0					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRF 062 2-Stage Specifications

Frame Size	062											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	35	35	50	50	50	50	50	46	46	35
Maximum Output Torque	[Nm]	*2	46	46	66	66	66	66	66	66	66	46
Emergency Stop Torque	[Nm]	*3	80	80	90	90	90	90	90	90	90	80
Nominal Input Speed	[rpm]	*4	3000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.04									
Maximum Radial Load	[N]	*7	550									
Maximum Axial Load	[N]	*8	680									
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.08	0.07	0.07	0.06	0.06	0.07	0.06	0.06	0.06	0.06
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.16	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.14
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	-	-	-	-	-	-	-	-	-	-
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arcmin]	*10	2.3									
Maximum Torsional Backlash	[Arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤58									
Protection Class	--	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	1.5									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

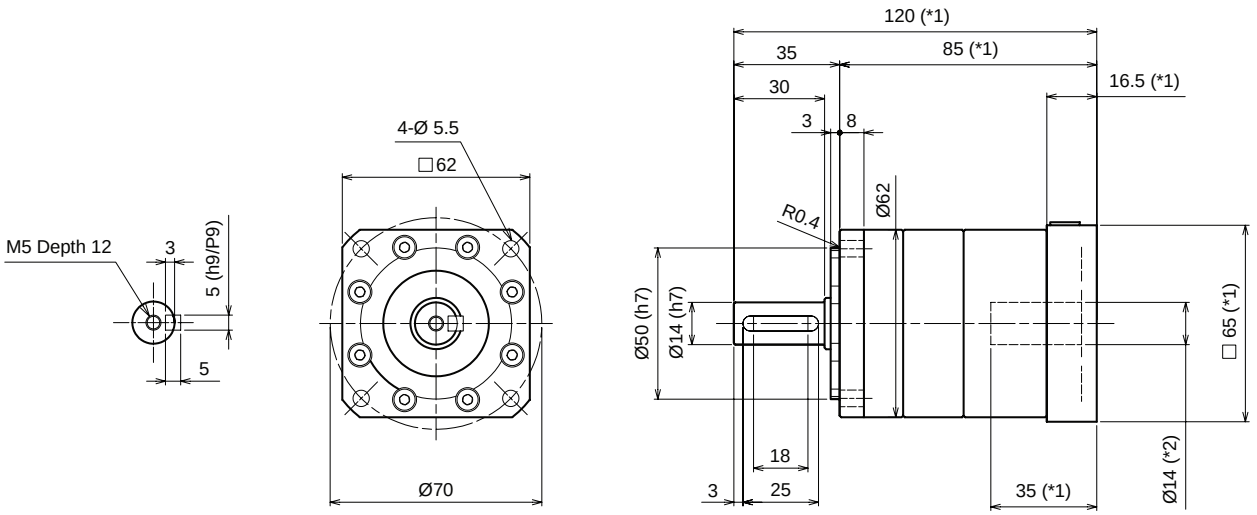
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

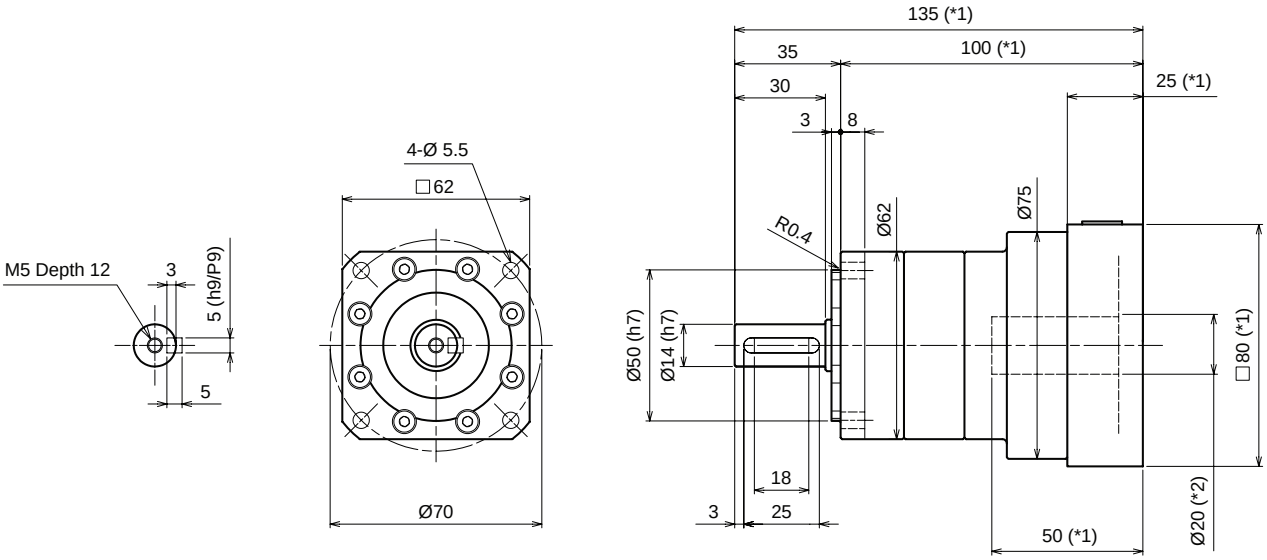
*12 Weight may vary slightly between models

PRF 062 1-Stage Dimensions

Input bore size ≦φ14 mm



Input bore size ≦φ19 mm

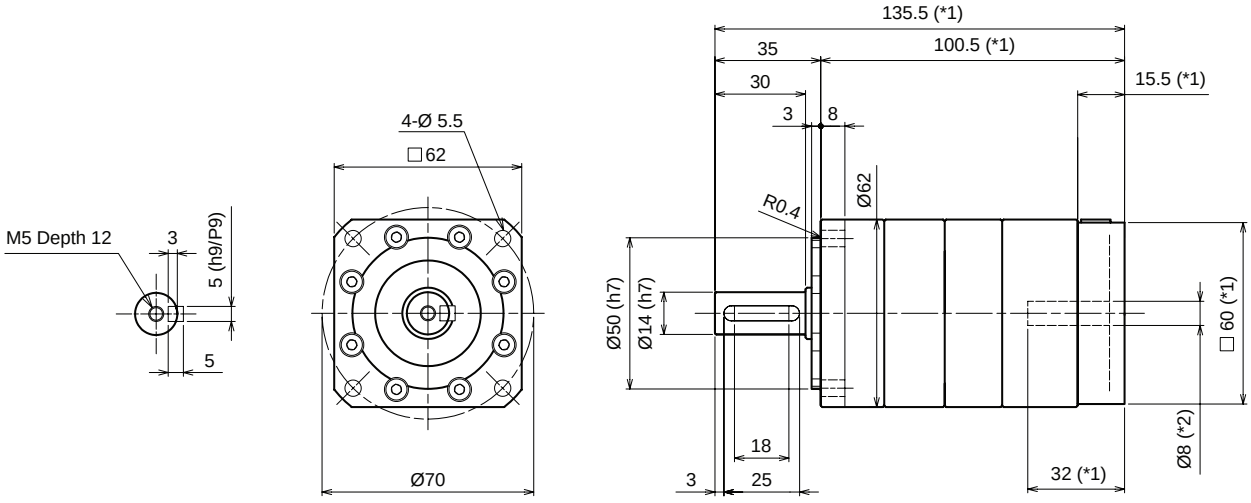


*1 Length will vary depending on motor

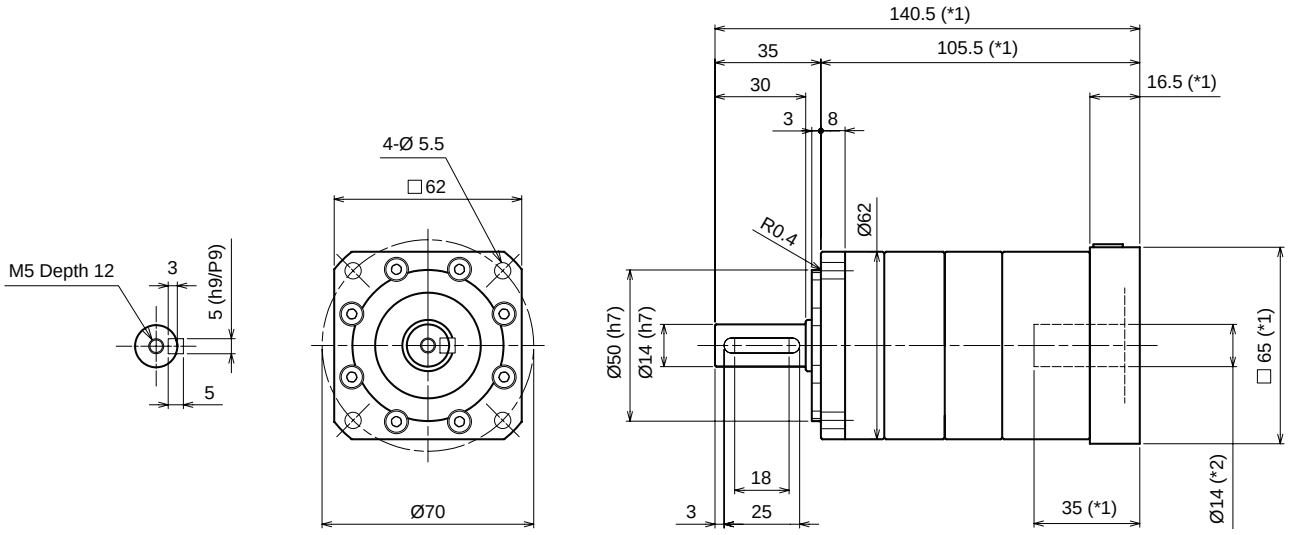
*2 Bushing will be inserted to adapt to motor shaft

PRF 062 2-Stage Dimensions

Input bore size ≦φ8 mm



Input bore size ≦φ14 mm



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

PRF 082 1-Stage Specifications

Frame Size	082							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	80	125	125	125	80	80
Maximum Output Torque	[Nm]	*2	135	200	200	190	145	145
Emergency Stop Torque	[Nm]	*3	200	210	210	210	200	200
Nominal Input Speed	[rpm]	*4	3000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	0.35					
Maximum Radial Load	[N]	*7	990					
Maximum Axial Load	[N]	*8	1500					
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.57	0.41	0.35	0.31	0.30	0.30
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.04	0.87	0.82	0.77	0.77	0.76
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	3.13	2.96	2.91	2.86	2.86	2.85
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arc-min]	*10	6					
Maximum Torsional Backlash	[arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤60					
Protection Class	--	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	2.5					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRF 082 2-Stage Specifications

Frame Size	082											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	80	80	125	125	125	125	125	120	120	80
Maximum Output Torque	[Nm]	*2	108	108	165	165	165	165	165	165	165	112
Emergency Stop Torque	[Nm]	*3	200	200	210	210	210	210	210	210	210	200
Nominal Input Speed	[rpm]	*4	3000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.06									
Maximum Radial Load	[N]	*7	990									
Maximum Axial Load	[N]	*8	1500									
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.39	0.33	0.33	0.32	0.32	0.32	0.28	0.29	0.28	0.28
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.84	0.78	0.78	0.77	0.77	0.78	0.73	0.74	0.74	0.74
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.91	2.85	2.85	2.84	2.83	2.84	2.79	2.81	2.81	2.81
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arc-min]	*10	6									
Maximum Torsional Backlash	[arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤60									
Protection Class	--	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	3.0									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

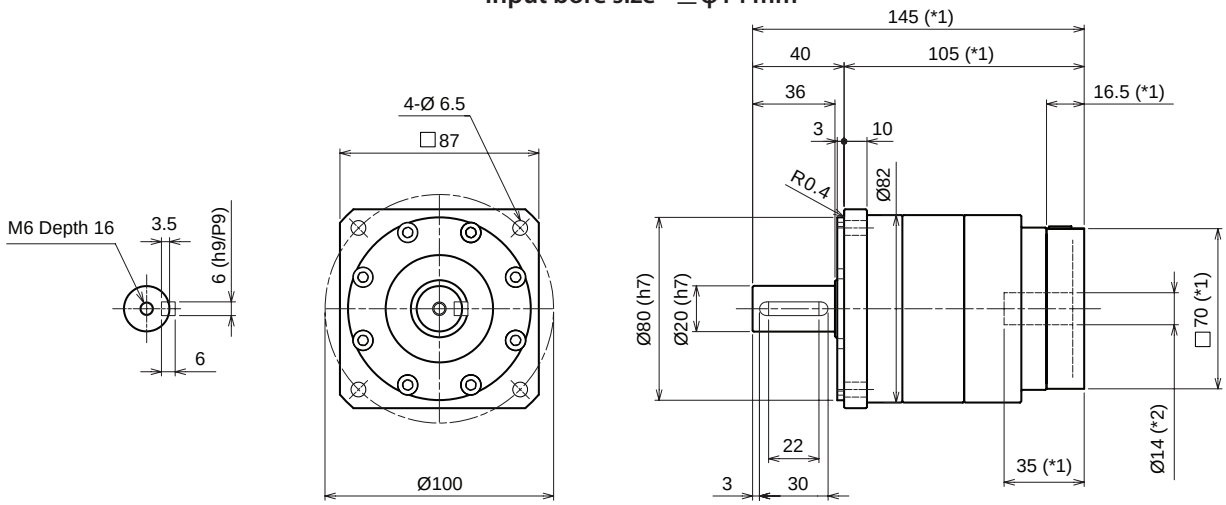
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

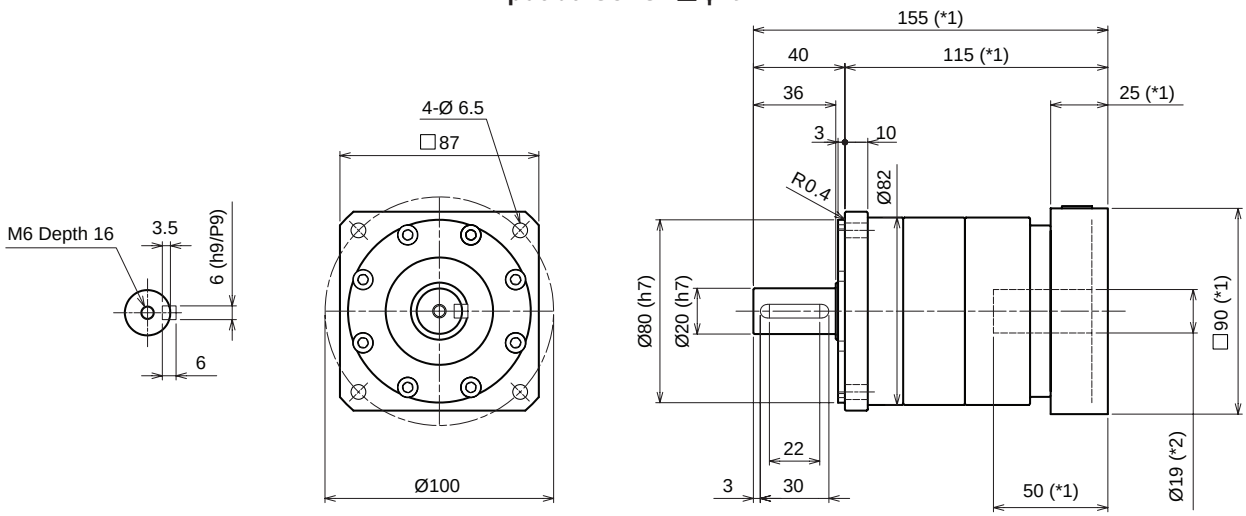
*12 Weight may vary slightly between models

PRF 082 1-Stage Dimensions

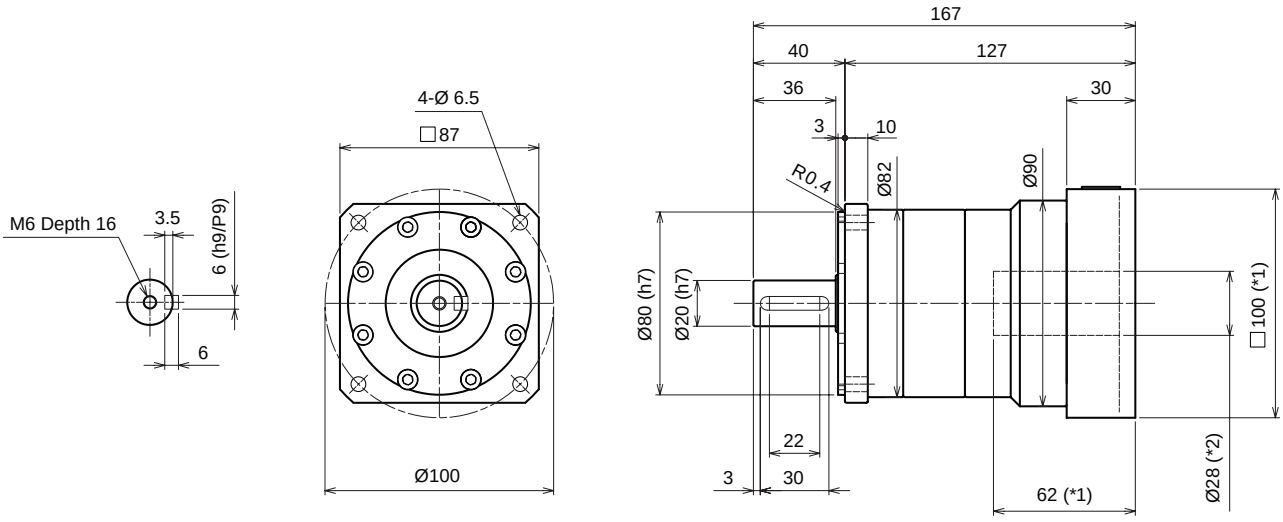
Input bore size ≦φ14 mm



Input bore size ≦φ19 mm



Input bore size ≦φ28 mm

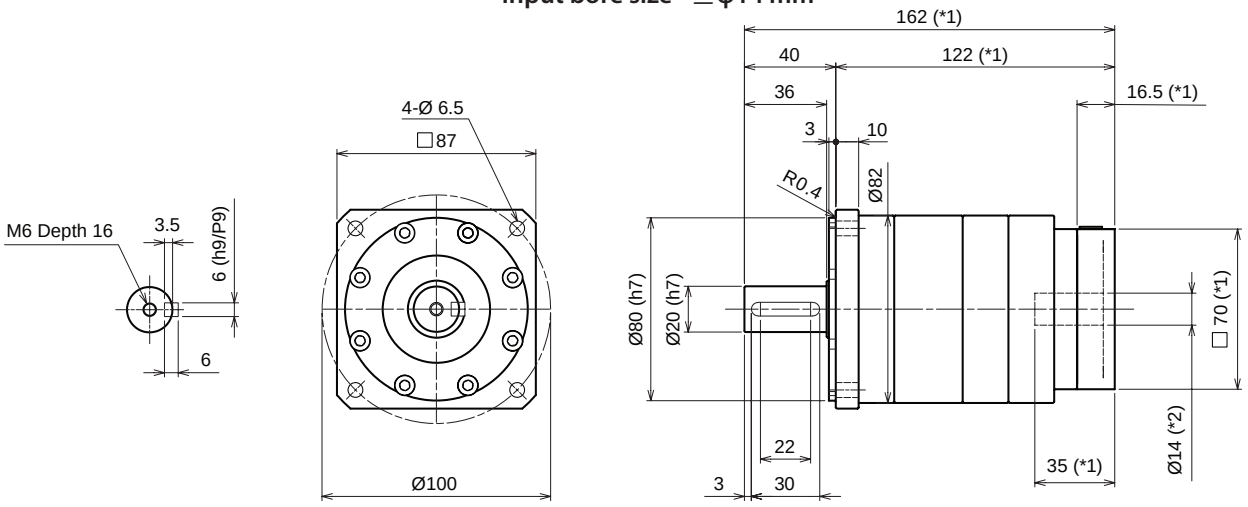


*1 Length will vary depending on motor

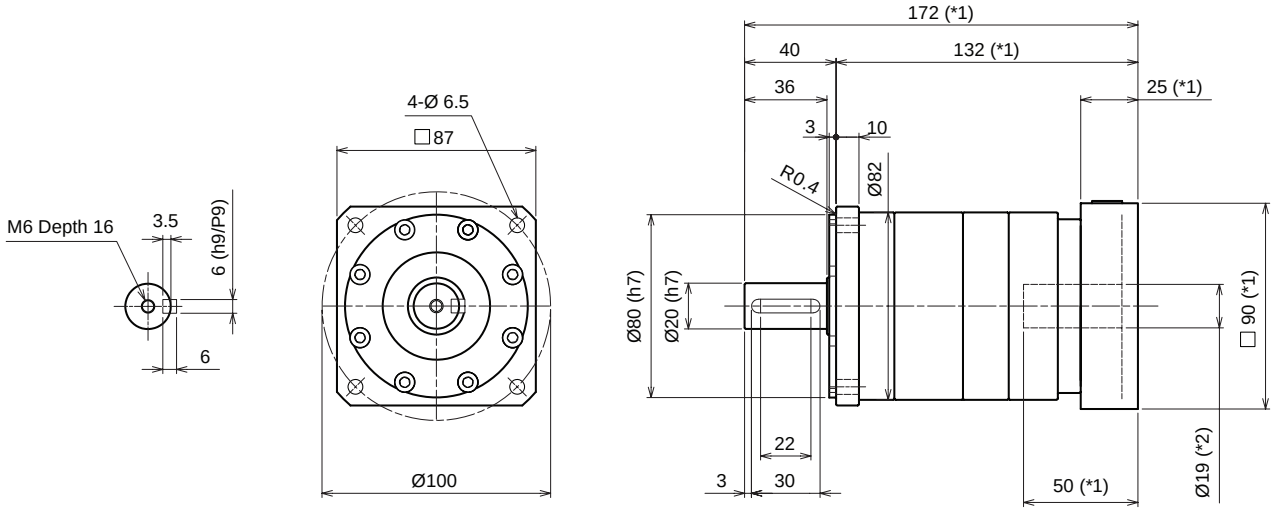
*2 Bushing will be inserted to adapt to motor shaft

PRF 082 2-Stage Dimensions

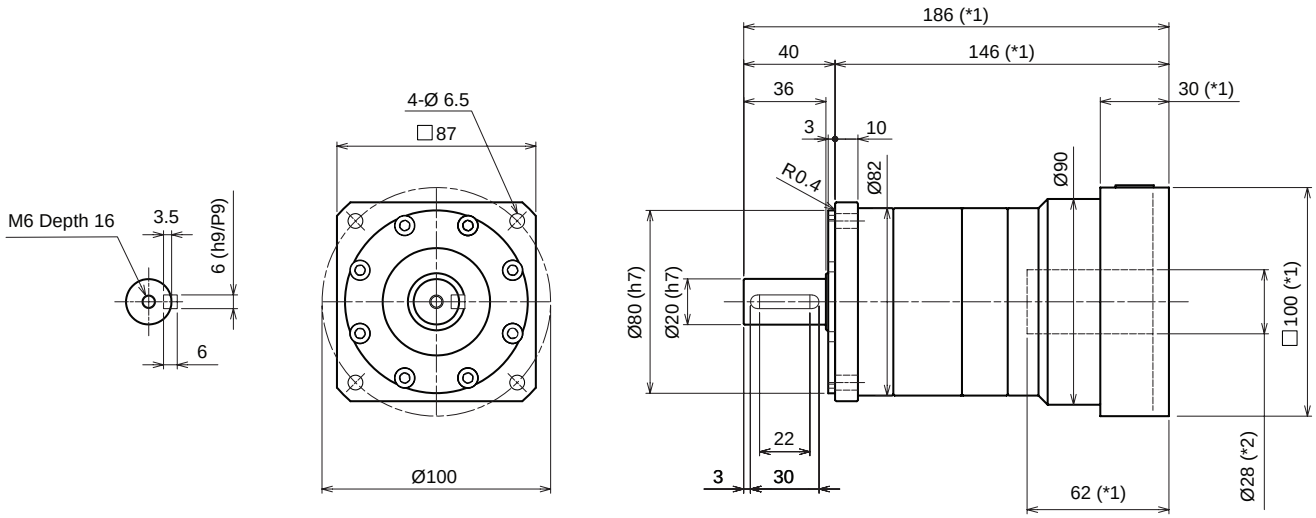
Input bore size ≦φ14 mm



Input bore size ≦φ19 mm



Input bore size ≦φ28 mm



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

PRF 120 1-Stage Specifications

Frame Size	120							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	225	330	330	330	225	225
Maximum Output Torque	[Nm]	*2	340	490	490	480	370	370
Emergency Stop Torque	[Nm]	*3	500	550	550	550	500	500
Nominal Input Speed	[rpm]	*4	3000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	1.30					
Maximum Radial Load	[N]	*7	2000					
Maximum Axial Load	[N]	*8	2800					
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.38	1.45	1.17	0.88	0.85	0.83
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.41	3.48	3.13	2.89	2.86	2.84
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	12.27	11.34	11.05	10.72	10.69	10.67
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arc-min]	*10	15					
Maximum Torsional Backlash	[arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤65					
Protection Class	*15	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	6.8					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRF 120 2-Stage Specifications

Frame Size	120											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	225	225	330	330	330	330	330	280	280	225
Maximum Output Torque	[Nm]	*2	270	270	390	390	390	390	390	390	390	292
Emergency Stop Torque	[Nm]	*3	500	500	550	550	550	550	550	550	550	500
Nominal Input Speed	[rpm]	*4	3000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.42									
Maximum Radial Load	[N]	*7	2000									
Maximum Axial Load	[N]	*8	2800									
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.32	1.08	1.07	0.93	0.92	1.03	0.76	0.80	0.79	0.79
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	3.31	2.97	3.06	2.93	2.91	3.03	2.75	2.78	2.78	2.78
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	-	-	-	-	-	-	-	-	-	-
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arc-min]	*10	15									
Maximum Torsional Backlash	[arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤65									
Protection Class	*15	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	8.8									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

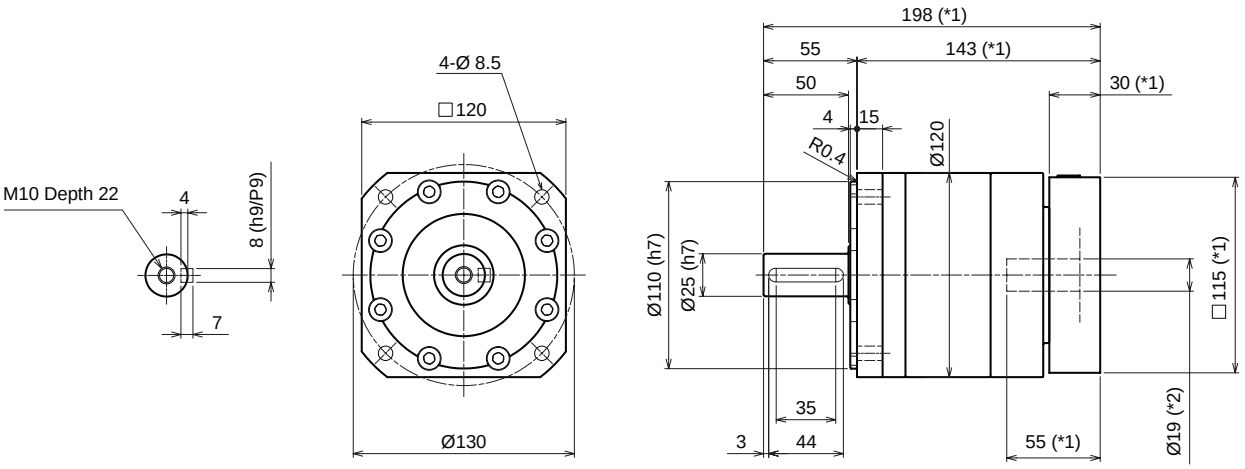
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

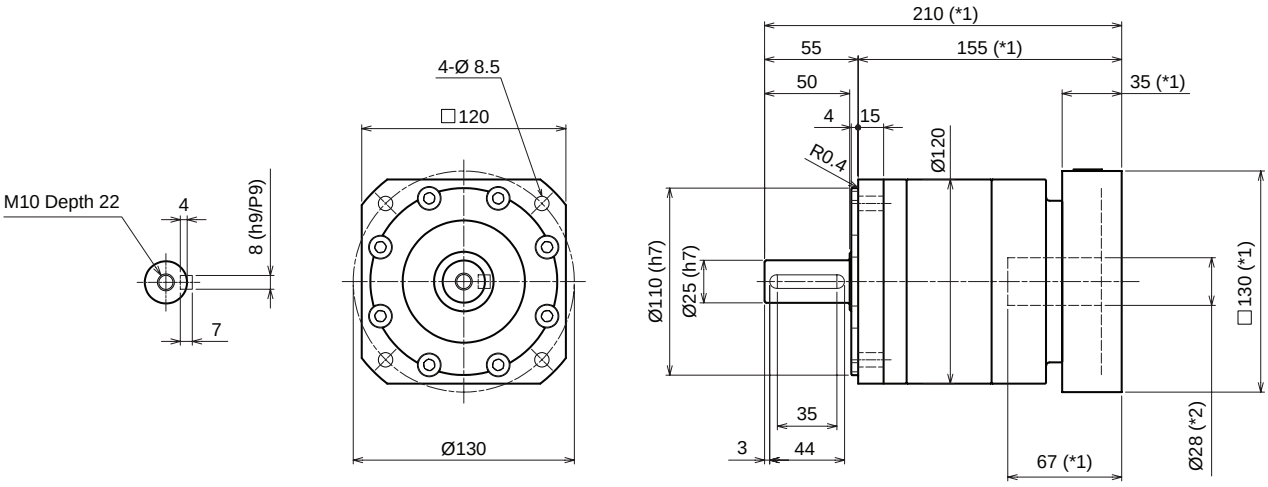
*12 Weight may vary slightly between models

PRF 120 1-Stage Dimensions

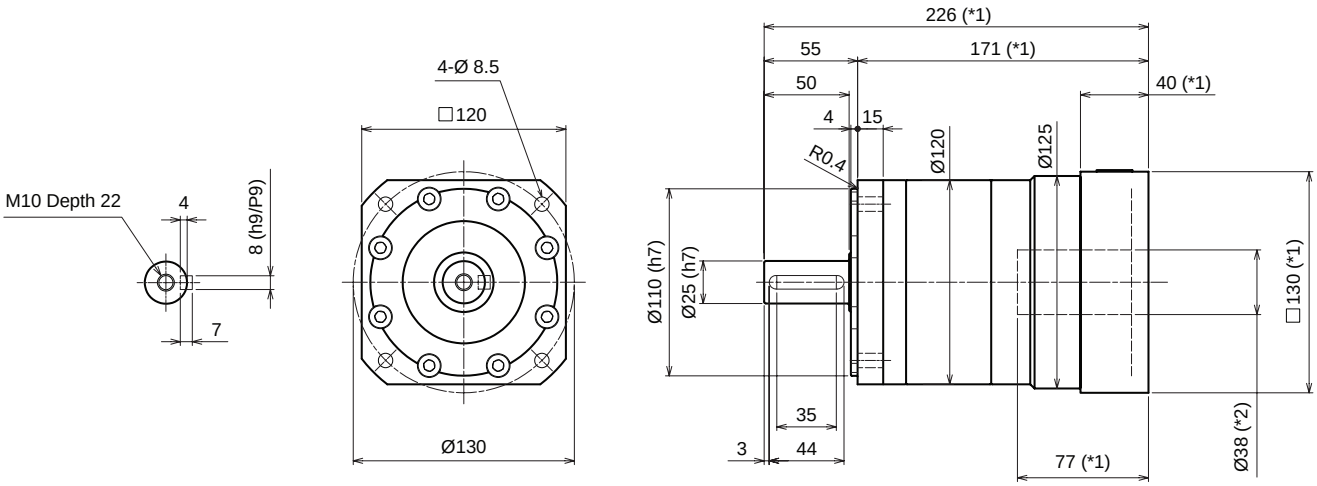
Input bore size ≦φ19 mm



Input bore size ≦φ28 mm



Input bore size ≦φ38 mm

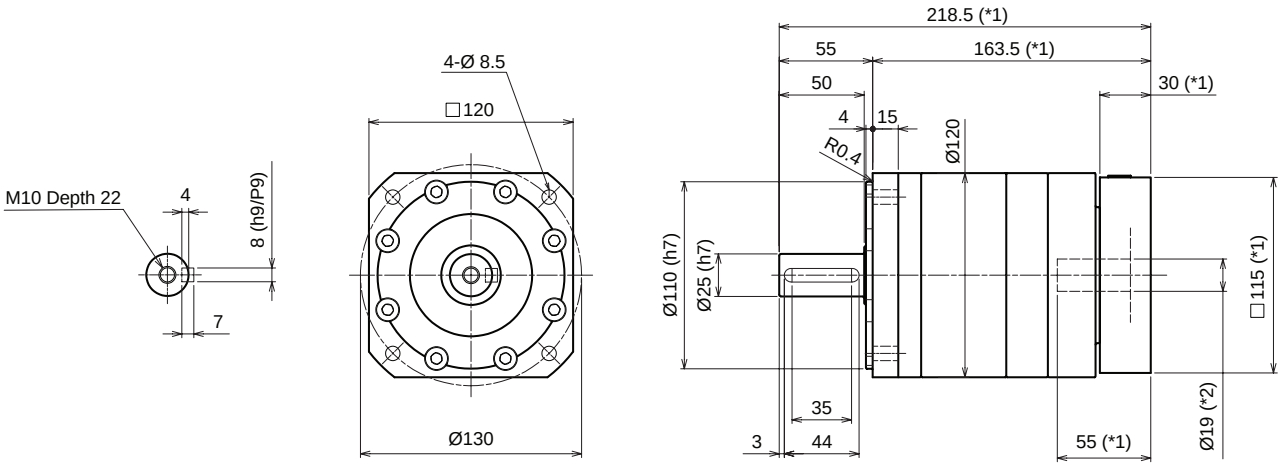


*1 Length will vary depending on motor

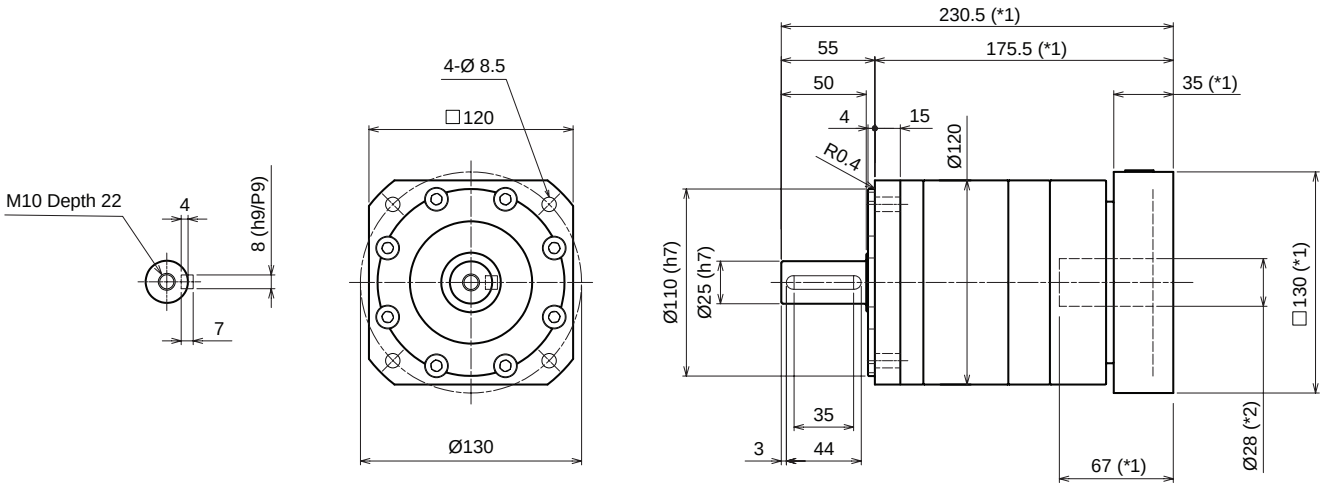
*2 Bushing will be inserted to adapt to motor shaft

PRF 120 2-Stage Dimensions

Input bore size ≦φ19 mm



Input bore size ≦φ28 mm



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

PRF 160 1-Stage Specifications

Frame Size	160							
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	470	700	700	700	470	470
Maximum Output Torque	[Nm]	*2	630	1000	1000	950	730	730
Emergency Stop Torque	[Nm]	*3	1000	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*4	2000					
Maximum Input Speed	[rpm]	*5	6000					
No Load Running Torque	[Nm]	*6	1.63					
Maximum Radial Load	[N]	*7	6100					
Maximum Axial Load	[N]	*8	9000					
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	7.17	3.67	2.62	1.60	1.50	1.43
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	17.03	13.51	12.46	11.36	11.26	11.19
Efficiency	[%]	*9	95					
Torsional Rigidity	[Nm/arc-min]	*10	45					
Maximum Torsional Backlash	[arc-min]	--	≤8					
Noise Level	dB [A]	*11	≤70					
Protection Class	--	--	IP54					
Ambient Temperature	[°C]	--	0-40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*12	16.5					

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

*12 Weight may vary slightly between models

PRF 160 2-Stage Specifications

Frame Size	160											
Ratio	**Unit**	**Note**	**12**	**15**	**16**	**20**	**25**	**32**	**40**	**50**	**80**	**100**
Nominal Output Torque	[Nm]	*1	470	470	700	700	700	700	700	700	700	470
Maximum Output Torque	[Nm]	*2	560	560	840	840	840	840	840	840	840	610
Emergency Stop Torque	[Nm]	*3	1000	1000	1250	1250	1250	1250	1250	1250	1250	1000
Nominal Input Speed	[rpm]	*4	2000									
Maximum Input Speed	[rpm]	*5	6000									
No Load Running Torque	[Nm]	*6	0.56									
Maximum Radial Load	[N]	*7	6100									
Maximum Axial Load	[N]	*8	9000									
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	5.41	2.50	2.55	1.94	1.89	2.42	1.23	3.11	3.09	3.09
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	14.00	12.09	12.54	11.92	11.87	12.41	11.17	11.90	11.90	11.90
Efficiency	[%]	*9	90									
Torsional Rigidity	[Nm/arc-min]	*10	43									
Maximum Torsional Backlash	[arc-min]	--	≤10									
Noise Level	dB [A]	*11	≤70									
Protection Class	--	--	IP54									
Ambient Temperature	[°C]	--	0-40									
Permitted Housing Temperature	[°C]	--	90									
Weight	[kg]	*12	20.3									

*1 Continuous rating at 100% duty cycle, S1 operation, measured at 100rpm output and 30°C

*2 Permitted for 30,000 output shaft revolutions. Note operation factor on page 469

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*4 The average input speed at nominal torque. Maintain housing temperature below permitted value

*5 The maximum intermittent input speed

*6 Torque at no load applied to the input shaft at nominal input speed

*7 The maximum radial load that the gearbox can accept

*8 The maximum axial load that the gearbox can accept

*9 The efficiency at the nominal output torque ratings

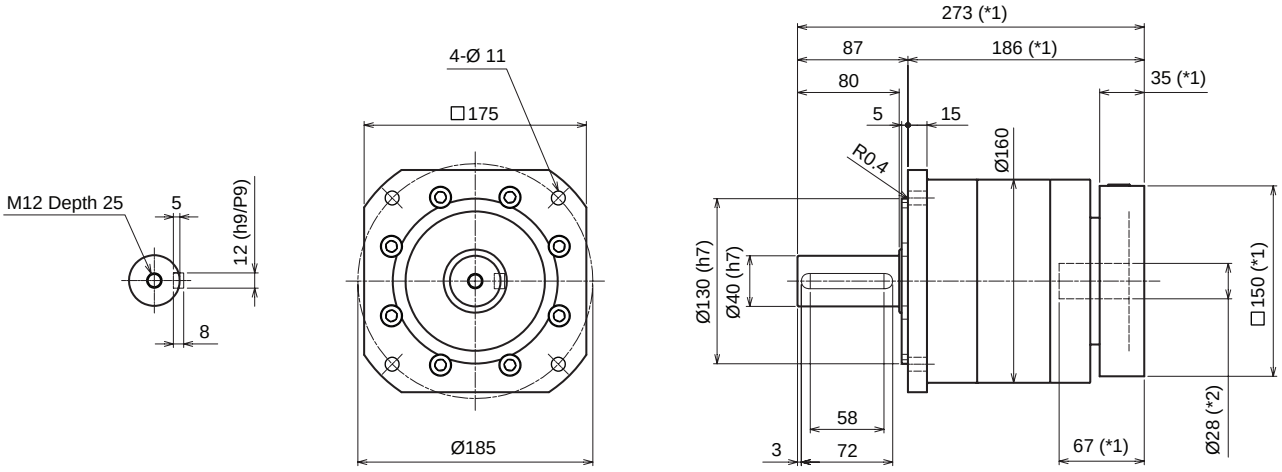
*10 This does not include lost motion

*11 Contact Nidec Drive Technology for the testing conditions and environment

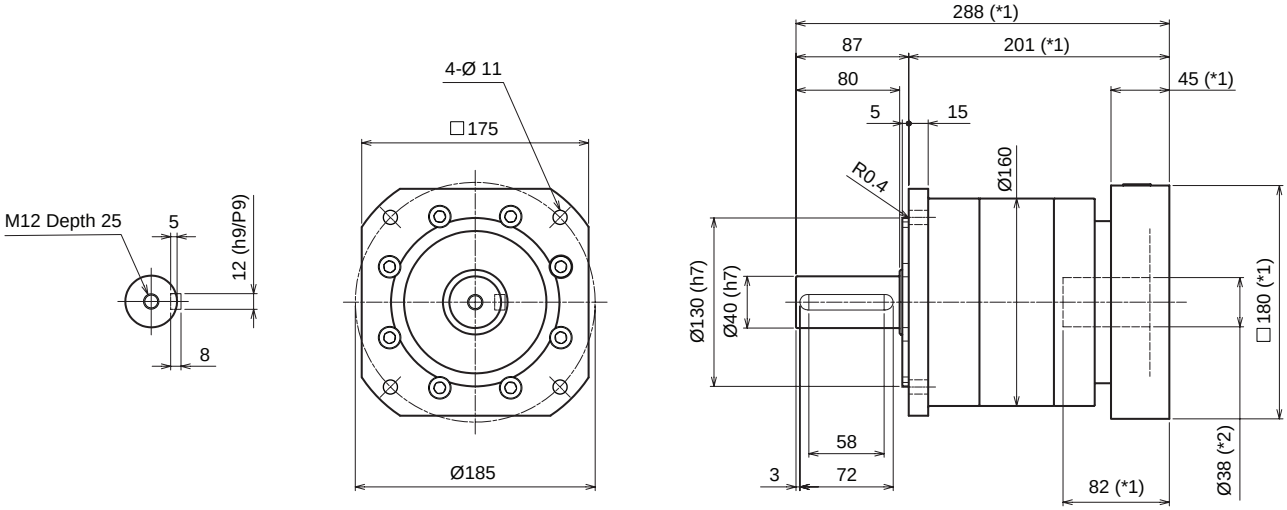
*12 Weight may vary slightly between models

PRF 160 1-Stage Dimensions

Input bore size ≦φ28 mm



Input bore size ≦φ38 mm

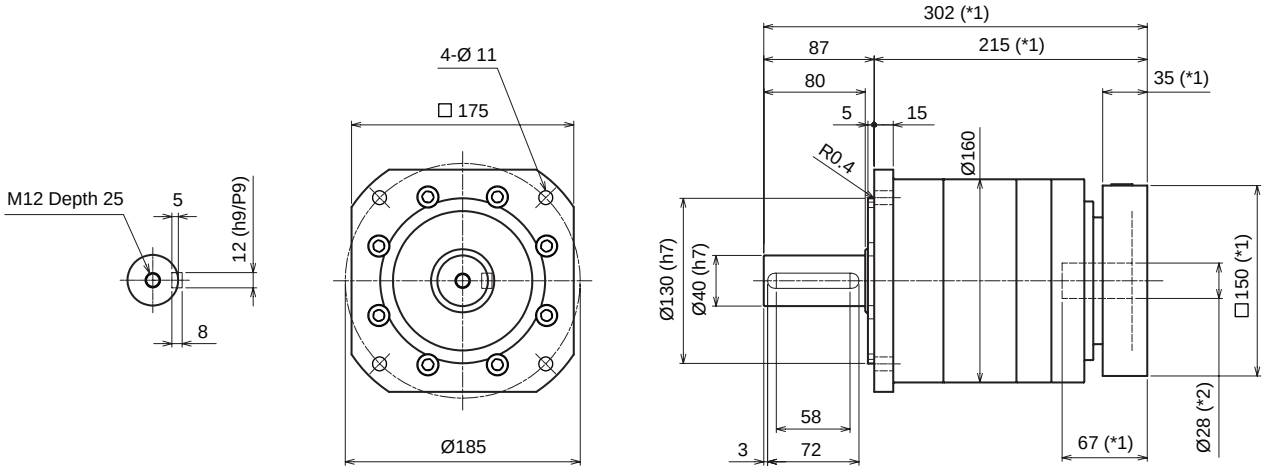


*1 Length will vary depending on motor

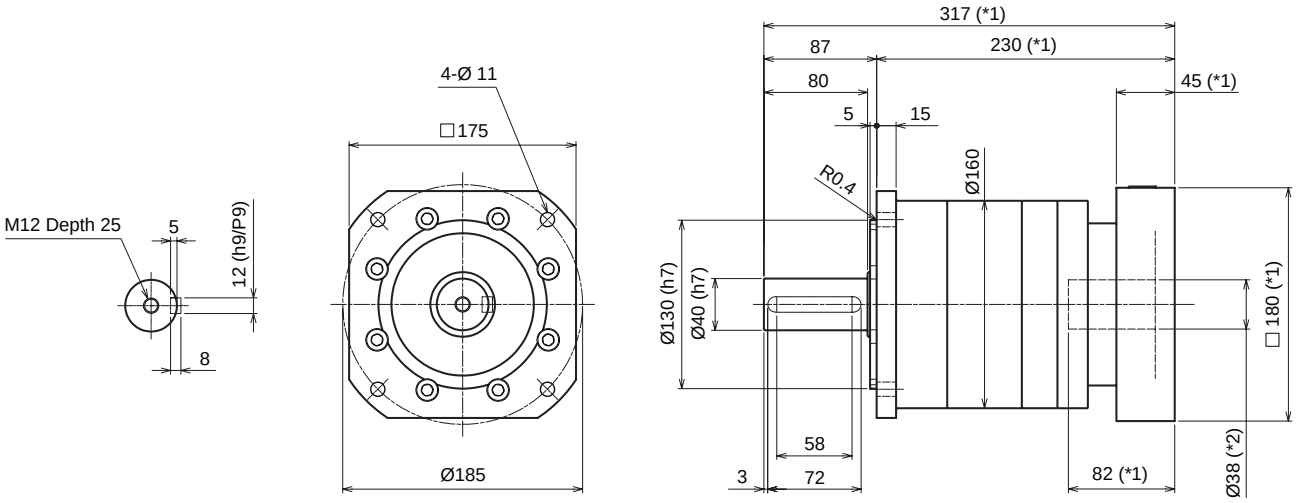
*2 Bushing will be inserted to adapt to motor shaft

PRF 160 2-Stage Dimensions

Input bore size ≦φ28 mm



Input bore size ≦φ38 mm



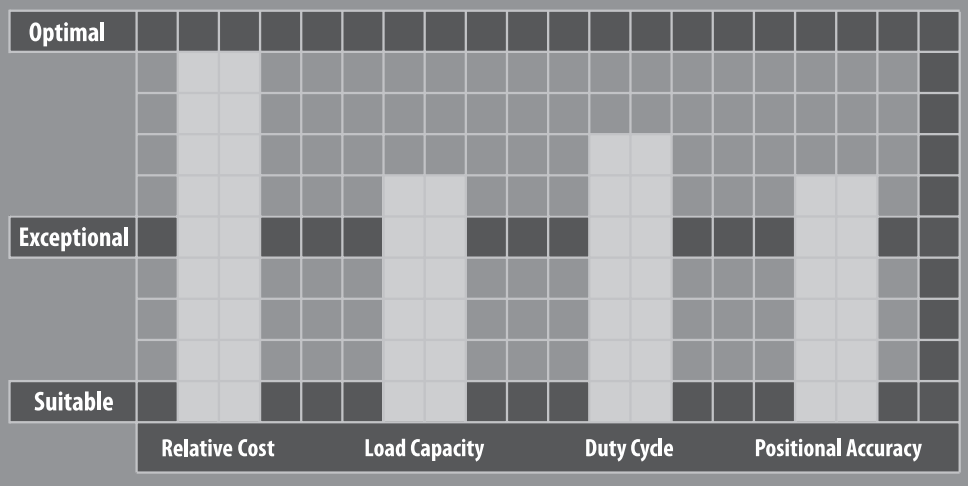
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRL SERIES

The VRL series is the all-rounder in the planetary gear reducer marketplace. With helical gearing, robust internal construction, smooth operation and high torque density, this product is truly best-in-class. 5 arc-min backlash allows the VRL to be applied to a wide range of applications where accuracy and dynamics are in play, but cost is of concern.

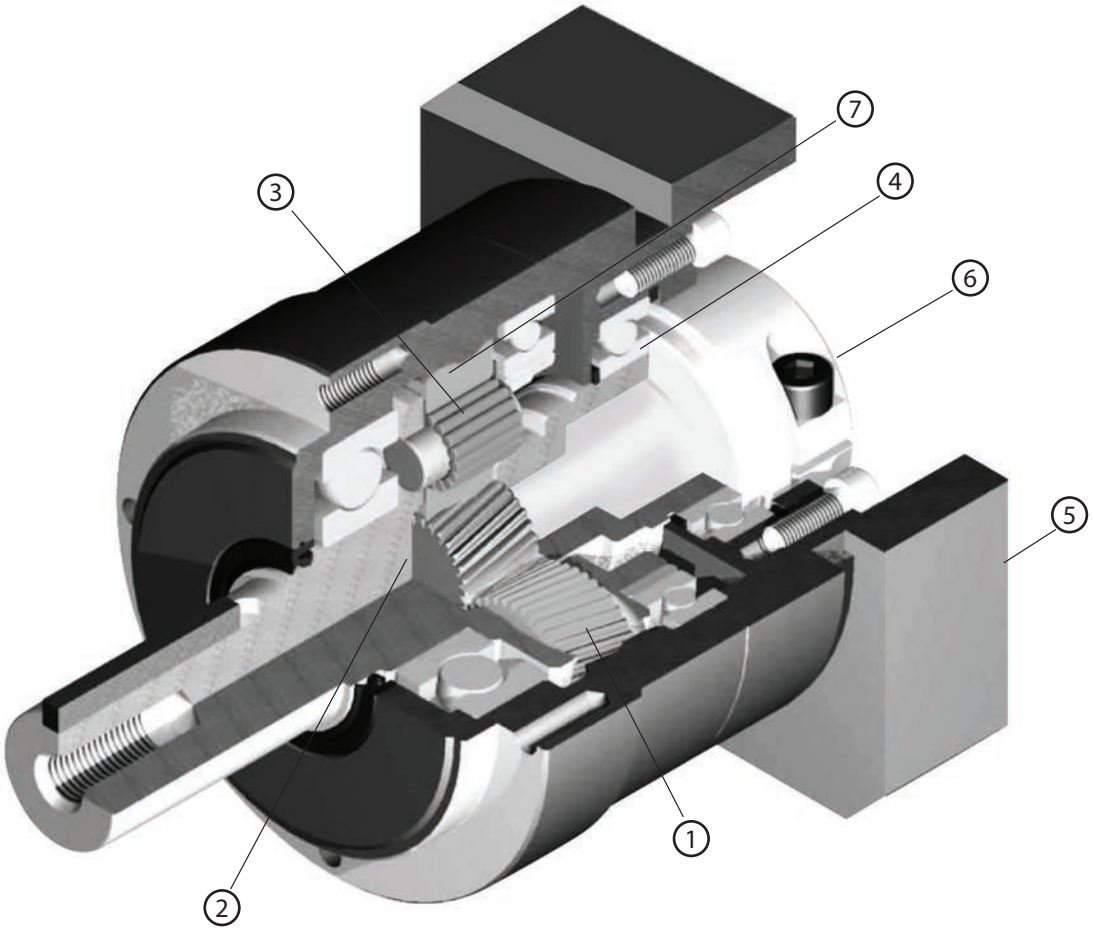
The VRL is an excellent choice for servo applications in packaging, handling and automation systems. A variety of standard wash down and food grade options are available, making it an attractive option for the toughest environments. We offer the broadest selection of frame sizes and ratios, giving our customers more flexibility than ever before. Industry standard mounting dimensions allow the VRL to be implemented in legacy machine designs, saving our customers valuable time.



VRL SERIES

- The all-rounder for mid to high end motion control applications
- The widest range of frame sizes and ratios available in the market
- Best-In-class backlash (≤5 arc-min)
- Broad range of mounting adapters offer a simple, precise attachment to any motor
- Maintenance-free solution that is lubricated for life. High performance grease allows flexible mounting in any orientation
- Industry standard mounting dimensions
- Assembled in the USA, with immediate delivery

VRL Series Features



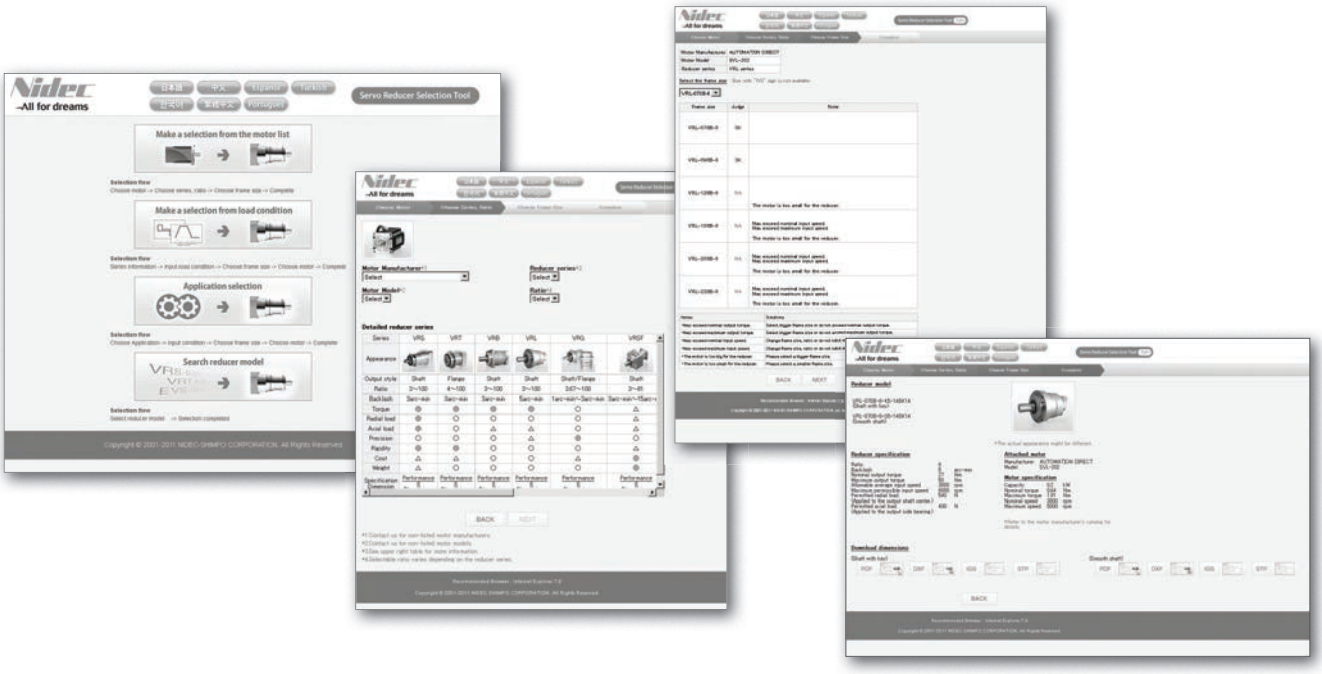
1. Carburized helical gears with proprietary secondary finishing process for higher accuracy and smooth, quiet operation. 40% higher tooth surface area than the industry standard
2. One piece output shaft and planet carrier with two bearings straddling the planet gears. Higher stiffness, torque capacity and safety factor, with guaranteed alignment of gearing
3. Uncaged needle roller bearings provide excellent torque density and torsional rigidity. 43% larger bearing surface area compared to the rest of the industry
4. Unique labyrinth input seal design greatly reduces heat and increases system efficiency. IP65 protection is available for wash down applications
5. Optimized mounting system with active centering on motor pilot diameter guarantees alignment of motor. Motor can be installed in any orientation
6. True concentric motor shaft clamping connection, optimized for your specific motor. Reduced inertia for dynamic performance and balanced for high speed operation
7. Ring gear machined directly into the housing, not welded or pressed in. Provides greater concentricity and elimination of speed fluctuation

VRL Series Model Code

VRL	—	090	C	—	7	—	K	5	—	19HB16
Series Name		Frame Size	Design Version		Ratio		Output Mounting Style	Backlash		Motor Mounting Code
VRL		050 070 090 120 155 205 235	Design Version		1 Stage: 3 4 5 6 7 8 9 10 2 Stage: 15 16 20 25 28 30 35 40 45 50 60 70 80 90 100		K: Keyed Shaft S: Smooth shaft	≤5 arc-min		Motor mounting code varies depending on the motor

* Use the selection tool link below to configure the code

Contact us for additional information or refer to our online gearhead selection tool.
Selection tool https://www.nidec-drivetechnology.co.jp/selection/all/



VRL 050 1 Stage Specifications

Frame Size	050									
Ratio	**Units**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	6	9	10	10	10	10	10	10
Maximum Acceleration Torque	[Nm]	*2	14	21	21	21	21	21	14	14
Maximum Torque	[Nm]	*3	17	25	25	25	25	25	17	17
Emergency Stop Torque	[Nm]	*4	30	35	35	35	35	35	30	30
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8000	8000	8000	8000	8000	8000	8000	8000
No Load Running Torque	[Nm]	*7	0.03							
Maximum Radial Load	[N]	*8	710							
Maximum Axial Load	[N]	*9	640							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.053	0.041	0.036	0.034	0.032	0.031	0.031	0.030
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	2							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	0.7							

VRL 050 2 Stage Specifications

Frame Size	050									
Ratio	**Units**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	9	14	14	15	15	11	15	15
Maximum Acceleration Torque	[Nm]	*2	14	21	21	21	21	14	21	21
Maximum Torque	[Nm]	*3	17	21	21	21	21	14	21	21
Emergency Stop Torque	[Nm]	*4	30	35	35	35	35	30	35	35
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.01							
Maximum Radial Load	[N]	*8	710							
Maximum Axial Load	[N]	*9	640							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.035	0.038	0.034	0.034	0.038	0.030	0.034	0.030
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	2							
Maximum Torsional Backlash	[arc-min]	--	≤ 7							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	0.8							

VRL 050 2 Stage Specifications

Frame Size	050								
Ratio	**Units**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	11	15	15	15	15	11	11
Maximum Acceleration Torque	[Nm]	*2	14	21	21	21	21	14	14
Maximum Torque	[Nm]	*3	14	21	21	21	21	14	14
Emergency Stop Torque	[Nm]	*4	30	35	35	35	35	30	30
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.01						
Maximum Radial Load	[N]	*8	710						
Maximum Axial Load	[N]	*9	640						
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.034	0.030	0.030	0.030	0.030	0.030	0.030
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	2						
Maximum Torsional Backlash	[arc-min]	--	≤ 7						
Noise Level	dB [A]	*12	≤ 61						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	0.8						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor **f_0**, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

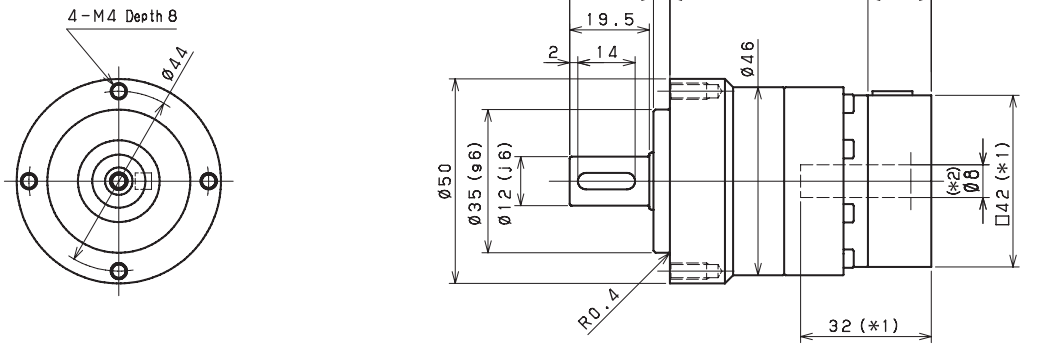
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

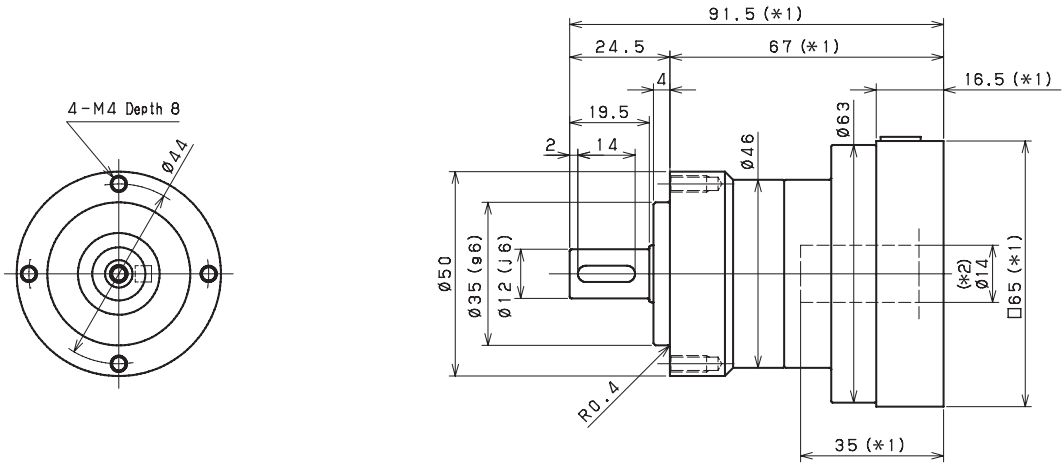
*14 Weight may vary slightly between models

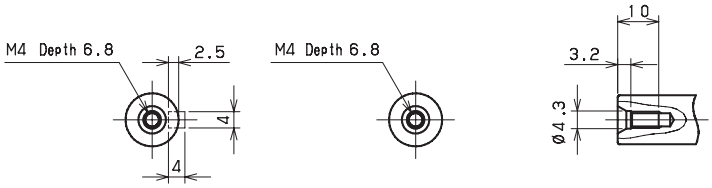
VRL 050 1 Stage Dimensions

Input bore size ≦φ8 mm



Input bore size ≦φ14 mm





Keyed shaft

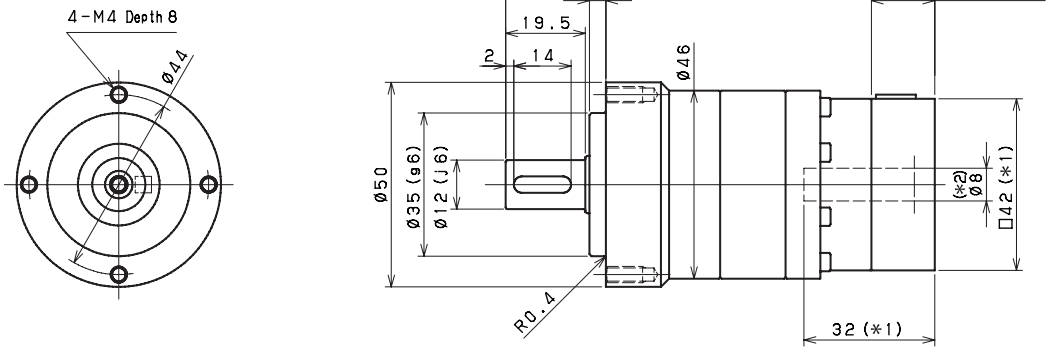
Smooth shaft

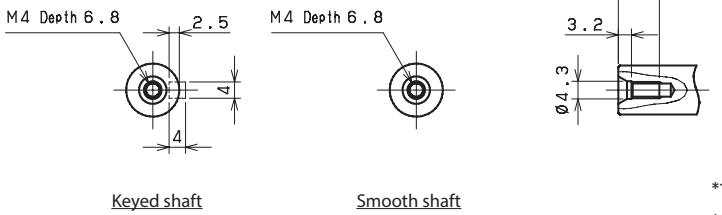
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRL 050 2 Stage Dimensions

Input bore size ≦φ8 mm





Keyed shaft

Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRL 070 1 Stage Specifications

Frame Size	070									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	19	27	28	28	28	28	28	28
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	55	79	79	79	79	76	55	55
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	3300	3300	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.08							
Maximum Radial Load	[N]	*8	1200							
Maximum Axial Load	[N]	*9	1100							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.14	0.095	0.077	0.068	0.062	0.059	0.057	0.056
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.25	0.21	0.19	0.18	0.17	0.17	0.17	0.17
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.53	0.48	0.46	0.46	0.45	0.45	0.44	0.44
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arcmin]	*11	3							
Maximum Torsional Backlash	[Arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 66							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	1.5							

VRL 070 2 Stage Specifications

Frame Size	070									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	25	32	32	43	45	32	45	45
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	46	66	66
Maximum Torque	[Nm]	*3	46	66	66	66	66	46	66	66
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	80	100	100
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04							
Maximum Radial Load	[N]	*8	1200							
Maximum Axial Load	[N]	*9	1100							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.064	0.070	0.062	0.061	0.068	0.051	0.061	0.051
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.18	0.18	0.17	0.17	0.18	0.16	0.17	0.16
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.45	0.46	0.45	0.45	0.46	0.44	0.45	0.44
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arcmin]	*11	3							
Maximum Torsional Backlash	[Arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 66							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	1.7							

VRL 070 2 Stage Specifications

Frame Size	070								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	32	45	45	45	45	32	32
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	46	66	66	66	66	46	46
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	4000	4800	4800	5500	5500	5500	5500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04						
Maximum Radial Load	[N]	*8	1200						
Maximum Axial Load	[N]	*9	1100						
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.061	0.051	0.051	0.051	0.051	0.051	0.051
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.17	0.16	0.16	0.16	0.16	0.16	0.16
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.45	0.44	0.44	0.44	0.44	0.44	0.44
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arcmin]	*11	3						
Maximum Torsional Backlash	[Arc-min]	--	≤ 5						
Noise Level	dB [A]	*12	≤ 66						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	1.7						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

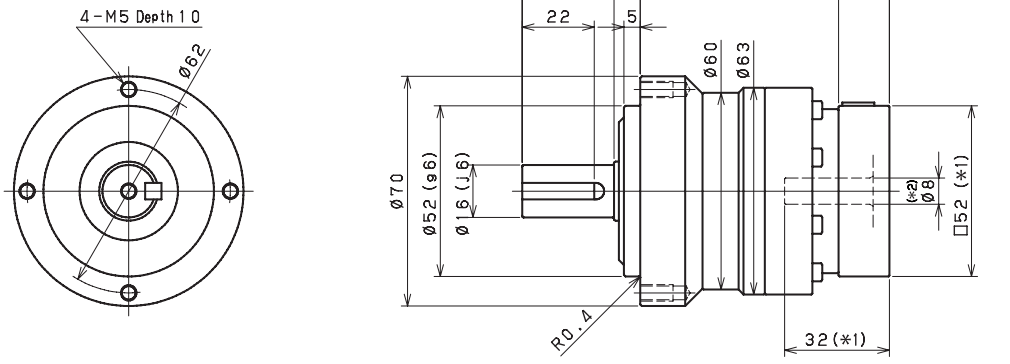
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

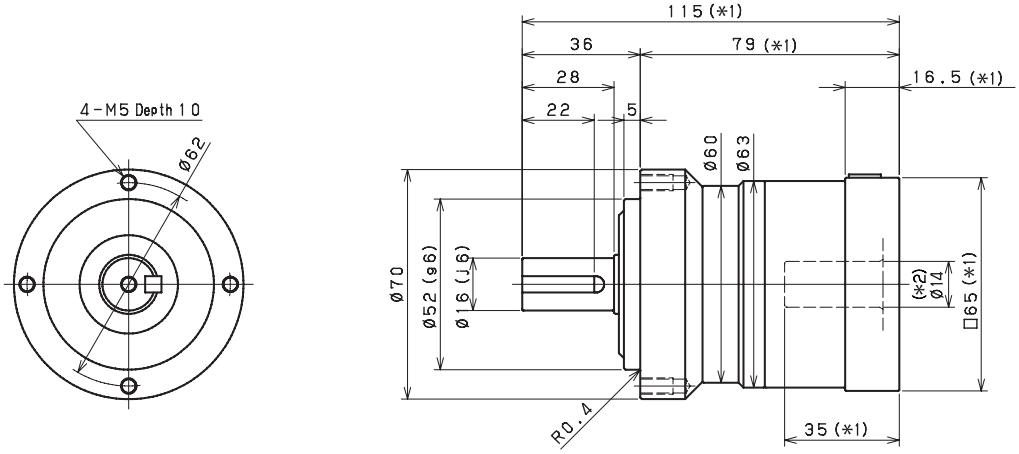
*14 Weight may vary slightly between models

VRL 070 1-Stage Dimensions

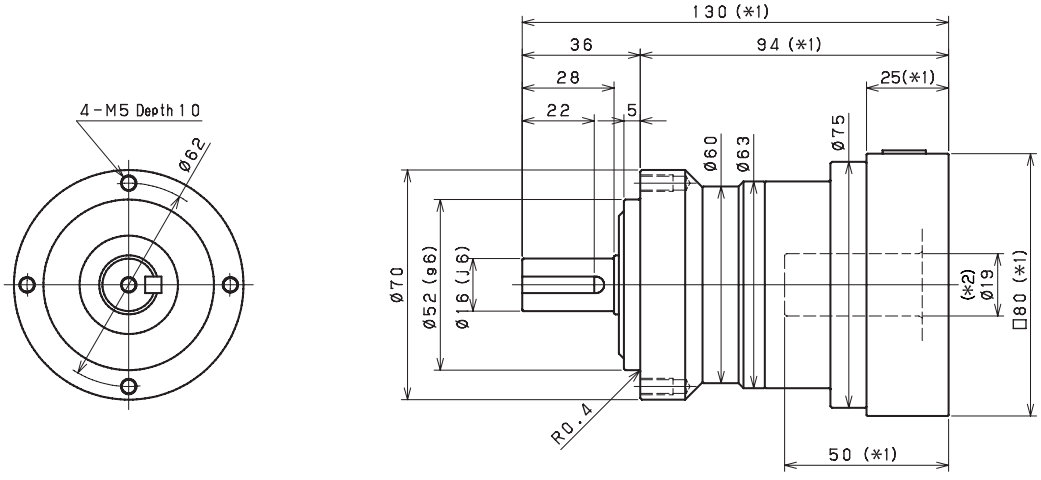
Input bore size ≦φ8 mm

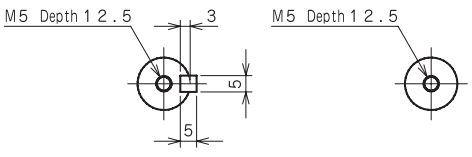


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm





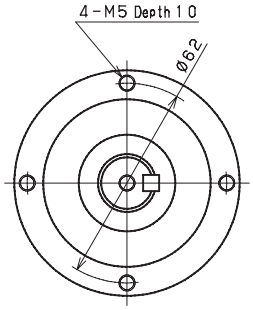
Keyed shaft Smooth shaft

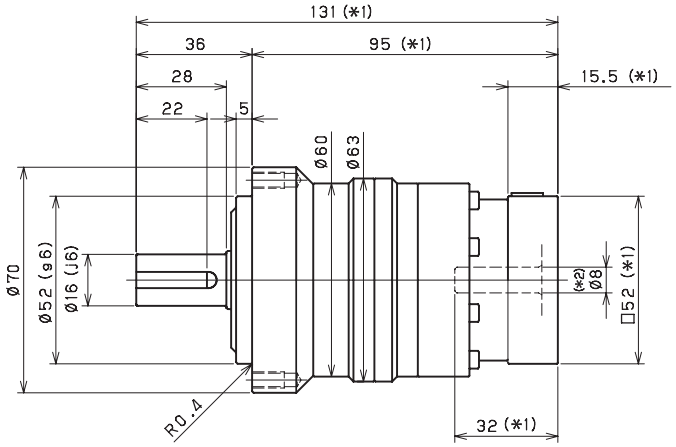
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

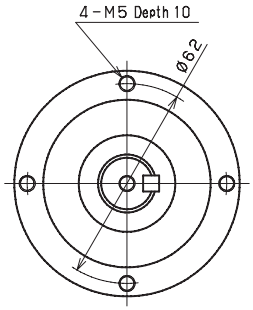
VRL 070 2-Stage Dimensions

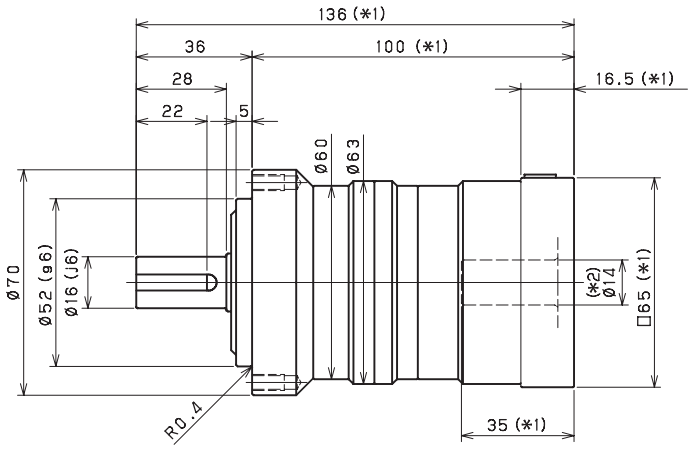
Input bore size ≦φ8 mm



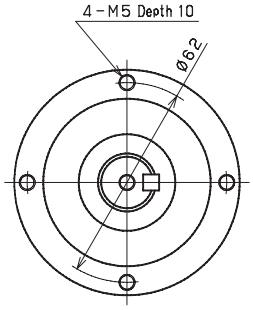


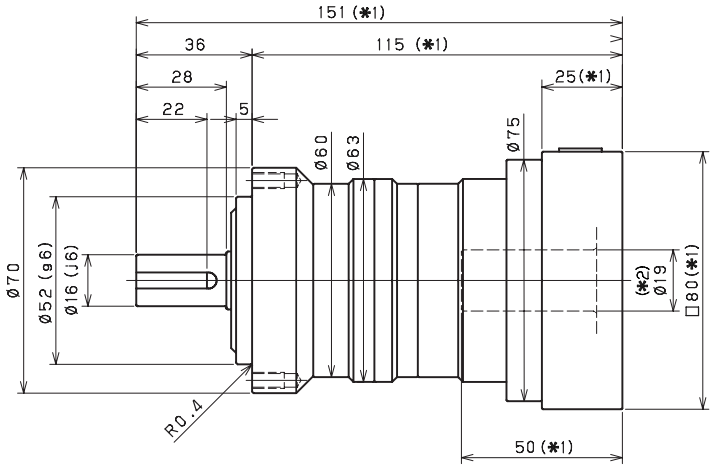
Input bore size ≦φ14 mm

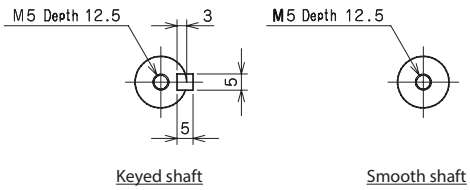




Input bore size ≦φ19 mm







Keyed shaft　　Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRL 090 1 Stage Specifications

Frame Size	090									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	53	77	84	84	84	84	84	84
Maximum Acceleration Torque	[Nm]	*2	108	165	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	135	200	200	195	195	190	145	145
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	2900	2900	2900	2900	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.35							
Maximum Radial Load	[N]	*8	2400							
Maximum Axial Load	[N]	*9	2200							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.72	0.50	0.41	0.36	0.33	0.31	0.30	0.30
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	0.90	0.80	0.75	0.73	0.71	0.70	0.70
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.9	2.7	2.6	2.5	2.5	2.5	2.5	2.5
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	10							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	3.5							

VRL 090 2 Stage Specifications

Frame Size	090									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	65	80	86	106	118	88	118	118
Maximum Acceleration Torque	[Nm]	*2	108	165	165	165	165	108	165	165
Maximum Torque	[Nm]	*3	108	165	165	165	165	108	165	165
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	200	250	250
Nominal Input Speed	[rpm]	*5	3500	3500	3500	3500	3500	3500	3500	3500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.06							
Maximum Radial Load	[N]	*8	2400							
Maximum Axial Load	[N]	*9	2200							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.20	0.25	0.19	0.19	0.24	0.12	0.18	0.11
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.36	0.41	0.35	0.35	0.40	0.28	0.35	0.28
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.75	0.79	0.74	0.74	0.78	0.67	0.73	0.67
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.4
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	10							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	4							

VRL 090 2 Stage Specifications

Frame Size	090								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	88	118	118	118	118	88	88
Maximum Acceleration Torque	[Nm]	*2	112	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	112	165	165	165	165	112	112
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	3500	3800	3800	4500	4500	4500	4500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.06						
Maximum Radial Load	[N]	*8	2400						
Maximum Axial Load	[N]	*9	2200						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.18	0.11	0.11	0.11	0.11	0.11	0.11
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.73	0.67	0.67	0.67	0.67	0.67	0.67
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.5	2.4	2.4	2.4	2.4	2.4	2.4
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	10						
Maximum Torsional Backlash	[arc-min]	--	≤ 5						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	4						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor **f_0**, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

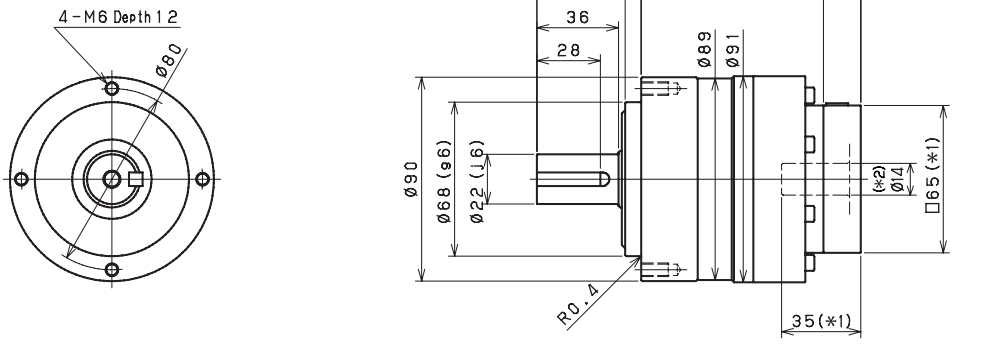
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

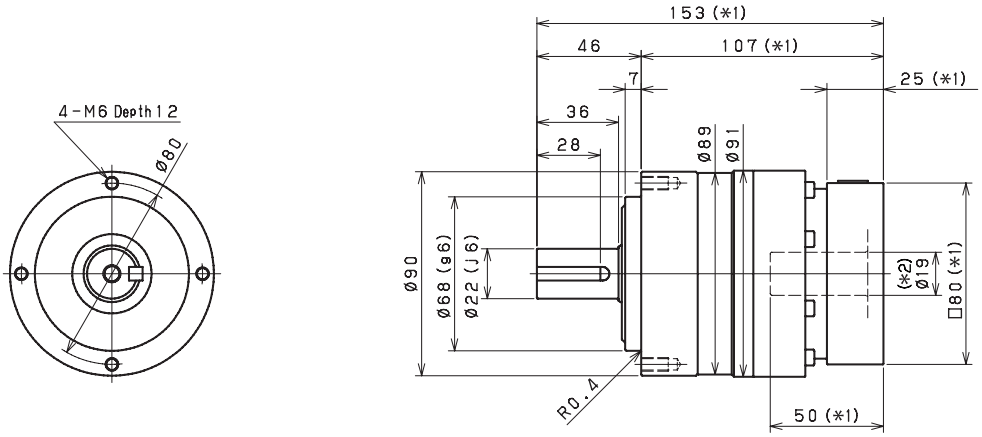
*14 Weight may vary slightly between models

VRL 090 1 Stage Dimensions

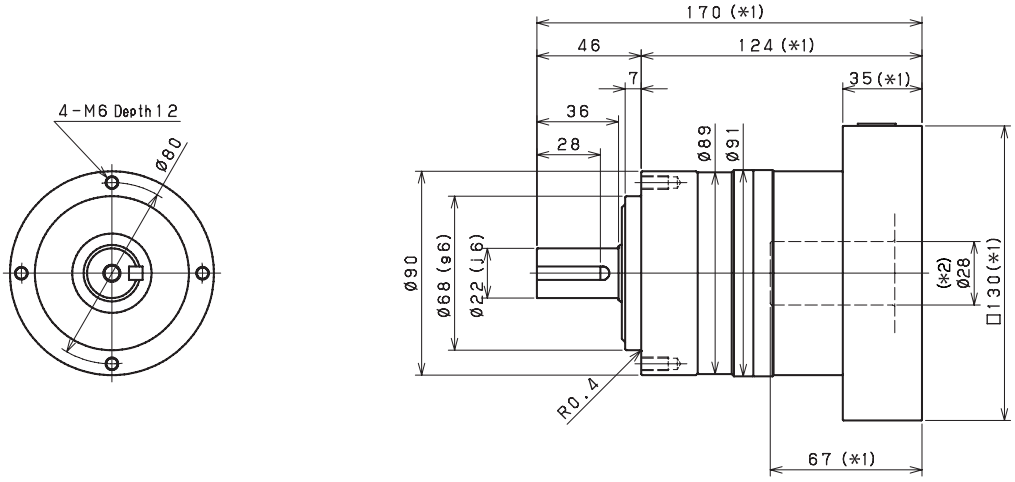
Input bore size ≦φ14 mm

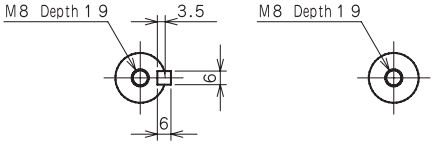


Input bore size ≦φ19 mm



Input bore size ≦φ28 mm





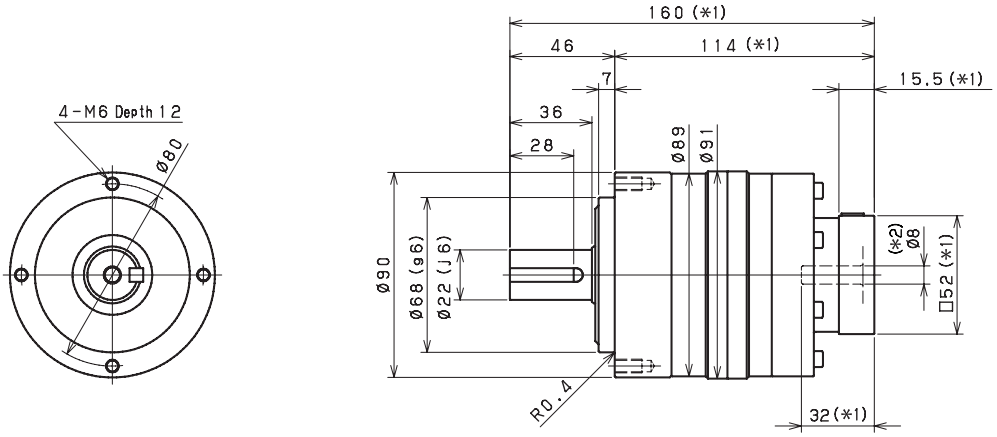
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

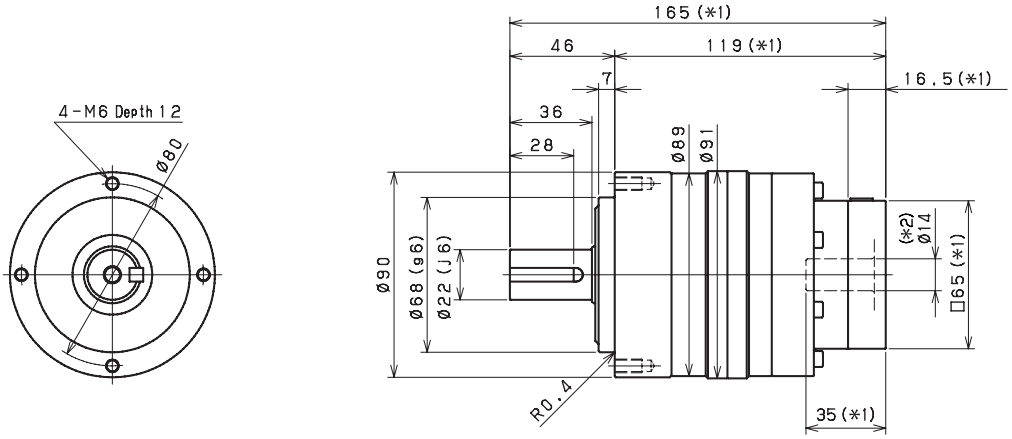
*2 Bushing will be inserted to adapt to motor shaft

VRL 090 2 Stage Dimensions

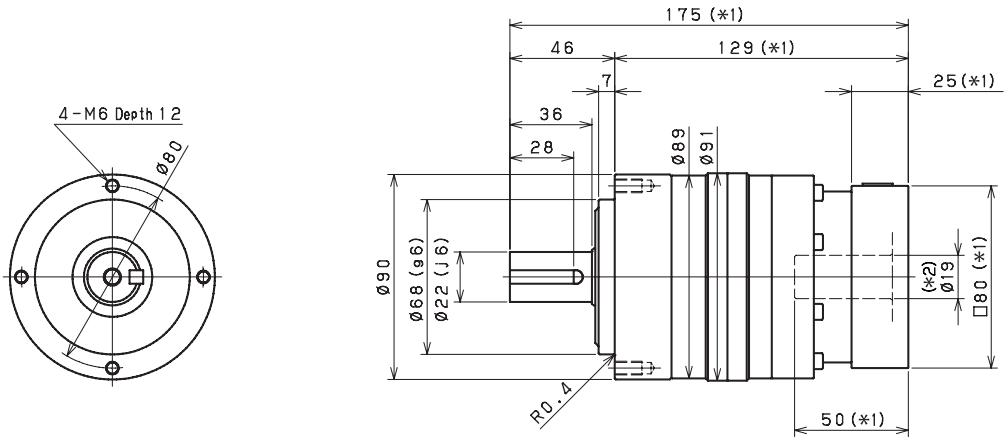
Input bore size ≦φ8 mm

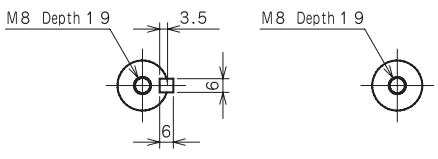


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm (*3)





Keyed shaft Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 28mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRL 120 1 Stage Specifications

Frame Size	120									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	128	146	190	190	190	190	190	190
Maximum Acceleration Torque	[Nm]	*2	270	390	390	390	390	390	292	292
Maximum Torque	[Nm]	*3	340	490	490	480	480	480	370	370
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	625	500	500
Nominal Input Speed	[rpm]	*5	2800	2800	2800	2800	2800	2800	2800	2800
Maximum Input Speed	[rpm]	*6	5500	5500	5500	5500	5500	5500	5500	5500
No Load Running Torque	[Nm]	*7	1.30							
Maximum Radial Load	[N]	*8	4300							
Maximum Axial Load	[N]	*9	3900							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	3.2	2.0	1.4	1.2	1.0	0.92	0.86	0.83
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	5.1	3.7	3.1	2.9	2.8	2.7	2.6	2.6
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	12	10	9.5	9.3	9.1	9	8.9	8.9
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	31							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*13	≤ 71							
Protection Class	*15	--	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	*13	90							
Weight	[kg]	*14	7.8							

VRL 120 2 Stage Specifications

Frame Size	120									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	174	200	220	280	280	220	280	270
Maximum Acceleration Torque	[Nm]	*2	270	390	390	390	390	270	390	390
Maximum Torque	[Nm]	*3	270	390	390	390	390	270	390	390
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	500	625	625
Nominal Input Speed	[rpm]	*5	3100	3100	3100	3100	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.42							
Maximum Radial Load	[N]	*8	4300							
Maximum Axial Load	[N]	*9	3900							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.77	0.98	0.72	0.70	0.92	0.38	0.68	0.37
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.2	1.4	1.1	1.1	1.3	0.78	1.1	0.77
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.9	3.1	2.8	2.8	3	2.5	2.8	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.2	9.4	9.1	9.1	9.3	8.8	9.1	8.8
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	31							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*13	≤ 71							
Protection Class	*15	--	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	*13	90							
Weight	[kg]	*14	8.7							

VRL 120 2 Stage Specifications

Frame Size	120								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	220	280	280	280	280	220	220
Maximum Acceleration Torque	[Nm]	*2	292	390	390	390	390	292	292
Maximum Torque	[Nm]	*3	292	390	390	390	390	292	292
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	500	500
Nominal Input Speed	[rpm]	*5	3100	3500	3500	4200	4200	4200	4200
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.42						
Maximum Radial Load	[N]	*8	4300						
Maximum Axial Load	[N]	*9	3900						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	0.19	0.19	0.19	0.19	0.19	0.19
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.68	0.36	0.36	0.36	0.36	0.36	0.36
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	0.76	0.76	0.76	0.76	0.76	0.76
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.8	2.5	2.5	2.5	2.5	2.5	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.1	8.8	8.8	8.8	8.8	8.8	8.8
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	31						
Maximum Torsional Backlash	[arc-min]	--	≤ 5						
Noise Level	dB [A]	*13	≤ 71						
Protection Class	*15	--	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	*13	90						
Weight	[kg]	*14	8.7						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

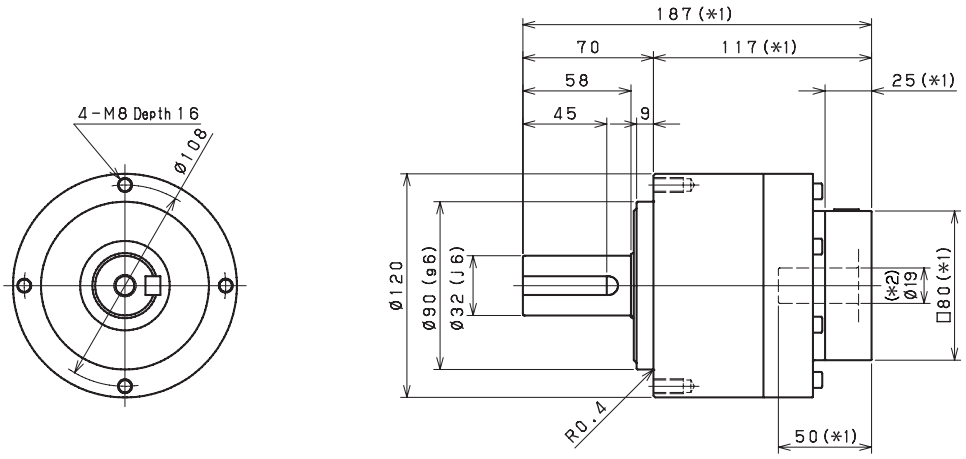
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

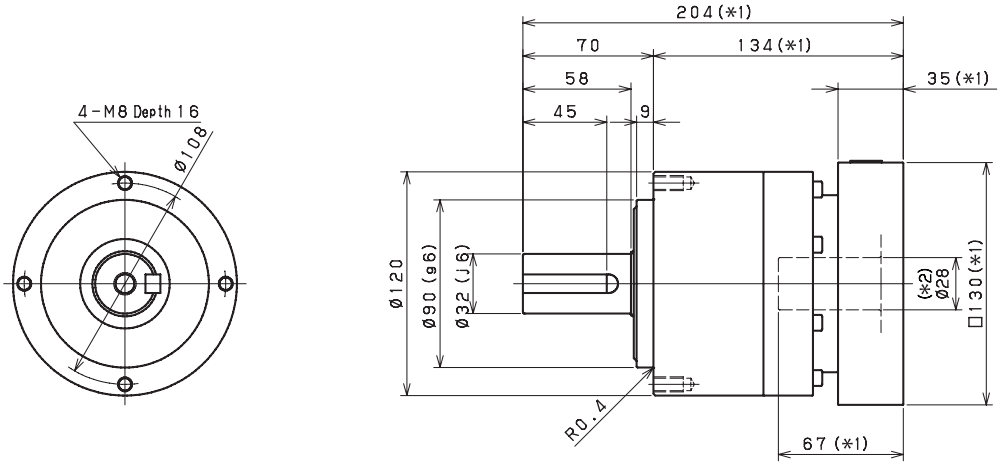
*14 Weight may vary slightly between models

VRL 120 1 Stage Dimensions

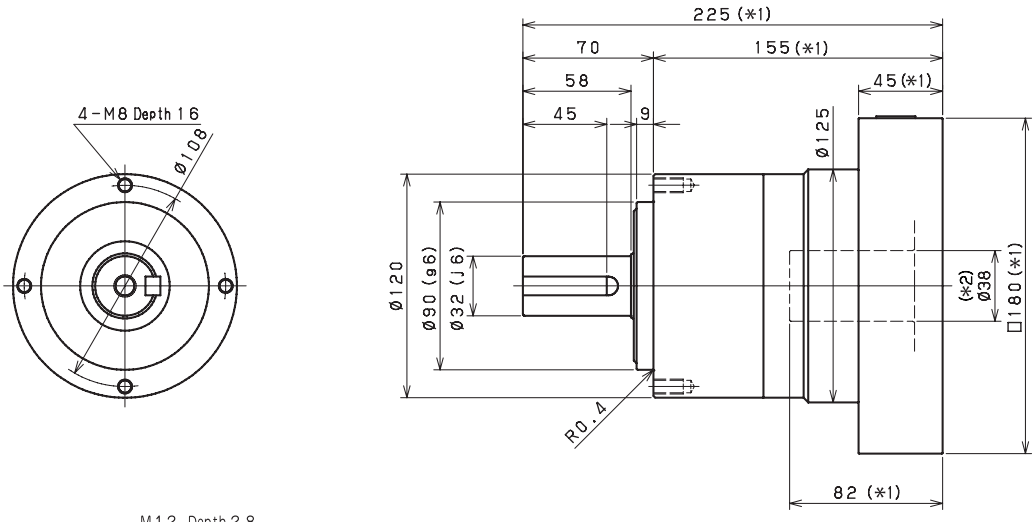
Input bore size ≦φ19 mm

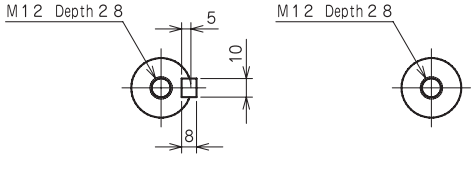


Input bore size ≦φ28 mm



Input bore size ≦φ38 mm





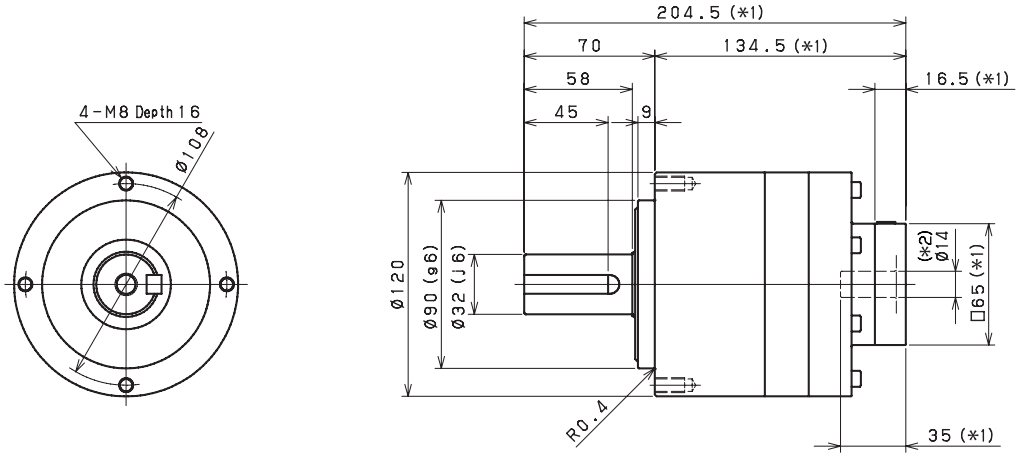
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

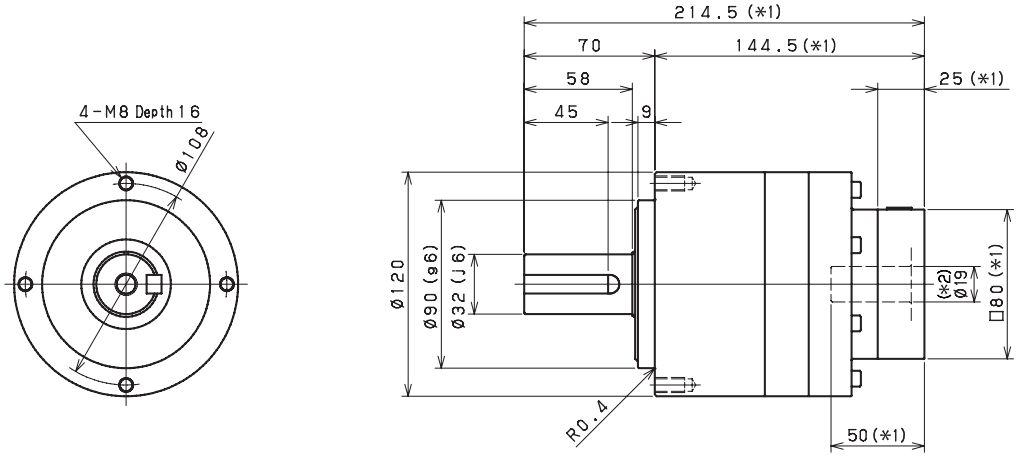
*2 Bushing will be inserted to adapt to motor shaft

VRL 120 2 Stage Dimensions

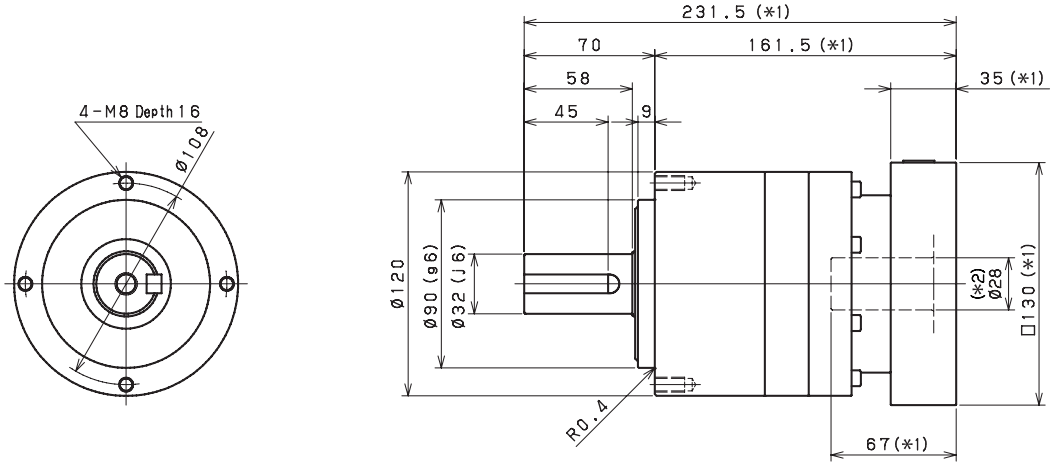
Input bore size ≦φ14 mm

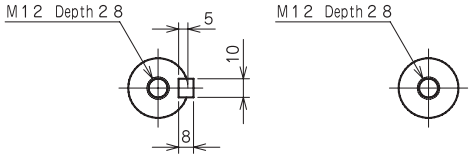


Input bore size ≦φ19 mm



Input bore size ≦φ28 mm (*3)





Keyed shaft Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 38mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRL 155 1 Stage Specifications

Frame Size	155									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	248	280	380	380	380	380	380	380
Maximum Acceleration Torque	[Nm]	*2	560	840	840	840	840	840	610	610
Maximum Torque	[Nm]	*3	630	1000	1000	950	950	950	730	730
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*5	2100	2100	2100	2100	2600	2600	2600	2600
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.63							
Maximum Radial Load	[N]	*8	9100							
Maximum Axial Load	[N]	*9	8200							
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	12	7.3	5.3	4.3	3.9	3.5	3.3	3.2
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	18	14	12	11	10	9.9	9.7	9.6
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	35	29	27	26	25	25	25	25
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	60							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	16							

VRL 155 2 Stage Specifications

Frame Size	155									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	360	380	410	590	590	440	590	500
Maximum Acceleration Torque	[Nm]	*2	560	840	840	840	840	560	840	840
Maximum Torque	[Nm]	*3	560	840	840	840	840	560	840	840
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1000	1250	1250
Nominal Input Speed	[rpm]	*5	2900	2900	2900	2900	2900	2900	2900	2900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.56							
Maximum Radial Load	[N]	*8	9100							
Maximum Axial Load	[N]	*9	8200							
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.6	3.5	2.4	2.4	3.3	1.1	2.3	1.1
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.4	5.3	4.2	4.1	5.1	2.9	4.1	2.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	11	12	10	10	11	9.2	10	9.1
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	26	27	25	25	26	24	25	24
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	60							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	18							

VRL 155 2 Stage Specifications

Frame Size	155								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	440	590	590	590	590	440	440
Maximum Acceleration Torque	[Nm]	*2	610	840	840	840	840	610	610
Maximum Torque	[Nm]	*3	610	840	840	840	840	610	610
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*5	2900	3200	3200	3900	3900	3900	3900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.56						
Maximum Radial Load	[N]	*8	9100						
Maximum Axial Load	[N]	*9	8200						
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	0.65	0.64	0.64	0.63	0.63	0.63
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.3	1.1	1.1	1.1	1.1	1.1	1.1
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.0	2.8	2.8	2.8	2.8	2.8	2.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	10	9.1	9.1	9.1	9.1	9.1	9.1
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	25	24	24	24	24	24	24
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	60						
Maximum Torsional Backlash	[arc-min]	--	≤ 5						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	18						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

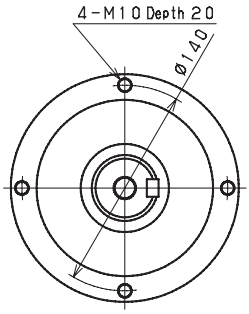
*12 Contact Nidec Drive Technology for the testing conditions and environment

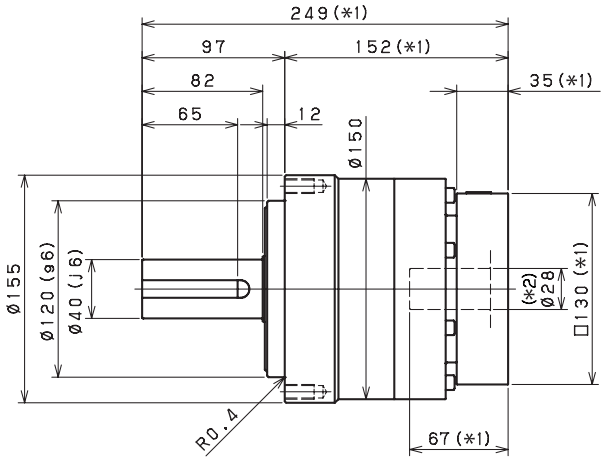
*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*14 Weight may vary slightly between models

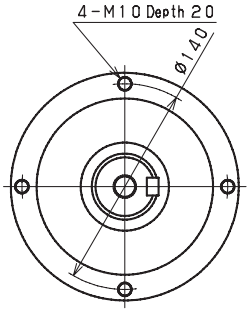
VRL 155 1-Stage Dimensions

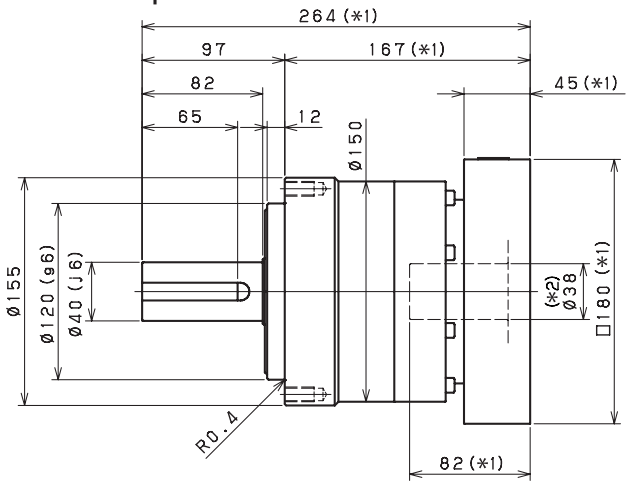
Input bore size ≦φ28 mm



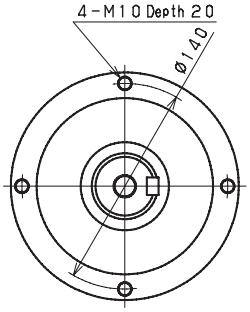


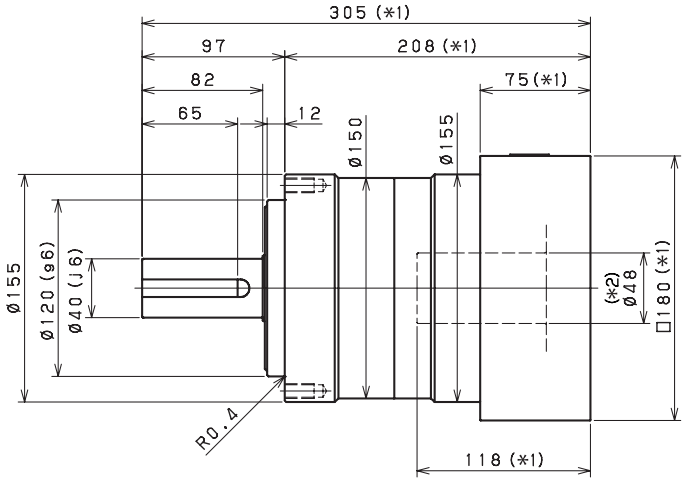
Input bore size ≦φ38 mm

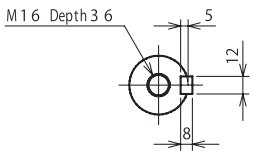




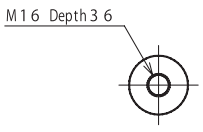
Input bore size ≦φ48 mm







Keyed shaft



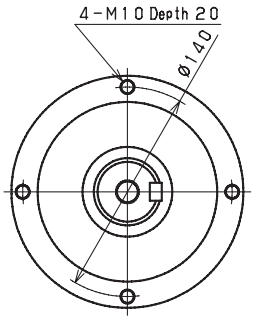
Smooth shaft

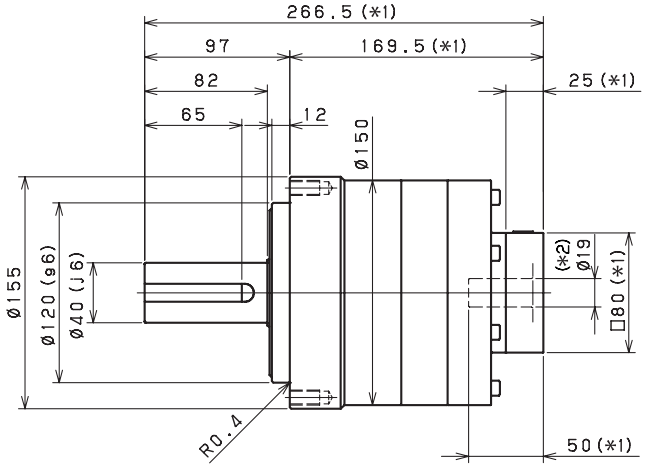
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

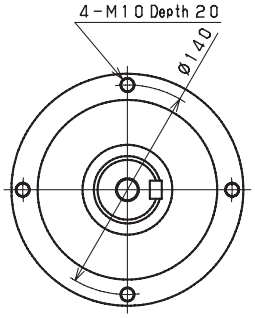
VRL 155 2-Stage Dimensions

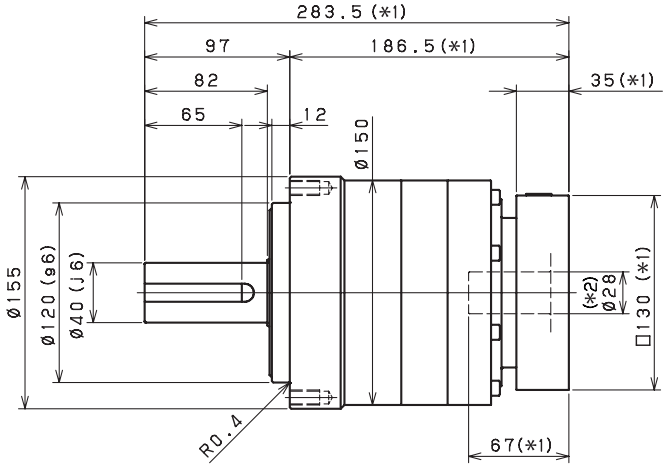
Input bore size ≦φ19 mm



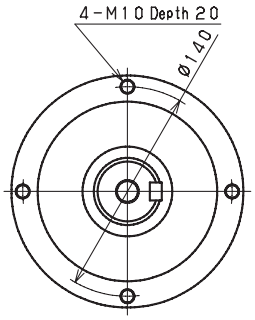


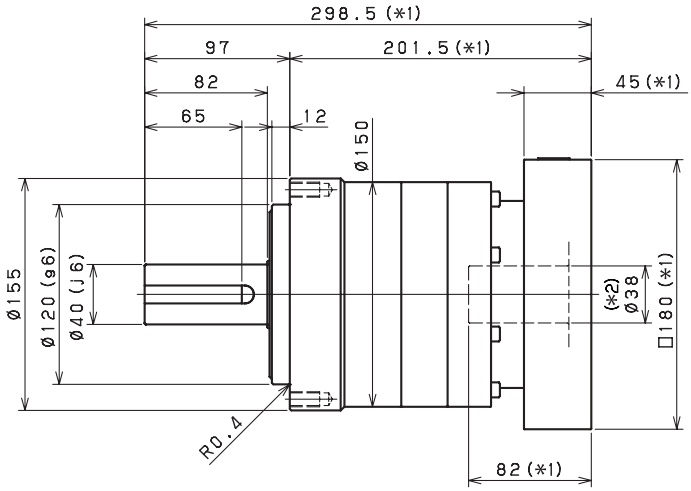
Input bore size ≦φ28 mm

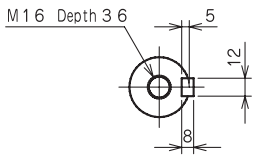




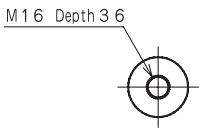
Input bore size ≦φ38 mm







Keyed shaft



Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 48mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRL 205 1-Stage Specifications

Frame Size	205									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	570	850	910	910	910	910	910	910
Maximum Acceleration Torque	[Nm]	*2	1300	1850	1850	1850	1850	1850	1350	1350
Maximum Torque	[Nm]	*3	1450	2250	2250	2150	2150	2150	1750	1750
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2750	2200	2200
Nominal Input Speed	[rpm]	*5	1500	1500	1500	1500	2300	2300	2300	2300
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	2.68							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	43	26	19	15	14	13	12	12
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	57	41	34	31	29	28	27	27
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	110	85	78	75	73	72	71	71
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	175							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	39							

VRL 205 2-Stage Specifications

Frame Size	205									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	660	850	910	1100	1300	930	1300	1200
Maximum Acceleration Torque	[Nm]	*2	1300	1850	1850	1850	1850	1300	1850	1850
Maximum Torque	[Nm]	*3	1300	1850	1850	1850	1850	1300	1850	1850
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2200	2750	2750
Nominal Input Speed	[rpm]	*5	2700	2700	2700	2700	2700	2700	2700	2700
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.39							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	8.8	11	8.1	7.9	11	4.0	7.6	3.9
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	15	18	14	14	17	10	14	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	30	33	29	29	32	25	29	25
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	175							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	40							

VRL 205 2-Stage Specifications

Frame Size	205								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	930	1300	1300	1300	1300	930	930
Maximum Acceleration Torque	[Nm]	*2	1350	1850	1850	1850	1850	1350	1350
Maximum Torque	[Nm]	*3	1350	1850	1850	1850	1850	1350	1350
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2200	2200
Nominal Input Speed	[rpm]	*5	2700	2900	2900	3400	3400	3400	3400
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.39						
Maximum Radial Load	[N]	*8	15000						
Maximum Axial Load	[N]	*9	14000						
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	1.9	1.9	1.8	1.8	1.8	1.8
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	7.6	3.8	3.8	3.8	3.7	3.7	3.7
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	14	10	10	10	10	10	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	29	25	25	25	25	25	25
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	175						
Maximum Torsional Backlash	[arc-min]	--	≤ 5						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	40						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

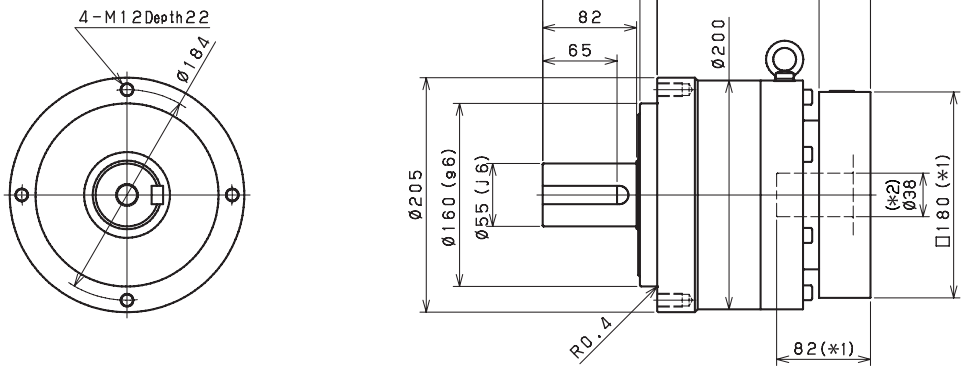
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

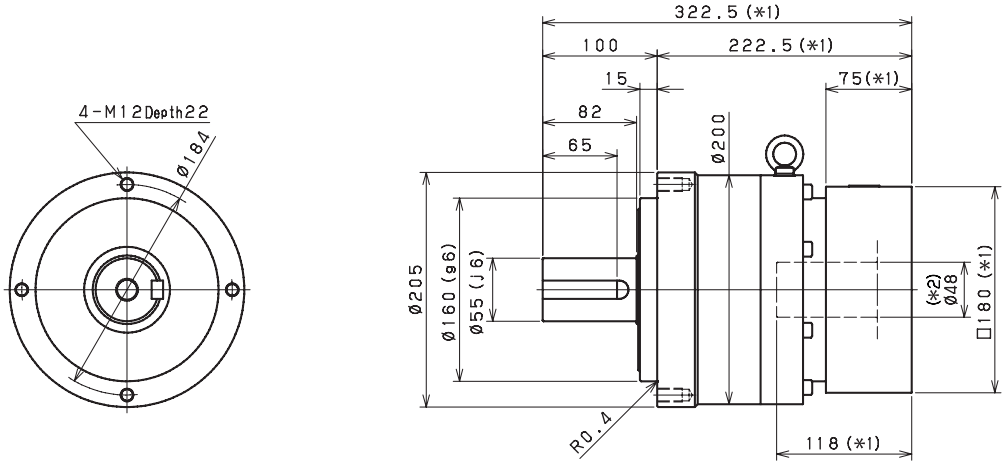
*14 Weight may vary slightly between models

VRL 205 1-Stage Dimensions

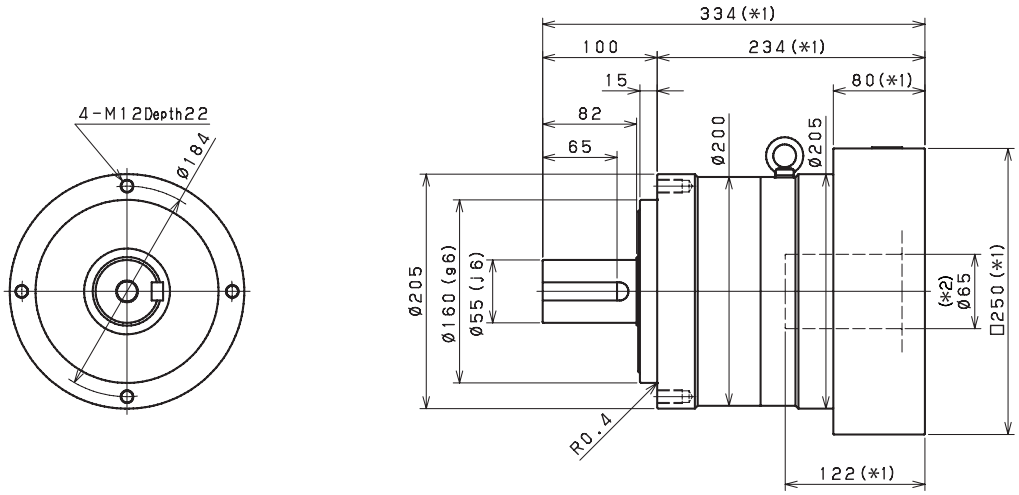
Input bore size ≦φ38 mm

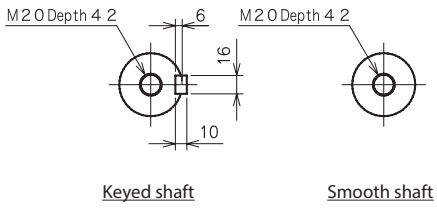


Input bore size ≦φ48 mm



Input bore size ≦φ65 mm





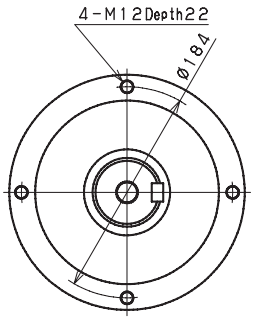
Keyed shaft Smooth shaft

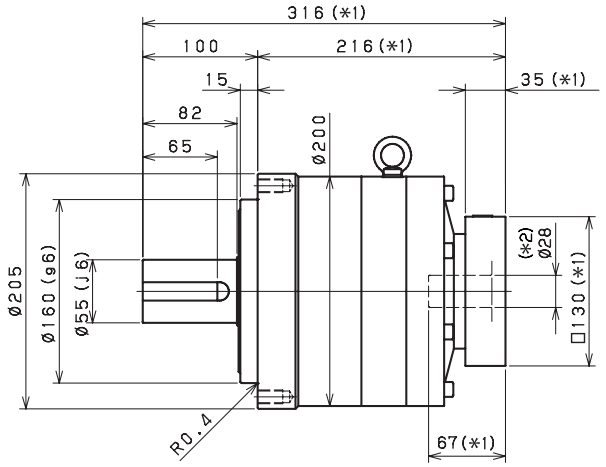
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

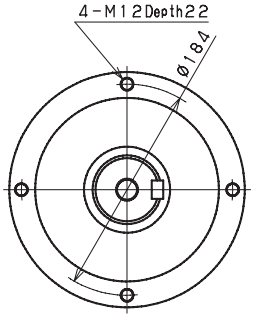
VRL 205 2-Stage Dimensions

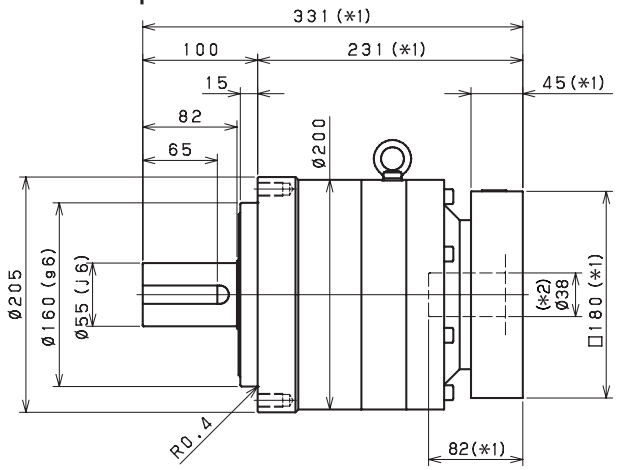
Input bore size ≦φ28 mm



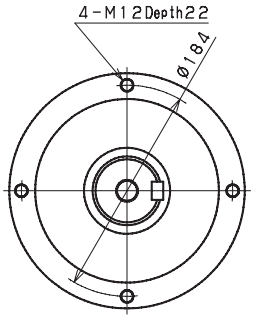


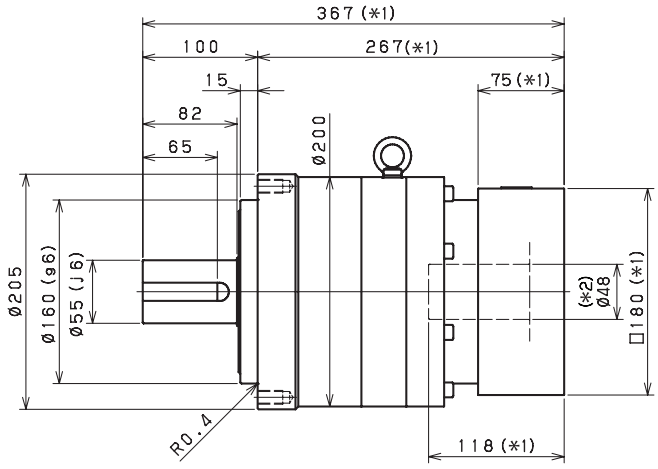
Input bore size ≦φ38 mm

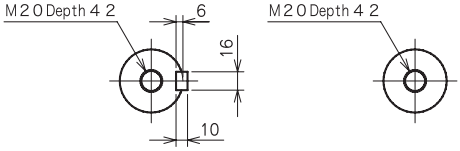




Input bore size ≦φ48 mm







Keyed shaft　　Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRL 235 1-Stage Specifications

Frame Size	235									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	980	1400	1400	1600	1700	1700	1700	1700
Maximum Acceleration Torque	[Nm]	*2	2000	2900	2900	2900	2900	2900	2600	2200
Maximum Torque	[Nm]	*3	2400	3700	3700	3500	3500	3400	3000	2700
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	5000	4000	4000
Nominal Input Speed	[rpm]	*5	1200	1200	1500	1500	1700	1700	2000	2000
Maximum Input Speed	[rpm]	*6	3000	3000	3000	3000	3000	3000	3000	3000
No Load Running Torque	[Nm]	*7	2.92							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	110	54	42	35	33	30	29	28
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	160	98	85	79	76	74	73	72
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	400							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	55							

VRL 235 2-Stage Specifications

Frame Size	235									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	1100	1400	1500	1800	2000	1300	2000	2000
Maximum Acceleration Torque	[Nm]	*2	2000	2900	2900	2900	2900	2000	2900	2900
Maximum Torque	[Nm]	*3	2000	2900	2900	2900	2900	2000	2900	2900
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	4000	5000	5000
Nominal Input Speed	[rpm]	*5	2200	2200	2200	2200	2200	2200	2200	2200
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.14							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	20	24	19	18	23	12	18	12
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	34	39	33	33	37	26	32	26
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	400							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	57							

VRL 235 2-Stage Specifications

Frame Size	235								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	1300	2000	2000	2000	2000	1300	1300
Maximum Acceleration Torque	[Nm]	*2	1800	2900	2900	2900	2500	1800	1600
Maximum Torque	[Nm]	*3	1800	2900	2900	2900	2500	1800	1600
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	4000	4000
Nominal Input Speed	[rpm]	*5	2200	2500	2500	3000	3000	3000	3000
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.14						
Maximum Radial Load	[N]	*8	15000						
Maximum Axial Load	[N]	*9	14000						
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	4.7	4.7	4.6	4.6	4.6	4.6
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	18	12	11	11	11	11	11
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	32	26	26	26	26	26	26
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	400						
Maximum Torsional Backlash	[arc-min]	--	≤ 5						
Noise Level	dB [A]	*12	≤ 61						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	57						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

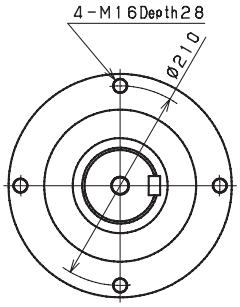
*12 Contact Nidec Drive Technology for the testing conditions and environment

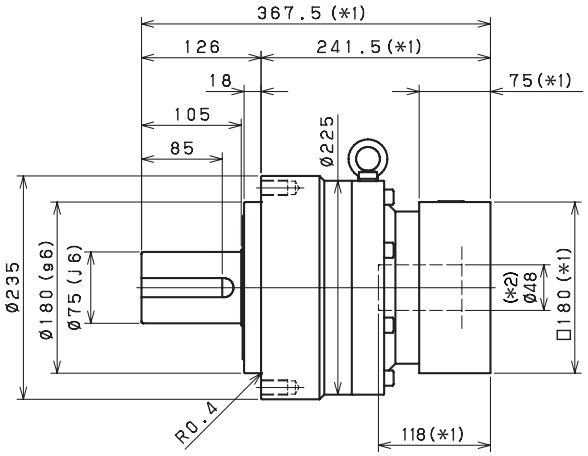
*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*14 Weight may vary slightly between models

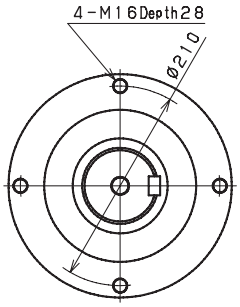
VRL 235 1-Stage Dimensions

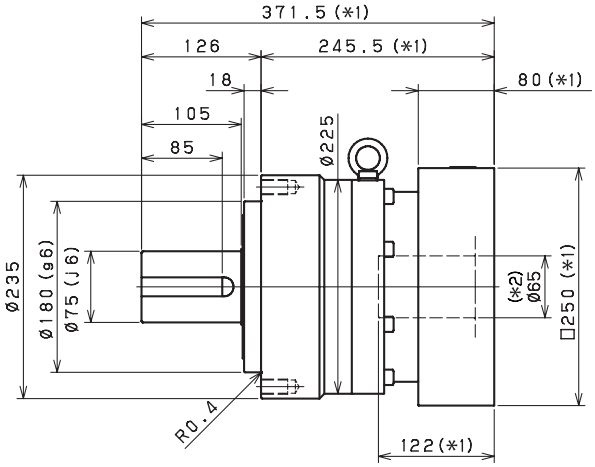
Input bore size ≦φ48 mm

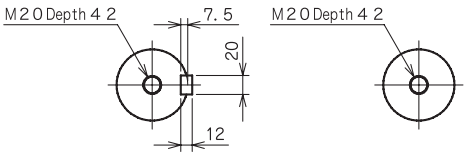




Input bore size ≦φ65 mm







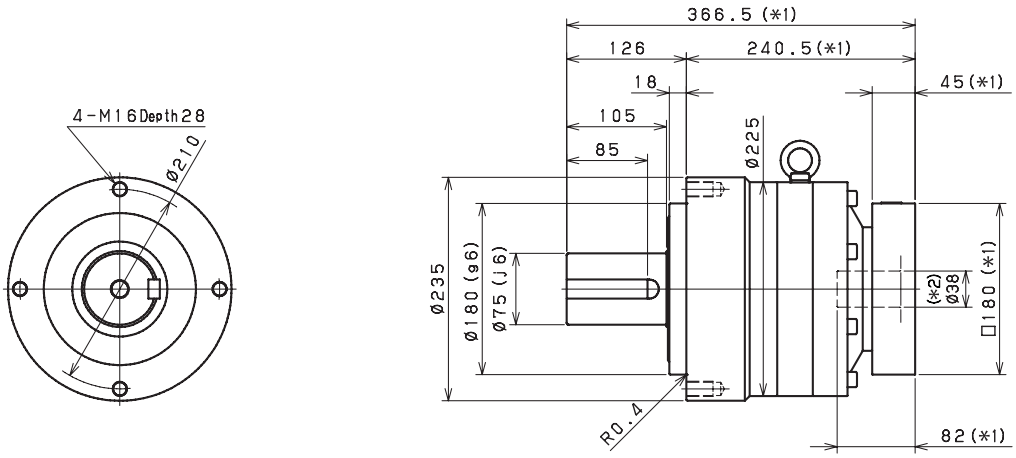
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

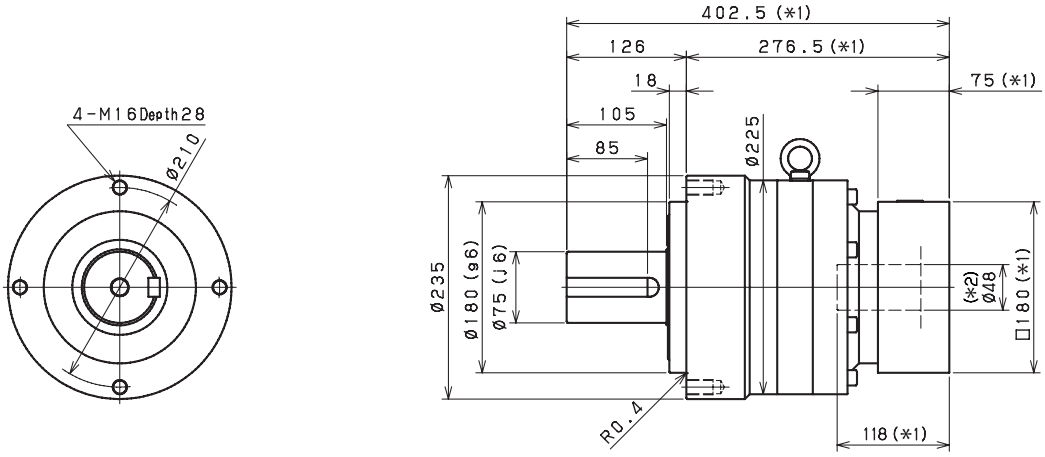
*2 Bushing will be inserted to adapt to motor shaft

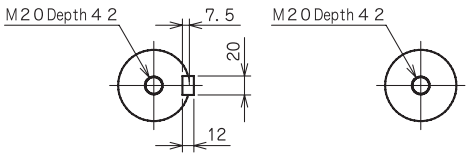
VRL 235 2-Stage Dimensions

Input bore size ≦φ38 mm



Input bore size ≦φ48 mm





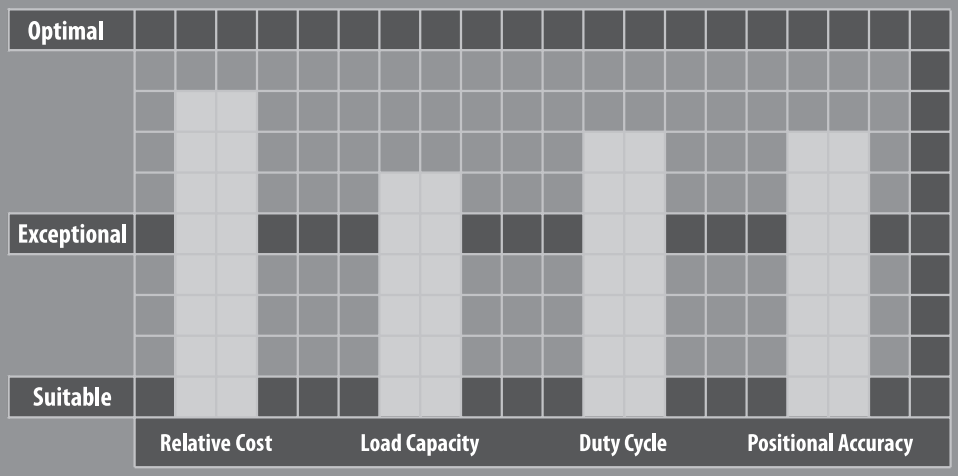
*1 Length will vary depending on motor

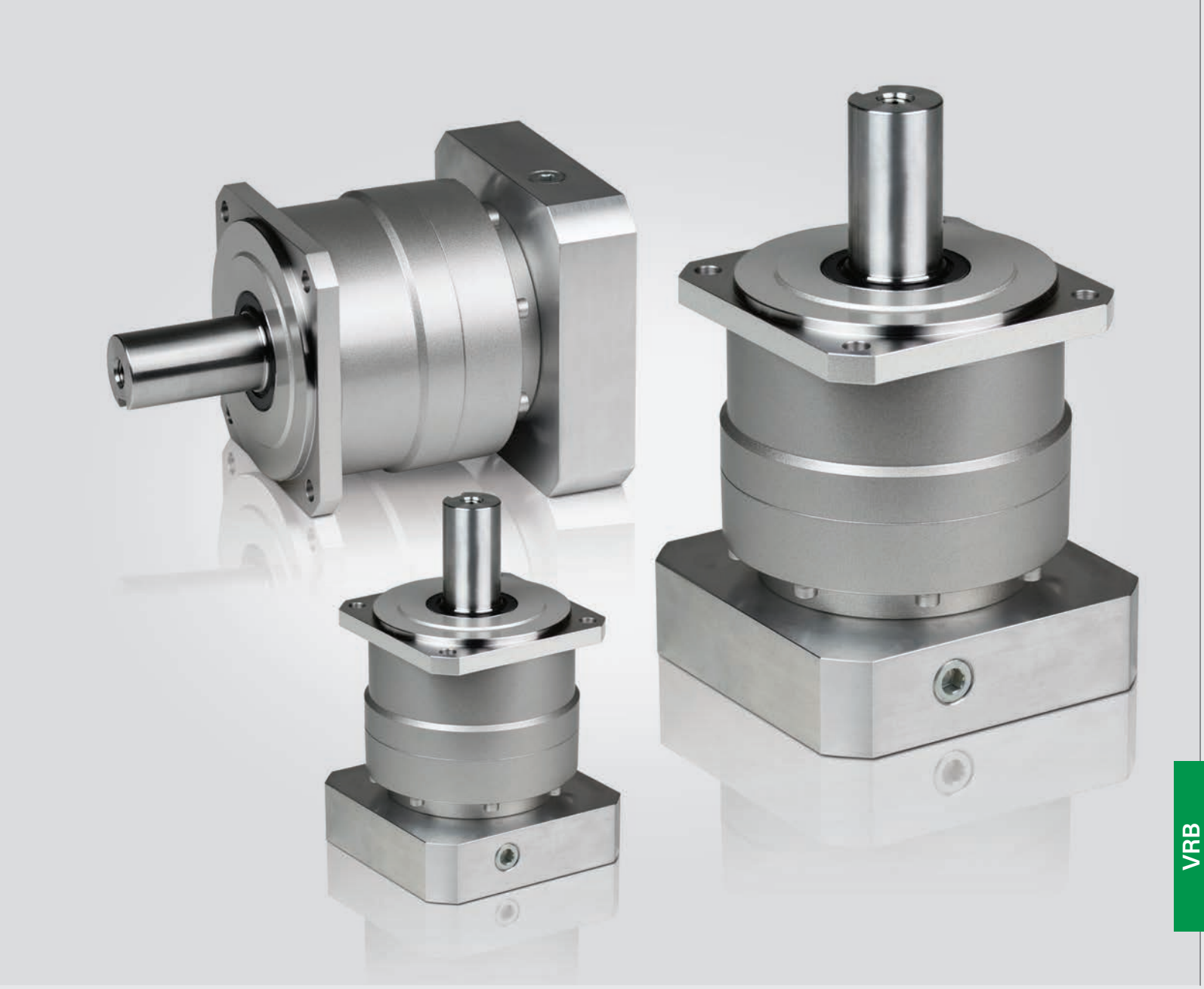
*2 Bushing will be inserted to adapt to motor shaft

VRB SERIES

A valuable alternative for applications requiring high positional accuracy and dynamic performance. The VRB is a <3 arc-min gear reducer that offers a through hole mounting design, making it easier to assemble onto various equipment. This product is an ideal fit for various belt drive and actuator applications found throughout the packaging and assembly cell automation markets.

Various standard wash down and food grade options are available, making the VRB an attractive choice for the toughest environments. We offer the broadest selection of frame sizes and ratios, with immediate availability on most configurations. Industry standard mounting dimensions allow the VRB to be employed in legacy equipment designs, saving our customers time and money.

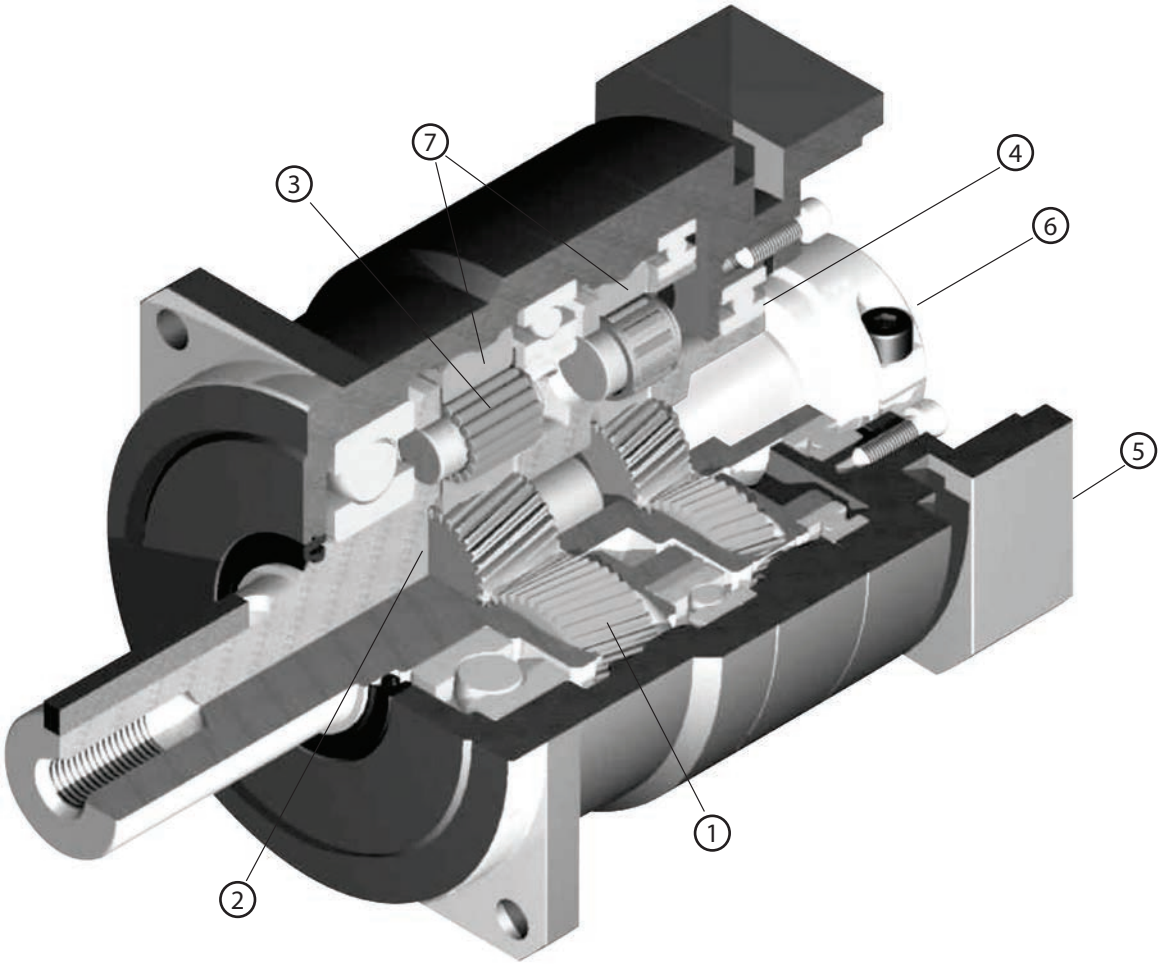




VRB SERIES

- Exceptional value for high end motion control applications with demanding accuracy requirements
- The widest range of frame sizes and ratios available in the market
- Best-In-class backlash (≤3 arc-min)
- Broad range of mounting adapters offer a simple, precise attachment to any motor
- Maintenance-free solution that is lubricated for life. High performance grease allows flexible mounting in any orientation
- Industry standard through-bolt mounting style
- Assembled in the USA, with immediate delivery

VRB Series Features



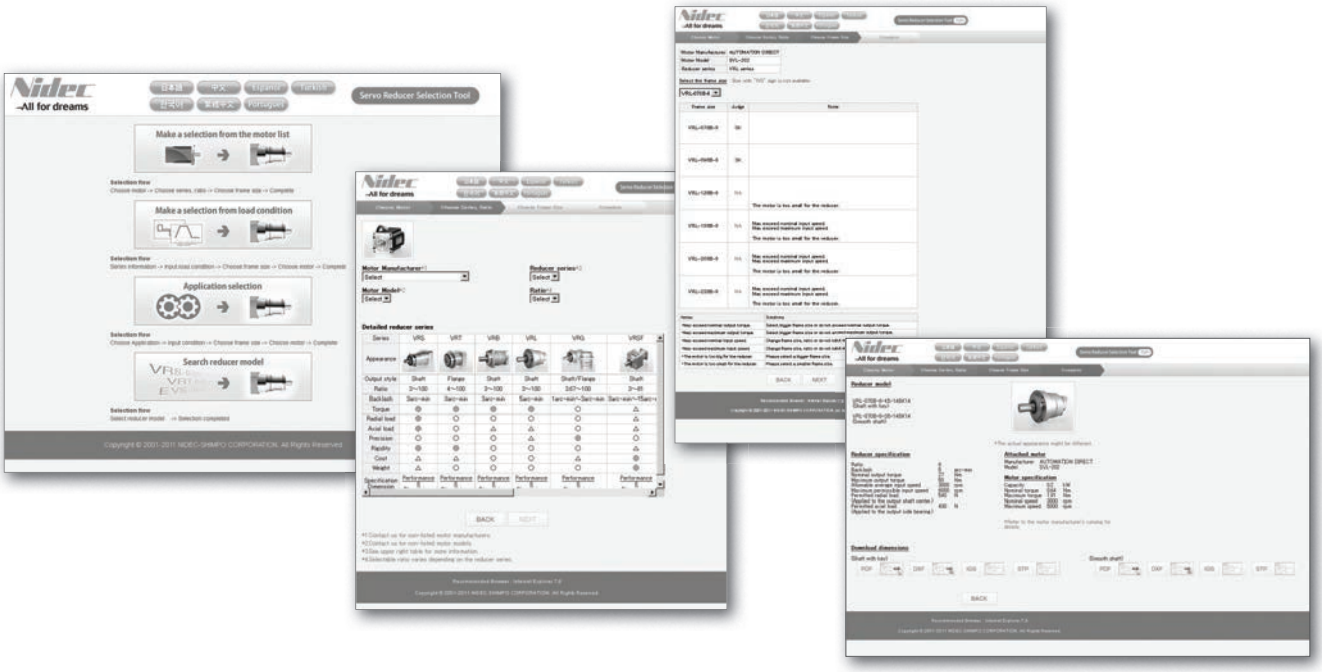
1. Carburized helical gears with proprietary secondary finishing process for higher accuracy and smooth, quiet operation. 40% higher tooth surface area than the industry standard
2. One piece output shaft and planet carrier with two bearings straddling the planet gears. Higher stiffness, torque capacity and safety factor, with guaranteed alignment of gearing
3. Uncaged needle roller bearings provide excellent torque density and torsional rigidity. 43% larger bearing surface area compared to the rest of the industry
4. Unique labyrinth input seal design greatly reduces heat and increases system efficiency. IP65 protection is available for wash down applications
5. Optimized mounting system with active centering on motor pilot diameter guarantees alignment of motor. Motor can be installed in any orientation
6. True concentric motor shaft clamping connection, optimized for your specific motor. Reduced inertia for dynamic performance and balanced for high speed operation
7. Ring gear machined directly into the housing, not welded or pressed in. Provides greater concentricity and elimination of speed fluctuation

VRB Series Model Code

VRB	—	090	C	—	7	—	K	3	—	19HB16
Series Name		Frame Size	Design Version		Ratio		Output Mounting Style	Backlash		Motor Mounting Code
VRB		042 060 090 115 140 180 220	Design Version		1 Stage: 3 4 5 6 7 8 9 10 2 Stage: 15 16 20 25 28 30 35 40 45 50 60 70 80 90 100		K: Keyed Shaft S: Smooth shaft	≤3 arc-min		Motor mounting code varies depending on the motor

* Use the selection tool link below to configure the code

Contact us for additional information or refer to our online gearhead selection tool.
Selection tool https://www.nidec-drivetechnology.co.jp/selection/all/



VRB 042 1-Stage Specifications

Frame Size	042									
Ratio	**Units**	**Notes**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	6	9	10	10	10	10	10	10
Maximum Acceleration Torque	[Nm]	*2	14	21	21	21	21	21	14	14
Maximum Torque	[Nm]	*3	17	25	25	25	25	25	17	17
Emergency Stop Torque	[Nm]	*4	30	35	35	35	35	35	30	30
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8000	8000	8000	8000	8000	8000	8000	8000
No Load Running Torque	[Nm]	*7	0.03							
Maximum Radial Load	[N]	*8	710							
Maximum Axial Load	[N]	*9	640							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.053	0.041	0.036	0.034	0.032	0.031	0.031	0.030
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	2							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	0.6							

VRB 042 2-Stage Specifications

Frame Size	042									
Ratio	**Units**	**Notes**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	9	14	14	15	15	11	15	15
Maximum Acceleration Torque	[Nm]	*2	14	21	21	21	21	14	21	21
Maximum Torque	[Nm]	*3	14	21	21	21	21	14	21	21
Emergency Stop Torque	[Nm]	*4	30	35	35	35	35	30	35	35
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.01							
Maximum Radial Load	[N]	*8	710							
Maximum Axial Load	[N]	*9	640							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.035	0.038	0.034	0.034	0.038	0.030	0.034	0.030
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	2							
Maximum Torsional Backlash	[arc-min]	--	≤ 5							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	0.7							

VRB 042 2-Stage Specifications

Frame Size	042								
Ratio	**Units**	**Notes**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	11	15	15	15	15	11	11
Maximum Acceleration Torque	[Nm]	*2	14	21	21	21	21	14	14
Maximum Torque	[Nm]	*3	14	21	21	21	21	14	14
Emergency Stop Torque	[Nm]	*4	30	35	35	35	35	30	30
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.01						
Maximum Radial Load	[N]	*8	710						
Maximum Axial Load	[N]	*9	640						
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.034	0.030	0.030	0.030	0.030	0.030	0.030
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	2						
Maximum Torsional Backlash	[arc-min]	--	≤ 5						
Noise Level	dB [A]	*12	≤ 61						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	0.7						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

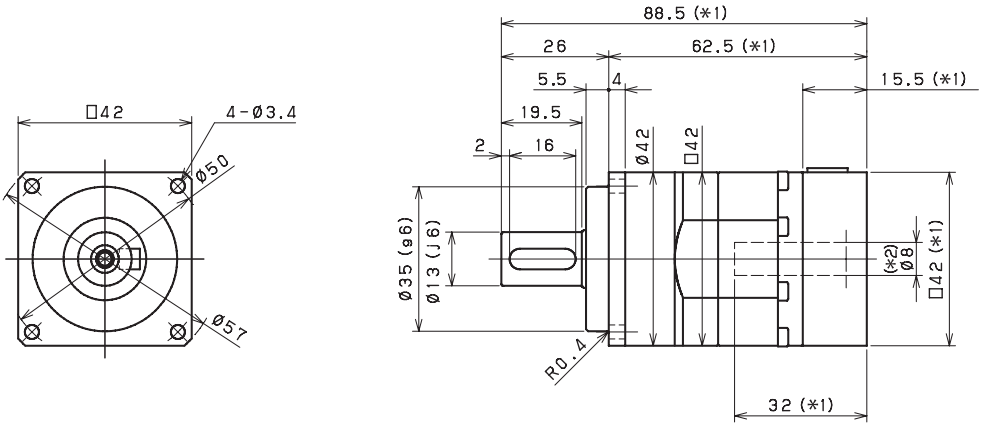
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

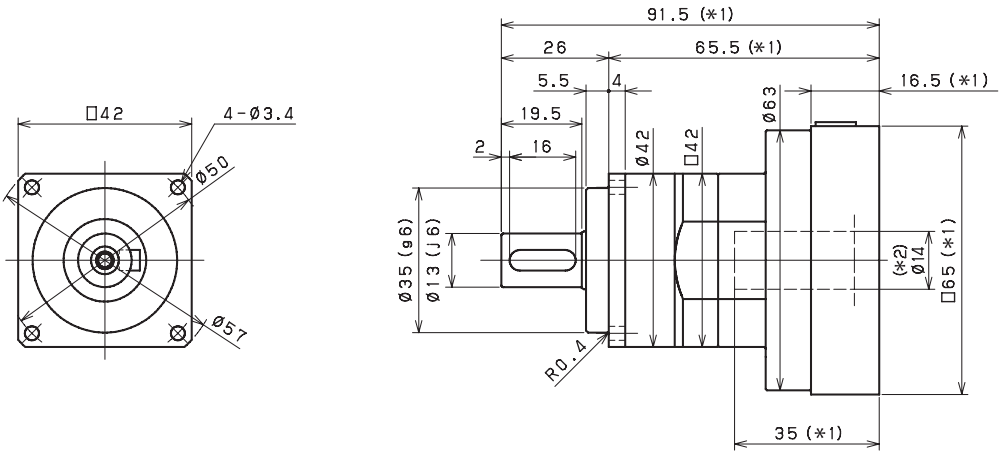
*14 Weight may vary slightly between models

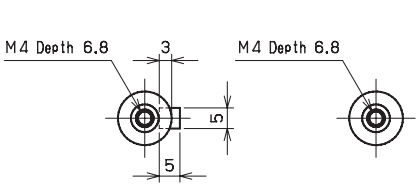
VRB 042 1-Stage Dimensions

Input bore size ≦φ8 mm

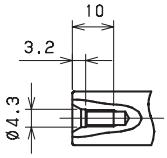


Input bore size ≦φ14 mm





Keyed shaft Smooth shaft

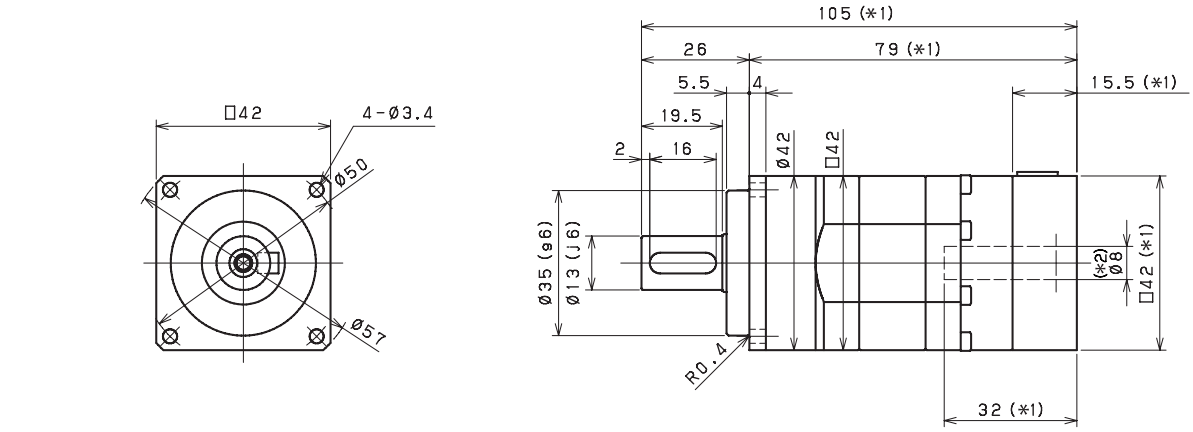


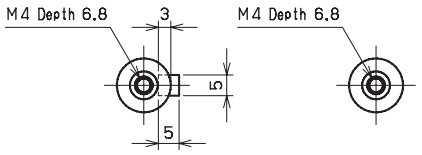
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

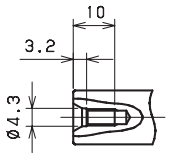
VRB 042 2-Stage Dimensions

Input bore size ≦φ8 mm





Keyed shaft Smooth shaft



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRB 060 1-Stage Specifications

Frame Size	060									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	19	27	28	28	28	28	28	28
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	55	79	79	79	79	76	55	55
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	3300	3300	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.15							
Maximum Radial Load	[N]	*8	1200							
Maximum Axial Load	[N]	*9	1100							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.14	0.095	0.077	0.068	0.062	0.059	0.057	0.056
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.25	0.21	0.19	0.18	0.17	0.17	0.17	0.17
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.53	0.48	0.46	0.46	0.45	0.45	0.44	0.44
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	3							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 66							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	1.4							

VRB 060 2-Stage Specifications

Frame Size	060									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	25	32	32	43	45	32	45	45
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	46	66	66
Maximum Torque	[Nm]	*3	46	66	66	66	66	46	66	66
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	80	100	100
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04							
Maximum Radial Load	[N]	*8	1200							
Maximum Axial Load	[N]	*9	1100							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.064	0.070	0.062	0.061	0.068	0.051	0.061	0.051
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.18	0.18	0.17	0.17	0.18	0.16	0.17	0.16
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.45	0.46	0.45	0.45	0.46	0.44	0.45	0.44
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	3							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 66							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	1.6							

VRB 060 2-Stage Specifications

Frame Size	060								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	32	45	45	45	45	32	32
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	46	66	66	66	66	46	46
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	4000	4800	4800	5500	5500	5500	5500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04						
Maximum Radial Load	[N]	*8	1200						
Maximum Axial Load	[N]	*9	1100						
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.061	0.051	0.051	0.051	0.051	0.051	0.051
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.17	0.16	0.16	0.16	0.16	0.16	0.16
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.45	0.44	0.44	0.44	0.44	0.44	0.44
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	3						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 66						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	1.6						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

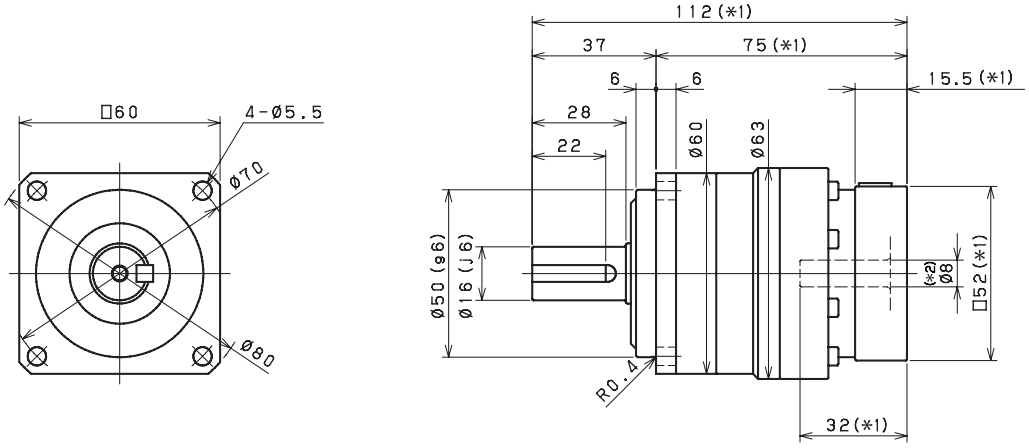
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

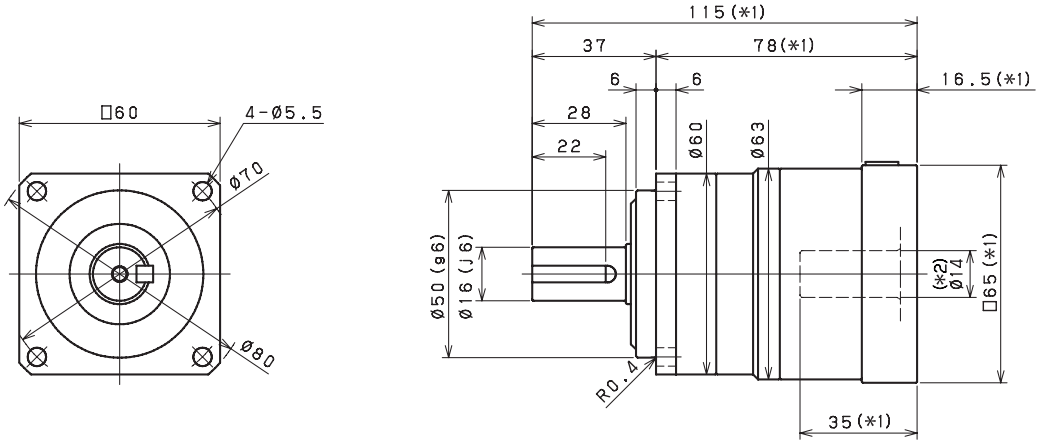
*14 Weight may vary slightly between models

VRB 060 1-Stage Dimensions

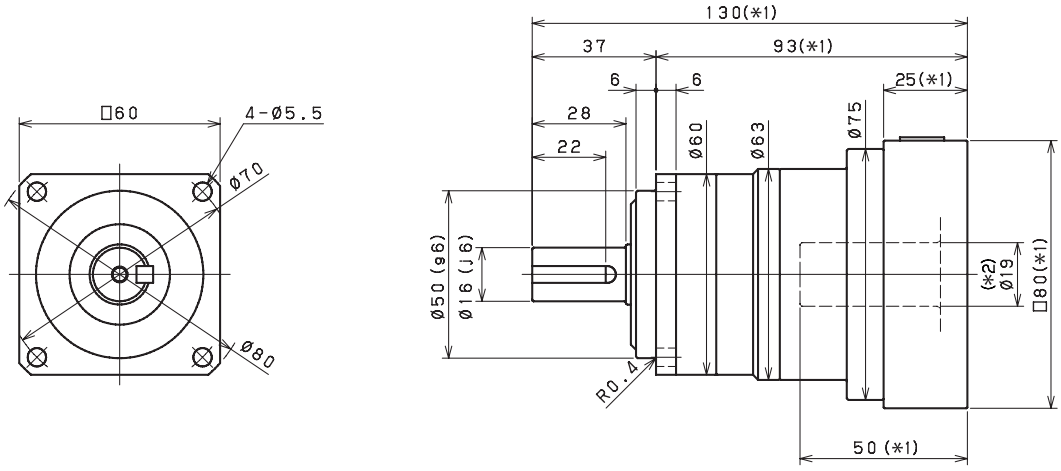
Input bore size ≦φ8 mm

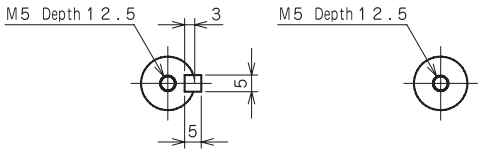


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm





Keyed shaft

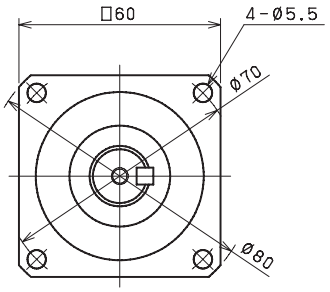
Smooth shaft

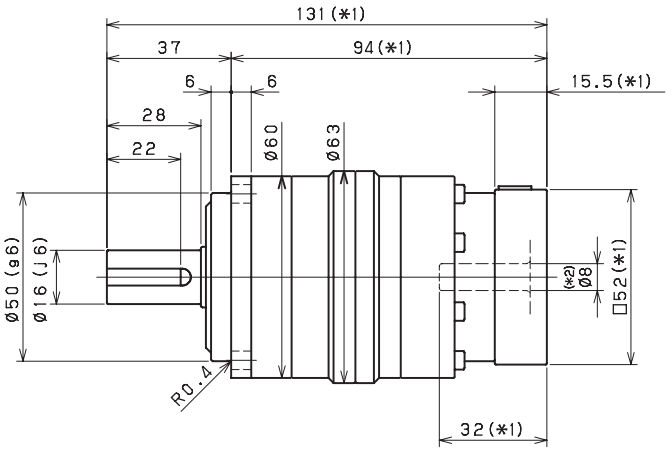
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

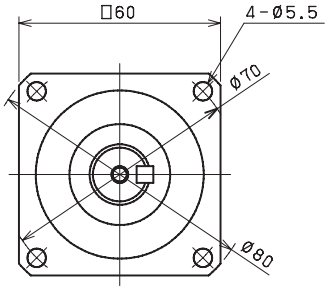
VRB 060 2-Stage Dimensions

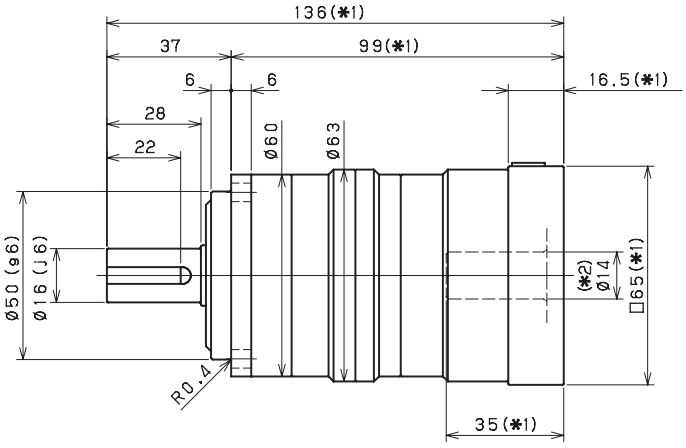
Input bore size ≦φ8 mm



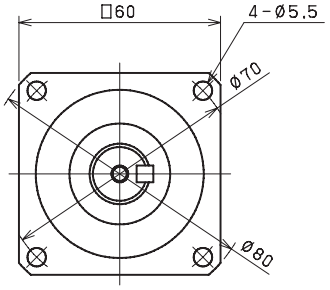


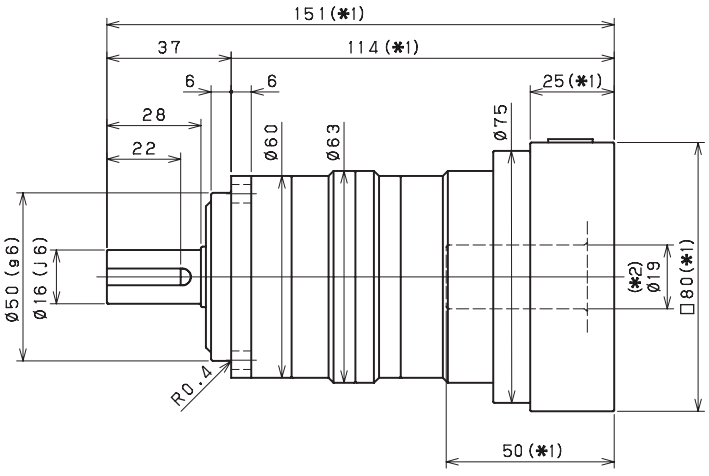
Input bore size ≦φ14 mm

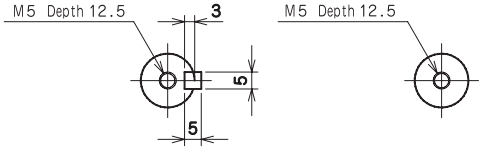




Input bore size ≦φ19 mm







Keyed shaft　　Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRB 090 1-Stage Specifications

Frame Size	090									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	53	77	84	84	84	84	84	84
Maximum Acceleration Torque	[Nm]	*2	108	165	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	135	200	200	195	195	190	145	145
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	2900	2900	2900	2900	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.35							
Maximum Radial Load	[N]	*8	2400							
Maximum Axial Load	[N]	*9	2200							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.72	0.50	0.41	0.36	0.33	0.31	0.30	0.30
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	0.90	0.80	0.75	0.73	0.71	0.70	0.70
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.9	2.7	2.6	2.5	2.5	2.5	2.5	2.5
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	10							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	3.7							

VRB 090 2-Stage Specifications

Frame Size	090									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	65	80	86	106	118	88	118	118
Maximum Acceleration Torque	[Nm]	*2	108	165	165	165	165	108	165	165
Maximum Torque	[Nm]	*3	108	165	165	165	165	108	165	165
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	200	250	250
Nominal Input Speed	[rpm]	*5	3500	3500	3500	3500	3500	3500	3500	3500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.06							
Maximum Radial Load	[N]	*8	2400							
Maximum Axial Load	[N]	*9	2200							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.20	0.25	0.19	0.19	0.24	0.12	0.18	0.11
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.36	0.41	0.35	0.35	0.4	0.28	0.35	0.28
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.75	0.79	0.74	0.74	0.78	0.67	0.73	0.67
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.4
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	10							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	4.2							

VRB 090 2-Stage Specifications

Frame Size	090								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	88	118	118	118	118	88	88
Maximum Acceleration Torque	[Nm]	*2	112	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	112	165	165	165	165	112	112
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	3500	3800	3800	4500	4500	4500	4500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.06						
Maximum Radial Load	[N]	*8	2400						
Maximum Axial Load	[N]	*9	2200						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.18	0.11	0.11	0.11	0.11	0.11	0.11
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.73	0.67	0.67	0.67	0.67	0.67	0.67
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.5	2.4	2.4	2.4	2.4	2.4	2.4
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	10						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	4.2						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor **f_0**, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

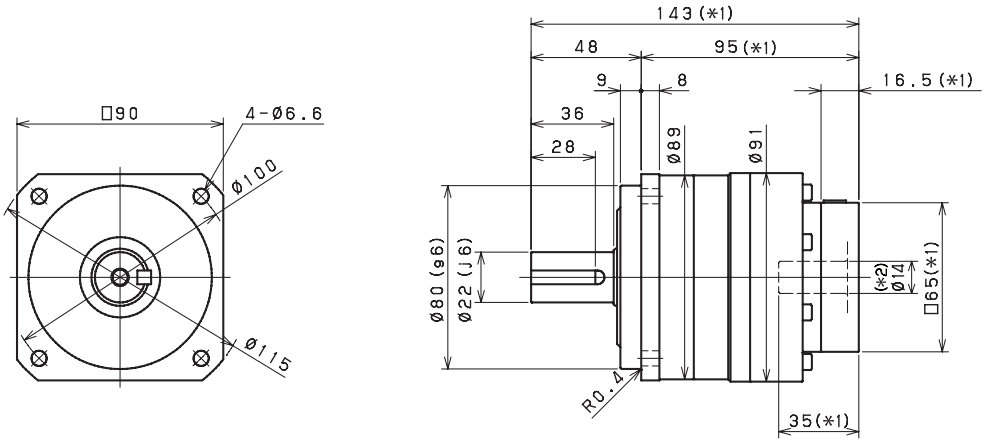
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

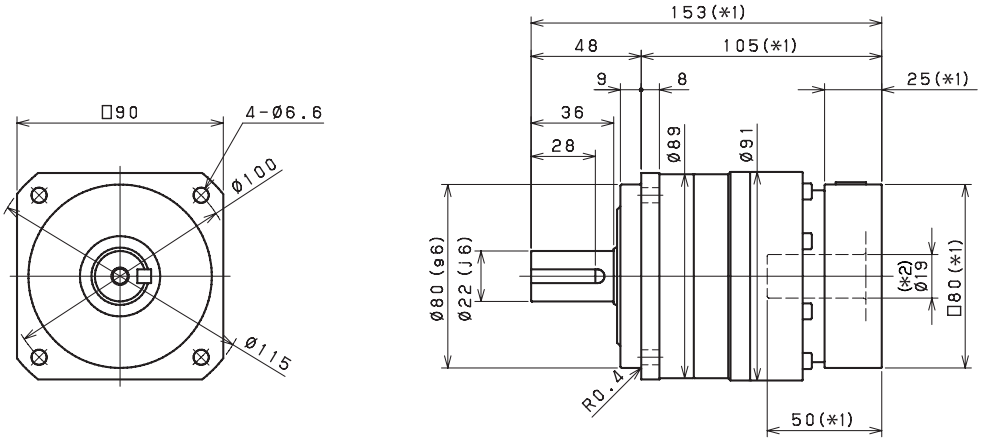
*14 Weight may vary slightly between models

VRB 090 1-Stage Dimensions

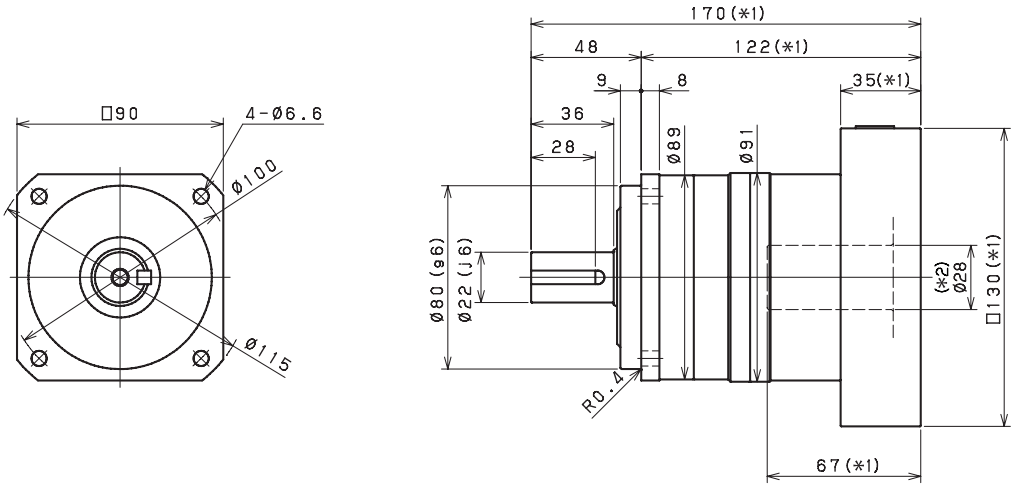
Input bore size ≦φ14 mm

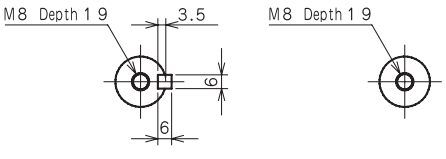


Input bore size ≦φ19 mm



Input bore size ≦φ28 mm





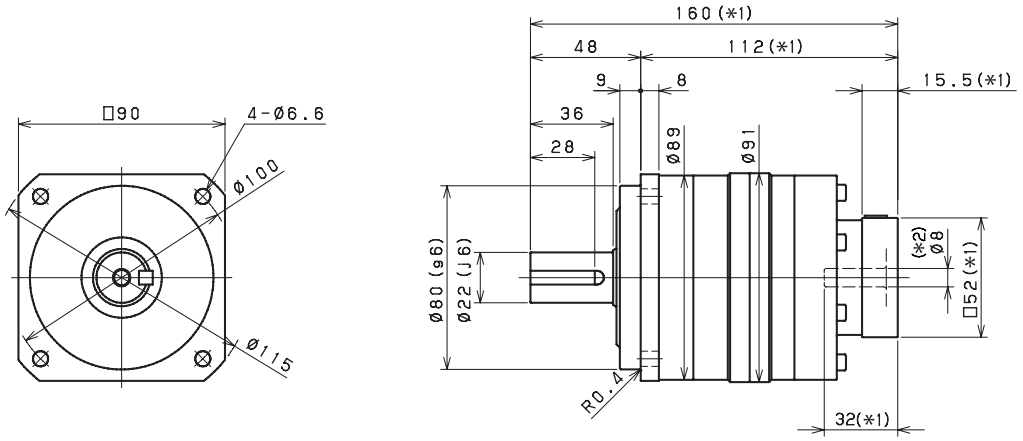
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

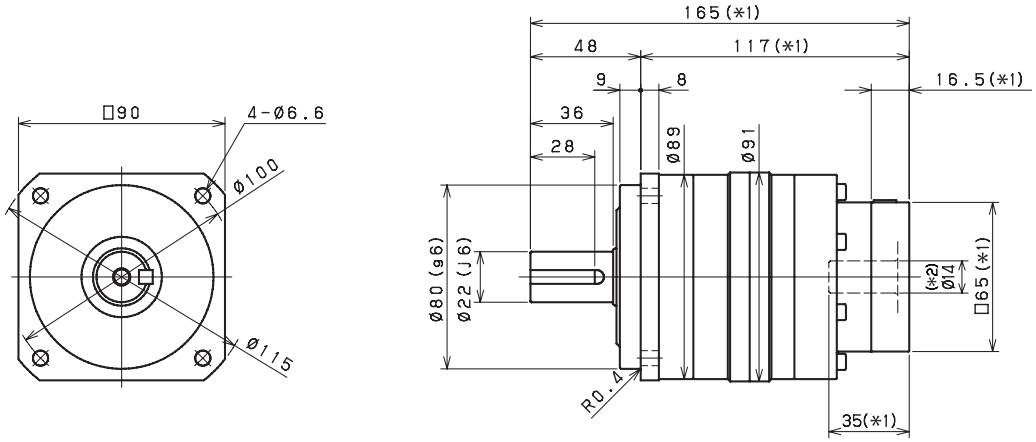
*2 Bushing will be inserted to adapt to motor shaft

VRB 090 2-Stage Dimensions

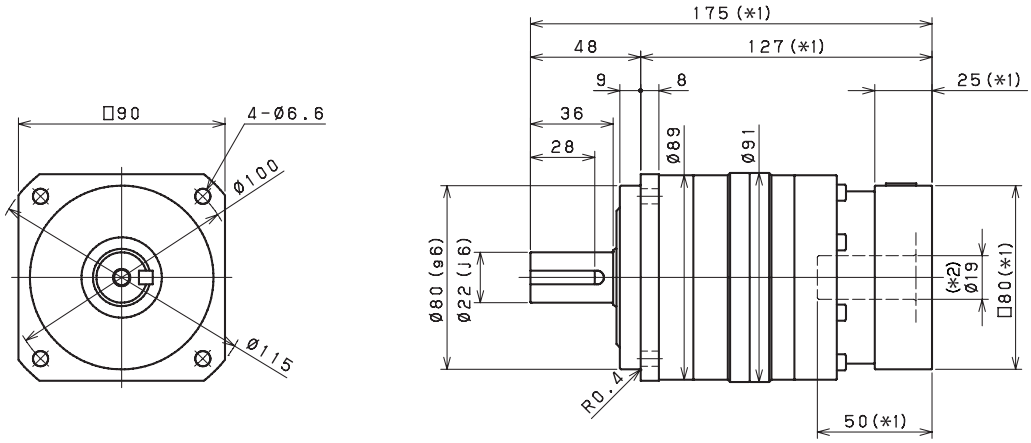
Input bore size ≦φ8 mm

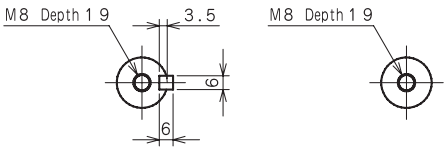


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm (*3)





Keyed shaft

Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 28mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRB 115 1-Stage Specifications

Frame Size	115									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	128	146	190	190	190	190	190	190
Maximum Acceleration Torque	[Nm]	*2	270	390	390	390	390	390	292	292
Maximum Torque (new)	--	*3	340	490	490	480	480	480	370	370
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	625	500	500
Nominal Input Speed	[rpm]	*5	2800	2800	2800	2800	2800	2800	2800	2800
Maximum Input Speed	[rpm]	*6	5500	5500	5500	5500	5500	5500	5500	5500
No Load Running Torque	[Nm]	*7	1.30							
Maximum Radial Load	[N]	*8	4300							
Maximum Axial Load	[N]	*9	3900							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	3.2	2.0	1.4	1.2	1.0	0.92	0.86	0.83
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	5.1	3.7	3.1	2.9	2.8	2.7	2.6	2.6
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	12	10	9.5	9.3	9.1	9.0	8.9	8.9
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	31							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 71							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	8							

VRB 115 2-Stage Specifications

Frame Size	115									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	174	200	220	280	280	220	280	270
Maximum Acceleration Torque	[Nm]	*2	270	390	390	390	390	270	390	390
Maximum Torque (new)	--	*3	270	390	390	390	390	270	390	390
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	500	625	625
Nominal Input Speed	[rpm]	*5	3100	3100	3100	3100	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.42							
Maximum Radial Load	[N]	*8	4300							
Maximum Axial Load	[N]	*9	3900							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.77	0.98	0.72	0.70	0.92	0.38	0.68	0.37
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.2	1.4	1.1	1.1	1.3	0.78	1.1	0.77
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.9	3.1	2.8	2.8	3.0	2.5	2.8	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.2	9.4	9.1	9.1	9.3	8.8	9.1	8.8
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	31							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 71							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	8.9							

VRB 115 2-Stage Specifications

Frame Size	115								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	220	280	280	280	280	220	220
Maximum Acceleration Torque	[Nm]	*2	292	390	390	390	390	292	292
Maximum Torque (new)	--	*3	292	390	390	390	390	292	292
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	500	500
Nominal Input Speed	[rpm]	*5	3100	3500	3500	4200	4200	4200	4200
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.42						
Maximum Radial Load	[N]	*8	4300						
Maximum Axial Load	[N]	*9	3900						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	0.19	0.19	0.19	0.19	0.19	0.19
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.68	0.36	0.36	0.36	0.36	0.36	0.36
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	0.76	0.76	0.76	0.76	0.76	0.76
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.8	2.5	2.5	2.5	2.5	2.5	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.1	8.8	8.8	8.8	8.8	8.8	8.8
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	31						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 71						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	8.9						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

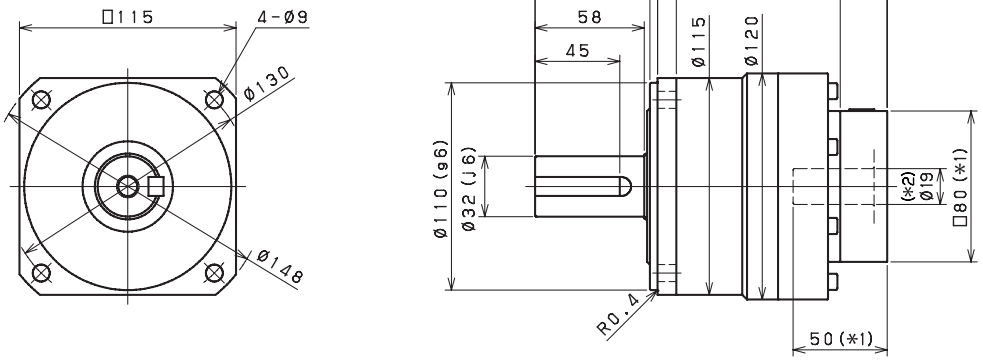
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

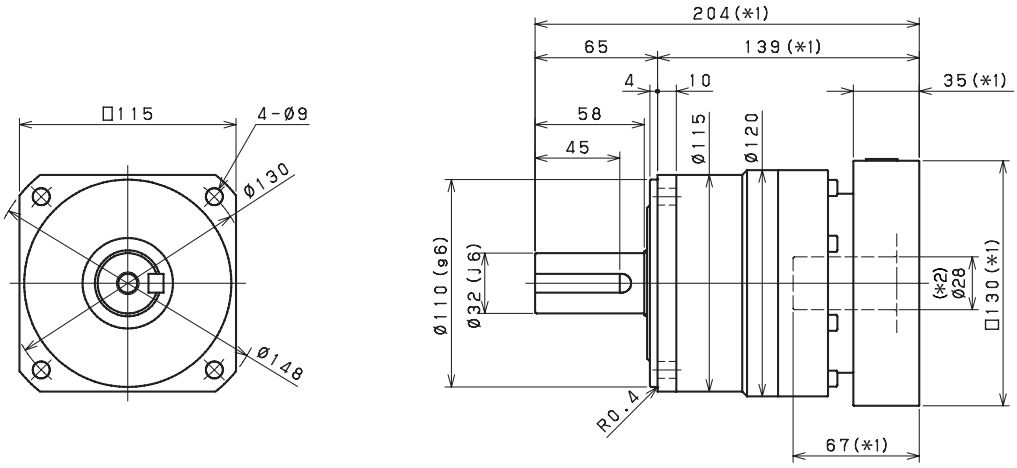
*14 Weight may vary slightly between models

VRB 115 1-Stage Dimensions

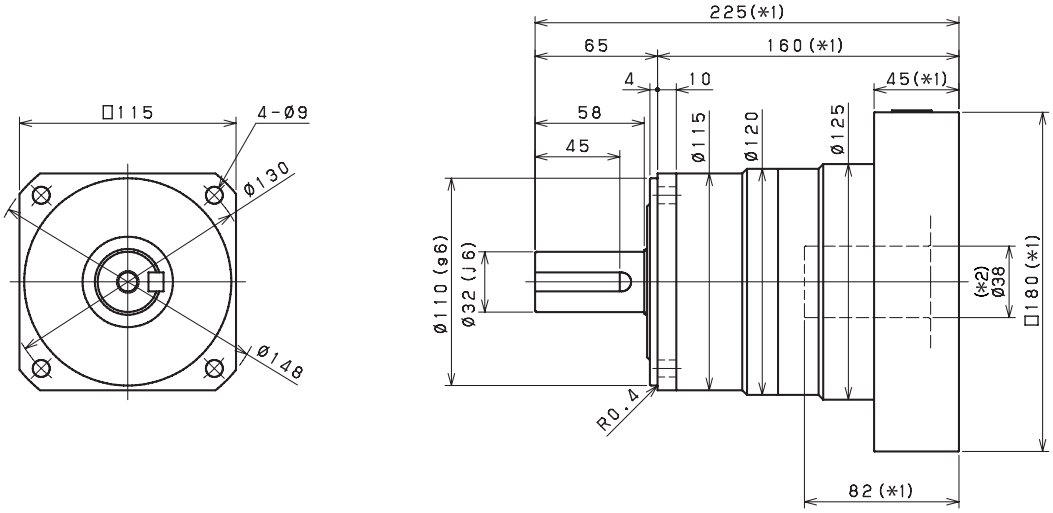
Input bore size ≦φ19 mm

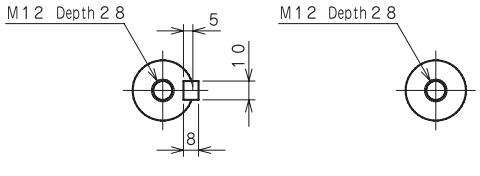


Input bore size ≦φ28 mm



Input bore size ≦φ38 mm





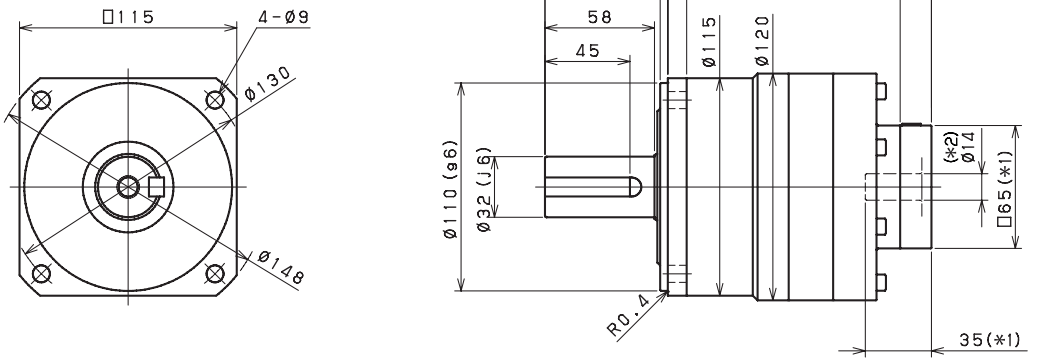
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

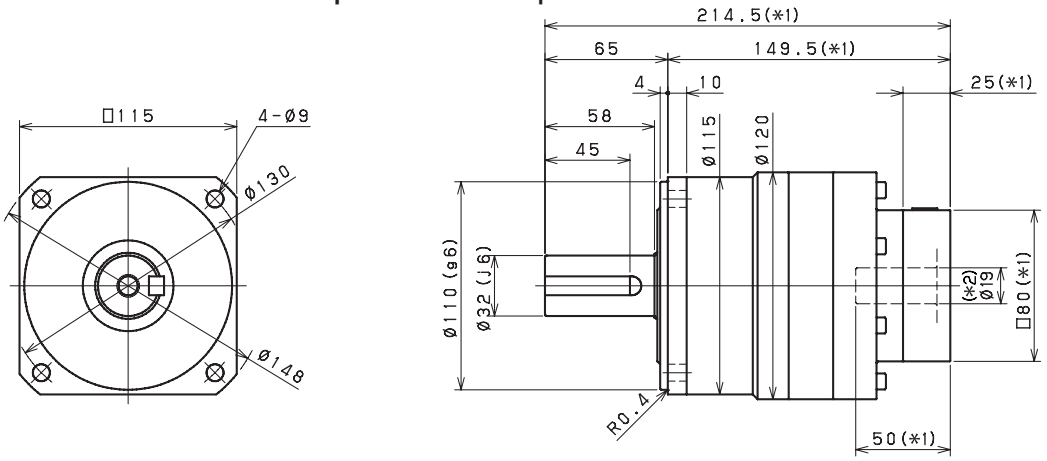
*2 Bushing will be inserted to adapt to motor shaft

VRB 115 2-Stage Dimensions

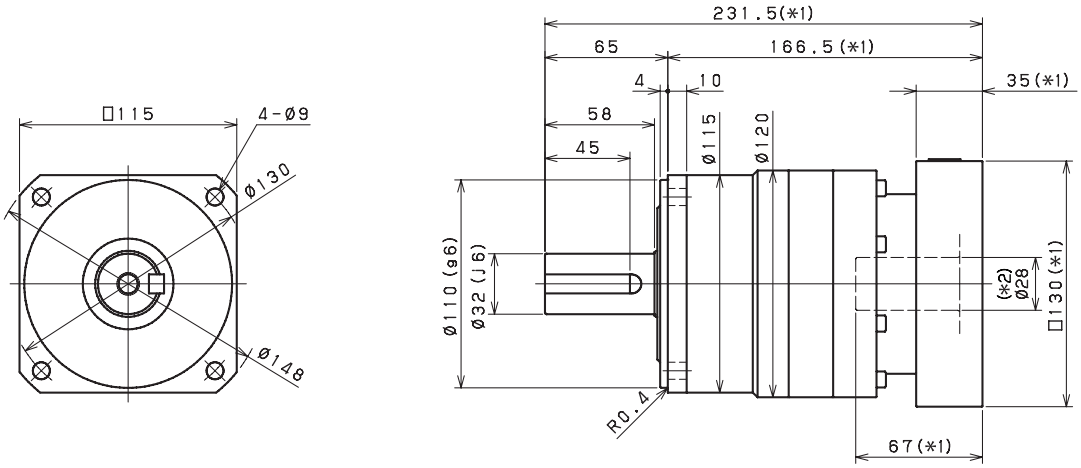
Input bore size ≦φ14 mm

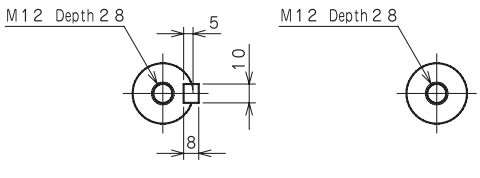


Input bore size ≦φ19 mm



Input bore size ≦φ28 mm (*3)





Keyed shaft　　Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 38mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRB 140 1-Stage Specifications

Frame Size	140									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	248	280	380	380	380	380	380	380
Maximum Acceleration Torque	[Nm]	*2	560	840	840	840	840	840	610	610
Maximum Torque	[Nm]	*3	630	1000	1000	950	950	950	730	730
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*5	2100	2100	2100	2100	2600	2600	2600	2600
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.63							
Maximum Radial Load	[N]	*8	9100							
Maximum Axial Load	[N]	*9	8200							
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	12	7.3	5.3	4.3	3.9	3.5	3.3	3.2
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	18	14	12	11	10	9.9	9.7	9.6
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	35	29	27	26	25	25	25	25
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	60							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	16							

VRB 140 2-Stage Specifications

Frame Size	140									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	360	380	410	590	590	440	590	500
Maximum Acceleration Torque	[Nm]	*2	560	840	840	840	840	560	840	840
Maximum Torque	[Nm]	*3	560	840	840	840	840	560	840	840
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1000	1250	1250
Nominal Input Speed	[rpm]	*5	2900	2900	2900	2900	2900	2900	2900	2900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.56							
Maximum Radial Load	[N]	*8	9100							
Maximum Axial Load	[N]	*9	8200							
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.6	3.5	2.4	2.4	3.3	1.1	2.3	1.1
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.4	5.3	4.2	4.1	5.1	2.9	4.1	2.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	11	12	10	10	11	9.2	10	9.1
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	26	27	25	25	26	24	25	24
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	60							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	17							

VRB 140 2-Stage Specifications

Frame Size	140								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	440	590	590	590	590	440	440
Maximum Acceleration Torque	[Nm]	*2	610	840	840	840	840	610	610
Maximum Torque	[Nm]	*3	610	840	840	840	840	610	610
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*5	2900	3200	3200	3900	3900	3900	3900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.56						
Maximum Radial Load	[N]	*8	9100						
Maximum Axial Load	[N]	*9	8200						
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	0.65	0.64	0.64	0.63	0.63	0.63
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.3	1.1	1.1	1.1	1.1	1.1	1.1
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.0	2.8	2.8	2.8	2.8	2.8	2.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	10	9.1	9.1	9.1	9.1	9.1	9.1
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	25	24	24	24	24	24	24
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	60						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	17						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

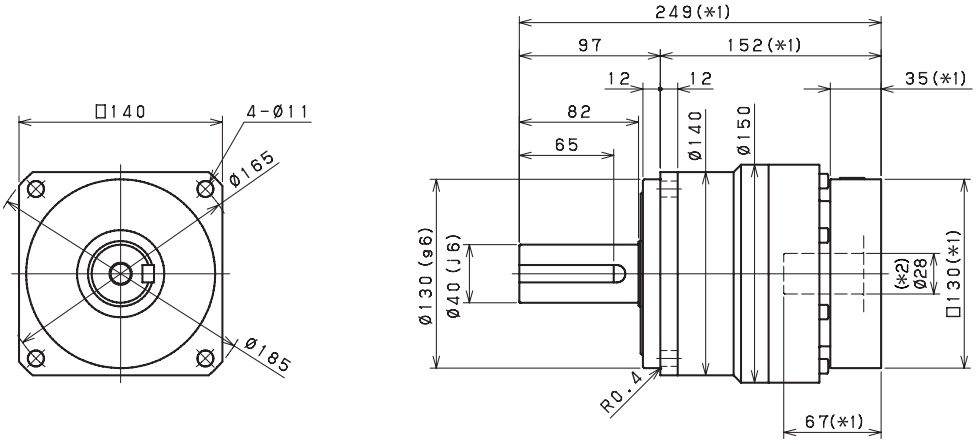
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

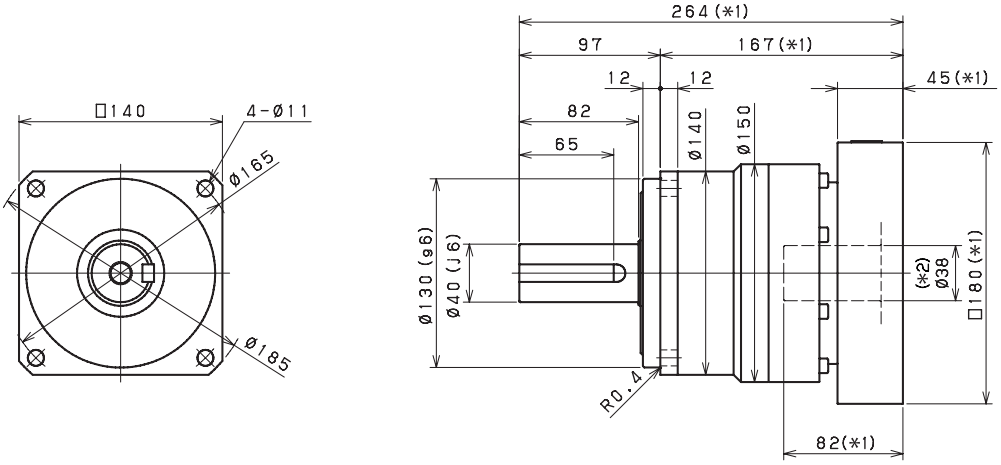
*14 Weight may vary slightly between models

VRB 140 1-Stage Dimensions

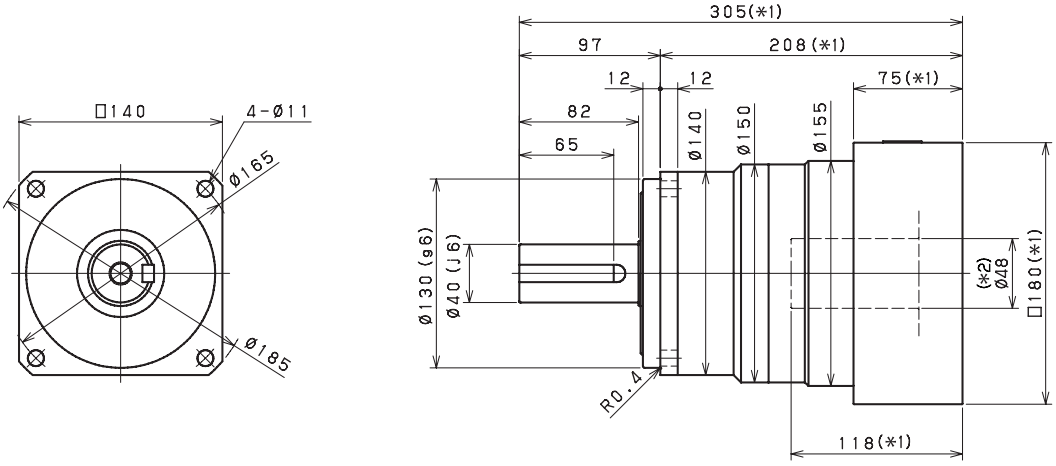
Input bore size ≦φ28 mm

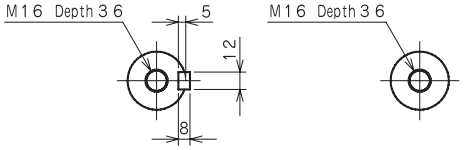


Input bore size ≦φ38 mm



Input bore size ≦φ48 mm





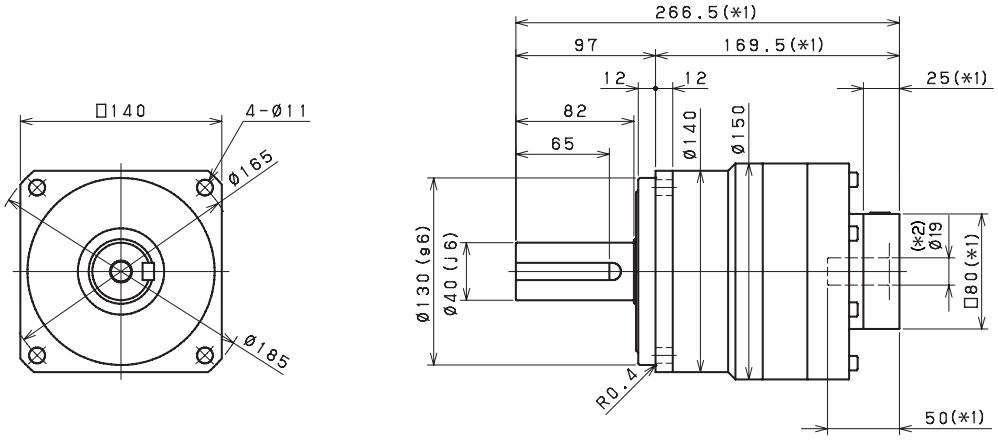
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

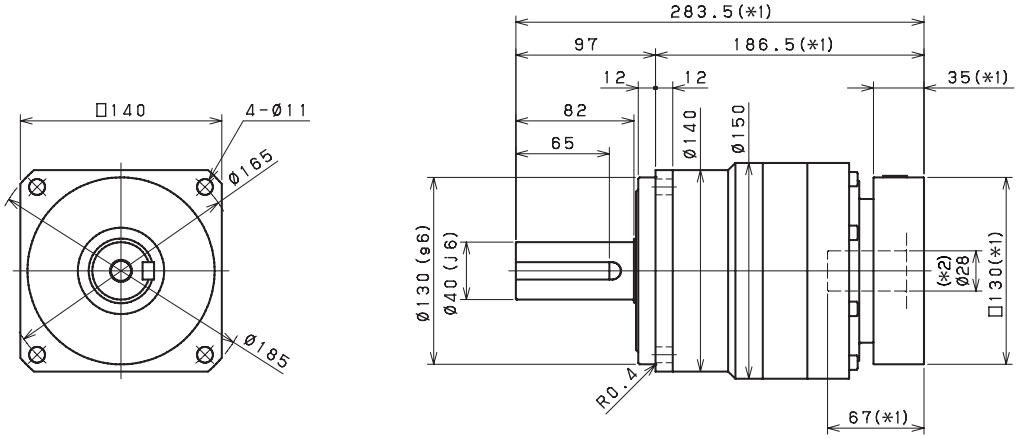
*2 Bushing will be inserted to adapt to motor shaft

VRB 140 2-Stage Dimensions

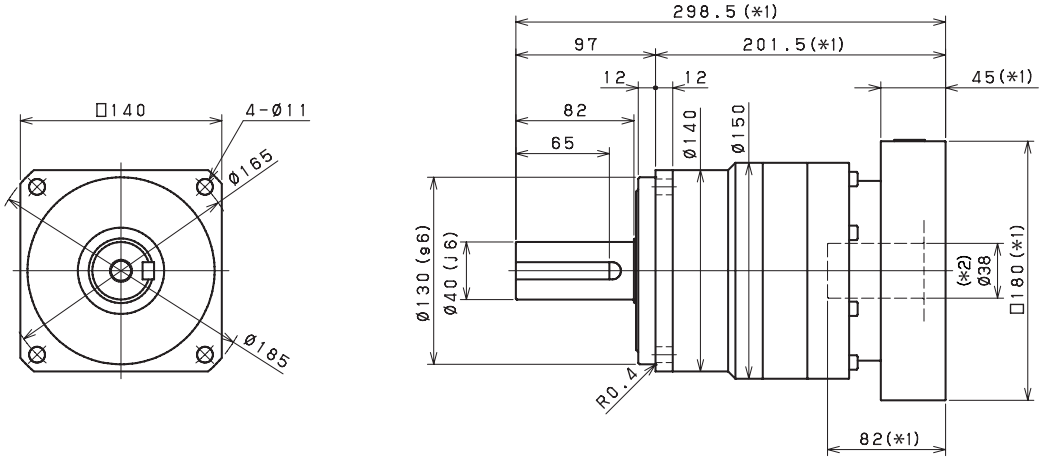
Input bore size ≦φ19 mm

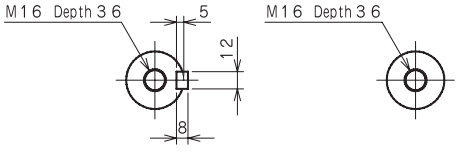


Input bore size ≦φ28 mm



Input bore size ≦φ38 mm (*3)





Keyed shaft Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 48mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRB 180 1-Stage Specifications

Frame Size	180									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	570	850	910	910	910	910	910	910
Maximum Acceleration Torque	[Nm]	*2	1300	1850	1850	1850	1850	1850	1350	1350
Maximum Torque	[Nm]	*3	1450	2250	2250	2150	2150	2150	1750	1750
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2750	2200	2200
Nominal Input Speed	[rpm]	*5	1500	1500	1500	1500	2300	2300	2300	2300
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	2.68							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	43	26	19	15	14	13	12	12
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	57	41	34	31	29	28	27	27
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	110	85	78	75	73	72	71	71
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	175							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	36							

VRB 180 2-Stage Specifications

Frame Size	180									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	660	850	910	1100	1300	930	1300	1200
Maximum Acceleration Torque	[Nm]	*2	1300	1850	1850	1850	1850	1300	1850	1850
Maximum Torque	[Nm]	*3	1300	1850	1850	1850	1850	1300	1850	1850
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2200	2750	2750
Nominal Input Speed	[rpm]	*5	2700	2700	2700	2700	2700	2700	2700	2700
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.39							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	8.8	11	8.1	7.9	11	4.0	7.6	3.9
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	15	18	14	14	17	10	14	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	30	33	29	29	32	25	29	25
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	175							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	37							

VRB 180 2-Stage Specifications

Frame Size	180								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	930	1300	1300	1300	1300	930	930
Maximum Acceleration Torque	[Nm]	*2	1350	1850	1850	1850	1850	1350	1350
Maximum Torque	[Nm]	*3	1350	1850	1850	1850	1850	1350	1350
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2200	2200
Nominal Input Speed	[rpm]	*5	2700	2900	2900	3400	3400	3400	3400
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.39						
Maximum Radial Load	[N]	*8	15000						
Maximum Axial Load	[N]	*9	14000						
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	1.9	1.9	1.8	1.8	1.8	1.8
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	7.6	3.8	3.8	3.8	3.7	3.7	3.7
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	14	10	10	10	10	10	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	29	25	25	25	25	25	25
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	175						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	37						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor **f_0**, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

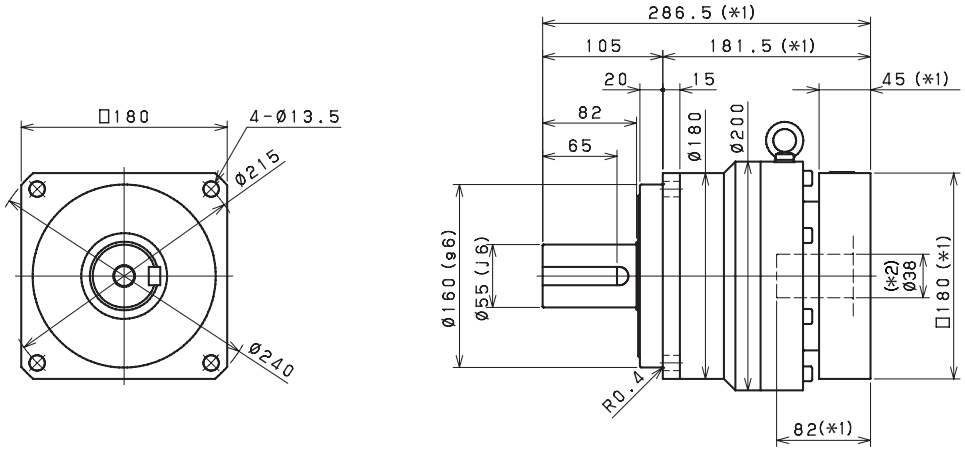
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

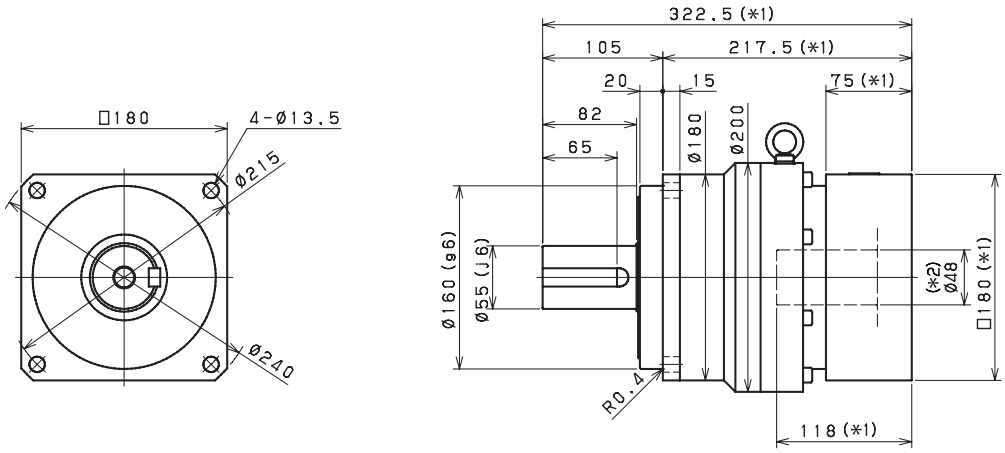
*14 Weight may vary slightly between models

VRB 180 1-Stage Dimensions

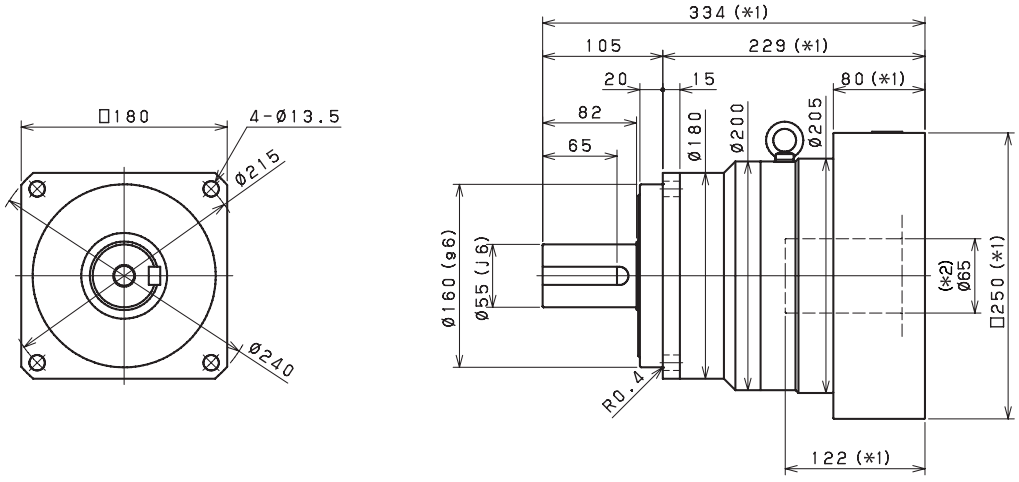
Input bore size ≦φ38 mm

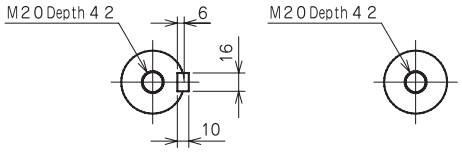


Input bore size ≦φ48 mm



Input bore size ≦φ65 mm





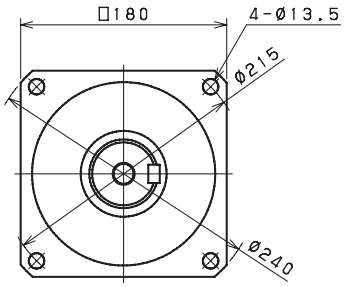
Keyed shaft Smooth shaft

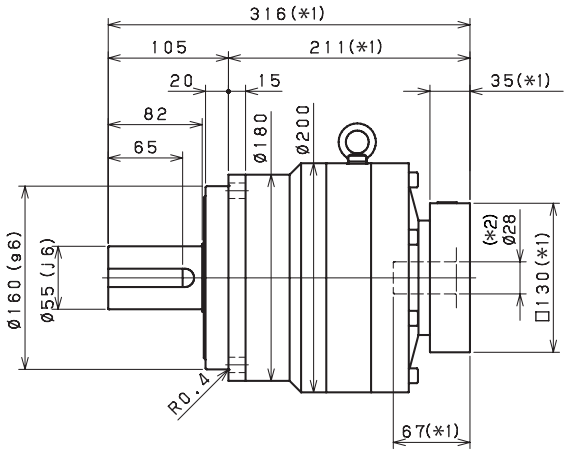
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

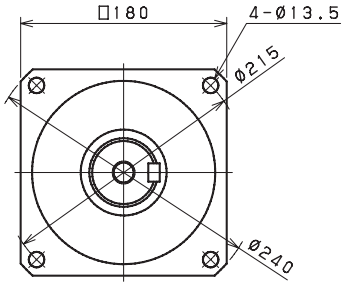
VRB 180 2-Stage Dimensions

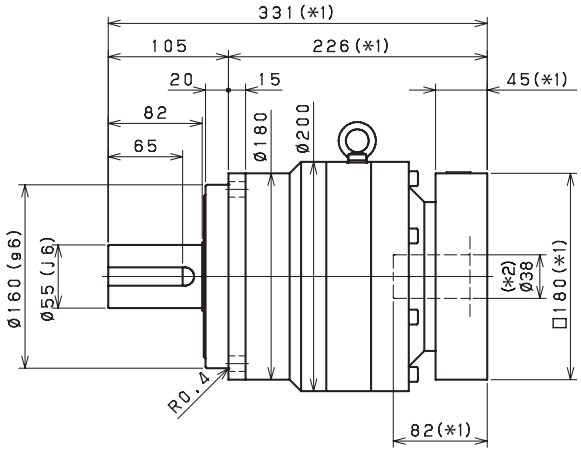
Input bore size ≦φ28 mm



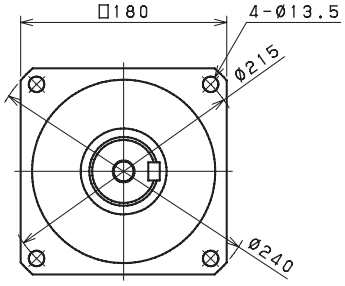


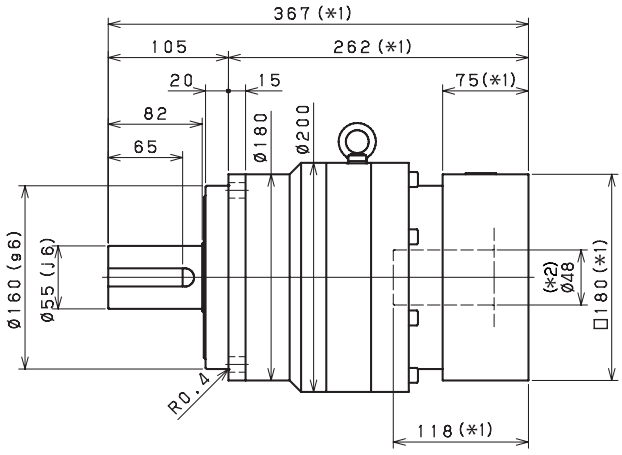
Input bore size ≦φ38 mm

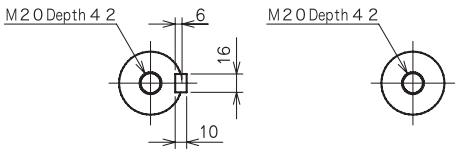




Input bore size ≦φ48 mm







Keyed shaft　　Smooth shaft

*1　Length will vary depending on motor

*2　Bushing will be inserted to adapt to motor shaft

VRB 220 1-Stage Specifications

Frame Size	220									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	980	1400	1400	1600	1700	1700	1700	1700
Maximum Acceleration Torque	[Nm]	*2	2000	2900	2900	2900	2900	2900	2600	2200
Maximum Torque	[Nm]	*3	2400	3700	3700	3500	3500	3400	3000	2700
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	5000	4000	4000
Nominal Input Speed	[rpm]	*5	1200	1200	1500	1500	1700	1700	2000	2000
Maximum Input Speed	[rpm]	*6	3000	3000	3000	3000	3000	3000	3000	3000
No Load Running Torque	[Nm]	*7	2.92							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	110	54	42	35	33	30	29	28
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	160	98	85	79	76	74	73	72
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	400							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	53							

VRB 220 2-Stage Specifications

Frame Size	220									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	1100	1400	1500	1800	2000	1300	2000	2000
Maximum Acceleration Torque	[Nm]	*2	2000	2900	2900	2900	2900	2000	2900	2900
Maximum Torque	[Nm]	*3	2000	2900	2900	2900	2900	2000	2900	2900
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	4000	5000	5000
Nominal Input Speed	[rpm]	*5	2200	2200	2200	2200	2200	2200	2200	2200
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.14							
Maximum Radial Load	[N]	*8	15000							
Maximum Axial Load	[N]	*9	14000							
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	20	24	19	18	23	12	18	12
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	34	39	33	33	37	26	32	26
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	400							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	54							

VRB 220 2-Stage Specifications

Frame Size	220								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	1300	2000	2000	2000	2000	1300	1300
Maximum Acceleration Torque	[Nm]	*2	1800	2900	2900	2900	2500	1800	1600
Maximum Torque	[Nm]	*3	1800	2900	2900	2900	2500	1800	1600
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	4000	4000
Nominal Input Speed	[rpm]	*5	2200	2500	2500	3000	3000	3000	3000
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.14						
Maximum Radial Load	[N]	*8	15000						
Maximum Axial Load	[N]	*9	14000						
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	4.7	4.7	4.6	4.6	4.6	4.6
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	18	12	11	11	11	11	11
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	32	26	26	26	26	26	26
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	400						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 61						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	54						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor **f_0**, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

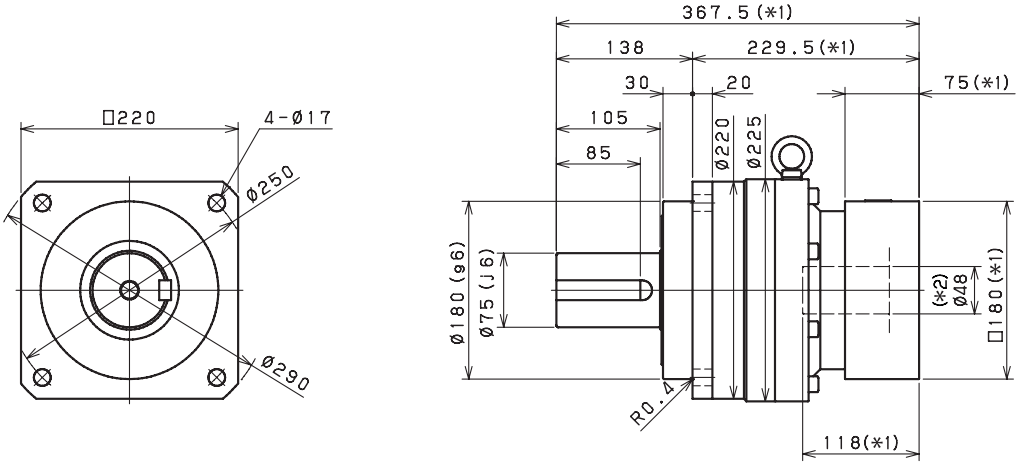
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

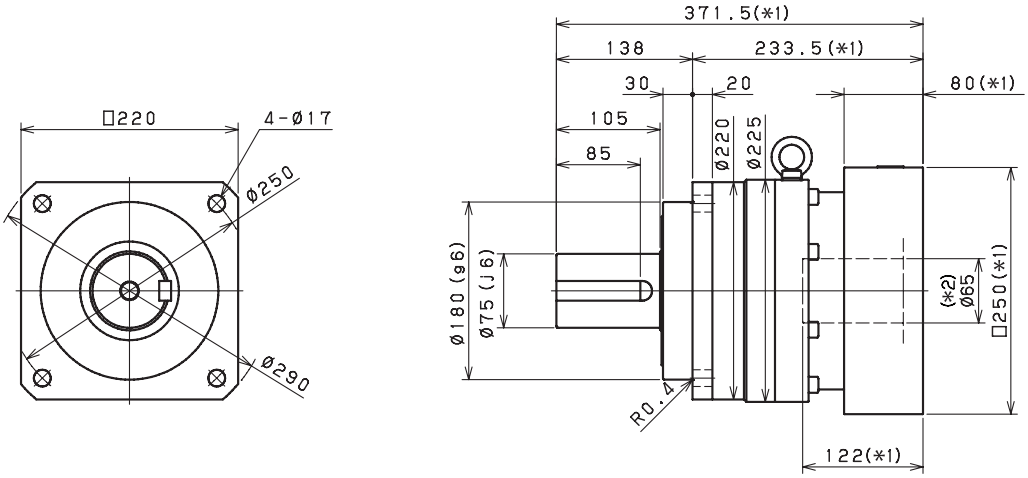
*14 Weight may vary slightly between models

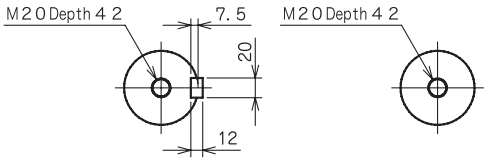
VRB 220 1-Stage Dimensions

Input bore size ≦φ48 mm



Input bore size ≦φ65 mm





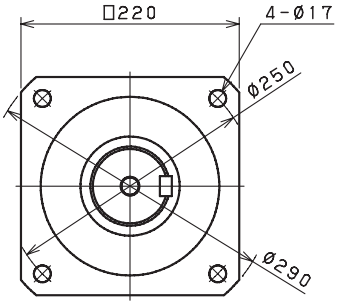
Keyed shaft Smooth shaft

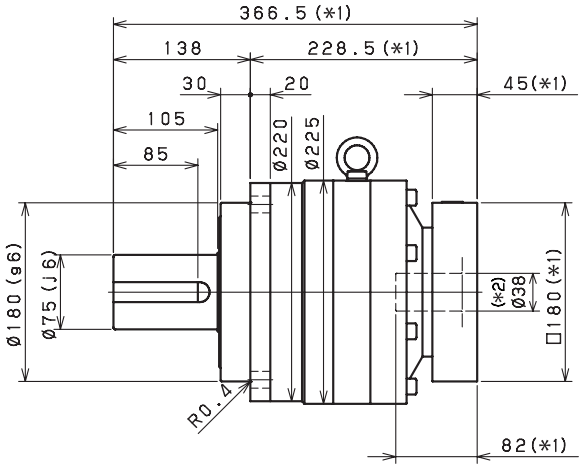
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

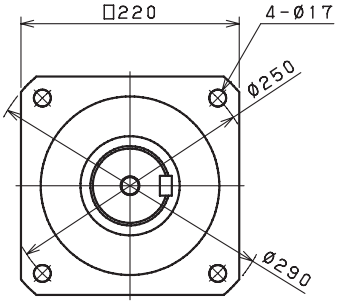
VRB 220 2-Stage Dimensions

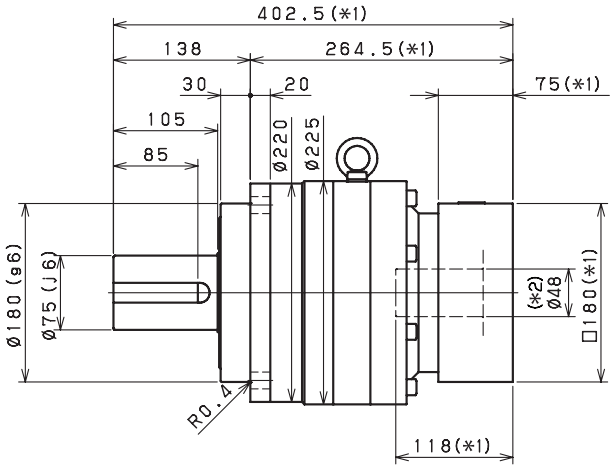
Input bore size ≦φ38 mm

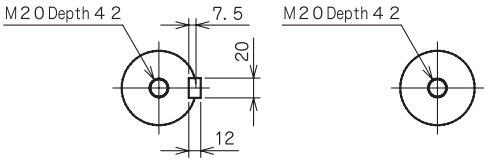




Input bore size ≦φ48 mm







Keyed shaft　　Smooth shaft

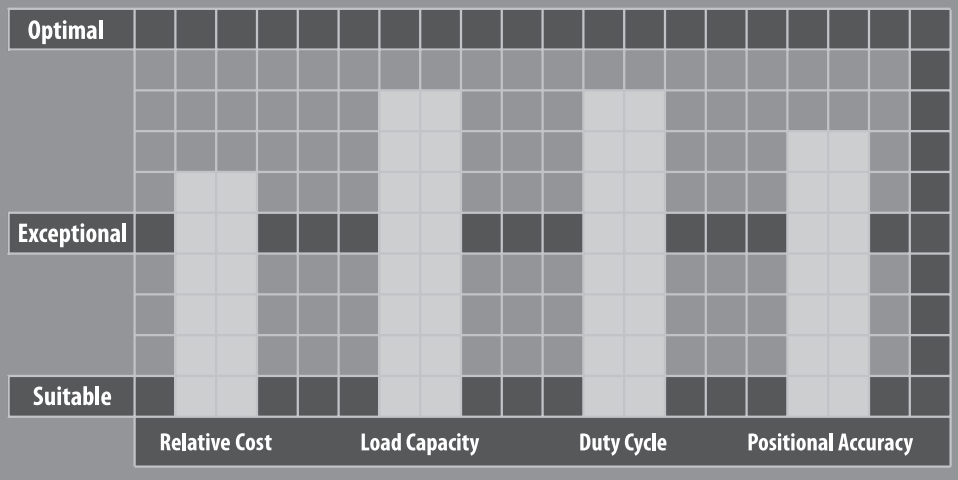
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRS SERIES

Compact and precise, the VRS is the ideal solution for demanding positioning accuracy and speed requirements. This product is a proven performer in higher speed, continuous duty applications where heat reduction is critical. Equipped with two rows of robust tapered roller bearings, the VRS runs smoothly and quietly even with the most challenging dynamic and static forces.

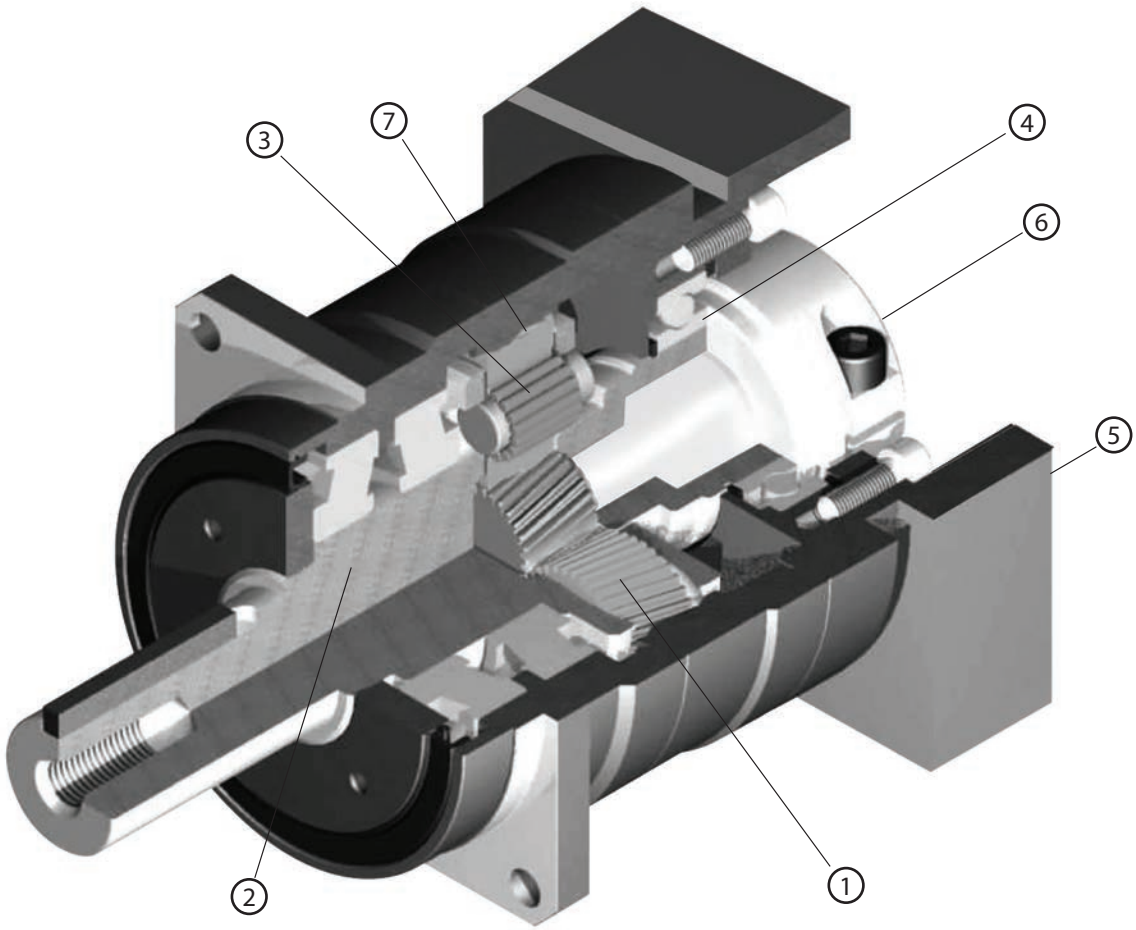
The VRS is available with reduced backlash, less than 2 arc-min, to handle dynamic machine tool and robotic applications with ease. With maximum acceleration torques up to 3700Nm, this product is an excellent partner to higher capacity servomotor models. Our customers specify this product when the industry standard is simply not good enough.



VRS SERIES

- Proven performer in high end motion control applications with demanding accuracy requirements
- Excellent fit for difficult overhung load situations or continuous duty cycles
- The widest range of frame sizes and ratios available in the market
- Best-In-class standard backlash (≤3 arc-min) with reduced backlash options available
- Broad range of mounting adapters offer a simple, precise attachment to any motor
- Maintenance-free solution that is lubricated for life. High performance grease allows flexible mounting in any orientation
- Industry standard through-bolt mounting style
- Assembled in the USA

VRS Series Features



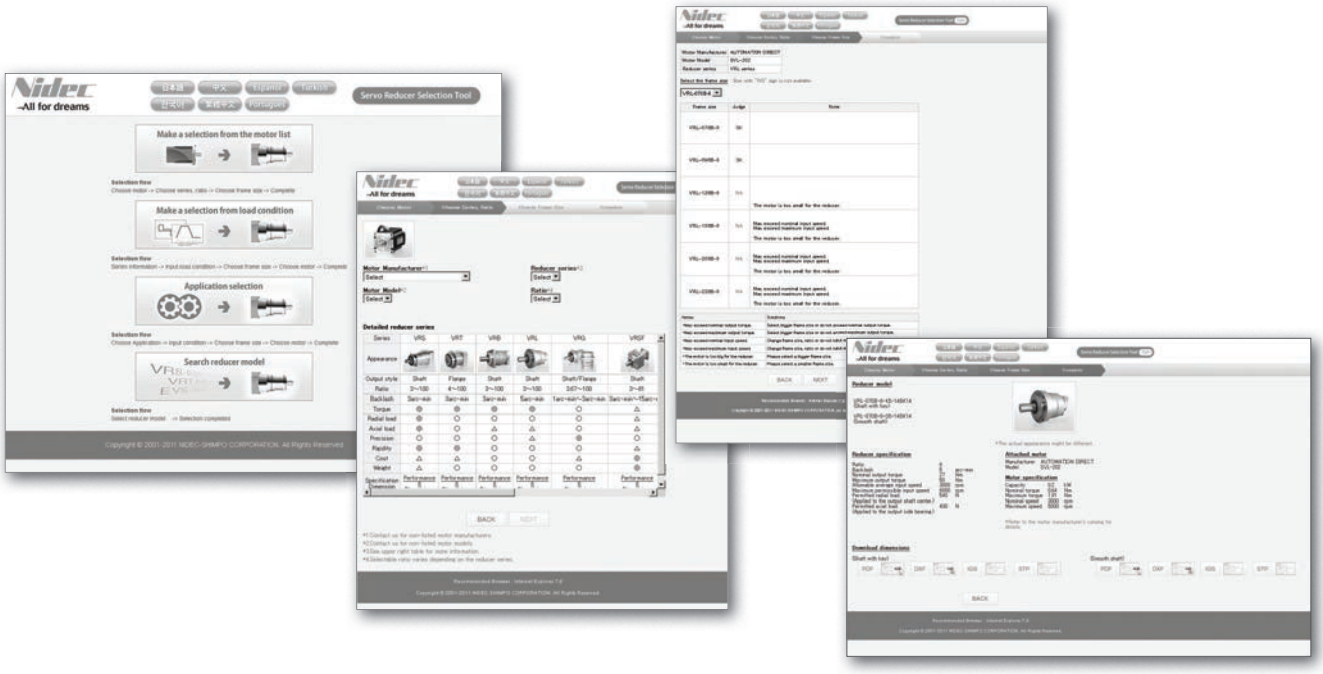
1. Carburized helical gears with proprietary secondary finishing process for higher accuracy and smooth, quiet operation
2. One piece output shaft and planet carrier with two robust tapered bearings. Higher radial/axial load capacity, stiffness, torque density and safety factor, with guaranteed alignment of gearing
3. Uncaged needle roller bearings provide excellent torque density and torsional rigidity
4. Unique labyrinth input seal design greatly reduces heat and increases system efficiency. IP65 protection is available for wash down applications
5. Optimized mounting system with active centering on motor pilot diameter guarantees alignment of motor. Motor can be installed in any orientation
6. True concentric motor shaft clamping connection, optimized for your specific motor. Reduced inertia for dynamic performance and balanced for high speed operation
7. Ring gear machined directly into the housing, not welded or pressed in. Provides greater concentricity and elimination of speed fluctuation

VRS Series Model Code

VRS	–	100	C	–	7	–	K	3	–	19HB16
Series Name		Frame Size	Design Version		Ratio		Output Mounting Style	*Backlash		*Motor Mounting Code
VRS		060 075 100 140 180 210 240	Design Version		1 Stage: 3 4 5 6 7 8 9 10 2 Stage: 15 16 20 25 28 30 35 40 45 50 60 70 80 90 100		K: Keyed Shaft S: Smooth shaft	Standard Backlash: ≤3 arc-min Reduced Backlash: ≤2 arc-min (*2) Reduced Backlash: ≤1 arc-min (*3)		Motor mounting code varies depending on the motor (*1)

*1 Motor mounting code varies depending on the motor. Use the selection tool link below to configure the code.
*2 Sizes 060/075, Single Stage Only
*3 Sizes 100/140/180, Single Stage Only

Contact us for additional information or refer to our online gearhead selection tool.
Selection tool https://www.nidec-drivetechnology.co.jp/selection/all/



VRS 060 1-Stage Specifications

Frame Size	060									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	19	27	28	28	28	28	28	28
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	55	79	79	79	79	76	55	55
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	3300	3300	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.15							
Maximum Radial Load	[N]	*8	3000							
Maximum Axial Load	[N]	*9	2700							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.15	0.10	0.080	0.070	0.064	0.060	0.058	0.056
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.26	0.21	0.19	0.18	0.18	0.17	0.17	0.17
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.54	0.49	0.47	0.46	0.45	0.45	0.45	0.44
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	3.5							
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 2							
Noise Level	dB [A]	*12	≤ 66							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	1.6							

VRS 060 2-Stage Specifications

Frame Size	060									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	25	32	32	43	45	32	45	45
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	46	66	66
Maximum Torque	[Nm]	*3	46	66	66	66	66	46	66	66
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	80	100	100
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04							
Maximum Radial Load	[N]	*8	3000							
Maximum Axial Load	[N]	*9	2700							
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.064	0.070	0.062	0.062	0.068	0.052	0.061	0.051
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.18	0.18	0.17	0.17	0.18	0.16	0.17	0.16
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.45	0.46	0.45	0.45	0.46	0.44	0.45	0.44
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	3.5							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 66							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	1.8							

VRS 060 2-Stage Specifications

Frame Size	060								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	32	45	45	45	45	32	32
Maximum Acceleration Torque	[Nm]	*2	46	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	46	66	66	66	66	46	46
Emergency Stop Torque	[Nm]	*4	80	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	4000	4800	4800	5500	5500	5500	5500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04						
Maximum Radial Load	[N]	*8	3000						
Maximum Axial Load	[N]	*9	2700						
Moment of Inertia (≤Ø 8)	[kgcm2]	--	0.061	0.051	0.051	0.051	0.051	0.051	0.051
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.17	0.16	0.16	0.16	0.16	0.16	0.16
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.45	0.44	0.44	0.44	0.44	0.44	0.44
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	3.5						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 66						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	1.8						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

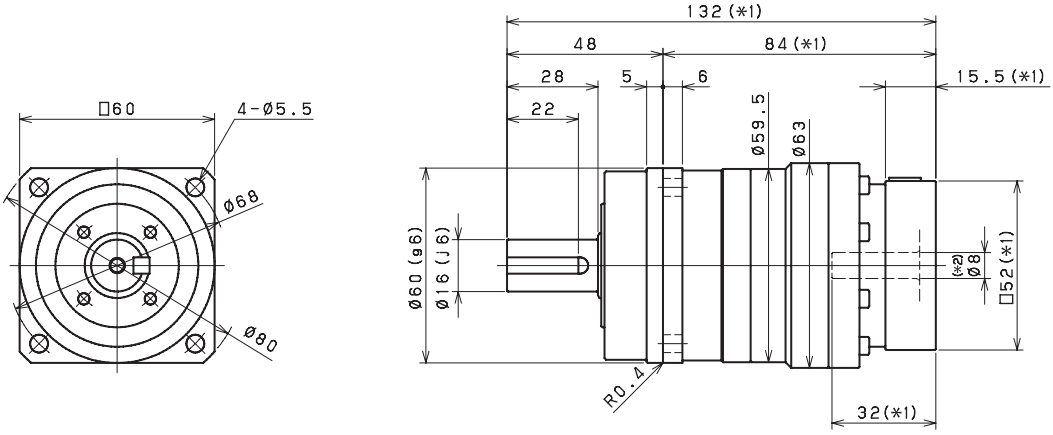
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

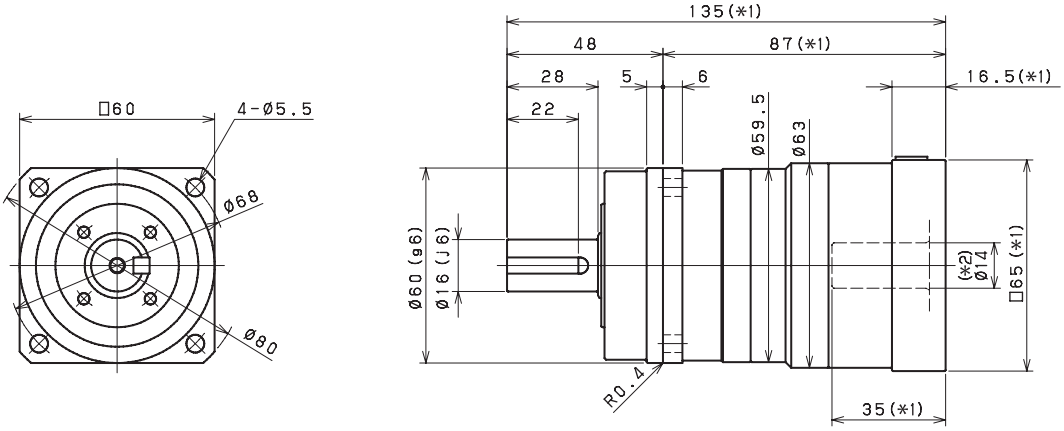
*14 Weight may vary slightly between models

VRS 060 1-Stage Dimensions

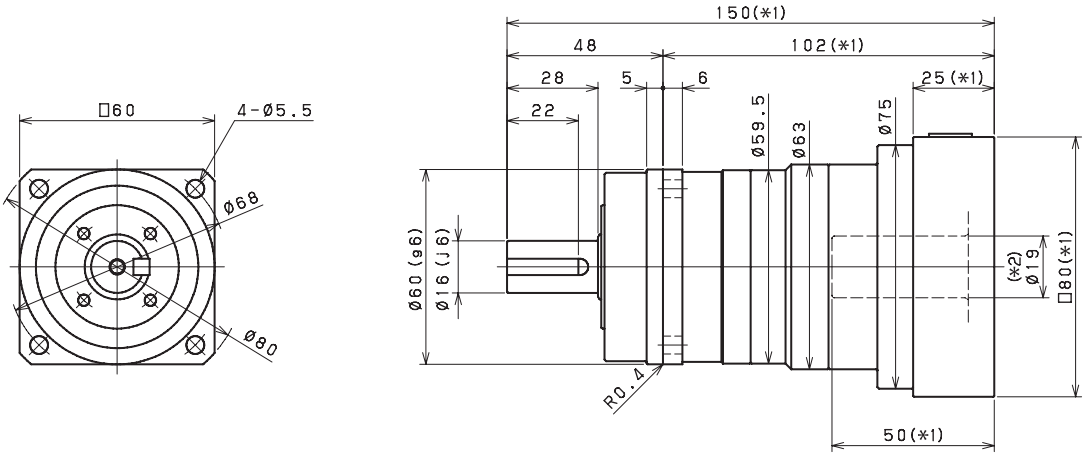
Input bore size ≦φ8 mm

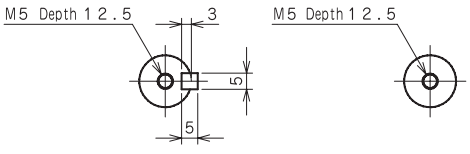


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm





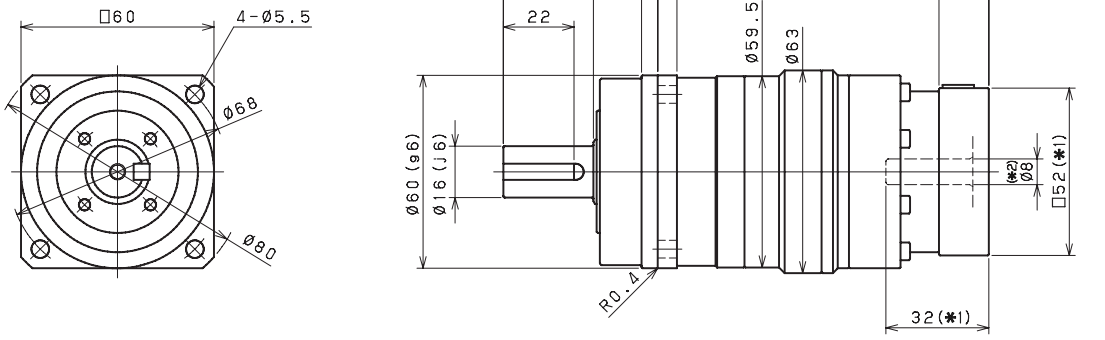
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

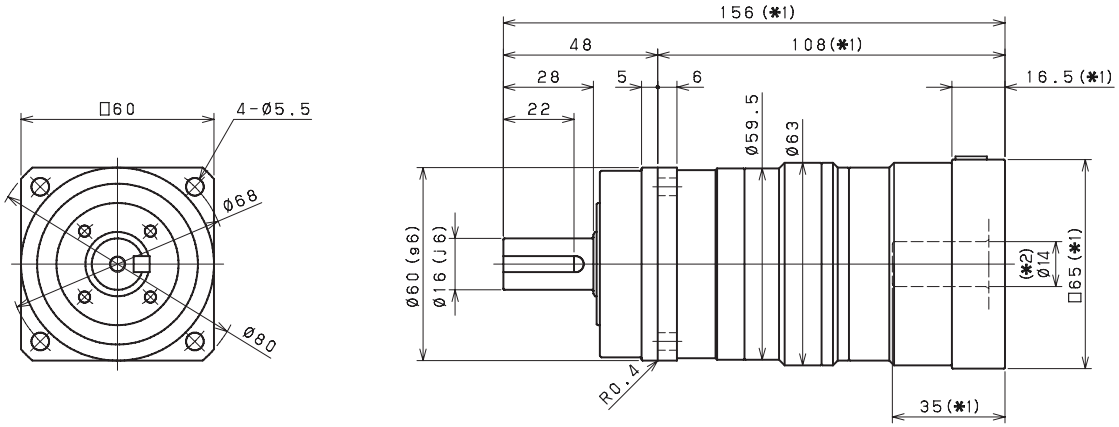
*2 Bushing will be inserted to adapt to motor shaft

VRS 060 2-Stage Dimensions

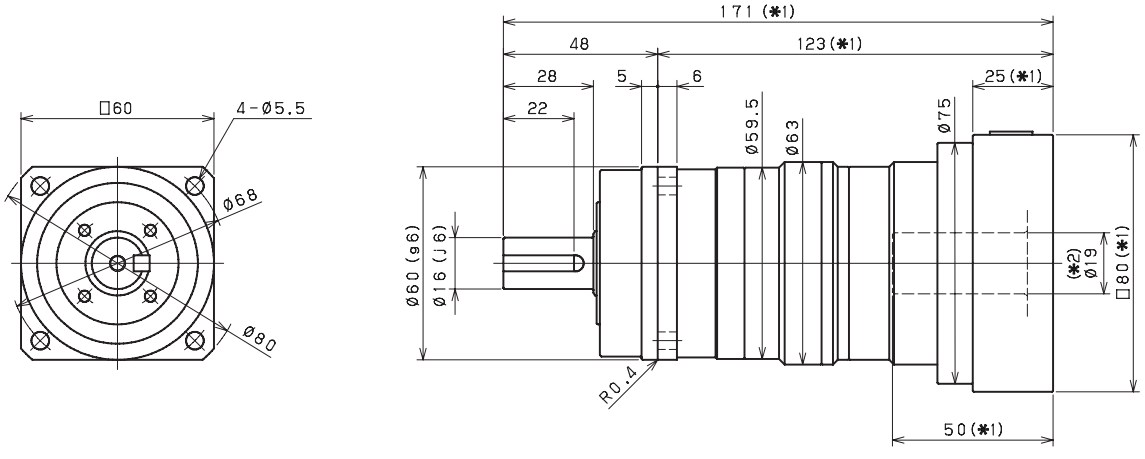
Input bore size ≦φ8 mm

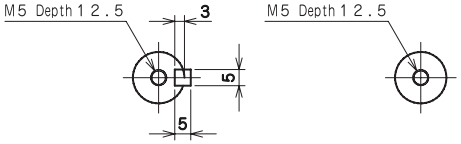


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm





Keyed shaft Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRS 075 1-Stage Specifications

Frame Size	075									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	53	77	84	84	84	84	84	84
Maximum Acceleration Torque	[Nm]	*2	108	165	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	135	200	200	195	195	190	145	145
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	2900	2900	2900	2900	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.35							
Maximum Radial Load	[N]	*8	4300							
Maximum Axial Load	[N]	*9	3900							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.68	0.48	0.39	0.34	0.32	0.31	0.30	0.29
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	0.87	0.79	0.74	0.72	0.71	0.70	0.69
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.9	2.6	2.6	2.5	2.5	2.5	2.5	2.4
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	10							
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 2							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	3.4							

VRS 075 2-Stage Specifications

Frame Size	075									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	65	80	86	106	118	88	118	118
Maximum Acceleration Torque	[Nm]	*2	108	165	165	165	165	108	165	165
Maximum Torque	[Nm]	*3	108	165	165	165	165	108	165	165
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	200	250	250
Nominal Input Speed	[rpm]	*5	3500	3500	3500	3500	3500	3500	3500	3500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.06							
Maximum Radial Load	[N]	*8	4300							
Maximum Axial Load	[N]	*9	3900							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.20	0.25	0.19	0.19	0.24	0.12	0.18	0.11
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.36	0.41	0.35	0.35	0.40	0.28	0.34	0.27
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.75	0.79	0.74	0.73	0.78	0.67	0.73	0.67
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.4
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	10							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	3.8							

VRS 075 2-Stage Specifications

Frame Size	075								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	88	118	118	118	118	88	88
Maximum Acceleration Torque	[Nm]	*2	112	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	112	165	165	165	165	112	112
Emergency Stop Torque	[Nm]	*4	200	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	3500	3800	3800	4500	4500	4500	4500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.06						
Maximum Radial Load	[N]	*8	4300						
Maximum Axial Load	[N]	*9	3900						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.18	0.11	0.11	0.11	0.11	0.11	0.11
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.73	0.67	0.67	0.67	0.67	0.67	0.67
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.5	2.4	2.4	2.4	2.4	2.4	2.4
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	10						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	3.8						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

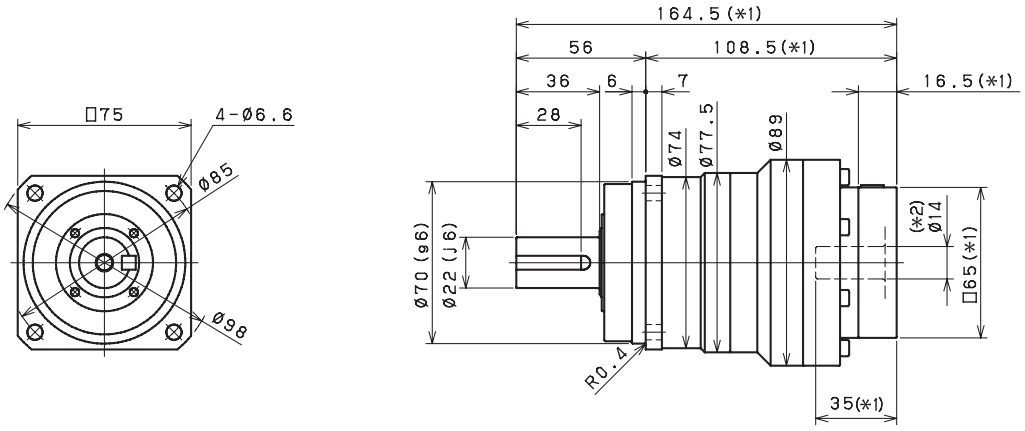
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

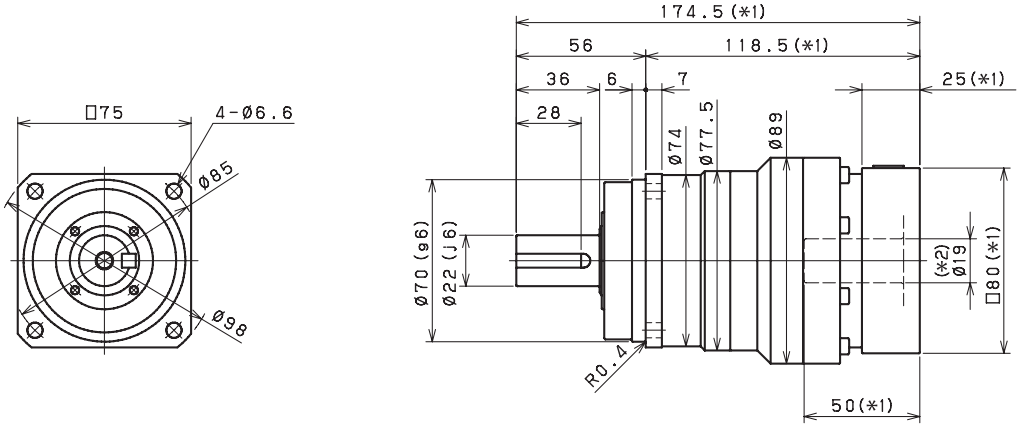
*14 Weight may vary slightly between models

VRS 075 1-Stage Dimensions

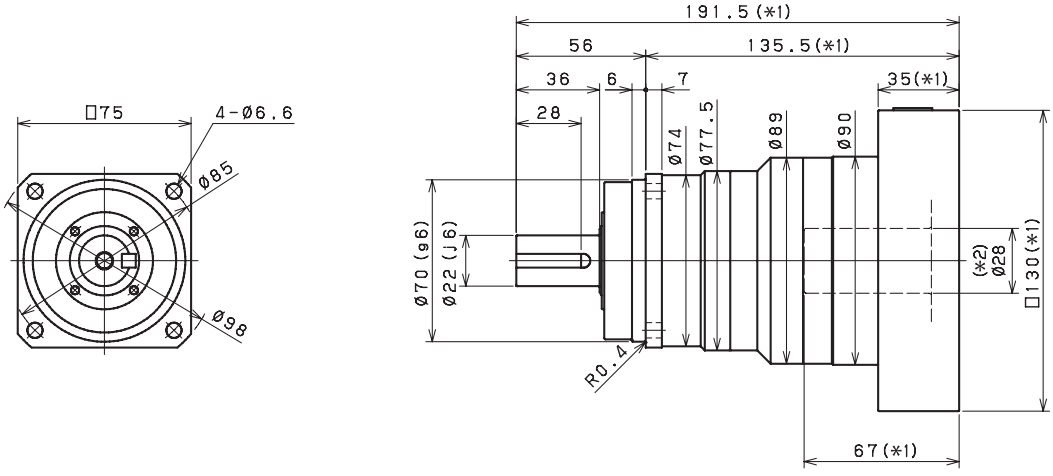
Input bore size ≦φ14 mm

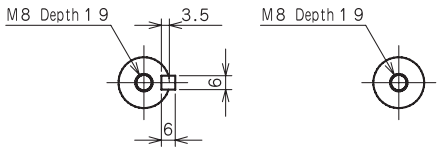


Input bore size ≦φ19 mm



Input bore size ≦φ28 mm





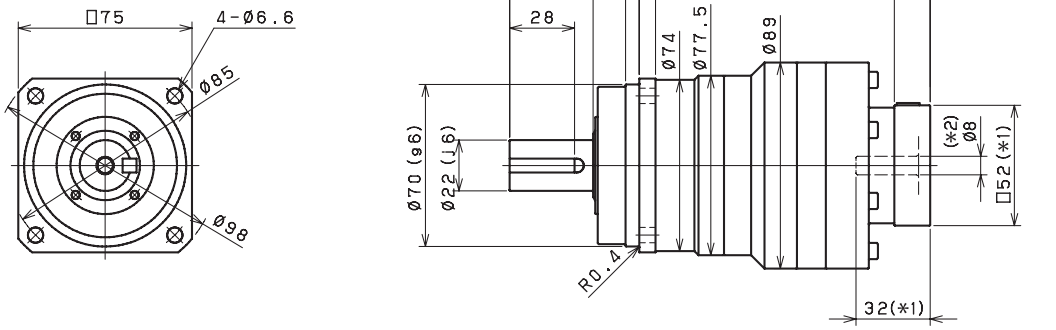
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

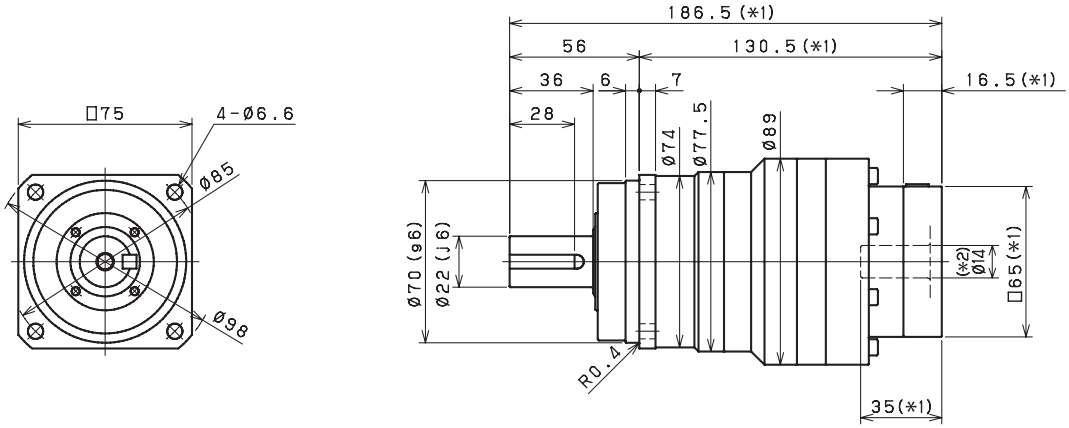
*2 Bushing will be inserted to adapt to motor shaft

VRS 075 2-Stage Dimensions

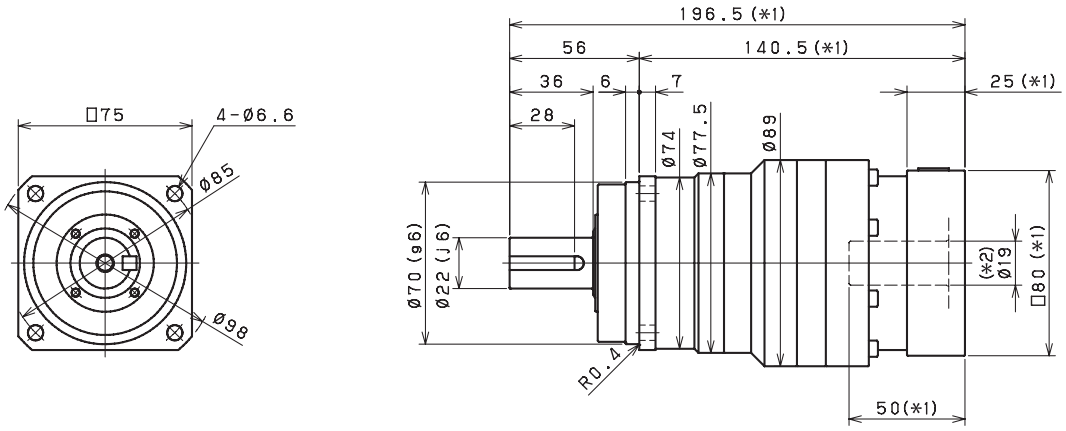
Input bore size ≦φ8 mm

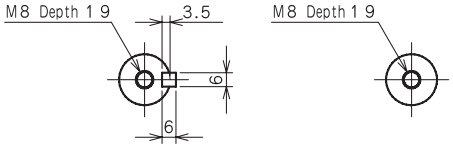


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm (*3)





Keyed shaft Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 28mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRS 100 1-Stage Specifications

Frame Size	100									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	128	146	190	190	190	190	190	190
Maximum Acceleration Torque	[Nm]	*2	270	390	390	390	390	390	292	292
Maximum Torque	[Nm]	*3	340	490	490	480	480	480	370	370
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	625	500	500
Nominal Input Speed	[rpm]	*5	2800	2800	2800	2800	2800	2800	2800	2800
Maximum Input Speed	[rpm]	*6	5500	5500	5500	5500	5500	5500	5500	5500
No Load Running Torque	[Nm]	*7	1.30							
Maximum Radial Load	[N]	*8	7000							
Maximum Axial Load	[N]	*9	6300							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	3.1	1.9	1.4	1.1	1.0	0.91	0.85	0.82
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	5.0	3.7	3.1	2.8	2.7	2.6	2.6	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	12	10	9.5	9.2	9.1	8.9	8.9	8.8
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	31							
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 1							
Noise Level	dB [A]	*12	≤ 71							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	8.1							

VRS 100 2-Stage Specifications

Frame Size	100									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	174	200	220	280	280	220	280	270
Maximum Acceleration Torque	[Nm]	*2	270	390	390	390	390	270	390	390
Maximum Torque	[Nm]	*3	270	390	390	390	390	270	390	390
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	500	625	625
Nominal Input Speed	[rpm]	*5	3100	3100	3100	3100	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.42							
Maximum Radial Load	[N]	*8	7000							
Maximum Axial Load	[N]	*9	6300							
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.76	0.97	0.72	0.70	0.92	0.38	0.68	0.37
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	1.4	1.1	1.1	1.3	0.78	1.1	0.77
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.9	3.1	2.8	2.8	3	2.5	2.8	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.2	9.4	9.1	9.1	9.3	8.8	9.1	8.8
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	31							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 71							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	8.8							

VRS 100 2-Stage Specifications

Frame Size	100								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	220	280	280	280	280	220	220
Maximum Acceleration Torque	[Nm]	*2	292	390	390	390	390	292	292
Maximum Torque	[Nm]	*3	292	390	390	390	390	292	292
Emergency Stop Torque	[Nm]	*4	500	625	625	625	625	500	500
Nominal Input Speed	[rpm]	*5	3100	3500	3500	4200	4200	4200	4200
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.42						
Maximum Radial Load	[N]	*8	7000						
Maximum Axial Load	[N]	*9	6300						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	0.19	0.19	0.19	0.19	0.19	0.19
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.68	0.36	0.36	0.36	0.36	0.36	0.36
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	0.76	0.76	0.76	0.76	0.76	0.76
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.8	2.5	2.5	2.5	2.5	2.5	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.1	8.8	8.8	8.8	8.8	8.8	8.8
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	31						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 71						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	8.8						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

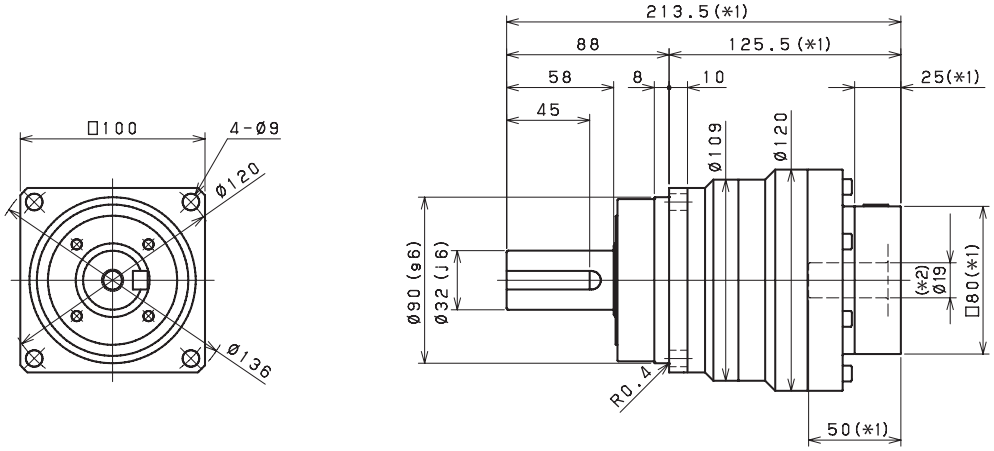
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

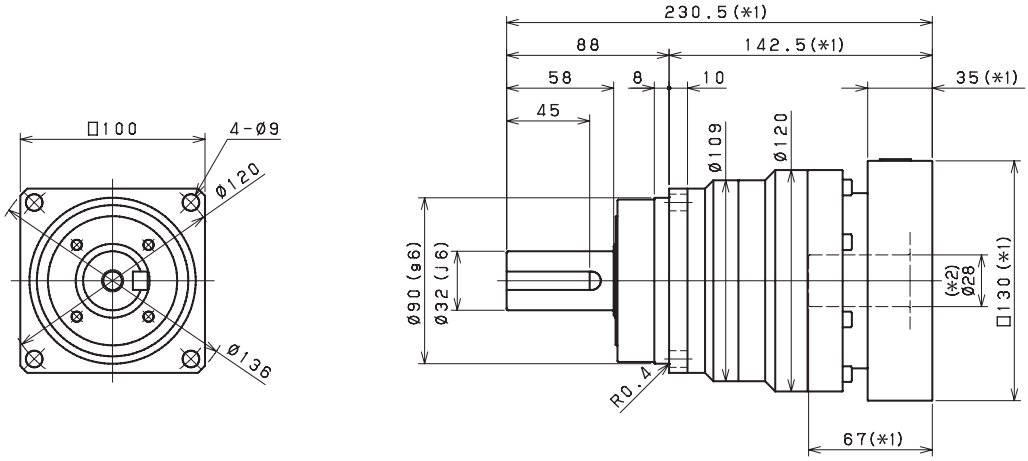
*14 Weight may vary slightly between models

VRS 100 1-Stage Dimensions

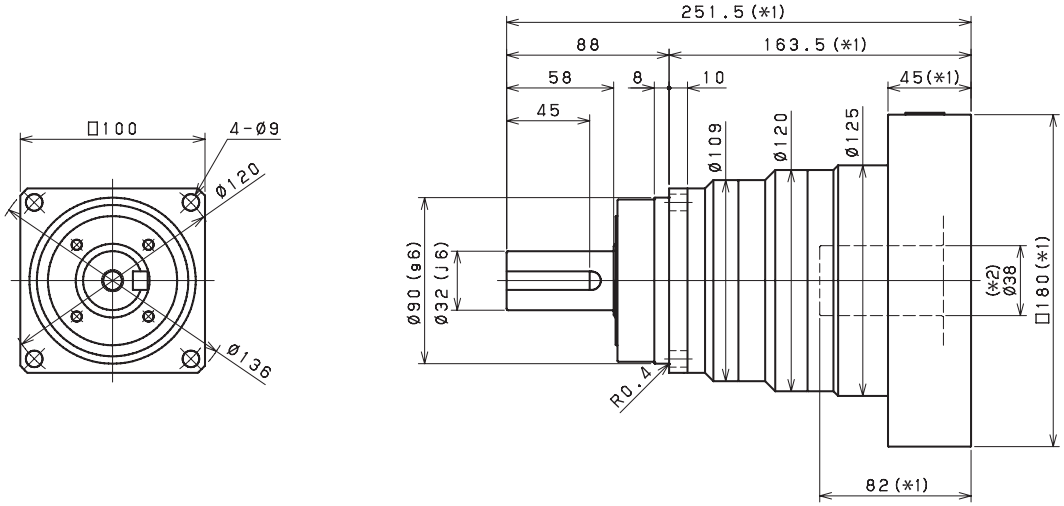
Input bore size ≦φ19 mm

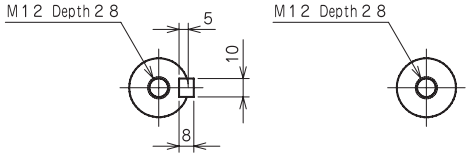


Input bore size ≦φ28 mm



Input bore size ≦φ38 mm





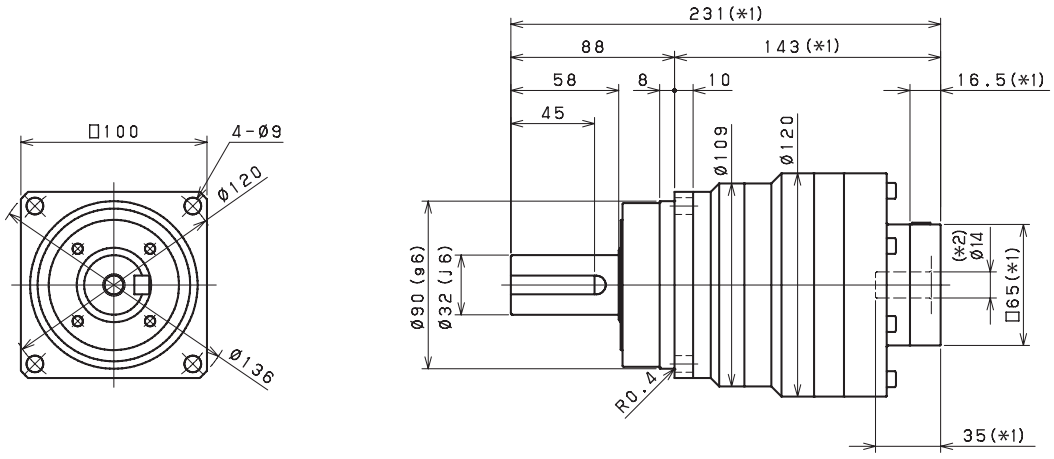
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

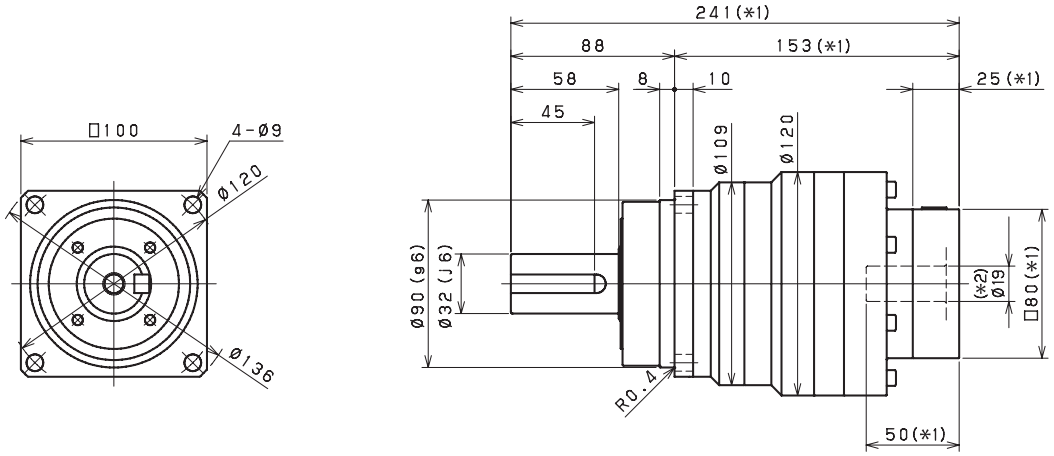
*2 Bushing will be inserted to adapt to motor shaft

VRS 100 2-Stage Dimensions

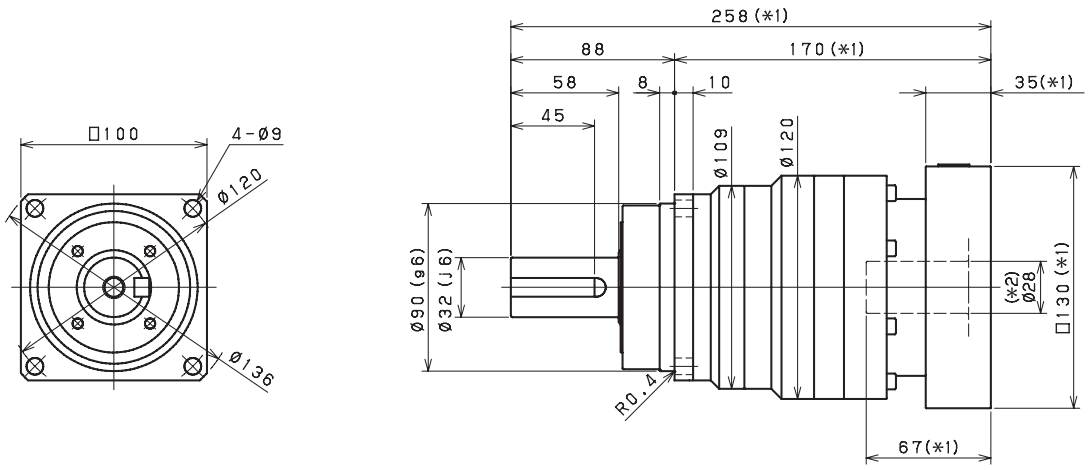
Input bore size ≦φ14 mm

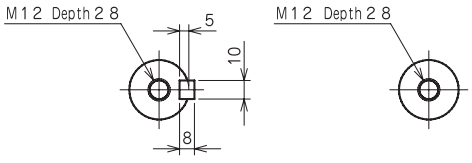


Input bore size ≦φ19 mm



Input bore size ≦φ28 mm (*3)





Keyed shaft　　Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 38mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRS 140 1-Stage Specifications

Frame Size	140									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	248	280	380	380	380	380	380	380
Maximum Acceleration Torque	[Nm]	*2	560	840	840	840	840	840	610	610
Maximum Torque	[Nm]	*3	630	1000	1000	950	950	950	730	730
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*5	2100	2100	2100	2100	2600	2600	2600	2600
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.63							
Maximum Radial Load	[N]	*8	10000							
Maximum Axial Load	[N]	*9	9000							
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	12	7.2	5.2	4.3	3.8	3.5	3.3	3.2
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	18	14	12	11	10	9.9	9.7	9.6
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	35	29	27	26	25	25	25	25
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	60							
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 1							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	17							

VRS 140 2-Stage Specifications

Frame Size	140									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	360	380	410	590	590	440	590	500
Maximum Acceleration Torque	[Nm]	*2	560	840	840	840	840	560	840	840
Maximum Torque	[Nm]	*3	560	840	840	840	840	560	840	840
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1000	1250	1250
Nominal Input Speed	[rpm]	*5	2900	2900	2900	2900	2900	2900	2900	2900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.56							
Maximum Radial Load	[N]	*8	10000							
Maximum Axial Load	[N]	*9	9000							
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.6	3.5	2.4	2.4	3.3	1.1	2.3	1.1
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.4	5.3	4.2	4.1	5.1	2.9	4.1	2.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	11	12	10	10	11	9.2	10	9.1
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	26	27	25	25	26	24	25	24
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	60							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	19							

VRS 140 2-Stage Specifications

Frame Size	140								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	440	590	590	590	590	440	440
Maximum Acceleration Torque	[Nm]	*2	610	840	840	840	840	610	610
Maximum Torque	[Nm]	*3	610	840	840	840	840	610	610
Emergency Stop Torque	[Nm]	*4	1000	1250	1250	1250	1250	1000	1000
Nominal Input Speed	[rpm]	*5	2900	3200	3200	3900	3900	3900	3900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.56						
Maximum Radial Load	[N]	*8	10000						
Maximum Axial Load	[N]	*9	9000						
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	0.65	0.64	0.64	0.63	0.63	0.63
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.3	1.1	1.1	1.1	1.1	1.1	1.1
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.0	2.8	2.8	2.8	2.8	2.8	2.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	10	9.1	9.1	9.1	9.1	9.1	9.1
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	25	24	24	24	24	24	24
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	60						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	19						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

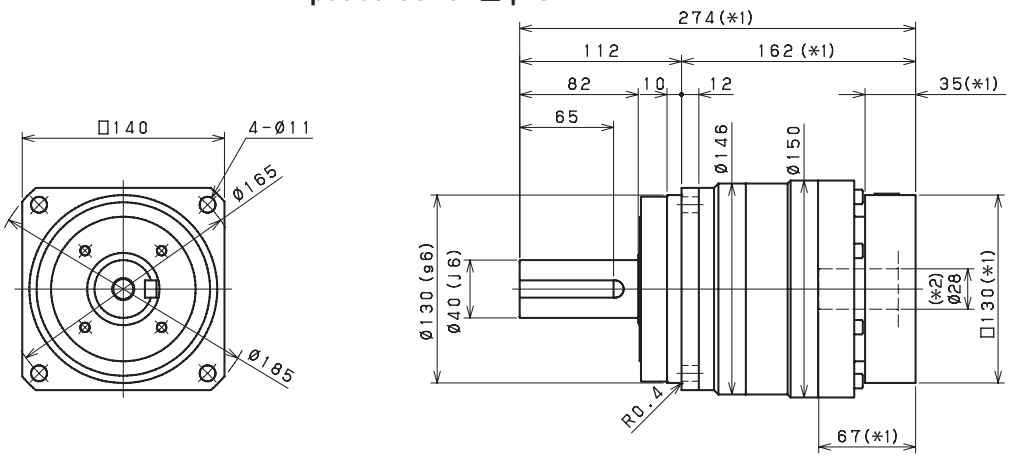
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

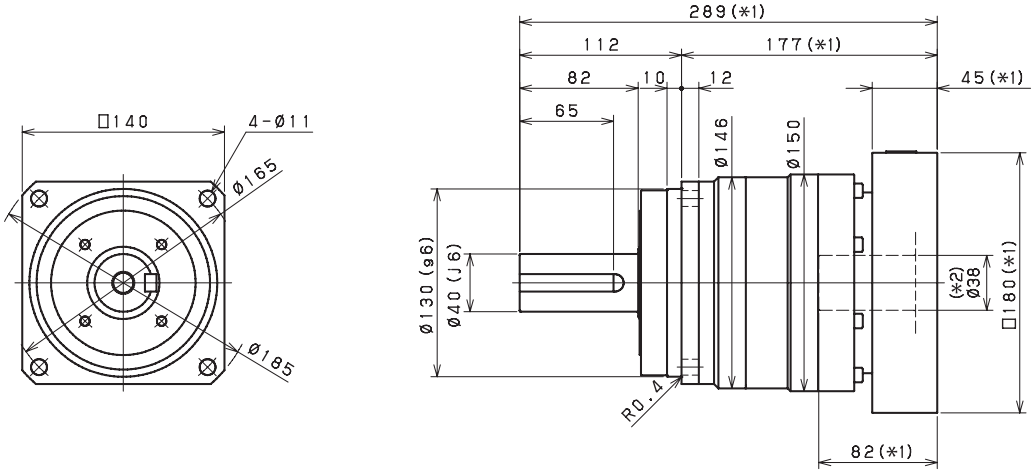
*14 Weight may vary slightly between models

VRS 140 1-Stage Dimensions

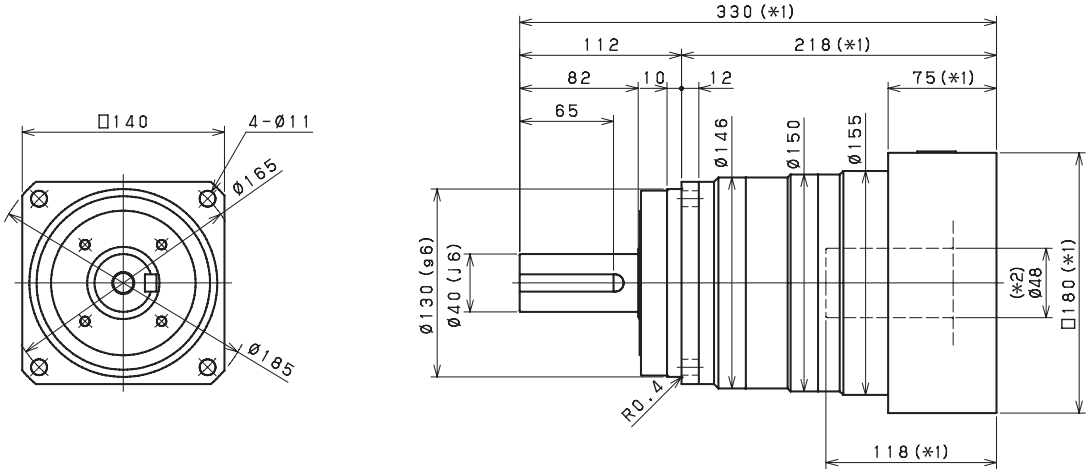
Input bore size ≦φ28 mm

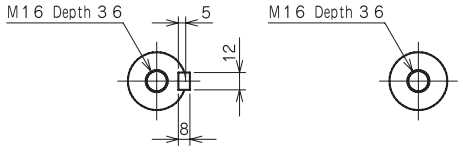


Input bore size ≦φ38 mm



Input bore size ≦φ48 mm





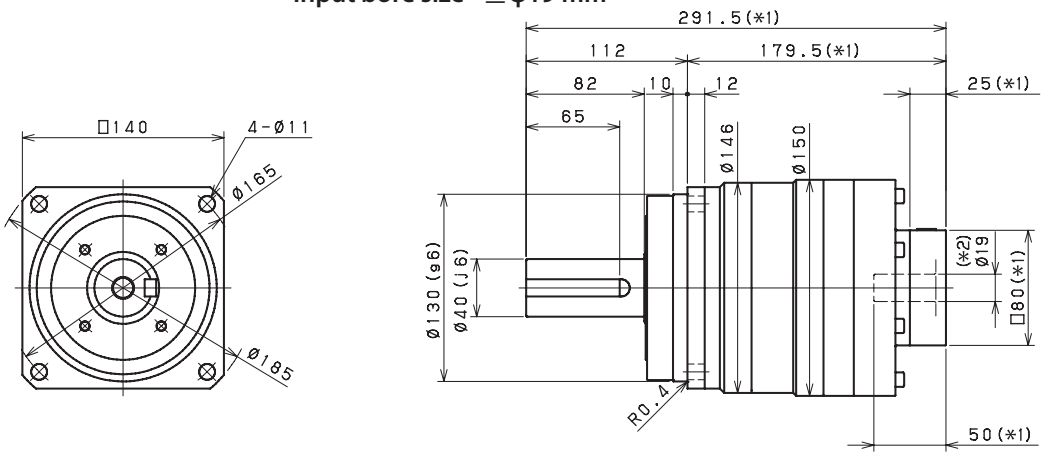
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

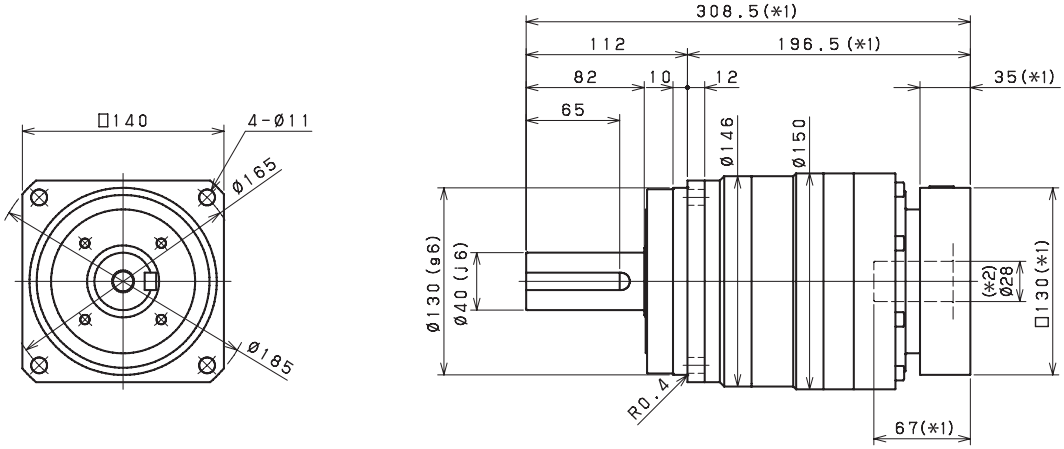
*2 Bushing will be inserted to adapt to motor shaft

VRS 140 2-Stage Dimensions

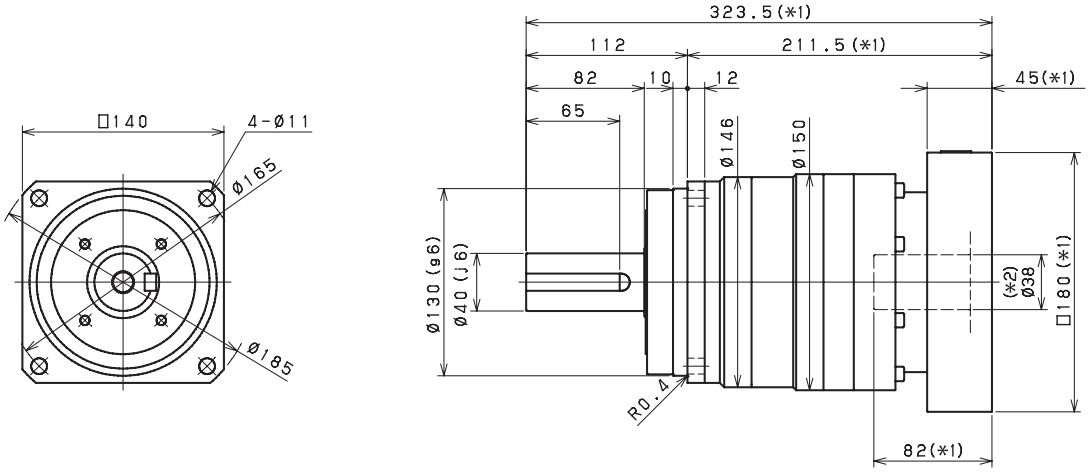
Input bore size ≦φ19 mm

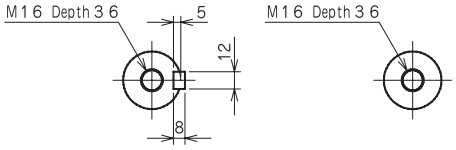


Input bore size ≦φ28 mm



Input bore size ≦φ38 mm (*3)





Keyed shaft Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 48mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRS 180 1-Stage Specifications

Frame Size	180									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	570	850	910	910	910	910	910	910
Maximum Acceleration Torque	[Nm]	*2	1300	1850	1850	1850	1850	1850	1350	1350
Maximum Torque	[Nm]	*3	1450	2250	2250	2150	2150	2150	1750	1750
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2750	2200	2200
Nominal Input Speed	[rpm]	*5	1500	1500	1500	1500	2300	2300	2300	2300
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	2.68							
Maximum Radial Load	[N]	*8	19000							
Maximum Axial Load	[N]	*9	17000							
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	41	25	18	15	13	12	12	11
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	55	40	33	30	29	27	27	26
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	110	84	78	74	73	71	71	70
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	175							
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 1							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	39							

VRS 180 2-Stage Specifications

Frame Size	180									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	660	850	910	1100	1300	930	1300	1200
Maximum Acceleration Torque	[Nm]	*2	1300	1850	1850	1850	1850	1300	1850	1850
Maximum Torque	[Nm]	*3	1300	1850	1850	1850	1850	1300	1850	1850
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2200	2750	2750
Nominal Input Speed	[rpm]	*5	2700	2700	2700	2700	2700	2700	2700	2700
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.39							
Maximum Radial Load	[N]	*8	19000							
Maximum Axial Load	[N]	*9	17000							
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	8.7	11	8.1	7.8	11	4	7.6	3.9
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	15	18	14	14	17	10	14	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	30	32	29	29	32	25	29	25
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	34	39	33	33	38	26	32	26
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	175							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 67							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	40							

VRS 180 2-Stage Specifications

Frame Size	180								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	930	1300	1300	1300	1300	930	930
Maximum Acceleration Torque	[Nm]	*2	1350	1850	1850	1850	1850	1350	1350
Maximum Torque	[Nm]	*3	1350	1850	1850	1850	1850	1350	1350
Emergency Stop Torque	[Nm]	*4	2200	2750	2750	2750	2750	2200	2200
Nominal Input Speed	[rpm]	*5	2700	2900	2900	3400	3400	3400	3400
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.39						
Maximum Radial Load	[N]	*8	19000						
Maximum Axial Load	[N]	*9	17000						
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	1.9	1.9	1.8	1.8	1.8	1.8
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	7.6	3.8	3.8	3.8	3.7	3.7	3.7
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	14	10	10	10	10	10	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	29	25	25	25	25	25	25
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	32	26	26	26	26	26	26
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	175						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 67						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	40						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

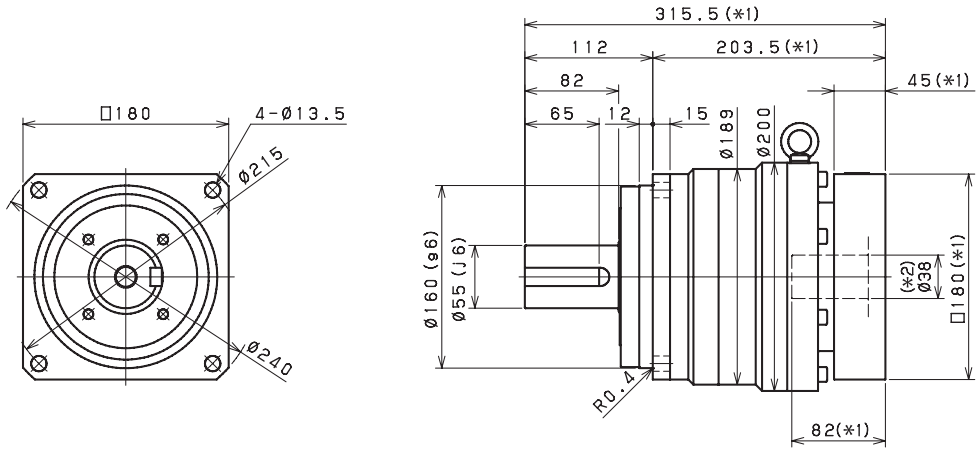
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

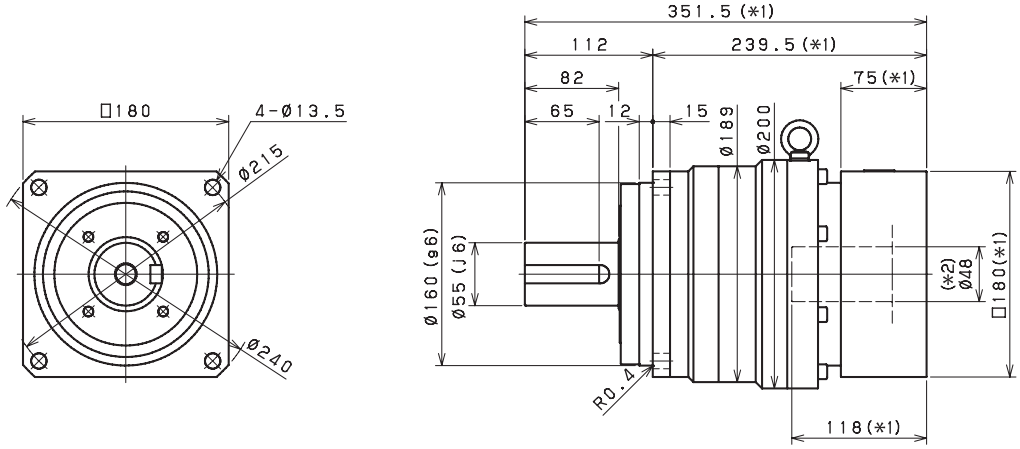
*14 Weight may vary slightly between models

VRS 180 1-Stage Dimensions

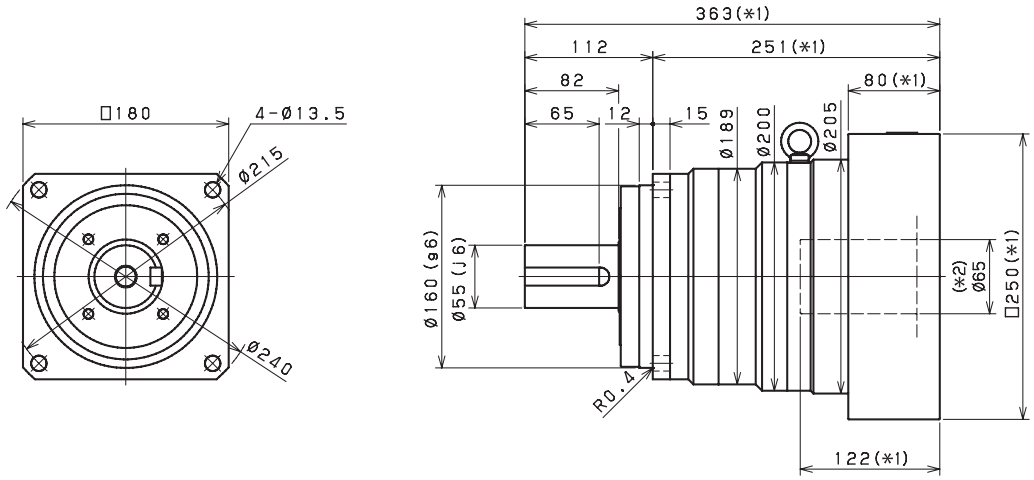
Input bore size ≦φ38 mm

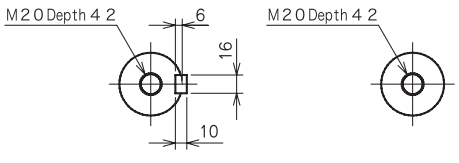


Input bore size ≦φ48 mm



Input bore size ≦φ65 mm





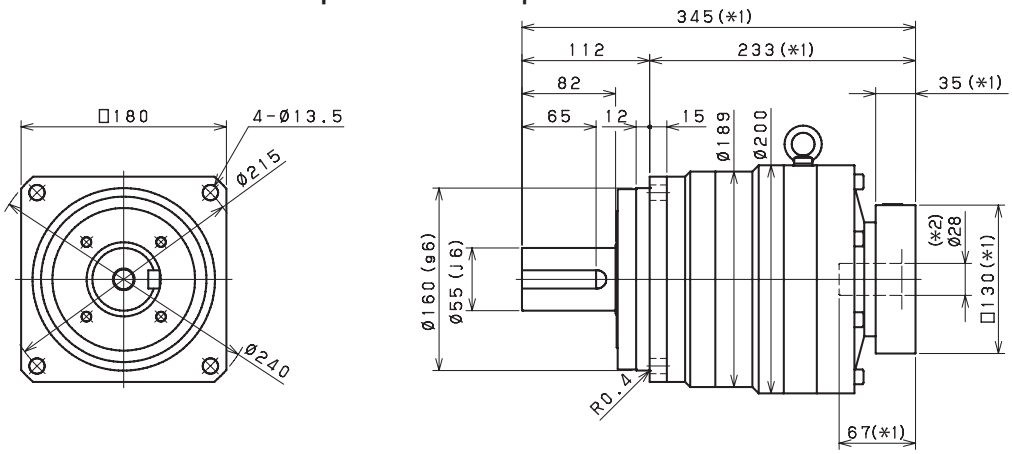
Keyed shaft Smooth shaft

*1 Length will vary depending on motor

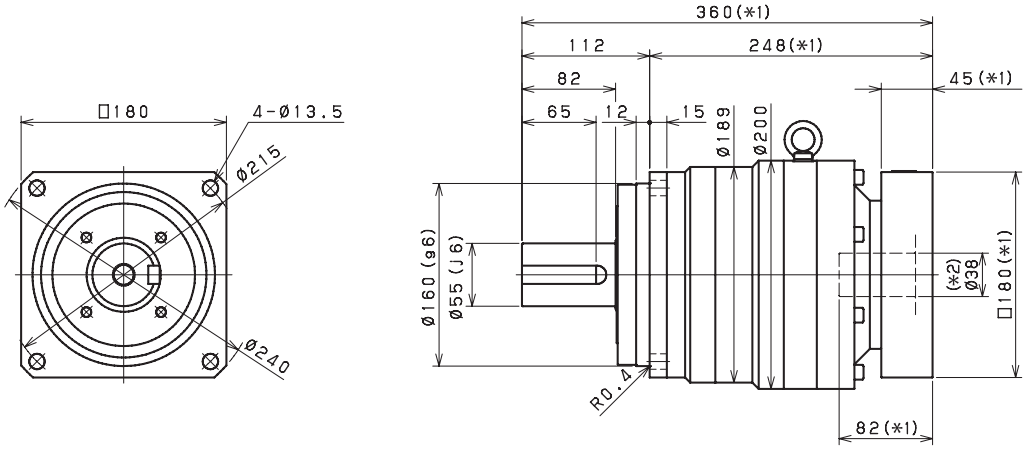
*2 Bushing will be inserted to adapt to motor shaft

VRS 180 2-Stage Dimensions

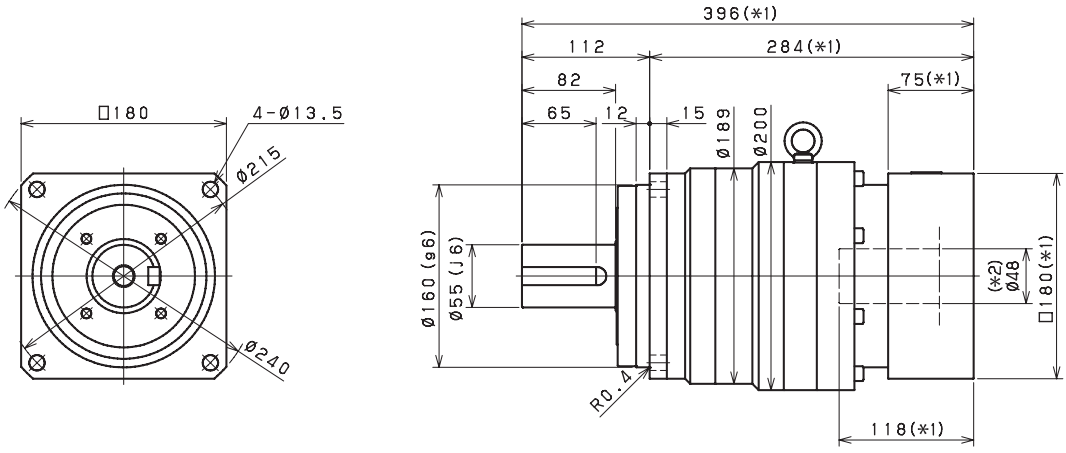
Input bore size ≦φ28 mm

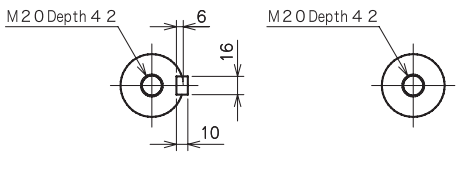


Input bore size ≦φ38 mm



Input bore size ≦φ48 mm





Keyed shaft　　Smooth shaft

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRS 210 1-Stage Specifications

Frame Size	210									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	980	1400	1400	1600	1700	1700	1700	1700
Maximum Acceleration Torque	[Nm]	*2	2000	2900	2900	2900	2900	2900	2600	2200
Maximum Torque	[Nm]	*3	2400	3700	3700	3500	3500	3400	3000	2700
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	5000	4000	4000
Nominal Input Speed	[rpm]	*5	1200	1200	1500	1500	1700	1700	2000	2000
Maximum Input Speed	[rpm]	*6	3000	3000	3000	3000	3000	3000	3000	3000
No Load Running Torque	[Nm]	*7	2.92							
Maximum Radial Load	[N]	*8	24000							
Maximum Axial Load	[N]	*9	22000							
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	110	55	42	36	33	31	29	28
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	160	99	86	80	77	74	73	72
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	400							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	59							

VRS 210 2-Stage Specifications

Frame Size	210									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	1100	1400	1500	1800	2000	1300	2000	2000
Maximum Acceleration Torque	[Nm]	*2	2000	2900	2900	2900	2900	2000	2900	2900
Maximum Torque	[Nm]	*3	2000	2900	2900	2900	2900	2000	2900	2900
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	4000	5000	5000
Nominal Input Speed	[rpm]	*5	2200	2200	2200	2200	2200	2200	2200	2200
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.14							
Maximum Radial Load	[N]	*8	24000							
Maximum Axial Load	[N]	*9	22000							
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	20	24	19	18	23	12	18	12
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	34	39	33	33	38	26	32	26
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	400							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 61							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	60							

VRS 210 2-Stage Specifications

Frame Size	210								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	1300	2000	2000	2000	2000	1300	1300
Maximum Acceleration Torque	[Nm]	*2	1800	2900	2900	2900	2500	1800	1600
Maximum Torque	[Nm]	*3	1800	2900	2900	2900	2500	1800	1600
Emergency Stop Torque	[Nm]	*4	4000	5000	5000	5000	5000	4000	4000
Nominal Input Speed	[rpm]	*5	2200	2500	2500	3000	3000	3000	3000
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.14						
Maximum Radial Load	[N]	*8	24000						
Maximum Axial Load	[N]	*9	22000						
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	4.7	4.7	4.6	4.6	4.6	4.6
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	18	12	11	11	11	11	11
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	32	26	26	26	26	26	26
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	400						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 61						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	60						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

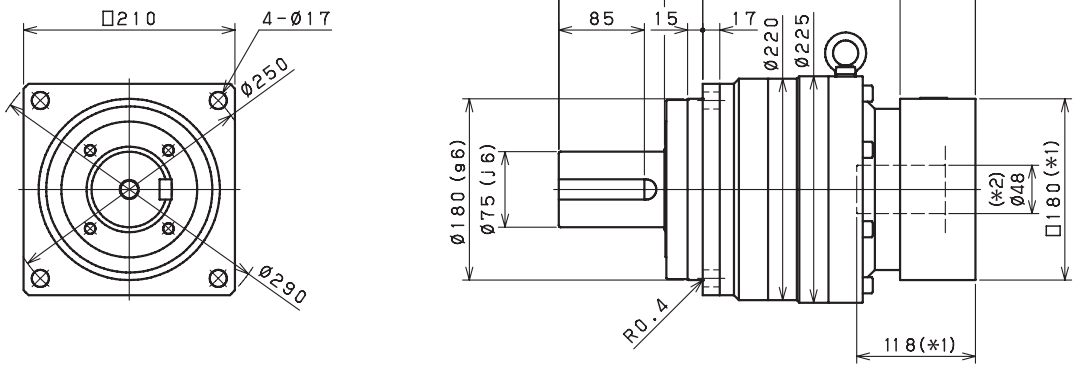
*12 Contact Nidec Drive Technology for the testing conditions and environment

*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

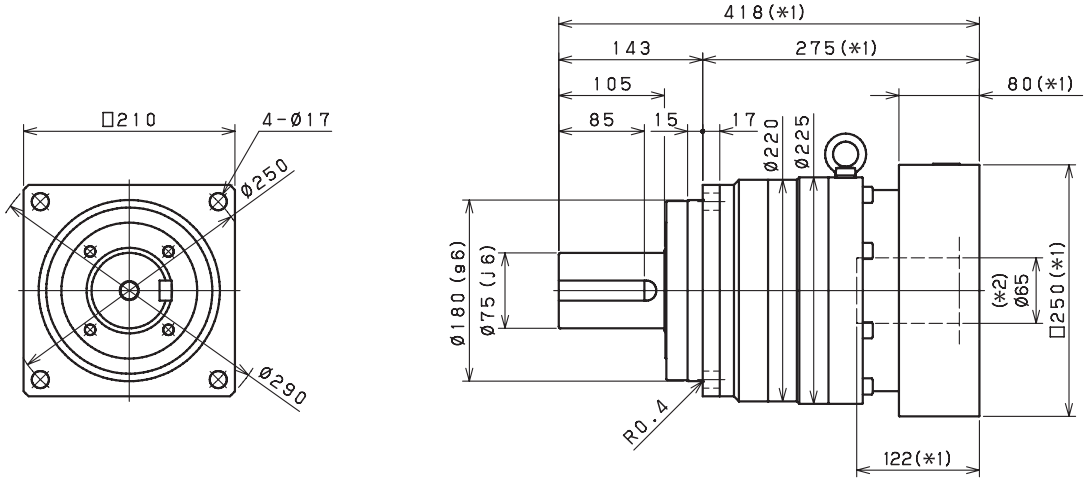
*14 Weight may vary slightly between models

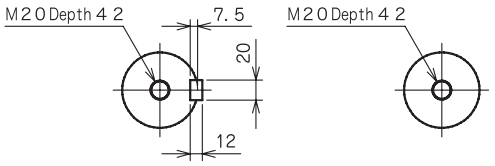
VRS 210 1-Stage Dimensions

Input bore size ≦φ48 mm



Input bore size ≦φ65 mm





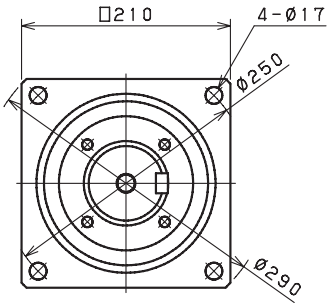
Keyed shaft Smooth shaft

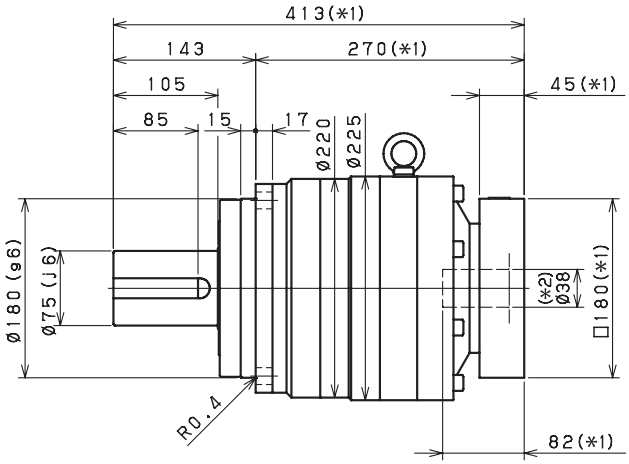
*1 Length will vary depending on motor.

*2 Bushing will be inserted to adapt to motor shaft

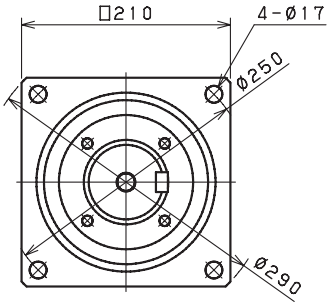
VRS 210 2-Stage Dimensions

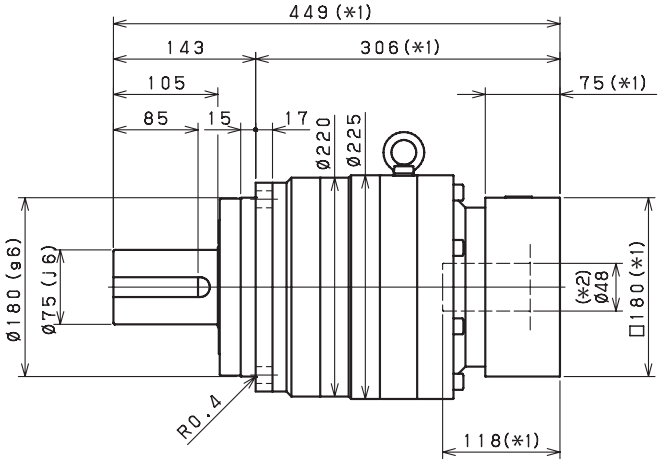
Input bore size ≦φ38 mm

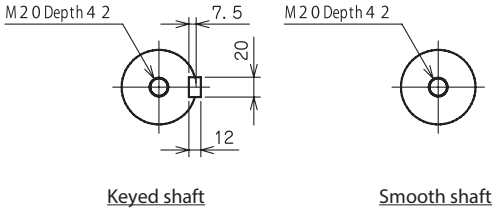




Input bore size ≦φ48 mm







Keyed shaft　　Smooth shaft

*1 Length will vary depending on motor.

*2 Bushing will be inserted to adapt to motor shaft

VRS 240 1-Stage Specifications

Frame Size	240									
Ratio	**Unit**	**Note**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	1600	2400	2400	2600	2700	2700	2700	2700
Maximum Acceleration Torque	[Nm]	*2	3300	5100	5100	4800	4800	4700	4200	3600
Maximum Torque	[Nm]	*3	3800	5700	5700	5400	5400	5300	4700	4100
Emergency Stop Torque	[Nm]	*4	6000	8000	8000	8000	8000	8000	6000	6000
Nominal Input Speed	[rpm]	*5	1000	1000	1200	1200	1500	1500	1700	1700
Maximum Input Speed	[rpm]	*6	3000	3000	3000	3000	3000	3000	3000	3000
No Load Running Torque	[Nm]	*7	5.96							
Maximum Radial Load	[N]	*8	30000							
Maximum Axial Load	[N]	*9	27000							
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	230	130	110	92	86	81	78	77
Efficiency	[%]	*10	95							
Torsional Rigidity	[Nm/arc-min]	*11	550							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 62							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	85							

VRS 240 2-Stage Specifications

Frame Size	240									
Ratio	**Unit**	**Note**	**15**	**16**	**20**	**25**	**28**	**30**	**35**	**40**
Nominal Output Torque	[Nm]	*1	2000	2400	2600	3200	3400	2000	3400	3400
Maximum Acceleration Torque	[Nm]	*2	3300	5100	5100	5100	4900	3300	4900	5100
Maximum Torque	[Nm]	*3	3300	5100	5100	5100	4900	3300	4900	5100
Emergency Stop Torque	[Nm]	*4	6000	8000	8000	8000	8000	6000	8000	8000
Nominal Input Speed	[rpm]	*5	2000	2000	2000	2000	2000	2000	2000	2000
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.28							
Maximum Radial Load	[N]	*8	30000							
Maximum Axial Load	[N]	*9	27000							
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	47	55	45	44	52	32	43	31
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90							
Torsional Rigidity	[Nm/arc-min]	*11	550							
Maximum Torsional Backlash	[arc-min]	--	≤ 3							
Noise Level	dB [A]	*12	≤ 62							
Protection Class	--	*13	IP54 (IP65)							
Ambient Temperature	[°C]	--	0-40							
Permitted Housing Temperature	[°C]	--	90							
Weight	[kg]	*14	89							

VRS 240 2-Stage Specifications

Frame Size	240								
Ratio	**Unit**	**Note**	**45**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	2000	3400	3400	3400	3400	2000	2000
Maximum Acceleration Torque	[Nm]	*2	2900	5100	4800	4900	3700	2900	2500
Maximum Torque	[Nm]	*3	2900	5100	4800	4900	3700	2900	2500
Emergency Stop Torque	[Nm]	*4	6000	8000	8000	8000	8000	6000	6000
Nominal Input Speed	[rpm]	*5	2000	2200	2200	2800	2800	2800	2800
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.28						
Maximum Radial Load	[N]	*8	30000						
Maximum Axial Load	[N]	*9	27000						
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	14	13	13	13	13	13
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	43	31	31	31	31	31	31
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*10	90						
Torsional Rigidity	[Nm/arc-min]	*11	550						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*12	≤ 62						
Protection Class	--	*13	IP54 (IP65)						
Ambient Temperature	[°C]	--	0-40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*14	89						

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor **f_0**, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The efficiency at the nominal output torque rating

*11 This does not include lost motion

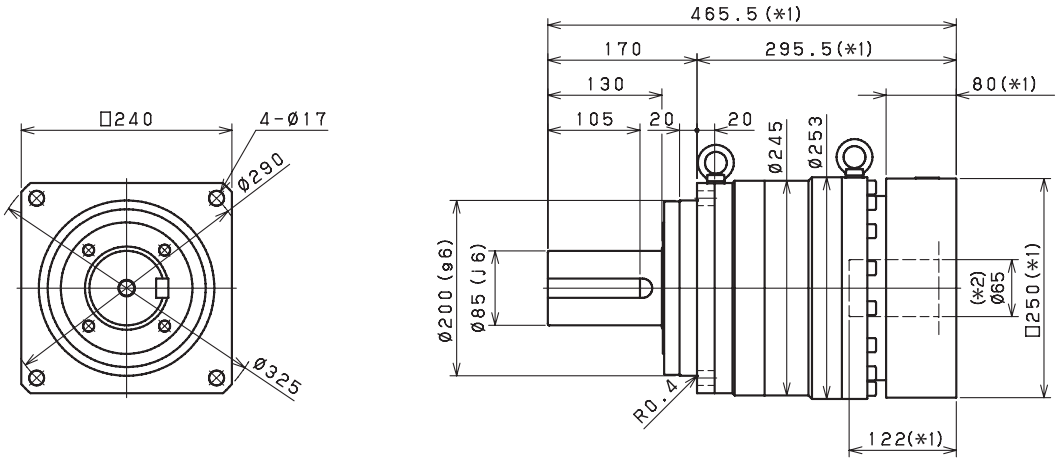
*12 Contact Nidec Drive Technology for the testing conditions and environment

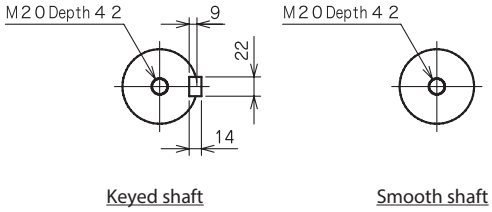
*13 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*14 Weight may vary slightly between models

VRS 240 1-Stage Dimensions

Input bore size ≦φ65 mm





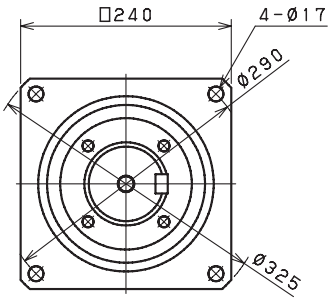
Keyed shaft Smooth shaft

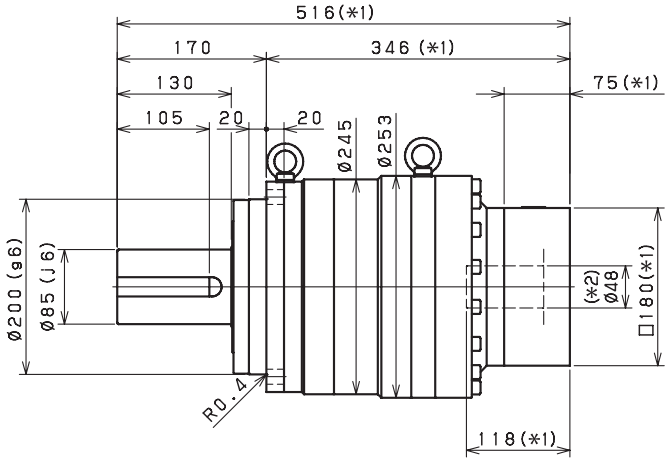
*1 Length will vary depending on motor

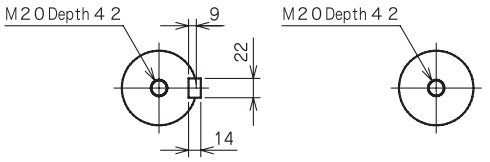
*2 Bushing will be inserted to adapt to motor shaft

VRS 240 2-Stage Dimensions

Input bore size ≦φ48 mm







Keyed shaft Smooth shaft

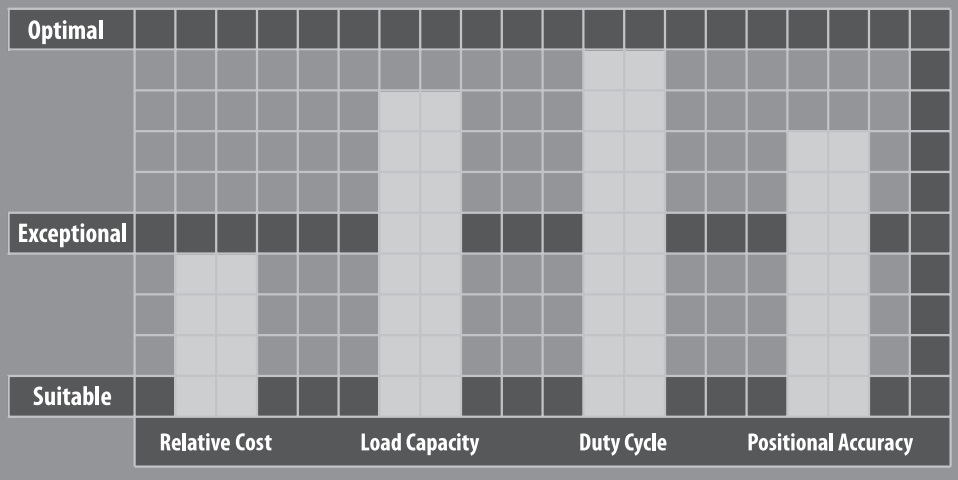
*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRT SERIES

The VRT series sets the new standard in applications requiring extremely high torque density and rigidity. Its compact design and robotic industry ISO flange is ideal for equipment requiring high speed, high precision indexing movement and streamlined installation. The remarkable torsional stiffness and ultra low backlash combine to provide outstanding positioning accuracy.

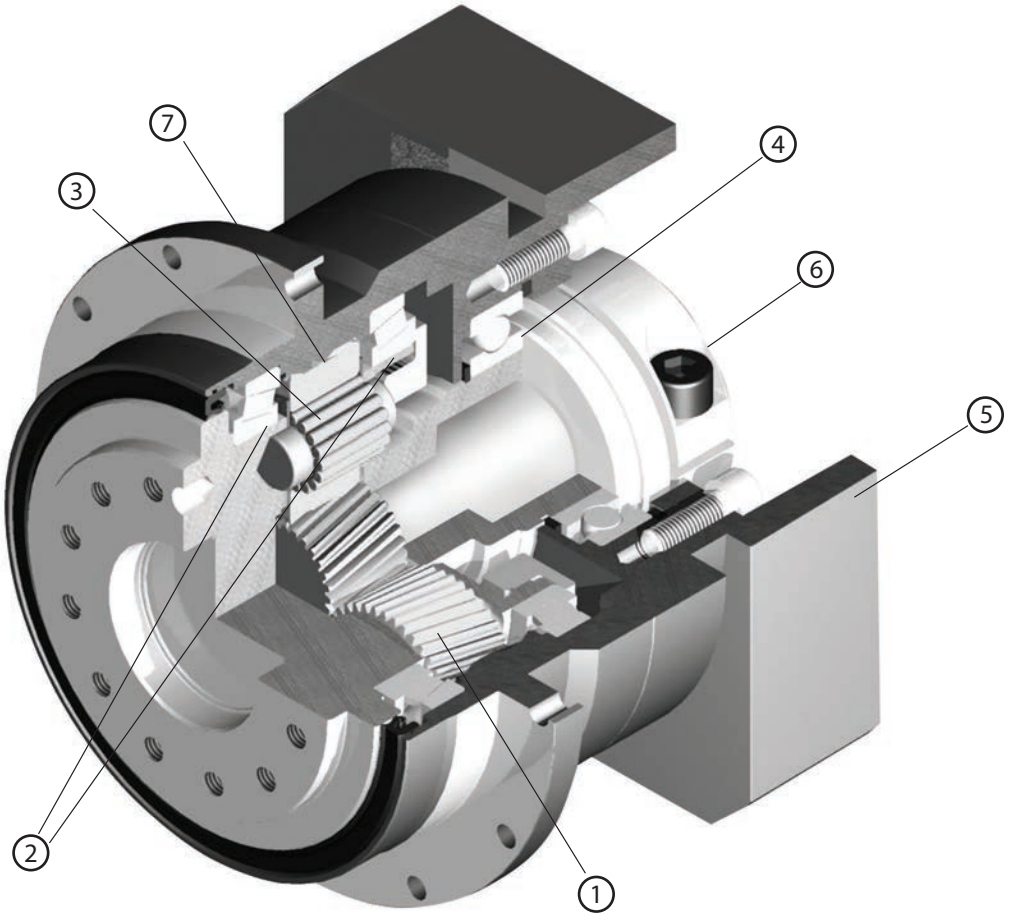
This product comes standard with <3 arc-min backlash, but is also available with reduced options down to <1 arc-min. The VRT is the most robust planetary solution in the marketplace and is used across a numerous range of applications including 7th axis robot shuttles, dial tables, end of arm tooling and any other axis where installation space, reduced assembly time and torque density play an important role.



VRT SERIES

- The most compact and robust option for machine builders. Tapered roller bearings allow for high radial and axial loading
- ISO robotic mounting interface for superior flexibility and direct mounting of pinions, pulleys and turntables
- Exceptional torsional rigidity for high positional accuracy needs
- Best-In-class standard backlash (≤3 arc-min) with reduced backlash options available
- Broad range of mounting adapters offer a simple, precise attachment to any motor
- Maintenance-free solution that is lubricated for life. High performance grease allows flexible mounting in any orientation

VRT Series Features



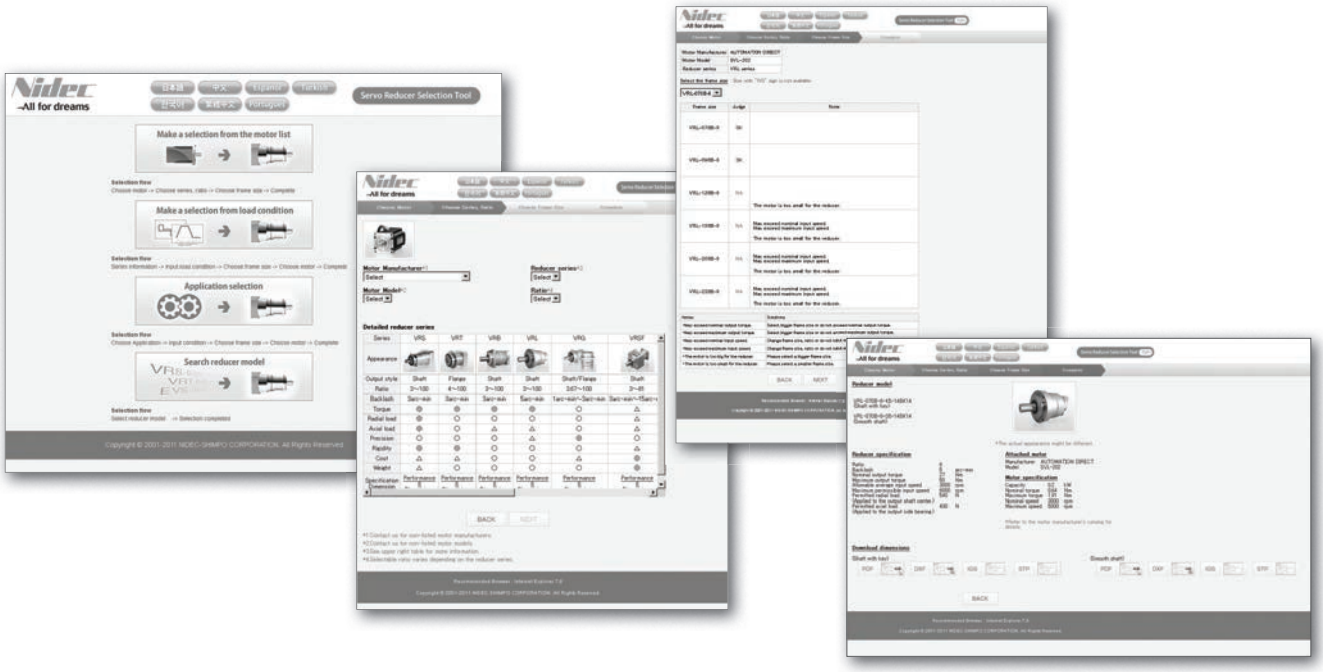
1. Carburized helical gears with proprietary secondary finishing process for higher accuracy and smooth, quiet operation
2. One piece output shaft and planet carrier with two robust tapered bearings straddling the planet gears. Higher radial/axial load capacity, stiffness, torque density and safety factor, with guaranteed alignment of gearing
3. Uncaged needle roller bearings provide excellent torque density and torsional rigidity
4. Unique labyrinth input seal design greatly reduces heat and increases system efficiency. IP65 protection is available for wash down applications
5. Optimized mounting system with active centering on motor pilot diameter guarantees alignment of motor. Motor can be installed in any orientation
6. True concentric motor shaft clamping connection, optimized for your specific motor. Reduced inertia for dynamic performance and balanced for high speed operation
7. Ring gear machined directly into the housing, not welded or pressed in. Provides greater concentricity and elimination of speed fluctuation

VRT Series Model Code

VRT	–	110	C	–	7	–	F	3	–	19HB16
Series Name		Frame Size	Design Version		Ratio		Output Mounting Style	*Backlash		*Motor Mounting Code
VRS		047 064 090 110 140 200 255 285	Design Version		1 Stage: 4 5 7 10 2 Stage: 16 20 25 28 35 40 50 70 100		F: Flange	Standard Backlash: ≤3 arc-min Reduced Backlash: ≤1 arc-min (*2)		Motor mounting code varies depending on the motor (*1)

*1 Motor mounting code varies depending on the motor. Use the selection tool link below to configure the code.
*2 Sizes 090/110/140/200 Only

Contact us for additional information or refer to our online gearbox selection tool.
Selection tool https://www.nidec-drivetechnology.co.jp/selection/all/



VRT 047 1-Stage Specifications

Frame Size	047								
Ratio	**Unit**	**Notes**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	9	10	10	10	10	10	10
Maximum Acceleration Torque	[Nm]	*2	21	21	21	21	21	14	14
Maximum Torque	[Nm]	*3	25	25	25	25	25	17	17
Emergency Stop Torque	[Nm]	*4	35	35	35	35	35	30	30
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8000	8000	8000	8000	8000	8000	8000
No Load Running Torque	[Nm]	*7	0.03						
Maximum Radial Load	[N]	*8	1100						
Maximum Axial Load	[N]	*9	550						
Maximum Tilting Moment	[Nm]	*10	32						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.052	0.043	0.038	0.036	0.034	0.033	0.032
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.17	0.16	0.15	0.15	0.15	0.15	0.15
Efficiency	[%]	*11	95						
Torsional Rigidity	[Nm/arc-min]	*12	2						
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*13	≤ 61						
Protection Class	--	*14	IP54 (IP65)						
Ambient Temperature	[°C]	--	0 - 40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*15	0.7						

VRT 047 2-Stage Specifications

Frame Size	047								
Ratio	**Unit**	**Notes**	**16**	**20**	**25**	**28**	**35**	**40**	**45**
Nominal Output Torque	[Nm]	*1	14	14	15	15	15	15	11
Maximum Acceleration Torque	[Nm]	*2	21	21	21	21	21	21	14
Maximum Torque	[Nm]	*3	21	21	21	21	21	21	14
Emergency Stop Torque	[Nm]	*4	35	35	35	35	35	35	30
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.01						
Maximum Radial Load	[N]	*8	1100						
Maximum Axial Load	[N]	*9	550						
Maximum Tilting Moment	[Nm]	*10	32						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.039	0.035	0.034	0.038	0.034	0.030	0.034
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--	--
Efficiency	[%]	*11	90						
Torsional Rigidity	[Nm/arc-min]	*12	2						
Maximum Torsional Backlash	[arc-min]	--	≤ 5						
Noise Level	dB [A]	*13	≤ 61						
Protection Class	--	*14	IP54 (IP65)						
Ambient Temperature	[°C]	--	0 - 40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*15	0.8						

VRT 047 2-Stage Specifications

Frame Size	047							
Ratio	**Unit**	**Notes**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	15	15	15	15	11	11
Maximum Acceleration Torque	[Nm]	*2	21	21	21	21	14	14
Maximum Torque	[Nm]	*3	21	21	21	21	14	14
Emergency Stop Torque	[Nm]	*4	35	35	35	35	30	30
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.01					
Maximum Radial Load	[N]	*8	1100					
Maximum Axial Load	[N]	*9	550					
Maximum Tilting Moment	[Nm]	*10	32					
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.030	0.030	0.030	0.030	0.030	0.030
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--	--	--
Efficiency	[%]	*11	90					
Torsional Rigidity	[Nm/arc-min]	*12	2					
Maximum Torsional Backlash	[arc-min]	--	≤ 5					
Noise Level	dB [A]	*13	≤ 61					
Protection Class	--	*14	IP54 (IP65)					
Ambient Temperature	[°C]	--	0 - 40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*15	0.8					

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

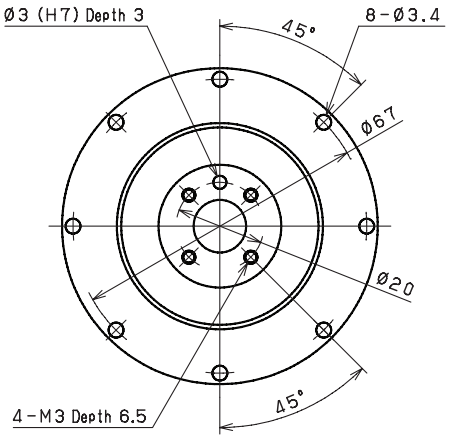
*13 Contact Nidec Drive Technology for the testing conditions and environment

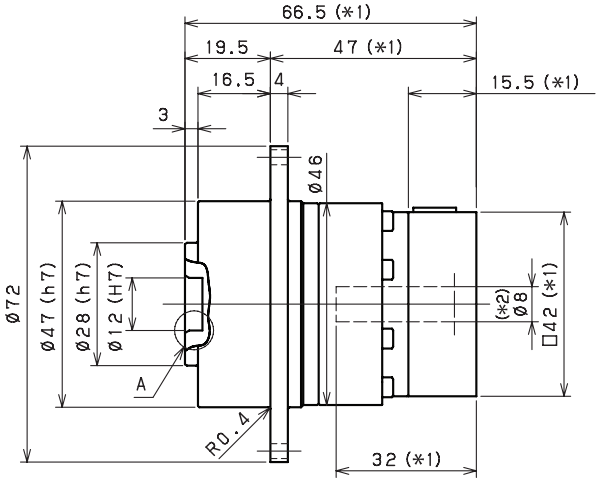
*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*15 Weight may vary slightly between models

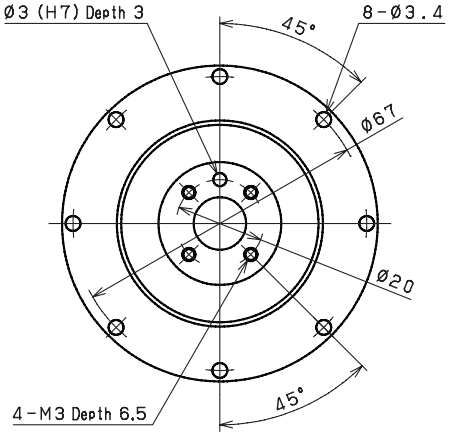
VRT 047 1-Stage Dimensions

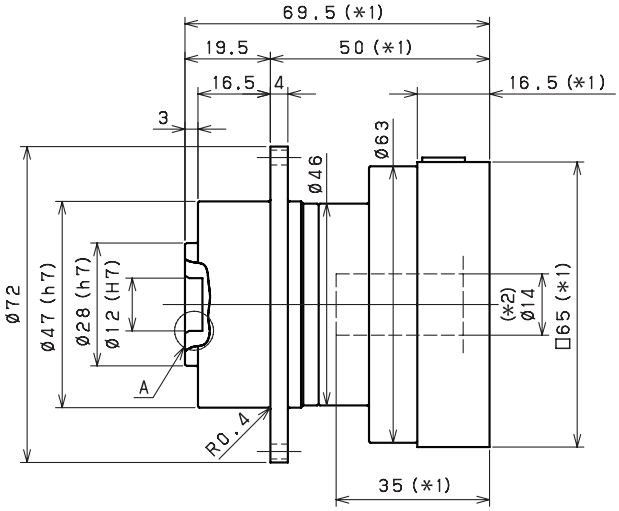
Input bore size ≦φ8 mm





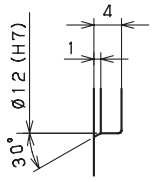
Input bore size ≦φ14 mm





*1 Length will vary depending on motor

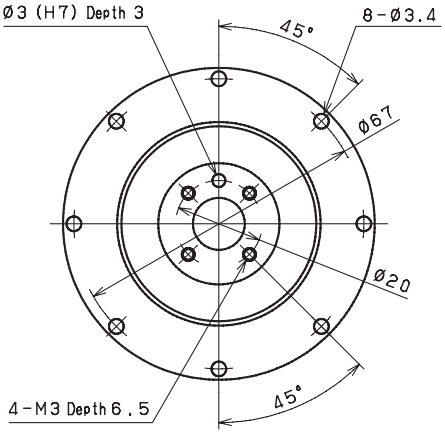
*2 Bushing will be inserted to adapt to motor shaft

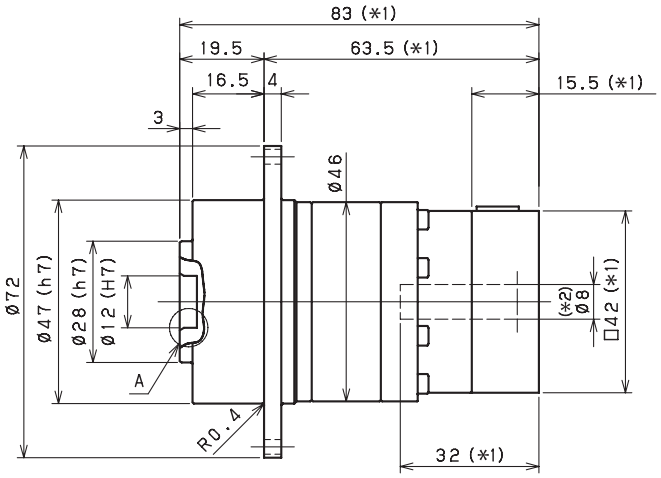


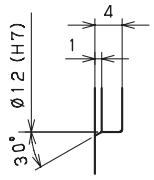
Enlarged detail A

VRT 047 2-Stage Dimensions

Input bore size ≦φ8 mm







Enlarged detail A

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRT 064 1-Stage Specifications

Frame Size	064								
Ratio	**Unit**	**Note**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	27	28	28	28	28	28	28
Maximum Acceleration Torque	[Nm]	*2	66	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	79	79	79	79	76	55	55
Emergency Stop Torque	[Nm]	*4	100	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	3300	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.08						
Maximum Radial Load	[N]	*8	1500						
Maximum Axial Load	[N]	*9	750						
Maximum Tilting Moment	[Nm]	*10	58						
Moment of Inertia (≤ Ø 8)	[kgcm2]	-	0.13	0.10	0.085	0.075	0.068	0.064	0.062
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.24	0.21	0.20	0.19	0.18	0.18	0.17
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.52	0.49	0.47	0.46	0.46	0.45	0.45
Efficiency	[%]	*11	95						
Torsional Rigidity	[Nm/arc-min]	*12	12	12	11	11	8	8	8
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*13	≤ 66						
Protection Class	--	*14	IP54 (IP65)						
Ambient Temperature	[°C]	--	0 - 40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*15	1.4						

VRT 064 2-Stage Specifications

Frame Size	064								
Ratio	**Unit**	**Note**	**16**	**20**	**25**	**28**	**35**	**40**	**45**
Nominal Output Torque	[Nm]	*1	32	32	43	45	45	45	32
Maximum Acceleration Torque	[Nm]	*2	66	66	66	66	66	66	46
Maximum Torque	[Nm]	*3	66	66	66	66	66	66	46
Emergency Stop Torque	[Nm]	*4	100	100	100	100	100	100	80
Nominal Input Speed	[rpm]	*5	4000	4000	4000	4000	4000	4000	4000
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04						
Maximum Radial Load	[N]	*8	1500						
Maximum Axial Load	[N]	*9	750						
Maximum Tilting Moment	[Nm]	*10	58						
Moment of Inertia (≤ Ø 8)	[kgcm2]	-	0.072	0.064	0.062	0.069	0.061	0.051	0.061
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.18	0.18	0.17	0.18	0.17	0.16	0.17
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.46	0.45	0.45	0.46	0.45	0.44	0.45
Efficiency	[%]	*11	90						
Torsional Rigidity	[Nm/arc-min]	*12	12	12	12	12	12	11	11
Maximum Torsional Backlash	[arc-min]	--	≤ 3						
Noise Level	dB [A]	*13	≤ 66						
Protection Class	--	*14	IP54 (IP65)						
Ambient Temperature	[°C]	--	0 - 40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*15	1.6						

VRT 064 2-Stage Specifications

Frame Size	064							
Ratio	**Unit**	**Note**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	45	45	45	45	32	32
Maximum Acceleration Torque	[Nm]	*2	66	66	66	66	46	46
Maximum Torque	[Nm]	*3	66	66	66	66	46	46
Emergency Stop Torque	[Nm]	*4	100	100	100	100	80	80
Nominal Input Speed	[rpm]	*5	4800	4800	5500	5500	5500	5500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.04					
Maximum Radial Load	[N]	*8	1500					
Maximum Axial Load	[N]	*9	750					
Maximum Tilting Moment	[Nm]	*10	58					
Moment of Inertia (≤ Ø 8)	[kgcm2]	-	0.051	0.051	0.051	0.051	0.051	0.051
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.16	0.16	0.16	0.16	0.16	0.16
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.44	0.44	0.44	0.44	0.44	0.44
Efficiency	[%]	*11	90					
Torsional Rigidity	[Nm/arc-min]	*12	12	9	11	7	7	8
Maximum Torsional Backlash	[arc-min]	--	≤ 3					
Noise Level	dB [A]	*13	≤ 66					
Protection Class	--	*14	IP54 (IP65)					
Ambient Temperature	[°C]	--	0 - 40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*15	1.6					

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

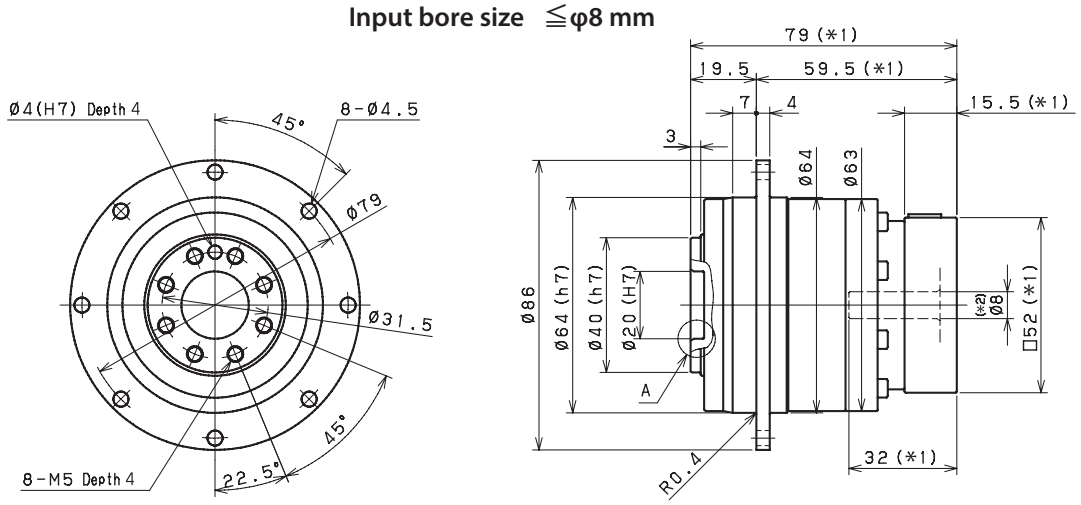
*13 Contact Nidec Drive Technology for the testing conditions and environment

*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

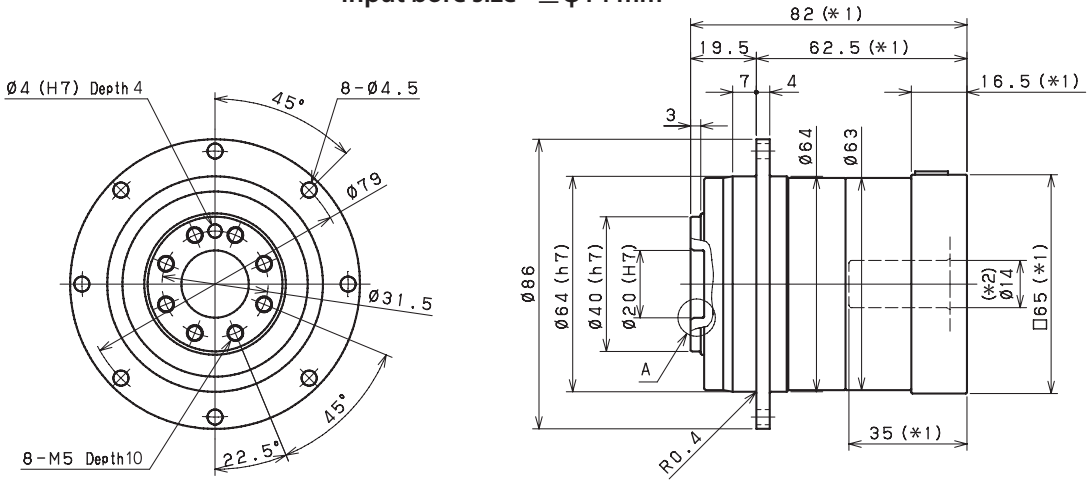
*15 Weight may vary slightly between models

VRT 064 1-Stage Dimensions

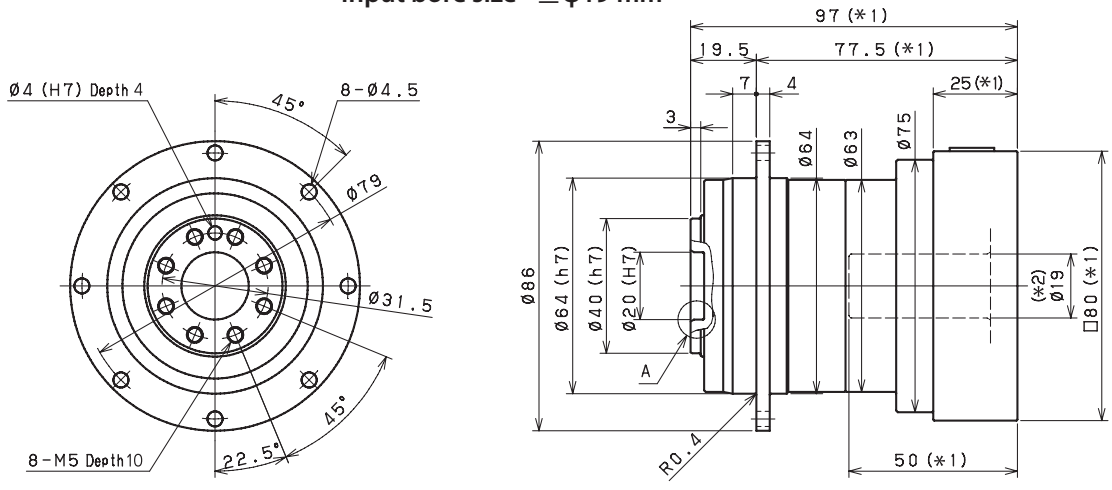
Input bore size ≦φ8 mm

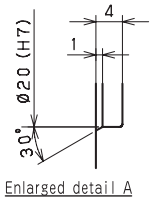


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm



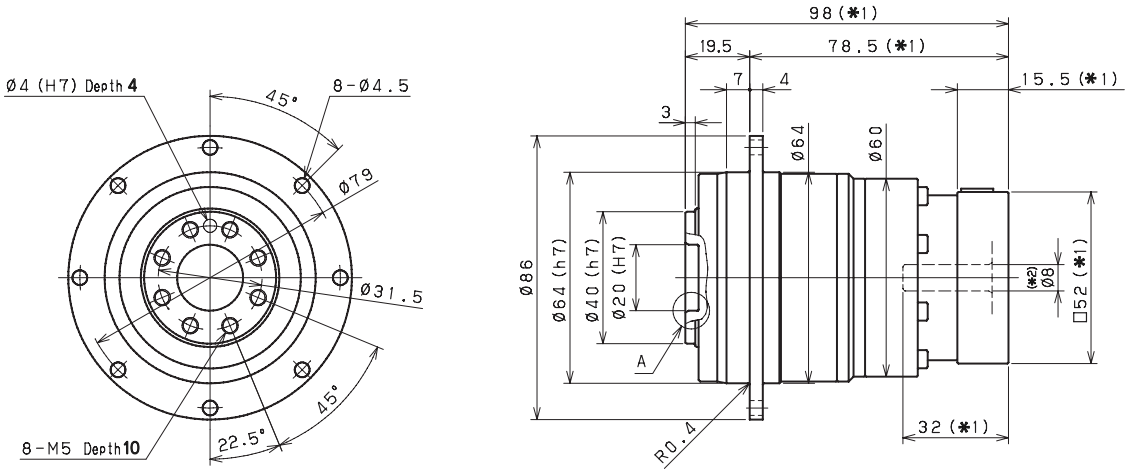


*1 Length will vary depending on motor

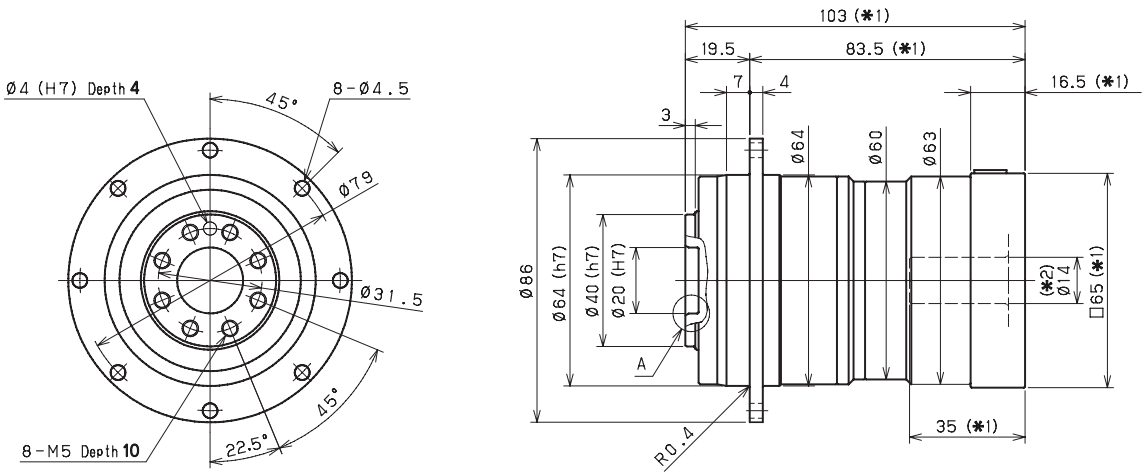
*2 Bushing will be inserted to adapt to motor shaft

VRT 064 2-Stage Dimensions

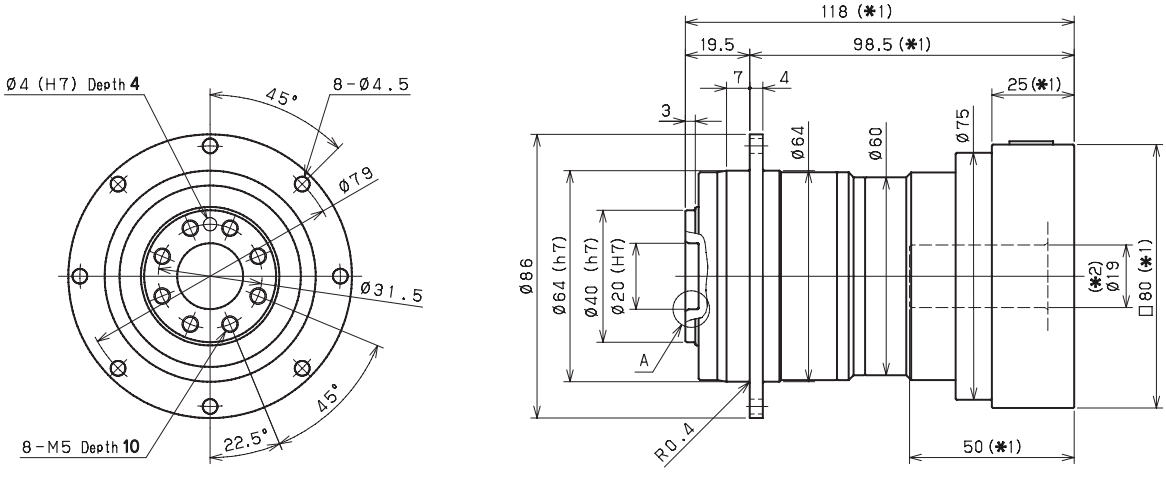
Input bore size ≦φ8 mm

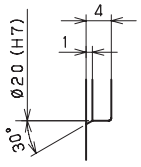


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm





Enlarged detail A

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRT 090 1-Stage Specifications

Frame Size	090								
Ratio	**Unit**	**Note**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Nominal Output Torque	[Nm]	*1	77	84	84	84	84	84	84
Maximum Acceleration Torque	[Nm]	*2	165	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	200	200	195	195	190	145	145
Emergency Stop Torque	[Nm]	*4	250	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	2900	2900	2900	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	7500	7500	7500	7500	7500	7500	7500
No Load Running Torque	[Nm]	*7	0.17						
Maximum Radial Load	[N]	*8	3300						
Maximum Axial Load	[N]	*9	1700						
Maximum Tilting Moment	[Nm]	*10	170						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.78	0.58	0.48	0.42	0.38	0.36	0.34
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.2	0.98	0.87	0.82	0.78	0.75	0.74
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.9	2.7	2.6	2.6	2.5	2.5	2.5
Efficiency	[%]	*11	95						
Torsional Rigidity	[Nm/arc-min]	*12	32	33	30	30	23	23	23
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 1						
Noise Level	dB [A]	*13	≤ 67						
Protection Class	--	*14	IP54 (IP65)						
Ambient Temperature	[°C]	--	0 - 40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*15	3.6						

VRT 090 2-Stage Specifications

Frame Size	090								
Ratio	**Unit**	**Note**	**16**	**20**	**25**	**28**	**35**	**40**	**45**
Nominal Output Torque	[Nm]	*1	80	86	106	118	118	118	88
Maximum Acceleration Torque	[Nm]	*2	165	165	165	165	165	165	112
Maximum Torque	[Nm]	*3	165	165	165	165	165	165	112
Emergency Stop Torque	[Nm]	*4	250	250	250	250	250	250	200
Nominal Input Speed	[rpm]	*5	3500	3500	3500	3500	3500	3500	3500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.05						
Maximum Radial Load	[N]	*8	3300						
Maximum Axial Load	[N]	*9	1700						
Maximum Tilting Moment	[Nm]	*10	170						
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.26	0.20	0.19	0.24	0.19	0.12	0.19
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.43	0.36	0.36	0.40	0.35	0.28	0.35
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.81	0.75	0.74	0.79	0.74	0.67	0.73
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.5	2.5	2.5	2.5	2.5	2.4	2.5
Efficiency	[%]	*11	90						
Torsional Rigidity	[Nm/arc-min]	*12	32	32	32	31	32	30	30
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 1						
Noise Level	dB [A]	*13	≤ 67						
Protection Class	--	*14	IP54 (IP65)						
Ambient Temperature	[°C]	--	0 - 40						
Permitted Housing Temperature	[°C]	--	90						
Weight	[kg]	*15	4						

VRT 090 2-Stage Specifications

Frame Size	090							
Ratio	**Unit**	**Note**	**50**	**60**	**70**	**80**	**90**	**100**
Nominal Output Torque	[Nm]	*1	118	118	118	118	88	88
Maximum Acceleration Torque	[Nm]	*2	165	165	165	165	112	112
Maximum Torque	[Nm]	*3	165	165	165	165	112	112
Emergency Stop Torque	[Nm]	*4	250	250	250	250	200	200
Nominal Input Speed	[rpm]	*5	3800	3800	4500	4500	4500	4500
Maximum Input Speed	[rpm]	*6	8500	8500	8500	8500	8500	8500
No Load Running Torque	[Nm]	*7	0.05					
Maximum Radial Load	[N]	*8	3300					
Maximum Axial Load	[N]	*9	1700					
Maximum Tilting Moment	[Nm]	*10	170					
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	0.12	0.11	0.11	0.11	0.11	0.11
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.28	0.27	0.27	0.27	0.27	0.27
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	0.67	0.67	0.67	0.67	0.67	0.67
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.4	2.4	2.4	2.4	2.4	2.4
Efficiency	[%]	*11	90					
Torsional Rigidity	[Nm/arc-min]	*12	30	24	28	22	22	22
Maximum Torsional Backlash	[arc-min]	--	Standard ≤ 3 / Reduced ≤ 1					
Noise Level	dB [A]	*13	≤ 67					
Protection Class	--	*14	IP54 (IP65)					
Ambient Temperature	[°C]	--	0 - 40					
Permitted Housing Temperature	[°C]	--	90					
Weight	[kg]	*15	4					

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

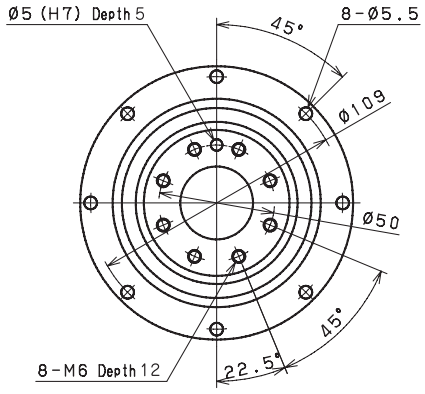
*13 Contact Nidec Drive Technology for the testing conditions and environment

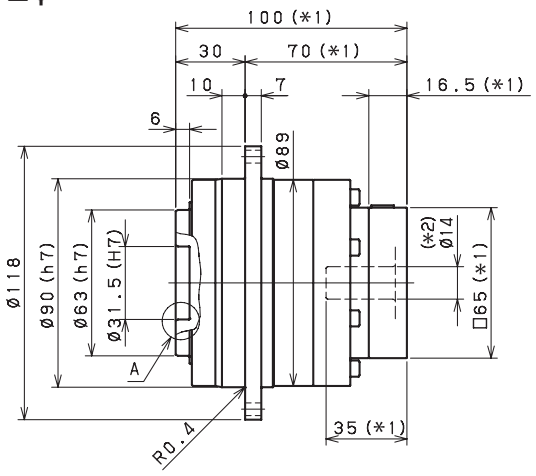
*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*15 Weight may vary slightly between models

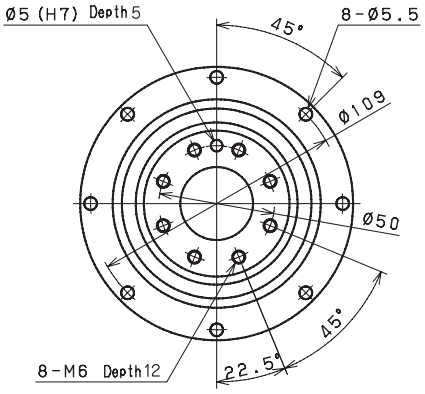
VRT 090 1-Stage Dimensions

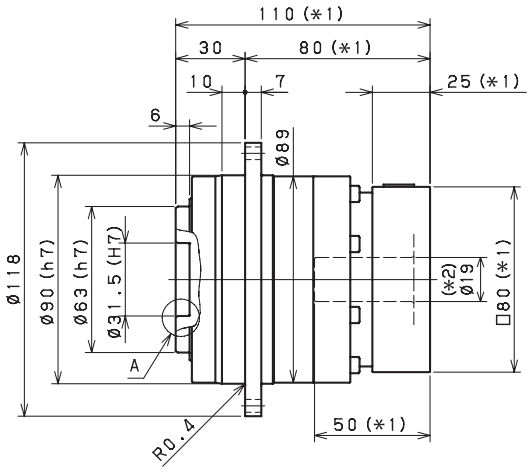
Input bore size ≦φ14 mm



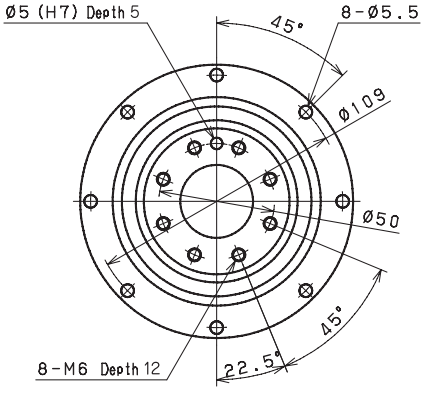


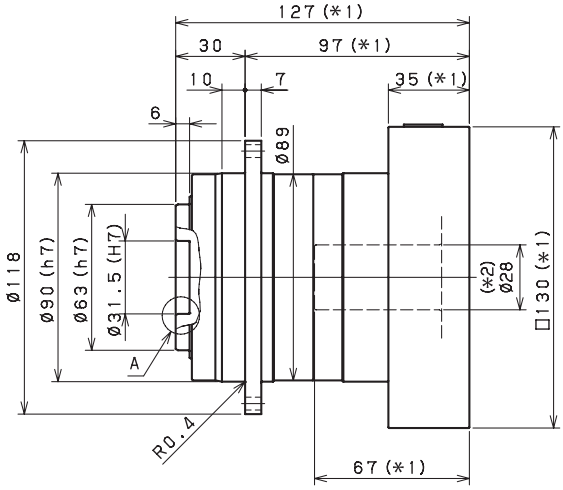
Input bore size ≦φ19 mm

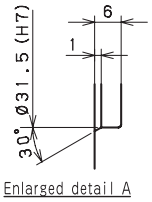




Input bore size ≦φ28 mm





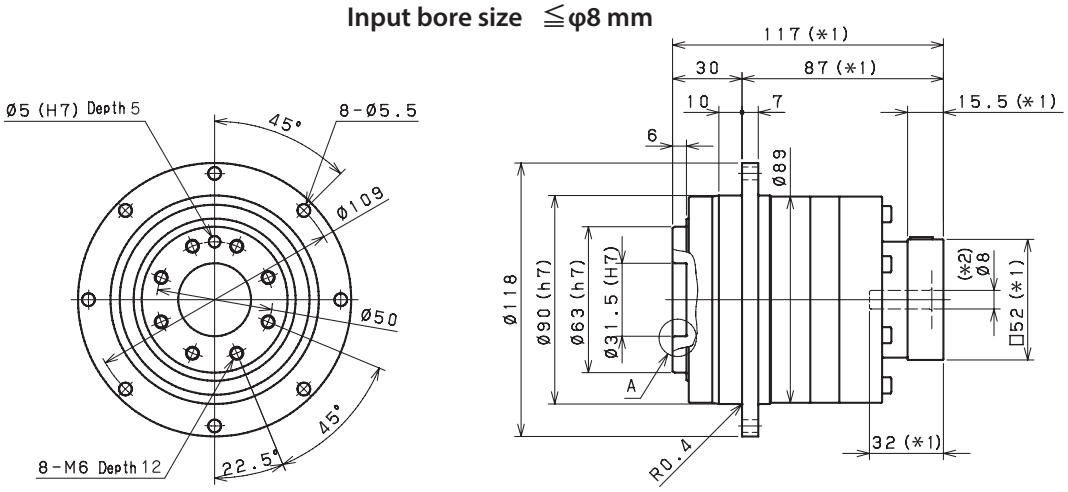


*1 Length will vary depending on motor

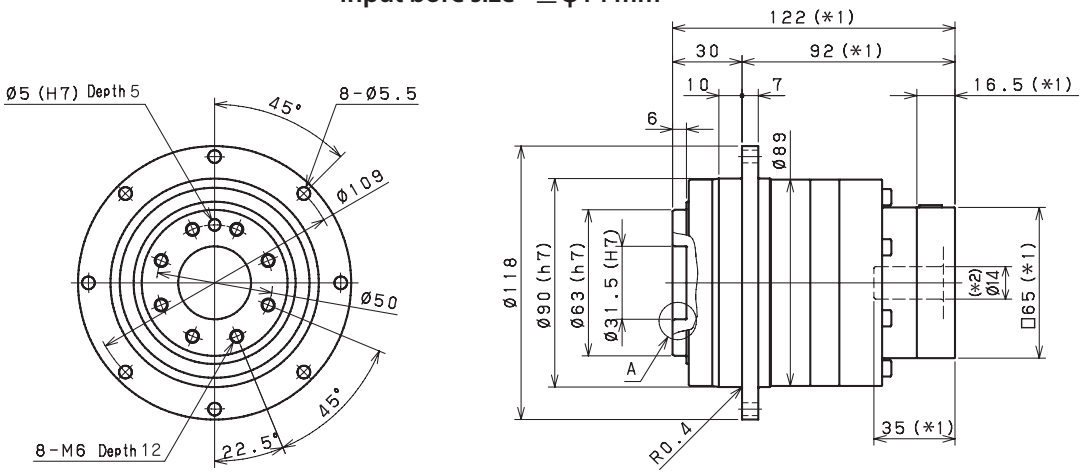
*2 Bushing will be inserted to adapt to motor shaft

VRT 090 2-Stage Dimensions

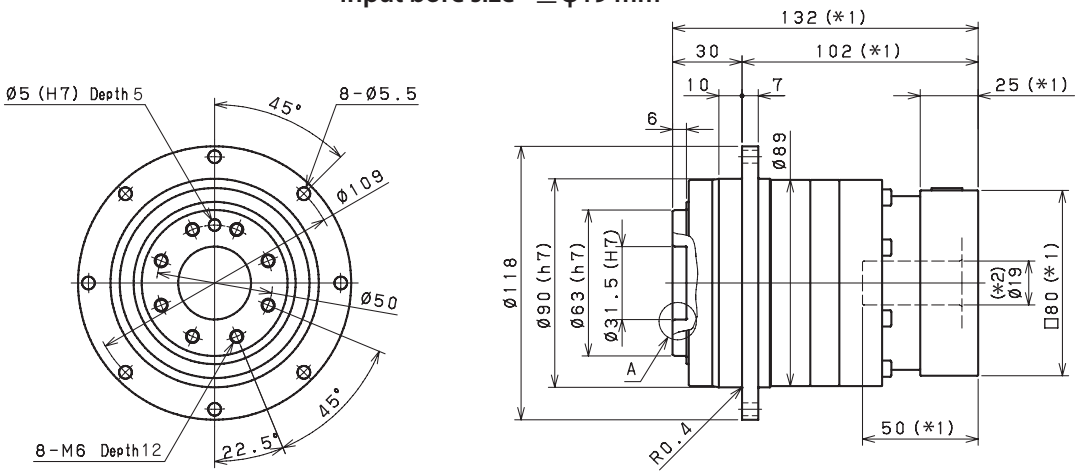
Input bore size ≦φ8 mm

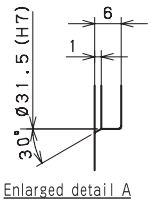


Input bore size ≦φ14 mm



Input bore size ≦φ19 mm (*3)





Enlarged detail A

*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 28mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRT 110 1-Stage Specifications

Frame Size	110					
Ratio	**Unit**	**Note**	**4**	**5**	**7**	**10**
Nominal Output Torque	[Nm]	*1	146	190	190	190
Maximum Acceleration Torque	[Nm]	*2	390	390	390	292
Maximum Torque	[Nm]	*3	490	490	480	370
Emergency Stop Torque	[Nm]	*4	625	625	625	500
Nominal Input Speed	[rpm]	*5	2800	2800	2800	2800
Maximum Input Speed	[rpm]	*6	5500	5500	5500	5500
No Load Running Torque	[Nm]	*7	0.77			
Maximum Radial Load	[N]	*8	12000			
Maximum Axial Load	[N]	*9	8800			
Maximum Tilting Moment	[Nm]	*10	990			
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	3.1	2.1	1.3	0.99
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.8	3.8	3.1	2.7
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	11	10	9.5	9.0
Efficiency	[%]	*11	95			
Torsional Rigidity	[Nm/arcmin]	*12	80	86	76	62
Maximum Torsional Backlash	[Arc-min]	--	Standard ≤ 3 / Reduced ≤ 1			
Noise Level	dB [A]	*13	≤ 71			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	7.8			

VRT 110 2-Stage Specifications

Frame Size	110					
Ratio	**Unit**	**Note**	**16**	**20**	**25**	**28**
Nominal Output Torque	[Nm]	*1	200	220	280	280
Maximum Acceleration Torque	[Nm]	*2	390	390	390	390
Maximum Torque	[Nm]	*3	390	390	390	390
Emergency Stop Torque	[Nm]	*4	625	625	625	625
Nominal Input Speed	[rpm]	*5	3100	3100	3100	3100
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.17			
Maximum Radial Load	[N]	*8	12000			
Maximum Axial Load	[N]	*9	8800			
Maximum Tilting Moment	[Nm]	*10	990			
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	-	--	--	--
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	1.0	0.76	0.73	0.94
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.4	1.1	1.1	1.3
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	3.2	2.9	2.9	3.1
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.5	9.2	9.1	9.4
Efficiency	[%]	*11	90			
Torsional Rigidity	[Nm/arcmin]	*12	81	81	83	80
Maximum Torsional Backlash	[Arc-min]	--	Standard ≤ 3 / Reduced ≤ 1			
Noise Level	dB [A]	*13	≤ 71			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	8.6			

VRT 110 2-Stage Specifications

Frame Size	110						
Ratio	**Unit**	**Note**	**35**	**40**	**50**	**70**	**100**
Nominal Output Torque	[Nm]	*1	280	270	280	280	220
Maximum Acceleration Torque	[Nm]	*2	390	390	390	390	292
Maximum Torque	[Nm]	*3	390	390	390	390	292
Emergency Stop Torque	[Nm]	*4	625	625	625	625	500
Nominal Input Speed	[rpm]	*5	3100	3100	3500	4200	4200
Maximum Input Speed	[rpm]	*6	6500	6500	6500	6500	6500
No Load Running Torque	[Nm]	*7	0.17				
Maximum Radial Load	[N]	*8	12000				
Maximum Axial Load	[N]	*9	8800				
Maximum Tilting Moment	[Nm]	*10	990				
Moment of Inertia (≤ Ø 8)	[kgcm2]	--	--	--	0.20	0.19	0.19
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	0.70	0.38	0.37	0.36	0.36
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	1.1	0.78	0.77	0.76	0.76
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	2.8	2.5	2.5	2.5	2.5
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	9.1	8.8	8.8	8.8	8.8
Efficiency	[%]	*11	90				
Torsional Rigidity	[Nm/arcmin]	*12	82	76	80	71	60
Maximum Torsional Backlash	[Arc-min]	--	Standard ≤ 3 / Reduced ≤ 1				
Noise Level	dB [A]	*13	≤ 71				
Protection Class	--	*14	IP54 (IP65)				
Ambient Temperature	[°C]	--	0 - 40				
Permitted Housing Temperature	[°C]	--	90				
Weight	[kg]	*15	8.6				

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

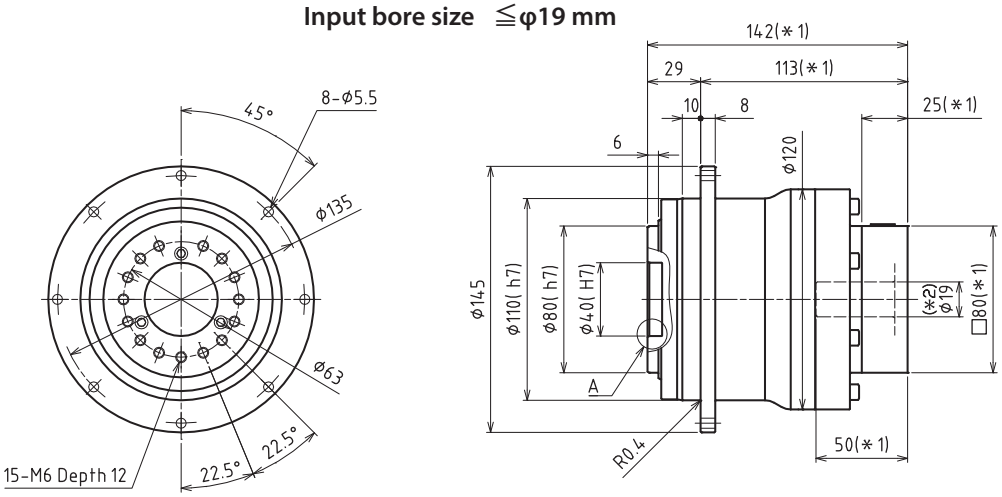
*13 Contact Nidec Drive Technology for the testing conditions and environment

*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

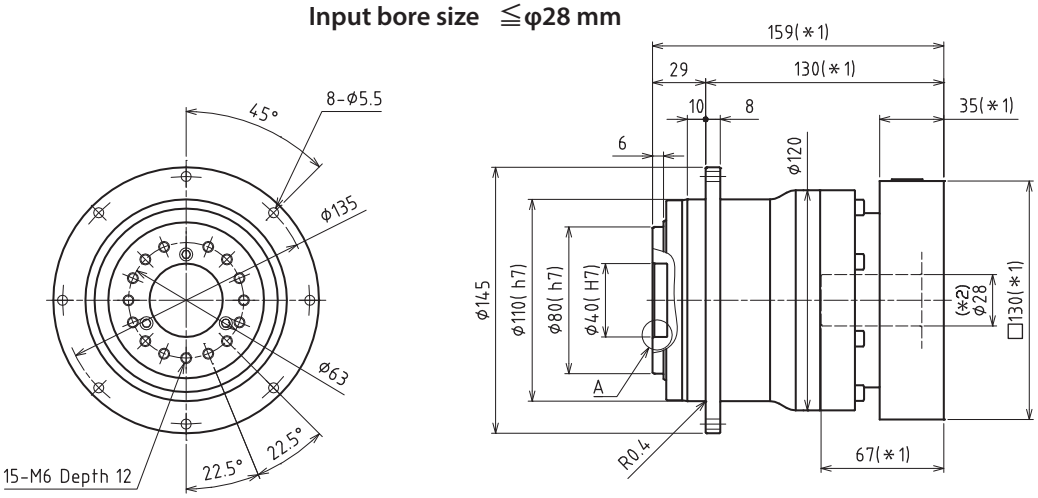
*15 Weight may vary slightly between models

VRT 110 1-Stage Dimensions

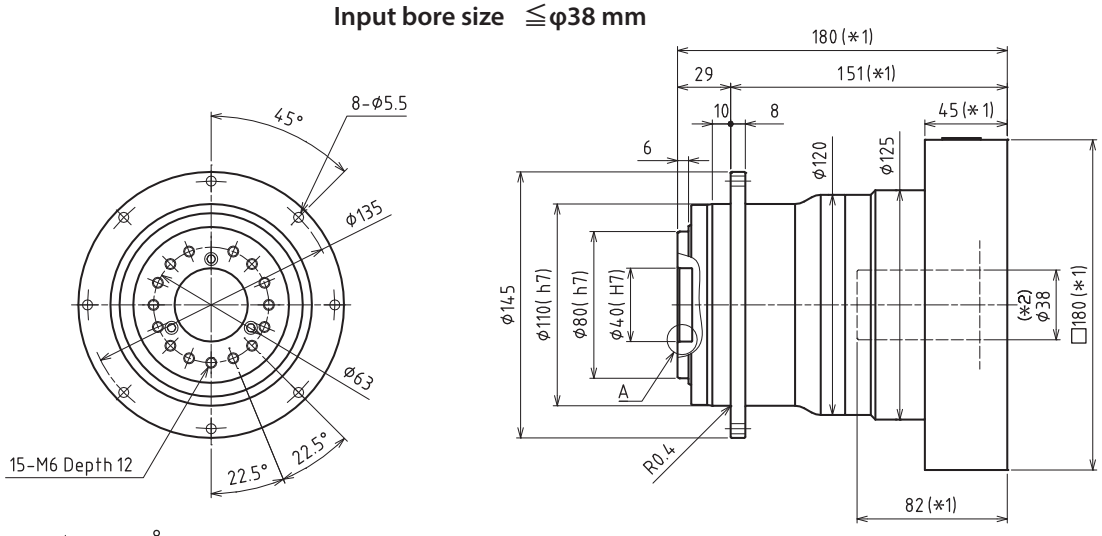
Input bore size ≦φ19 mm

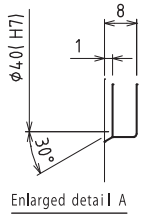


Input bore size ≦φ28 mm



Input bore size ≦φ38 mm



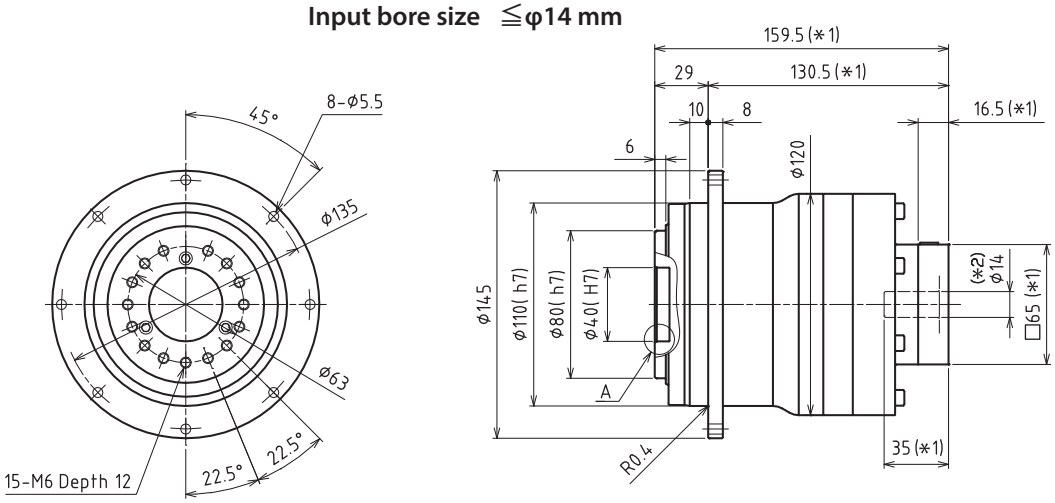


*1 Length will vary depending on motor

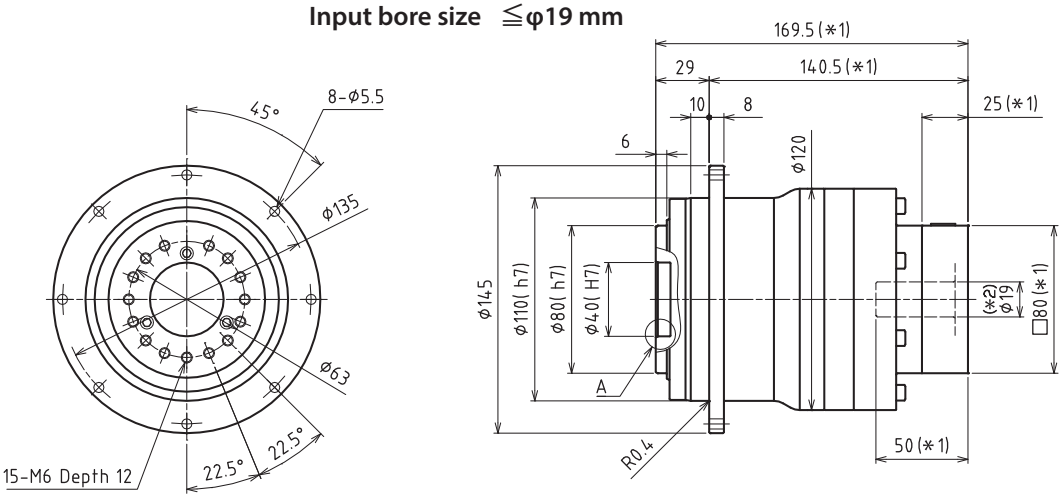
*2 Bushing will be inserted to adapt to motor shaft

VRT 110 2-Stage Dimensions

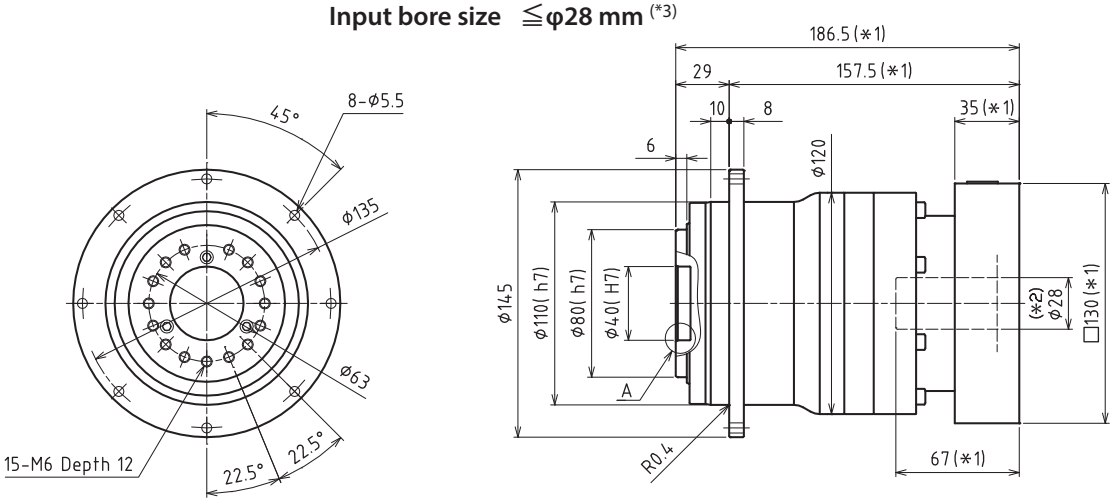
Input bore size ≦φ14 mm

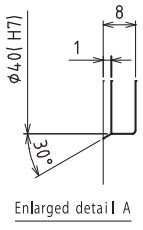


Input bore size ≦φ19 mm



Input bore size ≦φ28 mm (*3)





*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 38mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRT 140 1-Stage Specifications

Frame Size	140					
Ratio	**Unit**	**Note**	**4**	**5**	**7**	**10**
Nominal Output Torque	[Nm]	*1	280	380	380	380
Maximum Acceleration Torque	[Nm]	*2	840	840	840	610
Maximum Torque	[Nm]	*3	1000	1000	950	730
Emergency Stop Torque	[Nm]	*4	1250	1250	1250	1000
Nominal Input Speed	[rpm]	*5	2100	2100	2600	2600
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.00			
Maximum Radial Load	[N]	*8	19000			
Maximum Axial Load	[N]	*9	14000			
Maximum Tilting Moment	[Nm]	*10	2000			
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	11	7.7	5.1	3.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	18	14	12	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	33	29	27	25
Efficiency	[%]	*11	95			
Torsional Rigidity	[Nm/arcmin]	*12	190	187	159	140
Maximum Torsional Backlash	[Arc-min]	*13	Standard ≤ 3 / Reduced ≤ 1			
Noise Level	dB [A]	--	≤ 67			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	15			

VRT 140 2-Stage Specifications

Frame Size	140					
Ratio	**Unit**	**Note**	**16**	**20**	**25**	**28**
Nominal Output Torque	[Nm]	*1	380	410	590	590
Maximum Acceleration Torque	[Nm]	*2	840	840	840	840
Maximum Torque	[Nm]	*3	840	840	840	840
Emergency Stop Torque	[Nm]	*4	1250	1250	1250	1250
Nominal Input Speed	[rpm]	*5	2900	2900	2900	2900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.54			
Maximum Radial Load	[N]	*8	19000			
Maximum Axial Load	[N]	*9	14000			
Maximum Tilting Moment	[Nm]	*10	2000			
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	3.8	2.6	2.5	3.4
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	5.5	4.3	4.2	5.1
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	12	11	11	11
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	27	26	25	26
Efficiency	[%]	*11	90			
Torsional Rigidity	[Nm/arcmin]	*12	180	185	180	180
Maximum Torsional Backlash	[Arc-min]	*13	Standard ≤ 3 / Reduced ≤ 1			
Noise Level	dB [A]	--	≤ 67			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	17			

VRT 140 2-Stage Specifications

Frame Size	140						
Ratio	**Unit**	**Note**	**35**	**40**	**50**	**70**	**100**
Nominal Output Torque	[Nm]	*1	590	500	590	590	440
Maximum Acceleration Torque	[Nm]	*2	840	840	840	840	610
Maximum Torque	[Nm]	*3	840	840	840	840	610
Emergency Stop Torque	[Nm]	*4	1250	1250	1250	1250	1000
Nominal Input Speed	[rpm]	*5	2900	2900	3200	3900	3900
Maximum Input Speed	[rpm]	*6	6000	6000	6000	6000	6000
No Load Running Torque	[Nm]	*7	0.54				
Maximum Radial Load	[N]	*8	19000				
Maximum Axial Load	[N]	*9	14000				
Maximum Tilting Moment	[Nm]	*10	2000				
Moment of Inertia (≤ Ø 14)	[kgcm2]	--	--	--	0.68	0.65	0.64
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	2.4	1.1	1.1	1.1	1.1
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	4.1	2.9	2.9	2.8	2.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	10	9.2	9.1	9.1	9.1
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	25	24	24	24	24
Efficiency	[%]	*11	90				
Torsional Rigidity	[Nm/arcmin]	*12	175	175	175	145	140
Maximum Torsional Backlash	[Arc-min]	*13	Standard ≤ 3 / Reduced ≤ 1				
Noise Level	dB [A]	--	≤ 67				
Protection Class	--	*14	IP54 (IP65)				
Ambient Temperature	[°C]	--	0 - 40				
Permitted Housing Temperature	[°C]	--	90				
Weight	[kg]	*15	17				

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

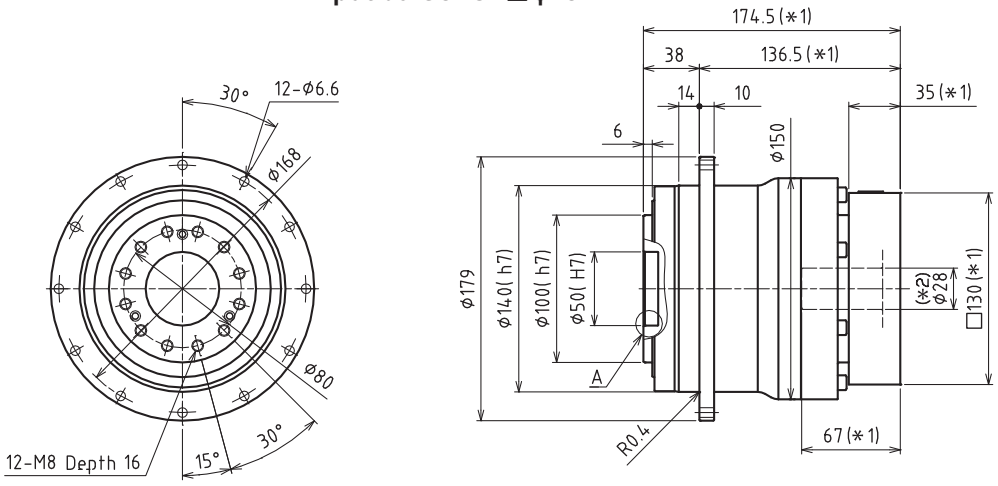
*13 Contact Nidec Drive Technology for the testing conditions and environment

*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

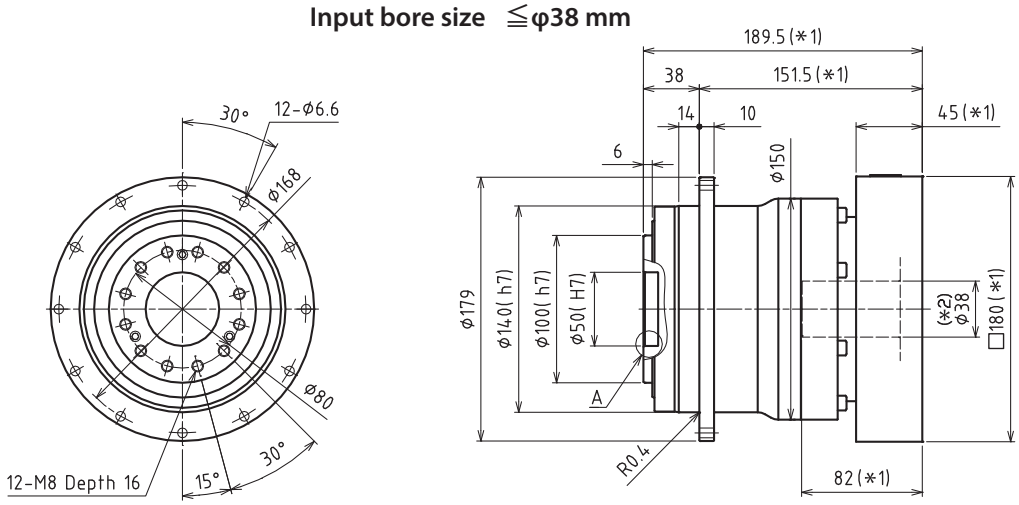
*15 Weight may vary slightly between models

VRT 140 1-Stage Dimensions

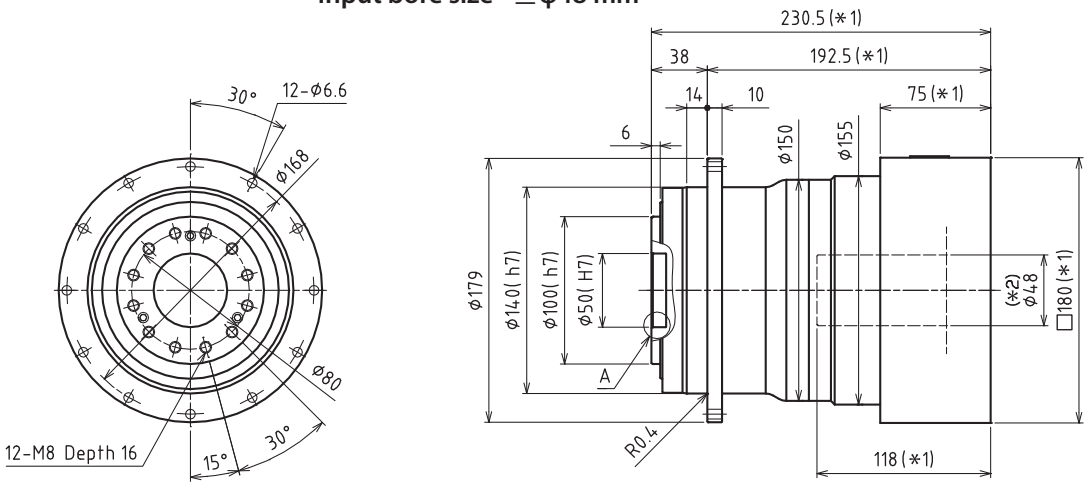
Input bore size ≦φ28 mm

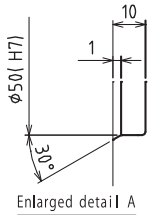


Input bore size ≦φ38 mm



Input bore size ≦φ48 mm



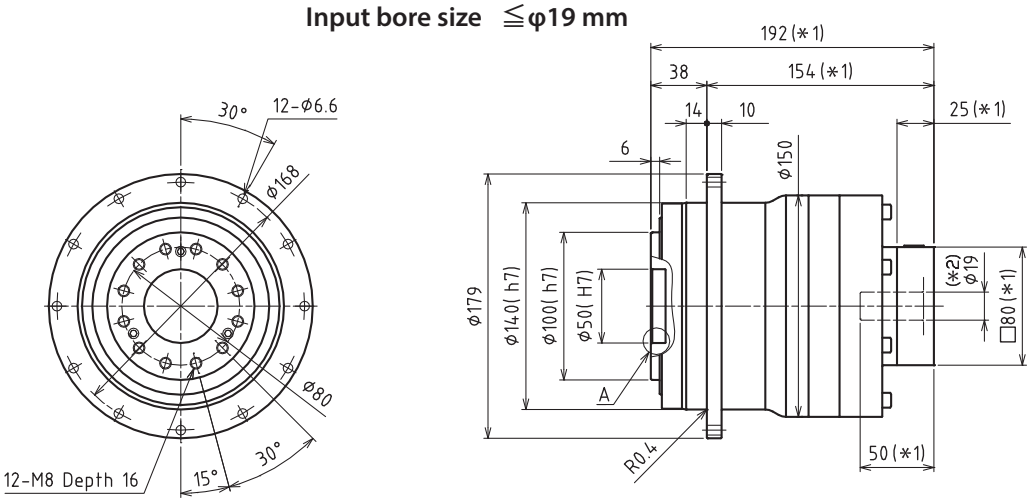


*1 Length will vary depending on motor.

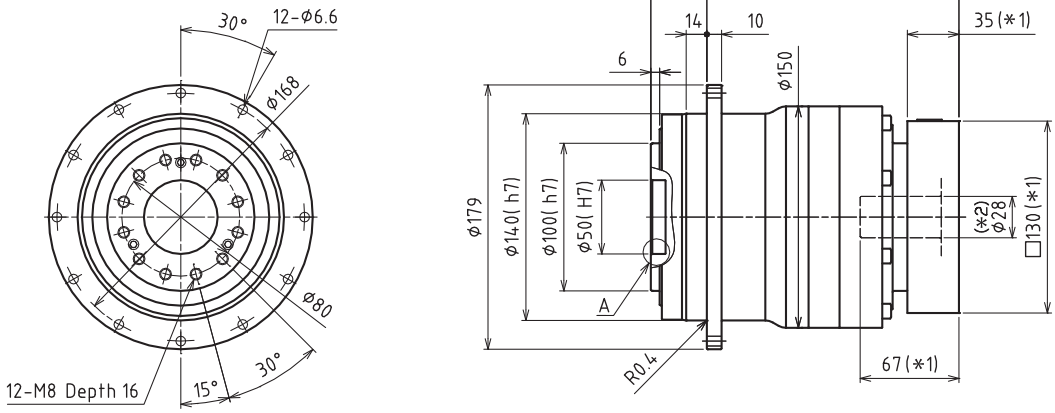
*2 Bushing will be inserted to adapt to motor shaft

VRT 140 2-Stage Dimensions

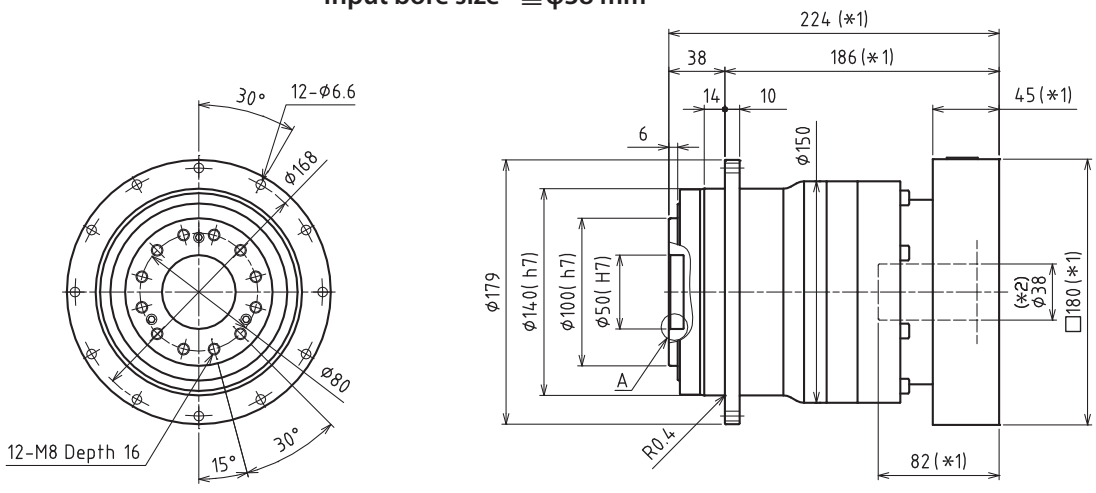
Input bore size ≦φ19 mm

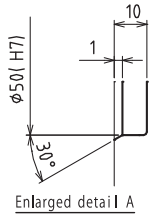


Input bore size ≦φ28 mm



Input bore size ≦φ38 mm (*3)





*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

*3 48mm input bore is available for this frame size. Use our online configurator to make your selection or contact us for assistance

VRT 200 1-Stage Specifications

Frame Size	200					
Ratio	**Unit**	**Note**	**4**	**5**	**7**	**10**
Nominal Output Torque	[Nm]	*1	850	910	910	910
Maximum Acceleration Torque	[Nm]	*2	1850	1850	1850	1350
Maximum Torque	[Nm]	*3	2250	2250	2150	1750
Emergency Stop Torque	[Nm]	*4	2750	2750	2750	2200
Nominal Input Speed	[rpm]	*5	1500	1500	2300	2300
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.9			
Maximum Radial Load	[N]	*8	40000			
Maximum Axial Load	[N]	*9	30000			
Maximum Tilting Moment	[Nm]	*10	5300			
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	53	36	23	16
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	68	51	37	31
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	110	95	81	75
Efficiency	[%]	*11	95			
Torsional Rigidity	[Nm/arcmin]	*12	610	610	550	445
Maximum Torsional Backlash	[Arc-min]	*13	Standard ≤ 3 / Reduced ≤ 1			
Noise Level	dB [A]	--	≤ 67			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	42			

VRT 200 2-Stage Specifications

Frame Size	200					
Ratio	**Unit**	**Note**	**16**	**20**	**25**	**28**
Nominal Output Torque	[Nm]	*1	850	910	1100	1300
Maximum Acceleration Torque	[Nm]	*2	1850	1850	1850	1850
Maximum Torque	[Nm]	*3	1850	1850	1850	1850
Emergency Stop Torque	[Nm]	*4	2750	2750	2750	2750
Nominal Input Speed	[rpm]	*5	2700	2700	2700	2700
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.3			
Maximum Radial Load	[N]	*8	40000			
Maximum Axial Load	[N]	*9	30000			
Maximum Tilting Moment	[Nm]	*10	5300			
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	13	9.2	8.6	11
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	19	15	15	18
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	34	30	30	32
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--
Efficiency	[%]	*11	90			
Torsional Rigidity	[Nm/arcmin]	*12	585	580	570	560
Maximum Torsional Backlash	[Arc-min]	*13	Standard ≤ 3 / Reduced ≤ 1			
Noise Level	dB [A]	--	≤ 67			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	43			

VRT 200 2-Stage Specifications

Frame Size	200						
Ratio	**Unit**	**Note**	**35**	**40**	**50**	**70**	**100**
Nominal Output Torque	[Nm]	*1	1300	1200	1300	1300	930
Maximum Acceleration Torque	[Nm]	*2	1850	1850	1850	1850	1350
Maximum Torque	[Nm]	*3	1850	1850	1850	1850	1350
Emergency Stop Torque	[Nm]	*4	2750	2750	2750	2750	2200
Nominal Input Speed	[rpm]	*5	2700	2700	2900	3400	3400
Maximum Input Speed	[rpm]	*6	5000	5000	5000	5000	5000
No Load Running Torque	[Nm]	*7	1.3				
Maximum Radial Load	[N]	*8	40000				
Maximum Axial Load	[N]	*9	30000				
Maximum Tilting Moment	[Nm]	*10	5300				
Moment of Inertia (≤ Ø 19)	[kgcm2]	--	--	--	2.1	1.9	1.9
Moment of Inertia (≤ Ø 28)	[kgcm2]	--	8.0	4.1	4.0	3.8	3.8
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	14	10	10	10	10
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	29	25	25	25	25
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--
Efficiency	[%]	*11	90				
Torsional Rigidity	[Nm/arcmin]	*12	560	520	525	480	395
Maximum Torsional Backlash	[Arc-min]	*13	Standard ≤ 3 / Reduced ≤ 1				
Noise Level	dB [A]	--	≤ 67				
Protection Class	--	*14	IP54 (IP65)				
Ambient Temperature	[°C]	--	0 - 40				
Permitted Housing Temperature	[°C]	--	90				
Weight	[kg]	*15	43				

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

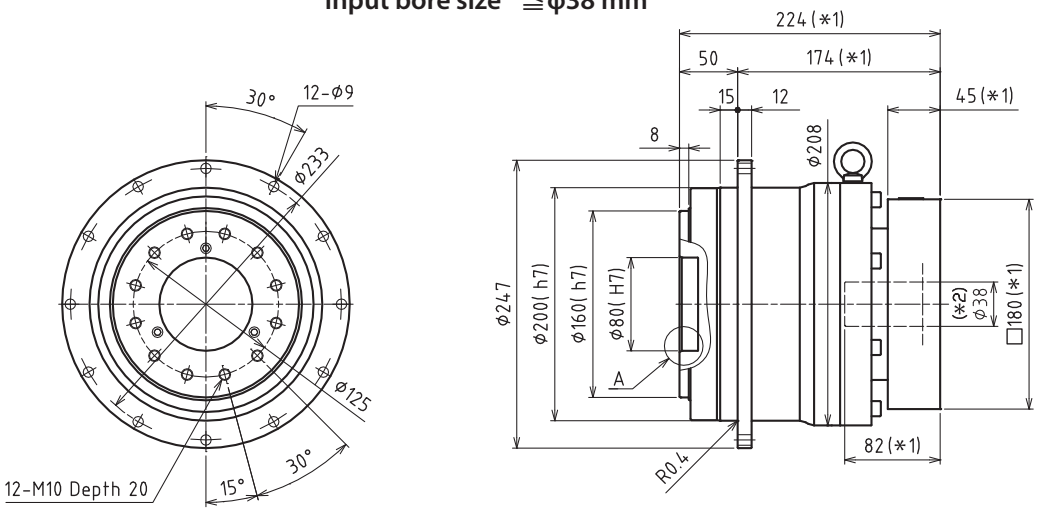
*13 Contact Nidec Drive Technology for the testing conditions and environment

*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

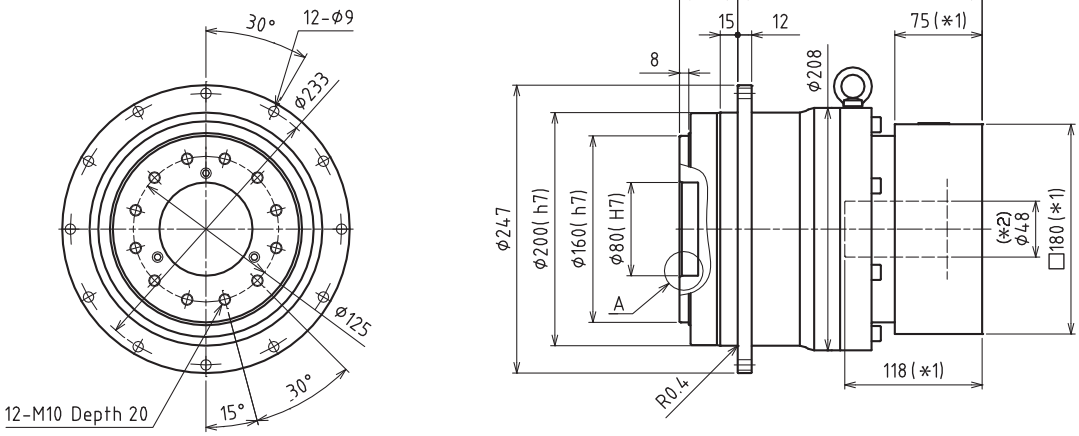
*15 Weight may vary slightly between models

VRT 200 1-Stage Dimensions

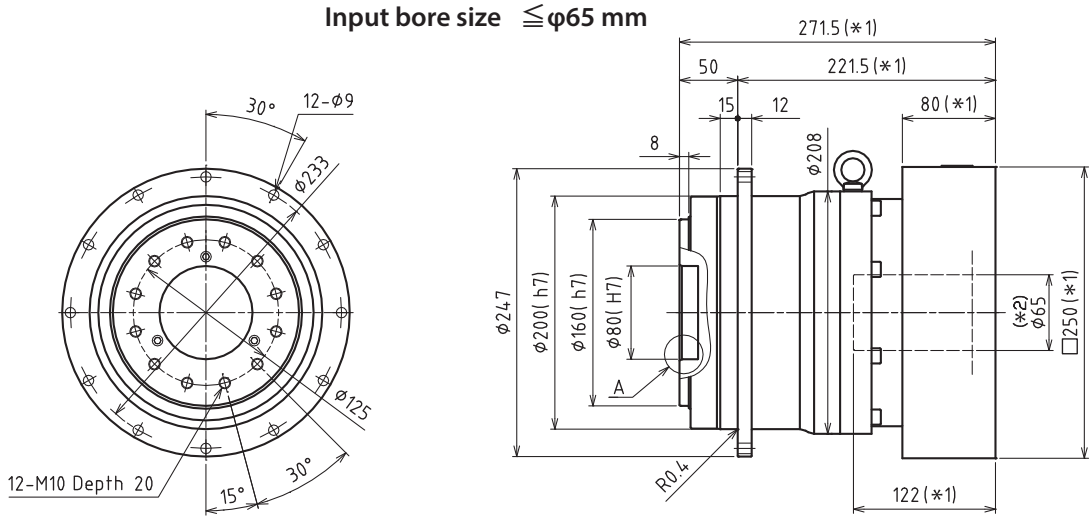
Input bore size ≦φ38 mm

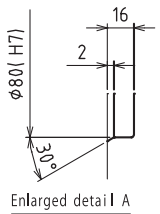


Input bore size ≦φ48 mm



Input bore size ≦φ65 mm



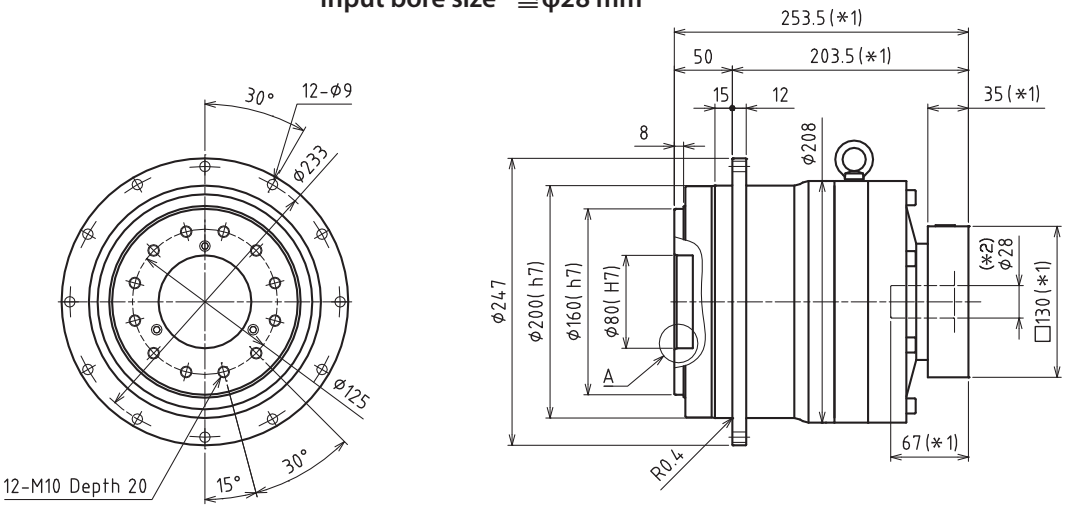


*1 Length will vary depending on motor

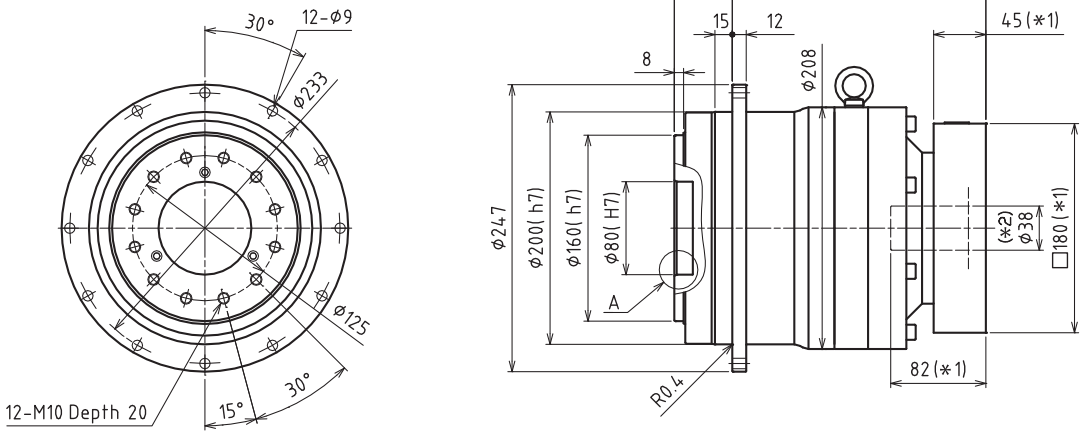
*2 Bushing will be inserted to adapt to motor shaft

VRT 200 2-Stage Dimensions

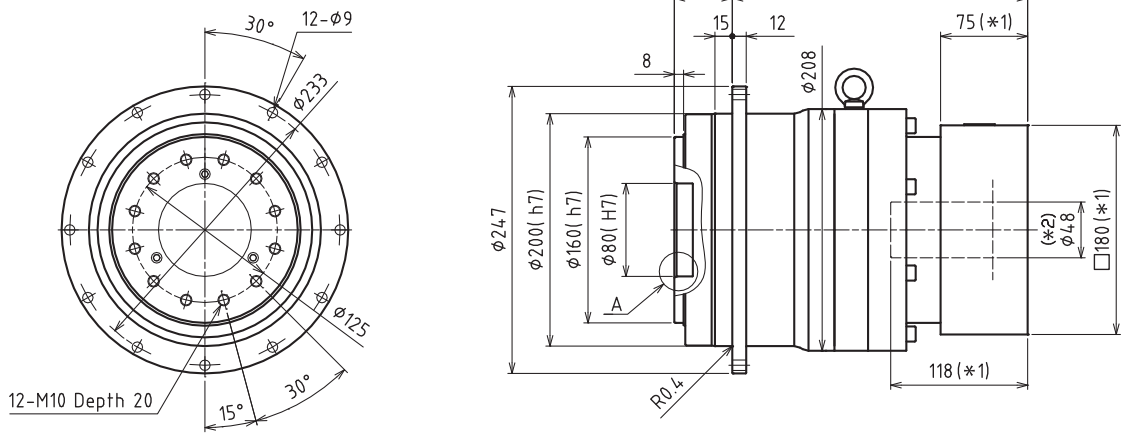
Input bore size ≦φ28 mm

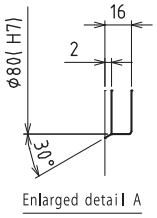


Input bore size ≦φ38 mm



Input bore size ≦φ48 mm





*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRT 255 1-Stage Specifications

Frame Size	255					
Ratio	**Unit**	**Note**	**4**	**5**	**7**	**10**
Nominal Output Torque	[Nm]	*1	2400	2400	2700	2700
Maximum Acceleration Torque	[Nm]	*2	5100	5100	4800	3600
Maximum Torque	[Nm]	*3	5700	5700	5400	4100
Emergency Stop Torque	[Nm]	*4	8000	8000	8000	6000
Nominal Input Speed	[rpm]	*5	1000	1200	1500	1700
Maximum Input Speed	[rpm]	*6	3000	3000	3000	3000
No Load Running Torque	[Nm]	*7	2.5			
Maximum Radial Load	[N]	*8	64000			
Maximum Axial Load	[N]	*9	48000			
Maximum Tilting Moment	[Nm]	*10	11000			
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	180	130	100	84
Efficiency	[%]	*11	95			
Torsional Rigidity	[Nm/arcmin]	*12	840	1000	900	840
Maximum Torsional Backlash	[Arc-min]	*13	≤ 3			
Noise Level	dB [A]	--	≤ 62			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	84			

VRT 255 2-Stage Specifications

Frame Size	255					
Ratio	**Unit**	**Note**	**16**	**20**	**25**	**28**
Nominal Output Torque	[Nm]	*1	2400	2600	3200	3400
Maximum Acceleration Torque	[Nm]	*2	5100	5100	5100	4900
Maximum Torque	[Nm]	*3	5100	5100	5100	4900
Emergency Stop Torque	[Nm]	*4	8000	8000	8000	8000
Nominal Input Speed	[rpm]	*5	2000	2000	2000	2000
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.0			
Maximum Radial Load	[N]	*8	64000			
Maximum Axial Load	[N]	*9	48000			
Maximum Tilting Moment	[Nm]	*10	11000			
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	58	47	45	53
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--
Efficiency	[%]	*11	90			
Torsional Rigidity	[Nm/arcmin]	*12	840	850	950	840
Maximum Torsional Backlash	[Arc-min]	*13	≤ 3			
Noise Level	dB [A]	--	≤ 62			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	89			

VRT 255 2-Stage Specifications

Frame Size	255						
Ratio	**Unit**	**Note**	**35**	**40**	**50**	**70**	**100**
Nominal Output Torque	[Nm]	*1	3400	3400	3400	3400	2000
Maximum Acceleration Torque	[Nm]	*2	4900	5100	5100	4900	2500
Maximum Torque	[Nm]	*3	4900	5100	5100	4900	2500
Emergency Stop Torque	[Nm]	*4	8000	8000	8000	8000	6000
Nominal Input Speed	[rpm]	*5	2000	2000	2200	2800	2800
Maximum Input Speed	[rpm]	*6	4500	4500	4500	4500	4500
No Load Running Torque	[Nm]	*7	1.0				
Maximum Radial Load	[N]	*8	64000				
Maximum Axial Load	[N]	*9	48000				
Maximum Tilting Moment	[Nm]	*10	11000				
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	14	13	13
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	44	32	32	31	31
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--
Efficiency	[%]	*11	90				
Torsional Rigidity	[Nm/arcmin]	*12	900	840	840	840	840
Maximum Torsional Backlash	[Arc-min]	*13	≤ 3				
Noise Level	dB [A]	--	≤ 62				
Protection Class	--	*14	IP54 (IP65)				
Ambient Temperature	[°C]	--	0 - 40				
Permitted Housing Temperature	[°C]	--	90				
Weight	[kg]	*15	89				

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor $\mathbf{f_0}$, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

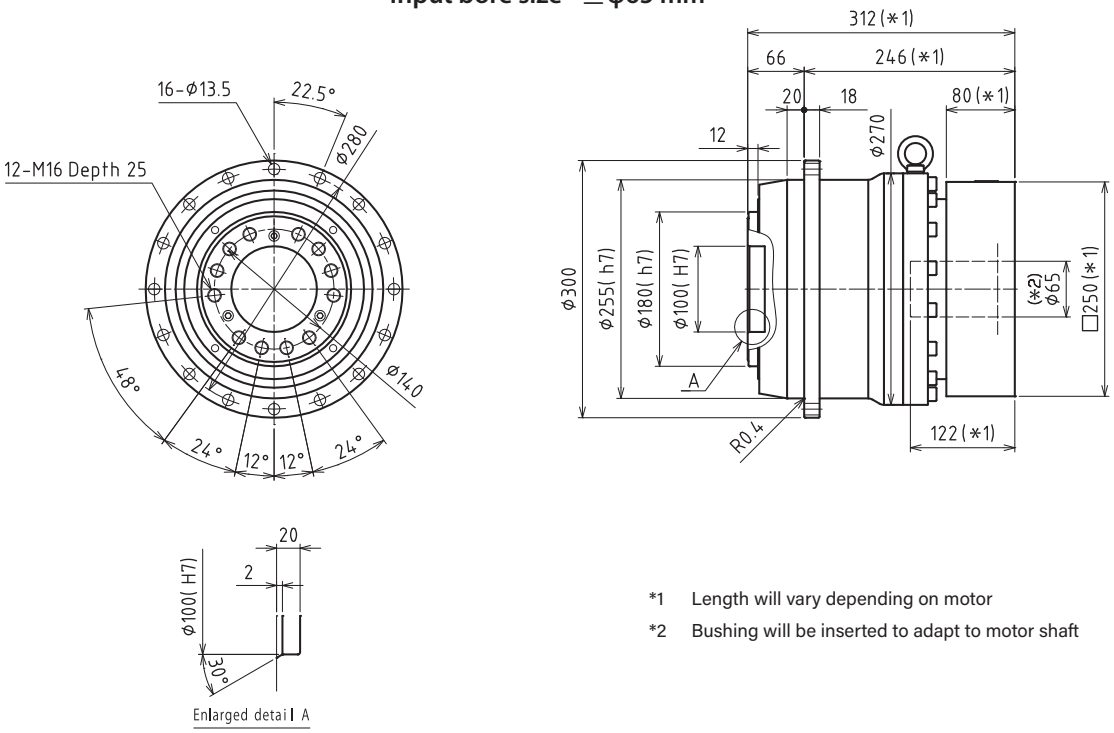
*13 Contact Nidec Drive Technology for the testing conditions and environment

*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*15 Weight may vary slightly between models

VRT 255 1-Stage Dimensions

Input bore size ≦φ65 mm

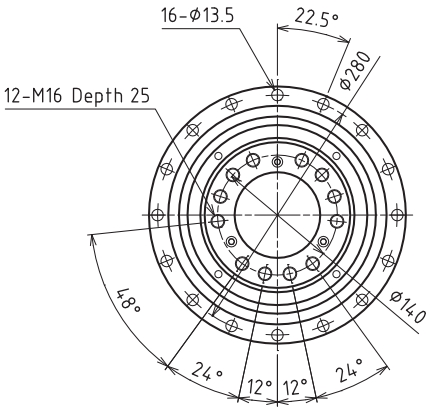


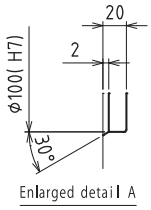
*1 Length will vary depending on motor

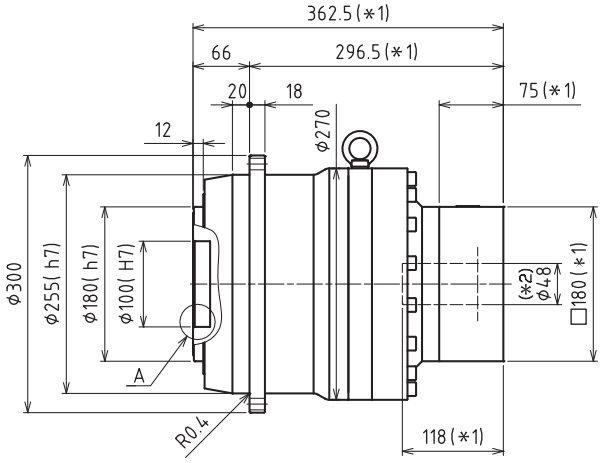
*2 Bushing will be inserted to adapt to motor shaft

VRT 255 2-Stage Dimensions

Input bore size ≦φ48 mm







*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRT 285 1-Stage Specifications

Frame Size	285					
Ratio	**Unit**	**Note**	**4**	**5**	**7**	**10**
Nominal Output Torque	[Nm]	*1	3400	3400	3400	3400
Maximum Acceleration Torque	[Nm]	*2	6700	6700	6700	5100
Maximum Torque	[Nm]	*3	7500	7500	7500	5900
Emergency Stop Torque	[Nm]	*4	12000	12000	12000	10000
Nominal Input Speed	[rpm]	*5	900	1100	1300	1300
Maximum Input Speed	[rpm]	*6	3000	3000	3000	3000
No Load Running Torque	[Nm]	*7	2.7			
Maximum Radial Load	[N]	*8	86000			
Maximum Axial Load	[N]	*9	64000			
Maximum Tilting Moment	[Nm]	*10	18000			
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	270	190	130	96
Efficiency	[%]	*11	95			
Torsional Rigidity	[Nm/arcmin]	*12	1200	1450	1300	1200
Maximum Torsional Backlash	[Arc-min]	*13	≤ 3			
Noise Level	dB [A]	--	≤ 63			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	110			

VRT 285 2-Stage Specifications

Frame Size	285					
Ratio	**Unit**	**Note**	**16**	**20**	**25**	**28**
Nominal Output Torque	[Nm]	*1	2700	2900	3600	4200
Maximum Acceleration Torque	[Nm]	*2	6700	6700	6700	6700
Maximum Torque	[Nm]	*3	6700	6700	6700	6700
Emergency Stop Torque	[Nm]	*4	12000	12000	12000	12000
Nominal Input Speed	[rpm]	*5	1500	1500	1500	1500
Maximum Input Speed	[rpm]	*6	4000	4000	4000	4000
No Load Running Torque	[Nm]	*7	0.6			
Maximum Radial Load	[N]	*8	86000			
Maximum Axial Load	[N]	*9	64000			
Maximum Tilting Moment	[Nm]	*10	18000			
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	--	--
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	63	50	47	55
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--
Efficiency	[%]	*11	90			
Torsional Rigidity	[Nm/arcmin]	*12	1200	1400	1450	1200
Maximum Torsional Backlash	[Arc-min]	*13	≤ 3			
Noise Level	dB [A]	--	≤ 63			
Protection Class	--	*14	IP54 (IP65)			
Ambient Temperature	[°C]	--	0 - 40			
Permitted Housing Temperature	[°C]	--	90			
Weight	[kg]	*15	120			

VRT 285 2-Stage Specifications

Frame Size	285						
Ratio	**Unit**	**Note**	**35**	**40**	**50**	**70**	**100**
Nominal Output Torque	[Nm]	*1	4200	4200	4200	4200	2700
Maximum Acceleration Torque	[Nm]	*2	6700	6700	6700	6700	3400
Maximum Torque	[Nm]	*3	6700	6700	6700	6700	3400
Emergency Stop Torque	[Nm]	*4	12000	12000	12000	12000	10000
Nominal Input Speed	[rpm]	*5	1500	1500	2000	2200	2200
Maximum Input Speed	[rpm]	*6	4000	4000	4000	4000	4000
No Load Running Torque	[Nm]	*7	0.6				
Maximum Radial Load	[N]	*8	86000				
Maximum Axial Load	[N]	*9	64000				
Maximum Tilting Moment	[Nm]	*10	18000				
Moment of Inertia (≤ Ø 38)	[kgcm2]	--	--	--	14	14	13
Moment of Inertia (≤ Ø 48)	[kgcm2]	--	45	33	32	31	31
Moment of Inertia (≤ Ø 65)	[kgcm2]	--	--	--	--	--	--
Efficiency	[%]	*11	90				
Torsional Rigidity	[Nm/arcmin]	*12	1400	1200	1300	1250	1200
Maximum Torsional Backlash	[Arc-min]	*13	≤ 3				
Noise Level	dB [A]	--	≤ 63				
Protection Class	--	*14	IP54 (IP65)				
Ambient Temperature	[°C]	--	0 - 40				
Permitted Housing Temperature	[°C]	--	90				
Weight	[kg]	*15	120				

*1 At nominal input speed, service life is 20,000 hours

*2 The maximum torque when starting or stopping operation. Apply Cycle Factor **f_0**, found on page 468, for higher duty cycle applications

*3 Permitted 10,000 times during service life. Based on 10% of maximum radial load and smooth output shaft

*4 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life

*5 The average input speed at nominal input torque. Maintain housing temperature below permitted value

*6 The maximum intermittent input speed

*7 Torque at no load applied to the input shaft at nominal input speed

*8 The maximum radial load that the gearbox can accept

*9 The maximum axial load that the gearbox can accept

*10 The maximum load at output flange surface

*11 The efficiency at the nominal output torque rating

*12 This does not include lost motion

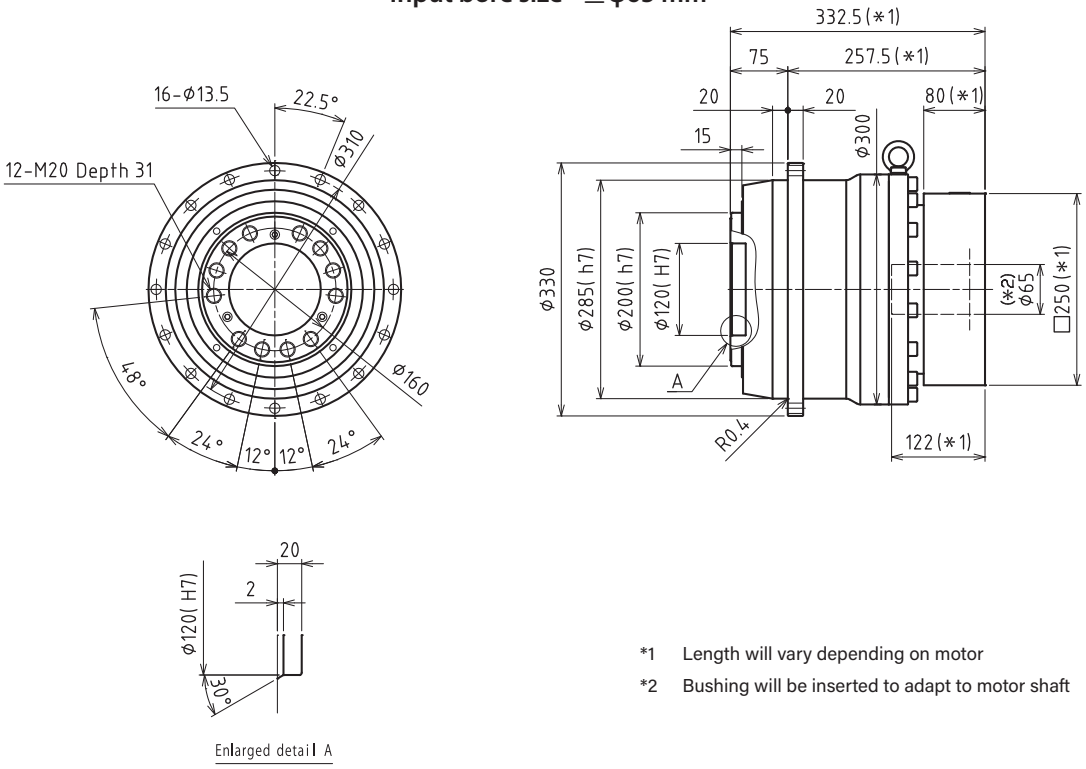
*13 Contact Nidec Drive Technology for the testing conditions and environment

*14 IP65 (wash-down) is available as an option. Contact Nidec Drive Technology for more details

*15 Weight may vary slightly between models

VRT 285 1-Stage Dimensions

Input bore size ≦φ65 mm

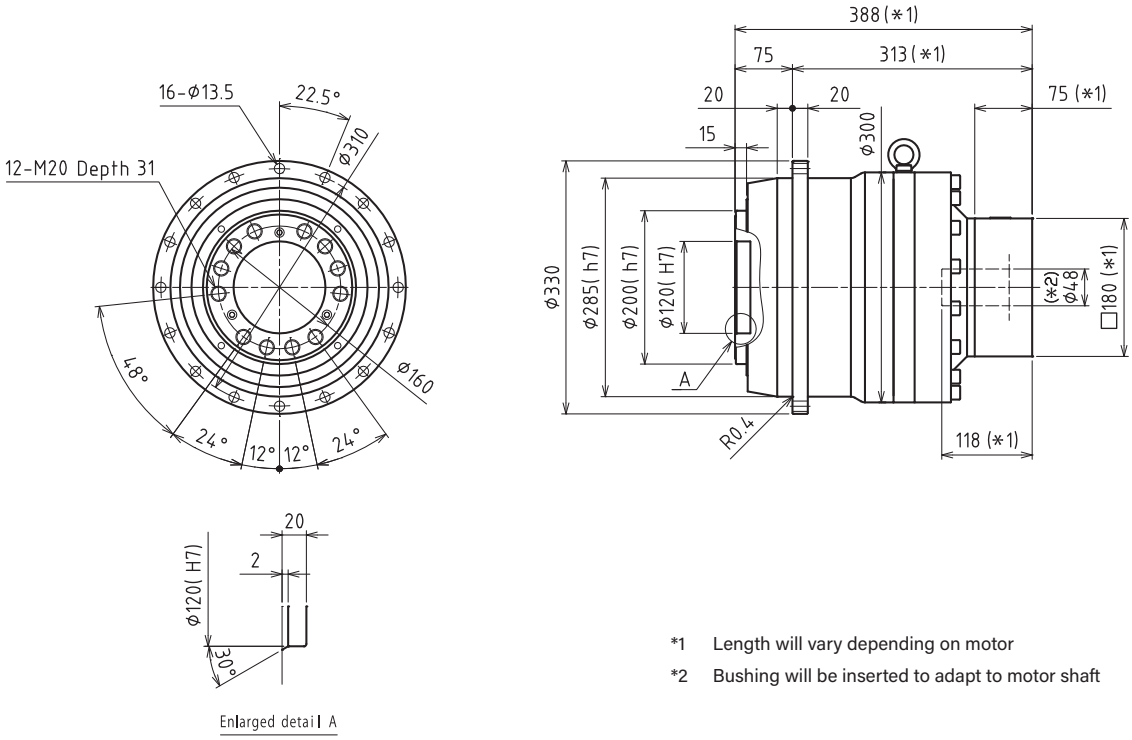


*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

VRT 285 2-Stage Dimensions

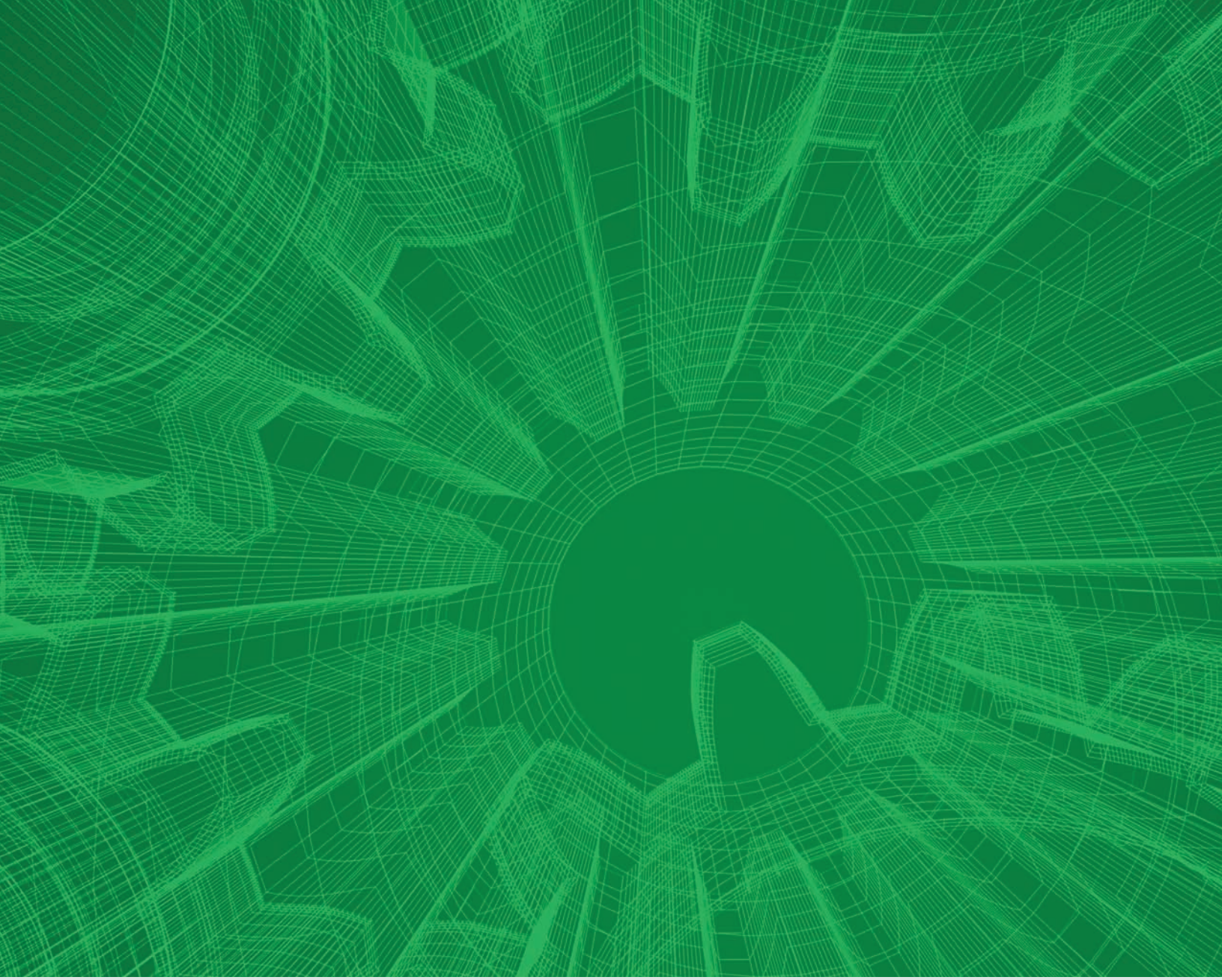
Input bore size ≦φ48 mm



*1 Length will vary depending on motor

*2 Bushing will be inserted to adapt to motor shaft

Technical Information

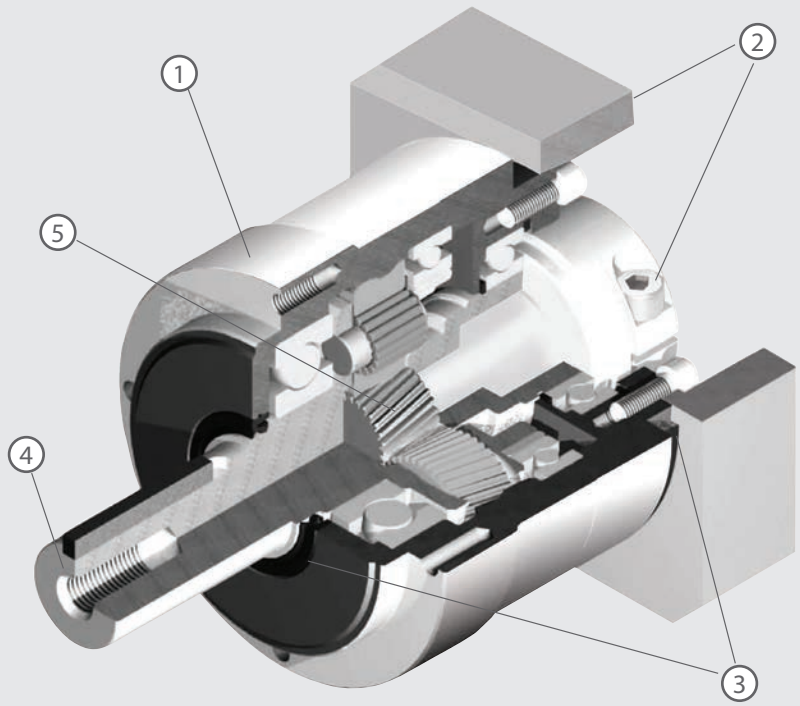


Options and Modifications

Build Your Ideal Gearbox

Nidec Drive Technology Corporation realizes that even with our vast range of products, you may not find exactly what you need for your application. We are highly capable of supplying custom solutions for OEMs, which include completely customized gearboxes or gear sets, modified standard designs and integrated product assemblies to meet unique application requirements.

We work closely with our OEM customers during early phases of development to create special designs that can overcome the harshest environments, tightest space constraints and most demanding positioning requirements. Whether your application requires weight relief, cost-down considerations, special coatings or materials of construction, Nidec Drive Technology can develop a product to meet your target.



1. Housing Coatings and Surface Finishes: White Epoxy, Steel-It, Nickel Plating, Black Oxide
2. Motor Mounting: Custom motor adapters, integrated assemblies
3. Ingress Protection: IP65 Protection available using special input seals, output seals and sealants
4. Output Shaft Materials of Construction & Modifications: 300 Series Stainless, 400 Series Stainless, 17-4PH Stainless, Nickel Plating, Special Width, Special Length
5. Lubrication: Food Grade, Low Temperature, High temperature, Vacuum-rated

Note: The following options and modifications may require minimum order quantities.
Contact Nidec Drive Technology for additional details.

Standard Planetary Washdown and Food Grade Options

Food, beverage, pharmaceutical and cosmetics equipment builders compete on their ability to deliver more innovative processing and packaging, with higher throughput and less downtime. Strict hygiene regulations require equipment to be cleaned often with water, steam and harsh chemicals that can quickly destroy ordinary machine components. These operating conditions pose challenges for gearbox manufacturers and Nidec Drive Technology is up to the task.

Nidec Drive Technology offers standard washdown and food grade options for our planetary products in a select group of configurations.

These options include stainless steel output shaft and fasteners, IP65 ingress protection, white epoxy, Steel-it paint or nickel plating and food grade lubrication. These options are outlined below. Our industry experts can help you determine the right protection for your application and environment.

Series	VRL			
Frame Size	050	070	090	120
1 Stage Ratios	3, 4, 5, 7, 10			
2 Stage Ratios	15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 100			

* Nickel plating not available as standard option for VRL-050

Series	VRB			
Frame Size	042	060	090	115
1 Stage Ratios	3, 4, 5, 7, 10			
2 Stage Ratios	15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 100			

* Nickel plating not available as standard option for VRB-042

Series	VRS		
Frame Size	060	075	100
1 Stage Ratios	3, 4, 5, 7, 10		
2 Stage Ratios	15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 100		

* Nickel plating not available as standard option for VRS

Series	VRT		
Frame Size	064	090	110
1 Stage Ratios	4, 5, 7, 10		
2 Stage Ratios	16, 20, 25, 28, 35, 40, 50, 70, 100		

* Nickel plating not available as standard option for VRT

Model Code

VRB	—	090C	—	7	—	K	3	—	19HB16	—	XV
Series		Frame Size		Ratio		Output shaft style	Backlash		Adapter code		Washdown and Food Grade Options

Order Code		Description of Features
C		IP 65 Protection Only
W		Standard Grease. Food Grade White Epoxy
S		Standard Grease, Steel-It™ Paint
J		Standard Grease, Nickel Plated Output Housing
F		Food Grade Grease, Standard Paint
X		Food Grade Grease, Food Grade White Epoxy
G		Food Grade Grease, Steel-It™ Paint
K		Food Grade Grease, Nickel Plated Output Housing
	V	Stainless Steel Shaft & Fasteners, IP65 Protection

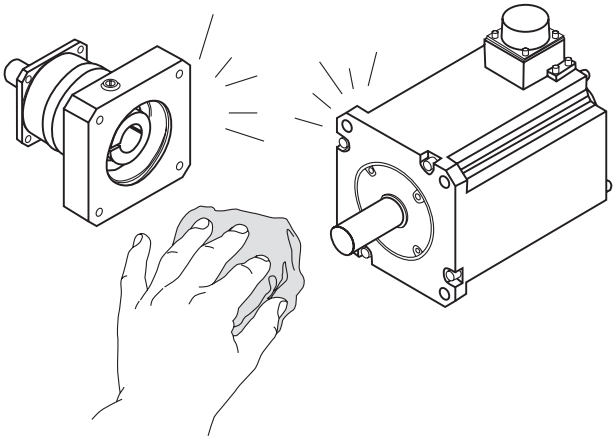
* First letter represents grease and coating combination. Second letter represents shaft material & ingress protection. Select "C" for IP65 protection only.

Inspection and Preparations

A. Upon delivery of the gearbox, confirm that you received the exact model that was specified on your purchase order.

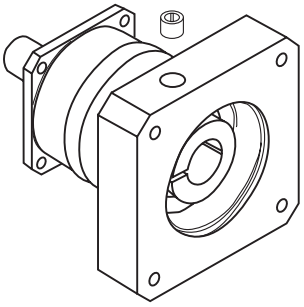
B. Inspect for shipping damage. Notify the shipping agent immediately if any damage is discovered.

C. Remove the protective covering from the output shaft.

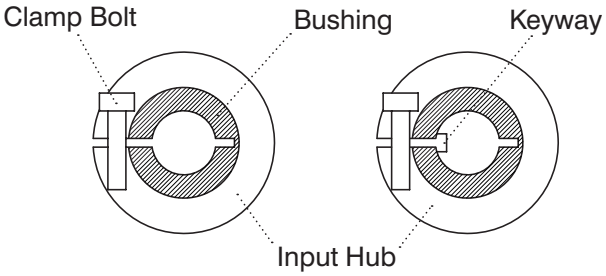


D. Clean and de-grease the motor mounting surface and shaft, as well as the gearbox mounting surface, input hub bore, and shaft bushing (if included). This cleaning is very important for the shaft and bushing, to prevent slip during motion.

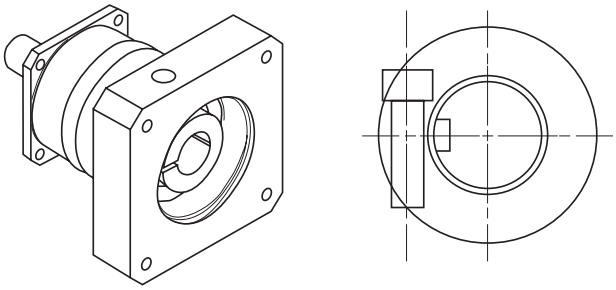
Motor Mounting



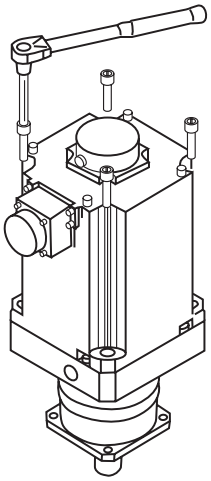
A. Remove the access hole plug, allowing access to the motor shaft clamp.



B. Carefully align the shaft bushing (if included) so that the opening in the bushing aligns with the opening in the input hub. It is also recommended that the motor shaft keyway (if present) aligns with the opening in the input hub clamp.



C. Rotate the gearbox input hub so that the clamp bolt is aligned with the access hole. Loosen the clamp bolt.

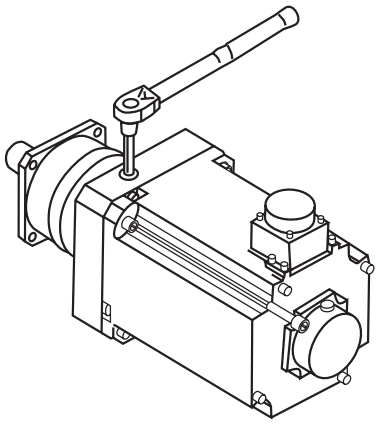


D. Remove the motor key (if supplied), as it is not required for proper installation and operation.

E. Slowly slide the motor into the gearbox, so that the motor shaft enters the gearbox input hub with motor shaft keyway (if present) aligned with gearbox input shaft clamp opening. Install the four motor flange bolts in a cross-wise pattern, to ensure proper alignment of motor to gearbox.

Table A

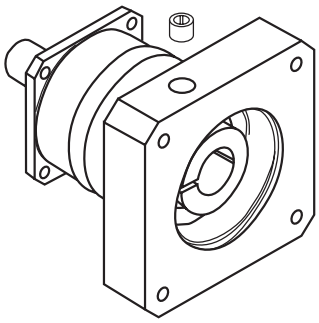
Motor Installation Bolt Size	Tightening Torque	
	(Nm)	(in lbs)
M3	1.1	9.7
M4	2.5	22.1
M5	5.1	45.1
M6	8.7	77
M8	21	186
M10	42	372
M12	72	637



Tighten the bolts to the proper torque using a torque wrench (see Table A).

Table B

Clamp Bolt Size	Tightening Torque	
	(Nm)	(in lbs)
M3	1.9	16.8
M4	4.3	38.1
M5	8.7	77
M6	15	133
M8	36	318
M10	71	628
M12	125	1106



F. Tighten the gearbox input shaft clamp bolt to the proper torque using a torque wrench (see Table B).

G. Re-install the access hole plug into the motor

Safety Precautions

A. Avoid use in wet or corrosive areas, unless the gearbox is specified for these environments.

B. Ambient temperature in the area of the gearbox must be in the range of 0° -40°C, unless the gearbox is built to withstand a different temperature range.

C. The gearbox (with motor) must be firmly attached to a vibration-free frame or fixture.

D. The gearbox has been lubricated and can be operated immediately.

E. At initial operation, check the direction of shaft rotation, then apply the load gradually.

F. Avoid excessive loads.

G. Ensure that the motor speed does not exceed the maximum RPM specified for the gearbox.

H. Watch for the following problems and discontinue motion immediately:
   a. Sharp increase in temperature
   b. Abnormal noise
   c. Unstable output speed

I. The gearbox is not designed to be disassembled.

J. The gearbox is lubricated for its lifetime with appropriate grease. No re-lubrication is required.

IP 65 Versions

If you have received an IP65 version of the gearbox, be sure to seal between the gearbox and motor interface with a sealant to ensure an IP65 rating of the gearbox / motor assembly. Also apply sealant to the access hole plug during step “G”. Please contact Nidec Drive Technology with any questions.

Motor Mounting Codes

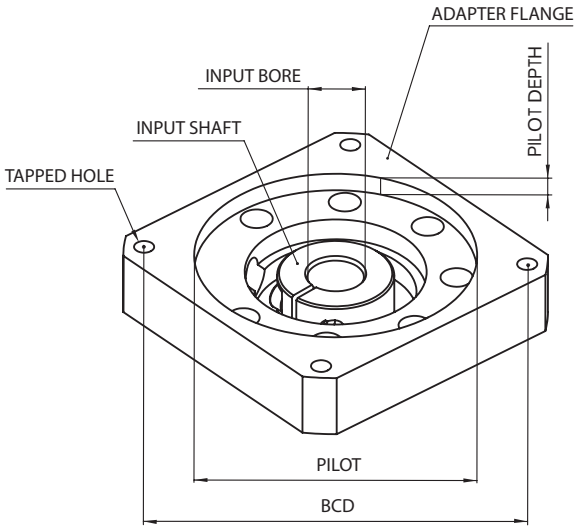
Our motor mounting codes can be configured automatically using our online selection tool. These tables supply the details behind these codes. The tables start with Input Bore measurement and the Part # Code, which are indicated at the end of every model code. For each Part # Code, the Pilot**,** BCD, Tapped Hole, and Pilot Depth, are explained.

Please note that even though the Part# Code may have the same letters (i.e. DC, FB, HA, etc), the Pilot and BCD dimensions may not be the same if a different input bore diameter. Locate the table by input bore diameter first, and then find the appropriate adapter Part# Code to check the dimensions. If you have any questions, contact Nidec Drive Technology

Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
65	MA	114.3	200	M12	8
65	MB	200	235	M12	8
65	MC	180	215	M12	8
65	MD	180	265	M12	8
65	NA	230	265	M12	8
65	NB	230	265	M12	18
65	NC	230	290	M12	8
65	ND	230	265	M20	18
65	PA	250	300	M16	8
65	PB	250	320	M16	18
65	QA	300	350	M16	8
65	QB	280	325	M16	8

Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
48	KA	114.3	200	M12	8
48	KB	110	130	8.8	8
48	KC	130	215	M12	8
48	LA	180	215	M12	8
48	MA	180	265	M12	8
48	MB	200	235	M12	8
48	NA	230	265	M12	8
48	PA	250	300	M16	8

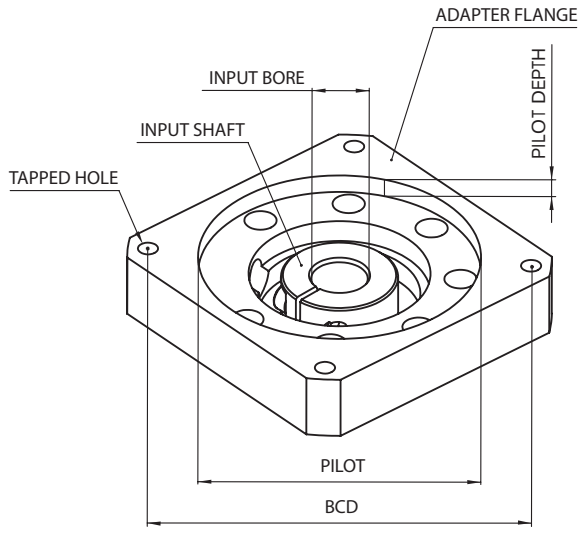
Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
38	HA	110	130	8.8	8
38	HB	110	145	M8	8
38	HE	110	130	M8	8
38	JA	130	165	M10	8
38	KA	114.3	200	M12	8
38	KB	130	215	M10	8
38	KC	130	215	M12	8
38	KD	95	200	M10	18
38	KE	114.3	200	M12	18
38	LA	180	215	M12	8
38	LB	180	215	M12	18
38	MA	180	265	M12	8
38	MB	200	235	M12	8
38	MC	215.9	184.15	13.7	5.5
38	MD	200	250	M8	18
38	NA	230	265	M12	8



Motor Mounting Codes

Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
28	FA	80	100	M6	8
28	FB	95	115	M6	8
28	FC	95	115	M8	8
28	FD	95	115	M6	8
28	FE	95	115	M8	6
28	GA	55.563	125.73	M6	8
28	GB	63.5	127	M6	8
28	GC	95	130	M8	8
28	GD	110	130	M8	8
28	GE	110	130	M10	8
28	GF	110	130	8.8	8
28	GG	110	135	M8	8
28	GH	95	135	M8	8
28	HA	110	145	M8	8
28	HB	110	145	M8	18
28	HC	110	145	10.5	8
28	HD	114.3	149.23	10.5	8
28	HE	95	145	M8	18
28	HF	110	145	M8	8
28	JA	110	165	M8	8
28	JB	110	165	M10	8
28	JC	130	165	M10	8
28	JD	130	174	M10	28
28	JE	130	165	M10	18
28	JF	114.3	160	M10	8
28	KA	114.3	200	M12	8
28	KB	130	215	M10	8
28	KD	114.3	200	M12	18
28	KE	150	185	M10	8
28	LA	180	215	M12	8
28	LB	180	220	M12	18
28	MA	200	235	M12	8
28	MB	200	250	M8	18

Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
19	DA	60	90	M5	6
19	DB	70	90	M5	6
19	DC	70	90	M6	6
19	DD	70	90	M6	16
19	DE	70	90	M5	11
19	EA	73.025	98.43	M5	11
19	EB	80	100	M6	6
19	EC	80	100	M6	16
19	ED	60	98.99	M6	6
19	FA	95	115	M8	6
19	FB	95	115	M8	16
19	GA	55.563	125.73	M6	11
19	GB	95	130	M8	6
19	GC	110	130	M8	11
19	GD	110	130	8.8	6
19	GE	95	130	M8	16
19	GF	100	125	M8	16
19	GH	95	135	M8	11
19	HA	110	145	M8	6
19	HB	110	145	M8	21
19	HC	110	145	10.5	11
19	HD	114.3	149.23	M8	11
19	HE	114.3	149.23	10.5	11
19	JA	130	165	M10	16
19	JB	115	165	M8	21



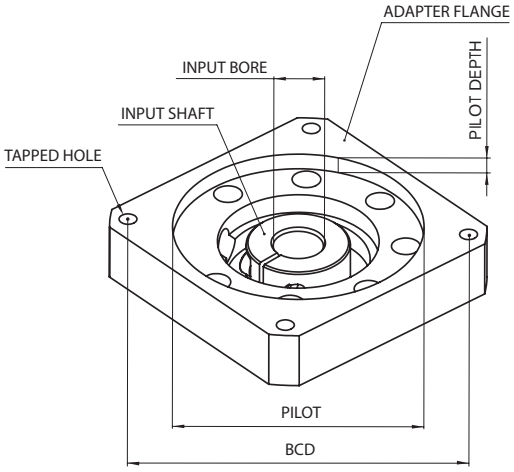
Motor Mounting Codes

Our motor mounting codes can be configured automatically using our online selection tool. These tables supply the details behind these codes. The tables start with Input Bore measurement and the Part # Code, which are indicated at the end of every model code. For each Part # Code, the Pilot**,** BCD, Tapped Hole, and Pilot Depth, are explained.

Please note that even though the Part# Code may have the same letters (i.e. DC, FB, HA, etc), the Pilot and BCD dimensions may not be the same if a different input bore diameter. Locate the table by input bore diameter first, and then find the appropriate adapter Part# Code to check the dimensions. If you have any questions, contact Nidec Drive Technology

Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
14	BA	38.1	66.68	M4	5
14	BB	38.1	66.68	M5	5
14	BC	38.1	66.68	M5	10
14	BD	40	63	M4	5
14	BE	40	63	M5	5
14	BF	40	65	M5	5
14	BG	40	70	M4	5
14	BH	50	60	M4	10
14	BJ	50	70	M4	5
14	BK	50	70	M5	5
14	BL	50	70	M5	15
14	BM	50	70	M5	10
14	BN	50	70	M4	10
14	BP	36	70.71	M4	5
14	CA	60	75	M5	5
14	CB	60	75	M6	10
14	CC	60	80	M4	5
14	DA	50	95	M6	5
14	DB	60	85	M5	5
14	DC	60	90	M5	5
14	DD	70	85	6.5	5
14	DE	70	90	M5	10
14	DF	70	90	M6	5

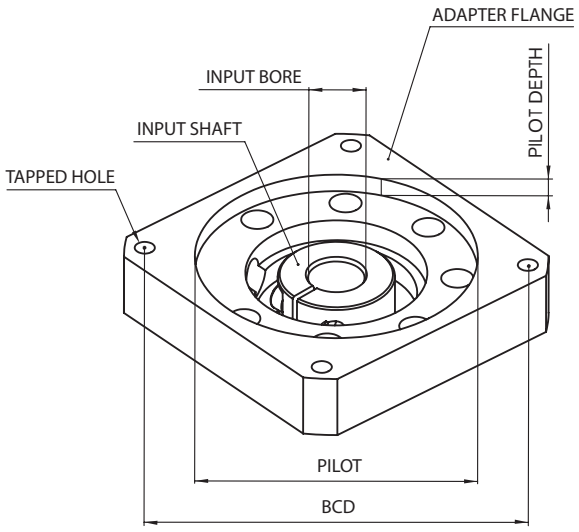
Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
14	DG	70	90	M6	15
14	DH	70	95	M6	5
14	DJ	60	95	M5	5
14	DK	36.8	82.024	M6	15
14	DL	62	91.924	M5	10
14	EA	50	100	M6	5
14	EB	73.025	98.43	M5	5
14	EC	80	100	M6	5
14	ED	80	100	M6	15
14	EE	73.025	98.43	M6	15
14	EF	50	98.43	M5	5
14	EG	60	98.995	M5	5
14	EH	80	105	M6	15
14	EJ	60	98.995	M6	10
14	EK	73.025	98.43	M6	5
14	EL	73	94	M6	5
14	EM	83	104	M8	10
14	FA	60	115	M6	5
14	FB	95	115	M8	15
14	GA	80	139.7	M6	5
14	GB	80	130	M5	20
14	GC	94	120	M8	10
14	JA	115	165	M8	10



Motor Mounting Codes

Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
8	AA	20.02	46.69	M3	5
8	AB	22	43.82	4.7	10
8	AC	22	48	M3	5
8	AD	22.22	50.8	M3	5
8	AE	25.4	38.89	4	10
8	AF	30	45	M3	5
8	AG	30	46	M4	5
8	AH	30	46	M4	10
8	AJ	30	46	3.5	10
8	AK	34	48	M3	10
8	AL	30	48	M3	5
8	AM	22	43.82	3.5	5
8	AN	40	50	M4	5
8	AQ	37.6	48	M3	5
8	BA	38.1	66.68	M4	5
8	BB	38.1	66.68	M5	5
8	BC	50	60	M4	10
8	BD	50	70	M4	5
8	BE	50	70	M5	5
8	BF	50	70	M5	10
8	BG	36	70.71	M4	5
8	BH	54	70	M4	5
8	BJ	50	58	M3	5
8	CA	50	80	M4	10

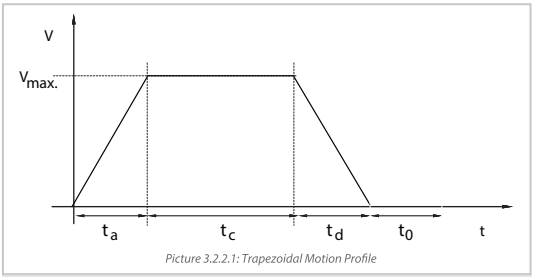
Input Bore (mm)	Part# Code	Pilot (mm)	BCD (mm)	Tapped Hole	Pilot Depth (mm)
S8	ZA	20.02	46.69	M3	5
S8	ZB	22	43.82	4.7	10
S8	ZC	22	48	M3	5
S8	ZD	22.22	50.8	M3	5
S8	ZE	25.4	38.89	4	10
S8	ZF	30	45	M3	5
S8	ZG	30	46	M4	5
S8	ZH	30	46	M4	10
S8	ZJ	30	46	3.5	10
S8	ZK	34	48	M3	10
S8	ZL	30	48	M3	5
S8	ZM	22	43.82	3.5	5
S8	ZN	40	50	M4	5
S8	ZQ	37.6	48	M3	5
S8	BA	38.1	66.68	M4	5
S8	BB	38.1	66.68	M5	5
S8	BC	50	60	M4	10
S8	BD	50	70	M4	5
S8	BE	50	70	M5	5
S8	BF	50	70	M5	10
S8	BG	36	70.71	M4	5
S8	BH	54	70	M4	5
S8	BJ	50	58	M3	5



Selection Flow Charts

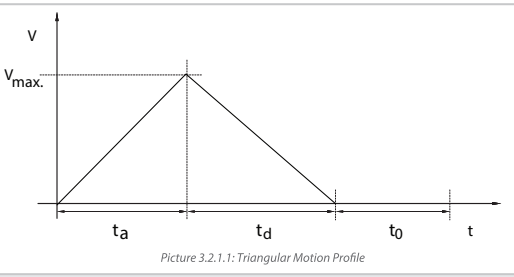
Gearbox Selection Procedure

Determine Type of Move and Profile Requirements



Picture 3.2.2.1: Trapezoidal Motion Profile

Trapezoidal Move



Picture 3.2.1.1: Triangular Motion Profile

Triangular Move

Select a Preliminary Frame Size & Series

Calculate / Compare

Max Operating Radial Load & Max Operating Axial Load

Max Operating Radial Load (N): $Fr_{MAX\text{-}O} = Max.\ of\ Fr_{O1}, Fr_{O2}, \cdots Fr_{On}$

Max Radial Load (N): $Fr_{MAX\text{-}P}$

Max Operating Axial Load (N): $Fa_{MAX\text{-}O} = Max.\ of\ Fa_{O1}, Fa_{O2}, \cdots Fr_{On}$

Max Axial Load (N): $Fa_{MAX\text{-}P}$

$[Fr_{MAX\text{-}P} \geqq Fr_{MAX\text{-}O}]$ — ***FALSE***

$[Fa_{MAX\text{-}P} \geqq Fa_{MAX\text{-}O}]$ — ***FALSE***

TRUE

Calculate: Max Operating Output Torque & Max Operating Output Speed

Max Operating Output Speed (rpm): $no_{MAX\text{-}O} = Max.\ of\ no_{O1}, no_{O2}, \cdots no_{On}$

Max Operating Output Torque (rpm): $To_{MAX\text{-}O} = Max.\ of\ To_{O1}, To_{O2}, \cdots To_{On}$

Select: Preliminary Reduction Ratio (R)
Calculate: Max Operating Input Speed (niMAX-O)

$ni_{MAX\text{-}O} = no_{MAX\text{-}O} \times R$

Compare Input Speed — ***FALSE***

$[ni_{MAX\text{-}P} \geqq ni_{MAX\text{-}O}]$

Compare the Max Input Speed ($ni_{MAX\text{-}P}$) to the Max Operating Input Speed: ($ni_{MAX\text{-}O}$)

TRUE

Compare Output Torque — ***FALSE***

$[To_{MAX\text{-}P} \geqq To_{MAX\text{-}O}] \times f_0$

Compare the Max Acceleration Torque ($To_{MAX\text{-}P}$) to the Max Operating Output Torque ($To_{MAX\text{-}O}$)

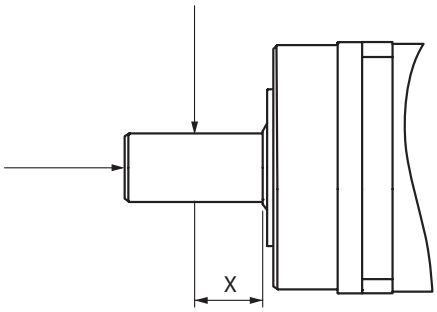
Apply Cycle Factor if needed

Cycle Factor

f_0	-1k cycles/hour	1-3k cycles/hour	3-5k cycles/hour	5-7k cycles/hour	7k-cycles/hour
< 1 hours/day	1.0	1.2	1.3	1.3	1.4
< 8 hours/day	1.3	1.5	1.6	1.9	1.9
< 16 hours/day	1.4	1.6	1.9	2.4	2.6
< 24 hours/day	1.5	1.9	2.4	2.9	3.1

Look up Data in Catalog: Green text
Calculate: Red text

Calculate: Average Operating Radial Load & Average Operating Axial Load



Average Operating Radial Load (N):

$$Fr_{AVG-O} = \sqrt[3]{\frac{no_{O1} \cdot t_1 \cdot |Fr_{O1}|^3 + no_{O2} \cdot t_2 \cdot |Fr_{O2}|^3 + \cdots + no_{On} \cdot t_n \cdot |Fr_{On}|^3}{no_{O1} \cdot t_1 + no_{O2} \cdot t_2 + \cdots + no_{On} \cdot t_n}}$$

Average Operating Axial Load (N):

$$Fa_{AVG-O} = \sqrt[3]{\frac{no_{O1} \cdot t_1 \cdot |Ft_{O1}|^3 + no_{O2} \cdot t_2 \cdot |Ft_{O2}|^3 + \cdots + no_{On} \cdot t_n \cdot |Ft_{On}|^3}{no_{O1} \cdot t_1 + no_{O2} \cdot t_2 + \cdots + no_{On} \cdot t_n}}$$

Calculate: Average Operating Output Torque & Average Operating Output Speed

Average Operating Output Torque (Nm):

$$To_{AVG-O} = \sqrt[10/3]{\frac{no_O \cdot to_1 \cdot |To_{O_1}|^{10/3} + no_{2O} \cdot to_2 \cdot |To_{O2}|^{10/3} + \cdots + no_{On} \cdot to_n \cdot |To_{On}|^{10/3}}{no_{O1} \cdot to_1 + no_{O2} \cdot to_2 \cdots no_{On} \cdot to_n}}$$

Average Operating Output Speed (rpm):

$$no_{AVG-O} = \frac{no_{O1} \cdot to_1 + no_{2O} \cdot to_2 \cdots no_{On} \cdot to_n}{to_1 + to_2 + \cdots + to_n}$$

Calculate: Life

Bearing Life (Hours): $Lh = 20{,}000 \bullet \left(\frac{To_{AVG-P}}{To_{AVG-O}}\right)^P \bullet \left(\frac{ni_{AVG-P}}{no_{AVG-O}}\right)$

To_{AVG-P}: *Nominal Output Torque*

To_{AVG-O}: *Average Operating Output Torque*

ni_{AVG-P}: *Nominal Input Speed*

no_{AVG-O}: *Average Operating Output Speed*

There are 3 Life calculations that should be taken into account:

1. *Life of Needle Bearing*
2. *Life Due to Radial Load*
3. *Life Due to Thrust Load*

Increase One Frame Size

Lh ≥ Required Life

FALSE

TRUE

Ensure Proper Fit between Gearbox and Motor

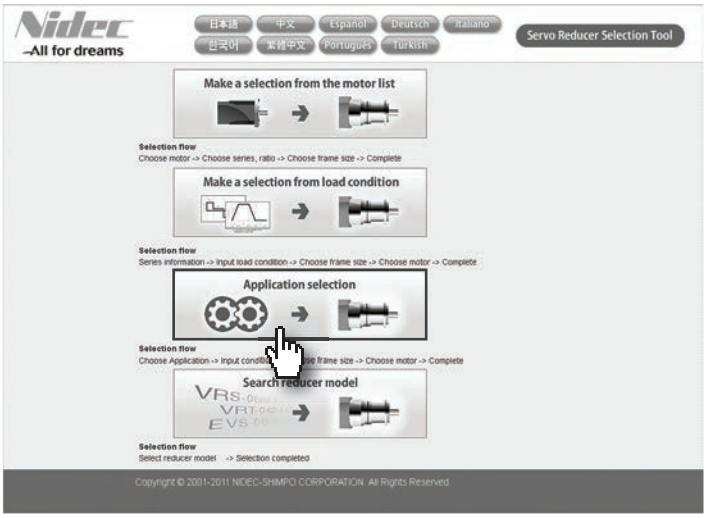
Gearbox Selection Complete

Look up Data in Catalog: Green text
Calculate: Red text
Contact Nidec Drive Technology for questions at (800) 842-1479

Online Planetary Sizing and Selection Tool

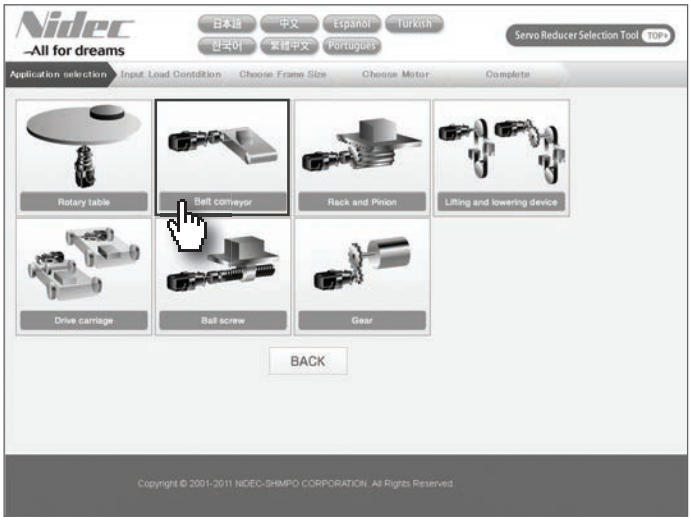
Nidec Drive Technology Corporation's online Selection Tool makes it simple to configure our planetary product. The online Selection Tool has an extensive list of Servo Motor Specifications, Requirements and Application Specifications. See the Selection Tool example screens below to guide, support and help you with your application needs.

Selection Tool Screen Example 1



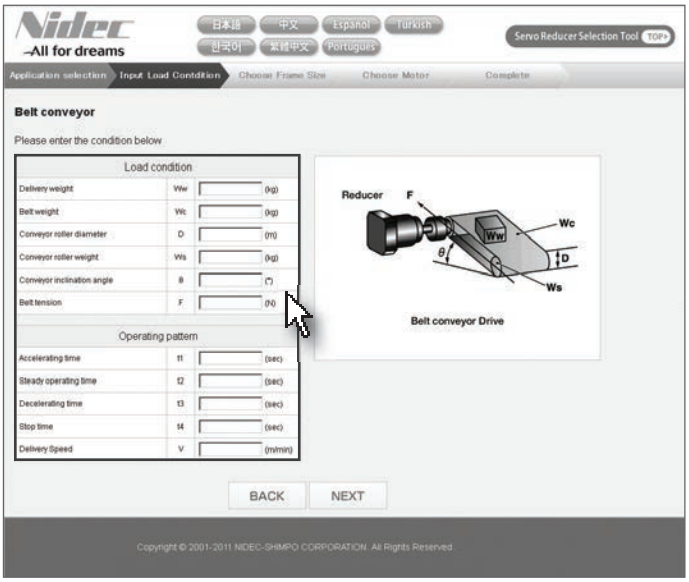
- Selection based on the Servo Motor Specifications
- Selection based on the Servo Motor Movement profile requirements
- Selection based on the Application Specifications includes all the above

Selection Tool Screen Example 2



- Select a application template based on your criteria

Selection Tool Screen Example 3

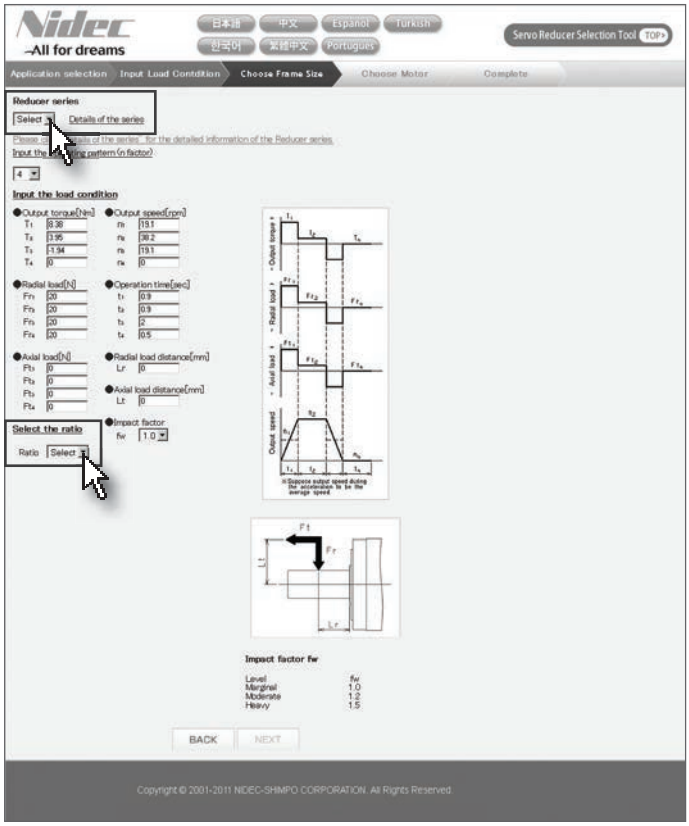


- Fill in all the information for your application

Load condition			
Delivery weight	Ww	10	(kg)
Belt weight	Wc	1	(kg)

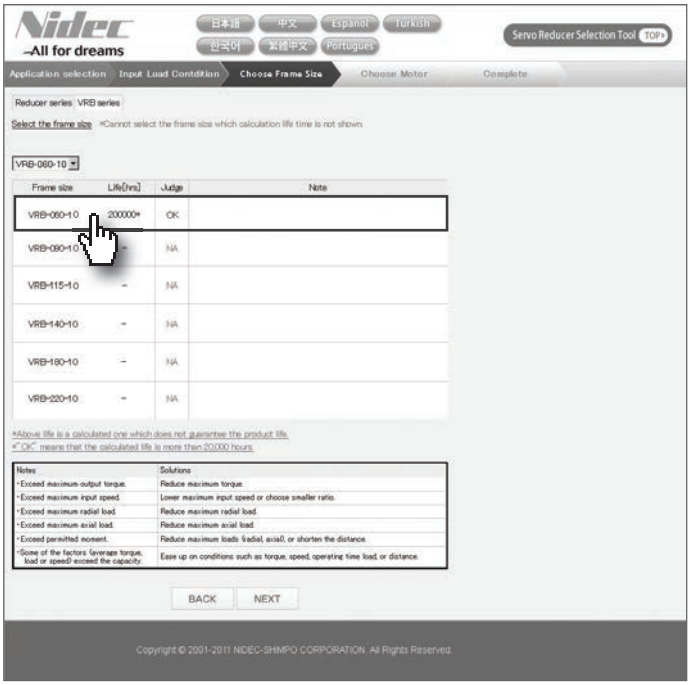
- Including the velocity, forces, mass, and move profile

Selection Tool Screen Example 4



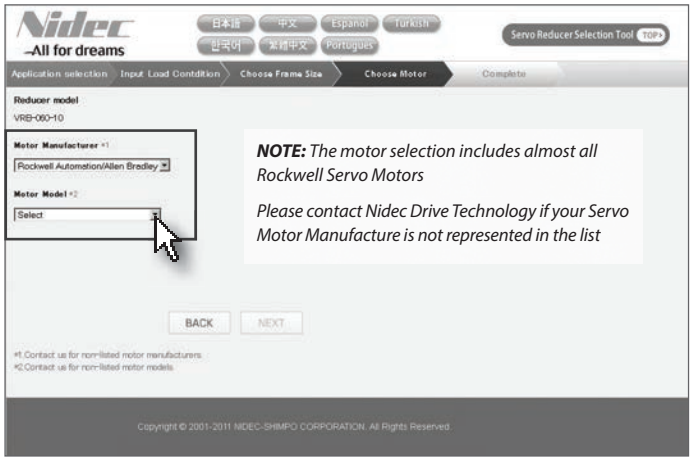
- Select a Nidec Drive Technology planetary gearbox series
- Select a Ratio that would put you near the rpm range for your application

Selection Tool Screen Example 5



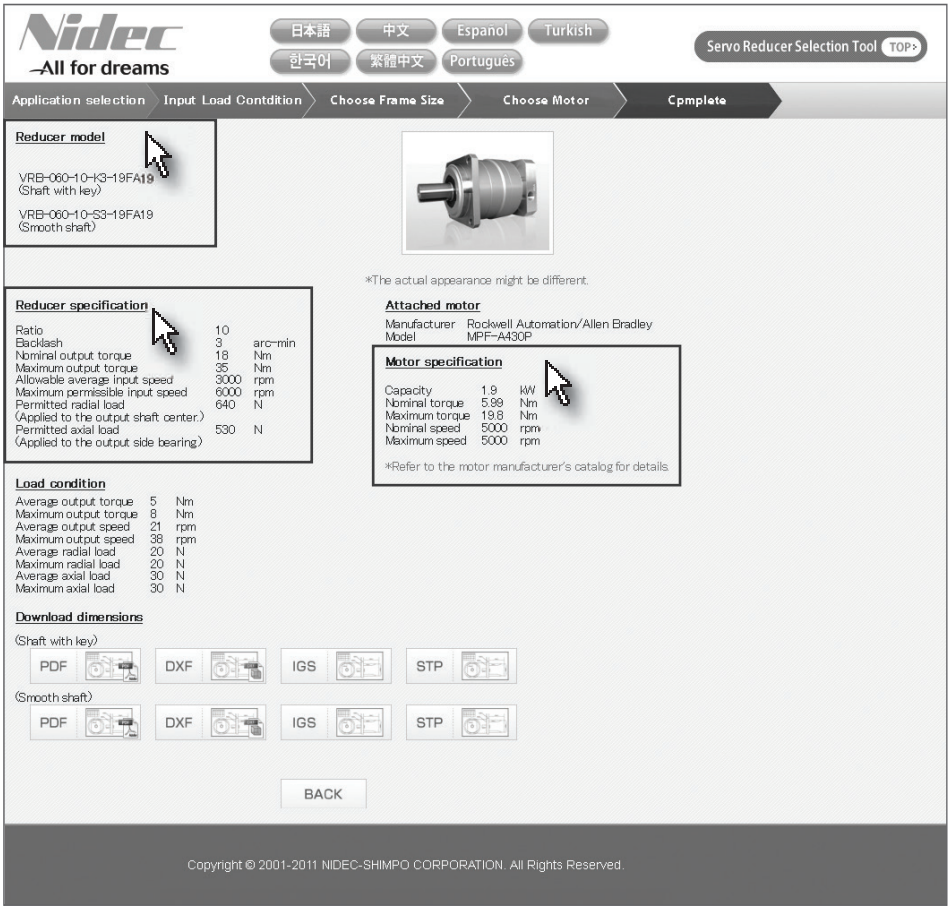
- The proper Nidec Drive Technology reducer frame size has been selected based on your application's criteria

Selection Tool Screen Example 6



- Select the Motor Manufacturer for your application from the list
- Select the appropriate motor via the "Motor Model drop down box"
- The manufacture Motor Model list includes new and former servo motors
- The sizing program does not select the servo motor

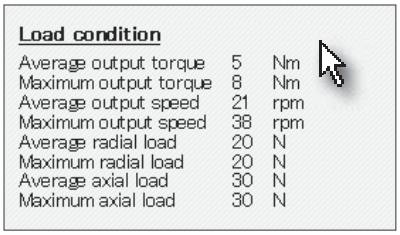
Selection Tool Screen Example 7



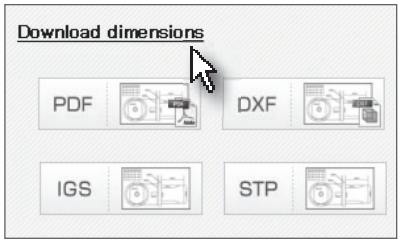
The resulting Load Condition can be helpful for sizing other related machine components

The Load Condition includes:

- Output Torque (Nm) and Output Velocity (rpm) of the Gearmotor



- These drawing formats can be downloaded: PDF, DXF, IGS, STP



Selection tool https://www.nidec-drivetechnology.co.jp/selection/all/

Customer Service and Support

Distinction in Service and Support

Nidec Drive Technology Corporation has invested heavily in building a global customer service and application support network that will meet the evolving needs of our customers. By leveraging our global infrastructure, our OEM customers maintain their competitiveness and profitability at home while able to expand into emerging markets abroad without any drop-off of service and support.

Nidec DTC pledges that we will continue to expand our service and support network footprint globally, and continuously strive for perfection as a dependable partner to our customers. In this section you will learn about our service and support capabilities that we will leverage in order to provide you peace of mind.

Online and Phone Support

Resolve your technical issues quickly and accurately, without disrupting your business. When you do business with Nidec Drive Technology, your company and your customers have immediate access to our global network of support centers and resources. Whether you need help designing, installing, and maintaining equipment or diagnosing an operating issue, Nidec DTC will deliver the tools and information that you need in order to insure that your equipment is running to perfection.

Contact your local sales office for immediate support either over the phone or in the field. A list of locations can be found in the back of this catalog. All customer accounts in North America have a dedicated Technical Support Engineer, knowledgeable about your business, on-standby ready to support you and your customers. If you do not know who to contact, please call our 1-800 number in order to get properly directed to the right person for help.

For online support, please visit our website in order to download any drawings, instruction manuals, or technical performance specifications that you require. All catalogs and brochures are easily downloadable on the website. If you prefer to inquire about an issue or for more information, please do not hesitate to submit your request online or email us at the address listed below.

Training Services

Investing our time in you, so together we build better, more competitive product for your customer. As the industrial world becomes increasingly competitive, new technologies are introduced every year requiring manufacturers to constantly rationalize and update existing designs. As a result, successful manufacturers realize the absolute need for product training.

Nidec DTC has a network of engineers that are factory trained and authorized to provide your workforce solid training on our products and basic power transmission concepts. The main objective of our standard program and materials is to better empower your workforce to size and select gearboxes for any motion control applications. We provide this service at no cost to our customers, because we see the value in building a more knowledgeable customer and helping them more quickly react to equipment design revisions when needed.

Other manufacturers are not as forthcoming with sharing information with their customers, an attempt to hide their higher manufacturing costs or to use unreleased performance data as a "product differentiator". Nidec DTC views their customers as long term partners and trains and shares information freely based on that vision.

Training classes can be conducted online, at any of our sales branches or offices, or at key distributor branches when requested. Nidec DTC can also bring the training session to your facility in order to make better use of your time and costs. A thorough hands-on training seminar can be provided at our North American headquarters in Glendale Heights, where customers can get the opportunity to completely assemble and test our products.

The Nidec DTC training program options provide support for any budget. Our training programs improve your employees' skill and knowledge competencies in the areas of power transmission and motion control while addressing any location, time, travel and productivity constraints. Contact your local sales office today in

Nidec Drive Technology Hotline:

Toll-free: (800) 842-1479
Email: info@nidec-dtc.com

The Nidec Drive Technology Corporation Warranty

1. **STANDARD WARRANTY**. With the exception of shaft seals, which is a normal wear item, Seller warrants that the products manufactured by the Seller to be free from defects in materials and workmanship under normal use and proper maintenance for:

VR, EV Planetary Products	5 years
ER Cycloidal Products	2 years
EJ Servo Worm Products	5 years
EJM Series	2 years
ST Rotary Index Tables	1 year

a. If within such period any product shall be proved to the Seller's reasonable satisfaction to be defective, such product shall be repaired or replaced at our option. The Seller's obligation and Buyer's exclusive remedy will be limited to such repair or replacement and shall be conditioned upon the Seller receiving written notice of any alleged defect no later than thirty (30) days after its discovery within the warranty period.

b. Shipping terms for any repaired or replaced product will be FOB shipping point unless negotiated otherwise. If necessary, Seller reserves the right to inspect the product claimed to be defective at Buyer's location or place of installation. Travel time and expenses for any Seller service personnel provided to Buyer's premises to affect such repair or replacement will be at the Buyer's expense. Seller reserves the right to satisfy our warranty obligation in full by reimbursing the Buyer for all payments made to Seller and Buyer shall thereupon return the product to Seller.

c. These warranties shall not be effective if the product has been subject to overload, misuse, negligence, or accident, or if the product has been repaired or altered outside of Seller's factory or authorized control in any respect which, in our judgment, adversely affects its condition or operation. Buyer shall establish, to our satisfaction, that the product has at all times, been properly assembled, installed, serviced, maintained, tested, operated and used in accordance with the current maintenance and operating instructions of Seller and has not been altered or modified in any manner without our prior written consent.

d. The Seller's warranty obligation shall not be effective for components or products hereunder where the product 1) is consumed by normal wear and tear, 2) is consumed by an application that was above the rated capacity, and 3) has a normal life that is fundamentally shorter in the length of time than the standard warranty as outlined, hereunder.

e. No extended warranty will be offered on wear items unless otherwise agreed to in writing by Nidec Drive Technology management at the time of the sale.

f. Descriptions or representations of the products provided by the Seller's employees, sales representatives, and distributors, regardless written or verbal, should not be construed as an expressed or implied warranty that would supersede any element of this standard warranty. Expressed or implied warranties are acceptable but only on a case-by-case basis as determined necessary by the Seller. A separate expressed or implied warranty must be provided in writing and confirmed by Nidec DTC management in order to be valid at the time of sale.

g. THE STANDARD WARRANTY AS DESCRIBED HEREIN SHALL BE IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED RELATED TO THE SELLER'S PRODUCTS, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS, AND SHALL BE IN LIEU OF ANY OBLIGATIONS OR LIABILITY ON THE SELLER'S BEHALF.

STANDARD TERMS AND CONDITIONS

1. **SHIPPING AND PAYMENT TERMS**. Unless otherwise specified, shipping terms are FOB shipping point, and payment terms are net 30 days. All payments are to be made in United States funds.

2. **TAXES AND SECURITY INTEREST**. Unless otherwise specified, the prices stated do not include any taxes which may now or hereafter be applicable to the products or performance of any services by Seller. Buyer agrees to pay or reimburse Seller for any such required taxes and all connected penalties and interests, or in lieu thereof, Buyer shall provide Seller with tax exemption documents acceptable to the taxing authorities involved. Buyer, by acceptance of the goods ordered, represents and warrants that Buyer is solvent and able to pay for the goods in accordance with the terms of sale. As security for payment of the purchase price for the products and all other amounts due from the Buyer under these Terms, Buyer hereby grants Seller a security interest in the products and agrees to execute and permit Seller to file and record all documents which may be requested by Seller in order to create, perfect, evidence and establish the foregoing security interest. If Buyer fails to pay any amount when due, or, prior to payment of all amounts due, removes all or any part of the products from Buyer's premises, we shall exercise any or all of the rights and remedies given to secured parties under the UCC of the State of Illinois, and under similar laws of any other state, if applicable.

3. **RETURN GOODS**. No product will be accepted for return unless authorized with appropriate returned goods number assigned. In all cases, freight charges must be prepaid. Buyer will be responsible for any damages incurred in transit to goods being returned. Title shall pass to Seller upon Seller's acceptance of return goods.

4. **CANCELLATION**. Terms, once accepted and approved by Seller, shall not be canceled or altered by Buyer, and Buyer shall not otherwise cause the work or shipment to be delayed, except with the consent of and upon the terms and conditions approved by Seller in writing. Orders canceled or suspended with our consent are subject to cancellation and/ or other charges as determined by Seller.

5. **DELAY IN DELIVERIES**. In no event shall Seller be liable for nondelivery or delays in delivery of products, or in the performance of any other obligations, arising directly or indirectly from acts of God, acts (including delay or failure to act) of any governmental authority (de jure or de facto), war (declared or undeclared), riot, fires, floods, weather, labor disputes, sabotage, epidemics, factory shutdowns or alterations, embargoes, delays, shortages or inability to procure transportation, labor, manufacturing facilities or materials, failure to obtain timely instructions or information from Buyer, or inability due to causes of any other kind beyond our control. The foregoing provisions shall apply even though such cause may occur after performance of our obligations has been delayed for other causes.

6. **INDEMNIFICATION**. Buyer shall notify Seller promptly in writing and in all events within ten (10) days after its occurrence, of any accident or malfunction involving the products which results in injury to or death of any persons, property damage or economic loss of any kind, and Buyer shall cooperate fully with Seller in investigating and determining the cause of any such accident or malfunction. Buyer further agrees to indemnify and hold Seller harmless from and against all claims and damages imposed upon Seller or incurred arising, directly or indirectly, from Buyer's failure to perform or satisfy any of the Terms described herein.

7. **GENERAL PROVISIONS**. These Terms shall be governed, construed and enforced in accordance with the laws of the State of Illinois, and shall be binding upon and inure to the benefit of any successors, assigns, and legal Distributors of Seller and Buyer. The Terms are not assignable without Seller's prior written approval. A judicial or administrative declaration in any jurisdiction of the

invalidity of any one or more of the provisions of the Terms in any jurisdiction, nor shall such declaration have any effect on the validity of interpretation of the Terms outside that jurisdiction.

8. **MINIMUM ORDER CHARGE**. The minimum charge on an order will be $60.00.

9. **BOXING ORDER CHARGE**. No charge is made for standard boxing or crating required by transportation companies for domestic shipments. Cost of special boxing, export boxing, cartage to steamer or transfer expenses will be added to the invoice unless charges are shown to be included in the prices.

Any and all Terms are subject to change prior to Buyer's acceptance of these Terms.

PROPERTY AND PATENT RIGHTS

1. Seller retains for itself any and all property rights, including but not limited to all patent, copyright, and trade secret rights, to any software materials and to all designs, engineering details, documentation, and other data pertaining to any product designed in connection herewith and to all right of discovery, invention or patent rights arising out of the work done in connection herewith. Buyer expressly agrees that it will not assert any property rights herein, except the right for itself and subsequent owners to use the product.

2. Buyer acknowledges that any software materials constitute valuable trade secrets of Seller and are unpublished works on which Seller holds the sole and exclusive copyright. Buyer agrees to maintain and protect the confidentiality of these trade secrets and agrees not to disclose them or use them for any purpose not contemplated by this Agreement. Buyer agrees to formulate and adopt appropriate safeguards in light of its own operating activities, to insure protection of the confidentiality of these trade secrets. Buyer shall immediately notify Seller of any information which comes to its attention which indicates that there has been any loss of confidentiality of Seller trade secret information.

SUBMISSION AND ACCEPTANCE OF ORDERS

1. All orders and contracts are subject to acceptance or rejection by an officer of Seller or any individual authorized by Seller in writing , at the main offices of Seller, which approval or rejection shall in all cases be in writing to the Buyer, and no order or contract shall be binding until so accepted. Seller reserves the right to refuse any business originating in the Territory of the Buyer, for any reason which in the considered judgment of Seller is sufficient grounds for refusal.

2. On orders and contracts of a deferred-payment nature, all such payment and credit extensions are subject to final review and approval by Seller. Seller may accept such orders or contracts, withhold shipment after initial acceptance if for any reason the Buyer's credit has become impaired.

SHIPMENTS AND SHIPPING INFORMATION

1. All shipments, from whatever source, shall be contingent upon prior approval of the order or contract by Seller, and after such prior approval, upon the effect of strikes, accidents, embargoes, priorities, or any cause natural or otherwise, beyond the control of this Seller. Seller, in effect, assumes no liability hereunder for its failure to make shipment on any order or contract.