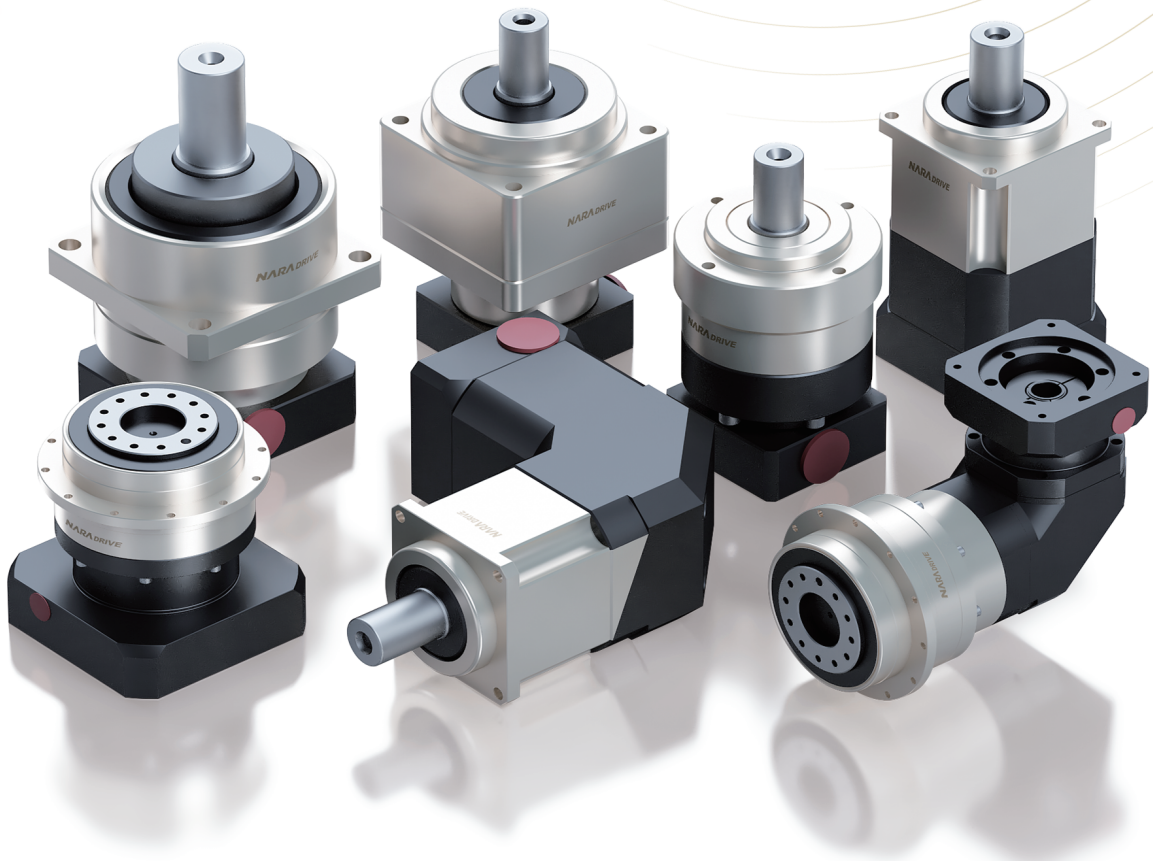
NARA DRIVE

Best Automation System

Precision Planetary **Gearboxes**



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Best Automation System

Nara Drive Planetary Gearboxes for servo motors are highly precision, highly rigid, and widely applicable to machinery and equipment in various areas. Due to helical gear provide much higher contact ratio than spur gear, and higher torque, as well as smooth and quite operation.

Contents

Application

- Gantry robot
- Printing machine
- Belt conveyor
- Liquid crystal glass transfer robot
- Semiconductor manufacturing machine
- Cutting & welding machine
- Machine tools
- Loader shaft drive
- Pillow packing machine
- Woodworking machine
- Laser machining apparatus
- Medical equipment (CT)
- Surveillance camera
- Bending machine
- Measuring equipment
- Turret head

Product Overview

NP series
- High-precision, Low-noise, Helical gear
- Inline type Planetary Gearbox

NPR series
- High-precision, Low-noise, Helical gear
- Right angle type Planetary Gearbox

NF series
- High-precision, Low-noise, Helical gear
- Inline Planetary Gearbox with output flange

NFR series
- High-precision, Low-noise, Helical gear
- Right angle Planetary Gearbox with output flange

NC series
- Precision, Low-noise, Helical gear
- Fixed tapped type General Planetary Gearbox

NX series
- High-precision, Low-noise, Helical gear
- Fixed tapped type Planetary Gearbox

NZ series
- High-precision, Low-noise, Helical gear
- Compact design Planetary Gearbox

Ordering Information

Planetary Gearbox | **Servo Motor**

NP — **115** — **015** — **S1** — **P1** — **MOTOR**

Type

NP : Inline type
NPR : Right angle type
NF : Flange type
NFR : Right angle type with output flange
NC : General type
NX : Fixed tapped type
NZ : Compact type

Size

NP, NPR : 042, 060, 090, 115, 142, 180, 220
NF, NFR : 047, 064, 090, 110, 140, 200, 255
NC : 050, 070, 090, 120,155, 205, 235
NX : 052, 078, 098, 125
NZ : 060, 090, 120

Ratio

Type	Stage	Ratio
NP	1	3, 4, 5, 6, 7, 8, 9, 10
	2	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
NPR	1	3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20
	2	25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200
NF	1	5, 7, 10
	2	25, 35, 50, 70, 100
NFR	1	5, 7, 10, 14, 20
	2	25, 35, 50, 70, 100, 140, 200
NC	1	3, 4, 5, 6, 7, 8, 9, 10
	2	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
NX	1	3, 5, 9
	2	15, 20, 25, 35, 45, 81
NZ	1	3.67 [1], 5, 9
	2	11, 15, 21, 33, 45, 81

1) For ratio of 3.67, the actual reduction ratio is 3/11.

Output shape

Blank : NF, NFR Series
S1 : Smooth shaft
S2 : Shaft with key

Backlash

P1 : Precision backlash
P2 : Low backlash
P3 : Standard backlash

Type	Stage	P1	P2	P3
NP NF	1	3'	5'	8'
	2	5'	7'	10'
NPR NFR	1	4'	6'	10'
	2	7'	9'	12'
NC	1	-	-	12'
	2	-	-	15'
NX NZ	1	3'	8'	12'
	2	5'	10'	15'

Maker / Model

Ordering Example

NP 115 - 015 - S1 - P1 _ MITSUBISHI / HG-KR73

Sizing and Selection

After choosing series (type), select suitable size as shown below.

Method 1. Quick selection by servo motor

If the servo motor and the reduction ratio are determined, it is possible to select the size by referring to the gearbox selection table for each servo motor maker in this catalog.

Method 2. Detailed selection by calculation

Select as follows.

① Check the load torque applied to the gearbox. (Refer to the load torque graph on the next page)

T (Nm) : Load torque a : Acceleration c : Constant

t (sec) : Time d : Deceleration p : Pause

n (rpm) : Output speed (average speed is applied during acceleration or deceleration)

② Calculate average load torque(T_{2m}) applied to the output shaft with the load pattern.

$$T_{2m} = \sqrt[10/3]{\frac{n_{2a} \cdot t_a \cdot |T_{2a}|^{10/3} + n_{2c} \cdot t_c \cdot |T_{2c}|^{10/3} + n_{2d} \cdot t_d \cdot |T_{2d}|^{10/3} + n_{2p} \cdot t_p \cdot |T_{2p}|^{10/3}}{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d + n_{2p} \cdot t_p}}$$

③ Calculate average output speed (n_{2m})

$$n_{2m} = \frac{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d + n_{2p} \cdot t_p}{t_a + t_c + t_d + t_p}$$

④ Maximum output speed (n_{out})and Maximum input speed (n_{in}) are determined by the reduction ratio(i).

$n_{in} / n_{out} \geqq i$ (n_{in} is determined by the motor.)

⑤ Calculate the maximum input speed(n_{in})with the maximum output speed(n_{out})and the reduction ratio(i).

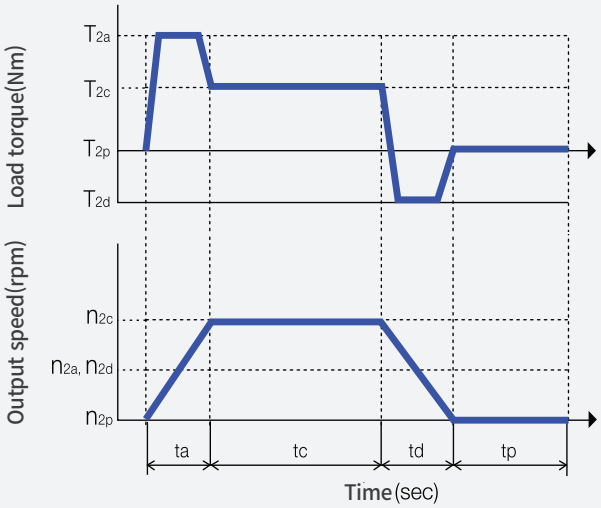
$$n_{in} = n_{out} \times i$$

⑥ Select the size that satisfies the following formula.

$T_{2m} \leqq T_{2N}$ (Nominal output torque)

(Refer to the specification table)

Sizing and Selection



<Load torque graph>

Check the followings by referring to the specification table to check if the selected size is appropriate.

⇩

⑦ Check whether the average input speed(n_{1m})is less than the nominal input speed (n_{1N}).

$$n_{1m} = n_{2m} \times i \leqq n_{1N}$$

⇩

⑧ If the maximum input speed(n_{in})is less than the maximum allowable input speed(n_{1B})of the gearbox, but exceeds the nominal input speed(n_{1N}), please contact NARA.

$$n_{1N} < n_{in} \leqq n_{1B}$$ (Contact NARA)

⇩

⑨ Check whether T_{2a}, and T_{2d} are below the maximum acceleration torque (T_{2B}).

$$T_{2a}, T_{2d} \leqq T_{2B}$$

⇩

⑩ Refer to the dimension table and check whether the motor shaft diameter($ØS_m$) is less than the maximum input bore($ØS_{max}$) of the gearbox.

$$ØS_m \leqq ØS_{max}$$

⇩

Selection completed

Sizing and Selection

Example of NP series Selection

① Operating conditions

At acceleration : T_{2a} = 100(Nm), t_a = 0.5(sec), n_{2a} = 70(rpm)

During normal operation : T_{2c} = 50(Nm), t_c = 2(sec), n_{2c} = 140(rpm)

At deceleration : T_{2d} = -80(Nm), t_d = 1(sec), n_{2d} = 70(rpm)

While stopped : T_{2p} = 0(Nm), t_p = 2(sec), n_{2p} = 0(rpm)

Maximum output speed : n_{out} = 140(rpm)

Maximum input speed : n_{in} = 3000(rpm)

Motor shaft diameter : $ØS_m$ = 14(mm)

② Calculate average load torque(T_{2m}) from the above operating conditions.

$$T_{2m} = \sqrt[10/3]{\frac{70 \cdot 0.5 \cdot |100|^{10/3} + 140 \cdot 2 \cdot |50|^{10/3} + 70 \cdot 1 \cdot |-80|^{10/3} + 0}{70 \cdot 0.5 + 140 \cdot 2 + 70 \cdot 1 + 0}}$$

T_{2m}= 66 (Nm)

③ Calculate average output speed(n_{2m}).

$$n_{2m} = \frac{70 \cdot 0.5 + 140 \cdot 2 + 70 \cdot 1 + 0}{0.5 + 2 + 1 + 2}$$

n_{2m}= 70 (rpm)

④ Maximum output speed(n_{out})and Maximum input speed(n_{in}) are determined by the reduction ratio(i).

3000 / 140 = 21.4

21.4 ≧ 20

(Select a lower reduction ratio in the specification table)

⑤ Calculate the maximum input speed(n_{in})with the maximum output speed(n_{out})and the reduction ratio(i).

140 x 20 = 2800

n_{in} = 2800 (rpm)

⑥ Select the size.

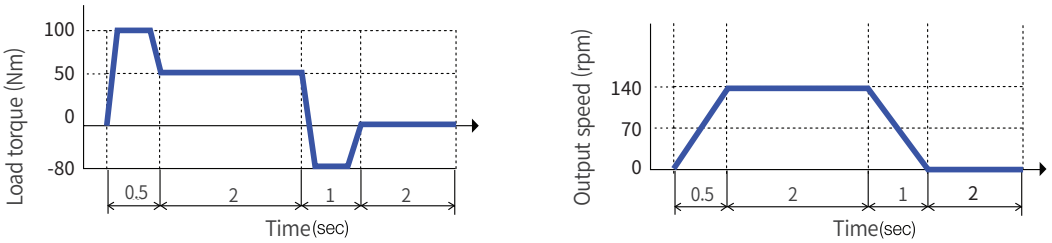
T_{2m} = 66 ≦ 84 (Nm)

(Refer to the specification table)

Selected as NP090-20

Sizing and Selection

Example of NP series Selection



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Check the followings by referring to the specification table to check if the selected size is appropriate.

⇩

⑦ Check whether the average input speed(n_{1m}) is less than the nominal input speed(n_{1N}).

$$n_{1m} = 70 \times 20 = 1400 \leqq 3000 \text{ (rpm)}$$

⇩

⑧ If the maximum input speed(n_{in})is less than the maximum allowable input speed(n_{1B}) of the gearbox, but exceeds the nominal input speed(n_{1N}), please contact NARA.

$$n_{in} = 2800 \leqq 3000 \text{ (rpm)} \quad \text{(Nominal input speed)}$$

⇩

⑨ Check whether T_{2a} and T_{2d} are below the maximum acceleration torque(T_{2B}).

$$T_{2a} = 100 \leqq 252 \text{ (Nm)} \quad / \quad T_{2d} = 80 \leqq 252 \text{ (Nm)}$$

⇩

⑩ Refer to the dimension table and check whether the motor shaft diameter ($ØS_m$) is less than the maximum input bore ($ØS_{max}$) of the gearbox.

$$ØS_m = Ø14 \leqq Ø16 \text{ (mm)}$$

⇩

Determined as model NP090-20

Sizing and Selection

Example of NX series Selection

① **Operating conditions**

At acceleration : T_{2a} = 90(Nm), t_a = 0.5(sec), n_{2a} = 80(rpm)

During normal operation : T_{2c} = 40(Nm), t_c = 3(sec), n_{2c} = 160(rpm)

At deceleration : T_{2d} = -70(Nm), t_d = 1(sec), n_{2d} = 80(rpm)

While stopped : T_{2p} = 0(Nm), t_p = 5(sec), n_{2p} = 0(rpm)

Maximum output speed : n_{out} = 160(rpm)

Maximum input speed : n_{in} = 4000(rpm)

Motor shaft diameter : $ØS_m$ = 14(mm)

② **Calculate average load torque (T_{2m}) from the above operating conditions.**

$$T_{2m} = \sqrt[10/3]{\frac{80 \cdot 0.5 \cdot |90|^{10/3} + 160 \cdot 3 \cdot |40|^{10/3} + 80 \cdot 1 \cdot |-70|^{10/3} + 0}{80 \cdot 0.5 + 160 \cdot 3 + 80 \cdot 1 + 0}}$$

T_{2m}= 53.6 (Nm)

③ **Calculate average output speed(n_{2m}).**

$$n_{2m} = \frac{80 \cdot 0.5 + 160 \cdot 3 + 80 \cdot 1 + 0}{0.5 + 3 + 1 + 5}$$

n_{2m}= 63.2 (rpm)

④ **Maximum output speed (n_{out}) and Maximum input speed (n_{in}) are determined by the reduction ratio(i).**

4000 / 160 = 25

25 ≧ 25

(Select a lower reduction ratio in the specification table)

⑤ **Calculate the maximum input speed (n_{in}) with the maximum output speed (n_{out}) aand the reduction ratio(i).**

160 x 25 = 4000

n_{in} = 4000 (rpm)

⑥ **Select the size.**

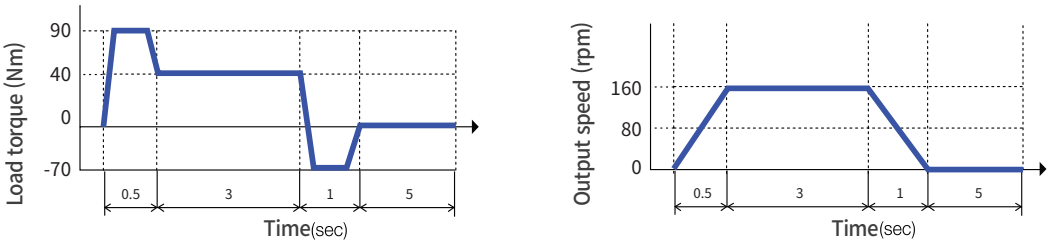
T_{2m} = 53.6 ≦ 65.9(Nm)

(Refer to the specification table)

Selected as NX098-25

Sizing and Selection

Example of NX series Selection



<Load torque graph>

Check the followings by referring to the specification table to check if the selected size is appropriate.

⇩

⑦ Check whether the average input speed (n_{1m}) is less than the nominal input speed (n_{1N}).

$$n_{1m} = 63.2 \times 25 = 1580 \leqq 3000 \text{ (rpm)}$$

⇩

⑧ If the maximum input speed(n_{in}) is less than the maximum allowable input speed(n_{1B})of the gearbox, but exceeds the nominal input speed(n_{1N}), please contact NARA.

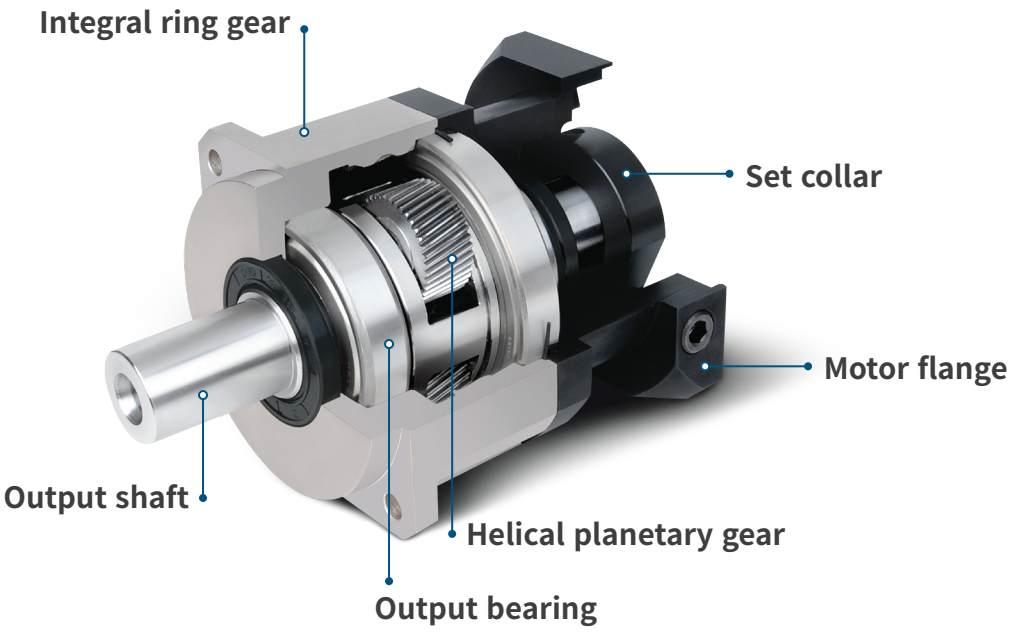
n_{in} = 3000 (rpm) < n_{in} = 4000 ≦ 6000 (rpm) = n_{1B}

(Nominal input speed) (Maximum allowable input speed)

NP Series

- Low-noise and high-precision planetary gearbox with helical gear
- Inline connection

Features



Low Noise
Low-noise is realized by using a helical gear that enables to provide smooth rotation.

High Rigidity
Ring gear directly gearing to provide compact, high rigidity and high torque.

High Precision
Enables high precision position control with precise backlash, and maximizes the characteristics of servo motor.

Long Life
No need for separate inspection or maintenance due to it's long service life.

Easy Mounting
Easy mounting of motor and gearbox due to corresponding of Set-collar and bushing to the output shaft of servo motor.

Herical Gearbox
Gearbox that uses helical gear and has a higher contact ratio than spur gear, it provides high torque and quiet operation.

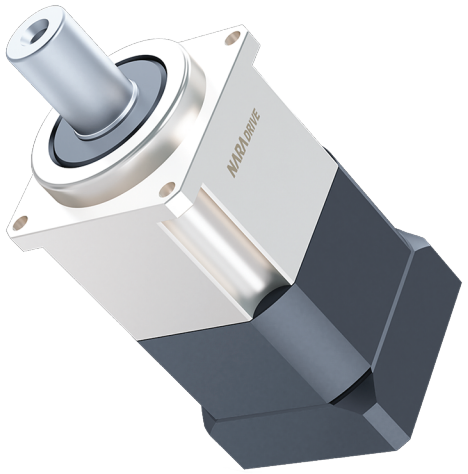
Specifications

Item	Unit	Stage	Ratio	NP042	NP060	NP060A	NP090	NP090A	NP115	NP142	NP180	NP220
Nominal output torque (T_{2N}) [1]	Nm	1	3	12	33	-	78	-	129	240	432	684
			4	11.4	30	-	84	-	174	325	630	1020
			5	13.2	36	-	96	-	198	390	720	1200
			6	12	33	-	90	-	186	360	660	1140
			7	11.4	30	-	84	-	180	330	660	1080
			8	10.2	27	-	72	-	156	300	600	960
			9	8.4	24	-	60	-	138	270	540	900
			10	8.4	24	-	60	-	138	270	540	900
		2	15	12	33	33	78	78	129	240	432	684
			20	11.4	30	30	84	84	174	325	630	1020
			25	13.2	36	36	96	96	198	390	720	1200
			30	12	33	33	90	90	186	360	660	1140
			35	11.4	30	30	84	84	180	330	660	1080
			40	10.2	27	27	72	72	156	300	600	960
			45	8.4	24	24	60	60	138	270	540	900
			50	13.2	36	36	96	96	198	390	720	1200
			60	12	33	33	90	90	186	360	660	1140
			70	11.4	30	30	84	84	180	330	660	1080
			80	10.2	27	27	72	72	156	300	600	960
			90	8.4	24	24	60	60	138	270	540	900
			100	8.4	24	24	60	60	138	270	540	900
Maximum acceleration torque (T_{2B}) [2]	Nm	1, 2	3~100	3 times of Nominal output torque(T_{2N})								
Emergency stop torque (T_{2E}) [3]	Nm	1, 2	3~100	4 times of Nominal output torque(T_{2N})								
Nominal input speed (n_{1N}) [4]	rpm	1, 2	3~100	3000	3000	3000	3000	3000	3000	3000	3000	2000
Maximum input speed (n_{1B}) [5]	rpm	1, 2	3~100	6000	6000	6000	5000	5000	5000	5000	5000	4000
Precision backlash (P1)	arcmin	1	3~10	≤3	≤3	-	≤3	-	≤3	≤3	≤3	≤3
		2	15~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Low backlash (P2)	arcmin	1	3~10	≤5	≤5	-	≤5	-	≤5	≤5	≤5	≤5
		2	15~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Standard backlash (P3)	arcmin	1	3~10	≤8	≤8	-	≤8	-	≤8	≤8	≤8	≤8
		2	15~100	≤10	≤10	≤10	≤10	≤10	≤10	≤10	≤10	≤10
Maximum radial load (F_{2rB}) [6]	N	1, 2	3~100	710	1210	1210	2710	2710	5490	7710	12260	27140
Maximum axial load (F_{2aB}) [7]	N	1, 2	3~100	470	770	770	1550	1550	3200	4830	7110	13560
Lifetime [8]	hr	1, 2	3~100	20000								
Noise level [9]	dB(A)	1, 2	3~100	≤56	≤58	≤58	≤60	≤60	≤63	≤65	≤67	≤70
Efficiency (η) [10]	%	1	3~10	≥95								
		2	15~100	≥90								
Weight [11]	kg	1	3~10	0.56	1.4	-	3.7	-	8.0	14.5	28.4	49
		2	15~100	0.84	1.5	2.0	4.1	5.4	8.9	17.8	33.6	59
Ambient temperature	˚C	1, 2	3~100	-15 to +40								
Permitted housing temperature	˚C	1, 2	3~100	+90								
Lubrication		1, 2	3~100	Grease								
Degree of protection [12]		1, 2	3~100	IP54 (IP65)								
Mounting position		1, 2	3~100	All directions								

1) Nominal output torque is the allowable value of average load torque applied to the output shaft.
2) Maximum acceleration torque is the allowable value of startup/stop torque generated during operation.
3) Emergency stop torque is the allowable value of overload or shock load torque. (1000 times permitted during the lifetime of the gearbox)
4) Allowable value of average input speed.
5) Maximum input speed allowed intermittently. (Please contact NARA when using over the nominal input speed)
6) When the output speed is 100 rpm, the allowable value of the radial load is on the middle of the output shaft. (Axial load 0 N)
7) When the output speed is 100 rpm, the allowable value of the axial load is on the center of the output shaft. (Radial load 0 N)
8) Lifetime during intermittent operation within nominal output torque and nominal input speed.
9) Representative value measured at a distance of 1m from a gearbox with a reduction ratio of 1/10 (1-stage) or 1/100 (2-stage) at the nominal input speed under no-load condition.
10) Efficiency at full load.
11) Weight is a representative value and depends on reduction ratio and applied motor.
12) Protection class IP65 is optional.

Inertia

Item	Unit	Stage	Ratio	NP042	NP060	NP060A	NP090	NP090A	NP115	NP142	NP180	NP220
Mass moment of inertia (J_1)	$kg \cdot cm^2$	1	3	0.050	0.260	-	1.373	-	5.576	14.4	42.3	93.4
			4	0.041	0.212	-	1.009	-	4.359	10.9	31.6	65.3
			5	0.037	0.193	-	0.874	-	3.853	9.4	27.1	54.0
			6	0.035	0.181	-	0.800	-	3.613	8.8	24.9	49.0
			7	0.034	0.177	-	0.771	-	3.507	8.5	23.4	45.7
			8	0.033	0.173	-	0.742	-	3.404	8.2	22.7	43.7
			9	0.032	0.170	-	0.725	-	3.340	8.0	22.2	42.3
			10	0.032	0.169	-	0.720	-	3.322	7.9	22.2	41.8
		2	15	0.037	0.040	0.196	0.218	0.891	0.963	4.1	10.2	28.8
			20	0.037	0.039	0.194	0.203	0.879	0.915	4.0	9.8	27.7
			25	0.037	0.038	0.193	0.198	0.875	0.895	3.9	9.6	27.3
			30	0.036	0.037	0.193	0.195	0.872	0.886	3.9	9.5	27.1
			35	0.036	0.037	0.193	0.194	0.871	0.882	3.9	9.5	26.9
			40	0.036	0.037	0.193	0.193	0.870	0.878	3.9	9.4	26.9
			45	0.036	0.037	0.192	0.192	0.869	0.875	3.8	9.4	26.8
			50	0.032	0.032	0.169	0.171	0.720	0.725	3.3	8.0	22.3
			60	0.032	0.032	0.169	0.170	0.720	0.723	3.3	7.9	22.2
			70	0.032	0.032	0.169	0.170	0.719	0.722	3.3	7.9	22.2
			80	0.032	0.032	0.169	0.170	0.719	0.721	3.3	7.9	22.2
			90	0.032	0.032	0.169	0.170	0.719	0.720	3.3	7.9	22.2
			100	0.032	0.032	0.169	0.170	0.719	0.720	3.3	7.9	22.2



Selection Table

1. Yaskawa Electric Corporation

Σ-7 Series SGM7J

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	SGM7J-A5A	3000	8	042(A04A)							
100	SGM7J-01A	3000	8								
150	SGM7J-C2A	3000	8								
200	SGM7J-02A	3000	14	060(B06A)							
400	SGM7J-04A	3000	14								
600	SGM7J-06A	3000	14								
750	SGM7J-08A	3000	19	090(C09B)							

(Notation example)

042 Gearbox Size (NP)

(A04A) Motor flange code

Servo Motor				Gearbox											
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)											
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	SGM7J-A5A	3000	8	042(A04A)				060(A04A)								
100	SGM7J-01A	3000	8													
150	SGM7J-C2A	3000	8							090(B06G)						
200	SGM7J-02A	3000	14	060A(B06A)					090(B06A)							
400	SGM7J-04A	3000	14										115(C09D)			
600	SGM7J-06A	3000	14											142		
750	SGM7J-08A	3000	19	090A(C09B)				115(C09B)					142(D10D)			180

Σ-7 Series SGM7A

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	SGM7A-A5A	3000	8	042(A04A)							
100	SGM7A-01A	3000	8								
150	SGM7A-C2A	3000	8								
200	SGM7A-02A	3000	14	060(B06A)							
400	SGM7A-04A	3000	14								
600	SGM7A-06A	3000	14								
750	SGM7A-08A	3000	19	090(C09B)							
1000	SGM7A-10A	3000	19								
1500	SGM7A-15A	3000	24	090(C10C)							
2000	SGM7A-20A	3000	24								
2500	SGM7A-25A	3000	24							115(D10E)	
3000	SGM7A-30A	3000	28	115(D13A)							
4000	SGM7A-40A	3000	28								
5000	SGM7A-50A	3000	28								
7000	SGM7A-70A	3000	28						142(E13F)		

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

Σ-7 Series SGM7A

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)												
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	SGM7A-A5A	3000	8	042(A04A)						060(A04A)						
100	SGM7A-01A	3000	8													
150	SGM7A-C2A	3000	8										090(B06G)			
200	SGM7A-02A	3000	14	060A(B06A)												
400	SGM7A-04A	3000	14			090(B06A)								115(C09D)		
600	SGM7A-06A	3000	14											142		
750	SGM7A-08A	3000	19	090A(C09B)				115(C09B)					142(D10D)			
1000	SGM7A-10A	3000	19												180	
1500	SGM7A-15A	3000	24	115(C10C)												
2000	SGM7A-20A	3000	24				142(D10E)					180(E13E)				
2500	SGM7A-25A	3000	24											220		
3000	SGM7A-30A	3000	28	142(D13A)												
4000	SGM7A-40A	3000	28				180(E13F)				220					
5000	SGM7A-50A	3000	28										Consult us			
7000	SGM7A-70A	3000	28													

Σ-7 Series SGM7P

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
100	SGM7P-01A	3000	8	042(A06C)							
200	SGM7P-02A	3000	14	060(B08B)							
400	SGM7P-04A	3000	14								
750	SGM7P-08A	3000	19	090(C13C)							
1500	SGM7P-15A	3000	19								

(Notation example)

042 Gearbox Size (NP)

(A06C) Motor flange code

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)												
				15	20	25	30	35	40	45	50	60	70	80	90	100
100	SGM7P-01A	3000	8	042(A06C)					060(A06C)						090(B06A)	
200	SGM7P-02A	3000	14	060A(B08B)								090(B08B)				
400	SGM7P-04A	3000	14										115(C09B)			
750	SGM7P-08A	3000	19	090A(C13C)					115(C13C)					142(D12B)		
1500	SGM7P-15A	3000	19		115(C13C)				142(D12B)				180			

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

Σ-7 Series SGM7G

Servo Motor				Gearbox							
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
0.3	SGM7G-03A	1500	16	060(B09C)							
0.45	SGM7G-05A	1500	16							090(C09J)	
0.85	SGM7G-09A	1500	24	090(C13A)							
1.3	SGM7G-13A	1500	24								
1.8	SGM7G-20A	1500	24						115(D13A)		
2.9	SGM7G-30A	1500	35	142(E18A)							
4.4	SGM7G-44A	1500	35								180(F18A)
5.5	SGM7G-55A	1500	42	180(F18B)							
7.5	SGM7G-75A	1500	42								
11	SGM7G-1AA	1500	42	180(F22B)							
15	SGM7G-1EA	1500	55	220(G22A)							Consult us

(Notation example)

060 Gearbox Size (NP)

(B09C) Motor flange code

Servo Motor				Gearbox										
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)										
				15	20	25	30	35	40	45	50	60	70	80	90	100
0.3	SGM7G-03A	1500	16	090(B09C)												
0.45	SGM7G-05A	1500	16					115(C09J)					142(D10F)			180
0.85	SGM7G-09A	1500	24	115(C13A)												
1.3	SGM7G-13A	1500	24			142(D13A)				180(E13F)				220		
1.8	SGM7G-20A	1500	24													
2.9	SGM7G-30A	1500	35	180(E18A)					220(F18A)							
4.4	SGM7G-44A	1500	35				220(F18A)									
5.5	SGM7G-55A	1500	42	220(F18B)												
7.5	SGM7G-75A	1500	42													
11	SGM7G-1AA	1500	42													
15	SGM7G-1EA	1500	55													

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

2. Mitsubishi Electric Corporation

MELSERVO-J4 Series HG-KR

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	HG-KR053(B)	3000	8	042(A04A)							
100	HG-KR13(B)	3000	8								
200	HG-KR23(B)	3000	14	060(B06A)							
400	HG-KR43(B)	3000	14								
750	HG-KR73(B)	3000	19	090(C09B)							

(Notation example)

042 Gearbox Size (NP)

(A04A) Motor flange code

Servo Motor				Gearbox										
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)										
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	HG-KR053(B)	3000	8	042(A04A)												
100	HG-KR13(B)	3000	8					060(A04A)						090(B06G)		
200	HG-KR23(B)	3000	14	060A(B06A)					090(B06A)							
400	HG-KR43(B)	3000	14							115(C09D)						142
750	HG-KR73(B)	3000	19	090A(C09B)				115(C09B)					142(D10D)			180

MELSERVO-J4 Series HG-MR

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	HG-MR053(B)	3000	8	042(A04A)							
100	HG-MR13(B)	3000	8								
200	HG-MR23(B)	3000	14	060(B06A)							
400	HG-MR43(B)	3000	14								
750	HG-MR73(B)	3000	19	090(C09B)							

Servo Motor				Gearbox										
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)										
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	HG-MR053(B)	3000	8	042(A04A)			042(A04A)									
100	HG-MR13(B)	3000	8						060(A04A)						090(B06G)	
200	HG-MR23(B)	3000	14	060A(B06A)			060A(B06A)									
400	HG-MR43(B)	3000	14				090(B06A)						115(C09D)			
750	HG-MR73(B)	3000	19	090A(C09B)					115(C09B)					142(D10D)		

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox							
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
0.5	HG-SR52(B)	2000	24	090(C13A)							
1	HG-SR102(B)	2000	24								
1.5	HG-SR152(B)	2000	24								115(D13A)
2	HG-SR202(B)	2000	35	142(E18A)							
3.5	HG-SR352(B)	2000	35								
5	HG-SR502(B)	2000	35								
7	HG-SR702(B)	2000	35							180(F18A)	

(Notation example)

090 Gearbox Size (NP)

(C13A) Motor flange code

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)												
				15	20	25	30	35	40	45	50	60	70	80	90	100
0.5	HG-SR52(B)	2000	24	090A(C13A)					115(C13A)					142(D13A)		
1	HG-SR102(B)	2000	24		115(C13A)					142(D13A)				180(E13F)		
1.5	HG-SR152(B)	2000	24												220	
2	HG-SR202(B)	2000	35	180(E18A)									220(F18A)			
3.5	HG-SR352(B)	2000	35						220(F18A)							
5	HG-SR502(B)	2000	35										Consult us			
7	HG-SR702(B)	2000	35													

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

3. Panasonic Corporation

A5 Series MSME

Servo Motor				Gearbox
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage) 3 4 5 6 7 8 9 10
50	MSME 5A	3000	8	042(A04B)
100	MSME 01	3000	8	
200	MSME 02	3000	11	042(A06A)
400	MSME 04	3000	14	060(B06B)
750	MSME 08	3000	19	090(C09C)
1000	MSME 10	3000	19	090(C10A)
1500	MSME 15	3000	19	
2000	MSME 20	3000	19	115(D10A)
3000	MSME 30	3000	22	090(C13A) 115(D13A)
4000	MSME 40	3000	24	090(C13B) 115(D13A)
5000	MSME 50	3000	24	142(E13F)

(Notation example)

042 Gearbox Size (NP)

(A04B) Motor flange code

Servo Motor				Gearbox
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage) 15 20 25 30 35 40 45 50 60 70 80 90 100
50	MSME 5A	3000	8	
100	MSME 01	3000	8	042(A04B) 060(A04B) 090(B06H)
200	MSME 02	3000	11	060(A06A) 090(B06B) 115
400	MSME 04	3000	14	060A(B06B) 090(B06B) 115(C09H)
750	MSME 08	3000	19	090A(C09C) 115(C09C) 142
1000	MSME 10	3000	19	090A(C10A)
1500	MSME 15	3000	19	115(C10A) 142(D10A) 180
2000	MSME 20	3000	19	180 220
3000	MSME 30	3000	22	142(D13A) 180(E13F) 220
4000	MSME 40	3000	24	142(D13A) 180(E13F) 220
5000	MSME 50	3000	24	**Consult us**

A5 Series MHMD

Servo Motor				Gearbox
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage) 3 4 5 6 7 8 9 10
200	MHMD 02	3000	11	042(A06A)
400	MHMD 04	3000	14	060(B06B)
750	MHMD 08	3000	19	090(C09C)

Servo Motor				Gearbox
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage) 15 20 25 30 35 40 45 50 60 70 80 90 100
200	MHMD 02	3000	11	060(A06A) 090(B06B) 115
400	MHMD 04	3000	14	060A(B06B) 090(B06B) 115(C09H)
750	MHMD 08	3000	19	090A(C09C) 115(C09C) 142

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

A5 Series MDME

Servo Motor				Gearbox								
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)								
				3	4	5	6	7	8	9	10	
1	MDME 10	2000	22	090(C13A)								
1.5	MDME 15	2000	22									
2	MDME 20	2000	22						115(D13A)			
3	MDME 30	2000	24	090(C13B)				115(D13A)			142(E13F)	
4	MDME 40	2000	35	142(E18A)								
5	MDME 50	2000	35									
7.5	MDME 75	1500	42	180(F18B)								
11	MDME C1	1500	55									
15	MDME C5	1500	55	220(G22A)							Consult us	

(Notation example)

090 Gearbox Size (NP)

(C13A) Motor flange code

Servo Motor				Gearbox											
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)											
				15	20	25	30	35	40	45	50	60	70	80	90	100
1	MDME 10	2000	22	115(C13A)											
1.5	MDME 15	2000	22				142(D13A)								
2	MDME 20	2000	22					180(E13F)					220		
3	MDME 30	2000	24				180(E13F)			220					
4	MDME 40	2000	35						220(F18A)						
5	MDME 50	2000	35	180(E18A)											
7.5	MDME 75	1500	42		220(F18B)										
11	MDME C1	1500	55	**Consult us**											
15	MDME C5	1500	55												

A5 Series MSMD

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)								
				3	4	5	6	7	8	9	10	
50	MSMD 5A	3000	8	042(A04B)								
100	MSMD 01	3000	8									
200	MSMD 02	3000	11	042(A06A)								
400	MSMD 04	3000	14	060(B06B)								
750	MSMD 08	3000	19	090(C09C)								

Servo Motor				Gearbox											
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)											
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	MSMD 5A	3000	8	042(A04B)											
100	MSMD 01	3000	8						060(A04B)						090(B06H)	
200	MSMD 02	3000	11	060(A06A)						090(B06B)						115
400	MSMD 04	3000	14	060A(B06B)			090(B06B)						115(C09H)			
750	MSMD 08	3000	19	090A(C09C)					115(C09C)					142		

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

4. Omron Corporation

G5 Series R88M-K (AC200V)

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)								
				3	4	5	6	7	8	9	10	
50	05030 H/T	3000	8	042(A04A)								
100	10030 H/T	3000	8									
200	20030 H/T	3000	11	042(A06A)								
400	40030 H/T	3000	14	060(B06B)								
750	75030 H/T	3000	19	090(C09C)								
1000	1K030 H/T	3000	19	090(C10A)								
1500	1K530 H/T	3000	19									
2000	2K030 H/T	3000	19								115(D10A)	
3000	3K030 H/T	3000	22	090(C13A)					115(D13A)			
4000	4K030 H/T	3000	24	090(C13B)					115(D13A)			
5000	5K030 H/T	3000	24							142(E13F)		

(Notation example)

042 Gearbox Size (NP)

(A04A) Motor flange code

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)												
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	05030 H/T	3000	8	042(A04A)					060(A04A)						090(B06G)	
100	10030 H/T	3000	8													
200	20030 H/T	3000	11	060(A06A)						090(B06B)						115
400	40030 H/T	3000	14	060A(B06B)			090(B06B)						115(C09H)			
750	75030 H/T	3000	19	090A(C09C)					115(C09C)					142		
1000	1K030 H/T	3000	19	090A(C10A)												
1500	1K530 H/T	3000	19		115(C10A)				142(D10A)				180			
2000	2K030 H/T	3000	19							180					220	
3000	3K030 H/T	3000	22	142(D13A)				180(E13F)					220			
4000	4K030 H/T	3000	24	142(D13A)			180(E13F)			220				Consult us		
5000	5K030 H/T	3000	24													

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

G5 Series R88M-K (AC400V)

Servo Motor				Gearbox														
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)														
				3	4	5	6	7	8	9	10							
750	75030 F/C	3000	19	090(C10A)														
1000	1K030 F/C	3000	19															
1500	1K530 F/C	3000	19															
2000	2K030 F/C	3000	19								115(D10A)							
3000	3K030 F/C	3000	22	090(C13A)					115(D13A)									
4000	4K030 F/C	3000	24	090(C13B)					115(D13A)									
5000	5K030 F/C	3000	24							142(E13F)								

Servo Motor				Gearbox														
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)														
				15	20	25	30	35	40	45	50	60	70	80	90	100		
750	75030 F/C	3000	19	090A(C10A)														
1000	1K030 F/C	3000	19				115(C10A)											
1500	1K530 F/C	3000	19							142(D10A)			180					
2000	2K030 F/C	3000	19							180					220			
3000	3K030 F/C	3000	22	142(D13A)				180(E13F)					220					
4000	4K030 F/C	3000	24	142(D13A)			180(E13F)			220								
5000	5K030 F/C	3000	24														Consult us	

(Notation example)

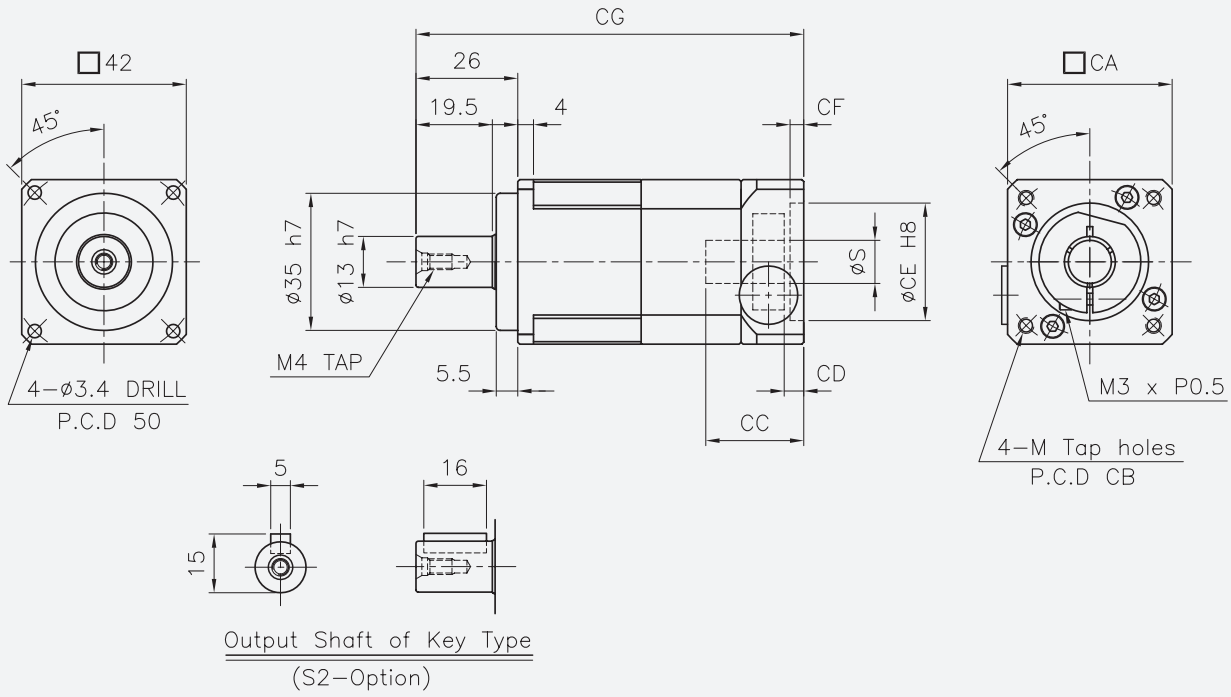
090 Gearbox Size (NP)

(C10A) Motor flange code

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Dimensions

NP042, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



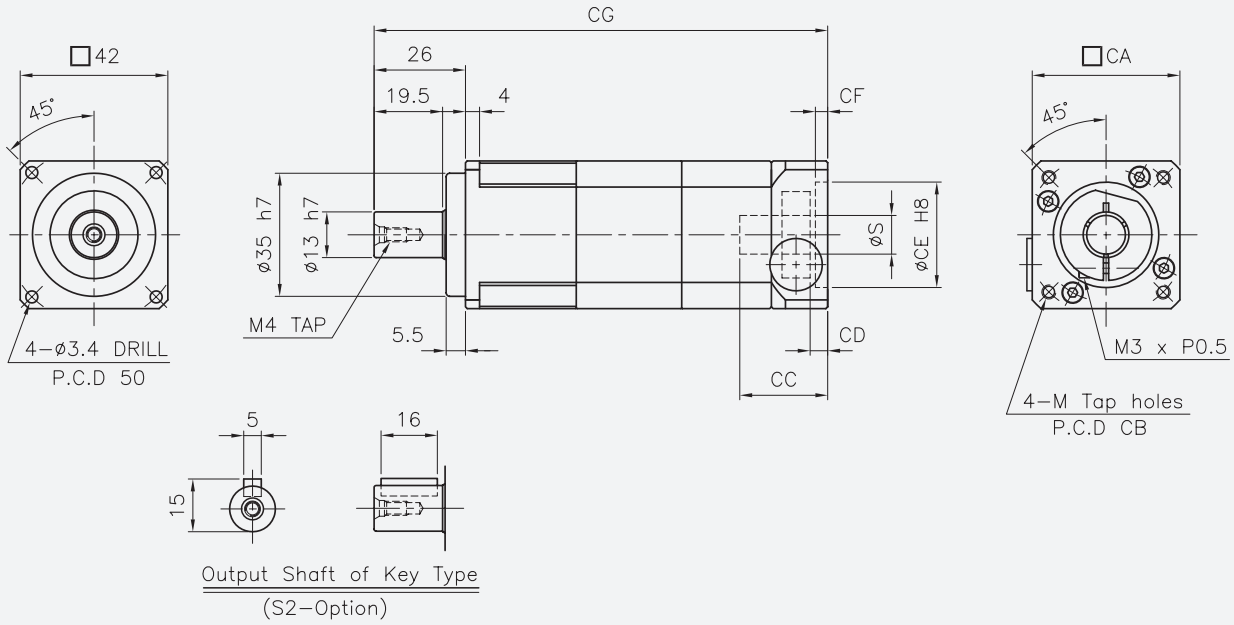
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
A04A	8	42	46	25	5	30	3.5	99	4
A04B	8	42	45	25	5	30	3.5	99	3
A06A	11	60	70	30	10	50	8	104	4
A06C	8	60	70	30	10	50	8	104	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NP042, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



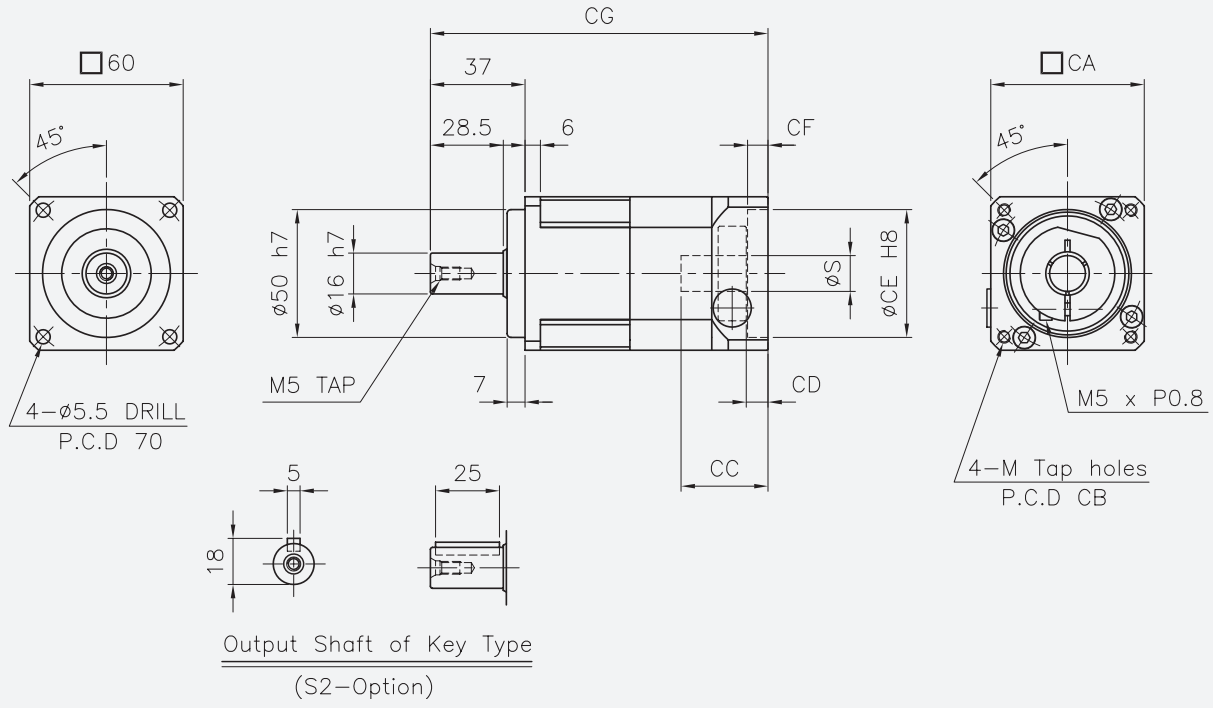
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
A04A	8	42	46	25	5	30	3.5	129	4
A04B	8	42	45	25	5	30	3.5	129	3
A06A	11	60	70	30	10	50	8	134	4
A06C	8	60	70	30	10	50	8	134	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NP060, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



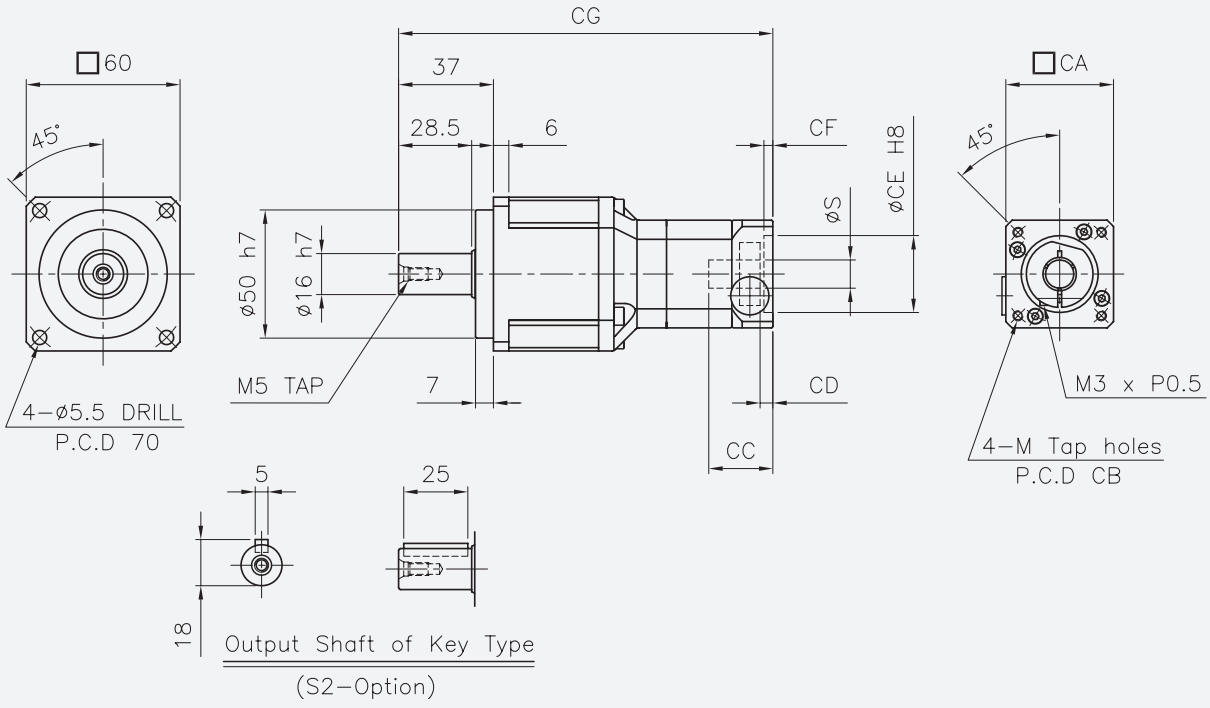
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
B06A	14	60	70	34	8.5	50	8	132	5
B06B	14	60	70	34	8.5	50	8	132	4
B08B	14	80	90	40	14.5	70	5	138	6
B09C	16	90	100	40	14.5	80	11	138	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NP060, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



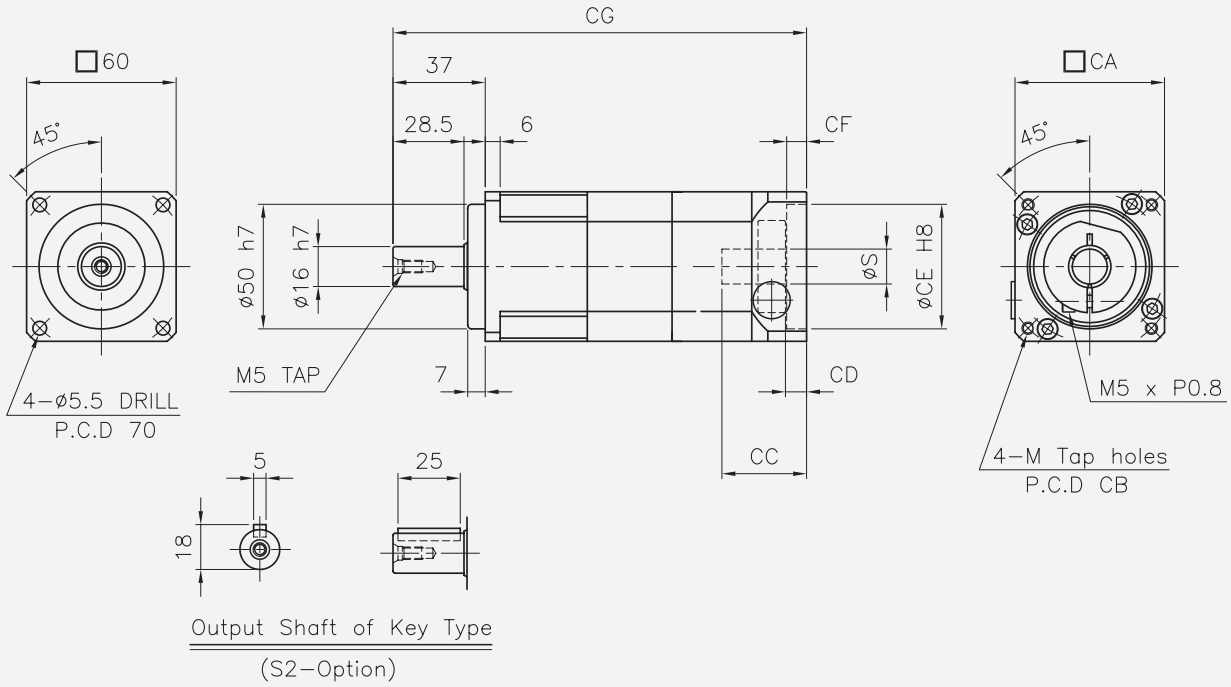
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
A04A	8	42	46	25	5	30	3.5	146	4
A04B	8	42	45	25	5	30	3.5	146	3
A06A	11	60	70	30	10	50	8	151	4
A06C	8	60	70	30	10	50	8	151	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NP060A, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



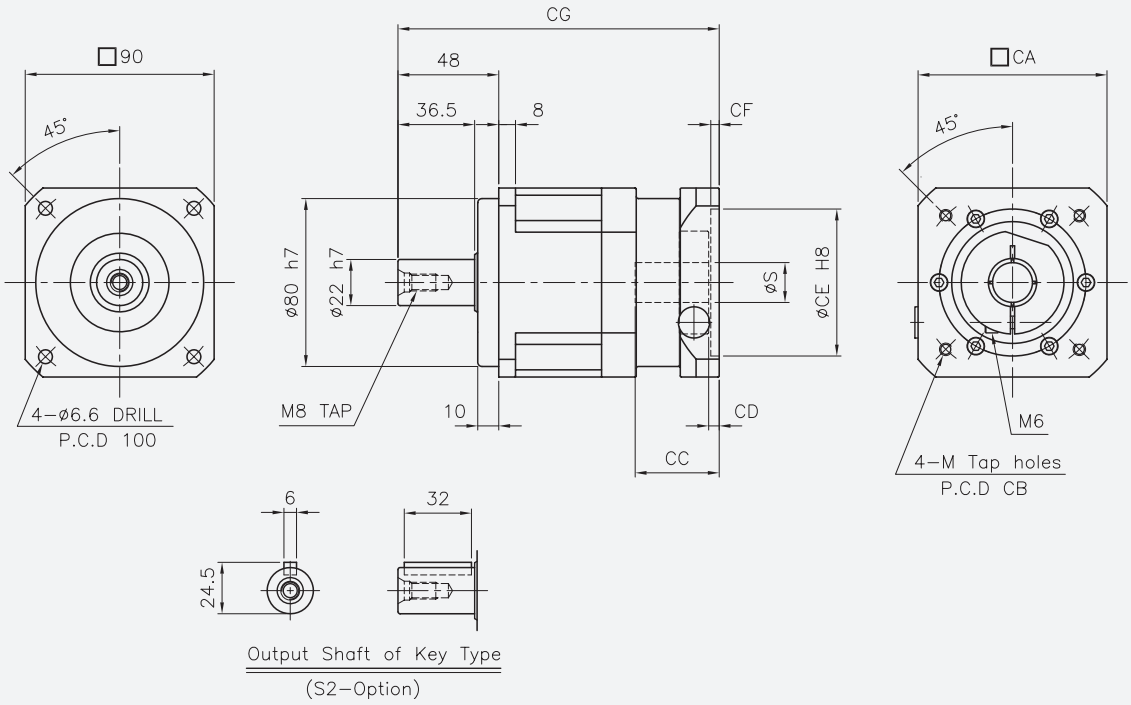
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
B06A	14	60	70	34	8.5	50	8	166	5
B06B	14	60	70	34	8.5	50	8	166	4
B08B	14	80	90	40	14.5	70	5	172	6
B09C	16	90	100	40	14.5	80	11	172	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NP090, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



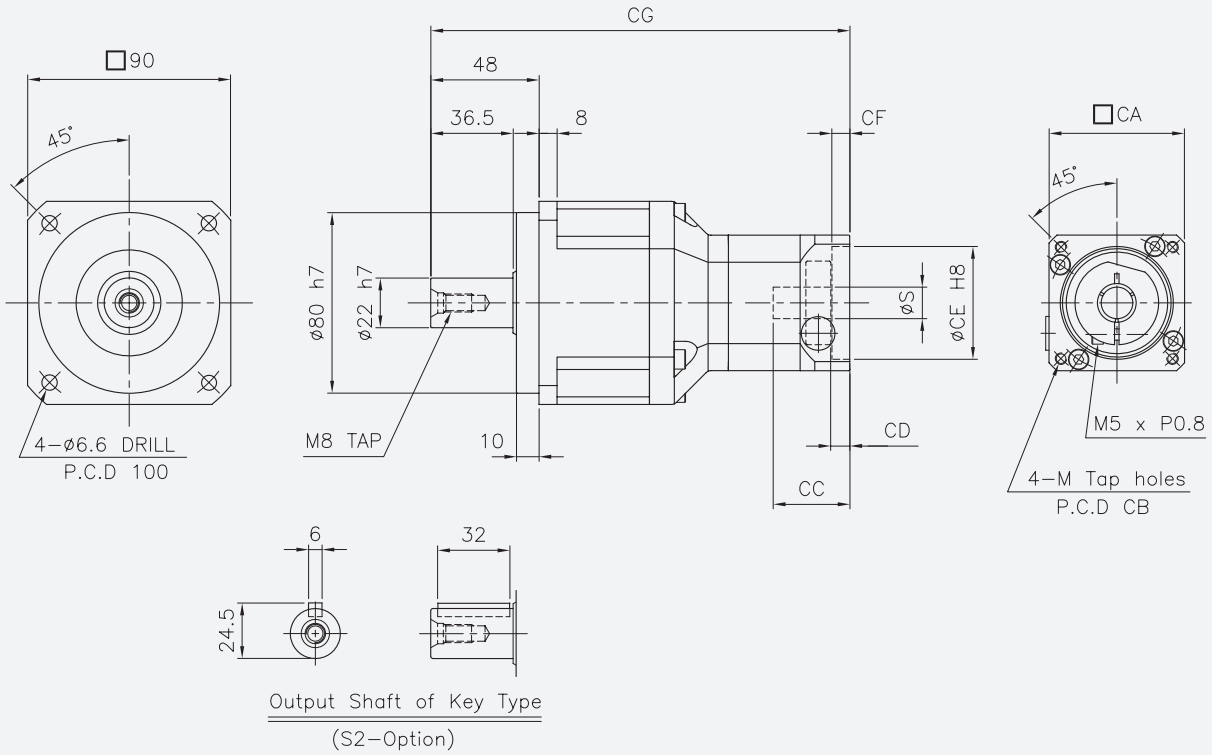
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
C09B	19	90	90	40	5	70	4	153	6
C09C	19	90	90	40	5	70	4	153	5
C09J	16	90	100	48	13	80	6	161	6
C10A	19	101	115	55	20	95	7	168	8
C10C	24	101	115	45	10	95	5	158	6
C13A	22	130	145	58	23	110	7	171	8
	24	130	145	58	23	110	7	171	8
C13B	24	131	145	70	35	110	8	183	8
C13C	19	131	145	48	13	110	7	161	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NP090, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



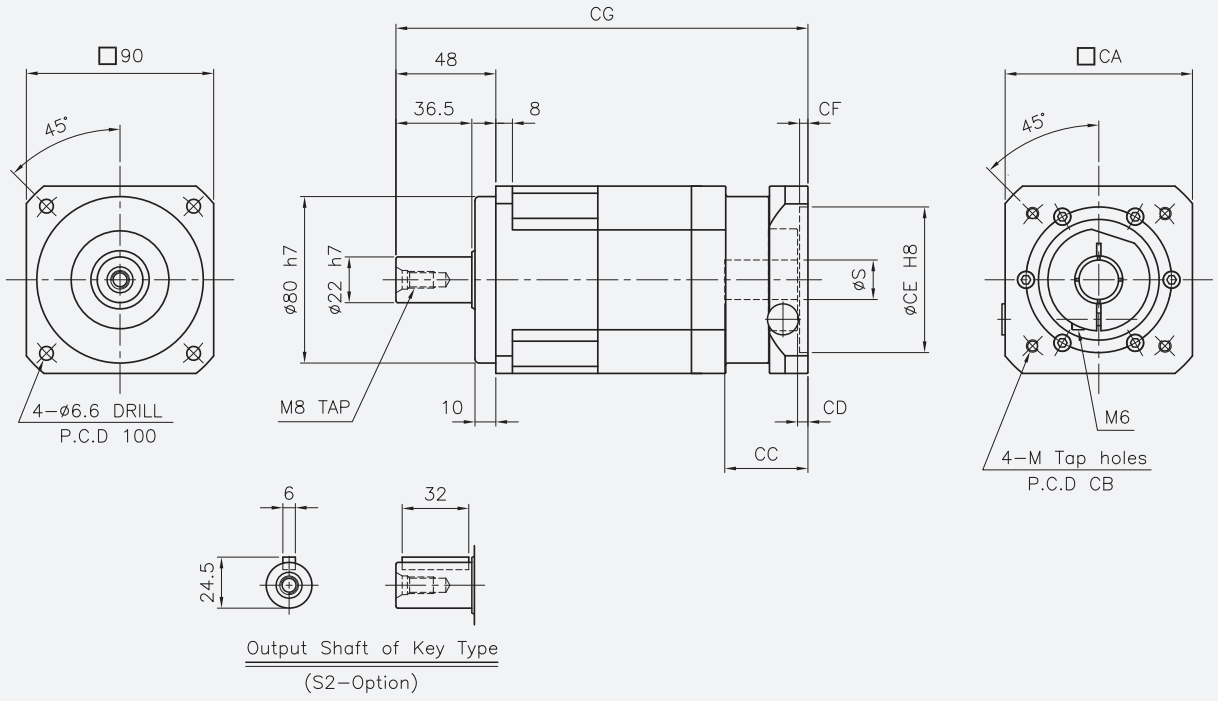
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
B06A	8	60	70	34	8.5	50	8	186	5
	14	60	70	34	8.5	50	8	186	5
B06B	11	60	70	34	8.5	50	8	186	4
	14	60	70	34	8.5	50	8	186	4
B06G	8	60	46	35	9.5	30	8	187	4
B06H	8	60	45	35	9.5	30	8	187	3
B08B	14	80	90	40	14.5	70	5	192	6
B09C	16	90	100	40	14.5	80	11	192	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NP090A, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



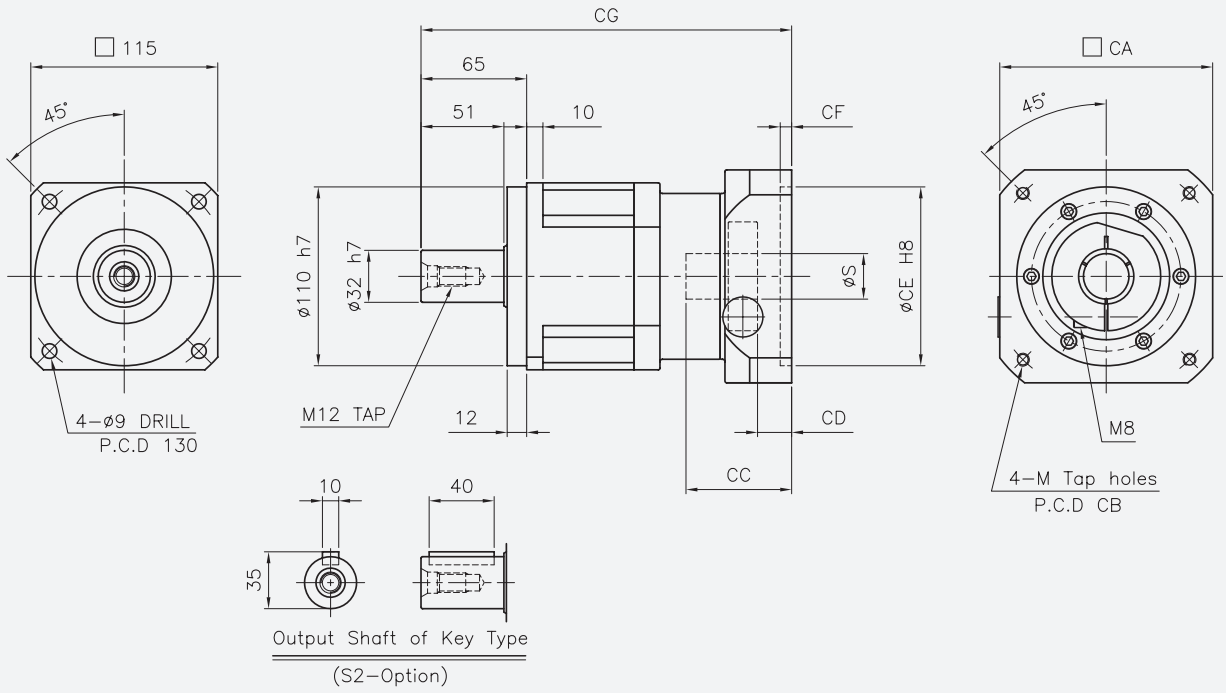
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
C09B	14	90	90	40	5	70	4	198	6
	19	90	90	40	5	70	4	198	6
C09C	19	90	90	40	5	70	4	198	5
C10A	19	101	115	55	20	95	7	213	8
C10C	24	101	115	45	10	95	5	203	6
C13A	22	130	145	58	23	110	7	216	8
	24	130	145	58	23	110	7	216	8
C13C	19	131	145	48	13	110	7	206	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NP115, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



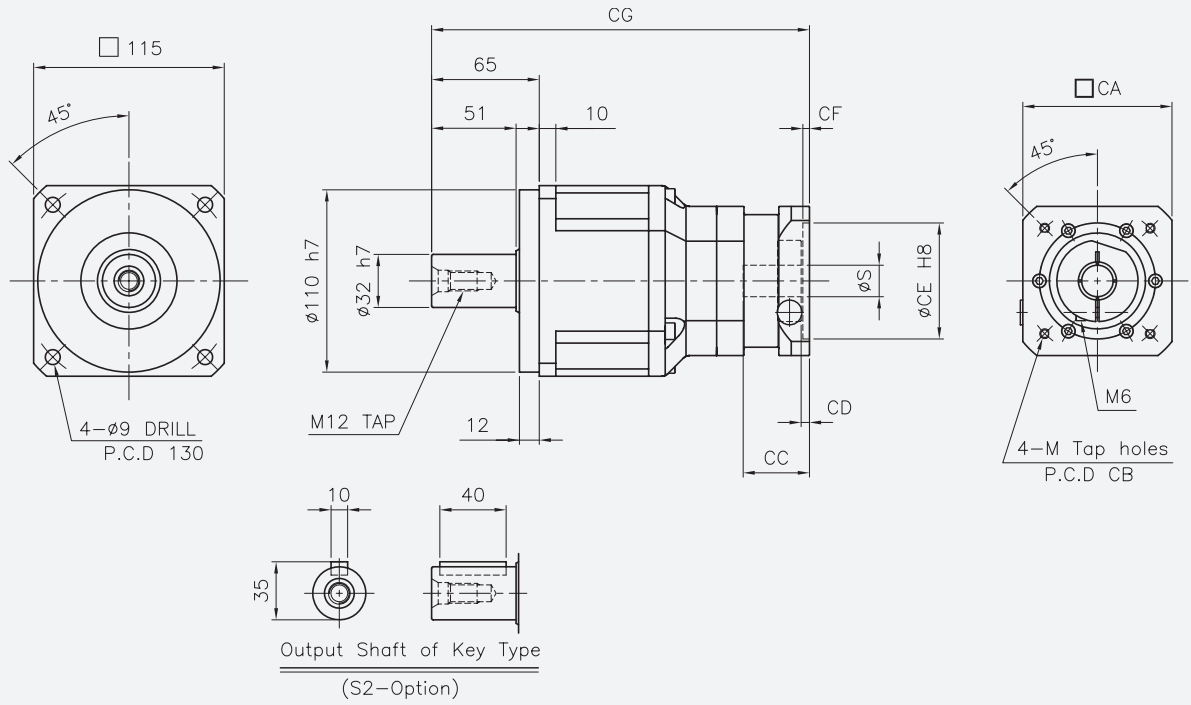
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
D13A	22	130	145	65	21	110	7	228	8
	24	130	145	65	21	110	7	228	8
	28	130	145	65	21	110	7	228	8
D10A	19	111	115	55	11	95	5	218	8
D10E	24	111	115	51	7	95	5	214	6

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NP115, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



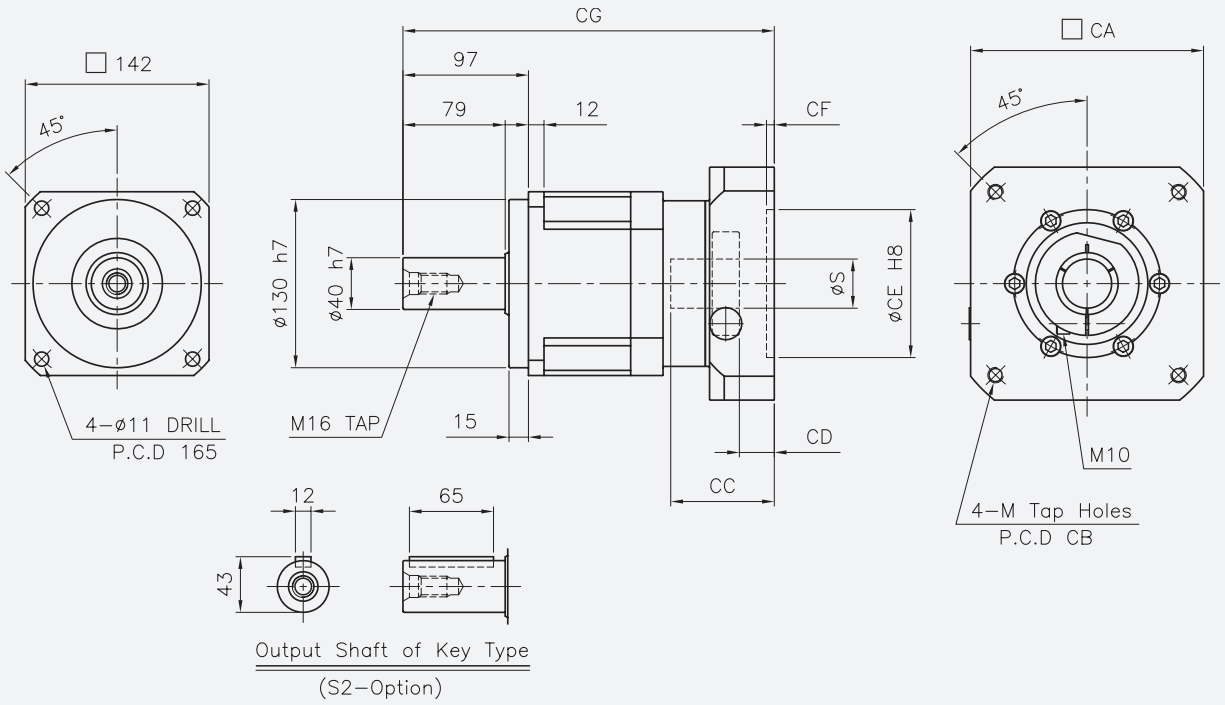
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
C09B	14	90	90	40	5	70	4	228	6
	19	90	90	40	5	70	4	228	6
C09C	19	90	90	40	5	70	4	228	5
C09D	14	90	70	43.5	8.5	50	6	231.5	5
C09H	14	90	70	43.5	8.5	50	6	231.5	4
C09J	16	90	100	48	13	80	6	236	6
C10A	19	101	115	55	20	95	7	243	8
C10C	24	101	115	45	10	95	5	233	6
C13A	22	130	145	58	23	110	7	246	8
	24	130	145	58	23	110	7	246	8
C13C	19	131	145	48	13	110	7	236	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NP142, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



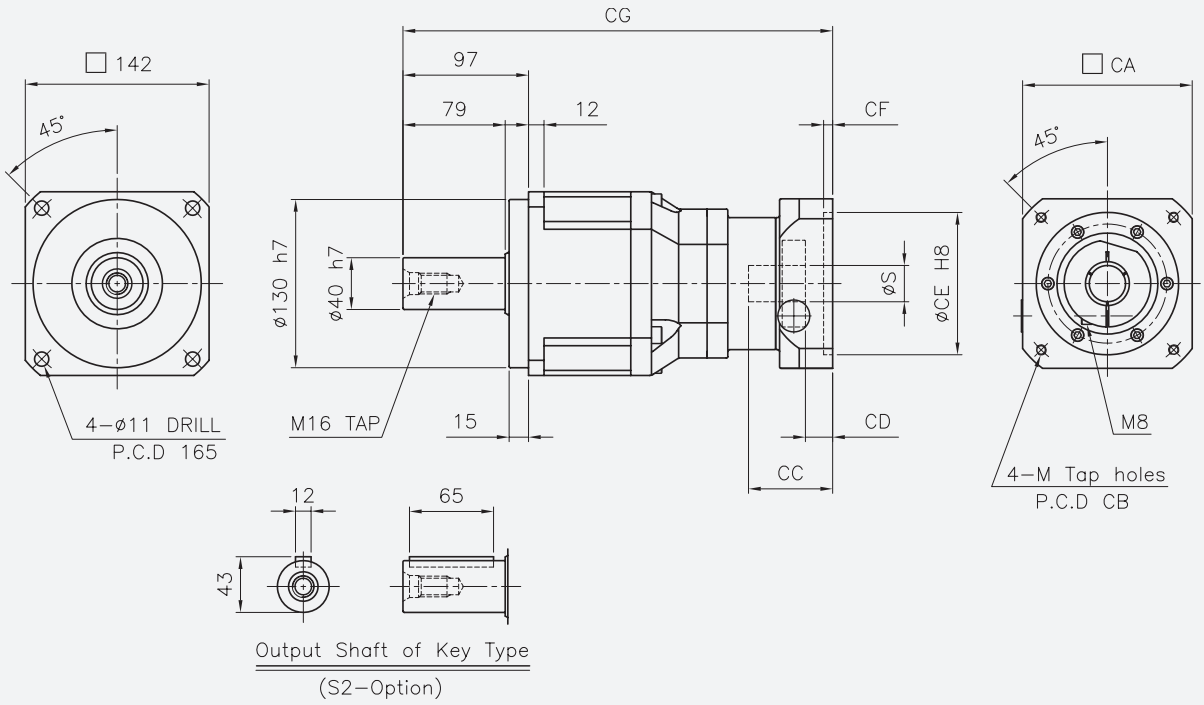
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
E18A	35	180	200	80	27	114.3	6	287	12
E13F	22	131	145	65	12	110	7	272	8
	24	131	145	65	12	110	7	272	8
	28	131	145	65	12	110	7	272	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NP142, 2-Stage,Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



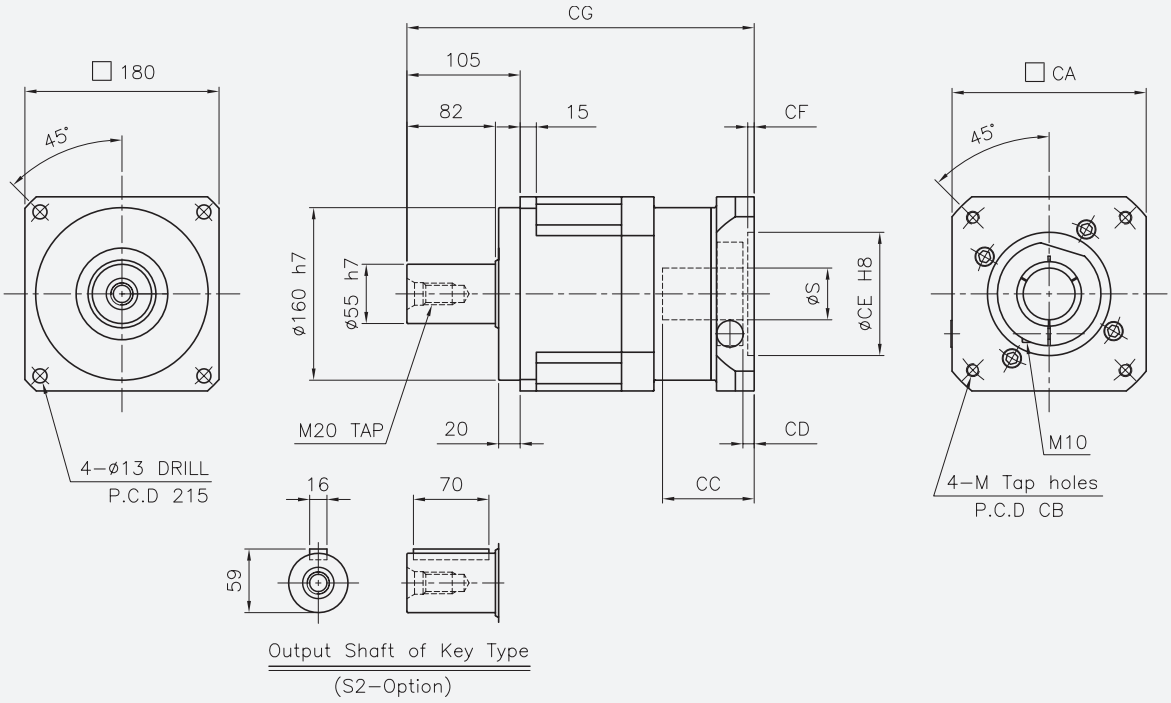
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
D13A	22	130	145	65	21	110	7	332	8
	24	130	145	65	21	110	7	332	8
	28	130	145	65	21	110	7	332	8
D10A	19	111	115	55	11	95	5	322	8
D10D	19	111	90	57	13	70	6	324	6
D10E	24	111	115	51	7	95	5	318	6
D10F	16	111	100	57	13	80	6	324	6
D12B	19	121	145	57	13	110	6	324	8

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NP180, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



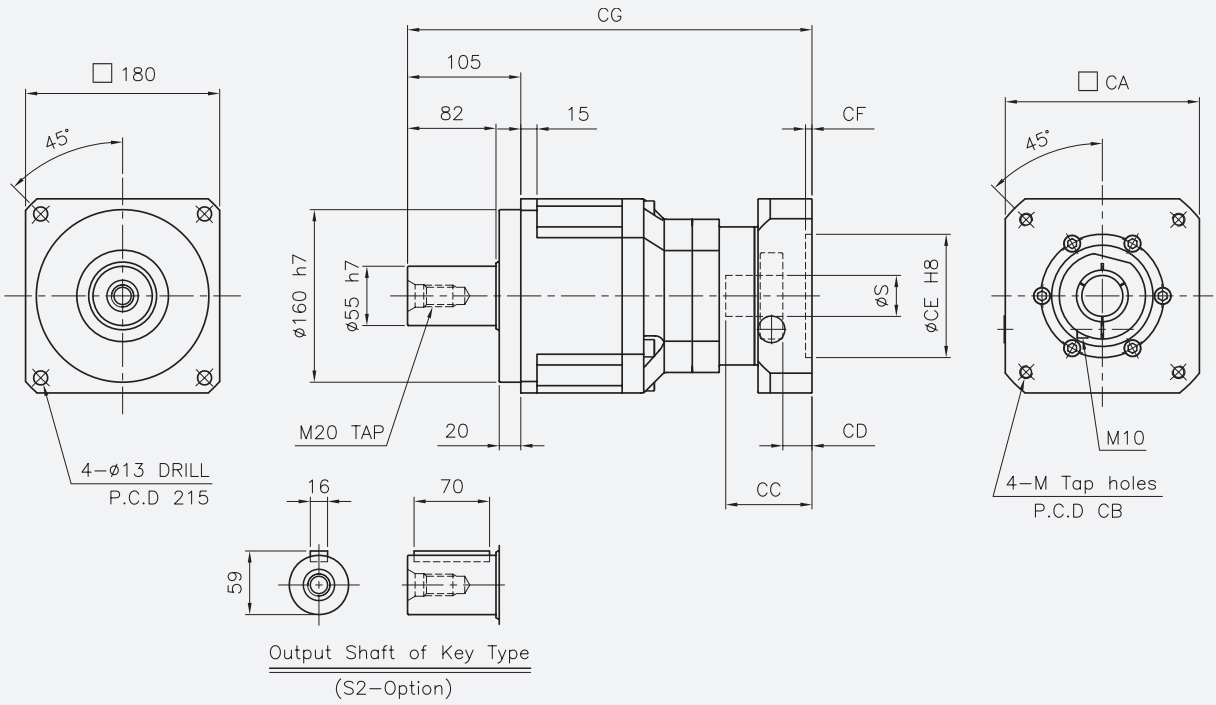
※ Max. input bore (ØSmax) = Ø48

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
F18A	35	180	200	85	10.5	114.3	6	322	12
F18B	42	180	200	113	38.5	114.3	6	350	12
F22B	42	220	235	116	41.5	200	10	353	12

1) For S dimension less than diameter 48, bushing from page 176 is provided.

Dimensions

NP180, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



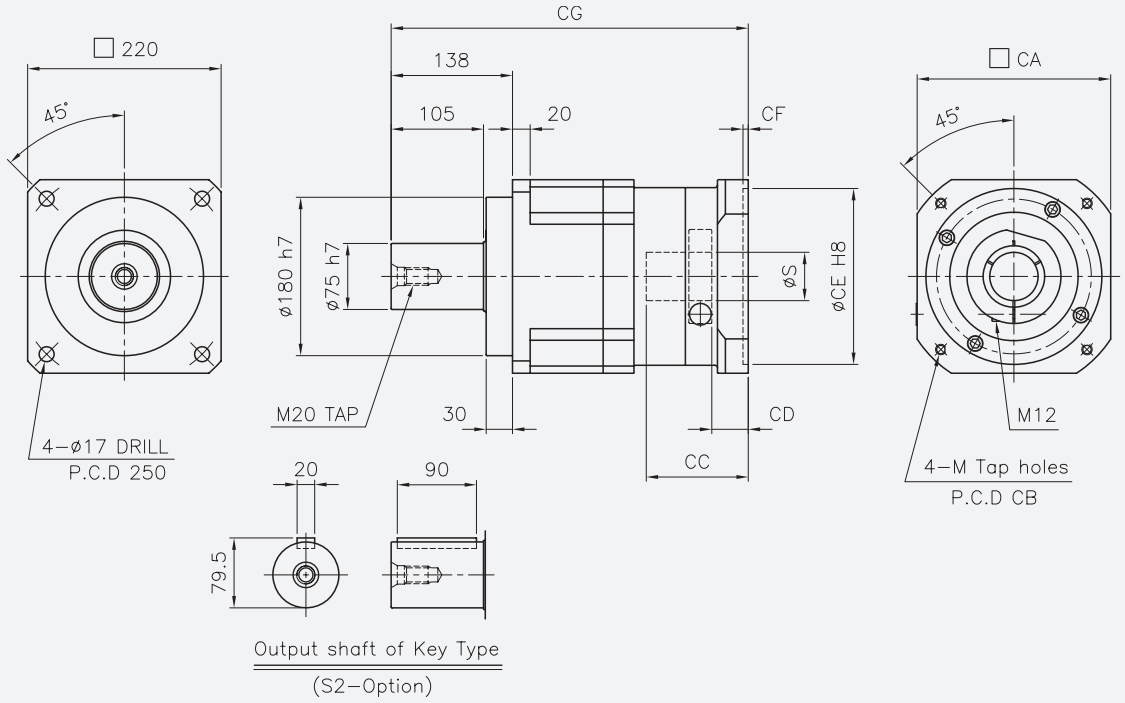
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
E18A	35	180	200	80	27	114.3	6	375	12
E13C	19	131	115	68	15	95	6	363	8
E13E	24	131	115	60	7	95	6	355	6
E13F	22	131	145	65	12	110	7	360	8
	24	131	145	65	12	110	7	360	8
	28	131	145	65	12	110	7	360	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NP220, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



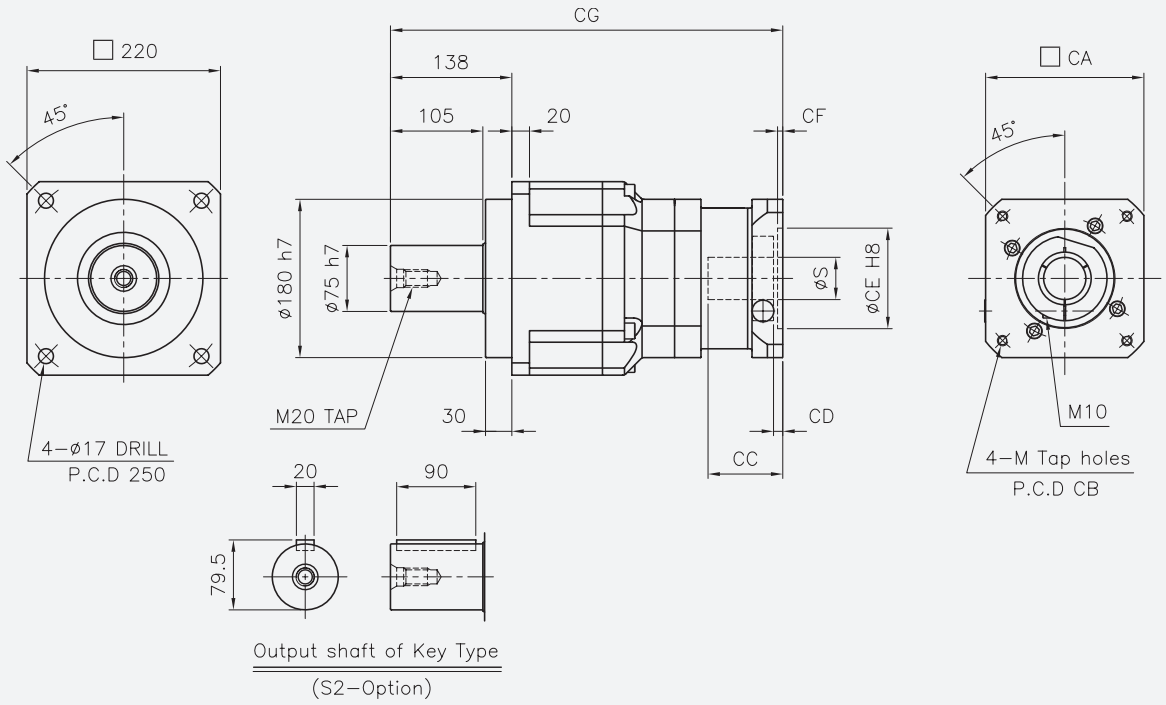
※ Max. input bore (ØSmax) = Ø55

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
G22A	55	220	235	116	41.5	200	6	406	12

1) For S dimension less than diameter 55, bushing from page 176 is provided.

Dimensions

NP220, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



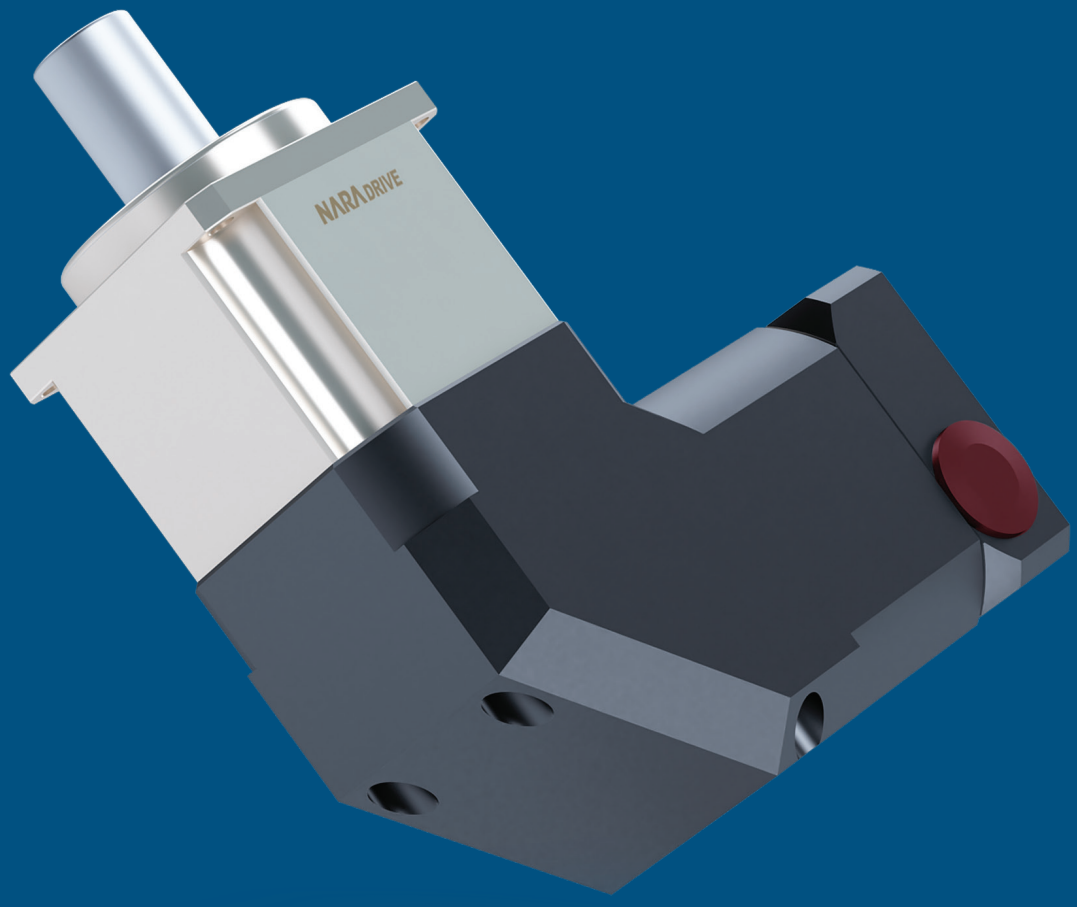
※ Max. input bore (ØSmax) = Ø48

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
F18A	35	180	200	85	10.5	114.3	6	446	12
F18B	42	180	200	113	38.5	114.3	6	474	12

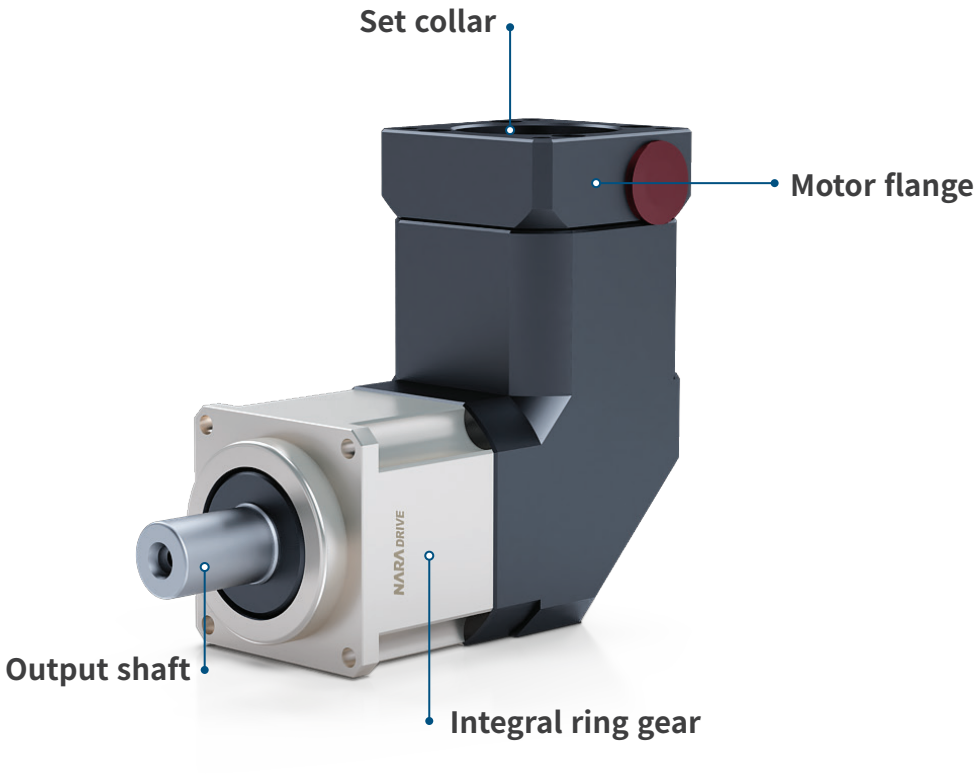
1) For S dimension less than diameter 48, bushing from page 176 is provided.

NPR Series

- Low-noise, high-precision and right angle planetary gearbox with helical gear
- Space saving



Features



Low Noise

Low-noise is realized by using a helical gear that enables to provide smooth rotation.

High Rigidity

Ring gear directly gearing to provide compact, high rigidity and high torque.

High Precision

Enables high precision position control with precise backlash, and maximizes the characteristics of servo motor.

Long Life

No need for separate inspection or maintenance due to it's long service life.

Easy Mounting

Easy mounting of motor and gearbox due to corresponding of Set-collar and bushing to the output shaft of servo motor.

Herical Gearbox

Gearbox that uses helical gear and has a higher contact ratio than spur gear, it provides high torque and quiet operation.

Space saving

By applying the bevel gear, the space of the application where the gearbox is installed is saved.

Specifications

Item	Unit	Stage	Ratio	NPR042	NPR060	NPR060A	NPR090	NPR090A	NPR115	NPR142	NPR180	NPR220
Nominal output torque (T_{2N}) [1]	Nm	1	3	5.4	21.6	-	54	-	117	240	352	684
			4	7.2	28.8	-	72	-	156	312	624	1008
			5	9	36	-	90	-	195	390	720	1200
			6	10.8	33	-	90	-	186	360	660	1140
			7	11.4	30	-	84	-	180	330	660	1080
			8	10.2	27	-	72	-	156	300	600	960
			9	8.4	24	-	60	-	138	270	540	900
			10	8.4	24	-	60	-	138	270	540	900
			12	10.8	33	-	90	-	186	360	660	1140
			14	11.4	25.2	-	84	-	180	330	660	1080
			16	10.2	27	-	72	-	156	300	600	960
			18	8.4	24	-	60	-	138	270	540	900
			20	8.4	24	-	60	-	138	270	540	900
		2	25	9	36	36	90	90	195	390	720	1200
			30	12	33	33	90	90	186	360	660	1140
			35	11.4	30	30	84	84	180	330	660	1080
			40	10.2	27	27	72	72	156	300	600	960
			45	8.4	24	24	60	60	138	270	540	900
			50	8.4	36	36	60	60	138	390	720	1200
			60	12	33	33	90	90	186	360	660	1140
			70	11.4	30	30	84	84	180	330	660	1080
			80	10.2	27	27	72	72	156	300	600	960
			90	8.4	24	24	60	60	138	270	540	900
			100	8.4	24	24	60	60	138	270	540	900
			120	12	33	33	90	90	186	360	660	1140
			140	11.4	25.2	25.2	84	84	180	330	660	1080
			160	10.2	27	27	72	72	156	300	600	960
			180	8.4	24	24	60	60	138	270	540	900
			200	8.4	24	24	60	60	138	270	540	900
Maximum acceleration torque (T_{2B}) [2]	Nm	1,2	3~200	3 times of Nominal output torque(T_{2N})								
Emergency stop torque (T_{2E}) [3]	Nm	1,2	3~200	4 times of Nominal output torque(T_{2N})								
Nominal input speed (n_{1N}) [4]	rpm	1,2	3~200	3000	3000	3000	3000	3000	3000	3000	3000	2000
Maximum input speed (n_{1B}) [5]	rpm	1,2	3~200	6000	6000	6000	5000	5000	5000	5000	5000	4000
Precision backlash (P1)	arcmin	1	3~20	≤4	≤4	-	≤4	-	≤4	≤4	≤4	≤4
		2	25~200	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Low backlash (P2)	arcmin	1	3~20	≤6	≤6	-	≤6	-	≤6	≤6	≤6	≤6
		2	25~200	≤9	≤9	≤9	≤9	≤9	≤9	≤9	≤9	≤9
Standard backlash (P3)	arcmin	1	3~20	≤10	≤10	-	≤10	-	≤10	≤10	≤10	≤10
		2	25~200	≤12	≤12	≤12	≤12	≤12	≤12	≤12	≤12	≤12
Maximum radial load (F_{2rB}) [6]	N	1,2	3~200	710	1210	1210	1210	2710	2710	7710	12260	27140
Maximum axial load (F_{2aB}) [7]	N	1,2	3~200	470	770	770	1550	1550	3200	4830	7110	13560
Lifetime [8]	hr	1,2	3~200	20000								
Noise level [9]	dB(A)	1,2	3~200	≤65	≤68	≤68	≤70	≤70	≤72	≤74	≤76	≤78
Efficiency (η) [10]	%	1	3~20	≥93								
		2	25~200	≥88								
Weight [11]	kg	1	3~20	0.95	2.26	-	6.7	-	12.4	24	47	82
		2	25~200	1.22	1.85	3.1	5.0	8.3	11.7	22.5	43	78
Ambient temperature	˚C	1,2	3~200	-15 to +40								
Permitted housing temperature	˚C	1,2	3~200	+90								
Lubrication		1,2	3~200	Grease								
Degree of protection [12]		1,2	3~200	IP54 (IP65)								
Mounting position		1,2	3~200	All directions								

1) Nominal output torque is the allowable value of average load torque applied to the output shaft.
2) Maximum acceleration torque is the allowable value of startup/stop torque generated during operation.
3) Emergency stop torque is the allowable value of overload or shock load torque. (1000 times permitted during the lifetime of the gearbox)
4) Allowable value of average input speed.
5) Maximum input speed allowed intermittently. (Please contact NARA when using over the nominal input speed)
6) When the output speed is 100 rpm, the allowable value of the radial load is on the middle of the output shaft. (Axial load 0 N)
7) When the output speed is 100 rpm, the allowable value of the axial load is on the center of the output shaft. (Radial load 0 N)
8) Lifetime during intermittent operation within nominal output torque and nominal input speed.
9) Representative value measured at a distance of 1m from a gearbox with a reduction ratio of 1/10 (1-stage) or 1/100 (2-stage) at the nominal input speed under no-load condition.
10) Efficiency at full load.
11) Weight is a representative value and depends on reduction ratio and applied motor.
12) Protection class IP65 is optional.

Inertia

Item	Unit	Stage	Ratio	NPR042	NPR060	NPR060A	NPR090	NPR090A	NPR115	NPR142	NPR180	NPR220
Mass moment of inertia (J_1)	kg·cm^2	1	3	0.080	0.399	-	2.505	-	7.762	22.8	72.0	188.0
			4	0.071	0.352	-	2.145	-	6.556	19.3	61.3	160.2
			5	0.067	0.333	-	2.002	-	6.050	17.9	56.8	148.8
			6	0.064	0.321	-	1.928	-	5.810	17.2	54.6	143.7
			7	0.064	0.317	-	1.899	-	5.704	16.9	53.2	140.4
			8	0.063	0.313	-	1.872	-	5.599	16.6	52.4	138.4
			9	0.062	0.310	-	1.854	-	5.535	16.4	51.9	137.0
			10	0.062	0.309	-	1.849	-	5.517	16.3	51.9	136.5
			12	0.049	0.238	-	1.206	-	3.992	10.3	29.4	69.9
			14	0.048	0.237	-	1.199	-	3.965	10.2	29.1	69.1
			16	0.048	0.236	-	1.192	-	3.939	10.2	28.9	68.6
			18	0.048	0.235	-	1.187	-	3.923	10.1	28.8	68.3
			20	0.048	0.235	-	1.186	-	3.918	10.1	28.8	68.1
		2	25	0.066	0.069	0.334	0.338	2.004	2.024	6.1	18.0	57.0
			30	0.066	0.067	0.331	0.335	1.988	2.014	6.1	17.9	56.8
			35	0.066	0.067	0.330	0.334	1.980	2.010	6.1	17.9	56.6
			40	0.066	0.067	0.329	0.333	1.976	2.006	6.1	17.9	56.6
			45	0.066	0.067	0.329	0.332	1.973	2.004	6.0	17.8	56.5
			50	0.062	0.062	0.313	0.311	1.877	1.855	5.5	16.4	52.0
			60	0.062	0.062	0.311	0.310	1.863	1.852	5.5	16.4	51.9
			70	0.062	0.062	0.310	0.310	1.856	1.851	5.5	16.4	51.9
			80	0.062	0.062	0.310	0.309	1.853	1.850	5.5	16.3	51.9
			90	0.062	0.062	0.309	0.309	1.850	1.850	5.5	16.3	51.9
			100	0.062	0.062	0.308	0.309	1.848	1.849	5.5	16.3	51.9
			120	0.048	0.048	0.235	0.235	1.189	1.187	3.9	10.1	28.8
			140	0.048	0.048	0.235	0.235	1.187	1.187	3.9	10.1	28.8
			160	0.048	0.048	0.235	0.235	1.187	1.186	3.9	10.1	28.8
			180	0.048	0.048	0.235	0.235	1.186	1.186	3.9	10.1	28.8
			200	0.048	0.048	0.235	0.235	1.186	1.186	3.9	10.1	28.8

Selection Table

1. Yaskawa Electric Corporation

Σ-7 Series SGM7J

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
50	SGM7J-A5A	3000	8	042(A04A)												
100	SGM7J-01A	3000	8													
150	SGM7J-C2A	3000	8													060(B06G)
200	SGM7J-02A	3000	14	060(B06A)												
400	SGM7J-04A	3000	14													
600	SGM7J-06A	3000	14										090(C09D)			
750	SGM7J-08A	3000	19	090(C09B)												

(Notation example)

042 Gearbox Size (NPR)

(A04A) Motor flange code

Servo Motor				Gearbox																
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)																
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	
50	SGM7J-A5A	3000	8	042(A04A)					060(A04A)											
100	SGM7J-01A	3000	8																	
150	SGM7J-C2A	3000	8										090(B06G)				115			
200	SGM7J-02A	3000	14	060A(B06A)					090(B06A)						115(C09D)					142
400	SGM7J-04A	3000	14																	
600	SGM7J-06A	3000	14					115(C09D)						142				180		
750	SGM7J-08A	3000	19	090A(C09B)			115(C09B)			142(D10D)						180			220	

Σ-7 Series SGM7A

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
50	SGM7A-A5A	3000	8	042(A04A)												
100	SGM7A-01A	3000	8													
150	SGM7A-C2A	3000	8													060(B06G)
200	SGM7A-02A	3000	14	060(B06A)												
400	SGM7A-04A	3000	14													
600	SGM7A-06A	3000	14											090(C09D)		
750	SGM7A-08A	3000	19	090(C09B)												
1000	SGM7A-10A	3000	19												115(D10D)	
1500	SGM7A-15A	3000	24	090(C10C)												
2000	SGM7A-20A	3000	24										115(D10E)			
2500	SGM7A-25A	3000	24												142(E13E)	
3000	SGM7A-30A	3000	28	115(D13A)												
4000	SGM7A-40A	3000	28													
5000	SGM7A-50A	3000	28													
7000	SGM7A-70A	3000	28										142(E13F)			180

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

(Notation example)

042 Gearbox Size(NPR)

(A04A) Motor flange code

Σ-7 Series SGM7A

Servo Motor				Gearbox																
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)																
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	
50	SGM7A-A5A	3000	8	042(A04A)																
100	SGM7A-01A	3000	8					060(A04A)					090(B06G)							
150	SGM7A-C2A	3000	8															115		
200	SGM7A-02A	3000	14	060A(B06A)				090(B06A)												142
400	SGM7A-04A	3000	14								115(C09D)									
600	SGM7A-06A	3000	14										142					180		
750	SGM7A-08A	3000	19	090A(C09B)					142(D10D)					180						
1000	SGM7A-10A	3000	19	115(C09B)															220	
1500	SGM7A-15A	3000	24	115(C10C)																
2000	SGM7A-20A	3000	24		142(D10E)					180(E13E)				220						
2500	SGM7A-25A	3000	24																	
3000	SGM7A-30A	3000	28	142(D13A)																
4000	SGM7A-40A	3000	28		180(E13F)															
5000	SGM7A-50A	3000	28					220												
7000	SGM7A-70A	3000	28																	

Consult us

Σ-7 Series SGM7P

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
100	SGM7P-01A	3000	8	042(A06C)												
200	SGM7P-02A	3000	14	060(B08B)												
400	SGM7P-04A	3000	14													090(C09B)
750	SGM7P-08A	3000	19	090(C13C)												
1500	SGM7P-15A	3000	19											115(D12B)		

Servo Motor				Gearbox																
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)																
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	
100	SGM7P-01A	3000	8	042(A06C)					060(A06C)					090(B06A)					115	
200	SGM7P-02A	3000	14		060A(B08B)					090(B08B)										
400	SGM7P-04A	3000	14									115(C09B)						142		
750	SGM7P-08A	3000	19	090A(C13C)					115(C13C)					142(D12B)				180		
1500	SGM7P-15A	3000	19	115(C13C)						142(D12B)					180				220	

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

Σ-7 Series SGM7G

Servo Motor				Gearbox
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)
				3 4 5 6 7 8 9 10 12 14 16 18 20
0.3	SGM7G-03A	1500	16	060(B09C) / 090(C09J)
0.45	SGM7G-05A	1500	16	
0.85	SGM7G-09A	1500	24	090(C13A) / 115(D13A) / 142(E13F)
1.3	SGM7G-13A	1500	24	
1.8	SGM7G-20A	1500	24	
2.9	SGM7G-30A	1500	35	142(E18A) / 180(F18A) / 220
4.4	SGM7G-44A	1500	35	
5.5	SGM7G-55A	1500	42	180(F18B) / 220
7.5	SGM7G-75A	1500	42	
11	SGM7G-1AA	1500	42	180(F22B) / Consult us
15	SGM7G-1EA	1500	55	220(G22A)

(Notation example)

060 Gearbox Size (NPR)

(B09C) Motor flange code

Servo Motor				Gearbox
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)
				25 30 35 40 45 50 60 70 80 90 100 120 140 160 180 200
0.3	SGM7G-03A	1500	16	090(B09C) / 115(C09J) / 142(D10F)
0.45	SGM7G-05A	1500	16	180 / 220
0.85	SGM7G-09A	1500	24	115(C13A) / 220
1.3	SGM7G-13A	1500	24	142(D13A) / 180(E13F) / 220
1.8	SGM7G-20A	1500	24	
2.9	SGM7G-30A	1500	35	180(E18A) / 220(F18A)
4.4	SGM7G-44A	1500	35	220(F18A)
5.5	SGM7G-55A	1500	42	220(F18B)
7.5	SGM7G-75A	1500	42	Consult us
11	SGM7G-1AA	1500	42	
15	SGM7G-1EA	1500	55	

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

2. Mitsubishi Electric Corporation

MELSERVO-J4 Series HG-KR

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
50	HG-KR053(B)	3000	8	042(A04A)												
100	HG-KR13(B)	3000	8													
200	HG-KR23(B)	3000	14	060(B06A)												
400	HG-KR43(B)	3000	14													090(C09D)
750	HG-KR73(B)	3000	19	090(C09B)												

(Notation example)

042 Gearbox Size (NPR)

(A04A) Motor flange code

Servo Motor				Gearbox																
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)																
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	
50	HG-KR053(B)	3000	8	042(A04A)					060(A04A)											
100	HG-KR13(B)	3000	8										090(B06G)					115		
200	HG-KR23(B)	3000	14	060A(B06A)				090(B06A)						115(C09D)					142	
400	HG-KR43(B)	3000	14											142		142			180	
750	HG-KR73(B)	3000	19	090A(C09B)		115(C09B)			142(D10D)					180					220	

MELSERVO-J4 Series HG-MR

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
50	HG-MR053(B)	3000	8	042(A04A)												
100	HG-MR13(B)	3000	8													
200	HG-MR23(B)	3000	14	060(B06A)												
400	HG-MR43(B)	3000	14													090(C09D)
750	HG-MR73(B)	3000	19	090(C09B)												

Servo Motor				Gearbox																
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)																
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200	
50	HG-MR053(B)	3000	8	042(A04A)																
100	HG-MR13(B)	3000	8				060(A04A)						090(B06G)						115	
200	HG-MR23(B)	3000	14	060A(B06A)				090(B06A)						115(C09D)						
400	HG-MR43(B)	3000	14													142				
750	HG-MR73(B)	3000	19	090A(C09B)			115(C09B)					142(D10D)				180				

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
0.5	HG-SR52(B)	2000	24	090(C13A)												
1	HG-SR102(B)	2000	24													
1.5	HG-SR152(B)	2000	24							115(D13A)						142(E13F)
2	HG-SR202(B)	2000	35	142(E18A)												
3.5	HG-SR352(B)	2000	35													
5	HG-SR502(B)	2000	35											180(F18A)		
7	HG-SR702(B)	2000	35												220	

(Notation example)

090 Gearbox Size (NPR)

(C13A) Motor flange code

Servo Motor				Gearbox															
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)															
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
0.5	HG-SR52(B)	2000	24	090A(C13A)			115(C13A)					142(D13A)				180(E13F)			
1	HG-SR102(B)	2000	24	115(C13A)			142(D13A)				180(E13F)								
1.5	HG-SR152(B)	2000	24										220						
2	HG-SR202(B)	2000	35	180(E18A)							220(F18A)								
3.5	HG-SR352(B)	2000	35				220(F18A)												
5	HG-SR502(B)	2000	35																
7	HG-SR702(B)	2000	35																

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

3.Panasonic Corporation

A5 Series MSME

Servo Motor				Gearbox															
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)															
				3	4	5	6	7	8	9	10	12	14	16	18	20			
50	MSME 5A	3000	8	042(A04B)															
100	MSME 01	3000	8																
200	MSME 02	3000	11	042(A06A)										060(B06B)					
400	MSME 04	3000	14	060(B06B)												090(C09H)			
750	MSME 08	3000	19	090(C09C)															
1000	MSME 10	3000	19	090(C10A)															
1500	MSME 15	3000	19																
2000	MSME 20	3000	19								115(D10A)								
3000	MSME 30	3000	22	090(C13A)					115(D13A)						142(E13F)				
4000	MSME 40	3000	24	090(C13B)					115(D13A)										
5000	MSME 50	3000	24						142(E13F)						180				

(Notation example)

042 Gearbox Size (NPR)

(A04B) Motor flange code

Servo Motor				Gearbox															
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)															
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
50	MSME 5A	3000	8	042(A04B)															
100	MSME 01	3000	8				060(A04B)						090(B06H)					115	
200	MSME 02	3000	11	060(A06A)				090(B06B)						115					
400	MSME 04	3000	14	090(B06B)					115(C09H)							142			
750	MSME 08	3000	19	090A(C09C)			115(C09C)					142				180			
1000	MSME 10	3000	19	115(C10A)															
1500	MSME 15	3000	19					142(D10A)					180			220			
2000	MSME 20	3000	19					180											
3000	MSME 30	3000	22	142(D13A)			180(E13F)				220								
4000	MSME 40	3000	24																
5000	MSME 50	3000	24	180(E13F)			220												

Consult us

A5 Series MHMD

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
200	MHMD 02	3000	11	042(A06A)										060(B06B)		
400	MHMD 04	3000	14	060(B06B)												090(C09H)
750	MHMD 08	3000	19	090(C09C)												

Servo Motor				Gearbox															
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)															
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
200	MHMD 02	3000	11	060(A06A)				090(B06B)						115					
400	MHMD 04	3000	14	090(B06B)					115(C09H)							142			
750	MHMD 08	3000	19	090A(C09C)			115(C09C)					142				180			

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

(Notation example)

042 Gearbox Size(NPR) | **(A04A)** Motor flange code

A5 Series MSMD

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
50	MSMD 5A	3000	8	042(A04B)												
100	MSMD 01	3000	8													
200	MSMD 02	3000	11	042(A06A)										060(B06B)		
400	MSMD 04	3000	14	060(B06B)												090(C09H)
750	MSMD 08	3000	19	090(C09C)												

Servo Motor				Gearbox														
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)														
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
50	MSMD 5A	3000	8	042(A04B)														
100	MSMD 01	3000	8	060(A04B)									090(B06H)					115
200	MSMD 02	3000	11	060(A06A)				090(B06B)								115		
400	MSMD 04	3000	14	090(B06B)					115(C09H)								142	
750	MSMD 08	3000	19	090A(C09C)				115(C09C)				142					180	

A5 Series MDME

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
1	MDME 10	2000	22	090(C13A)												
1.5	MDME 15	2000	22													
2	MDME 20	2000	22						115(D13A)						142(E13F)	
3	MDME 30	2000	24	090(C13B)					115(D13A)				142(E13F)			180
4	MDME 40	2000	35	142(E18A)										180(F18A)		
5	MDME 50	2000	35													
7.5	MDME 75	1500	42	180(F18B)									220			
11	MDME C1	1500	55	220(G22A)												
15	MDME C5	1500	55											Consult us		

Servo Motor				Gearbox														
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)														
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
1	MDME 10	2000	22	115(C13A)														
1.5	MDME 15	2000	22		142(D13A)					180(E13F)				220					
2	MDME 20	2000	22															
3	MDME 30	2000	24	180(E13F)					220										
4	MDME 40	2000	35	180(E18A)		220(F18A)													
5	MDME 50	2000	35																
7.5	MDME 75	1500	42	220(F18B)															
11	MDME C1	1500	55																
15	MDME C5	1500	55																

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

4. Omron Corporation

G5 Series R88M-K (AC200V)

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)												
				3	4	5	6	7	8	9	10	12	14	16	18	20
50	05030 H/T	3000	8	042(A04A)												
100	10030 H/T	3000	8													
200	20030 H/T	3000	11	042(A06A)										060(B06B)		
400	40030 H/T	3000	14	060(B06B)												090(C09H)
750	75030 H/T	3000	19	090(C09C)												
1000	1K030 H/T	3000	19	090(C10A)												
1500	1K530 H/T	3000	19											115(D10A)		
2000	2K030 H/T	3000	19													
3000	3K030 H/T	3000	22	090(C13A)						115(D13A)					142(E13F)	
4000	4K030 H/T	3000	24	090(C13B)						115(D13A)						
5000	5K030 H/T	3000	24									142(E13F)			180	

(Notation example)

042 Gearbox Size (NPR)

(A04A) Motor flange code

Servo Motor				Gearbox														
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)														
				25	30	35	40	45	50	60	70	80	90	100	120	140	160	180	200
50	05030 H/T	3000	8	042(A04A)														
100	10030 H/T	3000	8				060(A04A)						090(B06G)					115
200	20030 H/T	3000	11	060(A06A)				090(B06B)						115				
400	40030 H/T	3000	14	090(B06B)					115(C09H)							142		
750	75030 H/T	3000	19	090A(C09C)			115(C09C)					142				180		
1000	1K030 H/T	3000	19	115(C10A)				142(D10A)					180			220		
1500	1K530 H/T	3000	19															
2000	2K030 H/T	3000	19					180										
3000	3K030 H/T	3000	22	142(D13A)			180(E13F)				220							
4000	4K030 H/T	3000	24	180(E13F)				220										
5000	5K030 H/T	3000	24															

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

G5 Series R88M-K (AC400V)

Servo Motor				Gearbox
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)
				3 4 5 6 7 8 9 10 12 14 16 18 20
750	75030 F/C	3000	19	090(C10A) / 115(D10A)
1000	1K030 F/C	3000	19	
1500	1K530 F/C	3000	19	
2000	2K030 F/C	3000	19	
3000	3K030 F/C	3000	22	090(C13A) / 115(D13A) / 142(E13F)
4000	4K030 F/C	3000	24	090(C13B) / 115(D13A) / 142(E13F) / 180
5000	5K030 F/C	3000	24	

(Notation example)

090 Gearbox Size (NPR)

(C10A) Motor flange code

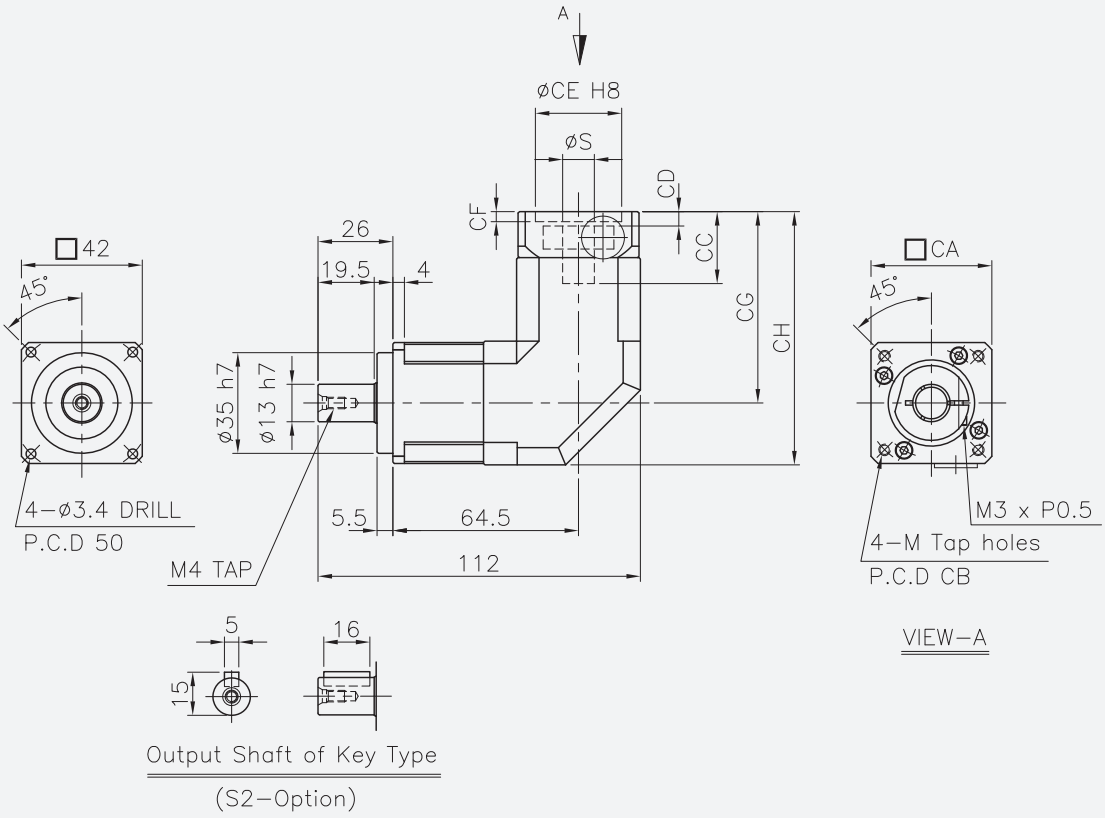
Servo Motor				Gearbox
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)
				25 30 35 40 45 50 60 70 80 90 100 120 140 160 180 200
750	75030 F/C	3000	19	090A(C10A) / 115(C10A) / 142(D10A) / 180 / 220
1000	1K030 F/C	3000	19	
1500	1K530 F/C	3000	19	
2000	2K030 F/C	3000	19	
3000	3K030 F/C	3000	22	142(D13A) / 180(E13F) / 220
4000	4K030 F/C	3000	24	180(E13F) / 220
5000	5K030 F/C	3000	24	

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Dimensions

NPR042, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



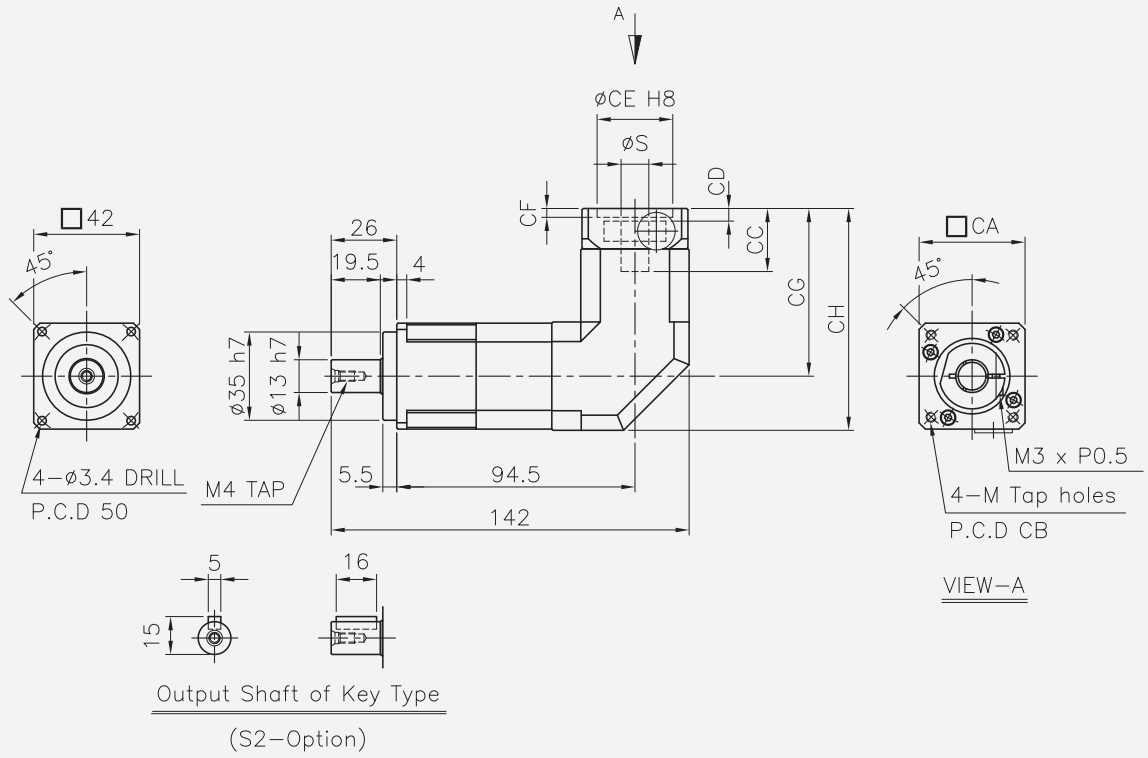
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
A04A	8	42	46	25	5	30	3.5	66.5	88	4
A04B	8	42	45	25	5	30	3.5	66.5	88	3
A06A	11	60	70	30	10	50	8	71.5	93	4
A06C	8	60	70	30	10	50	8	71.5	93	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NPR042, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



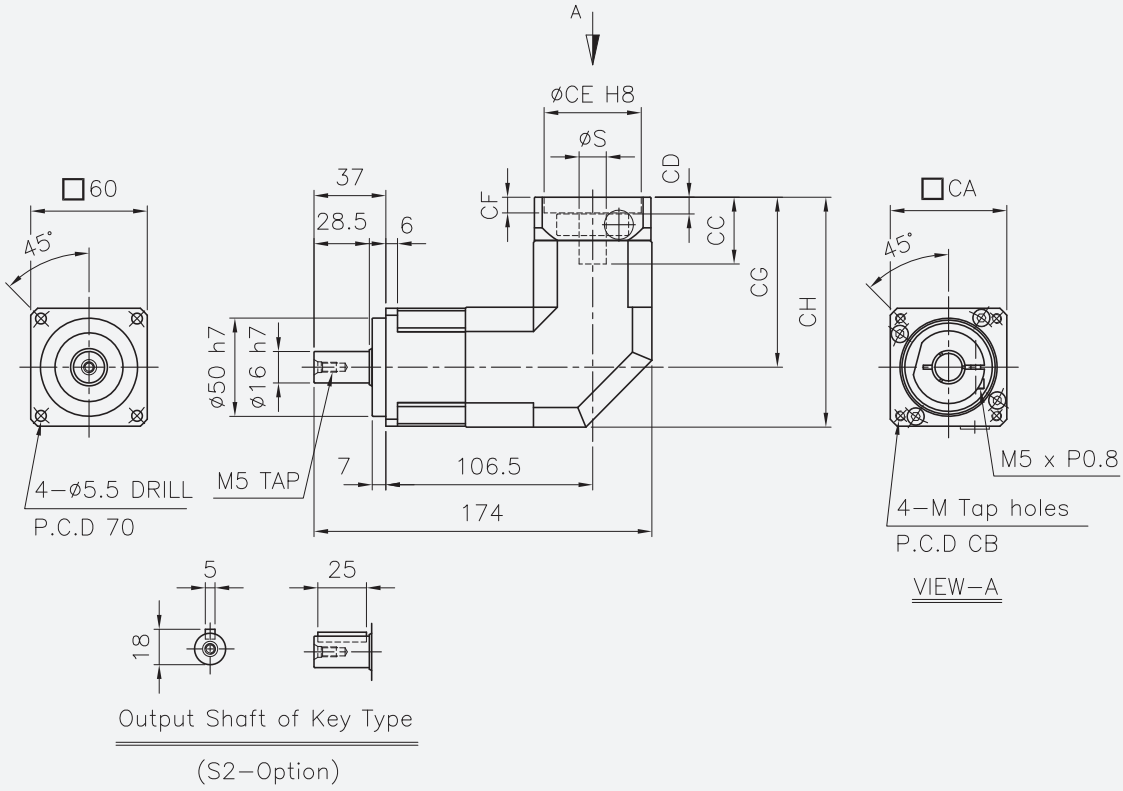
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
A04A	8	42	46	25	5	30	3.5	66.5	88	4
A04B	8	42	45	25	5	30	3.5	66.5	88	3
A06A	11	60	70	30	10	50	8	71.5	93	4
A06C	8	60	70	30	10	50	8	71.5	93	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option

Dimensions

NPR060, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



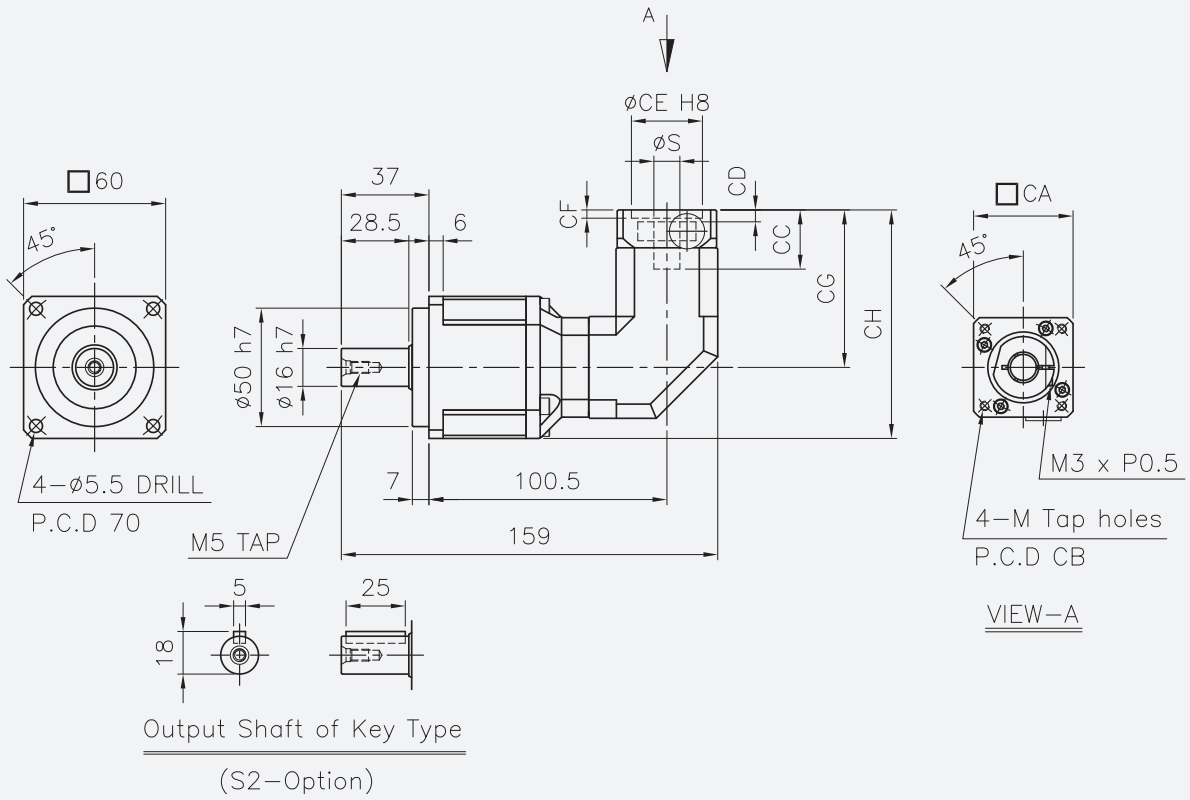
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
B06A	14	60	70	34	8.5	50	8	86.5	117	5
B06B	14	60	70	34	8.5	50	8	86.5	117	4
B06G	8	60	46	35	9.5	30	8	87.5	118	4
B08B	14	80	90	40	14.5	70	5	92.5	123	6
B09C	16	90	100	40	14.5	80	11	92.5	123	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NPR060, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



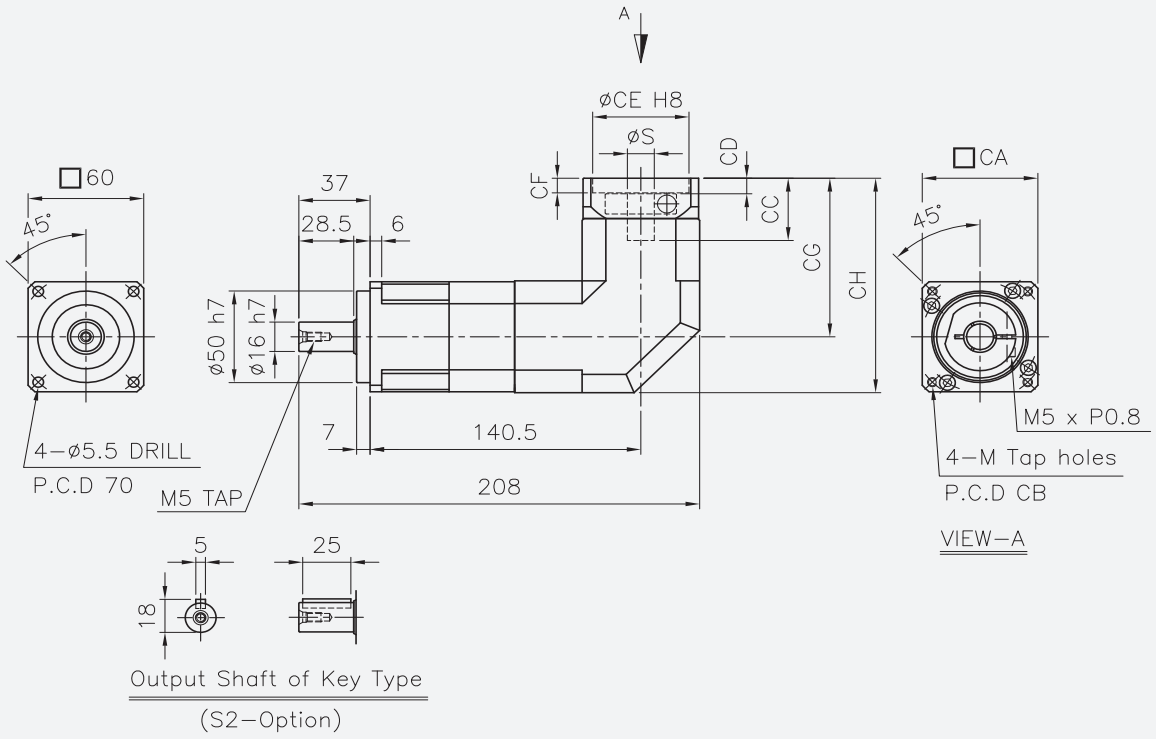
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
A04A	8	42	46	25	5	30	3.5	66.5	96.5	4
A04B	8	42	45	25	5	30	3.5	66.5	96.5	3
A06A	11	60	70	30	10	50	8	71.5	101.5	4
A06C	8	60	70	30	10	50	8	71.5	101.5	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NPR060A, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



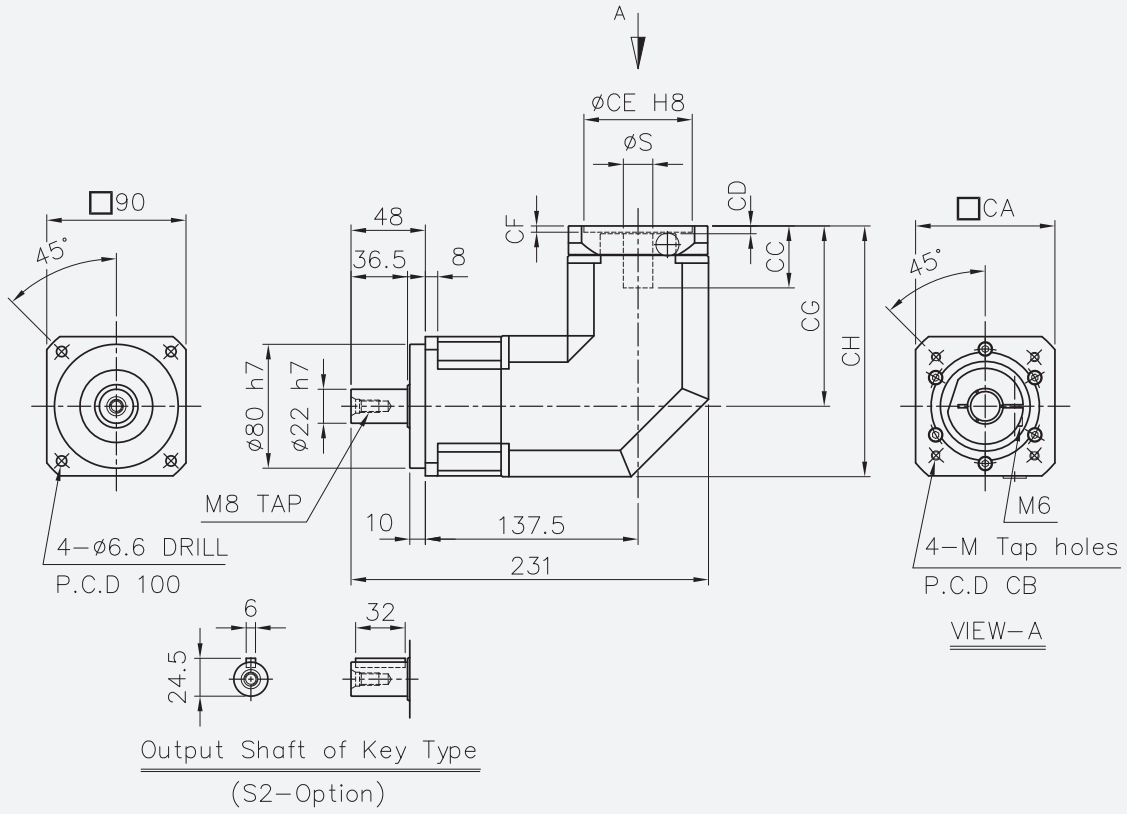
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
B06A	14	60	70	34	8.5	50	8	86.5	117	5
B06B	14	60	70	34	8.5	50	8	86.5	117	4
B08B	14	80	90	40	14.5	70	5	92.5	123	6
B09C	16	90	100	40	14.5	80	11	92.5	123	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NPR090, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



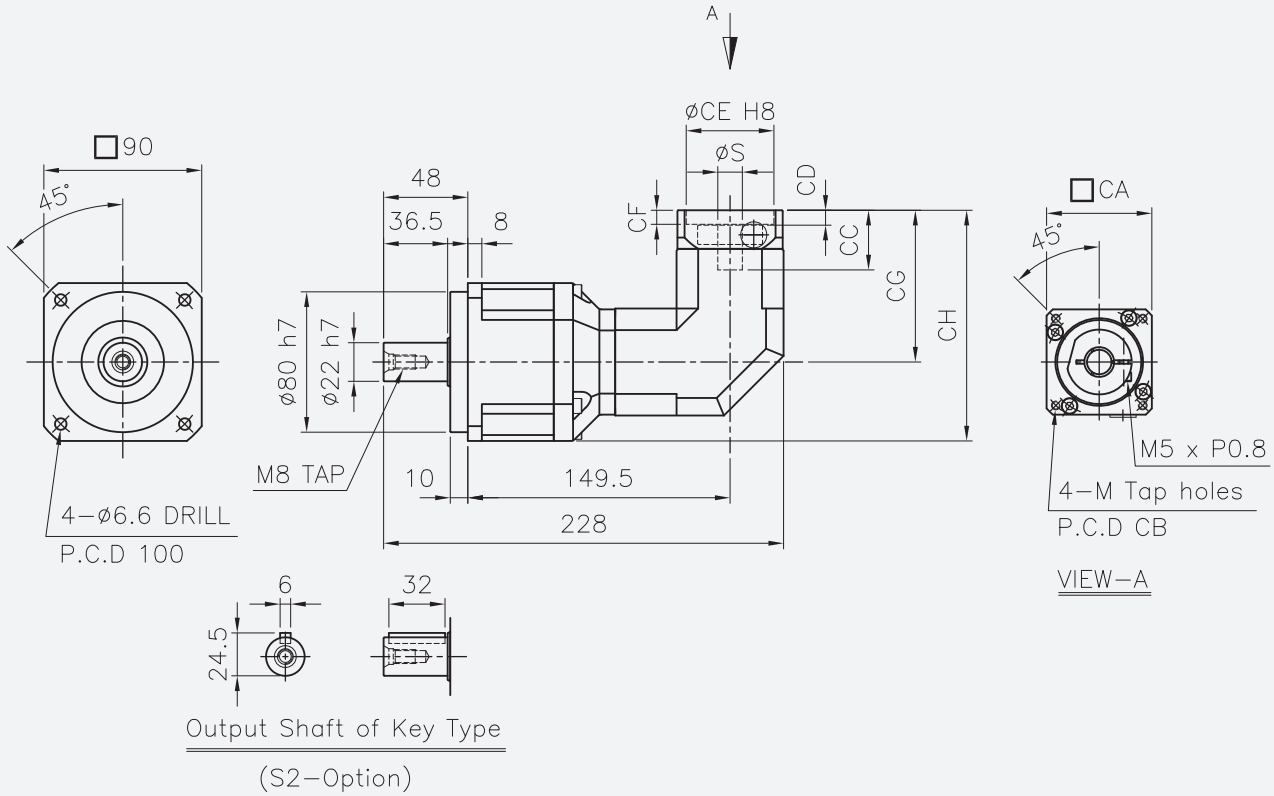
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
C09B	19	90	90	40	5	70	4	116.5	162	6
C09C	19	90	90	40	5	70	4	116.5	162	5
C09D	14	90	70	43.5	8.5	50	6	120	165.5	5
C09H	14	90	70	43.5	8.5	50	6	120	165.5	4
C09J	16	90	100	48	13	80	6	124.5	170	6
C10A	19	101	115	55	20	95	7	131.5	177	8
C10C	24	101	115	45	10	95	5	121.5	167	6
C13A	22	130	145	58	23	110	7	134.5	180	8
	24	130	145	58	23	110	7	134.5	180	8
C13B	24	131	145	70	35	110	8	146.5	192	8
C13C	19	131	145	48	13	110	7	124.5	170	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NPR090, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



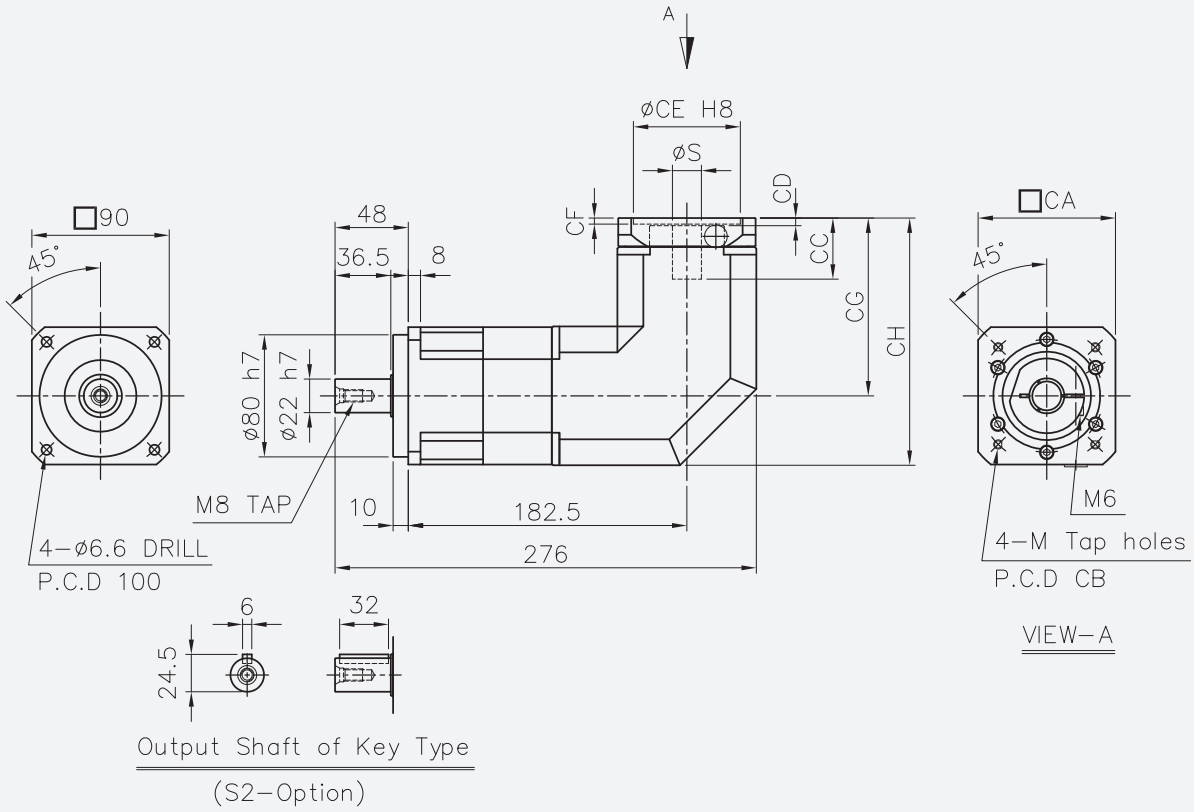
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
B06A	8	60	70	34	8.5	50	8	86.5	131.5	5
	14	60	70	34	8.5	50	8	86.5	131.5	5
B06B	11	60	70	34	8.5	50	8	86.5	131.5	4
	14	60	70	34	8.5	50	8	86.5	131.5	4
B06G	8	60	46	35	9.5	30	8	87.5	132.5	4
B06H	8	60	45	35	9.5	30	8	87.5	132.5	3
B08B	14	80	90	40	14.5	70	5	92.5	137.5	6
B09C	16	90	100	40	14.5	80	11	92.5	137.5	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NPR090A, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



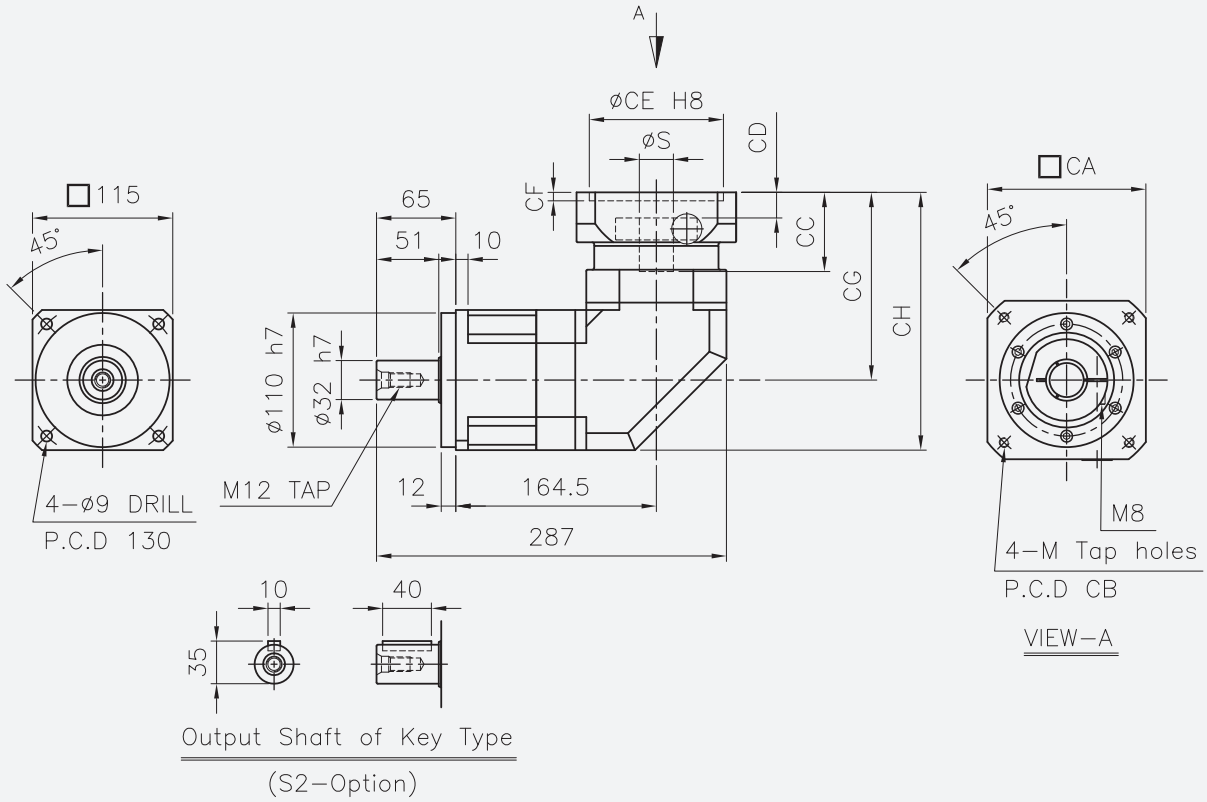
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
C09B	14	90	90	40	5	70	4	116.5	162	6
	19	90	90	40	5	70	4	116.5	162	6
C09C	19	90	90	40	5	70	4	116.5	162	5
C10A	19	101	115	55	20	95	7	131.5	177	8
C10C	24	101	115	45	10	95	5	121.5	167	6
C13A	22	130	145	58	23	110	7	134.5	180	8
	24	130	145	58	23	110	7	134.5	180	8
C13C	19	131	145	48	13	110	7	124.5	170	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NPR115, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



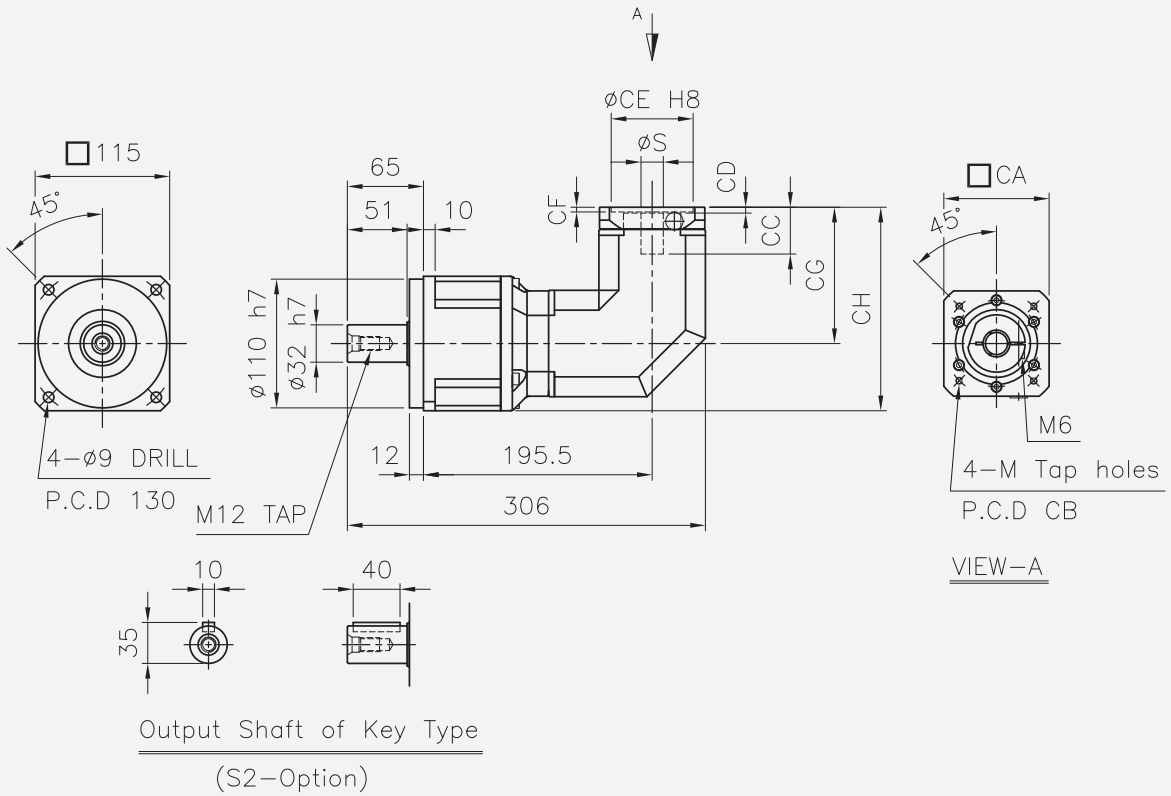
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
D13A	22	130	145	65	21	110	7	154	211.5	8
	24	130	145	65	21	110	7	154	211.5	8
	28	130	145	65	21	110	7	154	211.5	8
D10A	19	111	115	55	11	95	5	144	201.5	8
D10D	19	111	90	57	13	70	6	146	203.5	6
D10E	24	111	115	51	7	95	5	140	197.5	6
D12B	19	121	145	57	13	110	6	146	203.5	8

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NPR115, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



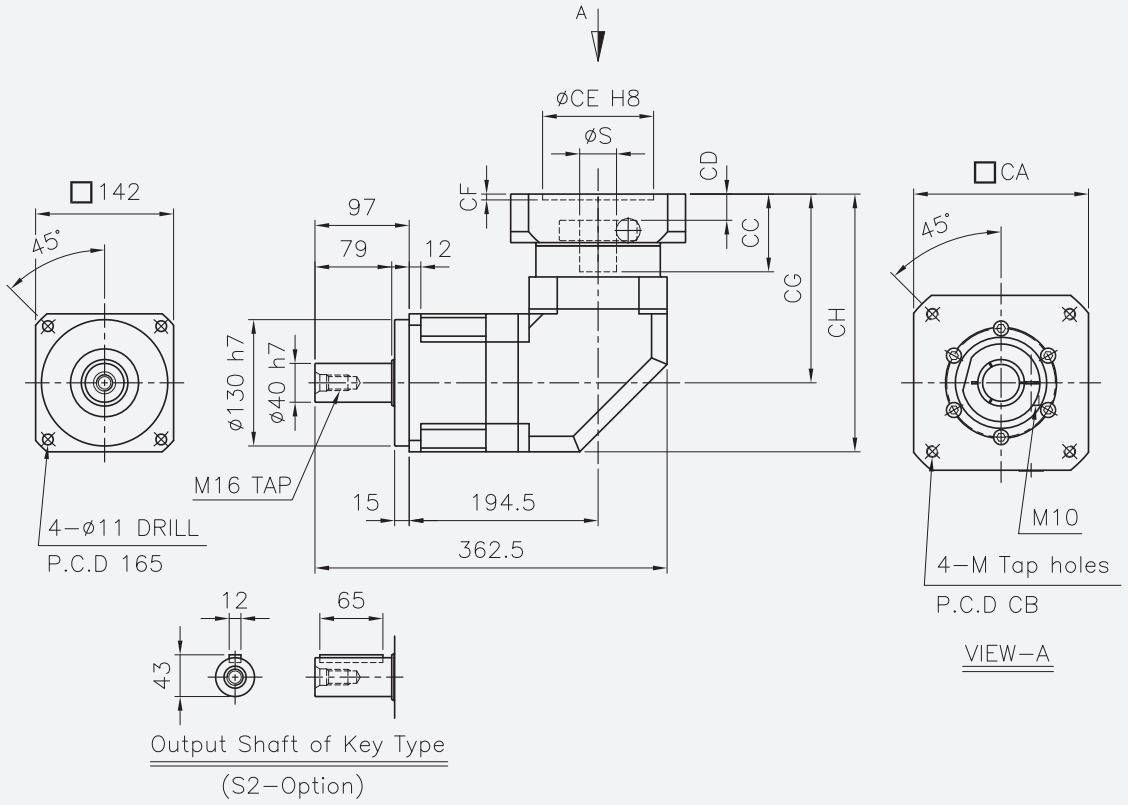
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
C09B	14	90	90	40	5	70	4	116.5	174	6
	19	90	90	40	5	70	4	116.5	174	6
C09C	19	90	90	40	5	70	4	116.5	174	5
C09D	14	90	70	43.5	8.5	50	6	120	177.5	5
C09H	14	90	70	43.5	8.5	50	6	120	177.5	4
C09J	16	90	100	48	13	80	6	124.5	182	6
C10A	19	101	115	55	20	95	7	131.5	189	8
C10C	24	101	115	45	10	95	5	121.5	179	6
C13A	22	130	145	58	23	110	7	134.5	192	8
	24	130	145	58	23	110	7	134.5	192	8
C13C	19	131	145	48	13	110	7	124.5	182	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NPR142, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



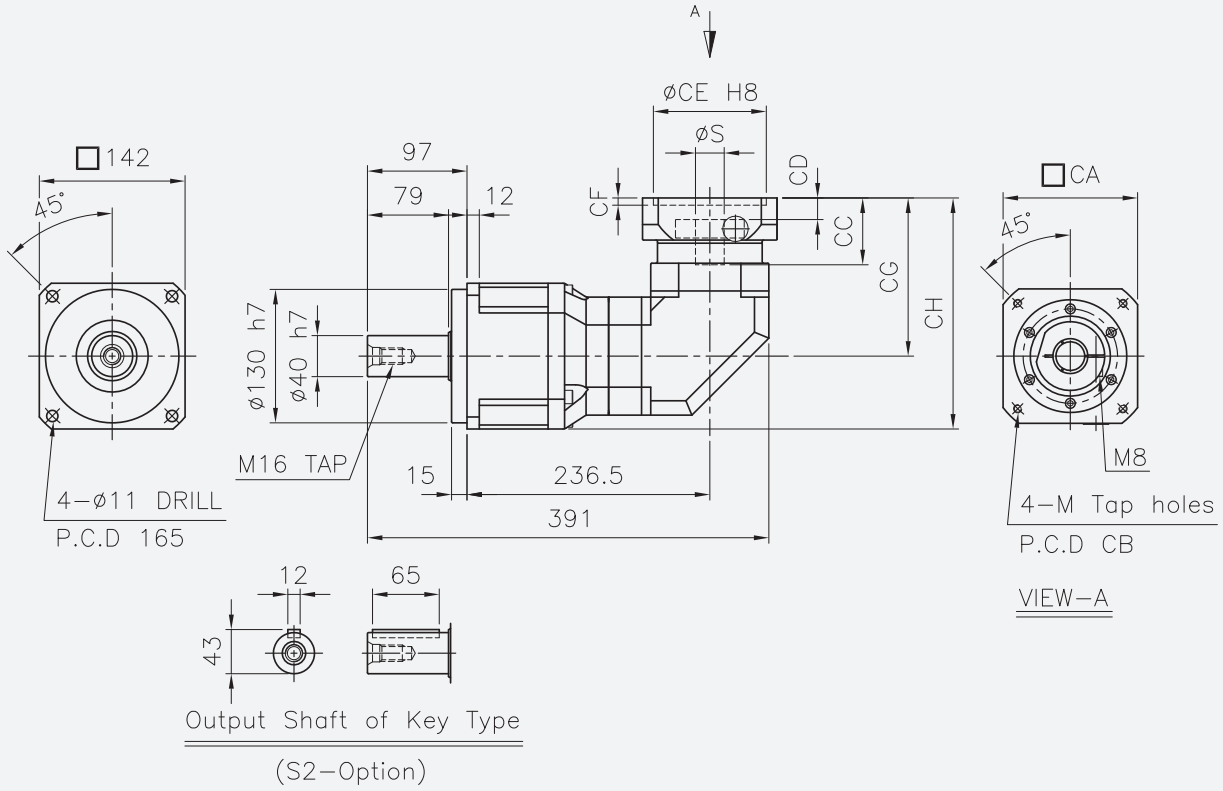
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
E18A	35	180	200	80	27	114.3	6	194.3	265.3	12
E13E	24	131	115	60	7	95	6	174.3	245.3	6
E13F	22	131	145	65	12	110	7	179.3	250.3	8
	24	131	145	65	12	110	7	179.3	250.3	8
	28	131	145	65	12	110	7	179.3	250.3	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NPR142, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



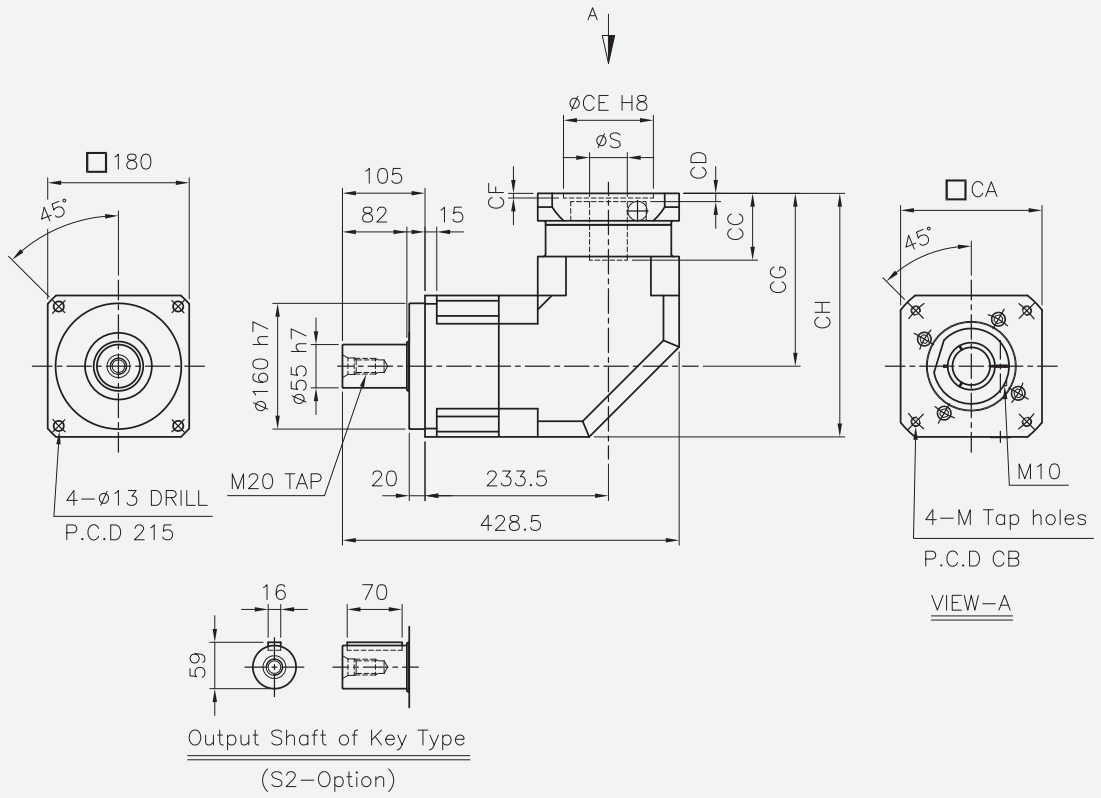
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
D13A	22	130	145	65	21	110	7	154	225	8
	24	130	145	65	21	110	7	154	225	8
	28	130	145	65	21	110	7	154	225	8
D10A	19	111	115	55	11	95	5	144	215	8
D10D	19	111	90	57	13	70	6	146	217	6
D10E	24	111	115	51	7	95	5	140	211	6
D10F	16	111	100	57	13	80	6	146	217	6
D12B	19	121	145	57	13	110	6	146	217	8

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NPR180, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



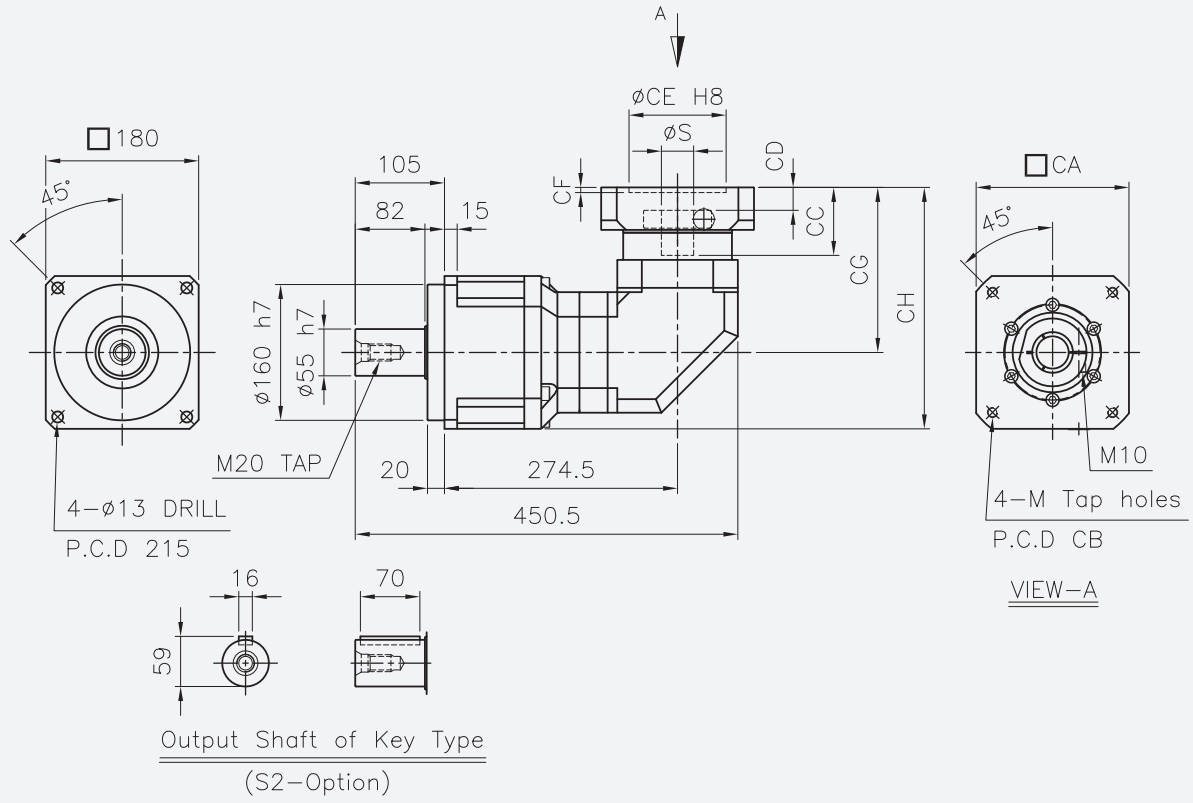
※ Max. input bore (ØSmax) = Ø48

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
F18A	35	180	200	85	10.5	114.3	6	220	310	12
F18B	42	180	200	113	38.5	114.3	6	248	338	12
F22B	42	220	235	116	41.5	200	10	251	341	12

1) For S dimension less than diameter 48, bushing from page 176 is provided.

Dimensions

NPR180, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



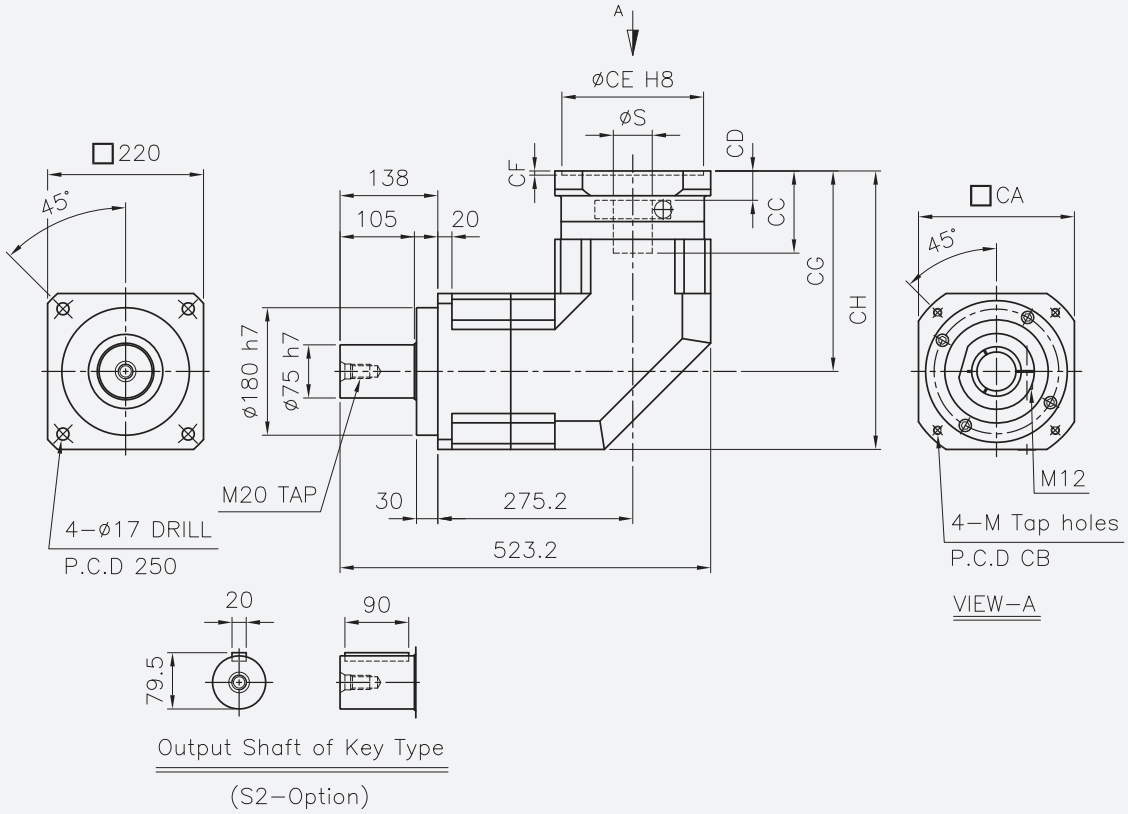
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
E18A	35	180	200	80	27	114.3	6	194.3	284.3	12
E13C	19	131	115	68	15	95	6	182.3	272.3	8
E13E	24	131	115	60	7	95	6	174.3	264.3	6
E13F	22	131	145	65	12	110	7	179.3	269.3	8
	24	131	145	65	12	110	7	179.3	269.3	8
	28	131	145	65	12	110	7	179.3	269.3	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NPR220, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



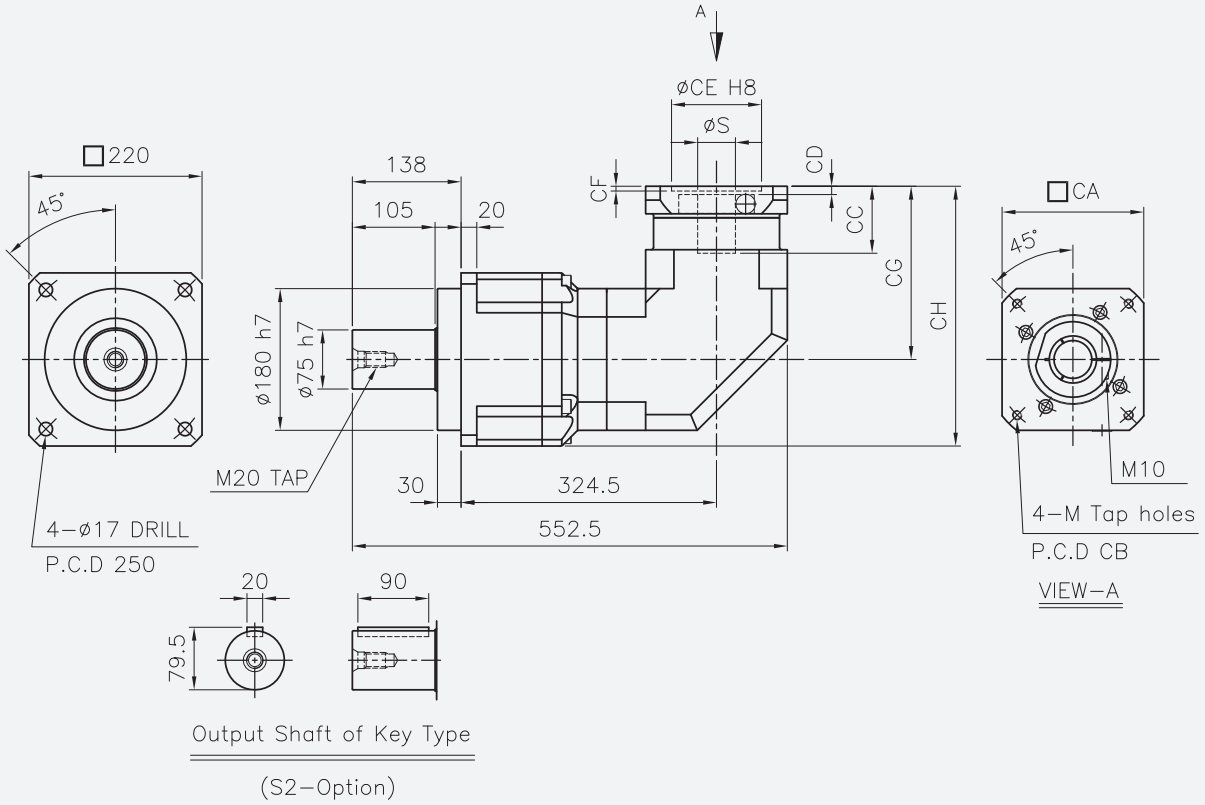
※ Max. input bore (ØSmax) = Ø55

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
G22A	55	220	235	116	41.5	200	6	283	393	12

1) For S dimension less than diameter 55, bushing from page 176 is provided.

Dimensions

NPR220, 2-Stage, Ratio(i) = 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



※ Max. input bore (ØSmax) = Ø48

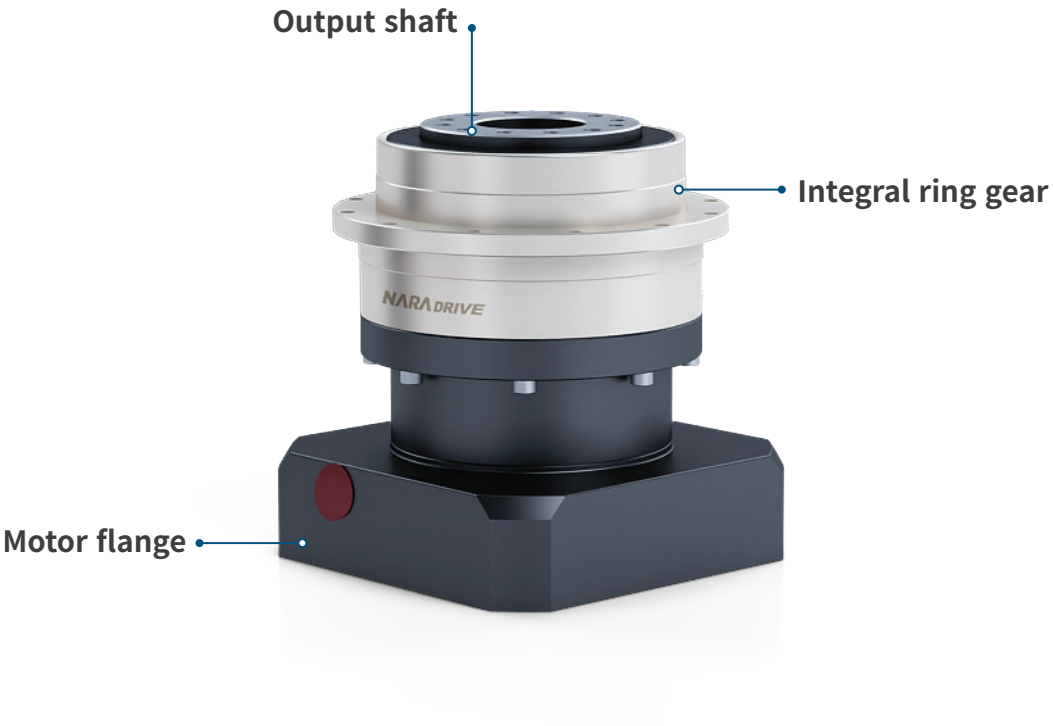
Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
F18A	35	180	200	85	10.5	114.3	6	220	330	12
F18B	42	180	200	113	38.5	114.3	6	248	358	12

1) For S dimension less than diameter 48, bushing from page 176 is provided.

NF Series

- Low-noise and High-precision planetary gearbox with output flange and helical gear
- Inline connection

Features



Low Noise
Low-noise is realized by using a helical gear that enables to provide smooth rotation.

High Rigidity
Ring gear directly gearing to provide compact, high rigidity and high torque.

High Precision
Enables high precision position control with precise backlash, and maximizes the characteristics of servo motor.

Long Life
No need for separate inspection or maintenance due to it's long service life.

Easy Mounting
Easy mounting of motor and gearbox due to corresponding of Set-collar and bushing to the output shaft of servo motor.

Herical Gearbox
Gearbox that uses helical gear and has a higher contact ratio than spur gear, it provides high torque and quiet operation.

Output Flange
Gearbox and application are mounted with output flange for high rigidity connection.

Specifications / Inertia

Specifications

Item	Unit	Stage	Ratio	NF047	NF064	NF090	NF110	NF140	NF200	NF255
Nominal output torque (T_{2N}) [1]	Nm	1	5	13.2	36	84	198	390	720	1200
			7	11.4	30	84	180	330	660	1080
			10	8.4	24	60	138	270	540	900
		2	25	13.2	36	84	198	390	720	1200
			35	11.4	30	84	180	330	660	1080
			50	13.2	36	84	198	390	720	1200
			70	11.4	30	84	180	330	660	1080
			100	8.4	24	60	138	270	540	900
Maximum acceleration torque (T_{2B}) [2]	Nm	1,2	5~100	3 times of Nominal output torque(T_{2N})						
Emergency stop torque (T_{2E}) [3]	Nm	1,2	5~100	4 times of Nominal output torque(T_{2N})						
Nominal input speed (n_{1N}) [4]	rpm	1,2	5~100	3000	3000	3000	3000	3000	3000	2000
Maximum input speed (n_{1B}) [5]	rpm	1,2	5~100	6000	6000	5000	5000	5000	5000	4000
Precision backlash (P1)	arcmin	1	5~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	25~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Low backlash (P2)	arcmin	1	5~10	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	25~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Standard backlash (P3)	arcmin	1	5~10	≤8	≤8	≤8	≤8	≤8	≤8	≤8
		2	25~100	≤10	≤10	≤10	≤10	≤10	≤10	≤10
Maximum tilting moment (M_{2kB}) [6]	Nm	1,2	5~100	21.6	33	132	283	419	1046	1540
Maximum axial load (F_{2aB}) [7]	N	1,2	5~100	910	1100	3320	5110	6880	13180	17050
Lifetime [8]	hr	1,2	5~100	20000						
Noise level [9]	dB(A)	1,2	5~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70
Efficiency (η) [10]	%	1	5~10	≥95						
		2	25~100	≥90						
Weight [11]	kg	1	5~10	0.7	1.4	3.5	6.9	14.5	30.5	53
		2	25~100	1.0	1.6	3.7	8.0	16.3	34.5	64
Ambient temperature	˚C	1,2	5~100	-15 to +40						
Permitted housing temperature	˚C	1,2	5~100	+90						
Lubrication		1,2	5~100	Grease						
Degree of protection [12]		1,2	5~100	IP54 (IP65)						
Mounting position		1,2	5~100	All directions						

1) Nominal output torque is the allowable value of average load torque applied to the output shaft.
2) Maximum acceleration torque is the allowable value of startup/stop torque generated during operation.
3) Emergency stop torque is the allowable value of overload or shock load torque. (1000 times permitted during the lifetime of the gearbox)
4) Allowable value of average input speed.
5) Maximum input speed allowed intermittently. (Please contact NARA when using over the nominal input speed)
6) When the output speed is 100 rpm, the allowable value of the tilting moment is on the output shaft. For moment calculation, refer to page 175.
7) When the output speed is 100 rpm, the allowable value of the axial load is on the output shaft.
8) Lifetime during intermittent operation within nominal output torque and nominal input speed.
9) Representative value measured at a distance of 1m from a gearbox with a reduction ratio of 1/10 (1-stage) or 1/100 (2-stage) at the nominal input speed under no-load condition.
10) Efficiency at full load.
11) Weight is a representative value and depends on reduction ratio and applied motor.
12) Protection class IP65 is optional.

Inertia

Item	Unit	Stage	Ratio	NF047	NF064	NF090	NF110	NF140	NF200	NF255
Mass moment of inertia (J_1)	$kg \cdot cm^2$	1	5	0.041	0.224	0.954	4.280	10.5	34.7	67.6
			7	0.036	0.199	0.851	3.780	9.3	27.7	53.3
			10	0.034	0.185	0.773	3.520	8.5	24.6	46.2
		2	25	0.038	0.040	0.210	0.935	4.1	10.2	28.3
			35	0.038	0.039	0.206	0.915	4.0	10.0	27.7
			50	0.033	0.034	0.205	0.756	3.5	8.4	22.9
			70	0.033	0.034	0.180	0.751	3.5	8.3	22.8
			100	0.033	0.033	0.179	0.748	3.5	8.3	22.7

Selection Table

1. Yaskawa Electric Corporation

(Notation example)
047 Gearbox Size(NF)
(A04A) Motor flange code

Σ-7 Series SGM7J

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
50	SGM7J-A5A	3000	8	047(A04A)			047(A04A)	064(A04A)			
100	SGM7J-01A	3000	8								090(B06G)
150	SGM7J-C2A	3000	8								
200	SGM7J-02A	3000	14	064(B06A)			090(B06A)				110(C09D)
400	SGM7J-04A	3000	14							110(C09D)	140
600	SGM7J-06A	3000	14								
750	SGM7J-08A	3000	19	090(C09B)			110(C09B)			140(D10D)	200

Σ-7 Series SGM7A

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
50	SGM7A-A5A	3000	8	047(A04A)			047(A04A)	064(A04A)			
100	SGM7A-01A	3000	8								090(B06G)
150	SGM7A-C2A	3000	8								
200	SGM7A-02A	3000	14	064(B06A)			090(B06A)				110(C09D)
400	SGM7A-04A	3000	14							110(C09D)	140
600	SGM7A-06A	3000	14								
750	SGM7A-08A	3000	19	090(C09B)			110(C09B)			140(D10D)	200
1000	SGM7A-10A	3000	19								
1500	SGM7A-15A	3000	24	090(C10C)			110(C10C)				
2000	SGM7A-20A	3000	24					140(D10E)		200(E13E)	255
2500	SGM7A-25A	3000	24			110(D10E)					
3000	SGM7A-30A	3000	28	110(D13A)			140(D13A)	200(E13F)		220	
4000	SGM7A-40A	3000	28								
5000	SGM7A-50A	3000	28							**Consult us**	
7000	SGM7A-70A	3000	28			140(E13F)			220		

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

(Notation example)
047 Gearbox Size(NF)
(A06C) Motor flange code

Σ-7 Series SGM7P

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
100	SGM7P-01A	3000	8	047(A06C)			047(A06C)		064(A06C)		090(B06A)
200	SGM7P-02A	3000	14	064(B08B)			090(B08B)				
400	SGM7P-04A	3000	14							110(C09B)	
750	SGM7P-08A	3000	19	090(C13C)			110(C13C)				140(D12B)
1500	SGM7P-15A	3000	19						140(D12B)	200	

Σ-7 Series SGM7G

Servo Motor				Gearbox							
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
0.3	SGM7G-03A	1500	16	064(B09C)			090(B09C)		110(C09J)		140(D10F)
0.45	SGM7G-05A	1500	16			090(C09J)				140(D10F)	200
0.85	SGM7G-09A	1500	24	090(C13A)			110(C13A)				
1.3	SGM7G-13A	1500	24			110(D13A)		140(D13A)	200(E13F)		255
1.8	SGM7G-20A	1500	24							255	
2.9	SGM7G-30A	1500	35	140(E18A)			200(E18A)		255(F18A)		
4.4	SGM7G-44A	1500	35			200(F18A)		255(F18A)			
5.5	SGM7G-55A	1500	42	200(F18B)			255(F18B)				
7.5	SGM7G-75A	1500	42								
11	SGM7G-1AA	1500	42	200(F22B)		255(G22A)					
15	SGM7G-1EA	1500	55	255(G22A)							

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

2. Mitsubishi Electric Corporation

(Notation example)
047 Gearbox Size(NF)
(A04A) Motor flange code

MELSERVO-J4 Series HG-KR

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
50	HG-KR053(B)	3000	8	047(A04A)			047(A04A)				
100	HG-KR13(B)	3000	8					064(A04A)			090(B06G)
200	HG-KR23(B)	3000	14	064(B06A)			090(B06A)				110(C09D)
400	HG-KR43(B)	3000	14							110(C09D)	140
750	HG-KR73(B)	3000	19	090(C09B)			110(C09B)			140(D10D)	200

MELSERVO-J4 Series HG-MR

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
50	HG-MR053(B)	3000	8	047(A04A)			047(A04A)				064(A04A)
100	HG-MR13(B)	3000	8						064(A04A)		090(B06G)
200	HG-MR23(B)	3000	14	064(B06A)			090((B06A)				
400	HG-MR43(B)	3000	14							110(C09D)	
750	HG-MR73(B)	3000	19	090(C09B)			110(C09B)				140(D10D)

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox							
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
0.5	HG-SR52(B)	2000	24	090(C13A)			110(C13A)				140(D13A)
1	HG-SR102(B)	2000	24							200(E13F)	
1.5	HG-SR152(B)	2000	24			110(D13A)		140(D13A)			255
2	HG-SR202(B)	2000	35	140(E18A)			200(E18A)			255	
3.5	HG-SR352(B)	2000	35								
5	HG-SR502(B)	2000	35					255(F18A)		**Consult us**	
7	HG-SR702(B)	2000	35			200(F18A)	255(F18A)				

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

3. Panasonic Corporation

(Notation example)

047 Gearbox Size(NF) | **(A04B)** Motor flange code

A5 Series MSME

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
50	MSME 5A	3000	8	047(A04B)			047(A04B)				064(A04B)
100	MSME 01	3000	8						064(A04B)		090(B06H)
200	MSME 02	3000	11	047(A06A)			064(A06A)			090(B06B)	110
400	MSME 04	3000	14	064(B06B)			090(B06B)			110(C09H)	
750	MSME 08	3000	19	090(C09C)			110(C09C)				140
1000	MSME 10	3000	19	090(C10A)			110(C10A)			140(D10A)	
1500	MSME 15	3000	19							200	
2000	MSME 20	3000	19			110(D10A)		140(D10A)			255
3000	MSME 30	3000	22	090(C13A)		110(D13A)	140(D13A)	200(E13F)		255	
4000	MSME 40	3000	24	090(C13B)	110(D13A)		140(D13A)			255	
5000	MSME 50	3000	24			140(E13F)	200(E13F)		255	**Consult us**	

A5 Series MSMD

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
50	MSMD 5A	3000	8	047(A04B)			042(A04B)				060(A04B)
100	MSMD 01	3000	8						060(A04B)		090(B06H)
200	MSMD 02	3000	11	047(A06A)			060(A06A)			090(B06B)	110
400	MSMD 04	3000	14	064(B06B)			090(B06B)			110(C09H)	
750	MSMD 08	3000	19	090(C09C)			110(C09C)				140

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

(Notation example)

047 Gearbox Size(NF) | **(A06A)** Motor flange code

A5 Series MHMD

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
200	MHMD 02	3000	11	047(A06A)			060(A06A)			090(B06B)	110
400	MHMD 04	3000	14	064(B06B)			090(B06B)			110(C09H)	
750	MHMD 08	3000	19	090(C09C)			110(C09C)				140

A5 Series MDME

Servo Motor				Gearbox							
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
1	MDME 10	2000	22	090(C13A)			110(C13A)			200(E13F)	
1.5	MDME 15	2000	22			110(D13A)		140(D13A)			255
2	MDME 20	2000	22				140(D13A)	200(E13F)		255	
3	MDME 30	2000	24	090(C13B)	110(D13A)	140(E13F)	140(D13A)	200(E13F)		255	
4	MDME 40	2000	35	140(E18A)			200(E18A)	255(F18A)			
5	MDME 50	2000	35								
7.5	MDME 75	1500	42	200(F18B)			255(F18B)				
11	MDME C1	1500	55	255(G22A)						**Consult us**	
15	MDME C5	1500	55								

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

4. Omron Corporation

(Notation example)
047 Gearbox Size(NF)
(A04A) Motor flange code

G5 Series R88M-K (AC200V)

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
50	05030 H/T	3000	8	047(A04A)			047(A04A)				064(A04A)
100	10030 H/T	3000	8						064(A04A)		090(B06G)
200	20030 H/T	3000	11	047(A06A)			064(A06A)			090(B06B)	110
400	40030 H/T	3000	14	060(B06B)			090(B06B)			110(C09H)	
750	75030 H/T	3000	19	090(C09C)			110(C09C)				140
1000	1K030 H/T	3000	19	090(C10A)			110(C10A)			140(D10A)	
1500	1K530 H/T	3000	19							200	
2000	2K030 H/T	3000	19			110(D10A)		140(D10A)			255
3000	3K030 H/T	3000	22	090(C13A)		110(D13A)	140(D13A)	200(E13F)		255	
4000	4K030 H/T	3000	24	090(C13B)		110(D13A)	140(D13A)			255	
5000	5K030 H/T	3000	24			140(E13F)	200(E13F)		255	**Consult us**	

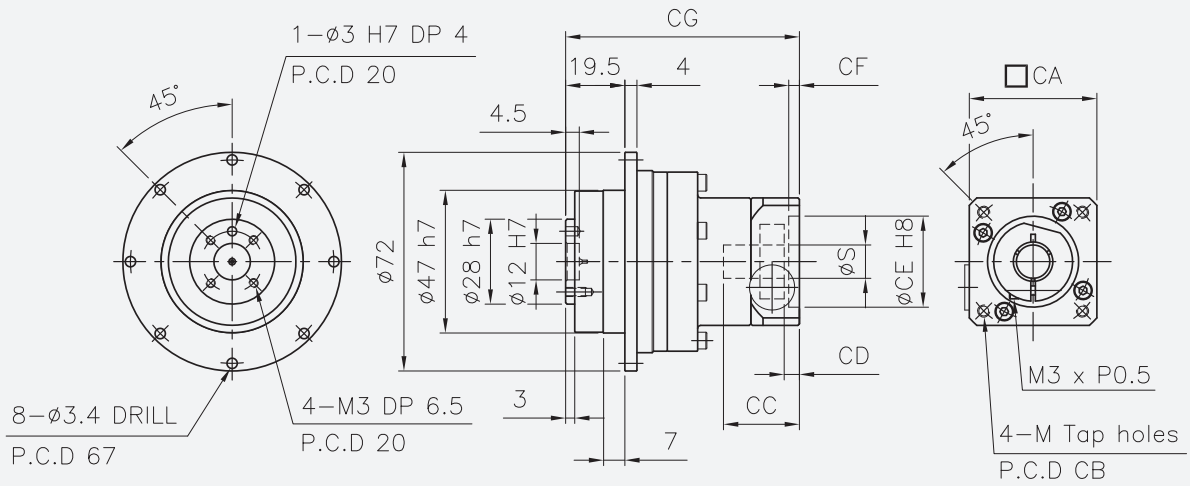
G5 Series R88M-K (AC400V)

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)				
				5	7	10	25	35	50	70	100
750	75030 F/C	3000	19	090(C10A)			110(C10A)				140(D10A)
1000	1K030 F/C	3000	19							140(D10A)	
1500	1K530 F/C	3000	19						140(D10A)	200	
2000	2K030 F/C	3000	19			110(D10A)					255
3000	3K030 F/C	3000	22	090(C13A)		110(D13A)	140(D13A)	200(E13F)		255	
4000	4K030 F/C	3000	24	090(C13B)	110(D13A)		140(D13A)			255	
5000	5K030 F/C	3000	24			140(E13F)	200(E13F)		255	**Consult us**	

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Dimensions

NF047, 1-Stage, Ratio(i) = 5, 7, 10



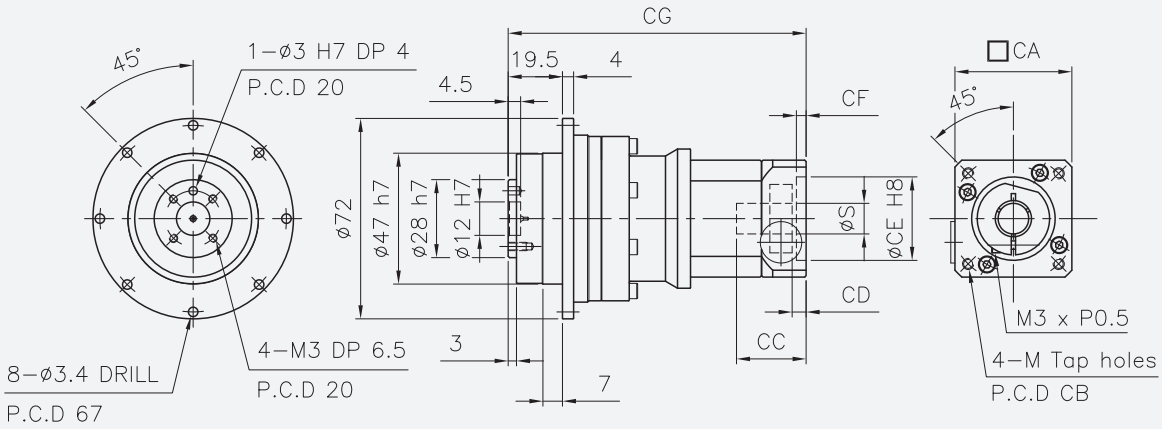
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
A04A	8	42	46	25	5	30	3.5	77	4
A04B	8	42	45	25	5	30	3.5	77	3
A06A	11	60	70	30	10	50	8	82	4
A06C	8	60	70	30	10	50	8	82	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NF047, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100



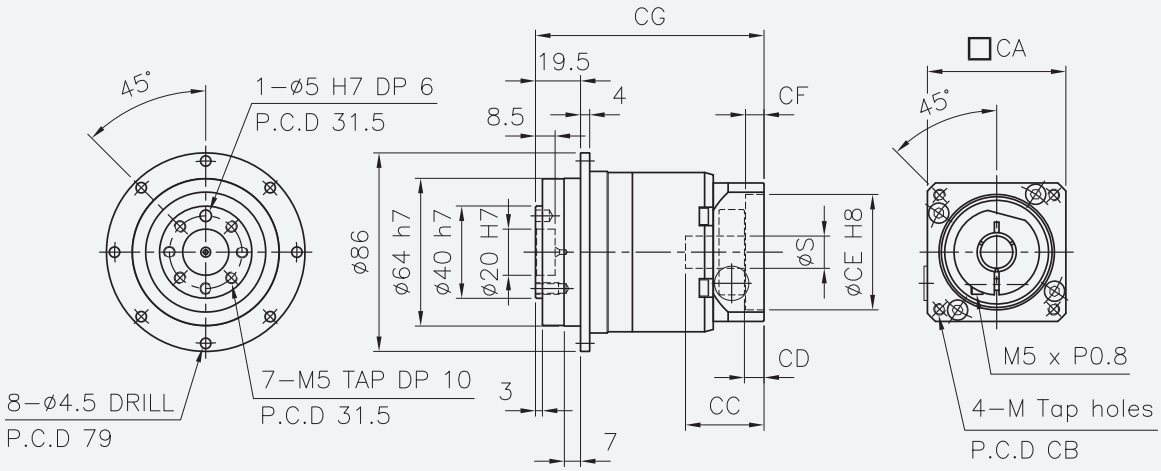
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
A04A	8	42	46	25	5	30	3.5	107	4
A04B	8	42	45	25	5	30	3.5	107	3
A06A	11	60	70	30	10	50	8	112	4
A06C	8	60	70	30	10	50	8	112	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NF064, 1-Stage, Ratio(i) = 5, 7, 10



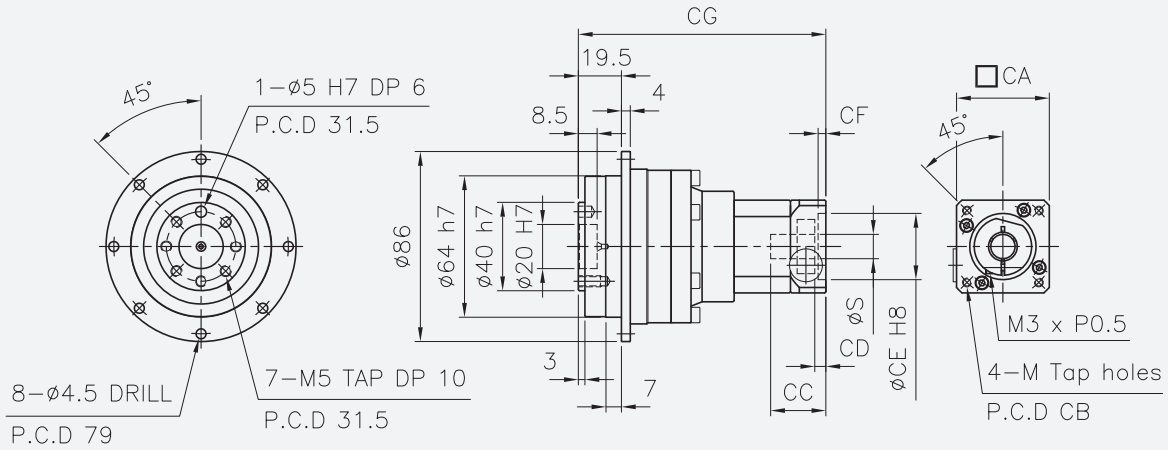
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
B06A	14	60	70	34	8.5	50	8	99	5
B06B	14	60	70	34	8.5	50	8	99	4
B08B	14	80	90	40	14.5	70	5	105	6
B09C	16	90	100	40	14.5	80	11	105	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NF064, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100



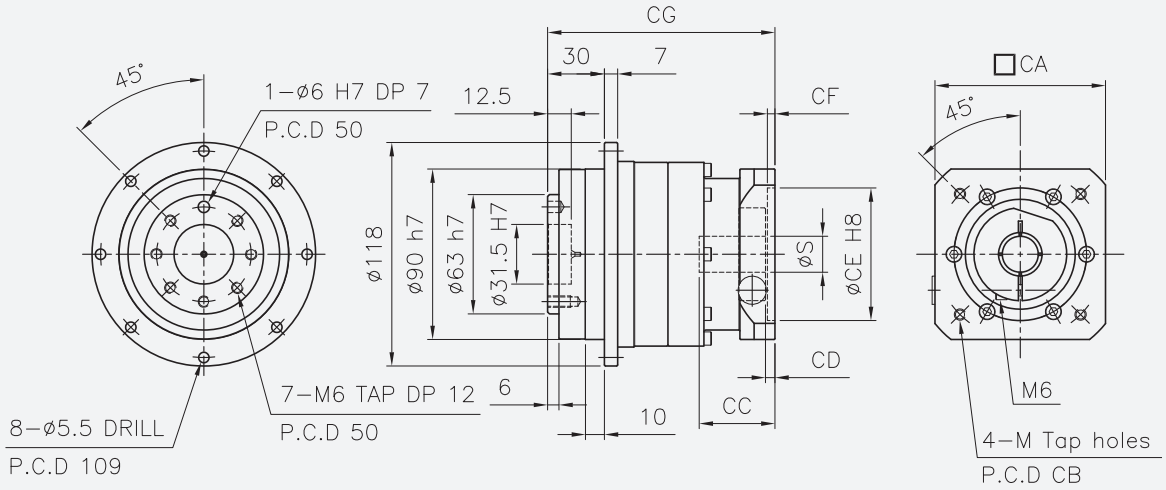
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
A04A	8	42	46	25	5	30	3.5	112	4
A04B	8	42	45	25	5	30	3.5	112	3
A06A	11	60	70	30	10	50	8	117	4
A06C	8	60	70	30	10	50	8	117	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NF090, 1-Stage, Ratio(i) = 5, 7, 10



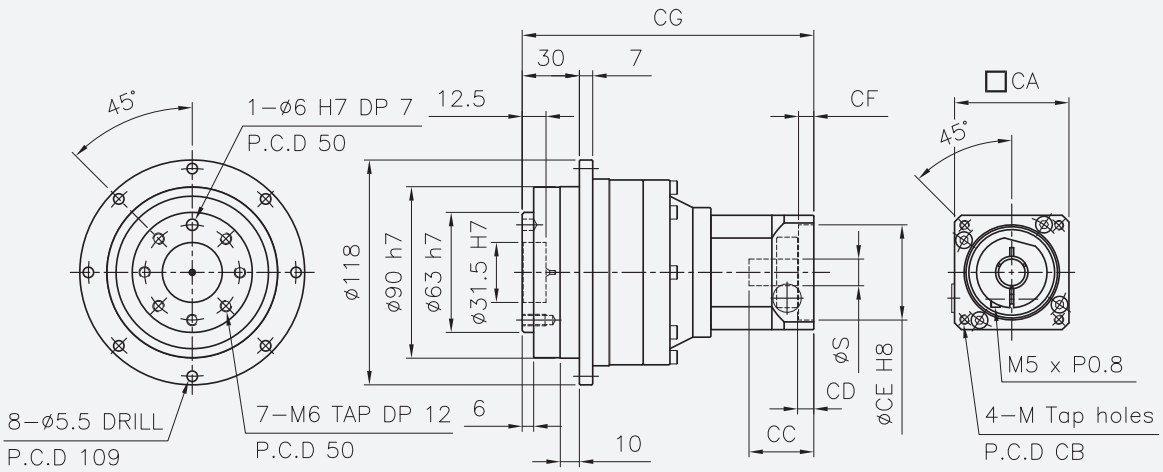
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
C09B	19	90	90	40	5	70	4	120	6
C09C	19	90	90	40	5	70	4	120	5
C09J	16	90	100	48	13	80	6	128	6
C10A	19	101	115	55	20	95	7	135	8
C10C	24	101	115	45	10	95	5	125	6
C13A	22	130	145	58	23	110	7	138	8
	24	130	145	58	23	110	7	138	8
C13B	24	131	145	70	35	110	8	150	8
C13C	19	131	145	48	13	110	7	128	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NF090, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100



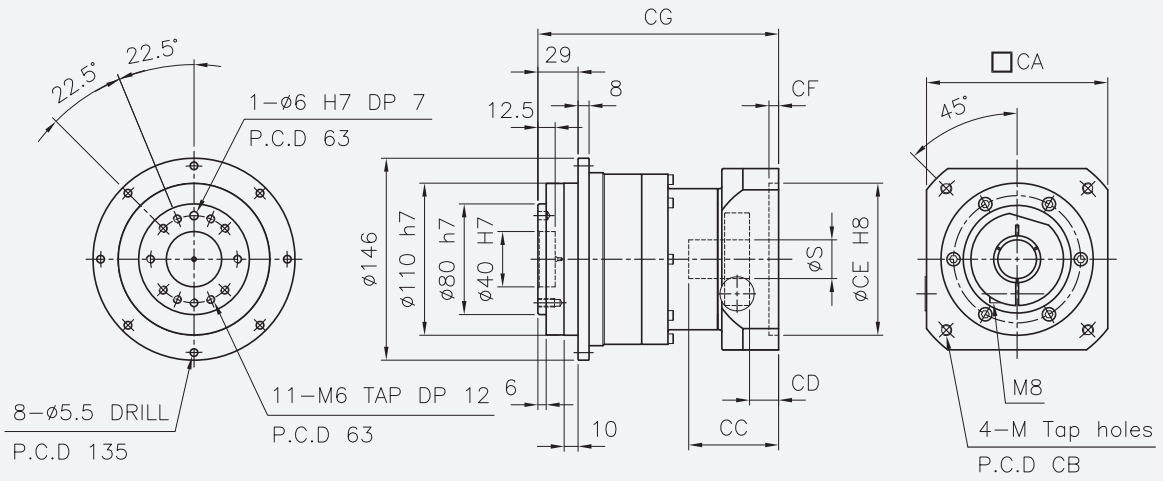
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
B06A	8	60	70	34	8.5	50	8	153	5
	14	60	70	34	8.5	50	8	153	5
B06B	11	60	70	34	8.5	50	8	153	4
	14	60	70	34	8.5	50	8	153	4
B06G	8	60	46	35	9.5	30	8	154	4
B06H	8	60	45	35	9.5	30	8	154	3
B08B	14	80	90	40	14.5	70	5	159	6
B09C	16	90	100	40	14.5	80	11	159	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NF110, 1-Stage, Ratio(i) = 5, 7, 10



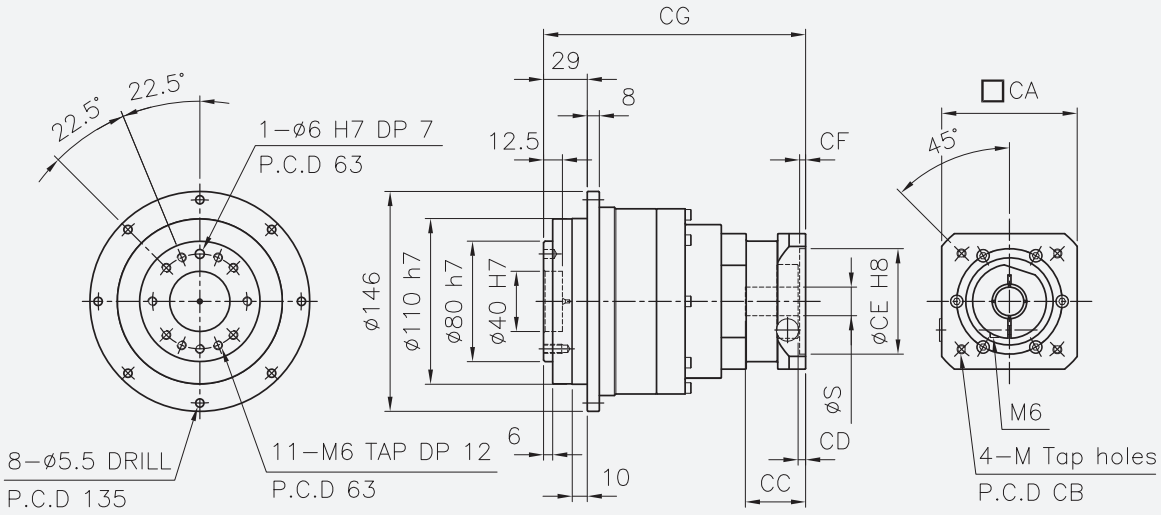
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
D13A	22	130	145	65	21	110	7	174	8
	24	130	145	65	21	110	7	174	8
	28	130	145	65	21	110	7	174	8
D10A	19	111	115	55	11	95	5	164	8
D10E	24	111	115	51	7	95	5	160	6

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NF110, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100



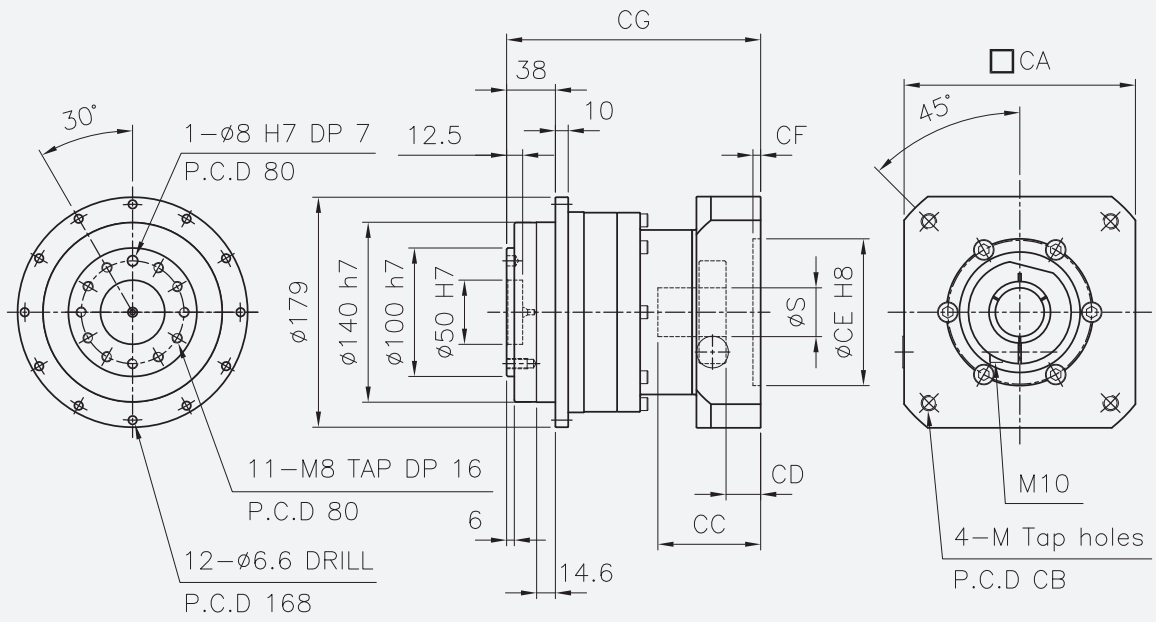
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
C09B	14	90	90	40	5	70	4	174	6
	19	90	90	40	5	70	4	174	6
C09C	19	90	90	40	5	70	4	174	5
C09D	14	90	70	43.5	8.5	50	6	177.5	5
C09H	14	90	70	43.5	8.5	50	6	177.5	4
C09J	16	90	100	48	13	80	6	182	6
C10A	19	101	115	55	20	95	7	189	8
C10C	24	101	115	45	10	95	5	179	6
C13A	22	130	145	58	23	110	7	192	8
	24	130	145	58	23	110	7	192	8
C13C	19	131	145	48	13	110	7	182	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NF140, 1-Stage, Ratio(i) = 5, 7, 10



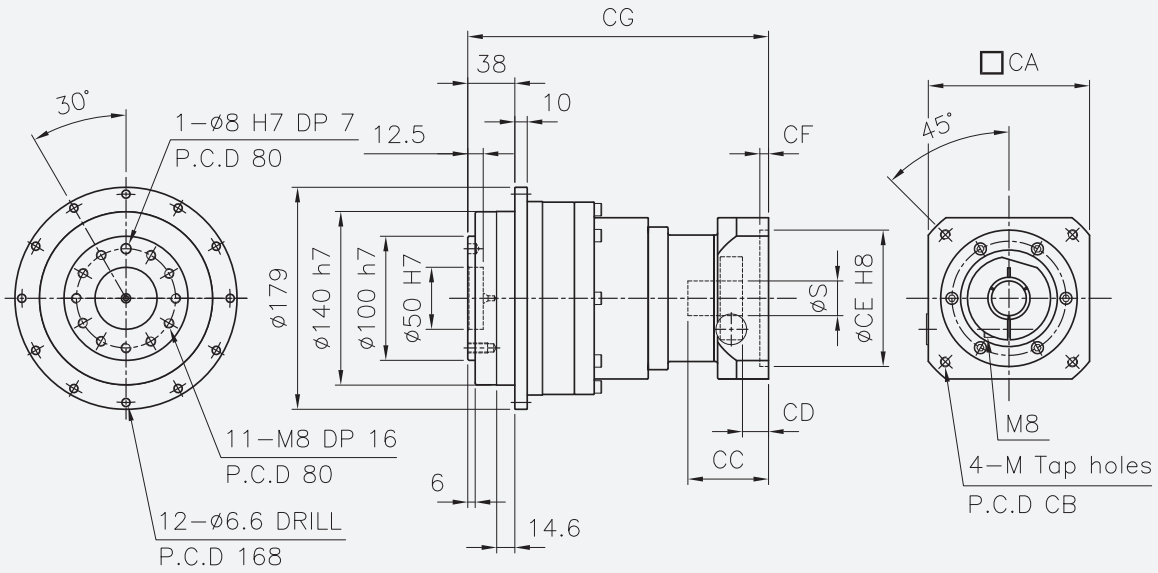
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
E18A	35	180	200	80	27	114.3	6	197.8	12
E13F	22	131	145	65	12	110	7	182.8	8
	24	131	145	65	12	110	7	182.8	8
	28	131	145	65	12	110	7	182.8	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NF140, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100



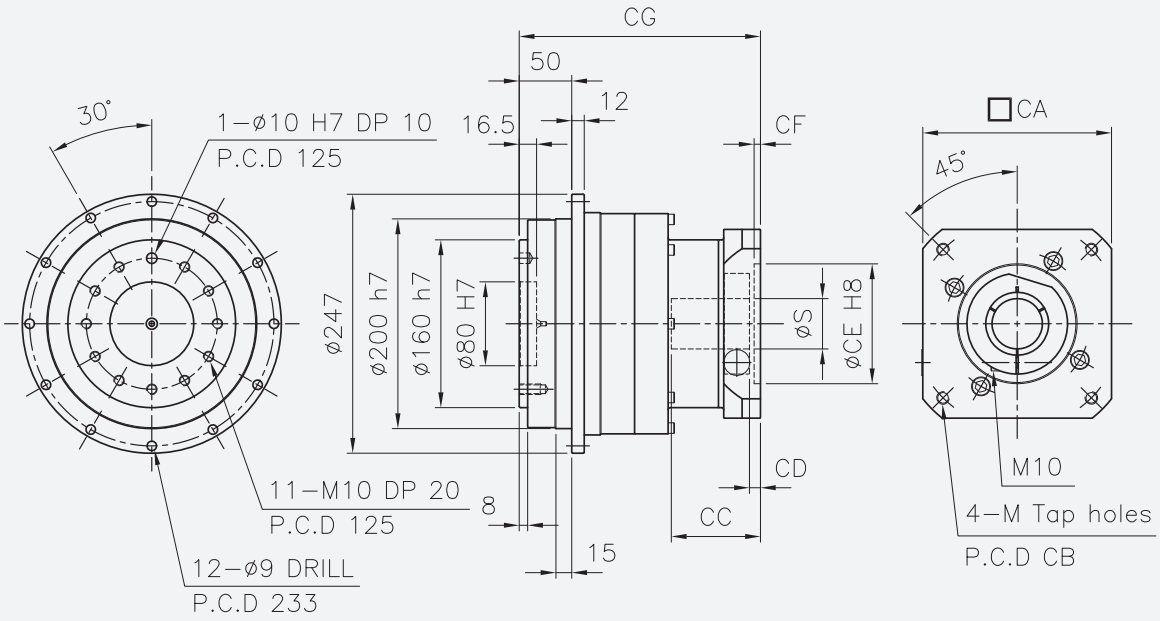
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
D13A	22	130	145	65	21	110	7	242.5	8
	24	130	145	65	21	110	7	242.5	8
	28	130	145	65	21	110	7	242.5	8
D10A	19	111	115	55	11	95	5	232.5	8
D10D	19	111	90	57	13	70	6	234.5	6
D10E	24	111	115	51	7	95	5	228.5	6
D10F	16	111	100	57	13	80	6	234.5	6
D12B	19	121	145	57	13	110	6	234.5	8

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NF200, 1-Stage, Ratio(i) = 5, 7, 10



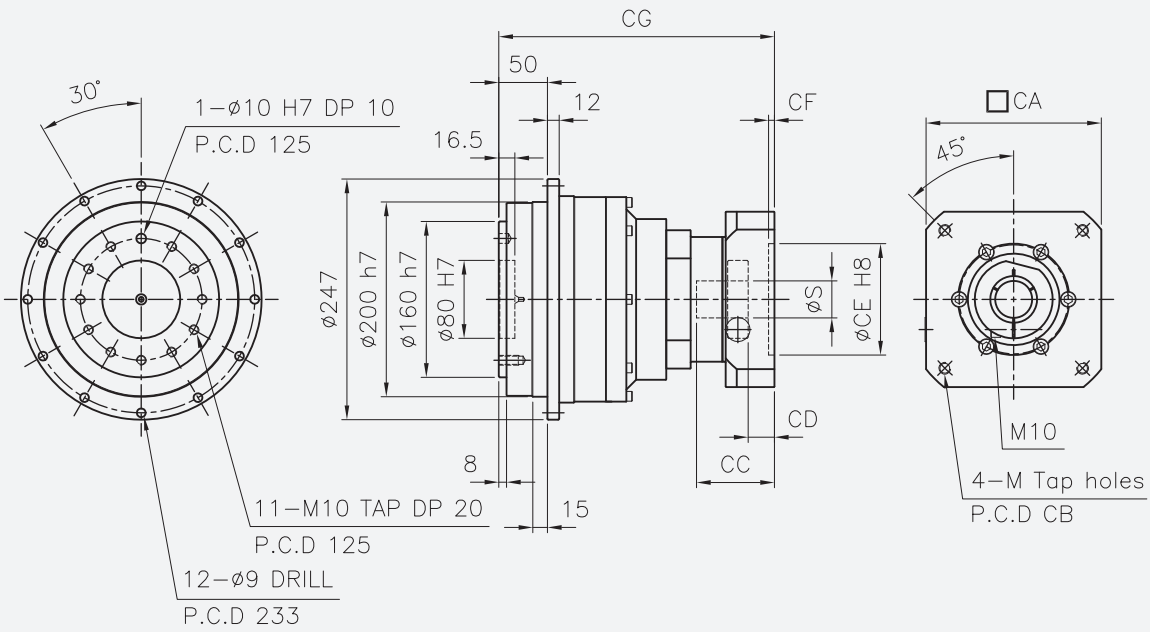
※ Max. input bore (ØSmax) = Ø48

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
F18A	35	180	200	85	10.5	114.3	6	230	12
F18B	42	180	200	113	38.5	114.3	6	258	12
F22B	42	220	235	116	41.5	200	10	261	12

1) For S dimension less than diameter 48, bushing from page 176 is provided.

Dimensions

NF200, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100



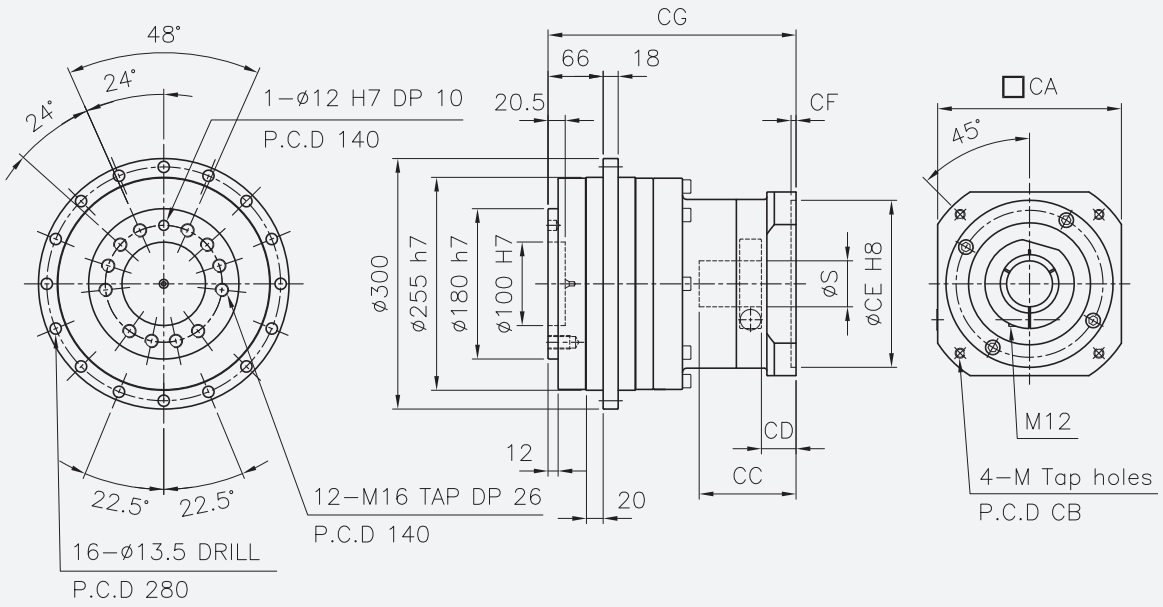
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
E18A	35	180	200	80	27	114.3	6	283	12
E13C	19	131	115	68	15	95	6	271	8
E13E	24	131	115	60	7	95	6	263	6
E13F	22	131	145	65	12	110	7	268	8
	24	131	145	65	12	110	7	268	8
	28	131	145	65	12	110	7	268	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NF255, 1-Stage, Ratio(i) = 5, 7, 10



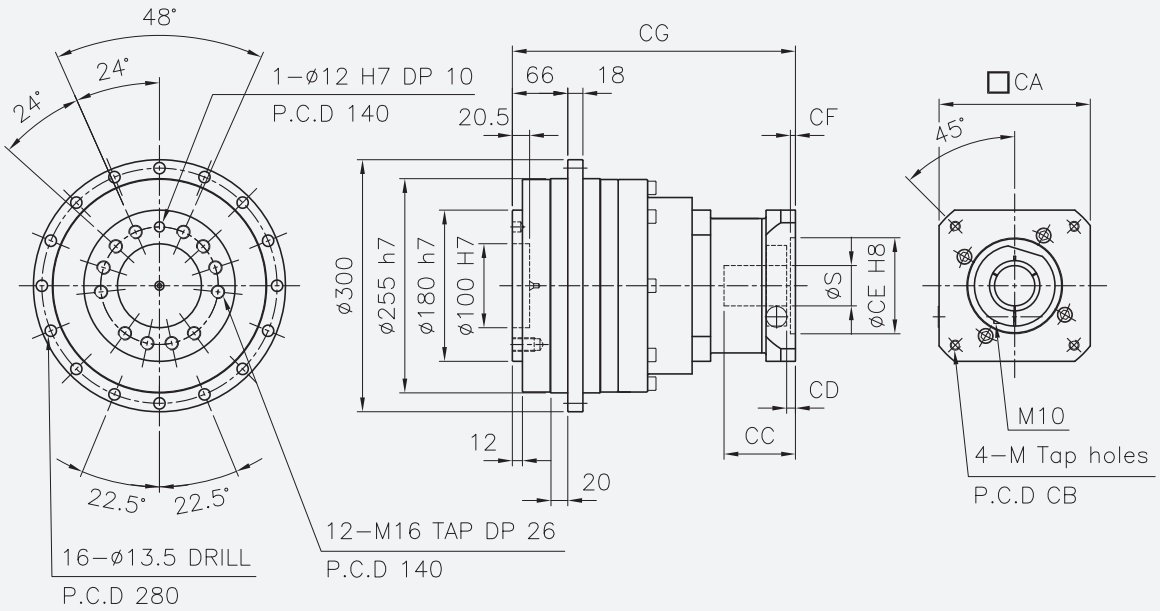
※ Max. input bore (ØSmax) = Ø55

Motor flange code	치수								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
G22A	55	220	235	116	41.5	200	6	297	12

1) For S dimension less than diameter 55, bushing from page 176 is provided.

Dimensions

NF255, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100



※ Max. input bore (ØSmax) = Ø48

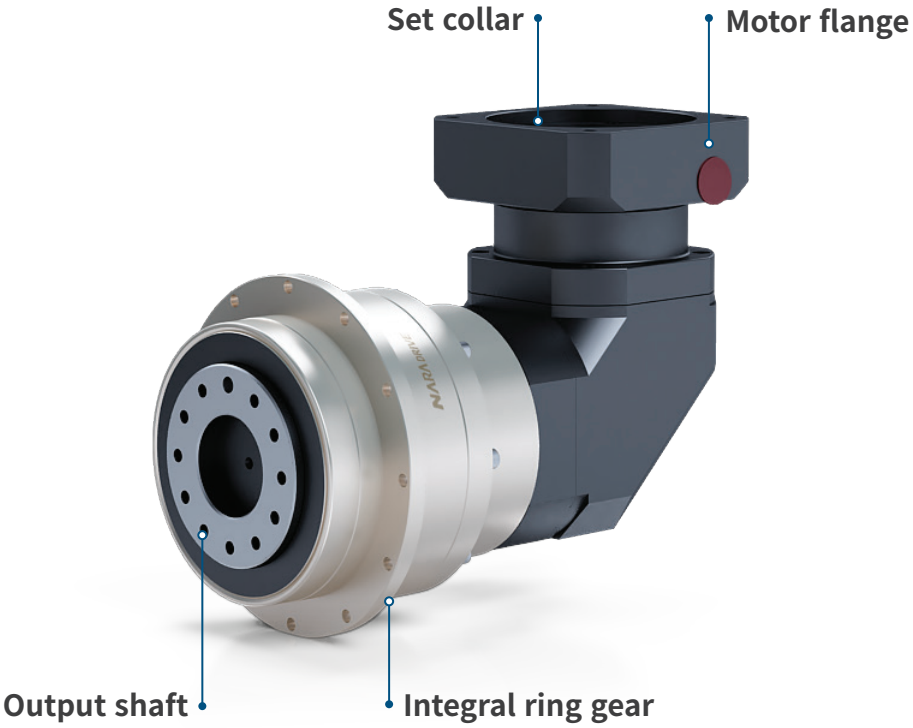
Motor flange code	Dimensions								
	S [1]	CA	CB	CC	CD	CE	CF	CG	M
F18A	35	180	200	85	10.5	114.3	6	337	12
F18B	42	180	200	113	38.5	114.3	6	365	12

1) For S dimension less than diameter 48, bushing from page 176 is provided.

NFR Series

- Low-noise, high-precision and right angle planetary gearbox with output flange and helical gear
- Space saving

Features



Low Noise
Low-noise is realized by using a helical gear that enables to provide smooth rotation.

High Rigidity
Ring gear directly gearing to provide compact, high rigidity and high torque.

High Precision
Enables high precision position control with precise backlash, and maximizes the characteristics of servo motor.

Long Life
No need for separate inspection or maintenance due to it's long service life.

Easy Mounting
Easy mounting of motor and gearbox due to corresponding of Set-collar and bushing to the output shaft of servo motor.

Herical Gearbox
Gearbox that uses helical gear and has a higher contact ratio than spur gear, it provides high torque and quiet operation.

Output Flange
Gearbox and application are mounted with output flange for high rigidity connection.

Space saving
By applying the bevel gear, the space of the application where the gearbox is installed is saved.

Specifications / Inertia

Specifications

Item	Unit	Stage	Ratio	NFR047	NFR064	NFR090	NFR110	NFR140	NFR200	NFR255
Nominal output torque (T_{2N}) [1]	Nm	1	5	9	36	84	195	390	720	1200
			7	11.4	30	84	180	330	660	1080
			10	8.4	24	60	138	270	540	900
			14	11.4	25.2	84	180	330	660	1080
			20	8.4	24	60	138	270	540	900
		2	25	9	36	84	195	390	720	1200
			35	11.4	30	84	180	330	660	1080
			50	8.4	36	84	138	390	720	1200
			70	11.4	30	84	180	330	660	1080
			100	8.4	24	60	138	270	540	900
			140	11.4	25.2	84	180	330	660	1080
			200	8.4	24	60	138	270	540	900
Maximum acceleration torque (T_{2B}) [2]	Nm	1,2	5~200	3 times of Nominal output torque(T_{2N})						
Emergency stop torque (T_{2E}) [3]	Nm	1,2	5~200	4 times of Nominal output torque(T_{2N})						
Nominal input speed (n_{1N}) [4]	rpm	1,2	5~200	3000	3000	3000	3000	3000	3000	2000
Maximum input speed (n_{1B}) [5]	rpm	1,2	5~200	6000	6000	5000	5000	5000	5000	4000
Precision backlash (P1)	arcmin	1	5~20	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		2	25~200	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Low backlash (P2)	arcmin	1	5~20	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		2	25~200	≤9	≤9	≤9	≤9	≤9	≤9	≤9
Standard backlash (P3)	arcmin	1	5~20	≤10	≤10	≤10	≤10	≤10	≤10	≤10
		2	25~200	≤12	≤12	≤12	≤12	≤12	≤12	≤12
Maximum tilting moment (M_{2kB}) [6]	Nm	1,2	5~200	21.6	33	132	283	419	1046	1540
Maximum axial load (F_{2aB}) [7]	N	1,2	5~200	910	1100	3320	5110	6880	13180	17050
Lifetime [8]	hr	1,2	5~200	20000						
Noise level [9]	dB(A)	1,2	5~200	≤65	≤68	≤70	≤72	≤74	≤76	≤78
Efficiency (η) [10]	%	1	5~20	≥93						
		2	25~200	≥88						
Weight [11]	kg	1	5~20	1.21	2.28	6.68	11.6	23	49	88
		2	25~200	1.39	1.93	4.88	11	21	44	83
Ambient temperature	°C	1,2	5~200	-15 to +40						
Permitted housing temperature	°C	1,2	5~200	+90						
Lubrication		1,2	5~200	Grease						
Degree of protection [12]		1,2	5~200	IP54 (IP65)						
Mounting position		1,2	5~200	All directions						

1) Nominal output torque is the allowable value of average load torque applied to the output shaft.
2) Maximum acceleration torque is the allowable value of startup/stop torque generated during operation.
3) Emergency stop torque is the allowable value of overload or shock load torque. (1000 times permitted during the lifetime of the gearbox)
4) Allowable value of average input speed.
5) Maximum input speed allowed intermittently. (Please contact NARA when using over the nominal input speed)
6) When the output speed is 100 rpm, the allowable value of the tilting moment is on the output shaft. For moment calculation, refer to page 175.
7) When the output speed is 100 rpm, the allowable value of the axial load is on the output shaft.
8) Lifetime during intermittent operation within nominal output torque and nominal input speed.
9) Representative value measured at a distance of 1m from a gearbox with a reduction ratio of 1/10 (1-stage) or 1/100 (2-stage) at the nominal input speed under no-load condition.
10) Efficiency at full load.
11) Weight is a representative value and depends on reduction ratio and applied motor.
12) Protection class IP65 is optional.

Inertia

Item	Unit	Stage	Ratio	NFR047	NFR064	NFR090	NFR110	NFR140	NFR200	NFR255
Mass moment of inertia (J_1)	kg·cm²	1	5	0.071	0.363	2.082	6.478	19.0	64.4	162.5
			7	0.066	0.339	1.979	5.976	17.7	57.4	148.0
			10	0.064	0.325	1.902	5.715	16.9	54.3	140.9
			14	0.050	0.249	1.239	4.127	10.7	30.5	71.8
			20	0.049	0.246	1.220	4.061	10.5	29.8	70.0
		2	25	0.068	0.279	0.349	2.064	6.3	18.6	58.0
			35	0.067	0.277	0.345	2.044	6.2	18.4	57.4
			50	0.063	0.272	0.321	1.885	5.7	16.8	52.6
			70	0.063	0.272	0.320	1.880	5.7	16.7	52.5
			100	0.063	0.272	0.319	1.878	5.6	16.7	52.4
			140	0.049	0.258	0.244	1.215	4.0	10.5	29.3
			200	0.049	0.258	0.244	1.214	4.0	10.5	29.3

Selection Table

1. Yaskawa Electric Corporation

(Notation example)
047 Gearbox Size(NFR) **(A04A)** Motor flange code

Σ-7 Series SGM7J

Servo Motor				Gearbox											
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)						
				5	7	10	14	20	25	35	50	70	100	140	200
50	SGM7J-A5A	3000	8	047(A04A)					047(A04A)						
100	SGM7J-01A	3000	8						064(A04A)				090(B06G)		110
150	SGM7J-C2A	3000	8					064(B06G)							
200	SGM7J-02A	3000	14	064(B06A)					090(B06A)				110(C09D)		140
400	SGM7J-04A	3000	14								110(C09D)		140		200
600	SGM7J-06A	3000	14				090(C09D)								
750	SGM7J-08A	3000	19	090(C09B)					110(C09B)		140(D10D)		200		255

Σ-7 Series SGM7A

Servo Motor				Gearbox											
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)						
				5	7	10	14	20	25	35	50	70	100	140	200
50	SGM7A-A5A	3000	8	047(A04A)					047(A04A)						
100	SGM7A-01A	3000	8						064(A04A)						110
150	SGM7A-C2A	3000	8					064(B06G)				090(B06G)			
200	SGM7A-02A	3000	14	064(B06A)					090(B06A)				110(C09D)		140
400	SGM7A-04A	3000	14								110(C09D)		140		200
600	SGM7A-06A	3000	14				090(C09D)								
750	SGM7A-08A	3000	19	090(C09B)					110(C09B)		140(D10D)		200		255
1000	SGM7A-10A	3000	19					110(D10D)							
1500	SGM7A-15A	3000	24	090(C10C)			110(D10E)		110(C10C)						
2000	SGM7A-20A	3000	24							140(D10E)			255		
2500	SGM7A-25A	3000	24					140(E13E)			200(E13E)				
3000	SGM7A-30A	3000	28	110(D13A)				140(E13F)	140(D13A)		200(E13F)		255	Consult us	
4000	SGM7A-40A	3000	28												
5000	SGM7A-50A	3000	28			140(E13F)		200			255				
7000	SGM7A-70A	3000	28												

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

(Notation example)
047 Gearbox Size(NFR)
(A06C) Motor flange code

Σ-7 Series SGM7P

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200
100	SGM7P-01A	3000	8	047(A06C)					047(A06C)		064(A06C)		090(B06A)		110
200	SGM7P-02A	3000	14						090(B08B)						
400	SGM7P-04A	3000	14	064(B08B)				090(C09B)			110(C09B)				140
750	SGM7P-08A	3000	19						110(C13C)				140(D12B)		200
1500	SGM7P-15A	3000	19	090(C13C)				110(D12B)			140(D12B)	200			255

Σ-7 Series SGM7G

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200
0.3	SGM7G-03A	1500	16						090(B09C)		110(C09J)		140(D10F)		200
0.45	SGM7G-05A	1500	16	064(B09C)		090(C09J)				110(C09J)	140(D10F)		200		255
0.85	SGM7G-09A	1500	24					110(D13A)	110(C13A)					255	
1.3	SGM7G-13A	1500	24	090(C13A)		110(D13A)		140(E13F)	140(D13A)		200(E13F)		255		
1.8	SGM7G-20A	1500	24									255			
2.9	SGM7G-30A	1500	35	140(E18A)				200(F18A)	200(E18A)		255(F18A)				
4.4	SGM7G-44A	1500	35			200(F18A)		255	255(F18A)						
5.5	SGM7G-55A	1500	42	200(F18B)				255	255(F18B)						
7.5	SGM7G-75A	1500	42				255								
11	SGM7G-1AA	1500	42	200(F22B)		255(G22A)									
15	SGM7G-1EA	1500	55	255(G22A)											

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

2. Mitsubishi Electric Corporation

(Notation example)
047 Gearbox Size(NFR) | **(A04A)** Motor flange code

MELSERVO-J4 Series HG-KR

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200
50	HG-KR053(B)	3000	8	047(A04A)					047(A04A)						
100	HG-KR13(B)	3000	8						064(A04A)				090(B06G)	110	
200	HG-KR23(B)	3000	14	064(B06A)					090(B06A)				110(C09D)	140	
400	HG-KR43(B)	3000	14					090(C09D)			110(C09D)		140	200	
750	HG-KR73(B)	3000	19	090(C09B)					110(C09B)		140(D10D)		200	255	

MELSERVO-J4 Series HG-MR

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200
50	HG-MR053(B)	3000	8	047(A04A)					047(A04A)				064(A04A)		090(B06G)
100	HG-MR13(B)	3000	8								064(A04A)		090(B06G)	110	
200	HG-MR23(B)	3000	14	064(B06A)					090(B06A)						
400	HG-MR43(B)	3000	14					090(C09D)			110(C09D)			140	
750	HG-MR73(B)	3000	19	090(C09B)					110(C09B)				140(D10D)	200	

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200
0.5	HG-SR52(B)	2000	24	090(C13A)					110(C13A)				140(D13A)	200(E13F)	
1	HG-SR102(B)	2000	24					110(D13A)				200(E13F)			
1.5	HG-SR152(B)	2000	24			110(D13A)		140(E13F)		140(D13A)			255		
2	HG-SR202(B)	2000	35	140(E18A)								255(F18A)			
3.5	HG-SR352(B)	2000	35						200(E18A)						
5	HG-SR502(B)	2000	35				200(F18A)			255(F18A)			Consult us		
7	HG-SR702(B)	2000	35					255	255(F18A)						

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

3. Panasonic Corporation

(Notation example)
047 Gearbox Size(NFR) | **(A04B)** Motor flange code

A5 Series MSME

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200	
50	MSME 5A	3000	8	047(A04B)					047(A04B)				064(A04B)		090(B06H)	
100	MSME 01	3000	8								064(A04B)		090(B06H)		110	
200	MSME 02	3000	11	047(A06A)				064(B06B)	064(A06A)			090(B06B)	110			
400	MSME 04	3000	14	064(B06B)				090(C09H)	090(B06B)			110(C09H)		140		
750	MSME 08	3000	19	090(C09C)					110(C09C)				140	200		
1000	MSME 10	3000	19	090(C10A)					110(C10A)		140(D10A)				255	
1500	MSME 15	3000	19									200				
2000	MSME 20	3000	19			110(D10A)							255			
3000	MSME 30	3000	22	090(C13A)		110(D13A)		140(E13F)	140(D13A)	200(E13F)		255	Consult us			
4000	MSME 40	3000	24	090(C13B)	110(D13A)			140(E13F)	140(D13A)			255				
5000	MSME 50	3000	24			140(E13F)		200	200(E13F)		255					

A5 Series MSMD

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200	
50	MSMD 5A	3000	8	047(A04B)					047(A04B)				064(A04B)		090(B06H)	
100	MSMD 01	3000	8								064(A04B)		090(B06H)		110	
200	MSMD 02	3000	11	047(A06A)				060(B06B)	064(A06A)			090(B06B)	110			
400	MSMD 04	3000	14	064(B06B)				090(C09H)	090(B06B)		110(C09H)			140		
750	MSMD 08	3000	19	090(C09C)					110(C09C)				140	200		

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

(Notation example)

047 Gearbox Size(NFR) | **(A06A)** Motor flange code

A5 Series MHMD

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200
200	MHMD 02	3000	11	047(A06A)				064(B06B)	064(A06A)			090(B06B)	110		
400	MHMD 04	3000	14	064(B06B)				090(C09H)	090(B06B)		110(C09H)			140	
750	MHMD 08	3000	19	090(C09C)					110(C09C)				140	200	

A5 Series MDME

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200
1	MDME 10	2000	22	090(C13A)		110(D13A)		110(D13A)	110(C13A)			200(E13F)			
1.5	MDME 15	2000	22					140(E13F)		140(D13A)			255		
2	MDME 20	2000	22						140(D13A)	200(E13F)		255			
3	MDME 30	2000	24	090(C13B)	110(D13A)	140(E13F)		200	140(D13A)	200(E13F)		255			
4	MDME 40	2000	35	140(E18A)			200(F18A)		200(E18A)	255(F18A)					
5	MDME 50	2000	35												
7.5	MDME 75	1500	42	200(F18B)			255		255(F18B)			Consult us			
11	MDME C1	1500	55	255(G22A)											
15	MDME C5	1500	55												

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

4. Omron Corporation

(Notation example)
047 Gearbox Size(NFR) | **(A04A)** Motor flange code

G5 Series R88M-K (AC200V)

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200	
50	05030 H/T	3000	8	047(A04A)					047(A04A)				064(A04A)		090(B06G)	
100	10030 H/T	3000	8								064(A04A)		090(B06G)		110	
200	20030 H/T	3000	11	047(A06A)				064(B06B)	064(A06A)			090(B06B)	110			
400	40030 H/T	3000	14	064(B06B)				090(C09H)	090(B06B)		110(C09H)			140		
750	75030 H/T	3000	19	090(C09C)					110(C09C)		110(C09C)		140	200		
1000	1K030 H/T	3000	19	090(C10A)					110(C10A)						255	
1500	1K530 H/T	3000	19									200		225		
2000	2K030 H/T	3000	19			110(D10A)				140(D10A)						
3000	3K030 H/T	3000	22	090(C13A)		110(D13A)		140(E13F)	140(D13A)	200(E13F)		255				
4000	4K030 H/T	3000	24	090(C13B)	110(D13A)			140(E13F)	140(D13A)			255	Consult us			
5000	5K030 H/T	3000	24			140(E13F)		200	200(E13F)		255					

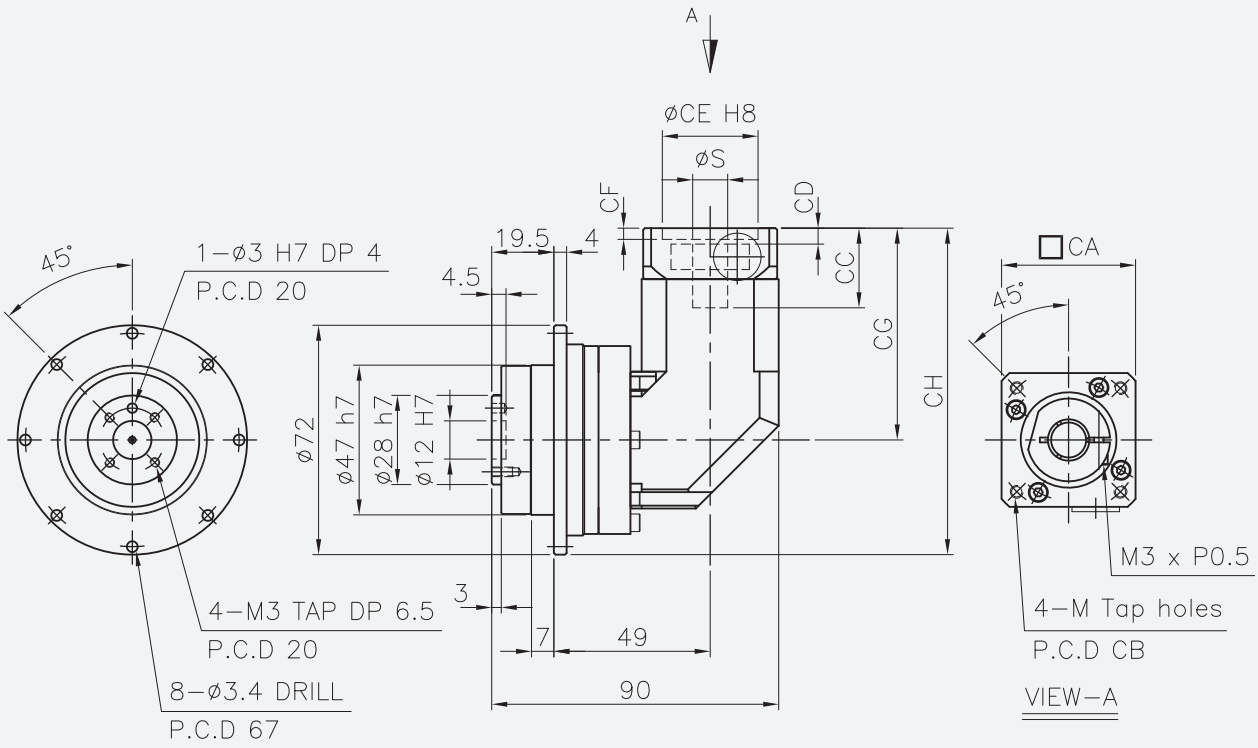
G5 Series R88M-K (AC400V)

Servo Motor				Gearbox												
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)					Ratio (2-Stage)							
				5	7	10	14	20	25	35	50	70	100	140	200	
750	75030 F/C	3000	19	090(C10A)					110(C10A)				140(D10A)			
1000	1K030 F/C	3000	19								140(D10A)				255	
1500	1K530 F/C	3000	19									200		255		
2000	2K030 F/C	3000	19			110(D10A)										
3000	3K030 F/C	3000	22	090(C13A)		110(D13A)		140(E13F)	140(D13A)	200(E13F)		255				
4000	4K030 F/C	3000	24	090(C13B)	110(D13A)			140(E13F)	140(D13A)			255	Consult us			
5000	5K030 F/C	3000	24			140(E13F)		200	200(E13F)		255					

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Dimensions

NFR047, 1-Stage, Ratio(i) = 5, 7, 10, 14, 20



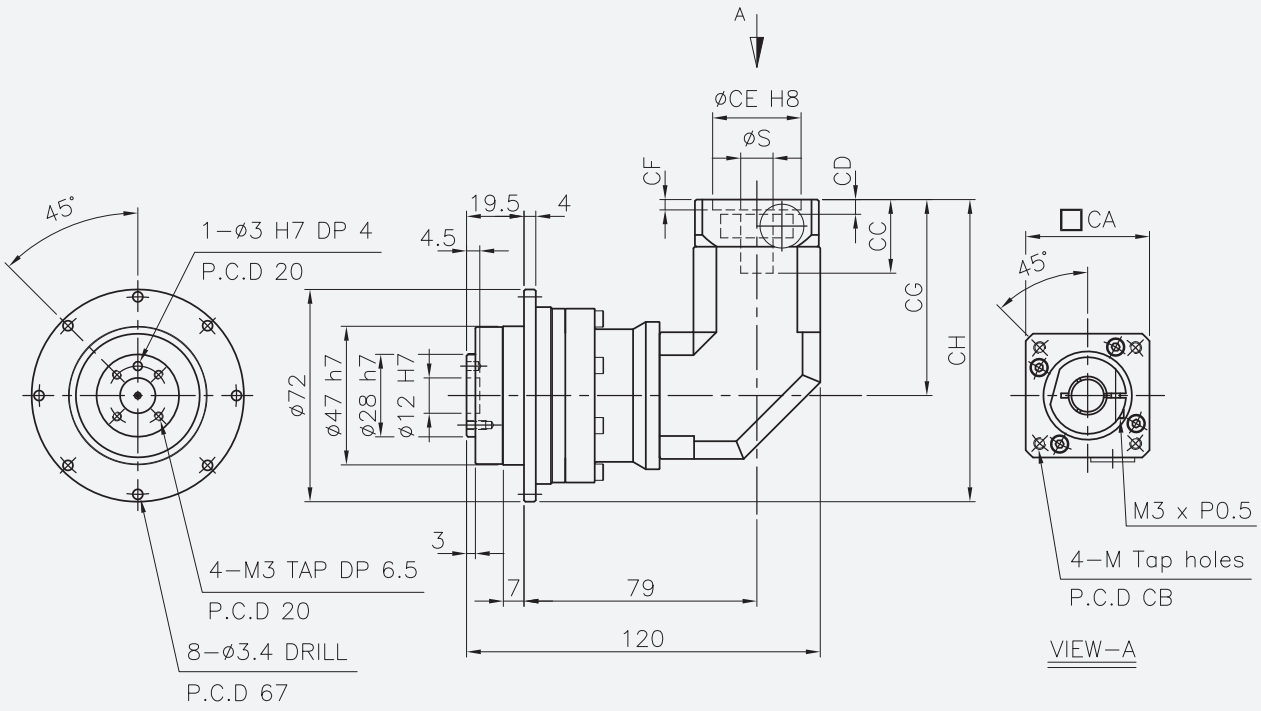
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
A04A	8	42	46	25	5	30	3.5	66.5	102.5	4
A04B	8	42	45	25	5	30	3.5	66.5	102.5	3
A06A	11	60	70	30	10	50	8	71.5	107.5	4
A06C	8	60	70	30	10	50	8	71.5	107.5	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NFR047, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100, 140, 200



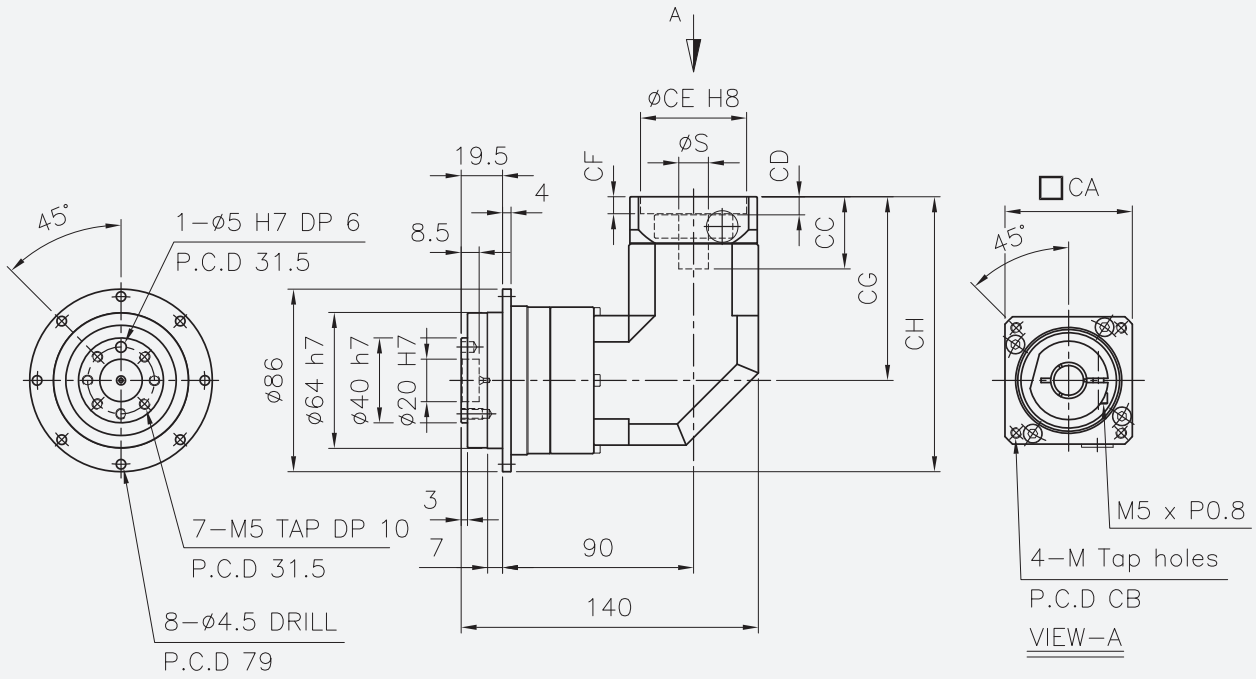
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
A04A	8	42	46	25	5	30	3.5	66.5	102.5	4
A04B	8	42	45	25	5	30	3.5	66.5	102.5	3
A06A	11	60	70	30	10	50	8	71.5	107.5	4
A06C	8	60	70	30	10	50	8	71.5	107.5	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NFR064, 1-Stage, Ratio(i) = 5, 7, 10, 14, 20



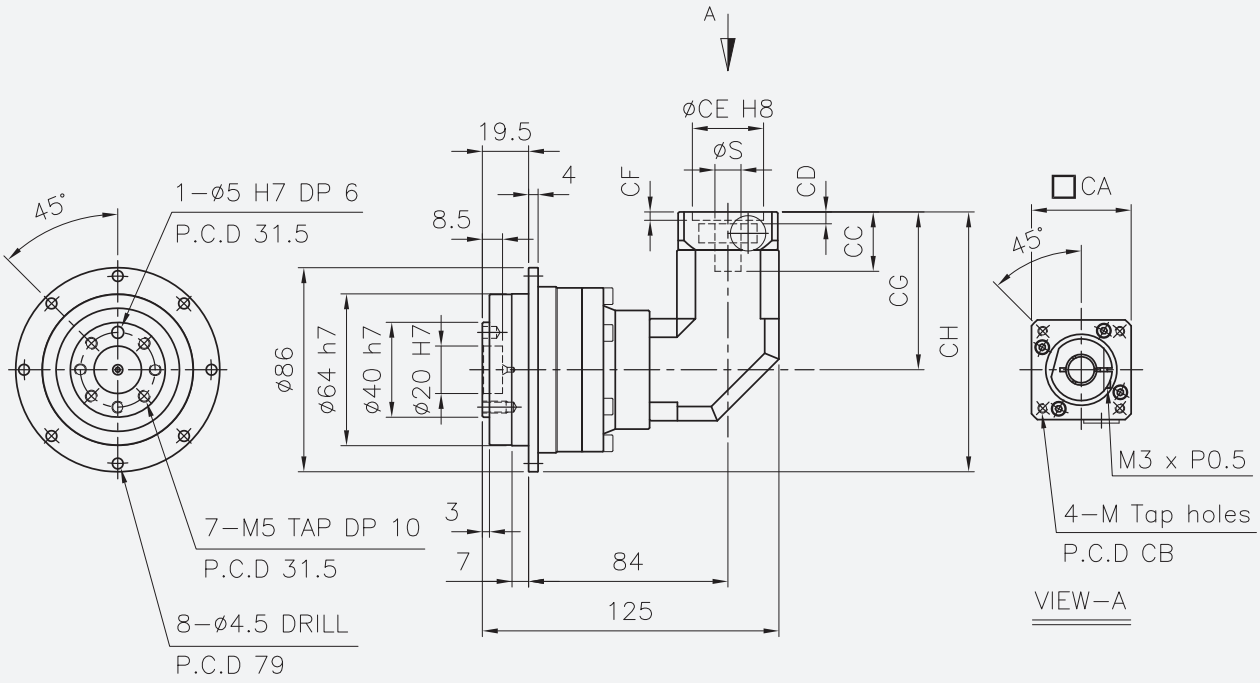
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
B06A	14	60	70	34	8.5	50	8	86.5	129.5	5
B06B	14	60	70	34	8.5	50	8	86.5	129.5	4
B06G	8	60	46	35	9.5	30	8	87.5	130.5	4
B08B	14	80	90	40	14.5	70	5	92.5	135.5	6
B09C	16	90	100	40	14.5	80	11	92.5	135.5	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NFR064, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100, 140, 200



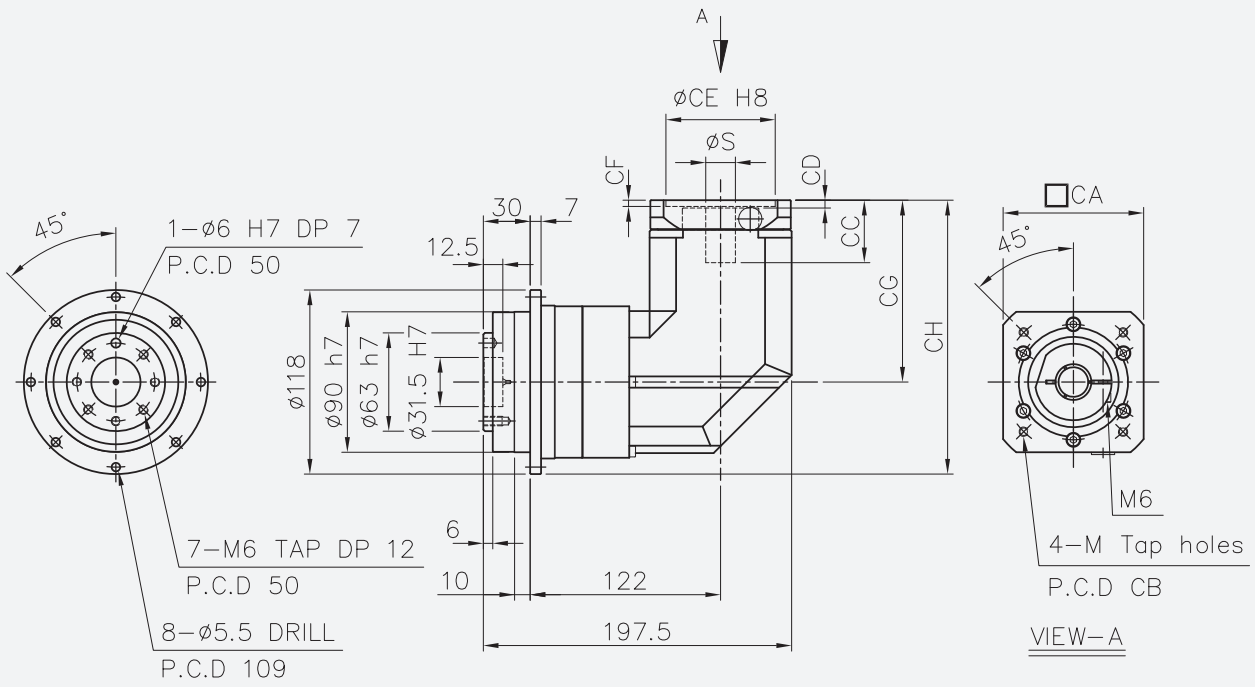
※ Max. input bore (ØSmax) = Ø12

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
A04A	8	42	46	25	5	30	3.5	66.5	109.5	4
A04B	8	42	45	25	5	30	3.5	66.5	109.5	3
A06A	11	60	70	30	10	50	8	71.5	114.5	4
A06C	8	60	70	30	10	50	8	71.5	114.5	5

1) For S dimension less than diameter 11, bushing from page 176 is provided.
For S dimension 12, input shaft is supplied as an option.

Dimensions

NFR090, 1-Stage, Ratio(i) = 5, 7, 10, 14, 20



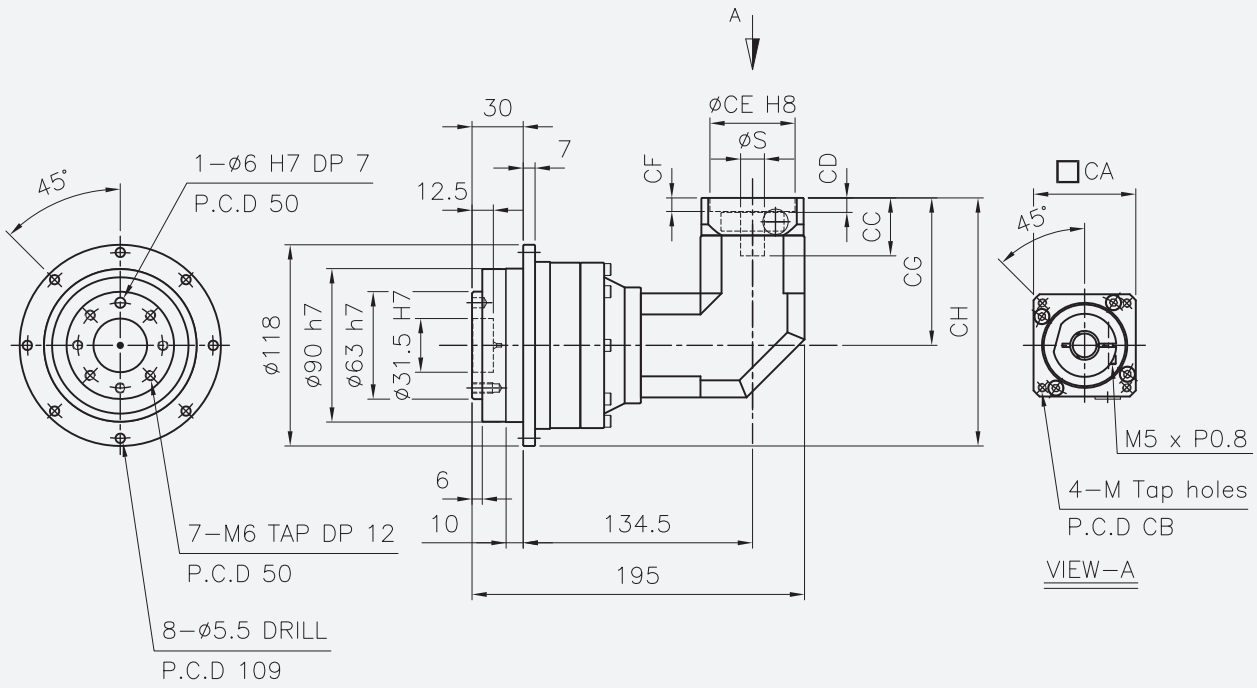
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
C09B	19	90	90	40	5	70	4	116.5	175.5	6
C09C	19	90	90	40	5	70	4	116.5	175.5	5
C09D	14	90	70	43.5	8.5	50	6	120	179	5
C09H	14	90	70	43.5	8.5	50	6	120	179	4
C09J	16	90	100	48	13	80	6	124.5	183.5	6
C10A	19	101	115	55	20	95	7	131.5	190.5	8
C10C	24	101	115	45	10	95	5	121.5	180.5	6
C13A	22	130	145	58	23	110	7	134.5	193.5	8
	24	130	145	58	23	110	7	134.5	193.5	8
C13B	24	131	145	70	35	110	8	146.5	205.5	8
C13C	19	131	145	48	13	110	7	124.5	183.5	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NFR090, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100, 140, 200



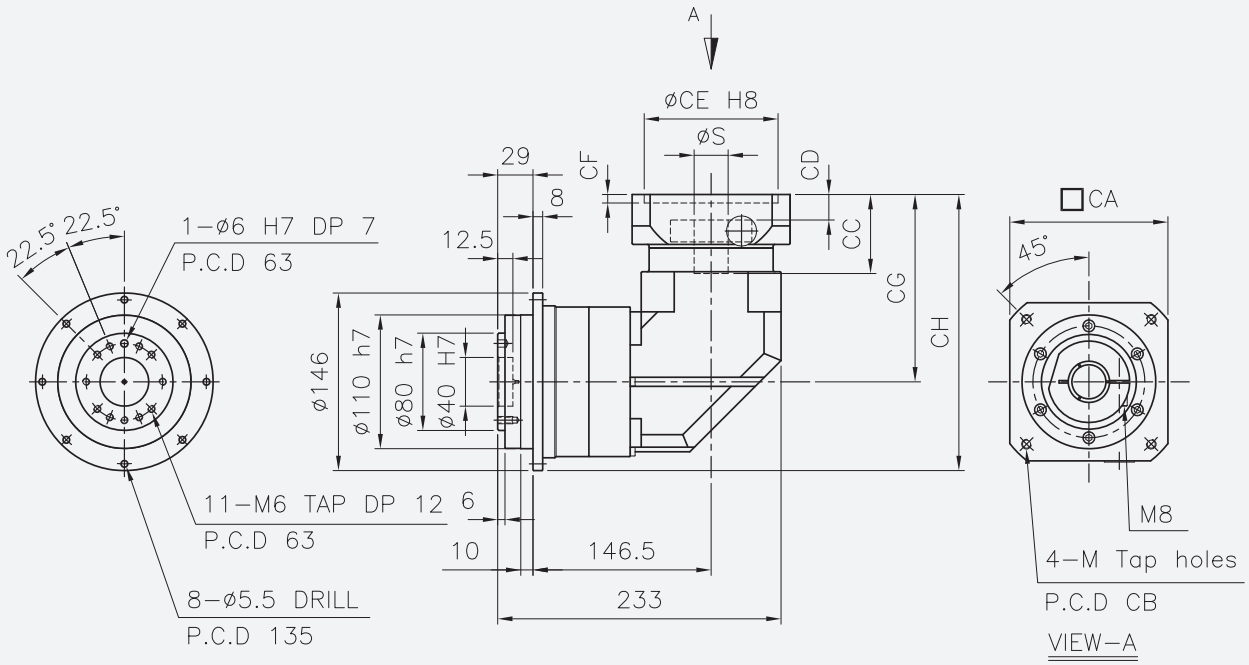
※ Max. input bore (ØSmax) = Ø16

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
B06A	8	60	70	34	8.5	50	8	86.5	145.5	5
	14	60	70	34	8.5	50	8	86.5	145.5	5
B06B	11	60	70	34	8.5	50	8	86.5	145.5	4
	14	60	70	34	8.5	50	8	86.5	145.5	4
B06G	8	60	46	35	9.5	30	8	87.5	146.5	4
B06H	8	60	45	35	9.5	30	8	87.5	146.5	3
B08B	14	80	90	40	14.5	70	5	92.5	151.5	6
B09C	16	90	100	40	14.5	80	11	92.5	151.5	6

1) For S dimension less than diameter 14, bushing from page 176 is provided.
For S dimension 16, input shaft is supplied as an option.

Dimensions

NFR110, 1-Stage, Ratio(i) = 5, 7, 10, 14, 20



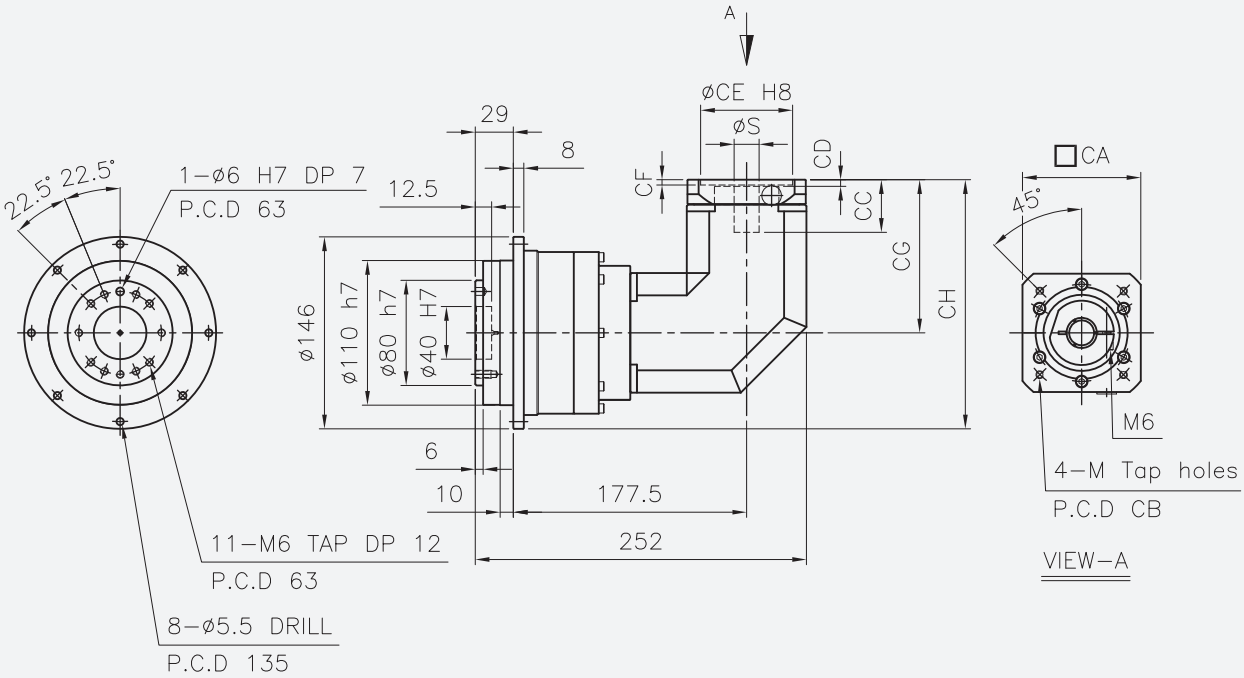
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
D10D	19	111	90	57	13	70	6	146	219	6
D12B	19	121	145	57	13	110	6	146	219	8
D13A	22	130	145	65	21	110	7	154	227	8
	24	130	145	65	21	110	7	154	227	8
	28	130	145	65	21	110	7	154	227	8
D10A	19	111	115	55	11	95	5	144	217	8
D10E	24	111	115	51	7	95	5	140	213	6

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NFR110, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100, 140, 200



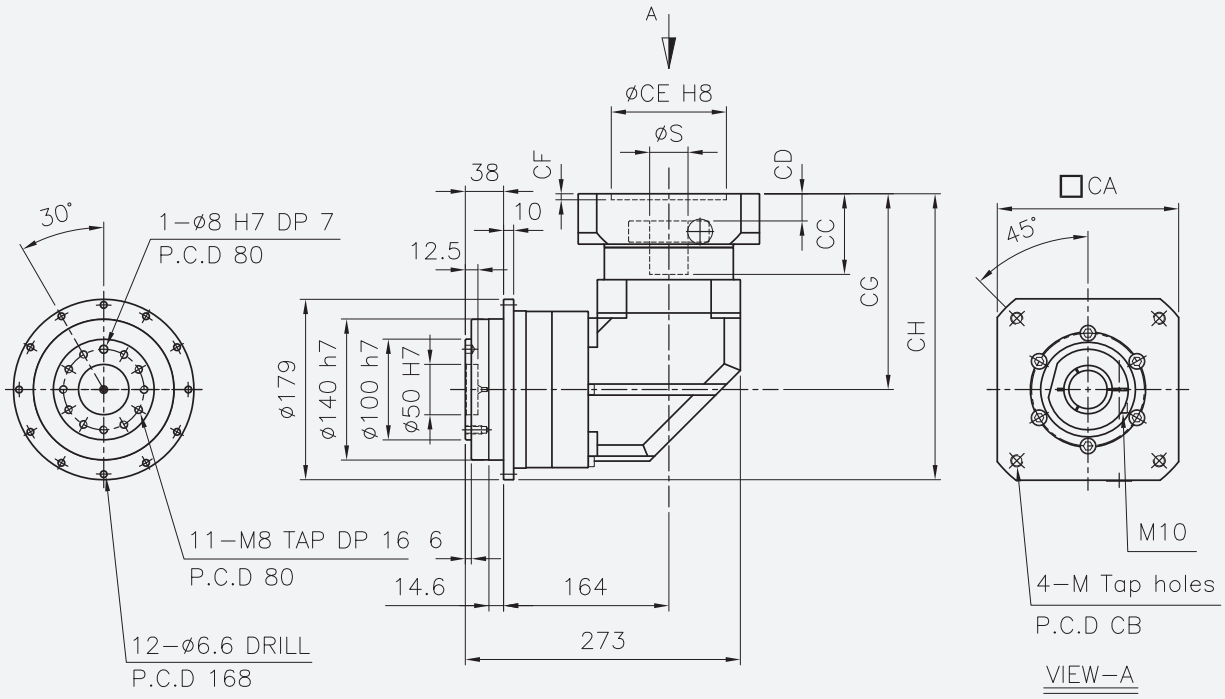
※ Max. input bore (ØSmax) = Ø24

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
C09B	14	90	90	40	5	70	4	116.5	189.5	6
	19	90	90	40	5	70	4	116.5	189.5	6
C09C	19	90	90	40	5	70	4	116.5	189.5	5
C09D	14	90	70	43.5	8.5	50	6	120	193	5
C09H	14	90	70	43.5	8.5	50	6	120	193	4
C09J	16	90	100	48	13	80	6	124.5	197.5	6
C10A	19	101	115	55	20	95	7	131.5	204.5	8
C10C	24	101	115	45	10	95	5	121.5	194.5	6
C13A	22	130	145	58	23	110	7	134.5	207.5	8
	24	130	145	58	23	110	7	134.5	207.5	8
C13C	19	131	145	48	13	110	7	124.5	197.5	8

1) For S dimension less than diameter 19, bushing from page 176 is provided.
For S dimension 22, optional input shaft and bushing from page 176 is provided.
For S dimension 24, input shaft is supplied as an option.

Dimensions

NFR140, 1-Stage, Ratio(i) = 5, 7, 10, 14, 20



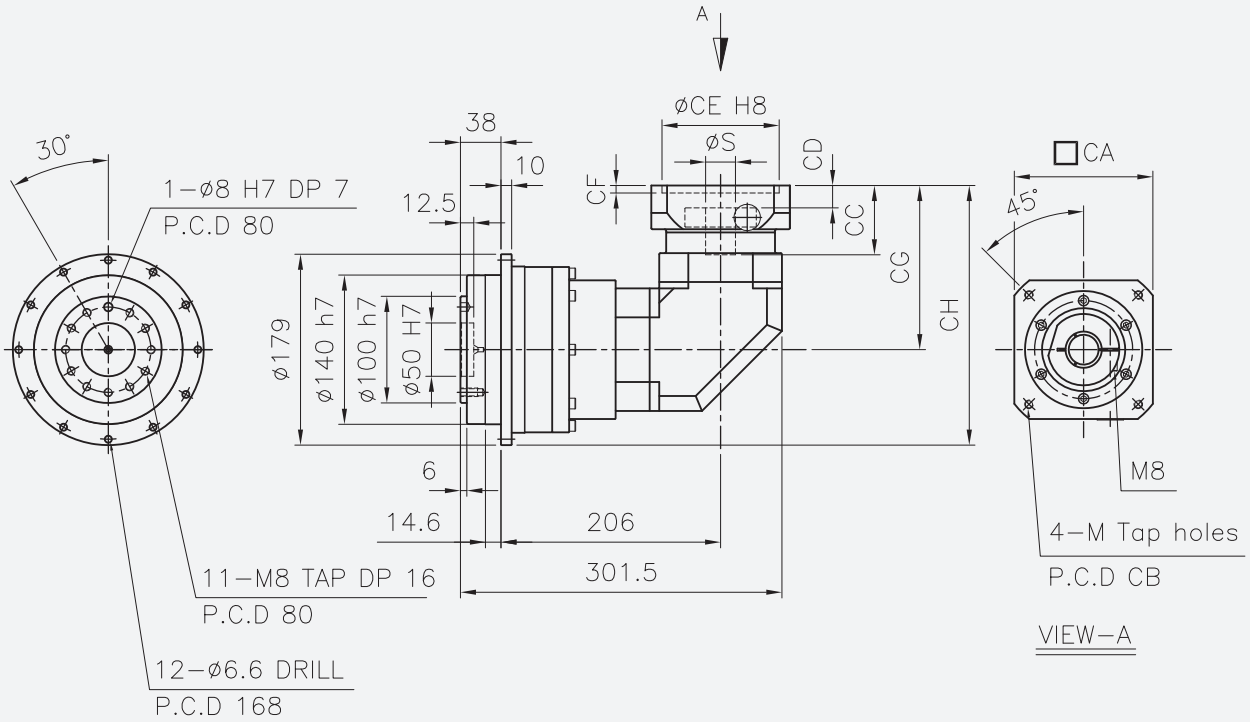
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
E18A	35	180	200	80	27	114.3	6	194.3	283.8	12
E13E	24	131	115	60	7	95	6	174.3	263.8	6
E13F	22	131	145	65	12	110	7	179.3	268.8	8
	24	131	145	65	12	110	7	179.3	268.8	8
	28	131	145	65	12	110	7	179.3	268.8	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NFR140, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100, 140, 200



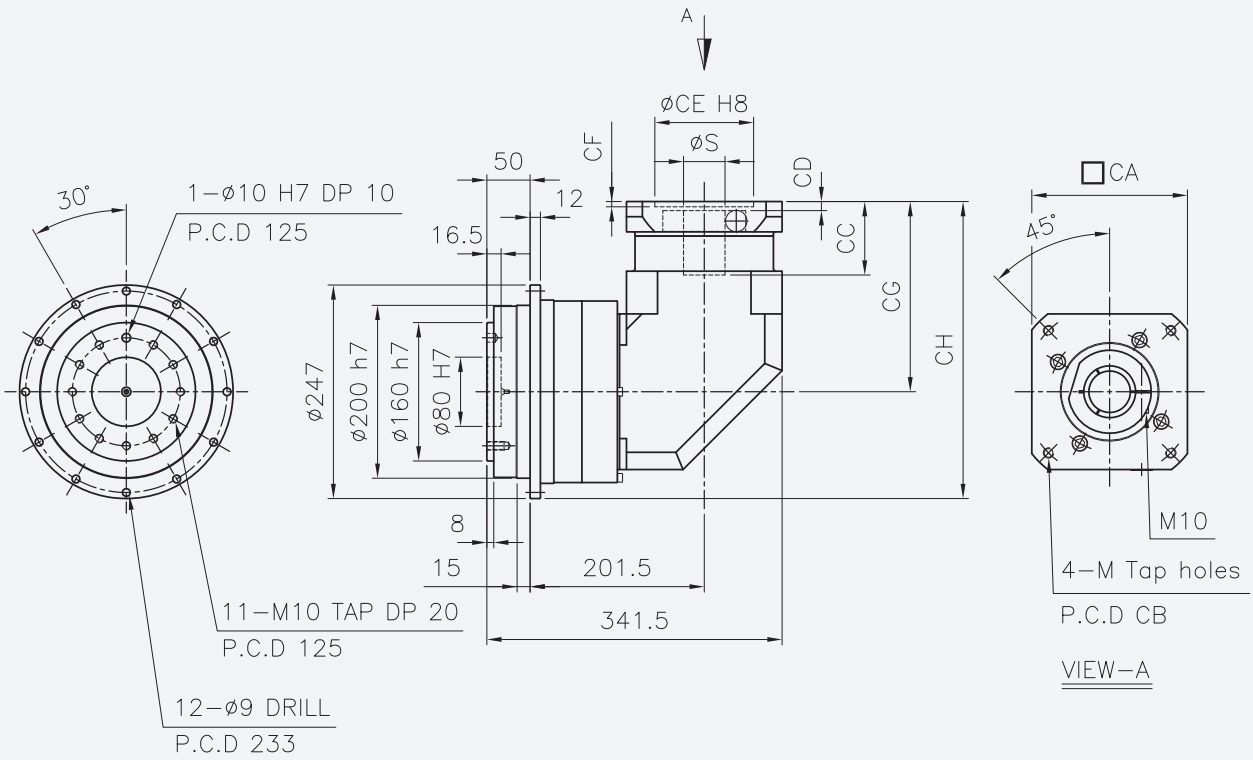
※ Max. input bore (ØSmax) = Ø32

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
D13A	22	130	145	65	21	110	7	154	243.5	8
	24	130	145	65	21	110	7	154	243.5	8
	28	130	145	65	21	110	7	154	243.5	8
D10A	19	111	115	55	11	95	5	144	233.5	8
D10D	19	111	90	57	13	70	6	146	235.5	6
D10E	24	111	115	51	7	95	5	140	229.5	6
D10F	16	111	100	57	13	80	6	146	235.5	6
D12B	19	121	145	57	13	110	6	146	235.5	8

1) For S dimension less than diameter 28, bushing from page 176 is provided.
For S dimension 32, input shaft is supplied as an option.

Dimensions

NFR200, 1-Stage, Ratio(i) = 5, 7, 10, 14, 20



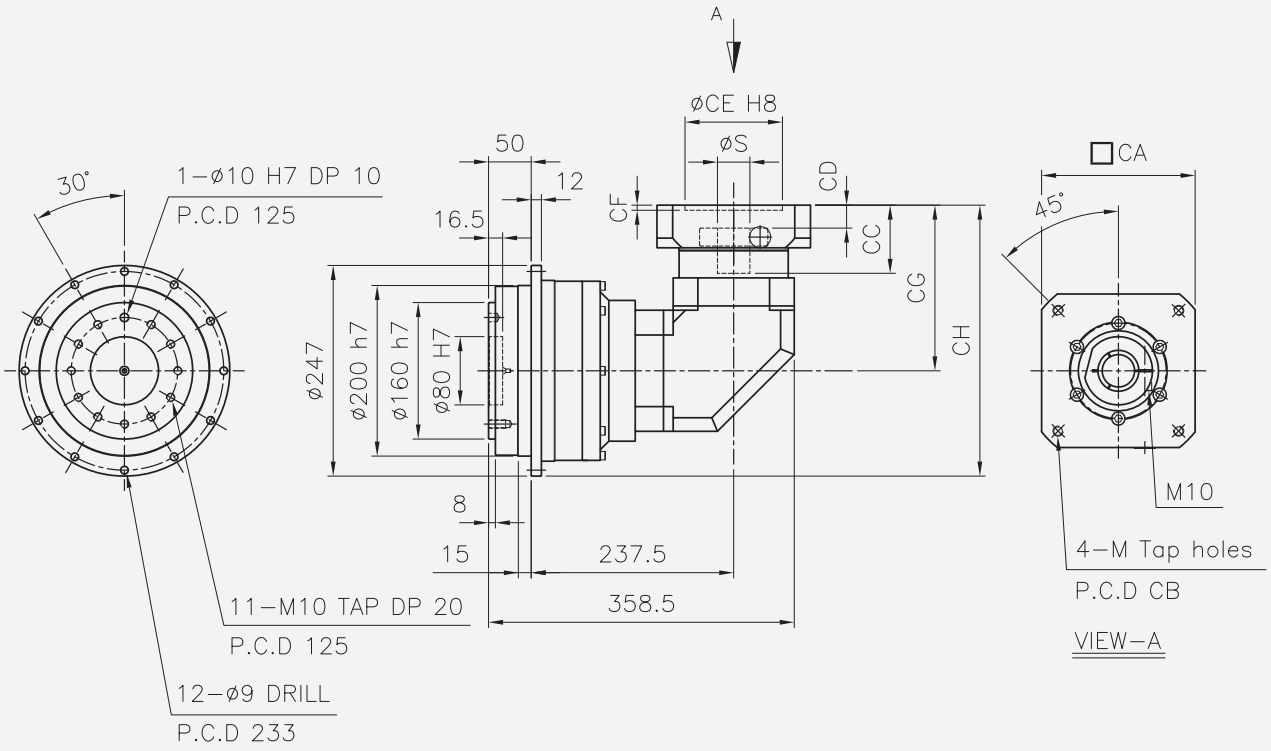
※ Max. input bore (ØSmax) = Ø48

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
F18A	35	180	200	85	10.5	114.3	6	220	343.5	12
F18B	42	180	200	113	38.5	114.3	6	248	371.5	12
F22B	42	220	235	116	41.5	200	10	251	374.5	12

1) For S dimension less than diameter 48, bushing from page 176 is provided.

Dimensions

NFR200, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100, 140, 200



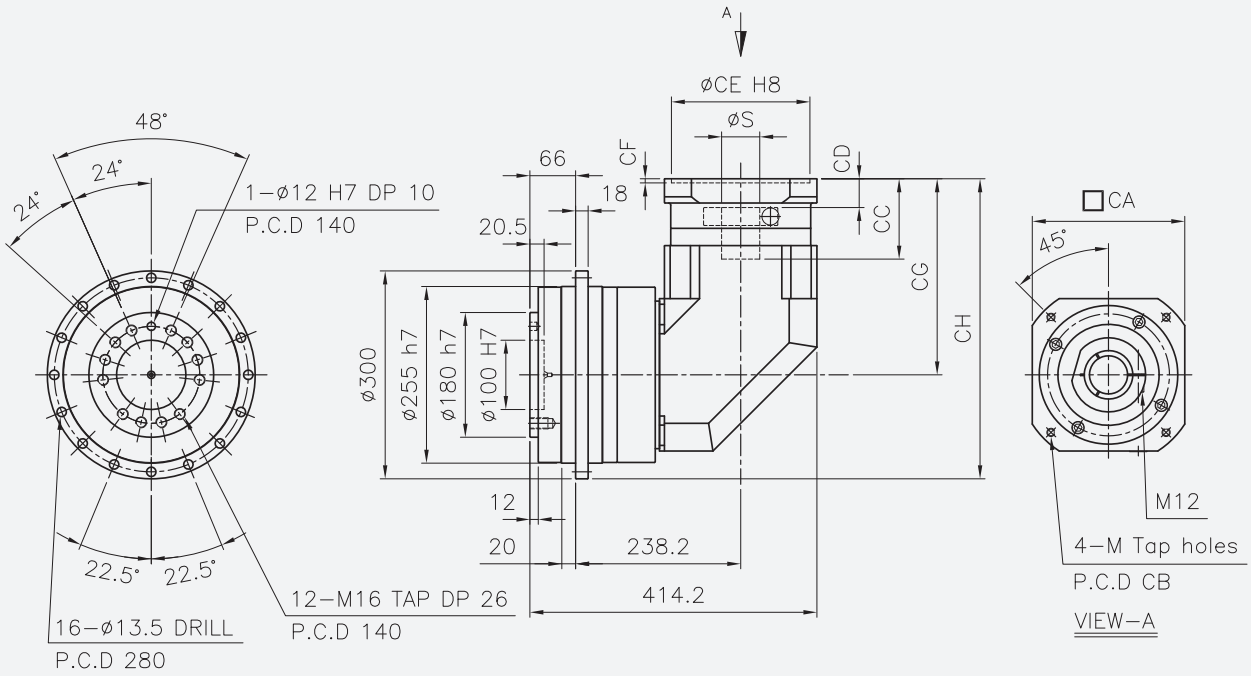
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
E18A	35	180	200	80	27	114.3	6	194.3	317.8	12
E13C	19	131	115	68	15	95	6	182.3	305.8	8
E13E	24	131	115	60	7	95	6	174.3	297.8	6
E13F	22	131	145	65	12	110	7	179.3	302.8	8
	24	131	145	65	12	110	7	179.3	302.8	8
	28	131	145	65	12	110	7	179.3	302.8	8

1) For S dimension less than diameter 38, bushing from page 176 is provided.

Dimensions

NFR255, 1-Stage, Ratio(i) = 5, 7, 10, 14, 20



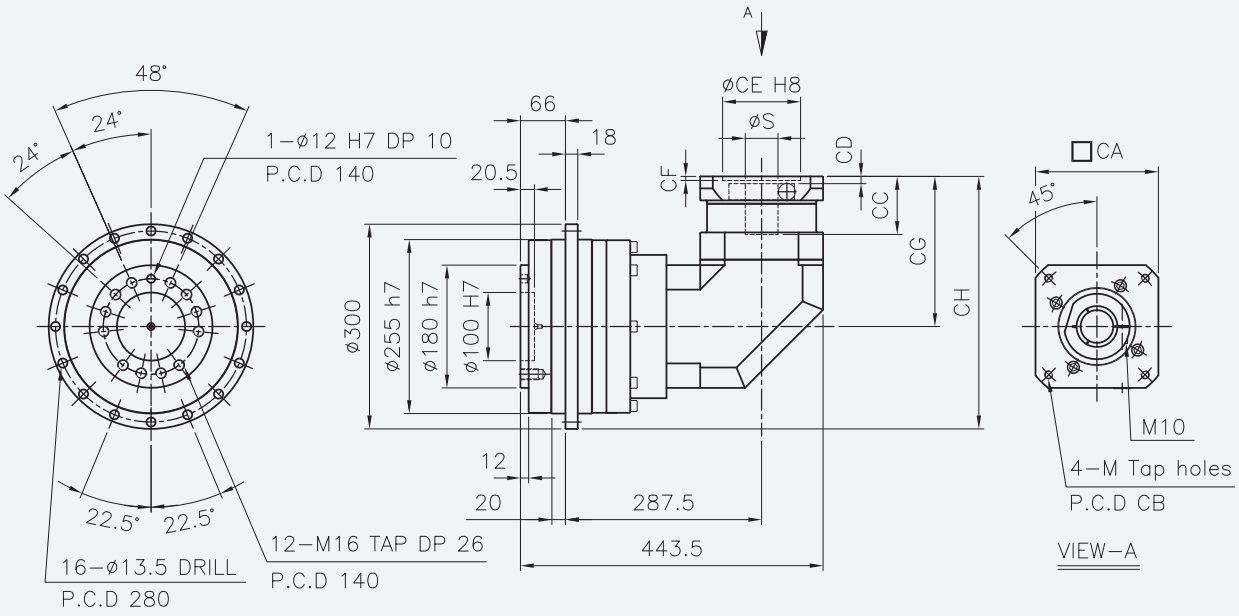
※ Max. input bore (ØSmax) = Ø55

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
G22A	55	220	235	116	41.5	200	6	283	433	12

1) For S dimension less than diameter 55, bushing from page 176 is provided.

Dimensions

NFR255, 2-Stage, Ratio(i) = 25, 35, 50, 70, 100, 140, 200



※ Max. input bore (ØSmax) = Ø48

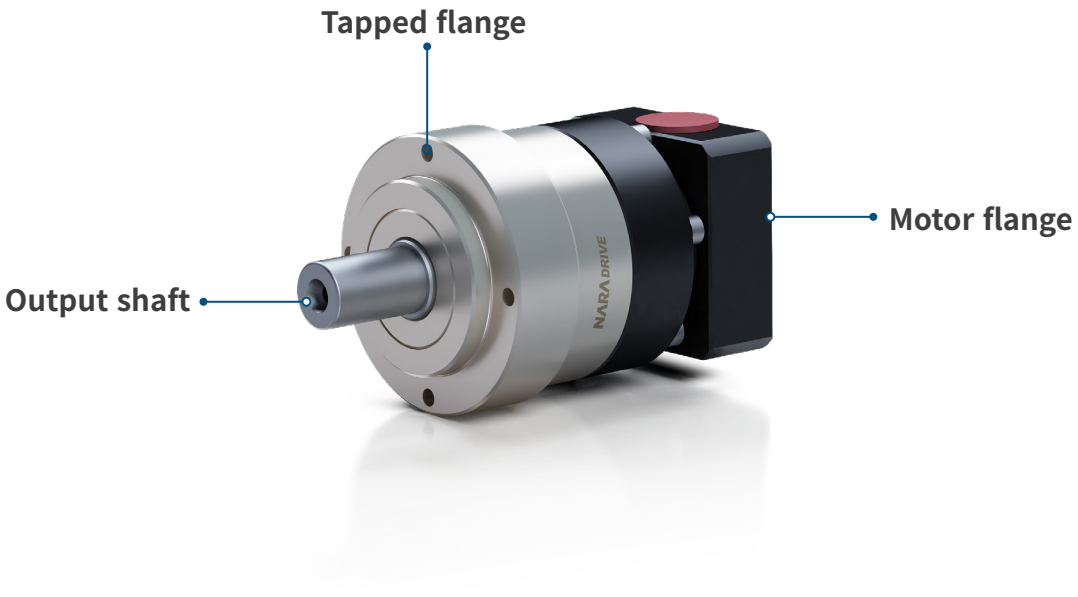
Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CH	M
F18A	35	180	200	85	10.5	114.3	6	220	370	12
F18B	42	180	200	113	38.5	114.3	6	248	398	12

1) For S dimension less than diameter 48, bushing from page 176 is provided.

NC Series

- Low-noise and precision planetary gearbox with helical gear
- Fixed tapped type general gearbox

Features



Low Noise
Low-noise is realized by using a helical gear that enables to provide smooth rotation.

High Rigidity
Ring gear directly gearing to provide compact, high rigidity and high torque.

Long Life
No need for separate inspection or maintenance due to it's long service life.

Easy Mounting
Easy mounting of motor and gearbox due to corresponding of Set-collar and bushing to the output shaft of servo motor.

Herical Gearbox
Gearbox that uses helical gear and has a higher contact ratio than spur gear, it provides high torque and quiet operation.

Extension of gearbox scope
By extending the maximum bore of the input shaft, the allowable torque of the gearbox can be used to the maximize, and can be applied to the shaft diameter of the 22 kW servo motor.

Specifications

Item	Unit	Stage	Ratio	NC050	NC070	NC090	NC120	NC155	NC205	NC235
Nominal output torque (T_{2N}) [1]	Nm	1	3	6	18	50	120	240	500	1000
			4	9	27	75	120	240	750	1500
			5	9	27	75	180	360	750	1500
			6	9	27	75	180	360	750	1500
			7	9	27	75	180	360	750	1500
			8	9	27	75	180	360	750	1500
			9	6	18	50	120	240	500	1000
			10	6	18	50	120	240	500	1000
		2	15	6	18	50	120	240	500	1000
			20	9	27	75	180	360	750	1500
			25	9	27	75	180	360	750	1500
			30	6	18	50	120	240	500	1000
			35	9	27	75	180	360	750	1500
			40	9	27	75	180	360	750	1500
			45	6	18	50	120	240	500	1000
			50	9	27	75	180	360	750	1500
			60	9	27	75	180	360	750	1500
			70	9	27	75	180	360	750	1500
			80	9	27	75	180	360	750	1500
			90	6	18	50	120	240	500	1000
			100	6	18	50	120	240	500	1000
Maximum acceleration torque (T_{2B}) [2]	Nm	1	3	12	35	80	225	470	970	1600
			4	18	50	125	330	700	1400	2300
			5	18	50	125	330	700	1400	2300
			6	18	50	125	330	700	1400	2300
			7	18	50	125	330	700	1400	2300
			8	18	50	125	330	700	1400	2200
			9	12	35	80	225	470	970	1900
			10	12	35	80	225	470	970	1600
		2	15	12	35	80	225	470	970	1600
			20	18	50	125	330	700	1400	2300
			25	18	50	125	330	700	1400	2300
			30	12	35	80	225	470	970	1600
			35	18	50	125	330	700	1400	2300
			40	18	50	125	330	700	1400	2300
			45	12	35	80	225	470	970	1300
			50	18	50	125	330	700	1400	2300
			60	18	50	125	330	700	1400	2300
			70	18	50	125	330	700	1400	2300
			80	18	50	125	330	700	1400	1800
			90	12	35	80	225	470	970	1300
			100	12	35	80	225	470	970	1200

1) Nominal output torque is the allowable value of average load torque applied to the output shaft.
2) Maximum acceleration torque is the allowable value of startup/stop torque generated during operation.

Specifications

Item	Unit	Stage	Ratio	NC050	NC070	NC090	NC120	NC155	NC205	NC235
Emergency stop torque (T_{2E}) [3]	Nm	1	3	30	80	200	500	1000	2200	4000
			4	35	100	250	625	1250	2750	5000
			5	35	100	250	625	1250	2750	5000
			6	35	100	250	625	1250	2750	5000
			7	35	100	250	625	1250	2750	5000
			8	35	100	250	625	1250	2750	5000
			9	30	80	200	500	1000	2200	4000
			10	30	80	200	500	1000	2200	4000
		2	15	30	80	200	500	1000	2200	4000
			20	35	100	250	625	1250	2750	5000
			25	35	100	250	625	1250	2750	5000
			30	30	80	200	500	1000	2200	4000
			35	35	100	250	625	1250	2750	5000
			40	35	100	250	625	1250	2750	5000
			45	30	80	200	500	1000	2200	4000
			50	35	100	250	625	1250	2750	5000
			60	35	100	250	625	1250	2750	5000
			70	35	100	250	625	1250	2750	5000
			80	35	100	250	625	1250	2750	5000
			90	30	80	200	500	1000	2200	4000
			100	30	80	200	500	1000	2200	4000
Maximum radial load (F_{2rB}) [4]	N	1	3	240	430	810	1300	3200	5600	5800
			4	270	470	890	1500	3500	6200	6400
			5	290	510	960	1600	3800	6700	6900
			6	310	540	1000	1700	4000	7100	7300
			7	320	570	1100	1800	4200	7400	7700
			8	340	600	1100	1900	4400	7800	8000
			9	350	620	1200	1900	4600	8100	8400
			10	360	640	1200	2000	4700	8400	8700
		2	15	410	740	1400	2300	5400	9600	9900
			20	460	810	1500	2500	6000	11000	11000
			25	490	870	1600	2700	6400	11000	12000
			30	520	930	1700	2900	6800	12000	13000
			35	550	980	1800	3000	7200	13000	13000
			40	570	1000	1900	3200	7500	13000	14000
			45	600	1100	2000	3300	7800	14000	14000
			50	620	1100	2100	3400	8100	14000	15000
			60	660	1200	2200	3600	8600	15000	15000
			70	690	1200	2300	3800	9100	15000	15000
			80	710	1200	2400	4000	9100	15000	15000
			90	710	1200	2400	4200	9100	15000	15000
			100	710	1200	2400	4300	9100	15000	15000

3) Emergency stop torque is the allowable value of overload or shock load torque. (1000 times permitted during the lifetime of the gearbox)

4) When the nominal input speed, the allowable value of the radial load is on the middle of the output shaft. (Axial load 0 N)

Specifications

Item	Unit	Stage	Ratio	NC050	NC070	NC090	NC120	NC155	NC205	NC235
Maximum axial load (F_{2aB}) [5]	N	1	3	270	310	930	1500	2400	4300	6400
			4	300	360	1100	1700	2700	4900	7200
			5	330	390	1200	1900	3000	5400	7900
			6	360	430	1300	2000	3300	5800	8600
			7	380	460	1300	2100	3500	6300	9200
			8	410	480	1400	2300	3700	6600	9700
			9	430	510	1500	2400	3900	7000	10000
			10	450	530	1600	2500	4100	7300	11000
		2	15	540	630	1900	3000	4900	8700	13000
			20	610	720	2100	3400	5500	9900	14000
			25	640	790	2200	3700	6100	11000	14000
			30	640	860	2200	3900	6600	12000	14000
			35	640	920	2200	3900	7000	13000	14000
			40	640	970	2200	3900	7500	13000	14000
			45	640	1000	2200	3900	7900	14000	14000
			50	640	1100	2200	3900	8200	14000	14000
			60	640	1100	2200	3900	8200	14000	14000
			70	640	1100	2200	3900	8200	14000	14000
			80	640	1100	2200	3900	8200	14000	14000
			90	640	1100	2200	3900	8200	14000	14000
			100	640	1100	2200	3900	8200	14000	14000
Nominal Input Speed (n_{1N}) [6]	rpm	1, 2	3~100	3000	3000	3000	3000	2000	1500	1000
Maximum Input Speed (n_{1B}) [7]	rpm	1,2	3~100	6000	6000	6000	6000	4000	3000	2000
Standard Backlash (P3)	arcmin	1	3~10	≤12						
		2	15~100	≤15						
Noise level [8]	dB(A)	1,2	3~100	≤60	≤62	≤64	≤66	≤68	≤70	≤72
Efficiency (η) [9]	%	1	3~10	≥95						
		2	15~100	≥90						
Lubrication		1,2	3~100	Grease						
Mounting position		1,2	3~100	All directions						

5) When the nominal input speed, the allowable value of the axial load is on the center of the output shaft. (Radial load 0 N)
6) Allowable value of average input speed.
7) Maximum input speed allowed intermittently. (Please contact NARA when using over the nominal input speed)
8) Representative value measured at a distance of 1m from a gearbox with a reduction ratio of 1/10 (1-stage) or 1/100 (2-stage) at the nominal input speed under no load condition.
9) Efficiency at full load.

Inertia

Item	Unit	Stage	Ratio	Input Bore	NC050	NC070	NC090	NC120	NC155	NC205	NC235
Mass moment of inertia (J_1)	kg·cm^2	1	3	≤Ø8	0.053	0.14	-	-	-	-	-
				≤Ø14	0.17	0.25	0.72	-	-	-	-
				≤Ø19	-	0.53	1.1	3.2	-	-	-
				≤Ø28	-	-	2.9	5.1	12	-	-
				≤Ø38	-	-	-	12	18	43	-
				≤Ø48	-	-	-	-	35	57	110
				≤Ø65	-	-	-	-	-	110	160
			4	≤Ø8	0.041	0.095	-	-	-	-	-
				≤Ø14	0.16	0.21	0.5	-	-	-	-
				≤Ø19	-	0.48	0.9	2	-	-	-
				≤Ø28	-	-	2.7	3.7	7.3	-	-
				≤Ø38	-	-	-	10	14	26	-
				≤Ø48	-	-	-	-	29	41	54
				≤Ø65	-	-	-	-	-	85	98
			5	≤Ø8	0.036	0.077	-	-	-	-	-
				≤Ø14	0.15	0.19	0.41	-	-	-	-
				≤Ø19	-	0.46	0.8	1.4	-	-	-
				≤Ø28	-	-	2.6	3.1	5.3	-	-
				≤Ø38	-	-	-	9.5	12	19	-
				≤Ø48	-	-	-	-	27	34	42
				≤Ø65	-	-	-	-	-	78	85
			6	≤Ø8	0.034	0.068	-	-	-	-	-
				≤Ø14	0.15	0.18	0.36	-	-	-	-
				≤Ø19	-	0.46	0.75	1.2	-	-	-
				≤Ø28	-	-	2.5	2.9	4.3	-	-
				≤Ø38	-	-	-	9.3	11	15	-
				≤Ø48	-	-	-	-	26	31	35
				≤Ø65	-	-	-	-	-	75	79
			7	≤Ø8	0.032	0.062	-	-	-	-	-
				≤Ø14	0.15	0.17	0.33	-	-	-	-
				≤Ø19	-	0.45	0.73	1	-	-	-
				≤Ø28	-	-	2.5	2.8	3.9	-	-
				≤Ø38	-	-	-	9.1	10	14	-
				≤Ø48	-	-	-	-	25	29	33
				≤Ø65	-	-	-	-	-	73	76
			8	≤Ø8	0.031	0.059	-	-	-	-	-
				≤Ø14	0.15	0.17	0.31	-	-	-	-
				≤Ø19	-	0.45	0.71	0.92	-	-	-
				≤Ø28	-	-	2.5	2.7	3.5	-	-
				≤Ø38	-	-	-	9	9.9	13	-
				≤Ø48	-	-	-	-	25	28	30
				≤Ø65	-	-	-	-	-	72	74
			9	≤Ø8	0.031	0.057	-	-	-	-	-
				≤Ø14	0.15	0.17	0.3	-	-	-	-
				≤Ø19	-	0.44	0.7	0.86	-	-	-

Inertia

Item	Unit	Stage	Ratio	Input Bore	NC050	NC070	NC090	NC120	NC155	NC205	NC235
Mass moment of inertia (J_1)	kg·cm^2	1	9	≤Ø28	-	-	2.5	2.6	3.3	-	-
				≤Ø38	-	-	-	8.9	9.7	12	-
				≤Ø48	-	-	-	-	25	27	29
				≤Ø65	-	-	-	-	-	71	73
			10	≤Ø8	0.03	0.056	-	-	-	-	-
				≤Ø14	0.15	0.17	0.3	-	-	-	-
				≤Ø19	-	0.44	0.7	0.83	-	-	-
				≤Ø28	-	-	2.5	2.6	3.2	-	-
				≤Ø38	-	-	-	8.9	9.6	12	-
				≤Ø48	-	-	-	-	25	27	28
				≤Ø65	-	-	-	-	-	71	72
		2	15	≤Ø8	0.035	0.064	0.2	-	-	-	-
				≤Ø14	-	0.18	0.36	0.77	-	-	-
				≤Ø19	-	0.45	0.75	1.2	2.6	-	-
				≤Ø28	-	-	2.5	2.9	4.4	8.8	-
				≤Ø38	-	-	-	9.2	11	15	20
				≤Ø48	-	-	-	-	26	30	34
			20	≤Ø8	0.034	0.062	0.19	-	-	-	-
				≤Ø14	-	0.17	0.35	0.72	-	-	-
				≤Ø19	-	0.45	0.74	1.1	2.4	-	-
				≤Ø28	-	-	2.5	2.8	4.2	8.1	-
				≤Ø38	-	-	-	9.1	10	14	19
				≤Ø48	-	-	-	-	25	29	33
			25	≤Ø8	0.034	0.061	0.19	-	-	-	-
				≤Ø14	-	0.17	0.35	0.7	-	-	-
				≤Ø19	-	0.45	0.74	1.1	2.4	-	-
				≤Ø28	-	-	2.5	2.8	4.1	7.9	-
				≤Ø38	-	-	-	9.1	10	14	18
				≤Ø48	-	-	-	-	25	29	33
			30	≤Ø8	0.03	0.051	0.12	-	-	-	-
				≤Ø14	-	0.16	0.28	0.38	-	-	-
				≤Ø19	-	0.44	0.67	0.78	1.1	-	-
				≤Ø28	-	-	2.4	2.5	2.9	4	-
				≤Ø38	-	-	-	8.8	9.2	10	12
				≤Ø48	-	-	-	-	24	25	26
			35	≤Ø8	0.034	0.061	0.18	-	-	-	-
				≤Ø14	-	0.17	0.35	0.68	-	-	-
				≤Ø19	-	0.45	0.73	1.1	2.3	-	-
				≤Ø28	-	-	2.5	2.8	4.1	7.6	-
				≤Ø38	-	-	-	9.1	10	14	18
				≤Ø48	-	-	-	-	25	29	32
			40	≤Ø8	0.03	0.051	0.11	-	-	-	-
				≤Ø14	-	0.16	0.28	0.37	-	-	-
				≤Ø19	-	0.44	0.67	0.77	1.1	-	-
				≤Ø28	-	-	2.4	2.5	2.8	3.9	-

Inertia

Item	Unit	Stage	Ratio	Input Bore	NC050	NC070	NC090	NC120	NC155	NC205	NC235
Mass moment of inertia (J_1)	kg·cm^2	2	40	≤Ø38	-	-	-	8.8	9.1	10	12
				≤Ø48	-	-	-	-	24	25	26
			45	≤Ø8	0.034	0.061	0.18	-	-	-	-
				≤Ø14	-	0.17	0.34	0.68	-	-	-
				≤Ø19	-	0.45	0.73	1.1	2.3	-	-
				≤Ø28	-	-	2.5	2.8	4	7.6	-
				≤Ø38	-	-	-	9.1	10	14	18
				≤Ø48	-	-	-	-	25	29	32
			50	≤Ø8	0.03	0.051	0.11	0.19	-	-	-
				≤Ø14	-	0.16	0.27	0.36	0.65	-	-
				≤Ø19	-	0.44	0.67	0.76	1.1	1.9	-
				≤Ø28	-	-	2.4	2.5	2.8	3.8	4.7
				≤Ø38	-	-	-	8.8	9.1	10	12
				≤Ø48	-	-	-	-	24	25	26
			60	≤Ø8	0.03	0.051	0.11	0.19	-	-	-
				≤Ø14	-	0.16	0.27	0.36	0.64	-	-
				≤Ø19	-	0.44	0.67	0.76	1.1	1.9	-
				≤Ø28	-	-	2.4	2.5	2.8	3.8	4.7
				≤Ø38	-	-	-	8.8	9.1	10	11
				≤Ø48	-	-	-	-	24	25	26
			70	≤Ø8	0.03	0.051	0.11	0.19	-	-	-
				≤Ø14	-	0.16	0.27	0.36	0.64	-	-
				≤Ø19	-	0.44	0.67	0.76	1.1	1.8	-
				≤Ø28	-	-	2.4	2.5	2.8	3.8	4.6
				≤Ø38	-	-	-	8.8	9.1	10	11
				≤Ø48	-	-	-	-	24	25	26
			80	≤Ø8	0.03	0.051	0.11	0.19	-	-	-
				≤Ø14	-	0.16	0.27	0.36	0.63	-	-
				≤Ø19	-	0.44	0.67	0.76	1.1	1.8	-
				≤Ø28	-	-	2.4	2.5	2.8	3.7	4.6
				≤Ø38	-	-	-	8.8	9.1	10	11
				≤Ø48	-	-	-	-	24	25	26
			90	≤Ø8	0.03	0.051	0.11	0.19	-	-	-
				≤Ø14	-	0.16	0.27	0.36	0.63	-	-
				≤Ø19	-	0.44	0.67	0.76	1.1	1.8	-
				≤Ø28	-	-	2.4	2.5	2.8	3.7	4.6
				≤Ø38	-	-	-	8.8	9.1	10	11
				≤Ø48	-	-	-	-	24	25	26
			100	≤Ø8	0.03	0.051	0.11	0.19	-	-	-
				≤Ø14	-	0.16	0.27	0.36	0.63	-	-
				≤Ø19	-	0.44	0.67	0.76	1.1	1.8	-
				≤Ø28	-	-	2.4	2.5	2.8	3.7	4.6
				≤Ø38	-	-	-	8.8	9.1	10	11
				≤Ø48	-	-	-	-	24	25	26

Selection Table

1. Yaskawa Electric Corporation

Σ-7 Series SGM7J

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	SGM7J-A5A	3000	8	NC050(8AA8)							
100	SGM7J-01A	3000	8								
150	SGM7J-C2A	3000	8							NC070 (8AA8)	
200	SGM7J-02A	3000	14	NC050(14BA14)						NC070 (14BA14)	
400	SGM7J-04A	3000	14	NC070(14BA14)					NC090(14BA14)		
600	SGM7J-06A	3000	14								
750	SGM7J-08A	3000	19	NC070(19CA19)			NC090(19CA19)				NC120 (19CA19)

Servo Motor				Gearbox										
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)										
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	SGM7J-A5A	3000	8	NC050(8AA8)											NC090 (8AA8)	
100	SGM7J-01A	3000	8	NC070(8AA8)												
150	SGM7J-C2A	3000	8							NC090(8AA8)				Consult us		
200	SGM7J-02A	3000	14	NC070 (14BA14)			NC090(14BA14)				NC090 (14BA14)					
400	SGM7J-04A	3000	14							NC120(14BA14)						
600	SGM7J-06A	3000	14									Consult us				
750	SGM7J-08A	3000	19	NC120(19CA19)			NC155 (19CA19)	NC120 (19CA19)		NC155(19CA19)						

(Notation example)

050 Gearbox Size(NC)

(8AA8) Motor flange code

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

Σ-7 Series SGM7G

(Notation example)

090 Gearbox Size(NC)

(28DB24) Motor flange code

Servo Motor				Gearbox									
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)									
				3	4	5	6	7	8	9	10		
0.85	SGM7G-09A	1500	24	NC090(28DB24)									
1.3	SGM7G-13A	1500	24				NC120(28DB24)						
1.8	SGM7G-20A	1500	24							NC155 (28DB24)			
2.9	SGM7G-30A	1500	35	NC120(38EA35)						NC205 (38EA35)			
4.4	SGM7G-44A	1500	35			NC155(38EA35)							
5.5	SGM7G-55A	1500	42	NC155(48EB42)				NC205 (48EB42)					
7.5	SGM7G-75A	1500	42							NC235 (48EB42)			
11	SGM7G-1AA	1500	42	NC205(48FA42)					NC235 (48FA42)				
15	SGM7G-1EA	1500	55	NC205(65FA55)				NC235 (65FA55)		Consult us			

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)												
				15	20	25	30	35	40	45	50	60	70	80	90	100
0.85	SGM7G-09A	1500	24	NC120 (28DB24)						NC205 (28DB24)						
1.3	SGM7G-13A	1500	24	NC155 (28DB24)			NC205 (28DB24)									
1.8	SGM7G-20A	1500	24													
2.9	SGM7G-30A	1500	35	NC205 (38EA35)				NC235 (38EA35)								
4.4	SGM7G-44A	1500	35	NC235 (38EA35)												
5.5	SGM7G-55A	1500	42	NC235 (48EB42)						Consult us						
7.5	SGM7G-75A	1500	42													
11	SGM7G-1AA	1500	42													
15	SGM7G-1EA	1500	55													

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

2. Mitsubishi Electric Corporation

MELSERVO-J4 Series HG-KR

(Notation example)
050 Gearbox Size(NC)
(8AA8) Motor flange code

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	HG-KR053(B)	3000	8	NC050(8AA8)							
100	HG-KR13(B)	3000	8								
200	HG-KR23(B)	3000	14	NC050(14BA14)						NC070(14BA14)	
400	HG-KR43(B)	3000	14	NC070(14BA14)						NC090(14BA14)	
750	HG-KR73(B)	3000	19	NC070(19CA19)			NC090(19CA19)				NC120 (19CA19)

Servo Motor				Gearbox										
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)										
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	HG-KR053(B)	3000	8	NC050(8AA8)			NC070(8AA8)								NC090(8AA8)	
100	HG-KR13(B)	3000	8							NC090(8AA8)					Consult us	
200	HG-KR23(B)	3000	14	NC070(14BA14)		NC090(14BA14)					NC090 (14BA14)					
400	HG-KR43(B)	3000	14				NC120(14BA14)								Consult us	
750	HG-KR73(B)	3000	19	NC120(19CA19)			NC155 (19CA19)	NC120 (19CA19)	NC155(19CA19)							

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox							
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
1	HG-SR102(B)	2000	24	NC090(28DA24)							
1.5	HG-SR152(B)	2000	24				NC120(28DA24)				
2	HG-SR202(B)	2000	35	NC120(38EA35)						NC155 (38EA35)	
3.5	HG-SR352(B)	2000	35							NC205 (38EA35)	
5	HG-SR502(B)	2000	35			NC155(38EA35)					
7	HG-SR702(B)	2000	35								Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

(Notation example)
120 Gearbox Size(NC)
(28DA24) Motor flange code

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)												
				15	20	25	30	35	40	45	50	60	70	80	90	100
1	HG-SR102(B)	2000	24	NC120(28DA24)		NC155(28DA24)					NC155 (28DA24)					
1.5	HG-SR152(B)	2000	24				NC205(28DA24)									
2	HG-SR202(B)	2000	35	NC155 (38EA35)		NC205(38EA35)				NC235(38EA35)						
3.5	HG-SR352(B)	2000	35													
5	HG-SR502(B)	2000	35	NC235 (38EA35)						Consult us						
7	HG-SR702(B)	2000	35													

MELSERVO-J4 Series HG-JR (1500 r/min)

Servo Motor				Gearbox							
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
11	HG-JR11K1M(B)	1500	55	NC205 (65FA55)							
15	HG-JR15K1M(B)	1500	55			NC235 (65FA55)			Consult us		
22	HG-JR22K1M(B)	1500	65	NC235 (65GA65)							

Servo Motor				Gearbox												
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)												
				15	20	25	30	35	40	45	50	60	70	80	90	100
11	HG-JR11K1M(B)	1500	55	Consult us												
15	HG-JR15K1M(B)	1500	55													
22	HG-JR22K1M(B)	1500	65													

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

3. Panasonic Corporation

A5 Series MSME

(Notation example)
050 Gearbox Size(NC)
(8AB8) Motor flange code

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	MSME 5A	3000	8	NC050(8AB8)							
100	MSME 01	3000	8								
200	MSME 02	3000	11	NC050(14BB11)						NC070 (14BB11)	
400	MSME 04	3000	14	NC070(14BB14)						NC090 (14BB14)	
750	MSME 08	3000	19	NC070(19CB19)			NC090(19CB19)				NC120 (19CB19)
3000	MSME 30	3000	22	NC120 (28DA22)	NC090 (28DA22)	NC120(28DA22)				NC155 (28DA22)	
4000	MSME 40	3000	24	NC120(28DA24)						NC155 (28DA24)	
5000	MSME 50	3000	24								Consult us

Servo Motor				Gearbox											
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)											
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	MSME 5A	3000	8	NC050 (8AB8)			NC070 (8AB8)								NC090 (8AB8)	
100	MSME 01	3000	8							NC090 (8AB8)					Consult us	
200	MSME 02	3000	11	NC070 (14BB11)		NC090 (14BB11)				NC120 (14BB11)	NC090 (14BB11)	NC120 (14BB11)				
400	MSME 04	3000	14	NC090 (14BB14)			NC120 (14BB14)									
750	MSME 08	3000	19	NC120 (19CB19)			NC155 (19CB19)	NC120 (19CB19)	NC155 (19CB19)							
3000	MSME 30	3000	22	NC155 (28DA22)		NC205 (28DA22)										
4000	MSME 40	3000	24	NC205 (28DA24)				NC205 (28DA24)	Consult us							
5000	MSME 50	3000	24													

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

A5 Series MSMD

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	MSMD 5A	3000	8	NC050(8AB8)							
100	MSMD 01	3000	8								
200	MSMD 02	3000	11	NC050(14BB11)						NC070 (14BB11)	
400	MSMD 04	3000	14	NC070(14BB14)						NC090 (14BB14)	
750	MSMD 08	3000	19	NC070(19CB19)			NC090(19CB19)				NC120 (19CB19)

(Notation example)

050 Gearbox Size(NC)

(8AB8) Motor flange code

Servo Motor				Gearbox										
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)										
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	MSMD 5A	3000	8	NC050 (8AB8)			NC070 (8AB8)								NC090 (8AB8)	
100	MSMD 01	3000	8							NC090 (8AB8)					Consult us	
200	MSMD 02	3000	11	NC070 (14BB11)		NC090 (14BB11)				NC120 (14BB11)	NC090 (14BB11)	NC120 (14BB11)				
400	MSMD 04	3000	14	NC090 (14BB14)			NC120 (14BB14)								Consult us	
750	MSMD 08	3000	19	NC120 (19CB19)			NC155 (19CB19)	NC120 (19CB19)	NC155 (19CB19)							

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

4. Omron Corporation

G5 Series R88M-K (AC200V)

Servo Motor				Gearbox							
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)							
				3	4	5	6	7	8	9	10
50	05030 H/T	3000	8	NC050 (8AA8)							
100	10030 H/T	3000	8								
200	20030 H/T	3000	11	NC050 (14BB11)						NC070 (14BB11)	
400	40030 H/T	3000	14	NC070 (14BB14)						NC090 (14BB14)	
750	75030 H/T	3000	19	NC070 (19CB19)			NC090 (19CB19)				NC120 (19CB19)
3000	3K030 H/T	3000	22	NC120 (28DA22)	NC090 (28DA22)	NC120 (28DA22)				NC155 (28DA22)	
4000	4K030 H/T	3000	24	NC120(28DA24)							
5000	5K030 H/T	3000	24					NC155 (28DA24)			Consult us

(Notation example)

050 Gearbox Size(NC)

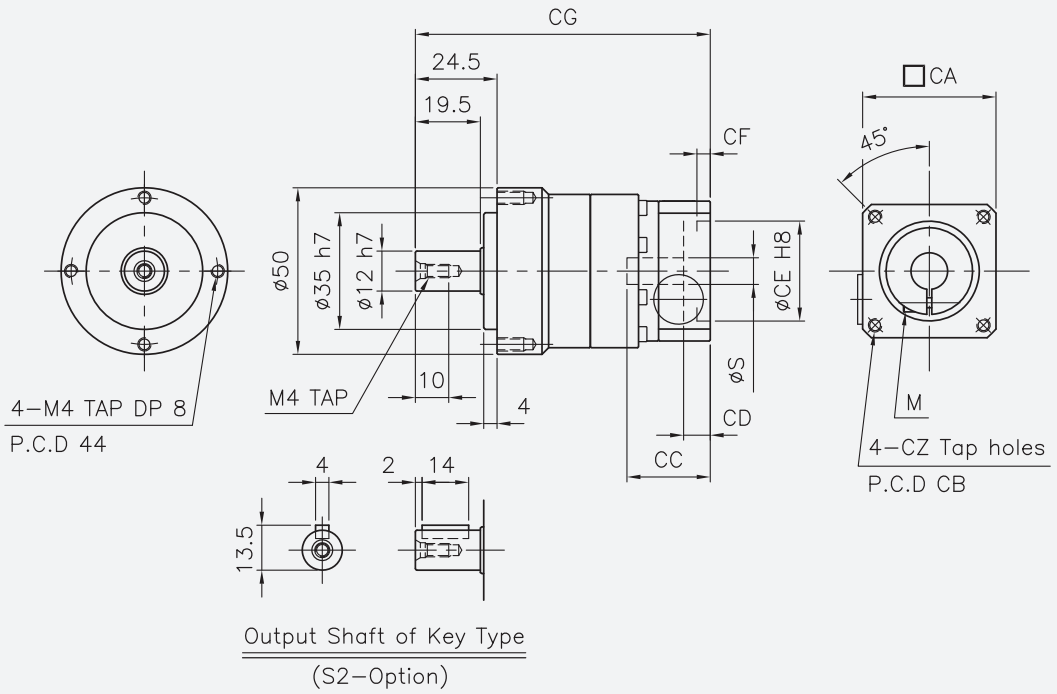
(8AA8) Motor flange code

Servo Motor				Gearbox										
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (2-Stage)										
				15	20	25	30	35	40	45	50	60	70	80	90	100
50	05030 H/T	3000	8	NC050 (8AA8)			NC070 (8AA8)								NC090 (8AA8)	
100	10030 H/T	3000	8							NC090 (8AA8)					Consult us	
200	20030 H/T	3000	11	NC070 (14BB11)		NC090 (14BB11)				NC120 (14BB11)	NC090 (14BB11)	NC120 (14BB11)				
400	40030 H/T	3000	14	NC090 (14BB14)			NC120 (14BB14)									
750	75030 H/T	3000	19	NC120 (19CB19)			NC155 (19CB19)	NC120 (19CB19)	NC155 (19CB19)							
3000	3K030 H/T	3000	22	NC155 (28DA22)		NC205 (28DA22)										
4000	4K030 H/T	3000	24	NC205 (28DA24)				NC205 (28DA24)	Consult us							
5000	5K030 H/T	3000	24													

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Dimensions

NC050, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



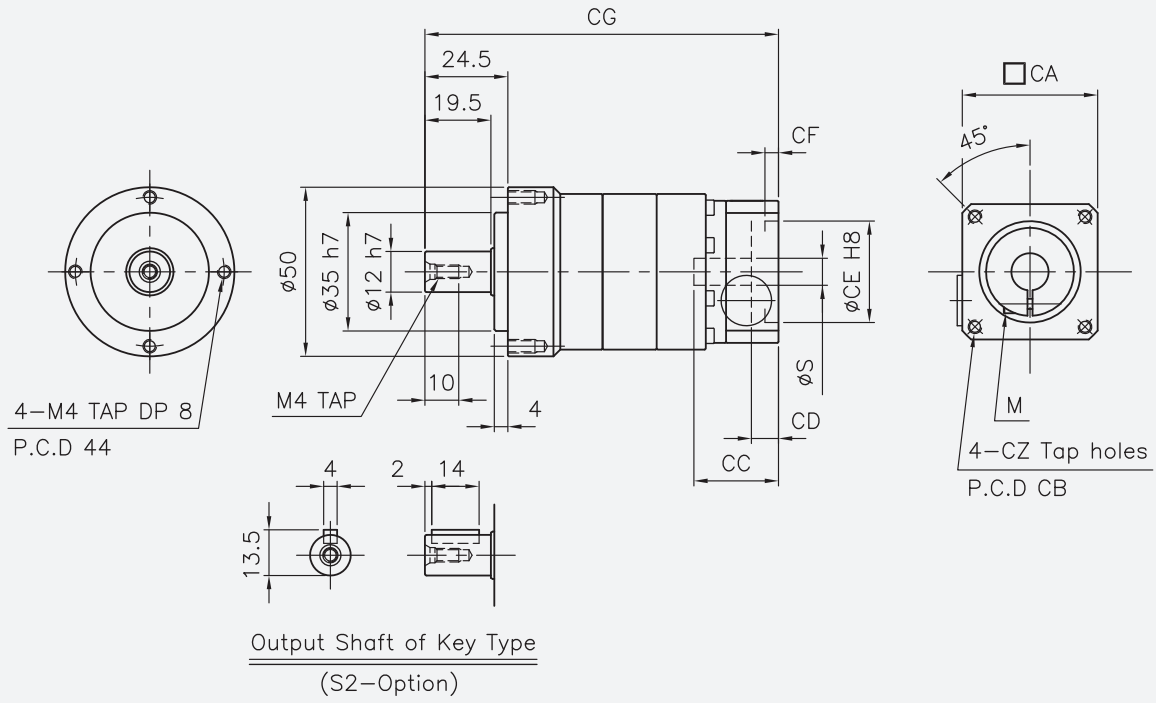
※ Max. input bore (ØSmax) = Ø14

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	42	46	32	5	30	5	88.5	4	3
8AB8	8	42	45	32	5	30	5	88.5	3	3
14BA14	14	65	70	40	11	50	10	96.5	5	5
14BB11	11	65	70	40	11	50	10	96.5	4	5
14BB14	14	65	70	40	11	50	10	96.5	4	5

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NC050, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100

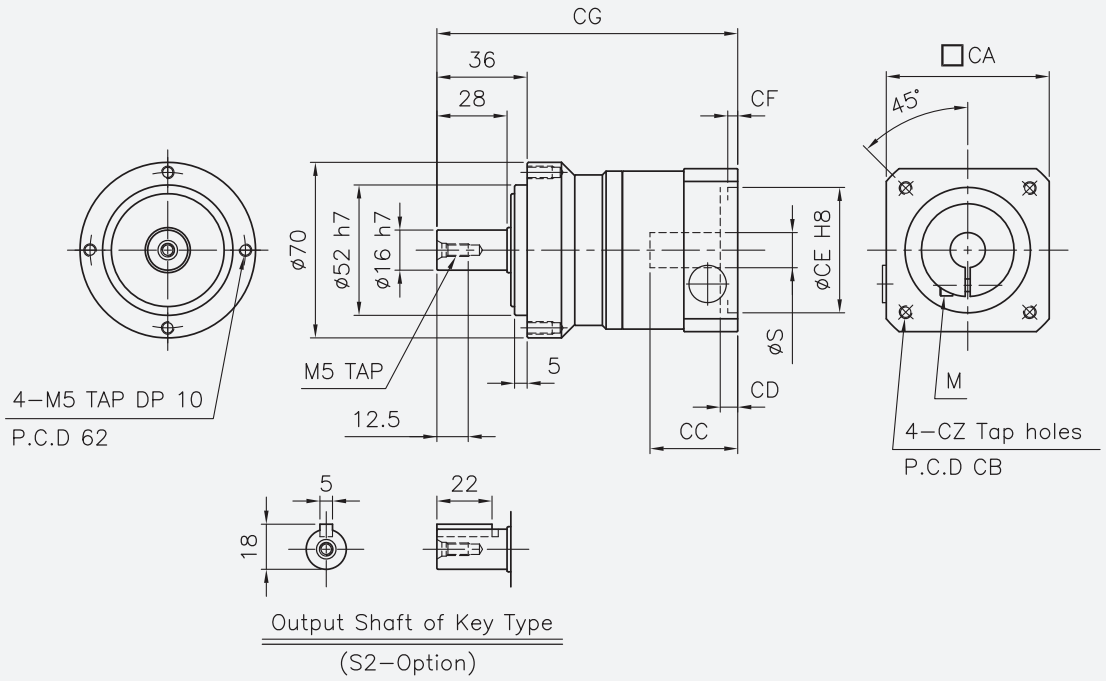


※ Max. input bore (ØSmax) = Ø8

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	40	46	32	5	30	5	105	4	3
8AB8	8	40	45	32	5	30	5	105	3	3

Dimensions

NC070, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



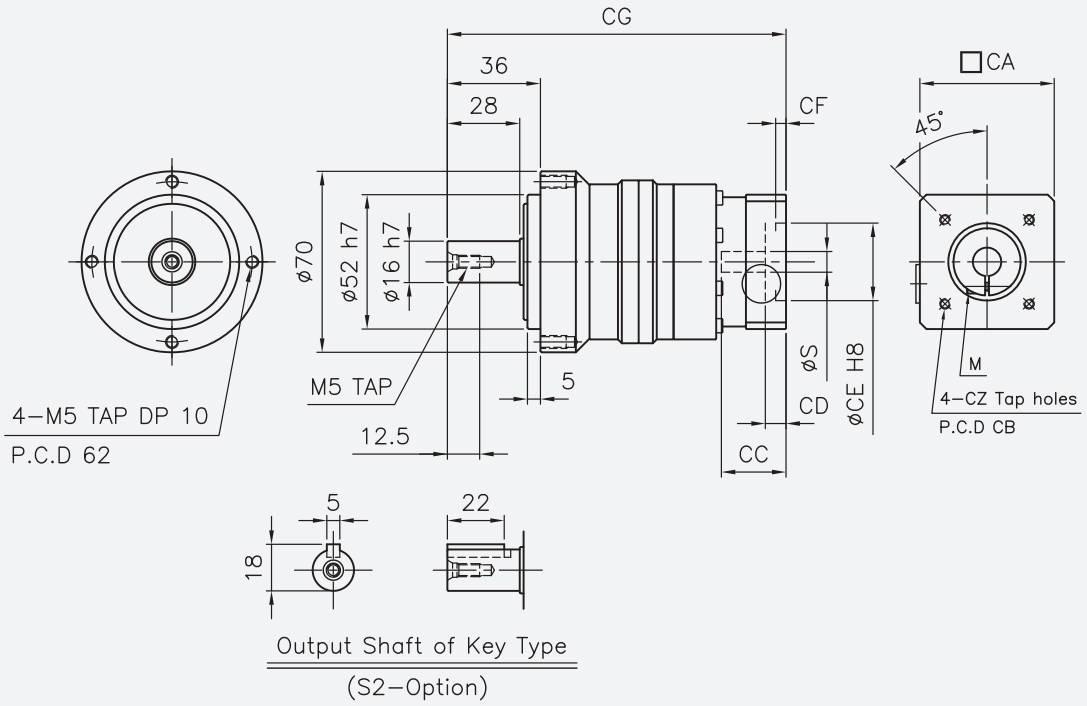
※ Max. input bore (ØSmax) = Ø19

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	52	46	32	5	30	5	112	4	4
8AB8	8	52	45	32	5	30	5	112	3	4
14BA14	14	65	70	40	10	50	10	120	5	5
14BB11	11	65	70	40	10	50	10	120	4	5
14BB14	14	65	70	40	10	50	10	120	4	5
19CA19	19	80	90	50	5	70	6	130	6	6
19CB19	19	80	90	50	5	70	6	130	5	6

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NC070, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



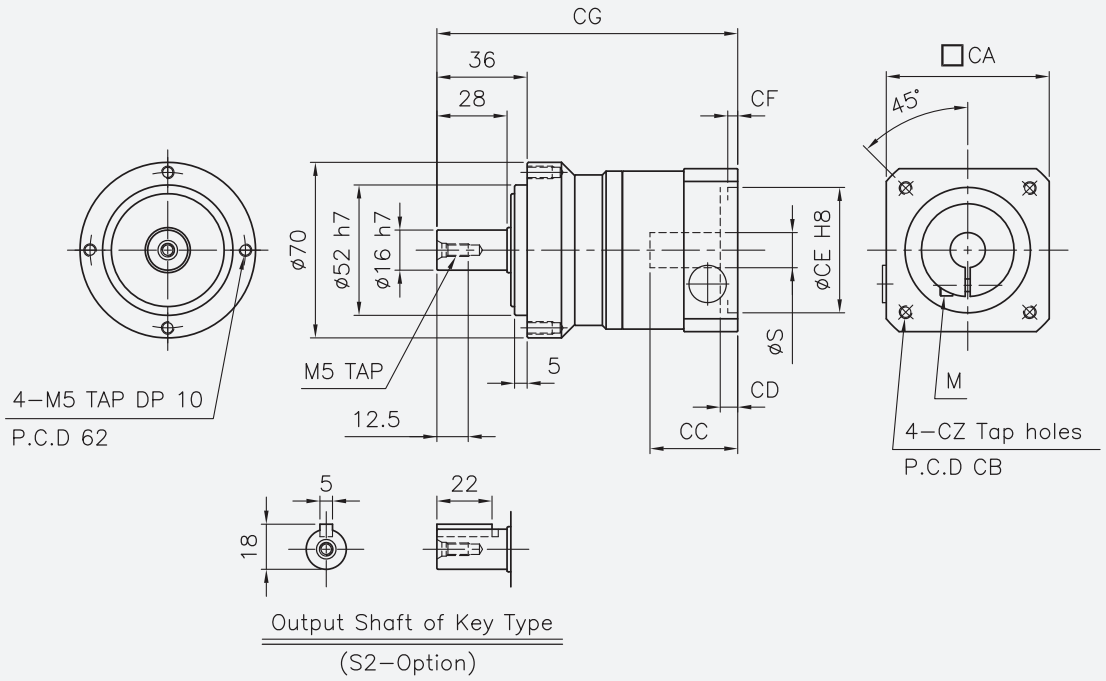
※ Max. input bore (ØSmax) = Ø14

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	52	46	32	5	30	5	131	4	4
8AB8	8	52	45	32	5	30	5	131	3	4
14BA14	14	65	70	40	10	50	10	141	5	5
14BB11	11	65	70	40	10	50	10	141	4	5
14BB14	14	65	70	40	10	50	10	141	4	5

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NC090, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



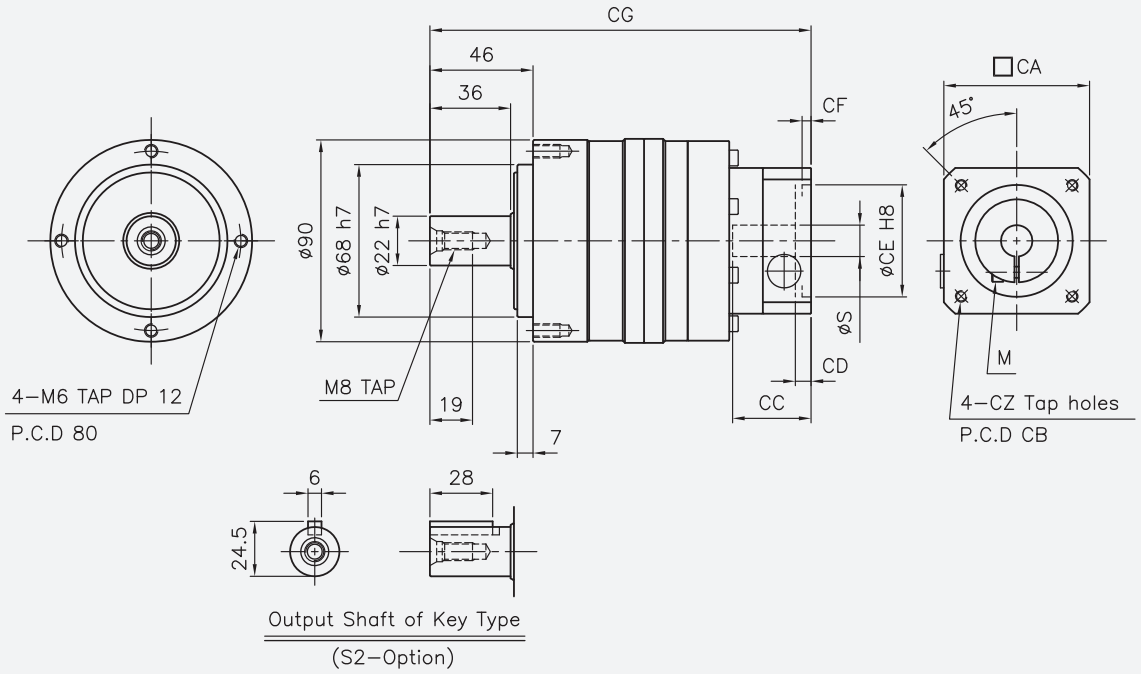
※ Max. input bore (ØSmax) = Ø28

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	65	70	40	10	50	10	148	5	5
14BB11	11	65	70	40	10	50	10	148	4	5
14BB14	14	65	70	40	10	50	10	148	4	5
19CA19	19	80	90	50	7	70	6	153	6	6
19CB19	19	80	90	50	7	70	6	153	5	6
28DA22	22	130	145	67	12	110	8	170	8	8
28DA24	24	130	145	67	12	110	8	170	8	8
28DB24	24	130	145	77	22	110	18	180	8	8

1) For S dimension 11, 22, 24, bushing from page 176 is provided.

Dimensions

NC090, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



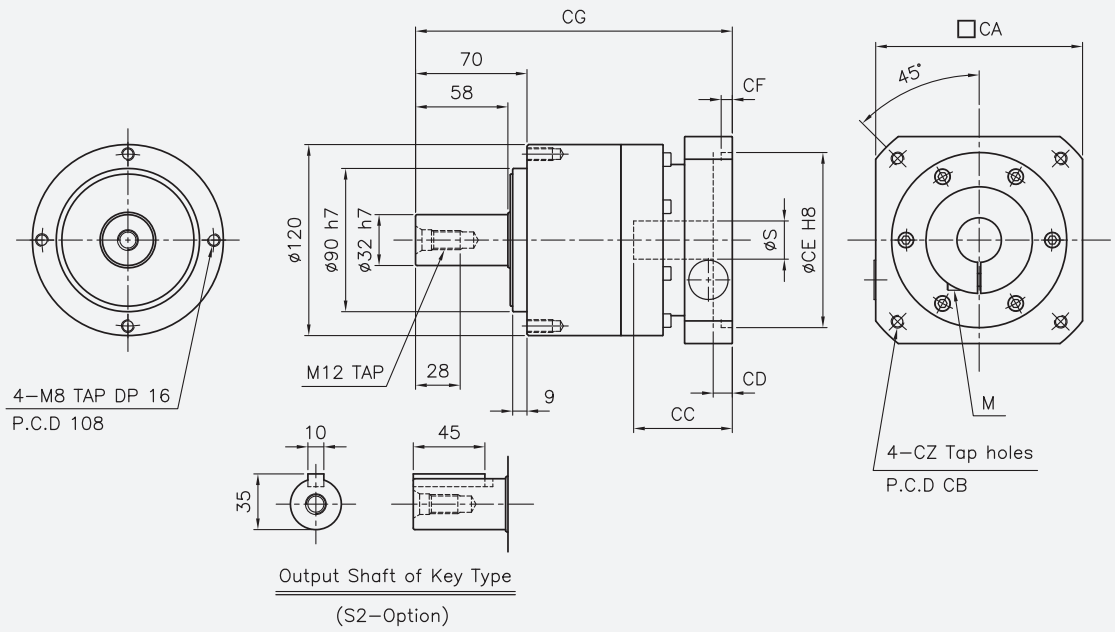
※ Max. input bore (ØSmax) = Ø14

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	52	46	32	5	30	5	160	4	4
8AB8	8	52	45	32	5	30	5	160	3	4
14BA14	14	65	70	40	10	50	10	170	5	5
14BB11	11	65	70	40	10	50	10	170	4	5
14BB14	14	65	70	40	10	50	10	170	4	5

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NC120, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



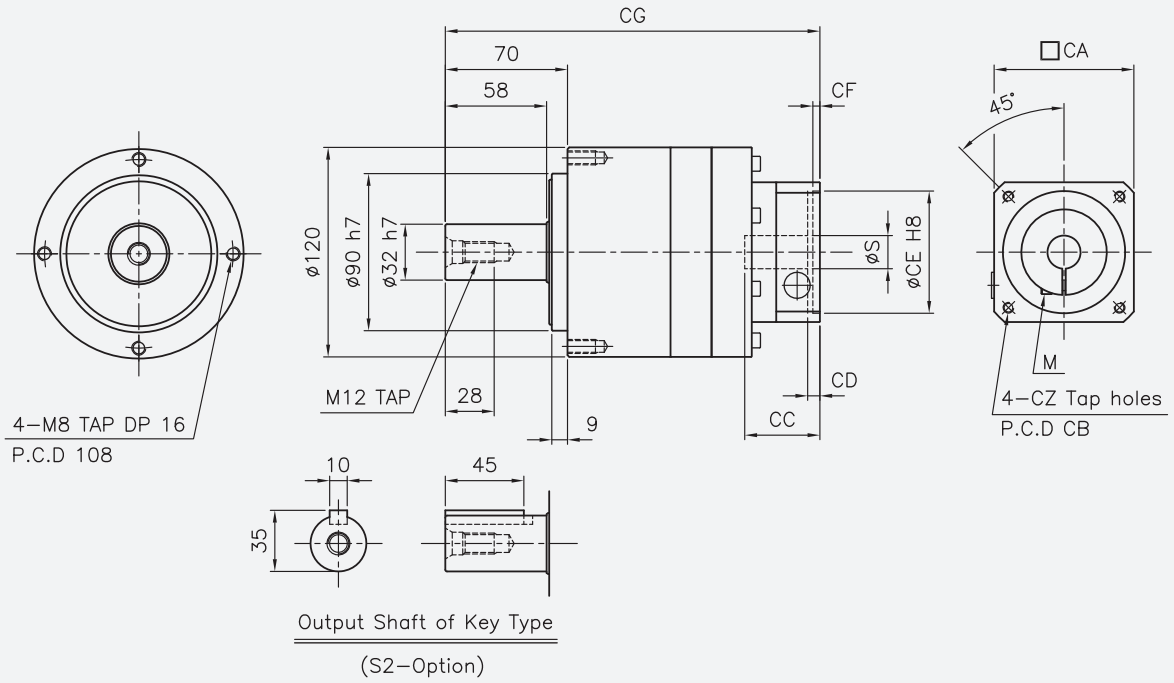
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
19CA19	19	80	90	50	7	70	6	214.5	6	6
19CB19	19	80	90	50	7	70	6	214.5	5	6
28DA22	22	130	145	67	12	110	8	204	8	8
28DA24	24	130	145	67	12	110	8	204	8	8
28DB24	24	130	145	77	22	110	18	214	8	8
38EA35	35	180	200	82	15	114.3	8	225	12	10

1) For S dimension 22, 24, 35, bushing from page 176 is provided.

Dimensions

NC120, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



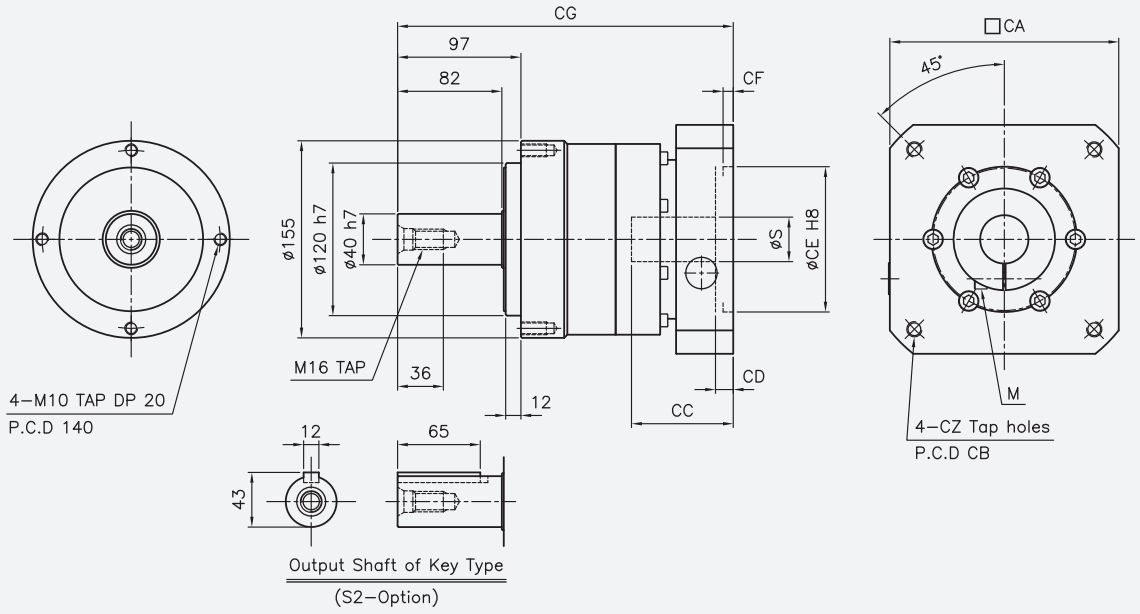
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	65	70	40	10	50	10	209.5	5	5
14BB11	11	65	70	40	10	50	10	209.5	4	5
14BB14	14	65	70	40	10	50	10	205	4	5
19CA19	19	80	90	50	7	70	6	214.5	6	6
19CB19	19	80	90	50	7	70	6	214.5	5	6
28DA22	22	130	145	67	12	110	8	231.5	8	8
28DA24	24	130	145	67	12	110	8	231.5	8	8
28DB24	24	130	145	77	22	110	18	241.5	8	8

1) For S dimension 11, 22, 24, 35, bushing from page 176 is provided.

Dimensions

NC155, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



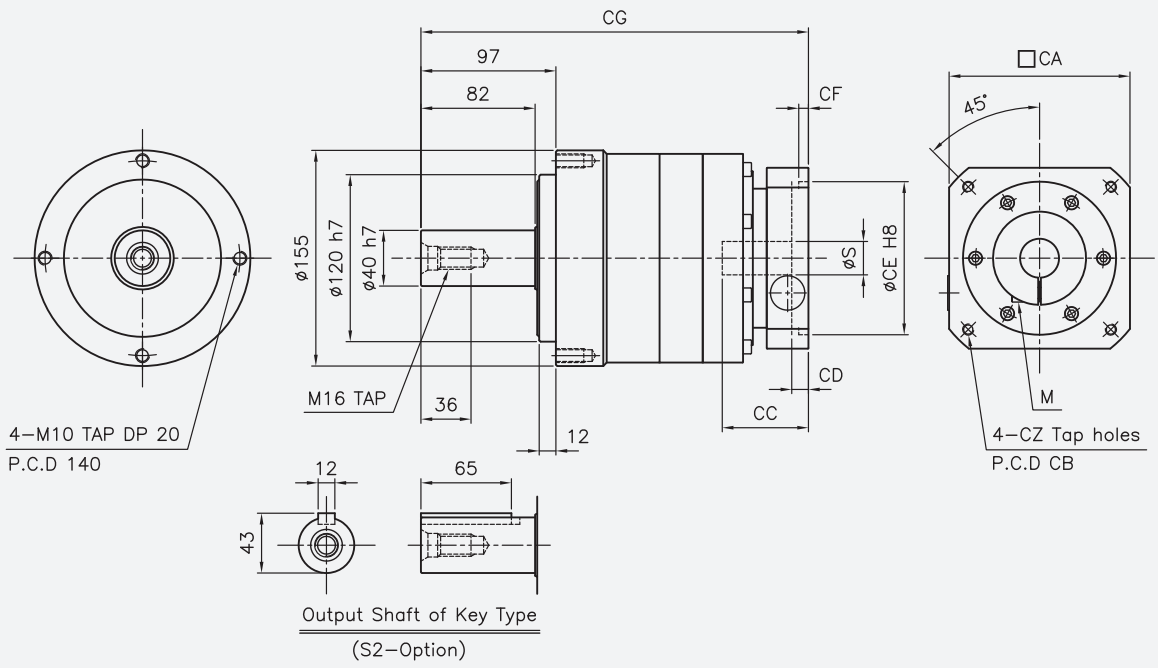
※ Max. input bore (ØSmax) = Ø48

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
28DA22	22	130	145	67	12	110	8	249	8	8
28DA24	24	130	145	67	12	110	8	249	8	8
28DB24	24	130	145	77	22	110	18	259	8	8
38EA35	35	180	200	82	15	114.3	8	264	12	10
48EB42	42	180	200	118	30	114.3	8	305	12	12

1) For S dimension 22, 24, 35, 42, bushing from page 176 is provided.

Dimensions

NC155, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



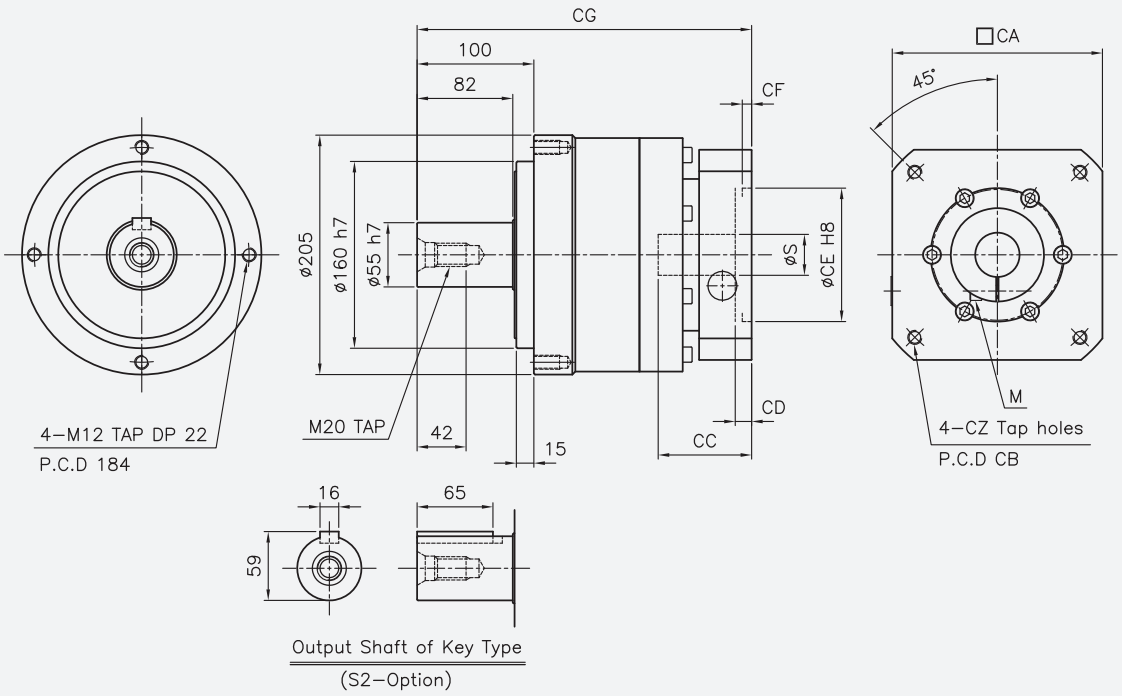
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
19CA19	19	80	90	50	7	70	6	266.5	6	6
19CB19	19	80	90	50	7	70	6	266.5	5	6
28DA22	22	130	145	67	12	110	8	283.5	8	8
28DA24	24	130	145	67	12	110	8	283.5	8	8
28DB24	24	130	145	77	22	110	18	293.5	8	8
38EA35	35	180	200	82	15	114.3	8	298.5	12	10

1) For S dimension 22, 24, 35, bushing from page 176 is provided.

Dimensions

NC205, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



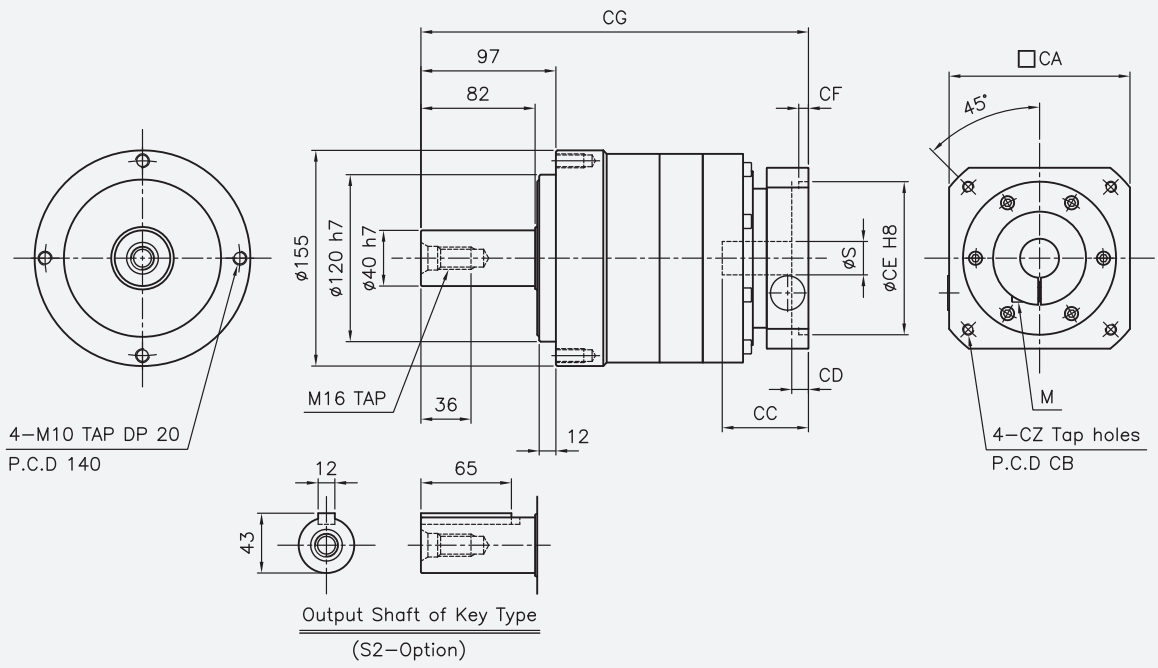
※ Max. input bore (ØSmax) = Ø65

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
38EA35	35	180	200	82	15	114.3	8	286.5	12	10
48EB42	42	180	200	118	30	114.3	8	322.5	12	12
48FA42	42	220	235	122	20	200	8	334	12	12
65FA55	55	220	235	122	20	200	8	334	12	12

1) For S dimension 35, 42, 55, bushing from page 176 is provided.

Dimensions

NC205, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



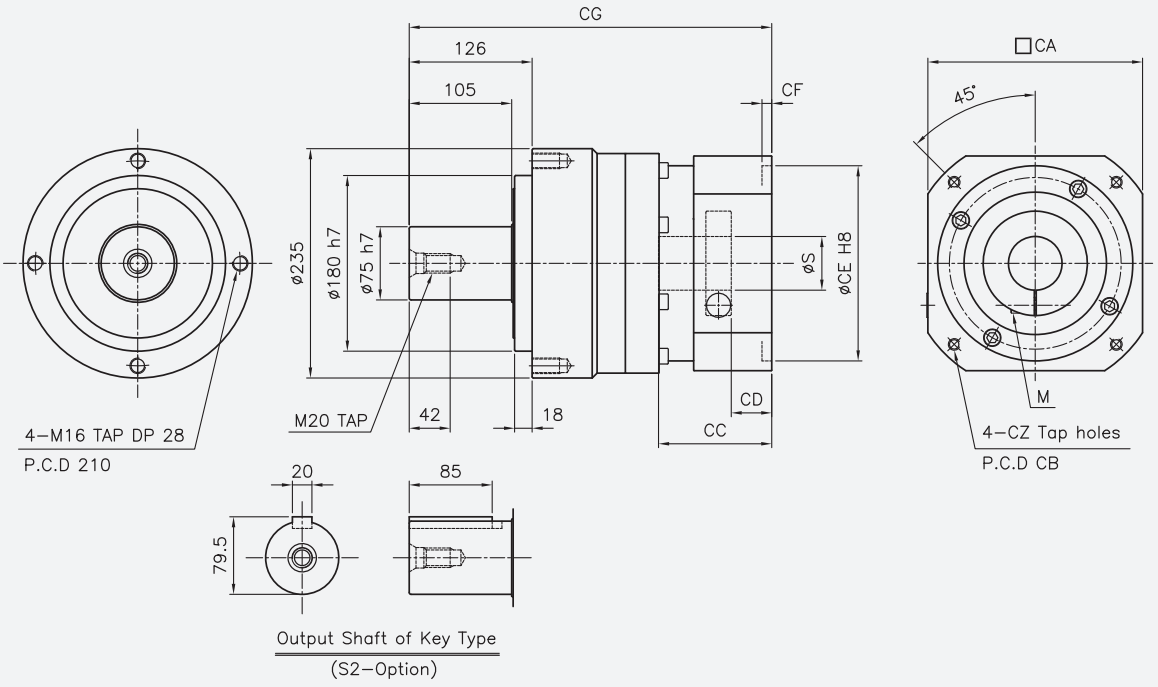
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
28DA22	22	130	145	67	12	110	8	316	8	8
28DA24	24	130	145	67	12	110	8	316	8	8
28DB24	24	130	145	77	22	110	18	326	8	8
38EA35	35	180	200	82	15	114.3	8	331	12	10

1) For S dimension 22, 24, 35, bushing from page 176 is provided.

Dimensions

NC235, 1-Stage, Ratio(i) = 3, 4, 5, 6, 7, 8, 9, 10



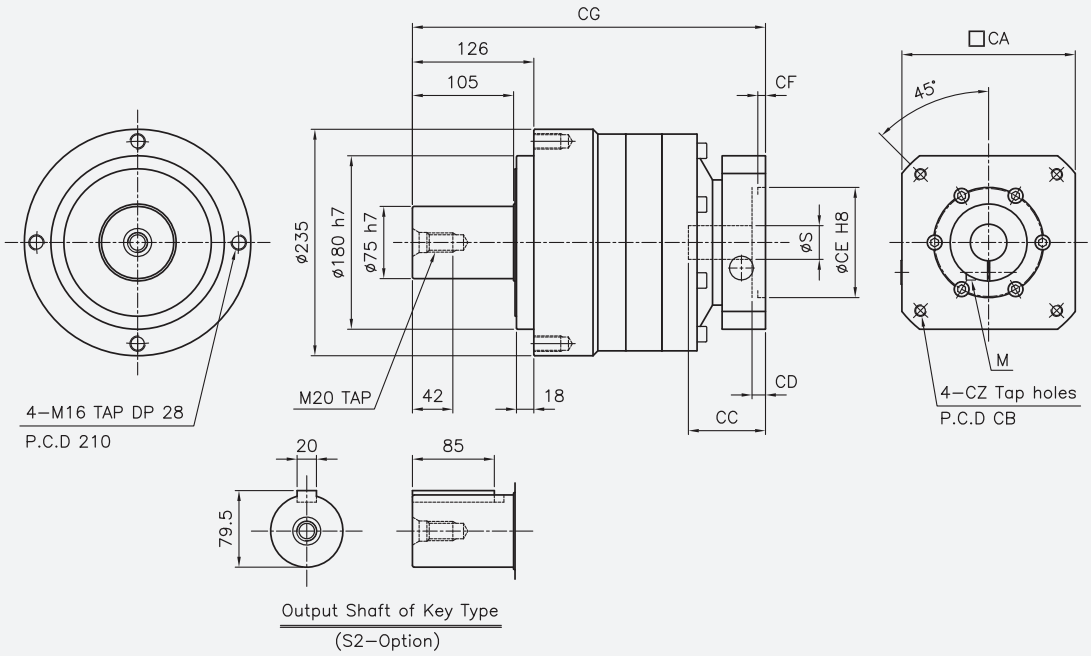
※ Max. input bore (ØSmax) = Ø65

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
48EB42	35	180	200	82	30	114.3	8	367.5	12	12
48FA42	42	220	235	122	20	200	8	371.5	12	12
65FA55	55	220	235	122	20	200	8	371.5	12	12
65GA55	65	250	265	152	50	230	18	401.5	20	12

1) For S dimension 35, 42, 55, bushing from page 176 is provided.

Dimensions

NC235, 2-Stage, Ratio(i) = 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100



※ Max. input bore (ØSmax) = Ø48

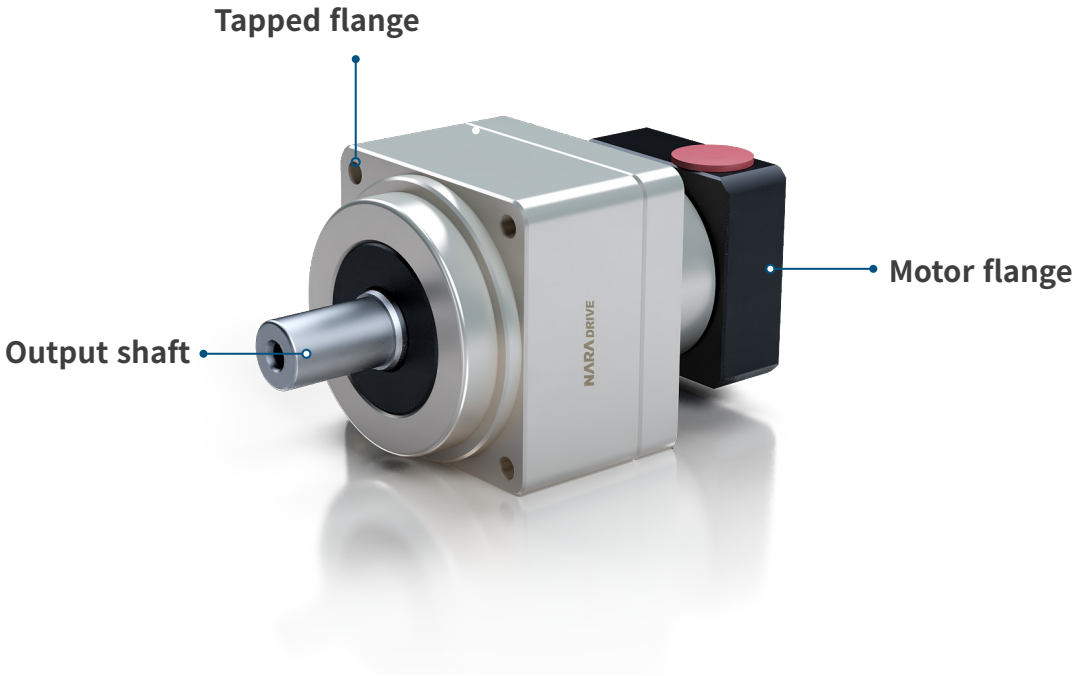
Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
38EA35	35	180	145	82	15	114.3	8	366.5	12	10
48EB42	42	180	145	118	12	114.3	8	402.5	12	12

1) For S dimension 35, 42, bushing from page 176 is provided.

NX Series

- Low-noise and high-precision planetary gearbox with helical gear
- Fixed tapped type precision gearbox

Features



Low Noise
Low-noise is realized by using a helical gear that enables to provide smooth rotation.

High Precision
Enables high precision position control with precise backlash, and maximizes the characteristics of servo motor.

Long Life
No need for separate inspection or maintenance due to it's long service life.

Easy Mounting
Easy mounting of motor and gearbox due to corresponding of Set-collar and bushing to the output shaft of servo motor.

Herical Gearbox
Gearbox that uses helical gear and has a higher contact ratio than spur gear, it provides high torque and quiet operation.

Extension of gearbox scope
By extending the maximum bore of the input shaft, the allowable torque of the gearbox can be used to the maximize.

Specifications

Item	Unit	Stage	Ratio	NX052	NX078	NX098	NX125
Nominal output torque (T_{2N}) [1]	Nm	1	3	4.46	8.92	23.8	57.3
			5	3.69	15	30.6	73.8
			9	3.06	12.6	23.7	95.6
		2	15	5.23	21.1	39.5	119
			20	6.5	27.4	52.8	102
			25	8.15	34.3	65.9	85
			35	4.99	20.2	48.1	92.3
			45	-	12.4	36.8	119
			81	-	12.6	23.1	56.3
Maximum acceleration torque (T_{2B}) [2]	Nm	1	3	12	24	64.1	132
			5	9.94	40.3	82.3	171
			9	8.23	34	63.7	221
		2	15	14.1	56.7	106	274
			20	17.5	73.9	142	235
			25	21.9	92.4	177	196
			35	13.4	54.3	130	213
			45	-	33.3	99.1	274
			81	-	34	62.3	130
Maximum radial load (F_{2rB}) [3]	N	1	3	390	780	880	1370
			5	490	980	1080	1670
			9	580	1180	1470	1960
		2	15	780	1470	1760	2350
			20	800	1570	1910	2500
			25	880	1670	2060	2650
			35	880	1670	2060	3430
			45	-	1670	2060	3520
			81	-	1670	2060	3520
Maximum axial load (F_{2aB}) [4]	N	1	3	190	390	440	680
			5	240	490	530	830
			9	290	580	780	980
		2	15	390	730	880	1180
			20	400	780	950	1250
			25	440	830	1030	1320
			35	440	830	1030	1710
			45	-	830	1030	1760
			81	-	830	1030	1760
Nominal input speed (n_{1N}) [5]	rpm	1, 2	3~81	3000	3000	3000	3000
Maximum input speed (n_{1B}) [6]	rpm	1, 2	3~81	6000	6000	6000	6000
Precision backlash (P1)	arcmin	1	3~9	≤3	≤3	≤3	≤3
		2	15~81	≤5	≤5	≤5	≤5
Low backlash (P2)	arcmin	1	3~9	≤8	≤8	≤8	≤8
		2	15~81	≤10	≤10	≤10	≤10
Standard backlash (P3)	arcmin	1	3~9	≤12	≤12	≤12	≤12
		2	15~81	≤15	≤15	≤15	≤15
Noise level [7]	dB(A)	1,2	3~81	≤70	≤70	≤70	≤70
Efficiency (η) [8]	%	1	3~9	≥90			
		2	15~81	≥85			
Lubrication		1,2	3~81	Grease			
Mounting position		1,2	3~81	All directions			

1) Nominal output torque is the allowable value of average load torque applied to the output shaft.
2) Maximum acceleration torque is the allowable value of startup/stop torque generated during operation.
3) When the input speed is 3000 rpm, the allowable value of the radial load is on the middle of the output shaft. (Axial load 0 N)
4) When the input speed is 3000 rpm, the allowable value of the axial load is on the center of the output shaft. (Radial load 0 N)
5) Allowable value of average input speed.
6) Maximum input speed allowed intermittently. (Please contact NARA when using over the nominal input speed)
7) Representative value measured at a distance of 1m from a gearbox with a reduction ratio of 1/9 (1-stage) or 1/81 (2-stage) at the nominal input speed under no-load condition.
8) Efficiency at full load.

Inertia

Item	Unit	Stage	Ratio	Input bore	NX052	NX078	NX098	NX125
Mass moment of inertia (J_1)	kg·cm^2	1	3	≤Ø8	0.09	-	-	-
				≤Ø14	0.18	0.57	1.23	-
				≤Ø19	-	1	1.72	4
				≤Ø28	-	-	3.45	5.8
				≤Ø38	-	-	-	13
			5	≤Ø8	0.06	-	-	-
				≤Ø14	0.15	0.38	0.56	-
				≤Ø19	-	0.83	1.05	1.9
				≤Ø28	-	-	2.77	3.6
				≤Ø38	-	-	-	11
			9	≤Ø8	0.05	-	-	-
				≤Ø14	0.14	0.27	0.35	-
				≤Ø19	-	0.75	0.8	1
				≤Ø28	-	-	2.53	2.7
				≤Ø38	-	-	-	10
		2	15	≤Ø8	0.06	0.145	-	-
				≤Ø14	0.14	0.3	0.36	0.65
				≤Ø19	-	-	0.82	1.1
				≤Ø28	-	-	2.55	2.8
				≤Ø38	-	-	-	11
			20	≤Ø8	0.058	0.14	-	-
				≤Ø14	0.14	0.3	0.35	0.58
				≤Ø19	-	-	0.8	1.1
				≤Ø28	-	-	2.52	2.8
				≤Ø38	-	-	-	10
			25	≤Ø8	0.056	0.138	-	-
				≤Ø14	0.14	0.3	0.34	0.57
				≤Ø19	-	-	0.79	1
				≤Ø28	-	-	2.52	2.7
				≤Ø38	-	-	-	10
			35	≤Ø8	0.055	0.135	-	-
				≤Ø14	0.14	0.29	0.34	0.55
				≤Ø19	-	-	0.79	1
				≤Ø28	-	-	-	2.7
				≤Ø38	-	-	-	-
			45	≤Ø8	-	0.113	-	-
				≤Ø14	-	0.27	0.28	0.36
				≤Ø19	-	-	0.74	0.81
				≤Ø28	-	-	-	2.5
				≤Ø38	-	-	-	-
			81	≤Ø8	-	0.113	0.13	-
				≤Ø14	-	0.27	0.28	0.36
				≤Ø19	-	-	0.74	0.81
				≤Ø28	-	-	-	2.5
				≤Ø38	-	-	-	-

Selection Table

1. Yaskawa Electric Corporation

(Notation example)
052 Gearbox Size(NX)
(8AA8) Motor flange code

Σ-7 Series SGM7J

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
50	SGM7J-A5A	3000	8	NX052(8AA8)						NX078(8AA8)		NX098 (8AA8)
100	SGM7J-01A	3000	8								NX098 (8AA8)	NX125
150	SGM7J-C2A	3000	8									
200	SGM7J-02A	3000	14	NX052(14BA14)		NX078(14BA14)				NX098(14BA14)		NX125 (14BA14)
400	SGM7J-04A	3000	14									Consult us
600	SGM7J-06A	3000	14			NX098(14BA14)				NX125(14BA14)		
750	SGM7J-08A	3000	19	NX078(19CA19)		NX098(19CA19)				NX125(19CA19)		

Σ-7 Series SGM7A

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
50	SGM7A-A5A	3000	8	NX052(8AA8)						NX078(8AA8)		NX098 (8AA8)
100	SGM7A-01A	3000	8								NX098 (8AA8)	NX125
150	SGM7A-C2A	3000	8									
200	SGM7A-02A	3000	14	NX052(14BA14)		NX078(14BA14)				NX098(14BA14)		NX125 (14BA14)
400	SGM7A-04A	3000	14									
600	SGM7A-06A	3000	14			NX098(14BA14)				NX125(14BA14)		
750	SGM7A-08A	3000	19	NX078(19CA19)		NX098(19CA19)				NX125(19CA19)		
1000	SGM7A-10A	3000	19	NX098(19CA19)		NX125(19CA19)				Consult us		

Σ-7 Series SGM7G

Servo Motor				Gearbox								
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
0.85	SGM7G-09A	1500	24	NX098(28DA24)								
1.3	SGM7G-13A	1500	24	NX125(28DA24)								
1.8	SGM7G-20A	1500	24									
2.9	SGM7G-30A	1500	35	NX125 (38EA35)								

Consult us

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

2. Mitsubishi Electric Corporation

(Notation example)
052 Gearbox Size(NX) | **(8AA8)** Motor flange code

MELSERVO-J4 Series HG-KR

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
50	HG-KR053(B)	3000	8	NX052(8AA8)						NX078(8AA8)		NX098 (8AA8)
100	HG-KR13(B)	3000	8								NX098 (8AA8)	NX125
200	HG-KR23(B)	3000	14	NX052(14BA14)		NX078(14BA14)				NX098(14BA14)		NX125 (14BA14)
400	HG-KR43(B)	3000	14									Consult us
750	HG-KR73(B)	3000	19	NX078(19CA19)		NX098(19CA19)				NX125(19CA19)		

MELSERVO-J4 Series HG-MR

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
50	HG-MR053(B)	3000	8	NX052(8AA8)						NX078(8AA8)		NX098 (8AA8)
100	HG-MR13(B)	3000	8								NX098 (8AA8)	NX125
200	HG-MR23(B)	3000	14	NX052(14BA14)		NX078(14BA14)				NX098(14BA14)		NX125 (14BA14)
400	HG-MR43(B)	3000	14									Consult us
750	HG-MR73(B)	3000	19	NX078(19CA19)		NX098(19CA19)				NX125(19CA19)		

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox								
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
0.5	HG-SR52(B)	2000	24	NX098(28DA24)						NX125(28DA24)		
1	HG-SR102(B)	2000	24			NX125(28DA24)						
1.5	HG-SR152(B)	2000	24							Consult us		
2	HG-SR202(B)	2000	35	NX125(38EA35)								
3.5	HG-SR352(B)	2000	35									

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

3. Panasonic Corporation

(Notation example)
052 Gearbox Size(NX) | **(8AB8)** Motor flange code

A5 Series MSME

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
50	MSME 5A	3000	8	NX052(8AB8)						NX078(8AB8)		NX098 (8AB8)
100	MSME 01	3000	8								NX098 (8AB8)	NX125
200	MSME 02	3000	11	NX052(14BB11)		NX078(14BB11)				NX098(14BB11)		NX125 (14BB11)
400	MSME 04	3000	14	NX052 (14BB14)		NX078(14BB14)				NX098(14BB14)		Consult us
750	MSME 08	3000	19	NX078(19CB19)		NX098(19CB19)				NX125(19CB19)		

A5 Series MSMD

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
50	MSMD 5A	3000	8	NX052(8AB8)						NX078(8AB8)		NX098 (8AB8)
100	MSMD 01	3000	8								NX098 (8AB8)	NX125
200	MSMD 02	3000	11	NX052(14BB11)		NX078(14BB11)				NX098(14BB11)		NX125 (14BB11)
400	MSMD 04	3000	14	NX052 (14BB14)		NX078(14BB14)				NX098(14BB14)		Consult us
750	MSMD 08	3000	19	NX078(19CB19)		NX098(19CB19)				NX125(19CB19)		

A5 Series MHMD

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
200	MHMD 02	3000	11	NX052(14BB11)		NX078(14BB11)				NX098(14BB11)		NX125 (14BB11)
400	MHMD 04	3000	14	NX052 (14BB14)		NX078(14BB14)				NX098(14BB14)		Consult us
750	MHMD 08	3000	19	NX078(19CB19)		NX098(19CB19)				NX125(19CB19)		

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

4. Omron Corporation

(Notation example)
052 Gearbox Size(NX)
(8AA8) Motor flange code

G5 Series R88M-K (AC200V)

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
50	05030 H/T	3000	8	NX052(8AA8)						NX078(8AA8)		NX098 (8AA8)
100	10030 H/T	3000	8								NX098 (8AA8)	NX125
200	20030 H/T	3000	11	NX052(14BB11)		NX078(14BB11)				NX098(14BB11)		NX125 (14BB11)
400	40030 H/T	3000	14	NX052 (14BB14)		NX078(14BB14)				NX098(14BB14)		Consult us
750	75030 H/T	3000	19	NX078(19CB19)		NX098(19CB19)				NX125(19CB19)		

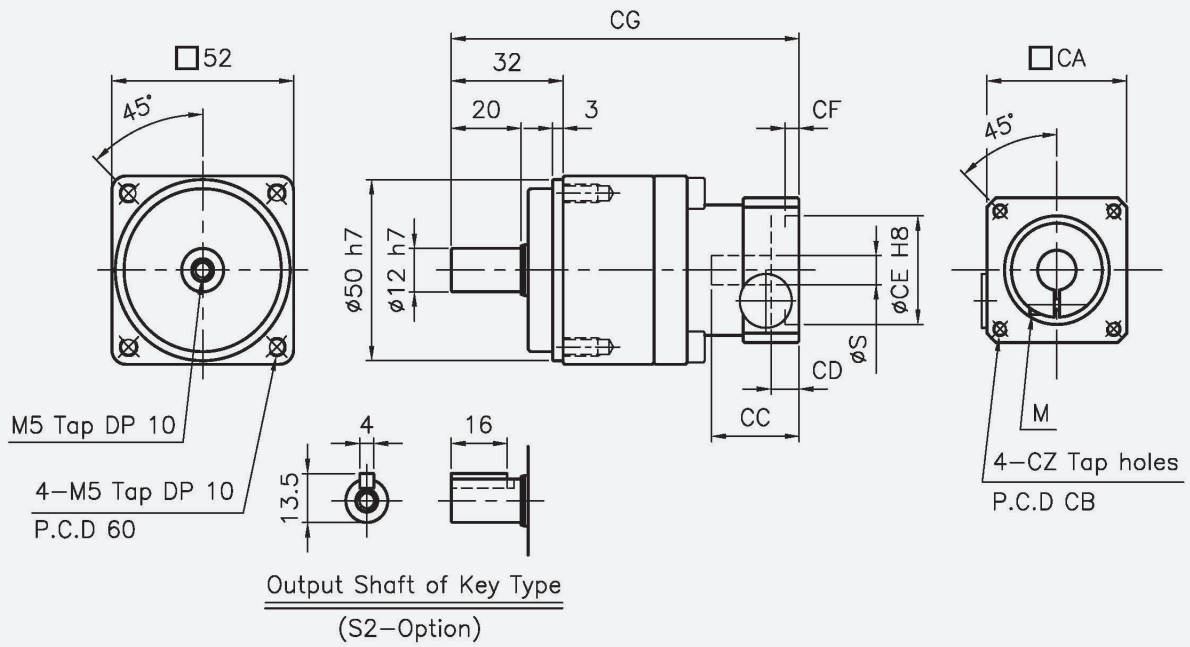
G5 Series R88M-K (AC400V)

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3	5	9	15	20	25	35	45	81
750	75030 F/C	3000	19	NX078(19CB19)		NX098(19CB19)				NX125(19CB19)		
3000	3K030 F/C	3000	22	NX125(28DA22)			Consult us					

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Dimensions

NX052, 1-Stage, Ratio(i) = 3, 5, 9



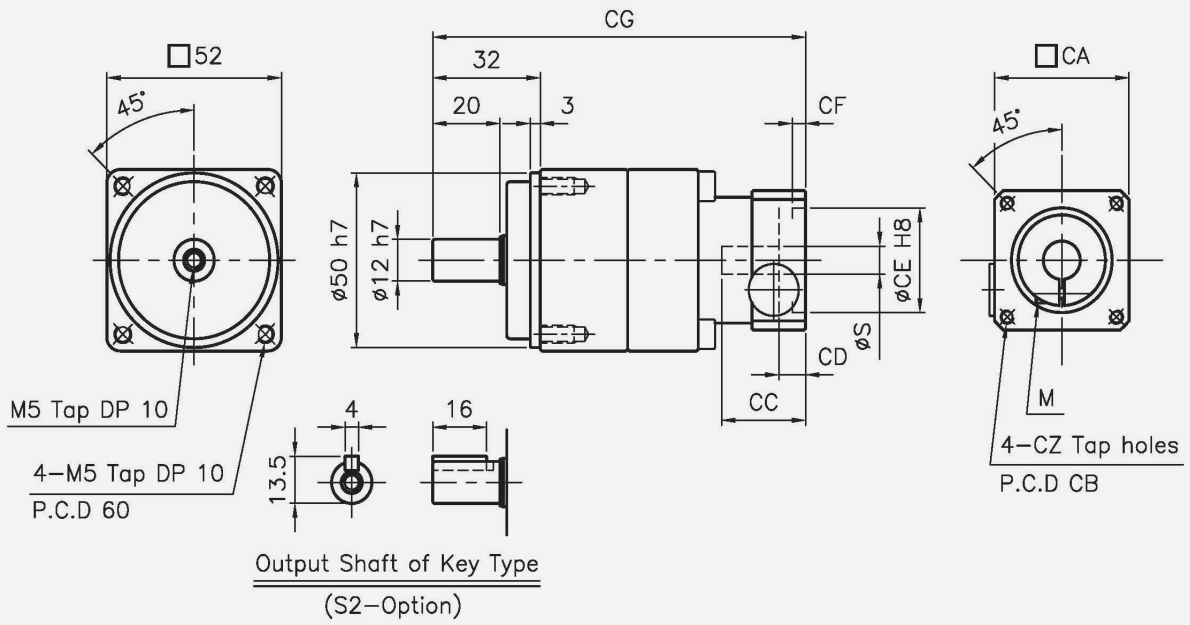
※ Max. input bore (ØSmax) = Ø14

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	40	46	27	5	30	4	99.5	4	4
8AB8	8	40	45	27	5	30	4	99.5	3	4
14BA14	14	60	70	35	5	50	4	104.5	5	5
14BB11	11	60	70	35	5	50	4	104.5	4	5
14BB14	14	60	70	35	5	50	4	104.5	4	5

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NX052, 2-Stage, Ratio(i) = 15, 20, 25, 35, 45, 81



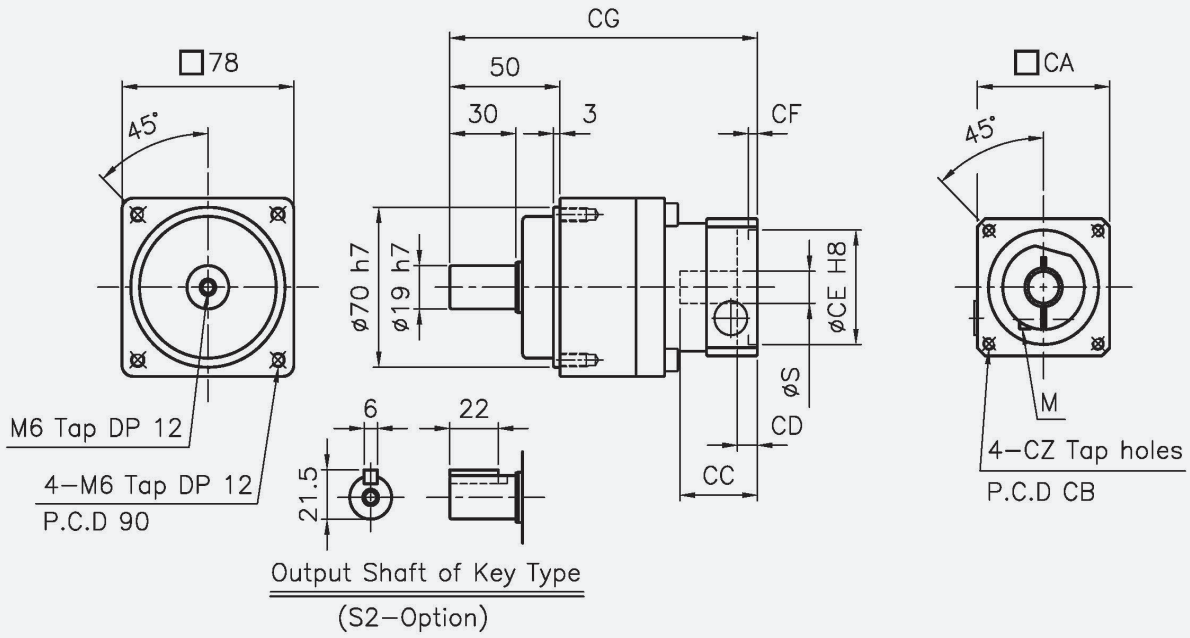
※ Max. input bore (ØSmax) = Ø14

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	40	46	27	5	30	5	110	4	4
8AB8	8	40	45	27	5	30	5	110	3	4

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NX078, 1-Stage, Ratio(i) = 3, 5, 9



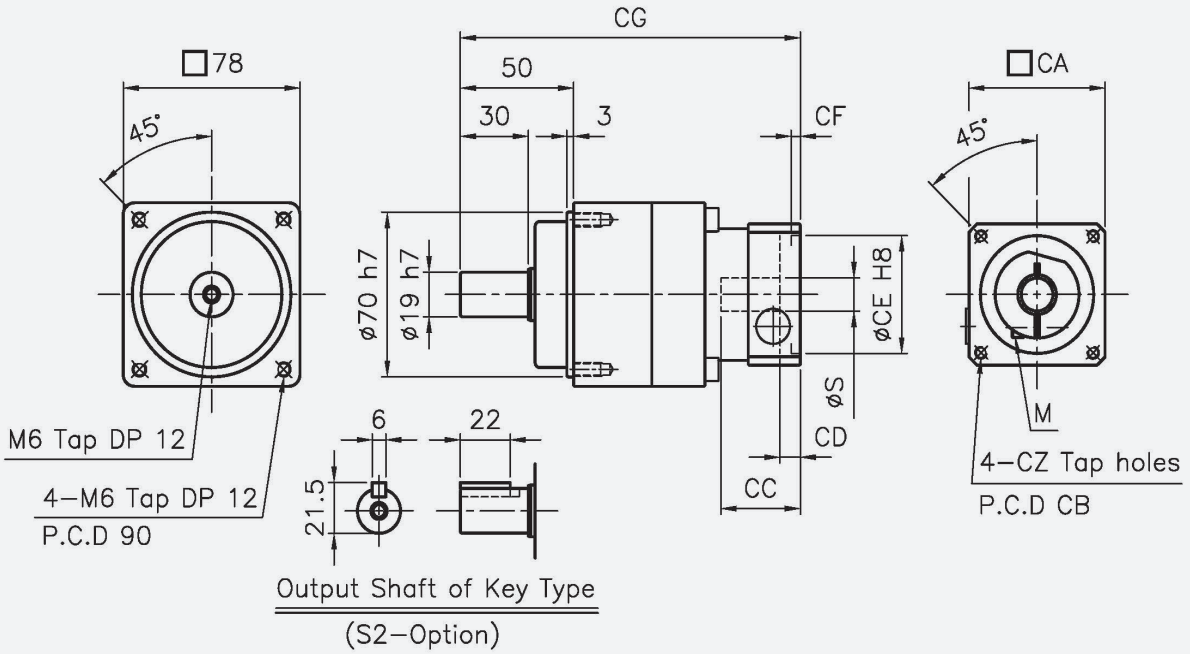
※ Max. input bore (ØSmax) = Ø19

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	60	70	35	5	50	4	139.5	5	5
14BB11	11	60	70	35	5	50	4	139.5	4	5
14BB14	14	60	70	35	5	50	4	139.5	4	5
19CA19	19	80	90	48	5	70	4	143.5	6	6
19CB19	19	80	90	48	5	70	4	143.5	5	6

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NX078, 2-Stage, Ratio(i) = 15, 20, 25, 35, 45, 81



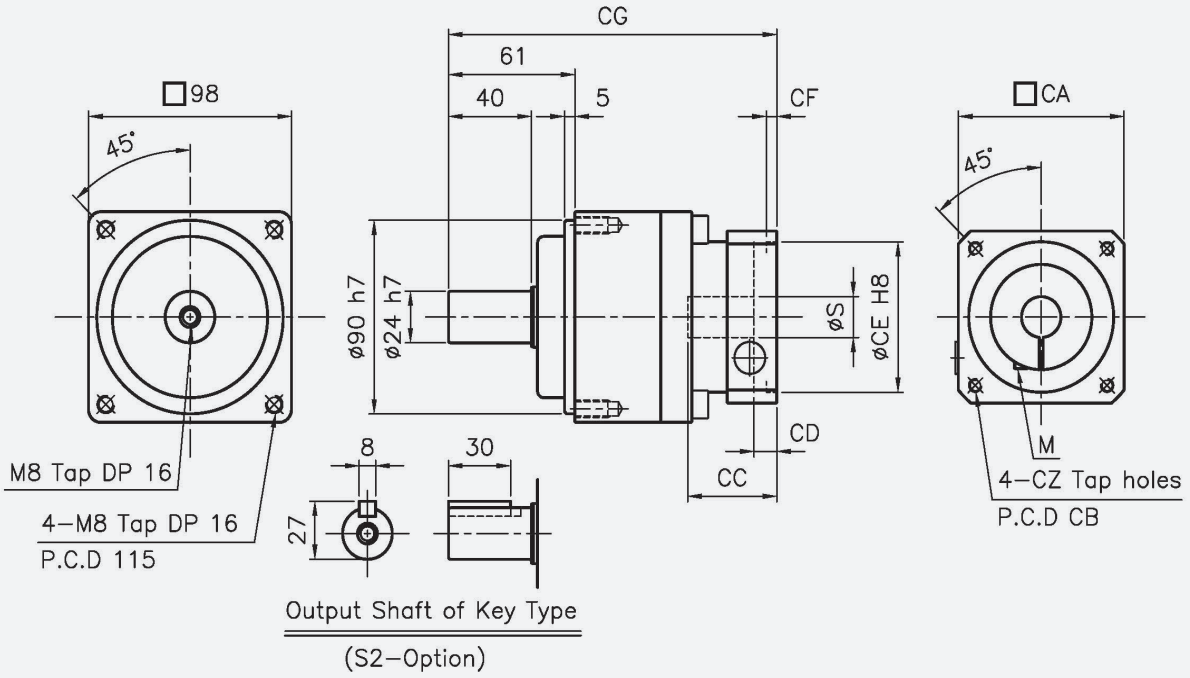
※ Max. input bore (ØSmax) = Ø14

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	40	46	30	5	30	4	142	4	4
8AB8	8	40	45	30	5	30	4	142	3	4
14BA14	14	60	70	35	5	50	4	150	5	5
14BB11	11	60	70	35	5	50	4	150	4	5
14BB14	14	60	70	35	5	50	4	150	4	5

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NX098, 1-Stage, Ratio(i) = 3, 5, 9



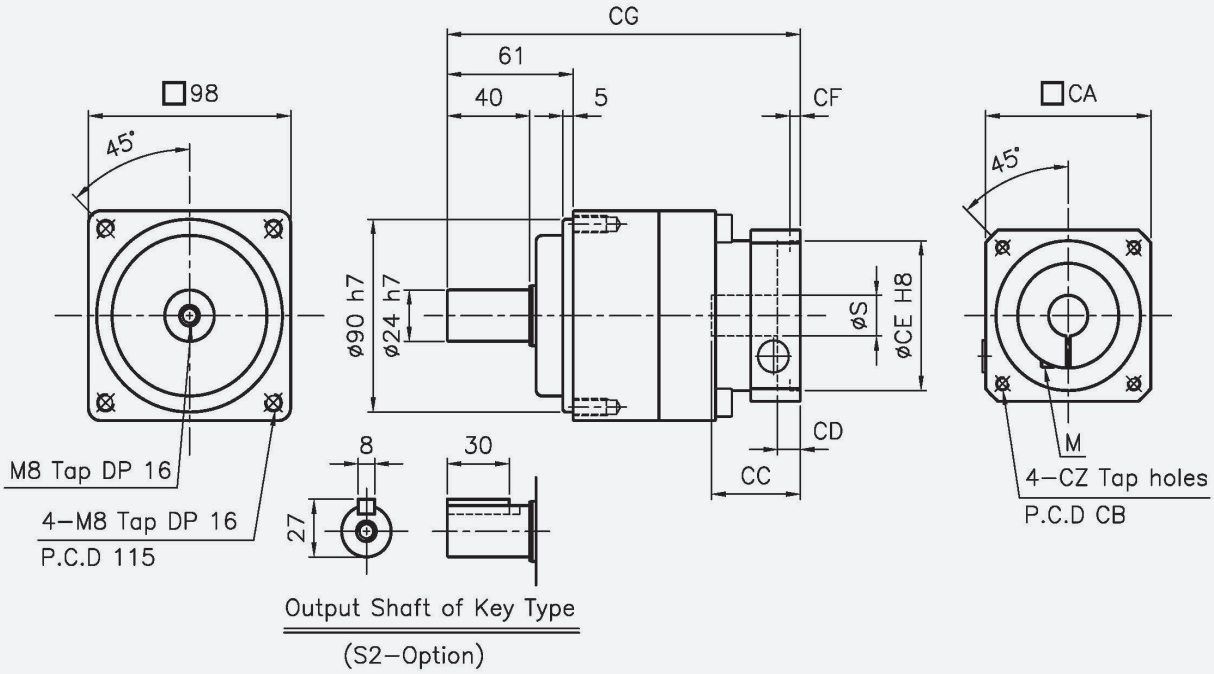
※ Max. input bore (ØSmax) = Ø28

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	60	70	35	5	50	4	165	5	5
14BB11	11	60	70	35	5	50	4	165	4	5
14BB14	14	60	70	35	5	50	4	165	4	5
19CA19	19	80	90	43	7	70	4	158.5	6	6
19CB19	19	80	90	43	7	70	4	158.5	5	6
28DA22	22	130	145	67	12	110	8	181	8	8
28DA24	24	130	145	67	12	110	8	181	8	8

1) For S dimension 11, 22, 24, bushing from page 176 is provided.

Dimensions

NX098, 2-Stage, Ratio(i) = 15, 20, 25, 35, 45, 81



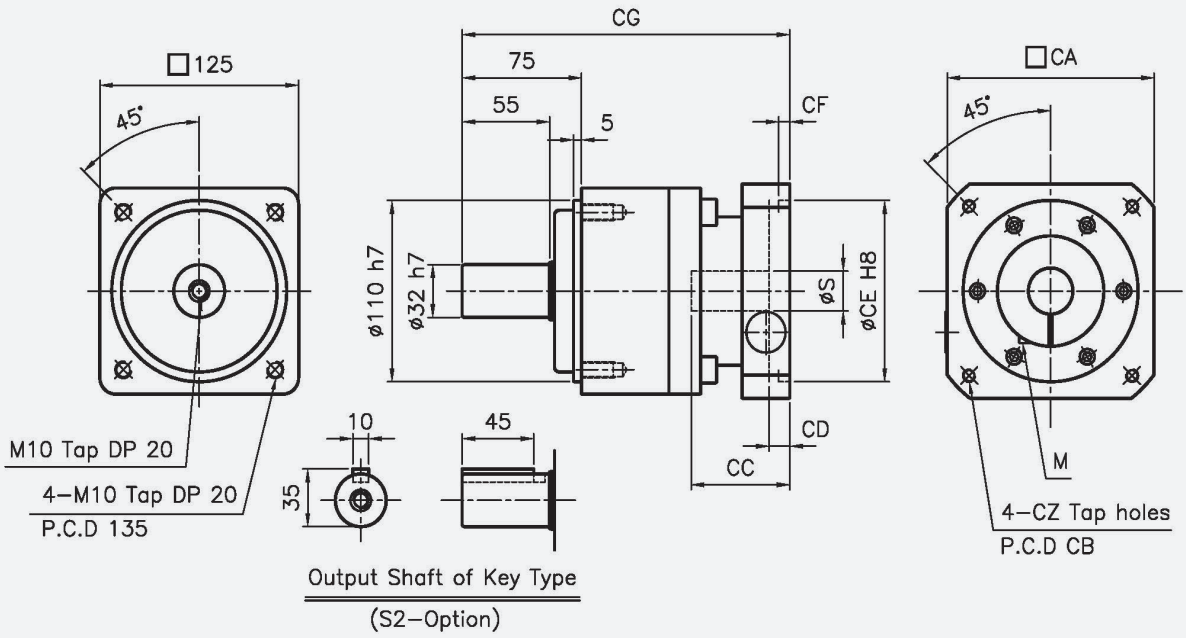
※ Max. input bore (ØSmax) = Ø28

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	40	46	27	5	30	4	158	4	4
8AB8	8	40	45	27	5	30	4	158	3	4
14BA14	14	60	70	35	5	50	4	165	5	5
14BB11	11	60	70	35	5	50	4	165	4	5
14BB14	14	60	70	35	5	50	4	165	4	5
19CA19	19	80	90	43	5	70	4	171	6	6
19CB19	19	80	90	43	5	70	4	171	5	6
28DA22	22	130	145	67	12	110	8	195	8	8
28DA24	24	130	145	67	12	110	8	195	8	8

1) For S dimension 11, 22, 24, bushing from page 176 is provided.

Dimensions

NX125, 1-Stage, Ratio(i) = 3, 5, 9



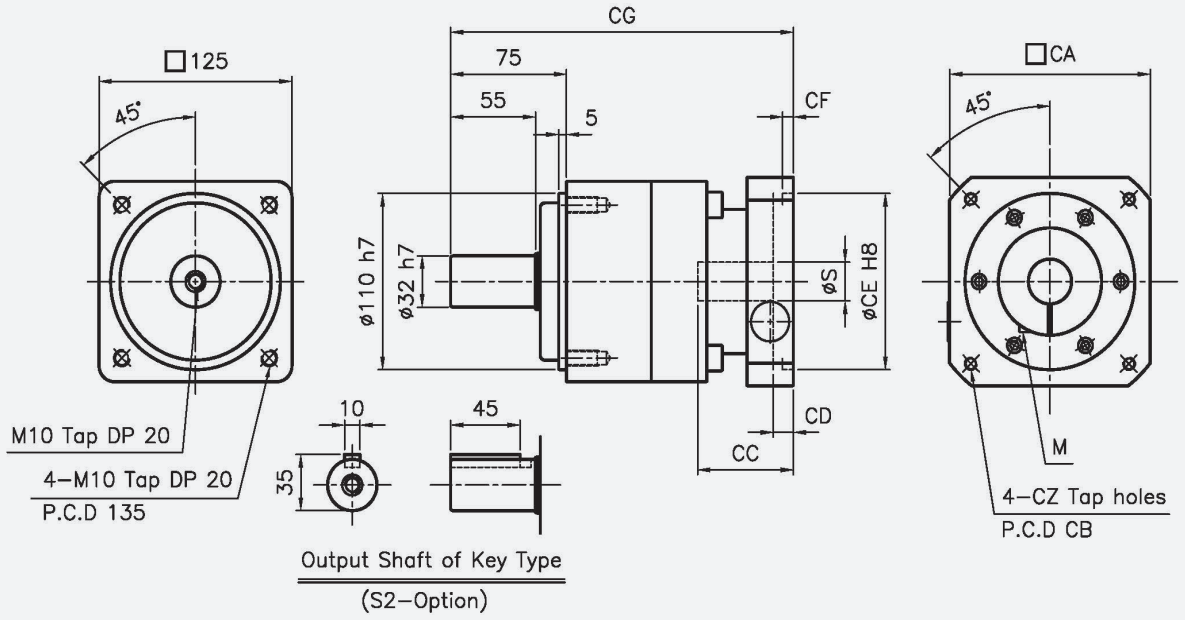
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
19CA19	19	80	90	50	7	70	6	198	6	6
19CB19	19	80	90	50	7	70	6	198	5	6
28DA22	22	130	145	67	12	110	8	211	8	8
28DA24	24	130	145	67	12	110	8	211	8	8
38EA35	35	180	200	82	15	114.3	8	226	12	10

1) For S dimension 22, 24, 35, bushing from page 176 is provided.

Dimensions

NX125, 2-Stage, Ratio(i) = 15, 20, 25, 35, 45, 81



※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	65	70	40	10	50	10	205	5	5
14BB11	11	65	70	40	10	50	10	205	4	5
14BB14	14	65	70	40	10	50	10	205	4	5
19CA19	19	80	90	50	7	70	6	210	6	6
19CB19	19	80	90	50	7	70	6	210	5	6
28DA22	22	130	145	67	12	110	8	227	8	8
28DA24	24	130	145	67	12	110	8	227	8	8
38EA35	35	180	200	82	15	114.3	8	242	12	10

1) For S dimension 11, 22, 24, 35, bushing from page 176 is provided.

NZ Series

- Low-noise, high-precision and compact gearbox with helical gear.
- Inline connection

Features

Low Noise
Low-noise is realized by using a helical gear that enables to provide smooth rotation.

High Rigidity
Ring gear directly gearing to provide compact, high rigidity and high torque.

High Precision
Enables high precision position control with precise backlash, and maximizes the characteristics of servo motor.

Long Life
No need for separate inspection or maintenance due to it's long service life.

Easy Mounting
Easy mounting of motor and gearbox due to corresponding of Set-collar and bushing to the output shaft of servo motor.

Herical Gearbox
Gearbox that uses helical gear and has a higher contact ratio than spur gear, it provides high torque and quiet operation.

Compact design
Compact design greatly saves space improving application design flexibility.

Specifications

Item	Unit	Stage	Ratio [10]	NZ060	NZ090	NZ120
Nominal output torque (T_{2N}) [1]	Nm	1	3.67	10	42	82
			5	10.5	44.5	86.5
			9	11.5	43	97.5
		2	11	15.5	34	66
			15	15.5	46.5	90
			21	17.5	49.5	96
			33	18.5	40.5	82
			45	22	55	112
			81	11.5	43.5	101
Maximum acceleration torque (T_{2B}) [2]	Nm	1	3.67	40	140	290
			5	45	145	325
			9	35	140	330
		2	11	45	135	320
			15	45	185	380
			21	45	190	380
			33	45	135	355
			45	45	180	380
			81	35	140	330
Emergency stop torque (T_{2E}) [3]	Nm	1	3.67	60	175	445
			5	60	240	500
			9	60	200	500
		2	11	60	180	395
			15	60	250	500
			21	60	250	500
			33	60	180	395
			45	60	250	500
			81	60	200	500
Maximum radial load (F_{2rB}) [4]	N	1	3.67	275	845	1135
			5	305	940	1260
			9	370	1145	1530
		2	11	395	1220	1630
			15	440	1355	1815
			21	495	1515	2030
			33	575	1765	2360
			45	635	1955	2620
			81	775	2380	3185
Maximum axial load (F_{2aB}) [5]	N	1	3.67	535	1570	2390
			5	595	1750	2650
			9	725	2130	3220
		2	11	775	2270	3450
			15	860	2525	3830
			21	960	2825	4280
			33	1115	3285	4980
			45	1240	3640	5520
			81	1500	4430	6720
Nominal input speed (n_{1N}) [6]	rpm	1, 2	3.67~81	3000	3000	3000
Maximum input speed (n_{1B}) [7]	rpm	1, 2	3.67~81	6000	6000	5000
Precision backlash (P1)	arcmin	1	3.67~9	≤3	≤3	≤3
		2	11~81	≤5	≤5	≤5
Low backlash (P2)	arcmin	1	3.67~9	≤8	≤8	≤8
		2	11~81	≤10	≤10	≤10
Standard backlash (P3)	arcmin	1	3.67~9	≤12	≤12	≤12
		2	11~81	≤15	≤15	≤15
Noise level [8]	dB(A)	1,2	3.67~81	≤70	≤70	≤70
Efficiency (η) [9]	%	1	3.67~9	≥90		
		2	11~81	≥85		
Lubrication		1,2	3.67~81	Grease		
Mounting position		1,2	3.67~81	All directions		

1) Nominal output torque is the allowable value of average load torque applied to the output shaft.
2) Maximum acceleration torque is the allowable value of startup/stop torque generated during operation.
3) Emergency stop torque is the allowable value of overload or shock load torque. (1000 times permitted during the lifetime of the gearbox)
4) When the input speed is 3000 rpm, the allowable value of the radial load is on the middle of the output shaft. (Axial load 0 N)
5) When the input speed is 3000 rpm, the allowable value of the axial load is on the center of the output shaft. (Radial load 0 N)
6) Allowable value of average input speed.
7) Maximum input speed allowed intermittently. (Please contact NARA when using over the nominal input speed)
8) Representative value measured at a distance of 1m from a gearbox with a reduction ratio of 1/9 (1-stage) or 1/81 (2-stage) at the nominal input speed under no load condition.
9) Efficiency at full load.
10) For ratio of 3.67, the actual reduction ratio is 3/11

Inertia

Item	Unit	Stage	Ratio	Input bore	NZ060	NZ090	NZ120
Mass moment of inertia (J_1)	$kg \cdot cm^2$	1	3.67	≤Ø8	0.142	-	-
				≤Ø14	0.211	0.849	-
				≤Ø19	0.422	0.985	-
				≤Ø28	-	1.679	3.827
				≤Ø38	-	-	6.901
			5	≤Ø8	0.116	-	-
				≤Ø14	0.186	0.831	-
				≤Ø19	0.394	0.975	-
				≤Ø28	-	1.668	2.943
				≤Ø38	-	-	6.018
			9	≤Ø8	0.098	-	-
				≤Ø14	0.168	0.506	-
				≤Ø19	0.378	0.647	1.82
				≤Ø28	-	1.341	2.288
				≤Ø38	-	-	5.363
		2	11	≤Ø8	0.14	-	-
				≤Ø14	0.211	0.513	-
				≤Ø19	-	0.647	1.92
				≤Ø28	-	1.338	2.285
				≤Ø38	-	-	-
			15	≤Ø8	0.137	-	-
				≤Ø14	0.208	0.491	-
				≤Ø19	-	0.596	1.822
				≤Ø28	-	1.316	2.186
				≤Ø38	-	-	-
			21	≤Ø8	0.107	-	-
				≤Ø14	0.178	0.44	-
				≤Ø19	-	0.546	1.555
				≤Ø28	-	1.243	1.897
				≤Ø38	-	-	-
			33	≤Ø8	0.092	-	-
				≤Ø14	0.16	0.411	1.284
				≤Ø19	-	-	1.404
				≤Ø28	-	-	1.711
				≤Ø38	-	-	-
			45	≤Ø8	0.092	-	-
				≤Ø14	0.16	0.41	1.273
				≤Ø19	-	-	1.393
				≤Ø28	-	-	1.7
				≤Ø38	-	-	-
			81	≤Ø8	0.092	0.352	-
				≤Ø14	-	0.408	1.265
				≤Ø19	-	-	-
				≤Ø28	-	-	-
				≤Ø38	-	-	-

Selection Table

1. Yaskawa Electric Corporation

(Notation example)
060 Gearbox Size(NZ)
(8AA8) Motor flange code

Σ-7 Series SGM7J

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
50	SGM7J-A5A	3000	8	NZ060(8AA8)								NZ090 (8AA8)
100	SGM7J-01A	3000	8									
150	SGM7J-C2A	3000	8									
200	SGM7J-02A	3000	14	NZ060(14BA14)						NZ090(14BA14)		
400	SGM7J-04A	3000	14					NZ090(14BA14)		NZ120 (14BA14)		
600	SGM7J-06A	3000	14									Consult us
750	SGM7J-08A	3000	19	NZ060(19CA19)	NZ090(19CA19)				NZ120(19CA19)			

Σ-7 Series SGM7A

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
50	SGM7A-A5A	3000	8	NZ060(8AA8)								NZ090 (8AA8)
100	SGM7A-01A	3000	8									
150	SGM7A-C2A	3000	8									
200	SGM7A-02A	3000	14	NZ060(14BA14)						NZ090(14BA14)		
400	SGM7A-04A	3000	14					NZ090(14BA14)		NZ120(14BA14)		
600	SGM7A-06A	3000	14									
750	SGM7A-08A	3000	19	NZ060 (19CA19)	NZ090(19CA19)				NZ120(19CA19)			
1000	SGM7A-10A	3000	19							Consult us		

Σ-7 Series SGM7G

Servo Motor				Gearbox								
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
0.85	SGM7G-09A	1500	24	NZ090(28DA24)			NZ120 (28DA24)					
1.3	SGM7G-13A	1500	24						Consult us			
1.8	SGM7G-20A	1500	24	NZ120 (28DA24)								
2.9	SGM7G-30A	1500	35									

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

2. Mitsubishi Electric Corporation

(Notation example)
060 Gearbox Size(NZ) | **(8AA8)** Motor flange code

MELSERVO-J4 Series HG-KR

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
50	HG-KR053(B)	3000	8	NZ060(8AA8)								NZ090 (8AA8)
100	HG-KR13(B)	3000	8									
200	HG-KR23(B)	3000	14	NZ060(14BA14)						NZ090(14BA14)		NZ120 (14BA14)
400	HG-KR43(B)	3000	14			NZ090 (14BA14)		NZ090(14BA14)		NZ120(14BA14)		Consult us
750	HG-KR73(B)	3000	19	NZ060 (19CA19)	NZ090(19CA19)				NZ120(19CA19)			

MELSERVO-J4 Series HG-MR

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
50	HG-MR053(B)	3000	8	NZ060(8AA8)								NZ090 (8AA8)
100	HG-MR13(B)	3000	8									
200	HG-MR23(B)	3000	14	NZ060(14BA14)						NZ090(14BA14)		NZ120 (14BA14)
400	HG-MR43(B)	3000	14			NZ090 (14BA14)		NZ090(14BA14)		NZ120(14BA14)		Consult us
750	HG-MR73(B)	3000	19	NZ060 (19CA19)	NZ090(19CA19)				NZ120(19CA19)			

MELSERVO-J4 Series HG-SR (2000 r/min)

Servo Motor				Gearbox								
Capacity (kW)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
0.5	HG-SR52(B)	2000	24	NZ090(28DA24)					NZ120(28DA24)			
1	HG-SR102(B)	2000	24			NZ120(28DA24)						
1.5	HG-SR152(B)	2000	24				Consult us					
2	HG-SR202(B)	2000	35	NZ120(38EA35)								
3.5	HG-SR352(B)	2000	35									

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

3. Panasonic Corporation

(Notation example)
060 Gearbox Size(NZ)
(8AB8) Motor flange code

A5 Series MSME

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
50	MSME 5A	3000	8	NZ060(8AB8)								NZ090 (8AB8)
100	MSME 01	3000	8									
200	MSME 02	3000	11	NZ060(14BB11)						NZ090(14BB11)		NZ120 (14BB11)
400	MSME 04	3000	14	NZ060(14BB14)		NZ090 (14BB14)	NZ060 (14BB14)		NZ090(14BB14)		NZ120(14BB14)	
750	MSME 08	3000	19	NZ060 (19CB19)		NZ090 (19CB19)				NZ120 (19CB19)		
3000	MSME 30	3000	22	NZ090 (28DA22)		NZ120 (28DA22)	Consult us					

A5 Series MSMD

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
50	MSMD 5A	3000	8	NZ060(8AB8)								NZ090 (8AB8)
100	MSMD 01	3000	8									
200	MSMD 02	3000	11	NZ060(14BB11)						NZ090(14BB11)		NZ120 (14BB11)
400	MSMD 04	3000	14	NZ060(14BB14)		NZ090 (14BB14)	NZ060 (14BB14)		NZ090 (14BB14)		NZ120(14BB14)	Consult us
750	MSMD 08	3000	19	NZ060 (19CB19)		NZ090(19CB19)				NZ120(19CB19)		

A5 Series MHMD

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
200	MHMD 02	3000	11	NZ060(14BB11)						NZ090(14BB11)		NZ120 (14BB11)
400	MHMD 04	3000	14	NZ060(14BB14)		NZ090 (14BB14)	NZ060 (14BB14)		NZ090(14BB14)		NZ120(14BB14)	Consult us
750	MHMD 08	3000	19	NZ060 (19CB19)		NZ090(19CB19)				NZ120(19CB19)		

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Selection Table

4. Omron Corporation

(Notation example)
060 Gearbox Size(NZ)
(8AA8) Motor flange code

G5 Series R88M-K (AC200V)

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
50	05030 H/T	3000	8	NZ060(8AA8)								NZ090 (8AA8)
100	10030 H/T	3000	8									
200	20030 H/T	3000	11	NZ060(14BB11)						NZ090(14BB11)		NZ120 (14BB11)
400	40030 H/T	3000	14	NZ060(14BB14)		NZ090 (14BB14)	NZ060 (14BB14)		NZ090(14BB14)		NZ120(14BB14)	
750	75030 H/T	3000	19	NZ060 (19CB19)	NZ090(19CB19)				NZ120(19CB19)			
3000	3K030 H/T	3000	22	NZ090 (28DA22)	NZ120 (28DA22)		Consult us					

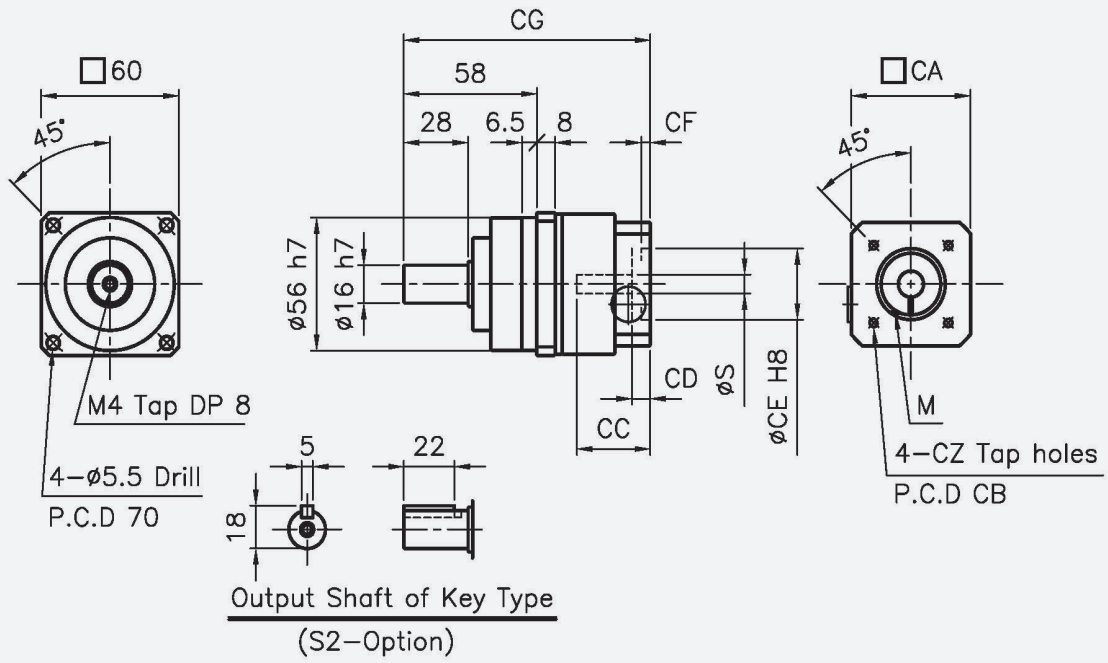
G5 Series R88M-K (AC400V)

Servo Motor				Gearbox								
Capacity (W)	Model	Speed (rpm)	Shaft dia. (mm)	Ratio (1-Stage)			Ratio (2-Stage)					
				3.67	5	9	11	15	21	33	45	81
750	75030 F/C	3000	19	NZ078(19CB19)		NZ098(19CB19)				NZ125(19CB19)		
3000	3K030 F/C	3000	22	NZ090 (28DA22)	NZ120(28DA22)		Consult us					

1) The content in ( ) is the motor flange code number.
2) For models without code number, please contact NARA.
3) Other servo motors not listed are also available, please contact NARA.
4) For detailed selection, please refer to the sizing and selection on page 6.

Dimensions

NZ060, 1-Stage, Ratio(i) = 3.67, 5, 9



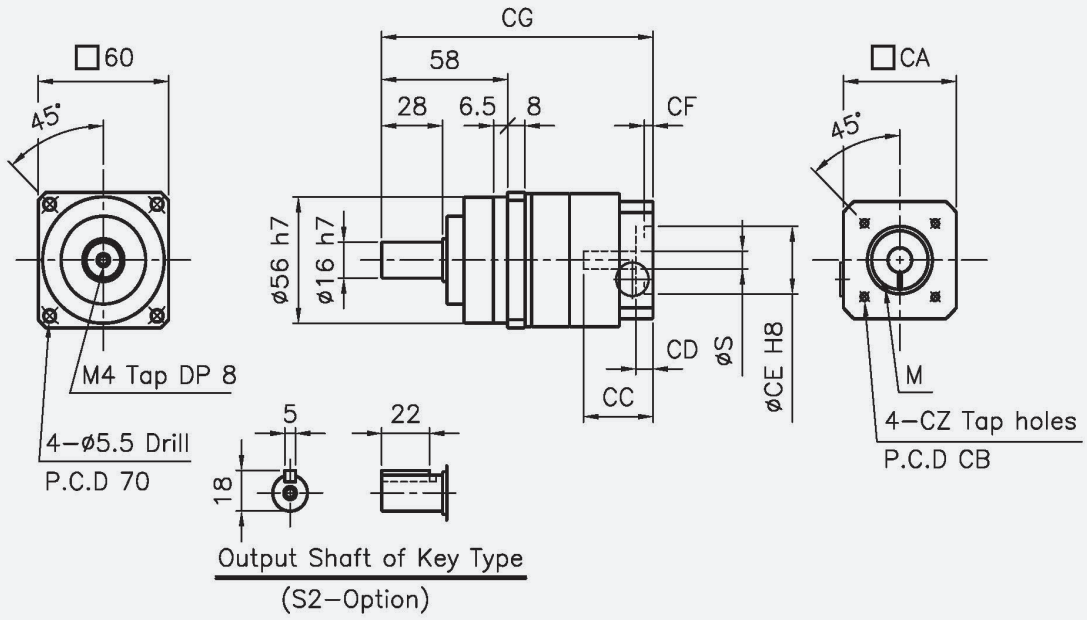
※ Max. input bore (ØSmax) = Ø19

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	52	46	32	5	30	5	107.5	4	4
8AB8	8	52	45	32	5	30	5	107.5	3	4
14BA14	14	65	70	40	10	50	10	117	5	5
14BB11	11	65	70	40	10	50	10	117	4	5
14BB14	14	65	70	40	10	50	10	117	4	5
19CA19	19	80	90	50	8	70	6	123	6	6
19CB19	19	80	90	50	8	70	6	123	5	6

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NZ060, 2-Stage, Ratio(i) = 11, 15, 21, 33, 45, 81



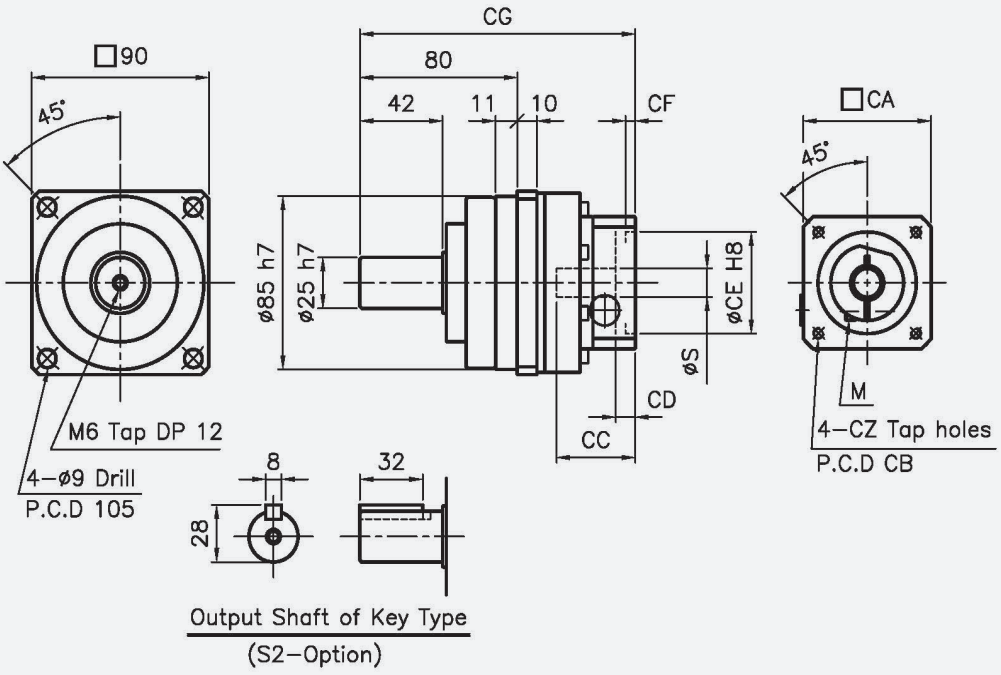
※ Max. input bore (ØSmax) = Ø14

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	52	46	32	5	30	5	125	4	4
8AB8	8	52	45	32	5	30	5	125	3	4
14BA14	14	65	70	40	10	50	10	134.5	5	5
14BB11	11	65	70	40	10	50	10	134.5	4	5
14BB14	14	65	70	40	10	50	10	134.5	4	5

1) For S dimension 11, bushing from page 176 is provided.

Dimensions

NZ090, 1-Stage, Ratio(i) = 3.67, 5, 9



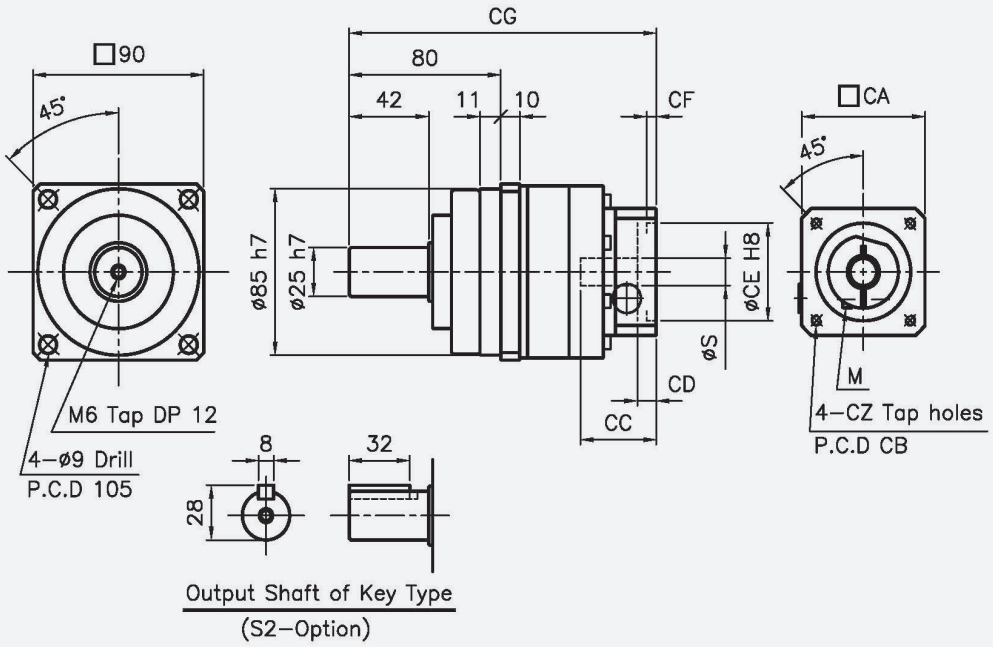
※ Max. input bore (ØSmax) = Ø28

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	65	70	40	10	50	10	140	5	5
14BB11	11	65	70	40	10	50	10	140	4	5
14BB14	14	65	70	40	10	50	10	140	4	5
19CA19	19	80	90	50	7	90	6	147.5	6	6
19CB19	19	80	90	50	7	90	6	147.5	5	6
28DA22	22	130	145	67	12	110	8	163.5	8	8
28DA24	24	130	145	67	12	110	8	163.5	8	8

1) For S dimension 11, 22, 24, bushing from page 176 is provided.

Dimensions

NZ090, 2-Stage, Ratio(i) = 11, 15, 21, 33, 45, 81



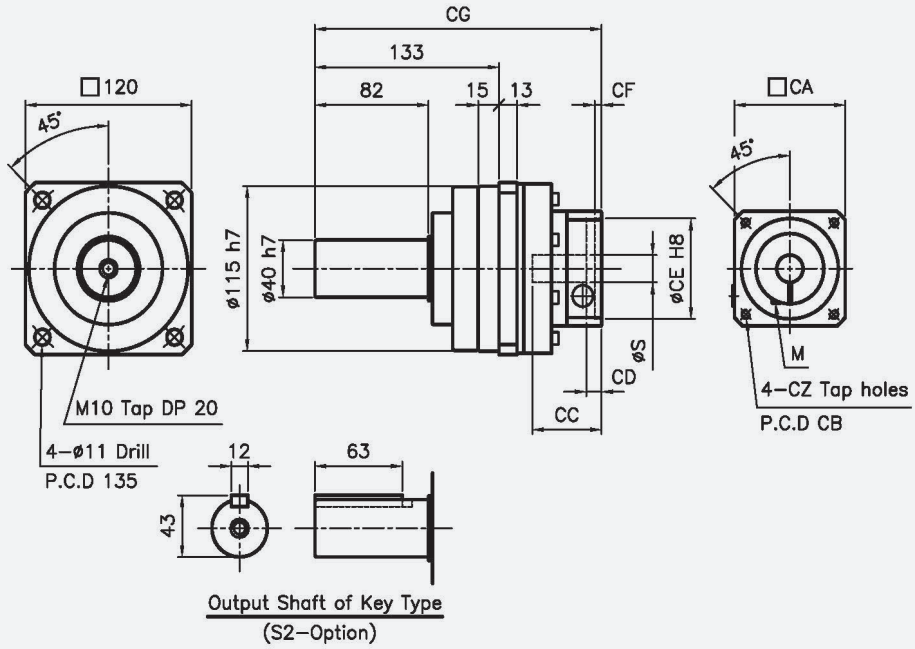
※ Max. input bore (ØSmax) = Ø28

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
8AA8	8	52	46	32	5	30	5	152.5	4	4
8AB8	8	52	45	32	5	30	5	152.5	3	4
14BA14	14	65	70	40	10	50	10	162	5	5
14BB11	11	65	70	40	10	50	10	162	4	5
14BB14	14	65	70	40	10	50	10	162	4	5
19CA19	19	80	90	50	7	70	6	169	6	6
19CB19	19	80	90	50	7	70	6	169	5	6
28DA22	22	130	145	67	12	110	8	186	8	8
28DA24	24	130	145	67	12	110	8	186	8	8

1) For S dimension 11, 22, 24, bushing from page 176 is provided.

Dimensions

NZ120, 1-Stage, Ratio(i) = 3.67, 5, 9



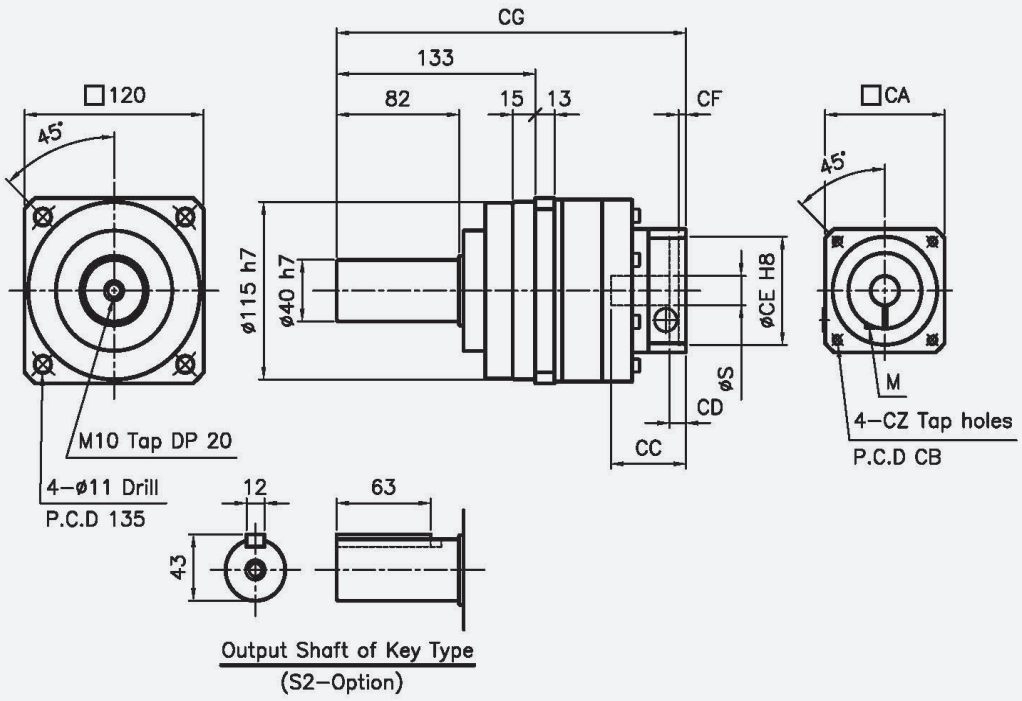
※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	65	70	40	10	50	10	201	5	5
14BB11	11	65	70	40	10	50	10	201	4	5
14BB14	14	65	70	40	10	50	10	201	4	5
19CA19	19	80	90	50	7	70	6	207	6	6
19CB19	19	80	90	50	7	70	6	207	5	6
28DA22	22	130	145	67	12	110	8	224	8	8
28DA24	24	130	145	67	12	110	8	224	8	8
38EA35	35	180	200	82	15	114.3	8	239	12	10

1) For S dimension 11, 22, 24, 35, bushing from page 176 is provided.

Dimensions

NZ120, 2-Stage, Ratio(i) = 11, 15, 21, 33, 45, 81



※ Max. input bore (ØSmax) = Ø38

Motor flange code	Dimensions									
	S [1]	CA	CB	CC	CD	CE	CF	CG	CZ	M
14BA14	14	65	70	40	10	50	10	228.5	5	5
14BB11	11	65	70	40	10	50	10	228.5	4	5
14BB14	14	65	70	40	10	50	10	228.5	4	5
19CA19	19	80	90	50	7	70	6	234	6	6
19CB19	19	80	90	50	7	70	6	234	5	6
28DA22	22	130	145	67	12	110	8	250	8	8
28DA24	24	130	145	67	12	110	8	250	8	8
38EA35	35	180	200	82	15	114.3	8	266	12	10

1) For S dimension 11, 22, 24, 35, bushing from page 176 is provided.

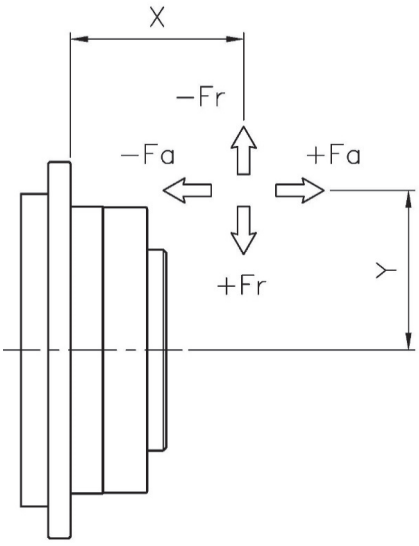
Tilting Moment

▪ Calculate the maximum tilting moment

In case the tilting moment acts on the output of the gearbox, use the formula below to ensure that the tilting moment does not exceed the allowable moment.

$$M_k = \frac{f_b \cdot \{Fr \cdot (X + K) + Fa \cdot Y\}}{1000} \leq M_{2kB}$$

Refer to the Table (1) to check if the result of the formula(M_k)is M_{2kB} or less.
If the M_k value exceeds the M_{2kB} value, select a larger size.



M_k : Tilting moment [Nm]
M_{2kB} : Allowable tilting moment [Nm]
f_b : Load factor
(Applicable when accurate load control is not performed)

Drive type	f_b	Drive type	f_b
Timing belt	1.2	Chain	1.3
V-belt	2.0	Cut gear	1.3
Flat belt	3.0		

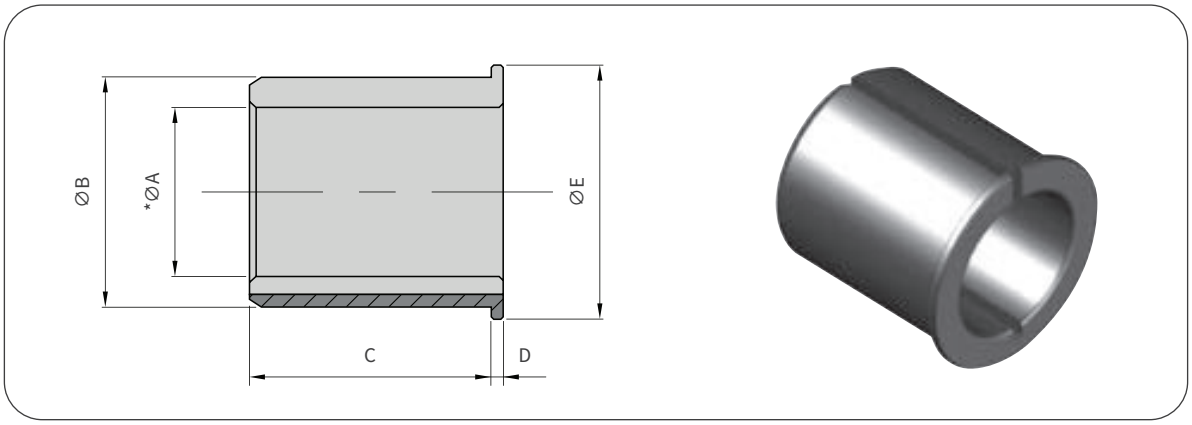
Fr : Average radial load [N]
X : Distance from output flange to Fr [mm]
K : Constant
Fa : Average axial load [N]
F_{2aB} : Allowable axial load [N]
Y : Distance of Fa load [mm]

Table (1)

NF, NFR	047	064	090	110	140	200	255
K	33.5	41.5	61	45.5	44	53	74
M_{2kB}	21.6	33	132	283	419	1046	1540
F_{2aB}	910	1100	3320	5110	6880	13180	17050

Bushing

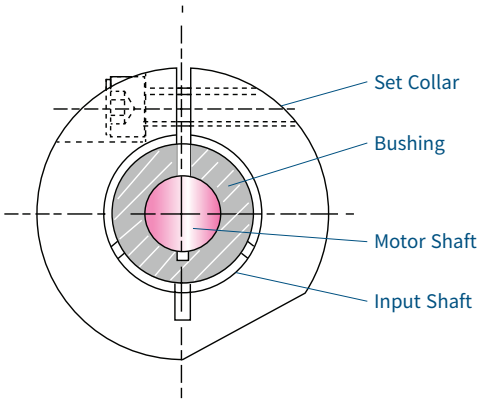
▪ Dimensions



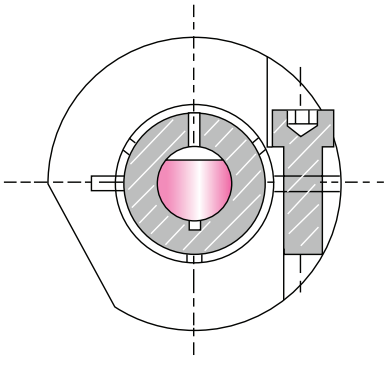
ØB	8	11	14	19	24	28	38	48	55
*ØA	5	6, 8	8, 9, 11	14, 16	22	19, 22, 24	24, 28, 32	35, 42	35
C	10	13.5	15	20	20	30	39	49	49
D	1	1	1	1	1	1	1	1	1
ØE	9	12	16	21	21	30	40	50	57

*ØA is an optional dimensions for the applied motor shaft. For the dimensions not shown in the table above, contact NARA.

▪ Arrangement of input shaft, bushing, and set collar.

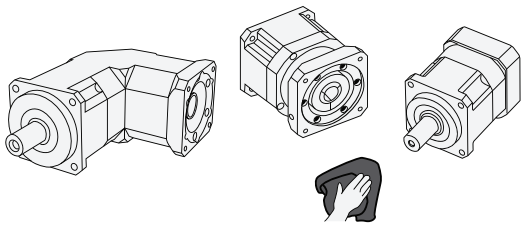


· To obtain high clamping force, arrange the bushing & set collar and each slot position in a line when assembling.

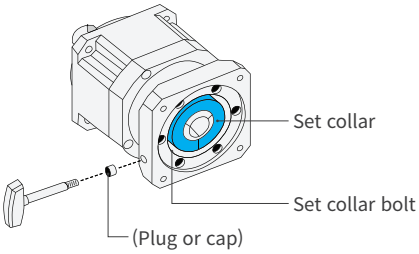


· In case the motor shaft is a flat shaft rather than a round , install it so that the flat surface of the shaft and the set color bolt of the gearbox are vertical as shown in the figure above.

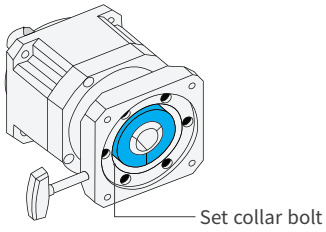
Motor Mounting



1. Double check the size of the motor and gearbox. And wipe the mounting surface clean.

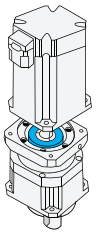


2. Remove the plug or cap of the motor flange. Adjust the position to loosen the set collar bolt.



3. Loosen the set collar bolt by one turn.

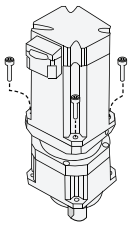
※ **Correct tightening method**
If the motor shaft is a flat shaft rather than a round , install it so that the flat surface of the shaft and the set color bolt of the gearbox are vertical.



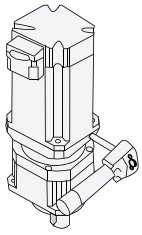
* It is recommended to assemble motor in the vertical direction.

* If a key is included in the motor shaft, remove the key.

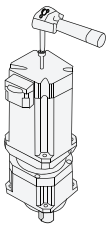
4. Slide the motor shaft into the input bore of the gearbox.
* Insert bushing if necessary.



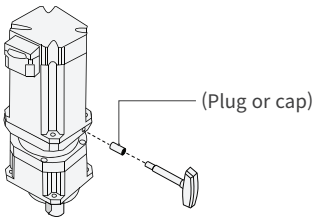
5. Tighten the motor mounting bolts in a diagonal direction about 5% of the tightening torque.



6. Use torque wrench to tighten the set collar bolts to the specified tightening torque.



7. Use torque wrench to tighten the mounting bolts for the motor and gearbox in the diagonal direction with specified tightening torque.



8. Assemble the plug or cap of the motor flange.

Tightening Torque

Motor mounting bolt

Bolt size	Tightening torque (Nm)
M3	1.1
M4	2.6
M5	5.2
M6	9.0
M8	21.6
M10	43
M12	73

Set collar bolt

Bolt size	Tightening torque (Nm)
M3	2.1
M4	4.9
M5	10
M6	17
M8	42
M10	83
M12	140

Gearbox mounting bolt
(NP, NPR, NF, NFR, NC, NZ)

Bolt size	Tightening torque (Nm)		
	G 8.8	G 10.9	G 12.9
M3	1.1	1.6	1.9
M4	2.6	3.9	4.5
M5	5.2	7.6	8.9
M6	9.0	12.8	15.4
M8	21.6	31.8	37.2
M10	43	63	73
M12	73	108	126
M16	180	264	309
M20	363	517	605

(NX)

Bolt size	Tightening torque (Nm)
M5	5.2
M6	9.0
M8	21.6
M10	43

* Use strength grade 8.8 or higher.

Caution & Warranty

Caution

Be careful when handling the product.

· Do not perform any actions to the product with a hammer, and be careful when handling it to avoid any damage caused by dropping.

Pay attention to the assembly when connecting the product directly to the load side.

· When connecting the product directly to the load side such as a belt or chain, pay attention to the state of direct connection such as concentricity, parallelism, and tension.
· Be careful when handling the product angle and output shaft keyseat. It may cause injury.
· Do not put your hands or other substances on the rotating shaft while the product is operating. It may cause injury.

Please do not apply any shock to the product.

· When assembling pulleys, couplings, keys, etc. to the product, be careful not to apply excessive shock.

Please do not exceed the allowable torque.

· Use within the torque(Nominal output, Maximum acceleration, Emergency stop) limit of the gearbox.

Do not disassemble the product.

· We do not guarantee the performance of the product in case you disassemble or reassemble the product arbitrarily.

Stop the system if it feels abnormal.

· Stop the system as soon as possible in case any abnormal sound, abnormal vibration, or abnormal heat is generated. It may adversely affect the system.

Warranty

The warranty period and scope of the product are as follows.

1. Warranty Priod

· 12 months from the product delivery or the operating time reaches 2000 hours, whichever comes first, is applied under the conditions of operation, assembly and lubrication specified by NARA.

2. Warranty scope

· During the warranty period, in case of a malfunction due to a manufacturing defect, Nara is obliged for repair or replacement free of charge. However, the following cases are excluded from the warranty scope.

① **Improper handling or use by the customer**
② **Product is arbitrarily modified or structurally changed**
③ **Failure which is caused by any other reason rather than the product itself**
④ **Other natural disasters**
⑤ **Reasons other than the preceding items**

However, if the product is connected to other devices of the customer, the warranty does not include its removing and installation, other incidental construction costs, transportation costs, opportunity loss, operation loss and other damages incurred by the customer.

* Specifications and dimensions in this catalog might change without any notice for product improvement, contact Nara before ordering.

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