G+® 吉嘉

Hollow Rotary Table [Economy Model]

Catalog No. EN-25

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CONTENTS

Hollow Rotary Table / GN Series

Multiple Combination Available, Cost-effective Choice
For High Precision Repeat Positioning Application

Standard Model

Equip Open Loop Stepper Motor

Equip Closed Loop Stepper Motor

Large Aperture Hollow Structure
Easy to wiring and piping

Direct Connection
Rotary table can be directly installed with working table robot arms

Long Life-span
The accuracy life can be reach 20000 hrs

Multiple Installation
Adopting cross roller bearing, it can be installed in horizontal, suspension and side

More Options for Motor Equip
Stepper and servo motor could be equipped

GN60

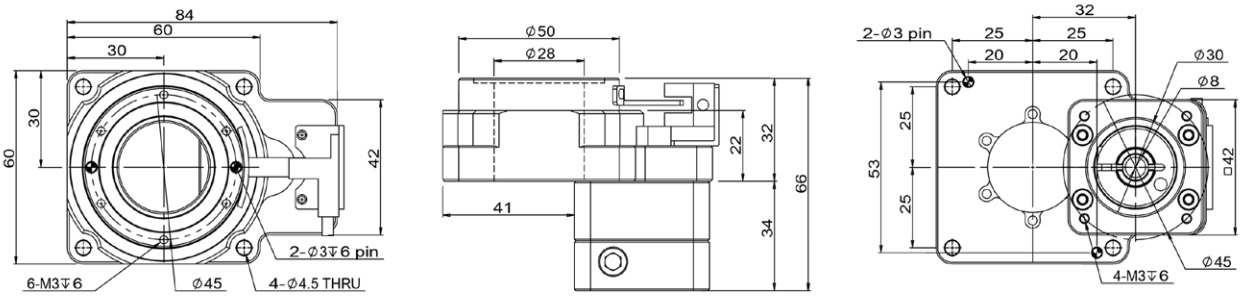
Series	Size	Type		Ratio		-		Motor
GN	60		-	05	-	SC	-	V1

Size	Type	Motor
60	F: Planetary	V1: Servo Ø8 PCD45,M3
85	Z: Right Angle	V2: Servo Ø8 PCD46,M4
130	None: Standard	Suit for 100W AC Servo Motor
200		
280		T1: Stepper Ø5 PCD43.8,M3
		T2: Stepper Ø6 PCD43.8,M3
		Suit for 42 Stepper Motor

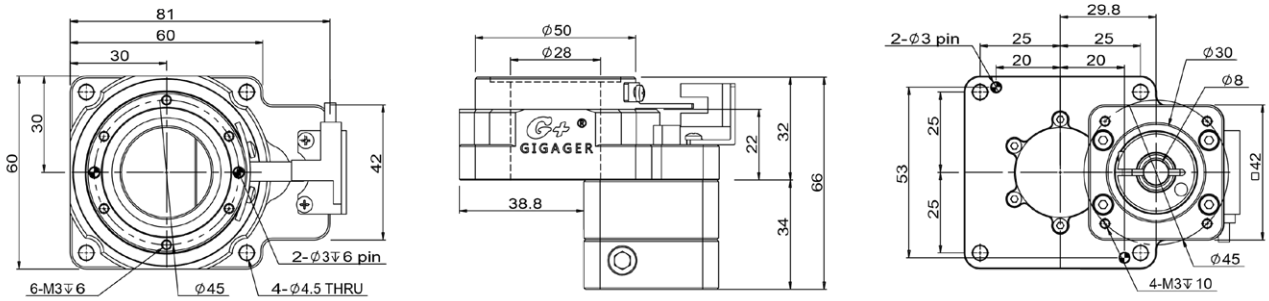
Technical Parameters

Parameters		Model						
		GN60		GN60Z	GN60F			
Bearing of Rotary Table		Cross Roller Bearing						
Gear Ratio	i	5	10	15	15	20	25	
Allowable Torque	N.m	5.2	4.0	5.2				
Allowable Table Speed	rpm	200		200				
Repeatability	arc-sec	≤ 10			≤ 15			
Allowable Moment of Inertia	N.m	5						
Positioning Accuracy	arc-min	≤ 1						
Allowable Axial Load	N	250						
Table Flatness	mm	≤ 0.01						
Table Concentricity	mm	≤ 0.01						
Ingress Protection	IP	40						
Weight	kg	0.6		1	1.1			

■ GN60-05



■ GN60-10



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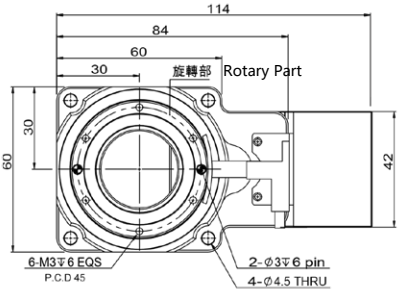
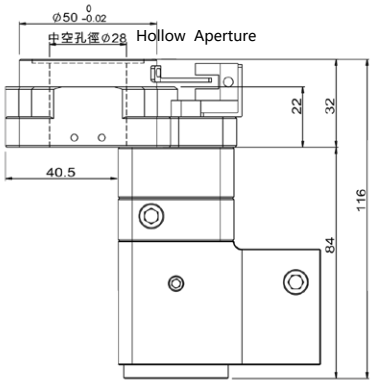
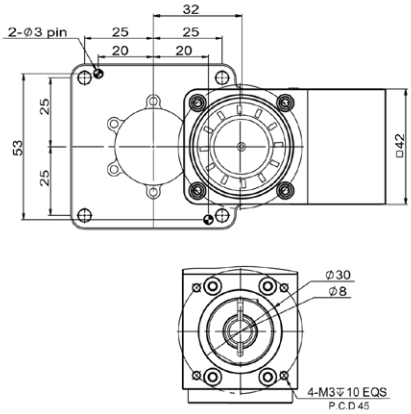
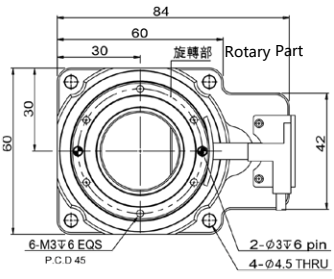
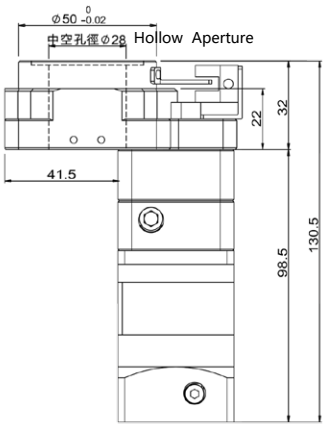


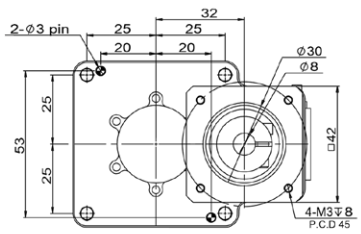




■ GN60F-15/20/25







GN85

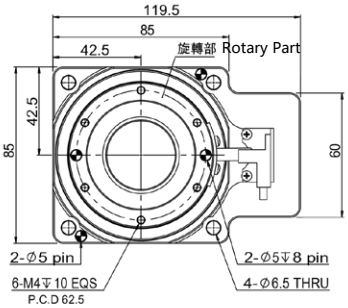
Seires	Size	Type		Ratio		-		Motor
GN	85		-	05	-	SC	-	V1

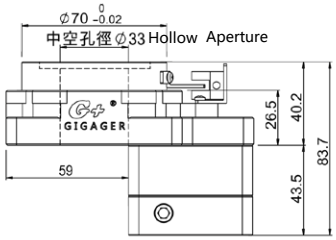
Size	Type	Motor
60 85 130 200 280	F: Planetary Z: Right Angle None: Standard	V1: Servo Ø14 PCD70,M4 V2: Servo Ø14 PCD70,M5 V3: Servo Ø11 PCD70,M4 Suit for 200~400W AC Servo Motor T1: Stepper Ø6.35 PCD66.67,M4 T2: Stepper Ø6.35 PCD70.7,M4 T3: Stepper Ø8 PCD70.7,M4 T4: Stepper Ø8 PCD66.67,M4 Suit for 57/60 Stepper Motor

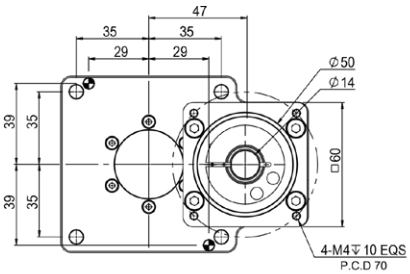
Technical Parameters

Parameters		Model						
		GN85		GN85Z		GN85F		
Bearing of Rotary Table		Cross Roller Bearing						
Gear Ratio	i	5	10	20	30	30	40	50
Allowable Torque	N.m	20	16	16	16	16	16	16
Allowable Table Speed	rpm	200						
Repeatability	arc-sec	≤ 10				≤ 15		
Allowable Moment of Inertia	N.m	10						
Positioning Accuracy	arc-min	≤ 1						
Allowable Axial Load	N	500						
Table Flatness	mm	≤ 0.01						
Table Concentricity	mm	≤ 0.01						
Ingress Protection	IP	40						
Weight	kg	1.4		2.6				

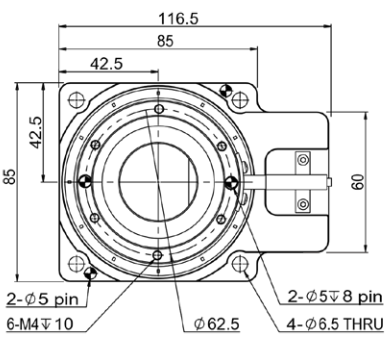
■ GN85-05

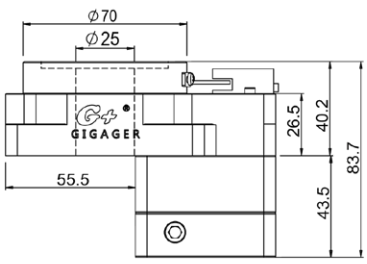


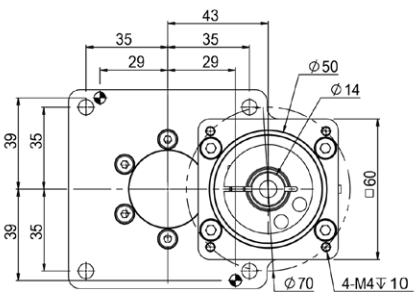




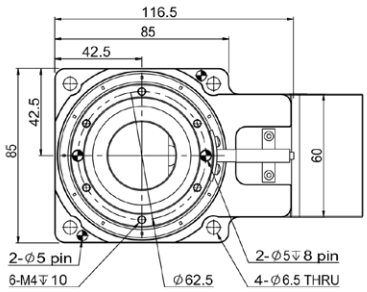
■ GN85-10

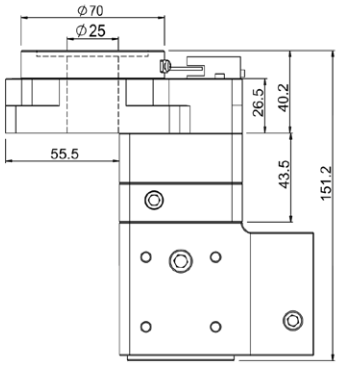


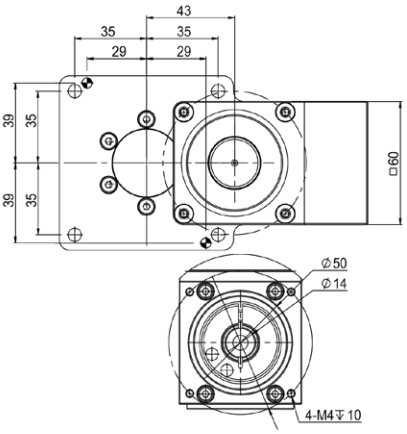




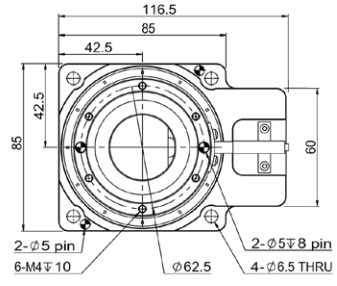
■ GN85Z-20/30

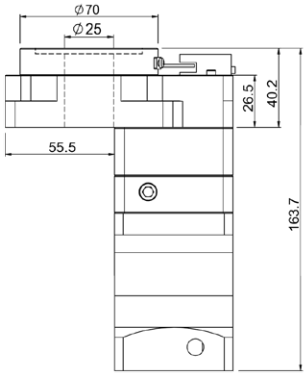


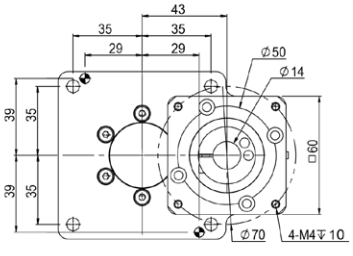




■ GN85F-30/40/50







GN130

Seires	Size	Type		Ratio		-		Motor
GN	130		-	10	-	SC	-	V1

Size: 60 / 85 / **130** / 200 / 280

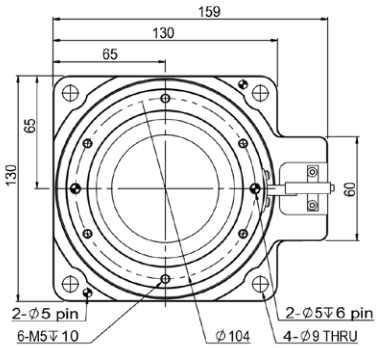
Type: F: Planetary; Z: Right Angle; None: Standard

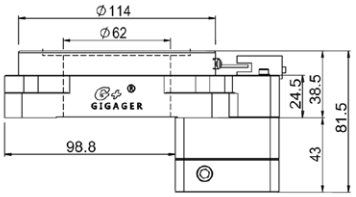
Motor:
- V1: Servo Ø14 PCD70,M4
  V2: Servo Ø14 PCD70,M5
  V3: Servo Ø11 PCD70,M4
  Suit for 200~400W AC Servo Motor
- T1: Stepper Ø6.35 PCD66.67,M4
  T2: Stepper Ø6.35 PCD70.7,M4
  T3: Stepper Ø8 PCD70.7,M4
  T4: Stepper Ø8 PCD66.67,M4
  Suit for 57/60 Stepper Motor

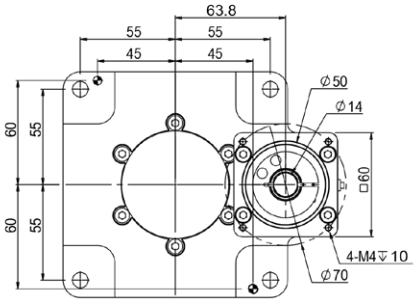
Technical Parameters

Parameters		Model						
		GN130		GN130Z		GN130F		
Bearing of Rotary Table		Cross Roller Bearing						
Gear Ratio	i	10	18	20	30	30	40	50
Allowable Torque	N.m	32	20	32				
Allowable Table Speed	rpm	200	150	200				
Repeatability	arc-sec	≤ 10				≤ 15		
Allowable Moment of Inertia	N.m	50						
Positioning Accuracy	arc-min	≤ 1						
Allowable Axial Load	N	2000						
Table Flatness	mm	≤ 0.01						
Table Concentricity	mm	≤ 0.01						
Ingress Protection	IP	40						
Weight	kg	2.5		3.8				

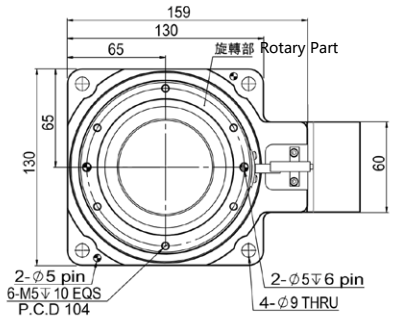
■ GN130-10/18

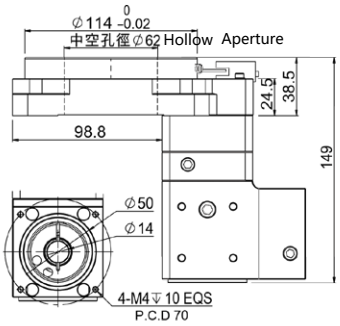


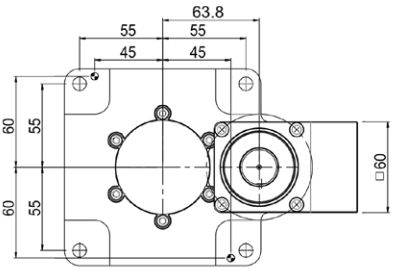




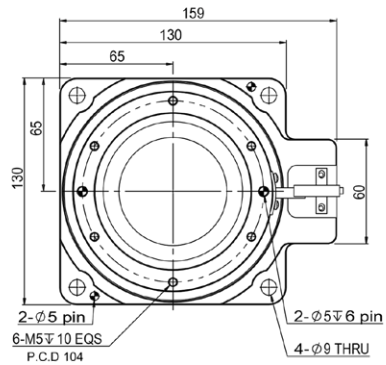
■ GN130Z-20/30

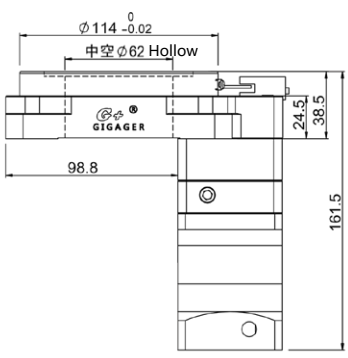


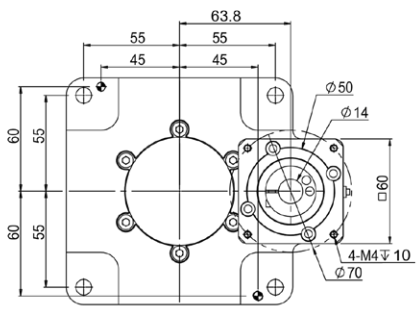




■ GN130F-30/40/50







GN200

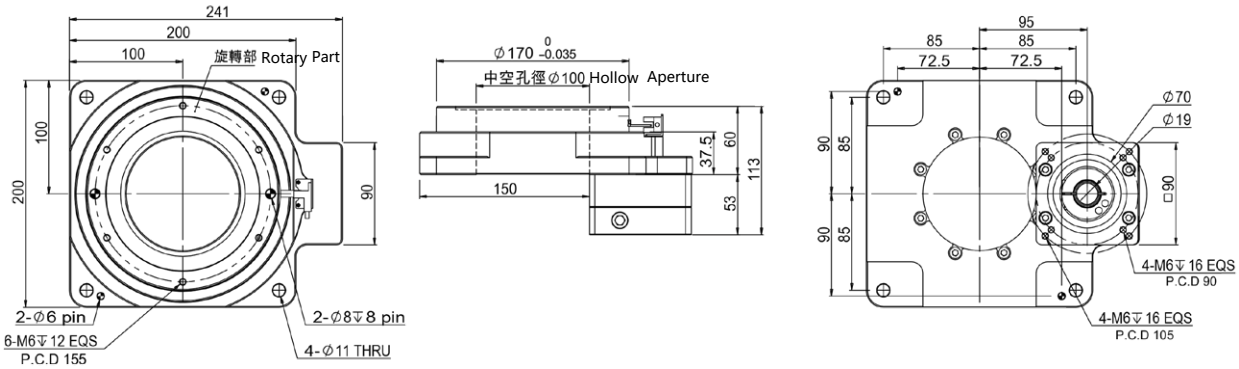
Seires	Size	Type		Ratio	-	Motor
GN	200		-	10	- SC	- V1

Size	Type	Motor
60 85 130 200 280	F: Planetary Z: Right Angle None: Standard	V1: Vhuyr Ø19 PCD90,M5 V2: Vhuyr Ø19 PCD90,M6 Vxlwiru :83Z DF Vhuyr Prwru T1: Vwhsshu Ø14 PCD98.4,M5 T2: Vwhsshu Ø14 PCD98.4,M6 Vxlwiru ;9 Vwhsshu Prwru

■ Technical Parameters

Parameters		Model						
		GN200		GN200Z		GN200F		
Bearing of Rotary Table		Cross Roller Bearing						
Gear Ratio	i	10	18	20	30	30	40	50
Allowable Torque	N.m	75	50	75				
Allowable Table Speed	rpm	200	150	200				
Repeatability	arc-sec	≤ 10				≤ 15		
Allowable Moment of Inertia	N.m	100						
Positioning Accuracy	arc-min	≤ 1						
Allowable Axial Load	N	4000						
Table Flatness	mm	≤ 0.01						
Table Concentricity	mm	≤ 0.01						
Ingress Protection	IP	40						
Weight	kg	7.8		12		11.5		

■ GN200-10/18



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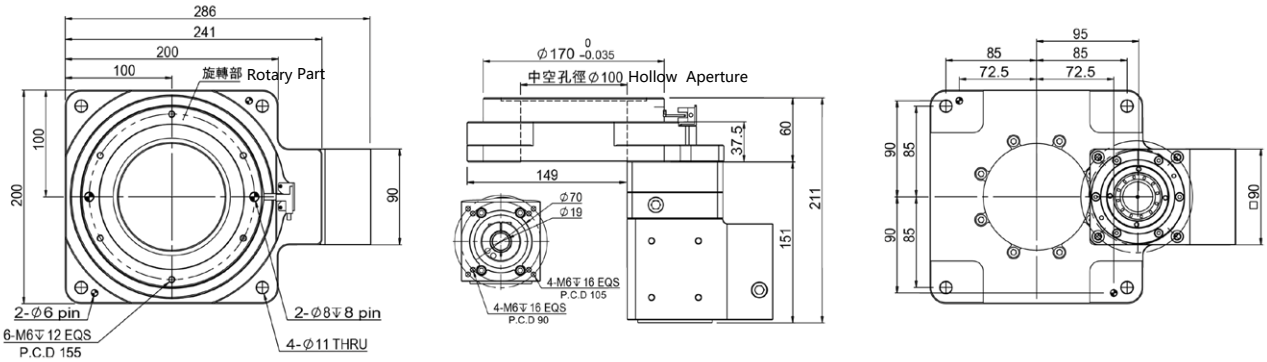
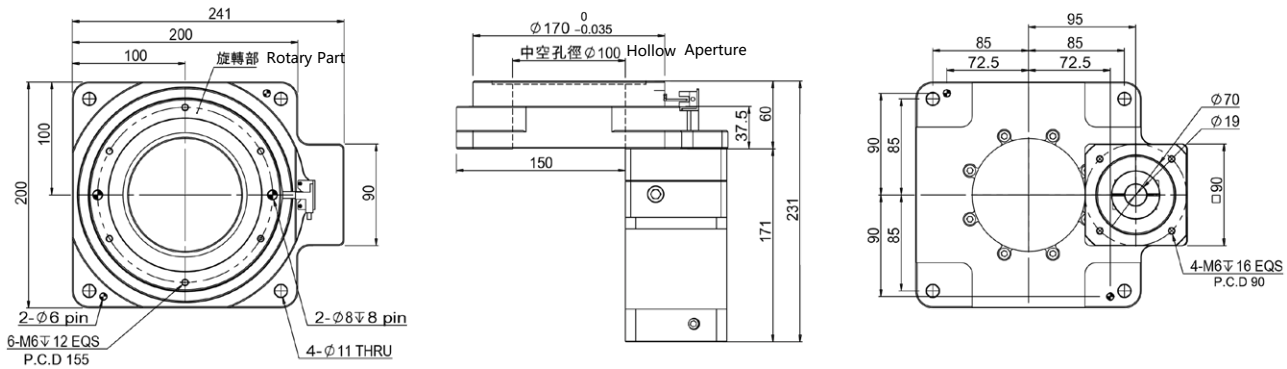


■ GN200F-30/40/50



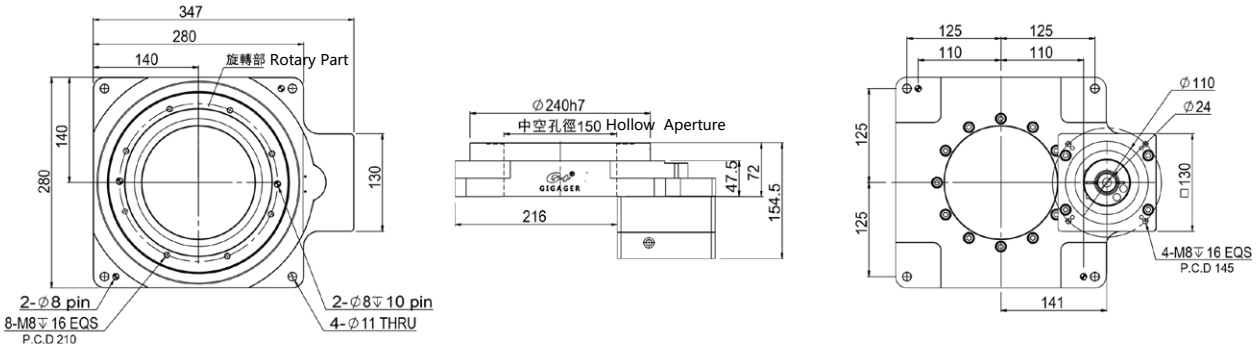
GN280

Seires	Size	Type		Ratio		-		Motor
GN	280		-	10	-	SC	-	V1
	60 85 130 200 280	I: Planetary None: Standard						V1: Servo Ø22 PCD145,M8 V2: Servo Ø24 PCD145,M8 Suit for 1000W AC Servo Motor

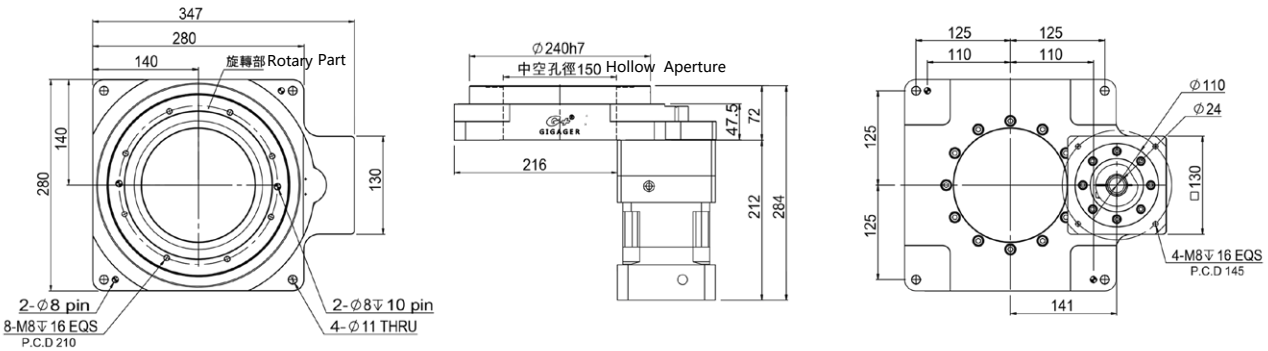
■ Technical Parameters

Parameters		Model			
		GN280	GN280F		
Bearing of Rotary Table		Cross Roller Bearing			
Gear Ratio	i	10	30	40	50
Allowable Torque	N.m	105			
Allowable Table Speed	rpm	200			
Repeatability	arc-sec	≤ 10			≤ 15
Allowable Moment of Inertia	N.m	200			
Positioning Accuracy	arc-min	≤ 1			
Allowable Axial Load	N	8000			
Table Flatness	mm	≤ 0.01			
Table Concentricity	mm	≤ 0.01			
Ingress Protection	IP	40			
Weight	kg	20	28		

■ GN280-10



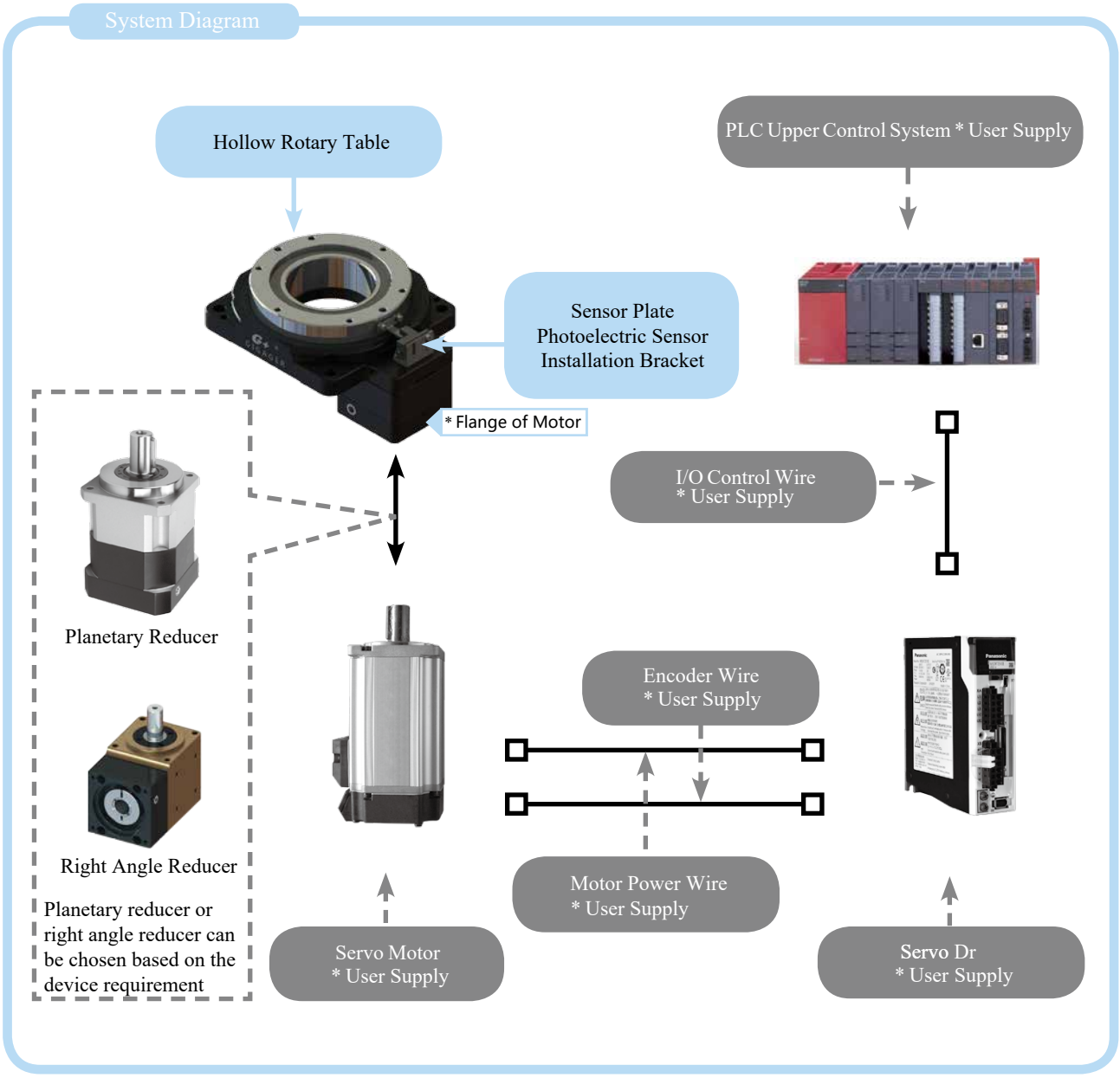
■ GN280F-30/40/50



System of Hollow Rotary Table● SV (For Servo Motor)

Standard Configuration	
Rotary Table * 1 set	Photoelectric Home Sensor 1 set
Sensor Plate 1 pcs	Sensor Installation Bracket 1 set

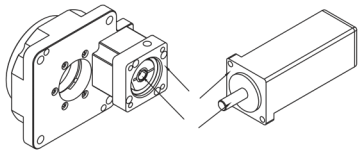
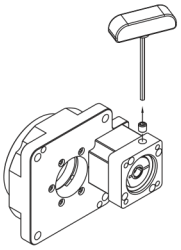
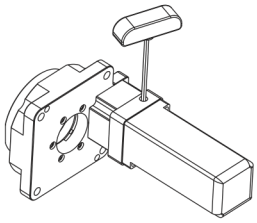
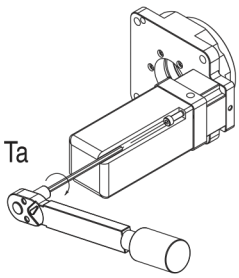
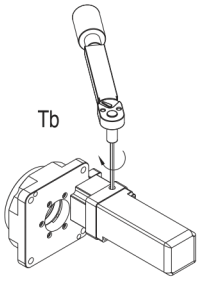
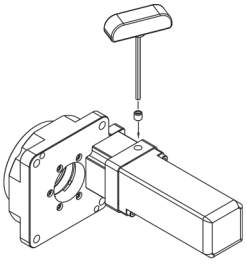
System Diagram



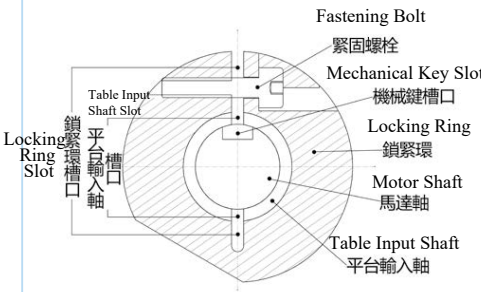
Note 1: Optional Accessories: The above Optional Accessories are for user's reference only, user can purchase as per the requirement

Motor Installation Instruction ● SV (Servo Type)

Motor Installation Instruction

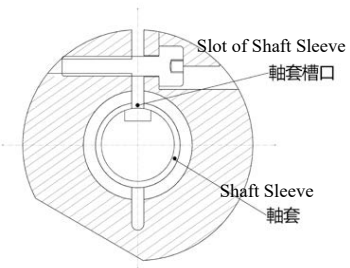
①	②	③
		
First match the size of the motor and the rotating platform and remove any foreign objects on the surface	Remove the screw plug on the adapter flange and adjust the position until the fastening bolt can be seen Note 1	Adjust the motor and adapter flange position and gently tighten the fastening bolts until the locking ring is no longer freewheeling
④	⑤	⑥
		
Diagonal preliminary fixing bolts, after the completion of step 5, refer to the tightening torque standard Ta Note 2 tighten the fastening bolts	Refer to the tightening torque standard Tb Note2 tighten the fastening bolts	Tighten the screw plug

Note 1: How to Install Motor?



Installation method for motor with mechanical key

Pull out the mechanical key, adjust the position of the locking ring, align its notch with the notch of the input shaft of the rotating platform, and then apply grease to the platform input shaft hole and the motor shaft, insert the motor shaft and make the mechanical key slot and Align the locking ring notches to maximize the fastening bolts of the locking ring for a stronger connection



Installation method with sleeve

Since the motor shaft diameter is too small to match the shaft input shaft hole of the platform, the sleeve can be added for adjustment. The installation method is the same as the motor mounting method with mechanical keys. It only needs to put the sleeve and open with the locking ring. Align the notches and tighten the fastening bolts of the locking ring

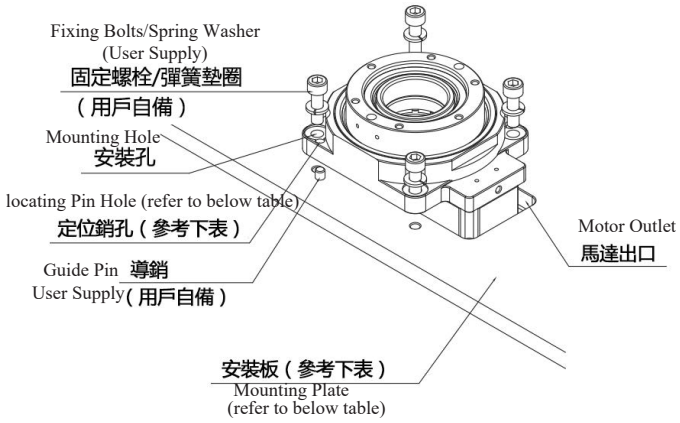
Note 2: Wrench Bolt Tightening Torque

Wrench Bolt Size	Motor Installation Ta(8.8T)		Locking Ring Installation Tb(12.9T)	
	N.m	kgf.cm	N.m	kgf.cm
M3	1.28	13	2.15	22
M4	2.9	30	4.95	50
M5	5.75	59	9.7	99
M6	9.9	101	16.5	168
M8	24	245	40	408
M10	48	489	81	826
M12	83	846	140	1428
M14	132	1346	220	2243
M16	200	2039	340	3467

Installation Instruction of Hollow Rotary Tables

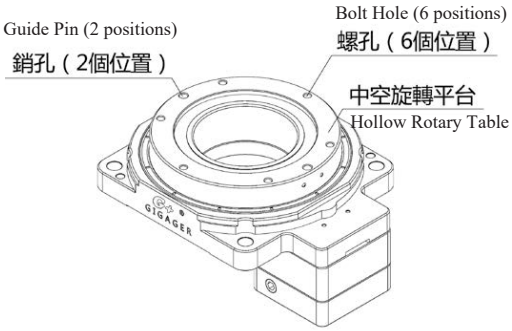
How to install a hollow rotary actuator?

Leave a motor outlet on the machine mounting plate to expose the motor Use the two locating pin holes (the locating pin holes in GSB60 and GSN60 are common to the mounting holes) and mount the hollow rotating actuator to the machine mounting plate shown below. These mounting holes are used to accurately position the hollow rotating actuator on the machine, making sure to secure the locating pins to the mounting plate



How to install a load on a hollow rotary actuator?

Install the load using the 6 mounting holes on the hollow rotating actuator. There are 2 pin holes for mounting the load on the hollow rotating actuator, which can be used to determine the position of the load. Be sure to fix the positioning pin firmly on the load



Locating pin hole size

Table Model	Diameter (mm)	Depth (mm)	Quantity
GN85	Ø5 + $^{0.012}_{0}$(H7)	9.5 (THRU)	2
GN130		14.5 (THRU)	2
GN200	Ø6 + $^{0.015}_{0}$(H7)	16 (THRU)	2
GN280	Ø8 + $^{0.015}_{0}$(H7)	25 (THRU)	2

Mounting plate thickness

Table Model	Thickness
GN60	More than 5mm
GN85	More than 8mm
GN130	More than 10mm
GN200	
GN280	More than 15mm

Installation Precautions

Before installation, read the following installation precautions and install as follows.

- Indoor (area not directly in contact with sunlight)
- Area without heat radiation
- Working environment temperature: 0~+50°C
- Temperature below the origin sensor: 0~+40°C
- Working environment humidity: less than 85%
- There is no flammable or explosive acid gas
- Place to block dust, oil and splashes
- Place without direct shock or excessive impact

Calculation Reference

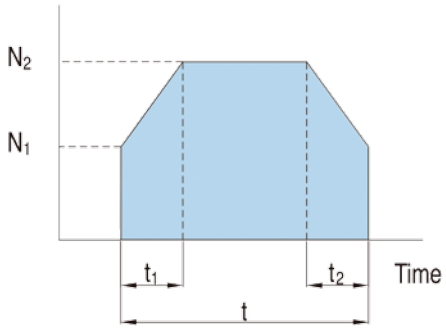
Load Calculation / Loads Moment of Inertia (J_W)

The moment of inertia of the load shall be less than 30 times the moment of inertia of the transmission

Calculate the Acceleration Torque (T_a) Refer to below formula

Acceleration Torque $Ta[N \cdot m]=(J_M+J_A+J_W) * \frac{\pi}{30} * \frac{(N_2-N_1)}{t_1}$

J_M : Motor Moment of Inertia [kg· m^2]
J_A : Mechanism Moment of Inertia [kg· m^2]
J_W : Load Moment of Inertia [kg· m^2]
N_2: Working Speed [r/min]
N_1: Starting Speed [r/min]
t_1 : Acceleration (Deceleration) Time [S]



Calculate the Required Torque

The required torque is calculated by multiplying the sum of the load torque caused by the frictional resistance and the acceleration torque caused by the moment of inertia by the safety factor

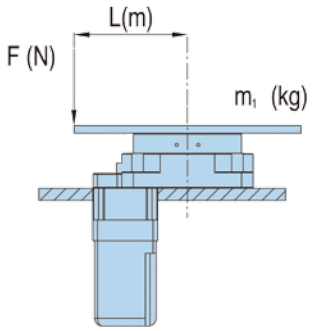
Required T =(Load torque [N.m]+ Acceleration torque [N.m]) *Safety factor

$=(T_L+T_a)* S$

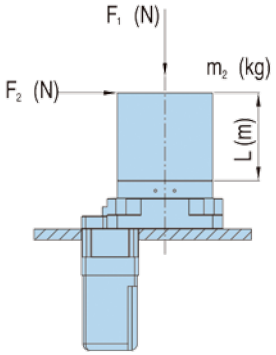
Safety factor S more than 1.5.

Axial Load, Calculation of Inertia Moment Load

When applying the load on the hollow rotating actuator as shown below, be sure to calculate that the axial load and the moment of inertia load are within the specified range of calculation of the following formula



Axial Load [N] : $F_t=F+m_1*g$
Inertia Moment Load [N.m] : $M=F*L$
g: Gravity Acceleration 9.807[m/s^2]

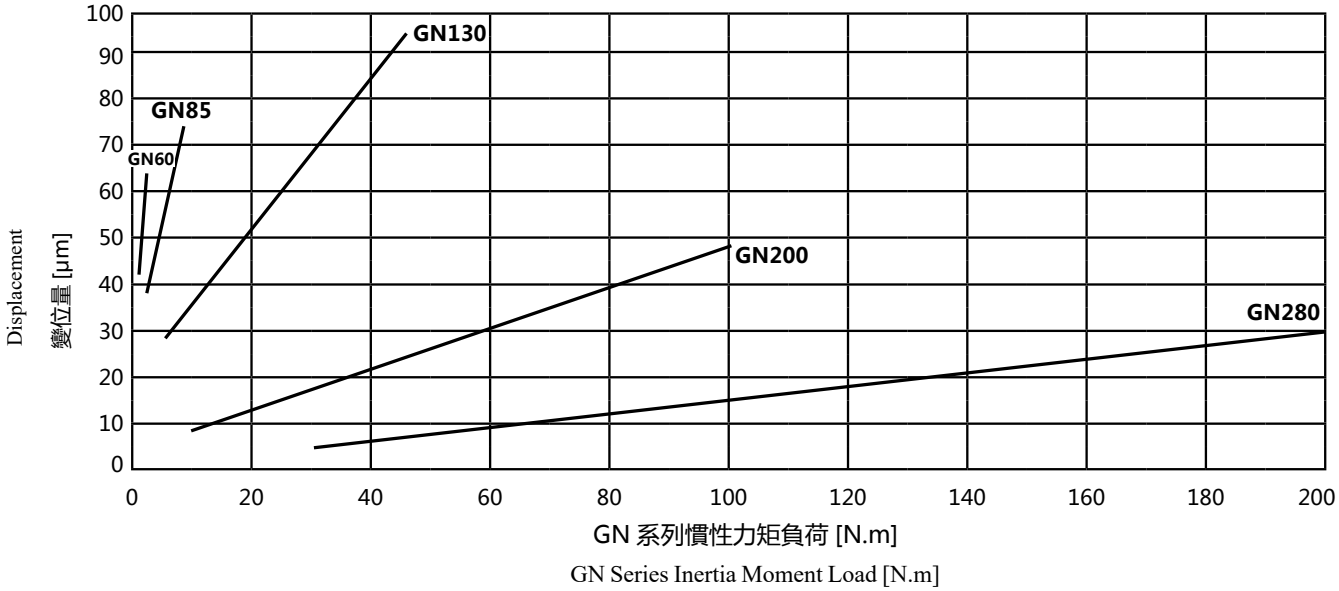


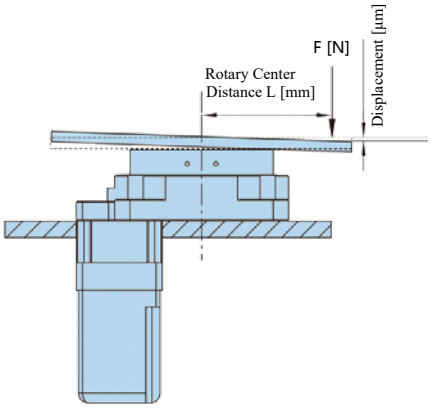
Axial Load [N] : $F_t=F_1+m_2*g$
Inertia Moment Load [N.m] : $M=F_2*(L+A)$
g: Gravity Acceleration 9.807[m/s^2]

Model	A
GN60	0.010
GN85	0.015
GN130	0.017
GN200	0.033
GN280	0.051

Actuator Rigid Reference

Different types of rotating actuators use different types of support bearings, which have a certain influence on the Permissible Moment of Inertia Load of the rotating platform, that is, the larger the model, the greater the permissible moment of inertia load. However, the amount of displacement for the moment of inertia load will be smaller. For details, refer to the following chart (L = 200mm)





Terminology

Motor Type	Rotating actuator adaptable motor type
Rotary Actuator Bearing	The type of bearing used for Rotary Actuator
Permissible Torque Note 1	The mechanical strength thresholds of the speed reduction mechanism, including the acceleration torque and the load inertia must be used within this Permissible Torque range
Allowable Speed	The table surface speed allowed by the mechanical strength of the speed reduction mechanism
Moment of Inertia	The sum of values of Moment of inertia of the motor rotor + the inertia of the deceleration mechanism on the rotating actuator
Allowable Axial Load	Allowable value of axial load applied to the axis of the rotating platform
Allowable Moment of Inertia Load	The load is applied at a position deviating from the center of the rotating platform, so that the force of the tilting of the rotating platform will occur when the center of the eccentricity * the load is calculated as the allowable value of the inertia moment load
Positioning Accuracy	The error between the theoretical rotation angle and the actual rotation angle Note 2 when the rotary platform is positioned at any point within 360°
Repetitive Positioning Accuracy	Indicates the error value generated when the same position is repeatedly positioned from the same direction
Table Flatness	Operating amplitude of the table surface
Table Concentricity	Concentricity error value of inner and outer diameter of rotating platform without load
Allowable Input Speed	The allowable input speed of the mechanical strength of the reducer structure
Backlash	Refers to the gear clearance of the rotating platform after fixing the motor shaft
Destructive Torque	When the reducer is subjected to this torque, the structure will be destroyed
Accuracy Lifespan	Designed life span that maintains accuracy under normal use of the reducer
Ingress Protection Note 3	For the protection structure of machines based on IEC529 and EN60034-5 (= IEC60034-5), it can be classified according to the degree of dustproof and waterproof

Note 1: Unit Exchange of Torque

Torque Unit	1 N.m	1 N.cm	1 kgf.m	1 kgf.cm	1 lbf.ft	1 lbf.in
1 N.m	1	10^{2}	0.10197	10.197	0.7376	8.8509
1 N.cm	10^{-2}	1	1.0197×10^{-3}	0.10197	7.376×10^{-3}	8.8509×10^{-2}
1 kgf.m	9.8066	980.665	1	10^{2}	7.233	86.79
1 kgf.cm	9.8066×10^{-2}	9.8066	10^{-2}	1	7.233×10^{-2}	0.8680
1 lbf.ft	1.356	1.356×10^{2}	0.1383	13.83	1	12
1 lbf.in	0.113	11.3	1.152×10^{-2}	1.152	8.333×10^{-2}	1

Note 2: Angle Units

Angle Units	Value	Symbol	Shorthand
Degree	1/360 Circle	°	Deg
Arc Minute	1/60 Degree	’ (Prime Number)	Arcmin,Amin,MOA
Arc-second	1/60 Arcmin	” (Double Prime Number)	Arcsec
1/1000 Arc Second	1/1000 Arcsec		Mas

Note 3: IP Ingress Protection

IP No.	Dustproof (first number)
IP 0 X	No special protection
IP 1 X	Objects over 50 mm in diameter cannot enter
IP 2 X	Objects over 80 mm in length and over 12mm in diameter cannot enter
IP 3 X	Objects with a diameter or thickness exceeding 2.5 mm and a diameter exceeding 2.5 mm cannot enter
IP 4 X	Objects with a thickness exceeding 1.0 mm and a diameter exceeding 1.0 mm cannot enter
IP 5 X	Prevent incoming dust from affecting equipment operation
IP 6 X	Completely prevent dust from entering

IP No.	Waterproof (second number)
IP X 0	No special protection
IP X 1	Drops falling vertically will not cause damage to the appliance
IP X 2	Prevents water droplets from immersing when tilted 15 degrees
IP X 3	In the range of 60° from the vertical direction, the sprayed water spray is not damaged.
IP X 4	Spilled by water in any direction without damage
IP X 5	Directly affected by water spray in any direction without damage
IP X 6	Impact water in any direction directly subjected to strong currents does not enter the interior
IP X 7	Underwater immersion can still be used normally under certain conditions
IP X 8	Can be used underwater

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