

April 2019

All specifications and sizes are subject to change without notice for the performance improvements. JUSTEK products cannot be used for medical or military applications.

# Direct Drive Rotary Motors

## Warning

Be sure to read carefully and check User's manual. Violation of any warning can result in serious and fatal injury, and/or damage to people, products or systems.

### Installation

- Never place or operate products in an environment subject to water, corrosive gases, flammable gases, or other combustible substances.

### Wiring

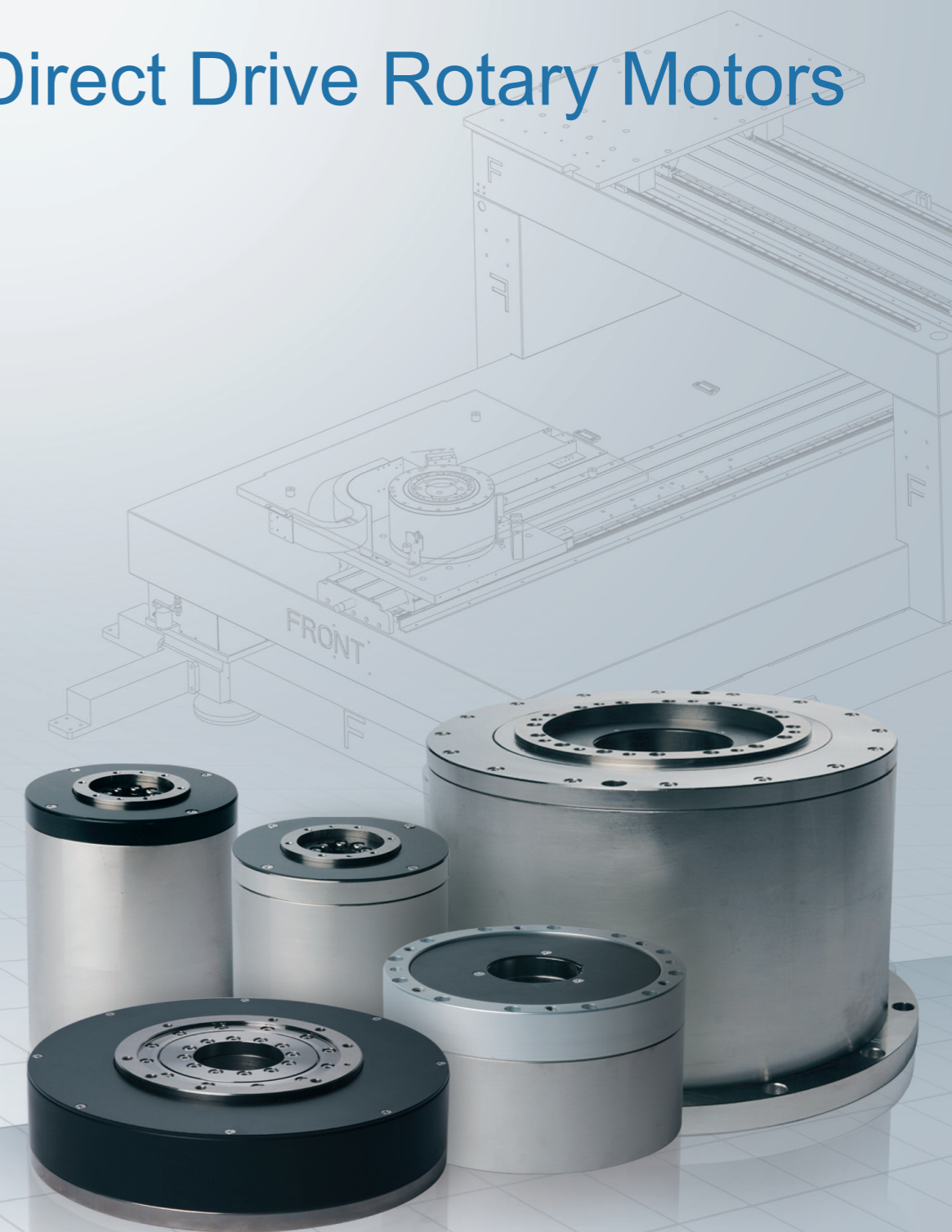
- Connect the Frame Ground(FG or G) terminal to class three ground.
- Do not connect a three-phase power supply directly into motor power output lines : U, V, or W.

### Operation

- Never touch any moving parts while the motor is operating.
- Never start operating the motor without first attaching the motor firmly to the frame or base
- Operate the motor alone without any attachment or accessories to verify it is functioning properly.
- Adjust or recalibrate parameters of other accessories or components to match the motor's parameters.
- Make sure that the emergency stop works properly at any time before starting the motor.

### Maintenance and Inspection

- Do not unscrew the cover of the motor mechanism or servo driver, while power is on.
- Do not touch terminals for five minutes after power has been turned OFF.
- Never touch the inside of the servo driver.
- Do not disassemble the motor.
- Do not disassemble the servo driver.
- Do not change connectors and wires while power is ON.



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## Type Designation

JTR 11 06 □ - B A 01 N

JTR Seires

Motor Outer Diameter

- 11 : 110 mm
- 15 : 152 mm
- 16 : 160 mm
- 24 : 240 mm
- 30 : 300 mm
- 49 : 490 mm
- 66 : 658 mm
- 15T : 150 mm
- 25T : 250 mm

Peak Torque

N : Standard  
Rn : non-Standard  
n = 0, 1, 2 ...

Design Number

Flange Option  
A : Without Flange  
F : With Flange

Encoder Specifications  
A : Analog  
B : x80(Standard)  
C : x200  
D : x400  
E : x1000

Rotor Type  
None : Inner Rotor  
E : Outer Rotor

DD Series	Encoder Specifications(ppr)				
	A* Analog	B(Standard) Interpolation x80	C Interpolation x200	D Interpolation x400	E Interpolation x1,000
JTR11	6,480	518,400	1,296,000	2,592,000	6,480,000
JTR15	8,192	655,360	1,638,400	3,276,800	8,192,000
JTR16	4,096	327,680	819,200	1,638,400	4,096,000
JTR24	8,192	655,360	1,638,400	3,276,800	8,192,000
JTR30	10,800	864,000	2,160,000	4,320,000	10,800,000
JTR49	12,960	1,036,800	2,592,000	5,184,000	12,960,000
JTR66	12,960	1,036,800	2,592,000	5,184,000	12,960,000
JTR15T	8,192	655,360	1,638,400	3,276,800	8,192,000
JTR25T	10,800	864,000	2,160,000	4,320,000	10,800,000

\* Line Count

## JTR Series Line Up

Maximum Torque	5	6	12	15	27	30	40	50	80	130	150	300	450	540	780	1090	2500	3700 (Nm)	
JTR11 Series Ø110 mm Inner Rotor	JTR1106	JTR1112																	
JTR15 Series Ø152 mm Outer Rotor			JTR1501E	JTR1503E	JTR1505E	JTR1508E													
JTR16 Series Ø160 mm Inner Rotor					JTR1604	JTR1608													
JTR24 Series Ø240 mm Inner Rotor				JTR2403		JTR2408	JTR2413												
JTR30 Series Ø300 mm Inner Rotor									JTR3015	JTR3030	JTR3045								
JTR49 Series Ø490 mm Inner Rotor										JTR4960	JTR4990	JTR49C0							
JTR66 Series Ø660 mm Inner Rotor													JTR6625	JTR6637					
JTR15T Series Ø150 mm Inner Rotor	JTR15T																		
JTR25T Series Ø220 mm Inner Rotor			JTR25T																



## Application of DD Motors

### Alignment & Indexing Equipment

- Alignment and Indexing 0°, 90° motion
- Good repeatability
- Axial/radial run-out less than 5µm for higher accuracy
- Recommended model : All Series

### ATC in Machine Tool

- Automated Tool Changer
- High speed indexing compared with the conventional mechanical index mechanism
- Simple and compact
- No sudden acceleration
- Recommended model : JTR30, JTR49, JTR66 Series

### Semiconductor Test Handler

- IC chip transfer in the package from tray to test socket
- Electrical testing and laser marking on the IC chips.
- Thermal load testing -60°C to +150°C (Burn-in Test Handler, especially IC chips for automobiles)
- Recommended model : JTR11, JTR15, JTR16 Series

### Loader/Unloader

- High precision repeatability with zero backlash
- Resolution over 1million pulse per revolution
- Minimized vibration in shawing after accurate positioning
- Axial/radial run-out less than 5µm for higher accuracy
- Recommended model : All Series

### Glass Titler

- High resolution, high precision positioning on large glass panels
- Maintenance free
- Recommended model : All Series

### Die Bonder, LED Handler

- Max. speed higher than 8rps
- Continuous rotating of short angle
- Low inertia, fast in-positioning
- Maintenance free
- Recommended model : JTR11, JTR15, JTR16 Series

# JTR11 Series



## Specifications

Performance Parameters	Unit	Model	
		JTR1106	JTR1112
Continuous Torque	Nm	2	4
Peak Torque	Nm	6	12
Continuous Current	$A_{rms}$	1.1	1.1
Peak Current	$A_{rms}$	3.3	3.3
Torque Constant	$Nm/A_{rms}$	1.8	3.6
Motor Constant	$Nm/\sqrt{W}$	0.4	0.6
Thermal Resistance	$^{\circ}C/W$	3.72	2.14
Back EMF Constant (Phase to Phase)	$V_{rms}/rad/s$	1.0	2.1
Pole Pare	-	10	10
Maximum Speed*	rps	10	8
Resolution**	ppr	518,400	518,400
Accuracy*	arcsec	$\pm 30$	$\pm 30$
Repeatability*	arcsec	$\pm 2.5$	$\pm 2.5$
Axial Run-out (no-load)***	$\mu m$	20/10/5	20/10/5
Radial Run-out (no-load)***	$\mu m$	20/10/5	20/10/5
Maximum Axial Load	kg	90	90
Maximum Moment Load	Nm	12	12
Rotor Inertia	$kgm^2$	0.0007	0.0012
Motor Weight	kg	3.9	5.4

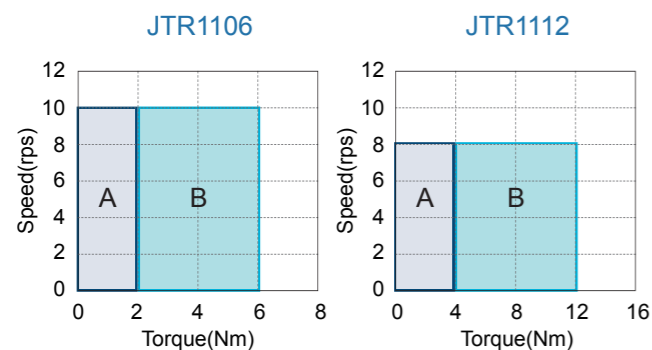
\* Dependent on the encoder resolution.

\*\* Option : 1,296,000 ppr, 2,592,000 ppr, 6,480,000 ppr.

\*\*\* Standard run-out specification is 20 $\mu m$ . For higher accuracy, please contact JUSTEK.

A : Continuous Duty Zone

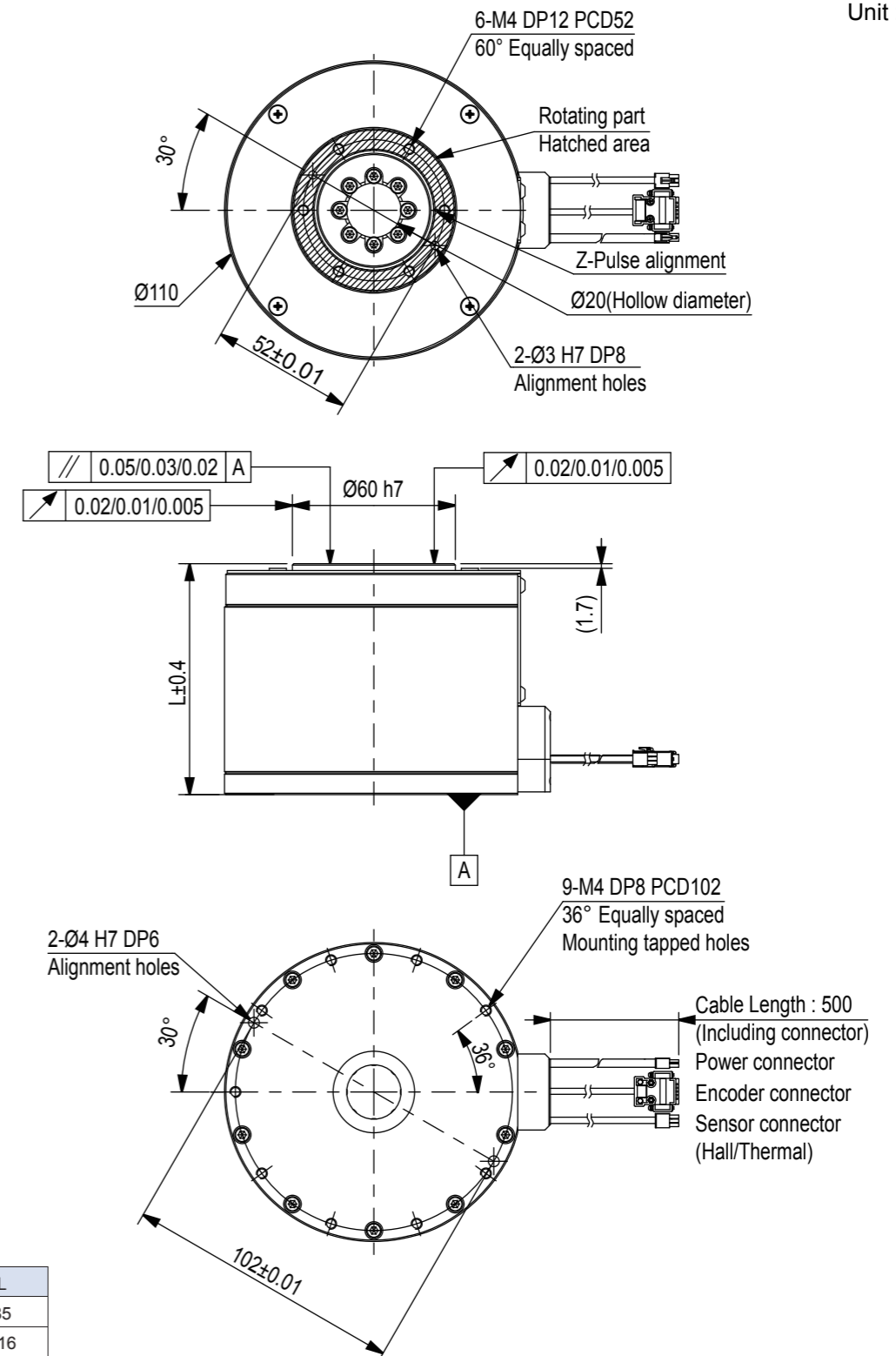
B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

## Dimensions

Unit : mm



# JTR15 Series



## Specifications

Performance Parameters	Unit	Model			
		JTR1501E	JTR1503E	JTR1505E	JTR1508E
Continuous Torque	Nm	5.3	10.7	18.1	28.8
Peak Torque	Nm	15.9	32.1	54.3	86.4
Continuous Current	$A_{rms}$	1.8	3.7	3.7	3.7
Peak Current	$A_{rms}$	5.5	11.1	11.1	11.1
Torque Constant	$Nm/A_{rms}$	2.9	2.9	4.9	7.8
Motor Constant	$Nm/\sqrt{W}$	0.8	1.3	1.9	2.6
Thermal Resistance	$^{\circ}C/W$	2.26	1.41	1.07	0.73
Back EMF Constant (Phase to Phase)	$V_{rms}/rad/s$	1.7	1.7	2.8	4.5
Pole Pairs	-	10	10	10	10
Maximum Speed*	rps	5.0	5.0	5.0	4.5
Resolution**	ppr	655,360	655,360	655,360	655,360
Accuracy*	arcsec	$\pm 30$	$\pm 30$	$\pm 30$	$\pm 30$
Repeatability*	arcsec	$\pm 2$	$\pm 2$	$\pm 2$	$\pm 2$
Axial Run-out (no-load)***	$\mu m$	20/10/5	20/10/5	20/10/5	20/10/5
Radial Run-out (no-load)***	$\mu m$	20/10/5	20/10/5	20/10/5	20/10/5
Maximum Axial Load	kg	530	530	530	530
Maximum Moment Load	Nm	96	96	96	96
Rotor Inertia	$kgm^2$	0.012	0.021	0.024	0.029
Motor Weight	kg	6.4	9.8	12.2	15.6

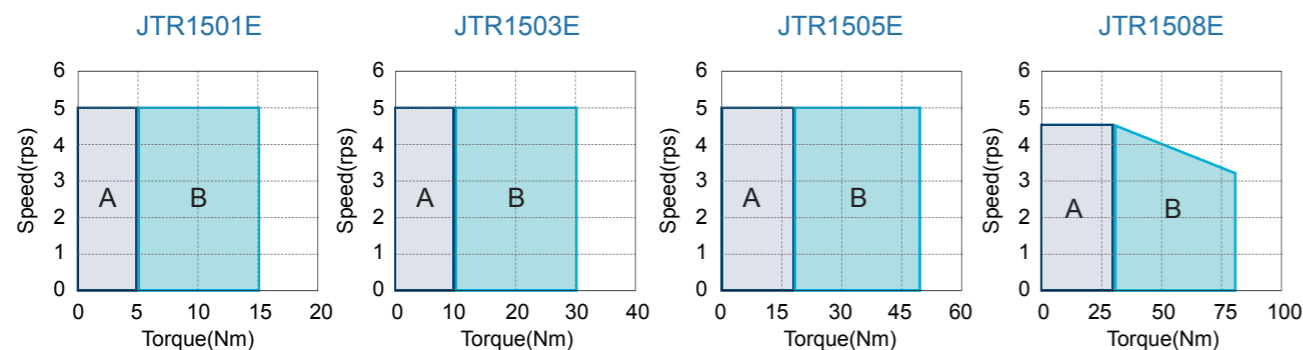
\* Dependent on the encoder resolution.

\*\* Option : 1,638,400 ppr, 3,276,800 ppr, 8,192,000 ppr.

\*\*\* Standard run-out specification is 20 $\mu m$ . For higher accuracy, please contact JUSTEK.

A : Continuous Duty Zone

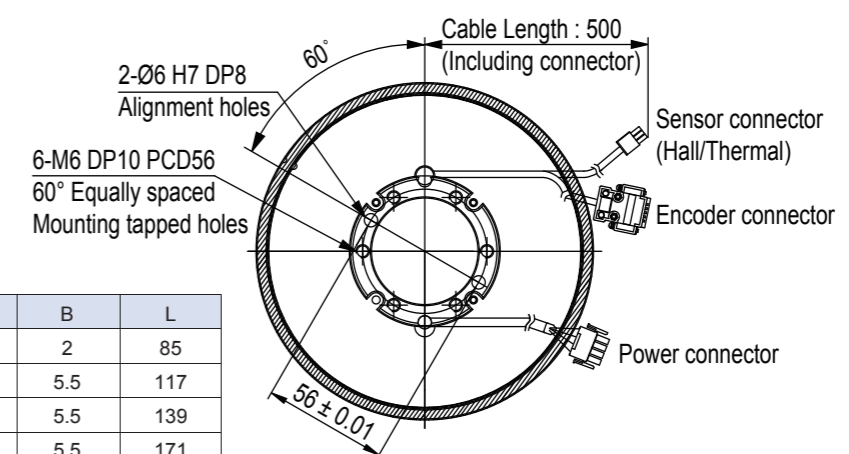
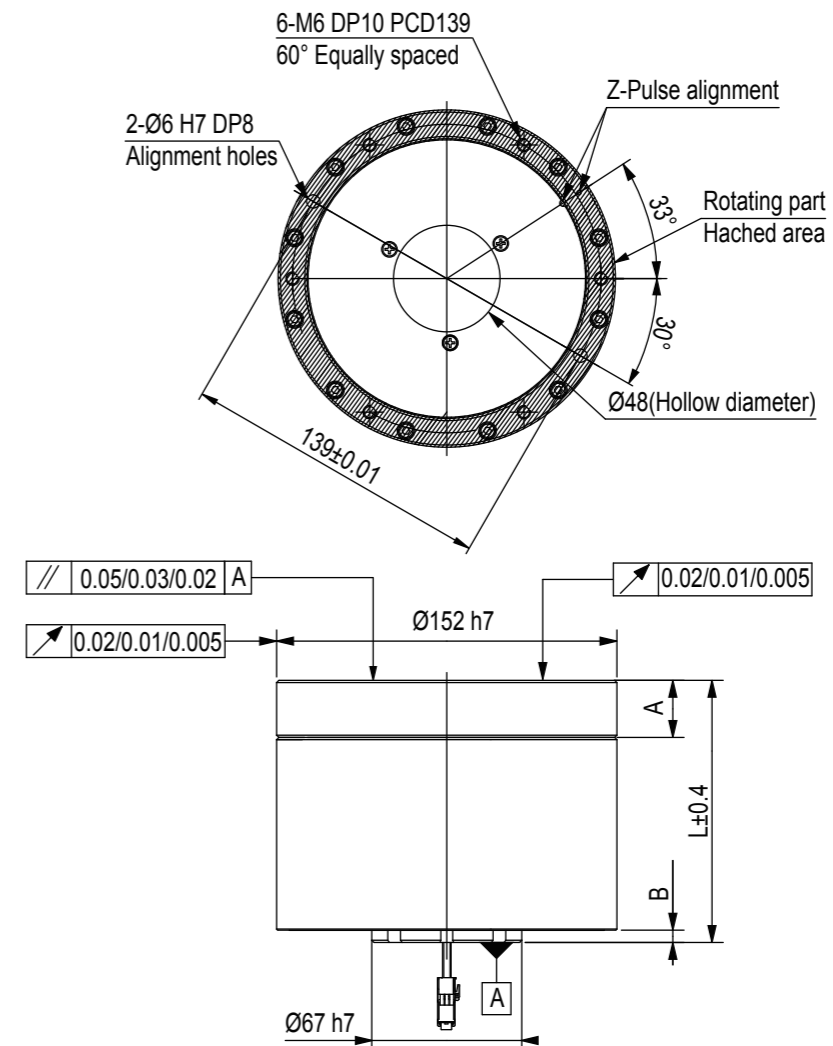
B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

## Dimensions

Unit : mm



Model	A	B	L
JTR1501E	35	2	85
JTR1503E	36	5.5	117
JTR1505E	36	5.5	139
JTR1508E	36	5.5	171

# JTR16 Series



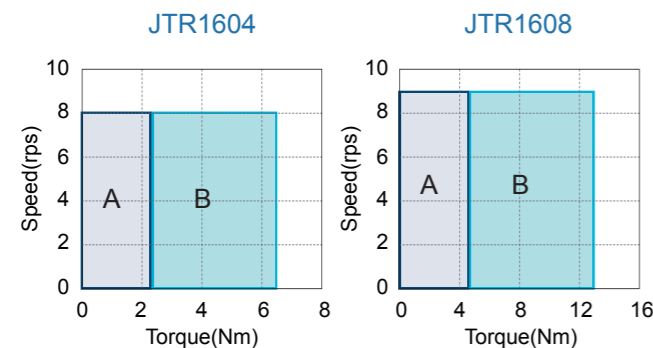
## Specifications

Performance Parameters	Unit	Model	
		JTR1604	JTR1608
Continuous Torque	Nm	14	27
Peak Torque	Nm	40	80
Continuous Current	A <sub>rms</sub>	4.3	9.0
Peak Current	A <sub>rms</sub>	12.9	27.0
Torque Constant	Nm/A <sub>rms</sub>	3.3	3.0
Motor Constant	Nm/√W	1.4	1.9
Thermal Resistance	°C/W	0.87	0.45
Back EMF Constant (Phase to Phase)	V <sub>rms</sub> /rad/s	1.9	1.7
Pole Pairs	-	10	10
Maximum Speed*	rps	8	9
Resolution**	ppr	327,680	327,680
Accuracy*	arcsec	±30	±30
Repeatability*	arcsec	±4	±4
Axial Run-out (no-load)***	μm	20/10/5	20/10/5
Radial Run-out (no-load)***	μm	20/10/5	20/10/5
Maximum Axial Load	kg	120	120
Maximum Moment Load	Nm	15	15
Rotor Inertia	kgm <sup>2</sup>	0.0031	0.0052
Motor Weight	kg	13.9	22.0

\* Dependent on the encoder resolution.  
 \*\* Option : 819,200 ppr, 1,638,400 ppr, 4,096,000 ppr.  
 \*\*\* Standard run-out specification is 20μm. For higher accuracy, please contact JUSTEK.

A : Continuous Duty Zone

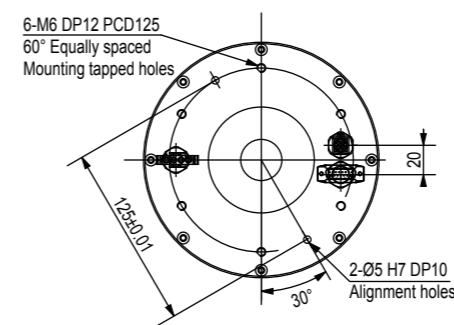
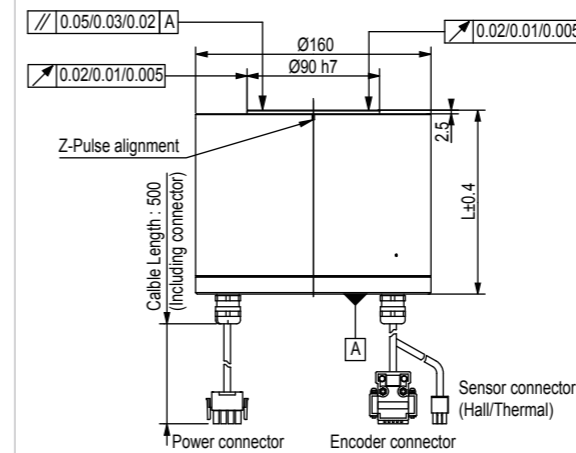
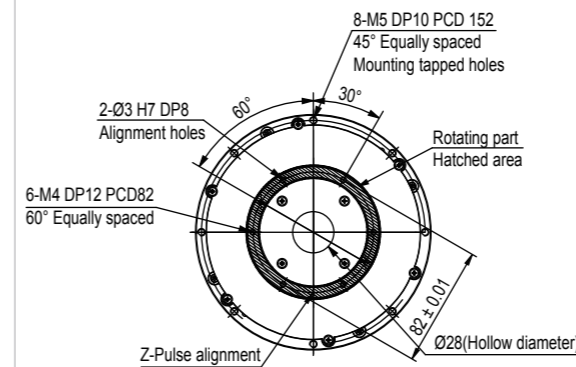
B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

## Dimensions

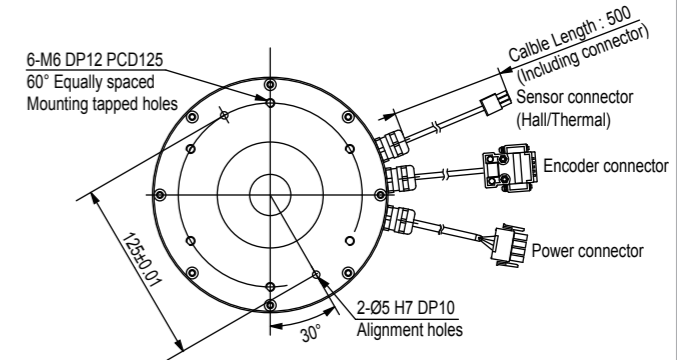
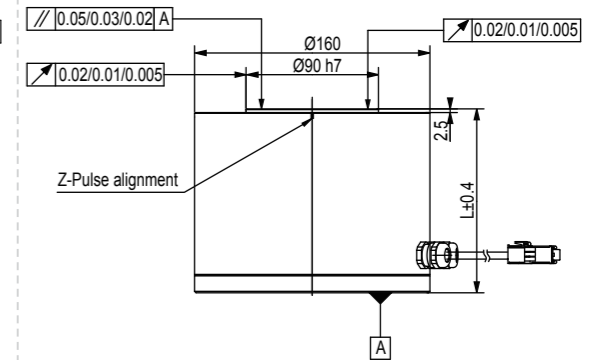
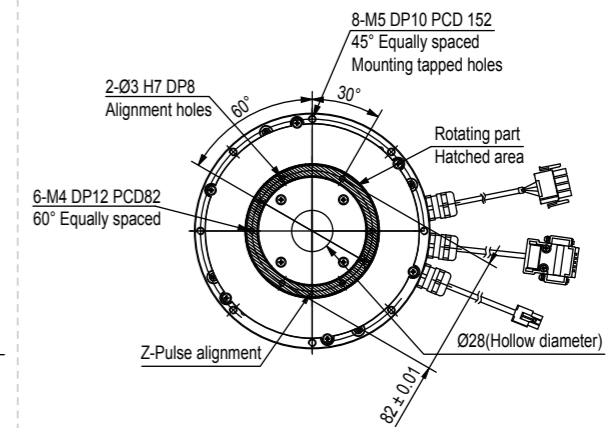
### Bottom Type



Model	L
JTR1604	125
JTR1608	187

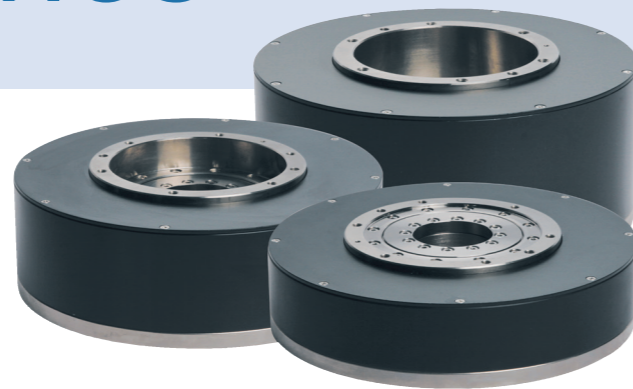
### Side Type

Unit : mm



Model	L
JTR1604	125
JTR1608	187

# JTR24 Series



## Specifications

Performance Parameters	Unit	Model		
		JTR2403	JTR2408	JTR2413
Continuous Torque	Nm	9.8	25.3	40.9
Peak Torque	Nm	29.3	75.3	121.8
Continuous Current	A <sub>rms</sub>	2.4	3.4	3.2
Peak Current	A <sub>rms</sub>	7.2	10.2	9.6
Torque Constant	Nm/A <sub>rms</sub>	4.1	7.4	12.8
Motor Constant	Nm/√W	1.3	2.5	3.5
Thermal Resistance	°C/W	1.52	0.89	0.69
Back EMF Constant (Phase to Phase)	V <sub>rms</sub> /rad/s	2.4	4.3	7.4
Pole Pairs	-	16	16	16
Maximum Speed*	rps	5.0	4.5	2.8
Resolution**	ppr	655,360	655,360	655,360
Accuracy*	arcsec	±30	±30	±30
Repeatability*	arcsec	±2	±2	±2
Axial Run-out (no-load)***	μm	20/10/5	20/10/5	20/10/5
Radial Run-out (no-load)***	μm	20/10/5	20/10/5	20/10/5
Maximum Axial Load	kg	410	410	410
Maximum Moment Load	Nm	80	80	80
Rotor Inertia	kgm <sup>2</sup>	0.0092	0.0143	0.0203
Motor Weight	kg	10.7	14.7	19.7

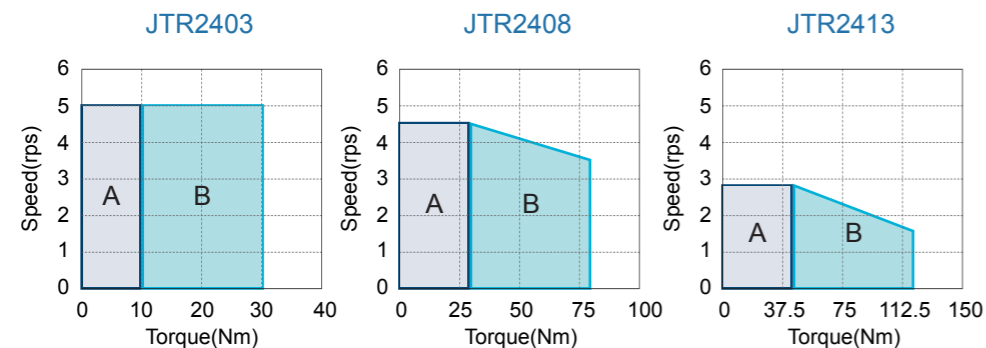
\* Dependent on the encoder resolution.

\*\* Option : 1,638,400 ppr, 3,276,800 ppr, 8,192,000 ppr.

\*\*\* Standard run-out specification is 20μm. For higher accuracy, please contact JUSTEK.

A : Continuous Duty Zone

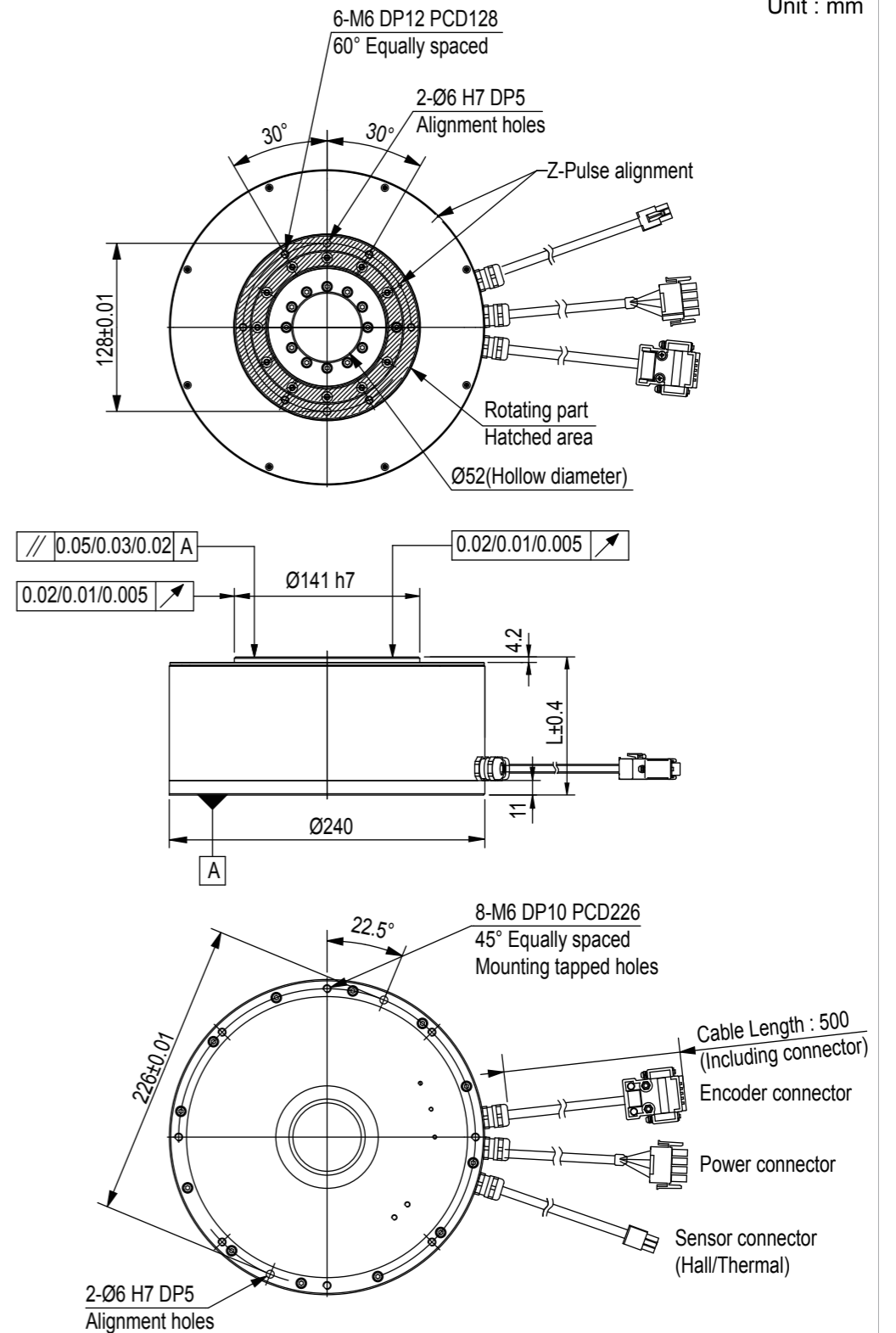
B : Intermittent Duty Zone



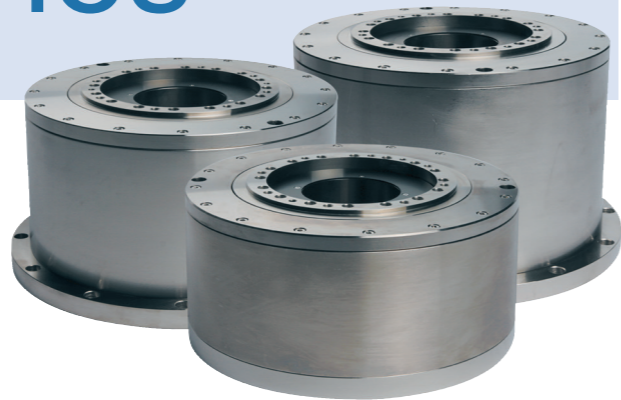
Note : When supplied input voltage is three phase AC220V

## Dimensions

Unit : mm



# JTR30 Series



## Specifications

Performance Parameters	Unit	Model		
		JTR3015	JTR3030	JTR3045
Continuous Torque	Nm	50	100	150
Peak Torque	Nm	145	280	420
Continuous Current	A <sub>rms</sub>	4.7	9.0	9.0
Peak Current	A <sub>rms</sub>	14.1	27.0	27.0
Torque Constant	Nm/A <sub>rms</sub>	10.6	11.1	16.7
Motor Constant	Nm/√W	3.8	6.3	8.1
Thermal Resistance	°C/W	0.53	0.37	0.27
Back EMF Constant (Phase to Phase)	V <sub>rms</sub> /rad/s	6.1	6.4	9.6
Pole Pare	-	16	16	16
Maximum Speed*	rps	2.9	3.0	2.0
Resolution**	ppr	864,000	864,000	864,000
Accuracy*	arcsec	±30	±30	±30
Repeatability*	arcsec	±2	±2	±2
Axial Run-out (no-load)***	μm	30/15/5	30/15/5	30/15/5
Radial Run-out (no-load)***	μm	30/15/5	30/15/5	30/15/5
Maximum Axial Load	kg	1100	1100	1100
Maximum Moment Load	Nm	250	250	250
Rotor Inertia	kgm <sup>2</sup>	0.1004	0.1288	0.1576
Motor Weight	kg	46.7	58.5	70.2

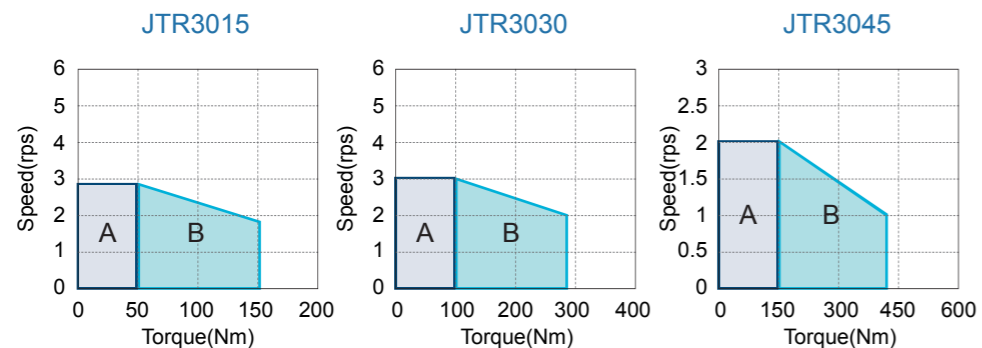
\* Dependent on the encoder resolution.

\*\* Option : 2,160,000 ppr, 4,320,000 ppr, 10,800,000 ppr.

\*\*\* Standard run-out specification is 30μm. For higher accuracy, please contact JUSTEK.

A : Continuous Duty Zone

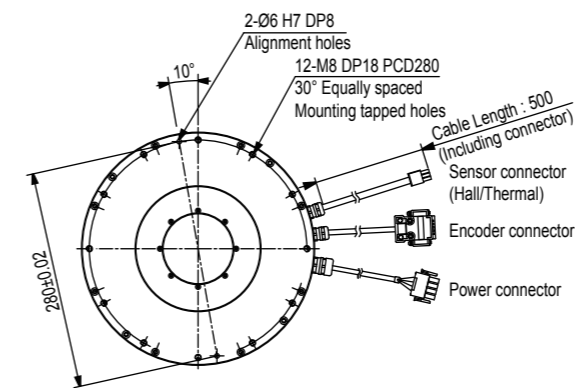
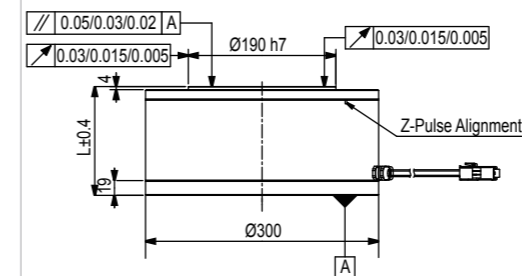
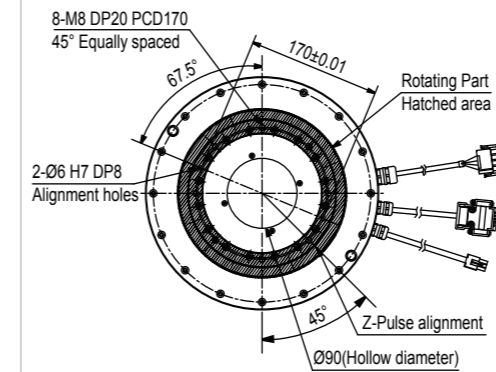
B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

## Dimensions

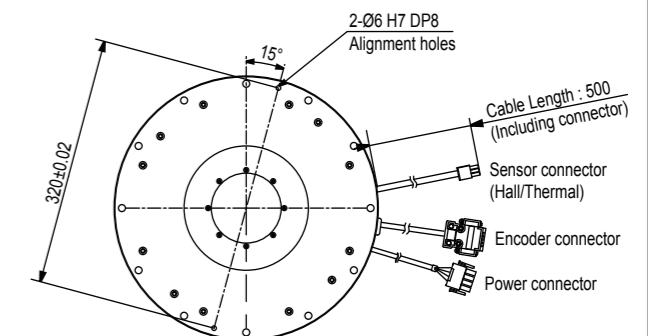
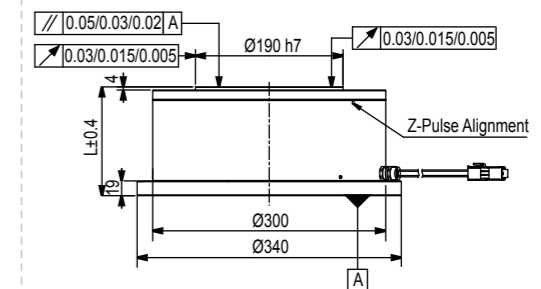
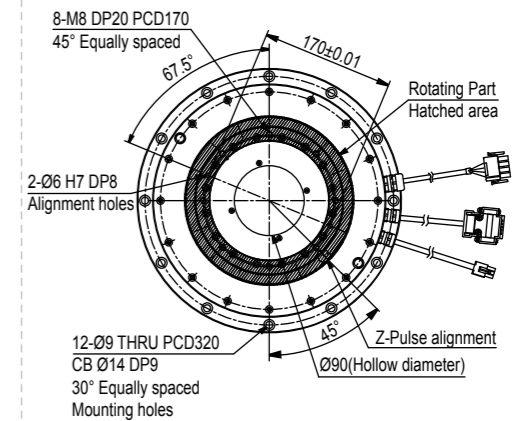
### Standard



Model	L
JTR3015	140
JTR3030	173
JTR3045	207

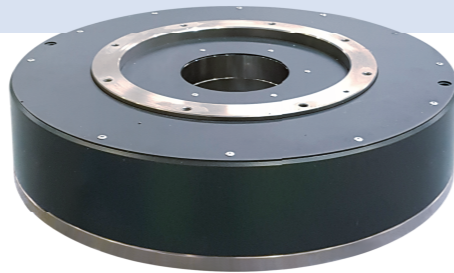
### Flange Type

Unit : mm





# JTR49 Series



## Specifications

Performance Parameters	Unit	Model		
		JTR4960	JTR4990	JTR49C0
Continuous Torque	Nm	200	300	400
Peak Torque	Nm	540	780	1090
Continuous Current	$A_{rms}$	10.5	10.5	10.5
Peak Current	$A_{rms}$	35.1	35.1	35.1
Torque Constant	$Nm/A_{rms}$	19.0	28.6	38.1
Motor Constant	$Nm/\sqrt{W}$	10.2	13.9	16.7
Thermal Resistance	$^{\circ}C/W$	0.24	0.20	0.16
Back EMF Constant (Phase to Phase)	$V_{rms}/rad/s$	11.0	16.5	22.0
Pole Pairs	-	24	24	24
Maximum Speed*	rps	2.3	1.4	1.0
Resolution**	ppr	1,036,800	1,036,800	1,036,800
Accuracy*	arcsec	$\pm 30$	$\pm 30$	$\pm 30$
Repeatability*	arcsec	$\pm 2$	$\pm 2$	$\pm 2$
Axial Run-out (no-load)***	$\mu m$	40/20/10	40/20/10	40/20/10
Radial Run-out (no-load)***	$\mu m$	40/20/10	40/20/10	40/20/10
Maximum Axial Load	kg	1100	1100	1100
Maximum Moment Load	Nm	250	250	250
Rotor Inertia	$kgm^2$	0.536	0.631	0.762
Motor Weight	kg	80.2	91.5	100.5

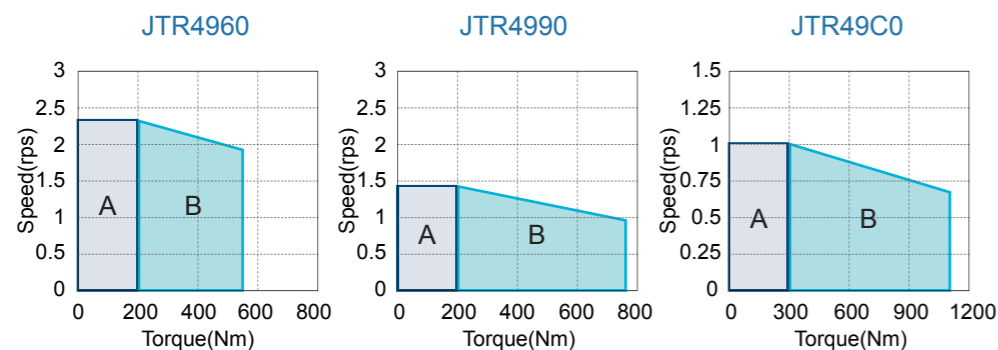
\* Dependent on the encoder resolution.

\*\* Option : 2,592,000 ppr, 5,184,000 ppr, 12,960,000 ppr.

\*\*\* Standard run-out specification is 40 $\mu m$ . For higher accuracy, please contact JUSTEK.

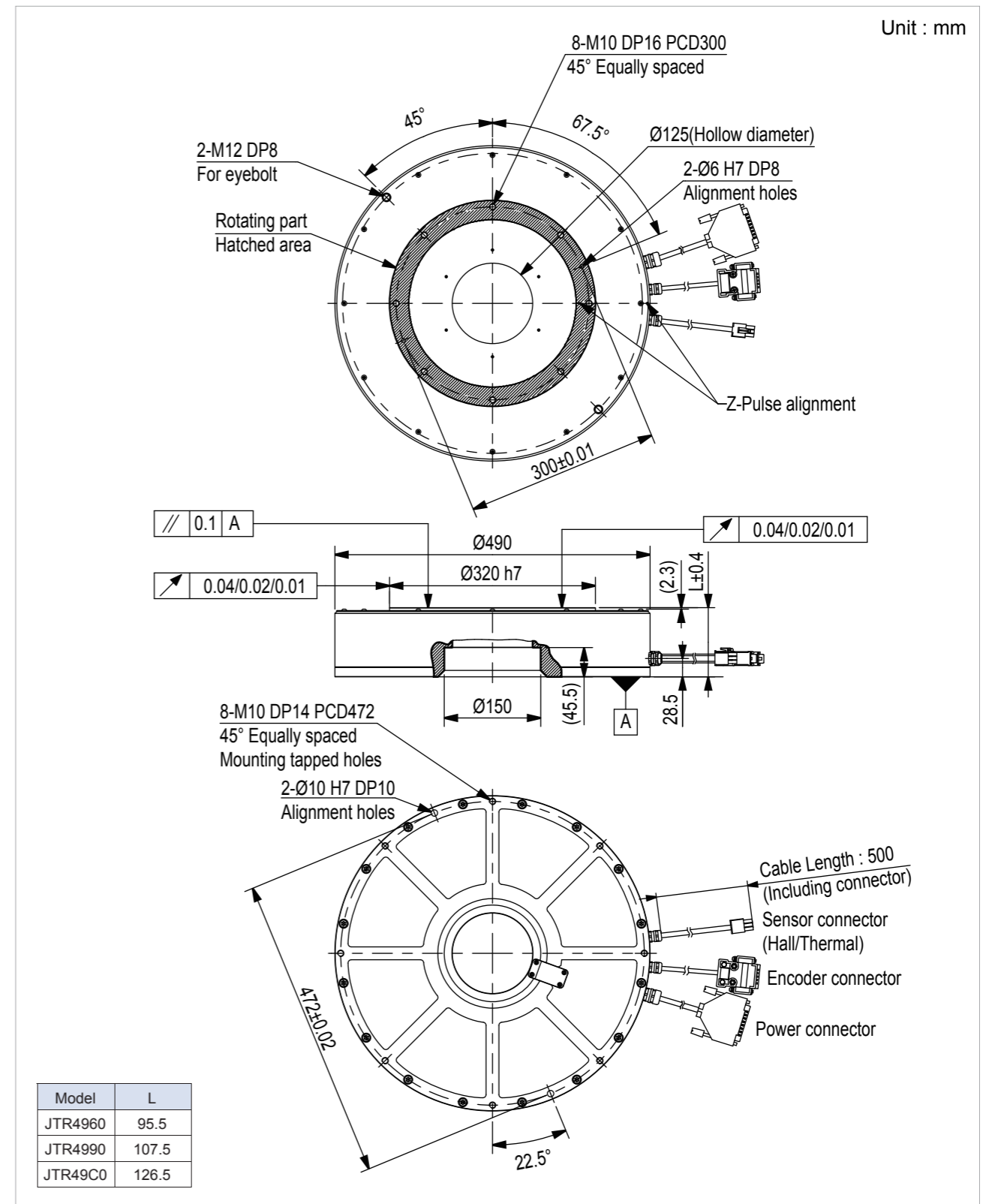
A : Continuous Duty Zone

B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

## Dimensions



# JTR66 Series

## Specifications

Performance Parameters	Unit	Model	
		JTR6625	JTR6637
Continuous Torque	Nm	1350	2000
Peak Torque	Nm	2500	3700
Continuous Current	A <sub>rms</sub>	60.9	60.9
Peak Current	A <sub>rms</sub>	120.9	120.9
Torque Constant	Nm/A <sub>rms</sub>	22.2	32.8
Motor Constant	Nm/√W	21.5	30.2
Thermal Resistance	°C/W	0.024	0.021
Back EMF Constant (Phase to Phase)	V <sub>rms</sub> /rad/s	12.8	19.0
Pole Pare	-	24	24
Maximum Speed*	rps	1	1
Resolution**	ppr	1,036,800	1,036,800
Accuracy*	arcsec	±30	±30
Repeatability*	arcsec	±2	±2
Axial Run-out (no-load)***	μm	50	50
Radial Run-out (no-load)***	μm	50	50
Maximum Axial Load	kg	9000	9000
Maximum Moment Load	Nm	8000	8000
Rotor Inertia	kgm <sup>2</sup>	3.57	4.42
Motor Weight	kg	250	303

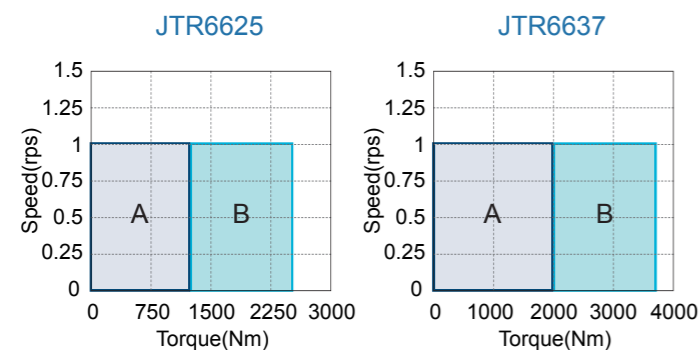
\* Dependent on the encoder resolution.

\*\* Option : 2,592,000 ppr, 5,184,000 ppr, 12,960,000 ppr.

\*\*\* Standard run-out specification is 50μm. For higher accuracy, please contact JUSTEK.

A : Continuous Duty Zone

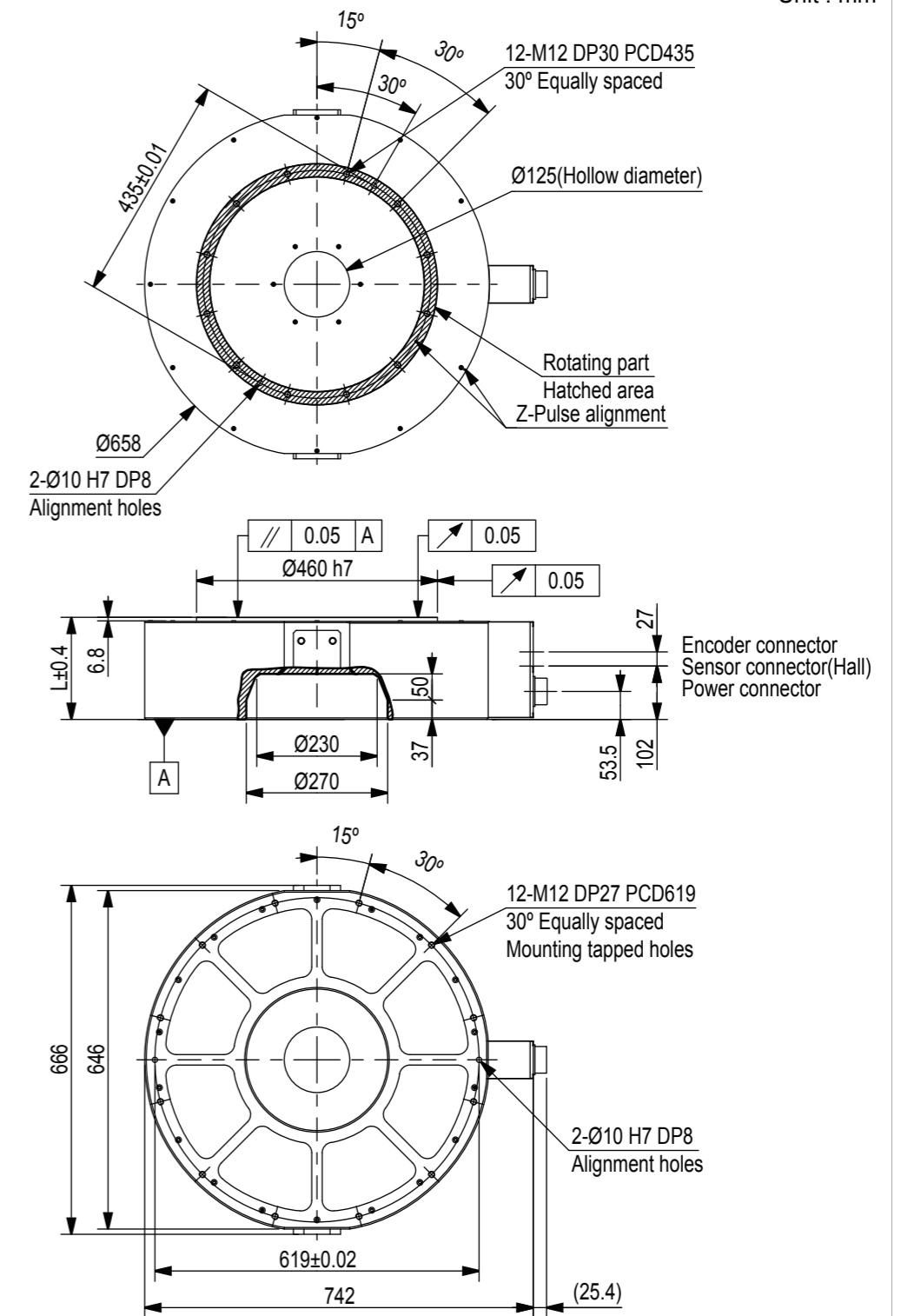
B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

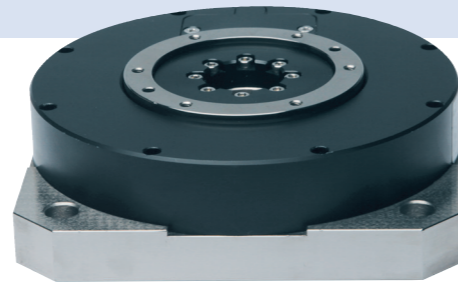
## Dimensions

Unit : mm



Model	L
JTR6625	159
JTR6637	195

# JTR15T Series

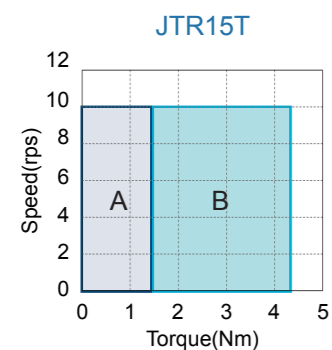


## Specifications

Performance Parameters	Unit	Model
		JTR15T
Continuous Torque	Nm	1.4
Peak Torque	Nm	4.2
Continuous Current	$A_{rms}$	1.2
Peak Current	$A_{rms}$	3.5
Torque Constant	$Nm/A_{rms}$	1.2
Motor Constant	$Nm/\sqrt{W}$	0.3
Thermal Resistance	$^{\circ}C/W$	3.32
Back EMF Constant (Phase to Phase)	$V_{rms}/rad/s$	0.7
Pole Pare	-	8
Maximum Speed*	rps	10
Resolution**	ppr	655,360
Accuracy*	arcsec	$\pm 30$
Repeatability*	arcsec	$\pm 2$
Axial Run-out (no-load)***	$\mu m$	20/10/5
Radial Run-out (no-load)***	$\mu m$	20/10/5
Maximum Axial Load	kg	120
Maximum Moment Load	Nm	15
Rotor Inertia	$kgm^2$	0.00226
Motor Weight	kg	4.4

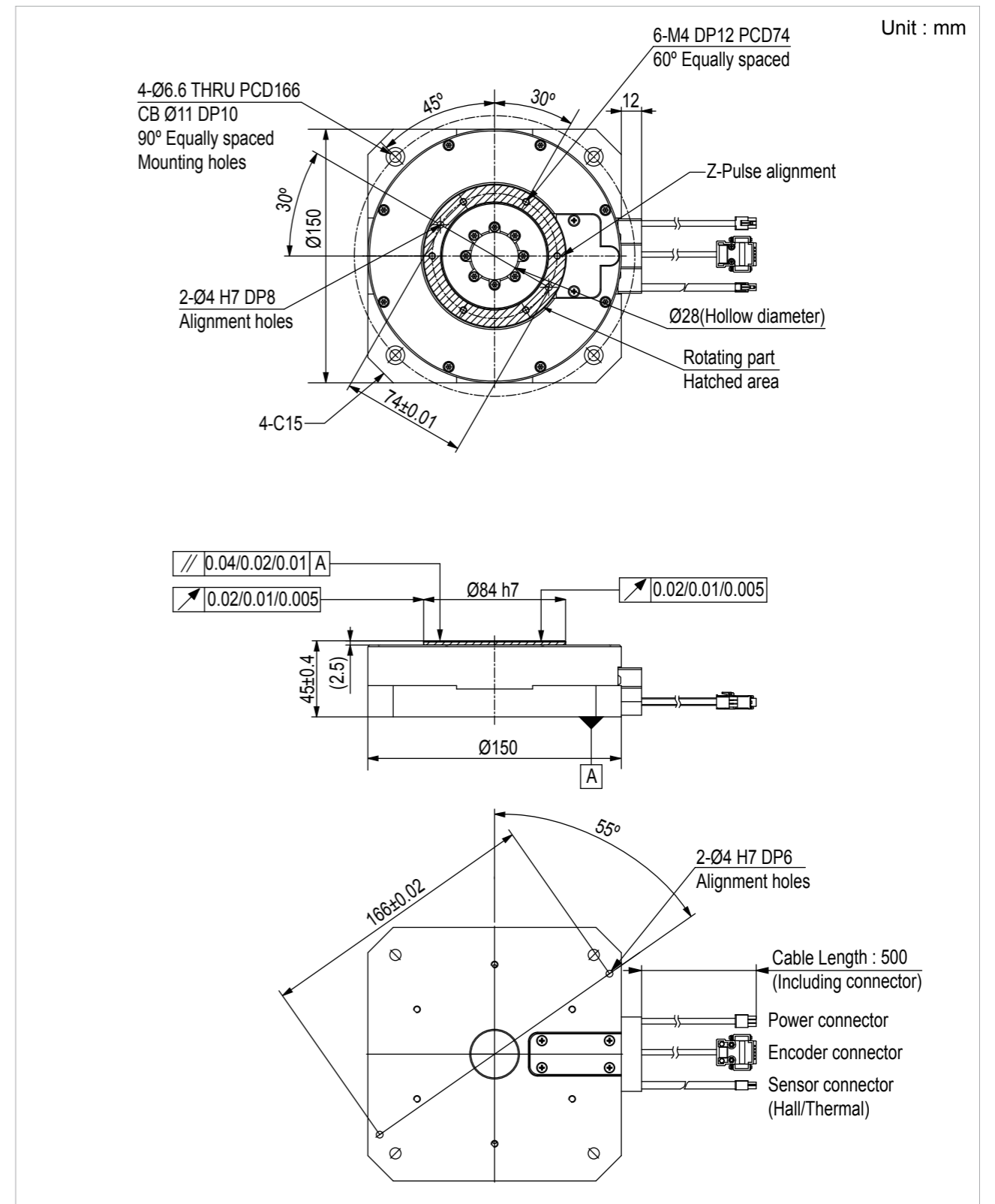
\* Dependent on the encoder resolution.  
 \*\* Option : 1,638,400 ppr, 3,276,800 ppr, 8,192,000 ppr.  
 \*\*\* Standard run-out specification is 20 $\mu m$ . For higher accuracy, please contact JUSTEK.

A : Continuous Duty Zone  
 B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

## Dimensions



# JTR25T Series

## Specifications

Performance Parameters	Unit	Model
		JTR25T
Continuous Torque	Nm	9
Peak Torque	Nm	27
Continuous Current	A <sub>rms</sub>	1.1
Peak Current	A <sub>rms</sub>	3.3
Torque Constant	Nm/A <sub>rms</sub>	8.2
Motor Constant	Nm/√W	1
Thermal Resistance	°C/W	1.22
Back EMF Constant (Phase to Phase)	V <sub>rms</sub> /rad/s	4.7
Pole Pare	-	12
Maximum Speed*	rps	3.6
Resolution**	ppr	864,000
Accuracy*	arcsec	±30
Repeatability*	arcsec	±2
Axial Run-out (no-load)***	μm	30
Radial Run-out (no-load)***	μm	30
Maximum Axial Load	kg	410
Maximum Moment Load	Nm	80
Rotor Inertia	kgm <sup>2</sup>	0.0195
Motor Weight	kg	11

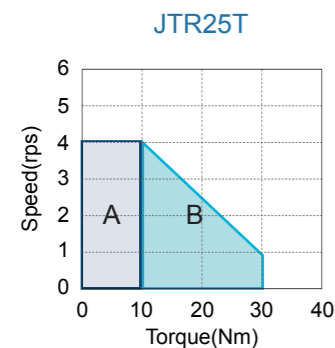
\* Dependent on the encoder resolution.

\*\* Option : 2,160,000 ppr, 4,320,000 ppr, 10,800,000 ppr.

\*\*\* Standard run-out specification is 30μm. For higher accuracy, please contact JUSTEK.

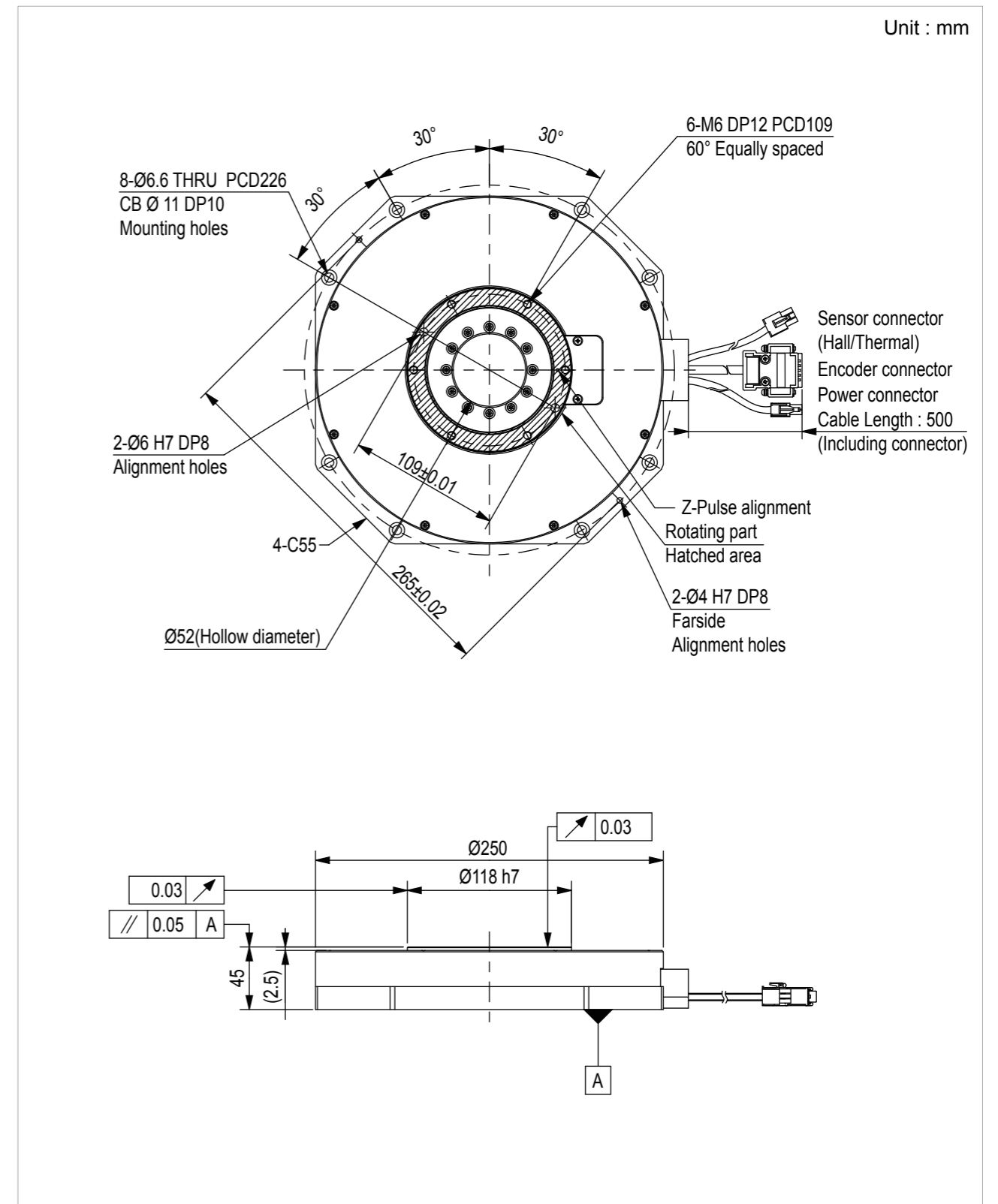
A : Continuous Duty Zone

B : Intermittent Duty Zone



Note : When supplied input voltage is three phase AC220V

## Dimensions



## Connector Pin Out

**Power connector**

Connector	Connector Pin	Applied Motor
350779-1 (AMP-4P Plug)	350552-1 (Plug pin)	JTR15, JTR16 JTR24, JTR30

1	U	Black
2	V	White
3	W	Red
4	FG	Green

Connector	Connector Pin	Applied Motor
172167-1 (AMP-4P Plug)	170360-1 (Plug pin)	JTR11, JTR15T JTR25T

2	1	
3	4	

Mating Connector  
Cap : 350780-1(AMP)  
Pin : 350551-1(AMP)

350779-1

Connector	Applied Motor
MS3102A32-17P	JTR66

A	U	Black
B	V	White
C	W	Red
D	FG	Green

Mating Connector  
MS3106A32-17S

MS3102A32-17P

A1 A2 A3 A4 A5

Connector	Connector Pin	Applied Motor
5W5P (AUK-4P Plug)	Soldering Type	JTR49

Mating Connector  
DWS05W5S-20(AUK)

DWS05W5P-20

**Encoder connector**

1	No Connection
2	GND
3	No Connection
4	Z
5	B
6	A
7	+5V
8	+5V
9	GND
10	No Connection
11	No Connection
12	Z
13	B
14	A
15	No Connection
Case	Shield

Connector	Mating Connector
747908-2 D-SUB 15P Male (2 Row)	747909-2 D-SUB 15P Female (2 Row)

747908-2

**Sensor connector(Hall/Thermal)**  
- All motors except JTR66 Series

Connector	Connector Pin	Connector
172340-1 (AMP-9P Plug)	171636-1 (Plug pin)	17JE-23090-02(D1)-A D-SUB 9P Male (2 Row)

Connector	Connector Pin	Applied Motor
172340-1 (AMP-9P Plug)	171636-1 (Plug pin)	JTR66 Series only

A	GND-HS	Green
B	Hall A	Brown
C	Hall B	Yellow
D	Hall C	Black
E	VCC-HS	Red
F	Thermal Sensor	White
G	No Connection	-
H	No Connection	-
I	Shield	Shield

Mating connector  
Socket : 172332-1(AMP)  
Pin : 171637-1(AMP)

172340-1

Mating Connector  
17JE-13090-02(D1)-A  
D-SUB 9P Female  
(2 Row)

17JE-23090-02(D1)-A

## DD Motor Selection

Application				
<b>Mount type</b>	Bottom mount ( )	Wall mount ( )	Upside down ( )	Etc.
<b>Load condition</b>	<p>1. Table diameter, thickness, material, weight, axial load</p> <p>2. Jig diameter, thickness, material, weight, axial load, amount</p> <p>3. PCD (Center diameter of jig)</p> <p>4. Moment load in Newton, direction</p> <p>Mass : [ kg ] Inertia : [ kgm<sup>2</sup> ]</p> <p>Please write here</p>			
<b>Index degree [ ° ]</b> <b>Index time [ sec ]</b>	[ ° ] /		[ sec ]	
<b>Repeatability(arcsec)</b>	± [ arcsec ]	Working radius :	mm / Tolerance range : ±	µm
<b>Motion profile</b>	<p>1. Moving time [ sec ]</p> <p>2. Dwell time [ sec ]</p> <p>3. Settling time [ sec ]</p> <p>4. Cycle time [ sec ]</p>			
<b>Servo command</b>	JSMD I/O ( )	Pulse ( )	Analog ( )	RS-232C ( )
<b>AC input</b>	AC 220V [single phase ( ) or three phase ( )]			
<b>Cable length</b>	Robot cable ( ) or Fixed cable ( )			m
<b>Other requirements</b>	IP rating, Vacuum, Axial runout, Radial runout			

# Memo


# Memo
