

WISE Linear Servo Drive and Motor

Selection Guide

(1st Edition)

(For WSDA Series)

Weihong Electronic Technology Co., Ltd.

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Preface

About This Manual

This manual is to describe the models, specifications, dimensions and other information of WZCR series linear motor. Refer to the manual for motor selection.

Module	Chapter	Content
Preface	-	Introduces general information of this manual, contact information of some manufacturers and the historical colophon of the manual.
WISE servo drive	1	Introduces the naming rules, types, dimensions, specifications and product features of WISE drive.
Wiring diagram	2	Introduces the wiring of the drive, motor and control system.
Cable connector of encoder	3	Introduces the cable connector of the encoder.
Combination of drive and motor	4	Introduces how to select the right type of motors according to the rated power (capacity) of the drive.
Motor	5	Introduces the specifications and dimensions of U-channel linear motor.
	6	Introduces the specifications and dimensions of iron core linear motor.
	7	Introduces the specifications and dimensions of tubular linear motor.
	8	Introduces the specifications and dimensions of direct drive motor.
Specifications and drawings of cables and peripheral devices	9	Introduces the specifications, wiring and dimensions of cables and peripheral devices.

Applicable Product Models

This manual is applicable to WISE linear servo drive. Refer to the table below for details:

Product	Model
WISE linear servo drive	Series WSDA.
U-channel linear servo motor	Series WZCR-U30 and WZCR-U50.
Iron core linear motor	Series WZCR-Z45, WZCR-Z60, WZCR-Z70, WZCR-Z95 and WZCR-Z120.
Tubular linear motor	Series WZCR-B32.
Direct drive motor	Series WZCR-D160S, WZCR-D112H, WZCR-D170H, WZCR-D224H and WZCR-D263H.

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Applicable CE Directives

This product is applicable to the following CE directives:

- 2014/35/EU Low Voltage Directive
- 2014/30/EU Electromagnetic Compatibility Directive

Revision History

You can refer to the following table for the revision records of each edition.

Date	Edition	Revision
2019.03	R1	This manual is released for the first time.

Precautions

Precautions can be divided into caution and warning according to the degree of possible loss or injury in case of negligence or omission of precautions stipulated in this manual.



: general info, mainly for informing, such as supplementary instructions and conditions to enable a function. In case of negligence or omission of this kind of precautions, you may not activate a function. Note that in some circumstances, negligence or omission of even this kind of precautions could cause physical injury or machine damage.



: warning info requiring special attention. In case of negligence or omission of this kind of precautions, you may suffer physical injury, or even death, machine damage or other losses.

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1 WISE Servo Drive

1.1 Model Designation

The model designation of WISE WSDA series linear servo drive is shown in Fig. 1-1.

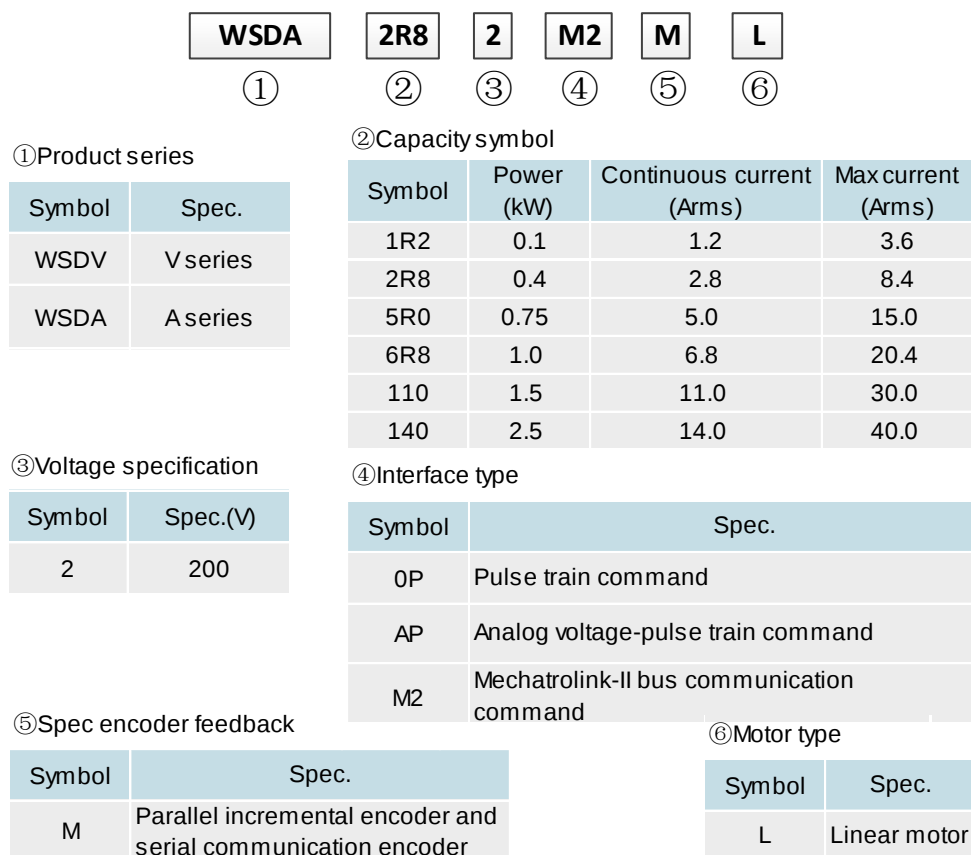


Fig. 1-1 Model designation

1.2 Dimensions

The outline dimensional drawings of WSDV series drive (analog•pulse type drive) and WSDA series drive (Mechatrolink-II bus-type drive) are the same. Taking WSDV series drive as examples, this part lists outline dimensional drawings and installation dimensional drawings of servo drives of different capacity.

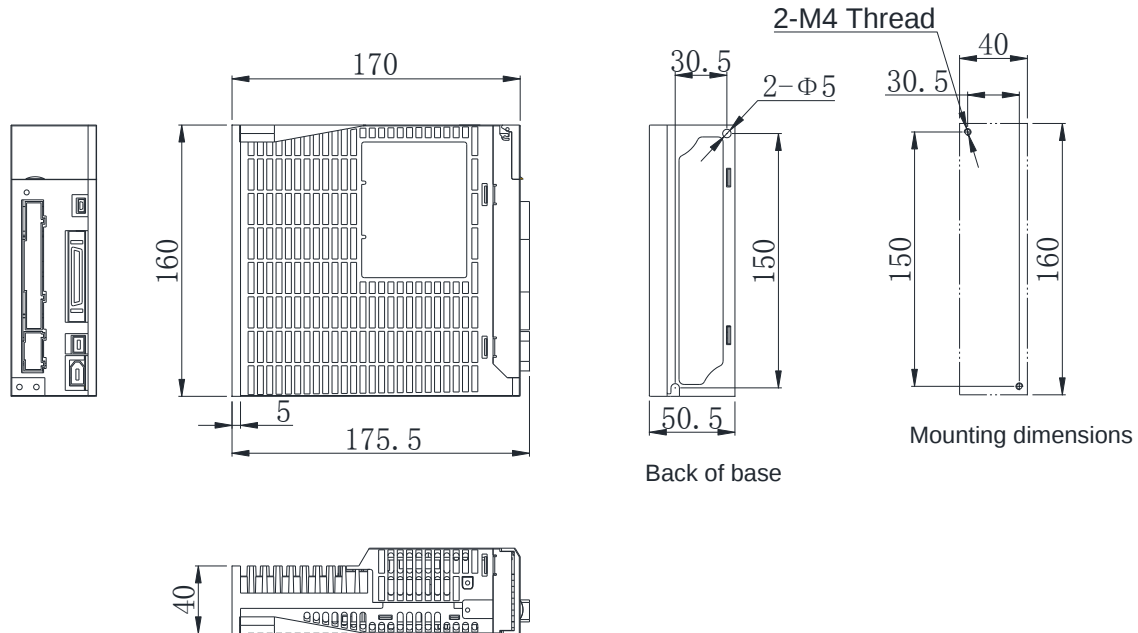


Fig. 1-2 Outline dimensional drawing of WSDV-1R2 and WSDV-2R8

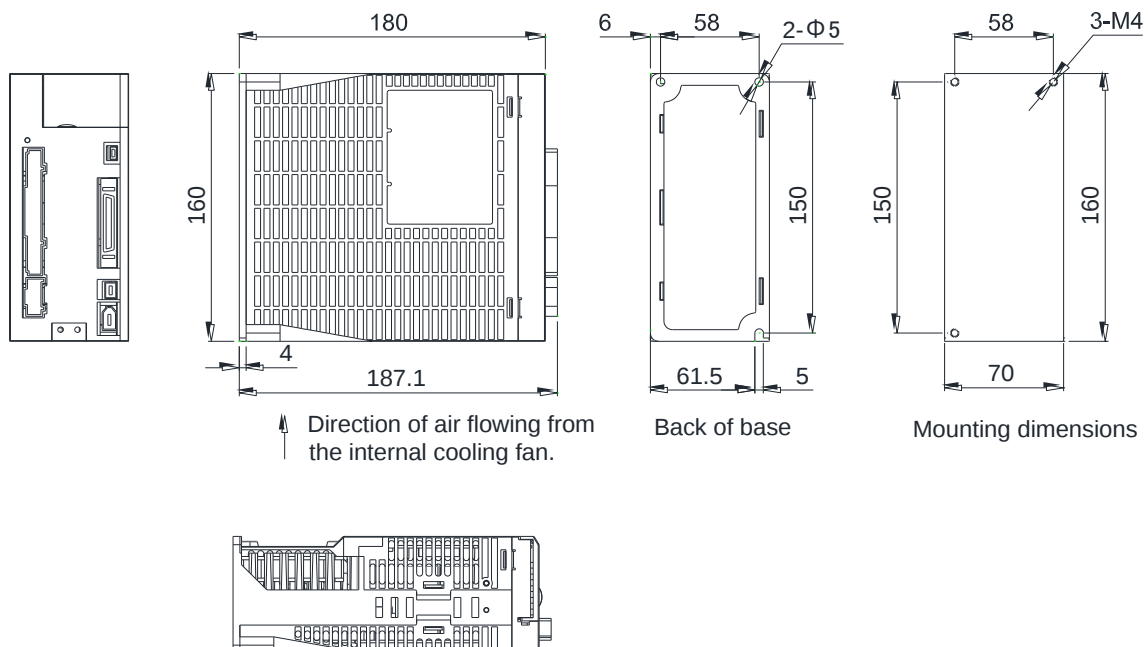


Fig. 1-3 Outline dimensional drawing of WSDV-5R0 and WSDV-6R8

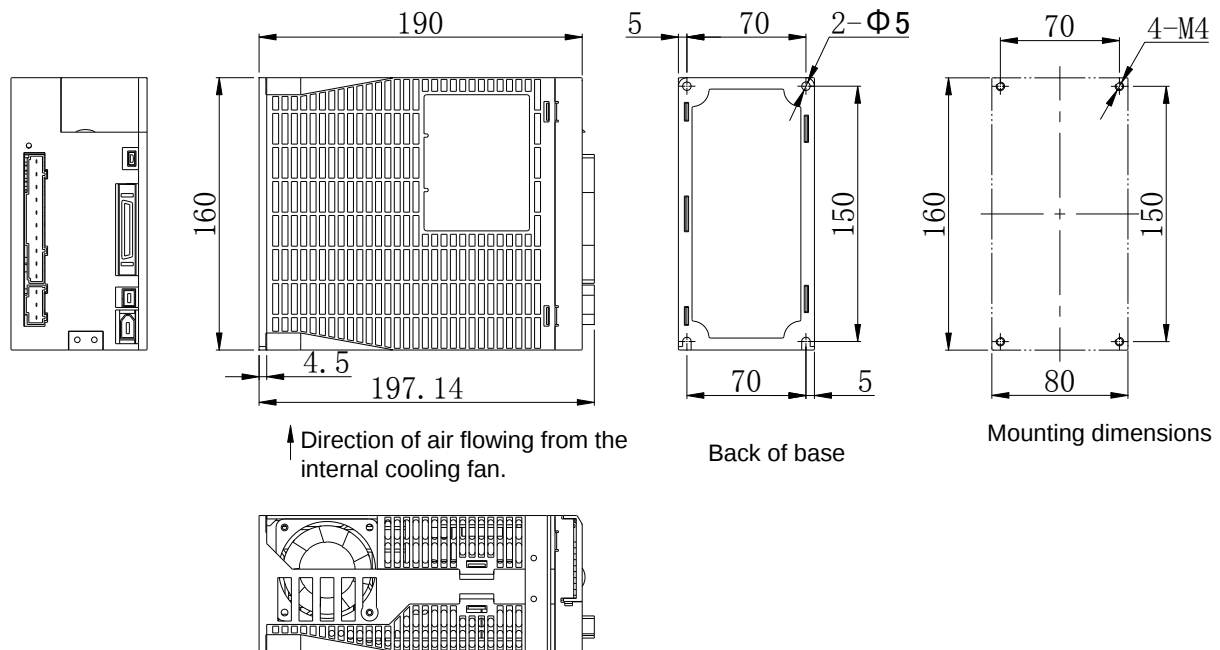


Fig. 1-4 Outline dimensional drawing of WSDV-110 and WSDV-140

1.3 Specifications

◆ Basic specifications

Main Circuit Power Supply	WSDA-1R2 WSDA-2R8 WSDA-5R0 WSDA-6R8	single-phase/three-phase 200V~240V ^{+10%} _{-15%} , 50/60Hz
	WSDA-110 WSDA-140	three-phase 200V~240V ^{+10%} _{-15%} , 50/60Hz
Control Circuit Power Supply	Single-phase 200V~240V ^{+10%} _{-15%} , 50/60Hz	
Withstand Voltage	AC 1500V or DC 2100V, withstanding voltage for 1min (leakage current should not exceed 10mA).	
Ambient Temperature	0~+55℃ (no freeze and condensation). 0~+45℃ when drive matches some motors, refer to specifications for details.	
Storage Temperature	-20~+65℃ (Max. guarantee: 80℃ for 72h; the relative humidity should not exceed 17%RH)	
IP and Cleanness	IP: IP1X; Cleanness: 2; The environmental requirements are as follows: 1) No corrosive gas or combustible gas; 2) No splashing water, oil or drug;	

	3) Little dust, ash, salt and metal powder.
Ambient Humidity or Storage Humidity	90%RH or below (No freeze or moisture condensation)
Control Mode	SVPWM
Encoder Feedback	17-bit 7-wire serial absolute encoder (resolution: 131072); 20-bit 5-wire serial incremental encoder (resolution: 1048576); 23-bit 7-wire serial absolute encoder (resolution: 8388608); 24-bit 7-wire serial absolute encoder (resolution: 16777216); A/B phase • origin signal differential input type encoder.
Pole position detection signal	It can be CS signal (CS1, CS2, CS3) or estimated by pole position. Switch via parameters.
Input Pulse Signal Format	Mechatrolink-II high-speed bus
Pulse Output	Feed out encoder feedback pulse (A, B and Z-phase) via line drive.
Communication Function	Connection with PC (iMotion software) via USB.
Sequence Control Input*1	Here are 7 inputs for general purposes. The signals that can be allocated to these 7 inputs are shown as following: 1) General input (GP) 2) Positive direction inhibit signal (POT) 3) Negative direction inhibit signal (NOT) 4) (To zero) Deceleration limit switch input (DEC) 5) External latch input signals (EXT1, EXT2, and EXT3) 6) Alarm clear (A-CLR) 7) Internal command speed selection signals (INTSPD1, INTSPD2, and INTSPD3) 8) Command pulse inhibit (INH) 9) Servo-on (SRV-ON) 10) Gain switching (GAIN) 11) Zero-speed clamp (ZEROSPD) 12) Deviation counter clear input (CL) 13) Torque limit switching input (TL-SEL) 14) Command division switching input (DIV1, DIV2) 15) Velocity command sign input (VC-SIGN) 16) Torque command sign input (TC-SIGN) 17) Forced alarm input (E-STOP) 18) Absolute value data request signal (SEN)

Sequence Control Output*1	4 outputs for general purposes, among which alarm output ALM is designated to SO1, and the rest of 3 outputs are:		
	1) External brake off (BRK-OFF) 2) In-position (INP) 3) Servo ready output (S-RDY) 4) Zero-speed clamp detection (ZSP) 5) Torque limit (TLC) 6) Velocity coincidence (V-COIN) 7) Arriving at speed (AT-SPEED) 8) Warning output (WARN1, WARN2) 9) Position command input (P-CMD) 10) Positioning completes (INP2) 11) Velocity limit (V-LIMIT) 12) Alarm attribute output (ALM-ATB) 13) Velocity command output (V-CMD) 14) Pole position estimation completes (CS-CMP)		
Front Panel	5 buttons and 6 LEDs.		
Regenerative Resistor	WSDA-1R2	WSDA-2R8	No internal regenerative resistor (only external type is acceptable)
	WSDA-5R0 WSDA-6R8	WSDA-110 WSDA-140	Internal regenerative resistor (external type is also acceptable)
Dynamic Brake	WSDA-1R2	WSDA-2R8	No dynamic brake
	WSDA-5R0 WSDA-6R8	WSDA-110 WSDA-140	Internal dynamic brake
Control Mode	① Position control; ② Speed control; ③ Torque control.		

*1: This function is not available. If needed, please contact Weihong Company.

◆ Functions

Position Control	Control input *2	1) Deviation counter clear; 2) Command pulse input inhibition; 3) Command division/multiplication switching; 4) Gain switching input, etc.	
	Control output *2	Positioning completes	
	Pulse input	Pulse input mode	Bus command input

		Command pulse for de-multiplication and multiplication (electronic gear ratio setup)	Used within 0.001~32000 multiplication of electronic gear ratio.
		Filters	Command smooth filter, FIR type filter and damping filter.
	Pulse output *2	A, B and Z-phase: line drive output. Division pulse number: 1~1/4 of encoder resolution setup value.	
Speed Control	Control input *2	1) Internal command velocity selection 1; 2) Internal command velocity selection 2; 3) Internal command velocity selection 3; 4) Zero-speed clamp.	
	Control output*2	Speed arrival	
	Internal speed command	Switching among 8 speeds is enabled by command input.	
	Speed command Acc./Dec adjustment	Individual setup of acceleration and deceleration is enabled. Sigmoid acceleration/deceleration is also enabled.	
	Zero-speed clamp*2	Zero-speed clamp function is available in position control mode or torque control mode.	
Torque Control	Control input*2	Zero-speed clamp input	
	Control output*2	Speed arrival	
	Speed limit*2	Velocity limit can be set via parameter setting.	
	Torque command filters	One first-order low-pass filter, four notch filters and one two-stage torque filter.	

*2: This function is not available. If needed, please contact Weihong Company.

◆ Protection

Hardware Protection	Over-voltage, under-voltage, over-current, over-speed, overload, overload of braking resistor, overheat of drive, abnormal encoder, etc.
Software Protection	Storage failure, initial failure, I/O allocation error, excessive position deviation etc.
Failure Logging	Up to 14 failures and latest 3 failures can be traced.

1.4 Product Features

WISE series servo drive is another expansion in motion control industry chain of Weihong Company. It boasts such functions as auto-gain tuning, auto adaptive mechanical resonance suppression, friction torque compensation, external disturbance observer, gain switching and time registration, to name but a few. Thanks to its precise positioning, quick response and ease of use, it has been proven to be an excellent and reliable solution provider when it is used together with Weihong CNC system. Chain-like product combination can effectively reduce components number and type for machine tool builders and facilitate daily maintenance for machines.

◆ Outstanding positioning precision and low-speed smoothness

It supports encoder with high resolution, reducing variation of torque, improving positioning precision of motor and enhancing smoothness of low-speed motion. When there is stiffness difference, WISE servo drive can remove oscillation via gain switching function.

◆ Ease of use

It features auto calculation of inertia ratio, real-time auto-gain tuning and auto suppression to mechanical resonance.

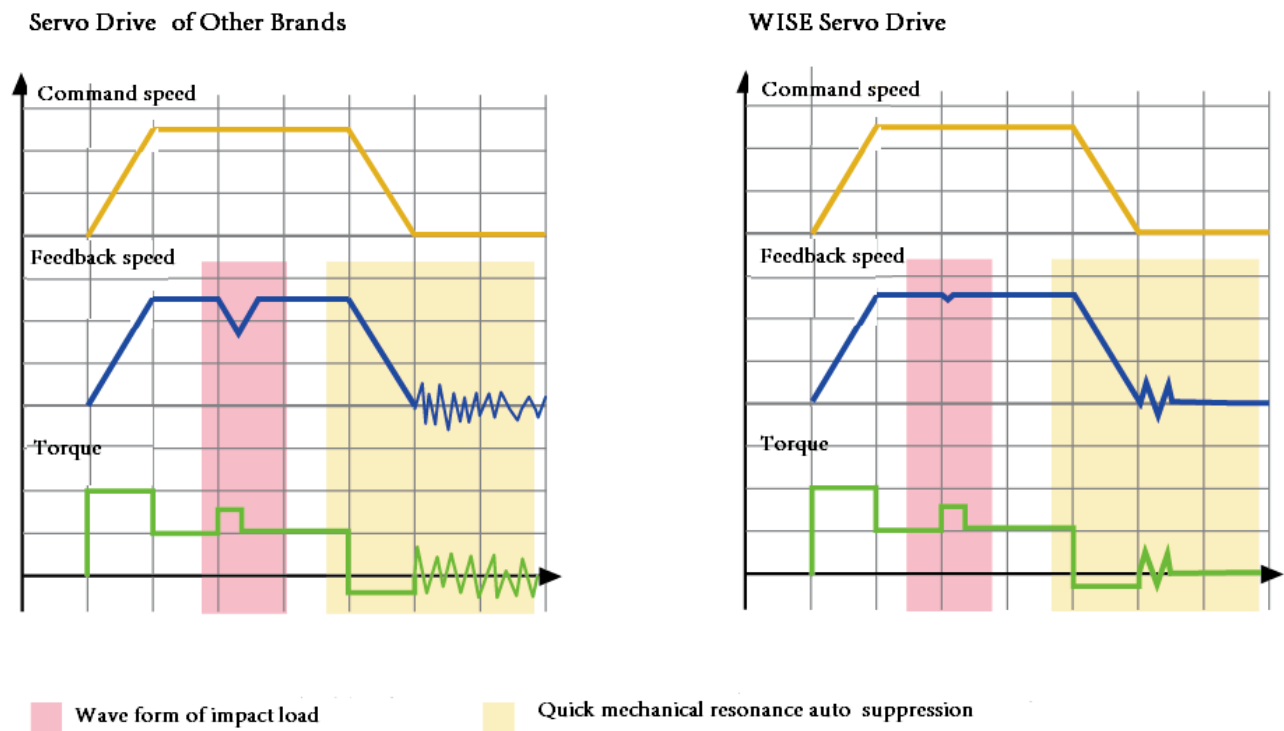


Fig. 1-5 Comparison between counterparts and WISE servo drive

◆ Powerful support software

WISE servo drive is user-friendly in HMI, and features functions such as real-time I/O monitoring and auto capture and analysis of waveform.

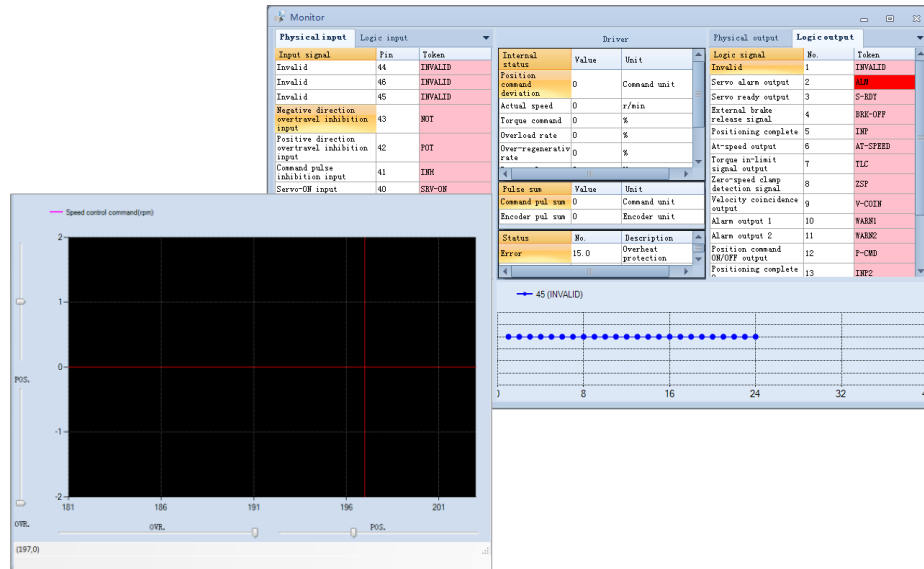


Fig. 1-6 Example of iMotion software

With the “iMotion”, you can execute the following operations.

- Parameters management

Editing, transmission, receipt, import, export and initialization of parameters can be realized, which is very convenient for operators.

- Real-time monitoring

Monitoring of I/O, existing alarms and history alarms, as well as system running status.

- Real-time/Triggered sampling

Main data waves in running will be captured with real-time/triggered sampling function, for debugging and analysis.

- Debugging

Rapidly adjust the servo drive stiffness, automatic calculation of inertia ratio.

- Mechanical analysis

Through FFT algorithm, quickly analyze and find the mechanical resonance point, and automatically setup notch filter to suppress vibration.

- Trial run

With versatile Trial Run interfaces, various application situations in real practices can be simulated.

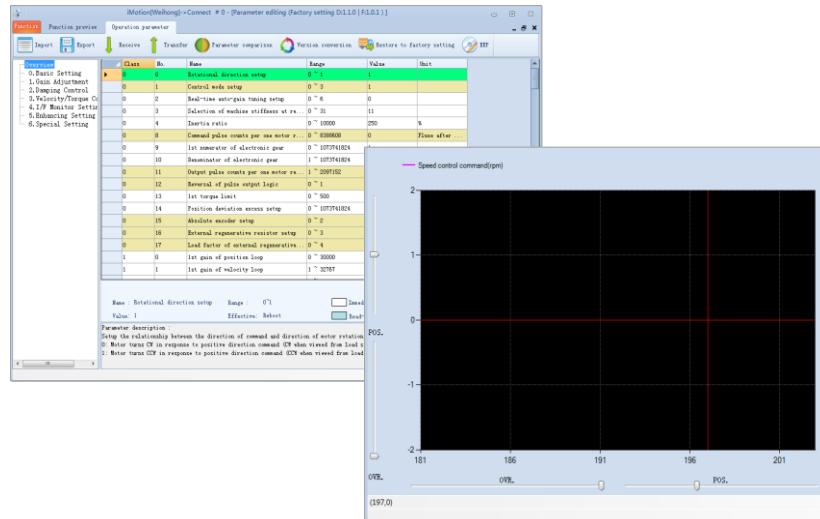


Fig. 1-7 Parameter interface (left) and real-time sampling interface (right)

◆ Time registration function

Double encryption for CNC system and servo drive is supported, which will limit the working time of the drive and safeguard manufacturers' legal rights to the greatest degree.



Fig. 1-8 Time registration function

◆ Wide applications in various industries

WISE servo drive adopts advanced control algorithms and can realize digital control of torque, rotational speed and position with the help of IPM intelligent module. It features excellent positioning precision and low-speed smoothness, on-line/off-line inertia recognition and real-time auto-gain tuning. Operations are easy. It can be widely applied in industries including milling and engraving, water jet cutting, laser cutting, glass cutting, metal cutting, robot manipulator and textile industry, etc.



Fig. 1-9 Examples of applicable industries

2 Typical Examples of Wiring Diagram

Before wiring, please note the following:

- 1) When externally wiring to a regenerative resistor, over-temperature protection MUST be provided.
- 2) Install over-temperature protection fuse and thermostat in the regenerative resistor. And once fuse action occurs, it cannot restore to previous state.
- 3) Please install the regenerative resistor on non-combustion substances.

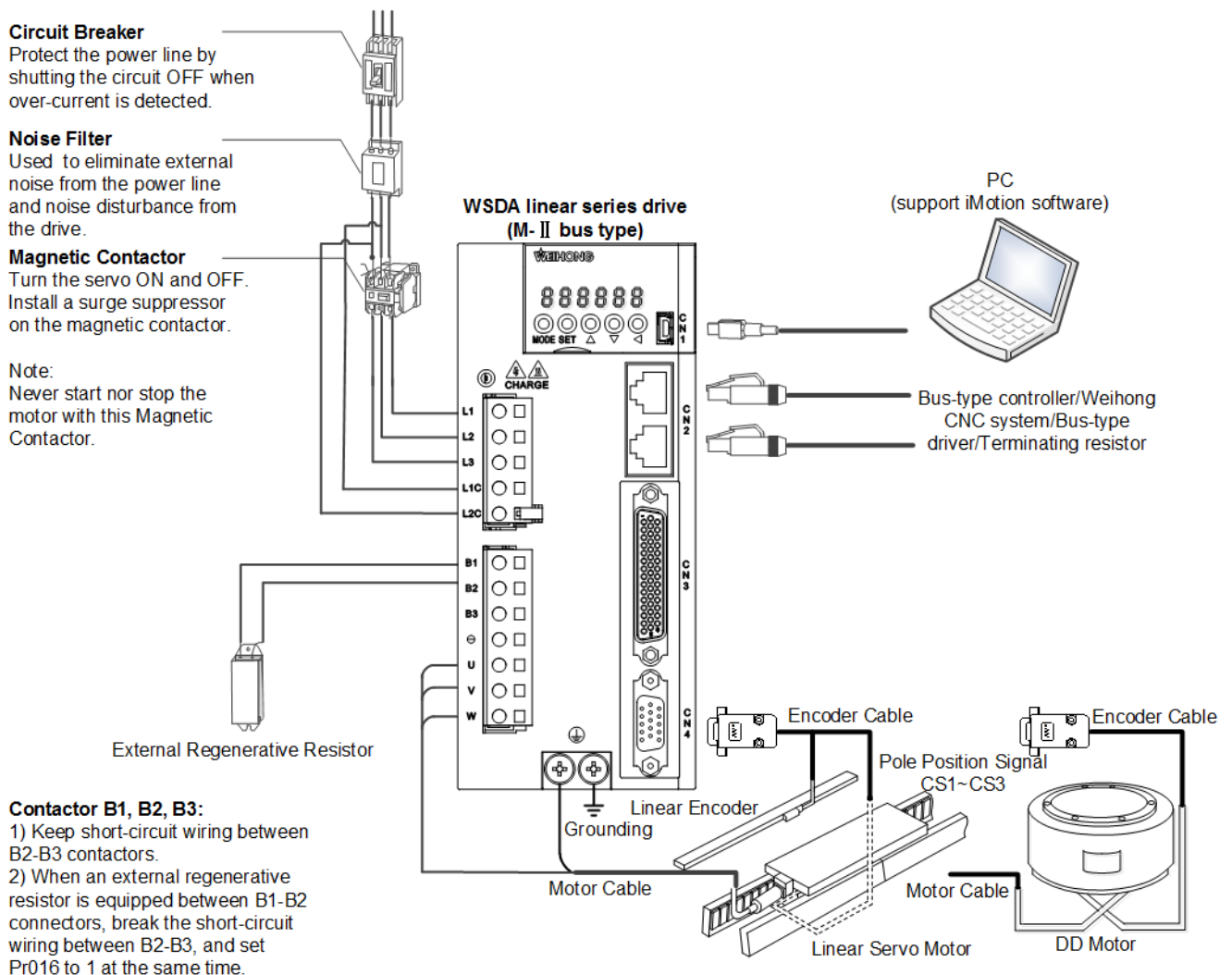
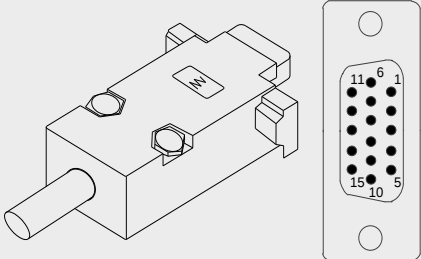


Fig. 2-1 Wiring diagram of WSDA-□2M2ML type drive

3 Cable Connector of Drive Encoder

Name	Applicable Drive	Pin	Signal	Diagram
DB15M • Material No.: 101903000062 Plastic case O-DB • Material No.: 101903000049	WSDA series linear servo drive	1	A	
		2	B	
		3	Z	
		4	-	
		5	+5V	
		6	/A	
		7	/B	
		8	/Z	
		9	CS1	
		10	CS2	
		11	CS3	
		12	-	
		13	/PS	
		14	PS	
		15	0V	

4 Combination of WISE Drive and Motor

Product information of WISE WSDA series linear servo drive is shown as follows:

Drive Model	Power (kW)	Continuous Current (A)	Max Current (A)	Main Circuit Power Supply	Control Circuit Power Supply
WSDA-1R22□ML	0.1	1.2	3.6	Single phase / three phase	Single phase 200V~240V +10% -15% , 50/60Hz
WSDA-2R82□ML	0.4	2.8	8.4		
WSDA-5R02□ML	0.75	5.0	15.0	200V~240V ^{+10%} _{-15%} ,	
WSDA-6R82□ML	1.0	6.8	20.4	50/60Hz	
WSDA-1102□ML	1.5	11.0	30.0	Three phase	
WSDA-1402□ML	2.5	14.0	40.0	200V~240V ^{+10%} _{-15%} , 50/60Hz	

Applicable motors of WSDA-2R82□ML drives are shown as follows:

Motor Model	Continuous Thrust Force (N)	Continuous Torque (N • m)	Continuous Current (A)	Peak Current (A)
WZCR-B32C1	80	-	2.5	7.5
WZCR-B32C2	160	-	2.5	7.5
WZCR-B32C3	240	-	2.5	7.5
WZCR-B32C4	320	-	2.5	7.5
WZCR-B32C5	400	-	2.5	7.5
WZCR-D170H-50	-	4.6	1.4	4.2
WZCR-D112H-65	-	9.0	2.5	7.5
WZCR-D224H-62	-	35	2.2	6.6

Applicable motors of WSDA-5R02□ML drives are shown as follows:

Motor Model	Continuous Thrust Force (N)	Continuous Torque (N · m)	Continuous Current (A)	Peak Current (A)
WZCR-AU30C1-□	29	-	3.8	15.2
WZCR-AU30C2-□	50	-	3.8	15.2
WZCR-AU30C3-□	87	-	3.8	15.2
WZCR-AU30C4-□	117	-	3.8	15.2
WZCR-AU50C1-□	85	-	3.6	15.2
WZCR-AU50C2-□	138	-	3.6	15.2
WZCR-AU50C3-□	170	-	3.6	15.2
WZCR-AU50C4-□	220	-	3.6	15.2
WZCR-AZ45C1-□	46	-	4.0	15
WZCR-AZ45C2-□	92	-	4.0	15
WZCR-AZ45C3-□	138	-	4.0	15
WZCR-AZ45C4-□	184	-	4.0	15
WZCR-AZ60C1-□	90.4	-	4.0	15
WZCR-AZ60C2-□	180	-	4.0	15
WZCR-AZ60C3-□	271.2	-	4.0	15
WZCR-AZ60C4-□	360	-	4.0	15
WZCR-AZ70C1-□	114.4	-	4.0	15
WZCR-AZ70C2-□	228.8	-	4.0	15
WZCR-AZ70C3-□	343.2	-	4.0	15
WZCR-AZ70C4-□	457.6	-	4.0	15
WZCR-AZ95C1-□	158	-	4.0	15
WZCR-AZ95C2-□	316	-	4.0	15
WZCR-AZ95C3-□	474	-	4.0	15
WZCR-AZ95C4-□	632	-	4.0	15
WZCR-AZ120C1-□	212.4	-	4.0	15
WZCR-AZ120C2-□	424.8	-	4.0	15
WZCR-AZ120C3-□	637.2	-	4.0	15
WZCR-AZ120C4-□	849.6	-	4.0	15

Applicable motors of WSDA-6R82□ML drives are shown as follows:

Motor Model	Continuous Thrust Force (N)	Continuous Torque (N • m)	Continuous Current (A)	Peak Current (A)
WZCR-D160S-88	-	5.8	6.0	30
WZCR-D160S-118	-	14.4	6.0	30
WZCR-D160S-148	-	23.0	6.0	30
WZCR-D160S-168	-	28.8	6.0	30

Applicable motors of WSDA-1102□ML drives are shown as follows:

Motor Model	Continuous Thrust Force (N)	Continuous Torque (N • m)	Continuous Current (A)	Peak Current (A)
WZCR-D263H-138	-	150	7.1	14.2
WZCR-AZ70C4S-□	457.6	-	8.0	30
WZCR-AZ95C4S-□	632	-	8.0	30
WZCR-AZ120C4S-□	849.6	-	8.0	30

5 U-channel Linear Servo Motor

5.1 Model Designation

The model specifications of MA/MN/ME/MB series motor are as shown in Fig. 5-1.

Rotor **WZCR** - **A** **U** **30** **C1** - **L30** Stator **WZCR** - **S** **U** **30** **M** - **A1**
 ① ② ③ ④ ⑤ ⑥ ① ② ③ ⑦ ⑧ ⑨

① Product series

Symbol	Spec.
WZCR	WISE CR series

② Motor structure

Symbol	Spec.
A	Rotor
S	Stator

③ Motor type

Symbol	Spec.
U	U-channel (without iron core)

④ Rotor width ⑦ Stator width

Symbol	Spec.
30	30mm
50	50mm

⑤ Rotor length and tap hole spec.

Rotor width is 30mm:

Symbol	Spec.
C1	81.3mm
C2	142.2mm
C3	202.7mm
C4	264.2mm

Rotor width is 50mm:

Symbol	Spec.
C1	142.2mm
C2	202.7mm
C3	264.2mm
C4	325.1mm

⑥ Rotor lead wire length

Symbol	Spec.
L30	3m
L50	5m

⑧ Component type

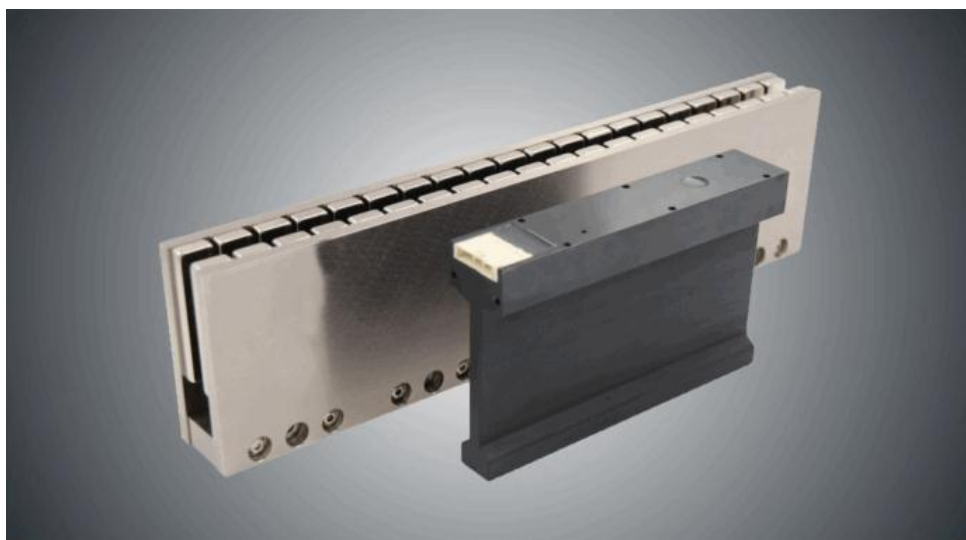
Symbol	Spec.
M	Magnetic steel component

⑨ Stator length

Symbol	Spec.
A1	128mm
A2	320mm

Fig. 5-1 Model designation of U-channel linear servo motor

5.2 WZCR-U30 Series



◆ Specifications

Motor Model	WZCR-AU30C1-□	WZCR-AU30C2-□
Continuous Thrust(N)	29	50
Peak Thrust(N)	120	220
Continuous Current(A)	3.8	3.8
Peak Current(A)	15.2	15.2
Rotor Mass(kg)	0.15	0.3
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	7.7	15
Motor Counter EMF(V/m/s)	6.3	12.2
Motor Constant(N/√W)	4.5	5.6
Resistance(Ω)	1.5	2.8
Inductance(mH)	0.8	1.6
Max Power(W)	830	1317
Continuous Power(W)	80	146
Max Temp of Rotor(℃)	100	100

Motor Model	WZCR-AU30C3-□	WZCR-AU30C4-□
Continuous Thrust(N)	87	117
Peak Thrust(N)	340	460
Continuous Current(A)	3.8	3.8
Peak Current(A)	15.2	15.2
Rotor Mass(kg)	3	0.45
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	22.8	39.2
Motor Counter EMF(V/m/s)	18.5	31.9
Motor Constant(N/√W)	7.7	9.7
Resistance(Ω)	2.2	4.5
Inductance(mH)	2.2	3.1
Max Power(W)	1317	1514
Continuous Power(W)	80	146
Max Temp of Rotor(°C)	100	100

◆ Outline dimensional drawing of the stator

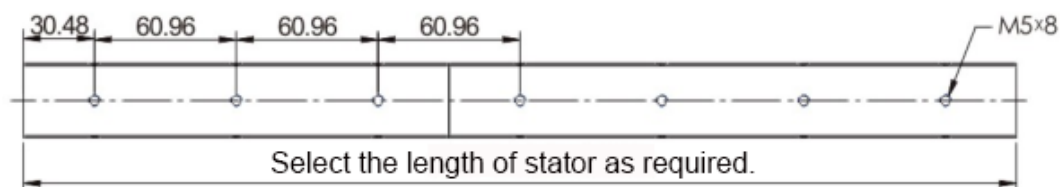


Fig. 5-2 Dimensional drawing of WZCR-U30 series stator

Dimensional drawing of WZCR-U30 series stator is shown in Fig. 5-2. See the table below for details.

Stator Model	WZCR-SU30M-A1	WZCR-SU30M-A2
Stator Length(mm)	182	243
Stator Width(mm)	31.75	31.75
Stator Height(mm)	47	47
Pole Distance(mm)	30.48	30.48
A(PCS)	1	4
Z(PCS)	4	10
Stator Mass(kg/m)	1.5	2.0

◆ Outline dimensional drawing of the motor

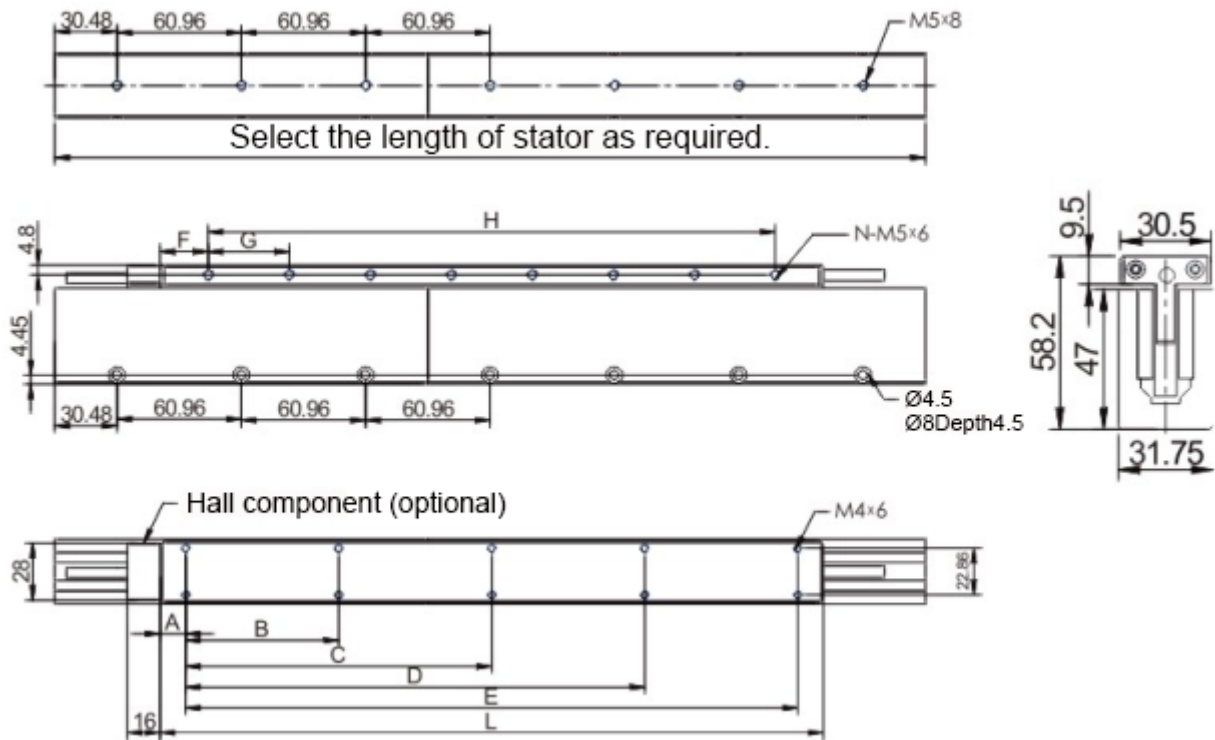
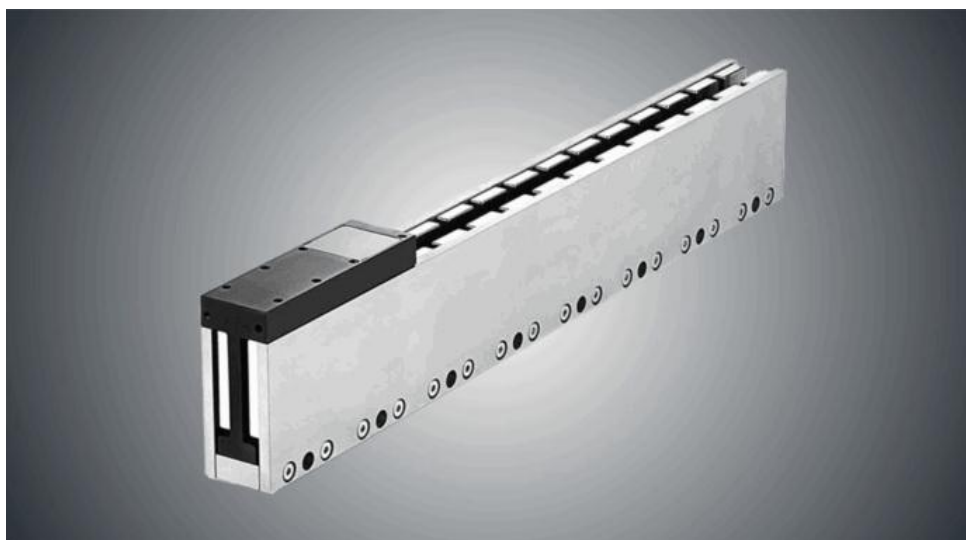


Fig. 5-3 Dimensional drawing of WZCR-U30 series

Dimensional drawing of WZCR-U30 series motor is shown in Fig. 5-3. See the table below for details (unit: mm).

Motor Model	WZCR-AU30C1-□	WZCR-AU30C2-□	WZCR-AU30C3-□	WZCR-AU30C4-□
L	81.3	142.2	202.7	264.2
A	10.65	21.1	11.4	12.7
B	30	50	60	79.6
C	60	100	120	159.2
D	/	/	180	238.8
E	/	/	/	/
F	20.8	11.5	22	33.1
G	39.7	39.7	39.7	33
H	39.7	119.1	158.8	198
N	2	4	5	7

5.3 WZCR-U50 Series



◆ Specifications

Motor Model	WZCR-AU50C1-□	WZCR-AU50C2-□
Continuous Thrust(N)	85	138
Peak Thrust(N)	340	550
Continuous Current(A)	3.6	3.6
Peak Current(A)	15.2	15.2
Rotor Mass(kg)	0.3	0.55
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	23.7	38.4
Motor Counter EMF(V/m/s)	19.3	30.4
Motor Constant(N/√W)	10.1	11.2
Resistance(Ω)	4	6.1
Inductance(mH)	2.3	3.5
Max Power(W)	1037	1639
Continuous Power(W)	100	158
Max Temp of Rotor(℃)	100	100

Motor Model	WZCR-AU50C3-□	WZCR-AU50C4-□
Continuous Thrust(N)	170	220
Peak Thrust(N)	680	880
Continuous Current(A)	3.6	3.6
Peak Current(A)	15.2	15.2
Rotor Mass(kg)	0.76	1.2
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	47.5	62.2
Motor Counter EMF(V/m/s)	38.6	50.6
Motor Constant(N/√W)	14.2	14.5
Resistance(Ω)	8	10
Inductance(mH)	4.5	5.8
Max Power(W)	2075	2687
Continuous Power(W)	200	259
Max Temp of Rotor(°C)	100	100

◆ Outline dimensional drawing of the stator

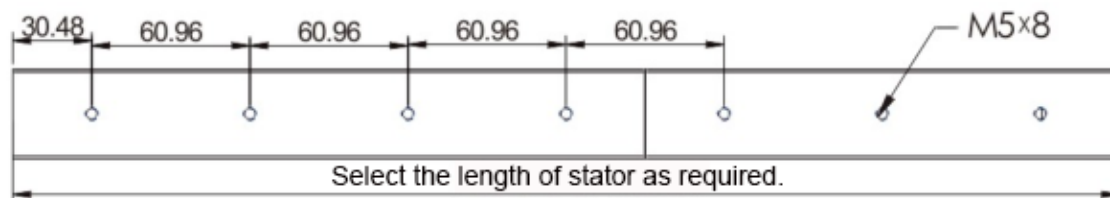


Fig. 5-4 Dimensional drawing of WZCR-U50 series stator

Dimensional drawing of WZCR-U50 series stator is shown in Fig. 5-2. See the table below for details.

Stator Model	WZCR-SU50M-A1	WZCR-SU50M-A2
Stator Length(mm)	182	242
Stator Width(mm)	34.3	34.3
Stator Height(mm)	67.3	67.3
Pole Distance(mm)	30.48	30.48
A (PCS)	1	4
Z (PCS)	4	10
Stator Mass(kg/m)	2.1	2.8

◆ Outline dimensional drawing of the motor

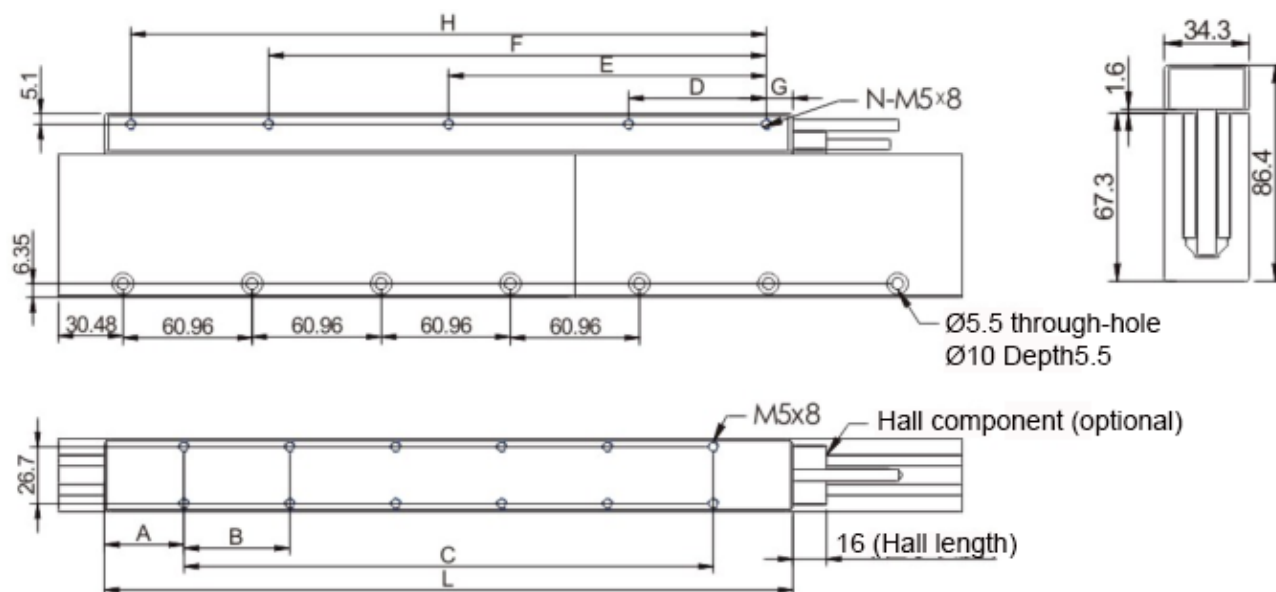


Fig. 5-5 Outline dimensional drawing of WZCR-U50 series

Dimensional drawing of WZCR-U50 series motor is shown in Fig. 5-5. See the table below for details.

Motor Model	WZCR-AU50C1-□	WZCR-AU50C2-□	WZCR-AU50C3-□	WZCR-AU50C4-□
L	142.2	202.7	263.7	325.1
A	21.1	12.45	11.85	37.55
B	50	88.9	60	50
C	100	177.8	240	250
D	40	50	70	85
E	80	100	140	150
F	120	150	210	235
G	11.1	26.35	26.85	12.55
H	/	/	/	300
N	4	4	4	5

6 Iron Core Linear Servo Motor

6.1 Model Designation

Rotor

WZCR

-

A

Z

45

C1

-

L30

Stator

WZCR

-

S

Z

45

M

A1

①

②

③

④

⑤

⑥

①

②

③

⑦

⑧

⑨

①Product series

Symbol	Spec.
WZCR	WISE CR series

②Motor structure

Symbol	Spec.
A	Rotor
S	Stator

③Motor type

Symbol	Spec.
Z	Straightening

④Rotor width ⑦Stator width

Symbol	Spec.
45	45mm
60	60mm
70	70mm
95	95mm
120	120mm

⑤Rotor length and tap hole spec.

Symbol	Spec.
C1	88.6mm
C2	153.4mm
C3	218.2mm
C4	283mm
C4S	

⑥Rotor lead wire length

Symbol	Spec.
L30	3m
L50	5m

⑧Component type

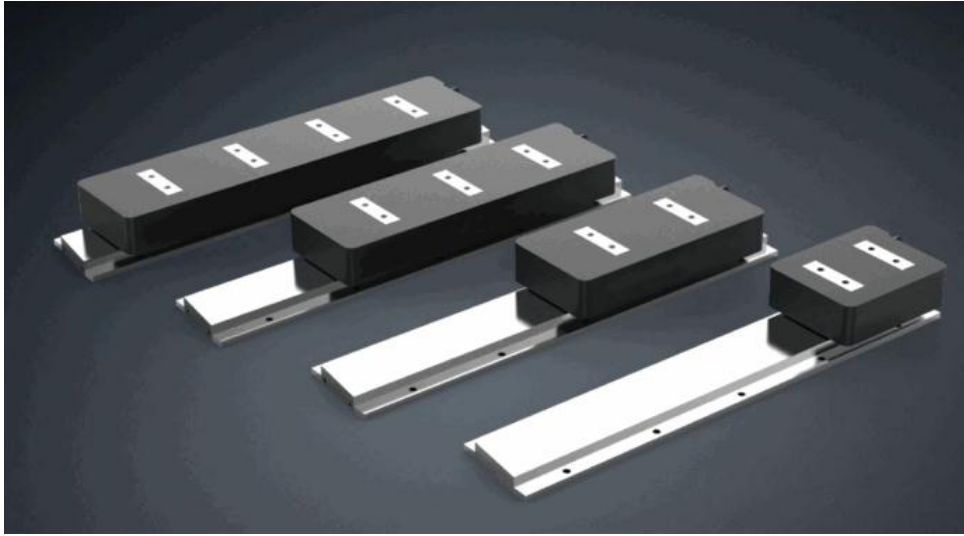
Symbol	Spec.
M	Magnetic steel component

⑨Stator length

Symbol	Spec.
A1	133mm
A2	325mm

Fig. 6-1 Model designation of iron core linear servo motor

6.2 WZCR-Z45 Series



◆ Specifications

Motor Model	WZCR-AZ45C1-□	WZCR-AZ45C2-□
Continuous Thrust(N)	46	92
Peak Thrust(N)	172.5	345
Continuous Current(A)	4	4
Peak Current(A)	15	15
Rotor Mass(kg)	1.1	1.9
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	11.5	23
Motor Counter EMF(V/m/s)	9.4	18.7
Motor Constant(N/√W)	8.6	12.5
Resistance(Ω)	1.8	3.4
Inductance(mH)	5.6	10.8
Max Power(W)	448.2	846.6
Continuous Power(W)	43.2	81.6
Max Temp of Rotor(℃)	120	120

Motor Model	WZCR-AZ45C3-□	WZCR- AZ45C4-□
Continuous Thrust(N)	138	184
Peak Thrust(N)	517.5	690
Continuous Current(A)	4	4
Peak Current(A)	15	15
Rotor Mass(kg)	2.7	3.5
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	34.5	46
Motor Counter EMF(V/m/s)	28.1	37.4
Motor Constant(N/√W)	15.3	17.9
Resistance(Ω)	5.1	6.6
Inductance(mH)	16.1	20.8
Max Power(W)	1269.9	1643.4
Continuous Power(W)	122.4	158.4
Max Temp of Rotor(℃)	120	120

◆ Outline dimensional drawing of the stator

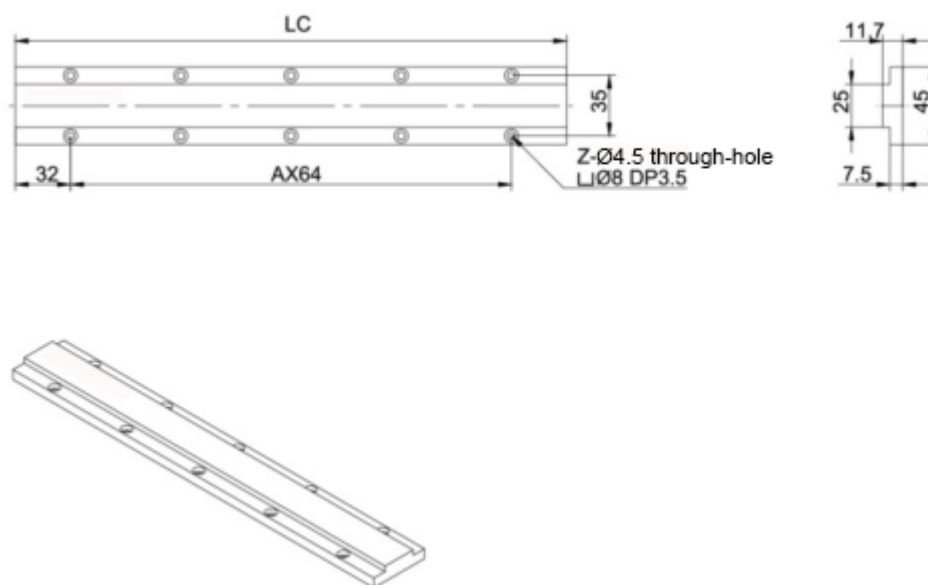


Fig. 6-2 Dimensional drawing of WZCR-Z45 series stator

Dimensional drawing of WZCR-U50 series stator is shown in Fig. 6-2. See the table below for details.

Stator Model	WZCR-SZ45M-A1	WZCR-SZ45M-A2
Stator Length(mm)	128	320
Stator Width(mm)	45	45
Stator Height(mm)	11.7	11.7
Pole Distance(mm)	32	32
A(PCS)	1	4
Z(PCS)	4	10
Stator Mass(kg/m)	3.4	3.4

◆ Outline dimensional drawing of the motor

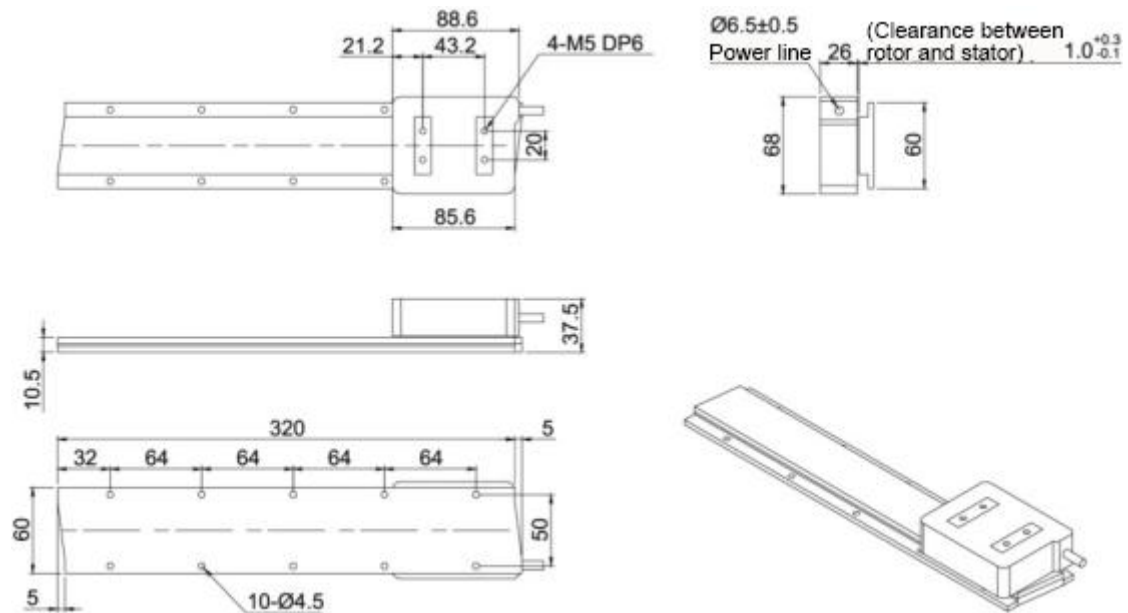


Fig. 6-3 Dimensional drawing of WZCR-AZ45C1-□ motor

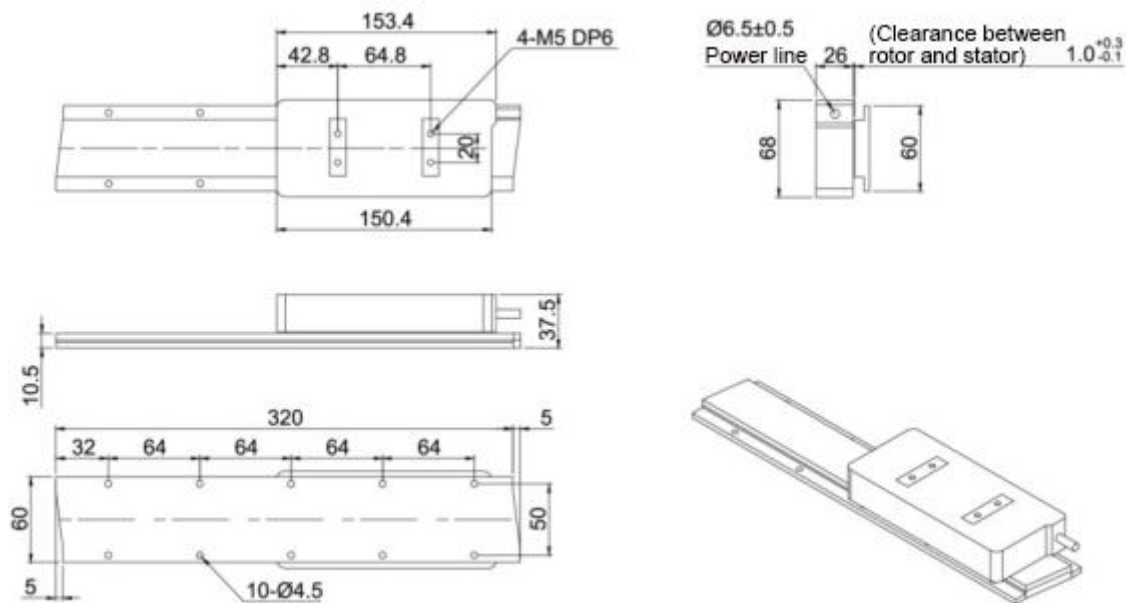


Fig. 6-4 Dimensional drawing of WZCR-AZ45C2-□ motor

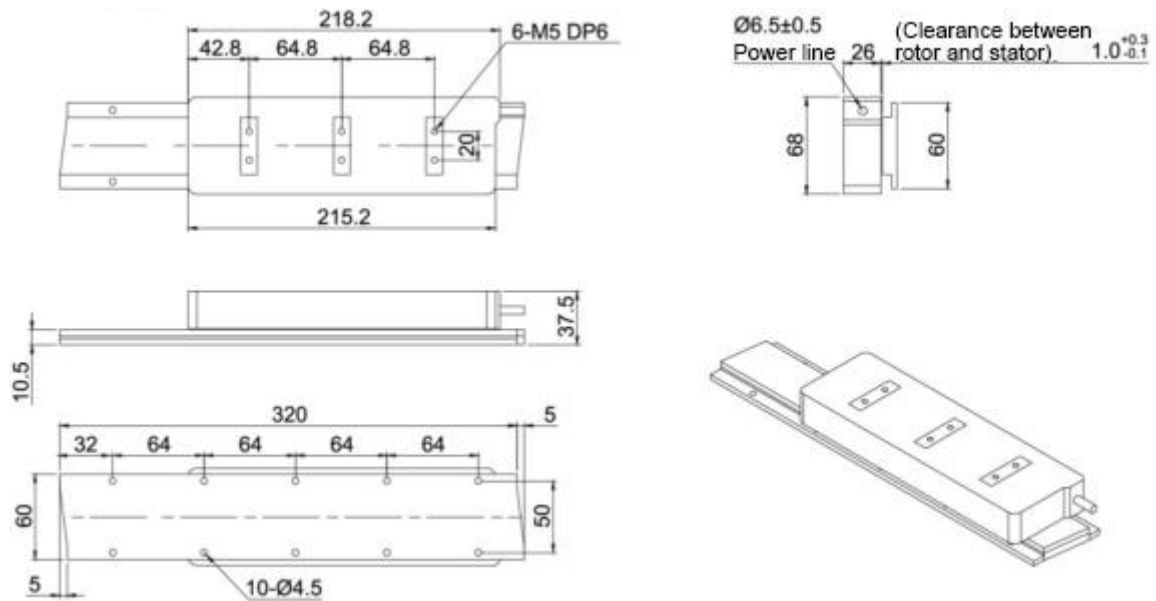


Fig. 6-5 Dimensional drawing of WZCR-AZ45C3-□ motor

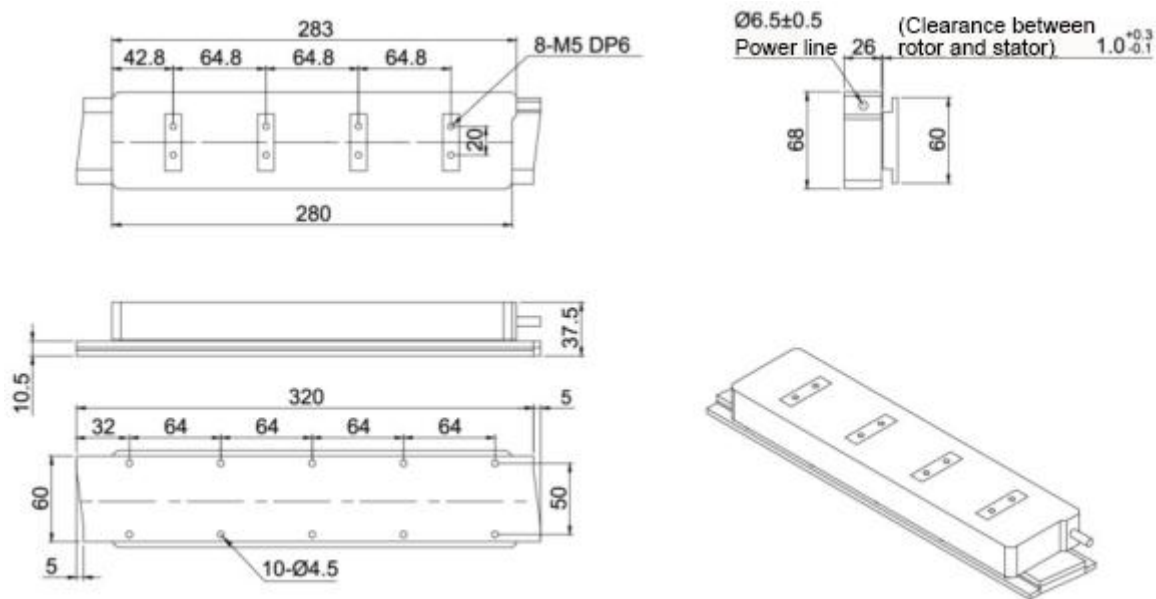
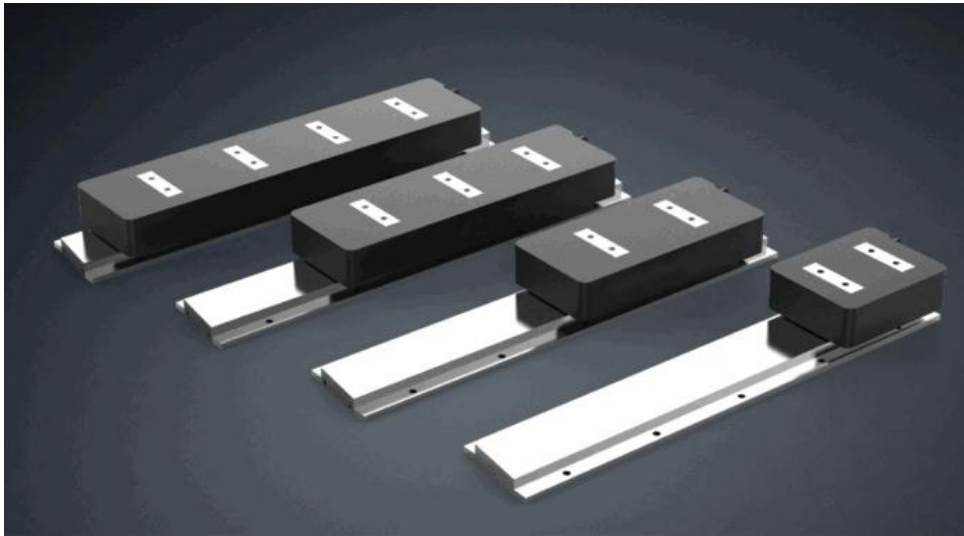


Fig. 6-6 Dimensional drawing of WZCR-AZ45C4-□ motor

6.3 WZCR-Z60 Series



◆ Specifications

Motor Model	WZCR-AZ60C1-□	WZCR- AZ60C2-□
Continuous Thrust(N)	90.4	180
Peak Thrust(N)	339	670
Continuous Current(N)	4	4
Peak Current(A)	15	15
Rotor Mass(kg)	0.95	1.65
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	22.6	45.5
Motor Counter EMF(V/m/s)	18.4	36.8
Motor Constant(N/√W)	11.6	17.2
Resistance(Ω)	3.8	3.8
Inductance(mH)	11	21
Max Power(W)	946.2	1718
Continuous Power(W)	91.2	165
Max Temp of Rotor(℃)	120	120

Motor Model	WZCR-AZ60C3-□	WZCR- AZ60C4-□
Continuous Thrust(N)	271.2	360
Peak Thrust(N)	1017	1350
Continuous Current(N)	4	4
Peak Current(A)	15	15
Rotor Mass(kg)	2.25	2.8
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	67.8	90
Motor Counter EMF(V/m/s)	55.1	73
Motor Constant(N/√W)	21	25
Resistance(Ω)	10.4	7.8
Inductance(mH)	31.8	41
Max Power(W)	2589.6	3290
Continuous Power(W)	249.6	310
Max Temp of Rotor(℃)	120	120

◆ Outline dimensional drawing of the stator

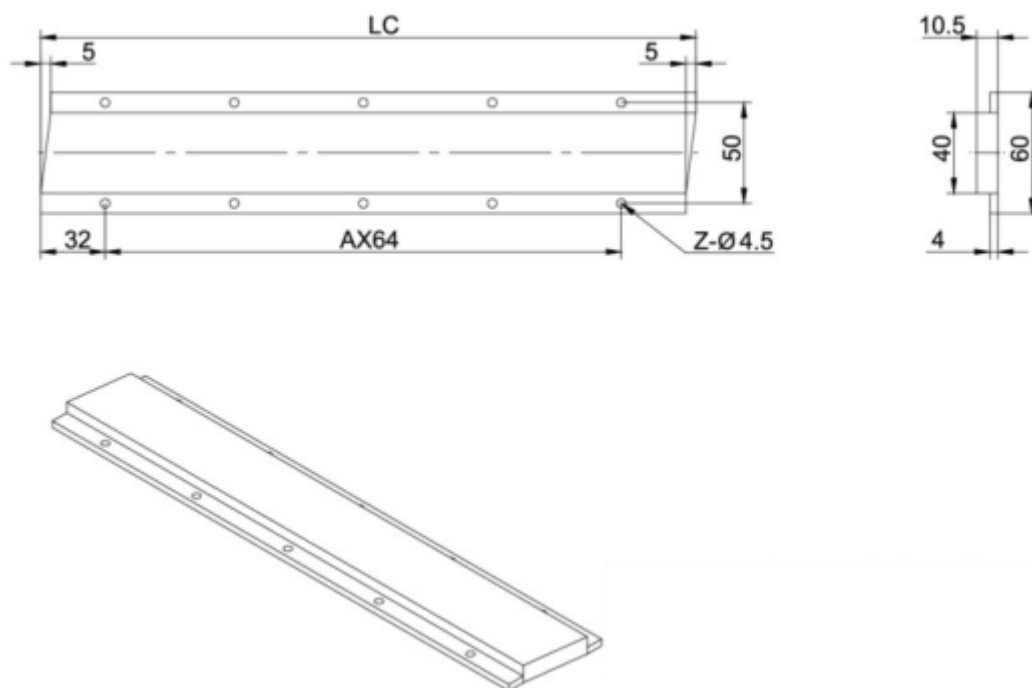


Fig. 6-7 Dimensional drawing of WZCR-Z60 series stator

Dimensional drawing of WZCR-Z60 series stator is shown in Fig. 6-7. See the table below for details.

Stator Model	WZCR-SZ60M-A1	WZCR-SZ60M-A2
Stator Length(mm)	133	325
Stator Width(mm)	60	60
Stator Height(mm)	10.5	10.5
Pole Distance(mm)	32	32
A(PCS)	1	4
Z(PCS)	4	10
Stator Mass(kg/m)	3.6	5.2

◆ Outline dimensional drawing of the motor

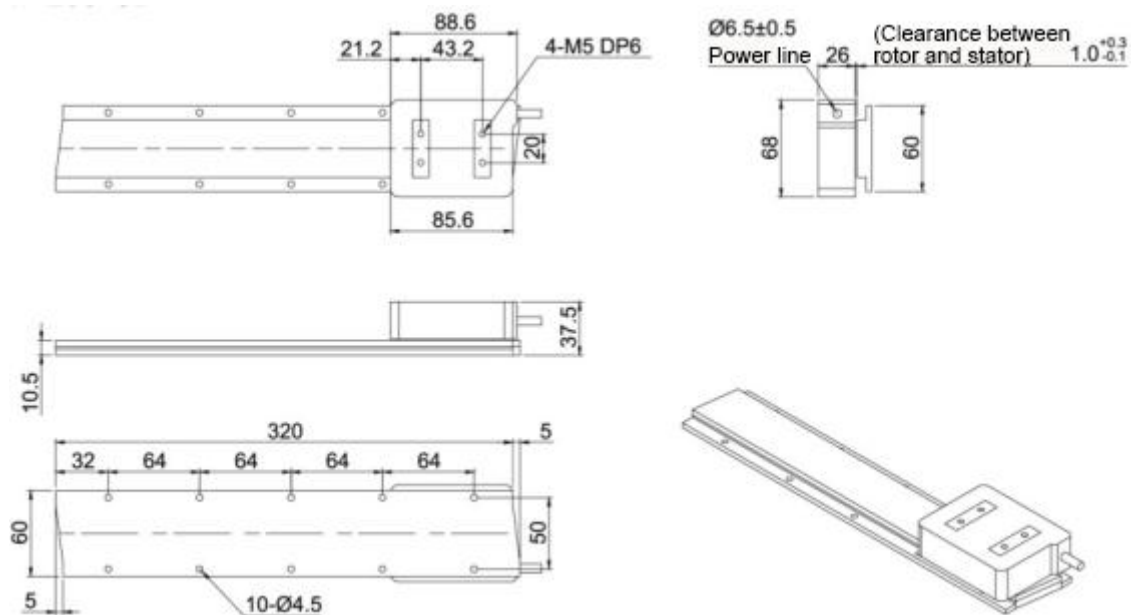


Fig. 6-8 Dimensional drawing of WZCR-AZ60C1-□ motor

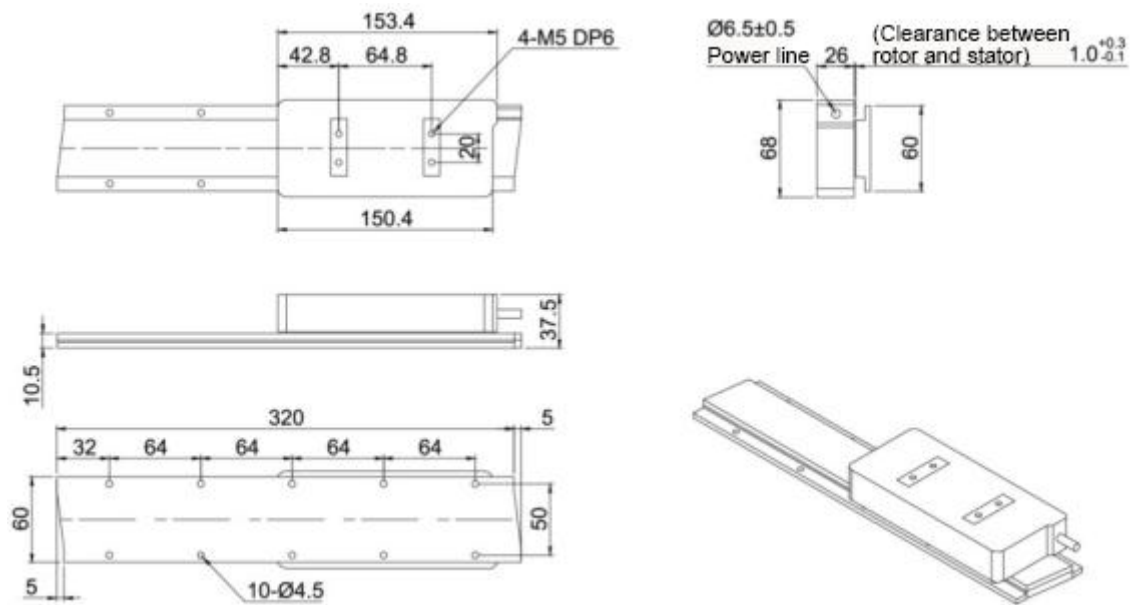


Fig. 6-9 Dimensional drawing of WZCR-AZ60C2-□ motor

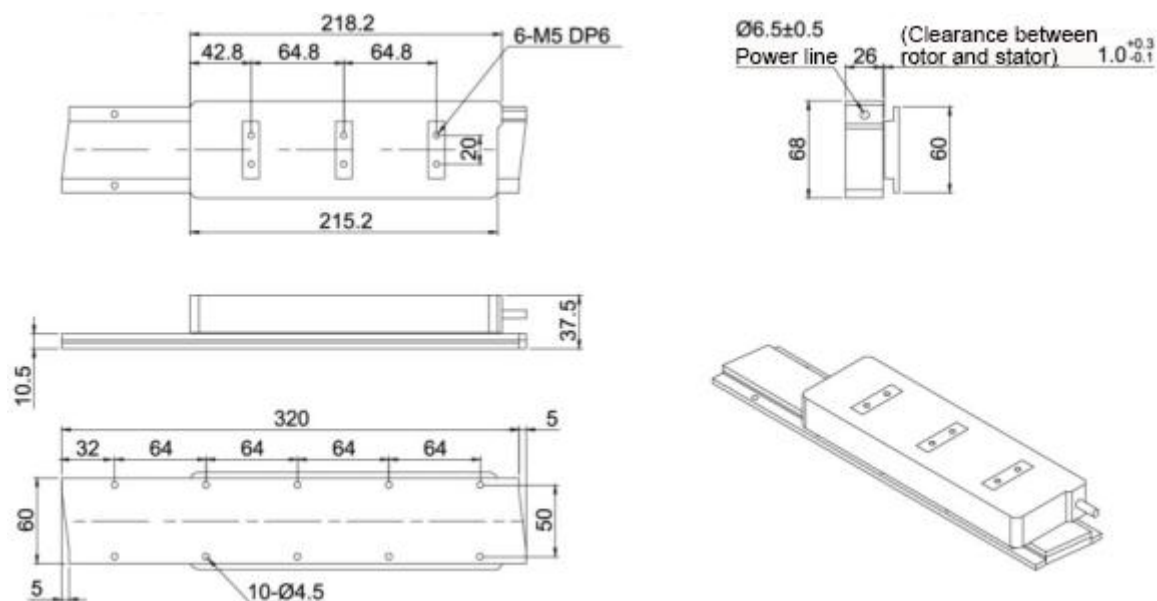


Fig. 6-10 Dimensional drawing of WZCR-AZ60C3-□ motor

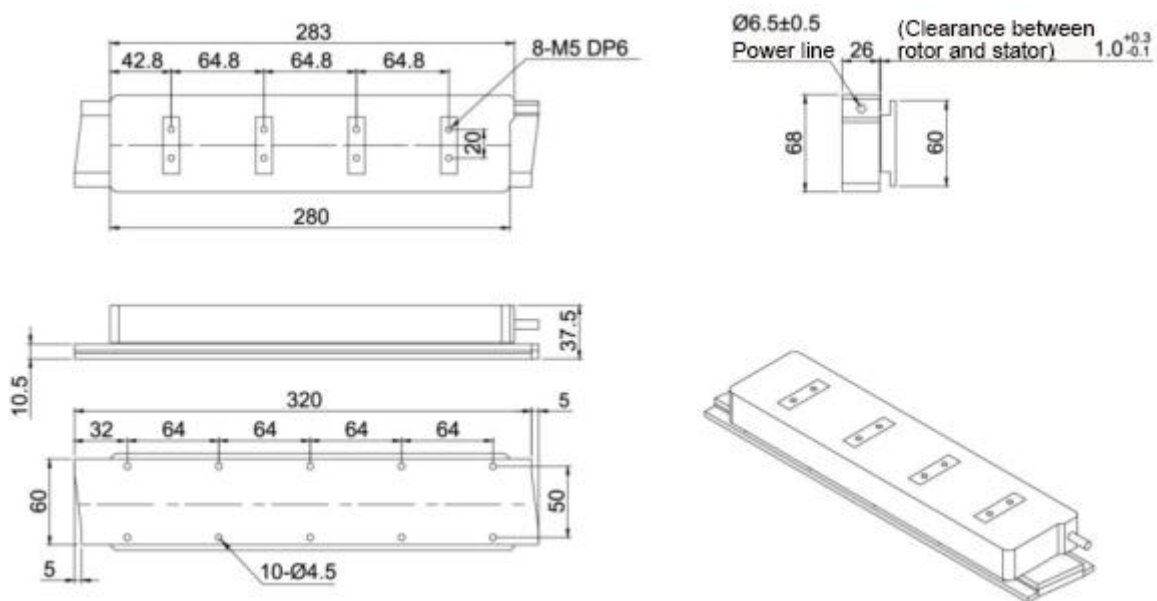
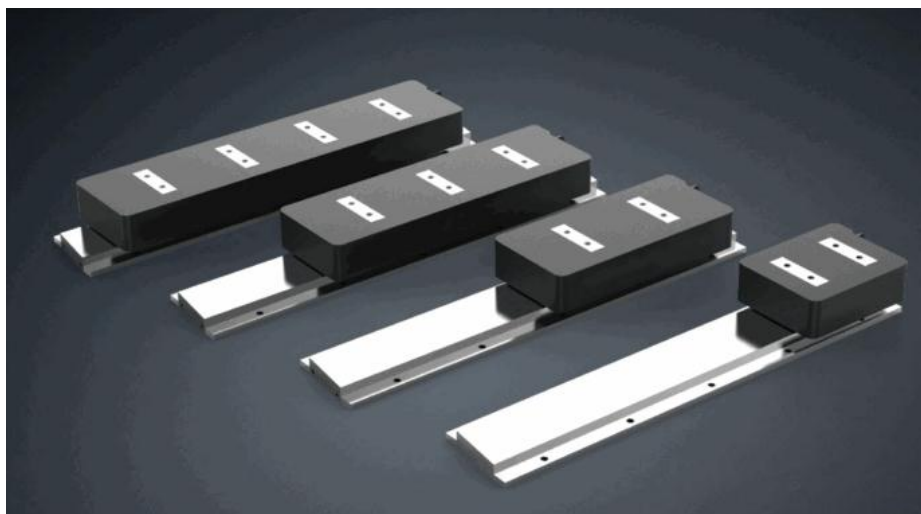


Fig. 6-11 Dimensional drawing of WZCR-AZ60C4-□ motor

6.4 WZCR-Z70 Series



◆ Specifications

Motor Model	WZCR-AZ70C1-□	WZCR- AZ70C2-□
Continuous Thrust(N)	114.4	228.8
Peak Thrust(N)	429	858
Continuous Current(N)	4	4
Peak Current(A)	15	15
Rotor Mass(kg)	1.1	1.9
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	28.6	57.2
Motor Counter EMF(V/m/s)	23.3	46.5
Motor Constant(N/√W)	13.7	20.4
Resistance(Ω)	4.33	7.86
Inductance(mH)	13	25.9
Max Power(W)	1078	1957.14
Continuous Power(W)	103	188.6
Max Temp of Rotor(°C)	120	120

Motor Model	WZCR-AZ70C3-□	WZCR- AZ70C4-□	WZCR- AZ70C4S-□
Continuous Thrust(N)	343.2	457.6	457.6
Peak Thrust(N)	1287	1716	1716
Continuous Current(N)	4	4	8
Peak Current(A)	15	15	30
Rotor Mass(kg)	2.7	3.5	3.5
Motor Air Gap(mm)	1	1	1
Thrust Constant(N/A)	85.8	114.4	57.2
Motor Counter EMF(V/m/s)	69.8	93	46.5
Motor Constant(N/√W)	24.9	29.5	27.5
Resistance(Ω)	11.85	15.06	4.32
Inductance(mH)	37.8	49.7	14.3
Max Power(W)	2950.7	3749.9	4302.7
Continuous Power(W)	284.4	361.4	414.7
Max Temp of Rotor(℃)	120	120	120

◆ Outline dimensional drawing of the stator

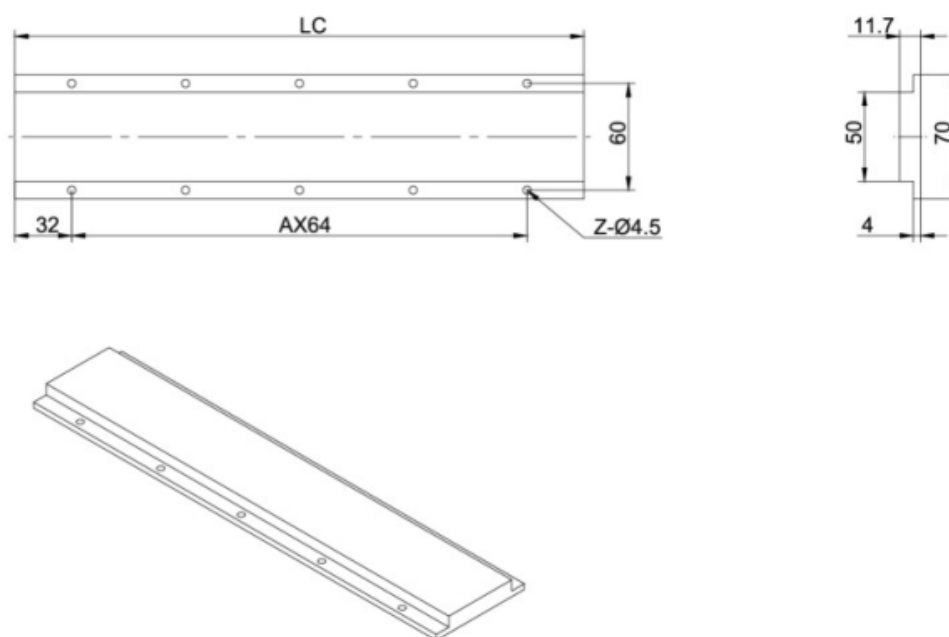


Fig. 6-12 Dimensional drawing of WZCR-Z70 series stator

Dimensional drawing of WZCR-Z70 series stator is shown in Fig. 6-12. See the table below for details.

Stator Model	WZCR-SZ70M-A1	WZCR-SZ70M-A2
Stator Length(mm)	133	325
Stator Width(mm)	70	70
Stator Height(mm)	12	12
Pole Distance(mm)	32	32
A(PCS)	1	4
Z(PCS)	4	10
Stator Mass(kg/m)	4.2	5.8

◆ Outline dimensional drawing of the motor

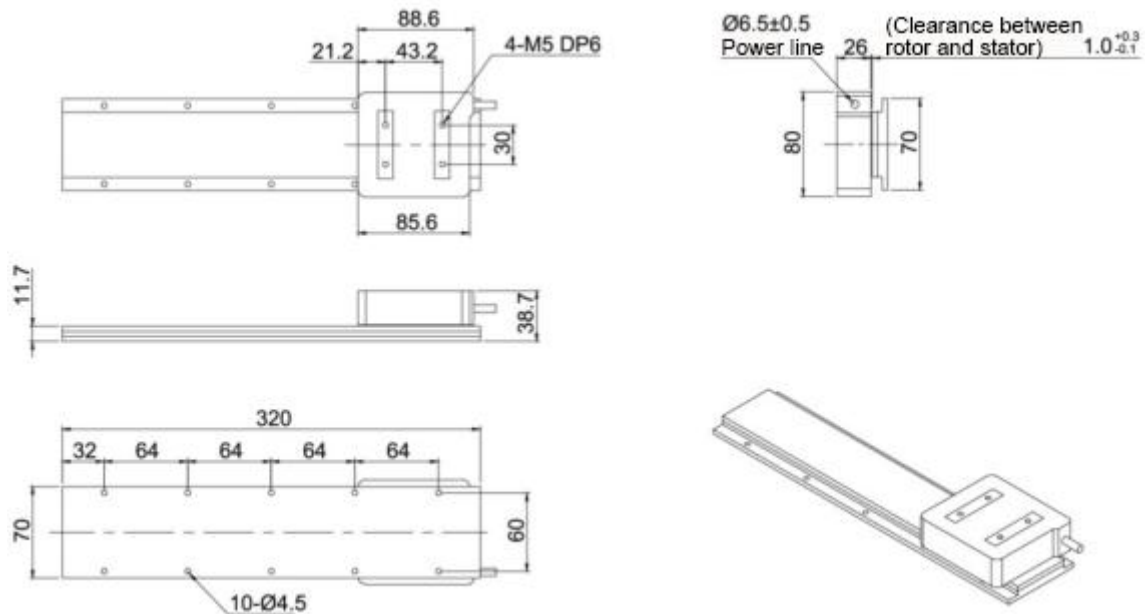


Fig. 6-13 Dimensional drawing of WZCR-AZ70C1-□ motor

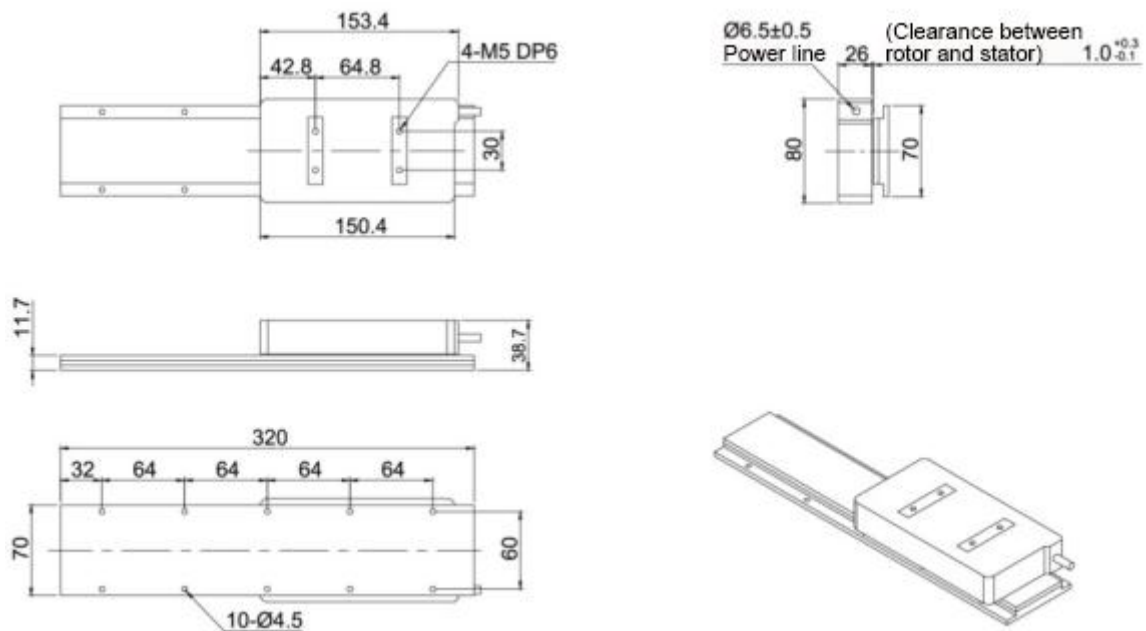


Fig. 6-14 Dimensional drawing of WZCR-AZ70C2-□ motor

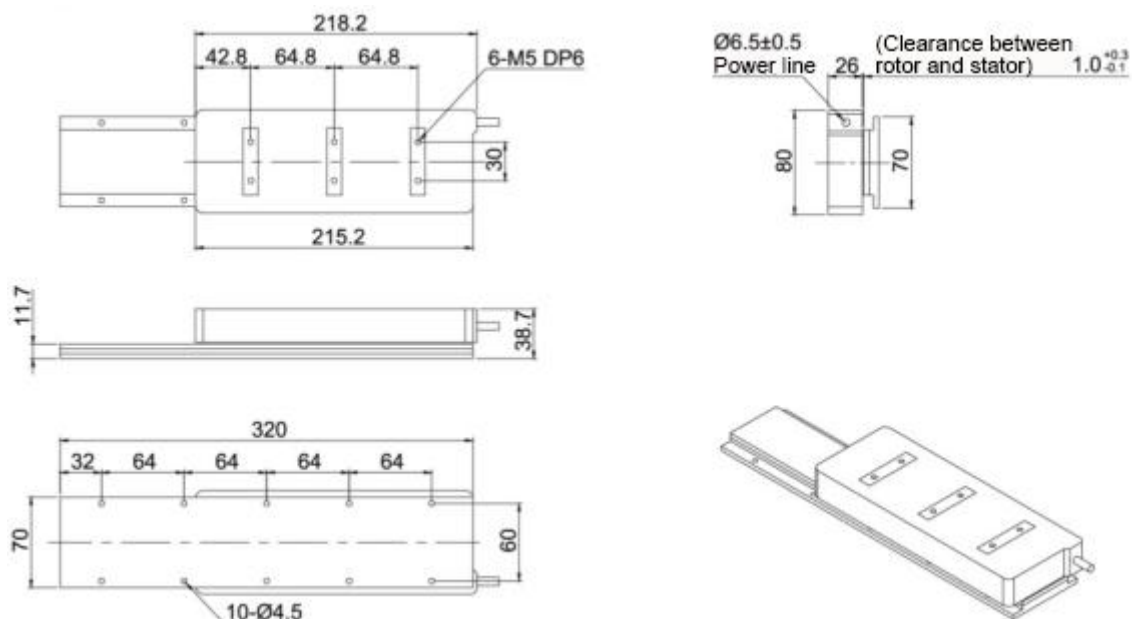


Fig. 6-15 Dimensional drawing of WZCR-AZ70C3-□ motor

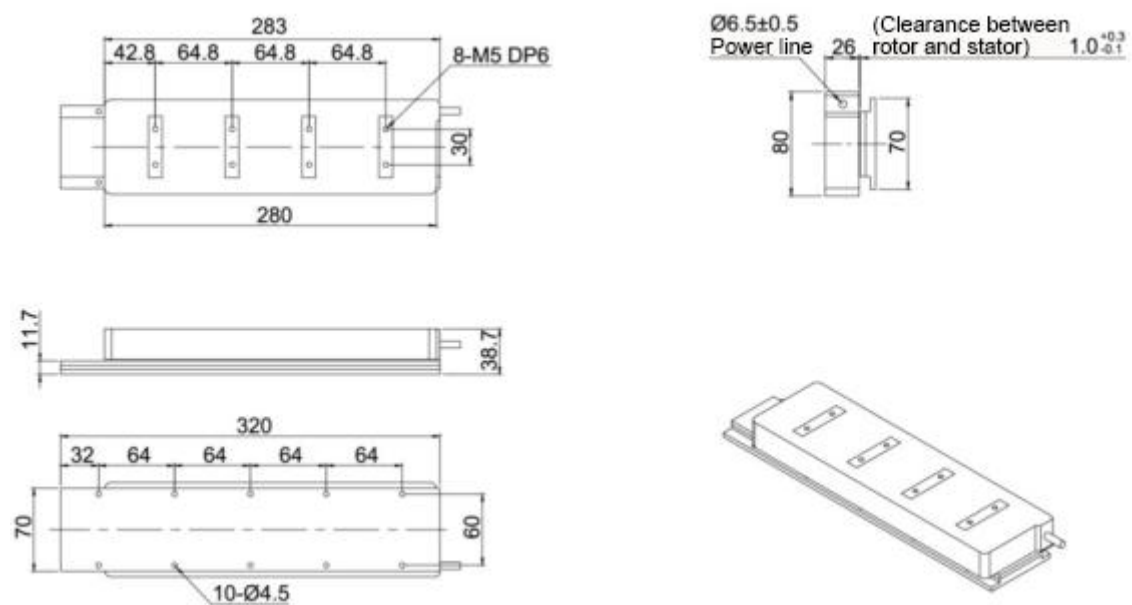
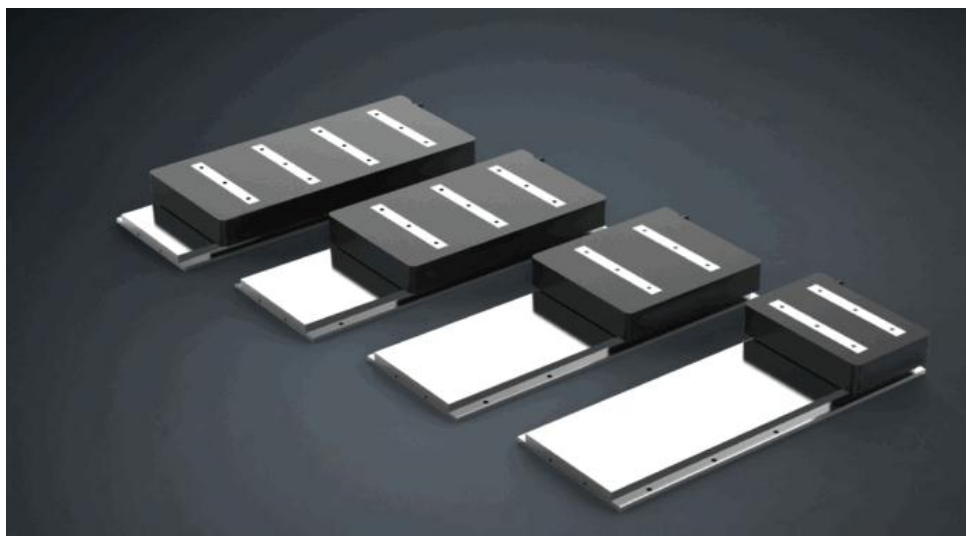


Fig. 6-16 Dimensional drawing of WZCR-AZ70C4-□ and WZCR-AZ70C4S-□ motor

6.5 WZCR-Z95 Series



◆ Specifications

Motor Model	WZCR-AZ95C1-□	WZCR- AZ95C2-□
Continuous Thrust(N)	158	316
Peak Thrust(N)	592.5	1185
Continuous Current(N)	4	4
Peak Current(A)	15	15
Rotor Mass(kg)	1.8	3.1
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	39.5	79
Motor Counter EMF(V/m/s)	32.1	64.3
Motor Constant(N/√W)	17.3	26
Resistance(Ω)	5.2	9.2
Inductance(mH)	17.1	33.6
Max Power(W)	1294.8	2290.8
Continuous Power(W)	124.8	220.8
Max Temp of Rotor(℃)	120	120

Motor Model	WZCR-AZ95C3-□	WZCR- AZ95C4-□	WZCR- AZ95C4S-□
Continuous Thrust(N)	474	632	632
Peak Thrust(N)	1777.5	2370	2370
Continuous Current(N)	4	4	8
Peak Current(A)	15	15	30
Rotor Mass(kg)	4.4	5.7	5.7
Motor Air Gap(mm)	1	1	1
Thrust Constant(N/A)	118.5	158.5	79
Motor Counter EMF(V/m/s)	96.4	128.5	64.3
Motor Constant(N/√W)	31.6	37.4	36.8
Resistance(Ω)	14.1	17.8	4.6
Inductance(mH)	49.3	65.1	16.8
Max Power(W)	3510.9	4432.2	4581.6
Continuous Power(W)	338.4	427.2	441.6
Max Temp of Rotor(℃)	120	120	120

◆ Outline dimensional drawing of the stator

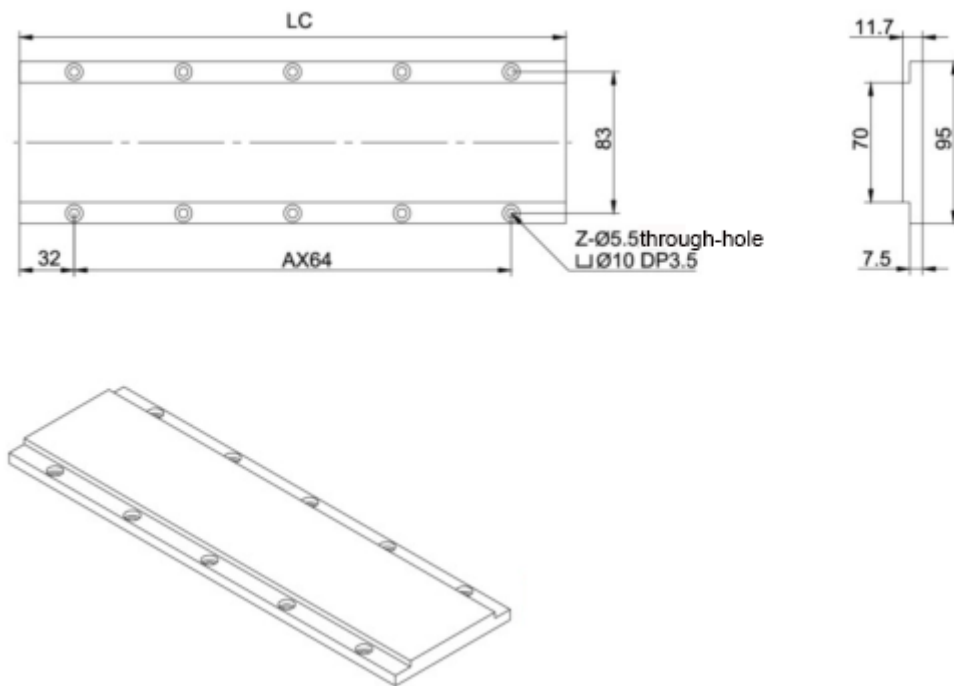


Fig. 6-17 Dimensional drawing of WZCR-Z95 series stator

Dimensional drawing of WZCR-Z95 series stator is shown in Fig. 6-17. See the table below for details.

Stator Model	WZCR-SZ95M-A1	WZCR-SZ95M-A2
Stator Length(mm)	128	320
Stator Width(mm)	95	95
Stator Height(mm)	11.7	11.7
Pole Distance(mm)	32	32
A(PCS)	1	4
Z(PCS)	4	10
Stator Mass(kg/m)	6.7	6.7

◆ Outline dimensional drawing of the motor

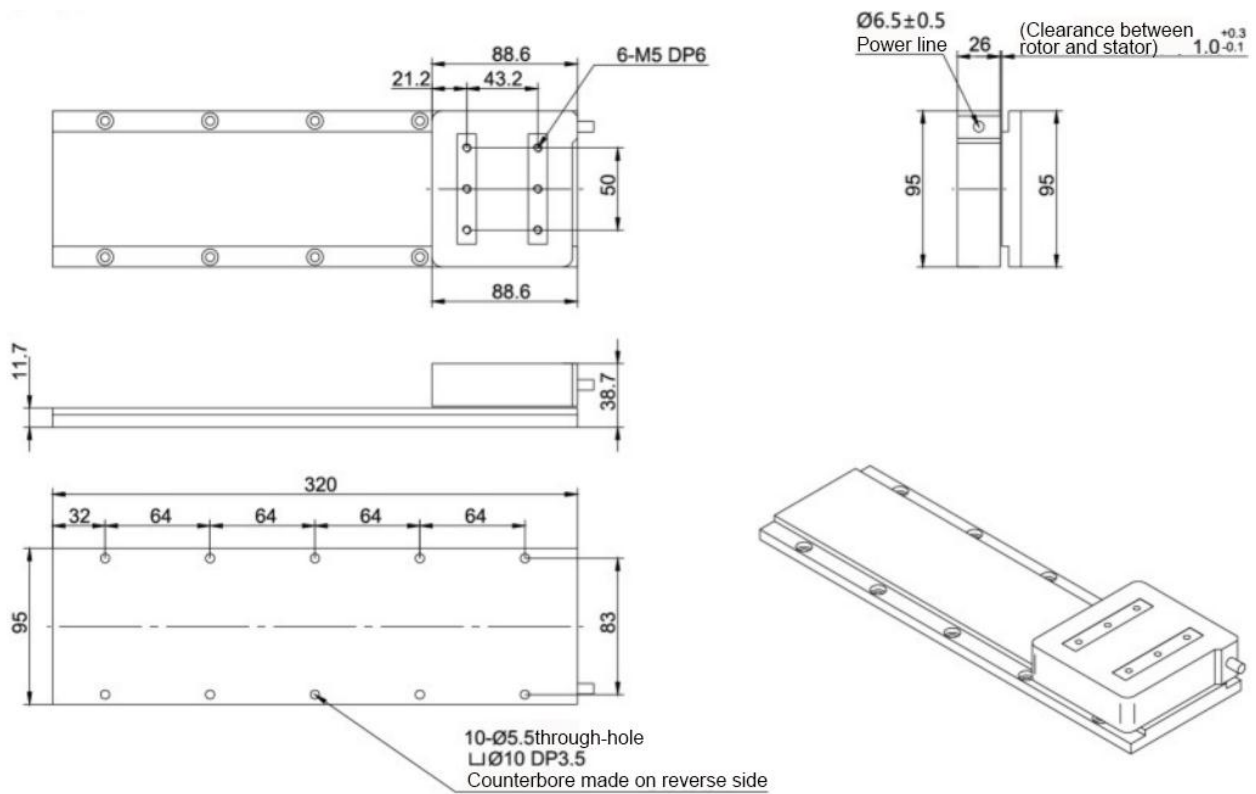


Fig. 6-18 Dimensional drawing of WZCR-AZ95C1-□ motor

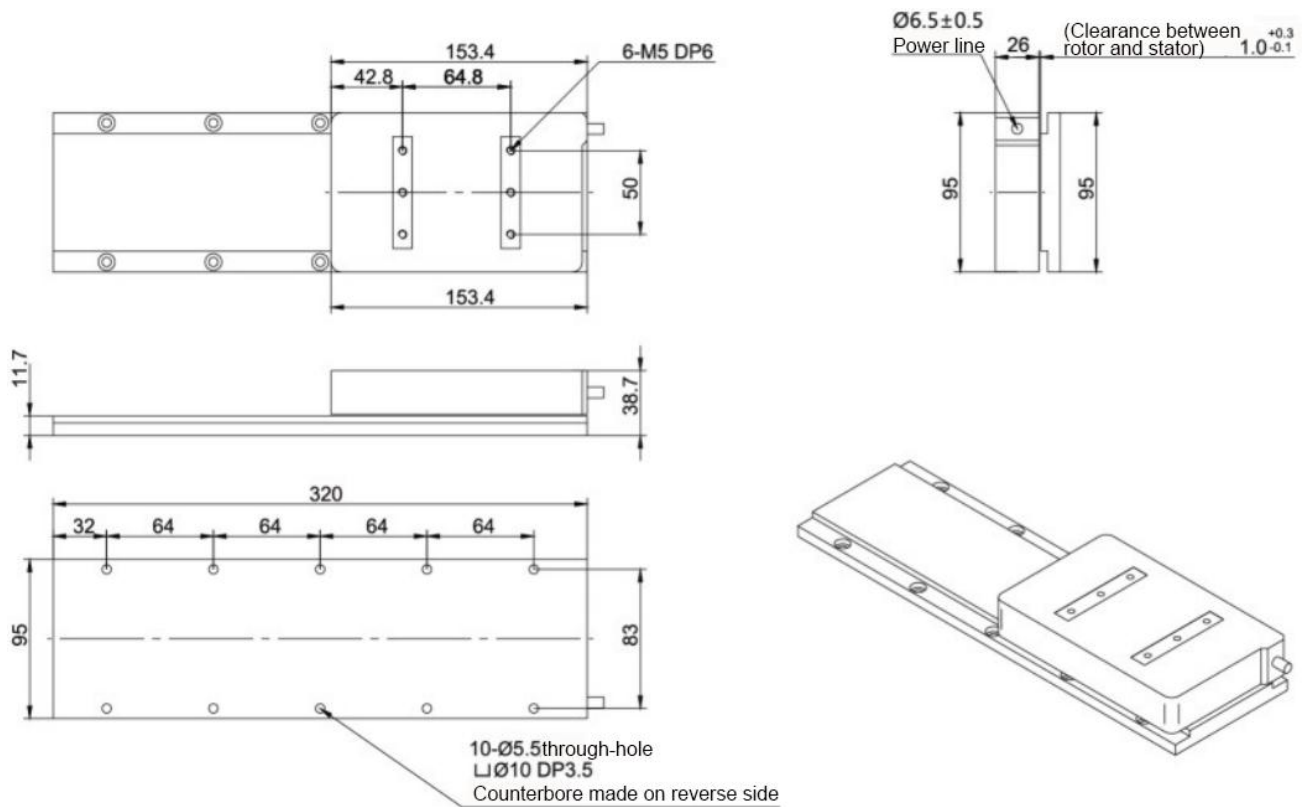


Fig. 6-19 Dimensional drawing of WZCR-AZ95C2-□ motor

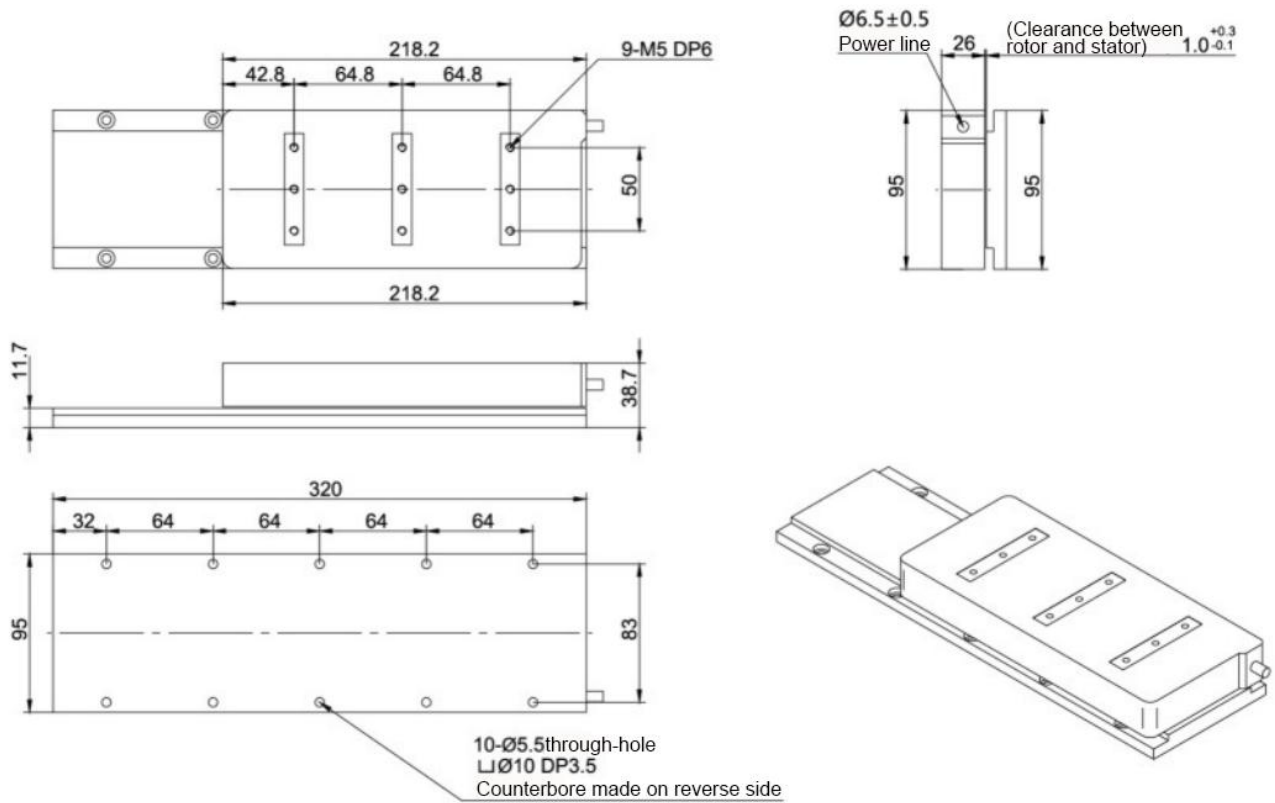


Fig. 6-20 Dimensional drawing of WZCR-AZ95C3-□ motor

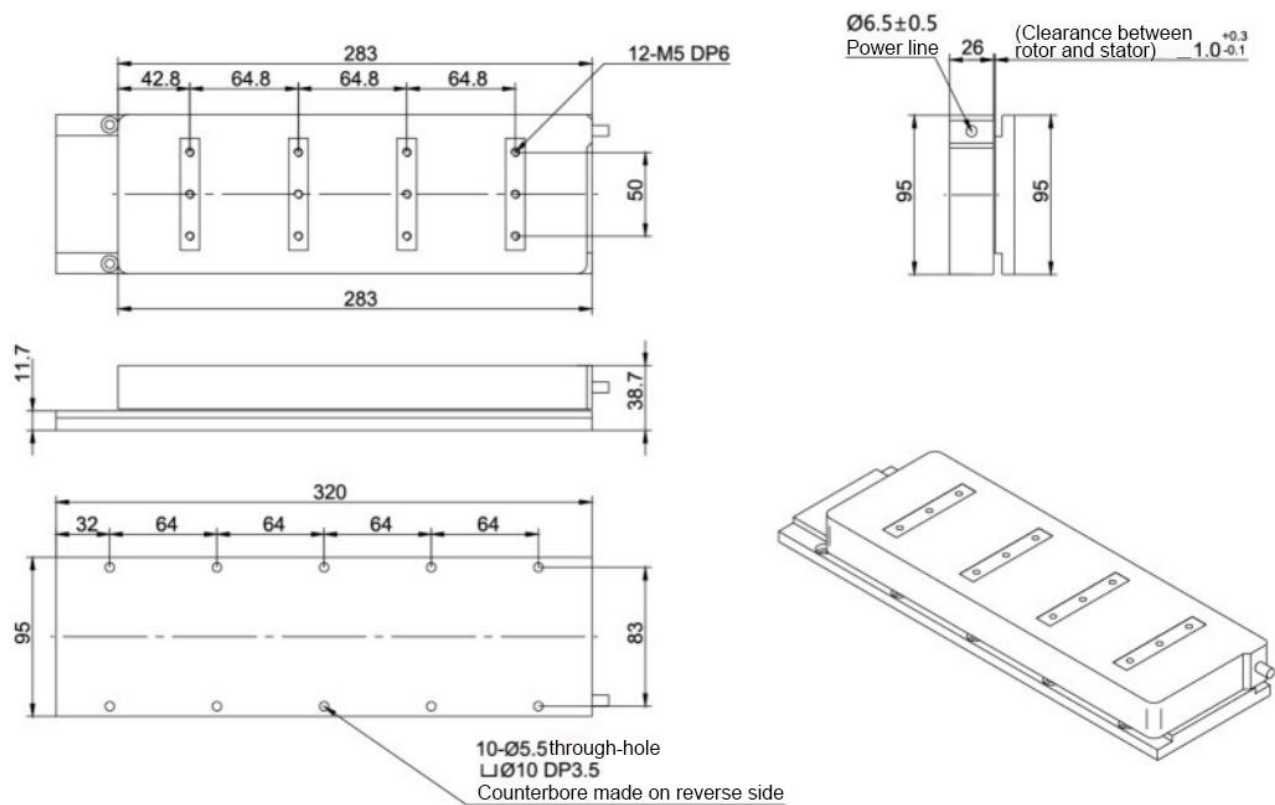
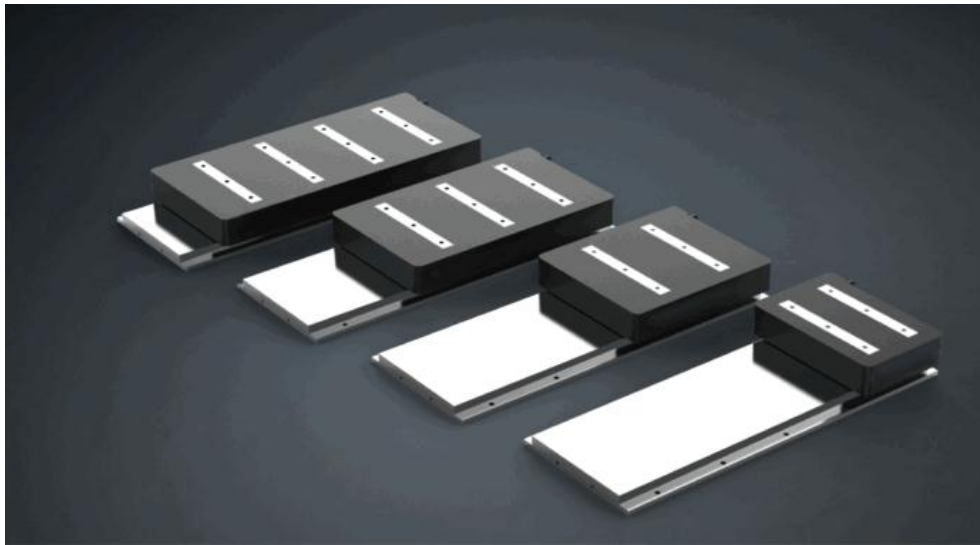


Fig. 6-21 Dimensional drawing of WZCR-AZ95C4-□ and WZCR-AZ95C4S-□ motor

6.6 WZCR-Z120 Series



◆ Specifications

Motor Model	WZCR-AZ120C1-□	WZCR- AZ120C2-□
Continuous Thrust(N)	212.4	424.8
Peak Thrust(N)	796.5	1593
Continuous Current(N)	4	4
Peak Current(A)	15	15
Rotor Mass(kg)	1.8	3.1
Motor Air Gap(mm)	1	1
Thrust Constant(N/A)	53.1	106.2
Motor Counter EMF(V/m/s)	43.3	86.5
Motor Constant(N/vW)	20.3	30.2
Resistance(Ω)	6.82	12.39
Inductance(mH)	22.8	45.2
Max Power(W)	1698	3085.1
Continuous Power(W)	163.7	297.4
Max Temp of Rotor(℃)	120	120

Motor Model	WZCR-AZ120C3- □	WZCR- AZ120C4-□	WZCR- AZ120C4S-□
Continuous Thrust(N)	637.2	849.6	849.6
Peak Thrust(N)	2389.5	3186	3186
Continuous Current(N)	4	4	8
Peak Current(A)	15	15	30
Rotor Mass(kg)	4.4	5.7	5.7
Motor Air Gap(mm)	1	1	1
Thrust Constant(N/A)	159.3	212.4	106.2
Motor Counter EMF(V/m/s)	129.6	172.7	86.4
Motor Constant(N/√W)	36.9	43.6	40.4
Resistance(Ω)	18.67	23.73	6.9
Inductance(mH)	65.9	86.7	22.7
Max Power(W)	4648.8	5908.8	6872.4
Continuous Power(W)	448.1	569.5	662.4
Max Temp of Rotor(°C)	120	120	120

◆ Outline dimensional drawing of the stator

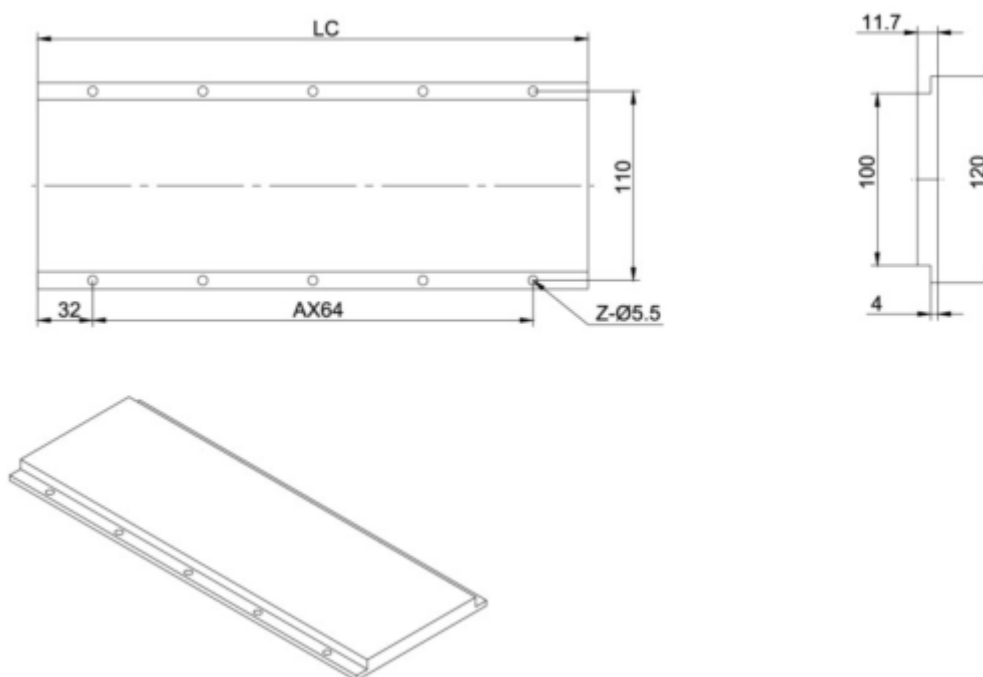


Fig. 6-22 Dimensional drawing of WZCR-Z120 series stator

Dimensional drawing of WZCR-Z95 series stator is shown in Fig. 6-17. See the table below for details.

Stator Model	WZCR-SZ120M-A1	WZCR-SZ120M-A2
Stator Length(mm)	128	320
Stator Width(mm)	120	120
Stator Height(mm)	11.7	11.7
Pole Distance(mm)	32	32
A(PCS)	1	4
Z(PCS)	4	10
Stator Mass(kg/m)	8.9	9.6

◆ Outline dimensional drawing of the motor

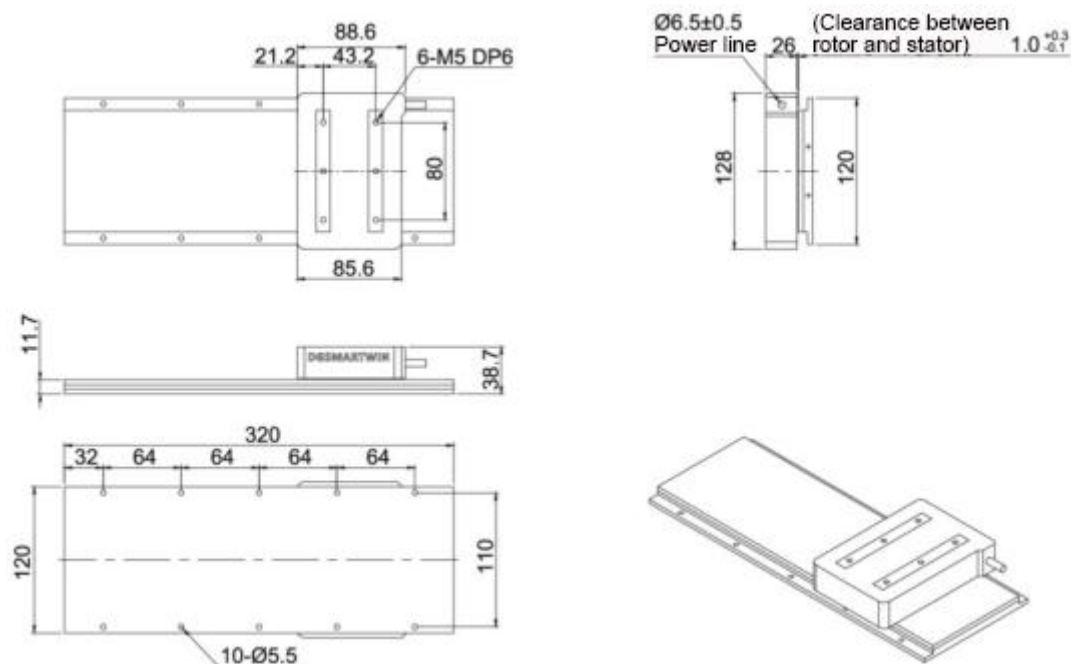


Fig. 6-23 Dimensional drawing of WZCR-AZ120C1-□ motor

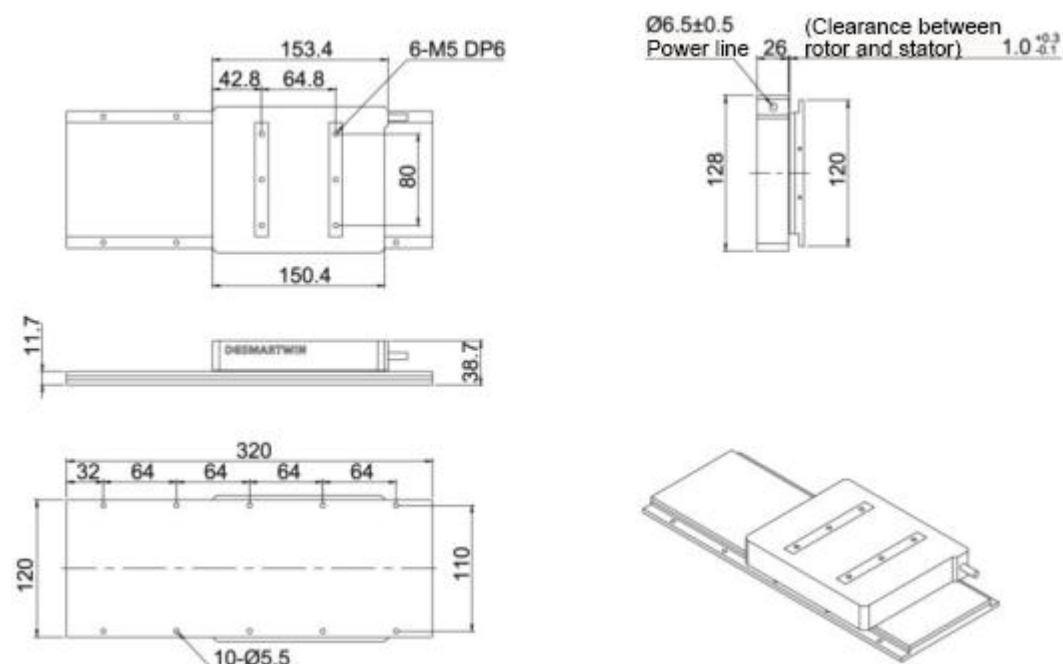


Fig. 6-24 Dimensional drawing of WZCR-AZ120C1-□ motor

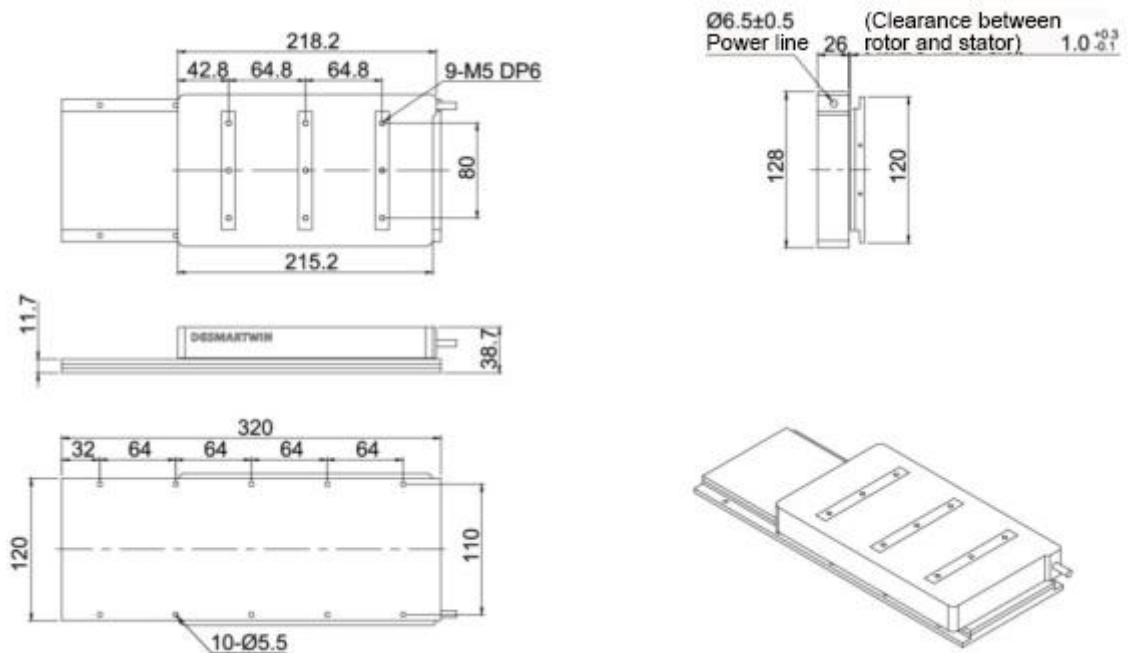


Fig. 6-25 Dimensional drawing of WZCR-AZ120C3-□ motor

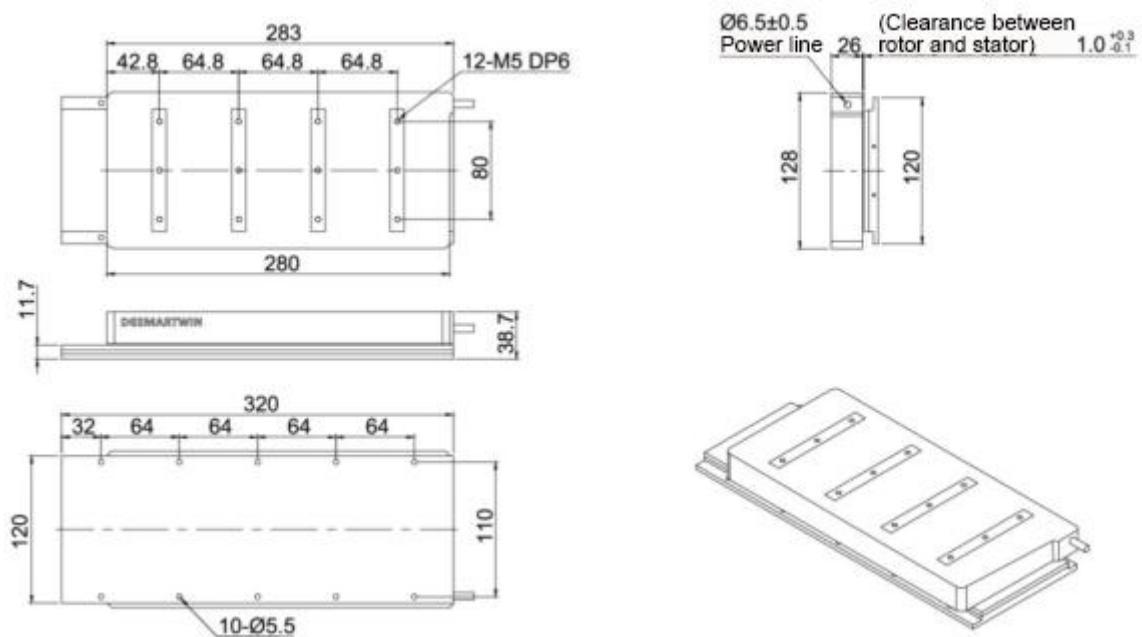


Fig. 6-26 Dimensional drawing of WZCR-AZ120C4-□ and WZCR-AZ120C4S-□ motor

7 Tubular Linear Motor

7.1 Model Designation

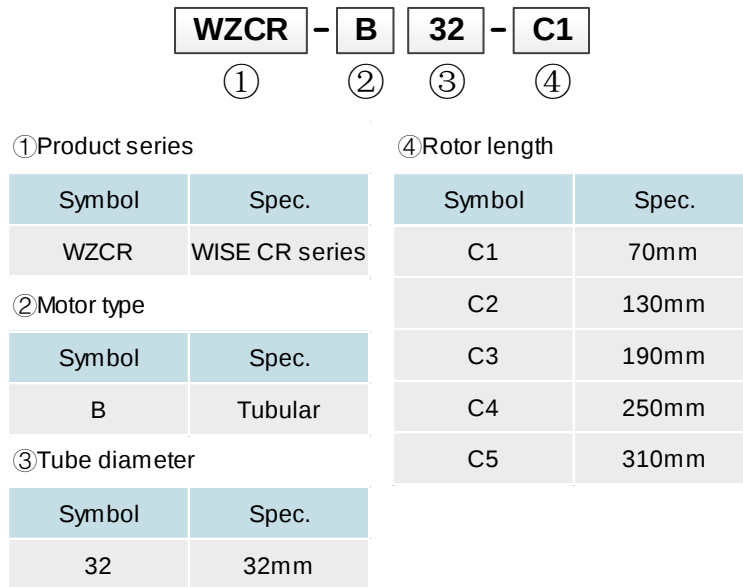


Fig. 7-1 Model designation of tubular linear motor

7.2 WZCR-B32 Series

WZCR-B32 series tubular linear motor excels in the following aspects: high thrust density, less wear, low noise, high speed and high precision. It is an ideal solution to industrial displacement control. Compared with traditional ball screw, WZCR-B32 series of servo motors features higher performance and reliability; while compared with traditional cylinder, this series of servo motors features better flexibility.



◆ Specifications

Motor Model	WZCR-B32-C1	WZCR-B32-C2
Peak Thrust(N)	240	480
Continuous Thrust(N)	80	160
Peak Current(A)	7.5	7.5
Rated Current(A)	2.5	2.5
Thrust Constant(N/A)	32	64
Motor Counter EMF(V/m/s)	26.2	52.4
Max Speed(m/s)	2	2
Rotor Size Width*Height*Length(mm)	70*70*70	70*70*130
Tube Diameter(mm)	32	32
External Sensor Resolution(μm)	0.1-5	0.1-5
Wire Resistance(mH)	18.3	36.7
Wire Inductance(Ω)	7.7	15.4
Pole Distance(mm)	120	120

Motor Model	WZCR-B32-C3	WZCR-B32-C4	WZCR-B32-C5
Peak Thrust(N)	720	960	1200
Continuous Thrust(N)	240	320	400
Peak Current(A)	7.5	7.5	7.5
Rated Current(A)	2.5	2.5	2.5
Thrust Constant(N/A)	96	128	160
Motor Counter EMF(V/m/s)	78.6	104.8	131
Max Speed(m/s)	2	2	2
Rotor Size Width*Height*Length(mm)	70*70*190	70*70*250	70*70*310
Tube Diameter(mm)	32	32	32
External Sensor Resolution(μm)	0.1~5	0.1~5	0.1~5
Wire Resistance(mH)	55	73.4	91.7
Wire Inductance(Ω)	23	30.8	38.3
Pole Distance(mm)	120	120	120

◆ Outline dimensional drawing of the coil

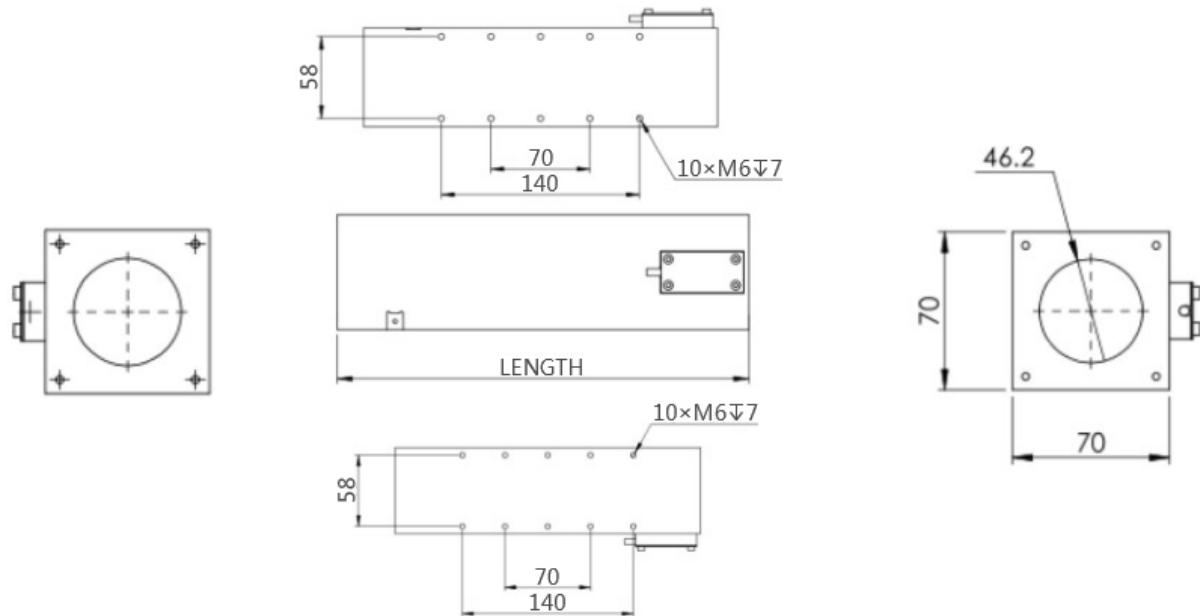


Fig. 7-2 Outline dimensional drawing of WZCR-B32 series coil

◆ Outline dimensional drawing of the magnetic tube



Fig. 7-3 Outline dimensional drawing of WZCR-B32 series magnetic tube

8 Direct Drive Motor

8.1 Model Designation

WZCR

-

D

160

S

-

88

①

②

③

④

⑤

①Product series

④Motor structure

Symbol	Spec.
WZCR	WISE CR series

Symbol	Spec.
S	Solid shaft
H	Hollow shaft

②Motor type

⑤Motor height

Symbol	Spec.
D	Direct drive motor

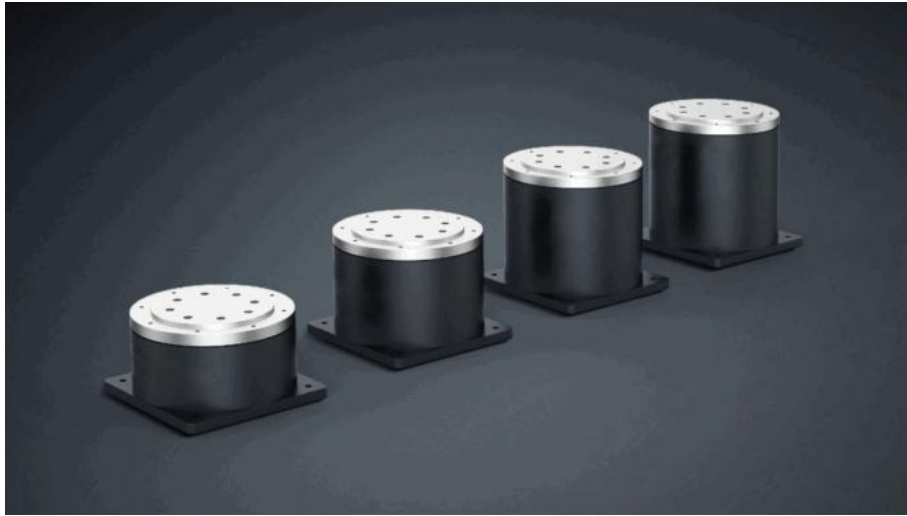
Symbol	Spec.
50	50mm
62	62mm
65	65mm
88	88mm
118	118mm
138	138mm
148	148mm
168	168mm

③Motor outer diameter

Symbol	Spec.
112	112mm
160	160mm
170	170mm
224	224mm
263	263mm

Fig. 8-1 Model designation of direct drive motor

8.2 WZCR-D160S Series



◆ Specifications

Motor Model	WZCR-D160S-88	WZCR-D160S-118
Continuous Torque(N*m)	5.8	14.4
Peak Torque(N*m)	30	72
Continuous Current(A)	6	6
Peak Current(A)	3	3
Motor Mass(kg)	3.9	6.8
Rotor Inertia(kg · m ²)	0.00314	0.00425
Pole Logarithm(N-S)	8	8
Max Speed(RPM)	500	400
Torque Constant(N/A)	0.96	2.4
Motor Counter EMF(V/Rad/s)	1.15	2.76
Motor Constant(N/√W)	0.67	1.23
Max Power(W)	2098.8	3625.2
Continuous Current(W)	118.8	205.2
Axial Runout(μm)	30	30
Radial Runout(μm)	20	20
Max Axial Load(N)	900	900
Max Load Torque(N*m)	15	40

Precision of Duplicated Positioning(arcsec)	+/-2.5	+/-2.5
Precision(arcsec)	+/-30	+/-30
Max Temp of Coil(℃)	120	120
Resolution(counts/rev)	1048576	1048576
Alternating Resistance(Ω)	1.47	2.72
Alternating Inductance(mH)	2.81	5.71

Motor Model	WZCR-D160S-148	WZCR-D160S-168
Continuous Torque(N*m)	23	28.8
Peak Torque(N*m)	115.2	144
Continuous Current(A)	6	6
Peak Current(A)	3	3
Motor Mass(kg)	9.2	11.2
Rotor Inertia(kg · m ²)	0.00535	0.0061
Pole Logarithm(N-S)	8	8
Max Speed(RPM)	350	300
Torque Constant(N/A)	3.84	4.8
Motor Counter EMF(V/Rad/s)	4.42	5.52
Motor Constant(N/vW)	1.62	1.84
Max Power(W)	5342.4	6487.2
Continuous Current(W)	302.4	367.2
Axial Runout(Um)	30	30
Radial Runout(Um)	20	20
Max Axial Load(N)	900	900
Max Load Torque(N*m)	65	90
Precision of Duplicated Positioning(arcsec)	+/-2.5	+/-2.5
Precision(arcsec)	+/-30	+/-30
Max Temp of Coil(℃)	120	120
Resolution(counts/rev)	1048576	1048576
Alternating Resistance(Ω)	3.84	4.38
Alternating Inductance(mH)	8.5	9.64

◆ Outline dimensional drawing of the motor

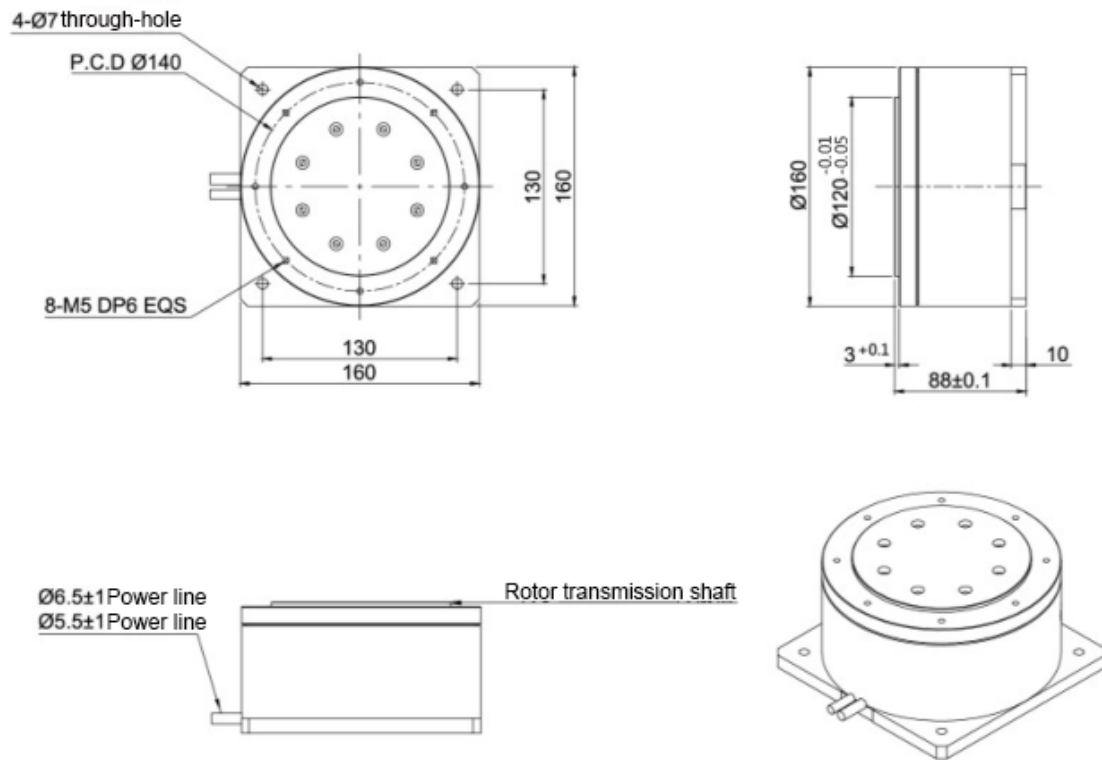


Fig. 8-2 Outline dimensional drawing of WZCR-D160S-88 motor

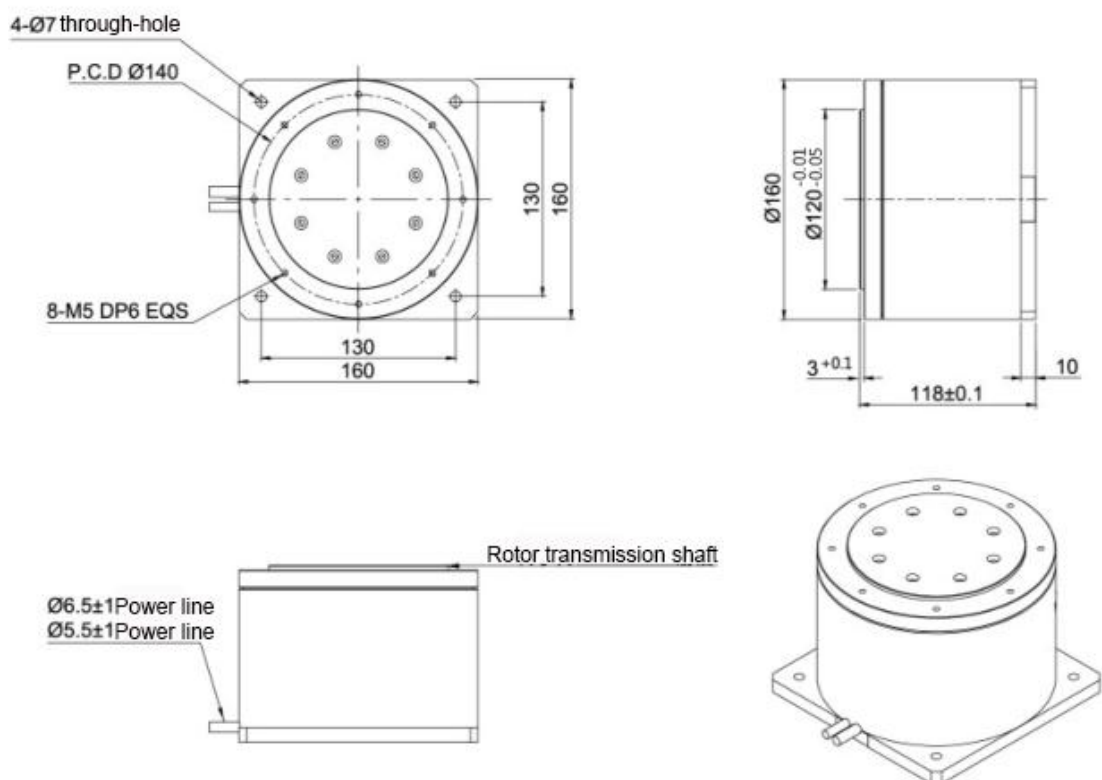


Fig. 8-3 Outline dimensional drawing of WZCR-D160S-118 motor

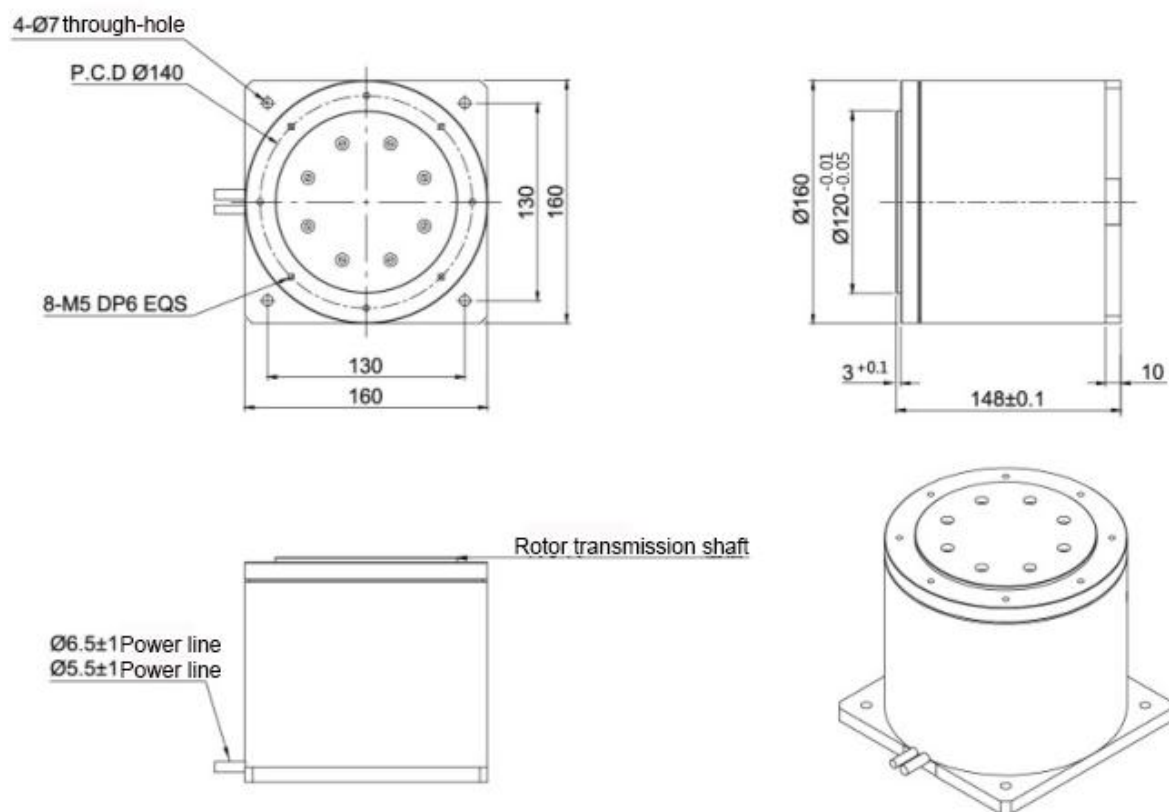


Fig. 8-4 Outline dimensional drawing of WZCR-D160S-148 motor

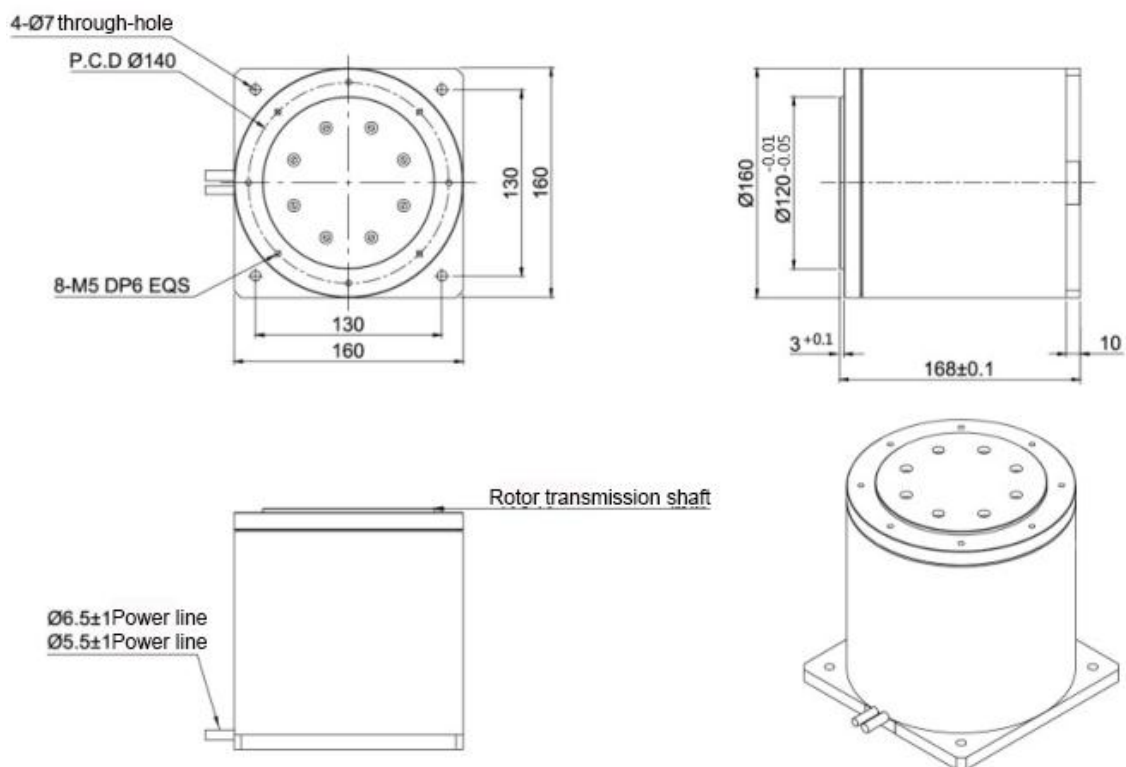


Fig. 8-5 Outline dimensional drawing of WZCR-D160S-168 motor

8.3 WZCR-D112H Series



◆ Specifications

Motor Model	WZCR-D112H-65
Max Torque(N · m)	9
Continuous Torque(N · m)	3
Motor Constant(N/√W)	0.6
Torque Constant(N/A)	1.2
Max Current(A)	7.5
Resistance(Ω)	2.2
Inductance(mH)	1.8
Motor Counter EMF(V/Rad/s)	1.0
Rotary Inertia(kg · m ²)	0.002
Max Rotational Speed(rpm)	350
Motor Mass(kg)	2.8
Positioning Precision(arcsec)	±30
Precision of Duplicated Positioning(arcsec)	±2.5
Pole Number	28
Resolution(p/rev)	8192
Max Axial Load(N)	2000
Max Radial Load(N)	40
Axial Swing(mm)	0.008
Radial Movement(mm)	0.008

◆ Outline dimensional drawing of the motor

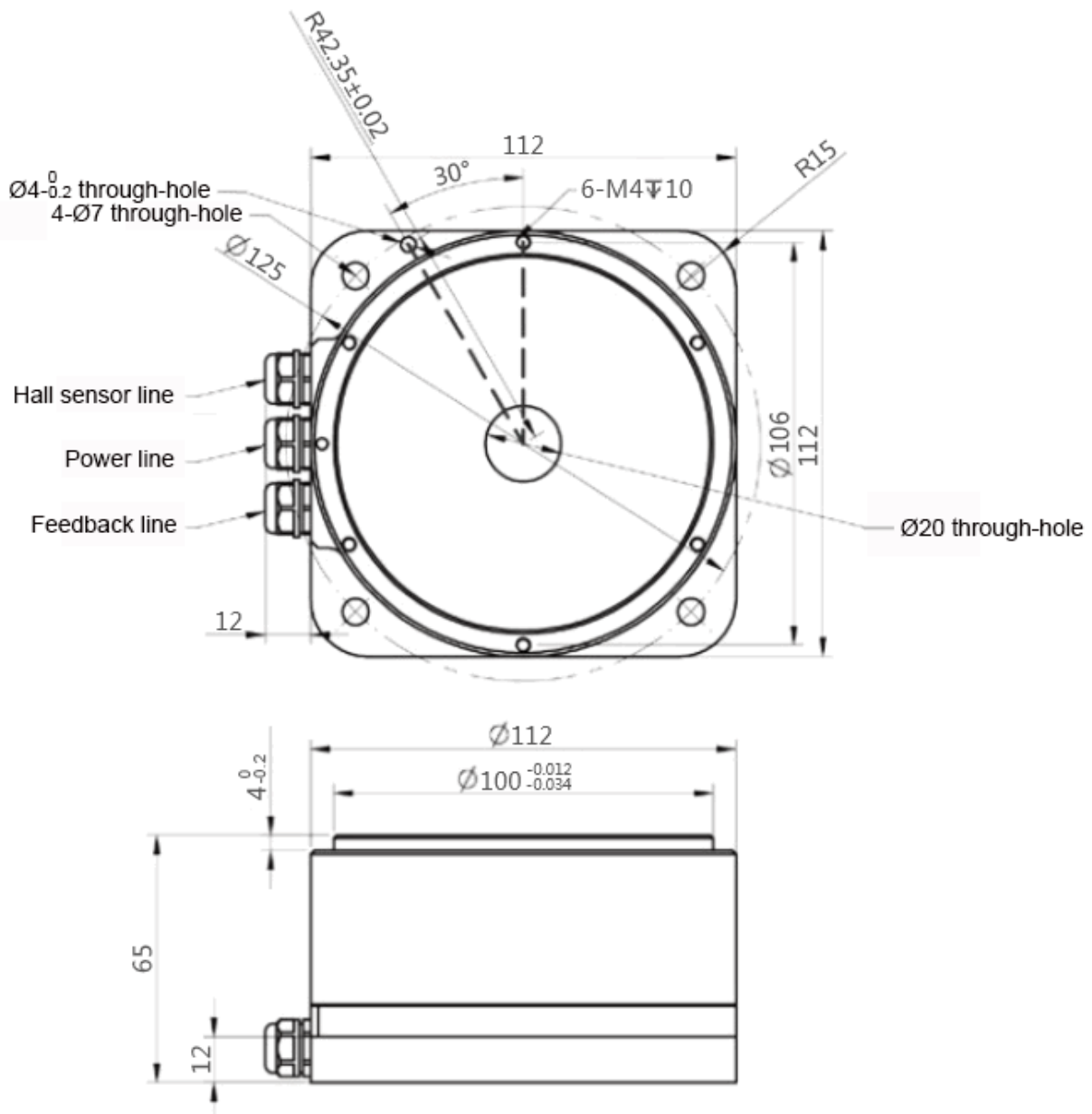


Fig. 8-6 Outline dimensional drawing of WZCR-D112H-65 motor

8.4 WZCR-D170H Series



◆ Specifications

Motor Model	WZCR-D170H-50
Max Torque(N*m)	14
Continuous Torque(N*m)	4.6
Motor Constant(N/√W)	2.1
Torque Constant(N/A)	3.3
Max Current(A)	4.2
Continuous Current(A)	1.4
Resistance(Ω)	6
Inductance(mH)	7.5
Motor Counter EMF(V/Rad/s)	2.7
Rotary Inertia(kg · m ²)	0.0066
Max Rotational Speed(rpm)	450
Motor Mass(kg)	3.7
Positioning Precision(arcsec)	±30
Precision of Duplicated Positioning(arcsec)	±2.5
Pole Number	30
Resolution(p/rev)	11740
Max Axial Load(N)	2000
Max Radial Load(N)	60
Axial Swing(mm)	0.008
Radial Movement(mm)	0.008

◆ Outline dimensional drawing of the motor

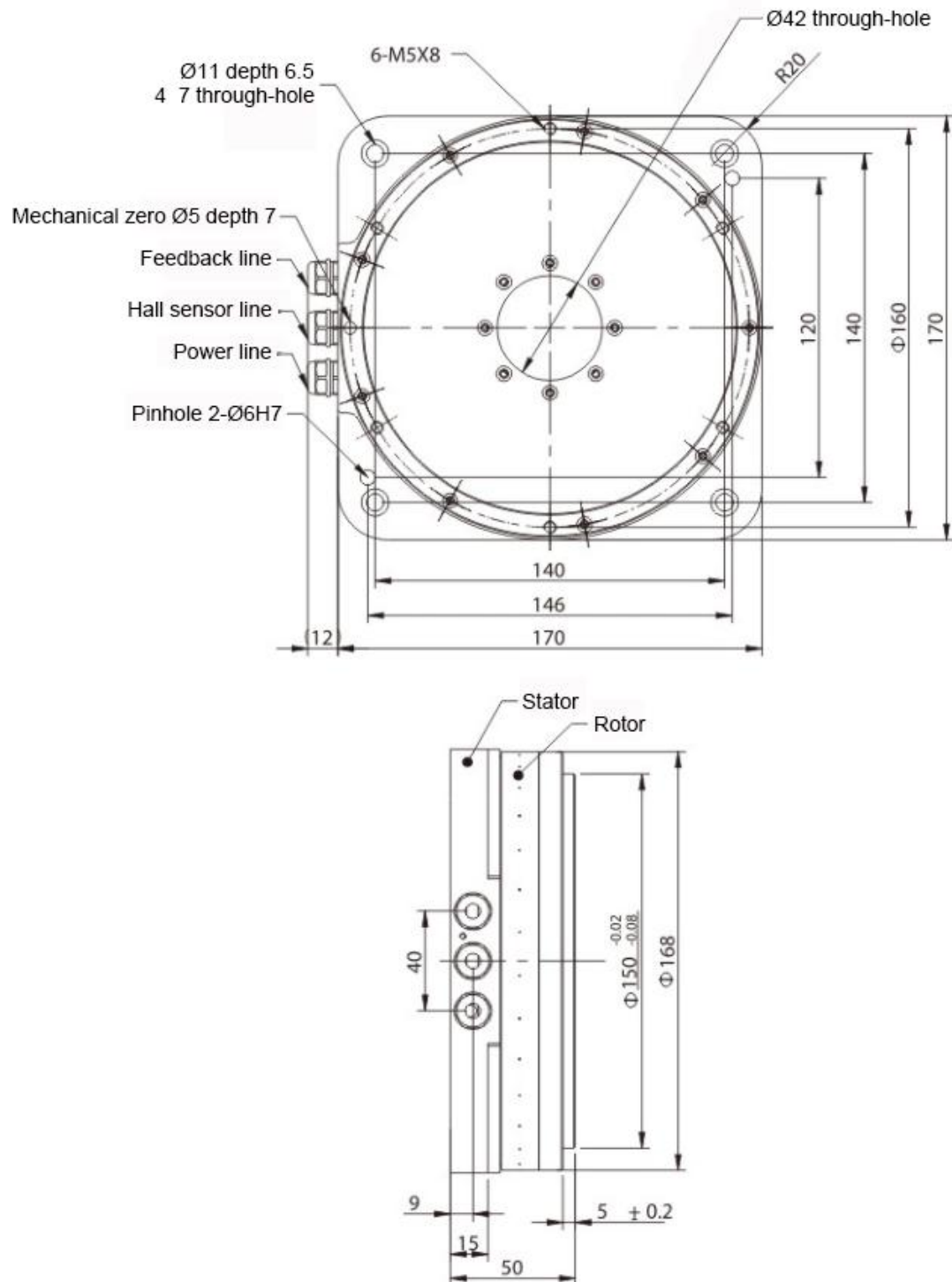
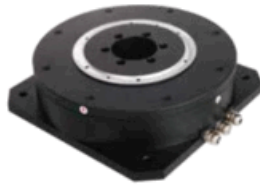


Fig. 8-7 Outline dimensional drawing of WZCR-D170H-50 motor

8.5 WZCR-D224H Series



◆ Specifications

Motor Model	WZCR-D224H-62
Max Torque(N*m)	105
Continuous Torque(N*m)	35
Motor Constant(N/√W)	5.6
Torque Constant(N/A)	16
Max Current(A)	6.6
Continuous Current(A)	2.2
Resistance(Ω)	13.9
Inductance(mH)	46
Motor Counter EMF(V/Rad/s)	10.76
Rotary Inertia(kg · m ²)	0.02
Max Rotational Speed(rpm)	200
Motor Mass(kg)	8.9
Positioning Precision(arcsec)	±30
Precision of Duplicated Positioning(arcsec)	±2.5
Pole Number	40
Resolution(p/rev)	16384
Max Axial Load(N)	2000
Max Radial Load(N)	200
Axial Swing(mm)	0.008
Radial Movement(mm)	0.008

◆ Outline dimensional drawing of the motor

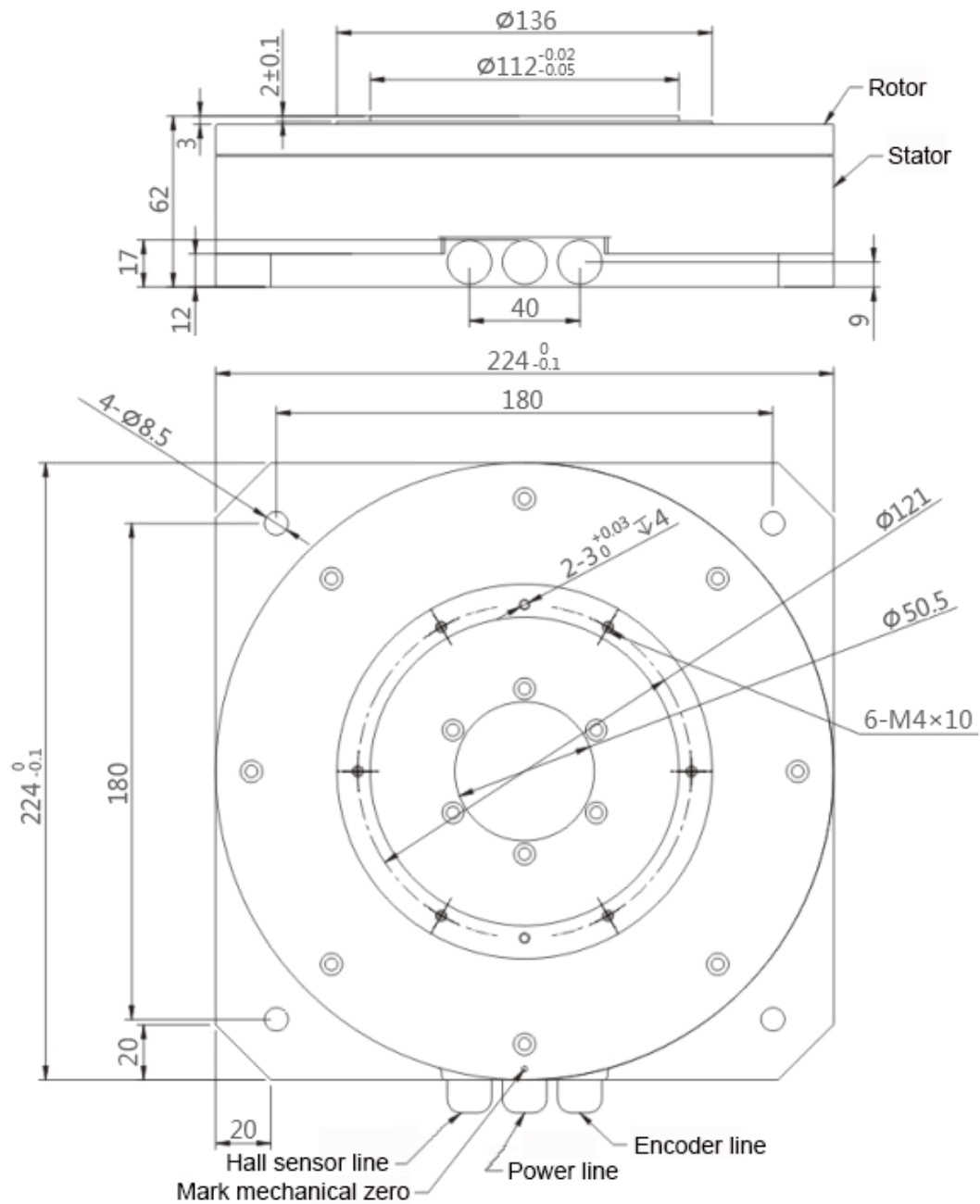
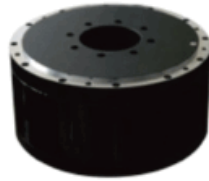


Fig. 8-8 Outline dimensional drawing of WZCR-D224H-62 motor

8.6 WZCR-D263H Series



◆ Specifications

Motor Model	WZCR-D263H-138
Max Torque(N*m)	300
Continuous Torque(N*m)	150
Motor Constant(N/vW)	7.9
Torque Constant(N/A)	21.9
Max Current(A)	14.2
Continuous Current(A)	7.1
Resistance(Ω)	4.2
Inductance(mH)	13.9
Motor Counter EMF(V/Rad/s)	17.8
Rotary Inertia(kg · m ²)	0.16
Max Rotational Speed(rpm)	200
Motor Mass(kg)	35
Positioning Precision(arcsec)	± 30
Precision of Duplicated Positioning(arcsec)	± 2.5
Pole Number	40
Resolution(p/rev)	16384
Max Axial Load(N)	4000
Max Radial Load(N)	400
Axial Swing(mm)	0.008
Radial Movement(mm)	0.008

◆ Outline dimensional drawing of the motor

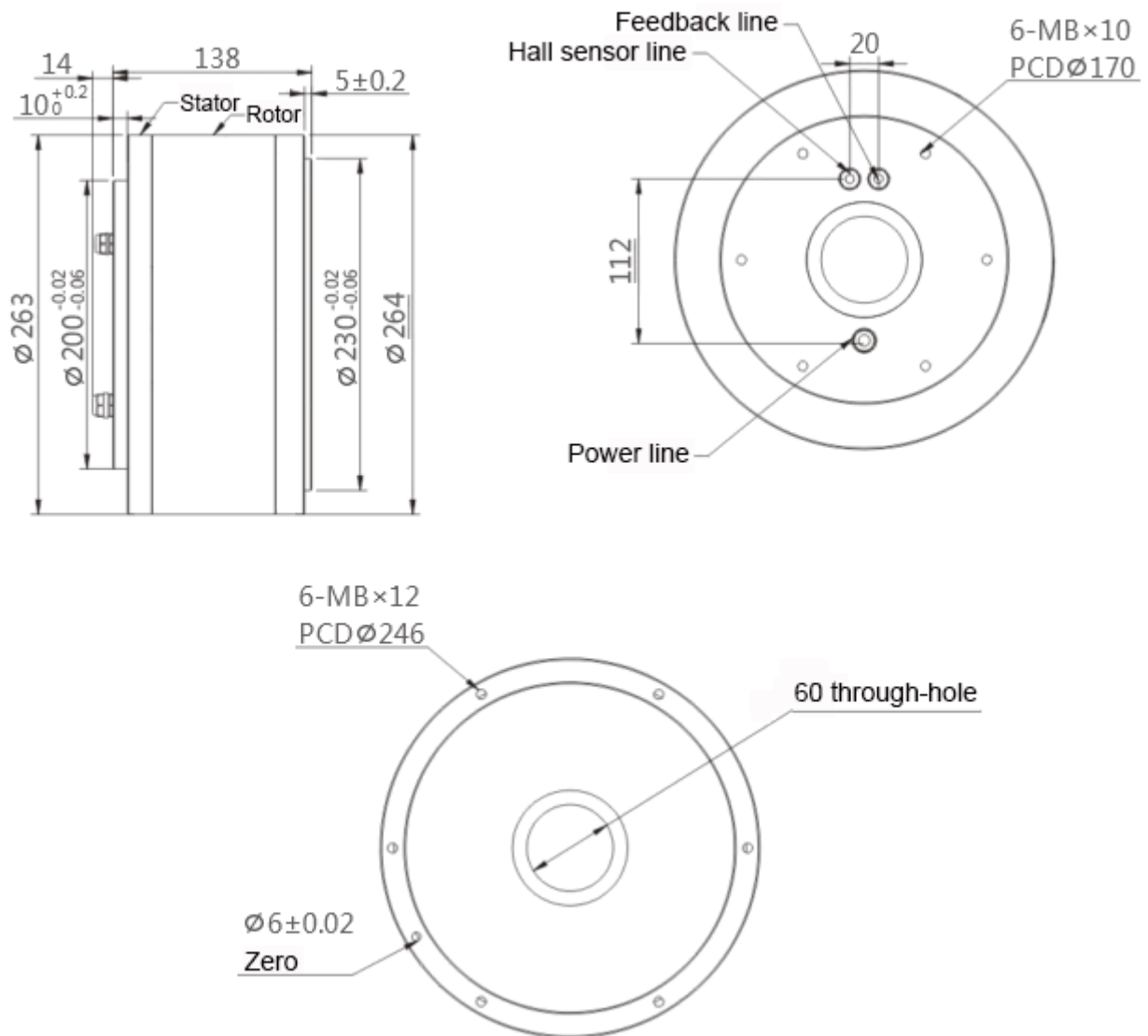


Fig. 8-9 Outline dimensional drawing of WZCR-D263H-138 motor

9 Specifications and Drawings of Cables and Peripheral Devices

9.1 Maglin Series Magnetic Grid

9.1.1 MRH20 Series Magnetic Grid Linear Encoder



◆ Specifications

Model	MRH20□
Resolution(μm)	1~50
Total Length of a Magnetic Grid Ruler(m)	50
Power Supply(V)	5±5%
Power Consumption(mA)	<30(No load)
Ambient Temperature(℃)	-10~80
Ambient Relative Humidity(%)	10~90
Protection Level	IP67
Acceleration	20G during running
Cable Diameter(mm)	5.2

The cable is a PUR super flexible cable with enhanced shielding effect. Its length can be customized according to customer demand.

◆ Digital output

Model	MRH20X	MRH20C	MRH20D
Resolution(μm)	1	2	5

Model	MRH20E	MRH20F	MRH20G	MRH20K
Resolution(μm)	10	20	25	50

◆ Analog output

Model	MRH20B
Differential Output	1Vp-p

◆ Mounting dimension

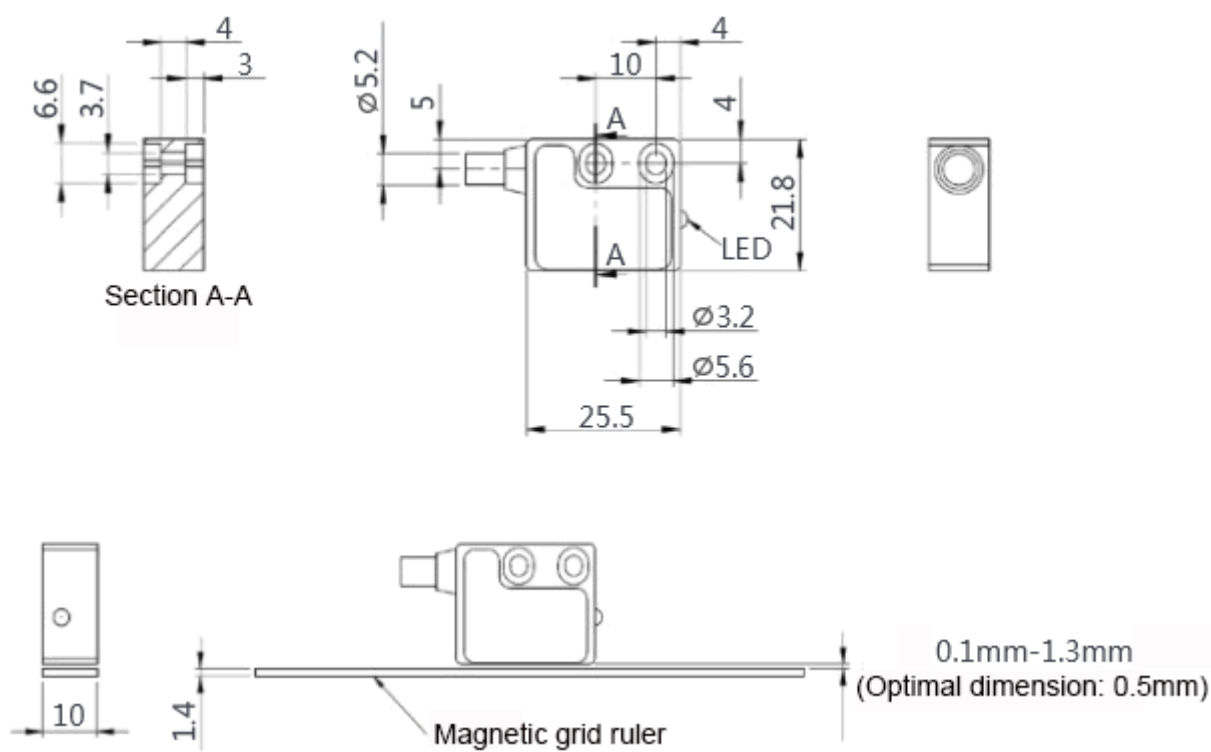


Fig. 9-1 Dimensional drawing of MRH20 series magnetic grid linear encoder

◆ Definition of extension cable

Pin	Color	To the Drive
5V	Red	5
GND	Black	15
A+	White	1
A-	Gray	6
B+	Blue	2
B-	Purple	7
Z+	Brown	3
Z-	Orange	8
Shielded cable	Case	Case

9.1.2 MS Series Magnetic Grid Ruler

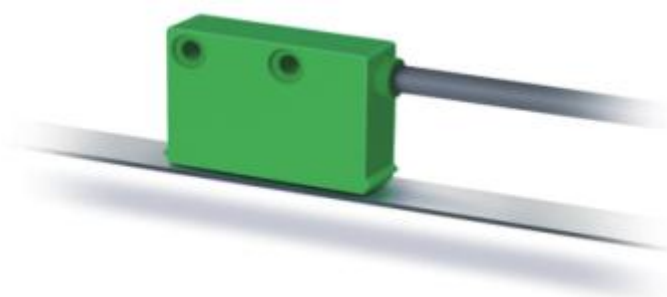


◆ Specifications

Model	MS100	MS200	MS500
Pole Distance N+S(mm)	1+1	2+2	5+5
Width(mm)	10	10	10
Thickness(mm)	1.4	1.4	1.4
Ambient Temperature(℃)	-20~700	-20~700	-20~700

9.2 SIKO Series Magnetic Grid

9.2.1 MSK200/1 Magnetic Grid Reading Head



◆ Specifications

Model	MSK200/1
Resolution(μ m)	1, 2, 4, 5, 10
System Precision	$\pm(0.020+0.01 \times L)$ mm, unit of L is m (for reference point signals of O and I types)
Precision of Duplicated Positioning	± 1 increment
Speed(m/s)	≤ 25
Reading Distance on Reading Head/Magnetic Grid Ruler(mm)	0.1~1
Operating Voltage(V)	24 $\pm$ 20% or 5 $\pm$ 5%
Current Consumption(mA)	24V: ≤ 100 5V: ≤ 30
Output Circuit	LD(RS422)
Output Signal	A, /A, B, /B, I, /I, R, /R
Real-time Request	Real-time signal processing
Operating Temperature($^{\circ}$ C)	-10~70
Storage Temperature($^{\circ}$ C)	-30~80
Relative Humidity(%)	100
Protection Level(%)	IP67

◆ Mounting dimension

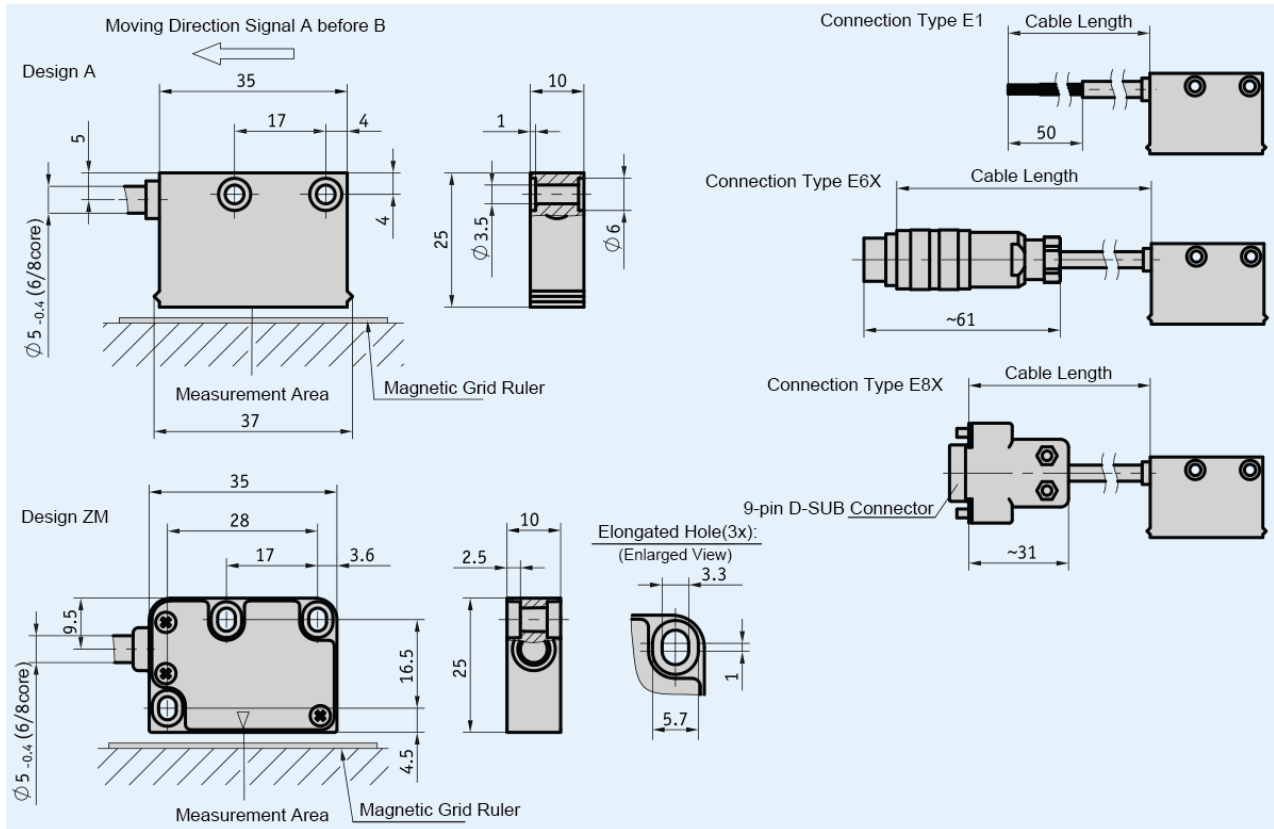


Fig. 9-2 Dimensional drawing of MSK200/1 Magnetic Grid Reading Head

When installing a magnetic grid ruler with reference, please ensure the reading head and the magnetic grid ruler have been aligned correctly:

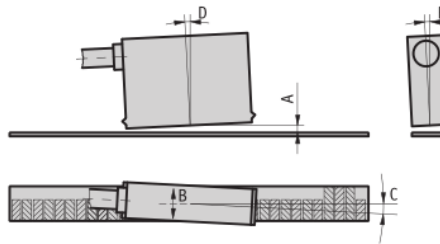


Fig. 9-3 Mounting drawing of MSK200/1 Magnetic Grid Reading Head

Reference Signal	O, I	R
A, Reading Distance on Reading Head/Magnetic Grid Ruler	$\leq 1\text{mm}$	$\leq 0.5\text{mm}$
B, Lateral Offset	$\pm 2\text{mm}$	$\pm 0.5\text{mm}$
C, Alignment Offset	$\pm 1^\circ$	$\pm 1^\circ$
D, Longitudinal Inclination	$\pm 1^\circ$	$\pm 1^\circ$
E, Lateral Inclination	$\pm 3^\circ$	$\pm 3^\circ$

◆ Order model

MSK200/1 - 4 - A - E1 - 2 - R - 1 - 0.10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Product series

Symbol	Spec.
MSK200/1	Incremental and digital magnetic grid reading head

② Operating voltage

Symbol	Spec.
5	5V DC

③ Design

Symbol	Spec.
A	Rectangular
ZM	Metal case without status LEDs

④ Connection type

Symbol	Spec.
E1	End with scattered lines
E6X	Round connector without matching connector
E8X	9-pin D-SUB connection mode. Without matching connector.

⑤ Cable length

Symbol	Spec.
2	20m

Cable length ranges from 2m to 20m, increasing by 1m at least.

⑥ Reference point signal

Symbol	Spec.
O	Without
I	Output pointer periodically
R	Scan reference point recorded on magnetic grid ruler

⑦ Resolution

Symbol	Spec.
1	1μm

Resolution includes: 1, 2, 4, 5, 10.

⑧ Pulse interval

Symbol	Spec.
0.10	0.10μs

Pulse interval includes: 0.10, 0.25, 0.50, 1.00, 2.00, 4.00, 8.00.

◆ Definition of extension cable

Function	Color	E6X	E8X	To the Drive
A+	Red	1	1	1
B+	Orange	2	2	2
Z+	Blue	3	3	3
+5V	Gray	4	4	5
GND	Black	5	5	15
/A	Yellow	6	6	6
/B	Green	7	7	7
Z-	Purple	8	8	8
nc	-	-	9	-

9.2.2 MB200 Magnetic Grid Ruler



◆ Specifications

Model	MB200
Magnetic grid width(mm)	2
Measuring Length(mm)	No limit
Ruler Width(mm)	10
Thickness(mm)	1.4(no cover strip)
Precision(μ m)	50
Temperature Coefficient	$(11 \pm 1) \times 10^{-6}/K$ (spring steel)
Operating Temperature(°C)	-20~70
Storage Temperature(°C)	-40~70
Humidity	100%rh(moisture condensation allowed)
Installation	Bond with pre-installed double sided tape
Cover Strip Material	Stainless steel

◆ Mounting dimension

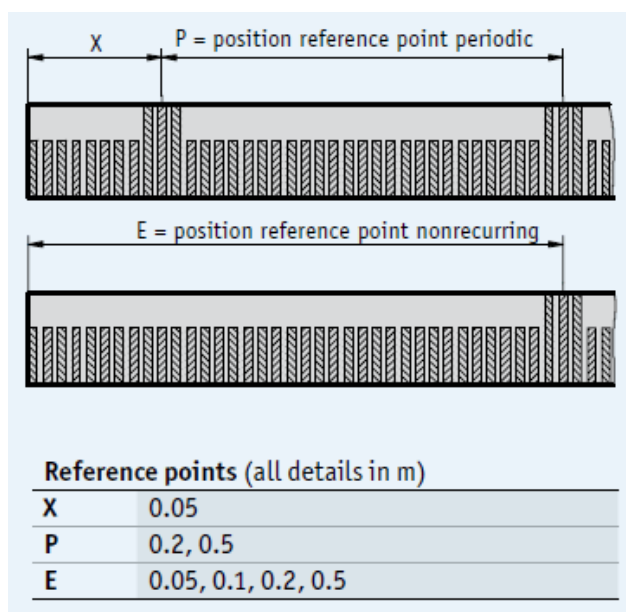
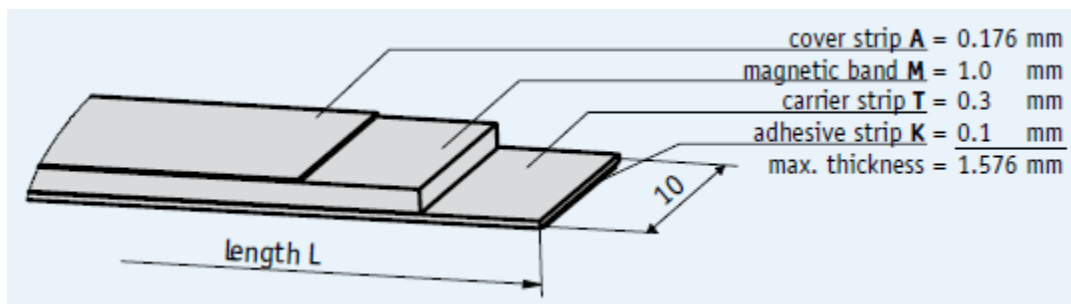


Fig. 9-4 Dimensional drawing of MB200 Magnetic Grid Ruler

◆ Order model

MB200 - 0.1 - TM - AM - 0 0.05
① ② ③ ④ ⑤ ⑥

① Product series

Symbol	Spec.
MB200	Magnetic grid ruler: incremental encode scale, magnetic grid width is 2mm

② Length of magnetic grid ruler

Symbol	Spec.
0.1	0.1m

Length of magnetic grid ruler ranges from 0.1m to 90m, increasing by 0.1m at least.

③ Adhesive carrier strip

Symbol	Spec.
TM	With
T0	Without

④ Cover strip

Symbol	Spec.
AM	With(stainless steel)
A0	Without

⑤ Reference point

Symbol	Spec.
0	Without
E	One-time
P	Periodic

⑥ Reference point E one-time or reference point P periodic

Reference point E is selected:

Symbol	Spec.
0.05	0.05m
0.1	0.1m
0.2	0.2m
0.5	0.5m

Reference point P is selected:

Symbol	Spec.
0.2	0.2m
0.5	0.5m

9.3 MS15 Series Linear Encoder



◆ Specifications

Model	MS 15 1vpp	MS 15 TT×20	MS 15 TT×100
Resolution(μ m)	Depending on external subdivision ratio	0.5	0.1
Max Speed(m/s)	10	2.4	0.96
Max output frequency	250kHz	200ns	100ns
Mass	Version MK: 17g/m		
	Reading head with connector and cable 40g + cable 30g/m		

◆ Mounting dimension

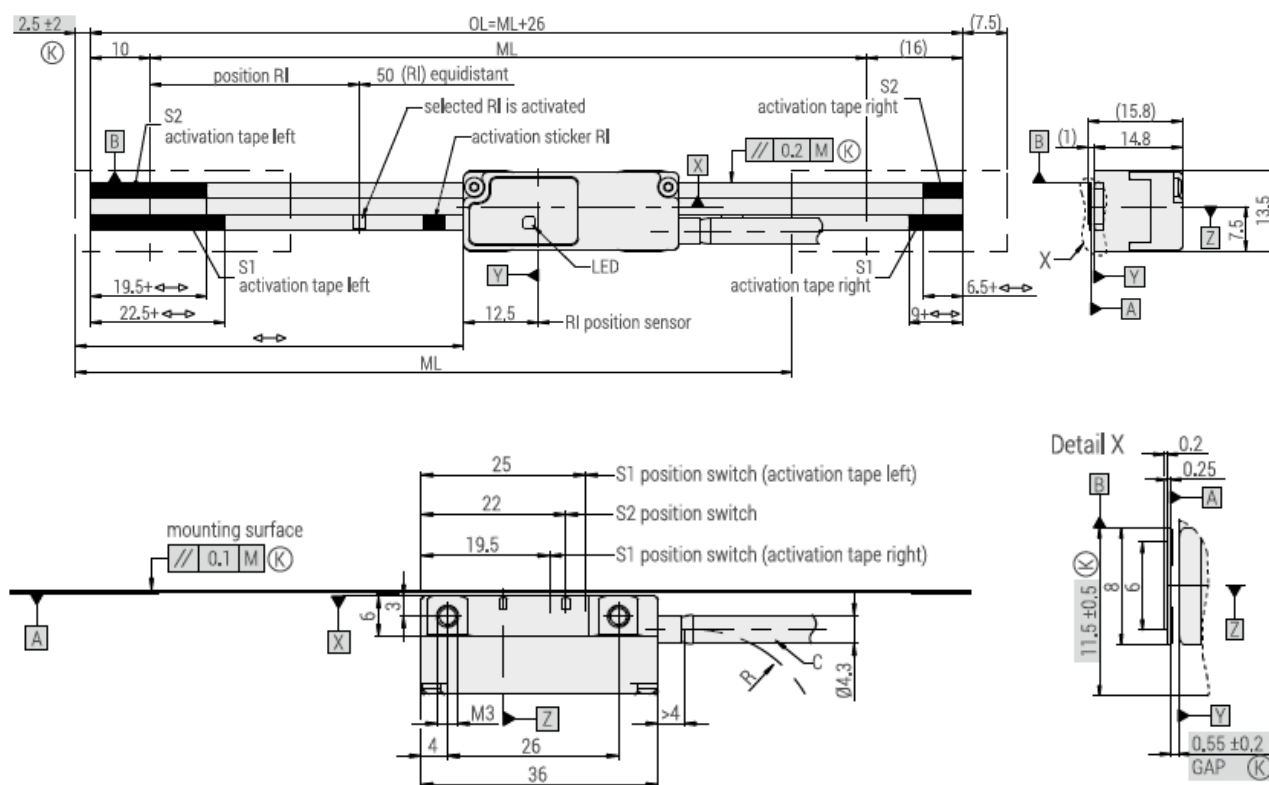


Fig. 9-5 Dimensional drawing of MS15 series linear encoder

Dimensional drawing of MS15 series linear encoder is shown in Fig. 9-5. See the table below for details.

M	Machine guideway	R	Bending radius	Static R 10mm Dynamic R 20mm
ML	Measuring length	S1、S2	Switch signal	
OL	Overall length	Z	$\pm 0.2\text{mm}$ (air gap)	
RI	Reference point	Y	$\pm 0.5\text{mm}$ (lateral)	
A	Cable	<Z	$\pm 1\text{mrad}$ or $\pm 0.06^\circ$ (yaw angle)	
K	Required mating dimension	<Y	$\pm 3.5\text{mrad}$ or $\pm 0.2^\circ$ (pitch angle)	
LED	Integrated mounting control via RGB-LED	<X	$\pm 4\text{mrad}$ or $\pm 0.23^\circ$ (roll angle)	

◆ Definition of extension cable

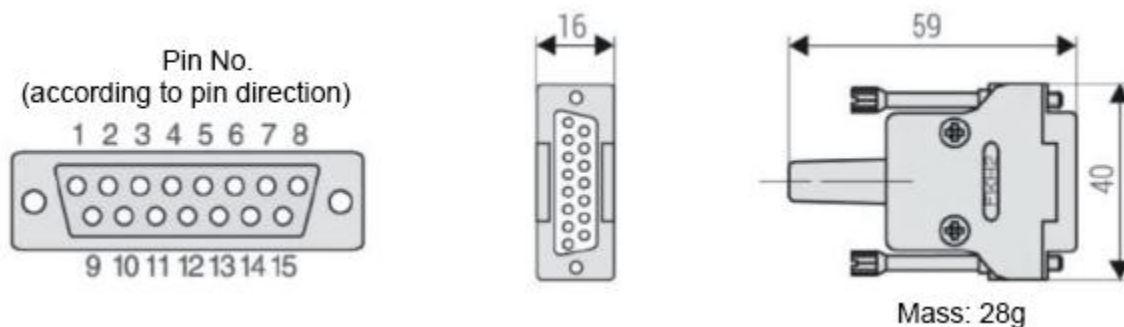


Fig. 9-6 LD15 plug

Function	LD15 Plug	To the Drive
5V	8	5
GND	9	15
A+	14	1
A-	6	6
B+	13	2
B-	5	7
Z+	12	3
Z-	4	8
Shielded cable	15	Case

9.4 Renishaw RGH24 Series Linear Encoder

9.4.1 RGH24 Reading Head



◆ Specifications

Model	RGH24
Linear Encoder	RGS20-S: gold plated steel tape, with protective lacquer coating or polyester coating
Pitch	20μm
Thermal Expansion Coefficient	Match that of substrate material when encoder ends are fixed by end clamps
Reference Mark	One-way duplication precision with actuator magnet is up to 1 unit resolution
Limit Switch	Single limit can be selected(during ordering)
Scale Length	Maximum length: 50000mm
Max Speed	Analog: up to 4m/s at -3dB Digital: up to 10m/s(depending on resolution)
Resolution	Analog: 1Vpp, 12μA(cycle: 20μm) Digital: resolution ranges from 5μm to 10nm
Electrical Connection	Cable length is 1.5m, 2m, 3m and 5m. Taking D type subplug (9-pin and 15-pin), round plug (9-pin), scattered line or JST plug
Power Supply	5V±5%, 120mA(unterminated)
Vibration(operating)	100m/s ² (max) at 55Hz to 2000 Hz (BS EN 60068-2-6: 1996)
Vibration(non-operating)	1000m/s ² , 6ms, ½ sine (BS EN 60068-2-27: 1993)
Operating Temperature	0° C ~ +55° C
Protection Level	IP40
Subdivision Error(SDE)	Generally less than ±0.15 μm
Dynamic Signal Control	None

◆ Mounting dimension

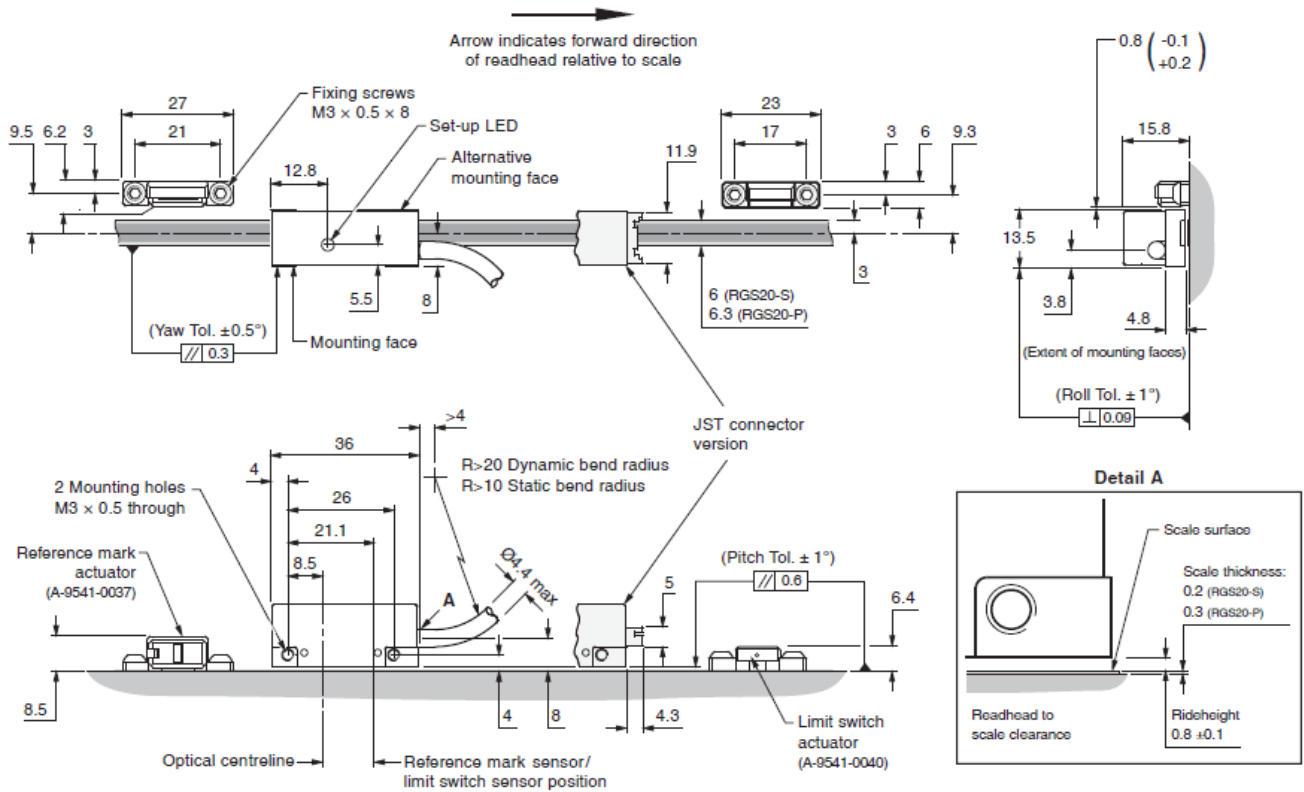


Fig. 9-7 Dimensional drawing of RGH24 reading head

◆ Order model

RGH24 - X - 30 - D - 00 - A

① ② ③ ④ ⑤ ⑥

① Product series

Symbol	Spec.
RGH24	Reading head series

② Output

Symbol	Spec.
D	5μm digital
X	1μm digital
Z	0.5μm digital
W	0.2μm digital
Y	0.1μm digital
H	50nm digital
I	20nm digital
O	10nm digital

③ Cable length

Symbol	Spec.
0	No cable
10	1.0m
15	1.5m
30	3.0m

④ Connector type

Symbol	Spec.
A	9-pin D type plug
D	15-pin D type plug
F	Scattered line(underminated cable)
L	15-pin analog D type plug
Z	JST plug(direct output-no cable)

⑤ Option

Symbol	Spec.
0	Standard reading head(no clocked output)
60	50MHz clocked output(reference mark only)
61	20MHz clocked output(reference mark only)
62	10MHz clocked output(reference mark only)
30	12MHz clocked output
31	8MHz clocked output
32	6MHz clocked output
33	4MHz clocked output
01	JST(no clocked output)
35	12MHz clocked output(JST plug)
36	8MHz clocked output(JST plug)
37	6MHz clocked output(JST plug)
38	4MHz clocked output(JST plug)

⑥ Reference mark/limit switch

Symbol	Spec.
A	Reference mark(incompatible with options 60, 61 and 62)
B	limit switch(digital output reading heads only)
H	Reference mark(options 60, 61 and 62 only)

◆ Definition of extension cable

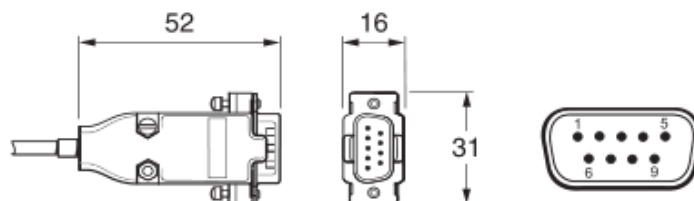


Fig. 9-8 9-pin D type plug (termination code A)

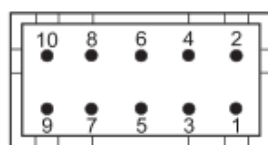


Fig. 9-9 10-pin JST plug (termination code Z)

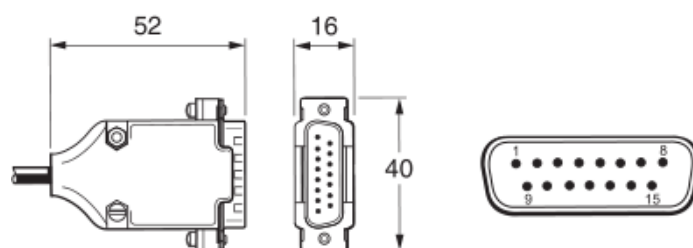


Fig. 9-10 15-pin D type plug (termination code D)

Function	Color	9-pin D Type(A)	JST(Z)	15-pin D Type(D)	To the Drive
5V	Brown	5	9	7, 8	5
0V	White	1	10	2, 9	15
A+	Green	2	8	14	1
A-	Yellow	6	7	6	6
B+	Blue	4	2	13	2
B-	Red	8	1	5	7
Z+	Pink	3	5	12	3
Z-	Gray	7	6	4	8
Inner shield	-	9	N/A	15	Case
Outer shield	-	Case	N/A	Case	Case
Remote LED driver-green	-	N/A	4	N/A	-
Remote LED driver-red	-	N/A	3	N/A	-

9.4.2 RGS20 Scale



◆ Specifications

Model	RGS20-S	RGS20-P
Linearity($\mu\text{m}/\text{m}$)	± 3	± 5
Scale period(μm)	20	20
Micro Linearity ($\mu\text{m}/\text{mm}$)	$\pm 0.75/60$	$\pm 1.5/60$
Form(HxW)(mm)	0.2x 6(including adhesive)	0.3x 6.3(including adhesive)
Scale length(m)	Up to 50(>50 by special order)	Up to 50(>50 by special order)

◆ Order model

RGS20-S: 20 μm pitch lacquered tape scale with self-adhesive backing tape.

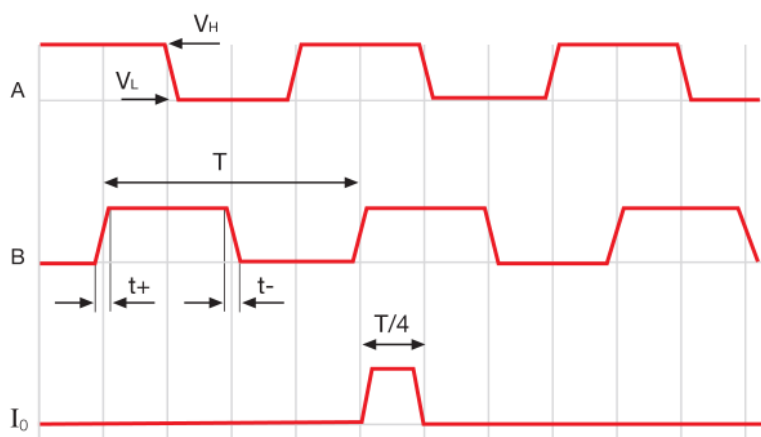
No.	Available Length	Available Increment	Ordering Instruction
A-9517-0043	100~50000mm	1mm	2455 represents ordering length is 2455mm (multiple orders are required for multiple lengths)
A-9517-0004	1~50m	1m	15 represents ordering length is 15m (multiple orders are required for multiple lengths)
A-9523-6xxx	10~999cm	1cm	xxx is the length in cm (e.g. length of ordered A-9523-6450 is 450cm)
A-9523-80xx	10~50m	1m	xx is the length in m (e.g. length of ordered A-9523-8033 is 33m)

RGS20-P: 20μm pitch polyester coated tape scale with self-adhesive backing tape.

No.	Available Length	Available Increment	Ordering Instruction
A-9517-0046	100~50000mm	1mm	2455 represents ordering length is 2455mm (multiple orders are required for multiple lengths)
A-9517-0045	1~50m	1m	15 represents ordering length is 15m (multiple orders are required for multiple lengths)

9.5 FAGOR Incremental Linear Encoder

◆ Electrical output signal



Features of signal are shown as follows:

Signal	A, /A, B, /B, I ₀ , /I ₀
Signal Level	$V_H \geq 2.5V$ $I_H = 20mA$ $V_L \geq 0.5V$ $I_L = 20mA$ With 1m cable
Reference Mark Signal (I₀) 90°	Signal synchronized with A, B signals
Switching Times	$t_+/t_- < 30ns$ With 1m cable
Supply Voltage and Current	$5V \pm 5\%$, $< 150mA$
Signal Cycle T	4, 2, 0.4, 0.2 μm
Max Cable Length	50m
Load Impedance	$Z_O = 120 \Omega$ between positive and negative differential signals

9.5.1 G2 Series



◆ Specifications

Model	G2X	G2Y	G2W	G2Z
Measurement	By means of a 20μm pitch graduated glass			
Glass Thermal Expansion Coefficient	α_{therm} : 8 ppm/K aprox			
Resolution(μm)	1	0.5	0.1	0.05
Output Signal	TTL differential			
Signal Cycle(μm)	4	2	0.4	0.2
Max Frequency	500KHz	1MHz	1.5MHz	500KHz
Max Speed(m/min)	120	120	36	6
Min Pulse Interval(μs)	0.2	0.2	0.1	0.3
Reference Mark Pulse I ₀	G2X, G2Y, G2W, G2Z, G2P: every 50mm G2OX, G2OY, G2OW, G2OZ, G2OP: distance-coded I ₀			
Max Cable Length(m)	50			
Supply Voltage(V)	5±5% <150mA(without load)			
Precision(μm/m)	±5 or ±3			
Anti-vibration Performance	200m/s ² (55...2000Hz)IEC60068-2-6			
Shock Resistance	300m/s ² (11ms)IEC60068-2-27			
Max Acceleration(m/s ²)	100 in the measuring direction			
Moving Force(N)	<5			
Operating Temperature(°C)	0~50			

Storage Temperature(°C)	-20~70
Mass	0.25kg+2.25kg/m
Relative Humidity(%)	20~80
SEaling Level	IP53(standard) IP64(DIN40050) using pressurized air at 0.8 ± 0.2 bar
Reading Head	With built-in connector Connection at both ends of the reading head

◆ Mounting Dimension

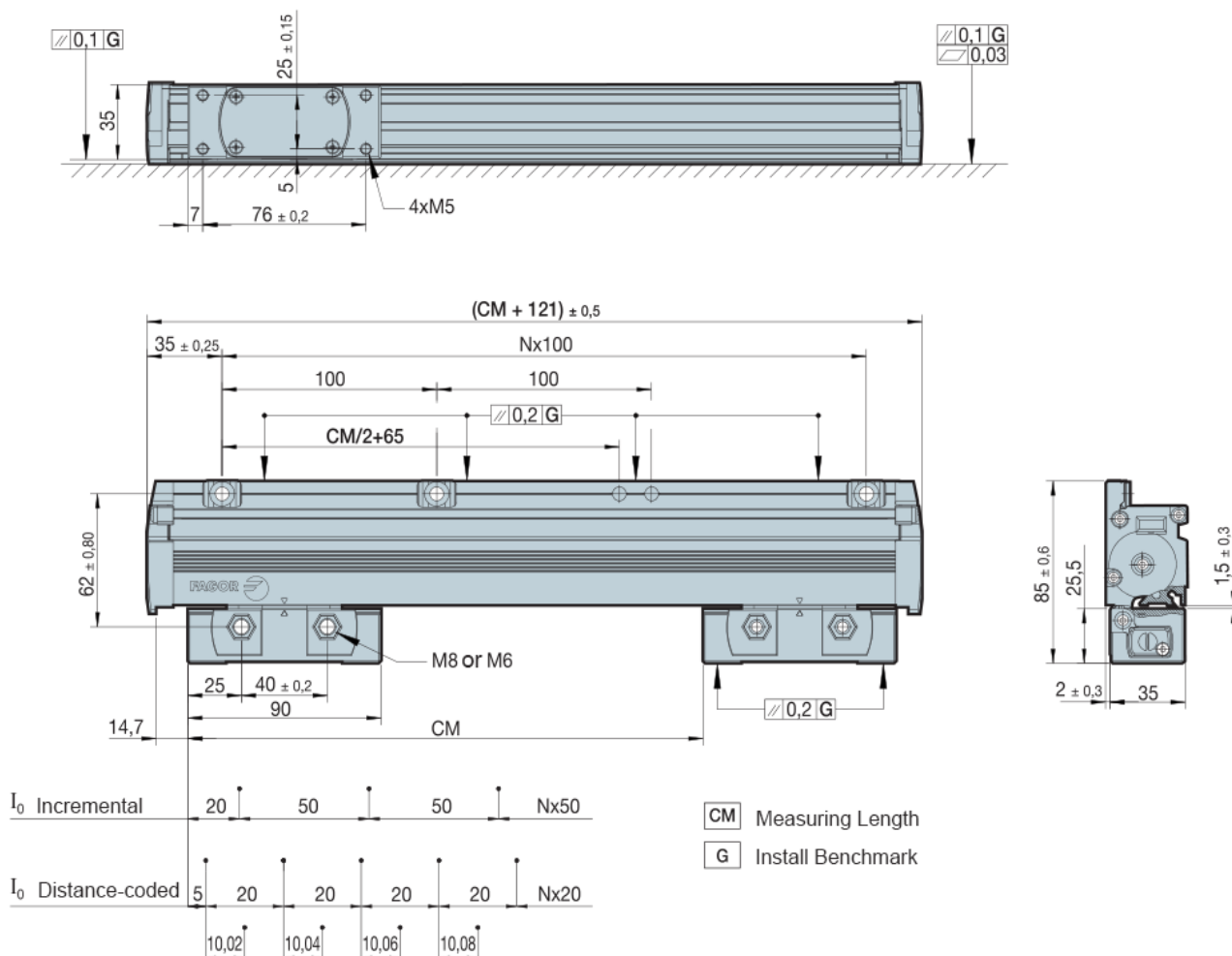


Fig. 9-11 Dimensional drawing of FAGOR incremental G2 series scale

◆ Order Model

G2
0
X
-
1640
-
5
-
A
-
T

①
②
③
④
⑤
⑥
⑦

① Product series

Symbol	Spec.
G2	Standard range. Sufficient installation space. Small-sized reading head

② Type of reference mark

Symbol	Spec.
Blank space	Incremental, one mark every 50mm
O	Distance-coded mark

③ Signal type

Symbol	Spec.
X	1μm resolution differential TTL
Y	0.5μm resolution differential TTL
W	0.1μm resolution differential TTL
Z	0.05μm resolution differential TTL
P	1Vpp sinusoidal

④ Measuring length

Symbol	Spec.
1640	1640mm

Measuring length specifications include:
140, 240, 340, 440, 540, 640, 740, 840,
940, 1040, 1140, 1240, 1340, 1440,
1540, 1640, 1740, 1840, 2040, 2240,
2440, 2640, 2840, 3040

⑤ Precision

Symbol	Spec.
5	±5μm
3	±3μm

⑥ Air intake on reading head

Symbol	Spec.
Blank space	Without
A	With

⑦ Threaded reading head

Symbol	Spec.
Blank space	M8
T	M6

9.5.2 S2 Series



◆ Specifications

Model	S2X	S2Y	S2W	S2Z
Measurement	By means of a 20μm pitch graduated glass			
Glass Thermal Expansion Coefficient	α_{therm} : 8 ppm/K aprox			
Resolution(μm)	1	0.5	0.1	0.05
Output Signal	TTL differential			
Signal Cycle(μm)	4	2	0.4	0.2
Max Frequency	500K Hz	1MHz	1.5MHz	500KHz
Max Speed(m/min)	120	120	36	6
Min Pulse Interval(μs)	0.2	0.2	0.1	0.3
Reference Mark Pulse I ₀	S2X, S2Y, S2W, S2Z, S2PP: every 50mm S2OX, S2OY, S2OW, S2OZ, S2OP: distance-coded I ₀			
Max Cable Length(m)	50			
Supply Voltage(V)	5±5% <150mA(without load)			
Precision(μm/m)	±5 or ±3			
Anti-vibration Performance	100m/s ² (55...2000Hz)IEC60068-2-6			
Shock Resistance	300m/s ² (11ms)IEC60068-2-27			
Max Acceleration(m/s ²)	100 in the measuring direction			
Moving Force(N)	<4			

Operating Temperature(°C)	0~50
Storage Temperature(°C)	-20~70
Mass	0.25kg+2.25kg/m
Relative Humidity(%)	20~80
Sealing Level	IP53(standard) IP64(DIN40050) using pressurized air at 0.8 ± 0.2 bar
Reading Head	With built-in connector

◆ Mounting Dimension

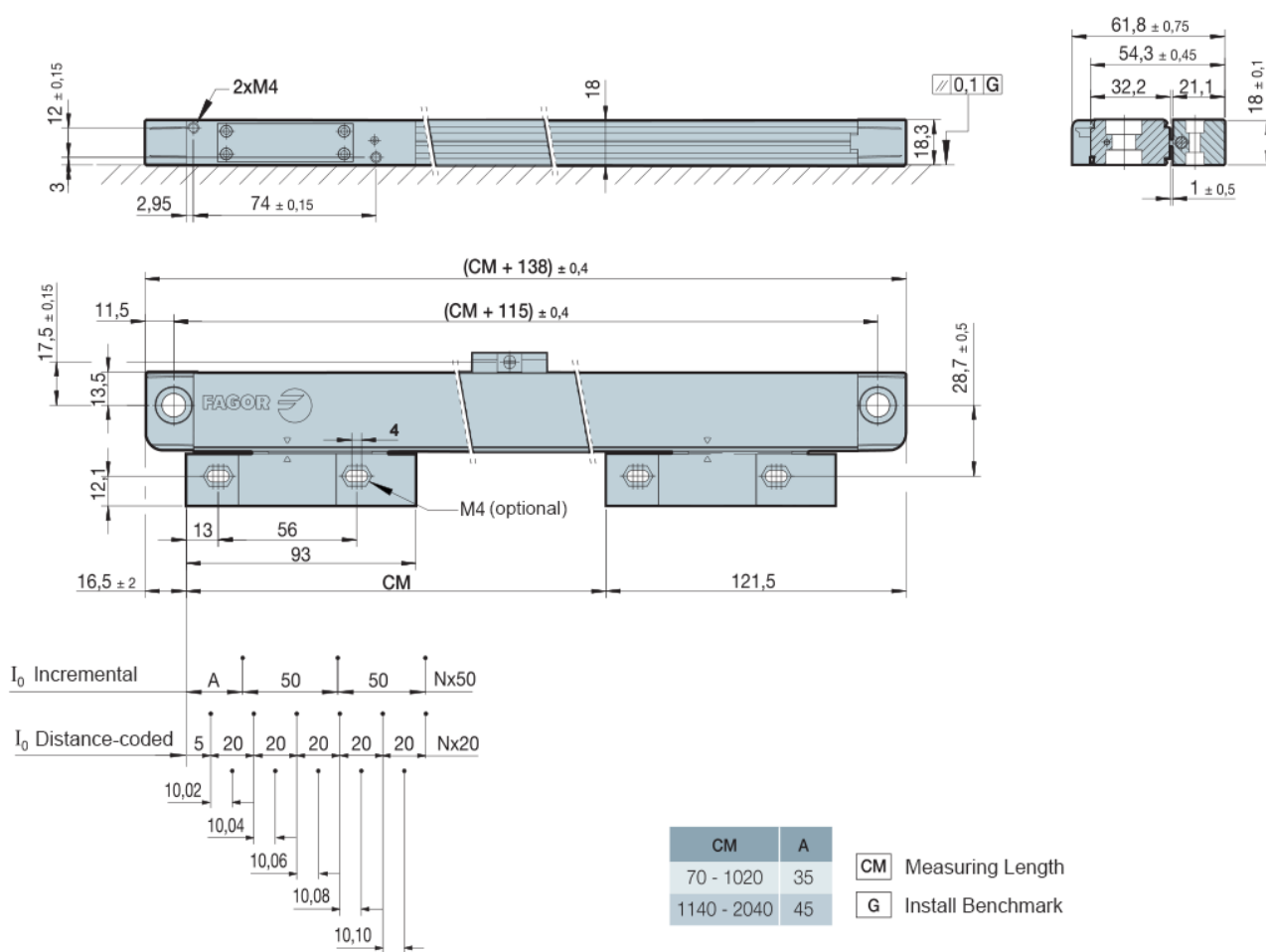


Fig. 9-12 Dimensional drawing of FAGOR incremental S2 series scale

◆ Order model



① Product series

Symbol	Spec.
S2	Standard installaion. Small installation space. Anti-vibration performance is up to 100m/s^2

② Type of reference mark lo

Symbol	Spec.
Blank space	Incremental, one mark every 50mm
0	Distance-coded mark

③ Signal type

Symbol	Spec.
X	1μm resolution differential TTL
Y	0.5μm resolution differential TTL
W	0.1μm resolution differential TTL
Z	0.05μm resolution differential TTL

④ Measuring length

Symbol	Spec.
1140	1140mm

Measuring length specifications include:
70, 120, 170, 220, 270, 320, 370, 420,
470, 520, 570, 620, 670, 720, 770, 820,
870, 920, 1020, 1140, 1240

⑤ Precision

Symbol	Spec.
5	±5μm
3	±3μm

⑥ Air intake on reading head

Symbol	Spec.
Blank space	Without
A	With

⑦ Threaded reading head

Symbol	Spec.
Blank space	No
T	M4

9.5.3 SV2 Series



◆ Specifications

Model	SV2X	SV2Y	SV2W	SV2Z
Measurement	By means of a 20μm pitch graduated glass			
Glass Thermal Expansion Coefficient	α_{therm} : 8 ppm/K aprox			
Resolution(μm)	1	0.5	0.1	0.05
Output Signal	TTL differential			
Signal Cycle(μm)	4	2	0.4	0.2
Max Frequency	500K Hz	1MHz	1.5MHz	500KHz
Max Speed(m/min)	120	120	36	6
Min Pulse Interval(μs)	0.2	0.2	0.1	0.3
Reference Mark Pulse I ₀	SV2X, SV2Y, SV2W, SV2Z, SV2P: every 50mm SV2OX, SV2OY, SV2OW, SV2OZ, SV2OP: distance-coded I ₀			
Max Cable Length(m)	50			
Supply Voltage(V)	5±5% <150mA(without load)			
Precision(μm/m)	±5 or ±3			
Anti-vibration Performance	200m/s ² (55...2000Hz)IEC60068-2-6			
Shock Resistance	300m/s ² (11ms)IEC60068-2-27			
Max Acceleration(m/s ²)	100 in the measuring direction			
Moving Force(N)	<4			
Operating Temperature(°C)	0~50			
Storage Temperature(°C)	-20~70			

Mass	0.25kg+2.25kg/m
Relative Humidity(%)	20~80
Sealing Level	IP53(standard) IP64(DIN40050) using pressurized air at 0.8 ± 0.2 bar
Reading Head	With built-in connector

◆ Mounting Dimension

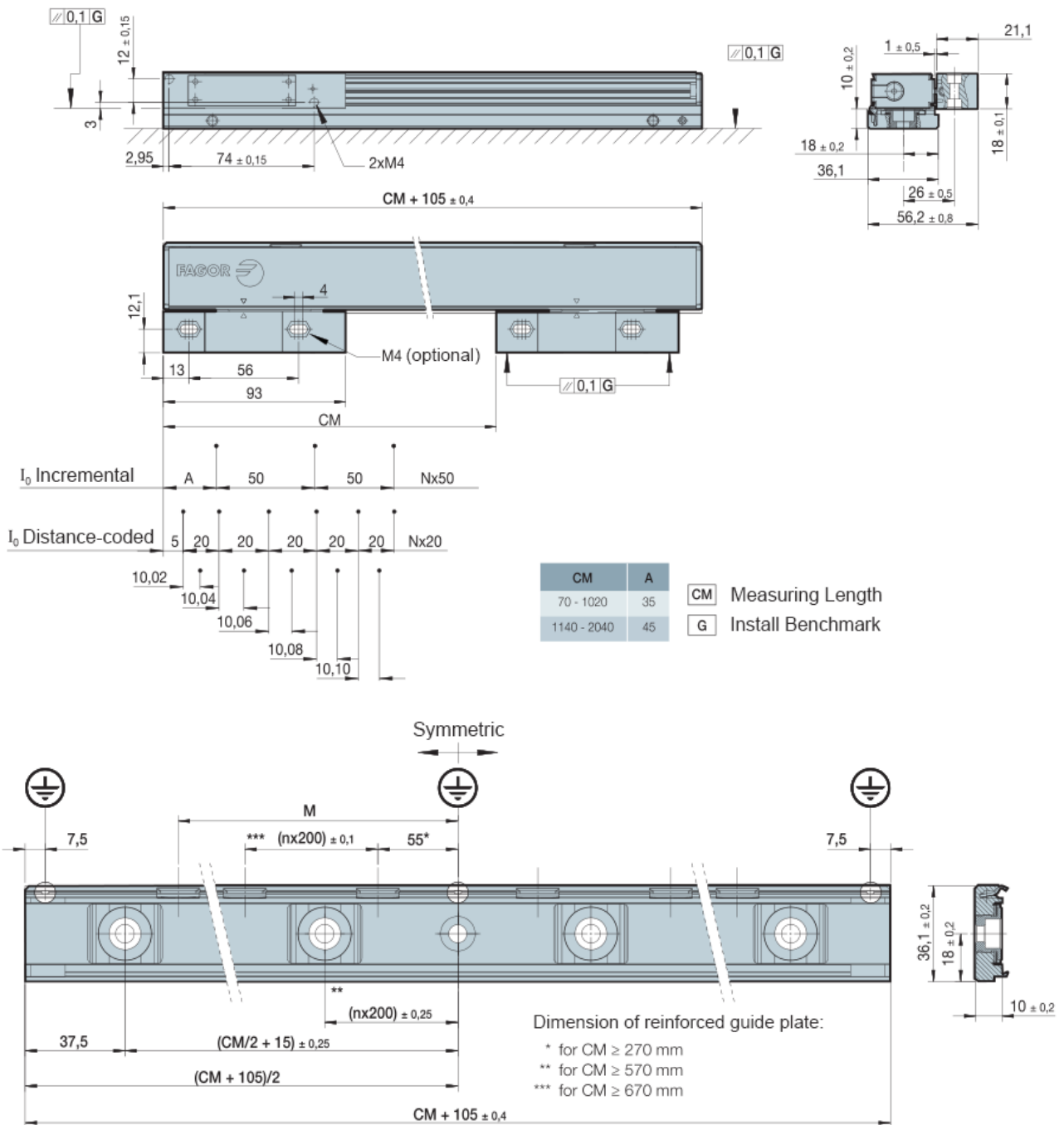


Fig. 9-13 Dimensional drawing of FAGOR incremental SV2 series scale

Dimensional drawing of SV2 series scale is shown in Fig. 9-13. See the table below for details.

CM	70	120	170	220	270	320	370	420	470	520
M	37.5	55	75	100	115	140	175	200	225	250

CM	570	620	670	720	770	820	870	920	970	1020
M	275	300	325	350	375	400	425	450	475	500

CM	1070	1140	1240	1340	1440	1540	1640	1740	1840	2040
M	515	555	610	655	710	760	810	855	910	1010

◆ Order model

SV2	0	X	-	1140	-	5	-	B	-	A	-	T
①	②	③		④		⑤		⑥		⑦		⑧

① Product series

Symbol	Spec.
SV2	Reinforced installaion. Small installation space. Anti-vibration performance is up to 200m/s ²

② Type of reference mark lo

Symbol	Spec.
Blank space	Incremental, one mark every 50mm
0	Distance-coded mark

③ Signal type

Symbol	Spec.
X	1μm resolution differential TTL
Y	0.5μm resolution differential TTL
W	0.1μm resolution differential TTL
Z	0.05μm resolution differential TTL

④ Measuring length

Symbol	Spec.
1140	1140mm

Measuring length specifications include:
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 570, 620, 670, 720, 770, 820, 870, 920, 970, 1020, 1070, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040

⑤ Precision

Symbol	Spec.
5	±5μm
3	±3μm

⑥ Air intake on reading head

Symbol	Spec.
Blank space	Without
A	With

⑦ Threaded reading head

Symbol	Spec.
Blank space	No
T	M4

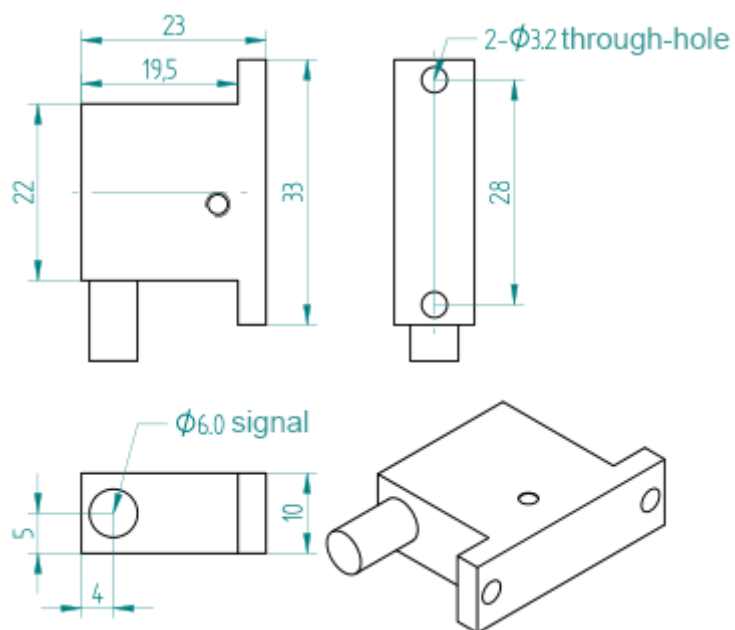
9.5.4 Definition of Extension Cable

Function	Color	To the Drive
A+	Green	1
A-	Yellow	6
B+	Blue	2
B-	Red	7
Z+	Gray	3
Z-	Pink	8
+5V	Brown	5
+5V sensor	Purple	-
0V	White	15
0V sensor	Black	-
Ground	Shielding net	Case

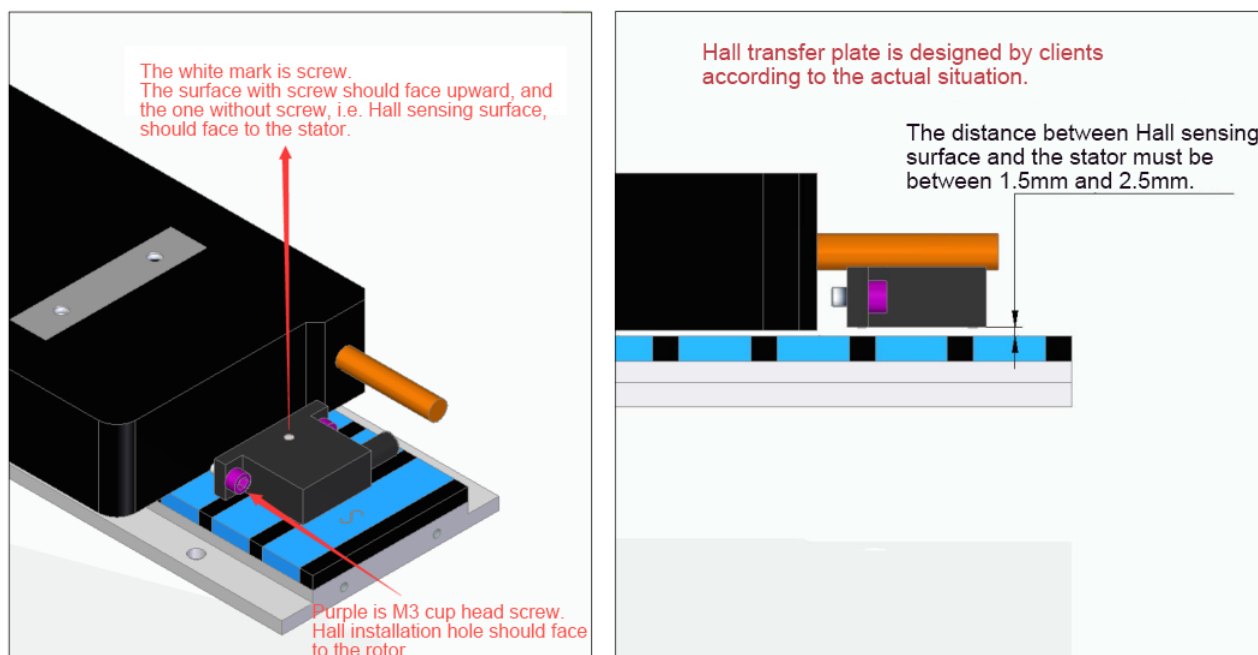
9.6 HR-KEYS-32 Hall



◆ Dimension



◆ Installation Diagram



◆ Definition of Extension Cable

Function	Color	DB9 Female	To the Drive
5V	Orange and red	5	5
0V	Orange and black	1	15
Hall U+	White and red	7	9
Hall V+	White and black	8	10
Hall W+	Gray and red	9	11