



In this manual, we have tried as much as possible to describe all the various matters about the spindle servo motor. However, we can not describe all the matters which must not be done or which can not be done because there are so many possibilities. Therefore, matters which are not especially described in this manual should be regarded as “impossible” or “forbidden”.



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PREFACE

Dear user:

It's our honor that you select **GSK ZJY** serial spindle servo motor
(Hereinafter referred to as motor).

For safety of the motor and the product and for the normal and effective running, please read the manual carefully before installing and using the product.

SAFETY PRECAUTION



The incorrect connection and operation may cause the accident, so before using and operating the motor, please read the manual carefully!

1. The motor is installed with the photoelectric encoder, and it's not allowed to hit the motor. And the user can't disassemble the photoelectric encoder by himself; otherwise, once the encoder is damaged, it may cause the motor out of running!
2. In the normal climate, measure the insulation resistance, which the motor winding is against with the cabinet, by 1000V megameter, and the value should NOT be less than 20 MΩ.
3. The motor and the drive unit should be connected correctly based on the manual to guarantee the protective grounding stable and reliable.
4. The motor can run with load only after the motor is free of noise and vibration during running from zero speed to the maximum speed in the dry run state.
5. During the motor running, it's not allowed to touch the motor shaft and cabinet.
6. Only the qualified person can adjust and maintain the motor.
7. It is forbidden to move the motor by dragging the wire (cable), the motor shaft or the encoder.
8. GSK does NOT take any responsibility for any change on the product by the user, and the warranty bill becomes invalid.

All specifications and designs are subject to change without notice.

RESPONSIBILITY

Responsibility of the manufacturer

——The manufacturer should be in charge of the design and the structure of the motor and its accessories.

——The manufacturer should be responsible for the safety of the motor and its accessories.

——The manufacturer should be in charge of the provided information and suggestion for the user.

Responsibility of the end user

——The user should be very familiar with the safety operation through learning the motor safety operation or participating in the training session.

——The user should be responsible for the safety after adding, changing or modifying the original motor and its accessories by himself.

——The user should be in charge of the danger resulted from the operation, adjusting, maintenance, installation and storage which are not complied with the manual regulation.

The manual is kept by **the end user**.

Thank you for your friendly support during using GSK product.

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I PRODUCT CHARACTERISTICS

GSK ZJY spindle servo motor is a new type of three phase inductive motor with high performance and adopts insulation structure of F level, corona resistance enameled wire dedicated for the frequency conversion motor and the encoder with high speed and precision, and the motor is researched, developed and manufactured by GSK. The product is with the characteristics of the compact structure, high rotation precision, low noise, high reliability and high capability with low cost, etc.



II RUNNING CONDITIONS

- 2.1 The height above sea level should NOT exceed 1000m.
- 2.2 The environment temperature should be in the range of -10℃ ~ +40℃.
- 2.3 The relative air humidity is ≤90% (without the condensation).
- 2.4 AC voltage value of steady state is : (0.9 ~1.1) multiplies AC rated voltage value.

III MODELS of the MACHINE

Example: ZJY208A-5.5BH-B3A2LY1-H

ZJY 208 A - 5.5 B H - B3 A2 L Y1 (**) - H
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

SR.NO	MEANING
(1)	The spindle servo motor
(2)	Motor width (182, 208, 265)
(3)	Design sequence number (None: Original A, B, C.....: design sequence number)
(4)	Rated power (Unit: kW)
(5)	Rated speed: (W: 750 r/min, A: 1000 r/min, B: 1500 r/min, E: 3000 r/min)
(6)	Max. speed (H: high speed 10000 r/min, M: medium speed: 7000 r/min, L: low speed: 4500 r/min)
(7)	Structure installation type: (B5 flange installation, B3 footing installation, B35 flange footing installation)
(8)	Encoder type (None: Incremental 1024 p/r, A: Incremental 2500p/r, A1: Incremental 4096 p/r, A2: Incremental 5000 p/r, A4: Absolute 17 bit, A8: Absolute 19 bit)
(9)	Position of the terminal box (None: The outlet box is on the top; R: The outlet box is on the right looking from the shaft end; L: The outlet box is on the left.)
(10)	Shaft end (None: Optic axis, Y1: with the standard key slot)
(11)	Customer special order number are bracketed in two capitals.
(12)	Power supply voltage (none: three phase 380V, H: three phase 440V)

IV MAIN TECHNICAL PARAMETERS and OVERALL DIMENSION of the MOTOR

4.1 Refer to list 1 about the main technical parameters and overall dimension of the motor.

List 1 The main technical parameters and overall dimension of the motor

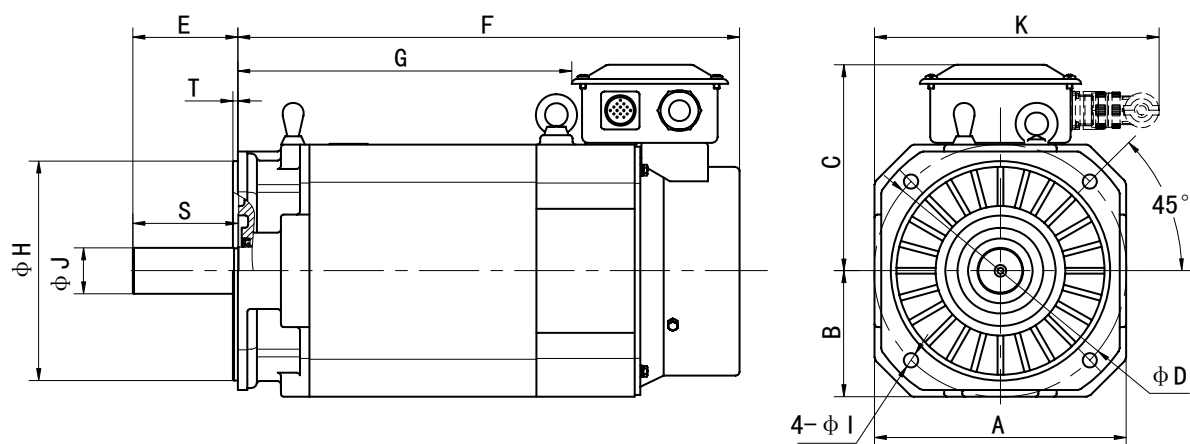
SPEC. ITEM	ZJY208-2.2AM	ZJY208-3.7AM	ZJY208-5.5AM	ZJY265-7.5AM	ZJY265-11AM	ZJY265-15AM	ZJY182-1.5BH	ZJY182-2.2BH	ZJY182-3.7BH
Rated power (kW)	2.2	3.7	5.5	7.5	11	15	1.5	2.2	3.7
Drive unit power supply (V)	Three phase AC 380 50/60Hz								
Rated current (A)	6.7	10.2	15.5	21	31	48.3	7.3	7.5	15.5
Rated frequency (Hz)	33.3	33.3	33.3	33.3	33.3	33.3	50	50	50
Rated torque (N·m)	21	35	53	72	105	143	9.5	14	24
30min power (kW)	3.7	5.5	5.5	11	15	18.5	2.2	3.7	5.5
30min current (A)	9.8	13.8	19.6	28	39	56	9.3	11	19.6
30min torque (N·m)	35	53	72	105	143	177	14	24	35
Rated speed (r/min)	1000	1000	1000	1000	1000	1000	1500	1500	1500
Constant power range (r/min)	1000~4000						1500~6000		
Max. speed (r/min)	M:7000						H:10000		
Rotation inertia (kg·m ²)	0.0168	0.0238	0.0309	0.0413	0.0826	0.086	0.0056	0.0074	0.0115
Weight (kg)	51	66	77	51	125	143	27	32	43
Installation type	IM B5 or B3						IM B35		
Protection level	IP54 (GB/T 4942.1-2006)								
Insulation level	F (GB 755-2008)								
Vibration level	B (GB 10068-2008)								
Inner encoder	Incremental 1024 p/r								
Cooling fan power supply	Three phase AC 380V 50Hz 40W 0.14A			Three phase AC 380V 50Hz 70W 0.21A			Three phase AC 380V 50Hz 30W 0.08A		

SPEC.		ZJY208-2.2AM	ZJY208-3.7AM	ZJY208-5.5AM	ZJY265-7.5AM	ZJY265-11AM	ZJY265-15AM	ZJY182-1.5BH	ZJY182-2.2BH	ZJY182-3.7BH
ITEM										
Overall dimension (Refer to the figure)	A	208	208	208	265	265	265	182	182	182
	B	104	104	104	132	132	132			
	C	188	188	188	216	216	216	126	126	126
	D	215	215	215	265	265	265	185	185	185
	E	60	80	80	110	110	110	60	60	60
	F	413	468	523	443	533	578	324	351	406
	G	237	292	347	260	350	395	198	225	280
	H	180h7	180h7	180h7	230h7	230h7	230h7	150h7	150h7	150h7
	I	15	15	15	15	15	15	12	12	12
	J	28h6	38h6	38h6	48h6	48h6	48h6	28h6	28h6	28h6
	K	272	272	272	300	300	300	184	184	184
	L	106	106	106	135	135	135	93	93	93
	N	180	180	180	230	230	230	156	156	156
	P	40	40	40	40	40	40	32	32	32
	Q	210	265	320	225	315	355	132	159	214
	S	60	80	80	110	110	110	60	60	60
	T	5	5	5	5	5	5	4	4	4
	Z	12	12	12	15	15	15	12	12	12

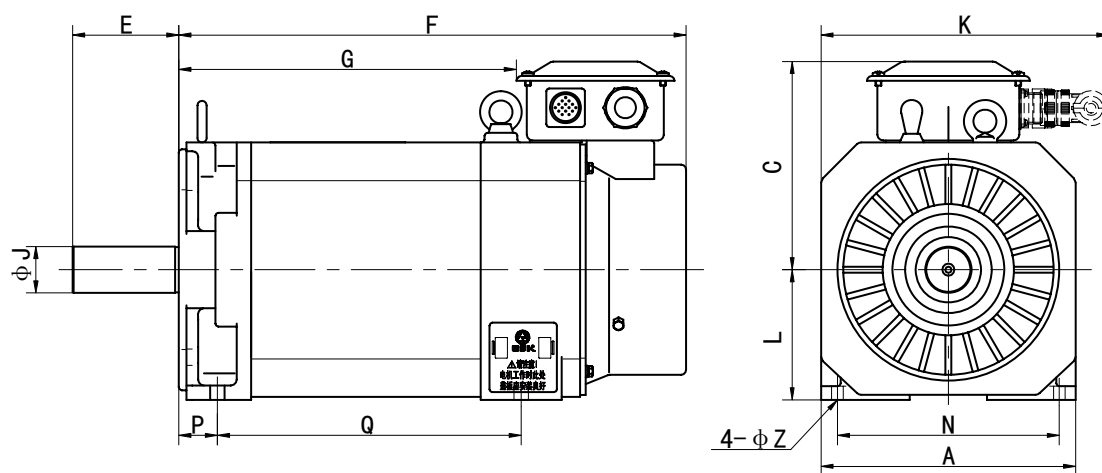
List 1 (Continued) The main technical parameters and overall dimension of the motor

SPEC		ZJY208-3.7B	ZJY208-5.5B	ZJY208-7.5B	ZJY265-7.5BM	ZJY265-11BM	ZJY265-15BM	ZJY265-18.5BM	ZJY265-22BM
ITEM									
Rated power (kW)		3.7	5.5	7.5	7.5	11	15	18.5	22
Drive unit power supply (V)		Three phase AC 380 50/60Hz							
Rated current (A)		8.9	13.7	18.4	18	26	35	48.7	58
Rated frequency (Hz)		50	50	50	50	50	50	50	50
Rated torque (N·m)		24	35	48	49	72	98	118	140
30min power (kW)		5.5	7.5	11	11	15	18.5	22	30
30min current (A)		13	18	25	26	34	42	54.7	73
30min torque (N·m)		35	48	70	74	100	123	140	191
Rated speed (r/min)		1500	1500	1500	1500	1500	1500	1500	1500
Constant power range (r/min)		1500~5000							
Max. speed (r/min)		M:7000、H:10000			M:7000				
Rotation inertia (kg·m ²)		0.0168	0.0238	0.0309	0.0413	0.0744	0.0826	0.086	0.102
Weight (kg)		51	66	77	89	107	125	143	162
Installation type		IM B5 or B3							
Protection level		IP54 (GB/T 4942.1-2006)							
Insulation level		F (GB 755-2008)							
Vibration level		B (GB 10068-2008)							
Inner encoder		Incremental 1024 p/r							

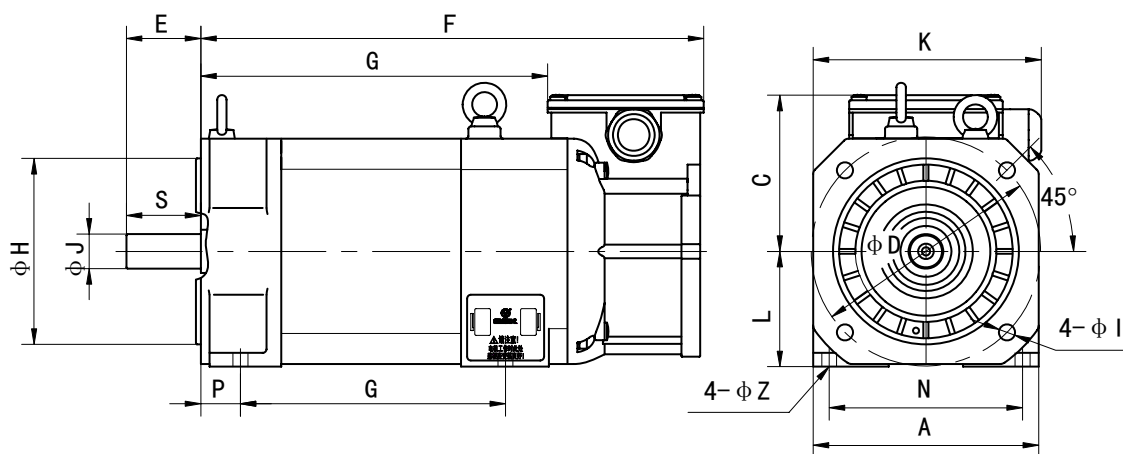
SPEC ITEM		ZJY208-3.7B	ZJY208-5.5B	ZJY208-7.5B	ZJY265-7.5BM	ZJY265-11BM	ZJY265-15BM	ZJY265-18.5BM	ZJY265-22BM
Cooling fan power supply		Three phase AC 380V 50Hz 40W 0.14A			Three phase AC 380V 50Hz 70W 0.21A				
Overall dimens ion (refer to the figure)	A	208	208	208	265	265	265	265	265
	B	104	104	104	132	132	132	132	132
	C	188	188	188	216	216	216	216	216
	D	215	215	215	265	265	265	265	265
	E	60	80	80	110	110	110	110	110
	F	413	468	523	443	488	533	578	633
	G	237	292	347	260	305	350	395	450
	H	180h7	180h7	180h7	230h7	230h7	230h7	230h7	230h7
	I	15	15	15	15	15	15	15	15
	J	28h6	38h6	38h6	48h6	48h6	48h6	55h6	55h6
	K	272	272	272	300	300	300	300	300
	L	106	106	106	135	135	135	135	135
	N	180	180	180	230	230	230	230	230
	P	40	40	40	40	40	40	40	40
	Q	210	265	320	225	270	315	355	410
	S	60	80	80	110	110	110	110	110
	T	5	5	5	5	5	5	5	5
	Z	12	12	12	15	15	15	15	15



Flange installation type (B5)



Footing installation type (B3)



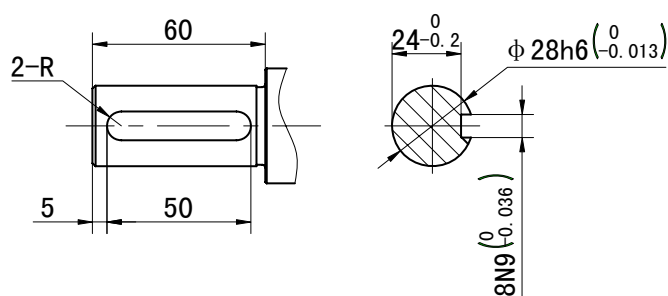
Flange and footing installation type (B35)

4.2 Dimension of the standard key slot

4.2.1 ZJY182-1.5BH, ZJY182-2.2BH, ZJY182-3.7BH, ZJY208-3.7B and ZJY208-2.2AM

The configuration keys: GB/T 1096 Keys: 8×7×50

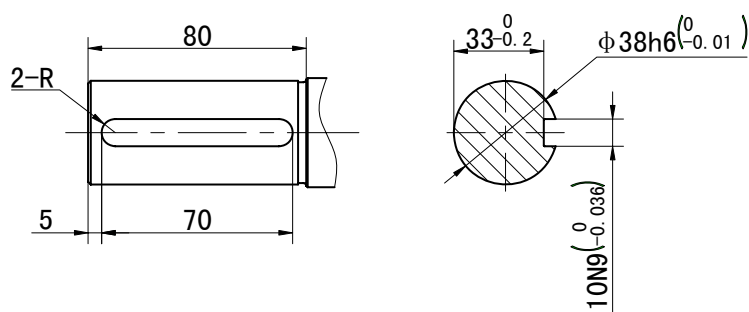
About the dimension of the shaft end key slot, refer to the following figure:



4.2.2 ZJY208-5.5B, ZJY208-7.5B, ZJY208-3.7AM and ZJY208-5.5AM

The configuration keys: GB/T 1096 Keys: 10×8×70

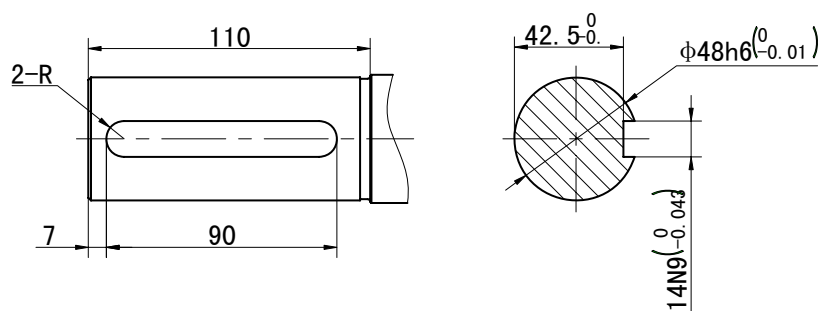
About the dimension of the shaft end key slot, refer to the following figure:



4.2.3 ZJY265-7.5BM, ZJY265-11BM, ZJY265-15BM, ZJY265-7.5AM, ZJY265-11AM and ZJY265-15AM

The configuration keys: GB/T 1096 Keys: 14×9×90

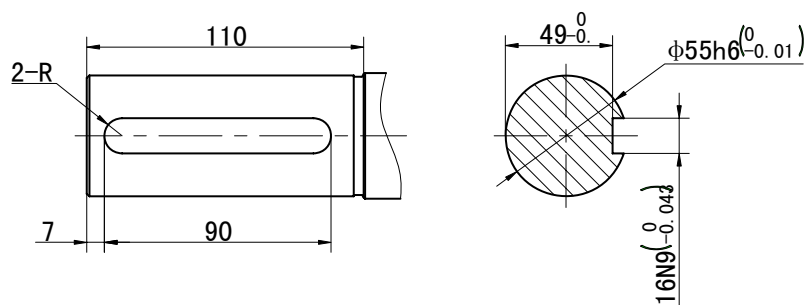
About the dimension of the shaft end key slot, refer to the following figure:



4.2.4 ZJY265-18.5BM and ZJY265-22BM

The configuration keys: GB/T 1096 Keys: 16×10×90

About the dimension of the shaft end key slot, refer to the following figure:

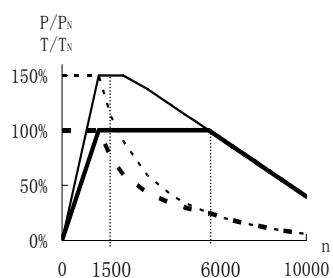


V MECHANICAL CHARACTERISTICS CURVE of the MOTOR

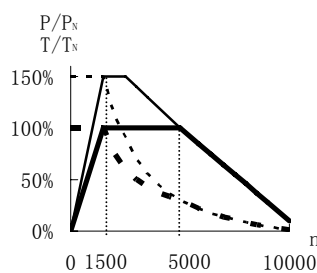
P/P_N ——Power/rated power;

T/T_N ——Torque/rated torque;

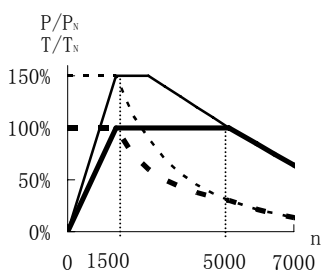
n ——Rated speed.



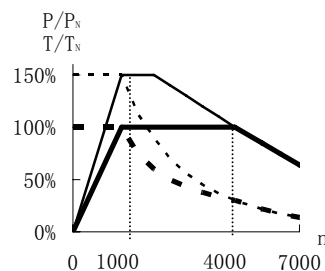
ZJY182 series: Rated speed: 1500r/min



ZJY208 series: Rated speed: 1500r/min



ZJY265 series: Rated speed: 1500r/min



ZJY208 & ZJY265: Rated speed: 1000r/min

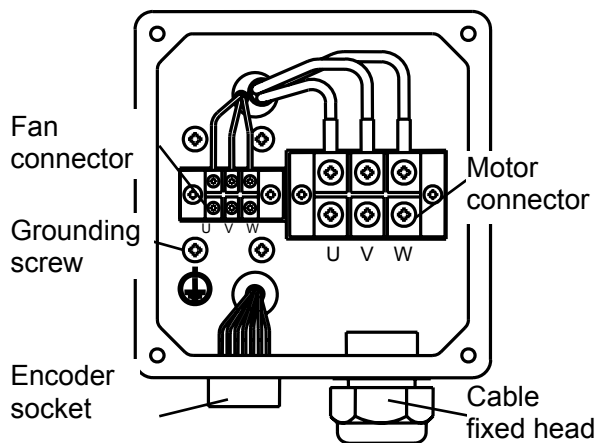
Figure:

—— Power of continuous working state; —— Power of 30min working state;
 - - - - Torque of continuous working state; - - - - Torque of 30min working state.

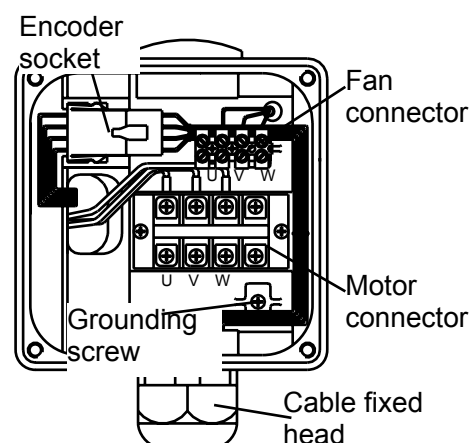
VI CONNECTION and INSTALLATION of the MOTOR

6.1 Connection of the motor and the drive unit

6.1.1 The three phase winding of the motor U, V, W and the cabinet (grounding) are led out by the cable fixed head, and about the position relation in the terminal box, refer to figure 3. U, V, W and the cabinet (grounding) are respectively connected with U, V, W and PE terminals of main return circuit in the drive unit. The air direction of the cooling fan is from one end of the shaft end to the other end.



ZJY208 & ZJY265 terminal box



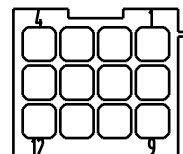
ZJY182 terminal box

6.1.2 Interface of the encoder

6.1.2.1 The incremental encoder lead of ZJY182 series motor is led out by the plug of 12-core connector in the terminal box; about its corresponding relation, refer to list 2. The outlet lead is connected with the plug of the drive unit feedback signal CN2 based on the drive unit requirement.

List 2

Encoder lead	Cabinet (grounding)	V_{CC}	GND	A	\bar{A}	B	\bar{B}	Z	\bar{Z}
Socket NO.	1	9	5	6	10	7	11	8	12

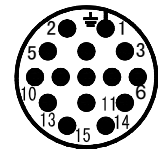


Socket (the back) sketch map

6.1.2.2 The incremental encoder lead of ZJY208 and ZJY265 series motor is led out by the plug of 15-core connector; about its corresponding relation, refer to list 3. The outlet lead is connected with the plug of the drive unit feedback signal CN2 based on the drive unit requirement.

List 3

Encoder lead	Cabinet (grounding)	V _{CC}	GND	A	\bar{A}	B	\bar{B}	Z	\bar{Z}
Socket NO.	1	2	3	4	7	5	8	6	9



Socket
(Welding side)
sketch map

6.2 Installation of the motor

If the motor should run at the speed above 2000r/min, it's recommended to use the motor of optic axis and the pulley is fixed by the expansion sleeve. And the pulley and the expansion sleeve must reach G1 requirements after the dynamic balancing process; otherwise, the big vibration occurs during running at high speed.

6.2.1 B5 flange installation mode (or use B35 flange installation mode)

ZJY182 series uses M10×35 bolt or HEX screw. During using the HEX screw, the length of the internal hexagonal wrench should be more than the total length of the motor and the wrench can be made by the user. Take down the rubber plug on the fan cover and fasten the screw from the back side, and then, push the rubber plug. (Refer to figure 4)

Use M12×45 bolt or HEX screw on **ZJY208** or **ZJY265** series motor.

6.2.2 B3 footing installation mode (Or use B35 footing installation mode)

Firstly remove the covers on the sides of back cover during installation. If it is B35 structure, the rubber plug should be also taken down from the footing hole (refer to fig. 5). M10 bolt or HEX screw is used on **ZJY182** and **ZJY208** series motor, M12 bolt or HEX screw is used on **ZJY265** series motor.

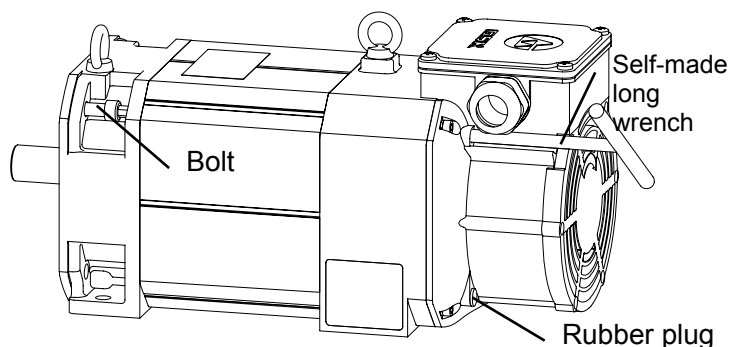


Fig. 4

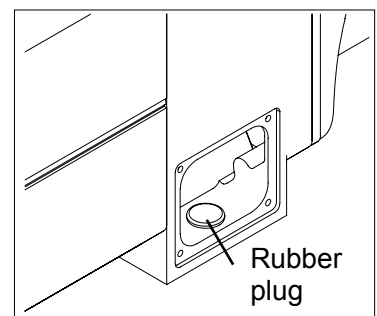


Fig.5

After fixing the motor, the covers on the sides of the back cover should be installed; otherwise, the cooling will get affected due to air leak, which causes the motor malfunction because of overheat.

VII STORAGE of the MOTOR

The motor should be stored in the room of which temperature should be among $-40^{\circ}\text{C}\sim+70^{\circ}\text{C}$, and the relative air humidity of the storeroom should not be more than 95%; Moreover, the storeroom should be clean, ventilated and free of the corrosive gas.

VIII TRANSPORTATION of the MOTOR

The motor should be put carefully and avoid hitting and impacting during transportation. And the corrosion substance, such as the sour and alkali, etc should not be put with the motor.

IX WARRANTY

On condition that the motor is transported, stored, installed, debugged and repaired based on the operation regulations, GSK is responsible for the motor repair freely in one year from the dispatch date (on the basis of the dispatch voucher) if the motor is damaged or can't be used normally due to the quality.

Remark 1: The listed motor modals in the manual are recommended by GSK, which can be used in many situations. If the user has some new requirements, GSK can provide the motor of the other specifications based on your requirements.

Remark 2: The basic shaft end of the motor manufactured by GSK is the cylinder shape without the key slot type. GSK can provide the motor with different shaft end types (remark during order), like the cylinder shape with the key slot shaft end (refer to GB/ T 756—2010), based on your requirements.

Remark 3: Because the spindle motor speed is very high, the rotary parts should reach the corresponding dynamic balance requirement; otherwise, it causes the big vibration and noise, even the motor and equipment get damaged. When the rotor of the spindle motor is dispatched from the factory, its dynamic balance precision is G0.4 when the speed is 6000r/min. The user should pay attention to the following points:

- ✧ It's recommended to use the spindle motor with the optic axis;
- ✧ The pulley must adopt the dynamic balance processing, and its precision should reach G1 or higher one (the amount of unbalance in one side should be less than 50mg.) when the speed is 6000r/min. Moreover, the weight of fixed screws should be same. Compared with the concentricity of the shaft, the installed clamping ring should NOT be more than 0.1mm;
- ✧ If the user has to adopt the key connection method, the pivot axis of dynamic balance should be made based on the spindle motor shaft end and the key dimension and material, and the pivot axis is for the pulley dynamic balance, and the dynamic balance precision is same as above. The pulley can be press mounted through the screw on the bolt hole at the motor shaft end, or the pulley is shrinkage installed, but it's not allowed to hit the pulley.
- ✧ If the required dynamic balance equipment isn't available for the user temporarily, the user can entrust GSK with the pulley balance processing and installation.

