PHASE

MOTION CONTROL

ULTRACT III

SERVO MOTOR'S INSTRUCTION MANUAL

FOR HYDRAULIC SYSTEM

INDEX

ULTRACT Ⅲ PRODUCT SPECIFICATION AND PERFORMANCE INSTRUCTION

The Ultract Ⅲ series of permanent magnet AC servo motors was convinced and designed as an advanced homogeneous range of high performance servo actuators, in line with the evolving demands of the automation industry.

The Ultract Ⅲ series of permanent magnet AC servo motors have the following characteristics:

1.With high torque/size and power/size ratios;

2.With low inertia and high stiffness;

3.With using the high-performance rare earth permanent magnetic materials, reduce the loss while the motor is motor is running;

4. With high power density and overload ability;
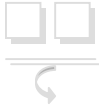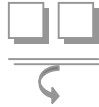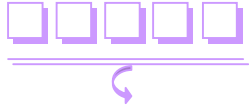
5. With high dynamic response;

6.With a variety of encoders to match the motor. (Resolver, Incremental Encoder, Sin-Cos Encoder, Absolute Encoder)

ULTRACT Ⅲ MOTOR'S TYPE SPECIFICATION

Size, (approx. shaft height in cm) U3(□75mm) U5(□100mm) U7(□145mm) U10(□200mm) U13(□266mm) U16(□365mm)	Locked rotor motor torque identifier: Nm for sizes U3, U5, U7; Nm*10 for sizes U10, U13, U16	Cooling：Naturalconvection, no field; F: Servo fan cooled C:Liquid cooling	Nominal speed identifier, rad/s*10	Nominal voltage at nominal speed identifie： 1）110/125Vac 2）220/240Vac 3）380/440Vac 4）24Vdc 5）48Vdc 6）460Vac	Sensor identifier: R4: TAMAGAWA Resolver, Type: TS2640N321E64 D2: TAMAGAWA Digital Incremental Encoder, Type: TS5214N566	Standard fields K: keyway on shaft M:terminals in conn-ection box and PCB. Accessoriesfields (can be cascaded) B: safty brake HK: spline shaft Y:terminals in conn-ection box and signal socket YZ: aviation socket (for U10, U13, U16) b: baseplate X: Custom execution Connector available on demand

Code Example:

U1007F20.3R4HKYb-T15: Motore type UL 1007F20 (70Nm, 2000rpm, fan cooling), 380Vac, Resolver, terminals in connection box and signal socket, with baseplate.

ULTRACT Ⅲ MOTOR'S SELECTION INSTRUCTION

When the injection molding machine's maximum demand flow and maximum system pressure is known, you can use the following methods to match the pump, motor and drive.

First: According to the demand of the maximum flow, calculate the theoretical demand displacement of pump.

Theoretical demand displacement = Maximum flow $\times$ 1000/Maxium speed

Unit of displacement: ml/rev; Unit of flow: liters/minute; Unit of speed: rpm.

Take the lower of the motor's and pump's maxium speed as the maxium speed.

Select the pump which displacement is higher and closest to the theoretical demand displacement.

Second: According to pump's displacement and maximum operating pressure, calculate the motor's theortical demand torque to choose the motor.

Theoretical demand torque = Pressure $\times$ Displacement/2π/0.85

Unit of torque: Nm;   Unit of pressure: Mpa.

Select the motor which nominal torque overloads 1.5 times is closest to the theoretical demand torque.

Third: According to the maximum current, choose servo controller.

Maximum current=Nominal current $\times$ Maximum pressure/ Continuously operating pressure

Unit of current: Arms.

Select the servo controller which peak current is higher and closet to the maximun demand current.

ⅠⅤ Motor Technical Data and Mounting Dimensions

Technical Data Sunmary

Motor specifications	Nom torque	Locked torque	Base speed	Nom current	Locked current	Rated power	Torque constant	Back E.M.F.	Rated F	Wind-ing R	Wind-ing I	Nominal voltage	Rotor inertia
	Nm	Nm	Rpm	Arms	Arms	KW	Nm/Arms	V/KRPM	Hz	Ohm	mH	V	Kgm210-3
U1004F.15.3	38	39	1500	11.6	12	6	3.32	200.7	100	1.67	16.33	350	6
U1004F.17.3	38.9	40.4	1700	15.2	15.8	7.6	2.81	169.9	113.4	1.19	16	381	6
U1004F.20.3	42	44	2000	18.8	19.6	8.7	2.37	143.3	133.4	0.85	8.33	321	6
U1005F.15.3	55	60.7	1500	16.6	20.2	8.6	3.31	200.1	100	0.97	14.6	300	6.1
U1005F.17.3	57	59.5	1700	20.4	23.3	10	2.81	169.9	113.4	0.72	10.6	336	6.1
U1005F.20.3	58	60.7	2000	24.3	25.7	12	2.6	157.2	133.4	0.6	9	364	6.1
U1007F.15.3	74	81.6	1500	23.9	26.5	11.6	3.37	203.8	100	0.665	11.4	329	9
U1007F.17.3	80	83	1700	28.2	31.8	14	2.85	172.3	113.4	0.48	8.09	341	9
U1007F.20.3	87	92	2000	36.7	38.3	18.2	2.53	153	133.4	0.356	4.74	341	9
U1008F.15.3	103	106.1	1500	33.2	34.6	16.4	3.38	204.4	100	0.473	9.05	370	9.8
U1008F.17.3	96.2	99.6	1700	35.1	36.8	17.6	2.98	180.2	113.4	0.417	7.04	370	9.8
U1008F.20.3	95.6	99.6	2000	40.1	42.5	20.4	2.58	156	133.4	0.314	5.29	370	9.8
U1010F.15.3	128	130.2	1500	41	42.9	20	3.3	199.5	100	0.338	7.38	360	12
U1010F.18.3	122	126.6	1800	44	48.7	23	2.87	173.5	120	0.273	5.42	312	12
U1010F.20.3	135	139	2000	60.5	61.8	28.3	2.37	143.3	133.4	0.181	2.78	321	12
U1013F.15.3	186	190	1500	61	63.8	29	3.26	197.1	100	0.249	3.7	370	15
U1013F.17.3	164.1	169.5	1700	55.4	58.5	28.7	3.19	192.9	113.4	0.236	5.03	380	15
U1013F.20.3	175	185	2000	73.7	77.3	36.7	2.53	153	133.4	0.144	2.37	340	15
U1320F.15.3	210	210	1500	62	62	33	3.43	207.4	100	0.098	4.46	369	36
U1320F.17.3	229	236	1700	92.6	98.3	39.4	2.94	177.8	113.4	0.107	4.5	377	36
U1320F.18.3	232	240	1800	96.46	99.8	44	2.64	159.6	120	0.085	3.647	379	36
U1320F.20.3	269	286	2000	120.7	127.8	56.3	2.37	143.3	133.4	0.068	2.13	347	36
U1330F.15.3	380	416	1500	106	117	60	3.56	215.2	100	0.082	3.19	380	49
U1330F.17.3	349	363	1700	145	153.4	62	2.89	174.7	113.4	0.06	2.9	368	49
U1340F.15.3	450.0	530.0	1500	130.0	158.0	70.0	3.56	215.2	100	0.058	2.40	347	63
U1340F.18.3	481.0	499.0	1800	196.0	203.3	91.0	2.71	163.8	113.4	0.035	1.864	379	63
U1340F.18.3	481.0	499.0	1800	196.0	203.3	91.0	2.71	163.8	113.4	0.035	1.864	379	63

Note: (1) Maximum speed: If does not use the drive's weak magnetic control function, maximum speed is 500rpm more than the rated speed; Otherwise, maximum speed is decided by the drive.
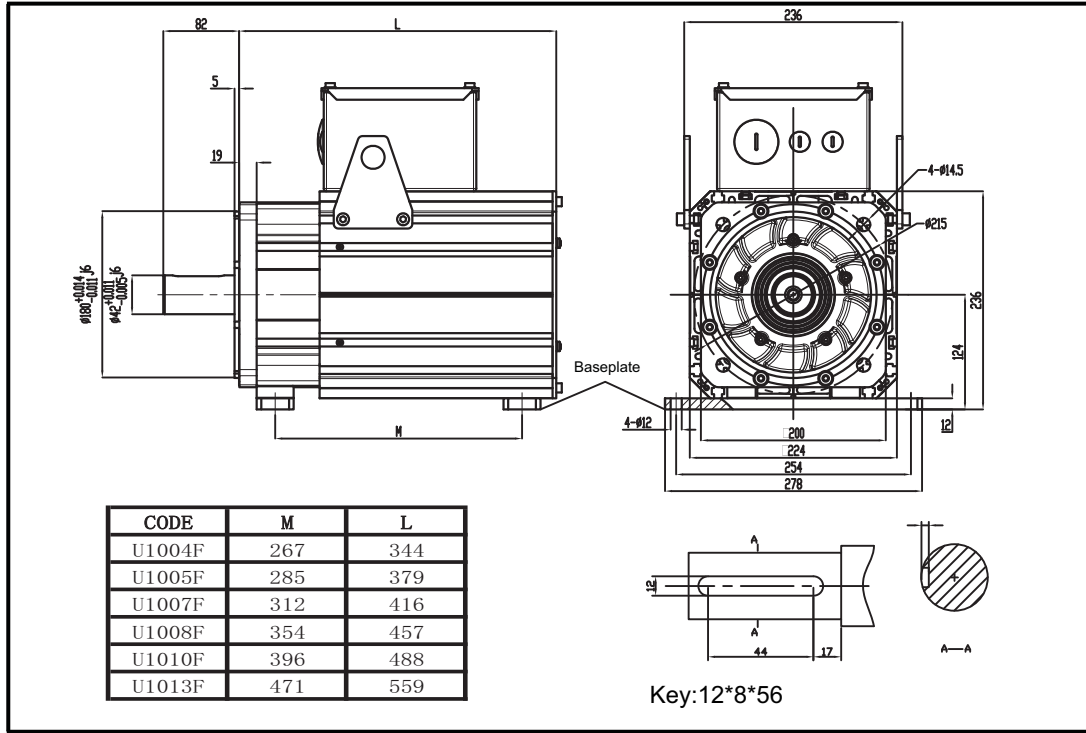
(2) Motor Poles:The motor above is 8 poles, namely 4 pairs of poles.
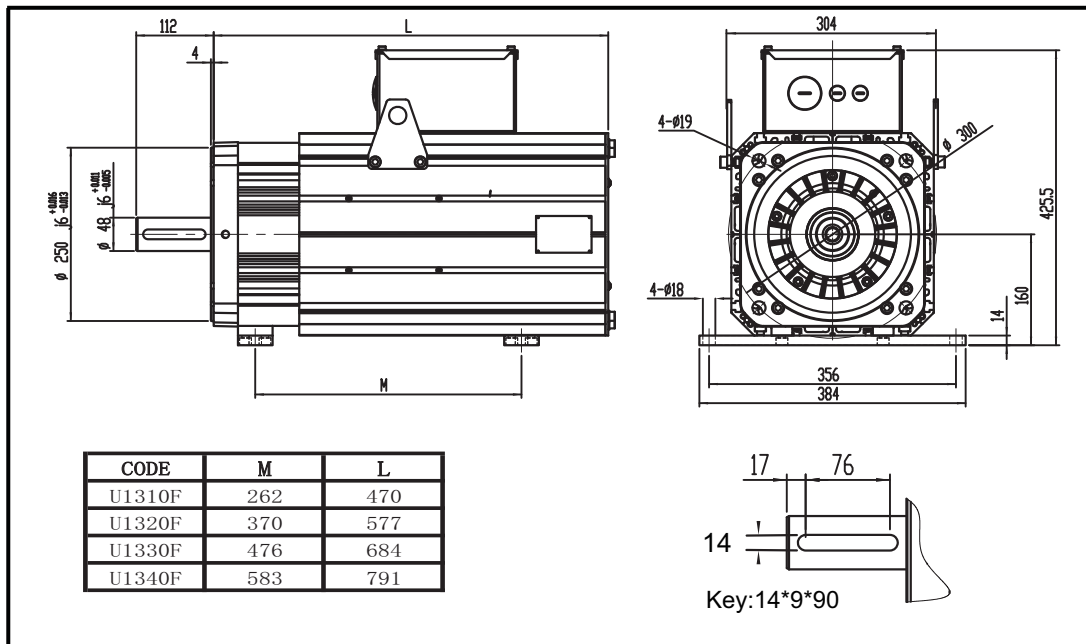
The Motor Mounting Dimensions

Motor shaft mainly uses standard axle(shaft withoutkey or single key shaft), internal spline shaft, external spline shaft, hollow shaft. Encoder signal wiring mainly uses the PCB, aviation socket also can be selected. The motor mounting can choose flange mounting or baseplate mounting.

ULTRACT Ⅲ SERIAL MOTOR DIMENSION DRAWING

1、U10 Serial Standard Motor Dimension

CODE	M	L
U1004F	267	344
U1005F	285	379
U1007F	312	416
U1008F	354	457
U1010F	396	488
U1013F	471	559

Key:12*8*56

2、U13 Serial Standard Motor Dimension

CODE	M	L
U1310F	262	470
U1320F	370	577
U1330F	476	684
U1340F	583	791

Key:14*9*90

3、U10 Serial Motor With Spine Dimension

CODE	M	L
U1004F	267	354
U1005F	285	389
U1007F	312	426
U1008F	354	467
U1010F	396	498
U1013F	471	583

SECTION B-B
SCALE 1 : 3

4、U13 Serial Motor With Spine Dimension

CODE	M	L
U1320F	369	586
U1330F	444	693

ANSI B92.1 16/32DP 30°
23T
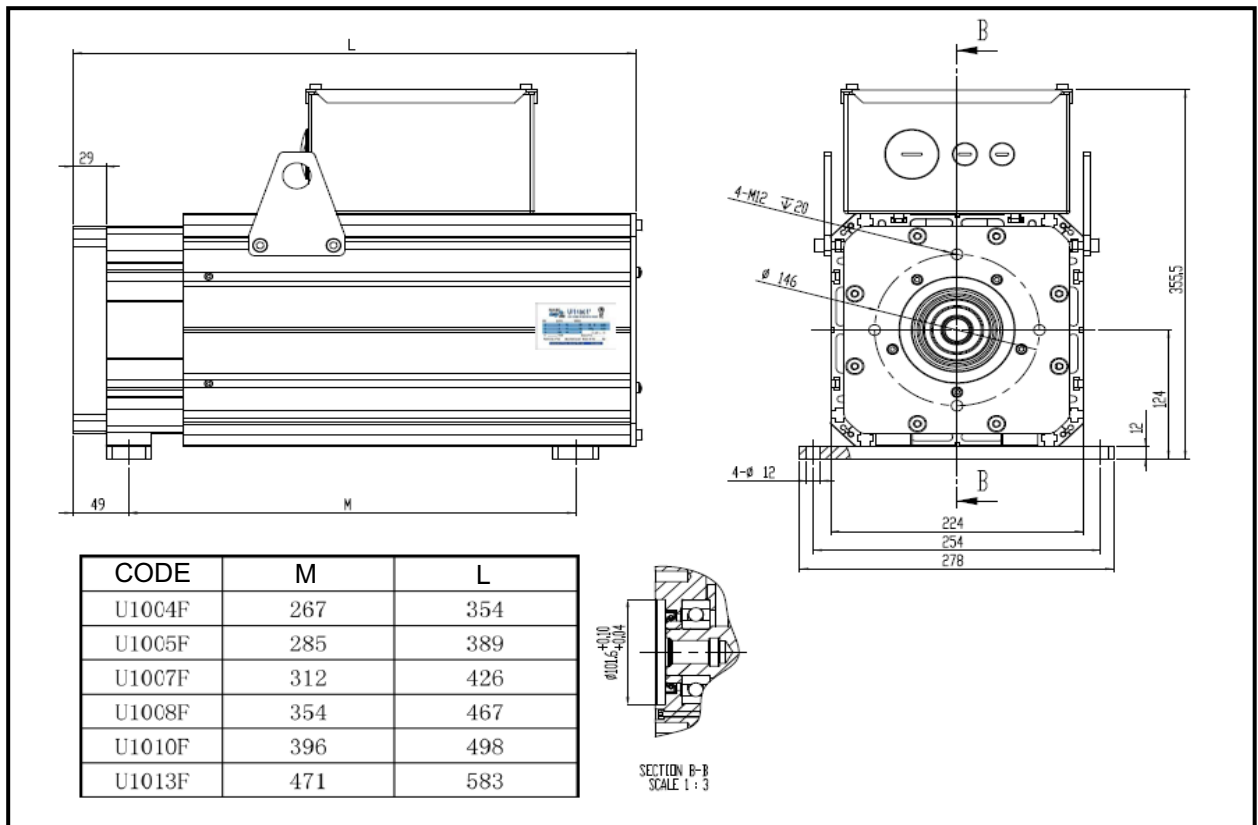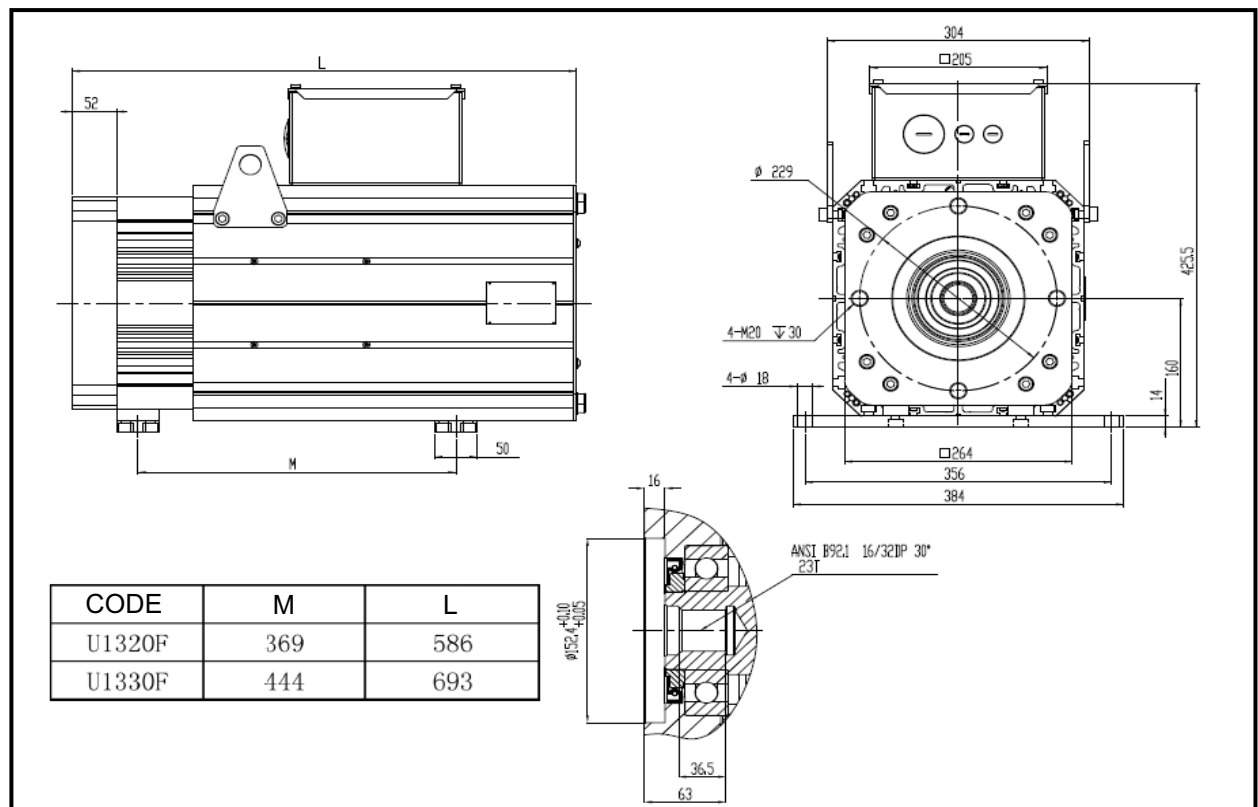
Example for Motor and Pump Selection

TABLE 4

Standard 140KG norms			
Applicable models	Pump specifications (cc)	Maximum flow (L/min)	Motor types
72T	32	● 64	U1005F.15.3
98T	40	● 80	U1007F.15.3
128T	45	90	U1007F.15.3
158T	40	● 100	U1007F.20.3
158T	45	112	U1007F.20.3
168T	50	● 125	U1008F.20.3
200T	63	◉ 145	U1010F.18.3
250T	80	● 175	U1013F.17.3
280T	100	● 210	U1013F20.3
420T	125	301	U1015F.20.3

TABLE 5

| Standard 175KG norms			
Applicable models	Pump specifications (cc)	Maximum flow (L/min)	Motor types
72T	32	61	U1007F.15.3
98T	40	77	U1007F.15.3
128T	45	86	U1007F.15.3
168T	50	120	U1008F.20.3
200T	63	139	U1010F.18.3
250T	75	166	U1013F.17.3
280T	90	217	U1015F.20.3
420T	125	300	U1320F.20.3
450T	145	350	U1330F.20.3

MOTOR INSTALL SPECIFICATION

Adopt Coupler: Follow is installation step

1. Put coupler into oil or oven and heat up to 200℃;

2. Put coupler on motor's shaft(Careful the coupler because of high temparature);

3. After installation,Please check shaft and coupler 's axiality or verticalty.

Adopt Spline to link:

1.Ensure pump and motor mounting interface clean.

2.Upright the motor shaft to perpendicular to the level foundation surface. (See Picture 1)

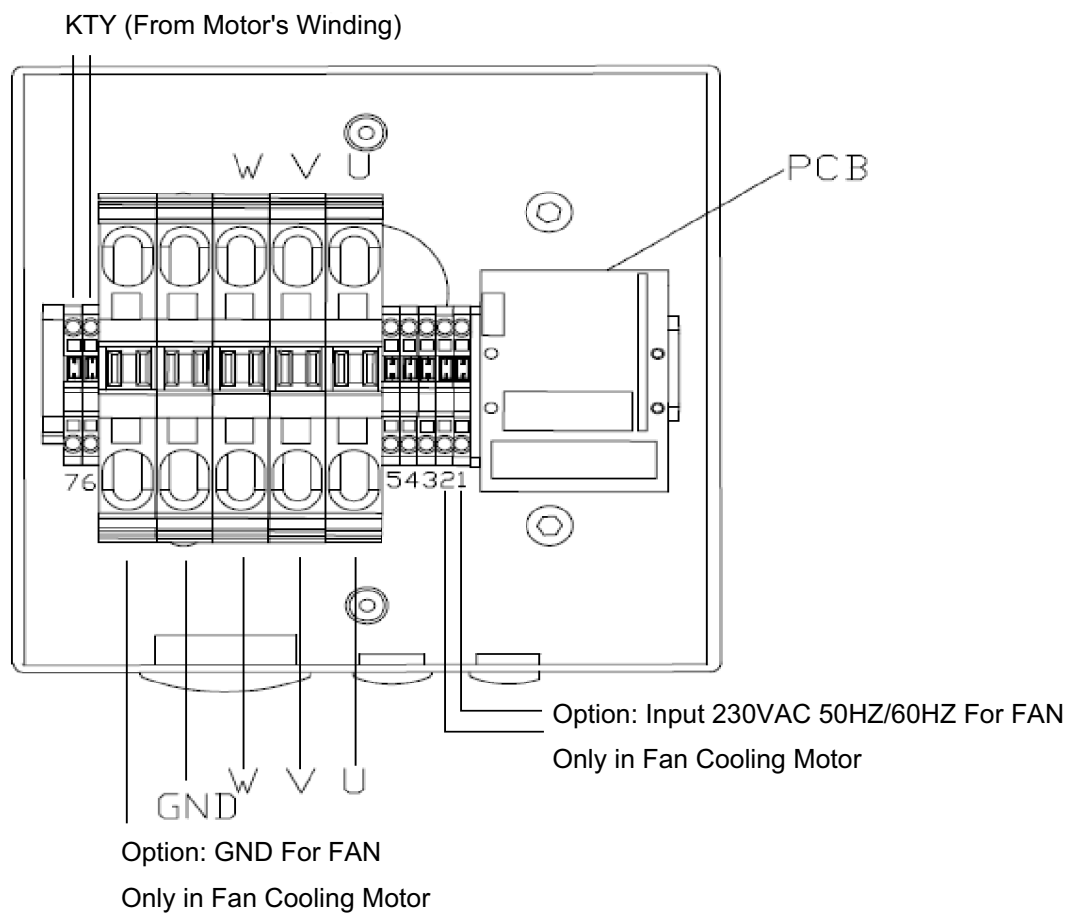3.Apply high-temperature grease to the spline of pump and motor evenly.
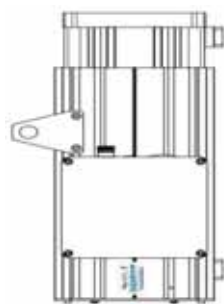
Picture 1

Picture 2
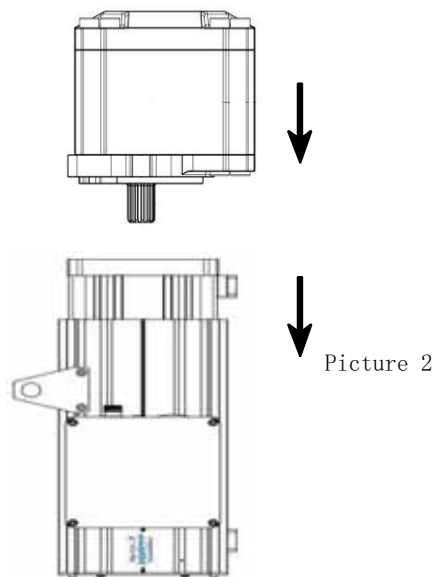
4.Downward insert the pump shaft into the motor spline shaft. Keep mounting smoothly, put down the

pump slowly till it fits to the motor's mounting surface. If the pump couldn't fit to the motor's abutted

surface, please pull out the pump and turn a direction remounting it. (See Picture 2)

5.Finally choose the right type of screw and gasket to fix the pump and motor.

Electrical connection instrutions

1) Power Section

KTY (From Motor's Winding)

W V U

PCB

76   54321

Option: Input 230VAC 50HZ/60HZ For FAN
Only in Fan Cooling Motor

GND W V U

Option: GND For FAN
Only in Fan Cooling Motor

NOTE:

(1) Driver's output U/V/W/GND connect to motor's input U/V/W/GND.

(2) U10F serial fan cooling motor:Power for fan=51KW/53KW,Current=0.29A/0.33A,
Voltage=220VAC.

(3) U13F serial fan cooling motor:Power for fan=135KW/200KW,Current=0.6A/0.88A,
Voltage=220VAC.

(4) When we use thermal switch(85ÿ),it will be closed at 85±5ÿ(Winding temparature)
 and fan can work well.

(5) Fan will be work immeditaly when power on and without thermal switch.
All the real product.

2) Signal Section

The motor which used in servo system main adopt resolver encoder.And follow is definition for encoder:

TABLE 6 Definition For PCB Board

The PCB pins number	Resolver	Digital incremental encoder
1	Resex+	+Vcc
2	Resex-	0V
3	Sin+	V -
4	Sin-	V+
5	Cos+	U+
6	Cos-	U -
7	--	A+
8	--	A -
9	--	Z -
10	--	Z+
11	--	W+
12	--	W-
13	--	B -
14	--	B+
15	PTC+（Output）	PTC+（Output）
16	PTC-（Output）	PTC- （Output）
17	PTC+（Input ）	PTC+ （Input）
18	PTC- （Input ）	PTC- （Input）

TABLE 7 Definition For Signal Connector

Aviation socket pins number	Resolver	Digital incremental encoder
1	--	+Vcc
2	--	0V
3	--	V -
4	Sin-	V+
5	Cos+	U+
6	Cos-	U -
7	Resex+	A+
8	KTY+	A -
9	KTY-	Z -
10	Resex-	Z+
11	--	W+
12	--	W-
13	--	B -
14	Sin+	B+
15	--	PTC+
16	PTC+	PTC-/KTY-
17	PTC−	KTY+

Note:
Table 6: Motor adopts PCB wiring,convenient to connect.
Table 7: Customer can choose aviation socket connection,ensure to purchase the corresponding aviation socket use special crimpling pliers to press the pins.

PHASE
MOTION CONTROL

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