

Laifual



ROTARY ACTUATORS

➤ ONE AND FOR ALL

HIGH VOLTAGE

Zhejiang Laifual Drive Co., Ltd.
www.laifualgroup.com

Preface

- Thank you very much for using our high-voltage series products.
- Incorrect operation and improper use of this product may lead to accidents and shorten the product's lifespan. To ensure long-term and safe use of this product, please read this manual carefully before use.
- Our company reserves the right to change the contents of this manual without notice.
- Company names and product names mentioned in this manual are generally registered trademarks or trademarks of their respective companies.
- Please keep this manual properly. Make sure to deliver this manual to the end user.

Safety Precautions for Safe Use

To ensure the safe and correct use of this product, please read the "Safety Precautions for Safe Use" and the main text thoroughly before use, and fully understand the contents.

Symbol Explanation

The safety-related warnings provided here are important. Please be sure to follow them diligently.

 Warning	Indicates that incorrect operation may result in death or serious injury.
 Caution	Indicates that incorrect operation may result in injury or property damage.
Warning	Indicates measures that should be taken or avoided to prevent malfunction, incorrect operation, or severe impact on the product's performance and functionality.

Usage Restrictions

This product is not recommended for the following applications. If necessary, please consult with our company in advance.

· Aerospace equipment · Aircraft equipment · Nuclear equipment · Vacuum equipment · Automotive equipment · Gaming facilities · Equipment directly affecting the human body · Household equipment and appliances · Equipment intended for transporting people · Equipment for special environments
--

Precautions for Using Actuators

● Design Precautions

 Caution	Please use within the specified environment. Actuators are designed for indoor use. Please adhere to the following conditions: ● Operating temperature: 0~40 °C / Storage temperature: -20~60 °C ● Ambient humidity: 20~80 %RH(non-condensation) ● Vibration: below 25m/s² ● No exposure to water, oil, etc. ● No corrosive or explosive gases Please install using the specified method. ● Ensure accurate centering of the actuator and the passive machinery as per the technical documentation. ● Misalignment may cause vibration and damage to the output shaft. ●
--	--

● Usage Precautions

 Warning	Do not exceed the permissible torque. ● The applied torque should not exceed the maximum torque. ● When attaching mechanical arms or similar directly to the output shaft, avoid collisions as they can render the output shaft uncontrollable. Do not plug directly into an outlet. ● The actuator will not operate without connecting to a dedicated driver. ● Direct connection to commercial power sources must be strictly avoided to prevent actuator damage and fire hazards. Do not strike the actuator. ● The actuator is directly connected to an encoder; do not strike with tools such as mallets. ● Damage to the encoder can cause the actuator to become uncontrollable. Do not pull on the wires. ● Pulling on the wires can damage the connections, leading to actuator malfunction.
--	--

Disposal Instructions

 Caution	Please dispose of this product according to industrial waste disposal standards. When discarding the product, disassemble it as much as possible. Components with material markings should be sorted according to the markings and disposed of following industrial waste standards.
--	---

Catalogue

Preface	2
Safety Precautions for Safe Use	3
Symbol Explanation	3
Usage Restrictions	3
Precautions for Using Actuators	4
● Design Precautions	4
● Usage Precautions	4
Disposal Instructions	5
Chapter1 Overview	1
Chapter 2: Model Naming Rules	2
Chapter 3: Performance Specifications	3
Chapter 4: Dimensions	9
M-90-XX	9
M-110-XX	9
M-142-XX	10
M-170-XX	10
Chapter 5: Mechanical Accuracy	10
Chapter 6: Encoder Specifications	12
Specifications	12
Output Shaft Resolution	12
Absolute Position Data	13
Chapter 7: Environment and Installation	14
Operating Environment	14
Installation Steps	14
Chapter8: Wiring Specifications	16
Motor Wire Specifications	16
Encoder Wire Specifications	17
Chapter 9: Commissioning and Operation	19
Debugging Process	19
Pre-Run Inspection	19
Power on	20
Parameter Settings	20

Chapter1:Overview

The high-voltage series comprises servo rotary modules that deliver high torque and precise rotational movements. These modules are composed of LHG-type reducers, motors, and encoders, available in models ranging from 14 to 40.

These products are widely used in the following fields:CNC machine tools,Laser processing,Electronics and semiconductors,Factory automation,Medical devices,Robotics,Logistics automation,Solar photovoltaic systems,LED equipment,Testing devices,Printing machinery,Precision measuring instruments,Aerospace equipment,Aircraft-related applications,FPD (Flat Panel Display) manufacturing equipment. Advantages:

Power Supply Voltage

- AC220V

Excellent Environmental Adaptability

- IP54 protection rating
- Compliance with neutral salt spray requirements
- Operating temperature: 0~40 °C / Storage temperature: -20~60 °C
- Alternating damp heat

Multi-brand Driver Compatibility

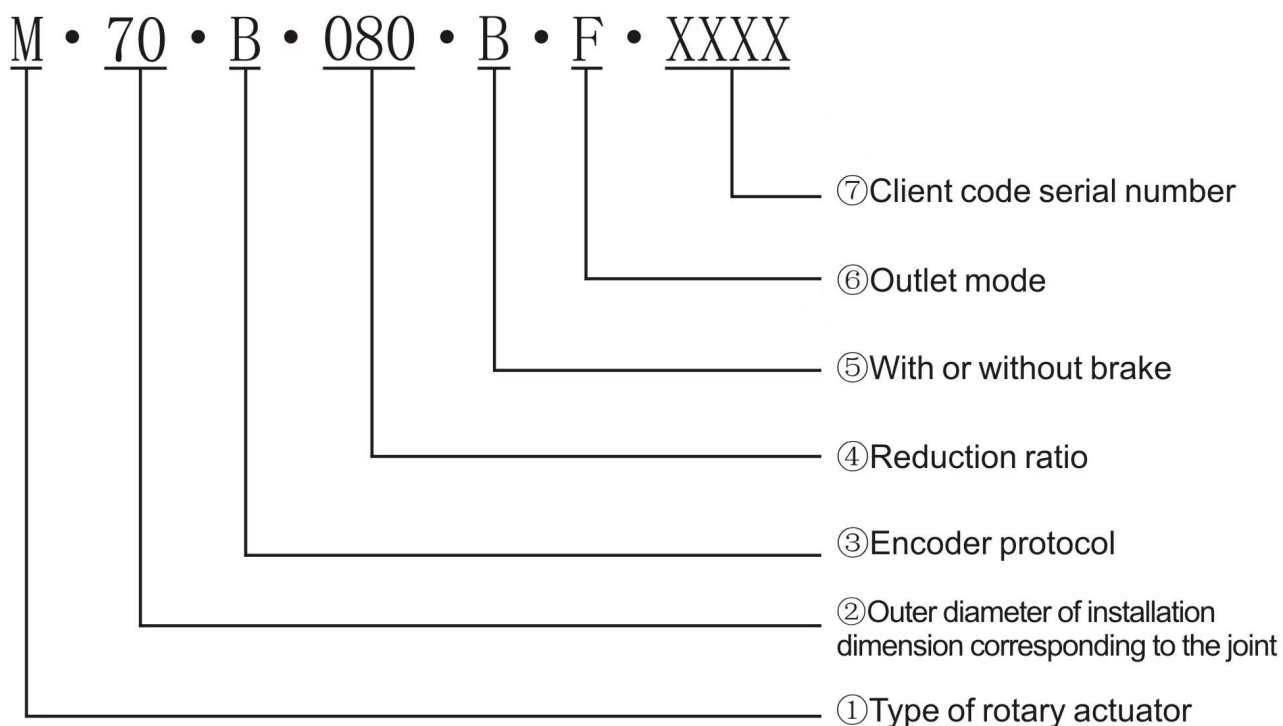
Highly Integrated Product Design

- Combines harmonic reducer, motor, encoder, and driver
- Extra-large hollow hole for easy wiring, piping, and laser routing
- Flange mounting structure

Outstanding Product Performance

- More than 20% torque increase in the same volume
- Excellent dynamic performance with very low noise and vibration
- Maintenance-free throughout the entire usage period
- Ultra-high product precision

Chapter 2: Model Naming Rules



Rule Description:

① Module Category:

M: High Voltage Module

② Joint mounting Outer Diameter:

I Series	70: Joint 70	80: Joint 80	90: Joint 90
	110: Joint 110	142: Joint 142	170: Joint 170

③ Encoder Protocol

B: BISS-C protocol D: TAMAGAWA protocol

④ Ratio

030: 31:1	050: 51:1	080: 81:1
100: 101:1	120: 121:1	160: 161:1

⑤With or Without brake

B: Brake	F: Without Brake
----------	------------------

⑥Wiring Method

F: Frontal Cable outlet	S: Side Cale outlet
-------------------------	---------------------

⑦Customer and Serial number:

XXXX: Customised products only

Chapter 3: Performance Specifications

The performance specifications of the high voltage series modules are as follows:

Model			M90			
Ratio			50	80	100	120
Input Voltage	V		220 (±10%)			
Maximum Torque	N · m		127	165	191	191
	kgf · m		12.96	16.83	19.49	19.49
Average Load Torque	N · m		44	61	64	64
	kgf · m		4.49	6.22	6.53	6.53
Peak Starting Torque	N · m		73	96	107	113
	kgf · m		7.45	9.79	10.92	11.53
Maximum Speed	r/min		118	75	60	50
Rated Speed	r/min		59	37	30	25
Torque Constant	N · m/A		0.40	0.40	0.40	0.40
	kgf · m/A		0.041	0.041	0.041	0.041
Maximum Current	A		5.17	4.28	3.82	3.37
Permissible Continuous Current	A		3.11	2.72	2.29	1.91
Back EMF Constant	V/Krpm		26.72			
Phase Resistance(20℃)	Ω		1.56			
Phase Inductance	mH		3.67			
Moment of Inertia	GD ² /4	kg · mm ²	116			
	J	kgf · cm · s ²	116*10 ⁻⁴			
Repetability ^{*1}	Arc-sec		20			
Positioning Accuracy ^{*2}	Arc-sec		60			
Encoder Communication Protocol	/		BISS/TAMAGAWA			

Encoder Communication Interface	/	BISS-C/TAMAGAWA			
Encoder Resolution	Single-turn Detector	17bit (131072pulses per revolution)			
	Multi-turn Detector	16bit (-32768~32767turns)			
Output Shaft Resolution	Pulses per revolution	6684672	10616832	13238272	15859712
Mass	kg	1.9KG			
Ambient Conditions		Operating Temperature: 0~40 °C/Storage Temperature: -20~60 °C			
		Operating/Storage Humidity: 20 - 80% RH (non-condensing)			
		Vibration Resistance: 25m/s ² (Frequency: 10~400Hz)			
		Shock Resistance: 300 m/s ²			
		No dust, metal powder, corrosive gases, flammable gases, or oil mist			
		Indoor use, avoid direct sunlight			
		Altitude below 1000m			
Design Life (H)		10000	15000	15000	15000
Motor Insulation		Insulation Resistance: Above 500 MΩ(DC500 V)			
		Withstand Voltage: AC1500 V/1 min			
		Insulation Class: F Class (155°C)			
Installation Direction		Can be installed in all directions			
Protection Level		Totally enclosed, self-cooling type(IP54)			

Model		M110			
Ratio		50	80	100	120
Input Voltage	V	220 (±10%)			
Maximum Torque	N · m	242	332	369	395
	kgf · m	24.69	33.88	37.65	40.30
Average Load Torque	N · m	72	113	140	140
	kgf · m	7.34	11.5	14.29	14.29
Peak Starting Torque	N · m	127	178	204	217
	kgf · m	12.95	18.16	20.82	22.14
Maximum Speed	r/min	110	70	56	47
Rated Speed	r/min	60	37	30	25
Torque Constant	N · m/A	0.44	0.44	0.44	0.44
	kgf · m/A	0.045	0.045	0.045	0.045
Maximum Current	A	8.15	7.19	6.61	5.87
Permissible Continuous Current	A	4.62	4.57	4.54	3.79
Back EMF Constant	V/Krpm	27.51			
Phase Resistance(20	Ω	0.51			

℃)					
Phase Inductance	mH				1.75
Moment of Inertia	GD ² /4	kg · mm ²			280
	J	kgf · cm · s ²			280*10 ⁻⁴
Repetability ^{*1}	Arc-sec				20
Positioning Accuracy ^{*2}	Arc-sec				60
Encoder Communication Protocol	/				BISS/TAMAGAWA
Encoder Communication Interface	/				BISS-C/TAMAGAWA
Encoder Resolution	Single-turn Detector				17bit (131072pulses per revolution)
	Multi-turn Detector				16bit (-32768~32767turns)
Output Shaft Resolution	Pulses per revolution	6684672	10616832	13238272	15859712
Mass	kg				3.5KG
Ambient Conditions		Operating Temperature: 0~40 ℃/Storage Temperature: -20~60 ℃ Operating/Storage Humidity: 20 - 80% RH (non-condensing) Vibration Resistance: 25m/s ² (Frequency: 10~400Hz) Shock Resistance: 300 m/s ² No dust, metal powder, corrosive gases, flammable gases, or oil mist Indoor use, avoid direct sunlight Altitude below 1000m			
Design Life (H) (H)		10000	15000	15000	15000
Motor Insulation		Insulation Resistance: Above 500 MΩ (DC500V) Withstand Voltage: AC1500 V / 1 min Insulation Class: F Class (155℃)			
Installation Direction		Can be installed in all directions			
Protection Level		Totally enclosed, self-cooling type(IP54)			

Model		M142			
Ratio		50	80	100	120
Input Voltage	V	220 (±10%)			
Maximum Torque	N · m	497	738	841	892
	kgf · m	50.71	75.30	85.82	91.02
Average Load Torque	N · m	140	217	281	281
	kgf · m	14.29	22.14	28.67	28.67
Peak Starting Torque	N · m	281	395	433	459
	kgf · m	28.67	40.30	44.18	46.84
Maximum Speed	r/min	95	60	48	40

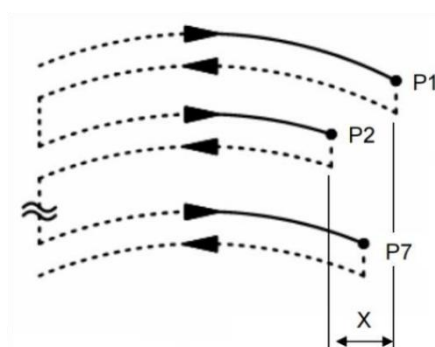
Rated Speed		r/min	60	37	30	25
Torque Constant		N ·m/A	0.59	0.59	0.59	0.59
		kgf ·m/A	0.006	0.006	0.006	0.006
Maximum Current		A	10.94	9.68	8.51	7.53
Permissible Continuous Current		A	5.45	5.32	5.52	4.61
Back EMF Constant		V/Krpm	42.1			
Phase Resistance(20℃)		Ω	0.46			
Phase Inductance		mH	2.5			
Moment of Inertia	GD²/4	kg ·mm²	680			
	J	kgf ·cm ·s²	680*10 ⁻⁴			
Repetability*¹		Arc-sec	20			
Positioning Accuracy*²		Arc-sec	60			
Encoder Communication Protocol		/	BISS/TAMAGAWA			
Encoder Communication Interface		/	BISS-C/TAMAGAWA			
Encoder Resolution		Single-turn Detector	17bit (131072pulses per revolution)			
		Multi-turn Detector	16bit (-32768~32767turns)			
Output Shaft Resolution		Pulses per revolution	6684672	10616832	13238272	15859712
Mass		kg	6.5KG			
Ambient Conditions			Operating Temperature: 0~40 ℃/Storage Temperature: -20~60 ℃ Operating/Storage Humidity: 20 - 80% RH (non-condensing) Vibration Resistance: 25m/s²(Frequency: 10~400Hz) Shock Resistance: 300 m/s² No dust, metal powder, corrosive gases, flammable gases, or oil mist Indoor use, avoid direct sunlight Altitude below 1000m			
Design Life (H)			10000	15000	15000	15000
Motor Insulation			Insulation Resistance: Above 500 MΩ(DC500 V) Withstand Voltage: AC1500 V/1 min Insulation Class: F Class (155℃)			
Installation Direction			Can be installed in all directions			
Protection Level			Totally enclosed, self-cooling type(IP54)			

Model	M170			
Ratio	50	80	100	120

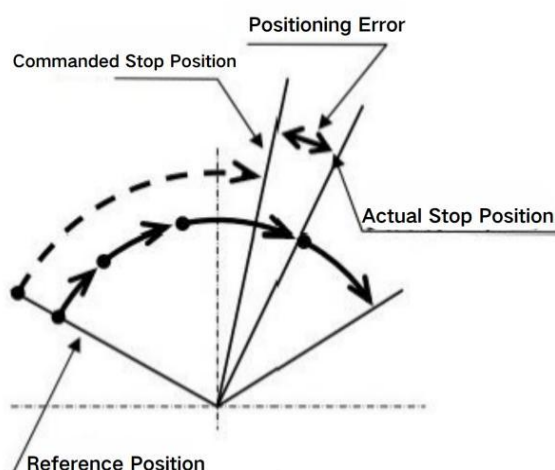
Input Voltage	V	220 (±10%)			
Maximum Torque	N · m	892	1270	1400	1530
	kgf · m	91.02	129.59	142.85	156.12
Average Load Torque	N · m	255	369	484	586
	kgf · m	26.02	37.65	49.38	59.79
Peak Starting Torque	N · m	523	675	738	802
	kgf · m	53.36	68.87	75.30	81.83
Maximum Speed	r/min	80	50	40	33
Rated Speed	r/min	40	25	20	17
Torque Constant	N · m/A	0.72	0.67	0.67	0.67
	kgf · m/A	0.073	0.068	0.068	0.068
Maximum Current	A	20.49	17.82	15.62	14.17
Permissible Continuous Current	A	9.99	9.74	10.24	10.35
Back EMF Constant	V/Krpm	53.7			
Phase Resistance(20℃)	Ω	0.298			
Phase Inductance	mH	0.99			
Moment of Inertia	GD ² /4	1819.4			
	J	1819.4*10 ⁻⁴			
Repetability ^{*1}	Arc-sec	20			
Positioning Accuracy ^{*2}	Arc-sec	60			
Encoder Communication Protocol	/	BISS/TAMAGAWA			
Encoder Communication Interface	/	BISS-C/TAMAGAWA			
Encoder Resolution	Single-turn Detector	17bit (131072pulses per revolution)			
	Multi-turn Detector	16bit (-32768~32767turns)			
Output Shaft Resolution	Pulses per revolution	6684672	10616832	13238272	15859712
Mass	kg	8.3KG			
Ambient Conditions		Operating Temperature: 0~40℃/Storage Temperature: -20~60℃			
		Operating/Storage Humidity: 20 - 80% RH (non-condensing)			
		Vibration Resistance: 25m/s ² (Frequency: 10~400Hz)			
		Shock Resistance: 300 m/s ²			
		No dust, metal powder, corrosive gases, flammable gases, or oil mist			
		Indoor use, avoid direct sunlight			
		Altitude below 1000m			
Design Life (H)		10000	15000	15000	15000

Motor Insulation	Insulation Resistance: Above 500 MΩ(DC500 V) Withstand Voltage: AC1500 V/1 min Insulation Class: F Class (155°C)
Installation Direction	Can be installed in all directions
Protection Level	Totally enclosed, self-cooling type(IP54)

*1Repetability: Refers to the precision with which the output shaft can return to a specific position after performing seven repeated positioning operations from the same direction. This measurement is taken at four different positions on the output shaft, and the maximum difference among these positions is calculated.



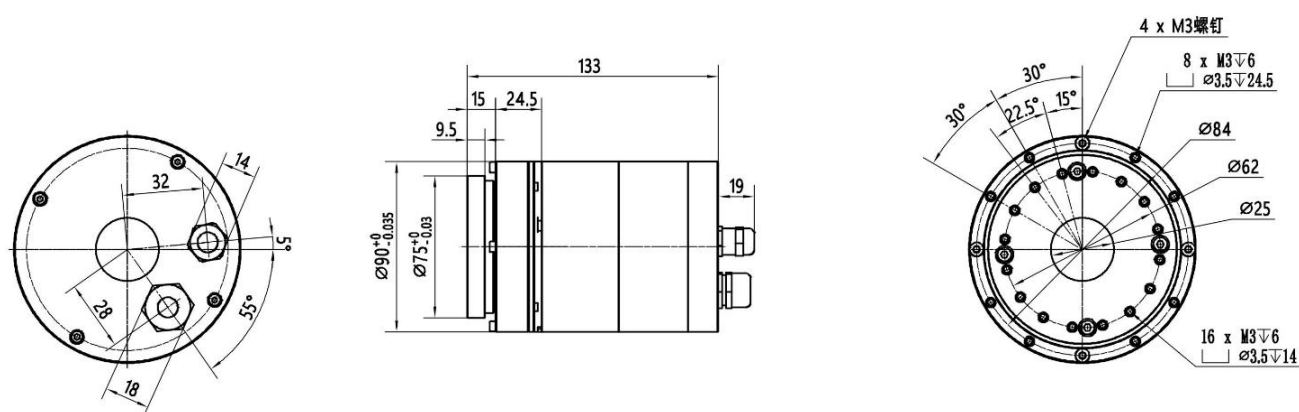
*2Positioning Accuracy: Refers to the precision of positioning in a fixed rotational direction. At each position, the difference between the actual rotational angle and the intended rotational angle relative to a reference position is calculated. The maximum value of these differences within one full rotation is then recorded.



Chapter 4: Dimensions

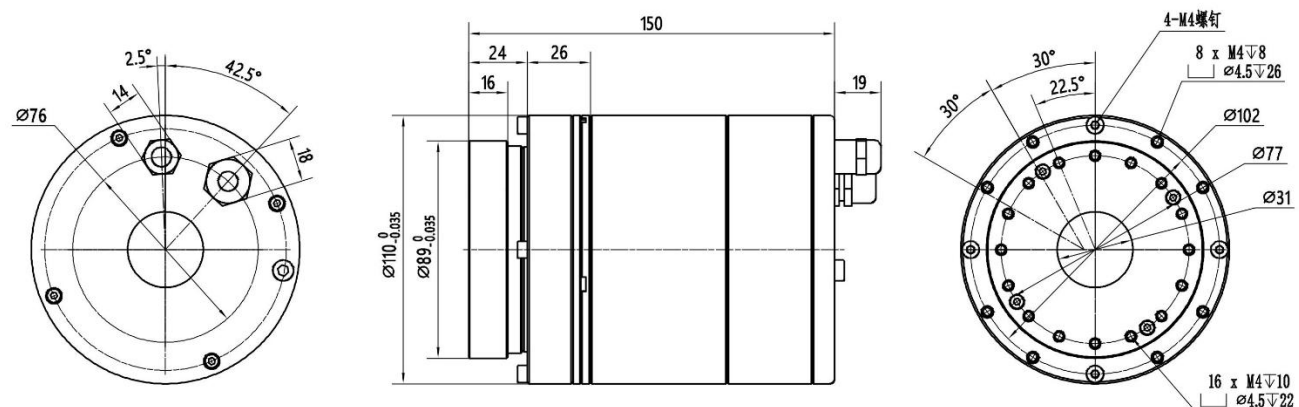
M-90-XX

Unit: mm



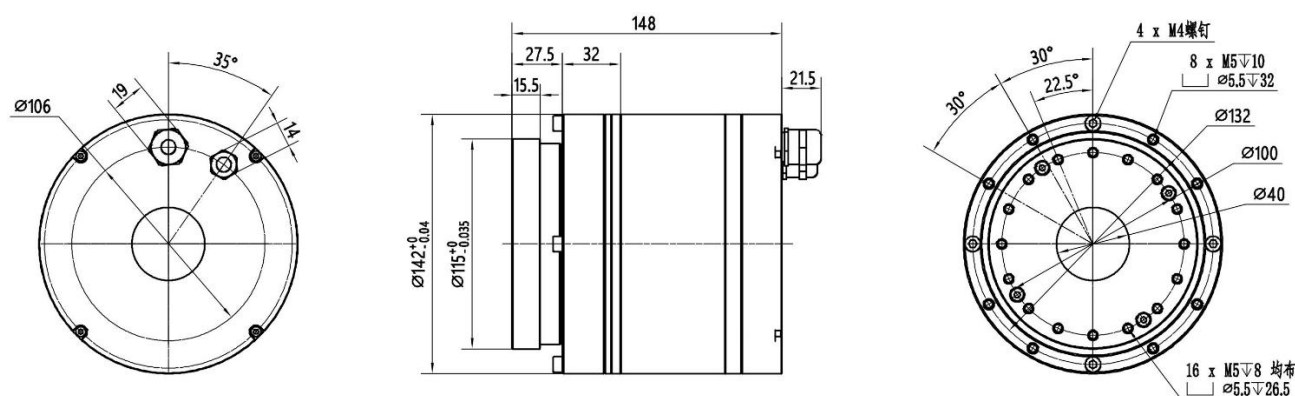
M-110-XX

Unit: mm



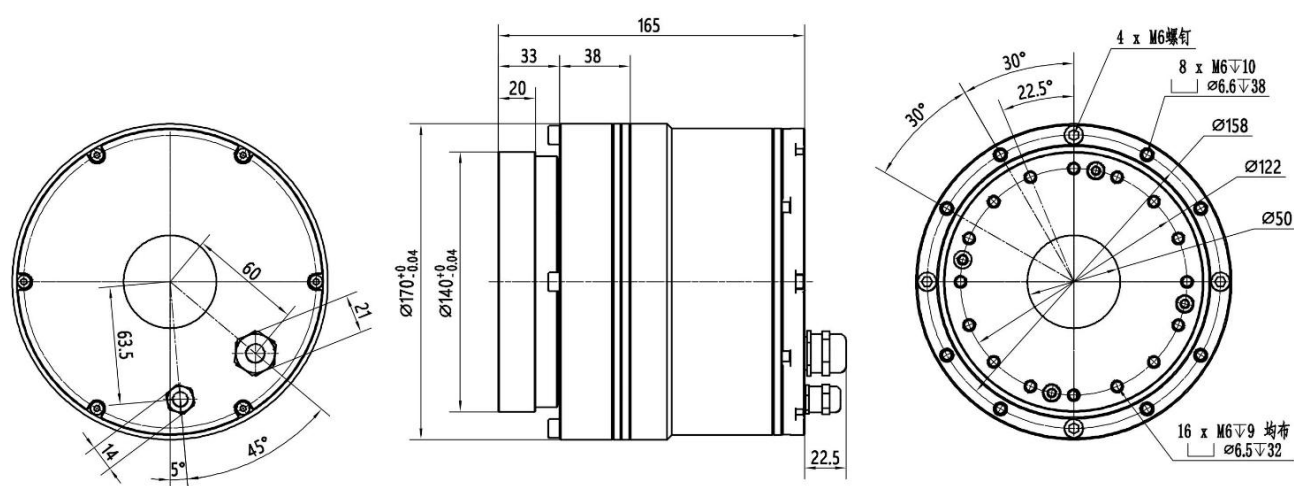
M-142-XX

Unit: mm



M-170-XX

Unit: mm



Note: Please refer to the confirmation drawings or contact us to obtain information about the dimensional tolerances not shown.

Chapter 5: Mechanical Accuracy

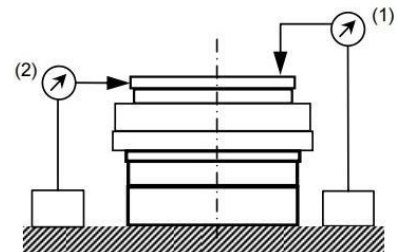
The mechanical accuracy of the output shaft and mounting flange for the high-voltage series modules is as follows:

Accuracy Items	M90	M110	M142	M170
1. Output Shaft End Deviation	0.015	0.015	0.015	0.015
2. Output Shaft Runout	0.02	0.02	0.02	0.02
3. Parallelism between Output Shaft and Mounting Surface	0.050	0.050	0.050	0.050
4. Coaxiality between Output Shaft and Mounting Fitting	0.050	0.050	0.050	0.050

Measurement Methods:

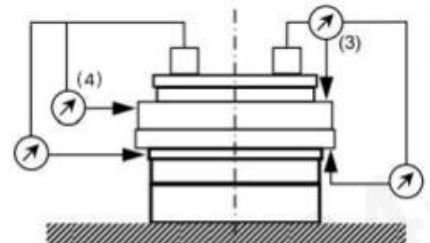
Output Shaft End Deviation

Measure the axial deviation (maximum amplitude) of the outermost circumference of the output shaft during one full rotation using an indicator fixed in place.



Output Shaft Runout

Measure the radial deviation (maximum amplitude) of the output shaft during one full rotation using an indicator fixed in place.



Parallelism between Output Shaft and Mounting Surface

Measure the axial deviation (maximum amplitude) of the outermost circumference of the mounting surface (both the output shaft side and the opposite side) during one full rotation using an indicator installed on the rotating part of the output.

Coaxiality between Output Shaft and Mounting Fitting

Measure the radial deviation (maximum amplitude) of the mounting fitting (both the output shaft side and the opposite side) during one full rotation using an indicator installed on the rotating part of the output.

Chapter 6: Encoder Specifications

The built-in encoder in the high-voltage series is a multi-turn absolute encoder capable of recording absolute positions and absolute rotation counts. It consists of a single-turn detector (17-bit) for detecting the motor shaft's rotational position and a multi-turn detector (16-bit) for detecting the number of rotations.

This encoder continuously detects the mechanical absolute position, regardless of the power ON/OFF status of the driver and external controller, and utilizes battery backup for data preservation. As long as the origin positioning is performed during mechanical installation, there is no need for origin resetting upon each power-up. It is also easy to restore after power outages or malfunctions.

The encoder currently supports both BISS-C and TAMAGAWA communication protocols.

Specifications

Type	Magnetic sensor / electronic battery backup system
Single-turn Detector	2 ¹⁷ :131072pulses
Multi-turn Detector	2 ¹⁶ :65536(-32768~32767)
Maximum Permissible Encoder Speed	7000 r/min ^{*1}
Safety and Redundancy	Matching detection method based on dual single-turn detectors Matching detection method based on dual cumulative rotation counters
External Battery Backup Duration	5years (when not powered) ^{*2}

^{*1}:The maximum speed at which the encoder can rotate, which is distinct from the speed at which the motor can drive.

^{*2}:This value applies when the motor shaft is not moving. If the shaft rotates frequently while the system is unpowered, the external battery will deplete more quickly

Output Shaft Resolution

Encoder Resolution		17bit(2 ¹⁷ :131072pulses)			
Ratio		1:51	1:81	1:101	1:121
Output Shaft Resolution	Pulses per revolution	6684672	10616832	13238272	15859712
Single Pulse Angle	seconds	Approx.0.2	Approx.0.12	Approx.0.1	Approx.0.082

Absolute Position Data

'Absolute Position': Refers to the absolute position within one rotation of the motor shaft.

'Multi-turn Rotation': Indicates the number of rotations of the motor.

The position of the output shaft of the transmission device can be calculated using the following formula:

Transmission Device Output Shaft Position=(Absolute Position+Multi-turn Rotation Data×Encoder Resolution)÷Reduction Ratio.

Chapter 7: Environment and Installation

Operating Environment

The operating conditions for the high-voltage series modules are as follows:

- **Operating Temperature: 0-40° C**

The temperature inside the cabinet may be higher than the ambient temperature, depending on the power dissipation of the enclosed equipment and the size of the cabinet. Plan the cabinet size, cooling system, and equipment placement to ensure the ambient temperature remains at or below 40° C

- **Operating Humidity: 20%-80%**

Ensure no condensation. Note that condensation may occur with significant day-to-night temperature changes or frequent starting and stopping of actuators.

- **Vibration: 24.5 m/s² (2.5G) (10-400Hz)**

The module cannot operate in applications subjected to continuous shock.

- **Operating Environment:** No dust, condensation, metal powder, corrosive gases, water, oil mist, etc
- **Protection Rating:** IP54
- **Altitude:** Below 1000 meters
- **leakage Measures:** Oil seals in rotating and sliding areas cannot completely prevent lubricant Leakage. If the actuator is used in clean rooms or similar environments, additional oil leakage prevention measures should be provided.
- **Installation Location:** Should be installed indoors or in protected outdoor areas, avoiding direct exposure to sunlight.。

Installation Steps

When installing the module, do not hit the module with a hammer. The module's reducer is a precision mechanism, and the module is equipped with an encoder. Excessive impact may damage the reduction mechanism and the encoder.

1.Align the Module Output and Load Shaft Precisely.

Note: Perform this alignment carefully, especially when using rigid couplings. Even slight misalignment can cause the actuator to exceed the allowable load, leading to damage to the output shaft.

Use flat washers and high-strength bolts to secure the module flange to the load side. Tighten them with a torque wrench to ensure proper tightening torque. The recommended tightening torques are listed in the table below.

Module Item		M90		M110		M142		M172	
		Output Shaft	Flange	Output Shaft	Flange	Output Shaft	Flange	Output Shaft	Flange
Tightening Torque	Bolt Specification	M3	M3	M4	M4	M5	M5	M6	M6
	Hole Depth	20	30	32	34	34	42	40	48
	N*m	1.5	1.5	3	3	6	6	10	10
	Kgf*cm	15.3	15.3	30.6	30.6	61.2	61.2	102	102

3、Connect the Motor Power Lines and Encoder Cables Correctly

Do not pull on the cables forcefully to avoid damaging the terminals at the connections.

Ensure the cables are slack to prevent tension on the module.

When bending the cables, provide a sufficient bending radius ($R=40\text{mm}$ or more) to prevent cable breakage due to excessive bending.

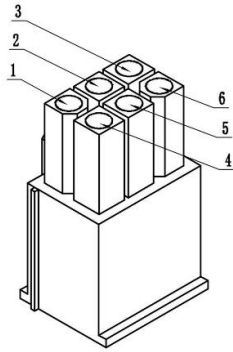
Chapter 8: Wiring Specifications

The motor wire and encoder wire specifications for the high-voltage series modules are as follows.

Model:M90, M110, M142, M170

PIN No.	Wire Color	Type
		With Brake
1	Brown	Motor U Phase
2	Gray	Motor V Phase
3	Purple	Motor W Phase
4	Orange	PE
5	White	BK+
6	Blue	BK-

Connector PIN Arrangement



Connector Model(MOLEX): HX41405-6P

PIN Model(MOLEX):

	Model20、25、32、40
MotorUVW	HX41406-6R/RT
Brake	/
MotorPE	HX41406-6R/RT

Encoder Wire Specifications

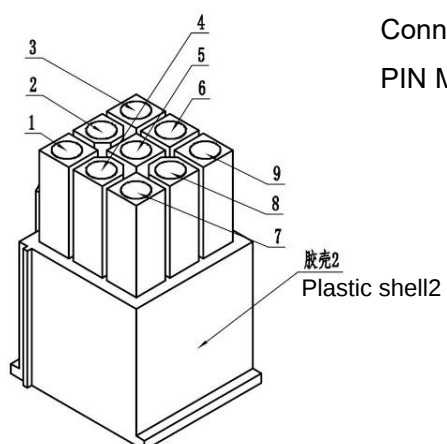
Biss Protocol Encoder Wire Definition

PIN No.	Wire Color	Signal Name	Note
1	Purple	SL+	BISS Communication Positive
2	Gray	Power-	Power Input 0V (GND)
3	Brown	Power+	Power Input 5V Positive
4	Blue	MA+	Clock Positive
5	Yellow	MA-	Clock Negative
6	Orange	SL-	BISS Communication Negative
7	Thick Black	Shield	Shield
8	Black	Battery-	Battery Negative
9	Red	Battery+	Battery Positive

TAMAGAWA Protocol Encoder Wire Definition

PIN No.	Wire Color	Signal Name	Note
1	Brown	485+	Data Communication Positive
2	Black	Power-	Power Input 0 V(GND)
3	Red	Power+	Power Input 5 V Positive
4	/	/	/
5	/	/	/
6	White	485-	DataCommunicationNegative
7	Shield	Shield	Shield
8	Purple	Battery-	BatteryNegative
9	Orange	Battery+	BatteryPositive

Connector PIN Arrangement



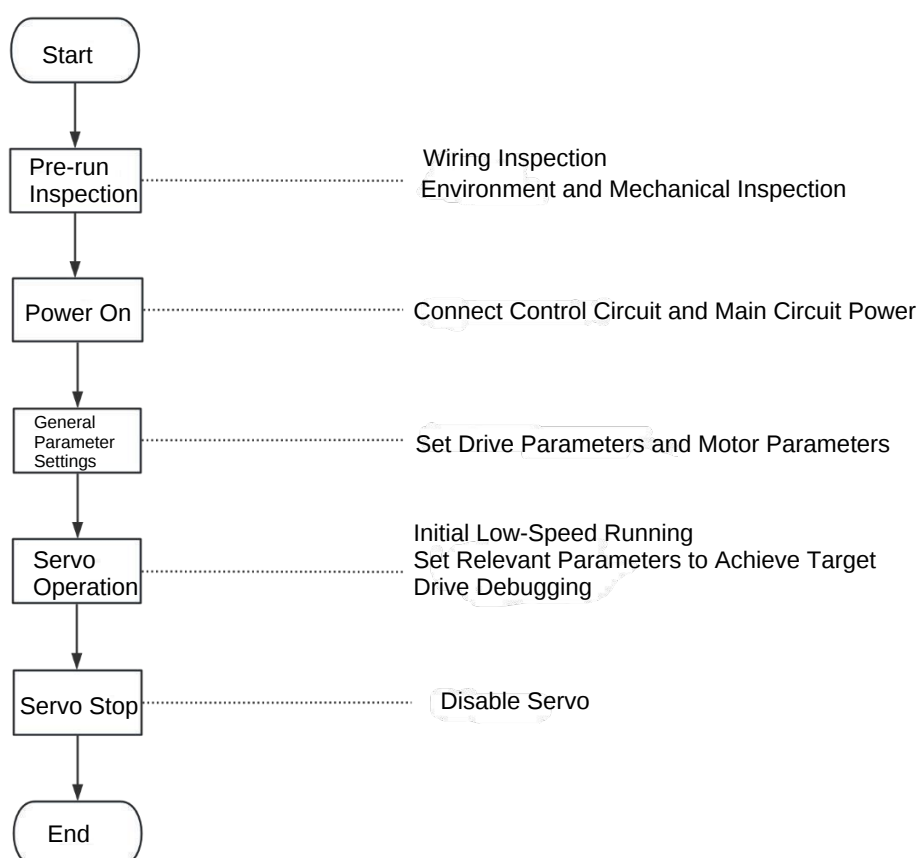
Connector Model (MOLEX): HX41405-9P

PIN Model(MOLEX): HX41405-9R/RT

Chapter 9: Commissioning and Operation

The Drive brand of this time high voltage series is Servotronix.

Debugging Process



Pre-Run Inspection

Before operating the servo drive and module, the following checks must be performed: :

No.	Content
	Wiring

1	The power input terminals of the servo drive (L1C, L2C, L1, L2, L3) must be correctly connected.
2	The servo drive output terminals (U, V, W) and the main power cable of the servo motor (U, V, W) must be in the correct phase and properly connected.
3	The power input terminals (L1C, L2C, L1, L2, L3) and the main circuit output terminals (U, V, W) of the servo drive must not be short-circuited.
4	All control signal cables of the servo drive must be correctly wired, and external signal lines such as brake and over-travel protection must be reliably connected.
5	The servo drive and module must be properly grounded.
6	All cables must be subjected to stress within the specified limits.
7	Wiring terminals must be properly insulated.
Environment & Mechanics	
1	There should be no foreign objects inside or outside the servo drive, such as wire clippings or metal debris, that could cause short circuits in the signal or power lines.
2	The servo drive and external braking resistor must not be placed on flammable materials.
3	The installation of the module, as well as the connection between the shaft and the mechanical system, must be secure.
4	The module and connected mechanical components must be in a condition suitable for operation.

Power on

Powering On the Input Power

The input power terminals are L1C, L2C (control circuit power input) and L1, L2, L3 (main circuit power input).

After turning on the input power:

The bus voltage indicator light should show no abnormalities.

The panel display should sequentially show "-----" → "8.8." → "5 02", indicating that the servo drive is in a ready-to-run state and is waiting for the upper controller to send the servo enable signal.

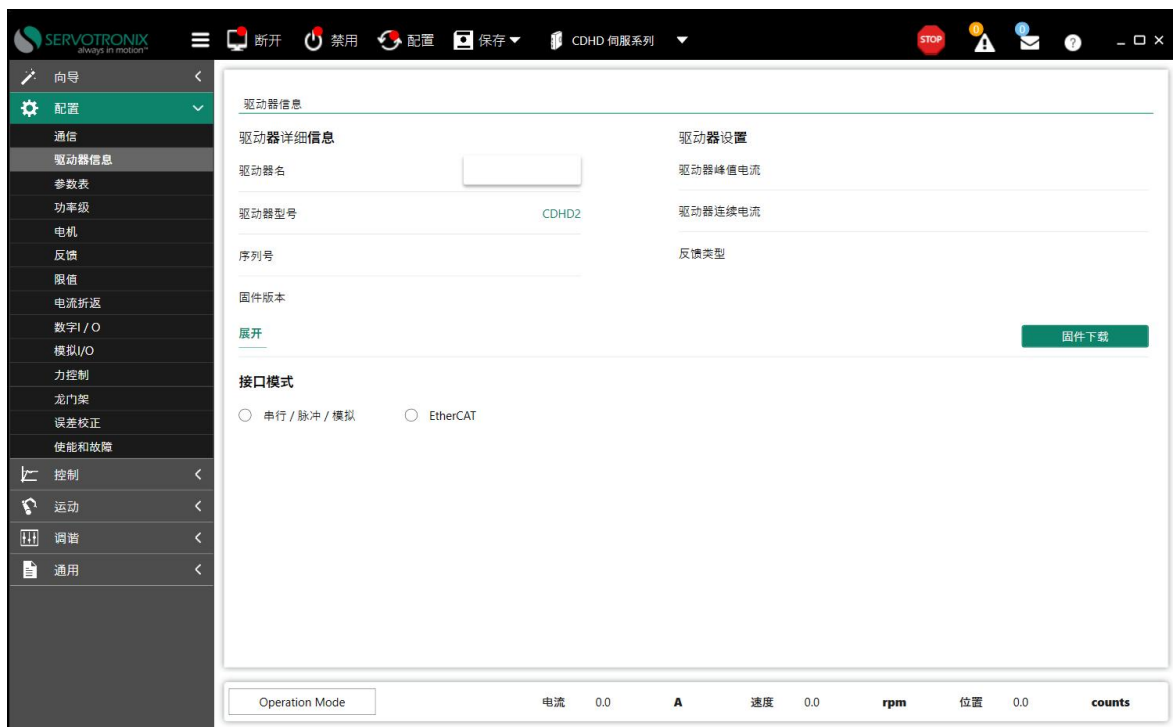
Parameter Settings

1、Software preparation

Download and install the Servotronic2 software in <https://www.servotronic.cn/zxqd/199.html>



2、Open the Servotronic ServoStudio 2 software. The software interface is shown in the figure below:

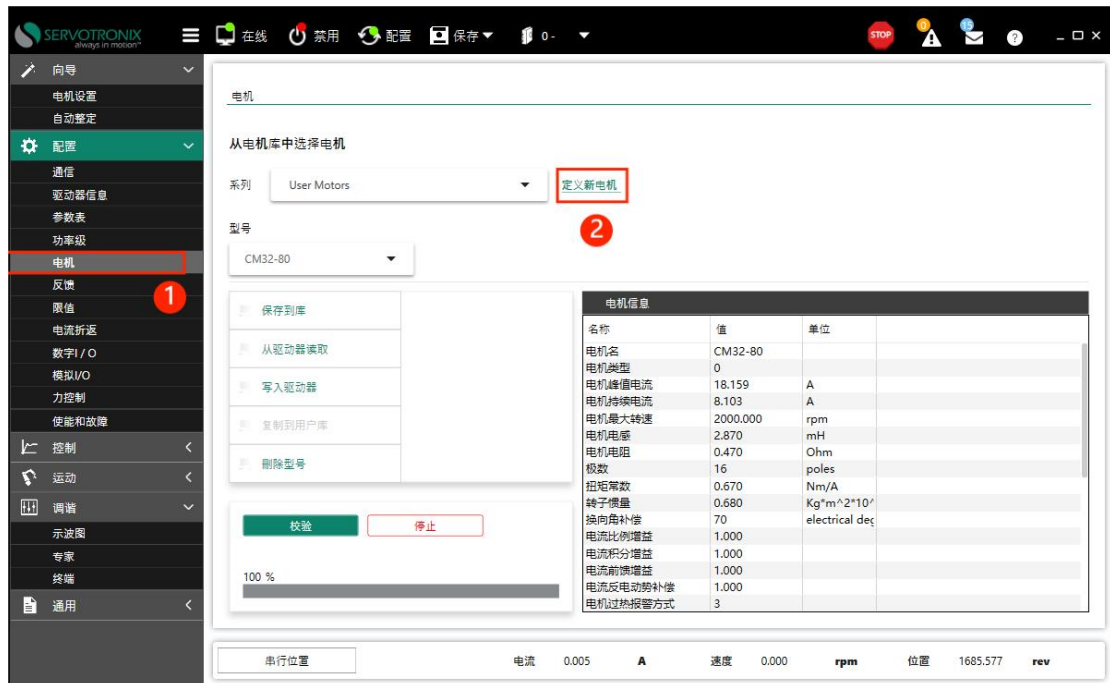


3、Click the **computer icon** at the top left until it turns **green** ("Connected"), and ensure that the **exclamation mark icon** at the top right is not **red**.

Then, click **"Drive Information"** on the left → **"Interface Mode"** → **"Serial/Pulse/Analog"**.



4、Find the "Motor" tab on the left and follow the steps below to input the correct motor parameters. After entering the values, click "NEXT".



New Motor

电机类型: 旋转电机

电机名:

电机图片 (可选): ...

电机峰值电流: Apeak (峰值)

电机持续电流: Apeak (峰值)

电机最大转速: rpm

电机电感: mH

电机电阻: ohm

极数:

扭矩常数: Nm/Apeak峰值

转子惯量: kg-m² * 10⁻³

CANCEL BACK **NEXT**

5、Select the correct encoder type and resolution. Click "NEXT", then select "Ignore Temperature Alarm", and click "Finish". (Here, a BISS-C interface encoder is used as an example.)

New Motor

BISS-C 接口编码器

Feedback Type

Feedback Type = 16 Motor Encoder Type = 0

BISS-C Options

Motor Encoder Resolution: bits

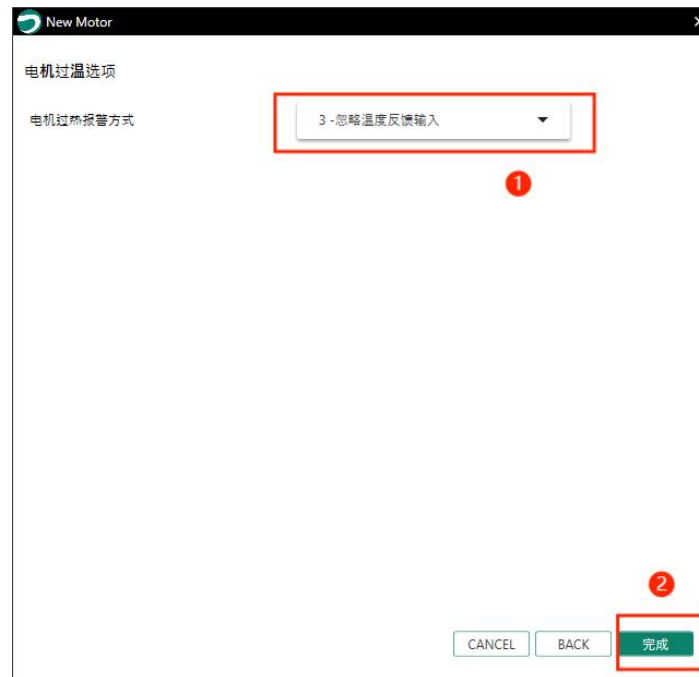
单圈数据长度: 比特

单圈有效分辨率: 比特

☒ Multi Turn

多圈数据长度: 比特

CANCEL BACK **NEXT**

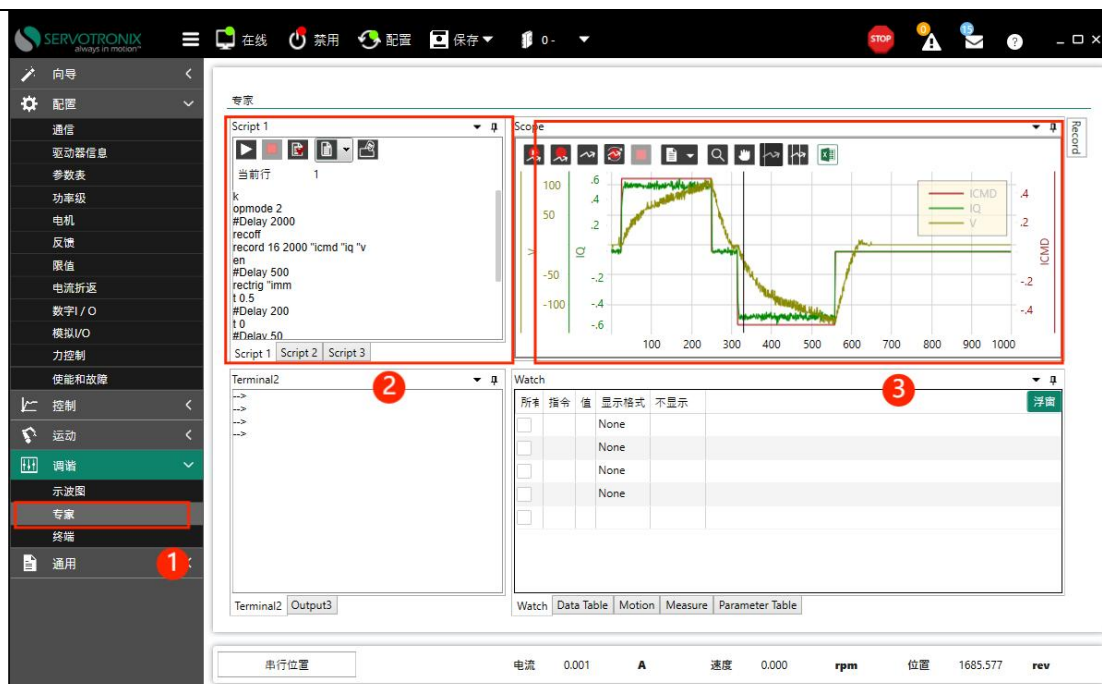


6、Click "Write to Drive" → "Save to Drive", and a prompt will confirm that the motor parameters have been successfully written. Then, click "Feedback" → "Phase Search" on the left to obtain the module phase position value.



7、Select the "Expert" tab on the left, write the current calibration script into Script 1, and click the "Run" button. The current calibration script is provided below; please copy it as needed.

Once the script has finished running, current and speed icons will appear on the right. Observe whether the current and speed directions are consistent. If they align well, the calibration is successful.



Script Separator

```
k
opmode 2
#Delay 2000
recoff
record 16 2000 "icmd "iq "v
en
#Delay 500
rectrig "imm
t 0.5
#Delay 200
t 0
#Delay 50
t -0.5
#Delay 200
k
#Plot
```

Script Separator

8、Select the "Limits" tab on the left and adjust the User Speed Limit and User Current Limit to reasonable values. These should be slightly lower than or equal to the system's maximum limit displayed above.



8、Select the "Oscilloscope" tab on the left, set the operating mode to "Serial Speed", input an appropriate speed and acceleration/deceleration values, then press "Enter". Click "Start", and the motor will begin to run smoothly.

Observe whether the actual position matches the set position to verify the encoder accuracy

