泰格运控（江苏）技术有限公司

TIGER MOTION CONTROL (JIANGSU) TECHNOLOGY CO.,LTD
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Tiger motion



SM 系列伺服电机安装维护手册

SM series servo motor installation and maintenance manual

资料简介

Data Introduction

感谢您购买泰格系列伺服电机!
Thank you for purchasing the Tiger series servo motor!
泰格 SM 系列伺服电机产品，功率范围 0.05kW~7.5kW
Tiger SM series servo motor products, power range 0.05kW~7.5kW

机座号 40mm~180mm，提供多种惯量配置、转速段配置，可根据客户需求提供不同配置的 编码器类型。
The frame size is 40mm~180mm, providing various inertia configurations and speed range configurations. Encoder types with different configurations can be provided according to customer needs.

本手册为 SM 系列伺服电机的安装手册，提供了电机安装须知、机械/电气安装以及保养与维护等内容。 若需了解电机功能及性能方面信息，请咨询泰格技术支持人员。
This manual is the installation manual for SM series servo motors, providing instructions for motor installation, mechanical/electrical installation, and maintenance and upkeep. If you need information on motor functions and performance, please consult Tiger technical support personnel.

由于致力于伺服电机的不断改善，因此本公司提供的资料如有变更，恕不另行通知
Due to our commitment to continuous improvement of servo motors, the information provided by our company is subject to change without prior notice.

说明
explain

- 为了说明产品的细节部分，本说明书中的图例有时为卸下外罩或安全遮盖物的状态。使用本产品时，请务必按规定装好外壳或遮盖物，并按照说明书的内容进行操作。

To illustrate the details of the product, the legend in this manual sometimes refers to the state of removing the outer cover or safety cover. When using this product, please make sure to install the shell or cover according to regulations and operate according to the instructions.

- 本使用说明书中的图例仅为了说明，可能会与您订购的产品有所不同。

The illustrations in this user manual are for illustration purposes only and may differ from the product you ordered.

- 由于产品升级或规格变更，以及为了提高说明书的便利性和准确性，本说明书的内容会 及时进行变更。

Due to product upgrades or specification changes, as well as to improve the convenience and accuracy of the manual, the content of this manual will be changed in a timely manner.

安全注意事项

Safety precautions

安全声明

Security Statement

本章对正确使用本产品所需关注的安全注意事项进行说明。在使用本产品之前，请先阅 读使用说明书并正确理解安全注意事项的相关信息。如果不遵守安全注意事项中约定的 事项，可能导致人员死亡、重伤，或设备损坏。

This chapter explains the safety precautions required for the correct use of this product. Before using this product, please read the user manual and correctly understand the relevant information on safety precautions. If the safety precautions are not followed, it may result in death, serious injury, or equipment damage.

手册中的“危险”、“警告”和“注意”事项，并不代表所应遵守的所有安全事项，只 作为所有安全注意事项的补充。

The "danger", "warning", and "precautions" in the manual do not represent all safety precautions that should be followed, but only serve as supplements to all safety precautions.

本产品应在符合设计规格要求的环境下使用，否则可能造成故障，因未遵守相关规定引 发的功能异常或部件损坏等不在产品质量保证范围之内。

This product should be used in an environment that meets the design specifications, otherwise it may cause malfunctions. Functional abnormalities or component damage caused by non-compliance with relevant regulations are not within the scope of product quality assurance.

因未遵守本书的内容、违规操作产品引发的人身安全事故、财产损失等，泰格运控将不承担任何法律责任。

Tiger Motion Control shall not be liable for any legal liabilities arising from personal safety accidents, property losses, etc. caused by non-compliance with the content of this book or violation of product operations.

安全等级定义

Security Level Definition



表示如果不按规定操作，则导致死亡或严重身体伤害。

Danger indicates that if not operated according to regulations, it can lead to death or serious bodily injury.



表示如果不按规定操作，则可能导致死亡或严重身体伤害。

A warning indicates that failure to follow the regulations may result in death or serious bodily injury.



表示如果不按规定操作，则可能导致轻微身体伤害或设备损坏。

Caution indicates that if not operated according to regulations, it may result in minor bodily injury or

equipment damage.

保修声明

Warranty Statement

正常使用情况下，产品发生故障或损坏，泰格运控提供保修期内的保修服务（产品保修期 请详见订货单）。超过保修期，将收取维修费用。

Under normal use, if the product malfunctions or is damaged, Tiger Motion Control provides warranty services during the warranty period (please refer to the purchase order for the product warranty period). Beyond the warranty period, repair fees will be charged.

保修期内，以下情况造成的产品损坏，将收取维修费用。

During the warranty period, repair fees will be charged for product damage caused by the following circumstances.

- 不按手册中的规定操作本产品，造成的产品损坏。

Failure to operate this product according to the instructions in the manual, resulting in product damage.

- 火灾、水灾、电压异常，造成的产品损坏。

Product damage caused by fires, floods, and abnormal voltage.

- 将本产品用于非正常功能，造成的产品损坏。

Using this product for abnormal functions may cause product damage.

- 超出产品规定的使用范围，造成的产品损坏。

Product damage caused by exceeding the specified usage range of the product.

- 不可抗力（自然灾害、地震、雷击）因素引起的产品二次损坏。

Secondary damage to products caused by force majeure factors such as natural disasters, earthquakes, and lightning strikes.

有关服务费用按照厂家统一标准计算，如有契约，以契约优先的原则处理。

The service fees shall be calculated according to the manufacturer's unified standards. If there is a contract, the principle of contract priority shall be applied.

安全注意事项

Safety precautions

- 本说明书中产品的图解，有时为了展示产品细节部分，产品为卸下外罩或安全遮盖物的 状态。使用本产品时，请务必按规定装好外罩或遮盖物，并按使用说明书的规定操作。

The illustrations of the product in this manual are sometimes used to show the details of the product. The product is in the state of removing the outer cover or safety cover. When using this product, please make

sure to install the outer cover or cover according to the regulations and operate according to the instructions in the user manual.

● 本说明书中的产品图示仅为示例，可能与您订购的产品略有差异，请以实际订购产品为准。
The product illustrations in this manual are only examples and may differ slightly from the product you ordered. Please refer to the actual ordered product for accuracy.

开箱验收 Unpacking acceptance
警 告 Warning ● 开箱时发现产品及产品附件有损伤、锈蚀、使用过的迹象等问题，请勿安装！ When unpacking, it is found that the product and its accessories are damaged, rusted, and show signs of use. Please do not install! ● 开箱时发现产品内部进水、部件缺少或有部件损坏时，请勿安装！ Please do not install the product when water ingress, missing or damaged components are found inside the box! ● 请仔细对照装箱单，发现装箱单与产品名称不符时，请勿安装！ Please carefully compare the packing list and do not install it if it does not match the product name!
注 意 Attention ● 开箱前请检查设备的外包装是否完好 ，有无破损、浸湿、受潮、变形等情况。 Before opening the box, please check whether the outer packaging of the equipment is intact, and whether there is any damage, moisture, deformation, etc. ● 请按照层次顺序打开包装，严禁猛烈敲打！ Please open the packaging in hierarchical order and do not forcefully tap! ● 开箱时请检查设备及附件表面有无残损、锈蚀、碰伤等情况。 When opening the box, please check the surface of the equipment and accessories for any damage, rust, or scratches. ● 开箱后请仔细对照装箱清单，查验设备及附件数量、资料是否齐全。 After unpacking, please carefully refer to the packing list and check whether the quantity and information of the equipment and accessories are complete.。
储存与运输时 During storage and transportation

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警 告 Warning

请务必使用专业的起重设备，且由具有操作资质的专业人员搬运大型或重型产品。否则有导致受伤或产品损坏的危险！

Please make sure to use professional lifting equipment and have qualified personnel handle large or heavy products. Otherwise, there is a risk of injury or product damage!

- 垂直起吊产品前，请确认产品的前外罩、端子排等产品构成部件已用螺丝固定牢靠，否则部件 脱落有导致人员受伤或产品损坏的危险！

Before lifting the product vertically, please confirm that the front cover, terminal block, and other components of the product have been securely fixed with screws. Otherwise, if the components fall off, there is a risk of personal injury or product damage!

- 产品被起重设备吊起时，产品下方禁止人员站立或停留。

When the product is lifted by lifting equipment, personnel are prohibited from standing or staying below the product.

- 用钢丝绳吊起产品时，请平稳匀速吊起，勿使产品受到振动或冲击，勿使产品翻转，也不要使 产品长时间处于被吊起状态，否则有导致人员受伤或产品损坏的危险！

When lifting products with steel wire ropes, please lift them steadily and at a uniform speed to avoid vibration or impact, flipping the products, and keeping them in a suspended state for a long time. Otherwise, there is a risk of personal injury or product damage!

注 意 Attention

搬运产品时请务必轻抬轻放，随时注意脚下物体，防止绊倒或坠落，否则有导致受伤或产品损坏的危险！

When handling products, please be sure to lift and place them gently, always pay attention to objects under your feet, and prevent tripping or falling, otherwise there is a risk of injury or product damage!

- 徒手搬运产品时，请务必抓牢产品壳体，避免产品部件掉落，否则有导致受伤的危险！

When handling products with bare hands, please make sure to grip the product shell firmly to avoid dropping product components, otherwise there is a risk of injury!

- 请严格按照产品要求的储存与运输条件进行储存与运输，否则有导致产品损坏的危险。

Please strictly follow the storage and transportation conditions required for the product, otherwise there is a risk of product damage.

- 避免在水溅雨淋、阳光直射、强电场、强磁场、强烈振动等场所储存与运输。

Avoid storage and transportation in places such as water splashing, rain, direct sunlight, strong electric fields, strong magnetic fields, and strong vibrations.

● 避免产品储存时间超过 3 个月，储存时间过长时，请进行更严密的防护和必要的检验。

● Avoid storing products for more than 3 months. If the storage time is too long, please take stricter protection and necessary inspections.

● 请将产品进行严格包装后再进行车辆运输，长途运输时必须使用封闭的箱体。

Please strictly package the product before transporting it by vehicle. Closed boxes must be used for long-distance transportation.

● 严禁将本产品与可能对本产品构成影响或损害的设备或物品一起混装运输。

It is strictly prohibited to mix and transport this product with equipment or items that may affect or damage this product.

● 如若电机输出轴安装平键容易掉落属于正常情况，不影响客户使用。

If the motor output shaft is installed with a flat key that is prone to falling off, it is a normal situation and does not affect customer use.

安装时 During installation

危 险 danger

．只有受过电气设备相关培训，具有电气知识的专业人员才能操作。严禁非专业人员操作！

Only professionals who have received relevant training on electrical equipment and possess electrical knowledge can operate it. Non professionals are strictly prohibited from operating!

警 告 warning

安装前请务必仔细阅读产品使用说明书和安全注意事项！

Please carefully read the product manual and safety precautions before installation!

.请勿在强电场或强电磁波干扰的场所安装本产品！

Do not install this product in places with strong electric fields or strong electromagnetic interference!

● 进行安装作业前，请确保安装位置的机械强度足以支撑设备重量，否则会导致机械危险。

Before carrying out installation work, please ensure that the mechanical strength of the installation position is sufficient to support the weight of the equipment, otherwise it may cause mechanical hazards.

● 进行安装作业时，请勿穿着宽松的衣服或佩戴饰品，否则可能会有触电的危险！

Do not wear loose clothing or accessories during installation work, as there may be a risk of electric shock!

● 将产品安装到封闭环境（如机柜内或机箱内）中时，请用冷却装置（如冷却风扇或冷却空调） 充分冷却，以满足安装环境要求，否则可能导致产品过热或火灾。

When installing the product in a closed environment (such as inside a cabinet or chassis), please use a cooling device (such as a cooling fan or air conditioning) to fully cool it to meet the installation environment requirements, otherwise it may cause the product to overheat or catch fire.

● 严禁改装本产品！

It is strictly prohibited to modify this product!

● 严禁拧动产品零部件及元器件的固定螺栓和红色标记的螺栓！

It is strictly prohibited to twist the fixing bolts and red marked bolts of product components and components!

● 本产品安装在柜体或终端设备中时，柜体或终端设备需要提供相应的防火外壳、电气防护外壳 和机械防护外壳等防护装置，防护等级应符合相关 IEC 标准和当地法律法规要求。

When this product is installed in a cabinet or terminal equipment, the cabinet or terminal equipment needs to provide corresponding protective devices such as fire-resistant shells, electrical protective shells, and mechanical protective shells, and the protection level should comply with relevant IEC standards and local laws and regulations.

● 在需要安装变压器等强电磁波干扰的设备时，请安装屏蔽保护装置，避免本产品出现误动作！

When installing equipment with strong electromagnetic interference such as transformers, please install shielding protection devices to avoid misoperation of this product!

● 请将产品安装在金属等阻燃物体上，勿使易燃物接触产品或将易燃物附着在产品上，否则会有 引发火灾的危险。

Please install the product on flame-retardant materials such as metal, and do not allow flammable materials to come into contact with the product or attach them to the product, otherwise there is a risk of fire.



注 意 attention

● 进行安装作业时，请用布或纸等遮住产品顶部，以防止钻孔时的金属屑、油、水等异物进入产 品内部，导致产品故障。作业结束后，请拿掉遮盖物，避免遮盖物堵住通风孔影响散热，导致 产品异常发热。

When carrying out installation work, please cover the top of the product with a cloth or paper to prevent metal shavings, oil, water and other foreign objects from entering the interior of the product during drilling, which may cause product failure. After completing the homework, please remove the cover to avoid blocking the ventilation holes and affecting heat dissipation, which may cause abnormal heating of the product.

● 当对以恒定速度运行的机械进行可变速运行时，可能发生共振。此时，在电机机架下安装防振 橡胶或使用振动抑制功能，可有效减弱共振。

When variable speed operation is performed on machinery operating at a constant speed, resonance may occur. At this time, installing anti vibration rubber or using vibration suppression function under the motor frame can effectively reduce resonance.

● 如若电机输出轴安装平键容易掉落属于正常情况，不影响客户使用。

If the motor output shaft is installed with a flat key that is prone to falling off, it is a normal situation and does not affect customer use.

接线时 When wiring



危 险 danger

● 严禁非专业人员进行设备安装、接线、保养维护、检查或部件更换！

Non professionals are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing equipment!

● 接线前，请切断所有设备的电源。切断电源后设备内部电容有残余电压，请至少等待产品上警 告标签规定的时间再进行接线等操作。测量主回路直流电压，确认处在安全电压之下，否则会 有触电的危险。

Before wiring, please cut off the power supply to all devices. After cutting off the power, there is residual voltage in the internal capacitance of the device. Please wait at least the time specified on the warning label on the product before proceeding with wiring and other operations. Measure the DC voltage of the main circuit and confirm that it is below the safe voltage, otherwise there is a risk of electric shock.

● 请在切断电源的状态下进行接线作业、拆产品外罩或触碰电路板，否则会有触电的危险。

Please perform wiring operations, remove the product cover, or touch the circuit board while cutting off the power, otherwise there is a risk of electric shock.

● 请务必保证设备和产品的良好接地，否则会有电击危险。

Please ensure good grounding of equipment and products, otherwise there may be a risk of electric shock.

警 告 warning

● 严禁将输入电源连接到设备或产品的输出端，否则会引起设备损坏，甚至引发火灾。

It is strictly prohibited to connect the input power to the output end of the device or product, otherwise it may cause equipment damage and even fire.

● 驱动设备与电机连接时，请务必保证产品与电机端子相序准确一致，避免造成电机反向旋转。

When connecting the driving equipment to the motor, please ensure that the phase sequence between the product and the motor terminals is accurate and consistent to avoid causing the motor to rotate in the opposite direction.

● 接线时使用到的线缆必须符合相应的线径和屏蔽等要求，使用屏蔽线缆的屏蔽层需要单端可靠 接地！

The cables used during wiring must meet the corresponding wire diameter and shielding requirements, and the shielding layer of the shielded cable must be reliably grounded at a single end!

● 请按照手册中规定的紧固力矩进行端子螺丝紧固，紧固力矩不足或过大，可能导致连接部分过 热、损坏，引发火灾危险。

Please tighten the terminal screws according to the tightening torque specified in the manual. Insufficient or excessive tightening torque may cause overheating and damage to the connecting parts, posing a fire hazard.

● 接线完成后，请确保所有线缆接线正确，产品内部没有掉落的螺钉、垫片或裸露线缆，否则可 能有触电危险或损坏产品。

After wiring is completed, please ensure that all cables are wired correctly and that there are no screws, gaskets, or exposed cables inside the product that have fallen off, otherwise there may be a risk of electric shock or damage to the product.

注 意 attention

● 请遵守静电防止措施（ESD）规定的步骤，并佩戴静电手环进行接线等操作，避免损坏设备或产品内部的电路。

Please follow the steps specified in the electrostatic discharge prevention measures (ESD) and wear an electrostatic wristband for wiring and other operations to avoid damaging the equipment or internal circuits of the product.

● 对控制回路接线时，请使用双股绞合屏蔽线，将屏蔽层连接到产品的接地端子上进行接地，否则会导致产品动作异常。

When wiring the control circuit, please use double stranded shielded wire to connect the shielding layer to the grounding terminal of the product for grounding, otherwise it may cause abnormal product operation.

● 如若电机输出轴安装平键容易掉落属于正常情况，不影响客户使用。

If the motor output shaft is installed with a flat key that is prone to falling off, it is a normal situation and does not affect customer use.

上电时 When powered on

危 险 danger

· 上电前，请确认产品安装完好，接线牢固，电机装置允许重新起动。

Before powering on, please confirm that the product is installed properly, the wiring is firm, and the motor device allows for restarting.

● 上电前，请确认电源符合产品要求，避免造成产品损坏或引发火灾！

Before powering on, please confirm that the power supply meets the product requirements to avoid product damage or fire!

● 严禁在通电状态下打开产品柜门或产品防护盖板、触摸产品的任何接线端子、拆卸产品的任何 装置或零部件，否则有触电危险！

It is strictly prohibited to open the product cabinet door or product protective cover plate, touch any wiring terminals of the product, or disassemble any device or component of the product while powered on, otherwise there is a risk of electric shock!

警 告 warning

● 接线作业和参数设定完成后，请进行机器试运行，确认机器能够安全动作，否则可能导致人员

After the wiring operation and parameter setting are completed, please conduct a machine trial run to confirm that the machine can operate safely, otherwise it may cause personnel damage

受伤或设备损坏。

Injury or equipment damage.

● 通电前，请确保产品的额定电压与电源电压一致。如果电源电压使用有误，会有引发火灾的危 险。

Before powering on, please ensure that the rated voltage of the product is consistent with the power supply voltage. If the power supply voltage is used incorrectly, there is a risk of fire.

● 通电前，请确保产品、电机以及机械的周围没有人员，否则可能导致人员受伤或死亡。

Before powering on, please ensure that there are no personnel around the product, motor, and machinery, otherwise it may cause injury or death to personnel.

运行时 Runtime

危 险 danger

● 严禁非专业人员进行产品运行，否则会有导致人员受伤或死亡危险！

Non professionals are strictly prohibited from operating the product, otherwise there is a risk of injury or death to personnel!

● 严禁在运行状态下触摸设备的任何接线端子、拆卸设备和产品的任何装置或零部件，否则有触 电危险！

It is strictly prohibited to touch any wiring terminals of the equipment, disassemble any devices or components of the equipment and products while in operation, otherwise there is a risk of electric shock!

警 告 warning

● 严禁触摸设备外壳、风扇或电阻等以试探温度，否则可能引起灼伤！

Do not touch the device casing, fan, or resistor to test the temperature, otherwise it may cause burns!

● 运行中，避免其他物品或金属物体等掉入设备中，否则可能引起火灾或产品损坏！

During operation, avoid other items or metal objects falling into the equipment, otherwise it may cause fire or product damage!

● 如若电机输出轴安装平键容易掉落属于正常情况，不影响客户使用。

If the motor output shaft is installed with a flat key that is prone to falling off, it is a normal situation and does not affect customer use.

保养时 During maintenance

危　险 danger

- 严禁非专业人员进行设备安装、接线、保养维护、检查或部件更换！

Non professionals are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing equipment!

- 严禁在通电状态下进行设备保养，否则有触电危险！

It is strictly prohibited to perform equipment maintenance while powered on, otherwise there is a risk of electric shock!

- 切断所有设备的电源后，请至少等待产品上警告标签规定的时间再进行设备保养等操作。

After cutting off the power to all devices, please wait at least the time specified on the warning label on the product before performing equipment maintenance and other operations.

- 使用 PM 电机时，即使产品的电源关闭，在电机旋转期间，电机端子上也会产生感应电压。请 勿触摸电机端子，否则可能会有触电风险。

When using a PM motor, even if the product's power is turned off, induced voltage will still be generated on the motor terminals during motor rotation. Do not touch the motor terminals, as there may be a risk of electric shock.

警　告 warning

- 请按照设备维护和保养要求对设备和产品进行日常和定期检查与保养，并做好保养记录。

Please conduct daily and regular inspections and maintenance of equipment and products in accordance with equipment maintenance and upkeep requirements, and keep maintenance records.

- 如若电机输出轴安装平键容易掉落属于正常情况，不影响客户使用。

If the motor output shaft is installed with a flat key that is prone to falling off, it is a normal situation and does not affect customer use.

维修时 During maintenance

危　险 danger

- 严禁非专业人员进行设备安装、接线、保养维护、检查或部件更换！

Non professionals are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing equipment!

- 严禁在通电状态下进行设备维修，否则有触电危险！

It is strictly prohibited to carry out equipment maintenance while powered on, otherwise there is a risk of electric shock!

- 切断所有设备的电源后，请至少等待产品上警告标签规定的时间再进行设备检查、维修等操作。

After cutting off the power to all devices, please wait at least the time specified on the warning label on the product before conducting equipment inspections, repairs, and other operations.

警告 warning

- 请按照产品保修协议进行设备报修。

Please follow the product warranty agreement for equipment repair.

- 当保险丝熔断、断路器跳闸或漏电断路器(ELCB)跳闸时，请至少等待产品上警告标签规定的时 间后，再接通电源或进行机器操作，否则可能导致人员伤亡及设备损坏。

When the fuse blows, the circuit breaker trips, or the leakage circuit breaker (ELCB) trips, please wait at least the time specified on the warning label on the product before connecting the power or operating the machine, otherwise it may cause personal injury or equipment damage.

- 设备出现故障或损坏时，务必由专业人员按照维修指导对设备和产品进行故障排除和维修，并 做好维修记录。

When the equipment malfunctions or is damaged, it is necessary for professional personnel to troubleshoot and repair the equipment and products according to maintenance instructions, and keep maintenance records.

- 请按照产品易损件更换指导进行更换。

Please follow the instructions for replacing vulnerable parts of the product.

- 请勿继续使用已经损坏的机器，否则可能会造成人员伤亡或产品更大程度的损坏。

Do not continue to use the damaged machine, as it may cause personal injury or greater damage to the product.

- 更换设备后，请务必重新进行设备接线检查与参数设置。

After replacing the equipment, please make sure to perform a new wiring check and parameter settings.

- 如若电机输出轴安装平键容易掉落属于正常情况，不影响客户使用。

If the motor output shaft is installed with a flat key that is prone to falling off, it is a normal situation and does not affect customer use.

报废时 When scrapped

警告 warning

- 请按照国家有关规定与标准进行设备、产品的报废，以免造成财产损失或人员伤亡！

Please dispose of equipment and products in accordance with relevant national regulations and standards to avoid property damage or personal injury!

- 报废的设备与产品请按照工业废弃物处理标准进行处理回收，避免污染环境。

Scrapped equipment and products should be disposed of and recycled according to industrial waste disposal standards to avoid environmental pollution.

安全标识

为了保障安全作业，请务必遵守粘贴在设备上的安全标识，请勿损坏、剥下安全标识。安 全标识说明如下：

安全标识 security identifier	内容说明 Content Description
	表示安装、运行前务必阅读说明书。 Please read the instruction manual before installation and operation.
	表示务必做好系统和产品接地！ It is essential to ensure proper grounding of the system and product!

	表示此处可能有危险！Indicates that there may be danger here!
	表示此处有高压危险！There is a danger of high voltage here!
	表示此处有机械伤人危险！There is a danger of mechanical injury here!

安全标识 security identifier	内容说明 Content Description
	表示此处有高温危险！ This indicates that there is a risk of high temperature here!
	表示电机禁止敲击！ Indicates that the motor is prohibited from being struck!

1.安装须知 Installation instructions

- 请务必遵守本章节中安装方向的要求，否则可能导致产品故障或损坏。

Please make sure to comply with the installation direction requirements in this chapter, otherwise it may cause product malfunction or damage.

- 严禁安装运行有损伤或缺少零部件的设备，否则会导致人身伤害。

It is strictly prohibited to install or operate equipment with damage or missing components, otherwise it may cause personal injury.

- 严禁将本产品安装在会溅到水的场所或易发生腐蚀的环境中，否则会导致产品故障。

It is strictly prohibited to install this product in places that may splash water or environments prone to corrosion, otherwise it may cause product failure.

- 严禁将本产品安装在易燃性气体及可燃物附近，否则会导致火灾或触电。

It is strictly prohibited to install this product near flammable gases and materials, otherwise it may cause fire or electric shock.

- 请将本产品安装于能提供防火，电气防护的安装柜内，否则可能导致火灾。

Please install this product in an installation cabinet that provides fire and electrical protection, otherwise it may cause a fire.

- 严禁在产品上面放置重物，否则可能会导致人身伤害或产品损坏。

It is strictly prohibited to place heavy objects on the product, otherwise it may cause personal injury or product damage.

- 严禁对设备施加过大冲击力，否则可能会导致产品损坏。

It is strictly prohibited to apply excessive impact force to the equipment, otherwise it may cause product damage.

2. 安装流程图 Installation process diagram

序号 No	步骤 Step	
1	开始 start	
2	安装前准备 Preparation before installation	
3	开箱 Unpacking	
4	安装前检查 PRE-INSTALLATION CHECK	机械安装 Mechanical Installation
5	安装电机 Installing the motor	
6	安装后检查 Post installation inspection	
7	动力线连接 Power line connection	电器安装 Electrical installation
8	编码器线缆连接 Encoder cable connection	
9	连接器插合操作 Connector insertion operation	
10	安装后检查 Post installation inspection	
11	结束 end	

说明 explain

图例为推荐安装步骤，在保证安装质量的前提下，可对安装步骤进行适当调整。

The legend shows the recommended installation steps, which can be adjusted appropriately while ensuring installation quality.

3.1 安装环境要求 Installation environment requirements

项 目 item	要求 requirement
海拔 altitude	1000m 及以下正常使用； 1000m 以上请降额使用 Normal use of 1000m and below; Please derate above 1000m
环境温度 Ambient temperature	0~40℃(不冻结)(not frozen)
存储温度 storage temperature	- 20° C~+60° C（不冻结） (not frozen)
环境湿度 ambient humidity	20%~80%RH(不结露)(without condensation)
存储湿度 Storage humidity	20%~80%RH（不结露）(without condensation)
振动等级 Vibration level	V15
抗振动强度 Vibration resistance strength	振动加速度（以法兰面为标准），径向 49m/s^2，轴向 24.5m/s^2 Vibration acceleration (based on the flange surface), radial 49m/s2, axial 24.5m/s2
抗冲击强度 impact strength	490m/s^2 （以法兰面为标准），冲击次数：2 次 490m/s2 (based on the flange surface), impact frequency: 2 times

外壳防护方式 Shell protection method	接线完成后，电机整体防护等级如下： After wiring is completed, the overall protection level of the motor is as follows: IP65(轴贯通及甩线型电机接插件除外) IP65 (excluding shaft through and swing type motor connectors)
安装场所 installation site	● 请勿在有硫化氢、氯气、氨、硫磺、氯化性气体、酸、碱、盐等腐蚀 Do not corrode with hydrogen sulfide, chlorine gas, ammonia, sulfur, chlorinated gases, acids, alkalis, salts, etc 性及易燃性气体环境、可燃物等附近使用本产品 This product is used in environments with high and flammable gases, as well as in the vicinity of combustible materials ● 在有磨削液、油雾、铁粉、切削等的场所请选择带油封机型 In places with grinding fluid, oil mist, iron powder, cutting, etc., please choose a model with oil seal ● 远离火炉等热源的场所 ● Places away from heat sources such as stoves ● 请勿在封闭环境中使用电机。封闭环境会导致电机高温，缩短使用寿命 Do not use the motor in a closed environment. A closed environment can cause high temperatures in the motor and shorten its lifespan ● 场所的 X-RAY 吸收剂量应<100rad（硅）/＜25rad（空气） The X-ray absorption dose of the site should be<100rad (silicon)/<25rad (air)

说明 explain

● [1]振动等级 V15 表示单台伺服电机再额定转速时，振动幅值小于 15μm。

● [1] Vibration level V15 indicates that when a single servo motor is at rated speed, the vibration amplitude is less than 15 μ M.

● [2]水平安装伺服电机轴时，上下、左右、前后 3 个方向上的抗振性如上表所示。

When installing the servo motor shaft horizontally, the vibration resistance in three directions: up and down, left and right, and front and back is shown in the table above.

● [3]水平安装伺服电机轴时，上下方向上的抗冲击强度如上表所示。

When installing the servo motor shaft horizontally, the impact strength in the up and down directions is shown in the table above.

● [4]电机振动强度受使用现场传动结构、对中精度、安装条件和外部振动等因素影响，这 些影响因素会提高电机上的振动值，当超出电机最大允许的振动限制值时，电机有失效 风险。因此，在使用过程中，有必要对共振加以限制，具体取决于现场应用和安装情况。

The vibration intensity of the motor is affected by factors such as the on-site transmission structure, alignment accuracy, installation conditions, and external vibration. These influencing factors can increase the vibration value on the motor. When the maximum allowable vibration limit of the motor is exceeded, there is a risk of motor failure. Therefore, it is necessary to limit resonance during use, depending on the on-site application and installation situation.

3.2 安装人员要求 Installation personnel requirements

本手册所属的产品/系统只允许符合各项工作要求的专业人员进行操作。其操作必须遵照各自附带的文件说明，特别是

其中的安全及警告提示。由于具备相关培训及经验，专业人员 可以察觉本产品/系统的风险，并避免可能的危险。

The products/systems to which this manual belongs are only allowed to be operated by professionals who meet various job requirements. Its operation must follow the instructions in the accompanying documents, especially the safety and warning prompts. Due to relevant training and experience, professionals can perceive the risks of this product/system and avoid potential hazards.

所有机械工作必须由受过培训的专业人员执行，本手册中涉及的机械专业人员是指熟悉安 装位置、机械安装、产品的故障排除与维护并具备下列资质的人员：

All mechanical work must be carried out by trained professionals. The mechanical professionals referred to in this manual refer to personnel who are familiar with the installation location, mechanical installation, product troubleshooting and maintenance, and possess the following qualifications:

- 上岗前应经过安全教育培训并考试合格或接受过机械专业的培训（如：机械工程师或机 电工程师）；

Before starting work, one should receive safety education and training, pass the exam, or receive training in mechanical engineering (such as mechanical engineers or electromechanical engineers);

- 熟悉电气设备，了解电机基本机械特性、安装要点；

Familiar with electrical equipment, understand the basic mechanical characteristics and installation points of motors;

- 身体无职业禁忌；
- No occupational taboos in the body;
- 了解本操作手册尤其是了解了所有安全注意事项的专业人员。
- Understand this operating manual, especially for professionals who understand all safety precautions.

所有电气工作必须由受过培训的专业人员执行，本操作手册中涉及的电气专业人员是指熟 悉电气安装、调试、产品的故障排除与维护并具备下列资质的人员：

All electrical work must be carried out by trained professionals. The electrical professionals mentioned in this operation manual refer to personnel who are familiar with electrical installation, debugging, product troubleshooting and maintenance, and possess the following qualifications:

- 接受过电气专业的培训（如：电气工程师或机电工程师）；
- Received training in electrical engineering (such as electrical engineers or electromechanical engineers);
- 了解本操作手册尤其是了解了所有安全注意事项的专业人员。
- Understand this operating manual, especially for professionals who understand all safety precautions.

说明 explain

接触带电部件会造成人员重伤，甚至死亡：

Contact with live parts can cause serious injury or even death to personnel:

- 只有专业人员才允许在电气设备上作业；

Only professionals are allowed to work on electrical equipment;

- 在所有作业中必须遵守本国的安全规定。

All assignments must comply with the safety regulations of the country.

3.3 安装工具准备 Preparation of installation tools

安装过程中所需工具及辅助材料：

Tools and auxiliary materials required during installation:

- 标准工具：手套、十字螺丝刀、 一字螺丝刀、内六角扳手、扭力扳手

Standard tools: gloves, Phillips screwdriver, flat screwdriver, hex wrench, torque wrench

- 扭矩扳手或带自锁的气压回转/脉冲螺丝起
- Torque wrench or self-locking pneumatic rotary/pulse screw driver
- 用于拆卸轴键的尖嘴钳

Sharp nose pliers for disassembling shaft keys

- 用于加工插接头的压接钳

Crimping pliers for processing plug-in joints

- 游标卡尺、千分尺、张力仪等
- Vernier calipers, micrometers, tension gauges, etc
- 防滑手套
- Anti slip gloves
- 普通溶剂的清洁剂
- Cleaning agents for ordinary solvents
- 180 机座电机标配 2 个 M8 吊环，用户无需自备

180 base motor comes standard with 2 M8 lifting rings, users do not need to bring them themselves

说明 explain

使用不合适的螺丝刀等工具或者采用不恰当的拧紧操作都可能损坏设备上的螺钉。

The use of inappropriate tools such as screwdrivers or improper tightening operations may damage the screws on the equipment.

- 请使用与螺钉头完全匹配的螺丝刀；

Please use a screwdriver that perfectly matches the screw head;

- 请使用技术文档中规定的扭矩拧紧螺钉；

Please tighten the screws using the torque specified in the technical documentation;

- 请使用扭力扳手或者带动态扭矩传感器和转速限制功能的机械式高精度螺丝刀。

Please use a torque wrench or a mechanical high-precision screwdriver with dynamic torque sensor and speed limit function.

3.4 线缆准备 Cable preparation

伺服电机侧与伺服驱动器相连接的线缆包含两种类型：动力线线缆和编码器线缆，两种类 型电缆需要一起配合使用。

The cables connecting the servo motor side to the servo drive include two types: power line cables and encoder cables, which need to be used together.

- 按照选型手册正确选配与驱动器和电机匹配的线缆，检察线缆表面是否完好，若有外皮 破损或插头松动等情况请及时更换线缆，否则会影响设备运行；

According to the selection manual, correctly select cables that match the driver and motor, check whether the surface of the cables is intact. If there are any external skin damage or loose plugs, please replace the cables in a timely manner, otherwise it will affect the operation of the equipment;

- 不建议自制线缆，若有特殊需求，请联系泰格运控人员；

It is not recommended to make self-made cables. If there are special requirements, please contact the TEG operation control personnel;

● 若有特殊需求，需要对线缆插头等进行更换、焊接等操作，请对照手册确认好引脚定义，线缆屏蔽层被破坏，设备有被干扰的风险。

If there are special requirements, such as replacing or welding cable plugs, please refer to the manual to confirm the pin definition. If the cable shielding layer is damaged, there is a risk of equipment interference.

4.开箱与搬运 Unpacking and Handling

4.1 开箱 Unpacking

开箱注意事项 Precautions for unpacking

- 在收到电机时，请留意包装上的搬运图标。

When receiving the motor, please pay attention to the handling icon on the packaging.

搬运图标及其含义：Transport icons and their meanings:

图标 icon	含义 meaning	图标 icon	含义 meaning
	此面朝上 This side faces upwards		防潮 moisture-proof
	易碎品 fragile products		不可堆叠 Non stackable

● 检查货物的完整性

● Check the integrity of the goods

■ 收货后立即检查货物是否与随附货物单证相一致。

Immediately upon receipt, check if the goods match the accompanying documents.

■ 立即向运输代理报告任何明显的运输损坏。

Immediately report any obvious transportation damage to the transportation agent.

■ 立即向相应的泰格运控办事处报告任何明显的组件缺失/不完整运输 。

Immediately report any obvious missing/incomplete transportation of components to the corresponding TEG operations control office.

说明 explain

- 超过时限的缺失索赔将不予授理。

Missing claims exceeding the time limit will not be accepted.

- 不可使用损坏的元部件。

Damaged components must not be used.

- 包装、运输电机时请遵守当地相关规定。

Please comply with local regulations when packaging and transporting the motor.

开箱后检查 Inspection after unpacking

在开箱时，请认真确认：When opening the box, please carefully confirm:

确认项目 Confirm project	说明 illustrate
到货产品是否与您订购的产 品型号相符？ Does the received product match the product model you ordered?	核对包装箱上的电机型号及规格是否与您购买的产品一致。 Verify if the motor model and specifications on the packaging box match the product you purchased. **注意：attention** 请检查外包装箱是否有破损，若有破损，请及时联系您的供应商。 Please check if the outer packaging box is damaged. If there is any damage, please contact your supplier in a timely manner.
产品是否有损坏的地方？ Is there any damage to the product?	请查看整机外表，产品在运输过程中是否有破损现象。若发现有某种遗漏或损坏，请速与本公司或您的供货商联系解决。 Please check the appearance of the entire machine to see if there is any damage to the product during transportation. If any omissions or damages are found, please contact our company or your supplier immediately for resolution.

4.2 搬运 transport

请注意遵守有关运输和正确处理设备的相关规定，在搬运和运输过程中，请使用合适的抓 取装置进行搬运和安装，电机在搬运或安装期间可能会因操作不当而受损。如果运行受损 的电机，可能会导致绕组、轴承以至于整个系统的损坏。

Please pay attention to following the relevant regulations on transportation and proper handling of equipment. During handling and transportation, please use appropriate gripping devices for handling and installation. The motor may be damaged due to improper operation during handling or installation. If a damaged motor is operated, it may cause damage to the windings, bearings, and even the entire system.

机座 180mm 以内使用吊具提升和搬运电机

Use lifting equipment to lift and transport the motor within 180mm of the base(see picture)



注意： 吊具选用不当或使用方式不当会导致电机坠落，进而造成人员重伤和/或死亡！

Attention: Improper selection or use of lifting equipment can cause the motor to fall, resulting in serious injury and/or death to personnel!

- 吊具的承载能力必须足以承受电机重量。

The load-bearing capacity of the lifting device must be sufficient to withstand the weight of the motor.

- 根据“使用吊具来起吊和运输电机”一图将吊具装到电机上 。

Install the lifting device onto the motor according to the diagram "Using a lifting device to lift and transport the motor".

- 请勿握住电缆或电机轴进行搬运，否则会导致受伤或故障！

Do not hold the cable or motor shaft for handling, as it may cause injury or malfunction!

机座 180mm 及以上使用吊环提升和搬运电机

Use lifting rings to lift and transport motors with a base of 180mm or larger(see picture)



注意： 悬挂点错误或未使用悬挂点可导致电机坠落，进而造成人员重伤或死亡！

Attention: Incorrect or unused suspension points can cause the motor to fall, resulting in serious injury or death to personnel!

- 对于大型电机而言，必须使用拧入在轴承端盖上的 2 个吊环螺钉来起吊和搬运电机。

For large motors, two lifting eye screws screwed into the bearing end cover must be used to lift and transport the motor.

- 装件的拉力方向不得超过 45°斜角。

The pulling force direction of the assembly shall not exceed a 45 ° angle.

- 将吊环螺钉完全拧入，用大约 6N•m~8N·m 的扭矩手动拧紧，请勿过于紧固吊装螺 栓，使用器具等强力紧固会导致螺孔破损！

Completely screw in the lifting ring screws and tighten them manually with a torque of approximately 6N · m~8N · m. Do not tighten the lifting bolts too tightly, as using tools or other strong tightening may cause damage to the screw holes!

- 不要使用已经变形或损坏的吊环螺钉！

Do not use deformed or damaged lifting eye screws!

放下电机 Lower the motor

1. 将电机放在一个固定且平整的台面或地面上。

1. Place the motor on a fixed and flat surface or ground.

2. 防止电机意外运动

2. Prevent accidental motor movement

4.3 存储 storage

项目 item	描述 description
气候环境条件 Climate and environmental conditions	- 20℃~ +60℃
最高的相对空气湿度 The highest relative air humidity	＜60%，不允许出现凝露 No condensation allowed
机械环境条件 Mechanical environmental conditions	平稳、无振动的存储场所，V 有效 ＜0.2mm/s stable and vibration free storage area, with a V-effective value less than 0.2mm/s 场所的 X-RAY 吸收剂量应 ＜100rad (硅) / ＜ 25rad (空气) The X-ray absorption dose of the site should be less than 100 rad (silicon)/less than 25 rad (air)

每六个月检查电机状态是否正常：

Check if the motor status is normal every six months:

- 检查电机是否受潮，为此必须检测绝缘电阻(检测电压 DC 500V)。

Check if the motor is damp, and for this, the insulation resistance must be tested (with a voltage of DC 500V).

- 检查连接件和紧固件是否锈蚀，密封件是否完好。

Check if the connectors and fasteners are corroded, and if the seals are intact.

- 进行必要的维护。

Perform necessary maintenance.

- 检查干燥剂的状态，必要时予以更换。

Check the condition of the desiccant and replace it if necessary.
对存储作业进行记录，以便在投入运行前完全解除电机的存储。
Record the storage operation to completely remove the storage of the motor before it is put into operation.
绝缘电阻与温度有很大关系，长期存放后，如果绝缘电阻太小，就必须对电机进行干燥处理，措施：采用热空气干燥电机。
The insulation resistance is closely related to temperature. After long-term storage, if the insulation resistance is too small, the motor must be dried by using hot air.
对存储作业进行记录，以便在投入运行前完全解除电机的存储。
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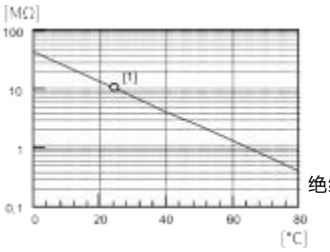


绝缘电阻与温度关系曲线 Insulation resistance temperature relationship curve

说明 explain

以下环境条件易导致冷凝水生成：

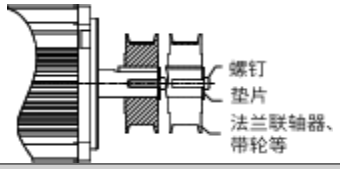
The following environmental conditions can easily lead to the generation of condensate water:

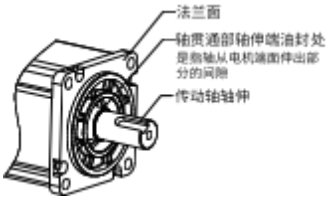
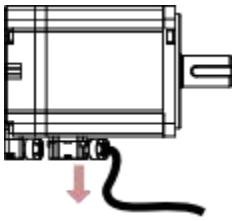
- 环境温度的剧烈波动；
- Intense fluctuations in ambient temperature;
- 太阳直射；
- Direct sunlight;
- 存储时较高的空气湿度；
- High air humidity during storage;
- 请避免上述这些环境条件,并请在包装中使用干燥剂。

Please avoid the above environmental conditions and use desiccants in the packaging.

5 机械安装 Mechanical Installation

5.1 安全提示 Safety Tips

<table>
<tr><th>项目 Item</th><th>描述 description</th></tr>
<tr><td>防锈处理
Rust proof</td><td>安装前请擦拭干净伺服电机轴伸端的“防锈剂”,然后再做相关的防锈处理。
Before installation, please wipe off the rust inhibitor on the extension end of the servo motor shaft, and then perform relevant rust prevention treatment.</td></tr>
<tr><td rowspan="2">轴伸安装注意
Attention for shaft extension installation</td><td>安装过程禁止撞击轴伸端，否则会造成内部编码器碎裂或轴承损坏。
During the installation process, it is prohibited to hit the shaft extension end, otherwise it may cause internal encoder breakage or bearing damage.</td></tr>
<tr><td>● 轴伸处有相关附件需要安装时，可通过在轴伸螺纹孔安装螺钉和垫片的 方式压入附件，避免敲击导致轴承损坏。
When there are related accessories to be installed at the shaft extension, they can be pressed in by installing screws and washers in the threaded hole of the shaft extension to avoid damage to the bearing caused by knocking.
● 拆卸相关附件可通过拉马等工具，防止轴承受冲击损伤。
Dismantling related accessories can be done through tools such as pullers to prevent shaft damage from impact.
● 为确保安全，在旋转区安装保护罩或类似装置。
To ensure safety, install protective covers or similar devices in the rotating area.

</td></tr>
<tr><th>项目 Item</th><th>描述 description</th></tr>
<tr><td>安 装 方 向
installation direction</td><td>伺服电机可安装在水平方向或者垂直方向上。
The servo motor can be installed in the horizontal or vertical direction.</td></tr>
</table>

油水对策 Oil and water countermeasures	● 油封只用于防尘，不用于防油防水。 Oil seals are only used for dust prevention and not for oil and water resistance. ● 请勿将电机、线缆浸在油或水中使用。 Do not immerse the motor or cable in oil or water for use. ● 在有水滴滴下的场所使用时，请在确认伺服电机防护等级的基础上进行 使用。(但轴贯通部除外) When using in places with water droplets, please confirm the protection level of the servo motor before use. (Except for the shaft penetration part)  . 在有液体的应用场合，请将电机接线端口朝下安装（如下图），防止液 体沿线缆流向电机本体。 In applications with liquid, please install the motor wiring port facing downwards (as shown in the figure below) to prevent liquid from flowing along the cable to the motor body.  ● 在有油滴会滴到轴贯通部的场所使用时，请指定带油封的伺服电机。 When using in areas where oil droplets may drip onto the shaft through section, please specify a servo motor with oil seal. ● 带油封的伺服电机的使用条件： Service conditions for servo motors with oil seals: ■使用时请确保油位低于油封的唇部。 Please ensure that the oil level is below the lip of the oil seal when using.

	■垂直向上安装伺服电机时，请勿使油封唇部积油。 When installing the servo motor vertically upwards, do not allow oil to accumulate on the oil seal lip. ■电机带油封时，若将输出轴向上安装，根据使用条件，机油可能进入电 机内部。向上安装时，请充分确认使用条件。 When the motor is equipped with an oil seal, if the output shaft is installed upwards, depending on the usage conditions, oil may enter the interior of the motor. When installing upwards, please fully confirm the usage conditions. ■伺服电机带减速机时，应使唇部留有少量油沫以作润滑。将油封浸泡在 油面中使用时，可能会有油进入电机内部从而导致故障。由于伺服电机的轴贯通部不是防水防油结构，请采取适当的措施防止水滴或切削油等进入电机内部，否则会导致故障。 When the servo motor is equipped with a reducer, a small amount of oil foam should be left on the lips for lubrication. When soaking the oil seal in the oil surface for use, oil may enter the interior of the motor and cause malfunctions. Due to the fact that the shaft penetration part of the servo motor is not a waterproof and oil proof structure, appropriate measures should be taken to prevent water droplets or cutting oil from entering the interior of the motor, otherwise it may cause malfunctions.

5.2 安装前检查 PRE-INSTALLATION CHECK

下列表格不要求完整性，根据系统特定条件，可能需要进行其他检查。在开始安装前请先 了解安全注意事项并注意下列安装前检查表。

The following table does not require completeness and may require additional checks depending on specific system conditions. Before starting the installation, please understand the safety precautions and pay attention to the following pre installation checklist.

安装前检查表 pre-installation check

序号 NO.	内容 Content	确认 confirm
1	收到的产品与订购产品型号一致。 The received product matches the ordered product model	□
2	产品外壳无变形、裂纹。 The product shell has no deformation or cracks.	□

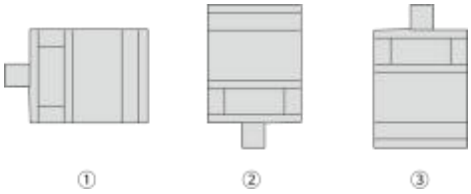
3	产品上的螺钉无松动、脱落。 The screws on the product are not loose or detached.	□
4	信号端子无破裂、异物，无歪斜。 The signal terminals are free from breakage, foreign objects, and skewness.	□
5	配置的驱动系统中的所有必要组件都存在，尺寸规格正确并已按照顺 序安装和连接。 All necessary components in the configured drive system are present, with correct size specifications and installed and connected in sequence.	□
6	安装的环境条件在允许的范围内。 The installation environment conditions are within the allowable range.	□
7	用户设备和电机的安装面（如：法兰面、轴）是否已清洁。 Have the installation surfaces of user equipment and motors (such as flange surfaces and shafts) been cleaned.	□
8	安装面没有腐蚀。The installation surface is not corroded.	□
9	用户设备上的安装尺寸（例如：轴直径、轴长度、径向跳动）与规格相符。 The installation dimensions on the user's device (such as shaft diameter, shaft length, radial runout) match the specifications.	□
10	带抱闸电机的抱闸制动扭矩符合相关要求并与现场实际负载相符合。 The braking torque of the brake with a brake motor meets the relevant requirements and is consistent with the actual load on site.	□
11	电机与减速机相连时，减速机的安装尺寸与电机规格尺寸相匹配。 When the motor is connected to the reducer, the installation size of the reducer matches the motor specifications	□
12	已采取安装外罩等措施，以免运行时意外碰触电机轴等旋转部。 Measures such as installing covers have been taken to prevent accidental contact with rotating parts such as the motor shaft during operation	□

5.3 安装电机 installing the motor

安装方向 installation direction

SM 系列电机仅支持法兰安装，有三种机械构造，安装方向如下图所示。

The SM series motors only support flange installation and have three mechanical structures. The installation direction is shown in the following figure.



伺服电机在水平和垂直方向上均可安装。采用③机械构造时：

Servo motors can be installed in both horizontal and vertical directions. When using ③ mechanical structure:

安装说明 Installation instructions

规范的安装是设备/机械制造商的责任，电机的机械和电气安装工作必须由受过培训的专业 人员执行：

Standardized installation is the responsibility of the equipment/machinery manufacturer, and the mechanical and electrical installation work of the motor must be carried out by trained professionals:

- 请遵循铭牌上的数据以及电机上贴附的警示图标。

Please follow the data on the nameplate and the warning icon attached to the motor.

- 检查安装地的环境条件（例如：温度、安装高度）是否符合要求，禁止在易爆环境中使用电机！

- Check if the environmental conditions of the installation site (such as temperature and installation height) meet the requirements. Do not use the motor in explosive environments!

- 彻底去除轴伸上的防腐剂，使用商业上惯用的普通溶剂。

Thoroughly remove the anti-corrosion agent from the shaft extension and use commonly used commercial solvents.

- 确保损耗热量能够充分排出，请在机床和电机之间安装一个散热板，安装面积越大，散热越好，建议的散热板尺寸(长度×宽度×厚度)及材质如下：250×250×6 mm（铝制）

To ensure that the heat loss can be fully discharged, please install a heat dissipation plate between the machine tool and the motor. The larger the installation area, the better the heat dissipation. The recommended size of the heat dissipation plate (length) × width × The thickness and material are as follows:250×250×6 mm (aluminum)

请勿在伺服电机和散热板之间使用衬垫等绝缘体，否则会导致电机温度升高发生故障。

Do not use insulation materials such as pads between the servo motor and the heat dissipation plate, as this may cause the motor temperature to rise and malfunction.

- 在进行轴伸向上的垂直安装时必须确保不会有液体渗入上部轴承。

When installing vertically with the shaft extended upwards, it is necessary to ensure that no liquid seeps into the upper bearing.

- 使用带油封的电机时，请将油面降至油封唇部一下使用。

When using motors with oil seals, please lower the oil level to the lip of the oil seal before use.

为了防止油封过度磨损，应使唇部留有少量油沫以做润滑

To prevent excessive wear of the oil seal, a small amount of oil foam should be left on the lips for lubrication.

- 电机只能根据规定的结构在一个平坦、无振动和抗扭曲变形的支撑法兰面进行安装。

The motor can only be installed on a flat, vibration free, and torsion resistant support flange surface according to the specified structure.

- 请使用强度等级至少为 8.8 的内六角柱头螺钉。

Please use hexagon socket head screws with a strength grade of at least 8.8.

- 拧紧固定螺钉时要防止螺钉变形。

When tightening the fixing screws, it is necessary to prevent deformation of the screws.

请遵循电机法兰固定螺钉的推荐紧固扭矩数值。

Please follow the recommended tightening torque values for the motor flange fixing screws.

机座 180mm 及以上的电机，安装后拆除旋入的吊环或者拧紧吊环。

For motors with a base of 180mm or larger, remove the threaded lifting rings or tighten them after installation.

说明 explain

- 敲打或挤压轴伸可能会损坏电机，安装电机时应避免敲打或挤压轴伸 。

Knocking or squeezing the shaft extension may damage the motor, so when installing the motor, avoid hitting or squeezing the shaft extension.

- 轴承和密封圈同清洁剂接触可能会导致材料损坏：

Contact between bearings and sealing rings with cleaning agents may cause material damage:

— 清洁电机轴末端的锈迹、污渍时，请使用普通清洁剂。

When cleaning the rust and stains on the end of the motor shaft, please use a regular cleaning agent.

— 请勿将轴承和密封圈同清洁剂接触。

- Do not contact the bearings and sealing rings with cleaning agents.

- 油进入伺服电机内部可能导致故障：请勿将油封浸泡在油面中使用。

Oil entering the servo motor may cause malfunctions: Do not soak the oil seal in the oil surface for use.

抱闸电机安装 Installation of brake motor

抱闸得电励磁线圈吸合玄铁释放，断电后抱闸通过机械弹性装置抱住电机轴。抱闸属于有 寿命部件，仅用于电机的停机抱闸，频繁使用电机抱闸进行急停操作会缩短其使用寿命， 如非绝对必要，请不要将电机抱闸用作急停或减速

装置。

The excitation coil of the holding brake is attracted and released by the black iron, and after the power is cut off, the holding brake holds the motor shaft through a mechanical elastic device. The brake is a durable component that is only used for stopping the motor. Frequent use of the motor brake for emergency stop operations can shorten its service life. If it is not absolutely necessary, please do not use the motor brake as an emergency stop or deceleration device.

抱闸的额定电压为 24V DC ±10 %；在电机侧的连接器上必须提供的最小电压为 24V DC(-10%)，以确保抱闸的正常开启；

The rated voltage of the brake is 24V DC ± 10%; The minimum voltage that must be provided on the connector on the motor side is 24V DC (-10%) to ensure the normal opening of the brake;

在超过最大电压 24V DC(+10%)的情况下，抱闸可能再次闭合。

When the maximum voltage exceeds 24V DC (+10%), the brake may close again.

长距离抱闸线缆应考虑电缆上的压降。铜制电缆压降 ΔU 近似计算如下：

Long distance brake cables should consider the voltage drop on the cable. Copper cable voltage drop The approximate calculation of U is as follows:

ΔU [V] = 0.042 Ω·mm2/m · (L / q) · I brake

其中：L = 电缆长度(m)，q = 抱闸芯线横截面积(mm2)，I 抱闸 = 抱闸直流电流(A)

Among them: L=cable length (m), q=cross-sectional area of the brake core wire (mm2), I Holding brake=Holding brake DC current (A)

抱闸的吸合时间和脱离时间因放电回路而异；使用时，请务必通过实际产品确认动作延迟 时间。

The engagement and disengagement times of the brake vary depending on the discharge circuit; When using, please make sure to confirm the action delay time through the actual product.

避免在抱闸尚处于连接状态下重复短时启动电机，因此，在驱动控制回路或者使能回路中 要考虑抱闸的开关时间和继电器接通时间。

To avoid repeatedly starting the motor for a short time while the brake is still connected, the opening and closing time of the brake and the relay connection time should be considered in the drive control circuit or enable circuit.

用于有重力轴、机械掉落等安全隐患的用途时，请考虑机械侧的安全，比如防掉落机构的 采用双重化安全结构。

When used for applications with safety hazards such as gravity axis and mechanical falling, please consider the safety of the mechanical side, such as the use of a dual safety structure for anti falling mechanisms.

说明 explain

- 带抱闸的电机在加速、停止或低速运行时，抱闸的旋转盘会产生轻微的摩擦声，并非故 障或异常。

When a motor with a brake is accelerating, stopping, or running at low speed, the rotating disc of the brake will produce a slight friction sound, which is not a fault or abnormality.

- 由于抱闸在未通电状态下也会发生制动器齿隙，电机轴在旋转方向上会有微小的回程间 隙，属于正常现象。

Due to the brake backlash occurring even when the brake is not powered on, there may be a slight backlash in the direction of rotation of the motor shaft, which is a normal phenomenon.

机械连接 Mechanical connection

只能使用合适的工具安装和拆卸传动单元，如联轴器、齿轮、皮带轮。

Only suitable tools can be used to install and disassemble the transmission unit, such as couplings, gears, and pulleys.

- 使用轴伸上的螺纹孔；
- Use threaded holes on the shaft extension;
- 必要时对传动单元进行加热；

If necessary, heat the transmission unit;

- 拆卸时使用垫圈保护轴伸中心；
- Use washers to protect the shaft extension center during disassembly;
- 带键槽的电机在出厂时经过半键平衡测试，必要时根据相关要求对带传动单元的电机进 行全平衡 。

The motor with keyway undergoes a half key balance test at the factory, and if necessary, the motor with transmission unit is fully balanced according to relevant requirements.

联轴器连接 Coupling connection

- 请使用专用的挠性联轴器。推荐使用允许一定偏心角的双板簧联轴器。

Please use a dedicated flexible coupling. It is recommended to use a double leaf spring coupling that allows for a certain eccentricity angle.

- 请选择满足使用条件且尺寸大小合适的联轴器，过大或过小都会导致故障。

Please choose a coupling that meets the usage conditions and is of appropriate size. Too large or too small can cause malfunctions.

- 联轴器的定心虽然因使用的转速及联轴器的型号而异，但请确保联轴器两端负载的同轴度 < 0.03mm。

The centering of the coupling may vary depending on the speed and model of the coupling used, but please ensure that the coaxiality of the load at both ends of the coupling is less than 0.03mm.

传动带连接

- 请根据伺服电机的允许径向负载以及电机的输出功率选择合适的传动带。

Please select the appropriate transmission belt based on the allowable radial load of the servo motor and the output power of the motor.

- 安装传动带时，应使传动带的拉力低于规定的允许径向负载值。

When installing the drive belt, the tension of the drive belt should be lower than the specified allowable radial load value.

- 传动带的详细安装注意事项请参照传动带厂家的使用说明。

Please refer to the manufacturer's instructions for detailed installation precautions of the drive belt.

5.4 安装后检查 Post installation inspection

以下检查表不要求完整性，根据系统特定条件，可能需要进行其他检查，安装完成后请按 照其他相关要求进行检查。

The following checklist does not require completeness. Depending on the specific conditions of the system, additional checks may be required. After installation, please follow other relevant requirements for inspection.

安装后检查表 Post installation checklist

序 号 NO.	检查项 checklist	确认 confirm
1	所有活动和带电零件都进行了安装和功能检测。 All activities and live parts have been installed and functionally tested.	□
2	电机已经按规定安装并进行了对中。 The motor has been installed and aligned according to regulations.	□
3	电机转子可以顺畅转动。 The motor rotor can rotate smoothly.	□
4	所有固定螺栓、连接件和电气接口都已用规定的紧固扭矩拧紧且正确 固定。 All fixing bolts, connectors, and electrical interfaces have been tightened with the specified tightening torque and correctly secured.	□
5	电机实际运行条件与功率铭牌上的数据一致。 The actual operating conditions of the motor are consistent with the data on the power nameplate.	□
6	根据传动单元的类型正确设置了传动单元。 The transmission unit has been correctly set according to its type. 例如： For example: ● 联轴器进行了对中和平衡。 The coupling has been neutralized and balanced. ● 使用皮带传动时正确的设置了皮带装置。 Correctly set the belt device when using belt transmission. ● 如果有齿轮，齿面间隙、齿尖间隙以及径向间隙都经过了正确的 调整。 If there are gears, the tooth surface clearance, tooth tip clearance, and radial clearance have all been correctly adjusted.	□

7	抱闸已通过施加运行电压打开。 The brake has been opened by applying operating voltage.	□
8	抱闸可以正常打开和闭合。 The brake can be opened and closed normally.	□
9	端子螺钉按规定扭矩锁紧并标记。 Tighten the terminal screws to the specified torque and mark them.	□
10	伺服电机的安装、轴和机械的连接必须可靠。 The installation of servo motors and the connection between shafts and machinery must be reliable.	□
11	伺服电机和所连接的机械必须处于可以运行的状况。 The servo motor and the connected machinery must be in a working condition.	□
12	主回路线耳铜管压接和安装牢靠。 The ear copper pipes of the main circuit are firmly crimped and installed.	□

说明 illustrate

- 电机只能和配置的伺服驱动器一起工作。

The motor can only work with the configured servo driver.

- 静电易损组件（ESD）可能会因静电放电而损坏。

Electrostatic vulnerable components (ESD) may be damaged due to electrostatic discharge.

- 请采取静电防护措施。

Please take electrostatic protection measures.

- 佩戴防护装置后才可接触部件端子。

Wear protective equipment before touching component terminals.

- 请遵循相关的的 EMC 说明。

Please follow the relevant EMC instructions.

6 电气安装 electrical installation

6.1 安全提示 Safety Tips

项目 item	描述 description

<table>
<tr><td>定心 Centering</td><td>在与机械连接时，请使用联轴节，并使伺服电机的轴心与机械的轴心保持在一 条直线上。安装伺服电机时，使其符合左图所示的定心精度要求。如果定心不 充分，则会产生振动，有时可能损坏轴承与编码器等。

When connecting with machinery, please use a coupling and keep the axis of the servo motor in a straight line with the axis of the machinery. When installing the servo motor, ensure that it meets the centering accuracy requirements shown in the left figure. If the centering is not sufficient, vibration may occur and sometimes damage bearings and encoders.

与电机端固定的一半联轴节外圆为基准，测量另一半联轴节左端圆周 方向任意四处与基准的距离，最大值与最小值之差保证在 0.03mm 以下。

The outer circle of the half coupling fixed to the motor end is used as the reference, and the distance between the left end of the other half coupling and the reference is measured at any position in the circumferential direction. The difference between the maximum and minimum values should be ensured to be less than 0.03mm.</td></tr>
<tr><td>线缆的应力状 况
Stress condition of cables</td><td>不要使电线“弯曲”或对其施加“张力”，特别是信号线的芯线为 0.2mm 或 0.3mm，非常细，所以配线(使用)时，请不要使其张拉过紧。
Do not bend or apply tension to the wires, especially when the core wire of the signal wire is 0.2mm or 0.3mm, which is very thin. Therefore, when wiring (using), please do not tension it too tightly.

线缆的最小弯折半径应满足下表：

The minimum bending radius of the cable should meet the following table:
<table><tr><td>普通线缆 Ordinary cables</td><td>R = 5 ×线缆直径 Cable diameter</td></tr><tr><td>拖链线缆 Drag chain cable</td><td>R = 10 ×线缆直径 Cable diameter</td></tr></table></td></tr>
<tr><td>连接器部分的处理
Handling of the connector section</td><td>请注意以下事项：
Please note the following:
● 连接器连接时，请确认连接器内没有垃圾或者金属片等异物。
When connecting the connector, please confirm that there is no garbage or foreign objects such as metal sheets inside the connector.
● 将连接器连到伺服电机上时，请务必先从伺服电机主回路线缆一侧连 接，并且主线缆的接地线一定要可靠连接。如果先连接编码器线缆一 侧， 那么，编码器可能会因 PE 之间的电位差而产生故障。接线时，请 确认针脚排列正确无误。
When connecting the connector to the servo motor, be sure to first connect it from one side of the main circuit cable of the servo motor, and the grounding wire of the main cable must be reliably connected. If one side of the encoder cable is connected first, the encoder may malfunction due to the potential difference between PEs. When wiring, please confirm that the pin arrangement is correct and error free.

● 连接器是由树脂制成的。请勿施加冲击以免损坏连接器。
The connector is made of resin. Do not apply impact to avoid damaging the connector.
● 在线缆保持连接的状态下进行搬运作业时，请务必握住伺服电机主体。 如果只抓住线缆进行搬运，则可能会损坏连接器或者拉断线缆。
When carrying out transportation operations while the cable is still connected, be sure to hold the main body of the servo motor. If only</td></tr>
</table>

	grasping the cable for handling, it may damage the connector or pull the cable. ● 如果使用弯曲线缆，则应在配线作业中充分注意，勿向连接器部分施加 应力。如果向连接器部分施加应力，则可能会导致连接器损坏。 If using bent cables, full attention should be paid during wiring operations to avoid applying stress to the connector section. If stress is applied to the connector section, it may cause damage to the connector.

6.2 接线前检查 Pre wiring inspection

以下检查表不要求完整性，根据系统特定条件，可能需要进行其他检查，接线前请按照其 他相关要求进行检查。

The following checklist does not require completeness. Depending on the specific conditions of the system, other checks may be required. Please check according to other relevant requirements before wiring.

序 号 NO.	检查项 Checklist	确认 confirm
1	已了解并阅读了伺服驱动器安装说明。 have understood and read the installation instructions for the servo drive.	□
2	线缆型号与电机和伺服器驱动匹配。 The cable model matches the motor and server drive.	□
3	线缆长度符合设备安装的需求。 The cable length meets the requirements of equipment installation.	□
4	线缆无破损、无裸露线头、连接器无开裂现象。 The cable has no damage, no exposed wire ends, and the connector has no cracking phenomenon.	□
5	已了解连接器的插接方向、了解防差错标志。 Understood the direction of connector insertion and error prevention signs.	□
6	已检查接线部位无水渍和铁屑等导电污染物。 Checked for conductive pollutants such as water stains and iron filings in the wiring area.	□


注意 attention

机器运动和松动的零件可引发生命危险：

Machine movement and loose parts can cause life-threatening situations.

- 直接连接到三相交流电源上会损坏电机。

  Directly connecting to a three-phase AC power supply will damage the motor.

- 请务必确认机器上所有的装配作业已完成。

  Please make sure to confirm that all assembly operations on the machine have been completed.

- 接通电机前确认电机内和电机上没有可能会甩出或掉落的松动零件。

  Before connecting the motor, make sure that there are no loose parts inside or on the motor that may be thrown out or fall off.

- 检查所有防护罩已经正确安装。

  Check that all protective covers have been installed correctly.

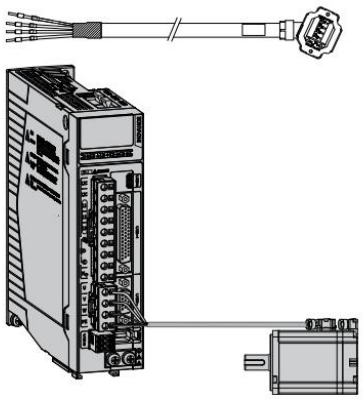
6.3 动力线缆连接 Power cable connection

- 当伺服驱动器匹配的电机是端子型电机时，其连接方式如下图所示。

When the motor matched with the servo drive is a terminal type motor, its connection method is shown in the following figure.

伺服驱动器输出与伺服电机连接示意图

Schematic diagram of the connection between servo driver output and servo motor



端子型电机的动力线缆接线方向有前出线和后出线两种类型，接线时请检查您订购的线 缆出线方向，接线时请注意接插件的插入方向。

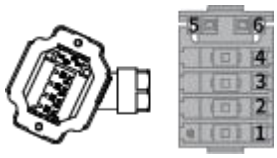
There are two types of power cable wiring directions for terminal type motors: front and rear. When wiring, please check the direction of the cable you ordered and pay attention to the insertion direction of the connector.

动力线缆连接器（伺服电机侧）说明

Power cable connector (servo motor side) description

泰格运控（江苏）技术有限公司

TIGER MOTION CONTROL (JIANGSU) TECHNOLOGY CO.,LTD
电话(Tel)：13862457235　地址(Address) 江苏省丹阳市云阳街道创智路 2 号智造中心一期 9 栋 101
Tel：13862457235 Address：Address: Room 101, Building 9, Phase I, Zhizao Center, No. 2 Chuangzhi Road, Yunyang Street, Danyang City, Jiangsu Province

适配电机框号[1] Adapted motor frame number [1]	连接器外形图 Connector Outline Drawing	端子引脚分布 Terminal pin distribution		
		针脚号 pin	信号名称 signal name	颜色 color
端子型：Terminal type: 40 60 80	 黑色 6 Pin 接插件 Black 6 Pin connector	1	PE	黄/绿 yellow/green
		2	W	红 red
		3	V	黑 black
		4	U	白 white
		5	抱闸（无正负）Holding brake (no positive or negative)	棕 brown
		6		蓝 blue

说明 explain

- [1]：电机框号指安装法兰宽度（单位：mm）。

[1] The motor frame number refers to the width of the installation flange (unit: mm).

- 动力线缆颜色请以实物为准，本手册中说明的线缆颜色均为泰格运控线缆。

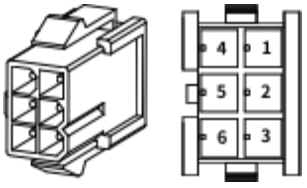
Please refer to the actual product for the color of the power cables. The colors of the cables described in this manual are all Tiger operation control cables.

- 当伺服驱动器匹配的电机是甩线型电机时，电机动力线连接器说明如下表所示。 甩线型电机的动力线缆接线，接线时请注意接插件的插入方向

When the motor matched with the servo drive is a swing type motor, the description of the motor power line connector is shown in the table below. Please pay attention to the insertion direction of the connectors when wiring the power cables of the swing type motor

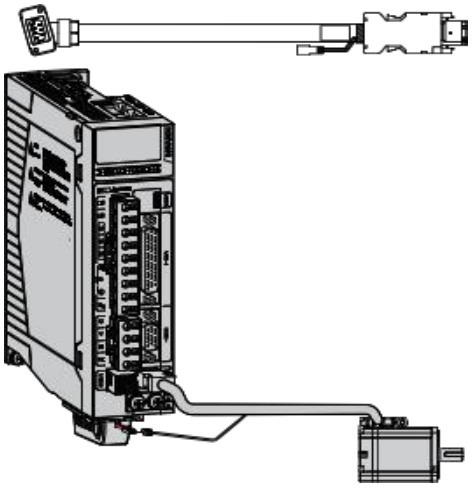
动力线缆连接器（伺服电机侧）说明

Power cable connector (servo motor side) description

适配电机框号[1] Adapted motor frame number [1]	连接器外形图 Connector Outline Drawing	端子引脚分布 terminal pin distribution		
		针脚号 pin	信号名称 signal name	颜色 color
甩线型：Swinging line 40 60	 黑色 6 Pin 接插件 推荐：塑壳：MOLEX-50361736；端子：MOLEX-39000061	1	U	白 white
		2	V	黑 black
		4	W	红 red
		5	PE	黄/绿 yellow/green
		3		棕 brown

80		6	抱闸（无正负）Holding brake (no positive or negative)	蓝 blue

6.4 编码器线缆连接 Encoder cable connection



绝对值编码器信号 接线示例图

Example diagram of absolute value encoder signal wiring

端子型电机的编码器线缆接线方向有前出线和后出线两种类型，接线时请检查您订购的线缆出线方向，接线时请注意接插件的插入方向。

There are two types of encoder cable wiring directions for terminal type motors: front and rear. When wiring, please check the cable wiring direction you ordered and pay attention to the insertion direction of the connector.

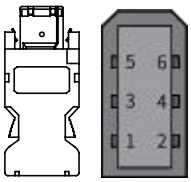
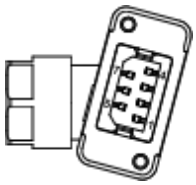
端子型电机编码器线缆连接 Terminal type motor encoder cable connection

端子型电机编码器线缆连接器

Terminal type motor encoder cable connector

泰格运控（江苏）技术有限公司

TIGER MOTION CONTROL (JIANGSU) TECHNOLOGY CO.,LTD
电话(Tel)：13862457235　地址(Address) 江苏省丹阳市云阳街道创智路 2 号智造中心一期 9 栋 101
Tel：13862457235 Address：Address: Room 101, Building 9, Phase I, Zhizao Center, No. 2 Chuangzhi Road, Yunyang Street, Danyang City, Jiangsu Province

适用电机框 Applicable motor frame numbe	连接器外形图 Connector Outline Drawing		端子引脚分布 Terminal pin distribution			
			针脚号 PIN NO.	信号名称 Signal name	颜色 color	类型 type
端子型：terminal type 40 60 80	驱动器侧 drive side	 6Pin 公头(右侧为对接面) 6pin Male(right side is docking surface)	1	+5V	红 red	对绞 Twisted pair
			2	GND	橙 orange	
			5	PS+	蓝 blue	对绞 Twisted pair
			6	PS-	紫 purple	
			外壳 shell	PE	-	-
	电机侧 motor side	 7Pin 接插件 7pin connecting pin	1	PS+	蓝 blue	对绞 Twisted pair
			2	PS-	紫 purple	
			3	DC+	棕 brown	对绞 Twisted pair
			4	DC-	黑 black	
			5	+5V	红 red	对绞 Twisted pair
			6	GND	橙 orange	
			7	PE	-	-

说明 explain

[1]：电机框号指安装法兰宽度（单位：mm）。

[1] The motor frame number refers to the width of the installation flange (unit: mm).

甩线型电机编码器线缆连接 Cable connection for swing type motor encoder

甩线型电机的编码器线缆接线，接线时请注意接插件的插入方向。

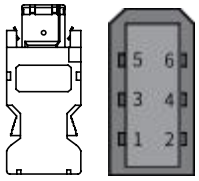
Please pay attention to the insertion direction of the connector when wiring the encoder cable of the wire shedding motor.

甩线型电机编码器线缆连接器

泰格运控（江苏）技术有限公司

TIGER MOTION CONTROL (JIANGSU) TECHNOLOGY CO.,LTD
电话(Tel)：13862457235　地址(Address) 江苏省丹阳市云阳街道创智路 2 号智造中心一期 9 栋 101
Tel：13862457235 Address：Address: Room 101, Building 9, Phase I, Zhizao Center, No. 2 Chuangzhi Road, Yunyang Street, Danyang City, Jiangsu Province

Flywire type motor encoder cable connector

适用电机框号[1] Applicable motor frame numbe	连接器外形图 Connector Outline Drawing			端子引脚分布 Terminal pin distribution			
				针脚号 PIN NO.	信号名称 Signal name	颜色 color	类型 type
甩线型： Swinging line 40 60 80		驱动器侧 driver side	 6Pin 公头(右侧为对接面)	1	+5V	红 red	对绞 twisted pair
				2	GND	橙 orange	
				5	PS+	蓝	对绞 twisted pair
				6	PS-	紫	
				外壳	PE	-	-
		电机侧 Motor side	 9 Pin 接插件 connecting pin 推荐：塑壳(recommend：plastic shell)：AMP 172161-1 端子 terminal：AMP 770835-1	1	电池+ Battery+	棕 brown	对绞 twisted pair
				4	电池- Battery-	黑 black	
				3	PS+	蓝 blue	
				6	PS-	紫 purple	
				9	+5V	红 red	-
				8	GND	橙 orange	
				7	屏蔽 shield	-	

说明 explain

[1]：电机框号指安装法兰宽度（单位：mm）。

[1] The motor frame number refers to the width of the installation flange (unit: mm).

大功率电机编码器线缆连接

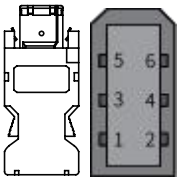
Cable connection for high-power motor encoder

大功率电机编码器线缆连接器

High power motor encoder cable connector

泰格运控（江苏）技术有限公司

TIGER MOTION CONTROL (JIANGSU) TECHNOLOGY CO.,LTD
电话(Tel)：13862457235　地址(Address) 江苏省丹阳市云阳街道创智路 2 号智造中心一期 9 栋 101
Tel：13862457235 Address：Address: Room 101, Building 9, Phase I, Zhizao Center, No. 2 Chuangzhi Road, Yunyang Street, Danyang City, Jiangsu Province

适用电机框号[1] Applicable motor frame numbe	连接器外形图 Connector Outline Drawing			端子引脚分布 Terminal pin distribution			
				针脚号 PIN NO.	信号名称 Signal name	颜色 color	类型 type
100 130 180		驱动器侧 Drive side	 6Pin 公头(右侧为对接面) 6pin male(right side is docking surface)	1	+5V	红 red	对绞 twisted pair
				2	GND	橙 orange	
				5	PS+	蓝 blue	对 twisted pair
				6	PS-	紫 purple	
				外壳 shell	PE	-	-
		电机侧 motor side		A	PS+	蓝 blue	对绞 Twisted pair
				B	PS-	紫 purple	
				E	电池+ Battery+	棕 brown	-
				F	电池- Battery-	黑 black	
				G	+5V	红 red	-
				H	GND	橙 orange	
				J	屏蔽 shield	-	

说明 explain

[1] ：电机框号指安装法兰宽度（单位：mm）。

[1] The motor frame number refers to the width of the installation flange (unit: mm).

6.5 连接器插合操作 Connector insertion and closing operation

动力连接器 Power connector

说明 explain

对插锁紧前，注意检查插头胶垫是否丢失、脱落等，胶垫需装配到位，两长 边需平整，胶垫未装 配到位或丢失禁止对插锁紧。

Before locking the plug, pay attention to checking whether the plug gasket is lost, detached, etc. The gasket must be assembled in place, and the two long edges must be flat. If the gasket is not assembled in place or lost, it is prohibited to lock the plug.

插头对插时信号 5、6 孔位需对正后（如下图）进行插合，且勿硬插，插合到位后进行锁紧，插头螺钉锁紧力矩 0.1N·m~0.15N·m。

When inserting the plug, the signal 5 and 6 holes need to be aligned (as shown in the figure below) before inserting, and do not forcefully insert. After inserting in place, lock it. The locking torque of the plug screw is 0.1N · m~0.15N · m.

编码器连接器 Encoder connector

说明 explain

对插锁紧前，注意检查插头胶垫是否丢失、脱落等，胶垫需装配到位，两长 边需平整的卡在外壳 槽内，胶垫未装配到位或丢失禁止对插锁紧。

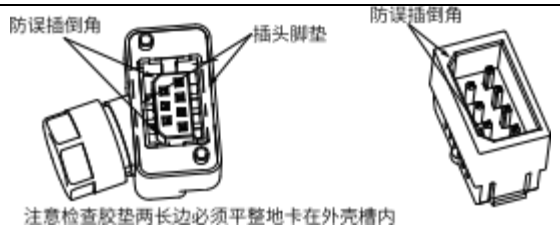
Before locking the plug, pay attention to checking whether the plug gasket is lost, detached, etc. The gasket must be assembled in place, and the two long edges must be flat and stuck in the housing groove. If the gasket is not assembled in place or lost, it is prohibited to lock the plug.

插头、插座设计有防误插倒角（如下图），插头对插时需防误插倒角对正后插合，且勿硬插，插合到位后插头上螺钉锁紧到面板上，锁紧力矩 0.1N·m~0.15 N·m。

The design of plugs and sockets has anti misinsertion chamfers (as shown in the figure below). When inserting plugs, it is necessary to prevent misinsertion chamfers and align them before inserting them, and do not forcefully insert them. After inserting them in place, the screws on the plug are locked to the panel with a locking torque of 0.1N · m~0.15 N · m.

对插锁紧前，注意检查插头胶垫是否丢失、脱落等，胶垫需装配到位，两长边需平整的卡 在外 壳槽内，胶垫未装配到位或丢失禁止对插锁紧。

Before locking the plug, pay attention to checking whether the plug gasket is lost, detached, etc. The gasket must be assembled in place, and the two long edges must be flat and stuck in the housing groove. If the gasket is not assembled in place or lost, it is prohibited to lock the plug.



编码器连接器 Encoder connector

说明 explain

. 插头绝缘体装配方向以实际为准。

The assembly direction of the plug insulator shall be based on the actual situation.

. 电连接器在未锁紧前，禁止通电使用。禁止带电插拔。

Electrical connectors are prohibited from being powered on before being locked. Prohibit live plugging and unplugging.

. 电连接器插拔寿命 50 次。使用寿命期间，应保持插头、插座结合面清洁、无油污； 使 用时应轻拿轻放，避免碰伤。

The insertion and removal life of the electrical connector is 50 times. During the service life, the mating surfaces of plugs and sockets should be kept clean and free of oil stains; When using, it should be handled with care to avoid injury.

每次连接公端、母端前，应在确认无凝露及污物后方可连接；连接器分开暂不使用时， 应注意防护，防止粉尘及液体进入。

Before connecting the male and female terminals, it is necessary to confirm that there is no condensation or dirt before connecting; When the connectors are separated and not in use temporarily, attention should be paid to protection to prevent dust and liquids from entering.

操作规范 Operating specifications

. **安装使用说明 Installation and usage instructions**

连接器内部必须保持干净，不能有残余的电缆和铁屑，不能受潮。

The interior of the connector must be kept clean, free from residual cables and iron filings, and free from moisture.

■ 检查连接器的密封圈和密封面是否符合防护等级。

Check whether the sealing ring and sealing surface of the connector meet the protection level.

■ 对电缆进行防扭转、拉拔和推撞以及弯曲的保护；连接器不允许持续受力。

■ Protect cables from twisting, pulling, pushing, and bending; The connector does not allow continuous force.

■ 电连接器在未锁紧前，禁止通电使用。

Before locking the electrical connector, it is prohibited to use it with electricity.

■ 禁止带电插拔。

Prohibit live plugging and unplugging.

■ 电连接器插拔寿命 50 次。使用寿命期间，应保持插头、插座结合面清洁、无油污； 使用时应轻拿轻放，避免碰伤。

The insertion and removal life of the electrical connector is 50 times. During the service life, the mating surfaces of plugs and sockets should be kept clean and free of oil stains; When using, it should be handled with care to avoid injury.

■ 带屏蔽成的电缆需与电机和变频器两端接地。

The shielded cable needs to be grounded at both ends of the motor and frequency converter.

- **维护说明 Maintenance instructions**
  - 每次连接公端、母端前，应在确认无凝露及污物后方可连接；

  Before connecting the male and female terminals, it is necessary to confirm that there is no condensation or dirt before connecting;
  - 连接器分开暂不使用时，应注意防护，防止粉尘及液体进入。

  When the connectors are separated and not in use temporarily, attention should be paid to protection to prevent dust and liquids from entering.

6.6 安装后检查 Post installation inspection

以下检查表不要求完整性，根据系统特定条件，可能需要进行其他检查，安装完成后请按 照其他相关要求进行检查。

The following checklist does not require completeness. Depending on the specific conditions of the system, additional checks may be required. After installation, please follow other relevant requirements for inspection.

安装后检查表 Post installation checklist

序 号 NO.	检查项 Checklist	确 认 confirm
1	配置的驱动系统中的所有必要组件都存在，尺寸规格正确并已按照顺 序安装和连接。 All necessary components in the configured drive system are present, with correct size specifications and installed and connected in sequence.	□
2	已经阅读了伺服电机安全注意事项。 I have read the safety precautions for servo motors.	□
3	了解了待运行的电机类型。如： MS1H1-***。 Understood the type of motor to be operated. For example: MS1H1- * * *.	□
4	环境条件在允许的范围内。 The environmental conditions are within the allowable range.	□
5	电机实际运行条件与功率铭牌上的数据一致。	□

	The actual operating conditions of the motor are consistent with the data on the power nameplate.	
7	遵循了最小绝缘电阻值。 The minimum insulation resistance value was followed.	□
8	按规定建立接地连接和等电位连接。 Establish grounding and equipotential connections according to regulations.	□
9	在伺服驱动上运行时遵循了给定的极限转速 nmax。 When running on the servo drive, the given maximum speed nmax was followed.	□
10	是按照规定的旋转方向连接电机。 When running on the servo drive, the given maximum speed nmax was followed. Connect the motor according to the specified rotation direction.	□
11	已经规范完成所有电气连接。 All electrical connections have been standardized and completed.	□
12	电机表面不允许有任何热敏或隔热材料覆盖。 The surface of the motor is not allowed to be covered with any thermal or insulation materials.	□
13	电机抱闸不在允许的电压范围内运行会提前磨损 ，确认电机抱闸在允 许的电压范围内运行。 If the motor brake does not operate within the allowed voltage range, it will wear out prematurely. Confirm that the motor brake operates within the allowed voltage range.	□
14	没有其他危险源。 There are no other sources of danger.	□
15	伺服驱动器输出端子(U、V、W)和伺服电机主电路线缆(U、V、W) 相位一致，且正确连接。 The phase of the output terminals (U, V, W) of the servo driver and the main circuit cables (U, V, W) of the servo motor are consistent and correctly connected.	□
16	所有线缆的受力在规定范围之内。 The force on all cables is within the specified range.	□
17	伺服驱动器和伺服电机必须可靠接地。 The servo driver and servo motor must be reliably grounded.	□
18	配线端子已进行绝缘处理。	□

	The wiring terminals have been insulated.	

注 意 attention

. 功率接口松动可造成财产损失，紧固扭矩太小或振动会导致功率接口松动。可能因此导 致火灾、设备损坏或功能故障。

Loose power interfaces can cause property damage, while too little tightening torque or vibration can lead to loose power interfaces. This may lead to fire, equipment damage, or functional failure.

. 用规定的紧固扭矩拧紧所有功率接口。

Tighten all power interfaces with the specified tightening torque.

. 请定期检查所有的功率接口，尤其是在运输后。

Please regularly check all power interfaces, especially after transportation.

7 日常保养与维护 Daily maintenance

7.1 定期检查项目 Regular inspection items

7.1.1 定期检查项目 Regular inspection items

定期检查项目清单 Regular inspection project list

序号 NO.	检查项目 Checklist	确 认 confirm
1	检查设备之间连接部位的固定螺丝无松动。 Check that the fixing screws at the connection points between the devices are not loose.	□
2	检查无过热迹象。 Check for no signs of overheating.	□
3	检查端子台无损伤。 Check that the terminal block is not damaged.	□
4	检查端子台的紧固部位无松动。 Check that the fastening parts of the terminal block are not loose.	□

7.1.2 定期保养项目 Regular maintenance items

为预防并维护伺服驱动器及电机，请按下表的标准进行更换。更换时，请与本公司或本公 司代理商联系，我们将在调查后判断是否更换部件。

To prevent and maintain servo drives and motors, please replace them according to the standards in the table below. When replacing, please contact our company or our agent, and we will investigate and determine whether to replace the parts.

对象 object	类别 category	标准更换周期 Standard replacement cycle	备注 note
电机 motor	绝对式编码器用电池 Battery for absolute encoder	寿命根据使用条件而异。The lifespan varies depending on the usage conditions. 请参考绝对编码器用电池附带操作说明。Please refer to the operating instructions provided with the battery for the absolute encoder.	标准更换周期仅供参考。即使标准更换周期未满，一旦发生异常也需更换。The standard replacement cycle is for reference only. Even if the standard replacement cycle is not yet complete, it needs to be replaced in case of any abnormalities.
	绝缘电阻检查 Insulation resistance inspection	每年至少检查一次。Check at least once a year.	使用绝缘电阻测量仪在 500V DC 档测量绝缘电阻。Measure the insulation resistance using an insulation resistance tester at 500V DC. Measurement method: 测量方法 ：在电机动力线 U、V、W 相中 的某一相和 PE(接地)间进行测量。电阻值超过 10MΩ则为正常。Measure between one of the phases U, V, and W of the motor power line and PE (ground). If the resistance value exceeds 10M Ω, it is considered normal.
设备 device	综合检修 Comprehensive maintenance	至少 5 年一次或至少每 20,000 小时一次，二者任意一个先达为准。At least once every 5 years or every 20000 hours, whichever comes first.	按照相关设备保养手册执行。Follow the relevant equipment maintenance manual for execution

8 附录 appendix

8.1 运行调试 Run debugging

调试前准备 Preparation before debugging

- 在接通电机前请事先设定和了解急停功能，以预防事故。

Before connecting the motor, please set and understand the emergency stop function in advance to prevent accidents.

- 请提前阅读伺服驱动的操作说明。

Please read the operating instructions for the servo drive in advance.

- 伺服驱动器和电机已正确设置。

The servo driver and motor have been set up correctly.

- 请正确设置电机旋转方向，伺服驱动器默认设置的正转指令，是从轴伸侧看时为逆时针 方向 (CCW) 旋转。

Please set the motor rotation direction correctly. The default forward rotation command for the servo drive is counterclockwise (CCW) rotation when viewed from the shaft extension side.



调试步骤 Debugging steps

通过伺服驱动器启动电机。

Starting the motor through a servo drive

电机必须正常运转(无过载、不必要的转速波动和强烈噪音等)。

The motor must operate normally (without overload, unnecessary speed fluctuations, and strong noise, etc.)

检查安全装置的功能。

Check the function of safety devices.

检查电机是否达到理想参数。

Check if the motor meets the ideal parameters.

关闭电机 Turn off the motor

通过伺服驱动关闭电机 Turn off the motor through servo drive

危 险 danger

- 专业人员需按照相关规定操作强电设备。

Professional personnel are required to operate strong electrical equipment in accordance with relevant regulations.

- 非专业人员操作强电设备或未按照相关规定和要求规范操作，可引发生命危险。

  Non professional personnel operating strong electrical equipment or not following relevant regulations and requirements can cause life-threatening situations.

- 电机连接到接地不充分的供电网络可产生危险电压，引发生命危险，可导致死亡、重伤 和电机损坏。

  The connection of the motor to an insufficiently grounded power supply network can generate dangerous voltage, which can cause life-threatening situations such as death, serious injury, and motor damage.

- 电机运行时其壳体可达到较高的温度，接触该壳体会导致灼伤。

  When the motor is running, its casing can reach a higher temperature, and contact with the casing can cause burns.

8.2 故障处理 Fault handling

按照 *"故障原因及解决方法"* 的故障解决方法并遵循伺服驱动器的调试手册排 除引发故障的原因，必要时修复或更换电机损坏部件，或者更换电机整机。

Follow the troubleshooting method of "Fault Causes and Solutions" and follow the debugging manual of the servo drive to eliminate the cause of the fault. If necessary, repair or replace damaged parts of the motor, or replace the entire motor.

故障现象 Fault phenomenon	可能的原因 Possible cause	解决方法 resolvent
电机不启动 Motor does not start	电源线中断 Power cord interruption	检查接线，并正确接线 Check the wiring and connect it correctly
	电机保护装置已报警 he motor protection device has triggered an alarm	检查保护参数设置是否正确，按照手册正确设置 Check if the protection parameters are set correctly and follow the manual to set them correctly
	伺服驱动器损坏、错误连接或设置错误 Servo drive damaged, incorrectly connected or set up	检查伺服驱动器，并按照调试手册正确接线盒设置 Check the servo drive and set the correct junction box according to the debugging manual
	过载 overload	减少负载 Reduce load
转向错误 Steering error	电机旋转方向设置错误 Motor rotation direction setting error	检查伺服驱动器上的参数设置 Check the parameter settings on the servo drive
电机加速缓慢	过载 overload	减少负载 Reduce load

Slow motor acceleration	伺服驱动器参数设置不正确 Servo driver parameter settings incorrect	检查伺服驱动器上的参数设置 Check the parameter settings on the servo drive
抱闸不释放 Brake not released	电压错误 Voltage error	使用正确抱闸接入电压 Using the correct holding brake to connect voltage
	接线错误 wiring error	检查接线 check wiring
	电源线上电压降幅 > 10% The voltage drop on the power line is greater than 10%	提供适当的接入电压，并检查电缆截面积 Provide appropriate connection voltage and check the cable cross-sectional area
抱闸扭矩不足 Insufficient brake torque	制动衬垫已磨损 The brake pad is worn out	更换电机 Replacing the motor
空载运行时电机出现过热 Motor overheats during no-load operation	伺服驱动器输出电压太高，频率太低 Servo driver output voltage too high, frequency too low	检查伺服驱动器上的设置 Check the settings on the servo drive
负载运行时电机出现过热 Motor overheats during load operation	过载 overload	减少负载 Reduce load
	堆积物等异物阻碍了电机有效散热 Foreign objects such as debris hinder the effective heat dissipation of the motor	清理电机表面，保证良好自然冷却散热 Clean the surface of the motor to ensure good natural cooling and heat dissipation
运行不平稳 Unstable operation	电机电缆和/或编码器电缆的屏蔽不够充分 Insufficient shielding of motor cables and/or encoder cables	检查屏蔽和接地 Check shielding and grounding
	伺服驱动器的增益太大	匹配伺服驱动器

	The gain of the servo driver is too large	Matching servo drive
刺耳的摩擦声，运行噪音 Harsh friction sound and running noise	旋转部件打滑 Rotating parts slipping	确定原因，修整部件 Determine the cause and repair the components
	电机内部有异物 There are foreign objects inside the motor	请联系您的供应商或当地泰格运控技术人员进行处理 Please contact your supplier or local Taige operation control technicians for handling
	轴承损坏 Bearing damage	请联系泰格运控技术人员进行处理 Please contact Tiger Operations Control technicians for assistance.
径向振动异常 Abnormal radial vibration	转子失衡 Rotor imbalance	请联系您的供应商或当地泰格运控技术人员进行处理 Please contact your supplier or local Tiger motion control technicians for handling
轴向振动异常 Abnormal axial vibration	转子不圆，芯轴弯曲 The rotor is not round and the core shaft is bent	请联系您的供应商或当地泰格运控技术人员进行处理 Please contact your supplier or local Tiger motion control technicians for handling
	校准不佳 Poor calibration	校准设备组，检查联轴器 Calibrate the equipment group and check the coupling
	相连设备失衡 Unbalanced connected devices	重新平衡相连设备 Rebalance connected devices
	相连设备出现振动 Connected equipment experiencing vibration	检查相连设备 Check connected devices
	齿轮箱运行不平稳 Uneven operation of gearbox	使齿轮箱正常运行 Ensure normal operation of the gearbox

8.3 废弃处置 Waste disposal

必须由具备专业知识的合格人员拆卸电机或指导电机的拆卸。

The disassembly of the motor must be carried out by qualified personnel with professional knowledge or guidance.

．废弃伺服电机时请按一般工业废弃物处置，并遵守当地相关法律规定。

When disposing of servo motors, please dispose of them as general industrial waste and comply with relevant local laws and regulations.

．根据需要，采取对最终产品的标示、告知等措施。

Take measures such as labeling and informing the final product as needed.

为了保护环境，请联系有资质的电子及电气废旧设备处理公司对您的废旧设备进行回收和 处理，并请根据当地的相应法规对您的废旧设备进行处置。

To protect the environment, please contact a qualified electronic and electrical waste equipment disposal company to recycle and dispose of your waste equipment, and dispose of your waste equipment in accordance with local regulations.

