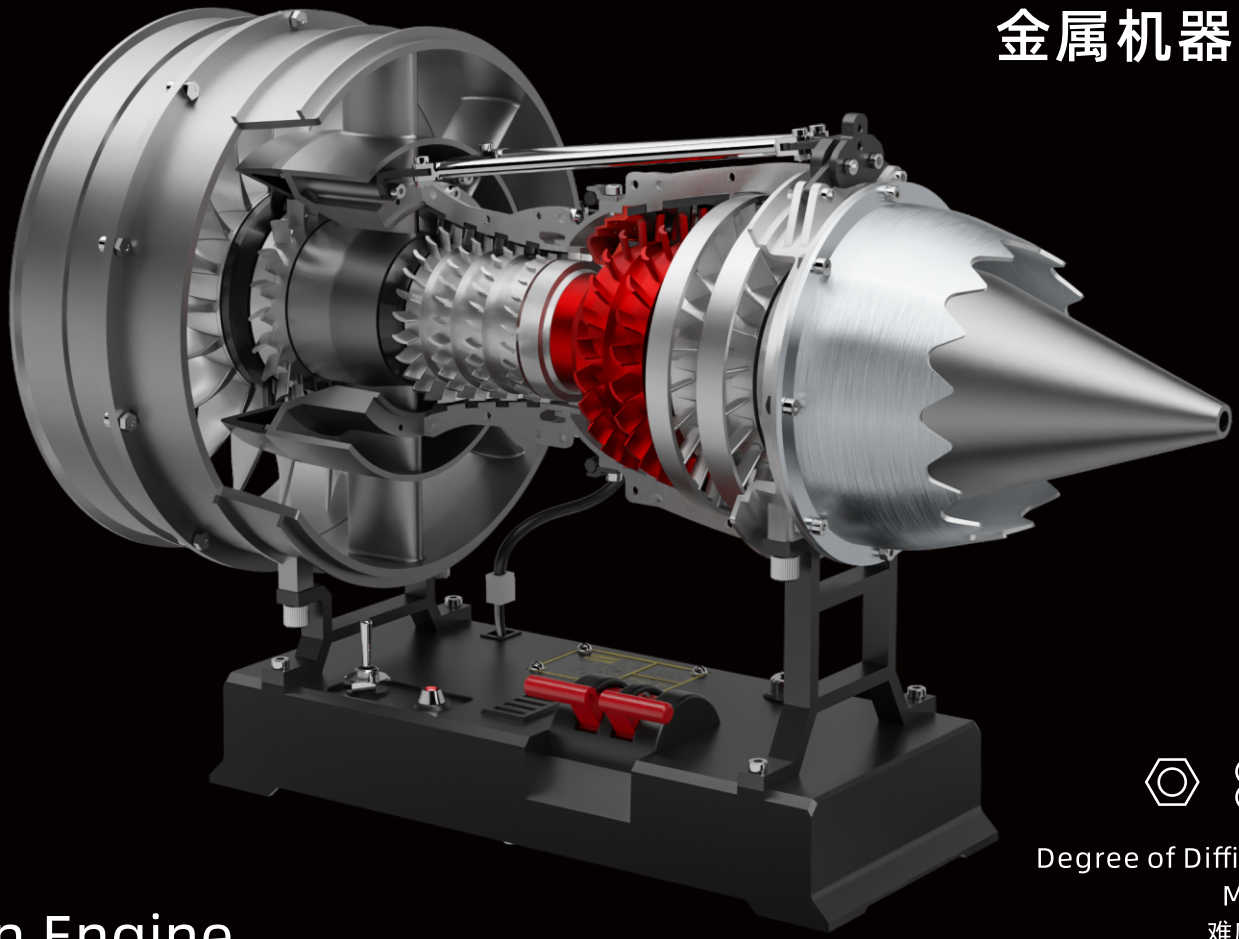
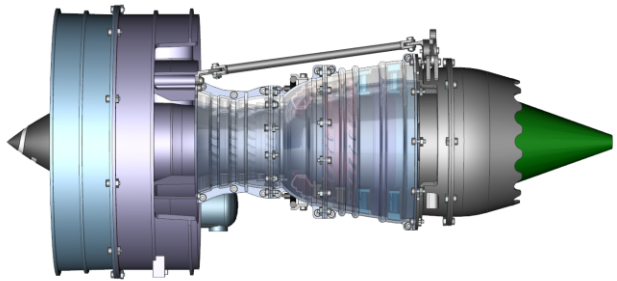
TECHING
土星文化

Metal Machine Assembly Model
金属机器 组装模型



Degree of Difficulty: ★★★☆☆
Model: DM121
难度系数: ★★★☆☆
型号: DM121

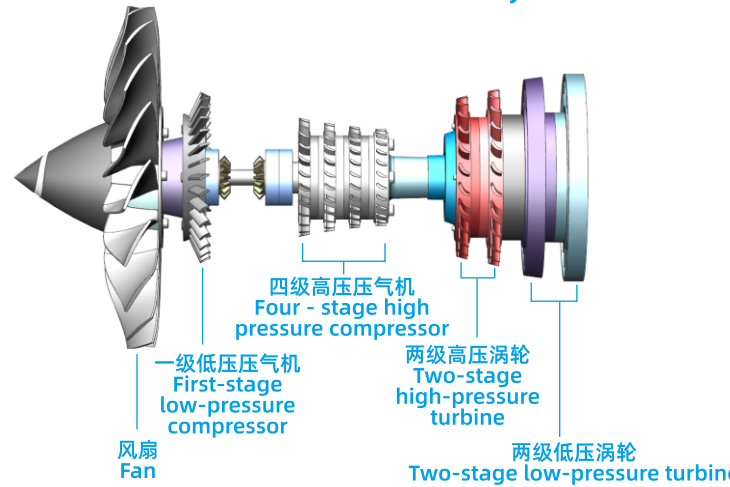
Civil Turbofan Engine
民用涡扇发动机



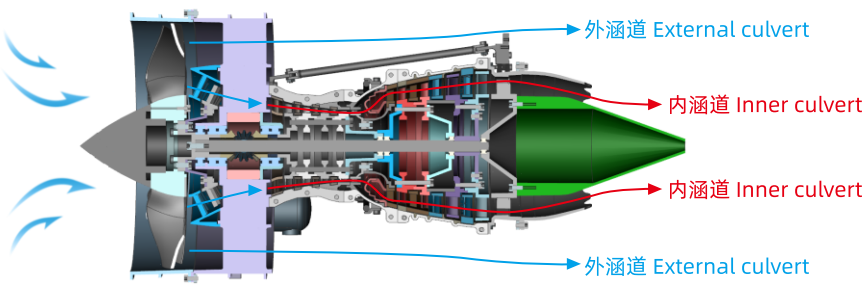
适用机型：
空客 A320
波音 B737
商飞 C919

Applicable models:
Airbus A320
Boeing B737
ComAC C919

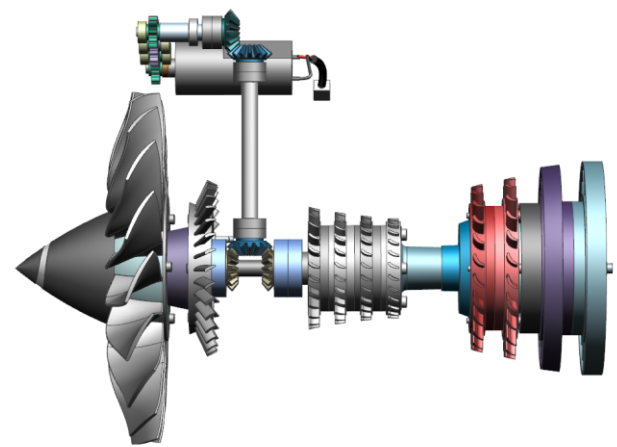
核心机转子总成
Core machine rotor assembly

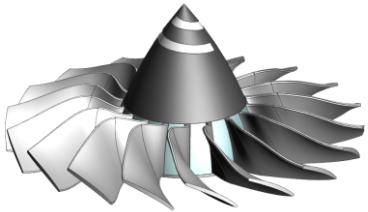


原理结构图
Principle structure diagram

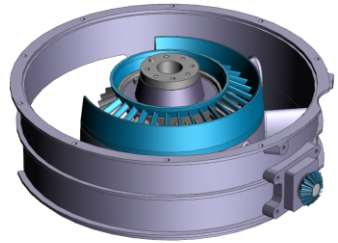


齿轮箱传动机构
Gearbox drive mechanism

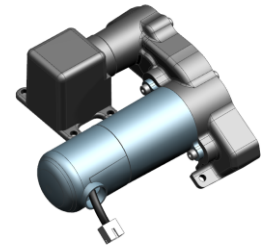




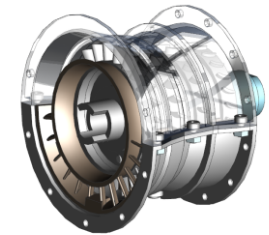
风扇总成
Fan assembly



中介机匣总成
Intermediate casing assembly



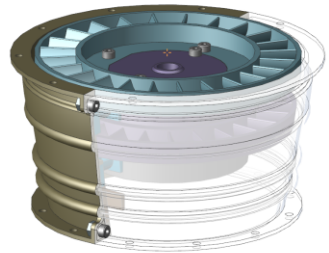
齿轮箱总成
Gearbox assembly



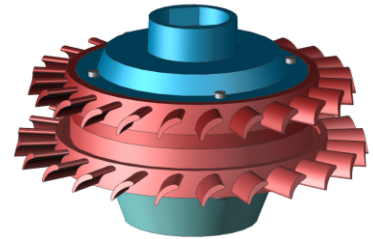
高压气机总成
High-pressure
compressor assembly



燃烧室总成
Combustion chamber assembly



低压涡轮总成
Low pressure turbine assembly



高压涡轮总成
High pressure turbine assembly

Real Models Real Worlds

真模型 真世界

产品基本信息

一.产品参数

产品名称：民用涡扇发动机

产品型号：DM121

主要材质：阳极氧化铝+不锈钢+锌合金

充电电压：直流5V

电池容量：800mAh

组装难度：IV级

产品标准：GB/T9254–2008

GB/T17626.2–2006

质检等级：A

二．产品介绍

- 土星工匠师系列产品为金属机构组装模型。主要材料选用铝合金表面阳极氧化，产品结构采用真实的工业结构；
- 使用各种工具组装零件，安装工序及方法接近实际工业要求；
- 该系列产品主要用来提高用户的动手能力、专注力，培养严谨讲秩序的习惯；
- 认识各种工业机器，学习各种工业结构，提高用户的探究及创新力。

三．组装要求

- 组装前要认真阅读《标准件组装基础知识》，学会基本的标准件组装方法和工具使用；
- 要求组装时桌面整洁，防止丢失零件或错装。 组装严谨有序，看图仔细，避免组装错误；
- 注意说明书中的提示语，注意零件的安装方向，防止理解错误。注意检测环节的要求；
- 摩擦部位尽量使用润滑油，防止运转时卡死。紧固螺钉必须安装到底，防止零件松动；
- 组装完成后要调试装配间隙及松紧度，有疑问可查询本公司相关网站或微信公众号；
- 鼓励在成人看护及确保安全的情况下，使用锉刀、砂纸等简单去材料工具，优化零件；
- 鼓励用户在没有安全隐患的情况下，将模型进行零部件修改或总体改

装，及早具备改装能力；

- 说明书后面附零件表，用户可根据列表拆散模型并重新装入盒中；
- 如果零件有丢失，可向我公司咨询或采购（土星官方网店）；
- 模型结构可能持续优化，如有说明书内容与实物不符，请参考公司最新组装资讯；
- 本产品长期不使用可能会造成电池失效、润滑油干枯、产品间隙沉积灰尘等造成产品无法运行的，请更换电池或拆解零件进行清洗。

注意事项

一．安全须知

- 请仔细阅读本手册中的内容，以确保您能够正确且安全的使用本产品；
- 该系列产品为工业级别金属机构模型，因此组装和使用该模型需要一定的安全意识，提高安全意识也是该模型的作用之一；
- 本模型适合14岁及以上用户使用，相关安全事项请仔细阅读本说明提示；
- 严禁让儿童或宠物吞咬本产品或其备件，以免造其伤害；
- 合理使用组装工具，严格按说明书组装零件，避免强装硬拆，防止划伤。严禁工具或零件尖角部位离眼睛太近，以免挫伤身体；
- 本模型主要由金属零件组成，具有一定的硬度和重量，请妥善放置，避免产品及配件受到强烈冲击和震动，以免砸伤身体或损坏本产品；
- 机械运动时，请不要将手指或身体其它部位放入零件运动范围内，避免压伤；
- 电线接头须按说明书指示标记连接，避免错接引起电路短路或失灵；
- 电池充放电及放置方法请按要求进行，电池停用3个月以上建议更换电池；
- 请勿以任何形式强行阻碍零件运转，如需关闭请直接关闭电源即可；
- 如对模型进行改装，请留意相关零件参数，避免使用大功率电器动力零部件或装置，导致意外；
- 请按说明书正确使用本产品的零部件，切勿做其它用途。

二．电池和充电注意事项

- 本产品配备专用充电线。用户自备电源适配器，其输出DC电压需5V，其输出DC电流不小于1000mA。禁止使用高于6V的适配器给产品充电；
- 充电前请确保触点干燥，无脏污。产品不使用或维修拆机时请不要充电；
- 不可将电池投入火中，也不能将其暴露在诸如日照、火烤或类似过热的环境中，以免电池漏液、过热、爆裂或起火；
- 如果电池更换不当会有爆炸危险，只能用同样类型或等效型电池来更换；
- 本产品配备的锂电池，严禁拆卸、挤压、加热或燃烧电池，严禁使用尖锐物、螺钉刀等触碰、撬电池，以上操作可能会引起电池起火

或燃烧；

- 如果电池在使用、充电或保存过程中有温度过高、变色、起鼓、漏液等异常现象，请停止使用并更换新电池，以免造成安全问题；
- 充电时，由于电池温度会升高，请不要将电池和易燃物放在一起（如：床头、衣物、书本等），以免引发火灾；
- 请勿在高温、潮湿等环境中充电，温度以0至35摄氏度为宜，湿度应在65%以下，产品设计使用最高环境温度为45摄氏度；
- 为减少儿童触电危险，请在家长或其他监护人的指导下操作。

三．产品声明

- 使用本产品前，请您仔细阅读并遵守本手册中的各种说明及警示。对于不正确使用或不遵守本产品相关说明使用所造成的后果，本公司概不负责；
- 本产品适合于14岁及以上用户使用。因使用本产品用户年龄偏小或将产品给对本产品相关安全要求不熟悉者使用，造成的安全问题本公司概不负责；
- 本产品是工业机构模型，仅作为学习和体验使用。不得将产品作为其它用途使用，否则本公司不承担任何责任；
- 本公司在不断提高、完善产品的设计和使用功能，如说明书所载内容与实际产品的内容略有不同，恕无法另行通知，敬请见谅。因此任何以本说明书的数据、图片或文字描述为依据的索赔要求将不予受理；
- 本着不断完善，持续发展的原则，本公司保留在不预先通知的情况下，对本手册中描述的任何产品细节进行修改和改进的权利；
- 产品说明书中的图片用于指导用户操作，仅供参考，具体请以实物为准；
- 在使用法律允许的最大限度内，在任何情况下，本公司与其供应商均不对任何特殊、偶然、附带、或间接损失承担责任，无论该损失由何种原因引起；
- 本手册中含有重要信息，请保留备用。

◆ Users are encouraged to perform part modification or overall modification of model without potential safety hazard so as to develop modification capability as soon as possible;
◆ The user may disassemble this model and put it in the package again according to the parts list attached hereto;
◆If any part is lost, please inquire of or purchase it from us (Teching official online store);
◆The model structure is subject to continual improvement. If the real object differs from the instruction manual, please refer to our latest assembly information.
◆ Once the product fails to function due to battery failure, lubricating oil shortage or dust accumulation in product gaps because it is left unused for long, it's advisable to change the battery or disassemble and clean its parts.

Precautions

I. Safety Instruction

◆ Please read this manual carefully so that you are in a position to use this product correctly and safely;
◆ This series of products are industrial–level metal models, so its assembly and use requires certain safety awareness; improvement of safety awareness is also a function of the model;
◆ This model is suitable for users aged 14 and over. Please read this manual carefully for relevant safety information;
◆ Strictly prohibit children or pets swallowing or biting this product or its spare parts, since this may cause injury/damage;
◆ Use assembly tools rationally, assemble the parts in strict conformity with the instruction manual, and avoid forcible handling to avoid scratches; keep sharp points of tools or parts away from the eyes to avoid contusions;
◆ This model is made up of metallic parts mainly, and has a certain level of hardness and a certain weight; please place it properly to avoid bodily injuries;Protect the products and accessories against intense shock and vibration so as to avoid personal injury and product damage;
◆ During mechanical movement, do not put a finger or any other part of the body within the movement range to avoid contusions;
◆ Wire connectors must be connected according to the marks specified in the instruction manual to avoid short–circuit or failure arising from wrong connection;
◆ Charge, discharge and place the battery as required; it is advised to replace the battery when it has not been used for 3 months or more;
◆ Do not prevent any part from running forcibly in any form; to do this, turn off the power directly;
◆ To refit this model, please pay attention to the relevant part parameters, and avoid using any high–power electric part or device that may result in an accident.
◆ Please use parts of this product properly as per instruction manual. Don't use them for other purposes.

II. Battery and charging precautions

◆ This product is delivered with dedicated charging cable. Users shall use their own power adapters; output DC voltage: 5V; output DC current ⩾1000mA;
◆ Please make sure the contact is dry and free of dirt before charging. Please don't charge the battery if the product is not in use or is in repair;
◆ Don't put the battery in fire or have it exposed to sunlight, fire or similar excessively hot environment, since this may lead to leakage, excessively high temperature, bursting or ignition of battery;
◆ If improper change of battery may cause explosion, the battery must be replaced with one of identical or equivalent type;

General information about product

I. Product Data

Product name: Civil Turbofan Engine

Product model: DM121

Main materials: Anodic aluminum oxide + stainless steel + zinc alloy

Charging voltage: DC 5V

Battery capacity: 800mAh

Assembly difficulty: Level IV

Product standards: GB/T9254–2008

GB/T17626.2–2006

II. Product description

◆ Teching Craftsman series of products are metal structure assembly models. Its primary material is aluminum alloy with anodized surface, and the product structure is a real industrial structure;
◆ Assemble parts using various tools with the installation procedures and methods substantially compliant with practical industrial requirements;
◆ This series of products are principally designed to improve users' hands–on ability and concentration, and to develop habits of "preciseness and stress on discipline";
◆ Learn about various industrial machines, and study various industrial structures to improve user's capability of research and innovation.

III. Assembly Requirements

◆ Be sure to read the Basics of Standard Parts Assembly carefully to master basic standard parts assembly procedure and the usage of tools before assembly;
◆ The table shall be kept tidy and clean during assembly to prevent parts being lost or incorrectly assembled. Assemble parts in a rigorous and orderly fashion, view the diagrams carefully, and avoid incorrect assembly;
◆ Pay attention to the prompt text in instruction manual, carefully view the part installation orientation, and avoid incorrect comprehension. Pay attention to the requirements on testing;
◆ Lubricating oil shall be applied to friction areas to the greatest extent to prevent jamming during operation. Fastening screws must be thoroughly mounted to prevent looseness of parts;
◆If you have any doubt when adjusting any assembly clearance or tightness after the completion of assembly, please refer to our website or WeChat public account;
◆ Users are encouraged to optimize the parts using material removing tools like files and sand paper with adult care where the personal safety is guaranteed;

◆ Never disassemble, squeeze, heat and set fire to the lithium battery delivered with this product, and never touch and pry the battery using any sharp object or screwdriver, etc., since this may cause the battery to ignite or burn;
◆ In the case of excessively high temperature, discoloration, bulging, leakage and other anomalies during the use, charging or keeping of battery, please take it out of service and change it with a new one to avoid safety problem;
◆ Since the battery temperature rises when it's being charged, please don't have the battery to come into contact with inflammables (e.g. bedside, clothing and books, etc.) since this may result in a fire;
◆Please don't charge the battery in a moist space with high temperature; the temperature is recommended to be 0¯35° C, and the humidity shall not exceed 65%; the design max. ambient temperature for using the product is 45° C;
◆ To alleviate the risk of electric shock, children are not allowed to use the product without the help of their parents or other custodians.

III. Product Declaration

◆ Please carefully read and observe various instructions and warnings in this manual before using this product. Our company shall not be held responsible for any consequence of failure to properly use this product or observe related operating instructions;
◆ This product is suitable for users aged 14 and over. Our company shall not be held responsible for any safety problem arising from the use of this product by too young users or users
who are not familiar with relevant safety requirements;
◆ As a model in industrial structure, this product is designed exclusively for learning and experience. Do not use this product for other purposes; otherwise, we will assume no responsibility for any consequence thereof;
◆ We have been improving the design and operation features of our product, so separate notice will not be given for slight difference between instruction manual and actual product. Hence, any claim for compensation filed based on the data, pictures or text of this instruction manual will be rejected;
◆ For constant improvement and sustainable development, our company reserves the right to modify and improve any product detail given in this manual without prior notice;
◆ The pictures in instruction manual guide users for operation, and are thus for indication only; the real product shall prevail;
◆ Our company and its suppliers shall not be held responsible for any special, incidental, collateral or indirect loss in any case to the greatest extent the law permits, regardless of its cause;
◆ Please keep this manual properly since it contains important information.

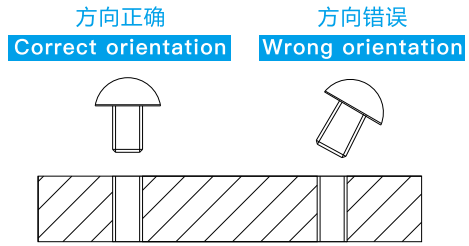
CATALOG
目录

- 1.底座总成 Base Assembly 001
- 2.风扇总成 Fan Assembly 005
- 3.中介机匣总成 Intermediate Casing Assembly 006
- 4.齿轮箱总成 Gearbox Assembly 010
- 5.高气压机匣总成 High-pressure Casing Assembly 015
- 6.燃烧室总成 Combustion Chamber Assembly 018
- 7.涡轮机匣总成 Turbine Casing Assembly 020
- 8.尾喷口总成 Tail Nozzle Assembly 024
- 9.总装 Final Assembly 024
- 10.零件表 Parts List 033

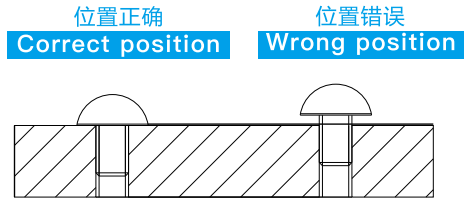
标准件组装基础知识 Basic knowledge of standard parts assembly

1、螺丝安装 Screw installation

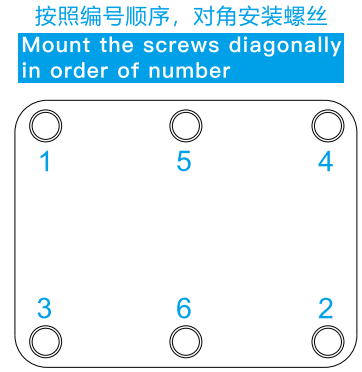
（1）螺丝安装方向 Screw installation direction



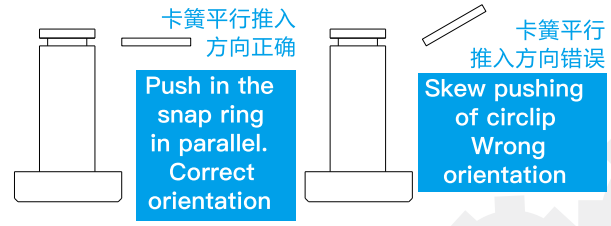
（2）螺丝拧紧深度 Screw tightening depth



（3）螺丝安装顺序 Screw installation sequence



2、卡簧安装方法 Circlip installation method

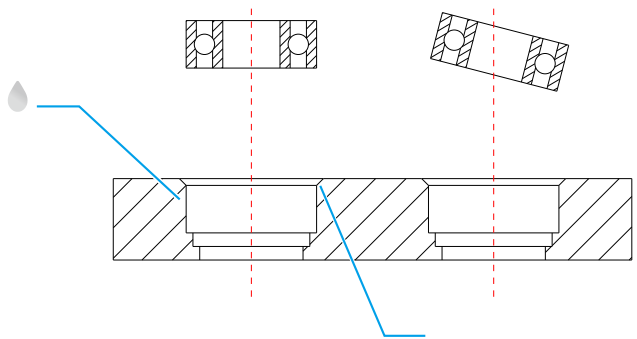


3、轴承安装 Bearing installation

（1）轴承装入轴承座孔
Insert the bearing into the bearing housing

方向正确
Correct orientation

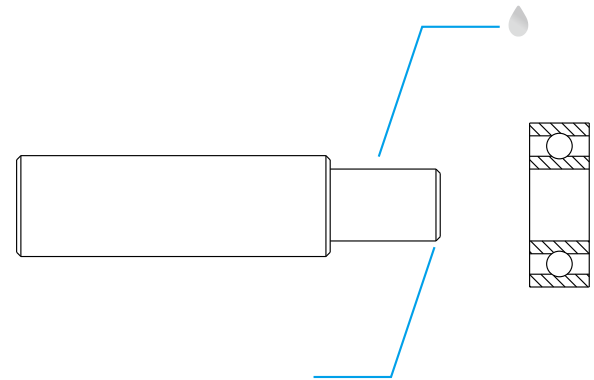
方向错误
Wrong orientation



检查轴承座孔倒角及毛刺；在轴承座孔侧面加少量润滑油；将轴承对直装入到底，施压部位为轴承外圈。

Check the orifice of bearing block for chamfer and burr; apply a little lubricating oil onto side face of shaft Installation point; align the bearing and mount it to the final position; pressure is applied to the outer race of bearing.

（2）轴承装入轴
Bearing into the shaft



Check the shaft end for chamfer and burr; apply a little lubricating oil onto side face of shaft Installation point;
align the bearing and mount it to the final position; pressure is applied to the inner race of bearing.

检查轴端倒角及毛刺；在轴安装部位侧面加量润滑油；将轴承对直装入到底，施压部位为轴承内圈。

重要提示：组装前，先找到瓶装润滑油，务必在所有润滑油标识处涂上足够的润滑油，否则机器容易卡死。

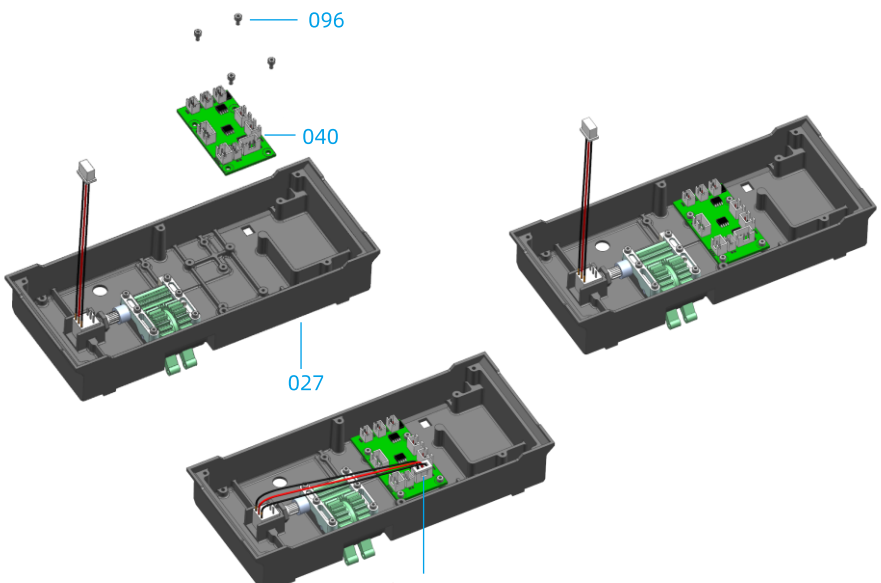
Important note: before assembly, find the bottled grease first, and be sure to apply enough grease on all grease marks, otherwise the machine is easy to get stuck.



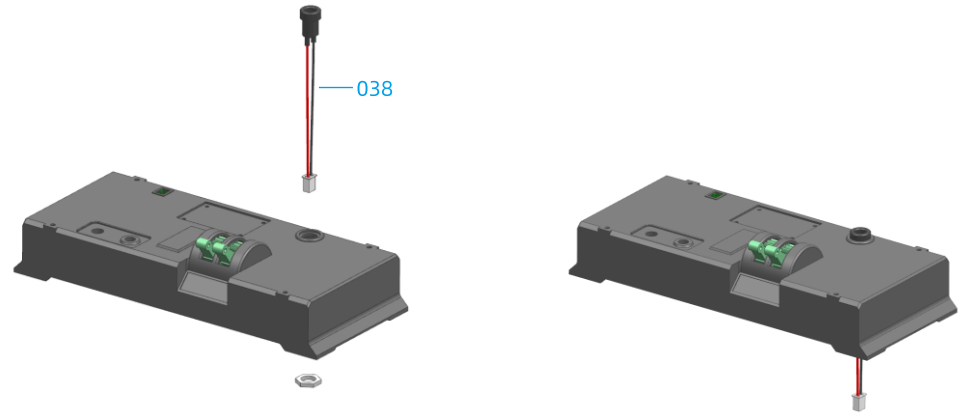
加润滑油的位置标识
Location identification of grease

1.底座总成 Base Assembly

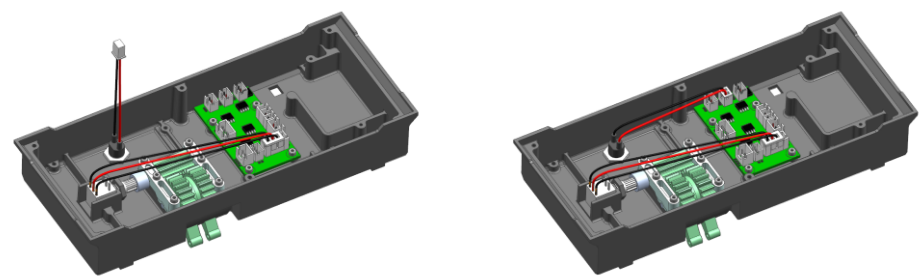
1.1 组装主板 Assemble the motherboard



1.2 组装充电口 Assemble the charging port

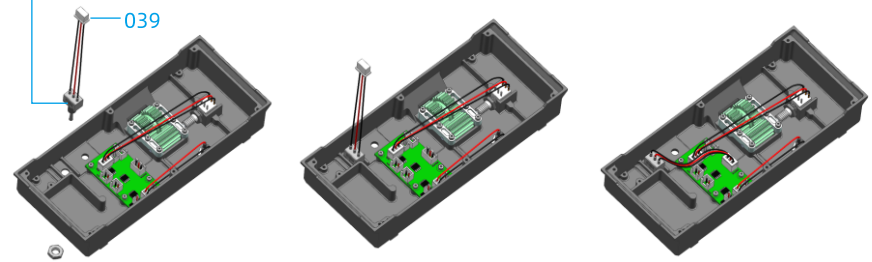


1.3 充电口连接主板 Connect the charging port to the motherboard

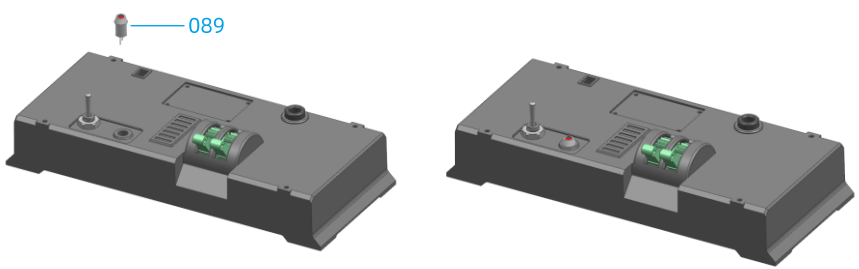


1.4 组装拨动开关 Assemble the toggle switch

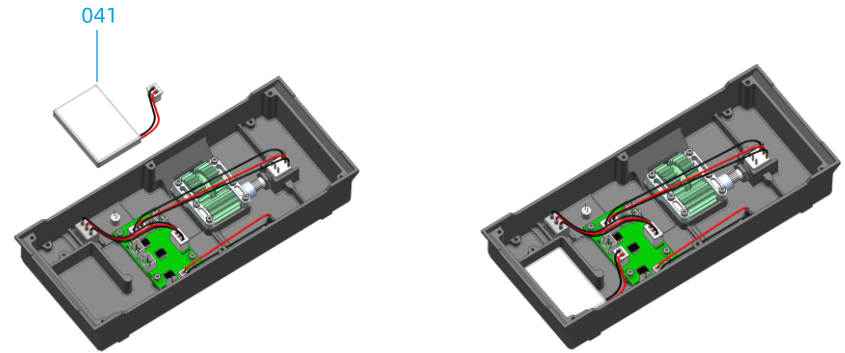
有字的一面朝左
The side with words faces left



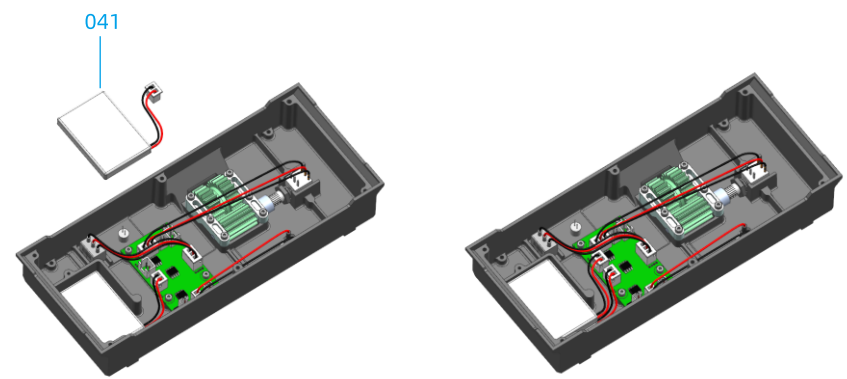
1.5 组装指示灯 Assemble the indicator light



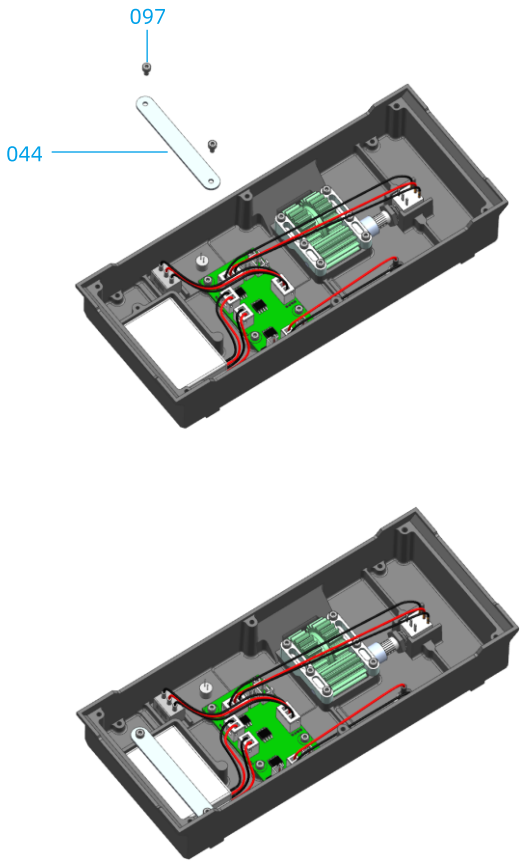
1.6 组装电池 Assemble the battery



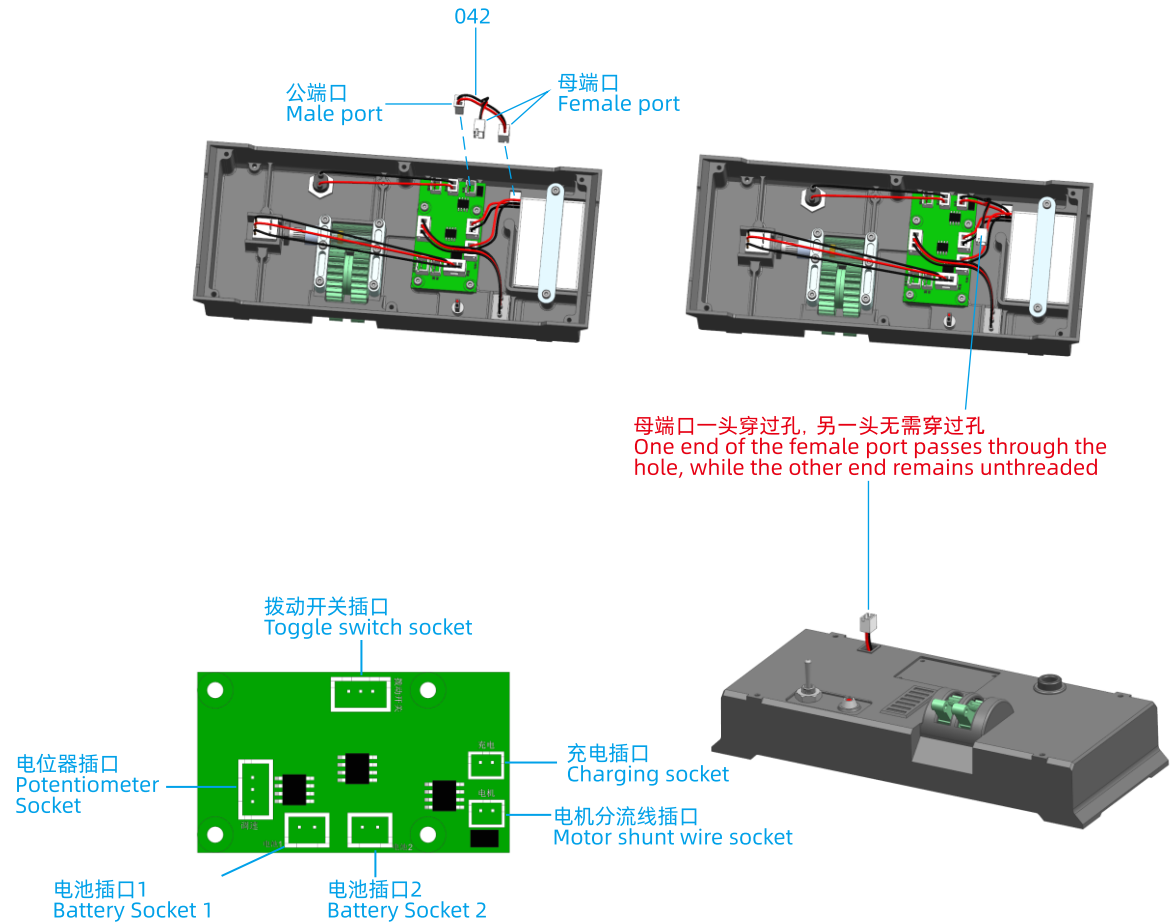
1.7 组装电池 Assemble the battery



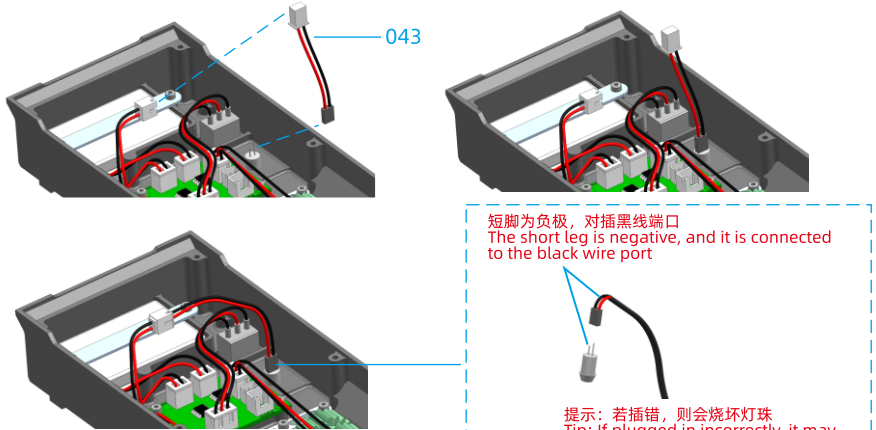
1.8 组装电池压板 Assemble battery pressure plate



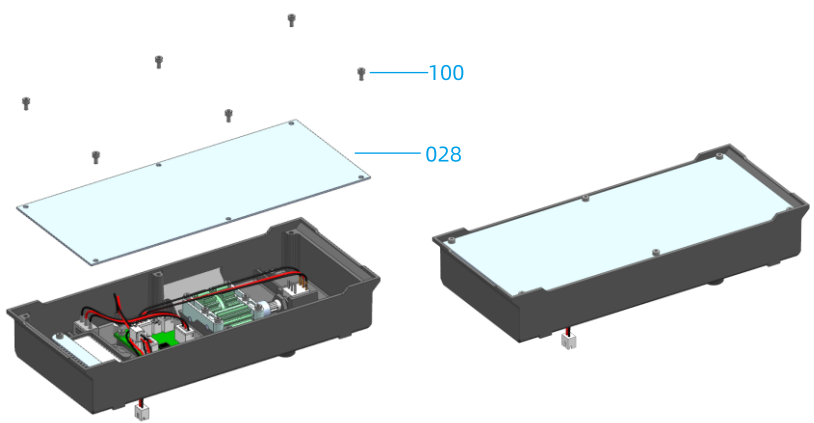
1.9 电机分流线连接主板 The motor shunt wire is connected to the mainboard



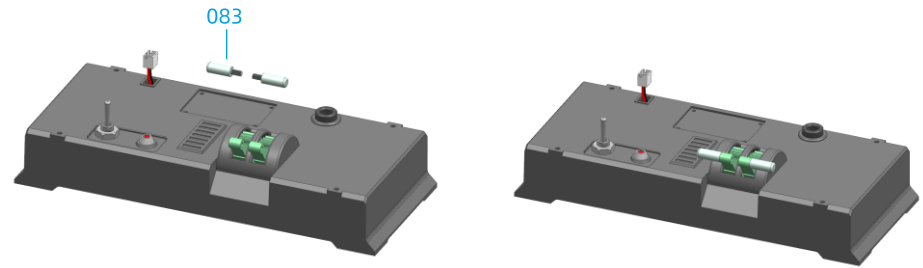
1.10 组装灯线 Assemble the lamp wire



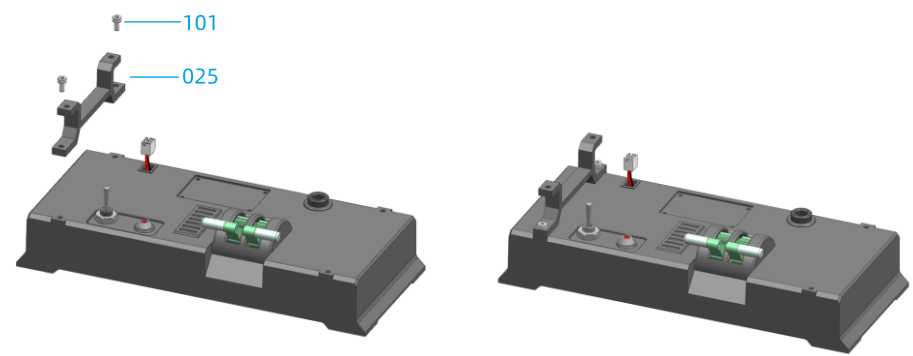
1.11 组装底座底板 Assemble base plate



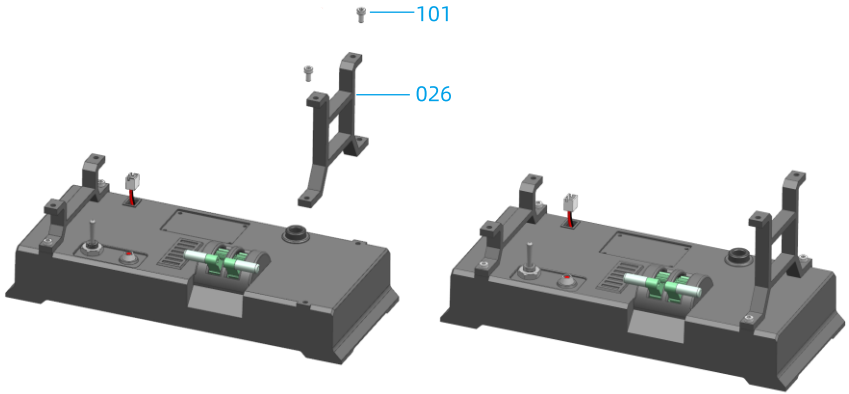
1.12 组装推杆手柄 Assemble push rod handle



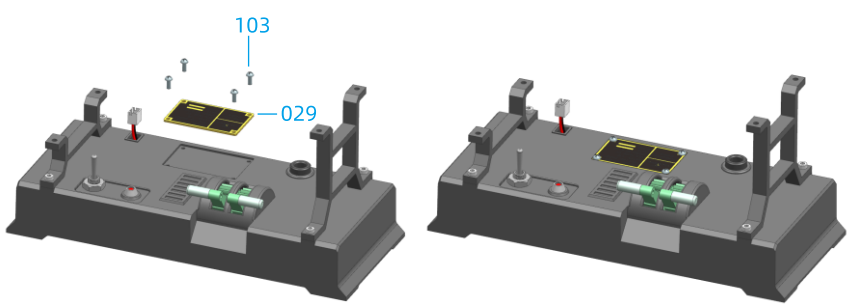
1.13 组装前支架 Pre-assembly bracket



1.14 组装后支架 Assemble rear bracket

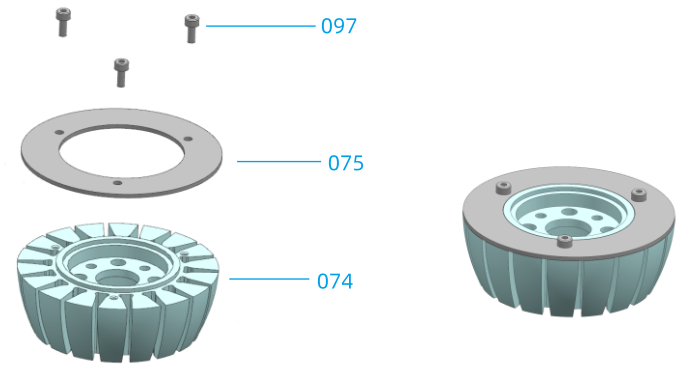


1.15 组装铭牌 Assemble nameplate

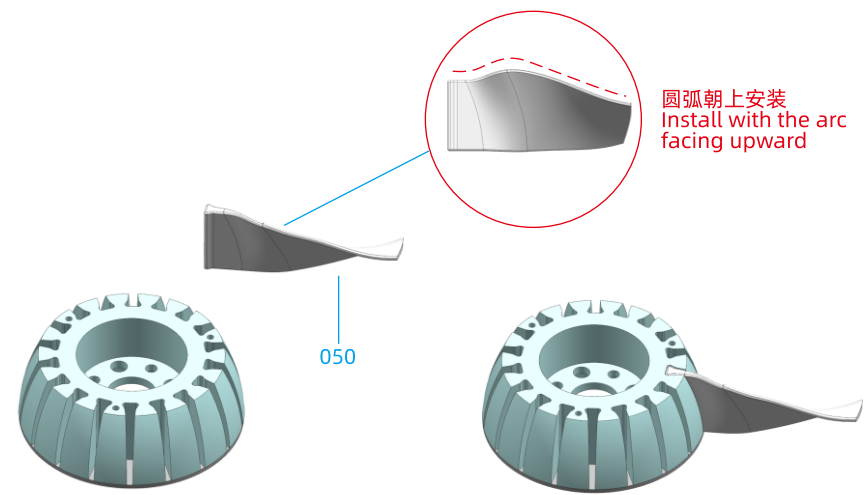


2.风扇总成 Fan assembly

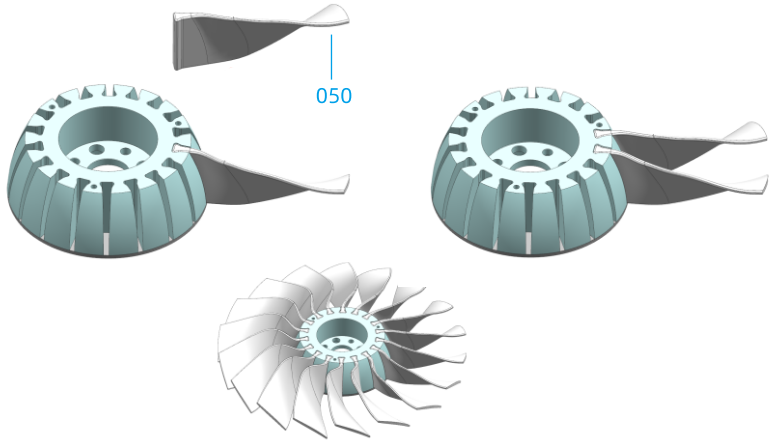
2.1 组装风扇封板 Assemble the fan cover plate



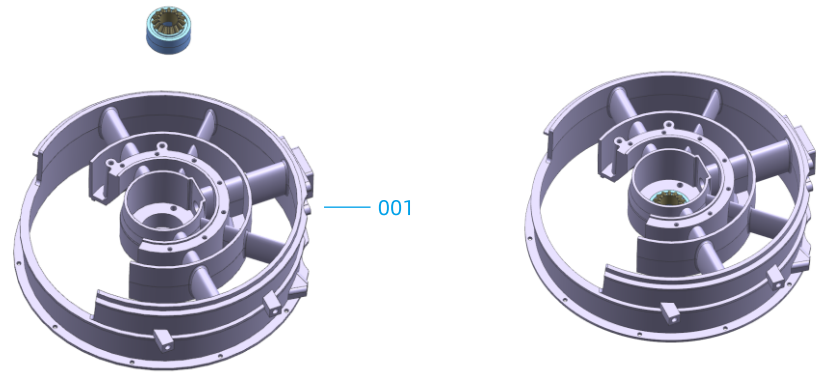
2.2 组装扇叶 Assemble the fan blades



2.3 依次组装风扇叶 Assemble the fan blades in sequence

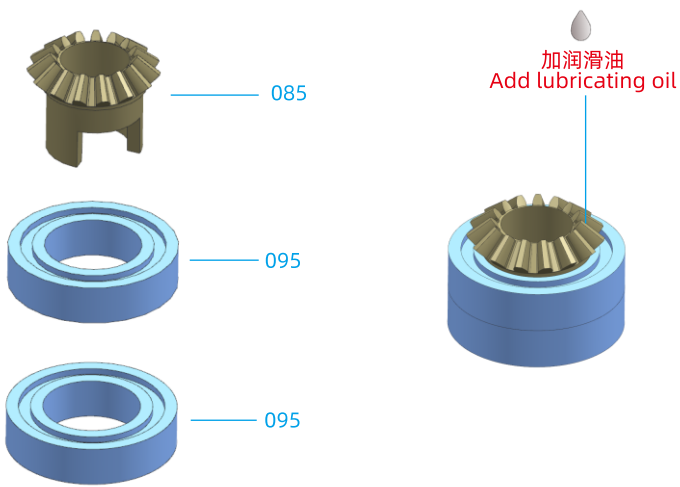


3.2 组装轴承组 Assemble bearing set

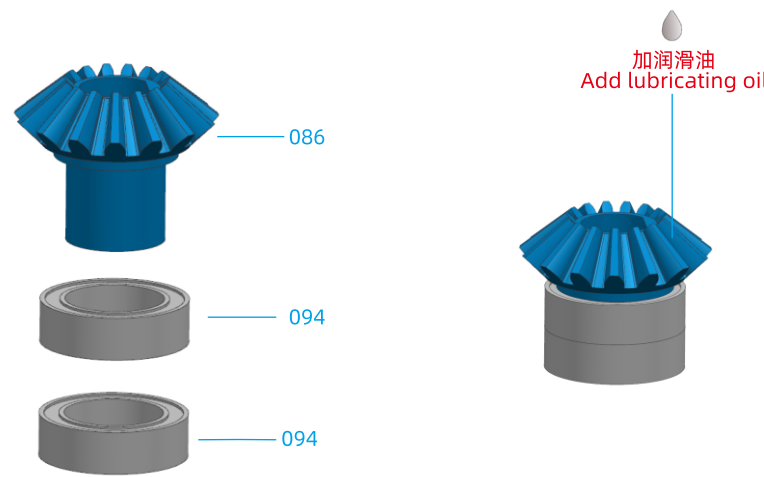


3. 中介机匣总成 Intermediate casing assembly

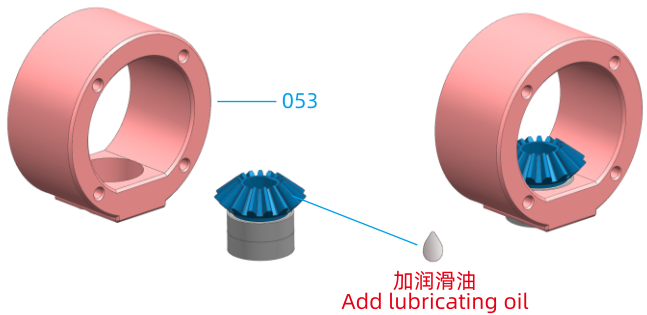
3.1 组装轴承 Assemble bearing



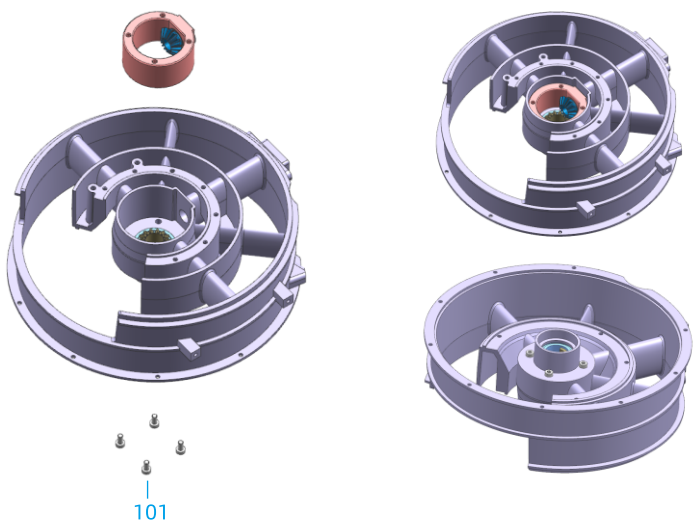
3.3 组装轴承 Assemble bearing



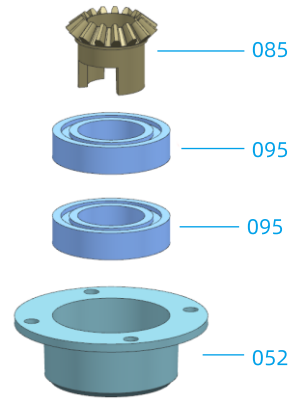
3.4 组装小锥齿轮组 Assemble small bevel gear set

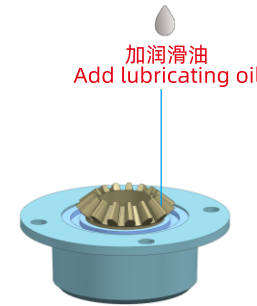


3.5 组装小锥齿座 Assemble of small bevel gear seat

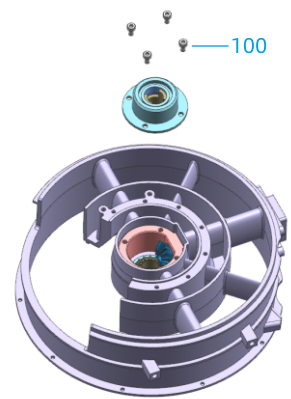


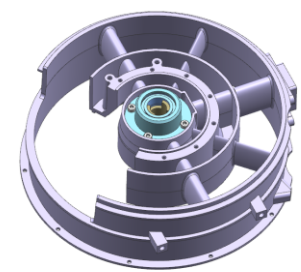
3.6 组装中心轴前端 Assemble the front end of the central shaft



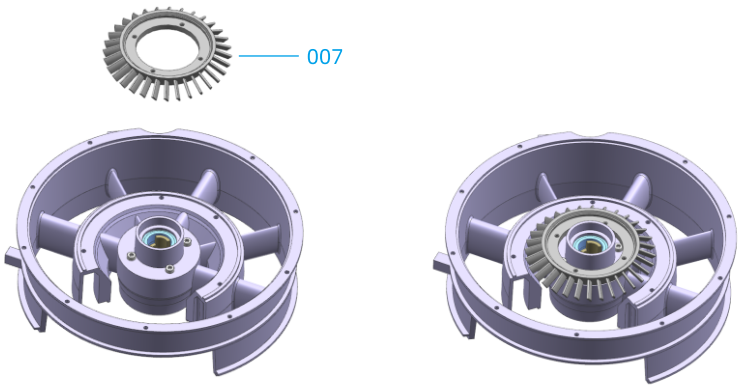


3.7 组装齿轮组 Assemble the gear set

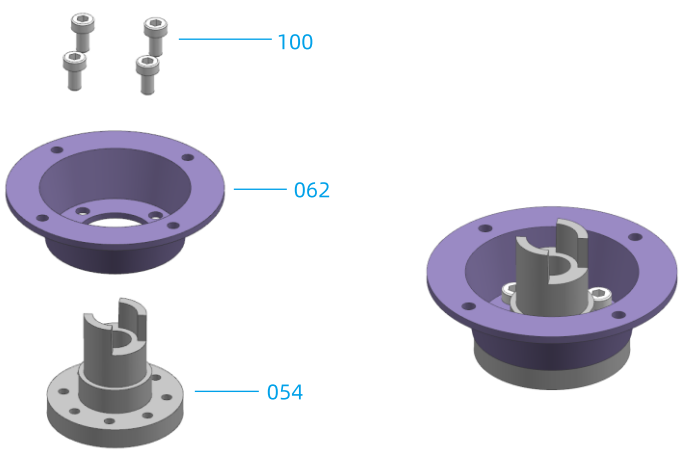




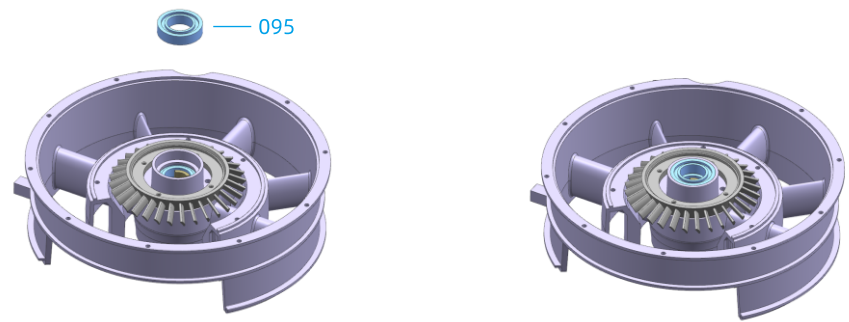
3.8 组装低压转子 Assemble the low-pressure compressor rotor



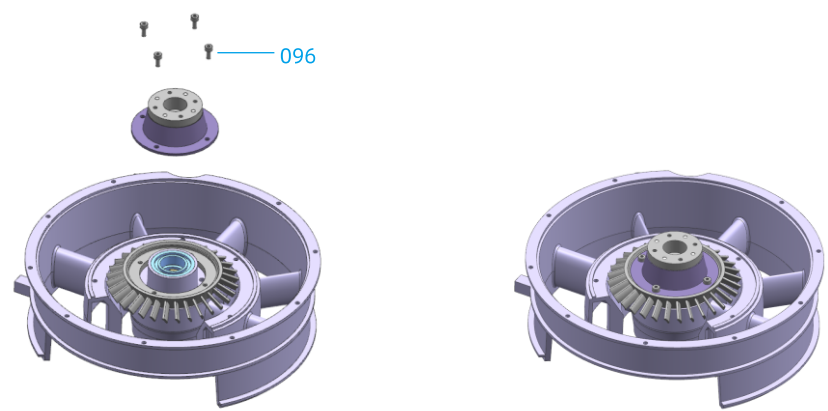
3.9 组装中心轴前端 Assemble the front end of the central shaft



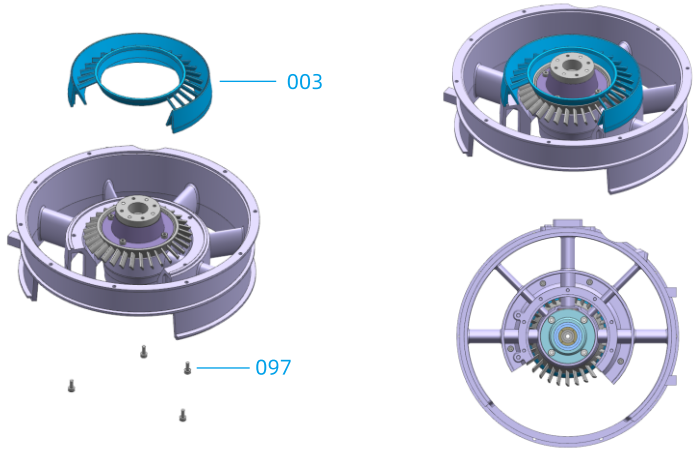
3.10 组装轴承 Assemble bearing



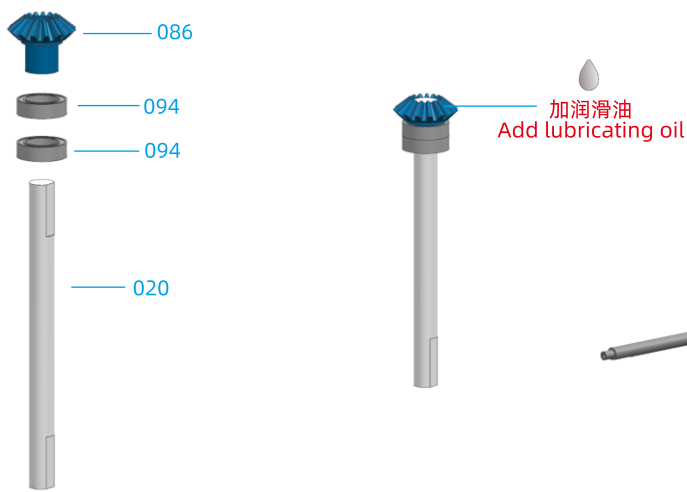
3.11 组装低压转子连接盘 Assemble the low-pressure compressor rotor coupling disc



3.12 组装低压静子 Assemble the low-pressure compressor stator



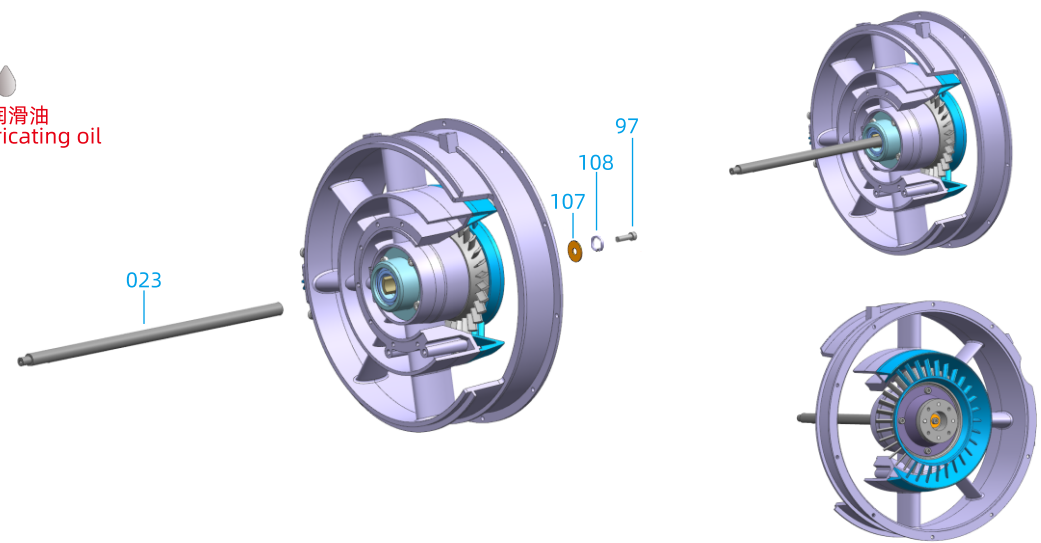
3.13 组装传动轴齿轮 Assemble the drive shaft gear



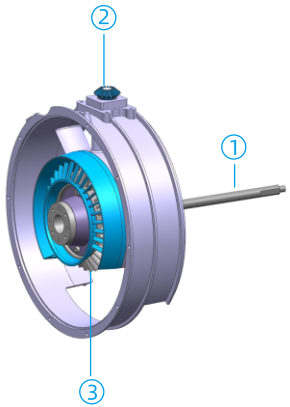
3.14 组装传动轴齿轮组 Assemble the drive shaft gear set



3.15 组装中心轴 Assemble the central shaft



3.16 测试 Test



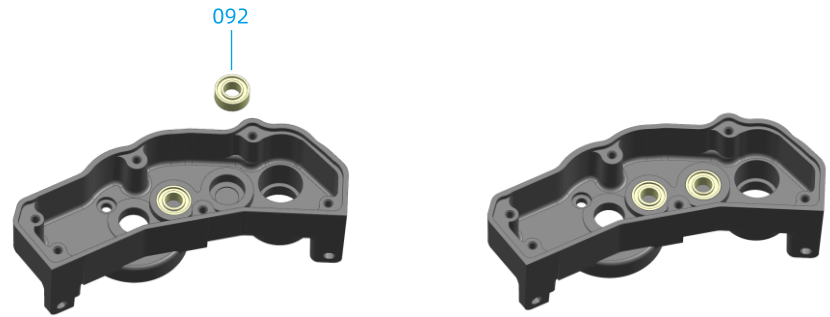
1、转动中心轴
2、观察小锥齿轮是否正常转动
3、观察低压转子是否正常转动
1. Rotate the central shaft.
2. Observe whether the small bevel gear rotates normally.
3. Observe whether the low-pressure compressor rotor rotates normally.

4.齿轮箱总成 Gearbox assembly

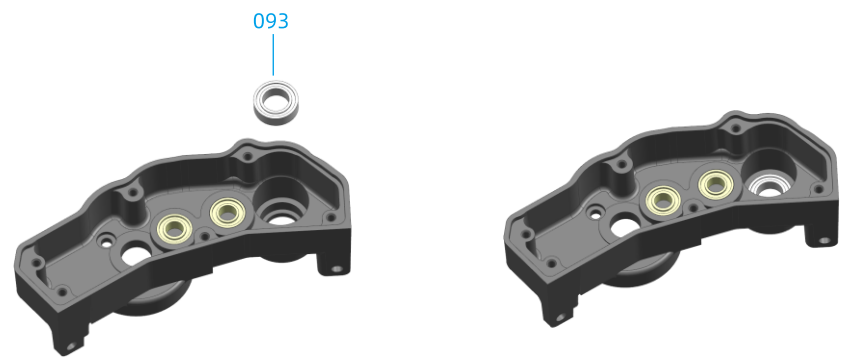
4.1 组装轴承 Assemble bearing



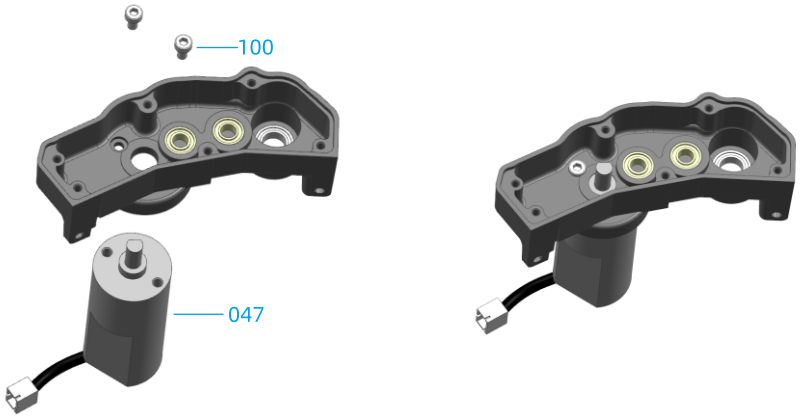
4.2 组装轴承 Assemble bearing



4.3 组装轴承 Assemble bearing



4.4 组装电机 Assemble the Motor



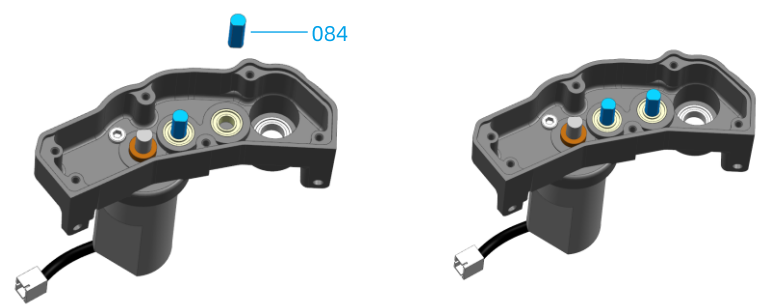
4.5 组装电机轴套 Assemble the Motor Shaft Sleeve



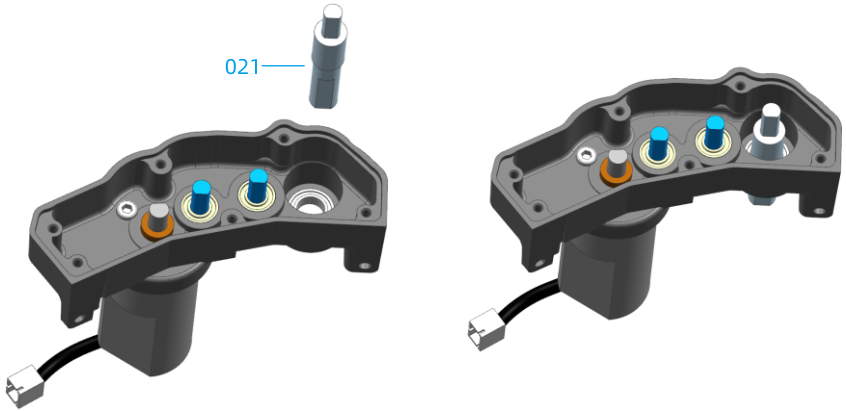
4.6 组装过渡轴 Assemble the Transition Shaft



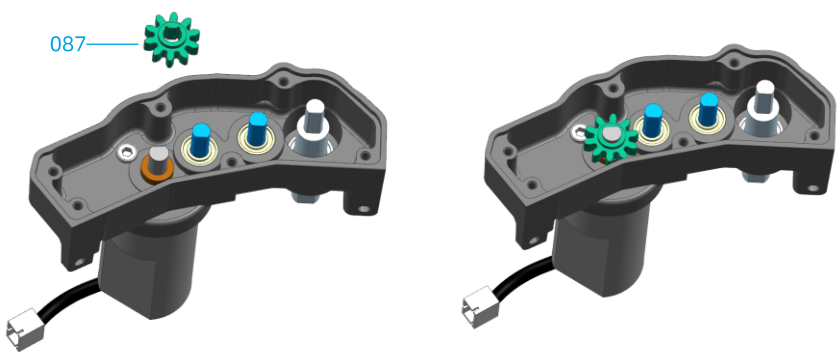
4.7 组装过渡轴 Assemble the Transition Shaft



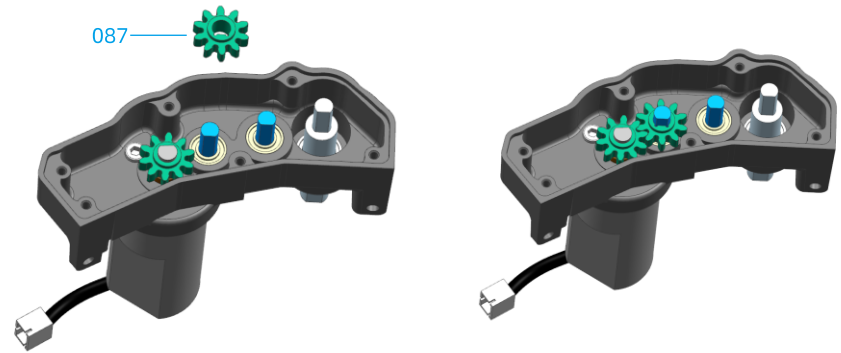
4.8 组装传动轴-1 Assemble the Transmission Shaft - 1



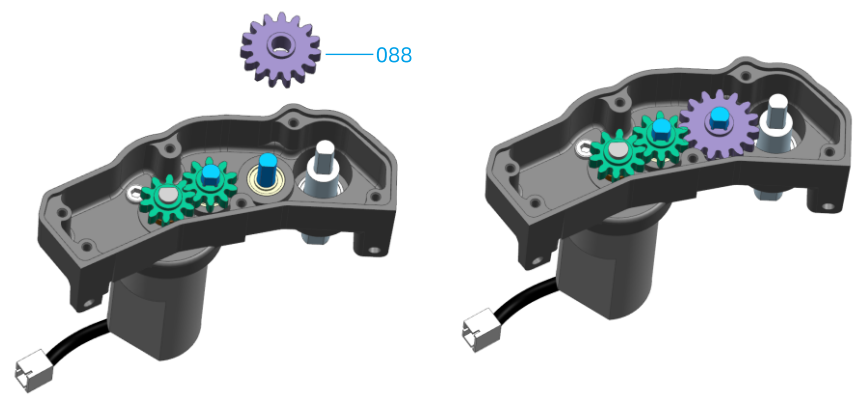
4.9 组装电机齿轮 Assemble the Motor Gear



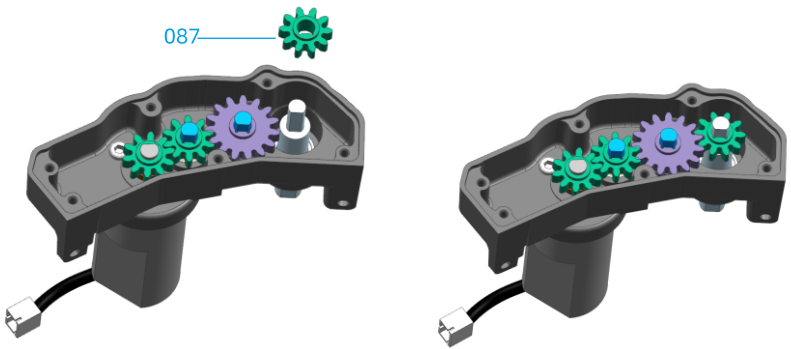
4.10 组装电机齿轮 Assemble the Motor Gear



4.11 组装过渡齿轮 Assemble the Transition Gear



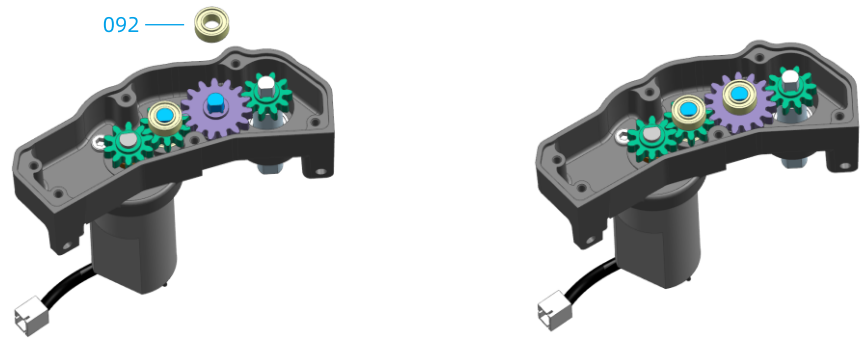
4.12 组装电机齿轮 Assemble motor gears



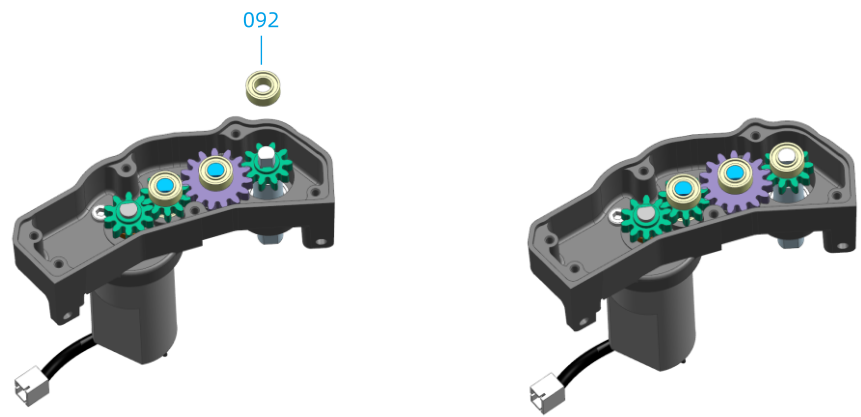
4.13 组装轴承 Assemble bearings



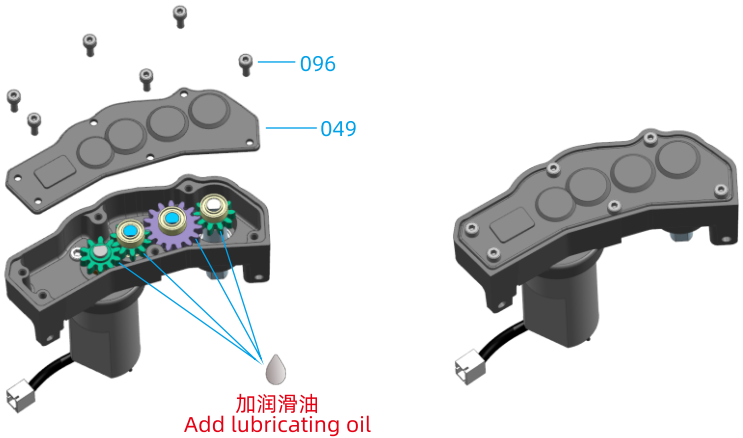
4.14 组装轴承 Assemble bearings



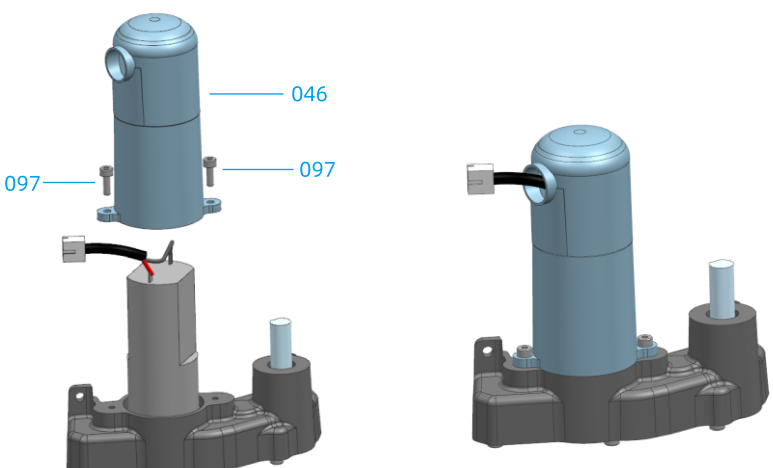
4.15 组装轴承 Assemble bearings



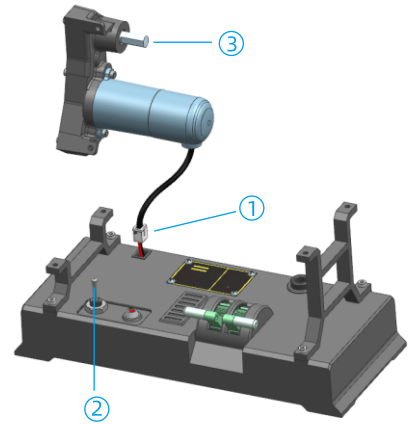
4.16 组装电机箱盖 Assemble the motor case cover



4.17 组装电机套 Assemble the motor sleeve

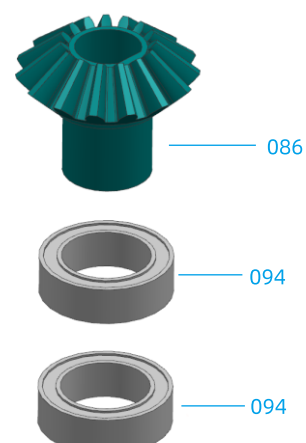


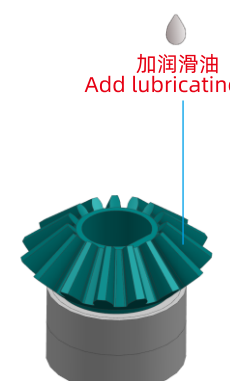
4.18 测试 Test



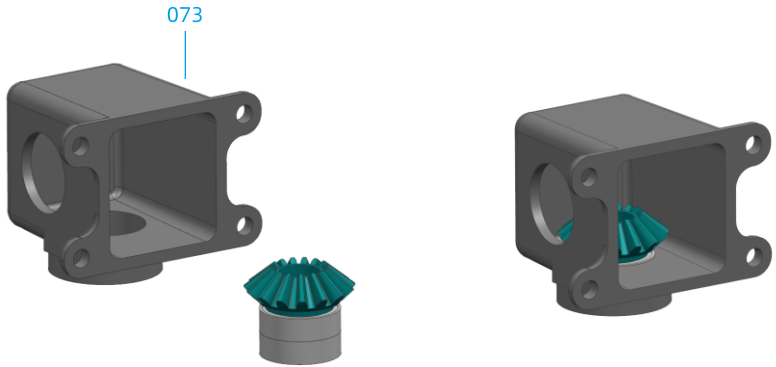
1、连接端子线
2、向前拨动开关
3、观察传动轴是否正常转动
1. Connect the terminal wire
2. Flip the switch forward
3. Observe whether the drive shaft is rotating normally

4.19 组装锥齿轮 Assemble bevel gears

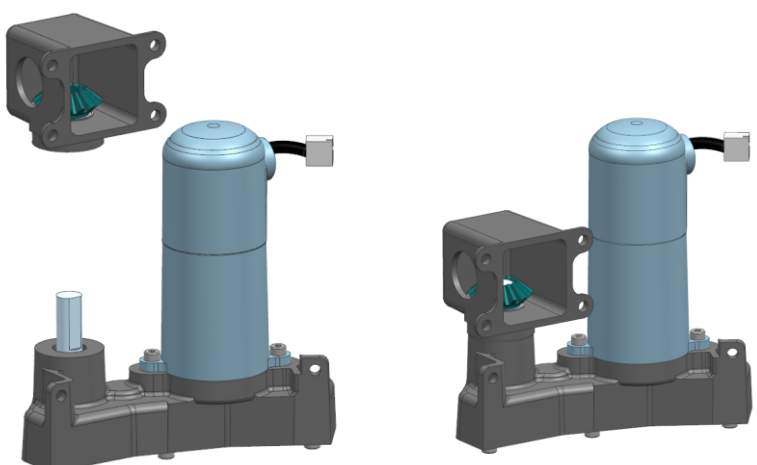




4.20 组装锥齿盖 Assemble the bevel gear cover

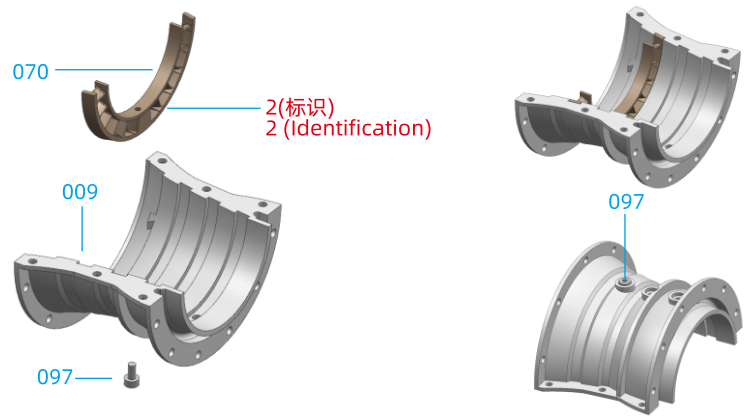


4.21 组装锥齿盖组 Assemble the bevel gear cover set

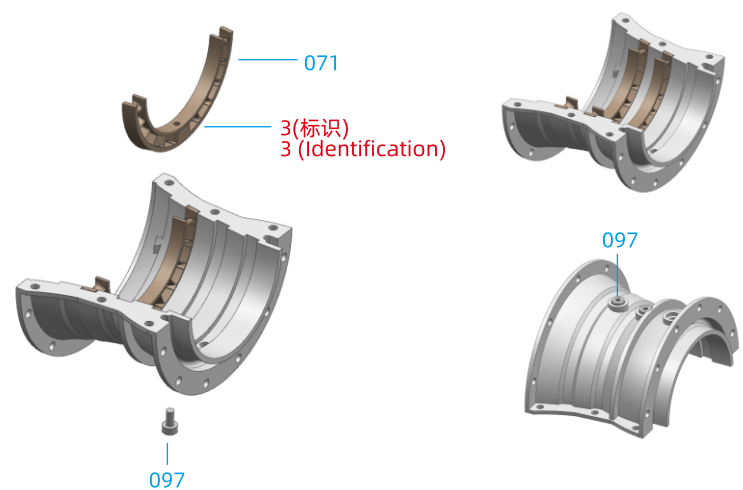


5.高气压机匣总成 High-pressure compressor casing assembly

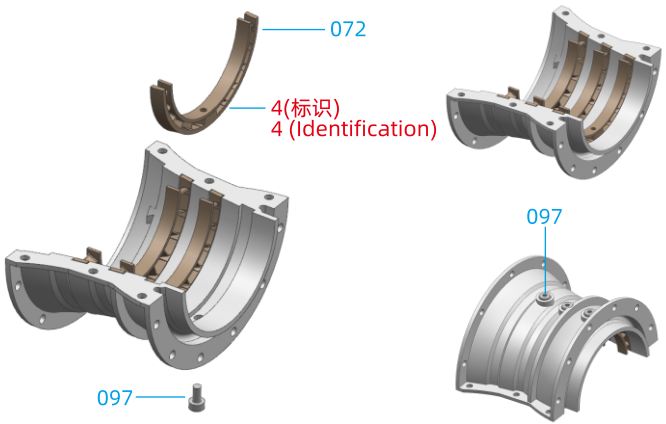
5.1 组装二级高压静子 Assemble the second-stage high-pressure compressor stator



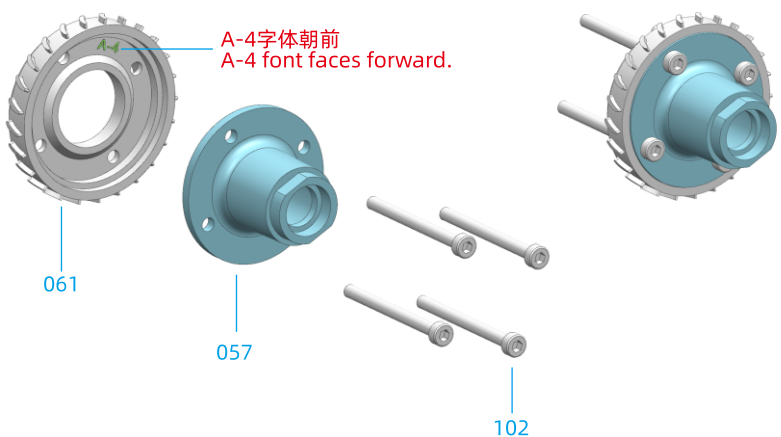
5.2 组装三级高压静子 Assemble the third-stage high-pressure compressor stator



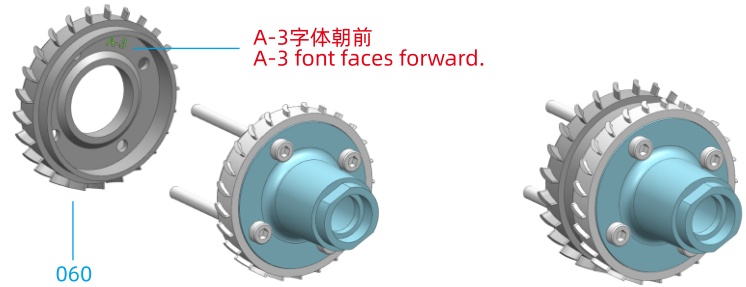
5.3 组装四级高压静子 Assemble the fourth-stage high-pressure compressor stator



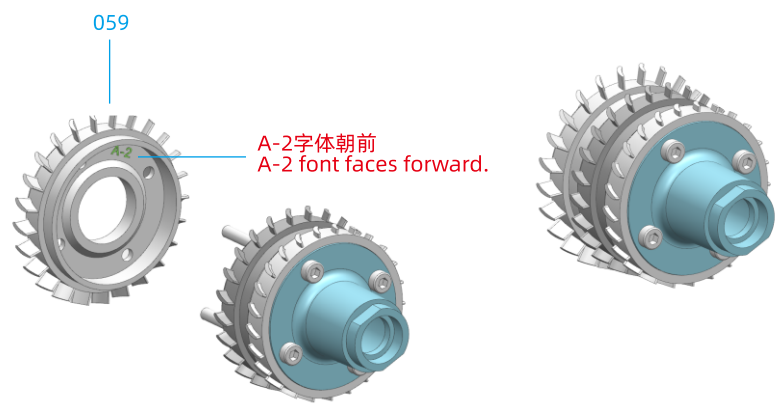
5.4 组装四级高压转子 Assemble the fourth-stage high-pressure compressor rotor



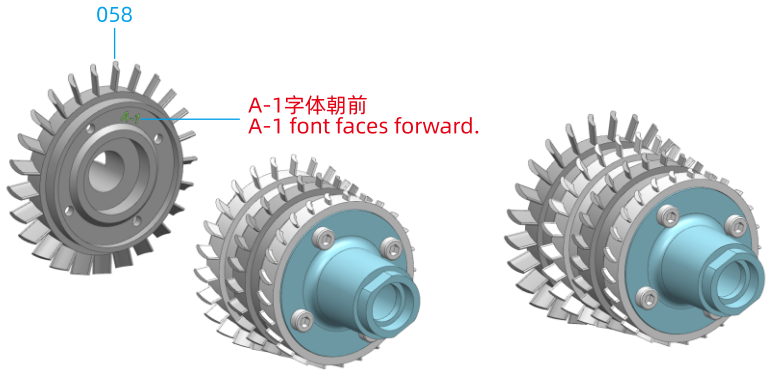
5.5 组装组装三级高压转子 Assemble the third-stage high-pressure compressor rotor



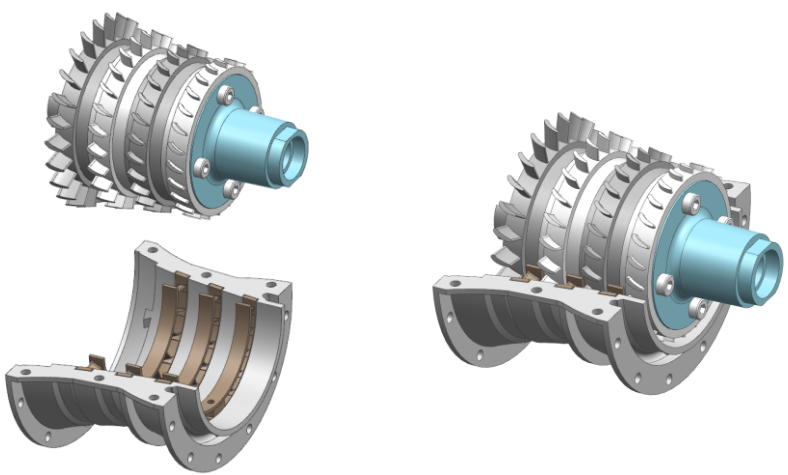
5.6 组装二级高压转子 Assemble the second-stage high-pressure compressor rotor



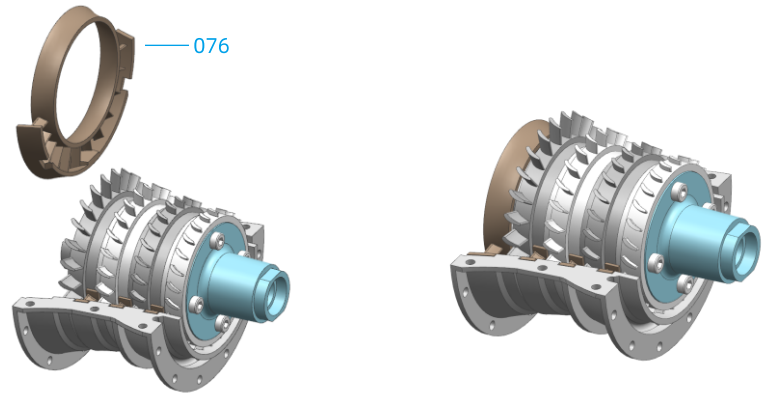
5.7 组装一级高压转子 Assemble the first-stage high-pressure compressor rotor



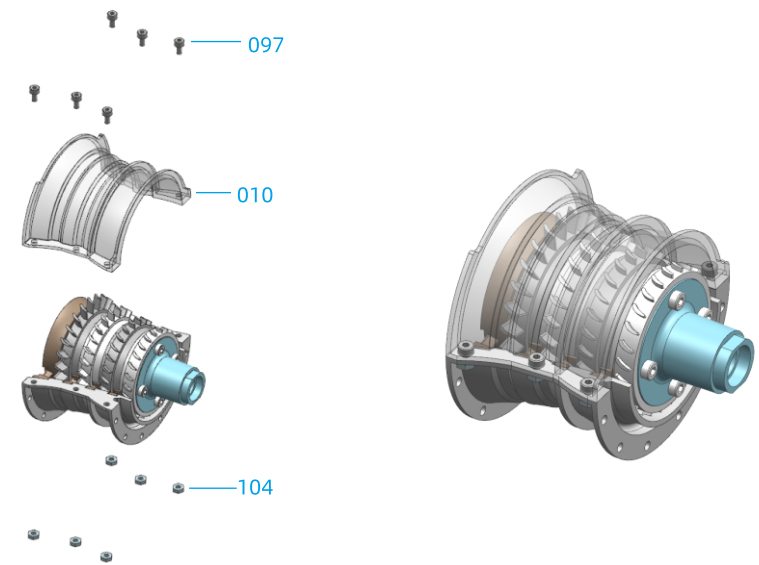
5.8 组装高压转子组 Assemble the high-pressure compressor rotor set



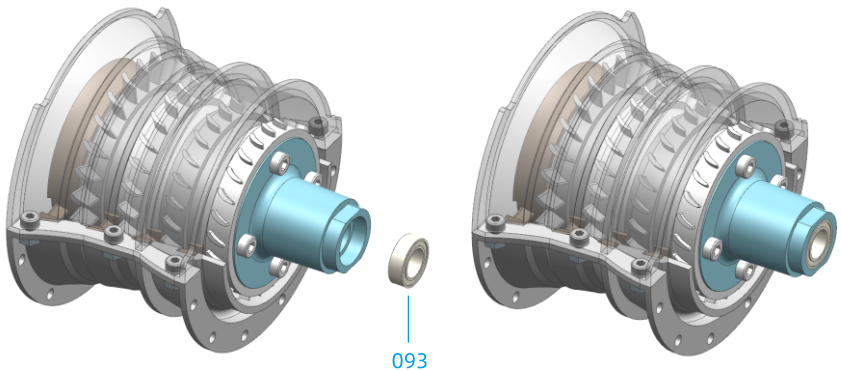
5.9 组装一级高压静子 Assemble the first-stage high-pressure compressor stator



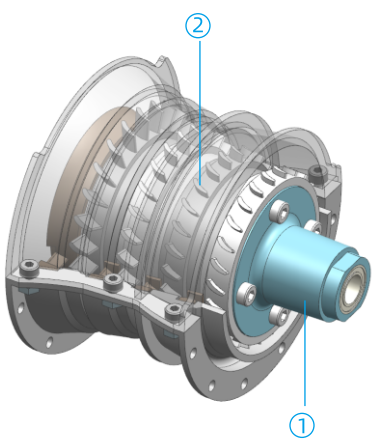
5.10 组装高压机匣透明罩 Assemble the high-pressure compressor casing transparent cover



5.11 组装轴承 Assemble bearings



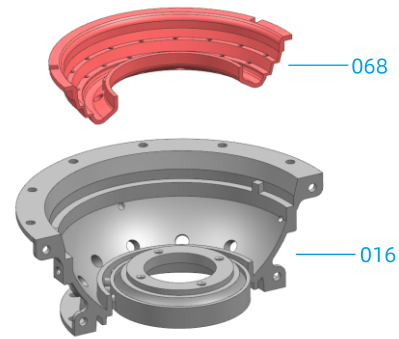
5.12 测试 Test

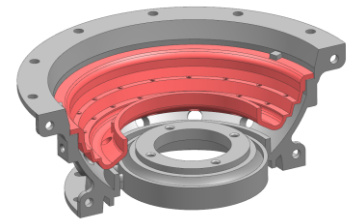


1、转动高压压气机后盘
2、观察高压转子是否顺滑转动
1. Rotate the high-pressure compressor rear disk
2. Observe whether the high-pressure compressor rotor rotates smoothly

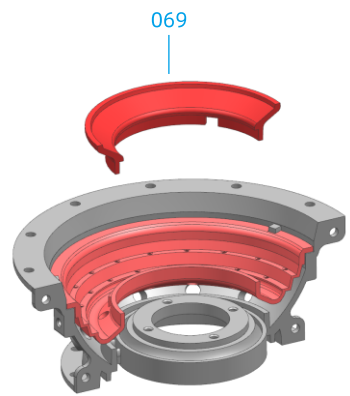
6. 燃烧室总成 Combustion chamber assembly

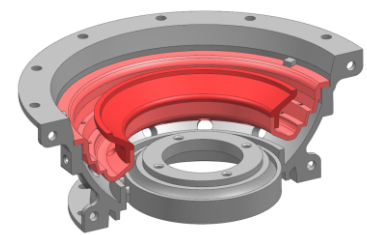
6.1 组装燃烧室外壳 Assemble the combustion chamber casing



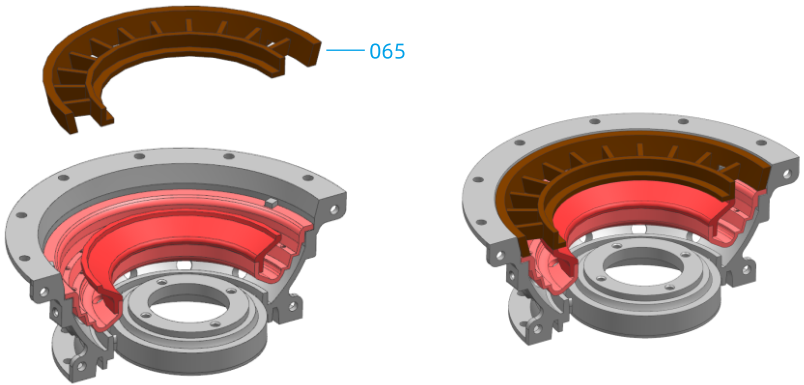


6.2 组装燃烧室内壳 Assemble the combustion chamber inner casing

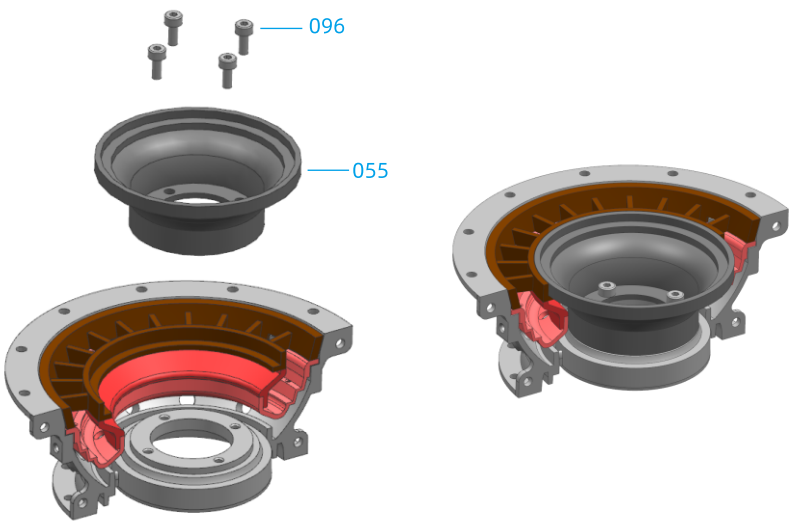




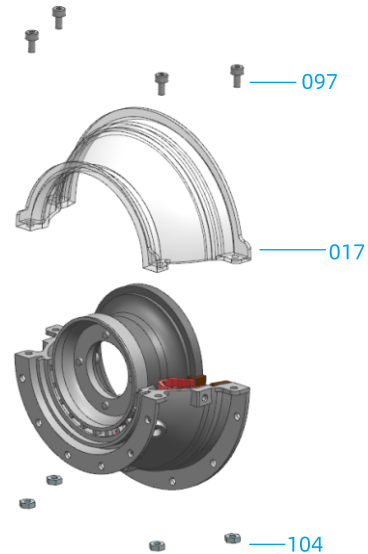
6.3 组装一级高压涡轮静子 Assemble the first-stage high-pressure compressor stator

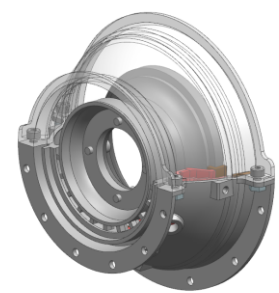


6.4 组装燃烧室内机匣 Assemble the combustion chamber inner casing



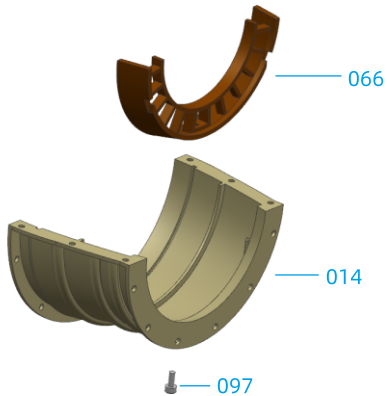
6.5 组装燃烧室透明罩 Assemble the combustion chamber transparent cover

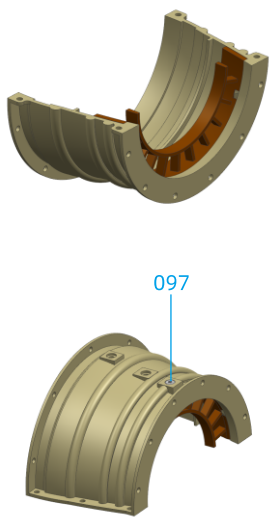




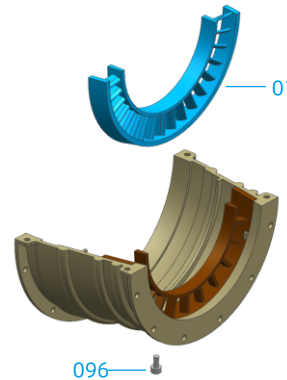
7. 涡轮机匣总成 Turbine casing assembly

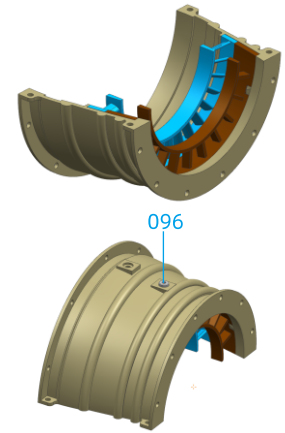
7.1 组装高压涡轮静子 Assemble the high-pressure turbine stator



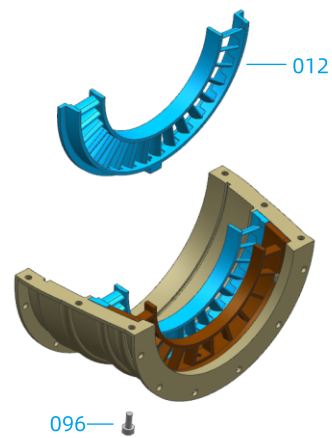


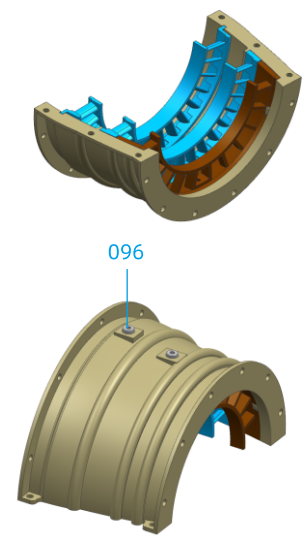
7.2 组装一级低压涡轮静子 Assemble the first-stage low-pressure turbine stator



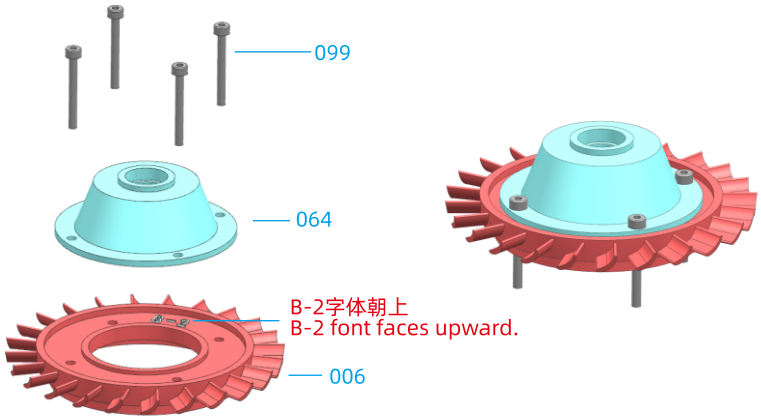


7.3 组装二级低压涡轮静子 Assemble the second-stage low-pressure turbine stator

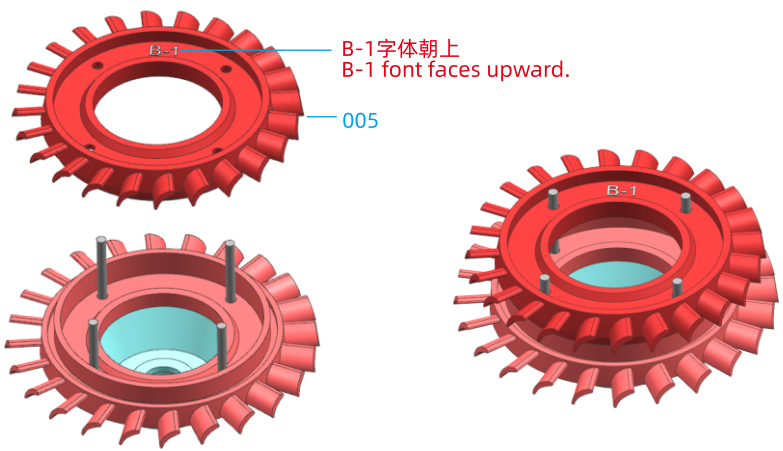




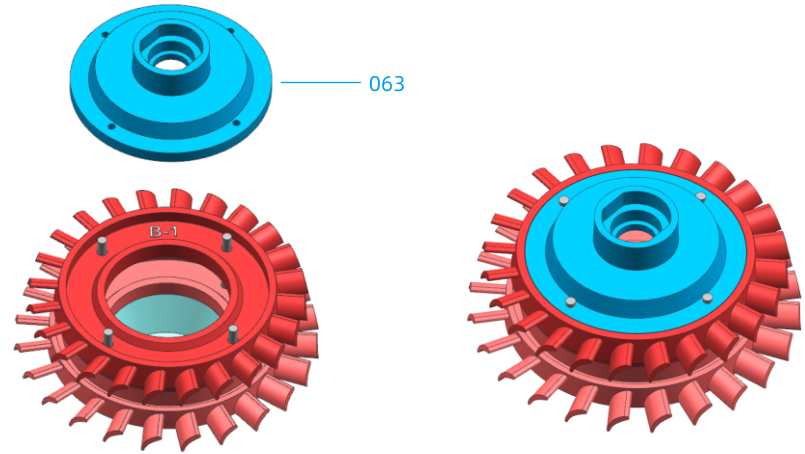
7.4 组装二级高压涡轮 Assemble the second-stage high-pressure turbine rotor



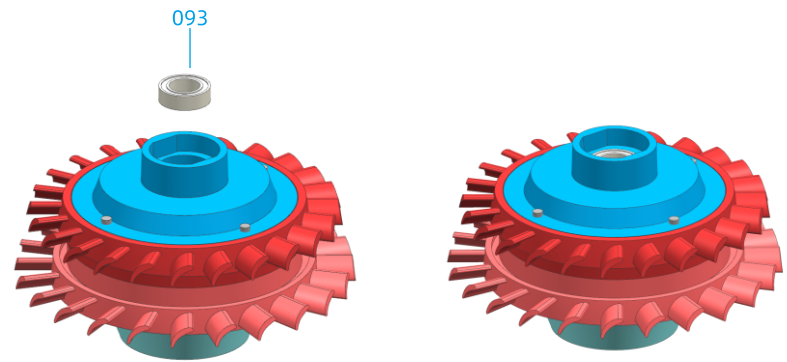
7.5 组装一级高压涡轮 Assemble the first-stage high-pressure turbine rotor



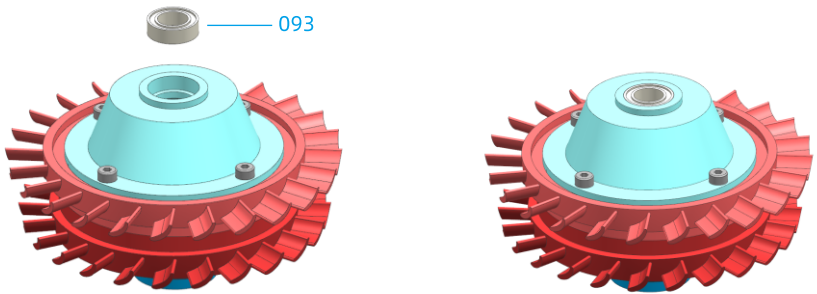
7.6 组装一级高压涡轮前盘 Assemble the front disc of the first-stage high-pressure turbine rotor



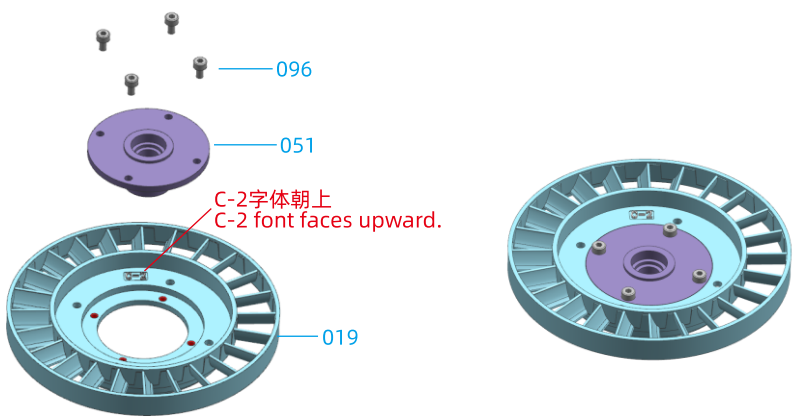
7.7 组装轴承 Assemble the bearing



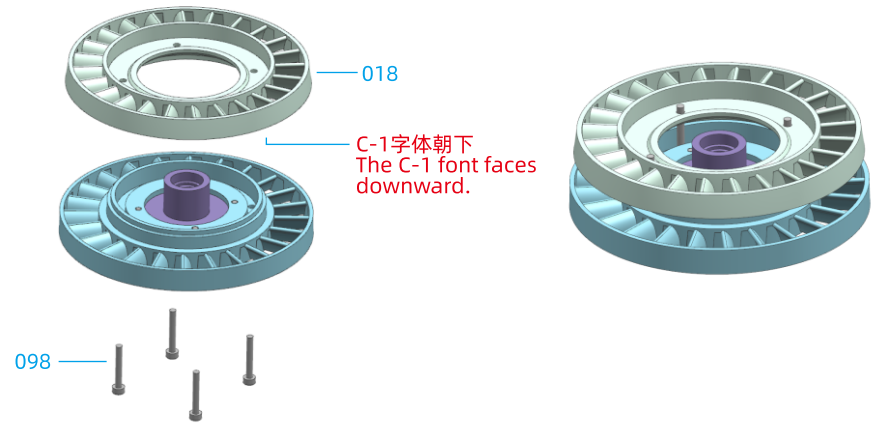
7.8 组装轴承 Assemble the bearing



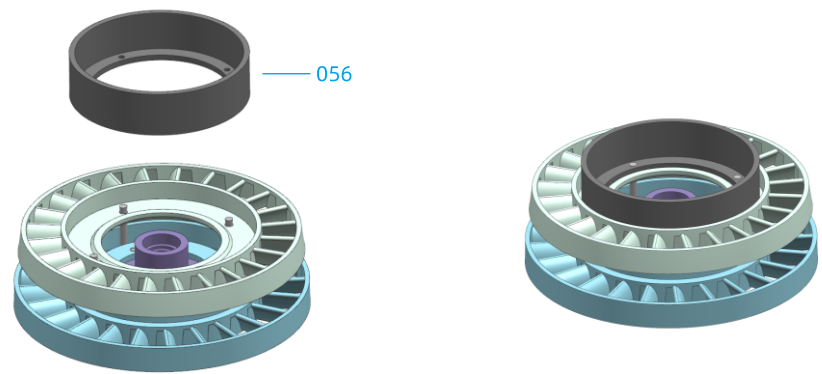
7.9 组装二级低压涡轮转子 Assemble the second-stage low-pressure turbine rotor



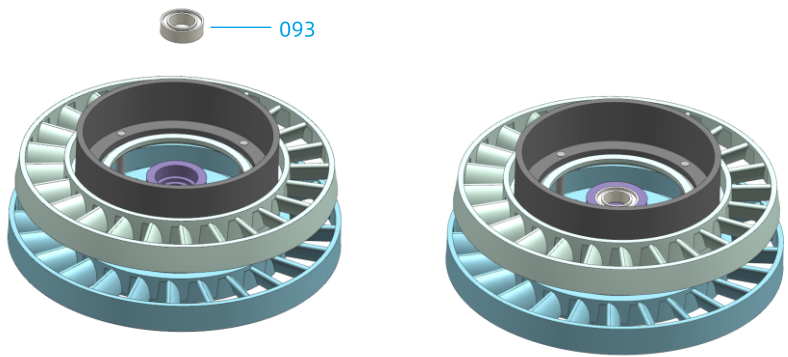
7.10 组装一级低压涡轮转子 Assemble the first-stage low-pressure turbine rotor



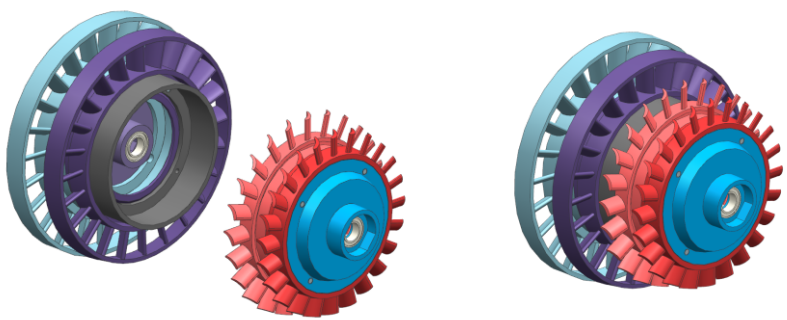
7.11 组装一级低压涡轮转子与涡轮连接环 Assemble the first-stage low-pressure turbine rotor and the turbine connecting ring



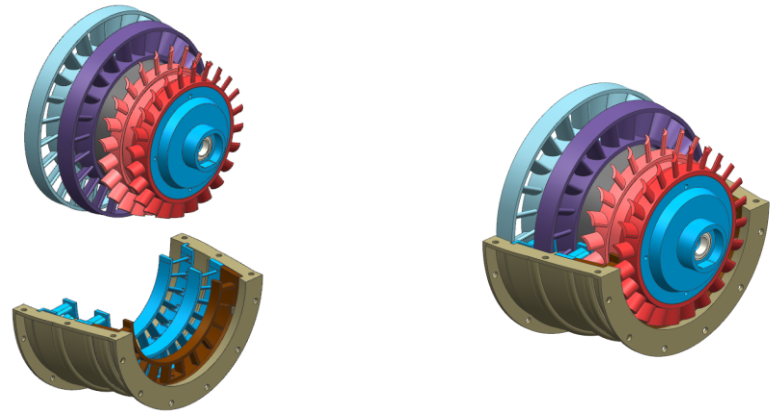
7.12 组装轴承 Assemble the bearing



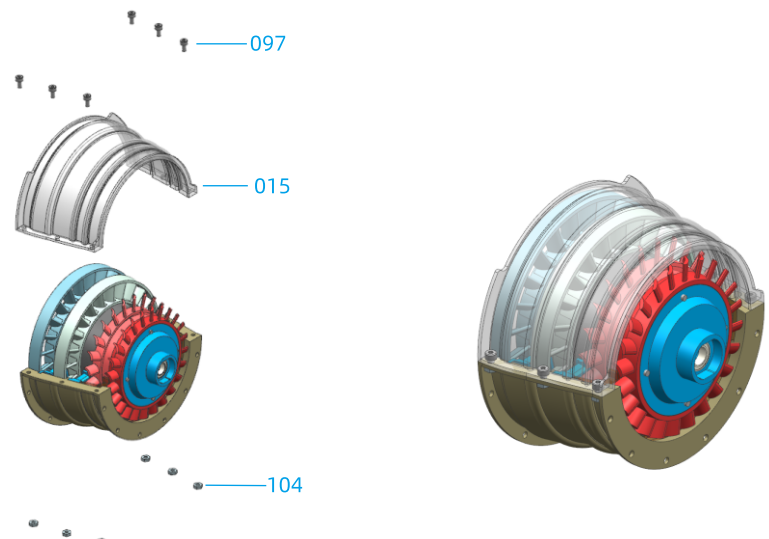
7.13 组装涡轮组 Assemble the turbine group



7.14 组装涡轮机匣 Assemble the turbine casing

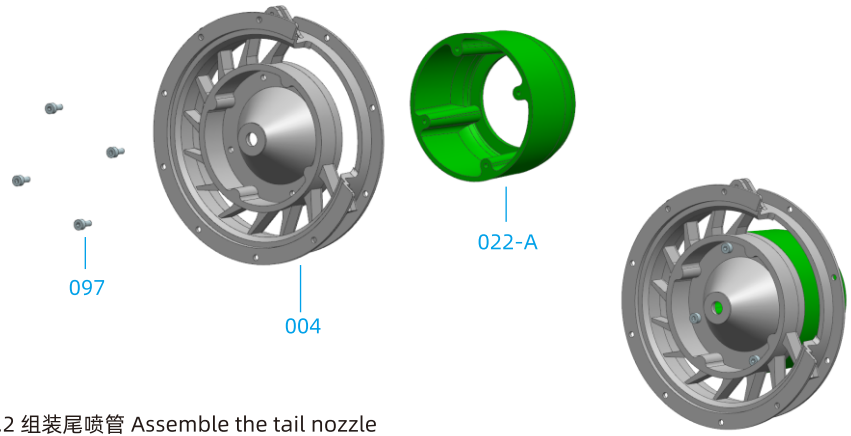


7.15 组装涡轮机匣透明罩 Assemble the turbine casing transparent cover

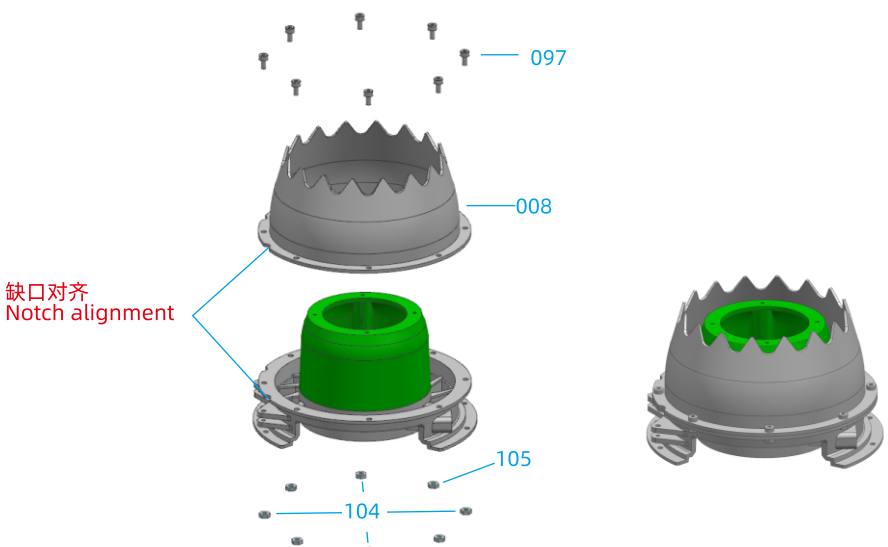


8.尾喷口总成 Tail nozzle assembly

8.1 组装尾椎前端 Assemble the front end of the tail cone

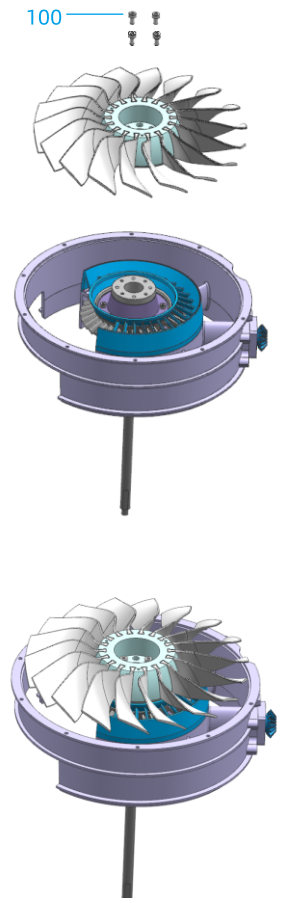


8.2 组装尾喷管 Assemble the tail nozzle

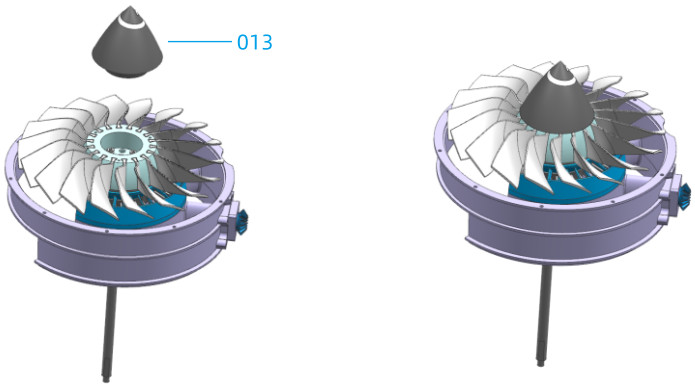


9.总装 Final Assembly

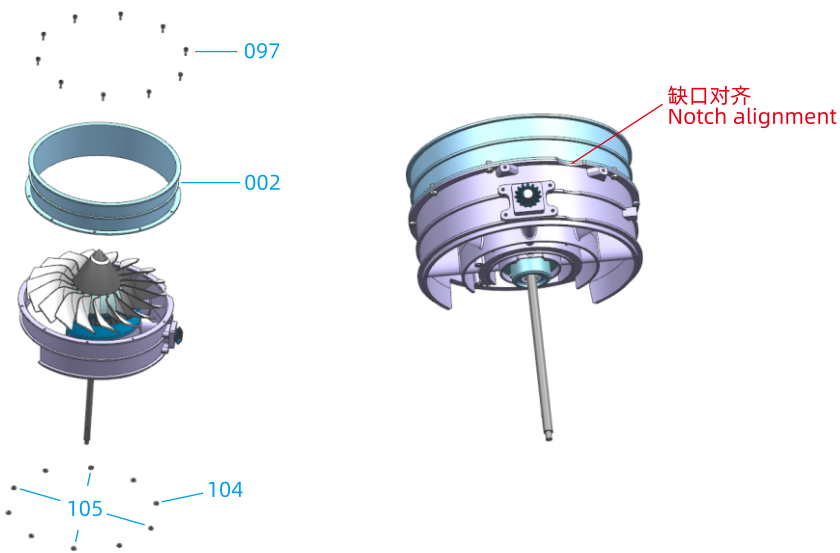
9.1 组装风扇组 Assemble the fan group



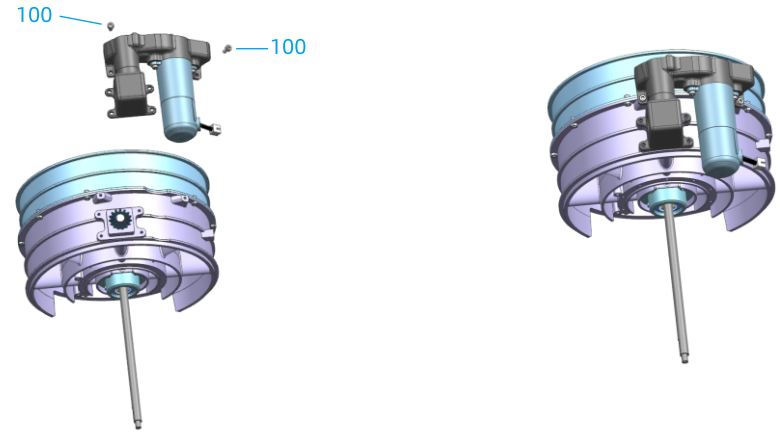
9.2 组装进气锥 Assemble the inlet cone



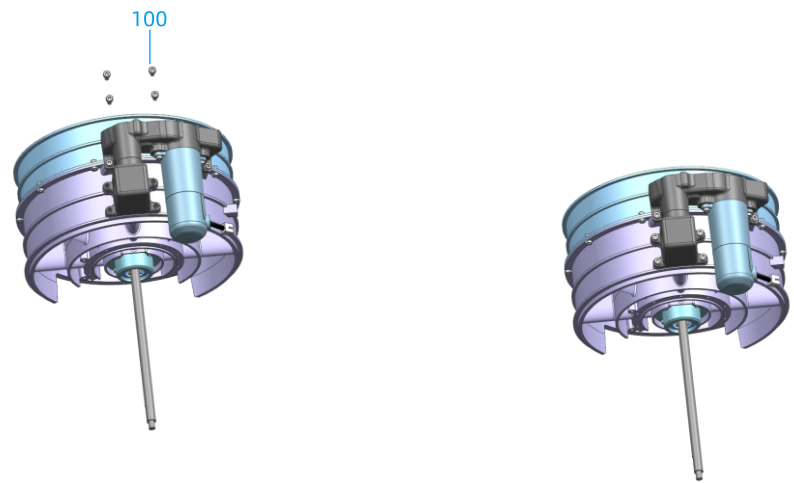
9.3 组装进气机匣 Assemble the inlet casing



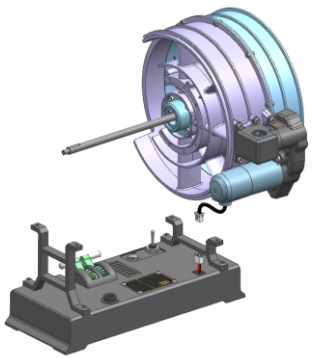
9.4 组装齿轮箱 Assemble the gearbox



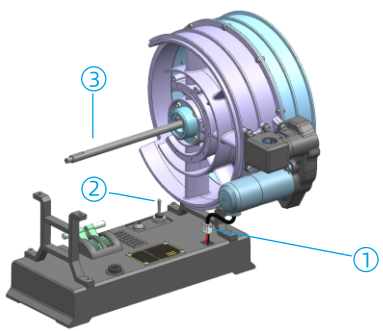
9.5 组装锥齿盖螺丝 Assemble the bevel gear cover screws



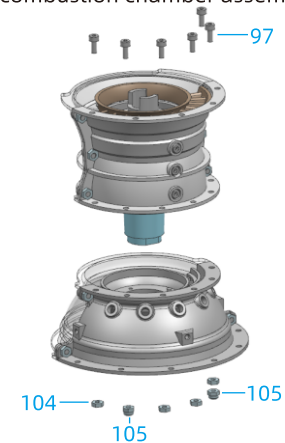
9.6 测试 Test

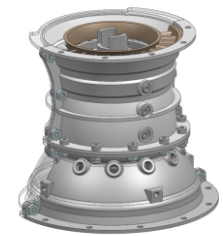


1、连接端子线
2、向前拨动开关
3、观察中心轴是否正常转动
1. Connect the terminal wires
2. Flip the switch forward
3. Observe whether the central shaft is rotating normally

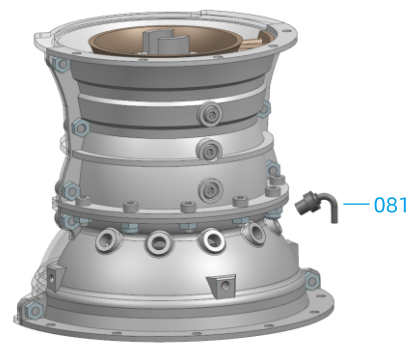


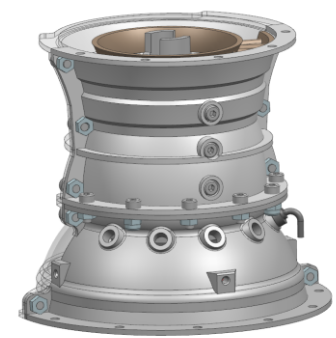
9.7 组装高压压气机机匣与燃烧室总成 Assemble the high-pressure compressor casing and combustion chamber assembly



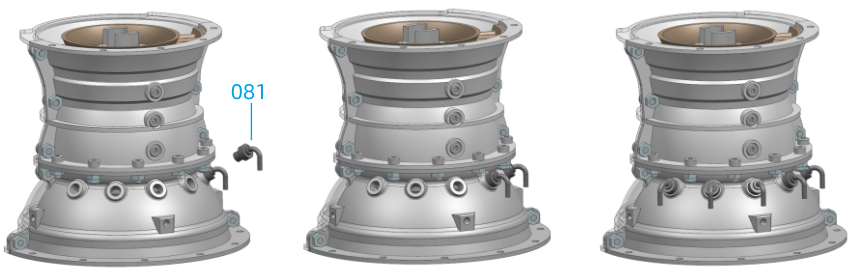


9.8 组装燃油支管 Assemble the fuel branch pipe





9.9 依次组装燃油支管 Assemble the fuel branch pipe in sequence



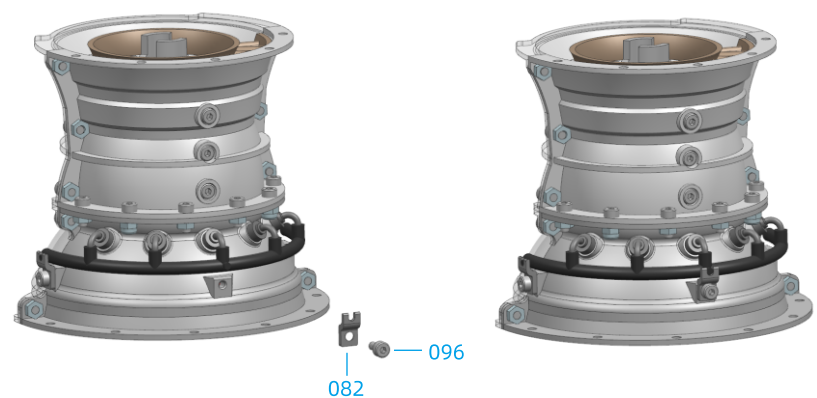
9.10 组装中心油管 Assemble the central fuel tube



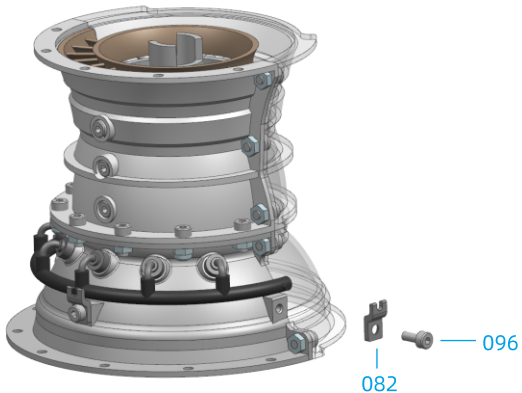
9.11 组装燃油管支架 Assemble the fuel pipe bracket

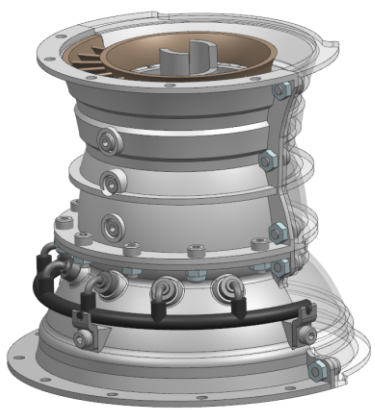


9.12 组装燃油管支架 Assemble the fuel pipe bracket

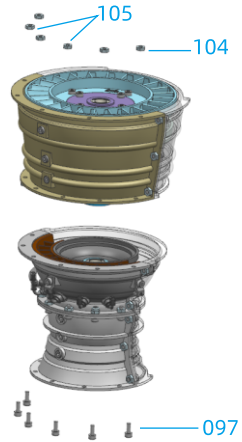


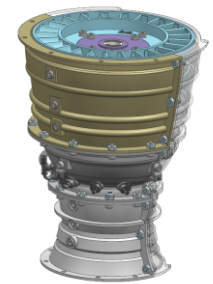
9.13 组装燃油管支架 Assemble the fuel pipe bracket



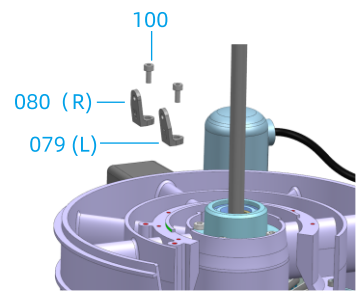


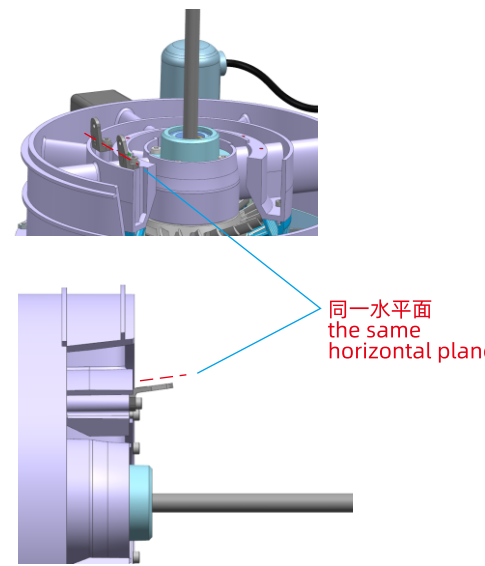
9.14 组装高压涡轮总成 Assemble the High-Pressure Turbine Assembly



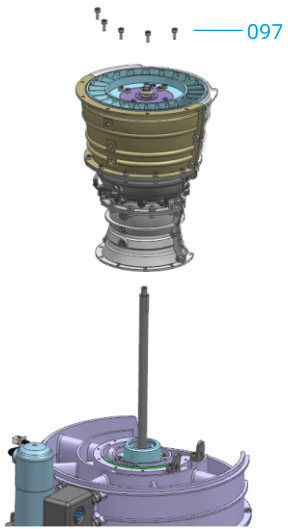


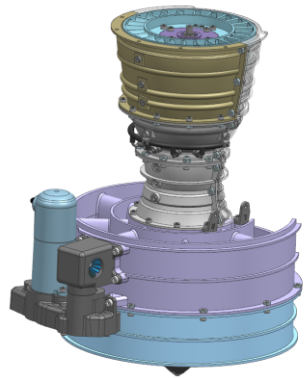
9.15 组装左右吊杆支架 Assemble the left and right boom brackets

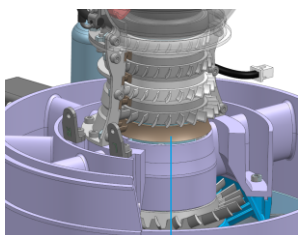




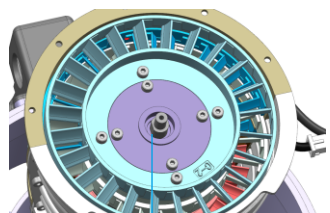
9.16 组装涡轮机组总成 Assemble the turbine unit assembly





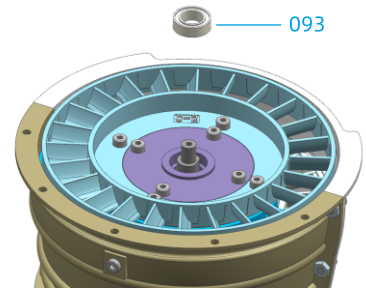


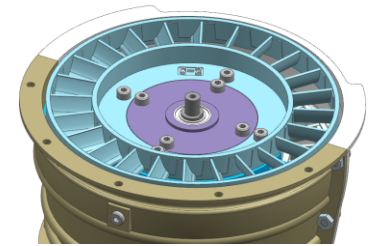
检查一级高压静子是否组装到位
Check if the first-stage high-pressure stator is properly assembled.



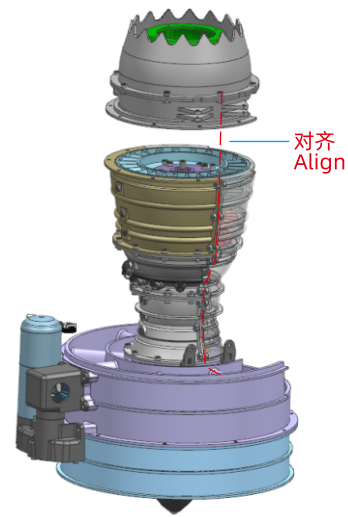
扁位对齐
Flat position alignment

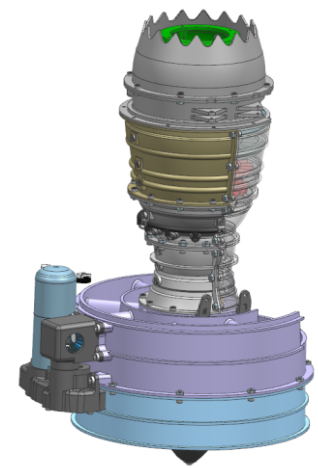
9.17 组装轴承 Assemble the bearing



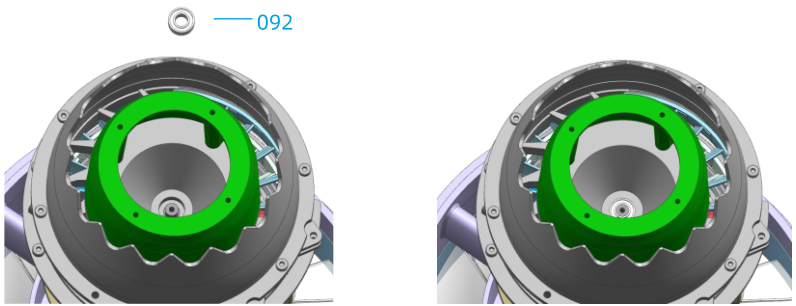


9.18 组装尾喷管总成 Assemble the tail nozzle assembly

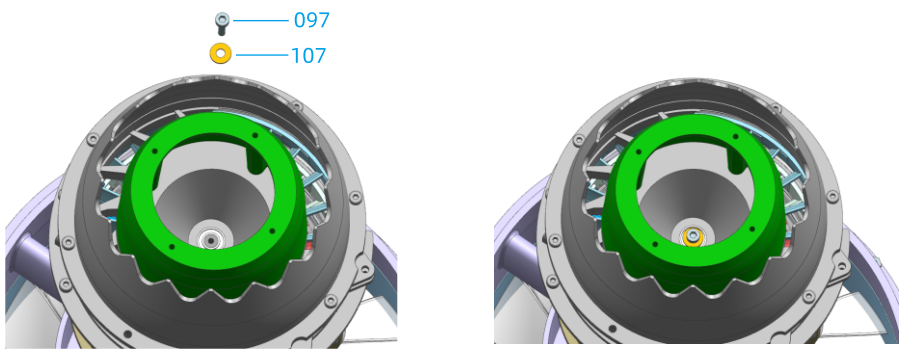




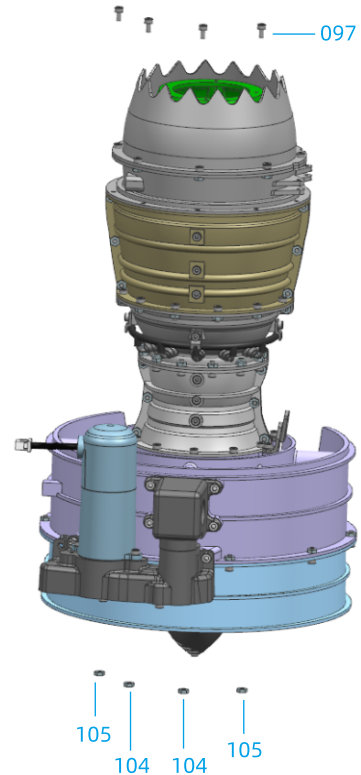
9.19 组装轴承 Assemble the bearing

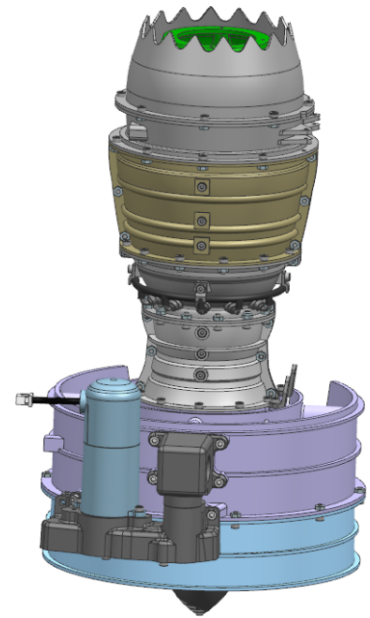


9.20 组装垫片螺丝 Assemble the gasket screw

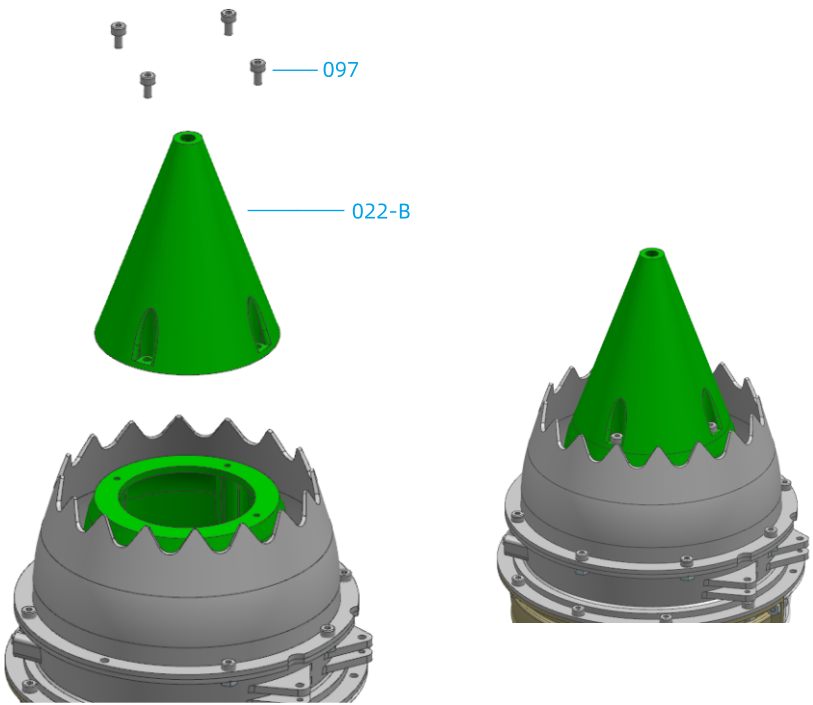


9.20 组装尾喷管总成螺丝 Assemble the screws of the tail nozzle assembly

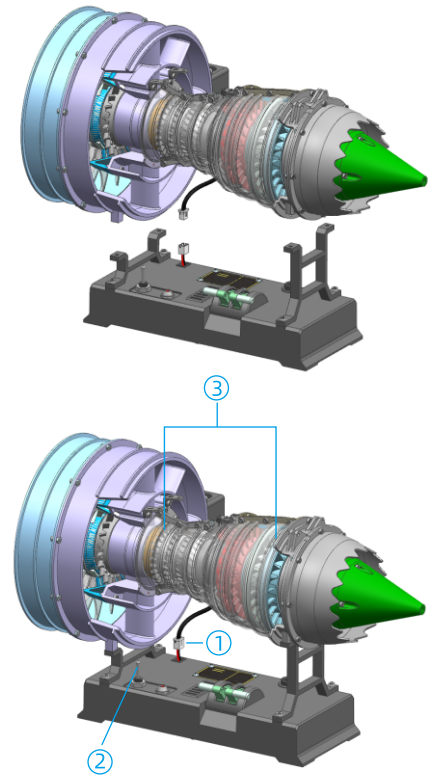




9.21 组装尾椎 Assemble the caudal vertebrae

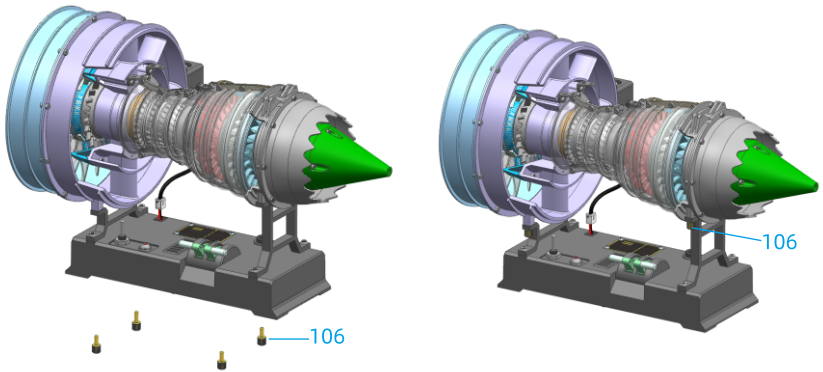


9.22 测试 Test

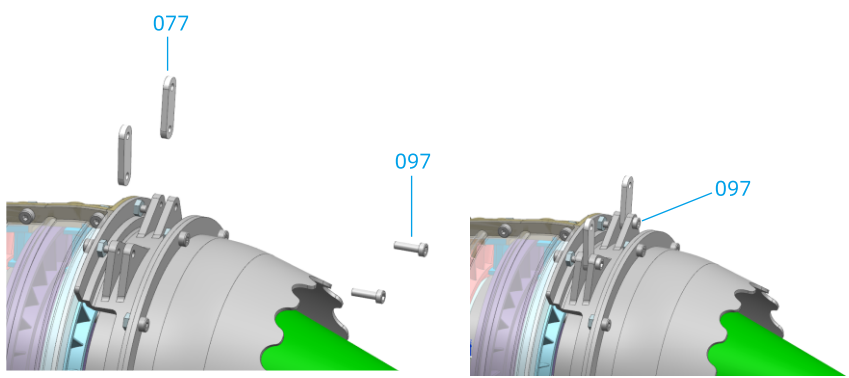


1、连接端子线
2、拨动开关
3、观察各组件是否运转正常
1、Connect the terminal wires
2、Toggle the switch
3、Check if all components are operating normally

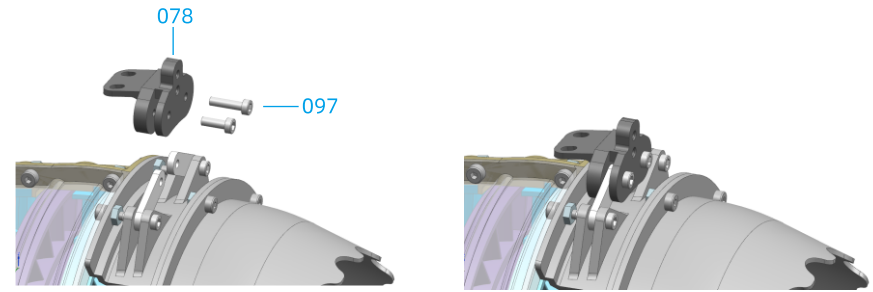
9.23 组装底座螺丝 Assemble the base screw



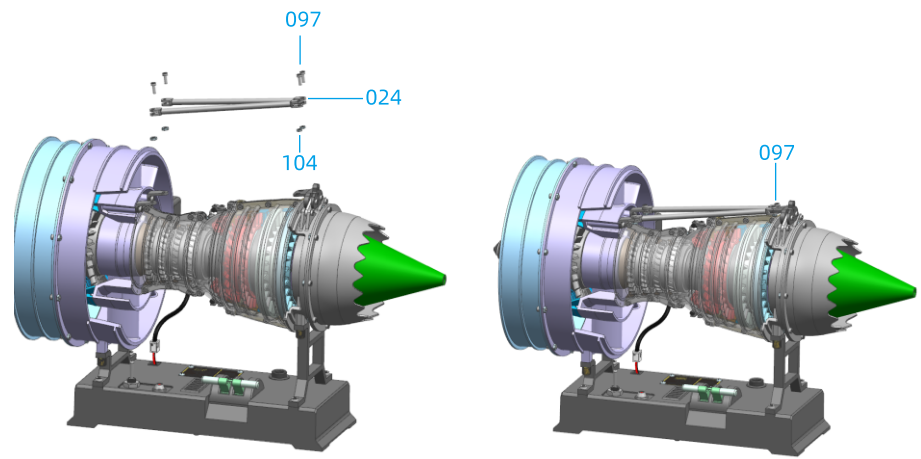
9.24 组装后吊板 Assemble the rear suspension plate



9.25 组装后支架 Assemble the rear bracket



9.26 组装拉杆 Assemble the tie rod

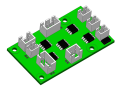
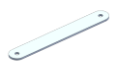


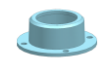
序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
01		中介机匣 Intermediate casing	1
02		进气机匣 Inlet casing	1
03		低压静子 low-pressure compressor stator	1
04		后支撑机匣 Rear support casing	1
05		一级高压涡轮 B-1 First-stage high-pressure turbine rotor B-1	1
06		二级高压涡轮B-2 Second-stage high-pressure turbine rotor B-2	1
07		低压转子 Low-pressure compressor rotor	1
08		尾喷管 Tailpipe	1

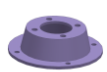
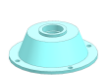
序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
09		高压机匣 High-pressure compressor casing	1
10		高压机匣透明罩 High-pressure compressor casing transparent cover	1
11		一级低压涡轮静子 First-stage low-pressure turbine stator	1
12		二级低压涡轮静子 Second - stage low - pressure turbine stator	1
13		进气锥 Inlet cone	1
14		涡轮机匣 Turbine casing	1
15		涡轮机匣透明罩 transparent cover of turbine casing	1
16		燃烧室外机匣 Outer casing of combustion chamber	1

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
17		燃烧室外机匣透明罩 Transparent cover of outer casing of combustion chamber	1
18		一级低压涡轮转子 C-1 First - stage low - pressure turbine rotor C - 1	1
19		二级低压涡轮转子 C-2 Second - stage low - pressure turbine rotor C - 2	1
20		传动轴 Transmission shaft	1
21		传动轴-1 Transmission shaft-1	1
22-A		尾锥前段 Forward section of the tail cone	1
22-B		尾锥 Tail cone	1
23		中心轴 Central shaft	1

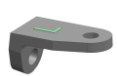
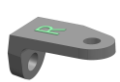
序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
24		拉杆 Tie rod	2
25		前支架 Front bracket	1
26		后支架 Rear bracket	1
27		底座 Base	1
28		底座底板 Bed plate of the base	1
29		铭牌 Nameplate	1
38		充电口 Charging port	1
39		拨动开关 Toggle switch	1

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
40		主板 Motherboard	1
41		电池 Battery	2
42		电机分流线 Motor shunt wire	1
43		灯线 Lamp wire	1
44		电池压板 Battery pressure plate	1
46		电机套 Motor casing	1
47		电机 Motor	1
48		电机箱 Motor casing	1

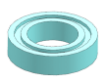
序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
49		电机箱盖 Motor box cover	1
50		风扇叶 Fan blades	18
51		二级低压涡轮固定盘 Second-stage low-pressure turbine fixed disk	1
52		3号轴承座 No. 3 bearing housing	1
53		小锥齿座 Small bevel gear seat	1
54		中心轴前段 Front section of the central axis	1
55		燃烧室内机匣 Combustion chamber inner casing	1
56		涡轮连接环 Turbine connecting ring	1

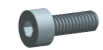
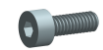
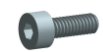
序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
57		高压气机后盘 High-pressure compressor end plate	1
58		一级高压转子 A-1 First - stage high - pressure compressor rotor A - 1	1
59		二级高压转子 A-2 Second - stage high - pressure compressor rotor A - 2	1
60		三级高压转子 A-3 Third - stage high - pressure compressor rotor A - 3	1
61		四级高压转子 A-4 Fourth-stage high-pressure compressor rotor A-4	1
62		低压转子连接盘 Low-pressure compressor rotor connecting disc	1
63		一级高压涡轮前盘 First-stage high-pressure turbine front disc	1
64		二级高压涡轮后盘 Second-stage high-pressure turbine rear disc	1

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
65		一级高压涡轮静子 First-stage high-pressure turbine stator	1
66		二级高压涡轮静子 Second-stage high-pressure turbine stator	1
67		中心油管 Central fuel tube	1
68		燃烧室外壳 Combustion chamber casing	1
69		燃烧室内壳 Combustion chamber inner casing	1
70		二级高压静子 2 Second-stage high-pressure compressor stator 2	1
71		三级高压静子 3 Third - stage high - pressure compressor stator 3	1
72		四级高压静子 4 Fourth - stage high - pressure compressor stator 4	1

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
73		锥齿盖 Bevel gear cover	1
74		风扇鼓 Fan drum	1
75		风扇封板 Fan cover plate	1
76		一级高压静子 1 First-stage high-pressure compressor stator 1	1
77		后吊板 Rear suspension plate	2
78		吊架后支架 Rear support bracket of the hanger	1
79		吊杆左支架 Left support bracket	1
80		吊杆右支架 Right support bracket	1

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
81		燃油支管 Fuel branch pipe	5
82		燃油管支架 Fuel pipe bracket	3
83		推杆手柄 Push rod handle	2
84		过渡轴 Transition shaft	2
85		中心锥齿轮 Central bevel gear	2
86		小锥齿轮 Bevel pinion	3
87		电机齿轮 Motor gear	3
88		过渡齿轮 Idler gear	1

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
89		显示灯 Indicator light	1
90		电机轴套管 Motor shaft sleeve	1
92		轴承 4*8-3 Bearing 4*8-3	6
93		轴承 6*10-3 Bearing 6*10-3	6
94		轴承 8*12-3.5 Bearing 8*12-3.5	6
95		轴承 12*21-5 Bearing 12*21-5	5
96		内六角螺钉 M2*4 Hex socket screw M2*4	28
97		内六角螺钉M2*6 Hex socket screw M2*6	102

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
98		内六角螺钉M2*14 Hex socket screw M2*14	5
99		内六角螺钉M2*18 Hex socket screw M2*18	5
100		内六角螺钉M2.5*6 Hex socket screw M2.5*6	42
101		内六角螺钉M2.5*8 Hex socket screw M2.5*8	11
102		内六角螺钉M2.5*30 Hex socket screw M2.5*30	5
103		十字角螺钉M2*4 Phillips socket screw M2*4	5
104		M2螺母 M2 Nut	50
105		M2 防松螺母 M2 lock nut	20

序号 Serial number	零部件图片 Parts Photo	零部件名称 Component Name	数量 Number
106		手拧螺丝 Hand-tightened screw	4
107		M2垫片 M2 Washer	2
108		M2.0弹簧垫片 M2.0 Spring washer	1
113		润滑油 Grease	1

保修说明

一> 保修须知

购买本产品，请仔细阅读以下保修条款，以确保产品得到有效保修

1. 本产品为组装体验式产品，拆包装后无质量问题不支持7天无理由退换货。不拆包装的情况下从购买之日起7天可以退换货；
2. 购买本产品时，由销售商协助在保修卡上完整、真实的填写您的相关信息，并索要有效发票或购买凭证，且妥善保管；
3. 用户需要保修时，必须出具购机发票或有效三包凭证。如果用户丢失有效发票或三包凭证且不能提供复印件的，根据机器的生产日期后延60日为保修的起始日期，提供一年的保修服务；
4. 保修对象为用户购机后及使用前有质量问题的零件。对于用户不合理使用而损坏的零件，本公司提供收费服务；
5. 本公司保留对售后服务条款的最终解释权及修改权限。

二> 售后服务及保修内容

1. 自产品签收日起，电机、电池、电路板三个月保修，其它零件提供一年保修；
2. 购新机时如发现零件缺失，凭保修卡的购买日期30天内厂家予以免费补发缺失的零件，超过30天则需要用户到土星官方网站购买
3. 用户组装完成后产品出现无法运转或不良的情况，可向厂家咨询原因，也可寄回厂家免费检测或调试；
4. 用户碰到任何产品问题，本公司或授权机构免费提供技术咨询或指导；
5. 所有在保修范围内被更换下来的零件，零件和附件归本公司所有。用户必须提供有质量问题的零件，向本公司换取新零件。

三> 非保修内容

1. 超过三包有效期的；
2. 未按产品使用说明书要求使用、维护、保管不当造成损坏的；
3. 非本公司或授权销售网点销售的产品；
4. 无有效发票或三包凭证的，或擅自涂改售后服务卡的（能够证明在三包有限期的产品除外）
5. 售后服务卡上的产品型号或编号与商品不相符的；
6. 因不可抗拒力（如：水灾、火灾、地震、雷击等）造成伤害的；
7. 产品使用中的自然磨损，如：产品间隙变大、润滑油干涩、电池长期老化等造成的问题；
8. 对于非产品本身品质原因造成的故障（如：进水、受潮、摔坏、外力挤压、变形、使用不当等）
9. 经销商对保修内容作出的约定，凡超出本保修协议的，不在保修范围内。

Warranty description

I. Warranty Instruction

Please carefully read the following warranty terms when purchasing this product so as to assure effective warranty for the product:

1. Since this product is for assembly experience, "7–day no–hassle return/change policy" is not available if no quality defect is found after unpacking. "7–day no–hassle return policy" is available if the package is not removed;
2. When this product is purchased, your dealer will assist you to write down your complete real information on the warranty card, when you should ask the dealer for effective invoice or purchase voucher; then, the invoice and voucher shall be properly kept;
3. Users who apply for warranty have to show their purchase invoices or effective "three guarantees" certificate. For users who lost their effective voices or "three guarantees" certificate and fail to provide their copies, the warranty period is one year from the 60th day after the manufacturing of machine;
4. The warranty object is the parts that are found with defects after purchase and before use. We provide paid services for parts damaged by improper use by users;
5. We reserve the right to interpret and modify the terms & conditions of after–sales service.

II. Items of After–sales Service and Warranty

1. The warranty period for motor, battery and circuit board is three months from the day on which they are received and accepted; the warranty period for other parts is one year from the day on which they are received and accepted;
2. The user who finds some part missed when purchasing a new machine could request the manufacturer to supply the missed part within 30 days after the purchase date on warranty card; the user has to purchase that part at Teching's official website after the said 30 days;
3. If the assembled product fails to run or run properly, the user could either consult the manufacturer for possible causes, or send the product back to the manufacturer for free testing or debugging;
4. We and our authorized agencies provide free technical advice or instruction for users who encounter any product problem;
5. All parts and accessories replaced within the scope of the warranty belong to our company. Users have to provide defective parts so that we can exchange them with new ones.

III. Items outside Scope of Warranty

1. Beyond the "three guarantees" period;
2. Damage is caused by failure to use, maintain and keep the product as per instruction manual;
3. Products that are not sold by us or our authorized sales outlets;
4. Those who hold no valid invoice or "three guarantees" certificate, or those who modify the after–sales service card without permission (except the case where the product is confirmed to be within the "three guarantees" period);
5. The product model or serial number on after–sales service card fail to match the commodity;
6. Damage caused by force majeure (e.g. flood, fire, earthquake, lightning strike, etc.);
7. Natural wear during the use of product, e.g. the problems arising from product gaps expansion, lubricating oil shortage, and battery aging, etc.;
8. For the faults (e.g. moisture invasion, dampness, breakage, external force extrusion, deformation and improper use, etc.) caused by other factors than product quality;
9. Dealers shall make agreement on warranty coverage; the situations outside this warranty agreement are not covered by the warranty.

售后服务

1.可以扫描土星小助手二维码，进行技术咨询；

2.可以进入土星文化公众号，获得相关技术咨询；

3.可以直接拨打本公司400电话，咨询本公司技术人员；

4.可以用邮件的形式向本公司进行技术咨询；

5.可以向附近的授权机构提出技术咨询；

6.可以以各种方式对本公司产品提出意见、建议和新产品期望。

售后服务卡

用 户 名：_____ 联系电话：_____

产品名称：_____ 产品编号：_____

产品流水号：_____

问题描述：_____

_____

服务内容：

☐ 零件补缺 ☐ 零件更换 ☐ 检测服务 ☐ 需退换货

销售单位：_____

销售地点：_____

经 办 人 ：_____ 售后完成时间：_____

公　　司：广州市土星文化发展有限公司

地　　址：广州市黄埔区宏明路宝盛大厦

售后邮箱：sales@techingedu.com.cn

热线电话：4001-020-019

土星公众号　　土星小助手

Sales service card

Account name: _____ Tel: _____

Product name: _____ Product No.: _____

Serial number of product: _____

Problem description: _____

_____

Service content:

☐ Part replenishment ☐ Testing service

☐ Part replacement ☐ Return and change of goods needed

Sales unit: _____

Place of sale: _____

Operator: _____ After-sales completion time: _____

Company:
Guangzhou Teching Cultural Development Co., Ltd.
Address:
Baosheng Building, Hongming Road,
Huangpu District, Guangzhou City, China
After-sales email: sales@techingedu.com.cn
Hotline: 0086-13924277386 4001-020-019

Sales Service

1. Scan the Teching Assistant QR code for technical consultation;
2. Relevant technical information is available at Teching's official account;
3. You can call our hotline directly and consult our technician;
4. Technical consultation can be sent to us by mail;
5. Technical advice can be obtained from nearby authorized agencies;
6. You are encouraged to bring forward your comments and suggestions on our products and your expectations for new products in various manners.

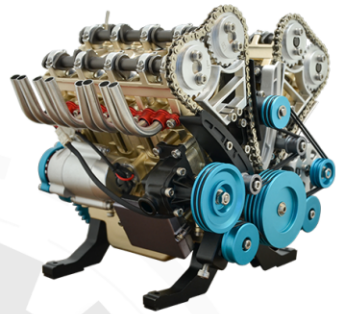
Inspection No.:

TECHING
土星文化

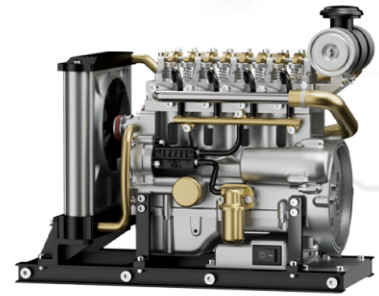
Super Products
超人气产品



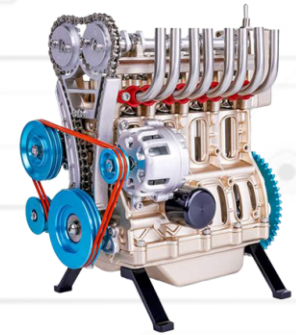
Turbofan engine (DM119)
航空涡扇发动机 (DM119)



V8 Engine(DM118)
V8发动机 (DM118)



Mini diesel engine (DM115)
迷你柴油发动机 (DM115)



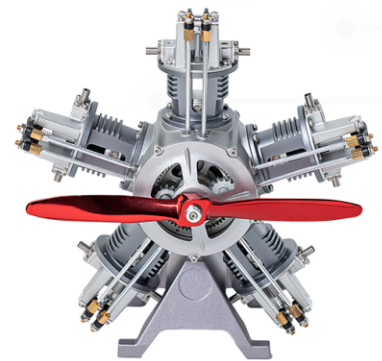
4-Cylinder engine (DM113)
直列四缸发动机 (DM113)



Small bypass turbofan engine (DM135)
小涵道比涡扇发动机 (DM135)



Turbocharged 4-Cylinder Engine (DM111)
涡轮增压四缸发动机 (DM111)



5-Cylinder radial engine (DM116)
星型五缸发动机 (DM116)



Oil pumping unit (DM601)
抽油机 (DM601)

传承·探索·创新

Heritage · Discovery · Discovery

TECHING
土星文化

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地　　址 Address　广州市黄埔区宏明路宝盛大厦 Baosheng building, Hongming Road, Huangpu District, Guangzhou City,China.

热线电话 Service Tel　0086-13924277386

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土星APP
TECHING

土星官网
OFFICIAL WEBSITE

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