

安装操作说明

Installation operation instructions



防爆增量编码器 Explosion-proof encoder EXDE100H系列 EXDE100H Series

本安装说明全面涵盖以上系列：
请注意，图示可能与实际产品的型号、材料、颜色和接头类型上发生差异。

This installation guide covers all of the above series:
Please note that the illustration may differ from the actual product model, material, color, and connector type.

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1、受伤风险 Risk of bodily injury

安装前注意事项 Important before mounting begins:



人身伤害危险



关闭电源
Switch off the power.



确保机器处于停机状态。
本产品安装在旋转部件上，
在运动状态下操作可能导致人身伤害。
Make sure the machine is at a standstill.
The product is to be mounted on a rotating part
that can cause bodily injury when in motion.

2、损坏产品的风险 Risk of damage to the product

本产品为精密测量仪器，应由有经验的人员小心操作。以下警告适用于，产品在超出技术规范极限值情况下使用。
The product is a precision measuring instrument. It should be handled with care, by experienced personnel. The warnings below apply in the event of effects outside the limit values stated in the product's data sheet.



产品损坏风险



产品温度组别/最高表面温度与使用环境温度范围关系如下
The product temperature group/maximum surface temperature is related to the ambient temperature range as follows

温度组别/最高表面温度 Temperature group/Maximum surface temperature	使用环境温度范围 Ambient temperature range
T5/T95°C -40...+80°C	-40...+80°C
T6/T80°C -40...+60°C	-40...+60°C



短路或供电电压过高
By short-circuits or an excessively high supply voltage



轴上作用力过大
If the shaft is exposed to high mechanical forces



遭受敲打，撞击或其他物理损坏
By impacts or knocks or other physical damage.



电子产品被接触时的静电放电
By ESD discharges if the electronics are touched



**潮湿或化学液体腐蚀
(不要竖直安装电缆)**
By moisture or chemical fluids
(Do not install cable pointing upwards)



剧烈振动或冲击
If it is exposed to powerful vibrations or shock

注意事项 Attention

1、涉及隔爆接合面的维修须联系产品制造商

For repairs involving flameproof joints, contact the manufacturer of the product.

2、现场使用和维护时必须遵守“存在爆炸性环境时严禁开盖”的规则。

Field use and maintenance must comply with the "in the presence of explosive environment, do not open the cover" rule.

3、安装现场应不存在对铝合金有腐蚀作用的有害气体

The installation site should be free of harmful gases that have a corrosive effect on aluminum alloy.

4、应当保持产品外表面清洁，以防粉尘堆积，严禁用压缩空气吹扫

The outer surface of the product should be kept clean to prevent the accumulation of dust, and blowing with compressed air is strictly prohibited.

5、用户不得自行更换该产品的零部件，应会同产品制造商共同解决运行中出现的故障，以杜绝损坏现象的发生。

The user shall not replace the parts and components of the product by himself, and shall work together with the product manufacturer to solve the faults in operation in order to eliminate the occurrence of damage.

6、产品的安装、使用和维护应同时遵守产品使用说明书、GB/T3836.13-2021“爆炸性环境

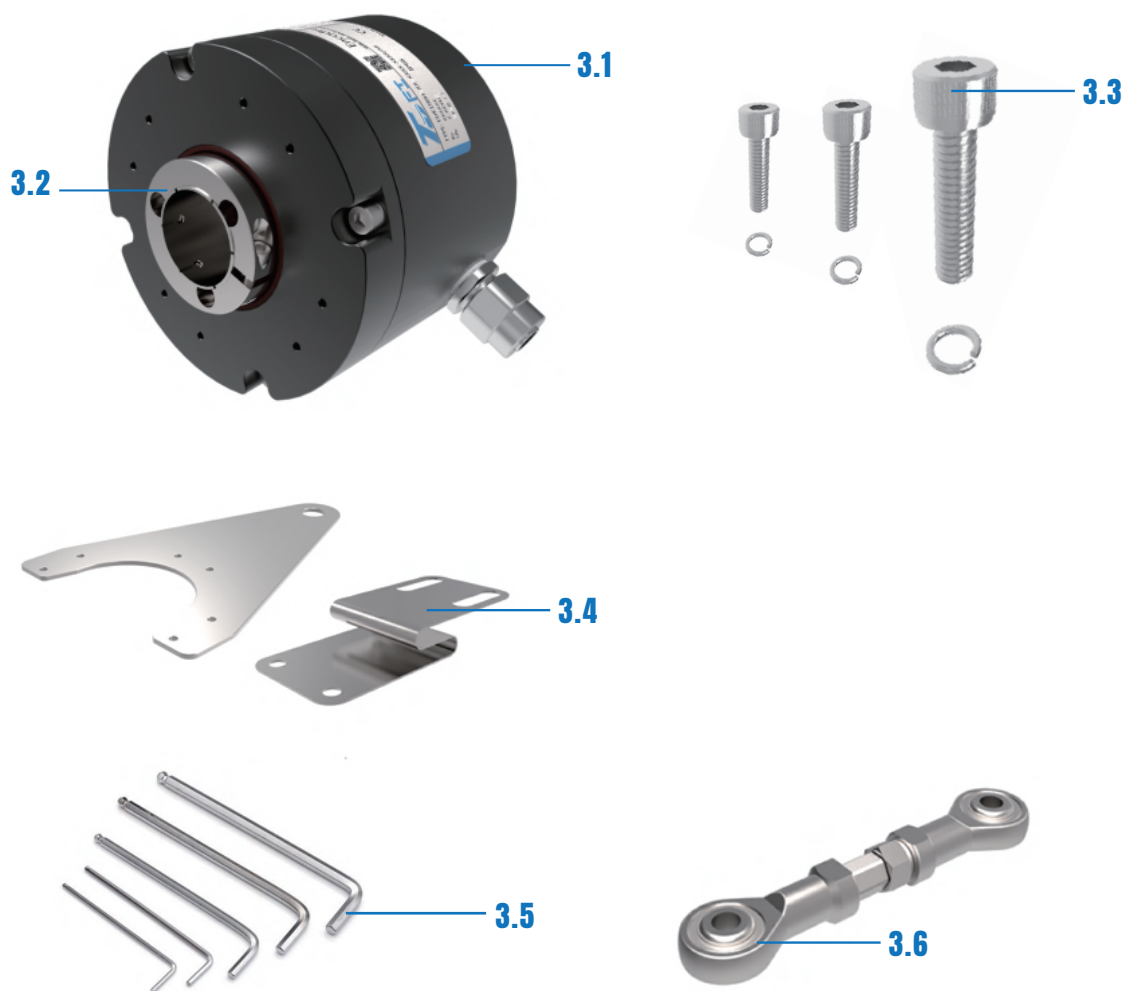
第13部分：设备的修理、检修、修复和改造”、GB/T 3836.15-2017“爆炸性环境

第15部分：电气装置的设计、选型和安装”、GB/T 3836.16-2022“爆炸性环境

第16部分：电气装置的检查与维护”、GB50257-2014“电气设备安装工程爆炸和火灾危险环境电气装置施工及验收规范”及GB15577-2018“粉尘防爆安全规程”的有关规定。

Design, selection and installation of electrical devices", GB/T 3836.16-2022 'Explosive environment Part 16: Inspection and maintenance of electrical devices', GB50257-2014 'Electrical equipment installation engineering GB50257-2014 'Explosive and fire micro-environment electrical device construction and acceptance specification' and GB15577-2018 "dust explosion-proof safety regulations" of the relevant provisions.

3、产品部件 Parts of the product



3.1 防爆编码器 Explosion-proof encoder

3.2 锁紧环 Clamping ring

3.3 内六角杯头螺钉 Six hexagon socket head cap screws M3×8 弹簧垫圈 Spring washer

内六角杯头螺钉 Six hexagon socket head cap screws M4×16 弹簧垫圈 Spring washer

内六角杯头螺钉 Six hexagon socket head cap screws M10×30 弹簧垫圈 Spring washer

3.4 安装支架 Mounting bracket

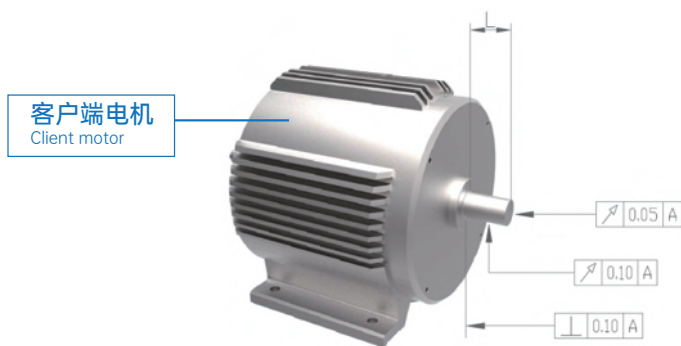
3.5 六角扳手 Hex wrench

3.6 力矩臂 Moment arm

4、机械安装 Mechanical mounting

4.1 对客户端电机主轴（电机机座号160 ~ 200）的要求。

Requirements for the client motor spindle (motor stand number 160 ~ 200).



电机主轴外露长度见图示

The exposed length of the motor spindle is shown in the figure: $L \geq 120\text{mm}$.

电机主轴 ϕd 与编码器配合为基轴制间隙配合，配合公差h6/G7。

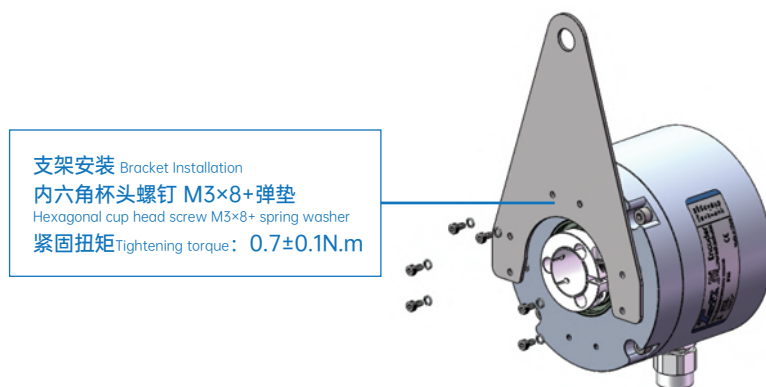
The motor spindle ϕd and encoder fit is a clearance fit in the base axis system with a fit tolerance of h6/G7.

同时保证电机主轴

Also ensure that the motor spindle:

轴向跳动 axial runout $\leq 0.05\text{mm}$; 径向跳动 radial runout $\leq 0.10\text{mm}$; 垂直度 perpendicularity $\leq 0.10\text{mm}$.

4.2 安装支架组装 Mounting bracket assembly



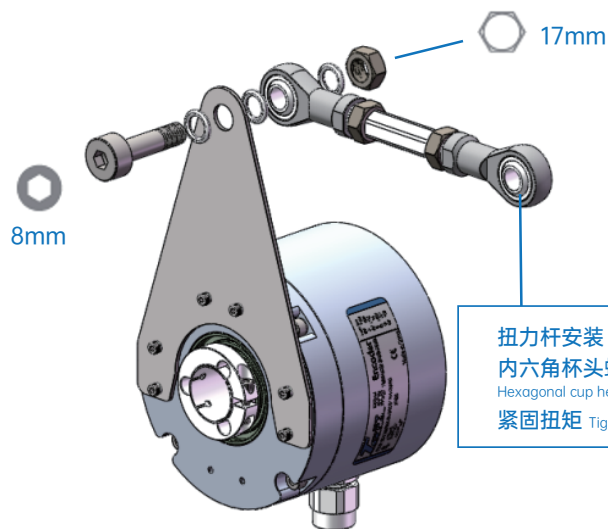
用六角扳手将安装支架、M3×8内六角杯头螺钉按图示方向组装并固定。

Assemble and fix the mounting bracket, M3×8 six hexagon socket head cap screws in the direction shown in the drawing with a hexagonal wrench

目视检测，确认安装支架与编码器安装面无间隙，无移动现象。

Visually inspect to confirm that there is no gap and no movement between the mounting bracket and the encoder mounting surface.

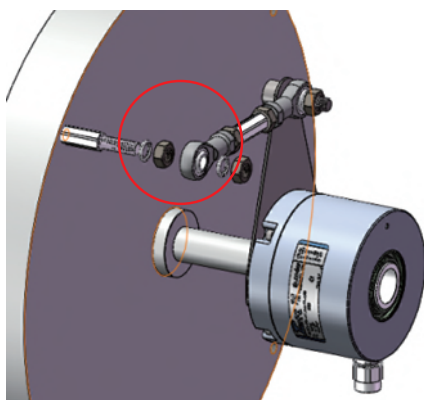
4.3 力矩臂组装 Torque arm assembly:



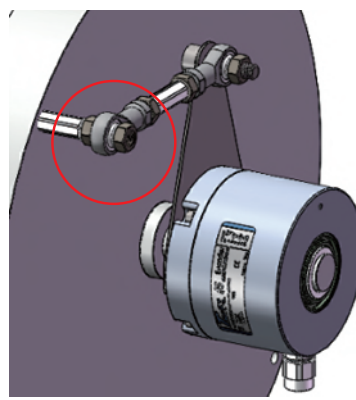
扭力杆安装 Torque arm Installation
内六角杯头螺钉M10×30+弹垫
Hexagonal cup head screw M10×30+ spring washer
紧固扭矩 Tightening torque: $20 \pm 0.2 \text{ N.m}$

4.3.1 将力矩臂、M10×30内六角杯头螺钉、弹簧垫圈、六角螺母按图示方向安装，并锁紧。

Install the torque arm, M10×30 six hexagon socket head cap screws, spring washers, and hex nuts in the directions shown below and lock them tightly.



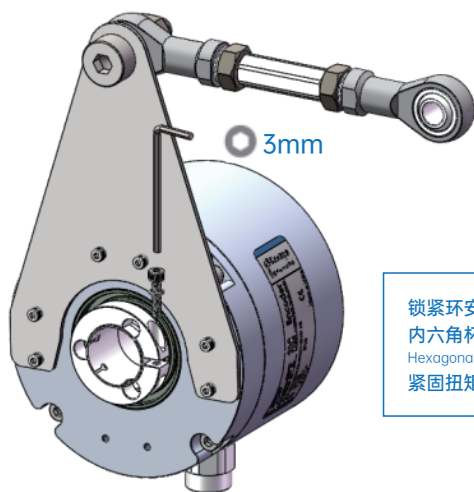
视图一



视图二

4.3.2 将M10六角螺母和弹垫组装在电机的丝杆上，编码器安装方向见视图一，六角螺母和弹垫预紧初固定见视图二。

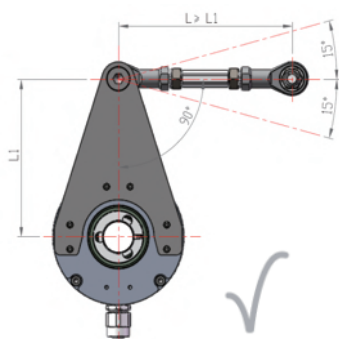
Assemble the M10 hexagonal nut and spring washers on the screw of the motor, then mount the encoder in the direction of picture one. The hexagonal nut and spring washers are pre-tensioned for initial fixing, see picture two.



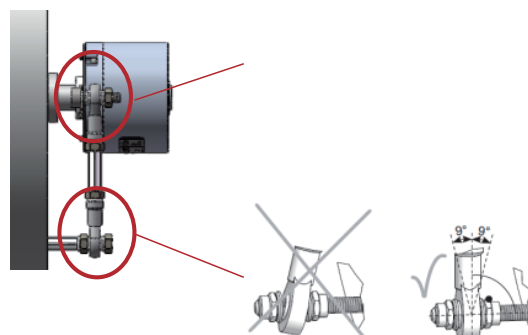
锁紧环安装 Lock ring installation
内六角杯头耐落螺钉M4×16
Hexagonal cup head fall resistant screw M4x16
紧固扭矩 Tightening torque: $2 \pm 0.1 \text{ Nm}$

4.3.3 固定锁紧环，用六角扳手将M4×16内六角螺钉紧固。

Secure the locking ring and tighten the M4 x 16 socket head cap screws with a hexagonal wrench.



视图三



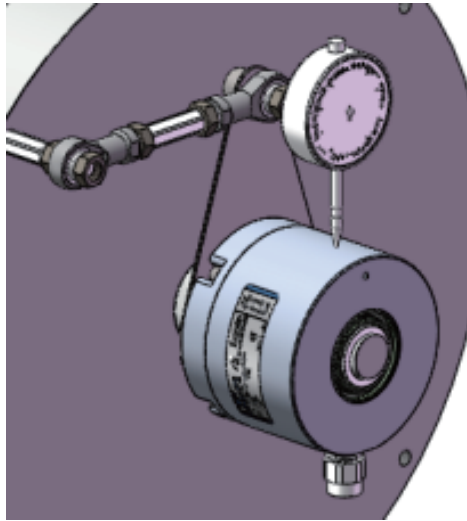
视图四

4.3.4 锁紧环固定后，调整力矩臂角度及位置，并锁紧力矩臂螺母。

After the locking ring is fixed, adjust the angle and position of the torque arm and lock the torque arm nut.

注意：安装角度及位置参加视图三和视图四，以确保最佳的测量角度。

Note: The mounting angle and position see Picture 3 and Picture 4 to ensure the best measuring angle.



4.3.5 力矩臂组件调试后，通过电机的慢速旋转(30...50rpm)来检查编辑器的径向位移。

After commissioning of the torque arm assembly, the radial displacement of the editor was checked by slow rotation of the motor (30...50 rpm).

位移不应超过0.2mm，否则将缩短编码器的使用寿命或影响系统的精度。

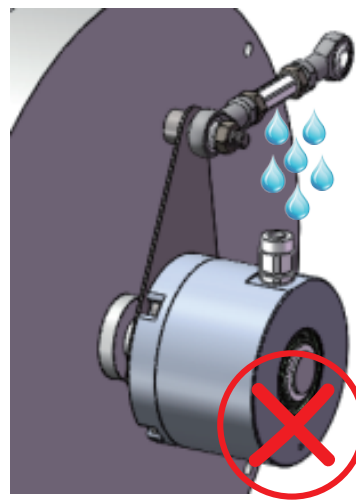
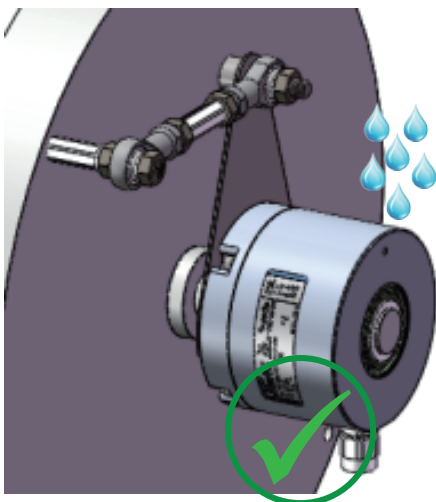
The displacement should not exceed 0.2mm, otherwise it will shorten the life of the encoder or affect the accuracy of the system.



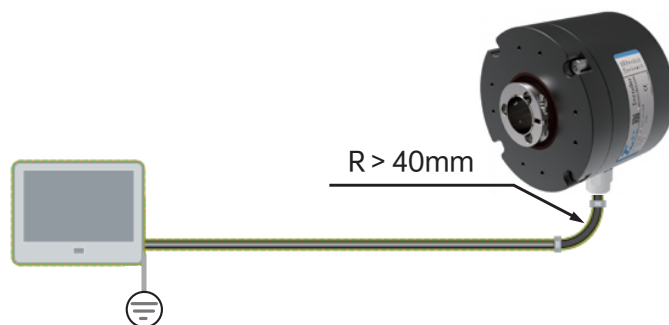
机械安装注意事项 Mechanical installation precautions:

编码器的电缆出线应避免同潮湿或化学液体腐蚀方向。

The cable outlet of the encoder should be avoided in the same direction as the corrosive direction of humidity or chemical liquids.

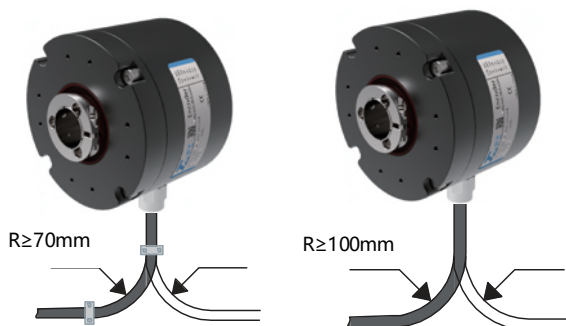


5、电气安装 Electrical mounting



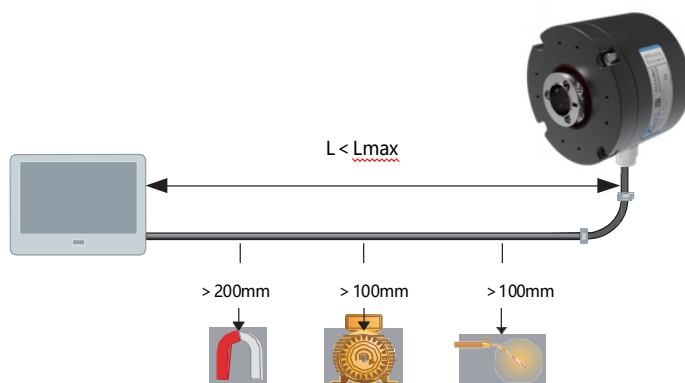
编码器的电气连接：使用屏蔽接地线，接地线必须连接到电机底座，并单点接地。

Electrical connection of the encoder: Use a shielded ground wire. The ground wire must be connected to the motor base with a single point of grounding.



编码器的电缆排布半径，确保电缆弯曲半径超过允许的最小值。

The cable row radius of the encoder ensures that the cable bend radius exceeds the minimum permissible value.



编码器的电缆排布环境，请将潜在的干扰源放置在远离电缆建议的最小值，并确保电缆长度不超过产品规定值。

Encoder cable routing environment, place potential sources of interference away from the minimum recommended cable
Ensure that the cable length does not exceed the product specification.

6、证书 Certificate

产品的符合性声明、证书和最新操作指南请浏览www.tofi-tech.com，可搜索产品型号查看具体产品详情。
Declarations of Conformity, certificates and newest operating instructions for products can be found at www.tofi-tech.com.



CCC Ex认证
CCC合格证编号: 2023322314005175



China NEPSI 防爆合格证
NEPSI防爆标志: Ex db IIC T5/T6 Gb, Ex tb IIIC T95°C/T80°C Db
合格证编号: GYB21.2832X



ATEX国际防爆认证
ATEX防爆标志: Ex II 2GD Ex db IIC T5/T6 Gb, Ex tb IIIC T95°C/T80°C Db
合格证编号: CSANe 24ATEX1099X



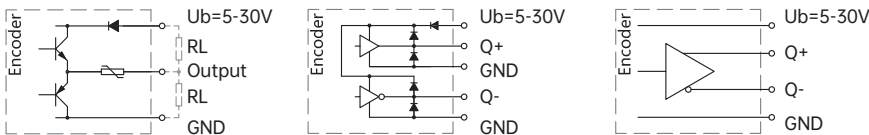
IECEX国际防爆认证
IECEX防爆标志: Ex db IIC T5/T6 Gb, Ex tb IIIC T95 °C/T80°C Db
合格证编号: IECEX CSA 24.0020X

7、技术参数 Technical parameter

机械参数 Mechanical parameter

轴径 Shaft diameter (mm)	空心轴 Hollow shaft $\Phi 20$ 、 $\Phi 30$ 、 $\Phi 45$ mm、5/8"、3/4"、7/8"、1"、1-1/8"、1-3/8" 空心+螺丝 Hollow+screw $\Phi 16$ 、 $\Phi 20$ mm; 锥轴 Cone shaft $\Phi 17$ mm (1: 10)
防护等级 Protection	IP66 DIN EN 60529
每分钟最大转速 Speed	3000 rpm
最大轴负荷 Maximum shaft load	径向Axial 200N; 轴向 Radial 100N
冲击 Shock resistance	$\leq 100g$ 6ms DIN EN 60068-2-27
振动 Vibration resistance	10g 10...2000Hz DIN EN 60068-2-6
轴承寿命 Bearing life	10^9 turns
转动惯量 Rotor moment of inertia	$\approx 1.8 \times 10^{-6} kgm^2$
启动力矩 Starting torque	$< 0.1Nm$
主体材料 Materials	铝合金阳极氧化 Anodic oxidation of aluminum alloy
主轴材料 Spindle materials	不锈钢 Stainless steel
外壳材料 The shell material	铝合金阳极氧化 Anodic oxidation of aluminum alloy
工作温度 Working temperature	-40°C...+85°C
贮存温度 Storage temperature	-40°C...+85°C
重量 Weight	2.3Kg (2m cable)

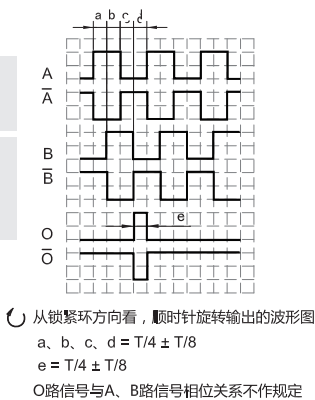
电气参数 Electrical parameter



输出电路 Output circuit	推挽输出 Push-pull output	推挽差分输出 Push-Pull Differential	RS422 (TTL)
分度 Pulse rate	Max. 3000P/R	Max. 3000P/R	Max. 3000P/R
电源 (VDC) Supply voltage	5-30V	5-30V	5-30V
无负载时消耗电流 Power consumption(no load)	80mA	80mA	80mA
负载电流 Permissible load/channel	$\pm 30mA$	$\pm 30mA$	$\pm 30mA$
最高输出频率 Pulse frequency	100KHz	100KHz	100KHz
信号高电平 Signal level high	Min. $U_b - 2.5V$	Min. $U_b - 2.5V$	Min. 2.5V
信号低电平 Signal level low	Max. 0.8V	Max. 0.8V	Max. 0.4V
上升时间 T_r Rise time T_r	Max. 1 μs	Max. 1 μs	Max. 1 μs
下降时间 T_f Fall time T_f	Max. 1 μs	Max. 1 μs	Max. 1 μs
短接保护 Short circuit proof outputs	Yes	Yes	Yes

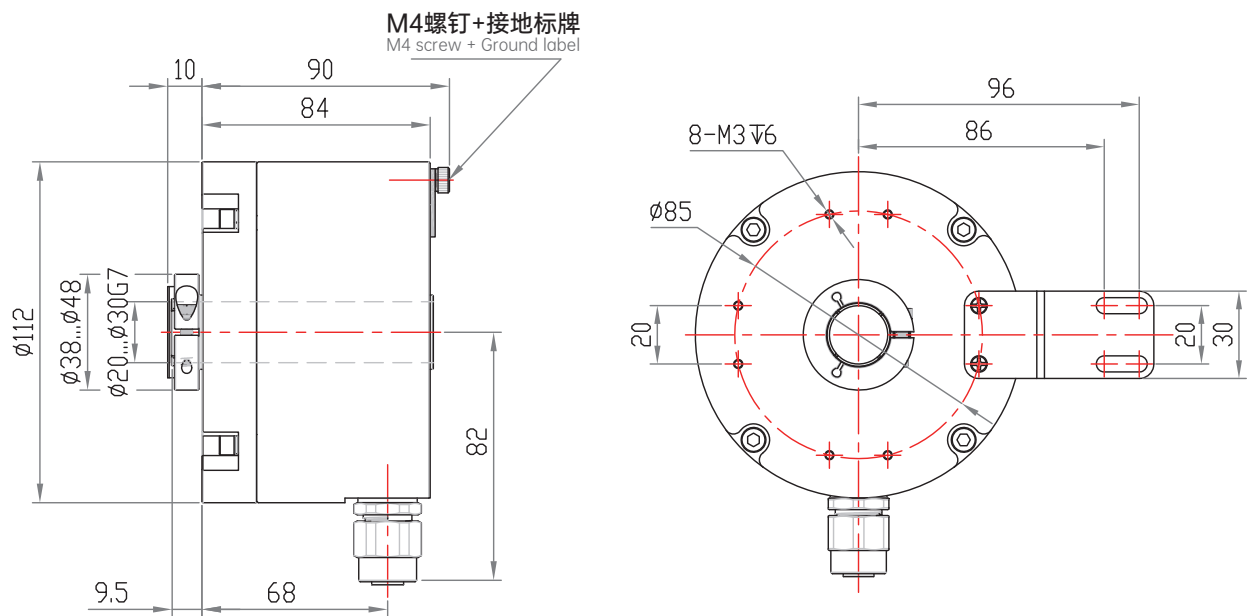
端子配置 Terminal assignment

信号		OV	+Ub	A	\bar{A}	B	\bar{B}	O	\bar{O}	\equiv
色标		白 WH	棕 BN	绿 GN	粉 PK	黄 YE	蓝 BU	灰 GY	红 RD	屏蔽 Shield

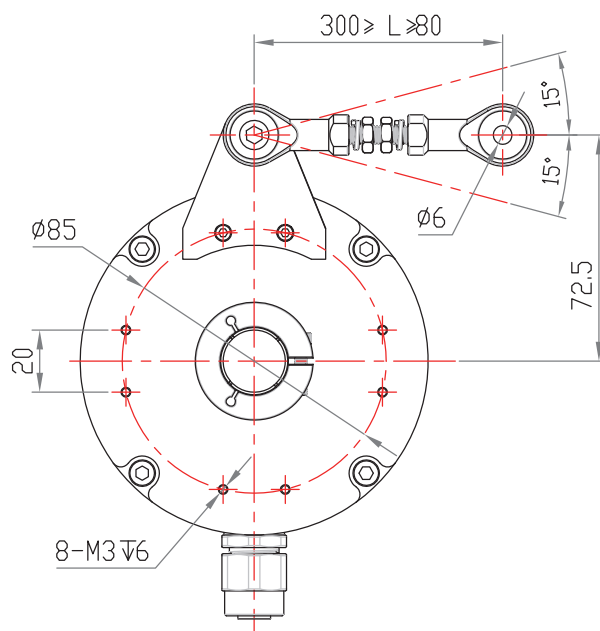
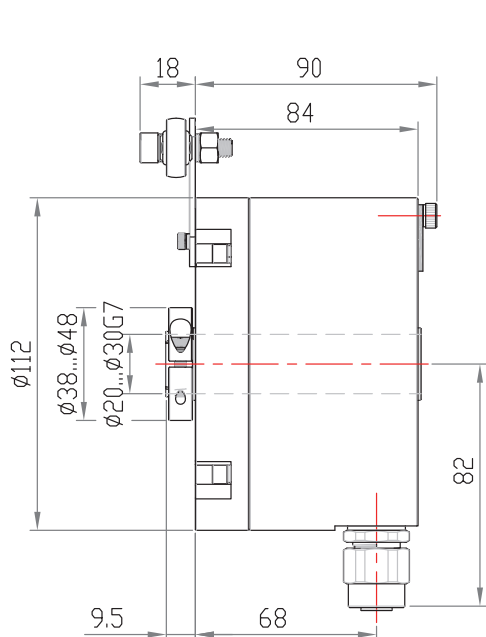


机械图 Dimensions

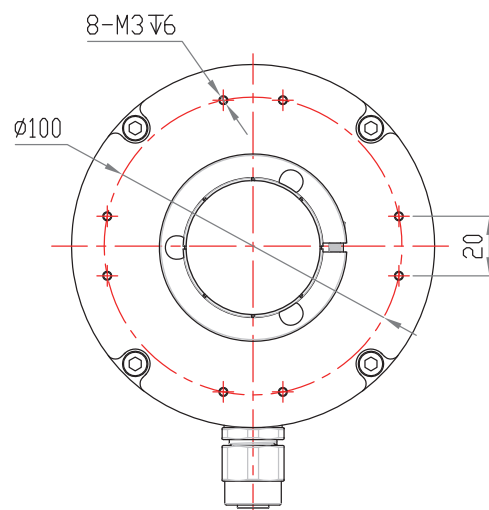
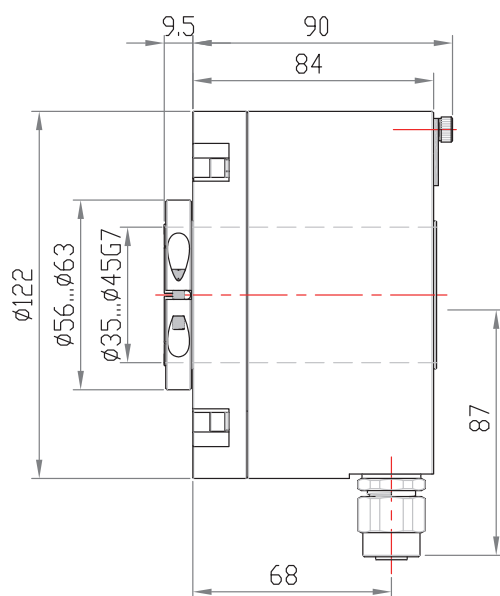
EXDE100H30+8117-A



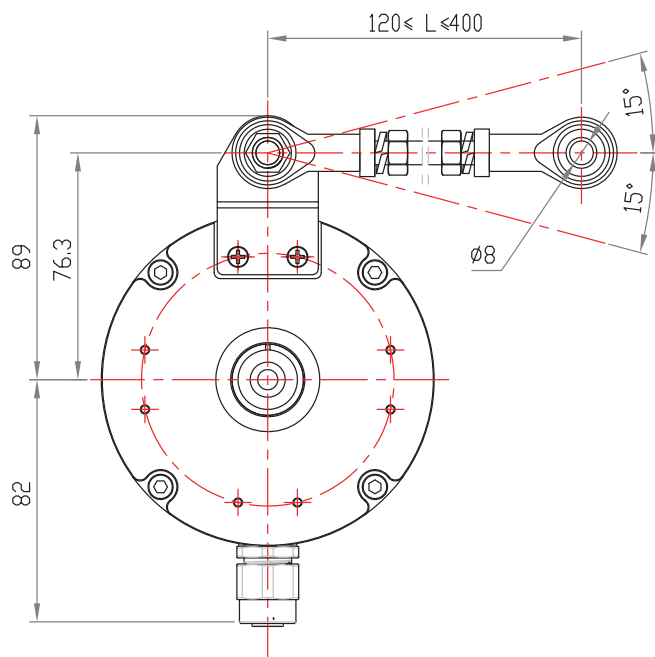
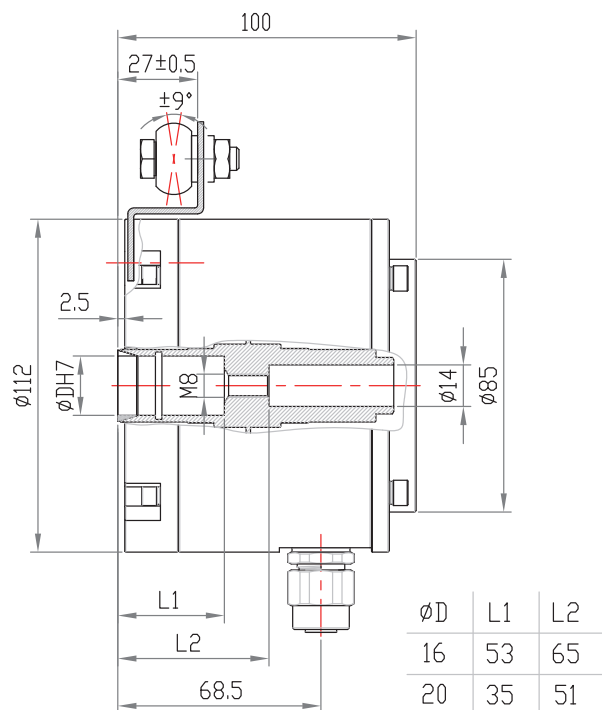
EXDE100H30+8150



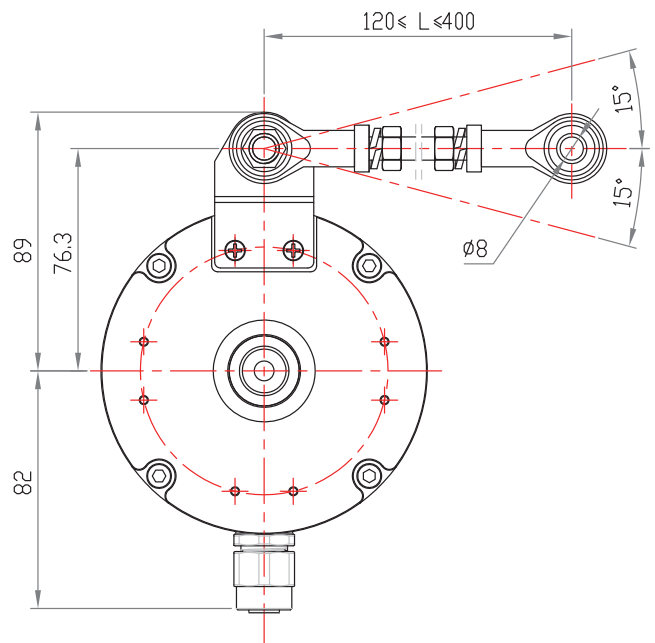
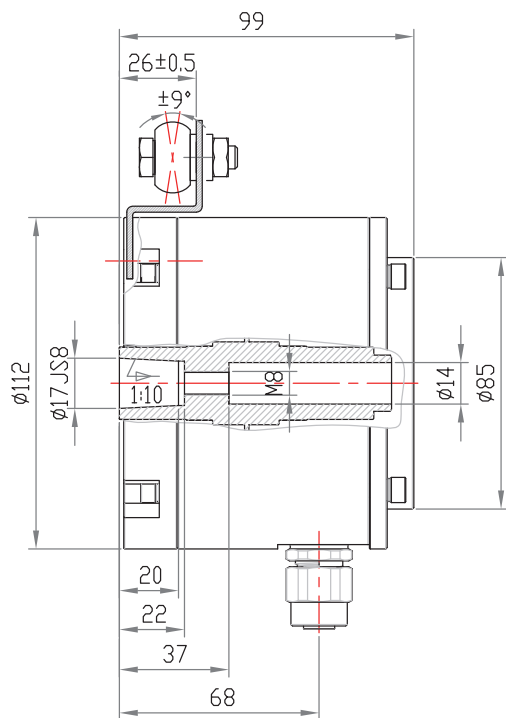
EXDE100H45



EXDE100HS+8186B+8564



EXDE100HZ+8186B+8564



本安装说明仅适用于EXDE100H系列防爆编码器产品，如果违反原设计用途使用产品，用户需自行承担风险。如有更改，恕不另行通知。

Instructions in these mounting instructions apply to products from EXDE100H series explosion-proof encoder, not for the system as a whole. If products are used in a way for which they are not intended, this is at the user's own risk. Subject to change without notice.

8、附件 Accessories

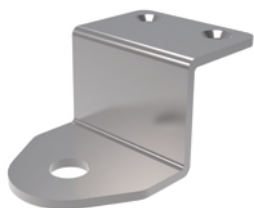
安装支架 Mounting bracket
型号（常规） Model: 8117-A



力矩臂 Torque arm
型号（常规） Model: 8561 6/L=X



安装支架 Mounting bracket
型号（常规） Model: 8186B



力矩臂 Torque arm
型号（常规） Model: 8564 8/L=X



更多产品信息 More Product Information

了解更多产品信息，请访问 www.tofi-tech.com
For more information, please visit www.tofi-tech.com

根据产品的不同，提供以下信息：

The following information is provided Depends on the product:

- 选型资料(数据表) Specification (data sheets)
- 安装操作手册 Installation and operation manuals
- 通讯手册（软件手册） Communication manuals (software manuals)
- CAD（DWG(2D)、STEP（3D）
- 证书 Certificates



维护 Maintenance

EXDE100H系列防爆编码器免维护，如损坏，则无维修选项。

The EXDE100H series explosion-proof encoder are maintenance-free, with no repair options if damaged.



废弃处理 Disposal

必须根据当地有效的现行废弃物废弃处理规定，安全环保地废弃处理无法再使用的设备。

Equipment that is no longer usable must be disposed of safely and environmentally in accordance with local waste disposal regulations currently in force.



编码器
传感器

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