

AUTOFLAME[®]

燃烧控制管理系统



AUTOFLAME
SERVOMOTORS GUIDE
伺服电机指南

2022.03.18



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Important Notes 重要提示

A knowledge of combustion related procedures and commissioning is essential before embarking work on any of the MM / EGA systems. This is for safety reasons and effective use of the MM / EGA system. Hands on training is required. For details on schedules and fees relating to group training courses and individual instruction, please contact the Autoflame Engineering Ltd. offices at the address listed on the front.

为了安全有效地使用控制模块/EGA 系统，控制模块/EGA 系统的操作人员必须具有与燃烧相关的流程和调试知识。我们要求使用者参加实践培训，请使用首页上 Autoflame 办公室通讯方式来详细了解团体培训和个别教学事宜。

Short Form - General Terms and Conditions 一般条款

A full statement of our business terms and conditions are printed on the reverse of all invoices. A copy of these can be issued upon application, if requested in writing.

在所有发票背面都印有我们的商业条款全文。客户可书面申请获得我公司商业条款文件。

The System equipment and control concepts referred to in this Manual MUST be installed, commissioned and applied by personnel skilled in the various technical disciplines that are inherent to the Autoflame product range, i.e. combustion, electrical and control.

只有专员人员才能安装，调试和使用本手册所提及的系统设备和控制概念。他们必须精通 Autoflame 产品所涉及的各个技术学科，即:- 燃烧，电气和控制。

The sale of Autoflame's systems and equipment referred to in this Manual assume that the dealer, purchaser and installer have the necessary skills at their disposal. i.e., a high degree of combustion engineering experience, and a thorough understanding of the local electrical codes of practice concerning boilers, burners and their ancillary systems and equipment.

经销，购买或者安装本手册提及的 Autoflame 系统和设备的人员都要具有必要的专业知识，即:-与锅炉，燃烧器和辅助系统/设备相关的丰富燃烧工程从业经验和全面电气行业规范知识。

Autoflame's warranty from point of sale 保修条款

- Two years on all electronic and electro-mechanical equipment, assemblies and components.
对所有电子系统和部件实行两年售后保修；
- One year on all EGA systems and UV & IR scanners, including parts, components, cells and sensors.
对所有机械系统和部件和传感器实行一年售后保修。

The warranty assumes that all equipment supplied will be used for the purpose that it was intended and in strict compliance with our technical recommendations.

Autoflame's warranty and guarantee is limited strictly to product build quality, and design. Excluded absolutely are any claims arising from misapplication, incorrect installation and/or incorrect commissioning.

保修前提: 所有设备必需被用于预期使用目的并且严格符合我们的技术建议。Autoflame 产品保修条款只适用于产品制造质量问题 and 设计问题。根据保修条款，Autoflame 不接受由于错误操作，错误安装和/或调试导致的索赔请求。

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IMPORTANT SAFETY NOTES / 重要安全提示



Servomotors must be installed, wired, commissioned and adjusted by an Autoflame trained and certified technician.

伺服电机必须由经过 **Autoflame** 培训和认证的技术人员安装、接线、调试和调整。

Any person installing, wiring, commissioning or adjusting the servomotors without undergoing proper Autoflame training and without full understanding of the Micro Modulation MM system might put themselves and others in a seriously dangerous situation that can result in serious injury or even death, and may cause permanent equipment damage and substantial property damage.

在没有接受适当的 **Autoflame** 培训和没有全面了解微调制控制模块系统，任何人安装、布线、调试或调整伺服马达可能会使自己和其他人处在严重危险的情况，可能会导致严重伤害甚至死亡，和可能引起永久的设备损害和大量的财产损失。

Some of the wiring connections are live, make sure to totally and safely isolate the mains power before undergoing any work related to the servomotors. Failure to do so can result in fatal injury.

有些接线是带电的，在进行任何与伺服电机有关的工作之前，请确保完全安全地隔离电源。如果不这样做，可能会导致致命的伤害。

Servomotors are supplied by the factory set at 0.0° position. Remember that this position may not necessarily automatically position the valve or damper at 0.0° or a closed position. This must be physically checked. Failure to check this can have seriously dangerous consequences.

伺服电机由工厂提供，设定在 **0.0** 度位置。请记住，这个位置不一定会自动将阀门或风门定位在 **0.0** 度或关闭位置。这必须进行物理检查。如果检查失败，可能会产生严重的危险后果。

This guide must be read in conjunction with the relevant MM system manual.

本指南必须与相关的控制模块系统手册一起阅读。

1. **AUTOFLAME SERVOMOTORS / Autoflame 伺服电机**

Autoflame servomotor is a rotary type electric actuator, used with Autoflame's Mk8 MM and Mini Mk8 MM Micro Modulation systems to achieve ultimate positioning accuracy for boiler and burner applications which in turn guarantees unmatched control precision, accuracy, efficiency, repeatability and reliability.

Autoflame 伺服电机是一种旋转型电动装置，与 Autoflame 的 Mk8 控制模块和 Mk8 微型控制模块微调制系统一起使用，以实现锅炉和燃烧器应用的最终定位精度，从而确保无与伦比的控制精密度、准确度、效率、可重复性和可靠性。

Autoflame offers three standard types of servomotors; small, large and industrial, which can be used for all control channels. Autoflame fuel and FGR valves require small or large servomotors only. All servomotors can be configured to drive clockwise or counter clockwise to open/close a valve or damper. The servomotors can be installed in any orientation.

Autoflame 提供三种标准类型的伺服电机; 小、大、工业，可用于所有控制通道。Autoflame 燃料和 FGR（烟气再循环）阀门只需要小型或大型伺服电机。所有伺服电机可配置为顺时针或逆时针驱动阀门/风门的开启/关闭。伺服电机可以安装在任何方向。

The servomotors applications include:

伺服电机应用包括:

- Main, primary or secondary air damper
主, 一次或二次风门
- Forced draught damper
强制通风门
- Induced draught damper
引导式通风门
- Gas and/or oil fuel control valves
燃气和/或燃油燃料控制阀
- Fuel atomisation
燃料雾化
- FGR valve/damper
FGR（烟气再循环）阀门/风门
- Feedwater valve
给水阀
- Draught control damper
背压控制风门
- TDS control valve
TDS 控制阀
- Bottom Blowdown Valve
底部排污阀
- NOx reduction systems
氮氧化物减少系统

Autoflame servomotors offer the following feature:

Autoflame 伺服电机提供以下功能:

- Ultra-high accuracy level
超高精度水平
- Lightweight
轻盈
- Compact design suitable for narrow spaces
紧凑的设计，适合狭窄的空间
- Simple structure maximises reliability
结构简单，可靠性最大化
- Can be mounted straight into Autoflame gas or oil valves/dampers
可以直接安装入 Autoflame 燃气或燃油阀门/风门

- **Mounting bracket available for use with third party valves/dampers**
可用安装支架与第三方阀门/风门一起使用
- **Easy access to wiring terminals for installation, maintenance and testing**
易于连接端子进行安装、维护和测试
- **Simple wiring connection using a terminal block integrated into the servomotor**
简单的布线连接使用一个集成到伺服电机的终端块
- **Optional flying lead connector for quick, trouble free installation and replacement**
可选引线连接器，快速、简易的安装和更换
- **2 years limited warranty**
两年有限保修



1.1. Servo Motor Sizes / 伺服电机尺寸

The following servomotors are available

以下伺服电机可使用

Servo Type 伺服类型	Max. Torque Nm 最大扭矩 Nm	Max. Torque ft.lb 最大扭矩 ft.lb
Small 小型	4	3
Large 大型	25	18
UNIC05	40	30
UNIC10	98	72
UNIC20	196	145
UNIC40	392	289

The load that the servomotor is used to drive should not exceed the maximum torque rating of the servomotor. With Autoflame supplied valves, the correct servomotor size is already specified by Autoflame.

用于伺服电机驱动的负载不应超过伺服电机的最大扭矩额定值。对于 Autoflame 提供的阀门，正确的伺服电机尺寸已经由 Autoflame 指定。

To correctly size an Autoflame servomotors for use with a third party valves or dampers, the torque required to drive that valve or damper should be checked, this in order to select a servomotor with sufficient torque to drive the damper reliably. Please check the manufacturer's specifications for that valve or damper to check the torque requirements.

为了正确确定与第三方阀门或风门一起使用的 Autoflame 伺服电机的尺寸，应该检查驱动该阀门/风门所需的扭力，以便选择具有足够扭力的伺服电机来可靠地驱动伺服电机。请检查该阀门或风门的制造商的规格，以检查扭力要求。

If this is unknown or the data is not available, then it is necessary to check the torque required to drive the valve/damper using a torque meter. The torque should be measured when the valve/damper is fully loaded.

For example, for an air damper, that will be when the fan motor / VSD is driven at maximum speed. It is recommended that a nominal 20% is added to the measured torque value to determine the type of servomotor required for the application. This nominal 20% takes into account any factors such as dust, rust, and lack of lubrication experienced between service intervals which can make the valve/damper require more torque.

如果这是未知的或数据不可用，则有必要使用扭力表检查驱动阀门/风门所需的扭力。扭力应该在阀门/风门满载时测量。例如，对于空气风门，当风机马达/ VSD（变频器）以最高速度运作。建议在测量的扭力值上增加额定 20%，以确定应用所需的伺服电机类型。这 20%的额定值考虑到各种因素，如灰尘、锈蚀和在使用间隔期间缺乏润滑，这些因素会使阀门/风门需要更多的扭力。

$$\text{Servomotor Torque} = \text{Measured torque at max. load} \times 1.2$$

伺服电机扭力 = 测量的最大扭矩负载 x 1.2

For example if the measured torque to drive an air damper at full load is 19Nm;
例如，如果测量的扭力驱动满载为 19Nm 的空气风门；

$$\text{Servomotor Torque} = 19 \times 1.2 = 22.8\text{Nm}$$

伺服电机扭力 = 19 x 1.2=22.8Nm

Therefore a large servomotor may be selected for this damper.

因此，可以为风门选择大型伺服电机。

2. **SMALL SERVOMOTORS / 小型伺服电机**

Small servomotors provide a maximum torque of up to 4Nm, they are compact, lightweight, extremely durable and can be used for variety of applications including controlling air dampers, gas and oil fuel valves. The housing is made from high impact Acrylonitrile Butadiene Styrene (ABS) for lighter weight and easier installation.

小型伺服电机提供最大扭矩达 4Nm，它们紧凑，轻便，非常耐用，可用于各种应用，包括控制空气风门，燃气和燃油燃料阀。外壳由高冲击丙烯腈丁二烯苯乙烯(ABS)制成，重量更轻，安装更容易。

ATEX approved version with metal housing is also available for use in hazardous environments where explosion proof equipment is necessary.

ATEX 认可的金属外壳的版本也可用于需要防爆设备的危险环境。

The following small servomotors are available:

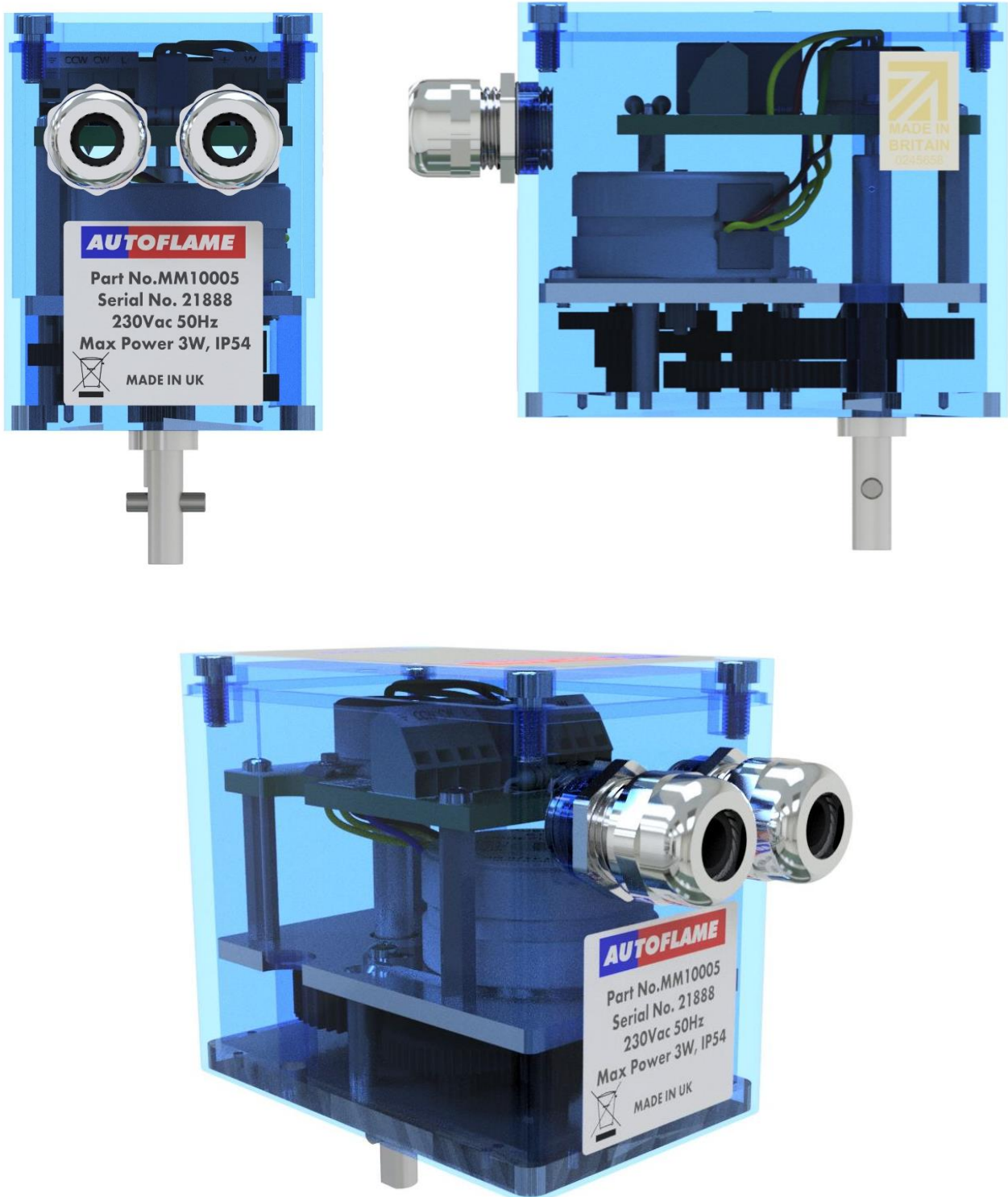
以下小型伺服电机可使用：

Voltage – V AC 电源 – V AC	Frequency 频率	Supplied Wiring Glands 提供接线格兰头	Part # 产品号
230	50Hz	2x PG11 Metal Glands 2x PG11 金属格兰头	MM10005
110	60Hz	2x M20 - 1/2" NPSM Adaptors 2x M20 - 1/2" NPSM 转接头	MM10005/A
24	50Hz	1x M20 - 1/2" NPSM and Blanking Plug 1x M20 - 1/2" NPSM 和堵头	MM10005/C
24	60Hz	1x M20 - 1/2" NPSM and Blanking Plug 1x M20 - 1/2" NPSM 和堵头	MM10005/D
110	50Hz	2x M20 - 1/2" NPSM Adaptors 2x M20 - 1/2" NPSM 转接头	MM10005/E

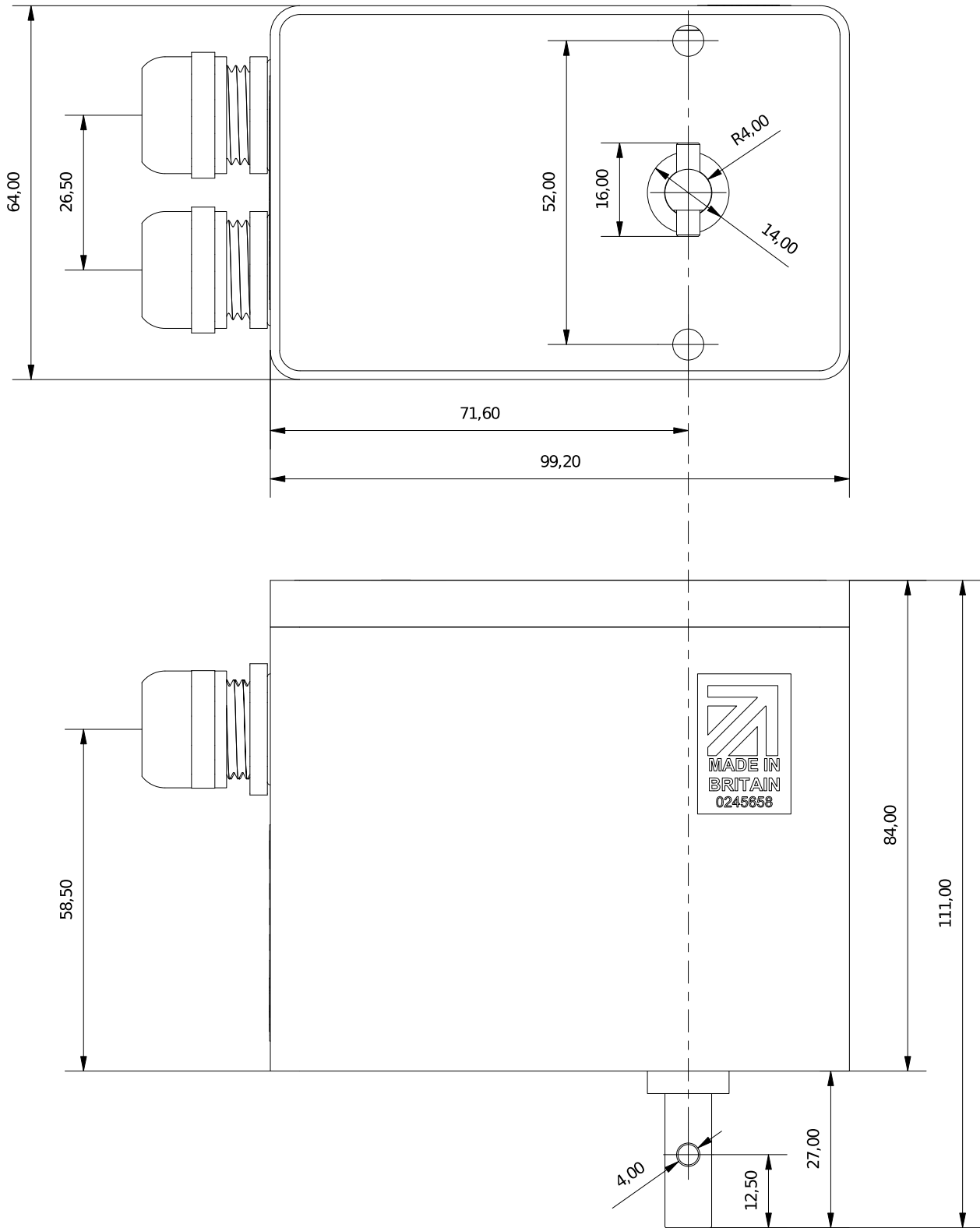
2.1. Specifications / 规格

Supply voltage 电源电压	AC - Dependant on part number AC -取决于产品号
Output torque at shaft 轴处输出扭力	4Nm (3ft lbs)
Rotation angle 旋转角度	360°
Operation angle 运行角度	-6° to 96°
Accuracy 精确度	Up to 0.1°, 900 positions available 最高 0.1 度, 900 个位置可用
Max. rated power 最大额定功率	3W
Min. operation temperature 最小运行温度	0°C (32° F)
Max. operation temperature 最大运行温度	60° C (140° F)
Ingress Protection rating IP 等级	IP54, NEMA3
Mounting angle 支架固定角度	360°
Positioning 定位	MM drive 控制模块驱动
Drive motor 驱动电机	Synchronous 同步
Body material 外壳材料	High Impact Polycarbonate 高抗冲聚碳酸酯
Gear material 齿轮材料	Polyoxymethylene 聚甲醛
Plates material 支架材质	Aluminium 铝
Screws material 螺丝材料	Stainless Steel 不锈钢
Dimension (LxWxH) 尺寸 (长*宽*高)	100 x 84 x 65.5 mm
Wiring connection (230V) 接线连接 (230V)	PG11 gland PG11 格兰头
Wiring connection (24V, 110V) 接线连接 (24V, 110V)	½" conduit adaptor and blanking plug 1/2 英寸的导管适配器和堵头
Lid screws 盖螺丝	4 x M4 x10 Stainless steel socket head 4 x M4 x10 不锈钢 6 角头
Lid screw torque 螺丝盖扭力	0.2 to 0.4 Nm
Body mounting screws 主体安装螺丝	2 x M5 x 25 Stainless socket head 2 x M5 x 25 不锈钢 6 角头
Body mounting torque 主体安装扭力	1.2 – 2.6 Nm
Shipped Weight 运输重量	0.55 kgs. (1.2 lbs)

2.2. External View / 外部视图



2.3. Dimensions / 尺寸



All dimension in millimetres: 1 inch = 25.4 mm
 所有尺寸单位为毫米:1 英寸= 25.4 毫米

3. **LARGE SERVO MOTOR / 大型伺服电机**

Large servomotors provide a maximum torque of up to 25Nm, they are extremely durable and can be used for variety of applications including controlling air dampers, gas and oil fuel valves, FGR, feedwater valves and many other applications.

大型伺服电机提供最大扭矩达 25Nm，它们非常耐用，可用于各种应用，包括控制空气风门，燃气和燃油阀，FGR（烟气再循环），给水阀和许多其他应用。

Large servomotors are available in metal (powder coated mild steel) housing as well as an option for high impact Acrylonitrile Butadiene Styrene (ABS). ATEX approved version is also available for hazardous environments where the use of explosion proof equipment is required.

大型的伺服电机有金属(粉末涂层低碳钢)外壳，也有高冲击的丙烯腈、丁二烯、苯乙烯(ABS)可供选择。ATEX 防爆版本也适用于需要使用防爆设备的危险环境。

Housing 外壳	Voltage – AC 电压 - AC	Frequency 频率	Supplied Wiring Glands 提供接线格兰头	Part # 产品号
Polycarbonate 聚碳酸酯	230V	50/60Hz	2x PG11 Glands 2*PG11 格兰头	MM10400
Polycarbonate 聚碳酸酯	230V	50/60Hz	1x PG11 - 1/2" NPSM & 1x Blanking Plug 1*PG11 - ½英寸 NPSM & 1*堵头	MM10400/NPSM
Polycarbonate 聚碳酸酯	110V	50/60Hz	2x PG11 Glands 2*PG11 格兰头	MM10400/A
Polycarbonate 聚碳酸酯	24V	50/60Hz	1x PG11 - 1/2" NPSM & 1x Blanking Plug 1x PG11 - ½英寸 NPSM & 1x 堵头	MM10400/D
Metal 金属	230V	50/60Hz	2x PG11 Glands 2x PG11 格兰头	MM10004
Metal 金属	230V	50/60Hz	1x PG11 - 1/2" NPSM & 1x Blanking Plug 1x PG11 - ½英寸 NPSM & 1x 堵头	MM10004/NPSM
Metal 金属	110V	50/60Hz	2x PG11 Glands 2x PG11 接头	MM10004/A
Metal 金属	24V	50/60Hz	1x PG11 - 1/2" NPSM & 1x Blanking Plug 1x PG11 - ½英寸 NPSM & 1x 堵头	MM10004/D

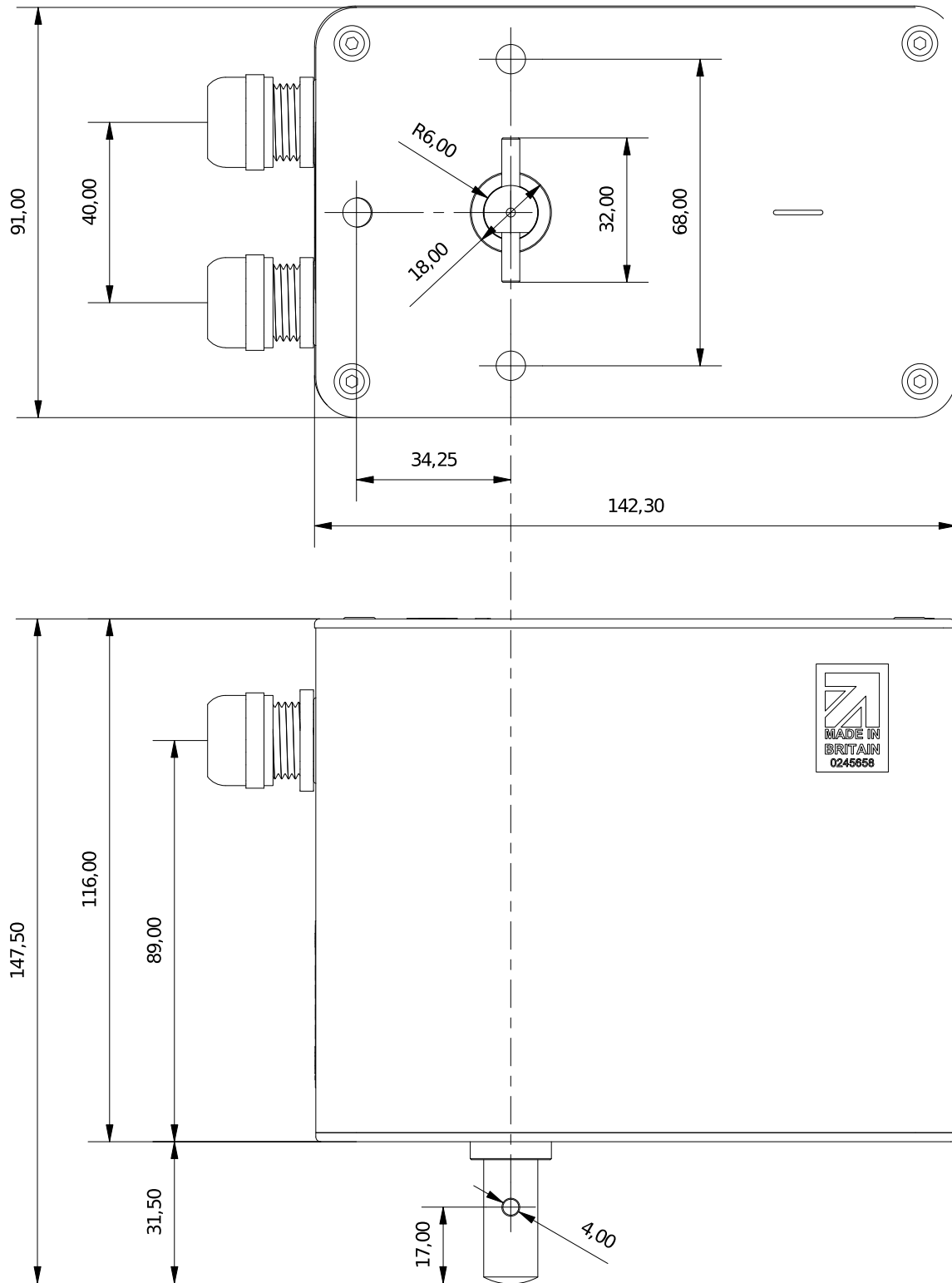
3.1. Specifications / 规格

Supply voltage 电源电压	AC - Dependant on part number AC -取决于产品号
Output torque at shaft 轴处输出扭力	25Nm (18ft lbs)
Rotation angle 旋转角度	360°
Operation angle 运行角度	-6° to 96°
Accuracy 精确度	Up to 0.1°, 900 positions available 最高 0.1 度, 900 个位置可用
Max. rated power 最大额定功率	9W
Min. operation temperature 最小运行温度	0°C (32° F)
Max. operation temperature 最大运行温度	60° C (140° F)
Ingress Protection rating IP 等级	IP65, NEMA4
Mounting angle 安装角度	360°
Positioning 位置	MM drive 控制模块驱动
Drive motor 驱动电机	Synchronous 同步
Housing material (polycarbonate) 外壳材料 (聚碳酸酯)	High Impact Polycarbonate 高强度聚碳酸酯
Housing material (metal version) 外壳材料 (金属版)	Mild steel CR4 with Interpon 700 Industrial Powder Coat 软钢 CR4, Interpon 700 工业粉末涂层
Gear material 齿轮材料	708M40T mild steel 708M40T 低碳钢
Plates material 支架材料	Aluminium 铝
Screws material 螺丝材料	Stainless Steel 不锈钢
Dimension (LxWxH) 尺寸 (长*宽*高)	See relevant drawing 见相关纸图
Wiring connection (230V) 接线连接 (230 伏)	PG11 gland PG11 格兰头
Wiring connection (24V, 110V) 接线连接 (24 伏、110 伏)	½" conduit adaptor and blanking plug ½ 英寸的导管适配器和堵头
Lid screws 盖子螺丝	4 x M4x10 Stainless steel socket head 4 x M4x10 不锈钢 6 角头
Lid screw torque 盖螺丝扭力	0.2 to 0.4 Nm
Body mounting screws 主体安装螺丝	2 x M5x25 Stainless socket head 2 x M5x25 不锈钢 6 角头
Body mounting torque 主体安装扭力	1.2 – 2.6Nm
Shipped Weight (Polycarbonate) 运输重量 (聚碳酸酯)	1.75 kgs. (3.85 lbs)
Shipped Weight (Metal version) 运输重量 (金属版)	1.85 kgs. (4.1 lbs)

3.2. External View – Metal Housing / 外部视图 – 金属外壳

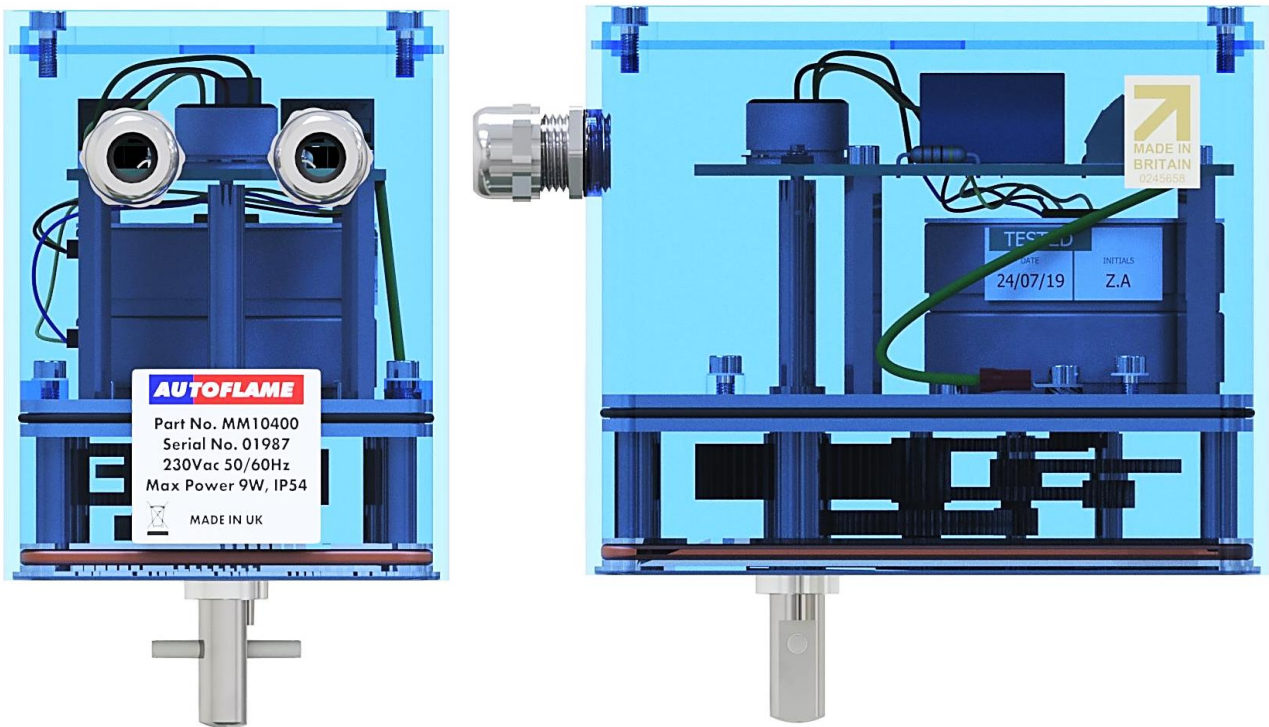


3.3. Dimensions – Metal Housing / 尺寸 – 金属外壳

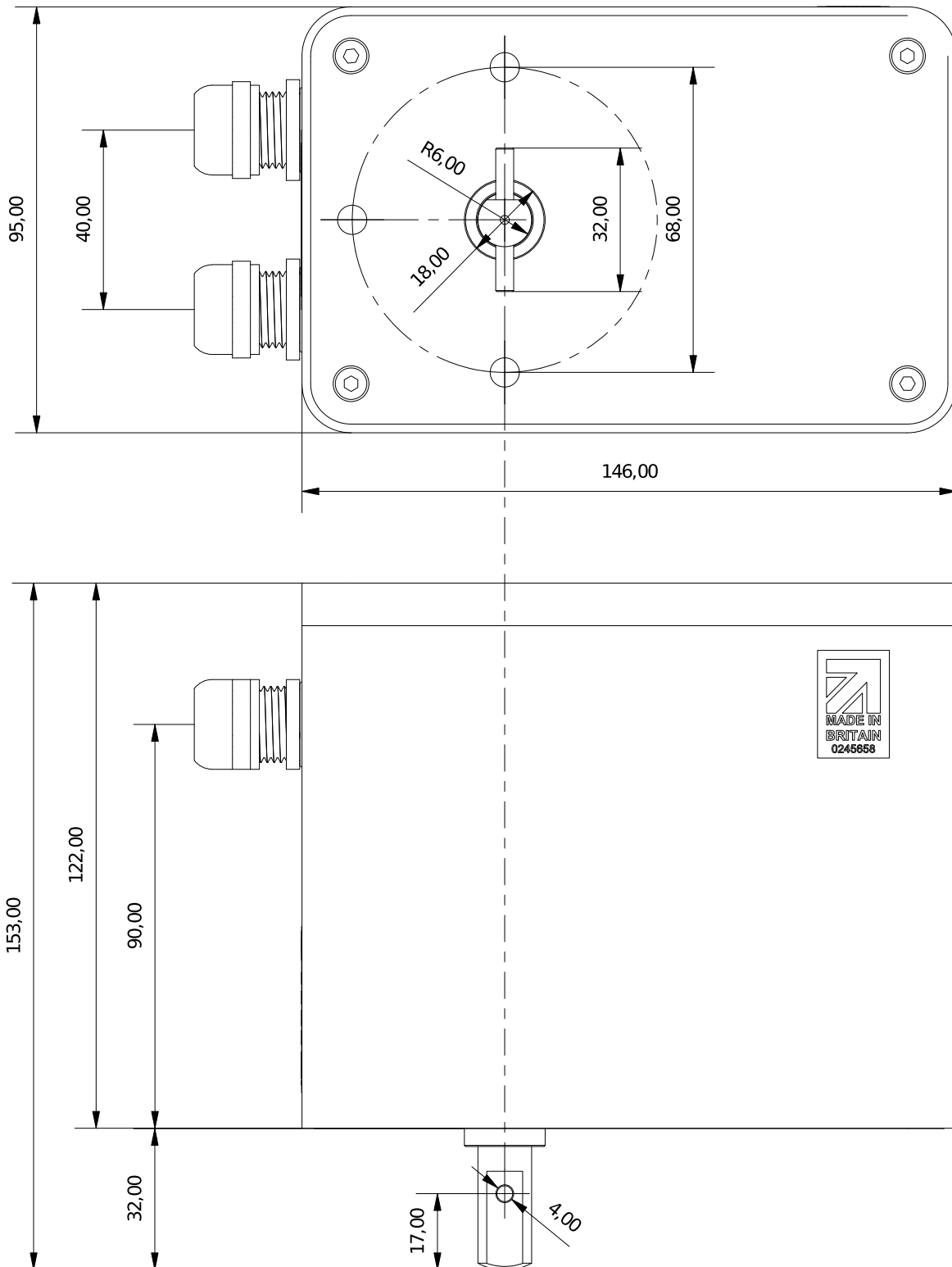


All dimension in millimetres: 1 inch = 25.4 mm
 所有尺寸单位为毫米:1 英寸= 25.4 毫米

3.4. External View – Polycarbonate Housing / 外部视图 - 聚碳酸酯外壳



3.5. Dimensions – Polycarbonate Housing / 尺寸 – 聚碳酸酯外壳



All dimension in millimetres: 1 inch = 25.4 mm 所有尺寸单位为毫米:1 英寸= 25.4 毫米

4. **INDUSTRIAL UNIC SERVOMOTORS / 工业 UNIC 伺服电机**

The industrial servomotor is a rotary type electric actuator for use with the MM systems. It is available in 4 sizes with torque output ranging from 40 to 400Nm. The UNIC servomotors can be used for air dampers and water valves.

工业伺服电机是与控制模块系统一起使用的旋转型电动装置。它可在 4 个尺寸扭力输出范围从 40 到 400Nm。UNIC 伺服电机可用于空气风门和水阀。

A 4-20mA version of the UNIC servomotors is available for use on the analogue channels on the MMs as well as for controlling feedwater valves.

一个 4-20mA 版本的 UNIC 伺服电机可用于控制模块上的模拟量通道以及控制给水阀门。

The industrial servomotors feature:

工业伺服电机特征：

- Light, compact design.
轻、紧凑设计
- High torque output.
高扭力输出
- Built-in thermal protector to prevent motor burnout by overloading.
内置热保护器，防止电机过载烧毁。
- Easy to install and suitable for use in narrow spaces.
易于安装，适用于狭小空间使用。
- Simple structure design.
结构设计简单
- Mounting bracket and coupling available for direct mounting onto air dampers or valves.
安装支架和联轴器可直接安装在空气风门或阀门上。
- Manual operation is possible with the included manual crank handle.
内含手动曲柄手柄，可进行手动操作。
- Simplified wiring using internal terminal block.
使用内部接线盒简化了布线。
- Available in 230V, 110V AC for use with the Mk8 MM and Mini Mk8 MM.
可提供 230V、110V 交流电用于 Mk8 控制模块和 Mk8 微型控制模块。
- 24V DC version available for use with Autoflame Bottom Blowdown modules.
24V 直流电版本可与 Autoflame 底部排污模块一起使用。
- ATEX approved version is available for hazardous environments.
ATEX 防爆认证版本可用于危险环境。
- 4-20mA version for use with MM analogue output channels.
4-20 毫安版本与控制模块模拟量输出通道一起使用。

The following UNIC servomotors are available:

以下 UNIC 工业伺服电机可用:

UNIC	Voltage V AC 交流电源	Torque Nm 扭力 牛米	Torque ft lb 扭力 ft lb	Part # 产品号
UNIC05	230	40	30	MM10070
UNIC05	110	40	30	MM10070/110
UNIC05	120	40	30	MM10070/120
UNIC10	230	98	72	MM10072
UNIC10	110	98	72	MM10072/110
UNIC10	120	98	72	MM10072/120
UNIC20	230	200	148	MM10074/B
UNIC20	120	200	148	MM10074/B/110
UNIC40	230	400	295	MM10078
UNIC40	110	400	295	MM10078/110

24V DC version is available for use with Autoflame Bottom Blowdown Modules:

24V 直流电版本可与 Autoflame 底部排污模块一起使用:

UNIC	Voltage V DC 直流电源	Torque Nm 扭力 牛米	Torque ft lb 扭力 ft lb	Part # 产品号
UNIC05	24	40	30	BBA10070
UNIC10	24	98	72	BBA10072

4.1. Specifications / 规格

The following specifications are universal for all the UNIC servomotors:

以下规格适用于所有 UNIC 伺服电机:

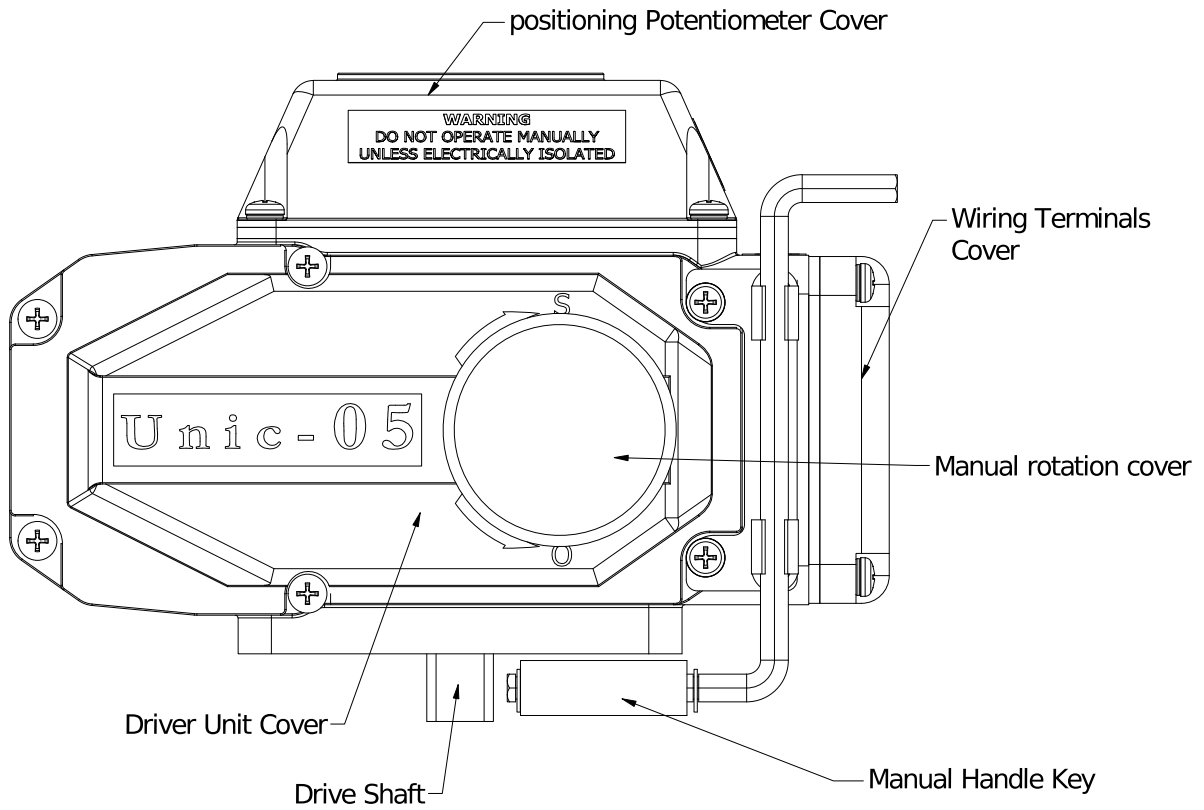
Operation angle 运行角度	0.0° to 90.0°
Drive Time (0° to 90°) 驱动时间 (0° to 90°)	15 to 30 seconds @ 50Hz (nominal) 50Hz 时 15 至 30 秒(公称)
Accuracy 精确度	Up to 0.5°, 180 positions available 可达 0.5 度, 180 个位置
Max. rated power 最大额定功率	9W
Min. operation temperature 最小运行温度	-25°C (-13° F)
Max. operation temperature 最大运行温度	55° C (131° F)
Ingress Protection rating IP 等级	IP65 (NEMA4X)
Protector 保护器	Thermal protector 热保护器
Stop 停止位	Mechanical type (open/close) 机械类型(开启/关闭)
Mounting angle 安装角度	360°
Positioning 定位	MM drive 控制模块驱动
Drive motor 驱动电机	Synchronous 同步
Insulation Resistance 绝缘电阻	100mΩ/ 500VDC
Withstand Voltage 耐压	1500VAC/ minute
Manual Operation 手动操作	Crank handle included 包括手摇曲柄
Housing material 外壳材料	Die cast aluminium ADC – 12 铝合金模压 ADC - 12
Finish 完成	Industrial baking varnish 工业烘干清漆
Dimension (LxWxH) 尺寸 (长*宽*高)	See relevant drawing 见相关图纸
Wiring connection 接线连接	2x ½" BSPP (male) to Die cast aluminium ADC – 12 ½" NPSM (female) 2 个半英寸 BSPP(公)至模压铝 ADC - 12 ½" NPSM(母)

The following specifications are unique for each UNIC servomotor:

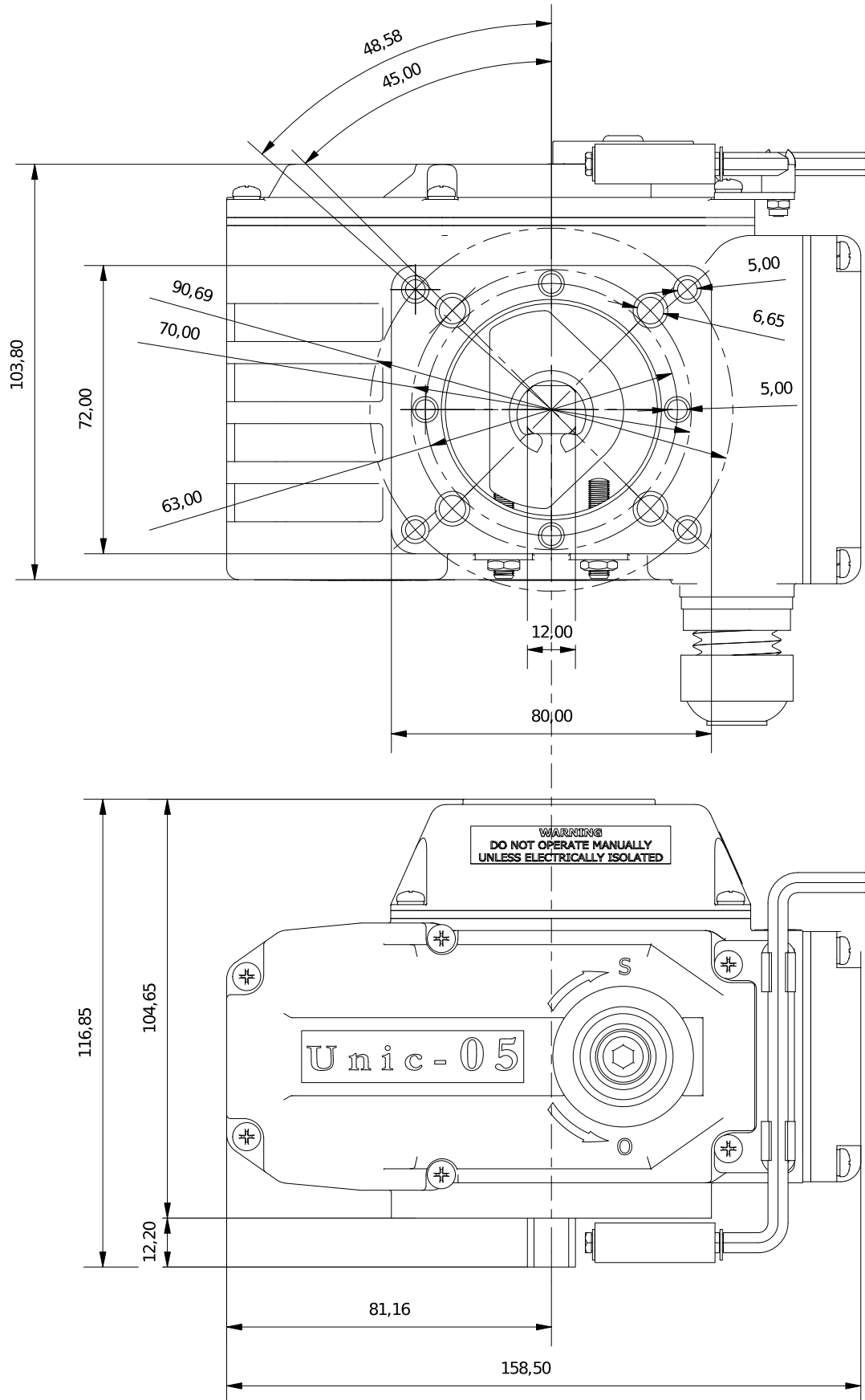
以下规格是每个 UNIC 伺服电机独一无二的:

	UNIC05	UNIC10	UNIC20	UNIC40
Torque at shaft 在轴的扭力	39.2Nm (29 Lb.ft) 39.2 牛米	98Nm (72 Lb.ft) 98 牛米	196Nm (145 Lb.ft) 196 牛米	392Nm (289 Lb.ft) 392 牛米
Drive motor 驱动电机	8W	20W	30W	90W
Wight 重量	2.3Kg	4.5Kg	7.8Kg	8.5Kg
Rotation angle 旋转角度	360	90	90	90
Mechanical stopper 机械式停止位	-	Adjustable 可调	Adjustable 可调	Adjustable 可调
Rated current (230V version) 额定电流 (230 伏版)	0.25/0.30A	0.30/0.35A	0.50/0.55A	0.7/0.9A
Rated current (120V version) 额定电流 (120 伏版)	0.6/0.7A	0.60/0.65A	1.0/1.1A	1.6/1.8A
Rated current (110V version) 额定电流 (110 伏版)	0.7/0.9A	0.65/0.70A	1.1/1.2A	1.8/2.0A

4.2. External Drawings / 外部图纸

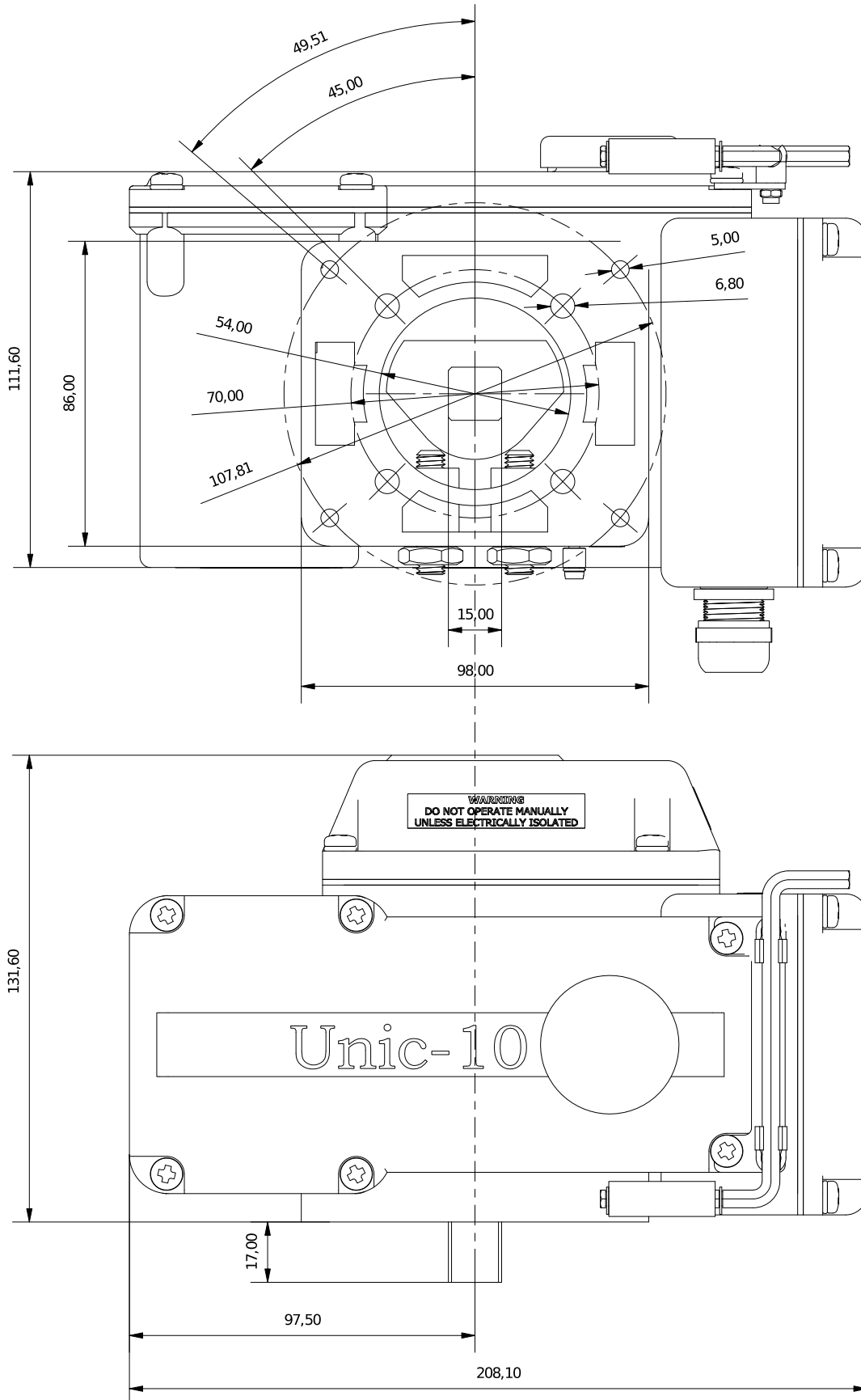


4.3. UNIC05



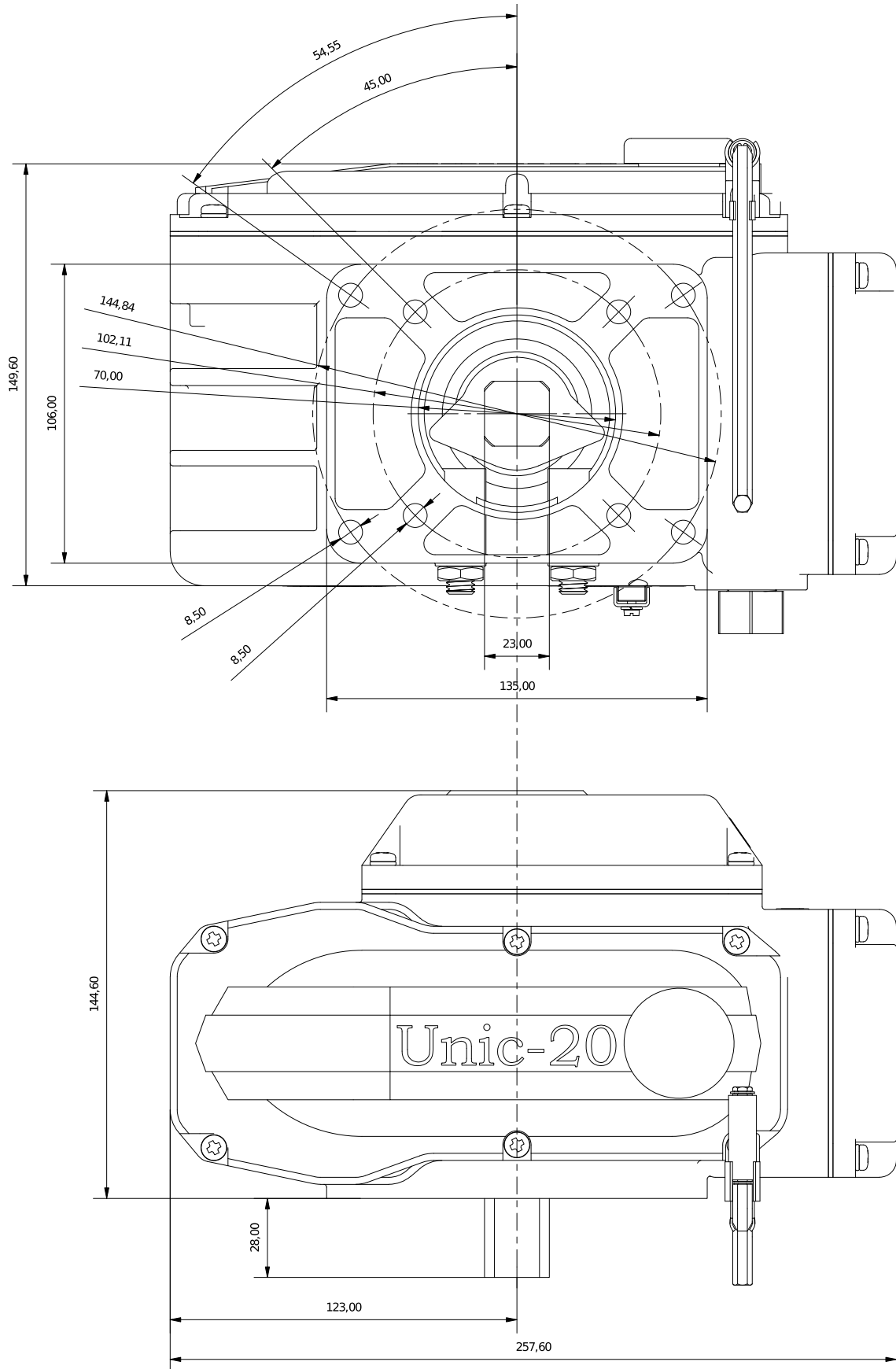
All dimension in millimetres: 1 inch = 25.4 mm 所有尺寸单位为毫米:1 英寸= 25.4 毫米

4.4. UNIC10



All dimension in millimetres: 1 inch = 25.4 mm 所有尺寸单位为毫米:1 英寸= 25.4 毫米

4.5. UNIC20 & UNIC40



All dimension in millimetres: 1 inch = 25.4 mm 所有尺寸单位为毫米:1 英寸= 25.4 毫米

4.6. Manual Operation / 手动操作

Autoflame UNIC servomotors can be turned manually. Before starting manual operation, the power to the servomotor must be isolated/ switched off, failing to do so can cause serious injury and will permanently damage the servomotor.

Autoflame UNIC 伺服电机可手动转动。在开始手动操作之前，必须隔离/关闭伺服电机的电源，否则会造成严重的伤害，对伺服电机造成永久性的损坏。

- I. Remove rubber cap covering the manual drive port.
拆下覆盖在手动驱动端口上的橡胶盖。
- II. insert the manual handle key into the hexagonal port.
将手动手柄钥匙插入六角孔。
- III. Turn the manual handle clockwise, the shaft moves in the CLOSE direction.
顺时针旋转手动手柄，轴在关闭方向转动。
- IV. Turn the manual handle counter clockwise, the shaft moves in the OPEN direction.
逆时针旋转手动手柄，轴在开启方向转动。



Important Notes: 重要提示:

- Do not over-turn the handle with excessive force or if the valve/damper is stuck/showing abnormal resistance; this will cause permanent damage to the servomotor and damper/valve.
如果阀门/挡板卡住/出现异常阻力，不要过度用力翻转手柄，这将对伺服电机和挡板/阀门造成永久性损坏。
- If power is not disconnected when driven manually, then the servomotor will try to automatically drive to its original position during manual operation. This will damage the servomotor and may cause physical injury.
如果手动驱动时电源未断开，则在手动操作时伺服电机可能会尝试自动驱动到原始位置。这将损坏伺服电机，并可能造成物理伤害。
- UNIC 10, 20 & 40 servomotors rotation is limited to 90°, overdriving the servomotors can cause permanent damage.
UNIC 10、20 和 40 伺服电机的旋转被限制在 90 度，过度驱动伺服电机会造成永久性损坏。

4.7. Industrial Servomotors 4-20mA / 工业伺服电机 4-20 毫安

The UNIC industrial servomotors are available as special version that can be controlled using analogue 4-20mA signal, which enable the servomotors to be controlled via the analogue current signal from the MM.

UNIC 工业伺服电机有特殊版本可用，可用于模拟量 4-20 毫安信号控制，这使控制模块通过模拟量电流信号控制伺服电机。

The following channel outputs can be used on the MM to drive the 4-20mA UNIC servomotors:

以下通道输出可用于控制模块驱动 4-20 毫安 UNIC 伺服电机：

MM system 控制模块系统	Channel 通道
Mk8 MM Mk8 控制模块	Ch5, Ch6, Feedwater servomotor/VSD analogue output 通道 5, 通道 6, 给水伺服电机/变频器模拟量输出
Mini Mk8 MM Mk8 微型控制模块	Ch4 通道 4

The following 4-20mA UNIC servomotors are available:

以下 4-20 毫安的 UNIC 伺服电机可供选择：

UNIC Size 尺寸	Voltage V AC 交流电压	Torque Nm 扭力 牛米	Torque ft lb 扭力 ft lb	Part # 产品号
UNIC10	230	98	72	MM10073
UNIC10	110	98	72	MM10073/110
UNIC20	230	200	148	MM10079
UNIC20	120	200	148	MM10079/110
UNIC40	230	400	295	MM10080
UNIC40	110	400	295	MM10080/110
UNIC40	110	400	295	MM10080/120

5. **ATEX APPROVED SERVMOTORS / ATEX 认证伺服电机**



Special versions of Autoflame servomotors are available with ATEX approval for use in hazardous environments where Explosion Proof equipment is required.

在需要防爆设备的危险环境中，Autoflame 伺服电机的特殊版本可获得 ATEX 认证。

5.1. **ATEX Certification / ATEX 认证**

The following instructions are specific to hazardous area installations (in accordance with IEC 60079-0:2011 clause 30) The following instructions relevant to safe use in a hazardous area apply to equipment listed in section 5 of this manual; Positioning Motors covered by certificate number Sira 19ATEX4141X Issue 3.

以下是针对危险区域安装的说明(按照 IEC 60079-0:2011 第 30 条)。以下与危险区域安全使用有关的说明适用于本手册第 5 部分列出的设备; 第 3 期认证编号 Sira 19ATEX4141X 所涵盖的定位伺服电机。

The certification marking is as follows:

认证标志如下:

- *(Servomotor's Part Number)* Positioning Motors (伺服电机产品号) 定位伺服电机
- II 3G
- Ex nA nL IIC T4
- Ta = - 20°C to + 40°C
- Entity parameters of the Motor terminal (J2):
电机端子(J2) 实体参数:
- The equipment may be used in zone 2 with flammable gases and vapours with apparatus groups IIA, IIB & IIC and with temperature classes T1, T2, T3 & T4.
设备可用于含有易燃气体和蒸汽的 2 区, 设备类别为 IIA、IIB 和 IIC, 温度等级为 T1、T2、T3 和 T4。
- The equipment is only certified for use in ambient temperatures in the range -20°C to +40°C and should not be used outside this range.
设备只是认证用于环境温度范围在 -20° C + 40° C 和不应使用这个范围之外。
- Installation shall be carried out in accordance with the applicable code of practice by suitably-trained personnel.
安装应由经过适当培训的人员按照适用的操作规范进行。
- There are no special checking or maintenance conditions other than a periodic check.
除了定期检查外, 没有特殊的检查或维护条件。
- With regard to explosion safety, it is not necessary to check for correct operation.
关于爆炸安全, 不需要检查操作是否正确。
- The equipment contains no user-replaceable parts and is not intended to be repaired by the user. Repair of the equipment is to be carried out by the manufacturer, or their approved agents, in accordance with the applicable code of practice.
该设备不包含用户可更换的部件, 不打算由用户维修。设备的维修须由制造商或其认可代理人按照适用的业务守则进行。
- Repair of this equipment shall be carried out in accordance with the applicable code of practice
该设备的维修应按照适用的操作规范进行

- If the equipment is likely to come into contact with aggressive substances, e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected thus ensuring that the type of protection is not compromised.

如果设备可能会接触到腐蚀性物质,如酸性液体或气体会腐蚀金属或溶剂可能会影响高分子材料,它是用户的责任去采取适当的预防措施,防止它不利影响从而确保保护的类型不被妥协。

- The certificate number has an 'X' suffix which indicates that special conditions of installation and use apply. Those installing or inspecting this equipment must have access to the contents of the certificate or these instructions. The conditions listed in the certificate are reproduced below:

证书编号有一个'X'后缀,表示特殊的安装和使用条件适用。安装、检查本设备的人员,必须接触到证书或本说明书的内容。证书中列出的条件复制如下:

- Do not open, maintain or service in an area where an explosive atmosphere may be present.
不要在可能存在爆炸性环境的区域打开、维护或服务。
- All cable entry holes shall be fitted with either a certified cable gland or a certified stopping plug that is suitable for the application.
所有的电缆进入孔都应该配备一个经过认证的电缆密封装置或一个符合实际应用的经过认证的堵头。
- The area in which the equipment is to be used shall be a minimum of Pollution degree 2 as defined in IEC 60664-1.
设备使用区域的污染程度应不低于 IEC 60664-1 中定义的 2。
- "Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the motor assembly supply terminals to the equipment".
暂态保护应设置在不超过设备的电机组件供电端子额定电压峰值的 140%的水平。
- The equipment must be mounted on a metallic frame that has earth bonding facility.
设备必须安装在有接地设施的金属框架上。
- To ensure IP65 rating servo must be installed using the provided servo to valve gasket and mounting screws tightened to a minimum torque of 2.6Nm and servo lid screws to a minimum 1.2Nm.
为了确保 IP65 额定值伺服必须使用所提供的伺服阀垫片和安装螺丝拧紧至最小扭力 2.6 牛米和伺服盖螺丝至最小 1.2 牛米。
- Atex approved Cable glands must be used, the enclosure has M20 tapped holes for this purpose
必须使用 ATEX 认可的电缆格兰头,为此外壳有 M20 螺纹孔
- Atex certified cables must be used to comply with approval
必须使用 ATEX 认证的电缆去符合认可
- An Atex approved isometric safe opto-isolator must be used on the low voltage circuit between the servo and the MM.
伺服器和控制模块之间的低压电路必须使用 ATEX 认证的等距安全光隔离器。
- The terminals shall be fitted with wires that have cross sectional area falling within the following limitations:
接线端子的横截面积应在以下限制范围内:
- Conductor cross section area min. 0.25 mm² and max. 1.5 mm²
导体截面面积最小为 0.25 毫米², 最大为 1.5 毫米²
- Conductor cross section AWG min. 26 and max. 14
导体截面 AWG 最小为 26, 最大为 14
- Tightening torque, min 0.5 Nm and max 0.6 Nm

拧紧扭力，最小 0.5 牛米，最大 0.6 牛米

- Insulated ferule type connectors or equivalent connectors shall be used for external connections.
外部连接用绝缘 ferule 型连接器或等效连接器应使用。
- The potentiometer connections (+V, 0V and W) shall only be terminated to an Autoflame MM Controller.
电位器连接(+V, 0V 和 W)只能连接到一个 Autoflame 控制模块控制器上。

5.2. ATEX Approved Small Servomotors / ATEX 认证小型伺服电机

The following ATEX approved small servomotors are available:

以下 ATEX 认证的小型伺服电机可供选择:

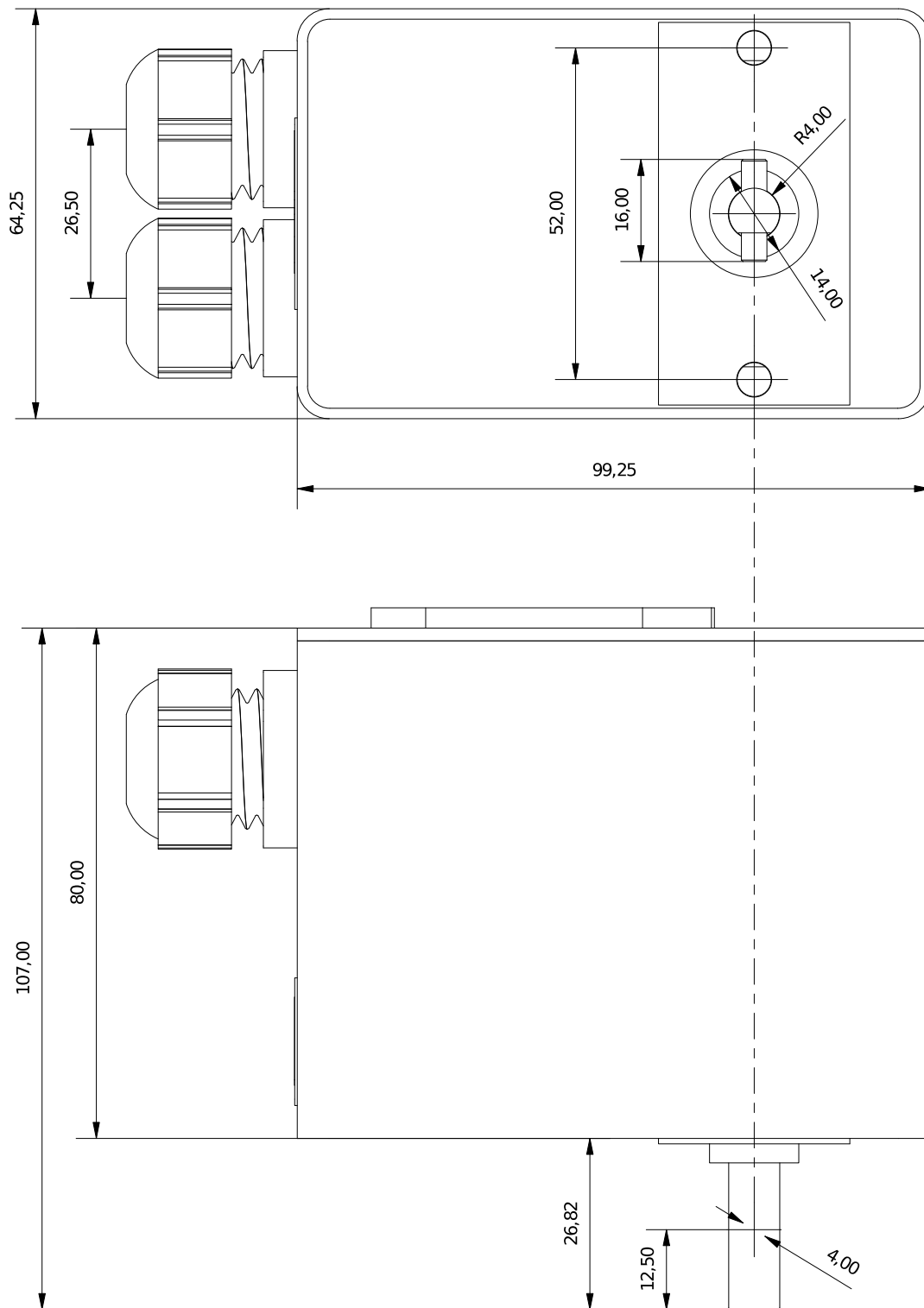
Voltage V AC 交流电压 伏	Frequency 频率	Torque Nm 扭力 牛米	Supplied Wiring Glands 提供接线接头	Part # 产品号
230	50Hz	4	-	MM10005/EXP
230	60Hz	4	-	MM10005/B/EXP
110	60Hz	4	-	MM10005/A/EXP
24	50Hz	4	-	MM10005/C/EXP
24	60Hz	4	-	MM10005/D/EXP



ATEX approved small servomotor
ATEX 认证的小型伺服电机

Note: ATEX certified glands must be used for the ATEX approval to apply to the servomotor.

注: 必须使用 ATEX 认证的格兰头才能获得 ATEX 认证才能应用到伺服电机上。



All dimension in millimetres: 1 inch = 25.4 mm
 所有尺寸单位为毫米:1 英寸= 25.4 毫米

5.3. ATEX Approved Large Servomotors / ATEX 认证大型伺服电机

The following ATEX approved large servomotors are available:

以下 ATEX 认证的大型伺服电机可供选择:

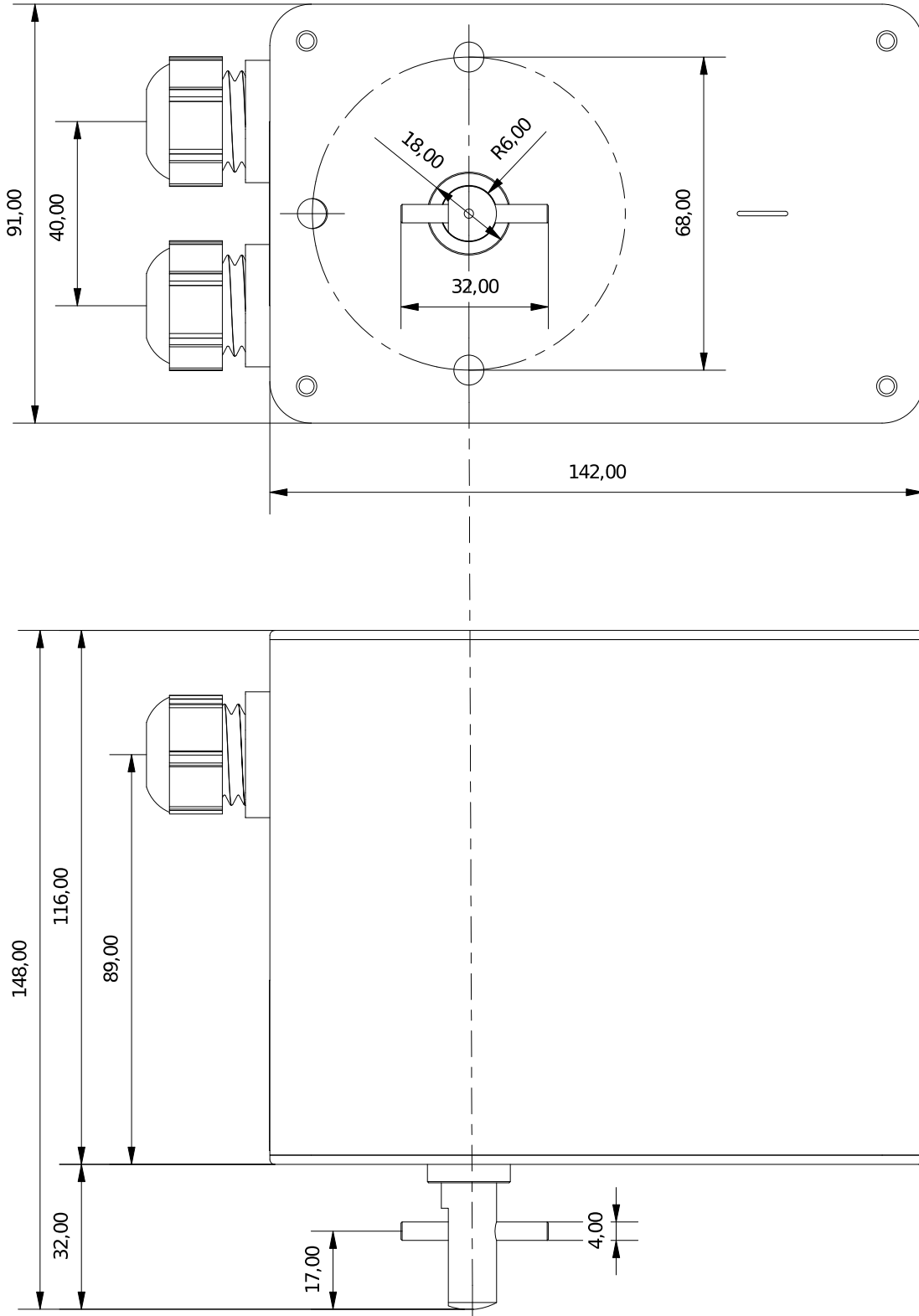
Voltage – AC 交流电压	Frequency 频率	Torque Nm 扭力 牛米	Supplied Wiring Glands 提供接线格兰头	Part # 产品号
230V	50/60Hz	25	-	MM10004/EXP
110V	50/60Hz	25	-	MM10004/A/EXP
24V	50/60Hz	25	-	MM10004/D/EXP



*ATEX approved large servomotor
ATEX 认证的大型伺服电机*

Note: ATEX certified glands must be used for the ATEX approval to apply to the servomotor.

注: 必须使用 ATEX 认证的格兰头才能获得 ATEX 认证才能应用到伺服电机上。



All dimension in millimetres: 1 inch = 25.4 mm
 所有尺寸单位为毫米:1 英寸= 25.4 毫米

5.4. ATEX Approved Industrial Servomotors / ATEX 认证工业伺服电机

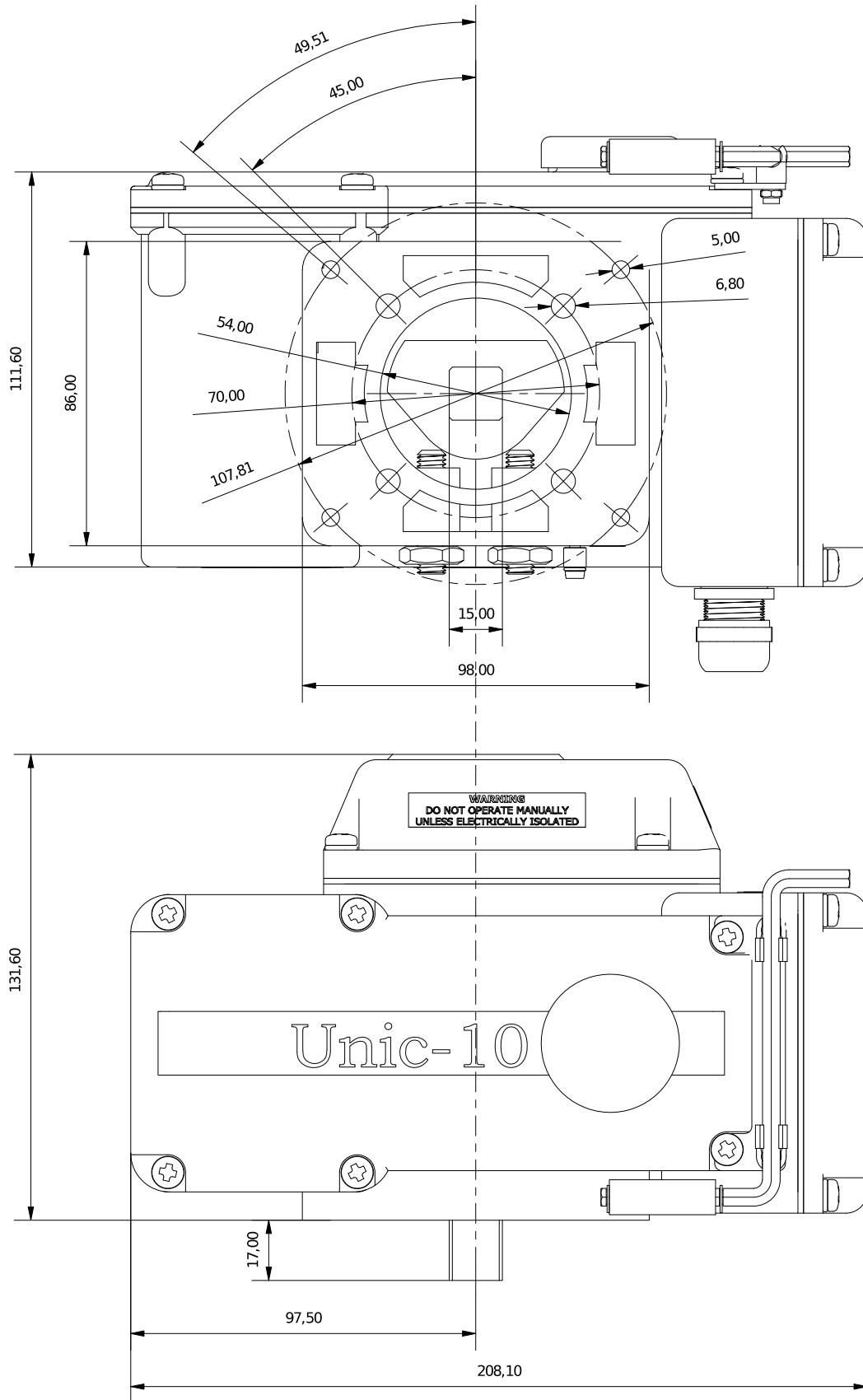
An ATEX approved Industrial UNIC10 servomotor is available.
可提供 ATEX 认可的工业 UNIC10 伺服电机。

Voltage AC 交流电压	Frequency 频率	Torque 扭力	Supplied Wiring Glands 提供接线格兰头	Part # 产品号
230V	50/60Hz	98	-	MM10072/EXP
120V	50/60Hz	98	-	MM10072/110/EXP



UNIC10 Servomotor – ATEX

UNIC10 伺服电机 - ATEX



All dimension in millimetres: 1 inch = 25.4 mm

所有尺寸单位为毫米:1 英寸= 25.4 毫米

6. **SERVOMOTORS MOUNTING BRACKETS / 伺服电机安装支架**

Servomotors mounting brackets and couplings are used to mount the Autoflame servomotor to third party valves or dampers.

伺服电机安装支架和联轴器用于将 Autoflame 伺服电机安装到第三方阀门或风门上。

The servomotor can be mounted directly and the supplied screws are used to fix the servomotor to the bracket. The coupling is used to connect the servomotor's shaft and pin to the valve or damper, this uses a circular connector, this can be easily drilled on site to suit the shaft of the damper or the valve using HSS drill bit.

可以直接安装伺服电机，用提供的螺丝固定伺服电机到支架上。该联轴器用于连接伺服电机的主轴和销轴到阀门或风门，这使用了一个圆形连接器，这可以很容易地在现场钻，使用 HSS 钻头以适应轴的风门或阀门。

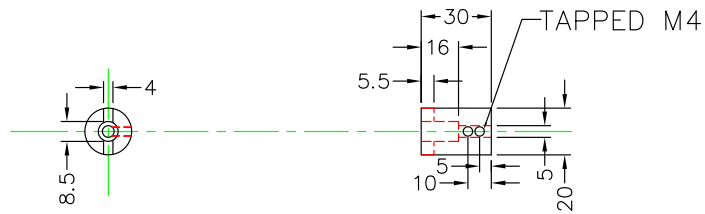
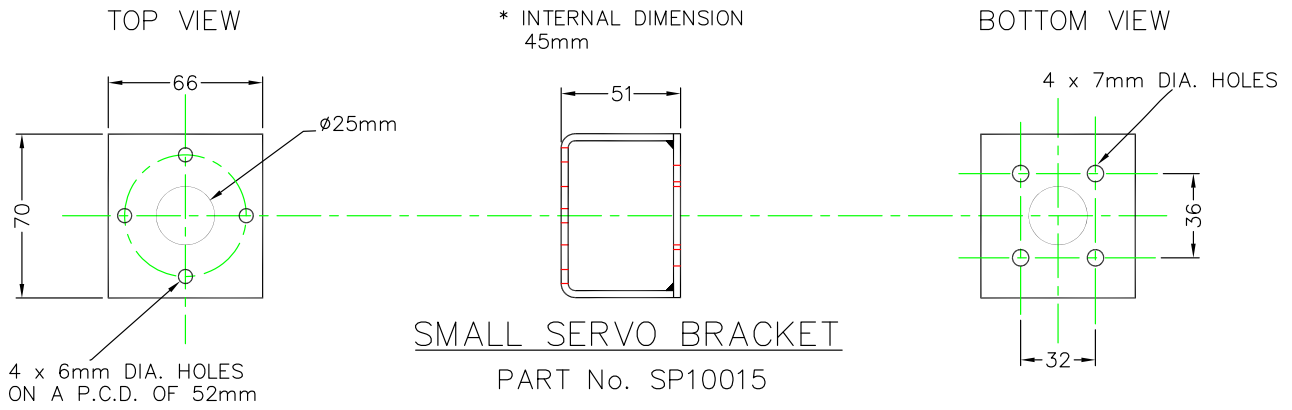
Servomotor Size 伺服电机尺寸	Bracket and Coupling part # 支架和联轴器产品号
Small Servo Motor 小型伺服电机	SP10015
Large Servo Motor 大型伺服电机	SP10016
Industrial Servo Motor UNIC05 工业伺服电机 UNIC05	SP10028/05
Industrial Servo Motor UNIC10 工业伺服电机 UNIC10	SP10028/10
Industrial Servo Motor UNIC20/40 工业伺服电机 UNIC20/40	SP10028/20

- I. Ensure that the servomotor is not powered.
确保伺服电机没有通电。
- II. Move the damper/valve by hand and make sure that it is free to move.
用手移动风门/阀门，并确保它可以自由移动。
- III. Set the damper/valve at the closed position.
将风门/阀门设置在关闭位置。
- IV. Make sure that the shaft is smooth in motion and there is no decentring/ inclination
确保轴在运动中是平滑的，没有偏心/倾斜
- V. Mount the servomotor to the bracket and secure using the supplied screws.
将伺服电机安装到支架上，用提供的螺丝固定。
- VI. Mount this assembly to the damper/valve ensuring that the damper/valve is in the fully closed position and then tighten the bolts and make sure that the assembly is fully secure.
将此总成安装在风门/阀门上，确保风门/阀门处于全关闭位置，然后拧紧螺栓，确保总成完全固定。



6.1. Small Servomotor Mounting Bracket and Coupling / 小型伺服电机安装支架和联轴器

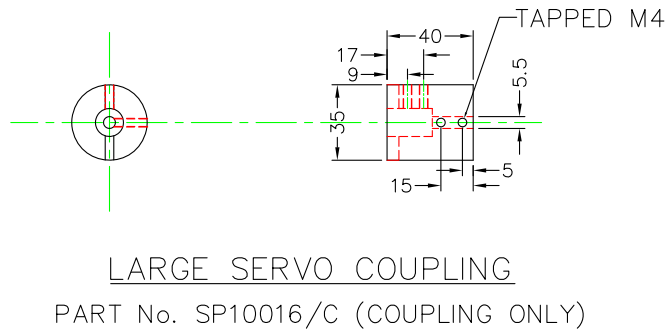
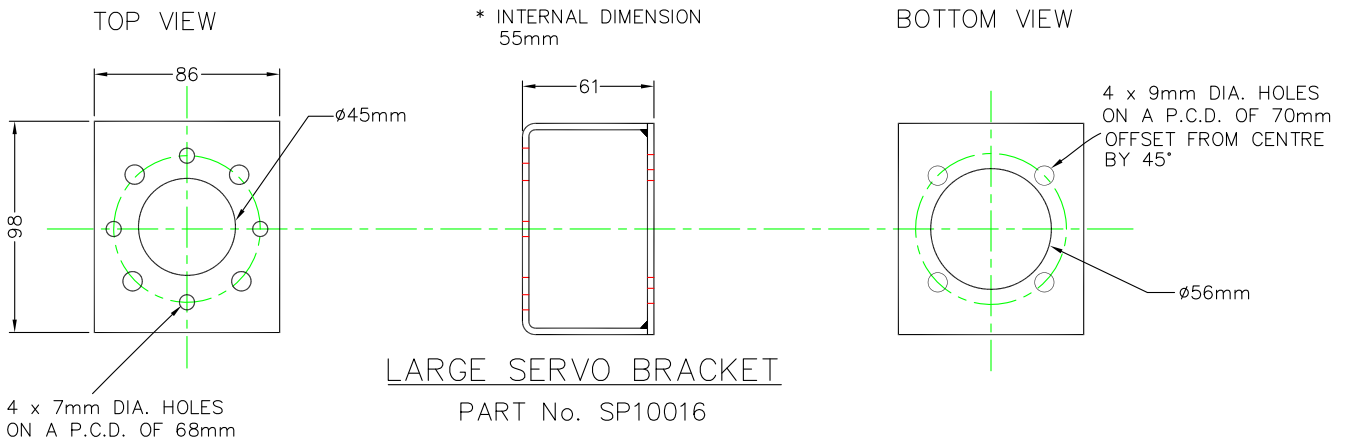




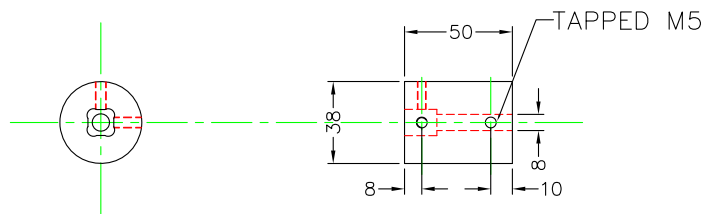
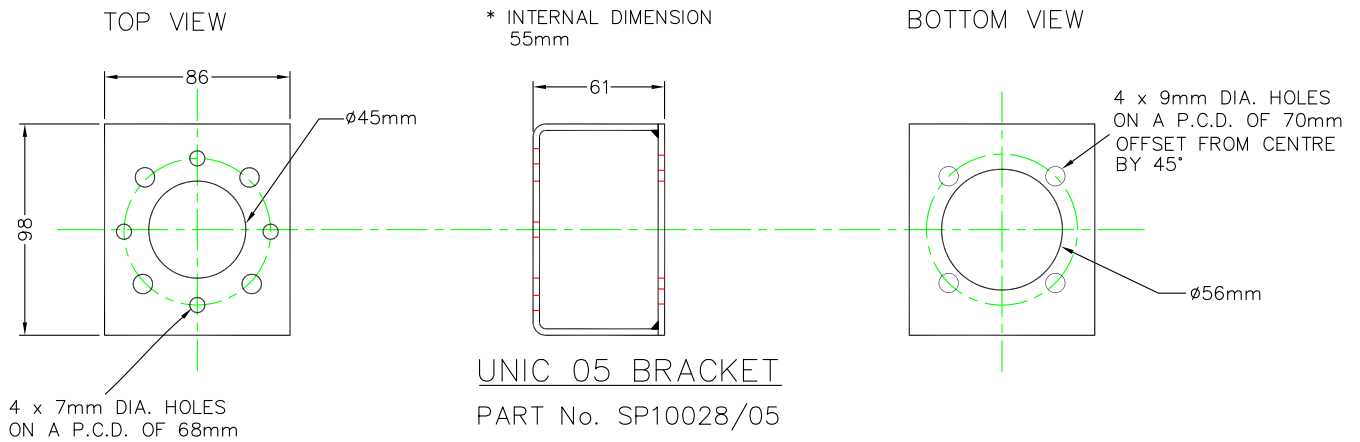
小型伺服电机联轴器
产品号 : SP10015/C (仅联轴器)

6.2. Large Servomotor Mounting Bracket and Coupling / 大型伺服电机安装支架和联轴器

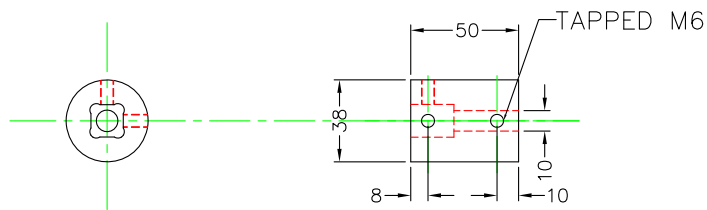
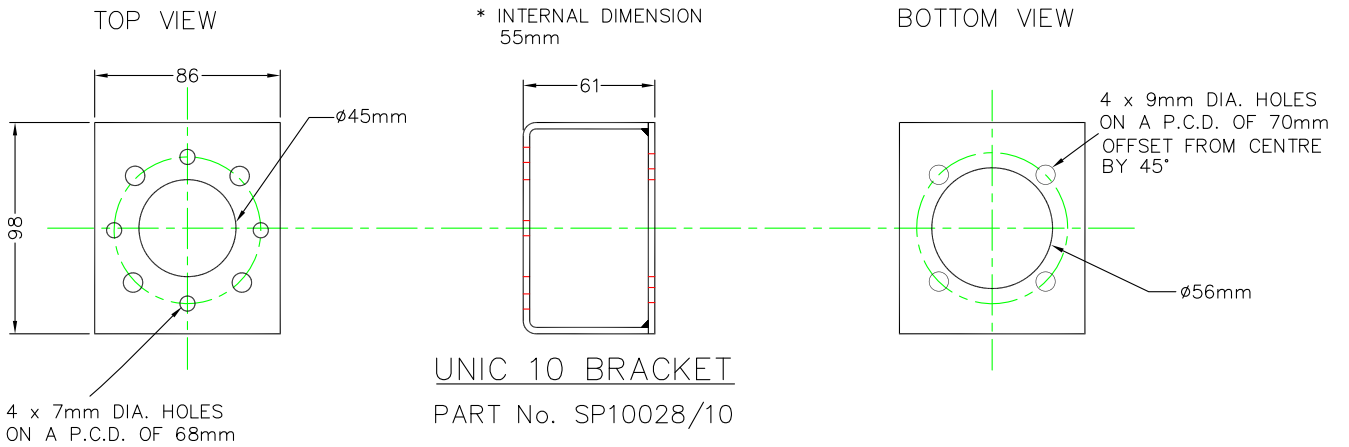




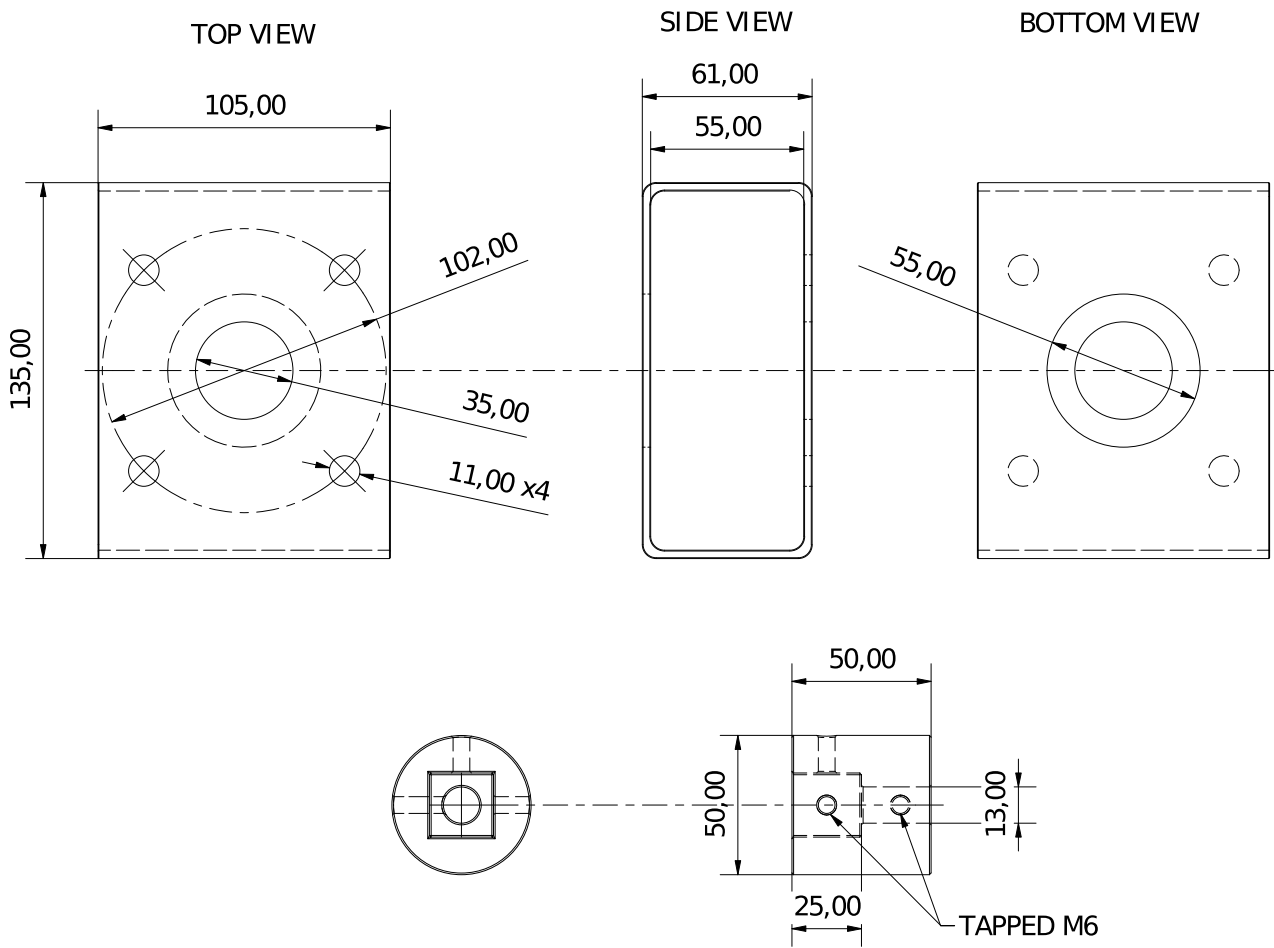
6.3. UNIC05 Mounting Bracket and Coupling / UNIC05 安装支架和联轴器



6.4. UNIC10 Mounting Bracket and Coupling / UNIC10 安装支架和联轴器



6.5. UNIC20 / UNIC40 Mounting Bracket and Coupling / UNIC20/UNIC40 安装支架和联轴器



7. **INSTALLATION / 安装**

7.1. **Overview / 概况**

Autoflame servomotors are supplied set at 0.0° position as standard. It is crucial to remember that this position may not necessarily position the damper at 0.0° or a closed position automatically. This must be physically checked.

Autoflame 伺服电机的标准配置设置为 0.0° 位置。重要的是要记住，这个位置不一定能自动将风门定位在 0.0° 或关闭位置。必须对此进行物理检查。

Viewing the shaft end-on from the potentiometer end, all servomotors drive in:

从电位器端看轴端，所有伺服电机驱动:

- Clockwise direction if power is applied between the LIVE and CW terminal.
如果在火线和 CW 终端之间通电，则按顺时针方向供电。
- Counter clockwise if the power is applied between the LIVE and CCW terminal.
如果电源应用在火线和 CCW 端子之间，则逆时针方向。

The operation of fuel valves and air dampers is often such that they open in a clockwise direction. If the operation needs to be reversed, it is necessary to swap various wiring connections between the MM and the servomotor.

燃料阀和空气风门的工作通常是顺时针方向开启的。如果操作需要逆转，必要在控制模块和伺服电机之间交换各种接线连接。

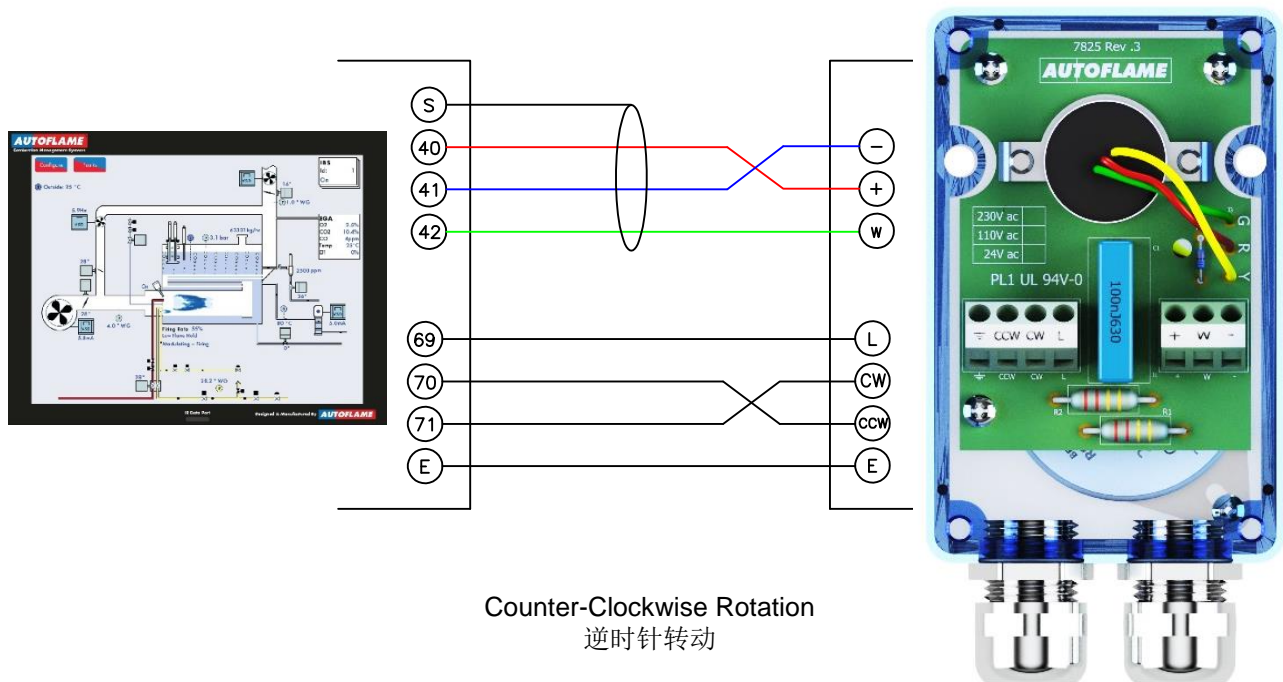
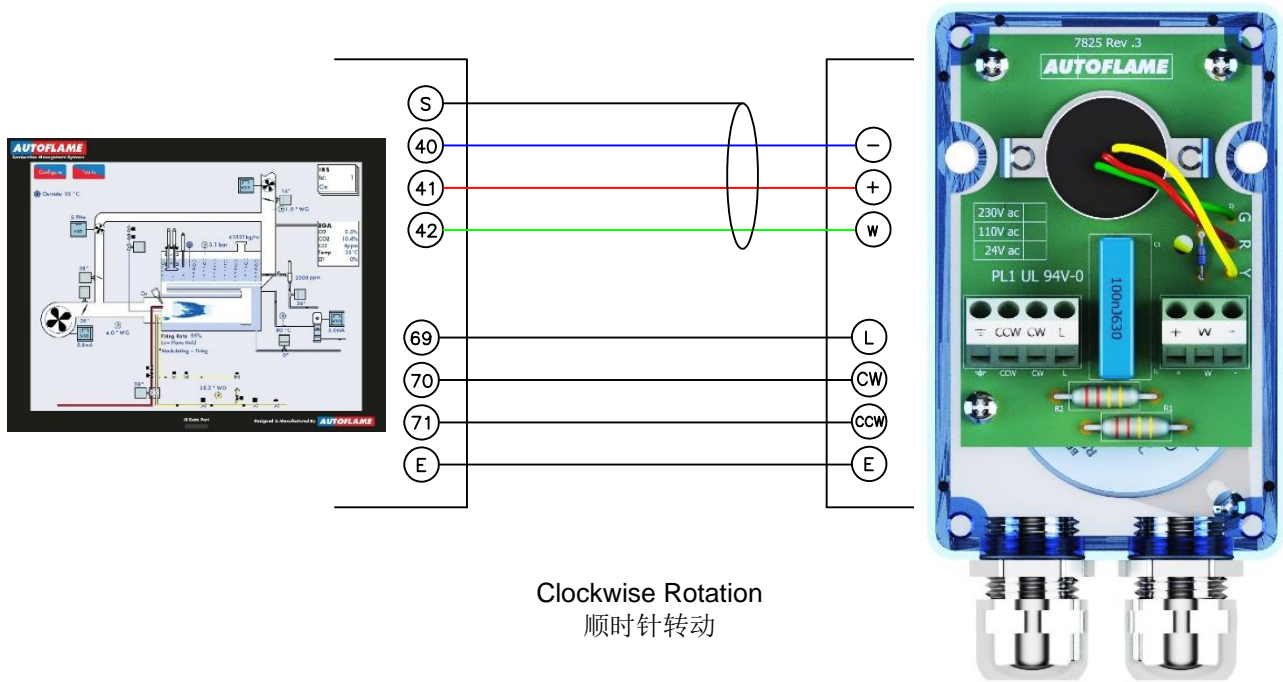
**DO NOT ASSUME THAT THE SERVOMOTORS HAVE BEEN PREVIOUSLY SET
CORRECTLY**

不要假设伺服电机先前已被正确设定

7.2. Wiring / 接线

The servomotors can be configured to rotate in clockwise or counter-clockwise direction, please refer to the wiring diagram below as an example for wiring a small servomotor to Channel 1 on a Mk8 MM.

伺服电机可设定为顺时针或逆时针旋转，请参阅以下接线图，作为在 Mk8 控制模块上连接小型伺服电机至通道 1 的例子。



7.3. Adjusting the Servomotor's Position / 调节伺服电机的位置

When commissioning a system, it is essential to set up each servomotor. A tamper proof screwdriver is required (Part # SP10002 – can be ordered directly from Autoflame).

调试系统时，必须设置好每个伺服电机。需要一个防篡改螺丝刀(部分# SP10002 -可以直接从 Autoflame 订购)。

Usual fuel control valves and air dampers operate from 0° to 90.0° angular degrees. The MM system can drive the servomotors through 360.0° degrees, but it will only display from -6.0° to 96.0° degrees.

通常的燃料控制阀和空气风门的工作角度为 0 度到 90.0 度。控制模块系统可以驱动伺服电机 360.0 度转动，但它将只显示从 -6.0 度到 96.0 度的区域。

All Channel readings displayed on the MM are in angular degrees. It is necessary to adjust the positioning potentiometer in the servomotor so that the MM reads 0.0° when the relevant valve/damper is at its fully closed position. The technician must physically check the mechanical position of the dampers and valves, whilst all servomotors are set to 0.0° before leaving the factory this may have changed during shipping.

控制模块上显示的所有通道读数都是角度。需要调整伺服电机的定位电位器，使其在阀门/风门全关闭时控制模块读数为 0.0°。技术人员必须亲自检查风门和阀门的机械位置，而所有伺服电机在出厂前都被设置为 0.0 度，这可能在运输过程中发生了变化。

Please see the relevant MM manual for the servomotors commissioning procedure.

伺服电机调试程序请参阅相关的控制模块手册。

- I. Remove the servomotor's terminal cover by loosening the 4 screws holding the cover.

通过松开固定伺服电机上盖的 4 个螺丝，拆卸伺服电机上盖。

- II. On Autoflame gas, oil and gas/oil piggy-back valves it is necessary to remove the servomotor. Manually position the oil/gas valve slot to its closed position. Observe the position of the drive pin on the servomotor.

对于 Autoflame 气，油和油/气附加阀，必须拆卸伺服电机。手动定位油/气阀槽至关闭位置。观察驱动销轴在伺服电机上的位置。

- III. Use the relevant channel up/down buttons on the MM to position the pin so that when the servomotor is reassembled to the valve it is in line with the slot

使用控制模块上的相关通道上/下按钮来定位销轴，这样当伺服电机重新组装到阀门上时，它就会与插槽一致。

- IV. In the MM commission screen, use the relevant channel up/down buttons to position the channel to its physically closed position.

在控制模块调试屏幕上，使用相关的通道上/下按钮将通道定位到物理关闭的位置。

- V. Reassemble the servomotor to the valve

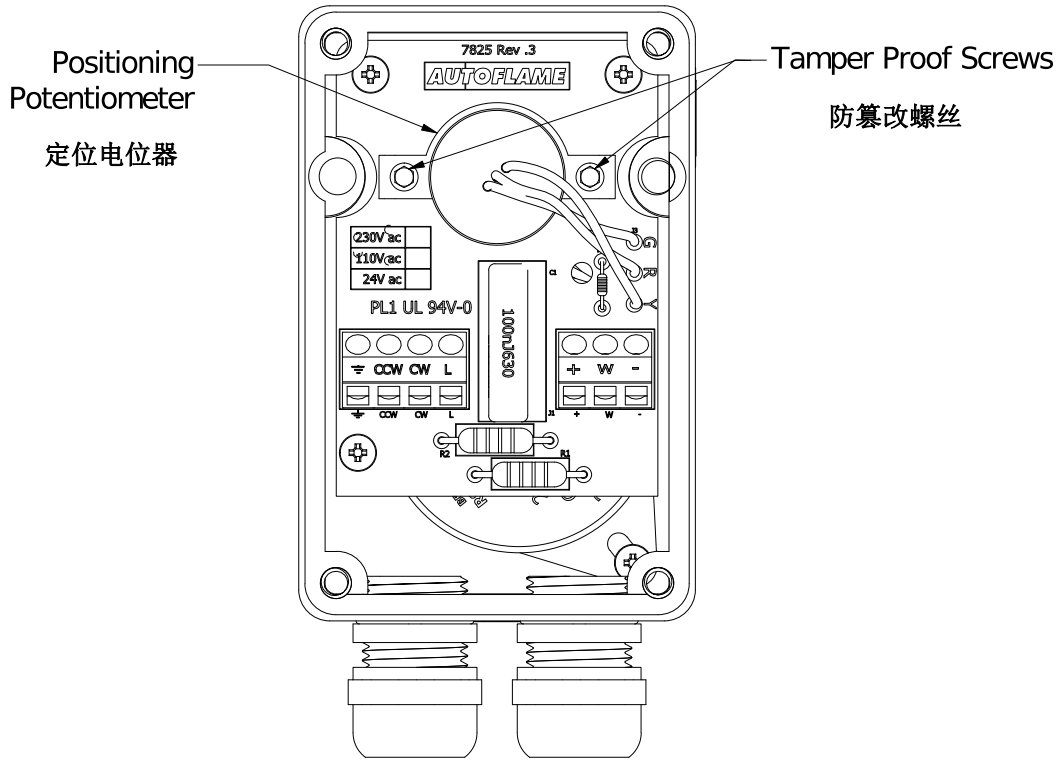
将伺服电机重新组装到阀门上

- VI. Loosen the two tamper proof screws just enough to enable the potentiometer to rotate. Rotate the potentiometer clockwise or counter clockwise by hand until the relevant channel reads 0.0°. Tighten the two tamper proof screws gently until the potentiometer is secure. Do not over tighten the screws. Check that the display still reads 0.0. If incorrect repeat the adjustment process.

稍微松开两个防篡改螺丝一些，使电位器可以手动转动。用手顺时针或逆时针旋转电位器，直到相关通道读数为 0.0°。轻轻拧紧两个防篡改螺丝，直到电位器牢固为止。不要过紧螺丝。检查显示是否仍然读数为 0.0。如果不正确，重复调整过程。

- VII. Use the external position indicator to ensure the valve is in the fully closed position.

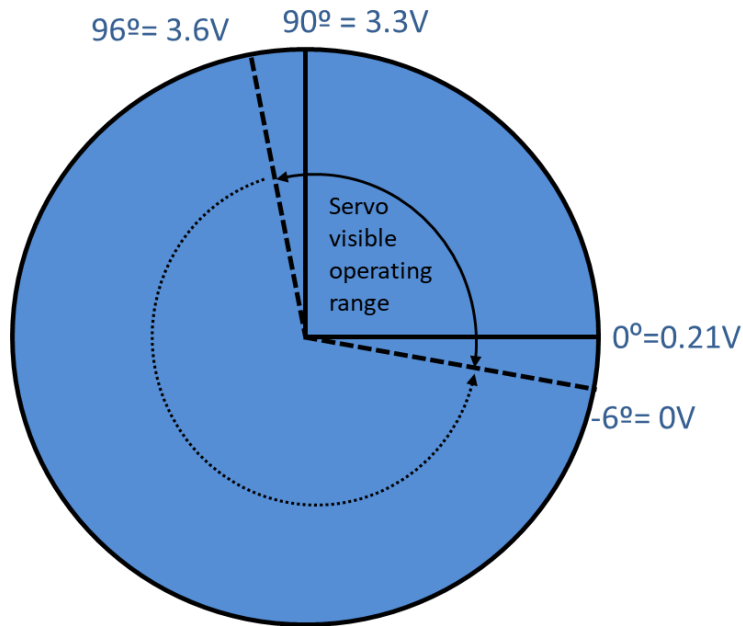
使用外部位置指示器来确保阀门处于完全关闭的位置。



7.4. Servomotor Feedback Voltage / 伺服电机反馈电压

In applications where the servomotor is not positioned close to the display then it is possible to measure the feedback voltage from the servomotor in order to ensure that 0.0° is displayed. By testing the DC voltage between the blue and green wires (wiper and 0V) on the servomotor low voltage terminals this will read $0.21V$ DC when the reading on the display is 0° . The same can be done for when the servomotor is at 96.0° where the voltage will be $3.6V$.

在应用中，在伺服电机不是靠近控制器，是可能测量伺服电机上的反馈电压，以确保 0.0° 的显示。通过测试伺服电机低压端子上的蓝线和绿线(W线和0伏线)之间的直流电压，当屏幕上的读数为0度时，将测量到 0.21 伏直流电。当伺服电机处于 96.0° 时，电压为 3.6 伏。



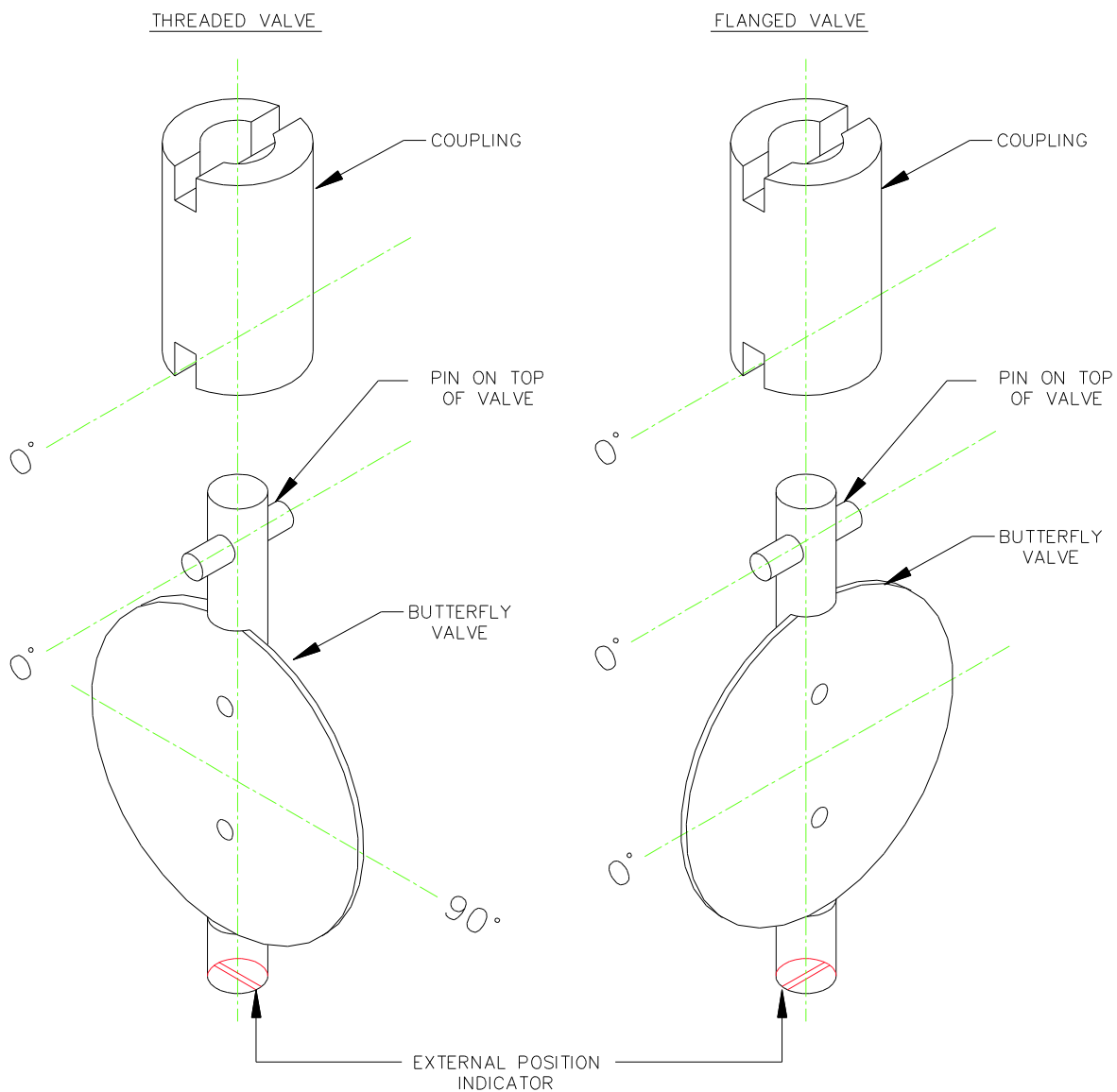
7.5. Servomotors with Autoflame Gas Valves / 带有 Autoflame 气阀的伺服电机

On threaded valves, the pin on the top of the valve is 90° opposite from the position of the butterfly valve.
在螺纹阀门上，阀门顶部的销轴与蝶阀的位置相差为 90 度。

On flanged valves, the pin on the top of the valve is in line with the position of the butterfly valve.
在法兰阀门上，阀门顶部的销轴与蝶阀的位置一致。

For both valves the external visual position indicator is in line with the position of the butterfly valve. Regardless of the type of valve being used, the servomotor is dispatched from the factory with the potentiometer in the zero position. The same servomotor will be correct for both types of valve, as the servomotor for the threaded valve is mounted at 90° different from the flanged valve.

对于这两个阀门，外部视觉位置指示器都与蝶阀的位置一致。无论使用哪种阀门，伺服电机电位器从工厂发出都是处于零点位置。同一伺服电机适用于两种类型的阀门，因为螺纹阀门的伺服电机安装在 90 度，与法兰阀门不同。



7.6. Servomotor Flying Leads and Connectors / 伺服电机引线和连接器

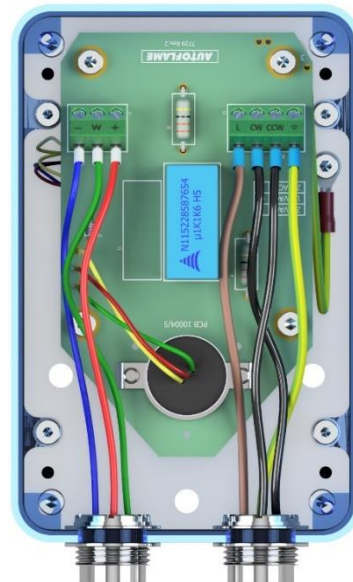
An enclosure mounted connectors and flying leads kit is available for easy installation and replacement of the servomotors. This is available for small and large servomotors only. This kit provides IP65/NEMA4 ingress protection to the servomotors. the wires are screened and they provide protection for the servomotor's signal from electrical noise and interference.

一个外壳安装连接器和飞行引线套件可提供方便的安装和更换伺服电机。这是可用于小型和大型伺服电机。该工具包为伺服电机提供 IP65/NEMA4 入口保护。电线被屏蔽，他们提供保护的伺服电机的信号，从电子噪音和干扰。

The kit includes: 工具包括:

- 1x 3m (10ft) flying lead for position signal
1 × 3 米(10 英尺)定位信号引线
- 1x 3m (10ft) flying lead for power and drive
1 × 3 米(10 英尺)供电和驱动引线
- 1x servo enclosure mounted connector for position signal
1x 安装在伺服外壳的连接器用于定位信号
- 1x servo enclosure mounted connector for power and drive
1x 安装在伺服外壳的连接器用于电源和驱动

Kit for use with 工具用于	Part # 产品号
Small servomotor 小型伺服电机	SP8305
Large servomotor 大型伺服电机	SP8304





8. MAINTENANCE AND TROUBLESHOOTING / 维护和故障排除

It is good practice to check the Autoflame equipment periodically for the integrity of the installation. An important aspect of the system installation is the mechanical assemblies associated with the servomotors, i.e. mounting brackets and couplings. The servomotor checks could include:

定期检查 Autoflame 设备的安装完整性是一个很好的做法。系统安装的一个重要方面是与伺服电机相关的机械组件，即安装支架和联轴器。伺服电机检查可包括：

- Overall mechanical soundness – check for corrosion or mechanical damage.
整体机械可靠性-检查是否有腐蚀或机械损坏。
- Couplings and associated linkages should be tight.
联轴器和相关连杆应紧密。
- Any associated set screws and fixings should be securely fastened.
任何相关的固定螺丝和固定件都应牢固固定。
- Mechanical pins (roll pins, split pins) should not show signs of corrosion and fatigue.
机械销(滚销、开尾销)不应显示腐蚀和疲劳迹象。
- When the burner is off and power has been securely isolated, remove the servomotor from the damper/valve and ensure that the damper/valve does not require excessive torque to operate. Make sure the servomotor is working within its recommended torque rating.
当燃烧器关闭且电源已安全隔离时，将伺服电机从风门/阀门上拆卸下来，确保风门/阀门不需要过大的扭矩才能运行。确保伺服电机在其推荐的扭力额定值内工作。

When installing a servomotor, please pay attention to the following:

安装伺服电机时，请注意以下几点：

- Do not stand on the servomotors as this may cause internal damage to the servomotor's electrical components leading to a system failure.
不要站在伺服电机上，因为这可能会对伺服电机的电气部件造成内部损坏，从而导致系统故障。
- Do not disassemble or remove any of the components of the servomotors as this will affect the integrity of the servomotor. This will also void any warranty that may apply to the unit.
不要拆卸或拆卸伺服电机的任何部件，因为这会影响伺服电机的完整性。这也将使适用于该设备的任何保证无效。
- Unless the servomotor has been supplied with NEMA4 (IP65) fixings, it is important that the servomotor is not subjected to an environmental condition exceeding the standard NEMA3 (IP54) rating.
必须保证伺服电机所处的环境条件不能超过标准 NEMA3 (IP54) 等级，除非伺服电机已经配备了 NEMA4 (IP65) 固定件。
- Make sure to tighten the servomotor's cover screws according to the torque specified in this manual, over tightening can damage the seals and the ingress protection rating may not apply.
请确保按照本手册规定的扭力拧紧伺服电机的盖螺丝，过度拧紧会损坏密封，可能不适用入口保护等级。

The servomotors do not have a torque limiter, so it will continue to drive regardless of the load, make sure the damper/valve is not stuck, also make sure the servomotor is not driven beyond the angle that the damper/valve allow, otherwise a permanent damage can be cause to the damper, servomotor or both.

伺服电机没有扭力限制器，所以无论是否负载它将继续驱动，以确保风门/阀不卡住，也确保伺服电机驱动不超过风门或阀门允许的角度，否则会对风门、伺服电机或两者造成永久性的损坏。

Troubleshooting 故障排除

If the servomotor does not rotate electrically, one of the following could be the cause:

如果伺服电机通电时不旋转，可能是下列原因之一：

- Power is switched off – check live supply voltage.
电源已关闭——检查电源电压。
- Wire/terminals are disconnected – replace wire or properly connect on terminals.

电线/端子断开-更换电线或正确连接端子。

- **Supply voltage is too low/high or incorrect – check the voltage with a meter.**
电源电压过低/过高或不正确-用电表检查电压。
- **No switched neutral – remove switched neutral connection and wire link to earth for both directions.**
无开关零线-移除开关零线连接并把两个方向的接线接到了地线上。
- **Effect of the terminal protector (due to a high/low ambient temperature or blocked damper) – lower/raise the ambient temperature or manually open/close the damper when power is removed from the motor**
终端保护器的作用(由于环境温度高/低或风门被堵塞)-降低/提高环境温度或从电机上取下电源时手动开启/关闭风门

Maintenance 维护

- **Lubrication: The small servomotor gears do not require any lubrication. The large servomotors are lubricated using Mobil Mobilith SHC 220 Red Lithium Grease. The industrial UNIC servomotors are lubricated with di-sulfied molybdenum grease (MOS2) and are pressure proofed, no further lubrication is required for any of the servomotors.**
润滑:小型伺服电机齿轮不需要任何润滑剂。大型伺服电机使用美孚公司的 SHC 220 红色锂脂润滑剂。该工业 UNIC 伺服电机是用二硫化钼脂 (MOS2) 润滑并且与存在压力, 对于任何一种伺服电机没有进一步的润滑需要。
- **Periodical Test: In case the motor is very seldom rotated or after a long period of rest, it is recommended to test the servomotor periodically. Remove power to the servomotor and check manual operation as described in this manual.**
周期性测试:如果电机很少旋转或长时间休息后, 建议对伺服电机进行周期性测试。按本手册所述拆去伺服马达的电源并检查手动操作。

Warranty 保修

All servomotors are covered under 2 years limited warranty.
所有伺服电机都有 2 年的有限保修。

AUTOFLAME
SERVOMOTORS GUIDE
伺服电机指南
18.03.2022

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