



使用说明书

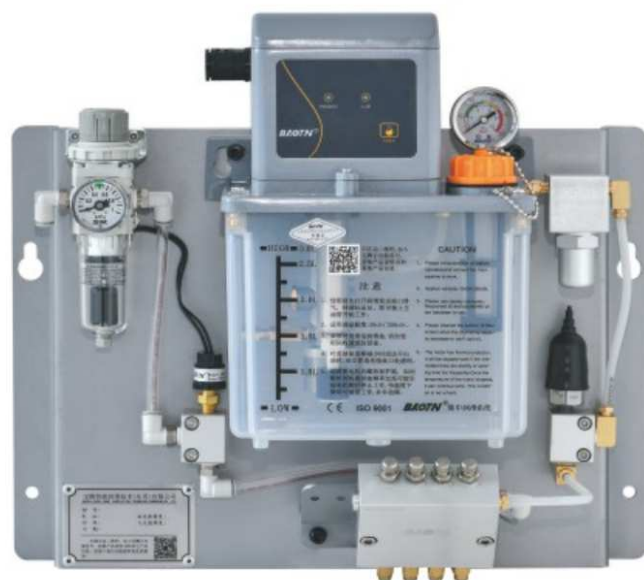
Operation Manual

ETC 油气润滑冷却系统

Oil and Gas Lubrication and Cooling System

集中润滑给油装置

CENTRALIZED LUBRICATION DEVICE



专注减摩增效，成就客户核心竞争力

宝腾智能润滑技术(东莞)有限公司

BAOTN INTELLIGENT LUBRICATION TECHNOLOGY (DONGGUAN) CO.,LTD.



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一、安全指示 Safety Instructions

以下的一些标志是对安全使用产品的一种提示	
	操作前请仔细阅读产品使用说明书，不当的操作可能导致产品的损坏和人员受伤。
	产品检修和维护前，请切断电源。
	接线前确保产品的外壳正确接地，否则可能会造成产品的严重损坏。
	警告标识。

二、声明

所有部件都是按照劳动安全和事故预防的规则生产。使用过程中仍有可能引起危险，造成使用者或者第三人及财产受到损失，因此产品的使用应该严格按照操作使用手册进行，通常能引起安全故障的问题应该立即排除。

(1) 责任免除

宝腾公司不承担由以下原因引起的损坏：

- ✧ 缺少润滑剂；
- ✧ 使用固体润滑剂或不合适的润滑剂；
- ✧ 未按照正常使用用途；
- ✧ 安装或连接错误；
- ✧ 对于故障排除的误操作。



(2) 授权安装技师

只有有资质的工程师可以安装、操作、维护和修理本产品。有资质的工程师指经过培训，有设备用户指定或委任的人员，此类人员接受培训，具有经验，熟悉相关的标准、规则、事故预防、故障排除及操作运行状况。

(3) 运输储存

对于公路运输、空运、海运没有限制。

(4) 环境保护

油和油脂是危害土地和水源的物质，所以在储存、处理、运输要有特殊的安全规则。

三、概述

由衷感谢您选用“宝腾”（BAOTN）牌 ETC 型油气润滑系统。本公司生产的“宝腾”（BAOTN）牌集中润滑装置系列产品，包括手动、电动稀油注油机；手动、电动油脂润滑泵、数字控制齿轮注油机，与之配套使用的分配器，以及油气、油雾类润滑系统相关产品。

在使用前请您详细阅读本说明书，正确地掌握本公司润滑产品的使用方法，以充分利用它的优异性能。多谢合作！

系统概述：

油气润滑是气液两相流体冷却润滑技术的典型应用，它通过形成的气液两相膜隔开相对运动的摩擦面从而起到润滑作用，同时由于含有大量的气体，速度较高的气液两相油气流还可以带走大量摩擦热，起到了冷却降温作用。

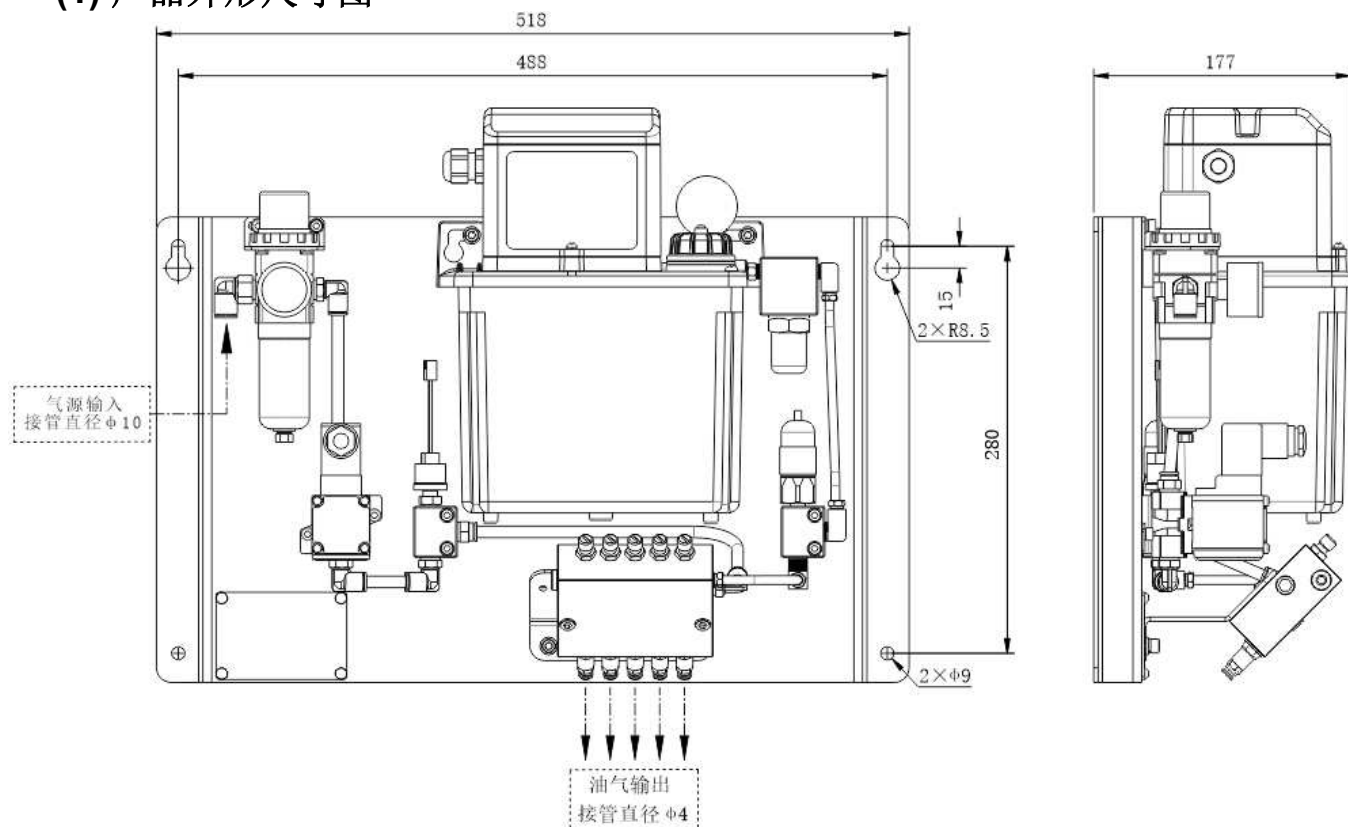
在气液两相油气流中，液体与气体牢固地形成了气液两相膜，它的形成兼有流体动压和流体静压的双重作用。因此，不仅在速度高时能够形成完整的气液两相膜，即使在速度较低时依然能够形成具有一定承载能力的气液两相膜，使作相对运动的摩擦面始终处在良好的工作状态下，这就使得气液两相流体润滑具有优良的润滑减摩作用。



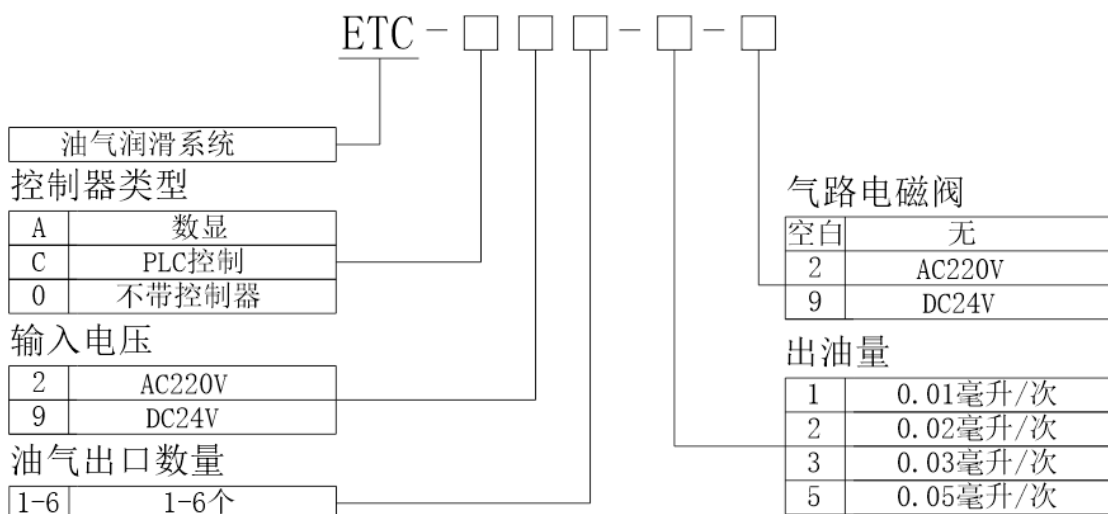
油气润滑适应机械工业设备的低碳环保发展的需要，适用于高温、重载、高速、极低速以及有冷却水和脏物侵入润滑点的工况条件恶劣的场合。尤其在高速电主轴、离心机等需要轴承润滑的场合中较传统的润滑方式有明显的优势。

四、外形尺寸及编制说明

(1) 产品外形尺寸图

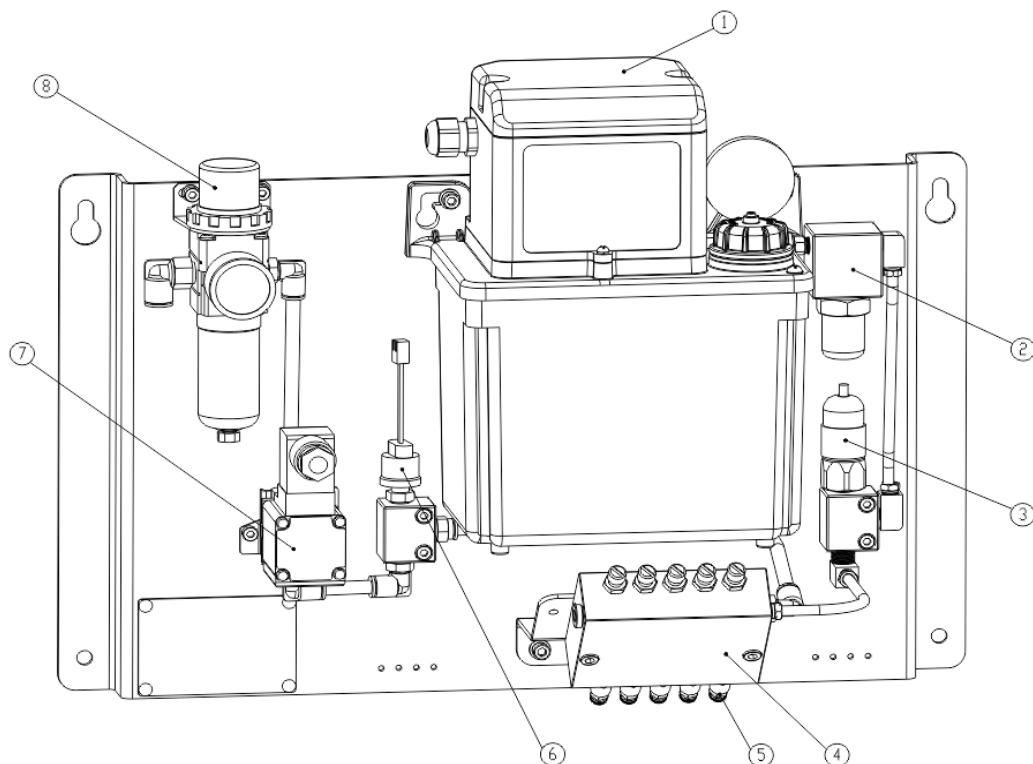


(2) 产品编制说明





(3) 主要部件介绍

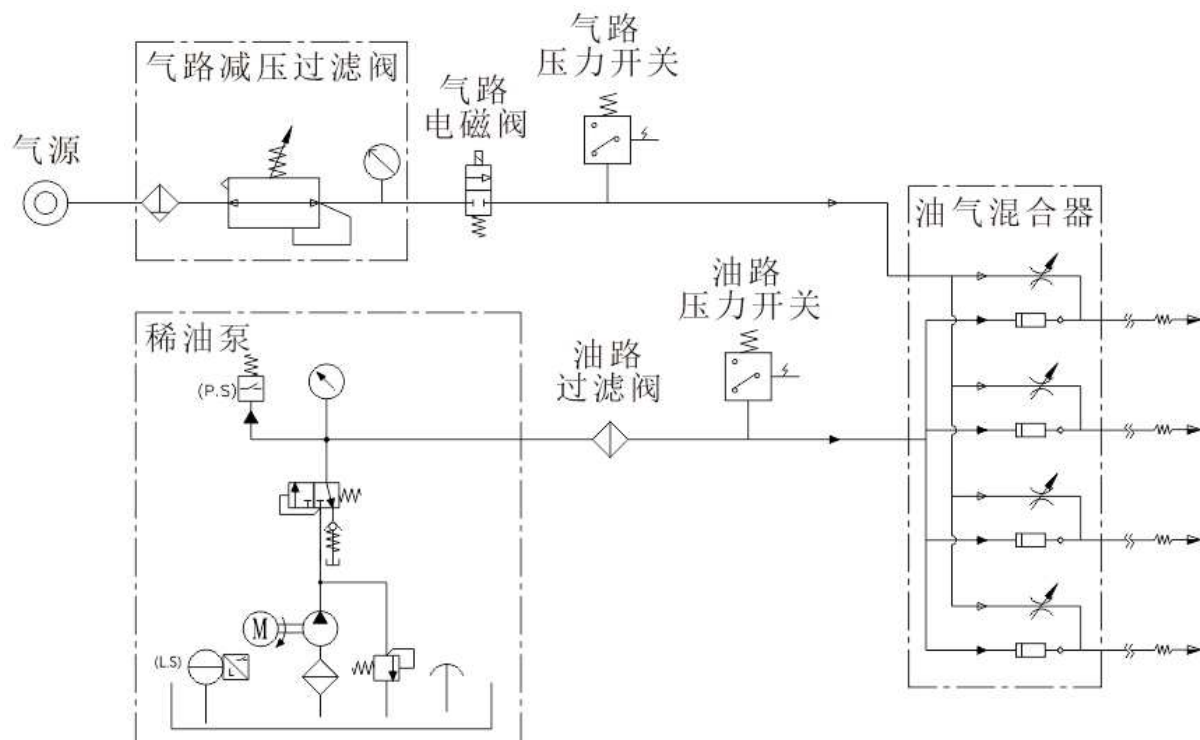


- ① 油气润滑泵：使用电压可选：AC220V/DC24V，额定输出压力 3MPa；
- ② 稀油过滤器：过滤精度 3 μ m；
- ③ 油路压力开关：常开(N.O.)，开启压力 2MPa；
- ④ 油气混合器：可选出口数量 1-6，可选排量 0.01/0.02/0.03/0.05mL/cy；
- ⑤ 油气快插接头：接管直径 Φ 4；
- ⑥ 气路压力开关：常开(N.O.)，开启压力 0.4MPa；
- ⑦ 气路电磁阀：常闭(N.C.)，使用电压可选 AC220V/DC24V
- ⑧ 空气过滤减压阀：过滤精度 5 μ m；



五、原理及性能参数

(1) 工作原理图



(2) 性能特点

- ✧ 微量、定量、连续供油，每口气量可精细调节，能在油气管路中建立稳定的油膜；
- ✧ 系统带数显，显示工作状态；
- ✧ 设有低油位报警开关，实现低液位报警；
- ✧ 系统设有气压压力开关和油压压力开关，可分别监控油气润滑装置中气压过低和油压不足状况；
- ✧ 多种出口数以及多种排量可以选择, 可以根据润滑点需求，选择不同的系统；
- ✧ 可根据实际需要设置系统的供油的频率，或接入用户系统 PLC 进行控制；
- ✧ 油路、气路设有高精度过滤装置，油路过滤精度 $3\ \mu\text{m}$ ，气路过滤精度 $5\ \mu\text{m}$ 。

注意：请使用指定清洁润滑泵油；输入在规定压力范围内的压缩空气。



(3) 技术参数

型号	油气出口数量	出油量 (mL/cy)	输入气压 (MPa)	使用油品粘度 (cSt)	油箱容积 (L)	输入电源 (V)
ETC	1~6	0.01 0.02 0.03 0.05	0.4~0.8	32~100	3	DC24/AC220

用油量选择

单位时间内的油量需求由相应的设备参数和运行条件决定。

参考公式: $Q = d \times I \times \alpha$

其中: Q = 润滑油的需求量 (mm^3/h)

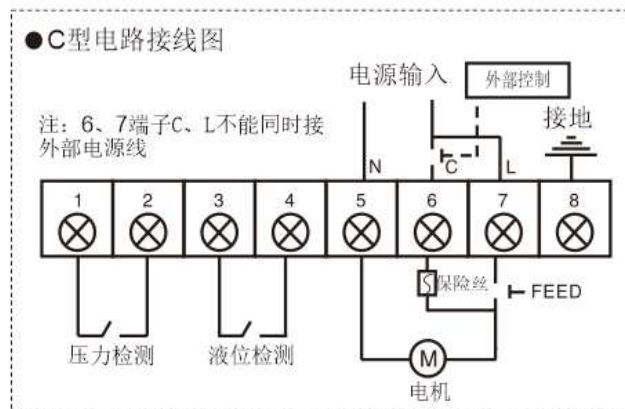
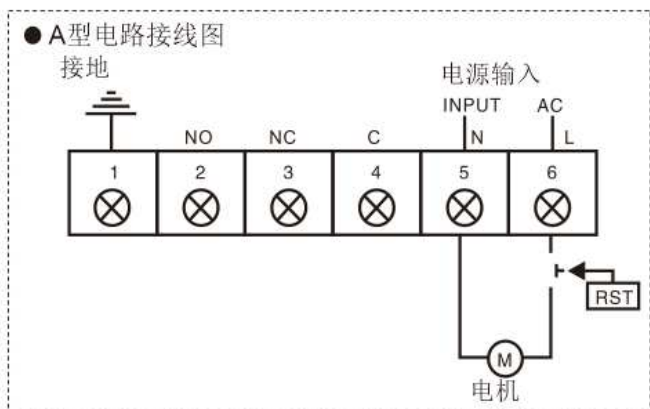
d = 轴承内径 (mm)

I = 轴承的宽度 (mm)

α = 系数 (0.01 适用于角接触球轴承; 0.02 适用于角普通球轴承,
0.03 适用于滚子轴承)

为了获得最佳润滑效果, 还需通过实验来修正供油量多少。润滑频率, 实践证明每小时 6-12 次是比较合适的, 上述频率可以使得润滑油管的内壁均匀地分布一层润滑油并缓慢向轴承连续运动。

(4) 电器接线图(接线盒内部)





六、控制器使用说明

控制器通过拨码实现是否锁键盘，是否记忆，休止时间单位（秒和分钟）选项，通过拨码开关进行选择，选择后需要断电重新上电后才有效。

(1) 系统可设定为两种动作模式：

- ① 润滑：开机时先执行润滑时间计时；
- ② 记忆：，断电后再次送电可继续执行之前的工作状态；

(2) 润滑次数跟间歇时间可自行设置：

内设有锁键功能，可锁定设置后的润滑和间歇时间，

设置格式为：LUB 润滑时间：1~999（秒）；

INT 间歇时间：1~999(分/秒)；

(3) 系统如下情况报警(报警时间闪耀显示异常并蜂鸣)：

- ① 压力不足显示 Erp；
- ② 液位不足显示 Ero；

(4) 面板指示灯可显示系统润滑和间歇状态：润滑状态绿灯亮；间歇状态红灯亮；

(5) 控制器任何一种状态下按下“RST”键可强制润滑或消除异常报警信号；

(6) 控制器的使用方法：

① 润滑时间的设定，长按 SET 键 2 秒后，则进去设定状态，此时数码管显示原润滑时间值，短按 SET、增、减键调到所需要润滑时间值后，按住 SET 键 2 秒后，则进入间歇时间设定状态，此时数码管显示原间歇时间值，短按 SET、增、减键调到所需要的时间值后，按住 SET 键 2 秒后，设定确认，数据被写入内存，数码管正常显示润滑，间歇时间值，系统并即时按新的设定时间自动进入工作；

② 在设置状态，按复位按键可以恢复原先的设定值；

③ 控制器接入 AC220V 电源进去工作，由润滑时间到间歇时间状态按设定时间循环；



七、系统安装调试

(1) 安装须知

- ✧ 严禁带电安装；
- ✧ 安装时要保证油箱上的液位线清晰、干净；
- ✧ 安装面应平整，安装连接要可靠；
- ✧ 距离热源 1 米以上。

(2) 润滑油粘度使用须知

- ✧ 润滑油使用粘度范围为 32-100cSt；
- ✧ 请使用清洁的润滑油。

(3) 润滑系统管道安装须知

- ✧ 油管应轴向垂直切断，不可使管口崩裂、划伤，更不可将油管压扁；
- ✧ 安装时管道必须保持干净、清洁，无污染物；
- ✧ 管路配管须短捷，以减少系统压力损失，确保管路畅通；
- ✧ 管路接头连接处必须连接可靠，不得出现渗漏现象。

(4) 润滑泵加油须知

- ✧ 液位上限标签位置是根据产品容积进行设定的；
- ✧ 加油时，加至液位上限即可，防止润滑剂油箱。

(5) 润滑系统调试须知

- ✧ 确认管路已正确地安装连接；
- ✧ 通过加油口加注清洁的润滑剂。
- ✧ 接入气源，气源压力 0.4-0.8MPa，系统带有空气过滤减压阀出厂额定值为 0.6MPa。
- ✧ 系统接入正确的电源。



- ✧ 启动系统后，观察系统油路压力表数值是否在 3.0MPa 左右；
- ✧ 首次使用系统时，打开所有润滑点接头，手动注油多次，排除系统中的空气直到润滑点出油，方可按照要求设置润滑泵。如果有控制器，请参照控制器说明；
- ✧ 气量与打油间隔可根据润滑点需求现场调整，调整完成后，将参数固定，系统进入正常工作状态；
- ✧ 为避免系统停止后润滑剂流失，当再次启动后，需要等待一定时间润滑剂才能够到达润滑点。安装管路时，一般会在最末端，靠近润滑点的地方，增加一段尼龙螺旋管，当再次开启油气系统后，压缩空气会将储存在螺旋管路底部的油迅速输送到润滑点。一般螺旋管应水平放置在尽可能接近润滑点的地方，与润滑点距离不小于 0.5 米；

八、维护与保养

- ✧ 本产品质保周期为 1 年，使用期间请依照本产品说明书进行使用及维护；
- ✧ 为保证润滑系统正常工作，务必使用清洁润滑油，并保持润滑油的清洁；
- ✧ 每月必须检查加油口处滤网，防止滤网脏污、破损等，造成油箱内油品污染，若发现滤网存在上述问题，请及时更换滤网；
- ✧ 过滤器维护：

本润滑系统使用高精度过滤器，过滤精度为 $3\mu\text{m}$ ，故需要定期维护保养。

 - 1) 每一年对过滤器滤芯进行更换；
 - 2) 更换滤芯后需拆开油气混合器末端的堵头来进行排气，确保没有空气进入油气混合器，防止出油异常；
- ✧ 每次加油后需要停机 15 分钟来排掉混在油里的空气，防止气泡进入系统导致油气混合器故障。



- ✧ 润滑泵在通入电源后禁止打开上盖，以防止电击伤人、火灾事故；
- ✧ 定期检查时，启动润滑系统，观察系统整体运行是否正常；
- ✧ 检查主油管路、分油管路有无渗漏、破裂，各润滑点是否均能注油；
- ✧ 检查管束固定及线束接插是否牢固；
- ✧ 检查和清洗油管和吸油口处滤网，以防堵塞吸油口处滤网造成系统喷雾量减少；
- ✧ 清除整个系统各部分污垢和润滑点外渗油污；
- ✧ 检查油箱中剩余油量，及时补充；
- ✧ 请做好维护记录。

九、运输

- ✧ 运输过程中，严禁雨淋、受潮和剧烈碰撞；
- ✧ 装卸时应小心轻放、不得倒置。

十、贮存

- ✧ 产品应贮存在通风、干燥、不受阳光直射及空气中不含腐蚀性气体的库房内；
- ✧ 所有管路两端应封闭，避免灰尘、杂质侵入；
- ✧ 产品在库房内要码放整齐、注意通风，并注意包装箱上的标志、不得倒置；
- ✧ 包装箱和地面、墙壁应保持至少 100 mm 以上的距离；
- ✧ 集中润滑系统贮存时间应不超过 6 个月。



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I、 Safety Instructions

The following signs are a reminder for safe use of the product	
	Please read the product manual carefully before operation. Improper operation may cause damage to the product and personal injury.
	Before product inspection and maintenance, please cut off the power supply.
	Ensure that the product's chassis is properly grounded before wiring, or it may cause serious damage to the product.
	Warning Labels.



II、Statement

All components are manufactured in accordance with labor safety and accident prevention regulations. However, hazards may still arise during use, potentially causing harm to users, third parties, or property damage. Therefore, the product must be operated strictly according to the user manual. Any conditions that may lead to safety failures should be promptly eliminated.

(1) **Exclusion**

BAOTN shall not be liable for damage caused by the following reasons:

- ✧ Insufficient lubricant.
- ✧ Use of solid or inappropriate lubricants.
- ✧ Operation deviating from the designed purpose.
- ✧ Installation or connection errors.
- ✧ Subsequent troubleshooting errors.

(2) **Authorized Installation Technician**

Only qualified engineers may install, operate, maintain, or repair this product. A qualified engineer is defined as personnel who:

- (a) Are trained and formally designated or appointed by the equipment user;
- (b) Have undergone specialized training and possess documented experience;
- (c) Demonstrate proficiency in relevant standards, safety regulations, accident prevention protocols, troubleshooting procedures, and operational requirements.



(3) **Storage and Transportation**

This product is not subject to transportation restrictions for:

Road transport (ADR)

Air transport (IATA/ICAO)

Maritime transport (IMDG)

(4) **Environmental protection**

Oil and grease are substances that pose a threat to land and water sources, so there must be special safety regulations for storage, processing, and transportation.

III、 Overview

We sincerely thank you for choosing the BAOTN ETC-type Oil-Air Lubrication System. Our company's BAOTN brand centralized lubrication device product line includes manual and electric dilute oil lubricators; manual and electric grease lubrication pumps, digital control gear lubricators, distributors used in conjunction with them, as well as related products for oil-air and oil mist lubrication systems.

Before use, please read this manual carefully and correctly master the use of our lubrication products to fully utilize their excellent performance. Thank you for your cooperation!



System Overview:

Oil-air lubrication is a typical application of gas-liquid two-phase flow cooling and lubrication technology. It lubricates by forming a gas-liquid two-phase film between relatively moving friction surfaces, separating them. Simultaneously, due to the large volume of gas contained, the high-velocity gas-liquid two-phase oil-air flow can carry away a significant amount of frictional heat, thus providing a cooling effect.

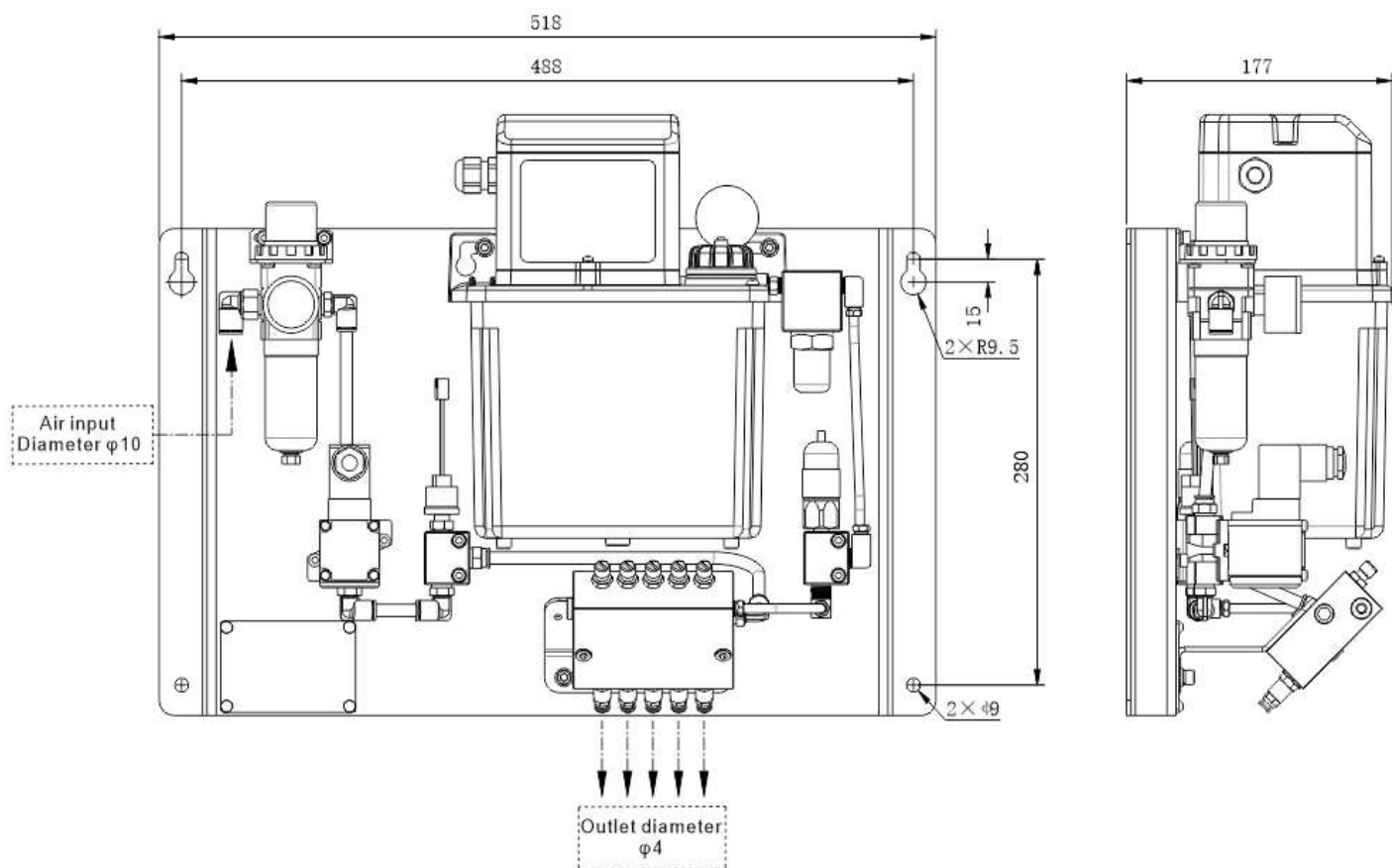
In the gas-liquid two-phase oil-air flow, the liquid and gas form a solidified gas-liquid two-phase film. The formation of this film involves a dual mechanism of both fluid dynamic pressure and fluid static pressure. Therefore, not only can a complete gas-liquid two-phase film be formed at high speeds, but even at lower speeds, a gas-liquid two-phase film with certain load-carrying capacity can still be formed. This ensures that the relatively moving friction surfaces are always in a good working state, which endows gas-liquid two-phase fluid lubrication with excellent lubrication and friction-reduction properties.

Oil-air lubrication meets the needs of low-carbon, environmentally friendly development in the mechanical industry. It is suitable for harsh working conditions involving high temperature, heavy load, high speed, extremely low speed, as well as the intrusion of cooling water and contaminants into the lubrication points. Especially in applications requiring bearing lubrication, such as high-speed electric spindles and centrifuges, it has significant advantages over traditional lubrication methods.

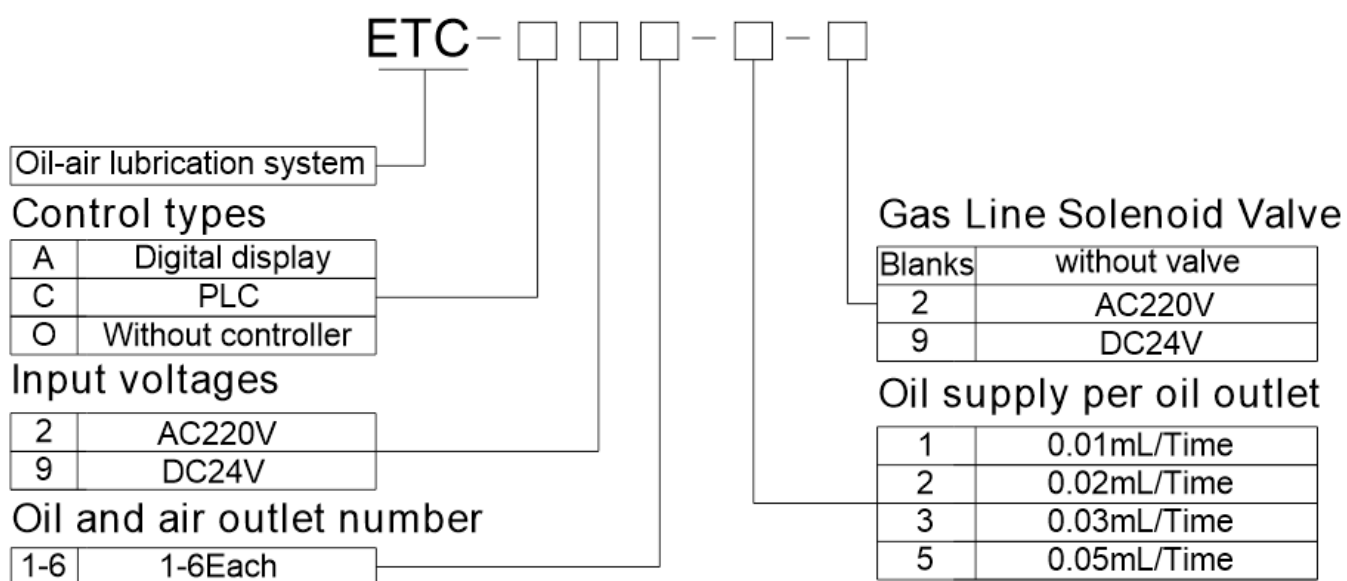


IV、Overall Dimensions and Specification

(1) Overall Dimensions

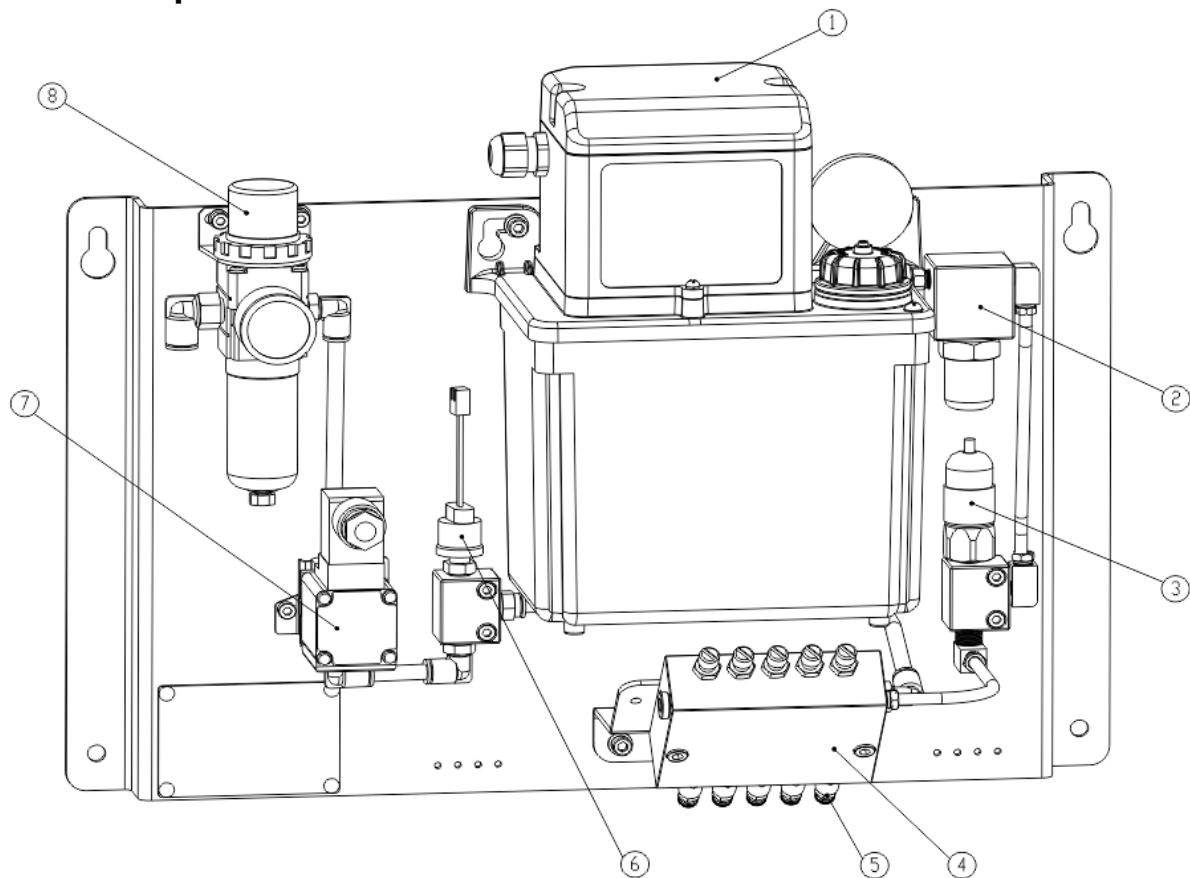


(2) Specification





(3) Main Components Introduction

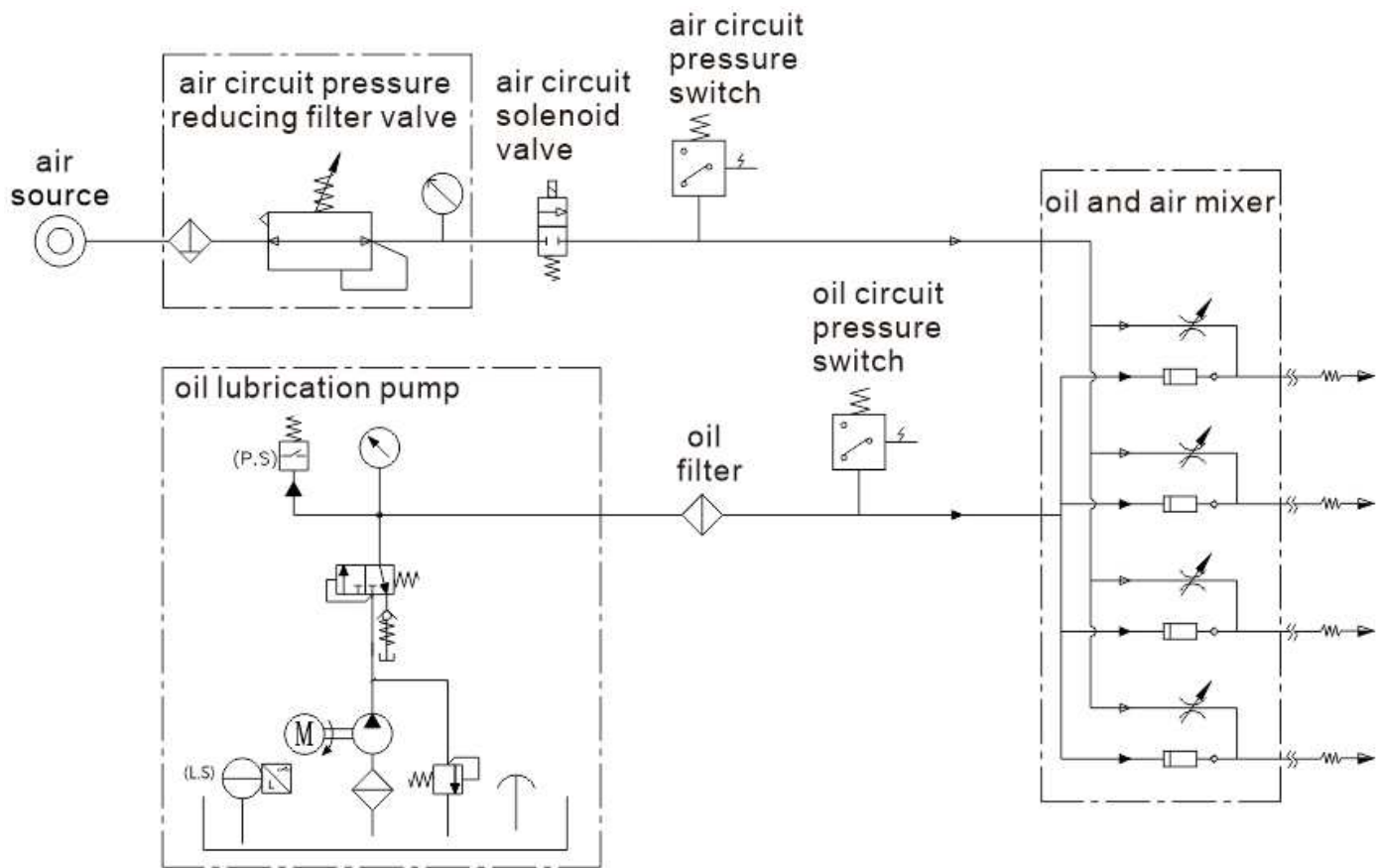


- ① **Oil-air lubrication pump:** Optional voltage: 220V/24V;
Rated output pressure 3MPa;
- ② **Oil filter:** Filtration accuracy 3μm;
- ③ **Oil circuit pressure switch:** Normally open (NO.);
Opening pressure 2MPa;
- ④ **Oil and air mixer:** Optional outlet number 1~6,
Optional displacement 0.01/0.02/0.03/0.05ml/cy;
- ⑤ **Quick-Release Coupling:** Tube Diameter φ4;
- ⑥ **Air Path Pressure Switch:** Normally Open (NO.);
Switching Pressure 0.4MPa;
- ⑦ **Air Path Solenoid Valve:** Normally Closed (NC.);
Operating Voltage AC220V/DC24V Optional;
- ⑧ **Air Filter Regulator:** Filtration Accuracy 5μm;



V、Working Principles and Performance Characteristics

(1) Working Principles



(2) Performance Characteristics

- ✧ The system provides trace, metered, and continuous oil supply, with each air volume finely adjustable to establish a stable oil film in the oil-air lines;
- ✧ The system is equipped with a digital display showing the operating status;
- ✧ It features a low oil level alarm switch to achieve low-level alarm;
- ✧ The system has both an air pressure switch and an oil pressure switch to monitor low air pressure and insufficient oil pressure in the oil-air lubrication device respectively;
- ✧ The system has both an air pressure switch and an oil pressure switch to monitor low air pressure and insufficient oil pressure in the oil-air lubrication device respectively;



- ✧ The system has both an air pressure switch and an oil pressure switch to monitor low air pressure and insufficient oil pressure in the oil-air lubrication device respectively;
- ✧ Multiple outlet numbers and multiple displacements are selectable, allowing different systems to be chosen according to lubrication point requirements;
- ✧ The oil supply frequency can be set according to actual needs, or it can be connected to the user's system PLC for control;
- ✧ Both the oil and air lines are equipped with high-precision filtration devices, with oil line filtration accuracy of 3μm and air line filtration accuracy of 5μm.

**CAUTION: Use exclusively designated clean lubricating oil for the pump;
Supply compressed air within the specified pressure range.**

(3) Technical Parameters

Model	Number of Oil-Air Outlets	Oil Flow Rate (mL/cy)	Input Air Pressure (MPa)	Usable Oil Viscosity (cSt)	Oil Tank Capacity (L)	Input Power (V)
ETC	1~6	0.01 0.02 0.03 0.05	0.4~0.8	32~100	3	DV24/AC220

Oil Quantity Selection

Required per unit time is determined by the corresponding equipment parameters and operating conditions.

Reference formula: $Q = d \times l \times \alpha$

Q =lubricating oil demand (mm³/h)

d = bearing inner diameter (mm)

l =Width of bearing (mm)

α =Coefficient (0.01 for angular contact ball bearings;

0.02 for angular contact ball bearings;

0.03 for roller bearings.)



In order to obtain the best lubrication effect, the amount of oil supply needs to be corrected through experiments. As for the frequency of lubrication, practice has shown that 6-12 times per hour is more appropriate. The above frequency can make the inner wall of the lubricating oil pipe evenly distributed with a layer of lubricating oil and slowly move continuously to the bearings.

VI、Controller User Manual

The controller uses DIP switches to select options such as whether to lock the keyboard, whether to enable memory function, and the sleep time unit (seconds or minutes). Selections made via the DIP switches require a power cycle (power off and then back on) to take effect.

(1) The system can be set to two operating modes:

- ① Lubrication: Upon startup, the lubrication timer is executed first.
- ② Memory: After power interruption and subsequent re-energization, the system can resume the previous working state.

(2) The number of lubrication cycles and the interval time can be set:

The device is equipped with a lock key function to lock the set lubrication and interval times. The settings are formatted as:

LUB Lubrication Time: 1~999 (seconds);

INT Interval Time: 1~999 (minutes/seconds).

(3) The system will trigger an alarm under the following conditions

(the alarm time will flash to indicate an anomaly and sound a buzzer):

- ① Low pressure displays "Erp".
- ② Low level displays "Ero".

(4) The panel indicator lights can display the system lubrication and interval status:

The green light is on during lubrication status;

The red light is on during interval status.



(5) Pressing the "RST" key in any mode of the controller can force lubrication or clear an abnormal alarm signal.

(6) How to Use the Controller

① To set the lubrication time: Long press the SET key for 2 seconds to enter the setting state. At this point, the digital tube displays the original lubrication time value. Short press the SET, "+" or "-" keys to adjust to the desired lubrication time value, then long press the SET key for 2 seconds to enter the interval time setting state. At this point, the digital tube displays the original interval time value. Short press the SET, "+" or "-" keys to adjust to the desired time value, then long press the SET key for 2 seconds to confirm the setting. The data is written into memory, and the digital tube normally displays the lubrication and interval time values. The system immediately enters operation based on the new time settings.

② In the setting state, pressing the reset button restores the original settings.

③ When the controller is powered and operational, it automatically cycles between the lubrication and interval states according to the set times.

VII、 Installation and Adjustment

(1) Installation Notice

- ✧ Never Install Energized;
- ✧ Ensure the level graduation on the oil tank remains clearly legible during installation;
- ✧ Mounting surfaces shall be flat, and installation connections must be securely fastened and reliable;
- ✧ Maintain a minimum distance of 1 meter from any heat source;



(2) Lubricant Viscosity Usage Guidelines

- ✧ Operational Viscosity Range for Lubricants: 32-100 cSt;
- ✧ Apply clean lubricating oil;

(3) Lubrication System Pipeline Installation

- ✧ Tubing must be cut perpendicular to its axis without causing fracture, burring, or scratching at the port; moreover, deformation must be avoided.
- ✧ Piping must remain clean and contaminant-free during installation.
- ✧ Piping must be routed compactly to minimize system pressure loss and ensure unimpeded flow.
- ✧ All piping joints must be securely connected with zero leakage tolerance.

(4) Refueling Guidance

- ✧ The maximum level marking position is set based on the rated liquid capacity of the product.
- ✧ During refueling, fill to the maximum level marking to avoid overfilling the lubricant reservoir.

(5) Lubrication System Pre-commissioning

- ✧ Confirm proper installation and connection of piping;
- ✧ Fill clean lubricant through the grease filler;
- ✧ Connect to air supply at 0.4-0.8MPa, with system air filter-regulator factory preset to 0.6MPa;
- ✧ Connect solenoid valve to correct power supply;



- ✧ After the system starts, observe whether the system oil pressure gauge reading is around 3.0 MPa;
- ✧ During the initial use of the system, open all lubrication point fittings and manually inject oil multiple times to bleed air from the system until oil discharges from the lubrication points. Only then can the lubrication pump be set according to the requirements. If a controller is present, please refer to the controller instructions;
- ✧ The air volume and lubrication interval can be adjusted on-site according to the requirements of the lubrication points. After the adjustments are completed, lock the parameters and the system will enter the normal operation mode;
- ✧ To prevent lubricant loss after system shutdown, a waiting period is required upon restart before lubricant reaches lubrication points. During piping installation, a section of nylon spiral tubing is typically added at the furthest end near lubrication points. When restarting the oil-air system, compressed air rapidly delivers oil stored at the base of the spiral tube to lubrication points. The spiral tubing should be installed horizontally as close as possible to lubrication points, maintaining a minimum distance of 0.5 meters.

VIII、 Maintenance

- ✧ The warranty period for this product is one year. During use, please operate and maintain the product strictly in accordance with the instructions in this manual;
- ✧ To ensure the normal operation of the lubrication system, clean lubricating oil must be used and its cleanliness maintained.



- ✧ The filter screen at the oil filling port must be inspected monthly to prevent contamination or damage that could pollute the oil in the tank. If any of the aforementioned issues are found, replace the filter screen promptly;
- ✧ Filter Maintenance: The lubrication system uses a high-precision filter with a filtration accuracy of $3\mu\text{m}$, therefore requiring regular maintenance:
 - 1) Replace the filter element annually;
 - 2) After replacing the filter element, remove the end plug of the oil-air mixer to bleed air, ensuring no air enters the mixer and preventing abnormal oil discharge;
- ✧ After each oil refill, shut down the system for 15 minutes to bleed off air entrapped in the oil, preventing air bubbles from entering the system and causing the oil-air mixer to malfunction;
- ✧ When the lubrication pump is powered, opening the top cover is prohibited to prevent electric shock injuries and fire accidents.
- ✧ During routine inspections, start the lubrication system and verify that the entire system is functioning properly.
- ✧ Check main and branch oil lines for leakage or rupture, and confirm that all lubrication points receive oil.
- ✧ Inspect tube bundle fastening and harness connector security.
- ✧ Check and clean oil pipes and the suction port filter screen to prevent clogging, which would cause reduced system spray volume.
- ✧ Remove contaminants from all system components and external oil seepage at lubrication points.



- ✧ Check the remaining oil level in the tank and replenish promptly.
- ✧ Maintain maintenance records.

IX、 Transportation Precautions

- ✧ Transportation must be protected against rain exposure, moisture absorption, and violent impacts.
- ✧ Handle with care during loading/unloading; keep upright and avoid impact.

X、 Storage Precautions

- ✧ Products must be stored in ventilated, dry warehouses protected from direct sunlight and free of corrosive gases in the air.
- ✧ All pipe ends must be sealed to prevent intrusion of dust and impurities.
- ✧ Products must be arranged in orderly stacks with adequate ventilation in the warehouse, and handled according to packaging markings to maintain upright orientation.
- ✧ Packaging crates must maintain a minimum distance of 100 mm from both the floor and walls.
- ✧ Centralized lubrication systems shall not exceed 6 months of storage time.



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