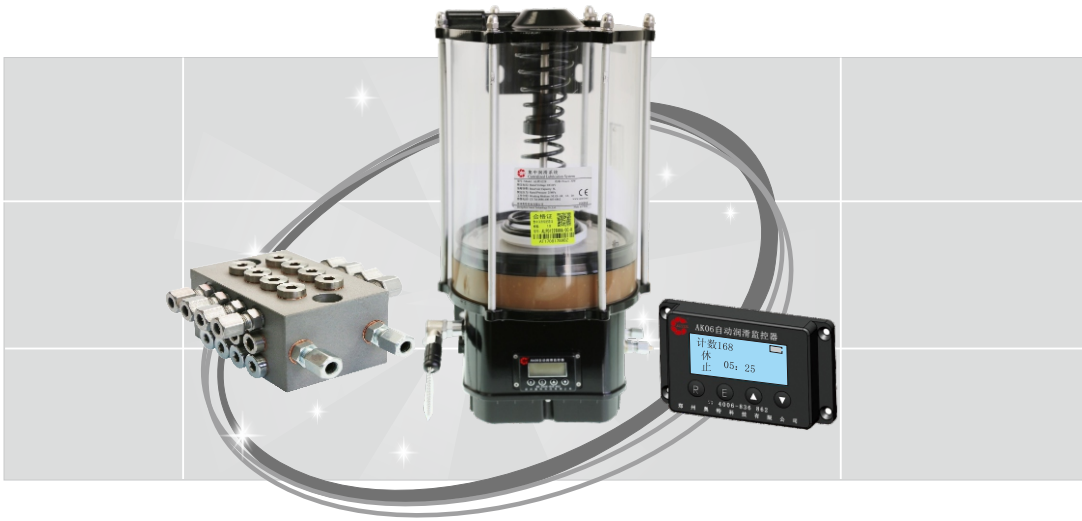
AUTOL

AUTOL 奥特

地址 /Address：郑州市高新技术开发区合欢街96号
No.96 Hehuan Rd, High–tech Zone, Zhengzhou City, China
电话 /Tel：0371–65692360
传真 /Fax：0371–65692390
邮编 /Zip Code：450001
网址 /Wed：http://www.autol.net
E–mail:sales@autol.net

AUTOL 奥特

>>> 集中润滑系统
CENTRALIZED LUBRICATION SYSTEMS



双线式集中润滑系统
使用说明书

Dual-Line Series
Centralized Lubrication System

郑州奥特科技有限公司
Zhengzhou Autol Technology CO.,LTD

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一、系统概述
System Overview

ADP100、ADP120系列集中润滑系统是奥特科技经过长期市场调研和技术创新研发的新一代集中润滑系统，在研发过程中申请了多项技术发明和技术创新专利。ADP100、ADP120系列集中润滑系统是根据设备润滑部位的需求定时、定量的对设备的各个润滑部位进行供油作业。定时、定量对润滑部位进行供油润滑可以减小摩擦阻力、减少接触磨损、降低摩擦表面温度，同时还可以起到一定的防锈、减震和密封作用，适用于风力发电、工程机械和重型机械等行业。

The ADP100 and ADP120 series of centralized lubrication system are the new generation of centralized lubrication systems developed by Zhengzhou Autol Technology Co., Ltd. through long-term market investigation and technical innovation. During the research and development, we applied for a number of technical inventions and technological innovation patents for them. The ADP100 and ADP120 series of centralized lubrication system are used to supply grease for lube points on the equipment at fixed amount at fixed time based on the demand of them. Supplying grease to the lube points at fixed amount at fixed time may reduce frictional resistance, contact wear, frictional surface temperature and for auxiliary functions of anti-rust, anti-pollution, vibration reduction, sealing, etc.

二、系统结构与工作原理
Structure and Operating Princilpe of System

ADP100/ADP120集中润滑系统由润滑泵、分配器、监控单元及附件组成。润滑泵通过管道输送润滑脂到分配器，经过分配器在向各润滑部位进行定量供油，以确保各润滑部位润滑良好。监控单元控制润滑泵的运行及检测集中润滑系统的运行状况。

The ADP100 / ADP120 centralized lubrication system consists of grease pump, distributor, monitoring unit and accessories. The grease pump delivers grease to the distributor through the pipeline and then to lube points at fixed amount to ensure that all the lube points are well lubricated. The monitoring unit controls the operation of the grease pump and detects the operating conditions of the centralized lubrication system.

润滑泵配备不同的分配器可以形成不同形式的集中润滑系统。润滑泵配备双线分配器可以形成双线式集中润滑系统；润滑泵配备双线分配器和递进分配器可以形成双线递进式润滑系统。

The grease pump is equipped with different distributors to form different centralized lubrication systems. The grease pump is fitted with dual-line distributors to form a dual-line centralized lubrication system. The grease pump is equipped with dual-line distributors and progressive distributors to form a dual-line progressive lubrication system.

2.1 双线式集中润滑系统
dual-line Centralized Lubrication System

双线式集中润滑系统有多种连接方式可以根据实际需求来定，双线分配器之间可以采用串联、并联及串并混合使用等连接方式。双线分配器末端设置有油压传感器用来检测双线式集中润滑系统的运行状态。

A dual-line centralized lubrication system has many kinds of connection depending on actual demands. The dual-line distributors many be connected in series, parallel, or series-parallel way. A grease sensor is provided at the end of the dual-line distributor to detect the operating conditions of the dual-line centralized lubrication system.

2.1.1 系统组成
System components

双线式集中润滑系统主要由双线泵、双线分配器、油压传感器、监控器及附件等组成。

A dual-line centralized lubrication system consists of dual-line pump, dual-line distributor, grease pressure sensor, monitors and accessories.

2.1.2 工作原理
Operating principle

双线式集中润滑系统工作原理：双线泵运行工作，把润滑脂经过换向阀输送到润滑系统主油路中，通过主油路A到达分配器，分配器一端开始供油，当分配器末端的压力达到油压传感器设定值时，油压传感器发出信号促使双线泵换向，A主油路压力卸荷，B主油路开始供油，分配器另一端开始

供油，当分配器末端的压力达到油压传感器设定值时，油压传感器发出信号促使双线泵换向，B主油路压力卸荷，随后进入休止阶段。双线式润滑系统完成了一个完整的润滑周期并进入下一个循环。在双线式润滑系统运行过程中如果主油路中的压力升高到溢流阀的开启压力时，此后主油路压力保持在溢流阀的开启压力且多余的润滑脂经溢流阀溢流回到油箱，系统压力保持在溢流阀设定的压力值。

The operating principle of a dual-line centralized lubrication system is described as follows: During operation of the dual-line pump, the grease is delivered to the supply line of the lubrication system via the reversing valve. Through the main supply line, the grease is supplied to the distributor A and one end of the distributor starts to supply. When the pressure at the end of the distributor reaches up to the setpoint of the pressure sensor, the sensor sends signal to make the dual-line pump be reversed. Now, the pressure in the supply line A is relieved and the grease is supplied from the supply line B and then from the other end of the distributor. When the pressure at the end of the distributor reaches up to the setpoint of the pressure sensor, the sensor sends signal to make the dual-line pump be reversed, and, the pressure in the supply line B is relieved. Then, it enters into the "OFF" state. Now, one lubrication cycle of the dual-line lubrication system is finished and the next lubrication cycle begins. During operation of the dual-line lubrication system, if the pressure in the supply line rises to the safety valve opening pressure, afterwards the pressure in the supply line remains under the safety valve opening pressure and excessive grease will return to the grease tank via the overflow valve. Thus, the system pressure remains under the pressure value set for the overflow valve.

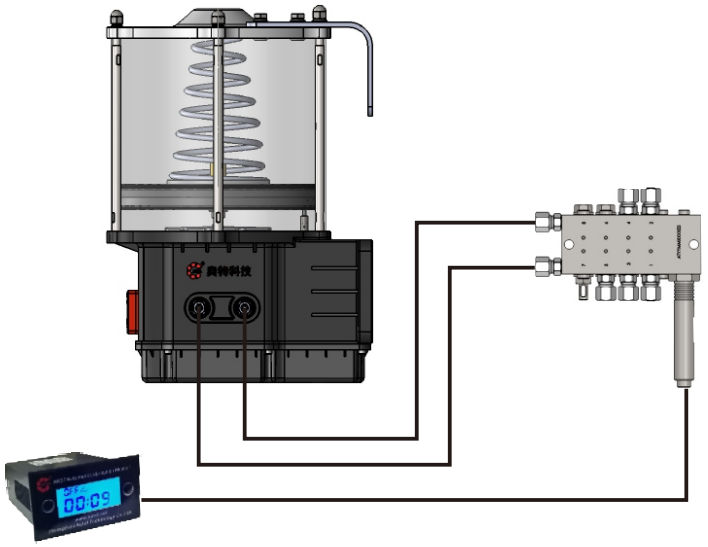


图1 双线式集中润滑系统
Figure 1 Dual–line Centralized Lubrication System

2.2 双线递进式润滑系统
Dual-line Progressive Centralized Lubrication System

双线泵配备双线分配器和递进分配器进行扩展形成双线递进润滑系统，拓展双线式集中润滑系统的使用范围。双线分配器末端设置有油压传感器用来检测双线分配器的运行状况，递进分配器末端装配有柱塞探测器来监控递进分配器的运行状况，通过油压传感器和柱塞探测器来监控整个双线递进润滑系统的运行状况。

The dual-line pump is equipped with dual-line distributors and a progressive distributors to form a dual-line progressive lubrication system to expanding the range of application for the dual-line centralized lubrication system. A grease pressure sensor is provided at the end of the dual-line distributor to detect the operation of the distributor. The end of the progressive distributor is equipped with a plunger detector to monitor the operating conditions of the progressive distributor. The operating conditions of the whole dual-line progressive lubrication system may be controlled and monitored with grease pressure sensor and plunger detector.

2.2.1 系统组成
System components

双线递进式集中润滑系统主要由双线泵、双线分配器、递进分配器、油压传感器、柱塞探测器、监控器和管路及附件等组成。

A dual-line progressive lubrication system consists of dual-line pump, dual-line distributor, progressive distributor, grease pressure sensor, plunger detector, monitor, piping system and accessories.

2.2.2 工作原理
Operating principle

双线递进集中润滑系统工作原理：接通电源双线泵运行工作，把润滑脂输送到双线分配器，经过双线分配器分配油脂进入递进分配器，递进分配器再把润滑脂输送到润滑点。双线分配器末端的油压传感器用来控制双线泵的换向工作，且检测双线分配器的运行状况；递进分配器末端装配有柱塞探测器来监控递进分配器的运行状况。在双线递进润滑系统运行过程中如果主油路中的压力升高到溢流阀的开启压力时，此后主油路压力保持在溢流阀的

开启压力且多余的润滑脂经溢流阀溢流回到油箱，系统压力保持在溢流阀设定的压力值。

The operating principle of a dual-line progressive centralized lubrication system is described as follows: Switch on the power supply and the dual-line pump starts to deliver the grease to the dual-line distributor and the distributed to then progressive distributor and finally to the lube points. The grease pressure sensor at the end of the dual-line distributor is used to control the reversing of the dual-line pump and detect the operating conditions of the dual-line distributor. At the end of the progressive distributor, a plunger detector is equipped to monitor the operating conditions of the progressive distributor . During operation of the dual-line progressive lubrication system, when the pressure in the supply line rises to the opening pressure of the overflow valve, afterwards the pressure in the supply line remains under the overflow valve opening pressure and excessive grease will return to the grease tank via the overflow valve. Thus, the system pressure remains under the pressure value set for the overflow valve.

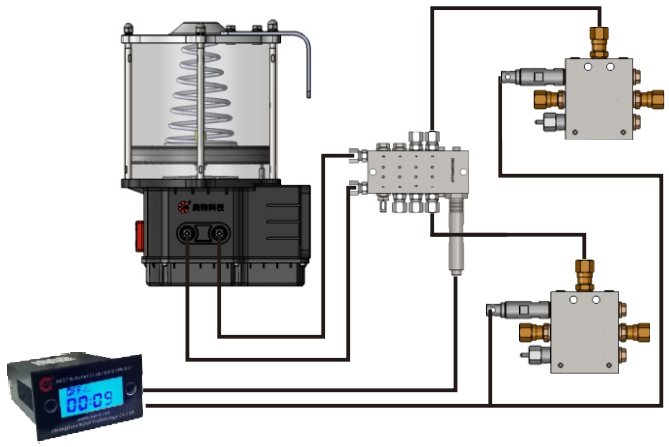
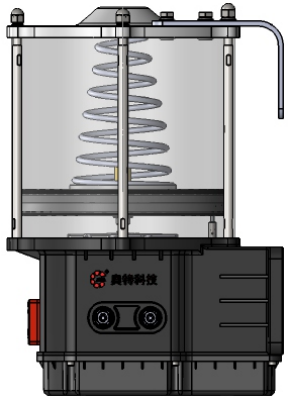


图2 双线递进式集中润滑系统
Figure 2 dual-line Progressive Centralized Lubrication

三、各部件结构和工作原理
Component Structure and Operating Principle

3.1 双线泵
dual-line Pump

3.1.1 润滑泵结构
Structure of dual-line pump



ADP100/ADP120系列润滑泵为高压柱塞润滑泵，采用内置溢流阀和机械换向阀，不仅使润滑泵外观简洁美观，而且可以解决溢流阀密封问题。

The ADP100/ADP120 series grease pumps are high-pressure plunger grease pumps. Built-in relief valve and mechanical reversing valve allow simple appearance of the grease pump and ensures normal sealing performance of the overflow valve.

3.1.2 技术参数
Technical parameters

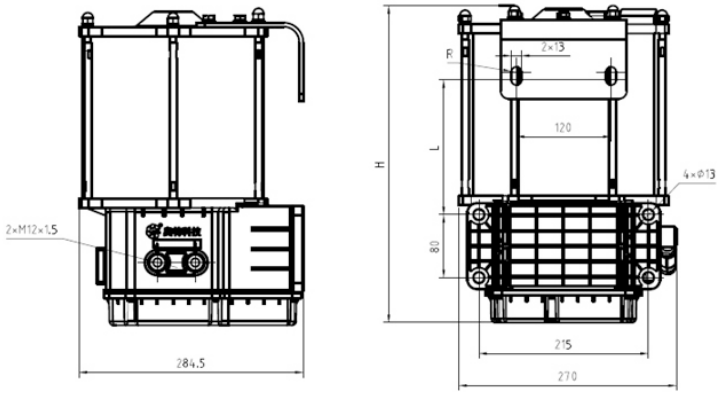
公称压力/Nominal pressure：25MPa
最高压力/Maximum pressure：30MPa
额定流量/Rated flow：12mL/min
额定电压/Rated voltage：DC24V/AC220V
适用油脂/Grease available：NLGI– 0#、1#、2#
防护等级/Degree or protection：IP65
工作温度/Working temperature：–40℃ ~ 75℃
润滑泵带有低液位报警功能和故障报警功能。
The grease pump is designed with alarm functions of low level and fault.

3.1.3 工作原理
Operating principle

双线润滑泵工作原理：电机启动运转带动柱塞副从油箱内吸油并把吸取的润滑脂送到换向阀内，经过换向阀进入润滑系统主油路中，润滑系统中另一主油路的润滑脂进过换向阀进入油箱内卸荷。当双线泵运行的时间达到监控器所设定的时间时，换向阀进行换向，双线泵向另外油路供油，而另一条主油路的润滑脂流回油箱卸荷。当双线泵运转到监控器设定的时间后，双线泵进入休止状态。达到设定的休止时间以后，双线泵完成了一个完整的润滑周期并进入下一个循环。在双线泵运转过程中如果主油路中的压力升高到溢流阀的开启压力时，此后主油路压力保持在溢流阀的开启压力且多余的润滑脂经溢流阀溢流回到油箱，系统压力保持在溢流阀设定的压力值。

The operating principle of a dual-line grease pump is described as follows: The motor starts to drive the plunger pair to suck the grease from the grease tank and delivered it to the reversing valve and then to the supply line of the lubrication system. The grease in another supply line of the lubrication system is flows into the grease tank for unloading. When the operating hours reaches up to the time set by the monitor, the reversing valve is reversed and the dual-line pump supplies grease to the other grease line while the grease in another supply line returns to the grease tank for unloading. When the operating hours of the dual-line pump reach up to the time set by the monitor, it is enters into the "OFF" state. After the set “OFF” time has elapsed, the dual-line pump has finished a complete lubrication cycle and enters into the next cycle. During operation of the dual-line pump, if the pressure in the supply line rises to the opening pressure of the overflow valve, afterwards the pressure in the supply line remains under the overflow valve opening pressure and excessive grease will return to the grease tank via the overflow valve. Thus, the system pressure remains under the pressure value set for the overflow valve.

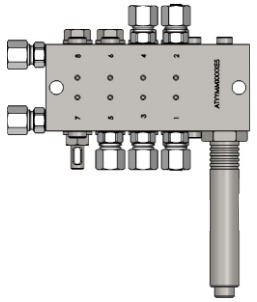
3.1.4 安装尺寸
Dimensions of installation



油箱容积 Capacity of grease tank	4L	8L	10L
H (mm)	402	507	571
L (mm)	164.5	269.5	333.5

3.2 双线分配器
Dual-line distributor

3.2.1 技术参数
Technical parameters



公称排量/Nominal displacement：2 -16mL/cy

公称压力/Nominal pressure：25MPa

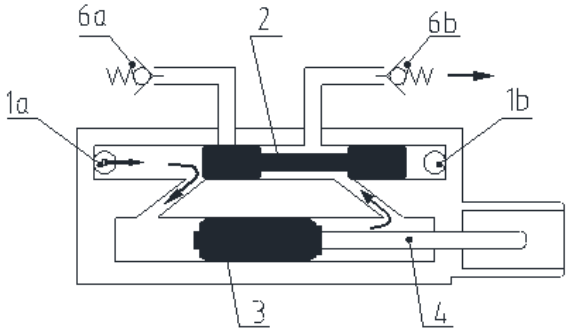
最高压力/Maximum pressure：30MPa

适用油脂/Grease available：NLGI- 0#、1#、2#

3.2.2工作原理
Operating principle

双线分配器有两个管路A、B对应的进油口1a、1b，当其中一个由润滑泵供油时，另一个则向贮油器（油箱）开放。

The dual-line distributor has two inlets 1a, 1b respectively corresponding to lines A and B. If one of them is supplied from the grease pump, another is opened for the reservoir (tank).



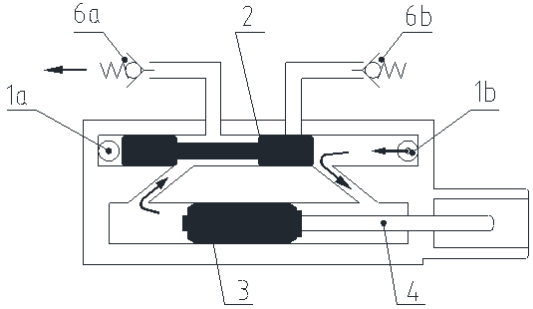
图一/Figure 1

阶段一

如图一所示，由泵压送来的润滑脂，经供油管1a输送至双线分配器，进入控制活塞2左端加压，将控制活塞2推向右侧，此时右侧与供油管1b连通卸荷。随着控制活塞2的右移，使计量活塞3左腔室与控制活塞左腔室连通，计量活塞右腔与出油口连通，供送的润滑剂进入计量活塞左腔，推动计量活塞右移，将其右腔的润滑剂经排油管6b压送到润滑点，完成第一阶段的给油动作。

As shown in Figure 1, the grease from the pump is delivered to the dual-line distributor via the supply line 1a, and then pressurized at the left end of the control piston 2 to push the control piston 2 towards the right. Now, the right side is connected to the supply line 1b for unloading. With the control piston 2 moved right, the left chamber of the metering

piston 3 is connected to the left chamber of the control piston and the right chamber of the metering piston to the outlet. The supplied grease enters the left chamber of the metering piston to move the metering piston right so that the grease in the right chamber is delivered to the lube points via the discharge line 6b. Now, the grease supply in Stage 1 has been finished.



图二/Figure 2

阶段二

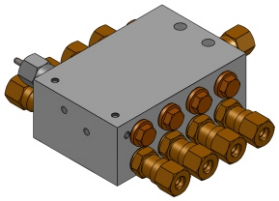
如图二所示，泵送润滑脂切换至供油管1b供油，经供油管1b输送至双线分配器，进入控制活塞2右端加压，将控制活塞2推向左侧，此时右侧与供油管1a连通卸荷。随着控制活塞2的左移，使计量活塞3右腔室与控制活塞右腔室连通，计量活塞左腔与出油口6a连通，供送的润滑剂进入计量活塞右腔，推动计量活塞左移，将其左腔的润滑剂经排油管6a压送到润滑点，完成第二阶段的给油动作。

As shown in Figure 2, the grease is supplied to the dual-line distributor from the supply line 1b, and pressurized at the right end of the control piston 2, to push the control piston 2 left. Now, the right side of the supply line 1a for unloading. With control piston 2 moved left, the

right chamber of the metering piston 3 is connected to the right chamber of the control piston and the left chamber of the metering piston to the outlet 6a, allowing that the grease flows into the metering piston right chamber to push the metering piston to be moved left sot that the grease in the left chamber is delivered to the lube points through the discharge line 6a. Now, the grease supply in Stage 1 has been finished.

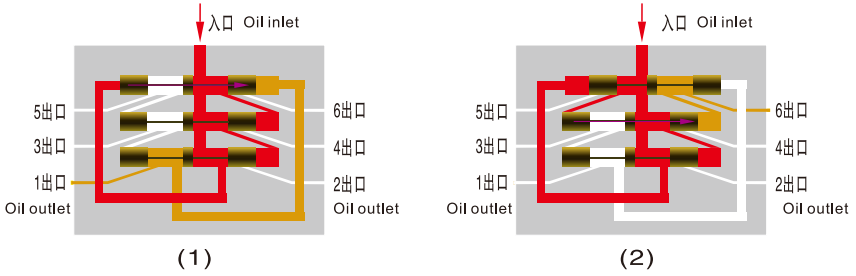
3.3 递进式分配器
Progressive Distributor

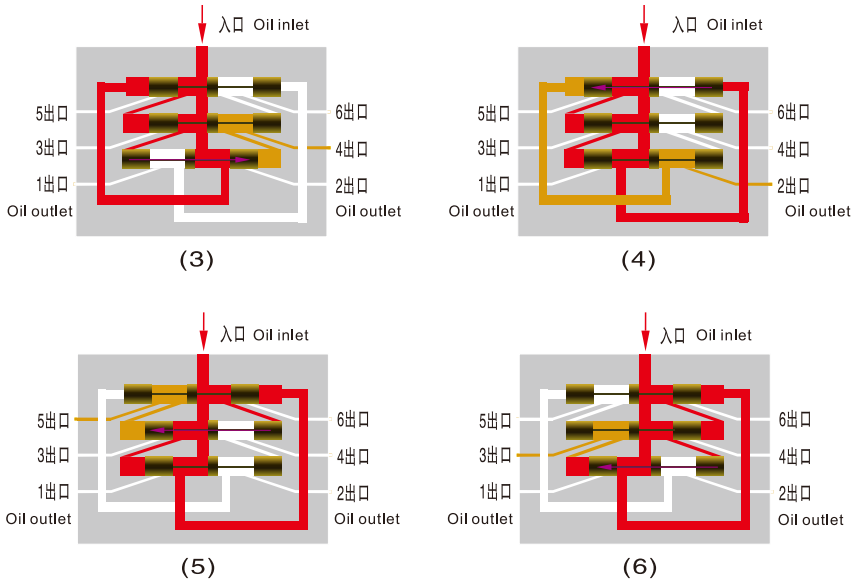
3.3.1 技术参数
Technical parameters



最高压力/Maximum pressure：30MPa；
排量/Displacement：0.2mL/cy；
工作温度/Working temperature：–40℃~70℃；
两出油口最大压差/Maximum differential pressure between two outlets：15MPa；
使用油脂/Grease available：NLGI–0#、1#、2#；

3.3.2 工作原理
Operating principle





四、安装设计和注意事项
Installation, Design and Precautions

安装前仔细阅读方案和安装调试作业指导书，严格按照方案和作业指导书的要求进行安装。

Before installation, read carefully the program and work instructions for installation and commissioning. Perform installation in strict accordance with the requirements of the program and work instructions.

4.1 润滑泵站安装注意事项
Precautions for Installation of Grease Pump

a) 严禁带电安装。

b) 安装时要保证油箱上的液位线清晰、干净。

c) 润滑泵应安装牢固，固定在环境污染少、加油维护方便、易于观察和操作的位置。

d) 安装面应平整，安装连接要可靠。

a) Do not work on live equipment.

b) During installation, ensure that the level mark on the grease tank is clear and clean.

c) The grease pump shall be firmly and reliably installed on a site with less environmental pollution, for easy filling, maintenance, observation and operation.

d) The installation plane shall be flat and the connection shall be reliable during installation.

4.2 分配器安装注意事项
Precautions for Installation of Distributor

a) 分配器要安装牢固，便于维护。

b) 安装时要分配器进出油口保持清洁、干净。

c) 分配器应尽量靠近润滑点布置。

a) The distributor shall be installed firmly and easy for maintenance.

b) Keep the inlets and outlets of the distributors clean.

c) The distributors shall be arranged as close possible to the lube points.

4.3 润滑系统管道安装注意事项
Precautions for Installation for Pipelines of Lubrication System

a) 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。

b) 安装时管道必须保持干净、清洁，无污染物。

c) 管路配管须短捷，以减少系统压力损失，确保管路畅通。

d) 管路最小弯曲半径7.9*14.3树脂管为R100，4.0*8.6树脂管为R60。

e) 管路接头连接处必须连接可靠，不得出现渗漏现象。

a) The grease pipes shall be axially cut and not to cracked, scratched, or flattened by compression.

b) For installation, keep the pipelines clean, without pollutant.

c) The pipelines must be as short as possible to reduce the pressure loss in the system and ensure that the pipelines are not be clogged.

d) The minimum bending radius shall be R100 for 7.9*14.3 resin pipes and R60 for 4.0*8.6 resin pipes.

e) The pipelines must be reliable connected to ensure no leakage.

五、系统调试
System Commissioning

5.1 润滑泵加油须知
Instructions to Filling Grease Pump

1.液位上限标签位置是根据产品容积进行设定的；

2.润滑泵首次加油时必须先进行排气作业，排气孔位置的设定是为首次加油时需要超过液位上限至排气孔位置进行排气，待空气完全排出后，活塞会自动封闭排气孔；

3.后续再次加油时，加至液位上限即可，以防止油脂溢出或异物进入油箱。

4.首次加油排气时，为使油箱内空气排净，会有少量油脂从排气孔中溢出，此属正常允许范围内，擦去清除即可。

5.后续再次加油时油箱若有空气，则与首次加油排气方式一样，将油脂加至排气孔位置，待空气排出后活塞自动封闭排气孔。

1.The MAX mark of the level is set depending on the product volume.

2.Venting operation must be performed before filling the grease pump for the first time. The vent hole is so positioned to vent when the level needs to exceed the MAX mark for the first filling operation. After the air is thoroughly removed, the piston will automatically close the vent hole.

3.It is enough to fill the pump up to the MAX mark for refilling to prevent overflowing grease or from the foreign object being entered into the grease tank.

4.For venting of filling for the first time, it is allowable that small amount of grease overflows from the vent hole to thoroughly remove air from the grease tank. In such case, you should remove the overflown grease.

5.Follow the steps of filling for the first time to vent if air presents in the grease tank when refilling. After the air is thoroughly removed, the piston will automatically close the vent hole.

5.2 系统调试
System Commissioning

1.在润滑泵接入系统之前运行润滑泵，确认润滑泵是否正常出油；

2.运行监控器，根据客户需求设定润滑周期；

3.启动润滑泵，润滑泵连续运行，观察各润滑点末端是否有润滑脂流出，如果各润滑点都有润滑脂流出则说明整个润滑系统正常运行。

4.如果部分润滑点末端未出油，拆除对应的润滑点的管路，观察分配器出油口是否有润滑脂流出；如果有润滑脂流出，则需要确认润滑管路及接头是否堵塞或泄露。如果没有润滑脂流出，则可以确认分配器存在问题，更换新的分配器再次运行直至各润滑点末端出油。

1.Before connecting the grease pump to the system, run the pump to confirm that it may normally output grease.

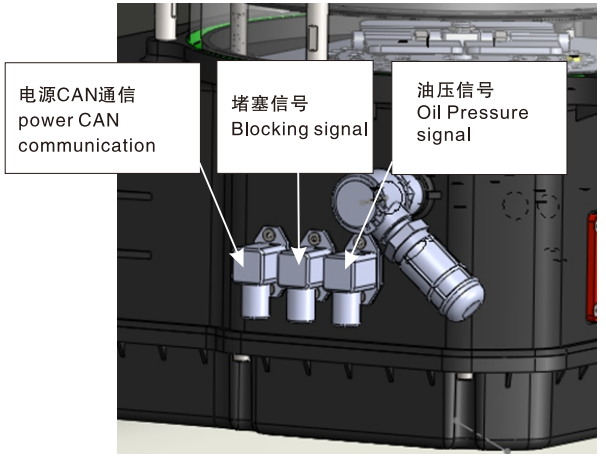
2.Run the monitor and set the lubrication interval as demanded.

3.Start to run continuously the grease pump. Observe that the grease flows from the end of the lube points. If the grease may flow from every lube point, the whole lubrication system may run normally.

4.If no grease flows out from some lube points, remove their pipelines and observe whether grease may flow out from the distributor outlet. If yes, confirm whether the lubrication pipelines and connector is clogged or leaked. If no, the distributor is faulty. In such case, replace it with a new one and re-start the system until grease may flow out from every lube point.

5.3 内置监控器操作说明
Instructions for Operation of Built-in Monitor

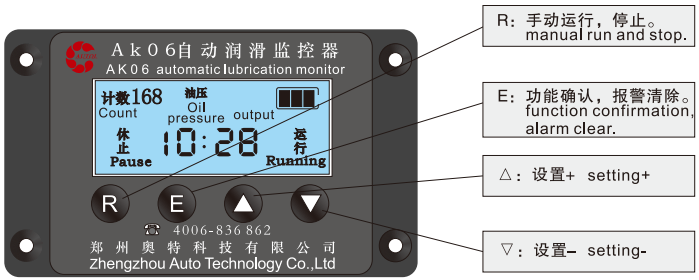
5.3.1 内置监控器接线方式
Connection of built-in monitor



内置监控器接线图/Figure Connection Diagram of Built–in Monitor

5.3.2 内置监控器操作说明
Instructions for operation of built-in monitor

（1）功能设定：
Functional setting:



内置监控器面板图/Figure View of Panel of Built–in Monitor

点按“E”进入设定界面:依次点按“E”选择设定项“1P、2P、3P、4P、5P、6P、7P、8P”，确认。

1P: 点按 "▼"或"▲"选择休止时间(1–30小时);

2P: 点按"▼"或"▲"选择电机正转时间(1–60分钟);

3P: 点按"▼"或"▲"选择电机反转时间(1–60分钟);

4P: 点按"▼"或"▲"选择温度(–50℃–0℃);

5P: 点按"▼"或"▲"选择润滑循环周期数(1–99);

6P: 点按"▼"或"▲"选择保压时间(1–60分钟);

7P: 点按"▼"或"▲"选择换向压力值(10–20MPa);

8P: 点按"▼"或"▲"选择超压报警值(16–30MPa);

点按“E”确认进入休止状态。

特别提示：

本监控器带有防误操作功能：

“和”一起按住超过4秒，按“E”可以进入设置模式。退出设置模式后自动再次锁住。

Press the "E" to enter into the setting interface and briefly press in turn the "E" to select the setting items “1P, 2P, 3P, 4P, 5P, 6P, 7P, 8P” and confirmed.

1P: 1P: Briefly press the or to select the off time (1 to 30 h);

2P: Briefly press the or to select the motor forward running time (1 to 60 min) ;

3P: 3P: Briefly press the or to select the motor reversing time (1 to 60 min) ;

4P: Briefly press the“or ”to select the temperature (-50℃ to 0℃) ;

5P: Briefly press the“or ”to select the lubrication interval (1 to 99) ;

6P: Briefly press the or to select the pressure holding time (1 to 60 min) ;

7P: Briefly press the “ or ” select the reversing pressure value (10 to 20 MPa) ;

8P: Briefly press the “ or ” to select the overpressure alarm value (16 to 30 MPa) ;

Briefly press the "E" to confirm entering into the "OFF" state.

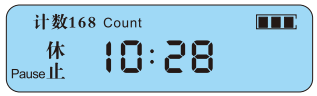
Special Attention!

This monitor is designed with function against misoperation:

Press and hold both and for 4 s and above and press the "E" to enter into the mode of setting. It is automatically relocked after exiting the mode of setting.

(2) 设置界面
Interface setting

1）休止状态
"OFF" state

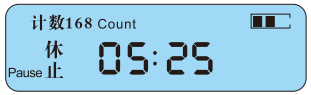


2)运行时,未检测到油压信号
On–pressure signal not detected during operation

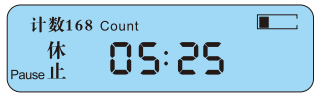
3）运行时,检测到油压信号
On–pressure signal detected during operation

4）低温待机
Low–temperature standby

5）低液位预警状态
Low level early warning status



6）低液位预警状态
Low level early warning status



7）低油位报警（产生报警，继续运行6次后停机。在注满油后自动清除报警）
Alarm due to low level (Alarm sends and the machine will be shut down after 6 consecutive operations, the alarm will be automatically acknowledged after the tank is fully filled)

8）注油量不足报警（不影响系统运行，在下一次运行正常时自动清除故障）
Alarm due to insufficient filling (It has no influence on system operation. Fault will be automatically cleared at the time of next normal operation)

9）超压报警（当润滑时检测到管路压力大于设定的8P压力值时,停止润滑报警.）
Alarm due to overpressure (If the pressures in the pipelines is greater than the set 8P pressure value, the lubrication alarm will be stopped.)

六、系统维护
System Maintenance

1.手动启动润滑泵，观察监控器运行是否正常；

2.检查所有润滑点是否有新鲜润滑脂流出；

3.检查管束固定及线束接插是否牢固；

4.润滑系统在保养维护时，所拆卸部位有组合垫、铝垫等密封元件时，重新安装必须更换新的密封件；

5.检查所有管路是否有破损、断裂现象，若有则及时修复；

6.检查油箱中剩余油量，及时补充；

7.做好维护记录。

1.Start manually the grease pump to observe that the monitor is running normally;

2.Check that fresh grease may flow out from all the lube points.

3.Check that the tube bundle is fixed and wiring harness is connected firm;

4.For maintenance and repair of the lubrication system, replace all the sealing elements such as combination gasket, aluminum gasket, etc.

5.Check that all the pipelines are not damaged or fractured. Replace them (if any).

6.Check the level of the grease tank. Re–fill it (if necessary).

7.Make good records of maintenance.

七、故障分析与排除
Troubleshooting

故障现象 Troubles	故障原因 Causes	排除方法 Remedies
润滑泵不出油 No grease flow out from the grease pump	监控器故障 Faulty monitor	更换监控器 Replace the monitor
	电机不工作 The motor does not work	检测电源和电机 Check the power supply and motor
	润滑泵抽空 Dry running of grease pump	排出空气 Vent
油压传感器无信号输出 No signal outputs from the grease pressure sensor	油压传感器损坏 Damaged grease pressure sensor	更换油压传感器 Replace the grease pressure sensor
	润滑泵溢流阀损坏 Damaged overflow valve of grease pump	更换溢流阀 Replace the overflow valve
	管路接头有泄露 Leaky pipe connector(s)	更换管路接头 Replace the pipe connector(s)
	信号线路断开 Disconnected signal line	检查信号线路 Check the signal line
部分润滑点润滑不足 Insufficient lubrication of some lube points	分配器柱塞卡滞 Distributor plunger jammed	更换分配器柱塞 Replace the distributor plunger
	配器出油口接头有渗漏油 Leaky connector of grease delivery outlet	更换接头 Replace the connector
低液位报警 Alarm due to low level	箱内油脂达到低液位下限 Tank level at MIN mark	往润滑泵内加注润滑脂 Refill the grease pump with grease

八、运输与储存
Transportation and Storage

8.1 运输
Transportation

1.装卸时．应小心轻放、不得倒置；

2.装卸和运输中，应避免和其它物品发生碰撞；

1.During loading/unloading, handle with care and do not place upside down.

2.During handling and transportation, avoid impact on the product.

8.2 储存
Storage

1)产品应储存在通风、干燥、不受阳光直射及空气中不含腐蚀性气体的库房内；

2)封闭所有开放的管路，防止灰尘、杂质进入；

3)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。包装箱和底面、墙壁要保持至少100mm以上的距离。

1.The product shall be stored in a dry well-ventilated warehouse, away from direct sunlight and free of corrosive gas.

2.All the open pipelines shall be enclosed to prevent dust and impurities from entering into it.

3.Place the products in good order and follow the marks on the package. The packing boxes are at least 100 mm from the ground and wall.

九、售后服务
After-sales Services

郑州奥特科技有限公司销售服务网点，遍布全国各地，全国各地售后服务人员80余人。

Autol's service network is distributed nationwide. We have more than 80 service technicians.

全国售后服务热线：
Service hotline nationwide:
400–683–6862