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http://baotn.com.cn/ (Chinese Website)
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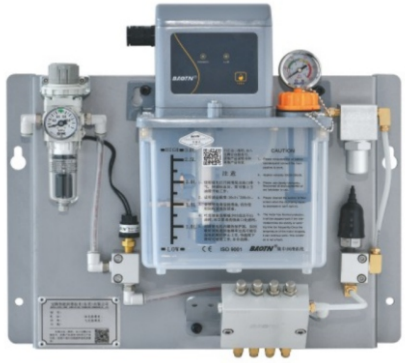
Note: The words,designs and techincal parameters are subject to change along with the development of technologies without prior notice.

Official website

WeChat official account

(Agent)

Operation manual
ETC



Honesty First, Quality Crucial

BAOTN INTELLIGENT LUBRICATION TECHNOLOGY (DONGGUAN) CO.,LTD. ISO9001

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

Introduction

Thank you for choosing the "BAOTN" brand ETC oil and air lubrication system.(BAOTN) brand centralized lubrication device series products include manual and electric oil injection machines; manual and electric grease lubrication pumps, digitally controlled gear oil injection machines, and distributors accordingly,oil-air and oil-mist lubrication system related products.Please read this manual carefully before use,correctly master the use of our company's lubrication products, and make full use of its excellent performance. Thank you for your cooperation!

●This operation manual is applicable to ETC oil and air lubrication system;

●You can get the latest version of the manual from the sales department, or obtain it through our WeChat official account;

●This operation manual contains important information required for the health and safety of equipment users. Be sure to read this manual carefully and keep it properly to ensure that it is available for operators to consult.

Ⅰ. System Overview and Product Features

1.System Overview:

oil-air lubrication is a typical application of air-liquid two-phase fluid cooling and lubrication technology. It separates the friction surfaces in relative motion by forming a air-liquid two-phase film to play a lubricating role. At the same time, due to the large--amount of air contained, the high-speed air-liquid two-phase oil and air flow can also take away a large amount of friction heat, playing a cooling role. In the air-liquid two-phase oil and air flow, the liquid and air firmly form a air-liquid two-phase film, and its formation has the dual effects of fluid dynamic pressure and fluid static pressure. Therefore, not only can a complete air-liquid two-phase film be formed at high speed, but even at low speed, a air-liquid two-phase film with a certain load-bearing capacity can still be formed, so that the friction surfaces in relative motion are always in a good working state, which makes the air-liquid two-phase fluid lubrication have excellent lubrication and friction reduction effects. oil-air lubrication meets the needs of low--carbon and environmentally friendly development of mechanical industrial equipment, and is suitable for high temperature, heavy load, high speed, extremely low speed,and harsh working conditions,and where cooling water and dirt invade the lubrication point. Especially in high-speed electric spindles,centrifuges and other occasions where bearing lubrication is required, it has obvious advantages over traditional lubrication methods.

2. Product features:

(1) Microscale, quantitative, continuous oil supply, each breath of air can be finely adjusted, and can form a stable oil film;
(2) System has a digital display to show the working status(optional);
(3) It is equipped with a low oil level alarm switch
(4) The system is equipped with an air pressure switch and an oil pressure switch to monitor the low air pressure and insufficient oil pressure in the oil-air lubrication device respectively;
(5)A variety of outlet numbers and displacements are available, and different systems can be selected according to the requirements of the lubrication points;
(6) The system's oil supply frequency can be set according to actual needs, or connected to the user system for PLC control;
(7) The oil circuit and air circuit are equipped with high-precision filtering devices, with the oil circuit filtering accuracy of 3μm and the air circuit filtering accuracy of 5μm.

Ⅱ. Production selection

ETC－□□□－□－□

Oil-air lubrication system

Control types

A	Digital display
C	PLC
O	Without controller

Input voltages

2	AC220V
9	DC24V

Oil and air outlet number

1-6	1-6Each

Gas Line Solenoid Valve

Blanks	without valve
2	AC220V
9	DC24V

Oil supply per oil outlet

1	0.01mL/Time
2	0.02mL/Time
3	0.03mL/Time
5	0.05mL/Time

Ⅲ. Technical parameters

Item / Models	Number of oil and air otulet(MPa)	one outlet discharge volume (mL/cy)	Air source pressure(MPa)	Use medium viscosity(cSt)
ETC	1-6	0.01 0.02 0.03 0.05	0.4 - 0.8	32 - 100

The oil quantity:

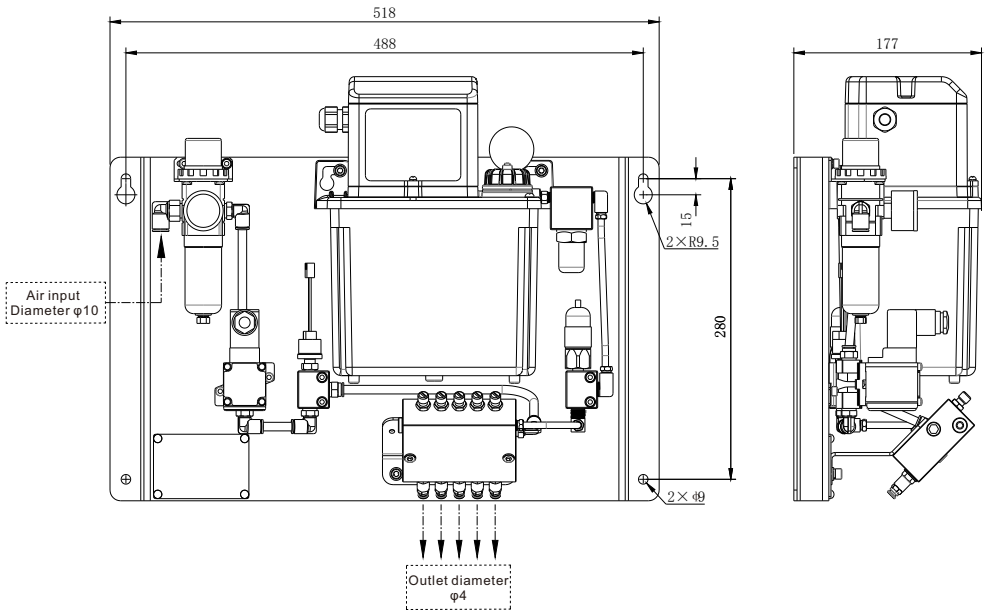
Required per unit time is determined by the corresponding equipment parameters and operating conditions.

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

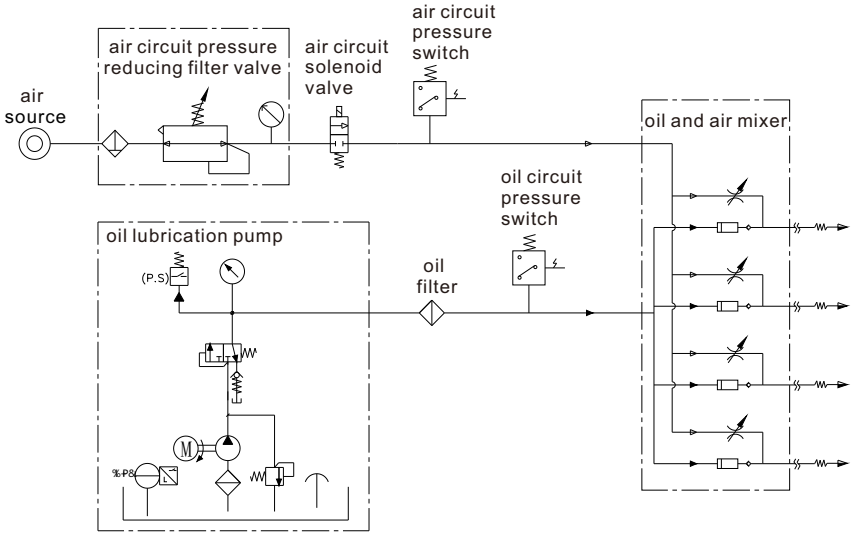
Q=lubricating oil demand (mm^3/h)
d = bearing inner diameter (mm)
l=Width of bearing (mm)
α =Coefficient (0.01 for angular contact ball bearings;
0.02 for angular contact ball bearings;
0.03 for roller bearings.)

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.

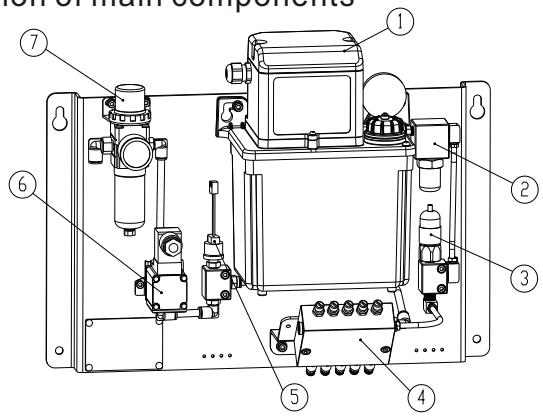
Ⅳ. Appearance and installation dimensions



V. System Schematic Diagram



VI. Introduction of main components



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.Air circuit pressure switch: normally open (NO.), opening pressure 0.4MPa;

6.Air circuit solenoid valve: normally closed (NC.), optional voltage 220V/24V;

7.Air circuit pressure reducing filter valve: filtration accuracy 5μm;

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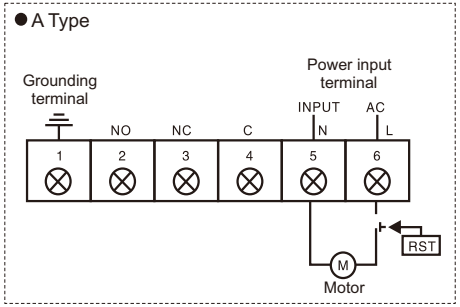
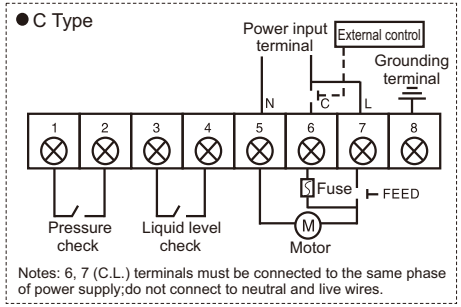
VII. Electrical wiring diagram (inside the junction box)





VIII. Controller Instructions

The soft-touch digital display microcomputer controller is a new generation of MPU time controller with double settings and double timers. It is characterized by easy setting, digital display, multiple fault alarms,high timing accuracy, and outstanding reliability.

1. The system has three action modes:
- **a.** Lubrication: When started, the system performs lubrication timing first.
- **b.** Intermission: At the end of lubrication, the system performs intermission timing.
- **c.** Memory: In case of power recovery following blackout, the system can continue the unfinishedintermission timing.

2. Lubrication time and intermission time can be set freely within the range as given below (Thesystem is provided with a button lock function to lock the set ubrication time and intermission time):

LUB lubrication time: 1~999 s;

INT intermission time: 1~999 min;

It is suggested that intermission time should be over 5 times the duration of lubrication.

3. In case of any of the following cases, alarm time blinks abnormally and gives buzzing:
- a.Erp is displayed in case of insufficient pressure.
- b.Ero is displayed in case of insufficient liquid level.

4. The panel indicator can indicate the lubrication and intermission states of system.

5. In any case, when "RST" button is pressed, the controller can start lubrication or eliminate the alarmof abnormal state in a forced way.

6.Usage of A-type soft-touch digital display microcomputer controller:

(1) Lubrication time setting: Hold down SET for 2 seconds to enter the setting state, and the digital tubedisplays the original lubrication time. Press PLUS (Up Arrow) or MINUS (Dow Arrow) until the time isset to value needed, then hold down SET for 2 seconds to enter the intermission time setting state. Inthis case, the digital tube-

-blinks and displays the original intermission time. Press PLUS or MINUS to set intermission time as needed. Hold down SET for 2 seconds for confirmation. Data are written in the memory. The digital tube displays lubrication time and intermission time as normal. In real time, the system starts working according to new time settings.
(2) Once the controller is connected to a power source of AC110V/220V, it starts working in cycles immediately according to lubrication and intermission time settings.
(3) When the system gives an abnormality alarm, pressure "RST" to recover the value to the setting,after exception handling.

IX.Installation and debugging

1.Installation

(1)Mechanical installation

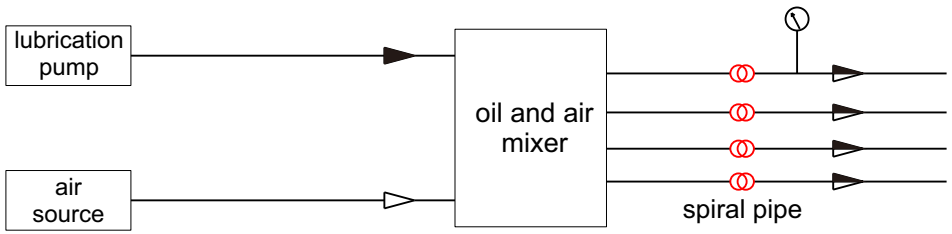
Use M8 bolts to fix the lubrication system to the equipment. Be sure to install it firmly to avoid the looseness caused by vibration. Connect all pipes and lubricate accessories correctly as required;

(2)The electrical installation

must be performed by professionally trained operators, and the power and signal lines must be correctly connected. Before connecting the power supply, be sure to confirm the voltage,incorrect wiring may cause the system to fail to operate or even be damaged.

(3)System connection

To prevent lubricant loss after the system stops, it will take a certain amount of time for the lubricant to reach the lubrication point after restarting. Generally, a section of nylon spiral pipe is added at the very end, near the lubrication point. In this way, when the oil and airsystem is turned on again, the air quickly transports the oil stored at the bottom of the spiral pipe to the lubrication point. Generally, the spiral pipe should be placed horizontally as close to the lubrication point as possible, but the distance from the lubrication point should not be less than 0.5 meters;



2.Debugging

(1) Check whether the pipeline installation and connection are correct;
(2) Fill clean lubricant through the oil filling port;
(3) Connect the correct power supply;
(4) Turn on the air source, the air source filtration accuracy is required to be 5μm, and the air pressure is adjusted to 0.4-0.8MPa;
(5) Observe whether the value of the system pressure gauge is around 3.0MPa;
(6) When using the system for the first time, open all lubrication point joints, manually add oil several times, and drain the air in the system until the lubrication point output oil, then set the lubrication pump as required. If there is a controller(timer), follow the controller instructions to set the lubrication pump.
(7) The air volume and lubrication interval time can be adjusted on site according to the needs of the lubrication point. After the adjustment is completed, fix the parameters and the system enters normal working state.

X. Maintenance and care

1.The warranty period of this product is 1 year. Please use and maintain it according to the product manual during use.
2.To ensure the normal operation of the lubrication system, be sure to use clean lubricating oil and keep the lubricating oil clean.
3.The filter at the fuel inlet must be checked every month to prevent the filter from being dirty or damaged, which may cause oil contamination in the fuel tank. If you find the filter has the above problems, please replace the filter in time;
4.Do not open the cover of the lubrication pump after it is powered on to prevent electric shock and fire accidents.
5.Filter maintenance:
This lubrication system uses a high-precision filter with a filtration accuracy of 3μm, so regular maintenance is required.
(1) Replace the filter element every year;
(2) After replacing the filter element, remove the plug at the end of the oil-air mixer to vent air to ensure that no air in the oil-air mixer to prevent abnormal oil discharge;
6.After each refueling, the machine needs to be shut down for 15 minutes to exhaust the air mixed in the oil to prevent bubbles from entering the system and causing failure of the oil-air mixer.

XI. Notes

1.Before powering on, please make sure that the voltage level meets the requirements. Wrong voltage will cause the system to complete damage to the lubrication pump and serious personal safety accidents;
2.After each replacement of the filter element, the air in the filter needs to be drained out to ensure that there are no bubbles in the pipeline;
3.The system pipeline must not be bent or crushed by heavy objects, otherwise it may cause pipeline damage and lubrication failure;
4.Always use clean lubricating oil, dirty lubricating oil may cause damage to the lubrication pump;

5.The filter screen needs to be replaced regularly every year, otherwise the filter element will be blocked, which will cause a serious decrease in filtration accuracy or insufficient fuel supply;
6.Regularly inspect the pipe joints of the system and replace them in time if any oil leakage is found;
7.Regularly inspect the electrical circuits of the lubrication system to see if they are connected properly. If any problems are found, replace and adjust them in time;
8.The lubrication system should be used as far as possible to avoid heavy dust and rain, otherwise it may cause lubrication system damage;

XII. Common faults and troubleshooting methods

S/N	Phenomenon	Reason	Troubleshooting
1	motor does not rotate	voltage is not correct	check the power supply
		wrong wiring	connect the wires in the correct way
		gear pump stuck	remove the bottom gear pumpand clean it. This must be done by professionals.
2	system pressure is too low	pressure gauge is damaged	replace the pressuregauge
		main oil pipe is leaking	check the main oil pipe to eliminate oil leakage
		When the lubrication pump is pressurized, the branch oil pipe continuously discharges oil (not cycle by cycle)	replace the faulty distributor
		The safety relief valve and pressure relief valve of the lubrication pump are not well sealed	disassemble and clean, replace damaged parts if necessary
		main oil pipe is leaking	check the main oil pipe to eliminate oil leakage
		the suction port is blocked	clean the oil tank, filter screen at the oil suction port
		the suction port is blocked	clean the oil tank, filter screen at the oil suction port

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S/N	Phenomenon	Reason	Troubleshooting
2	system pressure is too low	The air in the pump is not exhausted	repeatedly start the oil pump to see if the problem is resolved. If necessary,disassemble the oil outlet to vent air.
3	no oil output	motor does not rotate	see S/N 1
4	low oil output	The main oil pipe is clogged or leaking	clean or replace the main oil pipe
		The filter is clogged	replace the filter element
5	pressure alarm	system pressure is too low	check the pipeline pressure must reach 3.0MPa or above
		pressure switch is damaged	replace the pressure switch with a new one
6	lubrication pump with timer, motor does not rotate	The connection between the motor and the control board is loose, or the motor overheats and stops automatically	Lubrication time is less than 2 minutes, intermittent time is more than 3 minutes, and intermittent time is more than 5 times of lubrication time
7	No air coming out ofthe oil and air outlet	air circuit adjustment needle of the oiland air mixer is not turned on	turn on the air circuit adjustment needle of the oil and air mixer
		air circuit solenoid valve is not energized or damaged	power on or replace the air circuit solenoid valve
		air circuit pressure regulating filter is blocked or damaged	check and replace the air circuit pressure regulating filter
8	No oil coming out ofthe oil and air outlet	system pressure is too low	check whether the oil pump isworking properly
		oil and air mixer failure	repair by professionals
		filter is colgged	replace the filter element