A001 Ball Mill

Four nozzle Open Gear Spray

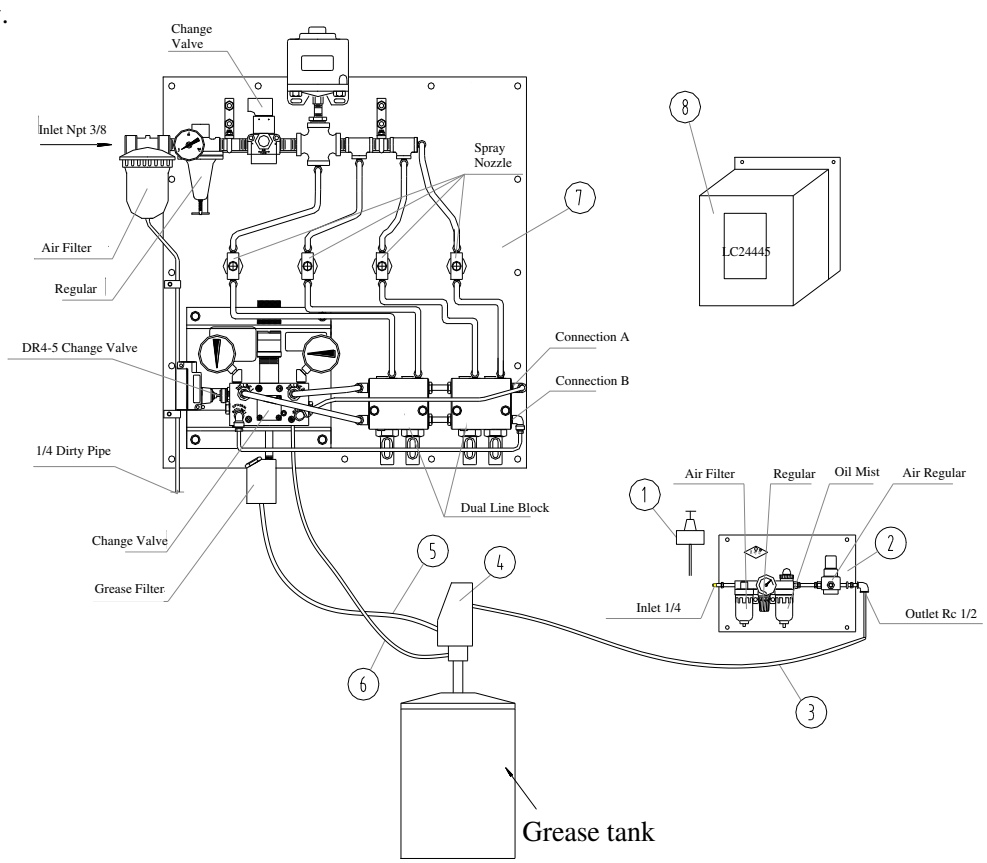
Lubrication System

Instrustion Manual

Isohitech Lubrication

Introduction

Open gear spray lubrication system can be widely used for cooling and lubricating large gears of steel, mining and power plant equipment, such as: ball mill, rod mill, rotary kiln, etc. The following figure is a typical two-line four-nozzle spray lubrication system, the system includes pneumatic lubrication pump, air source control components, multi-functional program controller, four-nozzle gear spray automatic control panel, pipeline and accessories, its main components are produced by Nanjing Eminence Technology Company.



4 Nozzle Open Gear Spray Diagram

Item	QTY	Partner Number	Description
1	1	71637& 71637-1	Air control Panel
2	1	61636	For air
3	1	8120	Air Grease Pump(50kg)
4	1	51634	Outlet
5	1	31635	Return Pipe
6	1	LD65098-4 或 LD65098-4A	Spray Nozzle Control Panel
7	1	LC24445	Controller

1．Open Gear Grease Spray System Working Procedure

A.The controller opens the two solenoid valves A and B, and the pneumatic pump starts to work. A fixed amount of grease is delivered from the double line distributor to the nozzle, and the grease and compressed air are atomized in the nozzle and sprayed to the gear surface.

B.When the two-line distributor operates once, the system pressure starts to rise to the set value and the reversing valve reverses direction.

C.When the reversing valve limit switch works, the solenoid valve A of the pump is closed, but the solenoid valve B of the nozzle air circuit is closed with a lag, blowing the residual grease on the nozzle.

D.The system pressure is unloaded to the pump through the reversing valve and another oil line is connected to the pump to build up the pressure in the next working cycle of the pump and repeat the above steps.

2.Parameter

Gear Width：538mm（ 20.18”）

Lubricant： NLGI000#—1#

Air Requirement：0.4—0.8Mpa

Power Requirement：220VAC/50HZ

3．Start-up procedure:

1．LC24445 Controller Setting

Isohitech Lubrication has pre-set the following control program before the LC24445 controller leaves the factory, but it should be noted that the pre-set program steps are for reference only. They should be adjusted in the field according to the actual situation.

Pre-set program：

System=2 Dual Line

Change Valve=1 Hydraulic

Spray System=Yes

Spay Time=5S（0：05）

Cycle Type=2 Half Cycle

Stop Type=1 Time Mode

Stop Time=5M (00：00：05：00)(Becareful)

Witness Time=30S (00：00：30)

Pre Lubrication=1 Yes

Lubrication Longer=1 Yes

Pump Power=1 Continue

Start Lubrication=1

Note: The standby time will gradually increase to 15 minutes as the amount of lubricant on the gear surface gradually increases.
clock. The maximum standby time is 20 minutes to ensure sufficient lubricant is available on the gear surface.

2 . Inject low viscosity lubricant (L-AN10) into the oil misters.

3. Inject lubricant (grease) into each of the two oil supply tubes according to the following procedure.

A.Loosen the connector A on the last two-wire distributor at the end of the first supply tube;

B.Press the controller "Manual/Reset" button to start the pneumatic oil pump;

C.Purge all air from the system until the last dispenser at the end is out of oil (no bubbles or foam);

d. Power off, the pump stops working;
e. Tighten the connector A;
f. Power on, start the pneumatic oil pump, gradually build up the pressure and push the reversing valve to work normally; g. Loosen the last distributor connector B at the end of the second oil supply pipe; h. Turn on the power;
g. Loosen the connector B of the last distributor at the end of the second oil supply pipe;
h. Repeat steps b, c, d, e, and f above to fill the second line with grease;
4. Adjust the gas regulator of the pump so that the pressure of the system reaches 12. 6MPa.
5. Set the pressure of the reversing valve at 10.5MPa.
6. Set the air pressure of the nozzle at 0.42-0.56MPa until the best atomization effect is achieved.
7. After the air in the pipeline is exhausted, operate the pump for a number of cycles until all nozzles produce oil normally and there is an oil film on the gear surface.
8. Before starting the equipment, apply grease on the gear wheel teeth surface in advance.

4. Air Requirement

The air consumption Va (m3) per lubrication cycle can be calculated by the following formula. Theoretically, it is twice the amount of pump and nozzle air.

Va（CBM/Cycle）$=2V_1(T_1+T_2)+2V_2(T_1+T_2+T_3)$

V1=Pump need Air

V2=Nozzle Consumption Air（CBM/M）（Drawing 2）

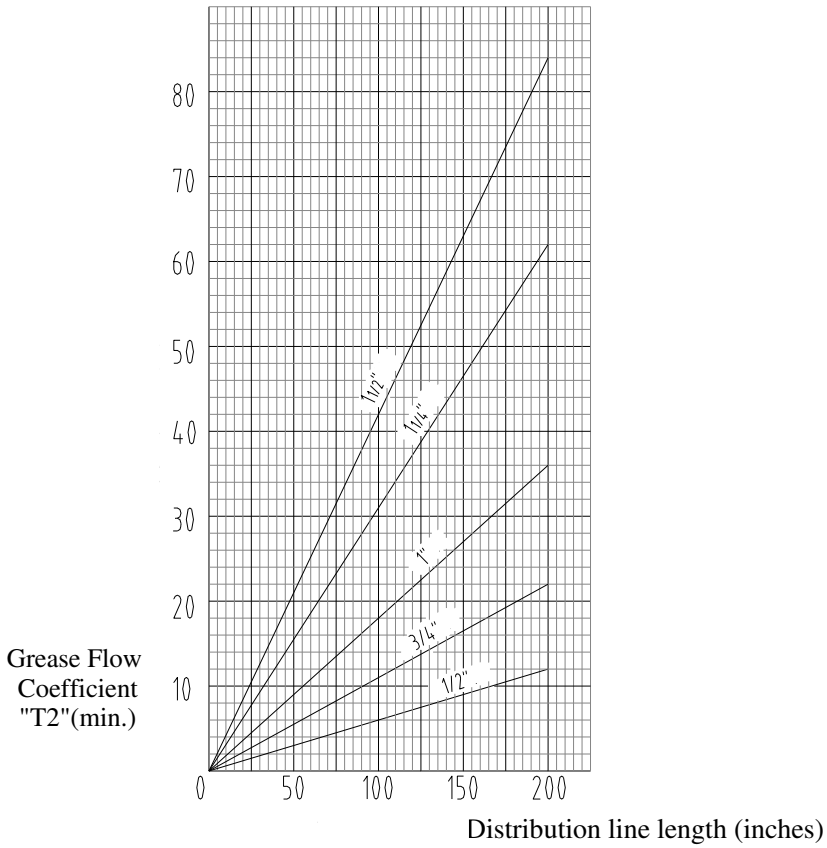
T1=Grease flow coefficient in the pipeline（Min.）（Drawing3）

T2=Nozzle discharge time of lubricant（Min）（Drawing 2）

T3=After the pump stops working, the time to blow back the nozzle (0.5 minutes)

Nozzle QTY	T_2(M ins)		V_2 (CBM /M ins)
	B5X Nozzle	B6X Nozzle	
1	.005	.015	0.382
2	.010	.030	0.764
3	.015	.045	1.147
4	.020	.060	1.529
5	.025	.075	1.911
6	.030	.090	2.294
7	.035	.105	2.676

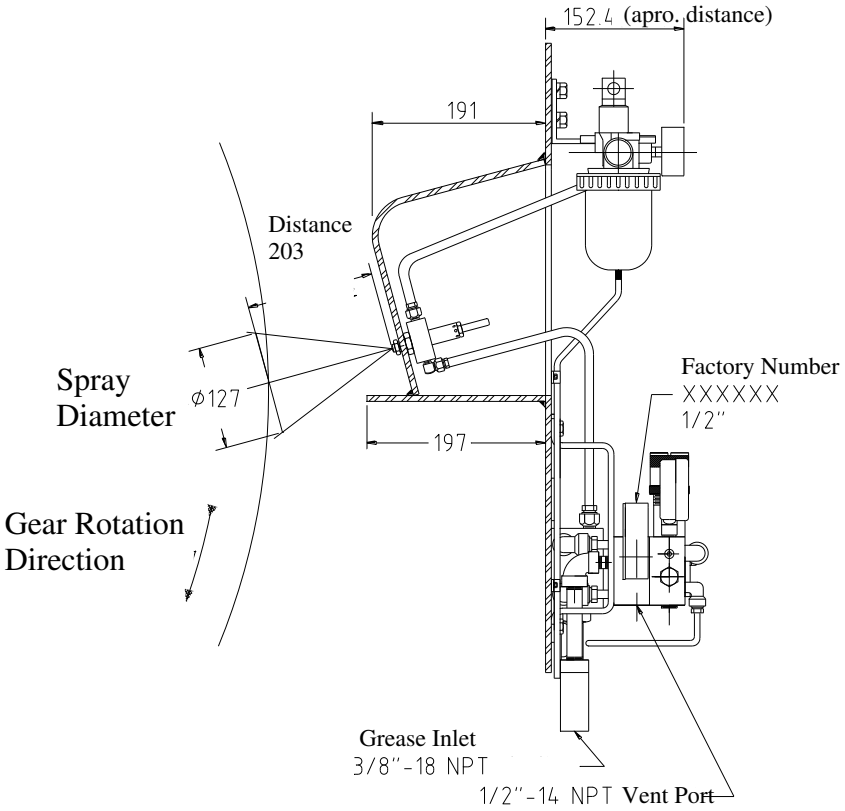
Dawing 2 T2 & V2



Drawing 3 Lubricating Grease Flow Coefficient T1

5. Installment

The installation schematic is as follows:



1. In most cases, the pump is close to the valve block. In this type of application, both air and oil lines use hoses, which should be of sufficient length to ensure that the pump can move when the oil drum is replaced;

2. clean the inside of the pipeline of impurities before installing the pipeline;

3. use sealant and filler at each pipeline connection to ensure reliable connection;

4. the mounting base of the four-nozzle gear spray automatic control panel is provided by the user;

5. lubricant, high quality open gear grease must have pumpability, grease in low temperature without heating should be able to spray from the nozzle. When choosing the grease grade, should take into account the lowest possible ambient temperature, grease still has pumpability.

6. Maintenance

1. If too much water accumulates in the pneumatic triplex and is not emptied in time, it will make the filter fail and enter the oil pump, affecting the normal work of the oil pump and system.

2. Make sure there is enough lubricating grease in the oil drum. If the oil is pumped in the empty drum, there will be gas into the system, and it is not easy to establish the system pressure.

3. Clean lubricating grease must be used. Otherwise the dirt mixed in the grease will block the distribution valve block and nozzle, and easy to make the pneumatic pump malfunction.

4. Make sure the grease filter is clean. The grease filter is at the inlet part of the reversing valve and should be cleaned regularly.

5. Check the whole system regularly, including the hose (if broken, it must be replaced), the joint (whether it is tightened), the gear (whether it is fully lubricated), and when the system is working, put a cardboard near the nozzle to check the nozzle.
When the system is working, put a cardboard near the nozzle and check the form and effect of oil spray from the nozzle to ensure that the gear surface is completely lubricated.
Note: The ball mill must be stopped when checking the spraying effect of the nozzle.

6. Thoroughly clean the system once or twice a year to prolong the service life of the system.

7. Common failure analysis:

Failure	Reason	Solution
1．Pump can't work	The supplied air does not meet the requirements	Adjust the gas source pressure to 0.2-0.3MPa to increase the air pressure supplied to the pump.
	Solenoid valve not working	Check the wiring of the controller according to its manual, and whether the program is set correctly.
	Hardening of grease in the container	Use small containers - As the thinner added to the grease evaporates, the grease will gradually harden.
2．Pump working but no pressure	Directional valve does not operate	Check and reinstall the oil supply line. Clear the air out of the lines.
	Pipe breakage	Repair or replacement
	Air in the system	Purge air our of lines and valves as described in the start-up procedure.
3．Double line distribution valve indicator lever does not work	No Pressure	Reference 2th
	Directional valve not working properly	Install two 3/8" pipe plugs on the directional valve outlet to quickly check the condition of the directional valve. Start the pneumatic drum pump and observe if the reversing valve can change direction properly. Clean the grease filter under the valve body every 6 months.
	Debris inside the Dual line distribution valve	Remove the internal plunger, clean the bore and plunger with solvent, and reassemble.
	There is a blockage in the pipeline	Find the blockage, remove the line and blow it clean with a clean air source, or replace the damaged area.