DAIKIN

CAT.25E

CENTRALIZED LUBRICATING SYSTEM

LUBMAX

Single Line

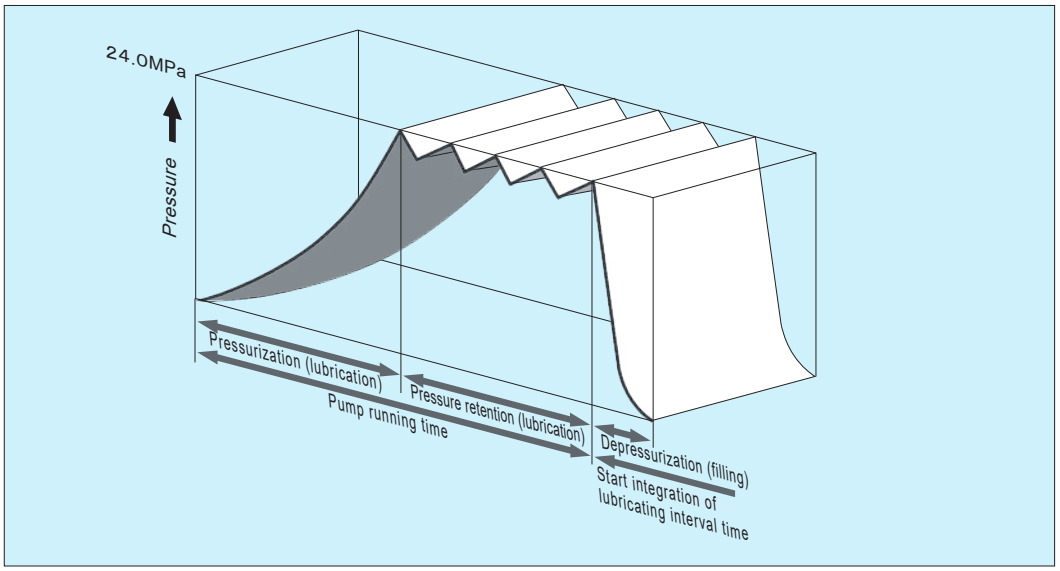
Daikin Single-pipe Parallel Lubricating System

DAIKIN LUBRICATION PRODUCTS & ENGINEERING CO., LTD.

Single-pipe Parallel Lubricating System LUBMAX

Features

- **Single-pipe Parallel Lubricating System**
  Easily configured system with very simple piping that connects the pump to the distributing valves by a single main supply line.
- **Ensure accurate reliable lubrication cycle**
  (Pressurization - lubrication - pressure retention - depressurization)
- **Distributing valves with adjustable lubrication quantity**
  Adoption of a grease cartridge enables grease to be replaced easily by one-touch operation.
  A wide range of lubrication conditions can be set by the exclusive controller.

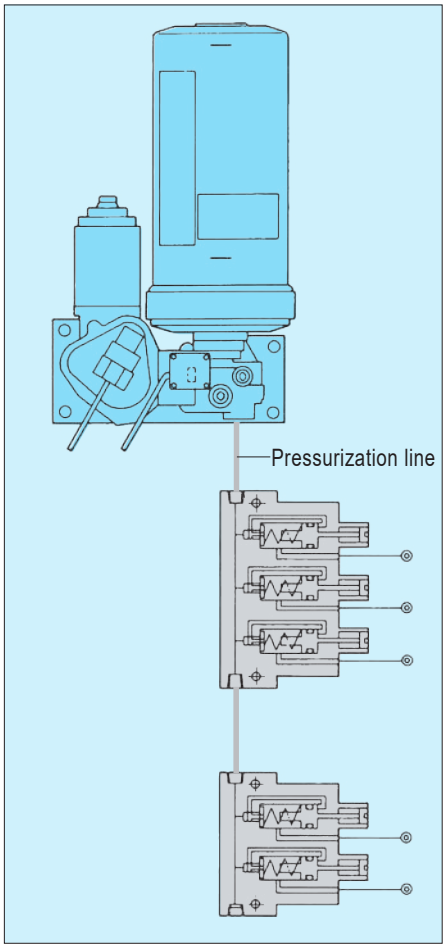


■ Applications

Power shovel

Wheel loader

■ Basic circuit



■ System specifications

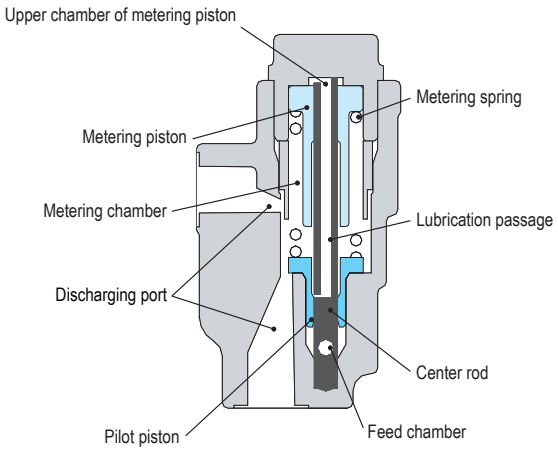
System pressure (MPa)	Operating temperature range (℃)	Grease used	Vibration resistance (MAX) (G)		
			Pump	Controller	Distributing valve
24.0	−20～60	NLGI consistency #0 to #2 (lithium-based)	8.9	8.9	15

∗ Excluding some products

■ Distributing valve operation

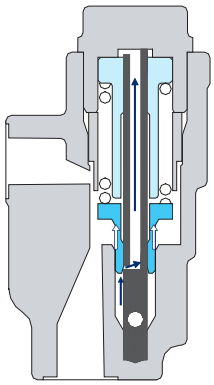
STEP 1

This is the standby state position without pressurization from the pump.



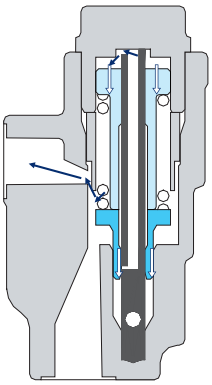
STEP 2

The feed chamber is pressurized by pump operation to push the pilot piston, and grease passes through the pilot passage to be transferred to the metering piston right chamber.



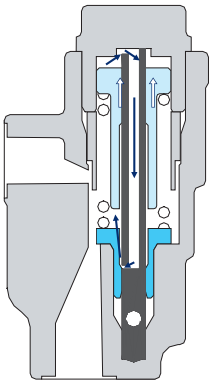
STEP 3

① The metering piston is pushed to discharge the grease in the metering chamber.
② Further, the metering piston moves downward, the pilot piston is pushed back, the feed chamber and the pilot passage are closed, and the discharge is completed.



STEP 4

When the pressure is released by the movement of the pilot piston, the metering piston is returned to the upper side by the force of the spring.
At this time, the grease in the upper chamber of the metering piston is transferred to the inside of the metering chamber from the groove at the spring receiving end.
When the pump is stopped, the pilot piston is pushed back downward, the pilot passage is released to the metering chamber, and the metering piston is pushed back upward to return to the standby state.



Pump

Amazing power of 24MPa

LD, LM

LUBMAX pumps are compact design high-pressure piston pumps with depressurization mechanism, pressure detection function, and integrated grease tank.

Features

- There are two types of tank structures: cartridge type and follower plate type. In particular, the cartridge type prevents dust and foreign matters from entering when replenishing grease, and grease can be replaced in a short time keeping your hands clean.

Explanation of Model Symbols (example)

LD 10 C P — ※※

Design No.	
Power source	P:24V DC B:200/220V AC 50/60Hz
Tank type	C:Cartridge type F:Foller plate type
Tank size	04:400cm 05:500cm^3(Type C) 800cm^3(Type F) 10:1,000cm^3(Type C) 1,600cm^3(Type F)
Basic model	LD:Motor driven pump LM:Manually operated pump

Specifications

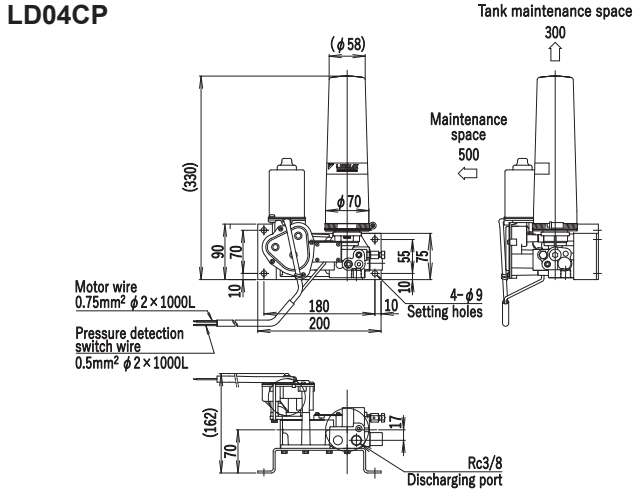
∗ Consult with us for a unit for oil.

Model		LD04CP	LD10CP LD05CP	LD10FP LD05FP	LD04CB	LD10CB LD05CB	LD10FB LD05FB	LM04C	LM05F
Max. operating pressure (MPa)		24	24	24	17	17	17	24	24
Discharging quantity (cm^3/min or cm^3/st)		12	12	12	8.3 (50Hz) 10 (60Hz)	8.3 (50Hz) 10 (60Hz)	8.3 (50Hz) 10 (60Hz)	0.6	0.6
Tank specifi -cation	Cartridge type (cm^3)	400	1,000 / 500	—	400	1,000 / 500	—	400	—
	Follower plate type (cm^3)	—	—	1,600 / 800	—	—	1,600 / 800	—	500
Operating temperature range (℃)		-5~50	-20~60	-20~60	-5~50	-5~50	-5~50	No.0: 0~60 No.1: 5~50	-20~60
Vibration durability (MAX) (G)		3	8.9	8.9	3	3	3	3	8.9
Consistency number of grease used		0~2	0~2	0~2	0~2	0~2	0~2	0~2	0~2
Rated current value (A)		3.5	3.5	3.5	0.30 / 0.26	0.30 / 0.26	0.30 / 0.26	—	—
Voltage		24V DC	24V DC	24V DC	200/220V AC	200/220V AC	200/220V AC	—	—
Protection type		Drip-proof	Drip-proof	Drip-proof	Drip-proof	Drip-proof	Drip-proof	Drip-proof	Drip-proof

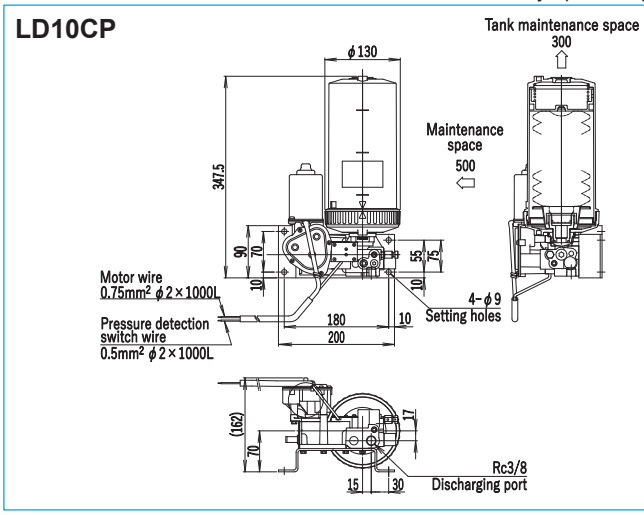
Dimension drawings (LD:Motor driven pump)

∗ Consult with us for the model LM:Mannually operated pumps.

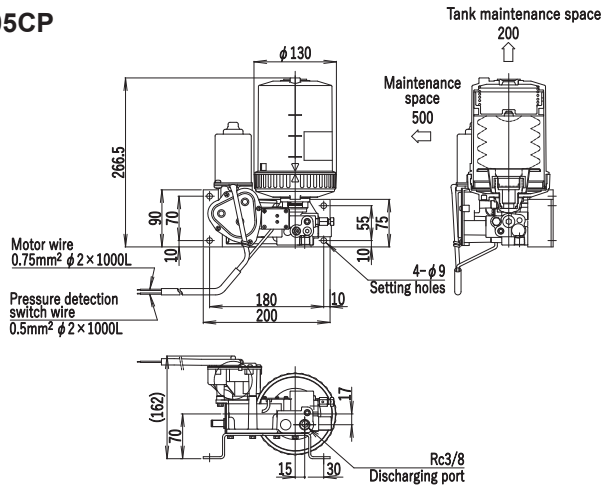
LD04CP



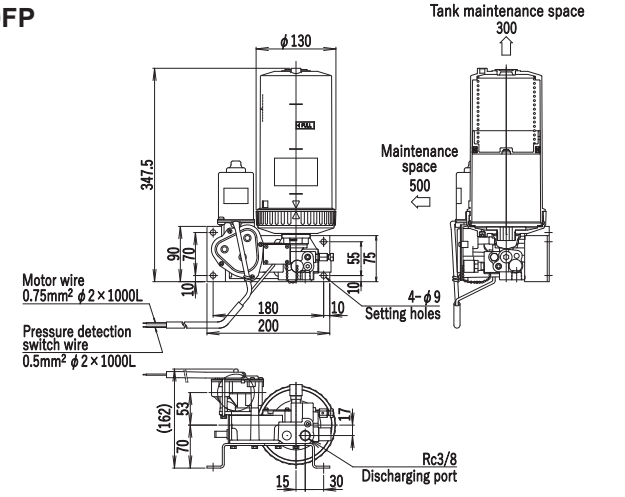
LD10CP



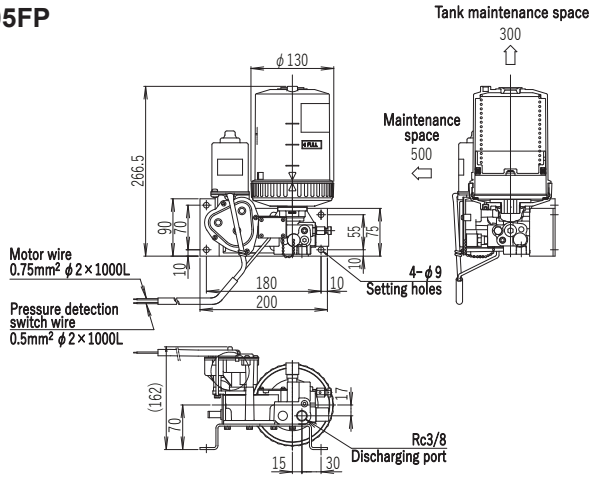
LD05CP



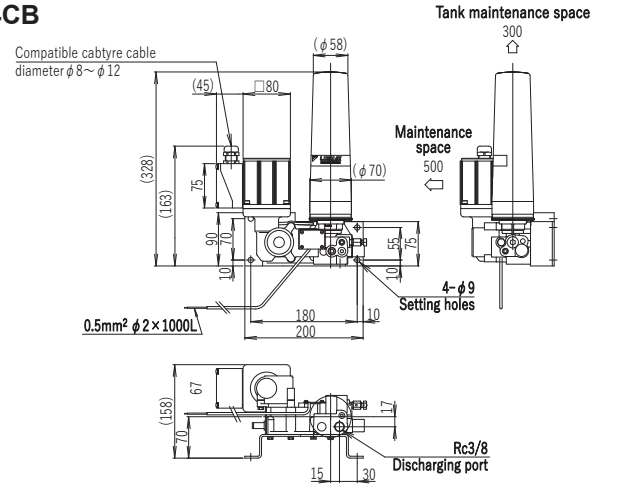
LD10FP



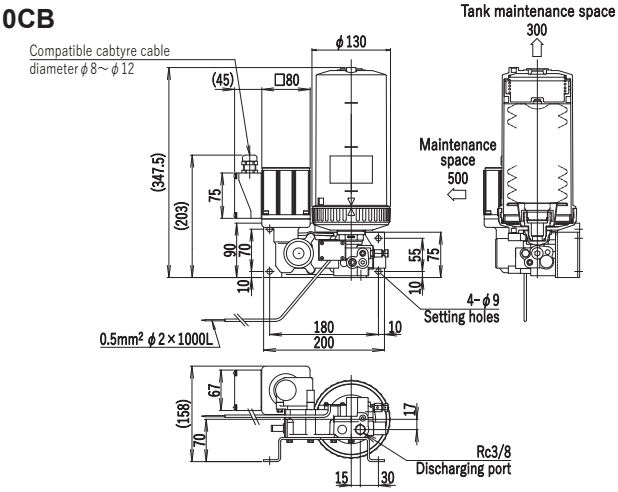
LD05FP



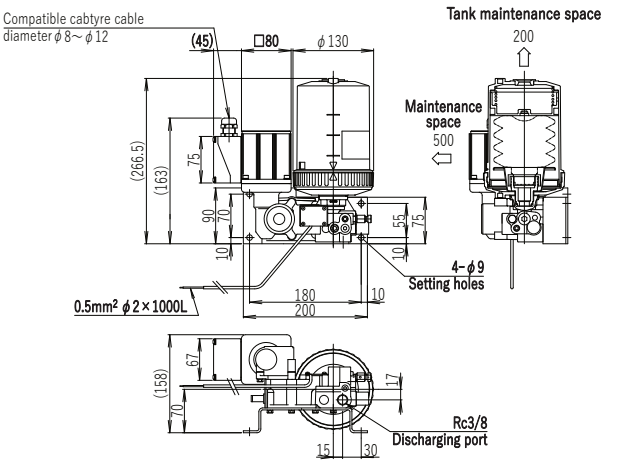
LD04CB



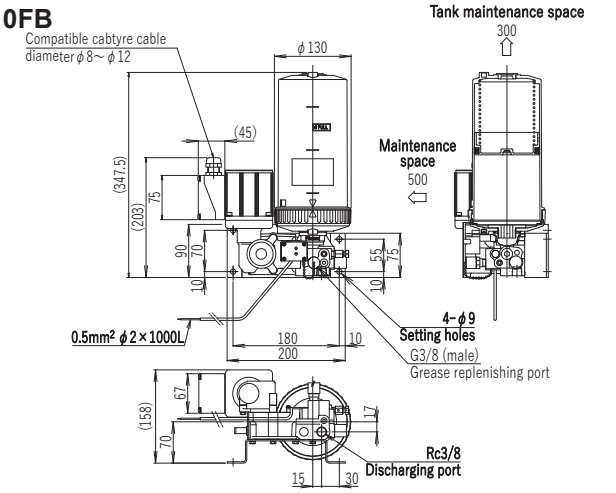
LD10CB



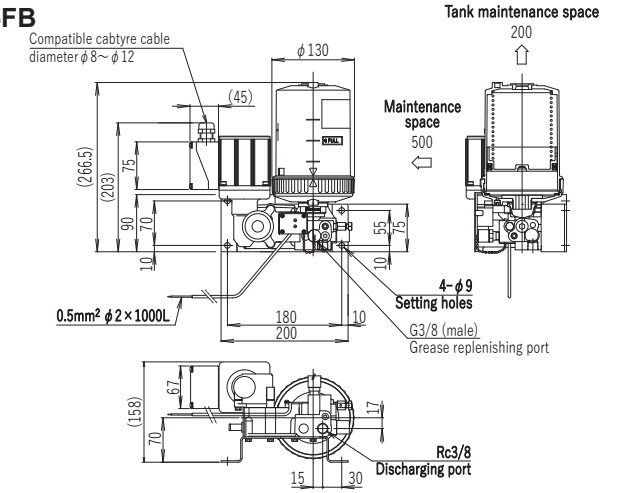
LD05CB



LD10FB



LD05FB



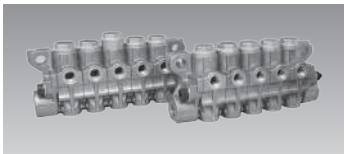
Distributing Valves

Highly reliable components that guarantee suitable lubrication and easy operation

LL0, LL2・LL2※V

By pressurizing and depressurizing the supply port, the built-in pistons discharge a metered amount of lubricant to accurately supply it to each lubrication point.

LL0



Features

- Small and compact design.
- The distributing valve is a layered element type, and the arrangement of the number of ports and discharge quantities can be freely selected.

Explanation of Model Symbols (example)

LL0 1 — 000000※ — 21

- LL0: Basic model
- 1: Number of discharging ports (1~7)
- (blank): Lubricant used — No symbol: For grease, B: For oil
- 000000※: Symbol of discharge quantity (Layout seen from the front) However, 0 indicates no element.
- 21: Design No.

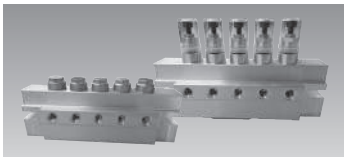
Specifications

Model code \ Item	Dimention A	B	C	D	Number of discharging ports	Max. operating pressure (MPa)	Discharge quantity Symbol: Setting value (cm³)	Grease used	Weight (kg)	Vibration durability (G)	Operating temperature range (℃)
LL01-000000※	62	42	0	0	1	24	R:0. 1:0.1 M:0.15 2:0.2 3:0.3 4:0.4 5:0.5 6:0.6	NLGI No.0 ~No.2	0.2	15	−20～+60
LL02-00000※※	84	64	22	1	2				0.3		
LL03-0000※※※	106	86	44	2	3				0.4		
LL04-000※※※※	128	108	66	3	4				0.5		
LL05-00※※※※※	150	130	88	4	5				0.6		
LL06-0※※※※※※	172	152	110	5	6 *1				0.7	3	−5～+50
LL07-※※※※※※※	194	174	132	6	7 *1				0.8		

＊1 Number of discharging ports 6 and 7 are available only for general industrial machines (machine tools, press machines, etc.).

〔Notes〕●When designing the system, take into consideration the amount of loss for distributing valve (0.13 cm3 per port).
●Design the piping so that the back pressure at the discharging port is 5MPa or less.

LL2・LL2※V



Features

- Improved reliability by adopting integrally molded body (Remarkably increased rigidity and strength)
- Discharge rate adjustment mechanism type (LL2※V) can also be available.
- Compatible with our conventional model LL
- The distributing valve is an element-integrated type, and the arrangement of the number of ports and discharge rate can be freely selected.

Explanation of Model Symbols (example)

LL2 1 — 00001 — 10

- LL2: Basic model
- 1: Number of Discharging ports (1~5)
- 00001: Symbol of discharge quantity (Layout seen from the front) However, 0 indicates no element.
- 10: Design No.

LL2 1 V — 0000F — 10

- LL2: Basic model
- 1: Number of Discharging ports (1~5)
- V: Discharge quantity adjustable type
- 0000F: Symbol of discharge quantity (Layout seen from the front)
  - 0: No element
  - F: Maximum 0.8cm³(adjustable)
- 10: Design No.

Specifications

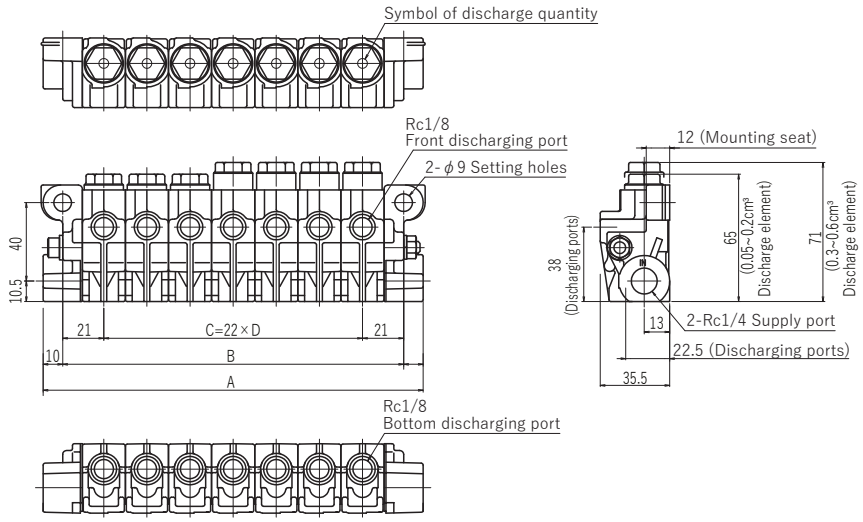
Model code \ Item	Dimention A	B	C	D	Number of discharging ports	Max. operating pressure (MPa)	Discharge quantity Symbol: Setting value (cm³)	Grease used	Weight (kg)	Vibration durability (G)	Operating temperature range (℃)
LL21-0000※	76	46	0	0	1	24	1:0.1 2:0.2 3:0.3 4:0.4 5:0.5 6:0.6	NLGI No.0 ~No.2	0.4	15	−20～+60
LL22-000※※	102	72	26	1	2				0.5		
LL23-00※※※	128	98	52	2	3				0.7		
LL24-0※※※※	154	124	78	3	4				0.8		
LL25-※※※※※	180	150	104	4	5				0.9		

LL21V-0000F	76	46	0	0	1	24	F : 0.1~0.8 (Adjustable)	NLGI No.0 ~No.2	0.4	15	−20～+60
LL22V-000FF	102	72	26	1	2				0.5		
LL23V-00FFF	128	98	52	2	3				0.7		
LL24V-0FFFF	154	124	78	3	4				0.9		
LL25V-FFFFF	180	150	104	4	5				1.0		

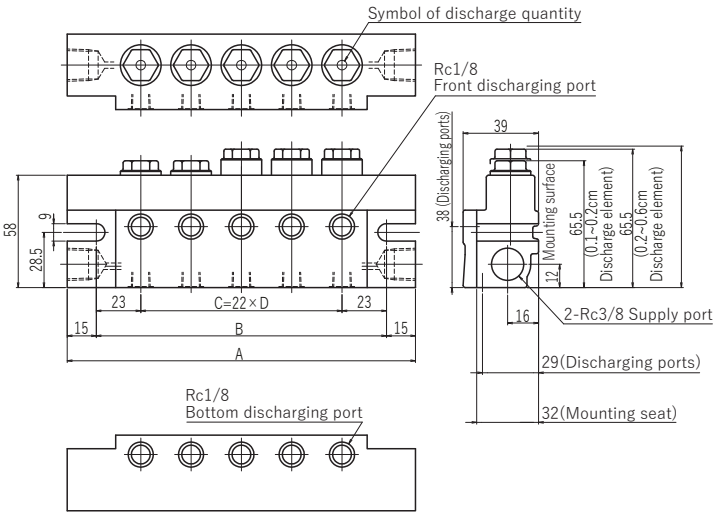
〔Notes〕●When designing the system, take into consideration the amount of loss for distributing valve (0.13 cm3 per port).
●Design the piping so that the back pressure at the discharging port is 5MPa or less.

■ Dimension drawings

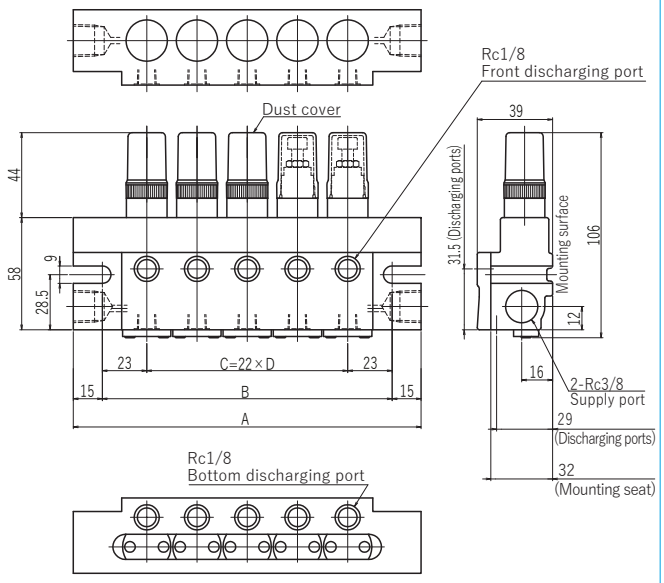
LL0



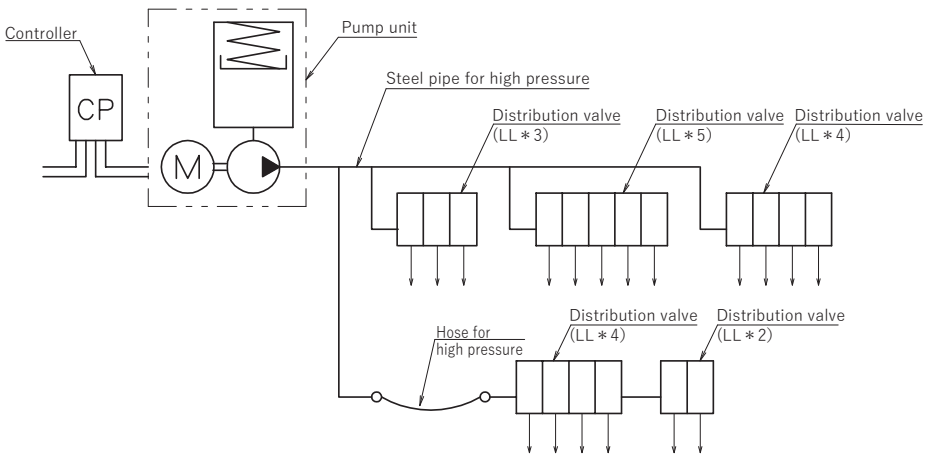
LL2



LL2※V



Flow diagram (reference)



Controller

Outstanding functions such as automatic operation, lubricant feed control, fault detection, and alarm output for performing system control

LC2MP

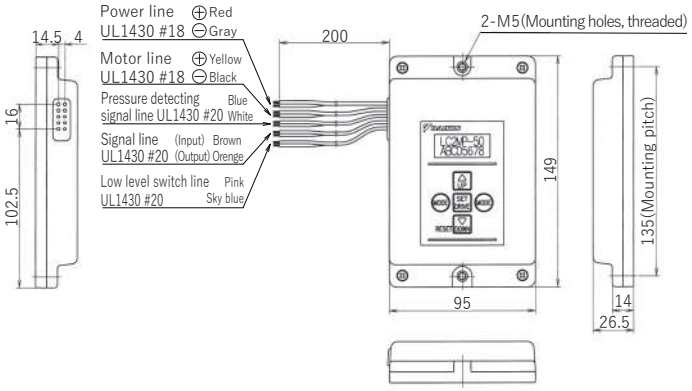
Features

- Since the lubrication timing and amount can be set in detail, you can use the machine with security by supplying the appropriate amount of lubrication at the right time according to the operating conditions of the machine.
- Unique system control ensures that high-viscosity grease can be supplied in low-temperature environments.

Dimension drawings

LC2MP-50

Weight: 0.3kg



Specifications

Model	LC2MP-50
Power supply voltage	24V DC
Rated current value (A)	MAX6.5 (Pump current value)
Fuse capacity	10
Operating temperature range (℃)	−20～＋60
Vibration durability	JIS D1601 Class 3 (8.9G)
Protection type	IP55

The controller has the following function of detecting failures and lubrication count management.

Item	Abnormal pump pressurization	Abnormal depressurization	Abnormal pressure detection	Overload error	Tank empty alarm
Phenomenon	The pressure does not rise to the specified pressure within the pump operating time.	Pressure does not release even after depressurization.	LS for pressure detection is activated before the lubrication system starts.	An overload (overcurrent) of the pump motor was detected.	The actual number of lubrication times has reached the set lubrication limit number. In case using a low level switch, the low level switch has been activated.
LCD (Flashing)	ERROR TIME UP	ERROR RELEASE	ERROR PRESS/SW	ERROR OVERLOAD	EMPTY 04:48:45 hh:mm:ss

Basic Operation of Controller

The controller controls the pump motor according to the following procedure, and manages the entire lubricating system.

Automatic Operation

1) Power switch ON

When the power is turned on, the controller waits for the input of the drive signal. There is no display on the LCD at this point.

2) Lubrication interval time measurement

When the drive signal is input, the controller starts up, measuring the lubrication interval timer until the next lubrication, and enters the lubrication standby state. The LCD counts down the time until the next lubrication.

LCD examples

WAITING 04:48:45 hh:mm:ss

3) Lubrication (Pressurization)

The pump operates and lubrication starts, when the lubrication interval time reaches the preset time. The elapsed lubricating time is displayed on the LCD.

DRIVING 02:16 mm:ss

4) Pressure retention

The system pressure is monitored by the pressure detection switch built into the pump, and when the specified pressure is reached, the pump stops and waits while maintaining the pressure in the supply line. The elapsed lubricating time will be displayed on the LCD continuously.

PRS/KEEP 03:25

5) Intermittent repressurization

Reoperates the pump when system pressure drops during pressure hold. After that, the ON/OFF of the pump is controlled so that the pressure is always maximized. The elapsed lubricating time will be displayed on the LCD continuously.

DRIVING 03:56

6) Depressurization

When the system pressure is maintained for the set lubrication time, the motor of the grease pump rotates in reverse and the depressurization mechanism operates to release the pressure in the system and complete lubrication.

PRESSURE RELEASE

Optional Operation

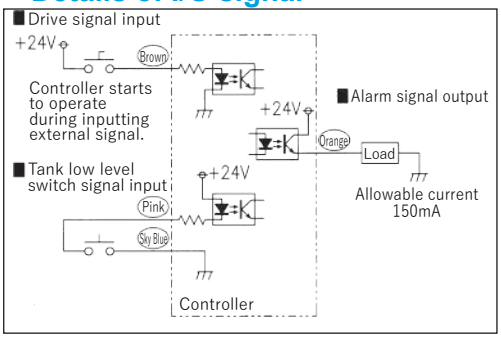
A process from lubrication to depressurization can be performed once at any timing independent of the timer. After completion of the lubrication, the integrated value of the lubricating interval timer is reset, and measurement of the timer for the next automatic operation starts.

DRIVING 02:16

End of Operation

When the operation signal of the main machinery is turned off, the controller stops the pump operation regardless of whether lubrication is in progress or standby. After depressurization, it memorizes the integrated time of the lubricating interval timer then shuts off the power supply to itself automatically. Furthermore, even after power supply to the controller is turned off, the integration content of the interval time timer and settings are held in controller's memory, when the next drive signal is input, the timer will count cumulatively from the last time it was shut off.

Details of I/O signal



Auxiliary equipment for the lubrication system has also been enhanced to make it even easier to use.

Filling pump

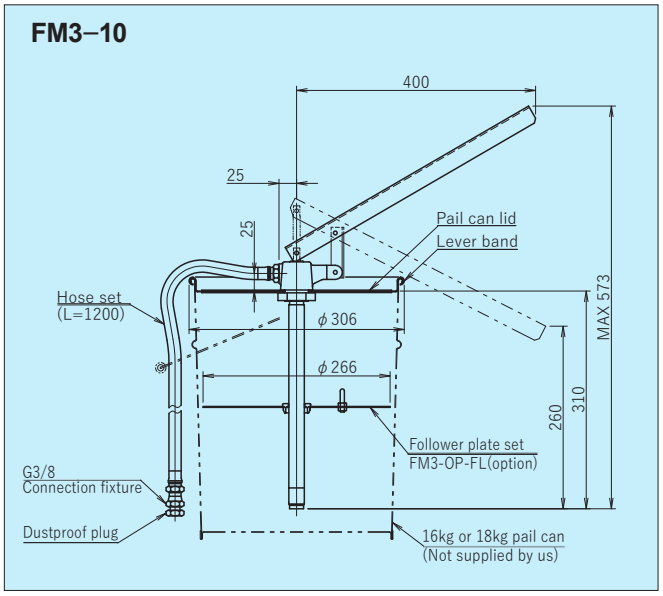
FM3

The filling pump FM3-10 is for replenishing grease directly from commercially available 16kg or 18kg pail cans to the tank of the manually operated pump (LM05F) and the motor driven pump (LD※※F) that are designed in a follower plate type tank structure with replenisher fixture.

■ Specifications

Discharge quantity (cm³/st)	9.0
Discharge pressure (MPa)	4.4
Operating temperature range (℃)	−10～50
Grease container used	JIS Z 1620 16 or 18 kg pail can
Handle operating force (N)	147
Weight (kg)	2.4

Use the follower plate set (FM3-OP-FL) in the dimention drawing when filling NLGI consistency No. 2 grease (lithium-based) at 5°C or less.



＊Follower plate set
FM3−OP−FL(option)

Grease cartridges (Lithium-based)

G-KL, GKL, GSL

We have prepared the following as genuine grease cartridge, but there are various general commercial products that can be obtained directly from oil manufacturers, so you can use them.
Consult with us when using grease other than lithium-based grease or grease that is not available in a cartridge.

Genuine grease cartridge containing 400cm³

NLGI consistency No.1	G-KL1	(Kyodo Yushi)

Genuine grease cartridge containing 500 and 1000cm³

NLGI consistency No.1	GKL-1-100 (1,000cm³)	(Kyodo Yushi)
	GKL-1-050 (500cm³)	(Kyodo Yushi)
	GSL-1-100 (1,000cm³)	
NLGI consistency No.2	GKL-2-100 (1,000cm³)	(Kyodo Yushi)
	GKL-2-050 (500cm³)	(Kyodo Yushi)
	GSL-2-100 (1,000cm³)	(Shell Lubricants Japan)
	GSL-2-050 (500cm³)	(Shell Lubricants Japan)

Grease cartridges

When Inquiring With Us

■Please inform us of the following items when inquiring about lubricating equipment.

1. The overall drawing or a sketch including overall dimentions of the machine equipment
2. Quantity and location of lubrication points
   In particular, please specify the points to be lubricated on the drawing (sketch).
3. Types and characteristics of the above lubrication points
   (a) Types of bearings and sliding parts (flat bearings, ball bearings, etc.)
   (b) Dimensions and number of revolutions
   (c) Whether the lubrication ports are fixed, movable, or rotatable, the movement, and the number of revolutions
   (d) diameter of the lubrication ports' thread
   (e) Special attentions to be paid in determining the amount of lubrication
   (f) Types of lubricants (grease and oil)
4. In case the product will be exposed to high or low temperatures (50°C or higher, 0°C or lower), provide us the detailed information of the environment.
5. Whether it will be for outdoor or indoor, or particular status environment.
6. Planned pump type and control method.
   Pneumatic/hydraulic pump, fully automatic control, semi-automatic control, with/without control panel, with/without spare pump.
7. Plans or instructions for the location of pumps and main pipes.
8. Power supply for motor driven pump control panel (voltage, frequency)
9. Special requirements regarding the control panel (remote display, remote operation, etc.)
10. Specification of drive pneumatic source and hydraulic source
11. Other important points regarding quotations
    (If you do not specify about items 3, 4 and below, we will estimate based on our standards.)
12. Drawings, documents and their number of copies to be submitted for quotation.
    Note that, if construction is included, please specify the following items.
    1. Construction site
    2. Scope of construction (In prínciple we do not provide electricity or foundation work.)
    3. Supplies
       For example, electricity, water (if nearby), lubricants used, oxygen, acetylene, etc.

Safety Precautions

This section describes items that require special attention for the safety of the lubrication system before using this product.

The safety precautions listed here are intended to prevent injury or damage to the customer.
In addition, the precautions are divided into two categories, "Warning" and "Caution", according to what may occur if the product is handled incorrectly.
Be sure to follow all of these instructions as they include important safety information.

⚠ **Warning**	In case where the product operation is mishandled ignoring this indication, a dangeours situation may occur leading to fatal or serious injuries.
⚠ **Caution**	In case where the product operation is mishandled ignoring this indication, a dangeours situation may occur leading to injuries or property damage.

⚠ Warning

1. Turn off the power switch on the control panel before installing, removing, or repairing the product. Otherwise, the pump will automatically operate, causing the grease to leak and stain the surroundings.
2. Do not step on the lubricating equipment, piping, etc. attached to the machine as a foothold or pull as a handrail. It may cause slips and falls or damage the lubrication system.
3. Do not disassemble or remodel the lubrication equipment. Please consult us if necessary.
   In the unlikely event that maintenance work is required at the site, it should be performed by a person with specialized knowledge (Hydraulic adjuster level 2).
4. Injury may occur when handling lubricating equipment, so wear protective equipment depending on the situation.

⚠ Caution

1. When venting air from the pump, protect it with a plastic bag and so on.
   Grease (oil) mixed with air may scatter and get into your eyes or stain the surroundings.
2. Use protective equipment when handling grease. If it gets in your eyes or touches your skin, it may cause visual impairment or inflammation.
3. Carry out periodic inspections of the lubrication system (grease/oil consumption control, operation check, etc.).
   If you forget inspections, it may cause machine failure due to seizure in bearings, etc.
4. Use the product within the rated specifications and the usable environmental conditions.
   Using the product outside of the rated specifications or in a special atmosphere (next to fire, explosive atmosphere, etc.) may cause mechanical failure or fire.

Point of contact

DAIKIN LUBRICATION PRODUCTS & ENGINEERING CO., LTD.
https://www.daikin-lubrication.co.jp/en/

■For improvement of the products, specifications are subject to change without prior notice and any obligation on the part of the manufacturer.