Universal Control Unit UC-2Au

UC-2Au **通用润滑系统控制器**

User's Manual

用户操作指导手册

Suzhou Leetern Industry Control Department

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Universal Control Unit UC-2Au is designed for controlling and monitoring of centralized Lubrication system. It is suitable for **minimal quantity air/oil mist lubrication system**, **brushing lubrication** control or other application where solenoid pump is used. Configuration data and parameters are saved in EEPROM, which made UC-2Au can store data safely for long period without backup power supply.
The control unit uses LED monitor and LED signal lights to show information. It is easy for operation.

Factory settings on UC-2Au:

Pause mode :	Timer
Pause time :	0 min （no PAUSE）
LUBE mode :	Counter
LUBE pulse :	9999 pulses
Current on time :	0.33 s
Pulse interval time :	0.33 s
Monitoring :	Level monitoring
	Compressed Air pressure monitoring

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Contents

Safety Warning!

Universal Control Unit UC-2Au is designed and manufactured not only in conformity with the generally engineering standards, industrial safety and accident prevention regulations, but also in accordance with some relevant generally industrial technical acceptance standards.

Although this unit complies with relevant safety technical requirements, the use of the unit may still entail dangers leading to personal injury of the user or third parties or damage to property. Therefore, the unit must be used when it is in perfect technical condition. And the operation must strictly comply with operation manual. Errors that may affect safety must be rectified immediately.

The controller is designed for controlling and monitoring centralized lubrication systems. The user himself shall be liable for any damage caused by improper use.

Potential electrical dangers

This controller must be connected to the power supply only by trained qualified personnel in accordance with the local electric technical regulations. Improper connection may lead to serious personal injury.

It is suitable for lubrication system that driven by single-phase AC power or similar electrical system. When it is used for any other purposes, all safety regulations should be complied with.

Note: The area that is circled by white heavy line on PCB is high voltage dangerous area. It is prohibited to touch directly by hand or with tools to avoid the danger of electric shock.

Qualified personnel

Qualified person means person trained, assigned and instructed by the operator of the equipment concerned. They are familiar with relevant safety rules or regulations and have certain knowledge and skills of safety. They are entitled to carry out the activities required in a given case and will be able to recognize and avoid possibly existing dangers.

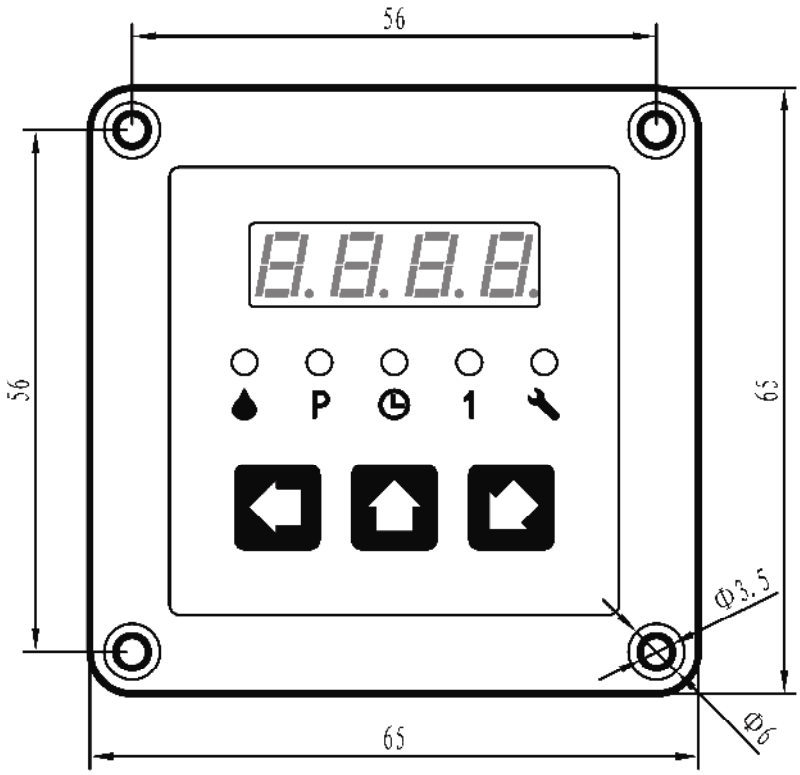
1. Installation

Universal Control Unit UC-2Au is **not** designed to work in open-air. It has to be installed in the room or in switch box to protect it from environmental influences.
Control panel component is designed with O ring seal groove. With O ring sealant and proper mounting hole, it can reach very high protection level.

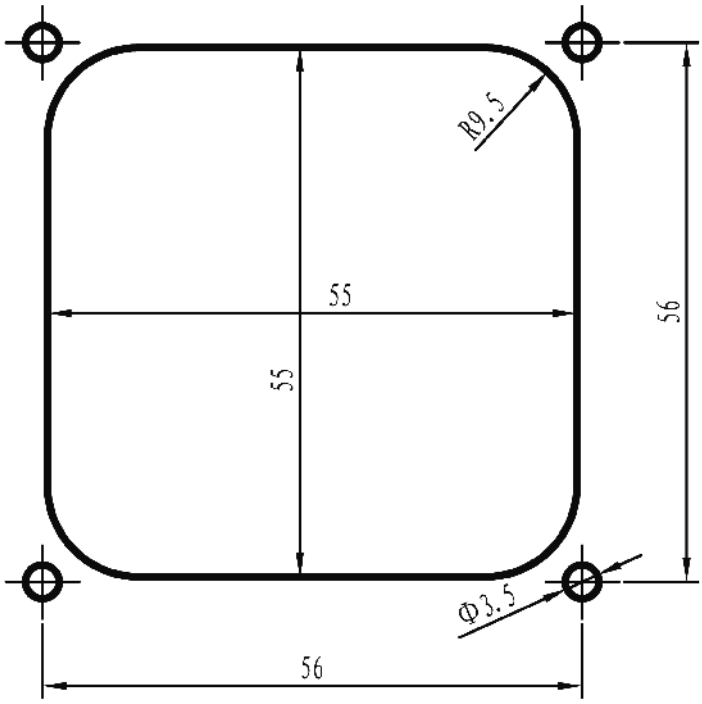
UC-2Au must be installed after Class II over-voltage electrical equipment, which supplies over-voltage protection. It is prohibited to install UC-2Au directly to a bus bar or a trunk line.

1.1 Installation dimension

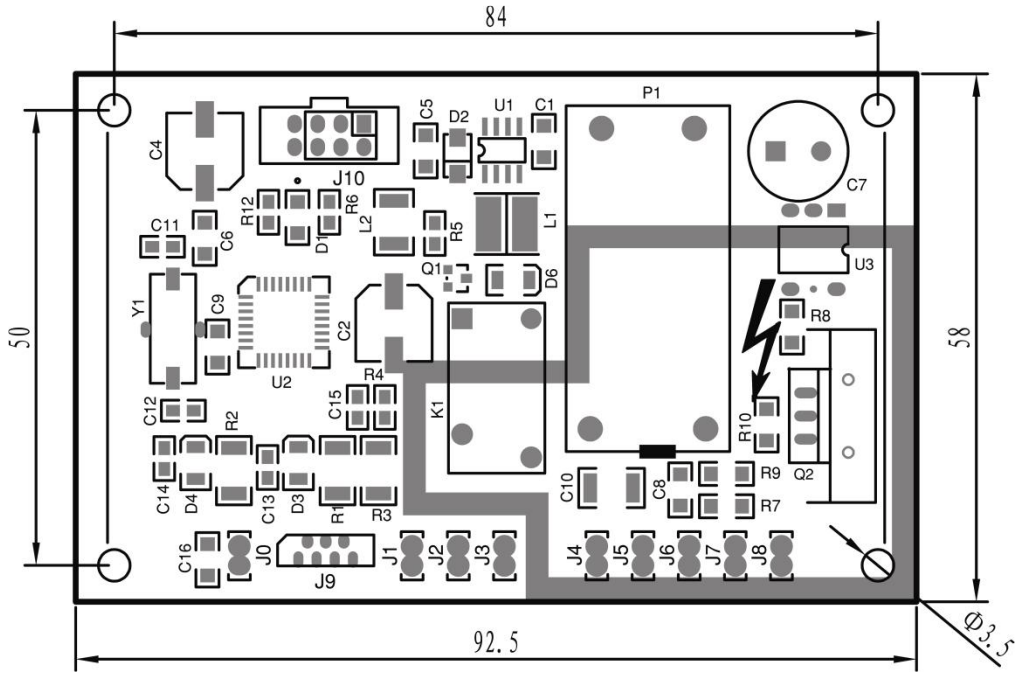
Operation board dimension:



PANEL CUT-OUT diagram



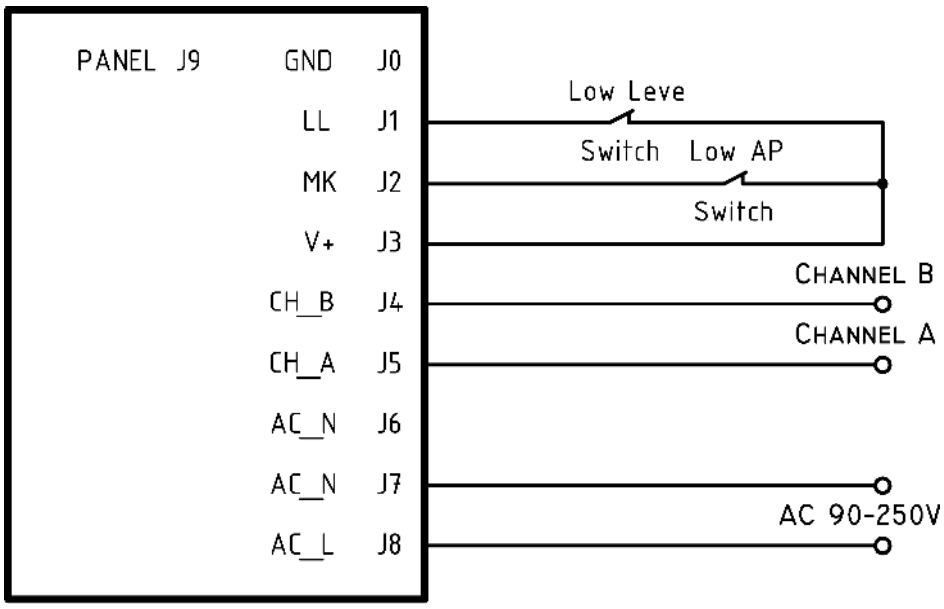
Outline dimension of control board



1.2 Electrical connection

J0 - GND	GND (PE)
J1 - LL	Level switch
J2 – LAP	Compressed Air pressure switch
J3 - V+	DC +24V
J4 - SR	Relay output of Channel B
J5 - PUMP_L	Output_L of channel A
J6 - PUMP_N	Output_N of Channel A
J7 - AC_N	Neutral wire
J8 - AC_L	Live wire
J9 - PANEL	To operation panel
J10 - TEST	Interface for test

Electrical connection diagram



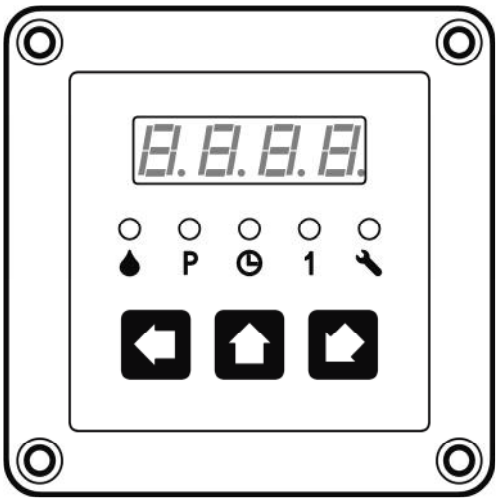
Channel A and B’s outputs belong to live wire (AC_L), their return current is on neutral wire (AC_N). Lubrication devices should be connected between CH_A and AC_N, CH_B and AC_N.

Note:

When UC-2Au is in use, be sure the system voltage is within voltage limit range. Power voltage fluctuation should be in the scope of 90V~250V. Lower or higher than the voltage limit for long time will permanently damage the control unit.

If controller is installed on a metal baseboard, an 8mm (at least) net safety space between the metal baseboard and control board should be guaranteed to avoid the danger of electric shock.

2. Display and control panel



Film panel protects UC-2Au from humidity and dust.
Please use soft cloth with warm water or neutral detergent to clean the film panel. Organic solvent is prohibited.
To avoid damage to the panel, do not use sharp tools/ object to touch it.
Please do not peel off the protection film before its final installation.

2.1 LED monitor

LED monitor displays operating status and parameters.

2.2 LED signal lights

PAUSE : Pause indicator light.

LED "PAUSE" is on: Power is supplied to pump and control unit. System is in PAUSE phase.
In programming, Light PAUSE on means the current programmed parameters relate to PAUSE.
"Light on" mentioned in this manual means the indicator light is a steady light. "Light flashes" means indicator light flashes by a frequency of 0.5s on and 0.5s off.

LUBE : Lubricating signal light

LED "LUBE" on: Power is supplied to pump and controller. System is now in lubrication status.
In programming, Light LUBE on means the current programmed parameter relates to LUBE.

TIMER：TIMER mode indicator light

LED light "TIMER" on: the current phase is now in TIMER control mode.

COUNTER：COUNTER mode indicator light

Reservation function

FAULT：Fault indicator light

LED "FAULT" flash means fault occurs in the lubrication system.

2.3 Keys

UPKEY

With key  , to increase the displayed value at cursor position by 1 in programming state. If the digit is already 9, then it will return to 0.

LEFTKEY

To move left the cursor position when input parameters in programming status. If the cursor is already at the leftmost bit, then press this key, the cursor will return to the rightmost position.

SETKEY

Activate programming mode. Confirm options or parameters.

When system is in FAULT state, briefly press this key to exit error state after troubleshooting.

NOTE：Programming operation can only be carried out when the system

at normal condition. If the system is in FAULT state, then troubleshooting needs to be done first.

2.4 Signal Light on control board SL

Red Signal Light SL on control board is used to show the output status of channel A. When channel A outputs pulses, SL is ON; when pulses disappear, SL will be off.

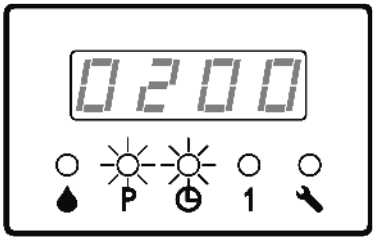
* In programming mode, if no key operations for more than 2 minute, LED turns off automatically and quit current operation.

3. Operation guide and programming

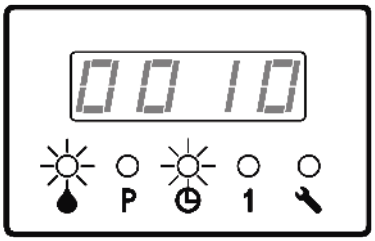
Controller shows operational parameters and states via LED monitor and LED pilot lights. User may change the preset parameters with keys (buttons) on control panel.
For parameters of PAUSE, the measurement unit of the figures displayed on LED monitor is minute; for parameters of LUBE, current on time and interval, the measurement unit is second.

3.1 Operation guide

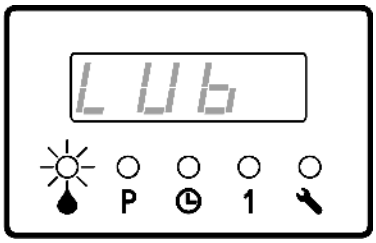
LED pilot lights indicate current operation status and control mode. LED monitor displays the remaining value of the current status.
Example：System is now in PAUSE phase, Timer mode, and remaining value is 200 minutes.



If controller is now in LUBE phase, and PAUSE is NOT set as 0 (zero), then LED monitor shows the LUBE remain value.
Example：Current remain value of LUBE is 10s.



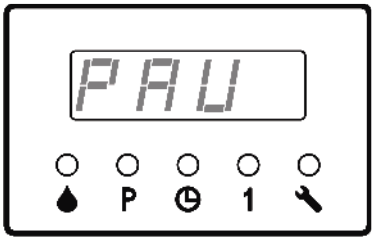
If PAUSE time is set as 0 (zero), LED monitor only displays “LUb” in LUBE state.



Please refer to chapter 5 for detailed "Error status display and instruction"

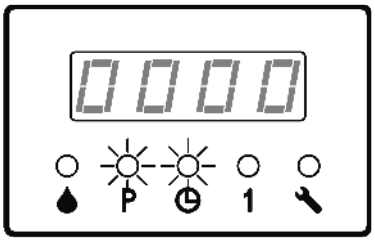
3.2 Programming

1. Press longer than 2 seconds, LED monitor shows "PAU", which means controller is now in programming mode, user can setup PAUSE time.



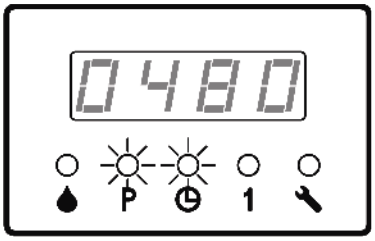
2. Press key , the light PAUSE on,, LED displays present PAUSE time paramter.

Example: **0** min (factory setting)

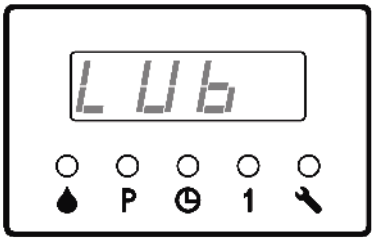


3. Use key to change PAUSE value.

Example: Change to 480min (8 hours)

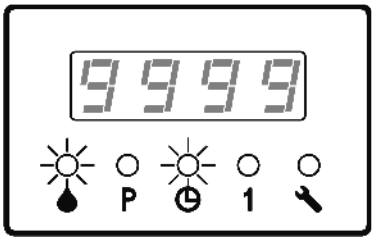


4. Press to confirm the new PAUSE parameter. LED now displays “LUb”, which means the controller is now in LUBE time setup state.



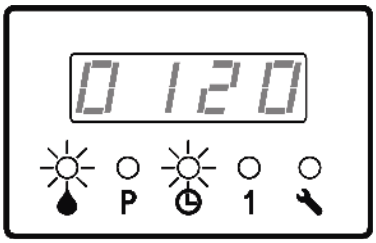
5. Press , light LUBE on, LED onitor displays preset LUBE time.

Example: 9999 s(factory setting)



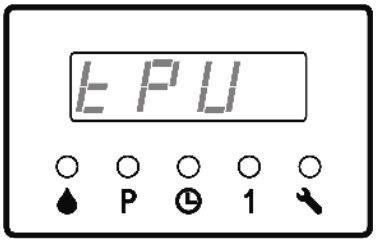
6. Use key ⌂ ◀ to change LUBE value.

Example: Change to 120 s



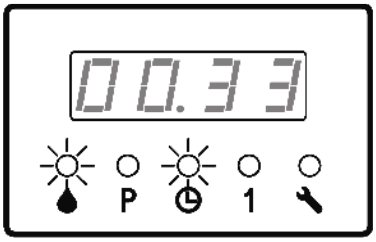
7. Press key ⌂ , to confirm the new LUBE time.

LED displays “tPU”, which means now begin to setup parameters for channel



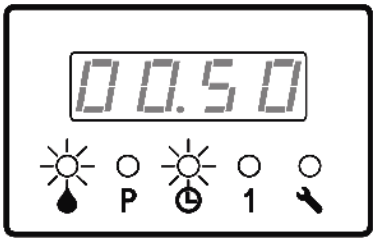
8. Press key ⌂ , light LUBE on. LED displays the current preset pulse time for channel A.

Example: 0.33 s(factory setting)



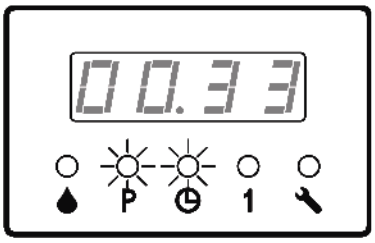
9. Use key ⌂ ◀ to change pulse time value.

Example: change to 0.5 s.

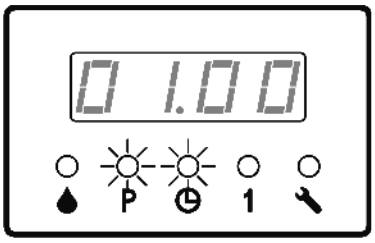


10. Press key ⌂ to confirm the new pulse time. Light PAUSE on, LED monitor displays the current pulse interval time for channel A.

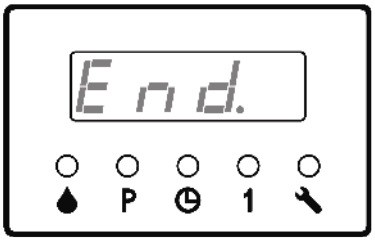
Example: 0.33 s(factory setting)



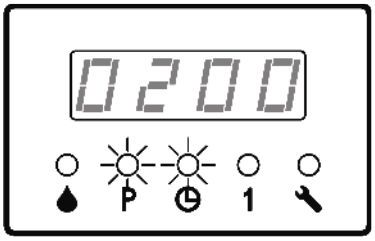
11. Use keys to change pulse interval time value.
Example: change to 1s.



12. Press key to confirm the new pulse interval time.
LED monitor displays “End”, which means programming will be finished.



13. Press key , controller then quit programming mode and back to normal operation display states. All the new programmed parameters will be saved permanently until next change via programming.



4. Operation modes

Controller supports multiple operation modes to meet different lubrication control application’s needs.

4.1 Lube channels

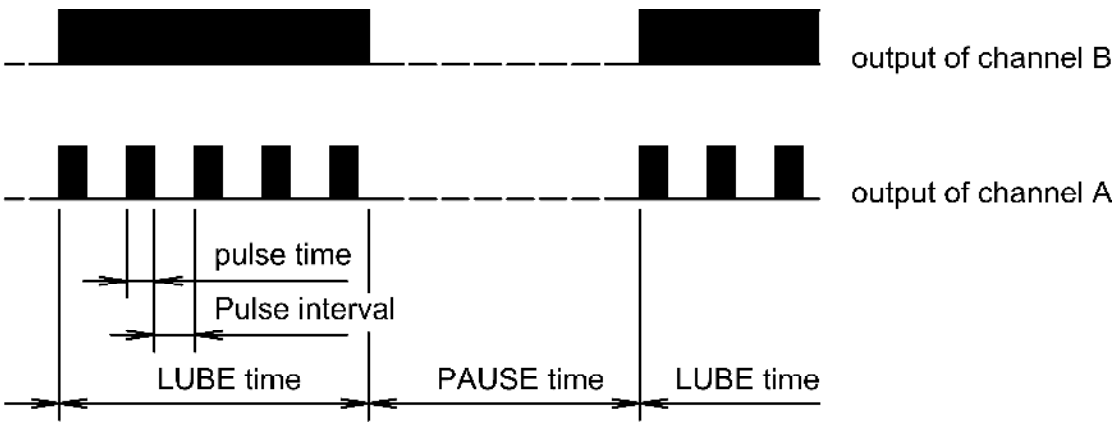
Controller owns silicon-controlled rectifier (A) and relay (B) two lubrication channels. Channel A can output high speed pulses, to drive fast speed lubrication devices with solenoid valve and solenoid pump; Channel B can synchronous running with channel A, closes in lubrication period to drive lubrication device. But channel B cannot output high speed pulses.
If lubrication system only use channel A to perform lube task, channel B can be used to indicate the lubrication status.

4.2 Cycle operation mode

After setup LUBE time and PAUSE time, controller will perform LUBE task, outputs lube pulses according to the pre-set time. When the programmed LUBE time is reached, controller goes to PAUSE state and stop outputting LUBE pulses. When preset PAUSE time ends, controller goes to LUBE state again and performs the cycle control of "PAUSE – LUBE – PAUSE".

4.3 Continuous operation

If PAUSE time is set as 0 (zero), controller will get into continuous operation mode. In this mode, controller will always work in LUBE state, continue outputs LUBE pulses and will not go to PAUSE state.
In this operation mode, LED monitor displays ’LUb’ and does not show remain time.



4.4 Pulse time and pulse interval

Channel A outputs lube pulses to drive lubrication device to perform lube tasks. The output time of LUBE pulse is called PULSE TIME. The time interval between two pulses is called PAUSE INTERVAL. These two parameters can be setup separately to adjust lubrication system's working condition.

The programmable pulse time range is 0.01-99.99 s. Since Alternating Current exists zero effect, it is NOT recommended to setup a too small pulse time parameter, because it may cause unstable pulse output.
The programmable pulse interval range is 0-99.99 s. for the same reason explained above, it is NOT recommended to setup a too small pulse interval parameter,
If pulse interval is set as 0 (zero), channel A will be same as channel B, it opens and continue outputs current during lube period; and closes in non-lube period and stop outputting current.

4.5 Power-off protection function

The controller has power-off protection function. When power is cut off, it automatically stores operating status and remaining values at the point of power-off. When power is supplied again, It will continue carrying out operation from the phase that it stopped.
Controller stores operating status and parameters in EEPROM. The data can reliable be stored for at least 10 years.

5. Faults

When controller detects faults, light "FAULT" on the panel will be flashing quickly to remind user: error occurs in lubrication system.. Meanwhile, controller stops normal operation and waiting for user to handle the faults. Detailed error type information will be displayed on LED monitor.

5.1 Level monitoring

Controller can monitor the level situation of the reservoir via level switch. When level is lower than a certain level, level switch will open. Once the controller detects the level switch opens, it gives alarm immediately and all LUBE channels stop at the same time.

Level monitoring function is activated all the time. It cannot be deactivated via setup. If user DOES NOT need this level monitoring function, they can short circuit terminal J1 and J3 on the control board.

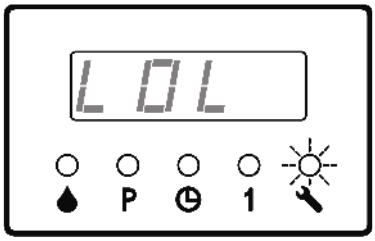
5.2 Compressed air pressure monitoring

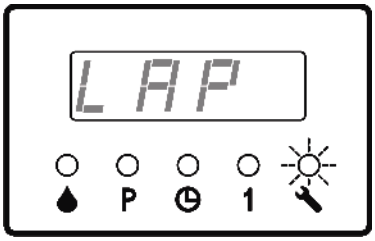
Some lubrication systems use compressed air as the working medium. Controller can monitor the compressed air pressure via pressure switch. When pressure is too low, pressure switch will open, controller gives alarm immediately and all lubrication channels stop.

Compressed air pressure monitoring function is activated all the time. It cannot be deactivated via setup. If user DOES NOT need this monitoring function, they can short circuit terminal J2 and J3 on the control board.

5.3 Fault information

Whenever controller detects fault, LED monitor will display corresponding error code and meanwhile light FAULT on the panel flashes.
When fault occurs, the information displayed on LED monitor may be as follow figures:





Left figure 'LOL' means **L**ow **O**il **L**evel fault occurs.

Right figure ‘LAP means **L**ow compressed **A**ir **P**ressure error is detected.

If LED monitor displays ‘ESS’, this means error occurs in the system. In this condition, please power off the controller for at least 1 minute, if the error still exists when electrify it again, please contact manufacturer.

5.4 Clear fault messages

After the error being handled, briefly press key  on the panel to clear the error message, exit fault state and gets back to normal lubrication circle.

If the reason that causes the error still exists, this operation does not work.

6. Technical specification

Working voltage ----------	90V~250V, 45~65Hz
SCR M. output ----------	>3A
Relay M. output ----------	>5A
Pulse time ----------	0.01~99.99 s
Pulse interval ----------	0~99.99 s
PAUSE time ----------	0~9999 min
LUBE time ----------	1~9999 s
External input signal---------	10V ~30V DC，input equivalent resistance of 10k
Working temperature--------	-30℃~+70℃