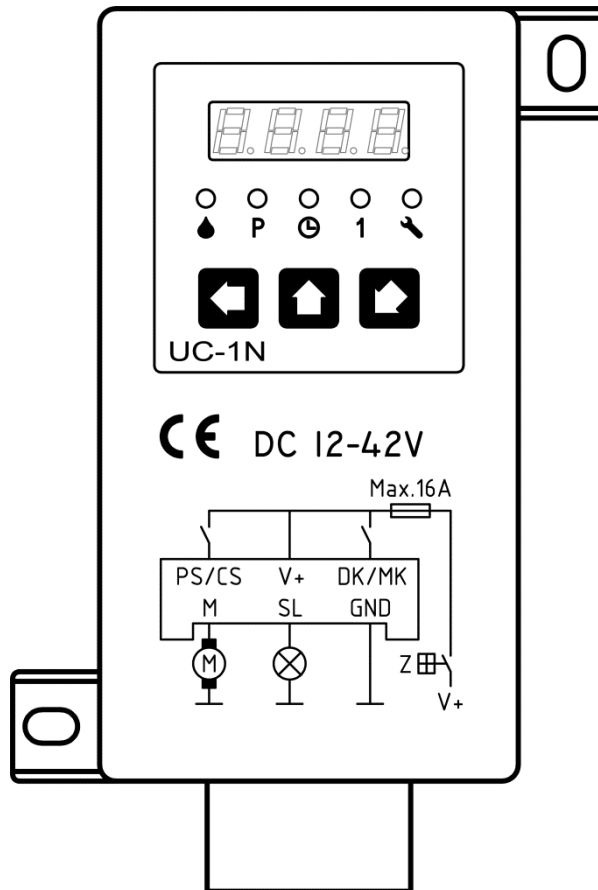


User's Manual

Universal Control Unit UC-1N



May 2012

Control Unit UC-1N is designed for controlling and monitoring of centralized lubrication systems of engineering machinery, chassis and lubrication stations. UC-1N stores control modes and parameters in EEPROM, which made UC-1N 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-1N are as followings:

Pause mode:	Timer
Pause time:	480 min(8h)
Lube mode:	Timer
Lube time:	120 s (2 min)
System monitoring:	Pressure Switch
	Cycle Switch
	OFF

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Safety Warning!

Universal Control Unit UC-1N 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 unit 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 unit 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.

This unit is designed to use in battery-powered on-board electric system of chassis, engineering equipment and lubrication station. When it is used for any other purposes, all safety regulations should be complied with.

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.

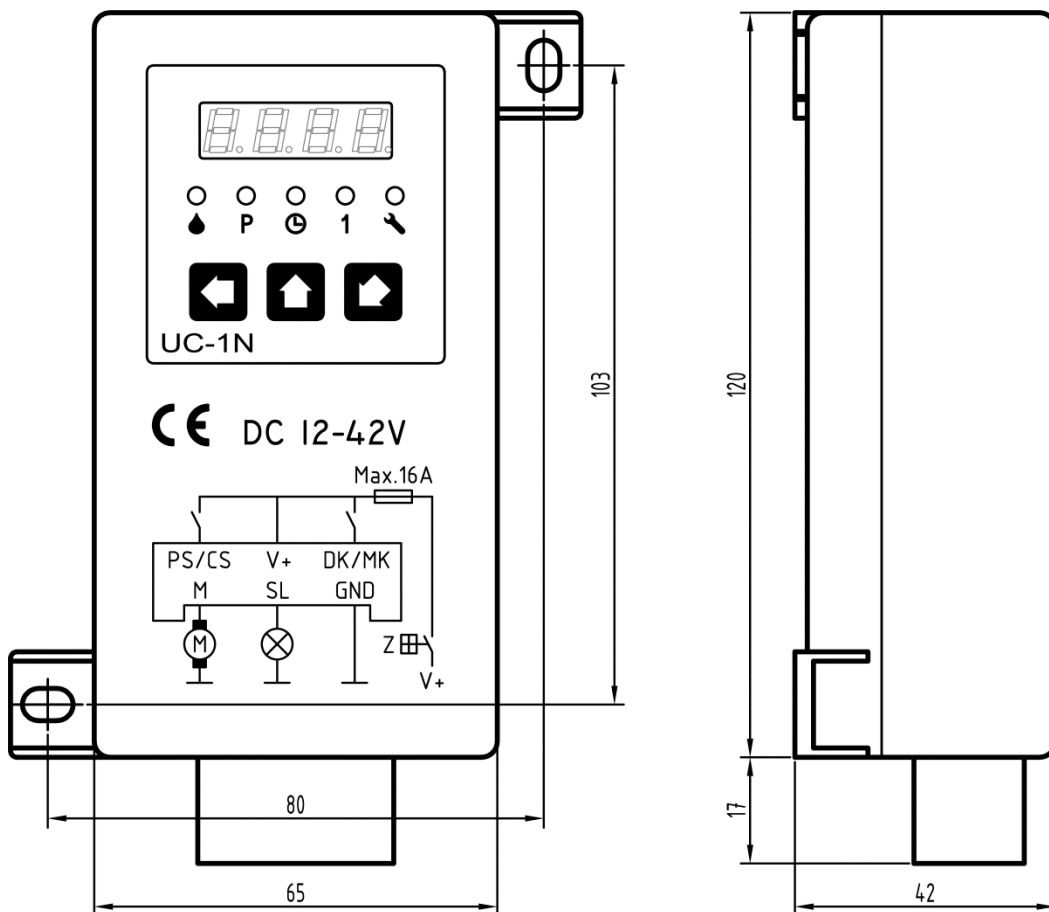
They are entitled to carry out the activities required in a given case and will be able to recognize and avoid possibly existing dangers.

Installation

Universal Control Unit UC-1N is **NOT** designed to work in open-air; it has to be installed in an enclosed compartment to protect it from environmental influences.

If the control unit is installed at an inaccessible position, it is advisable to install additional signal lights and illuminated pushbutton in operation room. So that the operating situation of the control unit can be remote monitored.

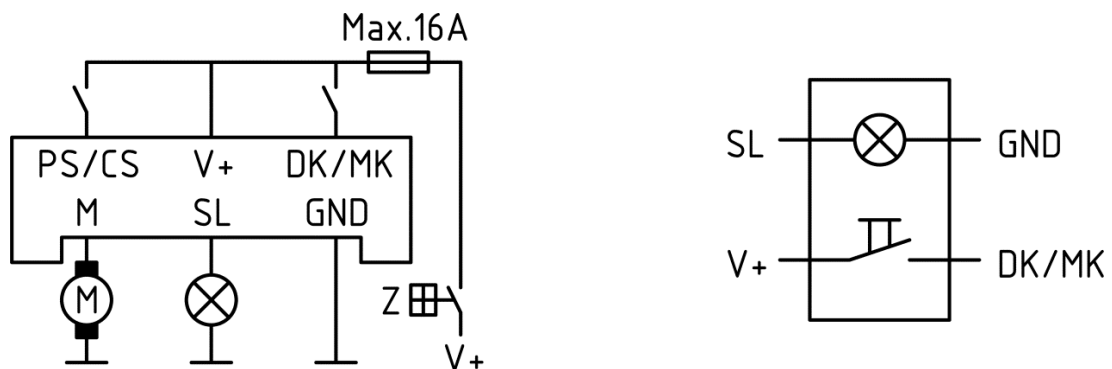
1.1 Installation dimension



1.2 Electrical connection

PS	External P ressure S witch
V+	Positive pole of power supply
+M	Pump motor
+SL	External S ignal L ight
DK / MK	External pushbutton (timer mode operation) Counter signal input (counter mode operation)
GND	Ground
Z	Start-switch

External electrical connection:

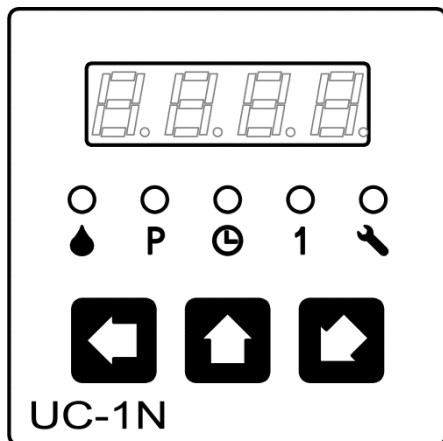


Note:

Please make sure that the system voltage matches the voltage range claimed for UC-1N. The fluctuation of supply voltage should be within the limit of **11V~45V**. Lower or higher than the voltage limit will permanently damage the control unit.

If the lowest required voltage is not guaranteed, please purchase Low Voltage Protector to protect the control unit against low voltage.

2. Display and control panel



Film panel protects UC-1A from humidity and dust.

Please use soft cloth with warm water or neutral detergent to clean the film panel. Organic solvent is prohibited.


Do not use sharp tools/ object to touch the panel.

Please do not peel off the protection film before its final installation.

2.1 LED monitor



LED monitor displays operating status and parameters.

It is deactivated normally. To activate it, press key  , LED monitor then start to display current status and programmed parameters. ※

2.2 LED signal light



P PAUSE : Pause signal light.

LED "PAUSE" is on: Power is supplied to pump and control unit. System is in PAUSE status.

In programming, PAUSE light on means the current programmed parameters are 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 UC-1N. System is now in lubrication status (pump motor is running).

In programming mode, LUBE light on means the current programmed parameter relates to LUBE.

 **TIMER** : Timer mode indicator light


LED "TIMER" on: System is now in TIMER control mode.

In programming mode, light TIMER flashes means the control mode can be changed.


 **COUNTER** : COUNTER mode indicator light

LED "COUNTER" on: System is now in COUNTER control mode.

In programming mode, light COUNTER flashes means the control mode can be changed.

 **FAULT** : Fault indicator light


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

Press key  , fault message will be displayed on LED monitor.

2.3 Keys

 **UPKEY**


Activate monitor.

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

 **LEFT / DK key**

To move 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.

In PAUSE state, to initiate an lubrication by pressing key  once.

In FAULT state, to clearance fault message and get system back to normal lubrication cycle by pressing key  once.



ENTER KEY

Activate programming mode. Confirm parameters.

NOTE : Programming operation can only be carried out when the system at normal condition. If the system is in FAULT state, then troubleshooting

2.4 External Signal Light SL


If an external signal light SL has been installed, SL will flash for 3 seconds after the start-switch is started.

Note: Control unit needs a certain time to save the operating parameters at the point of power-down so that the lubrication task could be continued after the break. **The interval of the power-down and the next power-on should not be shorter than 3 seconds. Otherwise, control unit may not start properly, and SL will not flash.**


Whenever the controller is performing the lubrication task, light “SL” will be on, indicating the status of lubricating. If the controller detects any faults during operating process, light “SL” will be flashing to remind user that the lubrication system is in fault.

※ Under display mode or programming mode, if there is no key operations for more than 2 minutes, LED turns off automatically and quit current

3. Display


Briefly press key  to activate display. The current values and the preset parameters are displayed.

During normal operation, LED signal lights are used to show current status of the control unit.

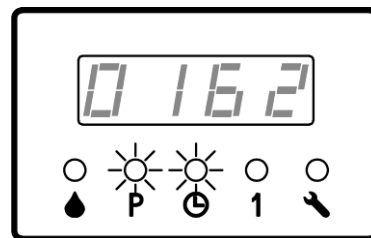
Press and hold key  to activate programming operation. Please refer to chapter 3.2 <Programming operation> for the detailed operation.


If PAUSE is set as TIMER mode, the measurement unit of the figure on LED monitor is minute. If LUBRICATION is set as TIMER mode, then the measurement unit of the figure on LED monitor is second. If LUBRICATION or PAUSE is set as COUNTER mode, the figure on LED monitor is number of times.

3.1 Display operation

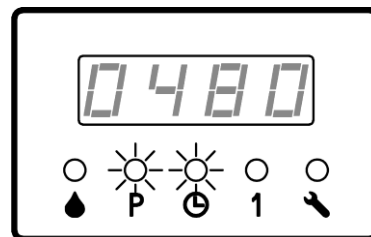
1. Briefly press key  to show current states, control modes and remain value.


Example: PAUSE light on means it is now in PAUSE phase, TIMER light on means PAUSE is in TIMER mode. And remaining time is 162 minutes.



2. Press key , the figure on LED monitor starts flashing; this means the figure is preset PAUSE control value.

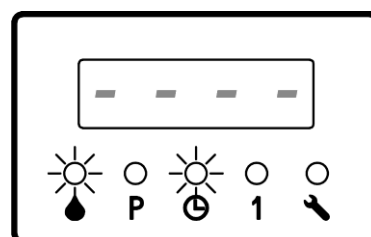
Example: Preset PAUSE time is 480 minutes.




3. Press key  to show LUBRICATION control mode and remaining value.

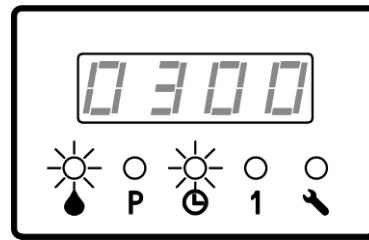
Example: TIMER light on means LUBRICATION is in TIMER mode.


Remaining value shows—— because it



4. Press key , the figure on LED monitor starts flashing; this means the figure is preset LUBRICATION value.

Example: Preset LUBRICATION time is 300 seconds

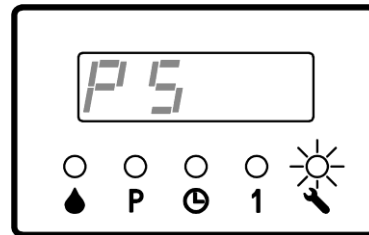


5. Press  to display system monitoring setting.

Displayed content may be:

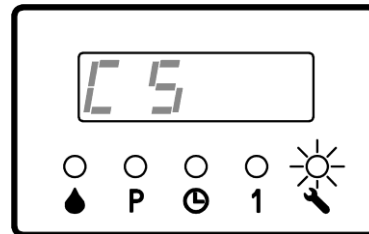
PS

(Monitoring via **P**ressure **S**witch)



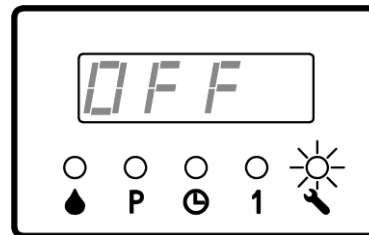
or **CS**


(Monitoring via **C**ycle **S**witch)



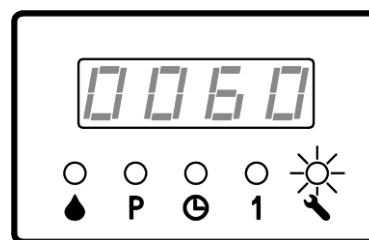
or **OFF**


(Monitoring disabled)



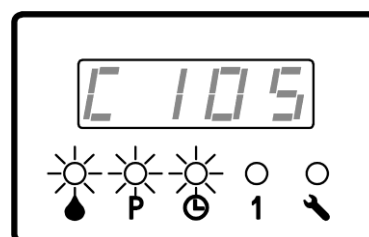
6. Press , if monitoring function is set as **CS** monitor, then LED displays monitoring time. Otherwise, display skips to next step.


Example: Monitoring time is 60s.



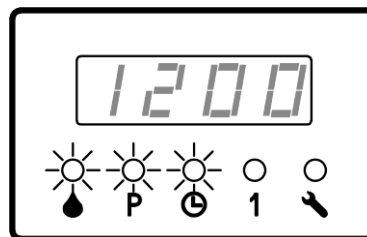
7. Press , LED monitor displays the 3 high-order digits of the total operational time. The first character "C" means the value is accumulated operational time


Example: C105 means the 3 high-order digits are 105.



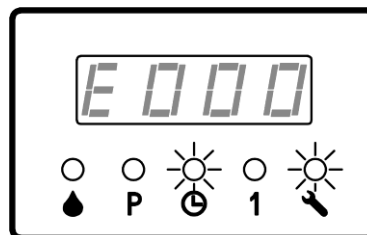
8. Press key , LED monitor displays the 4 low-order digits of the accumulated operational time.


Example: 1200. Compose the two digital segments to get the total operational time 1051200 min.



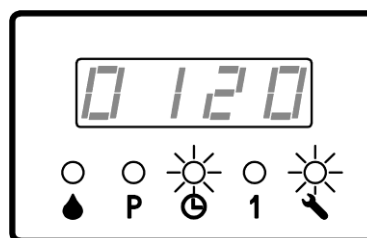
9. Press key , LED monitor displays the 3 high-order digits of the accumulated error time. The first character "E" means the value is accumulated error time.


Example: C000 means the 3 high-order digits of the value is 000.

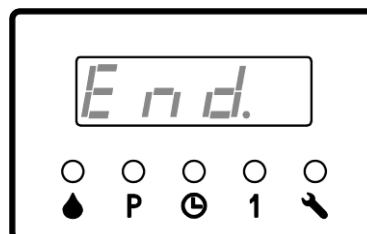



10. Press , LED monitor shows the 4 low-order digits of the error time value

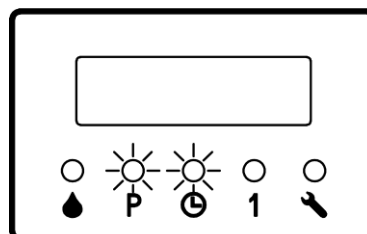
Example: 0120. To compose the two segments to get the accumulated error time is 000120 min.




11. Press key , LED monitor displays "End.", which means no more parameters to be displayed.



12. Press key . LED monitor goes out and quit display operation state.




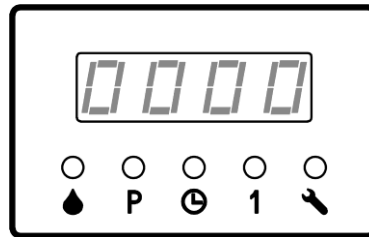
4. Programming operation



Press  longer than 2 seconds to activate programming mode. All preset parameters and control modes can be altered under this mode.

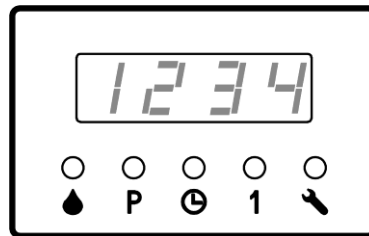
Please note: Programming operation always starts with steps 1-3 (input password)


4.1 Activate programming mode

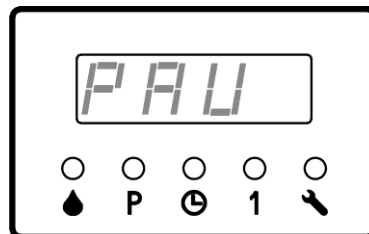
1. Press  longer than 2s, all pilot lights on the panel off, LED monitor shows "0000" to remind user to input




2. Input 4-digit password with key  
Example: 1234
Factory setting is "0000"

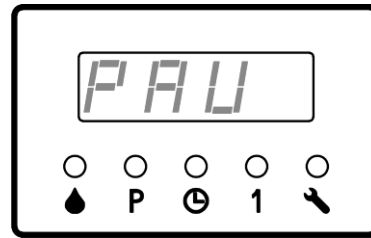



3. Press key  to confirm the input password. If the password is correct, LED display switches to operation item. Otherwise, controller quit programming mode.

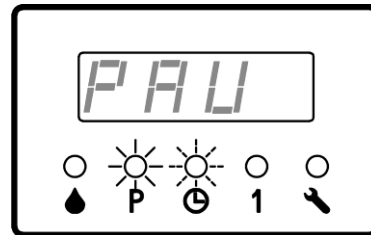



4.2 Alters PAUSE and LUBE values (Carry out steps 1-3 first)

4. Repeatedly press key  till LED display shows PAU.

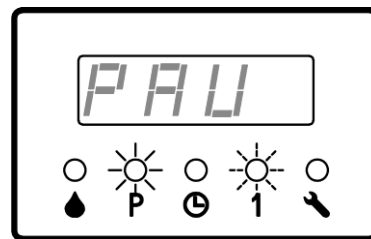



5. Press key , light PAUSE on, user may change PAUSE control mode now. Pilot light on display panel indicate present control mode.



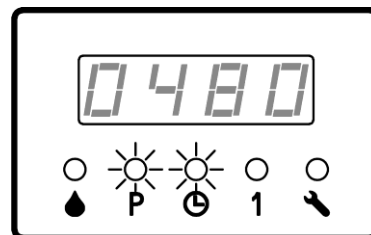
6. Press key , to switch the control mode between TIMER and COUNTER, relative lights on panel will flash accordingly to show user's setting.

Example: New setting is counter mode.



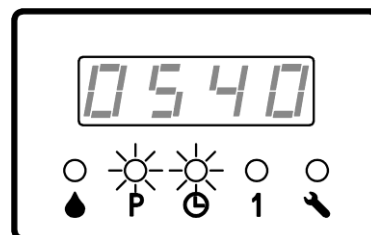
7. Press key , to confirm the new setting of PAUSE control mode, pilot lights on panel then stop flashing, LED monitor displays current control parameter of PAUSE.


Example: 480min

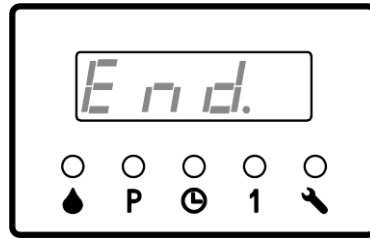




8. User may use keys   to change PAUSE value.

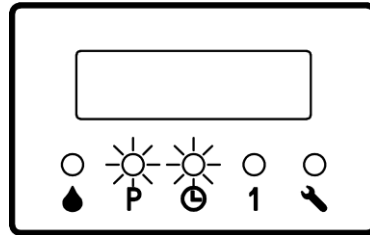
Example: change to 540 min




9 : Press key  to confirm the new parameter. LED monitor displays 'End.', which means new control mode and parameters are saved till next change via programming.

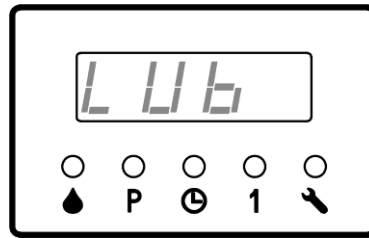



10. Press key  to exit programming mode; or press key  to program other items.



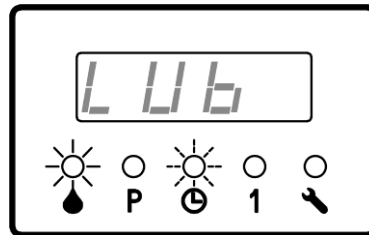
4.3 Change LUBE mode and parameters (carry out step 1-3 first)


4. Repeatedly press key  until LED monitor displays 'Lub'.



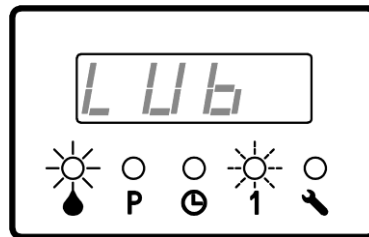
5. Press key , light LUBE on, user can change LUBE control mode now. Pilot light on panel shows present LUBE control mode.


Example: present LUBE mode is TIMER.



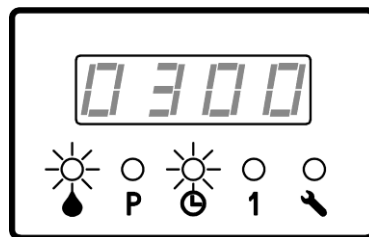
6. Use key  to change LUBE control mode. Following the change, relative lights TIMER or COUNTER will be flashing accordingly.

Example : Change to COUNTER mode.



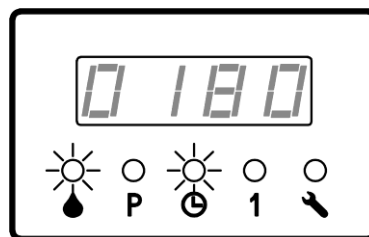
7. Press key  to confirm the new LUBE control mode. Pilot light on panel stop flashing and LED monitor then shows preset LUBE control value.


Example : 300 s

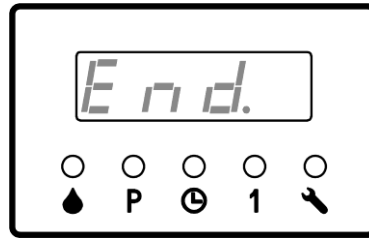



8. Use keys   to change LUBE parameter.

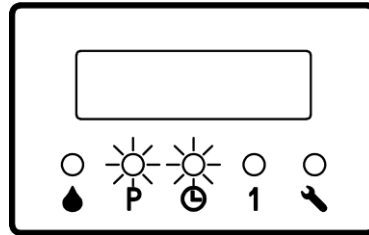
Example: change to 180 s




9. Press key  to confirm the new parameter. LED monitor displays 'End', which means new control mode and parameters are saved until next change via programming.

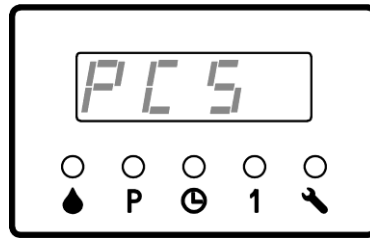



10. Press key  to exit programming mode; or press key  to program other items.

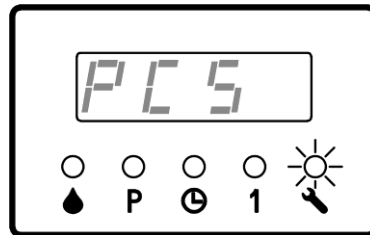


4.4 Change system monitoring settings (Please carry out step 1-3 first.)

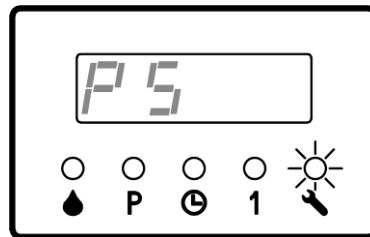
4. Repeatedly press key  until LED monitor displays 'PCS'.




5. Press key , light FAULT on, user can change monitoring setting.

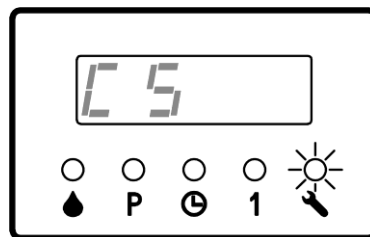


6. LED displays present monitoring setting and the content of the setting is flashing.

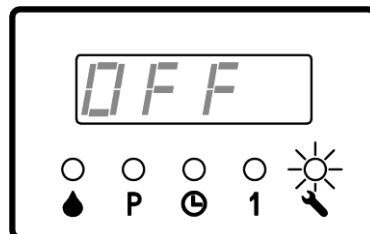



7. Use key  to change monitoring mode.

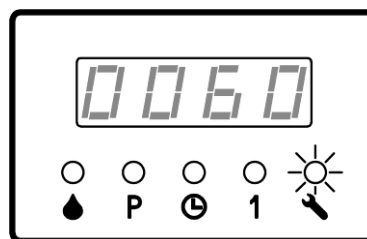
Example : Change to **CS** – **Cycle Switch** monitoring





Or **OFF** – monitoring disabled

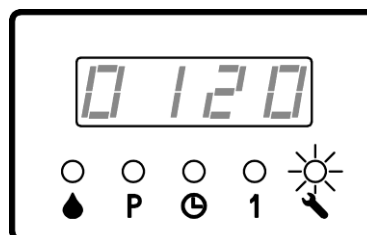



8. Press key  to confirm the new monitoring mode. If CS is set, then LED displays monitoring time. If other mode is set, then program skips to step 10.

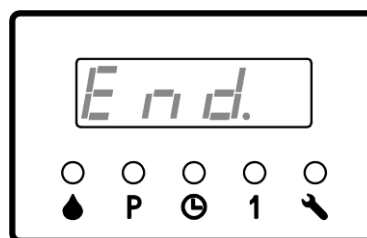




9. LED displays present monitoring time setting, user can use key   to change the setting.

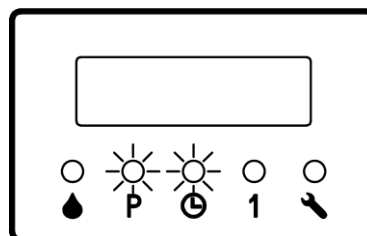
Example: Change to 120 s *.



10. Press key  to confirm the new parameter. LED monitor displays 'End.', which means new control mode and parameters are saved until next change via programming.





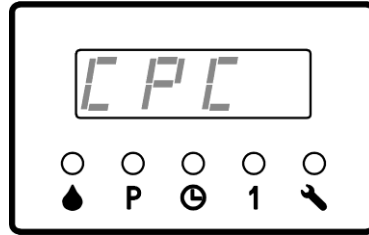
11. Press key  to exit programming mode; or press key  to program other items.




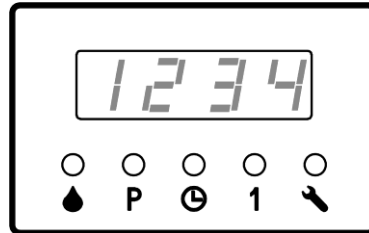
* If monitoring time is set to 9999 (default), then the monitor time function is deactivated. UC-1N only detects weather Cycle Switch had action when each lubrication process finish. By this to determine if there is CS error.



4.5 Change password (Carry out steps 1-3 first.)

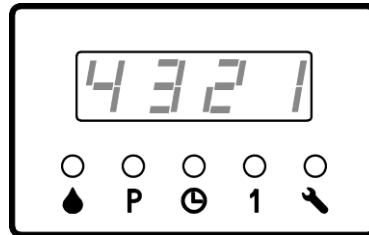
4. Repeatedly press key  until LED displays 'CPC'.
Then press key  to get into password change mode.




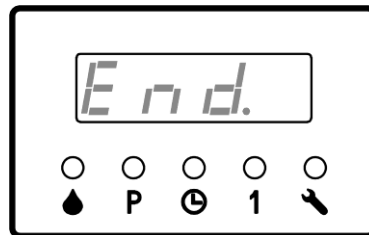
5. Press key , LED displays current password.
Example: 1234



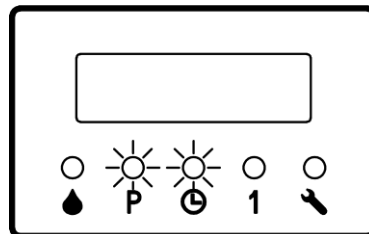
6. Use key   to change password.
Example : Change to 4321



7. Press key  to confirm the new password. LED monitor displays 'End.', which means new password is saved until next change via programming.




8. Press key  to exit programming mode; or press key  to program other items.



5. Operation modes

5.1 Timer operation

Set "TIMER" for PAUSE and LUBRICATION.

The control of the lubrication cycle takes place based on the values preset for PAUSE and LUBE times. It carries out the operation cycle of "PAUSE - LUBE". Press key  or external DK button can insert a lubrication or clear fault message. External DK button can be connected to the terminal DK/MK.

5.2 Counter mode operation (Pause depends on impulses)

Set "Counter" for PAUSE and "Timer" for LUBE.

Connect an external impulse transmitter to the terminal DK/MK.

PAUSE: Display and program values in impulses.

LUBE: Display and program values in seconds.

5.3 Combination operation (Pump running is controlled by external impulse)


PAUSE: Display and program values in impulses or time.


LUBE : Display and program values in impulses.

Users may combine "COUNTER MODE" of pause with "COUNTER MODE" of lube, or "TIMER MODE" of pause with "COUNTER MODE" of lube.

When combination operation is in service, lubrication system may control the pump by the method of counting the action times of CS. In order to guarantee the lubrication system reliable operates, we suggest user to activate CS monitoring function and set a proper CS monitoring time.

5.4 Forced service

Briefly press key  on the panel, controller will carry out a LUBE process once.

Press and hold key , controller will force the pump to operate until release the key. During this process, controller does not carry out any monitoring function.

5.5 System Monitoring

Controller can be set as **Pressure Switch** monitoring, to monitor the pressure build up situation in main pipe. If pressure switch does not detect proper pressure during lubrication period, fault will be automatically detected and displayed.

Controller also can be set as **Cycle Switch** monitoring, to monitor the movement of progressive distributor's plunger. If Cycle Switch does not detect movement of the plunger during lubrication period, fault will be automatically detected and displayed.

If lubrication system does not need monitoring, please set monitoring as OFF. Under this situation, lubrication circle only carries out lubrication by PAUSE and LUBE control parameters and does not do fault monitoring.

5.6 Power down protection function


The control unit has power down protection function. When power is cut off, the control unit auto stores operating status, remaining values and relative system data at the point of power-off. When next electrify starts, the control unit will continue carrying out operation from last point of power off.


The control unit stores operating status and values in EEPROM. The data can reliable be stored for 10 years.


6. Faults

When control unit detects system faults, LED “FAULT” on the panel will be flashing quickly. If an external **S**ignal **L**ight has been installed, light “SL” will be also flashing to remind user the lubrication system is in fault. Meanwhile, the control unit stops normal operation and wait for user to handle the faults. User may check the detailed reason of the fault through LED monitor.


6.1 Display faults

Briefly press  , fault information will be displayed on LED monitor. The



 No signal is received from Pressure switch during pump running time.

 No signal is received from Cycle switch during pump running time.

 Control unit detects error from Level switch.


 Control unit itself has error inside. If such situation occurs, get the control unit power off, then get it power on 1 minute

6.2 Clear fault messages

Press  or external DK button to clear fault messages(on the condition that one state is set as COUNTER mode) , and to start a normal lubrication cycle. 

Please note: and external DK button **must** be used after determining and correcting the faults. The user himself is liable for any

6.3 Operation with Pressure Switch monitoring

If external Pressure Switch has installed, system will stop once no signal is received from pressure switch during pump running time. Controller then gives alarm signal. FAULT light on the panel flash, Press key  , LED displays “EP”.

6.4 Operation with Cycle Switch monitoring

If external Cycle Switch is used to monitor the movement of the progressive distributor, system will stop once no signal is received from cycle switch during pump running time. Controller then gives alarm signal.

The role of CS monitoring time is:

Each CS (Cycle Switch) corresponding matches an internal timer Tc. When lubrication starts, Tc begins to countdown. If CS signal is received during the countdown, Tc clears and re-start countdown. If no CS signal received until the Tc countdown to the preset monitoring time, this means CS error occur. controller will give alarm signal and system then gets into CS error state.

- * If monitoring time is set to 9999 (default), then the monitor time function is deactivated. UC-1N only detects whether Cycle Switch had action when each lubrication process finish. By this to determine if there is CS error.



6.5 Block operation


If CS (Cycle Switch) monitoring is programmed, a block operation will be automatically activated when no signal from the cycle switch is received during the pump running time. To test Cycle Switch:

- ① When no signal from CS is received during the pump running period, the normal lubrication operation will be aborted, then a 15 min interval block operation begins.
- ② When the 1st 15 min block interval ends, controller drives the pump. If signal from CS is received, the block operation will be ended. System goes back to normal lubrication cycle. If still there is no signal from CS, then another block operation begins.
- ③ If signal from CS is received during the 2nd 15 min interval, the block operation is aborted and the system will go back to normal operation. If there is no signal from CS, then the 3rd block operation begins
- ④ If the system receives signals from CS during the 3rd 15 min interval, then

it will go back to normal lubrication cycle. If there is still no signal received, then the block operation is aborted and a fault message will be displayed.


If the preset PAUSE time is shorter than 15 min, the block pause will correspond to the preset value.

During block operation, relevant LED light on the control panel will be flashing to indicate that the control unit is now performing block operation. Light PAUSE flashes means block operation is now in PAUSE state. Press key , LED monitor shows "bP", light LUBE flashes, which means block operation is now in LUBE phase. Press key  at this time, LED monitor shows "bC".

User may use key  to exit block operation earlier and get the system back to LUBE phase.

Setting function is temporary deactivated during block operation period.

6.6 Level switch detection

If an external level switch is installed to monitor level situation, once controller detects the level switch is closed, controller automatically stops the system and gives alarm immediately. At the same time, Light fault on the control panel will flash. Press key , LED monitor displays 'EL' (means level switch error).

※ Level switch detection function is an optional function.

7. Technical Data

Voltage of power supply :	12V~42V
Type of protection :	IP40
Max. Load output M :	16A
SL output :	5A
Data storage:	No limitation
Operation temperature:	-30°C~75°C
Storage temperature:	-45°C~85°C
Recommended fuse specification:	10A
Installation dimensions L×W×H:	137mm×92mm×42mm
Programmable LUBE time range	1s~9999s
Programmable PAUSE time range:	1min~9999min
Programmable counting impulses range:	1~9999

