INSTRUCTION MANUAL AND PROGRMMING

PLC
Programmable logic controller
designed to monitor and regulate

VERS. 01.09/24


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ECP 1C

ELECTRONIC CONTROLLER FOR AUTOMATIC LUBRICATION
for pneumatic and electric pumps

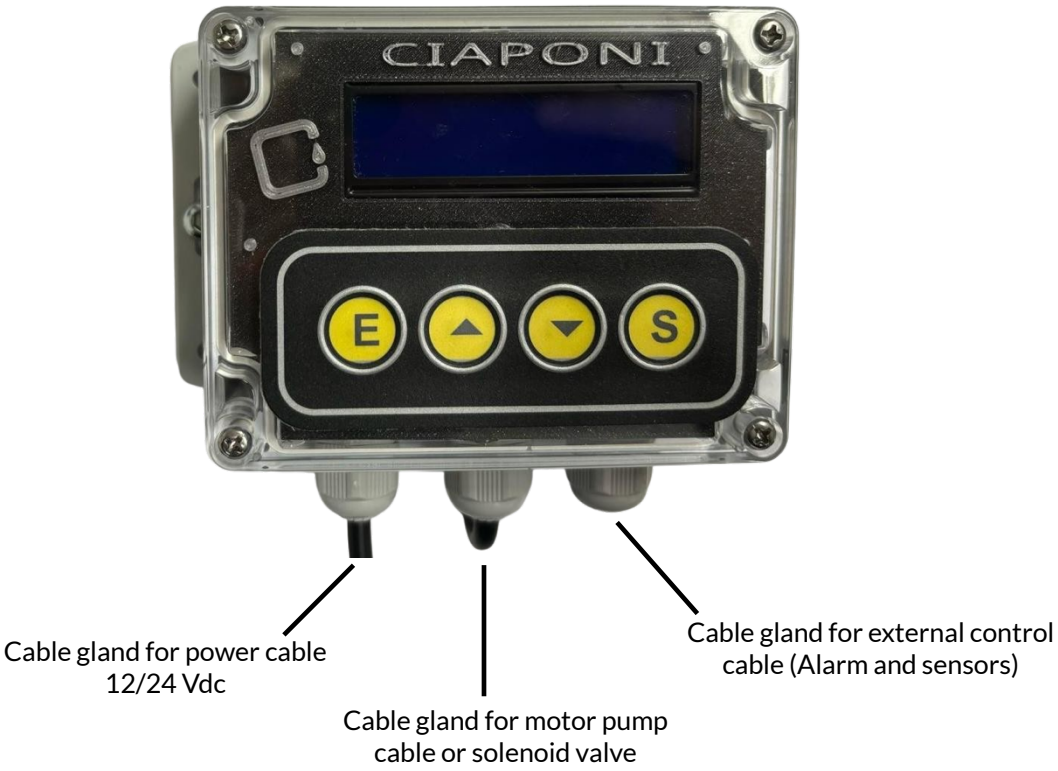
Note: It is not intended for use in Ex environments or areas classified as hazardous.

It is recommended to read all instructions carefully before proceeding with installation and programming of parameters.
Keep this manual for future reference.

WARNINGS:

- Do not install or operate the equipment if you are under the influence of drugs or alcohol.
- Disconnect the power supply before installing the wiring or performing maintenance.
- Do not install the controller in an outdoor environment subject to rain and/or excessive humidity.
- Protect the controller from direct sunlight.
- Do not install the controller in excessively hot environments.
- Periodically check the correct operation of the system and proceed with any repairs and/or replacements of defective components with original parts.
- Do not make any changes to the system unless authorized by the manufacturer.
- Make sure that the certifications comply with the environment in which the system is installed.
- Have installation, programming and any interventions carried out only by qualified personnel.
- Use the controller and the system components only for the purposes intended and authorized by the manufacturer.
- Disconnect the power supply to the controller and make sure to relieve pressure on the system before proceeding with maintenance and/or replacement of mechanical, pneumatic or electrical parts.

CONTROLLER DESCRIPTION:



KEY DESCRIPTION:

ESC KEY

Used to exit or go back during parameter programming during the pause, if pressed for 3 seconds, it allows to enter the statistics display mode. During a work cycle it allows to interrupt the greasing and return to pause.

UP ARROW

Used to increment the parameter value during programming

DOWN ARROW

Used to decrement the parameter value during programming

During the pause, by pressing both arrows simultaneously for 3 seconds, the timer enters into parameter programming mode (see programming section).

SET KEY

During the pause, if pressed, it allows to activate a test cycle (manual greasing).
At the end of the test cycle the system returns to automatic mode.

During programming it allows to confirm the value of the set parameter and to scroll to the next one.

DISPLAY:

The LCD display allows to view the status of the timer, during the pause, it allows to alternately view the set operating mode and the remaining time before the next automatic greasing cycle begins.

During parameter programming, it allows to view the current value of the parameter and then proceed with any changes.

If the controller detects anomalies, the LCD display will show the type of anomaly indicating whether it is a low grease level or a possible system block due to a cycle sensor error (if in pause-sensor or pause-pressure mode).

OPERATING MODES:

The controller can be configured with different operating modes; by entering programming the **SET MODE** parameter allows to set the operating mode by selecting one of the following options:

MODE 0: (**SENSOR** mode) in this mode the timer works as a PAUSE-SENSOR type timer, when the time set for the pause expires (SECONDS, MINUTES and HOURS) the timer will start the automatic greasing cycle, the end of the greasing cycle is determined by the closing of the sensor located on the grease distribution block (normal type sensor open).
The timer checks that during the work phase the sensor opens and then closes within the maximum time foreseen for each cycle (MAX. TIME CICLE).
This parameter sets the minutes in which the single greasing cycle must be completed, it is recommended to set this time **more than double** the time it takes in normal conditions to avoid possible false alarms.
If multiple greasing cycles are set (Num. OF CICLES) the maximum time per cycle (MAX. TIME CICLE) **is reset at each cycle**, the maximum time refers to the single sensor opening and closing cycle.

During the greasing cycle the display will show the pump status (Pump: ON) and the number of remaining cycles (C: 3), in this example the controller will perform 3 more cycles. The display will also show the countdown of the maximum time set for the single cycle.

If the entire greasing cycle ends within the expected time, the timer will enter pause mode again until the time expires before starting a new greasing cycle.

If during the greasing cycle (single cycle and also in the case of multiple cycles) the maximum time for each cycle should reach zero, the timer will signal the anomaly by indicating on the display:

STATUS: ERROR
S = reset

in this case the alarm output is activated where there will be 12V or 24V (depending on the supply voltage) for the control of relay or siren (maximum current 3 A).
By pressing the E button, it deactivates the alarm output (siren OFF), but the timer still remains in ERROR state), after having solved the problem start a new cycle by pressing the S button, if the cycle is completed correctly the error will no longer be displayed.

In this mode it is possible to set the pause time in SECONDS, MINUTES and HOURS, it is possible to set the number of cycles to be performed and the maximum time per cycle.

MODE 1: (PRESSURE mode) in this mode the controller works as a PAUSE-PRESSURE SWITCH type timer, when the set pause time expires (SECONDS, MINUTES and HOURS) the timer will start the greasing cycle and wait for the pressure switch to close from open.
If at the start of the greasing cycle (automatic and manual) the sensor is closed, the controller waits for it to open within the maximum time established by the MAX. TIME CICLE parameter.
When the pressure switch opens the controller starts the grease pump and waits for the pressure switch to close within the maximum time established by the MAX. TIME CICLE parameter.
During the pause the main grease line will be in a low pressure condition (pressure switch open), after the activation of the pump when the line is pressurized (pressure switch closed, value established by the **pressure switch which must be of the normal open type**) the timer will conclude the automatic greasing and enter the pause state.
It is possible to set the maximum time in minutes for the cycle to complete with the parameter (MAX. TIME CICLE).
In this mode the greasing cycle will always be a single cycle.

During the greasing cycle the display will show the pump status (PUMP: ON) and the pressure switch status (P: open) or (P: close) depending on the pressure switch status. The display will also show the countdown of the maximum time set for the single cycle.

Set the MAX. TIME CICLE parameter with a time more than double the time that the pump usually takes to pressurize the system to avoid false alarms.

If the pressure switch is already closed when the greasing cycle starts, the timer will display the fault when the maximum set time has expired. During greasing, the LCD display will show:

PUMP: ON P: close

If the pressure switch is open at start-up and the greasing cycle ends within the expected time, the timer will enter pause mode again until the time expires, before starting a new greasing cycle.

If during the greasing cycle the maximum time per cycle reaches the set limit, the timer will signal the anomaly by indicating on the display:

Status: ERROR
S= reset

in this case the alarm output is activated where there will be 12V or 24V (depending on the supply voltage) for the control of relay or siren (maximum current 3 A).
Pressing the E button deactivates the alarm output (siren OFF), but the timer still remains in ERROR state), after having solved the problem start a new cycle by pressing the S button, if the cycle is completed correctly the error will no longer be displayed.

In this mode it is possible to set the pause time in SECONDS, MINUTES and HOURS, it is also possible to set the maximum time per cycle.

MODE 2: (**PAUSE / ON** mode) in this mode the controller works as a pause - work timer, it is possible to set the pause times (SECONDS, MINUTES and HOURS) and it is possible to set the work times (pump active in SECONDS and MINUTES).
When the pause time expires the timer enters automatic greasing mode for the set time, after the time set for the work cycle has elapsed the timer will enter pause mode.
In this mode there are no sensors on the grease distribution block to control the lubrication cycle.

During the work cycle the display will show the pump status (PUMP Satus: ON) and the remaining set work time.

GREASE LEVEL SENSOR:

The grease level sensor is active in the three settable working modes, from the LEVEL parameter it is possible to configure the type of sensor:

0 = normal open sensor (open in the presence of grease)

1 = normal closed sensor (closed in the presence of grease)

If the grease level sensor is not present, configure the parameter to 0 (normal open) and leave the contacts unconnected.

If during the greasing cycle, in one of the operating modes, the grease sensor should indicate a low level, the timer interrupts the working cycle and enters anomaly mode indicating on the display:

Status: LOW lev.
S = reset

in this case the alarm output is activated where there will be 12V or 24V (depending on the supply voltage) for the control of the relay or siren (maximum current 3 A).
By pressing the E button, the alarm output is deactivated (siren OFF), but the timer still remains in the ERROR state), after refilling the grease container, start a new cycle by pressing the S button; if the cycle is completed correctly, the error will no longer be displayed.

PARAMETER ENTRY AND DESCRIPTION:

To enter parameter programming, press both arrows for 3 seconds during PAUSE.
(To interrupt a lubrication cycle in progress, press the E key).

The timer checks whether a PIN is present; if the PIN is set to 0000, the timer considers **WITHOUT PIN** and will therefore indicate on the display:

PIN 0000
NO PIN SET

thus allowing you to proceed with setting the parameters freely.

It will be asked if you want to set a new PIN:

NEW PIN?
E = NO S = YES

if you want to set a PIN, press the S key:

SET NEW PIN
0000

In this case, to exclude an existing PIN or to keep the PIN excluded, leave the field with 0000, otherwise use the UP and DOWN arrows to modify the value of the first digit, confirm with the S key and then modify the value of the second digit, confirm with the S key and continue for the other two digits.
To return to editing the previous digit press the E key, to edit the next digit press the S key.

After changing the last digit, you will be asked to confirm the new PIN:

CONFIRM PIN?
XXXX

The entered PIN will be displayed at the bottom (remember the code entered).

Press the S key to confirm
Press the E key to go back without confirming

If the new PIN is confirmed, the display will indicate that the change has been made: NEW PIN SET.
If the E key is pressed, the display will return to the PIN change request, allowing you to proceed with the change or not.

If, when entering programming, the timer detects the presence of a PIN other than 0000, the display will show:

PIN REQUIRED:
0000

use the UP and DOWN arrow keys to change the first digit to compose the PIN, confirm with the S key and proceed to enter the other digits, to confirm press the S key, to return to the previous digit press the E key.

If the PIN entered is correct, the timer allows you to enter parameter programming, if the PIN is incorrect, the timer will return to the state it was in previously without any changes to the parameters already stored.

If you want to exclude an already present PIN, enter the following PIN as the new PIN: 0000.

If no PIN is set or after entering the correct PIN, parameter programming continues as follows:

Entering a new PIN:

You can select E to not change the PIN or S to proceed with the change as indicated above.

If the E key is pressed, the display moves to the next parameter:

SET MODE?
E = NO S = YES

This parameter allows you to set the operating mode, press E if you do not want to change the current operating mode, press S if you want to change the operating mode.

Pressing E will move to the next parameter, pressing S will allow you to change the parameter as follows:

MODE OPTION	**MODE OPTION**	**MODE OPTION**
0	**1**	**2**

Using the UP and DOWN keys you can change the value of the parameter, press S to confirm the new value.

0 – pause mode – sensor (SENSOR)
1 – pause mode – pressure switch (PRESSURE)
2 – pause mode – work (PAUSE / ON)

After confirming the new mode, the display confirms the change by indicating the choice made for a few seconds.

TIMER SET	TIMER SET	TIMER SET
mode: Sensor	mode: Pressure	mode: Pause / ON

The next parameter allows you to set the seconds of the pause time:

PAUSE SECONDS:
5

If you want to confirm the current value, press the S key, by pressing the UP and DOWN arrows you can change the value from 0 to 59 seconds.
Briefly pressing one of the two arrows increases or decreases the value by a single unit, if one of the arrows is held down the value increases or decreases quickly.
Press S to confirm the new value.

The next parameter allows you to set the minutes of the pause time from 0 to 59, proceed as above to confirm or modify.

PAUSE MINUTES:
10

Then you can change the parameter relating to the hours of the pause time:

PAUSE HOURS:
1

The parameter accepts values between 0 and 240 hours, proceed as above to confirm or modify.

WARNING: If a combination of seconds = 0, minutes = 0 and hours = 0 is entered, the timer sets the minimum pause of 1 second.

Next, you can view and/or modify the parameter relating to the pump operating time during the automatic greasing phase (only in PAUSE / ON mode):

PUMP ON SECONDS:
15

You can confirm or modify it as for the other parameters.

The next parameter allows you to set the greasing minutes:

PUMP ON MINUTES:
10

Proceed as for the other parameters.

If a working combination of seconds = 0 and minutes = 0 is set, the timer automatically sets the minimum working time equal to 1 second.

The next parameter allows you to set the number of cycles (cycle repetition) only in the PAUSE – SENSOR operating mode.

Num. Of CICLES
3

You can enter a value between 1 and 99 repetitions of the greasing cycle. Every time the cycle sensor opens and closes, the residual value is decreased by one unit until it reaches zero.
By setting the value to 1 the timer will perform a single cycle for each lubrication cycle.

The following parameter (only in PAUSE-SENSOR and PAUSE-PRESSURE modes) allows you to set the maximum time in minutes for each single cycle, you must enter a maximum time considering a time more than double the common time for a complete cycle, in this way false alarms will be avoided.

MAX. time CICLE
5

The time that can be set in minutes must be between 1 and 59.
If multiple cycle repetitions are set (previous parameter > 1) at each opening and closing cycle of the sensor the time will be reset and the countdown restarts from the set time.

The last parameter refers to the logic of the minimum level sensor (in all modes).

Level: 0=NO 1= NC
0

By setting the parameter to 0 the grease level sensor will be of the normal open type, therefore in the presence of grease the contact will be open, while by setting the parameter to 1 the sensor must be of the normal closed type, therefore in the presence of grease the contact will be closed.

If the grease level sensor is not installed, it is necessary to leave the parameter 0 (normal open) and leave the connection terminals free.

If during programming no key is pressed for 90 seconds the controller automatically exits and returns to the established working mode.

It is recommended to end the programming procedure each time up to the last setting, by pressing S after configuring the type of grease level sensor, the controller returns to normal operation saving all the data entered.

STATISTICS:

To enter the work data display mode, you must hold down the E button for 3 seconds during the pause, the controller will display:

Counters View

The first parameter that displays is the time in hours and minutes of power supply, therefore for how long it has been powered (life hours).

LIFE TIMER
132:45 h:m

In this case it has been in operation for 132 hours and 45 minutes.

After 5 seconds, the parameter relating to the time in which the controller remained in an anomaly state (sensor error and low grease level) will be displayed automatically.

ERROR TIMER
30:12 h:m

The time displayed refers to the hours and minutes in which the controller was powered, but not operational as it was in an anomaly state.

After 5 seconds, the parameter relating to the total work cycles performed will be displayed.

TOTAL CICLES
1420

The data refers to how many work cycles have been carried out by the controller in the 3 operating modes, therefore to the activations carried out by the grease pump.

After 5 seconds the last counter will be displayed which refers to the partial work cycles:

PARTIAL CICLES
30

The controller will ask whether or not to reset this counter, by pressing E the partial count of the work cycles will not be reset, by pressing S the partial count will be reset.

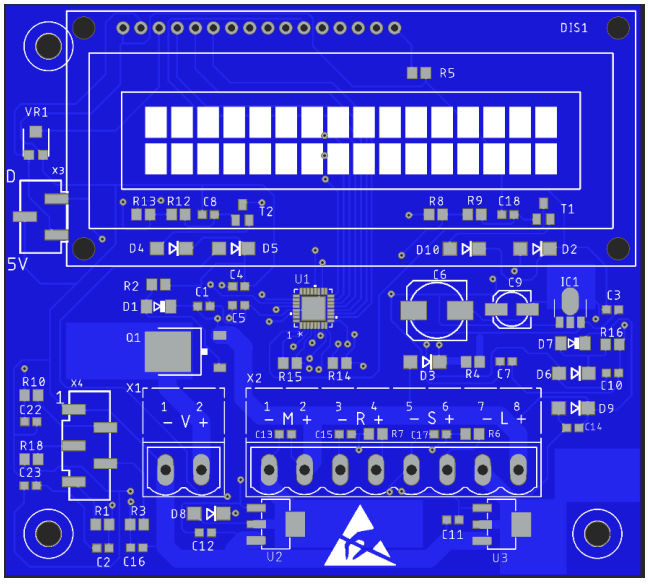
If no button is pressed for one minute, the controller returns to normal operation.

With these counters it is possible to monitor the actual operating time of the controller, the time in which it remained inactive because it was inhibited by one of the detected anomalies, it will also be possible to check the number of activations that the pump has carried out. The counting of the pump activations (lubrication cycles) is carried out by two counters, a total one that memorizes all the activations carried out during the life of the controller and a partial one, resettable by the user that allows you to check in a certain period of time how many activations have been carried out.

By comparing the counters it is possible to verify, noting the values and date, the total operating hours in a specific time frame (by how much they have increased since the previous detection), of these hours how long the controller remained in an anomaly state and how many cycles it has carried out.

Note: If the system is powered, but the tank is not regularly filled, the total activation hours increase regularly, but no lubrication cycles are carried out (malfunction status), therefore the cycle counters (total and partial) will not increase, but the hours of the error status counter will increase.

CONNECTIONS:



Connector X1:
PIN no. Description

1 (-V) Power supply negative
2 (+V) Power supply positive

Connector X2:
1 (-M) Pump motor or solenoid valve negative
2 (+M) Pump motor or solenoid valve positive

3 (-R) Grease level sensor negative
4 (+R) Grease level sensor positive

5 (-S) Cycle sensor negative
6 (+S) Cycle sensor positive

7 (-L) Siren or light bulb negative command
8 (+L) Siren or light bulb positive command

Electrical characteristics:
Power supply voltage: 10-30 Vdc
Short circuit and polarity inversion protection
Pump output current: 5 A max.
Siren and/or light bulb output current: 3A max.
Pump and siren/light bulb voltage output: = V. power supply
Absorption in Pause: 10 mA
Memory data retention: over 10 years without power supply

The controller stores the working data (timer times and status) every time the power is removed and at the next restart it resumes from the status it was in before the interruption (PAUSE, GREASING or ERROR)

TROUBLESHOOTING:

LCD:	Checks to be performed:
Low voltage	Check the supply voltage which must be between 10 and 30 Vdc
No characters, backlighting on	Check the supply voltage which must be between 10 and 30 Vdc, check that it is direct current.
No characters, backlighting off	Check the supply voltage which must be between 10 and 30 Vdc. Check the correct polarity, check that it is direct current.
STATUS: low level	Fill the grease tank and perform a test. Correctly configure the sensor type from the LEVEL parameter, select the sensor type normal open or normal closed.
STATUS: ERROR	Check the presence of grease in the tank, check that you have entered the correct time in the MAX. time CICLE parameter, otherwise increase the time entered. The maximum time must be more than double the time that the cycle takes in normal conditions.

ASSEMBLY INSTRUCTIONS:

The plastic container that the controller is equipped with has two holes outside the box for panel mounting.
These holes allow you to fix the controller to a flat surface without having to open the box. Use M4 or M5 bolts for mounting.
Generally, the controller is supplied already wired according to the order, so it is not necessary to open the container. If you need to open the box to make changes to the electrical system, make sure you pay attention to the internal wiring that connects the keyboard to the electronic board. You can detach this wiring by pulling it from the rigid plastic part to remove the cap.
To reinsert the keyboard connector, align the connector pins and push towards the electronic board, always holding it from the black rigid plastic part. Do not bend or pull the flexible part of the wiring.

CLEANING THE CONTROLLER:

To clean the electronic controller, use a soft cloth moistened with neutral soap, alternatively you can use isopropyl alcohol. Do not use aggressive solvents to avoid the risk of damaging the plastic or the keyboard.

CERTIFICATIONS:

The electronic controller complies with the directives indicated in the CE declaration, for the directive 2006/42/CE the controller is considered an integral part of machines or quasi-machines therefore it has all the safety devices required to be an integral part of other systems also compliant with this directive, the parts that it will have to control must also be compliant with the directive.

Thank you
for using
our technology