

HIDRA CRONO controller

PLC module programming manual



DC81225Q01



ENGLISH

How to use the manual

Each parameter is described as follows:

XX.XX.XX - Parameter name

Parameter description (*The description may include allowable values and notes*)

EXAMPLE: *Represents a possible situation*

FACTORY DEFAULT: *Default parameters*

MIN: *Minimum value (X)*

MAX: *Maximum value (XX)*

STEP: *Increase (X)*

Access Level
(Level required to view or change the parameter)

Device
(Device required to view or change the parameter)

Connection Location
(Location to connect device)

Example

02.02.01.03 - Close door attempts

Sets the number of door close attempts before entering blocked door mode

FACTORY DEFAULT: 10

MIN: 10

MAX: 20

STEP: 1

Basic - Intermediate - Advanced - Administrator - Keypad - PC -

Controller - Car

↓
Without access level
(not identified)

↓
With access level
(Indicated)

↓
Required Device

↓
Location to connect device

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Introduction

From firmware version 5.0, The Hydra Crono controller has an optional PLC feature (Programmable logic controller) to allow the implementation of special functions in a fast and easy way.

With this new functionality it is possible to provide the lift of practically any specific function of the building without the need to add external elements, spend time adding additional wiring or external elements of control

This software module is designed to not affect the normal operation of the lift. Because of this, it is not possible to change specific functions of this. Below are indicated some examples of the possibilities offered by the PLC module.

Glossary

In this manual there are some references at some concepts that is necessary to be clear in order to understand completely the operation of the PLC software module

Inputs

The inputs may be **physical inputs**, **lift status**, **temporal registers** or **permanent registers**.

The **physical inputs** are located in any of the general purpose inputs of the Hydra Crono controller (6 on controller, 6 on car top, 2 on each landing module, 8 on the pit module and 64 on MEX expansion modules). A free potential contact is required for this type of inputs, for example key switches, pushbuttons or relay contacts.

The **Lift status** inputs are generated by Hydra Crono controller depending of its status, for example, if is defined an input of "inspection" the value of this input will be 1 while the lift is under inspection.

An Input of **temporal register** is an internal memory position used to nest various elements. This type of registers does not maintain their values after a power fail. An example of the use of this registers is given below.

An input of **permanent register** is an internal memory position as mentioned before but in this case, its value is maintained during a power fail

Outputs

The Outputs may be **physical outputs**, **temporal registers**, **permanent registers** or **lift functions**

As in the case of the inputs, the **physical outputs** are located on any of the general purpose outputs of the Hydra Crono controller (6 on the controller, 6 on car top, 2 on each landing module, 8 on the pit module and 64 on MEX expansion modules)

On Controller, car top, landing modules and pit module there are 24VDC 1W max outputs

On MEX expansion modules are free potential outputs (250VAC 5Amax)

An output of **temporal register** is an internal memory position used to nest various elements. This type of registers does not maintain their values after a power fail. An example of the use of this registers is given below.

An output of **permanent register** is an internal memory position as mentioned before but in this case, its value is maintained during a power fail

The outputs of **lift function** allow modifying some lift operations. Below a list of this functions and its explanation are listed.

Logic Units

A Logic unit is an element able to read the value of two inputs, do a logic operation with both and set the value at one output

Timers

With the activation of an input (trigger) an output is activated depending of its behaviour.


Flip flops


A flip flop is a temporal store device with two states. It has a SET input to set the output to 1 and a RESET input to reset its output to 0.


32 Logic units (UL0 to UL31)


Each logic unit has 4 parameters to configure. Type, Input1, Input2 and Out


TYPE: If is configured as NoUse, this logic unit is not used, in other case, it could be one of the following types and its operation is shown on the corresponding table of the truth

 AND		
Input1	Input2	Out
0	0	0
0	1	0
1	0	0
1	1	1

 NAND		
Input1	Input2	Out
0	0	1
0	1	1
1	0	1
1	1	0

 OR		
Input1	Input2	Out
0	0	0
0	1	1
1	0	1
1	1	1

 NOR		
Input1	Input2	Out
0	0	1
0	1	0
1	0	0
1	1	0

 XOR		
Input1	Input2	Out
0	0	0
0	1	1
1	0	1
1	1	0

Note: The PLC module does not have the logic function NOT. This function may be made with a NAND or NOR logic unit with Input1 and Input2 programmed with the same value

Input1 and Input2:

Inputs with which the logical operation is performed

Out:

Resulting output of the logical operation

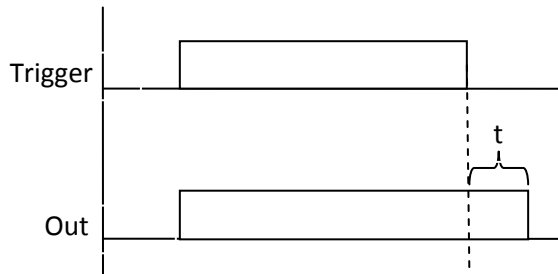
4 timer (Timer 0 to Timer 3)

Each timer has 4 parameters to define its behaviour: Type, Trigger, Out and time.

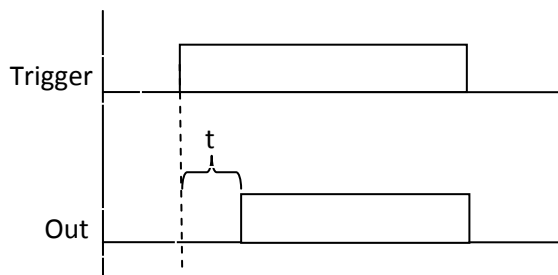
Type:

0 – Not enabled

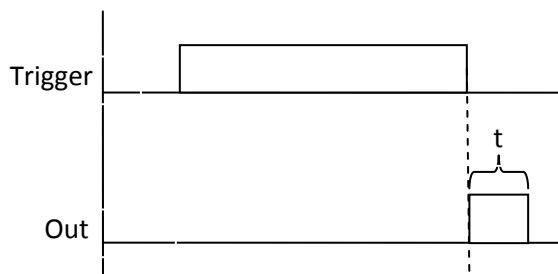
1 – Delay on disconnection



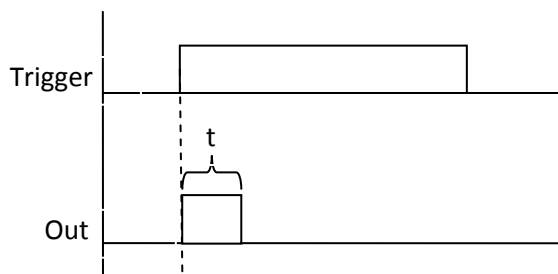
2 – Delay on connection



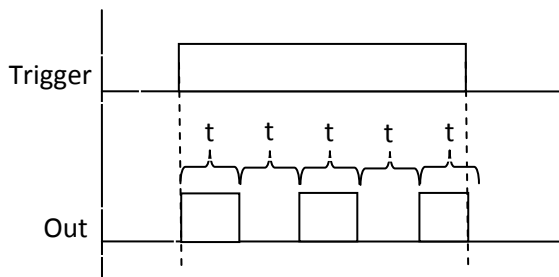
3 – Pulse on disconnection



4 – Pulse on connection



5 – Flashing



Trigger:

Inputs used as trigger of the timer

Out:

Output controlled by the timer

Time:

Set the time "t". This time is adjustable between 0.1 seconds and 1 week

8 Set/Reset Flip flops (Flip flop 0 to Flip flop 7)

Each flip flop has 4 parameters to adjust: Type, SET, RESET and Out

Type:

0 – Flip flop disabled

1 – Flip flop enabled

SET:

When this input is activated (1) the output OUT is set 1

RESET:

When this input is activated (1) the output is reset to 0. This inputs has priority so if SET and RESET are both 1, the output OUT will be 0

Out:

Output controlled by the flip flop

List of the available inputs

Name of the input	Location	Description
C0001,C0002,C0003,C0004,C0005,C0006	Car top	Physical input
P0001,P0002,P0003,P0004,P0005,P0006	Controller	Physical input
L0011,L0012,L0021,L0022,L0111,L0112,L0121,L0122,L0211,L0212,L0221,L0222,L0311,L0312,L0321,L0322,L0411,L0412,L0421,L0422,L0511,L0512,L0521,L0522,L0611,L0612,L0621,L0622,L0711,L0712,L0721,L0722,L0811,L0812,L0821,L0822,L0911,L0912,L0921,L0922,L1011,L1012,L1021,L1022,L1111,L1112,L1121,L1122,L1211,L1212,L1221,L1222,L1311,L1312,L1321,L1322,L1411,L1412,L1421,L1422	Landing module	Physical input
E0000,E0001,E0002,E0003,E0004,E0005,E0006,E0007,E0100,E0101,E0102,E0103,E0104,E0105,E0106,E0107,E0200,E0201,E0202,E0203,E0204,E0205,E0206,E0207,E0300,E0301,E0302,E0303,E0304,E0305,E0306,E0307	MEX expansion module	Physical input
RT000,RT001,RT002,RT003,RT004,RT005,RT006,RT007,RT008,RT009,RT010,RT011,RT012,RT013,RT014,RT015,RT016,RT017,RT018,RT019,RT020,RT021,RT022,RT023,RT024,RT025,RT026,RT027,RT028,RT029,RT030,RT031	Internal memory on Crono controller	Temporal register
RP000,RP001,RP002,RP003,RP004,RP005,RP006,RP007	Internal memory on Crono controller	Permanent register
Public Service	Internal status	Is 1 if the lift is under public service
Out of Service	Internal status	Is 1 if the lift is out of service
Inspection	Internal status	Is 1 if the lift is under inspection
Positioning	Internal status	Is 1 if the lift is positioning
UP	Internal status	Is 1 if the lift is going up
DOWN	Internal status	Is 1 if the lift is going down
TRIP	Internal status	Is 1 if the lift is on travel
IDLE	Internal status	Is 1 if the lift is under public service and idle
SSG	Internal status	Is 1 if the lift is SSG is closed
PP	Internal status	Is 1 if the lift is PP is closed
EPE	Internal status	Is 1 if the lift is EPE is closed
EPC	Internal status	Is 1 if the lift is EPC is closed
CDI	Internal status	Is 1 if the lift is reading CDI magnet
CDP	Internal status	Is 1 if the lift is reading CDP magnet
CVI	Internal status	Is 1 if the lift is below CVI signal
CVS	Internal status	Is 1 if the lift is above CVS signal
CPE	Internal status	Is 1 if the lift is reading CPE magnet
Door opening	Internal status	Is 1 when door opening
Door closing	Internal status	Is 1 when door closing
Door pre-opening	Internal status	Is 1 when door preopening
DOP	Internal status	Is 1 while door open pushbutton is pressed
DCP	Internal status	Is 1 while door close pushbutton is pressed
VIP	Internal status	Is 1 while the VIP switch is ON
Photocell 1,Photocell 2	Internal status	Is 1 if this photocell is intercepted
Zone 3,Zone 4,Zone 5	Internal status	Is 1 if is on zone 3, 4 o 5 of the landing zone
Leveling	Internal status	Is 1 if the lift is levelling
Rescuing	Internal status	Is 1 if the lift is rescuing
Car calls	Internal status	Is 1 if there is any car call
Up calls	Internal status	Is 1 if there is any up landing call

Down calls	Internal status	Is 1 if there is any down landing call
Full load	Internal status	Is 1 if the overload sensor indicates full load
Overload	Internal status	Is 1 if the overload sensor indicates overload
Blocked doors	Internal status	Is 1 if the doors are blocked
UPS	Internal status	Is 1 if the UPS signal is activated
Inverter error	Internal status	Is 1 if the inverter error signal is activated
PTC error	Internal status	Is 1 if there is an error with the PTC
Temp sensor error	Internal status	Is 1 if the machine room temperature is below or above of the allowed one
Fire alarm	Internal status	Is 1 if the fire signal is activated
micro SD present	Internal status	Is 1 if the micro SD card is plugged in
Hand held console present	Internal status	Is 1 if the hand held console is connected on the controller
Car light	Internal status	Is 1 when the car light is at ON state
FI 0,FI 1,FI 2,FI 3,FI 4,FI 5,FI 6,FI 7,FI 8,FI 9,FI 10,FI 11,FI 12,FI 13,FI 14,FI 15,FI 16,FI 17,FI 18,FI 19,FI 20,FI 21,FI 22,FI 23	Internal status	Is 1 when the car is on that floor. Example: If is programmed as "FI 4" this input will be 1 when the car is on floor 4
Sun,Mon,Tue,Wed,Thu,Fri,Sat	Internal status	Is 1 when is this weekday on the internal real time clock of the controller Example: If an input is programmed as "Sat" will be 1 from 0:00:00 until 23:59:59 of each Saturday
0 h,1 h,2 h,3 h,4 h,5 h,6 h,7 h,8 h,9 h,10 h,11 h,12 h,13 h,14 h,15 h,16 h,17 h,18 h,19 h,20 h,21 h,22 h,23 h	Internal status	Is 1 when is that hour on the internal real time clock of the controller Example: If an inputs is programmed as "13 h" will be 1 from 13:00:00 until 13:59:59 every day

List of the available outputs

Name of the output	Location	Description
C0001,C0002,C0003,C0004,C0005,C0006	Car top	24VDC physical output (1Wmax)
P0001,P0002,P0003,P0004,P0005,P0006	Controller	24VDC physical output (1Wmax)
L0011,L0012,L0021,L0022,L0111,L0112,L0121,L0122,L0211,L0212,L0221,L0222,L0311,L0312,L0321,L0322,L0411,L0412,L0421,L0422,L0511,L0512,L0521,L0522,L0611,L0612,L0621,L0622,L0711,L0712,L0721,L0722,L0811,L0812,L0821,L0822,L0911,L0912,L0921,L0922,L1011,L1012,L1021,L1022,L1111,L1112,L1121,L1122,L1211,L1212,L1221,L1222,L1311,L1312,L1321,L1322,L1411,L1412,L1421,L1422,L1511,L1512,L1521,L1522	Landing module	24VDC physical output (1Wmax)
E0000,E0001,E0002,E0003,E0004,E0005,E0006,E0007,E0100,E0101,E0102,E0103,E0104,E0105,E0106,E0107,E0200,E0201,E0202,E0203,E0204,E0205,E0206,E0207,E0300,E0301,E0302,E0303,E0304,E0305,E0306,E0307	MEX expansion module	Free of potential physical output (Contact rating 250VAC 5Amax)
RT000,RT001,RT002,RT003,RT004,RT005,RT006,RT007,RT008,RT009,RT010,RT011,RT012,RT013,RT014,RT015,RT016,RT017,RT018,RT019,RT020,RT021,RT022,RT023,RT024,RT025,RT026,RT027,RT028,RT029,RT030,RT031	Internal memory on Crono controller	Temporal register
RP000,RP001,RP002,RP003,RP004,RP005,RP006,RP007	Internal memory on Crono controller	Permanent register
COP buzzer	Lift function	If the value of this output is 1, the Car operation panel buzzer sounds
COP disable	Lift function	If the value of this output is 1, the car operation panel will not register calls
LOP disable	Lift function	If the value of this outputs is 1, the landing operation panels will not register calls
FI00 COP disable,FI01 COP disable,FI02 COP disable,FI03 COP disable,FI04 COP disable,FI05 COP disable,FI06 COP disable,FI07 COP disable,FI08 COP disable,FI09 COP disable,FI10 COP disable,FI11 COP disable,FI12 COP disable,FI13 COP disable,FI14 COP disable,FI15 COP disable	Lift function	If the value of this output is 1, the car operation panel pushbutton of this floor will not register calls. Example: If "FI01 COP disable" is 1, the floor 1 car operation pushbutton will not register any call
FI00 LOP disable,FI01 LOP disable,FI02 LOP disable,FI03 LOP disable,FI04 LOP disable,FI05 LOP disable,FI06 LOP disable,FI07 LOP disable,FI08 LOP disable,FI09 LOP disable,FI10 LOP disable,FI11 LOP disable,FI12 LOP disable,FI13 LOP disable,FI14 LOP disable,FI15 LOP disable	Lift function	If the value of this output is 1, the landing operation panel of this floor will not register calls. Example: If "FI03 LOP disable" is 1, the floor 3 landing operation pushbuttons will not register any call
FI00 disable,FI01 disable,FI02 disable,FI03 disable,FI04 disable,FI05 disable,FI06 disable,FI07 disable,FI08 disable,FI09 disable,FI10 disable,FI11 disable,FI12 disable,FI13 disable,FI14 disable,FI15 disable	Lift function	If the value of this input is 1, this floor will be disabled because the lift will not serve any new calls and it will clear the existing ones Example: If "FI03 disable" is 1, the floor 3 landing and car pushbuttons will not register new calls
COP calls clear	Lift function	If the value of this output is 1, all the car calls will be cleared
LOP calls clear	Lift function	If the value of this output is 1, all the landing calls will be cleared
FI0 call,FI1 call,FI2 call,FI3 call,FI4 call,FI5 call,FI6 call,FI7 call,FI8 call,FI9 call,FI10 call,FI11 call,FI12 call,FI13 call,	Lift function	If the value or this output is 1, a call to this floor will be generated

F14 call,F15 call,F16 call,F17 call, F18 call,F19 call,F20 call,F21 call, F22 call,F23 call		Example: If "F13 call" is 1, a call to the floor 3 will be generated
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PLC module configuration menu

02.51 –PLC functions

02.51.01 to 02.51.32 – UL0 to UL31

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.01.01 to 02.51.32.01- Type

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.01.10 to 02.51.32.10- Input1

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.01.11 to 02.51.32.11- Input2

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.01.20 to 02.51.32.20- Out

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.65 to 02.51.68 – Timer 0 to Timer 3

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.65.01 to 02.51.68.01- Type

Sets the behaviour of the timer

- 0 – Not enabled
- 1 – Delay on disconnection
- 2 – Delay on connection
- 3 - Pulse on disconnection
- 4 – Pulse on connection
- 5 – Flashing

FACTORY DEFAULT: 0

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.65.10 to 02.51.68.10- Trigger

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.65.20 to 02.51.68.20- Out

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.65.30 to 02.51.68.30- Time

FACTORY DEFAULT: 0.1 s

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.73 to 02.51.80 – Flip flop 0 to Flip flop 7

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.73.01 to 02.51.80.01- Type

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.73.10 to 02.51.80.10- SET

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

02.51.73.11 to 02.51.80.11- RESET

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

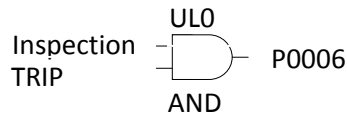
02.51.73.20 to 02.51.80.20- Out

FACTORY DEFAULT: NoUSE

Basic - Intermediate - **Advanced** - Administrator - Keypad - PC - Controller - Car

Object lesson 1

It is required to install an indicator in the controller to show if the car is moving under inspection



Programming for this case:

02.51.01.01 – Type: adjusted to “AND”

02.51.01.10 – Input1: adjusted to “Inspection”

02.51.01.11 – Input2: adjusted to “TRIP”

02.51.01.20 – Out: adjusted to “P0006”

Explanation: The logic unit 0 (ULO) is programmed as AND. The output OUT will be 1(ON) only if Input1 AND input2 are 1 (ON) together

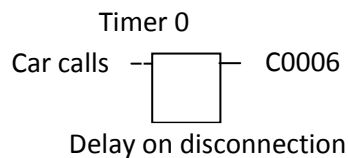
The Input1 is “Inspection” and its value is 1 if the lift is under inspection

The Input2 is “TRIP” and its value is 1 when the lift is moving up or down

The output P0006 will be 1 (and the indicator connected to this physical output will be lit) when Input1 and Input2 will be 1 (The lift is under inspection AND is moving up or down)

Object lesson 2

It is required to install a fan in the car operation panel. This fan will work when there is any car call and stops after 10 minutes of the car becomes idle



Programming for this case:

02.51.65.01 – Type: adjusted to “1” which is delay on disconnection

02.51.65.10 – Trigger: adjusted to “Car calls”

02.51.65.20 – Out: adjusted to “C0006”

02.51.65.30 – Time: adjusted to “10 min”

Explanation: The timer 0 is programmed as a delay on disconnection and in this mode when the input “trigger” changes to 1, the output "OUT" is set to 1. Once the trigger changes to 0, the output OUT maintain its value during the adjusted time.

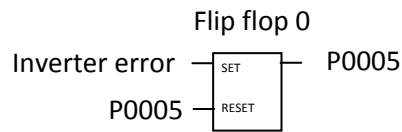
The input trigger is adjusted to “Car calls” that means that this input will be 1 when there is any car call

The output C0006 will be activated (and the fan connected starts to work) when there is one or more car calls. The controller clears a car call when arrives at the destination floor and opens the door. At this moment, if there are no more car calls, the input “Car calls” becomes 0 and the timer starts to decrease its value.

When its value reaches 0, the output C0006 will be 0 and the fan connected will stop

Object lesson 3

In an elevator with frequency inverter we suspect that sometimes the drive has an auto restart fault. We need to confirm this installing a light-pushbutton in the controller. Its light will be lit on if an inverter error occurs and remain ON until we push the pushbutton.



Programming for this case:

- 02.51.74.01 – Type: adjusted to “1”
- 02.51.74.10 – SET: adjusted to “Inverter error”
- 02.51.74.11 – RESET: adjusted to “P0005”
- 02.51.74.20 – Out: adjusted to “P0005”

Explanation: El Flip flop 0 has the input “SET” programmed to “Inverter error” which value is 1 if the inverter error signal is read by the controller

If the input SET is 1 (any inverter error happens) the output P0005 becomes 1 and remains on this state even if the input SET changes to 0 (inverter auto restart)

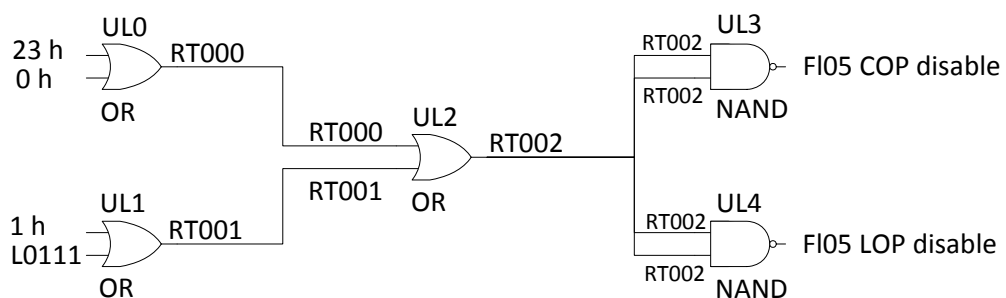
In order to reset the value of the output P0005, we need to press the pushbutton, then the input P0005 changes to 1 and the Flip flop resets the output P0005, then the light turns off

Object lesson 4

At 5th floor of a Hotel there are a music bar and a convention room. The music bar opens daily from 23:00 pm to 2:00 am and the convention room only on request.

The staff of the hotel wants to disable automatically the 5th floor when the music bar is closed. Also they want a key switch at main floor (1st) to enable it when there is a convention planned.

They don't want that anybody has to go to enable and disable the 5th floor every day according the opening hours of the music bar



Programming for this case:

UL0:

02.51.01.01 – Type: adjusted to “OR”
02.51.01.10 – Input1: adjusted to “23 h”
02.51.01.11 – Input2: adjusted to “0 h”
02.51.01.20 – Out: adjusted to “RT000”

UL1:

02.51.02.01 – Type: adjusted to “OR”
02.51.02.10 – Input1: adjusted to “1 h”
02.51.02.11 – Input2: adjusted to “L0111”
02.51.02.20 – Out: adjusted to “RT001”

UL2:

02.51.03.01 – Type: adjusted to “OR”
02.51.03.10 – Input1: adjusted to “RT000”
02.51.03.11 – Input2: adjusted to “RT001”
02.51.03.20 – Out: adjusted to “RT002”

UL3:

02.51.04.01 – Type: adjusted to “NAND”
02.51.04.10 – Input1: adjusted to “RT002”
02.51.04.11 – Input2: adjusted to “RT002”
02.51.04.20 – Out: adjusted to “FI 05 COP disable”

UL4:

02.51.05.01 – Type: adjusted to “NAND”
02.51.05.10 – Input1: adjusted to “RT002”
02.51.05.11 – Input2: adjusted to “RT002”
02.51.05.20 – Out: adjusted to “FI 05 LOP disable”

NOTE: The temporal registers (RTxxx) are used to nest logic units. It is possible to read or write a value. Because of this, a temporal register may be an output (to write to) and an Input (to read it)

Explanation:

UL0 is an OR logic unit and its output will be 1 if is “23 h” or “0 h”. This is true from 23:00:00 until 00:59:59 every day. During this time, the output RT000 will be 1 (this output is an internal memory position used later by UL2)

UL1 is an OR logic unit and its output will be 1 if is “1 h” or the key switch installed on “L0111” is on. In other words, if the time is between 1:00:00 am and 1:59:59 am or if the key switch is on, the output RT001 will be 1

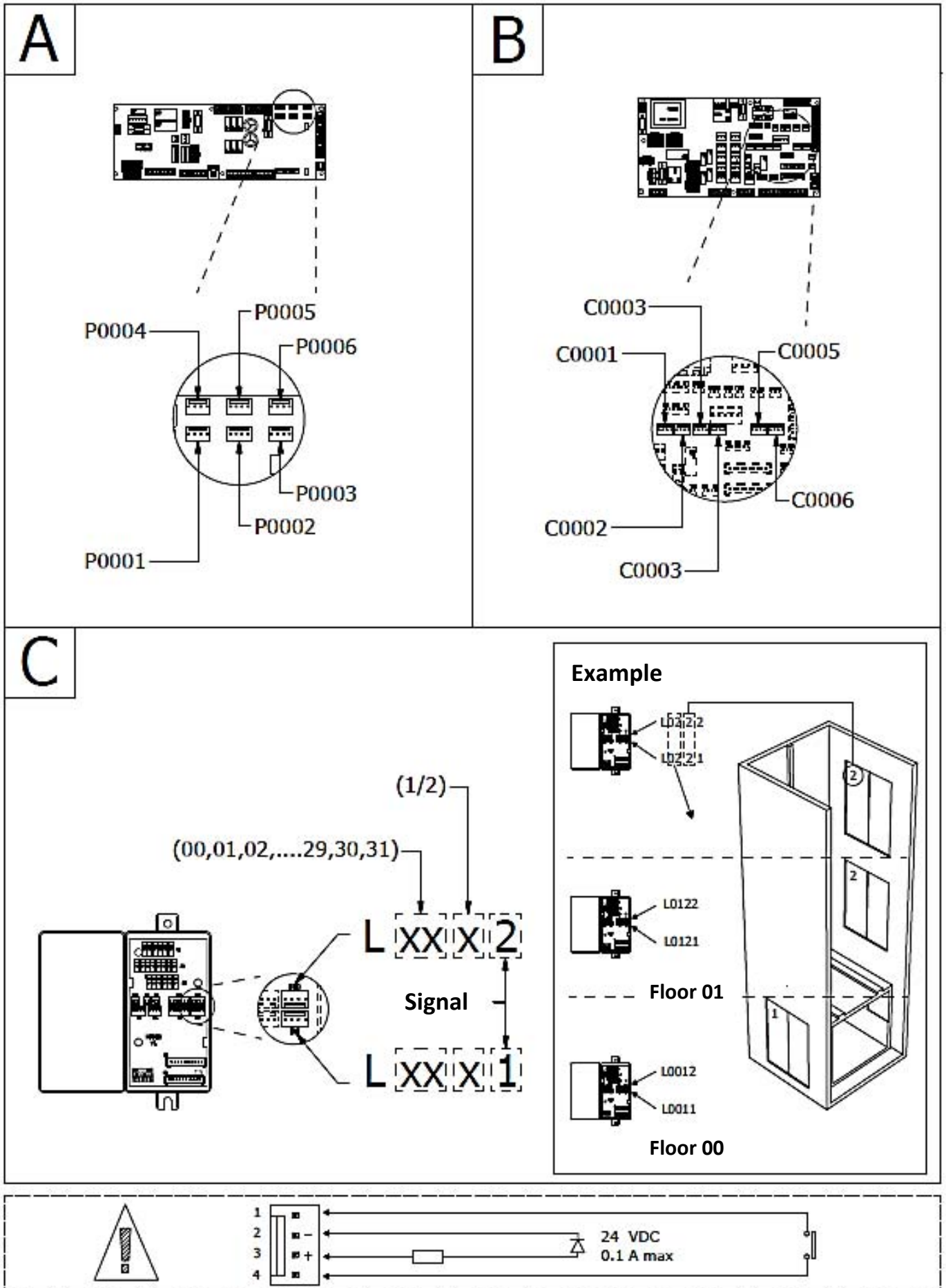
UL2 reads RT000 and RT001 and make the OR logic operation storing the value at RT002. With this, RT002 will be 1 every day between 23:00:00 pm and 1:59:59 am, or if the key switch is at ON position

UL3 and UL4 reads the RT002 value and make a NOT function. If the value is 1, it will be changed to 0 and vice-versa. (A NAND logic unit with both inputs programmed at the same value is a NOT logic unit)

If the outputs “FI 05 COP disable” and “FI 05 LOP disable” are 1, then the COP and LOP pushbuttons of floor 5 are disabled. Because of this we use UL3 and UL4 to change the value of RT002 (remember that RT2 is 1 during the opening hours of the music bar or if the key switch is ON).

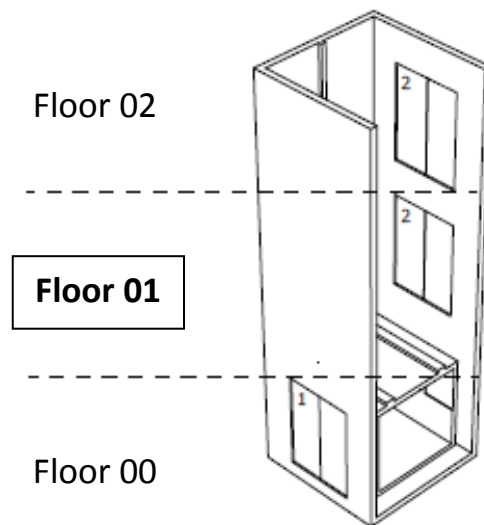
Annexes and Examples

Annex 1. Inputs and outputs available for Hidra Crono

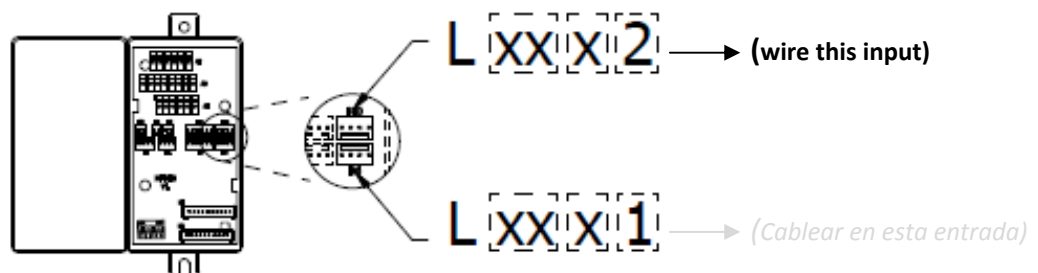


Example of menú settings

-If it is required to connect a fire signal in the FLOOR 01



-It will be wired to the FLOOR 01 MP module that serves that door, and it can be wired in any of the two possible inputs.

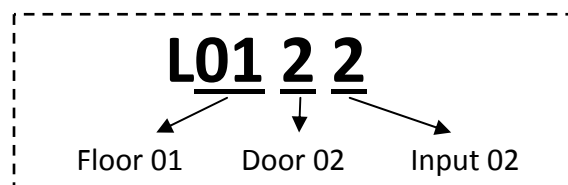


- Configure the setup menu to adjust the lift controller.

02.10.01.04 - Main alarm signal

Defines where the main alarm signal EN81-73 is connected

Set...





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