

DLI-P360L family

Extended range DALI-2 PIR sensor



Description

The DLI-P360L is a 360° PIR sensor to detect presence and/or movement in indoor installations with a built-in luxmeter, and temperature sensing, providing 3 products in one.

It is part of the Carlo Gavazzi building automation system and can be used to control lights, roller-blinds, air-conditioning, intruder alarms and all the other functions supported by the system, in an automatic way, so to implement energy-saving solutions based on people-presence.

This sensor is completely programmable and operated by UWP 4.0 or any DALI-2 controller.

Benefits

- **Standard:** DALI-2 certified solution, for plug'n play integration into Carlo Gavazzi systems or any DALI-2 based installation
- **Future proof:** thanks to the DALI-2 standard, this is a future proof solution, with no lock-in effect
- **Fast and easy installation:** either using Carlo Gavazzi UWP 4.0 or any DALI-2 compatible controller, a friendly and smooth commissioning experience is granted to installers and system integrators.
- **High noise immunity.** It can run next to power cables.
- **Scalability.** New modules can be progressively integrated into the system according to the application needs.
- **Multifunction:** the PIR sensor provides 3 functions at the same time: presence detection, lux-metering, temperature sensing

Applications

Building automation, BEMS (short of Building Energy Management Systems), Energy Saving.

Main functions

- Monitoring energy control systems so as to check energy efficiency status and improvements.
- Recording, displaying and transmitting information (events and history)
- Defining logical functions, reacting to abnormal conditions and control actuators
- Setting up and operating Building Automation functions
- Setting up and operating Lighting Control functions and DALI-2

Main features

- Detection range: DLI-P360L7xxx Ø 14 m at 2.7 m, DLI-P360L24xxx Ø 24 m at 2.7 m
- Mounting height: DLI-P360L7xxx 2 m....8 m, DLI-P360L24xxx 2 m6 m
- Detection angle: 360°
- Presence and movement detection
- Integrated daylight sensor: light measuring range 0 to 80 klux
- Indoor and outdoor installation
- Powered by the bus

Features

General

Material	White plastic (ABS/TBD), RAL9003
Dimensions	Surface: \varnothing 96.5 x 70.6 Built-in: \varnothing 95.0 x 81.5
Weight	25 g
Protection degree	DLI-P360L: IP20 DLI-P360L...O: IP55
Pollution degree	3 (IEC 60664)

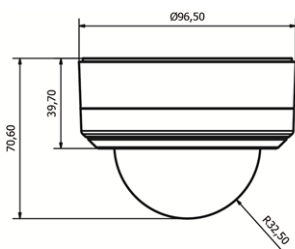


Fig. 1 Surface version

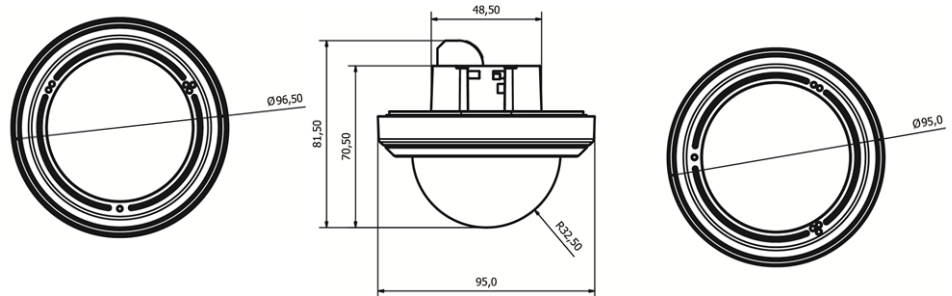


Fig. 2 Built-in version

Environmental




Operating temperature	-20 °C to +50 °C (-4 °F to 122 °F)
Storage temperature	-50 °C to +85 °C (-58 °F to +185 °F)
Humidity (non-condensing)	20 to 90% R.H.

Power Supply

Power Supply	Supplied by bus
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Compatibility and conformity

Electromagnetic compatibility (EMC) - immunity	EN 61000-6-2
Electromagnetic compatibility (EMC) - emissions	EN 61000-6-3
Approvals	  

DALI-2

Voltage	16 V
Maximum DALI-2 voltage	20.5 V
Minimum DALI-2 voltage	0 V
Maximum DALI-2 current	10 mA
Typical DALI-2 current	6 mA
Maximum start-up time	1200 ms

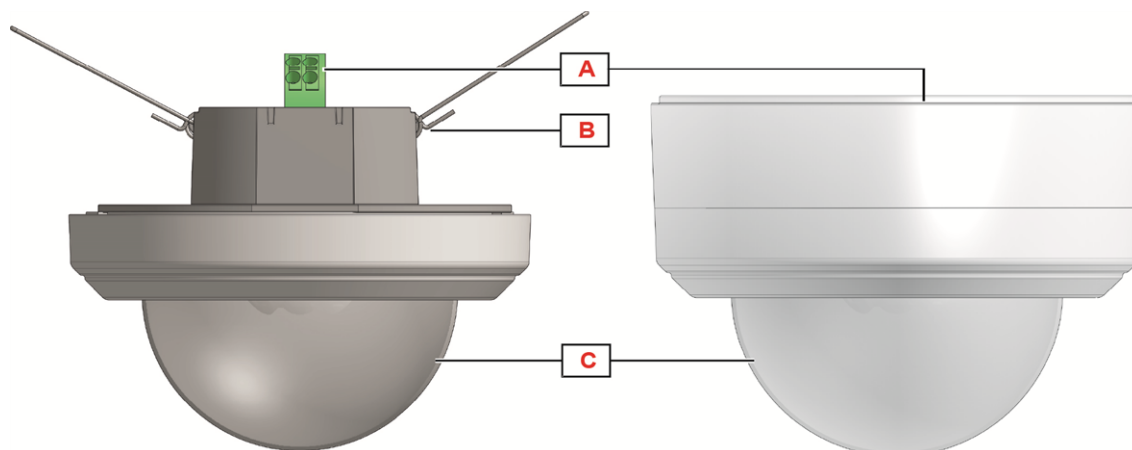
Input specifications

PIR	DLI-P360L24...: 3 pyroelectric sensors	Detection angle: 360° Detection range: Ø 24 m, @2.7
	DLI-P360L7...: 1 pyroelectric sensor	Detection angle: 360° Detection range: Ø 14 m, @ 2.7 m
	Configurable detection signals	Presence (central zone @ 5 m), movement, alarm. Each of this signals has independent filter
Luxmeter	Range: 0..80000 lux (resolution 1 lux) Measurement drift across temperature (typ): 0.01 %/°C	
Temperature	Range: -40 °C to +60 °C Resolution: 0.1 °C	

Output specifications

LED	3 white / 3 blue. The LEDs are used as feedback for presence (white) or movement (blue).
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Structure



Area	Description	Function
A	DALI-2 [®] bus	Detachable 2 x spring terminals, 1.5 mm ²
B	Mounting brackets	For built-in mounting
C	Sensing elements and LEDs	3 pyroelectric sensors Three white LEDs, three blue LEDs

Mode of operation

This PIR sensor responds to any fluctuation in infrared heat radiation, so any object or human presence changes the thermal image detected by the sensor when entering its field of vision.

The sensor is equipped with a segmented lens that divides the field of vision into active and passive zones (zones not visible to the sensor, see figure 3).

When a heat source crosses these zones, the sensor detects the change in infrared radiation and presence and/or movement are recognised.

How sensitive and fast the sensor has to be to detect presence and/or movement can be programmed by means of four parameters, by means of UWP 4.0 or any DALI-2 controller.

Mode of detection

A: one border between the active and the passive zone has to be crossed to give a pulse signal. This option has to be selected for presence detection and movement and turns the light on as soon as a person moves from an active to a passive area or vice versa (very quick response).

B: two borders have to be crossed to give a pulse signal. The person has to move from an active area to another active area, passing through a passive one or vice versa.

This option is recommended for sensors used in the intruder alarm function, in order to avoid false alarms.

Sensitivity

A number can be set from 3 to 100: the smaller this value is, the longer the detection distance, but the higher the sensitivity to heating sources. In the figures 4, 5, 6 and 7, examples of different sensitivity can be seen.

Please refer to the following memory map (2) for the occupancy sensor instance:

Address	Description	Default value (factory)	RESET value	Memory type	Valid range
0x00	Address of last accessible memory location	0x06	No change	ROM	N.A.
0x01	Indicator byte	0x02	No change	ROM	N.A.
0x02	Memory bank lock byte	0xFF	0xFF	RAM	[0x55], [0xFF]
0x03	PIR Filter Mode	0	0	NVM	[0, 5]
0x04	PIR Pulse Window Time	0	0	NVM	[0, 30]
0x05	PIR Pulse Number	1	1	NVM	[1, 8]

Address	Description	Default value (factory)	RESET value	Memory type	Valid range
0x06	Active PIRs	0x7	0x7	NVM	[0x1, 0x7]
0x7..0xFF	Not implemented	NO	No change	N.A.	

Number of pulses

The number of pulses is calculated according to mode A or B before sending a people detection message to the controller. This can be set from 1 to 8.

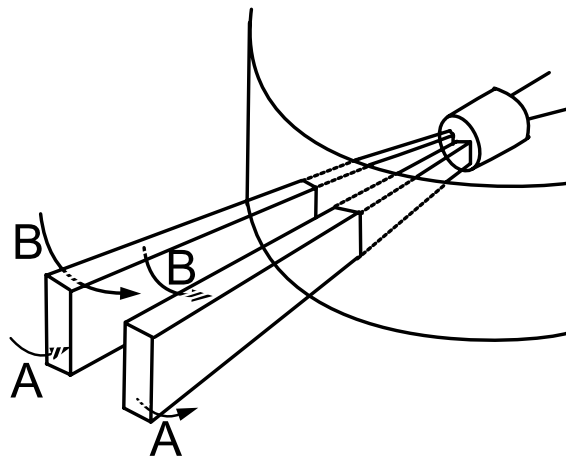


Fig. 3 Active and passive zones

Time window

This is the time interval within which the predefined number of pulses is detected. It can be set from 1 to 10 seconds.

In the table below is an example of settings which, of course, might depend on environmental conditions, application and type of installation.

	Presence	Movement	Alarm
Mode of detection	A	A	B
Sensitivity	10..30	30..70	50..100
Number of pulses	1	1	3
Time window	10	2	10

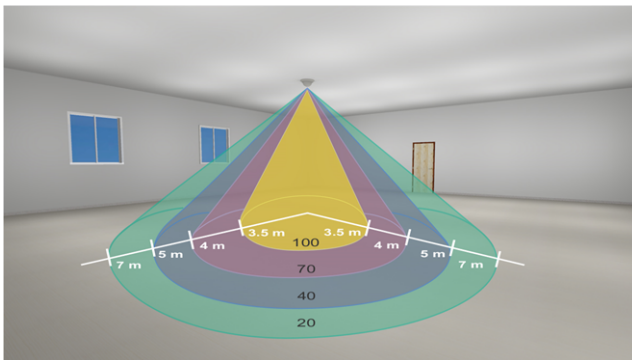


Fig. 4 Detection area vs. sensitivity - DLI-P360L7...

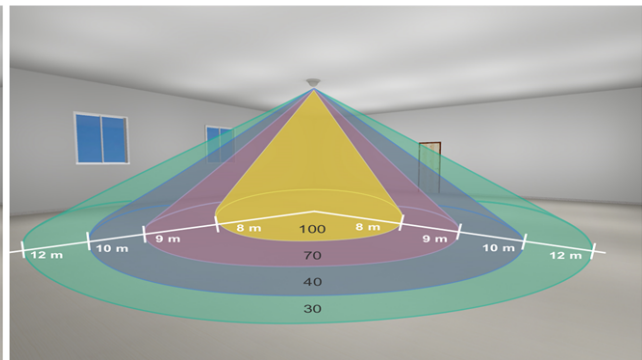


Fig. 5 Detection area vs. sensitivity - DLI-P360L24...

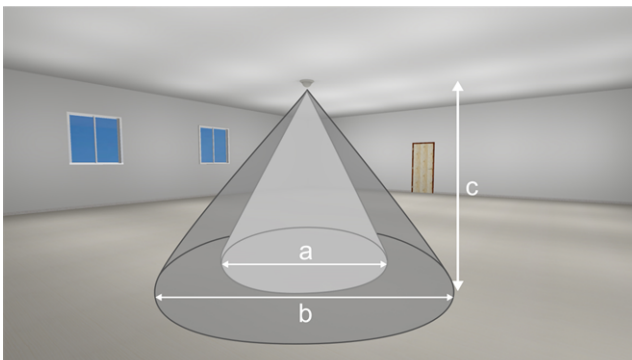


Fig. 6 Detection area - DLI-P360L7...

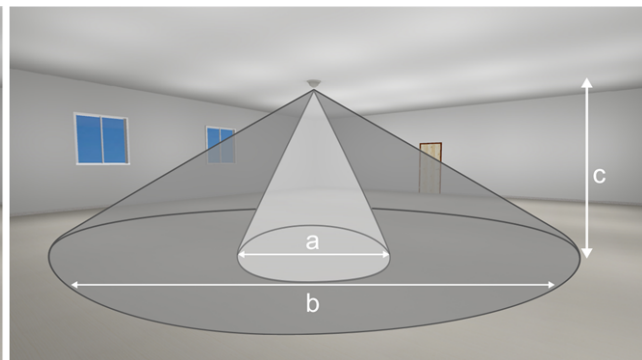


Fig. 7 Detection area - DLI-P360L24...

DLI-P360L7...			DLI-P360L24...		
Height (c)	Presence (a)	Movement (b)	Height (c)	Presence (a)	Movement (b)
2.4 m	5 m	12 m	2 m	5 m	20 m
2.7 m - 3 m	5 m	14 m	2.4 m	5 m	22 m
3 m - 8 m	5 m	16 m	2.7 m - 3 m	5 m	24 m
			3 m - 6 m	5 m	26 m

Light sensing

Please refer to the following memory map (3) for this instance:

Address	Description	Default value (factory)	RESET value	Memory type	Valid range
0x00	Address of last accessible memory location	0x06	No change	ROM	N.A.
0x01	Indicator byte	0x03	No change	ROM	N.A.
0x02	Memory bank lock byte	0xFF	0xFF	RAM	[0x55], [0xFF]
0x03	Input value resolution	0x0C	0x0C	NVM	[0x01, 0x0C]
0x04	Refresh time [ms]	0x3E8	0x3E8	NVM	[0x00, 0xEA60]
0x05					
0x06	Wait Led OFF condition	DISABLED	DISABLED	NVM	[ENABLED, DISABLED]
0x07..0xFF	Not implemented	NO	No change	N.A.	

The sensor provides light sensing with a combination between resolution and range according to the following table:

Resolution index	Brightness resolution [lux]	Maximum value [lux]
0x0	0.01	40.95
0x1	0.02	81.90
0x2	0.04	163.80
0x3	0.08	327.60
0x4	0.16	655.20
0x5	0.32	1310.40
0x6	0.64	2620.80
0x7	1.28	5241.60
0x8	2.56	10483.20
0x9	5.12	20966.40
0xA	10.24	41932.80
0xB	20.48	83865.60
0xC	AUTO	AUTO

Temperature sensing

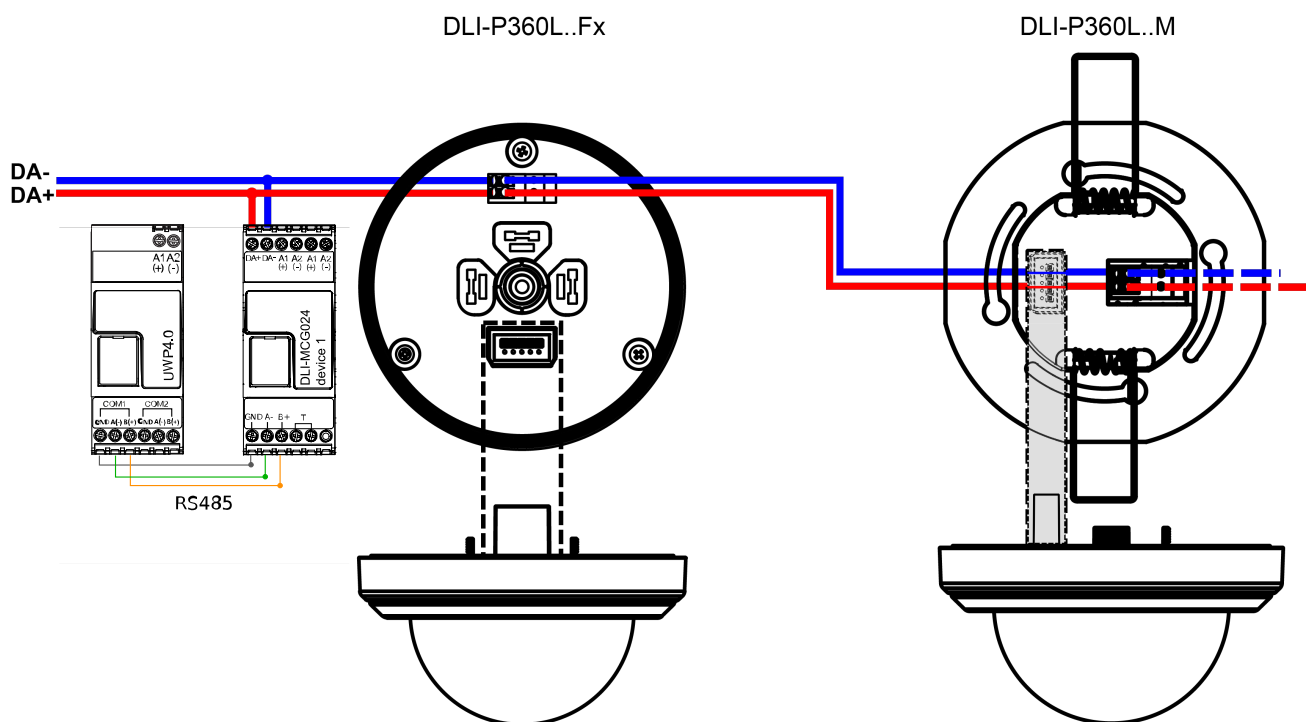
Please refer to the following memory map (4) for this instance:

Address	Description	Default value (factory)	RESET value	Memory type	Valid range
0x00	Address of last accessible memory location	0x05	No change	ROM	N.A.
0x01	Indicator byte	0x04	No change	ROM	N.A.
0x02	Memory bank lock byte	0xFF	0xFF	RAM	[0x55], [0xFF]
0x03	Input value decimals	0x01	0x01	NVM	[0x01, 0x04]
0x04...0x05	Refresh time [ms]	0x3E8	0x3E8	NVM	[0x00, 0xEA60]
0x06...0xFF	Not implemented	NO	No change	N.A.	

The sensor provides temperature sensing with range from -40 °C to +60 °C, with resolution 0.1 °C. Please refer to the following table to see how the number of decimals affects the temperature resolution:

Number of decimals	Temperature resolution	Minimum refresh time
1	0.5 °C	30 ms
2	0.25 °C	60 ms
3	0.125 °C	120 ms
4	0.0625 °C	240 ms

Connection diagrams



References

Further reading

Document	Where to find it
UWP IDE manual	www.gavazziautomation.com/UWPIDE_ENG.pdf
DLI-P360L24M DALI certification	www.dali-alliance.org/products/6196/extended-range-dali-2-pir-sensor
DLI-P360L24MF DALI certification	www.dali-alliance.org/products/6223/extended-range-dali-2-pir-sensor-flush-mount
DLI-P360L24MFO DALI certification	www.dali-alliance.org/products/6224/extended-range-dali-2-pir-sensor-flush-mount-ip55
DLI-P360L7M DALI certification	www.dali-alliance.org/products/6225/extended-range-dali-2-pir-sensor-7m
DLI-P360L7MF DALI certification	www.dali-alliance.org/products/6226/extended-range-dali-2-pir-sensor-7m-flush-mount
DLI-P360L7MFO DALI certification	www.dali-alliance.org/products/6227/extended-range-dali-2-pir-sensor-7m-flush-mount-ip55

How to order

 DLI P360L

Complete the code entering the corresponding option instead of

Code	Option	Description
DLI	-	DALI-2
P	-	PIR sensor
360		Detection angle
L		Luxmeter
<input type="checkbox"/>	24M	452 m ² Detection area
	7M	154 m ² Detection area
<input type="checkbox"/>	F	Surface
<input type="checkbox"/>	O	IP55 - available only with F (surface) version

Mounting	Distance	Detection area	Protection degree	Code
Built-in	24 m	452 m ²	20	DLI-P360L24M
Built-in	14 m	154 m ²	20	DLI-P360L7M
Surface	24 m	452 m ²	20	DLI-P360L24MF
Surface	24 m	452 m ²	55	DLI-P360L24MFO
Surface	14 m	154 m ²	20	DLI-P360L7MF
Surface	14 m	154 m ²	55	DLI-P360L7MFO

CARLO GAVAZZI compatible components

Purpose	Component name/code
Controller	UWP 4.0
Bus generator	DLI-MCG024



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