Just do it yourself ;)

Datasheet ITSLUX Illuminators models I1516, I1522, I3016, I3022, I6022, I6090, W6032 and W6075

PUMATRONIX
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This document is intended to provide technical information on Pumatronix new ITSLUX series, providing detailed installation process and features.

ITSLUX new illuminator line presents significant reduction in energy consumption. Thus, a power supply of 1A can be used for 24Vdc equipment. Real-time information about ITSLUX status is available when it is connected to ITSCAM. This status information corresponds to operating temperature and electrical problems like internal short circuit, burned LEDs (including the location of the defect) and capacitor voltage level.

1. Overview

ITSLUX is an electronic light emitting device designed to capture nighttime images. The equipment emits pulsed light and it works like a photographic flash lamp. Pumatronix illuminators are activated during the exposure time of the image sensor (shutter) and require little time to recharge. Thus, there is energy saving, increasing of LED life and reducing of the amount of necessary LEDs.

There are various illuminator models, distinguished by the distance (between the object that needs to be captured and the illuminator) and light type.

Series	Model*	Emitting angle	Recommended capture distance
Infrared	I1516	16°	15 to 21m
	I1522	22°	4 to 8m
	I3016	16°	15 to 28m
	I3022	22°	4 to 14m
	I6022	22°	4 to 21m
	I6090	90°	0 to 3m
White	W6032	32°	4 to 12m
	W6075	75°	2 to 8m
Video	W6032 Video	32°	4 to 8m
	W6075 Video	75°	2 to 4m

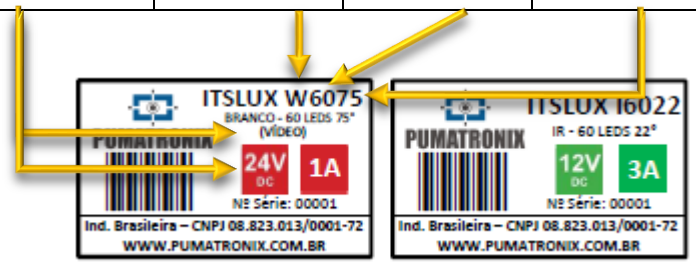
* All models can operate with 12Vdc. In this case, illuminator has 12Vdc on its label

There is equivalence between older Pumatronix Illuminators and the new ITSLUX Series, according to the table:

Equivalence between Pumatronix illuminators	
ITSLUX 150	ITSLUX I3022
ITSLUX 300	ITSLUX I6022
ITSLUX 150-60	ITSLUX I6090
SUPERLUX 150	ITSLUX I1516
SUPERLUX 300	ITSLUX I3016
WHITELUX-32	ITSLUX W6032
WHITELUX-75	ITSLUX W6075
WHITELUX VIDEO-32	ITSLUX W6032 Video
WHITELUX VIDEO-75	ITSLUX W6075 Video

Pumatronix ITSLUX model identification follows the code:

Characteristics	LED type	Amount of LEDs	Emitting angle
Video and/or 24 or 12 Volts	I Infrared W white	15, 30 or 60	16°, 22°, 32°, 75° or 90°



2. Risks

Electrical Shock Risk: Do not open illuminator because there are no parts to repair or for configuration. Send the equipment to Pumatronix Technical Assistance for maintenance.

Vision Damage Risk: Illuminators emit thermal energy and light energy (not visible in infrared models), so it is not recommended to look directly or using any optical device at the LEDs.

Oxidation Risk: The electrical and signal connections made on ITSLUX cable must be protected in enclosure box or similar structure to avoid connection oxidation and unwanted infiltration of liquids into the cable and consequently ITSLUX.

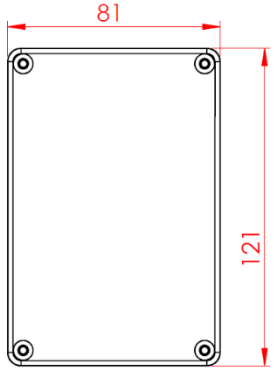
3. Mechanical Specification

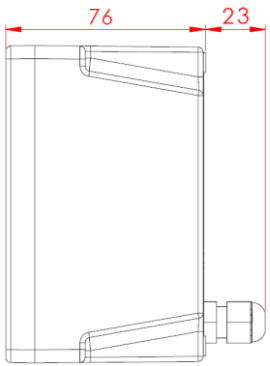
ITSLUX illuminator series I and W have equivalent mechanical properties regarding case, installation and operating temperature.

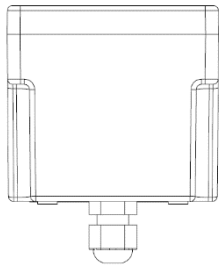
Approximated weight	500g
Case	Polycarbonate with IP67 protection
Installation	Stainless screws pan head self tapping 4,8x13mm (not included because the length varies depending on the application)
Operating temperature	-10°C to 60°C
Dimensions	121mm x 81 mm x 76 mm

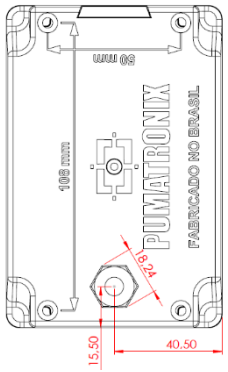
ITSLUX model with power cord on the backside is out of order. Technical specifications for this model are just for your information.

FYI: Tech Design of Backside Power (This version of ITSLUX is currently out of order)

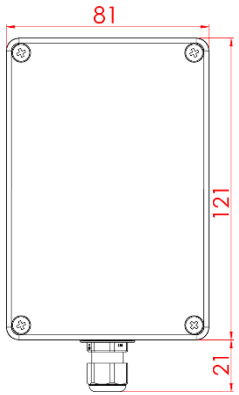


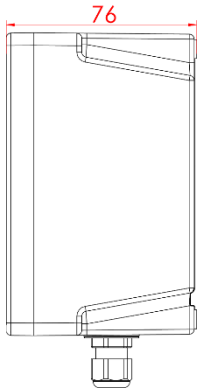


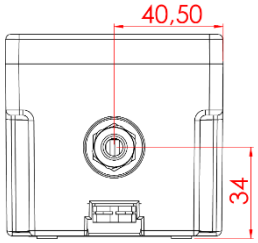


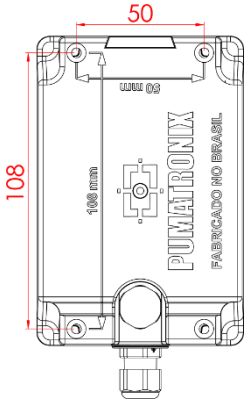


ITSLUX Tech Design (Bottom Power Supply Input)









RETORNA AO INÍCIO

3.1. ITSLUX Installation Support

ITSLUX illuminators have UV protection and the product can be installed outside without protection. Although, Pumatronix recommends installing ITSLUX with some sort of support that covers it, protecting ITSLUX from vandalism and direct case sunlight exposure. This protection can prolong ITSLUX lifetime far from warranty time.

It is possible to develop the support that protects ITSLUX from vandalism and sunlight or buy it from Pumatronix. It is also possible to require the Pumatronix model technical specifications to manufacture it in a proper dealer.

4. Overheating Protection

ITSLUX has an internal temperature monitoring system that turns itself off, if temperature exceeds the limit. When internal temperature returns to acceptable values, operation is automatically restored.

5. Electrical Specifications

	Wavelength
Infrared light	850nm

Power Supply	**24 to 32Vdc**	
Stand By	1W	
Medium Current (maximum shot cycles)	I1516, I1522, W6032, W6075	240mA
	W6032 Video, W6075 Video	360mA
	I3016, I3022	480mA
	I6022, I6090	960mA
Peak Current	I1516, I1522, W6032, W6075	1A
	W6032 Video, W6075 Video	
	I3016, I3022	
	I6022, I6090	

Power Supply	**12 to 20Vdc**	
Stand By	1W	
Medium Current (maximum shot cycles)	I1516, I1522, W6032, W6075	480mA
	W6032 Video, W6075 Video	720mA
	I3016, I3022	960mA
	I6022, I6090	1.9A
Peak Current	I1516, I1522, W6032, W6075	3A
	W6032 Video, W6075 Video	
	I3016, I3022	
	I6022, I6090	

6. Status LEDs

A bicolor LED at ITSLUX front panel shows device status. This LED is red during startup (about 3 seconds) and its behavior during equipment operation can be factory assigned with one of the following options:

Configuration 1 (default)	LED lights up red during startup and blinks at each shot
Configuration 2	LED stays off all the time
Configuration 3	LED blinks yellow at 0,5Hz and red at each shot
Configuration 4	Custom

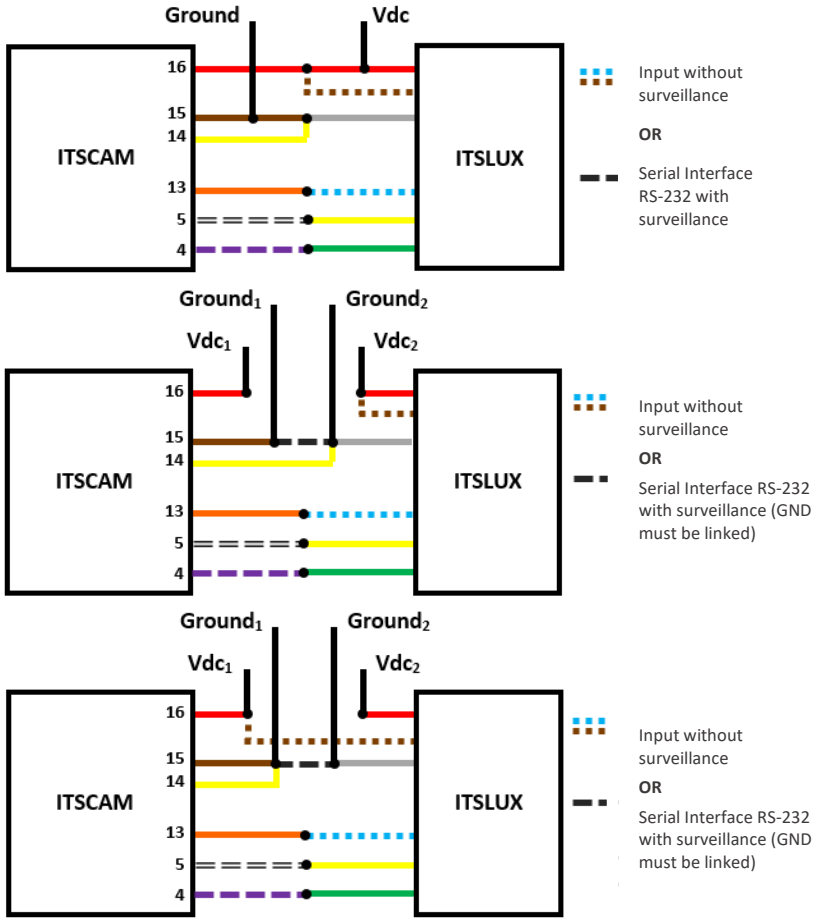
7. Connections

ITSLUX illuminator Series I and W have the same connecting scheme. Remember to share *Ground* signal with the equipment connected to ITSLUX.

Terminal	Signal	Description
Red	V+	Power supply
Gray	GND	Ground
Yellow	RS-232_Tx	Tx communication
Green	RS-232_Rx	Rx communication
Brown	IN+	Positive input
Blue	IN-	Negative input

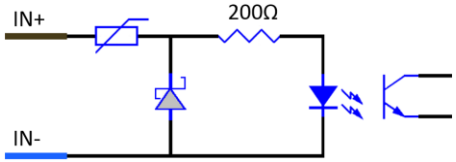
There are three options for connecting ITSLUX with ITSCAM, based on the equipment power supply.

ITSLUX firing: Can be done by serial interface RS-232 or by the wire pair brown/blue. ITSLUX provide surveillance at each shot handled by serial interface.



7.1. Input and Output

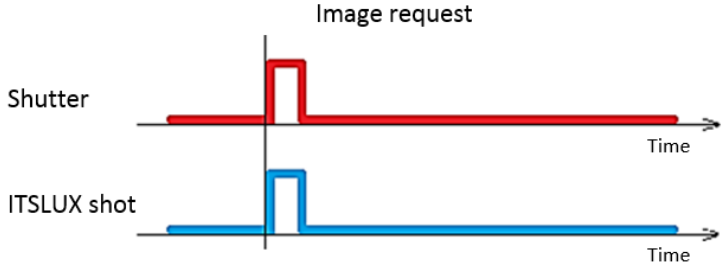
ITSLUX fire input has an optical isolated circuit that allows the connection of capturing equipment other than ITSCAM but compatible with the input.



Information about Illuminator status can be acquired by serial interface RS-232. This interface must be connected directly to ITSCAM or compatible equipment. It is possible to order illuminators compatible with RS-485 serial interface.

8. Firing

ITSLUX emit light during the period in which the input signal is high up to the limit time. In *Infrared* and *Video* models, the maximum time is 2ms, while the *White* model is up to 16ms.



Illuminator maximum lighting time	
ITSLUX I3022 ITSLUX I6022 ITSLUX I6090 ITSLUX I1516 ITSLUX I1522 ITSLUX I3016 ITSLUX W6032 Video ITSLUX W6075 Video	2ms
ITSLUX W6032 ITSLUX W6075	16ms

ITSLUX Series I and W has a real delay of 3µs. It is caused by the delay that occurs between receiving the shot request and the effective light emission.

The amount of shots per second that each ITSLUX Series can perform follows, using regular shutter values (image sensor light exposure). Intermediate shooting capability can be calculated with the desired activation time and the Protection Time required for each illuminator model.

ITSLUX ability of shots per second			
Shutter	**ITSLUX Infrared**	**ITSLUX White**	**ITSLUX Video**
1/60	Not allowed	0,2	Not allowed
1/100	Not allowed	0,4	Not allowed
1/250	Not allowed	1	Not allowed
1/500	4	2	16
1/750	6	3	24
1/1000	8	4	32
1/1500	12	6	64
1/2000	16	8	128

8.1. ITSLUX Multiple Fire

Illuminators of the series I and W except Video models are allowed to make up to four sequential shots with different intensities. Detailed information about shot requests using ITSCAM can be found in its Datasheet (available at www.pumatronix.com.br).

ITSLUX shots are different according to ITSCAM model:

Shot	ITSLUX pulse width using ITSCAM40X
1st	ITSCAM shutter
2nd	20µs
3rd	40µs
4th	Configurable

Shot	ITSLUX pulse width using ITSCAM41X and ITSCAM42X
1st	ITSCAM shutter
2nd	Configurable
3rd	ITSCAM shutter
4th	Configurable

Serial communication allows setting illuminator shot length by sending serial commands.

Shot	Illuminator pulse time using serial interface
1st	ITSCAM shutter
2nd	Configurable
3rd	Configurable
4th	Configurable

8.2. Minimum Shutter Configured with RS-232 Interface

Regardless of the device connected to ITSLUX, a minimum shutter value can be assigned to all exposures required for RS-232. This minimum value is 100 microseconds. Shot time smaller than 100 microseconds need changing on illuminator *maximum light time* and only serial interface can change this setting.

8.3. Protection Time

Pumatronix illuminators have a protection mechanism, which limits shot at maximum intensity to preserve LED integrity, maintaining product durability. Protection Time starts counting at the end of a request and varies according to the illuminator model.

In ITSLUX Video models (that do not support multiple shots), the Protection Time corresponds to 32 times the period in which the illuminator was activated (respecting the maximum shot time of 2ms).

Protection time formula for ITSLUX Video
32 X firing time

Using ITSLUX Infrared model it is possible to perform up to three shots within the protection time. In this case, the non-shot period is 128 times the sum of the lighting interval.

Protection time formula for ITSLUX Infrared
128 X sum of firing time

ITSLUX that emits white light has the longest protection, which is 256 times the period it was triggered. This illuminator also allows three other shots during Protection Time.

Protection time formula for ITSLUX White
256 X sum of firing time

To illustrate ITSLUX Protection Time, it was built a table with main shutter values (image sensor light exposure time):

Illuminator Protection Time			
Shutter	**ITSLUX Infrared**	**ITSLUX White**	**ITSLUX Video**
1/60	Not allowed	4,2s	Not allowed
1/100	Not allowed	2,5s	Not allowed
1/250	Not allowed	1,0s	Not allowed
1/500	256ms	512ms	64ms
1/750	170ms	341ms	44ms
1/1000	128ms	256ms	32ms
1/1500	85ms	170ms	22ms
1/2000	64ms	128ms	16ms

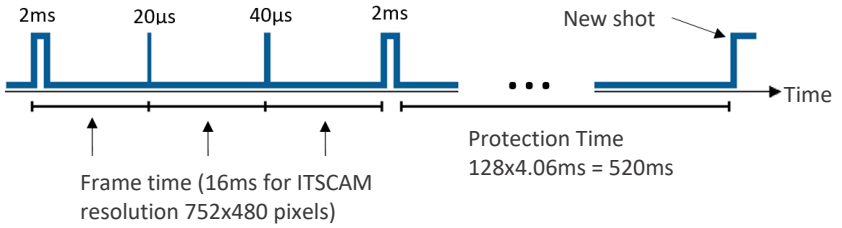
8.3.1. ITSCAM Requesting Multiple ITSLUX Shots Example

The infrared illuminator pulse length corresponds to ITSCAM shutter but limited to 2ms. For the second shot, there is a pause that corresponds to ITSCAM frame time. ITSCAM frame time according to its resolution:

ITSCAM Resolution	ITSLUX shot interval
752 x 480	16ms
800 x 600	20ms
1280 x 720	33ms
1280 x 960	44ms
1920 x 1440	100ms

After the first shot and frame time, other three shots can be performed on the Protection Time. The length of these shots for request made with ITSCAM40X is 20µs, 40µs and another shot up to 2ms (equivalent to ITSCAM shutter). Using ITSCAM41X or ITSCAM42X, the second shot time can be configured by ITSCAM, the third shot is equivalent to shutter and the fourth can be set either.

When light cycle ends, the Protection Time starts counting. In addition, ITSLUX ignores shot requests received after fourth shot during this Protection Time. The figure illustrates using ITSCAM40X (resolution 752x480 pixels and shutter 1/500 or 2ms image sensor light exposure) and an infrared illuminator.



9. ITSLUX Real-Time Status

Illuminators send status information in real-time using serial interface. Thus, ITSCAM or an equivalent structure can remotely analyze ITSLUX data. ITSCAM can also provide this data over network connection.

ITSLUX status informs equipment current temperature and possible electrical problems such as short-circuit, internal capacitor voltage and burned LEDs.

9.1. Communication Protocol

ITSLUX triggers the lighting system as soon as it receives a request and sends a status message right after shooting.

The communication protocol consists of two Bytes. The first Byte corresponds to the value *00h*. The second Byte shows status:

Bit	Meaning
7	Hardware problem. Send the equipment to Pumatronix Tech Support for maintenance
6	Not implemented
5	
4	
3	
2	Incorrect voltage
1	Overheating
0	LED lines not fully operational on last shot

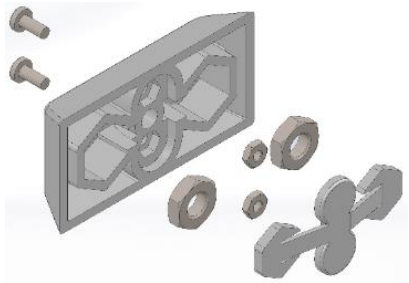
Successful shots return 2 Bytes with value *00h*

List of possible outcomes of the second Byte of the Communication Protocol:

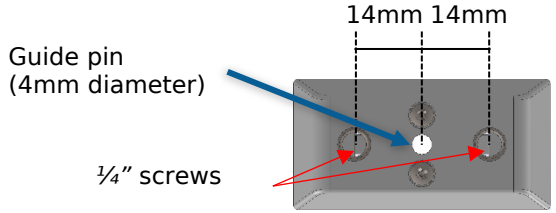
2nd Byte value	Bit 7	6	5	4	3	2	1	0	Meaning
00h	0	0	0	0	0	0	0	0	Successful shot
01h	0	0	0	0	0	0	0	1	Not all LEDs were fired
02h	0	0	0	0	0	0	1	0	ITSLUX overheating
03h	0	0	0	0	0	0	1	1	Burned LEDs and overheating
04h	0	0	0	0	0	1	0	0	Incorrect voltage
05h	0	0	0	0	0	1	0	1	Incorrect voltage and burned LEDs
06h	0	0	0	0	0	1	1	0	Incorrect voltage and overheating
07h	0	0	0	0	0	1	1	1	Incorrect voltage, overheating and burned LEDs
80h	1	0	0	0	0	0	0	0	**ITSLUX damaged. Send the equipment to Pumatronix Technical Assistance for maintenance**
81h	1	0	0	0	0	0	0	1	
82h	1	0	0	0	0	0	1	0	
83h	1	0	0	0	0	0	1	1	
84h	1	0	0	0	0	1	0	0	
85h	1	0	0	0	0	1	0	1	
86h	1	0	0	0	0	1	1	0	
87h	1	0	0	0	0	1	1	1	

10. Tripod Installation Kit

ITSLUX tripod installation kit allows easy setup for testing and for installation adjustments. It is an accessory sold separately that has several pieces, grouped as figure shows:



The illuminator must be installed using the kit with two screws ¼". These screws are not included, since the size varies according to the installation site.



Tripod Installation *Kit is meant for temporary use only: For* Long time use attachment must be done on ITSLUX backside and with proper screws.

10.1. Installing ITSLUX Using Tripod Kit

- Insert the kit on the rail (at the top of the illuminator). Included screws should be untightened so that it slides on rail
- Tighten the screws in order to attach the kit to ITSLUX. It is recommended to tight the screws simultaneously, thus the illuminator keeps installation perpendicularity
- Affix ITSLUX to desired surface using ¼" screws and guide pin

suporte@pumatronix.com.br

Datasheet ITSLUX Illuminators models I1516, I1522, I3016, I3022, I6022, I6090, W6032 and W6075

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