



# PHOXENE

FLASH TECHNOLOGY

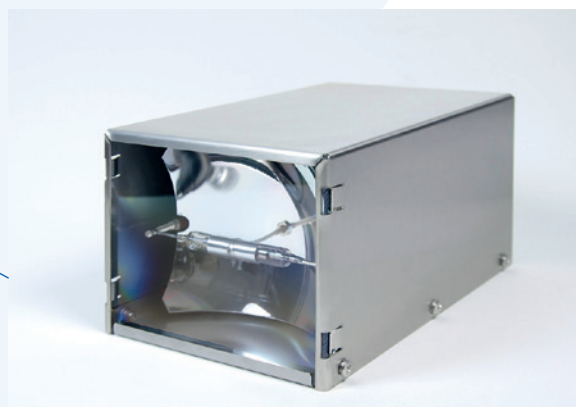
## TRAFFIC ENFORCEMENT PHOXENE PRODUCT GUIDE

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## PHOXENE PRODUCT RANGE

**Fx-1**



**Fx-2**



**Fx-D**



For over 25 years, Phoxene has acquired know-how in the technical design, manufacture and sale of flash tubes and flash illuminators, for applications such as professional photography and imaging systems.

### WHAT MAKES TRAFFIC ENFORCEMENT A SPECIAL CASE IN PHOTOGRAPHY?

When producing a photo or video of an enforcement scenario, the resulting image constitutes the proof of the infringement and the use of image correction software is usually very limited. Consequently, the raw image must be readable and interpretable. Also, from a photographic point of view, the scenes to be captured are challenging: the speed and range of the target vehicle vary greatly, as do the ambient light levels and the equipment has to work in a variety of road configurations. The images must accurately show details such as the licence plate, the driver and the illumination state of any traffic signals. Moreover, traffic enforcement is by nature an intensive, outdoor photo application, adding further constraints to the system's reliability, maintainability and operability.

### WHY IS THE FLASH SO IMPORTANT?

The intensity of the illumination and its homogeneity over the scene are obviously key factors to producing a readable image. But the flash is also important for the overall system's performance – a flash with a fast repetition rate, remote control and dynamic light adjustment is critical to developing a smart and efficient system. Finally, a high-quality and reliable flash strongly helps to reduce acquisition and system ownership costs by enabling the use of a medium-priced and average sensitivity camera, increasing the MTBF and requiring only limited and straight-forward maintenance.

### WHY CHOOSE A PHOXENE FLASH?

To simplify and speed-up your enforcement system development, Phoxene would be glad to share its experience on enforcement imaging with you and to loan you off-the-shelf prototypes for your first trials. Phoxene offers a wide range of options, from the basic to the most sophisticated, and you are sure to find your perfect flash, in terms of both performance and cost. Then, when it comes to deployment and production, you will benefit from Phoxene's proven manufacturing experience of flash illuminators dedicated to traffic enforcement.

### WHAT IS THE PHOXENE PRODUCT RANGE?

When seeking a traffic enforcement flash illuminator, the flash characteristics required are directly linked to the enforcement scenario.

Read on to discover Phoxene industrial expertise and proprietary technologies embedded into the Fx Flash Illuminator product range.

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Give us a call or send a mail to [phoxene@phoxene.com](mailto:phoxene@phoxene.com)



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	Fx-1	Fx-2	Fx-D
Standard beam angles (11° x 36°)	✓	✓	✓
Extended beam angles in option (20° x 36°)	✓	✓	✓
Narrowed beam angles in option (8° x 32°)	✓	-	✓
On-request beam angles (up to 50° x 80°)	✓	✓	✓
Pulse duration (µs)	300	300	300
Default Guide Number at 100 ISO (f-stop.metre)*	50	40	50
Distance for well exposed picture, 400 ISO, f2.8 (metre)*	35	28	35
Max. number of shots in a 50Hz burst before recharge*	4	3	8
Max. number of shots in a 1Hz burst before recharge*	12	10	24
Maximum repetition rate (Hz), 24/24h at 25°C*	0,75	0,75	0,75
Minimum time between shots (ms)	10	10	10
Number of energy levels accessible thru triggers	2	2	2
Option : Monitoring and Control interface	✓	✓	✓
Option : Energy adjustment interface	✓	✓	✓
Option : Back panel switch for energy adjustment	✓	-	✓
Option : Light colour Red or Infrared	✓	✓	✓
Overall dimensions (l x w x h) with stainless steel casing (mm)	224 x 144 x 112	162 x 140 x 102	212 x 114 x 112**
Supply voltage (V)	12	12	12
Maximum conversion power (W)	66	66	66
Idle consumption (W)	< 2	< 2	< 2
Operating ambient temperature (°C)	-20 to +55	-20 to +55	-20 to +55
Lamp lifespan (number of shots)	300 000	300 000	300 000

\* at default energy of 60J per shot except for FX-2 : 50J  
\*\* dimensions of the electronic block





## GEOMETRY OF THE ENFORCEMENT SCENE

### GETTING LIGHT ONLY WHERE YOU NEED IT

One reason the Phoxene flash is so efficient is its optical beam, which has a rectangular shape.

Traffic enforcement scenes to be captured must show the target vehicle and its licence plate, and sometimes the driver and a red light signal- but not necessarily surrounding trees or urban property.

The rectangular beam geometry maximizes the amount of light where it is needed, with homogeneity of intensity across the beam area of 1 f.stop.

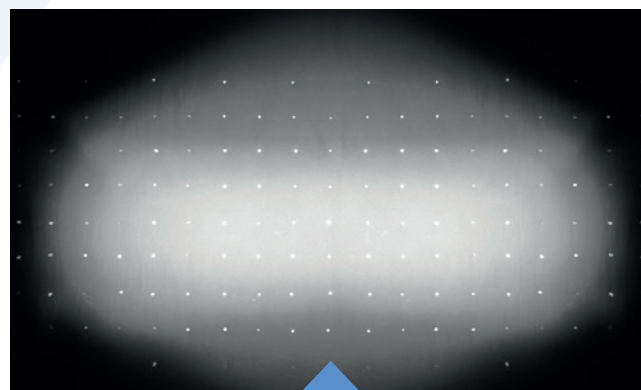
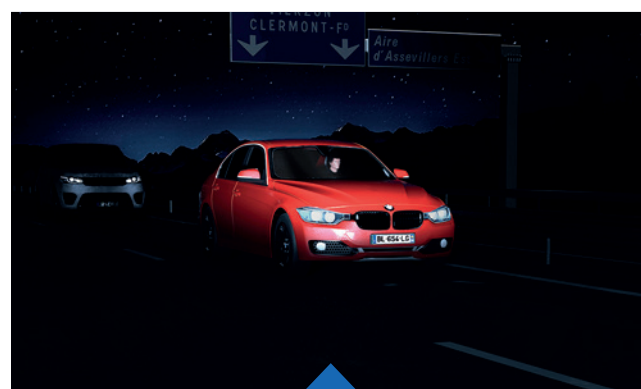
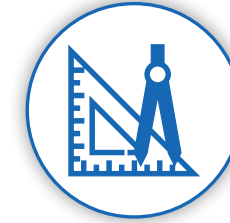


Image of the beam from a Phoxene flash projected onto a graduated black screen

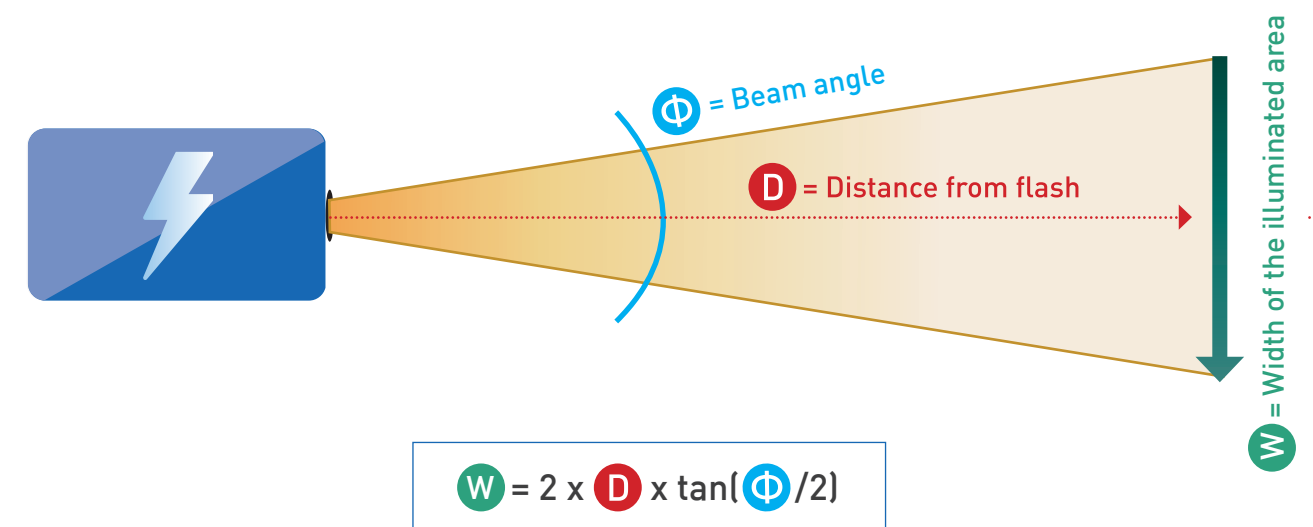


Typical image with Phoxene rectangular beam



### BRINGING LIGHT TO THE SCENE YOU WANT TO CAPTURE

The light emitted by a flash illuminator is in the form of a cone. Consequently, the farther away the target is, the wider the illuminated area.



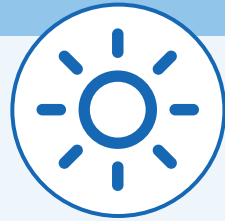
When the minimum and maximum distances to the target vehicle and the required width and height of illumination area are known, the flash light cone angles can be selected to maximize the resulting illumination of the car and/or the lanes.

Phoxene offers a selection of beam angles to match different requirements.

ON THE FX RANGE, THE STANDARD BEAM ANGLES AVAILABLE (VERTICAL X HORIZONTAL) ARE:

Standard:  $11^\circ \times 36^\circ$  — Extended:  $20^\circ \times 36^\circ$  — Narrow:  $8^\circ \times 32^\circ$

Custom designs can be made to meet other beam angle requirements.



## POWER OF LIGHT

### A FLASH TO FREEZE THE MOVEMENT

The Phoxene illuminators benefit from the use of a switch-off technology: part of the electrical energy stored in the capacitors is released in a very short pulse with an accurate control of the energy injected into the lamp.

This produces a very intense, short and powerful light pulse which provides superb illumination, and freezes the movement of the target vehicle, leading to a crystal clear picture.

PULSE DURATION RANGE OF THE FX ILLUMINATORS  
ARE: **100  $\mu$ s – 300  $\mu$ s**

### WHAT MAKES AN ENFORCEMENT SCENE BRIGHTER?

When considering how to illuminate an enforcement scene situated far from the illuminator, one traditionally thinks of the electrical energy, and considers the number of Joule given in specifications as the expression of quantity of light illuminating the picture.

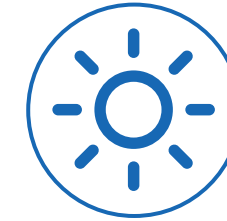
This can be misleading by a factor 10 or more! There is a vast difference between electrical energy stored in an illuminator's capacitors and the photons hitting the target.

GUIDE NUMBER (GN) = HOW INTENSE IS THE BEAM OF LIGHT

With flash technology, whatever the application, the guide number (GN) is the parameter that defines how much light actually illuminates the picture. For details related to the definition of the Guide Number, please refer to the Guide To Photo Traffic Enforcement edited by Phoxene.

GN = Quantity of light @ given distance

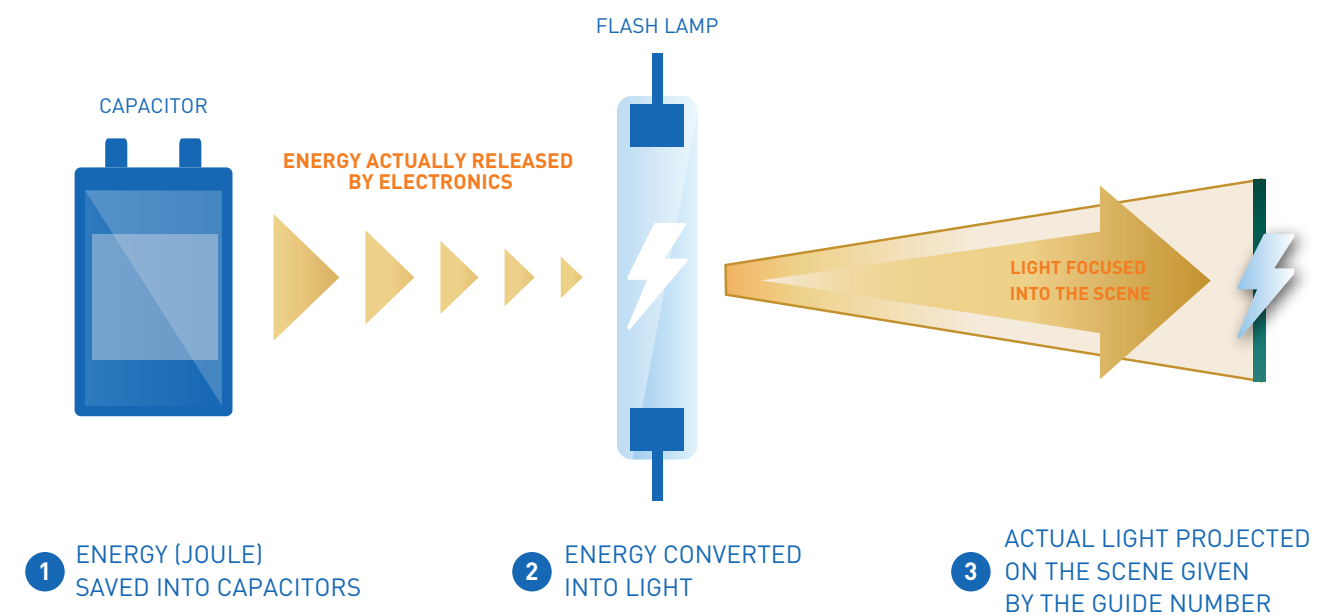
ON THE FX ILLUMINATORS, AVAILABLE GUIDE  
NUMBERS (F-STOP X METRE) ARE: **30 – 50 – 60**

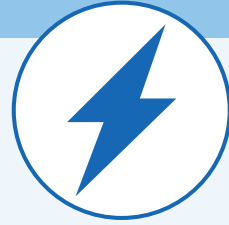


### THE BRIGHTEST LIGHT FOR THE SMALLEST POWER CONSUMPTION

Phoxene has specifically designed compact flash illuminators for traffic enforcement and developed electrical and optical features to maximize the energy efficiency:

- with the Phoxene proprietary discharge technology the lamp voltage is kept high for the duration of the flash pulse, maximizing lamp efficiency and minimizing electrical losses.
- the lamps integrated into Phoxene illuminators are manufactured to Phoxene specifications by long established companies recognized for their premium quality tubes. Their conversion rate from electricity into light is at the highest possible level.
- the Phoxene proprietary optical design concentrates the emitted light into a cone, targeting the enforcement scene with little light wasted.



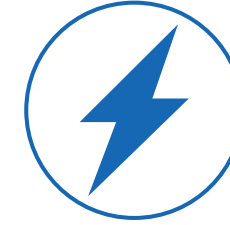
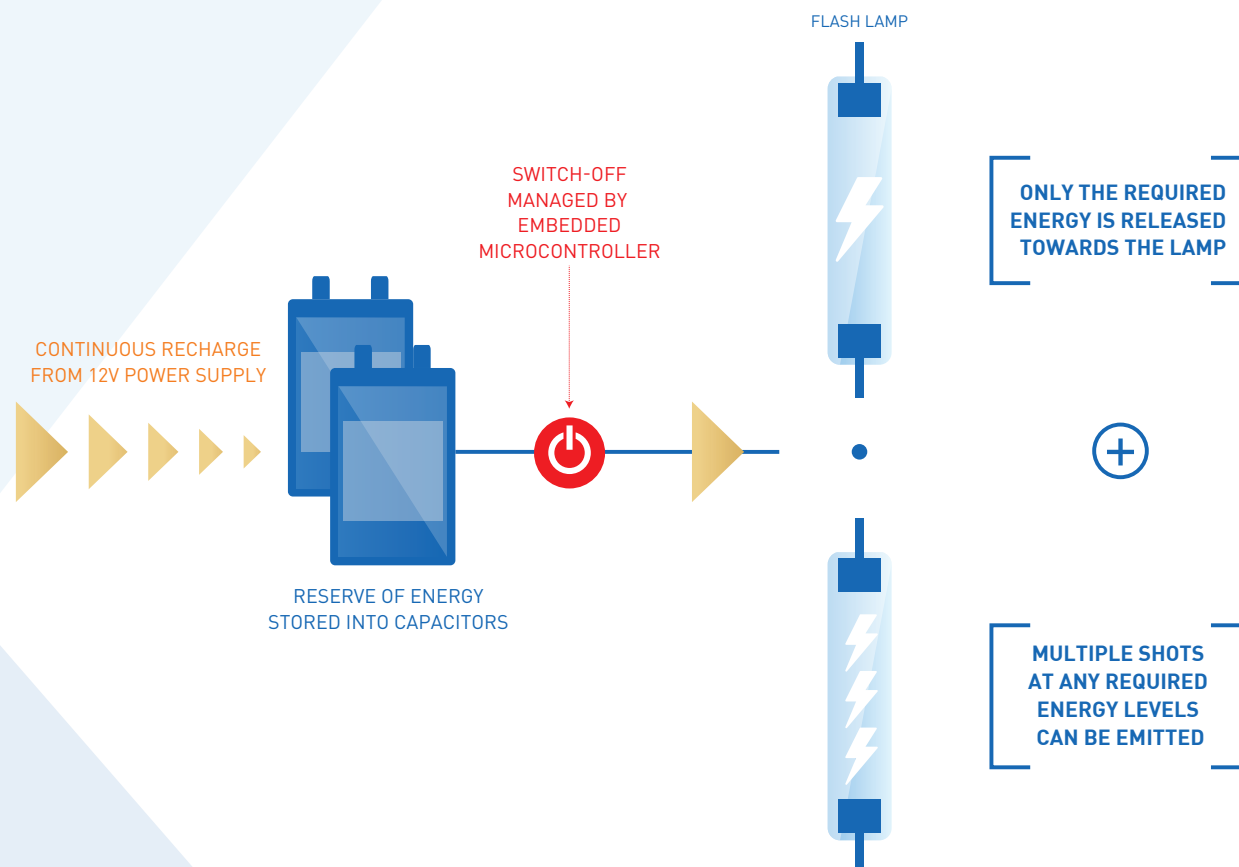


## REPETITION OF FLASHES

### CATCH MULTIPLE IMAGES THANKS TO FAST FLASH SEQUENCES

On a typical enforcement scenario, the system must be capable of catching fast target vehicles, close together, one after the other; or in a Red Light enforcement scenario, the same vehicle at different positions. To do so, the illuminator must be able to produce a burst of shots in a very limited time.

Phoxene illuminators incorporate a flash switch-off technology: the electrical energy stored in the capacitors is only partially released into the lamp keeping a reserve of energy for very fast bursts of shots. This technology also enables an accurate control of the injected energy.



### ADJUSTABLE LIGHT INTENSITY WITHIN A BURST OF SHOTS

By default, the Phoxene illuminators are fitted with two trigger inputs accessible on the back-panel connector, allowing two different, selectable energy levels to be used. This is especially useful when the enforcement system must work with two levels of ambient light, or with a Red Light scenario, when a target vehicle must be pictured at two distances from the flash.

For the most sophisticated systems, energy adjustment can be managed dynamically, within a few ms, with the serial interface (RS232) integrated into Fx flash devices.

### EXAMPLES OF FIRING SEQUENCES OF THE PHOXENE FX-1 AT THE DEFAULT ENERGY SETTING

Max. number of shots in a 50Hz burst before recharge: 4

Max. number of shots in a 1Hz burst before recharge: 12

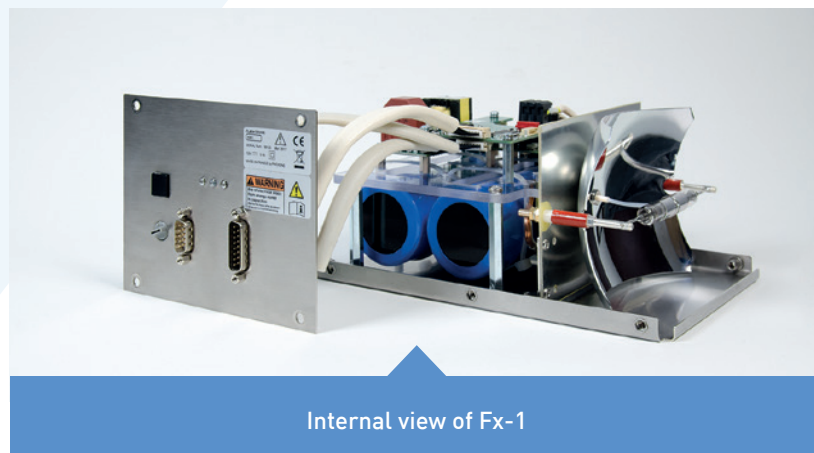
Maximum repetition rate (Hz), 24/24h at 25°C: 0,75



## SMART LIGHT

### INTELLIGENCE INSIDE THE FLASH

Thanks to the embedded microcontroller, operating parameters are continuously controlled. Status parameters can be read by the system either through I/O signals on the back panel connector or via the serial communication interface. Parameters such as "Flash ready to fire", "Flash fired OK" and the capacitor voltage are very useful for continuously tracking the illuminator's performance, either in remote supervision mode or during maintenance operations.

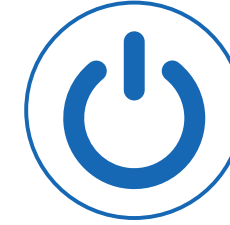


Internal view of Fx-1

The light intensity and sequence of shots can also be adjusted:

- The light intensity can be manually set with a selector on the back-panel.
- The serial interface can be used to produce specific sequences, with defined times between shots and light intensity of each shot, which can be activated by a single trigger. This can be used to produce multiple shots for Red Light enforcement, for example.
- Software energy adjustments from 16 different levels are also allowed thanks to the serial interface.

To ease initial development, Phoxene has released a demonstration software that will run on any computer, allowing engineers to control the Fx illuminator via its serial interface and discover all of its features (energy adjustment, flash sequences, flash status supervision...).



### CHOOSE THE COLOUR OF THE LIGHT

Requirements regarding the flash light colour differ from country to country, based on legislation. Xenon flash tubes are naturally "white", because the spectrum covers the range 400nm- 1100nm. That characteristic makes the xenon flash ideal for photography and its use is common in the industry. Either in a photo studio or at the roadside, the xenon flash helps to get clear pictures with a very good colour rendering. In traffic enforcement when coloured or sharp monochrome pictures are required, the use of a white flash is ideal. In this case, the key advantages of Phoxene Fx flash illuminators compared to standard xenon flash illuminators are: the beam is focused into a cone, the light intensity is adjustable, and flash output is of only hundreds of  $\mu$ s duration.

But an orange, red or even infrared colour is sometimes required. All Phoxene flash devices can be fitted with appropriate filters to meet local legislation requirements.

- White spectrum version: 400 nm to 1100 nm
- Red spectrum option: 600 nm – 1100 nm
- Infrared spectrum option: 800 nm – 1100 nm

And even when filtered, the resulting light intensity produces well illuminated pictures, thanks to the outstanding guide number performance of the Fx range.

### SMART OPTIONS AVAILABLE ON THE FX RANGE:

- RS232 monitoring and controlling interface
- Back panel switch for light energy adjustment
- Plug-in colour filters



## INTEGRATION INTO SYSTEMS

### COMPLIANCE WITH INTERNATIONAL STANDARDS

Enforcement systems are often required to comply with international standards and it is useful to use components that are also compliant. The Fx flash range developed and manufactured by Phoxene does comply with EN60065, EN61000-6-2, and EN61000-6-3 international standards.

### OPTIMAL FIT WITHIN ENFORCEMENT SYSTEMS

The Phoxene Fx-range is available with three types of enclosure: standard (Fx-1), compact (Fx-2) and a decoupled version (Fx-D), where the optical head and the electronics can be set up to 2 metres apart. Phoxene can also provide customer-specified enclosures.



Fx-1

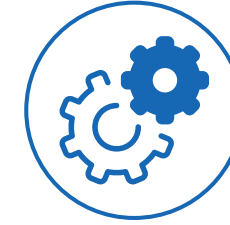


Fx-2



Fx-D stand-alone optical head

To ease system integration, Fx illuminators are designed with robust and standard D-Sub connectors for the 12V power supply, the trigger inputs and the serial interface.



### GAINS IN RELIABILITY

Designed to be integrated into industrial systems and deployed at outdoor locations, the Phoxene Fx-range has the following features:

- Idle power consumption < 2W and peak power of 66W during recharge
- Flash device MTBF over 1 million shots
- Maximised capacitor lifetime, due to the Phoxene proprietary discharge technology
- A lamp lifespan of up to 300,000 shots, depending on the light intensity level
- Operating temperature range -20°C / +55°C

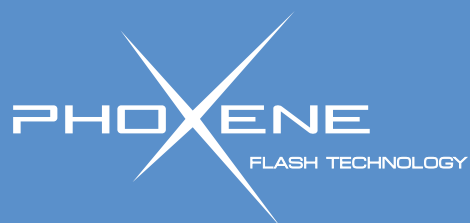
For maintenance purpose it is very easy to replace the Xenon bulb: the optical head has been designed to allow an easy swap. Just unplug the old bulb and plug-in the new one. No tools are required.

### EASE OF INTEGRATION

12V Power supply – Standard D-Sub connectors

RS232 Interface – Dual Trigger inputs





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