

## Emergency Lighting (Self-contained)

Adaptive Evacuation with CGLine+ system & Matrix luminaire



From static to adaptive  
escape routing

**EATON**

*Powering Business Worldwide*









## WorkSafe

### Protect your people and property

Specify superior escape route management technology in complex buildings with Eaton's **unique adaptive emergency lighting evacuation system**.

Risk management for commercial buildings is evolving rapidly. An increasingly urbanised and complex environment, combined with a rising diversity of safety threats, compels the owners and managers of buildings to re-evaluate the way they protect the people, property and business continuity that may be at risk in an emergency. It is not only a legal obligation but a moral, financial and reputational imperative.

In situations involving fire, terrorism, major crime, extreme weather and civil unrest, buildings must be able to detect, alert and evacuate. The safe and timely completion of this process is dependent on planning, equipment, training and infrastructure being in place. However, evacuation poses particular challenges when a proportion of occupants are unfamiliar with layout and procedures, and particularly if they are in large, densely-populated, high-risk or complex premises such as railway stations, shopping centres, airports, stadia, government buildings or leisure facilities.

During an emergency situation, panic is heightened and decision-making can be impaired. This can lead to congestion, delays and, in some instances, guide people to unsafe places. Research into crowd behaviour and advances in scenario-modelling technology have highlighted the need for evacuation strategies that are more adaptable to differing circumstances and buildings.

Eaton has developed an Adaptive Evacuation System that is capable of identifying the safest exit route in a given circumstance and guiding people towards it via digital signage. The ability of such systems to enhance safety has been confirmed by academic research and technical organisations.

## Adaptive evacuation

*Adaptive:*

*Capable of changing in response to changes in environment.*

Building upon decades of expertise in the delivery of life safety systems, and particularly emergency lighting technologies, Eaton's Adaptive Evacuation System enables faster, safer and more agile evacuations, particularly when deployed alongside a public address/voice alarm solution that provides additional guidance.

When installed, the system is programmed with a range of potential exit routes. Based on information from CCTV, fire detection and other devices that pinpoint the nature and location of a hazard, it can select the safest and fastest route for occupants and an appointed system operator within the building is given the opportunity to accept or reject this recommendation, so that occupants can be directed accordingly.

Unlike 'active' and 'dynamic' systems, Eaton's technology is fully adaptable and its instructions can be modified in real-time. It has been extensively tested and conforms with current regulatory requirements, although the technology is so new that standards are still to be fully defined.

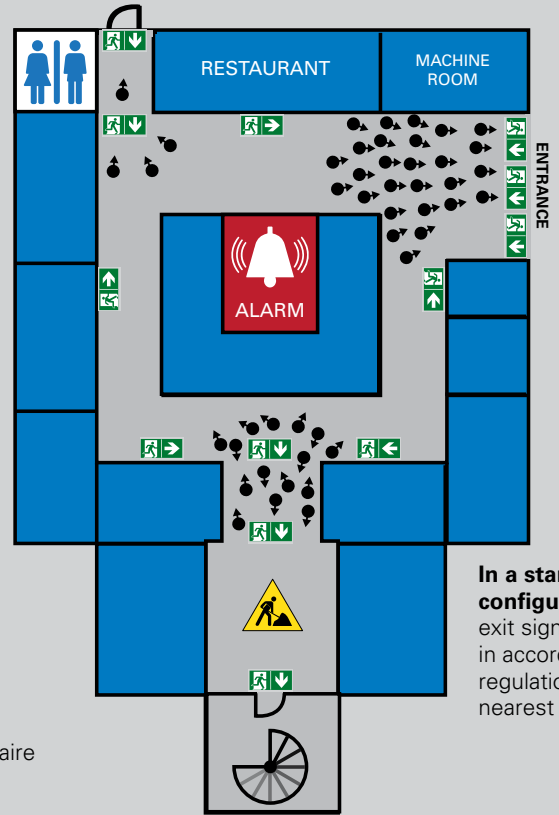
# From Static to Adaptive Evacuation

## 1. Evacuation situation with one exit blocked by works

### Static Emergency lighting (current state)

During an emergency situation, panic is heightened and decision-making can be impaired. This can lead to congestion, delays and, in some instances, guide people to unsafe places.

Research into crowd behaviour and advances in scenario-modelling technology have highlighted the need for evacuation strategies that are more adaptable to differing circumstances and buildings.



In a standard configuration, the exit signs positioned in accordance with the regulations indicate nearest exit.

- Shops
- Public
- Emergency exit
- High risk area
- Blinking luminaire

### Adaptive Evacuation



Eaton has developed an **Adaptive Evacuation** System that is capable of switching between a number of predefined routes and guiding people towards the safest exit.

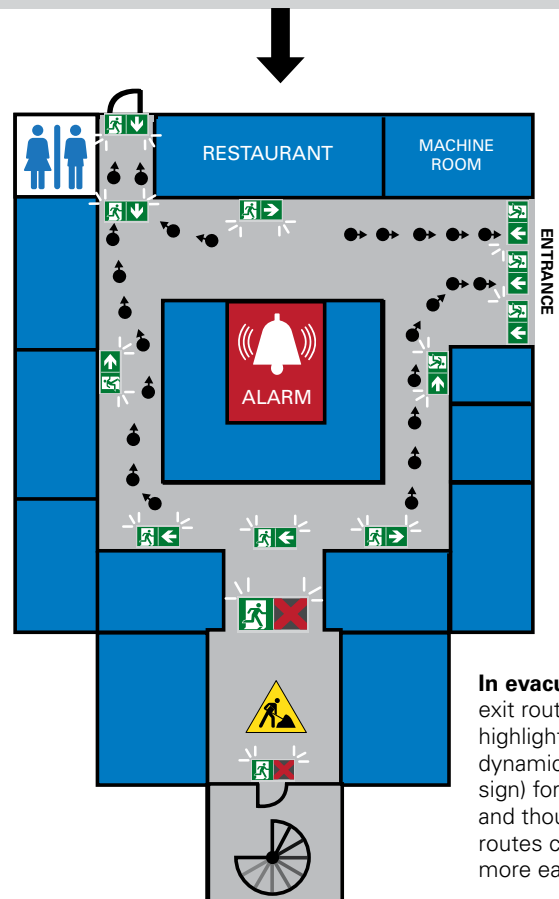


The Matrix luminaire can show either different arrow directions or a red cross depending on predefined scenarios.

The red cross functionality is particularly effective when keeping people confined to one place is the safest option (such as during attacks in schools).

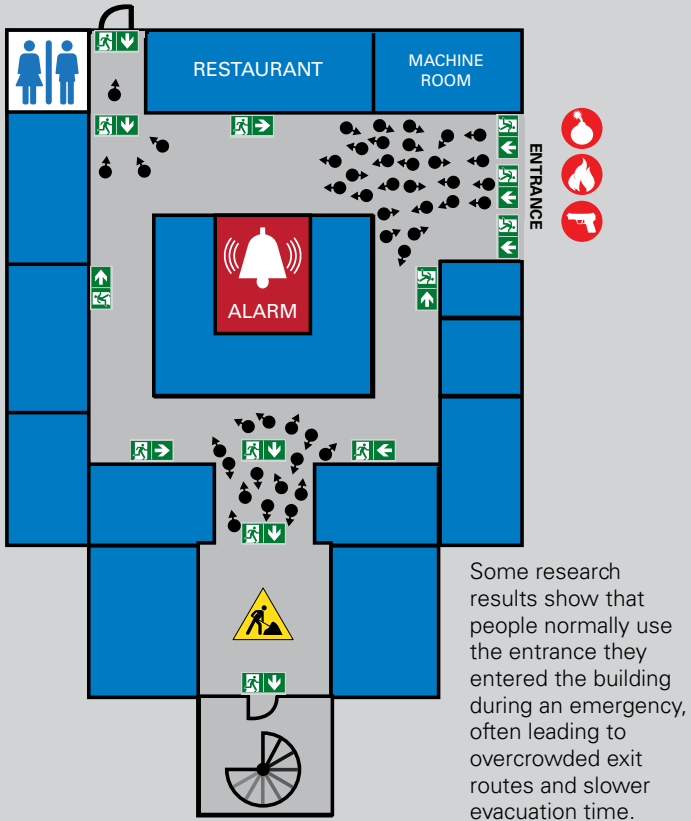


Matrix is equipped with a new **Increased Affordance** functionality (IA) which enables even better recognition by flashing or animated arrows.

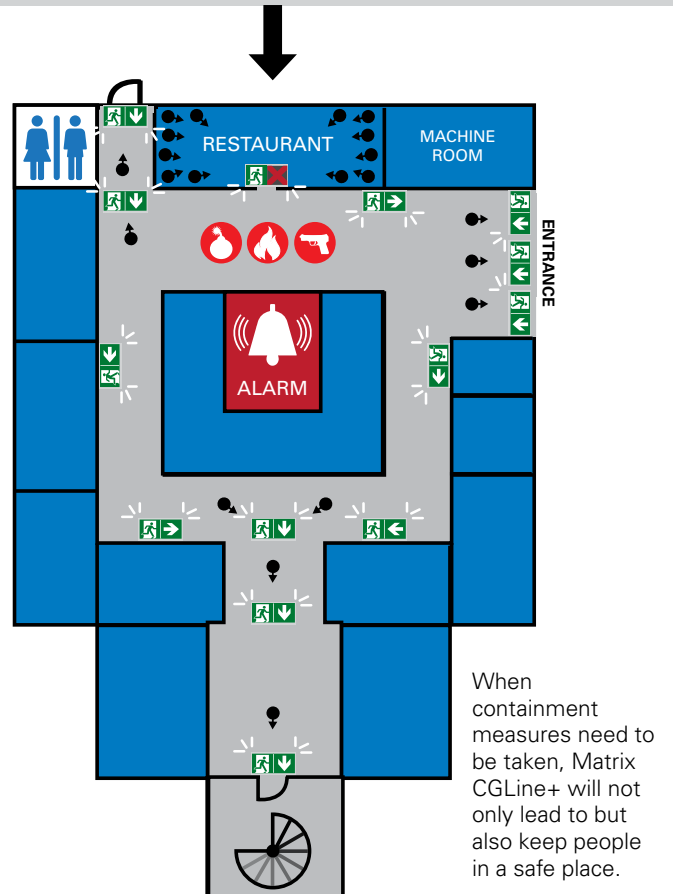
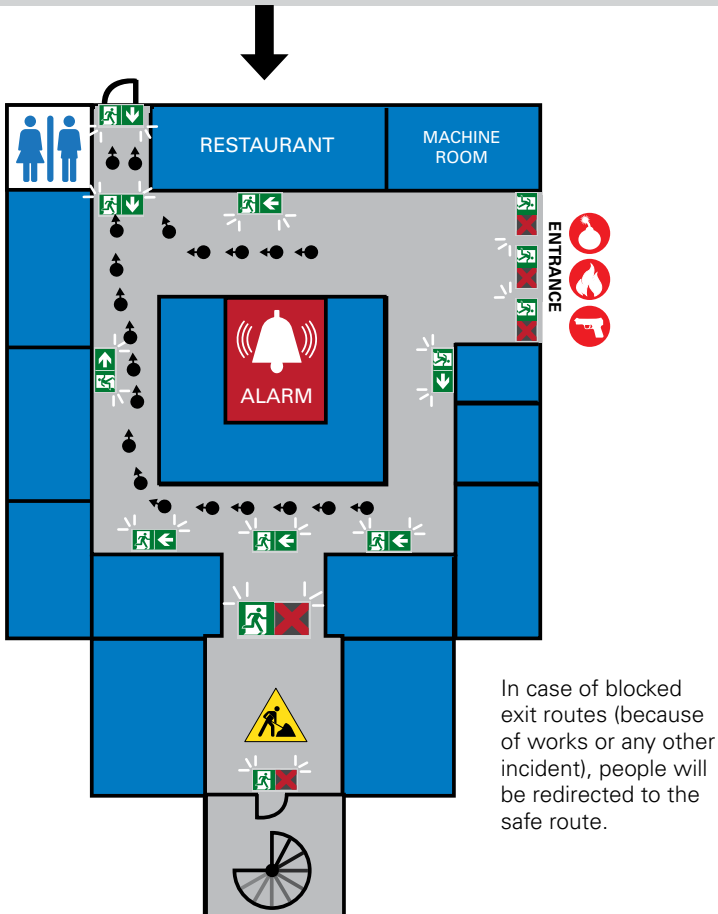
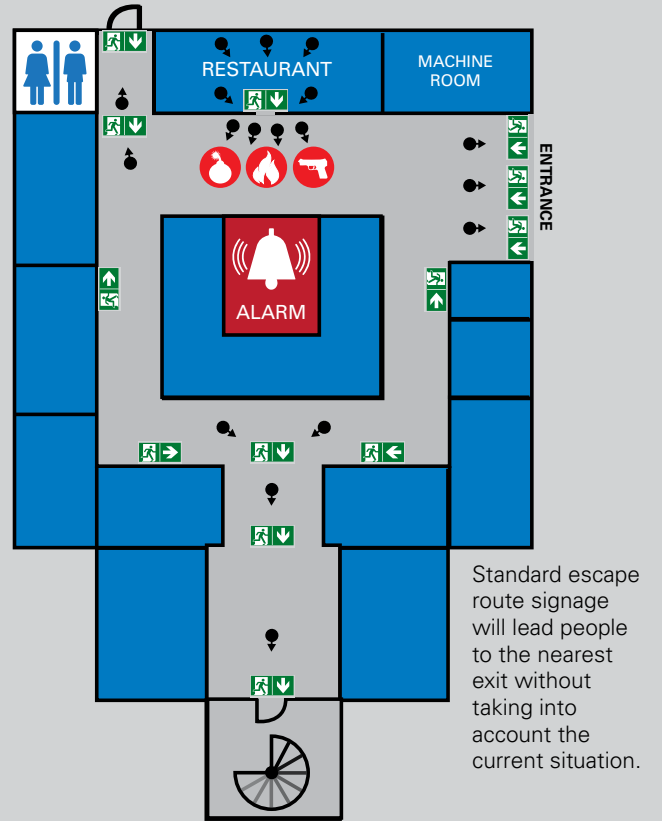


In evacuation mode, exit routes can be highlighted with a dynamic sign (blinking sign) for better visibility and though all exit routes can be found more easily.

**2. Evacuation situation**  
with one exit blocked by works and a high risk area on the other side of the building



**3. High risk situation**  
with need to contain people in a safe room



# Matrix CGLine+ luminaire

**The Matrix CGLine+ is an adaptive escape sign luminaire** that enables **real-time adjustment** of exit routes according to the nature and location of a hazard. Matrix CGLine+ can **adjust the direction of the arrow** it displays, with the aim of **improving the speed and safety of emergency evacuations** in commercial buildings.

The self-contained Matrix escape sign luminaire displays an arrow that can point in any one of four different directions. The additional ability to scroll the arrow from one side to the other **increases its visual impact** among the general population and helps to alert people with hearing impairments. It can also display a red cross to indicate that a particular exit route has become closed, blocked or dangerous.



### ...for flexible signage

Matrix is the first exit sign luminaire which can be configured in order to show a different evacuation direction (4 different arrows) or prohibit access to works zones or dangerous areas (red cross) without additional parts or pictogram foils.

The luminaire can work for 1 and 3 h emergency duration, this makes the planning easy and keeps the variance on stock low.

The luminaire is available with IP42 and IP65 and can therefore be used in normal indoor conditions and also in areas with higher level of dirt and humidity.

More of the capability of the Matrix will be used with the scenarios which can be activated locally with a universal switch input which can react e.g. on a contact at a fire sensor. With rotary switches the standard and the scenario pictogram can be chosen.

### ... for signage adapted to the situation

The full function of the Matrix is used in combination with the AE CGLine+ system. Here the arrow in standard mode and for up to 30 different scenarios can be easily programmed via the PC-software and will be applied via the AE CGLine+ web-controller.



AE CGLine+ Web-Controller

### ...for better visibility

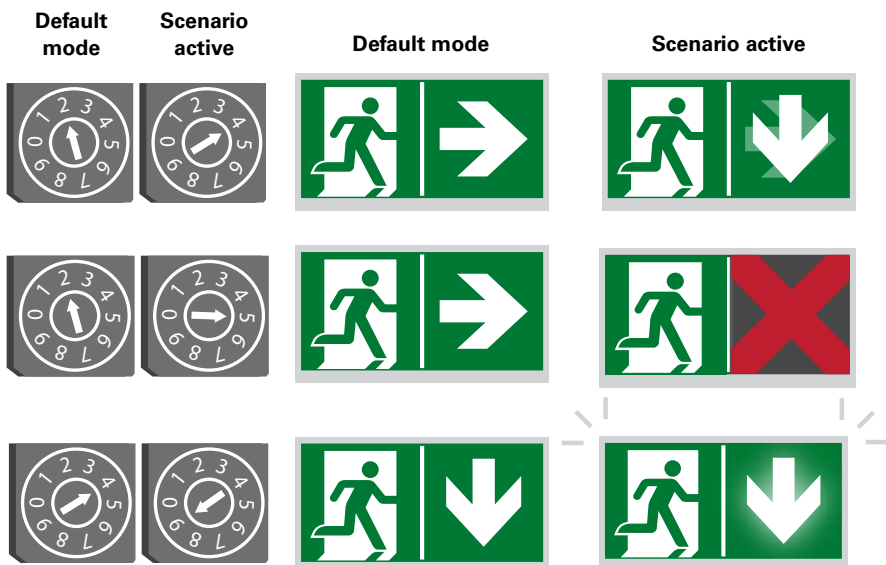
The scenario pictogram options include the dynamic sign, which means that the arrow can be animated or blinking and the red cross can be static or blinking. This will make the luminaire more visible and help people in case of an evacuation to find the right way instinctively.

The luminaire has a high luminance of more than 1000 cd/m<sup>2</sup> and with that it can be easily recognised in bright surroundings.

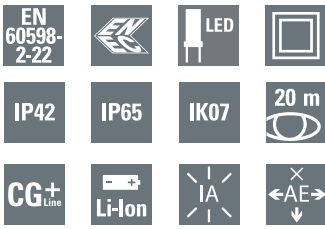
### ...for low operation costs

It is equipped with an eco-friendly and reliable Li-Ion battery with improved power consumption due to less self-discharge and optimized charging technology. The complete design is made for 10 years maintenance free operation.

### Rotary switches on the luminaire







## Matrix 20m CGLine+

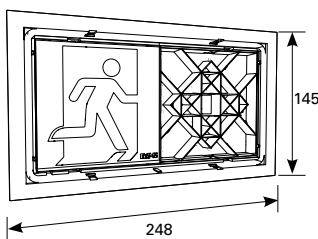
- Escape sign luminaire with Matrix technology for changeable signage
- Can be used for standard exit route signage as an universal exit sign
- Without need for changing any pictogram foils or plates and with a selectable operating time (1 or 3h operation) it is an all-in-one solution in line with the European emergency lighting standards or for increased visibility by animated signage
- Especially for adaptive evacuation (AE) which means the luminaire can change its signage dependent on an event. With this the luminaire can redirect people to an safe exit route or block an unsafe route
- For connection to CGLine+ systems and adaptive evacuation AE CGLine+
- The signage can be changed via a switching contact at the luminaire connected to e.g. a smoke detector or panic switch or it can be programmed and controlled via AE CGLine+ system
- Reliable LED solution with high service lifetime and a very good perceptibility on account of high luminance of the white contrasting colour > 1000 cd/m<sup>2</sup>
- Environmentally-friendly due to modern lithium ion technology
- Robust design made from impact resistance polycarbonate with an IK grade of 07
- Available with IP42 and IP65 ingress protection (IP65 variant including two cable glands)
- Several cable entries on top and back for through-wiring of power and bus cable
- In addition to the automatic tests, manual tests can be started with a magnet
- Simple fault analysis and status display via bicolor LED
- Blocking function prevents unintended discharge during idle operating times (only with CGLine+ WEB-Controller)

Matrix CGLine+



Luminous flux $\Phi_E/\Phi_N$ at end of rated operating time	100% - 1 h 40% - 3 h
Testing system	Automatic test in compliance with EN 62034 Connection possible to the CGLine+ monitoring system
Type of mounting	Wall surface-mounting
Housing material	Polycarbonate
Housing colour	White
Weight	IP42 : 0,6 IP65 : 0,7
Degree of protection	IP42, IP65
Terminals	Screwless terminals (L, L, N, PE, CGLine+ bus) for flexible and rigid wires From 0.5 to 2.5 mm <sup>2</sup>
Connection voltage	230V ~ 50/60Hz
Permissible ambient temperature	+5°C to +35°C
Battery	3.6 V / 3.3 Ah Li-Ion
Light source	LED array

Dimensional drawings (mm)



## Ordering details

Order N°	Product	Viewing Distance	Duration	Consumption
40071777002	Matrix 1-3h CGLine+ IP42	20m	1/3h	6.6 W / 13.8 VA
40071777003	Matrix 1-3h CGLine+ IP65	20m	1/3h	6.6 W / 13.8 VA

## Display possibilities with rotary switches :

### Options "Default mode"

0	1	2	3	4	5
■	←	→	↑	↓	✗

### Options "Scenario active"

						Arrows animated (IA functionality)*			
0	1	2	3	4	5	6	7	8	9
■	←	→	↑	↓	✗	←	→	↑	↓

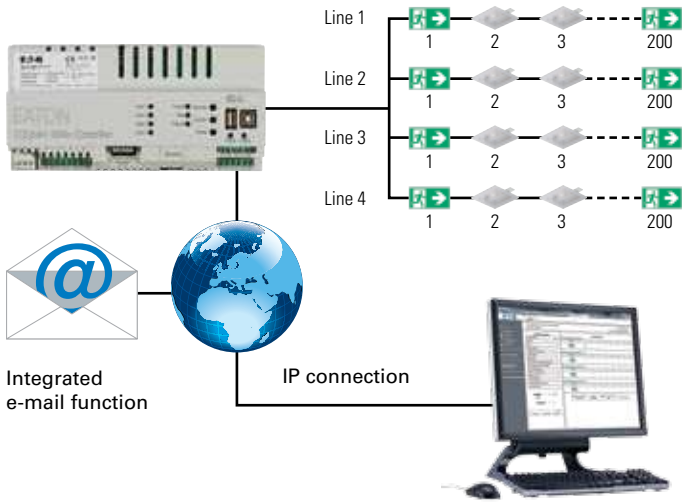
\*In combination with AE CGLine+ Web-Controller the Matrix can also show blinking arrows

# AE CGLine+ system

## Functions & Benefits

The CGLine+ system is a powerful system, perfectly in line with emergency lighting standards and regulations, that makes the operation of self-contained luminaire systems safe and convenient. The new CGLine+ Web-Controller can visualise a total of 800 CGLine+ luminaires. Maintaining an overview is important if there are a large number of luminaires. Luminaires of each line can be allocated to up to 8 zones (up to 16 zones in case of installing only two lines).

The zones can be areas where the luminaires need to be brought together, for example on a floor, in an area or in a room.



### Safety under control worldwide

An integrated web server is available for convenient visualization, control and monitoring of all connected CGLine+ luminaires. The controller can be accessed from any PC with an IP connection and a regular web browser without requiring any special software.

### Automatic e-mail notification in case of faults

The integrated e-mail service automatically sends e-mails to up to ten recipients in case of allocatable events, for example in case of critical status. The aim of this function is to actively notify without delay those persons responsible for building safety about any faults, even if they have no direct connection with the controller at that point in time.

### Tests are not forgotten, and are carried out at the right intervals for maximum safety

The timing and the intervals of regular function and duration tests can be conveniently and precisely set down to the minute, ensuring that the equipment is ready for operation at any time during the operating hours of the building. All test results are stored in the electronic log book for at least four years, in compliance with standards.

### CGLine+ Bus

The communication of all data and commands takes place using the CGLine+ bus installed in a free topology using a two-wire unshielded cable.

**Please ask for the dedicated CGLine+ brochure for detailed information about all features provided by the CGLine+ system.**





## Easy planning & commissioning

The AE CGLine+ system can combine standard CGLine+ luminaires and luminaires with Increased affordance functionality or a flexible solution with a changeable display like the Matrix CGLine+. Thus, there is only one system for standard emergency lighting and adaptive evacuation which means less installation effort and less complexity when planning and commissioning.

## High range back-up

The system has an internal power back-up for the controller in order to be able to react to the trigger even though the mains supply might be broken.

The back-up supply is designed to keep the controller working for at least 3 hours with the maximum possible 800 luminaires connected to the 4 lines.

The function of the back-up is monitored and failure information will be submitted to the Controller if maintenance is required.

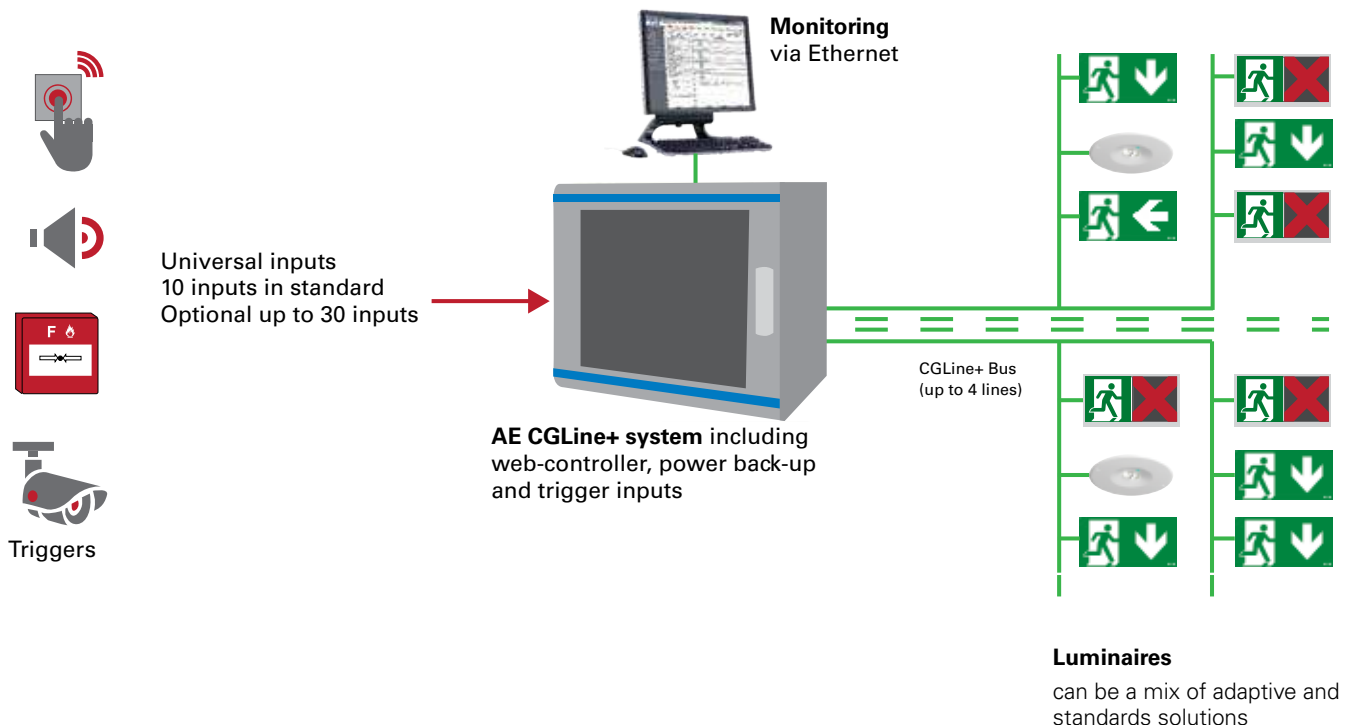
## Long life system and low operating cost

The battery and charging technology of the back-up power supply ensures a long life time of the system. The electronics are designed for lowest losses, resulting in low operating cost. The battery can be easily replaced in order to keep the system ready in the shortest time.

## Use any trigger you need

Dry contacts allow the connection of any trigger (Fire, CCTV, etc.) regardless the manufacturer, to the Eaton AE system. Commonly used, dry contacts are an easy and safe way of communication without the need for special protocols or gateways.

### AE CGLine+ System configuration:



# Planning & programming Adaptive Evacuation



Based on the risk analysis and the resulting evacuation concept the behaviour of the luminaires needs to be defined in a scenario table.

The table is the basis to program the AE CGLine+ system via the PC Software. It can also be used to define and document the structure of the CGLine+ system (i.e. defining the line, the test groups and local zones.)

## AE CGLine+ Scenario definition

Project name	
Description	

Name \_\_\_\_\_

Position \_\_\_\_\_

Signature \_\_\_\_\_

Date / Revision \_\_\_\_\_

Adr.(1-800)	ID (Unique ID of luminaire)	Test Group	Zone	Name	Information (luminaire description)	Category (Standard, IA, Matrix)	Default	Scenario 1	Scenario 2	Scenario 3
1	ED93EF	1	1	Luminaire 001	Matrix 1-3h CGLine +	Matrix	SD	BR	SX	MD
2	BB48F8	2	1	Luminaire 002	Matrix 1-3h CGLine +	Matrix	SR	BR	SX	SX
3	ECFB8C	1	1	Luminaire 003	Matrix 1-3h CGLine +	Matrix	BL	SX	BR	MR
4	ECFF6B	2	1	Luminaire 004	CrystalWay 1-8h IA CGLine +	IA	B	B	B	B
5	BCFD67	1	1	Luminaire 005	NexiTech 3h IA CGLine+	IA	S	B	B	B

S : Static  
 B : Blinking  
 P : Pulsing  
 M : Moving  
 OFF : Blank

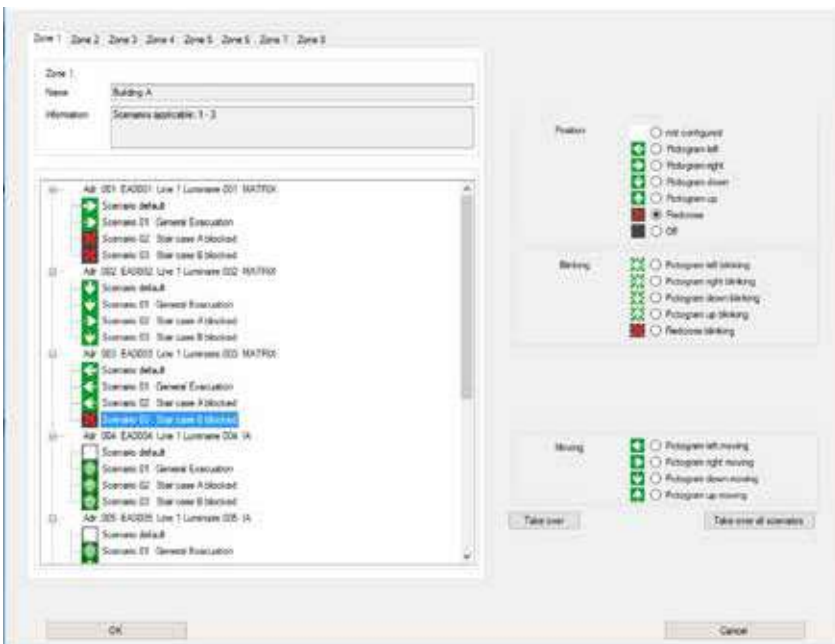
D : Down  
 L : Left  
 R : Right  
 U : UP  
 X : Red X

# Planning & programming Adaptive Evacuation

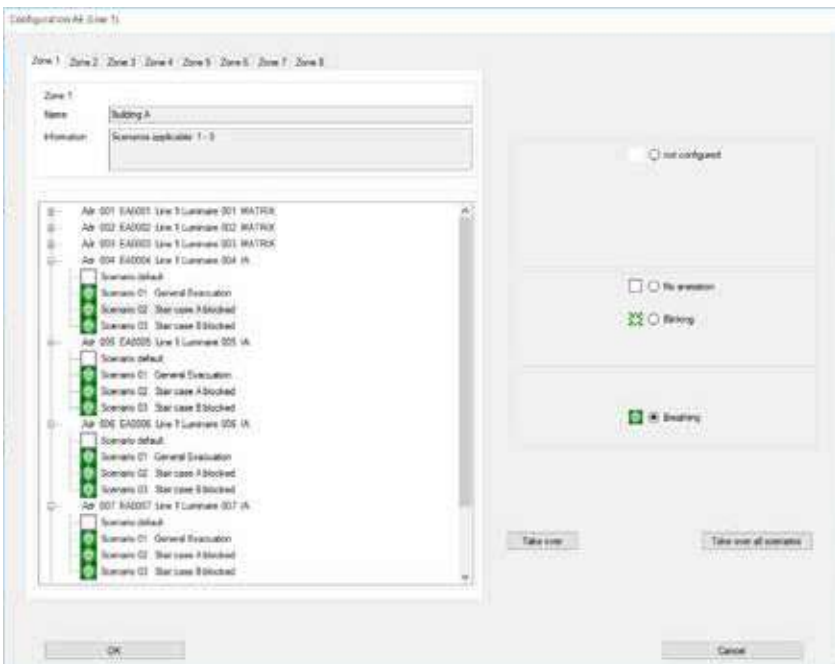
## Programming the scenarios with PC-Software

Configuration of the CGLine+ system is carried out using the CGLine+ PC software. Short addresses and unique names of luminaires can be assigned. Using this software, the time and interval of automatic tests are specified together with the zone assignment and the definition of test groups. As a result, the entire system can be configured in offline mode regardless of whether the IT network is available.

With the new AE programming capability, it can be easily programmed by mouse click how each AE luminaire will react per scenario.



Configuration of an AE Matrix luminaire



Configuration of a luminaire with IA functionality

In a tree structure all luminaires with AE and Increased Affordance (IA) capability are shown. For the currently selected luminaire it can be chosen which arrow direction will be displayed per scenario or if the luminaire will display a red cross (static or blinking) to block an unsafe route.

A scenario can be a mix of adaptive luminaires like the Matrix luminaire and other luminaires with IA functionality. Thus, in addition to the possibility to direct people in a safer direction, with the IA functionality the visibility of the exit signs can be increased and the urgency of the evacuation is emphasized.

For IA mode with the Matrix luminaire two different options are available: it can be chosen if the arrows will blink or move in the direction the arrows are directing.

CGLine+ luminaires with IA function can be programmed in the same way. Here it is possible to choose between pulsing (a smoother on and off) or blinking.

For more convenience, configurations can be copied to luminaires with same behaviour, for example for an exit with several doors side by side often used in big buildings.



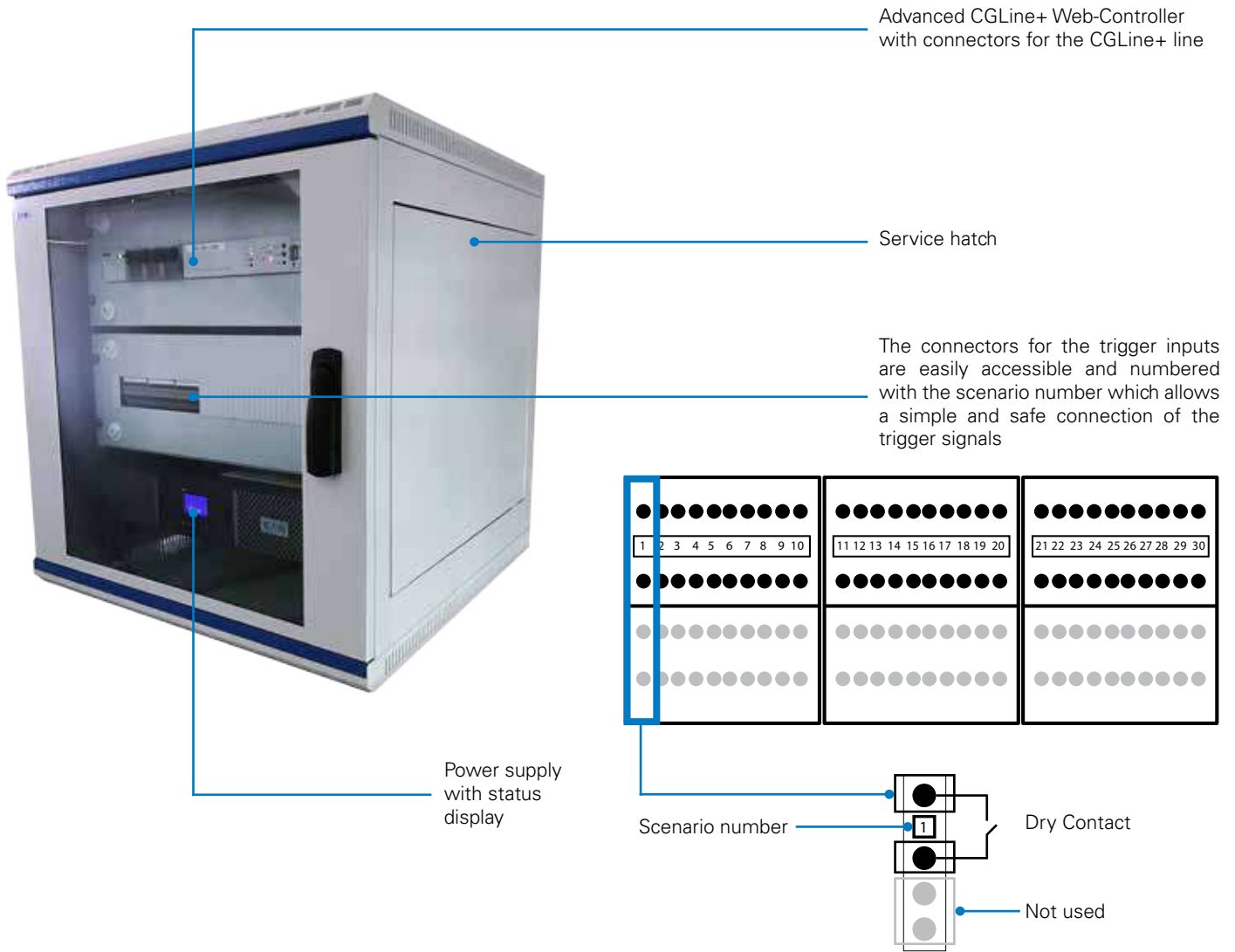
# Installation of AE CGLine+ system

## Installation

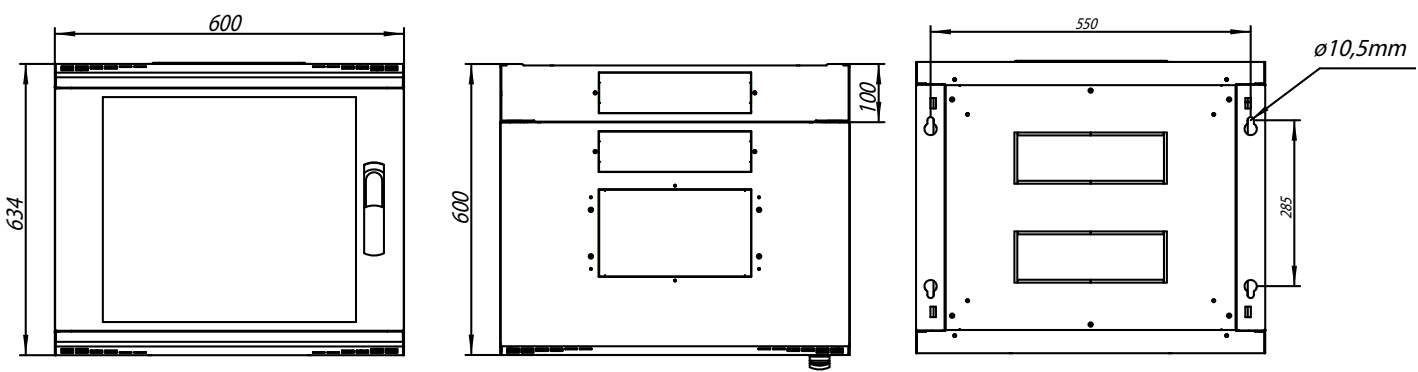
The AE CGLine+ system is wall mounted and features a metal housing with a glass door providing quick visual inspection of the power back-up in addition to the web-monitoring function. There are provisions for cable entries from the top and additional openings in the back of the housing for connection of the inputs, the CGLine+ lines and the mains supply.

An additional service hatch helps accessing the cabling area during installation and commissioning.

The front door can be equipped with a key (optional accessory) to avoid unauthorized access to the system.



## Dimensional drawings:



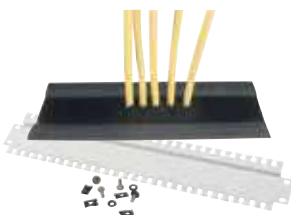
AE CGLine+ system



AE CGLine+ system without power back-up



Accessory kit for cable entry



## Adaptative Evacuation CGLine+ System

- System based on CGLine+ technology which enables controlling and monitoring of static emergency luminaires as well as luminaires for Adaptive Evacuation and Increased Affordance
- Including power back-up ensuring secure function of the controller in case of failure of controller's power supply. Optional available without power back-up in case of an existing secured mains supply on site
- With 10 to 30 universal switching contacts (dry contacts) which can be easily connected to triggers like fire systems, CCTV monitoring systems, etc.
- For connecting up to 800 luminaires ( 4 lines with 200 or 2 lines with 400 luminaires)
- Luminaires for Adaptive Evacuation, Increased Affordance and standard CGLine+ products can be freely mixed
- The integrated web server enables convenient visualization, control and monitoring
- Automatic luminaire search function requiring no manual addressing. Unique ID per luminaires assigned by the manufacturer
- Simple sorting using unrestricted short address assignment
- Unrestricted entry of target location names for the luminaires with up to 20 characters
- Clearly-shown allocation of luminaires to up to 8 zones per line
- Automatic function test and duration test, test interval can be individually defined
- Up to 8 test groups per luminaire can be defined for function test (FT) and duration test (DT)
- Electronic log book storage for a period of minimum 4 years
- E-mail service for sending automatic e-mail in case of malfunctions to up to 10 e-mail addresses, assignable to 2 escalation groups
- Blocking the emergency lighting function during non-operational periods (all / per bus line/ per zone / per luminaire)
- Luminaires in maintained mode switchable (all / per bus line / per zone / per luminaire)
- Password protected access as an administrator or standard user
- Visualization of luminaires in up to 30 different building layouts
- Efficient and convenient analysis of the log book using the CGLine+ PC software

Dimensions (L x W x H)	With power back-up: 600 x 600 x 634 mm Without power-backup (40071777994): 310 x 145 x 436 mm
Housing type and material	Wall mount – With power back-up: Sheet metal Without power-backup (40071777994): ABS
Degree of protection	With power back-up: IP30 Without power-backup (40071777994): IP65
Power supply	230 V AC, 50/60 Hz
Power consumption	With power back-up: 63 W (max load) Without power-backup (40071777994): 22 W (max load)
Connection inputs	For mains supply: max 2.5 mm <sup>2</sup> For CGLine+: max 1.5 mm <sup>2</sup> For switch inputs (trigger): max. 2.5 mm <sup>2</sup>
Battery (powerback-up)	Lead-acid 4 x 12 V, 7 Ah
Permissible ambient temperature	0 ... 35°C
Weight	With power back-up: 5.5 kg Without power-backup (40071777994): 3.6 kg

## Ordering details

Type	Order No.	Scope of supply
AE CGLine+ System, 3 h backup, 10 inputs	<b>40071777991</b>	Including Advanced CGLine+ Web-Controller and power back-up for up to 3 h emergency duration, connectors and input module for 10 trigger inputs, wall mount housing made from sheet metal
AE CGLine+ System, 3 h backup, 20 inputs	<b>40071777992</b>	Including Advanced CGLine+ Web-Controller and power back-up for up to 3 h emergency duration, connectors and input modules for 20 trigger inputs, wall mount housing made from sheet metal
AE CGLine+ System, 3 h backup, 30 inputs	<b>40071777993</b>	Including Advanced CGLine+ Web-Controller and power back-up for up to 3 h emergency duration, connectors and input modules for 30 trigger inputs, wall mount housing made from sheet metal
AE / IA CGLine+ System, 10 inputs *), (without power back-up)	<b>40071777994</b>	Including Advanced CGLine+ Web-Controller, input module for 10 trigger inputs, wall mount housing (plastic), for AE systems with an existing secured mains supply on site and for advanced IA system
PC Software CGLine+	<b>40071361178</b>	CGLine+ PC Software, for programming of standard CGLine+ systems as well as AE and IA systems
Accessory kit for cable entry from top (Not for 40071777994)	<b>40071777996</b>	Brush strip for cable entry (EATON NWS-2/BUE/LEI/KF) and a cable tie rail for 19" inch housing (EATON NWS-KBL/B19/M)

\* 20 or 30 inputs on request







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