



# STEMOR

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TE/248/883995/15

Data:

Miejsce:



ADAP 2110.0016  
PKN ISO 9001:2015



27/04/2021

Szczecin

## Signalization column Type: ST-KS-1.A

### 1. Description

ST-KS-1.A is designed to provide visual and acoustic alarm signaling on marine vessels and in other industrial applications. The column fully complies with SOLAS requirements and offers wide customization of audiovisual parameters per customer's requests.

Modular design of the column allows customized assembly in any variation of available signaling modules:

1. column driver board (ST-SGKP-V1.2) – master control board receives input signals and manages communication with subsequent slave devices
2. triangle signal lamp control board (ST-TSKS-V1.2) – this PCB controls a single triangle signal lamp installed in the column. It may be governed by SGKP or operate as a standalone device, in which case it will switch on after 750ms if there is no communication detected upon power on.
3. top flashing light and horn drive board (ST-SKKS-V1.1) – installed on top of the column, equipped with 4 color flashing, omnidirectional lights: red, green, white and yellow, and an acoustic horn driver. This board terminates the communication line.

Triangle shaped signal lamps are mounted on the front plate. Aluminum chassis is powder coated using RAL 7035 color and prepared by default for vertical installation. It has been designed for quick installation, easy maintenance and does not require any special mounting plates. The chassis is made of a structural channel that can be drilled, welded, riveted or screwed to any vertical surfaces. Remaining column assembly is then fixed to the base using hex screws.

ST-KS-1.A is designed for 24VDC supply. It can operate safely in range of 17-34V, but fault indication occurs if voltage drops below 18V or rises above 32V. In case of overvoltage of 34V (absolute maximum rating 36V) the column driver will cut off power in order to prevent any damage. Column driver inputs are optically isolated and require external power to trigger an alarm – customer may choose between 24VAC/DC or 230VAC inputs. During signaling the controller enables power to the column and after 50ms begins alarm command broadcast via RS485 at 9800bps. Each column receives the transmission and reacts accordingly to the received data packet.

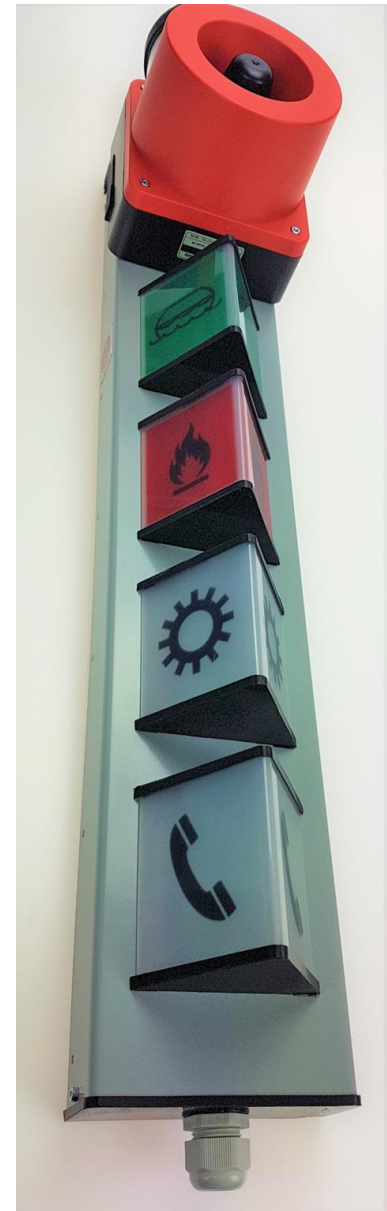


Figure 1 Column equipped with 4 triangle signal lamp, acoustic horn, and top flashing light.



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If a column module does not receive any data or the CRC is incorrect it automatically turns the segment on after 750ms timeout to provide extended failasafe operation

ST-KS-1.A may be fitted with maximum 8 alarms: General, Fire, CO2, Machinery, Steering, Telephone, Telegraph, Auxiliary or on customer's request it may be refitted with any other required signal mark and audio tone. The auxiliary channel can be easily modified using 4 dip switches on top of the signal lamp. User can choose one of four blinking colors and one of four predefined acoustic patterns. ST-KS-1.A also allows the user to change signal volume and frequency to avoid resonance with other equipment.

Column driver ST-SGKP-1.2 is DIN rail mounted, includes all alarm inputs, power supply input, fault SPDT relay output and column interface output. The drivers is equipped with 8 dip switches which allow quick and easy troubleshooting and column configuration (see table 1). 4 LED's on main board determine status of the device according to marks on the PCB. For best protection all PCB's are gold plated and dip varnished.

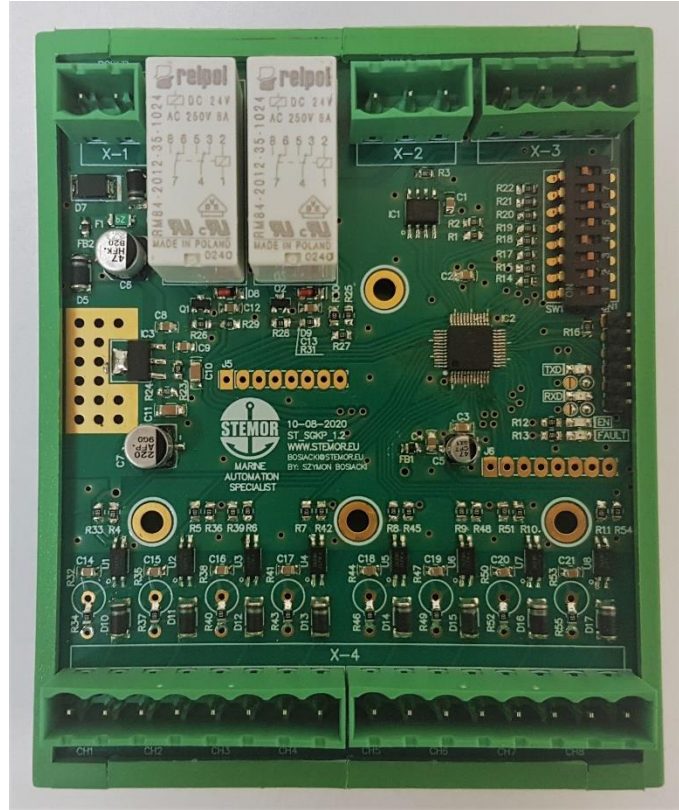


Figure 2 Column driver board

## Operation description

The column driver scans the input signal and upon detection of a rising slope it enables power supply to the column and begins broadcasting current alarm status. All triangle signal lamps are manufactured using the same board – TSKS, identical top and bottom cover and different front cover with alarm description pictogram. The signalling board is equipped with a set of jumper to determine the type of alarm a board will react to. All jumpers are set during the manufacturing stage and correspond to the front pictogram.

The top flashing light, and siren boards (SKKS) react to all alarm with predefined flashing and acoustic patterns. The board can display two different alarms at the same time; it has two slots for alarm color indication. Highest priority is reserved for green color (General Alarm), high priority for red (Fire, CO2), lower for orange (Machinery, Steering) and lowest for white (Telephone, Telegraph), e.g. if machinery and fire alarms are enabled concurrently, the top light flashes red and yellow. When emergency alarm is also enabled, green takes highest priority, and yellow is removed from the queue. Acoustic signaling is enabled for only one alarm according to the priority list (GA, Fire, CO2, Machinery, Steering, Telephone, Telegraph, Auxiliary).



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System is fully modular and can operate with any configuration of up to 64 devices as long as power demand remains within limits (depending on wire size and distance). Column is build from 4 basic modules:

1. Triangle shape signal lamp. Basic information unit. Design to mount on column frame or on any flat surface with access from back i.e. electric cabin. Signal lamp comes with graphic on glass. Graphic can be chose from any shape form Figure 4.

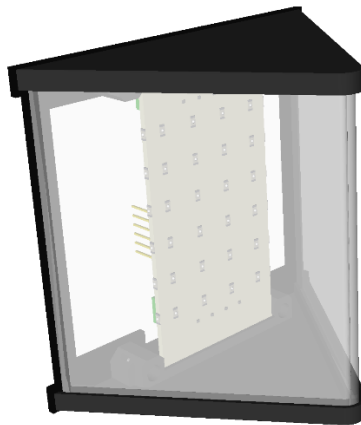


Figure 3 Triangle shape signal lamp

2. Top flashing light and acoustic horn driver. Mounted on top of column frame or on stand alone chassis to any surface. Emits blinking light in one of 4 predefined to alarm color. Device also controls acoustic horn with predefined audio patterns. Potentiometer on top board (POT1) is used for acoustic horn driver frequency change (to remove interference with already mounted signaling equipment)

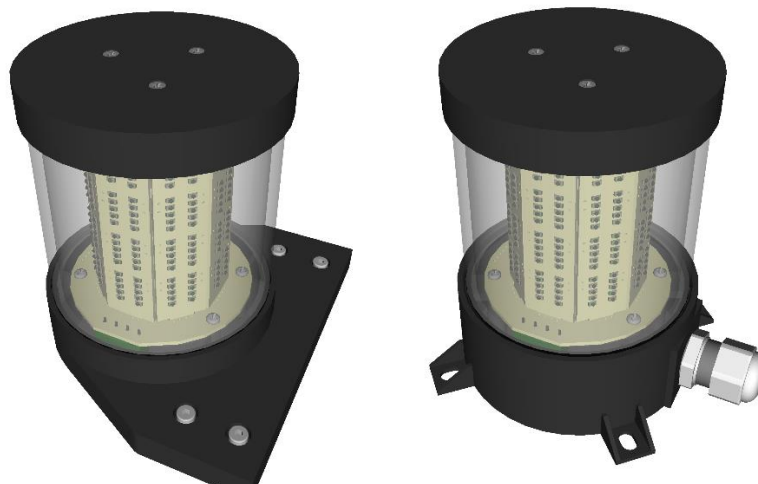


Figure 4 Top flashing and acoustic horn driver in column mount and standalone version



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3. Acoustic horn. Colum use Qlight QWH series acoustic horn and its delivered as single part. Mounted below top flashing light on column frame or stand alone. Sound volume can be adjusted by pulling out front cover (4 m4x20 screws) and rotate potentiometer R31 on top right side of PCB.

A single column can safely operate up to four fully assembled, 8 triangle signaling columns. Any triangle and flashing light may be configured way. There is no limit for similar triangle signaling lamps number in the system.

A triangle lamp can be used without a column driver: when power is applied and no alarm is broadcast the lamp will turn on after 500ms and light up until power is disabled.

On the column board driver there are 8 dip switches mounted for the purpose of testing and servicing. During normal operation they should be switched OFF.

Dip switch	Function
1	Enables main power relay - all signaling should turn on after maximum 750ms
2	Enables main power and shuts down all alarms - column not signalize any alarm
3	Enables main power and turns on all alarms
4	Enables main power and slowly cycles all alarms
5	Enables main power and quickly cycles all alarms
6	Not used
7	Changes triangle signaling light from constant to blinking
8	Mutes acoustic signaling

Table 1. Dip switch functions

## 2. Technical specification

### SGKP specification.

#### Mechanical:

Height	40mm
Length:	118mm
Width:	94mm
Mount:	DIN rail 35mm , Miniature top-hat rail 15mm

#### Electrical:

Supply voltage:	24V DC (17V-34VDC)
Idle current:	50mA
Active current:	100mA
Maximal support devices:	64 modules

### TSKS module specification.

#### Mechanical:



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Height: 89mm  
Length: 62mm  
Width: 94mm  
Mount: 4 screws, M4

## Electrical:

Supply voltage: 24V DC (17V-34VDC)  
Idle current: 10mA  
Active current: 120mA  
Triangle lamp brightness: green; 28-38cd, red; 22-33cd, yellow; 10-12cd

## SKKS module specification.

### Mechanical:

Height: 116mm, Horn: 136  
Length: 110mm, Horn: 128  
Width: 130mm, Horn: 136  
Mount: 4 screws, M4

### Electrical:

Supply voltage: 24V DC (17V-34VDC)  
Idle current: 10mA  
Active current: 1,5A  
Flash brightness: green; 160-184cd, red; 80-128cd, white 80-112cd, orange; 72-120cd  
Acoustic Volume: 115dB max, regulation 0-115dB.

## Column Specification.

### Mechanical:

Height: 655mm ( 4 segments, horn, top flashing light)  
Length: 168mm  
Width: 128mm  
Material: aluminum, PET-G, Plexiglas  
Finish: powder paint  
Chassis IP class: 42  
Output connector: PG16





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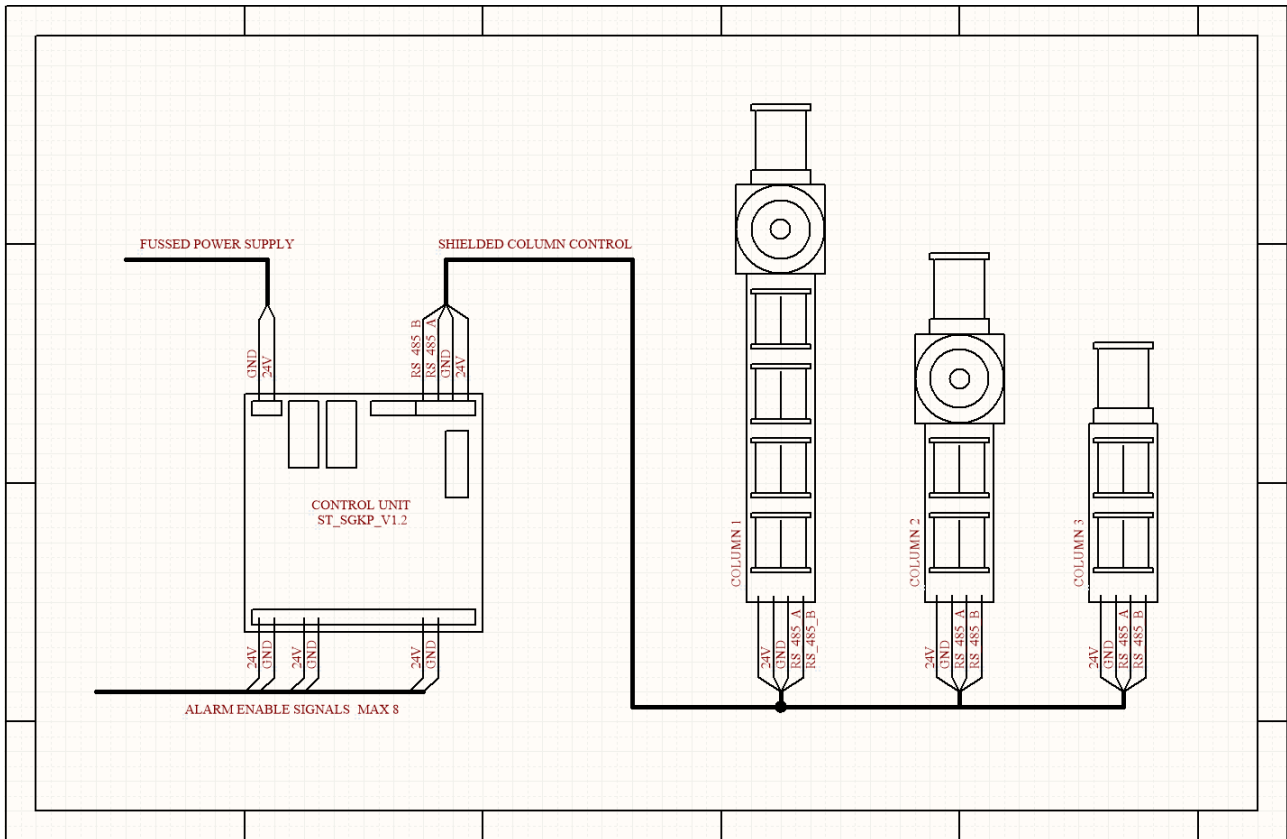


Figure 5 Example of system connection

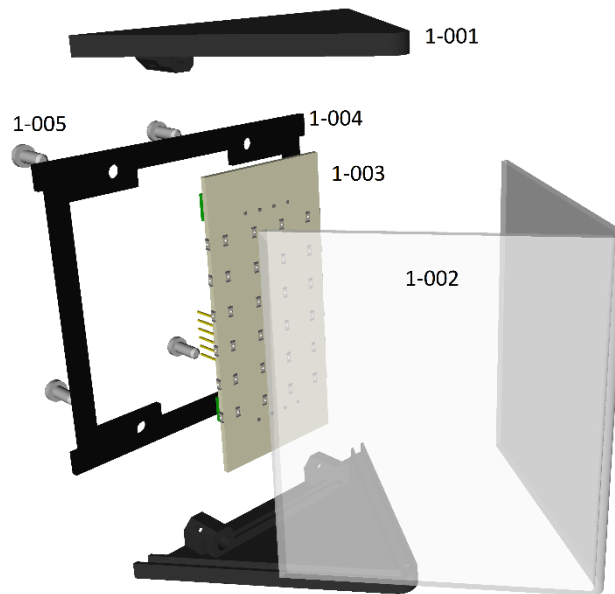


Figure 6 Triangle shape signalization lamp exploded view



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Part no	Quantity	Description	Material
1-001	2	Triangle lamp cover	PET-G
1-002	1	Triangle lamp glass	Polycarbonate with UV print
1-003	1	PCB with controller and LED lamp	FR4
1-004	1	Gasket (for higher IP assembly only)	Rubber PTU
1-005	4	Screw cylindrical head M4x10	Stainless steel

Table 2 Triangle signaling lamp Part list

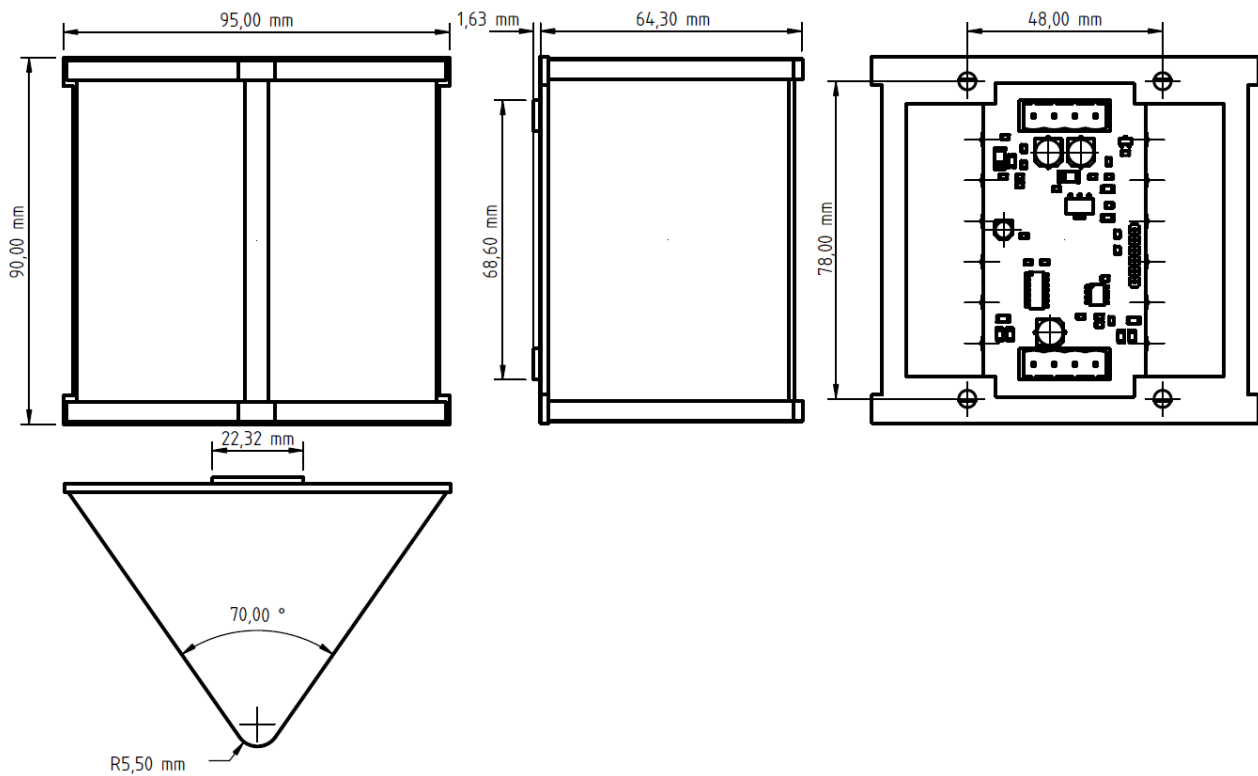


Figure 7 Triangle shape signalization lamp mechanical dimensions



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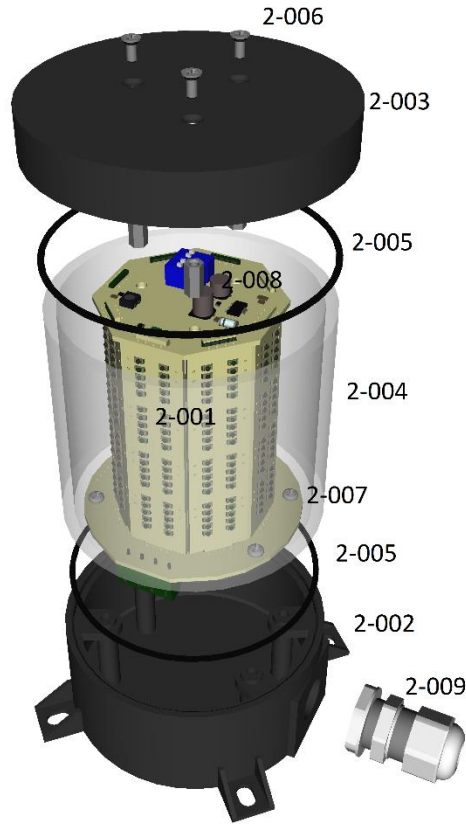


Figure 8 Top flashing light and acoustic horn driver in standalone chassis exploded view

Part no	Quantity	Description	Material
2-001	1	PCB with controller and LED lamp	FR4
2-002	1	Bottom chassis in standalone version	PET-G
2-002K	1	Bottom chassis in column mount version	PET-G
2-003	1	Top chassis	PET-G
2-004	1	Glass cover	Polycarbonate
2-005	2	O-ring 2x43	NBR
2-006	3	Screw countersunk head M3x6	Stainless steel
2-007	4	Screw cylindrical head M3x10	Stainless steel
2-008	3	Spacer sleeve m3x10mm	Brass
2-009	1	Cable gland (for 2-002 only)	PE

Table 3 Top flashing light and acoustic horn driver assembly parts





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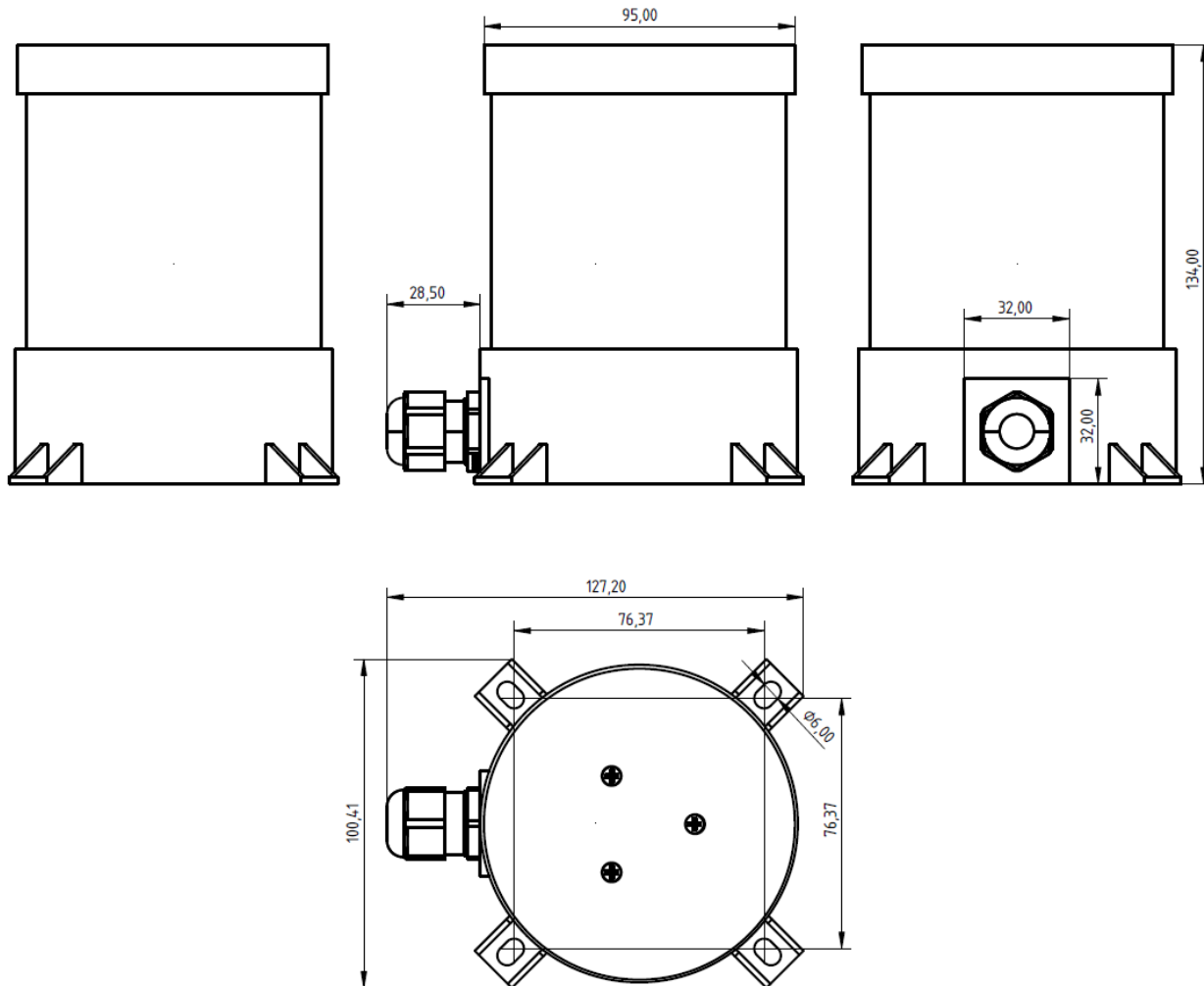


Figure 9 Top flashing and acoustic horn driver lamp in standalone version dimensions



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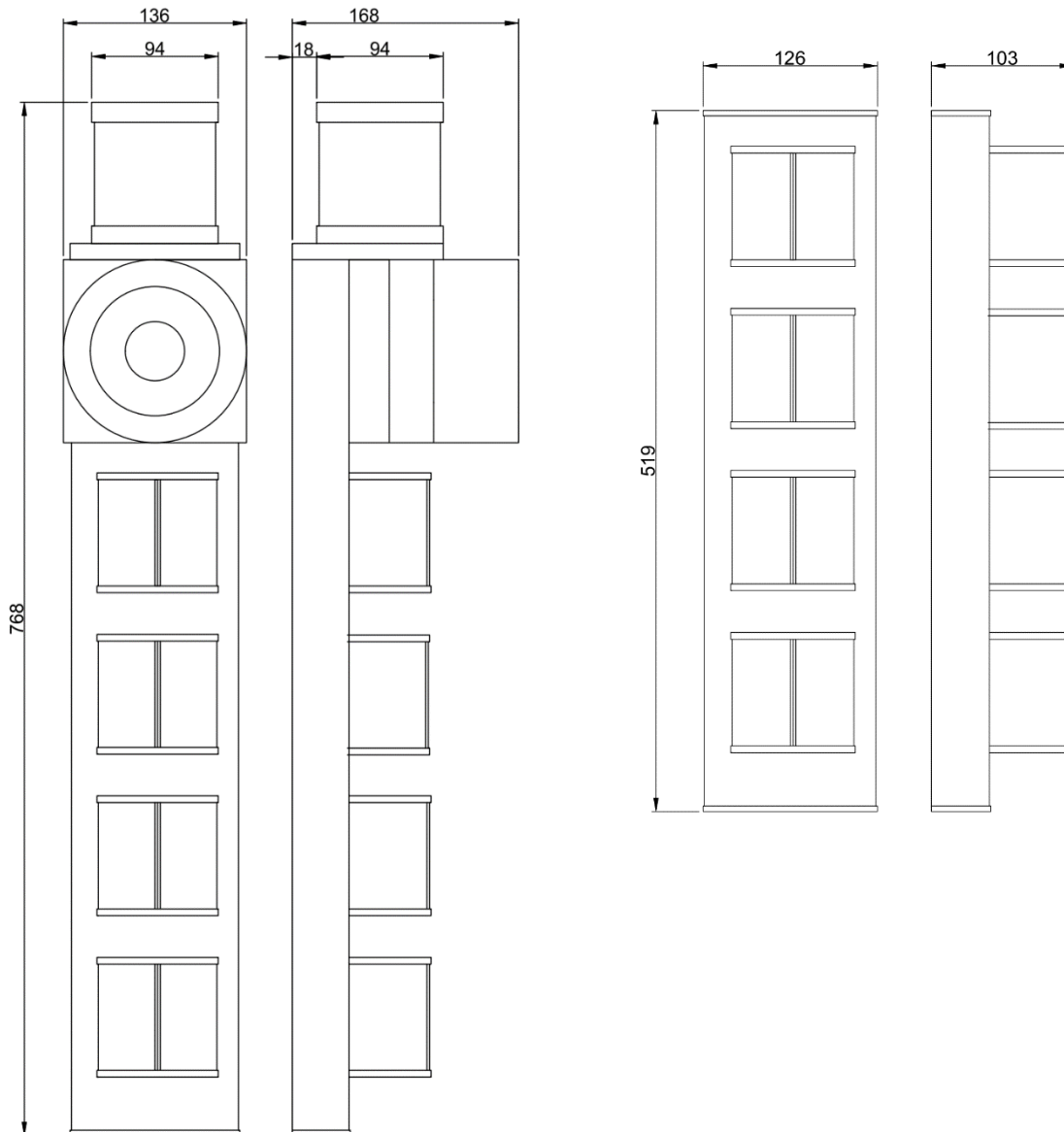


Figure 10 Signalization column in version ST-KS-1A/4bk, with flashing light and acoustic signalization.

Figure 11 signalization column in version ST-KS-1A/4,

Column total length depend from amount of used signalizator. Each additional triangle signalizator need 120mm height, minimal column height is 509mm (with Top flashing lamp, horn, and single triangle lamp) and maximal height is 1349mm (with 8 triangle shape lamps)



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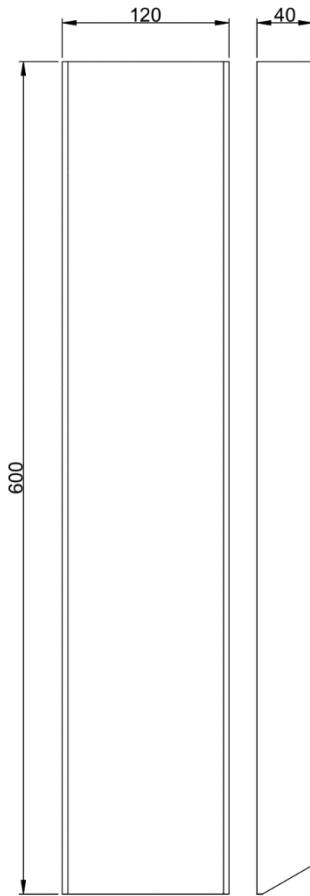


Figure 12 Mounting base for column in version 4bk/4b.

## Default alarm order and priority



Alarm 1. General,  
green backlight



Alarm 2. Fire, red  
backlight



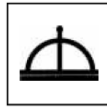
Alarm 3. CO<sub>2</sub>,  
red backlight



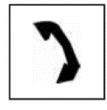
Alarm 4. Machinery,  
orange backlight



Alarm 5. Steering,  
orange backlight,



Alarm 6. Telegraph,  
white backlight



Alarm 7. Telephone,  
White backlight

Other

Alarm 8. Auxiliary  
channel, any graphic  
and any backlight  
colour can be used.

If required column default alarm and priority can be changed in any matter. For additional information please contact STEMOR representative.

Device meets all requirements for ship equipment and is fully comply with:

- PN-EN-61000-4-2:2011
- PN-EN-61000-4-3:2007 +A1:2008 +IS1:2009 +A2:2011
- PN-EN-61000-4-4:2013-05
- PN-EN-61000-4-5:2014-10 +A1:2018-01
- PN-EN-61000-4-6:2014-04
- PN-EN-60068-2-1:2009
- PN-EN-60068-2-2:2009
- PN-EN-60068-2-6:2008
- PN-EN-60068-2-30:2008
- PN-EN-60945:2004
- CISPR 16-2-3



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- CISPR 16-2-1
- PRS: PUBLICATION NR11/P:2016

Input board schematic	Appendix 1 ST-SGKP-1.2 Schematic.PDF
Input board PCB	Appendix 2 ST-SGKP-1.2 PCB.PDF
Triangle lamp board schematic	Appendix 3 ST-TKS_1.2 Schematic.PDF
Triangle lamp board PCB	Appendix 4 ST-TKS_1.2 PCB.PDF
Top flashing lamp schematic	Appendix 5 ST_SKKS_1.1 Schematic.PDF
Top flashing lamp PCB	Appendix 6 ST_SKKS_1.1 PCB.PDF

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