Aqua Signal Control System (ASC)
Navigationsleuchten schalten und überwachen

Betriebsanleitung

de

Aqua Signal Control System (ASC)
Navigation light switch and monitoring

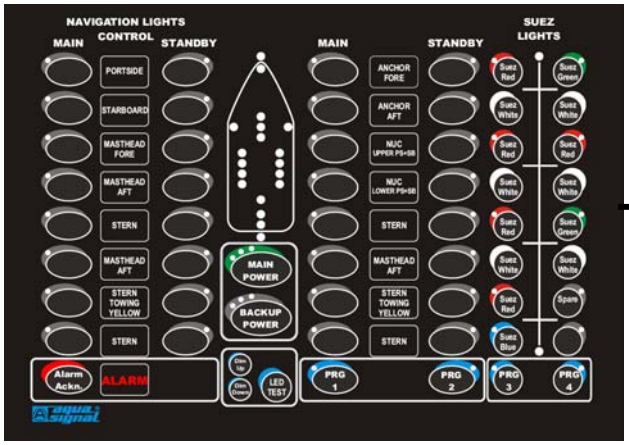
Operating Manual

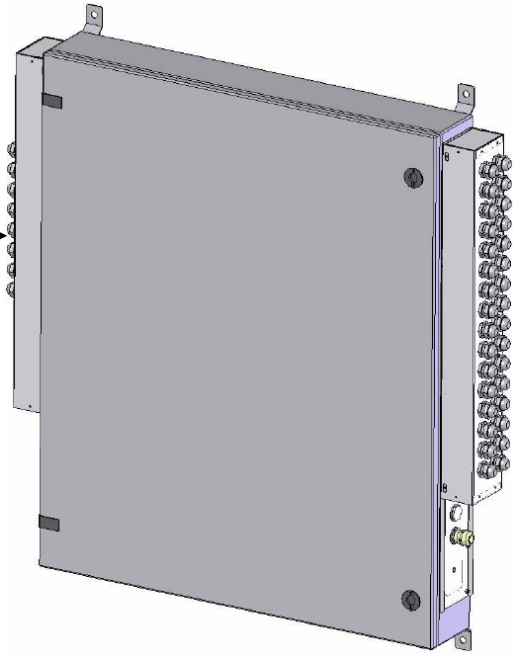
en

Aqua Signal Control System (ASC)
Feux de navigation

Instructions de service

fr





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Die Betriebsanleitung ist vor Einsatz des ASC sorgfältig zu lesen.

Please read the Operating Manual for your ASC carefully!

Il est recommandé de lire attentivement les pages suivantes et de suivre les instructions de service avec la même attention.

de

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AQUA SIGNAL BEHÄLT SICH VOR, AN DEN BESCHRIEBENEN PRODUKTEN TECHNISCHE ÄNDERUNGEN VORZUNEHMEN.

AQUA SIGNAL RESERVE THE RIGHT TO MAKE TECHNICAL AND DESIGN CHANGES TO THE PRODUCTS.

AQUA SIGNAL SE RESERVE LE DROIT DE MODIFIER LA TECHNIQUE OU LE DESSIN DE SES PRODUITS SANS PREVAIS

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1 Foreword

This operating manual is intended to familiarise you with safe operation of the ASC.

The ASC is designed and constructed with state-of-the-art technology according to the recognized safety regulations. However, hazards can arise for persons or objects, as not all hazard points can be avoided if the functional capacity is to be maintained. Accidents on account of these hazards and faults can, nevertheless, be prevented by observing the operating manual. Furthermore, you will then be able to utilize the full capacity of the ASC and avoid unnecessary faults.

Therefore always read this operating manual carefully before installing and commissioning your ASC. Always observe the notes and information contained therein, in particular the safety information.

This operating manual only applies for the ASC indicated on the front page and in the footnotes.

Keep the operating manual in a convenient location after first reading through it so that you can refer to it again later.

All data, figures and dimensions in this operating manual are not binding. Claims of any kind cannot be derived from these.

Conversion or modifications to the ASC are only permissible after written approval from the manufacturer. Unauthorised conversion will render any liability of the manufacturer as well as the warranty null and void.

Only use original spare parts and accessories approved by the manufacturer. Otherwise, properties of the ASC specified by the design as well as the functional capacity or safety could be negatively affected. The use of other parts therefore annuls liability for the consequences resulting from this.

Contact the Customer Service for ordering spare parts or accessories.

The Customer Service is available to help even if service work is necessary (See Section 9)

2 Hazard Information

The prerequisite for safe installation and fault-free operation of the ASC is knowledge of the safety information and safety regulations.

The operator himself is responsible for compliance with the safety provisions and for proper use of the ASC.

Operation of the ASC is at the user's own risk and hazard. The manufacturer is not liable for damage which arises when using the ASC, unless this damage can be traced back to grossly negligent or intentional violation of contract.

The manufacturer cannot predict every danger! The warnings contained in this information and attached to the ASC might not therefore include all hazards.

In addition to the information in this operating manual, the statutory regulations must be observed, in particular the safety and accident prevention regulations.

Therefore read through this section carefully before commissioning and operating the ASC and always pay attention to the information and warnings listed below. The safety information and warnings which you find at corresponding points in the text of the following sections also has to be observed. The manufacturer cannot be held liable if the information and warnings have not been heeded.

2.1 Intended Use

The operational reliability of the ASC is only ensured when used as intended. It must therefore only be used for the intended purpose.

The use is only deemed to be intended, if the ASC is used in conjunction with approved and internationally recognized navigation lights made by aqua signal AG.

Compliance with all data contained in these operating instructions also forms part of the intended use.

Warning!

If the ASC is used for an application other than the one described above, hazardous situations can result for persons or material damage can occur.

2.2 Improper Use

Every use diverging from that described in section 2.2 is deemed to be improper.

Improper uses which have already occurred are not known to the manufacturer.

2.3 Product Observation

Please inform us immediately if faults or problems occur during operation of the ASC or if accidents happen or nearly happen. We shall work out the solution to the problem, if applicable, and incorporate the insights gained in our future work.

Contact details are given in Section 9.

2.4 Requirements for the Personnel

Non-qualified personnel are prohibited from working on the ASC.

Working with the ASC is only authorised for personnel

- who have been trained in regard to this system,
- whose frame of mind is suitable,
- who have been instructed in respect to the associated hazards,
- who have been authorized for this by the operator,
- who have read and understood these operating instructions and
- who can be expected to reliably fulfil the tasks assigned to them.

These personnel must be carefully chosen by the operator. The area of responsibility and the responsibilities of the relevant persons must have been precisely specified by the operator.

2.5 Safety and Accident Prevention Regulations

In addition to the safety and accident prevention regulations of the nationally responsible bodies, the following information must be heeded, in order to avoid damage to persons and objects:

- The ASC may only be operated for its intended use, as otherwise hazardous situations resulting in injury or even death can occur (see Section 2.1).

  The operator is responsible for compliance with the intended use, in particular for ensuring that only authorized personnel work on the ASC.

- The national, local and system-specific provisions and requirements must be observed.
- The ASC may only be operated with properly mounted safety and protective equipment. This equipment may only be disassembled for maintenance and repair work. After completion of this work, the safety and protective equipment must be immediately mounted again. Otherwise there is a risk of injury.
- Maintenance and repair work may only be carried out by authorized personnel after disconnection from the power supply (see Section 2.4).
- Implementation of the specified maintenance and repair work is part of the intended use of the ASC, in particular compliance with the maintenance intervals. If you do not carry out this work, a perfect functioning cannot be ensured and hazards can result for persons and material objects. We recommend that you keep maintenance records.
- Before maintenance and repair work, also including cleaning work, the ASC must be switched off and disconnected from the power supply (disconnect from line connection). In addition to this, it must be ensured that no other person can restore the connection to the power supply. Otherwise there is a risk of injury.
- The ASC must not be operated in a defective state, as considerable risks of injury can result through this. If faults occur, in particular safety-relevant faults, the ASC must be disconnected from the power supply and a repair carried out.
- Cables must be replaced immediately if cracking or other forms of damage become visible.
- The ASC modules must not be opened. Unauthorized opening will render any liability of the manufacturer as well as the

warranty null and void.

- Only use original spare parts and accessories approved by the manufacturer. Liability for the resultant consequences shall expire if other parts are used.

2.6 Safety Labels

In addition to the safety information in these operating instructions, labels are attached to the ASC for warning against certain dangers. The meaning of these safety labels is described in the following table.

Removal of the safety labels is prohibited.
Safety labels which become detached or which have already been lost must be replaced
(For contact details see Section 9).

Warning of electrical voltage.

Life-threatening electrical voltages are present in the electrical components of the device.

Do not work on live components!

3 Guarantee Provisions

Unless otherwise agreed, the statutory provisions for the warranty and the General Terms and Conditions of Business (as at 12/2002) of aqua signal AG shall apply.

The warranty shall expire upon modification of the ASC!

4 System Description of the ASC

The ASC serves for switching and monitoring lights for navigation and signals.

The design is certified by Germanischer Lloyd (GL) and further classes (see Section 10).

The aim of this section is to illustrate the structure and functioning of the ASC. The individual components are described in the following sections for this.

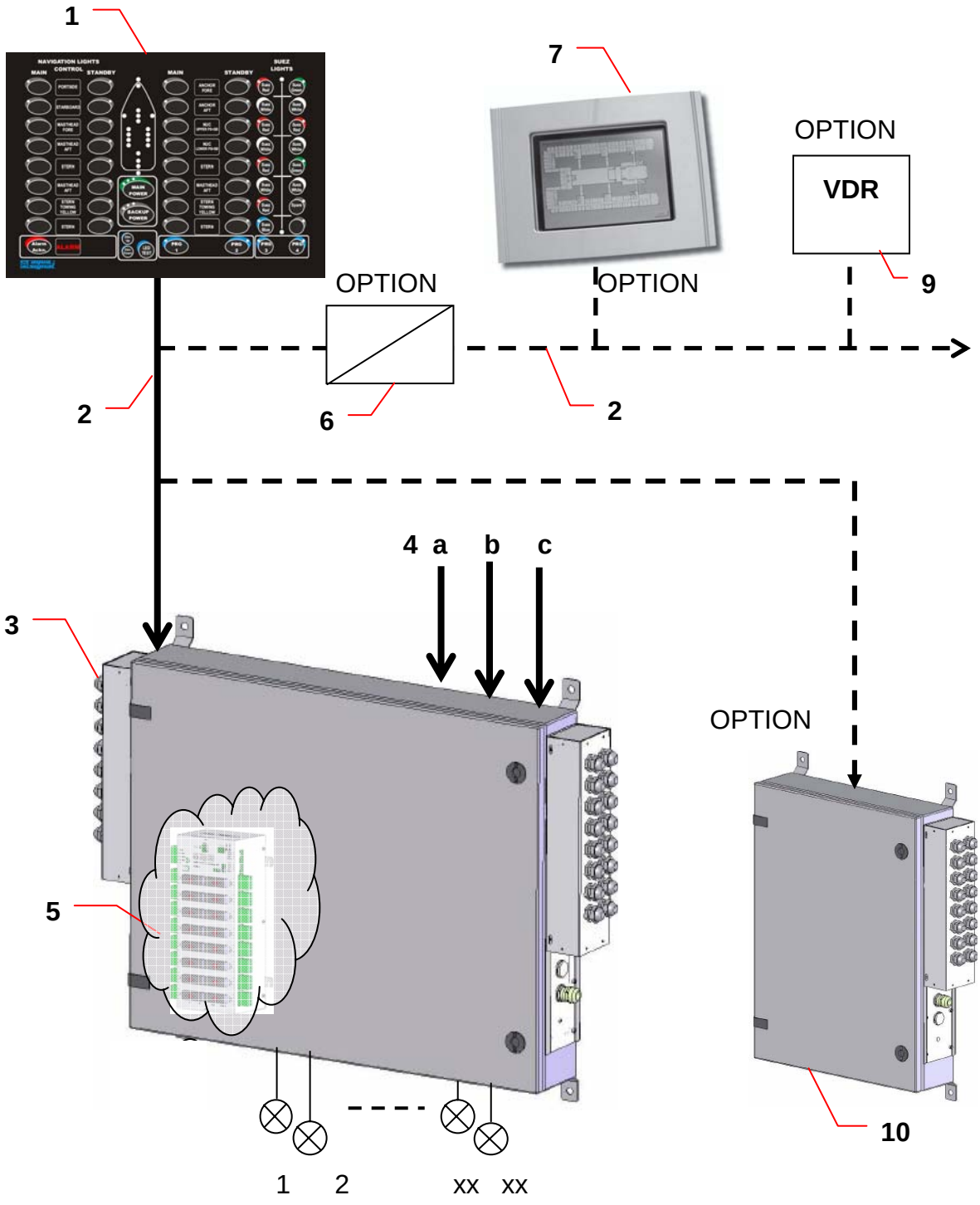
The advantage of the ASC lies in the flexible configuration and modular design.

In addition, the 2-wire bus system (RS485) enables a bidirectional control and monitoring via superordinate bridge systems.

A seamless logging of the switching states and system messages for Voyage Data Recording (VDR) systems is also possible

Further information on the serial bus protocol, dataflow monitoring and participant priorities is provided in a separate documentation to be requested.

4.1 System Overview



Legend

1	Control panel
2	Combination cable 2x2x0.5mm2 + shielding, supply 24V dc and RS485 Length max. 200m
3	Switch cabinet with modules and fuse elements
4	General input voltages 24V dc, 115V ac, 230V ac a) Device supply b) Navigation lights main supply c) Navigation lights reserve supply
5	Relay module with manual operation of the switching relay
6	OPTION : Interface with galvanic isolation to the external system
7	OPTION : Superordinate control of external providers, e.g. touchscreen
8	OPTION : Superordinate control of external providers, e.g. touchscreen
9	OPTION : Voyage Data Recorder System (VDR)
10	OPTION : Additional switch cabinet

System characteristic data:

- Supply 24V dc or 115/230V ac
- Max. 64 switching circuits
- Max. 2.5A per switching circuit (fuse)
- Undercurrent detection
  AGL/LED <80mA (+/-20mA)
- Undervoltage detection
  <17V AC/DC (+/-3V)
  Applies for all system voltages (24V dc, 115/230V ac)

4.2 Functional Description

The ASC can be configured flexibly and set up in various expansion levels:

- 1-8 control panels with up to 8 relay modules which may be distributed together or decentralized
- Operation via external systems of third-party providers, e.g. bridge systems, touchscreen, PC. The bus protocol is provided at the customer's request

A manual control directly to the relay modules is always ensured.

If the light is switched on, the function is signalled via assigned LEDs on the control panel at the button and in the ship/mast symbol, this corresponding to the corresponding light. The brightness of the light emitting diodes can set using the UP/DOWN buttons on the control panel.

The functional elements of the control panel are described in detail under item 7.

4.2.1 Infeeds

The ASC system is provided with 3 separate infeeds as standard :

- Device voltage 230/115V ac or 24V dc (smoothed)
- Infeed for main and signal lamp circuits 230/115V ac or 24V dc (smoothed)
- Infeed for reserve lamp circuits 230/115V ac or 24V dc (smoothed)

4.2.2 Current Monitoring

The navigation and signal lights are monitored by measuring the lamp current.

A galvanic isolation between the lamp voltage and monitoring electronics is ensured.

At least one lamp current of 80mA (+/-20mA) AC/DC per circuit can be monitored. At the same time, the current gaps must not be greater than 2 seconds.

The maximum permissible current is 2.5A AC/DC per circuit !

If there is a defect in the lamp current circuit (due to defective bulb/LED, wire break or fuse tripping), this will therefore be signalled with approx. 8 seconds delay.

At the same time, the corresponding light emitting diodes flash on the control panel and an acoustic signal is given.

4.2.3 Voltage Monitoring

The input voltages of the lamp supply are monitored separately in the main switching module.

The presence of lamp voltage is displayed by an LED. If the lamp voltage fails, the corresponding LED will flash and a continuous acoustic signal will be emitted.

In the relay modules, each output circuit is monitored and indicated as an alarm upon failure of a circuit or the overall supply.

Undervoltage detection <17V AC/DC (+/-3V)

4.2.4 Alarm Acknowledgement

The Acknowledge button on the control panel can be used to reset the acoustic alarm.

The optical alarm is retained until the fault is rectified or the defective current circuit is switched off.

If the fault persists after button entry again, a renewed optical and acoustic alarm will be emitted.

Pressing the LED test button causes all light emitting diodes to light up and the acoustic signal generator to sound.

(See item 7)

4.2.5 Different voltages in main and reserve lights

In the case of different voltages, only the combinations 24V/115V and 24V/230V are possible.

The internal device supply must occur separately.

If the internal supply of the ASC is decreased by the light voltages, both voltages must be equal (e.g. 2x 230V).

4.2.6 Optional Functions

The following options are only possible as a special design after prior clarification

AUTOMATIC POWER SUPPLY SWITCHOVER

The automatic switchover switches over the device and light supply in the event of a power failure.

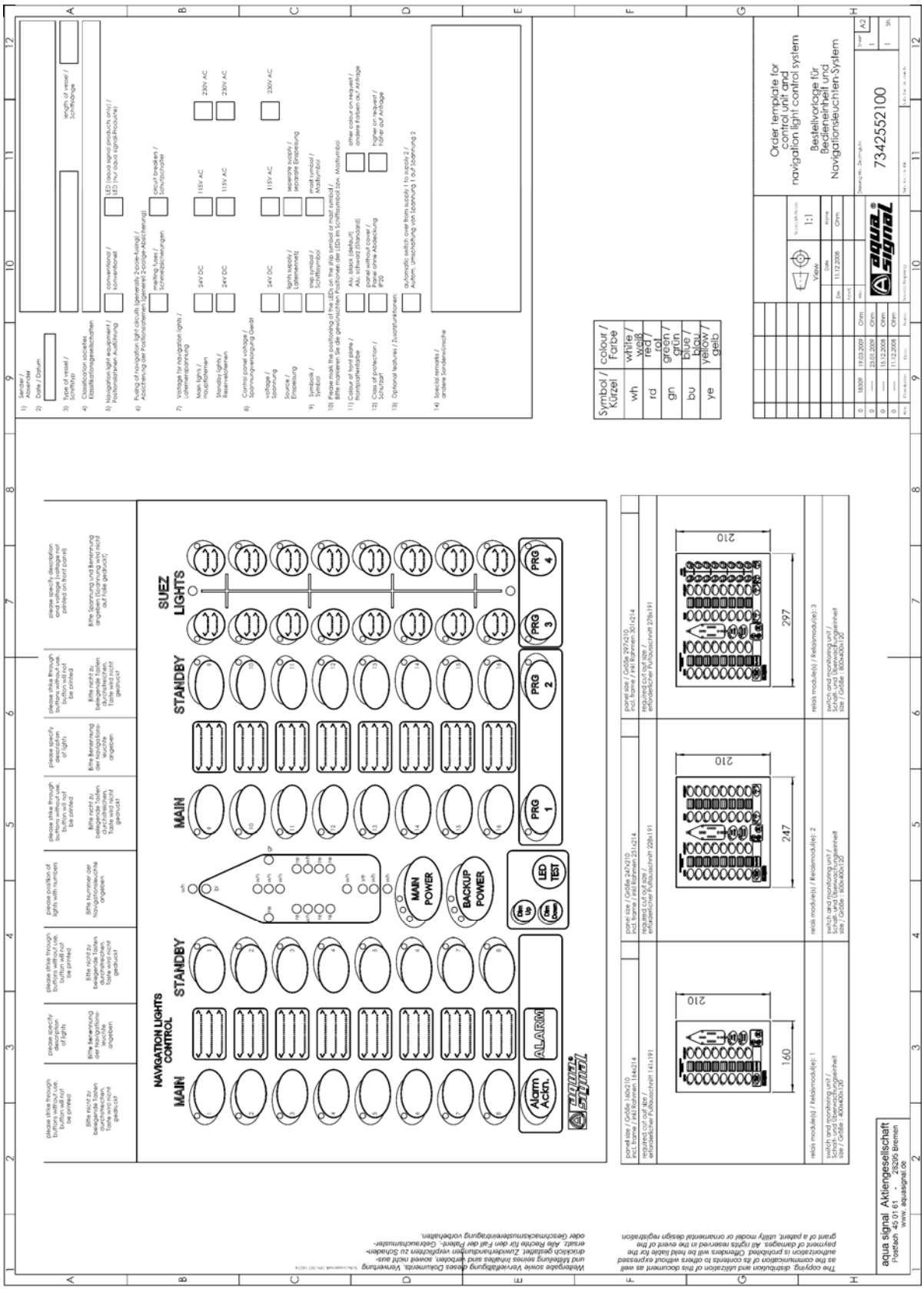
AUTOMATIC POWER SUPPLY SWITCHOVER WITH SEPARATE DEVICE SUPPLY

The automatic power supply switchover switches over the light supply in the event of a power failure

e.g. 24V device voltage, 2x 230V lamp voltage

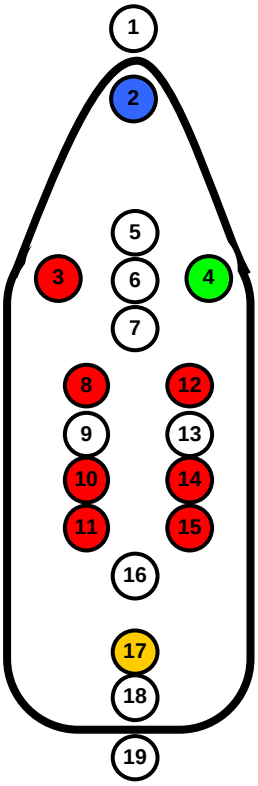
5 Components

New systems are generally configured customer specifically. The enclosed order form must therefore be used when ordering.



5.1 Explanation of Ship Symbol

The ship symbol on the standard control panel can be assigned as follows in the maximum configuration stage :



Navigations lights **ASSIGNMENT** **Designation**

1 (White) : ANCHOR FORWARD
2 (Blue) : STEERING LIGHT BLUE

3 (Red) : PORTSIDE
4 (Green) : STARBOARD

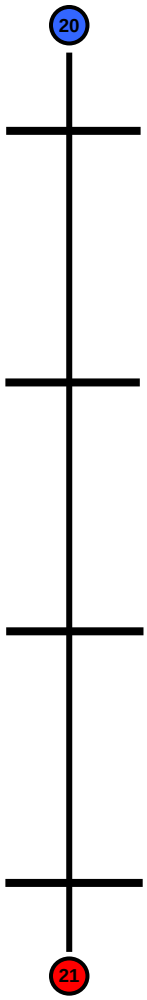
5 (White) : MASTHEAD FORWARD
6 (White) : MASTHEAD TOWING UPPER
7 (White) : MASTHEAD TOWING LOWER

Either only 8-11, or as backboard, if 12-15 present
8 (Red) : NUC* UPPER
9 (White) : RAM*
10 (Red) : NUC* LOWER
11 (Red) : DEEP DRAUGHT

if 12-15, then as starboard, are switched jointly with 8-11, but monitored separately
12 (Red) : NUC* UPPER
13 (White) : RAM*
14 (Red) : NUC* LOWER
15 (Red) : DEEP DRAUGHT

16 (White) : MASTHEAD AFT
17 (Yellow) : STERN YELLOW / TOWING
18 (White) : STERN
19 (White) : ANCHOR AFT

Suez lights
20 (Blue) : STEERING LIGHT BLUE (Alternative to 2)
21 (Red) : STERN RED



*NUC = Not Under Control
*RAM = Restricted Ability to Manoeuvre

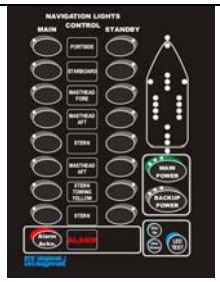
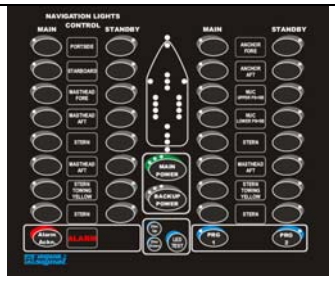
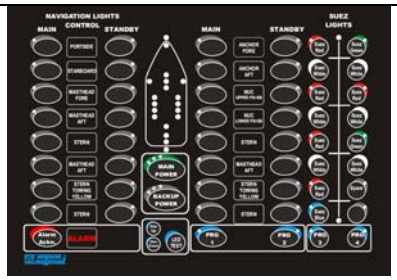
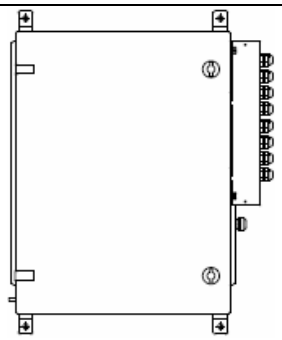
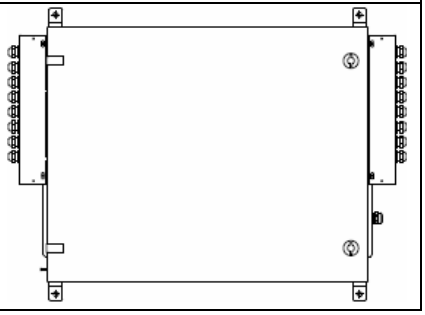
Other combinations and groupings are possible, depending in the relevant directives !

The designation of the lights can be used as standard lettering of the text fields.

Additional lights for special applications can be provided as further switching circuits with text field.
Assignment to the above symbols is not possible !

The Suez lights are also only displayed by the button LEDs.
The assignment of the position must be ensured by correct selection of the button position.

5.2 Component List

Component	Order no.	Figure
Control panel with 8+8 channels for 8 navigation lights main+reserve	83425502000-xxxx	
Control panel with 16+16 channels for 16 navigation lights main+reserve	83425504000-xxxx	
Control panel with 16+16+16 channels for 16 navigation lights main+reserve and max. 16 Suez lights)	83425506000-xxxx	
Switch cabinet type 1, incl. : 1 main switching module, 1 relay module, fuse elements	3425502000-xxxx	
Switch cabinet type 2, incl. : 1 main switching module, 2 relay modules, fuse elements	3425504000-xxxx	

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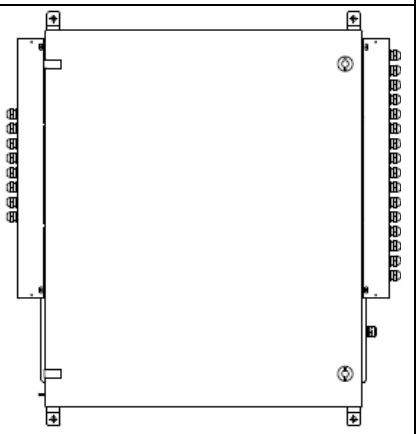
Component	Order no.	Figure
Switch cabinet type 3, incl. : 1 main switching module, 4 relay modules, fuse elements	3425506000-xxxx	

The serial number xxxx is project relevant, and must be indicated along with the order number !
Keep the order number with serial number at hand if you have any queries !

External cables are not generally included in the scope of supply:

- Cables for power supply connection
- Bus cables
- Cables for navigation lights

The specifications for the cables are described in Section 6.4.

5.3 Control Panel

Standard control panel in 3 configuration stages with up to 8+8, 16+16 and 16+16+16 circuits.

The panel is designed as a membrane keypad with tactile short-stroke keys in a flat metal housing. All signals are also shown as feedback on the front plate (LEDs and signal sound). The assignment of the front plate lettering can be customer specific.

Section 7 contains a description of the operation.

Figure: Panel with 16 (8+8) circuits

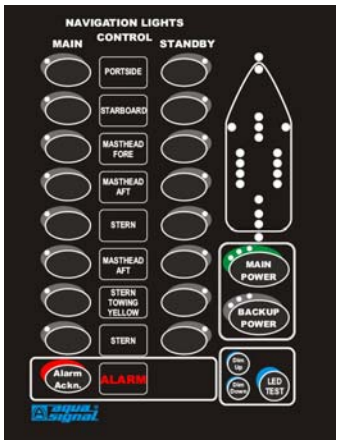


Figure: Panel with 16+16 circuits

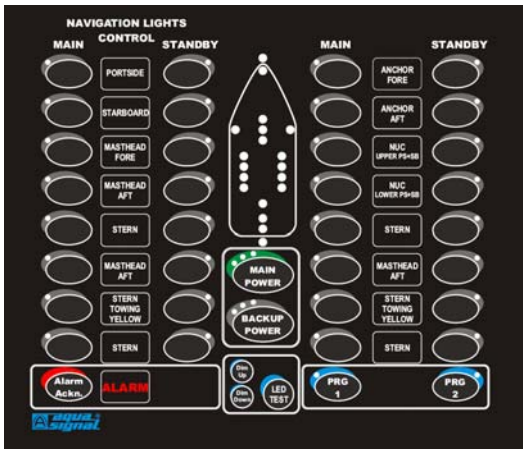
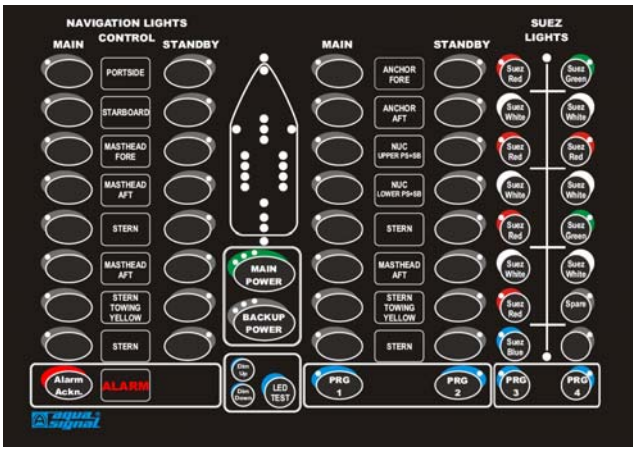


Figure: Panel with 16+16+16 circuits



5.3.1 Technical Data

Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	IP22 for higher protection class install in suitable housing
Dimensions [mm]:	See 5.3.2 to 5.3.4
Mounting:	4 x M4 bolts See 5.3.2 to 5.3.4
Energy supply:	22..28V dc, max. 500 mA
Connection:	Terminal block on rear
	Assignment : See 5.3.2 to 5.3.4
	**Attention :** **Use strain relief !** **Contact the shielding cleanly electrically under the strain relief loop !**
Address setting (not accessible)	**THIS SETTING IS DONE AT THE FACTORY,** **and must not be changed by the customer !**
	**Each address may only occur ONCE in the system**

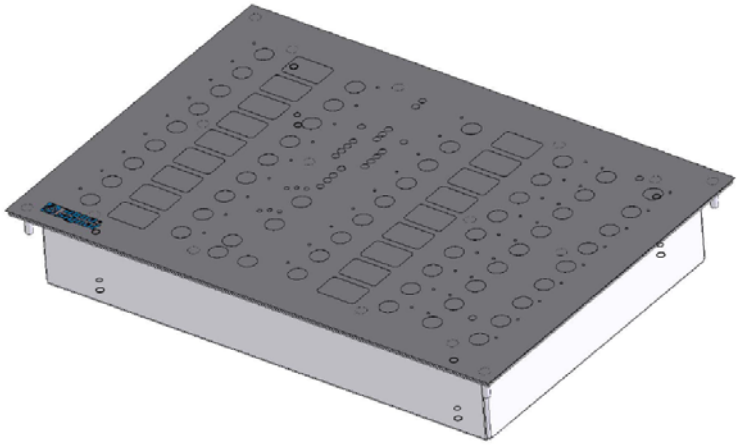
Further information on the serial bus protocol, dataflow monitoring and participant priorities is provided in a separate documentation to be requested.

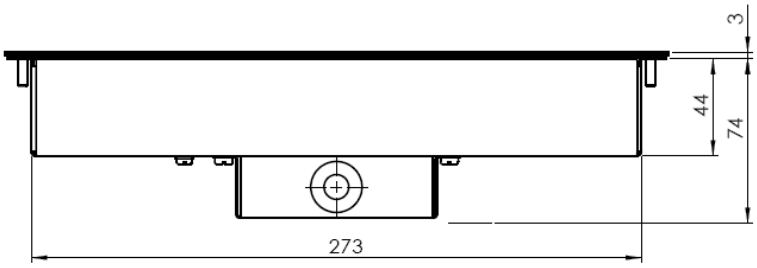
5.3.2 Control panel 16+16+16 circuits

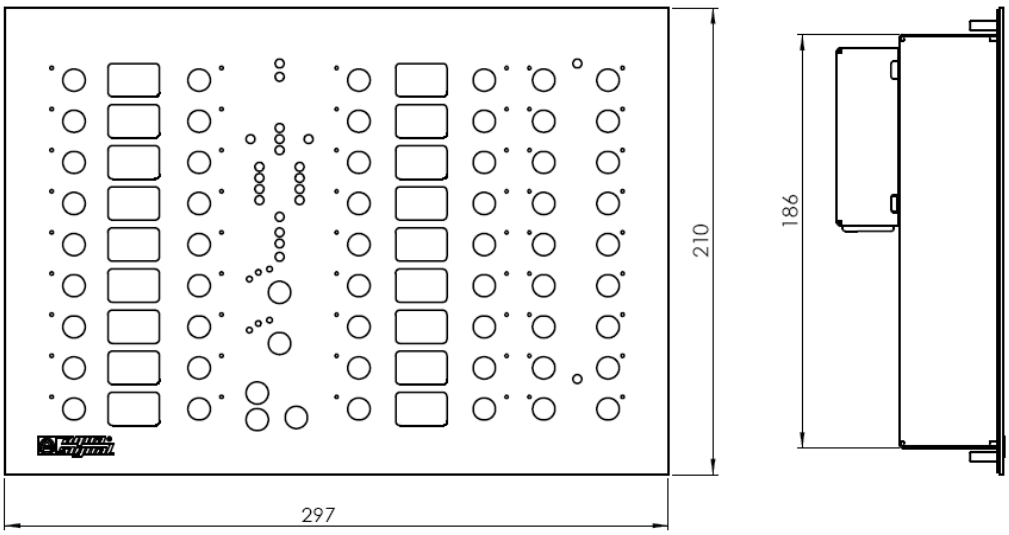
Maximum standard configuration stage for 16 main and 16 reserve lights and 16 signal lights (i.e. Suez)

In addition, 4 freely assignable program keys are also available. Complete switching scenarios can be saved and called up for here. (see also 7.7)

These keys cannot be assigned further light circuits !

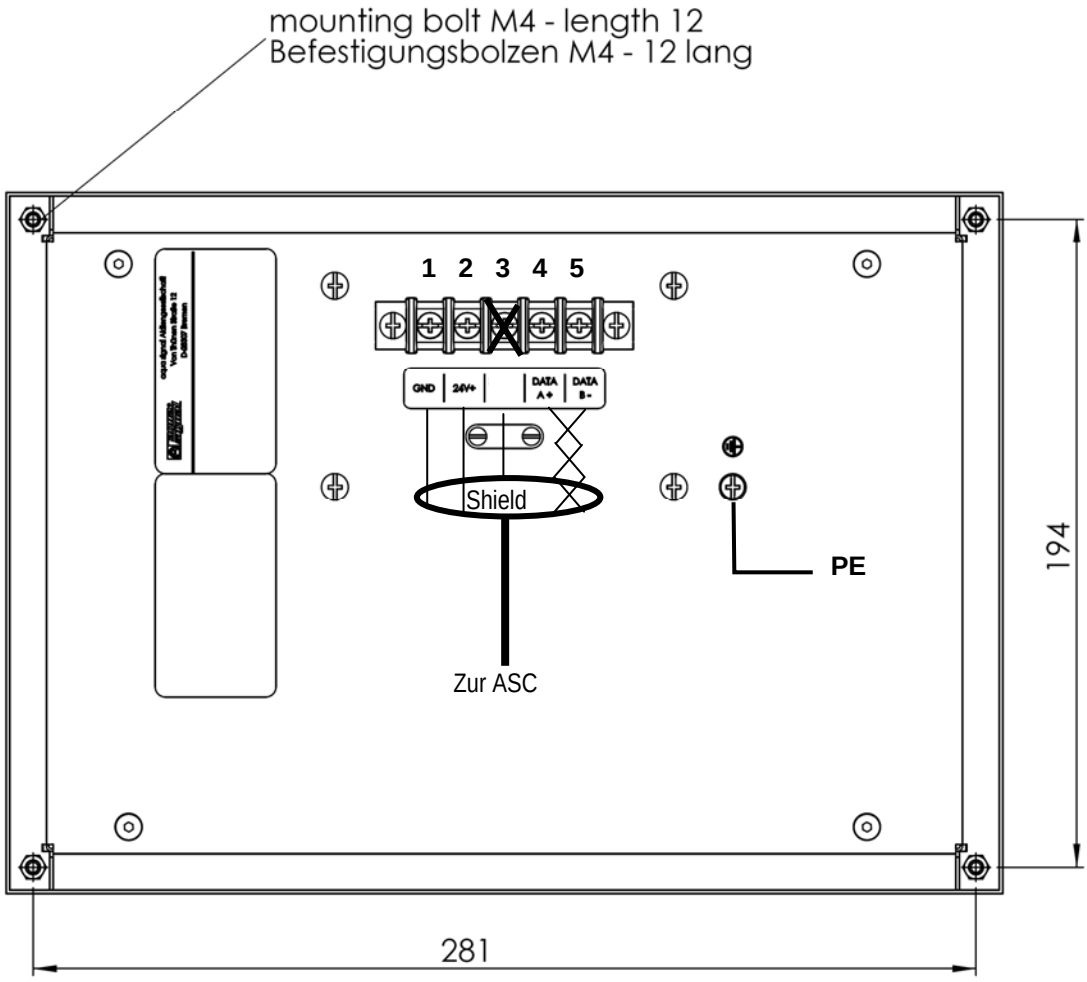






View of rear

With mounting and connection diagram



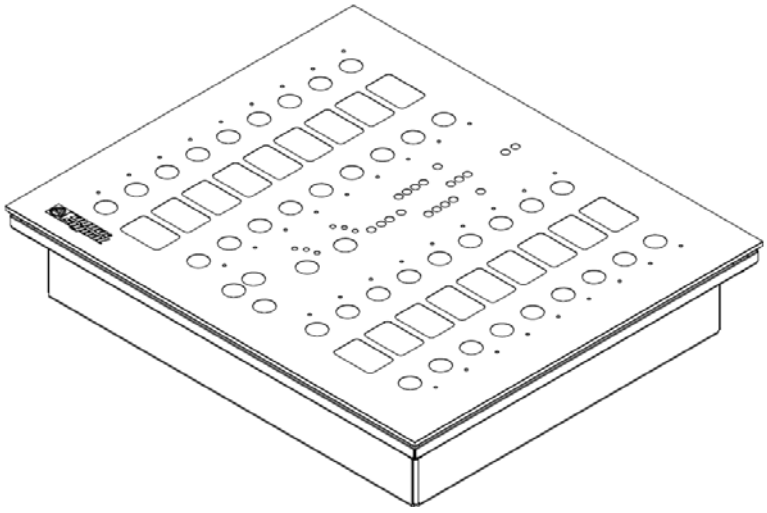
Connection assignment

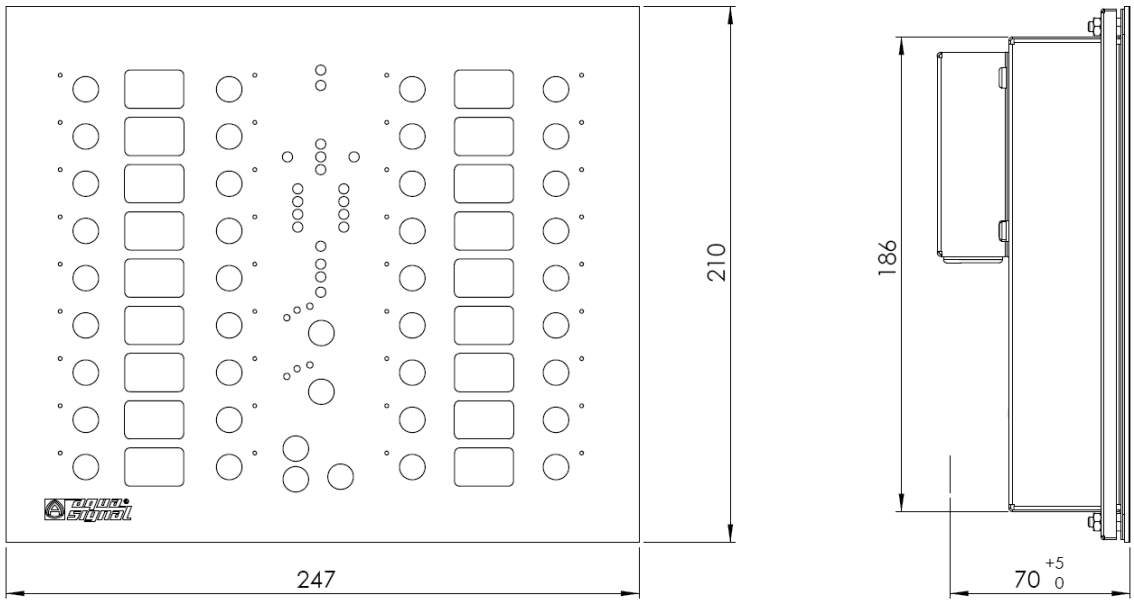
Pin no.	Function	Cable
1	GND	Cross-section depends on cable length
2	+24V DC	
3	*Not used*	Electrically contact shielding under strain relief
4	RS485 DATA A+	Wires twisted pair
5	RS485 DATA B-	

5.3.3 Control panel 16+16 circuits

Configuration stage for 16 main and 16 reserve lights

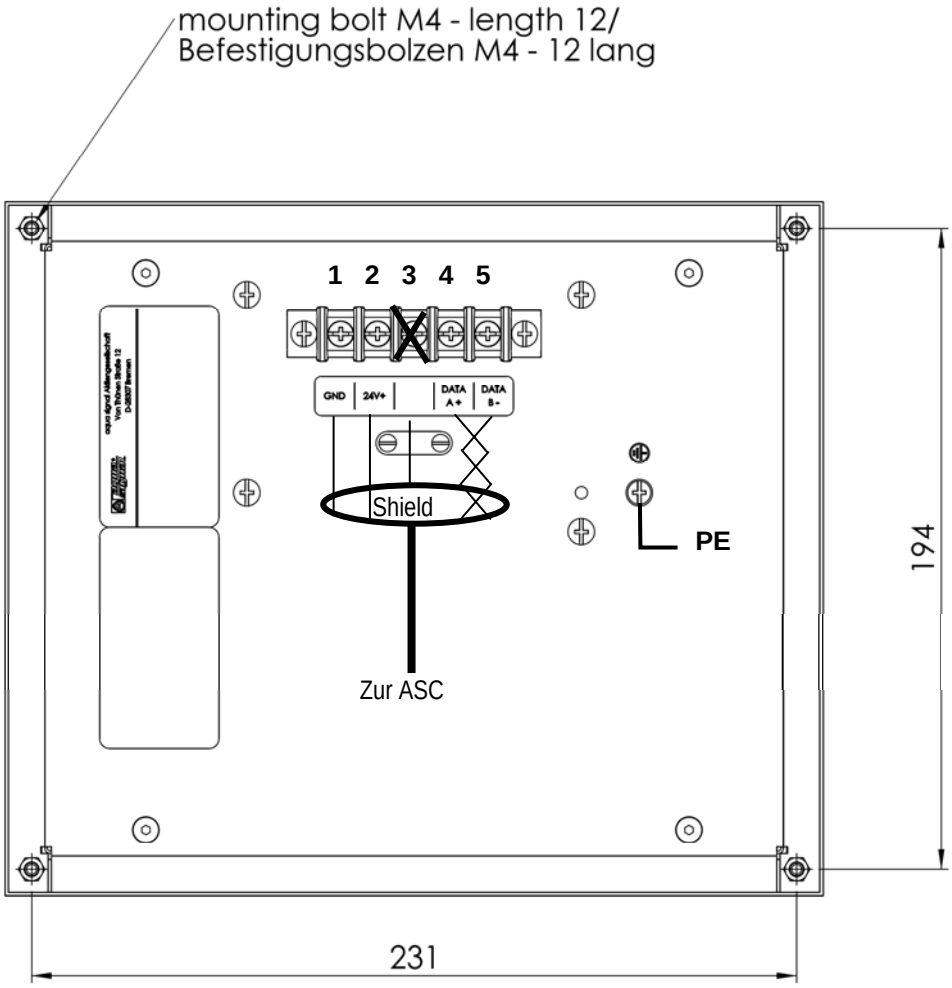
In addition, 2 freely assignable program keys are also available.





View of rear

With mounting and connection diagram



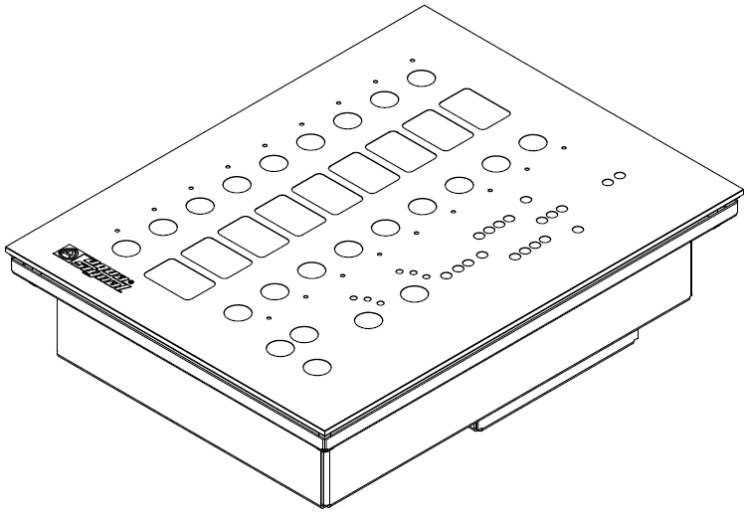
Connection assignment

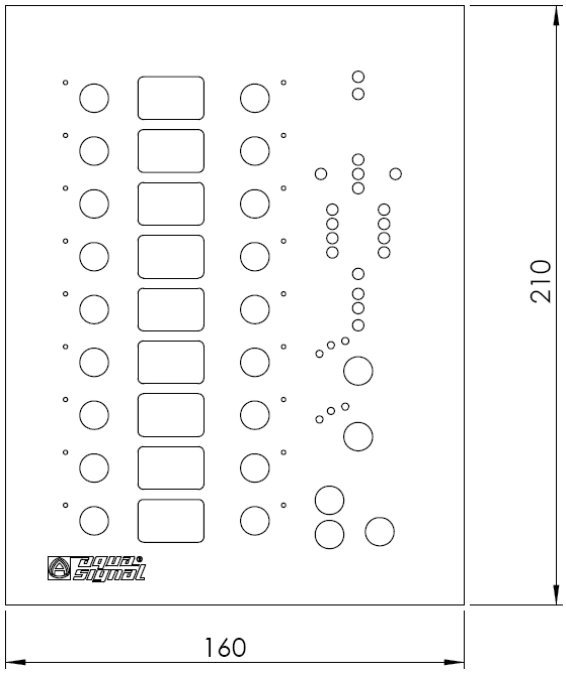
Pin no.	Function	Cable
1	GND	Cross-section depends on cable length
2	+24V DC	
3	*Not used*	Electrically contact shielding under strain relief
4	RS485 DATA A+	Wires twisted pair
5	RS485 DATA B-	

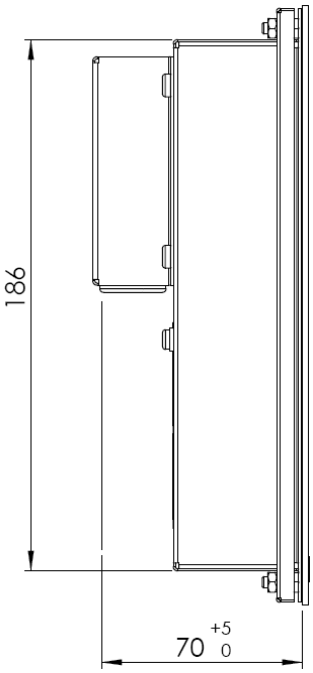
5.3.4 Control panel 16 (8+8) circuits

Configuration stage for 8 main and 8 reserve lights

No program keys are available.

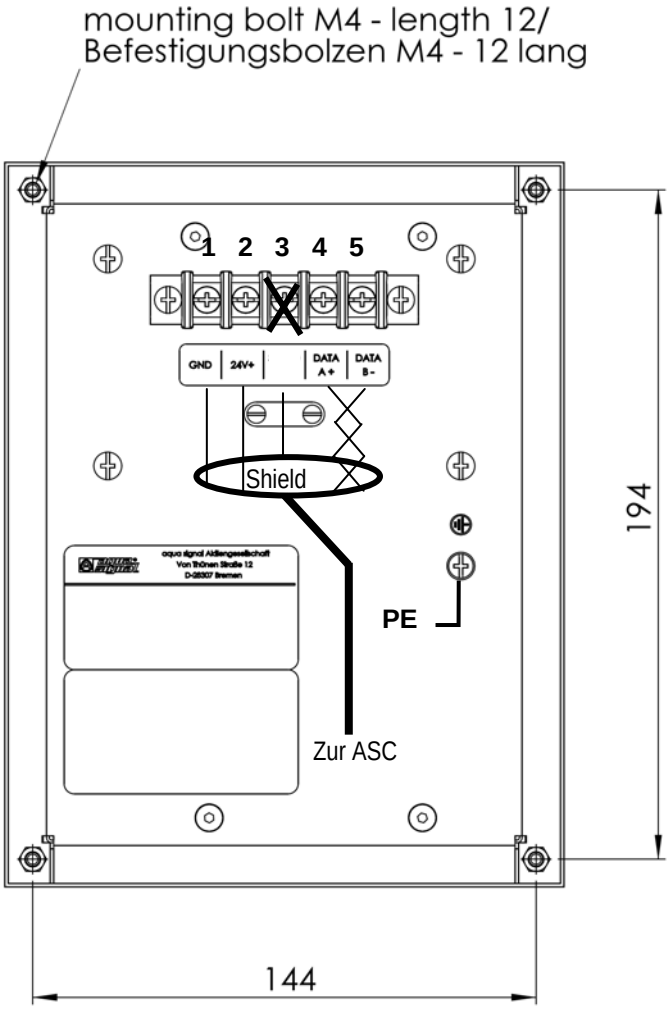






View of rear

With mounting and connection diagram



Connection assignment

Pin no.	Function	Cable
1	GND	Cross-section depends on cable length
2	+24V DC	
3	*Not used*	Electrically contact shielding under strain relief
4	RS485 DATA A+	Wires twisted pair
5	RS485 DATA B-	

5.4 Switch Cabinet

- The relay modules, main switching modules and fuse elements are grouped together in one (or more) terminal boxes The lights are connected on external screw connections. The cover must be removed with the cable bushings beforehand for this.
- The fuse protection has fuse terminals with fuse cut-out elements in the cabinet.
  Special solutions with automatic circuit breakers are also possible
- **The connection scheme comprises the terminal and connection diagrams provided**

Figure: Switch cabinet type 1: 3425502000

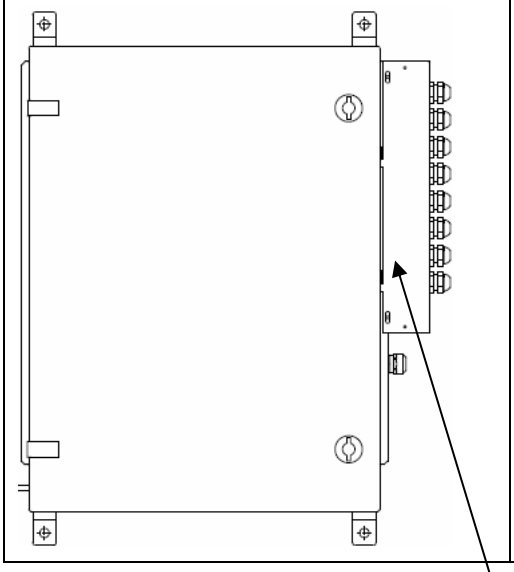
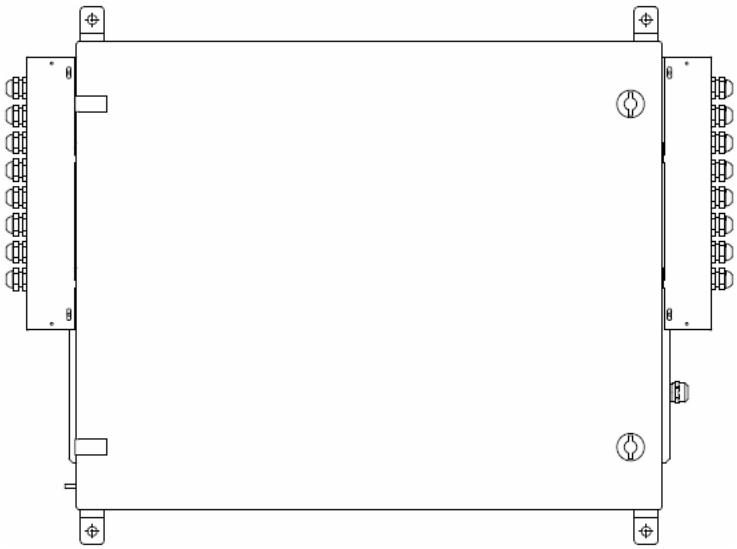
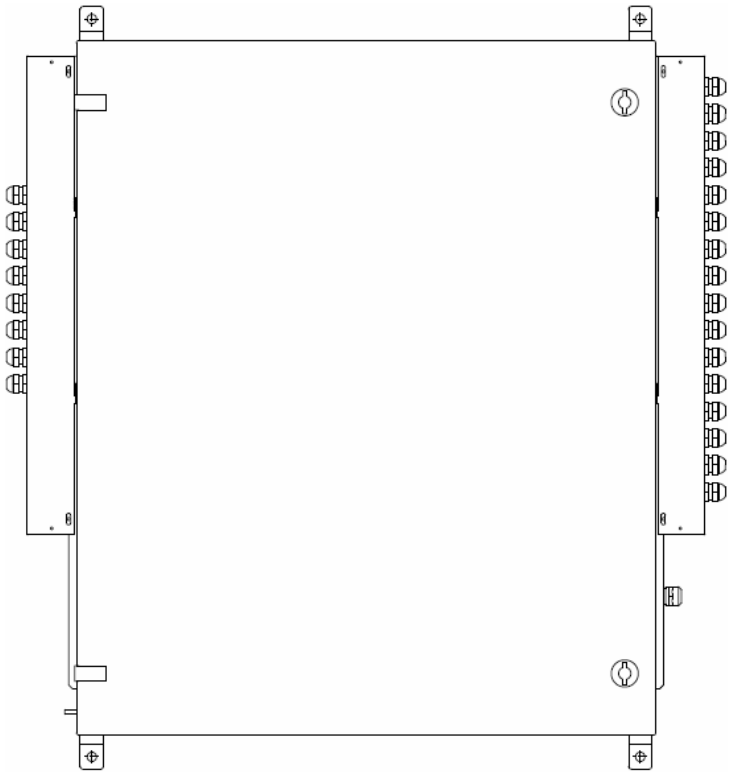


Figure: Switch cabinet type 2: 3425504000



Cover with cable glances

Figure: Switch cabinet type 3: 3425506000



5.4.1 Switch cabinet 3425502000-xxxx

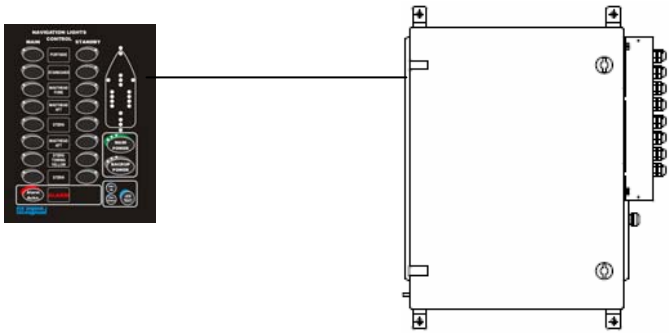
ASC switch cabinet 3425502000 can switch max. 8 main and 8 reserve navigation lights

Contains:

- 1 main switching module for switching over main or reserve supply
- 1 relay module for navigation lights (main/reserve)
- 1 power supply unit (optional for 115V/230V ac)
- Relay
- Fuse elements

5.4.1.1 Standard combination

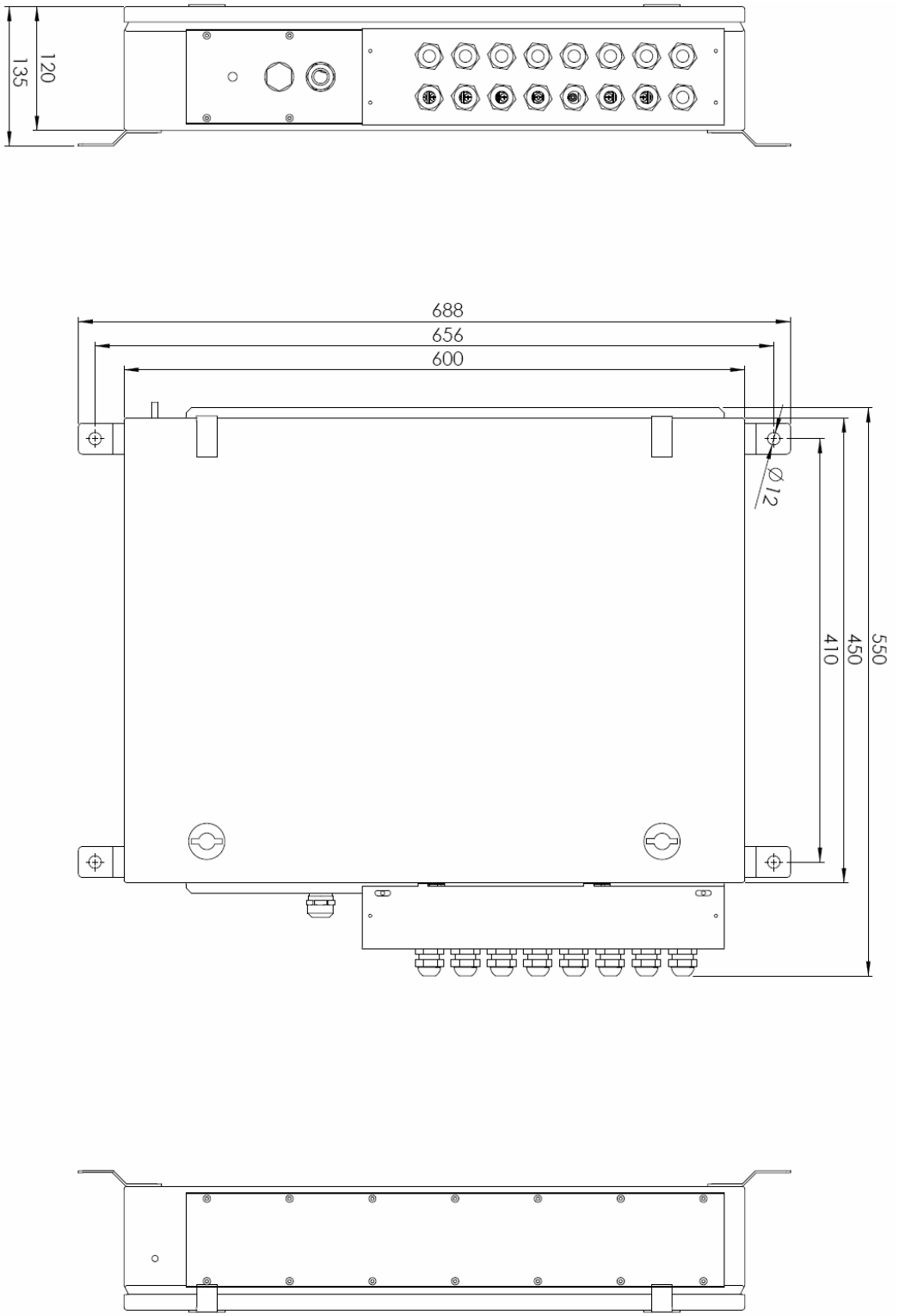
Panel 83425502000 with switch cabinet 3425502000



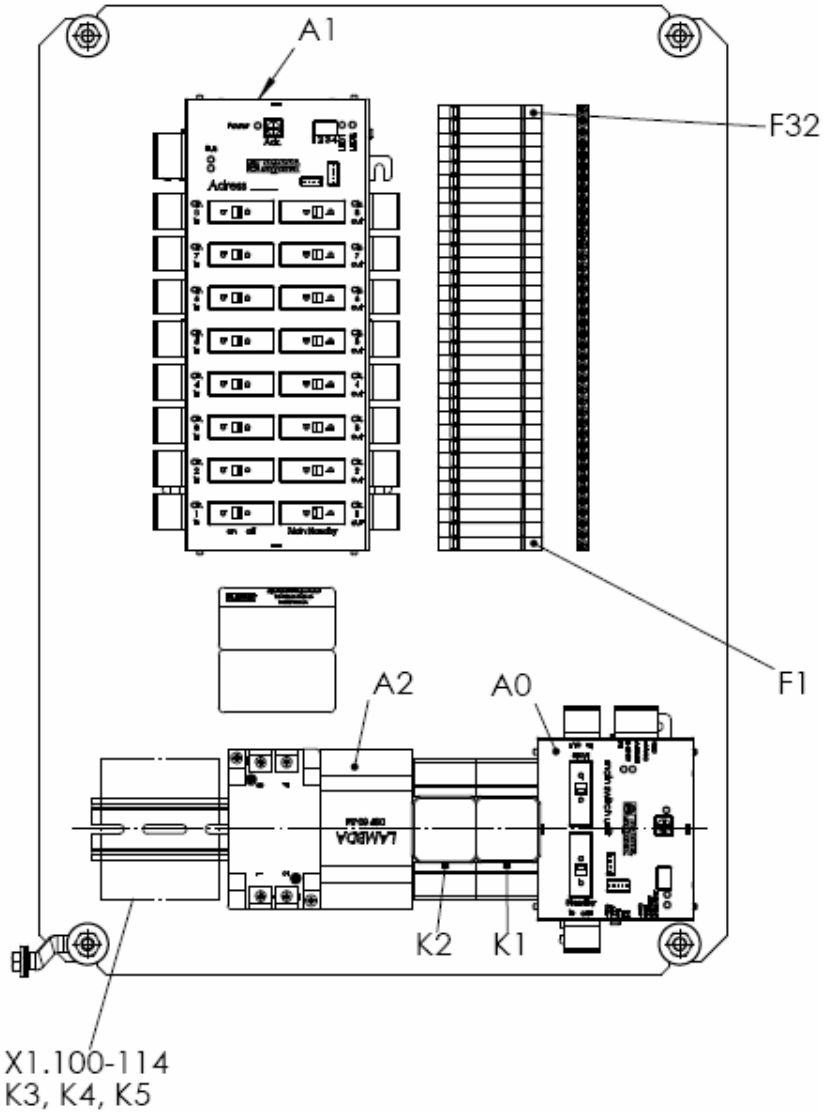
5.4.1.2 Technical Data

Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	Cabinet standard IP22 Other protection class on request
Dimensions [mm]:	See figures below
Weight:	23 kg
Material (External)	Sheet steel, powdered (RAL7035)
Mounting:	Wall mounting with 4 x M10 bolts
Device supply:	24V dc or 115V ac or 230V ac
Connection values per circuit	**Max. 2.5A**
Fuse protection	Standard fuse terminals with fine-wire fuse elements 2.5AMT Automatic circuit-breaker possible on request by customer

5.4.1.3 Cabinet dimensions in mm



5.4.1.4 Mounting plate layout



A0	Main switching module
A1	Relay module type 8+8Ch Alternative type 8Ch
A2	Power supply unit 115/230V ac (not necessary for 24V dc power supplies)
F1..F32	Output of fuse terminals
K1..K5	Relay
X1.100...114	Terminals for infeeds

5.4.2 Switch cabinet 3425504000-xxxx

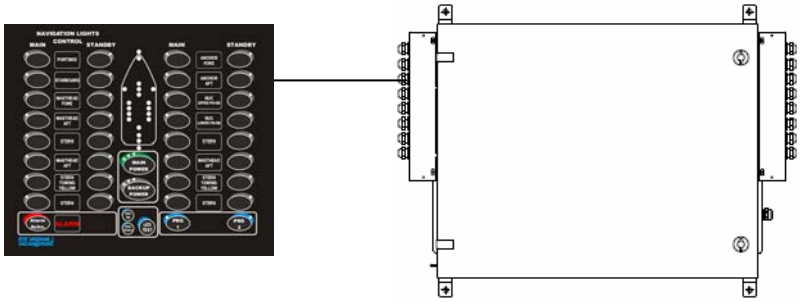
ASC switch cabinet 3425504000 can switch max. 16 main and 16 reserve navigation lights.

Contains:

- 1 main switching module for switching over main or reserve supply
- 2 relay modules for navigation lights (main/reserve).
- 1 power supply unit (optional for 115V/230V ac)
- Relay
- Fuse elements

5.4.2.1 Standard combination

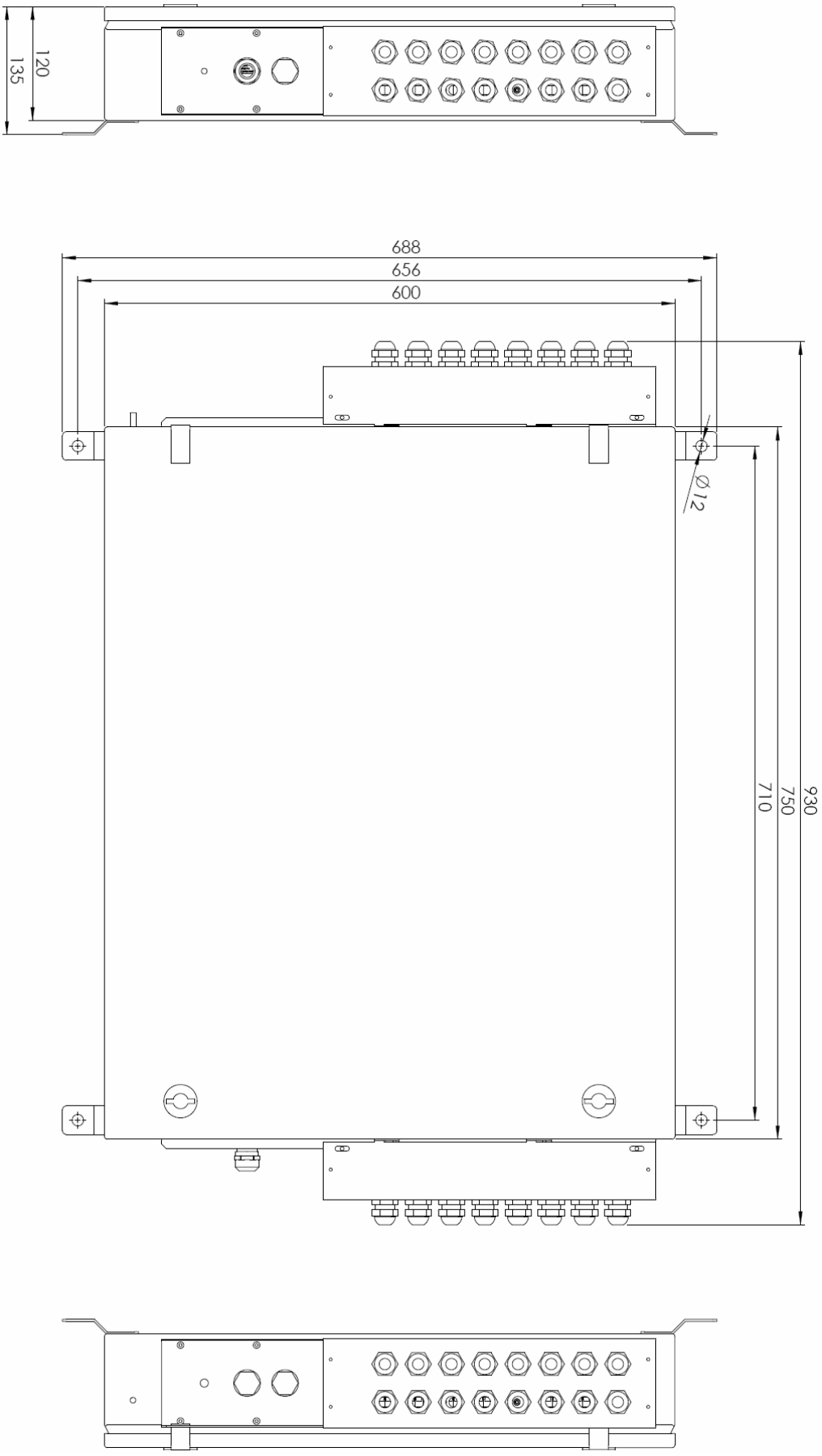
Panel 83425504000 with switch cabinet 3425504000



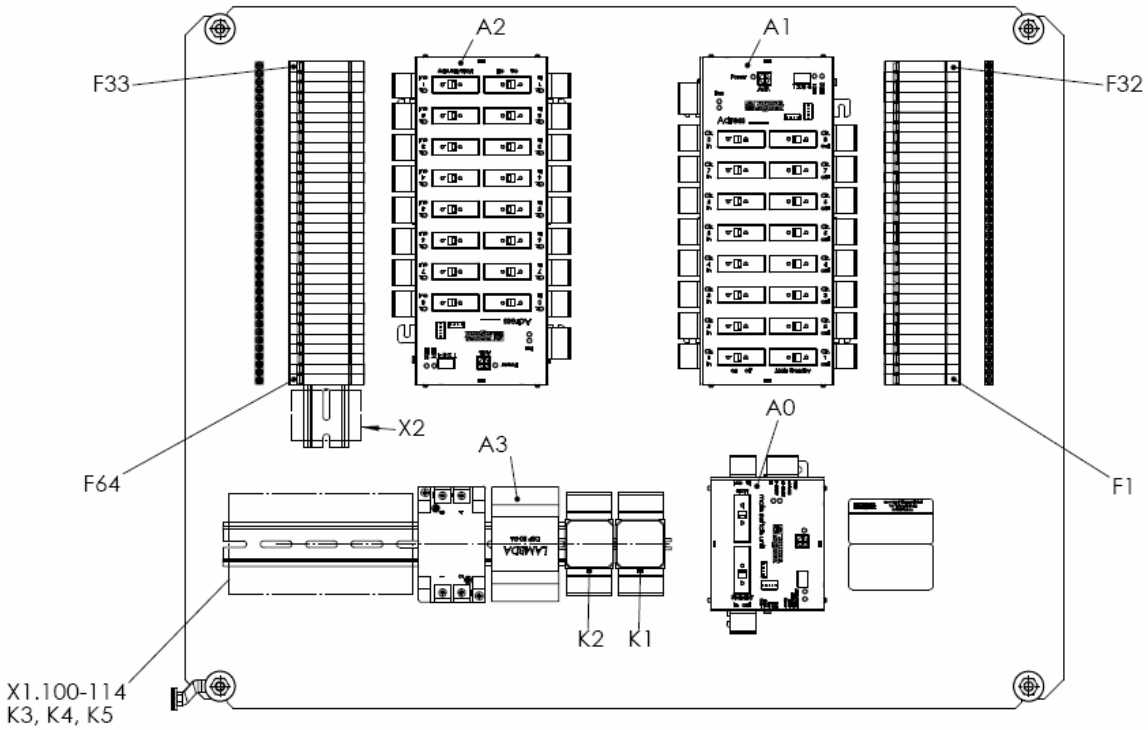
5.4.2.2 Technical Data

Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	Cabinet standard IP22 Other protection class on request
Dimensions [mm]:	See figures below
Weight:	33 kg
Material (External)	Sheet steel, powdered (RAL7035)
Mounting:	Wall mounting with 4 x M10 bolts
Device supply:	24V dc or 115V ac or 230V ac
Connection values per circuit	Max. 2.5A
Fuse protection	Standard fuse terminals with fine-wire fuse elements 2.5AMT
	Automatic circuit-breaker possible on request by customer

5.4.2.3 Cabinet dimensions in mm



5.4.2.4 Mounting plate layout



A0	Main switching module
A1, A2	Relay module type 8+8Ch Alternative type 8Ch
A3	Power supply unit 115/230V ac (not necessary for 24V dc power supplies)
F1..F64	Output of fuse terminals
K1..K5	Relay
X1.100...114	Terminals for infeeds

5.4.3 Switch cabinet 3425506000-xxxx

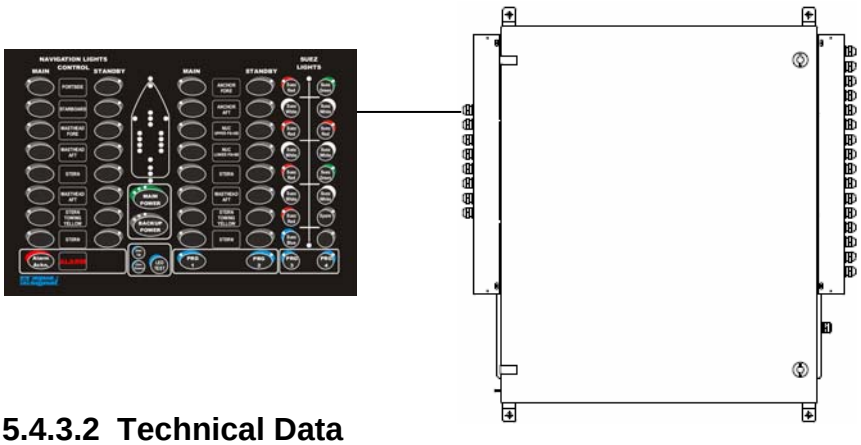
ASC switch cabinet 3425506000 can switch max. 16 main and 16 reserve navigation lights and max. 16 Suez lights (only main).

Contains:

- 1 main switching module for switching over main or reserve supply
- 2 relay modules for max 16 main and 16 reserve navigation lights
- 2 relay modules for max. 16 Suez lights (only main).
- 1 power supply unit (optional for 115V/230V ac)
- Relay
- Fuse elements

5.4.3.1 Standard combination

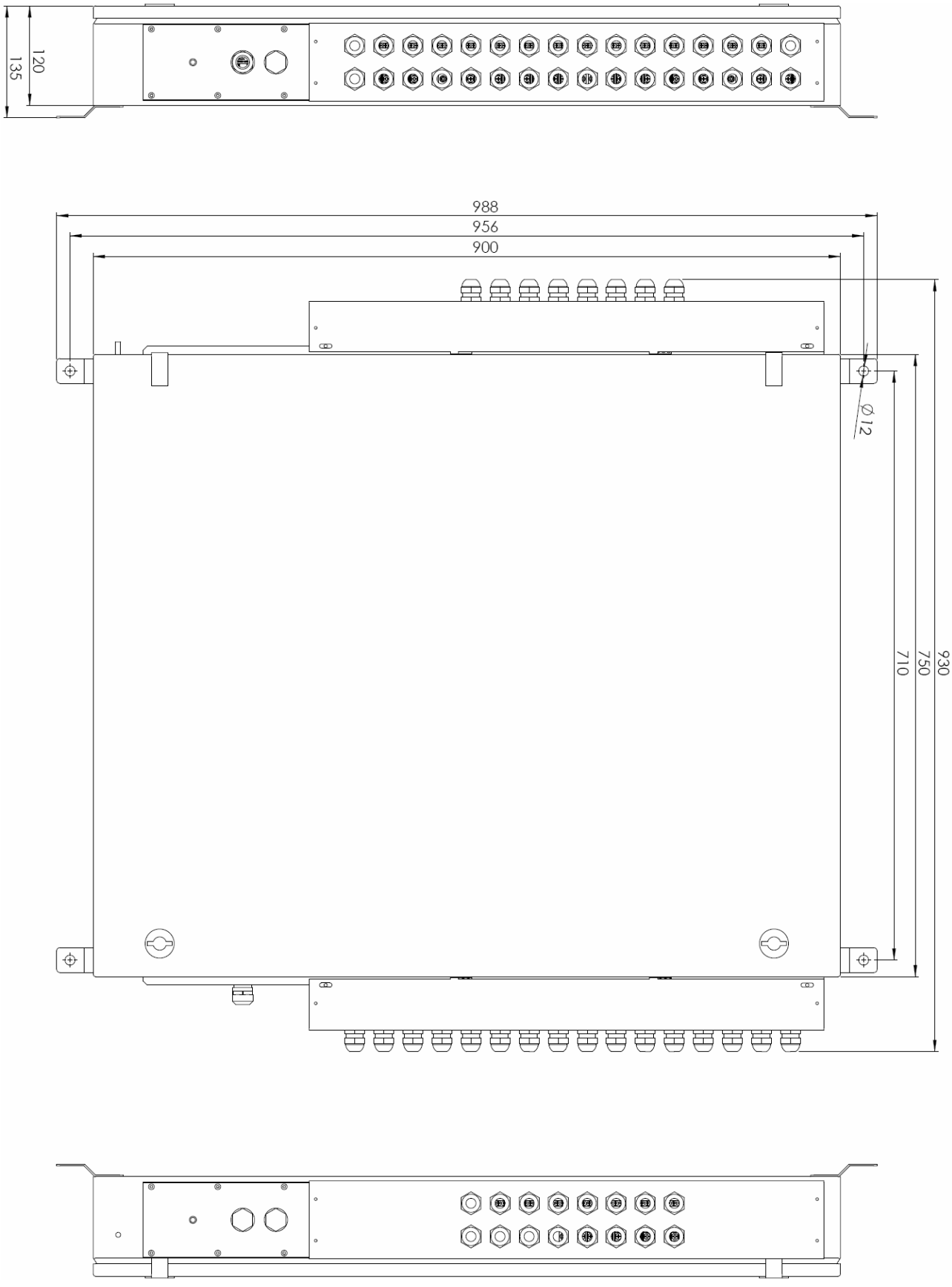
Panel 83425506000 with switch cabinet 3425506000



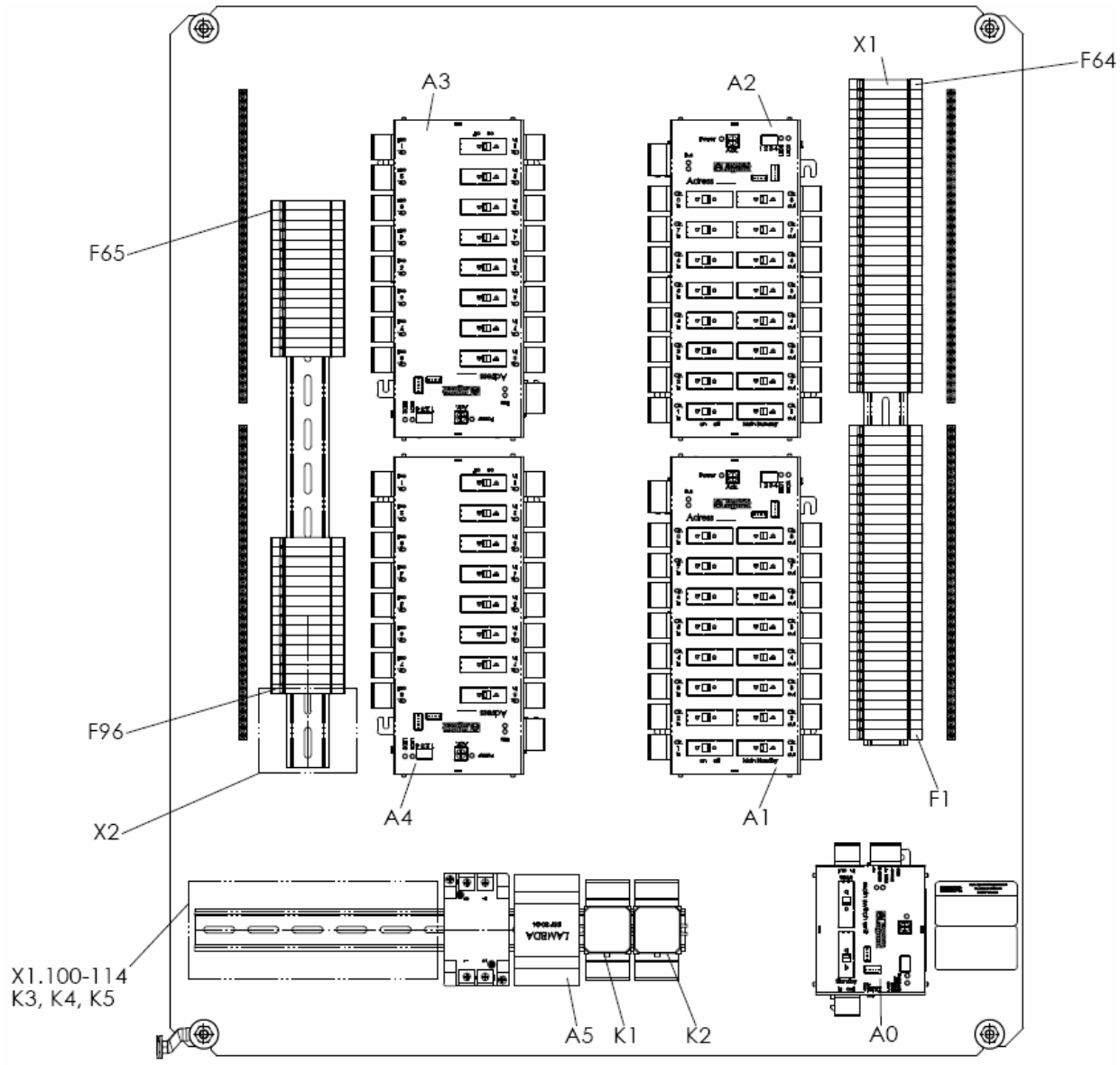
5.4.3.2 Technical Data

Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	Cabinet standard IP22 Other protection class on request
Dimensions [mm]:	See figures below
Weight:	43 kg
Material (External)	Sheet steel, powdered (RAL7035)
Mounting:	Wall mounting with 4 x M10 bolts
Device supply:	24V dc or 115V ac or 230V ac
Connection values per circuit	Max. 2.5A
Fuse protection	Standard fuse terminals with fine-wire fuse elements 2.5AMT Automatic circuit-breaker possible on request by customer

5.4.3.3 Cabinet dimensions in mm

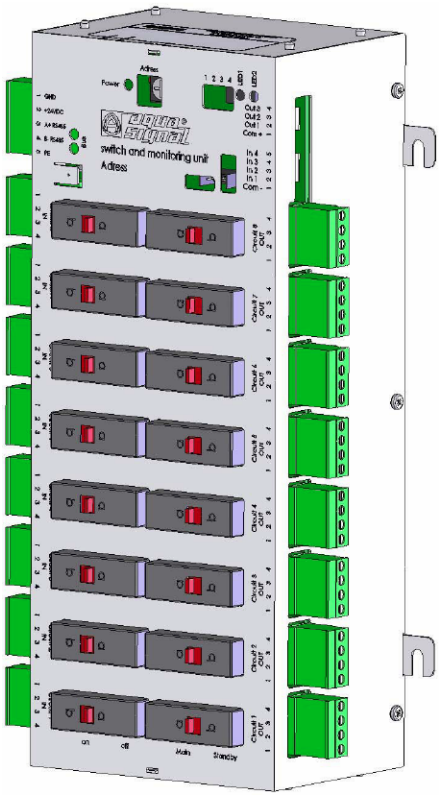


5.4.3.4 Mounting plate layout



A0	Main switching module
A1, A2	Relay module type 8+8Ch
A3, A4	Relay module type 8Ch
A5	Power supply unit 115/230V ac (not necessary for 24V dc power supplies)
F1..F96	Output of fuse terminals
K1..K5	Relay
X1.100...114	Terminals for infeeds

5.4.4 Relay module for 8 main and 8 reserve circuits

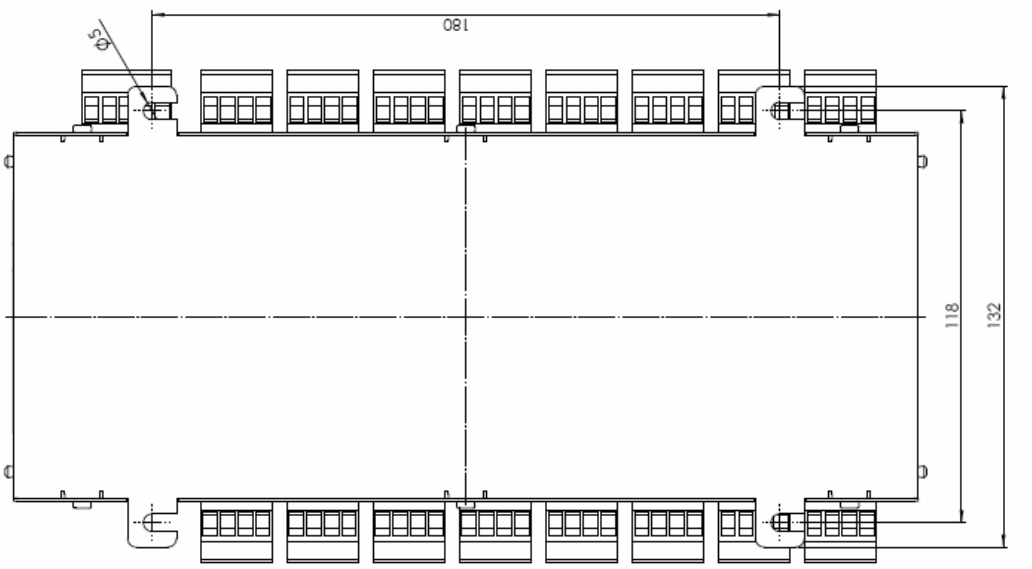


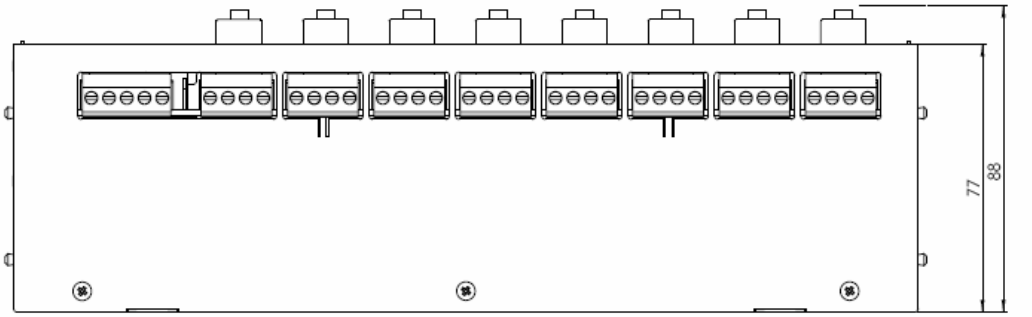
- For max. 8 main and 8 reserve lights.
- The light circuits are switched and monitored
- The operation is via an RS485 bus from the control panel and/or externally as standard
- Each circuit can be switched over manually at any time
- The light circuits can have different voltages, the main and reserve light each having to have the same voltage per circuit!!
- As each output is separately monitored for current and voltage, the actual states can also be sent to external systems directly WITHOUT re-initialization.
- All switching states are retained after a supply failure and startup again !
- All manual switching states are logged and signalled on the request of the panel.

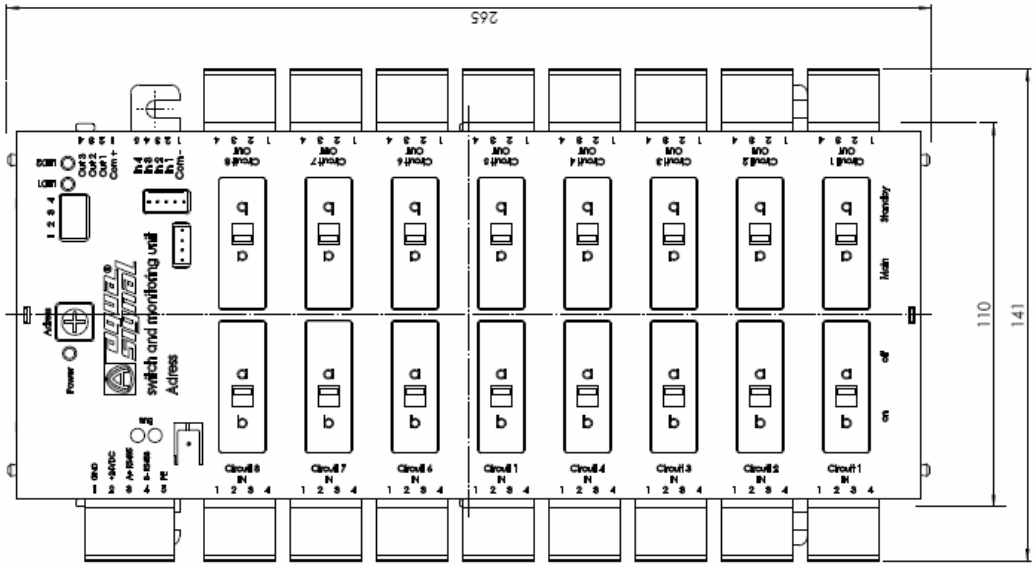
5.4.4.1 Technical Data

Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	IP22, for higher protection class install in suitable housing
Dimensions [mm]:	See 5.4.4.2
Mounting:	4 x M4 bolts
Device supply:	22..28V dc, max. 60mA
Connection values per circuit	24V dc, 115/230V ac, max. 2.5A **ATTENTION :** **- Fuse 2.5AMT external !!** **- ENSURE POLARITY FOR DC; AS OTHERWISE NO CORRECT FAULT DETECTION !** **For polarity, see 5.4.4.3**
Address selector switch and DIP switch (not accessible)	**THIS SETTING IS DONE AT THE FACTORY, and must not be changed by the customer !** **Each address may only occur ONCE in the system**

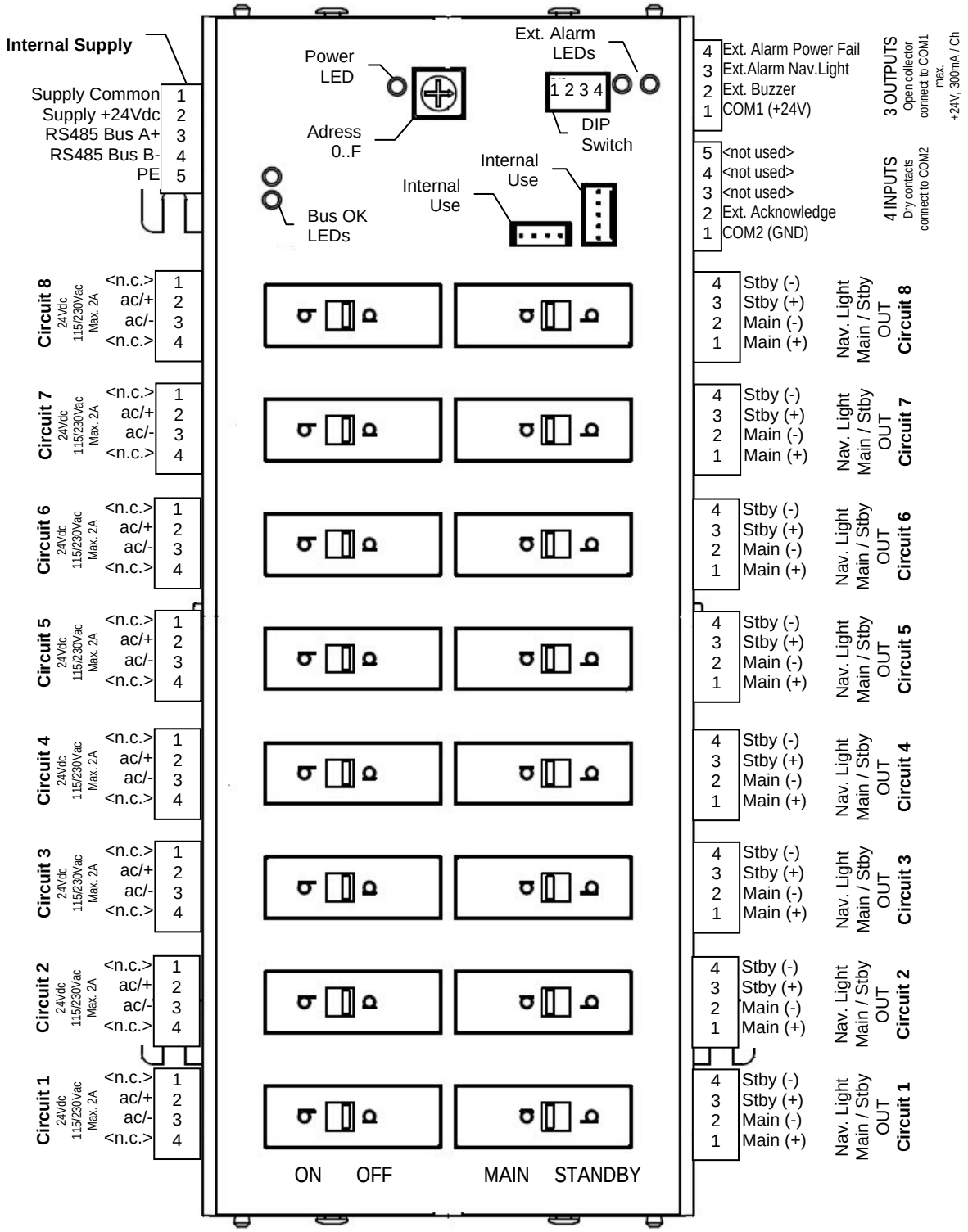
5.4.4.2 Dimensions in mm







5.4.4.3 Connection assignment for 8 main and 8 reserve circuits



- **Fuse 2.5AMT external !!**
- **- ENSURE POLARITY FOR DC AS OTHERWISE NO CORRECT FAULT DETECTION !**

5.4.4.4 Settings

All of the following settings have been made at the factory, and must not be changed by the customer !

For positions, see
5.4.4.3 Connection assignbment for 8 main and 8 reserve circuits

Address rotary selector switch

Address 1-F (15),
Address 0 is reserved for 1st main switching module

Each address may only occur ONCE in the system

DIP switches

DIP	Function OFF	Function ON
1	Standard 8+8Ch	Only 8 Ch main circuits
2	Standard 8+8Ch	4 main and 4 reserve circuits
3	ASC Mode for the 4 signal inputs	Helideck/Manoeuvre Light Mode
4	Current detection active	DIP3=OFF: Current detection deactivated Current OK is ALWAYS signalled Voltage failure continues to be signalled ! DIP3+4=ON : Manoeuvre light

Outputs for external signals

3 open collector outputs are provided for signals to external systems
Maximum connection values per output : 24V, 300mA
Switching occurs actively against Pin 1 (COM1=+24V)

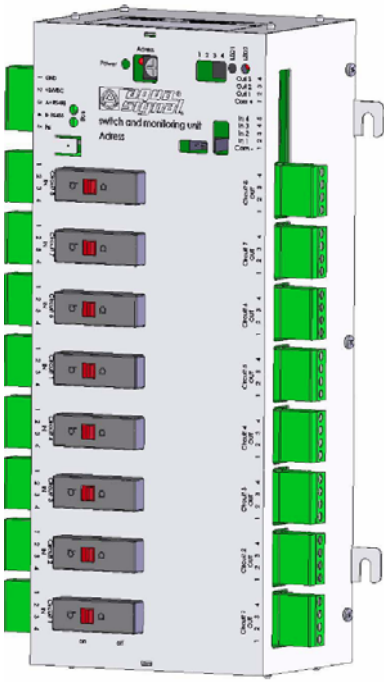
Connection terminal	Output	Function
1	-	COM1 = +24V
2	Output 1	External acoustic alarm (buzzer)
3	Output 2	External alarm for navigation light fault
4	Output 3	External alarm for infeed failure for light voltage

Inputs for external contacts

4 inputs for floating contacts are provided for signals from outside
Maximum connection values per contact : 24V, 10mA
Switching occurs actively against Pin1 (COM2=GND)

Connection terminal	Input	Function ASC DIP3 OFF	Function Helideck DIP3 ON Manoeuvre DIP3+4 ON
1	-	COM2 = GND	COM2 = GND
2	Input 1	Ext. alarm Acknowledge, Flank detection	Heli 1 : Hi=OK Man. 1 : Lo=OK
3	Input 2	<not yet assigned>	Heli 2 : Hi=OK Man. 2 : Lo=OK
4	Input 3	<not yet assigned>	Heli 3 : Hi=OK Man. 3 : Lo=OK
5	Input 3	<not yet assigned>	Heli 4 : Hi=OK Man. 4 : Lo=OK

5.4.5 Relay module for 8 main circuits

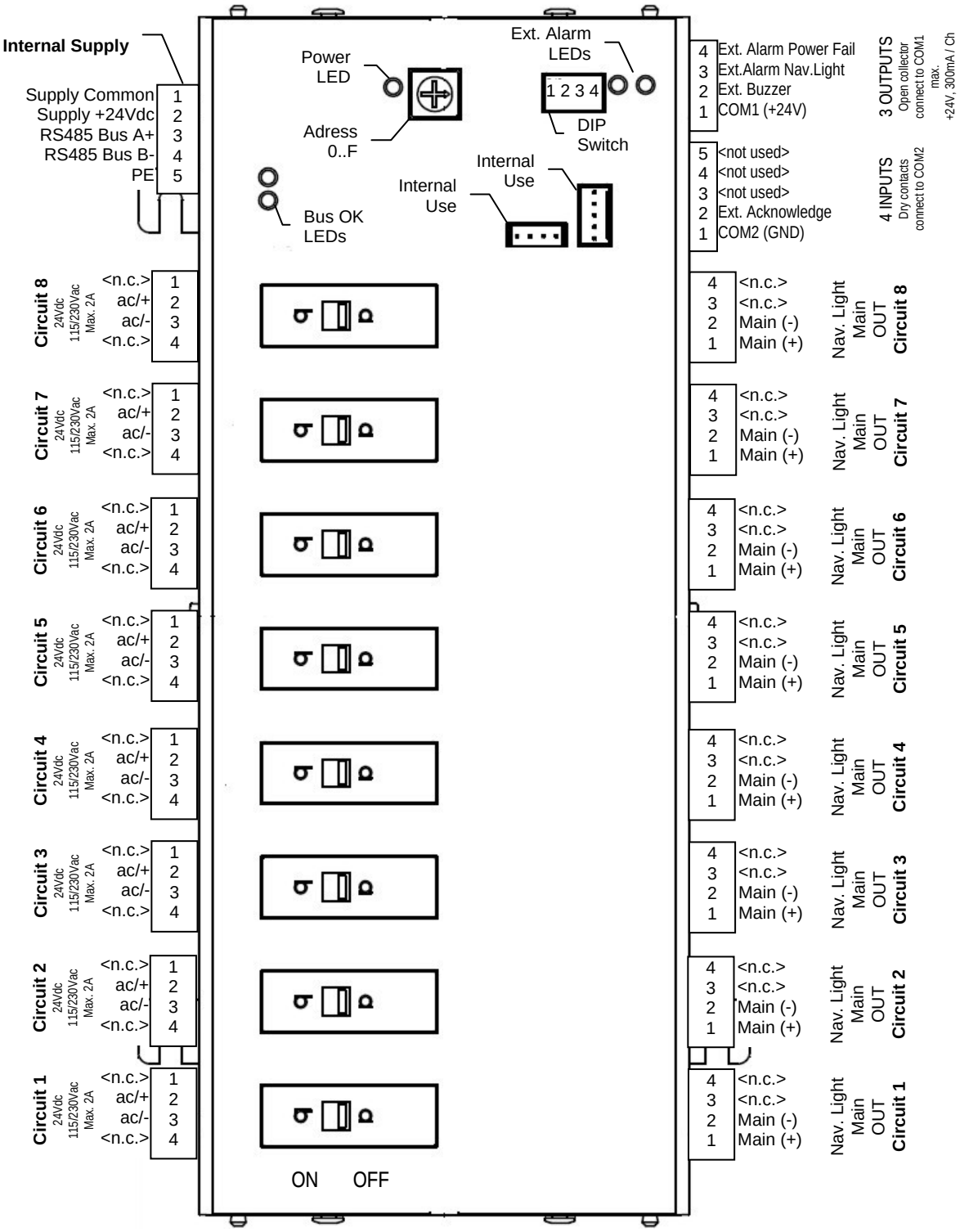


- For max. 8 main or signal lights without reserve lights
- The light circuits are switched and monitored
- The operation is via an RS485 bus from the control panel and/or externally as standard
- Each circuit can be switched over manually at any time
- The lights can have different voltages.
- As each output is separately monitored for current and voltage, the actual states can also be sent to external systems directly WITHOUT re-initialization.
- All switching states are retained after a supply failure and startup again !
- All manual switching states are logged and signalled on the request of the panel.

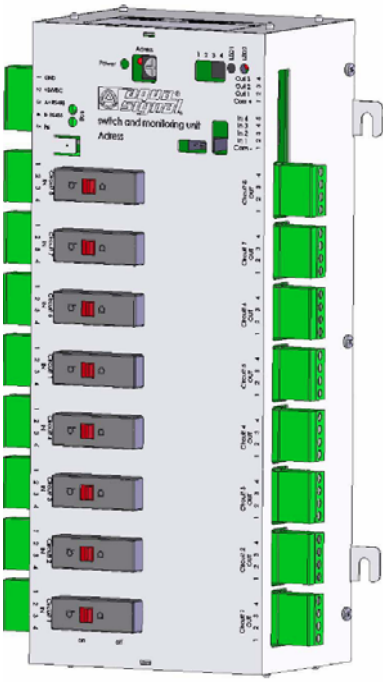
5.4.5.1 Technical Data

Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	IP22, for higher protection class install in suitable housing
Dimensions [mm]:	See 5.4.4.2
Mounting:	4 x M4 bolts
Device supply:	22..28V dc, max. 60mA
Connection values per circuit	24V dc, 115/230V ac, max. 2.5A **ATTENTION :** **- Fuse 2.5AMT external !!** **- ENSURE POLARITY FOR DC; AS OTHERWISE NO CORRECT FAULT DETECTION !** **For polarity, see 5.4.5.2**
Address selector switch and DIP switch (not accessible)	**THIS SETTING IS DONE AT THE FACTORY, and must not be changed by the customer !** **Each address may only occur ONCE in the system**

5.4.5.2 Connection assignment for 8 main circuits



5.4.6 Relay module for 4 main and 4 reserve circuits



- For max. 4 main and 4 reserve lights.
- The light circuits are switched and monitored
- The operation is via an RS485 bus from the control panel and/or externally as standard
- Each circuit can be switched over manually at any time
- Both main and reserve lights can have individually different voltages.
- As each output is separately monitored for current and voltage, the actual states can also be sent to external systems directly WITHOUT re-initialization.
- All switching states are retained after a supply failure and startup again !
- All manual switching states are logged and signalled on the request of the panel.

5.4.6.1 Technical Data

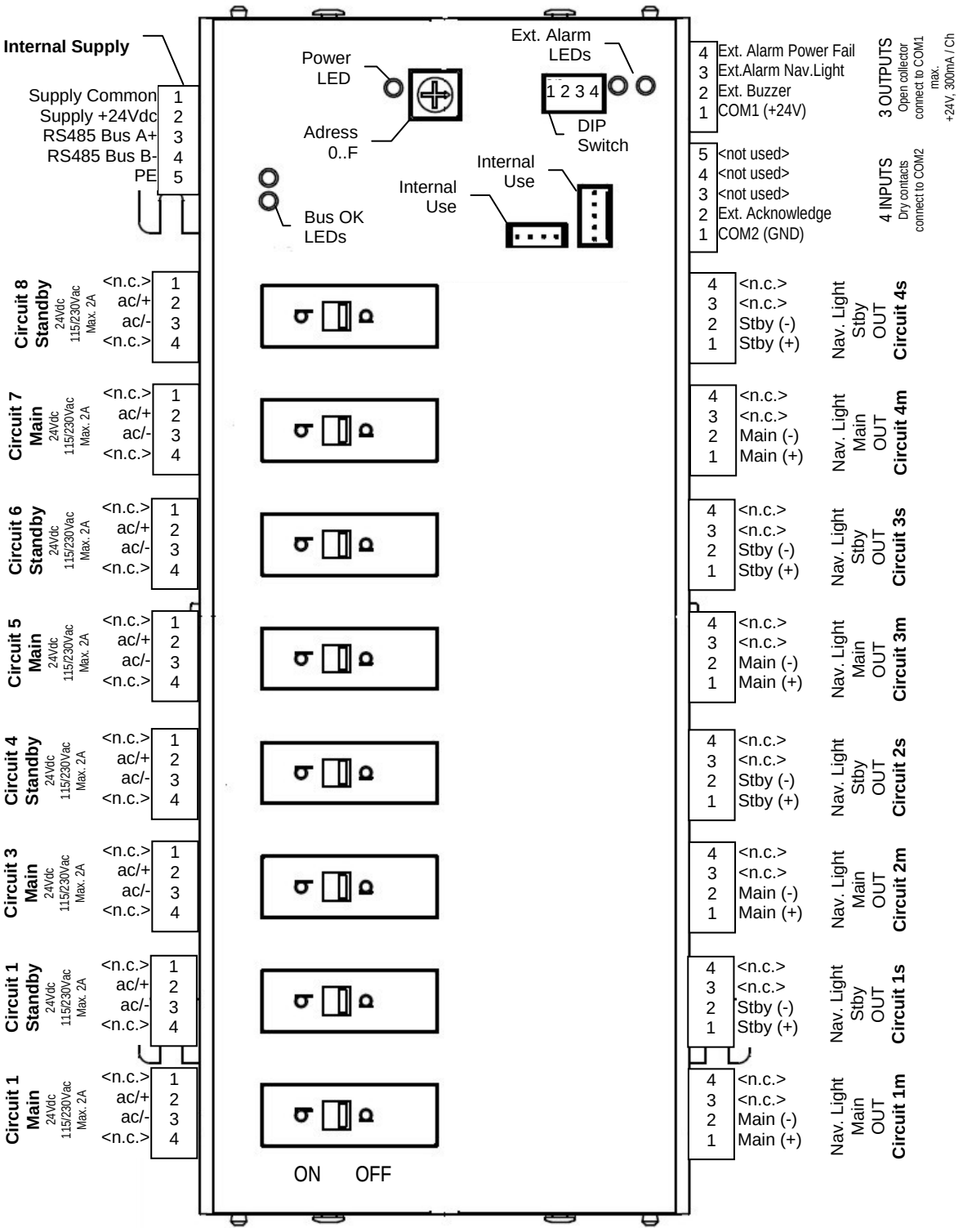
Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	IP22, for higher protection class install in suitable housing
Dimensions [mm]:	See 5.4.4.2
Mounting:	4 x M4 bolts
Device supply:	22..28V dc, max. 60mA
Connection values per circuit	24V dc, 115/230V ac, max. 2.5A **ATTENTION :** **- Fuse 2.5AMT external !!** **- ENSURE POLARITY FOR DC; AS OTHERWISE NO CORRECT FAULT DETECTION !** **For polarity, see 0**
Address selector switch and DIP switch (not accessible)	**THIS SETTING IS DONE AT THE FACTORY, and must not be changed by the customer !** **Each address may only occur ONCE in the system**

ATTENTION :

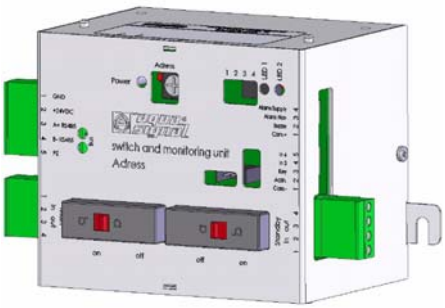
The operator must ensure as his own responsibility that either only the main light or only the reserve light is switched on in manual operation.

Simultaneous operation of the same main and reserve light is not permissible !

5.4.6.2 Connection assignment for 4 main and 4 reserve circuits



5.4.7 Main switching module

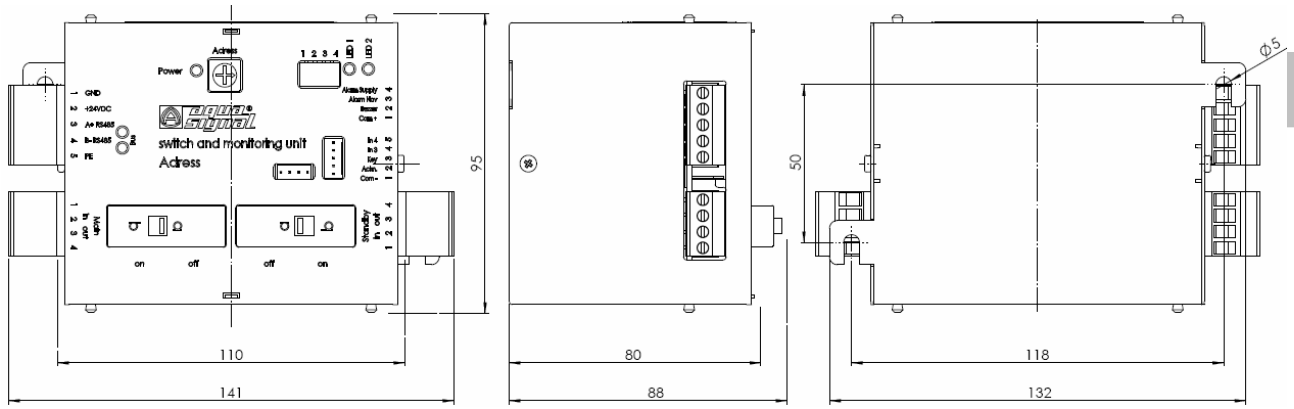


- The main switching module enables the infeed to be switched over from main to reserve supply with a separate power relay.
- As each output is separately monitored for current and voltage, the actual states can also be sent to external systems directly WITHOUT re-initialization.
- All switching states are retained after a supply failure and startup again !
- All manual switching states are logged and signalled on the request of the panel.

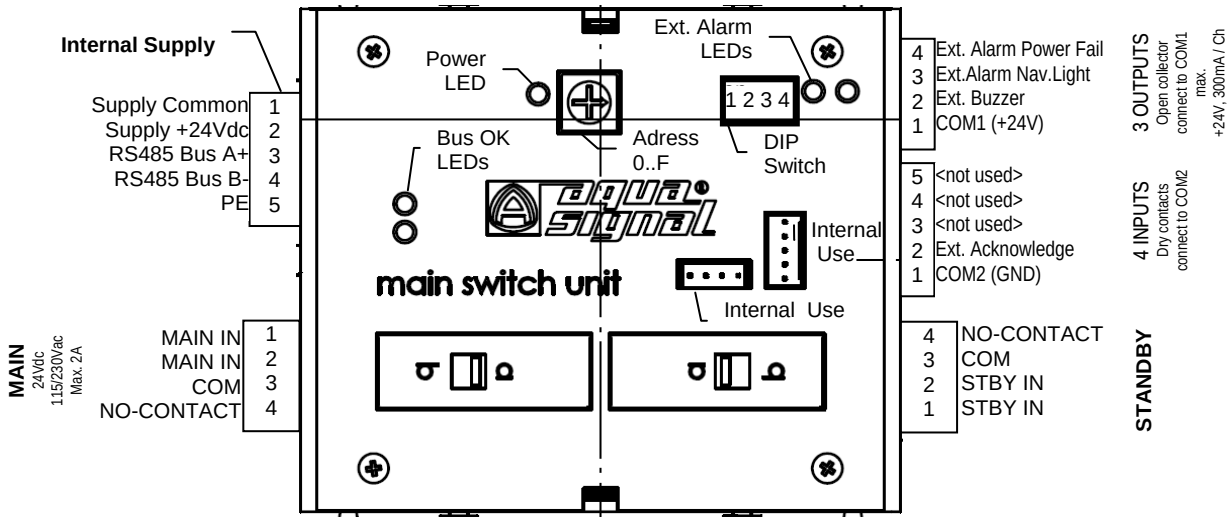
5.4.7.1 Technical Data

Temperature range	
During storage:	-15°C ≤ T ≤ +45°C
During operation:	0°C ≤ T ≤ +45°C
Protection class:	IP22, for higher protection class install in suitable housing
Dimensions [mm]:	See 5.4.7.2
Mounting:	2 x M4 bolts See figure on next page
Device supply:	22..28V dc, max. 50mA
Connection values per circuit	24V dc, 115/230V ac, max. 6A **ATTENTION :** **SWITCHOVER ONLY OPERATED VIA SEPARATE POWER RELAY WITH RECIPROCAL LOCKING**
Address selector switch and DIP switch (not accessible)	**THIS SETTING IS DONE AT THE FACTORY,** **and must not be changed by the customer !** **Each address may only occur ONCE in the system**

5.4.7.2 Dimensions in mm



5.4.7.3 Connection assignment for main switching module



5.4.8 Optional RS485 Interface

<< not available yet>>

- The RS485 interface serves for bidirectional connection of the internal bus to external systems.
- A galvanic isolation and controlled data transmission prevent both electrical problems as well as data collisions.
- In VDR Mode (Voyage Data Recorder, monitor function, unidirectional), each change of state is transmitted for each circuit (switching state and error messages upon light and voltage failure) with a transfer rate of 4800 Baud (8N1).
- In the external monitoring mode, the system can be both monitored and remote controlled.

6 Assembly and Commissioning

The commissioning of the ASC may only be carried out by authorized personnel (see Section 2.4).

Before commissioning, always read the information in the Safety section (see Section 2.5).

6.1 Control Panel

- Installation dimensions are given in Section 5.3.
- The ASC control panel must be adequately grounded, in order to ensure correct protection at power system contact and EMC.
  This is done with the connecting cable
  The shielding must be placed under the strain relief
  and hence electrically contacted without fault.
- The ASC must be mounted with the 4 mounting bolts in the installation panel without torsion with the enclosed bolts.
- The control panel is preconfigured at the factory to the specifications of the customer. No further measures are therefore necessary for this.

6.2 Switch Cabinet

The switch cabinet has a protection class suitable for the application.

A dry environment must be ensured.

The switch cabinet is designed for vertical wall mounting.

The foundation for fastening the cabinet **must be structured adequately and in accordance with the weight requirements.**

Fasten the cabinet **at the four fastening straps** with 4 x M10 fastening bolts on the wall bracket.

Bolts with a sufficient length and strength, adapted correspondingly to the application area, must be used.

When choosing the fastening (bolts, nuts and washers), we recommend the use of high-quality, stainless steel resistant to saltwater.
The bolts must be secured.

Guide the cabling through the cable threaded joints provided and fasten.

Carry out the wiring on the basis of the terminal and connecting diagrams provided.

The cabinet must be disconnected from the power supply during wiring or subsequent work !!

- **Observe ESD protection during installation !**
- **Ensure EMC-compatible installation !**
  Local EMC requirements must be checked !

6.3 Option : Individual Modules

If the relay/switching modules are installed as individual modules at the customer, correct fuse protection and EMC requirements must be ensured.

The modules are only approved in EMC-compatible environments in a grounded metal cabinet !

The warranty is restricted in this case !

6.4 Cabling Type

The control cable (RS485 +24Vdc) between the switch cabinet and control panel must be routed separately from other electric cables.

The cable between the control panel and switch cabinet with relay modules is specified as follows:

- Cable approved for the relevant applicable class
- As per RS485 specification
- Cross-section: 2x2 × 0.5mm^2.
- Twisted in pairs
- Shielded (shielding must be placed on PE on both sides !)
- Maximum permissible length 200 meters.
  Larger lengths on request for technical clarification.

The connecting cables between the switch cabinet and lights are specified as follows:

- Cable approved for the relevant applicable class
- Cross-section: max. 3 × 1.5mm^2.

The connecting cable between the supply and switch cabinet is specified as follows:

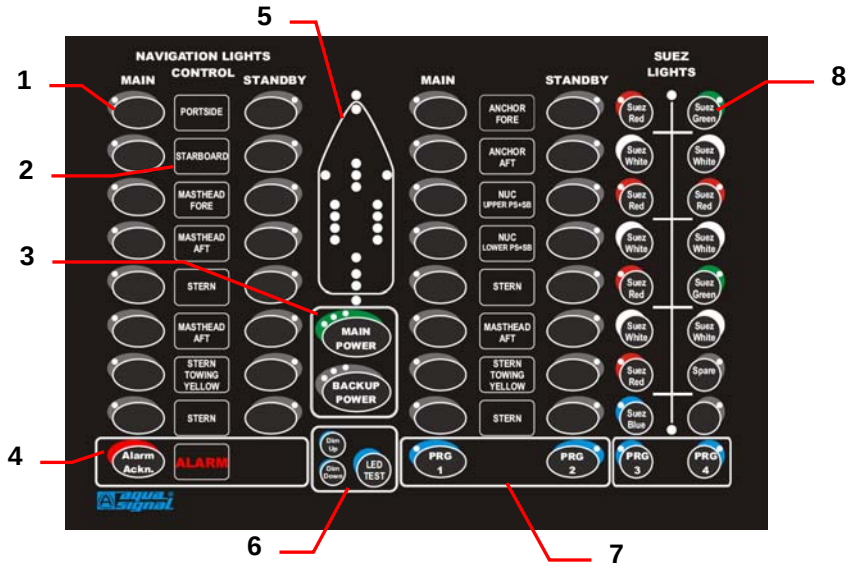
- Cable approved for the relevant applicable class
- Cross-section: max. 3 × 2.5mm^2.

The above cables are not included in the scope of supply !

The ASC system is now ready for operation !

7 Operation

Example with control panel 16+16+16 circuits



1	MAIN and STANDBY buttons each with 1x yellow signal LED
2	Backlit text field, customer-specific text
3	Switching the lights supply voltage main or reserve infeed
4	Alarm text field with alarm acknowledgement red text field flashes at alarm
5	Ship symbol with LED in the relevant colour
6	Buttons for dimming and testing the panel illumination
7	Up to 4 freely assignable program buttons see 7.7
8	Buttons for Suez lights, customer-specific assignment

The control panel is preconfigured at the factory to the specifications of the customer. No further configuration measures are therefore necessary for this.

The Customer Service must be contacted in case of subsequent changes.

7.1 Switching the Supply Voltages

The MAIN POWER and BACKUP POWER buttons are used to switch the supply voltage of the lamp circuits via the main switching module. Pressing the selected POWER button switches to the corresponding voltage.

The system is designed to prevent both voltage sources being switched on at the same time.

The status LED shows the current switching state of the voltage source. A voltage error has occurred if this is flashing (see 8.9 Error Statuses in the ASC System).

7.2 Switching the Navigation Lights

The **MAIN** and **STANDBY** buttons for the lamp circuits are used to switch the main or reserve circuits of the lights.

If the MAIN circuit is on, it is only possible to switch to the STANDBY circuit if the MAIN circuit has been switched off previously.

This rule also applies in reverse:

If the STANDBY circuit is on, it is only possible to switch to the MAIN circuit if the STANDBY circuit has been switched off previously.

The status LED of the button and the associated LED in the ship symbol, corresponding in colour to the corresponding light, shows the current switching state of the lights.

If the relevant LED is flashing, this indicates a fault in the corresponding lamp circuit. The acoustic alarm can be deactivated by acknowledging it.

(See 8.9 Error Statuses in the ASC System).

7.3 Switching SUEZ LIGHTS

The SUEZ-LIGHTS are switched with the **SUEZ** buttons. The status LED of the button shows the current switching state of the lights. A fault has occurred in the corresponding lamp circuit if these are flashing (see 8.9 Error Statuses in the ASC System).

7.4 Alarm Display and Acknowledgement

If an error message (see under 10.xx) occurs in the system, this will be signalled. The optical ALARM display flashes cyclically and the acoustic alarm annunciator sounds at the same or twice the rate.

The **Alarm Ackn.** button can be used to acknowledge the error message, the acoustic alarm as well as external alarm sources (see main switching module) being deactivated. The ALARM display continues to flash until the fault has been rectified, or a new button entry is made on the panel. If the fault persists, a renewed optical and acoustic alarm will be emitted.

7.5 Dimming the Panel Illumination

The brightness of the panel illumination can be set via the **Dim-UP/DOWN** buttons. The brightness is dimmed up or down each time the Dim buttons are pressed.

The brightness can be dimmed down to 10% of the maximum brightness.

7.6 Test

Pressing the **LED-Test** button actuates all LED's active in the system as well as acoustic signal generator.

During the test, the brightness of the panel illumination is set to the middle level.

7.7 Program Buttons

The up to four **PRG buttons** can be used to save preset illumination statuses and call up saved settings.

Set illuminations statuses are saved by pressing the PRG button for longer. If this is kept pressed for approx. 4 seconds, the buzzer will briefly sound and the current button statuses will be saved in the internal memory.

Saved illumination statuses are called up by pressing the PRG button for a short time. The selected program is displayed via the status LEDs of the PRG buttons.

7.8 Display of the Lamp Statuses in the Ship Symbol

The LEDs in the ship symbol display the current status of the associated MAIN or STANDBY buttons.

They correspond in colour to the associated lamps.

If an error occurs in a lamp circuit, this will be indicated by the associated LED flashing in the ship symbol.

The acoustic alarm (buzzer) can be deactivated by acknowledging it.

7.9 Error Status in the ASC System

a) Voltage failure MAIN-Power / BACKUP-Power

If a voltage failure occurs at the MAIN or BACKUP circuit, the associated button LED will flash at second intervals.
The ALARM display will also flash and an acoustic alarm will sound.

b) Current or voltage failure in the lamp circuit

In the event of a current or voltage failure in the lamp circuit, this will be indicated optically and acoustically after a delay time of approx. 8 seconds.

c) Relay module error

If a diagnostic error is determined at a relay module, this will be indicated via the optical and acoustic ALARM signal after approx. 40 seconds.
The flashing frequency is approx. 1 Hz.
The acoustic signal generator is actuated in parallel with twice the frequency.

d) Defective lamp status through manual operation at the relay board

If a lamp circuit is switched on or off manually directly at the relay board, this change status will be displayed on the control panel.
The current switching status is displayed with the corresponding LED in the ship symbol as well as the flashing status indication of the associated button.
The defective lamp status is indicated optically and acoustically after a time of approx. 8 seconds.

In general, the acoustic alarm can be terminated by the "ALARM ACKN." button, but the optical flashing alarm is retained until the fault is rectified.

8 Care, Maintenance, Repair

8.1 Regular Maintenance Work

No regular maintenance work is necessary on the components of the ASC !

If the control panel surfaces are cleaned, use cleaning agents suitable for plastic surfaces.
Abrasive cleaning agents (e.g. steel wool) as well as aggressive cleaning agents or those containing solvents must never be used.

Please contact the Customer Service for maintenance work which has to be carried out by an expert (see Section 9).

8.2 Changing Fuses

If it is necessary to change fuse elements, the cause of the failure must be rectified beforehand.

If using fuse terminals with cut-out fuses, ensure a correct replacement fuse :

Fine-wire fuse type 5x20mm, 2.5AMT

Note:
The fuse terminal contains a spare fuse which must be replaced, if required.

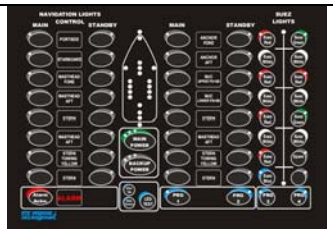
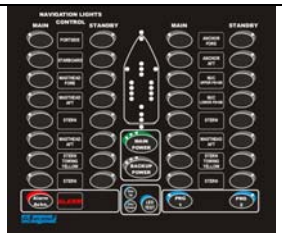
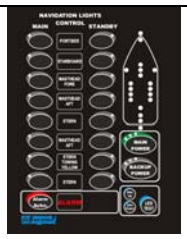
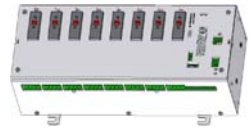
This does not apply if using automatic circuit-breakers (optional).

8.3 Disposal

After the service life of the ASC has come to an end, it can be returned to aqua signal AG for disposal. (See Section 9).

8.4 Spare Part Numbers

Always indicate the serial number xxxx along with the order number!

Spare parts component	Order no.	Figure
Control panel with 48 channels for 16 navigation lights main+reserve and max. 16 Suez lights)	E83425506000-xxxx	
Control panel with 32 channels for 16 navigation lights main+reserve	E83425504000-xxxx	
Control panel with 16 channels for 8 navigation lights main+reserve	E83425502000-xxxx	
Relay module 8+8 channels, for max. 8 navigation lights main+reserve	E83425504000-xxxx	
Relay module 8 channels, for max. 8 navigation lights main	E83425516000-xxxx	
Relay module 4+4 channels, for max. 4 navigation lights main+reserve	E83425519000-xxxx	
Main switching module	E83425512000-xxxx	

External cables are not generally included in the scope of supply:

- Cables for power supply connection
- Bus cables
- Cables for navigation lights

8.5 Faults and Troubleshooting

Proceed according to the fault table below in case of faults to the ASC. If this cannot provide a remedy, contact the Customer Service (see Section 9).

Faults are often due to an erroneous connection or maintenance. The information in these sections must strictly be observed.

Fault	(Possible) cause	Measures

9 Customer Service

The Customer Service of aqua signal AG is available for the provision of spare parts, for maintenance and repair work as well as for problems and questions.

Please keep the serial number of your ASC ready when contacting us.

You can find the product number with serial number in the format "3425xxx000-xxxx" on the following rating plates:

- Rear of the control panel
- Outside on the switch cabinet and inside on the mounting plate
- Top of the relay module/main switching module

You can enter the numbers here, so that you have them available when contacting the Customer Service.

Serial number of ASC: _____

The address is:

aqua signal AG

P.O.Box 45 01 61

28295 Bremen, Germany

Phone: +49 421-4893-0

Fax: +49 421-4893-210/-310

E-Mail: info@aquasignal.de

Internet: www.aquasignal.de

10 Certificates

10.1 Fulfilled Approvals, Provisions, Directives

For use as a switching and monitoring system in conjunction with aqua signal navigation lights

- CE Declaration of Conformity
- Fulfils the requirements of the following EU Directives per EMI/EMC Test Report No. 07/7052-4 :
  - EN 61000-6-4 (2007) : Generic emission standard, Part 2 : Industrial environment
  - EN 61000-6-2 (2001) : Generic immunity standard, Part 2 : Industrial environment
  - EN 61000-4-2 (2001) : Electrostatic discharge immunity test
  - EN 61000-4-3 (2006) : Radiated, radio-frequency electromagnetic field - immunity test
  - EN 61000-4-4 (2004) : Electrical fast transient/burst immunity test
  - EN 61000-4-5 (2006) : Surge immunity tests
  - EN 61000-4-6 (2001) : Immunity to conducted disturbances, induced by radio frequency fields
- IEC60945

Despite careful manufacture and installation, it cannot be ruled out that an interaction between the ASC and other sensitive devices (e.g. radio, radar) can occur in exceptional cases.
Please ensure sufficient spacing between the two devices !

10.2 aqua signal Certificates for GL Conformity

Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No.	86 643 - 10 HH
Company	aqua signal AG Von-Thünen-Straße 12 28307 Bremen, GERMANY
Product Description	Navigation light controller
Type	Aqua Signal Control System (ASC)
Environmental Category	C
Technical Data / Range of Application	Navigation light controller consisting of: - switch and monitoring unit - control cabinet each with 8 circuits or, 16 circuits or, 16+16 circuits or 16+16+16 circuits or any combination, up to 8x16 circuits Power supply (LED or standard bulbs), main and stand by 24VDC, 115VAC, 230VAC Option: electrical control devices may be served from additional external back-up supply Ingress protection: IP 22 switch and monitoring unit IP 44 control cabinet
Test Standard	GL Guidelines for the Performance of Type Approvals Chapter 2: 2003 Resolution MSC.253(83)
Documents	Dwg: 342550 2000, -4000, -6000; 343550 2000; 343550 4000, -6000 Report :TR-10708 dated 2010-01-30 09/9007-8 dated 2009-09-25
Remarks	Operation instruction of the manufacturer to be observed
Valid until	2015-01-21

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Type Approval Symbol

File No. I.J.01

Hamburg, 2010-01-22

Germanischer Lloyd

i.V. W. Voß — Wolfgang Voß

i.A. Zipfel — Joachim Zipfel

This certificate is issued on the basis of "Guidelines for the Performance of Type Approvals Part 1, Procedure".

10.3 aqua signal CE Declarations of Conformity

CERTIFICATE

The Germanischer Lloyd Certification GmbH, 20459 Hamburg,
herewith certifies that the company

aqua signal Aktiengesellschaft
Von-Thünen-Straße 12, D-28307 Bremen

including the location

aqua signal Teterow GmbH
Glasower Weg 5, D-17166 Teterow

has established and maintains a Quality Management System relevant for

Development, manufacture and sales of lighting systems and electronic equipment for shipping and off-shore industries.

Germanischer Lloyd Certification GmbH has audited the company. Evidence was provided that the Quality Management System fulfills the requirements of the following standard:

ISO 9001:2008

The validity of this certificate is subject to the company applying and maintaining its Quality Management System in accordance with the standard indicated. This will be monitored by Germanischer Lloyd Certification GmbH.

The certificate is valid until April 28, 2012

Hamburg, May 07, 2009

Certificate No. **QS-2821 HH**

(Thore Dabels) (Agata Nalewajko)

Deutscher Akkreditierungs Rat
DAR
TGA-ZM-07-91-00

GL