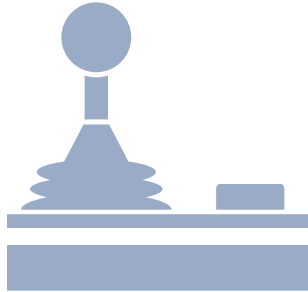


TECHNICAL MANUAL

Megaguard Control Panel



SINCE 1922

Den Haan Rotterdam



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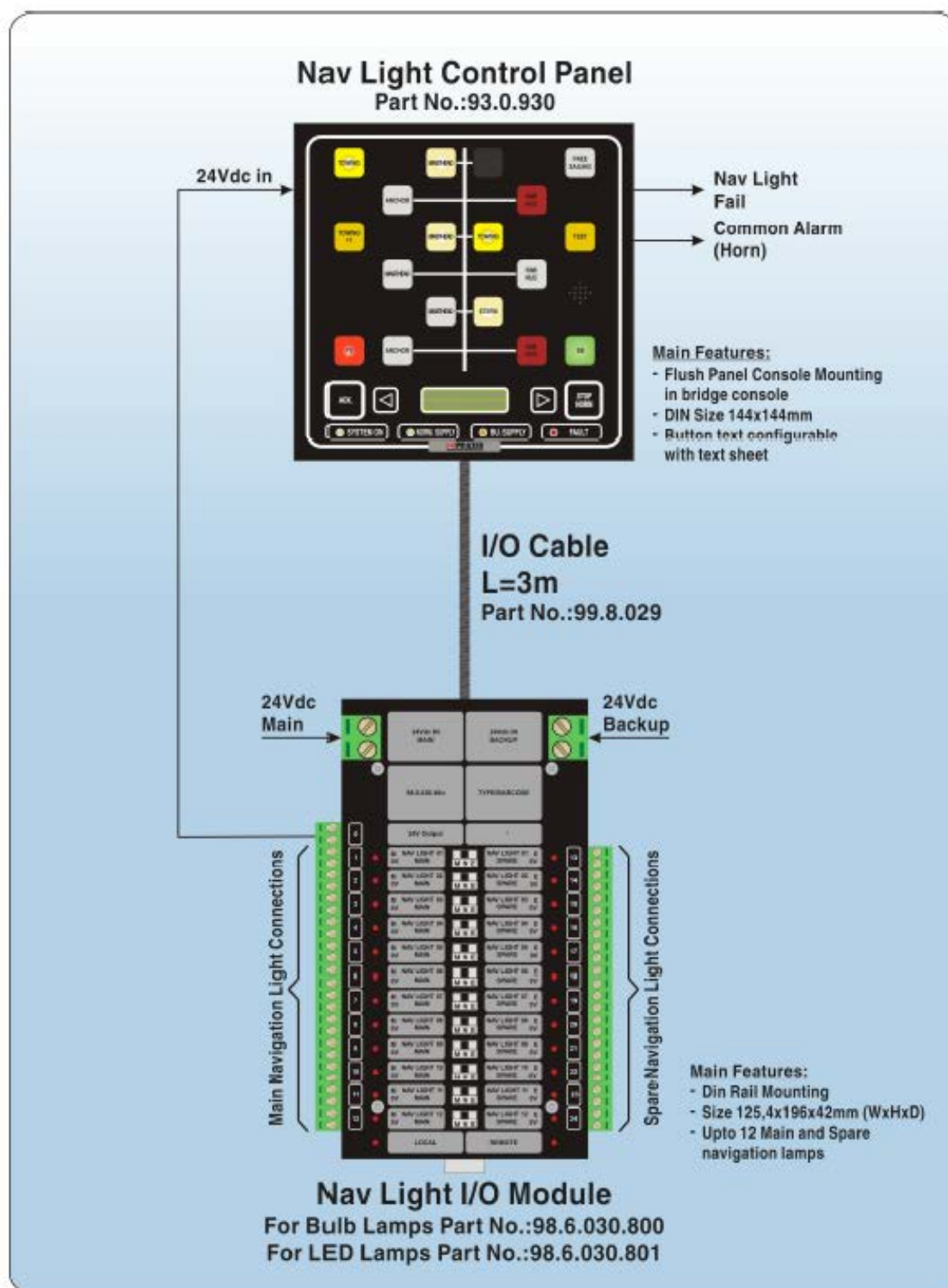


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1. OVERVIEW

1.1 Nav light overview drawing



1.2 Installation instructions

To meet class requirements the Navigation light module must be mounted in such a way that the I/O board can be reached without the need of tools.

1.3 Functional Overview

The Navigation Light Control System controls up to 12 lamps, each lamp having a Main output and a Spare output.

The Navigation Light Control System consists of two modules which are inter-connected by an IO cable:

- Navigation Light Control Panel, which is flush mounted in console, and contains operator push-buttons and LEDs.
- Navigation Light IO Module, which is DIN rail mounted inside console, and contains the connection terminals to the lamps and connection to the main and back-up supply. The Navigation Light IO Module comes in two versions: one for bulb lamps and one for LED lamps.

The Navigation Light Control Panel has standard DIN size 144 x 144 mm for flush panel console mounting. The rear of the unit is equipped with detachable terminal strips for field wiring.

The Navigation Light Control Panel is equipped with:

- 14 lamp buttons for controlling individual lamps; of these, up to 12 lamp buttons can be assigned to lamps;
- Three group buttons which control groups of lamps;
- A "Test" button, for manually testing the lamps;
- An Ack button for acknowledging alarms;
- A Stop Horn button for deactivating the external horn and the internal buzzer;
- Power supply input: 19-32VDC;
- Fail output (voltage-free);
- Horn output (voltage-free);
- Left Arrow and Right Arrow buttons - for various uses;
- LCD display with 2x16 characters with 3.5mm height;
- Internal buzzer;
- USB Host with one port for a USB drive.
- SystemOn LED;
- Fault LED;
- Main Supply LED;
- Backup Supply LED;

A text sheet with button description for each button is inserted from the top of the panel.

The activated buttons and LEDs on the panel can be dimmed during the night. The dimmed illumination level can be adjusted in normal operation mode by pressing the Left Arrow button for more dimming (= less brightness), or Right Arrow button for less dimming (= more brightness), in 8 steps. At power-up the dimming is set to no dimming (=maximum brightness).

Each button has background illumination, which shines through the text sheet for night visibility of the button text. The background illumination level can be adjusted in setup mode, and upon power-up the background illumination is set to this level.

The brightness of the maximum dimming level (=minimum brightness) will be considerably higher than the background illumination level in order to avoid confusion if a lamp is activated or not. The background illumination level and the maximum dimming level can be adjusted in setup mode.

A Lamp Test of the unit can be performed by pressing the Ack and Stop Horn buttons at the same time during normal operation; as long as both buttons are kept pressed, all buttons and all leds will be illuminated at maximum brightness. Also the firmware revision that is on the Control Panel and I/O Module is shown on the LCD display.

- When both Ack and Stop Horn are pressed, this is what the display shows;

CPL AA.BB.CC.DD
IOBO AA.BB.CC.DD

The Navigation Light Control System can work with bulb-type lamps or with LED-type lamps. Because LED-type lamps have a limited number of hours of operation, the panel counts the number of hours of operation of LED-type lamps, separately for the Main output and for the Spare output. When such a lamp exceeds its maximum number of hours of operation, alarms are generated (details in Lamp Lifetime Failure).

The remaining number of hours of operation is stored in the Flash memory once every hour for all lamps. If a power failure occurs while a lamp is activated, the average on-time that will be "lost" will be 30 minutes.

1.3.1 Normal Operation

When the Control Panel is in normal operation (not setup mode and not USB load/save mode) and is connected to the IO Module, the Remote LED on the IO Module is activated and the Local LED on the IO Module is deactivated.

When the Control Panel is not in normal operation or the IO Cable is disconnected, the Remote LED on the IO Module is deactivated and the Local LED on the IO Module is activated. Now the navigation lamps can be switched on using the manual switches present on the front of the IO Module. The Main lamp is activated when moving the switch to the left position and the Spare lamp is activated when moving the switch to the right position.

The manual switches always override the commands received from the Control Panel, even in remote mode. This means that the manual switches must be put in the middle (neutral) position when remotely controlled by the Control Panel.

1.3.2 Lamp Buttons (1 to 12, PS, SB)

There are 14 lamp buttons on the Control Panel which control individual lamps: the 12 buttons on the mast pictured on the front of the panel, the PS button, and the SB button.

Up to 12 of these 14 lamp buttons can be assigned to individual lamps. This can be done from setup mode.

Throughout this document, the lamp buttons will be referred to as follows:

- Button 1 – the left button on the first row of the mast;
- Button 2 – the right button on the first row of the mast;
- Button 3 – left button on the second row of the mast;
- Button 4 – right button on the second row of the mast;
-
- Button PS – the button labelled “PS”;
- Button SB – the button labelled “SB”.

When one of these lamp buttons is pressed while the corresponding navigation lamp is not already activated, the Control Panel tries to activate the Main output of the assigned lamp. In case the navigation lamp on the Main output is burned or disconnected, the Control Panel tries to activate the Spare output (provided the Spare output wasn't disabled in setup mode).

When one of these lamp buttons is pressed while the corresponding navigation lamp is already activated, the Control Panel deactivates the navigation lamp.

1.3.3 Special-function buttons: Group buttons and Test button

A special-function button can be configured as a Test button (will perform the Test function during normal operation), as a Group button (will control more lamps at once), or can be left unused.

1.3.4 Group buttons

A group of lamps can be assigned to each special-function button configured as Group button. Groups can be defined in setup mode. Throughout this document, the lamps controlled by a group will be referred to as group's lamps.

A Group button can control only those lamps which are already assigned to lamp buttons. For instance, if Button 5 was assigned to Lamp 1, and Button PS was assigned to Lamp 3, and no other lamp button was assigned to any lamp, a group will only be allowed to control Lamp 1 and/or Lamp 3.

When a group button is pressed during normal operation:

- If the LED under the group button is off: all lamps in the group will be activated, all other lamps will be deactivated, and the LED under the group button will be turned on.
 - o When an operator wants to activate other lamps as well which are not in this group, he can do so by pressing the corresponding lamp button; the LED under the group button will then be extinguished.
 - o When an operator wants to deactivate lamps in the group; he can do so by pressing the corresponding lamp button; the LED under the group button will then extinguish.
- If all the group's lamps are activated and all other lamps are deactivated, this is indicated by the LED under the group lamp which is on. By pressing the group button, all the lamps within the group will be deactivated.



1.3.5 Free Sailing Group

Free sailing can be configured as one of the group buttons. Pressing the Free Sailing button will turn on the configured lamps.

Free sailing also has a special meaning. When the IO Module loses communication with the Control Panel for any reason, it turns the lamps on/off in. If no group is set as 'Free Sailing' group and communication between the Control panel and the IO board is lost, the IO Board does not change the current illuminated lights.

Configuring Free Sailing will change lamp illumination if communication to IO Module is lost.

1.3.6) Test button

A special-function button configured as Test button can be used for a manual test of the navigation lamps. Pressing the button will activate all 12 Main output and deactivate all 12 Spare outputs for two seconds, then it will deactivate all 12 Main outputs and activate all 12 Spare outputs for the next two seconds (even if the spare outputs were previously disabled in the setup menu). The four-second cycle is repeated as long as the Test button is pressed.

During this test:

- All lamp buttons on the Control Panel are illuminated at 100% brightness.
- All group buttons are illuminated at 100% brightness.
- The Test button is illuminated at 100% brightness.

When the Test button is released, the lamps will be activated again in the same configuration they were before the button was pressed.

Pressing the test button checks all loads, and effectively resets alarms if loads are O.K.

1.3.7 The Ack button

During normal operation, the Ack button is used for acknowledging alarms, and for navigating through the list of alarms which are currently "on".

In setup mode and in USB save/load mode, the button has other uses (details in Setup and Configuration and in Saving and Loading Configuration to/from the USB drive).

1.3.8 The Stop Horn button

During normal operation, the Stop Horn button is used for deactivating the external horn and the internal buzzer.

In setup mode and in USB save/load mode, the button has other uses (details in Setup and Configuration and in Saving and Loading Configuration to/from the USB drive).

1.3.9 Power supply input

The panel is powered by a failsafe source of 18-32VDC coming from the Navigation Light IO Module.

1.3.10 The Fail output

The Fail output is used for signalling internal failures (details in Failures and Error Messages).

The output is a normal-open contact of a relay.

During normal operation the relays stays energized (contact closed) to signal the absence of failures.

1.3.11 The Horn output

The Horn output is used for activating an external horn when alarms occur. It can be deactivated by pressing the Stop Horn button.

The output is a normal-open contact of a relay.

During normal operation, the relay stays de-energized (contact open).

1.3.12 Left Arrow and Right Arrow buttons

During normal operation, these buttons can be used to adjust the dimming level.

In setup mode and in USB save/load mode, the button has other uses (details in Setup and Configuration and in Saving and Loading Configuration to/from the USB drive).

1.3.13 LCD Display

The panel has 2x16 character display, with a character height of 3.5mm, and with background illumination. During normal operation, the displays stays blank if no alarms are present.

Immediately after power-up, the LCD displays the following logo message:

– If the panel has a valid configuration:

```
Panel XX  
Fw AA.BB.CC.DD
```

XX is the ID of the Control Panel, as configured in Setup mode.

AA.BB.CC.DD is the firmware version.

– If the panel does not have a valid configuration:

```
No config!  
Fw AA.BB.CC.DD
```

This logo message remains on screen for at least 3 seconds, even if alarms are generated during these 3 seconds. If no alarm is generated, the logo message remains on screen for 10 seconds, after which the screen is erased and the background illumination of the LCD is turned off.

1.3.14 Internal buzzer

The internal buzzer is activated when alarms occur. It can be deactivated by pressing the Stop Horn button.

1.3.15 USB Host

The USB Host has one USB port which can be used for attaching USB drives.

It can be used either for updating the bootloader and firmware, or for saving and loading panel configurations.

To save or load a configuration, the USB drive can be inserted any time during normal operation. Details about the saving and loading procedure are in Saving and Loading Configuration to/from the USB drive.

1.3.16 SystemOn LED

This LED is kept activated as long as all the following conditions are met:

- The panel is powered.
- No internal failures or external failures are detected.

1.3.17 Fault LED

This LED is activated when an internal failure is detected on the Control Panel, or when communication with the IO Module does not work. It will be flashing when an External Failure is detected on the Control Panel or IO Module. It is automatically deactivated when both these conditions are gone.

1.3.18 Main Supply LED

The Main Supply LED stays activated as long as the IO Module has power on its Main Power Supply connector.

1.3.19 Backup Supply LED

The Backup Supply LED stays activated as long as the IO Module has power on its Backup Power Supply connector.

2. FAILURES AND ERROR MESSAGES

A Test function is executed continuously in order to test the internal electronics and the external connections.

Since many different kinds of alarm conditions can exist simultaneously, and the operator must be aware of all of them, even if they existed for a short while, a so called “Alarm List” is maintained by the panel. It is described in The Alarm List.

A distinction is made between Internal Failures and External Failures.

2.1 Normal Operation (No Failures)

When no failures of any kind are detected, the panel will indicate this as follows:

- The SystemOn LED is kept activated.
- The Fault LED is kept deactivated.
- The Fail Relay is energized (contact closed).
- The Horn Relay is de-energized (contact open).
- The LCD display is blank.
- The internal buzzer is deactivated.

2.2 The Alarm List

The Alarm List is a list maintained by each panel, and contains all the alarms that occurred. The list can consist of acknowledged and not-acknowledged alarms. Alarms that are not yet acknowledged are indicated by flashing text.

An alarm is added to the Alarm List when the alarm condition becomes “on”. An alarm is removed from the Alarm List when the alarm condition becomes “off” and the alarm has been acknowledged by the operator.

The operator can acknowledge an alarm by pressing the ACK button while the alarm is displayed on the LCD. The acknowledged alarm will stop flashing and the alarm text will remain on the display. Once an alarm has been acknowledged, the operator can navigate to the next alarm in the list by pressing the ACK button.

An example:

Step	External condition	Panel's reaction
1	The condition for alarm "A" becomes "on".	Alarm "A" is added to the internal Alarm List; A text such as "A-FAILURE" is shown on the LCD, with flashing text.
2	The operator presses "ACK" to acknowledge this alarm.	The flashing of the text is stopped.
3	The condition for alarm "B" becomes "on".	Alarm "B" is added to the internal Alarm List. A text such as "B-FAILURE" is shown on the LCD, with flashing text.
4	The operator presses "ACK" to acknowledge this alarm.	The flashing of text is stopped.
5	The operator presses "ACK" several times.	The LCD will scroll through all the alarms in the Alarm Lists (in this case between "A-FAILURE" and "B-FAILURE")
6	Condition for alarm "A" becomes "off"	Alarm "A" is removed from the Alarm List. "A-FAILURE" is erased from the LCD and the next alarm is displayed ("BFAILURE" in this example).
7	Condition for alarm "B" becomes "off"	Alarm "B" is removed from the Alarm List. "B-Failure" is removed from the LCD, and the LCD will be turned off.

Another example, this time with an alarm that went "on" and again "off" in the absence of the operator:

Step	External condition	Panel's reaction
1	The condition for alarm "A" becomes "on".	Alarm "A" is added to the internal Alarm List; A text such as "A-FAILURE" is shown on the LCD, with flashing text.
2	The condition for alarm "A" becomes "off"	Nothing happens. "A-FAILURE" remains flashing on the LCD.
3	The operator presses "ACK"	Alarm "A" is removed from the Alarm List, "A-FAILURE" is removed from the LCD, and the LCD is turned off.

2.3 Internal Failures

The panel executes every second a self-test procedure, to test the internal electronics.

In case the Control Panel detects an internal failure (malfunction of any kind), or if communication with the IO Module is not possible, this will always be signaled as follows:

- The Fail Relay will be de-energized (contact open);

The panel also attempts to signal this condition with the following methods, but they are not guaranteed to always work (whether or not they work depends on the exact type of the malfunction):

- The SystemOn LED will be deactivated.
- The Horn Relay will be energized (contact closed);
- The internal buzzer will be activated;
- The Fault LED will be activated;
- The LCD will show details about the internal failure.

In the particular case of an IO Module communication failure, and if no other failures are present, the Control Panel is able to signal this with all the methods listed above.

2.3.1 IO Module Failure

This means that communication is not possible with the IO Module. Only one IO Module is used, so the Control Panel will only look for this IO Module, at board position one (closest to the Control Panel). Any additional IO Modules connected are ignored.

The alarm text for this kind of failure is "IO MODULE FAIL".

2.4 External Failures

There are a few different types of external failures:

- Ethernet link failure;
- Lamp failure;
- Lamp lifetime failure;
- Main power supply failure on the IO Module.

They are described in the following paragraphs.

In case any of these failures occur, it is signaled as follows:

- The Horn output is activated (the contact is closed). It can be deactivated by pressing the Stop Horn button.
- The internal buzzer is activated. It can be deactivated by pressing the Stop Horn button.
- The LCD will display with flashing text the alarm, and the alarm is added to the Alarm List. The text depends on the exact type of failure. The flashing can be stopped with the ACK button, but alarm text(s) will remain on the display until all the alarms conditions become “off”. The operator can navigate throughout alarm texts with the Ack button.
- The Fault LED will be flashing. The flashing can be stopped with the ACK button, but the Fault LED will remain activated until all the alarms conditions become “off”.

2.4.1 Ethernet Link Failure

This means that communication is not possible on an Ethernet port. Either the Ethernet cable is interrupted or the panel at the other end of the cable is malfunctioning (or not powered at all).

The alarm text for this failure is “LINK M FAIL” or “LINK B FAIL” (“M” for the main Ethernet port, “B” for the Backup Ethernet port). If both ports have communication failures, two different alarms will be generated.

Ethernet Link Failures are detected instantly (the moment they happen, without any delay).

These failures are not generated if they were disabled in setup mode.

2.4.2 Lamp Failure

Those navigation lamps which were assigned to buttons in setup mode are continuously tested while they are active.

The alarm text for this kind of failure is:

```
MAIN/SPARE LAMP  
XX FAIL!
```

On the first line, either “MAIN” or “SPARE” will appear, depending on which output is burned/disconnected. If both are burned/disconnected, separate alarms will exist for each of them.

On the second line, XX is the lamp output number (1 to 12), not the button number.

After repairing lamp failures press the test button to check all loads and reset any alarms. See paragraph 1.3.6.



2.4.3 Lamp Lifetime Failure

In case of LED-based lamps, the Control Panel keeps track of how many hours each lamp has been in operation. A Lamp Lifetime Failure occurs when the lamp has exceeded its maximum permitted lifetime.

The operator can inspect any time the remaining number of hours of lifetime of a lamp by entering setup mode and navigating to the Lamp Lifetime setup screen; in this screen, the initially-displayed value is the remaining number of hours of operation.

The alarm text for this kind of failure is:

MAIN/SPARE LAMP
XX LIFETIME FAIL!

On the first line either "MAIN" or "SPARE" will be displayed. On the second line, XX is the lamp output number (1 to 12), not the button number.

If both the Main and the Spare navigation lamps have exceeded their lifetimes, an alarm is generated for each of them.

2.4.4 Main/Backup Power Supply Failure

The Control Panel continuously monitors the power state of the IO Module. When any of the power supplies of the IO Module fails, the IO Module informs the Control Panel about the failure.

The alarm text for this kind of failure is:

IO MODULE MAIN/BACKUP
SUPPLY FAIL!

On the first line, either "Main" or "Backup" will be displayed. Also the corresponding Main/Backup Supply led is deactivated.

Control Panel is connected to the failsafe power supply of the IO Module.

3 SETUP AND CONFIGURATION

The system can be configured using the buttons and the LCD in a special operating mode – the setup mode.

Normal operation is stopped when setup mode is entered, and the panel is restarted when setup mode is left.

3.1 General usage notes

On a blank panel (a panel without a configuration), a temporary configuration with default values is created when entering setup mode for the first time; in each setup screen, the initially displayed setting will be the default one.

On a non-blank panel, the existing configuration can be changed; in each setup screen, the initially displayed setting will be the one from the existing configuration.

The Left Arrow or Right Arrow buttons can be used to change the displayed setting. Then Ack can be pressed to store the changed setting, or Stop Horn can be pressed to leave the previously configured setting unaltered. After pressing Ack, the text “Stored!” is displayed briefly; then the next setup screen is displayed.

To exit the setup mode and return to normal operation, Left Arrow + Right Arrow can be pressed at the same time, from any setup screen. When exiting the setup mode this way, the altered configuration is permanently stored in the Flash memory.

If the panel is powered down while in setup mode, no changes will be stored.

In the following paragraphs, unless otherwise mentioned, the setup screens are described in the order in which they appear when the operator navigates through them.

3.2 Entering the setup mode password

To enter setup mode, Left Arrow and Right Arrow must be pressed at the same time during normal operation, then this screen appears in which the operator is asked to enter the password (as a sequence of 4 keys).

This screen will not be shown if the panel doesn't have a password already set.

When no password is set, the following text is displayed for a short time:

```
No password  
Entering setup
```

Otherwise the following text is displayed:

```
ENTER PASSWORD  
*****
```

The second row starts blank and an asterisk is added with each key pressed.

If no key is pressed for 10 seconds, the panel automatically exits this screen and resumes normal operation.

When the correct sequence is entered, the following text is displayed briefly: “Entering setup”. Then the first setup screen is displayed (where the password can be changed).

When an incorrect sequence is entered, the following text is displayed briefly: “Incorrect password”. Then normal operation is resumed.



3.3 Setup screen: Change password (Y/N)

In this setup screen, the operator can choose to change the password. The following screen is displayed:

```
Change password?  
<N>
```

The initially displayed value is N.

With the arrow buttons, the displayed value can be changed between Y and N.

If Ack is pressed while Y is displayed, a setup screen is displayed where a new password can be introduced. If Ack is pressed while N is displayed, the next setup screen is displayed (background illumination settings).

If Stop Horn is pressed, the next setup screen is displayed (background illumination settings).

3.4 Setup screen: Enter new password

In this setup screen the password can be changed. The following is displayed:

```
Enter new  
password:
```

The password length is 4 keys, so the panel will wait for the operator to press any 4 keys. An asterisk will be added to the second line with each key press.

After the 4th key has been pressed, the new password is stored and the text "Password changed" is displayed briefly, then the next setup screen is displayed.

3.5 Setup screen: Background illumination level and Maximum dimming level for buttons

In this setup screen, the background illumination level and the maximum dimming level can be adjusted.

To give a better idea of how the illumination will look like, half of the buttons are illuminated at nback-ground level (simulating "off" buttons), and the other half are illuminated at dimming level (simulating "on" buttons). The operator can adjust both levels with the arrow buttons, and this will be immediately reflected in the illumination of the buttons. Stop Horn can be used to toggle what should be adjusted: background or dimming. When both levels are set at the desired levels,

Ack can be pressed for going to the next setup screen.

Upon entering this setup screen, the illumination of the buttons on the left half of the front panel is set at the currently-configured background illumination level, and the illumination of the buttons on the right half of the front panel is set at the currently-configured maximum dimming level. If the panel is blank, the background is set to 10% and the dimming is set to 30% (=70% brightness).

The following text is displayed:

```
Adjust bkgnd  
(StopHorn-dim)
```

When the arrow keys are pressed, the background illumination level is adjusted between 0% and 20%, in increments of 5%; the illumination of the “off” buttons (1, 3, 5 etc) is also adjusted accordingly.

If Ack is pressed, the currently-selected settings are stored, the illumination for all buttons is set to the background level, and the next setup screen is displayed.

If Stop Horn is pressed, the following text is displayed:

```
Adjust dimming  
(StopHorn-bkgnd)
```

When the arrow keys are pressed, the dimming level is adjusted between 0% dimming (=100% brightness) and 80% dimming (=20% brightness), in increments of 5%; the illumination of the “on” buttons (2, 4, 6 etc) is also adjusted accordingly.

Although the background brightness can be set as high as 20% and the dimmed brightness can be set as low as 20%, the panel will always keep a 20% “distance” between the two brightness levels. If, for instance, the operator sets the background brightness to 15%, the panel will force the dimmed brightness to at least 35%. If the operator sets the dimmed brightness to 25%, the panel will force the background brightness to at most 5%.

If Ack is pressed, the currently-selected settings are stored, the illumination for all buttons is set to the background level, and the next setup screen is displayed.

If Stop Horn is pressed, the text “Adjust bkgnd” is displayed again, and the operator can continue to adjust both settings.

3.6 Setup screen: Dimming of the LCD

This is the illumination level that is used for the LCD when alarms are displayed.

Upon entering this setup screen, the illumination of the LCD is set to the currently-configured level. If the panel is blank, the illumination is set to 100% (no dimming).

The following text is displayed:

```
ADJUST DIMMING  
FOR LCD
```

With the arrow buttons, the dimming can be adjusted between 0% dimming (=100% brightness) and 80% dimming (=20% brightness), in increments of 5%.

With the Ack button, the current setting is stored and the next setup screen is displayed.

With the Stop Horn button, the current setting is discarded, the previously-configured setting is retained, and then the next setup screen is displayed.



3.7 Setup screen: Enable LINK DOWN alarms

With the default configuration, a panel generates LINK M/B DOWN failures when one or both of its Ethernet ports are not connected anywhere.

When a Control Panel works standalone (outside an Ethernet network), these failures must be disabled. This can be done in this setup screen.

The following is displayed:

```
Enable LINK DOWN  
alarms? <Y>
```

The options are Y and N. Default is Y.

3.8 Setup screen: Panel ID

The panel ID can be changed here. The initially-displayed ID is the previously-configured one. If there is no previous configuration, the initially-displayed ID is 33.

The following text is displayed:

```
Select Panel ID:  
<Nav Light 33>
```

With the arrow buttons the value can be increased/decreased, within the limits 33 (inclusive) and 36 (inclusive).

The panel's Ethernet MAC address is calculated from this panel ID, so care must be taken not to connect together two panels with the same panel ID, or else malfunctions will occur.

The Panel IDs for various types of panels are given below for reference:

- Alarm Panel 1 to 16 (max 16 units);
- Navigation Light Control Panel 33 to 36 (max 4 units);
- Wiper Control Panel 37 to 40 (max 4 units);
- Fire Alarm Panel 41 to 44 (max 4 units);

3.9 Setup screens: Options for deactivating all external horns from a single location

Sometimes it is desirable to deactivate the external horns of all panels from a single location. This can be configured here. The following is displayed:

```
Send STOP HORN  
to bus? <Y>
```

The options are “Y” and “N”. Default is “N”.

Then the following screen is displayed:

```
Accept STOP HORN  
from Bus? <Y>
```

The options are “Y” and “N”. Default is “N”.

3.10 Setup screen: Options for synchronizing the dimming level between Control Panels

During normal operation, the operator can increase/decrease the dimming level. It might be desirable to set the dimming level for multiple panels at once from a single location. This synchronization can be turned on or off here.

The following is displayed:

```
Send dimming  
to bus? <Y>
```

The options are “Y” and “N”. Default is “Y”.

Then the following screen is displayed:

```
Receive dimming  
from bus? <Y>
```

The options are “Y” and “N”. Default is “Y”.

3.11 Setup screen: Open-load alarm delay

The IO Board has the ability to detect open-load outputs by measuring the current flowing through the output while the output is activated. When the current is below a threshold, the IO Board sends this information to the Control Panel, which will generate an “open-load” alarm.

However, certain types of navigation lamps have low power consumption during power-up, and this might trigger spurious “open-load” alarms. To avoid these alarms, a delay is configured here. If a delay of X seconds is configured, open-load alarms will be generated only if the current consumption is low for more than X seconds.

The following is displayed:

```
Open-load alarm  
delay <2.0> sec
```

The allowed range is 0 to 5 seconds. Default is 2.0 seconds.

3.12 Setup screen: Lamp type (LED/Bulb)

In this screen, the panel can be configured to work with either LED-type lamps or bulb-type lamps.

The following text is displayed:

```
Lamp type?  
<Bulb/LED>
```

The default setting is “Bulb”.

3.13 Setting the options for each lamp button (1-12, PS, SB)

Various settings can be set for each of the 14 lamp buttons (1-12, PS, SB). While defining the settings of a button, the corresponding button is illuminated, and not other buttons is illuminated.

The buttons are configured one by one, in the following order: 1 to 12, then PS, then SB. After the last button is configured, the special-function buttons can be configured.

3.13.1 Setup screen: Button-to-Lamp assignment

In this setup screen, a button can be assigned to one of the 12 lamps, or it can be entirely disabled (assigned to no lamp).

The following text is displayed:

```
Button XX  
to lamp <XX>
```

On the first line, XX is the button number (1-12, PS, SB). On the second line, the navigation lamp button (=the IO Board output number) can be selected.

Default is "XX". (Equal to button number)

Pressing Left Arrow or Right Arrow changes the displayed setting between "None", "1", "2" ... "12".

Assignment of multiple buttons to the same lamp is not permitted. For example, if Button 1 was assigned to Lamp 1, other buttons, with the exception of group buttons, cannot be assigned to Lamp 1 too.

3.13.2 Setup screen: Disable spare output

In this setup screen we can disable/enable the IO Board Spare output for the lamp button previously selected. If a Spare output was disabled for a certain lamp, the corresponding IO Board Spare output is not used anymore and no "Spare Lamp Failure" and "Spare Lamp Lifetime Failure" alarms will be generated for that lamp.

The numbering of the buttons is described in Lamp Buttons. For easy identification, the button is also illuminated while its settings are configured.

The following text is displayed:

```
Disable spare  
output <N>?
```

The default is "N" (=spare output enabled).

3.13.3 Setup screen: Replace Lamp (Y/N)

This setup screen is shown only if the panel was configured to work with LED-type lamps and if the button was linked to lamp in a previous setup screen.

The remaining lifetime of the LED lamp is displayed – in hours – and the operator is asked if he wants to reset this value (in case the lamp was replaced or is going to be replaced).

The following text is displayed:

```
Lamp XX M 123456  
h left.Reset?<N>
```



On the first line, XX is the lamp number (1-12), "123456" is the remaining lifetime of the lamp in hours (the panel system counts the hours and decreases this value).

On the second line, the initially-displayed setting is "N".

Pressing Ack while "N" is selected will display the setup screens of the next lamp. Pressing ACK while "Y" is selected will display a setup screen where a new value can be set for the remaining number of hours.

By Pressing Stop Horn, the next button can be configured.

3.13.4 Setup screen: Lamp Lifetime

This setup screen is shown only if the selected lamp type is "LED", and the button was assigned to any lamp, and "Y" was selected in the previous menu (=lamp is being replaced).

The remaining lifetime of a LED lamp, in hours of operation, can be defined here. As long as a lamp is powered, the Control Panel will decrease this value with each passing hour (for greater precision, the internal counter is actually second-based, but only hours are displayed on the LCD).

The following text is displayed:

```
Lamp Main/Spare  
lifetime<123456>
```

On the first line, either "Main" or "Spare" is displayed. On the second line, the initially displayed setting is "50000".

Pressing Left Arrow or Right Arrow decreases/increases the number by 10000, within the limits of 10'000 and 100'000. This value is normally taken from the lamp's datasheet.

Pressing ACK stores the currently-displayed setting in the configuration, and resets the lamp's internal hour counter to the selected value. Then the next button can be configured.

Pressing Stop Horn discards the currently-displayed setting. Then the next button can be configured.

3.14 Special-function buttons

3.14.1 Setup screens: Button Function

Each of the four special-function buttons can be configured to work as Test button, as Group button, or can be left unused. If a button is configured as Group button, the set of lamps contained in the group can be selected later.

The button is illuminated and this text is displayed:

```
Special button  
func: <None>
```

Pressing Left Arrow or Right Arrow will navigate between these options:

- None;
- Test;
- Group 1;
- Group 2;
- Group 3.



The same function cannot be assigned to more than one button.
In this setup screen, the Ack and Stop Horn buttons have the usual functions for setup mode.

3.14.2 Setup screen: Free Sailing Group

This screen is shown for every special-function button configured as Group button. Here the operator can choose whether the group is the so-called “Free Sailing” group. This group defines the lamp configuration that is used when the IO Module loses communication with the control panel for any reason. If no “Free Sailing” group is configured the lamp configuration will not be changed after losing communication between IO Module and control panel.

The following is displayed:

```
Is FREE SAILING  
group? <N>
```

Default is “No”.

The IO Module changes lamp illumination after losing communication into the lamp configuration set for Free Sailing. If you do not want this, do not set a Free sailing group.

3.15 Setting the group options

Buttons for groups can be configured after all buttons for lamps have been configured.

While a group button is being configured, that group button is illuminated.

3.15.1 Setup screen: Button included in group (Yes/No)

The following is displayed:

```
Group include  
lamp XX? <N>
```

In this screen, the buttons will be illuminated as follows:

- Group button is illuminated.
- No other group button is illuminated.
- Lamp buttons included in the group are illuminated.
- Lamp buttons not included in the group are not illuminated.

4) SAVING AND LOADING CONFIGURATION FILES TO/FROM USB DRIVE

When a USB drive is inserted during normal operation, the panel stops normal operation and enters USB Load/Save mode.

1. The panel might not recognize a USB drive that has too many files/directories in the root directory. Make sure you are using a USB drive with at most 10-20 files/directories in the root directory.
2. Older firmware versions don't recognize certain types of USB sticks. If you have problems with a USB stick, try another one.

4.1 Saving the configuration to the USB drive

If the Control Panel doesn't have a configuration, this screen is skipped.

If the Control Panel has a configuration, the following will be displayed:

```
Save config  
to USB drive?
```

- If Ack is pressed, the configuration is saved to the USB drive, in the root directory, under the name NAVL_XX.CFG, where XX is the panel number (the number in the Panel ID). Any existing file with the same name is overwritten.
- If Stop Horn is pressed, the next screen is displayed.
- If the USB drive is removed, the panel will exit USB mode and will restart normal operation.

4.2 Loading the configuration from the USB drive

Here the panel looks for valid configuration files in the root directory of the USB drive. A valid configuration file has a filename of the form NAVL_XX.CFG (where XX is the panel ID). It also has an internal signature, to prevent random files renamed as NAVL_XX.CFG to be taken as configuration files. The following is displayed on the LCD:

```
Load  
<NAVL_XX.CFG>
```

XX is the panel ID of a configuration file which was found in the root directory.

If Right Arrow is pressed, the panel looks for the next valid configuration file and displays its corresponding ID. If Left Arrow is pressed, the panel looks for the previous valid configuration file and displays its ID.

If Ack is pressed, the selected configuration file is loaded and immediately stored in the Flash memory. The following is displayed on the LCD:

```
File loaded.  
Remove USB device
```

After removing the USB drive the panel restarts normal operation.



If Stop Horn is pressed, the file is not loaded, and the old configuration is kept. The following is displayed on the LCD:

Remove USB device

After removing the USB drive the panel restarts normal operation.

If the USB drive is removed, the panel leaves USB mode and restarts normal operation.



5. ETHERNET COMMUNICATION WITH OTHER PANELS

Currently, Ethernet communication has only one purpose: sending the STOP HORN pressed key and backlight dimming level to other panels when the operator changes it on one panel. Each panel has two Ethernet ports, and redundancy is ensured by connecting all panels in an Ethernet ring. One of the panels normally “splits” the ring in order to prevent loops. When one Ethernet cable is interrupted, or when one panel is malfunctioning or missing, the splitting is automatically removed, so all the panels will continue to see each other.

6. SOFTWARE UPGRADES WITH USB DRIVE

Software upgrades can be done using the USB bootloader on the panel.

The USB bootloader is capable of upgrading the following pieces of software:

1. Panel USB bootloader (self-upgrade);
2. IO Board CAN bootloader;
3. Panel firmware;
4. IO Board firmware.

The software must always be upgraded in the order given above, always to the most recent versions received from Praxis, otherwise the panel or the IO board might enter an irrecoverable state, after which only the serial bootloader can be used for writing software.

1. The panel might not recognize a USB drive that has too many files/directories in the root directory. Make sure you are using a USB drive with at most 10-20 files/directories in the root directory.
2. Older firmware versions don't recognize certain types of USB sticks. If you have problems with a USB stick, try another one.

6.1 Panel USB Bootloader upgrade

The USB bootloader can be started by keeping the ACK button pressed during panel power-up.

After the bootloader starts, and before a USB drive is inserted, the version number of the existing panel bootloader is displayed on the LCD. The upgrade process is described below.

For panels and IO boards already programmed with old software, the upgrade process is slightly different.

The bootloader upgrade process sometimes deletes the panel configuration (the settings made in setup mode). If you intend to keep the panel configuration, save it to a USB drive before upgrading the bootloader, then upgrade the bootloader, then upgrade the firmware, and then load the configuration back from the USB drive.

6.1.1 Upgrading the panel USB bootloader for panels that are already programmed with panel bootloader versions older than 1.21.0.0

Currently, the panel cannot be upgraded if it has an USB bootloader older than 1.21.0.0.

Only the serial bootloader can be used for this.

6.1.2 Upgrading the panel USB bootloader for panels that are already programmed with panel bootloader versions 1.21.0.0 or higher

The panel bootloader can be upgraded as follows:

– Put the Panel USB bootloader file on a USB drive (USB hard-disk or USB memory stick), in the root directory. The bootloader file has one of these names:

- o NavL-CPL-RevA-UsbBootloader.bin, for rev. A and B panels.



o UniversalUsbBootloader.bin, for later panels.

– Start the bootloader on the panel (by keeping ACK pressed during power-up).

– Insert the USB drive. Within a few seconds, you are prompted with Update panel bootloader? Answer Yes by pressing ACK.

– The panel starts looking for binary files in the root directory, and will display the name of the first file it finds (on the first row), together with a few details about the file (on the second row). The filename is truncated to 8.3 DOS filename format; this is a limitation of the software. Here you can:

o Press LEFT / RIGHT to see different details on the second row. You can see the following (not necessarily in this order):

◊ The binary type name. For the USB bootloader, this is “CPL-BLUSB”.
Don’t load a file whose binary type name is different.

◊ The panel type name.

- If you’re upgrading a rev. A or B panel, this must be “NAVLCPL”.
Don’t load a file whose panel type name is different.

- If you’re upgrading a rev. C or later panel, this must be “ALL-PANELS”. Don’t load a file whose panel type name is different.
The hardware revisions recognized by the bootloader file.

- If you’re upgrading a rev. A panel, this must be “A”. Don’t load a file whose recognized hardware revision is different.

- If you’re upgrading a rev. B or later panel, this must be blank.
Don’t load a file whose recognized hardware revision is different.

◊ The release version of the bootloader file, with the form X.Y.Z.W.
This must be the latest version you received from Praxis.

o Press ACK to load the bootloader from the USB drive and write it into the panel.

o Press STOP HORN to go to the next binary file from the root directory.

– Once you found your bootloader file, press ACK to load it on the panel. The update process takes a few seconds, and then the panel restarts itself and the new bootloader executes.

6.2 IO Board CAN Bootloader Upgrade

The IO Board CAN bootloader can be upgraded as follows:

– Put the IO Board CAN bootloader file on a USB drive (USB hard-disk or USB memory stick), in the root directory. The filename of the IO Board CAN bootloader is normally IOB-BL.BIN.



- Start the bootloader on the panel (by keeping ACK pressed during power-up).
- Insert the USB drive. You will be prompted with Update XXX messages. Press STOP HORN until you are prompted with Update IO Board bootloader, and answer Yes to this by pressing ACK.
- The panel starts looking for binary files in the root directory, and displays the name of the first file it finds (on the first row), together with a few details about the file (on the second row). Note that the filename is truncated to 8.3 DOS filename format; this is a limitation of the software. Here you can:
 - o Press LEFT / RIGHT to see different details on the second row. You can see the following (not necessarily in this order):
 - ◊ The binary type name. For the IO board CAN bootloader, this is “IOB-BL-CAN”. Don’t load a file whose binary type name is different.
 - ◊ The IO board type name. This must be “ALL-IO-BOARDS”.
 - ◊ The hardware revisions recognized by the bootloader file. This must be blank.
 - ◊ The release version of the bootloader file, with the form X.Y.Z.W. This must be the latest version you received from Praxis.
 - o Press ACK to select the displayed file
 - o Press STOP HORN to go to the next binary file from the root directory.
- Once you found your IO board CAN bootloader file, press ACK.
- The panel now starts looking for IO boards on the CAN bus. For each IO board found, you are prompted with Board X: Update bootldr.
- The system has a single IO Board, so the panel will display only Board 1: Update bootldr? Answer Yes by pressing ACK. The update process takes a few seconds, and then the IO Board restarts itself.

Only IO Board that already contain CAN bootloader version 1.20 or later can be upgraded with a USB drive. IO Boards with earlier software can only be upgraded via serial bootloader.

6.3 Panel Firmware Upgrade

The firmware can be upgraded as follows:

- Put the firmware file on a USB drive (USB hard-disk or USB memory stick), in the root directory. The firmware file has a name such as WW-CPL-RevA-Firmware.bin.
- Start the USB bootloader on the panel (by keeping ACK pressed during power-up).
- Make sure the panel is already running the latest version of the USB bootloader. You can check this by starting the bootloader without inserting the USB drive: the bootloader version is displayed on the LCD. This must be the latest version received from Praxis.



- Insert the USB drive. Within a few seconds, you are prompted with Update panel bootloader? Answer No by pressing STOP HORN.
- You are prompted with Update panel firmware? Answer Yes by pressing ACK.
- The panel starts looking for binary files in the root directory, and will display the name of the first file it finds (on the first row), together with a few details about the file (on the second row). The filename is truncated to 8.3 DOS filename format; this is a limitation of the software. Here you can:
 - o Press LEFT / RIGHT to see different details on the second row. You can see the following (not necessarily in this order):
 - ◊ The binary type name. For the firmware, this is “CPL-FW”. Don’t load a file whose binary type name is different.
 - ◊ The panel type name. For the Navigation Light Panel, this is “NAVL-CPL”. Don’t load a file whose panel type name is different.
 - ◊ The hardware revisions recognized by the firmware file. For example, a firmware file that works on hardware revisions “A” and “B” will display “AB” here.
 - ◊ The release version of the firmware file, with the form X.Y.Z.W. This must be the latest version you received from Praxis.
 - o Press ACK to load the firmware from the USB drive and write it into the panel.
 - o Press STOP HORN to go to the next binary file from the root directory.
- Once you found your firmware file, press ACK to load it on the panel. The update process takes a few seconds, after which the panel restarts itself.
- The new firmware starts. If you still have the USB drive inserted, the firmware might enter “USB load/save mode”; if this happens, remove the USB drive and the panel will restart itself, then the firmware starts in normal operation.

6.4 IO Board firmware upgrade

The IO Board firmware can be upgraded as follows:

Put the IO Board firmware file on a USB drive, in the root directory. The filename of the IO Board firmware is normally IOBOARDS.BIN.

- Start the bootloader on the panel (by keeping ACK pressed during power-up).
- Insert the USB drive. You will be prompted with Update XXX messages. Press STOP HORN until you are prompted with Update IO Board firmware, and answer Yes to this by pressing ACK.
- The panel starts looking for binary files in the root directory, and displays the name of the first file it finds (on the first row), together with a few details about the file (on the second row). The filename is truncated to 8.3 DOS filename format; this is a limitation of the software. Here you can:



o Press LEFT / RIGHT to see different details on the second row. You can see the following (not necessarily in this order):

- ◇ The binary type name. For the IO board firmware, this is “IOB-FW”. Don’t load a file whose binary type name is different.
- ◇ The IO board type name. This must be “ALL-IO-BOARDS”.
- ◇ The hardware revisions recognized by the bootloader file. This must be blank.
- ◇ The release version of the bootloader file, with the form X.Y.Z.W. This must be the latest version you received from Praxis.

o Press ACK to select the displayed file

o Press STOP HORN to go to the next binary file from the root directory.

- Once you found your IO board firmware file, press ACK.
- The panel now starts looking for IO boards on the CAN bus. For each IO board found, you are prompted with Board X: Update firmware.
- The system has a single IO Board, so the panel will display only Board 1: Update firmware? Answer Yes by pressing ACK. The update process takes a few seconds, and then the IO Board restarts itself.
- You’re done.

7. HARDWARE SPECIFICATIONS

7.1 Navigation Light Control Panel

General

Model description	Navigation Light Control Panel
Code number	93.0.930
Model size	H=144, W=144, D=37mm
Mounting	Flush Panel
Panel cut-out	H=136, W=128mm
Fastening	4 nuts M4 in each corner
I/O connections	Detachable screw terminals 2.5mm
Weight	Approx 500 grams
Supply voltage	19-32VDC
Power consumption	10W max

Operating Environment

Operating temperature

Test specification

Marine class approval

Marine class approval pending

-20 degrees C to +70 degrees C

EN60945

LR, GL, BV, RINA

DNV, ABS

Relay outputs:

Horn relay output function

At power off or when no alarm condition:

- Open contact (horn = off)

At power on and when alarm is present:

- Closed contact (horn = on)

Horn relay output voltage/current

DC : 0 -32VDC / 2A

AC: 100-250VAC / 2A

System Fail output function

At power off or in fail condition:

- Open contact

At power on and no fail condition:

- Closed contact

System Fail output voltage/current

DC : 0 -32VDC / 0.5A

AC: 100-250VAC / 0.5A



Control Panel

Design:

Number of buttons

Button description and illumination

Flat

18

Text window of 14x14 mm for each button

Paper with size 105x 108 mm with button descriptions can be inserted from the top.

Text is illuminated (backgroundillumination) and can be dimmed

ACK pushbutton

STOP HORN pushbutton

Arrow Left pushbutton

Arrow Right pushbutton

SystemOn LED

Fault LED

Acknowledgement of alarm pushbutton

De-activating the horn relay output

Decrease dimming level

Increase dimming level

Yes

Yes

Redundant Ethernet link

Number of RJ45 Ethernet connectors

Communication speed

Function

2

100MB

Dimming distribution

USB

Number of USB ports

USB compliance

Function -

1

2.0

- USB drive for firmware update

- USB drive for loading and saving panel configurations.

7.2 Navigation Light IO Module**7.2.1 IO Module for LED-type lamps**

Code number:

Model description

Model size

Mounting

Fastening

I/O connections

Power supply connections

98.6.030.801

IO Module for LED-type lamps

H=200, W=125.4, D=27.9mm

DIN rail

DIN rail fastening bracket included

Detachable screw terminals 2.5mm

- 19-32VDC Main supply input

- 19-32VDC Backup supply input

- 19-32VDC Failsafe output (connected to the Navigation Light Control Panel)

750 grams

Dual 19-32VDC (Main and Backup)

0.6 A / 15W

30mA / 1W

190W max

(180W for the lamps + 10W for the Control Panel)

Weight

Supply voltage

Maximum current / power per output:

Minimal current / power per output:

Power consumption



Operating Environment
Operating temperature
Test specification EN60945
Marine class approval

-20 degrees C to +70 degrees C
EN60945
LRS, GL, BV, ABS, DNV, BV, RINA pending

7.2.2 IO Module for bulb-type lamps

Code number:
Model description

Model size
Mounting
Fastening
I/O connections
Power supply connections

98.6.030.800
IO Module for LED-type lamps and bulbtype lamps
H=200, W=125.4, D=27.9mm
DIN rail
DIN rail fastening bracket included
Detachable screw terminals 2.5mm
- 19-32VDC Main supply input
- 19-32VDC Backup supply input
- 19-32VDC Failsafe output (connected to the Navigation Light Control Panel)
750 grams
Dual 19-32VDC (Main and Backup)
2.5A / 60W
0.7A / 17W
730W max
(720W for the lamps + 10W for Control Panel)

Weight
Supply voltage
Maximum current per output:
Minimal current / power per output:
Power consumption

-20 degrees C to +70 degrees C
EN60945
LRS, GL, BV, ABS, DNV, BV, RINA pending

Operating Environment
Operating temperature
Test specification
Marine class approval

8. CONNECTION DRAWINGS

Drawings can be divided in two groups:

- Projects drawings; in these drawings the text sheet for navigation light mast is adapted for the particular vessel. These drawings are made by customer. An example project drawing is part of this manual.
- Standard drawings; these are standard mounting, dimension and connection drawings which are applicable for all vessels. These drawings are part of this manual.

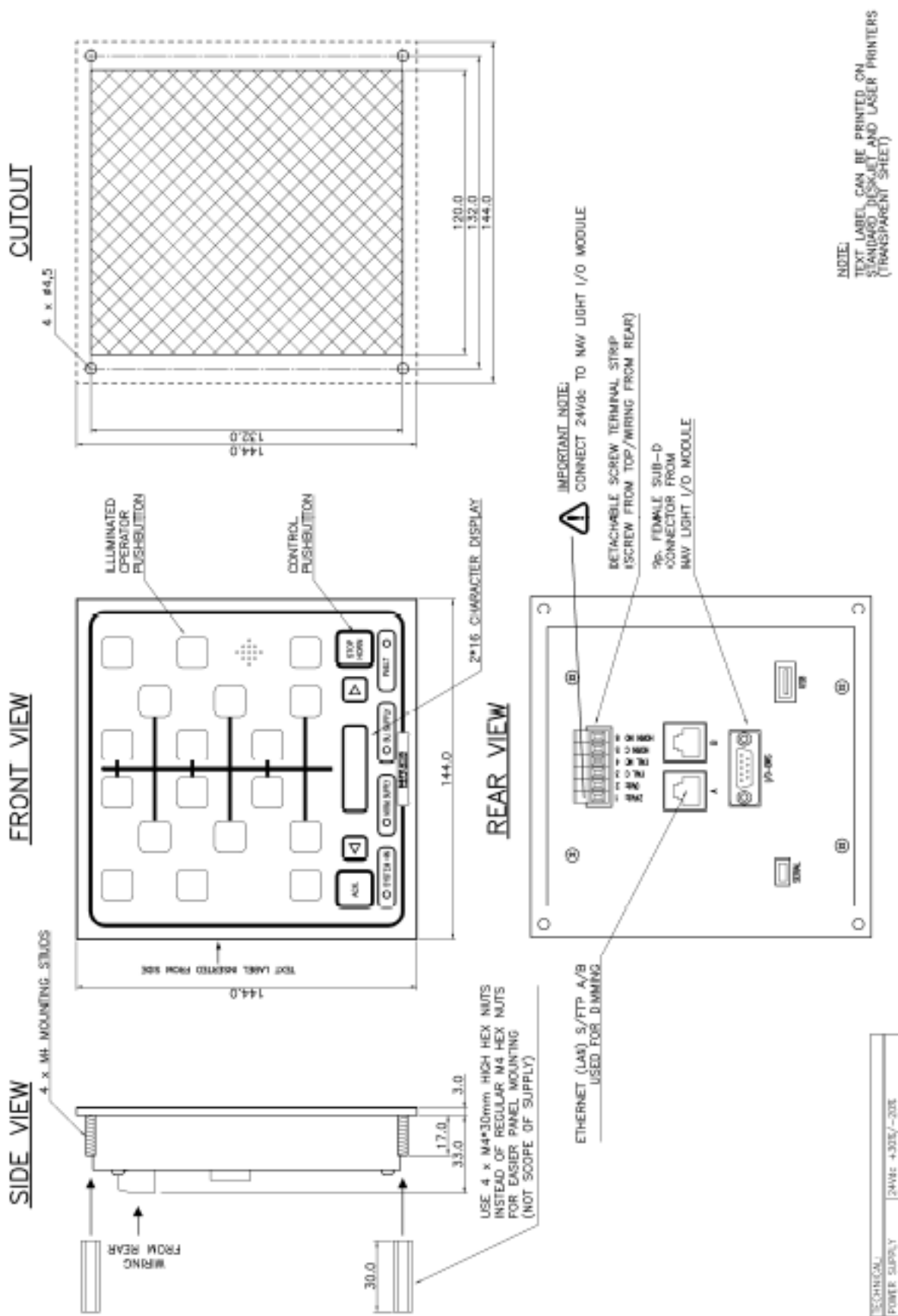
8.1 Project drawings

Please check your project drawing package for examples.

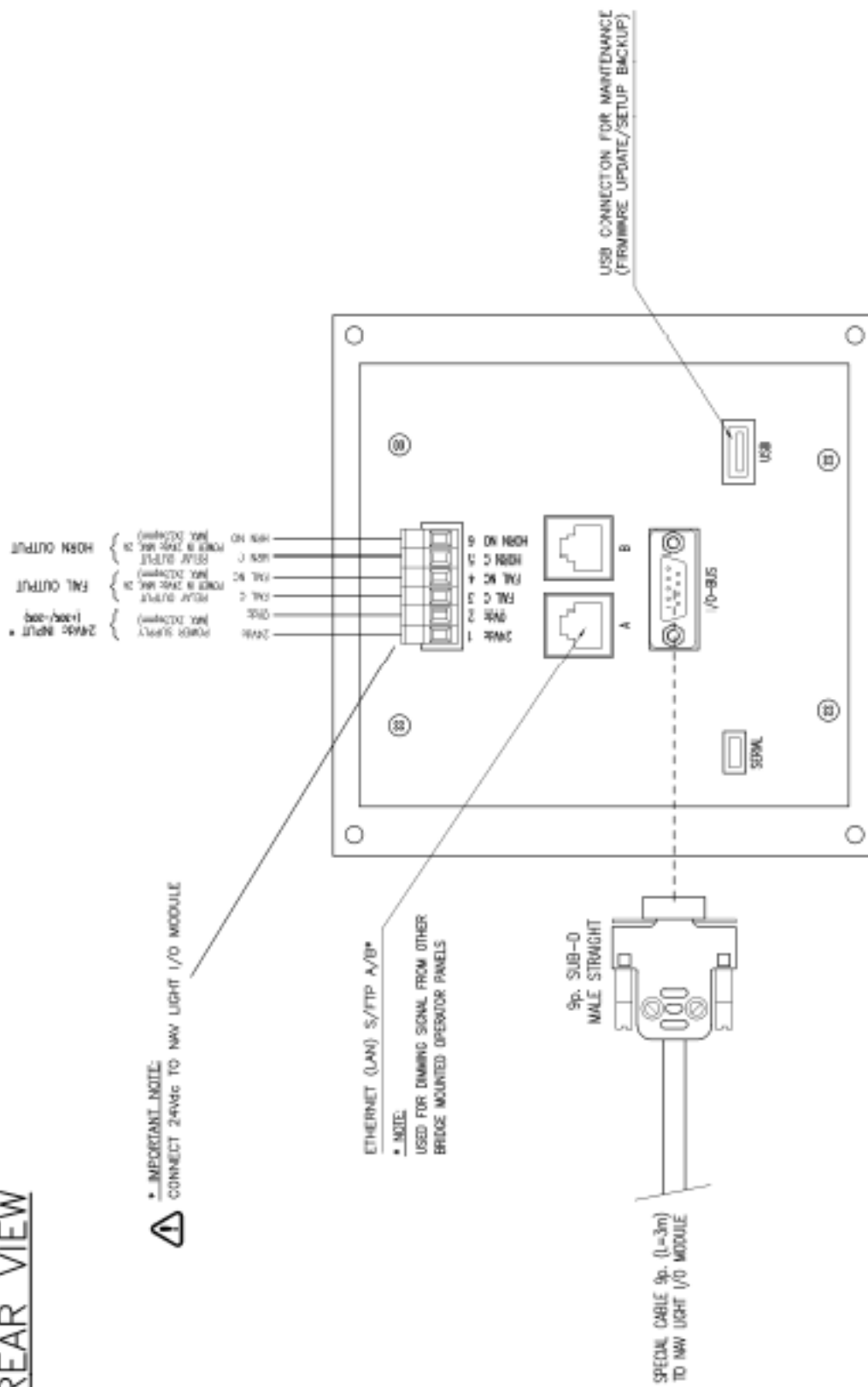
8.2 Standard drawings

See following pages.

8.2.1 Navigation Light Panel

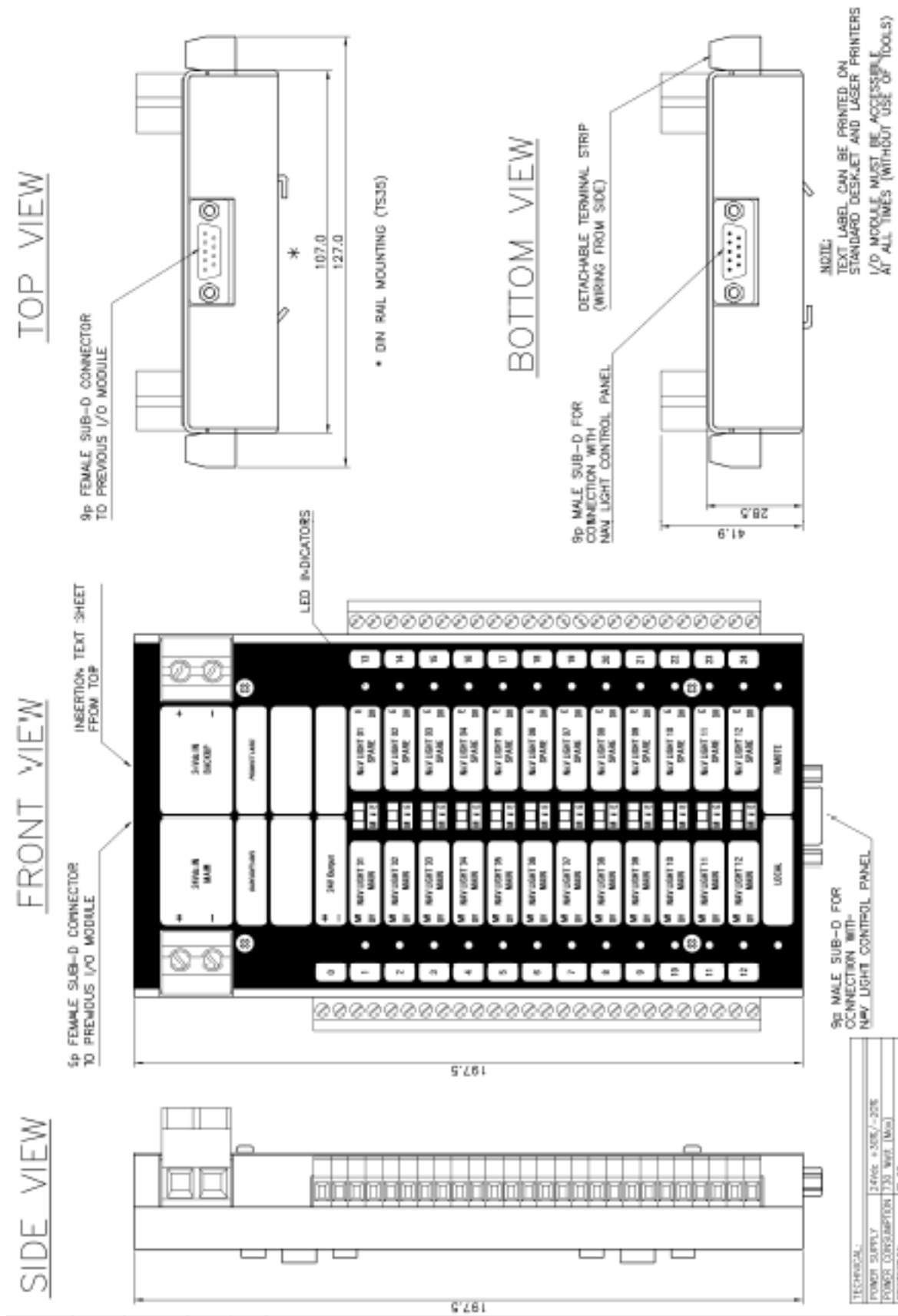


REAR VIEW

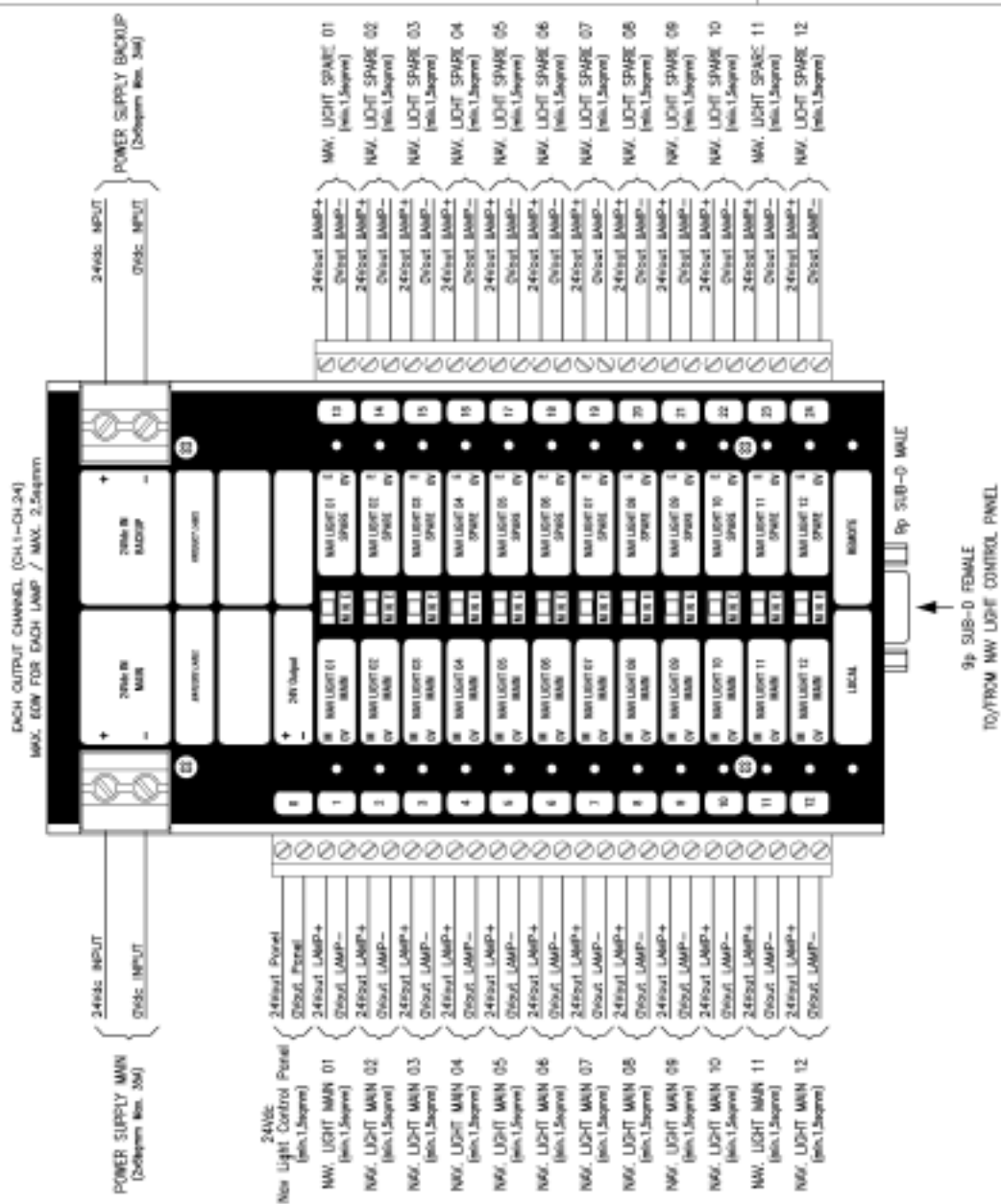




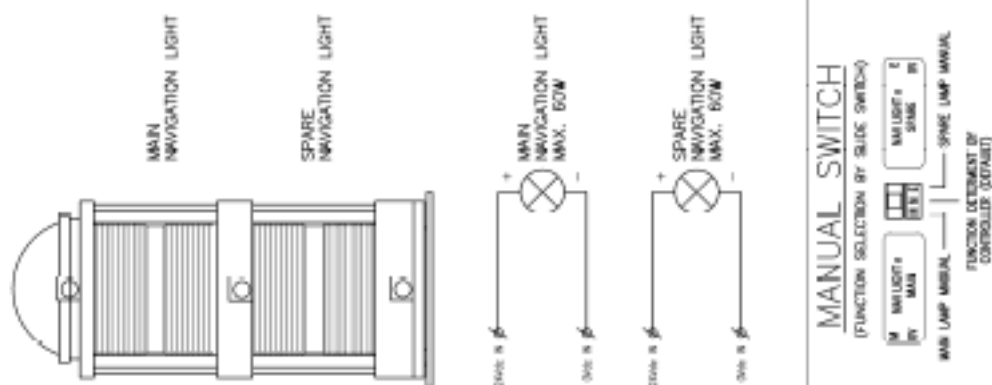
8.2.2 Navigation Light IO Module



FRONT VIEW

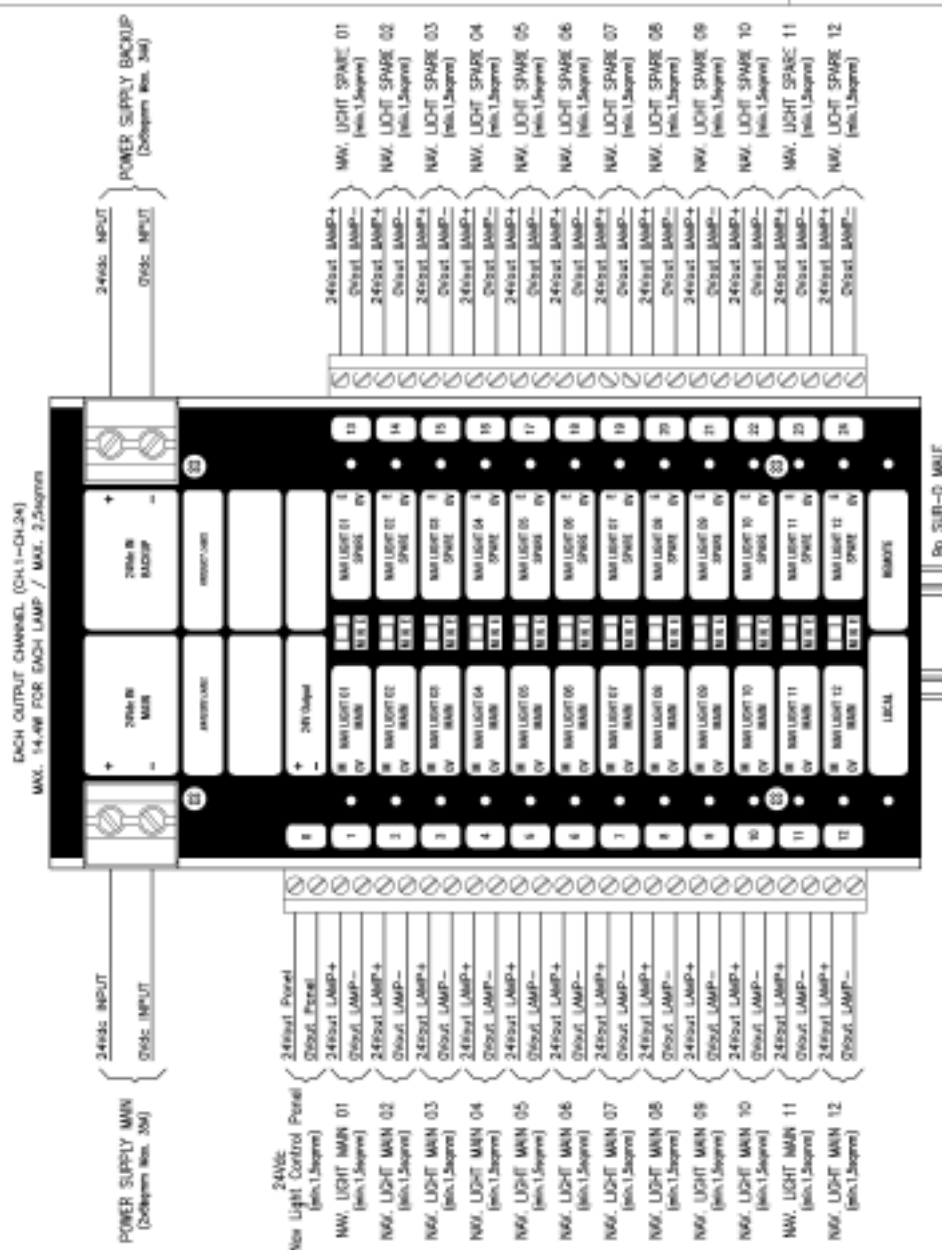


NAV, LIGHT CONNECTION



DETACHABLE SCREW TERMINAL STRIP MAX. 2.5sqmm / AWG 24-12

FRONT VIEW

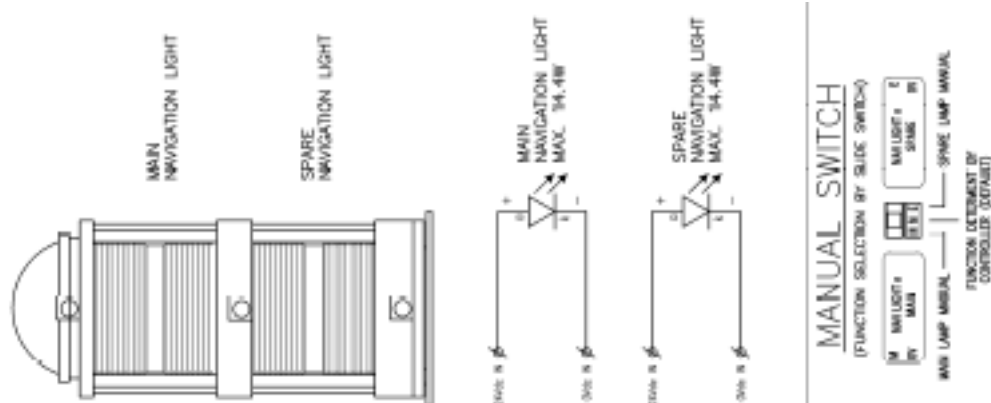


37-38 SUB-D FEMALE

TO/FROM NAV LIGHT CONTROL PANEL
96 SUB-D FEMALE

DETACHABLE SCREW TERMINAL STRIP MAX. 2.5sqmm / AWG 24-12

NAV: LIGHT CONNECTION





9. MINI-GUARD, MAXI-GUARD AND MEGA-GUARD E-SERIES

The Navigation Light Control System can be applied in the E-Series of Mini-Guard, Maxi-Guard, and Mega-Guard product line.

ADVANCED MARITIME SIGNALLING SOLUTIONS



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