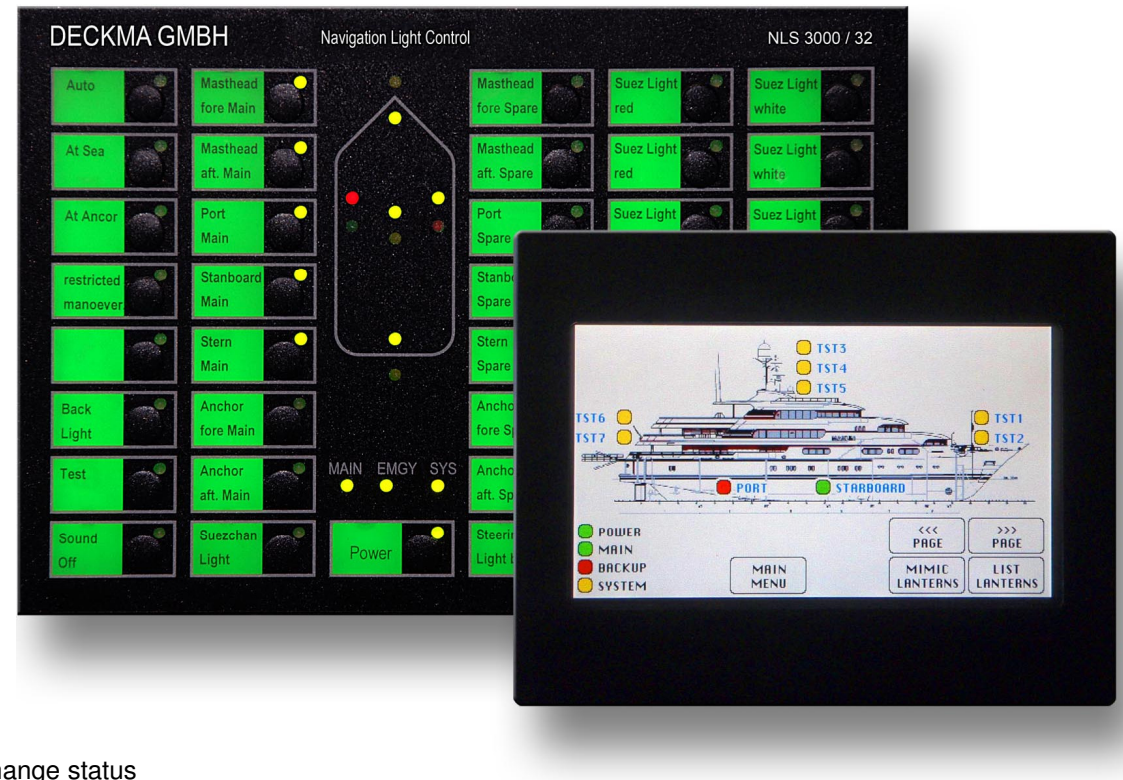
User manual

NAVIGATION LIGHT CONTROL SYSTEM
- NLS 3000 -

for use on seagoing vessels



Change status

Version	Date	Author	Checked	Remark
0.1	07.08.2008	STO	HN	1. Edition
0.2	29.09.2010	STO	TK	Changes to BK01-E to BK08...48-E
0.3	08.04.2016	TK	TK	Some small errors corrected
0.4	12.01.2017	TK	TK	„Special function“ handmade (p. 21)
0.5	24.08.2017	TK	TK	“SM01-E” removed, MODBUS added, working hour counter (2 channel LM) added

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1. Application and design

The navigation light control system NLS 3000 serves for switching and monitoring to up to 48 lights/lanterns on board of ships (conventional + LED* technology). These can be switched on or off individually. Two power supplies can provide the power for the lights (main and emergency power input). Selection between these two supplies can take place either manually or automatically in the event of failure of the power supply currently in use.

The navigation light control system NLS 3000 is a modular design. The light (lantern) modules (light switching and monitoring) are commonly installed in a control cabinet together with the main module (power and master module monitoring), but they can also be delivered as “naked” modules, mounted on a DIN rail. The control (user) panel (conventional with buttons and LEDs or graphic with touchscreen) can be also mounted project depending (like on or into a bridge desk).

The individual modules are interconnected via a bus cable that supplies the modules with operating voltage and data communication.

The system is organised according to the master-slave principle. This means that a master module collects the information from the slave modules, evaluates and manages the information and initiates actions at the slave modules.

For this purpose, the master (main module) must know which lights must be evaluated with which values and what actions need to be initiated in the event of failure. The system topology must also be known. This is achieved by the configuration of the main module and is permanently stored in the internal EEPROM. This configuration is simply written into the main module by text file transfer (terminal or SD card via data module). The text file containing configuration data and menu texts is arranged so that it can effectively be generated from Microsoft Excel tables.

*LED lantern:
This function is (based on the used LED type) only with limitations possible. Is the existing LED current too low (poor), the microcontroller (include his electrical signal detection circuitry) is probably not able to detect this safely enough, because harsh ship’s electrical environments will be often much stronger than this “little” LED current (emc/emv disturbance or jamming).

2. Type of modules

2.1 NLS 3000 MM01-E — Main module

- Supply 230VAC / 115VAC or 24VDC
- Switchover for main- and emergency power
- Supply for modules and distribution for the bus system
- 2 relay outputs for external signalling
- 2 optocoupler inputs for signalling
- Interface for data module (AFMS/FMS 3000 -> DT01-E)

2.2 NLS 3000 LM08-E — Lantern module, 8 channel

- 8 monitored, switched and protected light/lantern circuits
- Switchover of main- and emergency power

2.3 NLS 3000 LM02-E — Lantern module, 2 channel

- 2 monitored, switched and protected light/lantern circuits
- Switchover of main- and emergency power

2.4 NLS 3000 BK**-E — Control panel, conventional (mimic)

- Ship mimic with 7 LEDs for main lights/lanterns
- Display and switching option for up to 48 individual lights/lanterns
- 4x buttons for special light/lantern functions (group definitions)
- Buttons with illuminated labelling fields (in steps dimmable)

2.5 NLS 3000 BG01-E — Control panel, graphic (touchscreen)

- Graphic control panel with touchscreen (control options as on conventional control panel)
- Pictures (*.jpg/*.bmp) background images used as HMI for light/lantern positions

2.6 NLS 3000 VM01-E — VDR module (identical to FMS/AFMS 3000)

- Connection to VDR

2.7 NLS 3000 MBM01-E — MODBUS module (identical to FMS/AFMS 3000)

- Connection to ship automation systems via RS232 or RS485

2.8 NLS 3000 DT01-E — Data module (identical to FMS/AFMS 3000)

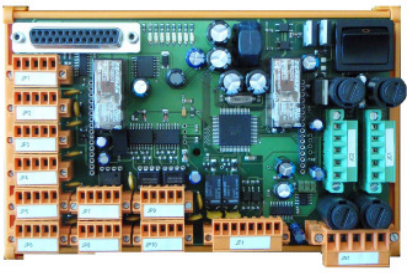
- Module for data management and system updates
- Only for connection to specific interface
- Identically used in FMS/AFMS 3000 systems
- Use for service purposes

2.9 FMS 3000 terminal adapter — RS232

- Interface for connection of the data module interface 8 (on NLS 3000 / MM01-E) with PC (RS232)
- Use for service purposes only (see and respect the separate service manual for this!)

3. Description of the modules

3.1 NLS 3000 MM01-E Main module



Width:	168mm	
Height:	108mm	
Depth:	50mm + connector	around 80mm
Mounting method:	Top-hat rail DIN EN 50022	
Weight:	0.5kg	

3.1.1 General

The main module is the communication master within the communication system. In addition to the power for the connected modules, the main module includes a power monitoring circuit. The main module also has a connection for an optional data module (DT01-E).
The main module has 10 WEIDMÜLLER connectors for modules supplying a total power of about 4A (maximum).

For conversion of the 230VAC and 115VAC power supplies to the 24V/DC internal system supply voltage, an option for the connection of two external power supplies is provided.

3.2 NLS 3000 LM08-E Lantern module, 8-ch.

Width:	275mm	
Height:	100mm	
Depth:	50mm + connector	about 80mm
Mounting method:	Top-hat rail DIN EN 50022	
Weight:	0.8kg	
Supply:	24VDC	from NLS bus
Power consumption 24V:	max. 0.4A	

3.2.1 General

The lantern module “8-channel” is a communication slave within the NLS 3000 communication system. It allows the connection of up to 8 lights/lanterns which can be switched on or off via relays with a conventional “2-pole” glass fuse (5x20mm) protection.
The current in the individual light/lantern circuit is continuously measured. These values are transferred to the master which evaluates these values from which it derives status information for the control panels. Should the current fail or reach the required maximum value, an alarm is generated.

3.2.2 Light/lantern circuits

The power supplies (main and emergency) are supplied jointly for all 8 lights/lanterns via JN1. For switching between the two power supplies, one switching relay for two lights respectively is arranged downstream of this supply circuit. The respective voltage is then distributed between the individual light circuits.

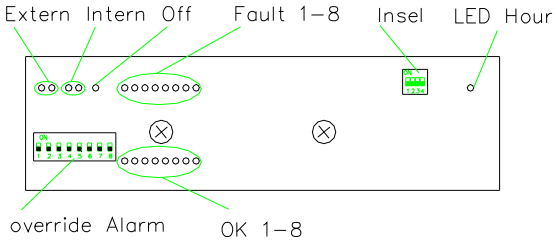
Each light/lantern circuit has a current sensor for two current ranges. The first switching operation takes place for currents up to about 200 mA via a shunt, the second, for currents up to about 4 A, a Hall sensor is used. Both switching operations are sensed by a microcontroller with a 10-bit analogue circuit and made available for further processing via the FMS bus communication.

Each light/lantern circuit has a two-pole glass fuse protection (5x20mm). Each light/lantern circuit can be switched by the microcontroller via one relay respectively. For this purpose, the commands from the master arriving via the FMS bus communication protocol are evaluated.

The light/lantern circuits are each combined in groups of four on the output connectors JL1 and JL2 from where separate wiring to the respective lights takes place.

Each light/lantern circuit can be switched on or off via a simple mechanical “double pole” switch independent of the microcontroller. This is also possible in the event of failed or disconnected electronic circuits, thus enabling an emergency light emergency or “fall-back” operation is given.

3.2.3 LEDs and DIP switch functions (microcontroller pcb)



"EXT" ⇒ External communication: (2 LEDs)

- Communication status with master via NLS bus system
- Green flashing ⇒ Communication without faults
- Red short ⇒ Individual communication faults
- Red ⇒ Communication in constant fault state

"INT" ⇒ Internal communication: (2 LEDs)

- Communication status with module-internal A/D converter
- Green flashing ⇒ Communication without faults
- Red short ⇒ Individual communication faults
- Red ⇒ Communication in constant fault state

"OK" ⇒ Light/Lantern status: (8 green LEDs)

- Light circuit status without faults
- Green ⇒ Light is switched on and values are correct
- Green flashing ⇒ Delay after switching on continues until valid A/D values are present or "overwrite" is active (DIP switch)

"FAULT" ⇒ Light/Lantern status: (8 red LEDs)

- Light circuit status with faults
- Red flashing ⇒ Light fault detected, new fault
- Red ⇒ Light fault detected, fault accepted

"OFF" ⇒ Fault "overwrite": (yellow LED, 8-circuit DIP switch)

- Faults in light circuits are not signalled
- LED off ⇒ No "overwrite" active on this module
- Yellow LED flashing ⇒ Minimum one "overwrite" active on this module
- DIP switch "ON" ⇒ Fault in light circuit is not signalled

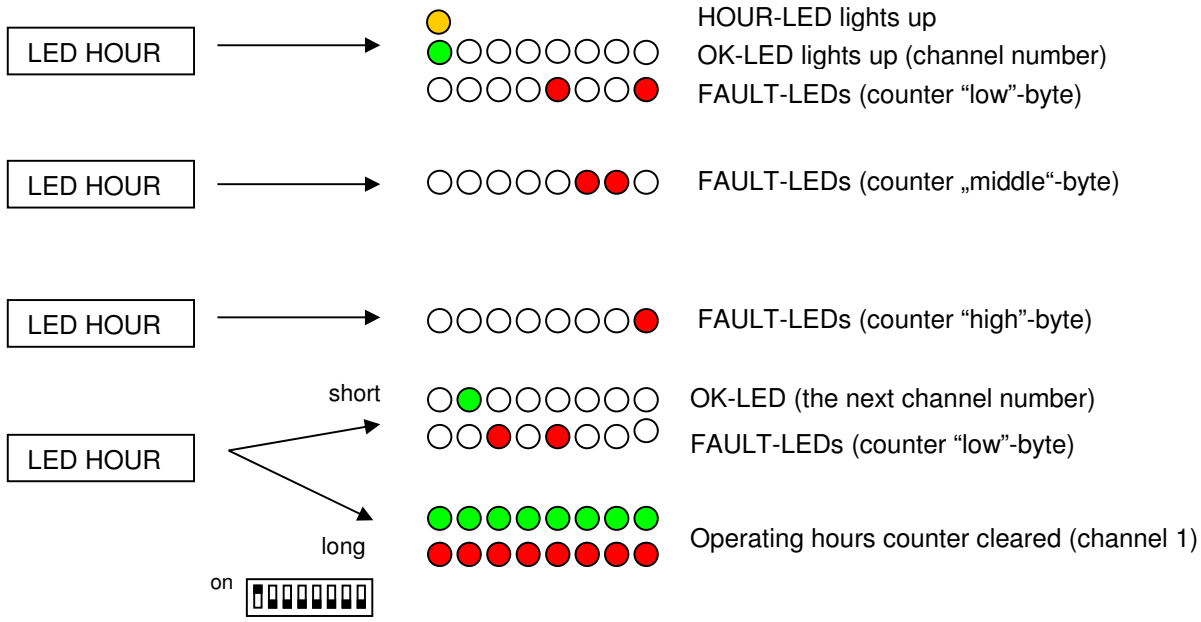
"ADR" ⇒ NLS address: (4-circuit DIP switch)

- Address in NLS 3000 - system
- Address must correspond with configuration data
- Each address may only be set 1x within the entire system

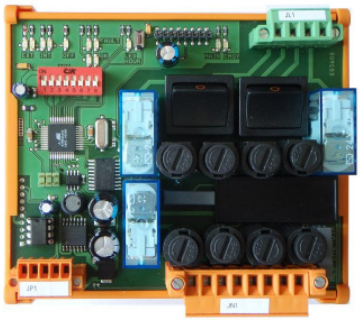
Readout and reset the operating hours counter LM08-E

HOUR-LED	(amber):	Operating hours display active
OK-LED	(green):	Display of the chosen channel
FAULT-LED	(rot):	Display the operating hours

1: Push the button “LED HOUR”. This will activate the operating hours display. After 30 seconds “with no action” this indication will be deactivated automatically.
2. Select single channel through DIP-switches “OFF”. Is no DIP-switch selected, the channel will be shown one after another (in chain). Clearing (resetting) one LED-channel is only possible, when the dedicated DIP-switch is set (set to active)!
3. The selected channel is shown through the “OK-LED”.
4. At the same time the lowest byte value from the operating hours counter will be shown through the “FAULT-LED”. This indication is here binary coded!
5. Push the button “LED HOUR” a second time, the LEDs will show the middle byte from the operating hours counter.
6. Push the button “LED HOUR” a third time, the LEDs will show the “highest” (high-byte) from the operating hours counter.
7. Is for the fourth time the button pressed AND the button is held down for around 5 seconds AND is the matched DIP-switch selected, the operating hours counter will be cleared. As feedback to this action all red and green LEDs lights up for a short time...



3.3 NLS 3000 LM02-E Lantern module, 2-channel



Width:	124mm	
Height:	108mm	
Depth:	50mm + connector	around 80mm
Mounting method:	Top-hat rail DIN EN 50022	
Weight:	0.8 kg	
Supply:	24VDC	from NLS bus
Power consumption 24V:	max. 0.4A	

3.3.1 General

The lantern module “2-channel” is a communication slave within the NLS communication system.
It allows the connection of up to two lights which can be switched on or off via relays with two-pole fuse protection.
The current in the individual light circuits is continuously measured. These values are transferred to the master which evaluates these values from which it derives status information for the control panels. Should the current fail to reach the required value, an alarm is generated.

3.3.2 Light/Lantern circuits

The power supplies (main and emergency) are supplied jointly for all two lights/lanterns via “JN1”. For switching between the two power supplies, one switching relay for two lights respectively is arranged downstream of this supply circuit. The respective voltage is then distributed between the individual light/lantern circuits.

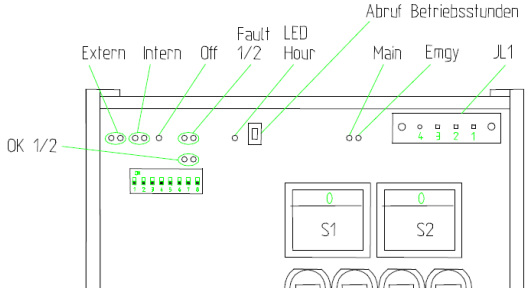
Each light/lantern circuit has a current sensor for two current ranges. The first switching operation takes place for currents up to about 200 mA via a resistor shunt, the second for currents up to about 4 A via a hall sensor. Both switching operations are sensed by a microcontroller with a 10-bit analogue resolution and are made for available for further processing via the FMS bus.

Each light/lantern circuit has two-pole fuse protection. Each light/lantern circuit can be switched on by the microcontroller via one relay respectively. For this purpose, the commands from the master arriving via the FMS bus are evaluated.

The light/lantern circuits are each combined on the output connector “JL1” from where separate wiring to the respective lights takes place.

Each light circuit can be switched via a toggle switch independent of the microcontroller. This is also possible in the event of failed or disconnected electronic circuits, thus enabling emergency light operation at any time.

3.3.3 LEDs and DIP switch functions (microcontroller pcb)



"EXT" ⇒ External communication: (2 LEDs)

- Communication status with master via NLS bus system
- Green flashing ⇒ Communication without faults
- Red short ⇒ Individual communication faults
- Red ⇒ Communication in constant fault state

"INT" ⇒ Internal communication: (2 LEDs)

- Communication status with module-internal A/D converter
- Green flashing ⇒ Communication without faults
- Red short ⇒ Individual communication faults
- Rot ⇒ Communication in constant fault state

"OK" ⇒ Light/Lantern status: (2 green LEDs)

- Light circuit status without faults
- Green ⇒ Light is switched on and values are correct
- Green flashing ⇒ Delay after switching on continues until valid A/D values are present or "overwrite" is active (DIP switch)

"FAULT" ⇒ Light/Lantern status: (2 red LEDs)

- Light circuit status with faults
- Red flashing ⇒ Light fault detected, new fault
- Red ⇒ Light fault detected, fault accepted

"OFF" ⇒ Fault "overwrite": (yellow LED, 8-circuit DIP switch – switch 7/8)

- Faults in light circuits are not signalled
- LED off ⇒ No "overwrite" active on this module
- Yellow LED flashing ⇒ Minimum one "overwrite" active on this module
- DIP switch "ON" ⇒ Fault in light circuit is not signalled

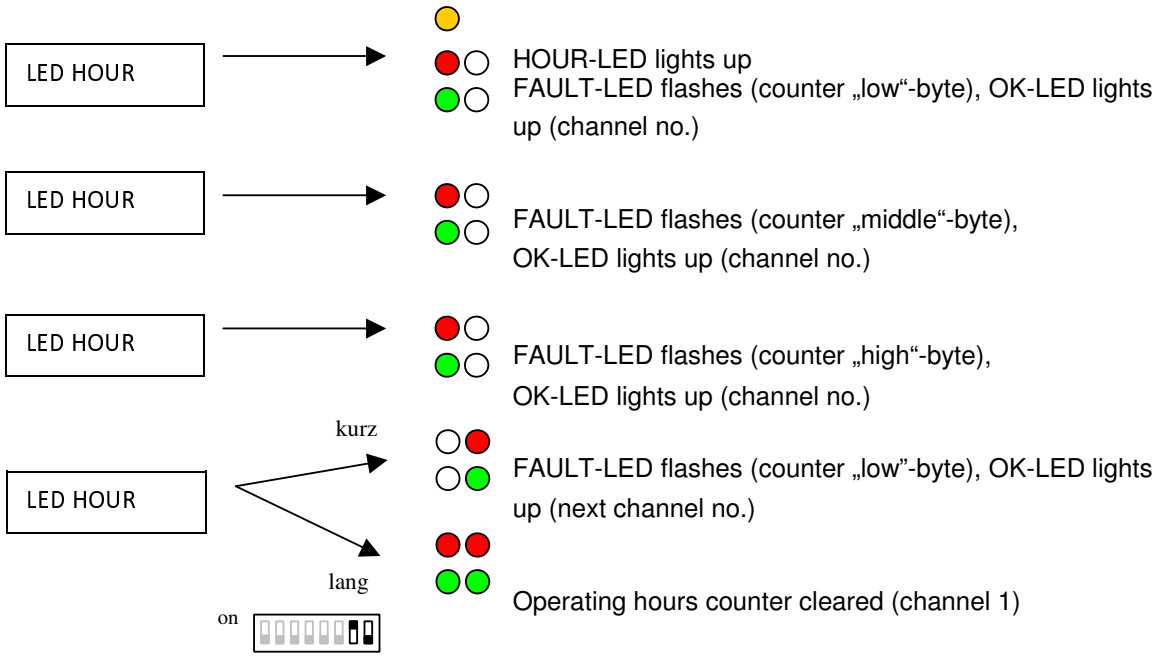
"ADR" ⇒ NLS address: (8-circuit DIP switch – switch 1-5)

- Address in NLS 3000 - system
- Address must correspond with configuration data
- Each address may only be set 1x within the entire system

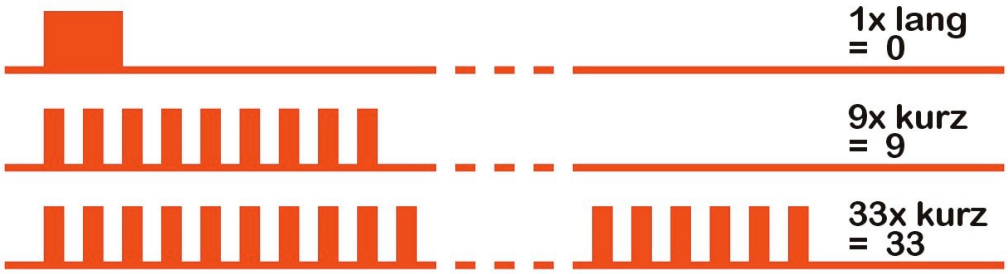
Readout and reset the operating hours counter LM02-E

HOUR-LED	(amber):	Operating hours display active
OK-LED	(green):	Display of the chosen channel
FAULT-LED	(rot):	Display the operating hours

1. Push the button “LED HOUR”. This will activate the operating hours display. After 30 seconds “with no action” this indication will be deactivated automatically.
2. Select single channel through DIP-switches “OFF”. Is no DIP-switch selected, the channel will be shown one after another (in chain). Clearing (resetting) one LED-channel is only possible, when the dedicated DIP-switch is set (set to active)!
3. The selected channel is shown through the “OK-LED”.
4. At the same time the lowest byte value from the operating hours counter will be shown through the “FAULT-LED” – as flashing sequence, counting now by hand is necessary. Note: This indication is binary coded.
5. Push the button “LED HOUR” a second time, the LEDs will show the middle byte from the operating hours counter.
6. Push the button “LED HOUR” a third time, the LEDs will show the “highest” (high-byte) from the operating hours counter.
7. Is for the fourth time the button pressed AND the button is held down for around 5 seconds AND is the matched DIP-switch selected, the operating hours counter will be cleared. As feedback to this action all red and green LEDs lights up for a short time...



Counting sample:



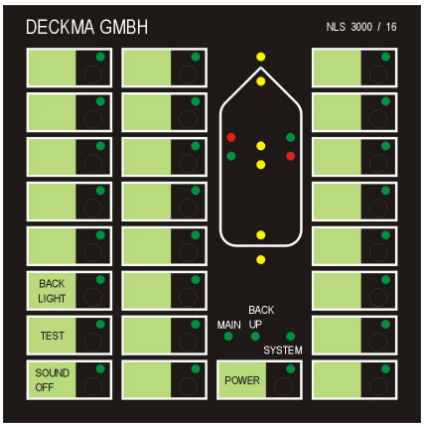
Calculation from the counted individual values (byte as decimal values):

[high-byte]	* 65536 +	[middle-byte]	* 256 +	[low-byte]	= [working hours]	hours
0	* 65536 +	9	* 256 +	33	= 2337	hours

Note:

With the terminal adapter and a PC, read-out and resetting is much more comfortable. See also „1.3.9 Terminal adapter_V0.1_20080831.pdf“ for more information to this.

3.4 NLS 3000 BK08...48-E
Control panel, conventional (mimic)



Width:	111.5mm 144mm 176.5mm 209mm 241,5mm 274mm	BK08-E BK16-E BK24-E BK32-E BK40-E BK48-E
Height:	144mm	
Depth:	60mm + connector	about 130mm
Mounting method:	Front panel mounting	
Weight:	0,6kg	BK16-E

3.4.1 General

The "conventional control panel" is a communication slave within the NLS 3000 communication system. It serves for display and control of the NLS, enabling lights to be switched on or off. From this control panel, the NLS generates visual and audible alarms on faults in the light circuits or in the NLS and system power supply.

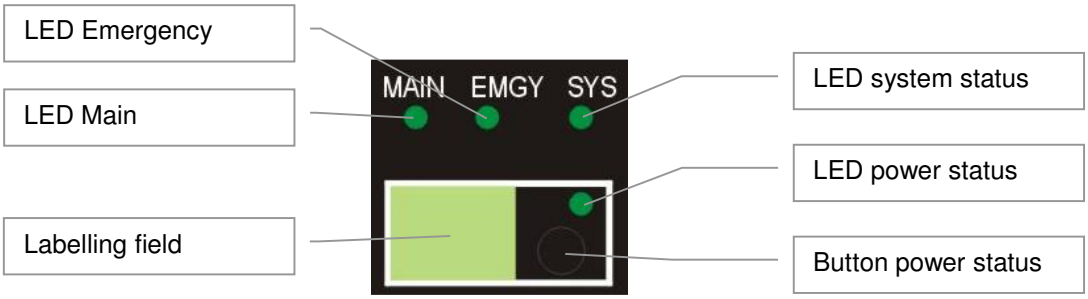
3.4.2 Buttons

Each individual button consists of a button, a status LED arranged above and a labelling field located on the left. The labelling field (dimmable) is backlit. Marking of the labelling fields takes place via an insertable strip that can be adapted for various projects.

3.4.3 General buttons

For general control of the NLS, permanent and free configurable functions are implemented. The associated buttons are arranged in the left section of the control panel or directly below of the ship's mimic indication.

3.4.5 Power and system:



Labelling field
- Marking with button function: …here: "Power"

Button power status
- Switches the power for the lights/lanterns
- Pressing this button switches on the power via "MAIN"
- With the power switched on, switching takes place between "MAIN" and "EMGY"
- Pressing and holding this button switches off the power after around 3 seconds

LED power status
- Off ⇒ Power off
- Green ⇒ Power on
- Red flashing ⇒ No power ("MAIN" or "EMGY"), new fault
- Red ⇒ No power ("MAIN" or "EMGY"), fault accepted

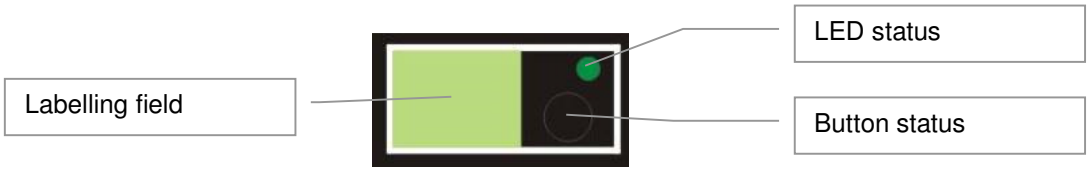
LED system status
- Green ⇒ System without faults
- Red flashing ⇒ System fault (e.g. module not accessible)

LEDs main- and emergency

a. to "Power off" status
- Green ⇒ Power available
- Green flashing ⇒ No power

b. to "Power on" status
- Green ⇒ Lights currently supplied via this power supply
- Off ⇒ Lights not currently supplied via this power supply
- Green flashing ⇒ No power

3.4.6 Function and lantern buttons:

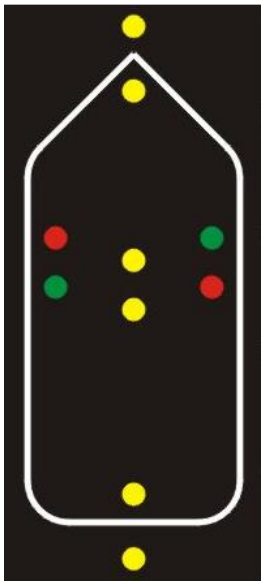


Labelling field
- Marking with associated button function

Button status
- Switches associated function or light on or off

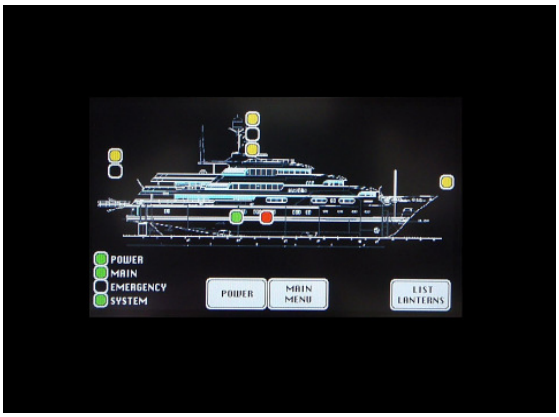
LED status
- Off ⇒ Function or light switched off
- Green ⇒ Function or light switched on
- Green flashing ⇒ Delay after switching on continues until valid A/D values are present or "overwrite" is active (DIP-switch)
- Red flashing ⇒ Light fault detected, new fault
- Red ⇒ Light fault detected, fault accepted

Mimic:



Mimic LEDs
- Off ⇒ Light switched off
- On ⇒ Light switched on
- Flashing ⇒ Light fault detected

3.5 NLS 3000 BG01-E Control panel, graphic (with touchscreen)

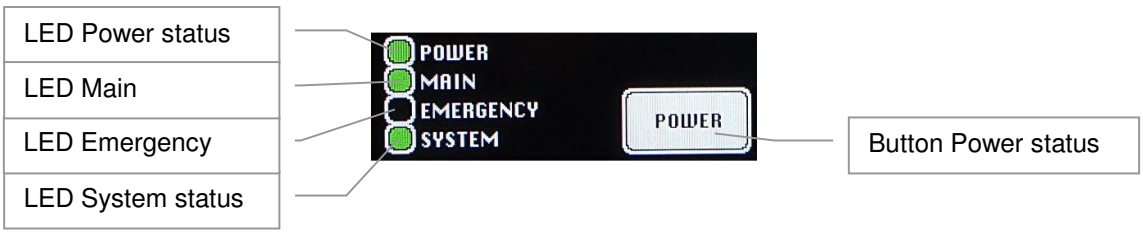


Width:	120mm	
Height:	95mm	
Depth:	60mm +connector	around 130mm
Mounting method:	Front panel mounting	
Weight:	0.4kg	
Connection NLS Bus In:	15-pin Sub-D (male)	JP1
Connection NLS Bus Out:	15-pin Sub-D (female)	JPT1
Supply:	24VDC	from NLS-bus
Power consumption 24V:	max. 0.3A	
Display visible area:	95.4mm x 53.9mm	
Display resolution:	480 x 272 pixel	
Display colours:	256	

3.5.1 General

The control panel “graphic” is also a communication slave within the NLS communication system.
It provides the display and control of the NLS system, enabling lights/lanterns to be switched on or off.
From this control panel, the NLS generates visual and audible alarms on faults in the light circuits or in the NLS and the system power supply.

3.5.2 Power and system:



Labelling field
- Marking with button function: …here: "Power"

Button power status
- Switches the power for the lights
- Pressing this button switches on the power via "MAIN"
- With the power switched on, switching takes place between "MAIN" and "EMGY"
- Pressing and holding this button switches off the power after about 3 seconds

LED power status
- Off ⇒ Power off
- Green ⇒ Power on
- Red flashing ⇒ No power ("MAIN" or "EMGY"), new fault
- Red ⇒ No power ("MAIN" or "EMGY"), fault accepted

LED system status
- Green ⇒ System without fault
- Red flashing ⇒ System fault (e.g. module not accessible)

LED main- and emergency

a. to "Power off" status
- Green ⇒ Power available
- Green flashing ⇒ No power

b. to "Power on" status
- Green ⇒ Lights currently supplied via this power supply
- Off ⇒ Lights not currently supplied via this power supply
- Green flashing ⇒ No power

3.5.3 Functions- and light buttons:

Labelling field
- Marking with associated button function

Button status
- Switches associated function or light on or off

LED status
- Off ⇒ Function or light switched off
- Green ⇒ Function or light switched on
- Green flashing ⇒ Delay after switching on continues until valid A/D values are present or "overwrite" is active (DIP switch)
- Red flashing ⇒ Light fault detected, new fault
- Red ⇒ Light fault detected, fault accepted

Mimic:

Mimic LEDs
- Off ⇒ Light off
- On ⇒ Light on
- Flashing ⇒ Light fault detected

3.6 NLS 3000 VM01-E VDR module

Width:	72mm	
Height:	104mm	
Depth:	88mm	
Mounting method:	Top-hat rail DIN EN 50022	
Weight:	0.3kg	

3.6.1 General

The VDR module sends data via RS485 or RS232 to a VDR (Voyage Data Recorder). The module can be alternatively provided with drivers for RS485 or RS232 communication.
The communication profile of the VDR interface is roughly referenced to the following specifications:

IEC 61162-1 Part 1 Single talker and multiple listeners
IEC 61162-100 Extra requirements for the UAIS
IEC 61162-102 Extra requirements for the Voyage Data Recorder

3.6.2 VDR interface

The microcontroller, an ATmega162 with two serial interfaces, communicates with the master via one of the interfaces and with the other interface via the alternative driver provided for RS485 or RS232.

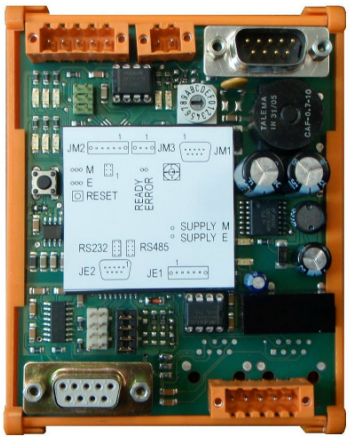
3.6.3 RS485 communication

Communication takes place via an RS485 driver module. The microcontroller takes over direct communication with the RS485 bus and filters the messages for the VDR module. The two status LEDs on the module indicate the status of the RS485 interface:

Green LED: Module status scanned by master.

Red LED: Communication problem or timeout.

3.7 NLS 3000 MBM01-E MODBUS module



Width:	85mm	
Height:	108mm	
Depth:	65mm (incl. mounting frame)	
Mounting method:	Top-hat rail DIN EN 50022	
Weight:	0.18kg	
Connection – data and power (JM2/JM3):	5-pole/2-pole Weidmüller	
Connection – data handover via RS232 (JE2):	9-pole Sub-D (female)	
Connection – data handover via RS485 (JE1):	5-pole Weidmüller RM3.5	
Supply:	5VDC (from NLS3000)	
Power consumption:	max. 100mA	

3.7.1 General

The MODBUS module is used to connect the NLS 3000 to a ship automation system via an RS232 or RS485 interface. There is a separate documentation available for the MODBUS module!

3.7.2 Connector

The communication is possible via an RS232/RS485 driver circuitry by changing a "black" (bridge – like jumper block) on the MODBUS module itself.

The module can transmit data either via the RS232 or the RS485 interface.

An RS485 connection also requires a terminating resistor (EOL) which is typically 120 ohms.

3.8 FMS 3000 DT01-E Data module

Width:	54mm	
Height:	60mm	
Depth:	17mm	
Mounting method:	Plug-in	
Weight:	0.05 kg	
Data and power connection:	25-pin Sub-D (male)	
Supply:	5VDC	
Power consumption:	max. 0.15A	
SD-card:	1GB…2GB	Recommended: Transcend “133x” (1GB/2GB)

3.8.1 General

The data module serves for the storage of configuration data and data occurring in the operation of AFMS3000 on an SD memory card. For this purpose, the module contains its own microcontroller, which makes reading and writing of the SD memory card independent of the higher-level system. Integration into the system takes place via a special interface.

3.8.2 Power supply

The module receives its 5V power for supplying the microcontroller via the interface. From this voltage, 3.3V is generated internally for supplying the SD memory card.

3.8.3 Connector

Communication takes place via an RS232 driver circuitry. The data module is also supplied with 5V operating voltage via the connector.

3.8.4 LEDs

Three status LEDs are provided on the back of the module (transparent window):

Green LED: Module OK and access to SD-card file system is possible
Yellow LED: A file is open for reading or writing
Red LED: Read or write operation, fault on steady light indication

3.8.5 SD-memory card slot

A slot is provided at the rear of the module for receiving an SD-memory card. This locks in place after it is pushed into the slot. The memory card can be removed by exerting light pressure on the same. The “LOCK” slide on the SD-card is without function here.

4.0 Operation of the NLS 3000 via display BK08...48-E, conventional

4.1 Switch-on of the NLS 3000 and switch-over the power input

Provided for switching the NLS 3000 on and off are control and indicating elements arranged directly below the ship mimic. Two green LEDs (labelled "MAIN" and "EMGY") indicate via a steady light the presence of the respective power supply. When the NLS is switched on, the LED for the currently used power supply lights up.

Arranged directly on the right next to the "Power" button is a two-colour LED. When this LED lights green, both power supplies are present and the NLS is on. In the event of failure of one of the power supplies, this LED flashes red or shows a steady light.

The NLS is switched on by pressing the "Power" button. The NLS can be switched off by pressing and holding the button for about 3 seconds. When the button is pressed during operation, switching takes place between the main and emergency power supply.

The "SYS" LED lights green to signal that the NLS is operating without fault and lights red on faults.

4.2 Setting the brightness of the LEDs

There are eight brightness levels for the individual LEDs and button backlight. Provided for this purpose is the "Back Light" button. The brightness is increased one level each time this button is pressed. Selection takes place from the highest level to the lowest level. When the button is pressed and held, these levels are selected in a 0.5 second cycle.

4.3 Lamp test

To test the function of the individual LEDs, a lamp test can be performed. The "Test" button is provided for this purpose.

4.4 Acceptance of alarms

For the acceptance of alarms and simultaneously switching off the buzzer, the "Sound Off" button is provided.

4.5 Configurable functions (special function buttons 1-4)

In order to simplify some settings of specific lantern scenarios, 4 special function buttons can be defined via a configuration file (with SD memory card + data module) or these buttons can be matched “by hand” at any time later on, too. Selections can subsequently be made via the 4 buttons labelled in according to their specific functions. For needed text changes (even later on), the small transparent foil can be removed out slightly to the side. A small needle can grab the foil inside a small “pocket”, where the foil can be seen. Use a laser transparent foil, print a new text on it, cut it into the needed shape and replace them 1:1.

The programming (or better “matching”) to one of these 4 possible buttons works as follows:

1) All lanterns, who should act later on to this button, must be switched on!
2) Now the button [SOUND OFF] must be pressed and MUST held down permanently!
3) Now press the button whom should act with this lantern set (button 1/2/3 or 4).
4) From now on this “special function” is matched to this button.

Notice: This “manual programming” is only possible via the display unit ranges BK08-E…BK48-E and this also only from the firmware version 0.2.5 and up. Graphic displays (like the BG01-E) cannot provide this settings. The here used touch display is not multi-touch capable.

4.6 Buttons for lights/lanterns

Each light is assigned to a button in the NLS and can be switched on or off via this button. A two-colour LED is arranged directly on the right next to the button. When the button lights green, the associated light is on and the power is in the given range. The LED flashes red on faults in the light circuit. After acceptance of the fault, the LED shows a steady red light.

For lights using LEDs, the operating time is also monitored. If the maximum permissible operating time is exceeded, a fault is generated.

4.7 Ship mimic

For the main lights, display is provided in the form a ship mimic. When these lights are switched on, the associated LED in the ship mimic also lights up and flashes on faults.

4.8 Buzzer

The buzzer is controlled via a driver transistor and a microcontroller port circuit.
The buzzer is located on the back of the control panel. It is activated pulsed on faults.

5.0 Operation of the NLS 3000 via display BG-01E, graphic

5.1 Switch-on of the NLS 3000 and switch-over the power input

Provided for switching the NLS 3000 on and off are control and indicating elements arranged on the bottom left of the screen. Two green LEDs (labelled "MAIN" and "EMGY") indicate via a steady light the presence of the respective power supply. When the NLS 3000 is switched on, the LED for the currently used power supply lights up.

Arranged directly next to the "Power" button is a two-colour LED. When this LED lights green, both power supplies are present and the NLS is on. In the event of failure of one of the power supplies, this LED flashes red or shows a steady light.

The NLS 3000 is switched on by pressing the "Power" button. The NLS 3000 can be switched off by pressing and holding the button for around 3 seconds. When the button is pressed during operation, switching takes place between the main and emergency power supply.

The "SYS" LED lights green to show, that the NLS 3000 is operating without faults - and lights red only on faults.

5.2 Backlight brightness setting

The display backlight has ten brightness settings. Provided for this purpose is the "Back Light" button. The brightness is increased one level each time this button is pressed. Selection takes place from the highest level to the lowest level. It is also possible to invert the display by pressing the "Invert Display" button.

5.3 Acceptance of alarms

For the acceptance of alarms and simultaneously switching off the buzzer, the [SOUND OFF] button is provided. This is only displayed when the buzzer is active.

5.4 Configurable functions

In order to simplify the setting of specific light scenarios, these buttons can be defined via configuration file (SD-memory card + data module DT01-E). Selection can subsequently be made via the buttons labelled according to their specific functions.

5.5 Buttons for lights/lanterns

Each light is assigned to a button in the NLS 300 and can be switched on or off via this button. A two-colour LED is arranged directly on the right next to the button. When the button lights green, the associated light is on and the power is in the given range. The LED flashes red on faults in the light circuit. After acceptance of the fault, the LED shows a steady red light.

For lights using LEDs, the operating time is also monitored. If the maximum permissible operating time is exceeded, a fault is generated.

5.6 Ship mimic

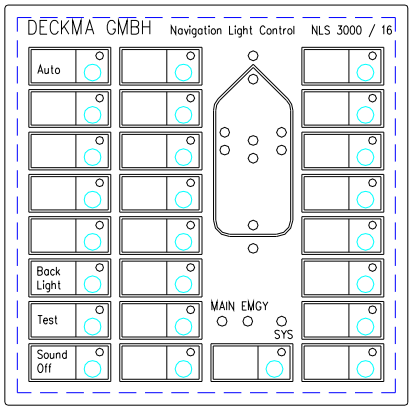
For the main lights, display is provided in the form a ship mimic. When these lights are switched on, the associated LED in the ship mimic also lights up and flashes on faults.

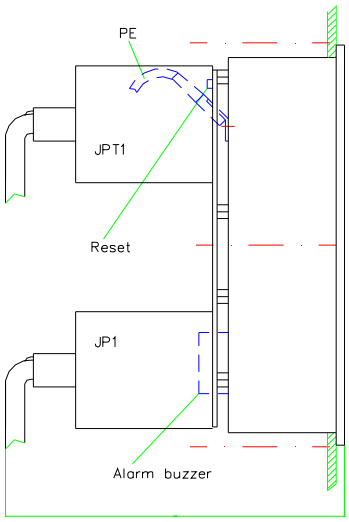
5.7 Buzzer

The buzzer is controlled via a driver transistor and a microcontroller port circuit.
The buzzer is located on the back of the control panel. It is activated pulsed on faults.

6.0 Mechanical specifications

6.1 Dimension of the control panel BK08...48-E, conventional

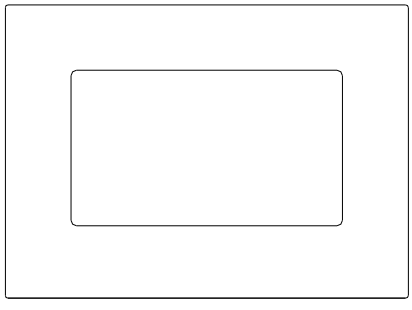


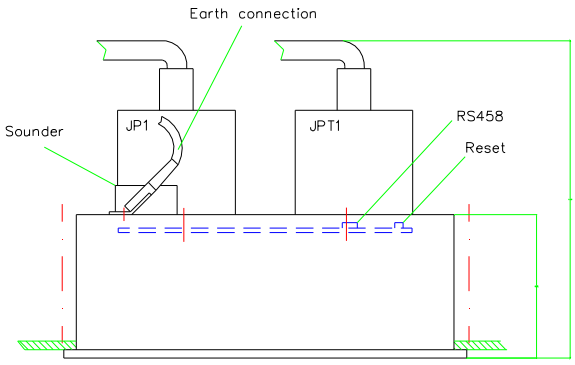


	Front plate	Housing	Panel cut out
NLS 3000 / 8	144x111,5	135x102,5	138x105,5
NLS 3000 / 16	144x144	135x135	138x138
NLS 3000 / 24	144x176,5	135x167,5	138x170,5
NLS 3000 / 32	144x209	135x200	138x203
NLS 3000 / 40	144x241,5	135x232,5	138x235,5
NLS 3000 / 48	144x274	135x265	138x268

All measurements are in mm

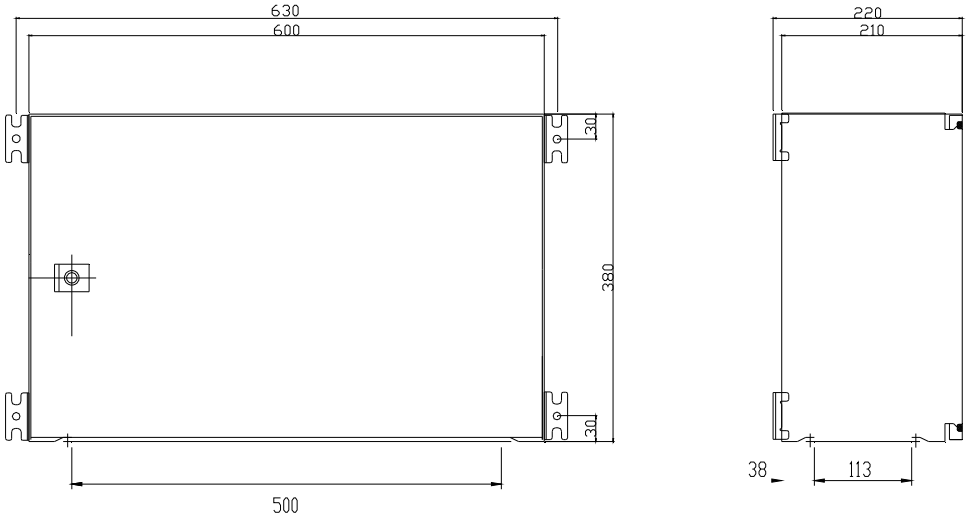
6.2 Dimensions of the control panel BG01-E, graphic



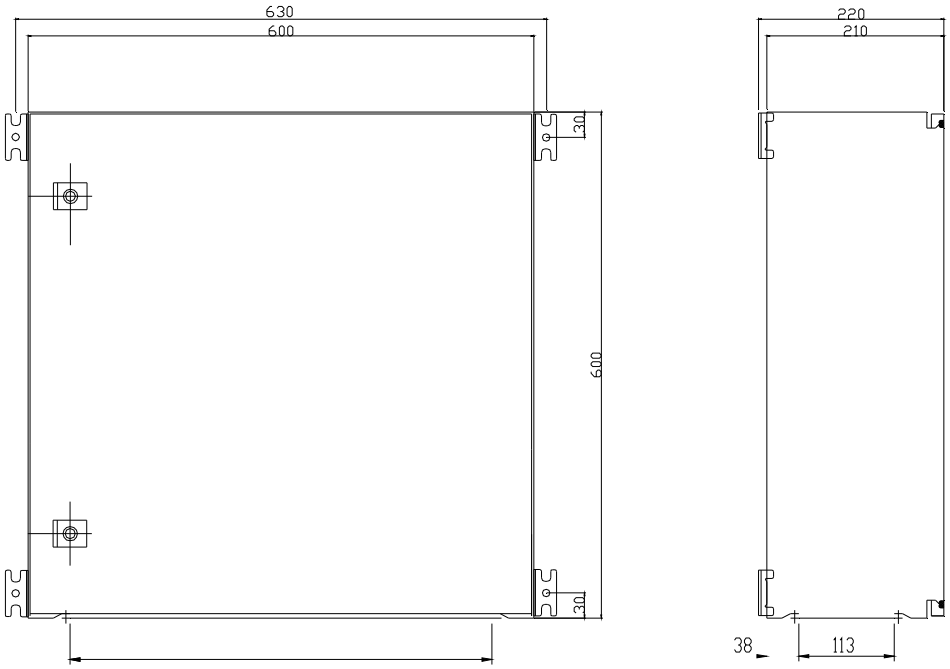


	Front plate	Housing	Panel cut out
dimensions in mm	144 x 105,5	135 x 96,5	138 x 99,5

6.3 Dimensions control cabinet (as example, for up to 16 lantern circuits)



6.4 Dimensions control cabinet (as example, for up to 48 lantern circuits)



7.0 Installation instructions

7.1 Cable requirements

The following cables are recommended for a safe and reliable operation for the complete system:

Main and emergency power supply:	unshielded cable, min.	3x1.5mm ²
Lights/lantern outputs:	unshielded cable, min.	3x1.5mm ²
Output contacts:	unshielded cable, min.	2x0.75mm ²
Control inputs:	shielded cable, min.	2x0.75mm ²
VDR output:	shielded twisted-pair cable	2x2x0.75mm ²
Control panel:	shielded twisted-pair cable	2x2x0.75mm ²
Approved, maximum cable length:	500m*	

*Depends on the line load and the cable core diameter (egg. voltage drop).