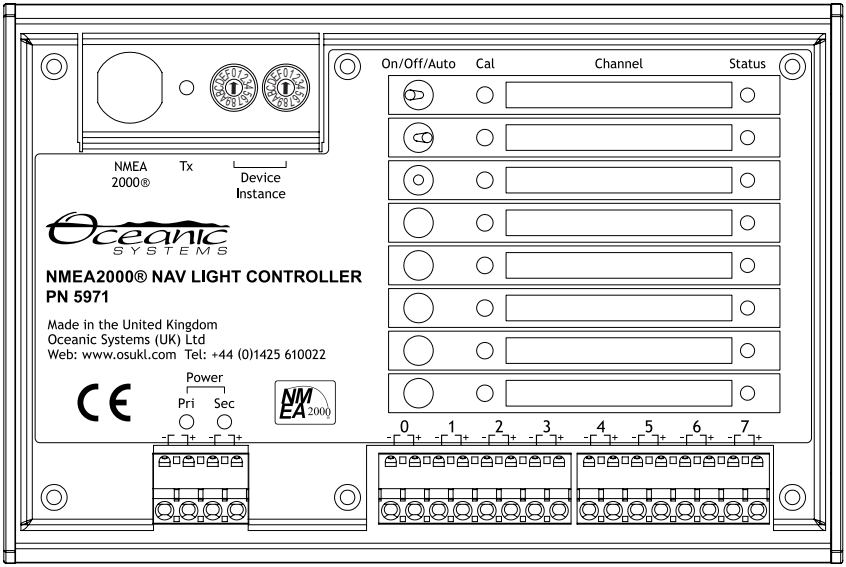
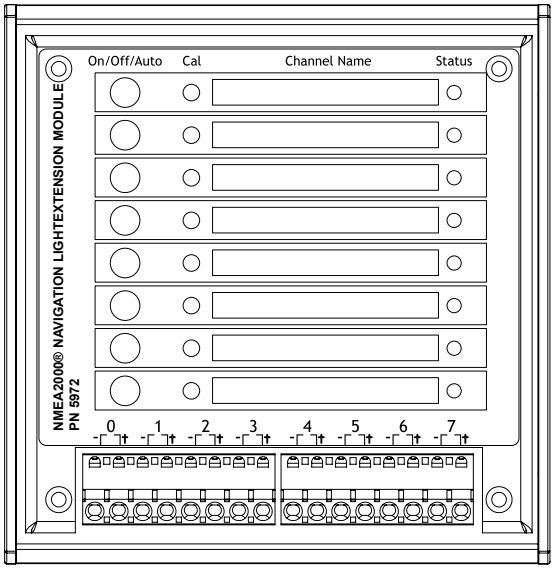
NMEA2000® NAVIGATION LIGHT CONTROLLER
Part Numbers: 5971
NAV LIGHT CONTROLLER EXPANSION UNIT
Part Numbers: 5972

Installation and Operation Manual

5971



5972



Document revision 1

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1 INTRODUCTION

The Oceanic Systems NMEA2000® Navigation Light Controller Part No. 5971 and Nav Light Controller Expansion Units Part No. 5972 are designed to control up to 24 Navigation Light LED Channels on a NMEA2000® network.

The 5971 is powered from the NMEA2000® network and has a primary and a secondary 12 or 24 Volt DC power connection for the navigation LEDS. If the primary power source fails the unit automatically connects the secondary power source and sends a warning message over the network.

The 5971 is DIN rail mounted in a protected location and controls 8 Navigation LED channels. The addition of one or two 5972 Expansion Units increase the controlled channels to 16 or 24 units. Each channel is rated to 750mA with a total system load of 2.5 Amps with all channels connected.

It is very important that it is installed and set up correctly according to this manual. Please read and follow the installation and setup instructions carefully to achieve the best results.

1.1 PRODUCT FEATURES

- 5971 Navigation Light Controller has 8 LED Navigation LED controlled channels
- Each 5972 Expansion Unit adds a further 8 channels, max two Expansion units
- Each channel has a manual isolate/override switch to allow control if the system fails
- Each channel has a green/red status LED
- 5971 has rotary Device Instance setting switches for fast installation
- Units are standard DIN rail mounting and side connect on the same rail
- Each channel has a write on area to identify the channel connection
- Unit tracks LED power on hours and warns if they exceed recommendations
- Unit tracks current draw for each channel and warns of LED unit failure or wiring damage
- Unit has standard NMEA2000® micro c interface plug and heartbeat blue LED

2 INSTALLATION

2.1 UNPACKING THE BOX

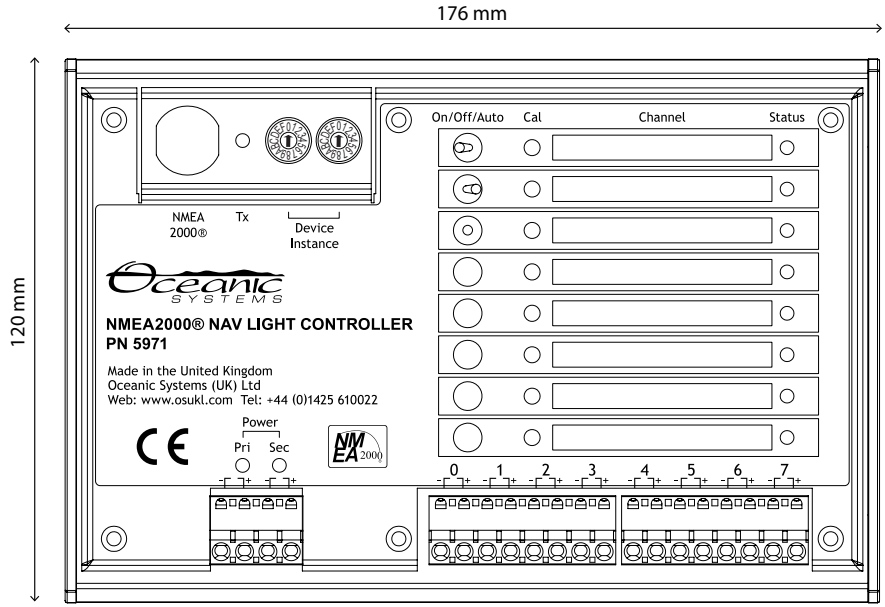
You will find the following items in the 5971 shipping box:
1 x 5971 NMEA2000® Navigation Light Controller
1 x 5971/5972 Installation and Operation Manual (This document)

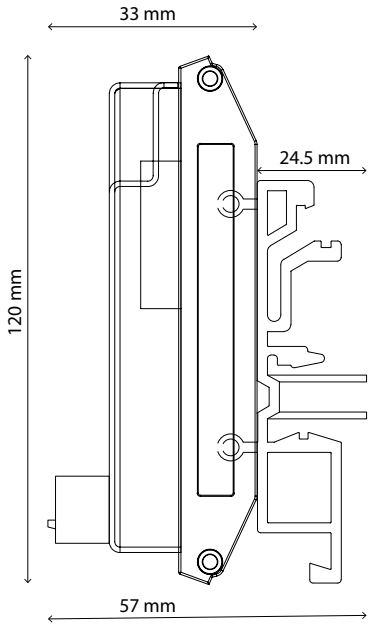
You will find the following items in the 5972 shipping box:
1 x 5972 Nav Light Expansion Unit
1 x 5971/5972 Installation and Operation Manual (This document)

2.2 MOUNTING THE UNIT

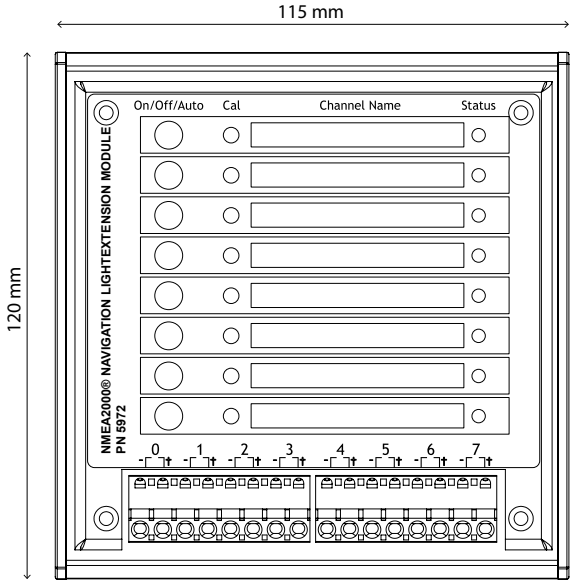
This unit is designed to be DIN rail mounted in a protected environment. The unit dimensions are shown in the following diagram. Note that this unit can be expanded to either 16 or 24 channels by mounting one or two 5972 Expansion Units plugged into the right hand side of this unit.

Dimension diagram of 5971





Dimension diagram of 5972



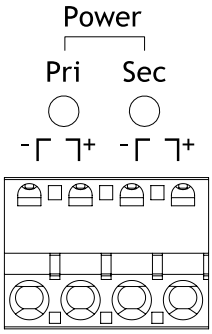
2.3 CONNECTING THE NMEA2000® CABLE

The unit is connected to the NMEA2000® network by the 5 way micro C socket on the front. Carefully attach the network drop cable to this plug and hand tighten until it is fully seated. Take care to match the orientation of the pip inside the socket to the recess inside the drop cable plug. The other end of the drop cable should be connected to a Tee connector on the NMEA2000® network backbone cable.

2.4 CONNECTING THE LED POWER INPUT CABLES TO THE UNIT

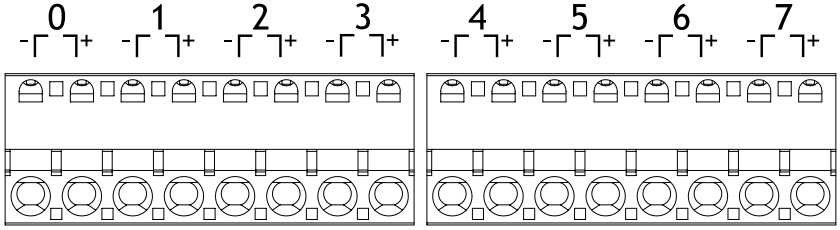
The unit has both a primary navigation lamp power connection and a secondary power connection with automatic fall back if the primary power fails. Each power source has a local green LED indicating power good from that source. The Controller will power the LED Navigation lights from either a 12 or a 24 Volt power source. The terminal block on the lower left hand front panel allows for the two separate connections. Please note that each input is galvanically isolated from the other for safety. The Cage Clamp style terminal blocks can accommodate wire diameters from x to y.

Each channel of the unit can power up to 750mA with a total over any unit of 2.5 Amps so it is important to size the wires and their protective fuses to be able to handle a maximum of 2.5 Amps.



2.5 CONNECTING THE LED NAVIGATION LAMPS TO THE UNIT

The 5971 and each 5972 if fitted each have 8 LED light control channels for connecting the navigation lights to the unit. These connections are arranged along the lower front edge of each unit with both the positive and negative connections arranged sequentially as shown.



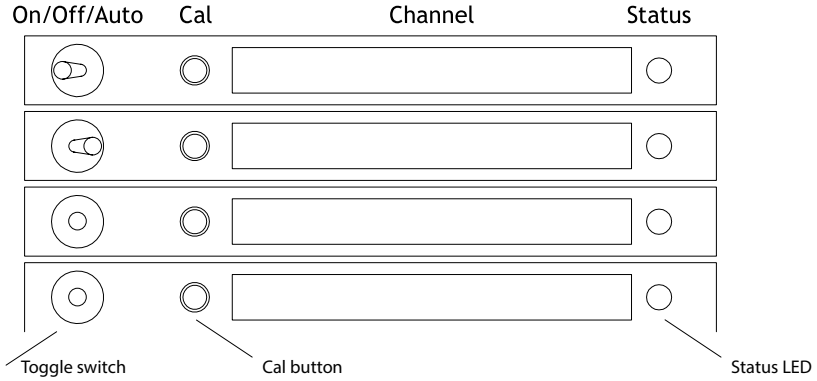
Note that LED connections are polarity sensitive and must be correctly wired to work. Each connection can supply 750mA with a maximum total current from each unit of 2.5 Amps.

After connecting the LEDs the unit should be calibrated for each channel which allows the unit to learn the current draw of each channel and warn if the LED has a partial failure or the connection is broken or corroded. See the next section for calibration procedure.

The units also track the total power on hours for each LED circuit and warns if they are exceeded so the LED lamp may be renewed.

2.6 PANEL CONTROLS AND INDICATORS

Each unit controls eight channels and has the following controls and indicators:



The override switch allows full manual control of each Navigation LED channel with a toggle switch that can either Turn OFF the channel, override the channel ON or AUTO to allow the channel to be system controlled. This ensures that the navigation lights are always controllable even if the system logic fails.

The Calibration button has two functions: If pressed for a short time it will recalibrate the channel by measuring the standard usage current and recording it to identify if the navigation lamp has partial LED failures or the connection goes high resistance or goes open circuit. Details of this function are detailed in a later section.

The second function is activated if the button is held down for 8 seconds or more when the navigation light power on hours will be zeroed when a new navigation light is installed. Details of this function are described below.

Each channel has a “write on area” for the installed to write the navigation lamp identity with a suitable marker for future reference.

Each channel also has an channel status indicator LED that shows the following characteristics:

LED Characteristics	Meaning
No LED illuminated	Channel switched OFF
Green LED Flashing	Channel switched ON but NOT calibrated
Solid Green LED	Channel calibrated and switched ON
Red LED flashing	Channel switched ON but over hours
Solid Red LED	Channel LED current < 85% of calibration value failure

2.7 CALIBRATION

Each channel of the 5971 and 5972 can be calibrated to measure the resistance of the connecting wires and current consumption of the LED navigation lamp. Then as the channel is turned on it will automatically measure the current being drawn and warn if the lamp has any failed internal LEDs or the connecting cable is starting to corrode and become a higher resistance or is broken.

The calibration is a fully automatic action that can be done at any time. To calibrate the channel, ensure that the electrical connection is secure, and the LED navigation lamp is fully functional. Then press the calibration button for that channel momentarily. The unit will turn on the LED, let it stabilise, measure and record the current draw.

Thereafter the unit will check that the current draw is at least 85% of the calibration current when the LED is on or will indicate a fault by lighting the red Channel LED and indicating the fault in the PGN messages back from the unit.

When the fault has been rectified then the user can re-calibrate the channel by repeating the above procedure.

2.8 LED POWER ON HOURS

Each channel of the 5971 and the 5972 keeps a track of the LED power on hours which is stored in non-volatile memory. When any channel exceeds 50,000 hours then the channel will remain fully functional but the channel indicator LED will flash red.

When the LED navigation lamp has been replaced hold the channel calibration button down for more than 8 seconds to reset the power on hours back to zero for the new lamp.

2.9 MAINTENANCE

- Clean the unit with a soft cloth. Do not use chemical cleaners.
- Ensure that the unit is mounted securely on the DIN rail
- Ensure any Expansion Units are securely plugged into the Controller/other expansion unit
- Check the security of the NMEA2000® network cable, tighten if necessary.
- Check the security of the power and LED cables connected to the terminal blocks, reseating them if necessary.

3 OPERATION

Ensure that the NMEA2000® network cable is securely attached and that the Device Instance rotary switches have been set to a valid and unique Device Instance on the network. The switches are marked with a Hexadecimal notation, so each switch has 16 possible positions. The combination of the two switches can be set from “00” being Device Instance 0 through to “FC” being the equivalent of decimal 252 being the highest valid Device Instance address.

Attach 12 or 24 Volt LED Navigation Light power feeds to the Primary and Secondary power connection block taking care to get the polarity correct. A local green LED will light for each power feed that is connected.

Connect the LED navigation lights to the terminal blocks taking care to get the polarity correct. Each output circuit has a 750mA resettable fuse included for protection.

The unit is controlled by issuing PGN 127502 Switch Bank Control messages with the first byte of the message matching the Device Instance value. Switch 1 control field controls channel 0 on the Controller through to Switch 8 control field controlling channel 7 on the controller. Switch 9 through Switch 16 control field operate the next eight channels on an Expansion unit and Switch 17 through 24 operate the next eight channels on the second expansion unit. Switch 25 through 28 control fields do not operate and channel switches.

The unit will transmit PGN 127501 Binary Status Report PGN every 2.5 seconds to advise navigation LED status including any error conditions. This Binary Status Report PGN first byte will contain the Device Instance as set on the rotary switches followed by the status of each navigation light channel shown as pairs of bits in subsequent bytes with values as follows:

Dibit Value	**Meaning**
00	Channel set OFF
01	Channel set ON
10	Channel Error (See LED status lamp on Controller)
11	Channel Error (See LED status lamp on Controller)

The unit will also transmit a proprietary PGN 131009 upon receipt of an ISO Command PGN 60928 or a Complex Command PGN 126208 requesting PGN131009. This PGN contains detailed status information, current calibration values and LED total power on hours for each channel.

PGN131009 Contains the following data structure:

Byte 6 = Channel 0 Status
Byte 7 and 8 = Channel 0 LSB and MSB LED Power On Hours
Byte 9 and 10 = Channel 0 LSB and MSB Channel milliwatts
Byte 11 and 12 = Channel 0 LSB and MSB Calibration milliwatts
These are repeated for channels 1 to 23.

Status byte Bit 0 = LED on, Bit 1 = fault, Bit 5 = calibrated, Bit 6 = watts <85% or >115% of calibration and Bit 7 = LED Hours over 50,000

4 TECHNICAL SPECIFICATION

Design Standards

Parameter	Comment
NMEA2000®	Certified
Maritime Nav and RadioComm Equipment	Designed to IEC61162-3
Maritime Nav and RadioComm Equipment	Designed to IEC60945
CE and FCC	Electromagnetic Compatibility
Class Approval	Designed to DNV Navigation Light Controller

NMEA2000® Parameter Group Numbers (Pgns)

Description	PGN #	PGN Name	Default rate
Control PGN	127502	Switch Bank Control	N/A
Periodic data PGNs	126993	Heartbeat	60 secs
	127501	Binary Status	2.5 secs
Response to requested PGNs	131009	Channel Status (proprietary)	N/A
	126464	PGN List (Transmit and Receive)	N/A
	126996	Product Information	N/A
	126998	Configuration Information	N/A
Protocol PGNs	059392	ISO Acknowledge	N/A
	059904	ISO Request	N/A
	060928	ISO Address Claim	N/A
	065240	ISO Address Command	N/A
	126208	Complex Command	N/A

Electrical

Parameter	Value	Comment
Network Voltage	9 – 32 Volts	DC Voltage
Network Power Consumption	350 mA	Maximum Network Power
Load Equivalency Number	7.5	1 LEN = 50mA
Reverse battery Protection	Yes	Indefinitely
Load Dump Protection	Yes	Energy rated per SAE J1113
LED Lamp Voltage Switch	12 or 24 Volt	9 – 32 Volts
Max LED Channel Current	750mA	Resettable Fuse
Max Total LED Current	2.5 Amps	Over 8 Channels

Mechanical

Parameter	Value	Comment
5971 Weight	395g	DIN Rail Mount
5971 Size	177mm x 118mm	
5972 Weight	TBA	DIN Rail Mount
5972 Size	115mm x 118mm	

Environmental

Parameter	Value
IEC 60945 Classification	Protected
Degree of Protection	IP40
Operating Temperature	-25°C to 55°C
Storage Temperature	-40°C to 70°C
Relative Humidity	93% RH @40°C per IEC60945-8.2
Vibration	2-13.2Hz @ 1mm, 13.2-100Hz @ 7m/s² per IEC60945-8.10
Solar Radiation	Ultraviolet B, A, Visible, and Infrared per IEC60945-8.12
Electromagnetic Emission	Conducted and Radiated Emission per IEC60945-9
Electromagnetic Immunity	Conducted, Radiated, Supply, and ESD per IEC60945-10
Safety	Dangerous voltage, Electromagnetic RF per IEC60945-12

5 WARRANTY

Oceanic Systems warrants this product to be free from defects in materials and workmanship for one year from the date of original purchase. If within the applicable period any such products shall be proved to Oceanic Systems satisfaction to fail to meet the above-limited warranty, such products shall be repaired or replaced at Oceanic Systems option. Purchaser's exclusive remedy and Oceanic Systems sole obligation hereunder, provided product is returned pursuant to the return requirements below, shall be limited to the repair or replacement, at Oceanic Systems option, of any product not meeting the above limited warranty and which is returned to Oceanic Systems; or if Oceanic Systems is unable to deliver a replacement that is free from defects in materials or workmanship, Purchaser's payment for such product will be refunded. Oceanic Systems assumes no liability whatsoever for expenses of removing any defective product or part, or for installing the repaired product or part or a replacement therefore or for any loss or damage to equipment in connection with which Oceanic Systems products or parts shall be used. The foregoing warranties shall not apply with respect to products subjected to negligence, misuse, misapplication, accident, damage by circumstances beyond Oceanic Systems control, to improper installation, operation, maintenance, or storage, or to other than normal use or service.

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WARRANTY RETURN PROCEDURE

To apply for warranty claims, contact Oceanic Systems or one of its dealers to describe the problem and determine the appropriate course of action. If a return is necessary, place the product in its original packaging together with proof of purchase and send to an Authorized Oceanic Systems Service Location. You are responsible for all shipping and insurance charges. Oceanic Systems will return the replaced or repaired product with all shipping and handling prepaid except for requests requiring expedited shipping (i.e. overnight shipments). Failure to follow this warranty return procedure could result in the product's warranty becoming null and void.

Oceanic Systems reserves the right to modify or replace, at its sole discretion, without prior notification, the warranty listed above.

6 TECHNICAL SUPPORT

If you require technical support for any Oceanic Systems products you can reach us using any of the following:-

tel: +44 (0)1634 290772

email: sales@energy-solutions.co.uk

web: osukl.com or energy-solutions.co.uk

osukl.com

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