Diver Signalling System-II

Nöjdhs

Diver Signalling System-II

The Diver Signalling System (DSS-II) provides a simple and robust way of communication between the personel inside the submarine and the divers in the water.

General description

The DSS-II consists of up to four Diver Panels (DP) for outboard placement and one Main Unit (MU) for inboard placement.

All five units have four pushbuttons and four indicator lights marked 1, 2, 3 and 4. To create a message, any combination of the four indicator lights can be lit by pressing the respective pushbuttons. The same indicator lights are then lit on all five panels. If a pushbutton is pressed and held longer than three seconds, all indicator lights are turned off, and after that a new message can be created. The indicator lights can also be turned off by a separate pushbutton on the MU.

The DSS-II can work with one up to four DPs connected to the MU. Connection is done by means of plugs. If any of the DPs is not connected it must be substituted with a blind plug to prevent seawater penetrating the connector.

Except for the above mentioned four indicator lights and four pushbuttons, the MU and each DP are fitted with an indicator light for power indication and a pushbutton for lamp test.

The MU has also got a power switch, power indications for each DP, a pushbutton for reset of the indicator lights and an instrument for earth fault monitoring with a selector switch.

Main Unit (MU)

Diver panel (DP)

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Diver panel

The Diver Panel have an indicator light for power, a pushbutton for lamp test, four pushbuttons and four indicator lights marked 1,2,3 and 4.

Its outer shell is made of an of rigid plastic with an inner shell of aluminium. The cavities for push-buttons and indicator lights have been machined out. After mounting all components, the whole unit is filled with resin to become a massive pressure resistant unit. A back plate, made in the same way as the shell with outer plastic and inner aluminium, is used to guide the movement of the pushbuttons. The back plate has no sealing function, the water and pressure resistance are obtained by all compo-nents being moulded in resin. The Diver Panel are made with a minimum of electronic components.

The pushbuttons can resist very high ambient pressure without being affected or moved. Still, they only require a low force to be pressed manu-ally, independent of the ambient pressure. This has been solved by using a pressure balanced design. A metal button without any electrical function is mounted in the panel. The button can be pressed into the panel, and the pressure for pressing it is independent of the water pressure as the button is surrounded by water. The pushbutton itself consists of a circular plate with a metal pin in the centre and a spring. The button as well as the spring is made of stainless steel. The position of the plate is then indicated by means of an inductive sensor being inside the plastic/aluminium structure.

The indicator lights are made of transparent plastic with a black coating in which the digit is engraved. The digit is engraved with a conical shape and is illuminated from the side with LEDs, so that the light is reflected out of the engraved symbol. The digit will consequently be lit with red light on a black background. The LEDs are mounted on a PCB which is mounted directly in contact with the plastic, and the LEDs are recessed into the plastic so that the optimum quantity of light will hit the digit. The design has been made to be very pressure resistant.

Technical Data Diver Panel

Dim (HxWxD)	300x190x40mm
Weight	4,1kg
Shock resistance	Half Sine Shock Pulse 160g, 2ms
Pressure tested	70bar
Degree of protection	IP68
Voltage	20-28V DC
Current	< 0,8A
Cable length	0,6m
EMC	Corresponding to MIL-STD-461

Main unit

The Main Unit have a power switch, a power indicator light, four Diver Panel-power indicator lights, a pushbutton for reset of the indicator lights, a pushbutton for lamp test, a built-in buzzer, a “buzzer off” indicator light, four pushbuttons and four indicator lights marked 1, 2, 3 and 4. It is also equipped with an instrument for earth fault measurement and a switch for selecting the pole to measure.

The Main Unit ‘s layout partly resembles the Diver Panel‘s with the power indicator light, “lamp test” pushbutton, the four pushbuttons and four indicator lights marked 1, 2, 3 and 4.

The Main Unit is an aluminium box that has been machined to fit the pushbuttons, indicator lights, switches and instrument.

The Main Unit is powered with 24V DC from the ship mains while the Diver Panels are powered by the Main Unit. The power to the Diver Panels are separately fused and the statuses are indicated on the front.

To prevent a possible earth fault in one of the outboard plugs for the Diver Panels to affect the submarine 24V mains, the Main Unit includes a DC/DC-converter with galvanic isolation. An earth fault measurement facility for checking the isolation in the Diver Panels and the plugs is included in the Main Unit. By means of the selector switch on the panel, the plus- or minus-pole is connected to earth via a large resistor. If the selector switch is put in the “+” position, the minus pole is connected to earth via the resistor and the instrument. This means that if there is an earth fault in the plus pole, a small current will flow from the plus pole via the earth fault, the large resistor and the instrument to the minus pole. Consequently, the instrument will measure the leakage current, and the scale is made to show the isolation in kΩ.

The turn on/off functionality for the indicator lights 1 to 4 is controlled by a PCB inside the Main Unit. Pressing a button will light up the corresponding indicator light on all panels. Continuously pressing a pushbutton for more than 3 seconds will turn off all indicator lights. When an indicator light is turned on by one of the Diver Panels, a sound from the buzzer is activated. The buzzer is silenced by pushing the reset button.

Technical Data Main Unit

Dim (HxWxD)	388x160x115mm
Weight	4,6kg
Shock resistance	Half Sine Shock Pulse 15g, 20ms
Degree of protection	IP44
Power supply	20-28V DC
EMC	Corresponding to MIL-STD-461
Power consumption *(with all indicator lights lit on 4 Diver Panels)	30W*

About us

Nöjdhs Elektronik AB and Nojdhs Underwater Technology PTE LTD belongs to the group TN Development AB. Included in the group TN Development AB is also Milab Microphones AB.

Nöjdhs Elektronik AB was founded in 1985 by Thomas Nöjdh, who has a background in the Swedish Navy and in Kockums AB´s submarine electrical design department. Nöjdhs Elektronik AB were one of the first companies in Sweden to use a PC-controlled milling machine for fast production of prototype PCBs.

The company has grown steadily, from 6 employees in 1990 to today's 35 employees divided on two locations, Singapore and Sweden.

Our customers are found mainly in the defence and in the industry. Defence related assignments, particularly in the underwater sector have helped us establish a special competence within this area. Defence projects have also set the standard for the quality and reliability of our products.

We provide customer specific designed solutions and production of electrical and electronic systems. We are specialised in rugged design for use in submarines, naval ships or other demanding environmental circumstances.

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2025-06-19