

COMPLETE BRIDGEWATCH ALARM SYSTEM VESSELGARD

General Description

The COMAS BRIDGE WATCH ALARM is built in conformance with “RESOLUTION MSC.128(75) (adopted on 20 May 2002), PERFORMANCE STANDARDS FOR A BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM (BNWAS)”.

Its function is exactly as described in the standard, with a very significant addition: According to the above IMO regulation, every item of the system tamperproof. For this reason, the Bridge Navigation Watch Alarm systems (BNWAS) MUST NOT BE INSTALLED BY CREW. Exceptions can be made ONLY for systems that are built with a specific way, approved by class, so that during installation, no system items are opened, and no cable connections are being made.

Our system (VESSELGARD) is available in two different types, A and B.

TYPE “A” CAN BE INSTALLED BY THE VESSELS CREW.

TYPE “B” IS A NORMAL SYSTEM AND MUST BE INSTALLED ONLY BY TECHNICIAN.

a. TYPE A SYSTEM INSTALLATION

The type A BNWAS system is designed, and approved by Class, in such a way (as described in our system’s Type Approval documentation), so that the vessel’s crew will be able to install it.

The items composing our Type A system are equipped with a 1m length pre-mounted cable, in order to make the system installation and connection easier (extending the cable length), so that installation can be completed by crew or any electrician, without opening the device. The system installation is very simple, and the process is described in detail using analytical drawings inside the manual, which is included in the system package.

All system devices are protected so that they cannot be damaged due to false connection.

b. TYPE A SYSTEM MAINTENANCE.

In case of any malfunction no specialist attendance required.

Our system is maintenance free, and is covered by a 3 year warranty.

Both types, A and B, are maintenance free. Any damage is repaired by replacing the defective item. Replacing procedure of any of the system items is very simple, and can be performed by crew.

This procedure is approved by the class, and is mentioned and included in the system's type approval.

In accordance with the standard, the basic functionality of the system is as described below:

The purpose of a bridge navigational watch alarm system (BNWAS) is to monitor bridge activity and detect operator disability which could lead to marine accidents. The system monitors the awareness of the Officer of the Watch (OOW) and automatically alerts the Master or another qualified OOW if for any reason the OOW becomes incapable of performing the OOW's duties. This purpose is achieved by a series of indications and alarms to alert first the OOW and, if he is not responding, then to alert the Master or another qualified OOW. Additionally, the BNWAS may provide the OOW with a means of calling for immediate assistance if required. The BNWAS should be operational whenever the ship's heading or track control system is engaged, unless inhibited by the Master.

The BNWAS incorporates the following operational modes:

- Automatic (Automatically brought into operation whenever the ship's heading or track control system is activated and inhibited when this system is not activated)
- Manual ON (In operation constantly)
- Manual OFF (Does not operate under any circumstances)

Additionally, we provide a "Port watch alarm" function, helpful when the vessel is in harbor.

The operational sequence of indications and alarms is as following:

- Once operational, the alarm system remains dormant for a period of between 3 and 12 min (Td). This time is easily set by the authorized personnel, for example the ship's master.
- At the end of this dormant period, the alarm system initiates a visual indication on the bridge, on the main unit and on as many auxiliary points as requested.
- If not reset, the BNWAS additionally sounds a first stage audible alarm on the bridge 15 s after the visual indication is initiated.
- If not reset, the BNWAS additionally sounds a second stage remote audible alarm in the back-up officer's and/or Master's location 15 s after the first stage audible alarm is initiated.
- If not reset, the BNWAS additionally sounds a third stage remote audible alarm at the locations of further crew members capable of taking corrective actions 90 s after the second stage remote audible alarm is initiated.

Multiply alarms units for each stage are possible.

The Reset function is initiated by suitable buttons on the bridge and by motion detectors. The Reset boxes include an auxiliary visual alarm indication. This way crew members on duty can easily identify the condition and press the reset.

The motion detectors relieve a busy Officer of the Watch of the need to press the reset function. Its activity in the bridge is automatically detected and causes a reset.

A continuous activation of any reset device does not prolong the dormant period or causes a suppression of the sequence of indications and alarms. This way a failure, for example a shorted or cut cable, does not stop the function of the system.

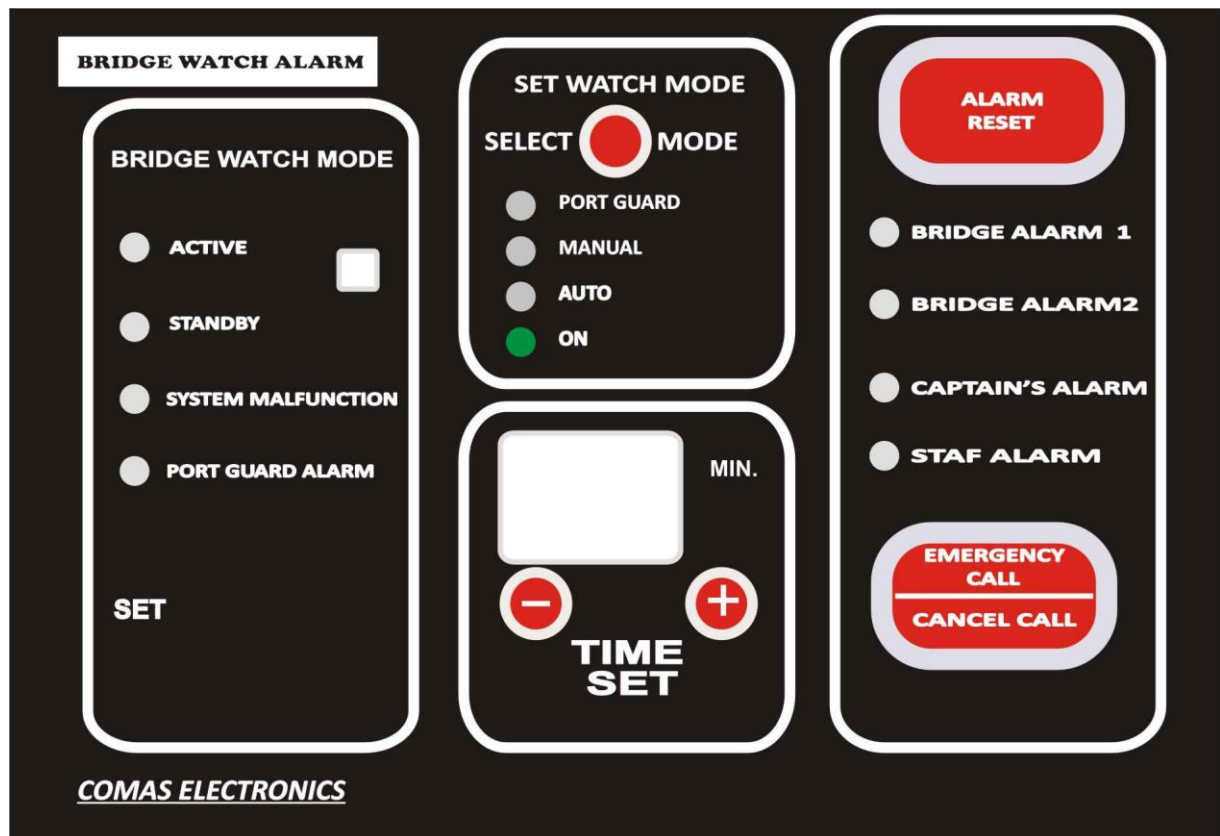
The power supply is from 100-230 Vac or from 18-36 Vdc . There is provision for a back-up battery.

Description of the Parts of the system

The system comprises of many function blocks: Main Unit, Reset Boxes, Alarm boxes and Port Watch Key Box.

A connection box makes the connections between the function blocks very easy.

Main Unit



The front of the main unit has four functional parts:

Left: Current State

- Active: the system is active. Internal timer counts the time to next alarm
- Standby: the system will activate as soon as the right conditions are met
- System Malfunction: an internal problem is detected
- Port Guard Alarm: auxiliary alarm, used when the bridge is not occupied

Middle, up: Function Mode

It shows the set mode

4 function modes:

- Off: The system is deactivated. The display shows OF. All leds, including ON, are not lite.
- On always: the system is continuously On. Leds "manual" and "on" are lite.
- Auto On/Off: the system is activated/deactivated by the external inputs. Leds "auto" and "on" are lite.

- Port Guard: auxiliary alarm function

Middle, down: Time Set

Time for alarm and for port guard. When the system is activated it is a down timer. It counts minutes remaining, except in the last minute, where it counts seconds. When the system is on "SET" mode, this display and the 2 buttons are used to set the activation times.

Right: Alarm State

- Bridge Alarm 1: Visual Alarm
- Bridge Alarm 2: Audible alarm
- Captain's Alarm: second stage
- Staff alarm: third stage

Two buttons are in this section: The "Alarm Reset" clears the alarms and restarts the time. The "Emergency call" activated all alarms, when the OOW needs immediate assistance.

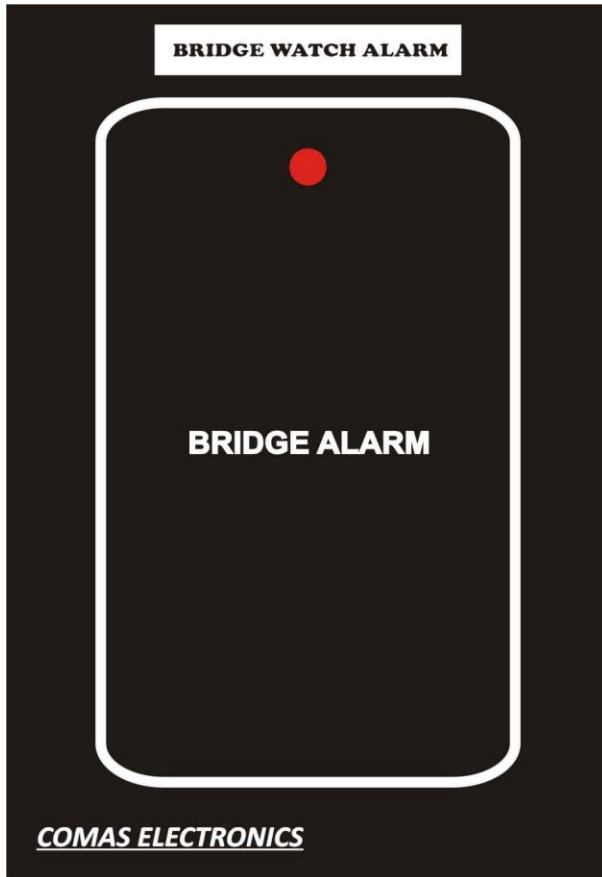
On the left side there is a lock that protects the Set functions. All Settings of parameters are protected

Reset / Visual Alarm

This box contains a reset button and a visual alarm indication. A level 1 audio alarm can be included in the box (Model RB-AR and Model RB-ARA)



Alarm Unit



The Bridge Alarm Unit and the Second and Third level alarms are housed in similar boxes. These Units do not contain a reset button, as all reset functions must be on the bridge, in accordance with the standard

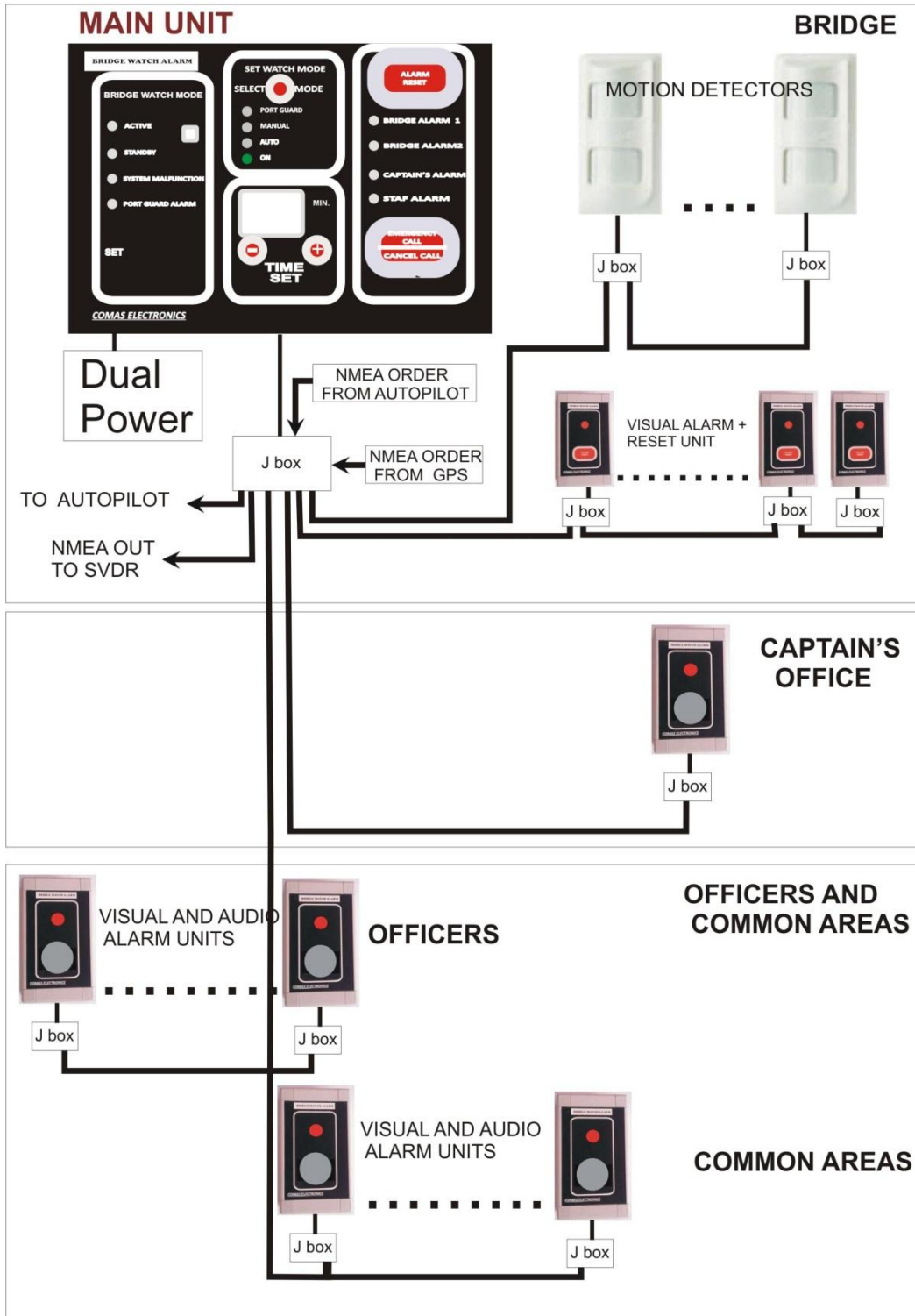


Optional: port alarm

These optional units are used when the ship is in port and are used to check the port guard. A key in the center reset the port guard alarm.

Connections

TYPE "A" SYSTEM



Function

The system has two basic modes: set and run. Set mode is entered by turning the key. If the key is left to the "SET" mode, after a timeout the system enters automatically "RUN" mode

- On SET mode, we can set the function mode (ON, AUTO, OFF, PORT) and the dormant time for BWA and PORT mode.

- On RUN mode, the internal timer count down the predefined time periods.
On normal mode, the system follows the IMO specification.

Port Watch Mode can be used when the vessel is in the port and the bridge is normally not occupied. The system is used to supervise the watch that guards the ship. In Port Watch mode the system is in OFF condition, according to the IMO specs, but it runs an auxiliary timer that sounds a second alarm. This is reset by a key in the special port watch reset boxes. If the guard does not reset the timer, the crew is alerted that the ship is not properly guarded.

Settings

Turning the protective key the system enters set mode.

Setting the Function Mode

The part of the main system to set the Function Mode is Middle, Up part:

The button "SET MODE" advances the mode round on the 4 function modes:

- Off: The system is deactivated. The display shows OF. All leds, including ON, are not lite.
- On always: the system is continuously On. Leds "manual" and "on" are lite.
- Auto On/Off: the system is activated/deactivated by the external inputs. Leds "auto" and "on" are lite.
- Port Guard: auxiliary alarm function

Turning the key to the opposite positions or after the timeout the system enters the set mode

Setting alarm times

The display at the middle lower part shows the set time. On PORT ALARM mode it shows the port alarm timeout, in all other modes the bridge alarm timeout, in minutes. Use the two key under the display to change the time.

NMEA

Output

Additionally, the BNWAS provides an interface according to IEC 61162-1, ALR sentence, with the following message content:

Device Code: Bridge navigational watch alarm system **BN**

Approved sentences: Set alarm state. Local alarm condition and status. This sentence is used to report an alarm condition on a device and its current state of acknowledgement.

The format for the sentence is defined as following:

`$BNALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>`

- hhmmss.ss: Time. This part may be left blank if the BNWAS does not include UTC time information.
- xxx: Designation of source of alarm or source of reset command. The automatic mode is designated as "000".
- A: A = Dormant period exceeded
V = Dormant period not exceeded
- A: A = Alarm acknowledged
V = Alarm unacknowledged
- c -- c: BNWAS mode: c1; c2; c3
c1 = AUT or MAN or OFF
c2 = Dormant period in min, (03 – 12)
c3 = Alarm stage: 1, 2 or 3.

Example

`$BNALR,,000,A,V,C1=AUT;C2=03;C3=1*hh<CR><LF>`

Input

An NMEA input is provided to automatically start the system (mode auto off). If any of the following conditions is detected then the alarm sequence will be initiated.

A. GPS connected.

If the system is in standby mode and a speed above 5 knots from the GPS is detected

B. Autopilot connected

If the system is in standby mode and the Autopilot is energized (Active \$--HTC or HTD message, mode manual or auto)

In case an NMEA output from the autopilot is not available, then a contact from the autopilot can be connected to the "Autopilot active" input port (see connections for the details)

Installation

Basic instructions

A. Trained Technician Installation – tamper proof after installation

All units of the system must be connected with suitable marine grade cables. After all connections are made the boxes must be sealed.

B. Crew Installation – tamper proof as delivered

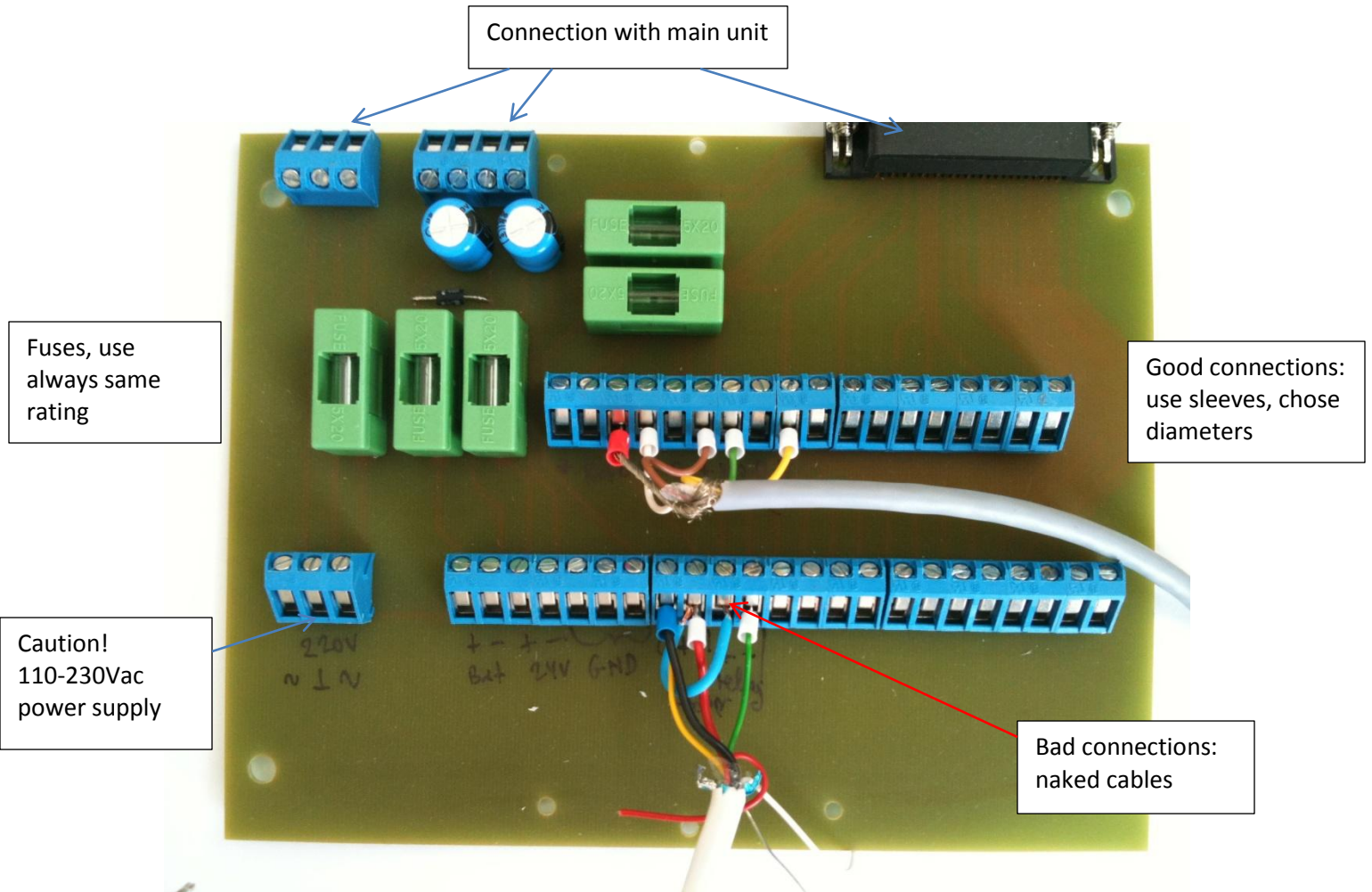
All units of the system are sealed. On every unit a short cable is connected. A connection box is provided to ease the connection of the expansion cable to the system.

Connection board

All connections from the main unit come to the connection board. In the same board there are the fuses, so that they can be changed without opening the main unit.

Use only the recommended cable types, to avoid electrical problems and to keep the system water tight.

Connection Board – shown with some example connections – not relevant components are removed.



Fuses:

Left middle: 110-230Vac, Battery, 24Vdc
 Upper middle: External Devices Supply

Connections (short list):

Upper Row: connection with main unit, allready connected in type B.
 Power supply 110-230Vac: (Neutral, Ground, Phase), Battery (+,-), 24Vdc(+,-)

Second row: connection with external Devices
 Port Reset (+,A,0), Visual Alarm (A,0), External Reset (+,A,0), Audible Alarm (A,0), Second Level Alarm (A,0), Third Level Alarm (A,0), Port Alarm (A,0), Malfunction (A,0)

Third Row: connection with power supply and external Devices
 Power supply 110-230Vac: (Neutral, Ground, Phase), Battery (+,-), 24Vdc(+,-)
 (Ground, Ground, Ground), External Motion Detector (0,+,A,B), External Emergency (A,B), Auto On 1 (A,B), Auto On 2 (A,B), NMEA Out (A,B), NMEA Aux (A,B), NMEA In (A,B)

Upper row: to main unit

Neutral	Ground	Phase
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Bat +	Bat -	24Vdc +	24Vdc -
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Middle Row

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Port Reset			Visual		External Reset			Audible Alarm		Second Level		Third Level		Port Alarm		Malfunction	
+	A	0	A	0	+	A	0	A	0	A	0	A	0	A	0	A	0

Lower row: to vessel (GroupA)

Neutral	Ground	Phase
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Group B

Bat +	Bat -	24Vdc +	24Vdc -	Ground	Ground	Ground
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Lower row, group B

1-7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
power	Motion Detector				Emergency		Auto On		Auto On		NMEA Out		NMEA Aux		NMEA In	
See above	0	+	A	B	A	B	A	B	A	B	A	B	A	B	A	B

Detailed Device Connection

A. Power Supply

Connection Box

Upper row: to main unit

Neutral	Ground	Phase
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Bat +	Bat -	24Vdc +	24Vdc -
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These connections are fixed in model A

Lower row: to vessel (GroupA)

Neutral	Ground	Phase
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Group B

Bat +	Bat -	24Vdc +	24Vdc -	Ground	Ground	Ground
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Connect

B. External Reset Buttons

Middle Row

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			Visual		External Reset			Audible Alarm									
			A	0	+	A	0	A	0								

Model A: With Visual Alarm

4 conductors: Green 4, Black 5, Red 6, White 7

Model B: With Visual and Audible Alarm

5 conductors: Green 4, Black 5, Red 6, White 7, Yellow 9

Connect screen to ground

C. External Alarm Units

Middle Row

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
			Visual					Audible Alarm		Second Level		Third Level		Port Alarm		Malfunction	
			A	0				A	0	A	0	A	0	A	0	A	0

All alarms units have 2 conductor cables. Connect brown to A, white to 0.

Connect screen to ground

D. External Motion Detectors

Lower row, group B

1-7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
power	Motion Detector															
	0	+	A	B												

Black 8, red 9, green 10, yellow 11. Bridge 9-10

C. External Port Reset

Middle Row

1	2	3																	
Port Reset																			
+	A	0																	

Brown 1, Green 2, white 3

NMEA

Lower row, group B

1-7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
power										NMEA Out		NMEA Aux		NMEA In		
											A	B	A	B	A	B

Auto On

Lower row, group B

1-7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
power								Auto On		Auto On							
							A	B	A	B							