X150

BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM (BNWAS)

Installation Manual

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Document Revision	Date	Modification Number (where applicable) Brief Record of Change and Reason for Change
Iss02 Rev00	13.09.17	Original Issue
Iss02 Rev01	14.05.19	Correction of Sounder Switch Settings and Connections
Iss02 Rev02	28.08.20	Correction of X150-D Dimensions and Unit Drawing

NOTE:
All alterations must be verified by re-authorisation and approval of the complete document.

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IMPORTANT WARNINGS

DANGER!
RISK OF ELECTRICAL SHOCK!

Disconnect from the power before removing protective covers.
DO NOT remove the covers while the unit is switched on.
24/12 Volt DC electrical power on external units.

NOTICE

Compass safe distance is 1 metre.

NOTICE

No user serviceable parts inside, servicing only by properly qualified and certified technical staff.

NOTICE

This manual is for informational use only, and may be changed without notice. This manual should not be construed as a commitment of AMI Marine Ltd. Under no circumstances does AMI Marine Ltd assume any responsibility or liability for any errors or inaccuracies that may appear in this document. The equipment should only be used for the purposes intended by the manufacturer; any deviation from this will void the warranty of the product.

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- Foreword

For over 15 years AMI Marine Ltd has enjoyed an enviable reputation for innovative and reliable marine electronics equipment. This dedication to excellence is enhanced by our extensive global network of service agents and dealers.

The BNWAS 150 has been designed and constructed to meet the rigorous demands of the marine environment. However, no equipment can perform its intended function unless installed, operated and maintained correctly. Please carefully read and follow the recommended procedures for installation, operation, and maintenance.

BNWAS 150 is designed for maintenance free operation providing fast, accurate information for the lifetime of the vessel. It is simple to use, straight forward to learn and easy to operate.

Human Machine Interface - The BNWAS 150 unit provides a tamper proof interface for communication with its sensors. The system's parameters and operation can be initialised and controlled via a simple LCD based navigation menu. The menu is key locked and should have access restricted, as directed by the ship's Master.

Various indications are signalled on the display control panel that indicate to the personnel on the bridge the status of the system and any action that may be required.

Alarms– There are 3 stages of alarm that are sequentially activated. Each stage activates alarm sounders in required locations of the vessel to notify off watch personnel that the bridge is no longer manned, and that immediate action is required.

- Introduction to BNWAS

MARITIME NAVIGATION AND
RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS –
BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM (BNWAS)

The International Standard IEC62616-Ed1 specifies the minimum performance requirements, technical characteristics and methods of testing, and required test results, for a bridge navigational watch alarm system (BNWAS) as required by Chapter V of the International Convention for the Safety of Life at Sea (SOLAS), as amended. It takes account of the general requirements given in IMO resolution A.694(17) and is associated with IEC 60945. When a requirement in this International Standard is different from IEC 60945, the requirement in this standard takes precedence.
The standard incorporates the parts of the performance standards included in IMO resolution MSC.128(75).

All text of the standard, whose wording is identical to that of IMO resolution MSC.128(75), is printed in italics, and the resolution and associated performance standard paragraph numbers are indicated in brackets.

(128/A1) *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 is underway at sea (SOLAS V/19.2.2.3).

The IMO Committee approved the draft amendments to the SOLAS Regulation that requires the mandatory carriage of a bridge navigation watch alarm system for the subsequent adoption at the MSC 86. (Amendments to the SOLAS Reg. V/19 - Carriage requirements for a bridge navigational watch alarm system)

Application: The amendments stipulate as follows:
1st July 2011 on or after for all new builds of 150 gt or over - (keel lay base)

Ships constructed prior to 1st July 2011 will have to fit the BNWAS by the 1st survey after:
1st July 2012 for cargo ships of 3000 gt or over and all passenger ships.
1st July 2013 for cargo ships of 500 gt or over but less than 3000 gt.
1st July 2014 for cargo ships of between 150 gt or over but less than 500 gt.
These requirements also apply to ships not engaged on international voyages.

3 Performance requirements

3.1 Functionality

3.1.1 Operational modes

(128/A4.1.1.1) *The BNWAS* shall *incorporate 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)*

NOTE The Automatic mode is not suitable for use on a ship conforming to regulation SOLAS V/19.2.2.3 which requires the BWNAS to be in operation whenever the ship is underway at sea.

3.1.2 Operational sequence of indications and alarms

3.1.2.1 Dormant period

(128/A4.1.2.1) *Once operational, the alarm system* shall *remain dormant for a period of between 3 and 12 min (Td).* See Table 1.

(128/A4.1.2.2) *At the end of this dormant period, the alarm system shall initiate a visual indication on the bridge.*

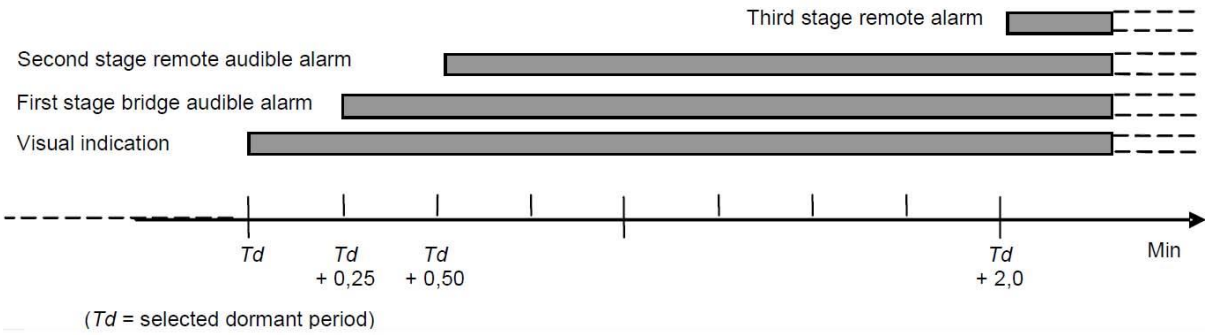

Table 1 – Alarm sequence without acknowledgements

3.1.2.2 First stage bridge audible alarm

(128/A4.1.2.3) *If not reset, the BNWAS* shall *additionally sound a first stage audible alarm on the bridge 15 s after the visual indication is initiated.*

3.1.2.3 Second stage remote audible alarm

(128/A4.1.2.4) *If not reset, the BNWAS* shall *additionally sound 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.*

3.1.2.4 Third stage remote audible alarm

(128/A4.1.2.5) *If not reset, the BNWAS* shall *additionally sound 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.*

3.1.2.5 Alarm alternatives

(128/A4.1.2.6) *In vessels other than passenger vessels, the second or third stage remote audible alarms may sound in all the above locations at the same time. If the second stage audible alarm is sounded in this way, the third stage alarm may be omitted.*

(128/A4.1.2.7) *In larger vessels, the delay between the second and third stage alarms may be set to a longer value on installation, up to a maximum of 3 min, to allow sufficient time for the back-up officer and/or Master to reach the bridge.*

Installation set-up facilities shall be provided to inhibit the third stage alarm and to increase the delay between the second and third stage alarms to 3 min.

3.1.3 Reset function

3.1.3.1 Description of reset function

(128/A4.1.3.2) *The reset function* shall*, by a single operator action, cancel the visual indication and all audible alarms and initiate a further dormant period. If the reset function is activated before the end of the dormant period, the period* shall *be re-initiated to run for its full duration from the time of the reset.*

Single operator action is defined as activating a hard-key or soft-key including any necessary cursor movement.

3.1.3.2 Initiation of reset function

(128/A4.1.3.3) *To initiate the reset function, an input representing a single operator action by the OOW is required. This input may be generated by reset devices forming an integral part of the BNWAS or by external inputs from other equipment capable of registering physical activity and mental alertness of the OOW.*

For the purposes of this standard, mental alertness means consciously intended operations or movements (for example performing a function available in the human-machine interface) for which there is no risk of automatic generation by vibration or by movement of the ship.

NOTE The IMO subcommittee on the safety of navigation at its 55th session (NAV 55/21) described three methods for the reset function as follows:

1) by a single operator action from a device forming an integral part of the BNWAS, for example a manually operated button or a touch screen; or
2) by external inputs from other equipment registering physical activity, for example sensors preferably detecting the presence and movements of a human body or floor pressure pads detecting movement of a human; or
3) by external inputs from other equipment registering mental alertness of the OOW, for example speech recognition sensors or changes in the operation of the manual controls of bridge equipment.

3.1.3.3 Continuous activation

(128/A4.1.3.4) *A continuous activation of any reset device* shall *not prolong the dormant period or cause a suppression of the sequence of indications and alarms.*

3.1.4 Emergency call facility and transfer of alarms

(128/A4.1.4) *Means may be provided on the bridge to immediately activate the second, and subsequently third, stage remote audible alarms by means of an "Emergency Call" push button or similar.*

Installation set-up facilities shall be provided for an “Emergency Call” system.
Facilities shall also be provided to immediately actuate the “Emergency Call” system from other equipment capable of transferring an unacknowledged alarm by contact closure or equivalent circuit, or an IEC 61162 interface using the ALR sentence.

NOTE Examples of equipment which are capable of transferring alarms include Integrated Navigation Systems and Track Control Systems.

IMO Resolution MSC.252(83), paragraph 20.5.1 states: *After a time defined by the user unless otherwise specified by IMO, an unacknowledged alarm should be transferred to the bridge navigational watch alarm system (BNWAS), if available. The unacknowledged alarm should remain visible and audible.*

IMO Resolution MSC.74(69) annex 2, paragraph 5.3.4 states: *In the case of any failure or alarm status received from the position-fixing sensor, the heading sensor or the speed sensor in use: 1) an alarm should be generated at the track control system; 2) the system should automatically provide guidance to the user of a safe steering mode; and 3) a back-up navigator alarm should be given if a failure or alarm status is not acknowledged by the officer of the watch (user) within 30s.*

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- BNWAS 150 System Overview

The BNWAS 150 system is designed for use on a vessel's navigation bridge. The remote alarm sounders cover key locations such as the officer cabins, mess area and ship's office.
Reset devices can be used on the bridge wings.
The display control and monitoring equipment is to be installed in protected areas inside the bridge.

Dormant Time
This function is adjustable between 3-12 minutes in 1 minute increments only whilst in SETUP mode.

Remote Resets
BNWAS 150 has a reset mechanism which can be activated by a combination of reset pushbuttons and PIR motion detection sensors.

Fail Alerts
BNWAS 150 has alert messages for Tamper, Power and Battery. Tamper alert is also audible by means of an on-board buzzer within the display control unit.

Emergency Call and Cabin Call
BNWAS 150 has an Officer call configurable in up to 5 officer cabins within the menu.

Power supply
BNWAS 150 is powered by two separate 24 Volt supplies (main and backup) which will automatically switch to the backup supply in the event of a main supply failure. This will raise an alarm.

Inputs from Valid Reset Devices & System Alarms
BNWAS 150 provides additional Digital Inputs to accept signals from other devices and transfer alarms. An external equipment in alarm will send a digital input to the BNWAS and the source will be shown on LCD display. These might include RADAR or ECDIS.

External valid reset inputs must be approved by the appropriate approval body before being used.
AMI Marine Ltd will assist with recommendations wherever possible from previous experience but will not accept responsibility if not accepted.

BNWAS 150 comprises:
Hardware consisting of - Control display panel, interface unit, physical and sensory reset devices, alarm sounders and beacons.
The BNWAS 150 Software Navigation Menu where the Master can configure and control the operational mode and parameters of the system.

Overall Layout
There are three areas within the vessel were the system and peripheral units are fitted:-
Wheel house / Bridge
Accommodation Areas
Remote Locations

Wheel house / Bridge
Equipment - Control display, Stage 1 Alarm sounders, Alarm Beacon, Directional PIR's, and push button reset switches. Push buttons can be mounted on the Bridge wing, and are IP rated accordingly.

Accommodation Decks
Equipment - Stage 2 Alarms are located in the accommodation area. The system is configurable through the navigation menu, for five separate accommodation rooms, labelled: Cabin 1, Cabin 2, Cabin 3, Cabin 4, Cabin 5 - (Captain, Officer 1, 2, 3 and 4) The alarm sounders or sounder beacons can be used.

Remote Locations
Equipment - Stage 3 Alarms are located in remote locations which could include Officer's mess, Office locations and Engine Control Room. They can be alarm sounders or sounder beacons.

Input Voltage
The acceptable input voltage range for the X150 is 22vdc to 30vdc.
Exceeding this will cause damage to the equipment.

Current Rating for PSU
Current drawn at maximum load is 780mA so a 1.5A power supply is recommended.

Maximum Number of X150-SB or X150-SD Units
It is recommended not to connect any more than 9 X150-SB or X150-SD units to the system.

- System Components

BNWAS 150 is made up of a number of component units including a central display control panel, reset pushbuttons, motion sensors and alarm sounders. This section provides both an overall view of the structure of the BNWAS 150 system and a description of the component units outlined in Table 1

Part Number	Description
X150-D	BNWAS Display Control Panel
X150-MD	BNWAS Passive Infra-red Detectors
X150-U	BNWAS Distribution Interface Unit
X150-IC	BNWAS Interconnection Cable
X150-RI	BNWAS Illuminated Reset Pushbutton
X150-RE	BNWAS Illuminated Reset Pushbutton with Buzzer
X150-SD	BNWAS Alarm Sounders
X150-SB	BNWAS Alarm Sounders with Beacon

Table 1: BNWAS 150 Components

X150-D

X150-MD

X150-U

X150-IC

X150-RI

X150-SD

X150-RE

X150-SB

NOTE: Images Not To Scale

- BNWAS 150 Controls and Functions

X150-D Display and Control

The BNWAS X150-D Display Control Panel is the user interface and display for the BNWAS150
The display control panel is to be mounted at a suitable location within the ship bridge preferably at a location where the watch officer is expected to be stationed during normal on watch operations

Figure 1 - X150-D Control Display Panel

The Key switch has 2 positions which change the function of the tactile buttons;

1. RUN – Normal operation position where the system is monitoring all sensor inputs.
2. SETUP – To set the 'Operational Mode' and to adjust the timing parameters.

EMERGENCY CALL / UP

CABIN CALL / DOWN

ALARM RESET / SELECT

Automatic Dimming of the LCD Display

A light detection sensor automatically dims the display at low light levels to prevent light pollution during night time operation.

X150-RI Illuminated Reset Pushbutton and X150-RE Illuminated Reset Pushbutton with Buzzer

The X150-RI reset pushbutton unit can be used to reset the BNWAS system's timer before or during the 1st stage alarm. The X150-RE unit performs the same function but also has an audible alarm making it ideal for use on the bridge wings.

Figure 2 - X150-RI
Illuminated Reset Pushbutton

Figure 3 - X150-RE
Illuminated Reset Pushbutton with Buzzer

X150-SD Alarm Sounder and X150-SB Sounder Beacon

The X150-SD alarm sounders are used for the 2nd or 3rd stage alarms and have adjustable volume between 85 and 105dB. The X150-SB performs the same function but also has a highly visible LED indication.

Figure 4 - X150-SD
Alarm Sounder

Figure 5 - X150-SB
Sounder Beacon

- Equipment Specifications

Display Control Panel - X150-D

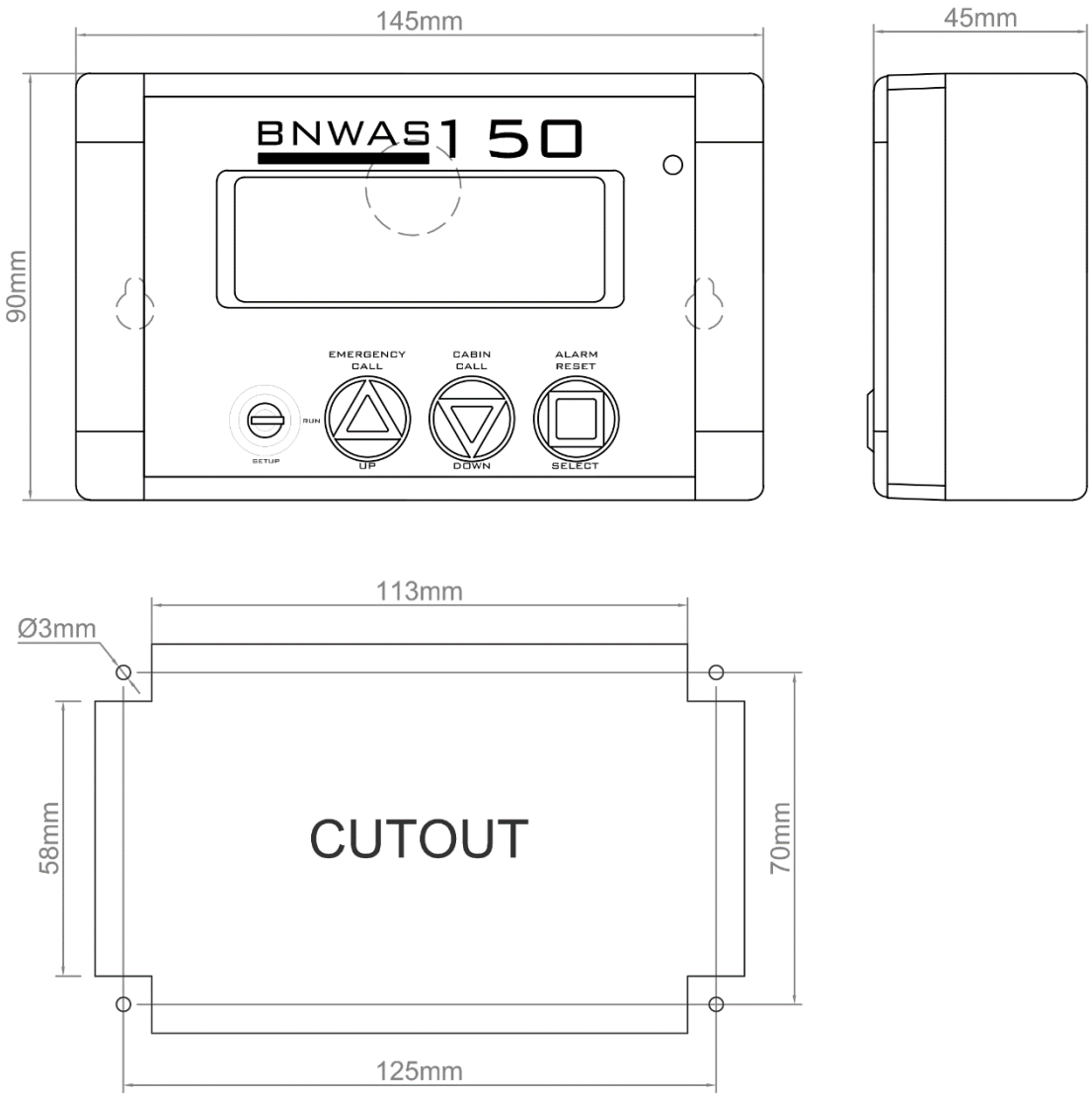


Figure 6: BNWAS X150-D Display Control Panel Front

The Display Control Panel – Comprises a backlit LCD display, audible and visual alarm, setup / run key switch and 3 button tactile keypad for Reset, Emergency Call and Setup functions.

X150-D Display Control Panel Specifications

- Power:- Nominal 24VDC
- Dimensions: - 145mm x 90mm x 45mm (W x H x D)
- Material:- ABS – Halogen Free
- Properties:- Ingress protection: IP52
- Operating Temperature -25°C to +55°C
- Automatic Dimming for Night Vision

Distribution Interface Unit - X150-U

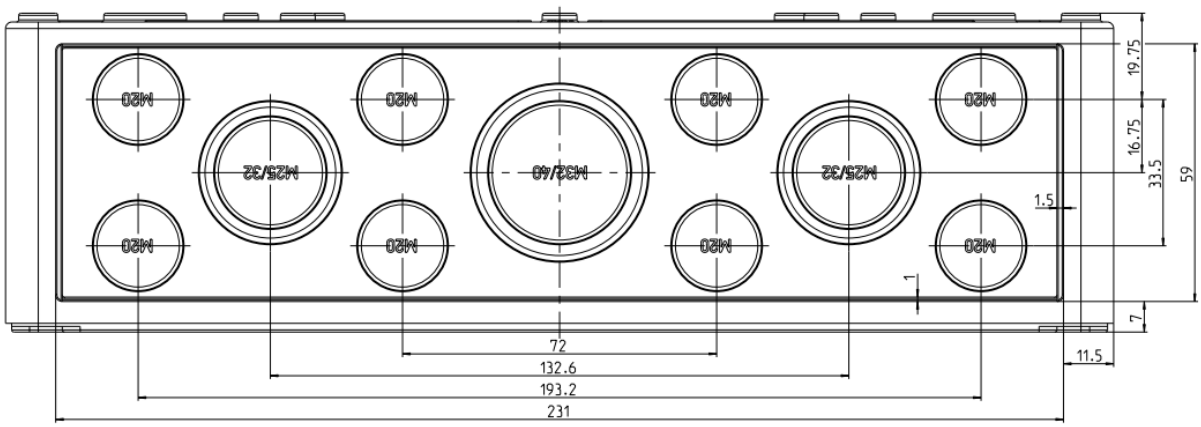


Figure 7 - X150-U Distribution Interface Unit
View from underneath

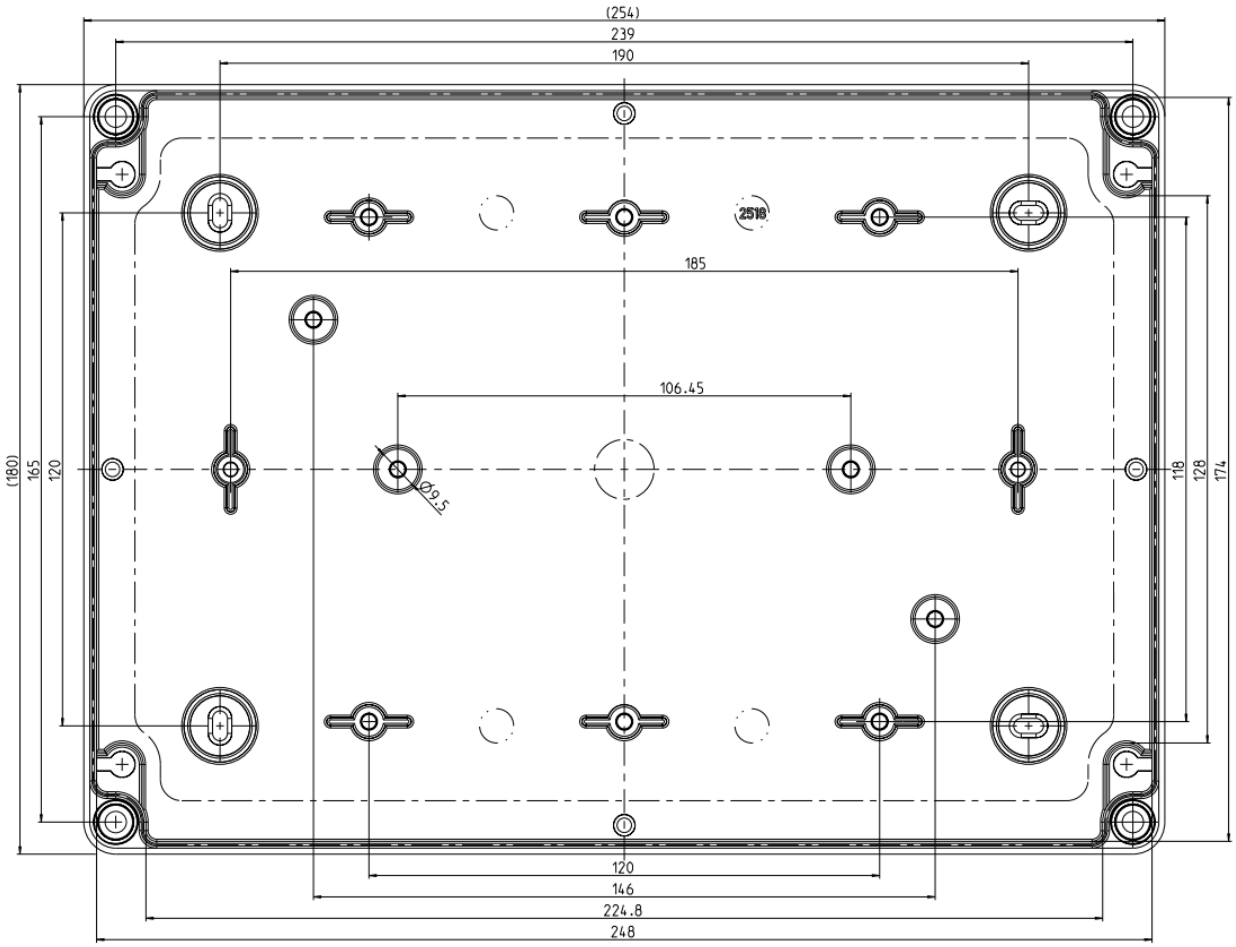


Figure 8 - X150-U Distribution Interface Unit
View from behind

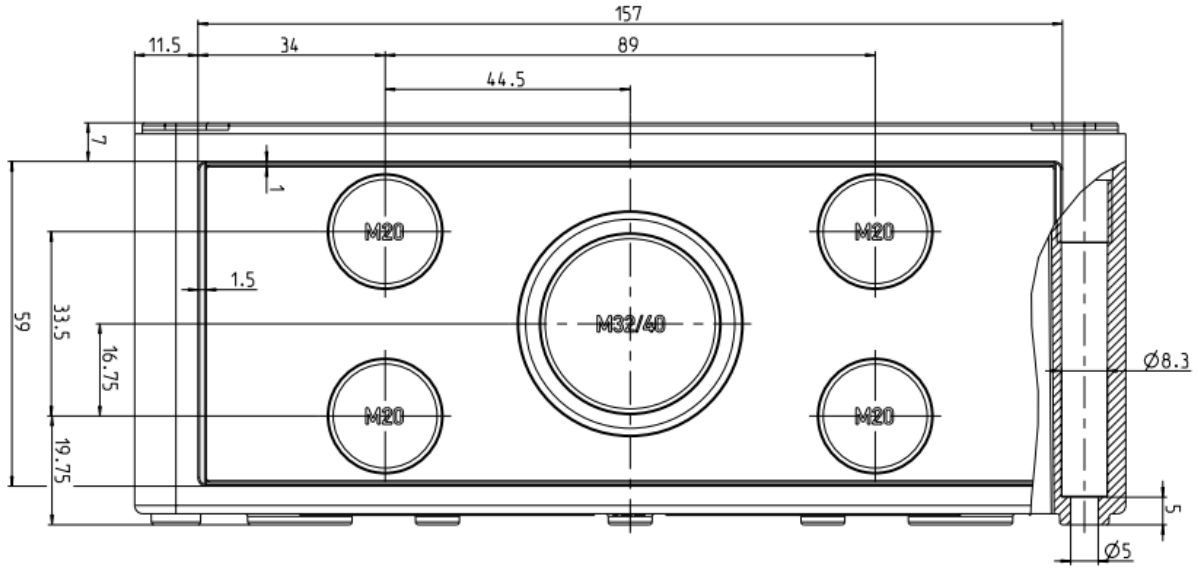


Figure 9 - X150-U Distribution Interface Unit
Side view

X150-U Junction Box Specifications

- Dimensions:- 254mm x 180mm x 90mm (W x H x D)
- Material: - Base and Cover: Polystyrene
- Properties: - Ingress protection: IP66 - acc. EN 60529 / DIN VDE 0470-1
- Operating Temperature: - -20°C to 40°C
- Halogen-free
- 3m Interconnection Cable (IC-150) to DC-150

Reset Push Button - X150-RI

The BNWAS 150 reset pushbutton module is used to indicate operator alertness to the system. The reset button must be pressed every 3-12 minutes (or before) as configured by the Master. The reset pushbutton module houses a Red illuminated pushbutton with 1 normally open contact.

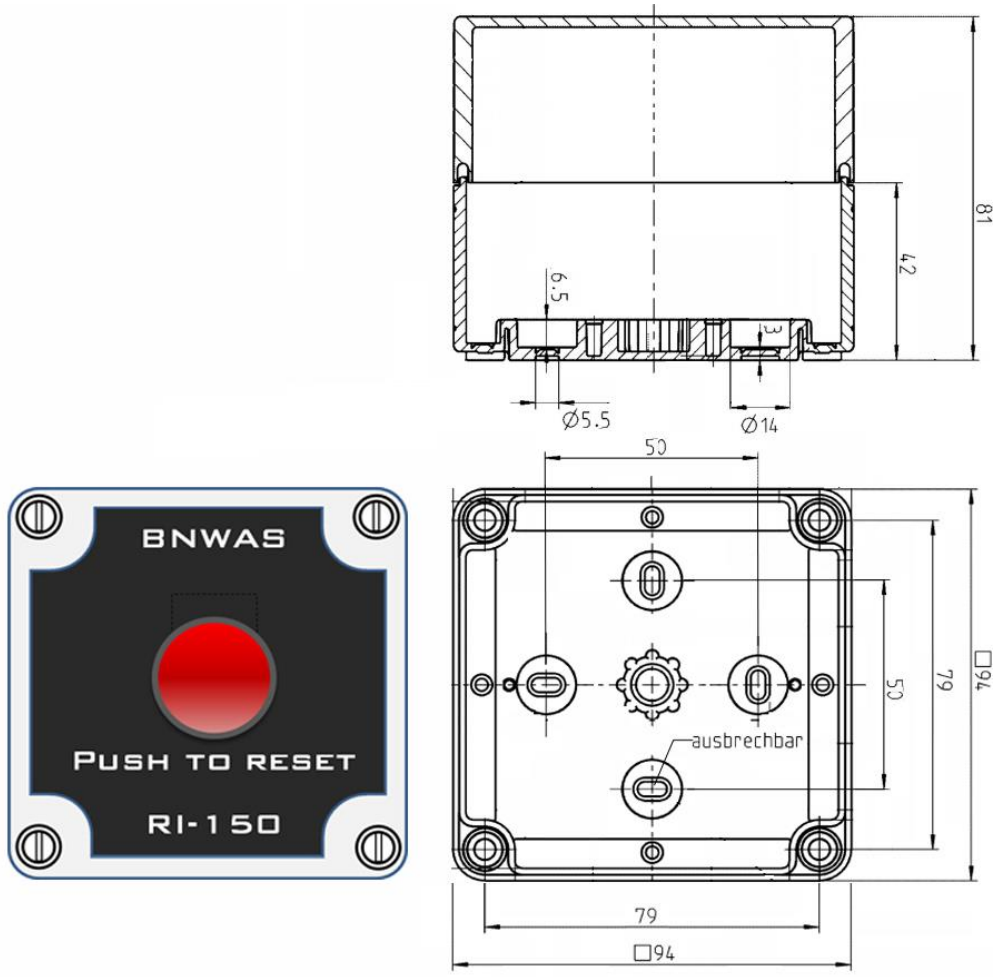


Figure 10 - BNWAS X150-RI Reset Pushbutton

X150-RI Push Button Specifications

- Power 12VDC
- Dimensions:- X150-RI = 94mm x 94mm x 81mm (W x H x D)
- Material: - Base and Cover: Polycarbonate, glass-fibre reinforced
- Properties: - Ingress protection: IP66 - acc. EN 60529 / DIN VDE 0470-1
- Operating Temperature: - -35°C to 80°C
- Halogen-free

Reset Push Button with Buzzer - X150-RE

The BNWAS 150 reset pushbutton module is used to indicate operator alertness to the system. The reset button must be pressed every 3-12 minutes (or before) as configured by the Master. The reset pushbutton module houses a Red illuminated pushbutton with 1 normally open contact. A built in buzzer provides additional alert when reset is required, making it idea for use on bridge wings

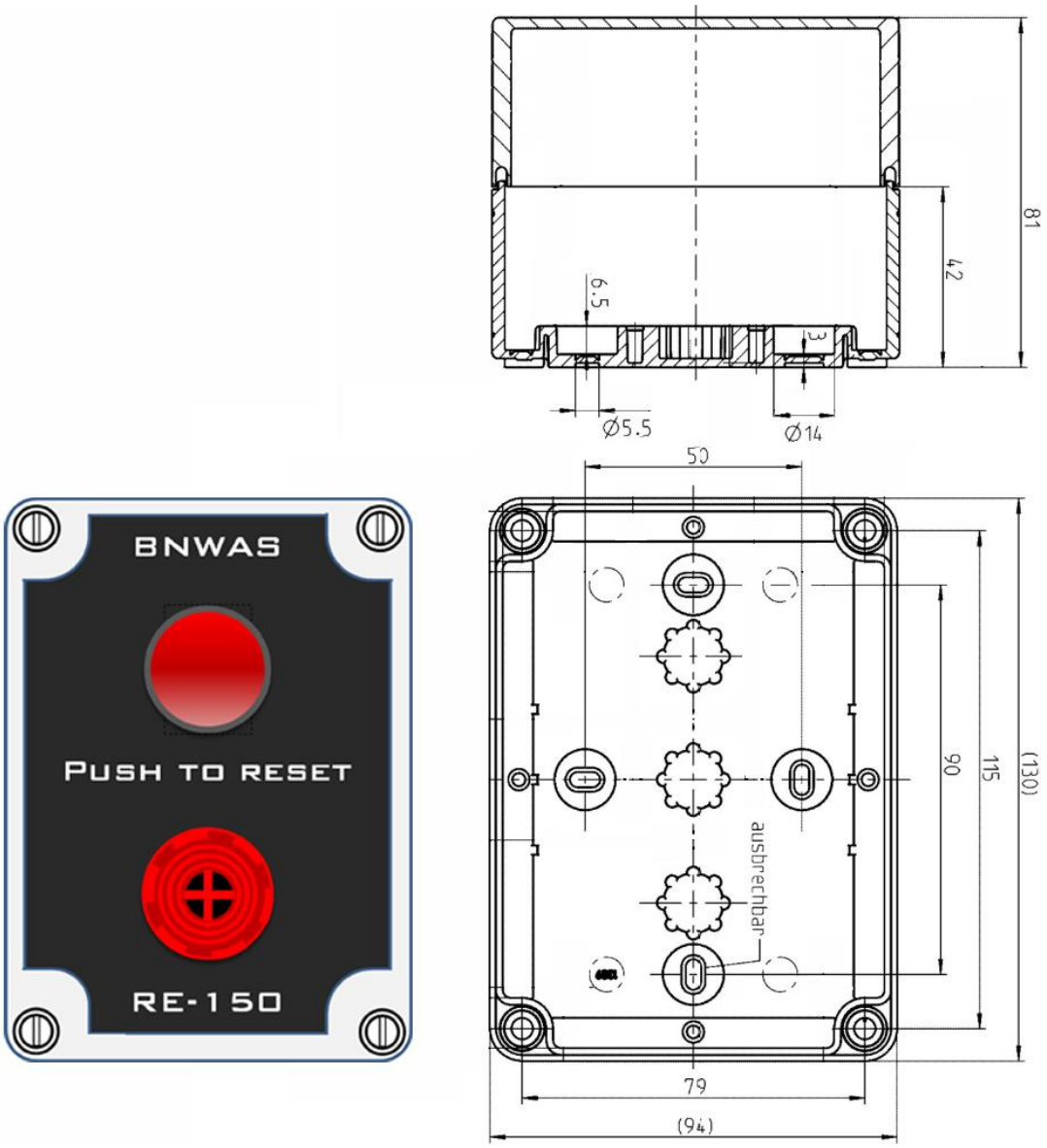


Figure 11 - BNWAS X150-RE Reset Pushbutton with Buzzer

X150-RE Push Button Specifications

- Power: 12VDC
- Dimensions:- X150-RE = 94mm x 130mm x 81mm (W x H x D)
- Material: - Base and Cover: Polycarbonate, glass-fibre reinforced
- Properties: - Ingress protection: IP66 - acc. EN 60529 / DIN VDE 0470-1
- Operating Temperature: - -35°C to 80°C
- Halogen-free

Passive Infra-Red (PIR) Detectors Motion Sensors - X150-MD

The BNWAS X150-MD Motion sensors are used to detect human presence by monitoring movement within the bridge area and reset the system timer.

Figure 12 - BNWAS X150-MD PIR Motion Sensor

X150-MD PIR Specifications

- Power - 12 VDC at 8mA
- Dimensions:- 94.5 x 63.5 x 49 mm (H x W x D)
- Material:- Polystyrene
- Properties:- Ingress protection: IP54
- Operating Temperature: - -10°C to 50°C
- Visual Indications – In 'Walk Test' mode steady red LED will illuminate for 2-3 seconds on detection of movement.
- Installation - Bulkhead surface or corner.
- Mounting Height - 1.8 to 2.4 m (6 to 8 ft.)
- Max. Coverage - 12 m (40 ft.) diagonal size / 90°
- Mass Immunity - Immune to objects weighing up to 36 kg (80 lb.)

Alarm Sounders and Sounder Beacons - X150-SD and X150-SB

The BNWAS 150 alarm sounders are to be configured in Bridge area(s), Officer Cabins and remote locations which might include passenger area(s), engine control room and officer mess.
The Alarm sounders are tone selectable during commissioning in order to differentiate between different alarm sounds.

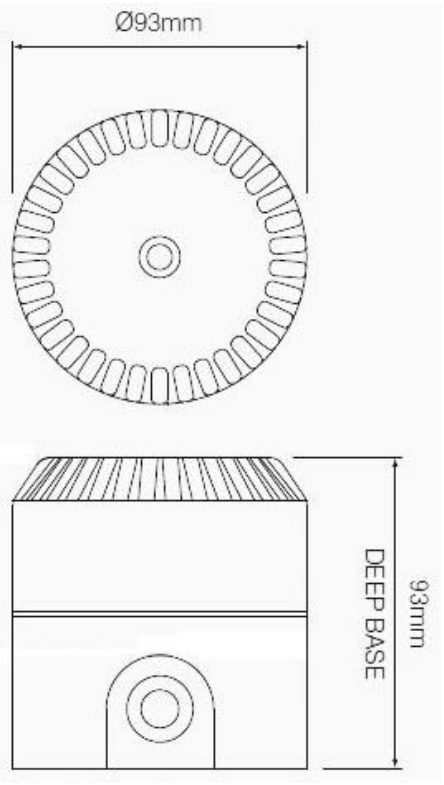


Figure 13 - X150-SD Sounder Universal Base

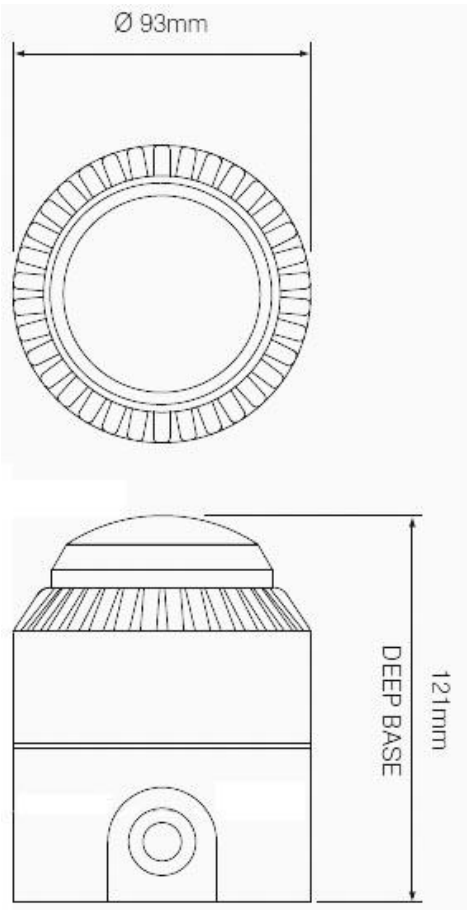


Figure 14 - X150-SB Sounder Beacon

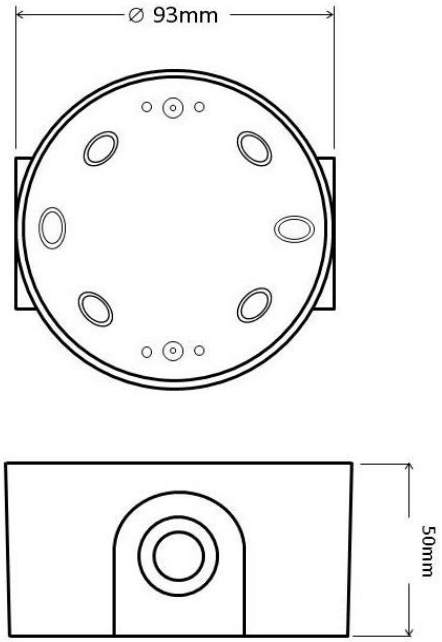


Figure 15 –

	X150-SD	X150-SB
• Input Voltage	12V DC	12V DC
• Input Current	~16mA	~68mA
• Temp Range	-10°C to +55°C	-10°C to +55°C
• Sound Pressure	85-102dB @ 1m, tone selectable	85-101dB@1m, tone selectable
• Environmental Rating	IP65	IP65

Note: Combinational Beacon/ Sounders are optional

- Equipment Description

Installation guide

Unpack BNWAS 150 System and peripherals verify all components as per Packing Specification.

X150-D Display Control Panel ***(ref Figure 6 - page 19)***

Identify suitable location for the BNWAS DC-150 Display Control Panel.

Unscrew BNWAS 150 front panel by removing the 4 x corner covers and unscrewing the 4 x screws. Unplug the 40 way connector and place the front panel in a safe location. This will allow access to the wall mount holes.
A 35mm hole should be made in the panel/console to allow the cable and 20mm gland to pass through. Once the display is sited in place mark up the securing holes and fit the back of the enclosure.

X150-U Distribution Interface Unit ***(ref Figure 7, 8 and 9 - page 20 and 21)***

Four holes are available for securing the rear of the enclosure to the selected surface.
Knock out holes are available at the bottom, sides and top of the enclosure for installing glands through which cables will be passed.
Once all wiring is completed as per the wiring schedule the enclosure lid should be secured using the four screws in the corners of the enclosure lid.

X150-RI Reset Pushbutton ***(ref Figure 10 and 17 – page 22 and 34)***

Complete the button assembly and connections as per Figure 17.
Four holes are available in the rear of the enclosure for securing to the selected surface – Figure 10.
There are four screws located on the front panel for securing to the enclosure.

X150-RE Reset Pushbutton with Buzzer ***(ref Figure 11 and 18 – page 22 and 34)***

Complete the button assembly and connections as per Figure 18.
Four holes are available in the rear of the enclosure for securing to the selected surface – Figure 11.
There are four screws located on the front panel for securing to the enclosure.

X150-SD Alarm Sounders ***(ref Figure 13, 15 and 19 – page 25 and 34)***

The base of the Alarm Sounder has six fixing holes for convenience as per Figure15
Care must be taken when choosing the fixing holes that the cable gland can still be installed comfortably.
Ideally a fixing hole adjacent to the gland opening should not be used.
Wiring should be completed as per Figure 19

X150-SB Alarm Sounder Beacons ***(ref Figure 14, 15 and 19 – page 25 and 34)***

The base of the Alarm Sounder has six fixing holes for convenience as per Figure 15
Care must be taken when choosing the fixing holes that the cable gland can still be installed comfortably.
Advice would be not to use a fixing hole adjacent to the gland opening.
Wiring should be completed as per Figure 19

Confirm all units installed correctly and wiring is as per schedule, prior to powering up system.

- Equipment Connection

The following connection diagrams show how to the assemble and interconnect the BNWAS150 system

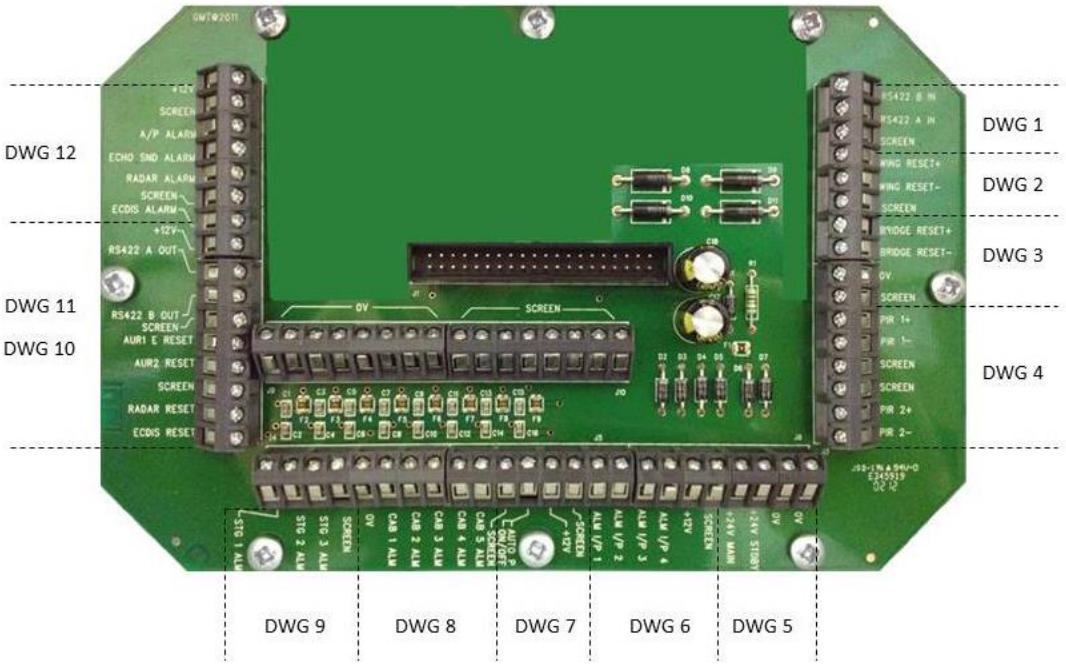
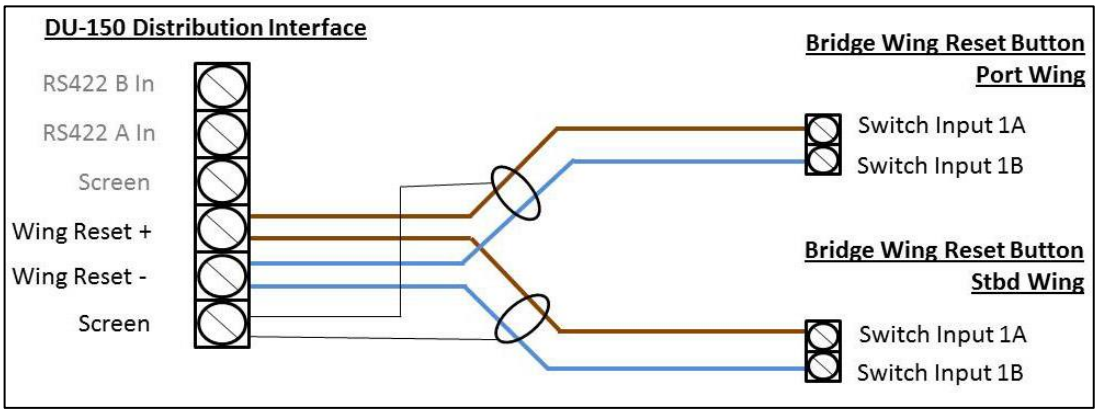


Figure 16 - X150-U Distribution Interface Unit

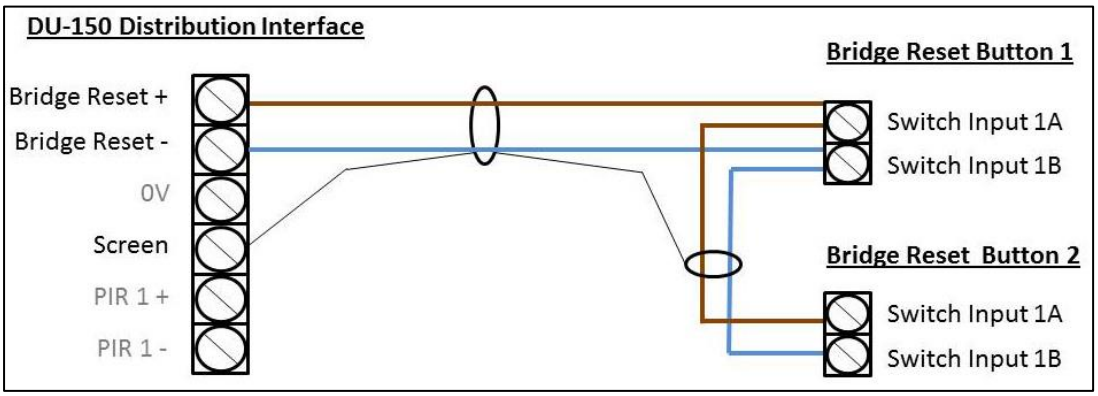
Please note: Additional terminals for the 0V and cable screens are provided below the ribbon cable socket. These may be used for any 0V or screen connection.

DWG 1 -Data Input

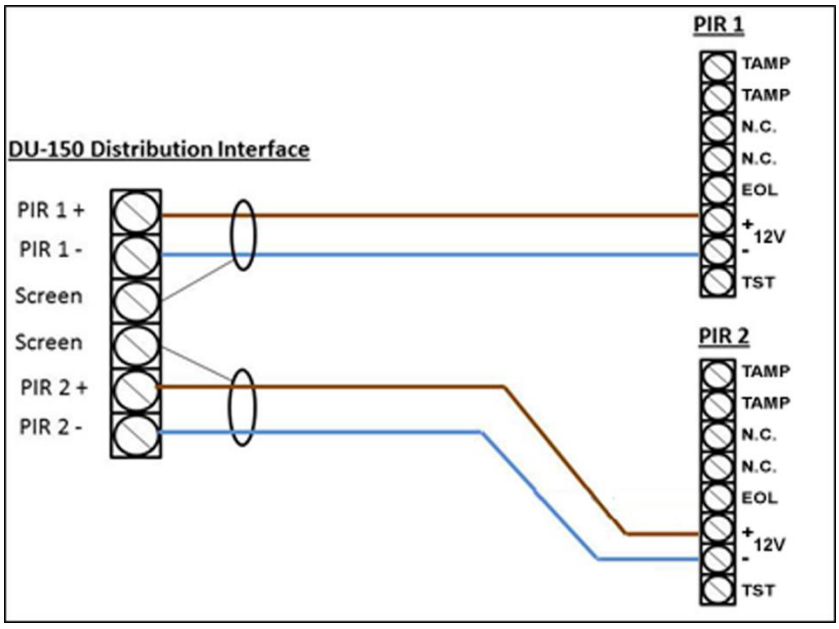
DWG 2 -Reset Pushbuttons with Buzzer (Bridge Wing)



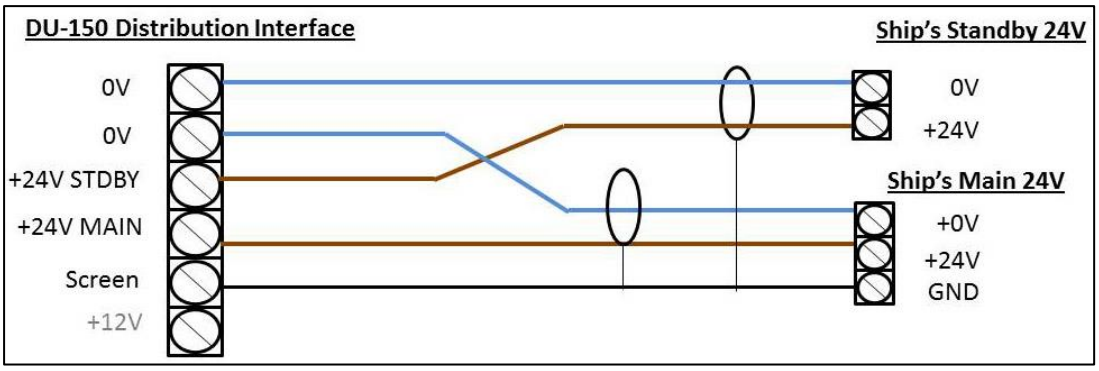
DWG 3 -Reset Pushbuttons (Bridge)



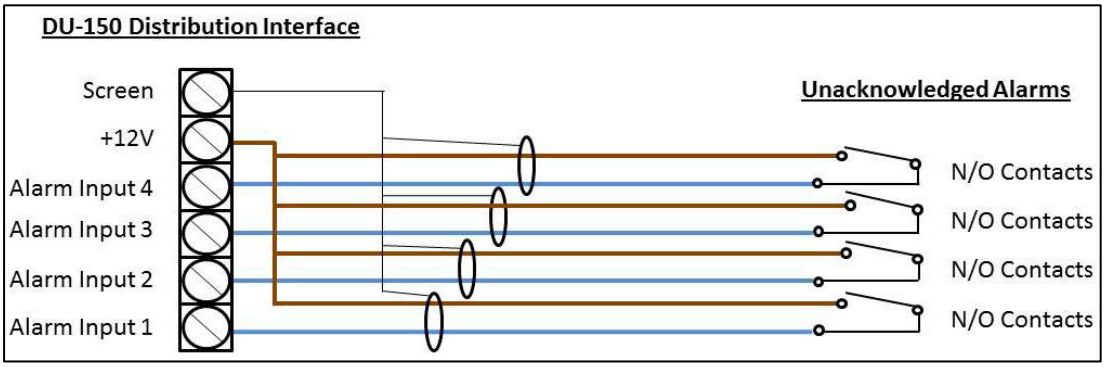
DWG 4 -PIR Motion Sensors



DWG 5 -Power Supply Input



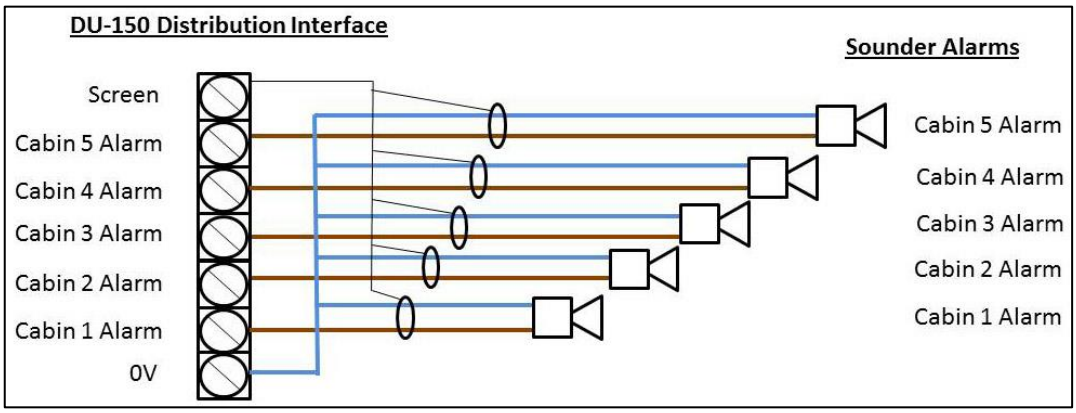
DWG 6 -Unacknowledged Alarm Inputs – Non-specific



DWG 7 -Automatic Activation – Autopilot Input

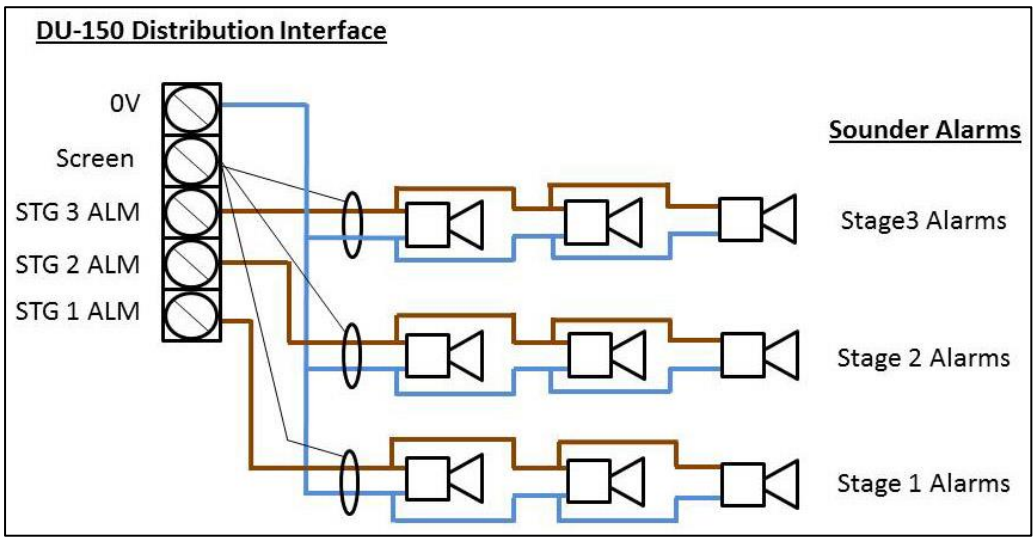
DWG 8 -Cabin Alarms

(See Figure 19 Page 34)

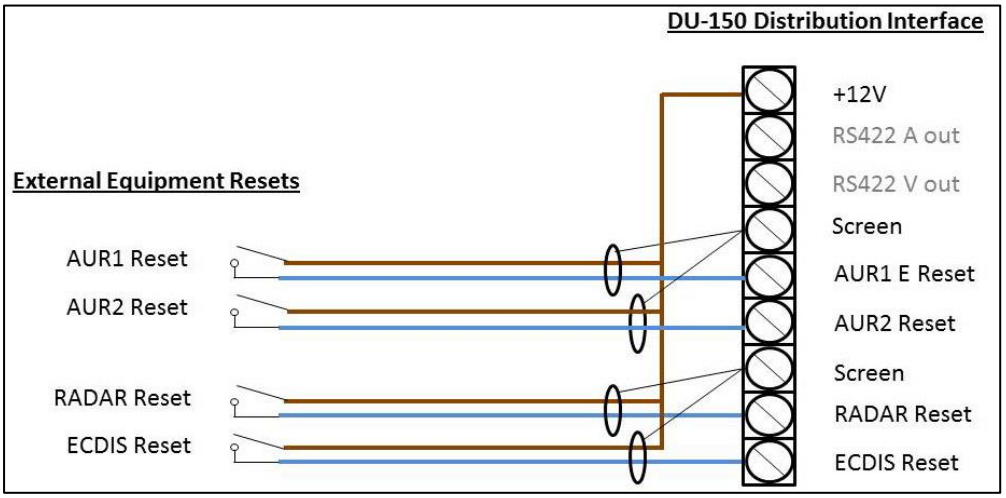


DWG 9 -Sounder Alarms For Stage 1,2 and 3

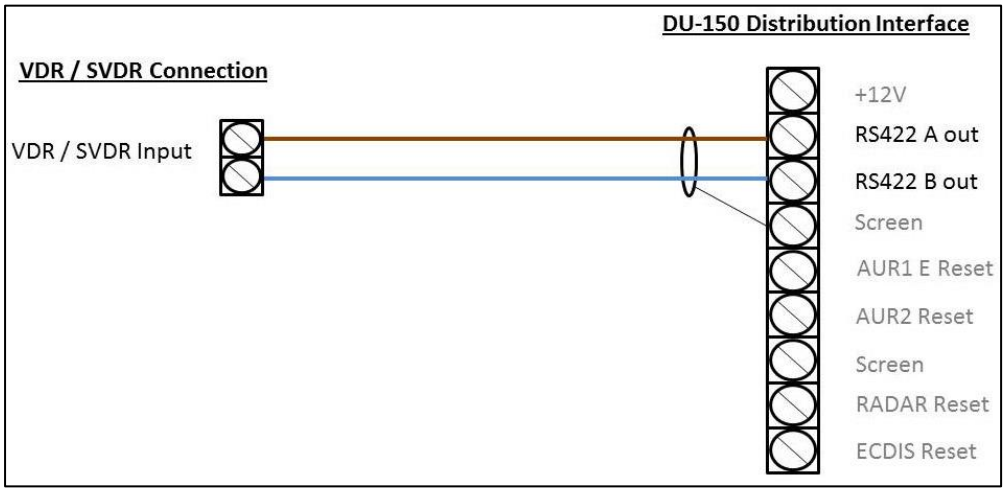
(See Figure 19 Page 34)



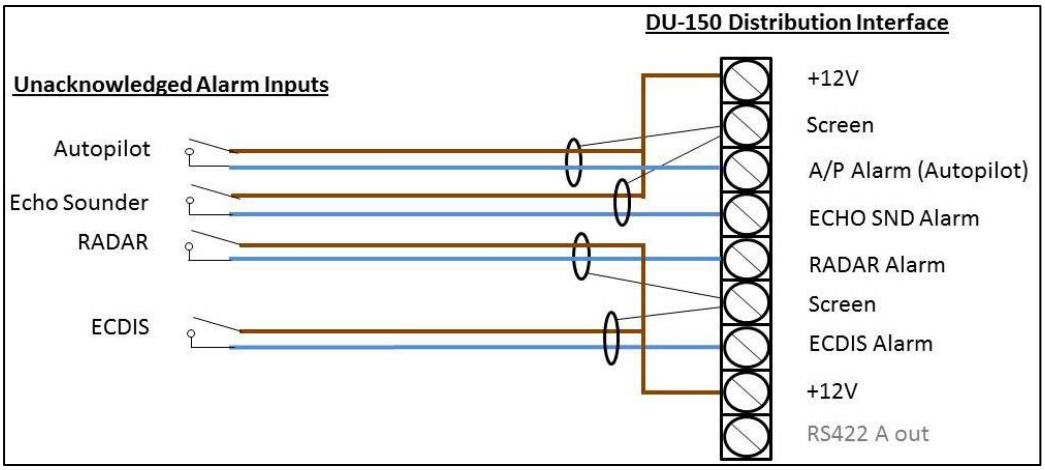
DWG 10 -External System Resets



DWG 11 -VDR / SVDR Connection



DWG 12 -Unacknowledged Alarm Inputs



- Equipment Assembly and Internal Connection

The below diagrams show the assembly and internal connections of the peripheral equipment

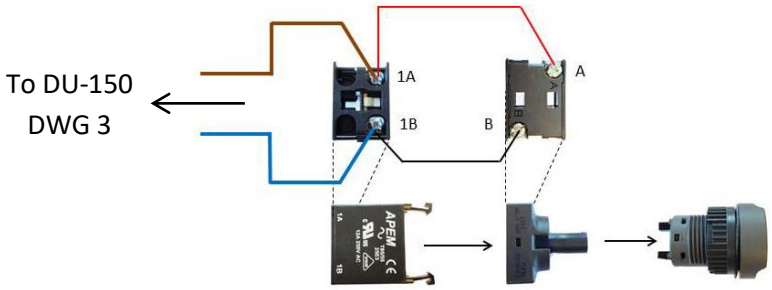


Figure 17 - X150-RI Reset Pushbutton

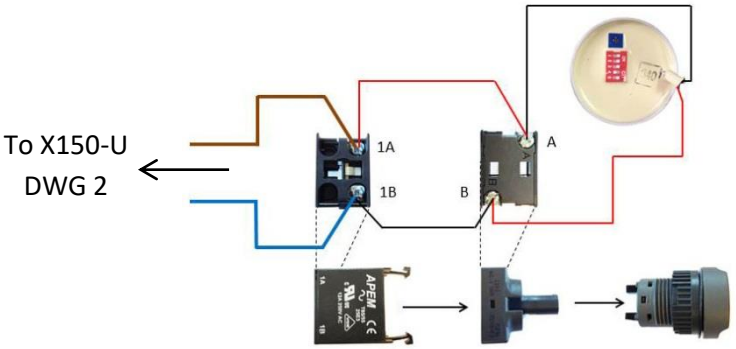


Figure 18 - X150-RE Reset Pushbutton with Buzzer

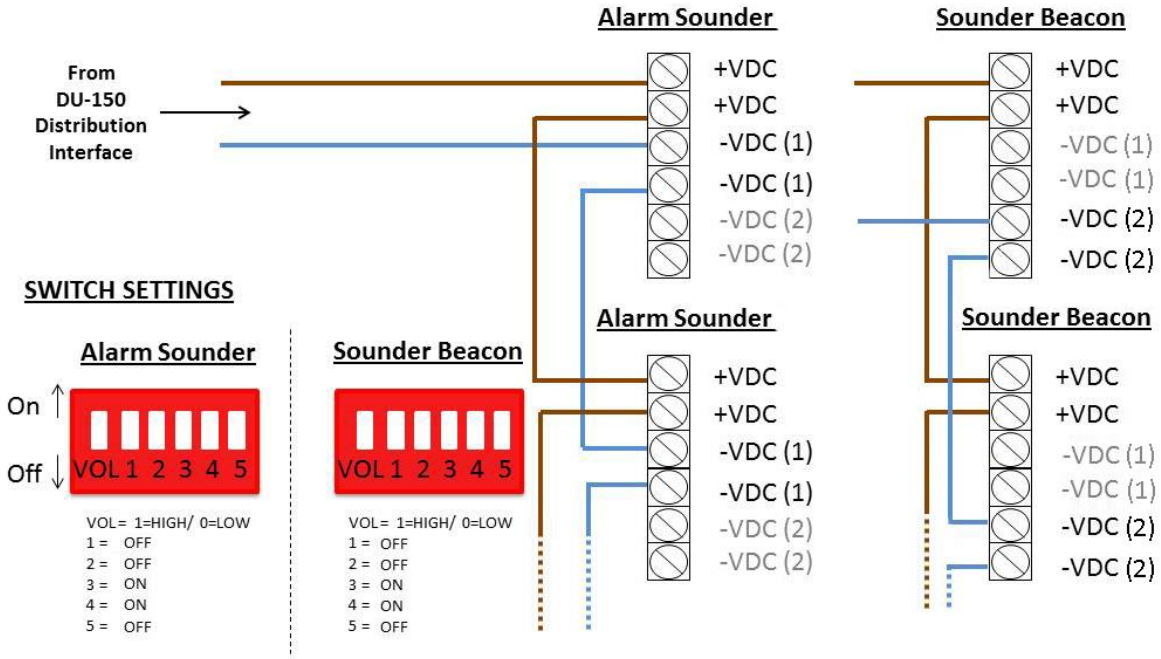


Figure 19 - X150-SD Alarm Sounder / X150-SB Sounder Beacon

X150 BNWAS - Bridge Navigational Watch Alarm System

- X150-MD Passive Infra-red Detector Installation

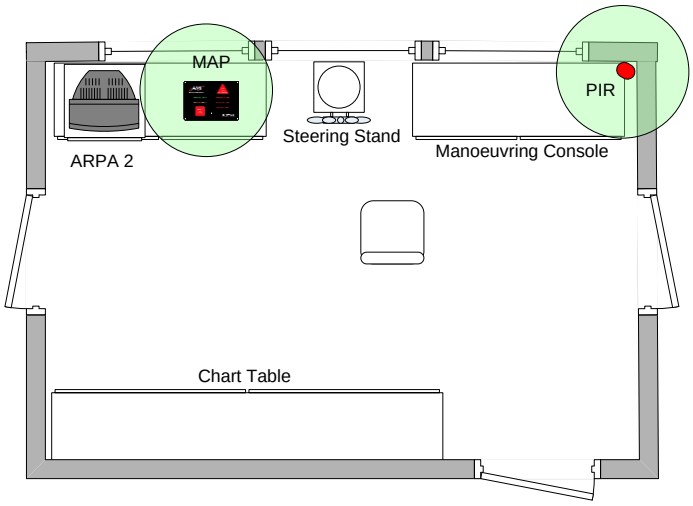
To ensure that the installation of the Motion Detector meets the required criteria the following must be strictly observed;

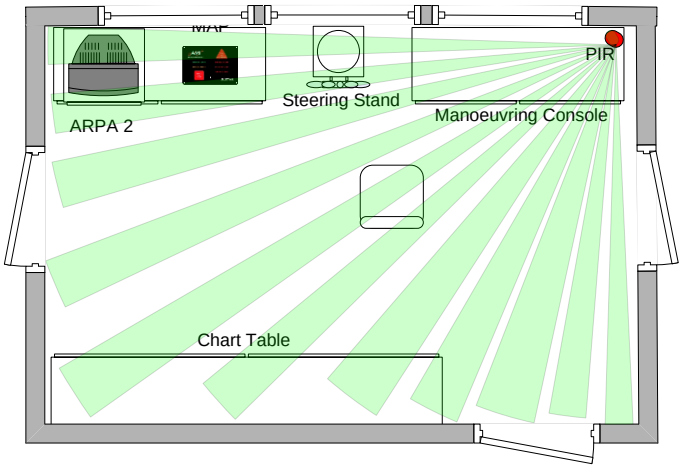
1. The PIR must be mounted on a vertical bulkhead/surface. No tilting or installing upside down is permitted.
2. The installation height of the PIR must be as per the guide 1.8 to 2.4 metres.
3. The distance to a work station where ever possible must be a minimum of 3 to 5 metres.
4. If two PIR units are installed in the bridge they should not face each other and must be mounted at least 5 metres apart.
5. Too many PIR units can be a problem so 2 units maximum on medium to large bridges.

Small Bridge:

Bridge Dimensions: 4 Metres wide and 3 metres deep.

The following drawings are suggested location and quantity only.



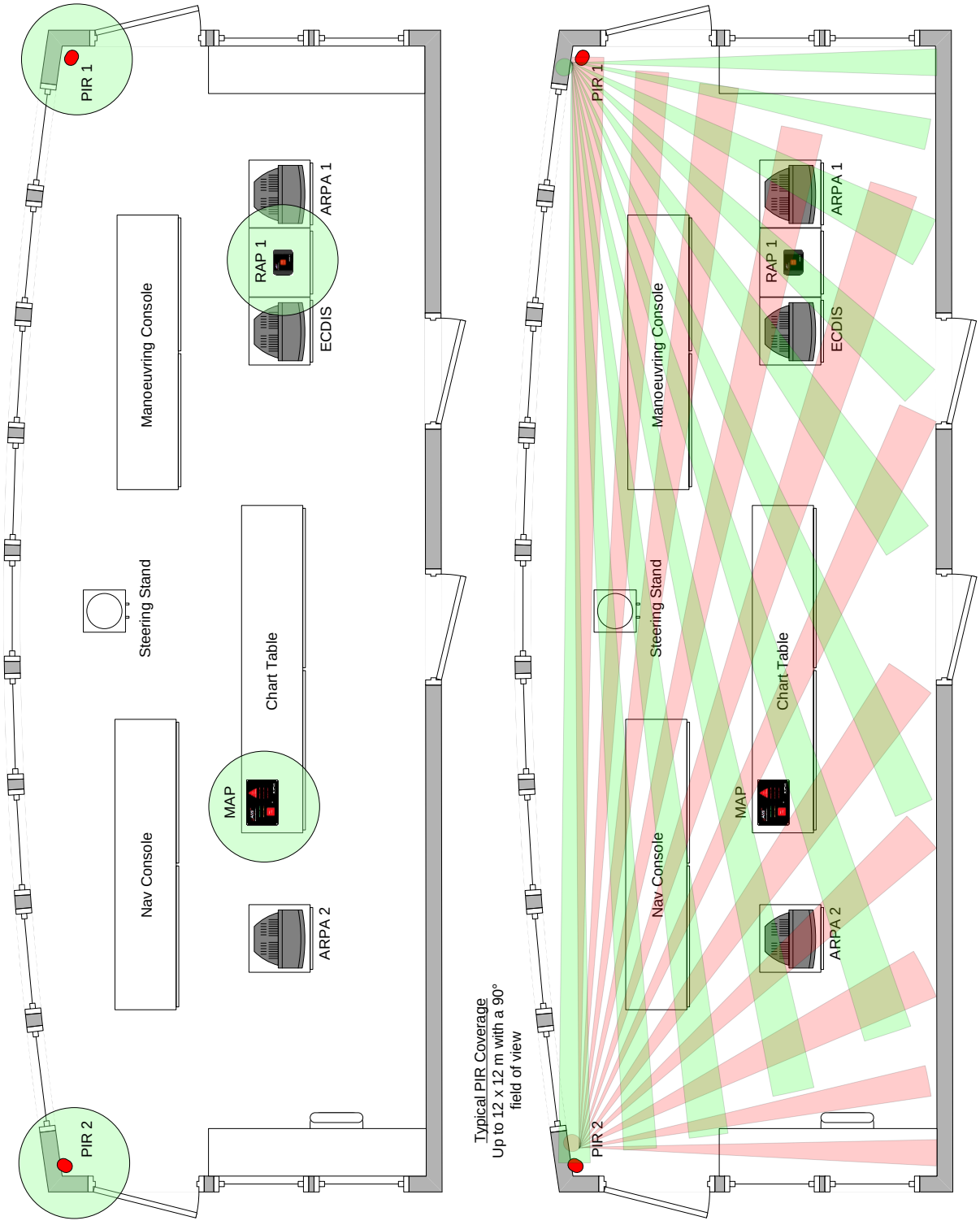


Typical PIR Coverage
Up to 12 x 12 m with a 90°
field of view

X150 BNWAS - Bridge Navigational Watch Alarm System

Medium Bridge:

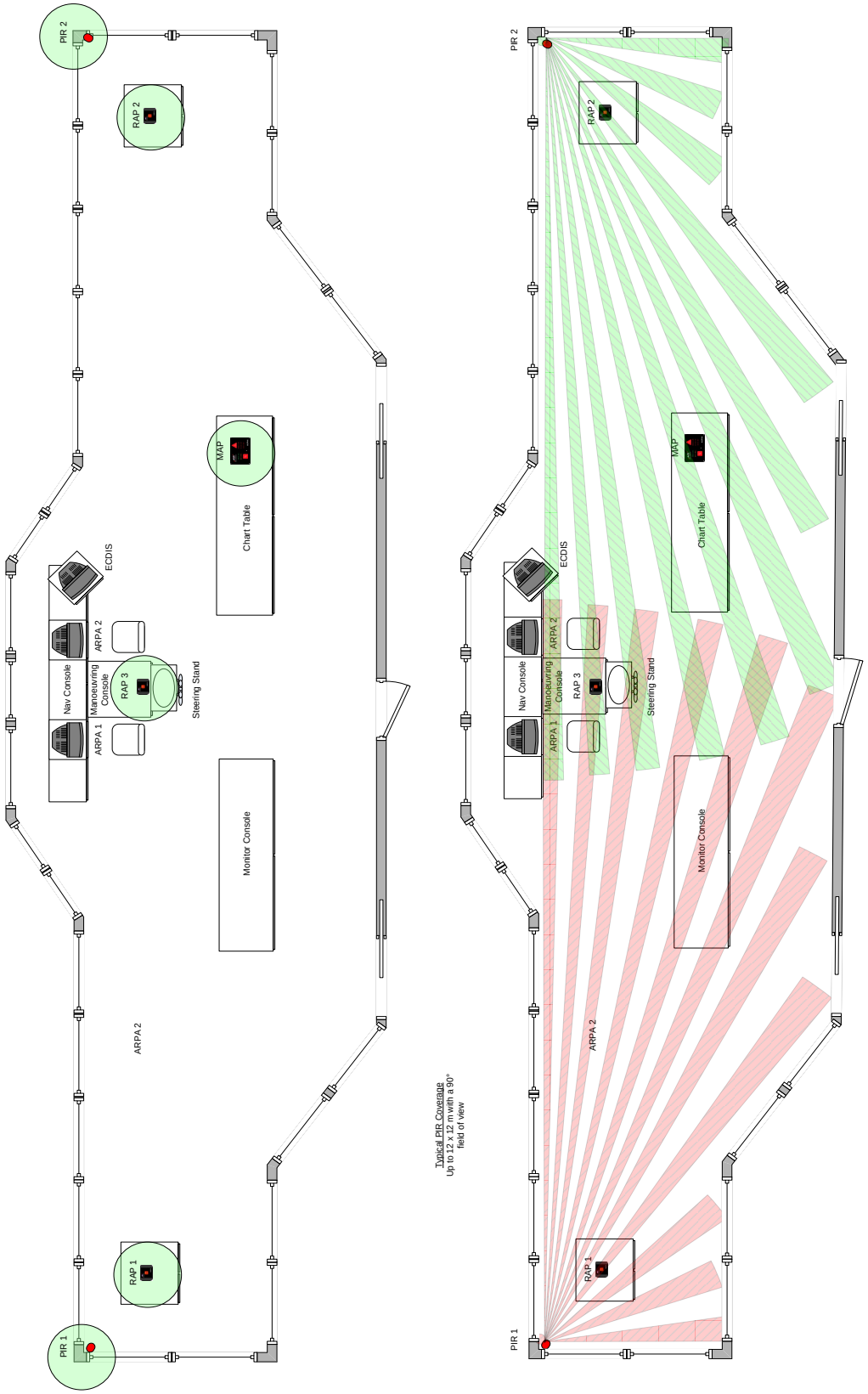
Bridge Dimensions: 12 Metres wide and 4 metres deep.



X150 BNWAS - Bridge Navigational Watch Alarm System

Large Bridge:

Bridge Dimensions: 23 Metres wide and 7 metres deep



X150 BNWAS - Bridge Navigational Watch Alarm System

Specifications – PIR:

Inputs:
12 VDC at 8mA

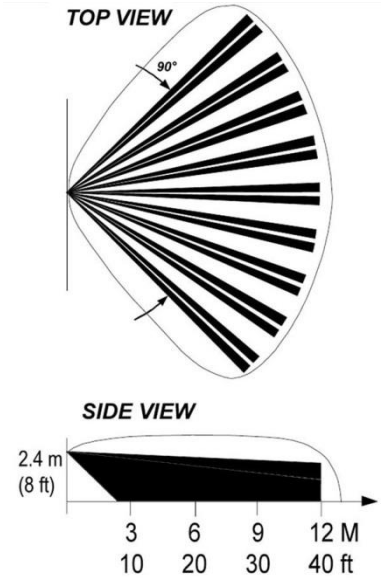
Outputs:
Motion Detected

Controls:
None

Terminal: NC (alarm relay)
Normally closed until movement detected.

Visual Indications:
Steady red LED will illuminate for 2-3 seconds on detection of movement.

Installation:
100% vertically on a Bulkhead surface or corner.



Mounting Height:
1.8 to 2.4 m (6 to 8 ft.)

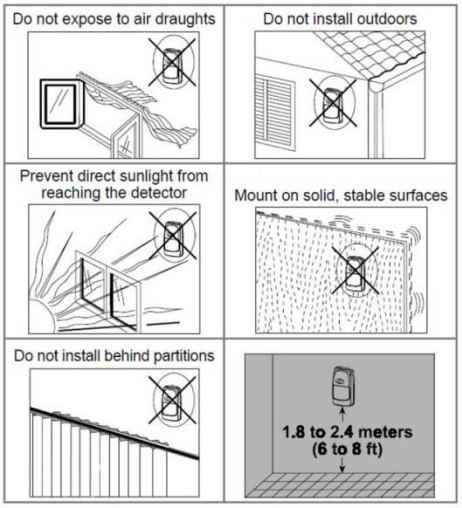
Max. Coverage:
12 m (40 ft.) diagonal size / 90°

Mass Immunity:
Immune to objects weighing up to 36 kg (80 lb.)

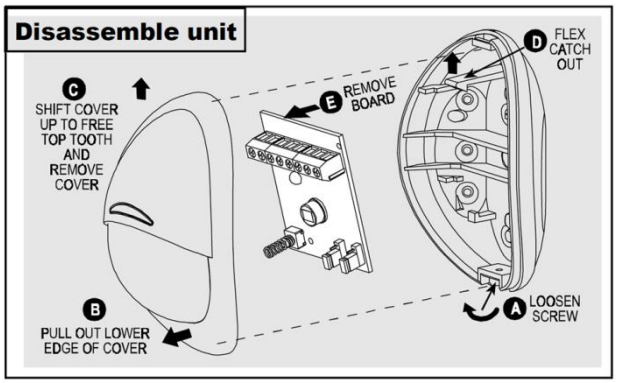
Installation Requirements
To minimise false detections:
In addition, a few important rules must be observed and complied with while selecting a mounting location:
The PIR must be mounted 100% vertically on a Bulkhead surface or corner at the required height.

If two PIR units are installed in the bridge they should not face each other and must be mounted at least 5 metres apart.

Do not install the PIR units in places where the detector circuit detects constantly or intermittently, due to environmental interference.



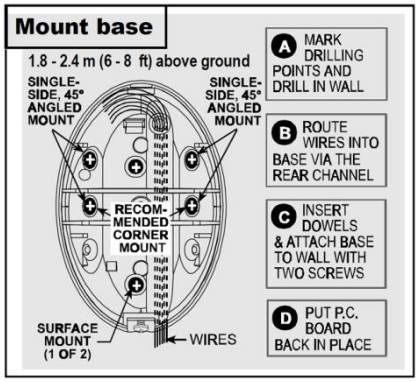
Mounting
Remove the front cover as shown below.



Cover and PCB Removal

Release the PCB by applying pressure on the upper flex catch. Remove the PCB and put it aside safe until required again.

Refer to the following figure and punch out the mounting knockouts at the rear wall of the base (for surface mounting) or at the angled sides of the base (for corner mounting).



Inside View

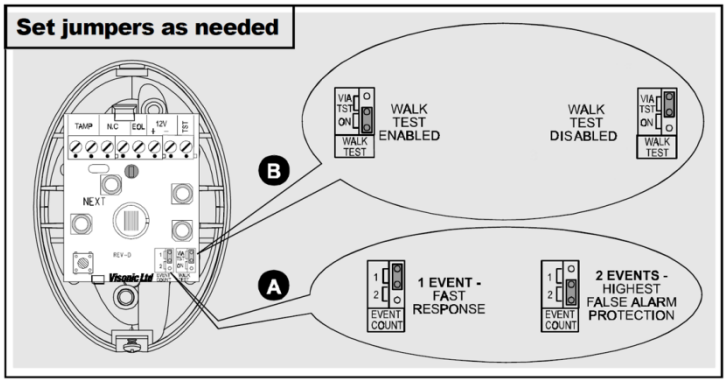
Punch out any one of the wiring knockouts shown above.
Hold the base against the bulkhead at the selected installation location, mark the points for drilling and drill the pilot holes.

Pass the wires through the wiring inlets into the base and attach the base to the bulkhead.
Return the PCB to its place within the base.

Notice is to be observed that the terminals will accept up to 1.0mm^2 conductors.

Setting the Pulse Counter:

Set the PIR detector for maximum false detection immunity; move the jumper to position 2. In this position, two consecutive motion events are required to trip the PIR detector.



Jumper Setting Options

Detection Walk Test

Verify that the LED is enabled.

Install the front cover in place.

Walk across the detector's field of view in different directions, at various distances from the detector, and verify proper detection throughout the detector's coverage area (the red LED will illuminate for several seconds each time motion is detected).

When done, remove the cover and disable the Walk Test. This will prevent the LED causing any possible pollution of the officer's night vision.

Remount the cover and fasten it to the base using the small screw at the bottom.

- NMEA Data Protocol – Output to VDR/S-VDR

The data available at the RS422 output port conforms to IEC 61162-1, 6.2 outputs.

During Dormant period;
`$BNALR,,000,V,A,C1=MAN;C2=03;C3=0*hh<CR><LF>`

At the end of the Dormant Period during the Visual Alert
`$BNALR,,000,A,A,C1=MAN;C2=03;C3=0*hh<CR><LF>`

During the 1st Stage Alarm;
`$BNALR,,000,A,A,C1=MAN;C2=03;C3=1*hh<CR><LF>`

During the 2nd Stage Alarm;
`$BNALR,,000,A,V,C1=MAN;C2=03;C3=2*hh<CR><LF>`

During the 3rd Stage Alarm;
`$BNALR,,000,A,V,C1=MAN;C2=03;C3=3*hh<CR><LF>`

BNWAS Mode: `c1 = AUT, MAN or OFF.`
`c2 = 03 to 12 minutes Dormant Period.`
`c3 = Alarm Stage 0, 1, 2 or 3.`

- Software Setup and Operation

Switching On The BNWAS 150

SETUP Menu

The SETUP mode allows the user to access the SETUP MENU and customise the timing parameters within the BNWAS 150 menus.
To enter the SETUP mode insert the key and turn clockwise to SETUP.

Mode Selection

In the SETUP menu you can step sequentially through the three different modes of operation by pressing the SELECT button. The three different modes are:-

ON

The system functions as per the set timing parameters.
Alarms as per IMO standard MSC128(75).

OFF

System operation inhibited. The Emergency Call function is still operational

AUTO

When this mode is selected the system runs as per “ON” mode only if Autopilot signal is active; otherwise operation is inhibited. This function should only be used with class approval.

STAGE ALARM 3 Timing Selection

Press the SELECT button until you arrive at the Stage Alarm 3 timing option.

Stage 2 to Stage 3 Delay Time

The Stage 2 to Stage 3 delay is defined in seconds. This is the time from the Stage 2 alarm becoming active to the Stage 3 alarms becoming activate, assuming Stage 2 is not acknowledged in the meantime.

The Stage 2 to Stage 3 delay is configured using the UP and DOWN buttons. A time between 90 seconds and 180 seconds in 10 second steps can be entered. When the desired timing is displayed press the SELECT button.

DORMANT Period Timing Selection

Press the SELECT button until you arrive at the dormant period timing option.

Dormant Period Time

The dormant period is defined in minutes. This period is the time taken from initial start-up, or operator reset, to the Visual Alert Stage being initiated. The dormant period is configured using the UP and DOWN buttons to toggle between digits 3 and 12. When the desired period is displayed press the SELECT button.

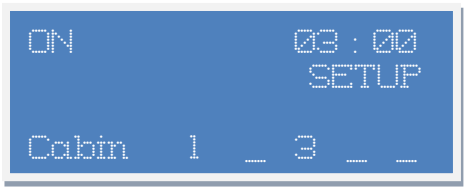
BNWAS150 Startup

On first power up a message from the system designers will appear on the display.

The software version and date will then be displayed followed by CPU 1 and CPU 2 running a self-test, a short beep will be heard on completion.

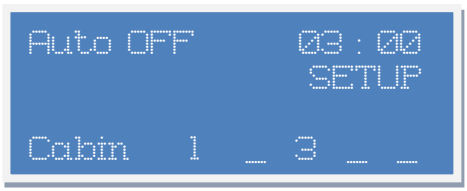
After a few seconds the operating screen will be displayed.

Entering Setup



Insert the MODE key and turn clockwise – the status indication will change from RUN to SETUP

Press SELECT button - mode will change from ON to OFF
The BNWAS is now set to OFF.



Pressing the SELECT button again, will cause the mode to change from OFF to Auto OFF

If the Autopilot is connected the system will automatically turn ON and OFF as the autopilot is engaged and disengaged.

Mode Selection

Pressing the SELECT button again, will change Dormant Period to ON.

If the key is now turned to the RUN position and removed, the system is now in the ON mode.

Pressing the SELECT button again will change ON to OFF.

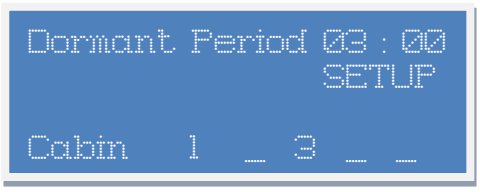
If the key is turned to RUN and removed the system is now in the OFF mode.

Pressing the SELECT button again will change OFF to Auto OFF.
If the key is turned to RUN and removed the system is now in the Automatic mode. The display will change to Auto ON if the Autopilot is connected and the Autopilot is engaged.

Stage 2 to Stage 3 Delay

Pressing the SELECT button again will change Auto OFF to Stage Alarm 3.
By using the UP and DOWN buttons the stage 3 alarm time can be changed, from 90 seconds (1:30) up to 180 seconds (3:00 minutes) in 10 second steps.

Initial Dormant Period



Pressing the SELECT button again will change Stage Alarm 3 to Dormant Period.
By using the UP and DOWN buttons the dormant period time can be changed from 3 minutes to 12 minutes, in 1 minute steps.

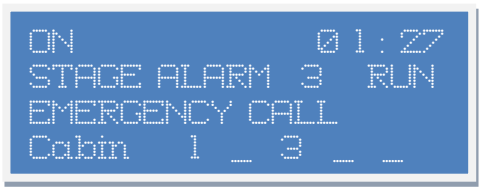
Operational Sequence

When the BNWAS countdown reaches 00 : 00 the STAGE ALARM message will appear.
The display and the remote reset buttons will now flash.
To reset the system press the RESET button or press a remote reset button.

15 Seconds after Stage Alarm is displayed STAGE ALARM 1 will be displayed and the Stage 1 alarm on the display unit will audible alarm along with any local sounder.
To reset the system press the RESET button or press a remote reset button.

15 Seconds after Stage Alarm 1 is displayed STAGE ALARM 2 will be displayed and Stage 2 and the selected cabin sounders will also begin to sound.
To reset the system press the RESET button or press a remote reset button.

1:30 to 3:00 minutes after stage 2, depending on the stage 3 delay setting, STAGE ALARM 3 will be shown and all sounders will sound in all installed locations.
To reset the system press the RESET button on the display.
NB: Pressing the remote resets, or motion detected by the PIR will not reset the system once stage 3 alarm has been reached.



EMERGENCY CALL, In the event of an emergency press and hold the EMERGENCY CALL button until the alarm sounds.
All stage 1 and the selected cabin sounders will become active.
To reset the system press the RESET button on the display.
NB: Pressing the remote resets or motion detected by the PIR will not reset the EMERGENCY CALL.

Selecting Duty Cabins and Using Cabin Call

Selecting Duty Cabins for Stage 2 Alarm and Cabin Call

The Selecting and De-selecting Cabins function can only be accessed when the system is in RUN MODE.

Press and hold the SELECT button until >_< appears.
With the SELECT button held press UP to move between the cabins and press DOWN to select or de-select a cabin.
When selected the cabin's number will be remain displayed.

Example:
Removing Cabin 4 - which is selected in the screen to the left.
Press and hold the SELECT button and >_< will appear at cabin number 1

While still holding the SELECT button, press UP and the cursor >_< will move to the next cabin location.

Repeat this past cabin >3<, still holding the SELECT button and pressing UP again.

While still holding the SELECT button, press UP once more so that >4< is shown on the display.

Continue to hold down the SELECT button. Once at cabin number >4< press DOWN - >_< will now be shown instead of >4<. Cabin 4 is now de-selected and will not be alerted at stage 2 or when Cabin Call is pressed.

Using Cabin Call Function

If the CABIN CALL button is pressed the CABIN CALL message appears and the cabins selected at the bottom of the screen will have their sounders activated.
In this case cabins 1 and 3 will be called.
Press the RESET button to clear the CABIN CALL.

External Reset
(if external equipment connected)

RADAR RESET message will be shown when the RADAR is in use by an operator and the BNWAS timer will reset.

(This will only be shown if the RADAR in use connection is made)

ECDIS RESET message will be shown when the ECDIS is in use by an operator and the BNWAS timer will reset.

(This will only be shown if the ECDIS in use connection is made)

AUXILIARY 1 RESET message will be shown when the equipment connected to Auxiliary 1 is in use by an operator and the BNWAS timer will reset.

(This will only be shown if the Auxiliary 1 connection is made)

AUXILIARY 2 RESET message will be shown when the equipment connected to Auxiliary 2 is in use by an operator and the BNWAS timer will reset

(This will only be shown if the Auxiliary 2 connection is made)

Unacknowledged Alarms

(if external equipment connected)

RADAR ALARM This will be displayed if an unacknowledged alarm is received from the Radar.
Pressing the RESET button will display any other active alarms but will not reset the alarm.

(This will only be shown if the RADAR alarm is connected)

ECDIS ALARM This will be displayed if an unacknowledged alarm is received from the ECDIS.
Pressing the RESET button will display any other active alarms but will not reset the alarm.

(This will only be shown if the ECDIS alarm is connected)

AUTOPILOT ALARM. This will be displayed if an unacknowledged alarm is received from the Autopilot.
Pressing the RESET button will display any other active alarms but will not reset the alarm.

(This will only be shown if the Autopilot alarm is connected)

ECHO SOUNDER ALARM. This will be displayed if an unacknowledged alarm is received from the Echo Sounder.
Pressing the RESET button will display any other active alarms but will not reset the alarm.

(This will only be shown if the Echo Sounder alarm is connected)

UNACKNOWLEDGED ALARM This will be displayed if any unacknowledged alarms, other than those listed above, are received by the BNWAS.
Pressing the RESET button will display any other active alarms but will not reset the alarm.

NOTE!! For all of the above unacknowledged alarms, pressing the RESET button will have not reset any alarm until the equipment generating the alarm has been acknowledged.

- System Faults

Power Error

If the main power fails the standby power will be used to power the system. This is indicated by the MAIN POWER FAIL being displayed on the LCD screen until the main power is restored to the system.

MAIN POWER FAIL will be shown if the main power input fails. Press the RESET button to clear message.
If message does not clear check main power input.

If the standby power fails, while main power remains on, STANDBY POWER FAIL will be indicated on the LCD display until the standby power is restored.

STANDBY POWER FAIL will be shown if the standby power fails.
Press the RESET button to clear message.
If message does not clear check standby power input.

Tamper Error

If the interface to any peripheral device is disconnected, "**Tamper**" will be displayed on the LCD screen. This will continue to be displayed until the cause of the tamper is removed.

If the Tamper message appears, the PIRs or one of the reset switches may have been tampered with or have become faulty. Check the PIR's and reset switches for damage.

Press the RESET button to clear the message once any fault has been rectified.

If Tamper remains displayed there is a further problem with another PIR or reset switch.

- Maintenance guide

The BNWAS 150 system requires periodic (annually) confirmation that all sensors are active, and conduct a full system integrity check.

Any damaged/inactive peripherals MUST be replaced by a suitable spare part by an approved engineer.

All cabling and interfaces should be re-checked to confirm system integrity and any damaged cables must be replaced/re-wired if required by an approved engineer.

Any changes made above must be tested to confirm system operation.

Any warranty void marks/visible tampering must be logged to prevent future disruption and system damage.

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- Commissioning Checklist

AMI Marine Ltd
Southampton

BNWAS-150
Bridge Navigational Watch Alarm System
COMMISSIONING & INSTALLATION REPORT

Vessel Hull No/Name:	
IMO Number:	
Flag State:	
Class Society:	
Serial No:	
Install Date:	
Commissioning Engineer:	

01. Pre-Requisites

This commissioning checklist and report must be carried out upon completion of the installation of the BNWAS 150 system:
Installation manual available for reference.
All peripheral equipment's that are to be connected are operational.
Make any necessary crew announcements warning of BNWAS testing.

02. Test Equipment

The following equipment is recommended for an effective and complete install.
Digital Multimeter
Laptop with serial cable and HyperTerminal or similar

03. Visual Inspection

Check	Requirement	Observation
Check all equipment fixings are secure.	All equipment are fixed to the vessel securely and not liable	
Check all units for physical condition.	There is no physical damage to the exterior of any of the equipment.	
Check all inter-unit cabling and the external equipment cable route.	The cables are secured in or to a proper cable support.	
Check cable entry into the BNWAS equipment.	The cables must enter the BNWAS equipment through a suitable sized gland and not be able to move.	

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04. Power Supply

Electrical Conformance	Requirement	Observation
24V DC supplies Ensure the supply voltage is of the correct rating.	Main supply voltage rating is correct. Standby supply voltage rating is correct.	
Apply the Main and Standby supplies to the BNWAS 150 unit and ensure correct operation.	Ensure the BNWAS X150-D display powers up. The LCD illuminates and the HMI starts the software initialisation.	
Isolate Main supply from the BNWAS 150 and ensure automatic switchover to Backup supply occurs.	Check the BNWAS 150 system continues operation without interruption and that the MAIN POWER FAIL is displayed.	
Re-apply Main supply to the BNWAS 150 unit and ensure it automatically switches back over to Main supply.	BNWAS 150 system continues operation without interruption After pressing the RESET button the MAIN POWER FAIL no longer appears.	
Isolate Standby supply from the BNWAS 150.	Check the BNWAS 150 system continues operation without interruption and that STANDBY POWER FAIL is displayed.	
Re-apply the Standby supply to the BNWAS 150 unit.	BNWAS 150 system continues operation without interruption After pressing the RESET button the STANDBY POWER FAIL no longer appears.	

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05. System Test

Conformance	Requirement	Observation
Check that both the stage 2 to stage 3 alarm and dormant period timings are set as required. All cabins are selected for Stage 2 alarm. If fitted cover the X150-MD PIR	Stage 2 to Stage 3 Delay. (90-180 seconds). Dormant Period. (3-12 minutes) All 5 cabin numbers show on the BNWAS X150-D. To prevent premature reset.	
Ensure the system mode is set to ON. Turn the key switch to RUN.	Ensure the BNWAS X150-D displays ON and RUN. The display starts the countdown from the set dormant period. The X150-RI and X150-RE switch	
Visual Alarm. The X150-D has counted down to 00:00 minutes.	Check the BNWAS X150-D Display Control unit displays STAGE ALARM and the X150-RI Reset unit will flash. Note! That the 150-RE unit will flash and sound alternatively.	
Stage 1 Alarm. 15 seconds after 00:00	Check the BNWAS X150-D Display Control unit displays STAGE ALARM 1 and sounds. If fitted the BNWAS X150-SD sounder also sounds.	
Stage 2 Alarm. 30 seconds after 00:00	Check the BNWAS X150-D displays STAGE ALARM 2. Check that all X150-SD or X150-SB units fitted as Stage 2 alarms also become active and sound.	
Stage 3 Alarm. 30 seconds plus Stage2 to Stage3 delay time.	Check the BNWAS X150-D displays STAGE ALARM 3. Check that all X150-SD or X150-SB units fitted as Stage 3 alarms also become active and sound.	
Press the RESET button on the BNWAS X150-D unit.	BNWAS 150 system resets and the dormant period reverts back to the pre-set time.	

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06. External Inputs (Resets & Unacknowledged Alarms)

Conformance	Requirement	Observation
Verify the external reset functionality. Remove the cover of the PIR.	Verify the X150-MD PIR detects movement and resets the dormant period. Verify the external equipment resets the dormant period.	
Cover the PIR.	Verify the dormant period does not reset.	
Apply a bridge across the relevant reset input & +12V.	Verify the dormant period resets.	
Remove the bridge across the relevant input and the +12V.	Verify the countdown restarts.	
Verify the Unacknowledged Alarm Transfer functionality.	Verify the BNWAS X150-D Display Control unit displays the relevant ALARM and passes it through to Stage 2.	
Apply a bridge across the relevant alarm input& +12V.	Verify the Display shows the alarm source & goes to Alarm Stage 2.	
Remove the bridge across the relevant input and the +12V. Press the RESET button.	Verify the alarm stops and the display reverts back to normal operation.	

07. System Modes

Conformance	Requirement	Observation
Verify the AUTO mode functionality. In the SEUP menu select the AUTO OFF and return the key to RUN position.	Verify the Auto OFF remains displayed on the X150-D and the time remains static.	
If connected apply the Autopilot signal to the BNWAS system. Else apply a bridge across to AUTO I/P and +12V input. J5-12 and 13.	Verify the Auto ON is now displayed on the X150-D and the time is now counting down.	
Remove the Autopilot signal to the BNWAS system. Else remove the bridge across the AUTO I/P and +12V input. J5-12 and 13.	Verify the Auto OFF is now displayed on the X150-D and the time is again static.	
Verify the OFF mode functionality. In the SEUP menu select the OFF and return the key to RUN position.	Verify the that no alarms are active and the system timer remains static.	

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08. Emergency and Cabin Call

Conformance	Requirement	Observation
Verify the Emergency Call functionality. Ensure the Mode is ON and the key to RUN position. Press the Emergency Call.	Verify the system alarms at the ALARM STAGE 3.	
Press the RESET button on the BNWAS X150-D unit.	BNWAS 150 system resets and the dormant period reverts back to the pre-set time.	
Verify the Cabin Call functionality. Ensure the Mode is ON and the key to RUN position. Press the Cabin Call.	Verify each of the cabins fitted with an X150-SD or X150-SB is active and sounding.	
Press the RESET button on the BNWAS X150-D unit.	BNWAS 150 system resets the sounders.	

09. VDR/S-VDR Output

Conformance	Requirement	Observation
Identify the NMEA0183 data output	No Corrupt data or incorrect values.	

10. Signature Page

Type Approval Certificate Issued by

Approval Certificate Number

Engineer Authorised by the Manufacturer

Initials & Name

Signature

Ship's Captain

Initials & Name

Signature

Date

Ship's Stamp

Original – Retained by vessel.
Copy 1 – Retained by Installation Engineer.
Copy 2 – Forwarded to AMI Marine Ltd.

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- Warranty Card

AMI Marine Warranty; (abbreviated, full version on request)

The Warranty Period is 24 months – first 12 months covers parts and labour, the second 12 months covers parts only - from date of dispatch unless an alternative period has been otherwise agreed in writing.

This warranty shall only apply where the REGISTRATION CARD (below) and COMMISSIONING REPORT (above) have been properly completed and returned to AMI Marine Ltd within the period of 21 days from installation.

Returns Procedure;
Send an email requesting an official Returns Authorisation Number via email with the subject "REQUEST FOR RETURN AUTHORISATION" to technical@amimarine.com

Please do not send any equipment to AMI Marine Ltd without an official Return Authorisation Number.

Documents to be included;
A copy of the original INSTALLATION REPORT and a print out of your RETURN MATERIAL AUTHORISATION INFORMATION EMAIL, and enclose both in the return package.

Please ensure the returned equipment is packaged safely and securely and according to carrier instructions. Damage incurred during return shipping due to inadequate protection will render the item ineligible for return, repair, or exchange under the Warranty Terms. Items not received by AMI Marine Ltd, will not be credited.

Most authorised returns should be returned to the address below - however there are some exceptions, so DO NOT ship to this address without first reviewing your RETURN AUTHORISATION INFORMATION EMAIL for applicable return instructions:

AMI Marine Ltd
Unit 9, Crosshouse Centre
Crosshouse Road
Southampton
SO14 5GZ
United Kingdom

A full explanation of AMI Marine Ltd warranty conditions can be found on our web site or requested via email.

* Terms of Service and Policies are subject to change without notice.

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Please complete and return to AMI Marine either by post to the above address or by email to technical@amimarine.com

Warranty Registration Form	
Model Number	
Serial Number	
Date of Install	
Installation Company	
Vessel Name	
IMO Number	

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