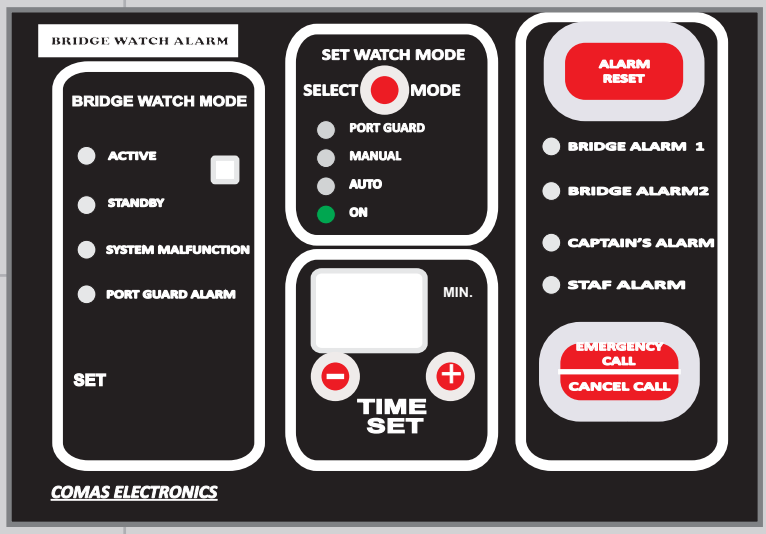
BASIC BRIDGE WATCH ALARM SYSTEM

VESSELGARD BNWAS SYSTEM

MANUAL

MAIN UNIT



BRIDGE:
MOTION DETECTOR

CAPTAIN'S QUARTER:
ACTIVATED 15"
AFTER ALARM 1

CREW AREA:
ACTIVATED 60" TO 80"
AFTER ALARM 2

THE ONLY MAINTENANCE FREE WATCH ALARM SYSTEM_

THE ONLY WATCH ALARM SYSTEM_
WHICH CAN BE INSTALLED BY VESSELS CREW_

COMAS ELECTRONICS INT. CO

COMAS-BNWAS-UM-V5-20120418

Table of Contents

CAUTIONS

Tampering system parts except connection boxes may permanently affect system functionality and void system warranty

Changing system parameters requires usage of key, used only by authorized crew members.

Cables used for ALL system connections must be Marine Type ONY

SYSTEM'S CERTIFICATES

MARINE DIVISION

Certificate number: 25201/A0 BV
File number: NAV0/85542/1
Product code: 4442H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

COMAS ELECTRONICS INTERNATIONAL LTD
LIMASSOL - CYPRUS

for the type of product

BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM (BNWAS)

BNWAS Model: VesselGard

Requirements:
IMO Res. A.694(17), IMO Res. MSC.128(75), IMO MSC/Circ.982, IMO Res.MSC.191(79), IEC 61162 Series, IEC 60945 (2002), IEC 62616 (2010), IEC 62288 (2008).

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 11 Aug 2016

For BUREAU VERITAS,

At BV PIRAEUS, on 11 Aug 2011,

Dimitris DIMITROPOULOS

BUREAU VERITAS SURVEYORS AT PARIS 1828 PIRAEUS INTERNATIONAL REGISTER

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

The Bridge Navigational Watch Alarm System BNWAS, Model VesselGard, monitors the bridge activity and detect operator disability which could lead to marine accidents.

1.1 - BNWAS Components:

Component	Model Number
Main Unit	V1.2
Reset / Visual Alarm Unit	V1.1
Alarm Unit	V1.1
Motion Detector	V1.1 - OTD-40T (PIR + MW)
Connection Box	V1.2
Port Alarm Reset Unit	V1.1

1.2 - Technical Specifications:

Operating Modes	Mode ON, Mode OFF and Automatic Mode
Inputs	Inputs for PIR + MW motion sensors Inputs for external manual reset units NMEA port for Auto On/Off Input for Auto On/Off Input for External Emergency Input for Port Guard Reset
Outputs	Output for Visual Alarm Output for 3 level Audible Alarm NMEA port for VDR / SVDR Output for Malfunction Alarm
Main Unit Supports	10 Reset units with visual alarm 15 Alarm units in 3 levels 8 Motion detectors in 2 groups 10 Port reset units
Main Power Supply	100/240 VAC, 50-60Hz
Emergency Power Supply	24 VDC (18 - 36VDC)

Type A: Allows installation by vessels crew members.
Type B: To be installed only by technicians.

1.3 - Software Version:1.2

2. DOCUMENTS AND DRAWINGS:

2.1 - Technical data sheets for intelligent motion sensors OTD-40T, rev.02, dated 07/2011.
2.2 - Unreferenced Technical data sheets for VesselGard - BNWAS
2.3 - Unreferenced User Manual V3 -BNWAS - VesselGard

3. TEST REPORTS:

3.1 - Test Report H.E.E.Q.A.C. N° 503616-E dated 27/04/2011
3.2 - Test Report H.E.E.Q.A.C. N° 503612-E dated 06/05/2011
3.3 - Test Report H.E.E.Q.A.C. N° 503647-E dated 25/07/2011
3.4 - Test Report comas S/N°, dated 22/07/2011

4. APPLICATION / LIMITATION:

4.1 - As per requirements stated on first page.
4.2 - Only Hardware and Software successfully tested together in compliance with the regulations as referred to in page one, according to the declaration of the manufacturer are covered by this certificate.
4.3 - Approval also valid for ships to be granted with the notations: SYS-NEQ, SYS-NEQ 1, SYS-IBS, SYS-IBS-1.

5. PRODUCTION SURVEY REQUIREMENTS:

5.1 - The **BNWAS - VesselGard** is to be manufactured, examined and tested by **COMAS ELECTRONICS INTERNATIONAL LTD** in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.

5.2 - Production sites are to be recognized by Bureau Veritas as per NR320 for HBV products. To this end **COMAS ELECTRONICS INTERNATIONAL LTD** has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.

5.3 - **COMAS ELECTRONICS INTERNATIONAL LTD** has declared to Bureau Veritas that the type of product described in this certificate may be manufactured at the following production site:

Ringel Electronics Agni Georgiadou & Co. LP
Industrial Area of Sindos
57022 THESSALONIKI
GREECE

6. MARKING OF PRODUCT:

6.1 - Trade name.

6.2 - Date of manufacture and serial number.

6.3 - Equipment type number or model identification under which it was type-tested.

6.4 - Marking is to be in accordance with IEC60945.

7. OTHERS:

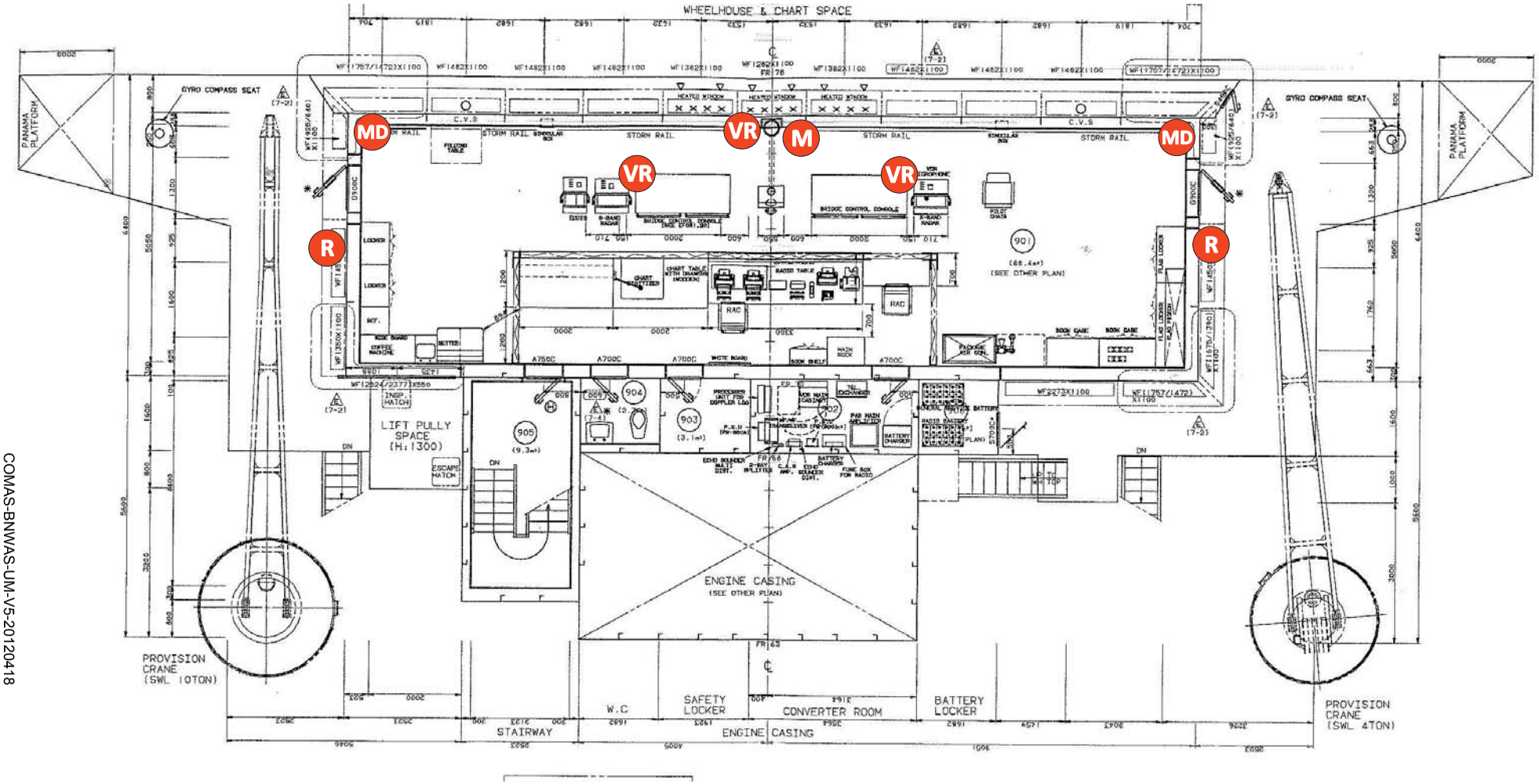
This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that:

COMAS ELECTRONICS INTERNATIONAL LTD
2 Riga Fereou str.,
Limassol Center B.,
5th Floor Limassol
Cyprus

will accept full responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the units and the conditions of this approval.

***** END OF CERTIFICATE *****

SAMPLE OF INSTALLATION (WIRING) DRAWINGS TO CLASS



COMAS-BNWAS-UM-V5-20120418

M MAIN UNIT + VISUAL + RESET

MD MOTION DETECTOR

A OFFICER OR COMMON AREA ALARM UNIT

VR RESET UNIT + VISUAL (ALL OUR COMPANY'S RESET UNITS ARE ALSO VISUAL UNITS)

V VISUAL ALARM UNIT

R EXTERNAL RESET UNIT (WATERTIGHT)

TITLE : 4,250 TEU. CONTAINER VESSEL

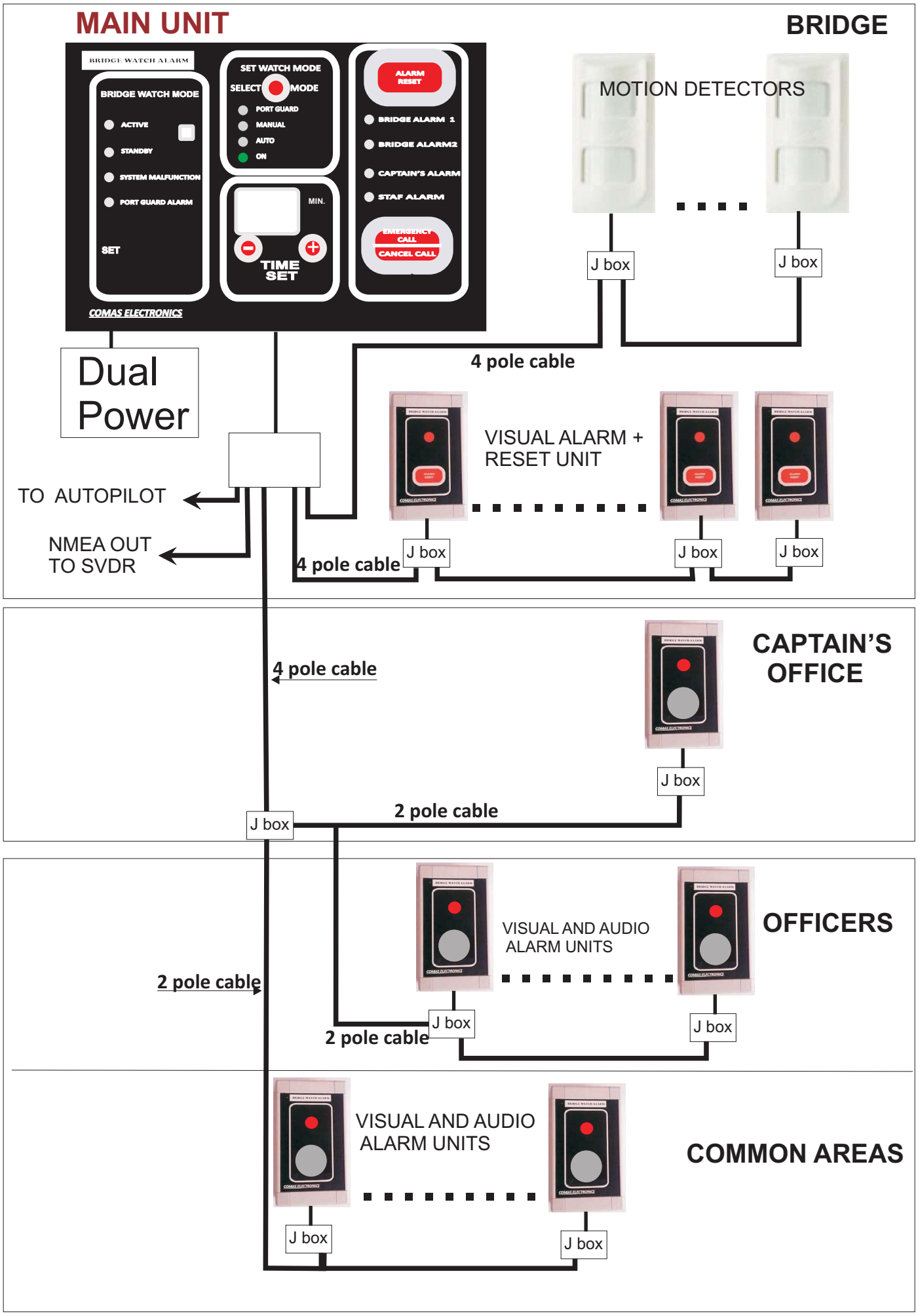
ACCOMMODATION ARRANGEMENT FOR NAV.BRI.DECK (9/9)

HULL NO: 1455/56 | DWG NO: AF081.20

SAMSUNG HEAVY INDUSTRIES CO., LTD.

DWG SIZE : A1 (594 X 840)

TYPE “A” SYSTEM



USER MANUAL

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 must be tamper proof**. 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, in case 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 follows:
- 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 extra auxiliary points as requested by customer.
- 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.

Multiple alarms units for each stage are possible.

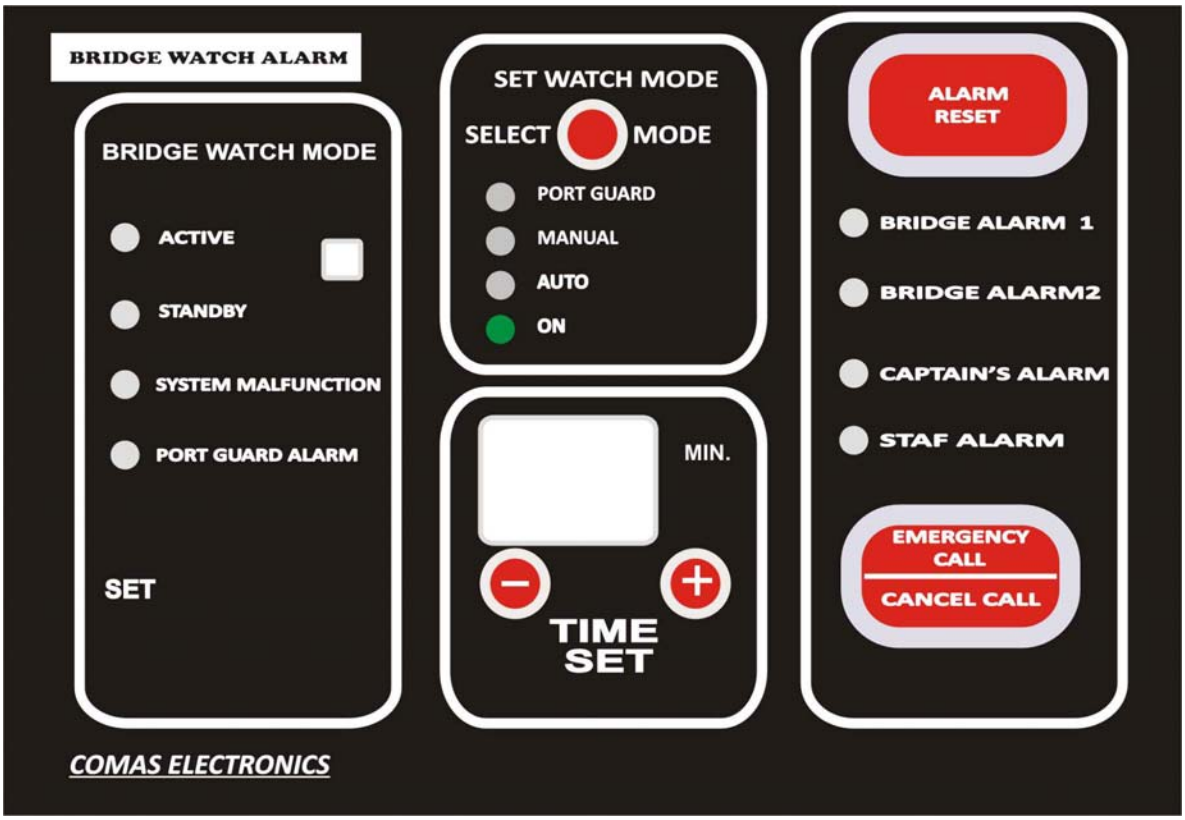
The Reset function is initiated by suitable buttons on the bridge and by motion detectors. The Reset boxes include an auxiliary visual alarm indication. This way crew members on duty can easily identify the condition and press the reset.
The motion detectors relieve a busy Officer of the Watch of the need to press the reset function. His activity on 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, which is not supplied and must be purchased by customer separately (12VDC, 1.5Ah)**.

Description of the system Parts

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:

Bridge Watch Mode (left column): 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
  If a power failure or system malfunction is detected the lamp is set to ON and an external signal is created (Iec62616/3.4). Additionally the box tampering initiates a malfunction signal.
- Port Guard Alarm: auxiliary alarm, used when the bridge is not occupied

Set Watch Mode (upper middle column): 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 lit.
- On always: the system is continuously On. LEDs “manual” and “on” are lit.
- Auto On/Off: the system is activated/deactivated by the external inputs. LEDs “auto” and “on” are lit.
- 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

	Display
- Bridge Alarm 1: Visual Alarm	A0
- Bridge Alarm 2: Audible alarm	A1
- Captain’s Alarm: second stage	A2
- Staff alarm: third stage	A3

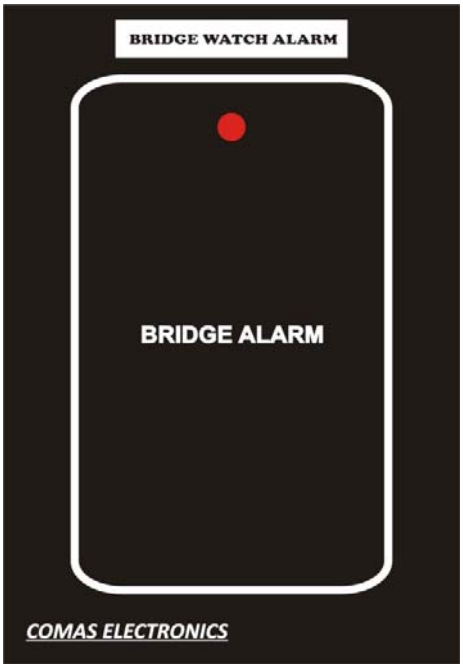
Two buttons are in this section: The “Alarm Reset” clears the alarms and restarts the time. The “Emergency call” activates all alarms, when the OOW needs immediate assistance.

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

Reset / Visual Alarm unit

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

Alarm unit

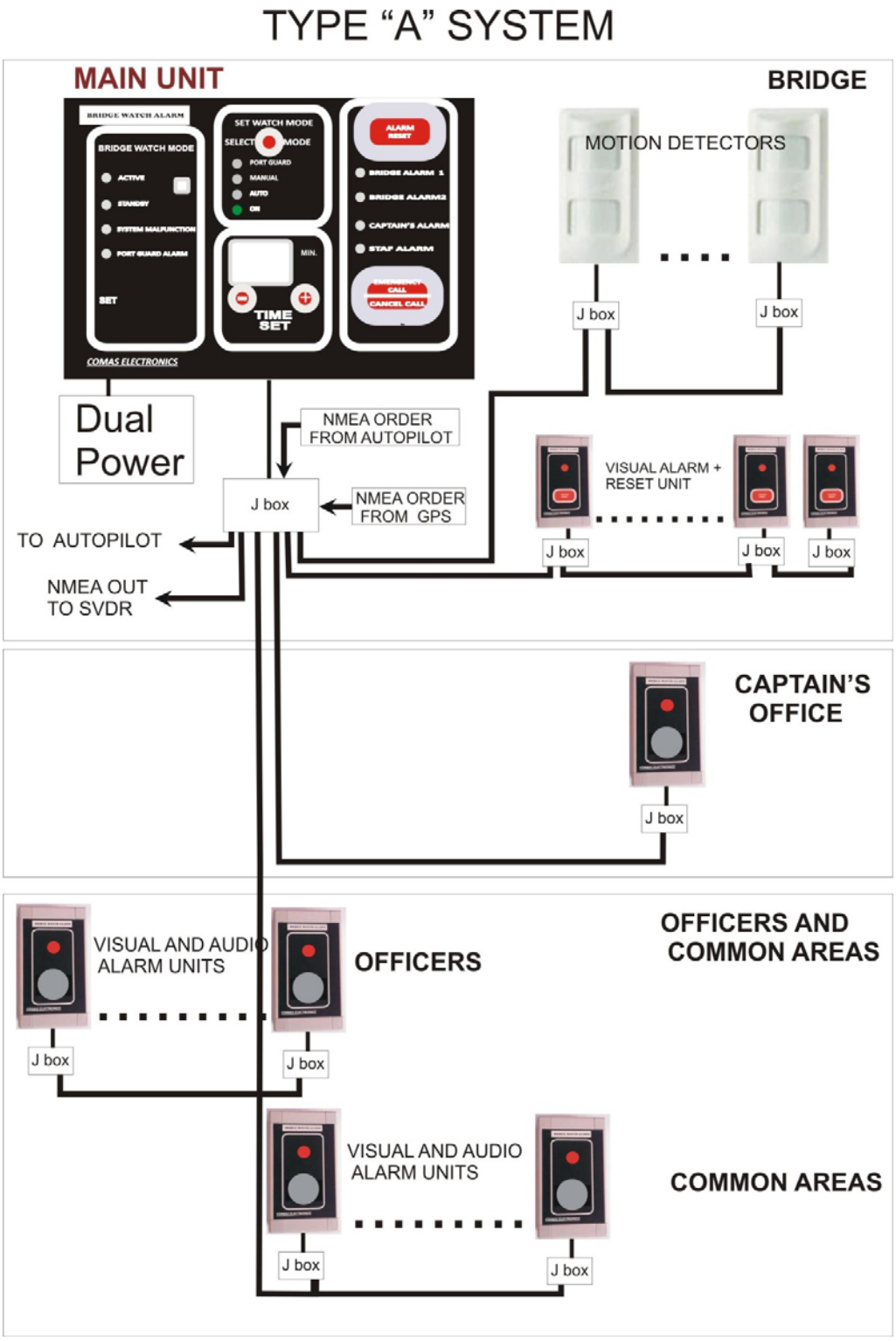


The Bridge Alarm Unit and the Second and Third level alarms are housed in similar boxes. These Units do not contain a reset button, as all reset functions must be on the bridge, in accordance with the standard

Port Alarm unit

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



System Functions

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 in “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.

System Settings

By 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 lit.
- On always: the system is continuously "ON". LEDs “manual” and “on” are lit.
- Auto On/Off: the system is activated/deactivated by the external inputs (GPS, AutoPilot) provided the system is connected to the external devices. LEDs “auto” and “on” are lit.
- 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.
When in normal bridge alarm mode the letters SE alternate with the (dormant period) time.
When in port alarm mode the letters SP alternate with the (port alarm) time.
Use the two key under the display to change the time.

After a timeout, for example if the key is forgotten at the position “Set”, the system exits Setting Mode and enters the programed mode.

Secondary settings are accessed by pressing the “RESET” buton while in set mode. 3 more settings are available:

- Sound modulation (S1 in the display): 8 modulation patterns for the first stage audible alarm are available numbered 0-7. In the following diagram 1 means sound, 0 means off. Each digit represents 1 second.

0: 010101….
1: 001100110011…
2: 011101110111….
3: 00001111000011110000…
4: 01011111010111110101…
5: 00111111001111110011…
6: 01111111011111110111…
7: 00000000111111110000…

- Sound Volume (S2 in the display): 4 levels are available, 0 means full level (82db) 1 is the lowest (76db) 2-3 intermediate.
- Delay before third stage alarm (S3 in the display): default is 90 seconds (displayed as 13, 1 min 30 sec), 2 min and 3 min possible (displayed as 20 and 30).

Testing the System

We recommend testing the function of the system from time to time. Although the expected failure rate is small, it is good practice to test the system every month according to the following procedure.

- Inform the crew that a test is in progress, to avoid alarming them
- Press one by one all the reset buttons on the main unit and on all the reset units. The display should show momentarily the time set.
- Walk in front of every Motion Detector. The display should show again the time set.
- Press the emergency key on main unit. All alarm LEDs should start blinking.
- Verify one by one that all visual and audible alarm units, of all levels, are active
- Reset the emergency alarm from a reset unit
- Test possible external emergency buttons that initiate an emergency alarm

If any of the above fails, ask service department for a replacement unit.

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 follows:

$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

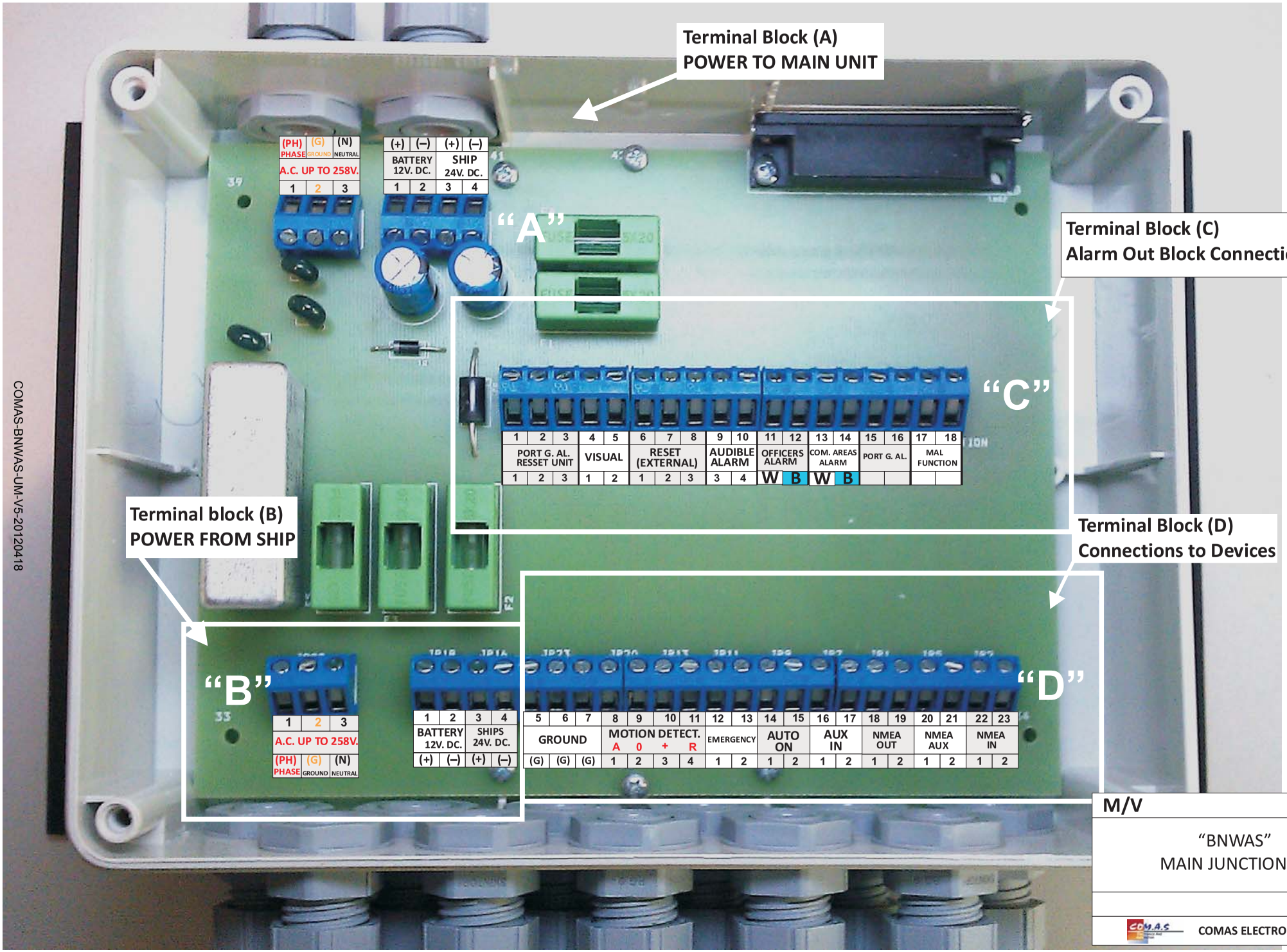
A. Crew Installation – tamper proof as delivered
All units of the system are sealed. On every unit a short cable is connected. A connection box is provided to ease the connection of the expansion cable to the system.

B. 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. Sealing is accomplished with the provided special screw caps, with should be glued in place with the glue contained in the box.

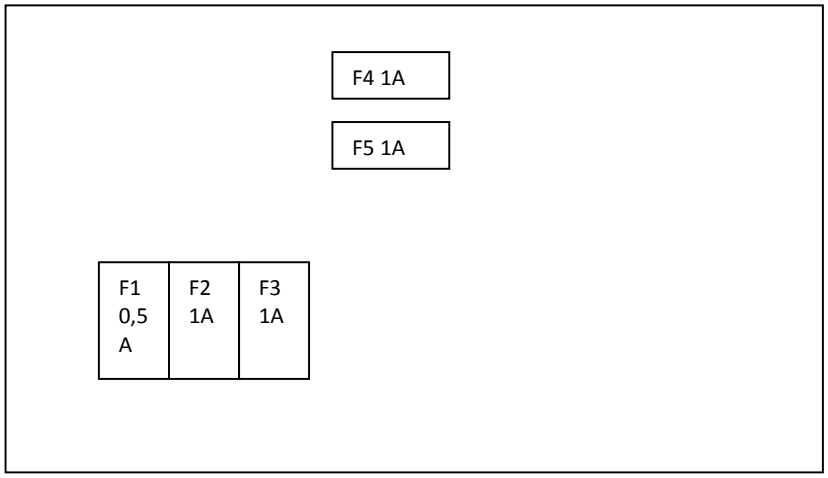
Connection board

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 IP65.


Terminal Block (A)
POWER TO MAIN UNIT
(PH) PHASE
(G) GROUND
(N) NEUTRAL
A.C. UP TO 258V.
1 2 3
(+) (–) (+) (–)
BATTERY 12V. DC.
SHIP 24V. DC.
1 2 3 4
"A"
Terminal Block (C)
Alarm Out Block Connections
"C"
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
PORT G. AL. RESSET UNIT
VISUAL
RESET (EXTERNAL)
AUDIBLE ALARM
OFFICERS ALARM
COM. AREAS ALARM
PORT G. AL.
MAL FUNCTION
1 2 3 1 2 1 2 3 3 4 W B W B
Terminal block (B)
POWER FROM SHIP
Terminal Block (D)
Connections to Devices
"B"
1 2 3
A.C. UP TO 258V.
(PH) PHASE
(G) GROUND
(N) NEUTRAL
1 2 3 4
BATTERY 12V. DC.
SHIPS 24V. DC.
(+) (–) (+) (–)
"D"
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
GROUND
MOTION DETECT.
A 0 + R
EMERGENCY
AUTO ON
AUX IN
NMEA OUT
NMEA AUX
NMEA IN
(G) (G) (G) 1 2 3 4 1 2 1 2 1 2 1 2 1 2 1 2 1 2
COMAS-BNWAS-UM-V5-20120418
M/V
"BNWAS"
MAIN JUNCTION BOX
DWG No.00231
COMAS ELECTRONICS INT.

Fuses:



F1: 110-230Vac
F2: Battery
F3: 24Vdc
F4,F5: External Devices Supply

Connections (short list):

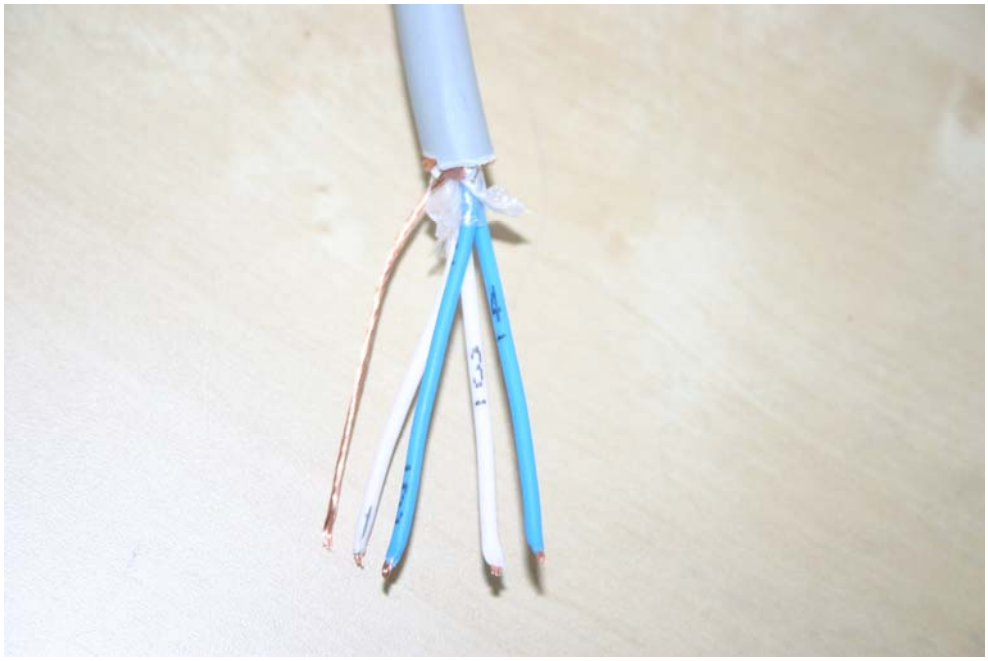
Upper Row: connection with main unit, allready connected in type "B".
Power supply 110-230Vac: (Neutral, Ground, Phase), Battery (+,-), 24Vdc(+,-)

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)

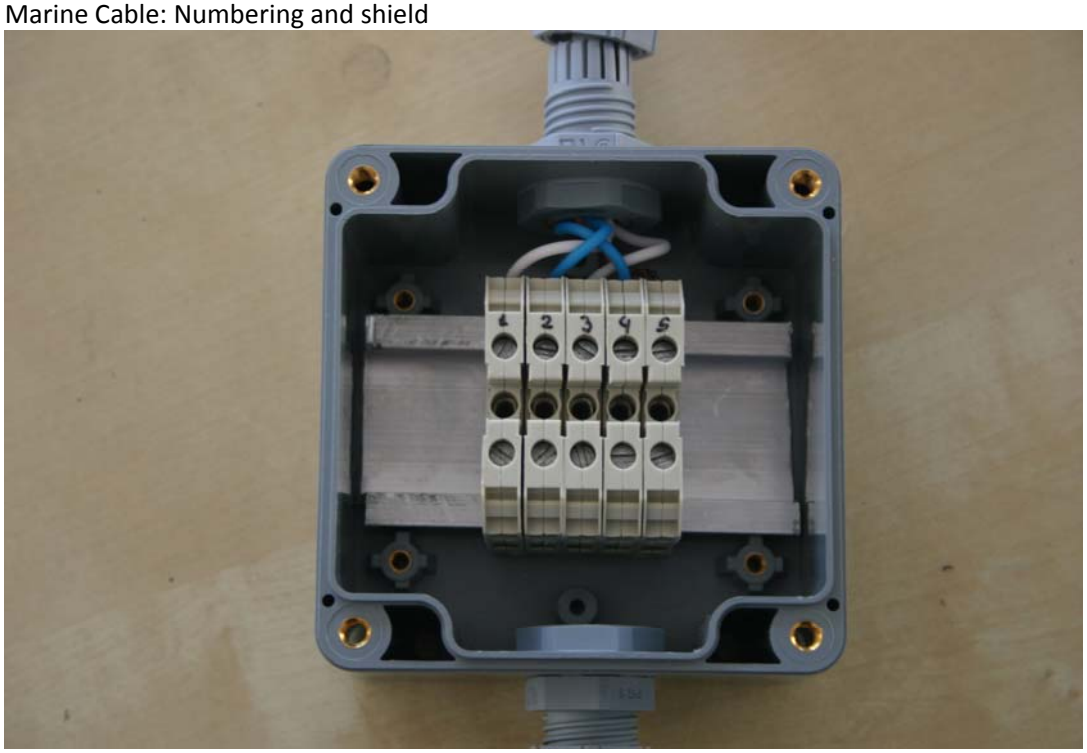
Third Row: connection with power supply and external Devices
Power supply 110-230Vac: (Neutral, Ground, Phase), Battery (+,-), 24Vdc(+,-)
(Ground,Ground,Ground), External Motion Detector (0,+,A,B), External Emergency (A,B), Auto On 1 (A,B), Auto On 2 (A,B), NMEA Out (A,B), NMEA Aux (A,B),NMEA In (A,B)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

External Devices Cabling

Use only marine-grade cables!



Marine Cable: Numbering and shield

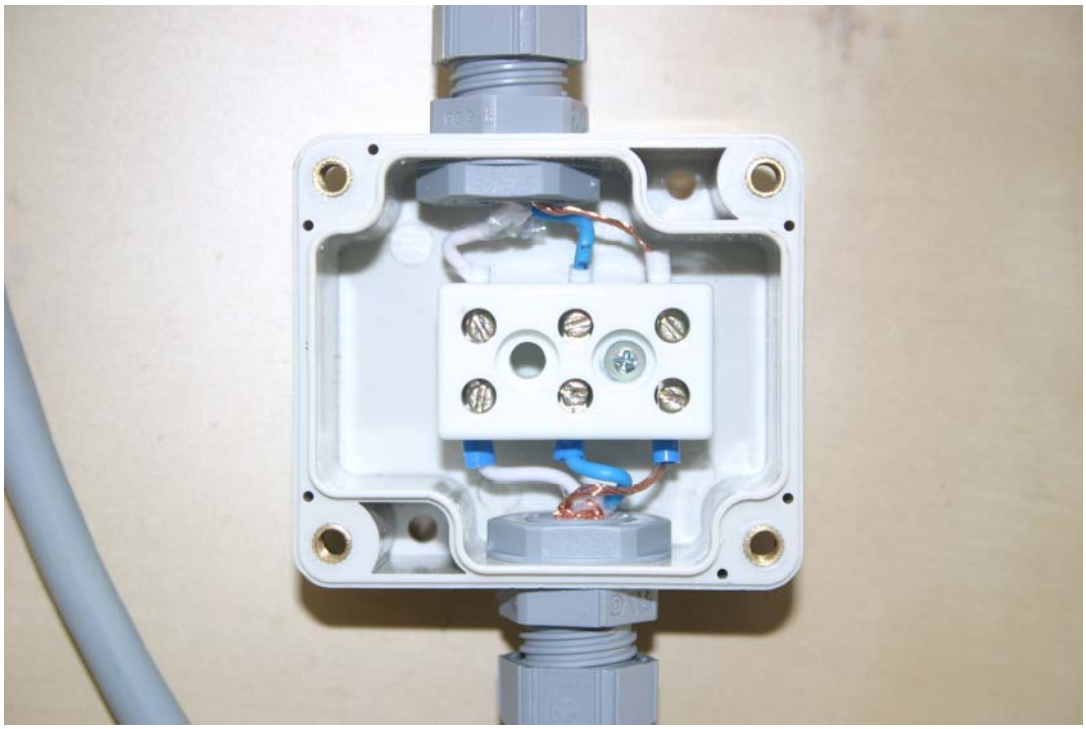


Reset Unit: Junction Box. Numbering straight 1,2,3,4,S

Same connection for motion detector:

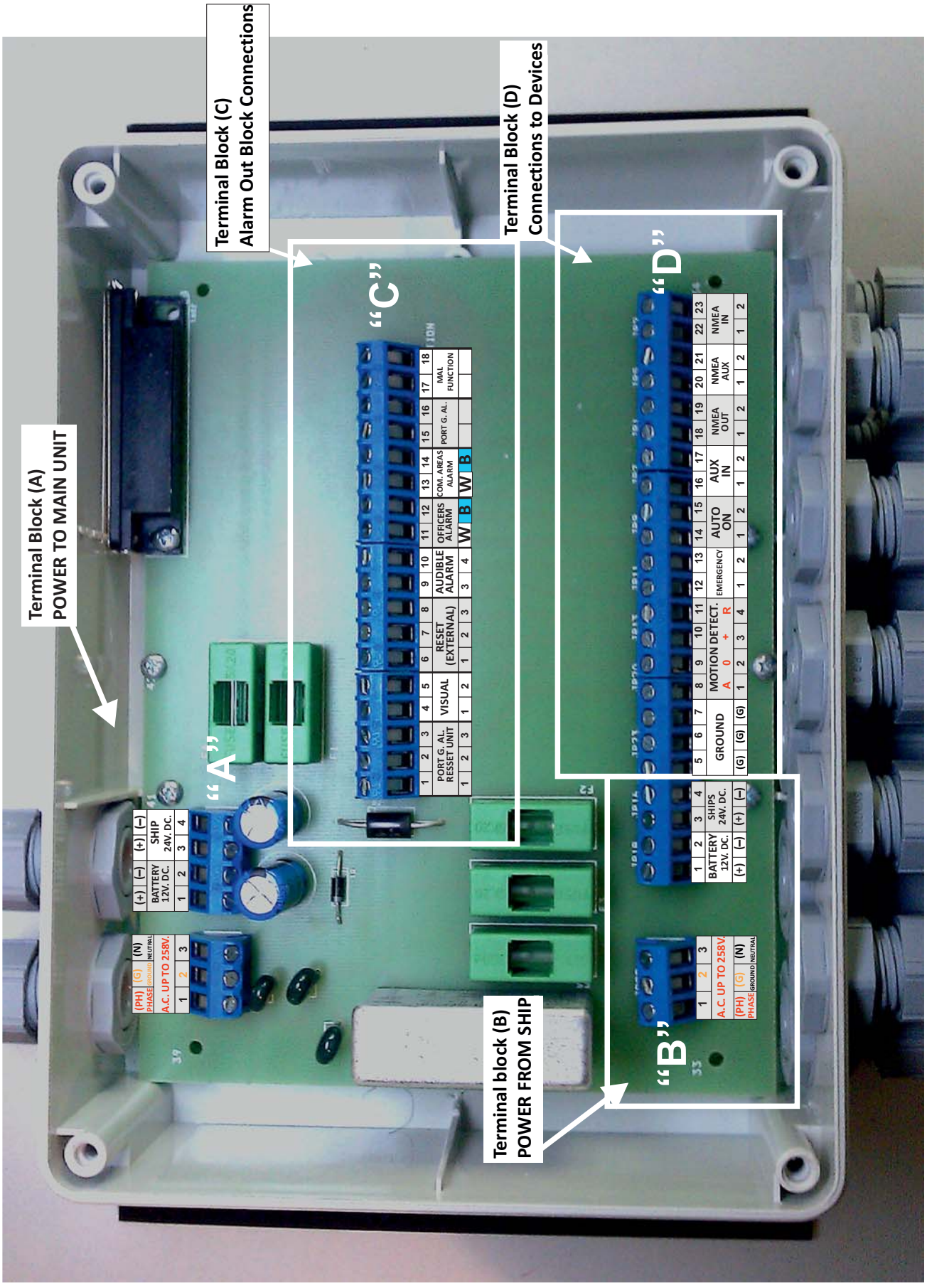
Black	Red	Yellow	Green	
-	+	Detect	Detect	Shield
1	2	3	4	S

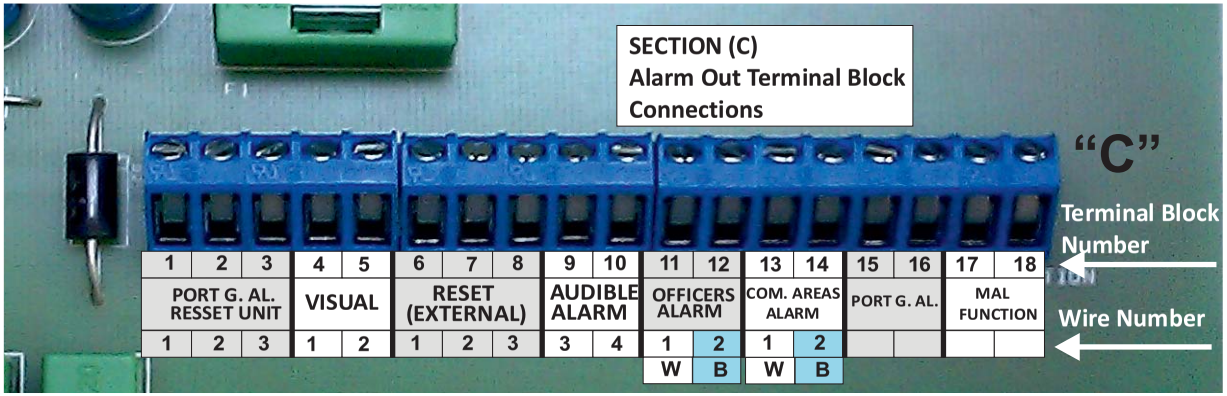
Motion detector junction box



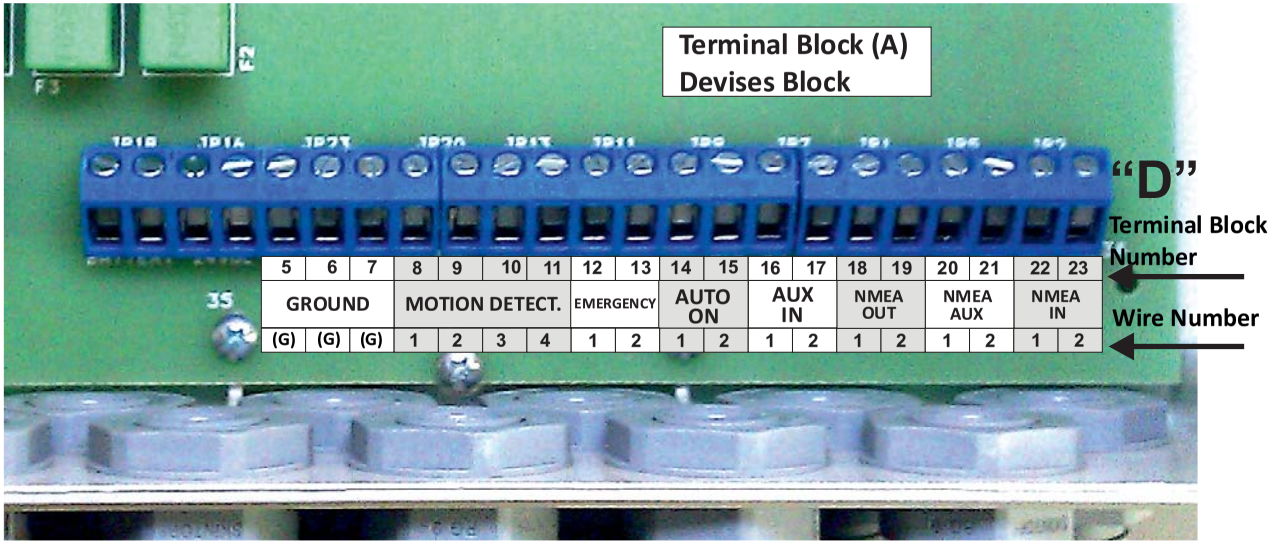
Alarm Unit Junction Box. Numbering is 1,2,S

Connection Box





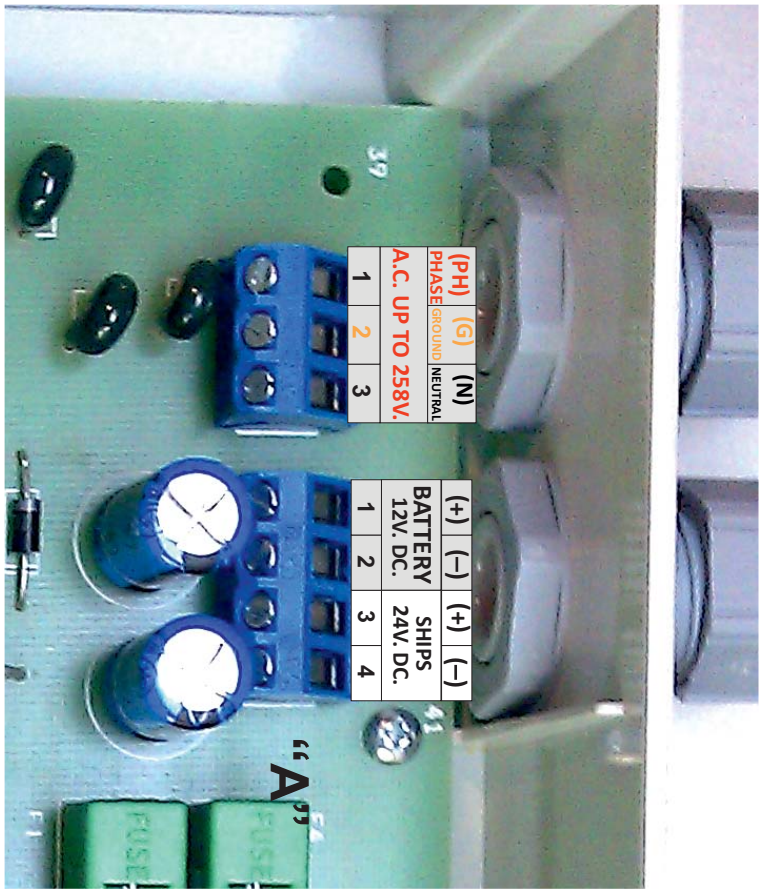
- Terminal Blocks "1,2,3" and "15,16" are used only if port guard alarm is connected.
- Terminal Blocks "17,18" is an optional output for Malfunction alarm.



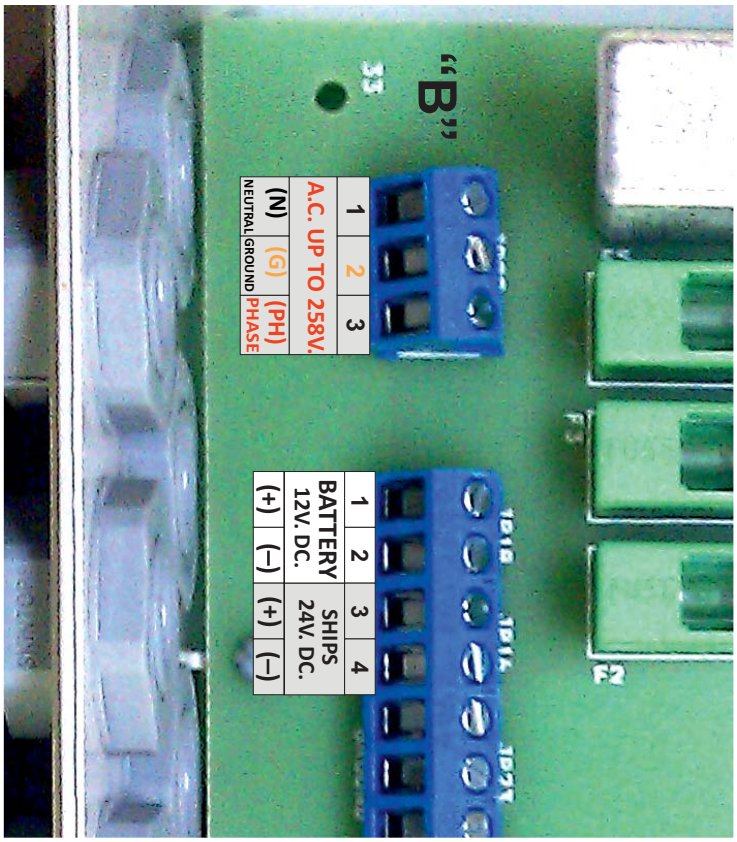
- Terminal Blocks "12,13" is an option input for Emergency Call alarm.
- Terminal Blocks "16,17" is an option Spare Input for feature use
- Terminal Blocks "20,21" is an optional Spare NMEA Input for feature use.
- **Optional Connection**
  Terminal Blocks "14,15" is an input Signal From The Autopilot, in Order to Auto Start the System
- **Optional Connection**
  Terminal Blocks "18,19" is an Output Signal to the S_VDR System
- **Optional Connection**
  Terminal Blocks "22,23" is an input Signal From The GPS, or the autopilot in Order to Auto Start the System

Connection Box Terminal Blocks A & B

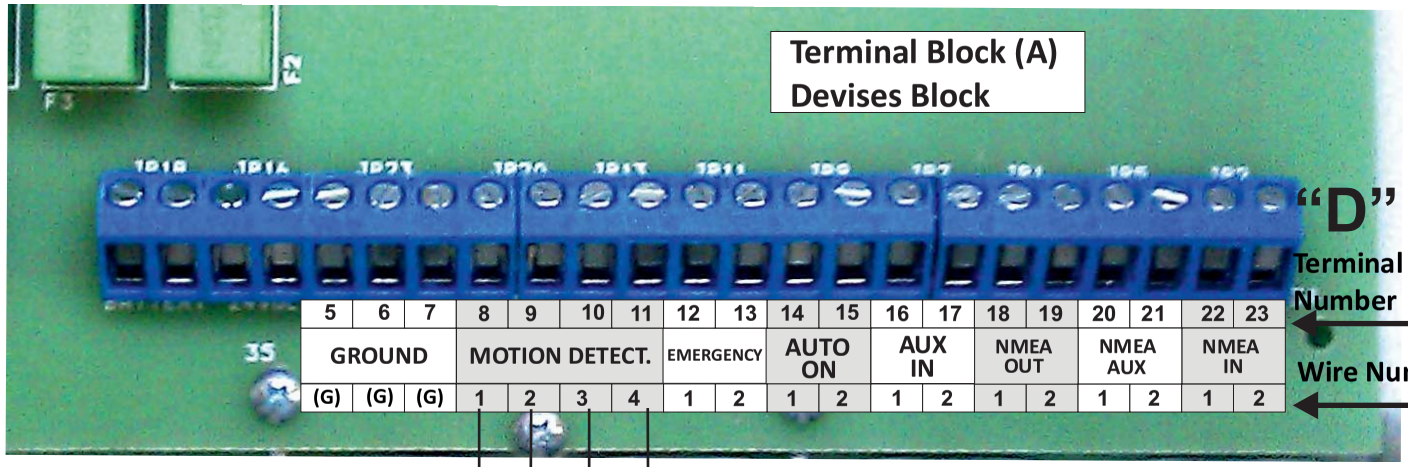
Terminal Block (A)



Terminal Block (B)



M/V
"BNWAS" SYSTEM MOTION DETECTOR CONNECTION DIAGRAM
DWG No.00233
COMAS ELECTRONICS INT.



1 2 3 4 Wire Numbers

GROUND

Terminal Block (A)
Devises Block

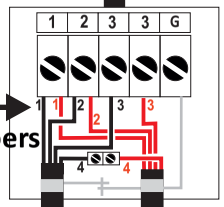
TERMINAL BLOCK NUMBER
5,6, OR 7 (GROUND TERMINALS)

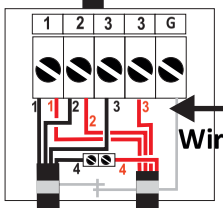
J. BOX

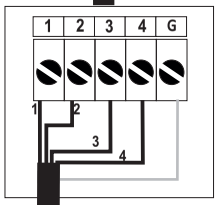
INTERMEDIATE MOTION DETECTOR

INTERMEDIATE MOTION DETECTOR

TERMINAL MOTION DETECTOR



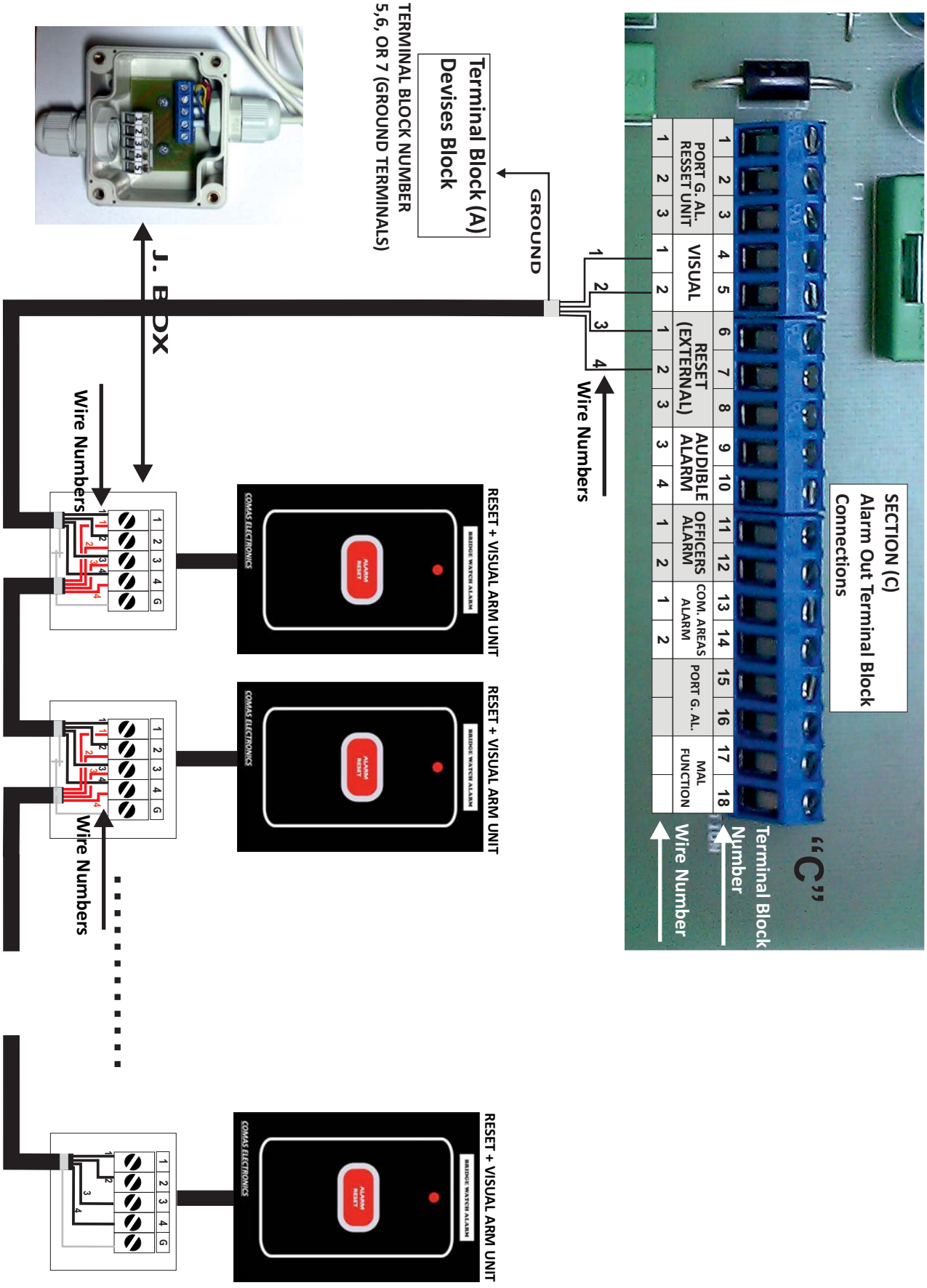




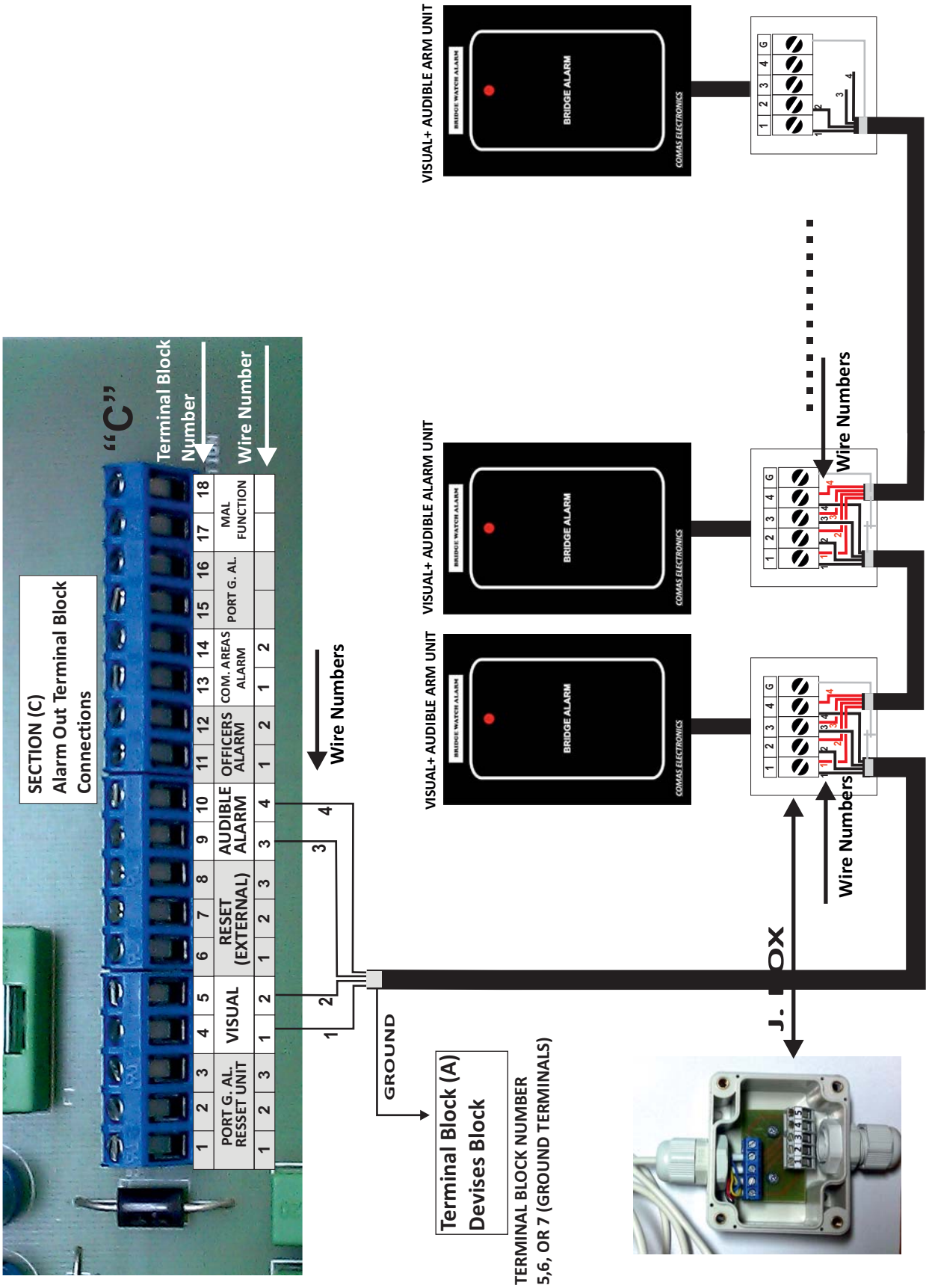
Wire Numbers

Wire Numbers

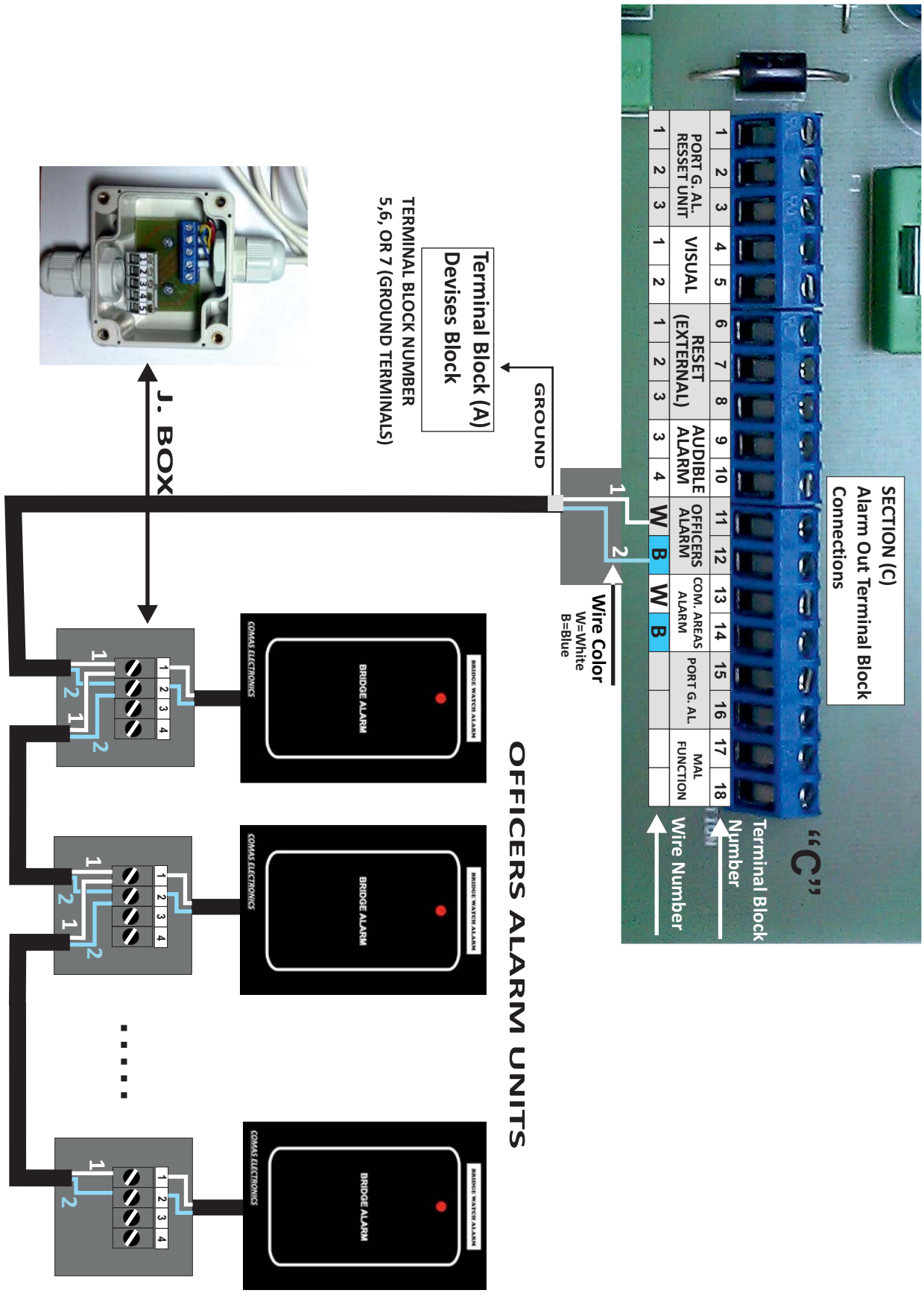
Reset and Visual Alarm Unit Connection Diagram



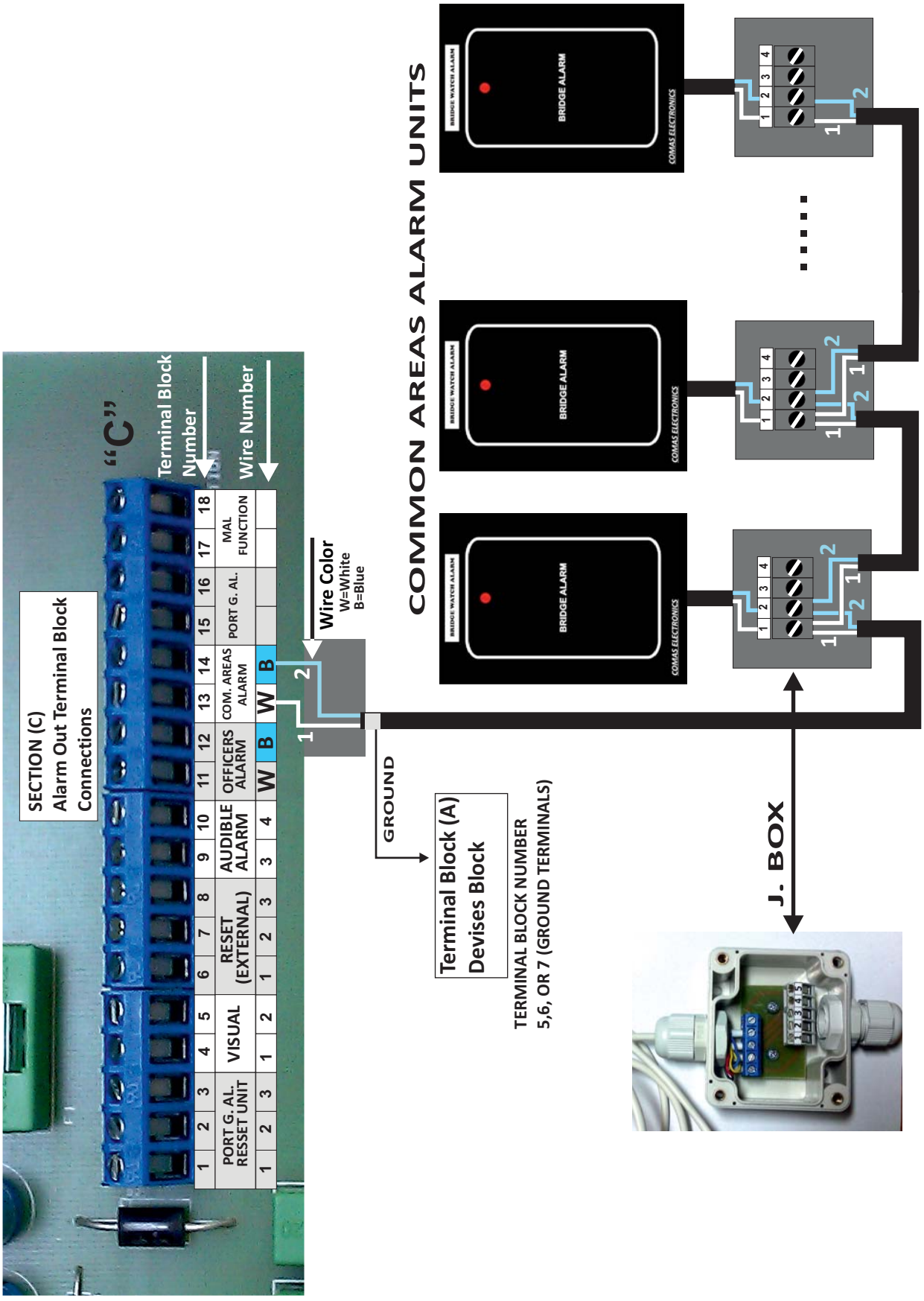
Visual and Audible Alarm Unit Connection Diagram



Officers Alarm Unit Connection Diagram



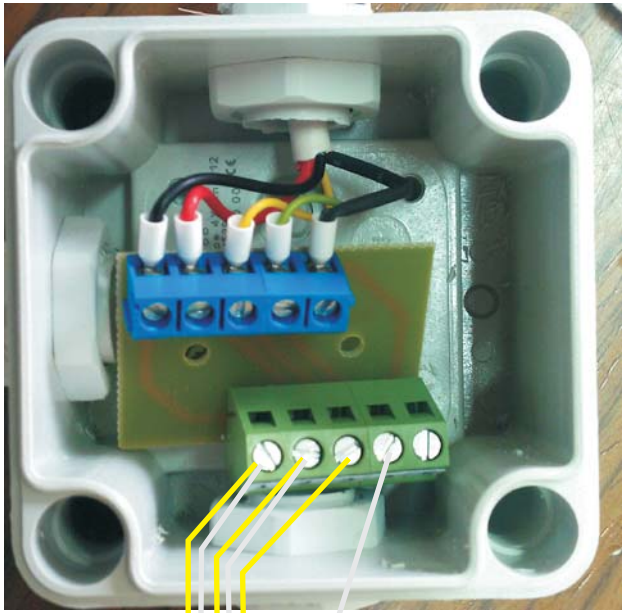
Common Areas Alarm Connection Diagram

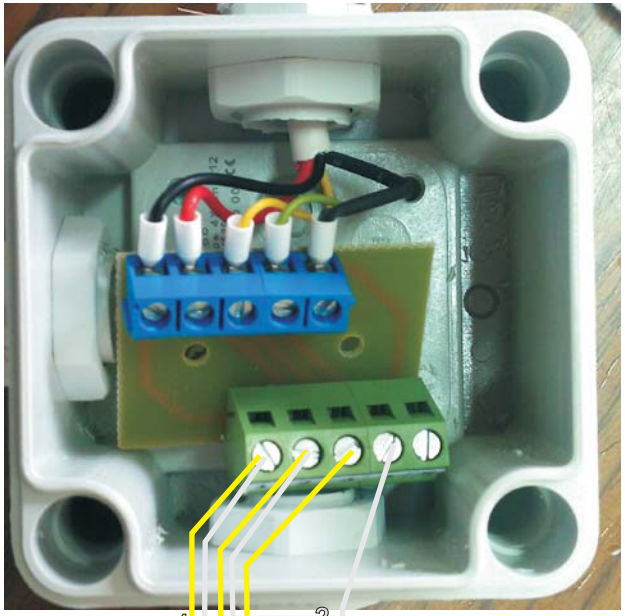


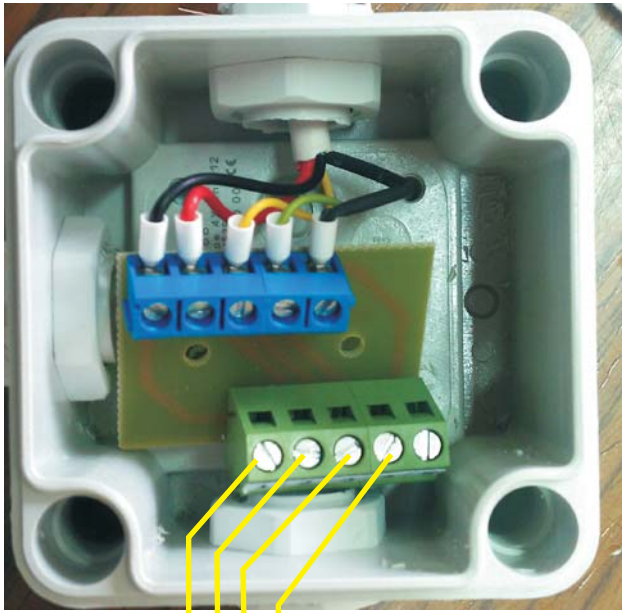
INTERMEDIATE

INTERMEDIATE

FINAL







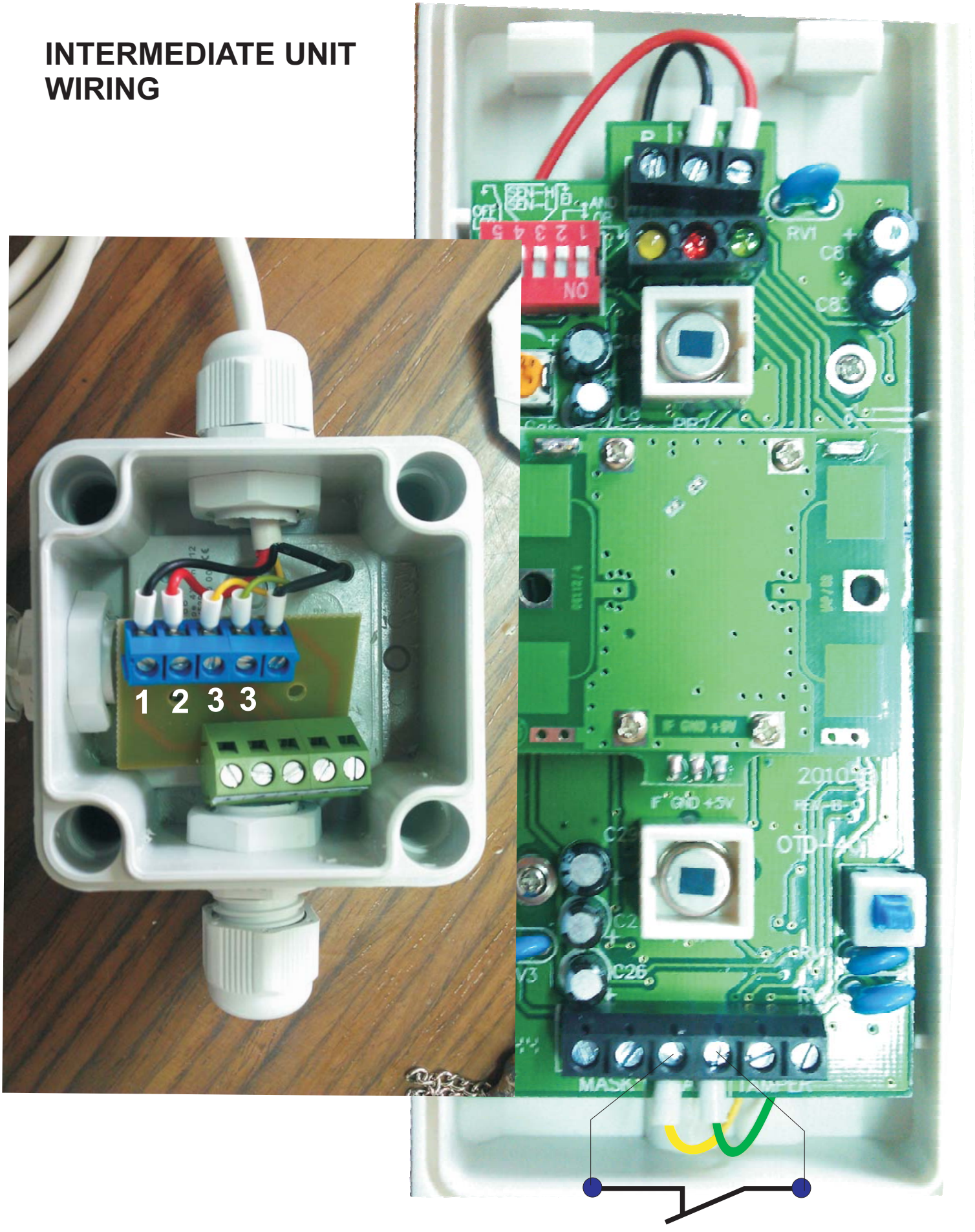
COMAS-BNWAS-UM-V5-20120418

FROM MAIN JUNCTION BOX

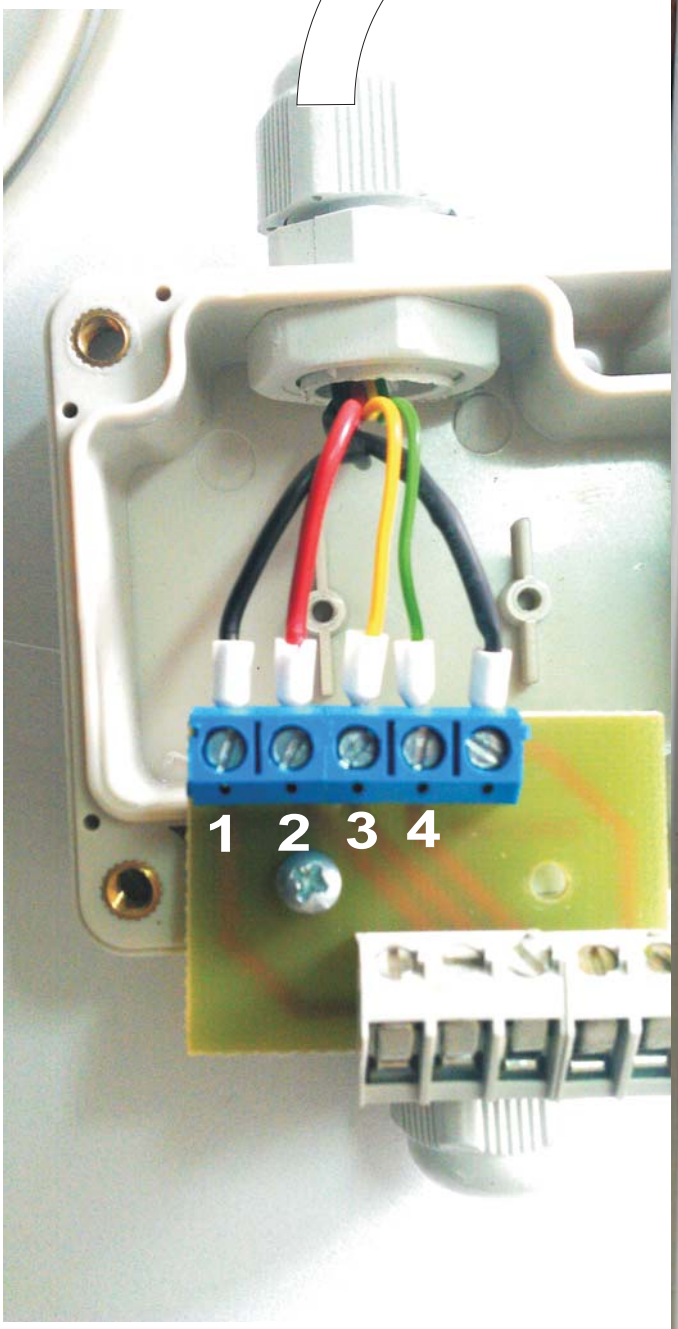
5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
GROUND			MOTION DETECT. A 0 + R				EMERGENCY		AUTO ON		AUX IN		NMEA OUT		NMEA AUX		NMEA IN	
(G)	(G)	(G)	1	2	3	4	1	2	1	2	1	2	1	2	1	2	1	2

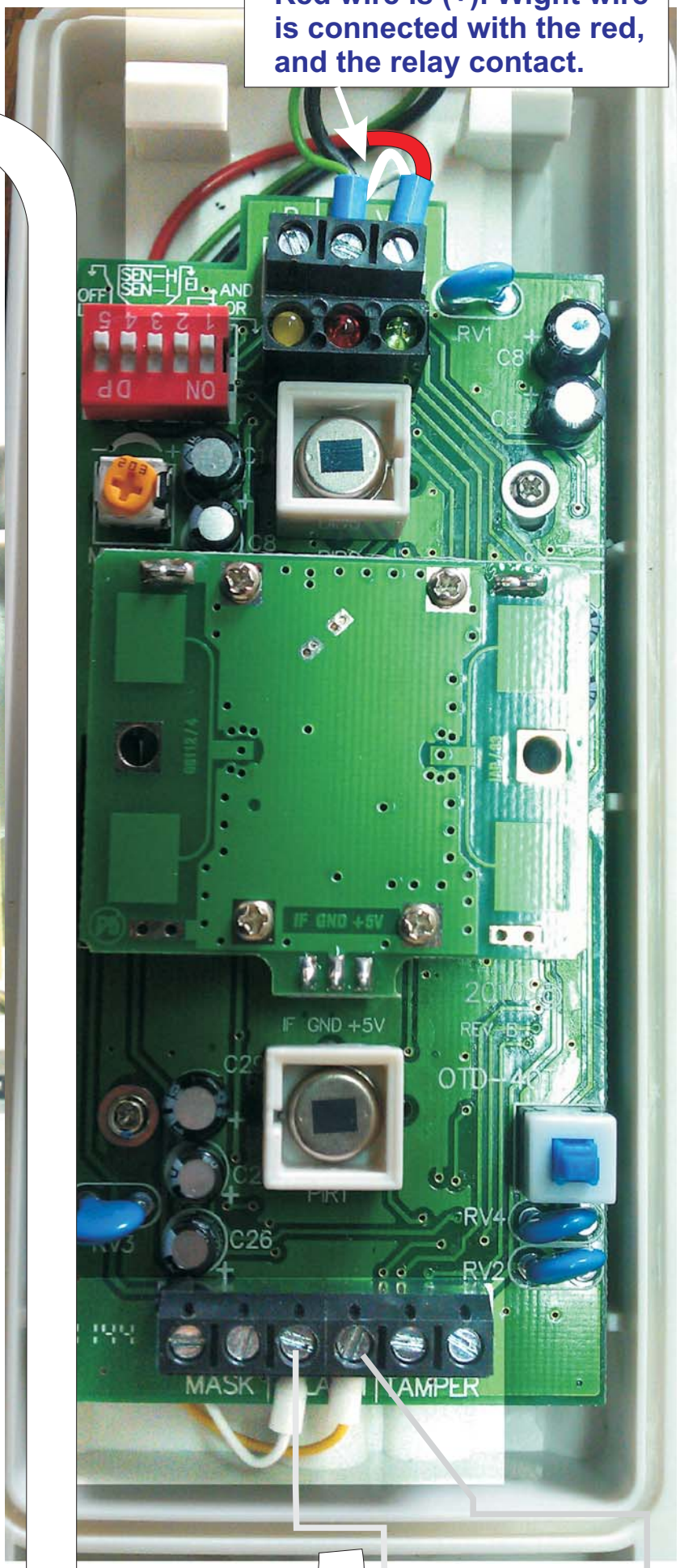
1. Please note that in case of a preconfigured system, intended using 3 motion sensors, all 3 motion sensors must be connected in order for the “BNWAS” system to work.
2. Also note that by measuring motion sensor connection terminals (3) and (4) we get 12vdc when NO motion is detected. We get 0vdc when motion is detected.

INTERMEDIATE UNIT WIRING



FINAL UNIT WIRING





Relay contact.

1) If the sensor detect movements the contact is OPEN.
2) If the Sensor did not detect any movement the relay will CLOSED

System components

Standard equipment

ALL CABLES USED FOR SYSTEM INTERCONNECTIONS MUST BE MARINE TYPE ONLY!

Type A configuration

#	Name	Part Nr.	Description
1.	Main Unit with Visual and Audio Alarm and Reset Button	M-0260-24-12	Cable 3x0.75 L=1.5m Cable 2x2x0.5 L=1.5m Cable 25pin M/FM L=1.5m
2.	Configuration Key	K-015	Main Unit Configuration Key
3.	Connection Box		
4.	Motion Detector Unit	MU-015	Cable 4x0.5 L=1,5m
5.	Officer & Common Area Alarm Unit	A-015-24	Cable 2x0.5 L=1,5m
6.	Reset & Visual Alarm Unit	VR-015-24	Cable 2x2x0.5 L=1,5m
7.	Visual Alarm Unit	V-015-24	Cable 2x0.5 L=1,5m
8.	External Reset Unit	R-015-24	Cable 2x2x0.5 L=1,5m
9.	Junction Box (5 connections)	JB-015-24-5	
10.	Junction Box (3 connections)	JB-015-24-3	

Type B configuration

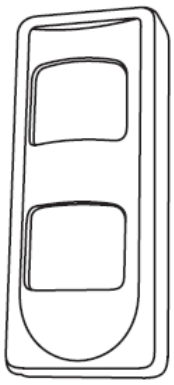
#	Name	Part Nr.	Description
1.	Main Unit with Visual and Audio Alarm and Reset Button	M-0260-24-12	Cable 3x0.75 L=1.5m Cable 2x2x0.5 L=1.5m Cable 25pin M/FM L=1.5m
2.	Configuration Key	K-015	Main Unit Configuration Key
3.	Connection Box		
4.	Motion Detector Unit	MU-015	
5.	Officer & Common Area Reset Unit	A-015-24	
6.	Reset & Visual Alarm Unit	VR-015-24	
7.	Visual Alarm Unit	V-015-24	
8.	External Reset Unit	R-015-24	

Optional Equipment

#	Name	Part Nr.	Description
1.	Port Alarm	PA-015-24	

NK PIR821
Installation instructions
Intelligent + 2 x PIR+MW 4 tech Outdoor Detector

1. INTRODUCTION



NK PIR821 is a special four-tech (PIR+PIR+MW+ASIC) complex detector for outdoor intrusion. Signals of 3 sensors are with super stability and dependability by its advanced multi-grades digital signal processing technology. And they can offer 3 different detection modes on 2 sensitive grades in order to choose the best the detection way for spot environment and gets the best rate between the best detection ability and the minimum false alarm rate. With normal AND and OR modes, NK PIR821 detector is also with EI mode to avoid the damage of dopes spraying on the lens. Its unique water-proof design is totally fit for outdoor installation. At the same time, NK PIR821 is also with other functions such as anti-masking automatic setting and alarm type memory etc.

2. BRIEF INTRODUCTION

-Two Passive Infrared PIR and Microwave MW detection technology
-Automatic setting of anti-masking
-Microwave synchronization
-Detection mode - EI-OR - AND
-Selectable detection sensitivity
-Alarm type memory
-Alternative Led OFF
-Anti white light
-Anti-pet 25kg
-Micro-strip MW with pulse transmission
-18 beams Fresnel lens with down-view window on its 4 planes
-Vertical adjustment
-Air-proof optical parts
-Wall inlay
-Total view:90 degree, Monitoring scale:15m
-Corner and wall installation. Universal connector
- Universal connector for option,
-90 horizontal adjustment 30 vertical adjustments

3. SPECIFICATIONS

- Power supply: 9-16VDC
- Current: 30mA
- Install high: 1.5m.-2.4m
- Coverage: 12m*12m 100
- MW frequency: 10.525GHz
- Alarm time: 3s
- Anti RFI/EMI:0.1-500MHz/3V/m
- Anti-white light :>10000 LUX
- Alarm output: 100mA/24V
- Mask output: 100mA/24V
- Temperature:-10 /+55
- Humidity (RH):95%
- Sensitivity: H / L Select
- Detect speed: 0.2m/s to 3.5m/s
- Dimensions (H*W*D):160mm*65mm*50.5mm

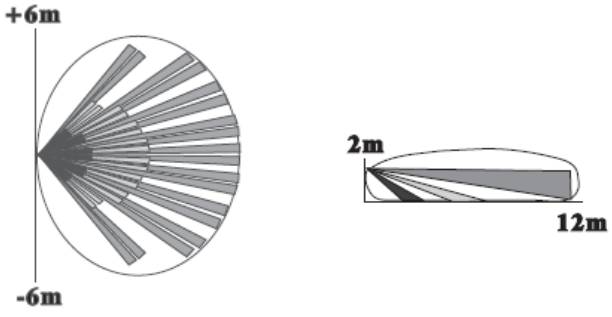


Figure 2

4. INSTALLATION GUIDE

Select the best installation point fit for PIR and MW technologies.
Put NK PIR821 onto the selected place and keep it away from door, window, running machine or heat sources.
If one detection place needs two or more sensors please to refer to MWSY-8 control board for installation see MW synchronization section to avoid MW interference.

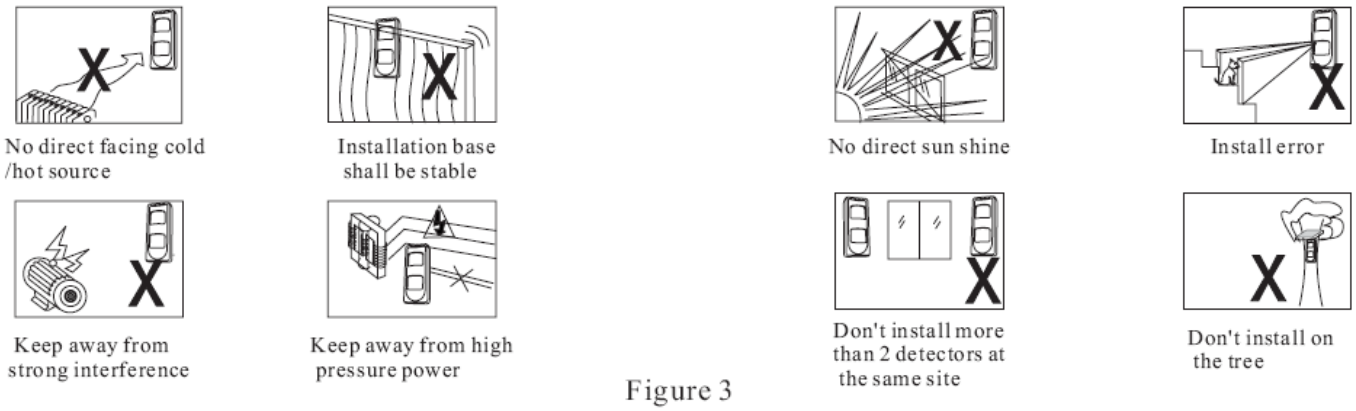


Figure 3

5. WALL FASTENING

In order to get the best signal covering scale, detector should be installed on 2.1m height and vertical adjustment to position A. Anyhow, detector can be installed to maximum 4 m height.
Make sure that there are no counterwork in front of the detector and it is with a wide view.
Remove the front cover, release the screws and then pull out the PCB. Break the pre-set hole, (if necessary, disclose the wall inlay pre-set hole and tear open once wiring hole ; mark the point of the hole on wall and put the wall inlay label on the pre-set hole. Drill 3 6mm holes and screw in the wall inlay screws , let its front extremity be 5/6 mm from the wall. Cross the wire from the cable hole and fasten the bottom cover onto the wall, confirm its front extremity enter the obligate site.

Procedure for opening the cover:

1. Turn around and release the screw on the external cover
2. Insert the blade screw driver into the opening slot, press it and wind it to the arrow direction, so the external cover can be open.

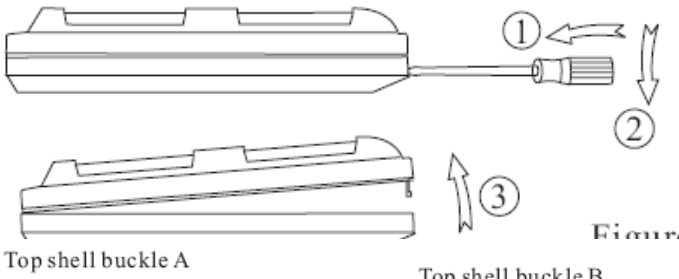


Figure 4

Procedure for closing the cover:

1. Face the B knob of upper cover to the slot of lower cover, and face Aknob of upper cover with Akbob of lower cover, press it down and then the covers can be closed.

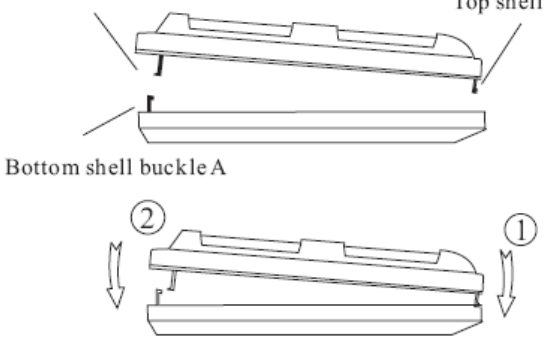


Figure 5

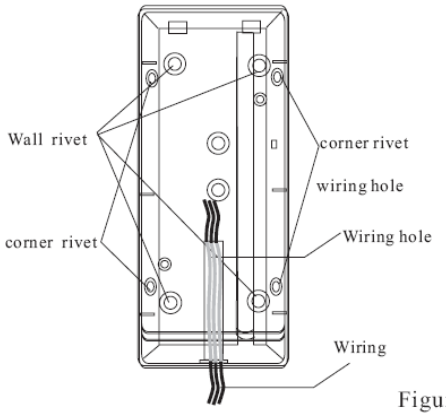


Figure 6

Optional for Ceiling bracket

First to fasten the wall mount accessory onto the proper main body for installation, and then insert twist and connection accessories, finally install the bottom cover of detector

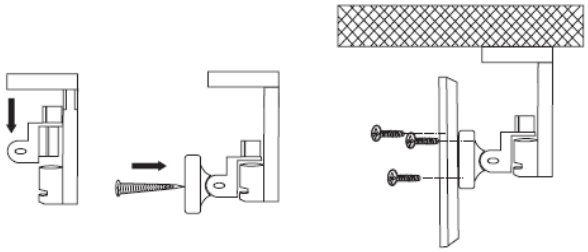


Figure 7

Optional for Conner bracket

First to fasten the ceiling mount accessory onto the proper main body for installation, and then insert twist and connection accessories, finally install the bottom cover of detector

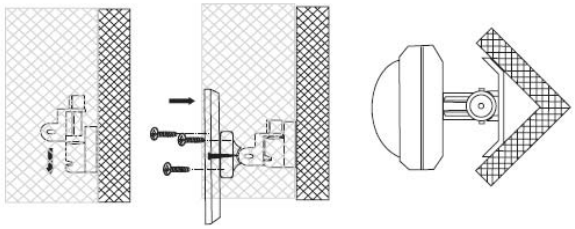


Figure 8

Optional for Ceiling bracket

First to fasten the corner mount accessory onto the proper main body for installation, and then insert twist and connection accessories, finally install the bottom cover of detector

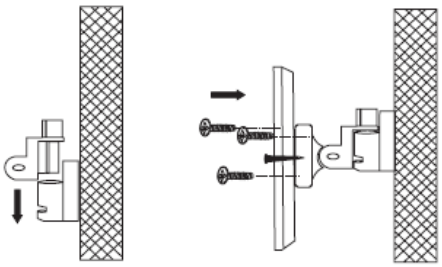


Figure 9

6. PART EXPLAIN

(Refer to the left diagram)

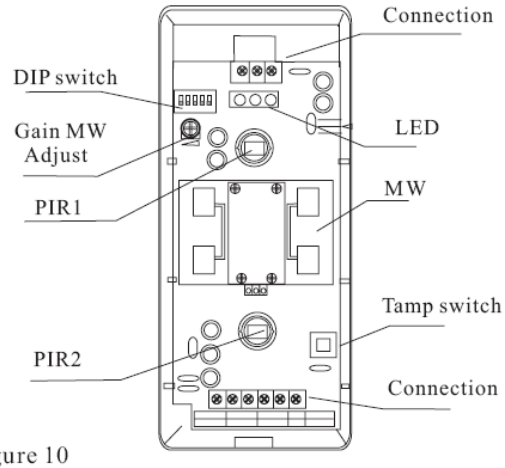


Figure 10

7. TESTING

DIP 1 switch on OFF anti masking cover OFF
DIP 5 switch on OFF LED actives
Note: During this mode, anti-masking is limited.
Tune microwave tuner to minimum, capacity can be adjusted from 2-15m to the extremity of protection area when LED indicator turns off operation radial movement to the detector, check MW detection by green LED. If green LED doesn't light, turn the MW tuner in clock wise to increase its capacity; repeat
this tests for several times till you get the required distance.
Remarks: MW adjustment turn the capacity to the minimum, for MW can penetrate wall while over high capacity is not helpful for detector function in its protection area. MW gets highest sensitivity when it performs radial movement to detectors

Time	9	10	11	12	1	2	3
Range	2m	4m	6m	8m	10m	12m	14m

Figure 11

Figure 12

PIR

Close the front cover, when LED indicator turns off, perform horizontal movement in the detection area, check the detection status of PIR through the yellow LED. This step can check whether there is deal corner in the detection area; when PIR gets highest sensitivity when horizontal movement to detector.
When all DIP switches are in OFF status, monitor is in standard operation.

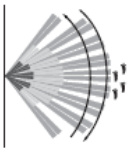


Figure 13

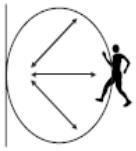
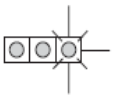
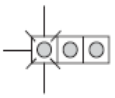


Figure 14



Yellow led
Figure 15



Green led
Figure 16

If want to get maximum monitoring, please refer to monitoring mode section.
Note: When there is interference to the monitor, anti-masking cover function will be limited.

8. MONITORING MODE

AND

DIP 2 switches on OFF status
If three sensors 2*PIR&MW get the detection signal at the same time, alarm will be trigger.
This mode is fit for installation with unstable factors.

OR

DIP 2 switches in ON position
Any of the sensors gets detection signal, alarm will be triggered.
This mode is fit for high stable environment and inquires the detector with very high detection ability.

EI MODE

DIP 3 switch is in ON position
During the status DIP 2 switch is useless.
If three sensors get the detection signal at the same time, such As AND mode or if it they gets more MW signal while there isn't any 2*PIR signal, alarm conditions are provided.
Fit for the installation which needs AND detection mode, but it may exist PIR shadow area, or somebody spray the dope onto the PIR lens willfully to damage the PIR detection.

SENSL

DIP 4 switch is in ON position
Detection sensitivity of both sensors are reduced.

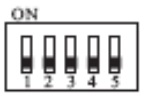


Figure 17

	1	2	3	4	5
ON	MASK	OR	EI	SENL	
OFF		AND		SEN H	LED

Figure 18

ALARM	Green Led	Red /Blue Led	Yellow Led
PIR+MW	OFF	ON	OFF
PIR	OFF	ON	ON
MW	ON	ON	OFF
MASK	FLASH	FLASH	FLASH

Figure 19

PIR During the time, signals detected by both negative and positive period of PIR are limited.
MW the detection response speed of MW is 0.5 seconds running speed is 0.6m/second.

9. FUNCTION

Anti-masking function
Anti object block the MW may cause alarm by the twinkle of LED indicator, and the signal is transported to monitoring center by MASK connector. Alarm status will last till the causes of formation are cleared away.
Activation of anti-masking function
DIP 1 switch is in ON position
The activation of anti-masking function is the final operation. After activation, NK PIR821 enters self-check status; during the time, LED indicator will twinkle for 100 seconds. During the time, close the front cover and keep away from the detector, detector will enter automatic setting status and perform automatic addition ustment of anti-masking height. The most important point is, during the time, there isn't anything approaching the detector to avoid its automatic setting.
LED OFF
DIP 5 switch
In ON position, it will limit detection display. When connect INHIBIT cable or pulling out the equipment, detector will start its display for 30 seconds after the first detection.
MWOFF
DIP 1 switch is in OFF position
DIP 5 switch is in ON position

Note
During this mode, anti-masking is limited.

When LED indicator is in OFF mode, anti-masking function is limited.
INHIBIT is connected monitoring center is broken LED indicator doesn't activate avoid radiation to the protection area.

Relay control
MW turns off to When INHIBIT is connected, monitoring center is broken, alarm relay is under limitation mode.
Memory
When INHIBIT is connected, equipment is disconnected and the first alarm will be displayed. (see figure 19). When equipment is reconnected, memory will be set again.
MW synchronization
Connect the INHIBIT cable of NK PIR821 to MWSY-8 control board; each sensor will be synchronized, in this way, wrong detection caused by MW interference can be avoided. It is fit for the environment that needs 2 or more NK PIR821

10. WIRE UP THE TERMINAL

TAMPER The contact is closed normally, if remove the front small
cover or the whole detector from the wall, contact will open. (sensor connects with wall in lay style monitor)

- +
12V DC:9-16V / 30mA

ALARM Alarm output is close normal and its contact will open
during alarm.

P INHIBIT:recognition input for plug in/draw out.
+12 tands for recognition of equipment drawing out.

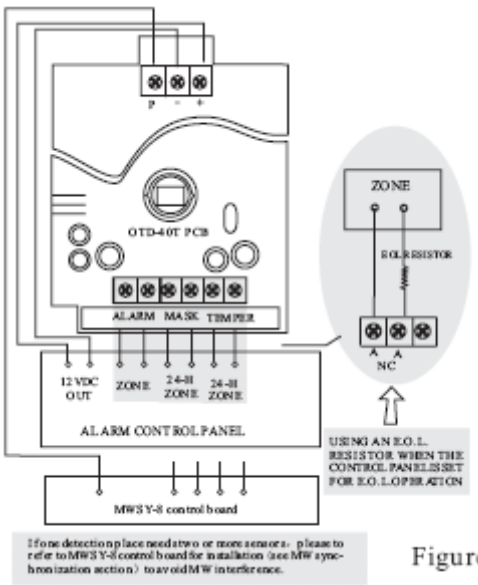


Figure 20

MASK Anti masking cover output contact is closed when it is normal.

11. VERTICAL ADJUST

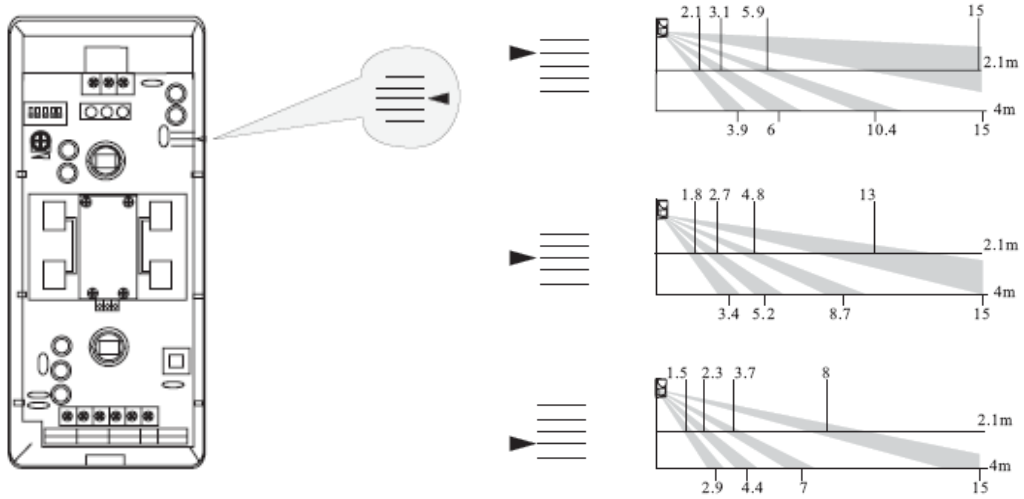


Figure 21

12. NOTES AND WARNINGS

Even the most sophisticated detectors can sometimes be defeated or may fail to warn due to :DC power failure/improper connection, malicious masking of the lens, tampering with the optical system, decreased sensitivity in ambient temperatures near that of the human body and unexpected failure of a component part. The above list includes the most common reasons for failure recommended that the detector and the entire alarm system be checked weekly, to ensure proper performance.

An alarm system should not be regarded as a substitute for insurance. Home & property owners or renters should be prudent enough to continue insuring their lives & property, even though they are protected by an alarm system.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant harmful interference in residential installations .This equipment generates, uses and can radiate radio frequency energy and ,if not installed and used in accordance

with the instructions ,may cause harmful interference to radio and television reception. However, there is no guarantee that interference will not occur in a particular installation .If this device does cause such interference , which can be verified by turning the device off and on ,the user is encouraged to eliminate the interference by one or more of the following measures:

- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one that supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

WARNING! Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user s authority to operate the equipment.