Falcon Eye BNA501

Bridge **N**avigational **W**atch **A**larm **S**ystem

Installation Guide

rev A 8/2011

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Safety Notices

WARNING

Dangerous voltages inside the Main Unit. Always disconnect mains supply before servicing the unit. No user serviceable parts inside. Servicing only by qualified personnel.

WARNING

Mains supply indicators are warning devices and do not warranty the absence of mains voltage inside the unit. Always disconnect mains supply before servicing the unit.

WARNING

Master Control Unit must be connected to protective earth.

NOTICE !

Compass safety distance=1m

Table of Contents

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List of Figures.

List of used Abbreviations

BNWAS: Bridge Navigational Watch Alarm System.

MCU: Main Control Unit.

CP: Control Panel.

BRU: Bridge Reset and Alarm Unit.

CAU: Cabin Alarm Unit.

MAU: Messroom Alarm Unit.

GPS: Global Positioning System.

SOG: Speed Over Ground.

PIR/MW: Passive Infrared/Microwave.

PLC: Programmable Logic Controller.

LED: Light Emitting Diode.

NMEA: National Marine Electronics Association.

VDR: Voyage Data Recorder

NO/NC: Normally Open/ Normally Closed

1. INSTALLATION

1.1 Equipment List

BNA 501 in standard configuration consists of the following equipment:

	Master Control Unit (MCU)	Order code: BNA501_MCU
	Control Panel (CP)	Order code: BNA501_CP
	Bridge Reset and Alarm Unit (BRU)	Order code: BNA501_BRU
	Cabin Alarm Unit (CAU)	Order code: BNA501_CAU
	Messroom Alarm Unit (MAU)	Order code: BNA501_MAU
	PIR/MW Movement Detection Unit	Order code: BNA501_PIR/MW

Fig 1.
BNA 501 Block Diagram

Control Panel

PIR/MW Detectors

GPS
AUTOPILOT
OTHER EQ.
NMEA 0183

VDR
NMEA 0183

Mains AC Input

24 VDC Input

AUTOPILOT IN

Other Bridge EQ. Reset

Unacknowledged Alarm

AC Fail

System Fail

Central Alarm Panel

Main Control Unit

Bridge Reset and Alarm Units

MASTER
CHIEF OFFICER
2nd MATE
3rd MATE
SPARE

Cabin Alarm Units

Messroom Alarm Units

1.2 Mounting and wiring considerations

1.2.1 General requirements

- The installation should fulfill the requirements of IEC 62616 Annex A and IMO MSC.128(75).
- Place the units in clean, well ventilated positions, away from heat radiating devices such as air conditioners, exhaust vents and direct sunlight..
- Place the units away from electromagnetic interference generating devices.
- Allow sufficient space for easy maintenance.
- All mounting hardware should be of marine grade quality.
- Allow for sufficient distance from compasses according to information found in page 3.
- All wiring should be securely fastened
- Protect wiring from sharp edges using suitable sleeves and/or cable glands.
- Hydel supplies all required cables but if a substitude is to be made ensure that it fullfils safety requirements.

1.2.2 Master Control Unit (dwg. 01, 02, 03)

Master Control Unit (MCU) can be installed in bridge or in an equipment room, taking in account the maximum cable run from the Control Panel which is 50 meters. Minimum distance from deck must be 150mm to allow easy cable insertion. Mount the unit with M6 bolts or self tapping screws.
Feed all cabling through the bottom of the unit and secure it with cable ties. To make connections to the spring loaded terminals (fig. 2) use the small screwdriver provided to open the terminals, insert cable and remove the screwdriver. Do not connect AC and DC power supply cabling until all system interconnections are made. Refer to interconnection diagram (dwg.11) for wiring details.

Fig. 2
Spring loaded terminals

1.2.3 Control Panel (dwg. 04)

Control Panel must be positioned in a bridge location providing proper lookout. It can be flush mounted or bulkhead mounted.

Bulkhead mount

Use the template on page 31 to mark hole positions. Drill the appropriate pilot holes. Unscrew the four screws (page 23). Remove the front cover of the unit. Mount the mounting base to the bulkhead using self tapping screws. Insert the RS485 cable through the cable gland . Make the connections to the screw terminals according to interconnection diagram (dwg.11). Mount the front cover and tighten the retaining screws. Tighten the cable gland.

Flush Mount

Use the template on page 32 to mark the appropriate cutout and mounting hole positions. Unscrew the four screws (page 23). Remove the mounting base of the unit. Attach RS485 cable to the screw terminals according to interconnection diagram (dwg.11) and secure it with cable ties. Mount the unit with self tapping screws.

1.2.4 PIR/MW Detectors (dwg. 04)

PIR/MW detectors are 360° devices and must be installed on the ceiling of the bridge. They must be mounted so as to cover all positions where the OOW might reasonably be, that offer proper lookout. Refer to page 29 for coverage diagram. Avoid all obstructions and place the detectors away from heat generating devices, fluorescence lights and other possible interference sources.

1.2.5 Bridge Reset and Alarm Units (dwg. 05, 06)

Bridge Reset and Alarm Units shall be easily accessible from the conning position, the workstation for navigating and maneuvering, and the workstation for monitoring and the bridge wings. The first stage audible alarm shall be audible from all operational positions on the bridge where the OOW may reasonably be expected to be stationed. The visual alarm shall be visible from all operational positions on the bridge where the OOW may reasonably be expected to be stationed.
To mount the unit remove the front cover loosening the four retaining screws (see page 24). Secure the mounting base to the bulkhead using self tapping screws. Insert the signal cables to the cable glands.
Make the connections according to interconnection diagram (dwg.11). Replace the front cover and tighten the four retaining screws. Tighten the cable glands.

1.2.6 Cabin and Messroom Alarm Units. (dwg. 07, 08, 09)

Cabin Alarm Units must be located to the Master's and backup officers cabins at positions allowing unobstructed sound transmission.
Messroom Alarm Units must be mounted to locations that allow the alerting of as many as possible of the crew.
To mount the unit remove the front cover loosening the four retaining screws (see page 26). Secure the mounting base to the bulkhead using self tapping screws. Insert the signal cables to the cable glands. Make the connections according to interconnection diagram (dwg.11). Replace the front cover and tighten the four retaining screws. Tighten the cable glands.

1.3 Connections with other equipment

1.3.1 VDR

MCU talks with ships' VDR through a standard IEC 61162 (NMEA) interconnection. Refer to Appendix B for NMEA sentence details. Refer to interconnection diagram (dwg.11) for wiring details. The transmission of the $BNALR sentence is **not** periodic so the VDR must be configured accordingly.

1.3.2 GPS

MCU communicates with ships' GPS though a standard IEC 61162 (NMEA) interconnection to acquire ships' speed over ground. Refer to Appendix B for NMEA sentence details. Refer to interconnection diagram (dwg.11) for wiring details.

1.3.3 Autopilot

MCU acquires ships' Autopilot status though a standard IEC 61162 (NMEA) interconnection or a normally open contact. Open contact is biased to 24VDC. Refer to Appendix B for NMEA sentence details. Refer to interconnection diagram (dwg.11) for wiring details.

1.3.4 Other Bridge Equipment.

BNA 501 can be reset by any bridge equipment that can provide a signal, through normally open contact, when changes in the operation of the manual controls are registered. Open contact is biased to 24VDC. Refer to interconnection diagram (dwg.11) for wiring details.

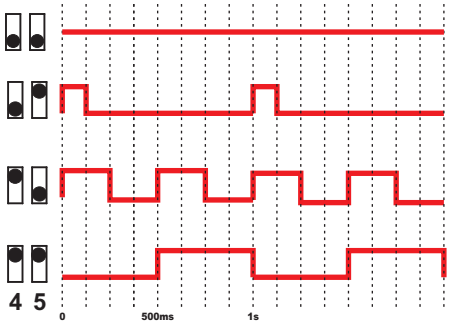
1.3.5 Unacknowledged Alarm Transfer.

Unacknowledged Alarms from other bridge equipment are transferred to BNA501 through a standard IEC 61162 (NMEA) interconnection or normally open contact. Open contact is biased to 24VDC. Refer to Appendix B for NMEA sentence details. Refer to interconnection diagram (dwg.11) for wiring details.

2. COMMISSIONING

2.1 DIP Switch settings

Installation specific settings are adjusted by means of six DIP Switches located at the back of MCU front door (fig. 3)

SW No.	Function	Settings
1 2	3rd stage alarm delay	90 sec 120 sec 150 sec 180 sec 1 2
3	3rd stage alarm inhibit	3rd stage alarm normal 3rd stage alarm inhibited 3
4 5	2nd and 3rd audio alarm modulation envelope	
6	Test mode	Normal operation Test mode. (see § 2.2) 6

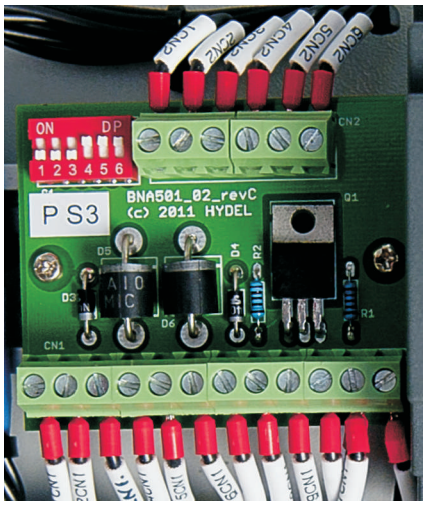


Fig. 3 DIP Switches

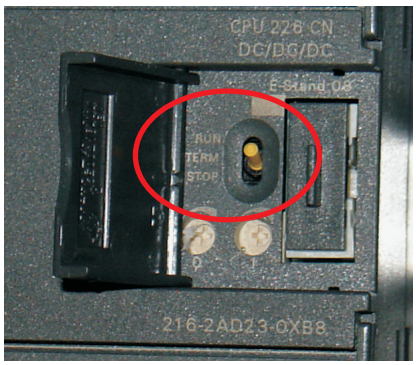


Fig. 4 PLC Mode Switch

2.2 Startup and initial testing.

- Carefully check the installation to verify that everything is securelly mounted and connected.
- Check DIP switch settings to verify your desired configuration.
- Put DIP Switch no 6 to the Test Mode position. This setting divides the first dormant time and the 3rd stage alarm delay by 6 (i.e 1 minute becomes 10 sec) to allow quick testing of the system.
- Verify that the Mode Switch on the PLC is at the RUN position. (See fig.4 and dwg. 02)
- Turn the keylock selector on the Control Panel to **OFF** position **.**
- Turn ON the mains and backup switches (page 22). The power indicators on the MCU front panel must turn ON (dwg. 01).

- Verify that the Control Panel is powered up. Press the LAMP TEST button on Control Panel . Check that all indicators are OK.

- Check the Control Panel for any displayed failures . Refer to § 3.2 if any failures are displayed.

- Turn the keylock selector on the Control Panel to **SET** position. Select MANUAL mode and 3 minutes dormant time.

- Turn the keylock selector on the Control Panel to **ON** position. The counting sequence should start. Check that the system operates as desired.

- When testing has finished, turn the keylock selector on the Control Panel to **OFF** position. Put DIP Switch no. 6 to the normal operation position.

3. FIRST LINE TROUBLESHOOTING

3.1 Fuse replacement

Any blown fuse should be replaced by the same type and rating to avoid the risk of fire. Always check for obvious short circuits etc. before replacing a blown fuse. Call for service if a fuse repeatedly blows.

WARNING

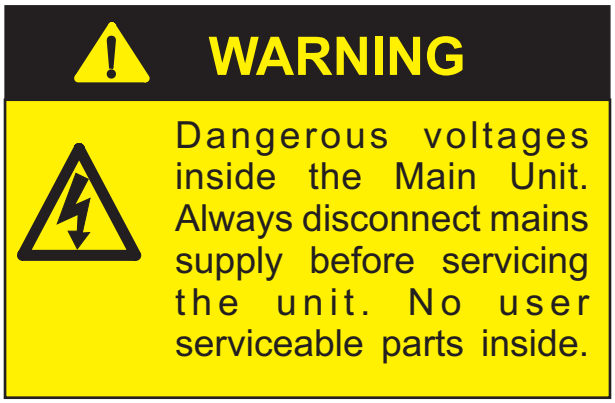
FUSE REPLACEMENT

To avoid the risk of fire always replace fuses with same type and rating.

Fuse ref. des.	Ref. dwg. page	Type	Protected circuits
F1	dwg. 03	Fuse breaker 6A 230 V	AC Mains supply Fuse breakers
F2	dwg. 03	Fuse breaker 4 A 250 V	Auxiliary supply 24 VDC Fuse breakers
F3	dwg. 03	Glass fuse 5x20mm 4A 250 V	24 VDC to PLC, HMI, external circuits
F4	dwg. 03	Glass fuse 5x20mm 4A 250 V	12 VDC PSU output to PIR/MW detectors
F5	dwg. 02	Glass fuse 5x20mm 4A 250 V	24 VDC PSU output (all circuits)
F6	dwg. 02	Glass fuse 5x20mm 4A 250 V	12 VDC PSU input and NMEA interface

3.2 Troubleshooting table

In case of system malfunction try to restore normal operation by checking the following troubleshooting table. which lists common simple symptoms. Call for service if normal operation cannot be restored.



Symptom	Probable causes
System does not power up. Power supply indicators on MCU OFF All Control Panel indicators OFF .	AC and auxiliary supply cabling. Mains and auxiliary fuse breakers. Fuse F5
Power supply indicators on MCU ON All Control Panel and BRU indicators OFF .	Fuse F3
All Control Panel indicators OFF BRU indicators ON.	Control Panel cabling.
“E” is displayed on the Control Panel dormant time display and “PLC ERROR on failure indicators.	Control Panel cabling. PLC mode button not in RUN position (see § 2.2).

APPENDIX A

NMEA INTERFACE SENTENCES

BNA501 uses a number of NMEA sentences to communicate with ships GPS,VDR ,Autopilot and Other bridge equipment. Below is a description of the used sentences.

Speed over ground (SOG) from GPS.

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K

System uses the N,x.x field to obtain ships speed over ground

Heading control status from Autopilot.

$--HTC,A,x.x,a,a,a,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,a,a*hh<CR><LF>
$--HTD,A,x.x,a,a,a,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,a,A, A, A,x.x,*hh<CR><LF>

Selected steering mode M = Manual steering.
S = Stand-alone
H = Heading control.
T = Track control.
R = Rudder control.

Override A = in use, V = not in use

For the Heading control to be active Override=V and steering mode anyone except M (Manual).

Unacknowledged Alarm transfer from other bridge equipment.

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

Alarm's description text

Alarm's acknowledge state, A= acknowledged, V = unacknowledged

Alarm condition (A = threshold exceeded, V = not exceeded)

ID number of the alarm source

Time of alarm condition change, UTC

On receiving an $--ALR sentence with a "V" at Alarm's acknowledge state field, BNWAS initiates the Emergency Call function.

BNWAS status to ships VDR.

$BNALR,,000,A,A,C1=xxx;C2=xx;C3=x*hh<CR><LF>

– A: A = Dormant period exceeded
V = Dormant period not exceeded
– A: A = Alarm acknowledged
V = Alarm unacknowledged

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>

The alarm message is sent twice with any change of the BNWAS settings for mode or dormant period, and with any activated and reset alarm.

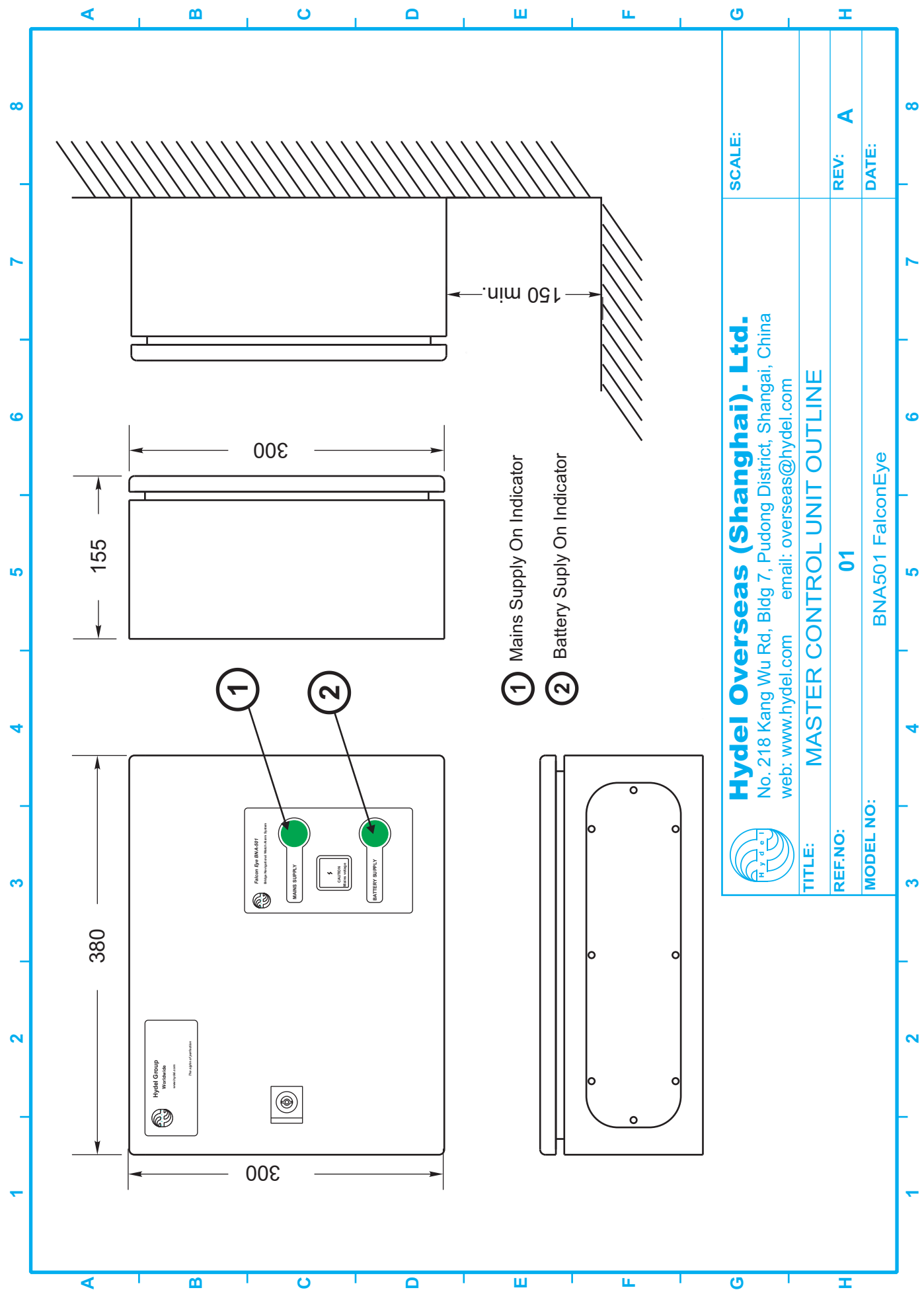
APPENDIX B

SPECIFICATIONS

Power supply:	Primary: 100-240 VAC 50/60 Hz Backup: 24 VDC
Dormant Time selection :	3-12 minutes in 1 minute intervals.
Modes of operation:	Manual, Off, Auto
Bridge audible alarm level:	78 dB
Cabin audible alarm level:	78 dB
Messroom audible alarm level:	78 dB
Inputs:	PIR/MW sensors Reset buttons (active low) Emergency call buttons (active low) Bridge Equipment reset (active low) Auto pilot (active low) Unacknowledged Alarm transfer (active low)
Outputs:	Bridge Audio Alarm 24VDC Bridge Visual Alarm 24VDC Backup Officers cabin audio alarms 24VDC Public audio alarm 24VDC PIR/MW supply 12VDC System Fail to central alarm panel (NO or NC dry contact) Power Supply Fail to central Alarm panel (NO or NC dry contact)
NMEA Inputs:	NMEA 0183 4800 bps Auto pilot ($--HTD, $--HTC), GPS ($GPVTG), Unacknowledged Alarm ($--ALR)
NMEA Output:	NMEA 0183 4800 bps $BNALR to ships VDR
Failure Indicators:	AC Power Fail DC Power Fail PLC Error Tamper
Main Control Unit dimensions:	380x300x155mm
Control Panel dimensions:	214x161x80mm
Alarm and reset boxes dimensions:	80x120x65mm
Compass safe distance:	1m
Operating temperature range:	-15 to +55 ˚C

APPENDIX C

OUTLINE DRAWINGS AND INTERCONNECTION DIAGRAMS


150 min.
300
155
380
300
1 Mains Supply On Indicator
2 Battery Suply On Indicator
MAINS SUPPLY
BATTERY SUPPLY
Hydel Group Worldwide
Hydel Overseas (Shanghai). Ltd.
No. 218 Kang Wu Rd, Bldg 7, Pudong District, Shangai, China
web: www.hydel.com email: overseas@hydel.com
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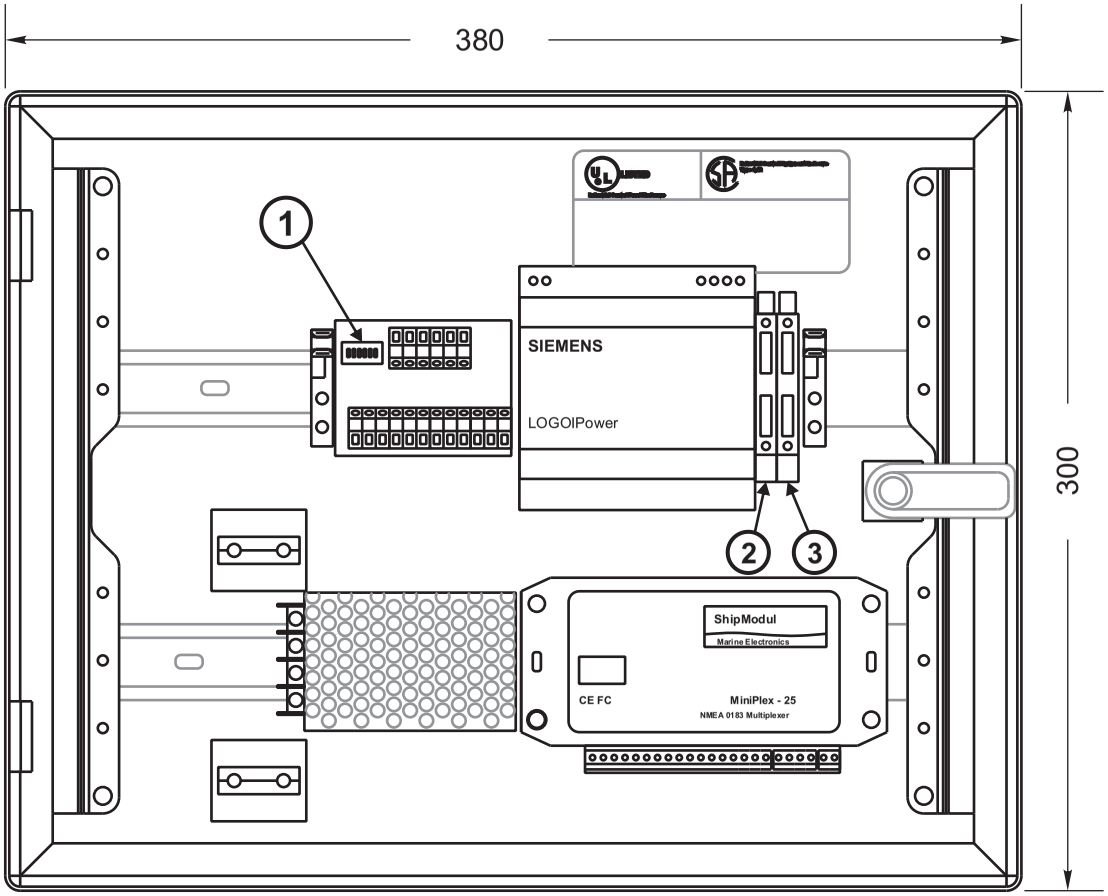
REV: A
MODEL NO: BNA501 FalconEye
DATE:



1. DIP Switches
2. Fuse F5
3. Fuse F6

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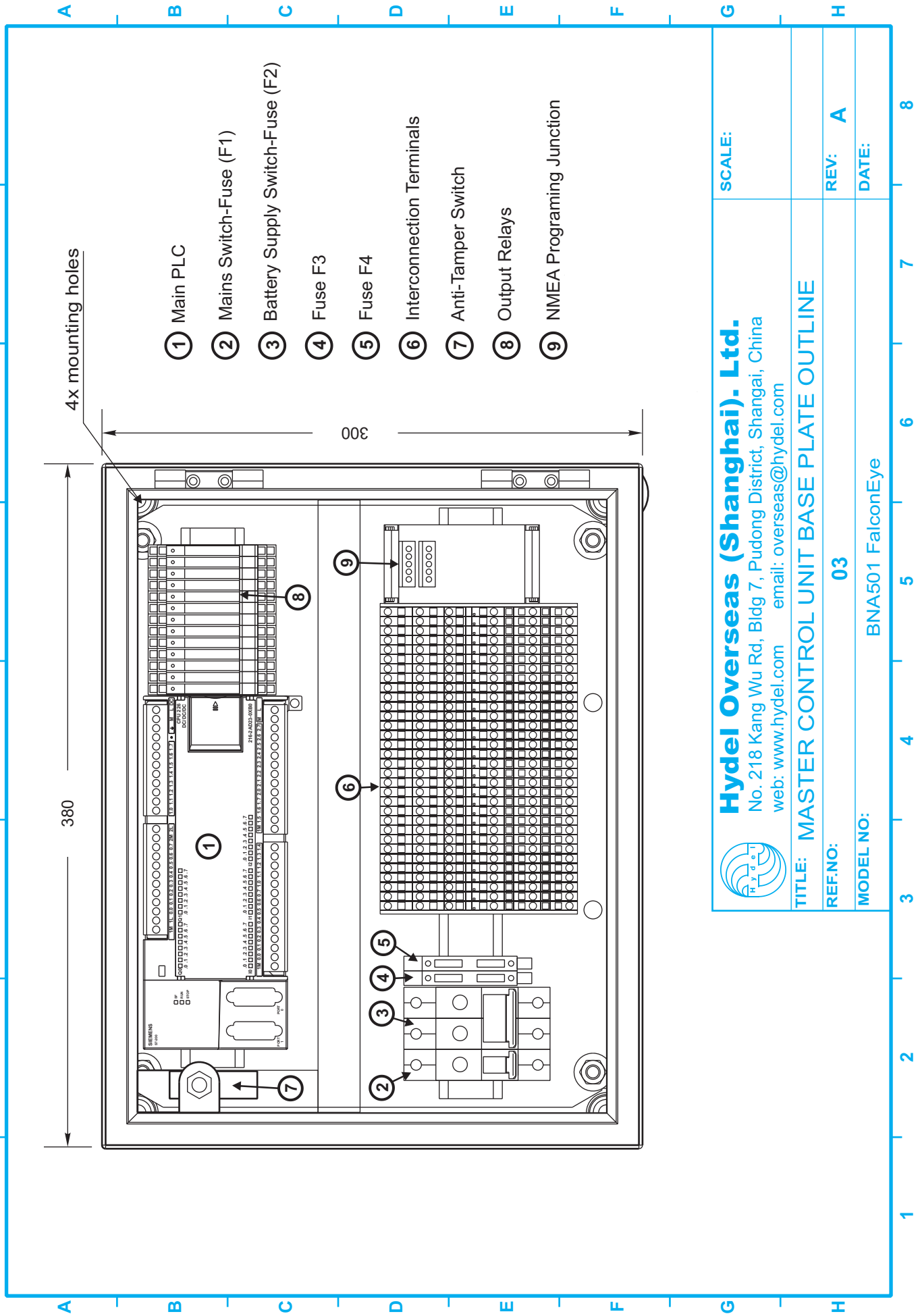
MODEL NO:	BNA501 FalconEye	DATE:


4x mounting holes
380
300
1 Main PLC
2 Mains Switch-Fuse (F1)
3 Battery Supply Switch-Fuse (F2)
4 Fuse F3
5 Fuse F4
6 Interconnection Terminals
7 Anti-Tamper Switch
8 Output Relays
9 NMEA Programing Junction
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web: www.hydel.com email: overseas@hydel.com
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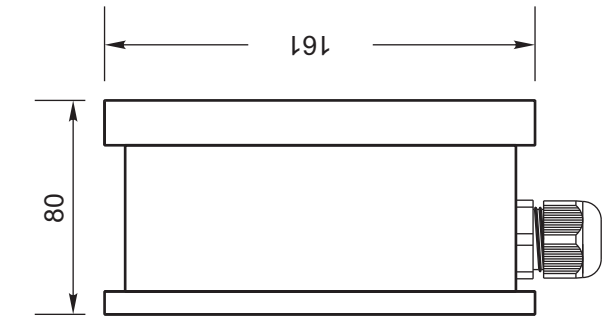

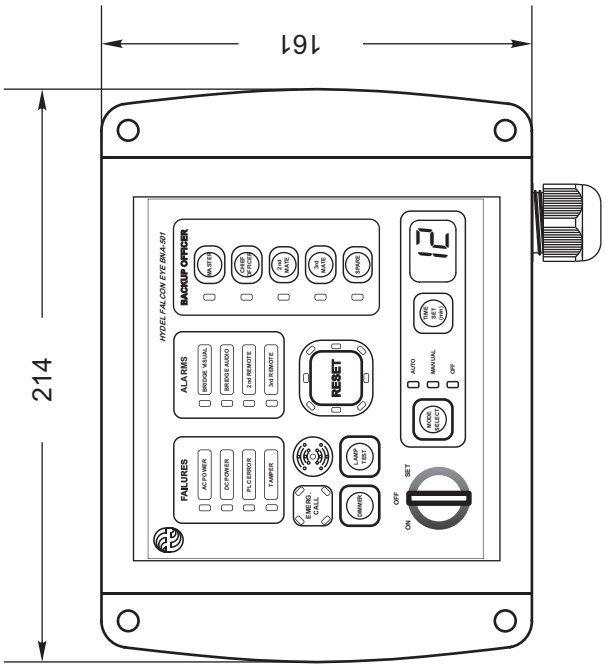

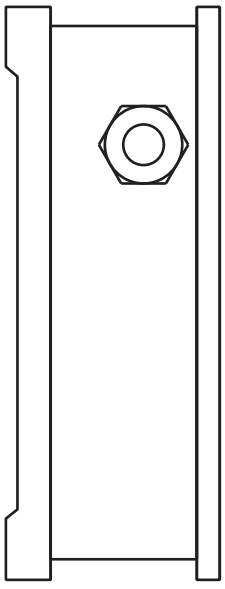

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SCALE:	
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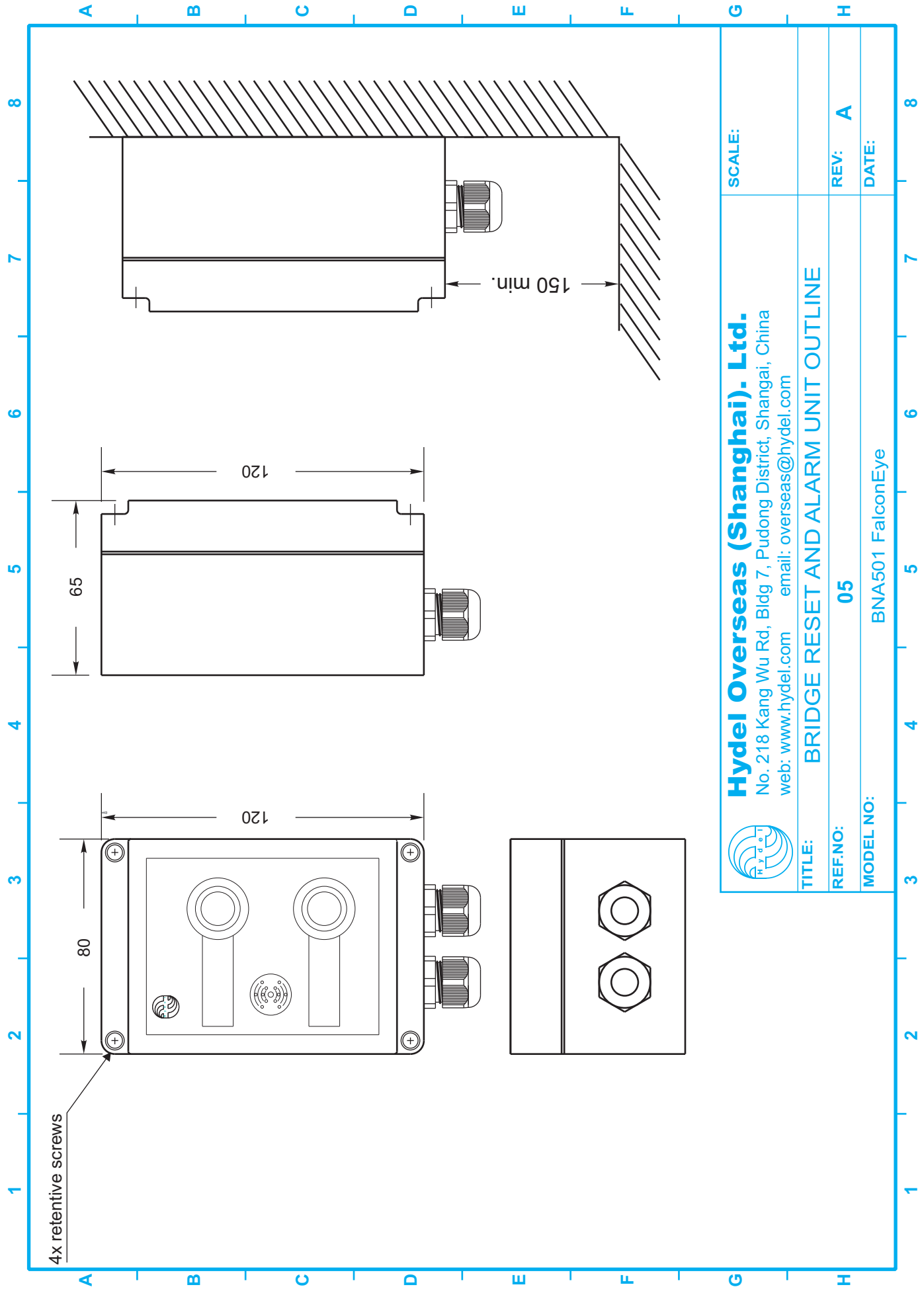
MODEL NO:	BNA501 FalconEye
DATE:	


150 min.
120
65
120
80
4x retentive screws
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No. 218 Kang Wu Rd, Bldg 7, Pudong District, Shangai, China
web: www.hydel.com email: overseas@hydel.com
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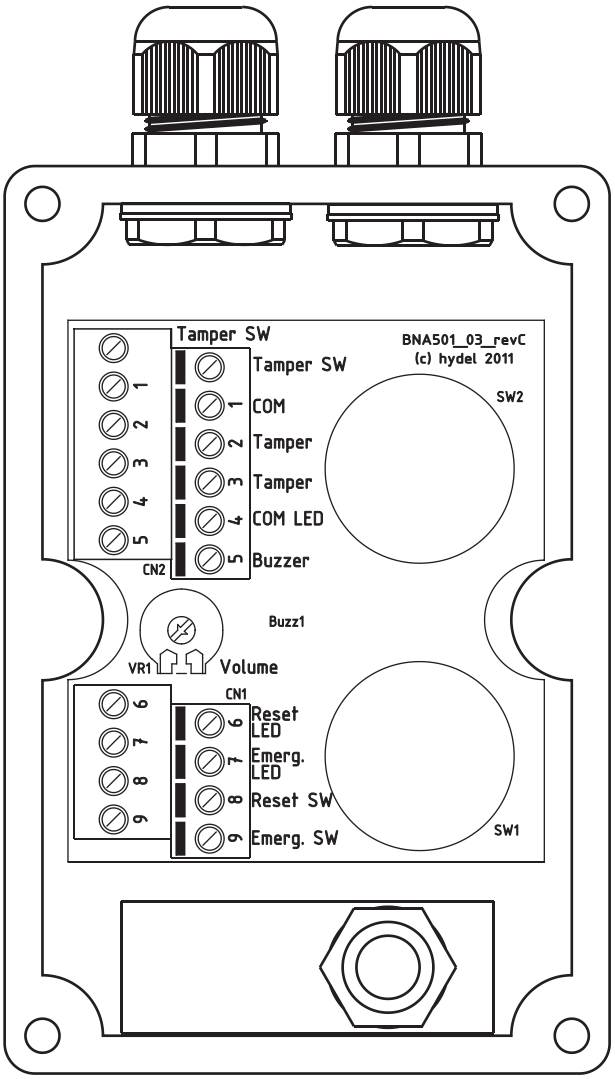
MODEL NO: BNA501 FalconEye



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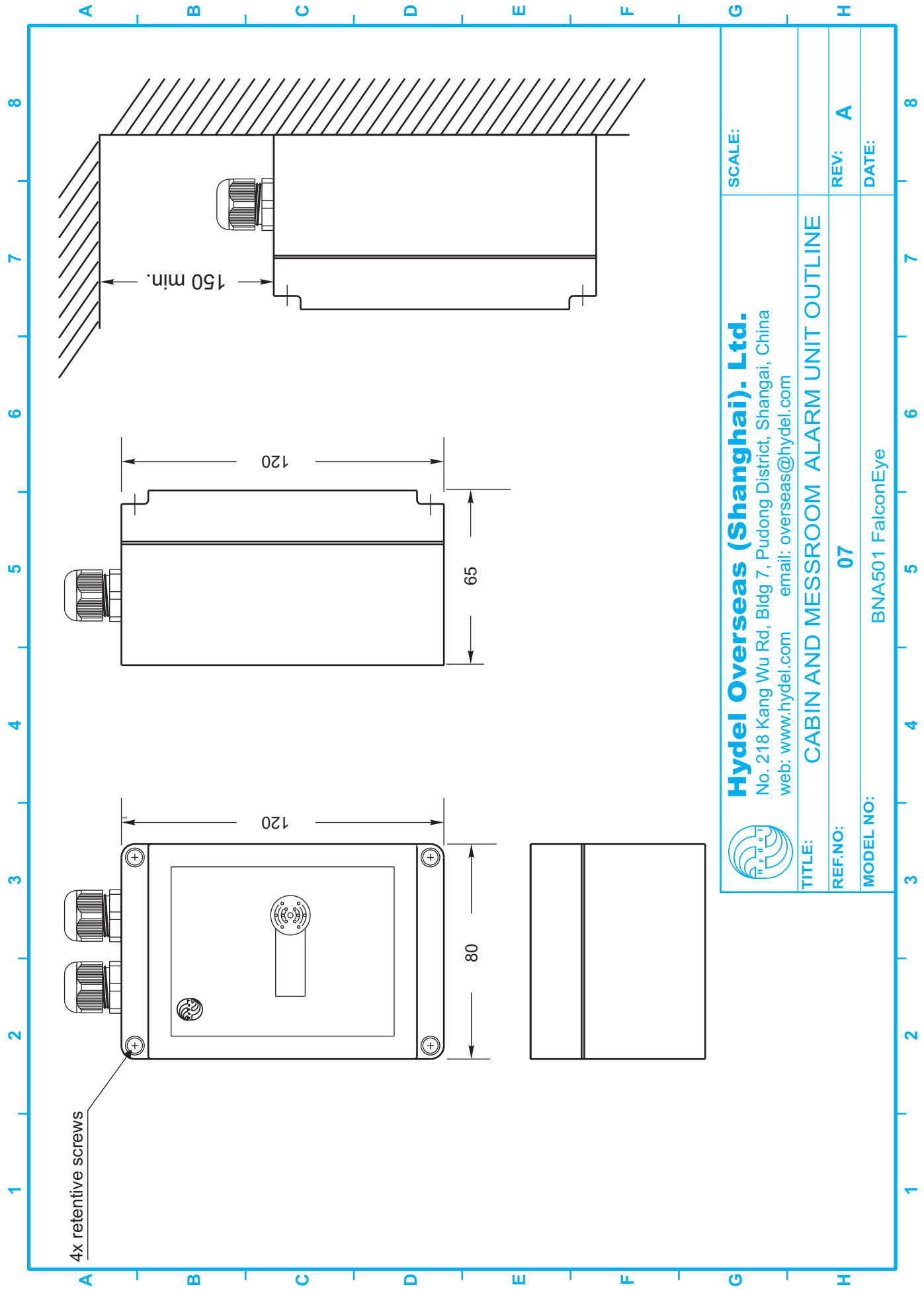
150 min.
120
65
120
80
4x retentive screws
Hydel Overseas (Shanghai). Ltd.
No. 218 Kang Wu Rd, Bldg 7, Pudong District, Shangai, China
web: www.hydel.com email: overseas@hydel.com
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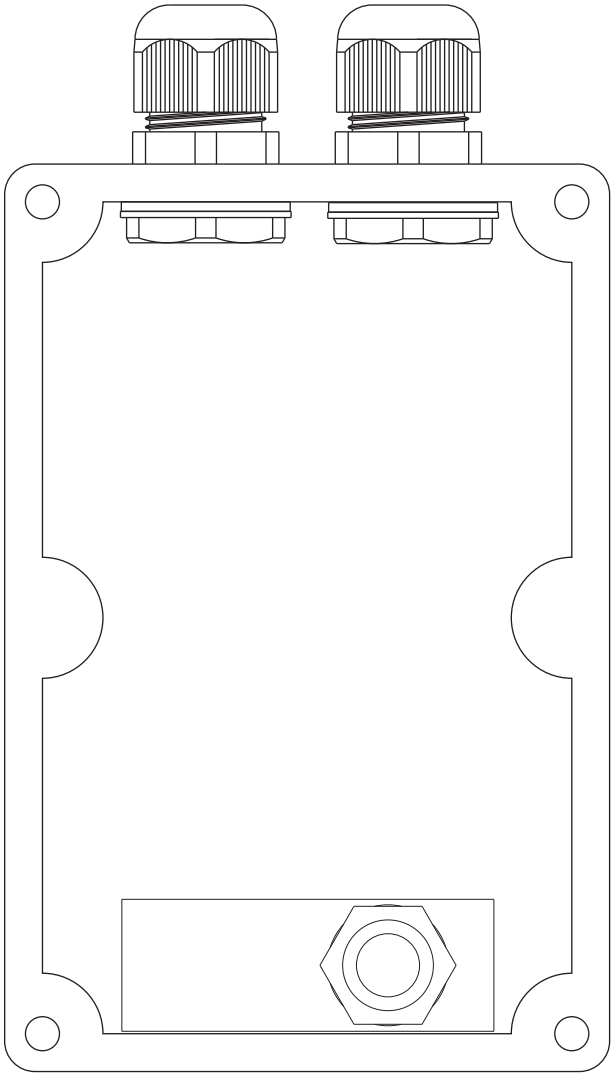
DATE:



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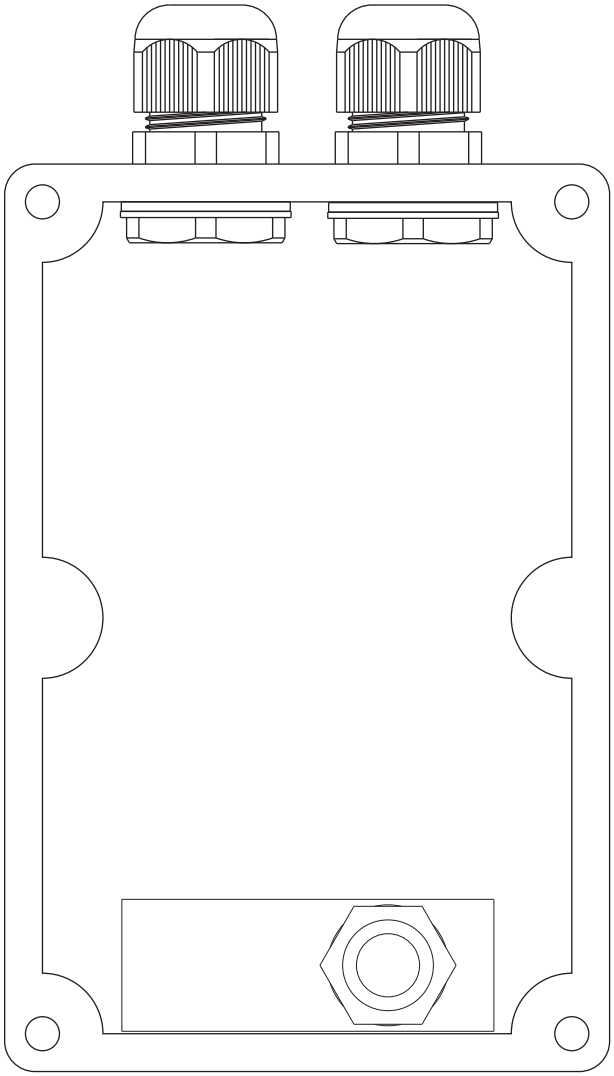

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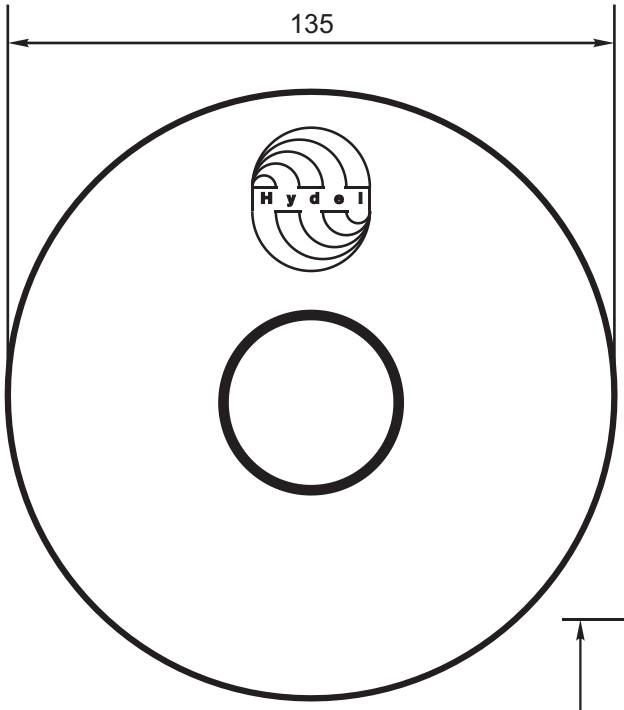
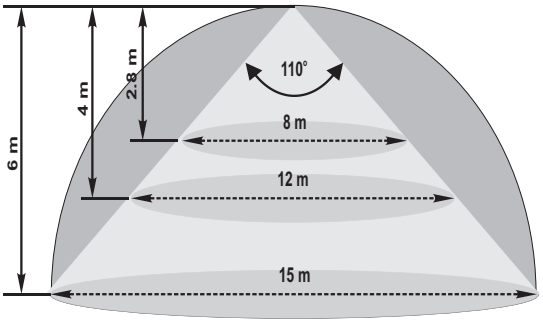
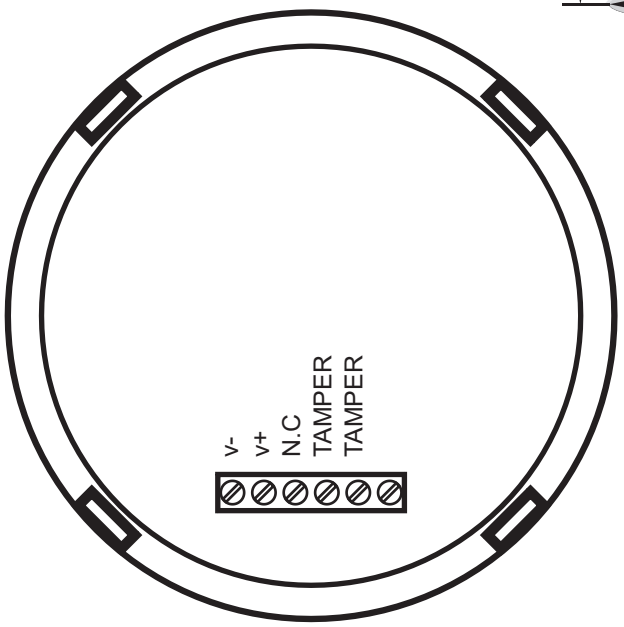
MODEL NO:	BNA501 FalconEye	DATE:





COVERAGE DIAGRAM



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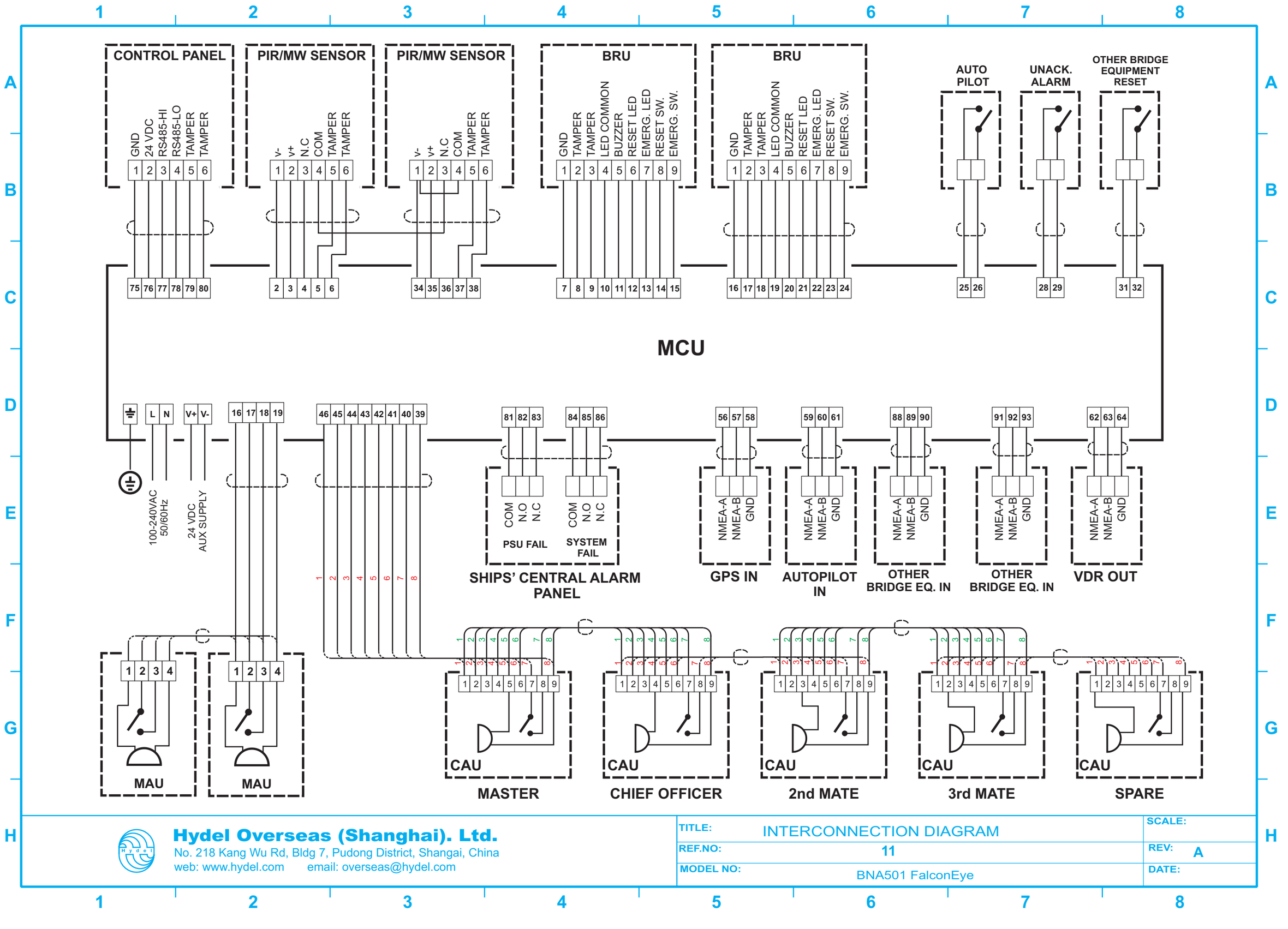

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TITLE:	INTERCONNECTION DIAGRAM	SCALE:
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MODEL NO:	BNA501 FalconEye	DATE:

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Revision History

Revision	Date	Description
rev. A	08/2011	Initial document release.

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