INSTALLATION MANUAL

Robertson RGC12

Gyro Compass

20220737

SIMRAD
A KONGSBERG Company

NOTE!

Simrad Robertson AS makes every effort to ensure that the information contained within this document is correct. However, our equipment is continuously being improved and updated, so we cannot assume liability for any errors which may occur.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.

Simrad Robertson AS disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Simrad Robertson AS
Nyåskaien
P.O. Box 55
N-4379 Egersund, Norway

Telephone: +47 51 46 20 00
Telefax: +47 51 46 20 01

Installation Manual
RGC12 Gyro Compass

This document describes the installation of the Simrad Robertson RGC12 Gyro Compass and optional equipment.

Document revisions

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A	04.01.2000	NG	VP	ThH
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Rev. A This is the first issue

Rev. B Section 5 Optional Equipment included. RGC12 External Wiring Diagram included.

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1 INTRODUCTION

This document describes the installation of the Robertson RGC12 Gyro Compass.

The compass consists of the Master Compass with Sensitive Element and Control Box.

The gyrocompass RGC12 is a system to detect and display true heading necessary for navigation and output data to external equipment. It has been designed for medium and large vessels and provides high accuracy and reliability on the basis of the TG-5000 series gyrocompass which has been installed on more than 5000 vessels.

The Control Box contains all interfaces to external equipment, as well as connection to the Master Compass. Power for the gyro system is also terminated in the unit.

Note !

The guidelines for installation presented here must be regarded as a base for detailed plans prepared by the installation shipyard. These plans must include drawings, instructions and procedures specific to the ship in which the equipment is to be installed. These drawings must be approved by the local maritime classification society.

Simrad Robertson AS accepts no responsibility for any damage or injury to the system, ship or personnel caused by drawings, instructions or procedures not prepared by Simrad Robertson AS.

2 SPECIFICATIONS

2.1 RGC12 Master Compass

Physical Dimensions

Height:.....432 mm (17,0”)

Width:.....360 mm (14,2”)

Depth:.....358 mm (14,1”)

Weight:..... 25 kg (55 lbs)

Power

Voltage input:.....Supplied from Control Box

Accuracy

Settling time:..Within 4 hours

(at lat. 35° when starting from deviation angle of within 30°)

Within 2 hours

(at lat. 35° when starting from deviation angle of within 5°)

Settle point error:..... ±0.3º x sec. latitude

Standard deviation:.....0.1º x sec. latitude

Repeatability:. ±0.2°x sec. latitude

Roll and pitch error: ..... ±0.5° x sec. latitude

Accuracy for environmental change: ..... ±0.5° x sec. latitude

Speed error correction accuracy ..... ±0.2 x sec. latitude

Environmental specifications

Enclosure material:.....Aluminium

Enclosure protection: IP22

Operational temperature range:.....–10°C to 50°C

Storage temperature range:.....–25°C to 70°C

Maximum storage period: (recommended temp. +5 - +35°C) 1 year

With reference to the Kongsberg Simrad Environmental Specification, the following exceptions and additions comply:

IEC Publication: 68-2-1 ref. EN 60945

68-2-2	ref. EN 60945
68-2-6	ref. EN 60945
68-2-27	Not tested.
68-2-30	ref. EN 60945
68-2-32	Not applicable ref. EN 60945
68-2-52	ref. EN 60945
157-1	Not tested

Note ! *The equipment is approved according to the European Marine Directive 96/98/EC (Wheel mark) which incorporates the European Norm EN 60945 (IEC 945 3rd revision).*

2.2 RGC12 Control Box

Physical Dimensions

Height:..... 570 mm (22,4")

Width:..... 334 mm (13,1")

Depth:..... 182 mm (7,2")

Weight:.....16,5 kg (36,3 lbs)

Power

Voltage input:..... 100/110/220 VAC, single phase, 50/60 Hz

Power consumption: ..... 140 VA (Starting)
70 VA (Running)

Emergency power supply:..... 24 VDC
140 W (Starting)
70 W (Running)

General specifications

Repeater type: ..... Step-motor type (24VDC 1 step = 1/6°)

Number of repeater ports:..... 9

(also possible to connect load of max 24V DC 8.5A)

Follow up rate (master compass):..... 30°/sec. (360°/12 sec.)

Angular freedom of gimbal: ..... ± 45° for roll and pitch

Latitude error correction:.....Automatic 0° ~ 70°

Speed error correction: ..... Automatic
(200 pulse/mile is input)
(GPS input)

or manual
0 ~ 50 Knots settable
Only the repeater compasses are corrected

Speed input signal: ..... Pulse signal
(200 pulses/nm dry contact point) or GPS.

Digital output - 1

Serial signal ports:.....8

Electrical specification:..... RS422/NMEA0183

Baud rate:..... .....4800 bits/second

Data length:... .....8 bits

Parity: .... None

Stop bit: ....1 bit

Transmission rate:.....1x/5x second

Output format:

$HEHDT, xxx. x, T*hh<CR><LF>

True heading (degree)

$HEROT, –xxx. x, A*hh<CR><LF>

Turning rate

Turning direction: CW (space), CCW (–)

$PTKM, HEALM, xxx. x, *hh<CR><LF>

Alarm group

Appears every 2 seconds.

Digital output - 2

Serial signal ports:.....4

Electrical specification:.....RS422 (Tokimec specification)

Baud rate:..... .....9600 bits/second

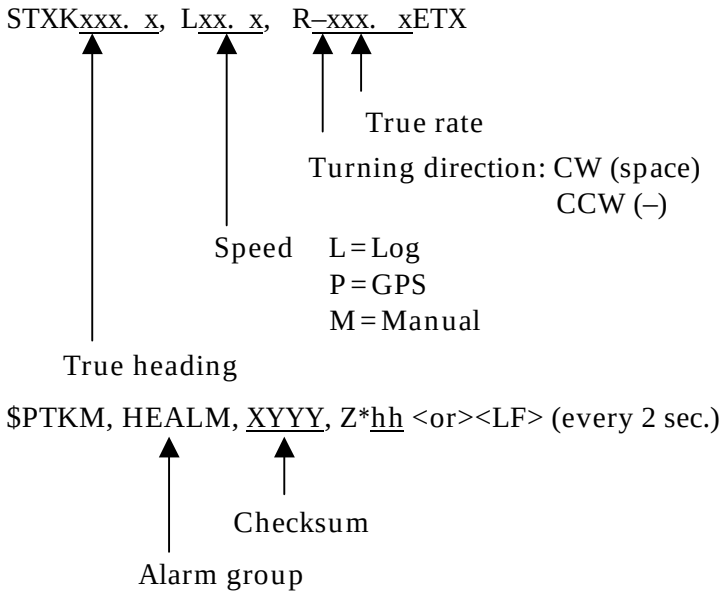
Data length:... .....8 bits

Parity: .... None

Stop bit: ....1 bit

Transmission rate:..... 50 msec (20x/second)

Output format:



Analogue signal – 1

Turn rate ports: 3

–5 to +5 V (±30°/min) + --- CW turn
– --- CCW turn

Analogue signal – 2

Turn rate scale-over ports:.....3

±30°/min or more ±5 V + --- CW turn
– --- CCW turn

GPS input signal (for latitude, speed signals)

Serial signal port: 1

Electrical specification:..... RS422/NMEA0183

The Tokimec specifications are as follows:

Baud rate: .....4800 bits/second

Data length:.....8 bits

Parity:..... None

Stop bit:.....1 bit

Transmission rate: .....1 sec

Input format:

$GPGLL, xxxx.xx, Nxxxxx.xx, E*hh<CR><LF>

Latitude Longitude

$GPVTG, xxx, T, xxx, M, xx.x,N,*hh<CR><LF>

Heading (COG), Speed (SOG)

Special specifications (option)

Repeater backup signal

24 VDC 1/6° step

3 circuits max. 2.5 A.

Optional output signals

ADD PCB

Additional 6 ports 24V DC stepper output

OPS PCB

Additional 2 ports 35 VDC stepper output

(OPS PCB can not be installed if an ADD PCB is installed.)

Environmental specifications

Enclosure material: .....Aluminium

Enclosure protection: IP22

Operational temperature range:.....–10°C to 50°C

Storage temperature range:.....–25°C to 70°C

With reference to the Kongsberg Simrad Environmental Specification, the following exceptions and additions comply:

IEC Publication:	68-2-1	ref. EN 60945
	68-2-3	ref. EN 60945
	68-2-6	ref. EN 60945
	68-2-28	Not tested.
	68-2-30	ref. EN 60945
	68-2-33	Not applicable ref. EN 60945
	68-2-53	ref. EN 60945
	157-1	Not tested

Note ! *The equipment is approved according to the European Marine Directive 96/98/EC (Wheel mark) which incorporates the European Norm EN 60945 (IEC 945 3rd revision).*

2.3 Cables

No cables are included with the RGC12 delivery.

See Figure 4-5 for cable connections.

Note ! *Check with supplied cable drawings.*

Cable no.	Minimum conductor requirement - mm^2	Type of cable or equivalent	Maximum cable length	Remarks
1	2 x 1.5 + E AWG15	RCOP	-	
2	2 x 1.5 AWG15	RCOP	-	Shielded
3	2 x 0.5 AWG20	RCOP	1 km	Shielded
4	2 x 1.5 AWG15	RCOP	13 m	Shielded
5	3 x 0.5 AWG20	RCOP	13 m	Shielded
6	4 x 0.5 AWG20	RCOP	13 m	Shielded

Cable Specification List (Ref. Figure 4-5)

3 INSTALLATION

3.1 General information

The RGC12 Gyro Compass, part no. 44166585, is shipped in a cardboard container that includes the following parts:

- RGC12 Master Compass P/N 44174001
- RGC12 Master Compass Sensitive Element P/N 44174019
- RGC12 Control Box P/N 44174027
- Spare Part and Tool Box
- RGC12 Instruction Manual P/N 20220679
- RGC12 Installation Manual P/N 20220737
- Warranty Card

If optional PCBs have been ordered, they are mounted in the RGC12 Master Compass before shipment. (Refer to Packing List).

3.2 Precaution before installation

For details of equipment dimensions and layout, see Figure 4-1 - Figure 4-4.

The Sensitive Element is packed in foaming styrol, for protection against vibration and shock, in a separate package.

Caution ! ***Only people authorized by Simrad or Kongsberg Simrad should mount the Sensitive Element in the Master Compass.***

Make sure that the delivered equipment is free from damage before starting the installation. Check:

1. Model of equipment
2. Ship's power supply

3.3 Logistics

Safety: Refer to general safety procedures

Personal qualifications: Trained mechanical workers

Minimum number of personnel: 1

Ship location: No recommendations

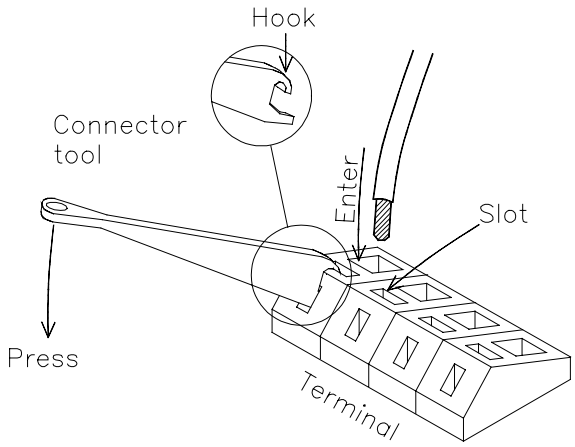
Special tools required: Terminal connector tool supplied with equipment

3.4 Terminal connector tool

All terminal connections are by self locking crimp terminals.

A special connector tool is located in a plastic bag inside the Control Box.

Insert the tool such that the hook enters the slot above the cable entry. Press down the shaft to open the wire lock mechanism and insert the wire. Release the pressure and lift out the tool. The wire is now locked and secured.



3.5 Caution in Installation

1. Install the RGC12 Master Compass so that horizontal base datum lines coincides with the ship's fore and aft line. See Figure 4-1, page 17.
2. Ensure that the service space shown in the installation drawing is provided. See Figure 4-2, page 18.
3. Install the RGC12 Control Box at a convenient place easy to operate and easy to access for inspection and service.
4. Since the spring-pressure type terminal boards are applied in the Control Box for cable connections, do not connect several wires to one terminal.

5. The safe distance for magnetic compass is clearly shown on each unit. Install units in accordance with these safe distances.
6. Be sure to install the recommended cables separated according to the function of each cable, as shown by separate cable list or inter unit wiring diagram (see Figure 4-5, page 21).
7. Be sure to install all the equipment cable more than 5 m away from radio equipment feeders if possible.
8. Connect terminals marked with ⏚ to the ground terminals of the ship. Shield end of shield cable is to be finished close to the terminal board and connect to the ground terminals of the ship.
9. Armour of cable end for the master compass should be finished 20~30 mm before the cable entrance for easy connecting to terminals.
10. Since semiconductor elements are used in the equipment. do not use a megger for any test.
11. Any shipyard that installs this equipment for the first time should be given instructions by Simrad or Kongsberg Simrad service engineers.

3.6 100/110V AC Mains

The Gyrocompass is pre-wired for connection to 220V AC Mains. If the Gyrocompass is connected to 100/110V AC Mains the following jumpers must be connected in the Control Box. Refer to Figure 3-1.

1. On the Power PCB connect the Jumper J1.
2. On the Term PCB connect the Jumper J3.

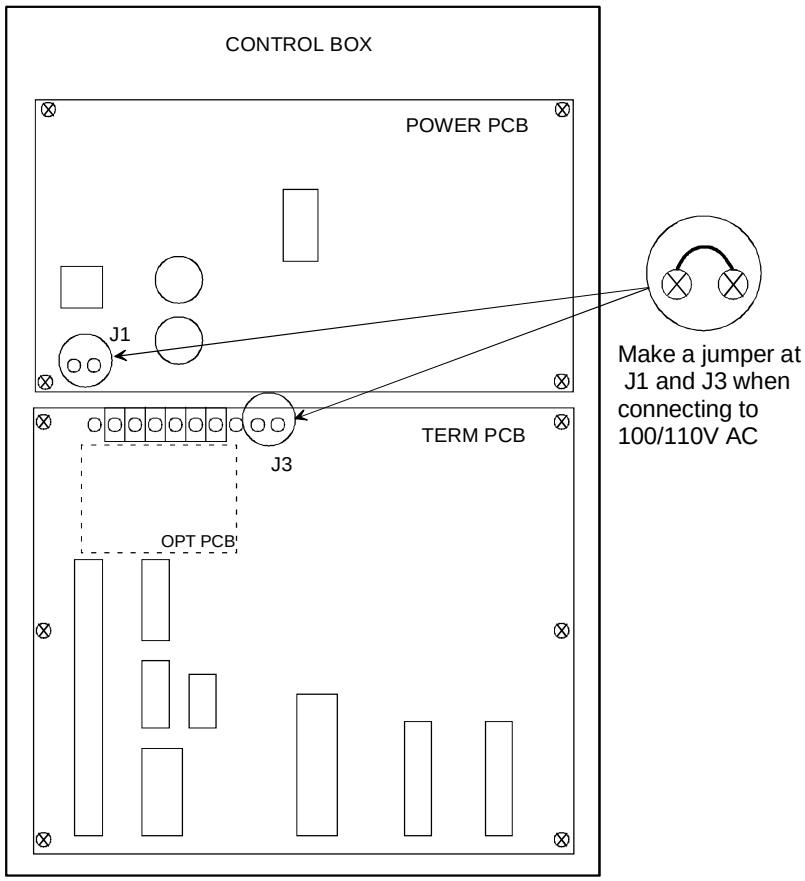


Figure 3-1 Jumper connection for 100/110V AC Mains supply

3.7 Spare parts

The Spare Part and Tool Box contains the following:

Item no.	Name of part	Quantity
	For Master Compass	
1	Fuse 250V, 15A (32x6mm)	2
	For Control Box	
2	Fuse 125V, 20A (32x6mm)	2
3	Fuse 250V, 6,3A (32x6mm)	2
4	Fuse 125V, 1A (20x5mm)	18
5	Terminal connector tool	1
	For Control Box, Optional Board	
6	Fuse 125V, 1A (20x5mm)	12

4 INSTALLATION DRAWINGS

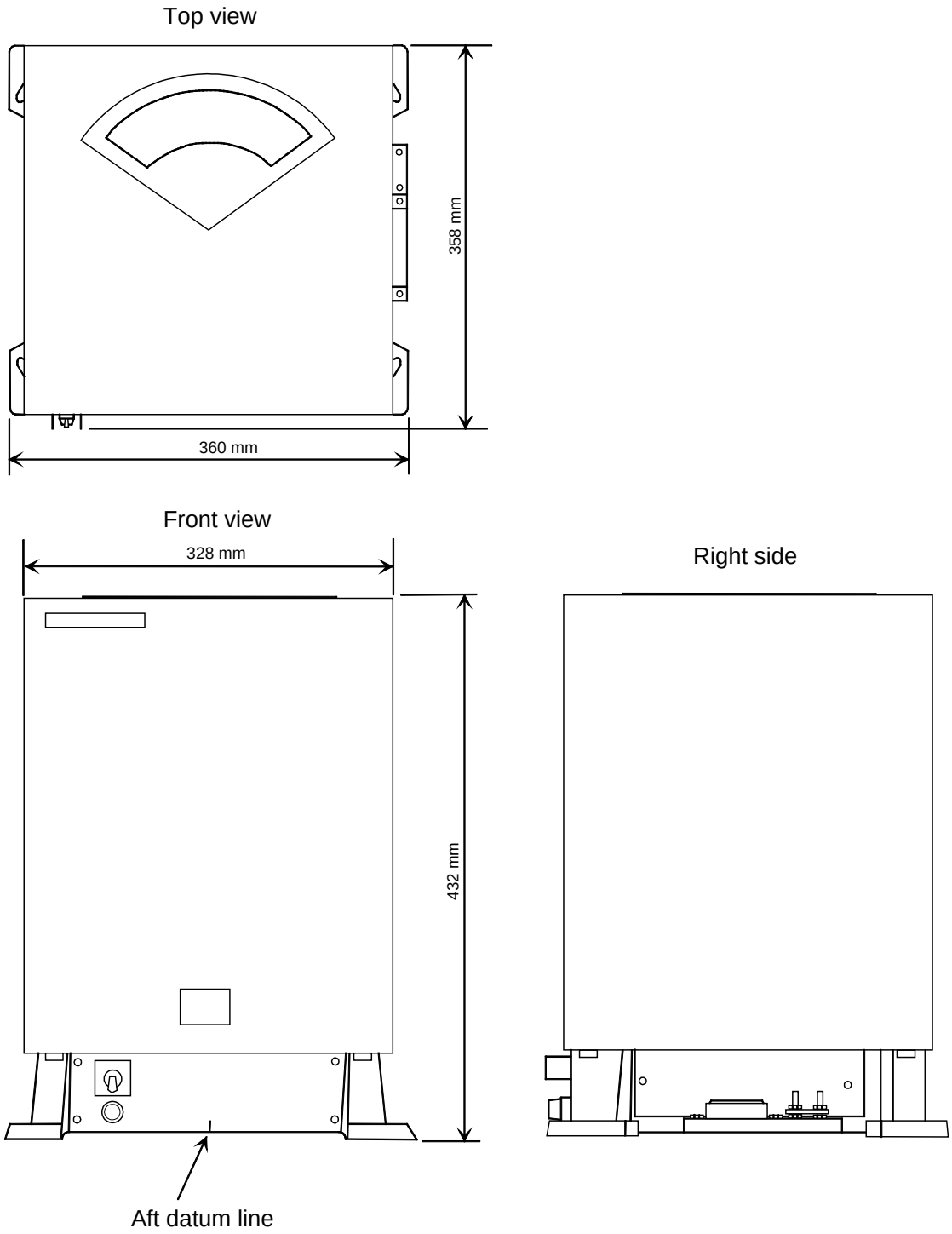


Figure 4-1 Master Compass Dimensions

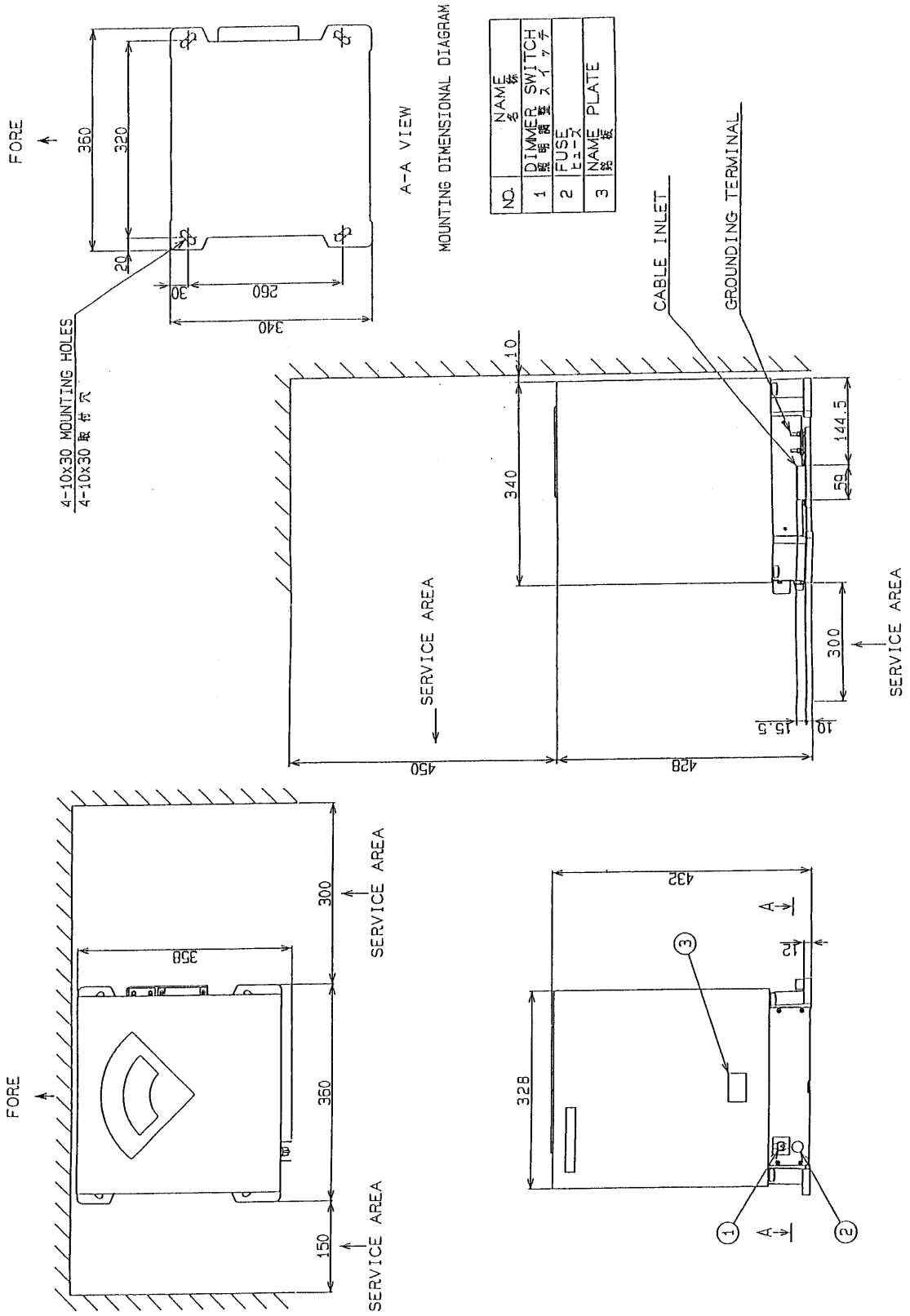


Figure 4-2 Master Compass Installation outline

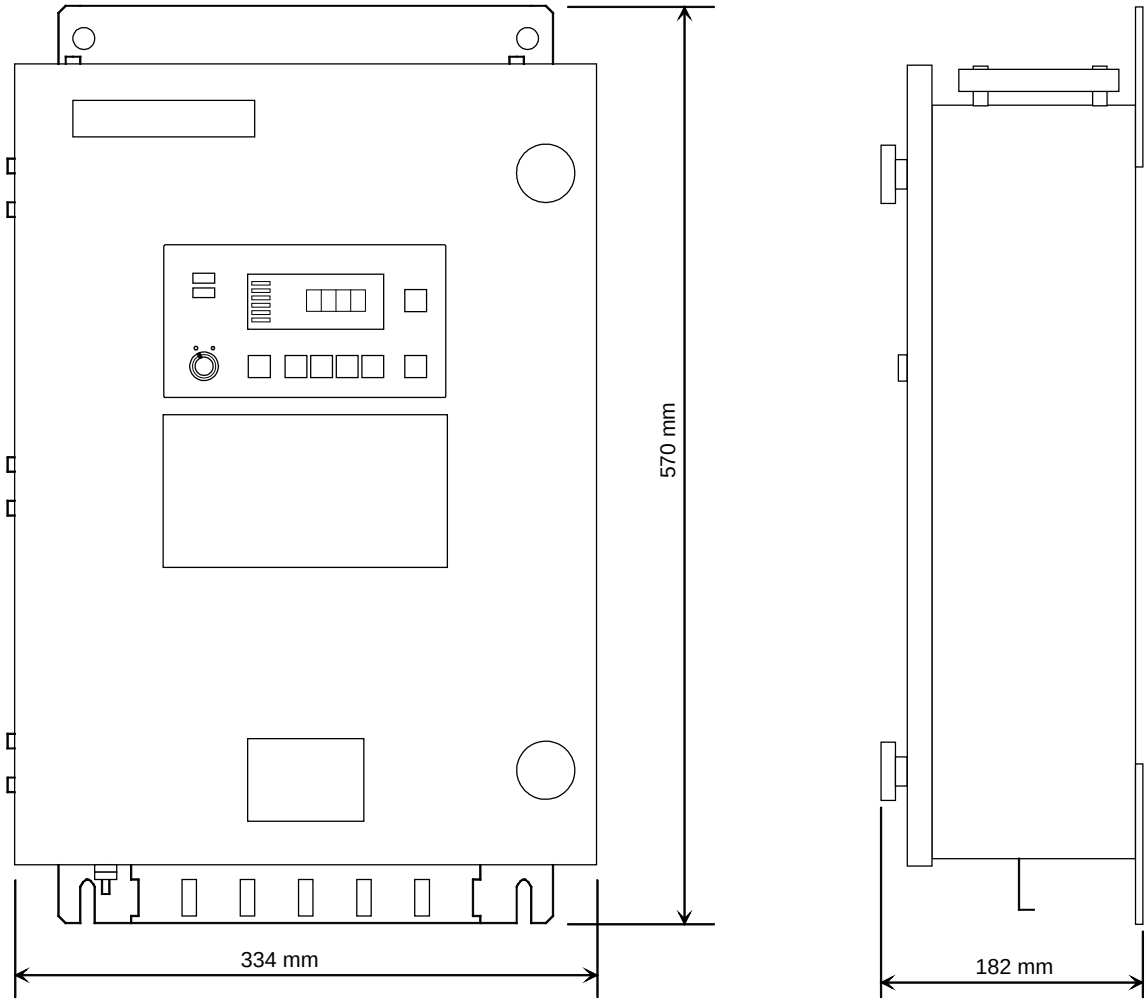


Figure 4-3 Control Box Dimensions

NO.	NAME 名称
1	POWER SWITCH 電源スイッチ
2	DISPLAY SWITCH 表示スイッチ
3	SETTING SWITCH 設定スイッチ
4	LAMP TEST SWITCH ランプテストスイッチ
5	ALARM STOP SWITCH 警報停止スイッチ
6	ALARM LED 警報LED
7	DISPLAY 表示部
8	DISPLAY ITEM LED 表示項目LED
9	MODE LED モードLED
10	OPERATING PLATE 操作銘板
11	NAME PLATE 銘板

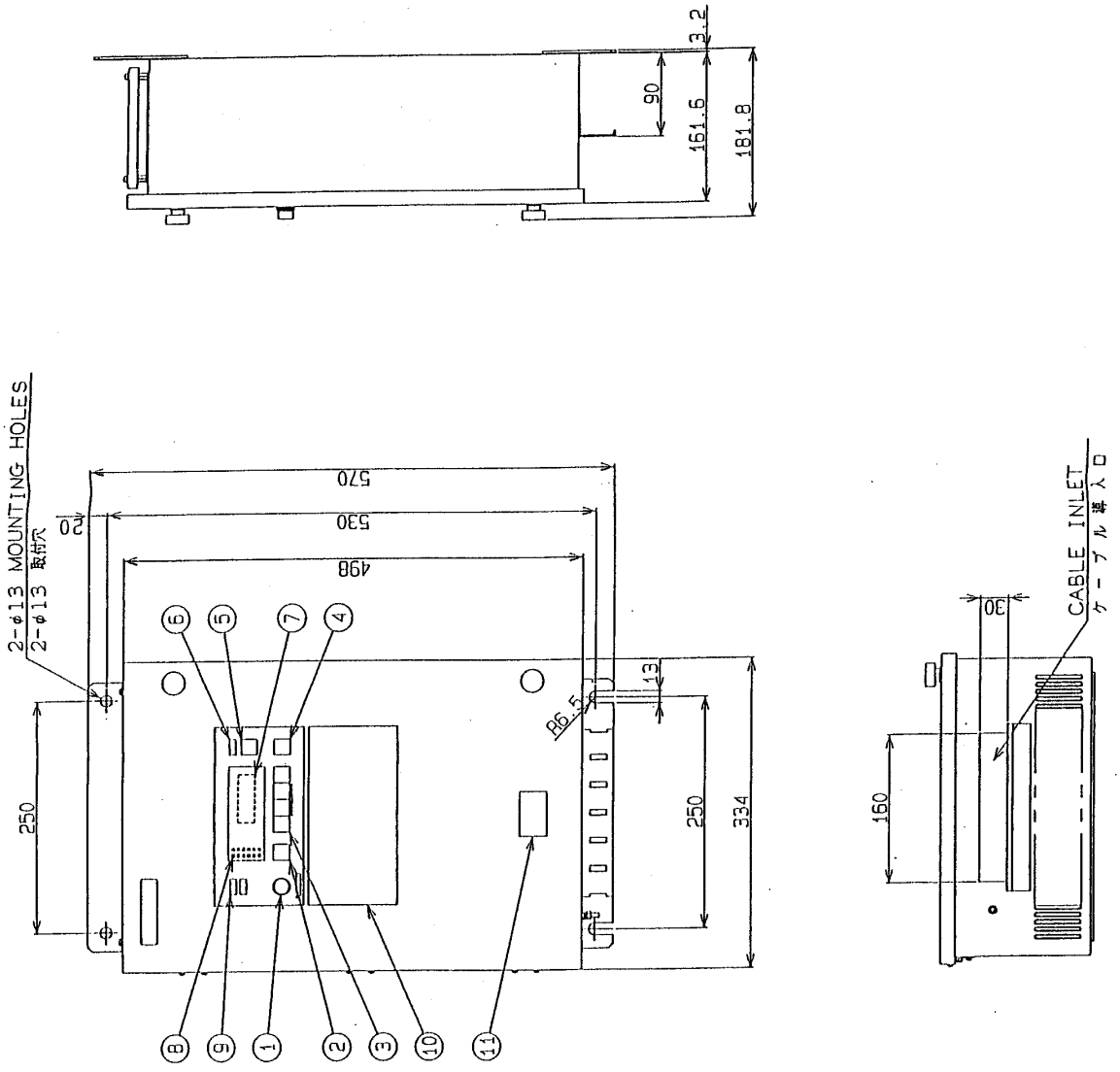


Figure 4-4 Control Box Installation outline

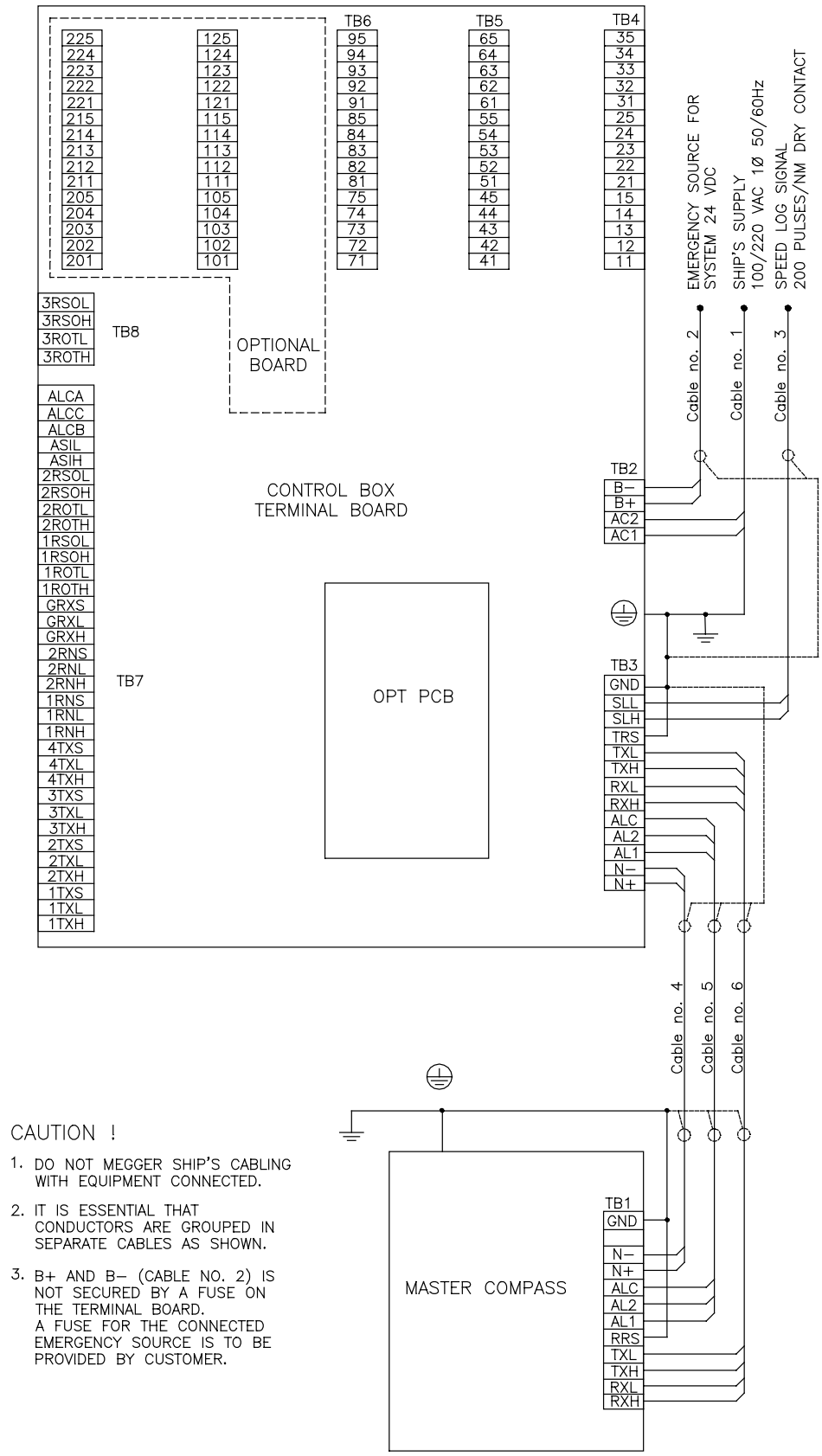


Figure 4-5 RGC12 Inter Unit Wiring Diagram (N3-082190)

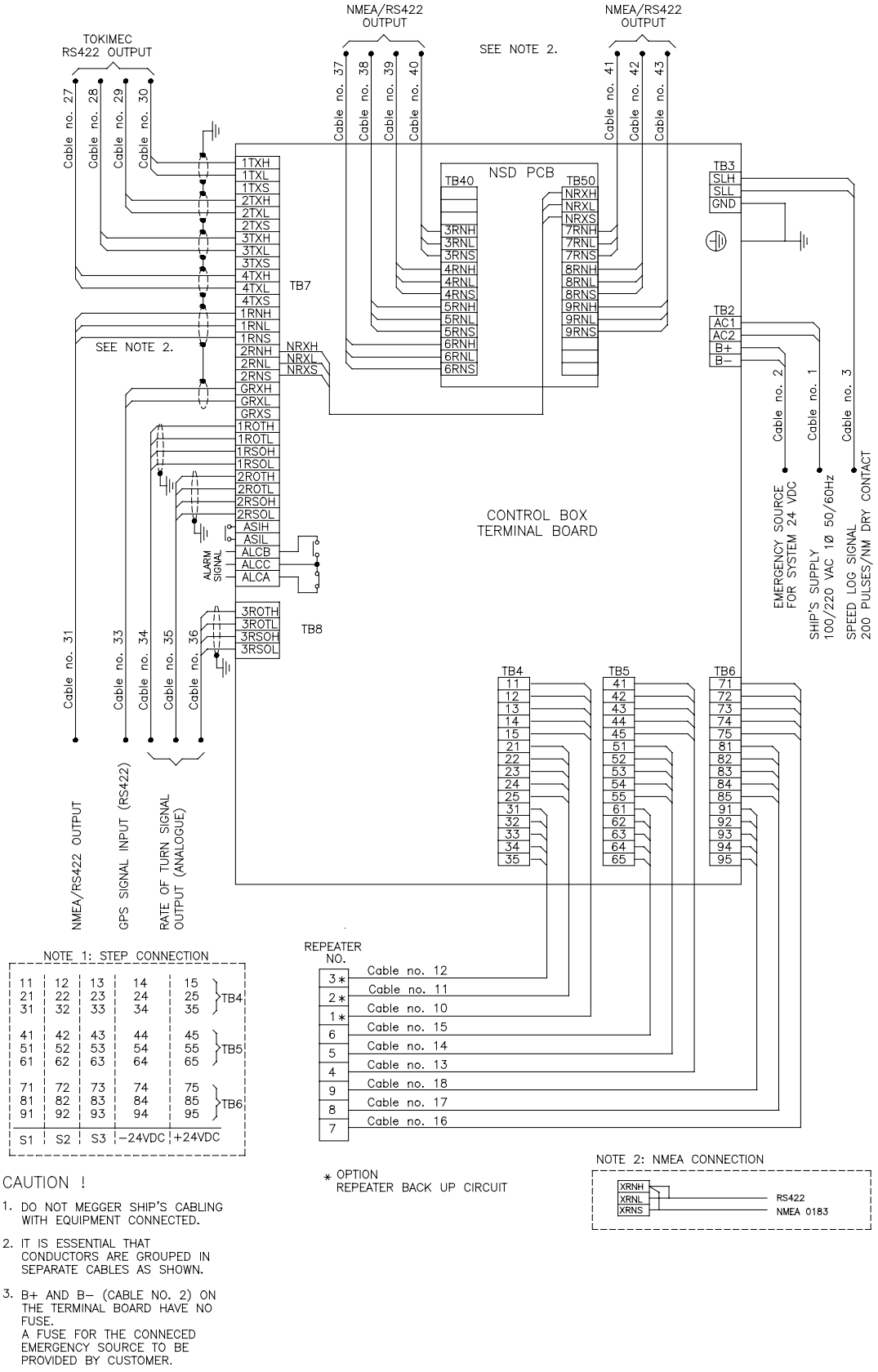


Figure 4-6 RGC12 External Wiring Diagram (N3-082093C)

5 OPTIONAL EQUIPMENT

5.1 DR75 Digital Repeater (NMEA)

Introduction

DR75 is a four digit, digital heading repeater. It is powered from 24 VDC, which is derived from the ships supply. Power consumption is low typically 10 watts.

The display gives a resolution and an accuracy to one tenth of a degree. The display is visible to three meters over an arc of ninety degrees from its centre.

The repeater can either be console mounted or bulkhead mounted with its supplied trunnion bracket.

The internal components are housed in a robust splashproof aluminium enclosure.

In addition to the heading display this repeater has an additional display which can be used to indicate rate of turn or to indicate the desired course to be steered. These features are selectable by buttons on the front.

Specifications

Overall Dimensions

Height:..... 97 mm

With:..... 192 mm

Depth: …37 mm (110 mm allowing for plug and cable clearance)

Weight (nominal):.....1.2 kg

Mounting options:.....Panel or Bulkhead

Finish:..... Light Weather-work Grey (BS3816-676)

Construction:..... Aluminium splash proof

Compass safe distance: .....2 m

Electrical

Power supply: ..... 24 VDC 10 watts

Data input:.....$HEHDTXXX.X<CR><LF>

Operational Features

Dynamic performance:

The Display has a resolution of one tenth of a degree and will retain alignment for rates in excess of 12 degrees per second.

Environmental specifications

Splash proof to: IP33

Temperature: .....-15°C to 45°C

Humidity:..... 0% to 95% at 40°C

Vibration: .....1-12.5 Hz ±1.6 mm

12.5 – 25 Hz ±0.38 mm

25HZ – 50 Hz ±0.1 mm

Magnetic Permeability:.... Cat. A (Acceptable for embarkation within volumetric allowances.

Installation

General Information

Upon receipt, carefully inspect the packaging for any signs of damage. Record any damage if evident for future reference or action.

Carefully unpack and examine all enclosed items as listed in the accompanying shipping note. Retain the packaging materials for possible future use.

Mounting Instructions

Visually inspect the installation site for the following (Refer to Figure 5-2 DR75 Digital Repeater - Dimensions, page 26):

- There is adequate shock clearance around the position where the repeater is to be sited.
- The mounting arrangement is such that the repeater is at a convenient level for viewing and or operating purposes.
- Sufficient accessibility must be provided to enable the repeater to be removed from the mounting position for servicing purpose.
- Adequate space for removal of the plug exists when the repeater is permanently mounted and to facilitate the routing of the power and data cable.
- Fix the repeater mechanically in to position ready for electrical connection.

Electrical Installation

Caution ! ***Application of any voltage supplies other than those stipulated in the product specification may cause damage to the repeater.***

DR75 are connected to the ships cabling by a supplied pre-wired D-type connector and a 2.5 m (8') six core screened cable. The D-type connector plugs directly into the repeater to make maintenance and servicing easier. The cable is connected to the Ship's Data Cable. It is recommended that a suitable junction box (not supplied), is used for this purpose.

Connect ships core to repeater cores according to the diagram below.

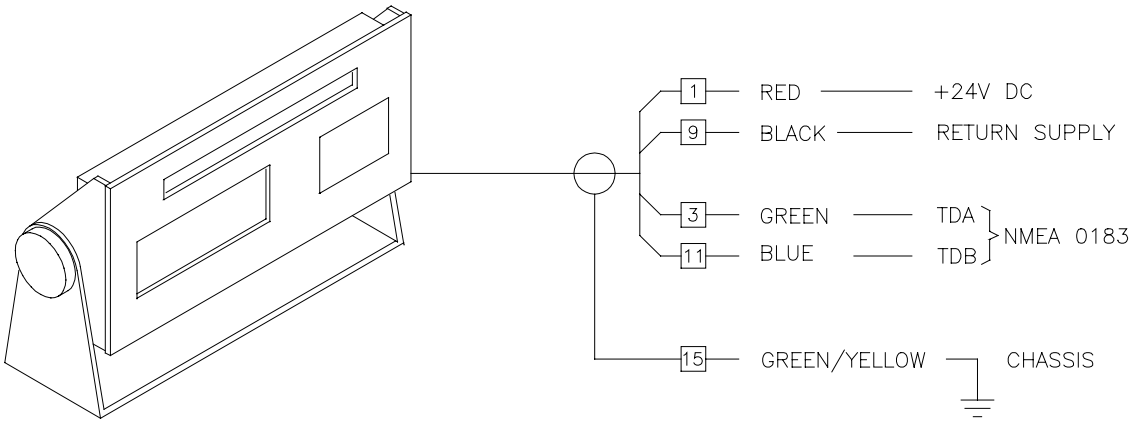


Figure 5-1 DR75 connection diagram

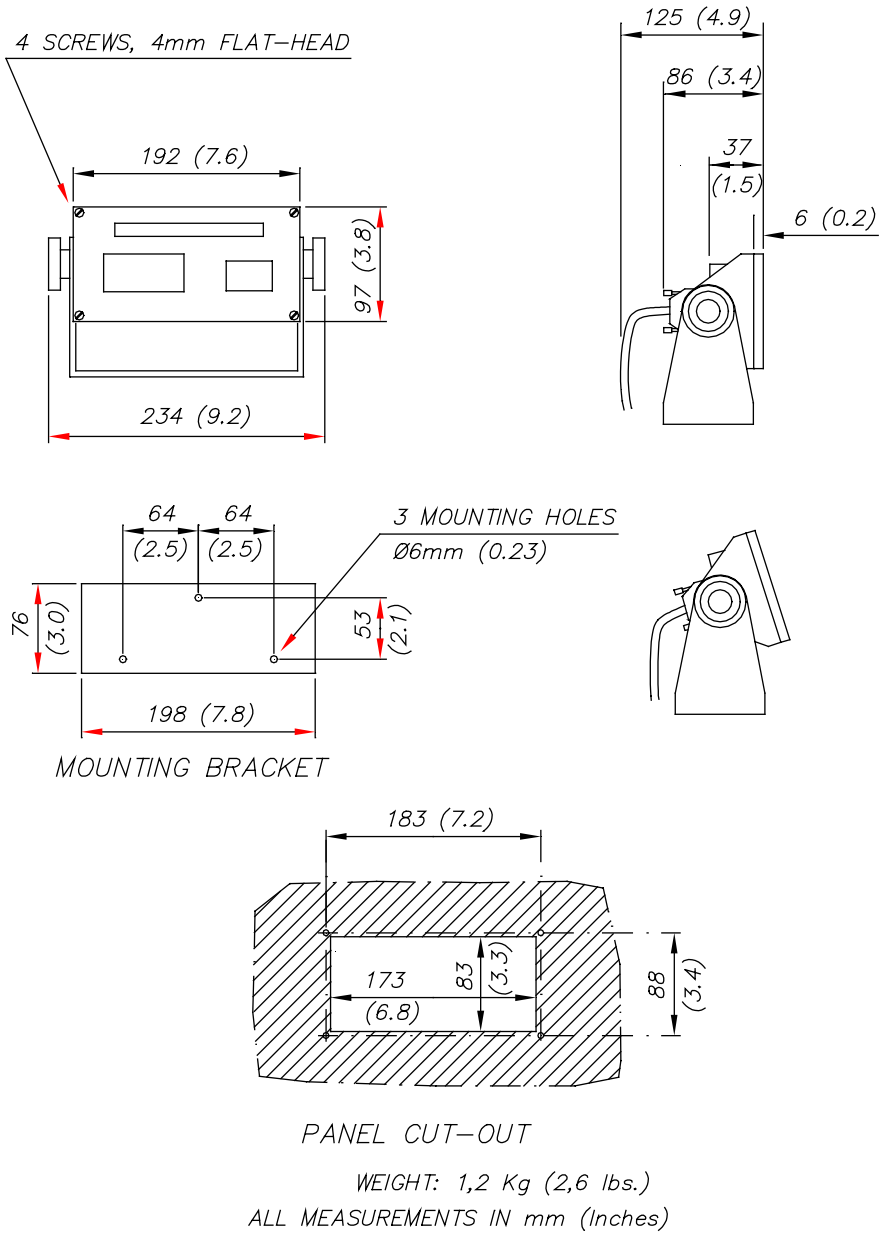


Figure 5-2 DR75 Digital Repeater - Dimensions

(Drw. N4-710311B)

Controls

The DR75 has three button controls. The first two are used to Dim the horizontal LED bar graph display and control the back lighting to the LCD display.

The third switch is used to mark or 'SET' a course that is to be steered to. This is depressed when the desired heading to be steered to is reached. When the correct course is being steered all the indicators are unlit. With each degree steered off-course the appropriate left or right LED is lit until this ship is on-course and all LED's are unlit.

Indicators

The DR75 has two indicators. One is a four digit liquid crystal display which displays input heading received from the transmitting device e.g. Gyro. The second is a horizontal LED bar graph display that is used either as a rate of turn indictor or as a steering indicator to show how far of a set course the vessel is.

Modes

The repeater's LED bar graph display has three modes of operation. Modes are selected by depressing both the set switch and the Dim bar digit simultaneously and is cycled until you release both switches when the desired mode of operation is indicated on the LCD display (0, 1 and 2).

The first two modes (0 and 1) are used to select the bargraph display to act as a rate of turn indicator with a course and fine setting. This is particularly useful when docking manoeuvres are taking place.

The third mode of operation selects the bargraph display to act as a set steering display. The set switch is depressed when the desired heading to be steered to is reached. When the correct course is being steered all the indicators are unlit. With each degree steered off-course the appropriate left or right LED is lit. The further off the desired course more LED's are lit until this ship is on-course and all LED's are unlit.

Flashing LCD display

If for any reason the heading display starts to flash this indicates that the data signal which is being sent by the transmitting device is either not present or not correct. This must be investigated further.

If the repeater is presented with a correct NMEA 0183 sentence but not being true heading (HDT), the display will still flash. If a magnetic heading is presented (HDM), the repeater will display the heading, but will still flash and respond slowly. The LED bar graph will not respond.

5.2 RSR68 Steering Repeater (Step)

Introduction

The RSR steering repeater satisfy a number of applications where accurate repetition of ships heading is displayed for pilotage or navigation purpose.

The display consists of an electro-mechanically driven compass card graduated in degrees. A lubber line is provided at the 000 degree mark

Interface between the display and the ships system is through a cable, which may be terminated via a suitable junction box.

Alignment and dimming facilities are provided through a membrane keypad on the front of the steering repeaters.

Specifications

Overall dimensions: ..... 215 x 215 mm

Card diameter: ..... 165 mm

Depth: ..... 125 mm allowing for cable clearance)

Weight (nominal):.....2.8 kg

Mounting options:.....Trunnion or Panel mounted

Finish:.....Satin black (RAL 9005)

Compass safe distance: .....2 m

Electrical

Power supply: .....From gyro supply 24V, 35V, 50V, 70V positive or negative common.

Overvolt protection:..... Continuous 25%. Transient (100ms) 35%

Data input:..... 6 steps per degree24V, 35V, 50V, 70V positive or negative common.

Data line current:.....20 mA

Power line current:.....500 mA

Operation

Display alignment: Continuous speed; one revolution (360°); per 20 seconds.

Display illumination: Push button operated providing 70 degrees back illumination to compass card and lubber line.

Dynamic limits: Alignment is retained with heading change rates of up to 12 degrees per second.

Performance accuracy: Indicates the transmitted heading in 1 degree scale graduations in steps of 1/6 degree resolution.

Environmental specifications

Protection:..... IP54

Temperature:.....–20°C to +60°C

Humidity:..... 0% to 95% at 40°C

Noise:.....Not greater than 65 dbA

Installation

General Information

Upon receipt, carefully inspect the packaging for any signs of damage. Record any damage if evident for future reference or action.

Carefully unpack and examine all enclosed items as listed on the accompanying shipping note. Retain the packaging materials for possible future use.

Mounting Instructions

Install the Repeater as follows (Refer to Figure 5-3 RSR68 Steering Repeater - Dimensions):

- Site the RSR68 at the position selected for installation. Ensure suitable shock clearance.
- Prepare for trunnion or panel mounting.

Electrical Installation

Wire the repeater as follows:

- Ensure that all supplies to the ships data cable are isolated before continuing.
- Using suitable crimp terminals. Terminate the repeater to the ships cable via junction box.

- For common negative steps connect polarity to –Vdc. For common positive steps connect polarity to +Vdc.

RED:	+24, 35, 50 or 70VDC
BLACK:	–VDC
GREEN:	L1
BLUE:	L2
WHITE:	L3
VIOLET:	Polarity
GRN/YELL:	Chassis

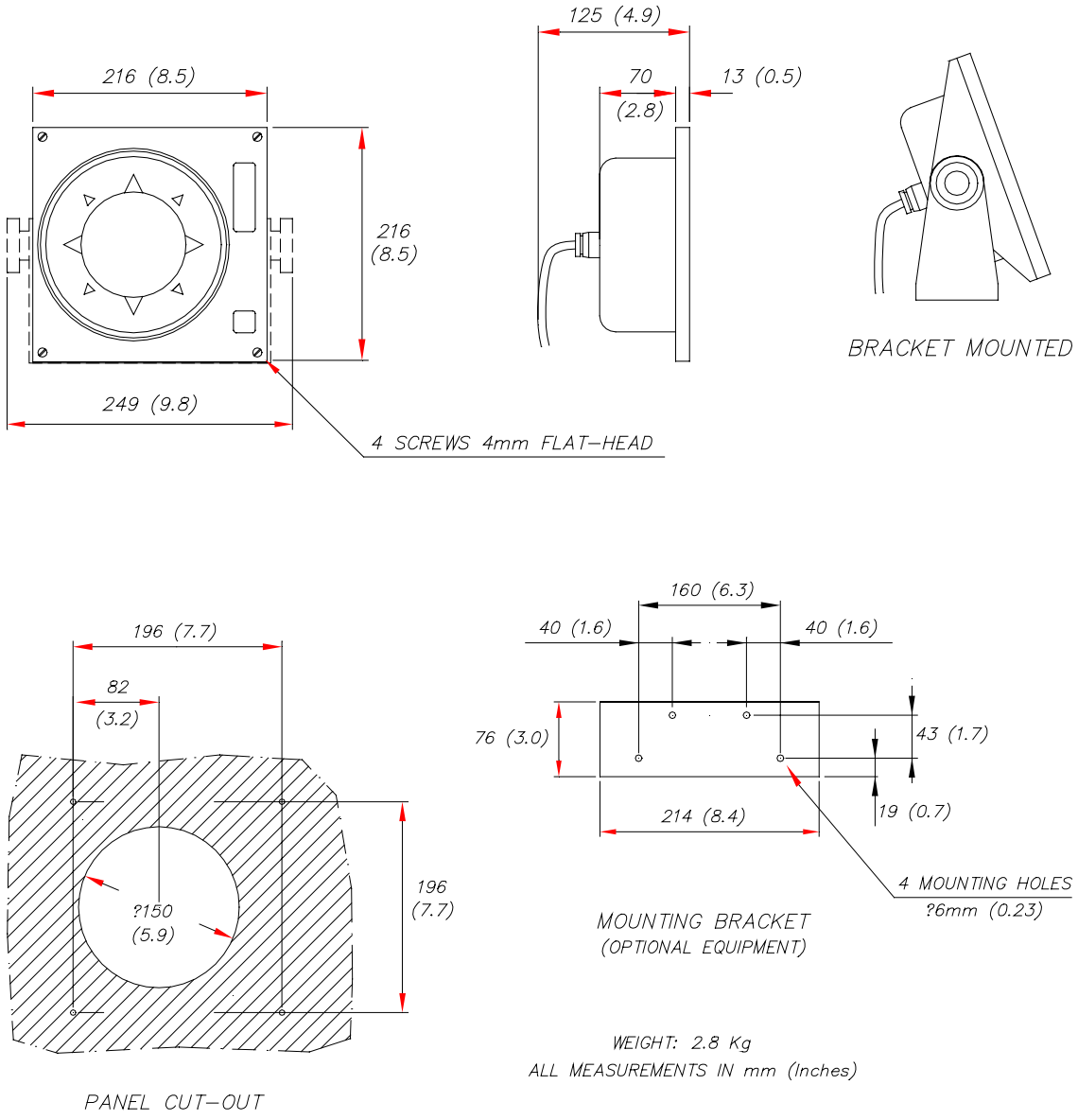


Figure 5-3 RSR68 Steering Repeater - Dimensions

(Drw. N4-710300)

5.3 RSR77 Steering Repeater (Step)

Introduction

The RSR steering repeater satisfy a number of applications where accurate repetition of ships heading is displayed for pilotage or navigation purpose.

The display consists of an electro-mechanically driven compass card graduated in degrees. A lubber line is provided at the 000 degree mark

Interface between the display and the ships system is through a cable, which may be terminated through a suitable junction box.

Alignment and dimming facilities are provided through a membrane keypad on the front of the steering repeaters.

Specifications

Overall dimensions: ..... 196 x 196 mm

Card diameter: ..... 120 mm

Depth: ……..... 125 mm allowing for cable clearance)

Weight (nominal):.....2.2 kg

Mounting options:.....Trunnion or Panel mounted

Finish:.....Satin black (RAL 9005)

Compass safe distance.....2 m

Electrical

Power supply: .....From gyro supply 24V, 35V, 50V, 70V positive or negative common.

Overvoltage protection: Continuous 25%. Transient (100ms) 35%

Data input:..... 6 steps per degree24V, 35V, 50V, 70V positive or negative common.

Data line current:.....20 mA

Power line current:.....500 mA

Operation

Display alignment: Continuous speed; one revolution (360°); per 20 seconds.

Display illumination: Push button operated providing 70 degrees back illumination to compass card and lubber line.

Dynamic limits: Alignment is retained with heading change rates of up to 12 degrees per second.

Performance accuracy: Indicates the transmitted heading in 1 degree scale graduations in steps of 1/6 degree resolution.

Environmental specifications

Protection:.....Front: IP66
Back: IP54

Temperature:.....–20°C to +60°C

Humidity:..... 0% to 95% at 40°C

Noise:.....Not greater than 65 dbA

Installation

General Information

Upon receipt, carefully inspect the packaging for any signs of damage. Record any damage if evident for future reference or action.

Carefully unpack and examine all enclosed items as listed on the accompanying shipping note. Retain the packaging materials for possible future use.

Mounting Instructions

Install the Repeater as follows (Refer to Figure 5-4 RSR77 Steering Repeater - Dimensions):

- Site the RSR77 at the position selected for installation. Ensure suitable shock clearance.
- Prepare for trunnion or panel mounting.

Electrical Installation

Wire the repeater as follows:

- Ensure that all supplies to the ships data cable are isolated before continuing.
- Using suitable crimp terminals. Terminate the repeater to the ships cable via junction box.
- For common negative steps connect polarity to –VDC. For common positive steps connect polarity to +VDC.

RED:	+24, 35, 50 or 70VDC
BLACK:	VDC
GREEN:	L1
BLUE:	L2

WHITE: L3
VIOLET: Polarity
GRN/YELL: Chassis

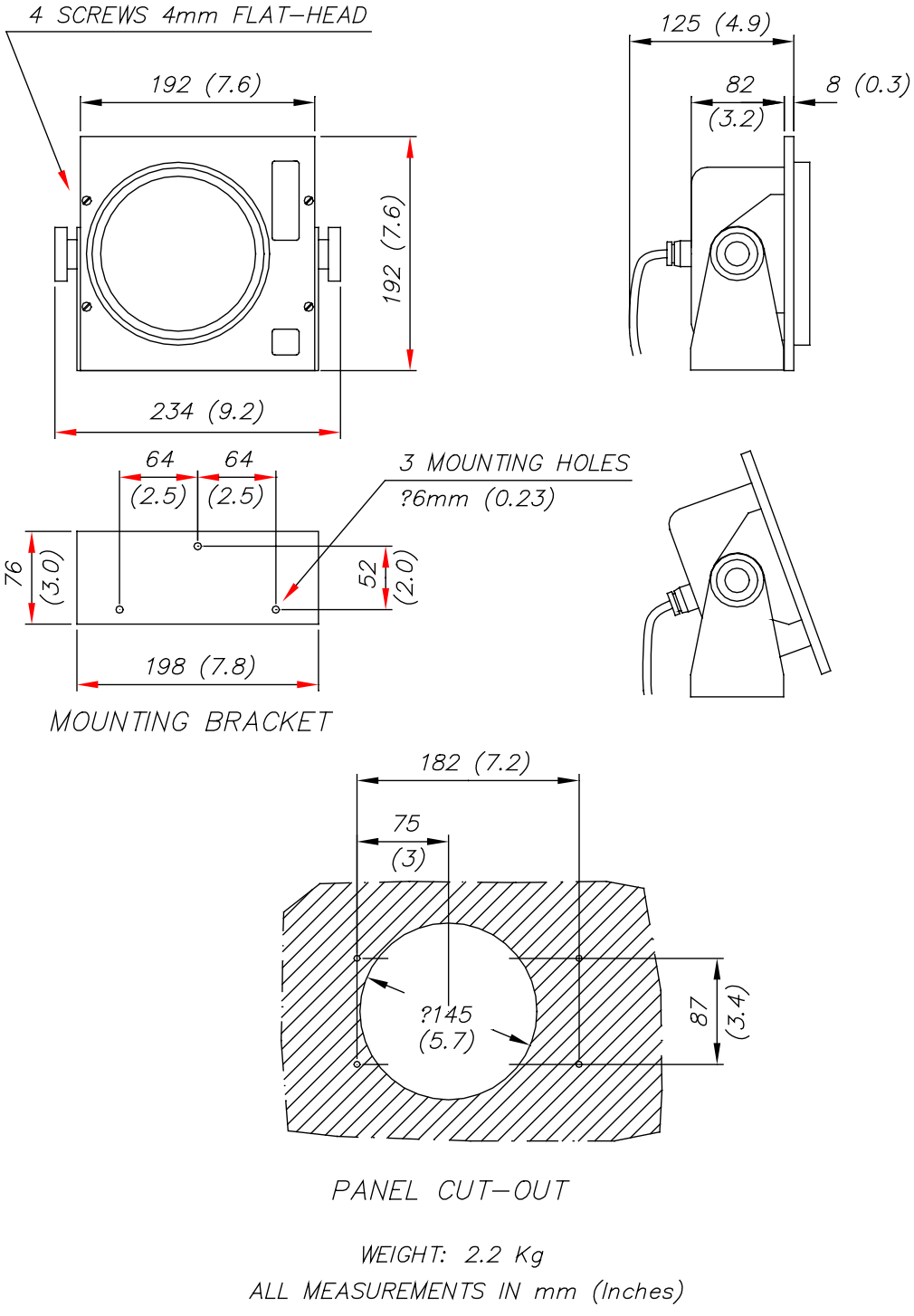


Figure 5-4 RSR77 Steering Repeater - Dimensions

(Drw. N4-710292)

5.4 RP-41-1 Bearing Repeater

Specifications

Weight: ..... 4.5 kg

Input voltage: 24VDC

Step voltage: ..... 24VDC 0.3A/phase (6 steps/degree)

Illumination: 24VDC 0.1A

Compass safe distance: ..... 0.5 m

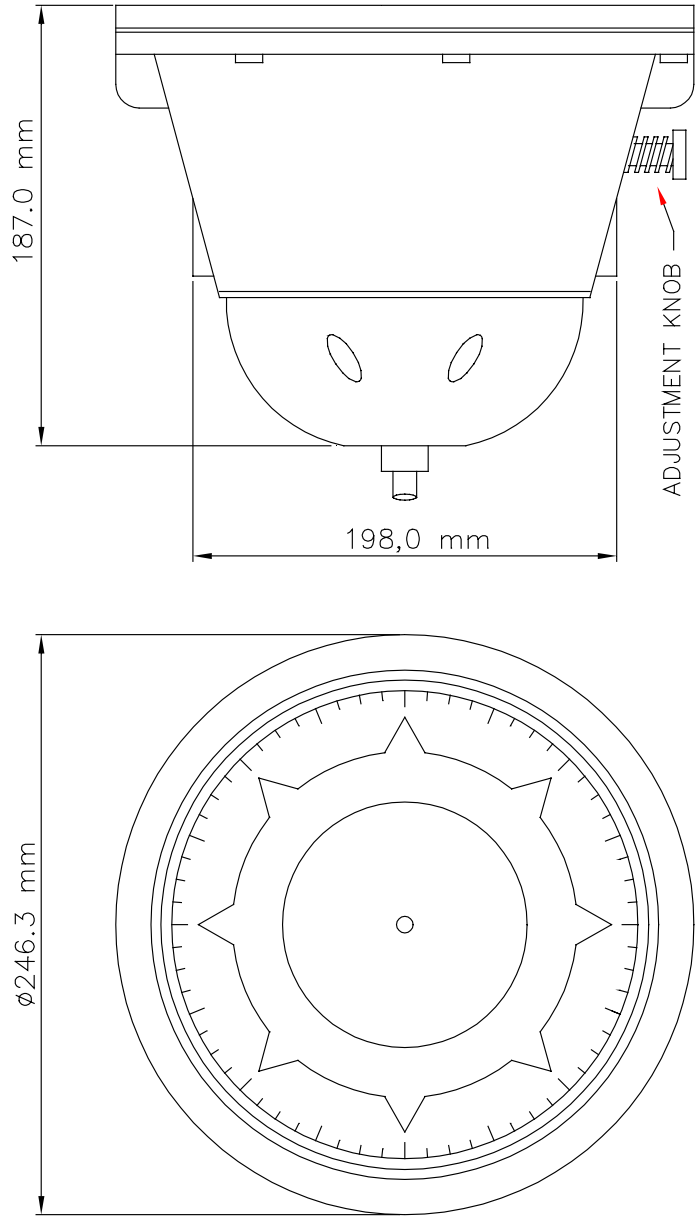
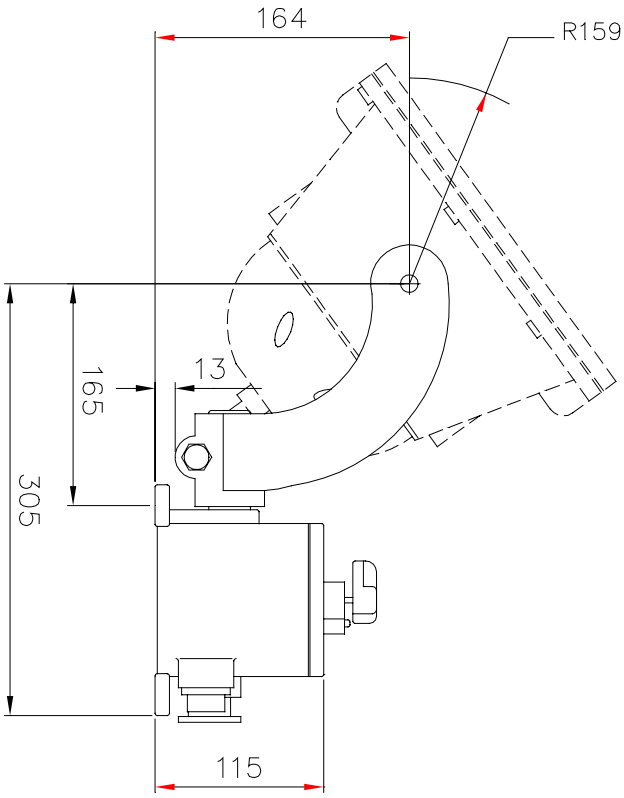
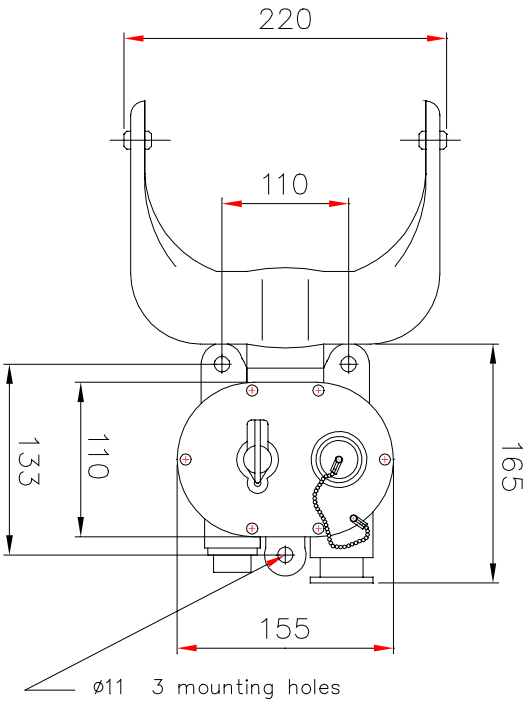


Figure 5-5 RP-41-1 Bearing Repeater - Dimensions

(Drw. N4-710302A)

MB Repeater Holder





Weght: 3.1 kg

Figure 5-6 MB Repeater Holder – Dimensions

(Drw. N4-710304)

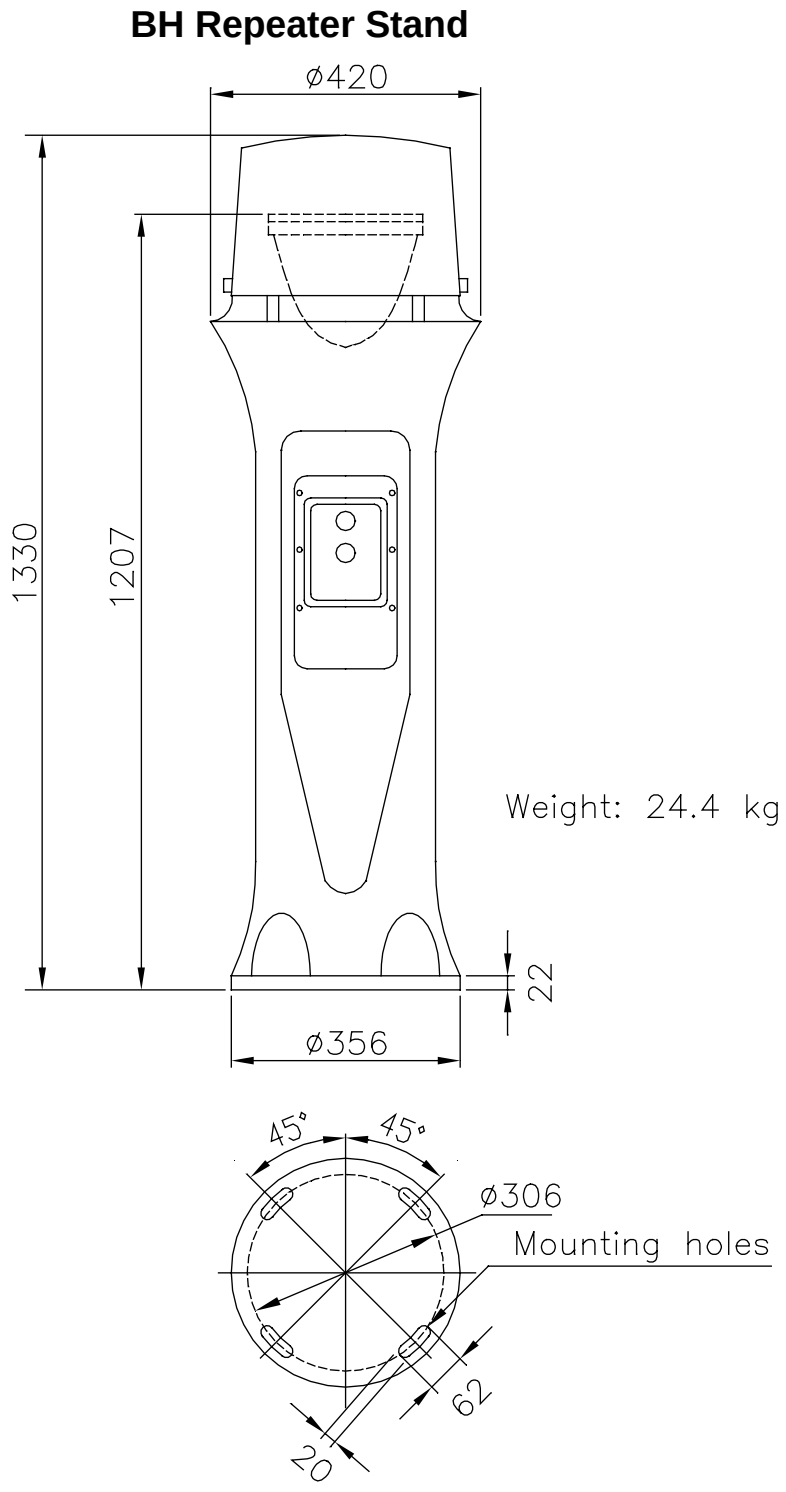


Figure 5-7 BH Repeater Stand - Dimensions

(Drw. N4-710292)

Bearing Repeater Connection

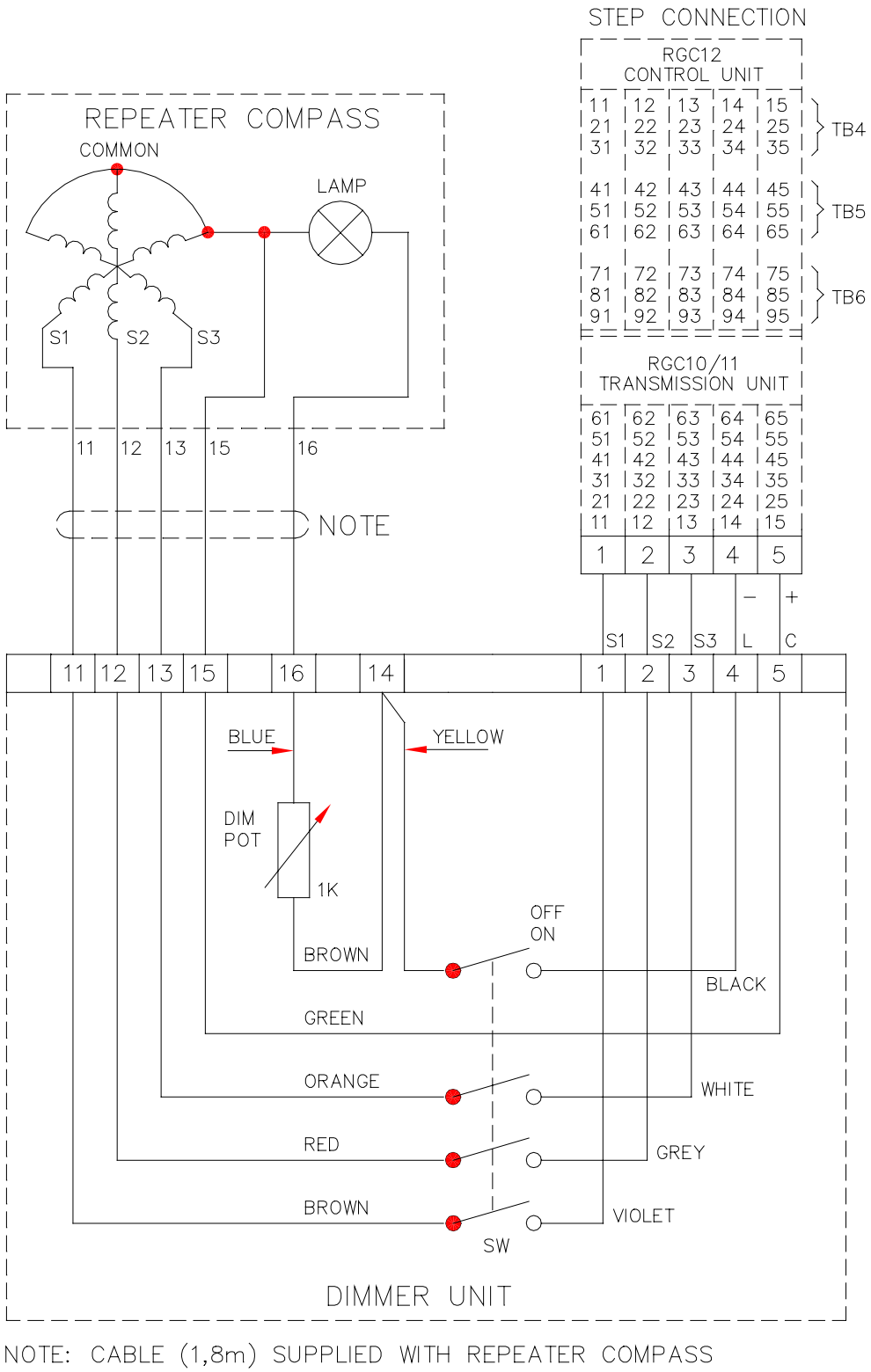


Figure 5-8 Bearing Repeater Connection Diagram
(Drw. N4-710305A)

5.5 Change Over Unit

Specifications

1. Main power supply: ..... 100 / 220VAC 1Φ 50 / 60 Hz, 16.5VA
2. Emergency power supply: 24VDC, 13.5W
3. Output: .....Real load repeater 1 / 6° 24VDC 9 circuits 8.5A max.

   Digital: 1) Tokimec proprietary / RS422
   (True bearing / Speed / Rate of turn).....x 4 ports

   2) NMEA0183 / RS422 (True bearing / Rate of turn).....x 8 ports

   Analogue 1) Rate of turn -5 through +5V (30° / min).....x 3 ports

   Scaleover Greater than ±30° / min ±5V .....x 3 ports

   2) Rate of turn -10 through +10V (120° / min).....x 3 ports

   Scaleover Greater than ±120° / min ±5V .....x 3 ports

   (Analogue (2) is since SCU Ver. 1. 18.)

   Note ! *Analogue output (1) and (2) cannot be output simultaneously.*

   Repeater backup 1 / 6° 24VDC 3 circuits 2.5A max.

4. Indication 7 segments: No. 1 True bearing / No. 2 True bearing / Deviation / Deviation alarm setting / No. Alarm / No. 2 Alarm
5. Power supply specifications:

	Model No.	Manufacturer	Primary (input)	Secondary (output)
PS101	WRB24SK	ETA	85-264VAC 1Φ 47-440 Hz	24VDC ± 1V
PS102	VTM-01C-24	ETA	19-32VDC	+ 5VDC ± 0.3V + 12VDC ± 0.5V -12VDC ± 0.5V
PS103	VTM-01C-24	ETA	19-32VDC	+ 5VDC ± 0.3V + 12VDC ± 0.5V -12VDC ± 0.5V

6. Input : The following input signal must be applied to each gyro-compass of No. 1 and No. 2.

   Analogue signal 200 pulse / nm dry contact .....x 1 port

   Digital signal (GPS) RS422 / NMEA0183 (Latitude / Longitude / Speed) .....x 1 port

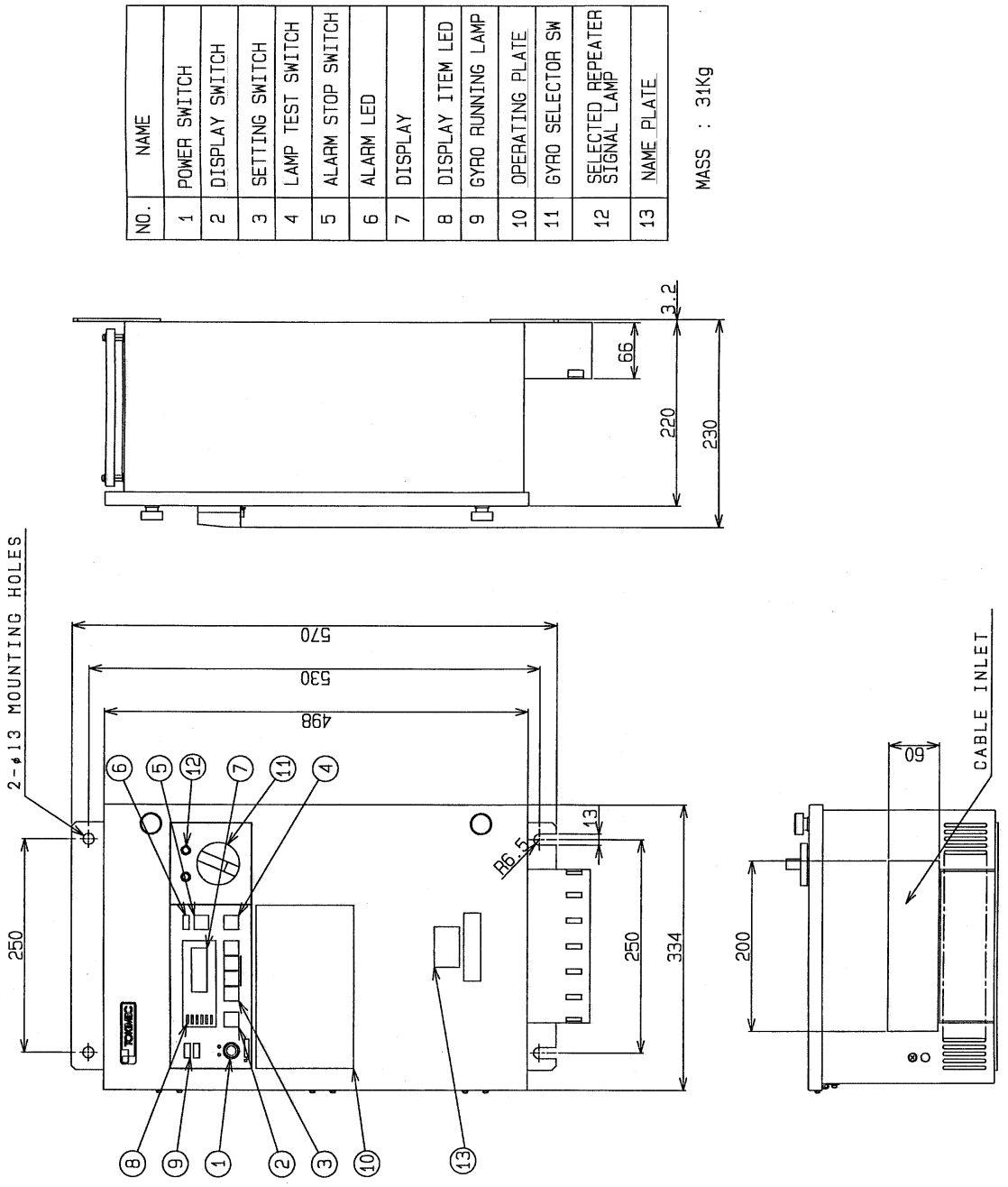


Figure 5-9 Change Over Unit (Bulkhead Type) Outline

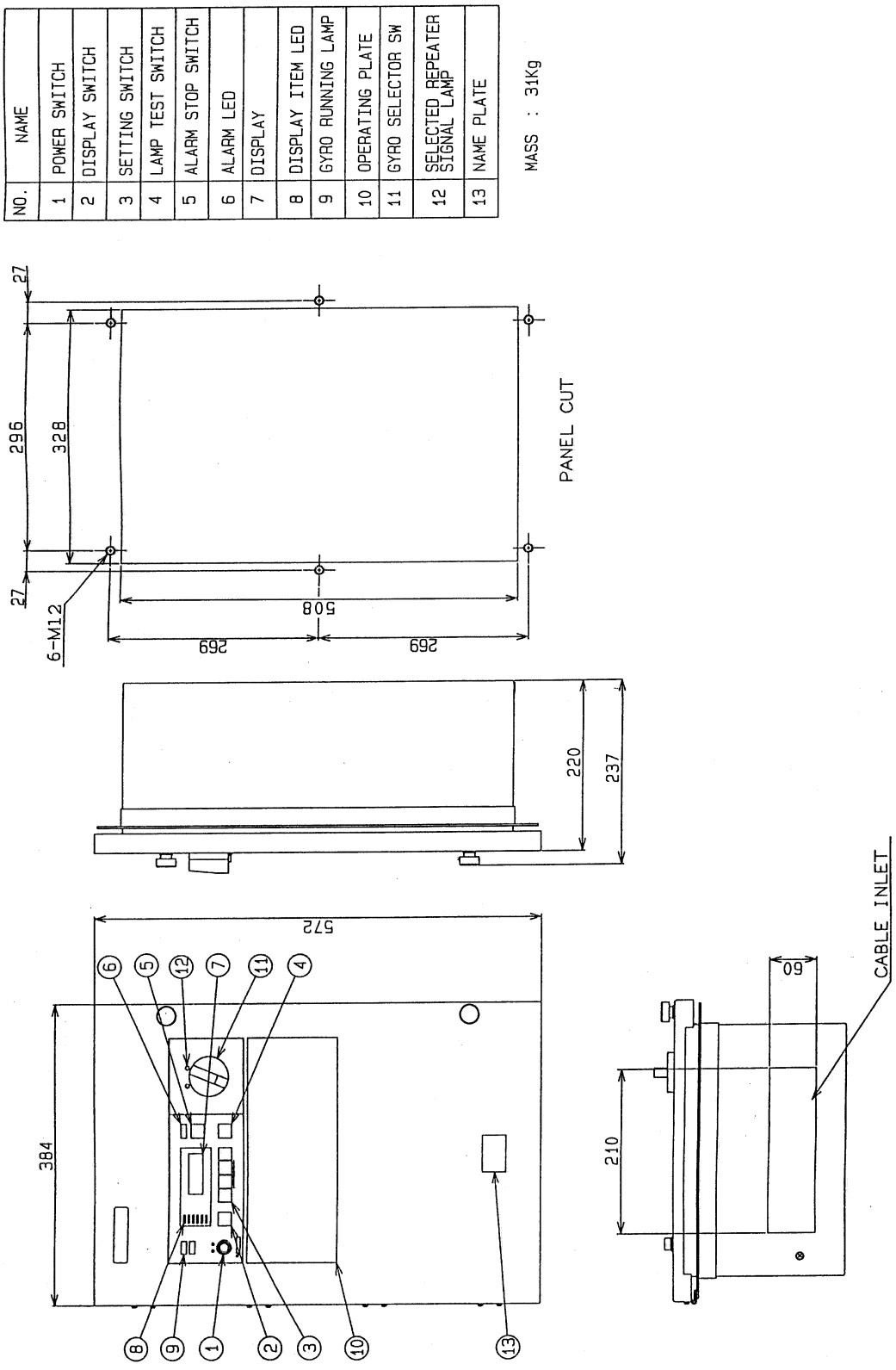


Figure 5-10 Change Over Unit (Flush type) Outline

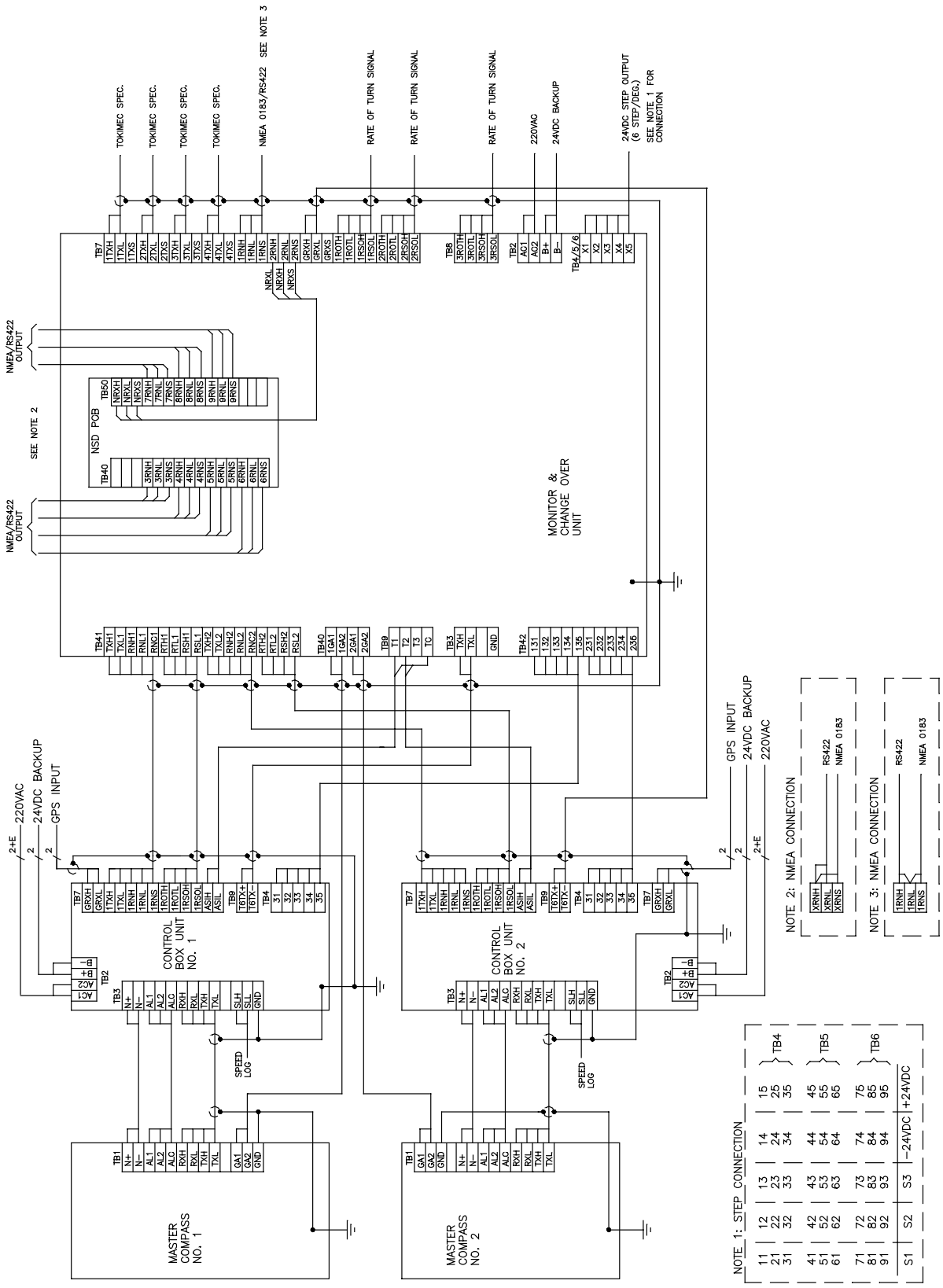


Figure 5-11 Change Over Unit - Wiring Diagram (N3-082462A)