

GYRO COMPASS

REPEATER COMPASS AND ACCESSORIES

● OPERATOR'S MANUAL

TOKIMEC INC.

E11-2209A

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External Dimensions of Repeaters and Accessories

1. GENERAL

The repeater compass receives the ship's heading bearing signal transmitted from the master compass, and remotely indicates the bearing.

The repeater compass contains a torque synchro motor or a step motor with which the repeater compass card is rotated through the gear train.

It is possible to use even in the night as the card is illuminated by the lamp which can be adjusted in brightness from the outside.

The following types of repeaters are provided.

Type	Name	Specification
RP-11-2	Synchro repeater	AC 100/110 V 50/60 Hz Synchro motor 90X
RP-13-1	Synchro open scale repeater	AC 100/110 V 50/60 Hz Synchro motor 90X
RP-14-1	Synchro G. C. P repeater	AC 100/110 V 50/60 Hz Synchro motor 90X
RP-21-2	Step repeater	DC 70 V step motor 90X
RP-31-1	Step repeater	DC 35 V step motor 90X
RP-41-1	Step repeater	DC 24 V step motor 90X

And, the following accessories are also provided.

Type	Name	Specification
BH-11-1	Repeater stand BH type	for synchro repeater
BH-21-1	Repeater stand BH type	for step repeater
BB-11-1	Repeater mounting BB type	for synchro repeater
BB-21-1	Repeater mounting BB type	for step repeater
MB-11-1	Repeater mounting MB type	for synchro repeater
MB-21-1	Repeater mounting MB type	for step repeater
	Junction box for RDF	
	Azimuth circle	
	Shadow pin	
	Repeater cover	
	Repeater shading plate	

2. DESCRIPTION FOR EACH UNIT

2-1 Repeater Compass (Type RP-11-2, RP-21-2, RP-31-1, RP-41-1)

The repeater compass is used to measure the bearing or to steer the ship, and the case is made of FRP (fiber reinforced plastic) and is water-proof construction abled to use even in the open deck.

For PR-11-2, the torque synchro motor with AC 100/110 V, 1 Φ , 50/60 Hz is contained in the case.

For RP-21-2, RP-31-1, RP-41-1, the step motor instead of the synchro motor is contained in the case.

The gear train with 1/90 ratio is mounted between the motor and the card.

On the repeater card, 360 degrees with every one degree are graduated (1X).

There are two illumination lamps for the card below the repeater card.

In the side of the repeater case, there is a synchronizing knob which synchronizes the repeater compass bearing with the master compass bearing, and is a hole and a screw hole to mount the repeater case on the repeater stand BH type or on the repeater mounting MB type.

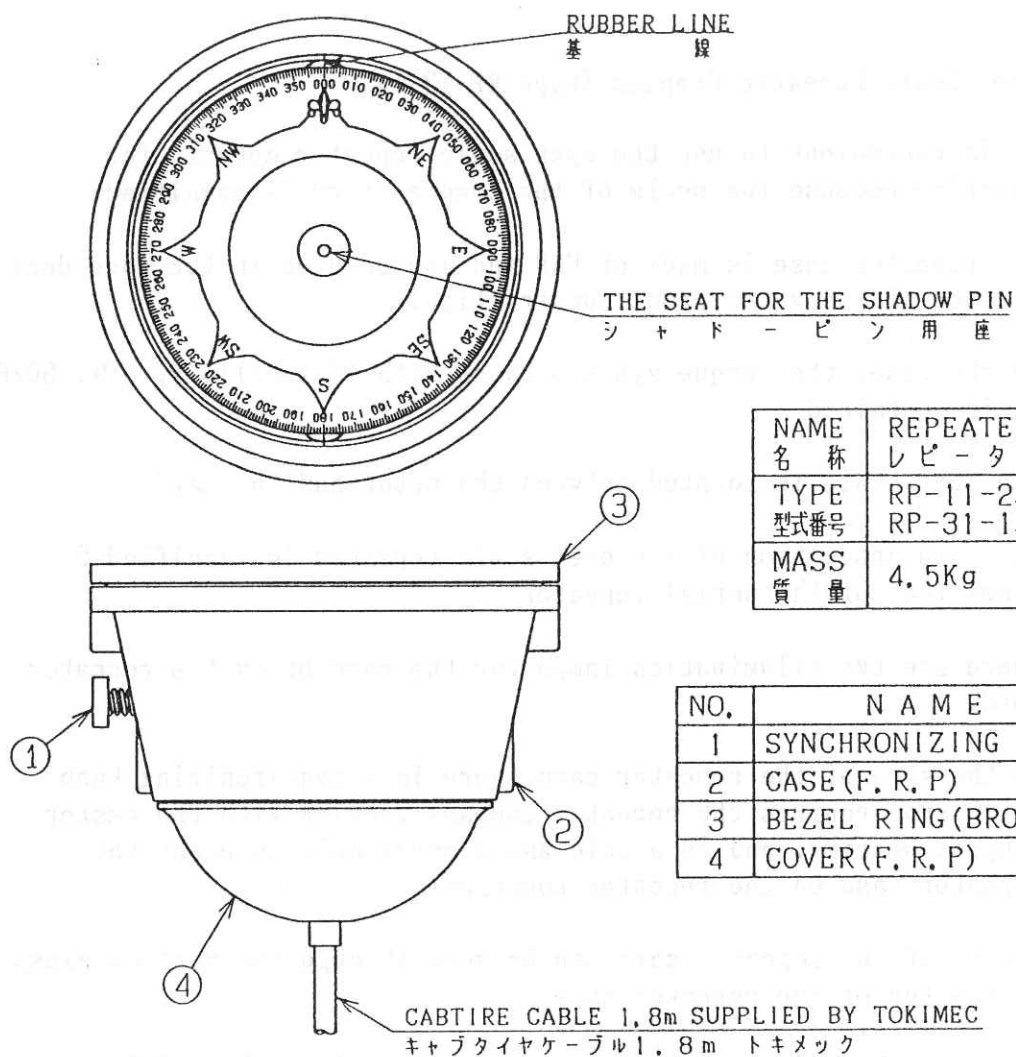
There is a bezel ring for the azimuth circle at the top of the repeater case. The bezel ring fixes the surface glass on the case together with the packing.

The seat for the shadow pin is adhered at the center of the surface glass.

At the bottom of the repeater case, the cabtire cable (1.8 m) with the packing for the water-proof gland is connected.

[Electric parts]

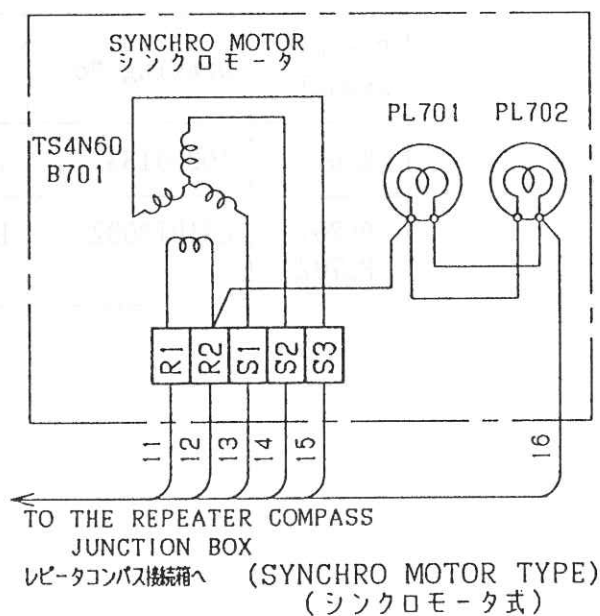
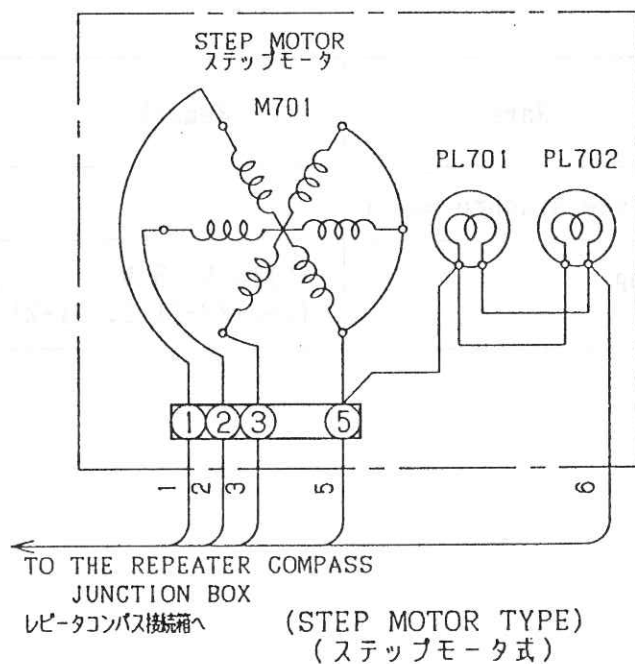
Circuit symbol	Drawing No.	Name	Remarks
B701	10350133-	Torque synchro motor	for RP-11-2
M701	10359030-	DC 70 V 90X step motor	for RP-21-2
	10359058-	DC 35 V 90X step motor	for RP-31-1
	10359095-	DC 24 V 90X step motor	for RP-41-1
PL701	081012032	Lamp	KP 115 V 5 W (for RP-11-2, 21-2)
PL702	10004345-	Lamp	45 V 5 W (for RP-31-1, 41-1)



NAME 名称	REPEATER レピータ
TYPE 型式番号	RP-11-2, RP-21-2 RP-31-1, RP-41-1
MASS 質量	4.5Kg

NO.	NAME	名称
1	SYNCHRONIZING KNOB	同調ノブ
2	CASE (F. R. P)	ケース (FRP)
3	BEZEL RING (BRONZE)	リング (青銅)
4	COVER (F. R. P)	カバー (FRP)

GENERAL VIEW
外觀図



CIRCUIT DIAGRAMS
回路図

2-2 Open Scale Repeater Compass (type RP-13-1)

It is convenient to use the open scale repeater compass for steering because the scale of the compass card is magnified.

The repeater case is made of FRP and can be used in the open deck because of the water-proof construction.

In the case, the torque synchro motor with AC 100/110 V, 1 Φ , 50/60 Hz is contained.

The gear train is mounted between the motor and the card.

The card graduation of the open scale repeater is magnified 5 times that of the normal repeater.

There are two illumination lamps for the card below the repeater card.

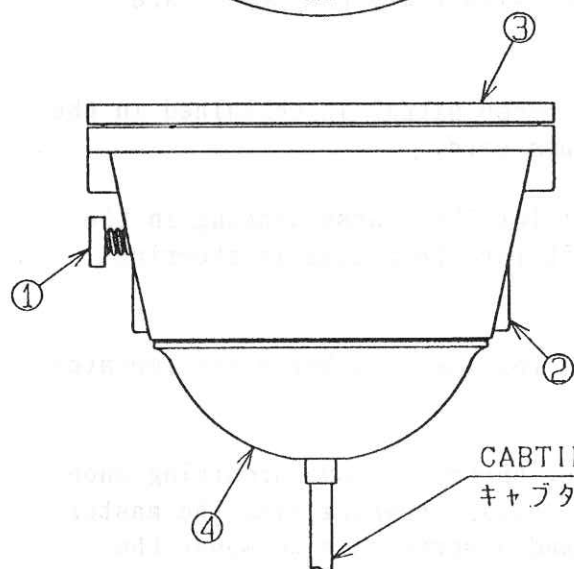
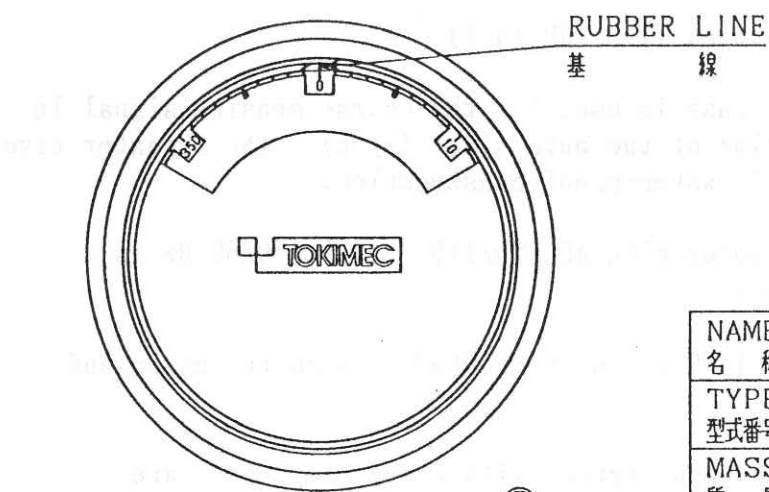
In the side of the repeater case there is a synchronizing knob which synchronizes the repeater compass bearing with the master compass bearing, and is a hole and a screw hole to mount the repeater case on the repeater mounting.

A part of the repeater card can be seen through the surface glass at the top of the repeater case.

At the bottom of the repeater case, the cable (1.8 m) with the packing for the water-proof gland is connected.

[Electric parts]

Circuit symbol	Drawing No.	Name	Remark
B701	10350133-	Torque synchro motor	
PL701 PL702	081012032	Lamp	KP115 V 5 W (for RP-11-2, 21-2)

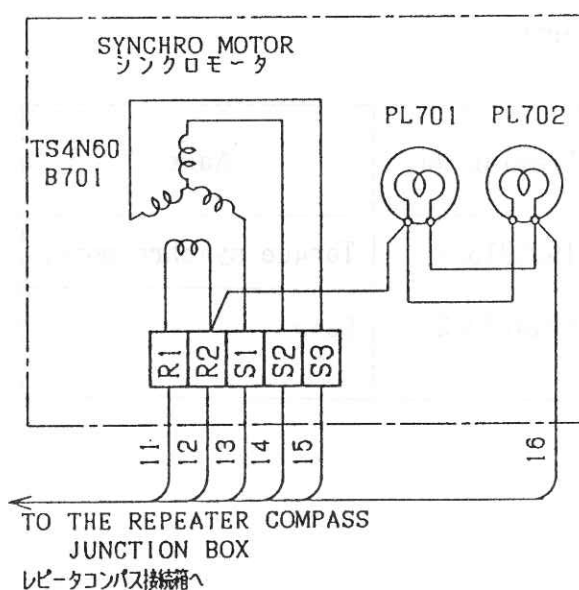


NAME 名称	OPEN SCALE REPEATER オープンスケール レピータ
TYPE 型式番号	RP-13-1
MASS 質量	4.5Kg

NO.	N A M E	名 称
1	SYNCHRONIZING KNOB	同調ノブ
2	CASE (F. R. P)	ケース (FRP)
3	BEZEL RING (BRONZE)	リング (青銅)
4	COVER (F. R. P)	カバー (FRP)

CABTIRE CABLE 1.8m SUPPLIED BY TOKIMEC
キャブタイヤケーブル 1.8m トキメック

GENERAL VIEW 外 観 図



CIRCUIT DIAGRAMS 回 路 図

2-3 G. C. P Repeater Compass (Type RP-14-1)

G. C. P repeater compass is used for the course sensing signal in the automatic steering of the auto pilot (gyro). The repeater case is made of FRP and is water-proof construction.

The torque synchro motor with AC 100/110 V, 1 Φ , 50/60 Hz is contained in the case.

The gear train with 1/90 ratio is mounted between the motor and the repeater card.

On the repeater card, 360 degrees with every one degree are graduated.

The magnet bar for sensing the course signal is contained in the cover at the center of the compass card.

This magnet bar generates signal for the course sensing in the pick off coil in the control unit for the automatic steering (refer to the separate manual).

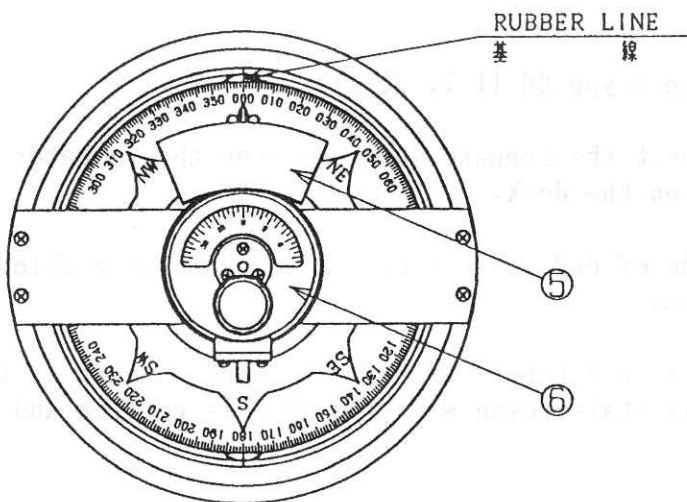
There are two illumination lamps for the card below the repeater card.

In the side of the repeater case, there is a synchronizing knob which synchronizes the repeater compass bearing with the master compass bearing, and is a hole and a screw hole to mount the repeater case on the repeater mounting.

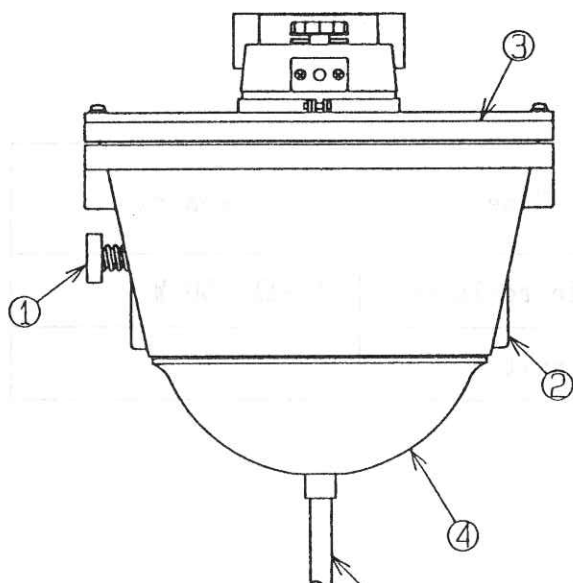
At the bottom of the repeater case, the cable (1.8 m) with the packing for the water-proof gland is connected.

[Electric parts]

Circuit symbol	Drawing No.	Name	Remark
B701	10350133-	Torque synchro motor	
PL701 PL702	081012032	Lamp	KP115 V 5 W (for RP-11-2, 21-2)



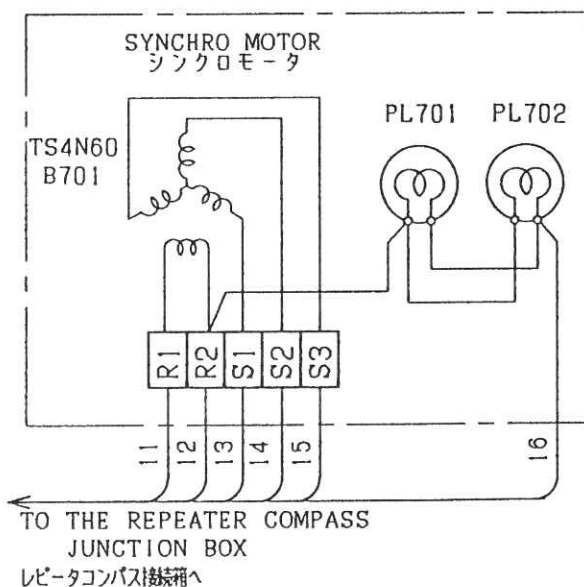
NAME 名 称	GCP REPEATER G C P レピータ
TYPE 型式番号	RP-14-1
MASS 質 量	4.5Kg



NO.	N A M E	名 称
1	SYNCHRONIZING KNOB	同調ノブ
2	CASE (F. R. P)	ケース (FRP)
3	BEZEL RING (BRONZE)	リング (青銅)
4	COVER (F. R. P)	カバー (FRP)
5	CONTROL UNIT	管制器
6	MAGNIFYING GLASS	拡大鏡

CABTIRE CABLE 1.8m SUPPLIED BY TOKIMEC
キャブタイヤケーブル 1.8m トキメック

GENERAL VIEW
外 観 図



(SYNCHRO MOTOR TYPE)
(シンクロモータ式)

CIRCUIT DIAGRAMS
回 路 図

2-4 Repeater Stand BH type (Type BH-11-1, 21-1)

It is a stand to support the repeater compass when the repeater compass is installed on the deck.

The stand body is made of FRP and has corrosion resistance abled to use in the open deck.

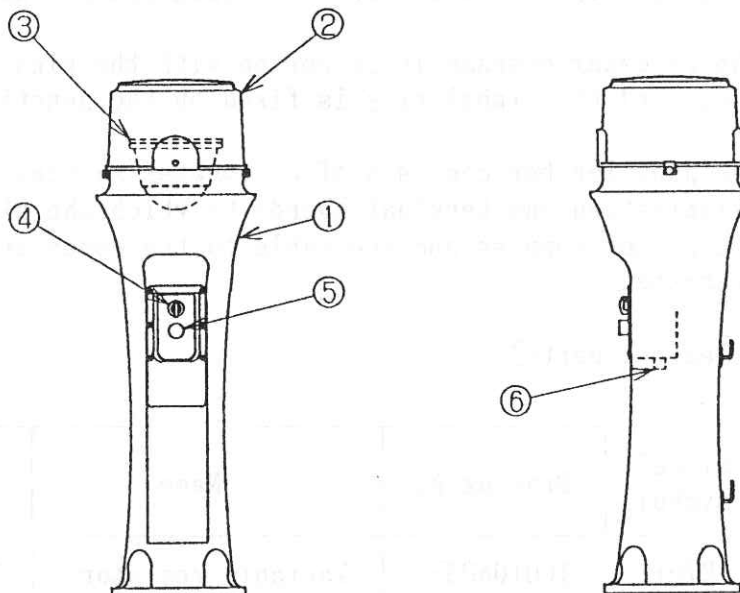
It has a gimbal ring at the upper part of the stand to support the repeater compass horizontally even when the ship is rolling and pitching.

At the middle part of the stand, there is a repeater switch and a dimmer for illumination.

[Electric parts]

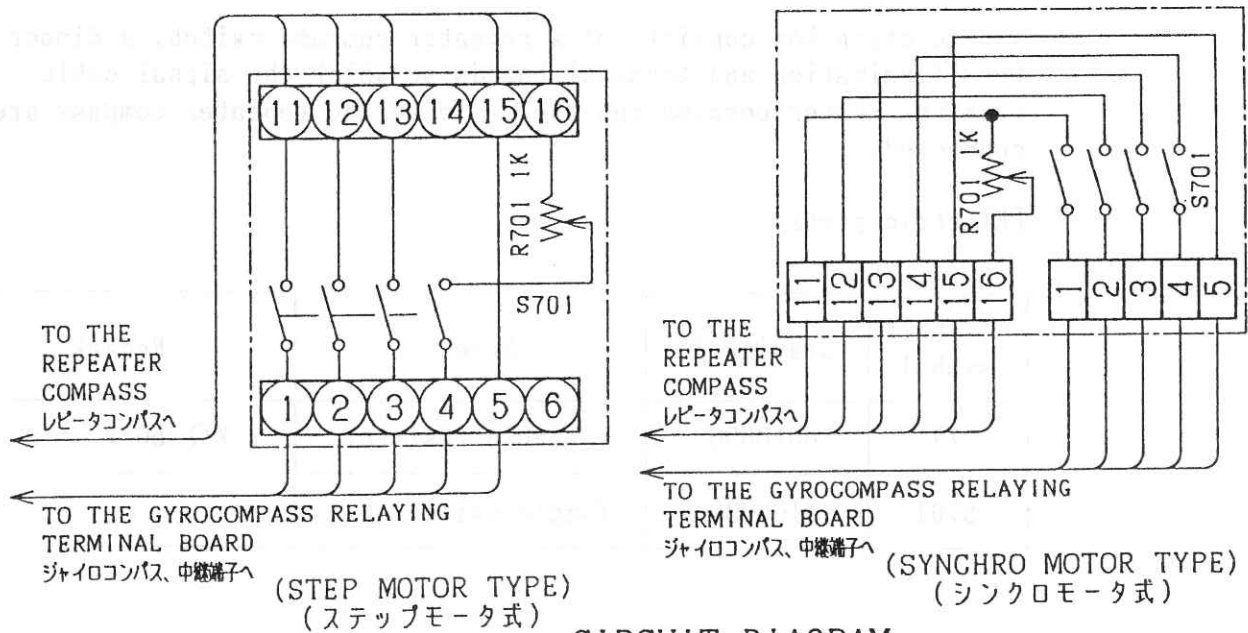
Circuit symbol	Drawing No.	Name	Remark
R701	10010896-	Variable resistor	1 K Ω 50 W
S701	11160036-	Toggle switch	

NAME	REPEATER STAND BH TYPE		
名称	B H 型 レピータ スタンド		
TYPE	BH-11-1	MASS	16Kg
型式番号	BH-21-1	質量	



NO.	NAME	名称
1	STAND (F. R. P)	スタンド (F. R. P)
2	HELMET (F. R. P)	ヘルメット (F. R. P)
3	REPEATER	レピータ
4	DIMMER	照明調整器
5	REPEATER SWITCH	レピータスイッチ
6	CABLE GLAND 25a	船用電線貫通金物 25a

GENERAL VIEW
外 観 図



CIRCUIT DIAGRAM
回 路 図

2-5 Repeater Mounting BB Type and Junction Box (Type BB-11-1, 21-1)

This mounting has a gimbal ring to support the repeater compass horizontally when the ship is rolling and pitching.

The repeater compass is supported with the pins in the gimbal ring, and the gimbal ring is fixed on the junction box.

The junction box consists of a repeater switch, a dimmer for illumination and terminal boards to which the signal cable from the master compass and the cable to the repeater compass are connected.

[Electric parts]

Circuit symbol	Drawing No.	Name	Remark
R701	10010896-	Variable resistor	1 K Ω 50 W
S701	11160036-	Toggle switch	

2-6 Repeater Mounting MB Type and Junction Box (Type MB-11-1, 21-1)

The repeater mounting MB type can support the repeater compass at a tilt with mounting screws.

It can be used for ship's steering and watching.

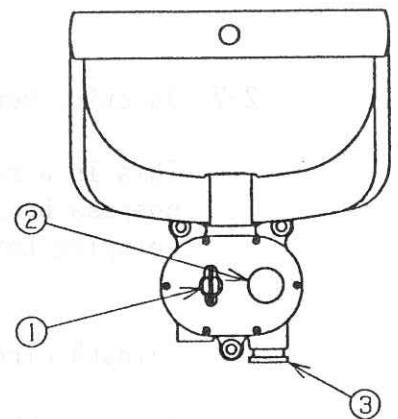
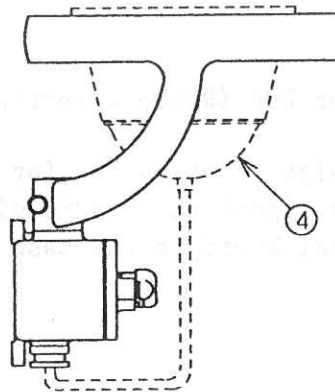
The junction box has the same dimensions as those of BB type and fixes the repeater mounting.

The junction box consists of a repeater compass switch, a dimmer for illumination and terminal boards to which the signal cable from the master compass and the cable to the repeater compass are connected.

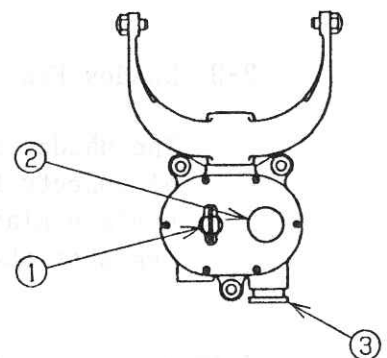
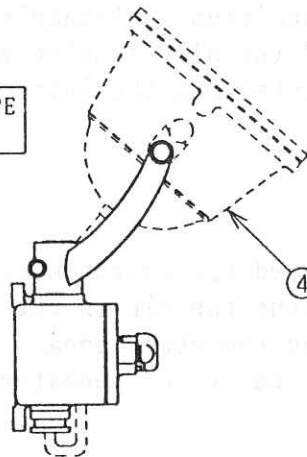
[Electric parts]

Circuit symbol	Drawing No.	Name	Remark
R701	10010896-	Variable resistor	1 K Ω 50 W
S701	11160036-	Toggle switch	

NAME	REPEATER MOUNTING BB TYPE		
名称	B B 型 レピータ 保持器		
TYPE	BB-11-1	MASS	6.7Kg
型式番号	BB-21-1	質量	

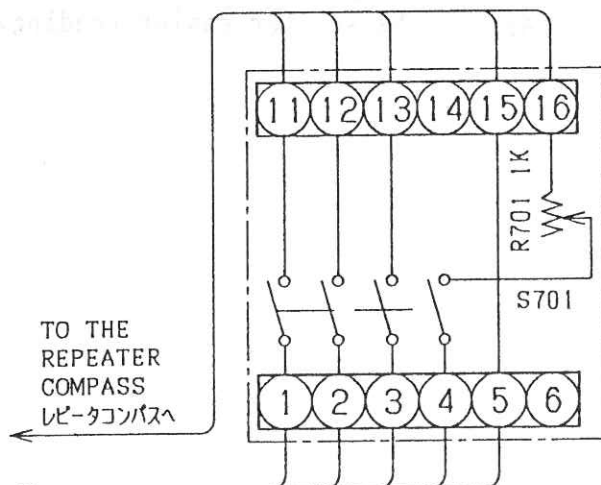


NAME	REPEATER MOUNTING MB TYPE		
名称	M B 型 レピータ 保持器		
TYPE	MB-11-1	MASS	3.0Kg
型式番号	MB-21-1	質量	



GENERAL VIEW
外 観 図

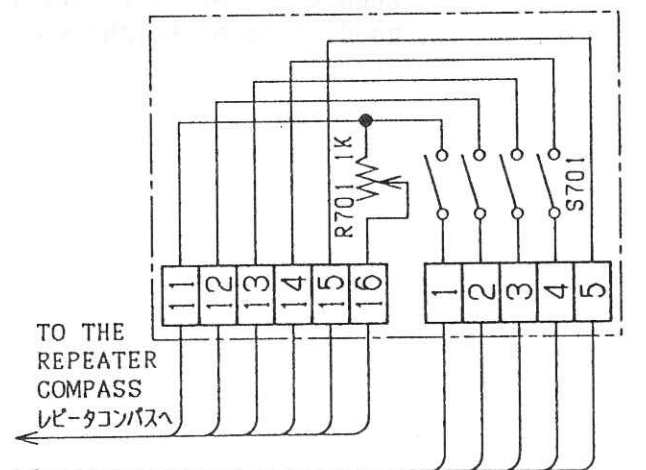
NO.	NAME	名 称
1	DIMMER	照明調整器
2	REPEATER SWITCH	レピータスイッチ
3	CABLE GLAND 25a	船用電線貫通金物 25a
4	REPEATER	レピータ



TO THE
REPEATER
COMPASS
レピータコンパスへ

TO THE GYROCOMPASS RELAYING
TERMINAL BOARD
ジャイロコンパス、中継端子へ

(STEP MOTOR TYPE)
(ステップモータ式)



TO THE
REPEATER
COMPASS
レピータコンパスへ

TO THE GYROCOMPASS RELAYING
TERMINAL BOARD
ジャイロコンパス、中継端子へ (SYNCHRO MOTOR TYPE)

(シンクロモータ式)

CIRCUIT DIAGRAM
回 路 図

2-7 Junction Box for RDF (Radio Direction Finder)

This is a relaying junction box for transmitting the master compass bearing signal to a radio direction finder, and has a relaying terminal board in the case.

2-8 Azimuth Circle

The azimuth circle is placed on the bezel ring of the repeater compass to support the repeater compass horizontally with two levels. In this condition, astronomical observation can be made with the mirror and the slit located on the azimuth circle, and measurement of objects with the lubber's line and the slit.

2-9 Shadow Pin

The shadow pin is used for astronomical observation or measurement of objects by standing the pin in the seat at the center of the surface glass of the repeater compass which is mounted on the repeater stand BH type or the repeater mounting BB type.

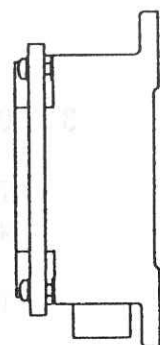
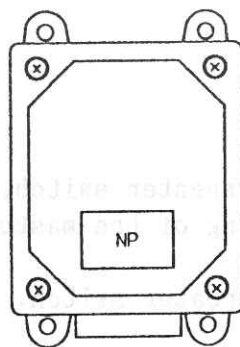
2-10 Repeater Cover

It protects the glass by placing on the repeater compass when the repeater compass mounted in the repeater stand BB type is not used.

2-11 Repeater Shading Plate

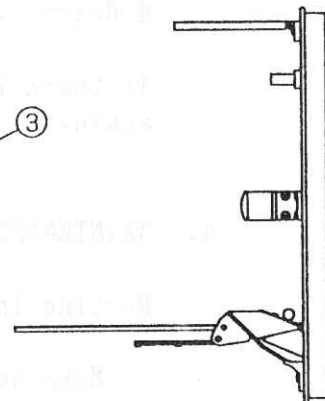
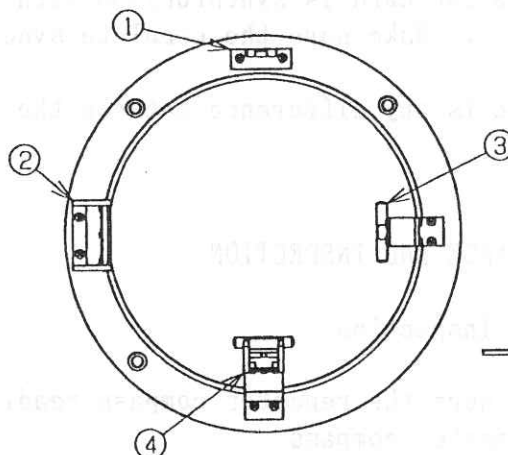
When the bearing repeater mounted in the repeater stand BB is used, this plate shades direct rays of the sun for easier reading.

NAME	JUNCTION BOX FOR RDF		
名称	方 深 接 続 箱		
DWG NO	100062130	MASS	0.6Kg
図 番		重 量	



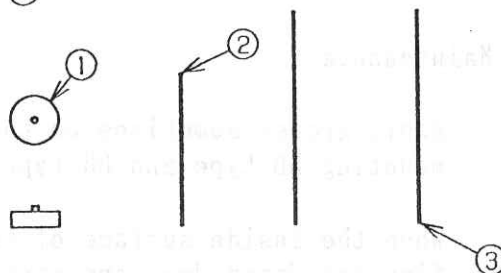
NAME	AZIMUTH CIRCLE		
名称	アジマスサークル		
DWG NO	100500090	MASS	2.2Kg
図 番		重 量	

NO.	NAME	名 称
1	FINDER	ファインダー
2	MIRROR	鏡
3	PRISM & LENS	プリズム 及び レンズ
4	PRISM	プリズム



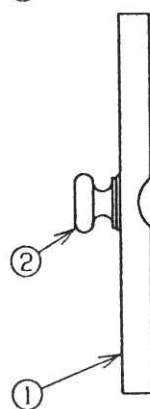
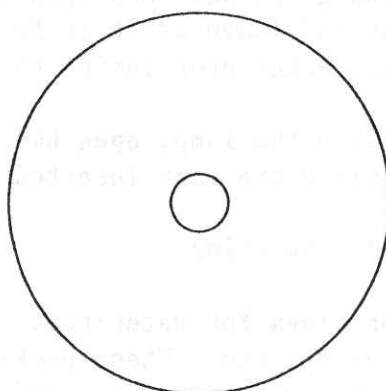
NAME	SHADOW PIN	
名称	シャドウピン	
DWG NO	100500110	
図 番		

NO.	NAME	名称
1	SEAT	座
2	PIN	ピン
3	PIN	ピン

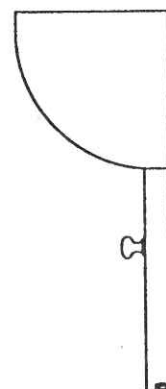
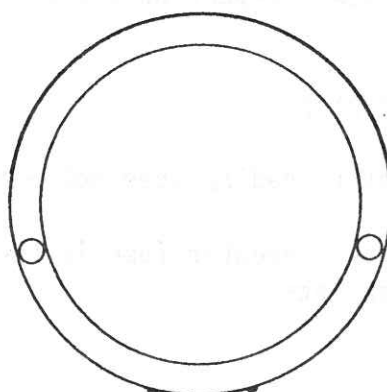


NAME	REPEATER COVER		
名称	レピータカバー		
DWG NO	10084B	MASS	0.5Kg
図 番		重 量	

NO.	NAME	名称
1	COVER	カバー
2	KNOB	ツマミ



NAME	REPEATER SHADOW PLATE		
名称	レピータ遮光器		
DWG NO	100192380	MASS	0.4Kg
図 番		重 量	



GENERAL VIEW
外 観 図

3. OPERATION

Turn OFF the repeater switch, and synchronize the repeater card with the reading of the master compass by the synchronizing knob.

Turn ON the repeater switch.

The repeater card is synchronized with the master compass at every 4 degrees. Make sure the complete synchronization.

If there is any difference between the two readings, synchronize again.

4. MAINTENANCE AND INSPECTION

Routine Inspection

Make sure the repeater compass reading coincides with that of the master compass.

Maintenance

Apply grease sometimes on the gimbal shaft of the repeater mounting BB type and BH type to rotate the gimbal smoothly.

When the inside surface of the repeater glass is dim, select a fine and dried day, and open the back cover of the repeater compass and leave as it is for several hours. Close the cover when the water drop inside the glass has disappeared.

To replace the lamp, open the back cover of the repeater compass and replace the lamp inserted in the socket.

Periodical Inspection

Many packings for water-proof construction are used in the repeater compass. These packings deteriorate while using for a long time. It is recommended to replace packings at the periodical inspection for the gyro compass.

5. TROUBLESHOOTING

The repeater reading does not agree.

Check the repeater fuse in the master compass, and synchronize the readings.

The repeater does not follow up.

Check the repeater fuse in the master compass.

When the fuse is normal, contact the service station to replace the repeater motor.

Illumination is no good.

Open the back cover of the repeater compass and replace the lamp inserted in the socket with a spare lamp.

Inside surface of glass is dim.

Open the back cover of the repeater compass in a fine and dried day, and leave as it is for several hours.

Close the cover when the water drop inside the glass has disappeared.

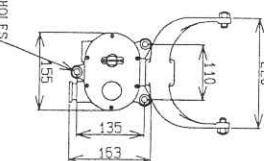
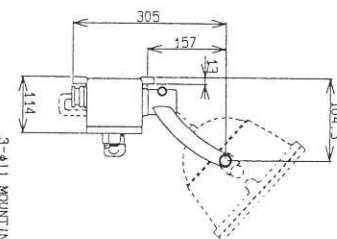
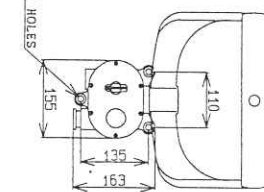
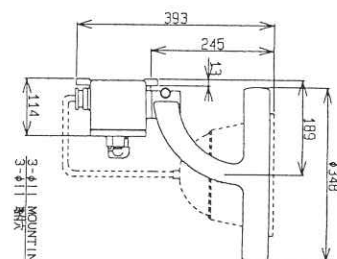
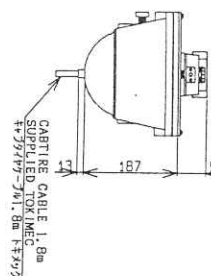
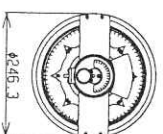
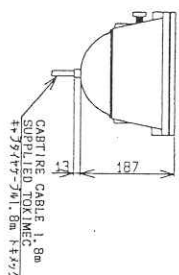
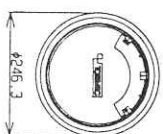
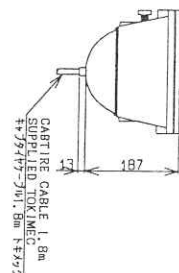
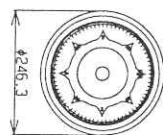
NAME	REPEATER	MASS
TYPE	RP-1-2, RP-21-2	4.5kg
TYPE	RP-31-1, RP-41-1	

NAME	OPEN SCALE REPEATER	
TYPE	A-7227-41C-9	
RP-13-1	MASS	4.5K0
FORM NO.	1	

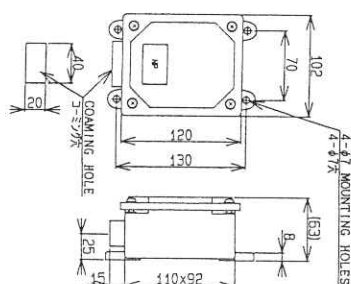
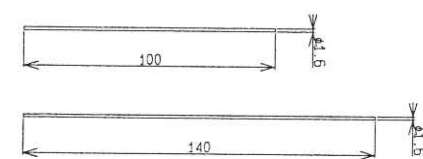
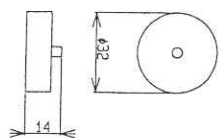
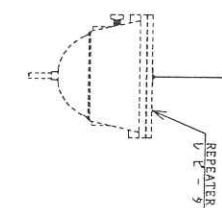
NAME	GCP REPEATER		
TYPE	GCP LC-9		
RP-14-1	MASS	4.5Kg	

NAME	REPEATER MOUNTING BB TYPE	
種別	B B 型 レーダー保持器	
TYPE		
型式番号	BB	質量 0.7Kg

NAME	REPEATER	MOUNTING	MB TYPE
TYPE	M.B. 2 L	C-9	張持器
TYPE	MB	MASS	3.0Kg
TYPE			

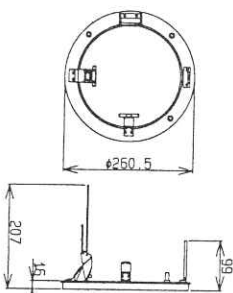
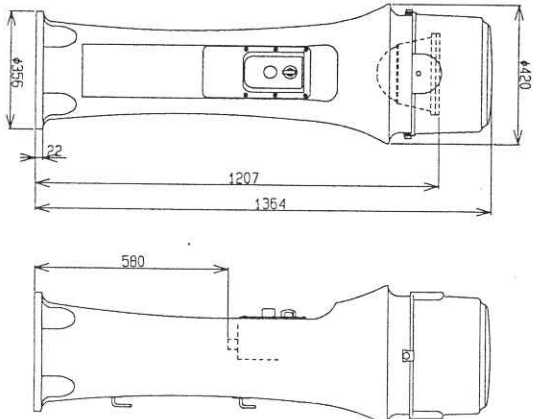


NAME	SHADOW PIN	
名称	シャドウピン	
DRG NO	100500110	MASS
図番		

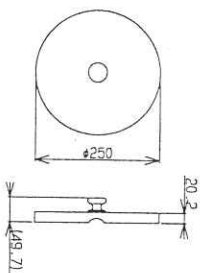


NAME	JUNCTION BOX FOR RDP		
名 称	方 孔 接 线 箱		
DRG NO	100062130	MASS	0.6kg
图 号		重 量	

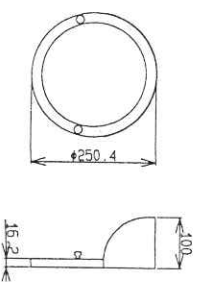
NAME	REPEATER STAND BH TYPE		
名称	B H 型 レピ - タ ス タ ント		
TYPE	BH	MASS	10Kg
型式番号		質量	



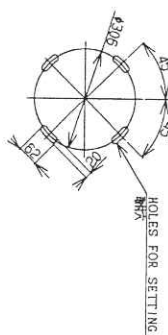
NAME	AZIMUTH CIRCLE
名称	アジマス円
DRG NO	100500090
図番	100500090
MASS	2.2Kg
質量	2.2Kg



NAME	REPEATER COVER
DRG NO	100848
MASS	0.5Kg



NAME	REPEATER SHADOW PLATT
DRG NO	100062130
MASS	0.6Kd

REPEATER COMPASS
AND ACCESSORIES
レピータコンパス 及び アクセサリー