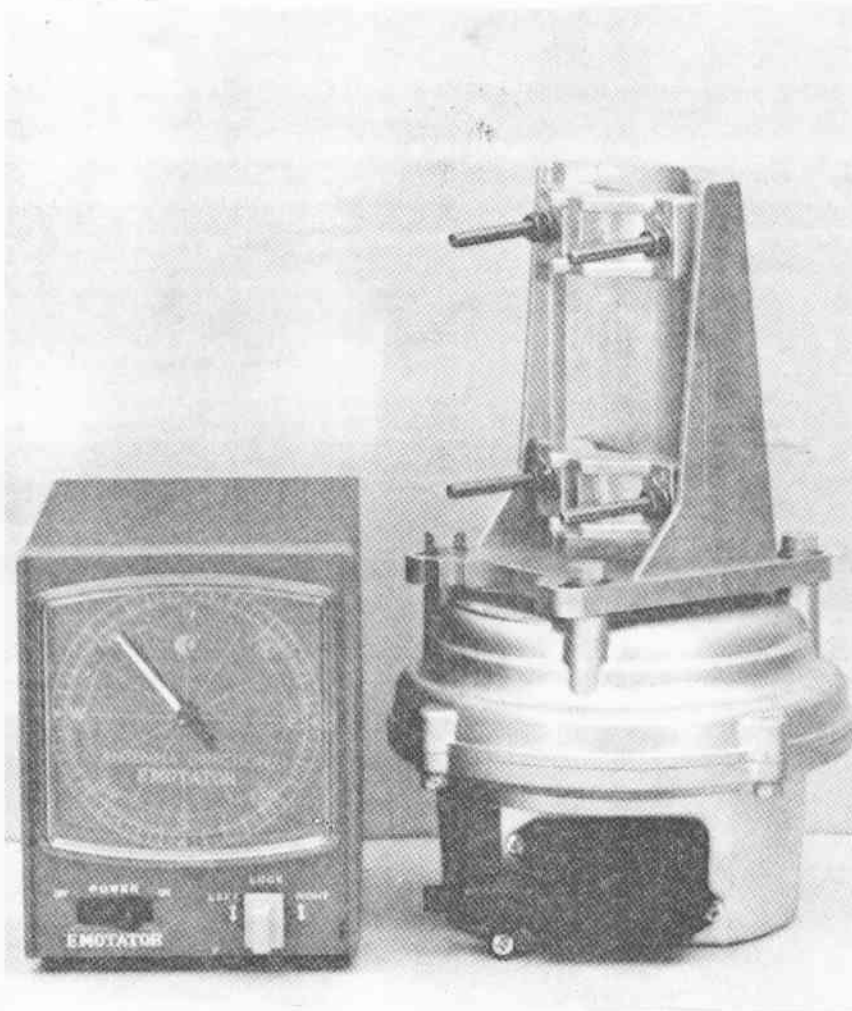


EMOTATOR MODEL 105TSX
INSTRUCTION



EMOTO ANTENNA CO., Ltd.

A HISTORY OF THE EMOTATOR

~~Emoto Antenna Co., Ltd. is an expert manufacturing company which specialize~~
in Antenna Rotator.

We understand the "KNOW HOW" very well and have more experience than any other rotator manufacturers, and producing the Emotator by excellent mechanical and modern electronics technologies.

Here in Japan, the Emotator is a pronoun of antenna Rotator and we guarantee that the Emotator can be used almost permanently.

PLEASE READ THIS INSTRUCTIONS CAREFULLY BEFORE STARTING OPERATION.

1. Installation must be made as per photograph which listed at the front page. The Emotator must not be installed top and bottom reverse or horizontally.
2. The wiring of 6-conductor cable must be made properly. At least check the wiring 2-times before start operation.

The packing includes the followings.

Rotor section	1
Controller section	1
Mast clamp (Consists of strap and U-bolts)	1
Bolt M8 x 25 with spring and flat washer for Mast clamp	4
Bolt M8 x 20 with spring washer for foundation	4
8 Pin US connector plug	1
Waterproof case with screw and rubber gasket	1
Waterproof Cover With Band	1
Cable Stopper	1
Instruction Manual	1



View attached to 105TSX

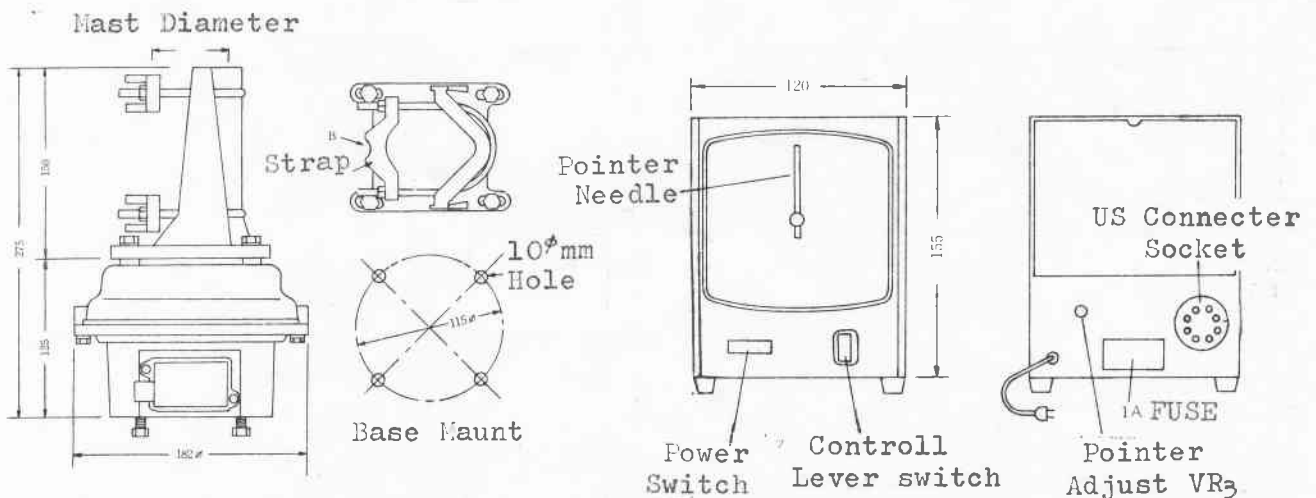
CONSTRUCTION

1. The Motor and rotate reduction mechanism are incorporated in a completely water proof aluminum diecast alloy housing, and it is made in an extremely compact size because the housing it self has to rotate.
2. The braking system is used special double action SP system.
3. The limit switch is operated one revolution, it is made snap action microswitch.
4. A Servo Mechanism and our original circuit mechanism have been incorporated in the Model 105TS Circle Controller and designed for simplified operation. The Servo Mechanism has been made so that the electrical as well as the mechanical sections have inter-related functions and is tested, adjusted and aligned before it is shipped from the factory. Tampering with this section may cause permanent damages and recommend that it be not touched.

SPECIFICATION

Power Source	117V.	AC 220 Volt	50/60 Hz	50 VA	(115V CANADA ONLY)
Rotation Torque	Motor Voltage	AC24 Volt	500	Kg.Cm	
Braking force			3,000	Kg.Cm	
Antenna wind surface			1	Square meter	
One Rotation			65/55	Sec.	
Antenna Mast Diameter			35-62	mm	
Control Cable			0.5 mm square	Conductor	
			Vinyl Cable	6	
Antenna Fly Wheel effect GD ²			Max.100Kg.	Square Meter (as shown next page)	

Dimension Drawing



SIZE OF USEFUL ANTENNA FOR EMOTATOR
AND ANTENNA FLY WHEEL EFFECT

A simple explanation of this should be given here. For example, an automobile is speeding at a given speed and the transmission is set at "neutral" and you still note that the engine power is not moving the rear two tires, but the automobile will keep running.

This is called the inertia running, and the same effect is present on the rotating antenna system. Once it starts to rotate, even if the power source is cut-off, the antenna and the Emotator will keep rotating for awhile. This is called the Fly wheel effect GD^2 .

The antenna system in the fly wheel rotation stage should not be stopped abruptly as it will generate a big force.

The largeness of the fly wheel effect will depend on the antenna system, the larger antenna, the larger the GD^2 .

The various antennas sold for amateur on the market have the following GD^2 , and antenna wind Surface A.

	A	GD^2	A	GD^2	A	GD^2	A	GD^2	A	GD^2	A	GD^2
H F Band	7M 2EVp 1.0	140	7M 3EVp 1.8	455	7M 2EF 2.2	750	3 7M 3EF 1500	2	7M 2ECQ 4.50	3	7M 3ECQ 700	
	14M 3EF 0.6	70	14M 4EF 1.2	250	14M 5EF 1.75	700	14M 6EF 2.2	1100				
	21M 3EF 0.4	100	21M 5EF 0.65	200	21M 2EHV 0.3	18	21M 2EHQ 0.4	40	21M 6EF 1.3	625	21M 8EF 2.5	1600
	28M 4EF 0.31	90	28M 5EF 0.53	50	28M 2EHV 0.25	15	28M 2EHQ 0.31	35				
H F Multi Band	7.14M 3EVp 0.5	190	7.14M 4EVp 0.8	200	14.21M 3E 0.35	150	14.21M 4E 0.4	160	21.28M 3E 0.3	130	21.28M 4E 0.3	150
	T 3E Jr 0.3	25	T 3E 0.4	75	T 4E 0.5	125	T 6E 0.55	180	T 2ECQ 0.5	58		
50MHz	4E 0.35	3.2	4E 2S 0.7	6.4	4E 2P 0.7	65	2EHV 0.4	12	2EHQ 0.8	30		200
	5E 0.35	40	5E 2S 0.7	30	5E 2P 0.7	150	6E 0.4	50	6E 2S 0.8	100	6E 2P 0.8	200
144MHz	6E 0.14	1.0	6E 2P 0.3	3.5	6E 2P 2S 0.6	7.0	6E 4P 0.6	35	6E 4P 2S 1.2	70		
	8E 0.18	2	8E 2P 0.35	7	8E 2P 2S 0.8	14	8E 4P 0.8	60	8E 4P 2S 1.6	110		
	10E 0.2	3.5	10E 2P 0.4	9.5	10E 2P 2S 0.8	20	10E 4P 0.85	65	10E 4P 2S 1.75	130		
	12E 0.21	2.5	12E 2P 0.4	10	12E 2P 2S 0.85	22	12E 4P 0.8	70	12E 4P 2S 1.8	150		
	11E 8P 1.5	520	X 8E 0.22	3.1	X 8E 2P 0.45	12	X 10E 0.3	5	X 10E 2P 0.6	19		
432MHz	10E 0.05	0.35	10E 2P 0.1	1.4	10E 2P 2S 0.2	3	10E 4P 0.2	5.8	10E 4P 2S 0.4	12		
	12E 0.06	0.5	12E 2P 0.1	2	12E 2P 2S 0.25	4	12E 4P 0.3	10	12E 4P 2S 0.6	20		

A=Wind Surface M^2 ; GD^2 =Fly wheel effect $Kg.M^2$; E=No. of Element;
P=No. of Stack (Parallel); S=Vertica Stack; CQ=Cubical quoad;
HV=HB9CV Antenna; HQ=Swiss Quoad; Vp=SHORT beam; Jr=Junia type;
W=Wide space; X=Cross Element; T=Tri band antenna;

It is very simple to taking into consideration an antenna system by checking the " GD^2 " and wind surface "A".

For example the Emotator 103 LBX.

Kind of Antenna	GD^2	A
Tri band 3 element Jr.type antenna (T3E Jr)	25	0.3
144 MHz 10 element Yagi antenna (144M 10E)	3.5	0.2
Total Sum	28.5	0.5

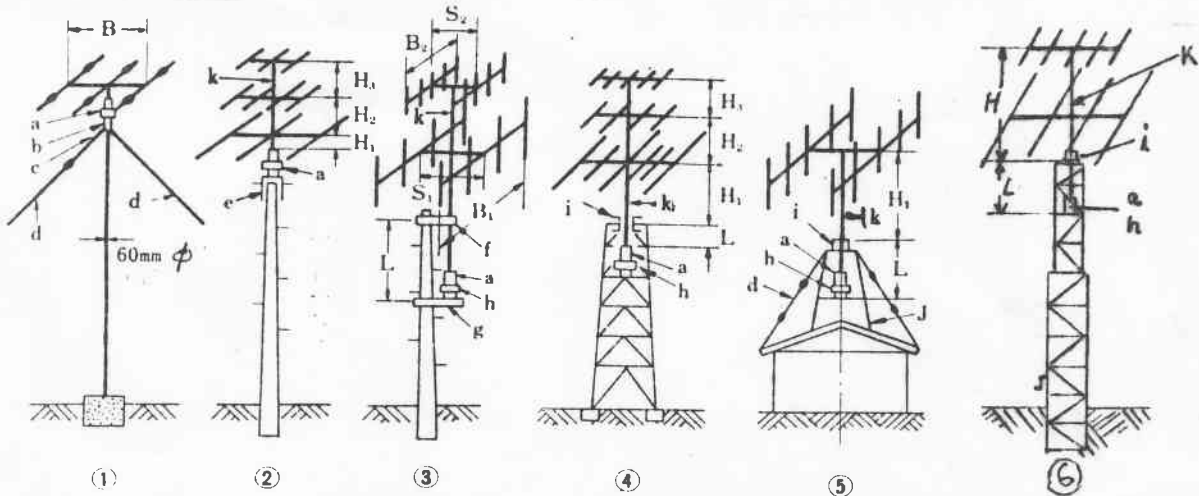
The allowable $GD^2=100$ and allowable wind surface $A=1.0$. Therefore these antenna systems function is lower than Emotators " GD^2 " and "A".

Antenna Tower and Antenna Mast Mounting

1. The antenna towers (See Fig.2) can be installed and assembled in six different ways.

Fig. 2

- | | |
|--------------------------|---------------------------|
| ① Steel pipe Mounting | ④ Steel Tower Mounting |
| ② Panza Mast Mounting(a) | ⑤ Roof Mounting |
| ③ Panza Mast Mounting(b) | ⑥ Crank-Up Tower Mounting |



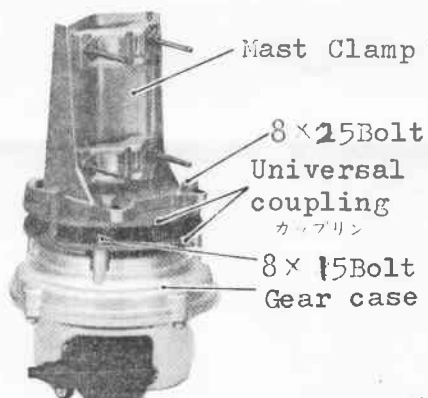
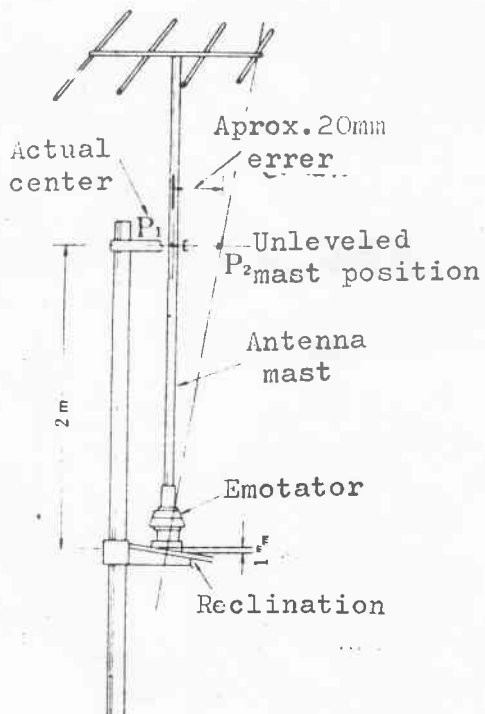
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|--------------------|-----------------------|-----------------|
| a. 105TSX Emotator | e. Panza Mast Cap | i. Mast Bearing |
| b. Mast Clamp | f. Mast Support | j. Roof Tower |
| c. Stay Clip | g. Emotator Support | k. Antenna Mast |
| d. Stay Wire | h. Universal Coupling | |

The Antenna mast mounting can be categorised into two systems.

A. Mounting system ① ② can be mounted directly to the EMOTATOR mast clamp. This is called the "Independent Mounting System". In this system, the antenna mast length (H) from the EMOTATOR should be kept as short as possible. Where the rotator is to be mounted Fig. ① it will be necessary to attach the mast clamp model No. 1211 to the under side of rotator.

B. Mounting system Fig. 2 ③ ④ ⑤ and ⑥ are mounted in the center of the mast by using the bearing adapter. This is called the "Rotating Antenna Mast System", when the rotator is installed in a tower, as in this case, it must be fixed tightly with bolts on the rotator mounting plate in the tower. This mounting surface must be perfectly flat, and the top tower hole must be concentric with the axis of rotation of the top part of the Emotator. The example, Pre-determine the surface level when using this Mounting system. As per illustration Fig. 3 if the reclination is more than 1 mm, the mast cannot be mounted and clamped into positions.

Fig.3



If the Emotator is mounted on a reclined position, the mounted Mast will be mounted at an angle (see P) instead of P. This is the reason why it has been stated earlier that the surface must be absolutely level. Don't force the Mast and the Emotator to be installed in this type of position. The 1 mm reclination at the bottom of the Emotator will show approx 20mm misarrangement at the tip of the 2 Meter length mast.

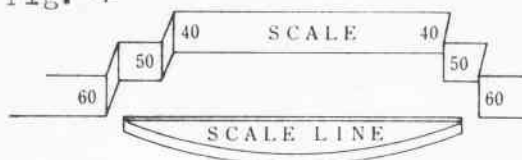
Forcing this type of mounting will cause permanent damage to your Emotator.

Owing to these circumstances, we recommend that our model No.452 Universal Coupling be used to overcome these unforeseen problems.

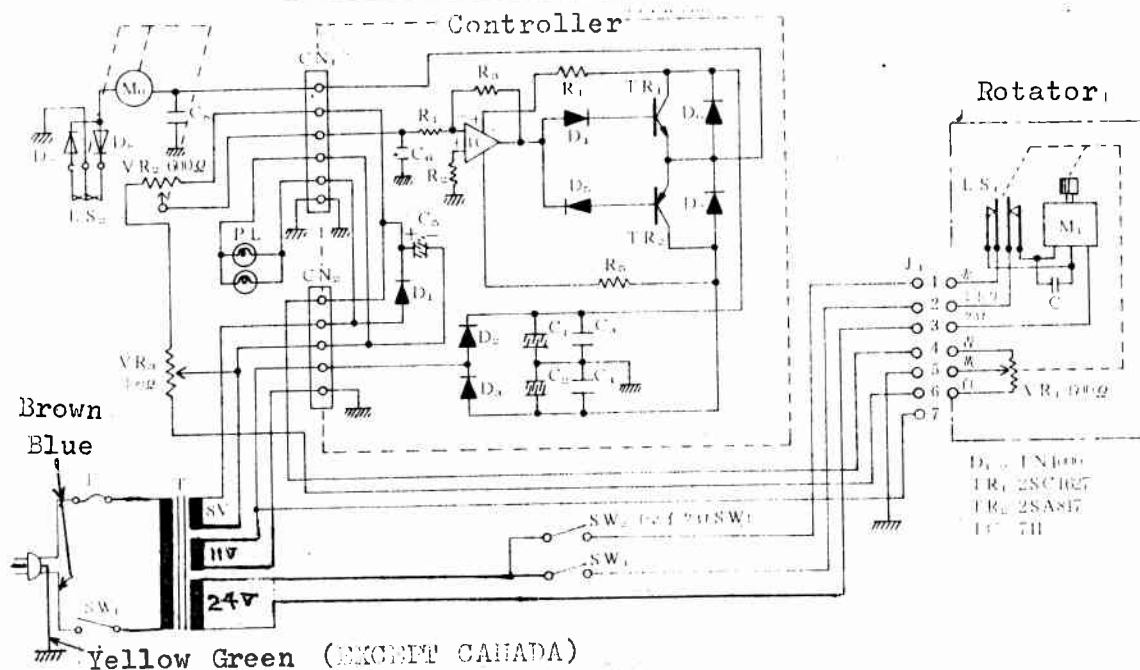
ANTENNA MAST CENTER ADJUSTMENT

As per Fig. 4 scale line must be made in line. The figures of 40, 50, 60, at lower position of mast clamp are indication an antenna Mast Diameter (Unit mm). Fig. 4 shows that the Mast diameter is matching to 60 mm.

Fig. 4

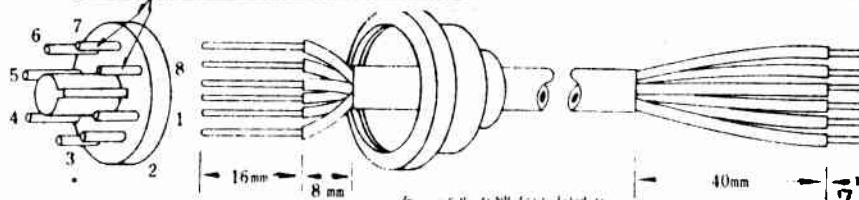


ELECTRICAL SCHEMATIC DIAGRAM



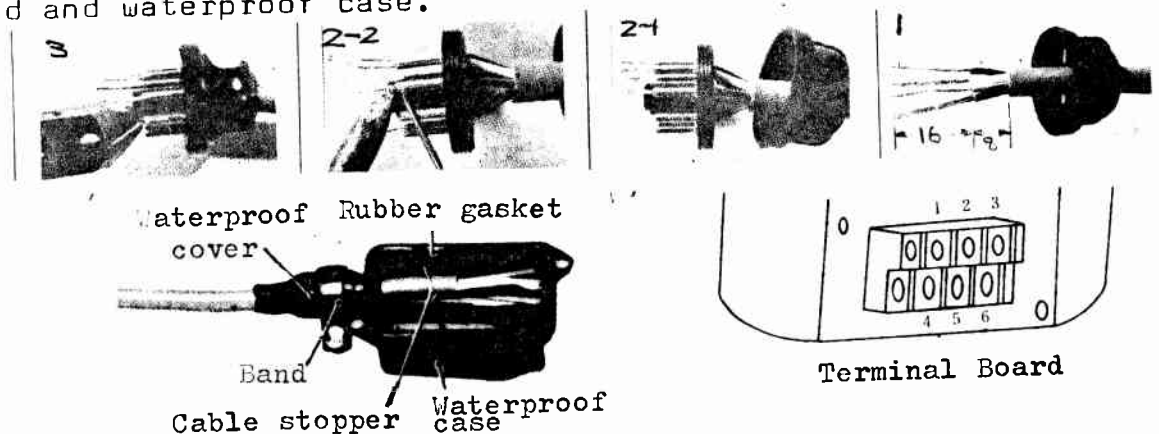
THE WIRING OF CONTROL CABLE.

Connect between rotor section and control section with a 0.5mm square 6-conductor vinyl cable. Process the tip of the cables as per Fig. 6, and connect same number of controller and the terminal board of rotor section.

Pin 7,8 non connection

1. Insert 6-conductor cable through the US plug cap.
2. Insert an each conductor through the US plug pin holes and solder.
3. Cut the tips of the wires protuding from the plug pin tips with a Nipper and screw on cap to plug.

On the other end of cable, insert cable through the waterproof cover, Band and waterproof case.

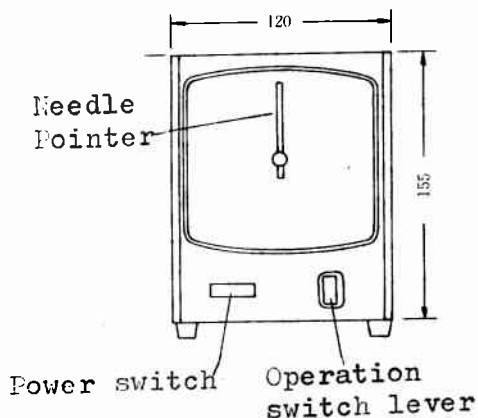


Between the US plug and the Terminal board, the tips of each wire end must be connected with the same pin number.

CAUTION

If the different pin number have been connected and supplied electrical power, the Emotator construction parts will be damaged at onecs. Please double check if the appropriate wiring have been made.

OPERATION



When finished the all of the electrical wiring, please make a theoretical test. By depressing power switch "on" and push the operation switch lever to the Right or to the Left, the rotor section also rotate to the Right or to the Left.

If the continuous rotation is required, push operation switch lever to the Right or to the Left and push up to Lock position.

ADJUSTING THE NEEDLE POINTER DIRECTION AND THE ANTENNA DIRECTION

The direction in which the controller pointer needle stopped automatically will give the indication which way your antenna is facing. If the needle pointer and the antenna direction is not the same, climb your antenna tower and loosen the screw holding the antenna mast and adjust the antenna so that it is in line with the needle pointer.

CAUTION: Do not adjust the direction of the needle pointer of the controller, (the antenna direction must be changed and not the controller's) as the rotation degree will differ.

CHANGING THE NEEDLE POINTER STANDARD POSITION:

When you wish to change the standard position of the needle pointer of your controller to an appropriate position you wish, remove cover and gently grip the needle pointer with thumb and fore finger and move it to the position that you have selected. The antenna must also be rotated to the exacting position that the needle pointer was moved. Unloosen mast clamp screw and reposition antenna and retighten the screw.

REPLACING OF MAPS:

The circle controller has a divided 360 degree installed as the scale plate. For operators requiring Local QSO, a local map should be installed. A local map suitable should be purchased and photo-copied and replaced with the 360 degree scale plate

Remove cover by unloosening the front panel. Gently pull towards you, the needle pointer and it will unloosen easily. Use tweezers and/or a sharp instrument to remove world map from the center hole. (Caution should be taken that the position of the needle pointer be marked before removing the needle pointer.) This is because the needle pointer must be repositioned later at the same position after installing the Local Map.

OVERHAUL AND RE-ASSEMBLY

The following cautions must be taken into consideration at the time of Overhauling and Re-Assemble.

1. Brake Rotor Positioning.

When supplied an electrical Power (AC 24 Volt) to the motor, the motor shaft rotate with floating. In this conditions, the Gap of the brake rotor and the brake lining must be fixed about 1 mm by the set screw.

2. POTENTIOMETER ADJUSTMENT.

As per Photo 1, loosen the set screw A, to the Gear TS56 rotate freely. In the next, rotate the Gear TS56 to fix the resistance between the terminal board terminal No. 4 and 5 at 80 ohm by using a universal multi meter, and tighten the set Screw A.

3. As per photo 2, put the housing and assemble the mark A become to in line with mark B.

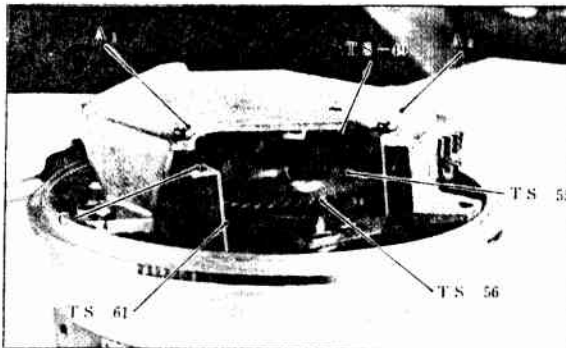
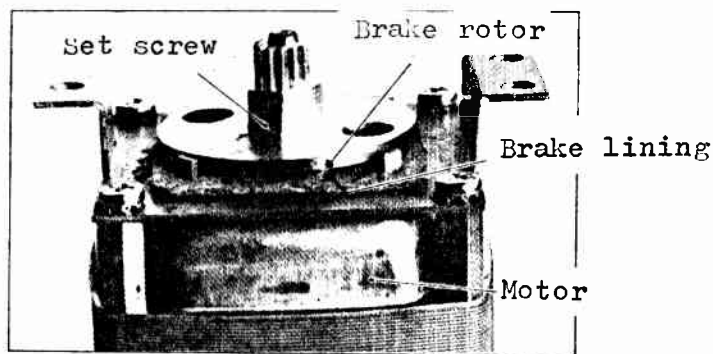


Photo <1>

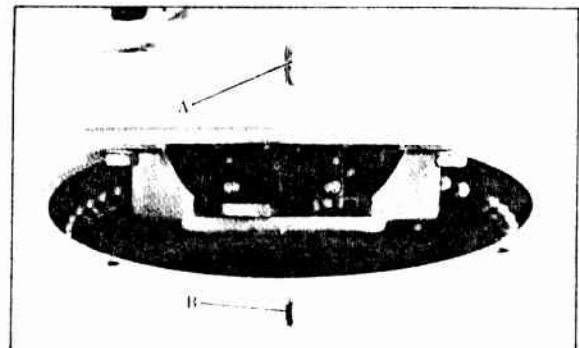


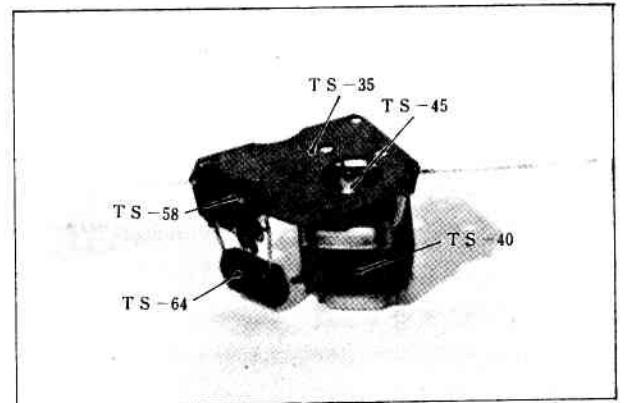
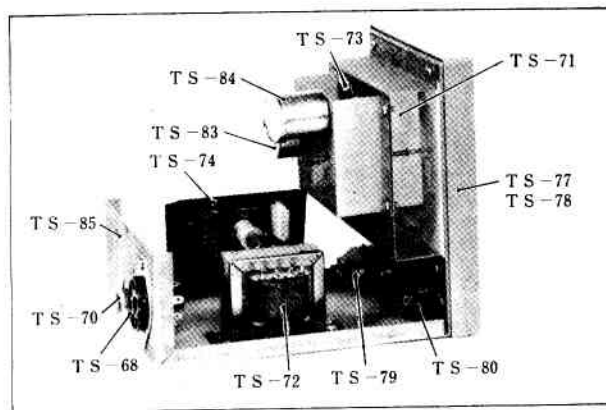
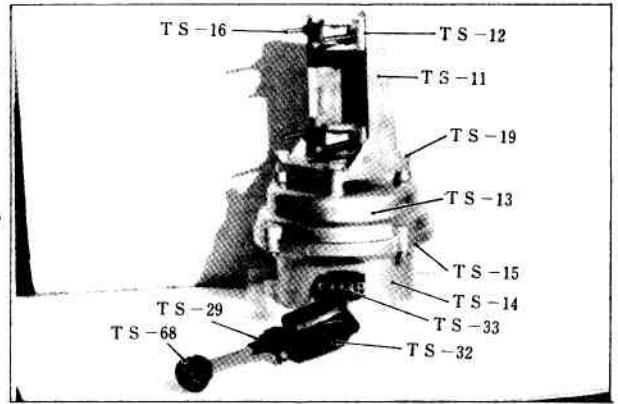
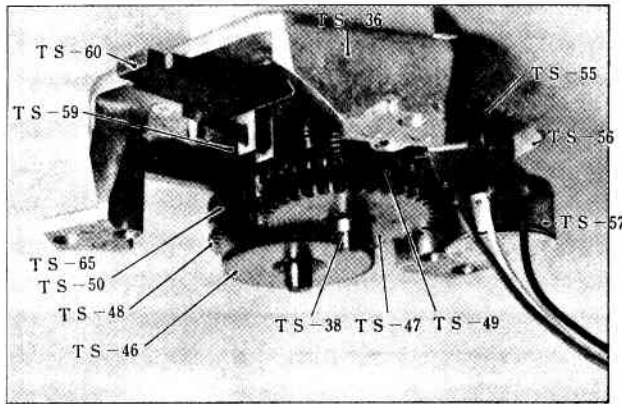
Photo <2>

AN INTERNAL WIRING OF ROTOR

Indicated wire color at this column is a wire color of inside of Rotor. These color discrimination is necessary to overhaul and repair the rotor, and it has no concern with a 6-conductor control cable.

At terminal board Terminal No.	1	2	3	4	5	6
Wire Color	Red	Green	Black	Blue	Yellow	White

PARTS LIST PHOTOGRAPH



OPTIONAL ACCESSORIES



Under Side
Mast Bracket
TS-1211



Mast Bearing
28-65mm
303



Stay Bearing
28-65 mm
300



Mast Bearing
60-115 mm
350

SPARE PARTS LIST

TS - 11	Mast Bracket	TS - 56	VR Gear
TS - 12	Strap	TS - 57	N600 ohm Potentiometer
TS - 13	Gear Case	TS - 58	Limit Switch Assy
TS - 14	Motor Case	TS - 59	Flat Spring
TS - 15	Ring	TS - 60	Stopper Lever
TS - 16	U Bolt	TS - 61	VR Hanger Strap
TS - 18	With S.W. 6x20 Bolt	TS - 64	Condenser
TS - 19	With SW, RW 8x25 Bolt	TS - 65	6x14 Bolt
TS - 28	Rubber Gasket	TS - 68	8Pin US Flag
TS - 29	Waterproof Cover	TS - 69	8Pin US Socket
TS - 31	9.5 Steel Ball	TS - 70	1 Amp. Fuse
TS - 32	Waterproof Case	TS - 71	8 Volt Pilot Lamp
TS - 33	6P Terminal Board	TS - 72	Transformer
TS - 34	Brake Lining	TS - 73	Servo Mecha. Assy
TS - 35	Frame Plate	TS - 74	Print Board Assy
TS - 36	Gear Frame	TS - 75	Chassis
TS - 38	Spacer	TS - 76	Housing
TSX- 40	AC 24 Volt Motor	TS - 77	Front Panel
TS - 41	5x12 Screw	TS - 78	Operation Knob
TS - 45	Brake Rotor Pinion	TS - 79	Operation Switch Assy
TS - 46	No.1 Gear	TS - 80	Power Switch
TS - 47	No.2 Gear	TS - 81	Needle Pointer Cover
TS - 48	No.3 Gear	TS - 82	Needle Pointer
TS - 49	No.4 Gear	TS - 83 (Long shaft)	VR Potentionmter
TS - 50	No.5 Gear	TS - 84	Servo Motor
TS - 54		TS - 85	
TS - 55	VR Counter Gear	TS -108	for foundation 8x20 Bolt