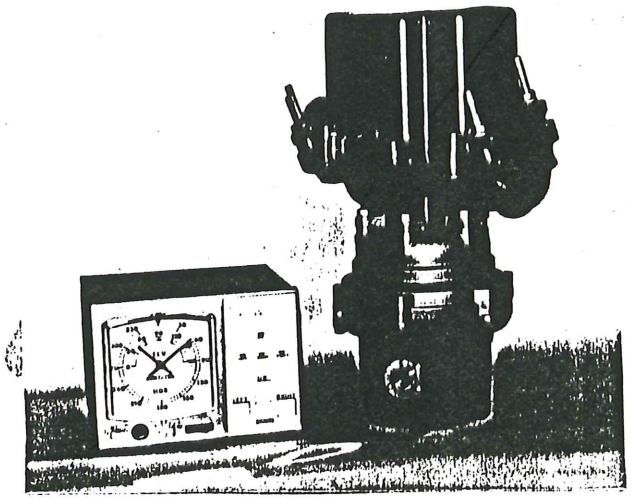
I N S T R U C T I O N

FOR

THE EMOTATOR MODEL EV700D5X ELEVATION/AZIMUTH

DUAL TYPE ROTATOR



EMOTO ANTENNA CO., LTD.

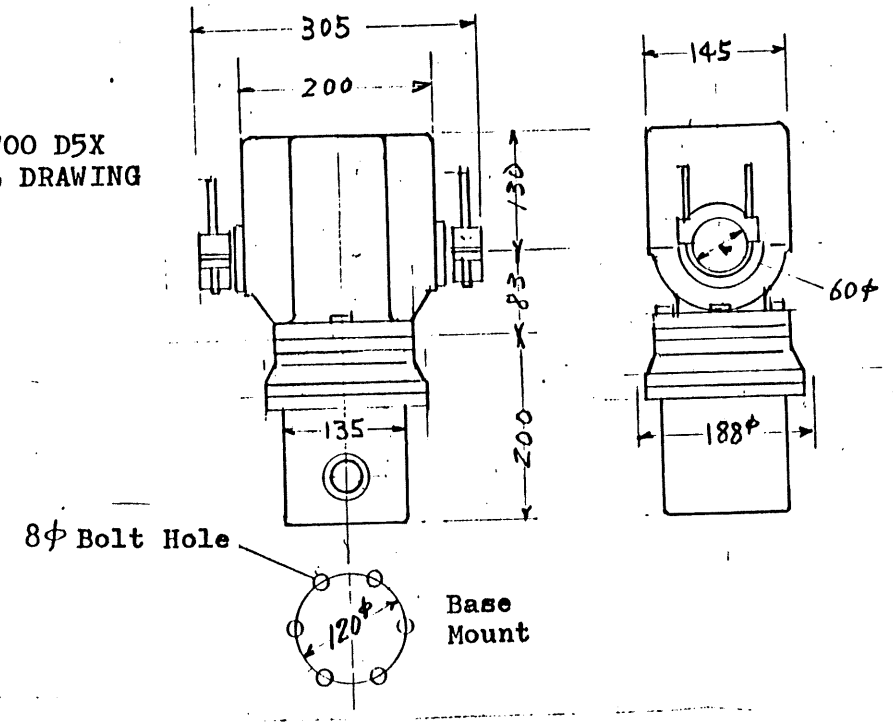
"THE WORLD RENOWN EMOTATOR"

You are now the proud owner of the famed EMOTATOR Amateur Radio Antenna Rotator, made by Emoto Antenna Co., Ltd.

Our model **EV700D5X** is an antenna dual rotator which rotate an antenna at Elevation or azimuth. Model **EV700D5X** is a combined model of the Emotator model 1105 rotor (Azimuth rotation) and model EV-700X rotor(Elevation rotation)

However, azimuth and elevation rotation is controlled with one controller. Therefore, please read this instruction carefully in regards to the usage of **EV700D5X**, antenna construction and wiring.

MODEL 700 D5X OVERALL DRAWING



MODEL EV-700DX CONSIST OF:-

Azimuth Rotor without MK-11, MK-12 & MK-16	1 Pc.
Elevation Rotor	1 Pc.
Controller	1 Pc.
Clamp Bracket	2 Pcs.
"U" Bolt with nut & washer	2 Pcs.
8 x 25 Bolt with washer	6 Pcs.
8 x 18 Bolt with washer.	6 Pcs.
8-pin square male connecter with cover	1 Pc.
7-pin round connecter with waterproof cover	1 Pc.
6-pin square male connecter	1 Pc.
6-pin square female connecter	1 Pc.
Waterproof case	1 Pc.
Instruction manual	1 Pc.
Clamp Bracket #1218 with Stud bolt X2	**1 Pc.**

CONSTRUCTION AND SPECIFICATIONS

A motor and strong geared speed reduction system are incorporated in a diecast waterproof housing. Rotation and Elevation angle indication is made by servo mechanism which joined rotor and controller.

MAIN SPECIFICATIONS

ELEVATION

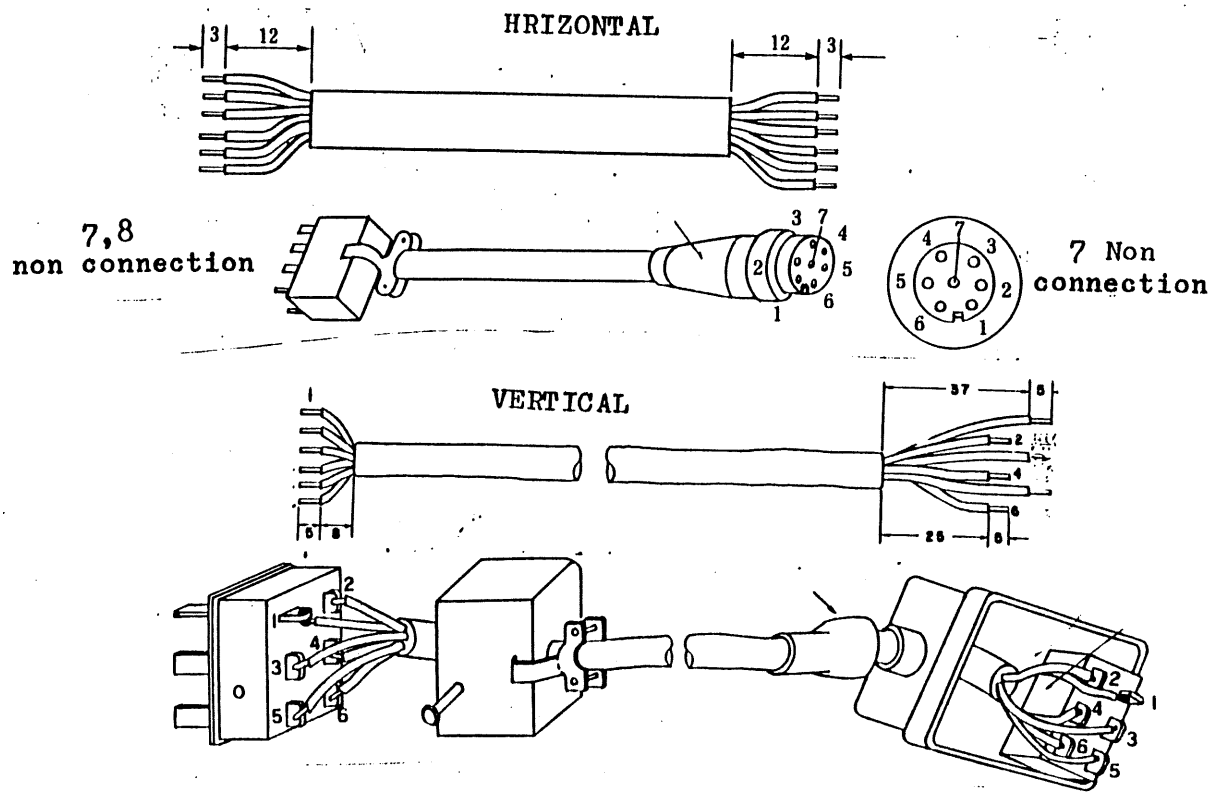
Input Power source	AC 50/60 Hz 117V, 115,220,240Volt 50VA
Operation voltage	AC 24 Volt
Rotation angle	Vertical center ±90×2±5Degree
Rotation time	50/60 Hz 85/75 Sec./180°
Rotation torque	3000 Kg.Cm
Braking torque	5000 kg.Cm
Horizontal and Vertical Mast dia.	40~50 mm.
Controll Cable	6 Conductor 0.5 mm^2 section

HORIZONTAL

Input Power source	AC 50/60 Hz 115,220, 240 Volt 70VA
Operation voltage	AC 24 Volt
Rotation time	50/60 Hz 75/65 sec./360°
Rotation torque	800 Kg.Cm
Braking torque	10,000 Kg.Cm
Mast Diameter	40~61/mm
Controll Cable	6 Conductor 0.5 mm^2 Section

CABLE ARRANGE-MENT

Connect same number of controller and the rotor section.



EXPLANATION OF CONTROLLER AND OPERATION

Fig. 4.

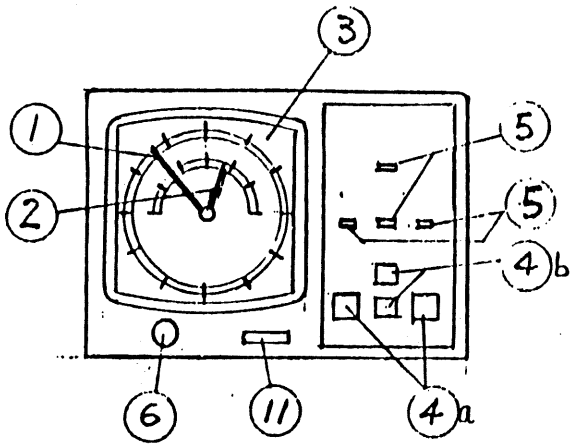
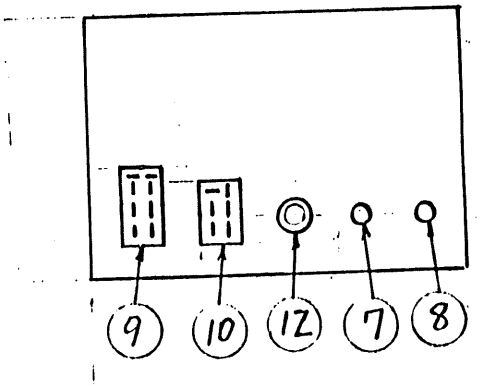


Fig. 5.



① This long pointer needle and outer 360° scale indicate azimuth rotation degree.

② Short pointer needle and 0° - 180° scale indicate elevation degree.

③ Scale plate.

④ Rotation Switch. Left, Right (4a), Up and Down. (4b)
*Even operate elevation and azimuth rotation at the same time, there is no problem.

⑤ LED Lamp. Showing under operation.

⑥ External connecting terminal. Use for rotation control of azimuth and elevation rotation or output analog voltage comply with rotation degree. SEE NOTE.

⑦ Direction adjusting Volume for long pointer needle (azimuth).

⑧ Direction adjusting Volume for short pointer needle (Elevation).

⑨ 8-pin connecter for connecting with 6-conducter cable from azimuth rotor. (Pin No. 7 and 8 are free)

⑩ 6-pin connecter for connecting with 6-conductor cable from elevation rotor.

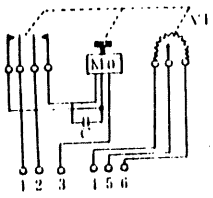
⑪ Power Switch.

⑫ Fuse Holder for 3 Amp.

Note: See next page.

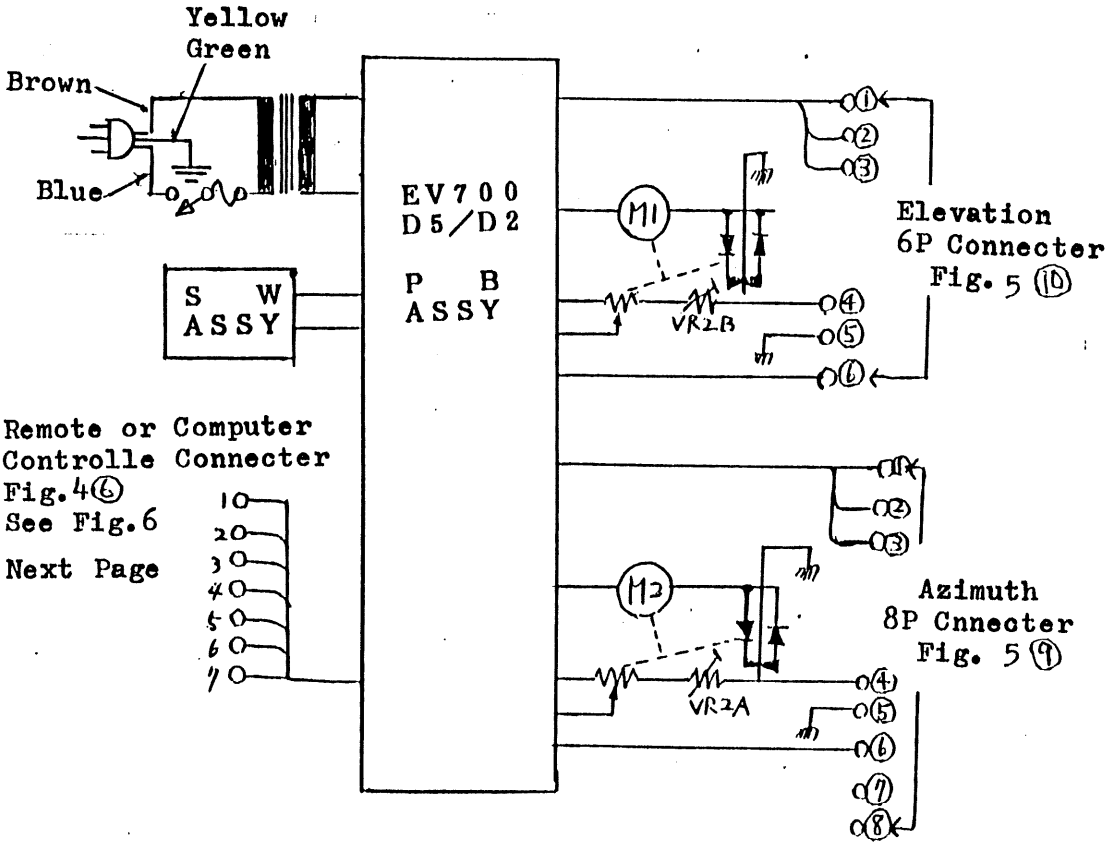
ELECTRICAL BLOCK DIAGRAM

ROTATOR



6P Connecter

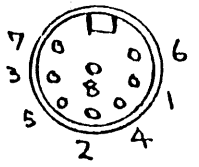
CONTROLLER



Note: How to use the external connecting terminal.

Fig. 6 shows pin number and positionning. Pins are used as follows.

Fig. 6,
View from the front



No. 1 pin.. "LEFT" rotation control.

2 pin.. "RIGHT" rotation control.

3 pin.. Elevation "UP" rotation control.

4 pin.. Elevation "DOWN" rotaiton control.

5 pin.. Azimuth direction degree indication voltage.

6 pin.. Elevation degree indication voltage.

7 pin.. DC 8V, 300mA out put.

8 pin.. "Ground"

Pins characteristics.

No. 1 - 4 pin works with $\overline{\text{LOW}}$ voltage. Being pulled up to +5V.

When control controller with remote control unit, control cable must be shorter than 1.5 meter. Otherwise false action may happen.

No. 5 and 6 pin output 0 - 5V voltage comply with rotation degree. Please use this output voltage as computer data bychanging to digital through A/D converter.

No. 7 is an output terminal of DC 8V 300mA, and can be used as a power source for small electric equipment. However, this power source is not stabilized.

CONNECTING CABLE BETWEEN CONTROLLER AND ROTOR.

Connection between controller and azimuth or elevation rotor is made with 6-conductor cable individually.

8-pin connecter (9) at back side of controller must be connected with azimuth rotor and 6-pin (10) connecter must be connected with elevation rotor.

On both end of 6-conducter cable, solder same pin number with same conductor of 6-conductor cable. For this procedure. please refer **2 Page Cable arrenge-ment.** manual. AGAIN, SAME PIN NUMBER OF CONNECTER MUST BE CONNECTED WITH SAME CONDUCTOR OF 6-CONDUCTOR CABLE.

In addition, No. 7 & 8 pin of 8-pin connecter (for azimuth use) are free. Unnecessary to connect.

CONSTRUCTION OF ANTENNA

* When used the Emotator **EV700D5X**, the following 2-systems are taking into consideration.

Photo. 1,

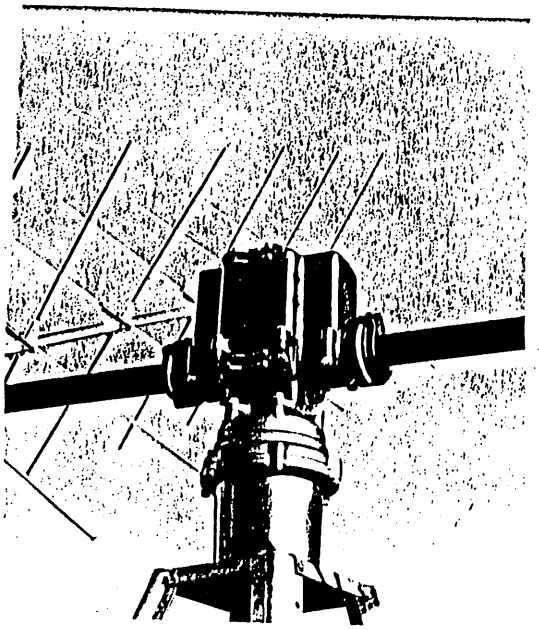


Fig. 1.

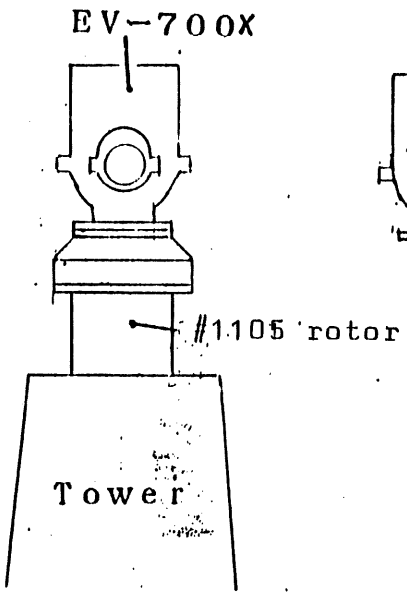


Fig. 3

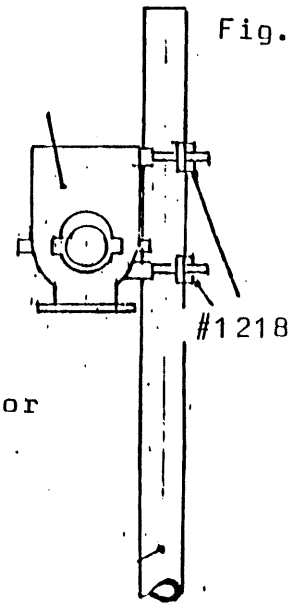
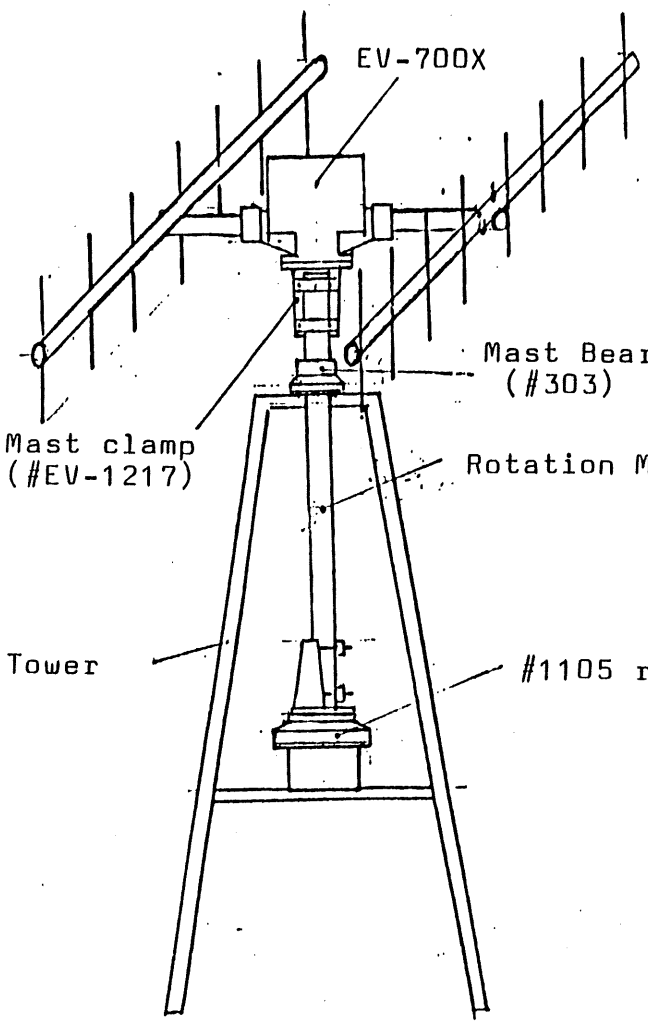


Fig. 2



1. As per Fig. 1 and photo 1, put the EV-700X on 1105 Rotor directly and install on the top of antenna tower.

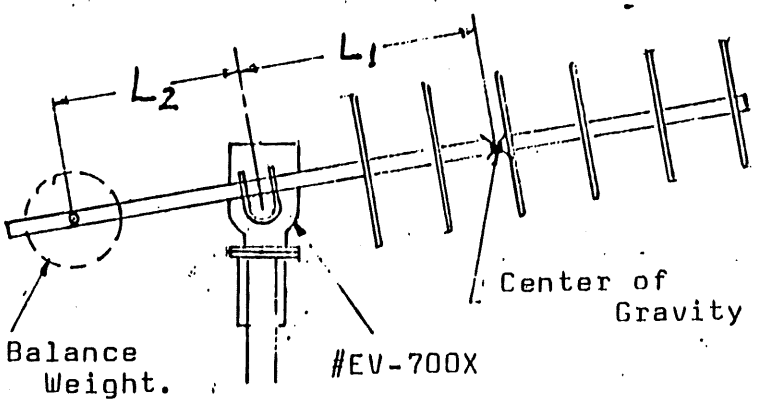
2. As per Fig. 2, Install 1105 roto at middle position of antenna tower. Then install EV-700X on the top of rotation mast which passed through the mast bearing on top of antenna tower by using #EV-1217 mast clamp bracket(optional item).

   or by using longer rotation mast, EV-700X will be installed as per Fig. 3.
   #EV-1218 mast clamp bracket.

THE BALANCE OF ANTENNA WEIGHT

When mount an antenna, the weight of antenna must be taken into consideration. Especially in elevation Emotator, the weight of antenna resist directly against rotation power.

The follwing points must be noted when construct antenna.



L1..Distance between rotation center and center of gravity(cm)

L2..Distance between rotation center and balance weight(cm)

W..Weight of antenna(Kg.)

M..rotation moment(Kg.cm)

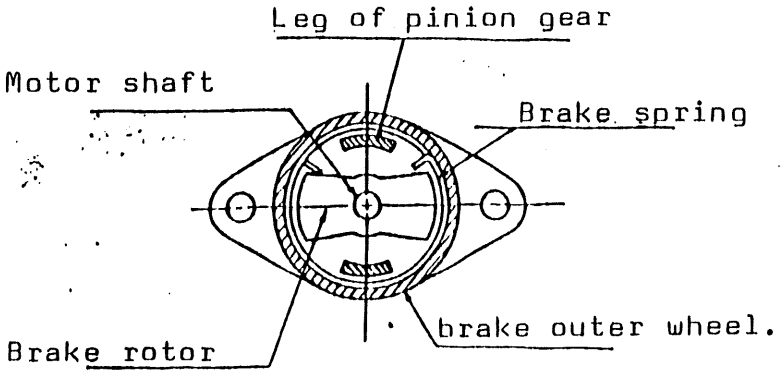
Calculate the "ROTATION MOMENT" with an equation of M=L1 x W. If the figure is larger than 2500, attach the balance weight at opposite side of antenna. Balance weight is calculated with an equation of BW(Kg)=M/L2.

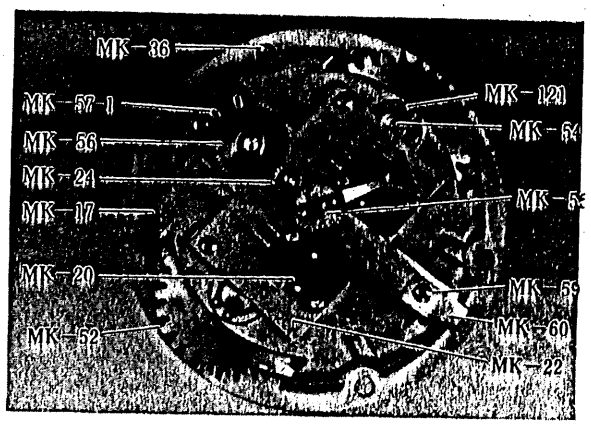
When center of gravity of antenna is unkown, fasten antenna tightly with a strap and pull up. Well balanced position is a center of gravity.

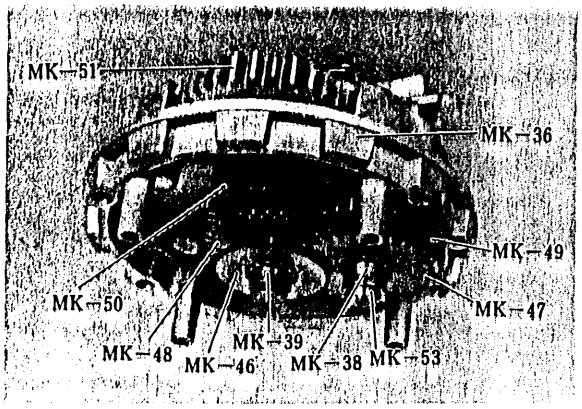
BRAKE OF THE EMOTATOR

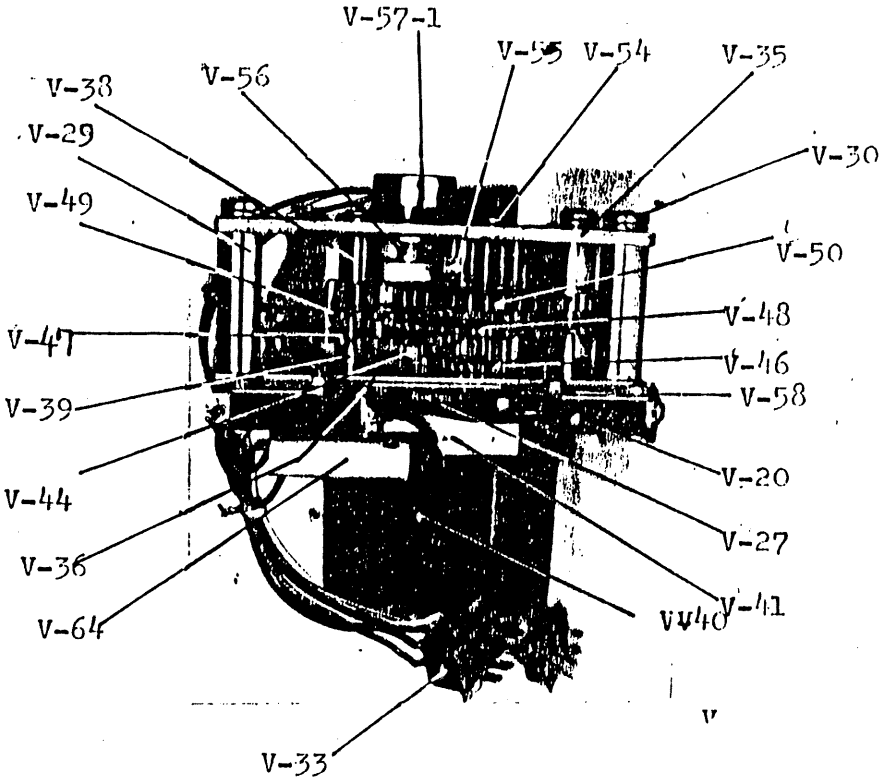
Brake of the Emotator is as per illustrated as follow.

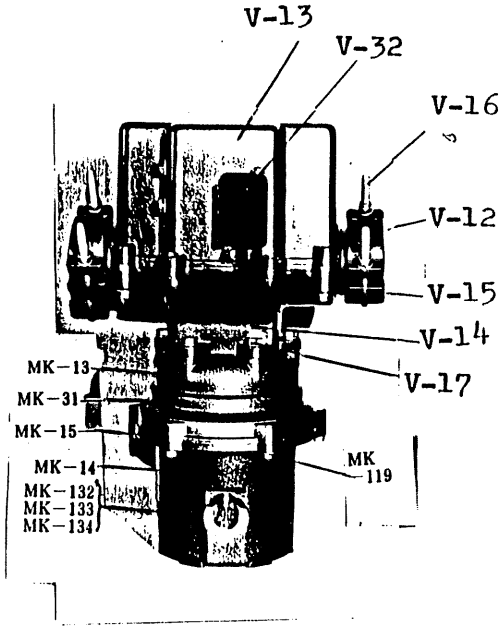
Assemble the position of leg of brake rotor, brake spring and pinion gear as per illustrated as follow. Lubricate machine oil between brake spring and brake outer wheel.

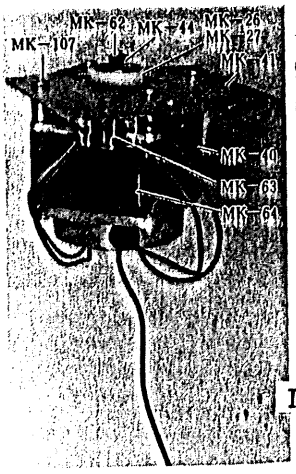


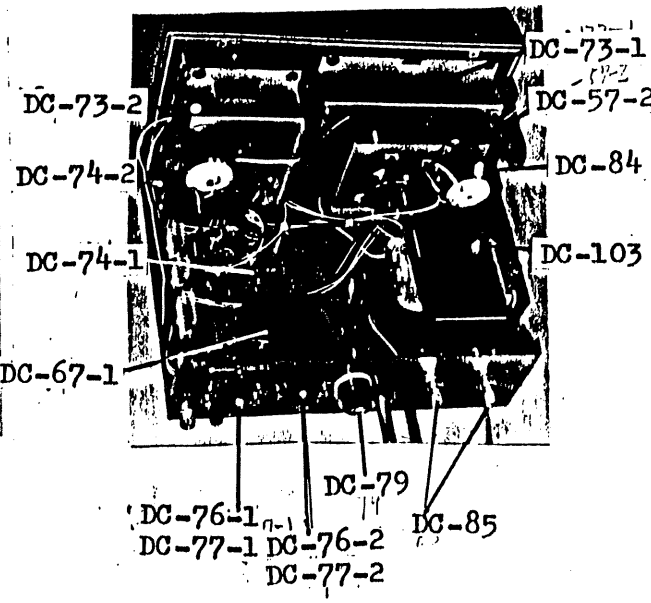

MK-36
MK-57-1
MK-121
MK-56
MK-54
MK-24
MK-17
MK-20
MK-62
MK-60
MK-22

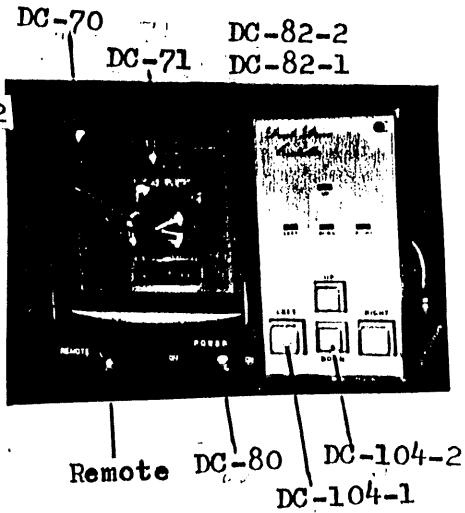

MK-51
MK-36
MK-49
MK-50
MK-47
MK-48
MK-39
MK-46
MK-38
MK-53


V-57-1
V-38
V-56
V-29
V-49
V-35
V-30
V-50
V-48
V-47
V-46
V-58
V-39
V-20
V-44
V-27
V-36
V-41
V-64
V-33


V-13
V-32
V-16
V-12
V-15
V-14
V-17
MK-13
MK-31
MK-15
MK-14
MK-132
MK-133
MK-134
MK-119


MK-62
MK-41
MK-26
MK-107
MK-27
MK-40
MK-63
MK-64


DC-73-2
DC-74-2
DC-74-1
DC-67-1
DC-76-1
DC-77-1
DC-76-2
DC-77-2
DC-79
DC-85


DC-70
DC-82-2
DC-71
DC-82-1
DC-73-1
DC-57-2
DC-84
DC-103
Remote
DC-80
DC-104-2
DC-104-1

PARTS LIST

HORIZONTAL

MK- 13	Gear case
MK-14	Motor Case
MK- 15	Ring
MK- 20	Micro Switch
Mk- 22	VR Base
MK- 24	VR Connecter Gear
MK- 26	BK Spring
MK- 27	BK Body
MK- 31	9.5φ Steel ball
MK- 36	Gear Frame
MK- 38	12φ Spacer (Long)
MK- 39	12φ Spaser (short)
MK- 40	AC Mortor
MK- 41	Motor Plate
MK- 42	4 10 Shaft
MK- 44	Motor Pinion
MK- 45	BK Rotor
MK- 46	No.1 Gear
MK- 47	No.2 Gear
MK- 48	No.3 Gear
MK- 49	No.4 Gear
MK- 50	No.5 Gear
MK- 52	No.6 Gear
MK- 53	12φ×56.5 Shaft
MK- 54	12φ×29 Shaft
MK- 55	Saw teeth arm Gear
MK- 56	VR Gear
MK-57-1	600 ohm VR
MK- 59	LS Spring
MK- 62	4φ Push nut

ELEVATION

V - 12	Clamp
V - 13	Upper Gear case
V - 14	Under Gear case
V - 15	Ceter Gear Axle
V - 16	U Bolt with SW,Nut
V - 17	8φ×25 Bolt with SW, Nut
V - 20	LS Micro switch
V - 27	BK Body
V - 29	Frame Spacer
V - 32	Water proof case
V - 33	6 P Connecter Mal
V - 34	6 P Connecter Femal
V - 35	Gear Frame
V - 36	Gear Frame
V - 38	10φ×14 Spaser
V - 39	10φ ×8 Spaser
V - 40	Motor
V - 41	Motor plate
V - 44	Motor pinipn
V - 46	No.1 Gear
V - 47	No.2 Gear
V - 48	No.3 Gear
V - 49	No.4 Gear
V - 50	No.5 Gear
V - 53	9φ×54 Shaft
V-- 54	9φE ring
V - 55	VR Counter Gear
V - 56	VR Gear
V - 57-1	600 Ohm VR
V - 58	LS Holder plate
V - 64	6.8 Micro Condenser
V - 62	4φ Push nut

CONTROLLER

DC- 57-2	600 Ohm VR (Long shaft)
DC- 67-1	SSR
DC- 70	Front Panel
DC- 71	Pilot lamp
DC- 73-2	Servo motor Assy .
DC- 73-1	Servo motor Assy.
DC- 74-1	Print board
DC- 74-2	Print board
DC- 76-1	8P Connecter Femal
DC- 76-2	6P Connecter Femal
DC- 77-1	8P Connecter Male
DC- 77-2	6P Connecter Male
DC- 79	1 Ampare Fuse
DC-80	Power Switch
DC-82-1	Needle pointer
DC-82-2	Needle pointer
DC-84	DC Motor
DC-85	200 Ohm VR
DC-103	Trans former
DC-104-1	Horizontal Switch
DC-104-2	Vertical Switch