

# **INSTRUCTION**

## **MANUAL**

**G-800S/G-1000S**  
**G-800SDX/G-1000SDX**



**YAESU MUSEN CO., LTD.**  
**C.P.O. BOX 1500**  
**TOKYO, JAPAN**

YAESU G-800S/SDX & G-1000S/SDX  
HEAVY-DUTY ANTENNA ROTATOR & CONTROLLERS



G-800S Controller



G-800SDX Controller



G-1000S Controller



G-1000SDX Controller

The Yaesu G-800S/SDX and G-1000S/SDX are designed to support and rotate medium- to large-size amateur and professional antenna arrays under remote control from the station operating position. The factory-lubricated rotator unit is housed in weatherproof melamine resin coated die-cast aluminum, to provide maintenance-free operation under all climatic conditions. A mast alignment gauge on the rotator housing simplifies accurate mechanical alignment during installation.

The controller unit is a handsomely-styled desktop unit which provides 360° indication of actual antenna bearing azimuth, in both compass direction and degrees. The deluxe SDX versions include operator selectable rotating speeds from 43 to 93 seconds per rotation. Hands-free operation is provided by both S and SDX versions: the S version having locking direction switches, and the SDX version having a preset feature which brings the antenna around to the preset heading automatically after being set, and slows rotation speed as the antenna approaches the desired heading to bring the antenna to a gentle stop. The operator may select the stopper heading (the bearing through which the rotator cannot be turned) most convenient for his location and operation, allowing full rotation through north, south or both, if desired. In any case, 90° overlapping rotation allows rotation through the selected stopper heading.

Plug connectors are provided on both the rotator and the controller, so cable connection and servicing is simple.

Please read this manual carefully before installing the rotator.

## SPECIFICATIONS

### Voltage requirement:

110-120 or 220-240 VAC

### Power consumption:

100 VA

### Motor voltage:

S vers.: 20 VDC

SDX vers.: 12 to 22 VDC

### 450° rotation time:

S vers.: 55 sec.

SDX vers.: 93 ± 10 sec. to 43 ± 15 sec.

### Braking torque:

G-1000S/SDX: 6,000 kg-cm (434 ft-lbs)

G-800S/SDX: 4,000 kg-cm (289 ft-lbs)

### Rotation torque (all models):

600-1100 kg-cm (43.4-79.5 ft-lbs)

### Maximum continuous duty:

5 minutes

### Rotation range:

450° +0/-5°

### Maximum vertical load:

200 kg (440 lbs)

### Wind loading area:

Tower Mounted: less than 0.45 m<sup>2</sup>

Mast Mounted: less than 2.2 m<sup>2</sup>

### Control cable:

5-conductors: #20 AWG or larger

### Mast diameter:

38 - 63mm (1-½ to 2-½ inches)

### Weight:

G-1000S/SDX Rotator: 3.5 kg (7.7 lbs)

G-800S/SDX Rotator: 3.4 kg (7.5 lbs)

S Controller: 3.2 kg (7.0 lbs)

SDX Controller: 3.6 kg (7.9 lbs)

## UNPACKING & INSPECTION

When unpacking the rotator confirm the presence of the following items:

Rotator Unit	1
Controller Unit	1
Mast Clamp	1 pair*
Round Cable Plug	1 ass'y
Rectangular Cable Plug	1 ass'y
Hex Bolts -	
M8 x 16	4
M8 x 25	4
M8 x 70	4
Split washer	12
Flat washer	4
M8 Nuts	4
Spare Fuse (117V:2A, 220V:1A)	1
Dial Heading Sheet	1

If any of these items are missing or damaged, save the packing material and notify the shipping company (or shop where you bought it).

Note that control cable is not included, as the length must be determined case-by-case. Contact your Yaesu dealer to obtain the length of cable your installation requires.

Before proceeding with installation, confirm that the AC voltage label on the rear of the Controller matches your local line voltage: either "117V" for 110 to 120 VAC, or "220" for 220 to 240 VAC. If the labelled voltage range does not match, return the controller to the dealer from whom you purchased it (different power transformers are installed for the different voltage ranges).

\* If you plan to install the rotator on the mast, above or without a tower, contact your Yaesu dealer to purchase a second clamp (model GC-038 or GC-048).

## CONTROLLER ADJUSTMENTS & SWITCHES



### Front

#### (1) POWER Switch

Press this switch to turn the Controller on to rotate the antenna. Turn it off when the rotator is not in use.

#### (2) LEFT/RIGHT Seesaw Switch

Press the LEFT side of this switch to rotate the antenna counterclockwise. Press the RIGHT side to rotate the antenna clockwise. In S versions only, pressing one side of the switch once will start rotation, and pressing the same side again will latch the rotator on (so you can remove your finger). Pressing the other side of the switch once will stop rotation.

#### (3)\* PRESET Switch and Control

Set this control to the desired antenna heading (according to the angular scale around this

control), then press the (momentary) PRESET switch to activate automatic rotation to the desired heading. The LEFT/RIGHT switch will abort preset operation.

#### (4)\* SPEED Control

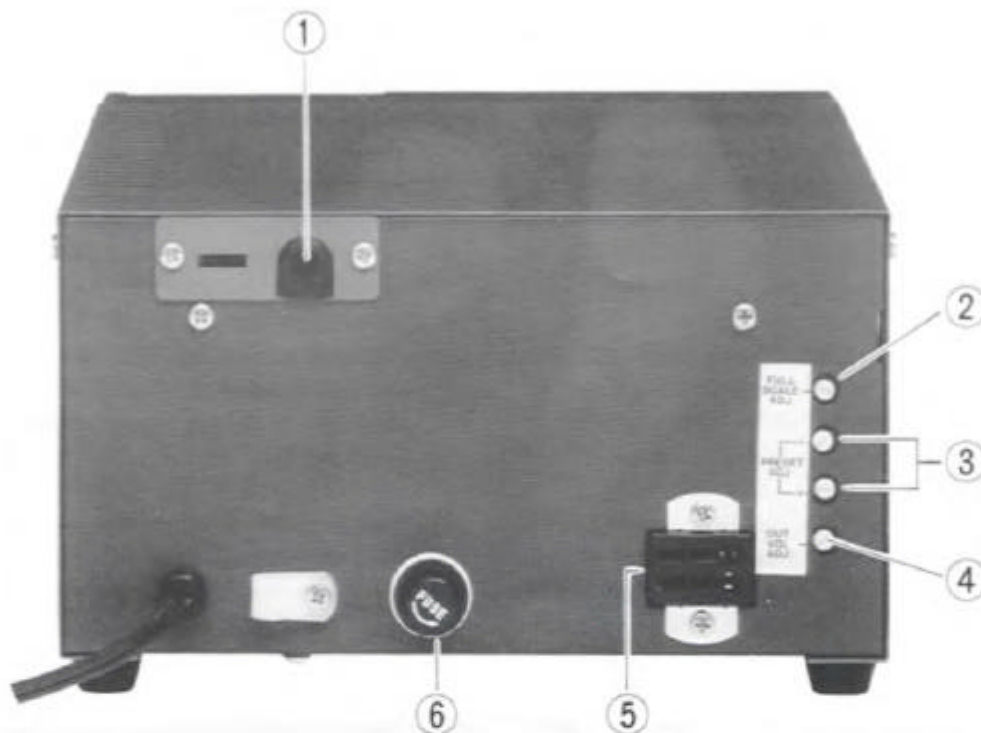
Set this control for the desired rotating speed between approximately 43 and 93 seconds per 450° revolution.

#### (5) OVERLAP Indicator

This red LED glows when the antenna is rotated beyond about 360° (to 450°) from its original installation direction (0°). Check this indicator before rotating the antenna clockwise, and turn the antenna counterclockwise to the desired position if the indicator is on.

\* SDX versions only.





## Rear

### (1)\* RS-232C Cable Grommet

If the optional Digital Interface Unit is installed, the RS-232C cable to the computer exits through this grommet and passes through the nylon cable clamp below it.

### (2) FULL SCALE ADJ Potentiometer

This control calibrates the maximum rotation angle of the azimuth indicating needle to match the maximum angle of the rotator.

### (3)\* PRESET ADJ A & B Potentiometers

These controls calibrate the angle of the PRESET control on the front panel to match the azimuth indicating needle. Pot A must

be adjusted only at the 450° position, and pot B only at the 0° position.

### (4)\* OUT VOL ADJ Potentiometer

This control presets the voltage range at pin 4 of the 8-pin External Control jack inside, for calibration of the A-to-D converter on the (optional) Digital Interface Unit.

### (5) Rotator Control Cable Jack

The rotator cable connects to this 6-pin jack.

### (6) FUSE Holder

A 2A fuse must be installed here for AC mains voltages from 110 to 120V. A 1A fuse must be installed for 220 to 240V.

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\* SDX versions only

## CONTROL CABLE INSTALLATION

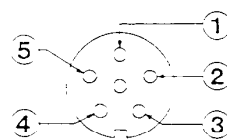
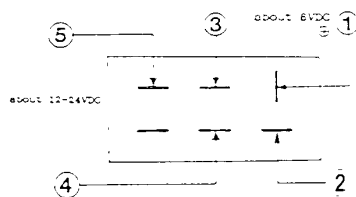
Before installing the antenna and rotator, prepare the rotator control cable and test rotator operation thoroughly on the ground as described here. We recommend that after this you also check the alignment of the controller, as described in the following section.

### Control Cable Preparation

Your control cable should have five stranded conductors of at least 0.5mm (#22 gauge) if the cable is shorter than 40m (125'), or 0.75mm (#18 gauge) if longer.

- (1) Disassemble the two supplied cable plugs: slide the rubber boot off the round plug, remove the setscrew in the shell with a small screwdriver, and then unscrew the shell from the plug. On the rectangular plug, just remove the two small screws in the shell. Save the setscrew from the round plug and the two small screws in a safe place until step 9, so you don't lose them.
- (2) Slide the rubber boot and round shell over the rotator end of the cable, far enough to allow dressing the end of the cable. Slide the rectangular shell over the other (controller) end of the cable.
- (3) Using special care to avoid nicking the insulation of the individual wires, strip back 15mm of the outer jacket of the cable from both ends, and then strip 5mm of insulation from each wire.
- (4) Solder the wires to the round plug pins, noting the color of the wire and number of each pin for reference later. Pin 6 (center pin) is not used. Confirm all solder joints are good and clean, as this part of the cable will be hard to access after installation. Don't slide the shell on yet.
- (5) Referring to your notes of the wire color at each pin on the round (rotator) plug, connect the wires to the pins of the rectangular (controller) plug so that the wire from each pin on the rotator plug connects to the pin with the same number on the controller, ie., 1 to 1, 2 to 2, etc. Pin 6 is not used. Don't slide the shell on yet.
- (6) Temporarily connect the round plug to the rotator, and the rectangular plug to the jack on the controller. Make sure that the POWER switch is in the off (out) position, and then connect the cord to the AC power outlet.
- (7) Turn on the POWER switch. The pilot lamps should light, and the direction indicator move to the position of the rotator and stop.
- (8) Press the LEFT side of the seesaw switch, and confirm that the rotator (when viewed from the top) and indicator needle turn counterclockwise together. Then press the RIGHT side of the seesaw switch and confirm that the rotator and indicator turn clockwise. If rotation does not occur as described, recheck your cable connections.
- (9) If the rotator and indicator work as described, replace the plug shells, setscrew, two small screws and rubber boot removed in step 1.

- 1 Red/ORG.
- 2 BRW/YELLOW
- 3 BLUE/GREEN
- 4 WHITE
- 5 BLACK



## Controller Checkout & Alignment

These steps are most easily carried out after connecting the rotator cable, before installing the rotator and antenna on the mast or tower. They may be repeated after installation to confirm controller calibration.

- (1) Press the LEFT side of the seesaw switch\* until the rotator turns counterclockwise as far as it will go, and stops. The indicator needle should now point precisely to 0°. If it does not, or if you want to change the starting angle, see 'Repositioning the Direction Indicator' following this procedure.
- (2) Note the precise position of the rotator\*\* by referring to the marks on the rotator housing just above the cable socket. Then press the RIGHT side of the seesaw switch to turn the rotator clockwise exactly 360° (according to the marks on the housing or actual antenna position).
- (3) The indicator needle should now point to exactly the same position as in step 1. If not, adjust the FULL SCALE ADJ potentiometer on the rear panel so that it does. The OVERLAP indicator should come on at about 360°.
- (4) Press the RIGHT switch again to continue clockwise rotation until the rotator reaches its end-stop. The indicator should now point to about 90°, and the OVERLAP indicator should be on.
- (5) Turn the rotator back and forth to each end-stop several times, confirming that the indicator matches the rotator angle at different settings.

The remaining steps on this page are for the SDX versions only.

- (6) Change the SPEED setting and confirm that rotation speed changes accordingly.
- (7) Set the PRESET control to 0°, and press the PRESET button (see the box below). Rotation should stop at 0°. Now turn the PRESET control slightly clockwise, and note whether the rotator moves. If the rotator stopped before the indicator reached 0°, or if it did not respond when the PRESET control was set slightly clockwise, adjust the PRESET ADJ B (lower) potentiometer and repeat this step.
- (8) Set the PRESET control to 360°. Rotation should again stop at 0°. If not, adjust the PRESET ADJ A (upper) potentiometer and repeat this step.

### PRESET MODE OPERATION (SDX versions only)

Pressing the PRESET button activates the preset mode: the rotator will turn until the indicator matches the PRESET control, and resetting the control will start the antenna turning again automatically. Pressing the seesaw switch or turning power off will cancel the preset mode until the PRESET button is pressed again.

\* In SDX versions, set the SPEED control fully clockwise, and then hold the seesaw switch during rotation. In S versions, press the seesaw switch momentarily to start rotation, and press the other side of the switch to stop.

\*\* If the rotator and antenna are already installed, note the exact bearing of the antenna boom instead of the marks on the rotator housing.

## Repositioning the Direction Indicator

The azimuth indicating needle may be repositioned, if desired, so that the rotator stopping point is south (or east or west) instead of north (as shipped from the factory). Of course the rotator and antenna will have to be installed to match the direction indicator.

- (1) Turn on the controller and press the seesaw switch to set the indicator needle to  $0^\circ$  (straight up). Then turn off the POWER switch.
- (2) Grasp the edge of the bezel, turn it  $10^\circ$  counterclockwise, and pull it off.
- (3) Gripping the needle, move it to the desired heading (we suggest only multiples of  $90^\circ$  - that is N, E, S or W, since the orange and blue markers on the bezel can only be installed in these directions).
- (4) Replace the bezel so that the orange marker ends up aligned with the needle.

**NOTE:** When installing the antenna after resetting the needle direction, make sure to aim the antenna in same direction as the new needle setting.

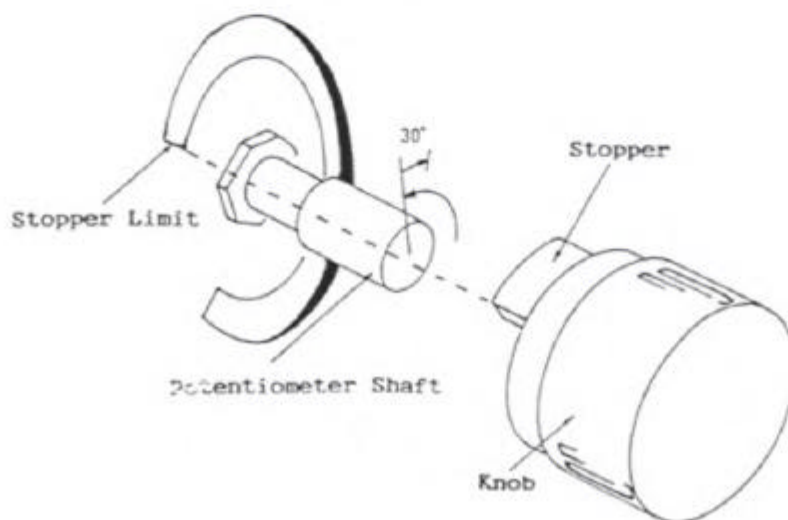
The compass heading labels can also be repositioned on the direction indicator face, for situations where it may be more convenient

to have the upmost indicator position be other than north.

- (1) Perform steps 1 and 2 of the procedure at the left.
- (2) Note the position of the needle, then grasp it at its center, and pull it straight off.
- (3) Push the E and W (or N and S) sides of the compass heading label sheet towards the center, and remove the sheet.
- (4) Determine which compass direction you desire to be upmost, and reinstall the compass heading label sheet.
- (5) Replace the needle and bezel in the same direction as they were before.

## PRESET Knob Alignment (SDX vers. only)

If it is not possible to calibrate the PRESET knob using the A and B potentiometers on the rear panel, pull off the PRESET control knob, turn the shaft fully counterclockwise, and reinstall the knob with its pointer at  $0^\circ$  on the PRESET scale. The knob stopper should be aligned with the counterclockwise edge of the slot in the panel behind the knob.





## ROTATOR INSTALLATION

The G-800S/SDX rotator unit is designed to accommodate medium-size antenna arrays, while the G-1000S/SDX rotator unit is designed to accommodate large antenna arrays. The maximum safe load depends on the wind surface area, size and weight of the antenna(s), method and quality of mechanical installation, and maximum wind velocity at the installation site. If your antenna specifications do not include wind surface area, refer to the Chart on this page.

The diagrams below show several recommended installations. Notice that mounting the rotator inside of a tower provides the greatest support capacity (antenna wind surface area up to 2m<sup>2</sup> for the G-800S/SDX, or 2.2m<sup>2</sup> for the G-1000S/SDX), and is preferable for larger antennas or in high-wind areas. Use our GS-050 or GS-065 Tower Mount Bearing at the top of the tower (and make sure that the bearing is aligned precisely with the center of the rotator, so the mast is exactly vertical).

If the rotator is mounted on the mast above the tower it should be as close to the antenna as possible, to minimize the stress on the rotator caused by wind pressure against the antenna. This bending force on the rotator limits the supporting capacity of this type

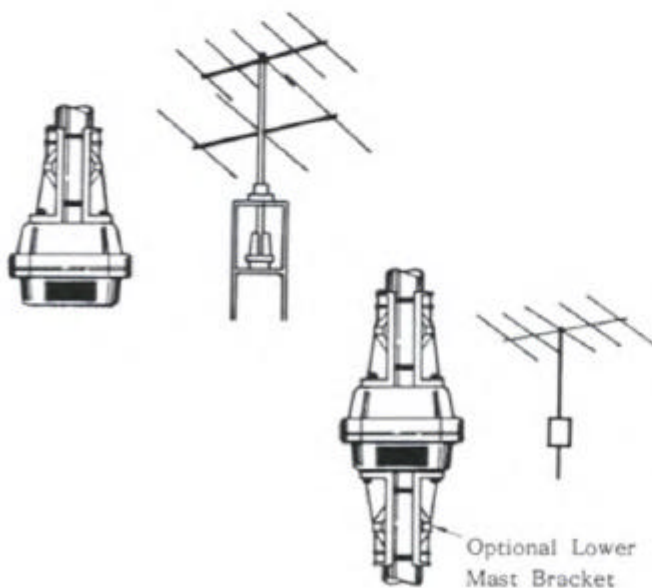
of installation to antennas with not more than 0.45/Lm square meters of wind surface area, where Lm is the length of mast (in meters) between the antenna and rotator.

In addition to antenna wind loading and regardless of the type of installation, the overall size and weight of the antenna should be considered. As a general rule, for the G-800S/SDX, the product of the rotating radius and weight of the antenna should not exceed 180 kg-m (1299 ft-lbs), and for the G-1000S/SDX, 230 kg-m (2020 ft-lbs).

Where multiple antennas are to be installed on the same mast, make sure to add the wind loading for each antenna, and the products of weight and radius for each when calculating the above loading factors.

Make certain that the antenna attaches to the mast at the center of gravity of the antenna. That is, the antenna should be balanced, providing only downward force on the mast (when there is no wind). These rotators can support up to 250 kg (550 lbs).

Be sure to leave enough slack in the coaxial cable feedline around the rotator so that it can rotate 450°.



ANTENNA WIND SURFACE AREA CHART

Freq. (MHz)	Elements	Area m <sup>2</sup>	Freq. (MHz)	Elements	Area m <sup>2</sup>
7	2	2.2	14/21	3Tr	0.4
7	1	0.2	14/21	4Tr	0.5
7	2 <sup>1/2</sup> Lc*	0.6	21/28	3Tr	0.3
7	3Lc	1.1	21/28	4Tr	0.4
14	3	0.7	14/21/28	3Tr	0.4
14	4	1.2	14/21/28	4Tr	0.4
14	5	1.7	50	4	0.25
21	3	0.45	50	5	0.3
21	4	0.6	50	6	0.37
21	5	0.8	50	2SQ	0.3
21	6	1.3	144	10	0.2
21	2SQ	0.3	144	10x2	0.44
28	3	0.3	144	10x4	0.95
28	4	0.42	144	10x2x4	2.0
28	5	0.6	430	12	0.06
28	2SQ	0.3	430	12x2	0.12
7/14	3Tr	0.5	430	12x4	0.3
7/14	4Tr	0.8	430	12x2x4	0.6

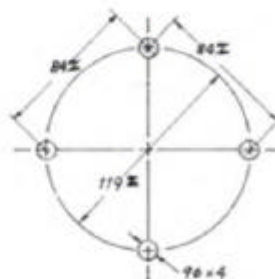
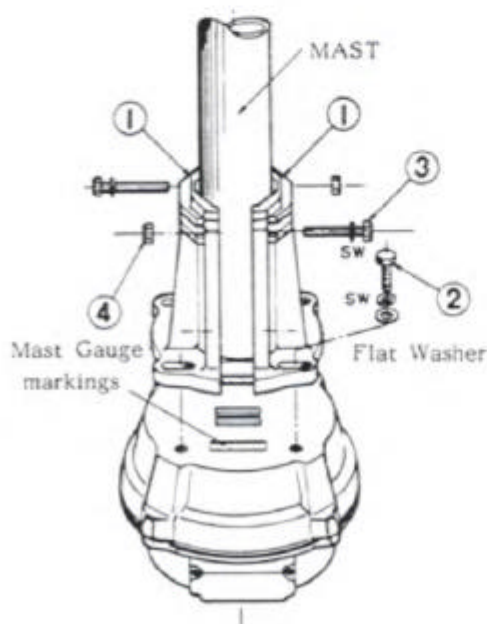
\* Lc = with loading coils  
 SQ = Swiss Quad configuration  
 Tr = Trapped multibander  
 No marking = full-size monobander

### Mast Bracket Assembly & Antenna Positioning

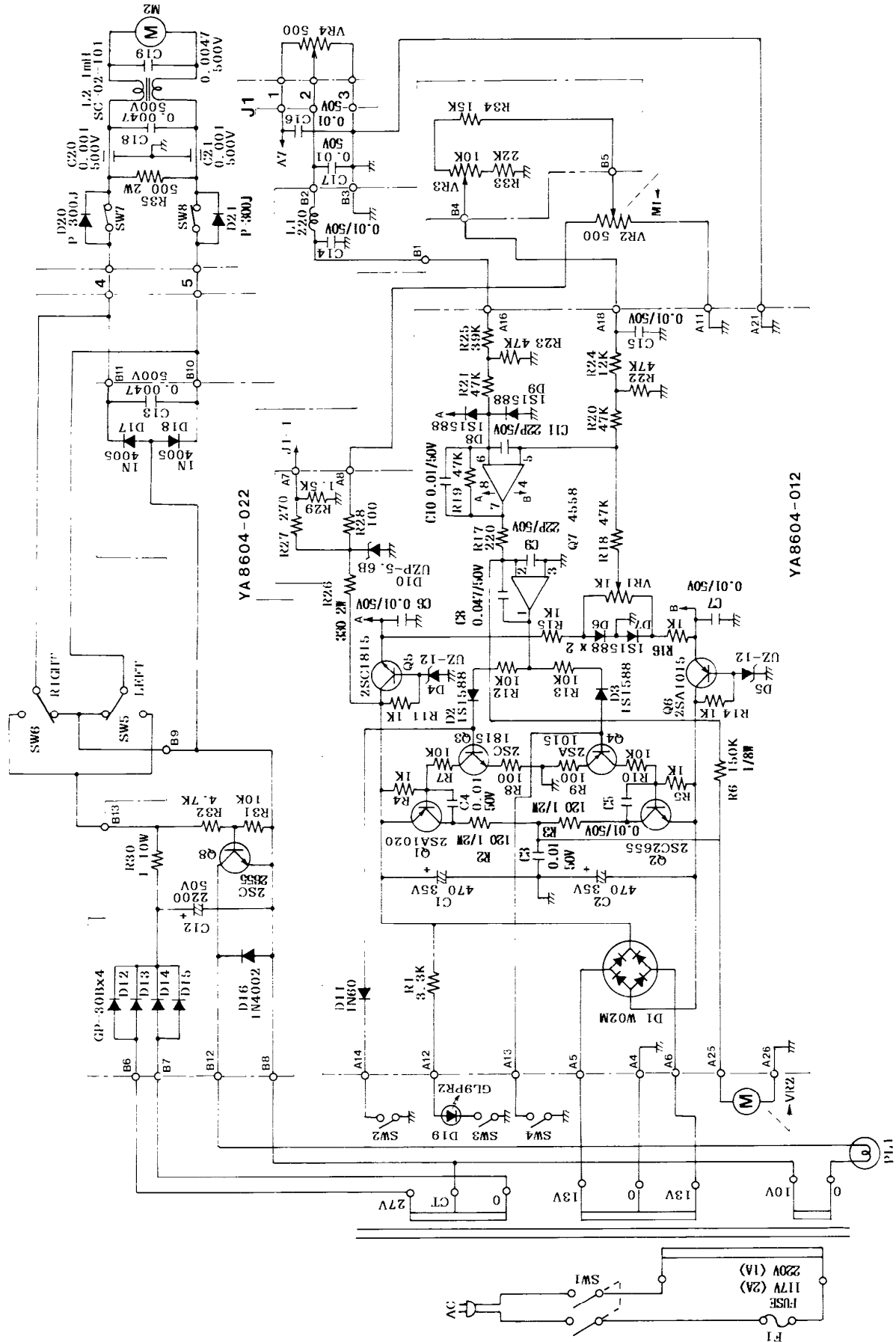
- (1) Loosely fasten the mast bracket halves (1) to the rotator housing using four short bolts, split washers and flat washers (2).
- (2) Insert the mast into the bracket, and finger-tighten the four longer bolts (3) with split washers, flat washers and nuts (4).
- (3) Set the controller so that it indicates precisely  $0^{\circ}$  (North). Then, using an accurate map and known landmarks, position the antenna (without using the controller) so that it points to true North. Alternatively, consult a Geodetic Survey map for your area to determine the Magnetic Deviation at your location, and then use a compass to position the antenna so that it points to true North (Magnetic North + Magnetic Deviation). Be careful not to disturb the antenna direction when tightening the mast bracket in the next step.
- (4) Referring to the mast gauge markings on the rotator housing, tap the mast bracket halves to center the mast while alternately tightening the short bolts (2) and nuts (4) on the long bolts alternately.

**CAUTION:** The G-800 and G-1000 rotators are designed for vertical mounting only. One half of the housing is marked "TOP SIDE". Water and contaminants will damage the motor unit if it is mounted horizontally or upside-down.

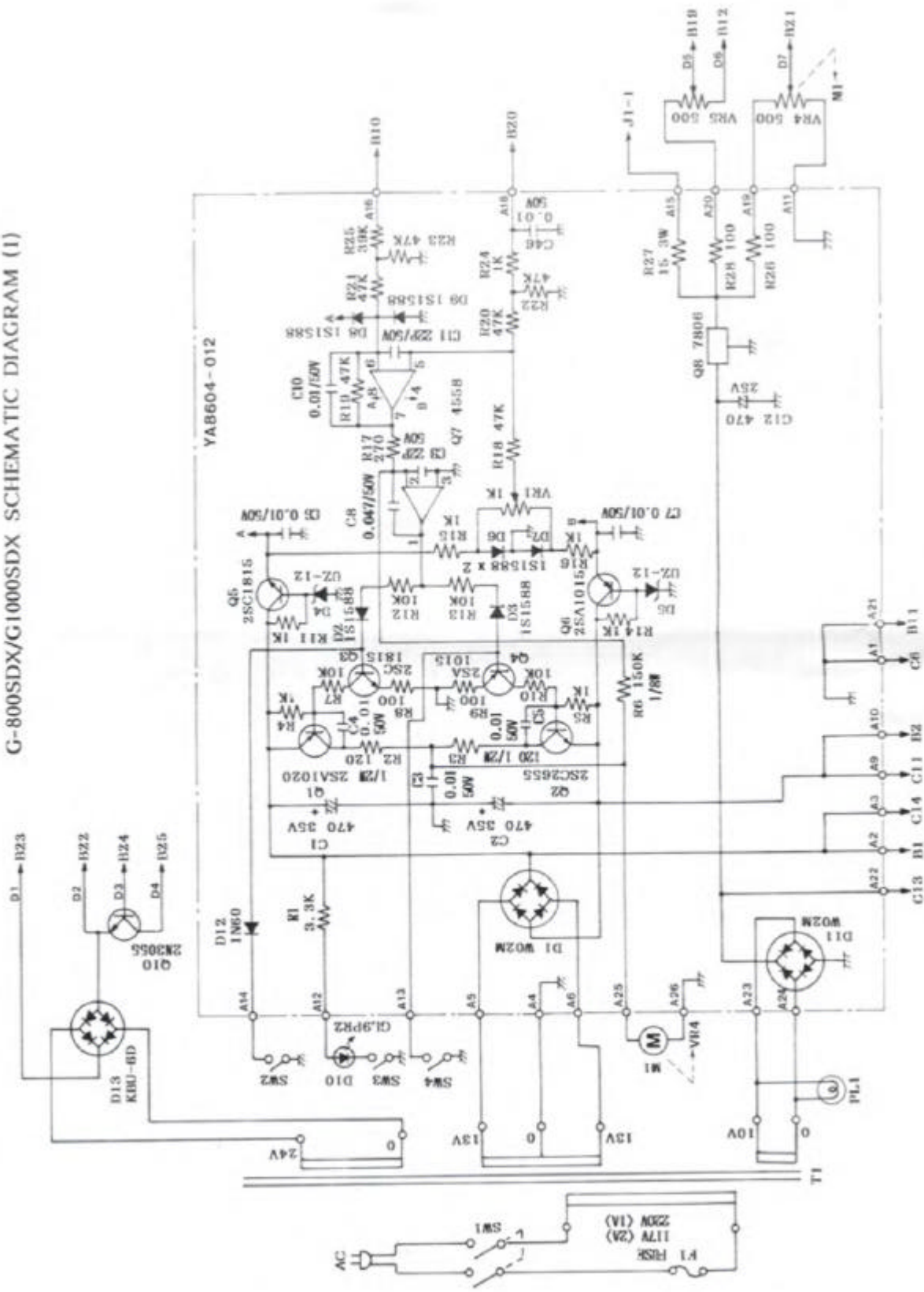
The rotator motor is rated for five-minutes intermittent duty. However, it can safely run continuously for as long as ten minutes providing that it be brought to rest for at least ten minutes afterwards.



G-800S/G1000S SCHEMATIC DIAGRAM

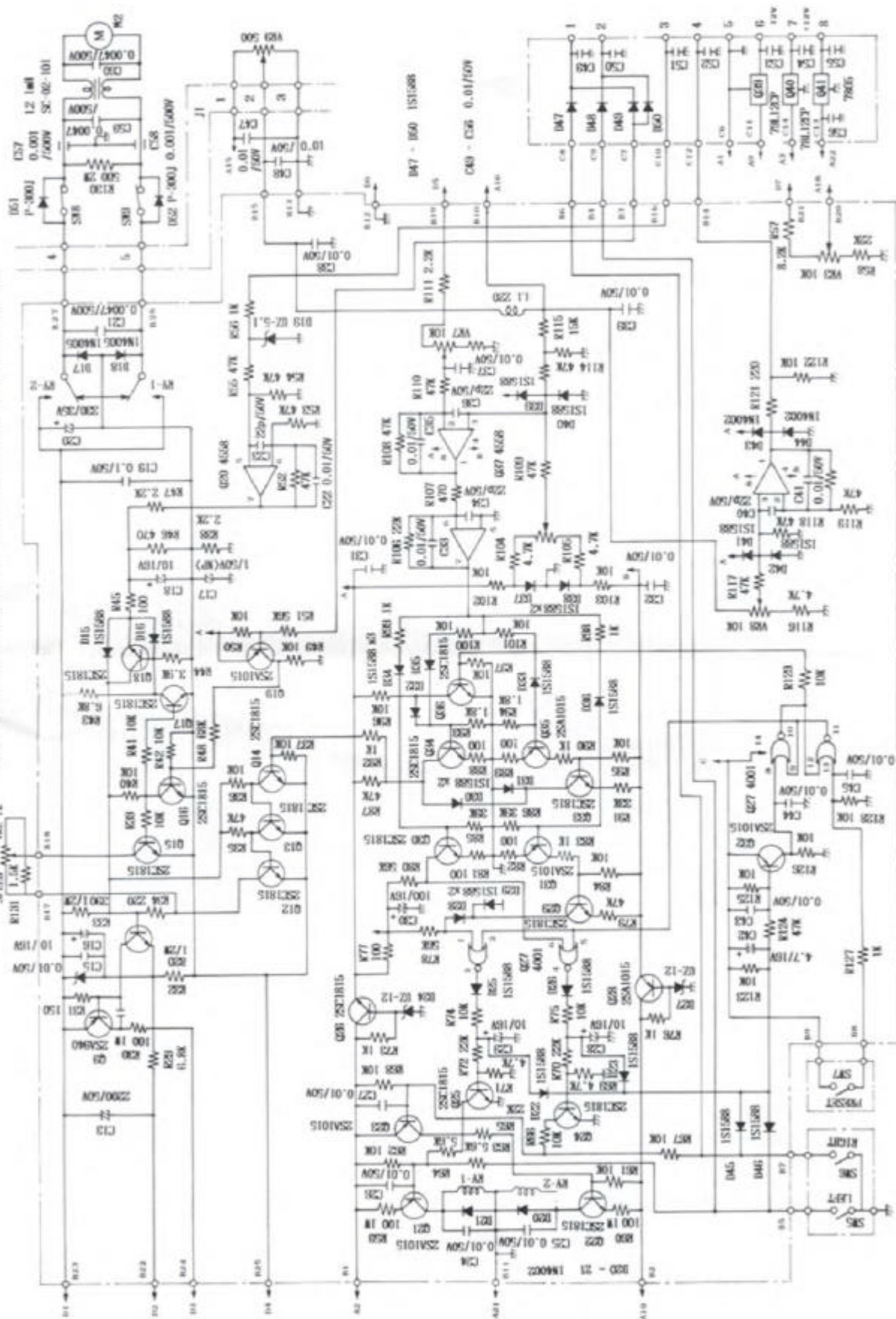


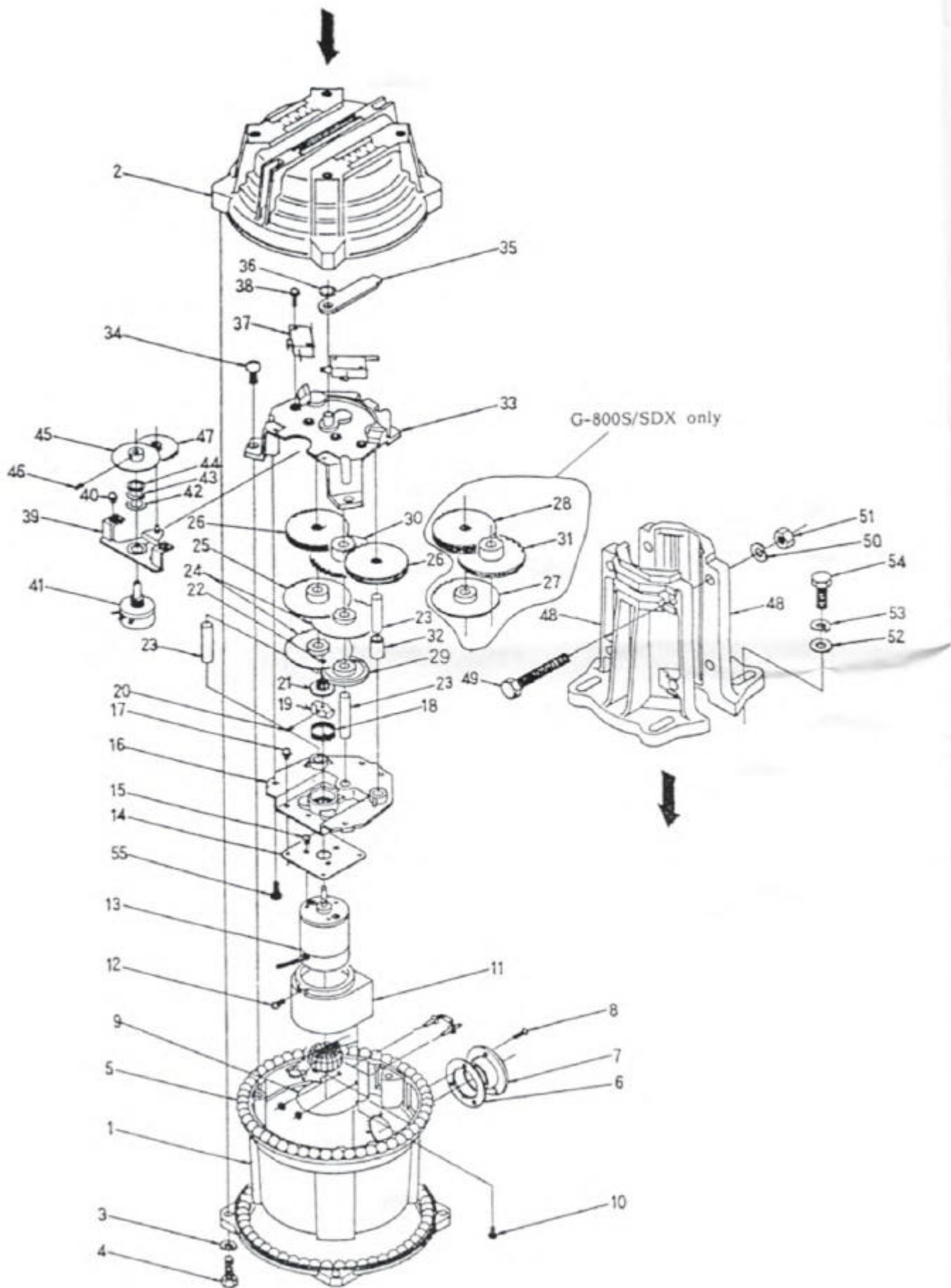
G-800SDX/G1000SDX SCHEMATIC DIAGRAM (1)





G-800SDX/G1000SDX SCHEMATIC DIAGRAM (2)





## PARTS LIST

### Rotator Unit

- |                              |                            |                            |
|------------------------------|----------------------------|----------------------------|
| (1) Lower Housing            | (18) Coil Spring           | (38) M3x16 Screw           |
| (2) Upper Housing            | (19) Spring Winder         | (39) Pot. Mounting Plate   |
| (3) M6 Split Washer (x4)     | (20) M3x3 Setscrew         | (40) Binding Screw         |
| (4) M6x20 Screw (x4)         | (21) Motor Pinion Gear     | (41) Potentiometer         |
| (5) Ball Bearing             | (22) 2.5mm E Ring          | (42) Pot. Flat Washer      |
| (6) Socket Gasket            | (23) Gearshaft (x3)        | (43) Pot. Lock Washer      |
| (7) Socket                   | (24),(27) Gear Ass'y A     | (44) Pot. Nut              |
| (8) 3x10 Tapping Screw (x3)  | (25) Gear Ass'y C          | (45) Pot. Gear #1          |
| (9) Inner Housing Seal Plate | (26),(28) Sandwich Gear #1 | (46) Pot. Gear Setscrew    |
| (10) Binding Screw (x2)      | (29) Divider Gear #1       | (47) Pot. Gear #2          |
| (11) Inner Housing           | (30),(31) Divider Gear #2  | (48) Mast Clamp (GC-038)   |
| (12) M3x8 Screw              | (32) Spacer Bushing        | (49) M8x70 Bolt            |
| (13) DC Motor                | (33) Upper Gearbox Plate   | (50),(53) 8mm Split Washer |
| (14) Motor Mount Plate       | (34) M6x6 Bolt (x4)        | (51) M8 Nut                |
| (15) M3x6 Screw (x3)         | (35) Rotation Limiter      | (52) 8mm Washer            |
| (16) Lower Gearbox Plate     | (36) Retainer Ring         | (54) M8x25 Bolt            |
| (17) M3x8 Screw (x4)         | (37) Limit Switch          |                            |

### OPTIONAL PARTS



GS-050 50mm  
THRUST BEARING



GS-065 65mm  
THRUST BEARING



GC-038  
MAST CLAMP



GC-048  
MAST CLAMP

### Installing the Dial Heading Sheet

A clear plastic round dial heading sheet is provided with the kit, which can be installed with north at any position you desire. This is particularly useful when you need to have south at the top of the dial (or east or west) instead of north. To install the heading scale:

- Perform the first two steps of the above procedure, *Reorienting the Azimuth Indicator*.
- Note the position of the needle, then grasp it at its center, and pull it straight off.
- Determine which compass direction you desire to be upmost, and install the compass heading label sheet against the azimuth scale, so that the small teeth in the edges of the sheet lock around the edge.
- Replace the needle, cover glass and bezel in the same direction as they were before (see diagram on previous page).

