

NITEC

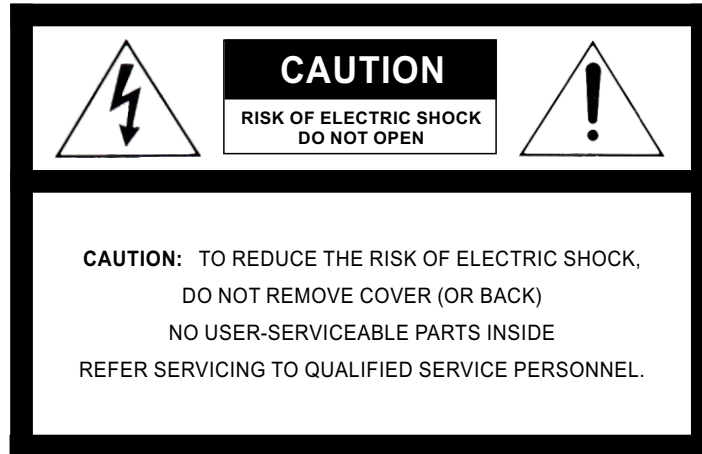
OPERATION MANUAL

satellite selector

EPS-103



SAFETY INSTRUCTIONS



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated „dangerous voltage“ within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING :

TO PREVENT FIRE OR SHOCK HAZARD? DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION:

TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

SAFETY INSTRUCTIONS

PLEASE READ ALL THESE INSTRUCTIONS AND RETAIN FOR FUTURE REFERENCES. FOLLOW ALL WARNINGS AND INSTRUCTIONS MARKED ON THE UNIT.

1. **Read Instructions**
All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions**
The safety and operating instructions should be retained for future reference.
3. **Heed Warnings**
All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions**
All operating and use instructions should be followed.
5. **Cleaning**
Unplug this product from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
6. **Attachments**
Do not use attachments not recommended by the manufacturer as they may cause hazards.
7. **Water and Moisture**
Do not use this product near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.
8. **Accessories**
Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the appliance. Use only with a cart, stand, tripod bracket. Any mounting of the appliance should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
9. **Ventilation**
Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
10. **Power Sources**
This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your appliance dealer or local power company.
11. **Grounding or Polarization**
This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.
12. **Power Cord Protection**
Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Lightning**
For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnected the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
14. **Power Lines**
An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing and outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.
15. **Overloading**
Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
16. **Object and Liquid Entry**
Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
17. **Servicing**
Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
18. **Safety Check**
Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating conditions.

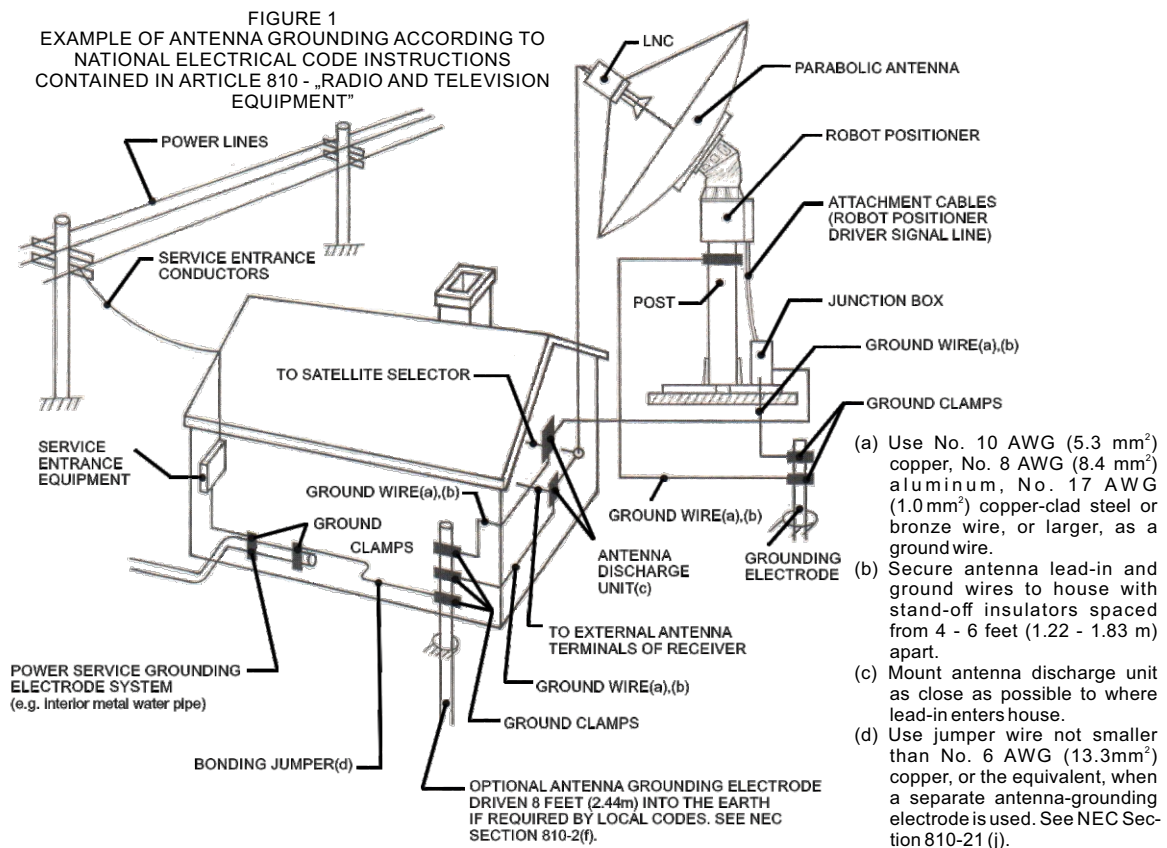
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SAFETY INSTRUCTIONS

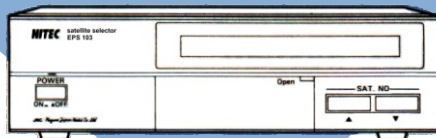
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19. **Damage requiring Service**
Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
- When the power-supply cord or plug is damaged.
 - If liquid has been spilled, or objects have fallen into the product.
 - If the product has been exposed to rain or water.
 - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
 - If the product has been dropped or the cabinet has been damaged.
 - When the product exhibits a distinct change in performance — this indicates a need for service.
20. **Replacement Parts**
When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

21. **External Load**
Connect the DC motor rated at 24 VDC, 2A (48W), or less to the product. Operate the pulse encoder at the load of 24 VDC, 0.5A (1.2W), or less.
22. **External Cables**
Connect the cables with VW-1 rated jacket to the product. Cables consisted of wires suitable for the rating of the intended load should be used. Otherwise, use the cables specified by the manufacturer.
23. **Installation**
This installation should be made by a qualified service person and should conform to all local codes.
24. **Outdoor Antenna Grounding**
If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70—1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure 1.



satellite selector EPS-103



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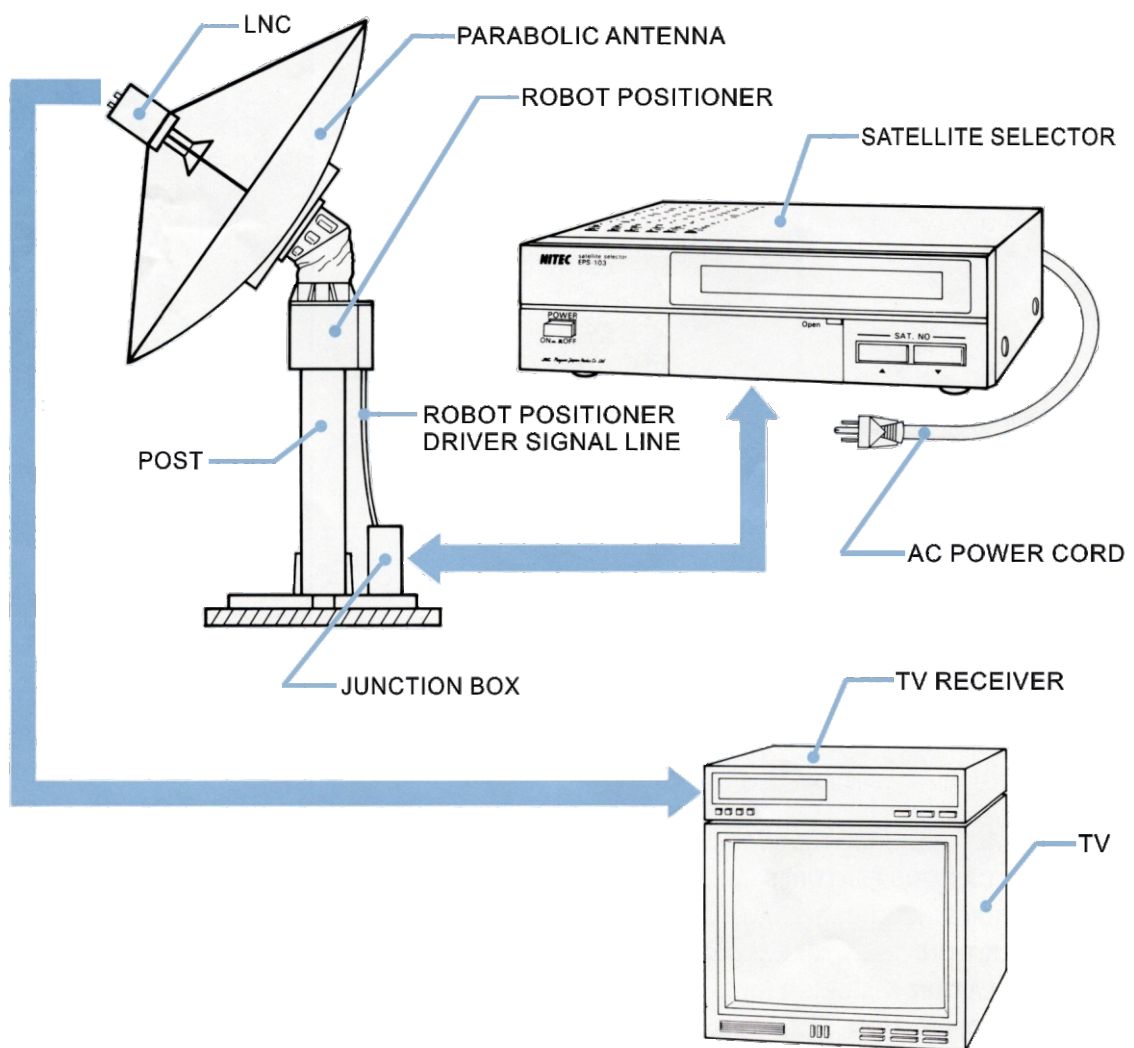
1 GENERAL

The ROBOT ANTENNA POSITIONER system consists of a satellite selector unit connected to a parabolic antenna by a Robot Positioner. The system allows the user to automatically set the elevation and azimuth angles of the parabolic antenna to a precise preprogrammed position, so that the best possible reception from only the

selected broadcasting satellite is achieved.

Using advanced electronics technology, including state of the art LSI (Large Scale Integration) ICs, the ROBOT ANTENNA POSITIONER system is an extremely compact, lightweight and highly reliable design.

● Configuration of NITEC System



2

SPECIFICATIONS-FEATURES

SPECIFICATIONS

Model Name	: EPS-103
POWER	: 120 VAC, 60Hz.
Input Current	: 1.5A
Control Method	: Semi-closed loop, using pulse encoders.
Programming	: Allows the programming of the azimuth and elevation angles for up to 32 satellites by entering the latitude and longitude of the Robot Positioner installation position.
Programmable Memory	: 32 satellites
Memory Back-up	: Effective for 30 days or more
Robot Positioner Drive Selection:	
- Control Shaft	: 2-shaft control for azimuth and elevation.
- Drive Motor Power Supply	: 24 VDC (both the azimuth and elevation motors.)
- Drive Motor Rated Power	: 18W (both the azimuth and elevation motors.)
- Drive Motor Rated Rotation Speed	: 3000 rpm (both the azimuth and elevation motors.)
Pulse Encoder interface (both the azimuth and elevation motors):	
- Input Pulse	: 2-phase (A and B) pulses.
- Input Pulse Speed	: 6 pulses/rev.
- Input Signal Level	: V _{OH} = 20V min. V _{OL} = 1.5V max.
- Input Waveform Rise Time	: 10 us max.
- Input Waveform Fall Time	: 10 us max.
- Output Circuit for ORG Detection	: Limit Switch (30 VDC 100 mA max.)
Pulse Encoder Power Supply	: 24 VDC
Internal Resolution	: Azimuth 0.01 degree/pulse Elevation 0.0025 degree/pulse
Repeatability	: ±0.2 degree (when combined with the Robot Positioner.)
Maximum Robot Positioner Movement Area:	
- Azimuth	: 180° (90° to 270° N)
- Elevation	: 40° (Upwards inclination 10° TO 50° from the horizontal.)
External Dimensions	: 12" (W) x 3" (H) x 8" (D) [300 (W) x 80 (H) x 200 (D) mm]
Weight	: 8.8 lbs or less (4.0 Kg or less)
Power Cable	: 5.9 ft (1.8m)
Accessories	
- Fuse	: 1 SET (3 fuses)
- Operation Manual	: 1
- Warranty Card	: 1

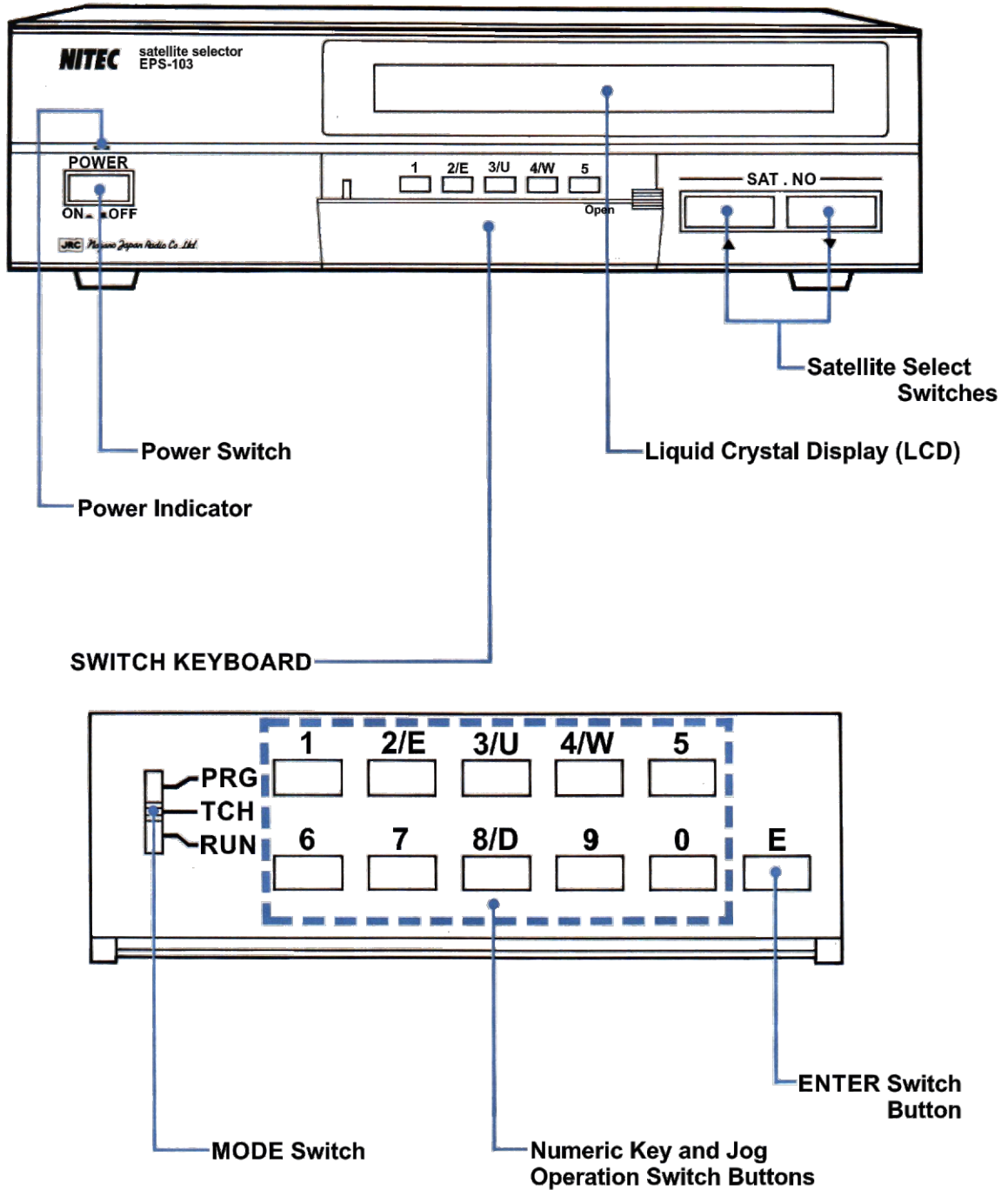
* Specifications are subject to change without notice.

FEATURES

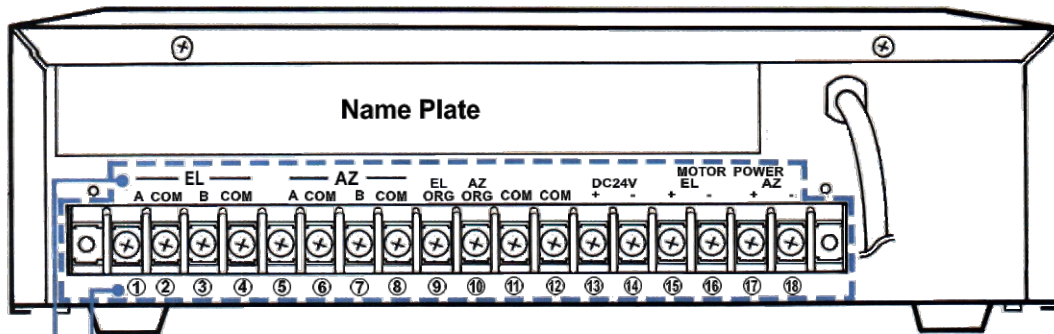
- (1) Calculates and memorizes the elevation and azimuth angles for each satellite simply by the user entering the latitude, longitude, etc., of the parabolic antenna's location.
- (2) Drives the Robot Positioner to position the parabolic antenna at the memorized elevation and azimuth angles when a satellite number is selected, to enable reception from the appropriate broadcasting satellite.
- (3) Allows movement of the parabolic antenna to the best reception position by a fine adjustment operation, if the broadcasting satellite is not located in the anticipated automatically calculated position. After fine adjustment, the system memorizes the altered elevation and azimuth angles.
- (4) This system allows the selection of reception from up to 32 satellites. 16 satellites have already been programmed in the system's memory. Remaining 16 satellites can be optionally programmed in the system's memory.
- (5) A liquid crystal display indicates the selected satellite number, satellite name, elevation angle and azimuth angle. For the satellites optionally selected by the user, this display indicates satellite number, elevation angle and azimuth angle.
- (6) The elevation and azimuth angles are saved in the memory even after the unit is powered off, and will not change or be erased until the user decides to alter them.

3 FUNCTIONS

- Front Panel



● Rear Panel



• Note

WHEN using an external cable consisting of 14 wires. COM ②, ④, ⑥, and ⑪ are not to be connected.

	A	①	..... A-phase pulse input terminal for elevation position detection.
EL	COM	②	..... A-phase pulse input return terminal for elevation position detection.
	B	③	..... B-phase pulse input terminal for elevation position detection.
	COM	④	..... B-phase pulse input return terminal for elevation position detection.
AZ	A	⑤	..... A-phase pulse input terminal for azimuth position detection.
	COM	⑥	..... A-phase pulse input return terminal for azimuth position detection.
	B	⑦	..... B-phase pulse input terminal for azimuth position detection.
	COM	⑧	..... B-phase pulse input return terminal for azimuth position detection.
	EL ORG	⑨	..... Elevation home position switch input terminal.
	AZ ORG	⑩	..... Azimuth home position switch input terminal.
	COM	⑪	..... Elevation home position switch and Azimuth home position switch input return terminal.
	COM	⑫	
DC24V	+	⑬	..... DC power output terminal for and encoder phases A and B
	-	⑭	
MOTOR POWER	EL +	⑮	..... Elevation motor drive power output terminal (24 VDC output).
	-	⑯	
	AZ +	⑰	..... Azimuth motor drive power output terminal (24 VDC output).
	-	⑱	

4 OPERATION

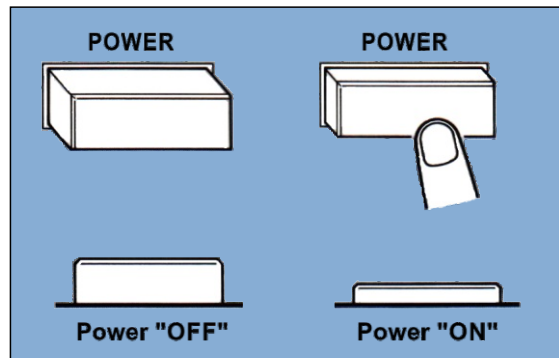
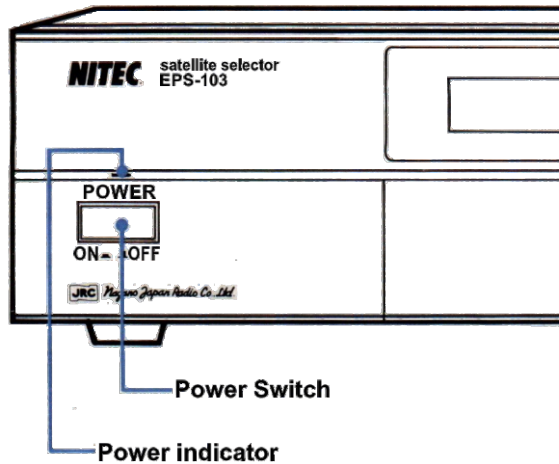
4-1 Start and Stop

● Start

- Press the POWER switch.
- The POWER indicator (green) lights.

● Stop

- Press the POWER switch.
- The POWER indicator (green) turns off.



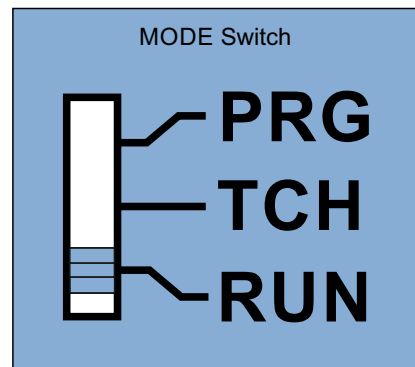
4-2 Selection of Satellite (RUN MODE)

Data on the elevation and azimuth angles of 16 satellites is already programmed into the memory. Sequence of selection is as follows:

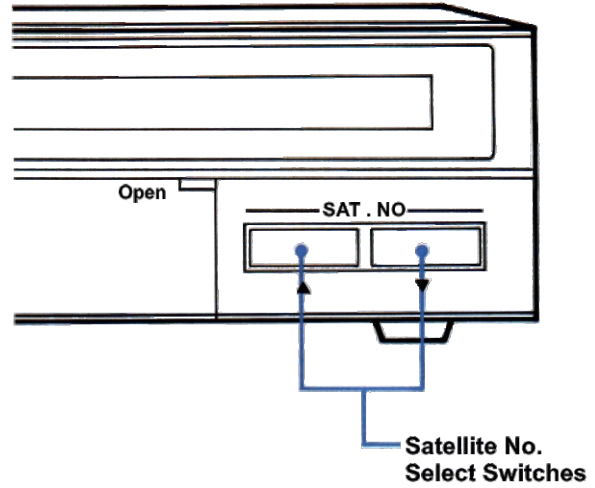
1. Set the MODE switch at „RUN” position.
Then the LCD displays „RUN”.

• Note

Memory capacity of Satellites is 32. Satellite numbers 01 ~ 16 are pre-programmed in memory, and the user can program other satellites into satellite numbers 17 ~ 32. (See Table 1)



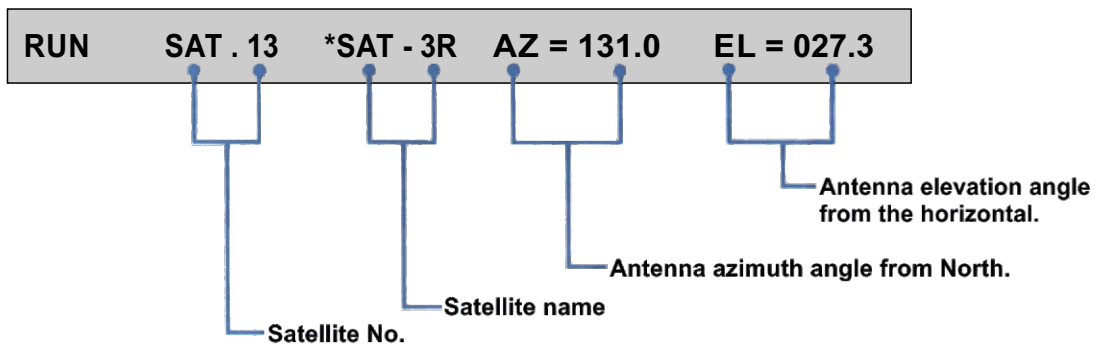
- Press either the ▲ or ▼ button of the SAT. No. select switches to display the desired satellite number on the LCD. The satellite names in the displayed messages change according to satellite No.



- ▲ : Counts through the satellite number in ascending order.
- ▼ : Counts through the satellite number in descending order.

- When the display indicates the desired satellite No., release the SAT. No. select switch. The Robot Positioner automatically operates after approximately 3 seconds. The LCD display flashes while the Robot Positioner is moving to indicate to the user that the antenna is being adjusted.

Once the antenna faces the selected satellite, the LCD display stops flashing, and indicates the azimuth and elevation angles as shown below:



• Note

For satellite numbers 01 ~ 16, the satellite numbers and names are programmed into the system's memory, so the satellite name of these satellites is indicated at the LCD display. See Table 1 for the programmed satellite numbers and names. For satellite numbers 17 ~ 32, the satellite names are not indicated on the display since these satellites are programmed by the user.

● TABLE 1

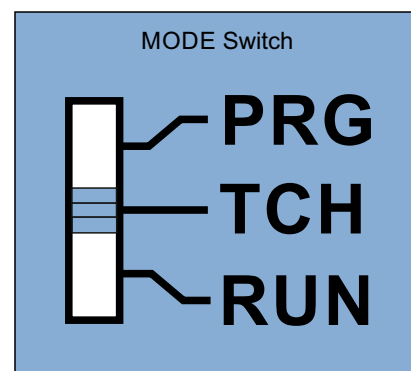
Satellite Names and Numbers Preprogrammed into the System Memory

Satellite Numbers	Satellite Name	Longitude
01	SAT-2R (SATCOM II R)	72°W
02	GAL-2 (GALAXY II)	74°W
03	COM-3 (COMSTAR III)	76°W
04	SAT-4 (SATCOM IV)	83°W
05	TEL-02 (TELSTAR 302)	86°W
06	WES-3 (WESTAR III)	91°W
07	TEL-01 (TELSTAR 301)	96°W
08	WES-4 (WESTAR IV)	99°W
09	ANK-D1 (ANIK DI)	104.5°W
10	SPN-1 (SPACENET I)	120°W
11	WES-5 (WESTAR V)	123°W
12	COM-4 (COMSTAR IV)	127°W
13	SAT-3R (SATCOM III R)	131°W
14	GAL-1 (GALAXY I)	134°W
15	SAT-1R (SATCOM IR)	139°W
16	SAT-5 (SATCOM V)	143°W
17 ~ 32	Area in which satellites other than 01 ~ 16 can be programmed by the user. (Program by entering satellite longitude at PRG04.)	

4-3 Fine Adjustment (TCH MODE):

The satellite selector has a fine adjustment function which allows movement of parabolic antenna to the best reception position if the picture on TV screen is degraded. The sequence of fine adjustment is as follows:

1. Set the MODE switch at "TCH" position.
2. The LCD display indicates the following message when, for example, the satellite number 13 was selected in the RUN mode.

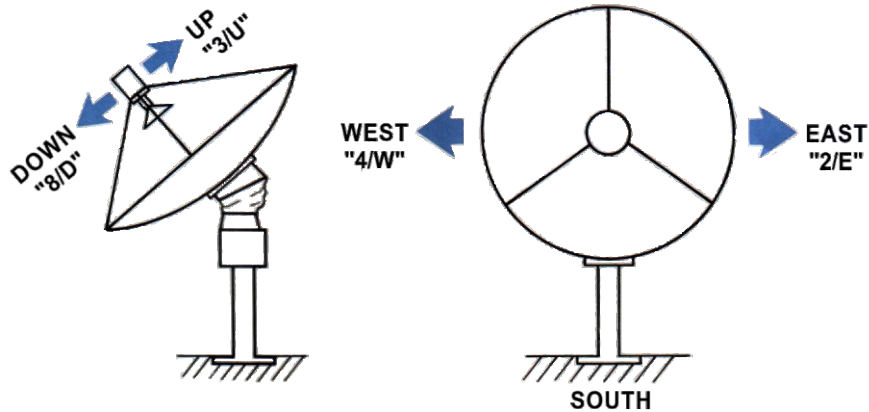
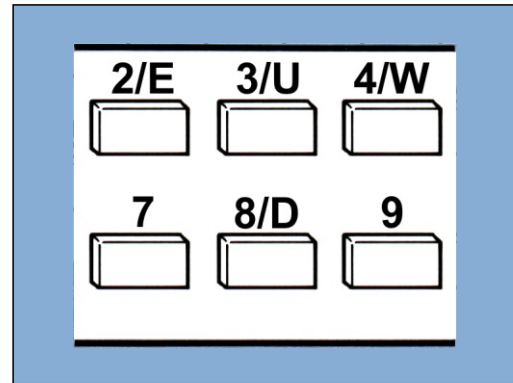


TCH SAT . 13 *SAT - 3R AZ = 131.0 EL = 027.3

3. Push the JOG Operation switch button „2/E”, „3/U”, „4/W” or „8/D” on the switch keyboard while observing the TV screen until the highest quality of the picture is

obtained. The elevation and azimuth angles displayed on LCD are altered accordingly.

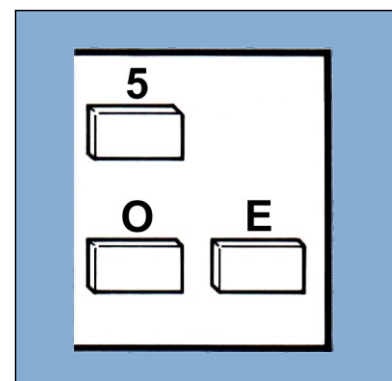
- 3/U : Increases the elevation angle.
- 8/D : Decreases the elevation angle.
- 2/E : Decreases the azimuth angle.
- 4/W : Increases the azimuth angle.



4. The LCD display indicates the altered elevation and azimuth angles.



5. Push the ENTER switch button "E". Then the altered elevation and azimuth angles are stored in the memory. Whenever the satellite is selected again in the future, the Robot Positioner will automatically move to the point corresponding to the altered elevation and azimuth angles. If the signals or pictures are not of the quality you expect, you may go back and re-position the antenna again.



4-4 Programming (PRG MODE):

Programming function allows the user to enter values into the system memory to properly

direct the antenna to a satellite in such case that data in memory has been lost for any reason.

● There are four PRG modes:

PRG 01 : Enters the latitude and longitude of the antenna's location.

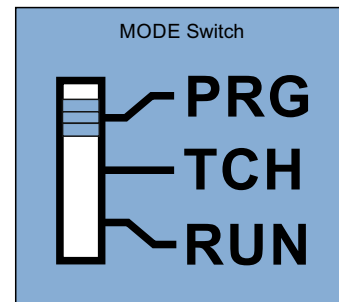
PRG 02 : Enters the azimuth and elevation angles of the Robot Positioner Home position.

PRG 03 : Displays the azimuth and elevation angles of the satellite, as calculated from the latitude and longitude entered in PRG 01 mode.

PRG 04 : Enters the satellite longitude. Programmed by user for programming satellites other than satellite numbers 01 ~ 16 which have already been programmed in system's memory at the satellite numbers 17 ~ 32.

1. Enter the data of antenna's location

a) Set the MODE switch at „PRG” position.

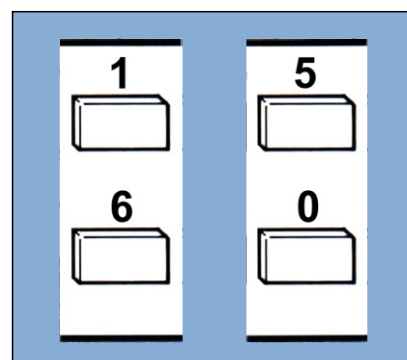
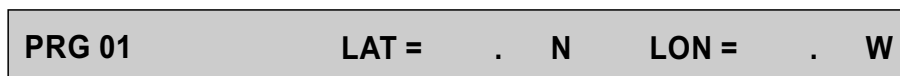


b) The LCD display indicates the following message:



Wait for the entry of a PRG number (01, 02, 03 or 04).

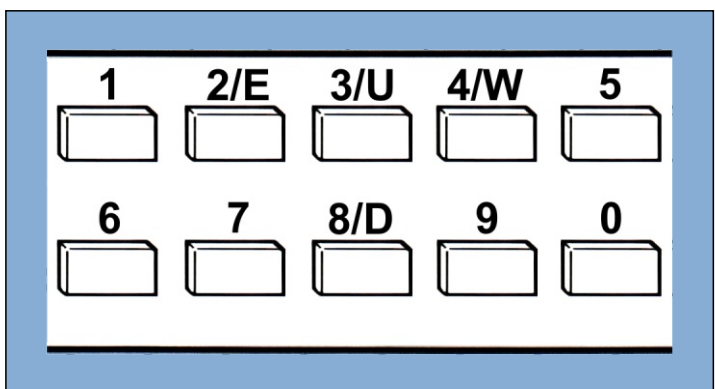
c) Enter the numerals 0 and 1 sequentially with the numeric key switches to select the PRG 01 mode.



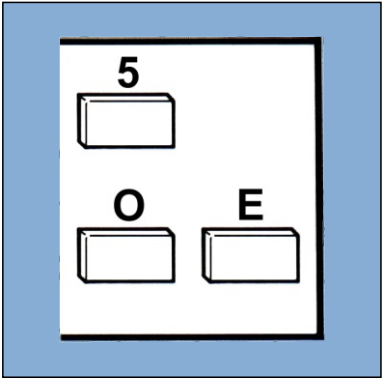
d) Then enter the latitude and longitude in sequence with the numeric key switches (5-digit input).

One example of obtaining the LAT/LON information is by containing your local FSC (Flight Service Center).

PRG 01 LAT = 034.12N LON = 118.57W



e) Push the E switch. Then the azimuth and elevation angles of each satellite are automatically calculated and stored in memory. The LCD strip will blink for 20 seconds. When it stops blinking, you can go on to next step.



• **Note**

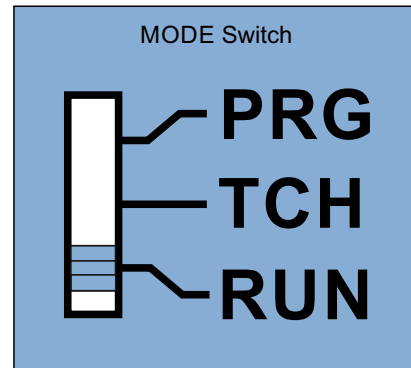
The azimuth and elevation angles calculated are displayed on LCD by selecting PRG 03 mode and entering a satellite number.

2. Derive the actual home position of the Robot Positioner

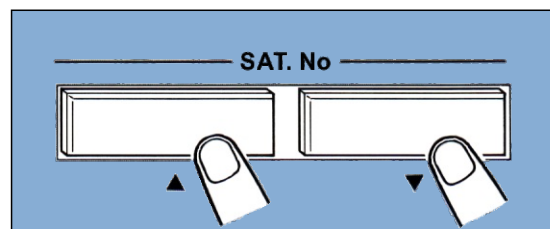
In the satellite selector, the initial preprogrammed home position is: Azimuth = 90° and Elevation = 10° . Actually, it may not be sure that the antenna is installed precisely at such angles.

Therefore it is required home position and compensate them.

- a) Set the MODE switch at „RUN” position.



- b) Push the satellite select switch „▲” or „▼” to select any one of the satellites.

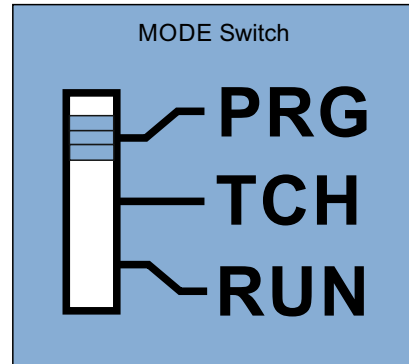


- c) Then the Robot Positioner moves to direct the antenna towards the satellite selected. At this time, azimuth and elevation angles displayed on LCD must be recorded for later use.
- d) Check the TV screen whether the picture is clear. If so, installation of the antenna is proper and there is no offset angles.
- e) If the picture is not clear, set the MODE switch at „TCH” position, and perform the fine adjustment of the TV screen by pushing the JOG operation button „2/E”, „3/U”, „4/W” or „8/D”.
- f) The LCD display indicates the optimum values of azimuth and elevation angles at the completion of fine adjustment.
- g) Subtract the optimum values from the recorded values as stated in c) above to obtain the offset angles of azimuth and elevation.
- h) Derive the actual home position by adding the offset values to the initial preprogrammed values of the azimuth and elevation angles (90° and 10° , respectively).

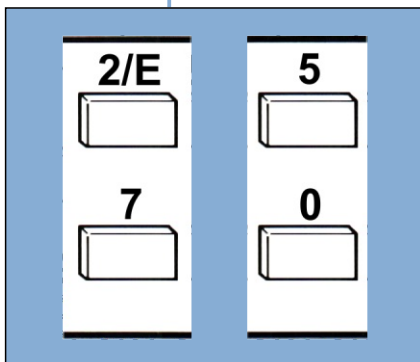
3. Enter the data of actual home position

In order to compensate the offset angles, the following operation should be performed.

- a) Set the MODE switch at „PRG” position.
- b) Enter „0” and „2” in sequence with the numeric key switches. Then the LCD indicates the following message and waits for entry of new azimuth and elevation angles of the actual home position.



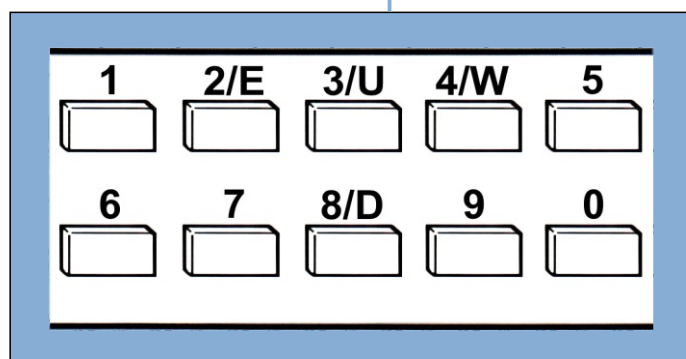
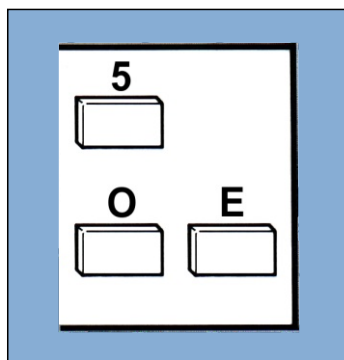
PRG 02 ORG-POINT AZ = 090.0 EL = 010.0



- c) Enter the new azimuth and elevation angles of the actual home position.

PRG 02 ORG-POINT AZ = 091.5 EL = 010.0

- d) Press the E switch.

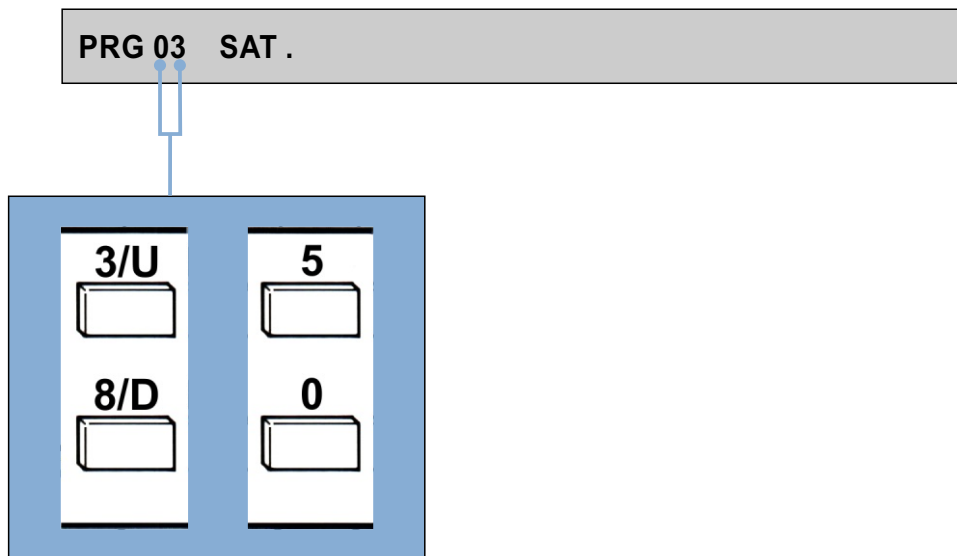


4. Indication of azimuth and elevation angles

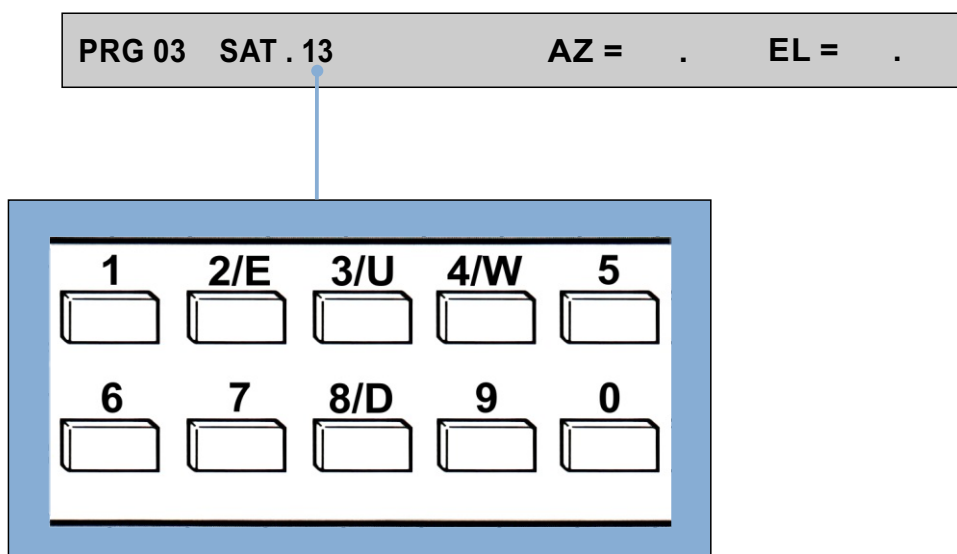
Selection of PRG 03 mode permits display of the azimuth and elevation angles of each

satellite, as calculated from the latitude and longitude entered with PRG 01 mode.

- a) Enter „0" and „3" in sequence with the numeric key switches. The LCD display indicates the following message and waits for entry of a satellite number.



- b) Enter the satellite number with the numeric switches.



- c) The LCD display indicates the azimuth and elevation angles as follows:

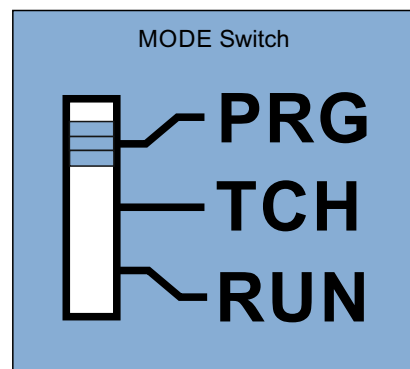
PRG 03 SAT . 13 *SAT - 3R AZ = 131.0 EL = 027.3

5. Program of new satellites by the user

To receive the satellites other than already programmed satellites (satellite number 01 ~ 16),

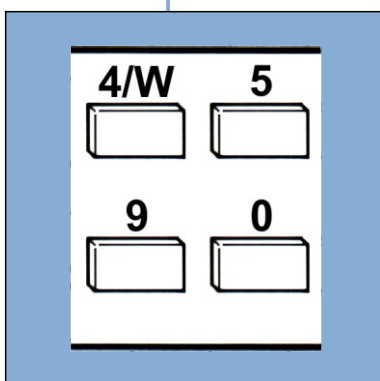
select PRG04 then program the desired satellite at satellite number 17 ~ 31.

- a) Set the MODE switch at „PRG” position.



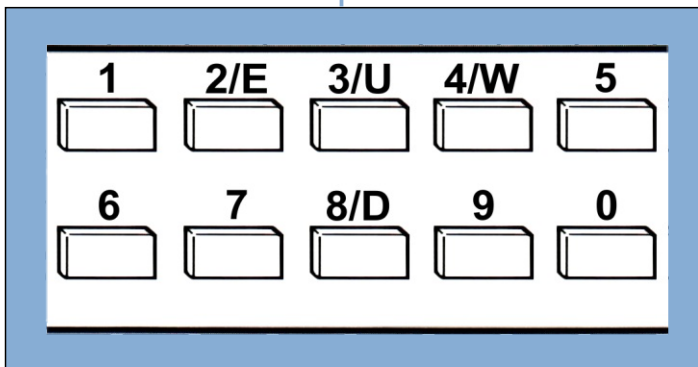
- b) Enter „0” and „4” in sequence with the numeric key switches. The LCD display indicates the following message and waits for entry of satellite number.

PRG 04 SAT .



c) Enter the satellite number with the numeric switches.

PRG 04 SAT.17 LON = W

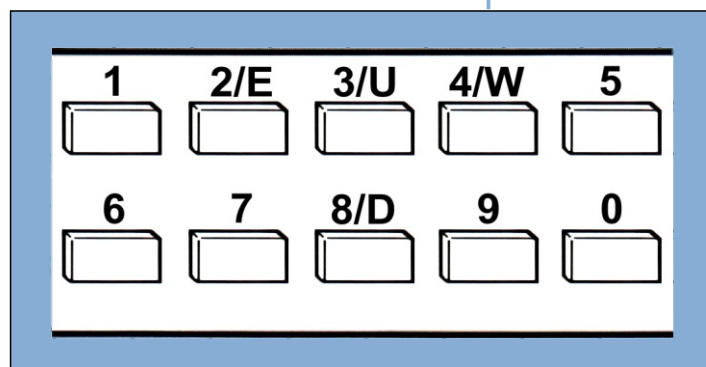


• Note

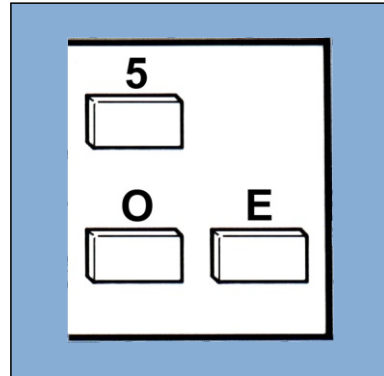
To program the new satellite, program the satellite in sequence from satellite number 17.

d) Enter the satellite longitude with the numeric switches.

PRG 04 SAT.17 LON = 122.00W



- e) Push the E switch. Then the elevation and azimuth of the satellite at the longitude 122.00° is automatically calculated and then programmed.



• **Note**

- 1) When the calculated elevation and angle of the satellite by entering the satellite longitude is out of elevation range that positioner moves at your position, LCD display indicates the following message and informs you that the satellite you programmed cannot be seen.

PRG/04 SAT.17 LON = 122.00W

- 2) As the name of the satellite you programmed is not indicated in LCD display, we recommended that you record the relationships of satellite and satellite number. This is useful for the selection in the future.

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