

1.3 Equipment Composition for MD-3000

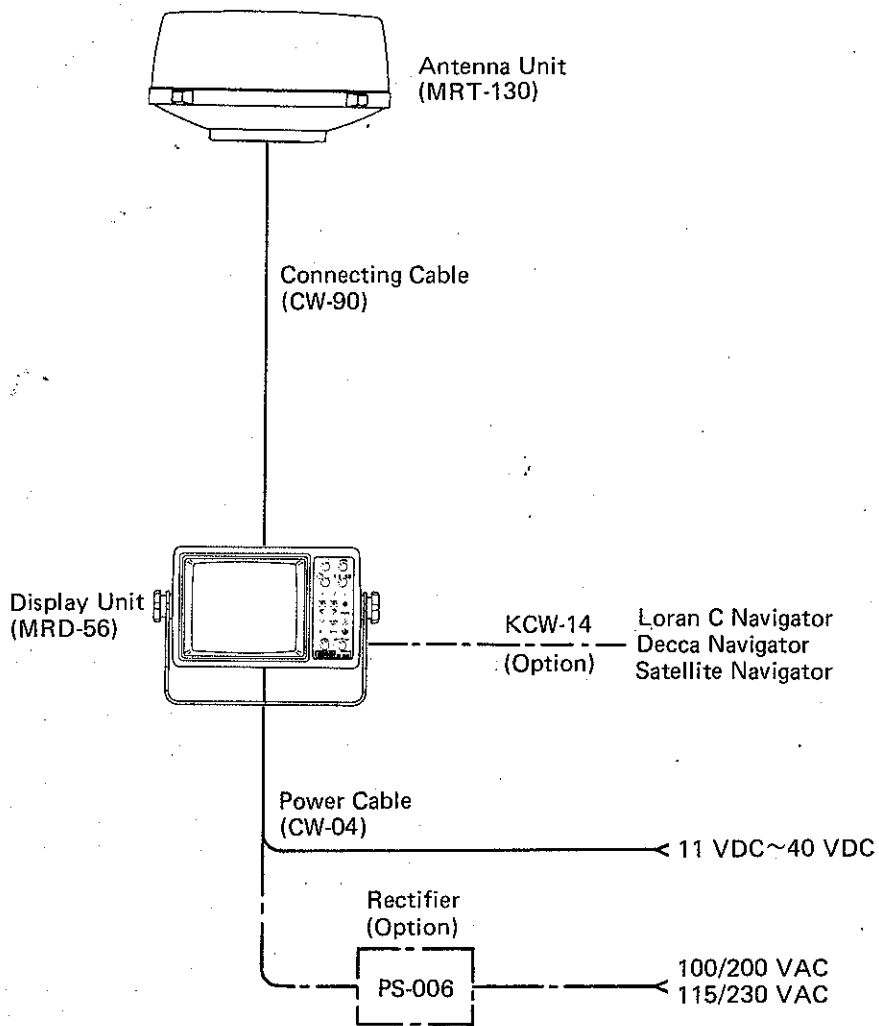


Table 1.1 Diagram of Equipment Composition

Model No.	Antenna Unit	Display Unit
MD-3000	MRT-130	MRD-56

3. FUNCTION OF THE RADAR CONTROLS

All radar controls are carried out at the display unit. The position of the knobs and key-pad switches are shown in the figure.

The control panel incorporates the rotating type elements and key-pad switches. The rotating controls including variable resistors and rotary switch are used where the primary radar functions are controlled. Key-pad switches are annotated with internationally recognized symbols and are illuminated for night-time operation. Each key has extruded rib to identify its position with finger.

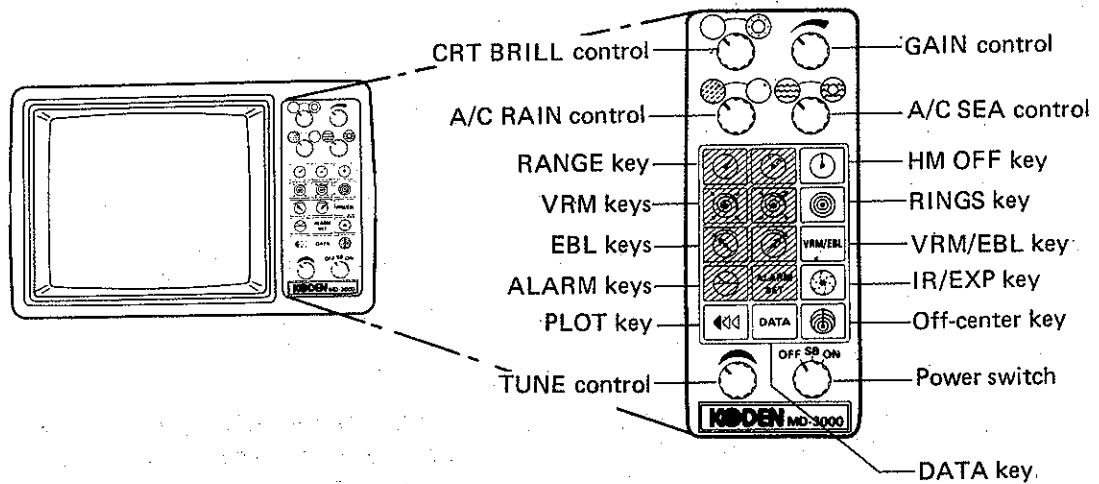




Fig. 3.1 Location of Switches and Controls

(1) Power switch (OFF-SB-ON)

OFF: Mains power supply is completely turned off.

SB : The equipment is in preheating mode, showing "WAIT" sign on the screen until preheating period of 180 seconds is complete. When preheating is completed, "STANDBY" sign will be shown.

ON: Radar starts transmission with aerial rotated.

(2) RANGE keys ( )

A pair of key-pad switches selects the desired operating range. Range scale increases or decreases depending on whether the right key or left key is pressed.

Table 3.1 Range Scales and Range Rings

Range (NM)	Range Ring Interval (NM)	Number of Rings	Pulse Length (Microseconds)
1/4	1/16	4	0.08
1/2	1/8	4	0.08
1	1/4	4	0.08
2	1/2	4	0.08
4	1	4	0.5
8	2	4	0.5
16	4	4	0.5
32	8	4	0.5
48	12	4	0.5

NOTE 1: Maximum range scale is assigned as follows according to the radar model.

MD-3000: 32NM

MD-3030: 48NM


NOTE 2: The range scale and range ring interval are indicated on the upper left corner of the screen. The range scale is set to lowest 1/4NM range when the radar is initially turned on.

(3) TUNE control ()


Tunes the receiver circuit in the antenna unit to obtain the largest target echoes.

(4) GAIN control ()

Controls the receiver gain. Full clockwise rotation provides the maximum receiver gain. Unlike the A/C Sea (STC) Control, this control provides uniform gain increase or decrease over the entire range.

(5) A/C (anti-clutter) SEA control - STC ()

Also known as the STC control, this control is used to reduce the sea clutter which could otherwise obscure the close range targets. Turning this control clockwise provides gradual reduction in gain around the center of the screen. This effect becomes maximum when the control is turned fully clockwise. The maximum effective range is approximately 6 NM.

(6) A/C (anti-clutter) RAIN control - FTC ()

Also known as the FTC control, this control is used to improve the target visibility in rain and snow. The control has a built-in switch which cuts off the FTC circuit when it is fully turned counter-clockwise. Turning the control clockwise activates the FTC circuit and gradually increases its effectiveness. This control can be used in normal weather condition to improve the picture definition particularly in short range. However, due care must be taken not to apply this effect excessively, otherwise small targets may be lost.

pressed after the alarm zone setting is established.
 Set up the alarm zone where assigned by the EBL and VRM. This key must be



* ALARM SET key ()

Selects the alarm zone pattern out of three kinds. The alarm zone can be selected at a press of this key in the following order; 90° (△), 180° (▽), 360° (○), and OFF.

* ALARM MODE key ()

(13) ALARM keys

Control the position of VRM circle. VRM moves inwards or outwards depending on whether the right key or left key is pressed. These keys are also used for setting the inner arc position of the alarm zone. The VRM is indicated by a dotted circular line.

(12) VRM keys ()

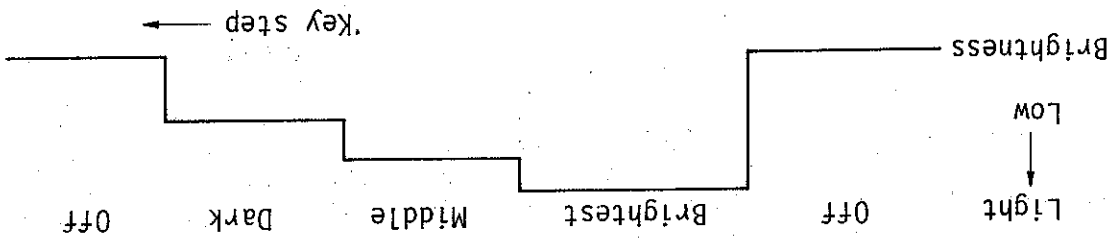
Control the movement of EBL. EBL rotates clockwise or counter-clockwise depending on whether the right key or left key is pressed. These keys are also used for setting the alarm zone in azimuth. The EBL is initially set to 000.0° when radar is turned on. The EBL data varies every 0.5° degrees.

(11) EBL keys ()

This key controls the VRM and EBL whether these markers are activated or not in four different modes. As this key is pressed, just VRM is selected then followed by just EBL, VRM + EBL, then finally all off.

(10) VRM/EBL key ()

Fig. 3.2 Sequence of brightness control



This key controls the brilliance of the range rings on the screen. The brilliance can be controlled in four steps including totally off with every press of the key.

(9) RINGS key ()

HM (Head Marker) is turned off to confirm small targets on the head marker while this key is pressed.

(8) HM OFF key ()

Controls the display brilliance. The brilliance increases or decreases depending on whether the control is rotated clockwise or counter-clockwise.

(7) CRT BRILL control ()

(14) PLOT key (◀◀)

Activates the plotting function. When this key is pressed, target echoes leave trail painted with subdue green. A plotting interval can be selected with each press of the key. The choice of plotting interval is 5, 15, 30 seconds, 1, and 3 minutes.

(15) Off-centering key (⊕)

Shifts the center of the radar picture downward in order to extend the forward range by 1.5 times the selected range. This function is not activated on maximum range.

(16) IR/EXP key (⊕)

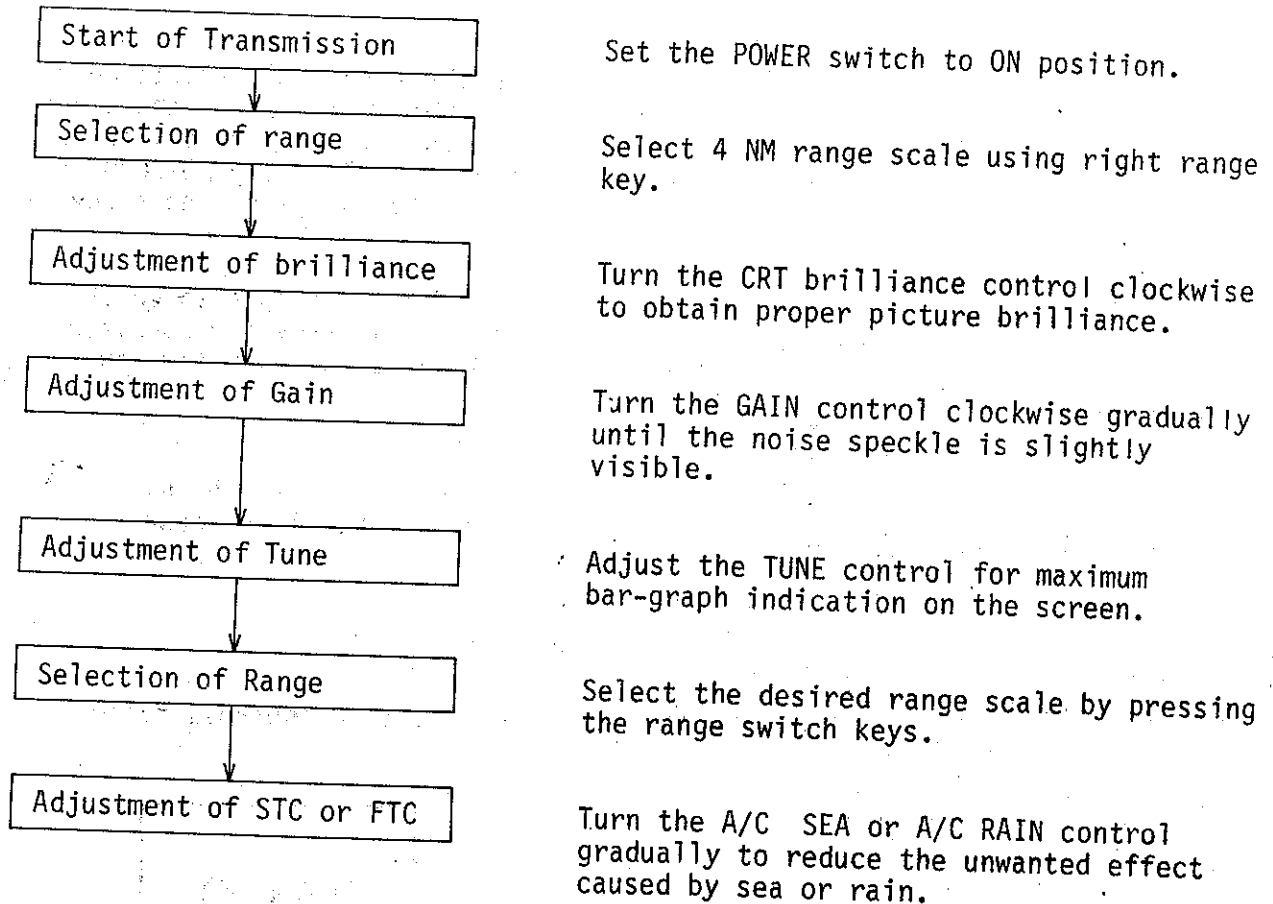
Selects either or both of IR (interference rejection) and EXP (target enhancement) functions. Each press of this key provides following functions as; IR alone, EXP alone, IR + EXP, and OFF. The operation mode is displayed in the lower left corner of the screen as, IR, EXP, IR/EXP, and no indication for OFF.

(17) DATA key (DATA)

Displays navigational data as ship's position in Lat/Long coordinate, LOP coordinate, ship's speed, or speed plus heading data on the lower left-hand corner of the screen. Each press of this key selects the respective data. To utilize this function, a connection of navigator equipment with NMEA-0182, 0183, or KODEN-717 output data format is necessary.

4.1.2 Operating procedure

Carry out the following operating procedure to perform the proper radar operation.



4.1.3 Switching the radar power OFF

a. Temporary OFF

Set the POWER switch to "SB" position. The operation can be readily performed without waiting three minutes.

a. Complete OFF

Set the POWER switch to OFF position.

4. OPERATING PROCEDURE

4.1 Start and Stop of Radar Operation

4.1.1 Switching the radar ON

- a) Turn the power switch to SB position, and preheating timer starts counting down from 180 seconds. The time remained to the completion of the preheating is displayed on the screen with "WAIT" sign. During this period, the screen remains in counting down mode, and the aerial is stationery(MD-3030 only) even if the function switch is set to ON mode. (Displays on the screen are shown in Figs. 4.1 & 4.2)
- b) When the preheating is complete, a "STANDBY" sign is displayed on the screen, informing the operator that a radar set is ready for operation. Following functional parameters are set as shown below each time the power switch is turned on.

RANGE	1/4 NM
VRM	ON(figures "00.00 is shown)
EBL	ON(figures "000.0° is shown)
ALARM	OFF
OFF-CENTER	OFF
IR	OFF
EXP	OFF

Note: Prior to radar operation, turn all the rotating controls fully counter-clockwise.

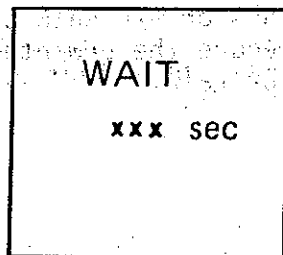


Fig. 4.1 Display during preheating period

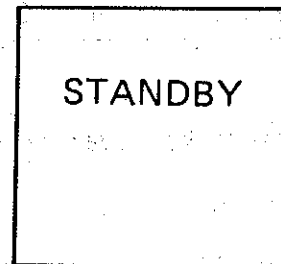


Fig. 4.2 Display when preheating is complete

7.8 Interconnection Diagram

7.8.1 MD-3000

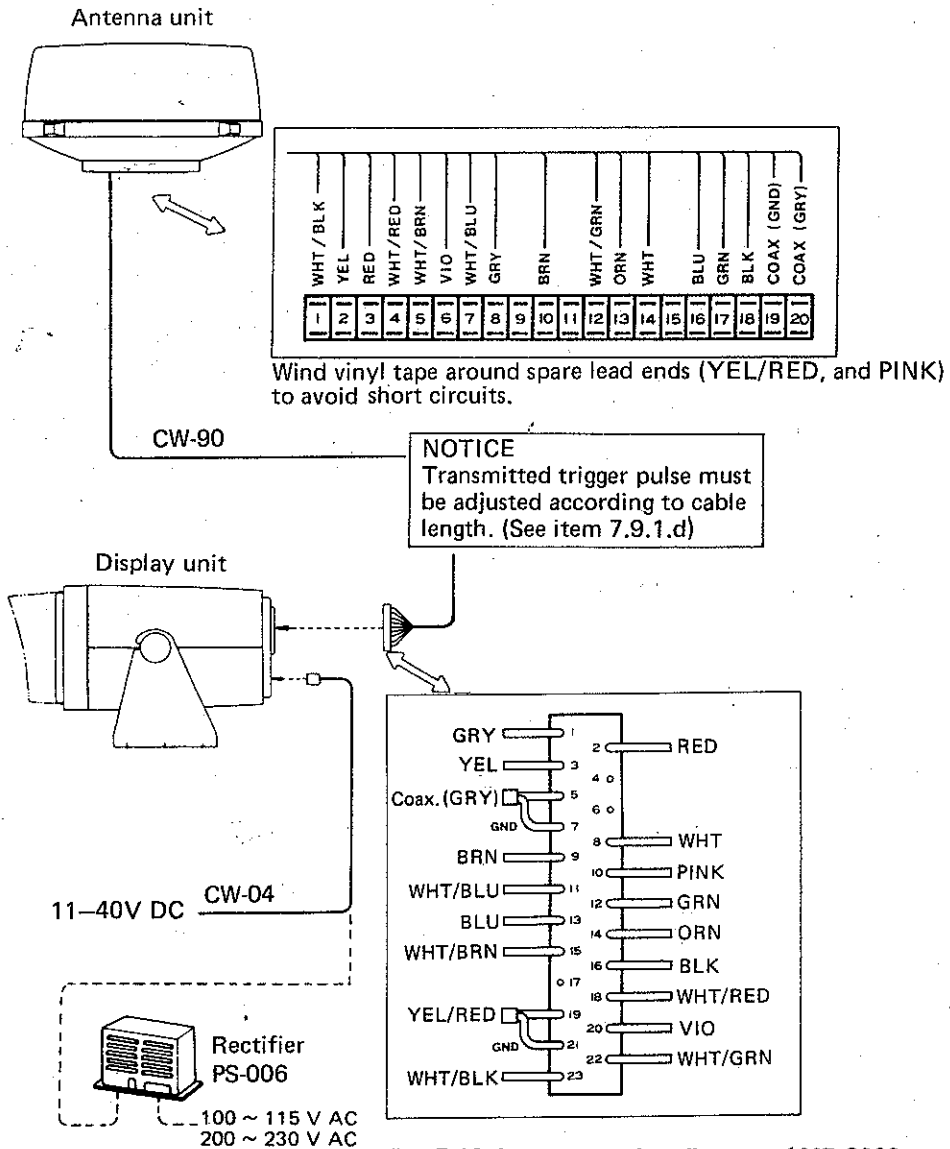
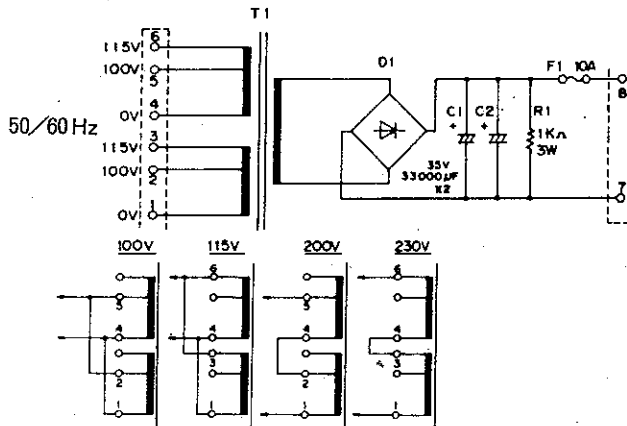


Fig. 7.12 Interconnection diagram of MD-3000

a. Circuit diagram of the rectifier



Note: For 200-230V AC input connect T1 primary windings in series.