



OPERATION MANUAL

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ATA (Automatic Tracking Aid)

MRE-280

AMENDMENT HISTORY

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Amendment policy

When any change is applied in the document, only the document number of the relevant sheet(s) and cover sheet are modified and the rest of the sheets are not changed. The document number is shown in the footer area, right or left bottom of each sheet.

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1. General

The Automatic Tracking Aid (ATA, herein after) MRE-280 is a built-in type optional adaptor unit developed for KODEN marine radar sets. The ATA predicts the motion of the selected targets by processing the radar video signal supplied from the radar set. Up to ten targets can be acquired manually or automatically and tracked automatically. The ATA unit outputs various navigational information of the selected target to the radar display including CPA (Closest Point of Approach), TCPA (Time to CPA), target's speed and course, etc. This data is processed and displayed on the screen in vector and numeric forms. The ATA also provides audio and visual warnings to alert the operator that the target is about to infringe the preset CPA and TCPA limits.

1.1 Precautions

Please take the following precautions in order to avoid possible adverse situation caused by misinterpretation of the information supplied from the MRE-280 unit.

- (1) The ATA is a simplified collision avoidance aid, providing navigational information for assisting safe navigation. The ship's officer must make the final maneuvering decision.
- (2) For using ATA functions your own ship's heading and speed data must be entered from navigational sensor devices. As a bearing sensor you need to connect a gyrocompass or a satellite compass. As a speed sensor, you need to connect a speed log (pressure log, Doppler speed log, etc) or a Navigator unit.
- (3) The tracking capability of the ATA depends on the performance of the sensors used. Tracking may become erroneous when the compass or speed log data is inaccurate.

2. Specifications

(1) Acquisition	Full auto or half-auto/half-manual acquisition
(2) Tracking	Automatic
(3) Number of tracked targets	10 targets maximum
(4) ATA data output	Target number, distance, bearing, speed, course, CPA and TCPA
(5) Alarm	Collision alarm, activated when a target enters the preset CPA and TCPA limits
(6) Display	Symbols: Predicted point and target number Vector: Predicted motion of a target calculated from the ship's speed and bearing information supplied from each sensor.
(7) Tracking range	0.5 to 40 NM
(8) PRF	2,000 Hz maximum
(9) Bearing signal rate	1,080 or 2,048 pulses / rev (Switched automatically) See NOTE

NOTE: The MRE-280 does not accept bearing signals other than those specified above. In case the ATA board is used in the monitor display, make sure that the data rate of an incoming bearing signal supplied from the antenna agrees with that specified in this specification.

3. Installing MRE-280

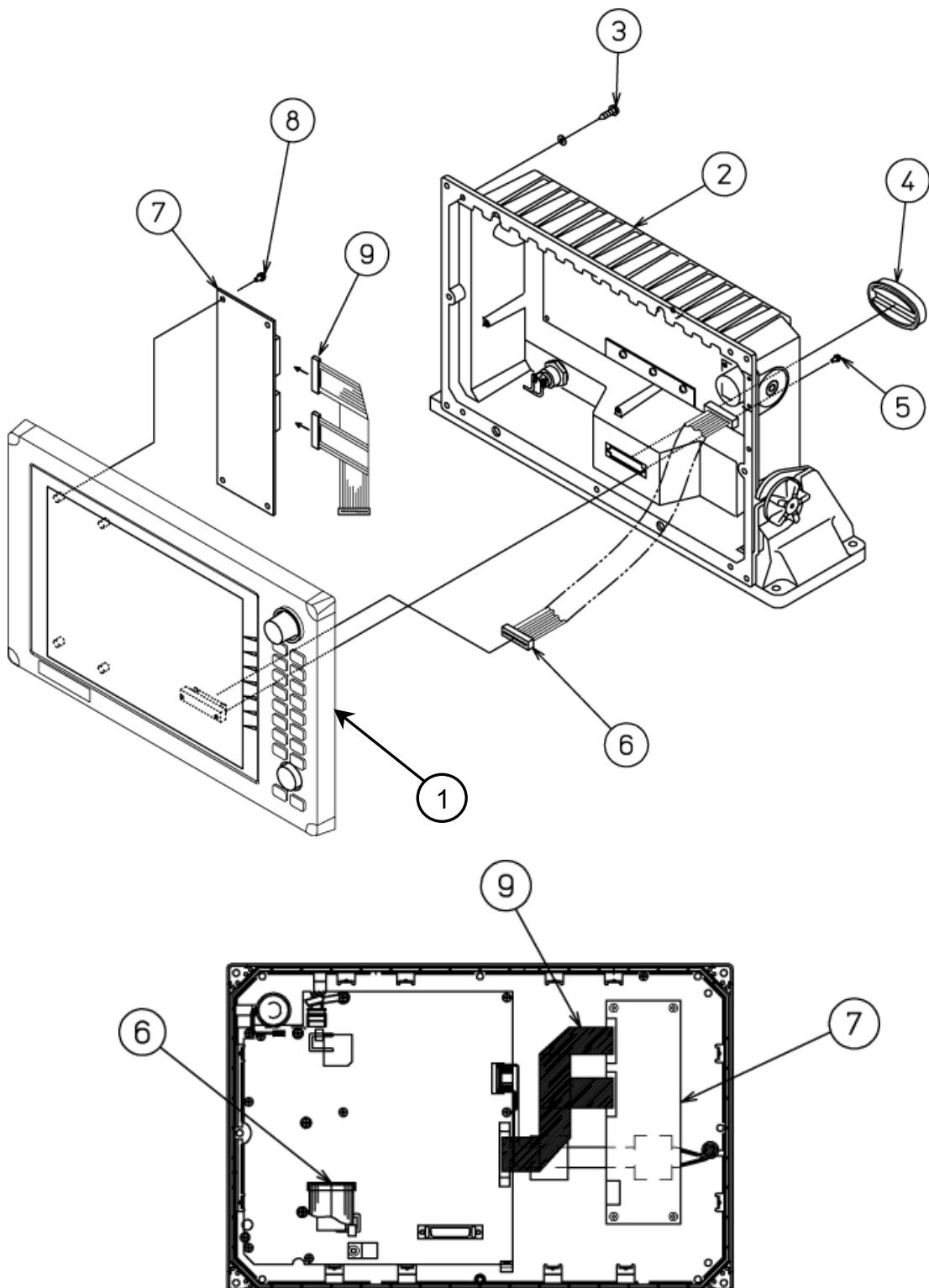
3.1 Applicable radar models

The MRE-280 can be installed in the MDL-1140 and MDC-1040 series radar sets.

3.2 Installing the ATA PCB

Turn off the radar set completely and switch off the main power at the distribution panel before carrying out the following procedures.

- (1) Remove all cables connected at the display rear panel and remove the two knurled fixing nuts that fasten the display unit to the base mount. Remove the display unit from the mount.
- (2) Put the display unit with the front face down in a safe flat area. Use a cushion to protect extruded control knobs.
- (3) To remove the front panel and chassis, remove the tapping screws No.3 (8 screws), fastening the front panel No.1 to the rear panel chassis No.2, and then remove the 2.5 mm screws No. 5 (2 screws), which fixes the optional connector to the rear panel, to allow the front panel and chassis to be removed. During this process, be sure to disconnect the internal wire harness No.6.
- (4) Put the removed front panel in a safe area. Use an appropriate cushion to protect extruded controls on the panel.
- (5) Connect the wire harness No.9 to the ATA board No.7. Use the color identification of the harness connectors and the sockets on the board. Fasten the ATA board using the 3 mm screw No.8 (4 pieces) to the backside of the front panel, as shown in Figure 1.
- (6) Connect the harness No.9 to the Logic board.
- (7) Now, put the front panel back in the original position. Move the front panel No.1 closer to the rear panel chassis No.2 and connect the internal harness No.6.
- (8) Push the front panel No.1 into the rear panel chassis No.2. Be careful not to allow the LCD backlight harness to get pinched between the two sections.
- (9) Secure the tapping screws No.3 (8 screws) to fasten the front panel to the chassis. Also fasten the optional connector to the rear panel chassis using the 2.5 mm screws No.5 (2 screws).
- (10) Connect the power cable to the display unit and turn the unit on.
- (11) Open the SET UP menu and select CUSTOM. Confirm that ATA PRESET is added.
- (12) Turn off the power and reset the display unit onto the base mount. Do all remaining connections at the rear panel.



(PCB connections on the backside of the display front panel)

Figure 1 **Installing MRE-280 into the display**

Table 1 Composition of MRE-280

No	Item name	Type	Q'ty
1	ATA board	E35-7010	1
2	Screw assembly	PWSM3X6B	4
3	Cable harness	E35ELA3000	1

Table 2 Parts list of MRE-280 assembly

No	Item name	Parts code	Type	Q'ty
1	Front panel			1
2	Rear panel chassis			1
3	Tapping screw	Not specified	BDT4X16U	8
4	Connector cap	70217061	23E67312-02	1
5	Screw assembly	75141515	PSM2.5X5B	2
6	Wire harness W2	65103369	24J157809	1
7	ATA board	60771450	E35-7010	1
8	Screw assembly	75091226	PWSM3X6B	4
9	Wire harness	65102992	E35ELA3000	1

4. Operation

4.1 Setting the ATA parameters

Before using the ATA function, the following ATA parameters must be set.

CPA: Closest point of approach. Enter the minimum distance of other ship's approach. Unit in NM.

Default: 3.0 NM.

TCPA: Time to CPA. Enter the minimum time required to reach the CPA. Unit in minutes. Default: 3 MIN.

VECT SET: Vector Time. Enter the length of a vector in minutes. The leading end of the vector is the predicted point of approach. Units in minutes. Default: 6 MIN.

VECT MODE: Vector Mode. This selects vector's motion mode, True or Relative. Defaulted to TRUE.

ATA: Sets ATA ON or OFF. Default: ON.

Use the following procedure to set up the ATA PRESET functions.

- (1) Activate the ATA function by the following menu operations; SET UP => CUSTOM => ATA PRESET => ATA ON.

CPA SET	3.0 NM
TCPA SET	3 MIN
VECT SET	6 MIN
VECT MODE	REL TRUE
ATA	ON OFF

Figure 3 ATA PRESET sub menu

- (2) Use the Up or Down cursor key to select the item. Use the right or left arrow key to move the cursor to the right or the left.

CAUTION: Unless the ATA board is installed properly, the ATA PRESET items are not displayed on the above SET UP/CUSTOM menu.

4.2 Changing the acquisition mode

To change the acquisition mode from full-auto to half-auto/half-manual or to full manual mode, use the following procedure:

- (1) In the radar display unit find the status switch S1 and change the settings referring to Table 5.
- (2) Set S1 according to your desired acquisition mode.

Table 5 Acquisition mode setting change

Acquisition mode	Number of Auto/Man acquired targets	Status switch S1 setting
Full auto	Auto: 10, Man: 0	S1-3: don't care, S1-4: ON
Half auto/half manual	Auto: 5, Man: 5	S1-3: ON, S1-4: OFF
Full manual	Auto: 0, Man: 10	S1-3: OFF, S1-4: OFF

4.3 Operating procedures

4.3.1 Acquisition of a target

There are two acquisition modes available in the MRE-280, i.e. manual acquisition and auto acquisition. Use the following procedures to operate.

4.3.1.1 Manual acquisition

- (1) Place the cursor on the target to be tracked and acquire it using the ACQ (acquisition) function.
- (2) Press the softkey if the ACQ function has been set. When operating from the MENU, place the cursor on NAVI/ACQ and press the ENT key.
- (3) Select a target clearly displayed with no other targets existing nearby. This is essential to avoid the ATA tracking the wrong target.
- (4) All targets acquired by the ATA are identified by the numbers from 0 to 9. These numbers will be shown in the upper right window on the screen. A row with a “-“ indicates that no target has been acquired.
- (5) Before selecting a target, use the TGT NUM (target number) function so that “-“ is highlighted. The TGT NUM function is used to change the target number. (The target number does not change automatically)
- (6) Press the softkey if the TGT NUM function has been set. When operating from the MENU, place the cursor on NAV/TGT NUM and press the ENT key.
- (7) When ATA starts acquisition, the acquisition symbol appears at the cursor position and the target number is displayed on the lower right of the symbol.

4.3.1.2 Auto acquisition

- (1) Set the Auto-ACQ zone using the radar's guard zone, which is effective from 0.5 NM. For activating the guard zone alarm function, see the radar's operation manual. As soon as the zone is set, “AT ACQ” is indicated on the screen.

CAUTION: All targets being tracked in Man-ACQ mode will be cancelled when the Auto-ACQ ATA is set.

- (2) An acquired target is bracketed with the acquisition symbol (See Figure 4) and a target number (0 to 9) affixed automatically nearby. These figures will also be shown in the upper right window on the

screen. A vacant row with a “-“ indicates no target has been acquired.

4.3.2 Tracking a target

As soon as a stable tracking is established, the target is circled with the tracking symbol and a vector is created from the target. The target tracking continues even if the range scale is changed. However, take care for small targets because, when the range scale is changed from a long or a medium range to a short range, the target (therefore the target intensity) becomes small in size. This may cause the ATA to lose track of the target due to an echoing area being reduced by the short transmission pulse. In such a case, the lost symbol mark will be displayed at the spot where the target disappeared.

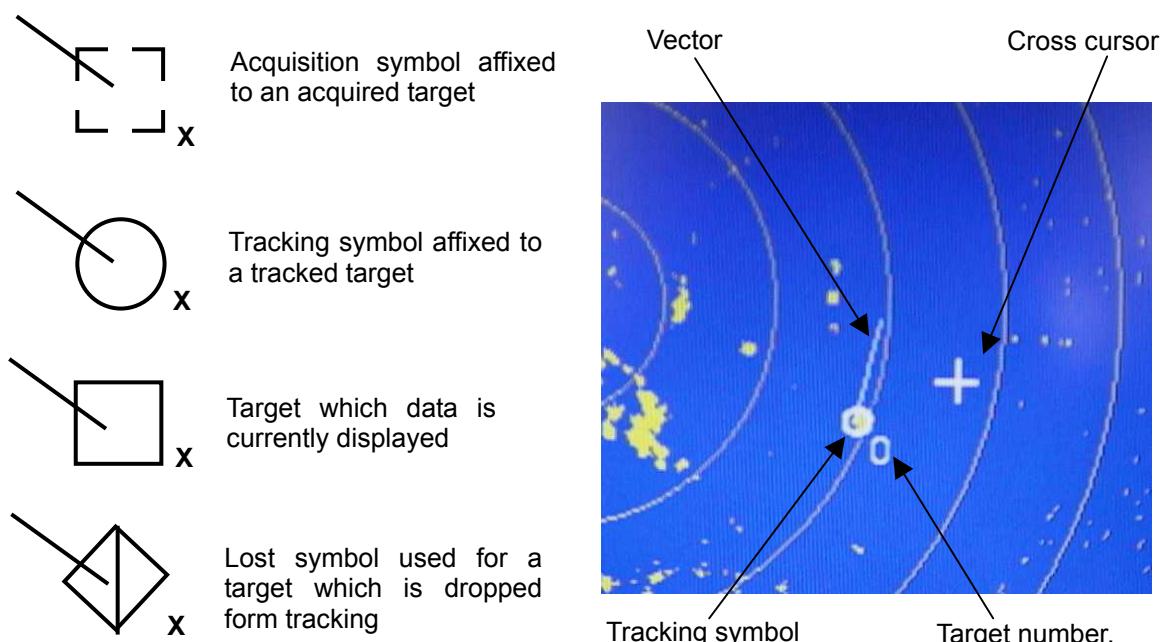
4.3.3 Canceling target tracking

To cancel tracking, use the DEL (delete) function. The target number shown in the upper right corner of the screen will disappear. If ALL DEL (delete all) is selected, the ATA will cancel tracking of all targets.

Use the following procedure to do:

- (1) Press the soft key when the DEL function has been set.
- (2) When using the menu driven “cancel” function, place the cursor on NAVI/DEL or NAVI/ALL DEL and press the ENT key.

The target tracking will be stopped when the radar is set to standby mode.



NOTE: “X” indicates a target number.

Figure 4 ATA symbols and their on-screen display

4.3.4 Data display

The numerical data of the target being tracked can be displayed in the data display window. Use the DATA function to display the data. The data of the target will be shown.

To use the menu driven DATA function, place the cursor on NAVI/DATA and press the ENT key.

The display items are as follows:

Target number: TGT NO.x	The number of the target currently displayed.
Vector time: TIME x x MIN.	Setting time to display vector length. (Speed x Time = vector length)
Vector mode: TRUE or REL	Display mode of vector data. TRUE for true motion and speed and REL for relative motion and speed.
Target data:	BRG (bearing), DIST (distance), CRS (course), SPD (speed), CPA (closest point of approach) and TCPA (time required to reach the CPA)
State:	The collision or lost alarm will appear according to the state of a target.

Example

TGT No.x	ALM	LOST	TIME x x MIN	TRUE
BRG 123.4DEG		CRS 234.5DEG		CPA 12.3NM
DIST 12.3NM		SPD 10.0KT		TCPA 12.3MIN

4.3.5 Ship's speed setting

Ship's speed data input can be set in the SPD SET sub menu in the SET UP/CUSTOM/PRESET 2 menu. The following speed input can be set:

Code	Description
NMEA	NMEA 0183 (default)
MANU 0.0 KT	Manual speed 0.0 knot
LOG 200P	Ship's speed log, output rate 200 pulses / NM

To set the numeric data, select the item with the cursor and rotate the rotary control. Turning the control to the right increases the value and to the left decreases the value.

5. Interface

5.1 Data output

The ATA data output is available at the optional connector terminal on the rear of the display unit. Pin No.32 is the NMEA_OUT signal terminal from which the signals conforming to the NMEA 0183 protocol can be output. This output terminal is used for the TARGET function (to output L/L of the cursor position), the MOB function (to output L/L of the ship's position) and the ATA data output function.

The data format is as follows:

\$RATTM,01,0.42,292.1,T,4.99,0.0,T,0.4,0.0,N,,T,,M*2A

Descriptions of ten sentence:

\$RA	Unit identification code (radar)
TTM	Formatter
01	Target number
0.42	Distance to the target
292.1	Bearing of the target (°)
T	Indicates the true bearing
4.99	Speed (knots)
0.0	Course (°)
T	Indicates the true speed and course, while R indicates relative speed and course.
0.4	Indicates the CPA (closest point of approach)
0.0	Time required for the ship to reach the CPA (min)
N	Indicates the unit of distance used: NM
T	Indicates tracking condition: Q: unstable T: tracking L: lost
M	Indicates that acquisition is carried out manually.
*2A	Sum checking

5.2 Log signal input

The speed log signal is applied to the OPTION connector at the rear of the display unit. (Pin No.31: Log signal input, Pin No.14 : GND) The log pulse rate can be selected from the menu, i.e. 400, 200, 150 or 100 pulses/NM.