

JMR-7230-S3/S
JMR-7225-7X3/9X3/6X/9X/6XH
JMR-7210-6X/6XH
JMR-7272-S
JMR-7282-S/SH
JMR-9230-S3/S
JMR-9225-7X3/9X3/6X/9X/6XH
JMR-9210-6X/6XH
JMR-9272-S
JMR-9282-S/SH

Marine Radar Equipment

Instruction Manual

<Function>

Overview	1
Name and Function of Each Unit	2
Common Basic Operations	3
Range and Bearing Measurement Methods	4
Basic Operation of the Radar	5
Target Tracking and AIS	6
True and False Echoes on Display	7
Functions of the ECDIS	8
Route Planning	9
Route Monitoring	10
Monitoring a Dragging Anchor	11
Automatic Sailing	12
Operating a Chart	13
Creating a User Map/ Updating a Chart Manually	14
Logbook	15
Setting Up Screen View	16
Setting Up Alerts	17
Setting Up the Operation Mode	18
Adjusting and Setting Up Equipment (for Services)	19
Playing Back Data Recorded During Navigation [Playback]	20
Maintenance & Inspection	21
Failures and After-Sale Services	22
About Disposal	23
Specifications	24
Radar Antenna Block Diagrams	APP A
Alert List	APP B
Setting the Interswitch	APP C
Menu List and Materials	APP D

Contents

Function

Section 5	Basic Operation of the Radar.....	5-1
5.1	Overview Flowchart.....	5-1
5.2	Starting and Shutting Down the Radar.....	5-3
5.2.1	Powering on and starting	5-3
5.2.2	Exiting radar operation.....	5-6
5.3	Observation Environment and Image Adjustment	5-7
5.3.1	Adjusting screen brightness.....	5-7
5.3.2	Changing the observation range.....	5-7
5.3.3	Adjusting tune	5-9
5.3.4	Adjusting gain	5-10
5.3.5	Rejecting sea clutter (Sea)	5-12
5.3.6	Rejecting rain/snow clutter.....	5-14
5.3.7	Adjusting to optimal images (Selection of observation scenes)	5-16
5.4	General Radar Operation.....	5-19
5.4.1	Interference Rejection (IR Function).....	5-19
5.4.2	Changing the transmitter pulse length	5-20
5.4.3	Enhancing targets	5-21
5.4.4	Using video processing (Echo Process).....	5-22
5.4.5	Setting the azimuth mode	5-23
5.4.6	Setting a motion mode.....	5-25
5.4.6.1	Resetting Own Ship to its Initial Position in [TM] (True Motion display) Mode.....	5-26
5.4.7	Setting the Stabilization Mode	5-27
5.4.8	Moving own ship's display position (Off Center).....	5-27
5.4.9	Displaying other ship's trails (Trails)	5-28
5.4.9.1	Trails motion mode	5-28
5.4.9.2	Changing motion mode of trails.....	5-30
5.4.9.3	Setting the length of the trail.....	5-30
5.4.9.4	Clearing trails data.....	5-31
5.4.10	Doubling the size of radar image	5-32
5.4.11	Hiding the heading line (HL OFF)	5-34
5.4.12	Hiding graphics information on radar display	5-35
5.4.13	Setting true bearing.....	5-35
5.4.14	Setting own ship speed.....	5-36
5.4.14.1	Switching own ship speed device.....	5-36
5.4.14.2	Entering the ship's heading/own ship's speed manually	5-38
Section 6	Target Tracking and AIS	6-1

6.1	Restrictions	6-2
6.2	Collision Avoidance Issue (Explanation)	6-3
6.2.1	Collision Avoidance in Navigation	6-3
6.2.2	Marine Accidents and Collisions	6-3
6.2.3	Basic Concept of Collision Avoidance	6-4
6.2.4	Relative Vector and True Vector	6-5
6.2.5	Radar and Collision Avoidance	6-5
6.3	Displaying Symbols	6-6
6.3.1	Displaying/hiding target tracking symbols/AIS target symbols	6-6
6.3.2	Types and Definitions of Target Tracking Symbols	6-6
6.3.3	Types and Definitions of AIS Target Symbols	6-7
6.3.4	About AIS AtoN (Aids to Navigation)	6-10
6.3.5	About AIS-SART Information	6-10
6.3.6	About Display Priority of AIS Targets	6-10
6.3.7	Switching between Ground Vector and Water Vector	6-11
6.3.8	Association Target Symbols	6-11
6.4	Preparation	6-12
6.4.1	Setting the Cursor Mode to AUTO Mode	6-12
6.4.2	Setting Vector	6-12
6.4.2.1	Vector modes	6-12
6.4.2.2	Setting vector mode	6-14
6.4.2.3	Vector Length (Vector Time)	6-14
6.4.2.4	Setting the Vector Length	6-15
6.4.3	Setting collision decision criteria	6-15
6.4.3.1	Setting CPA limit	6-15
6.4.3.2	Setting TCPA limit	6-16
6.4.4	Showing the CPA ring (RADAR only)	6-17
6.5	Setting and Operating Target Tracking	6-18
6.5.1	Acquiring target	6-18
6.5.1.1	Automatic acquisition (automatic acquisition) mode	6-18
6.5.1.2	ACQ MANUAL (manual acquisition) mode	6-19
6.5.1.3	Using manual acquisition and auto acquisition together	6-20
6.5.2	Setting up the automatic acquisition/activation zone (AZ)	6-20
6.5.2.1	Using "New Target Warning" dialog box in the [Alert] menu	6-21
6.5.2.2	Using the cursor	6-22
6.5.2.3	Using the EBL/VRM dial for the setting	6-23
6.5.3	Tracked target information display	6-24
6.5.4	Erasing unwanted tracked targets	6-25
6.5.5	Displaying Target ID No.	6-26
6.5.6	Editing tracked target properties	6-28
6.5.6.1	Adding Tracked Target ID Name	6-28
6.5.6.2	Setting track color of tracked target	6-30
6.5.7	Setting target for which ground is fixed to a reference target	6-31

6.5.8	Operation Test for Target Tracking.....	6-33
6.5.8.1	Test Video	6-34
6.5.8.2	[TT Simulator] (Target tracking simulator)	6-35
6.5.8.3	[Gate Display]	6-37
6.5.8.4	Status display	6-39
6.6	Setting and Operating AIS.....	6-40
6.6.1	Enabling AIS Function	6-40
6.6.2	Activating AIS targets (Activate AIS).....	6-40
6.6.2.1	Manual activation.....	6-40
6.6.2.2	Automatic activation	6-41
6.6.3	Deactivating AIS targets.....	6-41
6.6.4	Displaying AIS information.....	6-42
6.6.5	Displaying Target ID No.	6-50
6.6.6	Checking and setting AIS target property	6-51
6.6.6.1	Setting track color of AIS target.....	6-51
6.6.7	Conditions for deciding AIS target to be lost.....	6-52
6.7	Alert Display	6-53
6.7.1	Danger target alarm (CPA/TCPA).....	6-54
6.7.2	Alarm for new target acquired in automatic acquisition guard zone (New target)	6-55
6.7.3	Lost target notification (Lost)	6-56
6.7.4	Target Tracking function alarm (TT Data)	6-57
6.7.5	Gyro set notification (Set Gyro)	6-57
6.8	Track Function.....	6-58
6.8.1	Setting the Past position	6-58
6.8.2	Setting the other ship's tracks.....	6-58
6.8.2.1	Setting track color.....	6-59
6.8.2.2	Turning on/off other ship's track function.....	6-59
6.8.2.3	Setting other ship's track colors.....	6-59
6.8.2.4	Turning on/off other ship's track display	6-59
6.8.2.5	Setting up the display interval of other ship's track	6-60
6.8.2.6	Clearing other ship's track	6-60
6.8.2.7	Saving and loading other ship's track data.....	6-60
6.9	Entering Own Ship's AIS Voyage Data	6-61
6.10	Editing and Sending AIS Messages.....	6-62
6.11	AIS Message Tray	6-65
6.11.1	Displaying the AIS message tray	6-65
6.11.2	Switching message display.....	6-67
6.11.3	Sending a message in the message tray after editing.....	6-68
6.12	Highlighting TT/AIS Symbols	6-69
6.13	Trial Maneuvering.....	6-71
6.13.1	Outline of Trial Maneuvering.....	6-71
6.13.2	Performing a trial maneuver	6-74

6.14	Displaying the TT/AIS Target List.....	6-76
6.14.1	Displaying TT/AIS List.....	6-76
6.14.1.1	Switching between a standard window and an extended window	6-77
6.14.2	TT List	6-79
6.14.3	AIS List.....	6-80
6.15	Confirming Own Ship's AIS Information.....	6-82
6.16	Displaying the Last Lost AIS Target	6-83
Section 7 True and False Echoes on Display		7-1
7.1	Radar Wave with the Horizon	7-1
7.2	Intensity Reflected from the Target	7-3
7.3	Sea Clutter and Rain/Snow Clutter	7-5
7.3.1	Sea clutter.....	7-5
7.3.2	Rain and snow clutter	7-6
7.3.3	Coping with sea clutter and rain/snow clutter	7-8
7.4	False Echoes	7-9
7.4.1	Shadow	7-9
7.4.2	Side lobe effect	7-9
7.4.3	False echo by secondary reflection	7-10
7.4.4	False echo by multiple reflection	7-11
7.4.5	Second time echoes	7-11
7.4.6	Radar interference	7-12
7.5	Radar Transponder (SART) Screen Display.....	7-13
7.6	Display of AIS-SART	7-15
7.6.1	Radar screen display example	7-15
7.6.2	Numeric data display example.....	7-16
Section 8 Functions of the ECDIS (Option)		8-1
8.1	General Flowchart.....	8-1
8.1.1	Work Flowchart While Sailing	8-2
8.2	Starting and Preparing the ECDIS	8-3
8.2.1	Powering on and starting	8-3
8.2.2	Starting the ECDIS.....	8-4
8.2.2.1	Starting the ECDIS from the Task Menu.....	8-4
8.2.2.2	Starting ECDIS from a non-ECDIS task screen	8-5
8.2.3	Entering an ARCS PIN Number (ARCS Only).....	8-6
8.3	Moving the Chart.....	8-7
8.3.1	Moving the chart with the [HOME] button	8-7
8.3.2	Moving the chart with the cross-hair cursor	8-8
8.3.3	Moving the chart with the hand cursor.....	8-9
8.3.4	Switching a chart to be displayed by "My Port List"	8-10
8.3.5	Displaying the chart by entering the position	8-11
8.4	Zooming In/Out the Chart.....	8-12

8.4.1	Enlarging a Selected Area (S-57/C-MAP Only)	8-12
8.4.2	Enlarging/reducing a chart with the Zoom function	8-14
8.4.2.1	Enlarging/reducing with the [ZOOM IN]/[ZOOM OUT] key on the trackball operation unit (S-57/C-MAP only).....	8-14
8.4.2.2	Enlarging/reducing with the zoom slider (S-57/C-MAP only)	8-14
8.4.2.3	Enlarging/reducing with the Large/Small buttons (RNC only)	8-15
8.4.3	Switching between scale and range (S-57/C-MAP only).....	8-16
8.5	Changing the Object Category (S-57/C-MAP Only).....	8-17
8.5.1	Switching object display	8-18
8.5.2	Customizing object display	8-19
8.6	Selecting Motion/Bearing Mode	8-21
8.6.1	Setting motion mode	8-22
8.6.2	Setting Bearing mode (S-57/C-MAP only)	8-24
8.7	Registering and Displaying My Port List	8-26
8.7.1	Registering to My Port List.....	8-26
8.7.2	Deleting a port.....	8-27
8.8	Selecting a S-57 chart.....	8-28
8.9	Selecting an ARCS chart.....	8-29
8.9.1	Selecting charts from all.....	8-29
8.9.2	Changing active panels (ARCS only)	8-30
8.9.3	Changing a low resolution chart (ARCS only)	8-31
8.9.4	Changing a high resolution chart (ARCS only)	8-32
8.9.5	Displaying the note and diagram (ARCS only)	8-33
8.10	Multi View Display and Wide Range View Window Display of Charts	8-34
8.10.1	Display of multi view	8-35
8.10.1.1	Displaying multi view	8-35
8.10.1.2	Multi view operation procedure	8-37
8.11	Verifying Object Information (Pick Report Function).....	8-41
8.11.1	Pick Report of the S-57 chart.....	8-41
8.11.1.1	Displaying a Pick Report of the S-57 chart.....	8-41
8.11.1.2	Verifying Object Information	8-43
8.11.1.3	Verifying Chart Information	8-46
8.11.1.4	Verifying Chart Update History	8-47
8.11.2	Pick report of the ARCS chart.....	8-48
8.11.3	Manual Update Pick Report.....	8-49
8.11.3.1	Displaying a Manual Update Pick Report.....	8-49
8.12	Marking the Position of Own Ship with an Event Mark	8-50
8.13	Displaying Radar Images on a Chart by Overlaying	8-51
8.13.1	Turning On/Off overlay display	8-52
8.13.2	Turning On/Off range ring display.....	8-54
8.13.3	Turning On/Off bearing scale.....	8-55
8.13.4	Radar image adjustment.....	8-56

8.14	Setting a true bearing.....	8-57
8.15	Setting an own ship's speed	8-58
8.15.1	Switching an own ship's speed sensor	8-58
8.15.2	Entering the ship's heading/own ship's speed manually	8-59
Section 9	Route Planning.....	9-1
9.1	Overview of the Route Planning Function.....	9-2
9.2	Setting Route Display.....	9-3
9.2.1	Setting [Route] after selecting [View] - [Options] on the menu.....	9-3
9.2.2	Setting [Settings] - [Route] on the menu.....	9-5
9.3	Starting and Ending the Route Planning Dialog Box	9-9
9.3.1	Starting the "Route Planning" dialog box	9-9
9.3.2	Ending the "Route Planning" dialog box	9-9
9.4	Name and Function of Each Section of the "Route Planning" Dialog Box	9-10
9.4.1	Route Planning bar	9-10
9.4.2	Route planning tab.....	9-15
9.5	Saving a Route.....	9-17
9.6	Planning a Route by Using Table Editing	9-21
9.6.1	Table editing operation flow	9-21
9.6.1.1	Creating a new route file.....	9-21
9.6.1.2	Editing a route	9-22
9.6.2	Creating a new route file by table editing.....	9-23
9.6.3	Deleting WPT data.....	9-25
9.6.4	Editing a route by table editing	9-25
9.6.4.1	Inserting WPT	9-28
9.6.4.2	Deleting WPT	9-28
9.6.4.3	Dividing a leg	9-29
9.6.4.4	Copying the entire route	9-29
9.6.4.5	Pasting the route	9-30
9.6.4.6	Inserting the other route	9-30
9.6.4.7	Insert the same WPT as the last WPT	9-31
9.7	Planning a New Route by Graphic Editing.....	9-32
9.7.1	Graphic editing operation flow	9-32
9.7.1.1	Creating a new route file.....	9-32
9.7.1.2	Editing a route file.....	9-33
9.7.2	Creating a new route file by graphic editing	9-34
9.7.2.1	Creating a route by using EBL/VRM	9-36
9.7.2.2	Creating a route by using the assistant circle function	9-38
9.7.3	Editing a route by graphic editing	9-40
9.7.3.1	Inserting a WPT between WPTs.....	9-42
9.7.3.2	Moving a WPT	9-43
9.7.3.3	Changing XTL (cross track limit)	9-45
9.7.3.4	Adding WPT on the context menu.....	9-46

9.7.3.5	Moving WPT on the context menu	9-47
9.7.3.6	Deleting WPT on the context menu.....	9-48
9.7.3.7	Copying and pasting a route on the context menu.....	9-49
9.7.3.8	Rotating a route on the context menu	9-50
9.7.3.9	Moving a route on the context menu	9-51
9.7.3.10	Merging other route on the context menu	9-53
9.7.3.11	Inserting WPT between WPTs on the context menu	9-54
9.7.3.12	Dividing a leg on the context menu	9-55
9.7.3.13	Changing XTL (cross track limit) on the context menu.....	9-56
9.8	Creating an Alternate Route.....	9-58
9.8.1	Creating an alternate route	9-60
9.8.2	Saving an alternate route.....	9-61
9.8.2.1	Overwriting without changing the file name.....	9-61
9.8.2.2	Saving the file by naming	9-62
9.9	Checking Route Data	9-63
9.9.1	Checking a route based on the safety standards	9-63
9.9.2	Checking a route based on the limits.....	9-66
9.10	Navigation Calculation Function	9-68
9.10.1	ROT (Rate of Turn)	9-68
9.10.2	ETA (Estimated Time of Arrival)	9-68
9.10.3	TTG (Time to Go).....	9-68
9.11	Importing/Exporting a Route File	9-69
9.11.1	Importing a route file	9-69
9.11.2	Exporting a route file.....	9-70
9.12	Error Messages that are Displayed when a Route is Created.....	9-71
Section 10	Route Monitoring	10-1
10.1	Route Monitoring.....	10-1
10.1.1	Starting route monitoring.....	10-1
10.1.2	Ending route monitoring.....	10-2
10.2	Selecting and Deleting Route Files.....	10-3
10.2.1	Selecting a route to be displayed.....	10-3
10.2.2	Deleting a route file	10-4
10.3	Voyage Information (Voyage Monitoring Information) Dialog Box	10-5
10.4	Voyage Calculation Dialog Box.....	10-10
10.4.1	Calculating a schedule.....	10-12
10.4.2	Calculating a distance.....	10-13
10.4.3	Example of distance calculation	10-15
10.5	Comparing the Data between the Planned Route and the Actual Route.....	10-17
10.6	Verifying Detail Information of WPT	10-19
Section 11	Monitoring a Dragging Anchor	11-1
11.1	Setting a Dragging Anchor Monitoring Area.....	11-2

11.1.1	Setting a dragging anchor monitoring circle	11-2
11.1.2	Setting a dragging anchor monitoring polygon	11-3
11.2	Starting and Ending Dragging Anchor Monitoring	11-5
11.2.1	Starting dragging anchor monitoring	11-5
11.2.2	Ending dragging anchor monitoring	11-6
11.3	Moving/Editing/Deleting a Dragging Anchor Monitoring Area on the Chart	11-7
11.3.1	Moving a dragging anchor monitoring circle on the chart	11-7
11.3.2	Moving a dragging anchor monitoring circle on the context menu	11-8
11.3.3	Moving a dragging anchor monitoring polygon on the chart	11-8
11.3.4	Moving a dragging anchor monitoring ploygon on the context menu	11-8
11.3.5	Changing a size of a dragging anchor monitoring circle on the chart	11-9
11.3.6	Changing a size of a dragging anchor monitoring circle on the context menu	11-10
11.3.7	Changing a shape of a dragging anchor monitoring polygon on the chart	11-10
11.3.8	Changing a shape of a dragging anchor monitoring polygon on the context menu ..	11-11
Section 12	Automatic Sailing (Option)	12-1
12.1	Flow of Starting Automatic Sailing	12-2
12.2	Selecting a Route	12-6
12.2.1	Using the existing planned route	12-6
12.2.2	Creating a new route	12-8
12.3	Selecting a Waypoint at which Automatic Sailing Starts	12-10
12.4	Starting Automatic Sailing	12-12
12.5	Stopping Automatic Sailing	12-14
12.6	Alerts at Automatic Sailing	12-15
Section 13	Operating a Chart (option)	13-1
13.1	Updating a Chart Manually	13-3
13.2	Displaying/Searching an S-57 Chart [Select S-57 Chart]	13-4
13.2.1	Displaying a chart	13-4
13.2.2	Search a chart	13-5
13.2.2.1	Searching the position that is clicked on by the cursor	13-5
13.2.2.2	Searching by using a chart name	13-6
13.3	Displaying a Chart by Inputting a Position	13-7
13.4	Confirming/Accepting an S-57 Updated Chart	13-8
13.5	Displaying a Date-dependent Object	13-9
13.6	Displaying a Chart Boundary	13-10
13.6.1	Setting a boundary to be displayed on the chart	13-10
13.6.2	Displaying chart information	13-11
13.7	Confirming Temporary/Preliminary Information of an ARCS Chart (ARCS Only)	13-12
13.8	Adjusting an ARCS Chart Position (ARCS Only)	13-13
13.8.1	Offsetting an ARCS chart	13-13
13.8.2	Transforming a geodetic datum of an ARCS chart to WGS-84	13-15

13.9	Displaying a Chart Abbreviation List	13-20
13.10	Maintaining a Chart	13-21
Section 14	Creating a User Map/ Updating a Chart Manually	14-1
14.1	Creating/Editing a User Map	14-3
14.1.1	Display the "User Map" menu	14-4
14.1.2	Display the File Operation submenu.....	14-5
14.1.2.1	"File Operation" dialog box	14-5
14.1.3	Creating a new user map.....	14-7
14.1.4	Editing the existing user map.....	14-8
14.1.4.1	Editing the user map that is currently displayed.....	14-8
14.1.5	Displaying a user map	14-9
14.1.6	Operating a user map file	14-10
14.1.6.1	Deleting a user map file.....	14-10
14.1.6.2	Copying a user map file.....	14-10
14.1.6.3	Importing a user map file	14-11
14.1.6.4	Exporting a user map file.....	14-11
14.1.6.5	Merging multiple user map files.....	14-12
14.1.6.6	Performing geodetic datum conversion.....	14-13
14.2	Using Map Creation Tools (User Map Creation/Editing)	14-14
14.2.1	User map information bar	14-14
14.2.1.1	Displaying a user map information bar	14-14
14.2.2	Drawing toolbar.....	14-15
14.2.3	Selecting an object type.....	14-16
14.2.3.1	Using a user map object.....	14-17
14.2.4	Selecting a color of an object.....	14-18
14.2.5	Creating an object in the EBL/VRM mode	14-19
14.2.6	Creating an object by specifying latitude and longitude	14-19
14.2.6.1	Creating an object of symbol/circle/ellipse/arc/arrow/text	14-20
14.2.6.2	Creating an object of simple line/polygon/highlight	14-20
14.2.7	Deleting an object.....	14-20
14.2.8	Object property dialog box.....	14-21
14.2.8.1	Selecting an object	14-21
14.2.8.2	Setting a comment.....	14-22
14.2.9	Changing an object display scale range	14-23
14.2.10	Moving an object.....	14-23
14.3	Updating a Chart Manually (ECDIS Screen Only)	14-25
14.3.1	Displaying the Manual Update submenu	14-26
14.3.2	Selecting a chart to be updated	14-27
14.3.2.1	Searching the position that is clicked on with the cursor.....	14-28
14.3.2.2	Searching a chart with the chart name	14-28
14.3.3	Updating a chart manually	14-28
14.3.4	Displaying the selected chart only	14-29

14.3.5	Displaying the object/redisplaying the hidden object.....	14-29
14.4	How to Use the Map Creation Tools (for Manual Update)	14-30
14.4.1	Deleting or hiding an object	14-30
14.4.2	Selecting an object type.....	14-31
14.5	Creating an Object	14-32
14.5.1	Creating a symbol object (Symbol).....	14-33
14.5.1.1	Creating an object by specifying the latitude and longitude	14-33
14.5.1.2	Creating an object with EBL/VRM operation	14-34
14.5.2	Creating a simple line and a Warning line (Line object)	14-35
14.5.2.1	Creating a vertex by entering the position.....	14-38
14.5.2.2	Creating an object with EBL/VRM operation	14-38
14.5.3	Creating a circle, ellipse, and an arc (Line object).....	14-40
14.5.3.1	Creating an object by specifying a position for the center and size of the object.....	14-42
14.5.4	Creating a polygon and a Warning area (Area object)	14-43
14.5.4.1	Creating a vertex by entering the position.....	14-45
14.5.4.2	Creating an object with EBL/VRM operation	14-46
14.5.5	Creating circle, ellipse, and fan areas (Area object).....	14-47
14.5.5.1	Creating an object by specifying the center position and the object size.....	14-49
14.5.6	Creating a text (Text object).....	14-50
14.5.6.1	Creating a text by specifying the latitude and longitude	14-51
14.5.6.2	Creating a text with EBL/VRM operation.....	14-51
14.5.6.3	Editing a text.....	14-52
14.5.6.4	Editing a template.....	14-52
14.5.6.5	Changing a text angle.....	14-54
14.5.7	Creating an arrow (Line object)	14-55
14.5.7.1	Creating an object by specifying the starting point/ending point position coordinates	14-56
14.5.7.2	Drawing an object with EBL/VRM operation	14-57
14.5.8	Creating Mariner's Mark/Line drawing objects (ECDIS screen only).....	14-58
14.5.8.1	Information mark.....	14-58
14.5.8.2	Clearing line.....	14-60
14.5.8.3	Tidal Stream mark.....	14-63
14.5.8.4	Highlighted display	14-65
14.6	Collective Deletion of Objects [Delete by Type/Color]	14-71
14.7	Managing/Editing Objects [Mark Line/List].....	14-72
14.7.1	Displaying the "Mark/Line List" dialog box.....	14-72
14.7.2	Displaying a user map list.....	14-73
14.7.2.1	Displaying an object on a chart	14-73
14.7.2.2	Deleting an object.....	14-74
14.7.3	Displaying a Mariner's Mark/Line List (ECDIS screen only)	14-74
14.7.3.1	Displaying an object on a chart	14-74
14.7.3.2	Deleting an object.....	14-74

14.7.3.3	Deleting objects collectively from an object list	14-75
14.7.4	Displaying a manual update list (ECDIS screen only)	14-75
14.7.4.1	Displaying an object on a chart	14-75
14.7.4.2	Hiding an object	14-76
14.7.4.3	Redisplaying an object	14-76
Section 15	Logbook.....	15-1
15.1	Browsing a Logbook.....	15-1
	Searching an event based on the date	15-2
	Sorting events	15-2
	Switching the event groups	15-2
15.1.1	Event detail information	15-3
	Detail information that can be edited	15-3
15.2	Editing a Logbook	15-5
15.2.1	Adding an event	15-5
	Deleting an event mark	15-5
15.2.2	Editing event detail information.....	15-6
15.3	Outputting Event Data.....	15-7
15.3.1	Outputting a logbook as a file	15-7
Section 16	Setting up Screen View	16-1
16.1	Setting Chart Display Mode (Multi View Mode) (ECDIS only)	16-3
16.1.1	Setting Multi-Screen.....	16-3
16.2	Setting Screen Display Options	16-4
16.2.1	Setting up the display of Own Ship symbol	16-7
16.2.2	Setting up the display of ECDIS own ship's track.....	16-11
16.2.3	Setting up the display of Route Monitoring	16-13
16.2.4	Setting up the display of User Map.....	16-15
16.2.5	Setting up the display of Mariner's Mark/Line.....	16-17
16.2.6	Setting up Radar Overlay and Transparency of Echo/Trails	16-18
16.2.7	Setting up the display of TT/AIS Target	16-19
16.2.8	Setting up the display of Other Ship's Track.....	16-22
16.2.9	Setting up the display of Chart Common.....	16-27
16.2.10	Setting up the display of RADAR Chart.....	16-35
16.2.11	Setting up the display of ECDIS Chart.....	16-37
16.2.12	Setting up AIO display	16-43
16.2.13	Setting up the display of range/bearing measurement function	16-44
16.2.14	Setting up the display of Unit of Setting Value.....	16-45
16.2.15	Setting up display of Own Ship Track Control, display format of Own Ship/Cursor Position and display of Sub-Information dialog	16-47
16.2.16	Setting up the Water Depth display	16-48
16.2.17	Setting up the Rudder graph.....	16-49
16.2.18	Setting up the Gyro/Rudder graph.....	16-50

16.2.19	Setting up the Engine Graph	16-51
16.2.20	Setting up the graph range of the ROT slide bar	16-52
Section 17	Setting up Alerts	17-1
17.1	Selecting Setting Items	17-1
17.1.1	Displaying the "Alert" dialog box	17-1
17.1.2	Selecting a setting item	17-2
17.2	Collision Avoidance Alert Generation Conditions	17-4
17.2.1	Setting the CPA/TCPA limit values	17-4
17.2.2	Setting the status of the AIS target that is targeted for lost warning	17-5
17.3	New Target Alarm Generation Conditions	17-6
17.3.1	Switching AZ1/AZ2 to enable/disable	17-7
17.3.1.1	Enabling AZ1 or AZ2	17-7
17.3.1.2	Disabling AZ1 or AZ2	17-7
17.4	Depth/Safety Contour Alert Generation Conditions	17-8
17.5	Setting Up Vector/Sector	17-10
17.5.1	Switching to enable/disable a danger detection vector/sector	17-11
17.5.2	Setting up the size of a danger detection vector	17-11
17.5.3	Setting up the size of a danger detection sector	17-11
17.6	Area Warning Generation Conditions	17-12
17.7	Track Control Alert Generation Conditions	17-13
17.8	Position Integrity Alert Generation Conditions	17-14
17.8.1	Setting up the generation condition of the Position monitor warning	17-14
17.8.2	Setting up the HDOP exceeded caution generation condition	17-15
17.9	Setting up Alert Processing	17-16
17.10	Setting Up the Alert Timer	17-17
17.10.1	Setting up the timer	17-17
17.10.2	Setting up the time	17-17
Section 18	Setting up the Operation Mode	18-1
18.1	Basic Operation of the "Settings" Dialog Box	18-1
18.2	Basic Settings for Radar Signal Processing	18-4
18.3	Setting Radar Signal Processing	18-6
18.4	Presetting Each Observation Scene	18-7
18.5	Setting Other Ship's Radar Trails	18-13
18.6	Setting Radar Antennas	18-14
18.6.1	Setting radar antennas	18-14
18.7	Setting Associations	18-15
18.8	Setting Own Ship's Dynamic Trait	18-17
18.9	Setting Operation Tests	18-18
18.10	Setting AIS Filters	18-20
18.11	Setting the Target Track Function to ON/OFF	18-22

18.12	Setting Parameter Values at Route Plan Creation.....	18-23
18.13	Setting Automatic Sailing Parameter Values.....	18-25
18.14	Setting the Temporary Route Setting Values	18-28
18.15	Setting Chart Operation	18-29
18.16	Setting Logbook	18-32
18.17	Setting Navigation Equipment.....	18-35
18.18	Setting Colors and Brightness	18-36
18.19	Setting Sounds.....	18-40
18.20	Setting Key Assignment.....	18-43
18.21	Setting Preferences Information	18-46
18.22	Setting Screen Capture.....	18-55



Section 5 Basic Operation of the Radar

CAUTION



Use the radar as your navigation aid.

Final decision on the ship operation must be made by the ship operator himself.

If you depend entirely on the radar information for the final decision on the ship operation, such an accident as collision and stranding may occur.



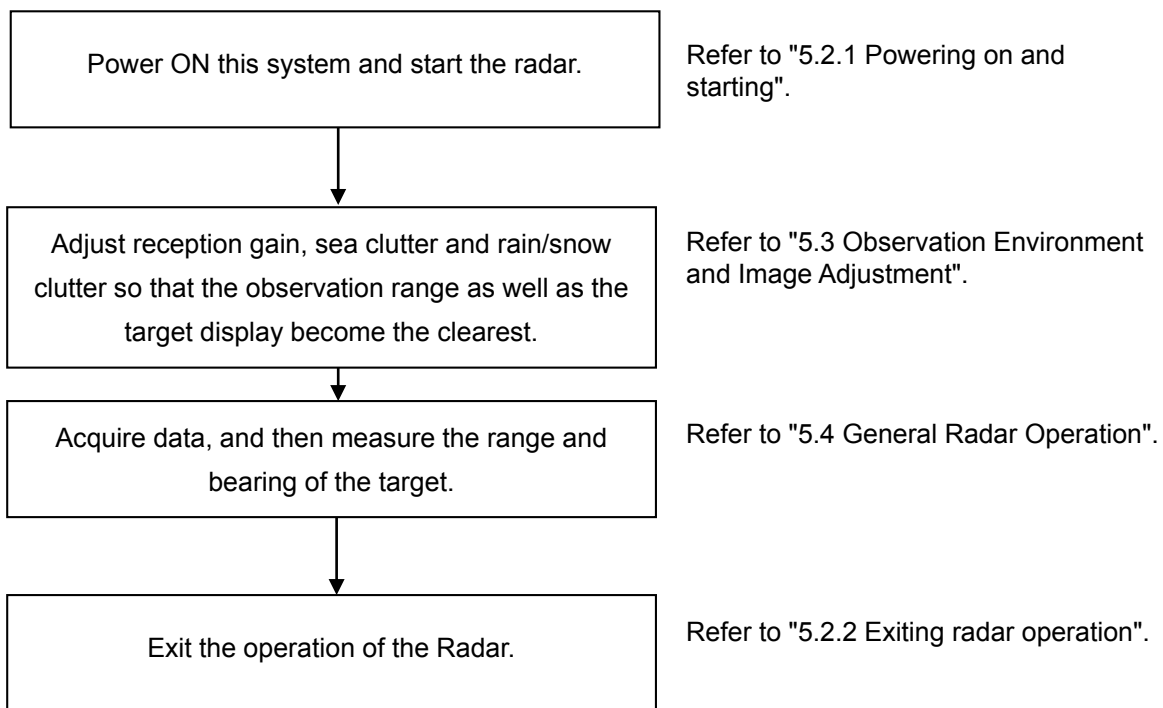
If momentary power interruption has occurred on the ship during the radar operation, the image may distort or may not appear. If this occurs, turn on the power again.

5.1 Overview Flowchart

CAUTION



- Do not put anything on the operation section.
In particular, if a hot object is placed on the operation section, deformation is likely to occur.
- Do not allow a heavy impact to be applied to the operation section, trackball or dial.
A trouble may occur.



5.2 Starting and Shutting Down the Radar

5.2.1 Powering on and starting

Note

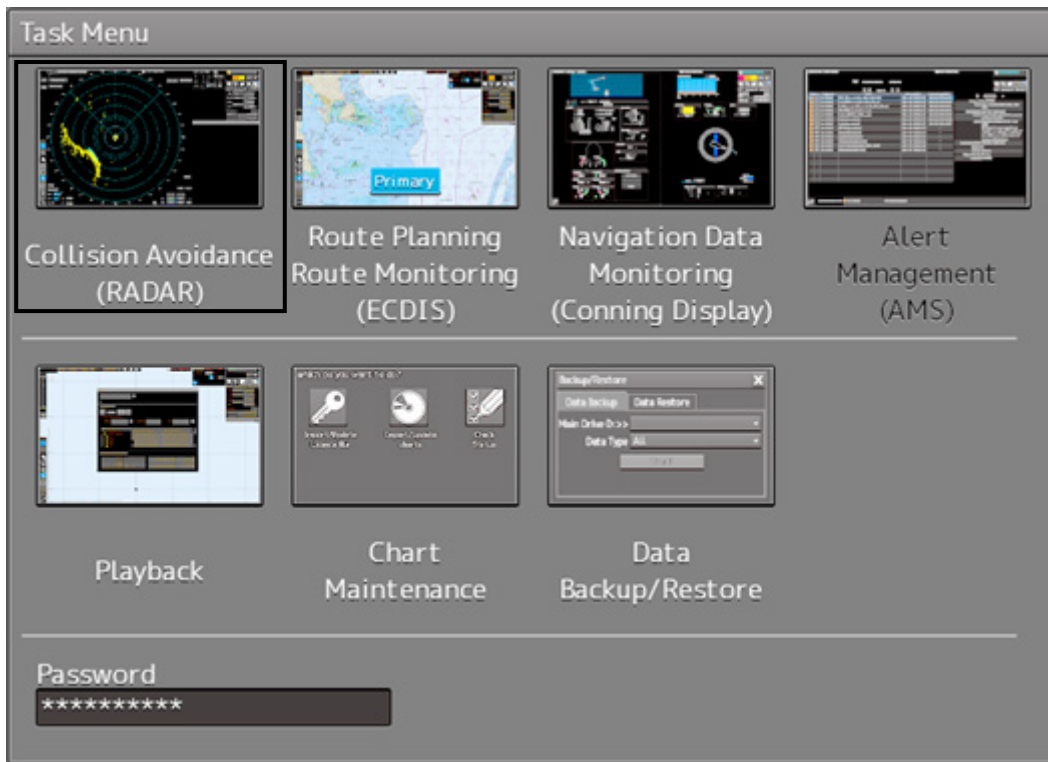
- Wait for about 2 seconds before turning on the power again.
- Immediately after the radar is installed, at start of the system after it has not been used for a long time, or after the magnetron is replaced, preheat the equipment in the standby state for 20 to 30 minutes before setting it into the transmit state.
If the preheating time is short, the magnetron causes sparks, resulting in its unstable oscillation.
- Start transmission on a short pulse range and change the range to the long pulse ranges in turn. If the transmission is unstable in the meantime, immediately place the system back into the standby state and maintain it in the standby state for 5 to 10 minutes before restarting the operation. Repeat these steps until the operation are stabilized.

1 Check that the ship's mains are turned on.

2 Press the Power button on the operation unit.

This equipment starts and Task Menu appears on the screen.

3 Click on the [Collision Avoidance (RADAR)] button on Task Menu.

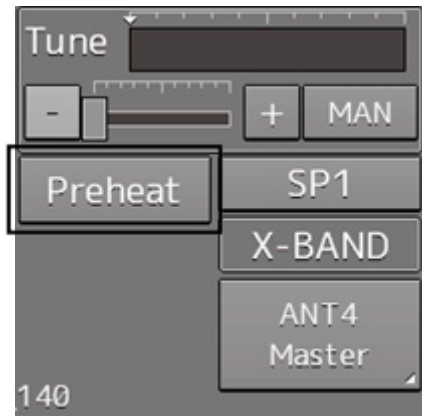


The RADAR screen appears.

The preheating time is displayed at the center of the screen.



When the magnetron radar antenna is connected, "Preheat" is displayed on the Standby/Send switching button.



4 Wait until preheating is complete.

When the preheating time expires, the preheating time display disappears, and the display of the Standby/Transmit switch button changes from "Preheat" to "Standby".

5 Click on the Standby/Transmit switch button.

Radar transmission starts and the radar antenna rotates.

The display of the Standby/Transmit switch button changes from "Standby" to "Transmit".

Note

Even if the Standby/Transmit switch button is clicked on while "Preheat" is being displayed, radar transmission cannot be performed.

Memo

When the "Preheat" display is held down (5 seconds or longer), the display is switched to "Standby".

5.2.2 Exiting radar operation

1 Click on the Standby/Transmit switch button in Radar system information.

Radar transmission stops and the rotation of the radar antenna stops.

The display of the Standby/Transmit switch button changes from "Transmit" to "Standby".

Memo

If observation using the radar is being scheduled within a comparably short period of time, keep this state. Observation can be started immediately by just clicking on the Standby/Transmit switch button.

2 Press the Power button on the operation unit.

The power to this equipment is turned OFF.

WARNING



Before starting maintenance, turn off power. Cut off all the power supplies to the equipment.

Some equipment components can carry electrical current even after the power switch is turned off, and conducting maintenance work may result in electric shock, equipment failure, or accidents.



When turning off the power supply, do not hold down the power button of the operation unit.

Otherwise, a trouble may occur due to termination failure.

5.3 Observation Environment and Image Adjustment

5.3.1 Adjusting screen brightness

1 Adjust the screen brightness.

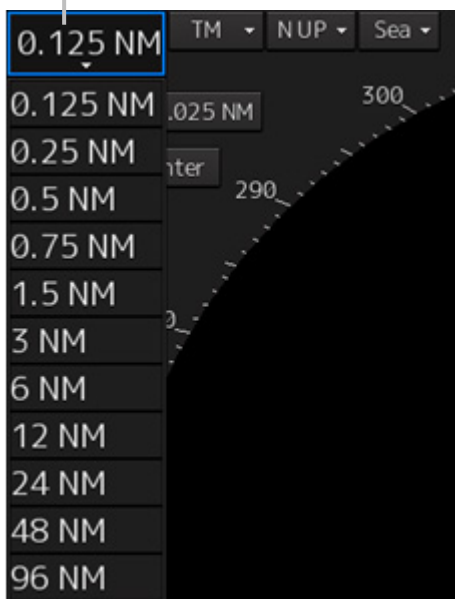
For the details of the adjustment, refer to "3.9 Adjusting the Brightness of the Screen and Operation Unit".

In consideration of the ambient brightness, adjust the brightness of the display that is high enough to easily observe the radar display but does not glare.

5.3.2 Changing the observation range

1 Click on the Range Scale button in Presentation and mode information, and then select Range from the pop-up menu.

Range Scale button



[Points on adjustments]

Increasing the observation range will enable a wider range to be observed.

However, a video image is small and the ability to detect targets near own ship decreases. Therefore, when observing the vicinity of own ship, use the smaller observation range.

Decreasing the observation range will enable the vicinity of own ship to be enlarged. However, caution must be taken because video images of the area beyond the observation range cannot be displayed.

CAUTION



Since the image within the previous observation range is displayed by expanding/contracting for the period from immediately after switching of the observation range from the next image updating, do not use this image for navigation.


If this image is used for navigation, an accident may occur.

Note

An observation range under which the own ship display position and the antenna position exceeds the area 66% of the screen radius cannot be selected.

5.3.3 Adjusting tune

⚠ CAUTION



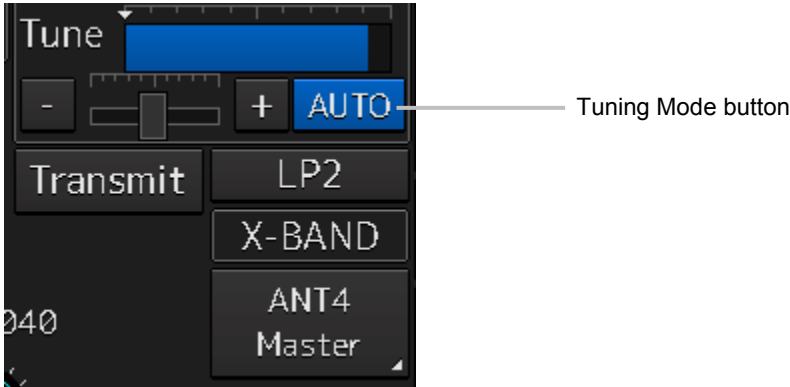
Normally, use the automatic tune mode.
If you use the manual tuning mode, an accident may be caused by fluctuation of transmission and reception.
Use the manual tune mode only when best tuning is not possible in the automatic tune mode due to deterioration of magnetron.

This equipment has the automatic tuning mode that performs tuning of the transmission frequency and the reception frequency by automatic control, and the manual tuning mode in which the user performs tuning. Normally use the automatic tune mode. Only when the best tuning is not possible by the automatic tune mode due to the deterioration of magnetron, use the manual tune mode. The tuning mode currently being used is displayed on the Tuning Mode button in Radar system information.

Note
This function is effective when a magnetron radar antenna is connected.

When using the automatic tune mode

- 1 Click on the tune mode button.**
[AUTO] (automatic) is displayed on the tune mode button.
Whenever the button is clicked on, the mode is switched between [AUTO] (automatic) and [MAN] (manual).



Using the manual tune mode

1 Click on the tune mode button.

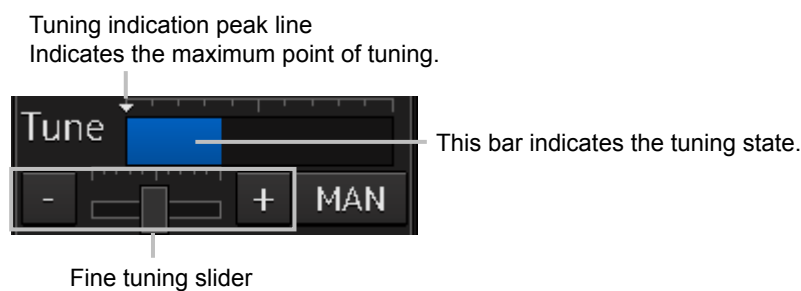
[MAN] (manual) is displayed on the tune mode button.

Each time this button is clicked on, the display switches between [AUTO] (automatic) and [MAN] (manual).

2 Move the fine tuning slider to the left and right sides.

The tuning status is displayed on the tuning bar according to the movement of the fine tuning slider.

Make adjustments so that the display on the tuning bar indicates the maximum (the state in which the tuning bar is positioned at the most right).



5.3.4 Adjusting gain

CAUTION



Be sure to always adjust for the best gain.

If the gain is too high, undesired signals including receiver noise and false echoes increase resulting in reduction of visibility of targets.

Otherwise, accidents may result.

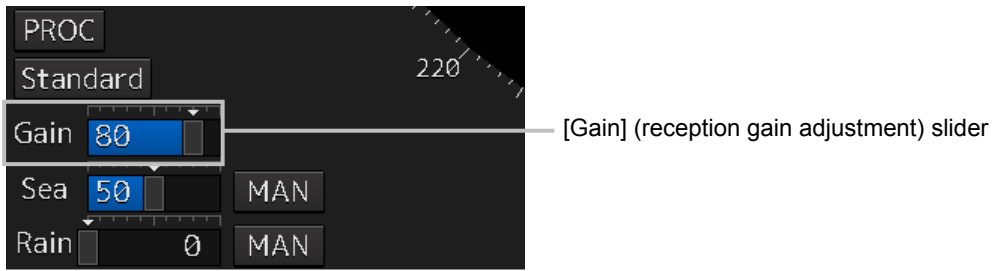
On the contrary, if the gain is too low, targets including ships and dangerous objects may not be clearly indicated.

Adjust the gain of the radar.

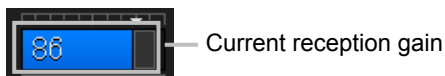
Memo

Set the optimum gain when making adjustments, giving consideration to the setting described in "5.3.7 Adjusting to optimal images (Selection of observation scenes)".

- 1 Drag the [Gain] (reception gain adjustment) slider dial in Radar signal information, turn the trackball, and set up reception gain.



Moving the slider to the right increases gain.
 Moving the slider to the left decreases gain.
 The current reception gain level is indicated by the bar and a numeric value.



[Points on adjustments]

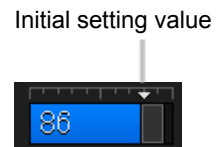
As reception gain is increased, the range in which radar images can be observed widens; however, if gain is increased too high, receiver noise, false echoes and other undesired signals will increase on the screen, lowering the visibility of targets.

Also, it gets easier to see the screen display if gain is decreased to observe cluttered targets and close range, but be careful not to overlook small targets.

Memo

If the optimal setting value was lost, it is recommended to reset to the initial value and tune up again.

The initial setting value is indicated as shown in the figure at right.



5.3.5 Rejecting sea clutter (Sea)

CAUTION



Never set the sea clutter suppression function before rejecting all the sea clutters at close range. Detection of not only echoes from the wave and so on but also targets such as other ships or dangerous objects may be suppressed.

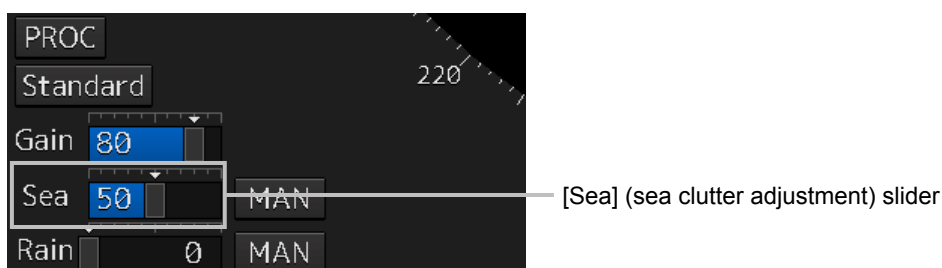
When using the sea clutter suppression function, make sure to choose the most appropriate setting for suppression.

Memo

Remove images by sea clutter by using the sea clutter suppression function.

When using the sea clutter suppression function, make the optimum setting, giving consideration to the setting described in "5.3.7 Adjusting to optimal images (Selection of observation scenes)".

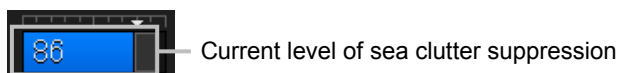
- 1 Drag the [Sea] (sea clutter adjustment) slider dial in Radar signal information, turn the trackball, and adjust the amount of images by sea clutter displayed on the screen so as to make display easy to observe.



Moving the slider to the right decreases the amount of images by sea clutter.

Moving the slider to the left increases the amount of images by sea clutter.

The current level of sea clutter suppression is indicated by the bar and a numeric value.



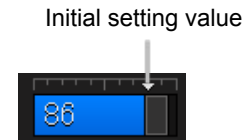
[Points on adjustments]

The sea clutter suppression function decreases the amount of images by sea clutter by lowering reception gain at close range. When reception gain is lowered, the effectiveness of sea clutter suppression increases; however, if excessive effect is applied, please note that targets having weak signal strength such as buoys and small ships will disappear.

Memo

If the optimal setting value was lost, it is recommended to reset to the initial value and tune up again.

The initial setting value is indicated as shown in the figure at right.



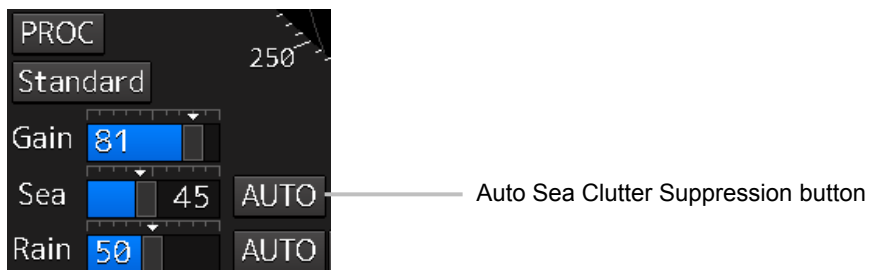
Using the function of automatic sea clutter suppression mode

The sea clutter suppression in accordance with the intensity of sea clutter is possible. Use this mode when the sea clutter's intensity differs according to directional orientation.

1 Click on the Automatic Sea Clutter Suppression button.

[AUTO] (automatic) is displayed on the automatic sea clutter suppression button.

Each time this button is clicked on, the display switches between [AUTO] (automatic) and [MAN] (manual).



2 Drag the sea clutter adjustment slider dial, turn the trackball, and adjust the amount of images by sea clutter displayed on the screen.

Even while automatic sea clutter is being suppressed, the amount of images can be fine-adjusted manually.

Canceling automatic sea clutter suppression

1 Click on the Automatic Sea Clutter Suppression button.

[MAN] (manual) is displayed on the automatic sea clutter suppression button.

Each time this button is clicked on, the display switches between [AUTO] (automatic) and [MAN] (manual).

5.3.6 Rejecting rain/snow clutter

CAUTION

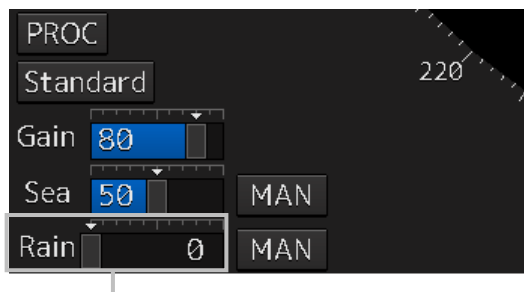


Never set the rain/snow clutter suppression function too high. Detection of not only echoes from the rain or snow but also images targets such as other ships or dangerous objects may be suppressed. When using the rain/snow clutter suppression function, make sure to choose the most appropriate setting for suppression.

Memo

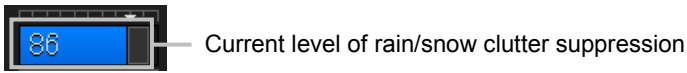
Remove images by rain/snow clutter by using the sea clutter suppression function. When using the rain/snow clutter suppression function, make the optimum setting giving considering to the setting described in "5.3.7 Adjusting to optimal images (Selection of observation scenes)".

- 1 Drag the [Rain] rain/snow clutter adjustment slider dial in Radar signal information, turn the trackball, and adjust the amount of images by rain/snow clutter displayed on the screen so as to make display easy to observe.



[Rain] (rain/snow clutter adjustment) slider

Moving the slider to the right decreases the amount of images by rain/snow clutter.
Moving the slider to the left increases the amount of images by rain/snow clutter.
The current level of rain/snow clutter suppression is indicated by the bar and a numeric value.



[Points on adjustments]

When the amount of images by rain/snow clutter is decreased, the outlines of targets hidden by images of rain/snow will appear, but please note that small targets may be missed. Since this can also reduce sea clutter, it is effective to use it together with the sea clutter rejection function.

Normally, set the level of rain/snow clutter suppression to 0.

Memo

If the optimal setting value was lost, it is recommended to reset to the initial value and tune up again.

The initial setting value is indicated as shown in the figure at right.

Initial setting value



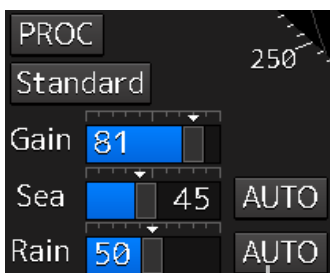
Using the automatic rain/snow clutter suppression mode

The rain/snow clutter suppression in accordance with the intensity of rain/snow clutter is possible. Use this mode when the rain/snow clutter's intensity differs according to directional orientation.

- 1 Click on the Automatic Rain/Snow Clutter Suppression button.**

[AUTO] (automatic) is displayed on the automatic rain/snow clutter suppression button.

Each time this button is clicked on, the display switches between [AUTO] (automatic) and [MAN] (manual).



Auto Rain/Snow Clutter Suppression button

- 2 Click the left mouse button of the button on the [Rain] (rain/snow clutter adjustment) slider, drag it with the trackball, and adjust the volume of the echo created by rain/snow clutter that is displayed on the screen.**

Even while auto rain/snow clutter is being suppressed, the amount of images can be fine-adjusted manually.

Canceling automatic rain/snow clutter suppression

- 1 Click on the Automatic Rain/Snow Clutter Suppression button.

[MAN] (manual) is displayed on the automatic rain/snow clutter suppression button.

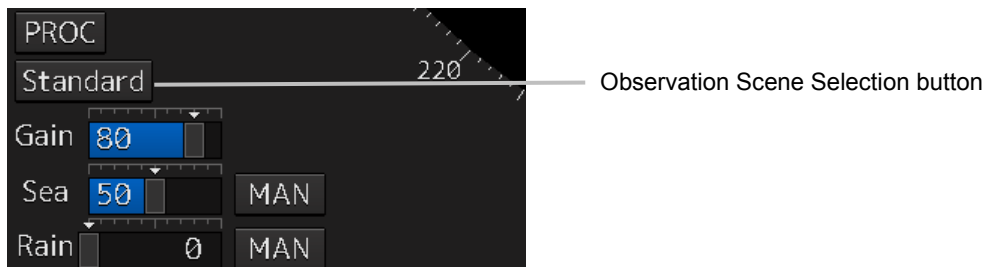
Each time this button is clicked on, the display switches between [AUTO] (automatic) and [MAN] (manual).

5.3.7 Adjusting to optimal images (Selection of observation scenes)

To obtain optimal images, it is necessary to understand the features of radar signal processing settings and perform adjustment according to the sea condition. When adjusting all setting values manually, such adjustment may sometimes difficult even for experienced operators.

Thus, signal processing settings suitable for general usage are preset in the observation scene selection function at the time of factory shipment. In many cases, optimal images can be obtained quickly by selecting the observation scene corresponding to the current sea condition.

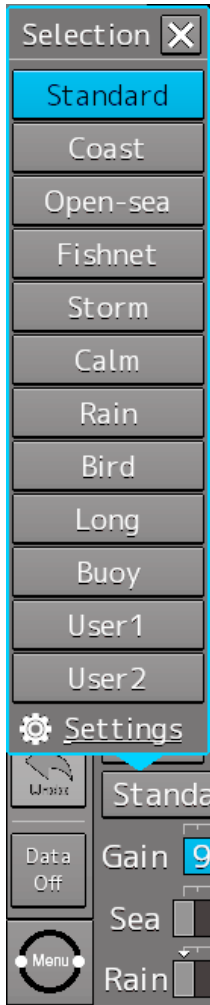
- 1 Click on the Observation Scene Selection button in Radar signal information.



The "Observation Scene Selection" dialog is displayed.

2 Select the observation scene corresponding to the current sea condition

Refer to the following table about the definitions of observation scene.



Observation Scene	Definition
Standard	Standard
Coast	Coastal navigation Use this scene to monitor a relatively short range, for example, bays and coasts where many boats and ships are running. (Importance is attached to resolution.)
Open-sea	Open-sea navigation Use this scene to monitor a relatively long range, for example, the open-sea. (Importance is attached to long range gain)
Fishnet	Fishnet Use this scene to detect small targets such as fishnets of round haul netters hidden by sea clutter returns. (Importance is attached to sea clutter suppression, and gain to moving targets lowers.)
Storm	Storm Use this scene when many rain/snow clutters or sea clutter are detected in stormy weather. (Importance is attached to rain/snow clutter and sea clutter suppression, and gain slightly lowers.)
Calm	Calm Use this scene when only a few rain/snow clutter or sea clutter are detected.
Rain	Rain Use this scene when sea clutter is not strong but rain/snow clutter is strong. (Importance is attached to rain/snow clutter suppression, and gain slightly lowers.)

Observation Scene	Definition
Bird	Bird Use this scene to detect a flock of sea birds.
Long	Long distance detection Use this scene to monitor utmost distances in the broad ocean.
Buoy	Buoy Use this scene to detect small targets such as radio buoys outside of sea clutter. (Targets having low detection probability are displayed.)
User1	User 1 General scene used when the nine scenes above are not applicable.
User2	User 2 General scene used when the nine scenes above are not applicable.

3 Adjust [Gain], [Sea] and [Rain] as necessary.

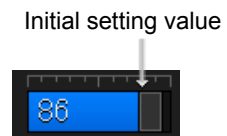
Note

When the setting value among the observation scene is changed from the initial value, underline is displayed for the observation scene selection button and a button corresponding to the "Selection" (observation scene selection) dialog is displayed.

Memo

If the optimal setting value was lost, it is recommended to reset to the initial value and tune up again.

The initial setting value is indicated as shown in the figure at right.



5.4 General Radar Operation

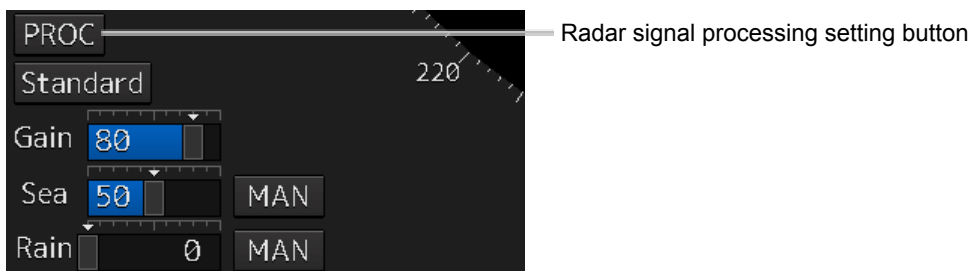
5.4.1 Interference Rejection (IR Function)

By setting IR (Interference Rejection) function, Interference by other radars is rejected.

Note

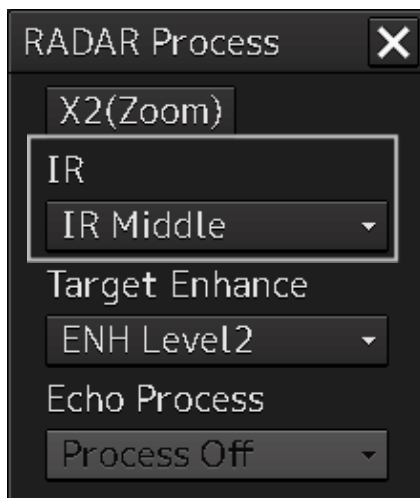
To observe the radar beacon and the SART signal, IR processing may occasionally suppress these images, so set IR to Off (interference rejection function OFF).

- 1 Click on the **RADAR Signal Processing Setting** button in Radar signal information.



The RADAR Process dialog box appears.

- 2 Click on **[IR]** and then select the interference rejection level from the list.



Setting items	Functions and effects
[Off]	Sets the IR function to Off.
[IR Low]	Sets the IR level to the low level.
[IR Middle]	Sets the IR level to the middle level.
[IR High]	Sets the IR level to the high level.

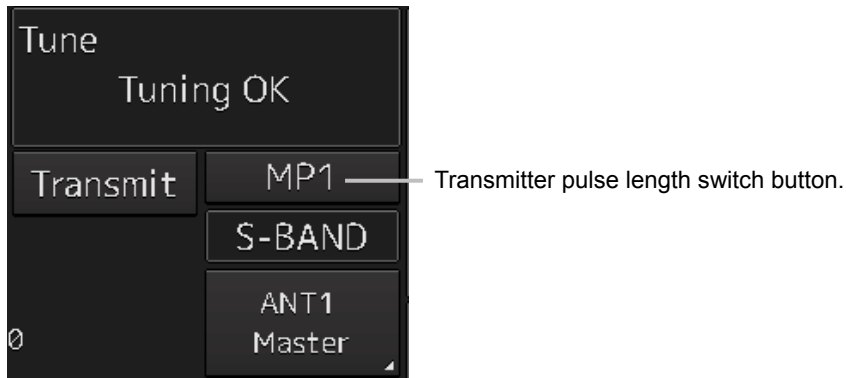
[Points on setting]

When a high interference rejection level is selected, the radar's ability of detecting small targets such as buoys and small boats is lower.

In general, [IR Low] should be selected.

5.4.2 Changing the transmitter pulse length

- 1 Click on the Transmitter Pulse Length switch button in Radar signal information.



Each time this button is clicked on, the transmitter pulse length changes.

Example: [MP1] → [MP2] → [LP1] → [LP2]



Transmitter pulse length	Functions and effects	Recommended condition for selection
[SP]	<ul style="list-style-type: none"> • The transmitter pulse becomes shorter, and the range resolution improves. • The effect of suppressing sea clutter and rain/snow clutter improves. 	In bays/harbors where targets are densely crowded Rough sea state due to torrential rain or stormy weather
[MP]	<ul style="list-style-type: none"> • The normal transmitter pulse length is set. • Both range resolution and gain are appropriately set. 	General navigation
[LP]	<ul style="list-style-type: none"> • The transmitter pulse becomes longer, and gain improves. • Small targets are zoomed and are easy to observe. • When the sea state is bad, detection performance decreases. 	Detection of small targets in good weather conditions

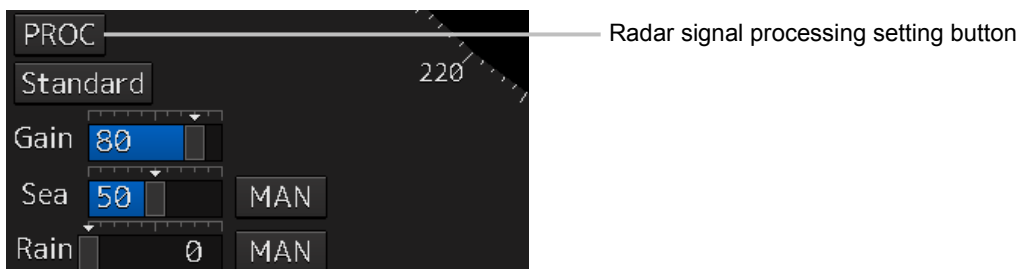
Memo

Usable transmitter pulse length differs according to the type of radar antenna being used and the observation range being used.

5.4.3 Enhancing targets

This function enlarges the display sizes of images to enhance targets.

- 1 Click on the **RADAR Signal Processing Setting** button in **Radar system information**.



The “RADAR Process” dialog box appears.

- 2 Select the target enhancement level from the list in **[Target Enhance]**.



Setting items	Functions and effects	Recommended use condition
[ENH Off]	Sets the target enhancement function to OFF.	Set this function to Off when resolution is particularly necessary.
[ENH Level1]	Enhances the radar echo by 1 level in the vertical and horizontal directions of the screen.	Normal navigation
[ENH Level2]	Enhances the radar echo by 2 levels in the vertical and horizontal directions of the screen.	Enhance the visibility of the radar image
[ENH Level3]	Enhances the radar echo by 3 levels in the vertical and horizontal directions of the screen.	Detect small targets such as buoys

[Setting points]

When [ENH Level3] is selected, sea clutter and rain/snow clutter are apt to be enlarged. To use, suppress images of sea clutter and rain/snow clutter using the [Sea] (sea clutter adjustment) slider and the [Rain] (rain/snow clutter adjustment) slider.

In general, [ENH Level1] or [ENH Level2] should be selected.

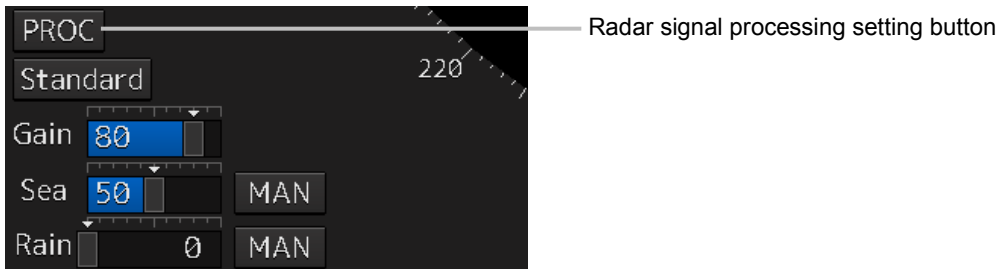
5.4.4 Using video processing (Echo Process)

This function reduces undesirable noise and enhances targets.

Note

- When viewing a radar beacon, SART signal, or fast moving target on the radar display, select [Process Off] (video process off).
- If video processing mode is set to [CORREL], a high speed target is less-visible .

- 1 Click on the RADAR Signal Processing Setting button in Radar signal information.**



The RADAR Process dialog box appears.

- 2 Select the video process mode from the list in [Echo Process].**

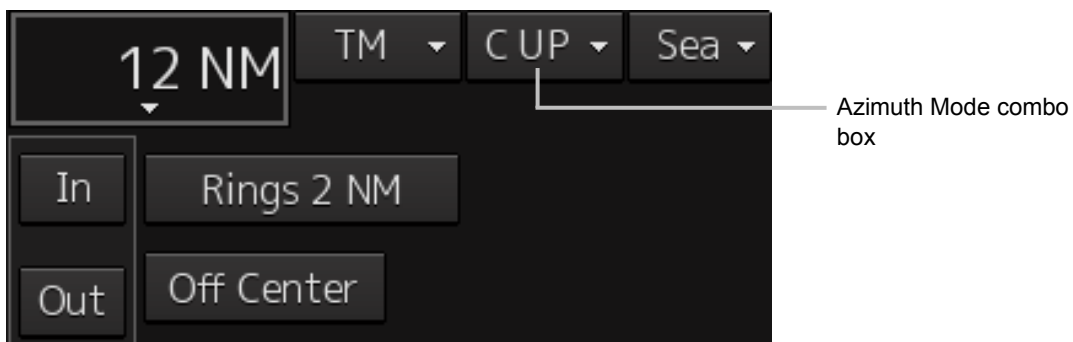


Setting items	Effects and recommended use conditions
[Process Off]	Sets the image processing function to Off.
[3 Scan CORREL]	Use when the rain/snow clutter images are heavy.
[4 Scan CORREL]	Use when enhancing the target while suppressing sea clutter images.
[5 Scan CORREL]	Use when detecting small targets in sea clutter images.
[Remain]	Use when own ship is rolling severely.
[Peak Hold]	Use for detection of small targets of low detection probability.

5.4.5 Setting the azimuth mode

Set the bearing for the radar video to be displayed on the radar display.

- 1 Click on the Azimuth mode combo box in Presentation and mode information.



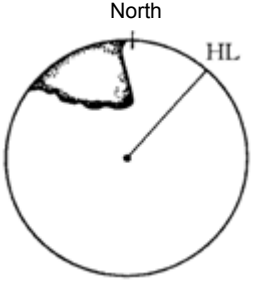
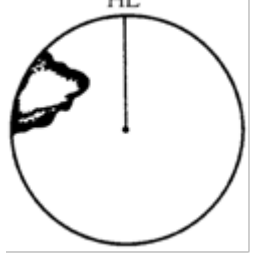
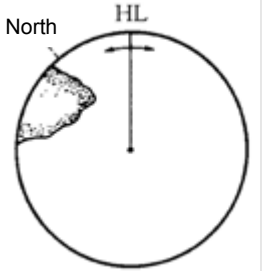
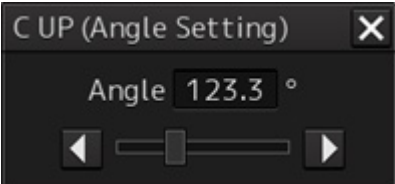
- 2 Select the Azimuth mode.

Note

Available combinations vary depending on the settings of the azimuth mode and the motion mode (refer to "5.4.6 Setting a motion mode").

Azimuth mode \ Motion mode	N UP	H UP	C UP	W UP	C UP (Angle Setting)
TM	○	×	○	×	○
RM(T) or RM(R)	○	○	○	○	○

The following azimuth modes can be set.

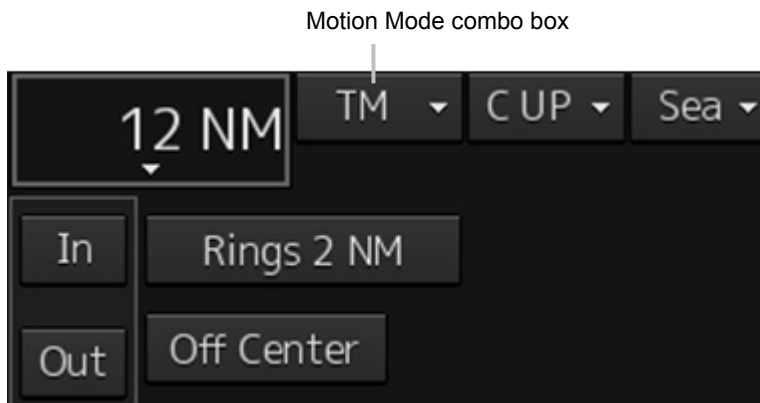
Setting items	Description	Display image
[N UP]	<p>North UP (North Up)</p> <ul style="list-style-type: none"> The video is displayed so that the zenith of the PPI points to the due north. Fixed targets do not flicker and are easily identified on the chart, and the true bearing of a target can easily be read out. 	
[H UP]	<p>Head UP (Head Up)</p> <ul style="list-style-type: none"> The video is displayed so that the ship's heading line is displayed at the top of the screen. Since targets are displayed in their directions relative to the ship's heading line, the operator can view the video in the same field of view as in operating the ship at sea. Therefore, This mode is suitable for watching over other ships This is not available for TM (True Motion) mode. 	
[C UP]	<p>Course UP (Course Up)</p> <ul style="list-style-type: none"> At the setting of Course Up, the ship's heading (HDG) is fixed and displayed immediately above the screen. Similar to true bearing display, the positions of stationary targets will not deviate even if yawing occurs in the ship: targets are displayed stably and the bearing of the heading line moves only according to the amount of change in own ship's course. To change the course, select the Course UP display by clicking on the Azimuth mode combo box several times. A course can be set again. 	
[W UP]	<p>Way Point UP (Waypoint Up)</p> <ul style="list-style-type: none"> The destination is displayed at the top of the screen. 	
[C UP (Angle Setting)]	<p>Course UP by angle setting (Course Up by angle setting)</p> <ul style="list-style-type: none"> When C UP is selected, the "C UP (Angle Setting)" dialog box is displayed. The course angle that is set in the dialog box is displayed by being fixed at the top of the screen. <div data-bbox="416 1617 812 1800" data-label="Image">  </div> <ul style="list-style-type: none"> Input the angle of the ship's heading in the [Angle] input box of the "C UP (Angle Setting)" dialog box. The angle can also be input (increase/decrease) by operating the angle input slider. After completing the setting, click on the [X] button. 	

5.4.6 Setting a motion mode

By setting a motion mode, the display method of the own ship's position on the radar screen can be changed.

Switching Relative Motion (RM) Mode to True Motion (TM) Mode

- 1 Click on the Motion Mode combo box in Presentation and mode information.

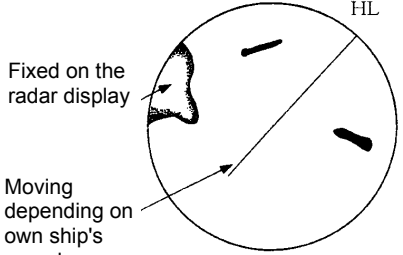


- 2 Select the motion mode.

Note

Available combinations vary depending on the settings of the motion mode and the azimuth mode (refer to "5.4.5 Setting the azimuth mode").

Azimuth mode \ Motion mode	N UP	H UP	C UP	W UP	C UP (Angle Setting)
TM	○	×	○	×	○
RM(T) or RM(R)	○	○	○	○	○

Setting items	Description	Display image
[TM]	<p>True Motion Mode (True Motion display)</p> <ul style="list-style-type: none"> In Ground mode, the own ship's display position moves according to the Speed Over the Ground (SOG) and fixed targets such as land are fixed on the radar screen. In Water mode, the own ship's display position moves according to the Speed Through Water (STW) and fixed targets such as land move according to the difference between the Speed Through Water (STW) and the Speed Over the Ground (SOG). When the own ship reaches to the true motion status, the own ship's position is set at the position of about 60% of the screen radius in direction opposite to the own ship's course by adding the influence of the tidal current. The ship's position starts to move according to the own ship's speed, course, and influence of the tidal current. When the own ship's position reaches the position of about 60% of the screen radius, the position is reset to the position of about 66% of the screen radius in the direction opposite to the own ship's course (COG) by adding the influence of the tidal current at that time. 	
[RM(T)] or [RM(R)]	<p>Relative Motion Mode (Relative Motion display)</p> <ul style="list-style-type: none"> Own ship is fixed at the center of the radar screen and fixed targets such as land move relatively. 	
[TM Reset]	<p>TM Reset</p> <ul style="list-style-type: none"> The own ship's position is reset in [TM] (true motion display) mode. For the details, refer to "5.4.6.1 Resetting Own Ship to its Initial Position in [TM] (True Motion display) Mode". 	

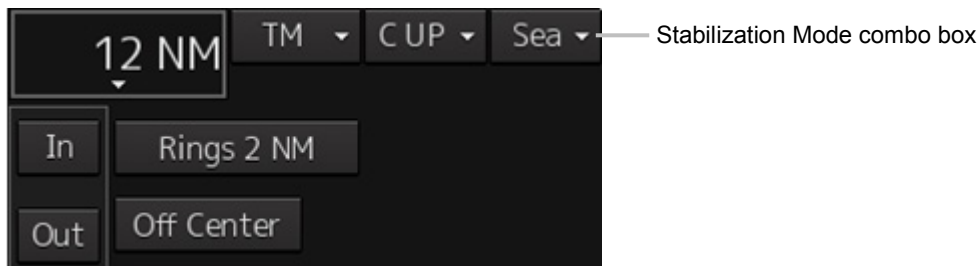
5.4.6.1 Resetting Own Ship to its Initial Position in [TM] (True Motion display) Mode

1 Select [TM Reset] from the Motion Mode.

Own ship is reset to its initial position as established when the relative motion mode is changed to the true motion mode. The ship starts moving from that position.

5.4.7 Setting the Stabilization Mode

- 1 Click on the Stabilization Mode button in Presentation and mode information



5

- 2 Select the Stabilization Mode.

[GND]: Use the ship speed relative to ground in the Stabilization Mode.

[Sea]: Use the ship speed relative to water in the Stabilization Mode.

5.4.8 Moving own ship's display position (Off Center)

The own ship's position can be moved from the display center to any position within 60% of the display radius. This function is convenient for observing a wide coverage in any direction.

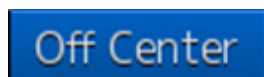
Note

This function is not available on the 96 NM range.

- 1 Click on the [Off Center] button in Presentation and mode information to turn the Off Center mode to "On".

The Off Center mode is switched to On/Off whenever the button is clicked on.

Off Center mode is On:



Off Center mode is Off:



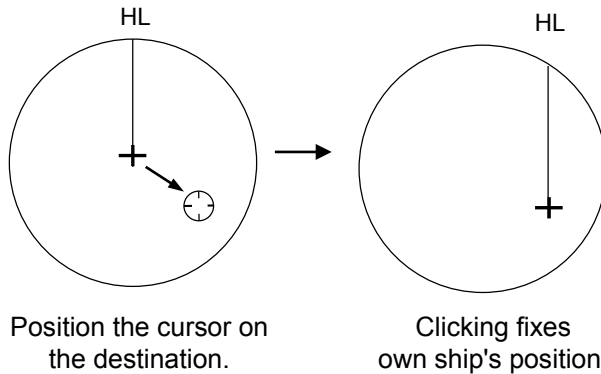
The cursor mode is set to the Off Center mode.

2 Place the cursor on the position you want to move and click on it.

Own ship's display position will be moved to the clicked position.

Note

An own ship display position can be moved within the range in which the own ship display position and the antenna position do not exceed 60% of the screen radius.



Returning own ship's position to the center of the display

1 Click on the [Off Center] button in Presentation and mode information to disable the Off Center mode.

The own ship position is returned to the center of the display (on relative motion) or the position to be reset (on true motion).

5.4.9 Displaying other ship's trails (Trails)

Other ships' movements and speeds can be monitored from the lengths and directions of their trails, serving for collision avoidance.

5.4.9.1 Trails motion mode

There are two types of trails: relative motion trail and true motion trail.

Relative motion trail:

The system plots the trails of a target at a position relative to the own ship. The operator can easily judge whether the target is approaching the own ship.

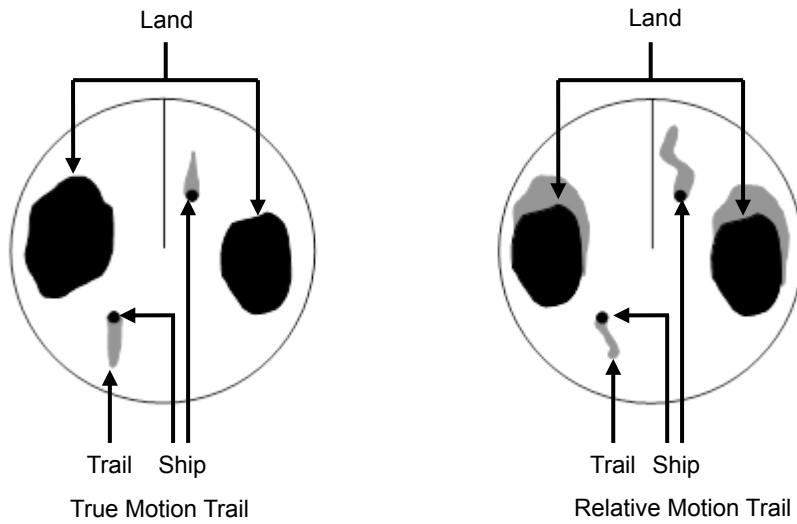
While the own ship is moving, the system also plots the trails of land and other fixed targets.

True motion trail:

The system plots the absolute motion trails of a target, irrespective of the own ship's position.

The operator can easily judge the course and speed of the target.

The system does not plot the trails of land and other fixed targets.



While the true motion trail mode is active, this equipment enables the continuous use of true motion trail even if any of the following operations is performed:

- Motion mode change (TM/RM)
- TM reset
- Azimuth mode change
- Off Center
- Chart display on/off (Chart)

Note

Accurate true bearing signals and speed signals are necessary for using the true motion trail mode.

5.4.9.2 Changing motion mode of trails

The trail display mode can be switched by using the Trail true/relative switching button of other ship information.

Note

The available trail motion modes vary depending of the motion mode that is set.

True motion display (TM): Only true motion trail is available.

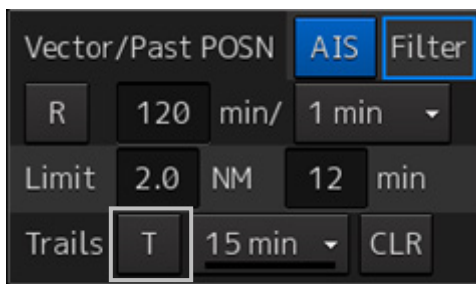
Relative motion display (RM): Relative motion trail and true motion trail can be selected.

[RM(R)] is displayed when relative motion trail is used.

[RM(T)] is displayed when true motion trail is used.

1 Click on the Trails True/Relative switch button.

Each time this button is clicked on, the display mode of Trails switches between [T] and [R].



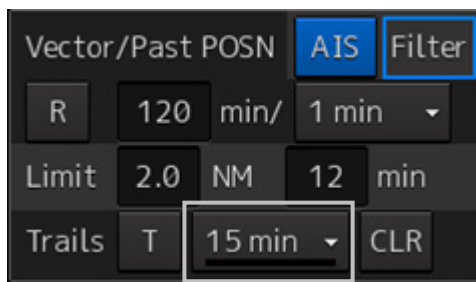
[T]: (True motion trail)

[R]: (Relative motion trail)

For the details of the motion mode of trails, refer to "5.4.9.1 Trails motion mode".

5.4.9.3 Setting the length of the trail

1 Click on the Trail Length switch combo box in [Trails] of other ships' information.



Select a radar trail length.

Short mode: Off, 15 sec, 30 sec, 1 min, 3 min, 6 min, 10 min, 15 min, 30 min, 60 min

Long mode: Off, 30 min, 1 hr, 2 to 24 hrs (at 1 hr interval from 1 to 24 hrs)

Memo

Saved trails cannot be erased even when the trail lengths are changed the Trail Length switch combo box.

Even after the trails display is turned off once, the past trails can be displayed traced back by setting a desired time. The plot of the trail starts when starting the transmission.

The system is plotting trails even while the trails display is off.

If only a short time has elapsed after the commencement of transmission, the display may not reach the specified value. The time not to reach is indicated by the length of the blue bar shown at the lower part of the Trail Length switch combo box.

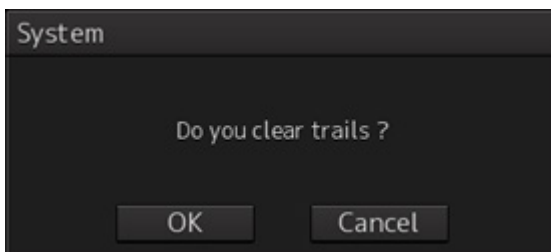
5.4.9.4 Clearing trails data

- 1 Click on the [CLR] (clear trails) button.



The confirmation dialog box appears.

- 2 Click on the [OK] button.



All the saved trails data will be cleared. The system starts plotting trails in initial state.

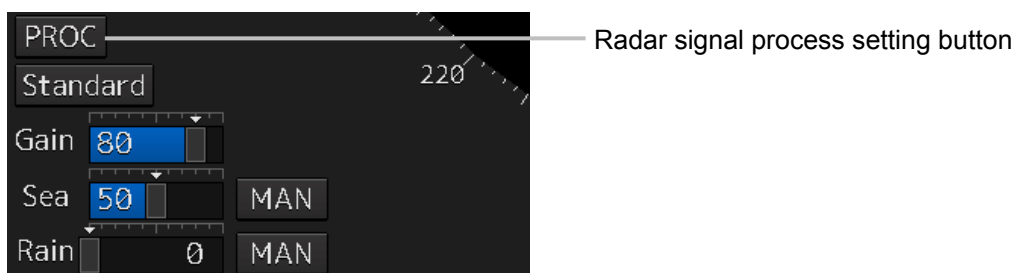
5.4.10 Doubling the size of radar image

This function doubles the size of radar video near a specified position.

Note

If the range is 0.125 NM and the motion mode is in the TM mode, this function is not available.

- 1 Click on the radar signal process setting button in Radar signal information.



"RADAR Process" dialog box appears.

- 2 Click on the [X2(Zoom)] (double zoom) button.



Each time this button is clicked on, the double zoom function is switched On and Off.

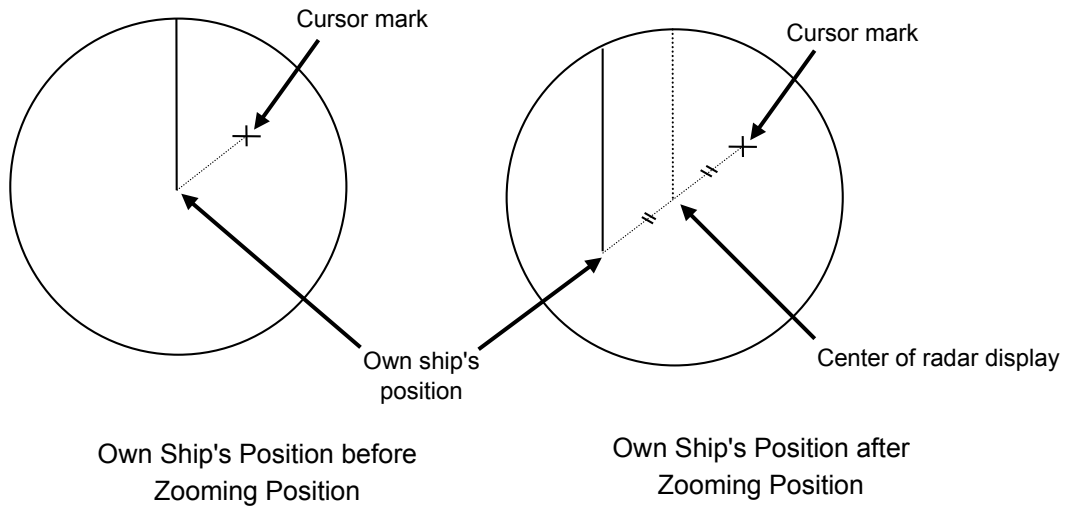
On display: 

Off display: 

When double zoom is set, the cursor mode changes to the off-set cursor.

3 Place the offset cursor on a location you want to zoom and click on it.

Using the cursor position as the reference, the screen display is enlarged by a magnification of 2 so that the midpoint between the cursor and own ship's position comes at the center of the radar display.



Canceling zoom display

1 Click on the [X2(Zoom)] button to turn the X2 Zoom function Off.

Off display: **X2(Zoom)**

5.4.11 Hiding the heading line (HL OFF)

- 1 Click on the disclosure button on the left toolbar.

When the left toolbar is set to expanded display, this operation is not required.



- 2 The ship's heading line is hidden while the [HL Off] button is pressed down.

When the button is released, the ship's heading line is redisplayed.



5.4.12 Hiding graphics information on radar display

On the radar screen of this equipment, various types of graphics information such as TT/AIS symbol, user map, and chart information are displayed. When the visibility of the radar screen deteriorates due to excessive amount of graphic information displayed, the visibility of the screen can be improved by temporarily clearing the unnecessary graphic information by using this function.

- 1 While the [Data OFF] button on the left toolbar is being held down, graphic information other than the TT and AIS of danger targets, radar images, radar trails and cross cursors are hidden.

When the button is released, graphics information is redisplayed.



5.4.13 Setting true bearing

When the GYRO I/F is used to enter a gyro signal, there is a rare case in which a true bearing value indicated by the master gyro does not match the true bearing value indicated by this equipment.

In that case, adjust the true bearing value of this system so that it matches the value indicated by the master gyro.

- 1 Click on the [Menu] button on the left toolbar.
A menu is displayed.
- 2 Click [Settings] - [General] on the menu.
The [General] dialog box appears.

- 3 Click on the input box of [GYRO Setting].



- 4 Input a master gyro value on the software keyboard.

5.4.14 Setting own ship speed

5.4.14.1 Switching own ship speed device

- 1 Select the ship speed device from the STW Source combo box in the own ship information.





- When using 1-axis log, heading speed component can be detected, but transverse speed component cannot be detected. Then leeway effect (component drifted by wind) cannot be detected.
- When using 2-axes ground log, its accuracy in shallow waters may be deteriorated, and its speed in deep sea areas may be unable to be detected.
- When using a GPS, COG accuracy is less than $\pm 3^\circ$ at speed: from 1kn to 17kn, and is less than $\pm 1^\circ$ at speed: more than 17kn.

5.4.14.2 Entering the ship's heading/own ship's speed manually

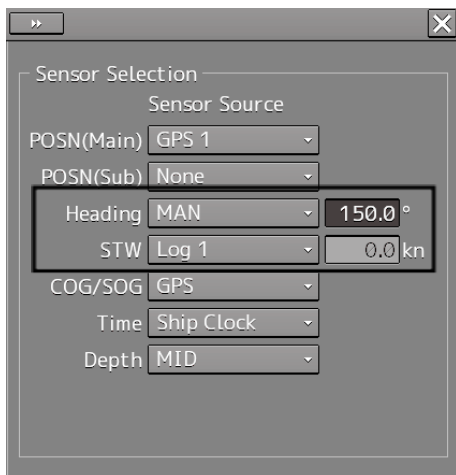
If any device such as LOG, etc., connected to this equipment malfunctions, it is possible to manually enter own ship's heading/speed by the method described below to use the target tracking (TT) and true motion display functions.

- 1 Select [Menu] from the corresponding combo box.



The [Sensor Selection/Status] dialog box is displayed.

- 2 When inputting a ship's heading manually, select [MAN] from the [Heading] combo box. To input an own ship speed manually, select [MAN] from the [STW] combo box.
- 3 Click on the input box.



- 4 Enter a numeric value by using the software keyboard.

Section 6 Target Tracking and AIS

This section explains Target Tracking (hereinafter, referred to as target tracking or TT) and Automatic Identification System (hereinafter referred to as AIS).

CAUTION



Use the target tracking function as your navigation aid. Final decision on the ship operation must be made by the ship operator himself.

If you depend entirely on the information of the target tracking function for the final decision on ship operation, an accident may occur.

An error may be contained in the vector, target value data and alarm indicated by the target tracking function. Further, the target not detected by radar cannot be captured or tracked.

If you depend entirely on the information of the radar for the final decision on ship operation, such an accident as collision or stranding may result.



Simulation is a function for determining if the target tracking function is working correctly or not. Accordingly, this function should be used only to check for the target tracking function operation.

In particular, if this mode is used during navigation, a pseudo target will appear on the radar screen and cannot be easily identified from the real target. This may cause such an accident as collision. Do not use this mode during the navigation.

6

Target Tracking

This function calculates the course and speed of a target by automatically tracking the target's move.

This function enables the automatic acquisition of targets by using the automatic acquisition zone function.

This function also enables the simulation of the ship maneuvering method to avoid collisions by using the trial maneuver function.

Memo

If the mode is ground stabilization, SOG/COG used for own ship's information. If the mode is sea stabilization, STW (speed through the water)/HDG (heading) is used for own ship's information.

Target tracking range is 32 NM. (Available all range scale)

For the details, refer to "6.5 Setting and Operating Target Tracking".

AIS

This function shows the target's information on the radar display, using other ship's information sent out from the AIS unit.

For the details, refer to "6.6 Setting and Operating AIS".

6.1 Restrictions

The acquisition and Target Tracking functions have the following restrictions.

Depending on distance and echo size, resolution between adjacent targets during automatic target tracking usually ranges somewhere between 0.03 to 0.05 NM. If multiple targets approach each other, there is a possibility of swapping them or losing one of them. Such swapping or loss of targets may also occur if the target being tracked is affected by rain/snow clutter or sea clutter or moves very close to land.

The intensity of echoes and the Target Tracking function have a relationship, and thus the target will be lost if no echoes are detected during six scans in succession.

If such a lost target exists, therefore, radar gain must be increased to support detection of the target. If, however, radar gain is increased too significantly, sea clutter or other noise may be erroneously detected and tracked as a target, and resultingly, a false alarm may be issued.

To execute accurate tracking, it becomes necessary first to appropriately adjust the gain, sea clutter suppression, rain/snow clutter suppression and tune of the radar so that the target to be acquired and tracked is clearly displayed on the radar display.

Inappropriate settings of these adjustments reduce the reliability/accuracy of automatic target tracking.

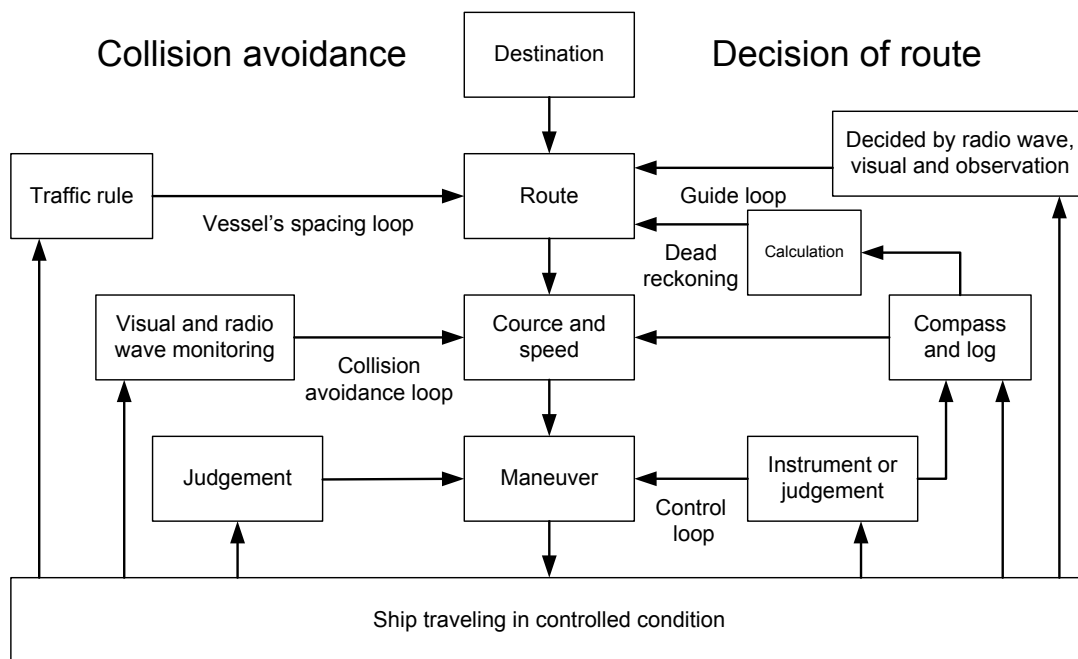
6.2 Collision Avoidance Issue (Explanation)

6.2.1 Collision Avoidance in Navigation

Marine collision avoidance in navigation is one of the problems that have been recognized from of old. This section contains a brief statement about the position of collision avoidance in navigation.

The navigation pattern of all mobile craft constitutes a system with some closed loops regardless of the media through which the mobile craft travels, whether air, water, the boundary between air and water, or space. This pattern consists of two closed loops in principle, one of which is a collision avoidance with another mobile craft and the other is a loop of finding a right and safe way to reach a predeterminate destination.

The following figure shows the conceptual diagram of navigation pattern by Mr. E.W. Anderson. The closed loop of collision avoidance is shown on the left side and the closed loop of finding a safe route on the right side.



Navigation Pattern

6.2.2 Marine Accidents and Collisions

Among marine accidents, collision accidents have been highlighted as the tonnages and speeds of ships become higher along with the increase in traffic at sea.

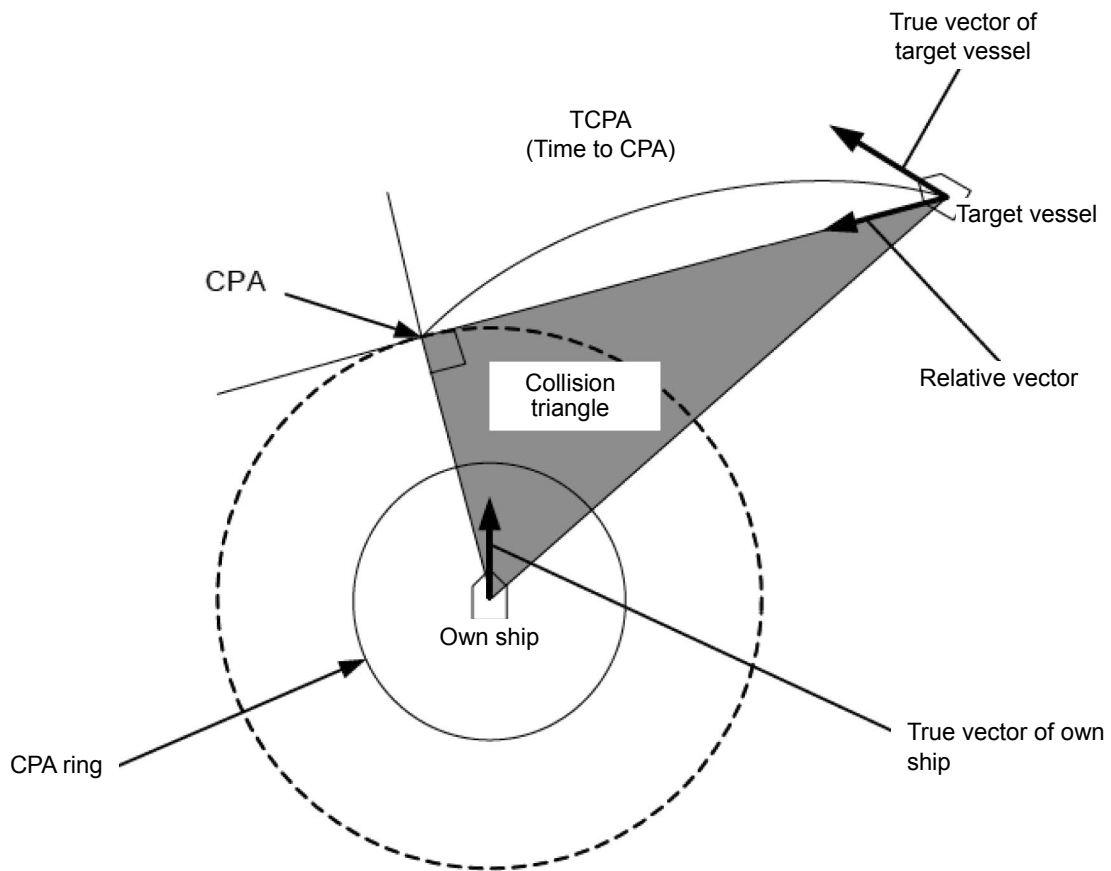
If a tanker carrying dangerous articles such as crude oil collides with any other vessel, then not only the vessels involved with the accident but other vessels in the vicinity, port facilities and inhabitants in the coastal area as well as marine resources may also suffer immeasurable influence.

Collision accidents have a high percentage of the marine accidents that have occurred in recent years. To cope with these problems, any effective measures are needed and some equipment to achieve collision avoidance requirements has been developed at rapid strides.

6.2.3 Basic Concept of Collision Avoidance

There are two aspects in collision avoidance: collision prediction and avoidance. Putting it in extreme terms, collision prediction is to predict that two or more vessels will happen to occupy the same point at the same time, while collision avoidance is to maneuver vessels not to occupy the same point at the same time.

In practical operation of vessels, a spot of collision has to be deemed to be a single point but a closed zone. This closed zone is conceptually defined as a CPA (Closest Point of Approach). Further, the time taken to arrive at CPA is required for collision prediction, and the danger of collision is judged considering the TCPA (Time to CPA). The following figure illustrates a diagram caked "Collision Triangle".



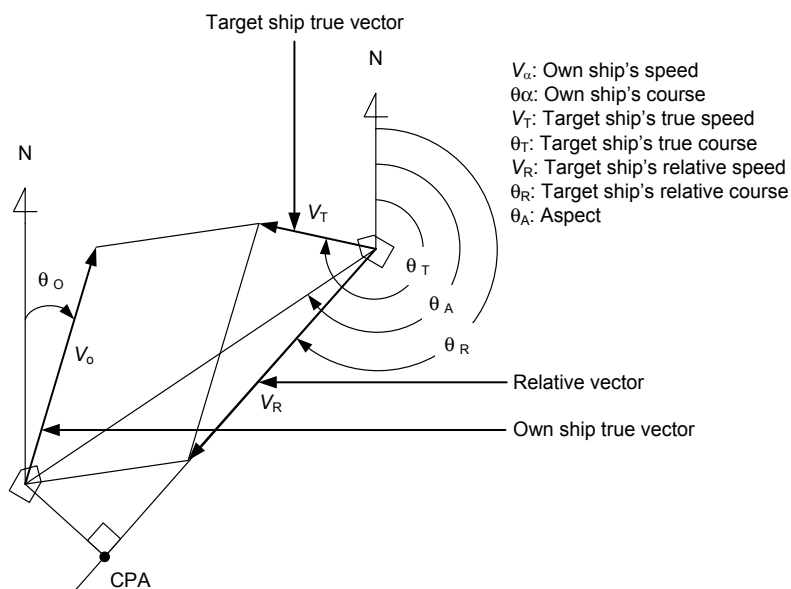
6.2.4 Relative Vector and True Vector

From two points of view, collision prediction and avoidance, it is necessary to obtain the relative vector of other ship for prediction and the true vector of other ship for collision avoidance in order to realize other ship's aspect.

The relationship between the relative vector and true vector is shown in the following figure.

Furthermore, the meanings of both vectors are explained.

Both rough CPA and TCPA can be obtained easily from the relative speed vector of other ship. This method has an advantage that the risks of collision with all other ships within the radar range can be seen at a glance. On the other hand, the course and speed of other ship can easily be obtained from its true speed vector, enabling other ship's aspect to be seen at a glance. Thus, the aspects of other ships (transverse, outsail, parallel run, reverse run, etc.) as described in the act of prevention of collision at sea can be readily understood. If there is a risk of collision with other ship, the operator can determine which rule to be applied and how to operate own ship.



6.2.5 Radar and Collision Avoidance

Radar is still playing an important role for collision prevention and positioning.

A plotter is used to further enhance the radar functionality. The plotter is capable of plotting other positions of other ships in 3 to 6 minute intervals to monitor their movement. The plots of other ships represent their tracks relative to own ship, and it is shown whether there is a risk of collision, namely CPA and TCPA can be obtained. This method using a plotter is fairly effective, but the number of target ship, which is manually plotted, is limited and it takes several minutes to measure those.

6.3 Displaying Symbols



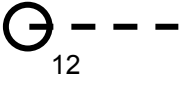

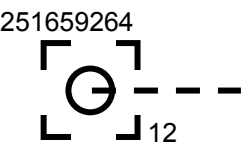


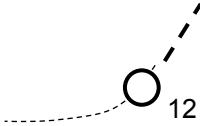
This section describes the symbols that are used for target tracking and AIS.

6.3.1 Displaying/hiding target tracking symbols/AIS target symbols






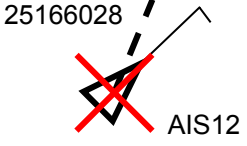




In the display setting at the time of shipment from the factory, the display of target tracking symbols and of the AIS target symbols is enabled. However, choosing [Options] – [Target] from the View menu can switch between display and hide.



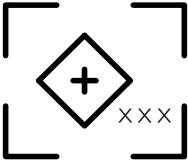
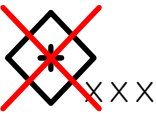





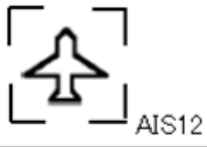

For the details, refer to "16.2.7 Setting up the display of TT/AIS target".


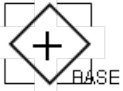

6.3.2 Types and Definitions of Target Tracking Symbols

Symbol	Definition	Remarks
	Initial acquisition target	This symbol is displayed until the vector is displayed after target acquisition.
	Target acquired in automatic acquisition zone	The alarm sounds. The alarm message (New Target) turns orange and blinks. The symbol turns red and blinks.
	Tracked target	This means a tracked target.
	Dangerous target	The alarm sounds. The alarm message (CPA/TCPA) turns red and blinks. The symbol is enlarged and displayed in red.
	Numeric displayed target	When the numeric data is displayed, the target symbol is enclosed in a square.
	Lost target	The alarm sounds. The alarm message (Lost) turns orange and blinks. The symbol turns red.
	Past position	The past positions of an AIS target are displayed as well as the target tracking symbol.
	Target track	The track of another ship as an AIS target is displayed as well as the target tracking symbol.

6.3.3 Types and Definitions of AIS Target Symbols

Symbol	Definition	Remarks
	Sleeping target	This symbol is displayed when received data is valid. The direction of the triangle's vertex indicates the target's heading or course.
	Activated target	The heading direction is displayed with a solid line, and the course vector is displayed with a dotted line. The line perpendicular to the heading direction indicates the direction to which the course is to be changed. This line may not be displayed.
	Outline display	The outlines of ships are displayed scaled down.
	Numeric displayed target	When the numeric data is displayed, the target symbol is enclosed in a square.
	Dangerous target	The alarm sounds. The alarm message (CPA/TCPA) turns red and blinks. The symbol is enlarged and displayed in red.
	Lost target	The alarm sounds. The alarm message (Lost) turns orange and blinks. The symbol is displayed by overlaying red x marks.
	Sleeping AIS-SART target	Displayed by the same color as AIS symbol.
	Activated AIS-SART target	Displayed target No. nearby the symbol.
	Numerical display AIS-SART target	When the numeric data is displayed, the target symbol is enclosed in a square.
	Lost AIS-SART target	Displayed if AIS-SART data is not received for 6 minutes.

Symbol	Definition	Remarks
	Real AIS AtoN target (On position)	Displayed target No./AtoN name (xxx) nearby the symbol.
	Real AIS AtoN target (Off position)	The symbol and target No./AtoN name (xxx) nearby the symbol are indicated in red.
	Real AIS AtoN target (Numerical display)	When the numeric data is displayed, the target symbol is enclosed in a square.
	Real AIS AtoN target (Lost)	The alarm sounds. The alarm message (Lost) turns orange and blinks. The symbol is displayed by overlaying red x marks.
	Virtual AIS AtoN target (On position)	Displayed target No./AtoN name (xxx) nearby the symbol.
	Virtual AIS AtoN target (Off position)	The symbol and target No./AtoN name (xxx) nearby the symbol are indicated in red.
	Virtual AIS AtoN target (Numerical display)	When the numeric data is displayed, the target symbol is enclosed in a square.
	Virtual AIS AtoN target (Lost)	The alarm sounds. The alarm message (Lost) turns orange and blinks. The symbol is displayed by overlaying red x marks.
	AIS SAR aircraft	Displayed by the same color as AIS symbol.
	Numerical display AIS SAR aircraft	When the numeric data is displayed, the target symbol is enclosed in a square.
	Lost AIS SAR aircraft	The alarm sounds. The alarm message (Lost) turns orange and blinks. The symbol is displayed by overlaying red x marks.

Symbol	Definition	Remarks
	AIS coastal base station	Displayed by the same color as AIS symbol.
	Numerical display AIS coastal base station	When the numeric data is displayed, the target symbol is enclosed in a square.
	Lost AIS coastal base station	The alarm sounds. The alarm message (Lost) turns orange and blinks. The symbol is displayed by overlaying red x marks.

6.3.4 About AIS AtoN (Aids to Navigation)

AIS AtoN is a system that displaying aid to navigation like a lighthouse, light buoy or unreal aid to navigation on the display unit on ships using AIS receiver.

There are following two kinds of AIS AtoN.

AIS AtoN type	Function	Operation example
Real AIS AtoN	Installs the AIS on real aid to navigation, and displays its location on the display unit on ships.	In low visibility, receiving the Real AIS AtoN symbols facilitates identification of the light location and light buoy.
Virtual AIS AtoN	Displays virtual aid to navigation on the display unit on ships according to the signals transmitted from the AIS station on the land.	In the sea area where installation of the light buoy is difficult, the Virtual AIS AtoN symbols are displayed as virtual light buoys that are used as targets for getting to the destination. This system can also be used as the aid substituted for the aid to navigation damaged by natural disasters.

6.3.5 About AIS-SART Information

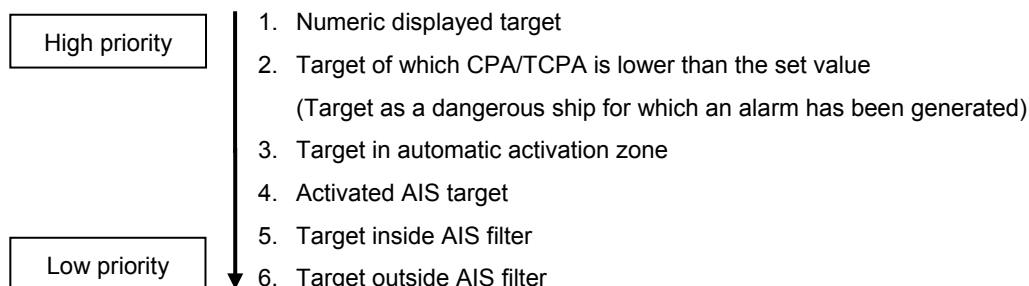
The AIS-SART function enables information about the location of wrecked ship to be displayed on the screen.

For the details, refer to "7.5 Display of AIS-SART".

6.3.6 About Display Priority of AIS Targets

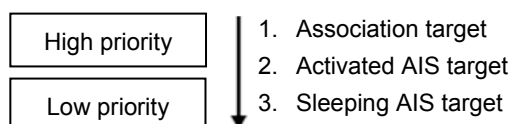
Up to 500*1 targets can be displayed in total of activated and sleeping AIS targets. Up to 500 activated AIS targets can be displayed in the total.

When there is an AIS target of 500*1 or more, the display is made according to the following priority order.



*1: The maximum number of AIS targets displayed can be changed to the option of 1000 targets.

If the number of targets at the same priority level exceeds the allowable maximum, they are displayed in the following priority order:



6.3.7 Switching between Ground Vector and Water Vector

The vector of an AIS target is to be displayed with a vector over ground or over water by switching the stabilization mode. The type of the currently displayed vector can be confirmed by viewing the setting of the stable mode.

When [GND] is selected for the stabilization mode: Ground vector

When [Sea] is displayed for the stabilization mode: Water vector

When the vector of an AIS target is displayed with a vector over water, the system has converted the AIS target's vector over ground to the vector over water according to the data received from the AIS and the own ship's information.

6.3.8 Association Target Symbols

When the TT target and AIS target are determined to be the same targets, the association symbols are displayed as follows.

Symbol display for high-priority TT targets



12 — Association targets

Symbol display for high-priority AIS targets



AIS12 — Association targets

When the TT target and AIS target are determined to be the same targets, the TT target or AIS target that are displayed on a higher priority basis can be set.

1 Right-click on the tracked target with association displayed.

The context menu appears.

2 Click on [Property] in the context menu.

The "TT Target INFO" or "AIS Target INFO" dialog appears.

3 Select [AIS] or [TT] from the [Priority] combo box.

[AIS]: The AIS target is displayed on a higher priority basis.

[TT]: The TT target is displayed on a higher priority basis.

6.4 Preparation

6.4.1 Setting the Cursor Mode to AUTO Mode

If the cursor mode is set to the AUTO mode, various TT/AIS functions can be executed quickly.

- 1 Click on the [AUTO] (cursor mode selection) button on the left toolbar.



The cursor mode changes to the AUTO mode.

The [AUTO] mode performs operation in accordance with the object at the cursor position when clicked.

For the details, refer to "3.12 Cursor AUTO Mode".

6.4.2 Setting Vector

A vector to represent a target's predicted position can be presented in the True vector or Relative vector mode. In each mode, a Vector Length can be freely changed for a time interval of 1 to 120 minutes.

6.4.2.1 Vector modes

Different vector modes can be used as described below according to the purpose.

To perceive the true state of the target: True Vector

To perceive the closest approach point of the target: Relative Vector

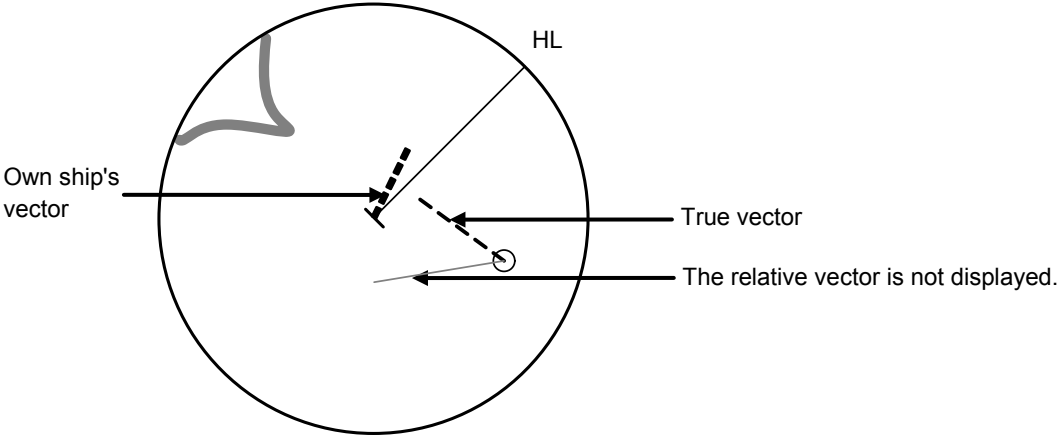
True vector mode

In the true vector mode, the directions of vectors indicate the true courses of targets and the Vector Lengths indicate the values which are proportional to their speeds.

In the true vector mode, the movements of other ships around own ship can be accurately and easily monitored.

Vectors of own ship are displayed as shown below.

Note
In true vector mode, CPA ring cannot be displayed.

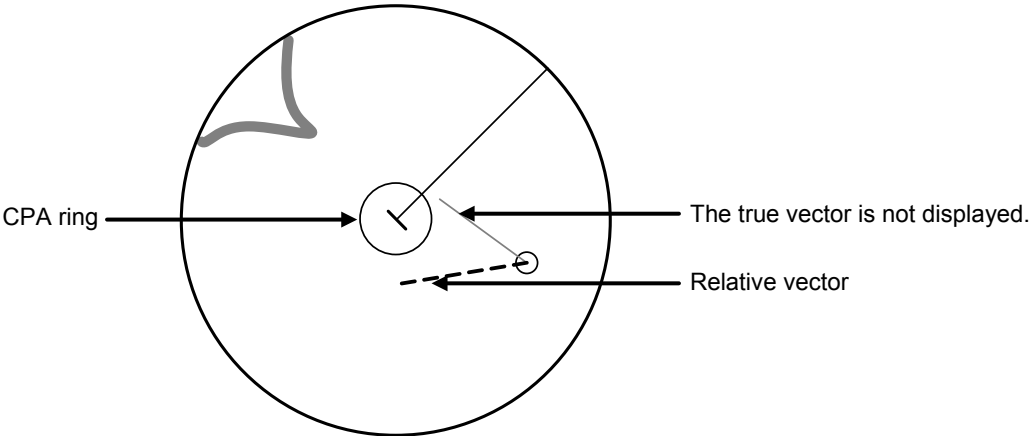


Example of True Vector Mode

Relative Vector Mode

The relative vector does not represent the true motion of the target, but its relative relation with own ship. A target with its relative vector directed to own ship (passing through the CPA limit ring) will be a dangerous target.

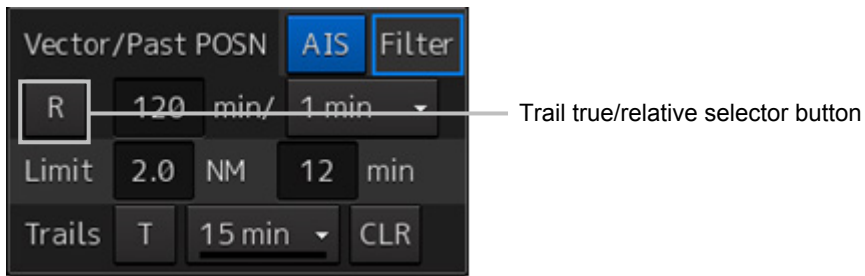
In the Relative Vector mode, it can be seen at a glance where the CPA limit of the dangerous target is.



Example of Relative Vector Mode

6.4.2.2 Setting vector mode

- 1 Click on the trail true/relative selector button in the other ship information window.

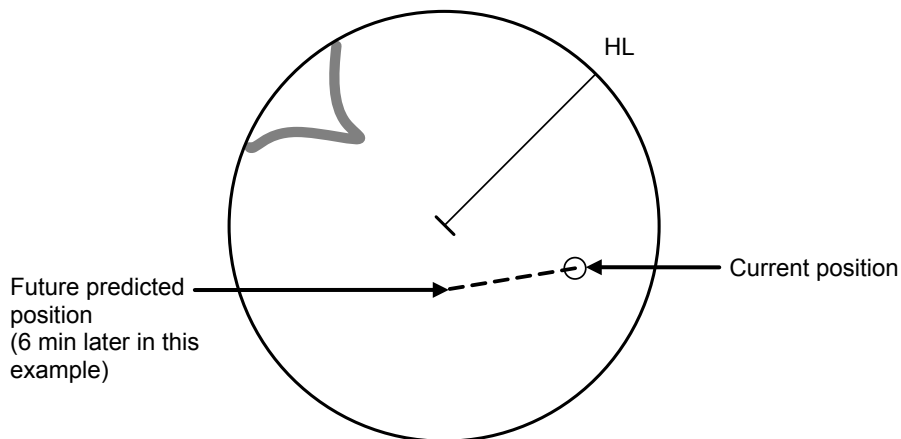


Each click switches track display mode between [T] and [R].

6.4.2.3 Vector Length (Vector Time)

The Vector Length of a target is proportional to its speed, and the vector time can be switched in a range of 1 to 120 minutes.

The following figure shows an example in which the Vector Length is set to 6 min, and the tip of the vector represents the target's position expected to reach 6 minutes later.



Example of Vector Length

6.4.2.4 Setting the Vector Length

The Vector Length is set in min in the range from 1 min to 120 min.

- 1 Click on the Vector Length input box in the other ship information window.



- 2 Enter the Vector Length.

6.4.3 Setting collision decision criteria

Collision decision criteria are set based on CPA and TCPA.

For an outline of CPA and TCPA, refer to "6.2.3 Basic Concept of Collision Avoidance."

Note

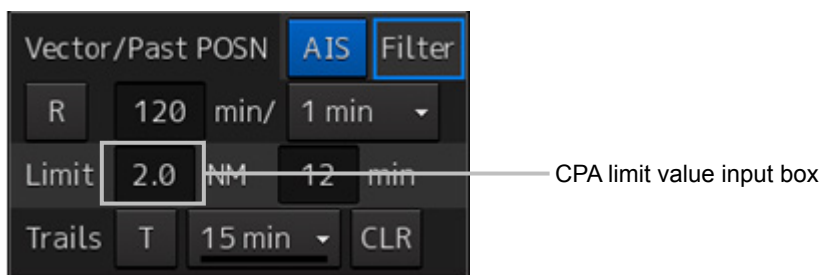
Set the optimum values of collision decision conditions, with consideration for vessel type, water area, weather and oceanographic conditions.

For the relations between those conditions and alarms, refer to "6.7 Alert Display".

6.4.3.1 Setting CPA limit

- 1 Click on the CPA limit value input box in the other ship information window.

Set the CPA limit in the unit of 0.1 NM within the range from 0.1 NM to 9.9 NM.



- 2 Enter the CPA limit.

6.4.3.2 Setting TCPA limit

- 1 Click on the TCPA limit value input box in the other ship information window.
Set the TCPA limit in the unit of 1 min within the range from 1 min to 99 min.



- 2 Enter the TCPA limit.

For the details on how to set up alerts based on the collision determination condition, refer to "17.2 Collision Avoidance Alert Generation Conditions".

6.4.4 Showing the CPA ring (RADAR only)

The CPA ring is rendered as a red circle with the own ship centered and the CPA limit set distance used as the radius.

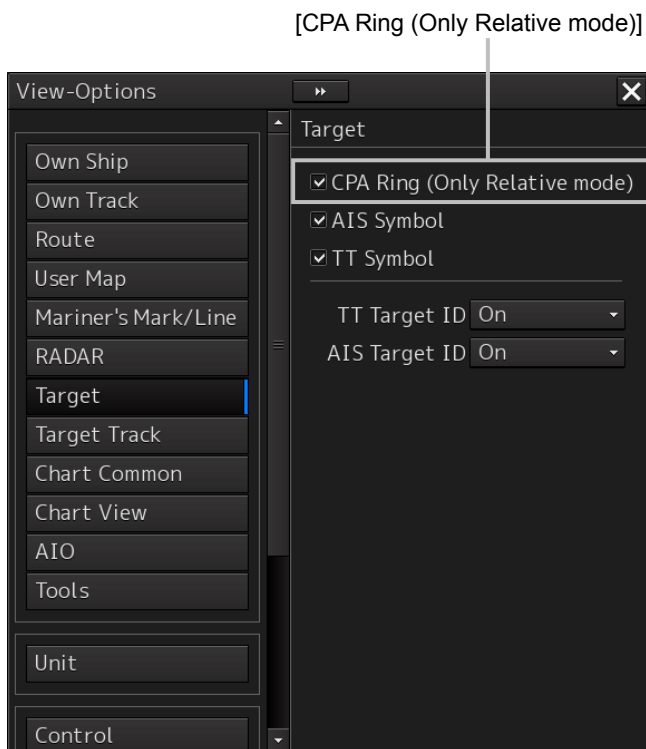
- 1 Click on the [Menu] button on the left toolbar.

The menu is displayed.

- 2 Click on [View] - [Option] - [Target].

The [Target] dialog is displayed.

- 3 Select [CPA Ring (Only Relative mode)].



The CPA ring is shown.

Note:

When True is specified for the vector mode, [CPA Ring (Only Relative mode)] cannot be selected.

6.5 Setting and Operating Target Tracking

The Target Tracking function automatically tracks the acquired targets and records and displays the course and speed of the targets as vector. Alerts can also be output based on the set collision decision criteria (CPA and TCPA).

Note

At power off and during preparation for transmission, tracking data records are deleted.

6.5.1 Acquiring target

The methods for acquiring targets include Auto Acquisition (automatic acquisition) mode and ACQ MANUAL (manual acquisition) mode.

Both modes can also be used concurrently.

6.5.1.1 Automatic acquisition (automatic acquisition) mode

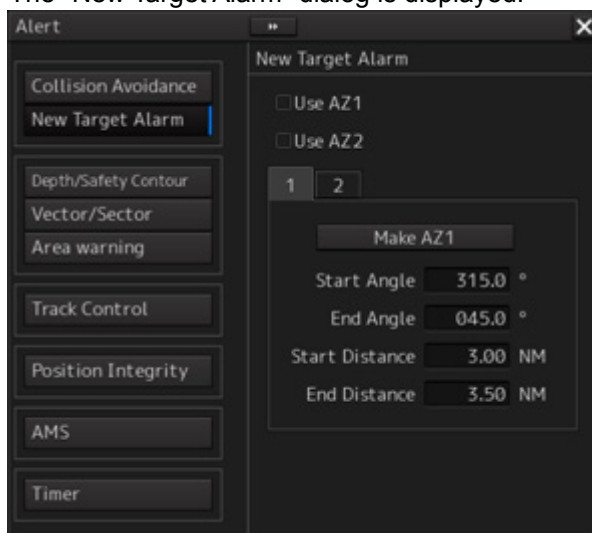
By setting up and enabling the automatic acquisition/activation zone (AZ), targets intruding into the AZ can automatically be acquired/tracked and also issue a new target warning.

Note

If manual acquisition is made in a state in which the number of targets being tracked has reached the maximum number of targets, the target with the lowest danger level among the targets that have been captured thus far automatically is erased successively.

Take the following steps to enable automatic acquisition/activation zone (AZ).

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click [Alert] - [New Target Alarm] on the menu.**
The "New Target Alarm" dialog is displayed.



3 Check [Use AZ1] (automatic acquisition zone 1) or [Use AZ2] (automatic acquisition zone 2).

Automatic acquisition/activation zone (AZ) includes AZ1 and AZ2.

To enable AZ1, check [Use AZ1].

To enable AZ2, check [Use AZ2].

Memo

For the details of "New Target Alarm" dialog box, refer to "17.3 New Target Alarm Generation Conditions".

To automatic acquisition/activation zone (AZ):

Clear the check of [Use AZ1] or [Use AZ2].

The AZ can also be enabled/disabled with the [AZ] key on the keyboard operation unit.

For the details of function assignment to the [AZ] key, refer to "18.20 Setting Key Assignment".

6.5.1.2 ACQ MANUAL (manual acquisition) mode

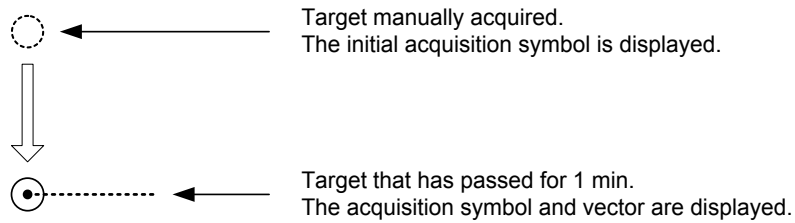
Note

The manual acquisition mode does not function in the following states.

State	Action to Take
The number of tracked targets has reached the maximum count.	Erase unnecessary targets.
The radar antenna is in the standby state.	Wait until the radar antenna becomes ready.
A PROC (Interrupt) warning is being generated.	Clear the warning.
A Gyro (I/F)/Gyro (Data)/Heading (Data) warning is being generated.	
The tracked target is located 32 NM away from own ship.	The manual acquisition mode cannot be used.
The tracked target is located less than 0.1 NM from own ship.	

To acquire the tracked target in the manual acquisition mode

- 1 Set the cursor mode to the AUTO mode.**
- 2 Place the cursor on the target to be acquired and then click on.**
The target is acquired and the initial acquisition symbol is displayed.
The vector is displayed within 1 minute.



Memo

If only the manual acquisition mode will be used without using auto acquisition/activation together, disable the AZ.

6.5.1.3 Using manual acquisition and auto acquisition together

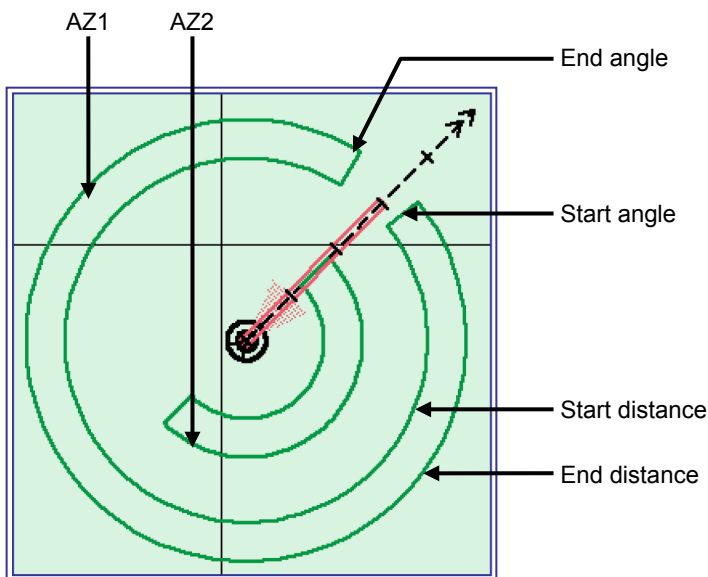
By using manual acquisition with AZ enabled, auto acquisition and manual acquisition can be used together. They may be used if a target to which particular attention should be given is manually acquired and other targets are automatically acquired.

Note

If a new target intrudes exceeding the maximum number of targets, the targets manually acquired are displayed even in the rearward until they go out of the screen. However, the targets automatically acquired are erased from those in the rearward.

6.5.2 Setting up the automatic acquisition/activation zone (AZ)

Auto acquisition/activation zone has the shape of sector set up according to the angle and distance as shown in the following figure.



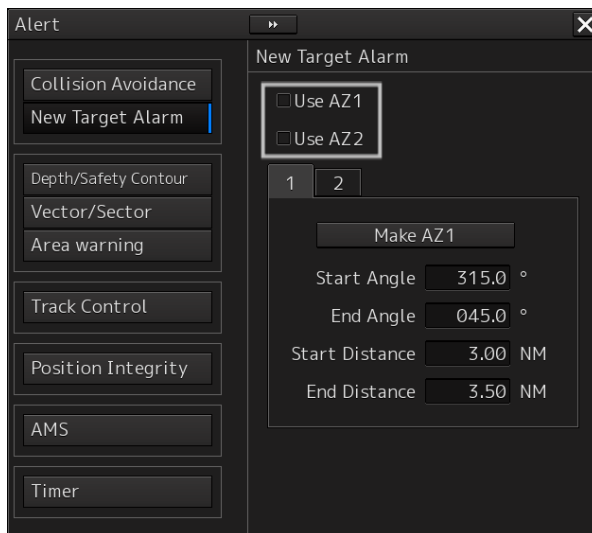
Example of auto acquisition/activation zone (AZ)

Auto acquisition/activation zone (AZ) is set up using the following three methods.

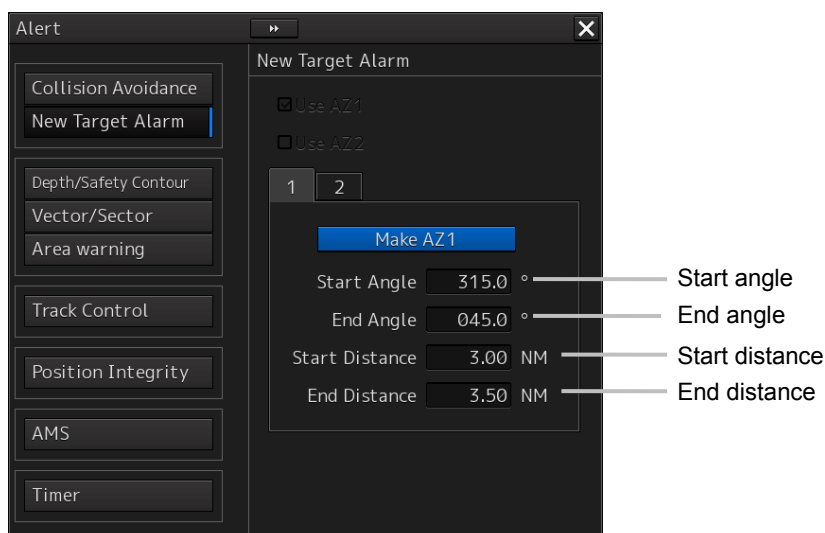
- (1) Use the "New Target Warning" dialog in the [Alert] menu.
- (2) Use the cursor.
- (3) Use the EBL/VRM dial.

6.5.2.1 Using "New Target Warning" dialog box in the [Alert] menu

- 1** Click on the [Menu] button on the left toolbar.
The menu is displayed.
- 2** Click [Alert] - [New Target Alarm] on the menu.
The "New Target Alarm" dialog is displayed.

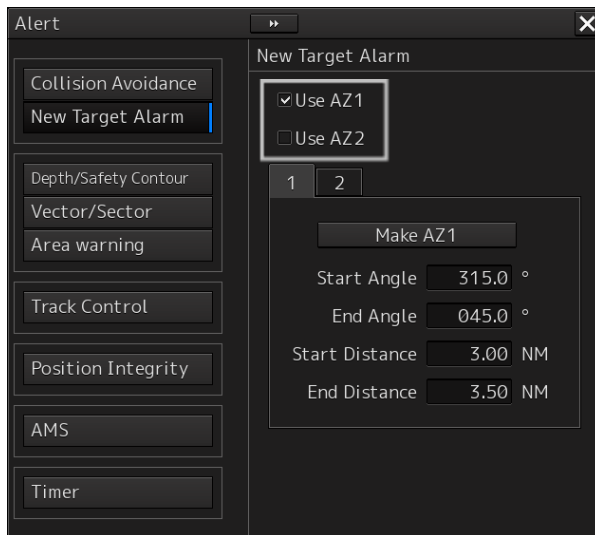


- 3** To set up AZ1, select the [Use AZ1] check box. To set up AZ2, select the [Use AZ2] check box.
- 4** To set up [Use AZ1], click on the [1] tab. To set up [Use AZ2], click on the [2] tab.
Their respective setting items are displayed.
- 5** Enter the start angle, end angle, start distance and end distance of AZ.



6.5.2.2 Using the cursor

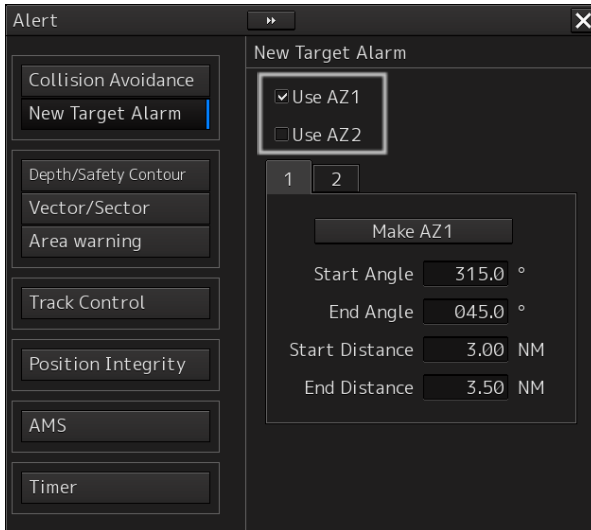
- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click [Alert] - [New Target Alarm] on the menu.**
The "New Target Alarm" dialog is displayed.
- 3 Select AZ ([Use AZ1] or [Use AZ2]) to be set.**



- 4 Click at the start angle position.**
The start angle is set.
- 5 Move the cursor and click at the end angle position.**
The line connecting the start angle and end angle appears.
- 6 Move the cursor and click at the start distance position.**
An arc appears at the start distance position.
- 7 Move the cursor and click at the end distance position.**
Auto acquisition/activation zone (AZ) with the shape of sector enclosed by start angle, end angle, start distance and end distance is created.

6.5.2.3 Using the EBL/VRM dial for the setting

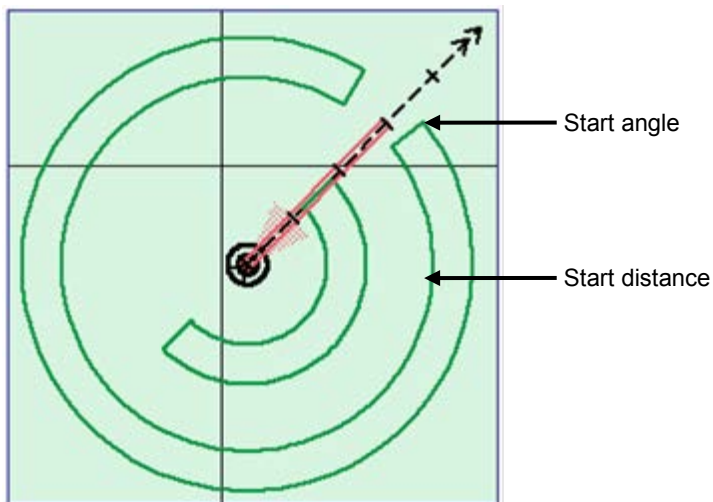
- 1 Click on the [Menu] button on the left toolbar.
The menu is displayed.
- 2 Click [Alert] - [New Target Alarm] on the menu.
The "New Target Alarm" dialog is displayed.
- 3 Select AZ ([Use AZ1] or [Use AZ2]) to be set.



- 4 Click on the [Make AZ1] button or [Make AZ2] button.
The cursor enters the AZ creation mode.

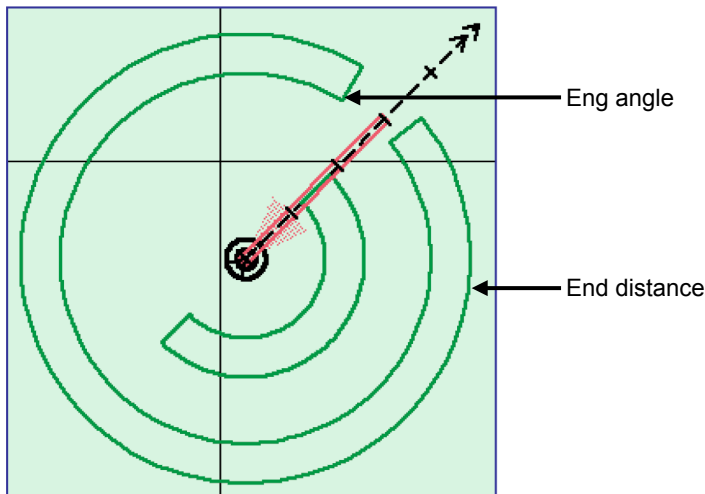
Make AZ1

- 5 Turn the EBL dial to set [Start Angle].
- 6 Turn the VRM dial to set [Start Distance]



- 7 Press the EBL dial and the VRM dial.
- 8 Turn the EBL dial to set [End Angle].

9 Turn the VRM dial to set [End Distance].



10 Press the EBL dial.

6.5.3 Tracked target information display

Note

When a target or own ship changes its course, or when a new target is acquired, its vector may not reach a given level of accuracy until 3 minutes or more has passed after such course change or target acquisition.

Even if 3 minutes or more has passed, the vector may include an error depending upon the tracking conditions.

1 Set the cursor mode to the AUTO mode.

2 Click on the target of tracking whose numerical value is to be displayed.

Numeric data for the specified target is displayed in the information monitoring window.

TT ID	4	1	
BRG	153.8	041.0	°
Range	8.84	8.48	NM
COG	012.3	028.7	°
SOG	8.7	10.1	kn
CPA	8.10	8.46	NM
TCPA	67.28	-Over	min
BCR		8.70	NM
BCT		+Over	min

The symbol display is changed to "⊙". The target data will remain on the radar display until the target is lost and its vector disappears, or until another target is designated.

If a target with the mark "⊙" is designated, only its true bearing and range appear until its vector appears.

Cancellation of numeric data display

- 1 Set the cursor mode to the AUTO mode.**
- 2 Place the cursor on the tracked target to cancel numeric value display and then click on.**

The numeric value disappears.

Details on tracked target information

Item	Explanation
TT ID	ID No. of tracked target being displayed
BRG	True bearing
Range	Distance
CTW (Course Through the Water stabilization mode)/ COG (Course Over the Ground stabilization mode)	Course
STW (Speed Through the Water stabilization mode) / SOG (Speed Over the Ground stabilization mode)	Speed
CPA	Closest approach distance
TCPA	Time up to closest approach distance
BCR	Bow crossing distance
BCT	Bow crossing time

6.5.4 Erasing unwanted tracked targets

If the vectors and symbols of the unwanted tracked targets remain displayed, the radar screen may become difficult to view. In such a case, unwanted tracked targets can be erased from the radar screen using the following method.

To erase one target

- 1 Place the cursor on the tracked target to be cancelled and then right-click.**
The context menu is displayed.
- 2 Click on the [Cancel TT] on the context menu.**
The vector symbol of the tracked target disappears and only the radar image remains.

To erase multiple targets

- 1 Place the cursor on the tracked target to be cancelled and then right-click.**
The context menu is displayed.
- 2 Click on the [Cancel TT mode] on the Context menu.**
The cursor changes to the selection cursor.
- 3 Place the cursor on another target to be cancelled and then click on.**
- 4 Repeat the operation in step 3.**
The vector symbols of the clicked tracked targets disappear and only the radar image remains.

To erase all targets

- 1 Place the cursor on the tracked target to be cancelled and then right-click.**
The context menu is displayed.
- 2 Click on the [Cancel all TT mode] on the Context menu.**
The vector symbols of all the tracked targets disappear and only the radar image remains.

Note

If all targets are cancelled, the tracking of all targets will stop; thus, automatic acquisition or manual acquisition must be performed newly. Unless necessary, do not cancel all targets.

6.5.5 Displaying Target ID No.

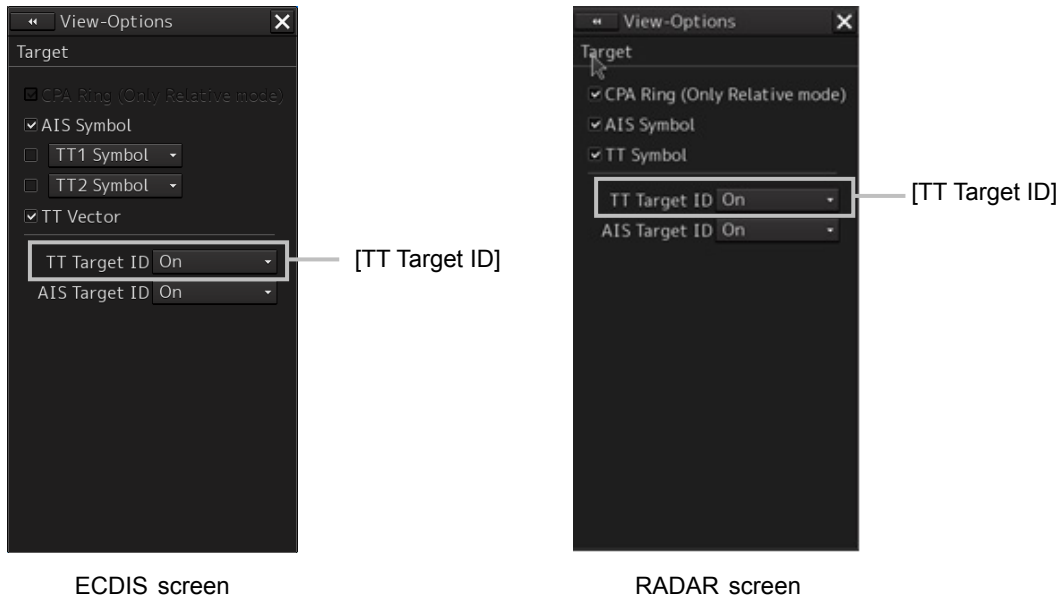
A target ID number is a value displayed beside the acquisition symbol when a target is acquired. A target ID number 1 to 100 is automatically assigned to each target in acquisition order. Once a target ID number is assigned, it identifies the target until the target is lost or the target acquisition is canceled.

Memo

The ID number is always displayed for only targets with which numeric data is displayed.

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on [View] - [Options] - [Target].**
The "Target" dialog is displayed.

3 Select the method for displaying ID No. from the [TT Target ID] list.



[On]: Displays target ID numbers.

[Off]: Hides target ID numbers.

[TT Track]: Displays ID numbers of only targets set for track of other ships.

[Ship's Name]: When the ship's name has been input in the "TT Target INFO" (property of tracked target) dialog box, that ship name is displayed. If the ship's name has not been input, the identification number is displayed.

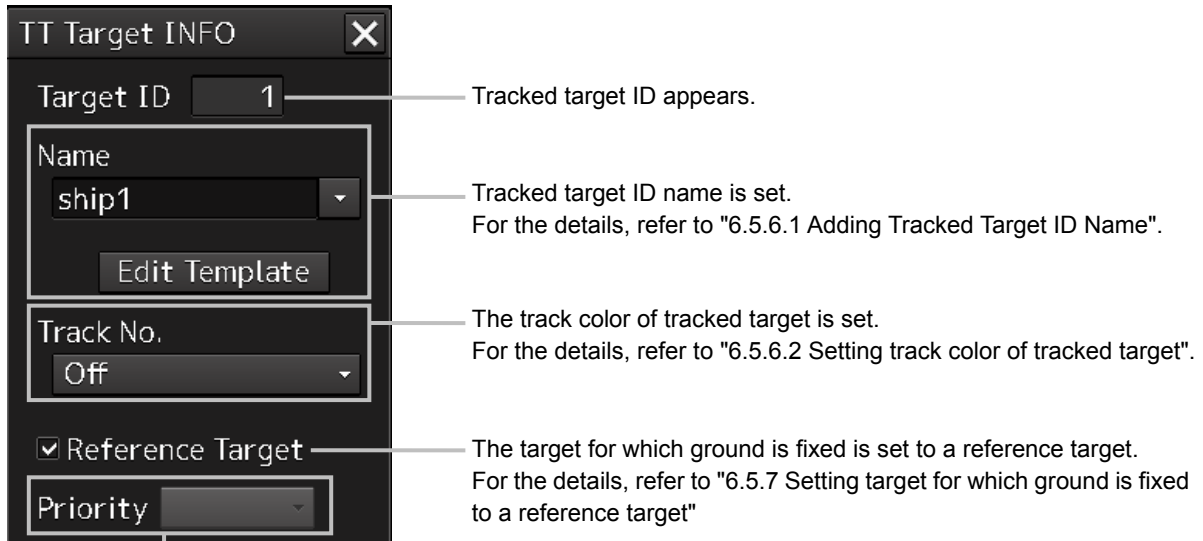
Memo

If there are many tracking targets and their symbol display is confusing, set Target Number Display to off to view the radar display easily.

6.5.6 Editing tracked target properties

The tracked target property such as tracked target ID name can be arbitrarily edited for individual tracked targets acquired.

The "TT Target INFO" dialog is used for editing.



When a TT target and AIS target are determined to be the same targets, the TT target or AIS target to be displayed on a priority basis can be set.

For the details, refer to "6.3.8 Association Target Symbols"

6.5.6.1 Adding Tracked Target ID Name

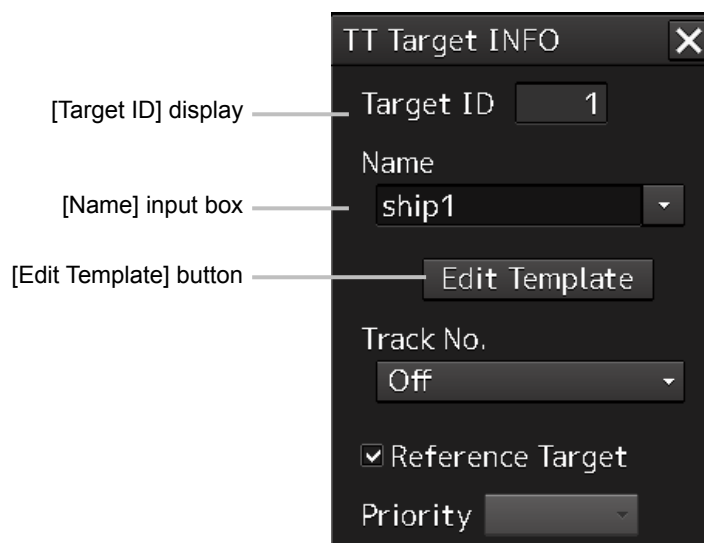
An ID name can be added to the tracked target acquired.

1 Right-click the cursor on the tracked target.

The context menu is displayed.

2 Click on [Property] on the context menu.

The "TT Target INFO" dialog box appears



3 Click on the [Name] input box or ▼ .

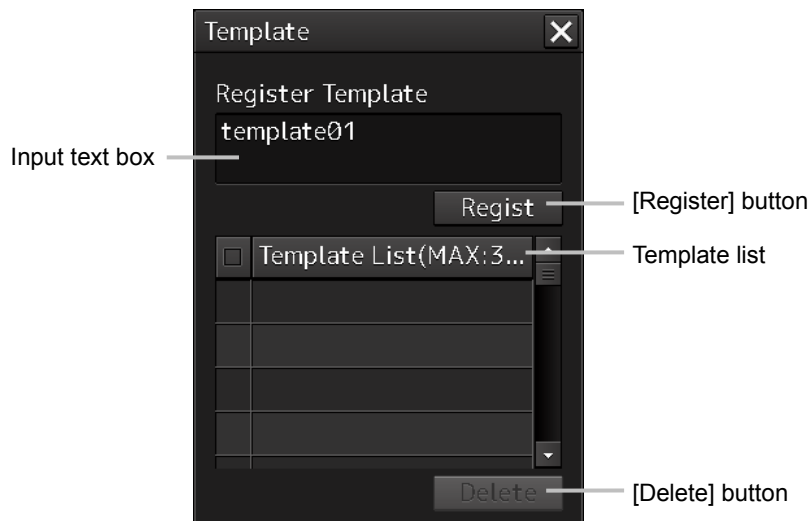
The input method varies with the selected item.

- | | | |
|-----------|---|---|
| Input box | : | Enter a new name.
When selected, the ship name ([Name]) entry window opens.
Enter a ship name of up to 15 characters. |
| ▼ | : | The names registered as templates are displayed in a list.
Select a name from the list. |

To register ship names as templates

1 Click on the [Edit Template] button in the [TT Target INFO] dialog box.

The [Edit Template] dialog box appears.



2 Enter the ship name to be registered as a template in the input text box.

3 Click on the [Register] button.

The entered ship name is registered in the template list.

4 Repeat steps 2 and 3, and register necessary ship names.

To cancel unwanted ship name registration

1 On the template list in the [Edit Template] dialog box, check the checkbox of the ship name whose registration to be canceled.

2 Click on the [Delete] button.

The checked ship name is deleted from the template list.

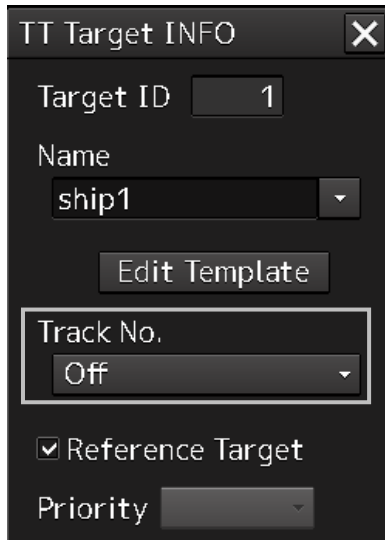
6.5.6.2 Setting track color of tracked target

The track color of tracked target is set.

1 Right-click on the cursor at the tracked target.

2 Click on the [Property] on the context menu.

The "TT Target INFO" dialog box appears.



3 Select track color from the [Track Color] list.

The selection items are as follows.

Off, No.1-Color, No.2-Color, No.3-Color, No.4-Color, No.5-Color, No.6-Color, No.7-Color, No.8-Color, No.9-Color, No.10-Color, No.11 to 20-Color

* In "Color," the track color name set by clicking [View] - [Options] - [Target Track] - [Plot] appears. For the details, refer to "16.2.8 Setting up the Display of Other Ship's Track"

6.5.7 Setting target for which ground is fixed to a reference target

By tracking the target for which ground is fixed and setting it to a reference target, the speed of the own ship can be obtained and displayed.

Note

- The reference target function is to be used if the own ship's speed cannot be displayed normally due to trouble such as a speed sensor malfunction. Do not use the reference target function except in emergencies.
- If the speed or course of the own ship is changed or a new reference target is set, the displayed speed may take 3 minutes or more to reach the specified speed after the speed/course change or the setting.
Even after 3 minutes or more has passed, the speed may differ from the specified speed depending on the tracking condition.
- If a large radar echo such as a land target is set as a reference target, the vectors of the speed and other tracking targets will not be displayed correctly and may cause an accident.
- If a sailing ship is set as a reference target, the vectors of the speed and other tracking targets will not be displayed correctly and may cause an accident.
- If the reference target is lost or the Target Tracking function is stopped, the ship speed against the ground will be GPS. (Only if the GPS is equipped.)
- If the reference target is lost or the Target Tracking function is stopped, that will make a major impact on the accuracy of the target tracking and the own ship speed.
- The reference targets are only used for the calculation of true speed.
- Do not use own speed based on reference target tracking for relative speed and CPA/TCPA calculation of AIS targets because the response of own speed is slower than actual own ship's speed change and it may cause a big error on the collision judgement of AIS targets.

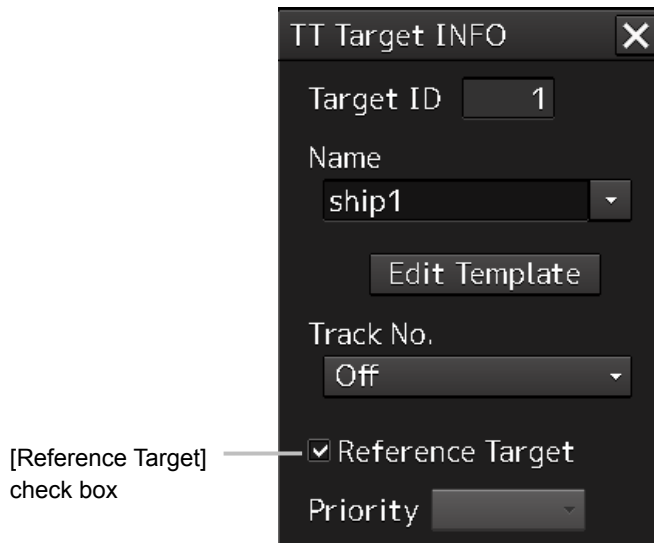
1 Acquire the ground-fixed target.

2 Click the right button on the acquired target.

A context menu is displayed.

3 Click on [Property] in the context menu.

The “TT Target INFO” dialog is opened.



4 To set the target to a reference target, check [Reference Target].

To not set the target to a reference target, uncheck [Reference Target].

5 Select [TGT] from the COG/SOG source combo box in the own ship information at the top right corner of the screen.

The ship speed is automatically calculated from the reference target and is displayed as the COG/SOG speed.

When a reference target is set, the symbol display changes to “ $\text{R}\bigcirc$ ”.

Note

Only one target can be set as a reference target.

When a new reference target is set, the previous reference target is cancelled.

6.5.8 Operation Test for Target Tracking

CAUTION



Simulation is a function for determining if the target tracking function is working correctly or not. Accordingly, this function should be used only to check for the target tracking function operation.

In particular, if this mode is used during navigation, a pseudo target will appear on the radar screen and cannot be easily identified from the real target. This may cause such an accident as collision. Do not use this mode during the navigation.

6

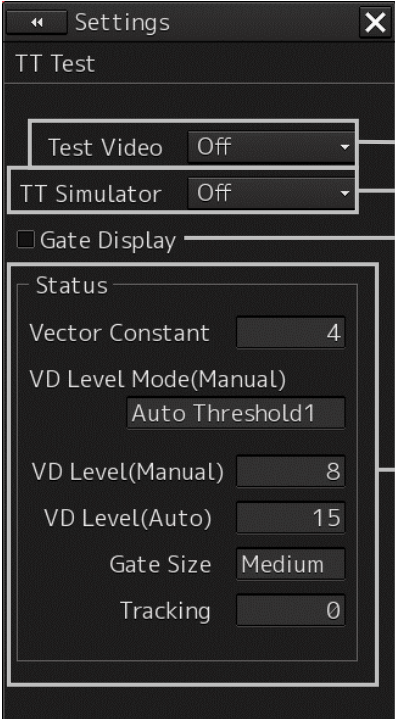
The following operation test and checking are performed to check the operation of target tracking as required. The "TT Test" dialog is used for operation.

1 Click on the [Menu] button on the left toolbar.

The menu is displayed.

2 Click on the [Settings] - [TT Test] on the menu.

The "TT Test" (Test for Target Tracking) dialog is displayed.



The operation of target detection circuit is checked.
For the details, refer to "6.5.8.1 Test Video".

A pseudo-target is generated on the radar screen to check that target tracking operates normally.
For the details, refer to "6.5.8.2 Target tracking simulator (TT Simulator)".

The gate size for acquiring and tracking targets are displayed.
For the details, refer to "6.5.8.3 Gate display".

The status of Target Tracking function is displayed.
For the details, refer to "6.5.8.4 Status display".

6.5.8.1 Test Video

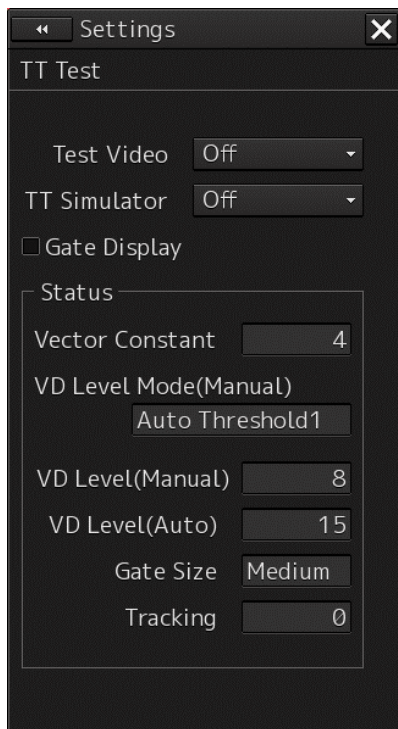
Test Video is used to check whether the video signals under target acquisition and tracking are input to and processed in the target detection circuit normally.

Normally, it is sufficient to just check that the VDIN of the Test Video is displayed.

Note

Test Video may not be displayed for a target which is not yet acquired or tracked. Test Video may not be displayed either if the [GAIN] dial or [SEA] dial is not properly adjusted.

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on the [Settings] - [TT Test] on the menu.**
The "TT Test" (Test for Target Tracking) dialog is displayed.
- 3 Select test video to be displayed from the [Test Video] combo box.**



The selected test video is displayed in the rearward of the radar image.

If any target displayed clearly in the normal radar display is not displayed in the Test Video mode, the target detection circuit of the Target Tracking unit may have a trouble.

To cancel test video

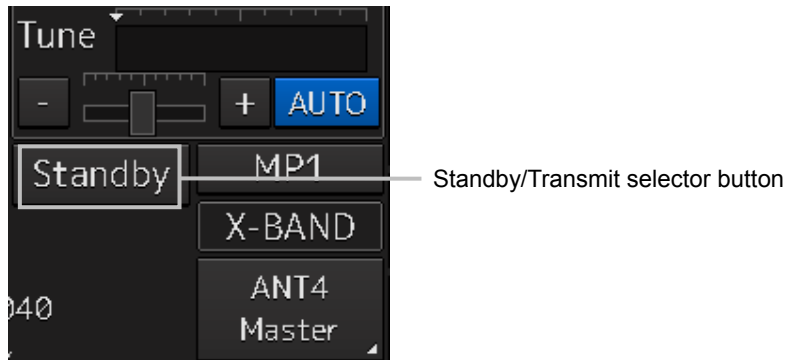
- 1 Select [Off] from the [Test Video] combo box.**
Test Video display turns off.

6.5.8.2 [TT Simulator] (Target tracking simulator)

Pseudo-targets are generated in certain known positions to check whether the target tracking units are operating normally. Since the pseudo-targets move depending on known parameters, the values for these pseudo-targets can be compared with the known value if the pseudo-targets are acquired and tracked, and displayed. Thus, it can be checked if the system is operating normally.

- 1 Click on the Standby/Transmit selector button for Radar system information to place the radar in the standby state.

The button indication changes to [Standby].



- 2 Click on the [Menu] button on the left toolbar.

The menu is displayed.

- 3 Click on the [Settings] - [TT Test] on the menu.

The "TT Test" (Test for Target Tracking) dialog is displayed.

- 4 Select simulator scenario from the [TT Simulator] combo box.



List of target tracking simulator/scenario

Scenario	Target No.	Motion (true motion)	Moving start point		
		Speed [kn]	Course [°]	Range [NM]	Bearing [°]
Scenario1	1	28.3	45	9.5	270
	2	22.4	27	1.12	333
	3	15.3	293	9.25	45
Scenario2	1	30	135	8	23
	2	20	270	5	135
Scenario3	1	45	180	5	23
	2	0	-	3	340
	3	30	0	8	180
Scenario4	1	0	0	2.02	31
	2	70	225	7.01	37
Scenario5	1	20	45	4.47	288
	2	30	45	5.1	304
	3	40	45	6.71	288
	4	0	-	7.07	307
	5	60	200	12	352
	6	20	225	11	315
	7	40	190	14.4	349
	8	-	-	8	318
	9	-	-	9	318
	10	-	-	10	318
Scenario6	1	5	96	5	0
	2	105	225	6	45

Note

- When the simulator is operating, set 0° as the heading bearing

5 Click on the Standby/Transmit selector button to place the radar in the transmission state.

The button indication changes to [Transmit].

The simulator turns on, the pseudo-target is generated, and the letter "X" appears on the lower side of the radar screen and near the pseudo-target to indicate that simulation mode is being executed.

To cancel simulation

1 Click on the Standby/Transmit selector button to place the radar in the standby state.

The button indication changes to [Standby] to enter transmission preparation state.

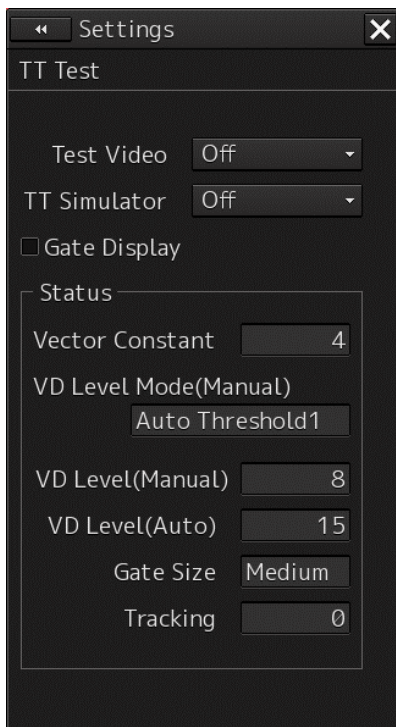
2 Select [Off] from the [TT Simulator] combo box in the "TT Test" dialog.

TT Simulator display turns off.

6.5.8.3 [Gate Display]

The gate displays an area monitoring a target using the TT function. This equipment allows the gate size to change automatically according to target range and size. The gate size can be checked using the following function.

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on the [Settings] - [TT Test] on the menu.**
The "TT Test" (Test for Target Tracking) dialog is displayed.
- 3 Select the [Gate Display] checkbox.**



When [Gate Display] is selected, the gate is displayed.

When [Gate Display] is cleared, the gate is not displayed.

- 4 Set the cursor mode to the AUTO mode.**

5 Click on the target of tracking whose numerical value is to be displayed.

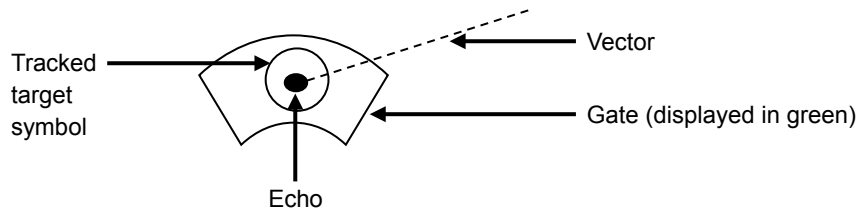
Numeric data for the specified target is displayed in the information monitoring window.

TT ID	4	1	
BRG	153.8	041.0	°
Range	8.84	8.48	NM
COG	012.3	028.7	°
SOG	8.7	10.1	kn
CPA	8.10	8.46	NM
TCPA	67.28	-Over	min
BCR		8.70	NM
BCT		+Over	min

The numeric value for the target is displayed, and the gate is displayed in green around the target tracking symbol.

Memo

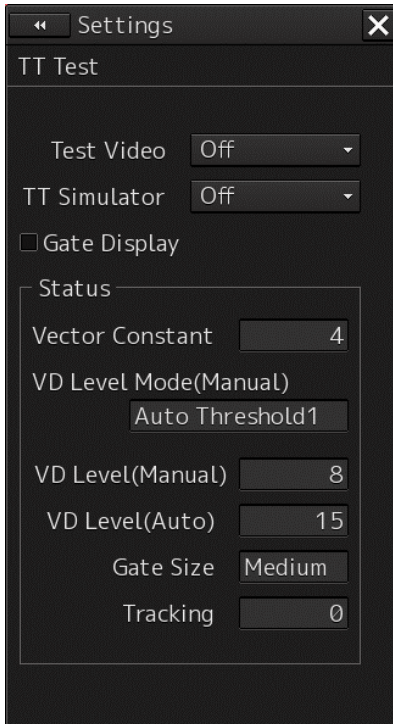
The Target Tracking can display the gate of two targets simultaneously.



6.5.8.4 Status display

The status of the TT function is displayed.

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on the [Settings] - [TT/AIS] - [TT Test] on the menu.**
The "TT Test" (Test for Target Tracking) dialog is displayed.
- 3 Check the display of [Status].**



[Vector Constant]	: Vector response
[VD Level Mode (Manual)]	: Using quantization level on manual acquisition
[VD Level (Manual)]	: Quantization level on manual acquisition
[Video Level (Auto)]	: Quantization level on automatic acquisition
[Gate Size]	: Size of gate used for tracking
[Tracking]	: Number of targets currently acquired

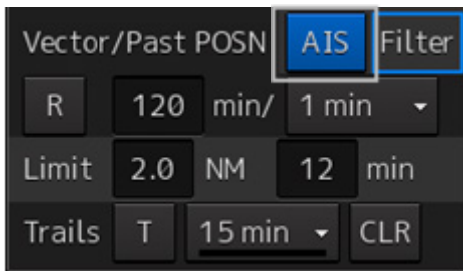
6.6 Setting and Operating AIS

6.6.1 Enabling AIS Function

Note

- When the AIS function is set to Off, the AIS display function is turned off and AIS symbols are no longer displayed.
- Once AIS function is set to Off, even if a dangerous target exists, the function is not automatically switched to On.

- 1 Click on the [AIS] button for other ship information on the upper right of PPI.



The button indication becomes ON and the AIS function becomes enabled.

ON indication: 

The received AIS information is displayed on the screen.

6.6.2 Activating AIS targets (Activate AIS)

Activates an AIS target, and displays the target's vector and make a collision decision.

6.6.2.1 Manual activation

Activates an AIS target in manual mode to display the vector and heading line.

- 1 Set the cursor mode to the AUTO mode.
- 2 Place the cursor on the sleeping AIS symbol to be activated and then click on.
The selected AIS target is activated.

6.6.2.2 Automatic activation

Activate an AIS target in automatic mode to display the vector and heading line.

When the automatic activation function is used, AIS targets are automatically activated when they go into the automatic activation zone. The automatic activation zone is identical to the automatic acquisition zone (AZ) used for target tracking. For the zone setting, refer to "6.5.1.1 Automatic acquisition".

Note

When the AIS target's symbol is activated but the vector is not displayed, the following are probable causes of the trouble:

- COG/SOG is not input yet from the GPS.
- The selected speed sensor is malfunctioning.

Memo

The bearing or range in the acquisition/activation zone shall be based on the position of the radar antenna.

If there are more AIS targets than the allowable maximum, they are deactivated from the low-priority (Refer to "6.3 Displaying Symbols").

6.6.3 Deactivating AIS targets

Deactivates an AIS target and clear the display of the vector and heading line.

[Deactivating one AIS target]

- 1 Right-click on the AIS target to be deactivated.**
The setting items for cursor modes are displayed.
- 2 Click on the [Deactivate] on the Context menu.**
The selected AIS target is deactivated.

[Deactivating multiple AIS targets]

- 1 Right-click on the AIS target.**
The setting items for cursor modes are displayed.
- 2 Click on the [Deactivate mode] on the Context menu.**
The cursor changes to the selection cursor.
- 3 Click on the AIS target to be deactivated.**
The selected AIS target is deactivated.

Note

This operation is available only for an activated AIS target.

6.6.4 Displaying AIS information

- 1 Set the cursor mode to the AUTO mode.
- 2 Place the cursor on the AIS target to display the activated AIS target information and then click on.

The information of the selected AIS target is displayed.



Note

When the numeric data of a target is displayed but the mark " [] " is not on the radar display, the target is outside the display.

Canceling AIS target information display

- 1 Set the cursor mode to the **AUTO** mode.
- 2 Move the cursor to and click on the activated AIS target whose AIS target information is to be cancelled.

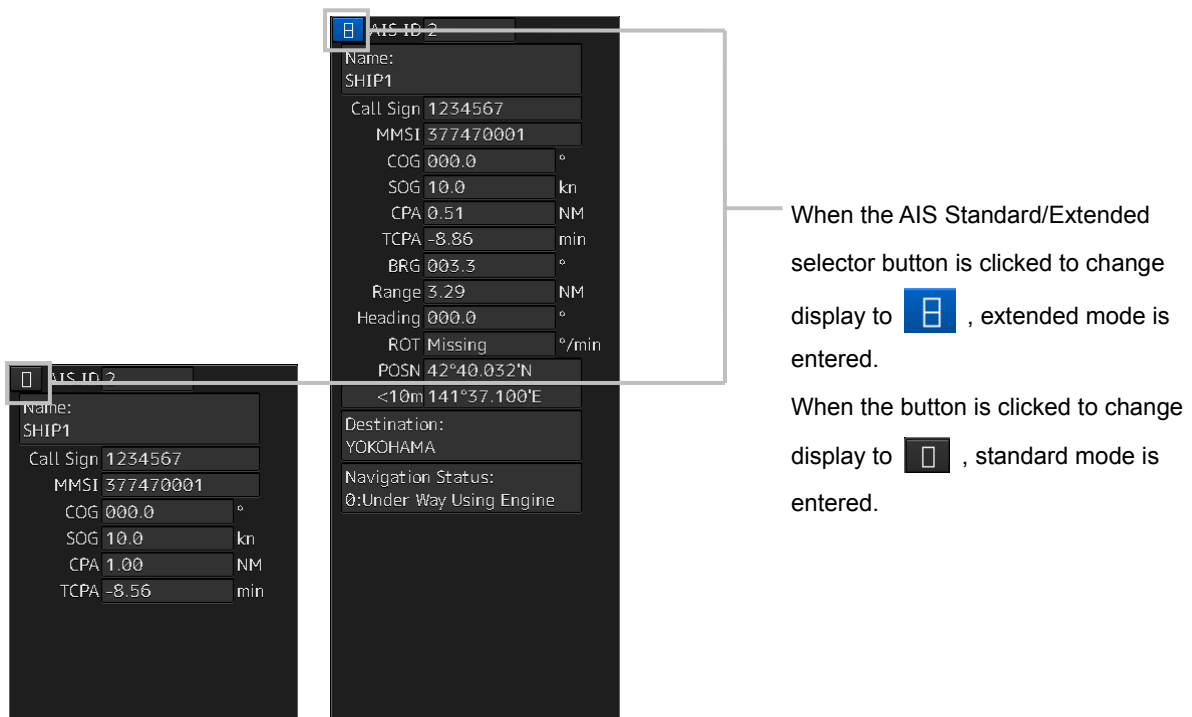
The information display of the selected AIS target is canceled.

Details on AIS target information

Two AIS target information display modes are available, a standard mode, and an extended mode, and the items that are displayed vary depending on the mode.

Use the AIS Standard/Extended selector button for switching between the standard mode and the extended mode.

For verifying more detailed information of the AIS target, refer to "2.3.1.4 AID Detail INFO".



The display contents vary depending on the types of AIS targets.

[Normal AIS target]



Item	Explanation
AIS ID	ID No. of AIS target
Name	Ship name of AIS target
Call Sign	Call sign of AIS target
MMSI	Maritime Mobile Service Identity
COG or CTW	COG: Course Over the Ground CTW: Course Through Water * In ground mode, COG is displayed. In water mode, CTW is displayed. * Operates in fixed ground mode on the ECDIS screen.
SOG or STW	SOG: Speed Over the Ground STW: Speed Through Water *If the SOG or STW column is Over, the speed of other system is 102.2 kn or more. * In extended mode, the display area for two simple modes is used. * Operates in fixed ground mode on the ECDIS screen.
CPA	Closest approach distance
TCPA	Time up to closest approach distance
BRG	True direction * In standard mode, this item is not displayed.
Range	Distance * In standard mode, this item is not displayed.
Heading	Heading * In standard mode, this item is not displayed.

Item	Explanation
ROT	Rate of turn * In standard mode, this item is not displayed. * If the ROT column is blank, it indicates that ± 127 is received. At this time, only turning direction indicated on the turn indicator is reliable. The turn indicator is displayed as a straight line normal to the heading direction on the AIS symbol. (Refer to "6.3 Displaying Symbols.")
POSN	Latitude/longitude * In standard mode, this item is not displayed.
>10m or <10m	>10m: Low positioning accuracy <10m: High positioning accuracy * In standard mode, this item is not displayed.
Destination	Destination * In standard mode, this item is not displayed.
Navigation Status	The status is displayed by number. For the details, refer to "Navigation Status" table. * In standard mode, this item is not displayed.

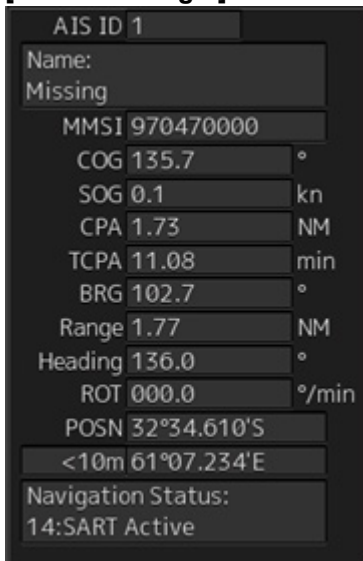
Memo

In the extended mode, a display area equivalent to two standard mode areas is used.

Navigation Status

Status
0: Under Way Using Engine
1: at Anchor
2: Not Under Command
3: Restricted Maneuverability
4: Constrained by Her Draught
5: Moored
6: Aground
7: Engaged in Fishing
8: Under Way Sailing
9: Reserved for HSC
10: Reserved for WIG
11-14: Reserved
15: Not Defined

[AIS SARTTarget]



There is neither the Call Sign nor Destination item. The display of some items of Navigation Status is different. Otherwise, the display contents are the same as those of usual AIS target.

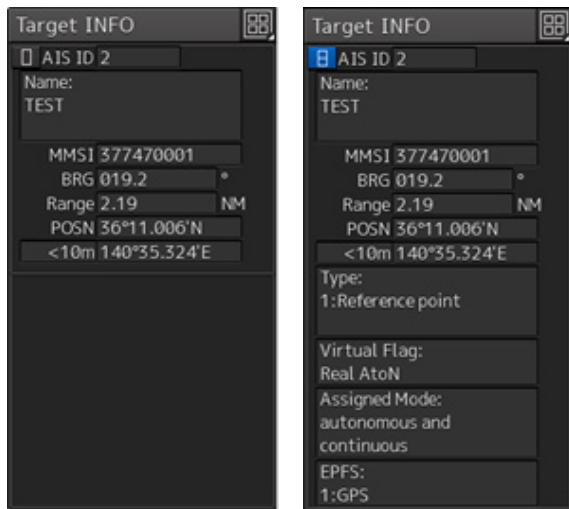
Navigation Status

Display
0 ~ 13: Same display as for the usual ship
14: AIS-SART ACTIVE(14)
15: AIS-SART TEST(15)

Memo

Switching between standard and extended modes is not provided.

[AIS AtoN Target]



Item	Description
AIS ID	AIS target ID
Name	Ship name of AIS target
MMSI	Maritime Mobile Service Identity code
BRG	True bearing
Range	Range
POSN	Latitude/longitude
>10m or <10m	>10m: Position fixing accuracy low <10m: Position fixing accuracy high
Type	Displays the AtoN type. For the details, refer to the "Type" table. * Not displayed in standard mode.
Virtual Flag	Real AtoN: Real AtoN Virtual AtoN: Virtual AtoN (does not exist) * Not displayed in standard mode.
Assigned Mode	Autonomous and continuous: Operating in autonomous/continuous mode Assigned: Operating in assignment mode * Not displayed in standard mode.
EPFS	Displays the EPFS type. For the details, refer to the "EPFS" table. * Not displayed in standard mode.

Type

Display
0: Not Available
1: Reference point
2: RACON
3: Fixed structure off shore
4: Spare
5: Light, without sectors
6: Light, with sectors
7: Leading Light Front
8: Leading Light Rear
9: Beacon, Cardinal N
10: Beacon, Cardinal E
11: Beacon, Cardinal S
12: Beacon, Cardinal W
13: Beacon, Port hand
14: Beacon, Starboard hand
15: Beacon, Preferred Channel Port hand
16: Beacon, Preferred Channel Starboard hand
17: Beacon, Isolated danger
18: Beacon, Safe water
19: Beacon, Special mark
20: Cardinal Mark N
21: Cardinal Mark E
22: Cardinal Mark S
23: Cardinal Mark W
24: Port hand Mark
25: Starboard hand Mark
26: Preferred Channel Port hand
27: Preferred Channel Starboard hand
28: Isolated danger
29: Safe Water
30: Special Mark
31: Light Vessel /LANBY/Rigs

EPSF

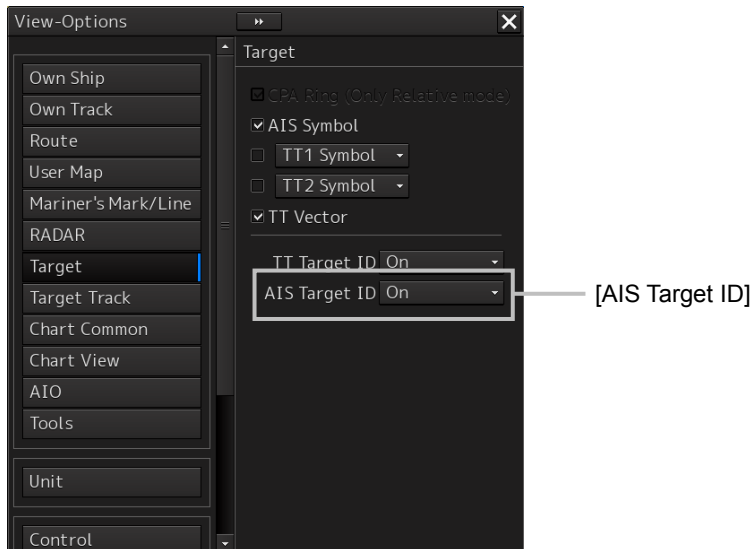
Display
0: Undefined
1: GPS
2: GLONASS
3: combined GPS/GLONASS
4: LORAN-C
5: Chayka
6: INS
7: surveyed
8: Galileo
15: internal GNSS
9-14: not used

6.6.5 Displaying Target ID No.

When an AIS target is activated, a target ID number is displayed next to the AIS target symbol.

A target ID number 1 to 1000 is assigned to each target in the order of receiving targets by MFD. Once a target ID number is assigned, it identifies the AIS target until the AIS target is lost.

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on the [View] - [Options] - [Target] on the menu.**
The "Target" dialog is displayed.
- 3 Select the method for displaying ID No. from the [AIS Target ID] combo box.**



- [On] : Displays target ID numbers.
[Off] : Hides target ID numbers.
[AIS Track] : Displays ID numbers of only targets set for track of other ships.
[Ship's Name] : Displays the ship's name.

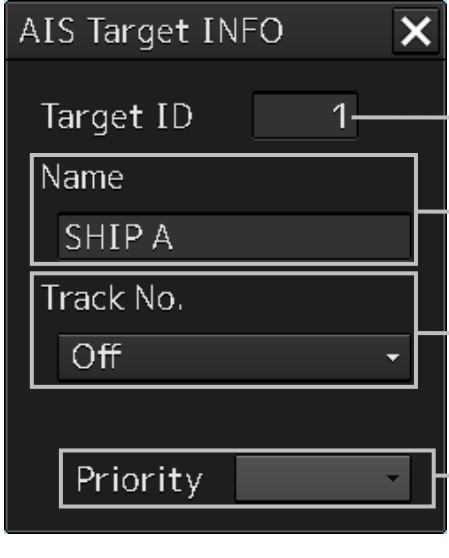
Memo

- ID number or ship's name is always displayed for only targets with which numeric value is displayed.
- If there are many AIS targets and their symbol display is confusing, set Target Number Display to off to view the radar display easily.

6.6.6 Checking and setting AIS target property

The AIS target property such as ID name can be checked for individual acquired AIS targets. The track color of AIS target can also be set.

The "AIS Target INFO" dialog is used for editing.



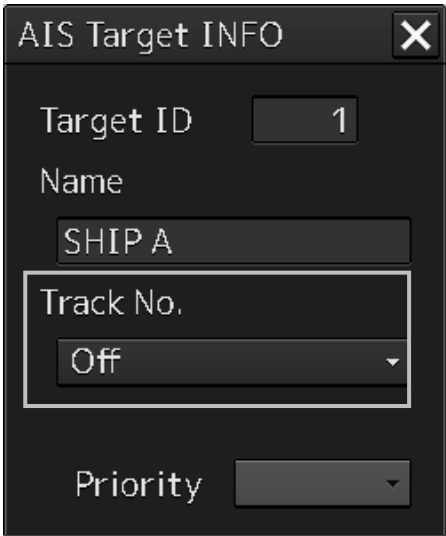
The screenshot shows the "AIS Target INFO" dialog box with the following fields and callouts:

- Target ID:** A text box containing the number "1". Callout: "AIS target ID appears."
- Name:** A text box containing "SHIP A". Callout: "AIS target ID name appears."
- Track No.:** A dropdown menu currently set to "Off". Callout: "The track color of AIS target is set. For the details, refer to '6.6.6.1 Setting track color of AIS target'."
- Priority:** A dropdown menu. Callout: "When a TT target and AIS target are determined to be the same targets, the TT target or AIS target to be displayed on a priority basis can be set. For the details, refer to '6.3.8 Association Target Symbols'."

6.6.6.1 Setting track color of AIS target

The track color of AIS target is set.

- 1 Right-click on the AIS target.**
The context menu is displayed.
- 2 Click on [Property] on the context menu.**
The "AIS Target INFO" dialog box appears.



3 Select the track color from the [Track No.] combo box.

The selection items are as follows.

Off, No.1-Color, No.2-Color, No.3-Color, No.4-Color, No.5-Color, No.6-Color, No.7-Color, No.8-Color, No.9-Color, No.10-Color, No.11 to 20-Color

* In "Color," the track color name set by clicking [View] - [Options] - [Target Track] - [Plot] is displayed. For the details, refer to "16.2.8 Setting up the Display of Other Ship's Track".

6.6.7 Conditions for deciding AIS target to be lost

About an AIS target lost

When the data of a target cannot be received for a specified time, the target is decided to be lost and the target data is deleted. As shown in the table below, the time until target data is deleted varies depending on the class of received data and the target status.

Note

- Since the lost time and that of the AIS indicator are different, this equipment may display lost information earlier than the AIS display depending on the target status (speed, navigation status, etc.).
- The target of lost target is continuously displayed until Lost Warning is approved. Since negligence of approval operation may hinder display of a new AIS target, perform approval operation as soon as possible.

Conditions for Deciding Target to be Lost

Target status	Time until data is lost	
	SOLAS ship (Class A)	Non-SOLAS ship (Class B)
Vessel below 3 kn (Class A) or 2 kn (Class B) and it is now at anchor or on the berth	18 min	18 min
Vessel of 3 kn or more and it is now at anchor or on the berth	60 sec	—
Vessel of 0 to 14 kn (Class B: 2 to 14 knots)	60 sec	180 sec
Vessel of 0 to 14 kn and it is now changing the course (Class B: 2 to 14 knots)	60 sec	180 sec
Vessel of 14 to 23 knots	36 sec	180 sec
Vessel of 14 to 23 kn and it is now changing the course	36 sec	180 sec
Vessel of 23 kn or more	30 sec	180 sec
Vessel of 23 kn or more and it is now changing the course	30 sec	180 sec
AtoN (Aids to navigation)	18 min	
SART	6 min	6 min
AIS-AtoN	18 min	18 min
AIS SAR aircraft	60 sec	
AIS coastal base station	60 sec	

Note

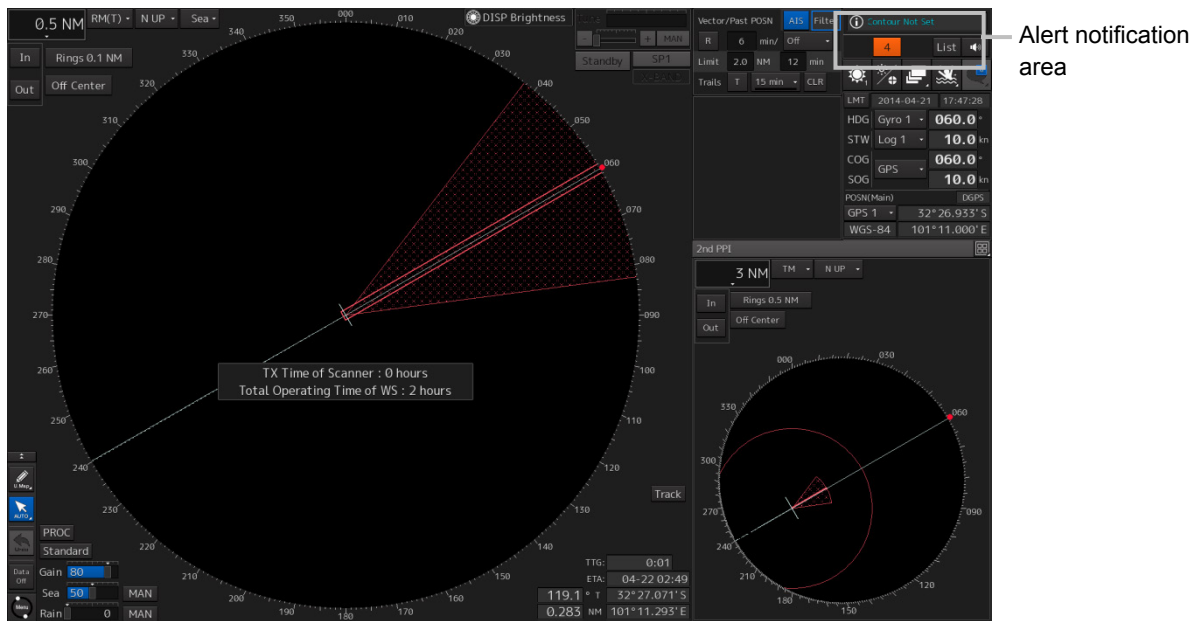
- When a dangerous target ship is lost, a lost alarm is issued and the symbol changes to a lost symbol. The system calculates the current position from the last-received data and continues displaying the symbol for eternity.
- When the [AIS] button in the target ship information window is turned off, the symbol is canceled.

6.7 Alert Display

Target tracking and AIS system have the following alerts.

Message	Description
AIS ACT 95% Capacity	The number of activated AIS targets reached 95% of tolerance.
AIS 95% Capacity	The number of AIS targets reached 95% of tolerance.
CPA/TCPA(AIS)	CPA/TCPA warning (AIS)
Lost(AIS)	The AIS target was lost.
AIS MAX Target	The number of AIS targets reached the maximum number of targets displayed.
New Target(AIS)	The AIS target was acquired and activated.
Not Allowed(TT Out of Range)	Out of TT acquisition range
Trial	Under the trial process. Occurs instead of a danger target alarm when the predicted route of the tracking target intersects with the CPA/TCPA limit range
TT(95% Capacity)	The number of TT targets reached 95% of tolerance.
TT(CPA/TCPA)	CPA/TCPA warning (TT)
TT(Lost)	Acquired TT was lost.
TT(MAX Target)	The number of TT targets reached the maximum number of targets.
TT(New Target)	TT was acquired.
TT(Out of Range)	TT went out of 32NM.
TT(Reference Lost)	The TT reference target was lost.

An alert is displayed in the alert notification area (upper right of the screen).



6.7.1 Danger target alarm (CPA/TCPA)

⚠ CAUTION



Since these alarms may include some errors depending on the target tracking conditions, the navigation officer himself should make the final decision for ship operations such as collision avoidance.

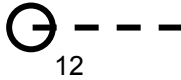


Making the final navigation decision based only on the alarm may cause accidents such as collisions.

In this system, targets are categorized into two types: tracked targets and dangerous targets depending on the danger level. The danger level can easily be recognized on the display at a glance. So, it is easily possible for the ship operator to judge which target is to be cautious about.

The danger target symbol of the tracked target will be displayed until either the tracking is stopped or the conditions no longer apply.


The types of target and alarm are shown below.


Dangerous Target Alarm

Status	Symbol on display	Alert characters	Alarm sound	Conditions
Tracked target				<ul style="list-style-type: none"> • CPA > CPA Limit • 0 > TCPA • TCPA > TCPA Limit
Activated AIS target		(Off)	(Off)	The symbol is displayed when one or more of the above conditions are met.
Dangerous target		CPA/ TCPA	Beep sound (pi-pi-pi) Alarm acknowledgeable	<ul style="list-style-type: none"> • CPA ≤ CPA Limit • 0 ≤ TCPA ≤ TCPA Limit <p>An alarm is issued when all the conditions are met. The sleeping AIS targets will be activated.</p>

CPA Limit and TCPA Limit: Setting Values

6.7.2 Alarm for new target acquired in automatic acquisition guard zone (New target)

 **CAUTION**




In setting an automatic acquisition guard zone, it is necessary to adjust the gain, sea clutter suppression and rain/snow clutter suppression to ensure that target echoes are displayed in the optimum conditions.

No automatic acquisition guard zone alarms will be issued for targets undetected by the radar, and this may cause accidents such as collisions.

The automatic acquisition function sets a zone in a range and issues an alarm when a new target (which is not yet acquired) goes into this zone.

For the setting of an automatic acquisition guard zone, refer to "6.5.1 Acquiring target".

Alarm for New Target Acquired in Automatic Acquisition Guard Zone

Status	Symbol on display	Alert characters	Alarm sound	Conditions
New target in automatic acquisition guard zone	 Red Blinking	New Target	Beep sound (pipi) Alarm acknowledgeable	The alarm is issued when a new target is acquired in the automatic acquisition guard zone.

Note

When an already acquired target goes into automatic acquisition guard zone, the alarm for the new target acquired in automatic acquisition guard zone does not sound.

6.7.3 Lost target notification (Lost)

Note

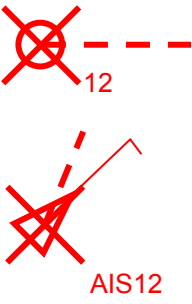
If the gain, sea clutter suppression, rain/snow clutter suppression are not adjusted adequately, the lost target notification may be easily generated. So, such adjustments should be very carefully.

When it is impossible to continue tracking any acquired and tracked target, or the data of AIS target cannot be received for a specified time, the [Lost] notification will be issued. The typical causes for alarm are shown below:

- The target echo is very weak.
- The target is hidden by a shore or a large ship and its echo is not received.
- The target echo is blurred by sea clutter or rain/snow clutter.

If a target under tracking goes into a range over 32 NM and can no longer be tracked, it is canceled without a lost target notification being issued.

Lost Target Notification

Status	Symbol on display	Alert characters	Alarm sound	Conditions
Lost target	 Red Blinking	Lost	Beep sound (pipi) notification acknowledgeable	The notification will sound once when a lost target symbol is displayed.

6.7.4 Target Tracking function alarm (TT Data)

If some failure occurs in input signals or the processor circuits, an alarm will be issued. If an alarm is issued in the Target Tracking function, [TT(Data)] is displayed in the alarm indication and nothing is displayed in the indication of the target tracking information. Its cause is inferred that the Target Tracking function is malfunctioned. In that case, please consult with our branch office, branch shop, sales office, or our distributor in your district to repair it.

Target Tracking function Alarm

Alert characters	Alarm sound	Condition
TT (Data)	Beep sound (pipi)	If the Target Tracking function has some abnormal condition, this alarm issues.

6.7.5 Gyro set notification (Set Gyro)

The GYRO I/F in this system receives signals from a gyro. Even if the power is turned off, the system will follow up the gyro. However, the system stops the follow-up operation when the power of the master gyro is turned off or when any trouble occurs to the line. When the power of the master gyro is recovered, the [Set Gyro] notification will be issued.

When this notification is issued, set the true bearing value of the gyro. For the details, refer to “5.4.13 True bearing”.

Gyro Set Notification

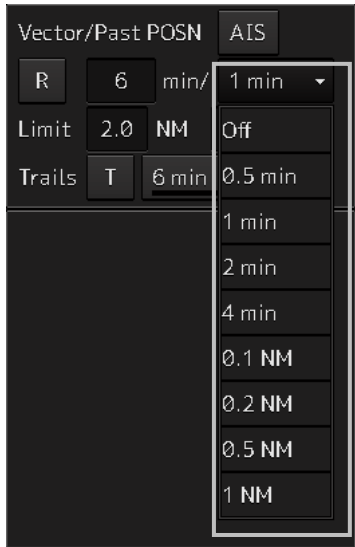
Alert characters	Alarm sound	Conditions
Set Gyro	Beep sound (pi-)	The signals from the gyro are stopped, but the gyro is recovered.

6.8 Track Function

6.8.1 Setting the Past position

- 1 Select the track display interval time from the past position interval selector combo box for other ship information at the upper right of PPI.

The past position is set.



[Off] : Tracks are not displayed.

[Numeric] : Tracks are displayed at intervals of the specified value.

The past position function can display up to ten past positions of a target under tracking. The past position display interval can be set to specified time intervals of 0.5, 1, 2, or 4 minutes, or specified range intervals of 0.1, 0.2, 0.5, or 1 NM.

When [Off] is displayed, the track display function is turned off.

The track mode operates in conjunction with the vector mode, and a true or relative track is displayed.

In relative vector mode, the relative tracks of the target are displayed.

In true vector mode, true tracks that are calculated from the relative bearing, range, own ship's course, and speed are displayed.

Note

When the target is acquired, past position of traced target is start plot. When the AIS target is displayed, past position of AIS target is start plot. If the past position plotted time or range is short, the indicated past position duration may not have achieved the specified time or range.

6.8.2 Setting the other ship's tracks

This function makes settings for the tracks of tracked targets and AIS targets.

This equipment can display the tracks of up to 20 target ships.

6.8.2.1 Setting track color

For the details on how to set the track color of tracked target, refer to "6.5.6.2 Setting track color of tracked target"

For the details on how to set the track color of AIS target, refer to "6.6.6.1 Setting track color of AIS target"

6.8.2.2 Turning on/off other ship's track function

For the details, refer to "18.11 Setting the Target Track Function to ON/OFF ".

Note

Note that when this function is turned off, all the other ship's track functions are turned off. In this case, the track data of other ships is not saved, so they cannot be traced later.

6.8.2.3 Setting other ship's track colors

You can set either one track color for all targets under tracking, or individual colors for the ships of track numbers from 1st to 10th. The same color is used to display the 11th to 20th ships.

For the details, refer to "16.2.8 Setting up the Display of Other Ship's Track".

Note

If the other ship's track function (Target Track Function) is turned off, the track data of other ships is not saved.

6.8.2.4 Turning on/off other ship's track display

The target track display function can be turned on/off. Choices for track display are displaying/hiding the tracks of all ships and Individual (displaying the tracks of individual ships).

For the details, refer to "16.2.8 Setting up the Display of Other Ship's Track".

Note

Even when Target Track Display is turned off, the track data of other ships is saved if Track display Interval is set.

6.8.2.5 Setting up the display interval of other ship's track

A display interval of other ship's track can be set.

For the details, refer to "16.2.8 Setting up the Display of Other Ship's Track".

Note

This function is not available when the Target Track Function is turned off.

6.8.2.6 Clearing other ship's track

The other ship's track can be cleared by setting a color or a track number.

For the details, refer to "16.2.8 Setting up the Display of Other Ship's Track".

6.8.2.7 Saving and loading other ship's track data

Other ship's track data can be saved on HDD and load from the HDD.

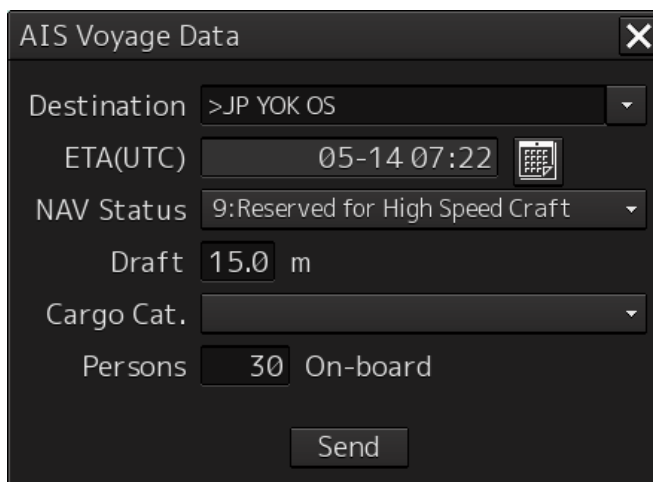
(Data can be saved to HDD until the data volume becomes full.)

For the details, refer to "3.19.2 File management".

6.9 Entering Own Ship's AIS Voyage Data


Set the own ship's AIS voyage data.

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on [TT/AIS] - [AIS Voyage Data] on the menu.**
The "AIS Voyage Data" dialog box appears.



In the "AIS Voyage Data" dialog box, information collected from AIS is displayed.

- 3 Enter information manually if not being displayed, or change the information being displayed.**

Item	Setting
Destination	Enter the destination in the [Destination] input box (maximum 20 characters), or display the history list and click on the destination to enter.
ETA (UTC)	Click on the calendar icon  to display the date picker, and enter the expected date (and time) of arrival by clicking.
NAV Status	Select the "Navigation Status" from the combo box. For the details of Navigation Status, refer to "6.6.4 Displaying AIS information".
Draft	Enter the draft in the [Draft] input box in the range between 0 and 25.5 m. The draft can be entered in increments of 0.1 m. If the draft is more than 25.5 m, enter 25.5 m.
Cargo category	Select the cargo category from the combo box.
Persons on-board	Enter the number of persons on board in the [Persons on-board] input box in the range between 0 and 8191. If the number of persons on board is more than 8191 persons, enter 8191.

- 4 Click on the [OK] button to save the input information.**

6.10 Editing and Sending AIS Messages

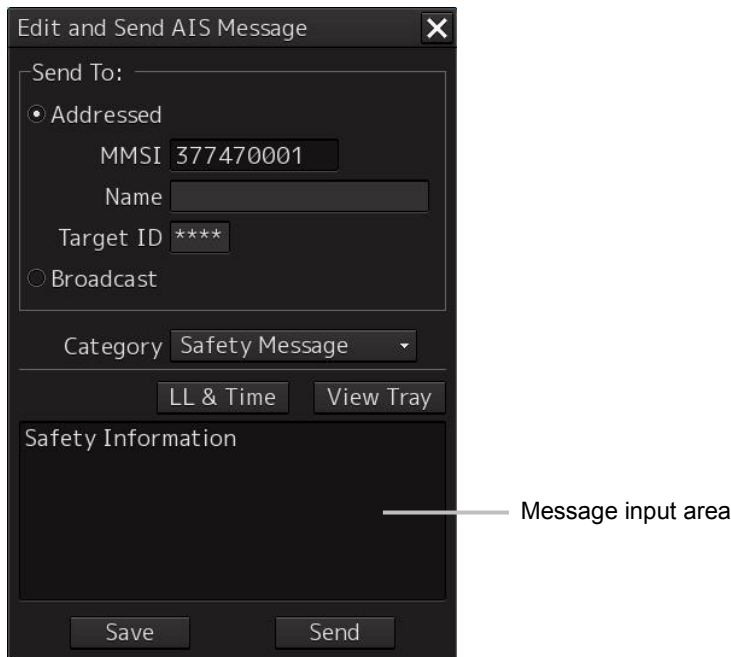
AIS messages can be edited and sent.

- 1 Click on the [Menu] button on the left toolbar.**

The menu is displayed.

- 2 Click on [TT/AIS] - [Edit and Send AIS Message] on the menu.**

The "Edit and Send AIS Message" dialog box appears.



- 3 Specify whether a message will be sent by specifying an MMSI code or distributing a broadcast message.**

For the details, refer to "To send a message by specifying an MMSI code:" and "To distribute a broadcast message:".

- 4 Display the [Message Category] list and select the type of the message to send.**

To send a safety related message: Click on [Safety Message].

To send a routine message: Click on [Routine Message].

- 5 Type a message in the message input area.**

To automatically enter own ship's latitude/longitude/UTC:

Click on the [LL&Time] (latitude/longitude/time) button.

To copy an existing message:

Click on the [View Tray] button to display the contents of the AIS Message Tray. Select the message to copy to display it, and then copy it. The message can be copied from the beginning up to the maximum number of characters.

Note

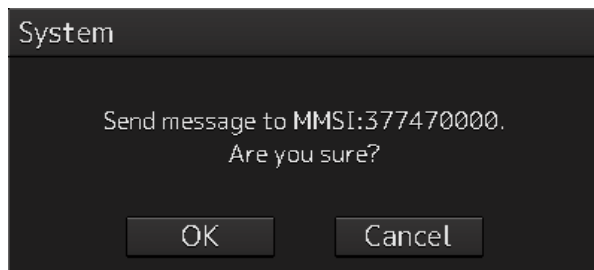
The maximum number of characters that can be input changes depending on the transmission method and the message type.

- Sending a message by specifying the MMSI code
 - Safety message: Up to 156 characters
 - Routine message: Up to 151 characters
- Distributing a broadcast message
 - Safety message: Up to 161 characters
 - Routine message: Up to 156 characters

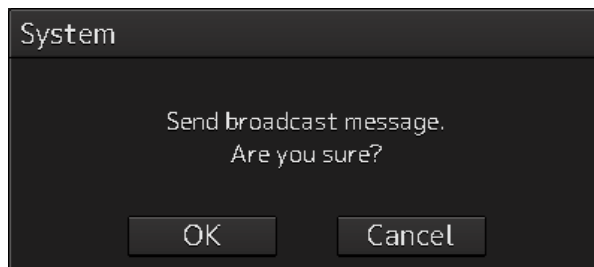
6 Click on the [Send] button to send the message.

The message transmission confirmation dialog box appears.

When sending a message by specifying an MMSI code:

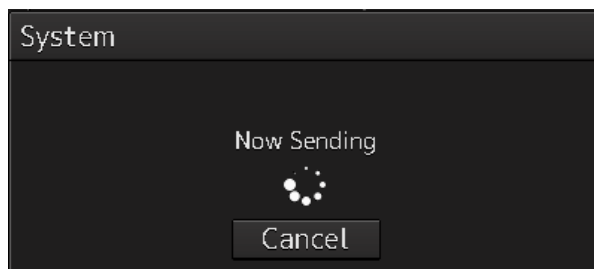


When distributing a broadcast message:

**7 Click on the [OK] button to send the message.**

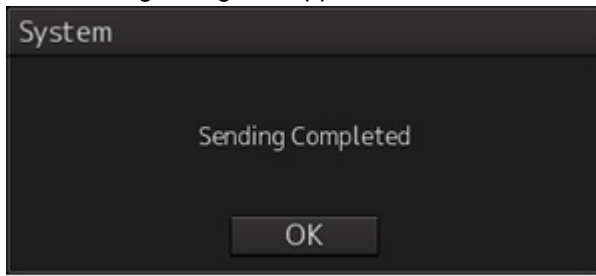
To cancel the transmission of the message, click on the [Cancel] button.

The following dialog box appears while sending a message.



The transmission of the message currently in progress can be stopped by clicking the [Cancel] button.

The following dialog box appears when the transmission of a message completes.



- 8** Click on the [OK] button to close the dialog box.
- 9** To save an MMSI code and a typed message in the case of MMSI transmission, click on the [Save] button.
- 10** Click on the [x] button to close the dialog box.

To send a message by specifying an MMSI code:

- 1** Click on the [Addressed MMSI] (specified MMSI code) button.
- 2** Type an MMSI code (9 digits) in the [MMSI] input box.
The name of the ship having the entered MMSI code is displayed in the [Name] box.
The identification number is displayed in the [Target ID] box.
- 3** Type a message in the message input area.
In the case of a safety related message: Maximum 156 characters
In the case of a routine message: Maximum 151 characters

To distribute a broadcast message:

- 1** Click on the [Broadcast] button.
- 2** Type a message in the message input area.
In the case of a safety related message: Maximum 161 characters
In the case of a routine message: Maximum 156 characters

6.11 AIS Message Tray

The received, sent and saved AIS messages are displayed in AIS Message Tray in a list form.

Memo

The information reference window such as AIS message tray can be switched to standard window display or extended window display.

In this example, extended window display is used.

For the details of switching between standard window display and extended window display, refer to "2.3.2.1 Switching between a standard window and an extended window".

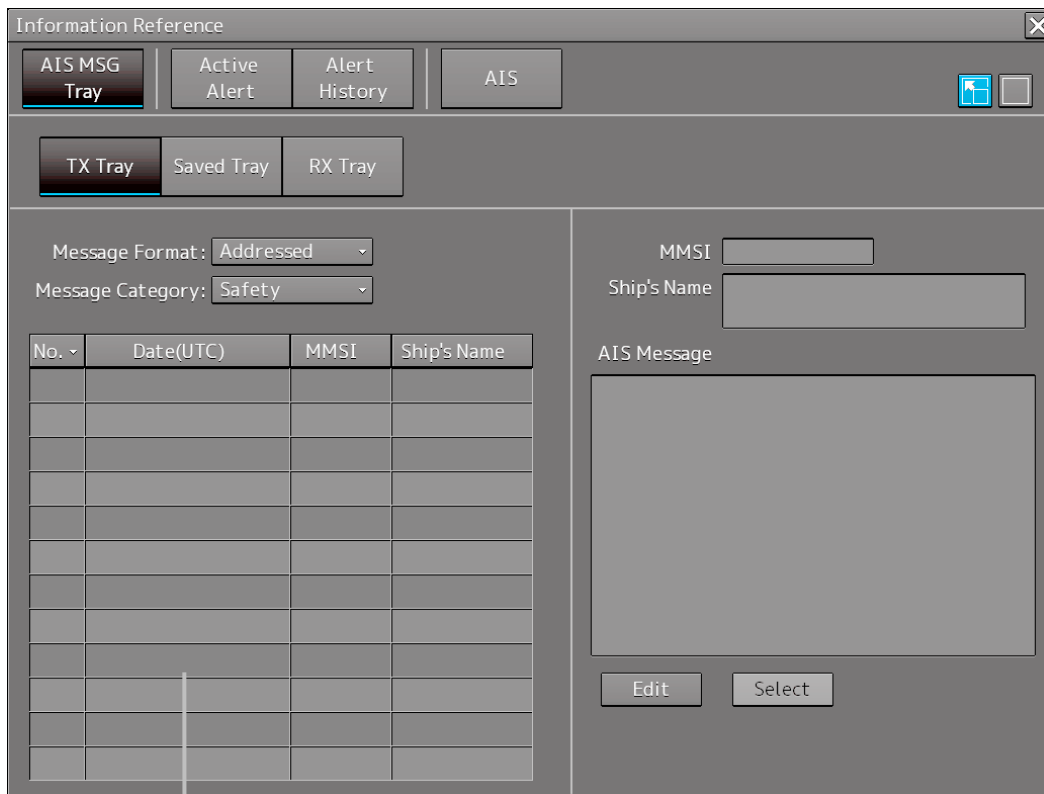
6

6.11.1 Displaying the AIS message tray

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on [TT/AIS] - [AIS Message Tray] on the menu.**
The "Information Reference" window appears.
- 3 Click on the [AIS MSG Tray] button.**
The AIS Message Tray is displayed.

Memo

The AIS message tray can also be displayed by clicking on the [View Tray] button in the "Edit and Send AIS Message" dialog.



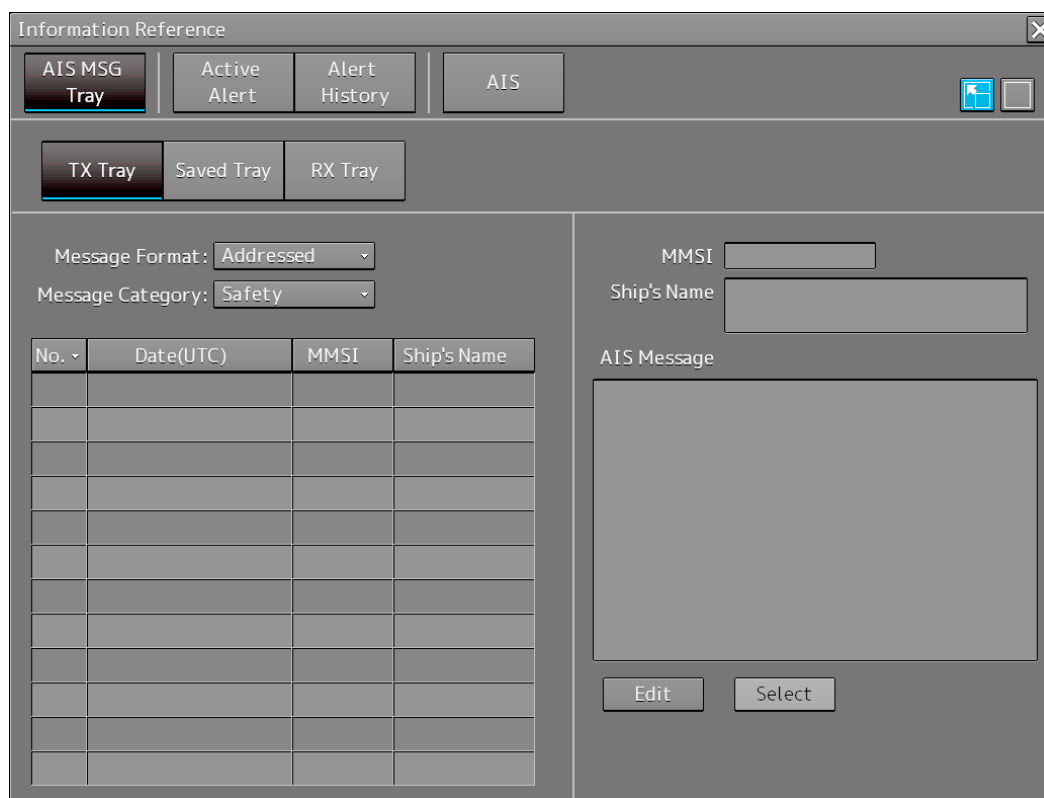
Message list

Up to 50 most recent messages are displayed in the message list, from the newest date first. When the 51st message is registered, the message having the oldest date will automatically be deleted.

By clicking any item of the title columns, messages can be sorted in ascending or descending order.

When a message is clicked in the message list, the detailed information of that message will be displayed in the right area of the list.

6.11.2 Switching message display



6

To display transmitted messages:

Click on the [TX Tray] (Transmitted Tray) button.

To display saved messages:

Click on the [Saved Tray] button.

To display received messages:

Click on the [RX Tray] (Received Tray) button.

Unread messages are displayed in boldface.

To filter messages by specifying the transmission method:

To display only messages sent/received by specifying an MMSI code:

Click on the [Addressed] (address specification) button.

To display only messages distributed through broadcasting: Click on the [Broadcast] button.

When messages are not filtered by the transmission method: Click on the [All] (display all) button.

To filter messages by specifying category:

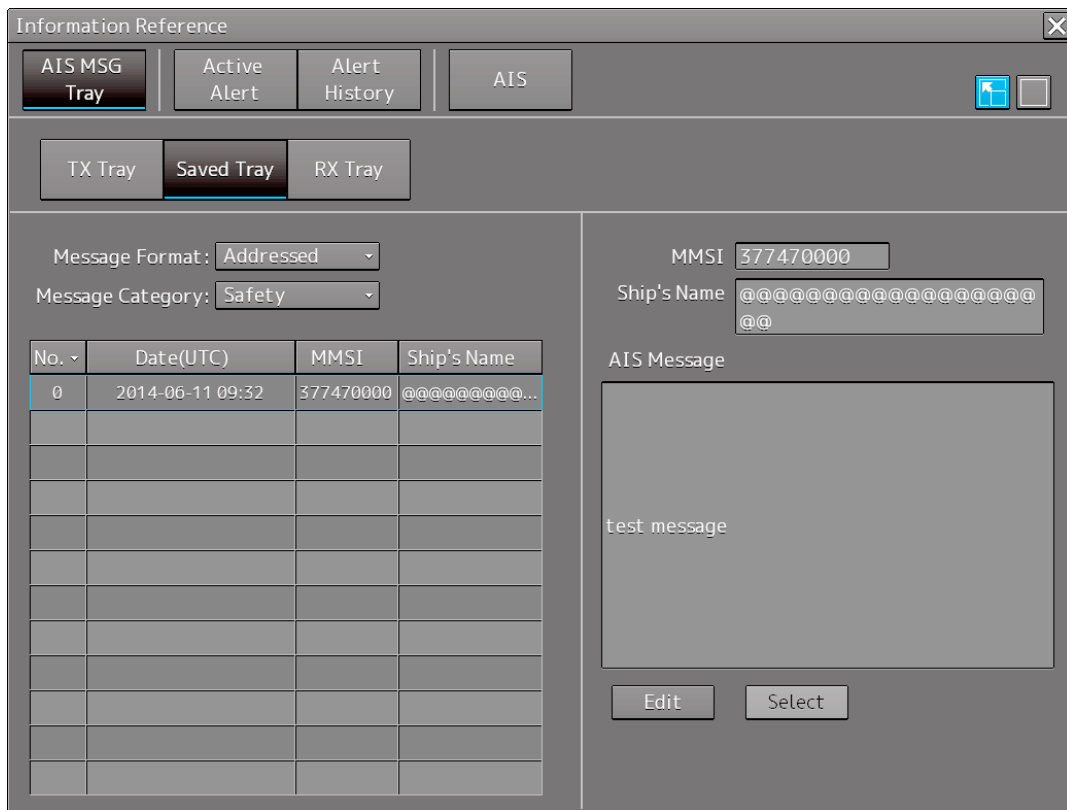
To display only safety related messages: Click on the [Safety] (safety related) button.

To display only routine messages: Click on the [Routine] button.

When messages are not filtered by category: Click on the [All] (display all) button.

6.11.3 Sending a message in the message tray after editing

- 1 Click the message to copy in the message list.



- 2 Click on the [Edit] or [Select] button.

When the AIS Message Tray is displayed by opening the AIS Message Tray submenu:

Click the [Edit] button.

The [Edit and Send AIS Message] dialog box appears, and the AIS message will be copied to the [Edit and Send AIS Message] dialog box. When a message is sent by specifying an MMSI code, the MMSI code will also be copied:

When the AIS Message Tray was displayed by clicking the [View Tray] button in the [Edit and Send AIS Message] dialog box: Click the [Select] button.

The AIS message will be copied to the [Edit and Send AIS Message] dialog box. The MMSI code is not copied by this method.

6.12 Highlighting TT/AIS Symbols

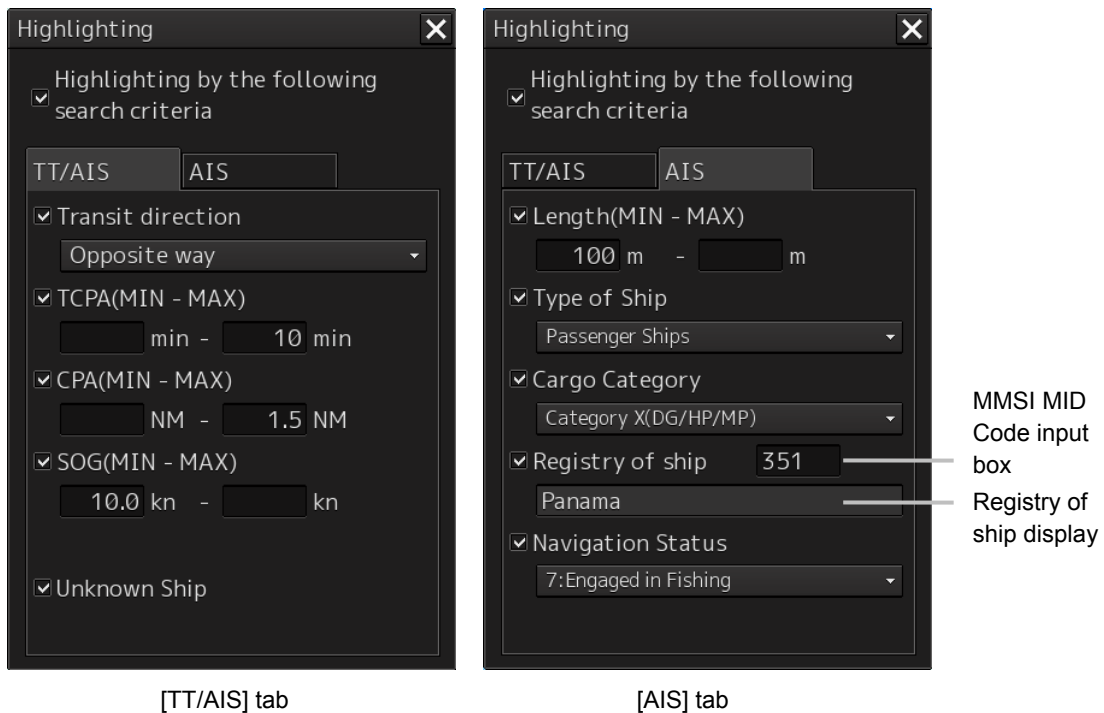
TT/AIS symbols can be searched by specifying criteria and highlight them.

- 1 Click on the [Menu] button on the left toolbar.

The menu is displayed.

- 2 Click on [TT/AIS] - [Highlighting] on the menu.

The "Highlighting" dialog box appears.



- 3 To include all search criterions as highlight targets, select the [Highlighting by the following search criteria] checkbox.

To exclude all search criterions from highlight targets, clear the [Highlighting by the following search criteria] checkbox.

- 4 If the [Highlighting by the following search criteria] checkbox is selected in step 3 above, clear the checkboxes of the search criterion to be excluded from highlighting.

5 Of the checked search items, specify the search criteria for highlighting.

Transit direction: Select the transit direction from the combo box.

N	Sailing North
NE	Sailing North East
E	Sailing East
SE	Sailing South East
S	Sailing South
SW	Sailing South West
W	Sailing West
NW	Sailing North West
Same way	Same way
Opposite way	Opposite way

Item	Setting
TCPA	Specify the minimum and maximum values in the range between 1 to 99 min.
CPA	Specify the minimum and maximum values in the range between 0.1 to 9.9 NM.
SOG	Specify the minimum and maximum values in the range between 0.0 to 102.2 kn.
Unknown Ship	As a result of conducting association processing using the TT/AIS function, targets that were not identified will be categorized as unknown ships.
Length	Specify the minimum and maximum values in the range between 1.0 to 1022.0 m.
Type of ship	Open the list and click on the type of the ship to be highlighted.
Cargo category	Open the list and click on the cargo category to be highlighted.
Registry of ship	Specify the MMSI MID Code in the range between 200 and 800. The registry of ship corresponding to the entered code is displayed.
Navigation Status	Open the list and select the navigation status to be highlighted.

6.13 Trial Maneuvering

Note

Trial maneuvering is to simulate own ship's course and speed in the conditions that the course and speed of a target ship are unchanged as they are. The situation is different from any actual ship maneuvering, so set values with large margins to CPA Limit and TCPA Limit.

6.13.1 Outline of Trial Maneuvering

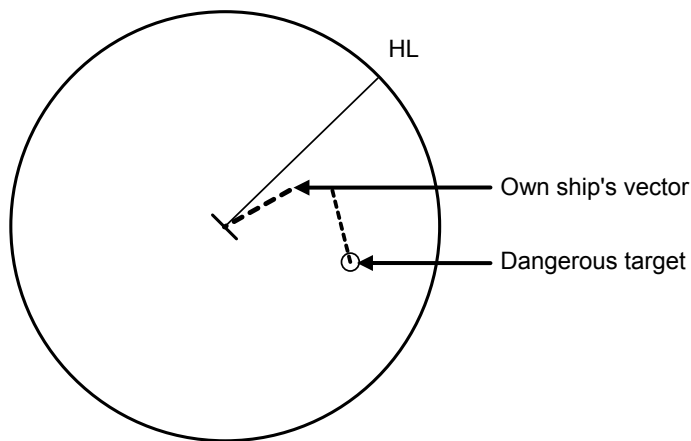
The trial maneuvering is the function of simulating own ship's course and speed for collision avoidance when a dangerous target appears. When the own ship's course and speed are entered in manual mode, the trial maneuvering function checks if pre-acquired or pre-activated targets are dangerous.

Trial maneuvering in the true vector mode

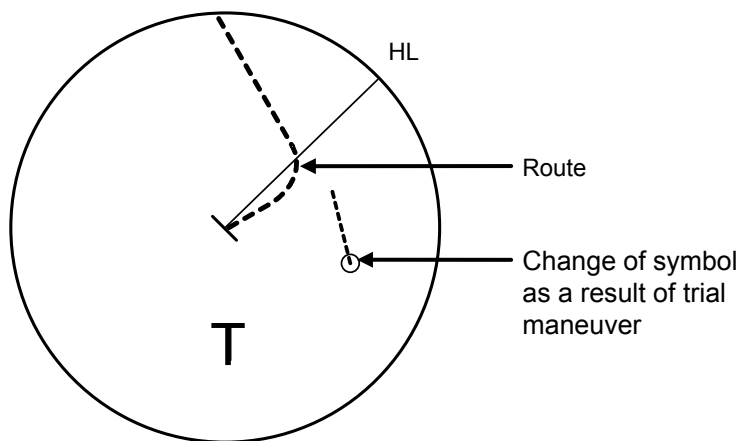
If the own ship's vector mode is the true vector mode, the own ship's vector is calculated according to the own ship's trial speed and trial course as well as the own ship's dynamic characteristic, and the result is displayed as the own ship's expected course. The following figures show an example of veering to the left: the dangerous target at front right has changed to a safe target as a result of trial maneuver.

The tracked target information indicates the current CPA and TCPA values regardless of the result of simulation.

NORMAL



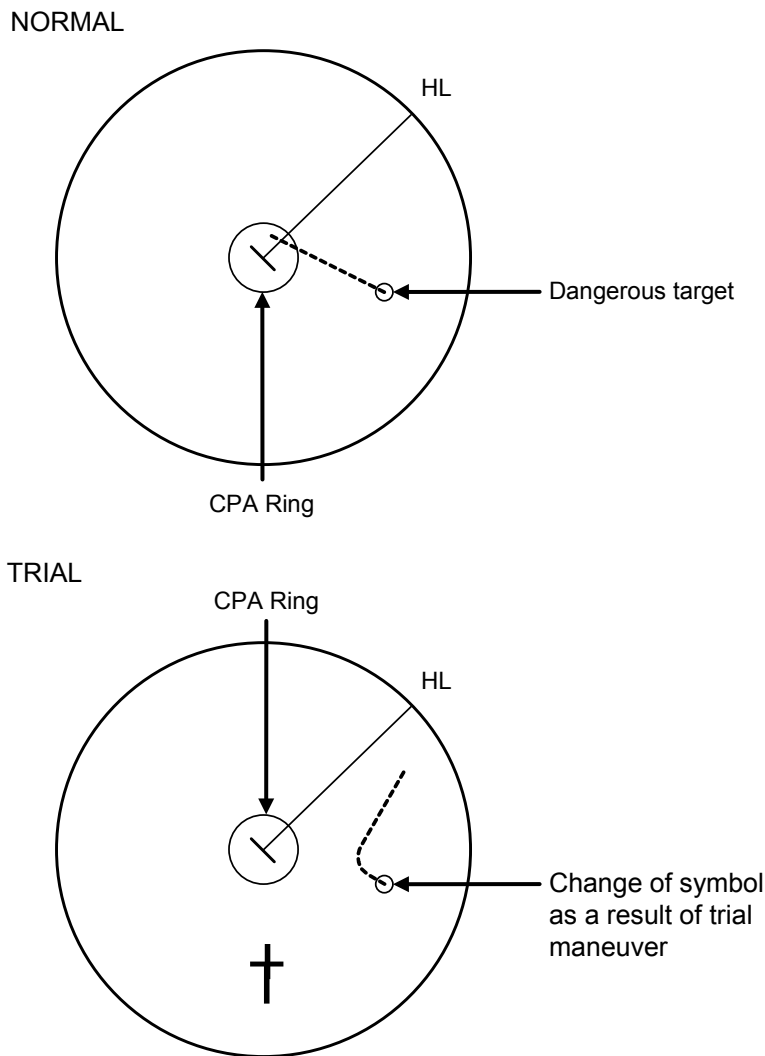
TRIAL



Trial Maneuvering in the True Vector Mode

Trial maneuvering in the relative vector mode

If the own ship's vector mode is the relative vector mode, an expected relative course of the target is displayed in relation to the own ship's expected course when in the true vector mode. The following figures show an example of a dangerous target changing to a safe target. The target vector will cross the CPA ring and will thus be a dangerous target. By trial maneuver of ship avoidance simulation (under the same condition as the true vector in the previous section), the relative vector (expected course) of the target changes to a safe target as shown in the lower figure.



Trial Maneuvering in the Relative Vector Mode

The above figure shows that the relative vector of the target has changed as shown in the Figure as a result of simulation (course and speed) in the previous section, so that the symbol color is changed into "White", a safe target.

Irrespective of the simulation results, the current CPA and TCPA values are shown in the tracked target information just like when the true vector mode is active.

The course change of own ship is displayed as a dotted-line.

Better information is provided by using the trial relative vector mode when sea stabilization mode is active.

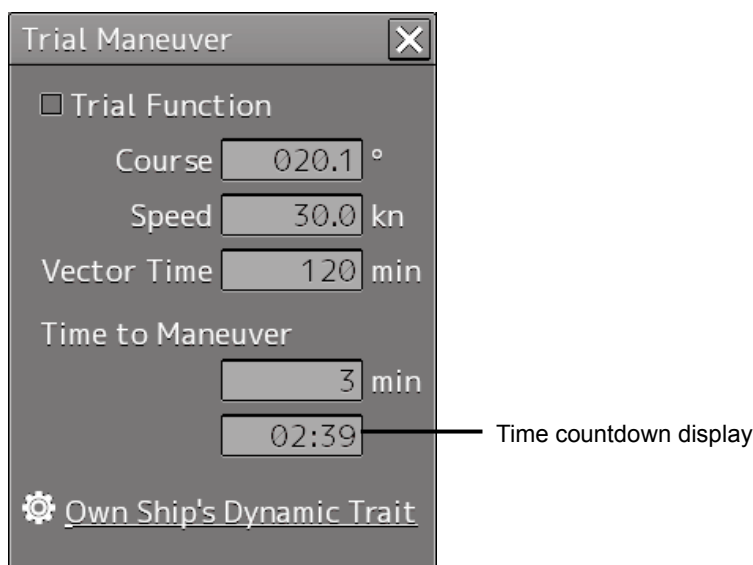
6.13.2 Performing a trial maneuver

- 1 Click on the [Menu] button on the left toolbar.

The menu is displayed.

- 2 Click on [TT/AIS] - [Trial Maneuver] on the menu.

The "Trial Maneuver" dialog box appears.



- 3 Select the [Trial Function] checkbox.

The trial function is turned on.

When Trial Function is set to On, the character "T" blinks at the bottom of the own ship display field in the radar display and means a trial maneuver.

- 4 Enter a setting value in each of the [Course] and [Speed] input boxes.

Memo

[Course] can be set up by turning the [EBL] dial and [Speed] by turning the [VRM] dial.

- 5 Set other characteristics.

[Vector Time]: Vector time (1 to 120 min)

[Time to Maneuver]: Time until trial maneuvering is started (0 to 30 min)

[Own Ship's Dynamic Trait]:

When this item is clicked, the dialog is displayed to set own ship's dynamic trait.

For the details, refer to "18.8 Setting own ship's dynamic trait".

For the settings of [Own Ship's Dynamic Trait], refer to "18.5.2 Setting own ship's dynamic trait". The dangerous target symbol is displayed in red and the safe target symbol is displayed in white.

The color of the safe target symbol can be changed with [Target Symbol] of [Settings] - [General] - [Color and Brightness]. For the details, refer to "18.18 Setting Colors and Brightness".

Vector Time is valid only when Trial Function is set to On. If it is Off, the vector time before trial maneuvering is displayed.

Time until the start of trial maneuvering is counted down directly after the input.

The acceleration and deceleration are influenced depending on the relationship between the current speed and the input speed for trial maneuvering.

If 0.0 kn/min is set for [Acceleration] when the speed for trial maneuvering is faster than the current speed, or for [Deceleration] when the speed for trial maneuvering is slower than the current speed, the system performs simulation on the assumption that the speed is changed directly after the time set for [Time to Maneuver].

To finish trial operation:

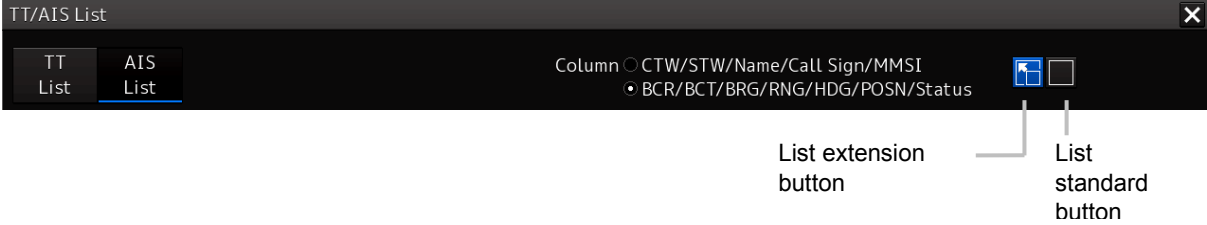
- 1 Clear the [Trial Function] checkbox.**

6.14.1.1 Switching between a standard window and an extended window

The TT/AIS list can be switched to a standard window or an extended window.

To switch to an extended window, click on the List extension button.

To switch to a standard window, click on the List Standard button.



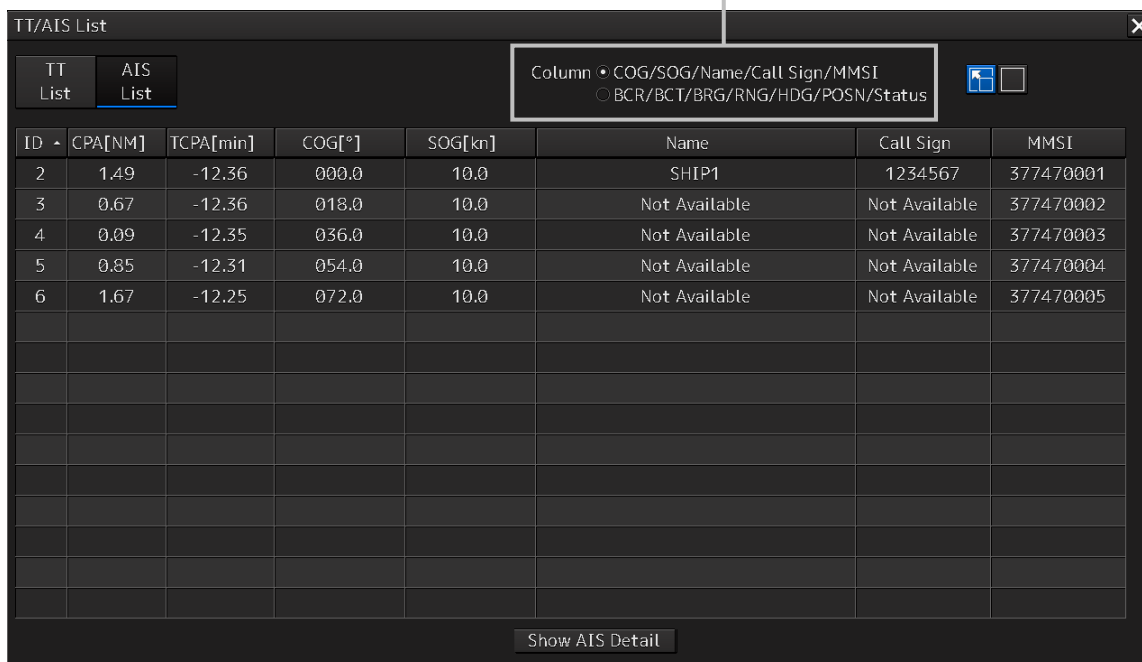
[Example of Extended window]

ID	CPA[NM]	TCPA[min]	BCR[NM]	BCT[min]	BRG[$^{\circ}$]	RNG[NM]	HDG[$^{\circ}$]	LAT	LON	Status
8	2.12	12.48	2.12	12.6	315.4	2.98	090.0	0 $^{\circ}$ 02.121'N	0 $^{\circ}$ 02.079'W	Sleeping
7	2.12	12.48			224.6	2.98	090.0	0 $^{\circ}$ 02.121'S	0 $^{\circ}$ 02.080'W	Sleeping
1	0.00	17.74			270.0	2.98	090.0	0 $^{\circ}$ 00.000'N	0 $^{\circ}$ 02.957'W	Sleeping
2	3.00	-0.24			000.8	3.00	090.0	0 $^{\circ}$ 03.000'N	0 $^{\circ}$ 00.041'E	Sleeping
6	3.00	-0.25			179.2	3.00	090.0	0 $^{\circ}$ 03.000'S	0 $^{\circ}$ 00.042'E	Sleeping
3	2.12	-12.99			045.8	3.04	090.0	0 $^{\circ}$ 02.121'N	0 $^{\circ}$ 02.164'E	Sleeping
5	2.12	-12.99			134.2	3.04	090.0	0 $^{\circ}$ 02.121'S	0 $^{\circ}$ 02.164'E	Sleeping
4	0.00	-18.25			090.0	3.06	090.0	0 $^{\circ}$ 00.000'N	0 $^{\circ}$ 03.042'E	Sleeping

6.14.3 AIS List

When [CTW/STW/Name/Call Sign/MMSI] is clicked, CTW, STW, Name, Call Sign, and MMSI are displayed in the rows of list.

When [BCR/BCT/BRG/RNG/HDG/POSN/Status] is clicked, BCR, BCT, Bearing, Range, Heading, Lat, Lon, and Status are displayed in the row of list.



Display Example

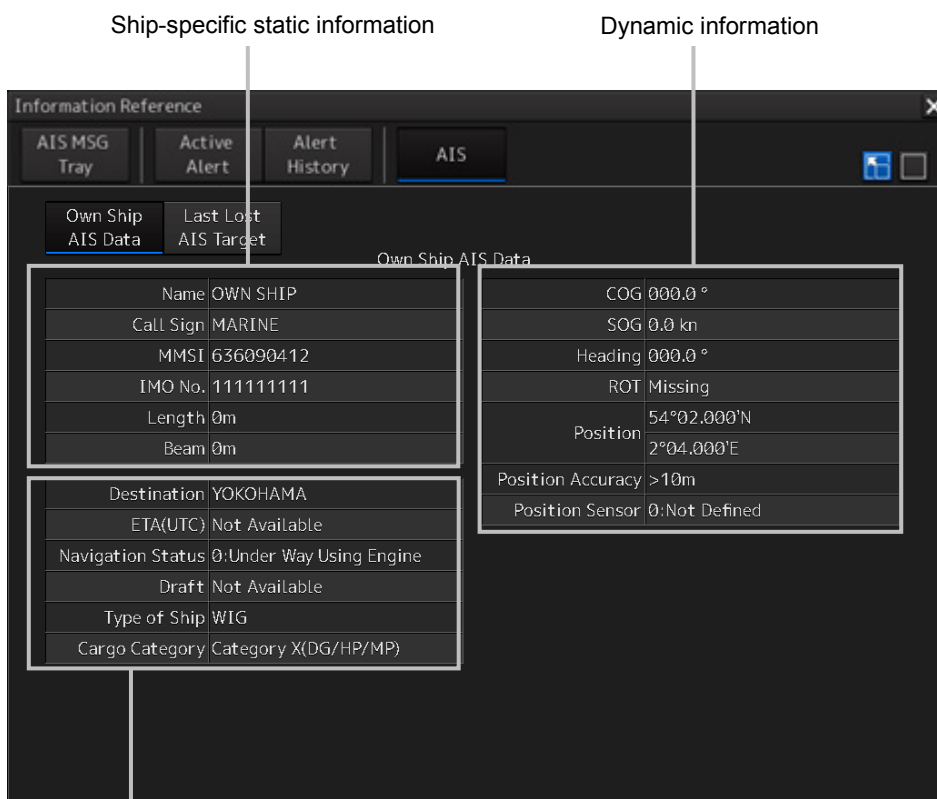
Item	Description
ID	ID No. of AIS
CPA	Closest approach distance
TCPA	Time up to closest approach distance
COG or CTW	COG: Course Over the Ground CTW: Course Through Water *In ground mode, COG is displayed. In water mode, CTW is displayed. *Operates in fixed ground mode on the ECDIS screen.
SOG or STW	SOG: Speed Over the Ground STW: Speed Through Water *In ground mode, SOG is displayed. In water mode, STW is displayed. *Operates in fixed ground mode on the ECDIS screen.
Name	Ship name
Call Sign	Call sign
MMSI	Maritime Mobile Service Identity
BCR	Bow crossing distance
BCT	Bow crossing time
BRG	True direction
RNG	Distance
HDG	Heading
Lat	Latitude

Item	Description
Lon	Longitude
Status	Status Sleeping: Sleeping in progress Activated: Activation in progress Lost: Lost status Danger: Dangerous ship
[Show AIS Detail] button	When one item is selected from the list and this button is clicked, AIS detail information is displayed in the information monitoring window. For the details, refer to "2.3.1.4 AIS Detail INFO".

6.15 Confirming Own Ship's AIS Information

Take the following steps to display own ship's AIS information.

- 1 Click on the [Menu] button on the left toolbar.**
The menu is displayed.
- 2 Click on [TT/AIS] - [Own Ship AIS Data] on the menu.**
The "Information Reference" (information monitoring window) is displayed.
- 3 Click on the [Own Ship AIS Data] button.**
Own ship's AIS information is displayed in the information monitoring window.



Static information that may change during each navigation

Memo

The Information Reference can be switched to standard window display or extended window display.

In the above example, the extended window is used.

For the details of switching between the standard window and the extended window, refer to "2.3.2.1 Switching between a standard window and an extended window".

6.16 Displaying the Last Lost AIS Target

- 1 Click on the [Menu] button on the left toolbar.
The menu is displayed.
- 2 Click on [TT/AIS] - [Last Lost AIS Data] on the menu.
The "Information Reference" (information monitoring window) is displayed.
- 3 Click on the [Last Lost AIS Target] button.
The last lost information about AIS target is displayed in the information monitoring window.

The screenshot shows the 'Information Reference' window with the 'AIS' tab selected. The 'Last Lost AIS Target Data' section is active, displaying two tables of information.

Ship-specific static information		Dynamic information	
Name	SHIP1	Bearing	000.0 °
Call Sign	1234567	Range	1.29 NM
MMSI	377470001	COG	000.0 °
IMO No.	1234567	SOG	20.0 kn
Length	200m	Heading	000.0 °
Beam	40m	ROT	000.0 °/min
Destination	YOKOHAMA	Position	32°03.286'N 60°55.000'E
ETA(UTC)	Not Available	Position Accuracy	<10m
Navigation Status	0:Under Way Using Engine	Position Sensor	1:GPS
Draft	Not Available		
Type of Ship	WIG		
Cargo Category	Category X(DG/HP/MP)		

Static information that may change during each navigation

Last Lost AIS Target (last lost information about AIS target)

Memo

The Information Reference can be switched to standard window display or extended window display.

In the above example, the extended window is used.

For the details of switching between the standard window and the extended window, refer to "2.3.2.1 Switching between a standard window and an extended window".

