FURUNO FINLAND OY

FICE-100 Ice Radar | FOIL-200 Oil Radar

OPERATORS MANUAL

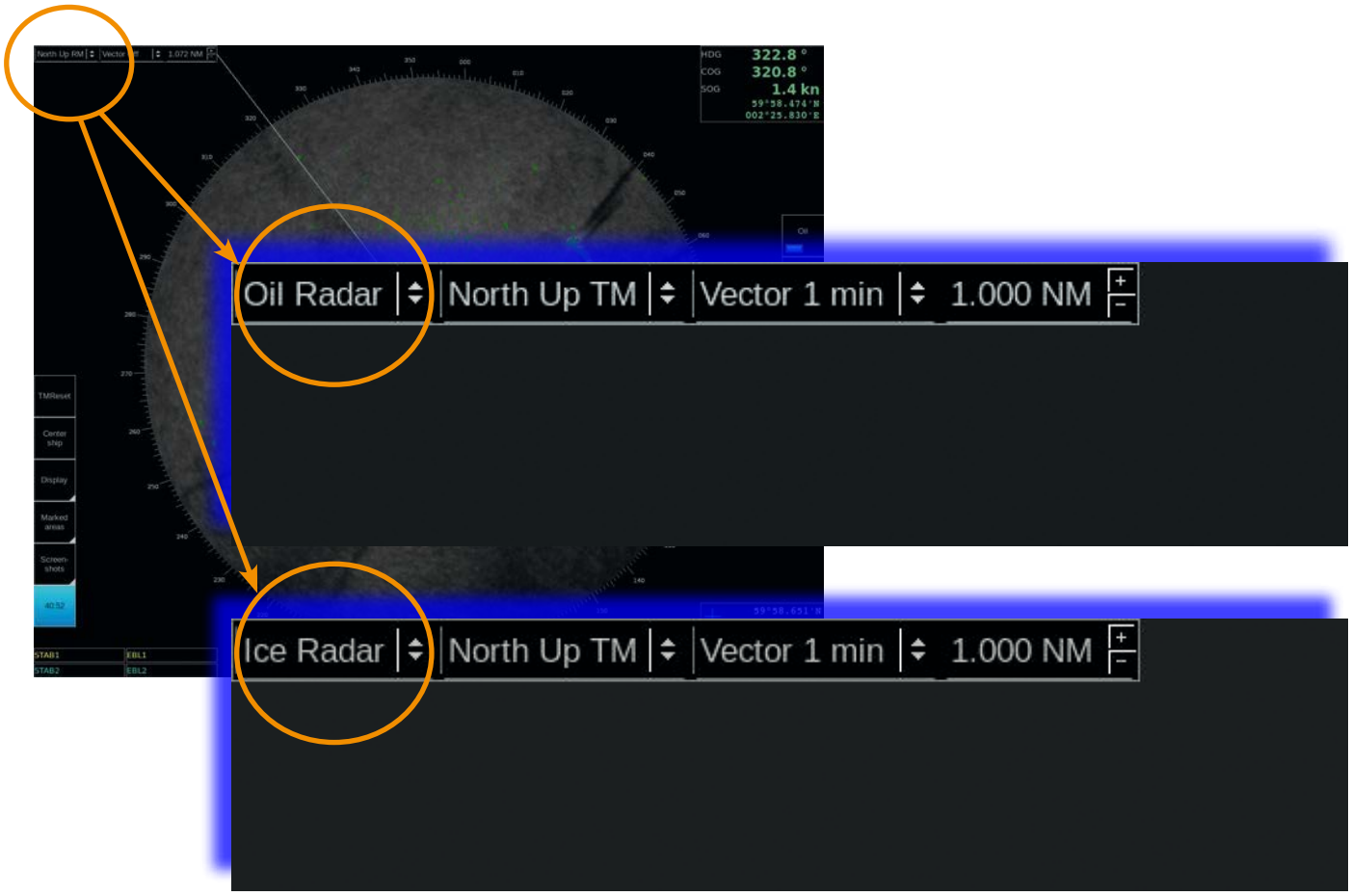
Furuno Finland Oy
www.furuno.fi

TABLE OF CONTENTS

FICE-100 / FOIL-200 OPERATOR'S MANUAL

This manual includes FICE-100 Ice Radar and FOIL-200 Oil Radar operator's manuals. FICE-100 and FOIL-200 are built on the same hardware, but the software is different. FICE-100 Ice Radar can be upgraded into FOIL-200 Oil Radar with a software upgrade only.

FOIL-200 can also include FICE-100 Ice Radar software. There by the user is able to change between the Ice and Oil Radar modes. The change between these modes is simply done in the drop-down menu on the upper left corner of the screen.



FOREWORD

A WORD TO THE OWNER OF THE FURUNO FINLAND ICE RADAR FICE-100 / OIL RADAR FOIL-200

Congratulations on your choice of the Furuno Finland Ice Radar FICE-100 / Oil Radar FOIL-200.

Your equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless properly operated and maintained. Please carefully read and follow the operation and maintenance procedures set forth in this manual.

Thank you for considering and purchasing Furuno Finland Ice Radar / Oil Radar.

We would appreciate feedback from you, the end-user, about whether we are achieving our purposes.

FEATURES

The Furuno Finland Ice Radar / Oil Radar is a hybrid ice radar. It is based on the normal Furuno ARPA radar, and captures a copy of the raw radar signal from the ARPA processor. The normal operation of the ARPA radar is not affected.

The Ice Radar / Oil Radar is not a navigational device. It is a supplementary system for the specific task of observing ice conditions or detecting oil spills by radar.

If you would like to know more about the Ice Radar / Oil Radar capabilities please contact to Furuno Finland Oy (www.furuno.fi).

FICE-100 SOFTWARE HISTORY

V1.00 Initial Release

V1.20 Motion compensation release

V1.30 New GUI and support for GPS sensors

V1.40 Revised version (1.0.8136)

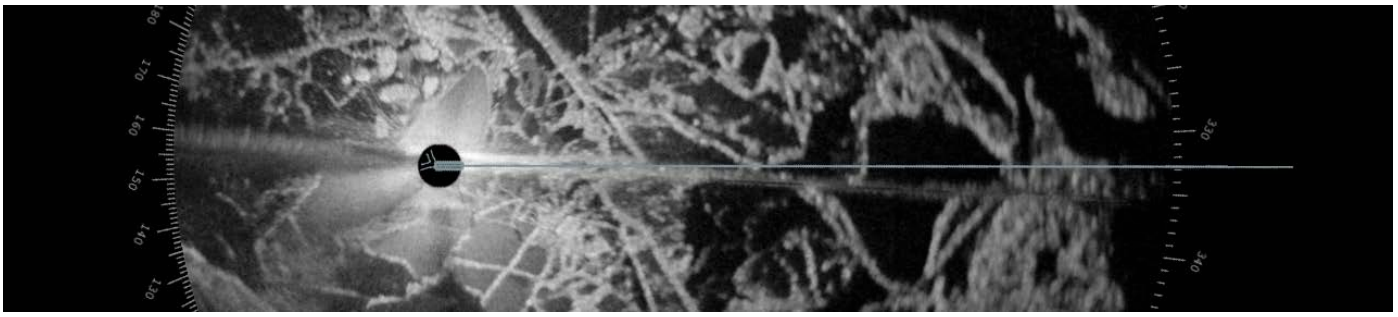
V1.50 Revised version (1.0.8473)

FOIL-200 SOFTWARE HISTORY

V1.00 Initial Release

V1.10 Revised version (1.0.8473)

V1.20 Revised version (1.0.8842)



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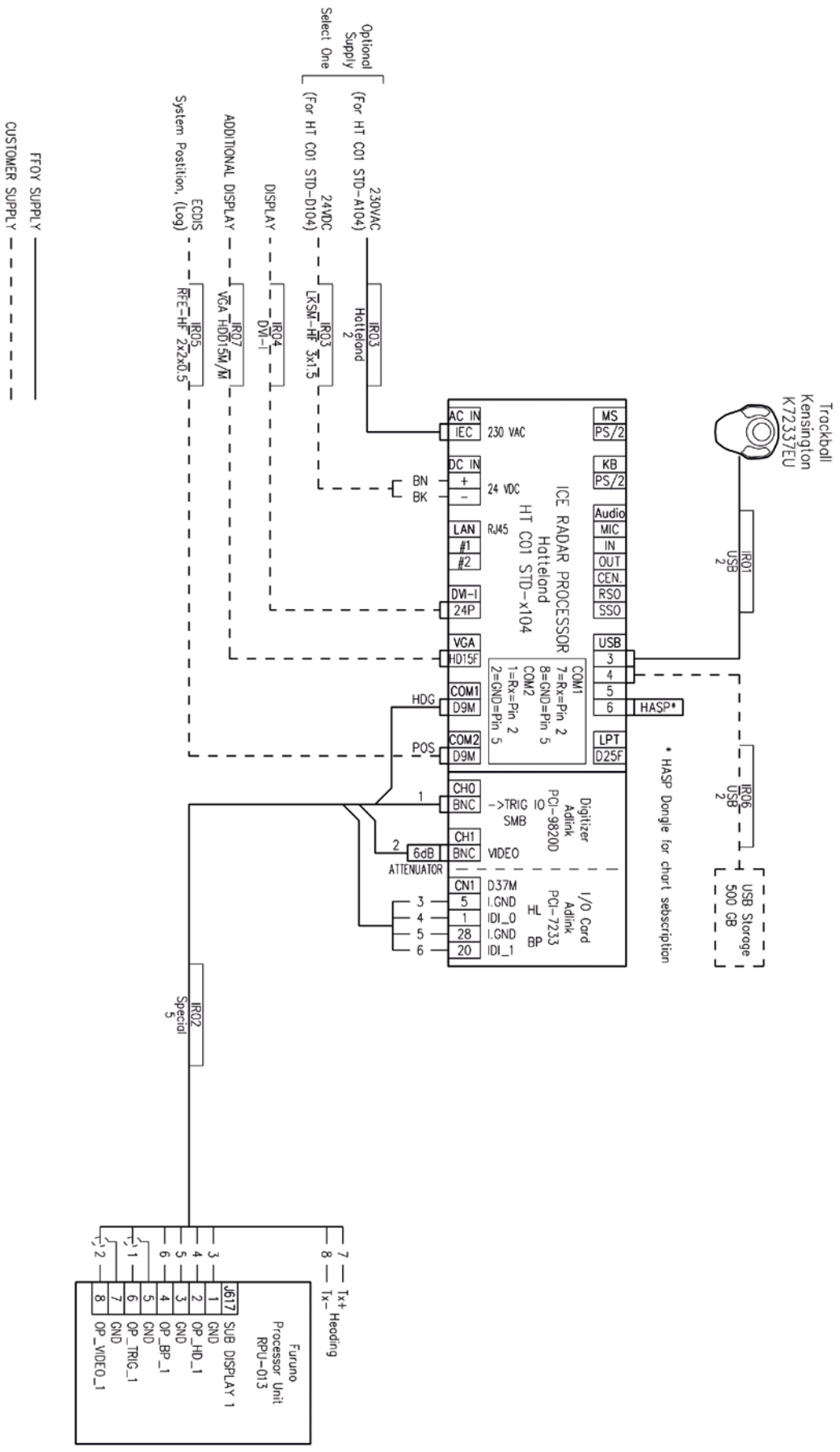
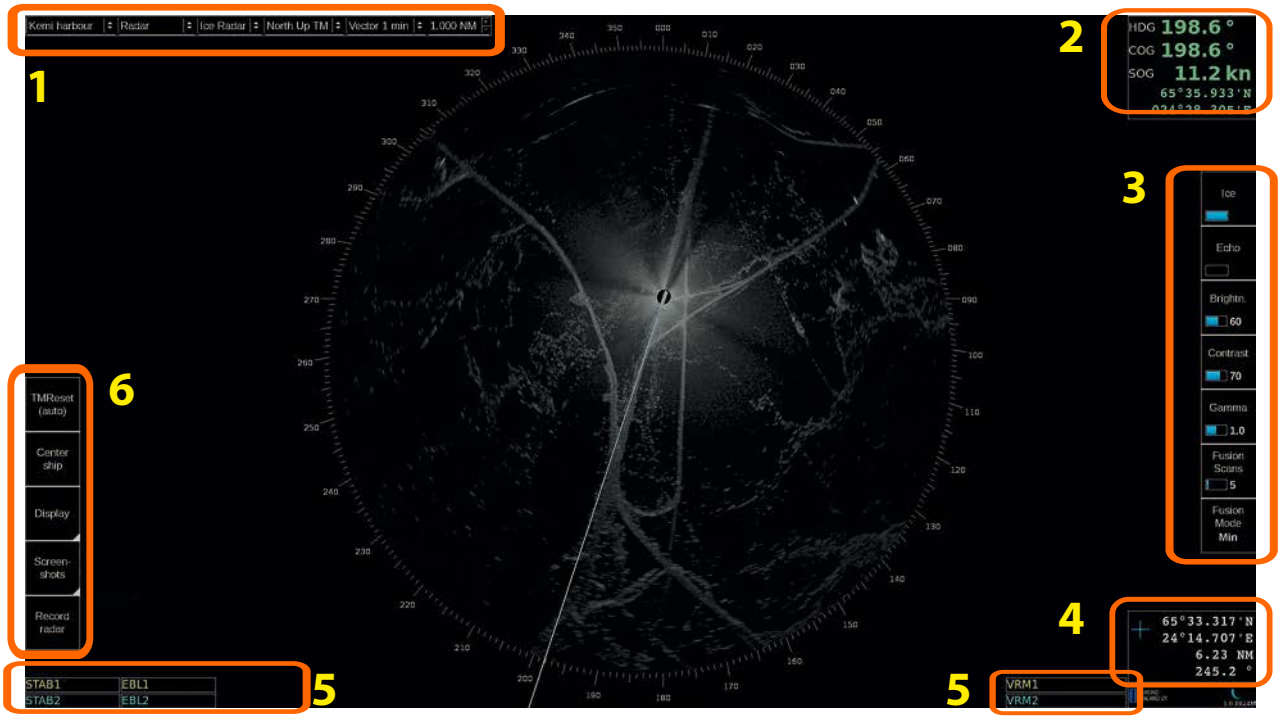
SYSTEM CONFIGURATION

NOTE: connect COM 1: port the same heading device as connected to navigation radar. Use separate output available in gyro or use RS-422 data buffer (or similar) to maintain good signal level both to navigation radar and to Ice radar.



1. GRAPHICAL USER INTERFACE (GUI)

THE ICE RADAR GRAPHICAL USER INTERFACE (GUI) IS BASED ON A SINGLE SCREEN



User interface sections	
1.	Heading mode, vector time selection and range/scale selection
2.	Navigational data
3.	Ice filter parameter adjustment
4.	Cursor position indicator
5.	EBL/VRM indicators
6.	TM reset, Center ship buttons, Display palette selection, Screenshots and Record radar buttons

1.1 OPERATING MODE SELECTIONS

	Description
1.	Motion mode select - Available modes: Head Up TM Head Up RM North Up TM North Up RM
2.	Vector – Selection of vector length (Off, 1 min, 3 min, 6 min)
3.	Range/Scale indicator – Shows the range used in Radar display.

1.2 NAVIGATIONAL DATA

The indicators are passive repeaters of navigational data received from the sensors.

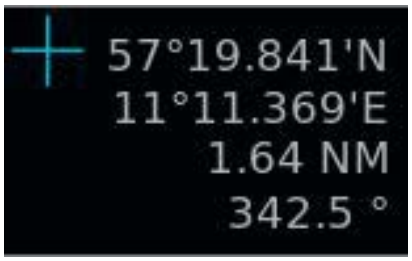
	Description
1.	HDG; Heading
2.	SPD; Speed over water (is shown only if source of SPD connected to radar)
3.	COG; Course over ground
4.	SOG; Speed over ground
5.	Position (Lat, Lon)

1.3 ICE FILTER PARAMETER ADJUSTMENTS

These parameters affect the behavior of the Ice filter

	Description
	Ice – toggle Oil echoes on/off
	Echo – toggle navigational radar echoes on/off
	Brightness – adjust brightness of Ice layer.
	Contrast – adjust contrast of Ice layer.
	Gamma – adjust linearity of Ice color.
	Adjust number of scans – how many overlapping radar scans are used for the Ice echoes Note, if Fusion mode is "Off", Fusion scans is not in use.
	Fusion Mode: Iceberg Lead

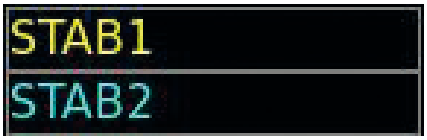
1.4 CURSOR POSITION INDICATOR



	Description
1.	Cursor position display (LAT, LON) and range and bearing from own ship position

1.5 EBL/VRM

There are two EBL/VRM measurement tools available. You can choose the operating modes of these tools by clicking in the STAB1 or STAB2 box with your mouse.



	Description
1.	Blank – tool is disabled
2.	Ship – the measurements are done from the ship's conning position
3.	Gnd – the measurements are stabilized to ground

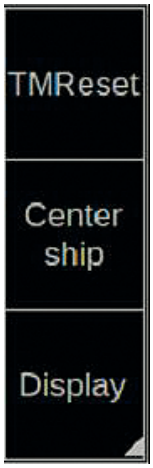
The EBL and VRM values are shown both on screen and in the respective boxes.

	Description
1.	Click on EBL1 or EBL2 will toggle the EBL between true (T) and relative (R) measurements
2.	Click on VRM1 or VRM2 will show or hide the VRM measurement
3.	Using the scroll wheel on any box will adjust that value.

EBL/VRM can be adjusted by dragging the intersection point on the screen.

Note: you choose the point to drag by clicking on the first point with the right mouse button. To release the drag you have to click with the right mouse button again after moving the point to the new position.

1.6 DISPLAY MODE SELECTIONS



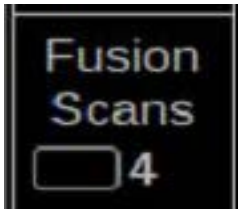
Description	
1.	Click on TMReset to reset vessel position to reset margin.
2.	Click on Center ship to place vessel on the center of screen.
3.	Use Display to select Day or night palette.

2. USE OF FUSION SCANS AND MODES

Ice radar FICE-100 has several options to choose Fusion modes together with number of scans to process video image on screen. Radar scans are motion compensated. The best result will be achieved when selecting a value between 4 and 8 scans.

Below you will find instructions on how to adjust Fusion Scans, descriptions of the Fusion Modes and some examples on how to use them.

2.1 ADJUSTING FUSION SCANS



No.	Description
1.	You can adjust Fusion Scans by moving the cursor over Fusion Scans and selecting the number of Scans by scrolling with the mouse middle button. Note: If Fusion Modes is set to Off, Fusion Scans is not in use.

Fusion modes can be changed by moving the mouse cursor over Fusion Modes and selecting the mode with mouse middle button scroll. Below you will find explanations for each Fusion Mode.

Mode	Description
Iceberg	Fusion Mode is disabled and Fusion Scans are not in use.
Lead	This mode is used to remove temporary noise. The edges of echoes are displayed. Note that moving echoes (objects) will be lost. This can be used for example when you need a sharp image of faint trails through ice.

3. SCREEN SHOTS

No	Description
	Click on Screenshots to capture single or multiple screenshots covering the whole display.

Screenshots –function allows you to capture single or multiple screenshots of the whole display in JPEG -format. These screenshots can be also exported to an external memory, such as an USB stick.

Screenshots –function is operated by clicking Screenshots with your mouse and selecting Take, Export or Delete all.

3.1 HOW TO TAKE SCREENSHOTS

No	Description
1.	Click on Screenshots to open the screenshots menu
2.	Click on Take to capture single or multiple screenshots. You can see the number of taken screenshots in the Export –box.

3.2 HOW TO EXPORT SCREENSHOTS

No	Description
1.	Click on Screenshots to open the screenshots menu
2.	Click on Export to move the captured screenshots to an external memory, such as an USB stick. You can export the screenshots by following these steps: 1. Connect the external memory to your workstation 2. Click Screenshots and Export 3. The screenshots have been successfully moved to an external memory, when the number under Export goes back to zero. 4. On your external memory the screenshots can be found in folder "\exports\screenshots\". The filenames of screenshots indicate the date and time of capture e.g. "20140221T111738025UTC.jpg"

Note: Clicking Export moves the screenshots to an external memory and removes them from your workstation.

3.3 HOW TO DELETE SCREENSHOTS

No	Description
1.	Click on Screenshots to open the screenshots menu
2.	Click on Delete all to delete all captured screenshots. If Delete all is selected, "Are you sure?" dialogue appears, and has to be clicked again for confirmation. After Deleting all, the number under Export will return to zero.

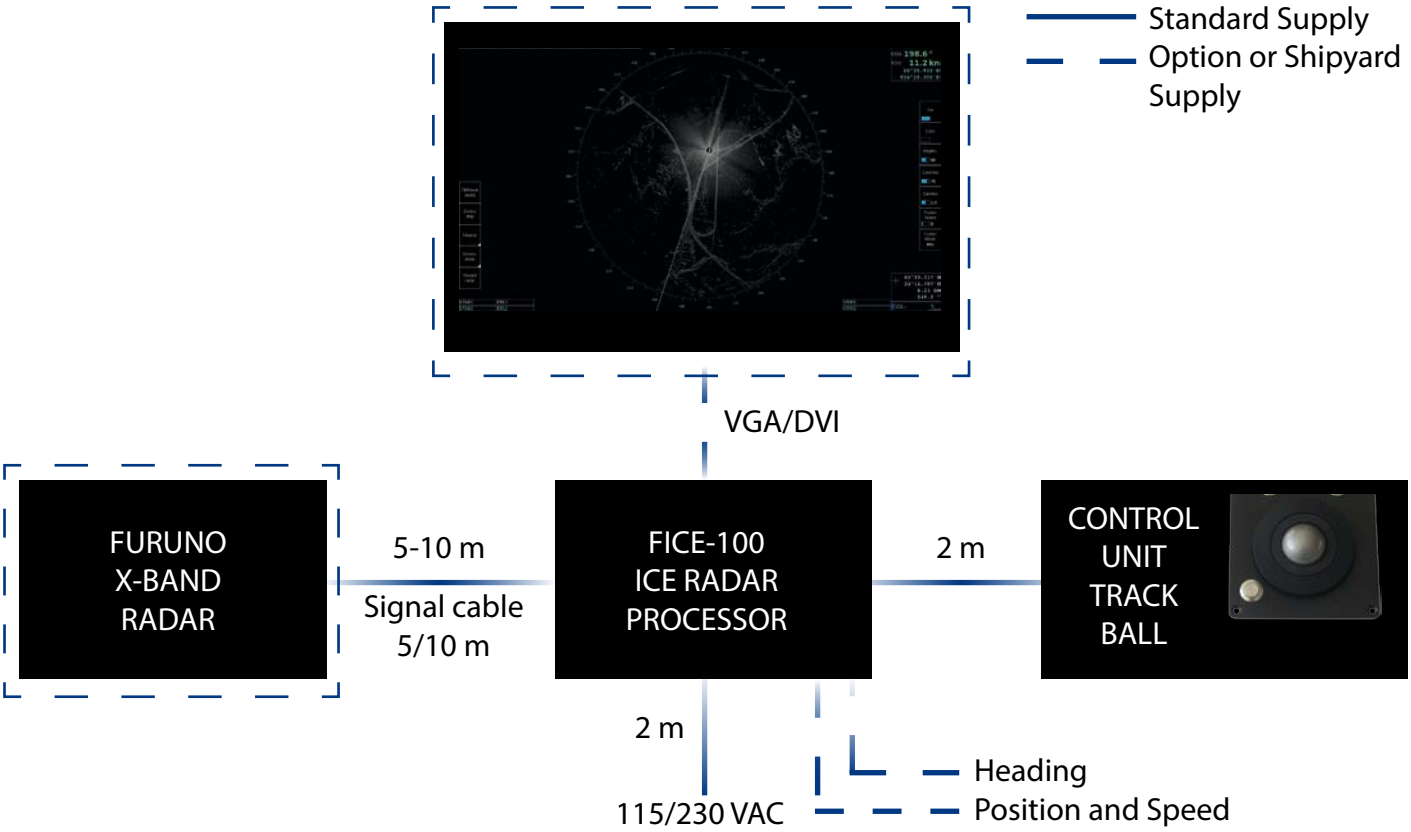
4. INSTALLATION

Sensor and conning positions on ship are in "vessel.config" file, which must be edited at installation time.

Description		Function
1.	Power up ice radar	Start up ice radar
2.	Open login screen	Press Ctrl-Alt F1 to open a login screen
3.	Authenticate	Login: ffoy [enter] Password: ffoy [enter]
4.	Edit vessel.config file	cd .furunofinland [enter] nano vessel.config [enter]
5.	Set length and width	Enter ship measurements (in meters)
6.	Set offsets to CCRP, gps antenna and radar antenna	; Offsets are measured in meters from ship centerpoint ; Transverse: positive (starboard), negative (port) or zero (center) ; Longitudinal: positive (bow), negative (stern) or zero (center) [ccrp offset] transverse=xx.x longitudinal=xx.x [radar_offset] ; Offset of radar antenna position from ship's centerpoint transverse=xx.x longitudinal=xx.x [gp_offset] ; Offset of gps antenna position from ship's centerpoint transverse=xx.x longitudinal=xx.x
7	Save your edits	Ctrl-X and Y
8.	Restart ice radar	sudo reboot

5. SPECIFICATIONS

INTERCONNECTION DIAGRAM



SPECIFICATIONS		EQUIPMENT LIST	
General	Ice radar processor - marine rack computer	**Standard**	1. FICE-110 Oil radar processor
	Power supply 115/230 VAC, 50/60 Hz or 24 VDC		2. Signal cable 5-10 m Ice radar cable
	Trackball control unit		3. Track Ball Control unit with 2 m cable
	High resolution high bandwidth digitizer		4. Standard spare parts and installation materials
	Ice radar display outputs DVI and VGA		
Input signals	Radar signals FAR-2xx7 X-band *)	**Option**	1. Ice radar display w. cable (Specify when ordering)
	- radar video and trigger		
	- azimuth and heading line signals		
	- standard cable length is 5 meters		
	Heading, position and speed		

*) Minimum requirements for radar signals:

Transceiver	12 kW
Antenna radiator	4 ft
Gear box	24 rpm

6. PERFORMANCE TEST FOR FAR-2XX7

FAR-2xx7 is used as normal navigation radar. To verify performance of radar, see installation manual of FAR-2xx7. Following should be proceeded:

- "Tune initialize"
- Check TX time of magnetron
- Use "Performance monitor" to check gain. Performance monitor is an option. If not available, check TX time of magnetron. Replace magnetron if TX time is more than 5000 hours.

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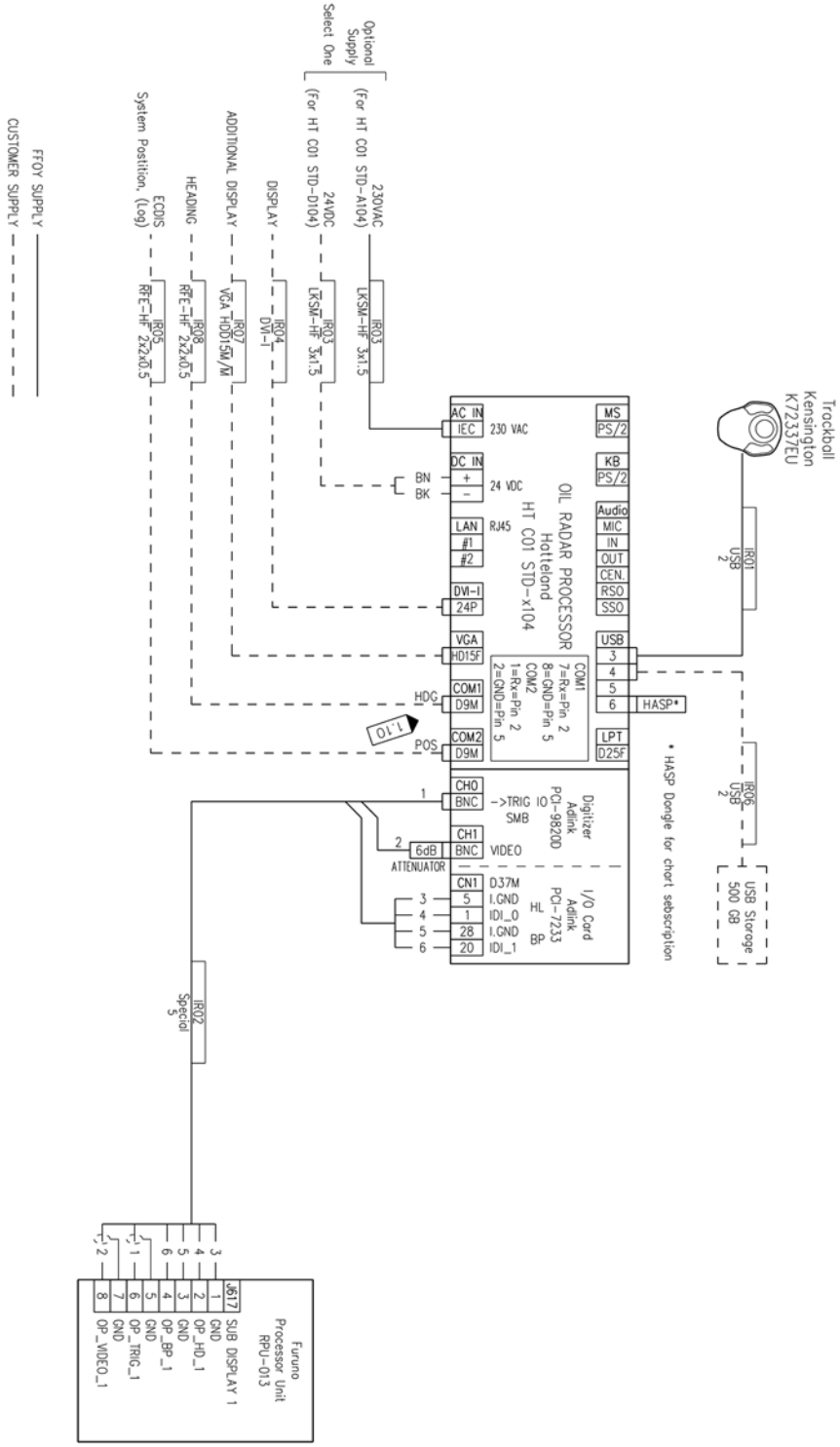
SYSTEM CONFIGURATION

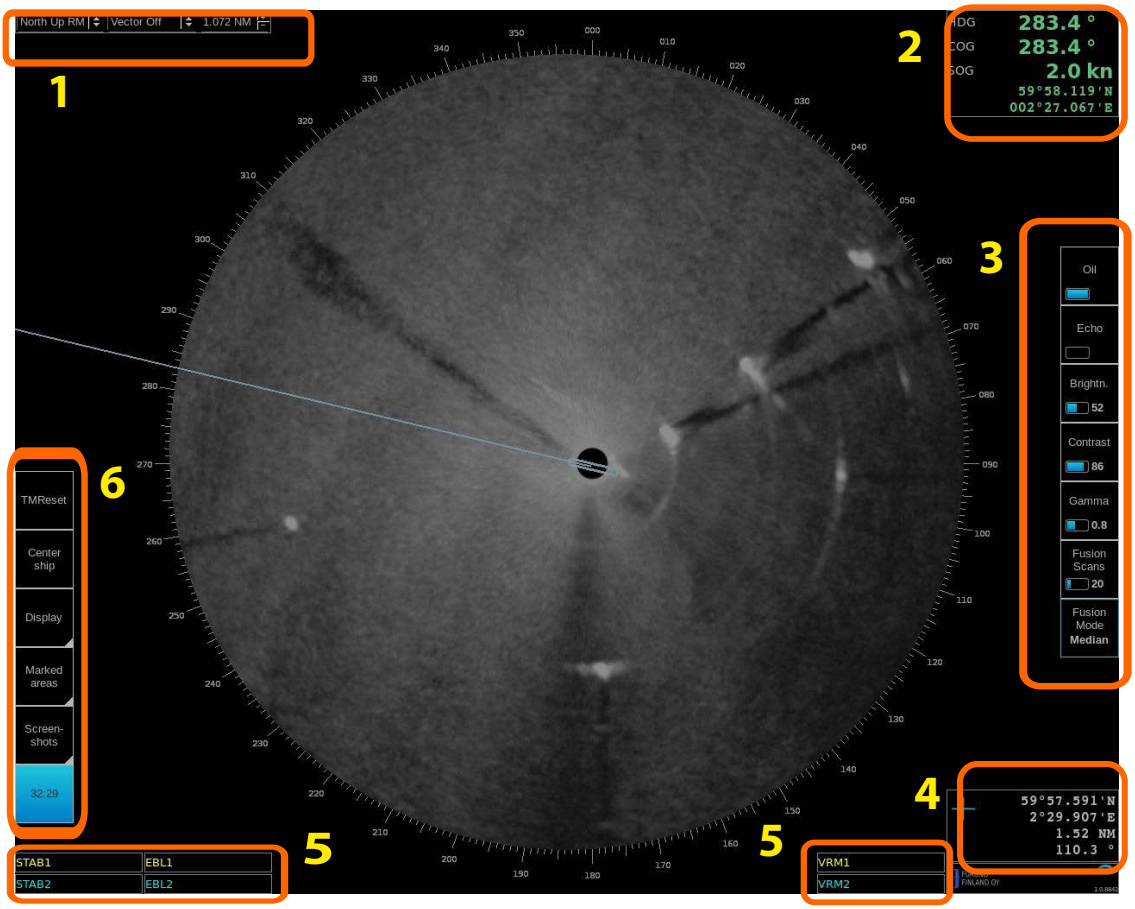
TYPICAL OIL RADAR SYSTEM CONFIGURATION



Note: connect COM 1: port the same heading device as connected to navigation radar. Use separate output available in gyro or use RS-422 data buffer (or similar) to maintain good signal level both to navigation radar and to oil radar.

1. GRAPHICAL USER INTERFACE (GUI)

THE OIL RADAR GRAPHICAL USER INTERFACE (GUI) IS BASED ON A SINGLE SCREEN



User interface sections	
1.	Operating mode, Heading mode, vector selection, sweep selection, range/scale and ship center button
2.	Navigational data
3.	Oil filter parameter adjustment
4.	Cursor position indicator
5.	EBL/VRM indicators
6.	TM reset, Center ship buttons, Display palette selection, Screenshots and Record radar buttons

1.1 OPERATING MODE SELECTIONS

	Description
1.	Motion mode select - Available modes: Head Up TM Head Up RM North Up TM North Up RM
2.	Vector – Selection of vector length (Off, 1 min, 3 min, 6 min)
3.	Range/Scale indicator – Shows the range used in Radar display.

1.2 NAVIGATIONAL DATA

The indicators are passive repeaters of navigational data received from the sensors.

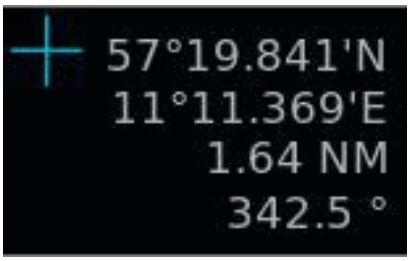
	Description
1.	HDG; Heading
2.	SPD; Speed over water (is shown only if source of SPD connected to radar)
3.	COG; Course over ground
4.	SOG; Speed over ground
5.	Position (Lat, Lon)

1.3 OIL FILTER PARAMETER ADJUSTMENTS

These parameters affect the behavior of the oil filter

	Description
1.	Oil – toggle oil echoes on/off
2.	Echo – toggle navigational radar echoes on/off
3.	Brightness – adjust brightness of oil layer.
4.	Contrast – adjust contrast of oil layer.
5.	Gamma – adjust linearity of oil color.
6.	Adjust number of scans – how many overlapping radar scans are used for the oil echoes Note, if Fusion mode is “Off”, Fusion scans is not in use.
7.	Fusion Mode: Off Median Minimum Adaptive

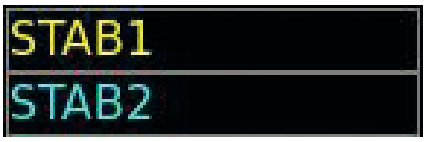
1.4 CURSOR POSITION INDICATOR



	Description
1.	Cursor position display (LAT, LON) and range and bearing from own ship position

1.5 EBL/VRM

There are two EBL/VRM measurement tools available. You can choose the operating modes of these tools by clicking in the STAB1 or STAB2 box with your mouse.



	Description
1.	Blank – tool is disabled
2.	Ship – the measurements are done from the ship's conning position
3.	Gnd – the measurements are stabilized to ground

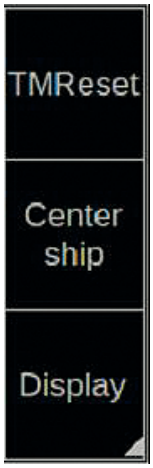
The EBL and VRM values are shown both on screen and in the respective boxes.

	Description
1.	Click on EBL1 or EBL2 will toggle the EBL between true (T) and relative (R) measurements
2.	Click on VRM1 or VRM2 will show or hide the VRM measurement
3.	Using the scroll wheel on any box will adjust that value.

EBL/VRM can be adjusted by dragging the intersection point on the screen.

Note: you choose the point to drag by clicking on the first point with the right mouse button. To release the drag you have to click with the right mouse button again after moving the point to the new position.

1.6 DISPLAY MODE SELECTIONS



Description	
1.	Click on TMReset to reset vessel position to reset margin.
2.	Click on Center ship to place vessel on the center of screen.
3.	Use Display to select Day or night palette.

2. USE OF FUSION SCANS AND MODES

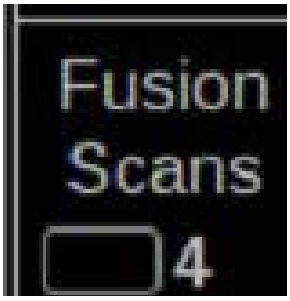
Oil radar FOIL-200 has several options to choose Fusion modes together with number of scans to process video image on screen. Radar scans are motion compensated.

Below you will find instructions on how to adjust Fusion Scans, descriptions of the Fusion Modes and some examples on how to use them.

2.1 ADJUSTING FUSION SCANS

No.	Description
1.	You can adjust Fusion Scans by moving the cursor over Fusion Scans and selecting the number of Scans by scrolling with the mouse middle button. Note: If Fusion Modes is set to Off, Fusion Scans is not in use.

2.2 FUSION MODES



Fusion modes can be changed by moving the mouse cursor over Fusion Modes and selecting the mode with mouse middle button scroll. Below you will find explanations for each Fusion Mode.

Mode	Description
Off	Fusion Mode is disabled. This mode can be used if you want to get normal radar video image without oil information.
Median	This mode is used to remove temporary noise. The edges of echoes are displayed. Note that moving echoes (objects) will be lost.
Minimum	This mode uses weak echoes. This mode can be used for example if you need to display very weak oil signals.
Adaptive	Adaptive mode is like a median filter, but with this mode weak echoes of moving objects can be shown. This mode can be used for example when you need to combine the properties of Median and Off modes.

3. SCREEN SHOTS

No	Description
1.	Click on Screenshots to capture single or multiple screenshots covering the whole display.

Screenshots –function allows you to capture single or multiple screenshots of the whole display in JPEG -format. These screenshots can be also exported to an external memory, such as an USB stick. Screen-shots –function is operated by clicking Screenshots with your mouse and selecting Take, Export or Delete all.

3.1 HOW TO TAKE SCREENSHOTS

No	Description
1.	Click on Screenshots to open the screenshots menu
2.	Click on Take to capture single or multiple screenshots. You can see the number of taken screenshots in the Export –box.

3.2 HOW TO EXPORT SCREENSHOTS

No	Description
1.	Click on Screenshots to open the screenshots menu
2.	Click on Export to move the captured screenshots to an external memory, such as an USB stick. You can export the screenshots by following these steps: 1. Connect the external memory to your workstation 2. Click Screenshots and Export 3. The screenshots have been successfully moved to an external memory, when the number under Export goes back to zero. 4. On your external memory the screenshots can be found in folder "\exports\screenshots\". The filenames of screenshots indicate the date and time of capture e.g. "20140221T111738025UTC.jpg"

Note: Clicking Export moves the screenshots to an external memory and removes them from your workstation.

3.3 HOW TO DELETE SCREENSHOTS

No	Description
1.	Click on Screenshots to open the screenshots menu
2.	Click on Delete all to delete all captured screenshots. If Delete all is selected, "Are you sure?" dialogue appears, and has to be clicked again for confirmation. After Deleting all, the number under Export will return to zero.

4. USER MARKED AREAS ON RADAR

No	Description
1.	Click on Marked areas to create area to mark place of oil spill on Oil radar.

Marked areas –function is operated by clicking Marked areas with your mouse and selecting Show/ Hide, Add, Edit, Delete or Delete all.

4.1 HOW TO SHOW OR HIDE MARKED AREA ON DISPLAY

You can toggle areas ON/OFF on oil radar as you requested. When area is selected to be displayed color of button is blue as shown below.

No	Description
1.	Click on Marked areas to open the screenshots menu
2.	Click on Show/Hide to have areas to shown or not shown on display

4.2 HOW TO ADD NEW AREA

Note: Clicking Export moves the screenshots to an external memory and removes them from your work-station.

No	Description
1.	Click on Marked areas to open the screenshots menu
2.	Click on Add to make new area on display
3.	Use cursor to point location of corner point, use left button of mouse to fix location of corner point
4.	When modifying is completed, click on Marked areas again, and click OK to confirm modified area.
5.	Area is named with date and time stamp (UTC) and color of area is turned to green.

4.3 HOW TO MODIFY AREA

No	Description
1.	Click on Marked areas to open the screenshots menu
2.	Click on Edit to make new area on display
3.	Use cursor to point area to be modified, use left button of mouse to select area. Color of Selected (modified) area is yellow. You can drag and drop corner points or add new corner points to area.
4.	When modifying is completed, click on Marked areas again, and click OK to confirm modified area.
5.	Area is named with date and time stamp (UTC) and color of area is turned to green.

4.4 HOW DELETE AREA(S)

No	Description
1.	Click on Marked areas to open the screenshots menu
2.	Click on Delete or Delete all to delete areas stored on radar. - Delete is used to remove selected (yellow) area on radar - Delete all is used to remove all areas on radar
3.	Click on Delete to delete selected area: - Use cursor to point area to be deleted, use left button of mouse to select area. Color of Selected area is yellow. Click Marked areas again, and click OK to confirm modified area.
4.	Click on Delete all to delete all captured screenshots. - If Delete all is selected, “Are you sure?” dialogue appears, and has to be clicked again for confirmation.

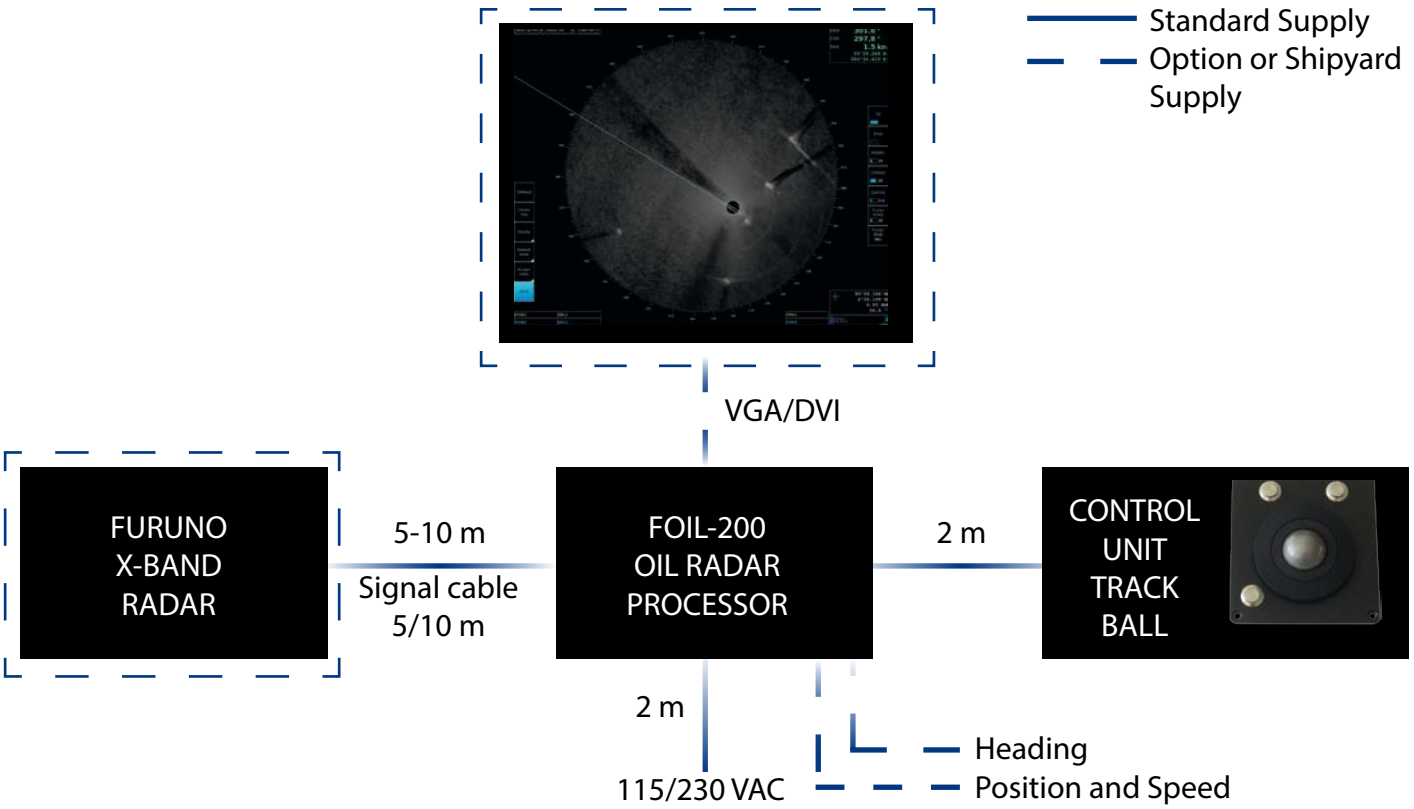
5. INSTALLATION

Sensor and conning positions on ship are in "vessel.config" file, which must be edited at installation time.

Description		Function
1.	Power up oil radar	Start up oil radar
2.	Open login screen	Press Ctrl-Alt F1 to open a login screen
3.	Authenticate	Login: ffoy Password: ffoy
4.	Edit shipInstall.ini file	nano ./FFOYBIN/vessel.config.ini
5.	Set position sentence	Alternatives are GLL, GGA or PNEDA
6.	Set length and width	Replace ship measurements to correct ones (in meters)
7.	Set offsets to CCRP, gps antenna and radar antenna	; Offset from ship's centerpoint ; Transverse: positive (starboard), negative (port) or zero (centre) ; Longitudinal: positive (bow), negative (stern) or zero (centre) [CCRP offset] transverse=xx.x Longtudinal=xx.x [gpsAntenna] ; Offset of gps antenna position from ship's centerpoint transverse=xx.x Longtudinal=xx.x [radarAntenna] ; Offset of radar antenna position from ship's centerpoint transverse=xx.x Longtudinal=xx.x
8.	Save your edits	Ctrl-X and Y
9.	Restart oil radar	sudo reboot

6. SPECIFICATIONS

INTERCONNECTION DIAGRAM



SPECIFICATIONS		EQUIPMENT LIST	
General	Oil radar processor - marine rack computer	**Standard**	1. FOIL-210 Oil radar processor
	Power supply 115/230 VAC, 50/60 Hz or 24 VDC		2. Signal cable 5-10 m Oil radar cable
	Trackball control unit		3. Track Ball Control unit with 2 m cable
	High resolution high bandwidth digitizer		4. Standard spare parts and installation materials
	Oil radar display outputs DVI and VGA		
Input signals	Radar signals FAR-2xx7 X-band *)	**Option**	1. Oil radar display w. cable (Specify when ordering)
	- radar video and trigger		
	- azimuth and heading line signals		
	- standard cable length is 5 meters		
	Heading, position and speed		

*) Minimum requirements for radar signals:

Transceiver	12 kW
Antenna radiator	4 ft
Gear box	24 rpm

7. PERFORMANCE TEST FOR FAR-2XX7

FAR-2xx7 is used as normal navigation radar, when using FOIL-200. To verify performance of radar, see installation manual of FAR-2xx7. Following should be proceeded:

- "Tune initialize"
- Check TX time of magnetron
- Use "Performance monitor" to check gain. Performance monitor is an option. If not available, check TX time of magnetron. Replace magnetron if TX time is more than 5000 hours.