FURUNO®

REFERENCE MANUAL
AUTOPILOT NAVPILOT-500/511/520
WIND MODE

NAV*pilot*

⚠ SAFETY INSTRUCTIONS

⚠ WARNING

Do not use the WIND mode under strong or unstable wind.

The boat may capsize.

When gybing, watch for moving boom.

The boom may strike a person, possibly causing serious injury.

⚠ CAUTION

Trim the sail to the wind always optimally.

Wrong sail position may cause the autopilot's control error.

Monitor the wind direction when using the NAV mode.

The wind direction on the display may change because the heading moves according to route.

Try the TACK mode in good wheather to confirm how it works.

FOREWORD

The wind mode is designed specially for use on sailboats to keep the direction same as receiving wind direction. This reference manual provides the operating for the wind mode of Navpilot-500/511/520.

For other information, see the appropriate operator's manual and installation manual.

Feature

- Auto tacking (gybing) function
- Wind direction/speed alarm
- Tack Timer Function

1. OPERATION

1.1 WIND Mode

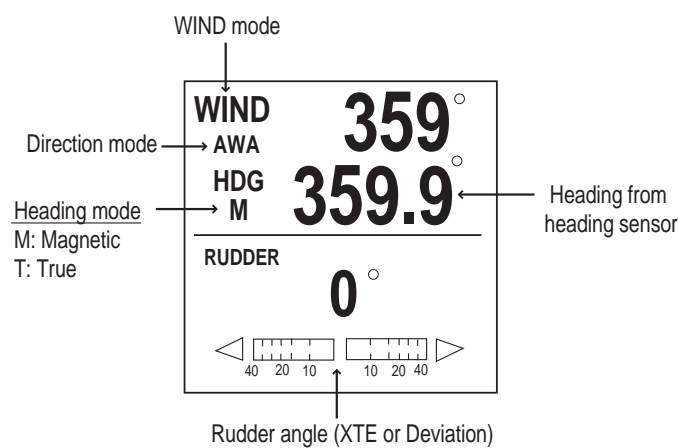The wind mode keeps the direction same as receiving wind direction.

Note: The WIND mode requires wind sensor data as below.

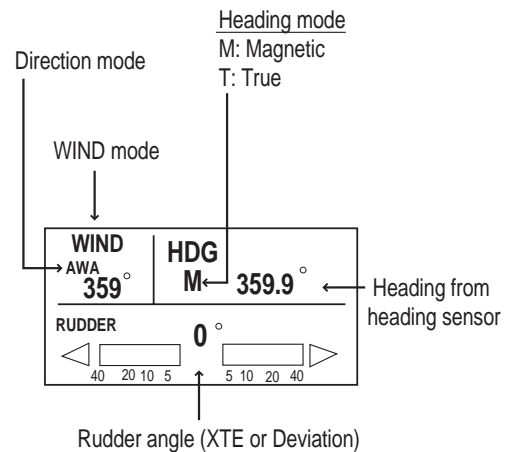| Mode	Required data	Update rate of wind data
AWA	Apparent wind angle and speed	2 Hz or more
TWA	True wind angle and speed or Apparent wind angle, speed and own boat's speed	2 Hz or more

For setting of the FI-30, see page 14.

1.1.1 Using the WIND mode

1. Direct the heading to the desired direction and trim the sail to keep the wind direction.
2. Press the [AUTO] key while holding the [STBY] key down to go to WIND mode.
3. To change/re-adjust the wind angle, simply rotate the course control knob.
   You can change the wind direction in 5, 10 or 20° step. For detail, ask your dealer.
4. To escape from the WIND mode, press the [STBY] key.

Navpilot-500   *Navpilot-511/520*

WIND mode display

1.1.2   Displays

(Navpilot-500)
There are four types of displays; Normal display, Normal display 2, Data display and Graphic display.

(Navpilot-511/520)
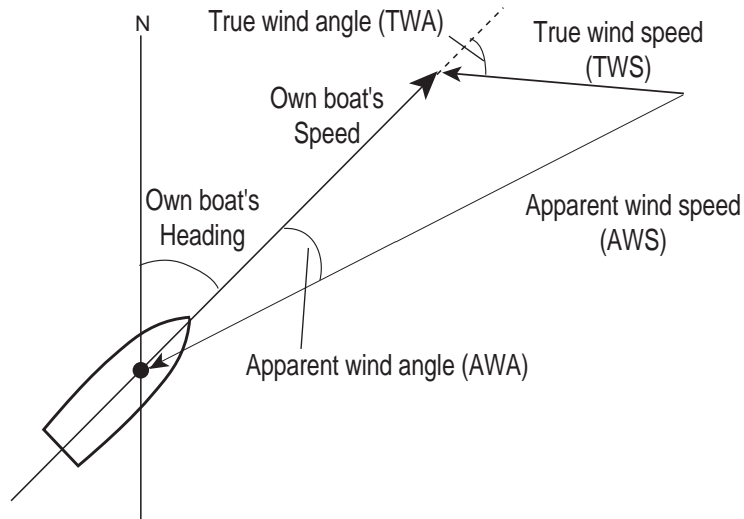There are three types of displays; Normal display 1, Normal display 2 and Data display.

To choose a display mode, press the [AUTO] key.

1.1.3   Selecting the wind angle mode

The wind mode has two wind angle modes, AWA (Apparent Wind Angle) and TWA (True Wind Angle).

AWA: The direction (in relation to ship's bow) of the wind as it appears to that on board, detected by the wind sensor. AWA mode requires wind angle and speed data. Use this mode when wind is stable.

TWA: The actual wind direction; combination of the AWS (Apparent Wind Speed) and own boat's speed. This mode requires apparent wind angle, apparent wind speed, own boat's speed and own boat's heading. Use this mode when there is a downwind unstable.

Apparent/True wind angle

NOTE
When running on engine, use the TWA (or AUTO) mode.
The autopilot cannnot control your boat when the boat's speed exceeds the true wind speed in AWA mode.

1. In the WIND mode, press the [MENU] key to show the WIND mode menu.
   For Navpilot-511/520, press the [TURN/MENU] key twice to show the menu.
2. Rotate the course control knob to select "SAILBOAT PARAMETERS", and then push the course control knob to show the sailboat parameters menu.
3. Rotate the course control knob to select "MODE TYPE", and then push the course control knob to show the mode type options window.

```
┌─────────┐
│  AWA    │
│  TWA    │
└─────────┘
```

Mode type options window

4. Rotate the course control knob to select AWA or TWA as appropriate.
5. Press the course control knob, and then press the [MENU] key ([MENU/TURN] key for Navpilot-511/520) twice to close the menu.
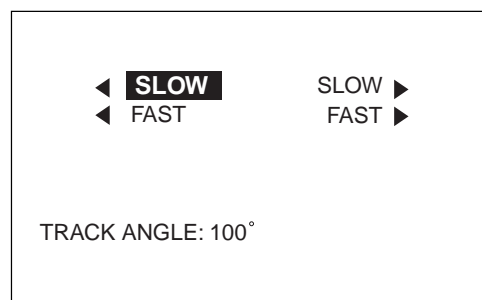
1.2 TACK Mode

In the AUTO and WIND modes, the [TURN] key provides various tacking and gybing motions.

1.2.1 Tacking/Gybing in AUTO mode (FIXED TACK)

This function changes the current course by the degrees (set on menu) to port or starboard direction. There are two types of speed, SLOW (for gybing) and FAST (for tacking) in this mode. This TACK mode can be used when your boat does not have a wind sensor.

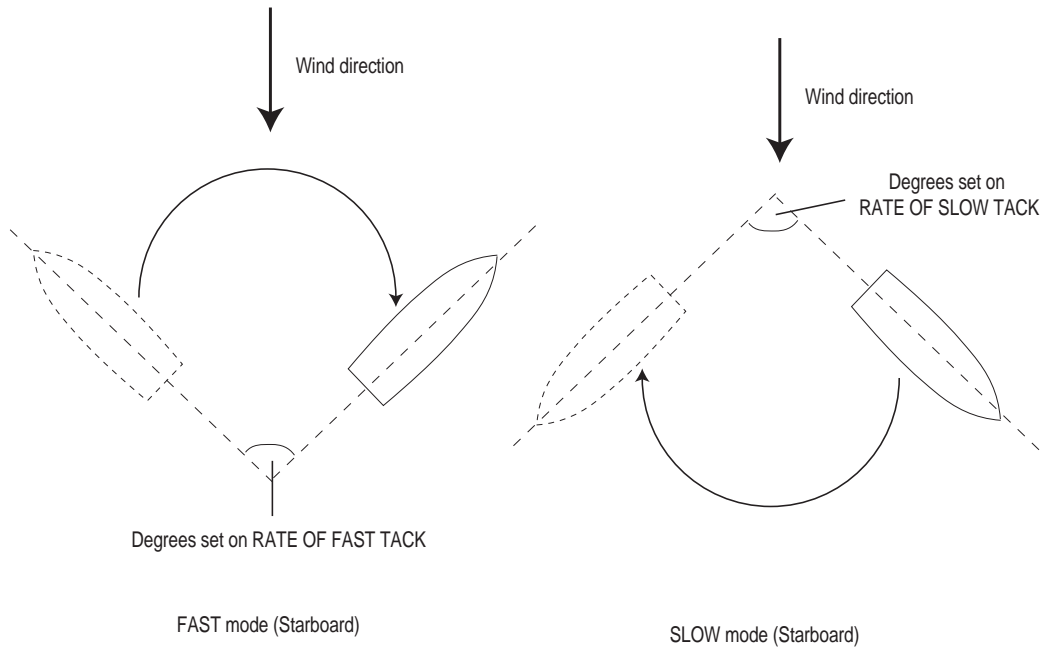To start tacking/gybing, do the following.

1. Press the [AUTO] key to go to the AUTO mode.
2. Press the [TURN] key to show the TACK menu.
   For Navpilot-511/520, press the [TURN/MENU] key.

```
┌───────────────────────────────────┐
│                                   │
│   ◄ SLOW          SLOW ►          │
│   ◄ FAST          FAST ►          │
│                                   │
│                                   │
│   TRACK ANGLE: 100°               │
│                                   │
└───────────────────────────────────┘
```
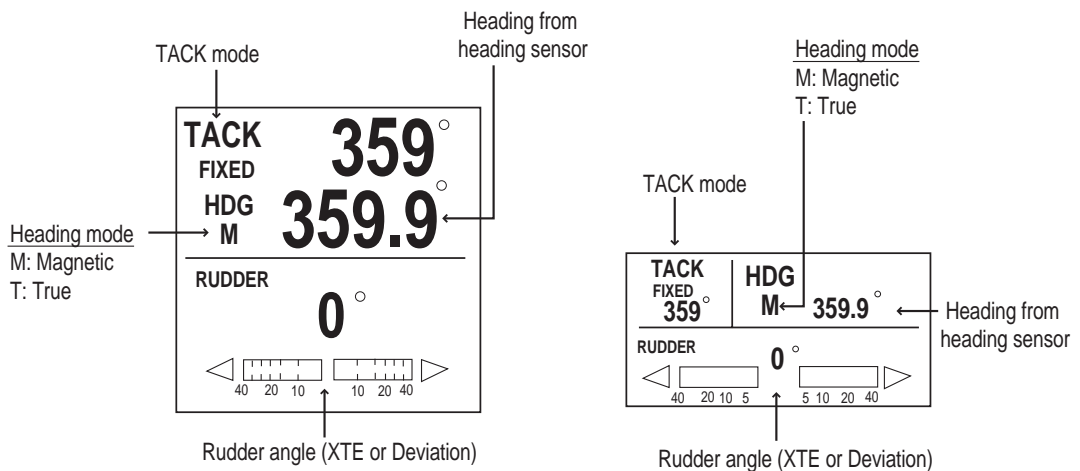
TACK menu (AUTO mode)

3. Rotate the course control knob to select a mode.
   The arrow next to the mode name shows the direction to turn.
   SLOW: Used when gybing. The boat slowly changes the heading the value set.
   FAST: Used when tacking. The boat rapidly changes the heading angle.

Wind direction

Wind direction

Degrees set on
RATE OF SLOW TACK

Degrees set on RATE OF FAST TACK

FAST mode (Starboard)

SLOW mode (Starboard)

4. Press the course control knob to execute.

The TACK mode display appears.

Heading from
heading sensor

TACK mode

TACK **359**°
FIXED
°
HDG **359.9**
M

Heading mode
M: Magnetic
T: True

RUDDER

0°

◁ |······| |······| ▷
40 20 10   10 20 40

Rudder angle (XTE or Deviation)

Heading mode
M: Magnetic
T: True

TACK mode

TACK | **HDG**
FIXED | **M** **359.9**°
359°

RUDDER **0**°

◁ |······| |······| ▷
40 20 10 5   5 10 20 40

Heading from
heading sensor

Rudder angle (XTE or Deviation)

Navpilot-500

Navpilot-511/520

TACK mode display

When the turning starts, a beep sounds three times.

Note: You can set the timing between pressing the course control knob and
starting tacking. For details, see "1.2.3 Setting the tack timer".

5. Your boat starts turning to the direction selected at step 3.

The tacking angle can be set on the menu. For details, see page 9.

6. When the turning is completed, a beep sounds three times to notify you. Also,
the message "TURN COMPLETED" appears on the display.

Setting the rate of turn for FAST/SLOW tacking

The rate of turn is preset as 3⁰ for SLOW and 20⁰ for FAST. If you need to change the value, do the following:

1. Press the [MENU] key to show the menu.
   For Navpilot-511/520, press the [TURN/MENU] key to show the main menu.
2. Rotate the course control knob to select "SAIL BOAT PARAMETERS", and then press the course control knob to show the sailboat parameters menu.
3. Rotate the course control knob to select "RATE OF SLOW TACK", and then press the course control knob to circumscribe the current value with the double rectangle.
4. Rotate the course control knob to set value, and then press the course control knob.
5. Rotate the course control knob to select "RATE OF FAST TACK", and then press the course control knob to circumscribe the current value with the double rectangle.
6. Rotate the course control knob to set value, and then press the course control knob.
7. Press the [MENU] ([TURN/MENU] for Navpilot-511/520) key to close the menu.
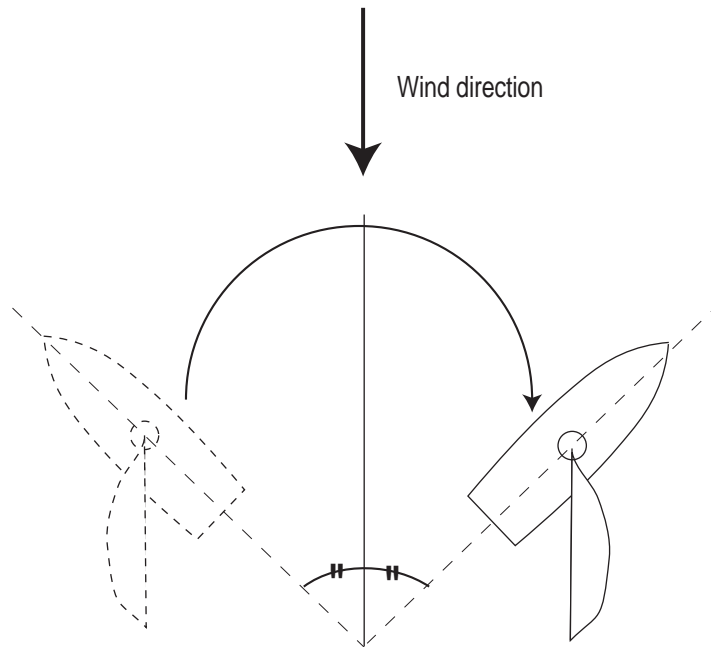
Setting the fixed tack angle

The fixed tacking mode requires the setting of tacking angle. You can set the angle on the menu.

1. Rotate the course control knob to select "FIXED TACK ANGLE", and then press the course control knob to circumscribe the current value with the double-rectangle.
2. Rotate the course control knob to set values (Setting range: 1º to 180º).
3. Press the course control knob.

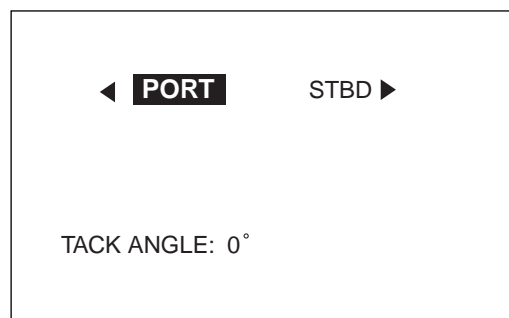## 1.2.2 Tacking in WIND mode (WIND TACK)

When using the WIND mode, the degree and direction of tacking are automatically set so that the boat receives the apparent wind on its opposite side with same angle.

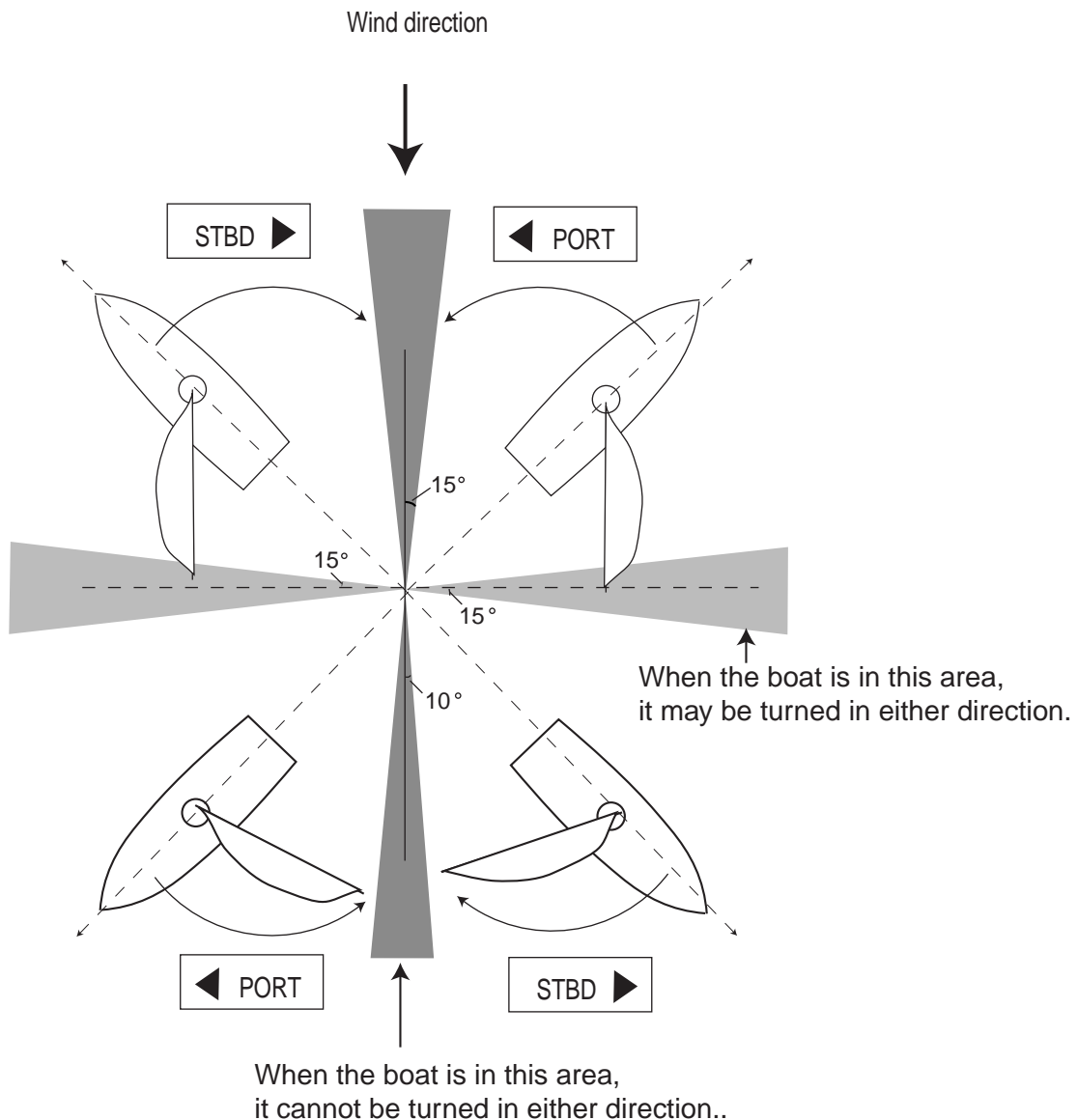
Tacking maneuver in WIND mode

To start turning, do the following:

1. In the WIND mode, press the [TURN] key to show the tacking menu. For Navpilot-511/520, press the [TURN/MENU] key.

Tacking menu (WIND mode)

The turning direction is determined according to the heading at the time the [TURN] ([TURN/MENU] for Navpilot 511/520) key is pressed, as shown below.

Wind direction

STBD ▶   ◀ PORT

15°

15°

15°

When the boat is in this area, it may be turned in either direction.

10°

◀ PORT   STBD ▶

When the boat is in this area, it cannot be turned in either direction..

▭ : Direction available to turn

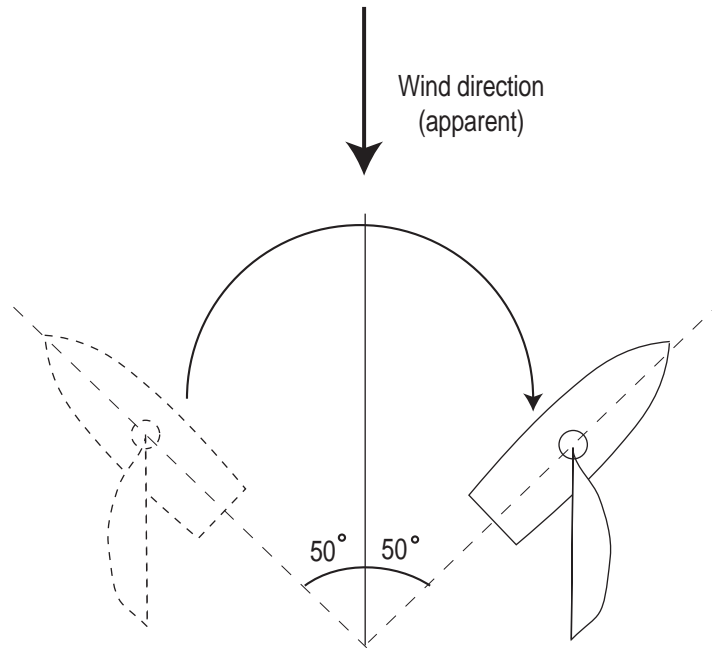*Relations of boat heading on starting the TACK mode and turning direction*

2. Rotate the course control knob to select the direction to turn.

Note that the message "WIND DIRECTION IS UNFIT FOR YOUR CHOICE." appears if you select an unavailable direction, and the selection is refused.

3. Press the course control knob to execute.

The boat starts turning toward the selected direction until the heading is twice at the time the course control knob is pressed. When the course control knob is pressed, for example, at the P (port) 50º, the boat turns until the heading becomes S (starboard) 50º.

Tacking maneuver when heading is 50º

You can set the interval between pressing the course control knob and starting turning. For details, see the next section.

4. When the turning is completed, a beep sounds three times to notify you.

Setting the maximum rudder angle for WIND TACKING

The tacking in the WIND mode requires the setting of maximum rudder angle. This angle is calculated automatically when the Navpilot is installed. If you need to change the value, do the following:

1. Rotate the course control knob to select "WIND TACK RUD ANGLE", and then press the course control knob to circumscribe the current value with a double-rectangle.
2. Rotate the course control knob to set values (Setting range: 1 to 45º).
3. Press the course control knob.

Setting the damping interval of wind data

You can set the damping interval of data from the wind sensor as below.

1. Rotate the course control knob to select "WIND DAMPING" and then press the course control knob to circumscribe the current value with the double rectangle.
2. Rotate the course control knob to set value (Setting range: 0.5 to 99.9 seconds)
3. Press the course control knob.

1.2.3   Setting the tack timer

You can set the timing between pressing the course control knob and starting actual turning.

1. On the STBY, AUTO or WIND mode, press the [MENU] key to show the main menu.
   For Navpilot-511/520, press the [TURN/MENU] key twice.
2. Rotate the course control knob to select "SAILBOAT PARAMETERS", and then press the course control knob to show the sailboat parameters menu.
   For STBY mode, the parameter setup menu should be opened before selecting "SAILBOAT PARAMETERS".

```
MODE TYPE:          AWA
WIND TACK RUD ANGLE:    35°
WIND DAMPING:      1.3 SEC
FIXED TACK ANGLE: 100
RATE OF SLOW TACK:      3°/s
RATE OF FAST TACK:      3°/s
TACK TIMER:  ON     10 SEC


PUSH MENU KEY TO RETURN
TO PREVIOUS MENU.*
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*: Not appeared on Navpilot-511/520

Sailboat parameters menu

3. Rotate the course control knob to select "TACK TIMER", and then press the course control knob to show the track timer options window.

```
OFF
ON
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Tack timer options window

4. Rotate the course control knob to select "ON", and then press the course control knob.
5. Rotate the course control knob to select the current timer value next to "ON", and then press the course control knob.
6. Rotate the course control knob to select the timer setting, and then press the course control knob. (Setting range: 1 to 99 seconds)
7. Press the [MENU] ([TURN/MENU] for Navpilot 511/520) key several times to close the menu.

1.3   DODGE Mode

The DODGE mode is useful in situations where you need to quickly take control of the helm to avoid an obstruction.
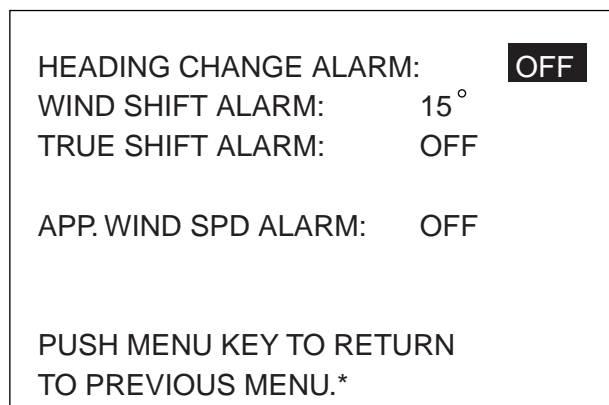
1. Press the [PORT] or [STBD] key down to change the course until boat finishes to avoid the obstruction. The equipment goes into the DODGE mode and the audible alarm sounds when one of the above key is operated, to alert you to dodge operation. Note also that "DODGE" appears on the display.
2. Release the [PORT] or [STBD] key to leave from the DODGE mode.

Note: You can change the wind direction in 5, 10 or 20° steps by using the dodge keys. This function is set on installation. For detail, ask your dealer.

1.4   Alarms

The WIND alarm, which is an alarm exclusively for sailboats, has four conditions which generate both audio and visual alarms: heading change, wind shift, true wind speed and APP. wind speed alarm. To access the WIND alarm menu, do the following:

1. Press the [MENU] key to show the mode menu.
    For Navpilot-511/520, press the [TURN/MENU] key twice.
2. Rotate the course control knob to select "WIND ALARMS", and then press the course control knob to show the WIND alarm menu.
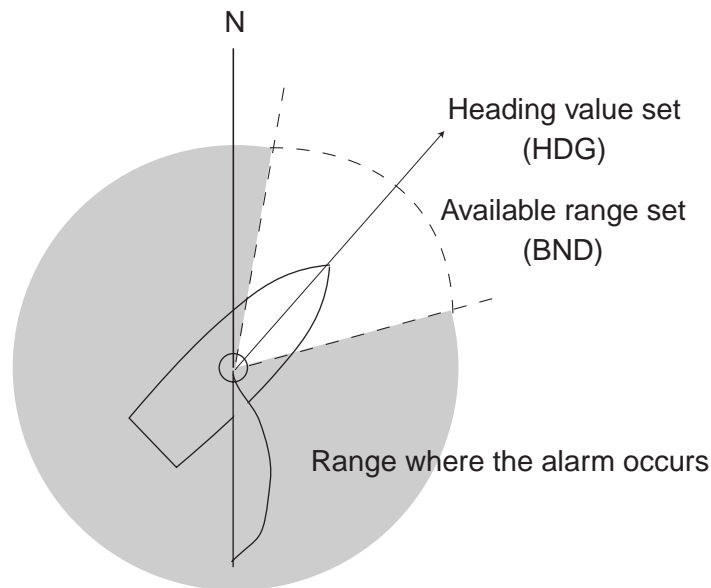
```
HEADING CHANGE ALARM:        OFF
WIND SHIFT ALARM:        15°
TRUE SHIFT ALARM:        OFF

APP. WIND SPD ALARM:    OFF


PUSH MENU KEY TO RETURN
TO PREVIOUS MENU.*
```

*: Not appeared on Navpilot-511/520.

Wind alarm menu

1.4.1   Setting the heading change alarm

The heading change alarm sounds when own boat's heading changes remarkably by the effects of true wind angle.
Set the heading value and alarm range as shown on the next page.

Heading change alarm maneuver

1. Rotate the course control knob to select "HEADING CHANGE ALARM", and the press the course control knob to show the option window.

Heading change alarm window

2. Rotate the course control knob to select "ON", and then press the course control knob.

   An area appears below "HEADING CHANGE ALARM".

3. Rotate the course control knob to select "HDG", and then press the course control knob to circumscribe the current value with the double rectangle.

4. Rotate the course control knob to set the value (Setting range: 0° to 359°).

5. Press the course control knob.

6. Rotate the course control knob to select "BND" and then press the course control knob to circumscribe the current value with the double rectangle.

7. Rotate the course control knob to set value (Setting range: 1 to 180°).

8. Press the course control knob.

1.4.2 Setting the wind shift alarm

The wind shift alarm sounds when the current wind angle is greater than the wind angle limit set.

1. Rotate the course control knob to select "WIND SHIFT ALARM", and then press the course control knob to circumscribe the current value with a double rectangle.

2. Rotate the course control knob to set the value (Setting range: 0 to 180°).

3. Press the course control knob.

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1.4.3   Setting the true wind speed alarm

The true wind speed alarm warns you when the true wind speed is over or under the wind speed alarm setting.

1. Rotate the course control knob to select "TRUE WIND SPEED ALARM", and then press the course control knob to show the option window.

OFF
ON

True wind speed alarm window

2. Rotate the course control knob to choose "ON", and then press the course control knob.

    The range setting area appears.
3. Rotate the course control knob to select the current value and then press the course control knob.
4. Use the course control knob to set the upper and lower limits.
5. Press the course control knob.

1.4.4   Setting the apparent wind speed alarm

The apparent wind speed alarm warns you when the true wind speed is over or under the wind speed alarm setting.

1. Rotate the course control knob to select "APP. WIND SPEED ALARM", and then press the course control knob to show the option window.

OFF
ON

Apparent wind speed alarm wind

2. Rotate the course control knob to choose "ON", and then press the course control knob.

    The range setting area appears.
3. Rotate the course control knob to select the current value and then press the course control knob.
4. Use the course control knob to set the upper and lower limits.
5. Press the course control knob.

1.5   Error Messages

Your equipment displays error messages to alert you to potential equipment trouble.

Error message	Meaning	Remedy
ABNORMAL WIND DATA	Wind angle exceeds 90%/s, or wind speed exceeds 20 kt/s.	Check the wind sensor and its connection.
NO WIND DATA	Wind data is not input.	Press the [STBY] key to go to STBY mode, and then check the appropriate sensor.

2. SETTING OF FI-30

When connecting with FI-30 server to input wind data, set it as below.

FI-30 NMEA output setting: update rate of AWA/TWA = 2Hz

Position	Setting
C77	MWV
C78	Other
C79	MWV
C80	Other
C81	MWV
C82	Other
C83	MWV
C84	Other
C85	MWV
C86	Other
C87	MWV
C88	Other
C89	MWV
C90	Other
C91	MWV
C92	Other

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