DC-400 OPERATION MANUAL

1. Important Notice

Congratulations on your purchase of the SI-TEX DC-400 Digital Compass. It is recommended that you read through the operation manual prior to installing and operating the unit.

After reading the operation manual, if you still have questions, we recommend you contact your dealer or SI-TEX Marine Electronics' Customer Service Department. As your DC-400 is built for marine use, the following instructions should be given special attention:

A. Exposing the DC-400 display to excessive sunlight or a heat source will make the LCD display black and invisible. It even may cause permanent damage.

B. Make sure to connect the power cable with correct polarity. Red is for positive and black is for negative.

C. The DC-400 is not waterproof but splashproof. When installing the unit take it into consideration.

D. The bearing sensor unit (DC-400S) should be installed at a site away from magnetizing objects (steel, stainless steel, etc.) or structure as much as you can to get better bearings.

E. After installation, calibration of bearing should take place in the open water without magnetic disturbance for accurate bearings.

2. Introduction

The DC-400 consists of a sensor unit and a display unit. The sensor unit picks up the magnetic field of the earth electrically and the display unit processes sensed information into bearing of your vessel by digital numbers. Sophisticated processing of information by a micro computer gives you more stable readings of bearing under various weather conditions by damping factor selection and give you more accurate hearing of your vessel by calibration.

In addition to displaying the heading of your vessel, DC-400 provides output data signal for interfacing to other equipments, as a bearing sensor.

This means you can interface your compass with a Sat Nav

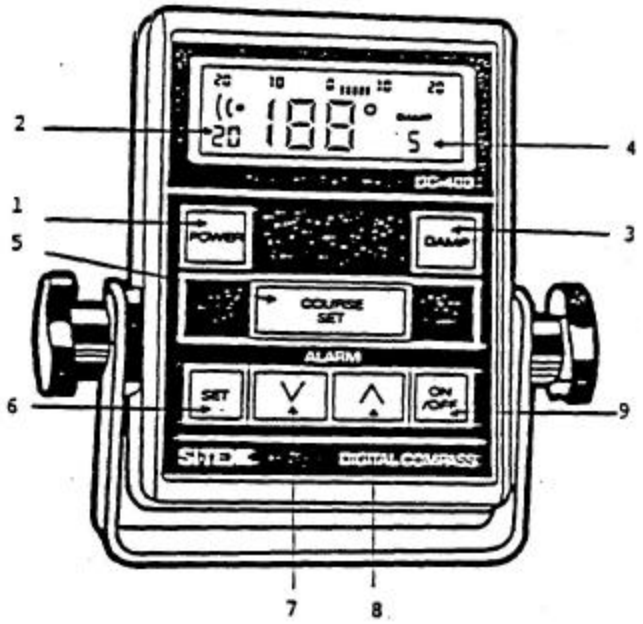
receiver, a radar with north up or true motion display or even an autopilot.

3. Operation

3.1 Normal Operation

A. A press of the "POWER" switch will turn the compass "ON", another press will turn it "OFF". (Fig. 1-1)

FIG. 1



B. The current heading of the vessel will appear in window. (Fig. 1-2)

C. A "DAMP" switch (Fig. 1-3) is provided to prevent excessive fluctuation in current heading readings because of adverse sea conditions. There are seven settings of damping to prevent these fluctuations. Each press of the "DAMP" switch will increase the damp setting from 1 thru 7 for averaging in the display window. (Fig. 1-4)

The correct "DAMP" setting is to use as small a number as possible for quicker response to your vessel's movement.

D. How To Set A Course

(a) An example: The compass indicates your vessel is heading on a course of 110° and you wish to set a course of 155°. Press "COURSE SET" switch, the "DAMP" indicator (Fig. 1-4) number will begin blinking. Then press the "∨" or "∧" switch (Fig. 1-7 or 1-8) until the display indicates the heading of 155 followed by the alarm "SET" switch press (Fig. 1-6). At this time a bar will appear in the upper part of the display to the left of the zero (0) indicator. The "DAMP" indicator will stop blinking and the course of 110° will be displayed. Turn the vessel to the right until the bar is no longer appearing. You are now on our desired course of 155°.

(b) Turn your vessel until you are on a desired course, then press the "COURSE SET" switch (Fig. 1-5), followed by the Alarm "SET" switch (Fig. 1-6).

NOTE:

1. In (b) above, if the alarm "SET" switch is not pressed within 5 seconds, the course will be automatically set and the damp indicator will stop blinking.

2. If you wander off our course line of 155°, a bar indication will display the number of degrees right or left of the course.

3. If the "COURSE SET" switch is pressed again, the present course line is turned off.

E. How to Set an "OFF" Course Alarm

After you have set a course line, you can set an "OFF" course alarm by the following steps:

(a) Press the "ON/OFF" switch (Fig. 1-9). A blinking alarm bell symbol will appear on the lower left portion of the display with the number 5 under it (this indicates the minimum alarm setting is 5 degrees).

(b) Press the "∨" or "∧" switch (Fig. 1-7 or 1-8) until the desired degrees of an "OFF"" course alarm appears under flashing alarm bell.

(c) Press the "SET" switch (Fig. 1-6). The blinking alarm bell will stop blinking. The alarm is now set to the desired "OFF" course alarm.

(d) When we wander off course beyond the number of degrees we have set, an alarm will sound and bar will appear left or right of zero (0) in the upper portion of the display.

(e) The alarm may be turned "OFF" by pressing the "ON/OFF" switch (Fig. 1-9).

NOTE:

1. The alarm may be set at any number between 5 degrees and 20 degrees.

2. In step (d) above, if the alarm "SET" switch is not pressed within 5 seconds, the alarm

3.2 **Bearing Calibration**

A. Press the "DAMP" switch (Fig. 1-3) until number 9 appears in the display (Fig. 1-4).

B. Press the "ON/OFF" switch.

NOTE:

You will calibrate the compass to known referencing bearings by a magnet compass, gyro compass or land marks at the following bearings: 0°, 30°, 60°, 90°, 120°, 150°, 180°, 210°, 240°, 270°, 300°, and 330°.

C. Align the heading of your vessel to the north. Press the "SET" switch (Fig. 1-6), the display will indicate 0°, a bar will appear right or left on the top of the display. Press the "SET" again. The display will change to 30° as a next reference bearing.

D. Turn your vessel clockwise until the 30° reference bearing. Press the "SET" switch (Fig. 1-6). The display indicator will now read ~~30~~ 60° with the same bar appearing.

E. Repeat step D for each of the above referenced bearings up to 330°.

F. When the "SET" switch (Fig. 1-6) is pressed for 330° the damp indicator (Fig. 1-4) will revert to damp No. ~~2~~ 1. This will indicate the calibration is completed.

clearing calibration. This will cancel entire calibration.

Note:

(a) Bearing calibration is required for following two purposes.

(1) Compensation for the bearing error caused by surrounding steel objects.

(2) Calibration to other reference bearings.

(b) Once calibrated, the compass will retain calibration when power is turned off.

3.3 Reference Bearing Calibration

A. Position your vessel at any known heading. As an example, you will use 20 degrees.

B. Press the "DAMP" switch (Fig. 2-3) until number 8 appears in the display (Fig. 1-4).

C. Press the "ON/OFF" switch (Fig. 1-9). The damps indicator 8 will start to blink.

D. Press the " $\vee$ " or " $\wedge$ " switch (Fig. 1-7 and 1-8) until 20° appears in the display window.

E. Press the "SET" switch (Fig. 1-6). The damp indicator 8 (Fig. 2-4) will change to number 1. The reference bearing calibration is now completed.

Note:

Bearing calibration invalidates former reference bearing calibration. Reference bearing calibration should take place after bearing calibration.

3.4 Null Setting

This setting is only required when the output of the unit is used to control an autopilot and does not affect display to any extent.

A. Press the "Damp" switch (Fig. 1-3) until number 0 appears in the display (Fig. 1-4).

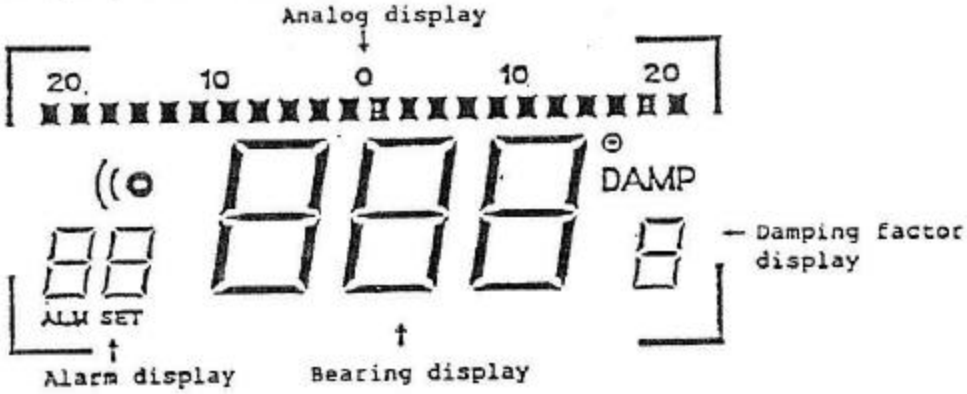
B. Press the "ON/OFF" switch (Fig. 1-9). The "Damp" indicator 9 will start to blink.

indicator 9 will start to blink.

C. Press the "V" or "Λ" switch (Fig. 1-7 or 1-8) until the desired degrees of null setting angle appears on the bearing display.

D. Press the "SET" switch (Fig. 1-6). The "Damp" indicator stops blinking and it will revert to Damp No. 1. This will indicate the setting is completed.

3.5 LCD Display Configuration



3.6 Connection

Sensor

1.	90°Signal(Pulse)	Brown
2.	0°signal(Pulse)	Red
3.	S_1 Signal (Pulse)	Yellow
4.	S_2 Signal (Pulse)	Green
5.	Bearing Signal	Blue
6.	Power(+B)	Gray
7.	Power (GRND)	Black + Shield
8.	NC	—

Data Output

1. Shield
2. Signal
3. Return
4.
5.
6. +12V

Data output

Power

Black | 00 0 | Red +

The supplied cable with a fuse holder should be used.

4. Functions of Each Key

4.1 Power

A. Controls the power to the unit.

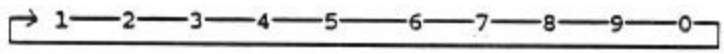
B. When the power is off, a press turns the power on.

C. When the power is on, a press turns the power off.

4.2 Damp (Damping factor or time delay, weather factor)

A. When the power is turned off, damp 1 is automatically set.

B. Every Press of this key increases number by 1, up to 9, then "0".



Damping factor	0:	Null range set
	1:	0.5 SEC
	2:	1 SEC
	3:	2 SEC
	4:	4 SEC
	5:	8 SEC
	6:	16 SEC
	7:	32 SEC
	8:	Reference bearing set
	9:	Calibration of bearing

4.3 Course Set

A. When the power is turned off, course set is automatically reset to off.

B. When course set is off, a press of this key sets the course to the bearing on the display.

C. When course set is on, a press of this key course set off.

D. When damping factor is from 1 to 7 and curse set is off, each press of the key makes the damp display blink. While the damp display is blinking, a press of "∨" or "∧" key of alarm makes current bearing display changes by 1 for decrease or increase. Continuous press makes continuous change to the direction of the arrow.

Maximum 359° Minimum 0°

E. Only while the damp display is blinking alarm "∨", "∧" and set key is effective.

F. When the bearing displayed becomes desired value, press the alarm set key to set the course at the bearing and change the course set status on.

G. When current bearing is deviated to the right from course bearing, right sector of the analog display shows up while deviation to the left makes the left show up.

H. When no key is pressed with the damp display blinking within five seconds, the current bearing is set as the course.

I. When the damp display shows 8, the course set key is not effective.

J. When the damp display shows 9 and is blinking press ON/OF then COURSE SET KEY. PRESS MAKES:

* Bearing calibration reset (no calibration)
* Display show "CLR"

4.4 **ON/OFF**

A. This key is pressed for alarm setting, bearing setting and bearing calibration.

B. When the damp number is from 1 to 7, a press of this key switches alarm on and off.

C. When the damp number is 8, a press of this key sets reference bearing mode.

D. When the damp number is 9, press of this key sets the bearing calibration mode.

4.5 Set

This key is pressed for setting alarm, course, reference bearing calibration and null range.

* Alarm Setting Mode
  Takes in the alarm range displayed and returns to normal compass mode.

* Course Set Mode
  Takes in the bearing displayed as the course bearing and returns to normal compass mode.

* Reference Bearing Mode
  Takes in the bearing displayed as the reference bearing and returns to normal compass mode.

* Bearing Calibration Mode
  Takes in the bearing displayed as a calibration bearing and shows next (30° step) calibration bearing. When 360° in total is covered, returns to normal compass mode.

* Null Range Mode
  Takes in the value displayed as null range and returns to normal compass mode.

4.6 Up (∧) and Down (∨) Key

This key is pressed for increasing or decreasing the value on the display in set mode for alarm range, course, reference bearing and null range.

* Alarm Range Setting Mode
  Initial value is 5° and changes up to 30°.

* Reference Bearing Mode
  The bearing on the display changes between 0° and 359°.

* Null Range Mode
  Initial value is 0° and changes up to 10°.

5. Specifications

Direction Display	Black LCD, Backlighted
Accuracy	± 1 Degree
Alarm Range	5° to 30° in 1 step
Damping Range	7 steps selectable 0.5 SEC to 32 SEC
Heading Calibration	0° to 359°
Bearing Compensation	Every 30°
Gimbal Limits	± 35° Pitch and roll
Data Output	NMEA-0183: HCHD(Heading) HCBOD(Course) HCXTR(Deviation)
Power Requirement	11 to 15 VDC, 150 MA
Ambient Temperature Range	32° to 122°F
Display Unit Dimensions	4.7"Hx3.5"WX1.8"D (5.1"Hx5.3"WX1.8"D With Trunion Mount and Knobs)
Sensor Unit Dimensions	4.8"HX4.0"WX4.0"D

6. Standard Components

Display Unit	1	Sensor Unit with Cable 18'	1
Mounting bracket	1	Mounting bracket	1
Bracket knob/bolt	2	Bracket bolt	4
Bracket screw	4	Bracket screw	4
Bracket spacer	2		
Power Cable Assy.	1		
Spare fuse	1		