SIGNETMARINE

SL250 BASE MODULE

Instruction Manual

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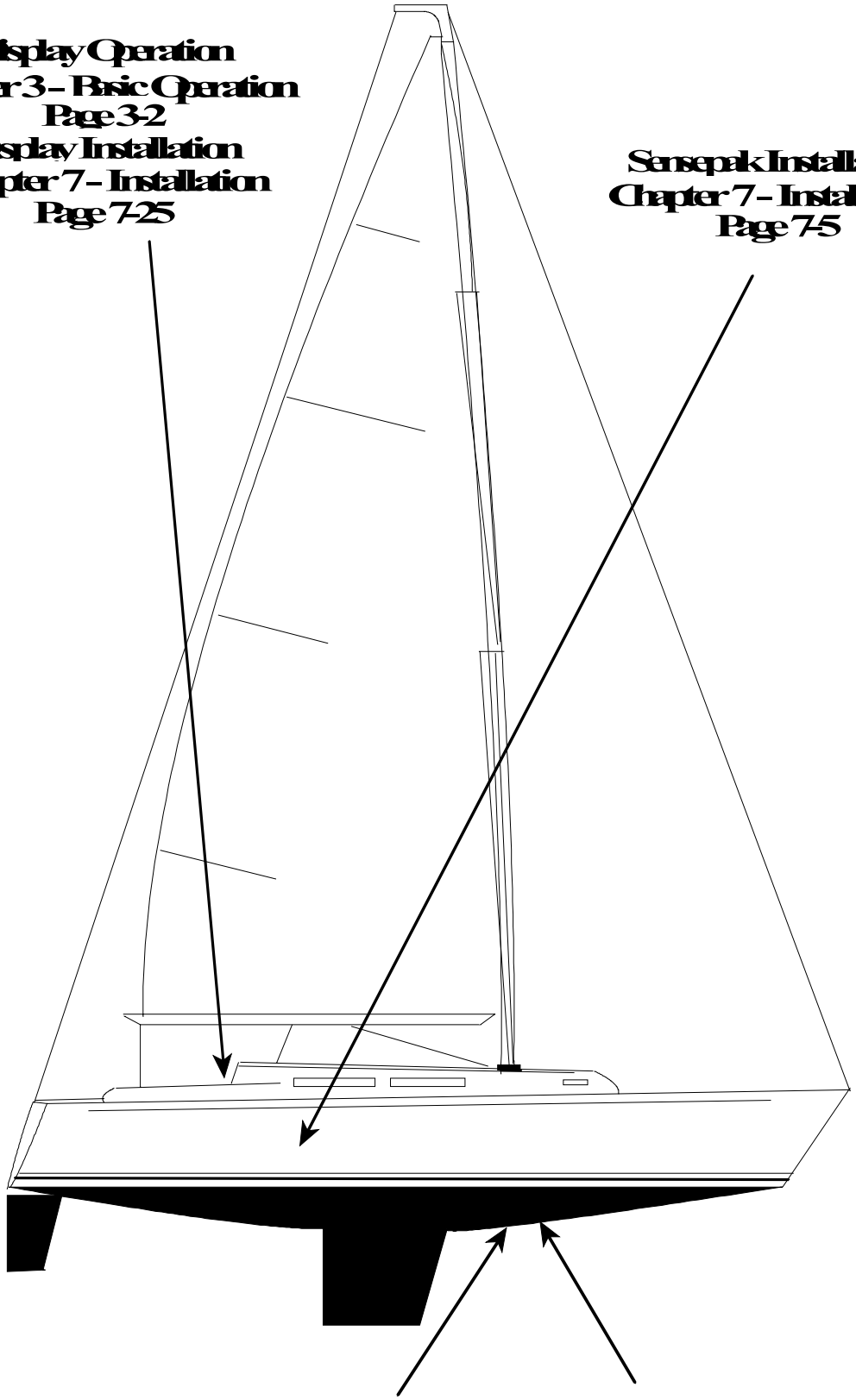
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1 INTRODUCTION

1.1 BASIC SYSTEM - DESCRIPTIONS

The SignetMarine Smartpak Basic System consists of a Display and the Base Module SL175 Sensepak with its associated transducers and sensors. The Sensepak is the main component which gathers information from whatever transducers and sensors are present. Data is collected and correlated by the Sensepak, then sent to the Display(s) for your evaluation. In other words, the Sensepak is the brain in the System and the Display is your window into that brain. Other Sensepaks or Displays can easily be added to the BASIC SYSTEM for enhancement of your System.

All Displays and Sensepaks are connected to a data bus that is called SIGBUS. SIGBUS is a four wire cable that interconnects all the components, providing power and allowing data to move freely between modules in the System. The operator does not need to be concerned with what data is coming from which module; all Sensepaks and Displays automatically communicate with each other.

Each Sensepak contains various data which are viewed on the Display. These data are arranged in "Channels". A "Channel" is the name given to specific functions shown on a Display connected to the System. For instance, some of the Channels available in the Base Module SL175 Sensepak are Speed, Depth, Water Temperature and Log. If you add the Wind Module SL225 Sensepak, some of the additional Channels available are Apparent Wind Angle, True Wind Speed, VMG, etc.

INTRODUCTION - 1.1 BASIC SYSTEM DESCRIPTIONS

For the present we will be concerned with only those Channels available with the Base Module SL175 Sensepak. Further information on the Channels available through other Sensepaks is contained on the last page in this manual, and in the corresponding manuals for these Sensepak modules.

The BASE MODULE (SL175 Sensepak) provides the following data Channels (functions) to be displayed:

SPD 1	Boat Speed
DEPTH	Water Depth
TEMP	Water Temperature
LOG 1	Log (Non-Resettable)
TIME 1	Time
RST	Racing Start Timer (Count-down)
T LOG 1	Trip Log (Resettable)
EL TM	Elapsed Time

The Display unit(s) allow you to see the information provided by the Sensepak. Each Display uses easy-to-understand "menus" to configure parameters and select Channels to be viewed. All configurations and calibrations are stored in permanent memory.

Many "Channels" of data are available for viewing on the Display. Channels dealing with angles (such as Heading) are presented in a digital format. If you have a Base Module only, you will not have any angular data available for displaying. A Display unit may store up to 6 "pages" of Channels. This allows you easy access from the Display to many different combinations of data.

1.2 EXTENDING THE SYSTEM

A SMARTPAK SYSTEM can easily be enhanced by acquiring additional Displays and compatible Sensepaks. A club racer could easily have 6 or more different Displays, allowing information access on both tacks by the helmsman, navigator, skipper, tactician and applicable crew. A full list of Channels available on the various Sensepaks can be found on the last page of this manual.

The Wind Module (SL225 Sensepak with Masthead Transducer) includes Apparent Wind Angle and Speed, True Wind Angle and Speed, as well as Velocity Made Good (VMG).

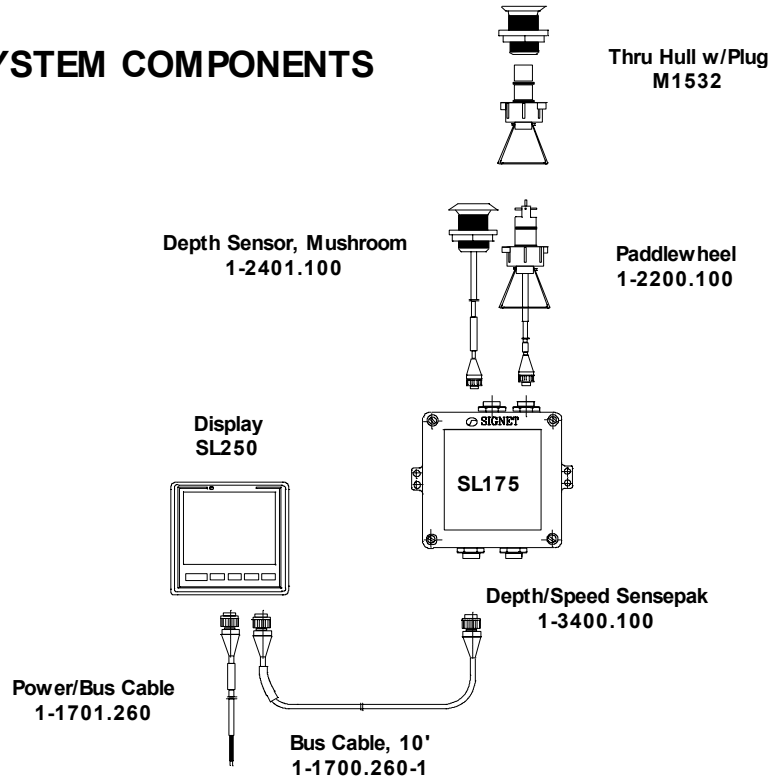
The Performance Module (SL385 Sensepak with Heel and Fluxgate Compass Sensors) offers a host of racing-oriented features, as well as an electronic compass and dead reckoning area navigation system.

The Navigation Module (SL425 Sensepak) provides for interface with GPS units, Lorans or Satnavs, allowing any display station to access Lat/Lon position, waypoint information, etc. The NMEA-0183 and RS 232C ports of the SL425 Sensepak provide for 2-way commun-ication with appropriate peripherals.

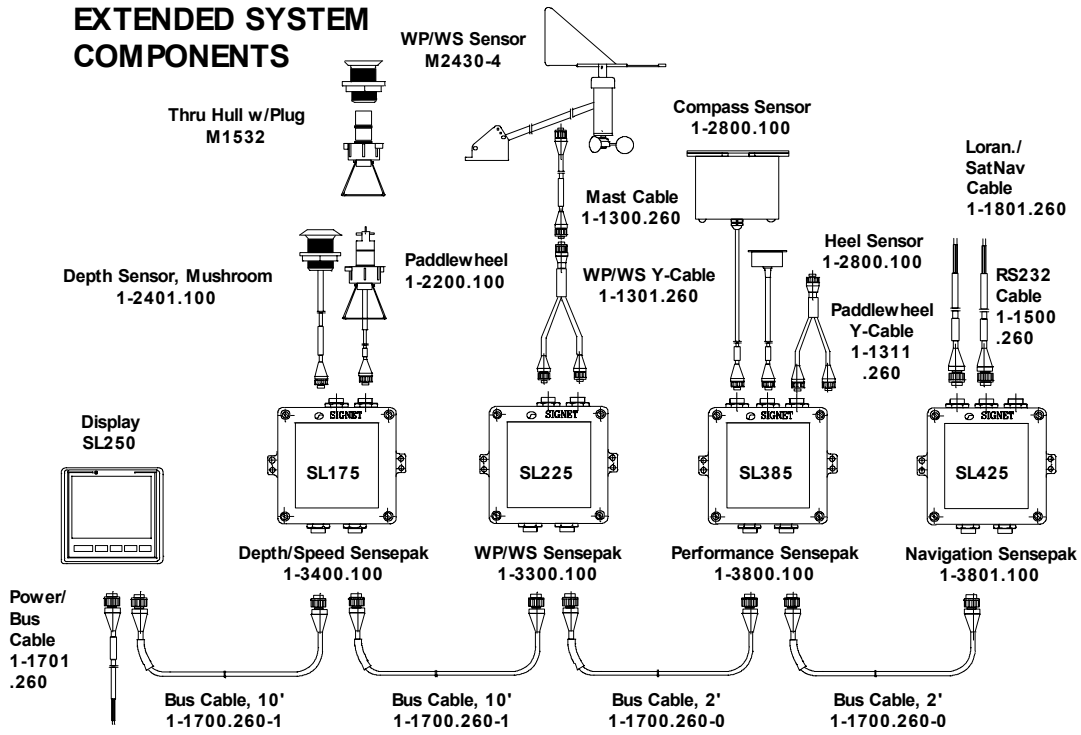
FOR MORE INFORMATION ON AVAILABLE SENSEPAKS FROM SIGNETMARINE CALL (310) 320-4349.

INTRODUCTION - 1.2 EXTENDING THE SYSTEM

BASIC SYSTEM COMPONENTS



EXTENDED SYSTEM COMPONENTS



1.3 SUBSTITUTION OF SENSEPAKS

As already stated, the BASIC SYSTEM includes the Base Module SL175 Sensepak and an SL250 Display. This manual assumes that you have acquired the standard BASIC SYSTEM with these two components, as well as the associated wiring and transducers. All examples, descriptions etc., refer to the "Channels" associated with the Base Module SL175 Sensepak. If you have purchased a System other than the Basic System, you should substitute the "Channels", descriptions and examples with the appropriate information, and refer to the corresponding manuals for these additional modules.

2 LEARNING GUIDE

The following chapter gives you detailed step-by-step instructions for first time use of the BASIC SMARTPAK SYSTEM. If you've used a SignetMarine Smartpak System before, or you feel confident with data systems and you just want to dig in on your own, you may wish to skip this chapter and go on to Basic Operation and Advanced Operation. However, for those who require a more detailed step-by step guide, we recommend reading this chapter and following along with your SMARTPAK SYSTEM.

After you've completed installing your System (for specific instructions, see Chapter 7 - Installation) you're ready to start up the SMARTPAK SYSTEM.

Each Sensepak in your System contains information organized in Channels. You access these Channels through the Display. In other words, think of the Sensepak as the CPU (computer) and the Display as the monitor / keyboard.

2.1 TURNING ON YOUR SYSTEM

To start the System, turn on the 12 volt power that feeds the SmartPak System. After this, all your interaction with the SMARTPAK SYSTEM will be through the Display unit.

NOTE: The SL250 display does not have an “on” switch. This makes for easier start-up when the System has more than one Display, and extends the life of the membrane switch.

LEARNING GUIDE - 2.1 TURNING ON YOUR SYSTEM

Once you have turned on the power, you will see a series of messages appear briefly as the Display runs through its "self check" sequences. A series of dashes appears as the Display unit requests each of the Sense-paks that are connected to the SMARTPAK SYSTEM to identify themselves. The Sensepaks are displayed as they respond. (Found 225, Found 175, etc.)

If a Sensepak that is known to be on the System is not detected, either the Sensepak is inoperative, did not respond to the SL250 Display, or the SL250 did not recognize the Sensepak's message. Power to the System should be turned off and then on to confirm the status of the Sensepak(s). **Only Channels (functions) on the Sensepaks found at this time will be made available in the Main Menu, such as calibration and Channel selection.**

Once the System is finished with the start-up sequence, it will automatically display either: a) the first factory- programmed Page (Depth and Speed) or b) the last Page that was displayed before the System was turned off. If either of these is the desired Page, no further action is needed. The SL250 will continue to output this information. Further instructions on programming Pages, etc. can be found in the following sections of this manual.

2.2 MAIN MENU

The SignetMarine Smartpak System uses a MAIN MENU that lists the options that control the Sensepaks and the SL250 Display. The "Main Menu" is the starting point for most operations of the Display unit and includes these options:

SELCT PAGE	SELECT A PAGE
CREAT PAGE	CREATE A PAGE
ENABL ALARM	ENABLE ALARM
SET RESET	SET / RESET
CAL	CALIBRATE
BEEP	SET BEEPER ON/OFF
SELCT UNITS	SELECT UNITS
DFALT PAGES	DEFAULT PAGES

To scroll through the various options from a displayed Page, press the Enter key once. This will get you to the Main Menu, which will automatically scroll to the first option, SELCT PAGE. To get to the next option, press the Down key. Repeating this will scroll down the line and then return to the first option (SELCT PAGE).

2.3 SELECT A PAGE OF INFORMATION

The first thing we'll do is look at a Page of Information. A Page contains two pieces of information, known as Channels, such as DEPTH, SPEED, TEMP, etc. You can program a Page with any combination of information that is available through the Sensepaks. We'll go through programming a Page in the next section of this chapter. First, we'll Select a Page of Information.

1. From the last displayed Page, press Enter to get to the Main Menu.
2. The Display will automatically scroll to the next option, which is SELCT PAGE (Select Page) .
3. Press the red Enter key when SELCT PAGE is present, and the Channels on the first Page (P 1) will be shown.
4. To show the Channels on the following Pages, press the Up or Down keys to scroll through the various Pages (P 1 - P 6).
5. To display the Channels on the Page you have selected, press Enter.
6. After Page 6 and before Page 1, EXIT MODE will appear. Pressing Enter when this appears will return you to the Main Menu.

NOTE: Your SL250 Display comes factory program-med with all 6 Pages of Channels set up for basic functions. These are referred to as the Default Pages. To customize these pages, refer to the Create a Page section. (Sec 2.4)

To exit the Page of Information and return to the "Main Menu", press the red Enter key.

2.4 CREATE A PAGE OF INFORMATION

So far you've been working with the Default Pages that SignetMarine programmed as part of the final test process. This section shows you how to create your own Pages with any Channels you wish. We will assume that you have purchased the BASIC SYSTEM which includes the SL175 Sensepak. If you have another Sensepak, you will need to substitute the Channels in this manual with the Channels you have available in the Sensepak(s) you have acquired.

Your SL175 Sensepak includes these Channels:

SPD 1	Boat Speed
DEPTH	Water Depth
TEMP	Water Temperature
LOG 1	Log (Non-resettable)
TIME 1	Time
RST	Racing Start Timer (Count Down)
T LOG 1	Trip Log (Re-settable)
EL TM	Elapsed Time

You must start from the "Main Menu". If you're in a Page, exit it by pressing the red Enter key, which will return you to the "Main Menu".

1. From the "Main Menu", the Display will automatically scroll to the first option, SELCT PAGE. Use the Down key to move through the Menu to the second option, CREAT PAGE.

2. Accept the CREAT PAGE (Create a Page) option by pressing the red Enter key.

3. The first Channel listed on the right is the one that will display the selected Channel (Speed, Temp, etc.) on the top portion of the Display. To choose a Channel, scroll through the list by pressing ***and holding*** the Up or Down keys until you find the one you want, and press Enter to accept this Channel. The list is constructed in a loop, so you will return to the beginning of it when you reach the last Channel in the list.

4. The Display will now show the Channel on the left which will appear in the lower portion of the Display. Once again, scroll through the various Channels until you find the one you want, and press Enter to accept it.

5. Once the second Channel is accepted, the Display will show P 1, which lists the Channels on the first Page. **You must select which Page you want to replace** with the new Channels you have just created, by scrolling through the list of 6 Pages until you find the one you want to replace. Press Enter and the new Page will be created in place of the old one (a Default Page in the case of a newly programmed System).

NOTE: If you have an extended System there may be two Channels listed as Speed. One is named SPD 1 and the other is SPD 3. Choose SPD 1. There is a difference between these two Channels which is explained in the SL385 manual.

6. The Display will automatically return to the Main Menu after the above programming has been completed.

7. To create another Page, repeat the process above.
   To select the Page and display it, follow the previous instructions, using SELCT PAGE.

NOTE: As with the Speed Channel, if you have an extended System there may be two Channels listed as Time: TIME 1 and TIME 4. Choose TIME 1. The difference between these two Channels is explained in the SL425 manual.

From now on, until you reprogram a given Page, these Channels are available to you through the stored Pages of information. They have been saved as part of the Smartpak System memory, which is retained even when the power to the System is turned off. Using the procedure above you can reprogram any of the 6 Pages.

Congratulations! You should now have a basic grasp of the SMARTPAK SYSTEM.

For more detailed explanations, descriptions, etc., carefully read the next two chapters, Basic Operation and Advanced Operation. Other descriptions and procedures are given for features not presented here, such as Alarms and Timers. If you have an extended System, the corresponding manuals give further information on features and functions.

3 BASIC OPERATION

3.1 BASE MODULE SL175 SENSEPAK CHANNELS

The Base Module (SL175 Sensepak) provides many Channels of data which may be selected for viewing. The abbreviations used, and description of the data are presented below:

SPD 1 Boat speed as received by the paddlewheel sensor plugged into the SL175 Sensepak.

DEPTH Depth to the bottom. Calibration allows an offset to be subtracted/ added to readings. High and low alarms.

TEMP Water Temperature

LOG 1 Total distance traveled (non-resettable) associated with the paddlewheel attached to the SL175.

TIME 1 Time, 24-Hour clock, as received from the SL175 Sensepak.

RST Race Start (count down) Timer.

T LOG 1 Trip Log (distance traveled, resettable) associated with the paddlewheel attached to the SL175.

EL TM Elapsed Time since the System was turned on, or the last time the EL TM function was reset

3.2 START-UP

3.2.1 SYSTEM POWER-UP

Turn on the 12 Volt power that feeds the SMARTPAK SYSTEM for the Display(s) and Sensepaks.

NOTE: The SL250 Display does not have an “on” switch. This makes for easier start-up when the System has more than one Display, and also extends the life of the membrane switch.

The SL250 Display has hands-free start-up, enabling the System to be used without programming if the first Page shown is the desired Page.

3.3 MAIN MENU

3.3.1 OPTIONS

The "Main Menu" is the starting point for most operations. The following list provides short descriptions of each option available. Detailed descriptions and procedures are found throughout the manual.

SELCT PAGE	Select a Page of information. A Page contains two pieces of information (Channels). You can program 6 Pages with any Channels available through your Sensepak(s). Programming a Page is accomplished through the "CREAT PAGE" option of the Main Menu.
CREAT PAGE	Creates a Page of information. Used to reprogram any of the 6 Pages available.
ENABL ALARM	Allows you to set any Alarms applicable to the various Channels. An example is setting an Alarm for Depth.
SET / RESET	Used to Set and Reset Timers. (Time, Race Timer, Elapsed Time and Trip Log)
CAL	Calibration Mode. Used to calibrate Channels such as Speed, Depth, Temp.

BEEP	Allows you to turn on or off beepers associated with different Channels and features.
SELCT UNITS	Allows you to select the type of Units you are most comfortable with such as nautical miles or statute miles, feet or meters.
DEFALT PAGES	Default Pages that are factory programmed by SignetMarine. These contain the most commonly used Channels and allow for easy start-up.

3.3.2 KEYS

The keys on the front membrane switch are:

ENTER	Used to select the option on the screen.
UP	Used to move through the list of options in the Menu.
DOWN	Used to move through the list of options in the Menu.
#	Units. When pressed during display of a Page, shows what Units the Channels are in. Example: °F and Knts for Temp and Speed Channels.

LIGHTS	Turns on and off the fiber-optic lighting in the SL250 Display.

3.4 SELECT A PAGE OF INFORMATION

Choosing the option "SELCT PAGE", brings up the first Page of stored information, P 1. Scrolling with the Up or Down keys shows all 6 Pages you have available. When you reach the Page you want to display, press the Enter key and this Page of information will be shown on the Display. Further information on Selecting a Page of information can be found in the Learning Guide, section 2.3.

3.5 CREATE A PAGE OF INFORMATION

Refer to Section 2.4 in the Learning Guide portion of this manual.

3.6 TURN-ON PAGE

It is not necessary to Select a Page every time the SMARTPAK SYSTEM is turned on. The Display's permanent memory retains the last Page displayed and automatically shows it when the SL250 is turned on.

1. To Select the Page of information that will automatically be displayed when the SL250 is turned on, simply follow the instructions in the Learning Guide, section 2.3, for Selecting a Page.

2. Upon start-up, the SL250 Display will show which- ever Page was on before the Display was turned off.

3.7 BEEPER

This option in the Main Menu is used to turn the audible Beeper on and off for the keypad (beeps every time a key is pushed) and for the Channels that have alarms, such as Depth.

1. From the Main Menu the Display will automatically
scroll to SELCT PAGE. Press the Down key 5 times to get to BEEP and press the Enter key to select this.

2. Once the Enter key has been pressed, the Display will alternately show “ALARM BEEPS” and “Y UP N DOWN”. To enable the Alarms (Depth and Race Timer) to beep, you must press the Up button.

NOTE: If a given alarm is set in the ENABL ALARMS option of the Main Menu, it will not sound until “ALARM BEEPS” is selected in the BEEP option of the Main Menu.

3. Once step 2 is followed, the Display will alternately show “KEYBD BEEPS” and “ Y UP N DOWN”. To enable the keypad to beep whenever a
key is pressed, press the Up key. If you don’t want the keypad to beep, press the Down button. The Display will now return to the Main Menu.

3.8 UNITS

Many of the Channels of data may be configured to read out in a variety of Units: knots, mph, kilometers/hour, nautical miles, statute miles, kilometers, feet, fathoms, meters, degrees Fahrenheit and degrees Celsius.

Note: Compatible Units are maintained with distance and Speed Channels, e.g. if the Units of LOG 1 are in statute miles, then the Units of SPD 1 are in statute miles per hour (m.p.h.).

In the rest of this manual it will be assumed that the Display has been set up with the following Units:

Speed Channels - Knots
Distance Channels - NM (Nautical Miles)
Depth - Feet
Temperature - Degrees Fahrenheit

CHANGING UNITS

1. In order to change Units, go to the MAIN MENU, scroll down (press the Down key 6 times, or the Up key twice) to SELCT UNITS and press Enter.

2. When SPD 1 appears, either select this by pressing Enter, or press ***and hold*** the Up or Down keys to scroll through the various Channels. Press Enter when you reach the one you want. The function (Example: SPD1) together with the current Units in use on that Channel will appear. Press the Up key, and you will see the Units change. Keep pressing this key until the Display shows the Units you want, then press the Enter key to return to the MAIN MENU.
Note: the Down key will not respond when scrolling through the various Unit settings.

3.9 TIME

BASIC OPERATION - 3.9 TIME

The Base Module's internal clock needs to be reset each time the power is interrupted, if you wish to use the TIME 1 Channel. If the clock has NOT been reset since the last power outage, the colon that separates the "hours digits" from the "minutes digits" will alternate with a period, indicating that the displayed Time may be inaccurate.

The Base Module uses a 24 hour clock system (0:00 through 23:59).

The TIME 1 Channel is not adjusted through the CALIBRATION function on the MAIN MENU, but is set by accessing the SET/RESET option in the Main Menu.

1. Select SET/RESET on the MAIN MENU, by pressing the Enter key, and then scroll through the various Channels by pressing ***and holding*** the Down key until you reach TIME 1.

2. Press the Enter key once the TIME 1 channel is shown. “UNLOCK TIME 1” and “Y UP N DOWN” will appear, alternating on the screen. If you press the Down key, the Display will return to the Main Menu.

3. Pressing the Up key will show the current value of the internal clock, with “PREST” and “Y UP N DOWN” alternating on the Display.

4. To accept the Preset Time (0:00), press the Up key and then press Enter to return to the Main Menu. In most cases you won’t want to accept the Preset Time.

5. To change the TIME 1 setting to the actual time, press the Down key. This will show the current Time on the internal clock. Press ***and hold*** the UP or DN keys until the displayed TIME is accurate, then press the Enter key to accept this Time and return to the Main Menu.

Note: Holding down either the Up or Down key causes the "minutes" to begin increasing or decreasing. If the UP or DN button is held down for more than 5 seconds, it will begin increasing or decreasing the “hour” digits.

If the TIME 1 Channel is being reset on a System that contains multiple components (Example: three SL250 Displays, one SL175, SL225 and SL385) there may be a slight delay when pushing the keys, due to an overload of information on the network (Sigbus).

3.10 ELAPSED TIME

The EL TM Channel indicates the Elapsed Time since the Channel was reset, or since the System was re-started.
This Channel is reset by using the SET/RESET option in the MAIN MENU, the same way the TIME 1 Channel is set/reset. (See Section 3.9)
The Elapsed Time starts out in minutes/seconds, but switches to hours/minutes after an hour.

3.11 RACING START TIMER

The Base Module's RST Channel is a "count-down" timer that is used when preparing to start a race. The Timer can be preset to an initial time (for example 10 minutes), and started/stopped by using the SET/RESET option in the MAIN MENU, and selecting RST from the list of Channels. Follow the same instructions for setting the TIME 1 Channel (Section 3.9).

3.12 TRIP LOG

The Trip Log holds its value when the System is turned off, and continues accumulating when the System is turned on the next time.

The Base Module monitors Trip Log (T LOG 1) through the paddlewheel connected to the SL175 Sensepak. This Channel is useful when calibrating the SPD 1 Channel over a measured distance. Refer to Boat Speed Calibration procedures. (Section 5.2)

The Trip Log can be reset using the same steps shown in the TIME 1 reset procedure. (Section 3.9) When resetting this Channel, select the Preset setting to get the Trip Log to zero.

3 BASIC OPERATION

If you have progressed through the basic Channels and operations described in Chapters 2 & 3, you are probably quite familiar with normal operation, and should feel comfortable with:

Selecting Pages
Creating Pages
Changing Units
Setting/Resetting Channels

This section describes some of the more advanced features available with the SMARTPAK SYSTEM.

4.1 ALARMS

The Base Module SL175 Sensepak includes two Channels which have Alarms associated with them, they are DEPTH and RST:

DEPTH	High and Low Alarms (Forward Looking)
RST	Racing Start Count-Down Alarm

If you have more than one Display, you can have only one Display sound or as many as you like. In order to make the various Alarms sound, the Beeper must be enabled (See Section 3.7 BEEPER)
(Turning the Beeper on or off does not enable or disable the Alarm - only the audible Beeper).

In order to prevent accidental Alarm changes, a LOCK/UNLOCK feature is provided. If an Alarm setting is LOCKED it must be UNLOCKED to modify its settings.

Turning off audible Alarm (Beeper): To turn off an Alarm when it is sounding, go to the Beep option in the Main Menu (details in Section 3.7), and press the Enter key. When “Alarm Beeps” appears, press the Down key to stop the Alarm beeper from sounding.

4.1.1 DEPTH ALARM

The microprocessor of the DEPTH Channel computes the slope trend of the sea bottom with respect to the forward speed of the vessel. The Forward-Looking Alarm will sound when this trend projects your vessel to be within approximately 20 seconds of running aground.

ADVANCED OPERATION - 4.1 ALARMS

To Set the Low and High Depth Alarms, follow the instructions below:

1. On the MAIN MENU, press the Down key twice to get to the ENABL ALARM option, and press Enter.

2. Press ***and hold*** the Down key until you reach the DEPTH function, which is just after SPD 1, and press Enter.

3. When "UNLCK DEPTH / Y UP N DN" shows on the Display, press the Up key to unlock the Alarm. The current setting for either the Low Alarm or the High Alarm will show in the upper portion of the Display, and "NEXT ALARM / Y UP N ENT" will alternate on the screen. To switch to the alternate Alarm, press the Up key.

4. To set the Alarm shown, press the Enter key. At this point, press ***and hold*** either the Up or Down key to move to the desired setting, for instance 6 feet.
Press Enter to confirm your setting.

5. When "DEPTH / ENABL UP / DISAB DOWN" appears, press the Up key to Enable the Alarm or the Down Key to disable the Alarm. If you select to disable the Alarm, your setting will stay programmed, but the Alarm won't sound.

6. Once you have selected to enable or disable the chosen Alarm, the Display will return to the Main Menu. At this point, if you need to set the other Depth Alarm, repeat steps 1-6 to set/enable this other Alarm.

4.1.2 RACE START TIMER ALARM

To enable the Race Start Timer (RST) follow these instructions:

1. On the MAIN MENU, press the Down key twice to get to the ENABL ALARM option, and press Enter.

2. Press ***and hold*** the Down key until you reach the RST function, which is just after TIME 1, and press Enter.

3. "UNLCK RST / Y UP N DOWN" will alternate on the screen. Press the Up key to unlock this function.

4. When "NEXT ALARM / Y UP N DN" appears, slowly press the Enter key ***twice***.

5. Press the Up key when "RST / ENABL UP DISAB DOWN" appears and the alarm will be enabled. The Display will return to the Main Menu.

To start the Race Timer go to the Set/Reset option, as described in Section 3.11.

The RST Alarm will sound 3 beeps when you are 3 minutes from the start, 2 beeps when you have 2 minutes left, once when you are 1 minute away, and will sound continuously in the last 10 seconds before the start.

4.2 DEFAULT PAGES

Sometimes it may be necessary to "clear" the Display's stored Pages of Channel data in order to be able to start over from a known condition. A Display can be set back to the same condition it was in when it was shipped from the factory by doing the following:

1. From the MAIN MENU, press the Up key once, or the Down key 7 times to get to DFALT PAGES.

2. Press Enter and the Display will return to the Main Menu.

The Default Pages are now programmed the same as they were when you first received the SL250 Display.

5 CALIBRATION

For optimal use, the SignetMarine SMARTPAK SYSTEM must be calibrated to the boat in which it is installed. Your BASIC SMARTPAK SYSTEM includes a Channel for "Boat Speed", known as SPD 1. **It is very important that the SPD 1 Channel be calibrated accurately.** Although it is tempting to calibrate the basic Boat Speed Channel quickly, it is strongly recommended that it be done carefully. Should you choose to expand your SMARTPAK SYSTEM with other modules, the calibration accuracy of the SPD 1 Channel becomes critical, since some of the new Channels depend on the SPD 1 Channel for the base calculation.

The following procedures describe calibration for the Channels available with the Base Module SL175 Sensepak. This includes SPEED, DEPTH, TRIP LOG and WATER TEMPERATURE. For information on calibration of Channels in other modules refer to the documentation in the corresponding manuals.

NOTE: No calibration is required if your System is only repeating Loran/Satnav positioning information.

5.1 LOCK/UNLOCK FEATURE

The calibration constant for each Channel is stored in the associated Sensepak's permanent memory. In order to prevent accidental calibration factor changes, a LOCK/UNLOCK feature is provided. If a Channel is LOCKED, its calibration cannot be changed. A Channel must be unlocked to perform calibration on it.

In each of the steps described below, it will be necessary to make sure that each of the Channels

needing calibration is first UNLOCKED. When the complete calibration procedure has been satisfactorily performed, the given Channel will be automatically locked.

When you change the calibration on any Channel, it will take about 2 minutes for the Sensepak's perma-nent memory to store this change. Do not shut off the power to the System until this is done.

5.2 BOAT SPEED PREFERRED CALIBRATION METHOD

Your SignetMarine Smartpak System has been factory calibrated to be compatible with the SignetMarine paddlewheel sensor. However, variations caused by hull configuration and sensor location may cause an error up to 30% in the indicated Speed (SPD 1) and Log values (LOG 1 & TLOG 1), requiring calibration after the unit is installed.

Boat Speed (SPD 1) must be calibrated in an area where there is negligible current. In order to compensate for any slight surface currents, calibration should be checked on two reciprocal courses, so that the average result is correct. Boat Speed calibration is best done under power on a calm day, using a known distance range.

NOTE: Boat speed can be monitored by more than one Sensepak in a Smartpak System (refer to your Performance and Navigation Module Manual(s) if you are expanding the Base Module).

In the Preferred Calibration Method of the SL175 SPD1 Channel, the associated Trip Log function (TLOG 1) is monitored to calculate the calibration percentage. This

gives the desired result and allows a higher accuracy

than the Alternate Calibration Method (below). The procedure is as follows:

1. Use the Select Page option and choose a Page that shows TLOG 1 and SPD 1 (Default Page # 4).

2. Observe the Trip Log value at the beginning and end of a run along a measured range (at least 1/2 mile, preferably one mile). Compare the distance indicated by the TLOG 1 Channel with the actual distance.

3. Run two reciprocal courses and average the deviation between the two. Use a calculator to determine the percentage adjustment to make.

4. While the boat is still under way (preferably at the same speed), press the Enter key once to return to the Main Menu, which will automatically scroll to Select Page.

5. Scroll down to CAL by pressing the Down key 4 times and then press the Enter key. SPD 1 will appear on the right side of the Display.

6. Press the Enter key and “UNLCK SPD 1 / Y UP N DOWN” will alternate on the Display. Press the Up Key to Unlock the SPD 1 function.

7. The current Boat Speed will appear in the upper portion of the Display and “PREST / Y UP N DOWN” will appear.

8. Press the Down key to decline the Preset value, and then press ***and hold*** the Up or Down keys to scroll to the correct Speed setting. For example, if the Speed indicated on the Display is 7.0 knots, and your test runs (over a measured distance) showed that your instrument is reading 10% too low, press

and hold the Up key until the Speed indicated is 7.7 knots.

NOTE: As the Speed setting is being changed, the Speed indicated will continue to jump up and down, due to the sensitivity of the Speed function.

9. Press the Enter key immediately once the desired Speed setting has been reached, and the Display will return to the Main Menu, and Select Page after this.

Confirm (or modify) the calibration.

5.2.1 ALTERNATE SPEED CALIBRATION METHOD

If a suitable calibration course (i.e. a measured mile) is not available, but the boat is equipped with a GPS, or a hand held GPS is available, this can be used to calibrate the SPD 1 Channel.

1. Motor at a steady speed, on a constant course, and monitor the SPD 1 indicated by the Smartpak Display. Determine the percentage difference between the Speed indicated on the GPS and the Speed indicated on the SPD 1 Channel. (Most Default Pages have SPD 1).

2. Maintaining the same engine speed, turn the boat around and run along a reciprocal bearing to the initial course, and again observe the percentage deviation between SPD 1 and the indicated GPS Speed.

3. Average the deviation of the two runs to determine the amount of correction to be made to the calibration constant.

4. While the boat is still under way (preferably at the same cruising speed), press the Enter key once to return to the Main Menu.

5. Scroll down to CAL by pressing the Down key 4 times, and then press the Enter key. SPD 1 will appear on the right side of the Display.

6. Press the Enter key and “UNLCK SPD1 / Y UP N DOWN” will appear on the Display. Press the Up key to Unlock the SPD 1 Channel.

7. The current Boat Speed will appear in the upper portion of the Display and “PREST / Y UP N DOWN” will appear.

8. Press the Down key to decline the Preset Speed, and then press ***and hold*** the Up or Down keys to scroll to the correct Speed setting. E.g. if the Speed indicated on the Display is 7.0 knots, and your test runs showed that your instrument is reading 10% too low, press ***and hold*** the Up key until the Speed indicated is 7.7 knots.

NOTE: As the Speed setting is being changed, the Speed indicated will continue to jump up and down, due to the sensitivity of the Speed Channel.

9. Press the Enter Key immediately once the desired Speed setting has been reached, and the Display will return to the Main Menu, and Select Page after this.

Confirm (or modify) the calibration.

5.3 DEPTH

The calibration of the Depth Channel adds or subtracts
an offset to (or from) the measured depth to compensate for the mounting depth of the transducer and/or keel. If desired, the Base Module can be calibrated to display Depth from the surface, or depth below the keel (keel offset).

1. While tied to a dock, or other non-movable structure, use a conventional lead line to determine the actual Depth.

2. Select a Page that shows Depth (Default Page #1)
and compare the actual Depth to the Depth indicated on the Display.

3. If you have determined that you want the Depth on the Display to read from the surface, the number you enter below should equal the actual Depth. To read the Depth from the bottom of the keel, take the actual Depth and subtract the keel depth.

4. From the Page of Information you are on, press the Enter key to return to the Main Menu, which automa-
tically scrolls to Select Page.

5. Scroll down to CAL by pressing the Down key 4 times, and then press the Enter key. SPD 1 will appear. Press ***and hold*** the Down key until DEPTH appears (the next Channel), and press Enter.

6. “UNLCK DEPTH / Y UP N DOWN” will appear. Press the Up key to unlock the Depth Channel.

7. The Depth currently indicated by the System will appear in the upper portion of the Display, along with “PREST / Y UP N DOWN” alternating on the screen.

8. Press the Down key to decline the Preset setting. Now press ***and hold*** the Up or Down keys to select the Depth you want. Once you have reached this setting, press Enter and the Display will return to the Main Menu.

9. When SELCT PAGE appears, press Enter and scroll to a Page with Depth on it. (Example: Default Page #1)
The Depth shown on the Display should be the same as the one you set.

5.4 WATER TEMPERATURE

The TEMP Channel is calibrated accurately at the factory, however if further calibration is needed, it can be calibrated against an accurate water temperature indicator. The calibration of the TEMP Channel is performed from a Display in the same fashion as the calibration of the DEPTH Channel. (See Section 5.3)

6 TROUBLESHOOTING

6.1 SELF TEST

Each component in the Smartpak System has been designed to withstand the marine environment. Whenever power is switched on, the SYSTEM components perform a self-test. If problems are detected, the Sensepaks will not be found on the System. “SENSPAK NO” or only one Sensepak found when there are more than one, indicates a problem.

6.2 SIGBUS

There is a large amount of data moving about on the 4 wire SIGBUS cable that ties the SignetMarine SMARTPAK SYSTEM together. If for any reason one or more Channels of data are not "spotted" by one of the Displays for 5 seconds or more, that Display will sound a single beep. This should be a rare occurrence, and is nothing to be concerned about. If, however, this occurs frequently, this is an indication that one of the devices on the SIGBUS might need service.

6.3 DATA INTERRUPTION

If your Sensepak stops transmitting Channel data, one or all of the SYSTEM'S Display units will attempt to reactivate it by sending diagnostic messages to the Sensepak. If this doesn't revive the unit, the Display will "freeze" on the current numbers being displayed. This could be caused by:

1. A cable problem (open or short).

2. A defective Sensepak.

3. A defective Display.

4. The Display may be looking for information that is not available on the System. Example: the Display has a Page that is programmed for Wind information, and the SL225 is not being detected by the Display.

6.4 BLANK SCREEN

When moving between Menus, an instance might be encountered whereby a totally blank screen is presented, with no prompt line or data. This should be a rare occurrence, and is due to the fact that the Display is waiting for data to be transmitted by a Sensepak, but the Sensepak's data was held up by traffic on the Sigbus, or garbled due to a "collision". If this occurs, press the red Enter key to get back to a viewable Menu.

7 INSTALLATION

7.1 UNPACKING

Your SignetMarine Base Module SL175 Sensepak and Display are shipped complete with all the required components and hardware for operation. When you receive the Base Module, inspect the shipping container after opening it. If the package shows any obvious damage, contact the shipping company immediately. If the package appears to be in good condition, unpack the container and verify that all of the components are included and appear in good condition:

7.1.1 BASE MODULE SL175 SENSEPAK PARTS

QTY	PART NO.	DESCRIPTION
1	1-3400.000	SL175 Sensepak, with Mounting Kit
1	1-2400.100	Depth Transducer, Flush Nylon Plastic
1	1-2200.100	Paddlewheel Speed Sensor
1	M1533	Flush Thru-Hull Fitting for Paddlewheel
1	M1536	Thru-Hull Plug for Paddlewheel
1	1-1701.260	Cable Assy, Power

NOTE: The above items are included in the "standard module". You may have replaced some standard items with some of the following options:

PART NO.	DESCRIPTION
1-2401.100	Depth Transducer, Mushroom
1-2402.100	Depth Transducer, Round Brass
2-2401.100	Depth Transducer, Brass Faired
1-0000.260	Bus Cable Interconnect

7.1.2 DISPLAY PARTS

QTY	PART NO.	DESCRIPTION
1	SL250	SL250 Display
1	1-0000.100	Bulkhead Mounting Kit
1	1-1700.260-1	Bus Cable 10'
1	1-3402.090	Manual, SL250 Base Module

NOTE: The above items are included in the "standard module", you may have replaced some standard items with some of the options listed below:

PART NO.	DESCRIPTION
2-0000.100	Tilt mount Kit
1-1700.260-0	Bus Cable, 2'
1-0000.580	Flush Mount Kit

7.2 SL175 SENSEPAK INSTALLATION

7.2.1 PROCESSING BOX

The SignetMarine SL175 SENSEPAK processing box is not designed for operation in an area that will be subjected to water. All I/O ports must be connected or covered to keep corrosion from damaging the connector contacts. The SL175 Sensepak can easily be mounted on any appropriate dry surface. Do not mount the Sensepak in a location that will become wet from the bilge when the boat is heeled over. Listed below are several tips on selecting a proper location.

SELECTING A PROPER LOCATION

- Mount the Sensepak in an accessible location, which allows for Sensor, Display, and Power hook-up.

- All Sensors (excluding the Masthead Sensor) should be within 35’ of the Sensepak(s).

- Select a dry area that will not be affected by hatch leaks or bilge run-off. (inside a cabinet, or under a seat serve as good locations.)

- If "stacking" of Sensepaks is required, allow for appropriate stack-up height. (See Figure 7.2.1)

INSTALLATION - 7.2 SENSEPAK INSTALLATION

MOUNTING THE SENSEPAK, SINGLE

1. Set the Sensepak on the surface you have selected and mark the outlines of the thru-holes located on the Sensepak mounting ears.

2. Drill two pilot holes (#18 drill, .169") as required for the #10 x 3/4" long wood screws provided.

3. Securely attach the Sensepak to the mounting surface with the screws (see Fig. 7.2.1).

4. Power-up per system hook-up instructions (see section 7.6).

MOUNTING THE SENSEPAKS, "STACKING"

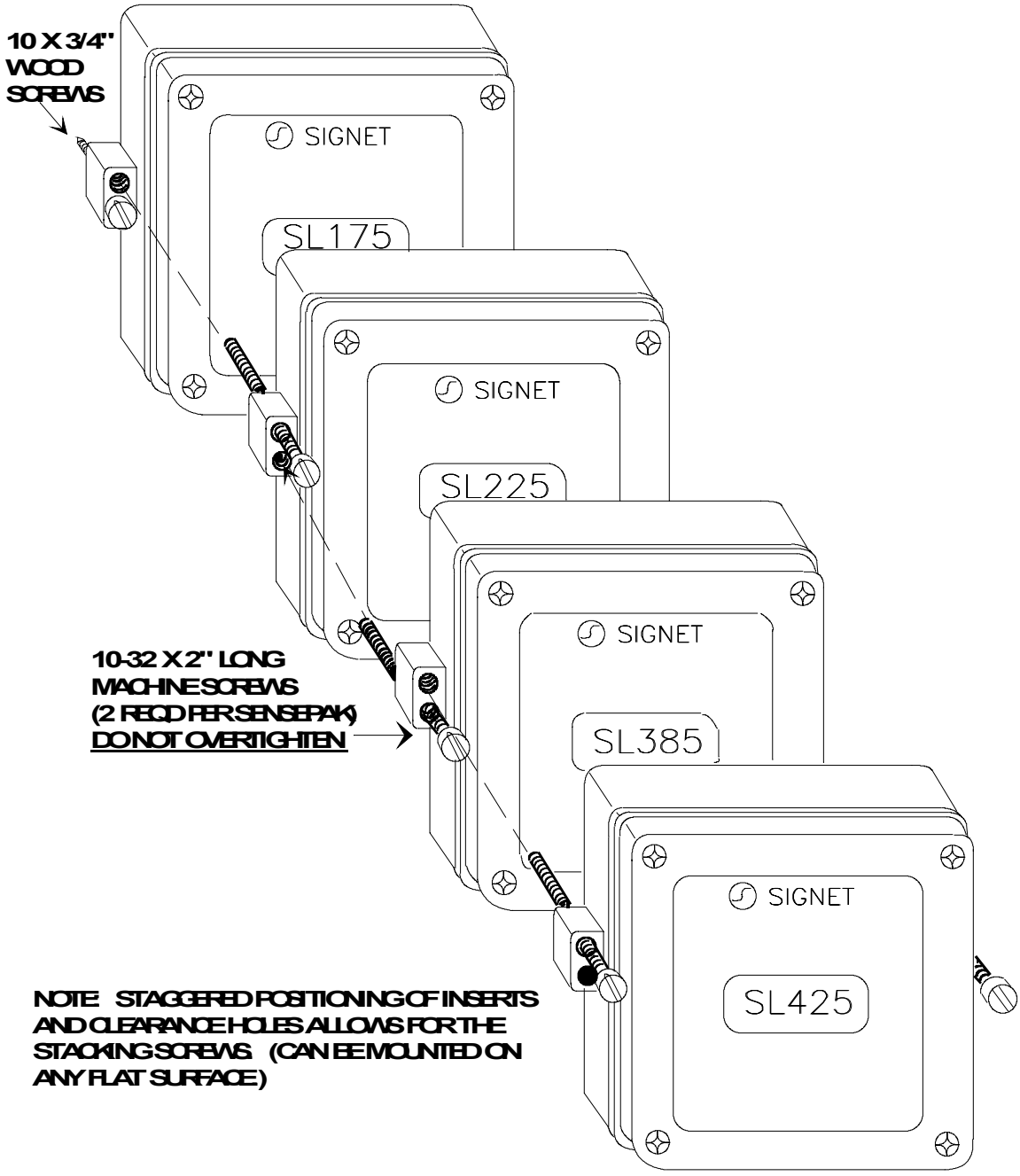
(ADDING AN ADDITIONAL SENSEPAK TO YOUR BASE MODULE)

1. Mount the bottom Sensepak as described above.

2. With the additional #10-32 x 2" long machine screws provided, secure the next Sensepak using the alternating inserts on the Sensepak mounting ears (see Fig. 7.2.1).

3. Power up per System hook-up instructions.

FIGURE 7.2.1 STACKING SENSEPAKS



7.3 PADDLEWHEEL INSTALLATION

The SignetMarine PADDLEWHEEL generates an AC signal whose frequency is proportional to the boat's Speed over water. Accuracy is determined by the location of the Paddlewheel with respect to hull flow characteristics. Therefore, the most important step of the Paddlewheel installation is choosing the proper location. Listed below are several location tips.

CHOOSING A PROPER LOCATION

- Note: Do not position the Paddlewheel directly ahead of a Depth transducer: turbulence created by the Paddlewheel rotation will adversely affect the Depth transducer at high boat speeds.

- Mount the Paddlewheel as near as possible to the hull centerline, at least 18" forward of the keel.

- On sailboat displacement hulls, the Paddlewheel should be mounted midship and fore. Verify Paddlewheel will be submerged during normal boat attitudes, motions and heel angles.

- On planing hulls, the Paddlewheel should be mounted further aft to insure that it is submerged at higher boat speeds.

- The Paddlewheel thru-hull should be installed facing directly forward, parallel with centerline.

- Provide a clearance radius of 5" inside the hull for Paddlewheel installation and periodic maintenance.

- Do not position the Paddlewheel alongside the keel: different flow paths on opposite tacks will give different Speed values.

INSTALLATION - 7.3 PADDLEWHEEL INSTALLATION

INSTALLING THE THRU-HULL FITTING

Required: Polysulphide or polyurethane bedding compound and waterproof or Teflon grease.

1. After choosing a proper location, drill a 3/8" (.38") pilot hole through the hull.

2. For the **Flush** thru-hull (part #M1533) use the SignetMarine thru-hull cutter (M1580) to cut the fitting hole with the necessary countersink. For the **Mushroom** thru-hull (part #1-2200.380), drill a 2” hole.

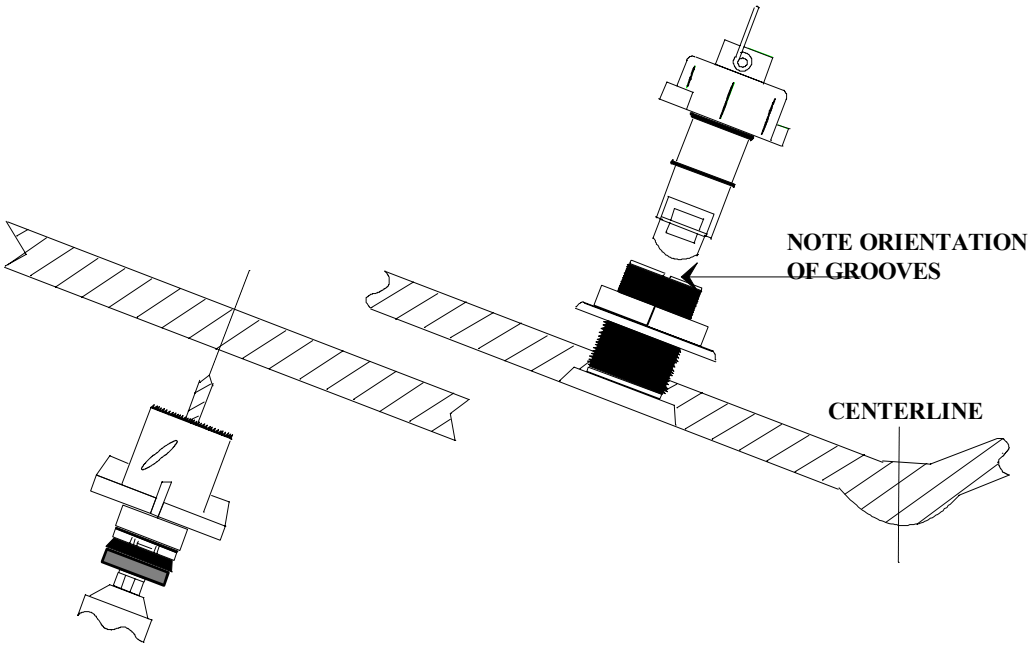
3. If installing a Flush thru-hull, and a cutter is not available, cut a 1 5/8" (1.63") hole through the hull and then use a rasp to make a 2 1/2" (2.50") countersink to fit the thru-hull flange.

4. Apply a small amount of polysulphide or polyurethane bedding compound to the surface of the thru-hull that will be in contact with the hull. Slide the fitting through the hole from the outside **with the notches in the top of the thru-hull fitting (flush or mushroom) parallel with the hull centerline (See Fig. 7.3).**

5. From inside the boat, install the nut on the fitting. Tighten the nut with a wrench.

6. Remove excess bedding compound and install the Paddlewheel into the thru-hull fitting, with a small amount of water-proof or Teflon grease on the o-rings. The sensor should “click” into the alignment notches

FIGURE 7.3 PADDLEWHEEL INSTALLATION



7.4 DEPTH TRANSDUCER INSTALLATION

CHOOSING A PROPER LOCATION FOR:

MUSHROOM, PLASTIC (1-2401.100)
FLUSH, PLASTIC (1-2400.100)
FAIRED, BRASS (2-2401.100)

Refer to the following guidelines when choosing a location for any of the above types of Depth transducers. Keep these guidelines in mind as you continue installation.

- Mount the transducer as near as possible to the hull centerline to ensure contact with the water at all times.

- Mount the transducer at least 18" fore of the keel.

- On sailboat displacement hulls, the transducer should be mounted midship and fore. Verify the transducer will be submerged under normal boat attitudes, motions, and heel angles.

- On planing hulls, the transducer should be mounted further aft to ensure that it is submerged at higher boat speeds.

- The transducer should be oriented vertically (within 10 degrees) with the water to yield a vertically directed acoustic beam.

- Provide a clearance radius of 5" inside the hull for transducer installation and periodic maintenance.

INSTALLATION - 7.4 DEPTH TRANSDUCER

- Mount the transducer within 35' of the Sensepak unit. **The shielded cable should not be spliced, cut or extended.**

- Do not position the Depth transducer directly behind a Paddlewheel sensor. Turbulence created by the Paddlewheel rotation will adversely affect the Depth transducer at high speeds.

- Do not position the transducer aft of protruding fittings or vents (to avoid turbulence).

CHOOSING A PROPER LOCATION FOR:

SMALL ROUND BRASS (1-2402.100)

The guidelines given above for choosing a location should all be taken into consideration. In addition, allow an area large enough for fairing the transducer (fairing not supplied by SignetMarine).

FIGURE 7.4 A TRANSDUCER LOCATION

Proper location for Depth Transducer

INSTALLATION - 7.4 DEPTH TRANSDUCER

MUSHROOM, PLASTIC (1-2401.100) INSTALLATION:

1. Select an appropriate location for installation following the guidelines already given.

2. Drill a 3/8" (.38") pilot hole through the hull at the position you have selected (perpendicular to the hull, unless fairing is needed).

3. Cut a 1-7/8" (1.88") hole through the hull.

4. Insert the cable through the hull. Apply bedding compound to the surface of the transducer that will be in contact with the hull. Use a polysul-phide or polyurethane compound; do not use a silicone seal. Insert the transducer through the hull.

5. From inside the boat, slide the nut over the wire and thread it on to the transducer stem. Tighten firmly with a wrench.

6. Wipe off any excess bedding compound.

7. Route the cable to the instrument, keeping it clear of ignition, tachometer, alternator or other sources of electrical interference. **Connector removal or cable splicing will render the trans-ducer inoperative.**

8. Any excess cable should be spread out **(not coiled)**, so that it doesn't interfere with the impedance of the transducer.

FLUSH PLASTIC (1-2400.100) INSTALLATION

INSTALLATION - 7.4 DEPTH TRANSDUCER

1. After choosing a proper location following the guidelines given earlier, drill a 3/8" (.38") pilot hole perpendicular to the hull.
2. With the SignetMarine thru-hull cutter (M1580), cut the fitting hole with the necessary countersink (refer to Fig. 7.4 B).
3. If a thru-hull cutter is not available, cut a 1-5/8" (1.63") hole through the hull and then use a rasp to make a 2-1/2" (2.50") countersink to fit the transducer flange.
4. Insert the cable through the hull. Apply bedding compound to the surface of the transducer that will be in contact with the hull. Use a polysul-phide or polyurethane compound; do not use a silicone seal. Insert the transducer through the hole from the outside. Make sure the flange is flush with hull underside.
5. From inside the boat, slide the nut over the wire and thread it on to the transducer stem. Make sure the transducer is seated tightly in the counter-sink and then tighten the nut with a wrench.
6. Remove excess bedding compound.
7. Route the cable to the instrument, keeping it clear of ignition, tachometer, alternator or other sources of electrical interference. **Connector removal or cable splicing will render the trans-ducer inoperative.**
8. Any excess cable should be spread out (**not coiled**), so that it doesn't interfere with the impedance of the transducer.

INSTALLATION - 7.4 DEPTH TRANSDUCER

SMALL ROUND BRASS (1-2402.100) INSTALLATION

1. After selecting a location using the guidelines given, drill a 3/8" (.38") pilot hole through the hull (vertical if custom fairing is used, perpendicular to the hull if deadrise angle is less than 10 degrees).

2. Cut or drill a 7/8" (.88") hole through the hull.

3. Custom fairing may be required for steep deadrise angles (see Fig. 7.4 B) to assure vertical beam direction and to minimize drag.

4. Insert the cable through the hull. Apply bedding compound to the surface of the transducer that will be in contact with the hull. Use a polysul-phide or polyurethane compound; do not use a silicone seal. Insert the transducer stem through the hull (with fairing if required).

5. From inside the boat, slide the nut over the cable and thread it on to the transducer stem (with fairing) and tighten firmly with a wrench.

6. Wipe off any excess bedding compound.

7. Route the cable to the instrument, keeping it clear of ignition, tachometer, alternator or other sources of electrical interference. **Connector removal or cable splicing will render the trans-ducer inoperative.**

8. Any excess cable should be spread out **(not coiled)**, so that it doesn't interfere with the impedance of the transducer.

FAIRED, BRASS (2-2402.100) INSTALLATION

INSTALLATION - 7.4 DEPTH TRANSDUCER

1. Choose an appropriate location using the guidelines given previously.

2. Drill a 3/8" (.38") pilot hole through the hull at the position you have selected.

3. Cut or drill a 7/8" (.88") hole through the hull.

4. Insert the cable through the hull. Apply bedding compound to the surface of the transducer that will be in contact with the hull. Use a polysul-phide or polyurethane compound; do not use a silicone seal. Insert the transducer stem through the hull with the "v" pointing fore.

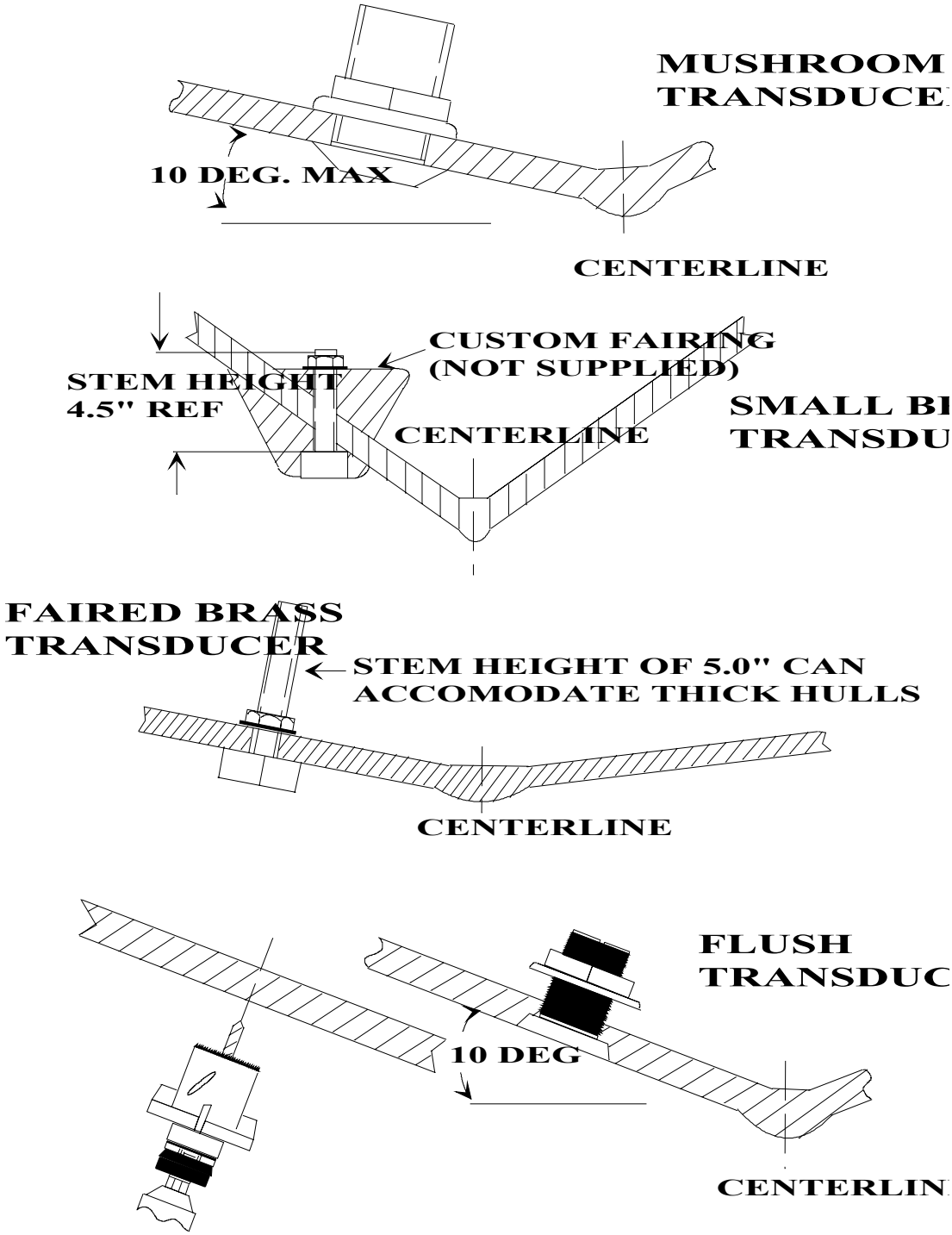
5. From inside the boat, slide the nut over the wire and thread it on to the transducer stem. Tighten firmly with a wrench.

6. Wipe off any excess bedding compound.

7. Route the cable to the instrument, keeping it clear of ignition, tachometer, alternator or other sources of electrical interference. **Connector removal or cable splicing will render the trans-ducer inoperative.**

8. Any excess cable should be spread out **(not coiled)**, so that it doesn't interfere with the impedance of the transducer.

FIGURE 7.4B TRANSDUCER INSTALLATION



7.5 DISPLAY INSTALLATIONS

7.5.1 BULKHEAD INSTALLATION

The Bulkhead Mounting Kit (1-0000.100) allows for flush mounting against an instrument panel or bulkhead.

1. Select a location with proper instrument operation clearance and 2" of clearance behind the panel (Connector clearance). The instrument should be mounted to ensure a clear view from all positions in the cockpit.

2. Follow the instructions printed on the mounting template provided for drilling operation.

3. Attach threaded studs to the 4 brass inserts located on the rear of the instrument. DO NOT OVERTIGHTEN THE STUDS TO THE INSTRUMENT.

4. Place instrument (with studs attached) and gasket against the instrument panel and tighten the wing nuts evenly. It may be necessary to hold the studs with a pair of pliers to prevent them from tightening into the Display case while the wing nuts are being tightened. DO NOT OVER-TIGHTEN. This will ensure even compression of the soft gasket.

7.5.2 INSTALLING WITH TILT MOUNT BRACKETS

The SignetMarine SL250 Display has four mounting inserts located symmetrically on the rear of the instrument which are capable of supporting horizontal and vertical mounting. (Horizontal mounting is shown.)

1. Select a location with proper clearance for tilting and access to the keypad and the input cables.

2. Select the mounting hardware to be used. If the mounting surface is thick enough, the wood screws (#10) provided can be used. A thinner panel may require standard (#10) machine screws and nuts, or moly bolts (not provided).

3. Place the stationary bracket on the mounting surface and outline the two mounting slots. Mark the centers of the slots (Kidney-shaped slots allow for +-8 degree rotation for fine adjustment).

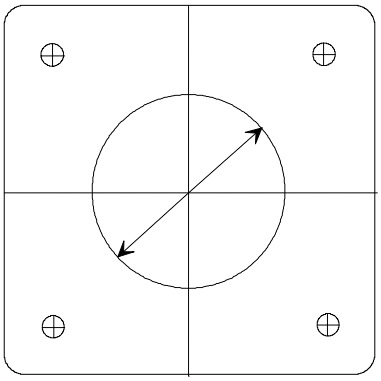
4. If using the wood screws provided, drill pilot holes (#28 or 9/64" drill) 1/2" deep. Screw the stationary bracket to the mounting surface. If using #10 standard hardware (not provided) drill proper clearance holes and secure the stationary bracket to the mounting surface.

5. Attach the instrument bracket to the back of the instrument with the two #10 machine screws provided.

6. Place the instrument with the bracket attached within the stationary bracket and secure into place with the thumb screws provided. Adjust for proper viewing and tighten into place (DO NOT OVERTIGHTEN).

FIGURE 7.5 BULKHEAD & TILT MOUNT INSTALL.

TOOLS REQUIRED:
- DRILL WITH A 1/4" DRILL BIT
- 2" DIA HOLE SAW
- STANDARD SCREWDRIVER (SMALL)

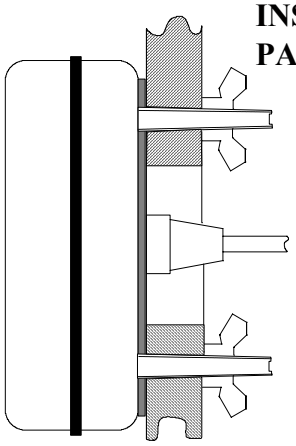


MOUNTING TEMPLATE

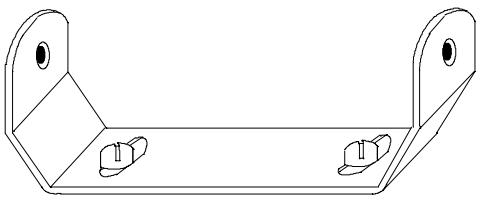
1. **MARK INSTRUMENT CENTERLINES**
2. **ALIGN TEMPLATE**
   CHECK STRAIGHTNESS, ADHERE
3. **DRILL 4 1/4" HOLES THRU BULKHD.**
4. **DRILL 2" HOLE IN BULKHEAD.**
5. **MOUNT INSTRUMENT GASKET**
   (NO SEALANT NEEDED)

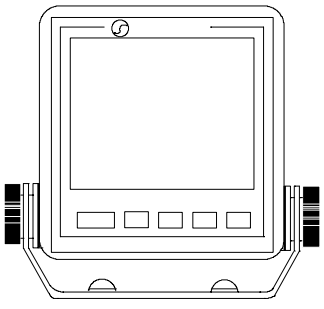
MOUNTING GASKET

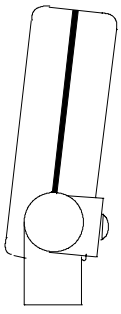
INSTRUMENT PANEL



BULKHEAD ASSEMBLY







7.6 SYSTEM HOOK-UP

After installing the Sensepak and Display per the appropriate installation instructions, choose a power source with the given criteria:

A. Avoid sharing circuit breakers with CB, VHF, or SSB radios (may cause interference with the depthsounder receiver).

B. Connect to a circuit breaker or fuse block with a current rating of 2 AMP (Refer to additional Smartpak Module(s) Hook-Up information for additional current rating requirements.) The SL250 Display will drain 135 mA with lights, and the SL175 Sensepak will drain 250 mA. Your circuit or fuse box should be adjusted accordingly.

C. Verify the battery voltage is between 11VDC to 15VDC continuous.

D. Verify battery polarity.

1. Connect the RED wire of the power cable to +12VDC ("+" terminal), and connect the BLACK wire to the common GND ("-" terminal).

2. With the breaker or battery switched-off, connect the power cable to Port "1" or "2" on any Sensepak (usually the Base Module SL175 Sensepak if stacking is required).

NOTE: The SL250 Display does not have a switch. It is highly recommended that a panel switch be used with an in-line fuse of 2 Amps. Turning off the power at the panel will shut off power to the entire Smartpak System

3. Connect the 3-pin Paddlewheel sensor connector to Port "A" of the SL175 Sensepak.

4. Connect the 6-pin Depth/Temperature transducer connector to Port "B" of the SL175 Sensepak.

5. Connect any other sensors associated with other Sensepak Modules you have installed in addition to the Base Module SL175 Sensepak. See the instructions in the corresponding manuals for the specific Sensepak Module.

6. If more than one Sensepak is included in your System, interconnect the Sensepaks as specified in the manuals for these additional Sensepaks.

7. Connect the Bus Cable from the Display unit to the remaining Bus Port on the Sensepak.

   Note: If the System has only one Display, there will be an empty port on the back of this Display. With more than one Display, the last one in the chain will have an empty port.

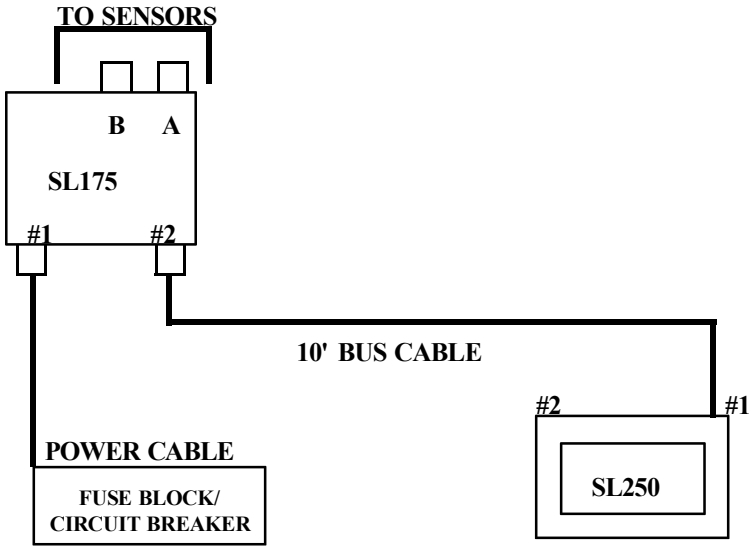
   The Bus Cable may be extended beyond the standard 10' length by using Bus Cable interconnects and/or:

   1-1700.260-0 Bus Cable, 2'
   1-1700.260-1 Bus Cable 10'
   1-1700.260-2 Bus Cable 50'
   1-0000.260 Interconnect (Cable to Cable)

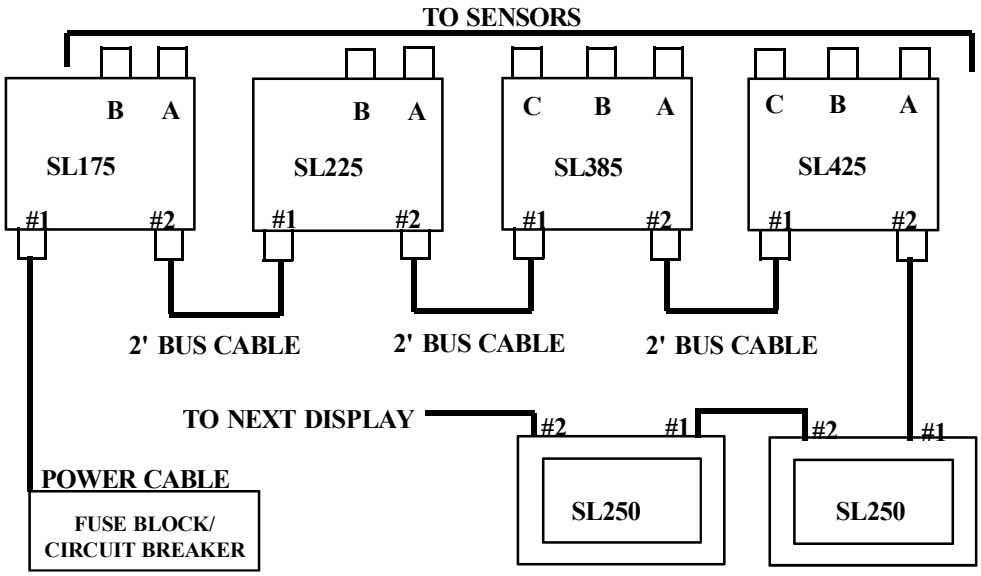
8. Turn breaker or battery switch "ON", and then turn on panel switch to verify operation.

FIGURE 7.6 SYSTEM HOOK-UP

BASE MODULE HOOK-UP



BASE MODULE SYSTEM EXPANSION



8 APPENDICES

8.1 CHANNEL OPERATION TABLE

CHANNEL	CALIBRATE	ALARMS	SET/RESET	UNITS	*PSET	NOTES
DEPTH	YES	YES	NO	FT FAT MTR	YES	
SPEED	YES	NO	NO	KTS MPH KPH	YES	**LEAVE IN KNOTS IF PERFORM. FEATURE IS USED.
LOG	NO	NO	NO	NM MI KM	NO	CALIBRATE IN SAME UNITS AS SPEED CHANNEL
T LOG	YES	NO	YES PSET=0	NM MI KM	YES	CALIBRATE IN SAME UNITS AS SPEED CHANNEL
TEMP	YES	NO	NO	F,C	YES	
TIME	NO	NO	YES	H:M	YES	
EL TM	NO	NO	YES	H:M	YES	
RST	NO	YES	ON/OFF	M:S	YES	

NOTE: PSET ALLOWS YOU TO RETRIEVE THE FACTORY SETTING FOR ANY CHANNEL WHICH CAN BE CALIBRATED.

NOTE: PERFORMANCE FEATURES APPLY TO ADDITIONAL SMARTPAK MODULES (WIND MODULE AND PERFORMANCE MODULE).

8.2 DISPLAY SPECIFICATIONS

Your SL250 Smartpak Display features the latest in High-Contrast Liquid Crystal Display technology, allowing for extremely acute angles of viewing, while the Fiber-Optic Lighting features dramatically improved viewing at night with very low power drain.

SL250 VIDEO DISPLAY:	DIMENSIONS - 4.2" X 4.2" X 1.4" REPEATABLE (2 SERIAL I/O PORTS) HIGH-CONTRAST HIGH-TEMP LCD 4" DIAGONAL VIEWING AREA CONTRAST RATIO > 10:1 FACTORY SET CONTRAST FIBER-OPTIC BACK-LIGHTING USER PROGRAMMABLE ON-SCREEN CALIBRATION WATERTIGHT ENCLOSURE SELF-PROMPTING, MENU DRIVEN

OPERATING TEMPERATURE	0 - 50° C (32-120° F)
POWER CONSUMPTION	100 mA @ 12VDC (WITHOUT LIGHTS) 135 mA @ 12VDC (WITH LIGHTS)

8.3 SL175 SENSEPAK SPECIFICATIONS

BOAT SPEED	0.00 - 50.0 KNOTS UNITS: KNOTS, MPH, KILOMETERS/HOUR
LOG	0.00 - 9999 NM (NON-RESETTABLE) NAUTICAL MILES, MILES, KILOMETERS
TRIP LOG	0.00 - 9999 NM (RESETTABLE) NAUTICAL MILES, MILES, KILOMETERS
DEPTHSOUNDER	RANGE: 4:00 - 350 FT. KEEL/SURFACE OFFSET HIGH, LOW, AND FORWARD LOOKING ALARMS UNITS: FEET, FATHOMS, METERS
TEMPERATURE	32.0 - 100.0 DEGREES F UNITS: DEGREES F OR C
TIME	24 HOUR CLOCK HOURS: MINUTES
ELAPSED TIME	0 TO 100 HOURS
RACING START TIMER	PRESETTABLE TO 60 MINUTES
POWER CONSUMPTION	250 mA @ 12VDC
SPEED SENSOR	FLUSH, THRU-HULL PADDLEWHEEL SENSOR WITH 35 FOOT INTEGRAL CABLE
DEPTH/TEMP TRANSDUCER	FLUSH STYLE, PLASTIC 200 Khz, 18 DEGREE BEAM ANGLE WITH 35 FOOT INTEGRAL CABLE

9 WARRANTY

SIGNETMARINE **LIMITED TWO YEAR WARRANTY**

SignetMarine's Limited Two Year Warranty warrants its instruments to be free from defect in material and workmanship under normal use two years from date of purchase by initial owner, or three years from date of manufacture, whichever is earlier. Products not purchased within three years from date of manufacture will not be covered by warranty service. Proof of date of purchase is required to validate all warranty service.

Instruments which prove to be defective in the first year of the warranty period will be repaired or replaced free of charge including labor, F.O.B. our factory. **Transducers or cables are not covered by warranty after installation.**

The limited warranty for the second year of the warranty period covers only non-moving parts, such as electrical components. All units qualifying for warranty repair after one year may be subject to a service charge of $20.00.

Items returned for warranty repair must be prepaid and insured for shipment. Warranty claims are processed on the condition that prompt notification of a defect is given to SignetMarine within the warranty period. SignetMarine shall have the sole right to determine whether in fact a warranty situation exists.

The SignetMarine warranty does not cover travel time, mileage expenses, removal, reinstallation or calibration.

WARRANTY

This warranty does not cover defects caused by installation, abuse, or electrical damage. SignetMarine will not warranty any instru-ments damaged during shipment to factory which arrive either without the case or when improperly packed. Repair attempts by other than SignetMarine will void warranty.

SignetMarine is continually making design changes and improve-ments that adapt to original circuit configuration. These may be incorporated as required in older units on a minimal charge basis.

CONSEQUENTIAL DAMAGES

SignetMarine shall not be liable for special consequential damages of any nature with respect to any merchandise or service sold, rendered, or delivered.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.