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ST50 SPEED
Installation and Operation

Contents

1. Specifications

The ST50 Speed can be used as a stand-alone instrument or when connected to the SeaTalk bus can supply information to a Multi Function Display, a Tridata Repeater or any SeaTalk compatible Autohelm Autopilot.
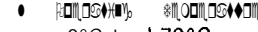
Both the Multi Function Display and Tridata Repeater have an NMEA standard output providing speed information to other onboard electronic equipment.

The timer functions operate independantly allowing boat speed and log information to be displayed whilst the timer is running.

Note: It is not possible to use the ST50 Speed as a repeater unit without a transducer input.

When a dedicated repeater is required use the ST50 Multi Function Display.

Specifications

- Power Supply
  - 11V to 16V DC at 50ma (illumination off).
- ▮▮▮▮▮▮, ▮▮▮▮▮▮
  - 0°C to +70°C.
- Size 110mm (4.33in) x 110mm (4.33in) x 24mm (lin) Overall depth 39mm (1.5in).
- Computer
  - 8 bit Intel Microprocessor + 8K Rom.
- Display
  - Custom dot matrix/7 segment liquid crystal display (LCD).
- Boat Speed
  - 0 to 60 knots (depending on transducer).
- Average Speed
  - 0 to 60 knots.
- Maximum Speed
  - 0 to 60 knots, user resettable. Resets on powerdown.
- Log
  - 0 to 9999.9nm, promenantly stored.
- Trip Log
  - 0 to 999nm, user resettable. Resets on powerdown.
- Sea Temperature
  - -10°C to 40°C (14 to 104°F).
- Timer
  - 0 to 100 hours countup.
  - 10 minute countdown.
  - 5 minute countdown.
- Illumination
  - 3 levels and OFF, user selectable.
- Unit Selection
  - Speed in MPH or knots, user selectable.
  - Distance in NM or statute miles, user selectable.
- Distance Lost Function
  - Indicates distance lost during a Tack in either feet or metres.

2. Control Head Installation

39mm (1.5in)
110mm (4.33111)
24mm (1.0in)
110mm (4.33in)

SPEED TRIP TIMER RESET
SPEED
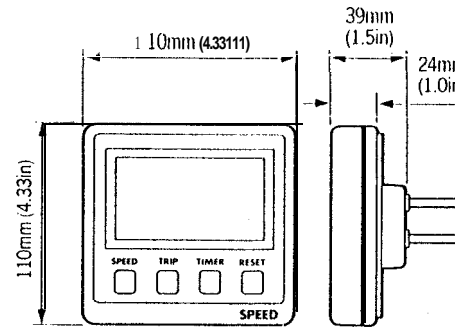
2.1 Siting

The ST50 speed instrument is designed for above or below deck installation.

Position where it is:
- Easy to read by the helmsman.
- Reasonably well protected from physical damage.
- At least 230mm (9in) from a compass.
- At least 500mm (20in) from radio receiving equipment.
- Accessable from behind to secure in place and run cables.
- Normally viewed straight on for best display legability.
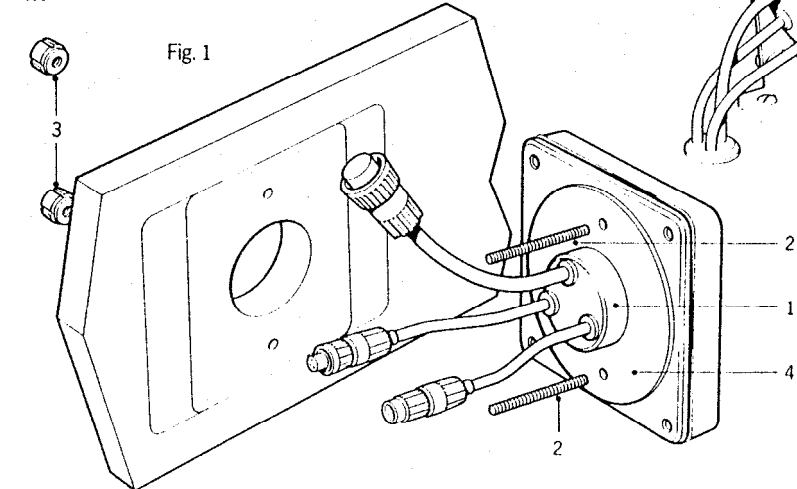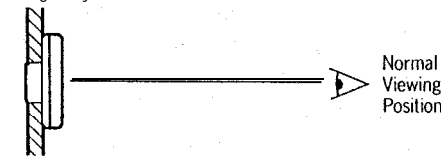
Note: Tlie back cover is designed to breath through a duct in the cable boss to prevent moisture accumulation.

2.2 Mounting Procedure (Fig. 1)
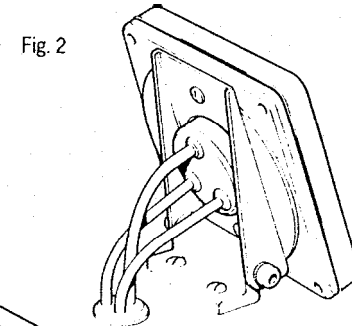
The mounting surface must be smooth and flat.
- Use the template provided to mark the centres of the two fixing holes and central boss.

Note: Adjacent units should have a 6mm (1/4in) separation to allow room for the protective covers.
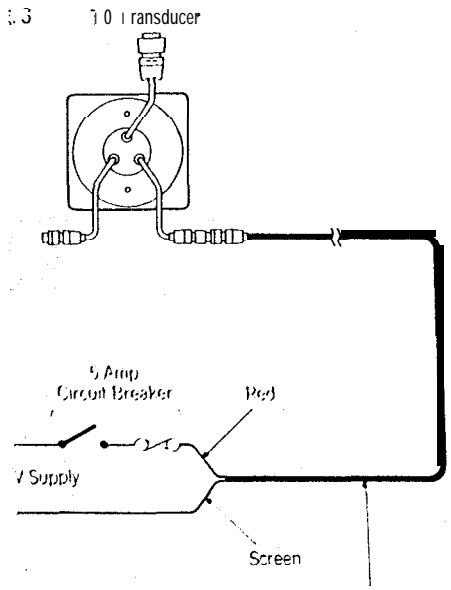- Drill to 4mm (5/32in) diameter.
- Use a 50mm (2in) diameter cutter to drill the hole for the central boss 1.
- Screw the two fixing studs 2, into the back cover.
- Pass the cable tails through the central hole and secure the instrument with the thumb nuts provided 3. (A sealing gasket 4 is already attached to the back cover).

Bracket Mounting (Fig. 2)

As an alternative to surface mounting, a bracket mounting kit (Cat. No. 9130) is available to allow the Instruments to be bracket mounted.

Normal Viewing Position

Fig. 2

Fig. 1

.3 Power Supply (Fig. 3)

Fig. 3   To Transducer

5 Amp
Circuit Breaker   Red

V Supply

Screen

| Power Supply Cable	
2m (6ft)	
Red	+12V
Screen	0V

Most installations only require one connection to the 12V power supply.
This is connected to the first SeaTalk instrument using the 2 metre cable supplied.
Plug the connector into the instrument and lead the other end back to the vessel's distribution panel. Cut the cable to length, connect directly to the distribution panel and protect with a 5A circuit breaker. Connect the red wire to t 12V and the screen to 0V. The yellow wire should be cut back and insulated.
Longer runs to the power supply can be made using the SeaTalk Extension Cable (Cat. No. 0131) which is 9m (30ft) long.

2.4 Connection to Adjacent Instruments (Fig. 4)

Fig. 4   To Transduce1   To Transducer

Sea Talk Tails   SeaTalk Tails
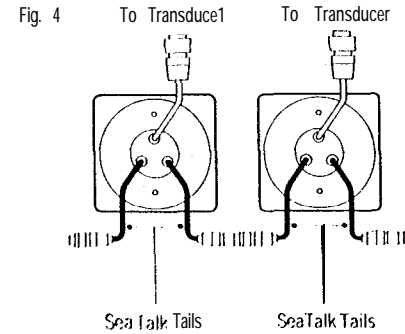
All instruments receive both power and information from the SeaTalk bus. Each instrument has two SeaTalk connectors (3 pin) on short 150mm (6in) tails to allow adjacent units to simply plug together.

2.5 Connection to Separated htruments (Fig. 5)

Separated instruments are connected using the SeaTalk Extension Cable (Cat. No. 0131). This is supplied with a SeaTalk connector fitted to each end and with a junction box to rejoin the cable if it is cut to ease routing or for shortening.
If preferred, any 2 core screen cable which has the following specification may be used in the place of the SeaTalk cable.

	Minimum Copper Area	AWG
Screen	0.5mm^2	22
2 Cores	0.5mm^2	22

Fig. 5
SeaTalk Extension Cable
Cat. No. 0131
(9m (30ft) supplied)

Junction
Box

Yellow

Screen   Red   Screen
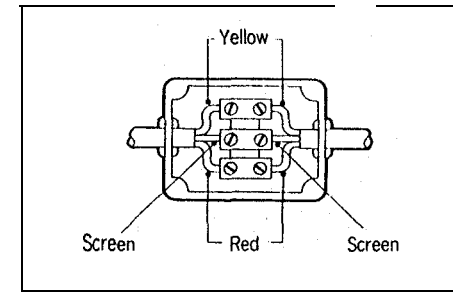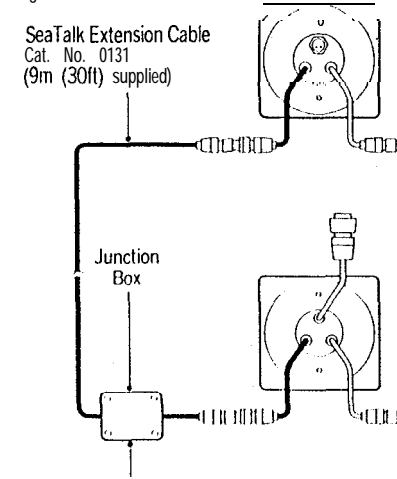
2.6 Ring Connection

installations with a large number of instruments on the SeaTalk bus may require a second ring main connection to the Power Supply to avoid excessive voltage drops. This can be checked using the table below:-

SeaTalk Cable Length	Max. Number of Units	
	Single Connection	Second Connection
Up to 10m (33ft)	13	26
Up to 20m (66ft)	7	13

The second connection should be made to the spare lead on the last instrument and led back to the circuit breaker.

2.7 Connection to SeaTalk Compatible Autopilots (Fig. 6)

If the vessels installation includes a SeaTalk Compatible Autopilot the ST50 instruments may be connected into the SeaTalk bus at any point. No separate connection to the 12V power supply is necessary as the instruments will receive power via the bus from the autopilot course computer.

Fig. 6

To Course
Computer BUS
Connection

To any f&her
ST50 Instruments
or Autopilot
Control Units

5
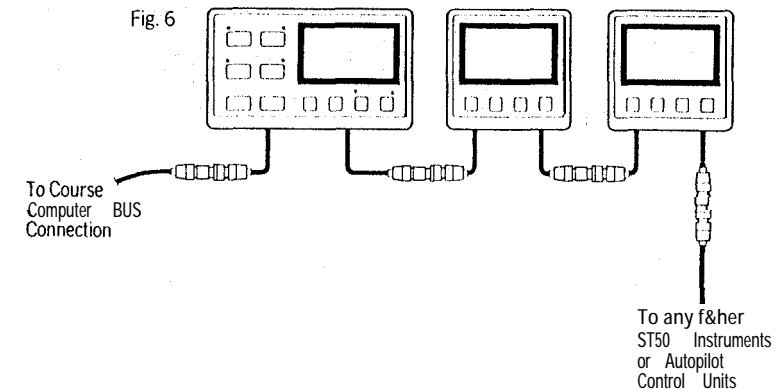
3. Transducer Installation

3.1 Connection to instrument

Each ST50 Speed instrument has a transducer cable tail with connector. Each transducer is supplied with 14m (45ft) of cable and the connector fitted on the end simply plugs into the instrument cable tail (Fig. 7).

Fig. 7
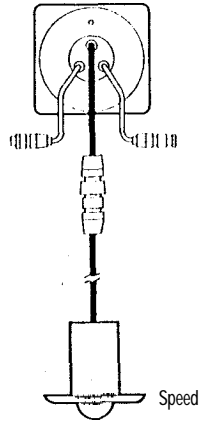
SPEED (2095) and Transducer

3.2 Transducer Selection

The speed transducers are selected depending on the hull material:-

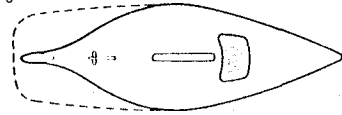| Hull Material	Transducer
GRP, Steel Aluminium	Z092 Through Hull Plastic
Wood	Z116 Through Hull Bronze

3.3 Transducer Installation

In all cases read the instructions supplied with the transducer completely before proceeding with the installation.

Installation of the through hull type is described below.
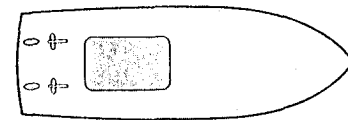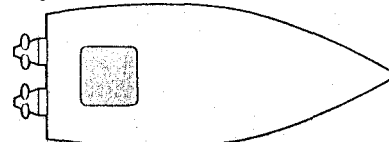
Siting (Fig. 8)

Fig. 8

Sailing Yacht


Semi Displacement

Planing

For accurate readings the transducer should be positioned within the shaded area indicated where it will be in clear flow.
● Be ahead of propellors (10% W.L. length min.).
● Be at least 150mm (6in) from the keel (in a sailing yacht ideally ahead of the keel).
● Be near the centreline.
● Be clear of other through hull fittings or projections.
● Have sufficient clearance inside the hull to allow the nut to be fitted.
● Have 100mm (4in) headroom above the through hull fitting to allow it to be withdrawn.

Installation (Fig. 9)
● Drill a 3mm (1/8in) pilot hole in the selected position and check both inside and out that the siting is good.
● Use a 50mm (2in) diameter cutter to drill the hole from the outside.
● Emery to remove burrs and roughen the surface to provide a good key. Clean inside and outside the hull removing any grease with a weak solvent cleaner or household detergent.

Fig. 9

Hole Size
50mm (2in) Dia.
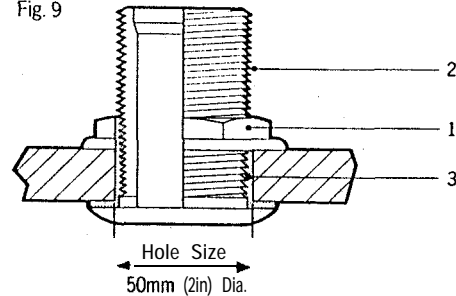
● Remove the paddlewheel assembly and nut from the through hull fitting 2 and apply sealing compound 3 to the mating flange and up the thread 6mm (1/4in) greater than the hull thickness.
● Assemble the through hull fitting making sure that the arrow points forward. Do not overtighten the nut 1.
● Remove excess sealing compound.
● Insert blanking plug ready for launch.
● Check for leaks immediately the vessel is launched. Recheck within 8 to 24 hours.

Cabling
● Route the cable back to the instrument.
● Avoid running the cable close to flourescent lights, engine, radio transmitting equipment etc. as these may cause interference.
● Keep the cable clear of the bilges and secure at regular intervals.

4. Fault Finding

All Autohelm products are subject to a
comprehensive test procedure prior to packing
and shipment. In the unlikely event that a fault
does arise the following check list should help
cure the problem.

Fault	Course	Action
Instrument Display Blank	No Supply	Check Supply
		Check Cabling and security of SeaTalk Connectors
		Check Fuse/Breaker
		Return ST50 Speed for repair
No Speed or Temperature Information	Transducer Cabling Problem	Check Cabling and security of Transducer Connector
No Speed Information	Transducer Paddle Wheel fouled	Clean Paddle Wheel
No exchage of information between SeaTalk Instruments (i.e. illumination levels).	SeaTalk Cabling Problem	Check security of SeaTalk Connectors.
		Remove Instruments one by one to isolate faulty unit
Failure of a group of Instruments in the SeaTalk Chain	SeaTalk Cabling/Connector problem	Check security of SeaTalk Connectors between functioning and non-functioning Instruments

5. Maintenance

5.1 Control Head

● In certain conditions, condensation may
appear on the window. This will not harm the
instrument, and can be cleared by switching
on the illumination to the brightest level.
● Never use any chemical or abrasive materials
to clean your ST50 Speed Instrument. If the
instrument becomes dirty wipe clean with a
damp cloth.

5.2 Through Hull Transducers

● Periodically check the through-hull fitting for
leaks.
● Keep the O-rings of the Speed/Log transducer
and plug well covered with Vaseline ensuring
plug is always attached to transducer, ready
for immediate use.
● Always replace the Speed/Log transducer
with the plug whenever the vessel is being
hauled out or left for long periods.
● Frequently check Speed/Log transducer for
fouling or damage.
● Clean the outside of the through hull fitting
flange, or external transducer face with a stiff
brush and protect with a single coat of anti-
fouling. Clean the paddle-wheel and exposed
end of Speed/Log transducer plug and apply
single coat of anti-fouling.

5.3 Cabling

● Avoid running cables through bilges where
possible and secure any coiled lengths at
regular intervals.
● Avoid running cables close to flourescent
lights, engine, radio transmitting equipment
etc.
● Check cabling for chafing or damage to outer
casing, replace where necessary and
re-secure.

Advice
Should any difficulties arise, please consult
Nautech Product Support Department in the
U.K. or your own National Distributor who will
be able to provide expert assistance.

5. Operation

The ST50 Speed Instrument can be used as an individual module or connected to other instruments to provide part of a fully integrated instrumentation system which can be linked to any of the Autohelm SeaTalk compatible autopilots.

6.1 Set Up

The ST50 Speed is set up in the factory to display speed in knots, distance in NM, and distance lost in feet. These can be changed to mph, statute miles and metres to suit your preference as follows:-
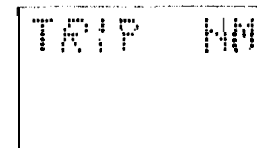
- Push and hold down for 2 seconds Speed and Trip together to select calibration mode.
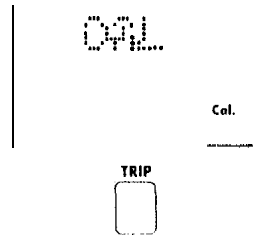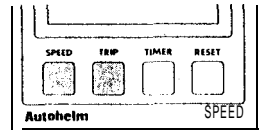
6.1.1 Measurement Units

- Push Reset to change display units between knots and mph.

- Push Reset to change display units between nautical miles and statute miles.
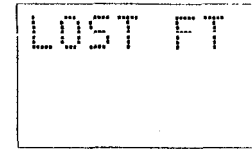
- Push Reset to change display units between feet and metres.
- Push and hold down for 2 seconds Speed and Trip together to exit calibration mode and store the selected units.

6.1.2 Display Contrast Adjustment

- The LCD viewing angle can be user set to achieve optimum display legability.
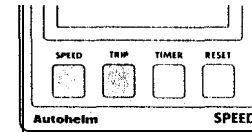
- Momentarily push Speed and Trip together.

- Push Reset to increase and Timer to decrease the contrast level.
- Adjust for optimum contrast.
- Momentarily push Speed and Trip together to store the display setting.

Note: Increasing the display setting will suit installations where the instrument is normally viewed from below.
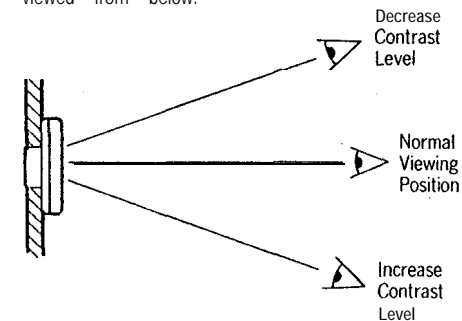
6.2 Illumination

Control of Illumination level is common to all ST50 Instrument Modules. The control is always selected using the left-hand push button.

- Push and hold down the Speed button for 1 second to switch ON (if OFF), or to display current illumination level (if already on).
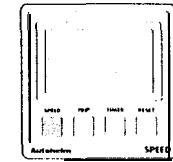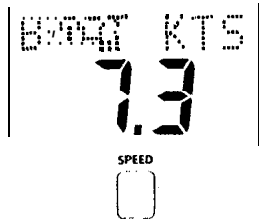

- Push Speed button within 8 seconds to select required illumination level.

  Lamp 3   High
  Lamp 2   Medium
  Lamp 1   Low
  Lamp OFF   O f f

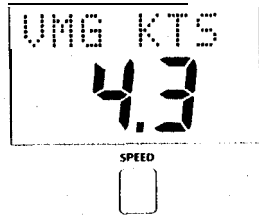The display will return to previous status after 8 seconds.

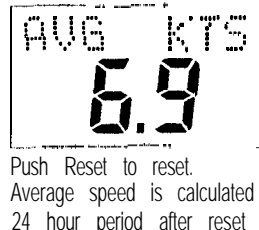## 6.3 Display Sequence: SPEED

● Boat Speed

B-DAT KTS
7.3

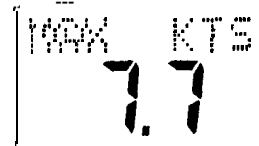● Velocity Made Good

VMG KTS
4.3

— only displayed if wind data available.

● Average Boat Speed*

AVG KTS
6.9

— Push Reset to reset.
— Average speed is calculated over a max.
24 hour period after reset and then flashes.
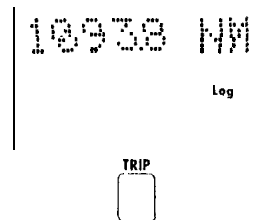
● Maximum Speed"

MAX KTS
7.7

— Push Reset to reset.
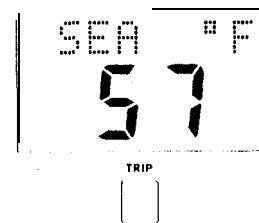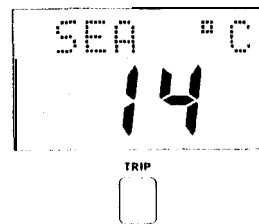*Display returns to current boat speed after 8 seconds.

● Trip Distance

TRIP NM
2.32

— Push Reset for 4 seconds to reset.

● Log

10938 NM
Log

● Sea Temperature

SEA °C
14

SEA °F
57
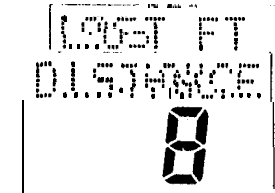
● Tack

TACK
0.0

When in Tack mode the ST50 speed instrument gives a measure of lost distance during a tack based on the average speed over the last 30 seconds. Push Reset just before starting the tack to start the distance lost function.
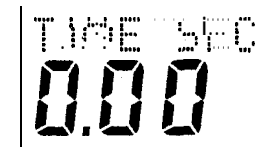
RESET

LOST FT
DISTANCE
8

● Tack the boat
— The distance lost will now count up until the boat reaches its average speed on the previous tack.
● Push Reset to reset the function ready for the next tack.

Note: The tack function should be reset at least 30 seconds before tacking so that the average speed can be accurately calculated.
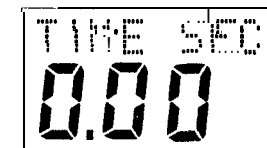
6.5 Display Sequence: TIMER

● Timer

TIME SEC
0.00

— Push Timer to start/stop.
— Push Timer to freeze display (indicated by flashing colon).

● Race Timer

START
RACE
10.0

— Push Timer for 1 second to select 10 minute countdown.
— Push Timer for 3 seconds to select 5 minute countdown.

● Push Reset at anytime to reset.

RESET

TIME SEC
0.00

Note: If timer is already running, use Timer to return to timer display.

7. Log Calibration

As supplied all ST50 Instrument Modules are Tested and Calibrated to factory standards. It is important that before using this instrument for Navigation purposes the following Log Calibration procedures are carried out for your specific installation.

There are two methods of log calibration.

● Manual Calibration — allows a calculated log calibration factor to be entered manually.

● Automatic Calibration — allows up to four measured runs to be entered and compared against a known distance. The log calibration factor is automatically calculated.
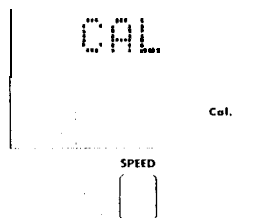
7.1 Manual Calibration Procedure

● Calculate Correction Factor(F).

$$F = \frac{\text{Known distance}}{\text{Measured distance}}$$

Known distance
— From a chart

Measured distance
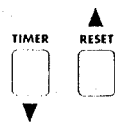— As recorded on speed instrument allowing for tidal flow as required.

Procedure

● Push and hold down for 2 seconds Speed and Trip together to select calibration mode.

● Push Speed to display log calibration factor.

● Calculate the new log Calibration Factor.
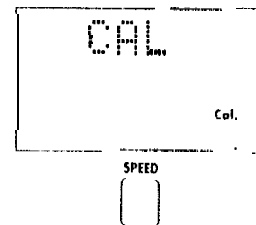= Displayed calibration factor x F (min. 0.25, max 1.50).

● Adjust the displayed calibration factor using Reset to increase (A) or Timer to decrease (▼).

● Push and hold down for 2 seconds Speed and Trip together to exit calibration and to store new calibration factor.
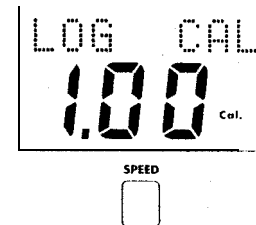
7.2 Automatic Calibration Procedure

● Seieci an easiiy ideniiiied marked measureci distance on a chart.

● Carry out the calibration when tidal flow is least.

● Complete a minimum of two runs (one in each direction) to cancel tide.
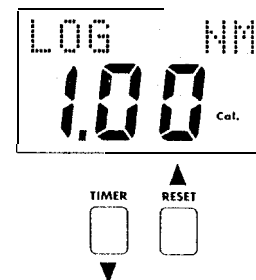
Procedure

Push and hold down for 2 seconds Speed and Trip together to select calibration mode,

● Push Speed to select log calibration.

● Push Speed to display distance.

● Adjust displayed distance using Reset to increase (A) and Timer to decrease (▼), until it equals marked measured distance (minimum 0.25nm, maximum 2.50nm).

● At the start of the measured run push Speed Display shows run number and measured distance

● Push Speed at the end of the run.
— Display shows recorded distance for the run, and after 5 seconds the log calibration factor.
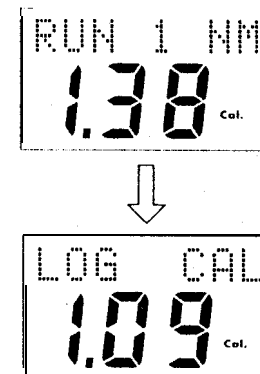
● Repeat last two stages to run the measured distance in the opposite direction.

● If required, repeat last two stages for up to 2 more calibration runs over the measured distance.

● Push and hold down for 2 seconds Speed and Trip together to exit calibration and to store the new log calibration factor.

Note: If the calibration factor is not within 0.25 and 1.50 a mistake has been made in the calibration sequence and the previous calibration factor will be retained when exiting calibration mode.

The trip distance will be lost whenever automatic calibration is used.