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ST50
MULTI-FUNCTION DISPLAY
Installation and Operation

Nautech Limited, Anchorage Park, Portsmouth
Hampshire, PO3 5TD, England.
Telephone (0705) 693611, Telex 86384 NAUTEC G.

Autohelm™

Contents

1. Specifications

The ST50 Multi Function Display is designed for use as a comprehensive repeater instrument either at a steering position or at the chart table.

Every Multi has an NMEA 0183 output which transmits data available on the SeaTalk bus (see section 7).

- **Power Supply**
  - 11V to 16V DC
- **Current Consumption**
  - 50ma (Illumination off)
  - 175ma (Max. Illumination)
- **Operating Temperature**
  - 0°C to +70°C
- **Size**
  - 110mm (4.33in) x 110mm (4.33in) x 24m (1in) Overall depth 39mm (1.5in)
- **Computer**
  - 8 bit Intel Microprocessor + 16K Rom
- **Display**
  - Custom dot matrix/7 segment Liquid Crystal Display (LCD).

Display Options

- Each button accesses a menu of related displays available from data on the SeaTalk bus.

In addition to providing repeater display of all information communicated on the SeaTalk bus by the main ST50 Instruments, the Multi also displays a range of computed functions:-

Computed Functions (Wind)

- **VMG**
  - Speed Made Good either upwind or downwind.
  - ST50 Instruments required:
    - Wind
    - Tridata or Speed
- **True Wind Direction**
  - Over the Water
  - ST50 Instruments required:
    - Wind
    - Tridata or Speed
    - Compass (Autopilot or Steering Compass)
- **True Wind Speed**
  - Over the Water
  - Can be displayed as Beaufort Strength
  - ST50 Instruments required:
    - Wind
    - Tridata or Speed
- **Tack Course**
  - Heading required to mirror the apparent Wind Angle on the opposite tack either upwind or downwind
  - ST50 Instruments required:
    - Wind
    - Tridata or Speed
    - Compass (Autopilot or Steering Compass)

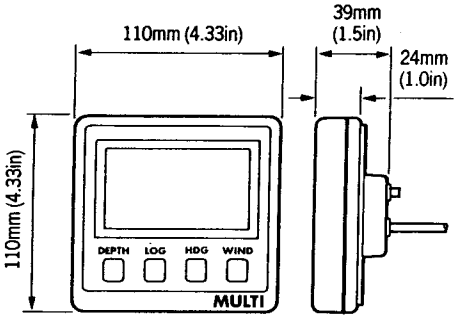
Computed Functions (Navigation)

- **DMG**
  - Distance Made Good
- **CMG**
  - Course Made Good

These are Dead Reckoned functions with no correction for Tidal set or drift.

  - ST50 Instruments required:
    - Tridata or Speed
    - Compass (Autopilot or Steering Compass).

2. Control Head Installation



2.1 Siting

The ST50 Multi 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

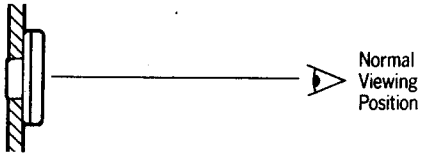
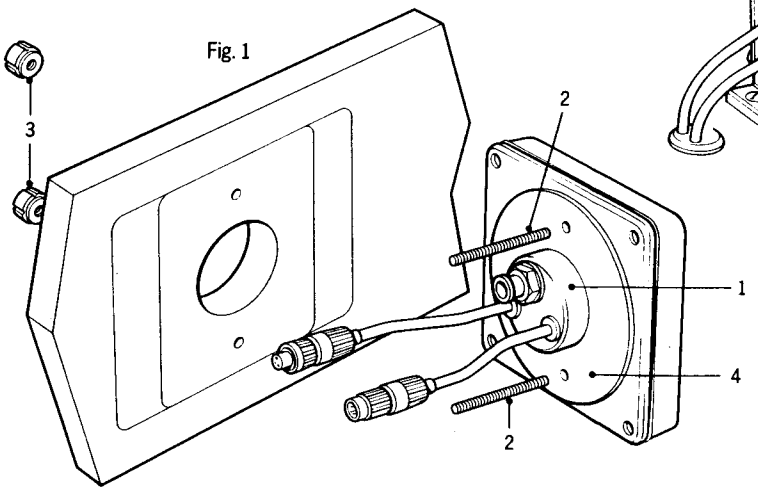


Fig. 1



Note: The 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.

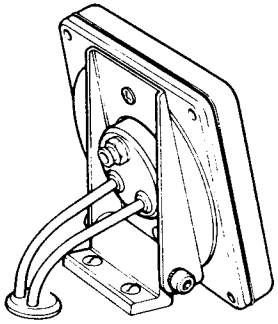
Note: Adjacent units should have a 6mm (1/4in) separation to allow room for the protective covers.

- 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)

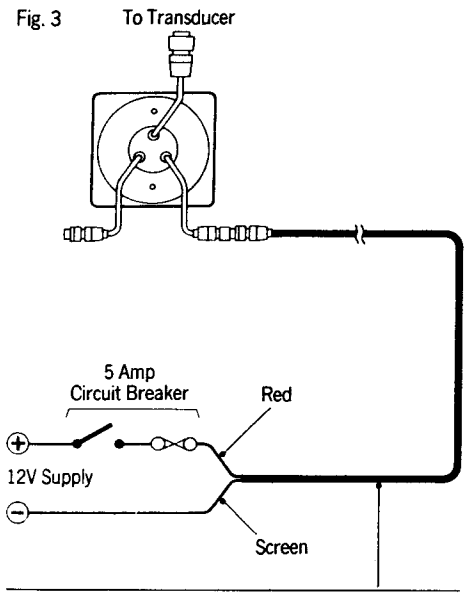
As an alternative to surface mounting, a bracket mounting kit (Cat. No. D130) is available to allow the Instruments to be bracket mounted.

Fig. 2



2.3 Power Supply (Fig. 3)

Fig. 3



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

Most installations only require one connection to the 12V power supply.

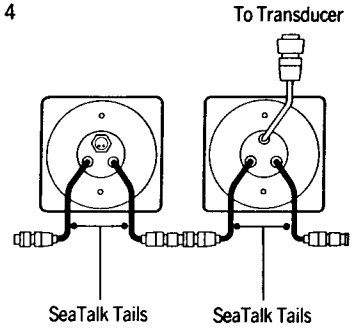
This is connected to the first SeaTalk Instrument using the 2 metre cable supplied.

Plug the connector into the instrument and lead the other 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 +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. D131) which is 9m (30ft) long.

2.4 Connection to Adjacent Instruments (Fig. 4)

Fig. 4



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.

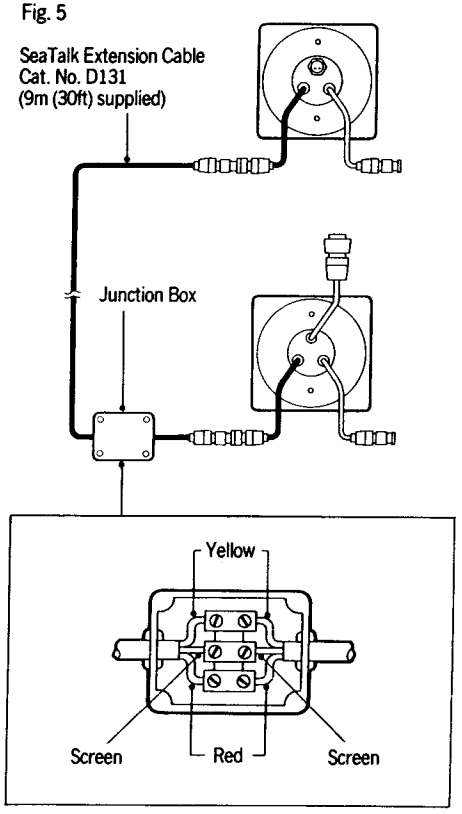
2.5 Connection to Separated Instruments (Fig. 5)

Separated instruments are connected using the SeaTalk Extension Cable (Cat. No. D131). 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
Screen	0.5mm^2
2 Cores	0.5mm^2

Fig. 5



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

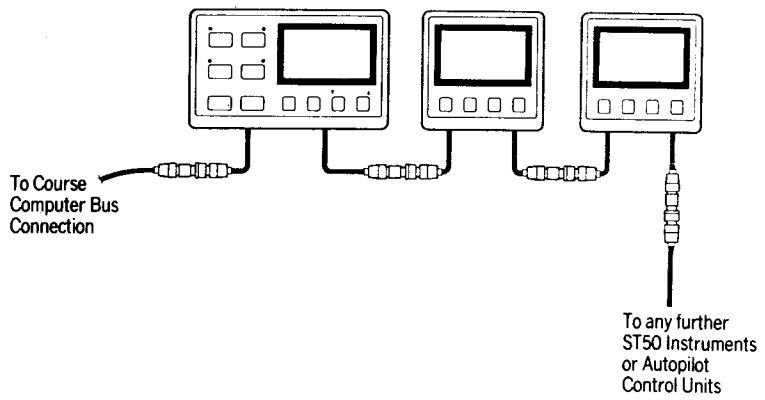
The second connection should be made to the spare lead on the last instrument and led back to the circuit breaker.

2.7 Connection to SeaTalk Compatible Autopilots (Fig. 6)

If the vessel's 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



3. Fault Finding

All Autohelm products are subjected 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	Cause	Action
Instrument Display Blank	No Supply	Check Supply. Check Cabling and security of SeaTalk Connectors. Check Fuse/Breaker. Return ST50 Multi for repair.
No exchange of information between SeaTalk Instruments (i.e. illumination levels, speed information, depth information etc).	SeaTalk cabling/ connector 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.

4. Maintenance

4.1 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 Multi. If the instrument becomes dirty wipe clean with a damp cloth.

4.2 Cabling

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

Advice

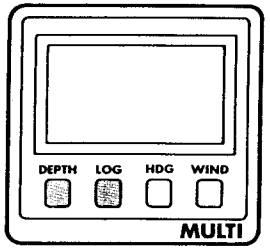
Should any difficulties arise, please consult Nautech Product Support Department in the U.K. or your own National Distributor who will be able to provide expert assistance.

5. Operation

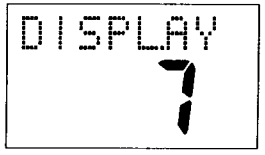
The ST50 Multi can be connected to other ST50 instruments to provide a fully integrated instrumentation system that can be linked to any of the Autohelm SeaTalk compatible autopilots. It can also provide NMEA 0183 data to navigation receivers, chart plotters or to other navigational equipment.

5.1 Display Contrast Adjustment

- The LCD viewing angle can be user set to achieve optimum display legability.

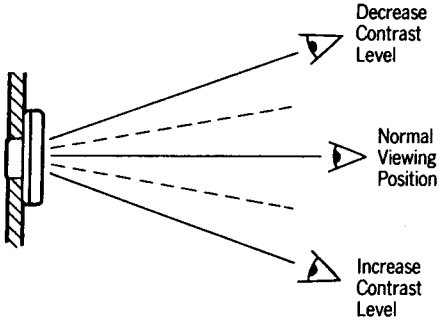


- Momentarily push **Depth** and **Log** together.



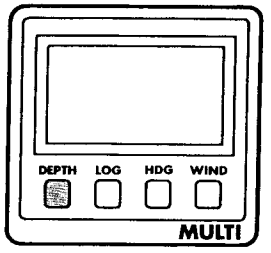
- Push **Wind** to increase and **HDG** to decrease the contrast level.
- Adjust for optimum contrast.
- Momentarily push **Depth** and **Log** together to store the display setting.

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

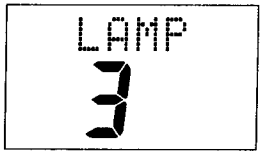


5.2 Illumination

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



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



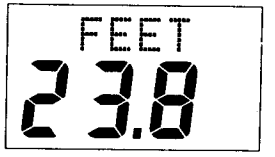
- Push **Depth** button within 8 seconds to select required illumination level.*

Lamp 3	High
Lamp 2	Medium
Lamp 1	Low
Lamp OFF	Off

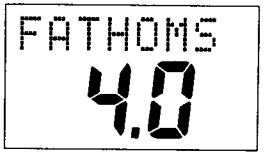
*Display returns to previous status after 8 seconds.

5.3 Display Sequence : DEPTH

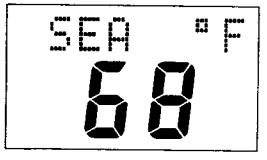
- **Depth in Feet***



- **Depth in Fathoms***



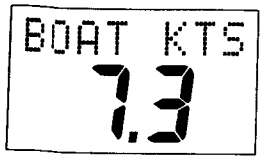
- **Sea Temperature**



*Display Sequence depends on unit selection made on main instrument.
Depth Alarms can be silenced by a single push of the depth key.

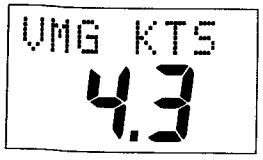
5.4 Display Sequence : LOG

- **Boat Speed***



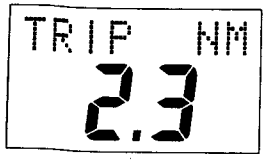
LOG

- **Velocity Made Good***



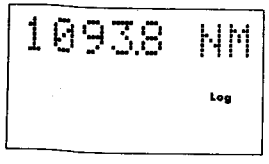
LOG

- **Trip Distance (Repeat)***



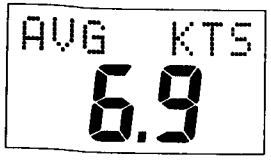
LOG

- **Log (Repeat)***



LOG

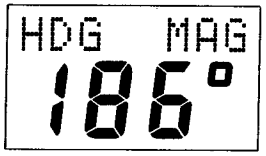
- **Average Speed (Repeat)***



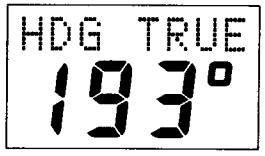
*Units depend on selection made on main instrument.

5.5 Display Sequence : HDG (Heading)

- **Heading (HDG) or Locked Course (Auto)**

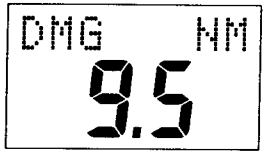


HDG



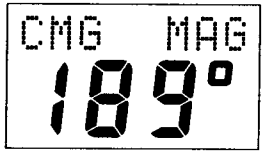
HDG

- **Distance Made Good**

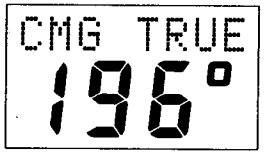


HDG

- **Course Made Good**



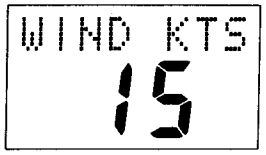
HDG



Note: Magnetic headings are only displayed if Variation is set up during calibration on either the Multi or a SeaTalk compatible autopilot.

5.6 Display Sequence : WIND

- **Apparent Wind Speed***

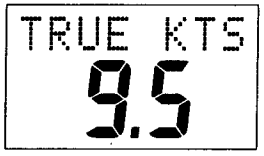


WIND

- **Apparent Wind Direction**

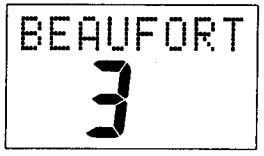
WIND

- **True Wind Speed***



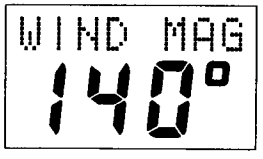
WIND

- **Beaufort Wind Strength**



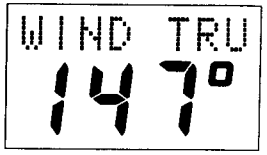
WIND

- **True Wind Direction (Magnetic)**



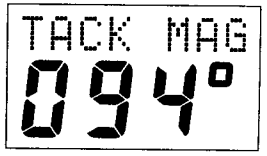
WIND

- **True Wind Direction (True)**



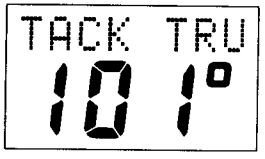
WIND

- **Tack Course (Magnetic)**



WIND

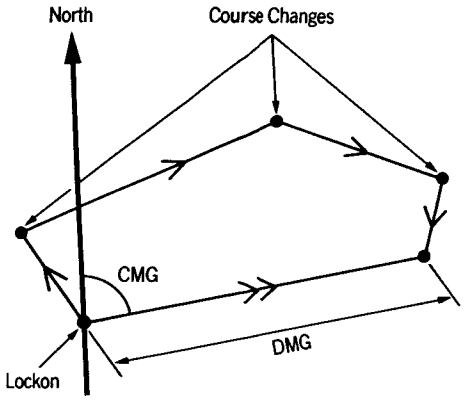
- **Tack Course (True)**



*Wind Speeds would be displayed in metres per second (m/s) if these units had been selected on the Wind Instrument.

Note: True headings are only displayed if Variation is set up during calibration.

5.7 Dead Reckoned Functions



Distance Made Good (DMG) and **Course Made Good** (CMG) are dead reckoned functions with no correction for tidal set or drift.

Calculations of DMG and CMG start from switch on or reset. To reset DMG and CMG, push and hold down **HDG** for 4 seconds when DMG or CMG are displayed. The display will flash before reset as a warning. DMG and CMG are reset together.

This provides dead reckoned functions completely independent of the operating mode of the Autopilot or Steering Compass.

If an ST50 Tridata or ST50 Speed is not fitted then Course Made Good will be approximated assuming constant boat speed.

Note: A navigational log and regular positional plots should be used to verify the computed information and ensure that the functions have not been accidently reset.

6. Setting Up Compass Display

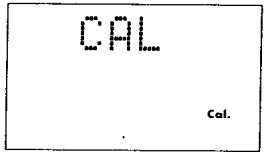
Heading information is transmitted onto the SeaTalk bus by the instrument which is reading the fluxgate compass. This can be the Autopilot or ST50 Steering Compass, either of which should be set up to display Magnetic headings.

For Magnetic Only:-
If you wish to display only Magnetic headings, set up the Autopilot or ST50 Steering Compass to read Magnetic and set Variation to zero on the Multi (This is the factory setting).

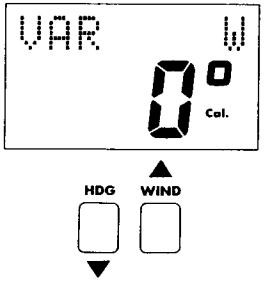
For True and Magnetic:
If you wish to display both True and Magnetic headings, set up the Autopilot or ST50 Steering Compass to read Magnetic as before.

If available in the Autopilot calibration menu, Variation should be set up on the Autopilot. If not proceed as follows to set up Variation on the multi.

- Push and hold down for 2 seconds **Depth** and **Log** together to select Calibration.



- Push **Depth** to display Variation.

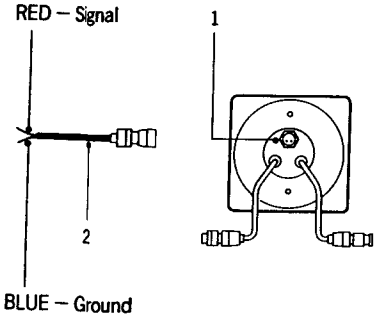


- Adjust variation using **Wind** to increase or **HDG** to decrease in 1° steps.
- Push and hold down for 2 seconds **Depth** and **Log** together to exit calibration and store the Variation.

When set up to display True heading significant changes in local variation will alter the True display as the fluxgate compass measures magnetic heading.

Note: If you wish to have your Steering Compass/Autopilot displaying True heading please contact your local distributor or Nautech's product support department for further advice on the correct setup procedure.

7. Connection to other Marine Equipment



The ST50 multi has an NMEA 183 data output connector (1). If available on the SeaTalk bus the following information will be transmitted every 1 to 2 seconds:-

Sentance	Content	Instrument required on SeaTalk Bus
VWR	Apparent Wind Speed (knots) and Direction	ST50 Wind
DBT	Depth of water below transducer (feet)	ST50 Depth or Tridata
HDM	Magnetic Compass Heading	ST50 Steering Compass or SeaTalk Autopilot
HSC	Locked Magnetic Compass Heading	SeaTalk Autopilot (operating in Auto Mode)
VHW	Water Speed (knots) Magnetic and True Compass Heading	ST50 Speed or Tridata ST50 Compass or SeaTalk Autopilot
MTW	Water Temperature (°C)	ST50 Speed or Tridata

A 1m (3ft) NMEA Interface cable 2 is supplied with every repeater unit. The red wire should be connected to the signal input and the blue wire to signal ground (0V). Up to two NMEA 0183 receivers may be connected to each ST50 Multi-Function Display.