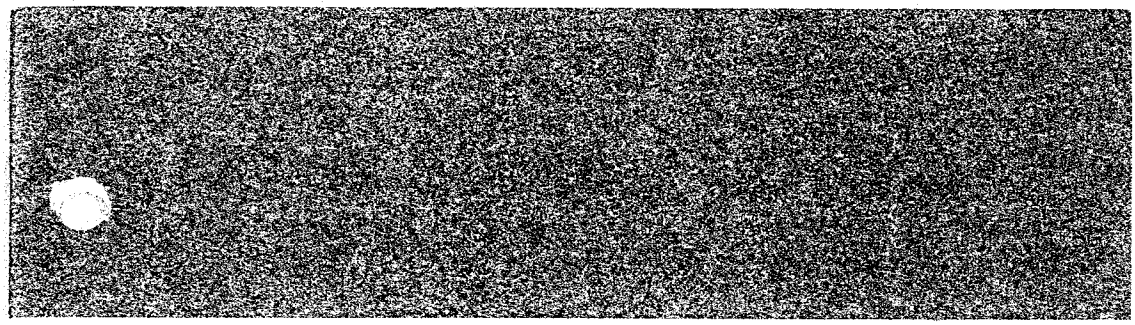
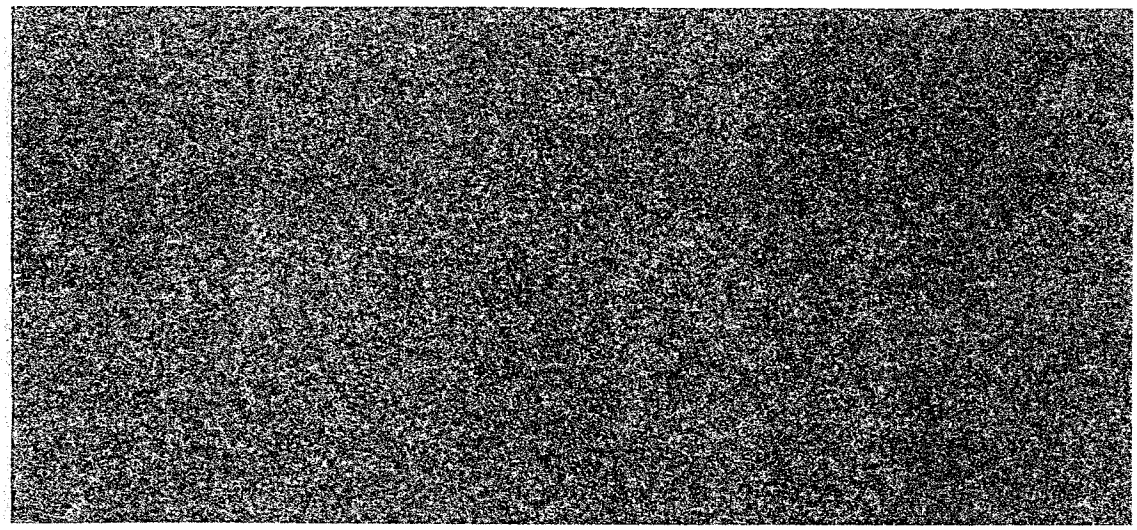
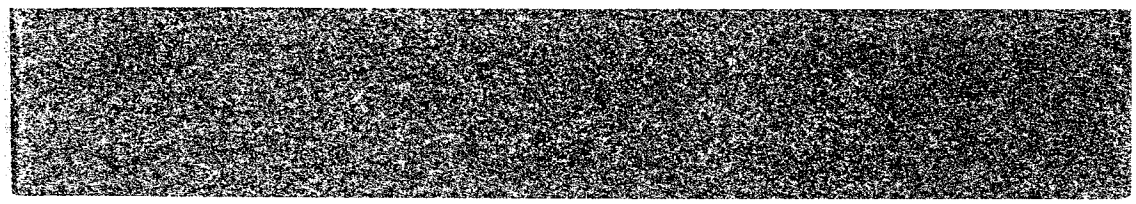


Hecta

HORNET DEPTH MONITOR



BROOKES & GATEHOUSE LTD



Owner's Handbook for Hecta/Hornet Depth Monitor

QUICK OPERATION INDEX

	Para.	*Page*
SWITCHING ON AND OFF	2.2	7
READING DEPTH	2.5	8
SHALLOW ALARM	2.3	8
DEEP ALARM	2.4	8
DATUM SETTING	3.1	9
FAULT FINDING	4.2	10

Important
Please read this book carefully before using the instrument, in particular Part 3 CALIBRATION. The depth monitor operates from a supply of 12-24V dc nominal.

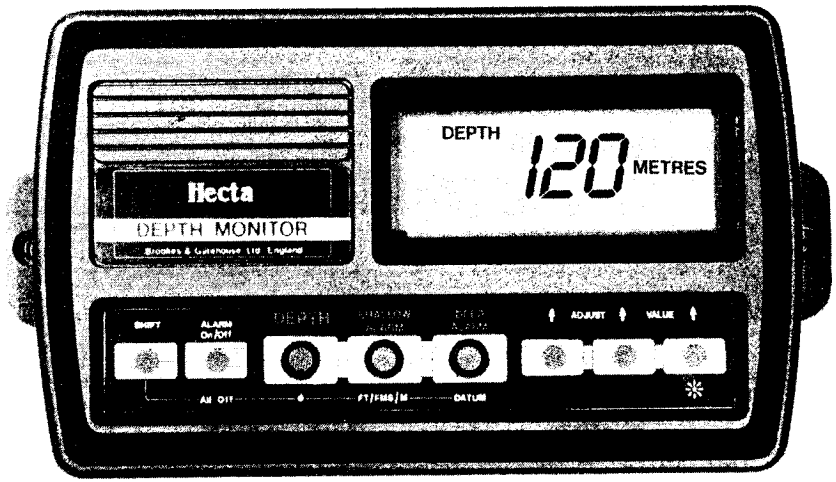
BROOKES & GATEHOUSE LTD
Bath Road, Lymington, Hampshire SO4 9YP, England
Telephone Lymington (0590) 74252 Telex 477724

© Brookes & Gatehouse Ltd 1984
Printed in England

229-HB-0040-C

CONTENTS

		Page
1 DESCRIPTION		4
1.1	INTRODUCTION	4
1.2	SPECIFICATION	4
1.2.1	Control unit	4
1.2.2	Alarms	5
1.2.3	Power supply	5
1.2.4	Mechanical design	5
1.2.5	Transducer	5
1.2.6	Repeaters	5
2 OPERATION		7
2.1	SWITCHING ON AND OFF	7
2.2	USE OF THE KEYBOARD	7
2.3	SETTING THE SHALLOW ALARM	8
2.4	SETTING THE DEEP ALARM	8
2.5	DEPTH READING	8
2.5.1	Control unit	8
2.5.2	Analogue repeater	8
2.5.3	Digital repeater	8
2.6	ADJUSTING THE DISPLAY ILLUMINATION	8
3 CALIBRATION		9
3.1	ADJUSTING THE DATUM SETTING	9
3.1.1	Depth from surface of the water	9
3.1.2	Depth under the keel	9
3.1.3	Setting in the new value	9
4 MAINTENANCE		10
4.1	ROUTINE MAINTENANCE	10
4.2	FAULT FINDING	10
4.2.1	Data retention check	10
5 PARTS LIST		11
6 INSTALLATION		12
6.1	GENERAL	12
6.1.1	Notes on electrical connections	12
6.2	DEPTH MONITOR	12
6.3	TRANSDUCER AND HOUSING	12
6.4	REPEATERS	12
6.5	ELECTRICAL INTERFERENCE SUPPRESSION	12
6.6	INSTALLATION DIAGRAM	13



CONTROL UNIT

1 DESCRIPTION

1.1 INTRODUCTION

The HECTA DEPTH MONITOR, making full use of micro-electronics technology, is a highly accurate and reliable instrument capable of operating even in the most adverse conditions. The output is clear and unambiguous, requiring no interpretation or guesswork. By sophisticated signal processing over a series of transmissions, the Hecta Depth Monitor gives the same advantage as a recording depthsounder, where the human eye can detect the presence of a bottom echo when hidden in background signals. The ultrasonic signal frequency is chosen to avoid cross-talk with other boats. The advent of micro-electronics has enabled a vast amount of circuitry to be contained in one small but rugged case. This can easily be mounted at the chart table, and with its illuminated liquid crystal display, matches other instruments in the ever-growing range of B&G instrumentation. The repeaters can be either digital or analogue, and can be mounted in whatever position is best suited for efficient operation of the boat.

For digital display of depth, whether at the depth monitor (control unit) or at a digital repeater, the units of measurement are selectable (metres, fathoms or feet) whilst operating. The analogue indicator is calibrated either in metres, or in feet and fathoms on a dual scale. This indication remains valid irrespective of the units selected for digital display.

Two adjustable alarms are provided to give audible indication that the boat has reached a pre-set value of depth. The shallow alarm is normally set to give ample warning of the danger of going aground. The deep water alarm operates when the pre-selected depth is reached, whether approached from shallower or deeper water. An optional remote alarm is available.

The depth measured by the Hecta Depth monitor is from the transducer face, but facilities are available to make the instrument indicate depth from the surface of the water or the bottom of the keel as required. This is referred to as the DATUM adjustment.

The instrument operates from the ship's dc supply but when switched off an internal memory retains such information as the DATUM setting, the ALARM settings and the units of depth last used.

The depth monitor is provided with a keyboard for the purpose of setting in information, control of the display and selection of units (metres, feet or fathoms). The display is of the liquid crystal type (LCD) and is provided with variable back lighting. The remote indicators are illuminated from the Depth Monitor.

1.2 SPECIFICATION

1.2.1 Depth monitor

Depth range: single range 0.9-137 metres, 3-450 feet, 0.5-75 fathoms.

Depth display: liquid crystal display with 15mm digits and comprehensive set of symbols for clear operation. Display is selectable to give depth with one decimal place, or in whole units. Illumination is controllable at the keyboard.

Accuracy: ±2%, ±0.2m for normal values of sea temperature and salinity (i.e. speed of sound is 1500m per second).

Transmitted power: 50 watts rms nominal.

Frequency of operation: 171kHz nominal.

Sounding rate: 2-20 pulses per second, automatically adjusted.

Datum correction: selectable via the keyboard, range ±30.5m, ±100 feet or ±16.7 fathoms.

Units: metres, feet or fathoms selectable via the keyboard.

Data retention: all settings are retained while power is off for more than three years using a standard 3V lithium batther (BR2325).

1.2.2 Alarms

Audible alarm: mounted in the depth monitor, with an optional remote alarm.

Shallow alarm: adjustable over the range 0-99.9m via the keyboard. Setting retained while power is off. The alarm gives short bursts* of tone continuously when the depth is less than the alarm setting. This alarm may be turned on and off without altering the set value.

Deep alarm: adjustable over the whole depth range. Alarm produces long bursts* of tone at the set depth for ten seconds, whether approaching from shallower or deeper water. This alarm may be turned on or off without altering the set value (see para. 2.2 (b).

* An optional remote alarm produces a continuous tone to advise that an alarm has been activated.

1.2.3 Power supply

9V to 30V (12V or 24V nominal)
270mA without repeaters or lights
Add 40mA for each analogue repeater (max. 2 of each type)
Add 5mA for each digital repeater

Lighting circuit: a lighting circuit is incorporated for the Depth Monitor display and the digital and analogue repeaters and is controlled at the Depth Monitor keyboard.
Current drain: 60mA per display.

1.2.4 Mechanical design

Glass-filled injection-moulded thermo plastic case. Fully sealed and fitted with desiccator internally.

Size: 230.5mm x 126.5mm x 62mm (9in x 5in x 2.5in)

Weight: 1.1kg (2.4lb)

Temperature:	operating range:	−10°C to +60°C
	storage range:	−25°C to +80°C
Humidity:	0 to 100%	

1.2.5 Transducer

Size: 108mm long, 30mm diameter (4.25in x 1.2in dia.)

Cable length: 10m (may be extended without adjustment)

Valveless housing size: 41mm diameter x 101mm (1.6in dia. x 4in)

1.2.6 Repeaters

Analogue synchro repeaters display the full depth range on a non-linear scale in metres, or in feet and fathoms, (extra repeaters connected in parallel).
Maximum number: 2
Bezel: 112mm x 112mm (4.4in x 4.4in)
Barrel diameter: 66mm (2.5in)
Barrel depth: 57mm (2.25in)

Weight: 450g (1lb)
Accuracy: ±10% of meter reading
Fully sealed and fitted with a desiccator

Safe distance of analogue indicator from compass:

Synchro type	200mm (8 inches)
Digital repeater	200mm (8 inches)

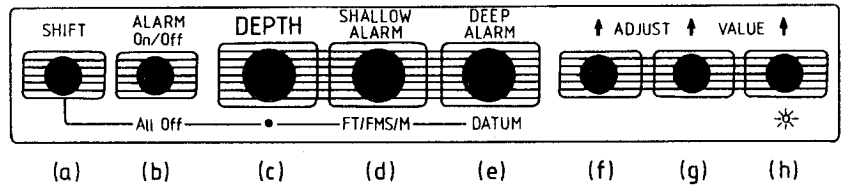
Digital repeaters display in metres, feet or fathoms as selected at the depth monitor.
Size: 110mm x 110mm x 42mm (4.375in x 4.375in x 1.625in)
Weight: 450gm (1lb)

2 OPERATION

2.1 SWITCHING ON AND OFF

The Hecta Depth Monitor is operational as soon as the dc supply is switched on at the ship's distribution panel. (See para 6.1.1). Depth is immediately displayed at the depth monitor in the units last used. When the supply is switched off all the datum and alarm settings are retained in the memory.

2.2 USE OF THE KEYBOARD



The keyboard comprises eight keys, four of which have two legends. The lower function is selected only when the left hand (shift) key is operated first. All the other functions are selected by single key operation.

(a) The blank left hand key (shift key) is pressed before operating **b, c, d** or **e** to select **ALARMS, ALL OFF, FT/FMS/M** or **DATUM** respectively. These are explained below.

(b) This key controls the operation of the alarms. If an alarm is sounding, it will silence it until the next excursion into the alarm condition. Operation when an alarm value is on display will switch that alarm on or off. Operation after pressing the shift key **(a)** switches off both the alarms.

(c) By itself this key brings the depth reading to display. When pressed following operation of the shift key **(a)** the display can be changed to show tenths of a unit or whole numbers.

(d) The setting of the shallow alarm is displayed when this key is pressed by itself. The alarm setting can be altered by pressing the three arrowed keys **(f), (g)** and **(h)** as necessary. When **(d)** is operated after pressing the shift key **(a)**, the units displayed can be changed. Successive operation of the keys changes the units from feet to fathoms to metres etc.

(e) The setting of the deep alarm is displayed when this key is pressed. This can be changed in the same manner as the shallow alarm.

Operated after the shift key **(a)**, this key **(e)** shows the datum setting, which can be changed by operating the arrowed keys at the right of the keyboard. The sign is changed by sequencing the first digit. In this case the digits can be sequenced through positive numbers followed by negative numbers. This enables a positive or negative datum to be set. The negative numbers are used when setting the datum for the keel, or positive for the water surface. The new datum is set by pressing key **(e)** until the display goes blank (approximately five seconds). (This method of setting the value over a period of five seconds is designed to prevent this important value being altered by chance).

(f) Pressing this key changes the left hand digit in the display when setting datum or alarms and calls up the '–' (negative) sign for datum entries.

(g) Press... this key changes the centre digit when setting datum or alarms.

(h) Operating this key changes the right hand digit when setting datum or alarms. When the display is showing depth this key adjusts the display illumination at the Depth Monitor and repeaters from OFF through levels 1 – 3.

2.3 SETTING THE SHALLOW ALARM

Operate **SHALLOW ALARM (d).** If the display shows **'OFF'**, operate **ALARM On/Off (b)** to switch the alarm on. Using the three right hand keys enter the depth (in the units already selected for display) at which the shallow alarm is required to operate. Press **SHALLOW ALARM** to set in the new value. (The display now stops flashing on and off).

Note: If the alarm is on before adjusting the setting, the old value will be used until the new value is set in.

2.4 SETTING THE DEEP ALARM

Operate **DEEP ALARM (e).** If the display shows **'OFF'** press **ALARM On/Off (b)** to swich the alarm on. Set the required value using the three right hand keys **(f) (g) (h)** as for shallow alarm. Press **DEEP ALARM** to set the new value in.

The deep water alarm sounds for ten seconds on passing through the alarm level in either direction. It can therefore also be used for locating the edge of a continental shelf when approaching from deeper water.

Note: If the alarm is on before adjusting the setting, the old value will be used until the new value is set in. This may cause the alarm to sound.

2.5 DEPTH READING

2.5.1 Control unit

Operate **DEPTH (c)** to display depth at the control unit. To change the units of measurement press the shift key **(a)** followed by **FT/FMS/M (d).** Repeat the procedure if a further change of units is required.

Note: Warning of the loss of the return signal for more than a few seconds is given on the digital displays by the appearance of a second decimal point, and on the analogue repeater by the pointer pointing down off the scale. This disappears as the signal is picked up again. Temporary loss of signal can be due to turbulent water in a ship's wake or extreme depth.

2.5.2 Analogue repeater

This shows the depth in the units marked on the indicator. The units (metres, or feet and fathoms) are not affected by changing the units displayed at the Depth Monitor.

2.5.3 Digital repeater

This shows the depth in the units selected for display at the Depth Monitor.

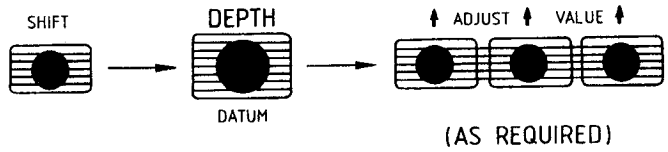
2.6 ADJUSTING THE DISPLAY ILLUMINATION

With depth being displayed the illumination level of the displays can be adjusted by operating the right hand key **(h).** Each key operation changes the lighting level by one increment. There are four levels varying from fully bright to off. The level of brightness selected is not affected by subsequent other use of the keyboard (e.g. when setting alarm or datum levels).

3 CALIBRATION

3.1 ADJUSTING THE DATUM SETTING

Operate the shift key **(a)** followed by the DATUM key **(e).** Then use the three right hand keys **(f) (g) (h)** to sequence the digits as required. The left hand (most significant) of these sequences through **0** to **+9** then **0** to **–9** to enable a positive or negative datum to be set.



3.1.1 Depth from surface of the water

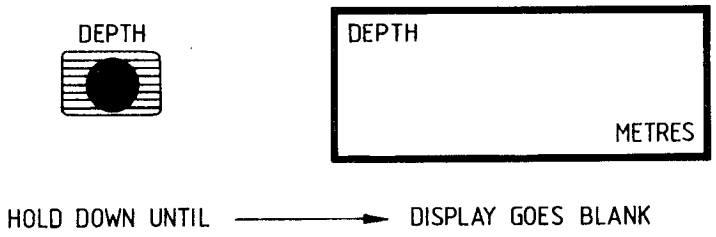
If it is required to indicate depth from the surface of the water, set in the vertical distance between the transducer face and the water surface operating the keys as described in **3.1**, using the units already selected for display (feet, fathoms or metres). The datum figure for this application must be positive (+). Set in the new value as described in **3.1.3.**

3.1.2 Depth under the keel

Alternatively to make the instrument indicate depth under the keel, key in the vertical height from the transducer face to the keel as a negative number (–), using the units already selected for depth measurement. Set in the new value as described in **3.1.3.**

3.1.3 Setting in the new value

To set in the datum value, operate **DEPTH (c)** and keep the key pressed until the display goes blank (approximately five seconds). Release the key and the depth will be displayed corrected for the datum setting. The datum is now stored in the memory even when the depthsounder is switched off.



4 MAINTENANCE

4.1 ROUTINE MAINTENANCE

No routine maintenance is required other than care of the transducer as follows. Weed and barnacles should not be allowed to grow thickly on the transducer face. Withdraw the transducer and screw the blanking cap onto the housing. Clean the transducer face with a scrubbing brush. Do not use a knife or scraper. Grease the neoprene sealing rings and screwthread of the transducer housing periodically. If the vessel is out of commission the transducer may be withdrawn and the blanking cap screwed on.

4.2 FAULT FINDING

DISPLAY BLANK	Check the main switchboard, batteries, and wire connections at back of the control unit. If OK return the control unit to an agent for repair.
INTERMITTENT DISPLAY	Check for intermittent fault in power supply.
DISPLAY ACTIVE BUT INCORRECT AND/OR TWO DECIMAL POINTS ON DISPLAY CONTINUOUSLY WHEN WITHIN DEPTHSOUNDER EFFECTIVE RANGE	Check transducer connections. Is transducer fitted in its housing? Is transducer face clean? Is transducer cable damaged? If OK return control unit to an agent for repair.
CONDENSATION	Remove desiccator and heat in an oven at 130°C. Keep the unit warm and dry, and fit the desiccator while still hot.
ANALOGUE DISPLAY NOT WORKING	Check the indicator cable. Check that the connections are correctly made.

4.2.1 Data retention check

All settings are retained while power is off. A check is made on these values when the unit is switched on. If an error is found due to a flat lighium battery or circuit fault, the settings go to zero and the CAL indication on the LCD flashes. This will only stop flashing after a new value for datum has been set in. If the above conditions occur contact a B&G service agent.

5 PARTS LIST

Depth monitor	229-00-010
Hull housing (standard, bronze)	129-00-116
Hull housing (shut-off valve)	155-00-025
Insulating kit for shut-off valve housing	155-30-017
Hull housing (angled 10°/30°)	117-00-136/8
Fairing pod (used with 117-00-136)	Hec-30-021
Transducer (standard, with 10m cable)	199-00-018
Transducer (long reach for fairing pod, with 1m cable)	157-00-044
Transducer for shut-off valve (with 1m cable)	157-AA-038
Changeover switch	190-00-146
Cable, remote alarm (9m)	135-0A-096
Cable, control unit to shut-off valve transducer (10m)	135-0A-077
Cable, control unit to changeover switch (3m)	135-0A-098
Cable, control unit to indicators (10m)	135-0A-095
Cable, power (9m)	135-0A-096
Indicator, 200m depth	215-00-025
Indicator, feet/fathoms	215-00-026
Digital repeater	226-00-016
Remote alarm unit	130-00-045

6 INSTALLATION

6.1 GENERAL

Refer to the installation sheet ref. IS6 for details of electrical connections and transducer housing, siting and fitting.

6.1.1 Notes on electrical connections

In some circumstances the Hecta Depthsounder may cause interference with reception of weak radio signals. It is recommended that the depthsounder be connected to a separate switched power circuit at the ship's distribution panel so that it may be readily switched off as necessary.

6.2 DEPTH MONITOR

This should be mounted on a bulkhead at any position convenient to the navigator or helmsman for operation of the keys. The mounting surface must be flat in order to ensure good sealing around cable entries. The length of cable run from the transducer does not affect the operating efficiency of the instrument and no electrical adjustment is required to compensate for a long cable run.

6.3 TRANSDUCER AND HOUSING

Details of the siting and installation of the transducer housing are given in the installation sheet ref. IS6. Ensure that the cable is protected from damage from sharp edges.

The radiating face of the transducer must be quite free from oil or grease. It is advisable to clean it with detergent solution before fitting. When installing the transducer, remove the sealing cap of the housing with one hand, quickly insert the transducer with the other hand, and press it home. The sealing rings then prevent further entry of water. Screw on the retaining ring and tighten by hand.

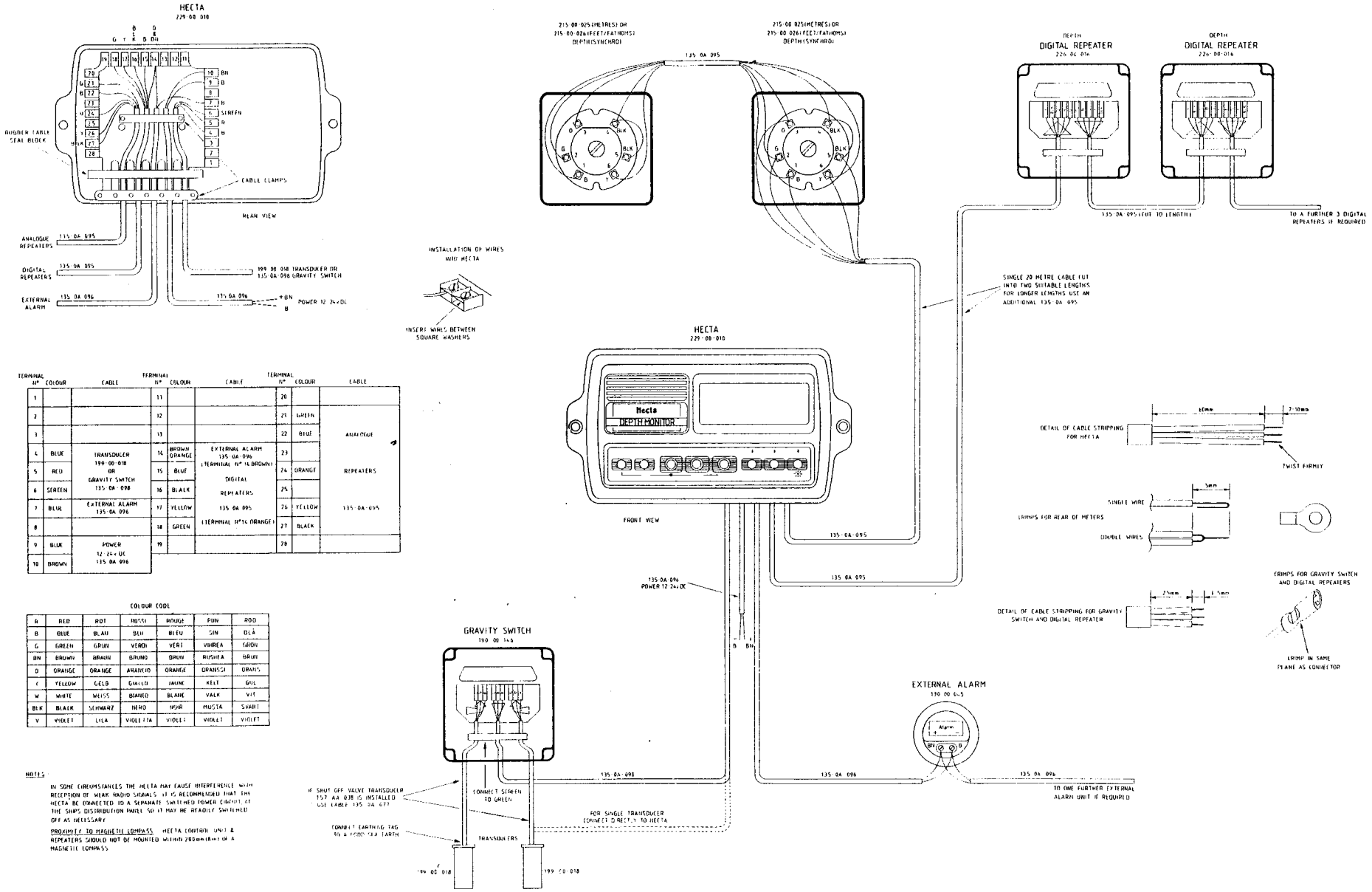
6.4 REPEATERS

Repeaters should be installed in positions best suited for easy visibility by the helmsman or other crewman as required. The digital repeater can be angled using the B&G wedge to give optimum visibility. Note that synchro type analogue indicators should not be installed nearer than 8 inches (200mm) from a magnetic compass.

Connections details are given in the installation diagram 6.6

6.5 ELECTRICAL INTERFERENCE SUPPRESSION

The ignition leads of petrol engines should always be fitted with suppressors. Ensure that the transducer cable is run at least two feet away from a petrol engine. The repeater cables should not be run close to the cable leading to the ignition switch. It is usually necessary to fit suppressors to alternators and powerful electric motors. The relevant manufacturers should be consulted.



TERMINAL No	COLOUR	CABLE	TERMINAL No	COLOUR	CABLE	TERMINAL No	COLOUR	CABLE
1			11			20		
2			12			21	GREEN	ANALOGUE
3			13			22	BLUE	
4	BLUE	TRANSDUCER 199-00-018 OR GRAVITY SWITCH 135-0A-098	14	BROWN ORANGE	EXTERNAL ALARM 135-0A-096 (TERMINAL No 14 BROWN)	23		
5	RED		15	BLUE	DIGITAL REPEATERS 135-0A-095 (TERMINAL No 16 ORANGE)	24	ORANGE	REPEATERS
6	SCREEN		16	BLACK		25		
7	BLUE	EXTERNAL ALARM 135-0A-096	17	YELLOW		26	YELLOW	135-0A-095
8			18	GREEN		27	BLACK	
9	BLUE	POWER 12-24v DC 135-0A-096	19			28		
10	BROWN							

COLOUR CODE

R	RED	ROT	ROSSO	ROUGE	PUN	ROD
B	BLUE	BLAU	BLU	BLEU	SIN	BLÅ
G	GREEN	GRUN	VERDI	VERT	VHREA	GRON
BN	BROWN	BRAUN	BRUNO	BRUN	RUSHEA	BRUN
O	ORANGE	ORANGE	ARANCIO	ORANGE	ORANSSI	ORANS
Y	YELLOW	GELB	GIALLO	JAUNE	KELT	GUL
W	WHITE	WEISS	BIANCO	BLANC	VALK	VIT
BLK	BLACK	SCHWARZ	NERO	NOIR	MUSTA	SVART
V	VIOLET	LILA	VIOLETTA	VIOLET	VIOLET	VIOLETT

NOTES

IN SOME CIRCUMSTANCES THE HECTA MAY CAUSE INTERFERENCE WITH RECEPTION OF WEAK RADIO SIGNALS IT IS RECOMMENDED THAT THE HECTA BE CONNECTED TO A SEPARATE SWITCHED POWER CIRCUIT AT THE SHIPS DISTRIBUTION PANEL SO IT MAY BE READILY SWITCHED OFF AS NECESSARY

PROXIMITY TO MAGNETIC COMPASS HECTA CONTROL UNIT & REPEATERS SHOULD NOT BE MOUNTED WITHIN 200mm (8INS) OF A MAGNETIC COMPASS

6.6 INSTALLATION DIAGRAM