



ALPHATRON
Marine



AlphaBinnacle GS720 TMC

F4720 TMC Unit

Installation and Operation Manual

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I Preface

The term TMC is used to describe a system using a sensor on the Magnetic Compass to provide a Heading signal. In this case, the Heading signal is manipulated to provide a Digital Heading Display and two NMEA 0183 outputs.

II Introduction & Installation

The F4720 System is made up out of the following units:

- F4720 Interface Unit.
- F4502 Heading Sensor.
- FW4603 Junction Box.

II.1 F4720 Interface Unit

The F4720 TMC Interface is designed to be panel mounted. See *Figure 3: F4720 Interface Unit* on page 11

The two primary functions of the F4720 Interface unit are to provide an independent heading to the Off Course Alarm (integrated within the Autopilot) and to provide back up Heading information in the event of a Master Gyro failure. Both of these outputs are in the form of NMEA 0183 serial data.

Standard features also include:

- Deviation Correction.
- Fascia push buttons; IP67 rated.
- LCD Display with variable illumination for night viewing.
- Heading data fail alarms.
- Small power requirement less than 14 Watts at 24V DC.

II.2 F4502 Heading Sensor

In most installations, Alphantron Marine BV. will be supplying the Magnetic Compass, to which the F4502 Sensor is supplied fitted and aligned to the Magnetic Compass Heading. The F4502 has a 1 meter cable with a 6 pole connector fitted, which plugs directly into the FW4603 socket. See *Figure 4: F4502 Heading Sensor* on page 12

II.3 FW4603 Junction Box

This box is splash proof and will be supplied fitted onto the top shelf within the Binnacle. See *Figure 5: FW4603 Junction Box Dimensions* on page 13. On installation, run the feed cable up through the base of the Binnacle, through the 20mm cable gland to the FW4603 position. Terminate connections within the FW4603, as shown on the connection diagram. (*Figure 2: Connection Diagram* on page 10).

1 Operation

1.1 Turn On

1. Press the ON/OFF key once to switch the unit ON.

 **Attention** On condition will be signaled to an external monitor by closure of a volt free normally open contact.

Once installed and calibrated the display will show a four digit Magnetic Heading with half degrees, i.e. 095.5, 096.0, etc.

2. Press the ON/OFF key once more to turn unit off.

1.2 Illumination

Four levels of illumination are available to the operator. Every time the ILLUM key is pressed will alter the red backlight intensity in steps as follows:

Off – 1 – 2 – Maximum – Off.

1.3 Deviation

Pressing the DEV key during normal operation permits inspection of deviation status:

- NO DATA = Not programmed.
- DATA IN = Deviation table programmed.

1.4 Calibration

Press CAL key for 5 seconds to enter calibration menu items 1 - 3.

1. CLXX (Flashing Display confirmed by a beep).

Use Up/Down Arrow keys to adjust two digits (XX) to read 'CL45'. This calibrates the fluxgate coil signal level WRT Compass Field Strength when first installed. (CL: 42 to CL: 50 is acceptable, a CL value in any case may change by two units dependent upon headings).

CL Values of 25 or less will trigger CPS Lo Fail LED.

CL Values of 63 or more will trigger CPS Hi Fail LED.

Press 'CAL' key once to proceed to second item on menu.

2. XXX.X (Flashing Display confirmed by a beep)

1. Use the UP/DOWN arrow keys to align displayed heading with ships magnetic compass heading.
2. Press CAL key once to proceed to final item on menu.

3. 000 alternating 01 (Flashing Display confirmed by a beep)

This is an instruction to steer 360° for the first of 12 headings in order to program the Deviation Table.

If deviation program not required, press Up Arrow key for 5 seconds ('no data' displayed), then press CAL key once for normal operations (for initial set up - see Note).

1. Press DEV key to enter when ship steady at 360°.
2. Repeat with ship steady on Magnetic Heading 030°.
3. Move to 060°, 090°, 120°, 150°, 180°, 210°, 240°, 270°, 300° and 330°, pressing the DEV key when ship is steady on each heading. Display will always indicate the heading to steer.

 **Attention** If a difference of more than 12.5° is registered between actual compass heading and perceived (sensed) compass heading, the entry will be rejected and the display will not move to the next 30° step.

 **Attention** When all headings have been entered successfully the display will show END.

4. Press CAL key to exit Calibration Mode and resume normal operation.



Note During initial set up the decimal point is configured to flash unless a deviation table is entered OR a conscious decision is made to dispense with deviation correction.

1.5 Mistakes

If a mistake is made during the Deviation Table Programming, which requires a restart, OR if a table already entered is to be Erased / Reprogrammed, then perform DEV table erase as follows:

1. Enter calibration menu item 3.
2. Press UP Arrow key for 5 seconds to erase table.
3. Press CAL to exit Calibration Mode.

1.6 Reset to Factory Default Settings

In the event of complete confusion for any reason, compass headings and deviation table can be erased as follows:

Press CAL key for 5 seconds. Display will show 'CLXX (Flashing Display confirmed by a beep).

Press CAL and Up Arrow Keys for a further 5 seconds (CLr data' will be displayed) until 'data rst' displayed. Unit is now reset.

1.7 Unusual Messages

1. At turning on, following the self test routine, but prior to any calibration, the unit may show the following fail message(s):
 - CPS LO Fail (CL Value Too Low).
 - CPS HI Fail (CL Value Too High).
 - CPS PHS Fail (CL Value/TMC Winding Lines Suspect).
 - Failure messages will be accompanied by a intermittent bleep and TMC input CH1 and CH2 flashing fail LED's.
 - The alarms can be ignored providing the calibration procedure is to be performed.
2. TMC computer (Led Only) - Indicates internal fault.
3. *Def Data - Magnetic sensor alignment cannot be read from internal memory. Power up alignment will be set to zero and any existing deviation table will be ignored.
4. *D Data error @ Power up - deviation data error existing deviation table cannot be read from internal memory and will be ignored.

If either message appears, turn off for a few seconds & then turn on again.

If message is repeated, internal memory is corrupted and standard calibration routine must be repeated.

1.8 NMEA 0183 Output

The Termination/PSU provides 2 Serial Data Outputs. Confirming to the NMEA 0183 standard for the interfacing of Marine Electronic Devices Version 2.00 (1/1/1992).

The sentences generated are as follows:

```
*1      $HCHDG, 237.0,01.5,W,,
        $HCHDM, 235.5,M
```

				Dev	
*1	\$	H C	H D G,	2 3 7 . 0, 0 1 .5,	C R L F
				W ,,	
Header	Header	Talk Identifier	Data Identifier	Data	Terminator

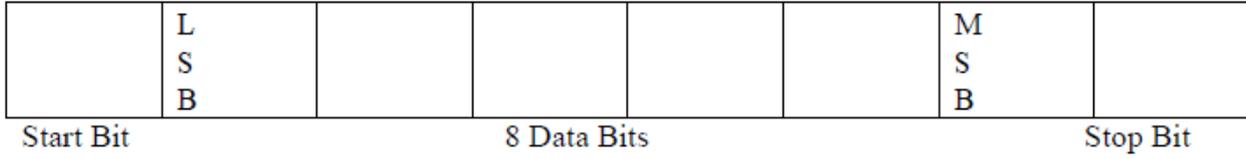
Baud Rate: 4800



Output Frequency: 10 Hz

Data Form

Data Form



- Start Bit 1
- Data Bit 8
- Parity NONE
- Stop Bit 1

*1 \$HCHDG only enabled on completion of Deviation Routine.

2 Troubleshooting

No.	Problem	Solution
1	No display readout when turning F4720 on.	Test for 24V DC on F4720 rear connector terminals 17 (+ve) and 16 (-ve). If voltage not present check ships DC supply. check fuses (2 off) on rear of F4720. If fuses blown, replace and retry turning on F4720. If new fuses blow immediately F4720 is defective - contact supplier. If fuses good, F4720 is defective – contact supplier.
2	Difference between Magnetic Compass Heading and F4720 Display.	Re-align sensor on Compass to remove error and / or perform deviation calibration as soon as convenient.
3	F4720 alarms.	CPS Lo/Hi alarm – check/set CL value to 45 in calibration routine. If unable to set value check sensor/cabling correct. CPS PHS Fail alarm – check sensor/cabling correct. TMC Computer (Led only) alarm – internal fault – contact supplier. Def Data/D Data @ Power on – deviation data error – switch off for 30 seconds then switch on, if error still present standard calibration routine must be performed. TMC Input alarm – loss of sensor input signal – check sensor/cabling. NMEA Output CH1/CH2 – Check cabling/connections correct to external equipment being supplied from F4720.

Table 1: F4720 Fault Finding Guide

2.1 Sensor Testing

Perform continuity test on F4502 sensor at plug connections on rear of F4720 (see *Figure 2: Connection Diagram* on page 10).

Disconnect cable connector and test using digital multimeter across the following connections:

No.	Between Terminals	Resistance Ω
1	R1 – R2 (Pins 9 – 10)	approximately 26.
2	S1 – S2 (Pins 6 – 7)	approximately 46k.
3	S1 – S3 (Pins 6 – 8)	approximately 46k.
4	S2 – S3 (Pins 7 – 8)	approximately 46k.

Table 2: Resistance readings



Note Testing sensor at connections on rear of F4720, tests continuity of both sensor and cabling. Therefore, if test fails ensure cabling and connections are correct as per the diagram. To test sensor only, perform the same test at terminals in FW4603 junction box on respective connections.

3 Drawings

3.1 F4720 System Block Diagram

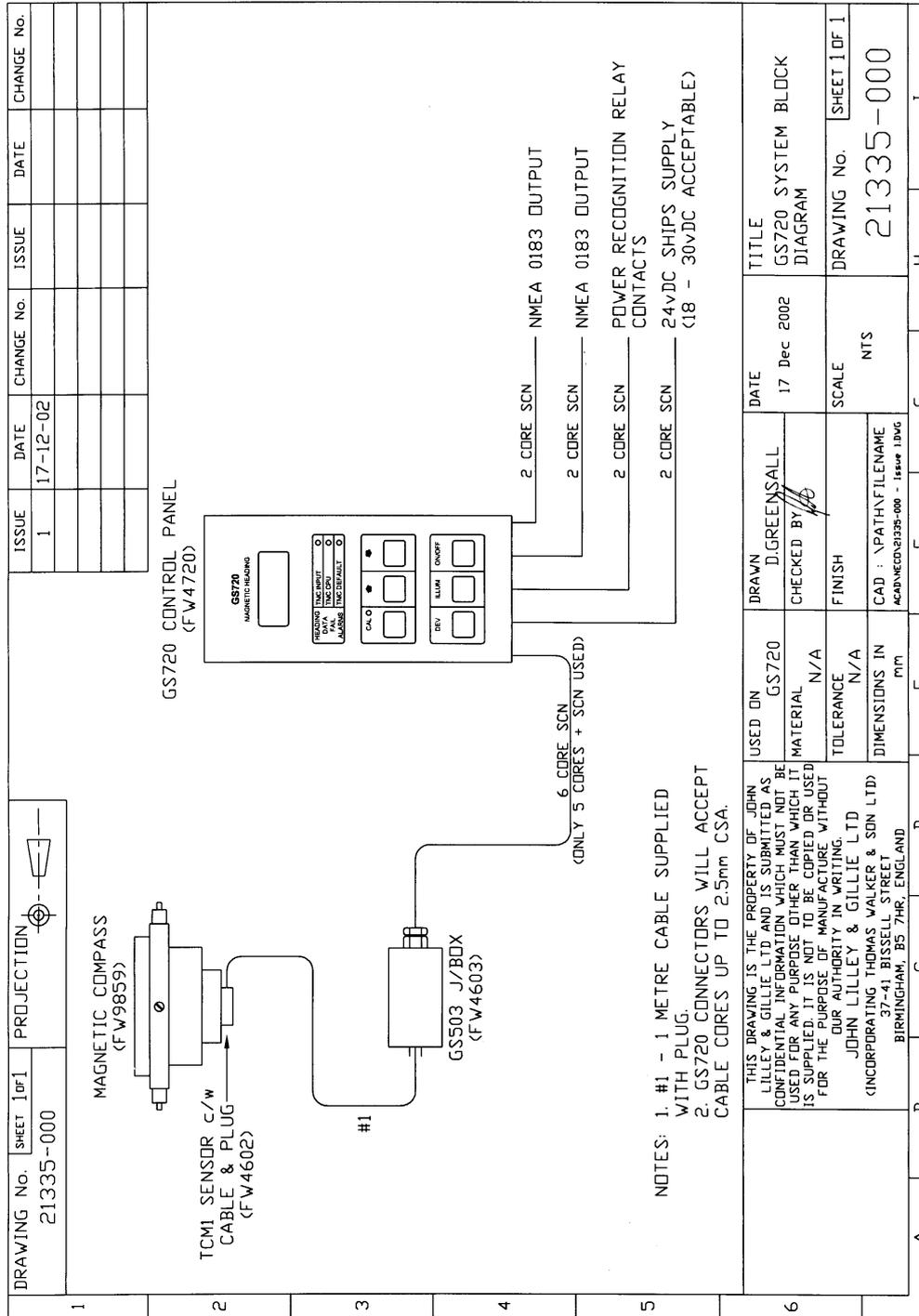


Figure 1: F4720 System Block Diagram

3.2 F4720 System Connection Diagram

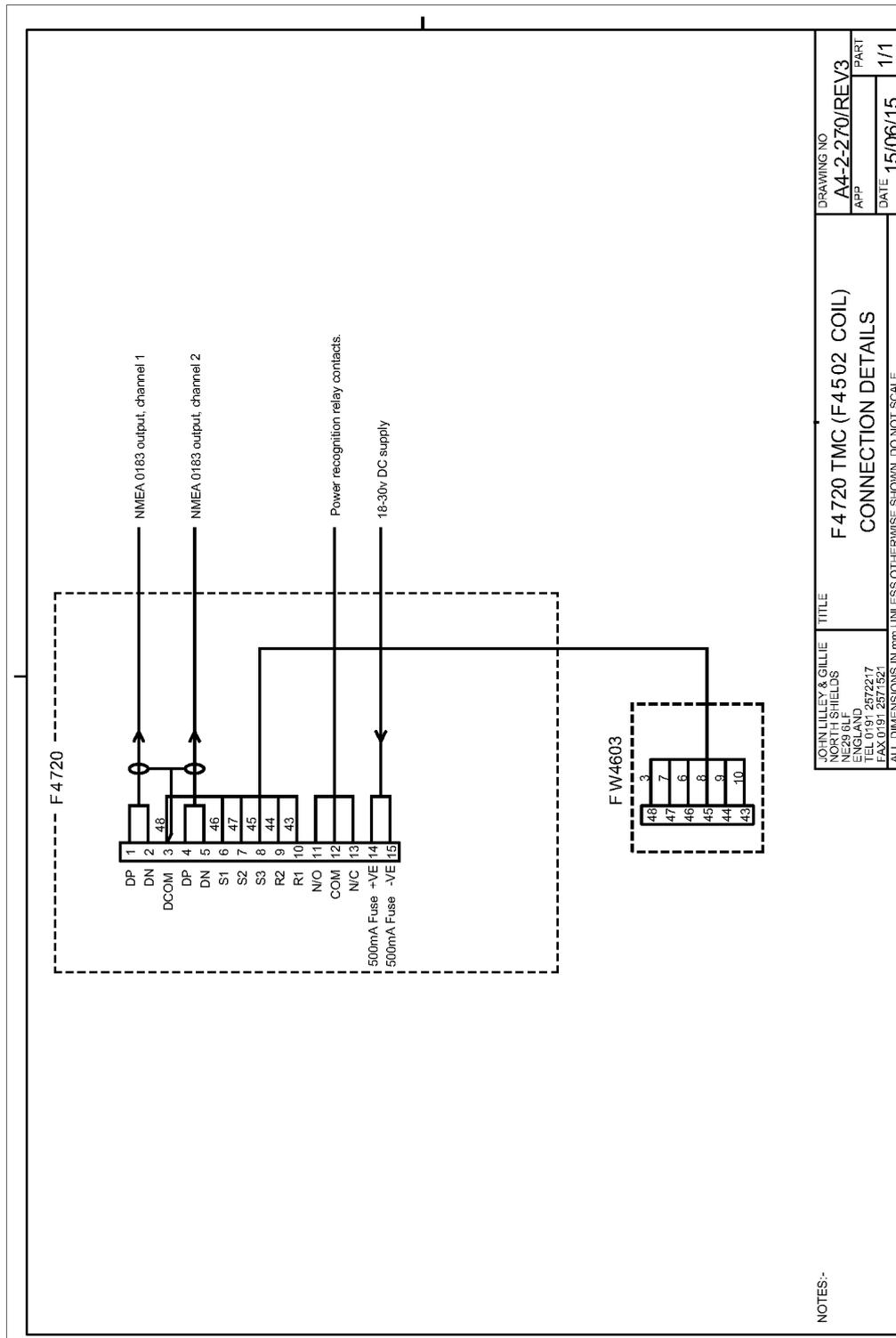


Figure 2: Connection Diagram

3.3 F4720 Interface Unit

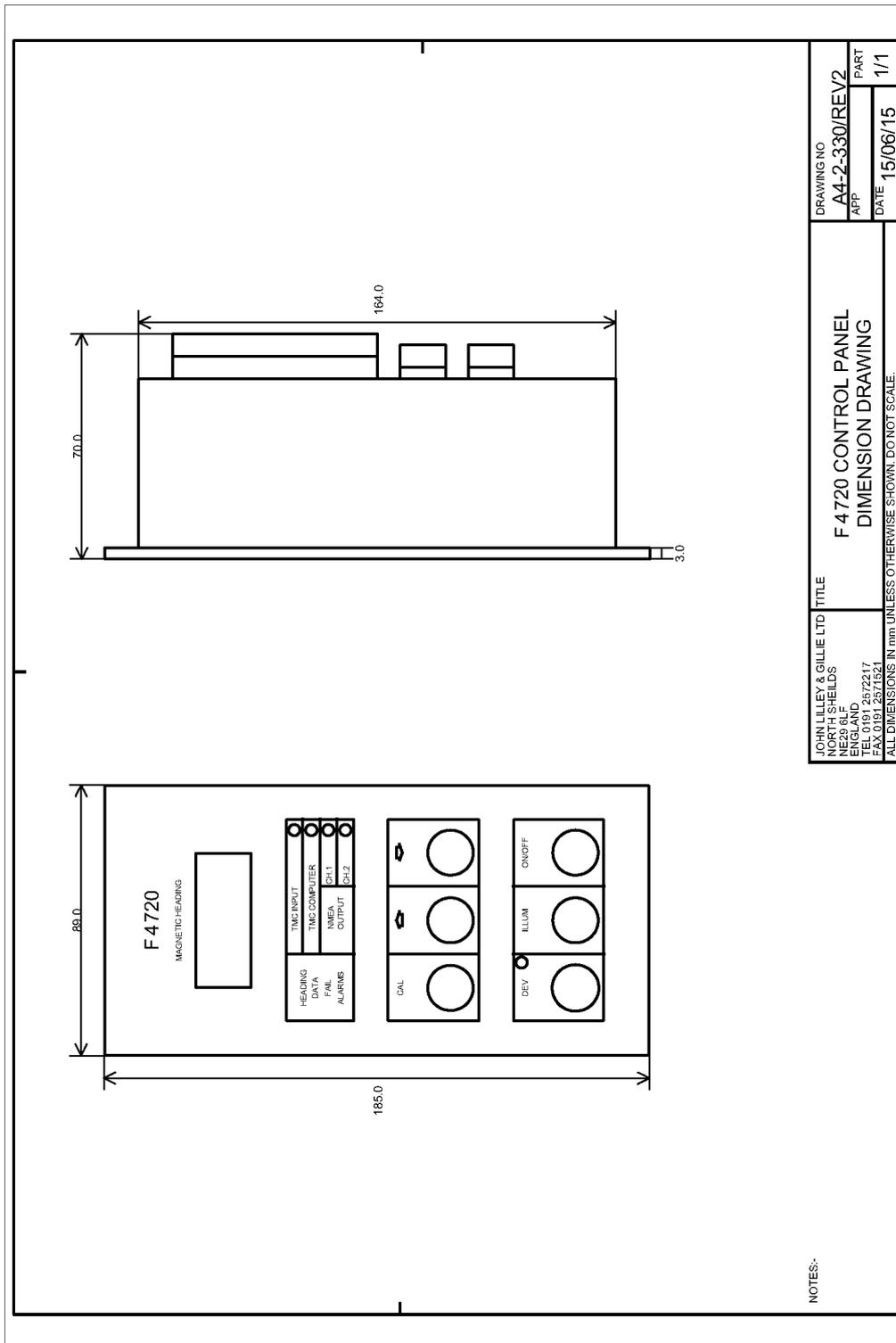


Figure 3: F4720 Interface Unit

3.4 F4502 Heading Sensor

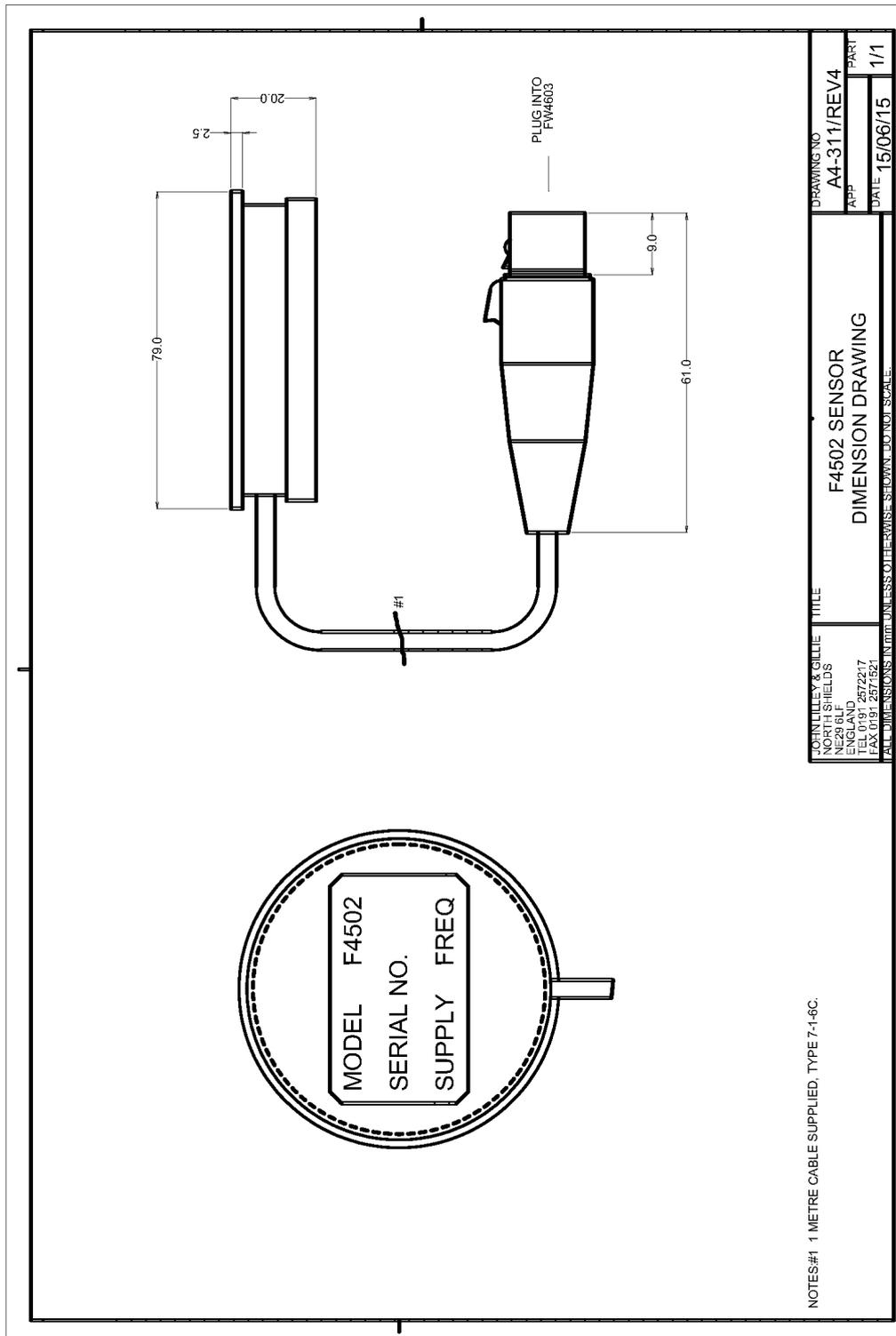


Figure 4: F4502 Heading Sensor

3.5 FW4603 Junction Box Dimensions

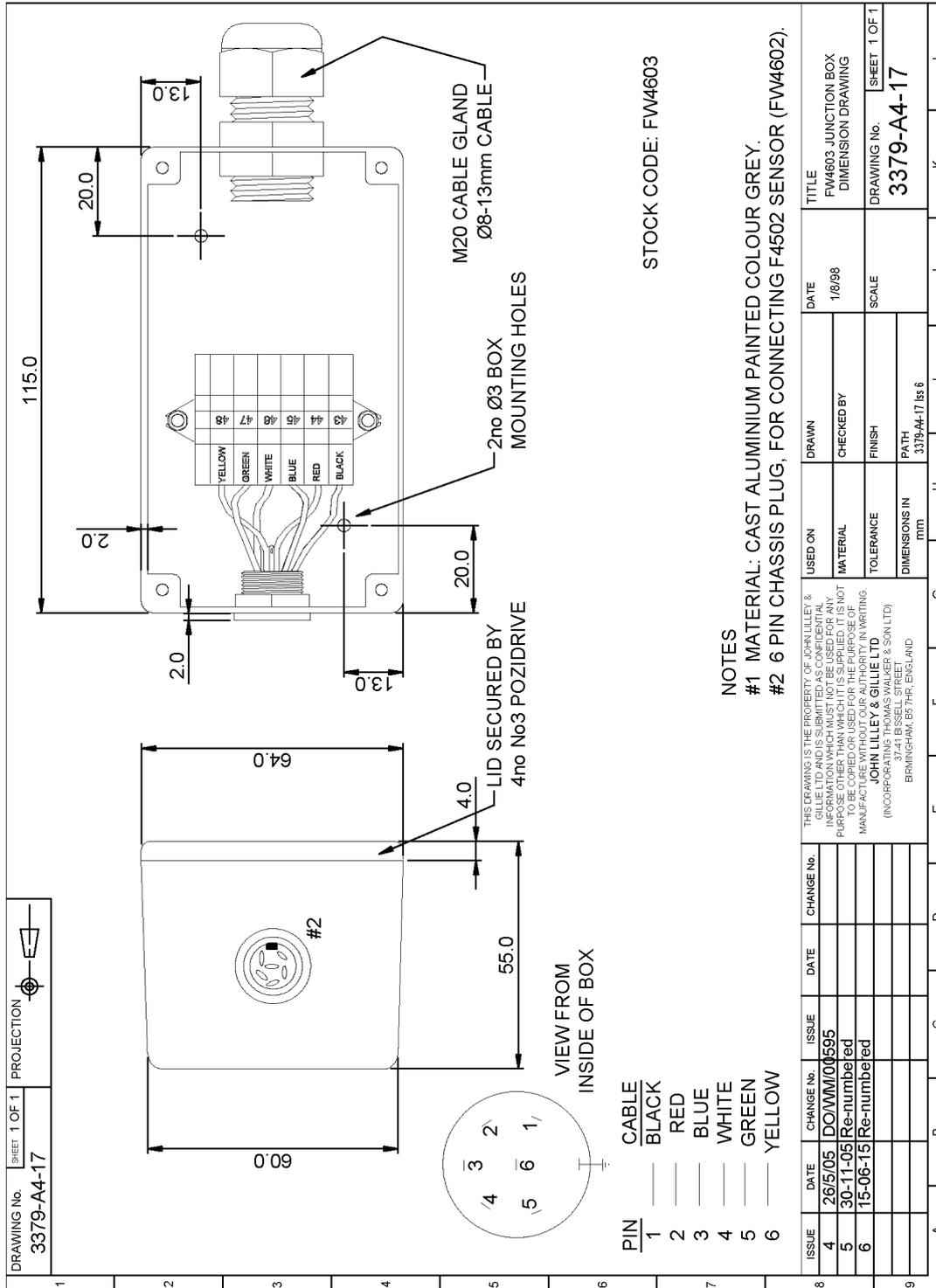


Figure 5: FW4603 Junction Box Dimensions

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