
User Manual for the

Barometer

type BS5



BS5-UM-3

AT

Delta-T Devices Ltd

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CE Conformity

The BS5 Barometer conforms to EU regulations regarding electromagnetic emissions and susceptibility and is CE marked by the manufacturer.

For certificates look on our website at www.delta-t.co.uk

Warnings

To maintain conformance to CE standards, the equipment must be used as described in this manual. Modifications to the equipment may invalidate CE certifications.

Delta-T Devices Ltd reserves the right to change the designs and specifications of its products at any time without prior notice.

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***For use with Climatronics M102663 User Manual
(available from www.climatronics.com).***



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Introduction

About the Manual

This user manual is intended to be used alongside the *Climatronics M102663 User Manual* which is available from the Climatronics website www.climatronics.com. It gives instructions on how to connect the BS5 to Delta-T Data Loggers and how to successfully set-up programs for a range of pressure measurements.

Features

The BS5 barometric pressure sensor offers selectable full scale analogue output ranges and a selectable pressure scale wrapped up in a weatherproof housing with a sun shield. It is packaged with a 3m output cable, and a mounting bracket for attachment to the Delta-T Weather Station. The selectable output ranges make the sensor suitable for all Delta-T loggers.

The BS5/N barometer version is supplied without the housing or mounting bracket. It is intended for use in non-condensing atmospheres where the housing is not needed.

The barometer uses the rugged Climatronics 102663 pressure sensor for accurate and stable measurement of barometric pressure.

The pressure transmitter requires a power source of 10-16VDC, 10mA at 12VDC.

Note: when used with DL2e or GP1 loggers these loggers must be powered externally from a 12V supply for the barometer to work (taking into account voltage drops in the logger).

Overview

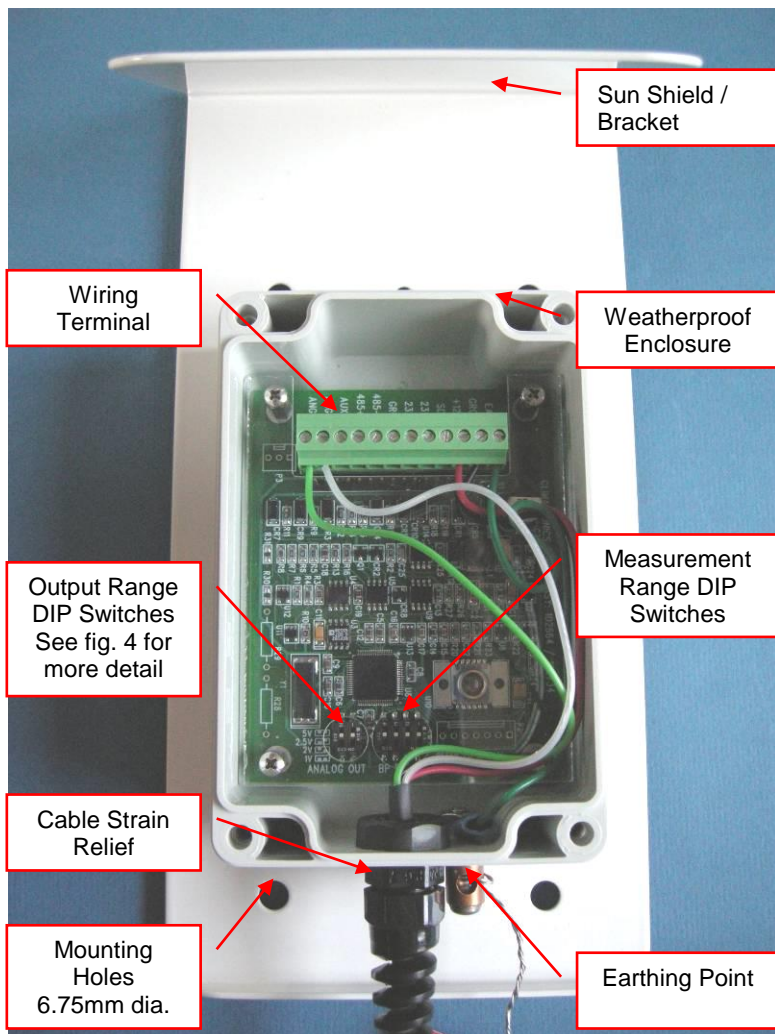


Figure 1. BS5 sensor overview

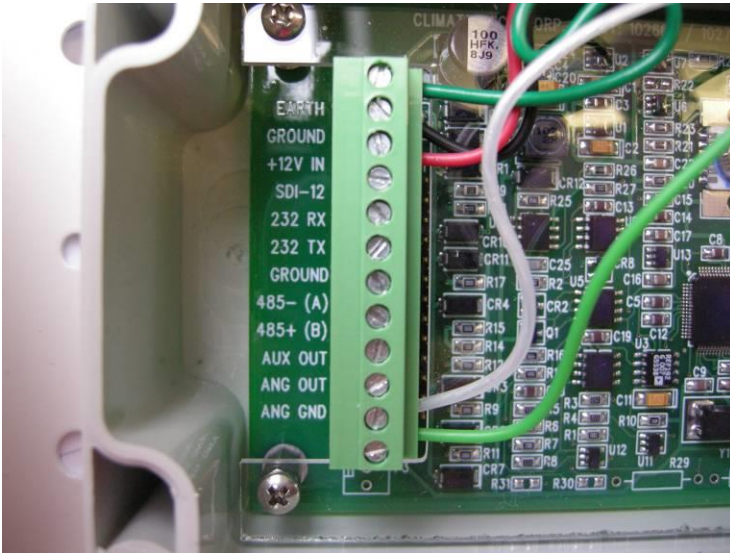


Figure 2. BS5 sensor terminal block

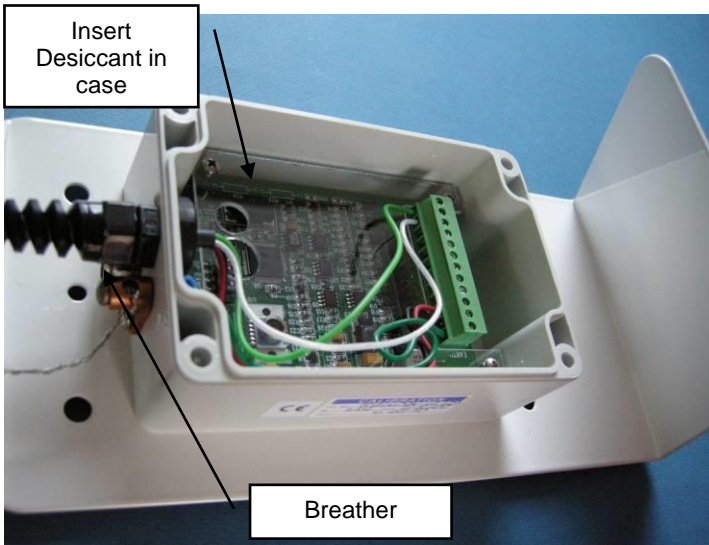


Figure 3. BS5 sensor case

Instructions

Assembly Instructions

Complete systems supplied by Delta-T

The complete BS5 system is supplied with a 3m cable and two stainless steel V-bolts for mounting. This enables it to be fitted to the mast of the Delta-T Weather Station, or to any vertical post less than 55mm in diameter.

Alternatively dispense with the V-bolts for mounting the backing plate directly to any vertical surface.

The housing is designed for indoor or outdoor use. It is designed to 'breathe', and should not be totally immersed or flooded with water.

See also *Climatronics User Manual rev F*, section 3.0 INSTALLATION

Measurement Range Set-Up

Two sets of DIP switches control the analogue output voltage and the range of the sensor. These will need to be changed depending on the logger used to measure the sensor and the range and accuracy of the readings. Greater resolution can be achieved when measuring a smaller range of pressure, this can be selected using the lower and upper limits.

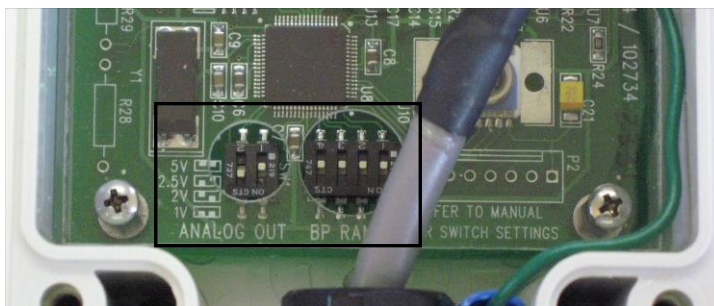


Figure 4. SW1 & SW2 DIP Switches

ANALOG OUT	SW1-1	SW1-2
0-1000mV	ON	ON
0-2000mV	ON	OFF
0-2500mV	OFF	ON

Table 1. SW1 Analogue output selector

Four DIP switches provide the option of 16 pressure ranges, the largest being 600-1100mbar. This enables the user to measure pressure at most altitudes.






Lower Limit	Upper Limit	SW2-1	SW2-2	SW2-3	SW2-4
600	800	ON	ON	ON	ON
600	900	OFF	ON	ON	ON
600	1000	ON	OFF	ON	ON
600	1100	OFF	OFF	ON	ON
700	800	ON	ON	OFF	ON
700	900	OFF	ON	OFF	ON
700	1000	ON	OFF	OFF	ON
700	1100	OFF	OFF	OFF	ON
800	800	ON	ON	ON	OFF
800	900	OFF	ON	ON	OFF
800	1000	ON	OFF	ON	OFF
800	1100	OFF	OFF	ON	OFF
900	800	ON	ON	OFF	OFF
900	900	OFF	ON	OFF	OFF
900	1000	ON	OFF	OFF	OFF
900	1100	OFF	OFF	OFF	OFF

Table 2. SW2 Pressure range selector

See *Climatronics User Manual section 5.0 USER INTERFACE* for a comprehensive table.

Operation for GP1

Wiring Diagram

Logger		Cable	Sensor
CH+		White/Clear	ANG OUT
CH -		Green	ANG GND
CH GND		Black	GROUND
CH GND		Screen (white and black)	N/A
CH PWR		Red	+12V IN

See *Climatronics User Manual*

Sensor Set-up

SW1 analogue output switch setting

Range	SW1-1	SW1-2
0-2500mV	OFF	ON

Table 3. See *Climatronics User Manual* section 5.0 USER INTERFACE

Example GP1 Logger Program

Input Channel Properties

Label: BS5

Sensor type: <custom voltage>

Warmup (s): PWR 2

Units: hPa

Linearization table:

Intercept: 900 Slope: 0.08

Calculation: 900 0.08

Result: hPa = 900 + 0.08 * mV

Minimum: 900 Maximum: 1100 Resolution: 0.01 hPa

OK Cancel Help

Figure 5. Channel Set-up for sensor range 900 to 1100 hPa

DeltaLINK 2.3 GP1 Program set up for a voltage channel

- Sensor Type - custom voltage
- Warm up - PWR 2 seconds
- Units - *hPa* or *mbars*
- Calculation - Intercept = Lower Limit
 - $\text{Slope} = \frac{(\text{Upper Limit} - \text{Lower Limit})}{\text{Fullscale Voltage}}$
 - E.g. $\text{Slope} = \frac{(1100 - 900)}{2500} = 0.08$
 - Full scale Voltage is set via the SW1 DIP switch on the BS5 sensor PCB and is in mV
- Data storage - Minimum = Lower Limit
 - Maximum = Upper Limit
 - Resolution = 0.01

Example for a range of 600 to 1100 mbar

Input Channel Properties

Label: BS5

Sensor type: <custom voltage>

Warmup (s): PWR 2

Units: mbars

Linearization table:

Intercept: 600 Slope: 0.2

Calculation:

Result: $\text{mbars} = 600 + 0.2 * \text{mV}$

Minimum: 600 Maximum: 1100 Resolution: 0.01 mbars

Data storage:






OK Cancel Help

Figure 6. Channel Set-up for sensor range 600 to 1100 mbars

Operation for DL2e

Wiring Diagram

Use a LAC1 15 channel card inside the logger

Logger		Cable	Sensor
CH1+		White/Clear	ANG OUT
CH1-		Green	ANG GND
CH61- or CH62-		Black	GROUND
CH61- or CH62-		Screen (white and black)	N/A
CH63 N/O		Red	+12V IN

See *Climatronics User Manual figure 3.4 ANALOG WIRING*

Sensor Set-up

SW1 analogue output switch setting

Range	SW1-1	SW1-2
0-2000mV	ON	OFF

Table 5. See also *Climatronics User Manual section 5.0 USER INTERFACE*

Strip back approximately 150mm of the cable insulation to allow for wiring into any channel of the DL2e.

Example Logger Program – DL2 Program Editor

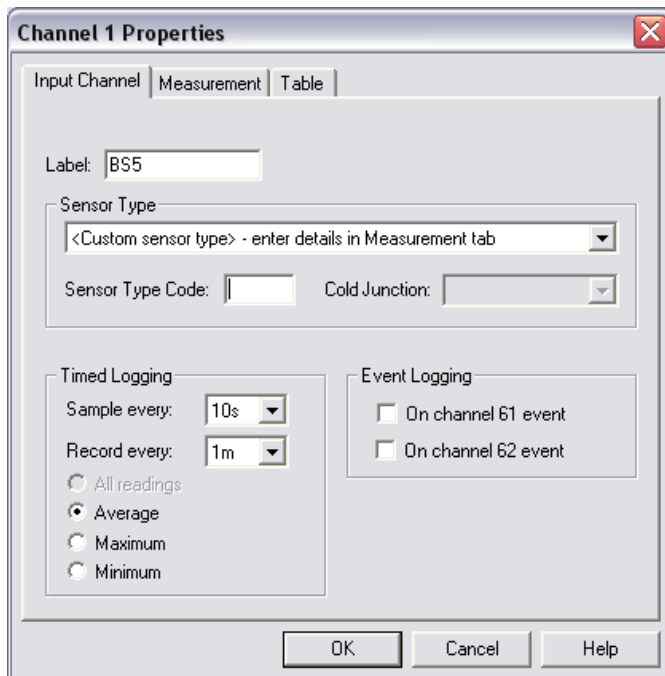


Figure 9. Channel Set-up for logging every 10s and recording every 1m

For complete program set up details see the logger user manual.

- Sensor Type - custom sensor type.
- Timed Logging - Sample every eg.10s
- Record every eg.1m
- Electrical Measurement - DC Voltage
- Lookup and interpolate in linearization table
 - Create a new table by clicking the New Table button.

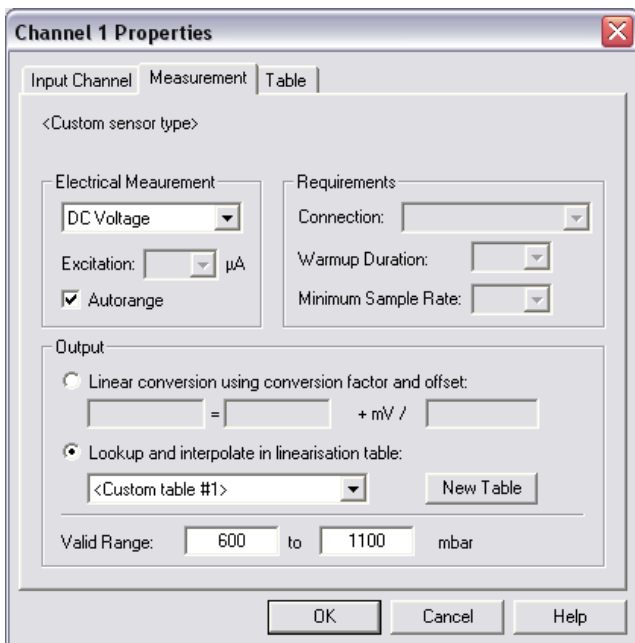


Figure 10. Channel Set-up for sensor range 600 to 1100 mbars

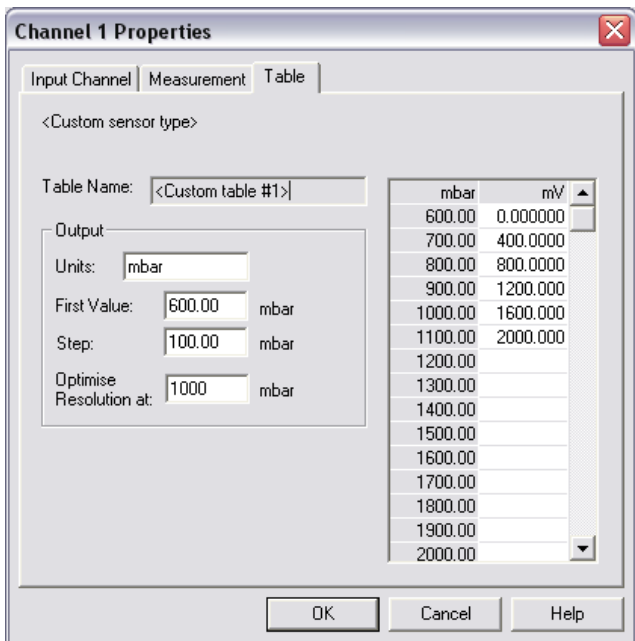


Figure 11. Table set-up for a sensor range 600 to 1100 mbars

- Units - hPa or mbar for example.
- First Value - Depending on the range selected on the sensor make the first value equal the lower limit. Eg. 600
- Step - to give 4 or 5 steps to the upper limit. Eg. 100
- Optimise Resolution - approx. 1000 mbars
- Enter the mV value in the table for the appropriate pressure using the formula or copy the table above for this pressure range.

$$mV = \frac{(mbar - limit_{lower})}{\left(\frac{(limit_{upper} - limit_{lower})}{full\ scale\ voltage\ (mV)}\right)}$$

$$Eg. mV = \frac{(1000 - 600)}{\left(\frac{(1100 - 600)}{2000}\right)} = \frac{400}{0.25} = 1600$$

- On the *Measurement* tab make sure the valid range is the same as is selected on the SW1 DIP switches of the sensor. The sensor should be set to 2000mV when used with a DL2e.
- Set a warm up of 5 seconds on the same relay channel as used to wire the sensor to the logger. The sensor takes over 1 second to stabilise.

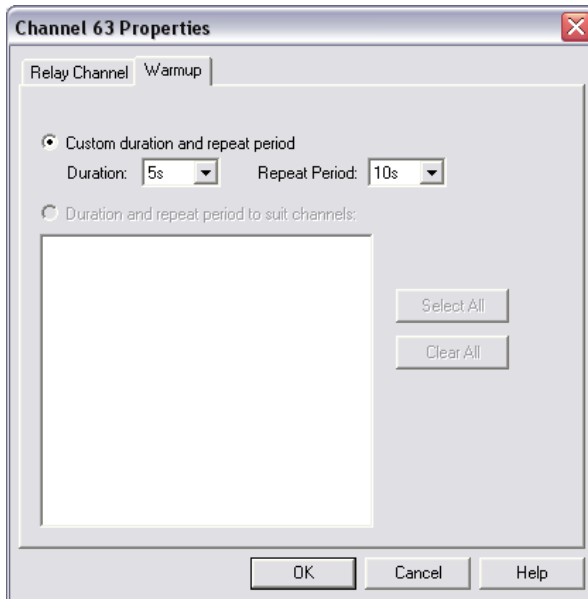


Figure 12. Warmup set-up for a logging rate of 10s

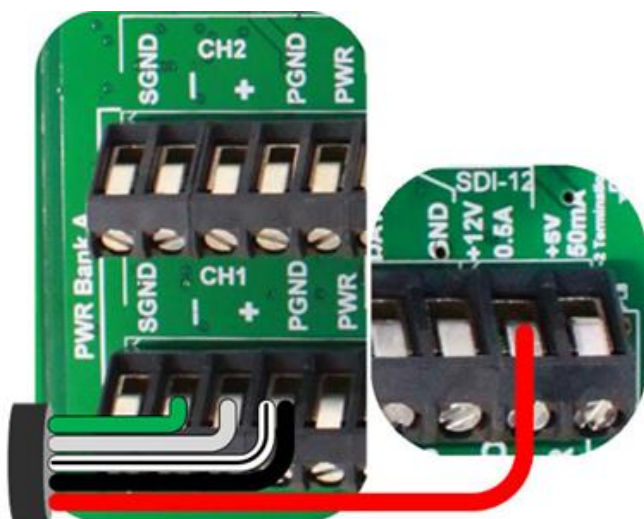
- Set the Repeat period to the same frequency as the logging rate.

Operation for GP2 Loggers

Requirements

You need version 3.0.1 or later of the DeltaLINK 3 GP2 Sensor Library installed. Get Installation instructions and an updated DeltaLINK sensor library from <http://www.delta-t.co.uk/software-downloads.asp>

Wiring diagram

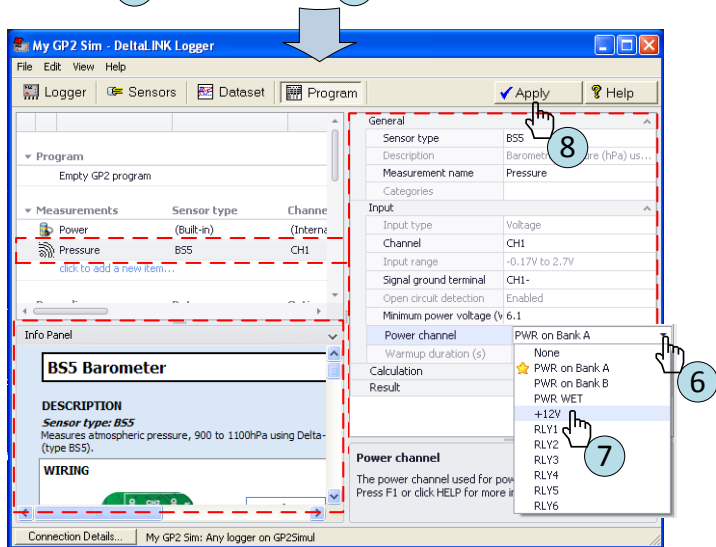
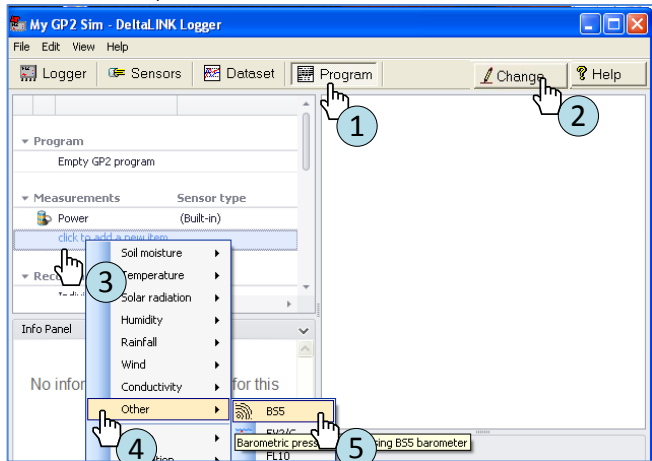


Colour	BS5 wiring	GP2 terminal	Notes
Green	Signal LO	CH (-)	
White/Clear	Signal HI	CH (+)	
Black	Power 0V	PGND	
White and Black	Screen	PGND	
Red	Power V+	+12V	Sensor needs to be powered from minimum 10V.

Note: The channel numbers are for illustration only. Other channel numbers are also possible.

Program the GP2 Logger in 6 easy steps

Before you start ensure DeltaLINK is connected to your GP2 (or to the GP2 Simulator).



1. Select **Program**.
2. Select **Change**.
3. Click on **click to add new item**, under **Measurement**.
4. Select **Other**.
5. Select **BS5**.
6. Click on the far right of **Power Channel** to expose a drop-down list of choices.
7. Select **+12V**.
8. Select **Apply** to send the program to the GP2 (or the simulator.)

This default program will read once an hour.
See the GP2 User Manual or online Help for further help.

Specification

For a comprehensive specification see *Climatronics User Manual*

Recalibration Period

“These sensors do not have a shelf life. The calibration performed on them in 2011 is still good today if they have not been in use. The sensor calibration is good until 1 year of use in the field”.
(Climatronics email received 17/4/2015)

The Climatronics Manual itself p11 says:

“6.0 Calibration

Calibration is performed against a NIST traceable standard. The calibration coefficients are stored in non-volatile memory at the factory. No user calibration is available. The sensor must be returned to Climatronics if periodic calibration is desired.

7.0 Maintenance

Periodic cleaning of the sintered filter on the bottom of the unit may be required in dusty conditions. Remove the filter from the bottom of the unit and clean with distilled water.

Return of the sensor to Climatronics for a yearly recalibration is recommended.”

Appendix

Climatronics M102663 User Manual (available from www.climatronics.com)

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Warranty and service

Terms and conditions of sale

Our Conditions of Sale (ref: COND: 1/00) set out Delta-T's legal obligations on these matters. The following paragraphs summarise Delta-T's position but reference should always be made to the exact terms of our Conditions of Sale, which will prevail over the following explanation.

Delta-T warrants that the goods will be free from defects arising out of the materials used or poor workmanship for a period of **twelve months** from the date of delivery.

Delta-T shall be under no liability in respect of any defect arising from fair wear and tear, and the warranty does not cover damage through misuse or inexpert servicing, or other circumstances beyond our control.

If the buyer experiences problems with the goods they shall notify Delta-T (or Delta-T's local distributor) as soon as they become aware of such problem.

Delta-T may rectify the problem by replacing faulty parts free of charge, or by repairing the goods free of charge at Delta-T's premises in the UK, during the warranty period,

If Delta-T requires that goods under warranty be returned to them from overseas for repair, Delta-T shall not be liable for the cost of carriage or for customs clearance in respect of such goods. However, we much prefer to have such returns discussed with us in advance, and we may, at our discretion, waive these charges.

Delta-T shall not be liable to supply products free of charge or repair any goods where the products or goods in question have been discontinued or have become obsolete, although Delta-T will endeavour to remedy the buyer's problem.

Delta-T shall not be liable to the buyer for any consequential loss, damage or compensation whatsoever (whether caused by the negligence of the Delta-T, our employees or distributors or otherwise) which arise from the supply of the goods and/or services, or their use or resale by the buyer.

Delta-T shall not be liable to the buyer by reason of any delay or failure to perform our obligations in relation to the goods and/or services, if the delay or failure was due to any cause beyond the Delta-T's reasonable control.

Service and spares

Users in countries that have a Delta-T Distributor or Technical Representative should contact them in the first instance.

Spare parts for our own instruments can be supplied from our works. These can normally be despatched within a few working days of receiving an order.

Spare parts and accessories for sensors or other products not manufactured by Delta-T, may have to be obtained from our supplier, and a certain amount of additional delay is inevitable.

No goods or equipment should be returned to Delta-T without first obtaining the agreement of Delta-T or our distributor.

On receipt at Delta-T, the goods will be inspected and the user informed of the likely cost and delay. We normally expect to complete repairs within a few working days of receiving the equipment. However, if the equipment has to be forwarded to our original supplier for specialist repairs or recalibration, additional delays of a few weeks may be expected.

Technical support

Technical Support is available on Delta-T products and systems. Users in countries that have a Delta-T Distributor or Technical Representative should contact them in the first instance.

Technical Support questions received by Delta-T will be handled by our Tech Support team. Your initial enquiry will be acknowledged immediately with a "T number" and an estimate of time for a detailed reply (normally a few working days). Make sure to quote our T number subsequently so that we can easily trace any earlier correspondence.

In your enquiry, always quote instrument serial numbers, software version numbers, and the approximate date and source of purchase where these are relevant.

Contact details:

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