

DARVALL

We Warm Animals

Functionality and Fault Finding Guide
for the
HBC /ZDS
Warm Inspired Air Control Unit

Use with

Darvall Heated Smooth-Wall Circuits (HBC)

On Circle Systems for Cats, Dogs and other small animals up to 80Kgs

or

Darvall Heated Qubes (ZDS)

A Non-Rebreathing System for Rodents, Birds, Exotics, Reptiles, Pups and Kittens

For Veterinary Use Only

(Not intended, evaluated, or approved for Human Medical purposes)

Certified By MET Laboratories to IEC / EN 61010-1

(Electrical equipment for measurement, control, and laboratory use)

AAS HBC Heated Breathing Controller Function Status Codes, and Problem Diagnosis

The 2020 upgraded HBC controller has been designed with a robust fault detection system. This not only electronically protects the controller from fault conditions but also gives the user rapid problem diagnosis to minimise “equipment fiddle time”.

The HBC Functionality Table (Table2) in this document describes all possible fault conditions due to cables, loads, sensors, and power problems.

Problem conditions will result in an abbreviated (but hopefully meaningful) word being displayed on the controllers’ LEDs. (Table 1)

7 segment LED Display	Meaning
L E A d	Lead OFF
O v L D	Overload
O r	Over Range
S U P y	Supply (mains off)

(Table1) Display of Problem Conditions

Function Status codes are also displayed on a USB connected computer in the HBC communications box (bottom left-hand corner of the main window). Codes 5 and 7 indicate that the System is working correctly (no error has been detected).

To use the table for diagnosis: -

- 1 Observe the output of the 7 segment LED display, the front panel LEDs, the button LEDs, and if connected to a computer, the Status number.
- 2 Look up the combination of controller responses in the table 2 (column 3) and the condition that caused the response (column 2).
- 3 Probable faults are highlighted in the fault-finding guide column.

(Table 2) HBC Functionality

Function	Condition	Response	Fault Finding Guide
0	No valid control temperature No valid auxiliary temperature No valid heater element found.	Control Indicator Off Auxiliary Indicator OFF Display reads "LEAd" System cannot heat	Heater and Auxiliary cables not plugged in (Lead Off) Heater Cable /Tube / Qube damage [Check/replace cable and/or Tube/Qube]
1	Valid control temperature No valid auxiliary temperature No valid heater element found.	Control Indicator ON Auxiliary Indicator OFF Display reads Control Temperature Value (unless out of range when display is "Or") System cannot heat	Heater Cable /Tube / Qube damage [Check/replace cable and/or Tube/Qube]
2	No valid control temperature Valid auxiliary temperature No valid heater element found.	Control Indicator OFF Auxiliary Indicator ON Display reads Auxiliary Temperature Value (unless out of range when display is "Or")	Only Auxiliary temperature lead plugged in [Normal Operation]
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Function	Condition	Response	Fault Finding Guide
		System cannot heat	
3	Valid control temperature Valid auxiliary temperature No valid heater element found.	Control Indicator and Auxiliary Indicator alternate with appropriate display Temperature Value. (unless out of range when display is "Or") System cannot heat	Heater element open circuit or cable fault [Check/replace cable and/or Tube/Qube]
4	No valid control temperature No valid auxiliary temperature Valid heater element found.	Control Indicator Off Auxiliary Indicator OFF Display reads "LEAd" System cannot heat	Auxiliary cable not plugged in (Lead Off) Heater Cable /Tube / Qube damage [Check/replace cable and/or Tube/Qube]
5	Valid control temperature No Valid auxiliary temperature Valid heater element found.	Control Indicator ON Auxiliary Indicator OFF Display reads Control Temperature Value and System can heat to Setpoint temperature. (unless out of range when display is "Or" when System cannot heat)	[Normal Operation]
6	No valid control temperature Valid auxiliary temperature Valid heater element found.	Control Indicator OFF Auxiliary Indicator ON Display reads Auxiliary Temperature Value System cannot heat	Heater Cable /Tube / Qube damage [Check/replace cable and/or Tube/Qube]

Function	Condition	Response	Fault Finding Guide
7	Valid control temperature Valid auxiliary temperature Valid heater element found.	Control Indicator and Auxiliary Indicator alternate with appropriate display Temperature value, and System can heat to a Setpoint Control temperature (unless control temperature is out of range when display is "Or" when System cannot heat)	[Normal Operation]
8	If the controller has no mains power to it, and the USB socket is powered by a computer or 5Volt supply	The Display reads "SUPy" The System cannot heat	Mains supply is absent. [Check the switch and and the mains fuse at the back of the controller, and the external mains supply]
9	If the heating element load is less than 11ohms – or is Short circuited	An Overcurrent detection system in the Heated breathing controlled detects overcurrent and switches OFF the heater output, The display reads "OVLd" and the microprocessor locks out any further operation.	OverLoad detected. [Switch the Controller OFF and remove /replace the Tube or Qube heater load and the cable supplying them. Normal controller operation will resume when the unit is powered up again without the Short circuit as load]