

CON THERM

INSTRUCTION MANUAL

CAT 6800CP

INCUBATOR

CON THERM SCIENTIFIC LIMITED

P O BOX 30-605 LOWER HUTT

TEL: (0064-4) 568 8034

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WARRANTY STATEMENT

*** * * * ***

CONTHERM Scientific Company will guarantee CONTHERM equipment for a period of twelve months from the date of installation against faulty workmanship and fabricated materials. This guarantee covers the replacement of component parts found to be defective and authorised labour charges during this period.

Should a malfunction occur or condition develop beyond reasonable acceptance the company will accept responsibility for returning the unit to its factory specification at no cost to the Purchaser providing that the operating instructions have been observed and the defect is due solely to faulty design, material and workmanship. That the defective part be returned, freight paid to the nearest sales service office, the Company shall service the affected component and despatch, freight prepaid, within ten working days of receipt. Units outside the warranty period will be accepted and repairs will be covered under an extension of the above for 90 days.

In remote installations where it is not possible for the company's or agents' engineers to attend, authority may be given to allow the Purchaser to arrange such service.

The Purchaser is required to remit the purchase price of the unit to the supplier within the terms of that supplier's condition of sale. CONTHERM Scientific Company will accept no liability or shall its agents for consequent damage of any kind due to a malfunction or component failure.

*** * * * ***

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IMPORTANT

All electrical servicing **must** be carried out by suitably qualified personnel only.

SECTION 1 DEFINITION OF TERMS

For the purpose of our standard specifications the following definitions shall apply:

- a) **WORKING SPACE**
That portion of the internal space which is above the lowest shelf and not less than 3cm from any wall (including roof).
- b) **CABINET TEMPERATURE**
That temperature at the centre of the working space.
- c) **SPATIAL VARIATION**
The difference between the midrange of all measured temperatures obtained at one site and that at another site for those sites which give the greatest difference.
- d) **TEMPORAL VARIATION**
The maximum value of the temperature range obtained for the standard site with the greatest range throughout the test interval.
- e) **TEMPERATURE DRIFT**
Any long term changes in cabinet temperature during continuous operation of the closed cabinet.
- f) **TEMPERATURE OVERSHOOT**
Any excess of actual over desired cabinet temperature during a heating up period.
- g) **TEMPERATURE REPRODUCIBILITY**
Temperature regained without alteration to controls.
- h) **TEST INTERVAL**
Interval of time to which the steady state characteristics apply (Max 1 hour).

NB: All the above apply with an empty chamber.
For definitions and test methods refer: **AS2853 : 1986** (and Appendices)

SECTION 2 INTRODUCTION AND SPECIFICATIONS

The CONTHERM 6800CP PROGRAMMABLE COOLED Incubator has been expressly designed to give the widest choice of operating conditions consistent with high reliability and low cost.

All specifications are quoted for a cabinet temperature of 20°C with an ambient temperature of 20°C.

- **Construction** - High quality stainless steel interior, full fibreglass insulation, with non-jar magnetic door catches and corrosive resistant epoxy powder coated exterior.
- **Safety** - Fitted with an independent user adjustable Hi-Limit completely separate from normal controls.
- **Convection** - All units come with mechanical convection fan systems.
- **Electrical** - All quoted at 20°C - ZP21 Micro-Controller mechanical Convection.
 - Designed to AS/NZS 3350.1.1994 220-240V AC M.E.N
- **EMC** - Designed to EN/IEC 61326

PERFORMANCE:

- a) **Temperature:**
- | | |
|----------------------------|-----------------|
| Nominal Range (Lights OFF) | +5°C - 50.0°C |
| (Lights ON) | +10°C - 50.0°C |
| Temporal Variation | ± 1.0°C |
| Spatial Variation 6800 | ± 3.0°C |
| Initial Overshoot | +2.0°C |
| Reproducibility | ±0.5°C |
| Dial resolution | 0.1°C |
| Operating Ambient | 10°C - 35°C |
| Mains Voltage Range | 220-240 AC 50Hz |
- b) **Timer:**
- | | |
|-------------------|--------------------------------|
| Timing range | 1 minute - 99 hours 59 minutes |
| Timing Resolution | 1 minute |

NB: Timer starts counting down IMMEDIATELY.

SECTION 3 OPERATING INSTRUCTIONS

This appliance is NOT intended for use by young children or infirm persons without supervision.

To set up unit for operation after unpacking and checking for damage proceed as follows:

- 1) Fit shelves to installed shelf guides (If not already installed). The centre mullion may be removed by removing the two knurled nuts and pulling the mullion slightly back and then sideways, allowing it to be lifted out.
- 2) Fit stainless steel water tray by placing it on cabinet floor, ensuring that the sloping side is pushed fully to the rear of the cabinet so that the tray is hard up against the back wall to catch any water dripping from the fridge evaporator.
- 3) Select a location handy to a 10amp electrical outlet.
- 4) Ensure a space of at least 150mm is allowed around all sides of the cabinet for air circulation. For easy access and servicing a clear space of 500mm is best around the sides and rear.

OPERATING CONTROLLER:

- 1) Plug cabinet into 220-250V 10A Mains outlet.
- 2) Turn on main switch - The LED display should show all 8888s then display the current temperature in the cabinet. Do **NOT** press any buttons until after the 8888's have gone from the display.
- 3) Press and HOLD the temperature button (top) UNTIL the 'SET' LED comes ON then RELEASE. The 'SET' LED above the LED display should now be ON!
- 4) Press the Centre button ("PROG") until the 'SET' LED comes ON then release, the current program number will be displayed. The display will show "P1" for program No1 and "P2" for program No2. If the LED display does NOT show "P1" change it to program No1 by using the "UP" or "DOWN" buttons. When finished just leave the keys for 10 seconds and the "SET" led will go out and the controller will return to the normal operating mode.
NB: LIGHTING (if Fitted) WILL COME ON WHEN PROGRAM No2 IS SELECTED!
- 5) While the 'SET' LED is On use the 'UP' & DOWN' buttons to adjust the SET POINT to the desired temperature.
- 6) WAIT for the display to return to normal; the 'SET' LED will then go off.

- 7) The TIMER must now be set to run the cabinet - use the SAME method as for the temperature EXCEPT press the 'TIME' button instead.

NB: the symbol '[.]' means run **CONTINUOUSLY**.

Setting the TIMER to **0.00** turns the cabinet **OFF**.

To obtain the special '[.]' symbol for continuous operation, first adjust the timer down until '0.00' is reached, then press the down button once more to get '99:59' then the 'up' button to go 1 step above '99:59' the special '[.]' symbol should now be shown.

If the cabinet has **TURNED OFF** after the completion of a TIMED operating period it is only necessary to PRESS and HOLD the TIMER button until the 'SET' led comes on to **REPEAT** the TIMED run.

- 8) The cabinet will now attempt to obtain the SET POINT and control until the TIMER runs out of time.
- 9) To look at the current TIME press the 'TIME' button for 2 seconds - the amount of time left will now be displayed continuously.
To display the TEMPERATURE continuously - press the 'TEMP' button for 2 seconds.
- 10) To CANCEL any Alarm (ie. 1- - -) PRESS and HOLD the 'TEMP' button until the 'SET' LED comes ON.
- 11) **NB:** When first supplied the mechanical USER HI-LIMIT may be turned OFF (Fully anticlockwise). Ensure it is turned sufficiently clockwise to allow the cabinet to operate correctly. (See next page)

NOTE: When operating the cabinet at temperatures below the room ambient temperature some condensation may occur on the outside of the inner glass doors. The amount of condensation will depend on the temperature difference between the cabinet and the ambient. Condensation on the glass doors when the cabinet temperatures are significantly below ambient temperatures is normal.

MECHANICAL HI-LIMIT MONITOR

The mechanical hi-limit is provided as a secondary safety device to protect the cabinet from over temperature in the event of electronic controller failure.

To set the Mechanical Hi-Limit

Turn the Hi-Limit control **FULLY CLOCKWISE**.

Allow the cabinet to stabilise at the required operating temperature (for at least 1 hour), then turn the Hi-Limit control anti-clockwise until the **MONITOR** neon comes on (or a slight 'click' is felt). Now turn the Hi-Limit control **SLOWLY CLOCKWISE** until the **MONITOR** neon goes off, then advance the Hi-limit clockwise 1-2 scale markings. This will set the Hi-Limit trip point about 3 - 4°C above the current cabinet temperature.

NB: It is **MOST** important that the mechanical Hi-Limit be set to help protect the cabinet contents from inadvertent exposure to high temperatures in the event of a control system failure.

WARNING: To prevent **FIRE** or **SHOCK** hazard, **DO NOT** expose this product to rain or any type of moisture.

FOR YOUR SAFETY

To ensure safe operation the three-pin plug supplied must be inserted **ONLY** into a standard three-pin power outlet that is effectively earthed through the normal building wiring.

Extension cords are **NOT** recommended.

The fact that the equipment operates satisfactorily does **NOT** imply that the power outlet is earthed and that the installation is completely safe. For your safety, if in any doubt about the effective earthing of the power outlet, consult a qualified electrician.

This appliance should be regularly tested (at intervals not exceeding 12 months) according to the procedures prescribed in **AS/NZS 3760**. The basic safety checks and tests on electrical appliances required by **AS/NZS 3760** are:

- a) A visual check to ensure that there is no mechanical damage, that controls etc. are in good working order and that no parts are missing.
- b) An earth continuity test. (Maximum allowed resistance is 1 Ω)
- c) An insulation resistance test. (Minimum insulation resistance is 1 M Ω)

ALARMS

All alarms are indicated by a number and three dashes on the LED display and are accompanied by an audible alarm.

To **CANCEL** any Alarm (ie 1---) PRESS and HOLD the 'TEMP' button until the 'SET' LED comes ON.

ALARM MEANING

- 1--- This means the cabinet is OVER or UNDER temperature. If UNDER temperature it could be due to the door being opened, otherwise check the cabinet to determine if the Internal fan is still operating and that the MECHANICAL Hi-Limit control is not interfering with normal operation.
- 3--- Preset alarm - The cabinet has lost its control settings due to an internal memory failure. Reset all control settings as desired. Check that the calibration factor has been retained.
- 4--- This means that the TEMPERATURE sensing probe has failed (1000 Ω RTD). The connections to the probe and the probe condition should be investigated.
- 9--- This is a WATCHDOG alarm - The Electronic PCB has failed - Replace the controller.

CALIBRATION

Calibration should be carried out at 20.0°C or at the temperature of interest, with the thermometer in the centre of the working chamber with the chamber empty and any lighting OFF.

NB: This cooled incubator will typically cool to a minimum temperature of 0°C (Lights OFF), the actual minimum temperature obtainable will depend on the ambient temperature. The calibration temperature must be within the achievable operating range of the cooled incubator.

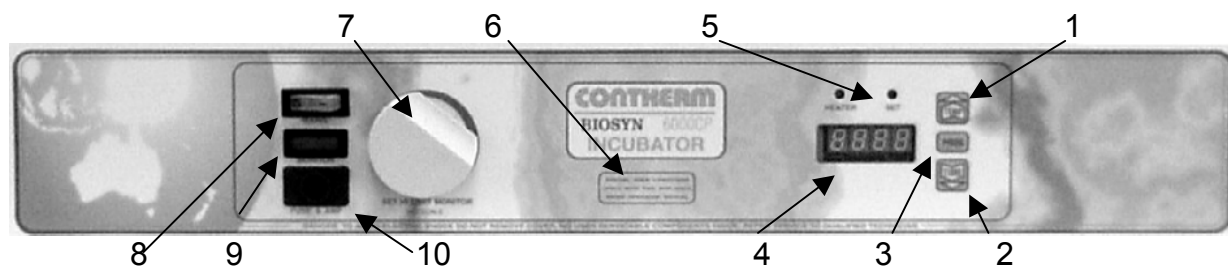
- 1) Place the Calibration Thermometer probe in the workspace centre, close the door and set the controller for 20.0°C or the temperature of interest, allow at least 1 hour to stabilise.
- 2) Read the temperature on the Calibration Thermometer.
- 3) To calibrate the cabinet -
 - a) Press and HOLD the `TEMP' button until the 'SET' LED comes ON and then release. The 'SET' led should now be ON.
 - b) WHILE the 'SET' led is ON: Press BOTH `UP' & `DOWN' buttons **TOGETHER** - a beep will be heard and the word `CAL' will appear briefly on the LED display. Adjust the reading on the LED display using the `UP' & `DOWN' buttons until it agrees with the Calibration Thermometer.

NB: If when attempting to press BOTH buttons together, the temperature SET POINT adjusts either up or down - it means you are NOT pressing BOTH buttons at the SAME TIME! - if the 'SET' led is still on you should attempt 3(b) again, if the 'SET' led is OFF you should repeat from 3 (a).
 - c) WAIT for a further beep to occur, the LED display will briefly show `----' and then the **CALIBRATION CONSTANT**, this will be a number in the range 0.0 to 19.9. This figure SHOULD BE NOTED as it may be used to return to this calibration setting. The LED will then briefly show another `---' and the controller will resume its role of normal operation.

NB: If a '[[[[' sign appears on the display the cabinet is OUTSIDE its calibration display range and calibration should be performed at a slightly higher temperature.
- 4) Allow to stabilise again - the temperature should now be correct. If NOT repeat the procedure.

NB: The calibration can only be performed within limits, if the calibration cannot be achieved a further fault exists.

CONTROL LAYOUT



- 0 RCD/Circuit breaker. (6800CP – located to the left of the main switch)
- 1 Temperature adjustment button.
(Also used to adjust set points)
- 2 Time adjustment button.
(Also used to adjust set points)
- 3 Program Button. (Lights are ON when 'P2' is selected).
- 4 LED Display - Gives readout of temperature in degrees centigrade OR elapsed time in hours and minutes.
- 5 LED Indicators - Left LED indicates when the element is ON. Right LED indicates when controller is in SET mode.
- 6 Refer "Caution" Instructions.
- 7 Mechanical Hi-limit set Adjustment Knob (No Scale).
- 8 Mains Switch and Illuminator combined - indicates power to controller board.
- 9 Hi-Limit Monitor Neon- will come on if power is being applied to heater element while mechanical Hi-Limit is tripped.
- 10 Fuse - contains a 10amp Antisurge fuse.

SECTION 4 THEORY OF OPERATION

This CONTHERM Special Purpose Incubator uses a new single chip microprocessor electronic PID controller with a 1000Ω Resistance RTD probe as the temperature sensing element. The LED display gives a direct readout of SET POINT or Cabinet temperature in degrees centigrade.

The operation of the ZP21 controller is based on the change of resistance with temperature.

The RTD probe is fed from a 1.05mA constant current source and the output is amplified to provide a final output of $10\text{mV}/^{\circ}\text{C}$. This output is sent to a hi-resolution A/D converter.

The outputs of the Microprocessor are used to switch zero crossing triac drivers (containing an led and a small triac internally), which in turn drive the heater triac and other devices. The zero-crossing driver ensures that radiated interference is kept to a minimum. An internal WATCHDOG monitors program execution and RESETs the microprocessor in the event of program failure.

Incoming AC mains power is conditioned by a varistor and inductor filter to prevent mains 'spikes' from causing damage, then goes through a double wound transformer to reduce the AC to 10 volts and provide isolation.

The +5 Volt supply is stabilised by a standard 3 terminal regulator.

COOLING is provided by a standard refrigeration unit. The cooling compressor runs continuously.

Calibration of the temperature is performed via the adjustment buttons and is retained in a eeprom IC, settings will typically be retained for up to 100 years even in the absence of power.

REFRIGERATION MAINTENANCE

If the unit is going to be stored for some period after the refrigeration has been used for some length, a drying out period is necessary to remove moisture from the element well. This could be done by turning the cabinet OFF and leaving the door slightly ajar to allow for the drying out of the moisture in the interior.

Once the unit is suitably dried it can be closed up and stored without further problems.

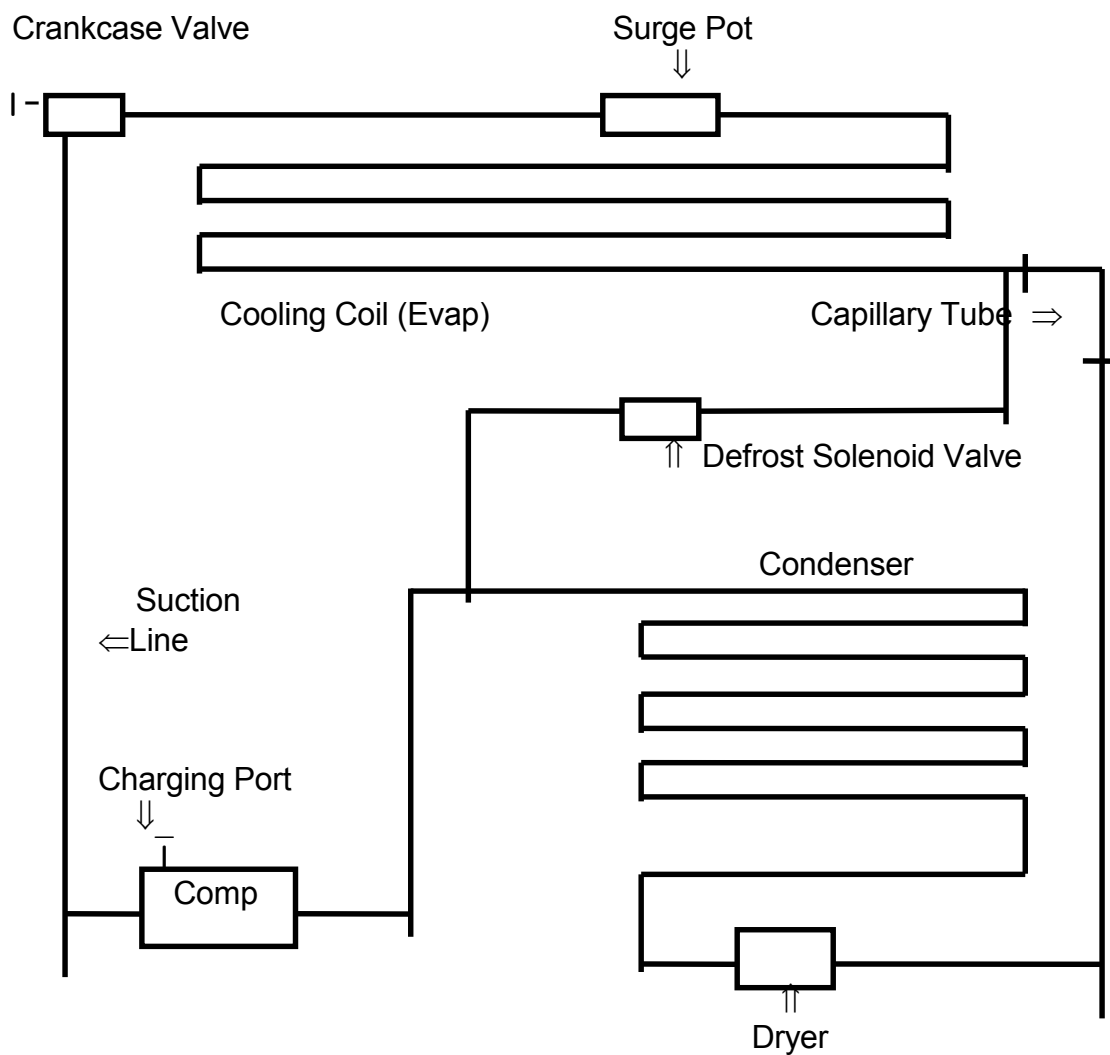
REFRIGERATION DATA:

MODEL	6800CP8
COMPRESSOR: Electrolux	GL80AA
CONDENSER:	2x S20/21
COOLING COIL:	G10/43/HG
DEFROST VALVE:	SPORLAN E3S120
CRANKCASE VALVE: REFRIGERANT:	SPORLAN CRO R134a
REFRIGERANT CONTROL: Capillary Type	6/044
DRYER:	Sweat Type MA256
COMP COOLING FAN:	SUNON 2123 HTB 38mm

The refrigeration system condenser located on the External rear of the cabinet is cooled by natural convection, therefore, it is important to ensure no obstructions are placed to prevent normal ventilation around the cabinet. The condenser will slowly collect a layer of dust, therefore it is recommended that once a year it is brushed clean with a small broom.

Components of the system are shown on the schematic diagram.

REFRIGERATION SCHEMATIC DIAGRAM



COMPONENT LOCATION

Inside Cabinet Behind False Back: Cooling Coil, Surge Pot

Inside cabinet base : Compressor, Condenser, Dryer, Defrost Solenoid Valve, Crankcase Valve

SECTION 5 TROUBLESHOOTING AND MAINTENANCE

MAINTENANCE

The epoxy powder coated mild steel exterior is resistant to corrosion and spillage's and should be wiped with a damp cloth occasionally to maintain its appearance.

The fan motor bearings do not require lubrication under normal conditions.

The stainless steel interior and shelves should be kept clean with a damp cloth. Take care that the temperature probe is not damaged during cleaning of the interior base. Any spillage or breakage within the cabinet should be cleaned up immediately with the cabinet switched off and unplugged at the mains.

ELECTRICAL SAFETY

This appliance should be tested for insulation and earthing continuity at regular intervals according to **AS/NZS 3760**..

TROUBLESHOOTING:

- A) **CABINET COMPLETELY DEAD. NO MAINS NEON :**
- NO POWER TO CABINET, CHECK WALL SOCKET AND WALL SOCKET FUSES
- B) **CABINET DEAD :**
- CHECK CABINET MAIN FUSE and RCD/CIRCUIT BREAKER.
- C) **LARGE TEMPERATURE VARIATION IN CABINET, CONTROLLER 'HEATER' LED PULSING :**
- INTERNAL FAN NOT GOING (CHECK FOR AIR MOVEMENT INSIDE CABINET)
- CABINET OVERLOADED WITH SAMPLES, REMOVE SOME SAMPLES TO ALLOW BETTER AIR FLOW.
- LOOK FOR HI-LIMIT MONITOR NEON COMING ON, INDICATES MECHANICAL HI-LIMIT SET TOO LOW
- D) **INSUFFICIENT COOLING :**
PERFORMANCE IS DEPENDANT ON THE AMBIENT TEMPERATURE, TYPICAL PERFORMANCE IS 5°C (LIGHTS OFF) AND +10°C (LIGHTS ON). IF LIGHTS ARE ON ALSO CHECK OPERATION OF DOOR COOLING FAN(S).
CABINET REQUIRES DEFROSTING – CHECK FOR INSUFFICIENT AIRFLOW DUE TO ICE BUILDUP ON THE INTERNAL FRIDGE EVAPORATOR LOCATED BEHIND THE FALSE BACK.
- E) **LIGHTS DO NOT WORK :**
NB: lights will ONLY work when cabinet is on P2. ENSURE ALL POWER TO CABINET IS OFF THEN CHECK 1.0AMP FUSE ON ZP21 PCB THIS FUSE MUST ONLY BE REPLACED BY A 1.0AMP ANTISURGE TYPE FUSE.

REMOVAL AND REPLACEMENT OF GP CONTROLLERS

The following should only be carried out by suitably qualified electrical personnel.

ENSURE that power cord has been REMOVED from the wall socket BEFORE attempting to remove the PCB.

To Remove PC Board:

- a) **ENSURE POWER CORD is REMOVED** from wall socket then Unplug socket from Controller PC Board. NOTE connections from side 10way socket to sensor probe etc so that they can be correctly reinstalled, then disconnect probe etc from socket.
- b) Using suitable socket undo four 4mm securing nuts. Carefully NOTE position and size of SPACERS
- c) Remove PC Board.
List FULLY all fault details, carefully pack, return to Agents for repair.
The refitting of the controller should be done in the reverse order as above, taking care when reconnecting the sensor etc that they are connected to the correct socket holes.
- d) Carry out Insulation (use 500V insulation tester) and earth continuity check BEFORE applying power to cabinet. (as per **AS/NZS 3760** – In-service safety inspection and testing of electrical equipment).
The basic safety checks and tests on electrical appliances required by **AS/NZS 3760** are:
 - d) A visual check to ensure that there is no mechanical damage, that controls etc. are in good working order and that no parts are missing.
 - e) An earth continuity test.
 - f) An insulation resistance test.

In order to provide evidence of compliance, a label (signed and dated by the person testing the equipment) may be placed on the tested appliance.

N.B: Check for loose wires that may have been missed, particularly the green earth wires.

The ZP21 PCB is equipped with a green "HEARTBEAT" LED adjacent to the large buzzer. When the cabinet is operating this LED should be PULSING about once per second. There are also TWO small glass fuses to protect the PCB. REMOVE ALL power from the unit (By removing the mains plug) BEFORE attempting to check these fuses.

ELECTRICAL GP LAYOUT ZP21

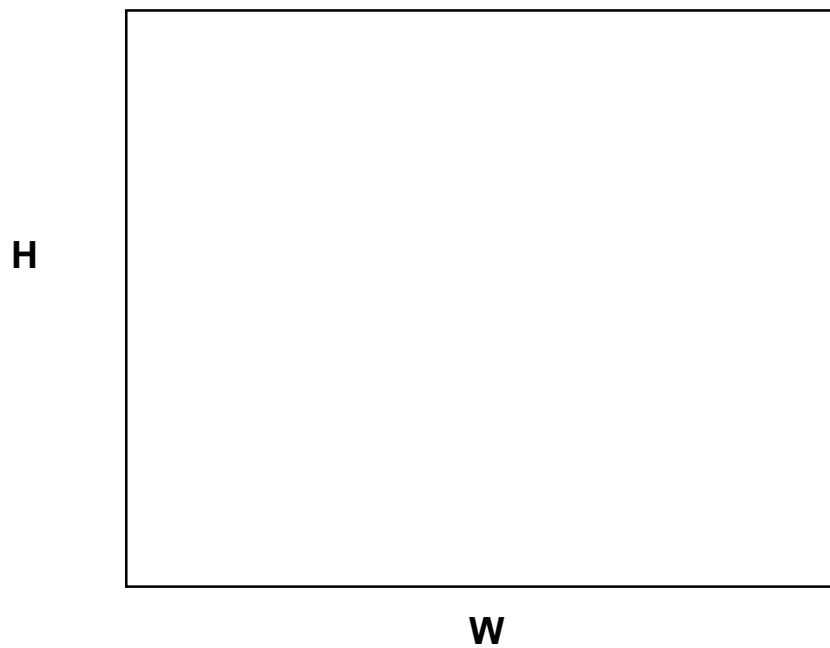
SECTION 6 PARTS LISTS AND SPARES

Shelves

Hinges:Glass Door	M1006
Fan Motors 2 x GP007	GP007
Fan Rotors 2 x Aluminium (PUNKER)	GP1409
Elements 2 x 400W (Precision Type)	
Temperature Sensor: 1000 Ω RTD	GP1307:M
Hi-Limit Thermostat: Incubator	GP1021
Mains Switch (Illuminated)	GP1033
Control Knob	GP1324
Control Circuit Board: ZP21	GP1306
ZP21 Auxiliary fuse 1Amp 20x5mm Antisurge	(Farnell 533-713)
ZP21 Power fuse 100mA 20x5mm slow-blow	(100ma-SB-GDL)
Fuse 10A Ceramic Antisurge	FUSE 10AMP
Monitor Neon	GP1073
Muffin Fan(s) (Door Cooling type Sunon 25mm 2122 HTB)	
LIGHTING:	
THORN PP236 HF 2x36W Batton Electronic	THOR26201
TUBES: PHI TUBE FLUORO 36W COL 84 ALTO TL-D 840	PHITLD36840ALTO
SOLID STATE RELAY: LIGHTS OPTO22	240A10

GLASS DOOR SIZES

(If purchasing independently)



5.0mm Toughened Clear Floated - All edges arased.

Cat.6800CP 618mm H x 590mm W 4off

Drawing Ref: 001-580/A/B/C

CONTHERM SCIENTIFIC LTD

CERTIFICATE OF CONFORMANCE (PQ)

This certifies that the CONTHERM equipment specified below has passed quality and performance tests according to our standard methods and procedures and has been approved for despatch to our customers. Contherm calibration equipment is traceable to a YSI Model 60 gallium melting point temperature standard.

CAT. No:

APPLIANCE No:

DATE:.....

TEST RESULTS

CALIBRATION FACTORS

Test Temperature: Temperature []

Probe Position:

Date of Test:

Actual Recorded Temperature

Temporal Variation Passed []

ELECTRICAL TESTS

Earthing: [] Ω Insulation: [] $M\Omega$

Flash: [] Leakage: [] Ma

The electrical tests are satisfactory: []

Signature of Test Personnel

**CONTHERM SCIENTIFIC LIMITED
NEW ZEALAND**

CONTHERM SCIENTIFIC
CUSTOMER INSTALLATION REPORT

Please fill in and return to:

CONTHERM SCIENTIFIC LIMITED
DEVELOPMENT SECTION
P.O. BOX 30605
LOWER HUTT
NEW ZEALAND

1) Did your cabinet arrive in good condition? **YES / NO**

2) Any difficulties experienced in setting up? **YES / NO**
Comments:

3) Is this your first CONTHERM purchase? **YES / NO**

4) Any previous problems of a specific nature with CONTHERM products? **YES / NO**
Comments:

5) Any suggestions for improvements or special features you would like to see -
Comments:

6) **Cabinet Details** **Catalogue No:** **CAT 6800CP8**

Appliance No:

Date Installed:

Company:

.....

.....

COUNTRY:

Contact Name:

PHONE: **FAX:**

PACKING INSTRUCTIONS
Installation Quality Check List (IQ)
(Leave with Cabinet)

CONTHERM CAT.No

...../...../.....

(6800CP8 Incubator)

App No:

Date:

Accessories Supplied

Qty

(IQ)Checked

Shelf Runners (pairs) [] []

Operating Manual [] []

Shelves [] []

IEC Mains Lead [] []

Other..... [] []

Cabinet Undamaged when Packed [] When Received []

Certificate of Compliance Completed [] []

Ensure cabinet has been fully tested and approved for packing . [] []

Ensure data plates are fitted. [] []

Interior and exterior clean. [] []

Cabinet Installed as per installation Instructions: []
(See SECTION 3 of the operating manual)

PACKED BY

(IQ)CHECKED BY

Date:/...../.....

Date:/...../.....