



**Read the instructions before use!**

**Damaged appliances shall not be used.**

**The appliance and its supply cord must be placed in an indoor area not subject to splashes of water or wet conditions and protected from or out of reach of animals.**

**Repairs shall be carried out only by a suitably qualified person.**

**This appliance shall not be used, cleaned or maintained by children or persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge without supervision. Children shall not play with the appliance.**

**Disconnect the incubator from the mains power supply during cleaning. Ensure that all electrical parts are kept dry.**

**Record your appliance serial number here: \_\_\_\_\_**

Congratulations on your purchase of the most advanced egg incubator available. The **Contaq Z7 Raptor** has been designed to allow the best possible environment for your eggs to incubate. These instructions detail the operation of your new Contaq incubator, incorporating Contact Incubation Technology (CIT). Please read them carefully before setting up the incubator in order to achieve best results.

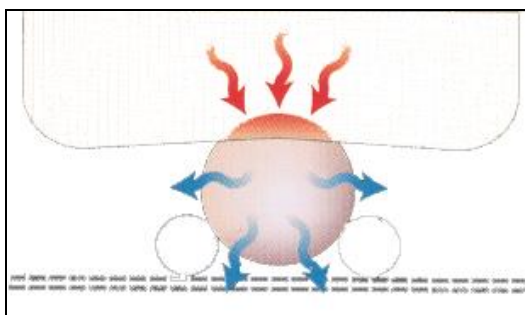
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## 1 Introduction to Contact Incubation

The method of contact incubation technology is actually as old as the birds themselves – but what is new is the unique way the method is applied by this Contaq machine.

Contact incubation is based on the natural incubation process. The most striking difference between natural and artificial incubation is the fact that the natural parent provides warmth by contact rather than surrounding the egg with warm air. This may not at first sight seem significant but important research studies carried out by J. Scott Turner at New York State University and the University of Cape Town has revealed major unsuspected differences in thermal behaviour of eggs incubated by contact rather than convection. Crucially, eggs in a forced draft incubator have near uniform temperature throughout incubation; there will be some increase in embryonic temperature towards the end of incubation as a result of increased metabolism but otherwise the whole egg will remain near incubator air temperature. By contrast, eggs incubated naturally or by contact, have significant temperature differences. Heat is entering the egg over a relatively small brood patch, which is therefore warmer than other regions of the egg, and is being lost from most of the remaining shell area which is cooler.

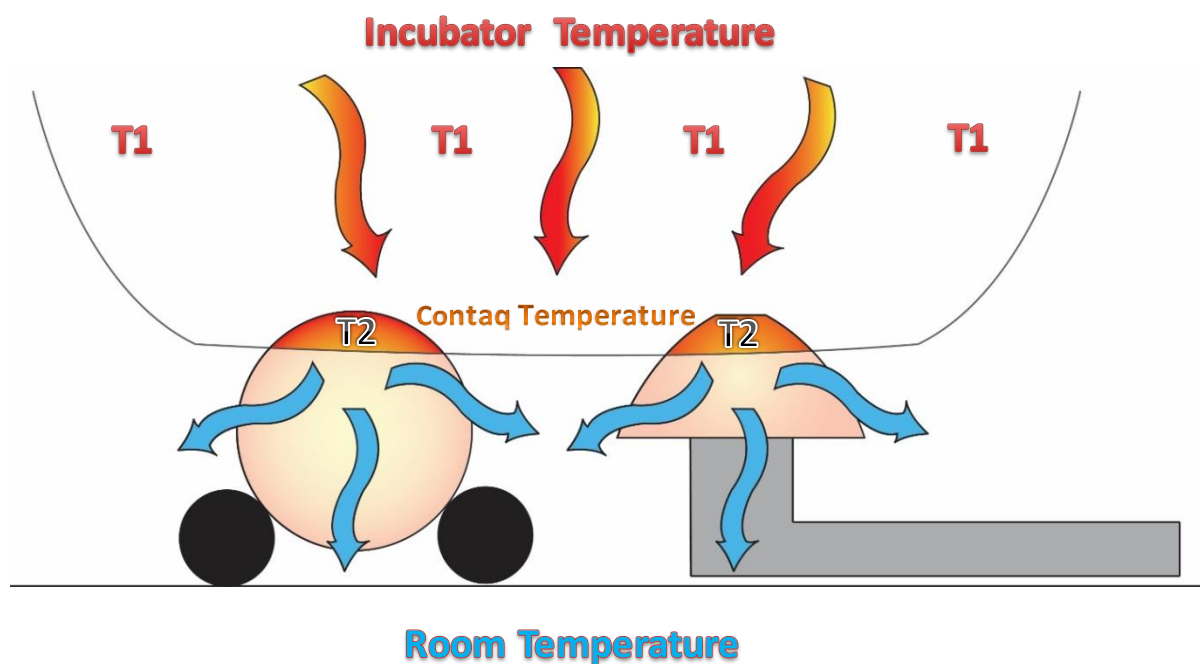


In contact incubation, the embryo temperature tends to fall at later stages of incubation as a result of the embryo's own blood circulation which becomes significantly more important than embryonic metabolism in determining temperature distribution and heat flow within the egg, quite contrary to previous understanding which assumed metabolism to be dominant and cause egg temperature to rise. The inevitable fact that the embryo grows larger and must move from its original position on top of the yolk sack downwards in the egg to cooler regions also tends to reduce embryonic temperature as incubation progresses. These important findings emphasise surprising differences between natural and artificial incubation, but there are others. Eggs in nature are certainly subjected to a cycle of warming and cooling coupled with ventilation as the parent bird leaves the nest to feed and defend territory, etc.

The Contaq incubator should be viewed as replacing the natural Bird and Nest combination. The pressurised 'skin' mimics the functions of an incubating parent; providing warmth by contact with the tops of eggs, but also the facility to lift from the eggs periodically and in doing so, causes a substantial influx of fresh air in the manner of a bird standing or leaving the nest. The Contaq egg chamber also provides sophisticated provision for automatic turning of eggs of different sizes. Egg turning coincides with lifting of the skin and enables programmable turns.

## 2 Introduction to the Contaq Thermometer System

The warm air within the contact skin is closely maintained at Incubator Temperature (referred to in this manual as T1). Heat is transferred from the warm air into the egg at the contact surface. Since the rest of the egg surface is in cool air (approximately room temperature) heat flows out through the egg into the cool air around it. This makes the contact surface on the top of the egg slightly cooler than the incubation air temperature around it. This “Contaq Temperature” is referred to in this manual as T2.



Research by a number of highly regarded breeders of raptor species has established that for the first half of incubation the Contaq Temperature (T2) on the top of the egg is a key indicator of correct incubation conditions. This has been routinely monitored using medical infra-red thermometers and so necessitated the opening of the incubator to measure the temperature.

To make this process easier Brinsea have developed the Contaq Thermometer System that mimics the egg pressed against the contact skin and directly monitors the Contaq Temperature (T2) on a continuous basis. The temperature is clearly displayed allowing the operator to be assured of correct conditions at a glance. Adjustable minimum and maximum temperature alarms provide warning if something has caused the operating conditions to change.

Since the temperature difference from the centre of the incubator to the outside air varies with changes in room temperature it may be observed that the Contaq Temperature (T2) varies slightly with room temperature changes. This clearly shows if the room temperature is too variable to give the eggs optimum conditions in the contact incubator.

### 3 Unpacking

Your incubator had been supplied in protective packaging. Please remove all tape, strapping and packing material. Retain the carton and packing materials to enable the unit to be repacked if necessary.

The Contaq Z7 Raptor includes:

<i>Item</i>	<i>Quantity</i>
Contaq Incubator	1
Turn System Chassis	1
Turn System Floor	1
Egg Rollers	12
Bag of Small O-Rings	1
Mains Lead	1
Contaq Skin Panel (fitted)	1
Contaq Thermometer Sensor Probe	1
Spot-Check Thermometer	1
9V Battery	1

Please identify each part and check that they are all present and undamaged. If there are any parts damaged or missing please contact your retailer or Brinsea Products (at the address at the end of this document). To register your new Brinsea product please visit [www.brinsea.co.uk](http://www.brinsea.co.uk) and follow the link on the right hand side of the home page to qualify for your free 3 year guarantee.

## 4 Setting Up Your Contaq Z7 Raptor

### 4.1 Location

Since the contact incubator is “open” to the ambient conditions in the incubation room the temperature gradient from the top to the bottom of the eggs will be affected by room temperature, just as eggs in a nest will experience changes in the temperature of their surroundings.

The contact incubator control system has to maintain the incubation temperature (T1) in a thermal system where heat loss from one surface (the contact skin) is deliberately high and as a consequence is affected to some degree by changes in room temperature. At lower room temperature a greater temperature gradient exists between the centre of the warm air chamber and the incubation room. This inevitably means the contact surface temperature

(T2) varies slightly with larger changes of room temperature. The contact thermometer system allows this to be directly observed and improvements to room conditions made if necessary.

Your incubator will give best results in a room free from wide temperature variations and with generous ventilation – particularly if several incubators are running at the same time. Ensure that the room temperature cannot drop on a cold night. Ideally thermostatically control the room at between 20 and 25°C (68 and 77°F). Never allow the room temperature to drop below 17°C (63°F) and ensure that the incubator cannot be exposed to direct sunlight.

Place the incubator on a flat, level surface capable of supporting the weight of the incubator (35kg).

Contaq Z7 and K7 incubators may be stacked a maximum of 2 units high. The top machine must be located squarely over the lower machine to ensure the weight is distributed through the load bearing structure.

## 4.2 Egg Turning System

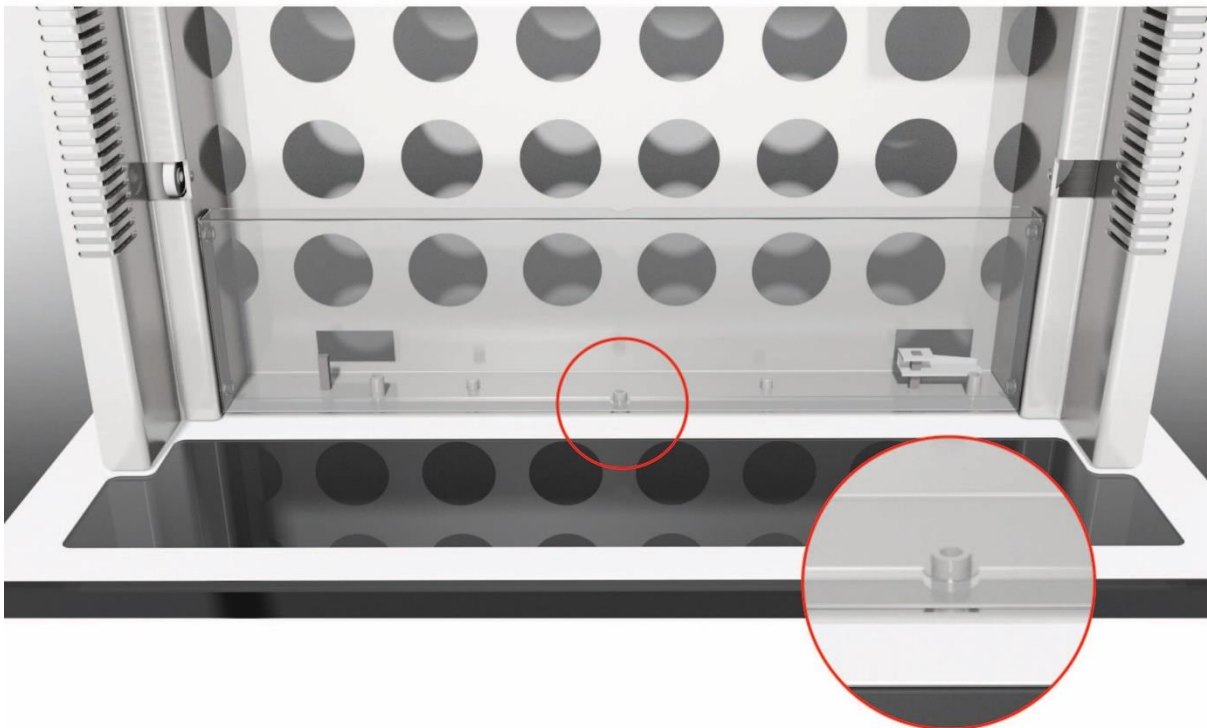
Release the drawer latches and fully open the drawer. Rest the turn system chassis in the drawer in a way that allows the turn system connector cable to be passed through the grommet in the base of the drawer.



Gently pull the cable through into a loop ready to plug into the incubator socket.



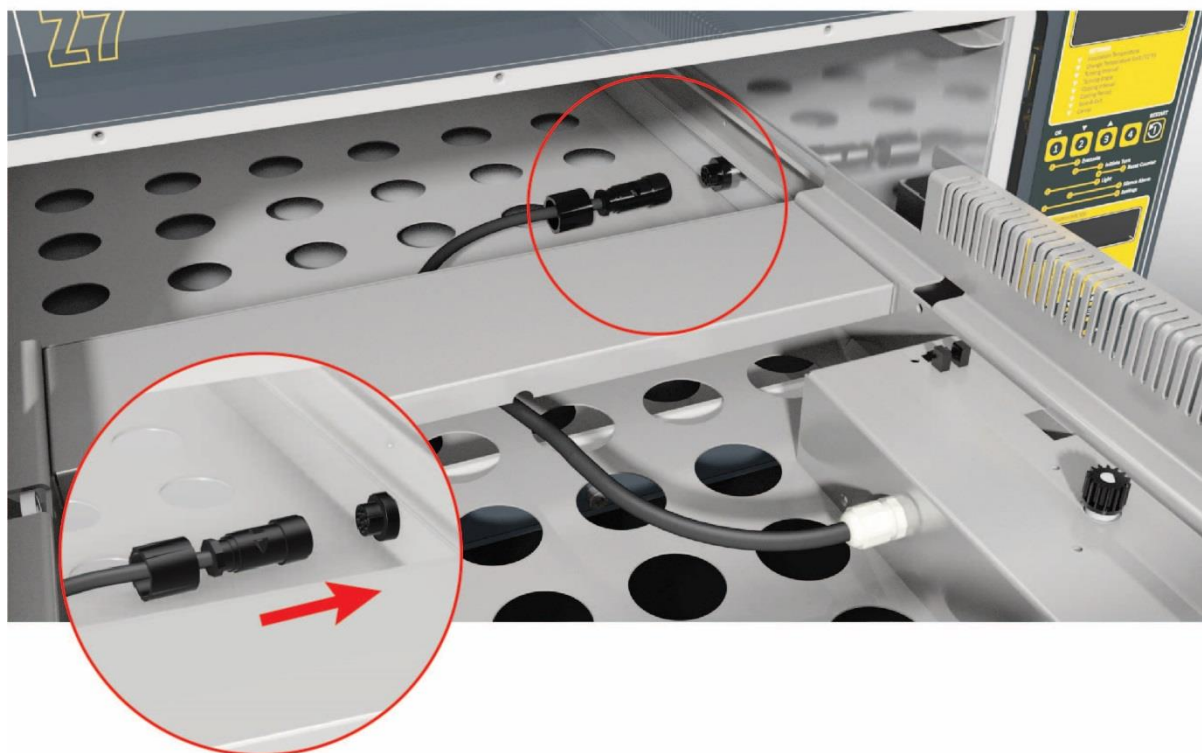
Lower the turn system chassis down into the drawer so that it locates centrally over the centre guide pegs. Correct location is important, the assembly will rock from side to side to show if it has not been fitted correctly and needs to be repositioned.



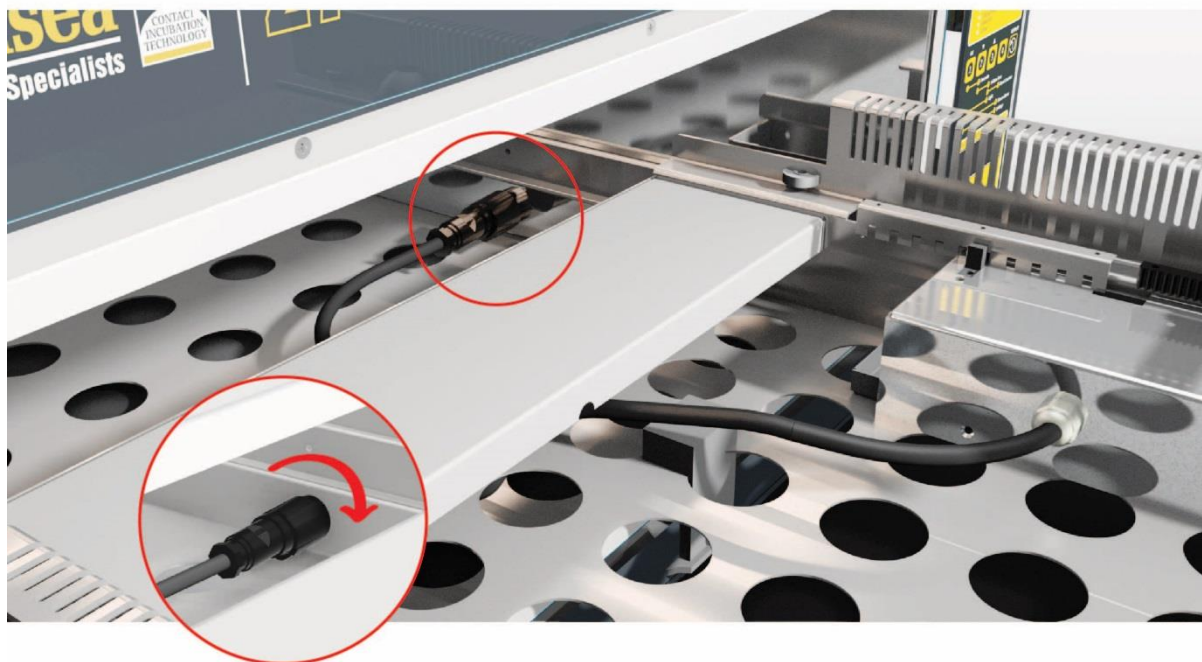




Once the turn system chassis is correctly located connect the plug to the socket in the side of the incubation chamber. The plug pushes in and then the lock ring screws down over it to seal the connector.

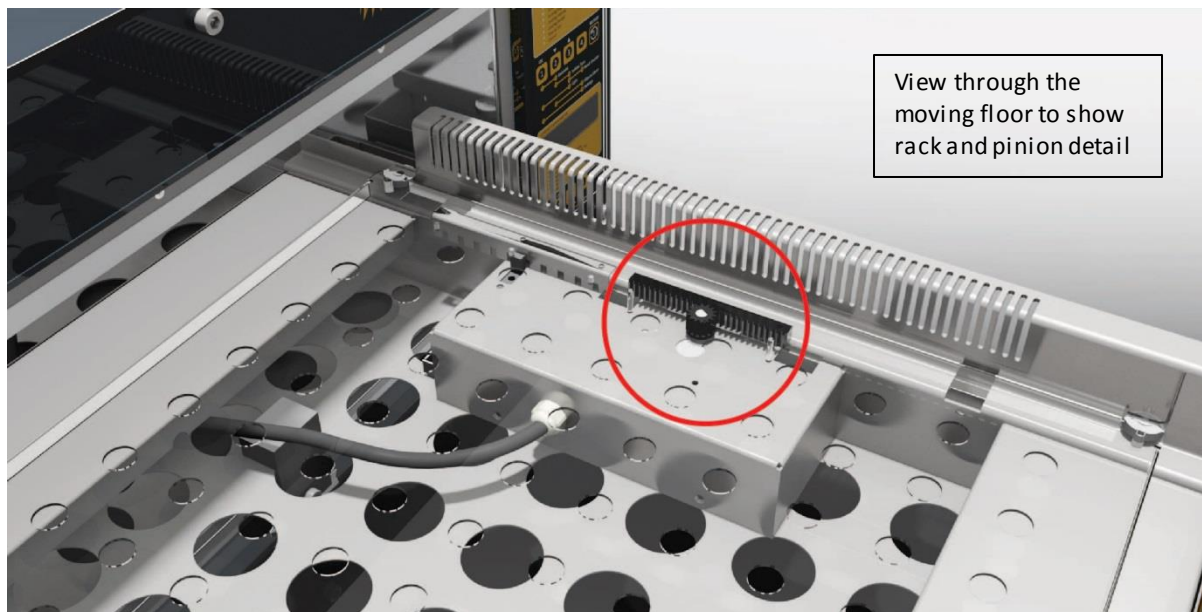




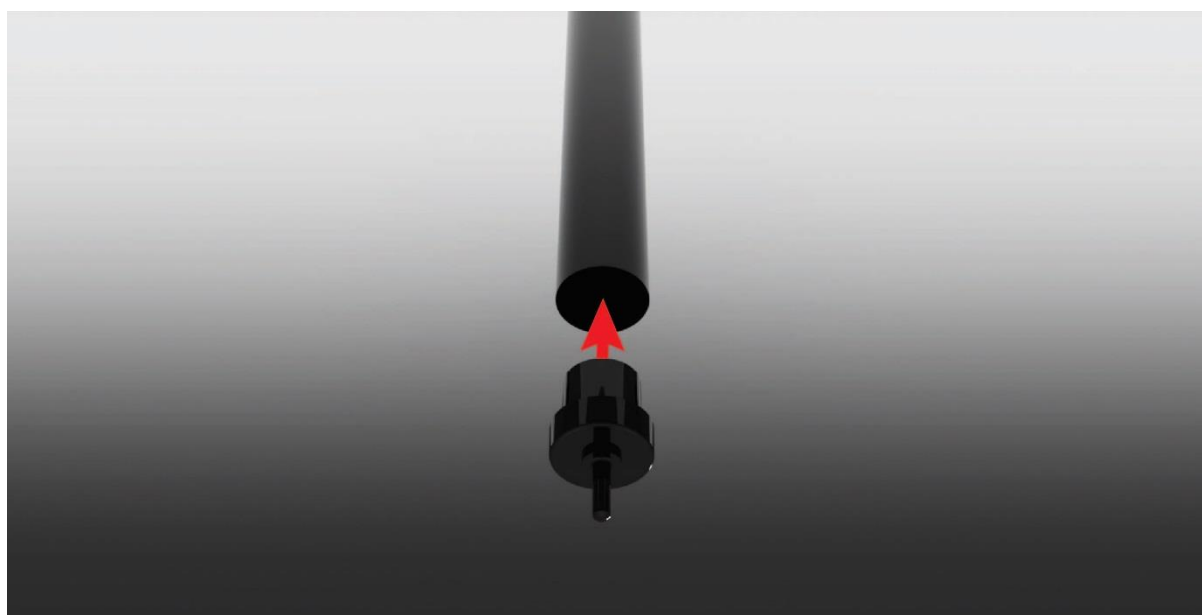


Gently lower the turn system floor onto the chassis. The toothed rack must fit over the side of the motor pinion, the floor will align itself once lowered into place.





Assemble the egg rollers by pressing the end caps into the tubes.

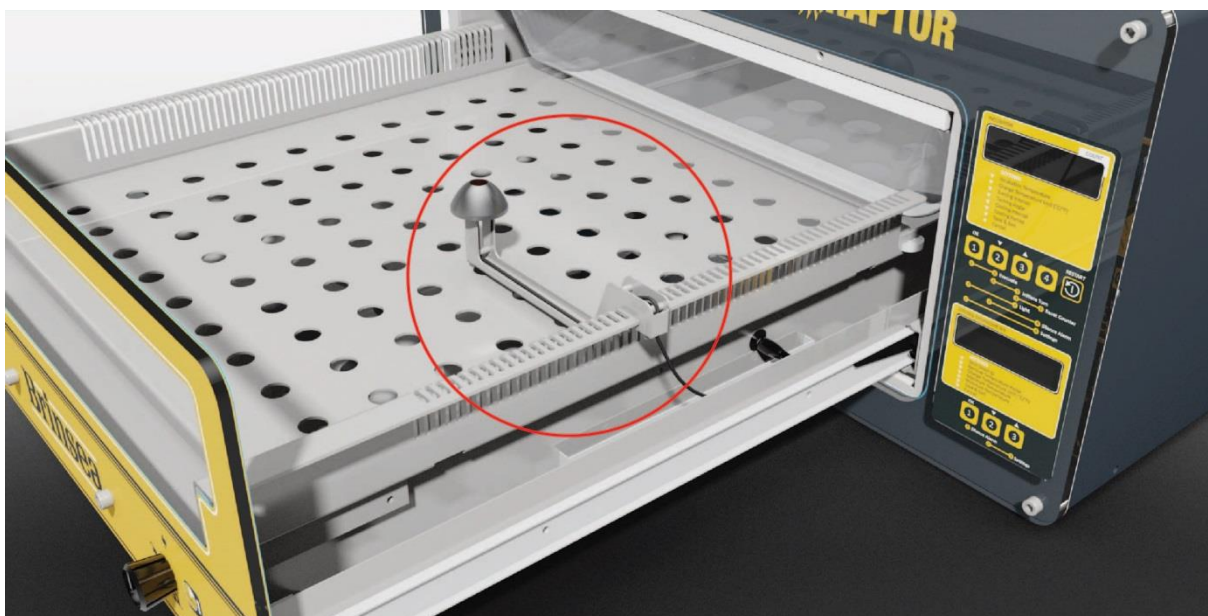


### 4.3 Contact Thermometer Probe

The thermometer probe bracket may be located in any location along the left or right hand slotted section of the turn system chassis but it is recommended to place it near the centre for routine use. The probe comes with a long cable that should be neatly coiled and fastened to prevent it becoming caught in the turning chassis or drawer mechanism.

The thermometer bracket is fitted by “hooking” it over the turn system chassis at an angle as shown and then lowering it down so that it engages in the slots.

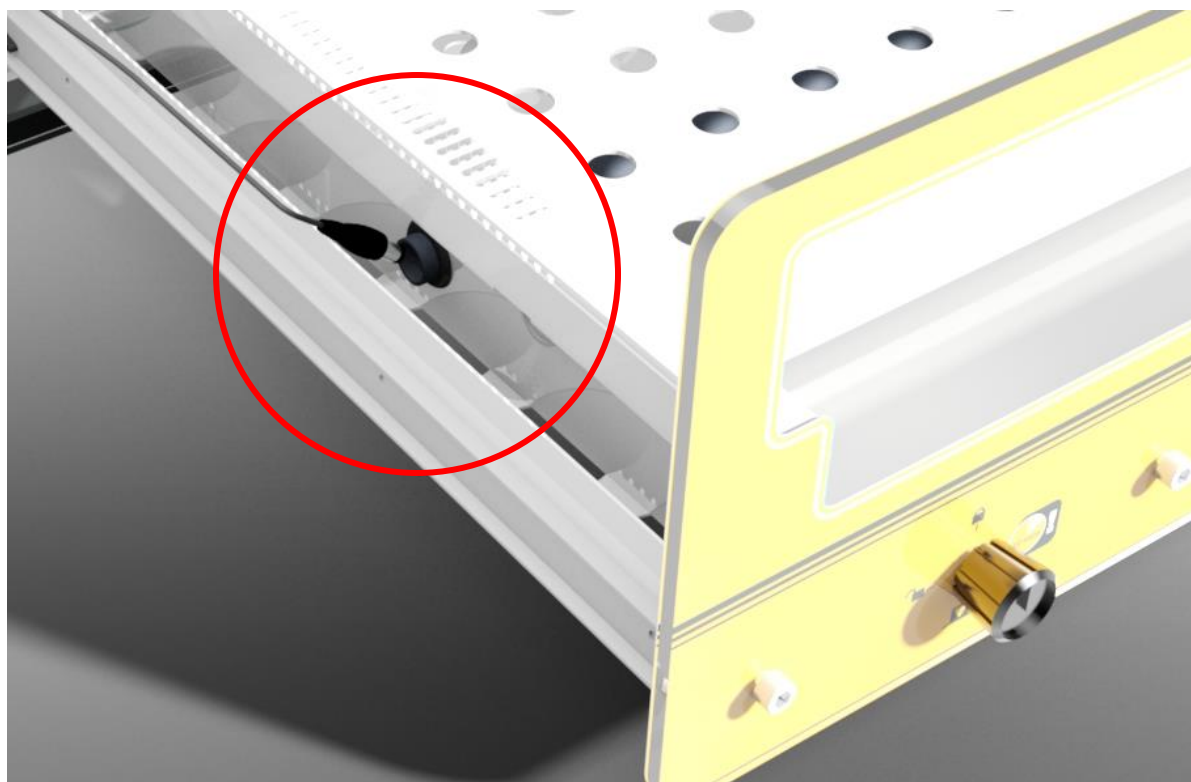
Right:



Left:

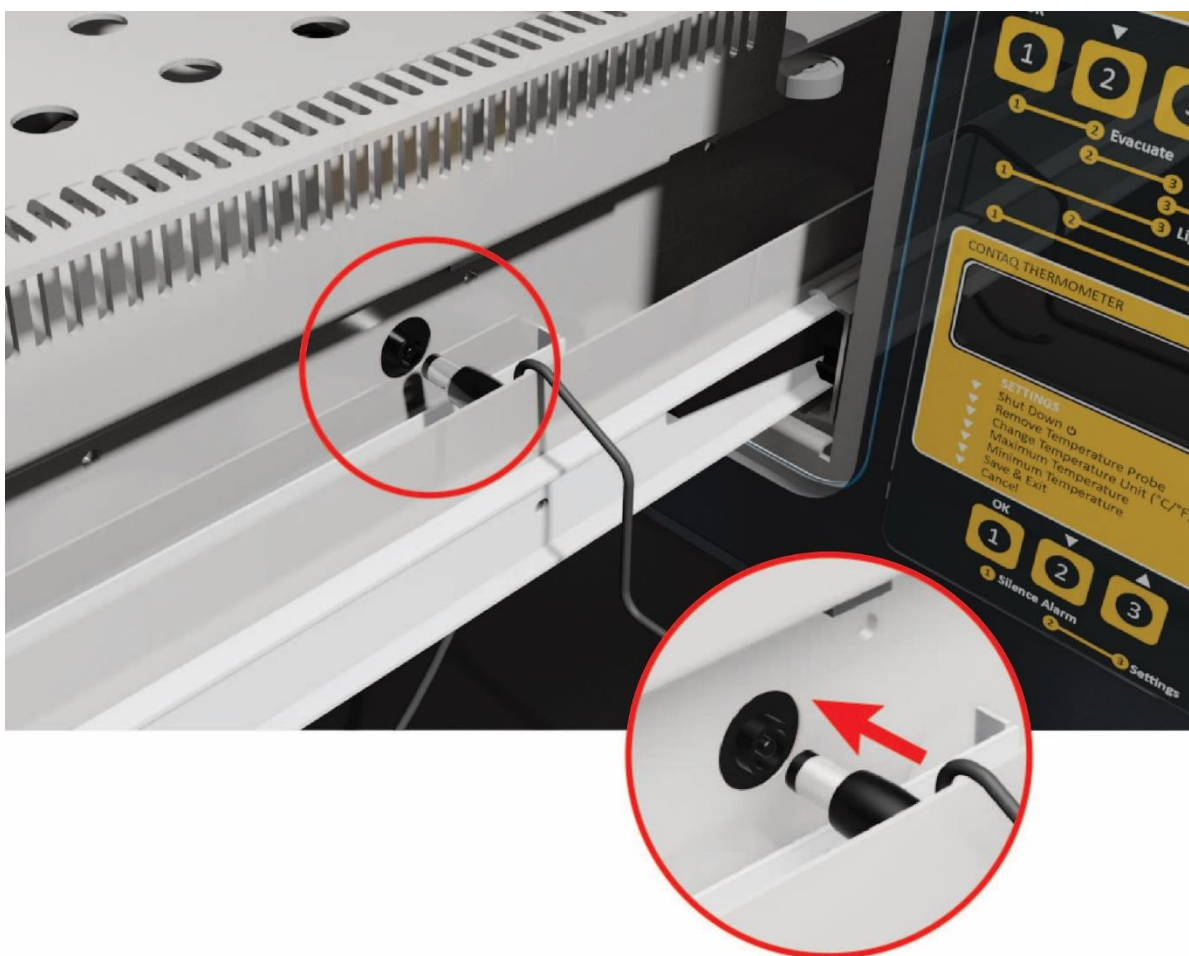
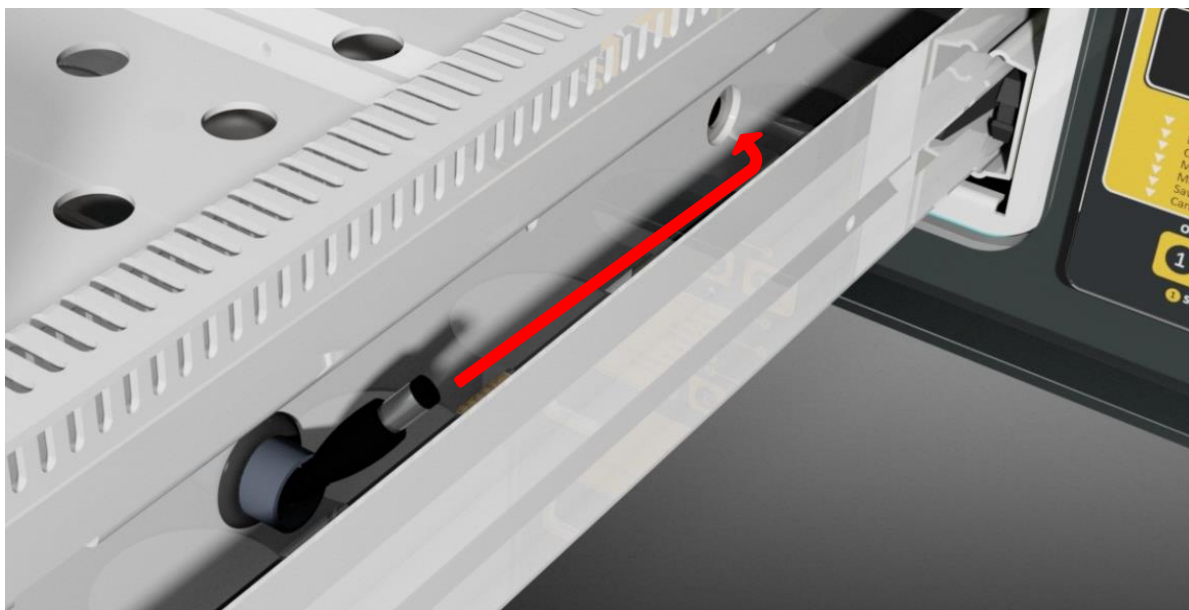


Pass the cable through the conduit tube.





Plug the contact thermometer probe cable into the socket on the side of the motor box.

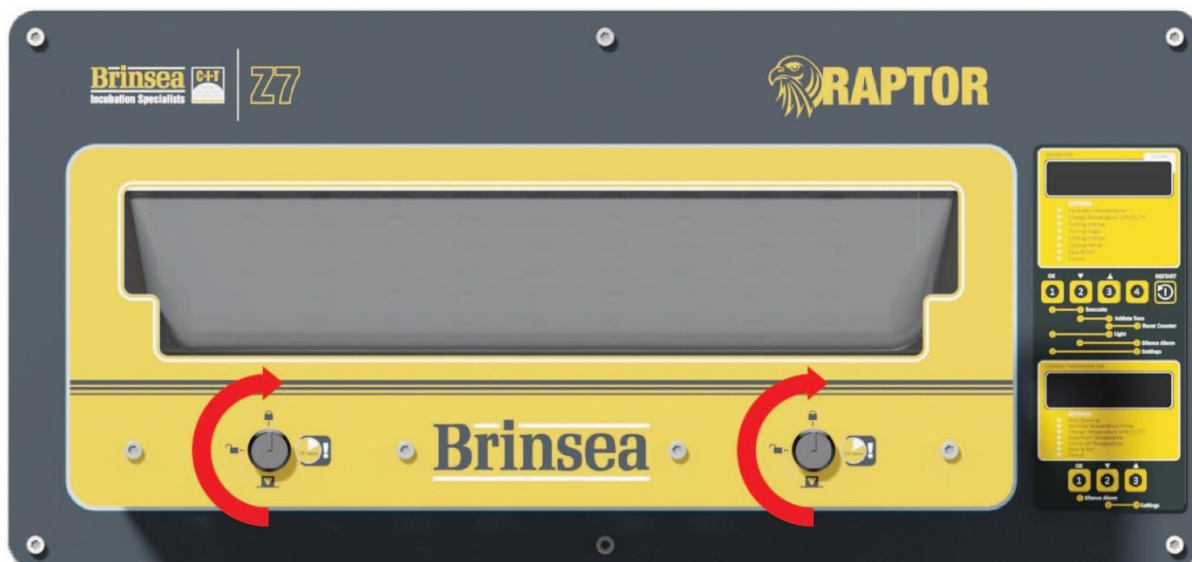


Neatly coil the thermometer probe cable and store in the base of the drawer.

The drawer may now be closed.

## **IMPORTANT**

When the drawer is closed both drawer handles must be turned fully clockwise to ensure the drawer is locked in position and the air pressurisation system is switched to the correct mode. **Failure to observe this may result in the Contact Skin remaining retracted and the eggs will not be warmed.**



To open the drawer, turn both door handles counter-clockwise. **It is important to wait while the skin is lifted from the eggs to prevent the eggs being dislodged as the drawer is opened.** Do not leave the drawer open longer than necessary.

### **4.4 Power Failure Alarm Battery**

The Contact Thermometer System monitors the power supply to the incubator. In the event of power failure an alarm sounds provided a PP3 / 6F22 / 6LR61 / 1604 type battery in good condition is fitted in the battery compartment on the back of the incubator. A battery is provided with the incubator. Ensure the polarity markings are observed. The battery is not charged by the incubator. Please dispose of old batteries in accordance with local regulations.

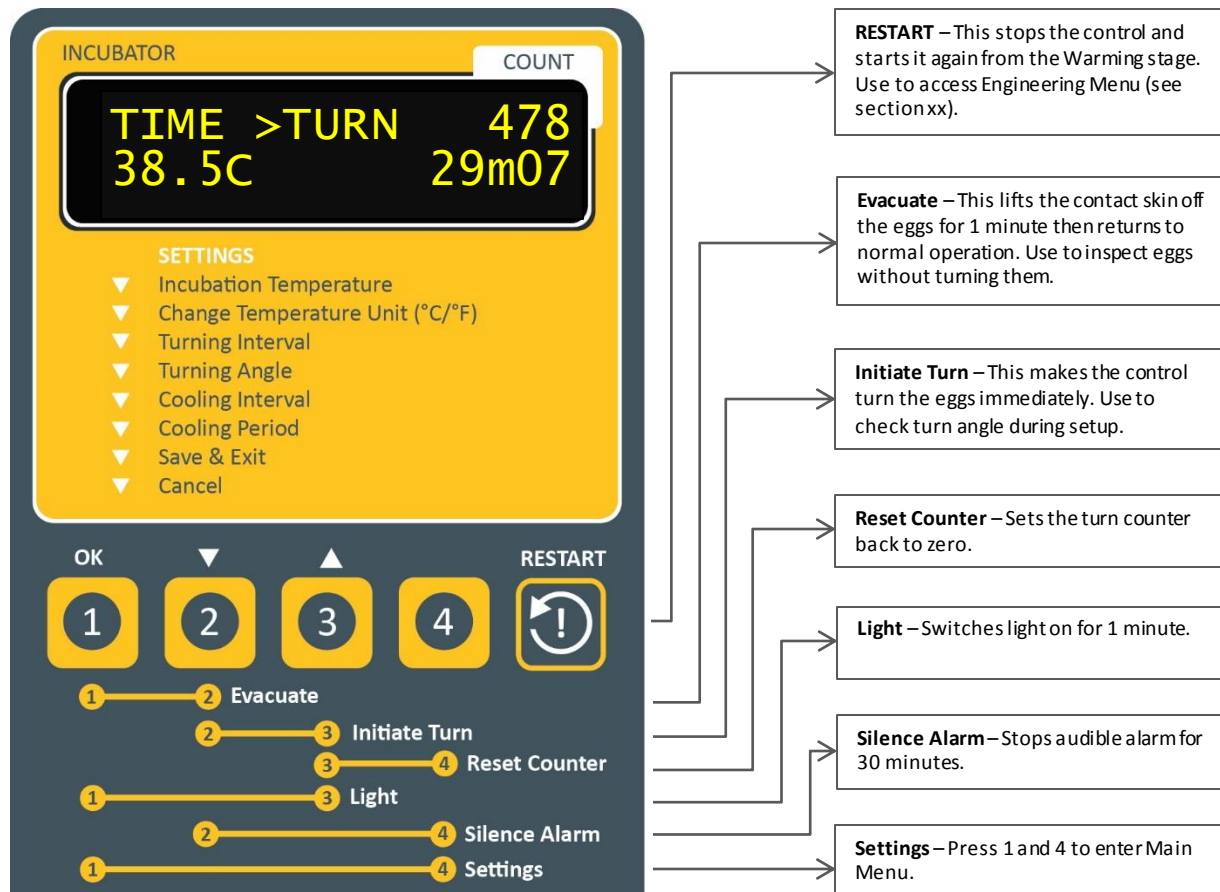




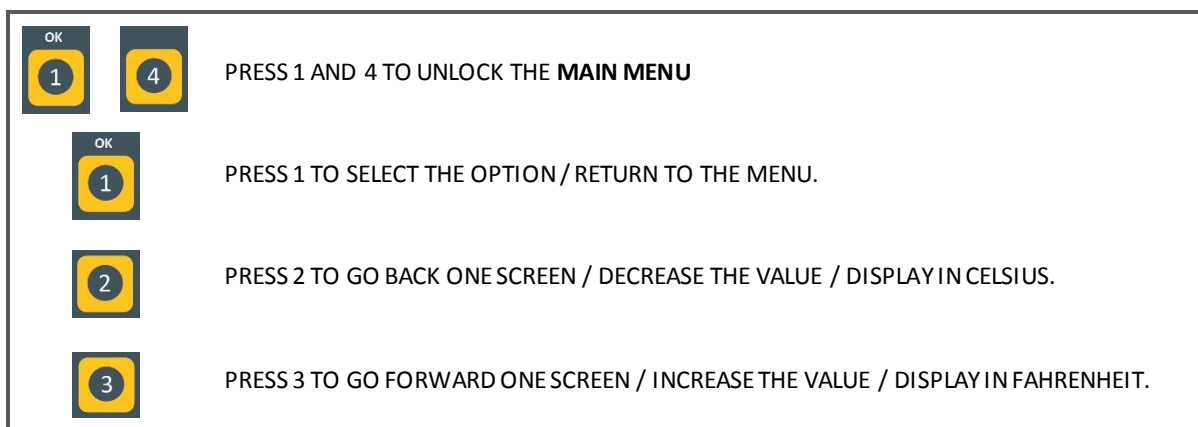
## 5 Incubator Digital Control System

The digital control system allows simple adjustment of key operating parameters. Read all parts of this manual so that you are familiar with the entire control system before attempting to set up the incubator for the first time.

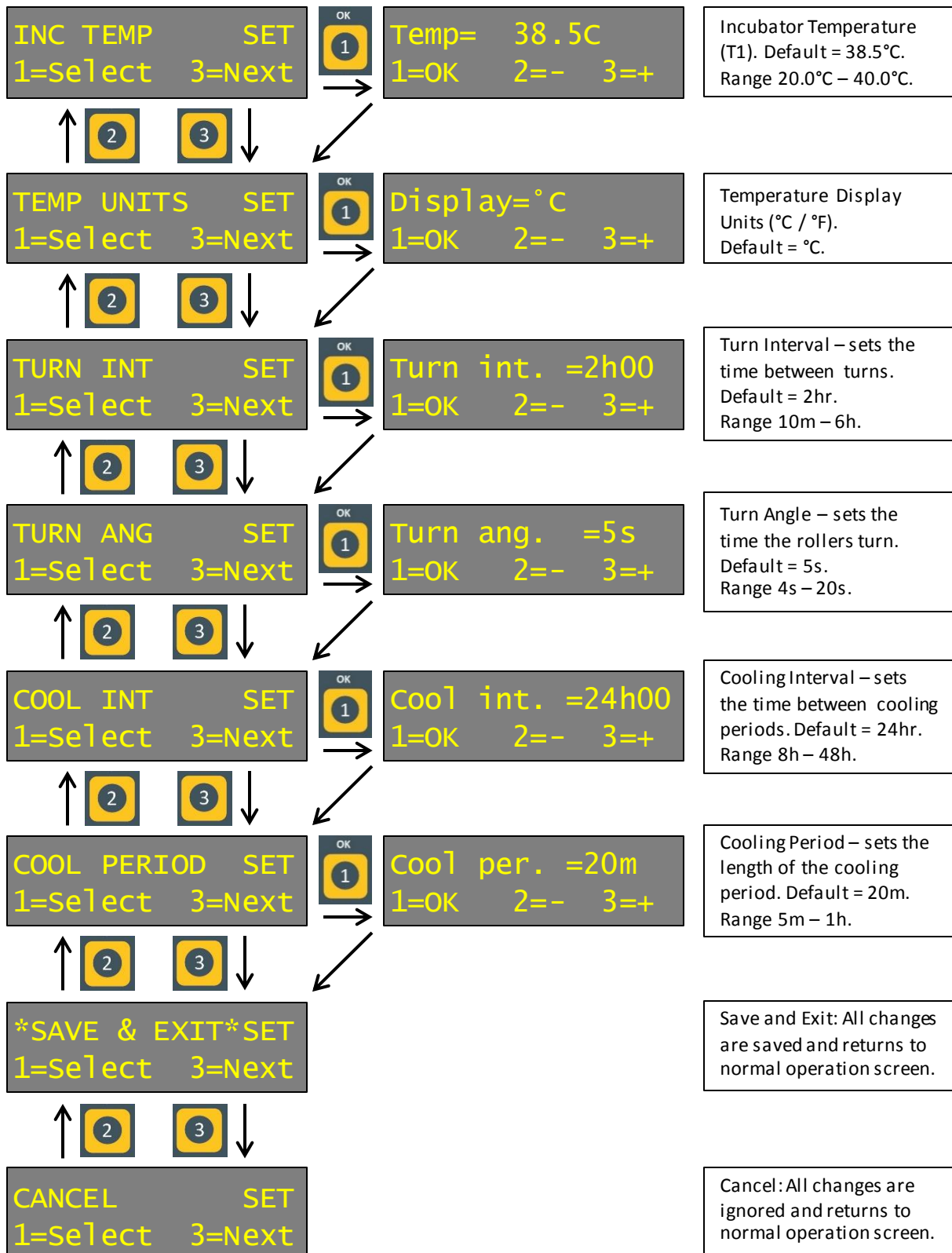
Certain operations may be selected directly from the keypad, these are listed on the keypad for reference:



The keypad is also used to access the menu systems. The control uses the **Main Menu** for frequently used settings:



### Main Menu



Individual incubation settings are discussed in detail in section 9 of this manual

## 5.1 Incubation settings

Individual incubations settings are discussed in detail in section 9 of this manual.

## 5.2 Room temperature alarm

The Contaq Z7 Raptor control system monitors the ambient conditions and warns if the room temperature is becoming (or has been) too high or low for optimum temperature control. Once the high or low room temperature has been investigated and rectified the RM indicator may be cleared from the display by pressing and holding the OK button.

TIME >TURN 23  
38.5C -RM 15m34

The -RM on this display shows the room temperature is, or has been, too low.

TIME >TURN 23  
38.5C +RM 15m34

The +RM on this display shows the room temperature is, or has been, too high.

## 5.3 Incubation temperature alarm

The incubation temperature T1 is monitored and if it exceeds set limits an alarm sounds and a warning is displayed showing actual temperature and set temperature. The limits may be adjusted, see section 13 for details. Check for ambient conditions that may have caused the incubation temperature to exceed normal limits.

LOW TEMP ALM  
31.5C 38.5C

The incubation temperature is too low.

HIGH TEMP ALM  
40.5C 38.5C

The incubation temperature is too high.

## 5.4 Turn system fault alarm

The egg turning system includes optical feedback of the movement of the stainless steel moving floor. If movement isn't detected within 2 seconds of starting the motor the control system reverses the motor in an attempt to clear a blockage. If the motor still fails to drive the moving floor an alarm sounds and the display shows a warning message.

Note that when the alarm system is triggered the turn system will still remain active to prevent loss of eggs in a false alarm situation such as the optical sensor being covered by dust.

TURN FAULT	ALM
38.5C	12m48

The turn system fault alarm has been triggered by one or more failed attempts to sense movement of the turning mechanism.
---

## 5.5 Temperature sensor failure alarm

The temperature control system uses a system with three independent temperature sensors. In the unlikely event that one sensor fails temperature control is maintained correctly using the other two sensors. A warning is displayed to show one sensor is outside the expected normal tolerance range.

TEMP SENSOR FAIL
38.5C 12m48

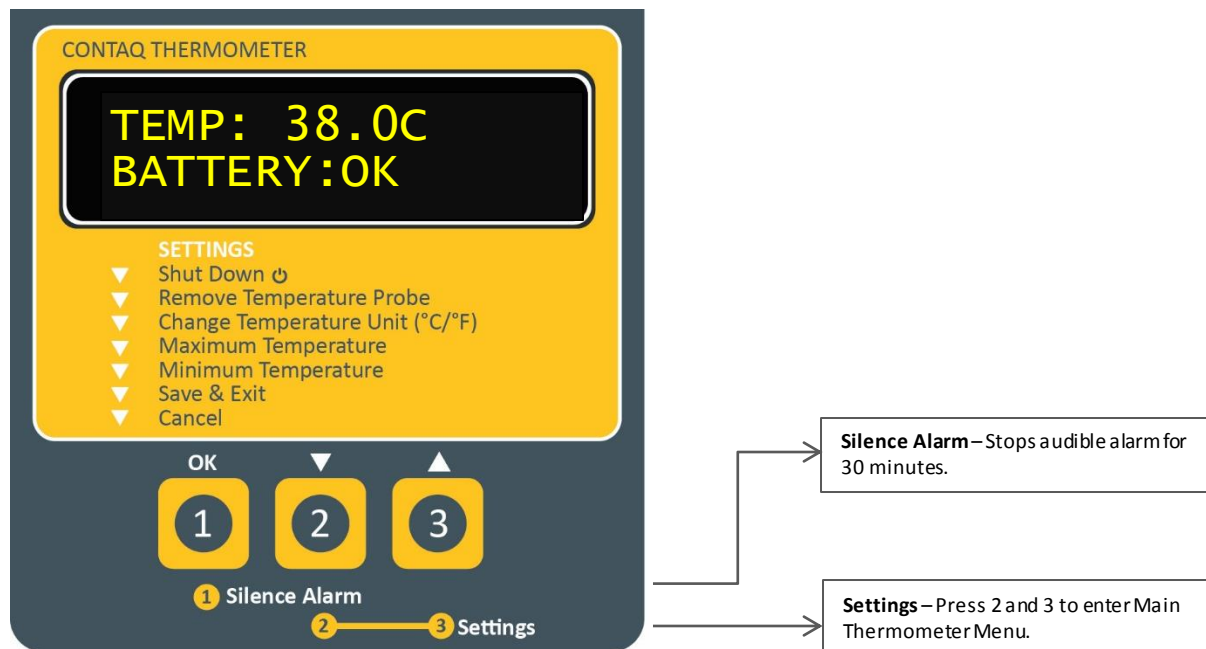
## 5.6 Control system health monitor

The incubator control system is independently monitored for system health. If the control is interrupted by, for instance, a power line disturbance this will be detected by the monitor and the system automatically reset to allow the control to immediately recover. This system may be tested by pressing the RESTART button on the keypad which simulates a control interruption.





## 6 Contaq Thermometer Digital Control System

The Contaq Thermometer digital control system provides independent monitoring of contact surface (“egg top”) temperature T2 with high and low temperature alarms and also a power failure alarm.

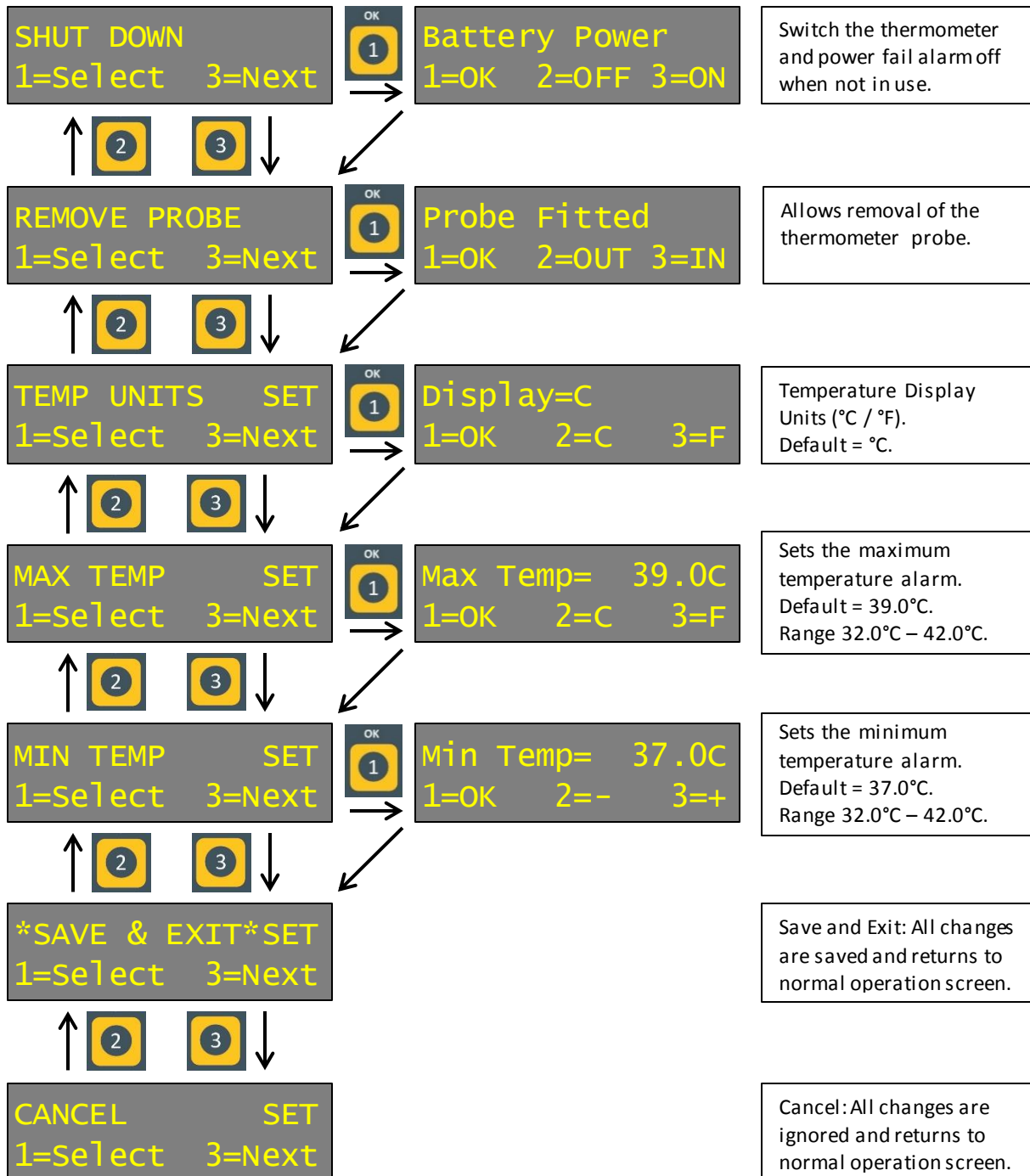
Certain operations may be selected directly from the keypad, these are listed on the keypad for reference:



The keypad is also used to access the menu systems. The thermometer uses the **Main Thermometer Menu** for frequently used settings:

	PRESS 2 AND 3 TO UNLOCK THE <b>MAIN THERMOMETER MENU</b>
	PRESS 1 TO SELECT THE OPTION / RETURN TO THE MENU.
	PRESS 2 TO GO BACK ONE SCREEN / DECREASE THE VALUE / DISPLAY IN CELSIUS.
	PRESS 3 TO GO FORWARD ONE SCREEN / INCREASE THE VALUE / DISPLAY IN FAHRENHEIT.

### Main Thermometer Menu





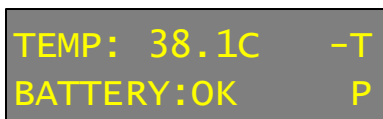
## 6.1 Power failure alarm

The contact thermometer system provides an audible alarm to indicate mains power failure. This alarm will be triggered any time power is disconnected, including when shutting down for cleaning or storage. To silence the alarm the thermometer system must be shut down by accessing the **Thermometer Main Menu**. Press buttons 2 and 3 together to access the menu, press OK to select SHUT DOWN and then press 2 to select OFF in the Battery Power screen.

The thermometer system will automatically start when mains power is applied again to the incubator.

If power has been lost (even briefly) a “P” symbol will flash on the thermometer display. Take steps to investigate why this has happened if it wasn’t a deliberate power interruption. The P symbol may be cleared by pressing the OK button.

If the temperature has dropped below the MIN setting for longer than the alarm delay period “-T” will remain on the screen even if power has come back on and the temperature has recovered:



TEMP: 38.1C    -T  
BATTERY:OK    P

This display shows power had failed and the temperature had fallen below MIN for more than the delay time.

## 6.2 Display Units

The temperatures in the contact thermometer system may be displayed in degrees Celsius or degrees Fahrenheit. This feature may be accessed in the **Thermometer Main Menu** (see above).

## 6.3 Min / Max contact temperature alarms

Minimum and maximum contact temperature (T2) alarms are provided which have adjustable delays to prevent false alarms during inspection or periodic cooling. See section 13 for information on adjusting the delay times. Do not set the min/max points too close to the normal temperature as nuisance alarms may occur. This feature may be accessed in the **Thermometer Main Menu** (see above).

If the temperature recovers by itself an indication remains on the display to show that the alarm has been triggered. Investigate for possible causes such as failed room heating or direct sunlight falling on the incubator.

TEMP: 38.1C -T  
BATTERY:OK

This display shows the temperature has fallen below MIN for more than the delay time but then recovered.

TEMP: 38.1C +T  
BATTERY:OK

This display shows the temperature has risen above MAX for more than the delay time but then recovered.

#### 6.4 Remove Probe

To maximise incubator capacity the probe may be removed and unplugged from its socket. To prevent the low temperature alarm being triggered the thermometer system can be set to ignore the probe (Remove Probe). This feature may be accessed in the **Thermometer Main Menu** (see above).

PROBE REMOVED  
BATTERY:OK

This display shows the thermometer control has been set to allow the probe to be removed without creating a low temperature alarm.

#### 6.5 Battery monitor

The battery for the power fail alarm is monitored and its condition is displayed:

TEMP: 38.1C  
BATTERY:OK

This display shows the battery will typically operate the power failure alarm for 18 hours or more.

TEMP: 38.1C  
BATTERY:LOW

This display shows the battery will typically operate the power failure alarm for approximately 12 hours.

TEMP: 38.1C  
BATTERY:REPLACE

This display shows the battery MUST BE REPLACED AS THE POWER FAILURE ALARM MAY NOT WORK.

## **6.6 Contaq temperature mapping**

It is possible to “map” the contact temperature pattern as part of the process of setting up the incubator. Place rollers in the turning chassis and place solid plastic eggs or infertile hens’ eggs on the rollers in order to space the contact skin as it would be in normal use. Rest the thermometer probe bracket in a pattern of locations and allow at least 1 hour for the temperature to stabilise before observing the indicated contact temperature in each location.

THE TURNING SYSTEM MUST BE SWITCHED OFF TO PREVENT THE THERMOMETER PROBE WIRE BECOMING ENTANGLED IN THE ROLLERS.

It is to be expected that there will be some variation, particularly at the outer edges of the contact skin. This may vary between different incubators as the warm air flow is turbulent and to some extent random. Mapping allows a detailed understanding of how to best achieve the correct temperature that suits all the eggs.

Note that due to the temperature gradient from the centre of the incubator to the room the INCUBATOR TEMPERATURE T1 will be slightly higher than the average CONTACT TEMPERATURE T2. Adjust the incubator temperature to achieve the desired contact temperature in the particular incubation room conditions.

## **7 Storage of Eggs**

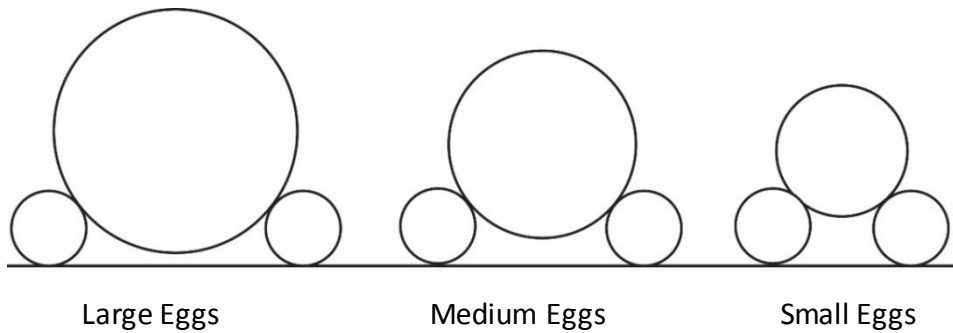
Always store eggs in cool, damp conditions. Most species may be safely stored for up to 14 days before serious reductions in hatch rates are likely. Daily turning of stored eggs also helps maintain hatchability.

Discard cracked, misshapen and heavily soiled eggs (if possible). Wash eggs using a 100:1 solution of Brinsea Incubation Disinfectant. Follow the instructions supplied. It is essential to wash eggs in solution that is significantly warmer than the egg. Bear in mind that all solutions will remove the outer cuticle from the egg as well as the dirt and care must be taken to avoid re-contaminating the eggs during later inspection etc.

## **8 Setting Eggs**

Your Contaq Z7 Raptor is supplied with rollers which must be fitted with at least 2 ‘O-rings’ (one at each end) to provide reliable drive from the moving floor to the rollers. Place the two O-rings at the ends of the roller tube on the aluminium tube itself, not the end caps.

Slide the tips of the rollers into the slots provided in the turn chassis. Ensure the tips are spaced equally from the front of the chassis so that they run parallel with each other. The distance between the rollers must be optimised for the size of the eggs.

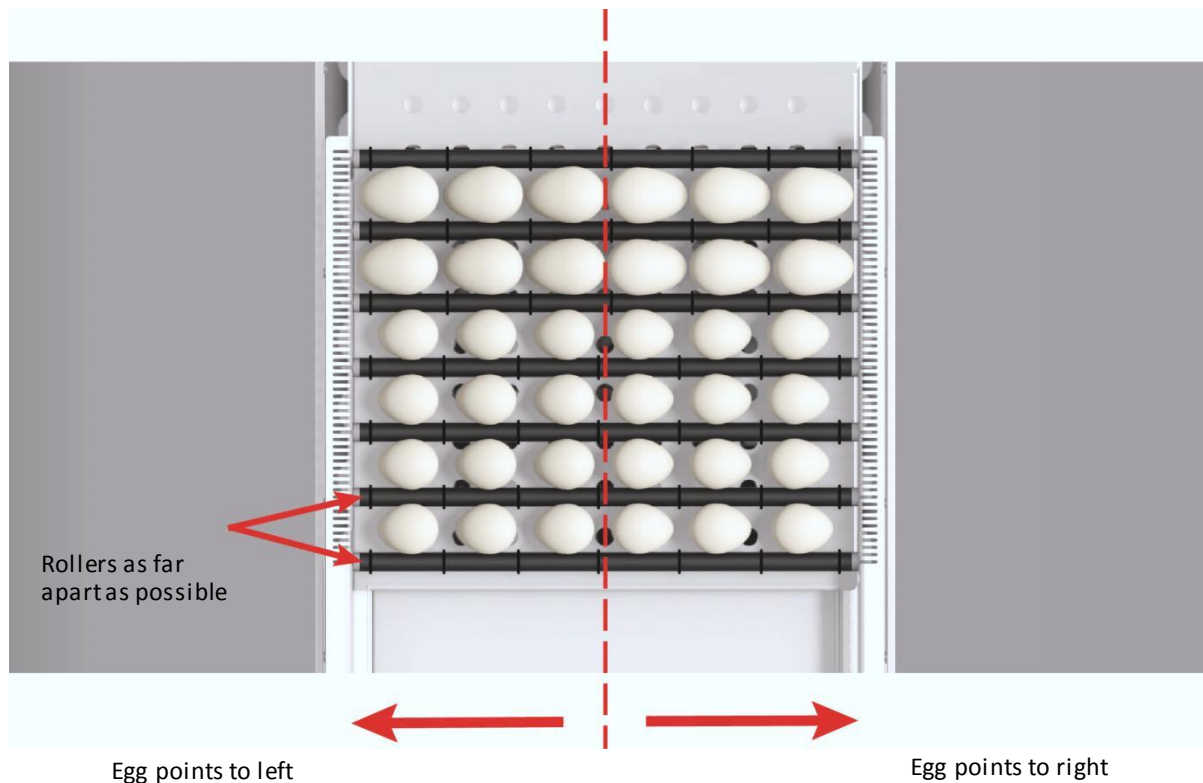


### IMPORTANT

During incubation all eggs should rest with their pointed end lower than the round end, the greater the angle the lower the risk of embryo mal-positioning. Check by regular observation that this is the case.

Rollers should be positioned as far apart as practicable for any particular sized egg, provided there is no danger of an egg falling through or getting jammed. Eggs supported like this are more likely to settle with the point slightly downwards. The angle tends to increase as the air cell dries out, as it does in Nature.

Eggs are set with pointed ends pointing towards the chamber side that is nearest. Thus eggs in the left half of the incubator should have their pointed end towards the left and eggs in the right half pointed towards the right:-



Use the small O-rings provided to divide eggs. By placing small O-rings on the tubing, this will stop eggs from gathering at one end of the tubing during turning.

## 9 Incubation Settings

Once plugged in, power-up the incubator by switching on the mains supply.

Notice the digital display reading 'warming...'. No operations can take place until the incubator has warmed up which will take about 20 minutes.

Once the warming period is finished, a screen similar to the following appears:-



The ContaQ Z7 Raptor is now in a working incubation mode and can be set-up for your personal preferences and those most suited to your species of eggs. To set-up your incubator, push buttons 1 and 4 on the control panel to enter settings. The **Main Menu** can now be accessed, refer to the menu list on page 11 to help navigate the screens.

### 9.1 Temperature

Stable and correct temperature is essential for good results. Allow the incubator to stabilise for at least an hour after adjusting the temperature. Adjust temperature with care – small differences have large effects on hatching performance.

Your ContaQ Z7 Raptor is fitted with a high quality, individually calibrated digital thermometer system that controls the air temperature within the contact skin. A calibrated Brinsea “Spot-Check” digital thermometer is also supplied to provide a convenient calibration reference (see section on Calibration). Be cautious of the accuracy of other thermometers used and have them calibrated if necessary. The control air temperature may be slightly higher than the average contact surface temperature (displayed on the contact thermometer system) due to the temperature gradient from the centre of the incubator to the room outside.

Note: Your incubator may not be set to the correct temperature for your eggs. The following procedure must be followed before setting eggs. These figures should be taken as a guide only.

As in Nature, Contact Incubation “skin” temperature is higher than that of the egg and the embryo inside it. The guide temperatures for Contact Incubation are therefore higher than those normally expected in Conventional Incubation, and the two very different techniques should not be directly compared.

As a guide for raptor eggs, the correct Incubator Temperature T1 should give a Contaq Temperature T2 of 37.8°C – 38.2°C. This may be monitored using the Contaq Thermometer System. Note that changes in room temperature have some effect on the contact temperature.

**The incubator temperature recommendations below are for guidance and based on current knowledge of contact incubation. These temperatures may need to be refined to optimise results for different ambient conditions. The contaq thermometer system provides a means of observing the contact surface temperature which would typically be 37.8°C to 38.2°C in raptor species (others may vary).**

	Rec'd temperatures:	Typical incubation period:
Hens	38.2°C 100.8°F	21 days
Pheasant	38.4°C 101.1°F	23-27 days
Quail	38.4°C 101.1°F	16-23 days
Ducks	38.2°C 100.8°F	28 days
Geese	38.2°C 100.8°F	28-32 days
Falcons	38.2°C 100.8°F	31-33 days
Parrots:		
Amazons	38.2°C 100.8°F	24-29 days
Macaws	38.2°C 100.8°F	28-30 days
Love birds	38.2°C 100.8°F	22-24 days
African Grey	38.2°C 100.8°F	26-28 days
Sulphur Cockatoo	38.2°C 100.8°F	29-31 days
Eclectus	38.2°C 100.8°F	28 days
Rhea	37.0°C 98.6°F	35-40 days
Emu	37.0°C 98.6°F	49-52 days

Developing embryos are fairly tolerant of short term temperature drops and the user need not be concerned about cooling that occurs when inspecting eggs. Temperatures above ideal can quickly have a serious detrimental effect on hatch rates and must be avoided.

The Contaq Z7 is fitted with a temperature alarm system, which gives audible and visual warning of unexpected high or low temperature readings. The screen displays the current temperature reading, as well as the 'correct' target temperature set by the user. To adjust the high and low temperature alarm settings, see section 16 of this manual.

The display of temperature in all aspects of the control and thermometer systems may be switched between degrees Celsius and degrees Fahrenheit. This setting is provided in the **Main Menu** (see page 11) and **Thermometer Main Menu** (see page 13)



## 9.2 Egg Turning

The Z7 Raptor has a robust, flexible egg turning system designed to allow accurate control of egg turning and easy cleaning and disinfection of parts.

The turning Angle is controlled by selecting the time that the turning motor runs for. The angle of turn will also be a function of the diameter of the eggs. Larger eggs will need a longer duration of turn to achieve a given angle of turn than smaller eggs. Use the guide to help you determine the correct duration of turn for the desired turn angle. PLEASE NOTE these are approximate figures and it is recommended you check the setting before incubation.

The settings for egg turning are provided in the **Main Menu** (see page 11). Note that the Turning Interval setting may be reduced to 0 (zero) to switch the turning system off.

The moving floor system has optical feedback that is linked to alarm software. In the unlikely event that the turning mechanism is jammed or fails to move the motor is automatically reversed. If this does not clear the error the alarm sounds and a warning is displayed.

### Recommended Turning Durations / Setup:-

Species	90°	120°	150°	180°
Partridge	-	4	5	6
Pheasant	4	5	7	8
Hen	6	7	9	11
Duck	7	9	11	13
Turkey	7	10	12	14
Goose	10	13	15	-
Emu/Rhea	13	15	-	-
Harris Hawk	6	8	10	11
Saker Falcon	6	8	10	11

The turning system has a digital counter that increments at the start of each turn sequence. When the counter reaches 999 it returns to 0. The counter may be reset at any time by pressing buttons 3 and 4 on the keypad.

### **9.3 Periodic Cooling**

Eggs are cooled briefly each time they are turned when the contact 'skin' is retracted, drawing in fresh air. Additional cooling can be achieved to simulate the bird leaving the nest. Typically this would be set for one or two cooling periods each day of 15 to 25 minutes duration. During the cooling period the contact skin is retracted and the heater is switched off. The cooling function settings are located in the **Main Menu** (by default cooling occurs every 24 hours for a period of 20 minutes). Note that the Cooling Interval setting may be reduced to 0 (zero) to switch periodic cooling off. The main menu is disabled while cooling is currently active, to stop cooling press the RESTART button.

### **9.4 Humidity**

Since the eggs in the contact incubator are immersed in air that is open to room conditions it is not feasible to alter the relative humidity to any useful extent. As the air is not moving (no fans) temperature and humidity gradients form that make accurate, meaningful measurement of humidity almost impossible and of no benefit to the operator or the eggs. For these reasons no direct measurement of humidity is provided.

It is to be noted that since the eggs are not immersed in artificially heated or rapidly moving air the water (weight) loss from the eggs is usually within normal limits. Weight loss may be corrected during the second half of incubation in a conventional incubator such as the Brinsea K7 to achieve optimised weight loss at time of pip.

## **10 Hatching**

The well-proven benefits of contact incubation are best suited to the first half of incubation. Eggs are often taken from the nest on day 1 and incubated for a period of approximately 10 to 14 days before being moved to conventional incubators such as the Brinsea K7 for weight loss management and hatching. Although many chicks have been hatched in contact incubators it is not recommended practice.

## **11 Routine Cleaning**

In order to get the most out the Contaq Z7 Raptor throughout its life, it is essential that care is taken in routine cleaning and maintenance. Parts can be removed for cleaning, or replacement, which is outlined and illustrated in this section.

**IMPORTANT:**

**DISCONNECT THE INCUBATOR FROM THE MAINS POWER SUPPLY DURING CLEANING.**

**ENSURE THAT ALL ELECTRICAL PARTS ARE KEPT DRY.**

NEVER WASH CONTAQ Z7 PARTS IN LIQUIDS OVER 50°C (120°F). DO NOT USE A DISHWASHER TO CLEAN COMPONENTS.

Following each use of the Contaq Z7 remove all debris from the roller dividers and moving floor. Soak parts in a 100:1 solution of Brinsea Incubation Disinfectant. Wipe all internal surfaces with a soft cloth soaked in 100:1 Brinsea Incubation Disinfectant solution.

The egg turning system chassis may be unplugged from its electrical connector and removed for cleaning. A cover cap is supplied to fit over the connector in the incubator to make it liquid tight for cleaning the inside of the egg chamber.

Always clean the incubator before storage and ensure that the unit is totally dry inside and out.

Re-order Brinsea Incubation Disinfectant by phoning 0845 226 0120 and quoting part number 14.35 (100ml) or 14.36 (600ml).

## 12 Contact “Skin” Frame Removal

The contact skin and frame may be removed after the drawer is opened slightly beyond its locking point by releasing the side levers and pulling further out as shown. Take care to prevent the drawer falling from the sliding parts.



Alternatively the drawer may be completely removed by releasing the levers and pulling all the way out of the front of the incubator. The turn system chassis must be removed first to ensure the cable is safe and to minimise the weight of the drawer.

Slide the Contact Skin Frame out of / into the guides in the top of the incubation chamber. Note that the frame is not square and will only push in fully when fitted the correct way. The frame will be a tight, sliding fit to ensure a good air seal. The black felt should be on the top.



Contact Skins are available as spares from Brinsea Products (part number Q3004). Note that small holes in the Contact Skin are not detrimental to the effectiveness of the system and larger holes may be simply fixed with tape in an emergency.

## 13 Troubleshooting

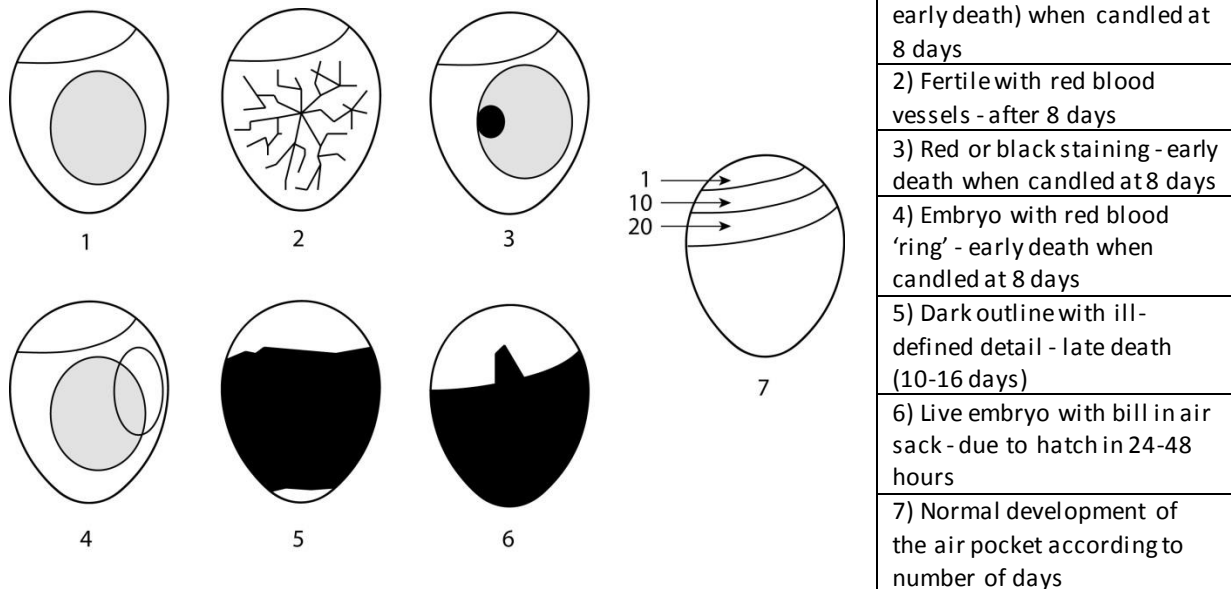
### 13.1 Poor Hatching Results

Poor hatching results are frustrating and can be caused by a large number of factors. The most common are given below. Brinsea Products will not be held responsible for loss of eggs or chicks under any circumstances. However we will try to advise on incubation technique to improve results where necessary.

#### Gather Information

Gather as much information from the hatching results as possible to enable the problem to be analysed in detail. Record dates that eggs are set, incubator settings, dates of hatches, weight losses and the number and condition of hatchlings. Candle or break open un-hatched eggs to estimate the extent of embryo development. Brinsea OvaView candling lamps are available from your dealer.

#### Embryo Development Guide



<b>Observation</b>	<b>Likely Cause(s)</b>	<b>Solution(s)</b>
No chicks hatch	Infertility, infection, drastically incorrect incubation settings, parent ill health.	Check egg viability – are similar eggs hatching naturally. Disinfect the incubator. Check incubator settings and procedures – particularly temperature.
Chicks hatch earlier than expected, deformities.	Incubation temperature too high	Reduce incubation temperature slightly 0.5°C (1°F)
Chicks hatch later than expected	Incubation temperature too low	Raise incubation temperature slightly 0.5°C (1°F)
Hatch dates widely spread	Different rates of development due to different storage times, incubation temperature variation.	Limit egg storage times. Check for incubation temperature variation – sunlight, large room variation etc.
Late stage 'dead in shell'	Incorrect humidity, probably too high.	Try reducing average humidity levels (but see section 7 above)
Generally poor results	Incorrect incubation settings, poor parent bird health, inadequate egg turning,	Improve parent bird health, check all incubation settings, analyse egg weight loss to confirm humidity correct, check turning working correctly.

For further information refer to the Brinsea Incubation Handbook available on line at [www.brinsea.co.uk](http://www.brinsea.co.uk)

## 14 Technical and Non-Routine Servicing

The incubator control and contact thermometer system have Engineering Mode functions to allow adjustment of temperature calibration and other system parameters that would not normally need to be changed on a regular basis.

Note: remove eggs from the incubator while making adjustments or checks and ensure the incubator behaves as expected before returning them.

### 14.1 Incubator control factory values reset

The default settings for all aspects of the control system may be reset as follows:

Hold button 1 (OK) of incubator control and momentarily press the RESTART button.

The factory defaults will be reset. **Note that the temperature calibration will be lost and must be adjusted as necessary. Adjust the control temperature display to match the calibrated “spot-check” thermometer supplied with the incubator.**

### 14.2 Contaq thermometer system factory values reset

The default settings for all aspects of the contact thermometer system may be reset as follows:

Disconnect power.

Shut down the thermometer / power fail alarm.

Hold button 1 (OK) of thermometer control and connect power while holding the button.

Release button 1.

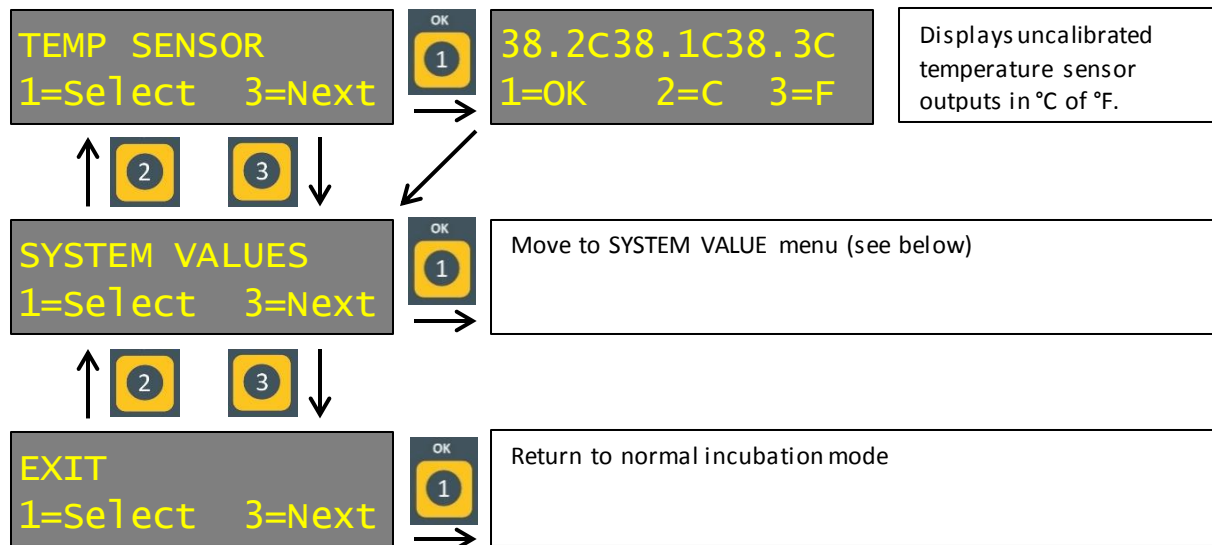
The factory defaults will be reset. **Note that the temperature calibration will be lost and must be adjusted as necessary. This may require specialist equipment (calibrated fine-wire thermocouple with calibrated digital thermometer are recommended).**

### 14.3 Engineering (ENG) Mode and System Values for Incubator Control: -

Engineering mode can be accessed to view temperature sensor readings and to adjust various system parameters including the temperature display calibration. To access the engineering mode menu hold buttons 2 and 3 and briefly press the RESTART button. Release buttons 2 and 3. The display will show “Initialising”. Press button 1 (OK) to enter engineering mode.

Note: Pressing the RESTART button at any point will ignore any changes made and return to incubation mode.

## Engineering Menu (Incubator Control)



## System Values (Incubator Control)

*Please Note: These are the recommended default values and it is not advised they are changed unless you are at an expert level in incubation practice and fully understand the relevance of each setting. Please call our Brinsea technical support team on 0845 226 0120 for help and advice required on this section.*

Push Button 1 to select System Values from the Engineering Menu.

Notice VAL appears in the top right of the display when selected. Use buttons 2 and 3 to scroll between values, and button 1 to select a value. The following settings are provided, the defaults are in brackets:-

CALIB TEMP	Use to calibrate the thermometer system up or down (see section 14.5). (0.0)
EVACUATION	Increase or decrease the time the Contact Skin is retracted during the turn routine. This must be greater than the Turn Delay plus maximum Turn Angle setting (e.g. 10s + 20s = 30s). (1m)
TURN DELAY	Increase or decrease the delay from the start of the turn routine to when the motor runs. This allows time for the Contact Skin to retract. (10s)
OVER TEMP	Increase or decrease the high temperature alarm. This is the difference in degrees Celsius between the set temperature and the alarm temperature. (2.0°C)



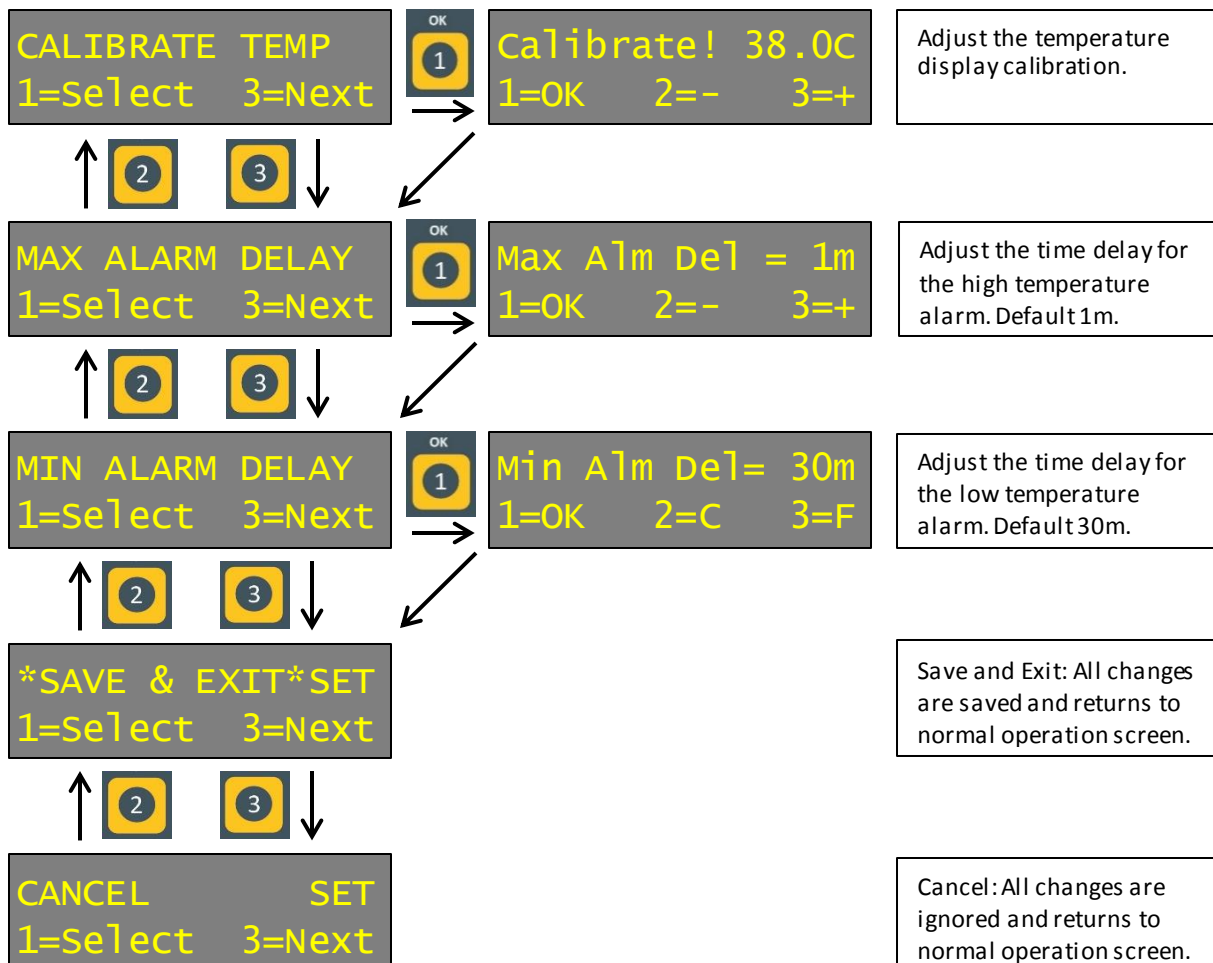
- UNDER TEMP**                    Increase or decrease the high temperature alarm. This is the difference in degrees Celsius between the set temperature and the alarm temperature. (5.0°C)
- BGH**                                Increase or decrease the heater gain constant. Low mains voltage in conjunction with low room temperature (or vice-versa) may cause control temperature oscillations. This setting adjusts the heating power at set point. (60)
- LIGHT ON TIME**                Increase or decrease the time the light stays on. (2m)

In order to save these settings, ensure you select SAVE & EXIT. If you are unhappy about any changes you have made, select ABORT CHANGES.

**14.4 Calibration and System Values for Contaq Thermometer: -**

To access the Contaq Thermometer calibration and system values menu press all three buttons on the thermometer control simultaneously.

**Contaq Thermometer Calibration / System Values Menu**



## 14.5 Temperature Calibration (Incubator Control)

### CAUTION

Temperature calibration should not be confused with setting the incubation temperature (section 9). The control system thermometer is adjustable to allow its reading to be precisely matched to a reference thermometer.

*Do not attempt to calibrate temperature unless the accuracy is suspected to be significantly compromised. Allow at least 24 hours for the equipment to fully warm and stabilise before making an adjustment. Small fluctuations over time are a result of drift in the electronic circuits and variations in room temperature. Do not be tempted to adjust the calibration very frequently; it only serves to exaggerate fluctuations. Please call our Brinsea technical support team on 0845 226 0120 for help and advice required on this section.*

**Always use a high quality thermometer calibrated to a traceable standard. Allow a minimum 30 minutes to stabilise after each adjustment.**

A tube is located behind a rubber bung on the right hand side of the incubator cabinet. This passes into the centre of the heater chamber adjacent to the temperature sensors. A calibrated Brinsea Spot-Check thermometer is provided with a holder made to the correct length for insertion into the tube. Any alternative thermometer used for this purpose should be a similar length when inserted into the incubator.

Once the machine and thermometer have stabilised enter Engineering Mode as explained in section 14.3. Scroll to the 'system values' section, and select. Then scroll to CALIB TEMP and adjust by a minus figure if the display is reading high, or a positive figure if the display is reading low. Note that the calibration figure is an offset in degrees Celsius, it is not the actual temperature. Select "Save and Exit" and allow 30 minutes to stabilise. Adjust further if required by small increments.

## 14.6 Temperature Calibration (Contaq Thermometer)

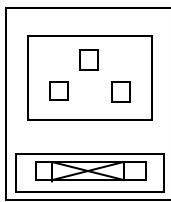
The temperature display for the Contaq Thermometer system may be adjusted to allow its reading to be precisely matched to a reference thermometer.

*Do not attempt to calibrate temperature unless the accuracy is suspected to be significantly compromised. Allow at least 24 hours for the equipment to fully warm and stabilise before making an adjustment. Small fluctuations over time are a result of drift in the electronic circuits and variations in room temperature. Do not be tempted to adjust the calibration very frequently; it only serves to exaggerate fluctuations. Please call our Brinsea technical support team on 0845 226 0120 for help and advice required on this section.*

Since the thermometer probe measures the temperature of the contact skin against the top of the bulk of the probe body the suggested method of checking this is to use a fine wire thermocouple of known calibration value and a calibrated thermometer suitable for the

chosen thermocouple to directly measure the temperature at this interface. Operate the incubator under normal conditions with the turning system switched off and the Contaq thermometer probe placed in its normal position of use. Attach the thermocouple to the face of the sensor disc on the top of the probe using adhesive tape. Carefully route the thermocouple wire out of the drawer. Close the drawer and leave the system to thermally stabilise for at least 1 hour. Access the calibration screen as shown in section 14.4 and adjust the display temperature to match the thermocouple reference thermometer. The Contaq thermometer display is the absolute value displayed in real time. Once matched press OK and then scroll to SAVE & EXIT. Press OK again to save the change to the calibration value.

### 14.7 Rear Panel Connections



a.c. inlet



external alarm socket

**a.c. inlet** 115 volt or 230 volt mains input as ordered. The inlet has a built-in fuse-holder for a 2 Amp "slow-blow" type fuse plus a compartment for a spare. Further spares may be ordered from Brinsea Products.

**CAUTION** - For continued protection against fire the fuse should only be replaced with one of similar rating.

**Alarm** The Incubator Control System has a set of relay contacts that can be used to trigger an external alarm system. The socket receives a 3.5mm jack plug: Body = common, Sleeve = N/O when alarm is active or power is off, Tip = N/C when alarm is active or power is off.

## 15 Specification

### Nominal Egg Capacity:

Quail	88
Partridge	63
Pheasant	48
Hen	42
Duck	20
Turkey	20
Emu/Rhea	8

**Dimensions:** 12.6" x 26" x 23.2" (320mm x 660mm x 590mm) h w d

**Weight:** 77lb 2oz (35Kg)

**Max Power Consumption:** 120 Watts

**Electrical Supply:** 115v 60Hz

### Consumable Parts

PN	Description
14.35	Brinsea Disinfectant (100 ml)
14.36	Brinsea Disinfectant (600 ml)
Q3004	Contaq Z6/Z7 Contact Skin (inc Frame)

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