

Brinsea

Octagon 20 Plus

Precision Egg Incubation System

Users instructions

Contents

<u>Section</u>	<u>Subject</u>	<u>Page</u>
1	Introduction	2
2	Unpacking	3
3	Location and Installation	3
4	Storage of eggs	6
5	Temperature	6
6	Humidity and Ventilation	6
7	Egg Setting	9
8	Egg Turning	9
9	Hatching	9
10	Cleaning Up	10
11	Servicing	10
12	Troubleshooting	11
13	Specification	12
14	Certificate of Thermometer Accuracy	13

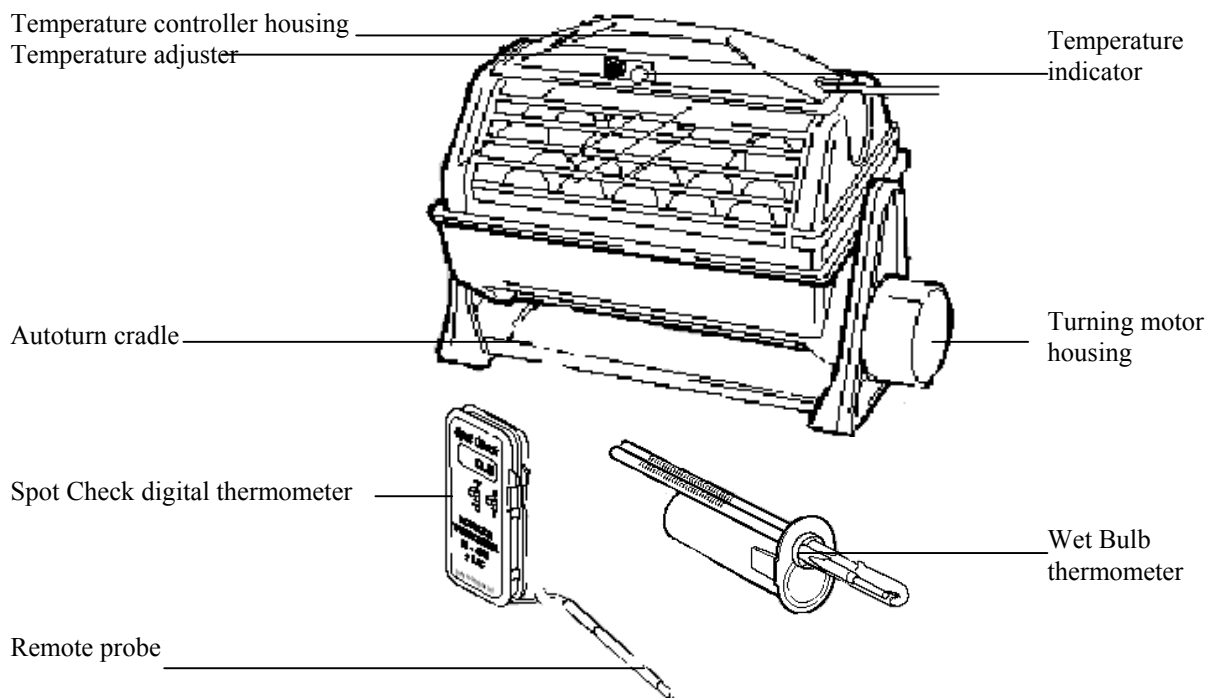
1.0 Introduction

These instructions detail the operation of your new Brinsea Octagon 20 Plus incubation system. Please read these instructions carefully before setting up your machine to achieve best possible results and keep these instructions safe for future reference. This document includes recommended procedures for successful hatching but incubation involves the control and manipulation of a large number of factors and in certain circumstances different procedures may be necessary. Your incubator is designed to allow the user to vary the incubation conditions to suit a wide range of species in different ambient conditions and the specific set-up for every situation is beyond the scope of these instructions.

These instructions cover the use of the incubator and wet bulb thermometer. Additional equipment (Automatic humidity and temperature alarm or brooder modules, for example) may be used in conjunction with your Octagon 20 Plus and in these cases separate operating instructions for these modules are supplied.

There is also a range of books available covering incubation techniques, for more information or to request a book list please don't hesitate to contact us.

Fig. 1 *Functional features of the Octagon 20 Plus incubator package.*



2.0 Unpacking

Your incubator has been supplied in protective packaging. Please remove all tape, strapping and packing from the incubator and parts. Retain the carton and packing materials to enable the unit to be repacked.

Your Octagon 20 Plus will include as standard:	<u>Quantity</u>	<u>Item</u>
Incubator:	1	Incubator (including removable lid)
	1	Egg tray (black)
	1	Set of six cushioned egg dividers & foam mat
	1	Spotcheck digital thermometer
	1	Guarantee Card
Autoturn Cradle	2	Black metal tubes
	1	Motorized cradle end
	1	Plain cradle end
	1	Set of four screws
Wet Bulb Thermometer	1	Two piece translucent moulding
	2	Spirit thermometers
	1	Length of hollow cotton wick
	1	Mounting clip
	1	Set of 2 screws and nuts

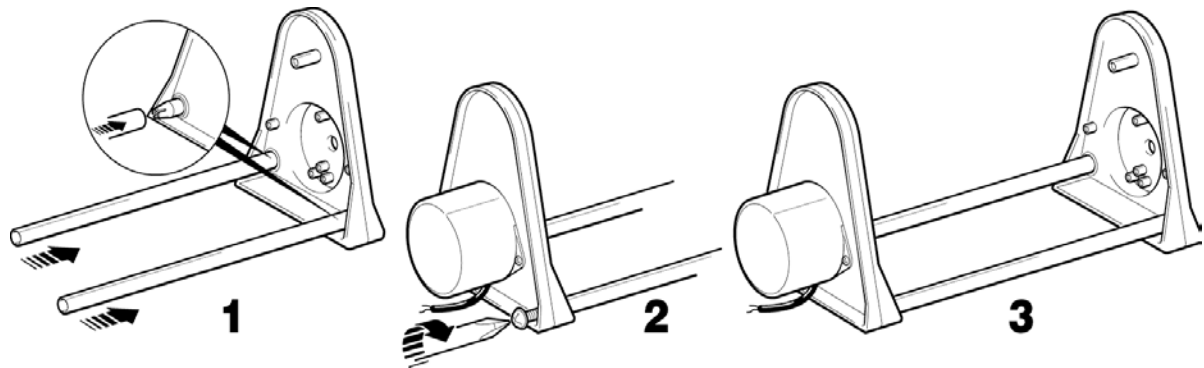
- 2.1 Please identify each part and check that they are all present and undamaged. If there are any parts damaged or missing please contact your retailer or Brinsea Products (at the address at the end of the document).
- 2.2 Check also that the electrical supply matches the machine's requirements (marked on the technical label on the inside of the lid of the incubator and on the side of the autoturn cradle).
- 2.3 Complete and return your guarantee card to register for the free two year guarantee covering your incubator.
- 2.4 Go to www.Brinsea.com and register as a free member of the Brinsea e-mail group to receive the latest news and information such as advance notice about new products, special offers, exclusive competitions and much more.

3.0 Location and Installation - Incubator

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 68 and 77°F (20 and 25°C). Never allow the room temperature to drop below 59°F (15°C) and ensure that the incubator cannot be exposed to direct sunlight.

- 3.1 Assemble the autoturn cradle in accordance with the diagram below (Fig. 2) and place on a flat, level surface (table height is ideal). Place the incubator into the autoturn cradle as illustrated (Fig. 1). The cabinet is designed to locate onto the lugs at either end of the autoturn cradle. Take care to offer the incubator at the angle which matches that of the drive lug to avoid damage to the mechanism. Ensure full engagement in the slots in the ends of the incubator so that the incubator is level end to end.
- 3.2 If using without the autoturn cradle place the incubator upright on a flat level surface.

Fig. 2



- 3.3 Uncoil a length of the Spotcheck digital thermometer sensor lead and push the end of the sensor through the small rubber grommet fitted into the black plate at the end of the incubator lid. The sensor should protrude at least 1.5”(40mm) into the incubator cabinet. Alternatively you can push the end of the sensor through one of the four ventilation holes in the yellow base of the incubator. The sensor should be placed in a representative position, near the top of the eggs but not touching the eggs. You can clip or tape the sensor to one of the dividers. Never insert the sensor lead through the sliding ventilation control on the top of the incubator, this would damage the circulating fan. Some small difference is to be expected between any two thermometers. A Spotcheck close to the eggs should be preferred, the other being regarded as a backup. The Spotcheck is fitted with a battery, replacements are available from Brinsea Products at the address at the end of these instructions. We recommend not leaving the thermometer permanently switched on to preserve battery life.
- 3.4 Separate instructions and specifications for the Spotcheck digital thermometer are included. Note that a certificate of accuracy for the particular thermometer supplied as part of this 20 Plus is included at the end of these instructions. The Spotcheck has a range of 90-110°F (32 – 43°C) and so will not give a reading until this range is attained (an “L” for Low temperature will appear on the digital readout).
- 3.5 Remove the lid, lift out the egg tray and fill one of the two water channels with water or 100:1 Brinsea Incubation Disinfectant Solution leaving the top of the liquid $\frac{3}{4}$ ” (20mm) from the top of the channel. Replace the tray and replace the lid. Slide the ventilation control to the center of its range.
- 3.6 Plug incubator and cradle mains supply cables into suitable outlets ensuring that the cables are not pulled tight. The incubator fan will start and the red LED on the temperature control housing will illuminate continuously and the digital temperature display will show the air temperature. The cradle motor will start and the incubator will begin to turn. The turning is very slow – taking about half an hour to turn each way.
- 3.7 Allow the incubator to run for at least an hour to stabilize the temperature (red LED flashing) before making adjustments or setting eggs (see section 5.0 below).

3.8 Installation – Wet Bulb Thermometer

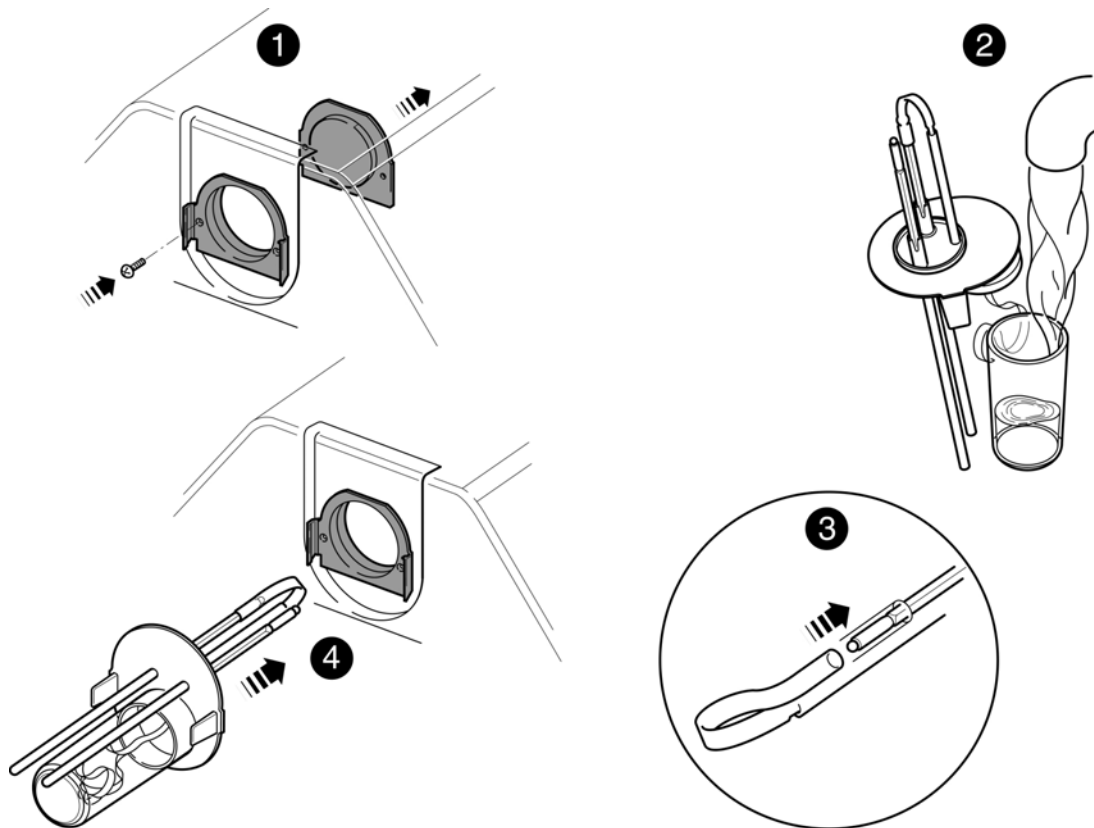
You will need a piece of stiff wire about 3 inches long (e.g. paper clip extended straight), a Phillips screwdriver and a small amount of distilled water. Assemble the wet bulb thermometer following the diagram (Fig.3).

- 3.9 Remove the black blanking plate from the side of your Octagon 20 incubator by pushing out plastic rivets from the inside of the incubator with a screw driver. (Fig.3- illustration 1)
- 3.10 Use the screws provided to attach the black wet-bulb clip to the outside of the incubator. Use the screw holes from the black plate that you previously removed. Making sure that the grooved edge fits snugly into the hole on the side of the incubator. The clip should face out and the long flat side should face downwards. (Fig.3- illustration 1).

- 3.11 Remove the water reservoir from the wet bulb thermometer moulding. This is the part that looks like a very small cup. Gently loosen the reservoir by turning it slowly. When loosened, pull it off straight.
- 3.12 Tie a knot 2" (50mm) from one end of the wick provided. Using the piece of stiff wire, push the untied end of the wick through the clear wick tube from the reservoir side. The remaining wick including the knot will be submerged in the reservoir of distilled water.
After filling the reservoir with distilled water hold the reservoir upright to prevent spillage, push the moulding firmly back on to the reservoir. (Fig.3 – illustration 2)
- 3.13 Locate the thermometers provided. Fit one thermometer through each hole bulb-end first. The thermometers should extend inside as far as the wick tube.
- 3.14 The loose end of the wick should then be pushed over the bulb of one of the thermometers like a sock so that the thermometer bulb is completely enclosed. (This is the thermometer that will give you the wet bulb reading. The other is the dry bulb or actual temperature of the incubator.) Ensure that the wick is neither pulled tight nor in a wide loop between the end of the tube and the thermometer bulb. (Fig.3 – illustration 3)
- 3.15 Clip the wet bulb to the plate on the side of the incubator ensuring that the bulb end of the thermometers is inside the machine. (Fig.3 – illustration 4)

Note. Use of distilled water will reduce the salt deposits which build up on the exposed wick and extend the wick life. It is essential that dirty and encrusted wick is trimmed off and more wick drawn through the tube to ensure accuracy. For complete accuracy and minimal infection risk, trim back the wick between each hatch. Additional lengths of wick are available from Brinsea Products or your supplier.

Fig. 3



4.0 Storage of eggs

- 4.1 Store eggs in cool, damp conditions. Some species may be safely stored for up to 14 days before serious reductions in hatch rates are likely, parrot eggs store less well. Daily turning of stored eggs also helps maintain hatchability.
- 4.2 Discard cracked, mis-shaped and heavily soiled eggs (if possible). Only wash soiled eggs using a brand egg wash solution such as Brinsea Incubation Disinfectant Concentrate following the manufacturers instructions. It is essential to wash eggs in solution which 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 may leave the egg at greater risk from bacterial contamination in the future.

5.0 Temperature

Stable and correct temperature is essential for good results. Adjust with care.

Note: your incubator may not be set to the correct temperature from the factory and the following procedure must be followed before setting eggs.

- 5.1 As the incubator warms up and approaches its control setting the red LED will change from continuously on to flashing. Allow the incubator to stabilize for at least an hour before adjusting the temperature.
- 5.2 Rotate the red adjustment spindle with a small screwdriver – clockwise to increase temperature, anticlockwise to reduce it. 2°F (1°C) is about ¼ turn of the spindle.
- 5.3 When reducing temperature the red LED may go out while the incubator cools – this is normal.
- 5.4 Use the calibrated Spotcheck thermometer supplied to check temperature. Adjust temperature with care – small differences have large effects on hatching performance.

Recommended temperatures:

Typical incubation period:

Hens	37.5°C	99.5°F	21 days
Pheasant	37.7°C	99.8°F	23-27 days
Quail	37.7°C	99.8°F	16-23 days
Ducks	37.5°C	99.5°F	28 days
Parrots:			
Amazons	37.2°C	99.0°F	24-29 days
Macaws	37.2°C	99.0°F	26-28 days
Love birds	37.2°C	99.0°F	22-24 days
African Grey	37.2°C	99.0°F	28 days
Eclectus	37.2°C	99.0°F	28 days

- 5.5 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.
- 5.6 The Octagon 20 Plus may be used in conjunction with the Brinsea T20 temperature alarm system which gives audible and visual warning of mains failure, over temperature and under temperature. Contact your dealer or Brinsea Products for further details.

6.0 HUMIDITY AND VENTILATION

Short term variations in humidity are not important. The average humidity over the incubation period needs to be near optimum to achieve the ideal weight loss. High humidity for the day or two of hatching is also important. Beware chronic, excessive humidity.

- 6.1 Two factors affect incubation humidity: water evaporation within the cabinet (from eggs as well as from additional water) and levels of ventilation. The moisture in the air being drawn through the incubator will also have an effect.
- 6.2 There are three methods available to bird breeders to achieve correct humidity levels:
- Follow manufacturers guidelines for water and ventilation levels (see below).
 - Measure humidity levels and adjust to match published guidelines for different species (see below).
 - Monitor egg weight loss which varies as a direct result of humidity and correct against published weight loss figures for the species.

a) Ventilation

As a general guide for poultry set the ventilation control to about half open and maintain water or 100:1 Brinsea Incubation Disinfectant Solution in one of the two water channels in the Octagon 20 Plus. If the incubator is not full reduce the ventilation level accordingly. If the incubator is full of parrot eggs, the ventilation control should be about 2/3 open.

For all species ensure water or disinfectant solution in all channels for the last two days of incubation. Higher humidity levels are needed for hatching to prevent membranes drying too quickly. **Do not close the vent below 1/3rd when hatching.**

The above guidelines make no provision for different ambient conditions and are necessarily rather generalized but they are simple and often effective.

b) Wet Bulb Measurement

If measuring humidity levels directly, be cautious of readings from low cost analogue or digital hygrometers. The best way of accurately measuring humidity levels at reasonable cost is to use the wet bulb thermometer supplied. By comparing the temperature readings of a wet bulb (WB) thermometer with a normal (dry bulb) thermometer the relative humidity (RH) level can be found by using a table (see below).

Relative humidity (always expressed as a percentage) is proportional to the difference between the dry and wet bulb thermometer readings. Do not confuse wet bulb temperatures (which are sometimes quoted in books) with percentage relative humidity.

<u>RH level (%)</u>	<u>WB Temp °F</u>	<u>WB Temp °C</u>
20	69.1	20.6
25	71.6	22
30	74.1	23.4
35	76.5	24.7
40	78.8	26
45	80.8	27.1
50	82.9	28.3
55	84.9	29.4
60	86.7	30.4
65	88.5	31.4
70	90.1	32.3
75	91.9	33.3
80	93.6	34.2
85	95	35
90	96.6	35.9
95	98.1	36.7
100	99.5	37.5

The figures above assume a dry bulb (incubation) temperature of 37.5°C (99.5°F).

Note that the wet bulb will read the same as the dry bulb either at 100% RH or, more probably, when the wick dries out.

Generally accepted incubation RH levels for species groups:

During incubation	Waterfowl	45-55% RH
	Poultry	40-50% RH
	Parrots	35-45% RH
	Most Birds of Prey	40-45% RH
	(Thin shelled - Merlins, Kestrels, Owls)	50%RH)
Hatching	All species	65% RH or more

For more specific information on particular species' requirements check the relevant literature.

c) Determining correct humidity setting – monitoring egg weight loss

Eggs lose moisture through their shells and the rate of evaporation depends on the humidity levels around the eggs. The range in recommended humidity level for any given species is because of individual differences in shell porosity between one egg and another – even if laid by the same bird.

There is a technique whereby water loss can be monitored during incubation, allowing the humidity level to be adjusted to keep water loss exactly right.

The need for eggs to lose a fixed amount of water during incubation corresponds to a loss in weight of around 13-18% depending on species. By weighing eggs periodically during incubation it is possible to monitor and, if necessary, correct humidity levels to achieve the correct weight loss.

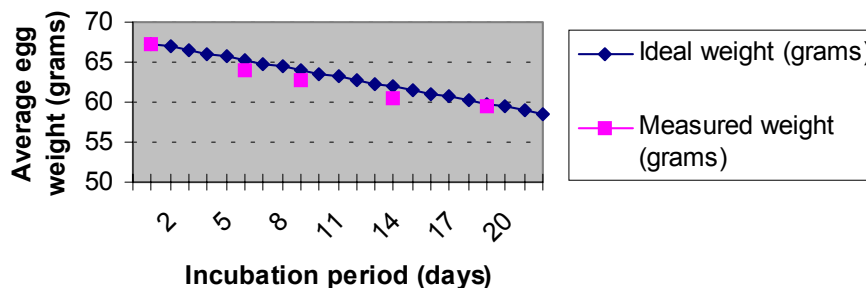
Weigh the eggs on the day they are set in the incubator, take the average weight and plot this on a graph (see example below). The ideal weight loss line can be plotted by joining the point representing initial average weight with the ideal hatch weight (13-18% less depending on species) with the x-axis representing the incubation period (in days).

By measuring actual average weights every few days the actual weight loss can be plotted and compared to the ideal weight loss line and corrections can be made. For example if the actual weight loss was greater than ideal (see graph below) then the air has been too dry and humidity levels need to be increased to compensate.

Typical ideal weight losses for species groups:

Birds of Prey	17%
Poultry	13%
Parrots	18%
Waterfowl	14%

Egg weight loss chart



6.3 Of the three methods given above the most reliable is egg weight method and is recommended – particularly where poor hatch rates are experienced or if eggs of high value are being incubated.

6.4 Alter the setting of the ventilation control and have water in neither, both or one of the water channels to change the humidity level (see section 6.2a above).

- 6.5 In all cases the humidity for hatching needs to be high. Because of the short duration involved water/weight loss will not be significantly affected. High humidity is necessary to prevent membranes drying and hardening before the hatch fully emerges. Humidity will naturally increase as the first eggs begin to hatch and internal membranes begin to dry. This effect is in addition to the increased area of water evaporation from the water channels. Humidity will fall dramatically when the lid is opened. Resist the temptation to lift the lid frequently.
- 6.6 The Brinsea H22 Automatic Humidity Management Module is available as an option on the Octagon 20 Plus. This module provides a readout of RH level and automatically controls water evaporation to maintain the user's setting.

7.0 Egg Setting

- 7.1 The Octagon 20 Plus is designed to be as flexible as possible, accommodating eggs of different sizes up to duck eggs. Foam cushions isolate the eggs from potentially harmful vibration. Some experimentation may be necessary to maximize capacity.
- 7.2 Before setting eggs ensure that the incubator has been run for several hours and has stabilized at the correct temperature.
- 7.3 Set the eggs in rows between the plastic dividers. The dividers must be positioned such that the eggs rest on the foam mat on the egg tray base and are not pressured by the dividers. Eggs rolling through a few degrees between the dividers as the incubator turns are not in danger. Eggs may be set on end (or at an angle) provided the large end of the egg is upwards.
- 7.4 Once the eggs have been set the temperature must not be adjusted for 24 hours to allow the eggs to warm. Check the water level every 3 days or so and temperature daily. Candle the eggs after 1/3rd of the incubation period has elapsed to reject clear, infertile eggs (see section 12).

8.0 Egg Turning

Warning: **NEVER MANUALLY TURN THE INCUBATOR WHILE IT IS ON THE CRADLE**, this will damage the turning mechanism and invalidate the guarantee.

- 8.1 The autoturn cradle will continuously turn the incubator and eggs on an hourly cycle (through 90° and back) while plugged into the mains supply. Some small intermittent movement due to play in the gears is normal and does not cause harm. Lubrication of the plastic linkage with WD40 helps to ensure smooth, silent movement.
- 8.2 Ensure that nothing can impede the movement of the incubator on the cradle (such as a mains cable or having the incubator too close to a wall).
- 8.3 Altricial species such as parrots or birds of prey may benefit from additional manual turning through a full 180° once or twice a day.

9.0 Hatching

- 9.1 If hatching in the Octagon 20 Plus, unplug the autoturn cradle and remove the incubator from the cradle. Place the incubator on the work surface in the upright position and remove the egg dividers two days before the hatch is due.
- 9.2 For maximum setting capacity, cleanliness, flexibility and performance a separate hatcher may be used. A second Brinsea Octagon 20, Octagon 10 or Hatchmaker incubators are recommended. Contact your dealer for details.

- 9.3 Eggs nearing hatch are slightly less sensitive to temperature variation and the hatching temperature can be reduced by up to 2°F (1°C) but this is not essential.
- 9.4 Hatching humidity levels need to be high (see section 6.0 above) but note that the VENTILATION CONTROL MUST BE AT LEAST 1/3RD OPEN DURING HATCHING.
- 9.5 When most eggs have hatched (12 to 48 hours) remove the hatchlings to a brooder. The Brinsea TLC-4 brooder or Octagon 20 Parrot Rearing Module are recommended for exotics and the Cozylamp for precocious species.
- 9.6 During hatching the high humidity levels will fall dramatically when the lid is lifted and will take some time to build up. Resist the temptation to open the incubator frequently – leave for at least 6 hours between inspections.

10.0 Cleaning Up

10.1 **IMPORTANT:**

DISCONNECT THE INCUBATOR AND BASE FROM THE MAINS POWER SUPPLY DURING CLEANING.

ENSURE THAT ALL ELECTRICAL PARTS ARE KEPT DRY.

NEVER WASH THE TRAYS, COVERS OR CABINET PARTS IN LIQUIDS OVER 120°F (50°C).
DO NOT USE A DISHWASHER TO CLEAN TRAYS, CABINET BASE OR LID.

- 10.2 Following each hatch in the Octagon 20 Plus remove and wash the egg tray, dividers and yellow base and wet bulb thermometer in Brinsea Incubation Disinfectant Concentrate (the foam parts of the dividers will need drying thoroughly before re-use). Wipe all internal surfaces with a soft cloth soaked in the sterilising solution. Periodically unscrew the four nuts retaining the fan cover, remove the cover and soak. Dust and fluff may be removed from the fan with a soft brush.
- 10.3 If a separate hatcher is used the procedure above should still be followed every two months.
- 10.4 The exterior of the incubator and Autoturn cradle may be cleaned with a damp cloth. Avoid allowing any moisture to get inside mechanical housings.
- 10.5 Always clean the incubator before storage and ensure that the unit is totally dry inside and out.

11.0 Servicing

IMPORTANT: THE HEATER IS AT MAINS VOLTAGE. NEVER DRILL INTO OR PUNCTURE THE CLEAR LID OF THE INCUBATOR. RISK OF ELECTRIC SHOCK.

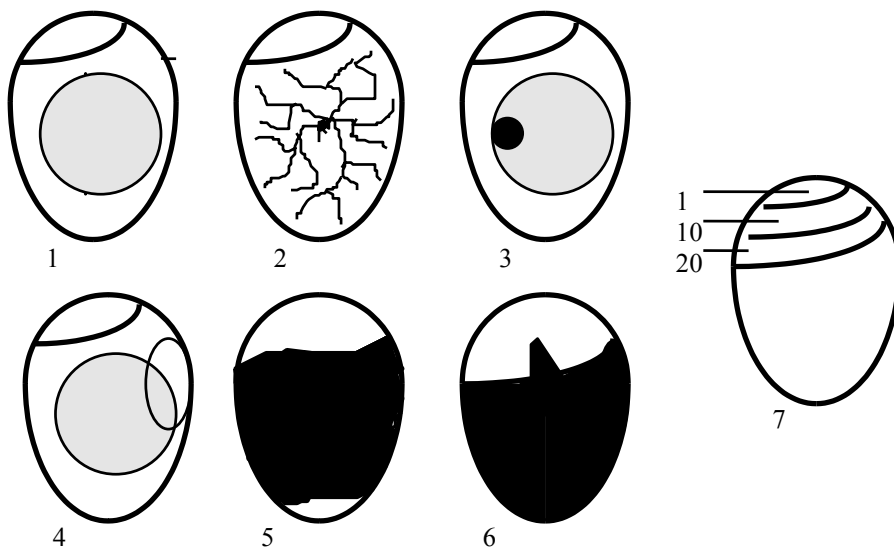
- 11.1 Under certain conditions it is possible that condensation may form between the inner and outer clear top mouldings. The presence of water between these layers does not affect the performance of your incubator and does not pose an electrical hazard because the element itself is sealed and the live parts are not exposed. To disperse condensation leave the incubator running without eggs or water in a warm room.
- 11.2 In case of failure first check that the mains power supply is working. If the problem persists contact your distributor or Brinsea Products Service Dept.
The functional parts of the Octagon 20 Plus are modular and parts are available and are readily exchanged by a suitably qualified person equipped with basic tools. Fitting instructions are supplied with replacement parts.
- 11.3 The digital temperature display is individually calibrated during manufacture but may be re-calibrated if required. To ensure optimal performance return the incubator to Brinsea Products Service dept. for re-calibration every two years. It is not recommended that this procedure is carried out by the user.

11.4 No lubrication or further servicing is required beyond the instructions above.

12.0 Troubleshooting

12.1 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.

12.2 Gather as much information from the hatching results as possible to enable the problem to be analyzed 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 unhatched eggs to estimate the extent of embryo development. The Brinsea Cool-Lume or Egg-Lume candling lamps are available from your dealer.



- 1) Clear when candled - probably infertile (or very early death) when candled at 1/3 of the incubation period
- 2) Fertile with red blood vessels - after 1/3 of the incubation period
- 3) Red or black staining - early death when candled after 1/3 of the incubation period
- 4) Embryo with red blood 'ring' - early death when candled after 1/3 of the incubation period
- 5) Dark outline with ill defined detail - late death (1/2 or 2/3 through incubation period)
- 6) Live embryo with bill in air sack - due to hatch in 24-48 hours
- 7) Normal development of the air pocket according to number of days

12.3 Some general guides:

Observation	Likely Cause(s)	Solution(s)
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 1°F (0.5°C)
Chicks hatch later than expected	Incubation temperature too low	Raise incubation temperature slightly 1°F (0.5°C)
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 ‘death in shell’	Incorrect humidity, probably too high.	Try reducing average humidity levels (but see section 6 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.

13.0 Specification

OCTAGON 20 Plus Maximum Setting Capacities:

<u>Egg size</u>	<u>No. eggs</u>
Quail	42
Pheasant	28
Amazon/Macaw	26
Hen	18
Duck	14

Dimensions : Incubator & Autoturn Cradle 16” x 9¼” x 11” high

Weight: Incubator & Autoturn Cradle 7 lbs

Power Consumption: Octagon 20 Plus max. 50 Watts
 Octagon 20 Plus typical average 25 Watts

Electrical Supply: 230v 50Hz or 115v 60Hz as ordered

**Brinsea Products Inc., 704 N Dixie Ave., Titusville, FL 32796-2017 USA.
 Phone. (321) 267-7009 Toll Free 1-888-667-7009 Fax (321) 267-6090
 e-mail BrinseaUSA@aol.com, website www.Brinsea.com**