

SmartSense™



Adaptive embryonic incubation

Royal Pas Reform has developed
a new series of fully connected,
data-driven incubators that
reliably 'sense' the changing
needs of the growing embryo:
SmartSense™



SmartSense™ uses a next generation series of intelligent, high-accuracy sensors for both adaptive incubator control and predictive process information. This results in ongoing optimization of the incubation process to maximise the number of best-quality chicks.

Optimal control for embryo wellbeing

Besides using pre-determined incubation programs for day-old chicks, SmartSense™ also evaluates and meets the current requirements of the embryo in each specific incubator section. We call this 'Adaptive Embryonic Incubation™' (AEI™).

Adaptive embryonic incubation

SmartSense™, with its industry leading, precise climate control – based on air temperature, relative humidity and CO₂ – also features a next generation series of intelligent, high-accuracy sensors in the SmartSense™ trolley. These constantly and non-invasively measure temperature, together with egg weight loss and heart rate averages (both available soon). The result is that the incubator can automatically adapt the environmental conditions to the actual needs of the growing embryos, further optimizing uniformity and maximizing post-hatch performance.

The full SmartSense™ incubation series comprises the SmartSense™ setter and SmartSense™ hatcher, combined with the SmartSense™ trolley, SmartSense™ interface and SmartCenterPro™ hatchery management system.



SmartSense™



Royal Pas Reform has been at the forefront of single-stage incubation design and technology for the past fifty years. Building on the tried and trusted success of our SmartPro™ incubation system, the new SmartSense™ series takes this principle a stage further, to maximize the number of top-quality chicks.

Homogeneous incubation temperature

Homogeneous temperature distribution is key to successfully incubating today's breeds, each with their own unique temperature 'signature' for embryonic development.

Because even minor temperature fluctuations can significantly impact uniformity and (post) hatch performance, SmartSense™ maintains the minimum difference in eggshell temperature that is feasible in commercial incubation.

Modular design, combined with eggshell temperature, air temperature, and averages of weight loss and heart rate measurements per incubator section, integrate to meet this requirement.

Modular single-stage incubation

The modular design of the SmartSense™ single-stage incubation series allows you to carefully manage the conditions required by the developing embryos per incubator section.

Each zone of the incubator is supported by its own temperature, heating, cooling, humidification and ventilation systems. This is the only way to guarantee a homogeneous temperature in incubators containing more than 130,000 hatching eggs.

By controlling each section individually, a range of incubation environments can be created to meet the specific needs of each egg, according to breed, flock, age or storage profile.

Together with the SmartSense™ trolley, the system automatically adapts to specific embryonic needs. The result is maximum uniformity and optimal climate conditions for each batch of eggs at every stage of the incubation process – making specific trolley positioning and transfer during incubation redundant.



Status

98.0	98.0	L1 60 %
X ❄	❄ X	W 53 %
98.0	97.9	W 0.40 %
X ❄	❄ X	Q 60 min.
98.0	98.0	⌚ 16.12
X ❄	❄ X	📅 Incubation
		📍 Submax 03 30 wk
		Carton 6 12 wk

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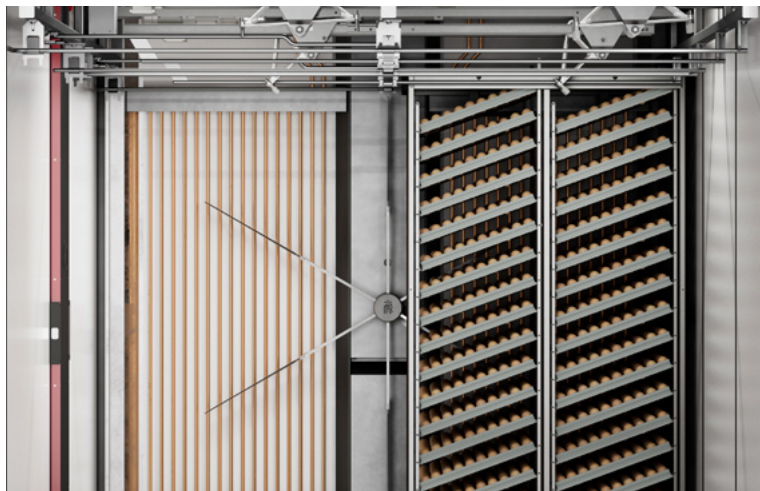
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Automatic drop-down seals guarantee an airtight seal



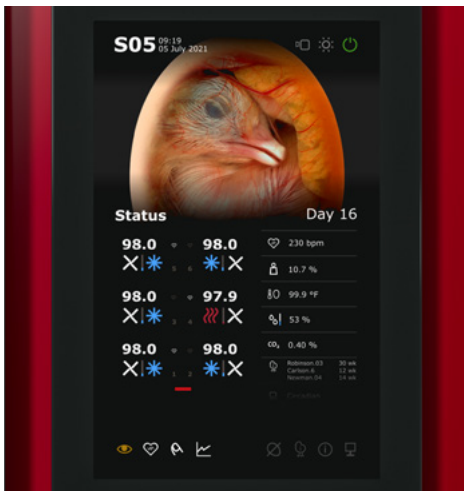
Compartmentalized sensors



Air flow parallel with turning direction of trays



Bi-directional airflow for truly homogeneous temperature distribution



Modular single-stage incubation



SmartSense™ accommodates a wide variety of tray types



Robust, ergonomic design

SmartSense™ Benefits

Fully sealed cabinet

SmartSense™ has a fully sealed cabinet for optimum control of the incubation climate. This ensures uniform temperature, humidity and CO₂ build up in the initial stages of incubation for a uniform start of the incubation process. The doors are fitted with both automatic magnetic closures and drop-down seals, guaranteeing a secure, airtight and energy efficient seal. When shut, the doors create a strong, reliable barrier against air infiltration and leakage, enabling the egg pack to heat up quickly and uniformly during initial incubation and preventing the loss of valuable climatized air.

Bi-directional airflow

The design of the SmartSense™ bi-directional flex fan ensures the most effective method of exchanging energy, CO₂/O₂ and moisture in the incubator – to achieve truly homogeneous temperature distribution. Straight, flexible fan blades make it possible to rotate the flex fan in both directions (independently programmable). Inlet air is mixed with conditioned air inside each section of the incubator and channelled along the side of the setter trolleys, before the air is then drawn back over the eggs. This process ensures complete air temperature homogeneity at each egg position and results in a highly uniform eggshell temperature. And because it runs at a lower speed and is used on a ‘slow’ speed motor, the newly designed flex fan brings a substantial reduction in electrical consumption, while also ensuring maximum operational reliability.

Integrated heating & cooling

The SmartSense™ setter has an integrated heating & cooling system in each section of the incubator – for optimum energy transmission, fast, even warm-up to set temperature, and maximum, future-proof cooling capacity. The system is fully integrated, with flex fans in front of the coils to deliver uniform cooling and temperature distribution throughout the cabinet. The SmartSense™ hatcher is equipped with Pas Reform’s exclusive SurroundCooling™ system: 12 parallel water-cooling circuits incorporated in the hatcher’s aluminium cabinet walls, for maximum, future-proof cooling capacity.

Turning in line with airflow

The SmartSense™ turning device rotates the egg trays in line with the airflow. This ensures superior temperature distribution throughout the incubator, whether it holds 4 or 24 trolleys. In addition, each pair of setter trolleys has an independent (adjustable) turning mechanism, which is designed to protect the delicate hatching eggs from harmful physical shocks.

ESM™ Energy Saving Module™

SmartSense™ uses Royal Pas Reform’s Energy Saving Module™ (ESM™) for fully programmable incubator fan RPMs and energy efficient, frequency-controlled motors. This, coupled with the flex fan, makes the SmartSense™ setter one of the most energy efficient on the market. Combined with the SmartSense™ trolley, ESM™ becomes adaptive by automatically adjusting the fan speed to meet the needs of the growing embryo.



Flexible post-hatch feeding



Optimum hygiene



Highly intuitive user interface



Visual inspections without disrupting the incubator climate



Total hatchery control via SmartCenterPro™



SmartSense™ hatchery

Adaptive Metabolic Feedback™



In a single-stage incubation environment, achieving the correct weight loss profile for hatching eggs is critical for proper air cell development. To achieve this, SmartSense™ incubators simultaneously measure and control humidity and CO₂ during incubation. This Adaptive Metabolic Feedback (AMF™) accurately replicates breed or flock-specific weight loss profiles, preventing excessive ventilation and the loss of expensive, climatized air. Combined with the SmartSense™ trolley, AMF™ becomes adaptive by automatically adjusting ventilation and humidity levels to changing incubation demands.

Optimum hygiene

SmartSense™ was specifically designed to meet the stringent hygienic requirements of the modern hatchery. Being resistant to strong disinfectants and corrosion, the robust cabinets are extremely durable. With compartmentalized sensors, modular hatchers to prevent cross contamination, the incorporation of Microban® antibacterial protection into hatcher baskets and integrated cooling pipes in ‘food safe’ anodized aluminium hatcher walls, SmartSense™ sets the industry standard for incubator hygiene.

SmartWatch™

SmartWatch™ monitors and adjusts the hatching process automatically, eliminating any need for human intervention. The module finely controls ventilation in the hatcher, based on a programmable CO₂ concentration, from the moment of transfer through to the hatching of the last chicks.

Ergonomic design

SmartSense's™ advanced ergonomic design benefits from decades of practical hatchery experience. Each detail has been thoughtfully engineered to deliver safe and efficient operation, whilst minimizing maintenance and reducing the risk of mistakes and labour costs.

SmartSense™ user interface

The SmartSense™ user interface provides total control over every function and setting in each individual incubator. With a large, vertical, high-resolution 15.4-inch colour touchscreen and multi-language intuitive design, it is simple to operate and easily accessible to operators of all skill levels. The SmartSense™ interface also includes an extensive incubation library for customer-specific incubation programs, with ongoing support from Pas Reform Academy.

Integrated webcam

SmartSense™ features a fully integrated webcam, which allows visual inspections without disrupting the incubator climate – not just in front of the machine, but also remotely from anywhere in the world.

Fully connected

SmartSense™ products are fully connected for remote support and updates, giving the hatchery greater control over the incubation process. Data is exchanged with SmartCenterPro™ to deliver detailed hatchery monitoring, analysis and reporting, allowing full track & trace functionality at every level of hatchery operation.

Flexible post-hatch feeding

The SmartStart™ version of SmartSense™ promotes the development of robust day-old chicks and helps to reduce the need for antibiotics. The hatcher comprises two key elements, that can be applied individually or together: precision feeding and intelligent lighting.



SmartSense™ Setter

Technical specifications

Type	Setter 6	Setter 4	Setter 3	Setter 2	Setter 1
Capacity hen eggs (150 egg tray / 16 trolley)	115,200	76,800	57,600	38,400	19,200
Capacity hen eggs (162 egg tray / 16 trolley)	124,416	82,944	62,208	41,472	20,736
Number of setter trays	768	512	384	256	128
Capacity hen eggs (150 egg tray / 17 trolley)	122,400	81,600	61,200	40,800	20,400
Capacity hen eggs (162 egg tray / 17 trolley)	132,192	88,128	66,096	44,064	22,032
Number of setter trays	816	544	408	272	136
Capacity duck eggs (126 egg tray / 14 trolley)	84,672	56,448	42,336	28,224	14,112
Number of setter trays	672	448	336	224	112
Capacity turkey eggs (126 egg tray / 14 trolley)	-	-	-	28,224	14,112
Number of setter trays	-	-	-	224	112
Width (mm) excluding corridor*	4184	4184	2293	4184 or 2293	2293
Width (mm) including corridor*	4784	4784	2889	4784 or 2889	2889
Height (+height of motor) (mm)	2459 (+300)				
Height including louvre (mm)	2978				
Depth (+central operating console) (mm)	7276	4938	7276	2600 or 4938	2600
Number of setter trolleys	24	16	12	8	4
Modular design	Heating, cooling, humidification and ventilation systems in each incubation section				
Number of temperature sensors	6	4	3	2	1
Heating	Integrated heating or electrical heating in each incubator section				

Cooling	Water cooling system in each incubator section
Humidification	2 nozzles in each incubator section (humidity roller upon request)
Ventilation	Bi-directional flex fan in each incubator section
Set points per section	Separate temperature set points for each incubator section
Incubator control	SmartSense™ user interface
Display	High-contrast, 15.4-inch colour LCD screen with Projective Capacitive Touch screen technology (PCT)
Embryonic reference	Detailed Academy info on the current status of embryonic development
Performance testing module	To run a performance check on incubators before starting a new incubation cycle
Pre-heating module	Full programming for pre-heating time, temperature and ventilation
Turning programmes	Fully adjustable turning programmes: frequency of turning, start/stop timing, 2 or 3 auto-turning positions
Transfer software module	Provides programmable turning intervals during egg transfer
AMF™	Adaptive Metabolic Feedback™, including fully integrated sensor box, with high precision electronic humidity and CO ₂ control
ESM™	Energy Saving Module, for fully programmable RPM of the flex fan
SmartGo™ performance testing tool	To quickly run performance checks on SmartSense™ prior to a new incubation cycle
SmartCenterPro™ (Optional)	Hatchery Management System
Housing	Fully sealed cabinet; robust, easy-to-clean construction with mainly stainless-steel interior; extruded, anodized aluminium profiles for maximum stability and ease of installation; seamless ‘Hotmelt’ panels with maximum insulation value; magnetic door closures and automatic door bottom drop down for an airtight seal

* Add 51 mm for standalone incubator



SmartSense™ Hatcher

Technical specifications

Type	Hatcher		
Capacity hen eggs (based on 150 egg tray)	19,200 or 20,400	Number of hatcher baskets	128 or 136
Capacity hen eggs (based on 162 egg tray)	20,736 or 22,032	Number of hatcher baskets	128 or 136
Capacity duck eggs (based on 126 egg tray)	14,112	Number of hatcher baskets	112
Capacity turkey eggs (based on 126 egg tray)	14,112	Number of hatcher baskets	112
Width (mm)*	3184		
Height (+height of motor) (mm)	2459 (+300)		
Height including louvre (mm)	2978		
Depth (+central operating console) (mm)	2211		

Number of hatcher dolleys	5
Modular design	Up to three modules with a maximum of 61,200 hen eggs (based on 150 egg tray) or 66,096 hen eggs (based on 162 egg tray)
Heating	Electrical heating
Cooling	SurroundCooling™: 12 parallel water-cooling circuits, incorporated in aluminium cabinet walls
Humidification	Nozzle (humidity roller upon request)
Incubator control	SmartSense™ user interface, including multiple machine control
Display	High-contrast, 15.4-inch colour LCD screen with Projective Capacitive Touch screen technology (PCT)
Embryonic reference	Detailed Academy info on the current status of embryonic development
Microban®	Antibacterial protection in hatcher basket
Performance testing module	To run a performance check on incubators before starting a new incubation cycle
SmartWatch™ (optional)	Hatch window module including fully integrated sensor box, with high precision electronic humidity and CO ₂ control
SmartCenterPro™ (Optional)	Hatchery Management System

Type	SmartStart™ post-hatch feeding hatcher
Capacity hen eggs	14.400 fertile eggs (90 eggs per basket) 20.480 fertile eggs (128 eggs per basket)
SmartStart™ semi-moist feed	Volume: 25 kg boxes consisting of two 12,5 kg bags Shelf-life: 6 months after production date Storage conditions: cool and dry
SmartStart™ hatcher basket	Feeding balconies: along both outer sides of the hatcher basket
SmartStart™ lighting	6 LED lighting units with primary and secondary optics Power consumption: 52W (maximum at full output, steady state)

Housing	Fully sealed cabinet; robust, easy-to-clean construction with extruded, anodized aluminium profiles for maximum stability and ease of installation; smooth-walled ‘food-safe’ anodized aluminium inner walls; seamless ‘Hotmelt’ panels with maximum insulation value; magnetic door closures and automatic door-bottom drop down for an airtight seal
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* Add 51 mm for standalone incubator

Royal Pas Reform

Royal Pas Reform is an international company, which has specialised in the development of integrated hatchery solutions for the poultry sector since 1919.

The company has earned its position as one of the world's leading hatchery equipment manufacturers, through decades of research into the biological and physiological aspects of embryo development, combined with a thorough understanding of all aspects of the poultry production chain – and a dedicated focus on the future.



Royal Pas Reform
Integrated Hatchery Solutions

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