The Incubator Company

Optimizing the Single Stage Environment

Henry Kohl
Hatchery Consultant
henry.kohl@Jamesway.com
Cell- 574-518-1426

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Optimizing the Single Stage Environment

Starts with Four Basic Requirements

1. Electricity
2. Water
3. Compressed Air
4. Ventilation

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Electrical requirements

Electrical Requirements

Incubators with Optional Dehumidifier

Water Heated	Circuit Breaker	Voltage	Connected Load	Starting Load
P20 Cabinets	30 A	230 V	15.6 A	23 A
P40 Cabinets	30 A	230 V	15.6 A	23 A
P60 Cabinets	30 A	230 V	15.6 A	23 A
P80 Cabinets	40 A	230 V	25 A	36 A
P120 Cabinets	40 A	230 V	25 A	36 A

Electric Heat	Circuit Breaker	Voltage	Connected Load	Starting Load
P20 Cabinets	60 A	230 V	43 A	50 A
P40 Cabinets	60 A	230 V	43 A	50 A
P60 Cabinets	60 A	230 V	43 A	50 A

Note: Electrically heated incubators include 2 x 3000 W heaters

Incubators without Dehumidifier

Water Heated	Circuit Breaker	Voltage	Connected Load	Starting Load
P20 Cabinets	20 A	230 V	9.6 A	17 A
P40 Cabinets	20 A	230 V	9.6 A	17 A
P60 Cabinets	20 A	230 V	9.6 A	17 A
P80 Cabinets	30 A	230 V	19 A	30 A
P120 Cabinets	30 A	230 V	19 A	30 A

Electric Heat	Circuit Breaker	Voltage	Connected Load	Starting Load
P20 Cabinets	50 A	230 V	37 A	44 A
P40 Cabinets	50 A	230 V	37 A	44 A
P60 Cabinets	50 A	230 V	37 A	44 A

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Electrical requirements

Hatchers

Water Heated	Circuit Breaker	Voltage	Connected Load	Starting Load
P20 Cabinets	20 A	230 V	9.6 A	17 A
P30 Cabinets	20 A	230 V	9.6 A	17 A
P40 Cabinets	20 A	230 V	9.6 A	17 A

Electric Heat	Circuit Breaker	Voltage	Connected Load	Starting Load
P20 Cabinets	40 A	230 V	32 A	38 A
P40 Cabinets	40 A	230 V	32 A	38 A
P60 Cabinets	40 A	230 V	32 A	38 A

Note: Electrically heated hatchers include 2 x 3000 W heaters

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Humidity Water requirements

Water

Incubator Humidity Water Supply	Requirements *	
Usage per Cabinet, P20–P60	1.15 US gal./h	4.35 L/h
Usage per Cabinet, P80 & P120	2.30 US gal./h	8.70 L/h
Pressure	60–100 psig	415–690 kPa

Note: * Based on number of nozzles and maximum duty cycle.

Hatcher Humidity Water Supply	Requirements *	
Usage per Cabinet, P20–P40	3.0 US gal./h	11.36 L/h
Pressure	60–100 psig	415–690 kPa

Note: * Based on number of nozzles and maximum duty cycle.

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Cooling system requirements

Cooling Water System - Incubators	General Conditions	
Temperature at ECU	55–60°F	13–16°C
Optimum Temperature at ECU	58°F	14°C
Optimum Flow per Machine, P20–P40	3 US gal./min.	11.4 L/min
Optimum Flow per Machine, P60	4 US gal./min.	15.1 L/min
Optimum Flow per Machine, P80 *	8 US gal./min.	30.3 L/min
Optimum Flow per Machine, P120 **	10 US gal./min.	37.9 L/min
Pressure at point of use, i.e., the ECU	30–40 PSI	207–275 kPa
Pressure Drop through ECU	10–15 psig @ 3–5 US gal./min.	
	69–103.4 kPa @11.4–18.9 L/min	

Note: * 4 US gal./min. (15.1 L/min) per ECU; ** 5 US gal./min. (18.9 L/min) per ECU

Cooling Water System - Hatchers	General Conditions	
Temperature at ECU	55–60°F	13–16°C
Optimum Temperature at ECU	58°F	14°C
Optimum Flow per Machine, P20–P30	3 US gal./min.	11.4 L/min
Optimum Flow per Machine, P40	4 US gal./min.	15.1 L/min
Pressure at point of use, i.e., the ECU	30–40 PSI	207–275 kPa
Pressure Drop through ECU	10–15 psig @ 3–5 US gal./min.	
	69–103.4 kPa @11.4–18.9 L/min	

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Heating system requirements

Heating Water System – Incubators	General Conditions	
Temperature at ECU	138–145°F	59–63°C
Optimum Temperature at ECU	140°F	60°C
Optimum Flow per Machine, P20–P40	3 US gal./min.	11.4 L/min
Optimum Flow per Machine, P60	4 US gal./min.	15.1 L/min
Optimum Flow per Machine, P80 *	8 US gal./min.	30.3 L/min
Optimum Flow per Machine, P120 **	10 US gal./min.	37.9 L/min
Pressure at point of use, i.e., the ECU	30–40 PSI	207–275 kPa
Pressure Drop through ECU	10–15 psig @ 3–5 US gal./min.	
	69–103.4 kPa @11.4–18.9 L/min	

Note: * 4 US gal./min. (15.1 L/min) per ECU; ** 5 US gal./min. (18.9 L/min) per ECU

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	69–103.4 kPa @11.4–18.9 L/min	

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Compressed air requirements

Compressed Air Requirements

The compressed air requirements in the table below are based on a flow rate of 0.07 to 0.1 scfm at a pressure of 60–90 psig (0.12 to 0.17 Nm3/h at 414–620 kPa) per rack once per hour.

Compressed Air Requirements for Turning Actuators

Incubator	# Racks	SCFM / Cabinet	Nm^3/h / Cabinet
P20 Cabinets	4	0.30–0.40	0.51–0.68
P40 Cabinets	8	0.60–0.80	1.02–1.36
P60 Cabinets	12	0.80–1.20	1.36–2.04
P80 Cabinets	16	1.20–1.60	2.04–2.72
P120 Cabinets	24	1.60–2.40	2.72–4.08

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Ventilation = Fuel for Machines

Maintains the machine temperature, humidity and airflow (pressure)

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Ventilation requirements

Ventilation

Incubator Room	General Conditions
Minimum Temperature, dry bulb	72°F 22°C
Maximum Temperature, dry bulb	78°F 26°C
Optimum Temperature, dry bulb	75°F 24°C
Relative Humidity 40–50%	40–50%
Optimum R.H. 45%	45%

Incubator Room	Fresh Air Supply per machine
P20 Cabinets	0–80 cfm 0–136 m3/h
P40 Cabinets	0–160 cfm 0–272 m3/h
P60 Cabinets	0–240 cfm 0–408 m3/h
Room Pressure Differential to Outside	0.005–0.015 in. w.g. 1.2–3.7 Pa
P80 Cabinets	0–350 cfm 0–595 m3/h
P120 Cabinets	0–500 cfm 0–850 m3/h
Room Pressure Differential to Outside	0.010–0.020 in. w.g. 2.5–5.0 Pa

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Ventilation requirements

Incubator Exhaust Plenum	Pressure Differential to Room
P20 Cabinets negative	(-) 0.015–0.020 in. w.g. 3.7–5.0 Pa
P40 Cabinets negative	(-) 0.020–0.030 in. w.g. 5.0–7.5 Pa
P60 Cabinets negative	(-) 0.020–0.030 in. w.g. 5.0–7.5 Pa
P80 Cabinets negative	(-) 0.025–0.035 in. w.g. 6.2–8.7 Pa
P120 Cabinets negative	(-) 0.030–0.040 in. w.g. 7.5–10.0 Pa

Incubator Exhaust Plenum	Pressure Differential to Outside
P20 Cabinets negative	(-) 0.005–0.010 in. w.g. 1.25–2.5 Pa
P40 Cabinets negative	(-) 0.010–0.020 in. w.g. 2.5–5.0 Pa
P60 Cabinets negative	(-) 0.010–0.020 in. w.g. 2.50–5.0 Pa
P80 Cabinets negative	(-) 0.015–0.025 in. w.g. 3.75–6.25 Pa
P120 Cabinets negative	(-) 0.020–0.030 in. w.g. 5.0–7.5 Pa

cfm (cubic feet per minute), in. w. g. (inches water gauge), Pa (Pascals)

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Ventilation requirements

Hatcher Room	General Conditions
Minimum Temperature,	dry bulb 72°F 22°C
Maximum Temperature,	dry bulb 78°F 26°C
Optimum Temperature,	dry bulb 75°F 24°C
Relative Humidity 40–50%	40–50%
Optimum R.H. 45%	45%

Hatcher Room	Fresh Air Supply per machine
P20 Cabinets	25–190 cfm 40–323 m3/h
P30 Cabinets	50–290 cfm 85–493 m3/h
Room Pressure Differential to Outside	0.005–0.015 in. w.g. 1.2–3.7 Pa
P40 Cabinets	75–400 cfm 127–680 m3/h
Room Pressure Differential to Outside	0.010–0.020 in. w.g. 2.5–5.0 Pa

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Ventilation requirements

Hatcher Exhaust Plenum	Pressure Differential to Room
P20 Cabinets negative	(-) 0.015–0.020 in. w.g. 3.7–5.0 Pa
P30 Cabinets negative	(-) 0.020–0.030 in. w.g. 5.0–7.5 Pa
P40 Cabinets negative	(-) 0.030–0.040 in. w.g. 7.5–10.0 Pa

Hatcher Exhaust Plenum	Pressure Differential to Outside
P20 Cabinets negative	(-) 0.005–0.010 in. w.g. 1.25 – 2.5 Pa
P30 Cabinets negative	(-) 0.010–0.020 in. w.g. 2.5 – 5.0 Pa
P40 Cabinets negative	(-) 0.020–0.030 in. w.g. 5.0 – 7.5 Pa

cfm (cubic feet per minute), in. w. g. (inches water gauge), Pa (Pascals)

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Platinum Calibration

One of the most important procedures with the Platinum or any incubation equipment is the calibration.

Jamesway recommends Temperature, Humidity and CO_2 be checked for each incubation cycle.

Hatchers require once a month calibration checks.

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Temperature/ Humidity Calibration

- **Temperature – HA1070**
- **Digital Therm & Plastic Probe**

- **Temperature/Humidity – HA1152 Digital Therm with Humidity Probe**
- **(HA1165 Strap Probe)**

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Ventilation Tools

- HA1150 Handheld Digital Manometer
- HA1149 Thermo-Anaemometer
- Multimeter
- Electrical screwdrivers

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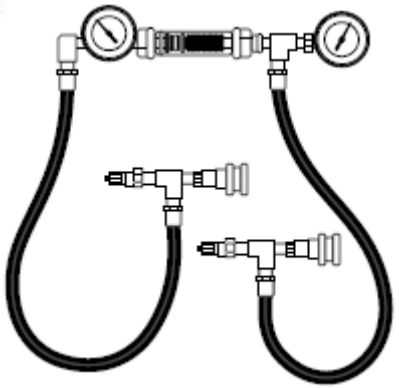
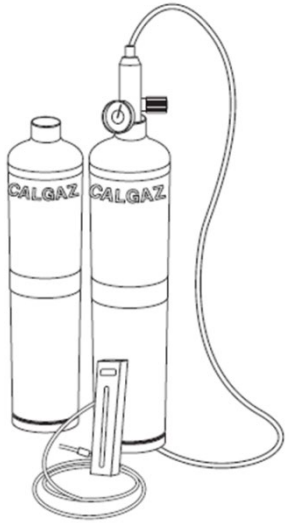
Specific Calibration Tools Single Stage



- Water Flow Tester
  1. Brass Couplers HA1143P
  2. Plastic Coupler HA1153
  3. Shark Bite HA1160

- Shark Bite Disconnect Tongs



- CO2 – HA1155
  1. Carbon Dioxide Gas Meter.

- CO2 Calibration Gas
  1. 5000 ppm CO2 (Balance Nitrogen)
  2. Nitrogen
  3. Regulator - Flow Rate 0.50 LPM
  4. No longer available at Jamesway

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Platinum Temperature Calibrations

- Machine must be up to programmed temperature (heat) and in stable state (Incubator 24 hours after set) (Hatchers 2 hours after transfer)
- Ensure humidity is not on - spraying during calibration
- Using a known properly calibrated electrotherm and plastic probe, insert probe into calibration hole in the Front Top of the machine.
- Wait until the electrotherm temperature stabilizes (3 minutes)
- Once the temperature on the electrotherm is stable go to machine display and enter set up menu
- Press the left temperature calibration icon for Front probe.
- Compare the displayed temperature to electrotherm temperature
- Enter the electrotherm actual temperature *

- An offset will be automatically entered into the machine controller, calibrating the machine to the electrotherm temperature
- * Procedure is best done with 2 personnel – one on roof taking temperature reading, one at display panel entering values.

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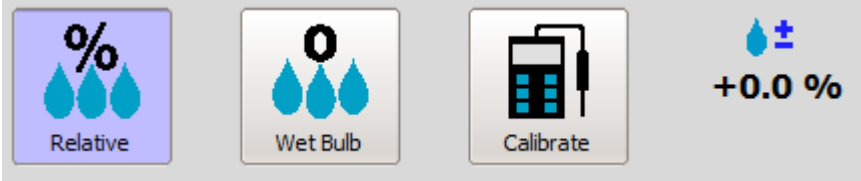
Platinum Humidity Calibrations

- With the machine running and humidity stable open the left side door of the machine and place relative humidity probe over the machine humidity probe
- Shut door and wait until the electrotherm relative humidity stabilizes (5 min)
- Once stable go into the set up screen to humidity calibration
- Enter the electrotherm relative humidity value in the humidity calibration
- 

- An offset will be automatically entered into the machine controller thus calibrating the machine to the electrotherm temperature
- Note: With machine empty and doors open humidity can be calibrated to room conditions

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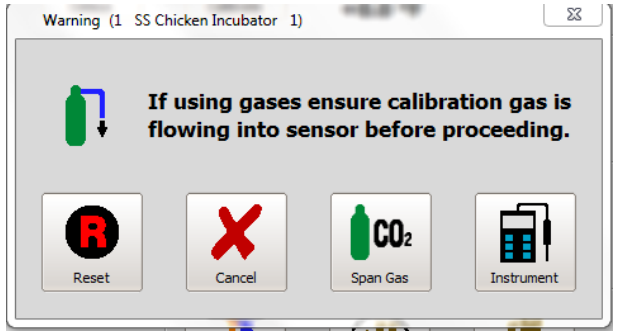
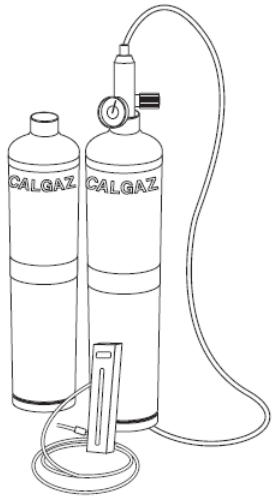
Platinum CO2 Calibrations (with gas)

- Before starting calibration go into the set up:
    a. Press the N2 icon – Press Reset
    b. Press the CO2 Span icon – Press Reset





- Remove lower filter on the CO2 sensor
- Screw the fitting attached to regulator and hose into CO2 sensor
- For Zero use Nitrogen calibration gas.
- For CO2 use 0.5% (5000ppm) concentration.

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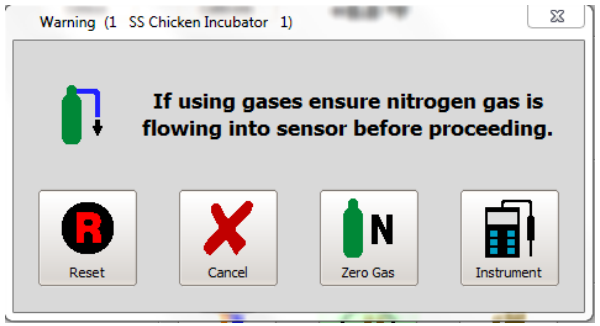
Platinum CO2 Calibrations (with gas)

- **Zero (N2) Calibration**

1. Attach the Nitrogen (Zero) gas bottle to the regulator and hose assembly
2. Turn the gas on and insure gas is flowing 500ml/min
3. Let gas flow for 3 minutes into the sensor
4. After 3 minutes go to set up screen and push the icon labeled N Calb Zero
5. Press the Zero Gas



1. Exit set up – the CO2 display must read 100 PPM (If not, repeat)
2. Detach Nitrogen (Zero) gas bottle

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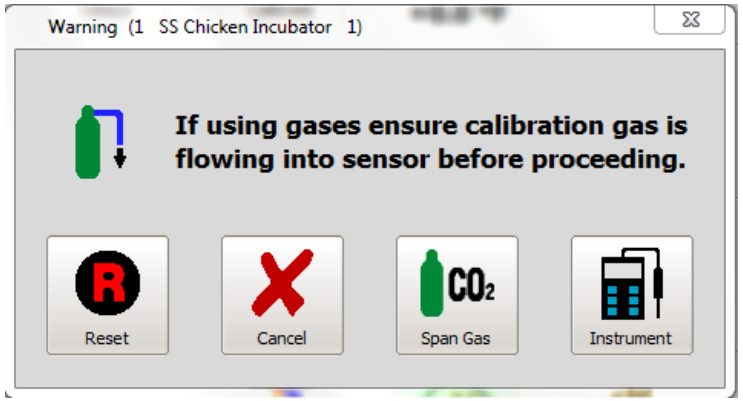
Platinum CO2 Calibrations (with gas)

Span (C02 5000 ppm Gas)

1. Attach the CO2 5000 PPM Gas bottle to the regulator and hose assembly
2. Go to set up screen and push the icon labeled CO2 Calb Span
3. Turn the gas on and insure gas is flowing
4. Press Span Gas
5. Let gas flow for 3 minutes into the sensor
6. After 3 minutes go to set up screen and push the icon labeled Span Gas again
7. Exit set up – the CO2 display must read 5000 PPM
8. Detach CO2 5000 PPM Gas bottle



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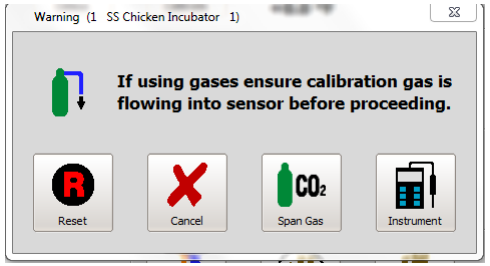
Platinum CO2 Calibrations (with Instrument)

- **Zero Calibration**

- Insert the instrument into an **empty** cabinet
- Let the reading stabilize for 5 minutes
- After 5 minutes go to set up screen and push the icon labeled N Calb Zero
- Press the Instrument
- Enter the value on the instrument
- Press OK



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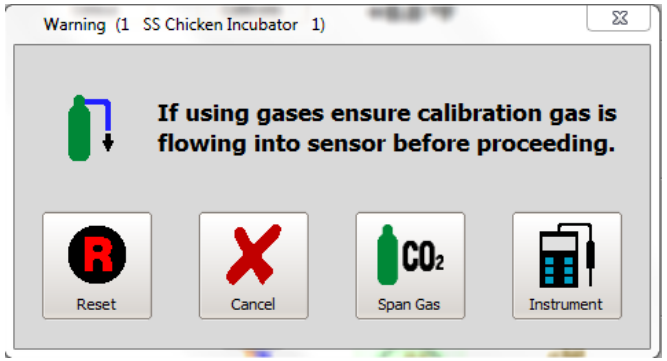
Platinum CO2 Calibrations (with Instrument)

Span Concentration

- Wait until the cabinet has at least 4000 ppm CO2
- Go to set up screen and push the icon labeled CO2 Calb Span
- Press Instrument
- Enter the value on the instrument
- Press OK.



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Platinum Calibrations Water Flow testing

1. On ECU disconnect the Hot/Cold return line from Shark Bite fitting
2. Connect hose to Tester on supply side (arrow on flow meter shows directions of water flow) from coil pack
3. Connect other tester hose end to return line
4. Disconnect fan connector at ECU
5. Go to front of unit and change temperature setpoint above display reading
6. Turn fans on and after solenoid opens verify flow through meter (4 gpm)
7. Connect to Cold return and repeat above steps except set temperature below actual readings

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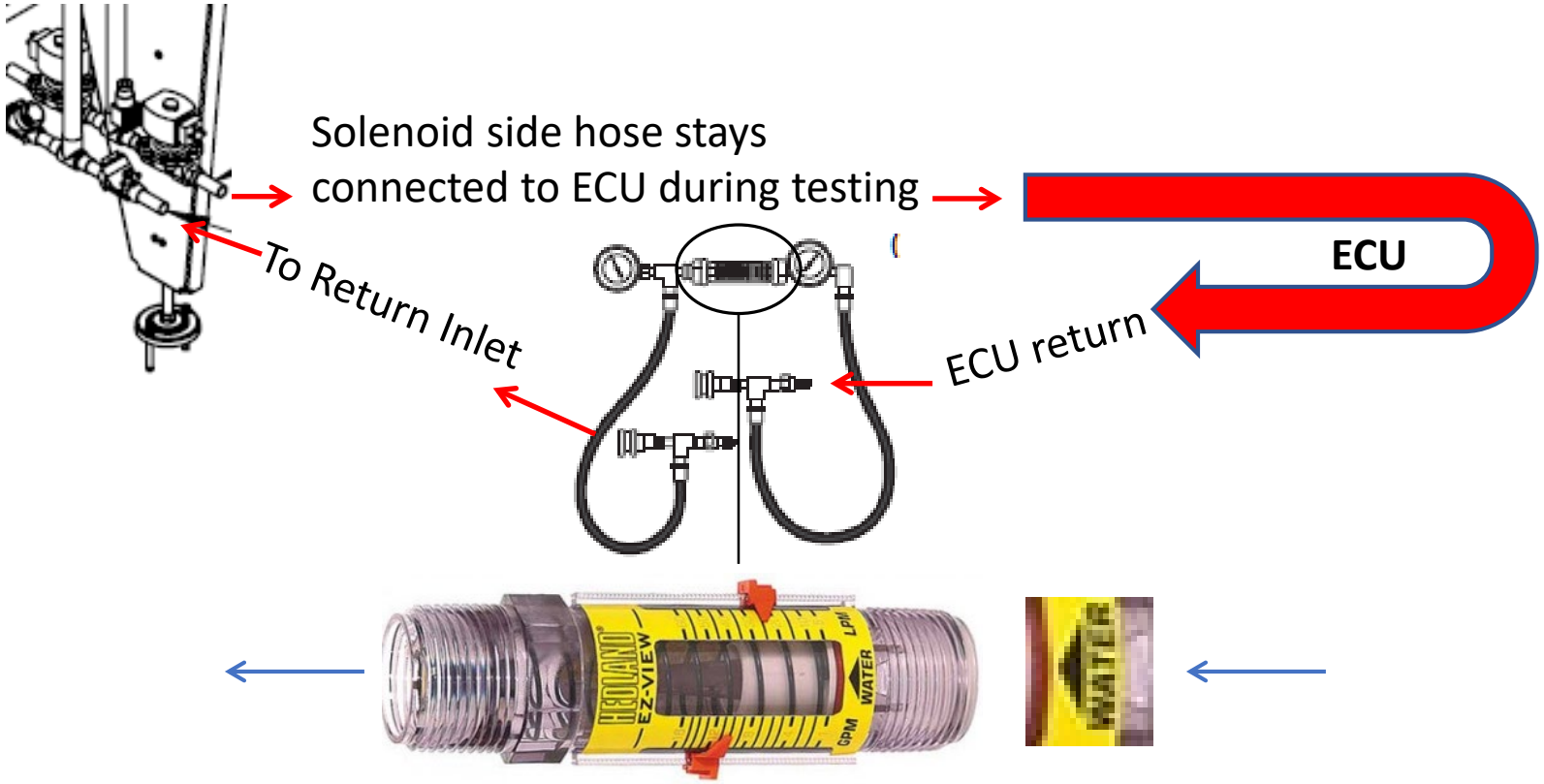
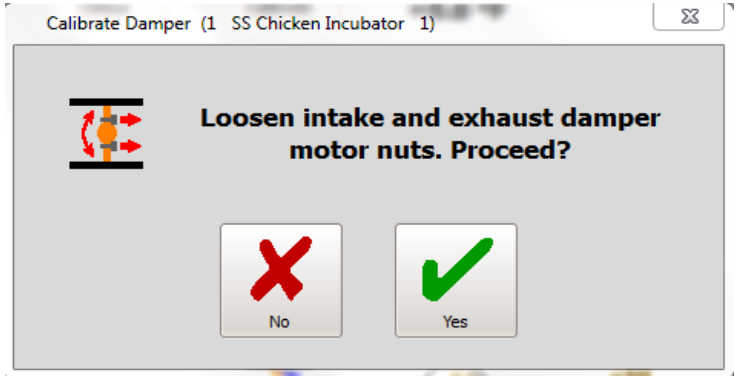
Platinum Calibrations Water Flow testing



Platinum Damper Calibration

Loosen nuts on the damper assembly (all dampers)

- Go to “Set Up” screen and push the icon labeled Damper Calibration
- Press OK
- Damper Calibration Starts
- Wait until Damper Calibration is Complete
- Insure damper is in fully closed position and tighten nuts on damper assembly



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Platinum Fan Current Calibration

- The first time the machine is used, it is necessary to calibrate the fan currents. This will allow the machine to learn the current flow at various fan speeds. The calibration step only needs to be performed once. Repeat the calibration if the machine gives false fan failure alarms once in a while.

- 1. Turn on fans.
- 2. In main screen select the ‘Alarm Setup’ function.
- 3. Choose ‘Fan Current’ calibration function, then ‘OK’ to commence fan current calibration.

This function will not be available if fans are off. If this button is not visible then the fan current sensor is not installed correctly or machine has incorrect software version.

- 4. The machine performs the calibration by stepping the fan speed from minimum to maximum. *
- * Note: If the calibration fails, check SMA111 board has jumper link J6 between pins 1&2.

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Prior to setting eggs

- Check each incubator rack for ease of turning ,
- An empty incubator rack should easily turn at 25 to 30psi if not please check into why and repair the rack. This should be done as a matter of routine PM.

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Prior to Loading Eggs in the Incubators

“Platinum Machines Are Low Maintenance”

---------But Not No Maintenance--------

- Checks for Any Air Leakage (Gaskets and Door Latching)
- Checks Humidity Spray
- Checks for Any Water Leaks
- Checks Damper Closed Properly
- Listen for Compressed Air Leakage and Air Line Condition
- Be Sure Probe Protective Covers Removed
- Visually Checks Cleanliness of Machine as Well as Probes
- Check Fans and Motor Off Switches

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Setting

- Starting With an Empty Incubator
- Very Important Do Not Pre-Cool!!!!
- Leave Incubator Fan Off and Doors Closed Till 2 Hours Before Loading Eggs From the Egg Room Into the Incubators
- 2 Hours Before Loading Open the Incubator Doors With Fans Off and Damper Closed and Allow Incubator to Cool to Room Temperature.

Setting

- Final Start Up Step
- Shut the Doors and Turn Fans On
- Start the profile
- Anytime You Enter a Date in the Future You Are Ask How to Hold Eggs Till Profile Starts
- Set Holding Mode at 75F, 65% RH and 0% Damper
- A Minimum 8 Hours of Holding Mode is Recommended and Needed to Stabilize the Egg Temperature

Holding Eggs

- Hatcheries can hold eggs for 96 Hours+.
- 68F (20C) is about the coolest the cabinet seems to maintain with 58F chilled water. 65-68F (18-20C) are common egg room temps.
- Recommend 68F (20C) 70RH stand by. Fan Speed 40% for holding.
- If water starts to collect on floor open damper 1-5%.
- The cabinet can usually maintain the egg room set point but difficult to lower egg temperature once inside. Eggs should be moved quickly from egg room to machine.

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Setting

- The Normal Temperature Recovery Time
- From Profile Start to Achieving Set Point is 4 – 5 Hours
- 100.3 – 100.4F Depending on the Specific Profile
- If Temperature is not Properly Achieved
- Indicates Problems With the Hot Water Supply or Air Leakage

Setting

- Very Important to Platinum SS for Incubation Success
- If There is No Operational Problem Inside the Incubator Do Not Open Incubator Doors Again Until Transfer 18 - 19 Days Later.

Setting reminder

- When setting multiple single stage incubators it is important to stagger your set timings based on how long it takes to process chicks from a machine. For example if it takes 2 hours to process a machine worth of chicks then stagger your set timings by two hours for every machine in that set.

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Prior to Loading Eggs in the Hatchers

“Platinum Machines Are Low Maintenance”

---------But Not No Maintenance--------

- Checks for Any Air Leakage (Gaskets and Door Latching)
- Checks Humidity Spray
- Checks for Any Water Leaks
- Checks Damper Closed Properly
- Be Sure Probe Protective Covers Removed
- Visually Checks Cleanliness of Machine as Well as Probes
- Check Fans and Motor Off Switches

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Incubator After Transfer

- When Incubator is Emptied at Transfer
- Take Off Profile
- Set Temperature @ 85F
- Set Humidity @ 50%
- Damper @ 0%
- Turn Fans Off and Close the Doors.

Emptied Hatcher

- After all of the chicks are removed from a hatcher the following procedure need to be followed:
- – Take off profile
- – Set the temperature @ 85F
- – Set the humidity @ 50%
- – Set the damper @ 0%
- – Shut and latch the hatcher doors
- – Turn the fans off if not already off
- If this procedure is not done properly the remaining hatchers with chicks still in them in common room and plenum will have their air flow disrupted.
- Actually the remaining hatchers intake and exhaust will be interrupted thus the chicks inside these hatchers will be affected due to improper air flow inside.

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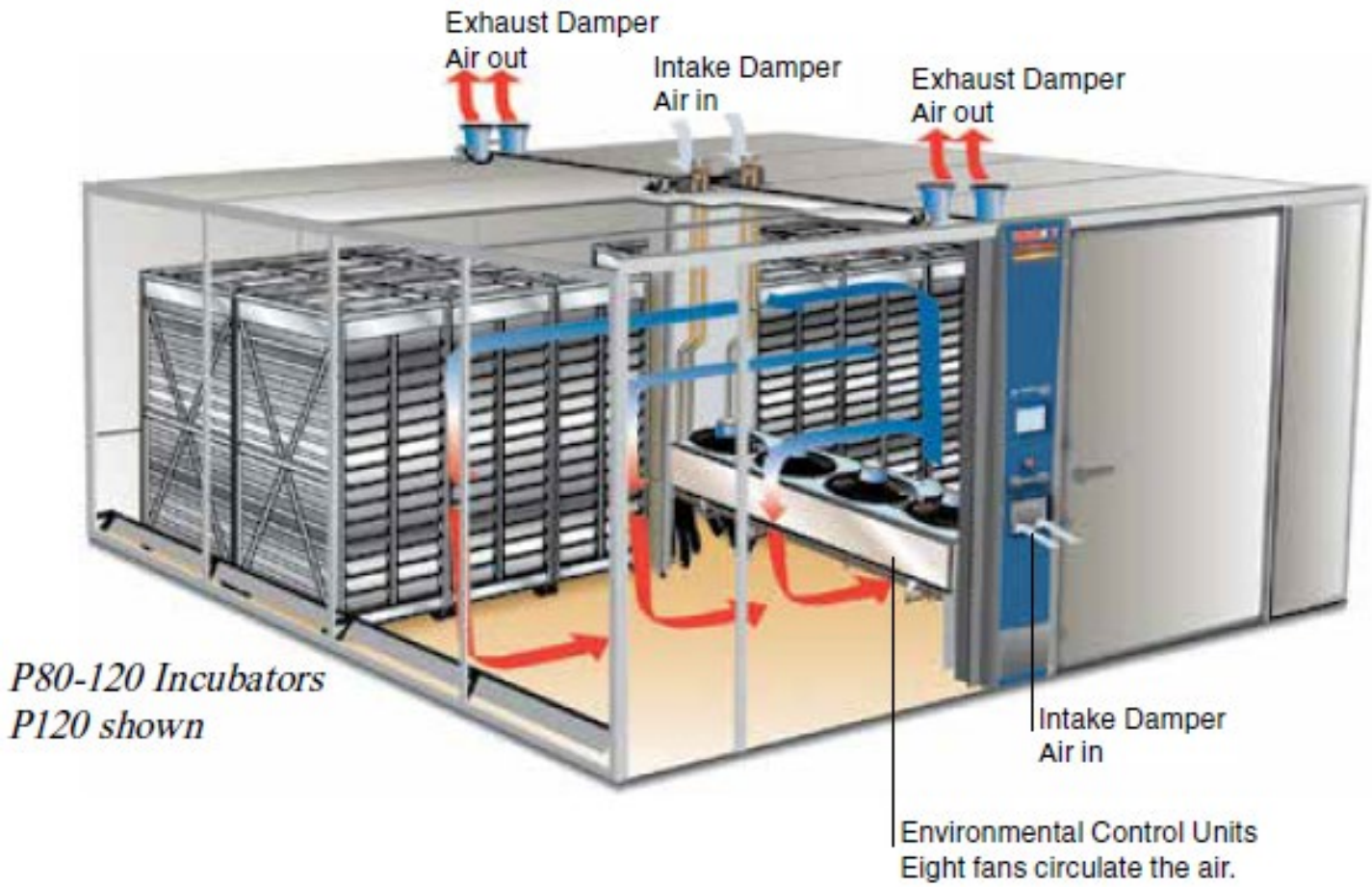
“Maintenance is Key to Optimizing the Single Stage Environment”



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Two types of hatchery maintenance

- Reactive Maintenance
- Preventative Maintenance (pro-active)

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Example of Jamesway PM Guide

MAINTENANCE SCHEDULE FOR PLATINUM INCUBATORS AND HATCHERS

All of the items mentioned below should be checked, as scheduled.

Actual readings should be recorded and compared with the optimum.

All other items should be assessed as to their operating condition – either satisfactory or unsatisfactory.

Unsatisfactory would include not operating properly, excessive wear, dirt or any potential problem. Items, not in satisfactory condition, should be repaired or replaced, and/or cleaned prior to further use.

Items to be Checked		Time Schedule			
		Incubators After Every Transfer/ Wash	Hatchers Monthly ●=denotes weekly	Both, Every 3 Months	Both, Every 6 Months
Temperature Calibration					
1. Display reading	°F or °C	○	○		
2. Check reading	°F or °C	○	○		
3. Setpoint	°F or °C	○	○		
Humidity Calibration					
1. Setpoint	RH °FWB or °CWB	○	○		
2. Display reading	RH °FWB or °CW	○	○		
3. Check reading	RH °FWB or °CWB	○	○		
Carbon Dioxide Calibration					
1. Setpoint	% or ppm	○	○		
2. Display reading	% or ppm	○	○		
3. Check reading	% or ppm	○	○		
Compressed Air					
1. Reading		○	○		
2. Water build up?		○	○		
3. Tank - drain		○	○		
General Machine					
1. Doors seal properly					●
2. Doors latch properly					●
3. Door gasket condition		○	●		
4. Door sweep condition				●	
5. Caulking - all joints				●	
6. Damper zero position				●	
7. Damper operating properly. See page 105.				●	
8. Damper slides not binding				●	
9. Damper openings equal		○	○		
10. Hatcher fan (if equipped) operating properly				●	
11. Water hose connections		○	○		
12. Water hose couplings		○			

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Daily PM Maintenance

- Check machine operation:
  - Set points and day in profile are correct
  - Machines are meeting set points
  - Damper opening and CO_2, humidification, heating and cooling are all typical for the stage in incubation
  - Watch for irregular conditions (i.e. water on floor)
- Check ventilation operation:
  - Set points are correct
  - Rooms and exhaust plenums are maintaining setpoints
  - Operation is within normal range
- Check compressed air system:
  - Pressure is typical
  - No excessive water build up in the automatic filters
- Check chiller and boiler operation:
  - Verify water temperatures are being maintained

Weekly PM Maintenance

- Inspect compressed air supply system
  - Look for leaks
  - Verify pressure is accurate
  - Drain main accumulation tanks
- Change HVAC filters (in the room and in the HVAC units):
  - Egg Room: weekly-monthly
  - Incubator room: weekly-monthly
  - Hatcher room: after every pull
  - Chick room: after every pull
  - Wash and clean rooms: weekly or up to monthly

PM Maintenance after every transfer/wash

- Door Gaskets and Sweeps
  - Check for torn or missing seals; replace
- ECU Fans
  - Check for excessive vibration (cannot read nameplate)
  - Check all fans for correct rotation (air blowing upwards).
  - Turn off and repair motors running backwards (capacitor is likely cause)
  - Verify no leaks in water hoses or coils
- Humidity Nozzles
  - Check for excessive scale build up or dripping; replace or clean the nozzle
- Dampers or Exhaust Fans
  - Verify damper openings are equal
  - Verify hatcher exhaust fan is operational

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PM Maintenance after every transfer/wash

- Touchscreen operation:
  - Verify the following buttons are working properly:
    - ECU fans
    - Turn button
    - Alarm bypass
    - Alarm silence
- Console:
  - Verify the E-stop is working
  - Check the power and alarm lights for function
- Racks & Dollies
  - Grease the wheels and castor plate bearings (if required) after washing (1-2 pumps of a grease gun)
  - Check turning operation at 25-30 psig (172-207 kPa)
    - Correct rubbing or binding
    - Repair any air leaks

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Sensor Maintenance

- Temperature Sensor
  - Ensure it is clean
  - Check calibration; recalibrate if difference is greater than 0.3°F
- Humidity Sensor
  - Check and clean the filter. It should not be wet; replace and re-use once dry
  - Check calibration; recalibrate if difference is greater than 2%
- CO_2 Sensor
  - Check and clean the filter
  - Check calibration; recalibrate if difference is greater than 500 ppm

AFTER EVERY WASH OR TRANSFER!

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3 Month PM Maintenance

- Control Console
  - Vacuum out any dust that has accumulated
  - Verify all wires are in good condition and seated properly
- Damper / Hatcher Exhaust Fan
  - Test dampers to ensure they are moving accurately
  - Run damper calibration if required
  - Verify all dampers close fully at 0%
  - Check damper are free from interference and that openings are equal
- Cabinet
  - Inspect silicone at all joints; replace if necessary
  - Inspect door sweep; replace if necessary
- Sensors
  - Verify all sensors are in good condition and sensor covers are still present

6 Month PM maintenance

- Doors
  - Verify that doors seal and latch properly
    - Go inside the incubator and close the door with the lights off. Look for light from the hallway
- Hatchery Support Systems
  - Routine inspection of HVAC equipment (just before season change)
  - Verify hot and chilled water supply
    - Temperature
    - Pressure
    - Flow
  - Verify humidification water pressure at a console

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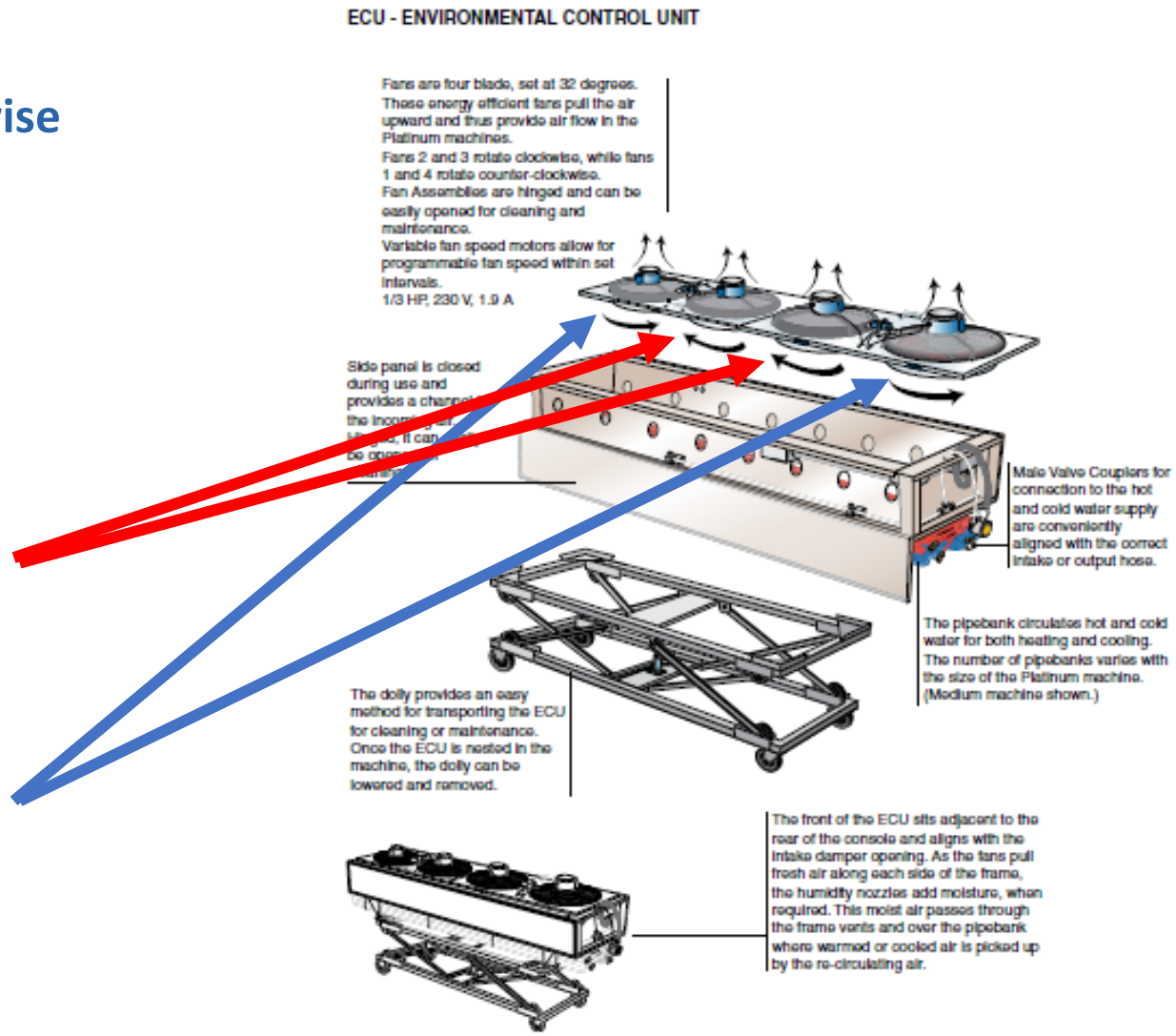
ECU

- Fans 2 and 3 rotate clockwise
- Fans 1 & 4 rotate counter clockwise

Fan blade PB142

Fan blade PB143



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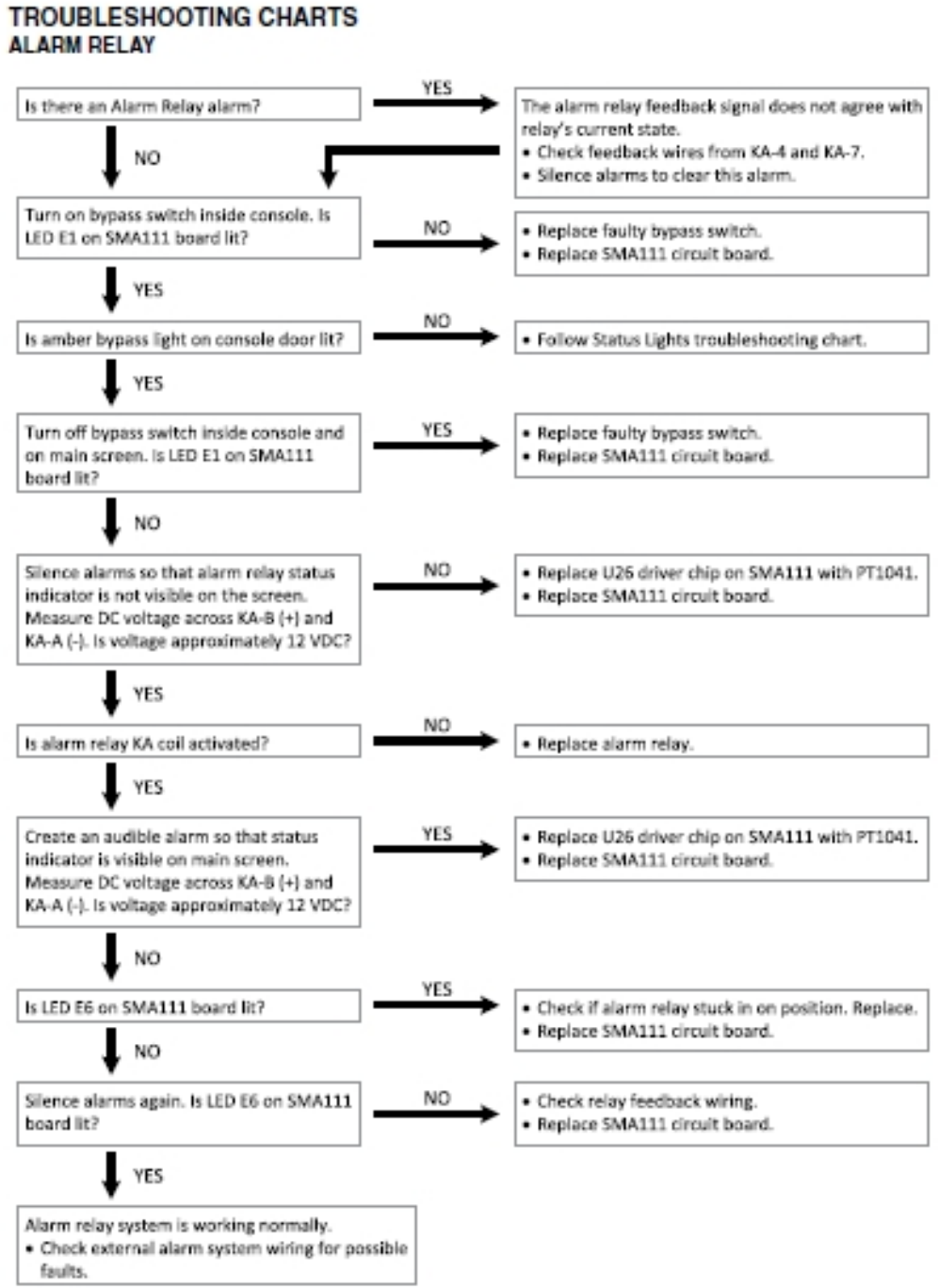
Example of Jamesway Troubleshooting Guide



Any hatchery regardless of it's size, age or location is only as good as it's routine and preventative maintenance programs

MAINTENANCE SCHEDULE FOR PLATINUM INCUBATORS AND HATCHERS

All of the items mentioned below should be checked, as scheduled.

Actual readings should be recorded and compared with the optimum.

All other items should be assessed as to their operating condition – either satisfactory or unsatisfactory.

Unsatisfactory would include not operating properly, excessive wear, dirt or any potential problem. Items, not in satisfactory condition, should be repaired or replaced, and/or cleaned prior to further use.

Items to be Checked		Time Schedule			
		Incubators After Every Transfer/ Wash	Hatchers Monthly ●Standtas weekly	Both, Every 3 Months	Both, Every 6 Months
Temperature Calibration					
1. Display reading	°F or °C	○	○		
2. Check reading	°F or °C	○	○		
3. Setpoint	°F or °C	○	○		
Humidity Calibration					
1. Setpoint	RH °FWB or °CWB	○	○		
2. Display reading	RH °FWB or °CW	○	○		
3. Check reading	RH °FWB or °CWB	○	○		
Carbon Dioxide Calibration					
1. Setpoint	% or ppm	○	○		
2. Display reading	% or ppm	○	○		
3. Check reading	% or ppm	○	○		
Compressed Air					
1. Reading		○	○		
2. Water build up?		○	○		
3. Tank - drain		○	○		
General Machine					
1. Doors seal properly					●
2. Doors latch properly					●
3. Door gasket condition		○	●		
4. Door sweep condition				●	
5. Caulking - all joints				●	
6. Damper zero position				●	
7. Damper operating properly. See page 105.				●	
8. Damper slides not binding				●	
9. Damper openings equal		○	○		
10. Hatcher fan (if equipped) operating properly				●	
11. Water hose connections		○	○		
12. Water hose couplings		○			

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Questions

Henry Kohl
Hatchery Consultant
henry.kohl@Jamesway.com
Cell- 574-518-1426
webinars@Jamesway.com

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