Munters

Author
Michael Ginsburg

SOFTWARE RELEASE NOTE: Trio R9.1.15

Summary

This release includes following features:

- Low/High heater support (Appendix B)
- Up to 15 days in tabs for cooling pad (9920) (Appendix C)
- Stop by humidity level – per cooling pad (9921) (Appendix C)
- Multiple cycle periods per program in fixed cycle for Cooling pad (5443) (Appendix D)
- Support for Fogger Device (4411) (Appendix E)
- Stir Fan Program (9599) (Appendix F)
- Up to 5 heat zones for Brooding (9841) (Appendix G)
- Effective nighttime temperature (7455) (Appendix H)
- Blowback fans (Appendix I)
- Expansion relay software update (Appendix J)
- LCD programmable sleep mode (Appendix K)
- Support for 15-minute history resolution
- Support for current batch history file generation to USB drive inserted into controller (Appendix L)
- Support for current batch history file sharing with Communicator-2
- Emergency high pressure mode
- Support for 4th silo weighing (8490)
- Support for 20 points at temperature curve (9917)
- Cool Pad Off time max limit increase (10695)
- Zone/Central heaters target at dashboard tile
- Displaying the weight value on RSU display according to the selected method
- Keeping livestock data at factory-reset, load-settings, and SW-update
- Improvement on:
    - Relay Expansion connectivity due to Trio SW update (21537)
    - Relay Expansion devices attributes presentation (20871)
    - Settings security in case of low battery
    - Water overflow alarm in dark hours (17177)
    - Scale Card error handling (14251)
    - RSU-2 connectivity (13519)
    - Chinese UI (13532)
    - Scale card connectivity (13388)

Munters

- o   Lights Off with Black Screen (13824)
- o   Pre-heat mode settings (10836)
- o   Heat settings – Send to all controllers (10424)
- o   Feed settings – Send to all controllers (10186)
- o   Cooling temperature setup (10843)
- o   Showing water graph at dashboard (10622)
- o   Showing Silo info at dashboard (10541)
- o   History sorting (8913)
- o   Date and time presentation (11487)
- o   Connectivity to Trio Air (11042, 12285)
- o   Showing support ID (11406)

Release specification

Product Name	Trio
Software Version	Trio 9.1.15
Supported Hardware	Trio Main CPU, Trio UI CPU
Communicator-2 Trio Software	Communicator-2 Trio 2.1.18
Release Date	03-March-26
Supported Languages	English, Italian, Danish, Swedish, German, Spanish, Portuguese, Russian, Chinese, Korean, Japanese, Thai, Hebrew, Arab, Turkish, Vietnamese, Polish

SW Update Issues

- The SW version rollback is supported for the Version 8.3.7 or higher

- The update package performs the SW upgrade for both Trio Main CPU, Trio UI CPU

- The update is available online while connected to WEB

- USB Disk should be used for the offline updates

- It's recommended to use USB update method in case of poor Internet quality

- The special proceedings should be performed for the smooth transition to version R9 (see Appendix A)

- **R9 Version download file size is 1.2 GB (takes around 2 minutes within 100 Mbit Internet connection)**

Known Anomalies

Description	Workaround
Ventilation & Control	
Settings & Backup	
Test & Calibration & Devices	
History	
Management	
When changing House Mode and growth day together, the Growth Day keeps the value of a previous House Mode	Change the house mode, save, and then change the growth day

Munters
Functionality by Version

Functionality	Trio 20 Poultry		
	R9.1	R8.3.7	R7.2.4
Control/Ventilation			
Temperature Curve Set	V	V	V
20 points at temperature curve	V	X	X
Effective nighttime temperature	V	X	X
Min/Max Ventilation Set	V	V	V
Minimum Ventilation Level at Extra/Tunnel mode	V	V	V
Tunnel door in basic ventilation	V	V	X
Air Quality (RH%, CO2, NH3)	V	V	V
Air Quality Automatic treatment by Heat or by fans according to the outside temp	V	V	V
Air Quality by Zone Heaters	V	V	V
Air Quality conditions failsafe activation	V	V	X
Static Pressure Inlet/Tunnel	V	V	V
Heaters	V	V	V
Cooling	V	V	V
Up to 15 days in tabs for cooling	V	X	X
Stop by humidity level – per cooling pad	V	X	X
Multiple cycle periods per program in fixed cycle for Cooling pad	V	X	X
Fogger	V	X	X
Timers	V	V	V
Timers control by outside temperature	V	V	V
Timers control by humidity	V	V	X
Ventilation levels	V	V	V
Inlet & Curtain Levels	V	V	V
Inlet & Curtain Levels Disable per level	V	V	V
Min/Max ventilation control by Outside temperature	V	V	V
Ventilation control by Wind Chill factor	V	V	V
Ventilation control by THI	V	V	V
Minimum Ventilation fan rotation	V	V	V
Cycling Extra/Tunnel fans	V	V	V
Ventilation test for Extra/Tunnel levels	V	V	X
Brooding	V	V	V
Brooding support for 5 zones	V	X	X
Pre-heat with negative days	V	V	V
Separate zone\central heating system	V	V	V
Heaters ignition time support	V	V	V
Heating in special house modes	V	V	V

Munters

Functionality	Trio 20 Poultry		
	R9.1	R8.3.7	R7.2.4
Ventilation types			
Minimum	V	V	V
Transitional	V	V	V
Tunnel	V	V	V
Basic Stir	V	V	V
Advanced Stir Fan Program	V	X	X
Blowback fans	V	X	X
Other Functions			
Water management	V	V	V
Drinker line flushing in manual mode	V	V	X
Feeding management	V	V	V
Feed Batch Weighing	V	V	V
Lighting	V	V	V
Lighting in special house modes	V	V	X
Service Lights	V	V	X
Flushing Drinker lines	V	X	X
Failsafe for air quality conditions	V	V	X
WOD (water on demand)	V	X	X
System			
Sequential deployment of output device at Power up	V	V	V
Expansion relay software update	V	X	X
Support for current batch history file generation to USB drive inserted into controller	V	X	X
Support for current batch history file sharing with Communicator-2	V	X	X
LCD programmable sleep mode	V	X	X
Management			
Alarm Settings	V	V	V
Alarm Test	V	V	V
Alarm Test duration	V	V	X
Alarm Reset	V	V	V
CO2 Emergency Threshold	V	X	X
Water Alarm according to light program	V	V	V
Batch Management	V	V	V
Separate Male/Female Management	V	V	V
Bird Curve Settings	V	V	V
Silo Management	V	V	V
Load/Save settings	V	V	V
Access control	V	V	V

Munters

Functionality	Trio 20 Poultry		
	R9.1	R8.3.7	R7.2.4
History			
Temperature	V	V	V
Humidity	V	V	V
Water	V	V	V
Cooling Water	V	V	V
Water/Feed Conversion	V	V	V
Feed	V	V	V
Heaters	V	V	V
Alarms	V	V	V
Events	V	V	V
24 Hours history per day	V	V	V
24 Hours history per day in 15-minute resolution (Graph & File Export)	V	X	X
CO2	V	V	V
Ammonia	V	V	V
Bird Weighing	V	V	V
Bird Weighing history chart	V	V	X
Silo Weighing	V	V	V
Feed Batch Weighing	V	V	V
Mortality	V	V	V
Power Consumption	V	V	V
Gas Consumption	V	V	V
Measurement & Calibration & Test			
Temperature	V	V	V
Humidity	V	V	V
CO2	V	V	V
Ammonia	V	V	V
Static Pressure	V	V	V
Water	V	V	V
Bird Weighing	V	V	V
Silo Weighing directly with load cell	V	V	V
Electronic Feed Batch Weighing	V	V	V
Mechanic Feed Batch Weighing	V	V	V
Potentiometer	V	V	V
Outside Temperature measurement sharing between controllers at the farm	V	V	V
Power Meter	V	V	V
Gas Meter	V	V	V
Lux meter (Light Intensity)	V	V	V
Sensors testing & troubleshooting	V	V	V
Vents auto calibration – Number of steps per device	V	V	X

Munters

Functionality	Trio 20 Poultry		
	R9.1	R8.3.7	R7.2.4
Installation			
Setup	V	V	V
Relay Layout	V	V	V
Relay Expansion 10	V	V	V
Relay Expansion 20	V	V	X
Relay Expansion Disable Mode	V	V	V
Analog Sensors	V	V	V
Digital Sensors	V	V	V
Analog/Digital Sensors Disable Option	V	V	V
Analog Output	V	V	V
Vent\Curt Setup	V	V	V
Temp Definition	V	V	V
Temp Sensor Location	V	V	V
Scales (Bird/Silo)	V	V	V
RSU-2 Remote Scale Units	V	V	V
RLED Light Dimmer over Communication	V	V	X
Device Properties	V	V	V

Munters
Devices by Version

Devices/Sensors Total No per Room/House	Trio 20 Poultry – R9.1							Trio 20 Poultry – R8.3						
	Output				Measurements			Output				Measurements		
	Total	Relay	0-10V	Comm	Analog	Digital	Comm	Total	Relay	0-10V	Comm	Analog	Digital	Comm
Cooling	4	4						2	2					
Fogger	4	4						NA	NA					
Heaters	6	6	6					6	6	6				
Inlets	4	4	4					4	4	4				
Outlets	1	NA	1					1	NA	1				
Tunnel Doors/Curtains	4	4	4					4	4	4				
Fans Exhaust/Tunnel	20	20	8					20	20	8				
Stir Fan	6	6	6					2	2	2				
Blowback Fan	1	1	1					NA	NA	NA				
Lights	4	4	4					4	4	4				
Timer	5	5						5	5					
Auger	2	2						2	2					
Feeder	4	4						4	4					
As Relay	20	20	NA					20	20	NA				
As Analog Output	8	NA	8					8	NA	8				
Alarm	1	1						1	1					
Temperature Sensors					12							12		
Humidity Sensors IN					2							2		
Humidity Sensors OUT					1							1		
CO2 Sensors					1							1		
Ammonia Sensors					1							1		
Pressure Sensors					1							1		
Potentiometers					4							4		
Bird Weighing					4							4		
Silo Weighing					4							3		
Feed Weighing					1							1		
Lux Meter (light intensity)					1							1		
Water Meters						4							4	
Aux. Input						4							4	
Auger Sensor						2							2	
Feeder Line Sensor						4							4	
Power Meter						2							2	
Gas Meter						3							3	
Feed Weighing by Pulse						2							2	
RSU-2 Remote Scale Unit							2							2
RLED Light Dimmer				2							2			

Appendix A: Upgrade to Version R9

1. Creating Backup file prior updating to Version R9

Before updating your trio controller from previous version to R8, please make sure to save a backup file to an external USB flash drive, so you can use it to load your setting to the controller once the upgrade to R9 is done.

<u>Backup file saved to one of the internal backup Slots in the Trio, will not be transferred on to R9.</u>

Please note, the USB backup file section will be provided only when the USB flash drive is inserted into the Trio

Munters
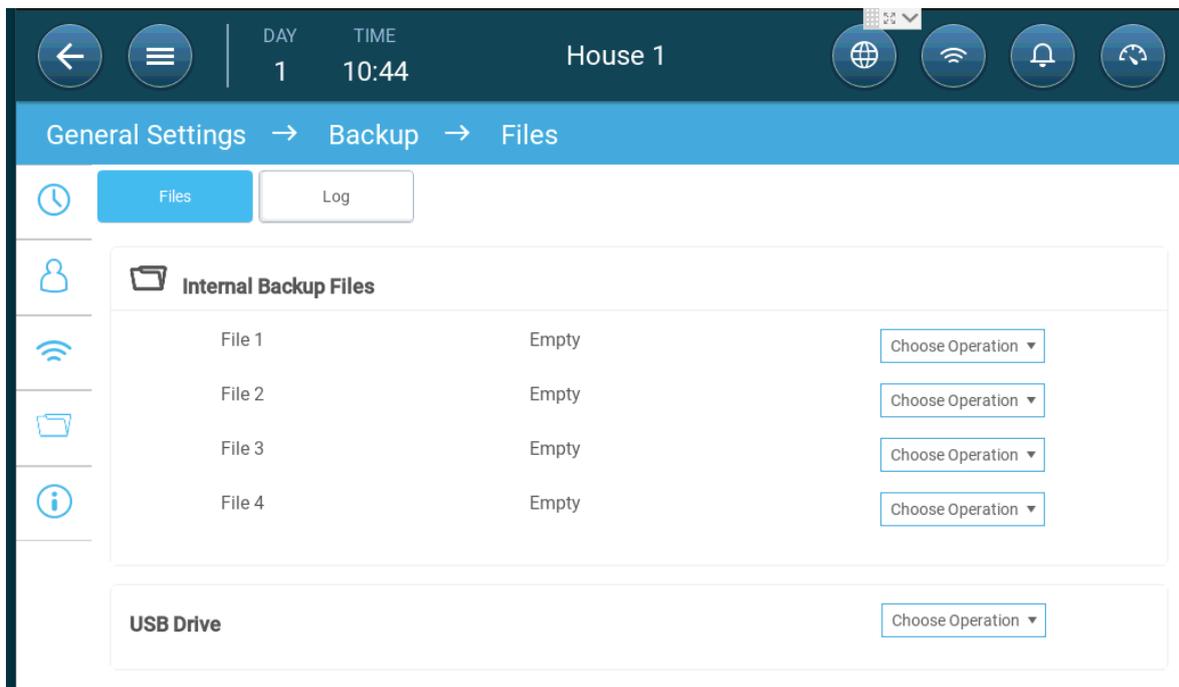
2. **Restoring Backup file to Controller upgraded to Version R9**

Use the same backup file on an external USB flash drive to restore previous versions controller settings.

The user should verify the list of loaded tables at the 'LOG' Tab.
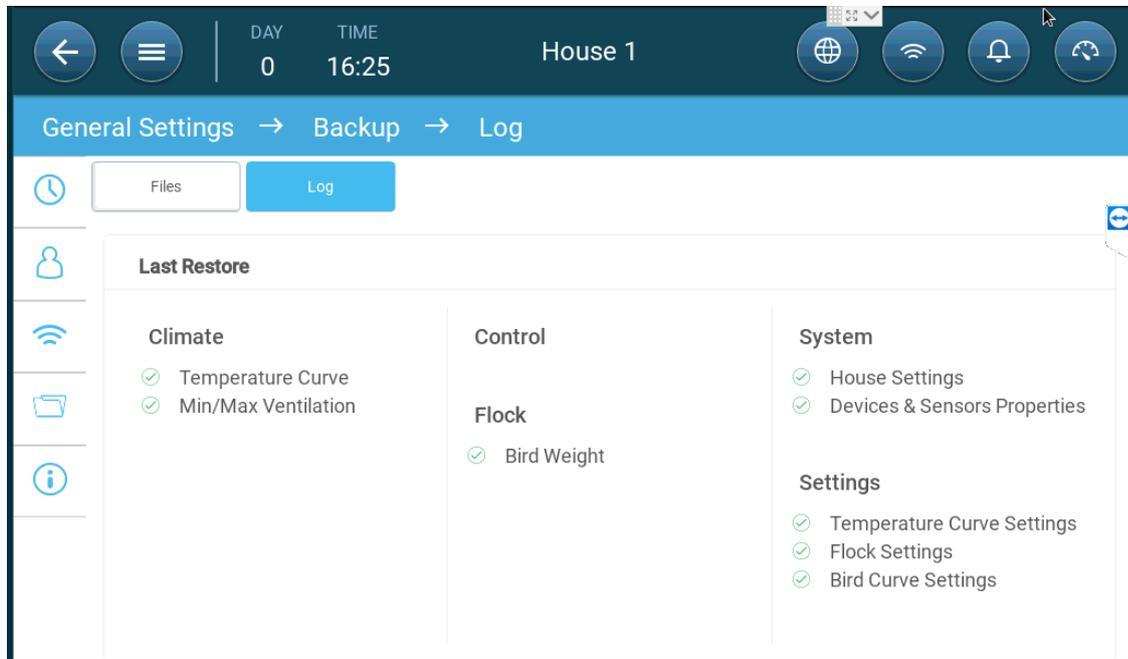
Trio Backup file – Exclusions in upgrade to R9 from R8

The following tables will not be restored, please make sure to manually record your settings/date before upgrading to R9:

- Temperature Curve
- Heaters
- Cooling
- Stir fan
- Timers
- Special House modes
- Temp. sensor definition

Munters

Appendix B: Low/High heater support
Defining the High Heaters

High heaters work in conjunction with relay heaters. High heater 1 works with heater 1, high heater 3 works with heater 3, and so on. If there is no corresponding heater to a high heater, the latter does not function.

➲ Define up to sixteen relays as high heaters.

```
Heat High 1

Reverse
Relay        (toggle)
Output




            TEST
```

How do Second Stage heaters work

Second stage heating (high heating) provides additional heat beyond the main heating system. Alternatively, second stage heating employs 2-stage heater (low/high fire). The second stage heating operates when the outside weather is so cold that the standard heaters cannot maintain the required temperature.

The second stage heater works in tandem with the primary heater. There must be a primary heater defined for the second stage heater to operate. For example if there is one primary heater and two secondary heaters, heater #1 and high heater #1 work together; the second secondary heater will not operate.

Munters

Munters

How do the Heaters and High Heaters Work Together?

When heating is defined as Zone, heaters and high heaters can work together or independently, depending on how their toggle switches are set. The following examples use Heater 1 and High Heater 1 as models.

- Auto Running: The current temperature is below the heat temperature.
- Auto Not operating: The current temperature is above the heat temperature.
- On: The heater operates continually, independent of the target temperature.
- Off: The heater is shut down.
- ≋ : Both heaters are off
- ≋ : The heater is operating
- ≋ : Either the heater and the high heater is operating or the high heater is operating alone

Munters

Munters
Appendix C: Up to 15 days in tabs for cooling pad. Stop by humidity level – per cooling pad

- Define:
  - Growth days at which the settings change. Define up to 15 days. The cooling pads run at their current levels until the next defined day.
  - Pad Control: Enable or disable a cooling pad.
  - Enable from Ventilation Level: Select the level (ventilation output) to enable cooling operation. (Default 1).
  - Start Temperature (Diff from Cool Temp.): Sets the temperature differential from the cooling temperature (Temperature Curve) to activate cooling. The calculated temperature to start cooling is adjusted according to the growth-days.
  - Stop Temperature ((Diff from Cool Temp.): Sets the temperature differential from the cooling temperature (Temperature Curve) to stop the cooling pad.
    - Stop cooling pad temperature = Cooling Target ± Stop temperature
  - Stop above this Humidity: Stop cooling when the humidity level reaches the level defined in this parameter. Define the level for each individual cooling pad.
    - An indoor humidity sensor must be installed for this parameter to appear.

Appendix D: Multiple cycle periods per program in fixed cycle for Cooling pad

Version 9.0 enables defining up to eight cooling cycles, each with its own temperture definition and duration.   Trio continually measures the difference between the current temperature and cooling temperature. When the difference exceeds the threashold, the appropriate cycle is activated. Once a cycle starts, Trio does not recheck the temperature until the cycle finishes.

- Click ✎ and define:
  - ○ Growth days at which the settings change.
  - ○ Status: Enable or disable   e a cooling device.
  - ○ Enable from ventilation Level: Select the level (ventilation output) to enable cooling operation. (Default 1).
    - If Extra or Tunnel ventilation modes are enabled, you can enable ventilation to start in any one of these modes.
  - ○ Stop Above This Humidity: Stop cooling when the humidity level reaches the level defined in the Humidity settings.
  - ○ Stop Temperature (Diff From Cool Temp.): Sets the temperature differential from the cooling temperature (Temperature Curve) to stop cooling device. Default: -0.2º. Range: -10.0º to -0.1º
    - Stop cooling device temperature = Cooling Target + Stop temperature
  - ○ For each cycle define:
    - Start Temp (Diff): Set the temperature differential from the cooling temperature (Temperature Curve) to activate the next cycle.
    - ON/OFF Time: Define the amount of time the cycle is ON and OFF, respectively.
      - ○ On: Default 30 seconds. Range: 5 – 999
      - ○ Off: Default 30 seconds. Range: 0 – 9,999
    - Click ADD CYCLE to define temperature differentials and cycle times.

⊗ Munters

Appendix E: Foggers

Foggers shoot a mist of water into the air to lower the temperature. Foggers are most effective when the humidity is below 60%.

- Foggers operate according to the house temperature, humidity, and bird age.
- A fogger can be mapped to a particular temperature sensor or be controlled by the average temperature.
- The amount of water sprayed should increase as the birds age.
- Foggers run is cycles, with the user defining the on and off times.

Defining the Foggers

➔ **Define up to 4 relays as foggers.**
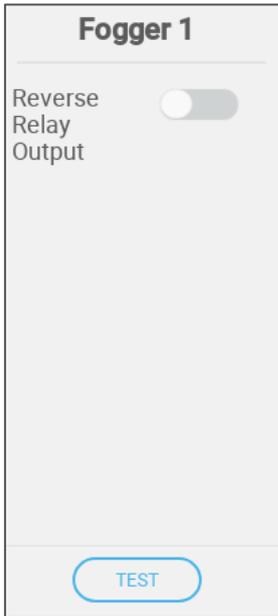
- Define:
    - Reverse Relay Output: Enable this function for Normally Closed Relays.

Munters

To configure the foggers:

⮕ **Map at least one fogger in Devices and Sensors**

1. Go to System > Temperature Definition.

Temperature Definition								
Device	**Avg.**	**Temperature Sensors**						
Full House		1	2	3	4	5	6	
Cooling Pad 3					4	5		
Cooling Pad 4		1	2					
Fogger 1	✓							
Fogger 2				3				
Fogger 3						5		
Fogger 4				3	4			

2. Map the fogger(s) to specific temperature sensors or to the average temperature.

3. Go to Climate > Cooling > Foggers 🔲 .

Cooling → Fogger				
Day 1	**Day 7**	**Day 14**	**Day 21**	
			Fogger	
Fogger Control			⬤	
From Ventilation Level			10 %	
To Ventilation Level			100 %	
Time of Day		00:00 → 08:00		
Start Temperature (Diff. From Cool Temp.)			0 °F	
Stop Temperature (Diff. From Cool Temp.)			-0.4 °F	
Off Time (Sec.)			300	
Minimum On Time (Sec.)			60	
Maximum On Time (Sec.)			300	
Ramping Temperature Range (Sec.)			9 °F	
Stop above this Humidity			85 %	

Munters

4. Define:

- ○ Growth days at which the settings change. Define up to four days. The foggers run at their current levels until the next defined day.
- ○ Fogger Control: Enable or disable the foggers (all foggers are enabled or disabled simultaneously).
- ○ From/To Ventilation Level: Define the minimum and maximum ventilation levels. If Extra or Tunnel Ventilation are enabled, the maximum level can be within these modes. Minimum level is always in Basic ventilation. Default: 10%/100%.
- ○ Time of Day: Set the time frame during which fogger operation is possible (24H or time frames). Default: 24 hours.
- ○ Start Temperature (Diff. From Cool Temp.): Define the temperature differential above the cooling temperature (Temperature Curve) above which the fogger starts to operate.
- ○ Stop Temperature (Diff. From Cool Temp.): Define the temperature differential above the cooling temperature (Temperature Curve) below which the fogger ceases to operate.
- ○ Off Time (Sec.): Define the time between fogging cycles. Default: 300 seconds. Range: 1 – 3600 seconds.
- ○ Minimum On Time: Once the temperature rises above the Start Temperature, the fogger operates for at least this amount of time. Default: 60 seconds. Range: 1 – 3600 seconds.
- ○ Maximum On Time: Once the fogger begins to operate, at a maximum the fogger operates for this amount of time. Trio automatically adjusts the actual on time based on the Ramping Temperature Range.
- ○ Ramping Temperature Range (Sec.): If the temperature rises, Trio adjust the Maximum On Time based on this parameter
- ○ Stop above this Humidity: Stop fogging when the humidity level reaches this level. Default: 85%. Range: 0 – 100. .
  - ▪ This parameter requires that a humidity sensor be installed. If the humidity sensor readings are invalid, this limit is disabled.
  - ▪ Based on this parameter, Trio prevents the foggers from starting an on cycle. Trio does not stop fogging midway through a cycle.

5. Go to Climate › Cooling › Foggers › Settings.

DAY 7	TIME 17:23	House 1				

Fogger → Settings

Humidity Resume Band	5 %
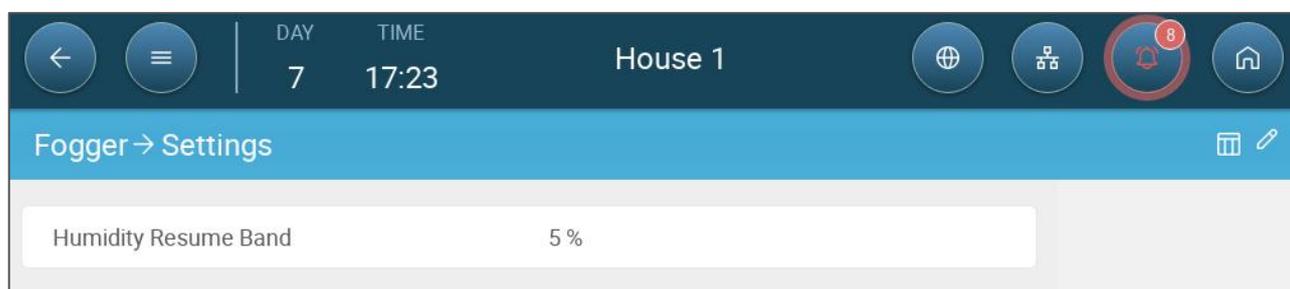
6. Define:

Humidity Resume Band: Before fogging can resume, the humidity must decrease from the [Stop Level] – [Resume Band]. For example, if the Stop Level is 80% and the resume band is 10%, fogging will not resume until the humidity drops to 70%. Default: 5%. Range: 2- 10%.

![Munters logo]

Appendix F: Stir Fan Program

Stir fans mix the air within the rooms. Because warm air rises and cool air falls, there can be a difference of several degrees in the temperature between the floor and the ceiling. By circulating the air, heating costs can be reduced while the environmental conditions are improved.

Stir fans can work continuously or in cycles.

How do Stir Fans and Exhaust Fans Work Together?

There are several rules guiding stir fan operation.

- An exhaust fan must be defined at the same level as a stir fan. The stir fan will not operate without an exhaust fan.

Valid Stir Fan – Exhaust Fan Configuration

Invalid Stir Fan – Exhaust Fan Configuration

Munters

- As the level of ventilation rises, the stir fan operates until there is a change in the exhaust fan configuration. At that point, the stir fan must be redefined or it will stop operating. In upper Figure, The stir fan operates at Level 0 and Level 1. At Level 2, when the exhaust fan configuration changes, the stir fan stops operating. Lower Figure illustrates how to define the stir fan to ensure continuous operation.

Change in Exhaust Fan – Stir Fan Stops Working

Change in Exhaust Fan – Stir Fan Continues Working

- Variable speed stir fans continue working at the same level until a new level is defined; there is no ramping. In Figure**Error! Reference source not found.** the stir f an works at 25% from Level 0 to Level 2. At Level 3, it rises to 50%.

Level M3/h	Fans			Inlet	Stir Fan
	1	2	3	1	1
0 5,000	✹			🏠 15 %	✹ 25 %
1 5,000	✹			🏠 20 %	
2 10,000	✹	✹		🏠 25 %	
3 0	✹	✹	✹	🏠 25 %	✹ 50 %

Variable Stir Fan Speed

- If the stir fans operate in a cycle, they can synchronize their on-time with exhaust fans that operate in a cycle (refer to Cycle Time Option). If the exhaust fans work continuously, the stir fans operating in a cycle work independently of the exhaust fans.

Munters

Appendix G: Brooding for up to 5 Heat Zones

Version 9.0 supports up to five (5) brooding areas. Each area is mapped to a specific temperature sensor. If more than one sensor is assigned to a brooding area, the functionality is determined by the average temperature.

1. Go to System > Control Strategy > Flock ⬜.

a. Enable Brooding Area.

b. If required, enable non-brood heaters and define the set point. These heaters are mapped to those sensors not mapped to the brooding area temperature sensors (next step).

- This function must be enabled for these heaters to operate.

2. Go to Flock > Flock Settings.

Munters

3. Select the number of brood areas.

4. Go to System > Temperature Definition (temperature sensors must be defined).

5. Map each brood zone to one or more temperature sensors.

Munters

Appendix H: Effective Nighttime Temperature

As an option, Version 9.0 enables defining a nighttime temperature differential. This option lowers the target temperature during the night (the user defines the nighttime period), starting from a user defined day. Effectively this function means that the heater starts functioning at a lower temperature.

To enable a nighttime differential:

1. Go to System > Control Strategy > Climate and enable **Effective Nighttime Temperature**.
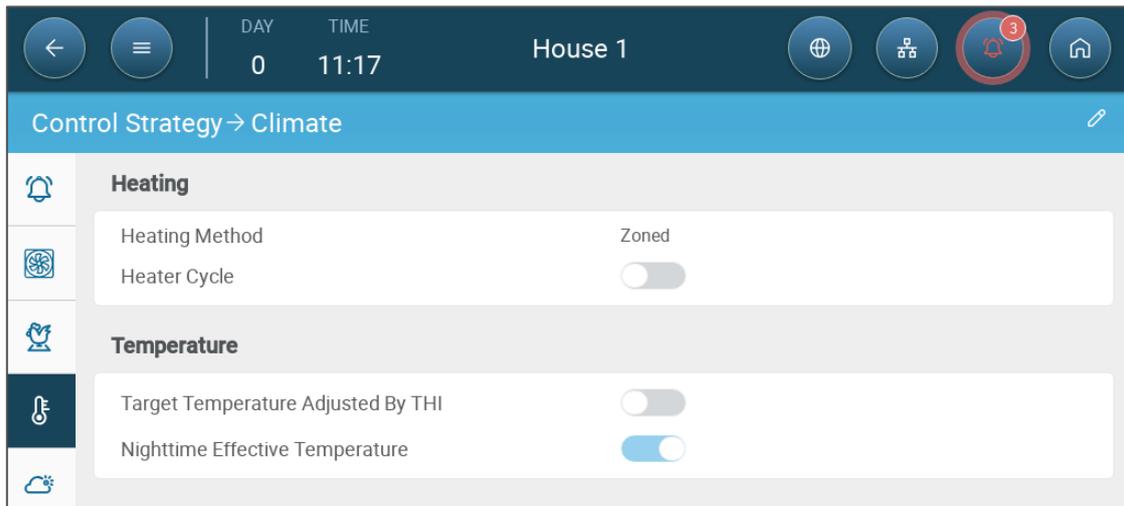
2. Go to Climate > Temperature Curve > Settings.
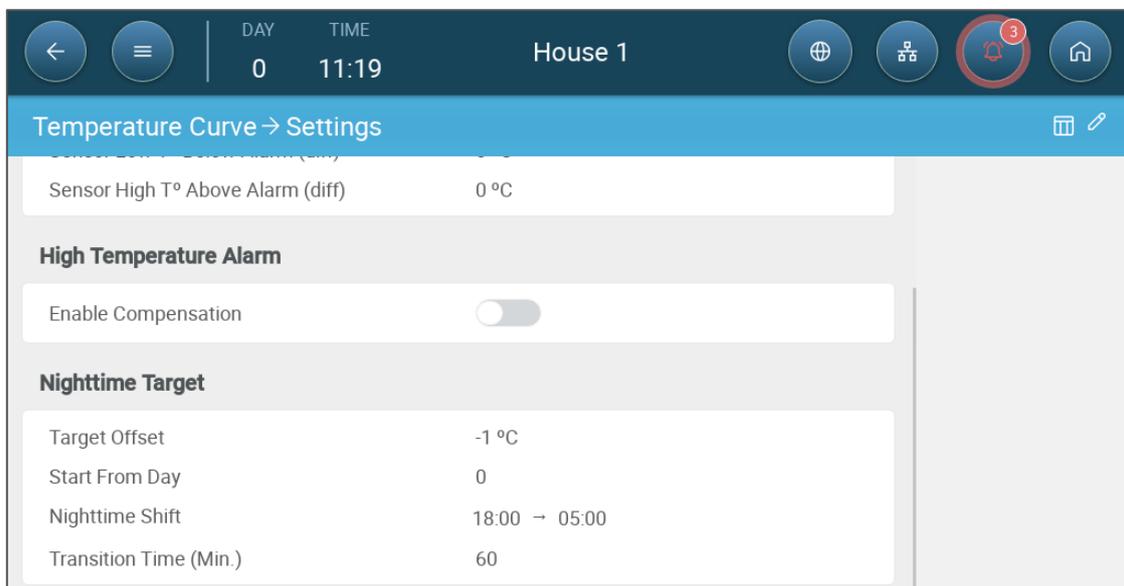
3. Define:

- ○ Target Offset: Define the nighttime temperature offset. Default: -1º C. Range: -5º - 0º C.
- ○ Start from Day: Define the growth day at which the function begins to operate. Default: 0. Range: 0 - 999
- ○ Nighttime: Define the nighttime hours. Default: 18:00 – 5:00.
- ○ Transition Time: Define the amount of time over which the temperature curve transitions between day to night and night to day. Default: 60 minutes. Range: 5 – 120.

Appendix I: Blowback Fan

As an option, blowback fans can be used during tunnel ventilation to improve airflow in the area of the cooling pads. Their purpose is to distribute air in areas with limited air flow.

➲ **Go to System > Devices and Sensors and set relays as Blowback Fans (**

Operation

- Blowback fans operate according to temperature readings. The fans must be mapped to a specific temperature sensor(s).
    - These fans do not operate according to the average temperature reading. If the mapped sensors fail, the fans cease operating.
- Blowback fan activation and deactivation temperatures are in reference to the tunnel temperature or the cool pad temperature.

Configuration

➲ **Tunnel Ventilation must be enabled**

1. Go to Climate › Ventilations › Settings.
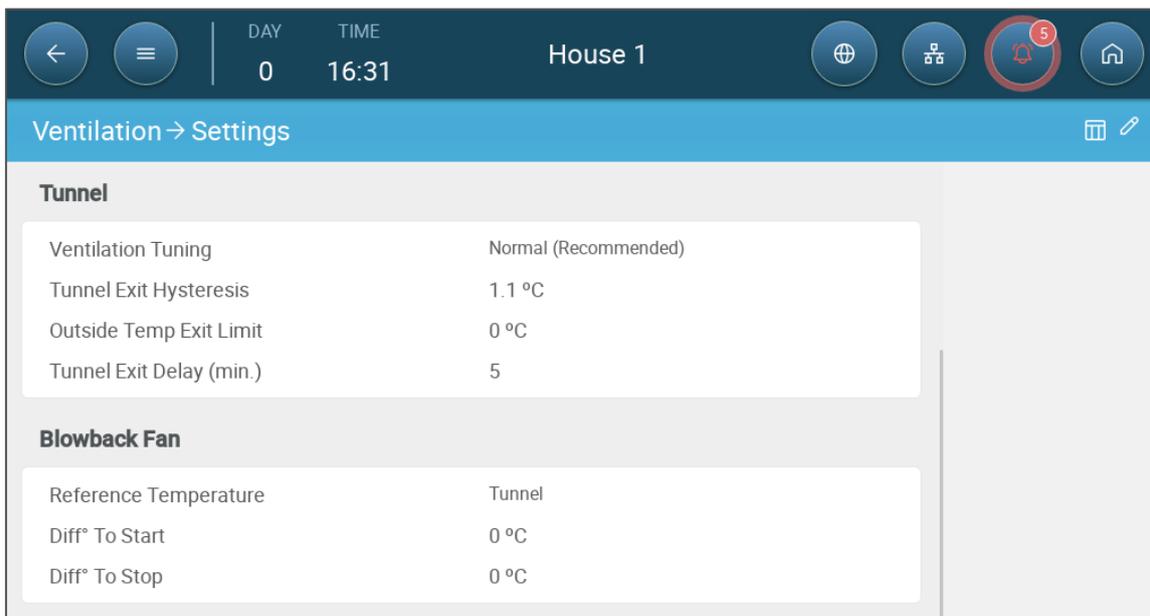
2. Select the reference temperature: Tunnel or Cooling.

3. Define the differential between the reference temperature and the start/stop temperature. Default: 0^0. Range: -10^0 to $+10^0$

Munters

Appendix J: Expansion relay software update

Rotem Trio, Version 9.0 supports a 10 or 20 relay expansion unit.
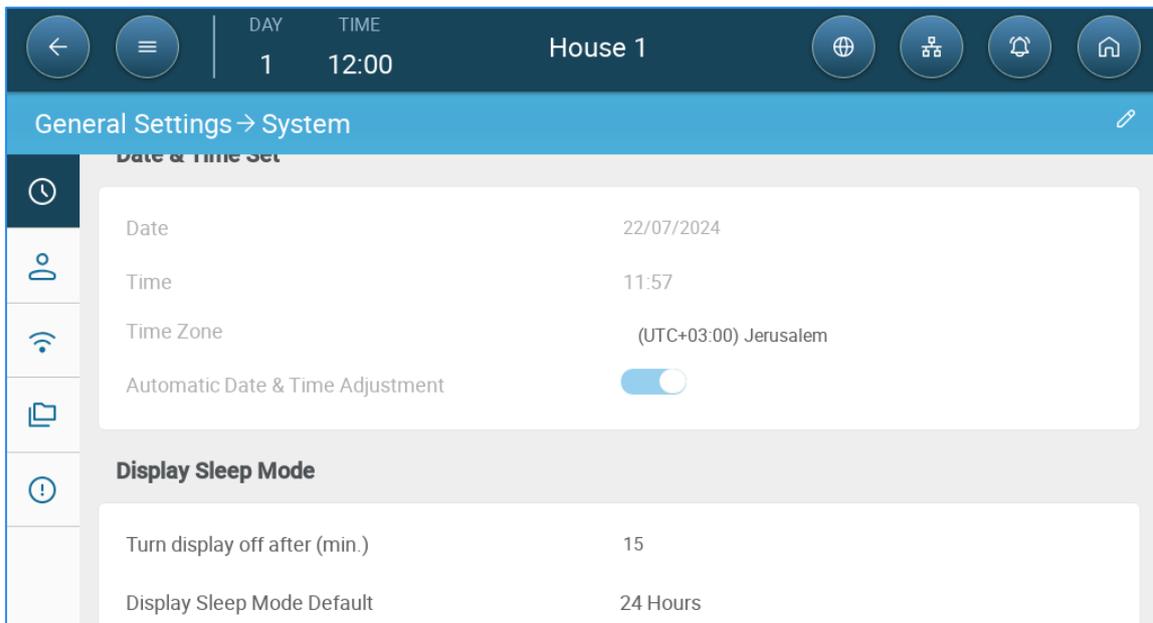
Munters

Appendix K: LCD programmable sleep mode

Defining the Sleep Mode

To extend the life time of the controller display screen's LEDs, the screen dims after a given amount of time has passed since a user touches the screen.

1. Go to System > General Settings > Time & Date 🕐.

2. Click Edit and define:
   - Turn Display Off After: 15, 30, 45 minutes (15 minute default).
   - Display Sleep Mode Default: Choose 24 hours or define the time frame.

Appendix L: Support for current batch history file generation to USB drive inserted into controller

Exporting History Data

Version 9.0 enables exporting history data to a USB device (flash drive). Data points are generated every 15 minutes.
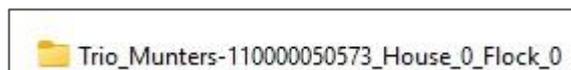
1. Go to Flock > History > Export History . The following screen appears.
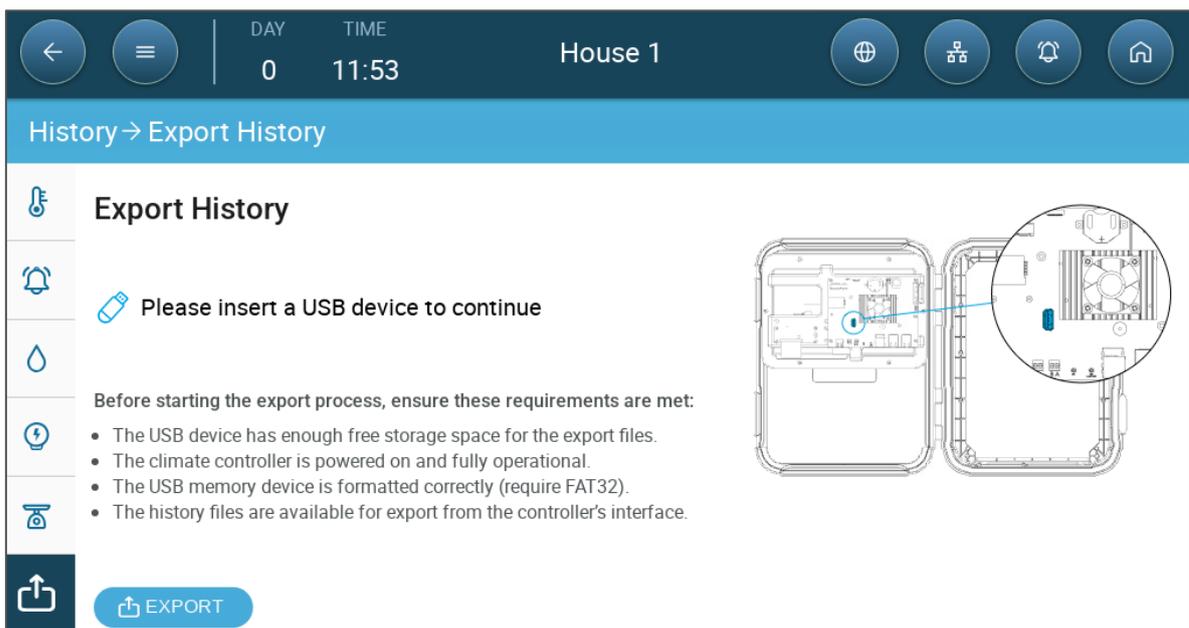
2. Insert a USB drive into the port as indicated and click **Export**.

3. Once the process is complete, remove the USB drive.

A directory containing excel files has been created on the drive.

- Click the clock symbol ( ) to view a detailed breakdown.