

Temperonic Controls TS32MZ Ventilation Control

Operators Manual



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Controller Features:

- 8 Actuators
 - Integrated current sensors for end limit detection, over current, under current.
 - 8 x 120/240Vac, 8 Amp, 1HP Maximum.
 - 8 potentiometer inputs, also tracks position based on run time
 - Auto calibration using internal current sensors
 - 8 rotary switches for manual open, close, off, auto of each actuator. Control reads state of manual switches and maintains position when under manual operation.
 - LED indicators for open and close
 - Can use weather information to limit curtain openings (wind speed and direction, winter maximum limits)

- 8 Variable 0-10V Outputs
 - for VFD, Light Dimming, Variable speed fan (using external module), other 0-10V devices
 - Toggle switch plus potentiometer for on/off/auto. When on, potentiometer can be used to set output level. Internal trimmer to set minimum allowable on voltage.
 - LED indicator that increases in brightness with output level.
 - Wind Speed and direction can be used to shut down a variable speed device (like a large fan)
 - Variable speed outputs can be interlocked with a relay for a go/stop signal such as a VFD enable/disable.

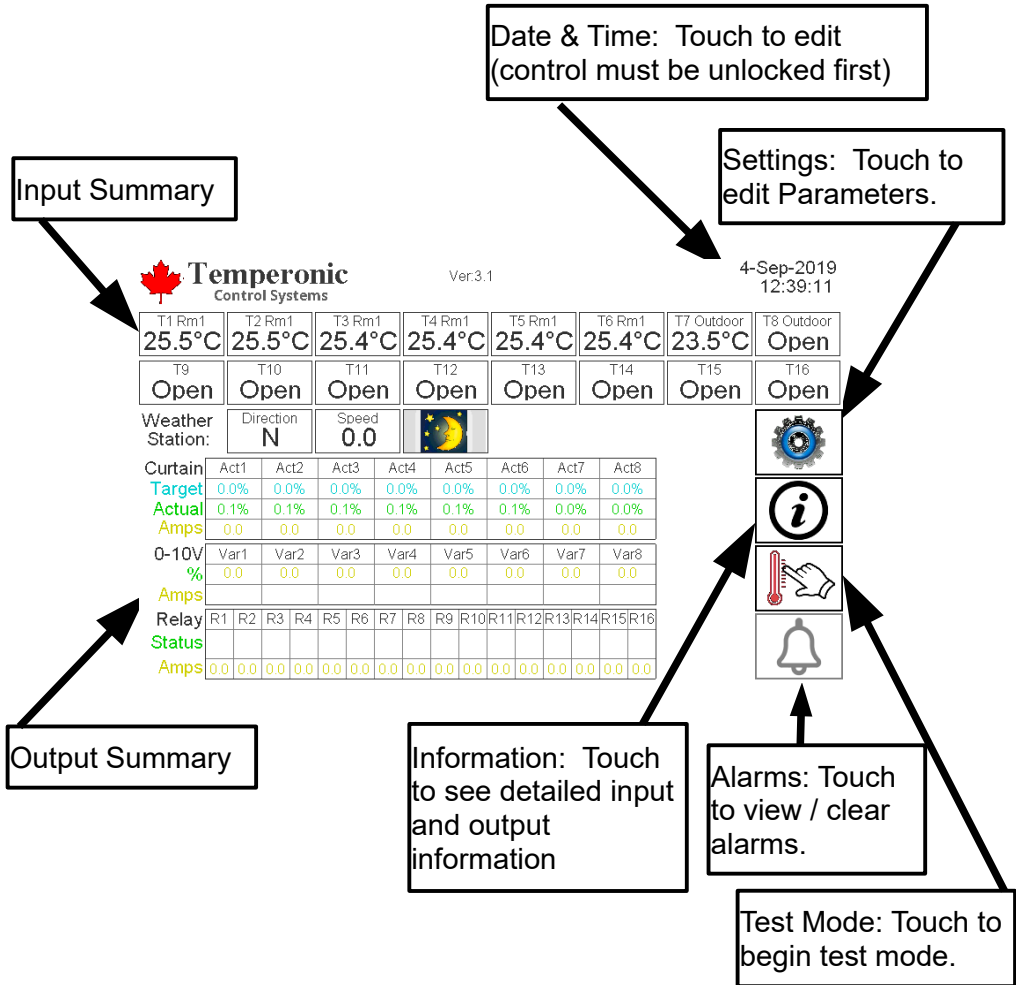
- 16 On/Off Relays
 - 16 inputs for connection of external current transformers (CT20)
 - 16 x 120/240Vac, Maximum 8Amp, 1HP
 - Toggle switch for on/off/auto. Control can detect switch position for on-screen status of output relays
 - 16 LEDs to indicate if relay is on or off.

- 25+ Analog Inputs
 - Accepts pulse input to detect wind speed
 - 5V input signal for wind direction
 - 12V Digital Input for rain indication
 - 5V analog input for detecting sun/cloud/night using photocell
 - 16 Temperature Sensors
 - 4 Humidity Sensors
 - 2500V isolation from main control with connection for earth ground.

- Other Features
 - 7" TFT 800x480 colour touch screen
 - Internal USB port for memory stick – data download, firmware upgrades, parameter load/save.
 - Internal wifi module for internet connectivity
 - Internal 128MB flash storage for data logging, firmware backup
 - RS485 interface for connection to modbus devices (may require custom programming)
 - Simple duplication of settings for actuators, relays and variable speed outputs.
 - Expandable CANBUS design will support up to 10 actuator and relay boards (80 actuators and 160 relays total). Requires expansion interface boxes.
 - Up to 8 input boards to support additional temperature, humidity, CO2, Static Pressure and digital inputs.
 - Soon to support a fully programmable light dimming control system.
 - Soon to support activation and monitoring of feed augers, laser bin level monitoring.
 - Support for weigh scale systems (hog sorting, bird weighing)
 - Outputs are programmed to turn on in sequence, not all at once. This reduces peak amperage problems for generators.
 - Multiple rooms and growth curves and lighting programs
 - Internal battery-backed-up clock

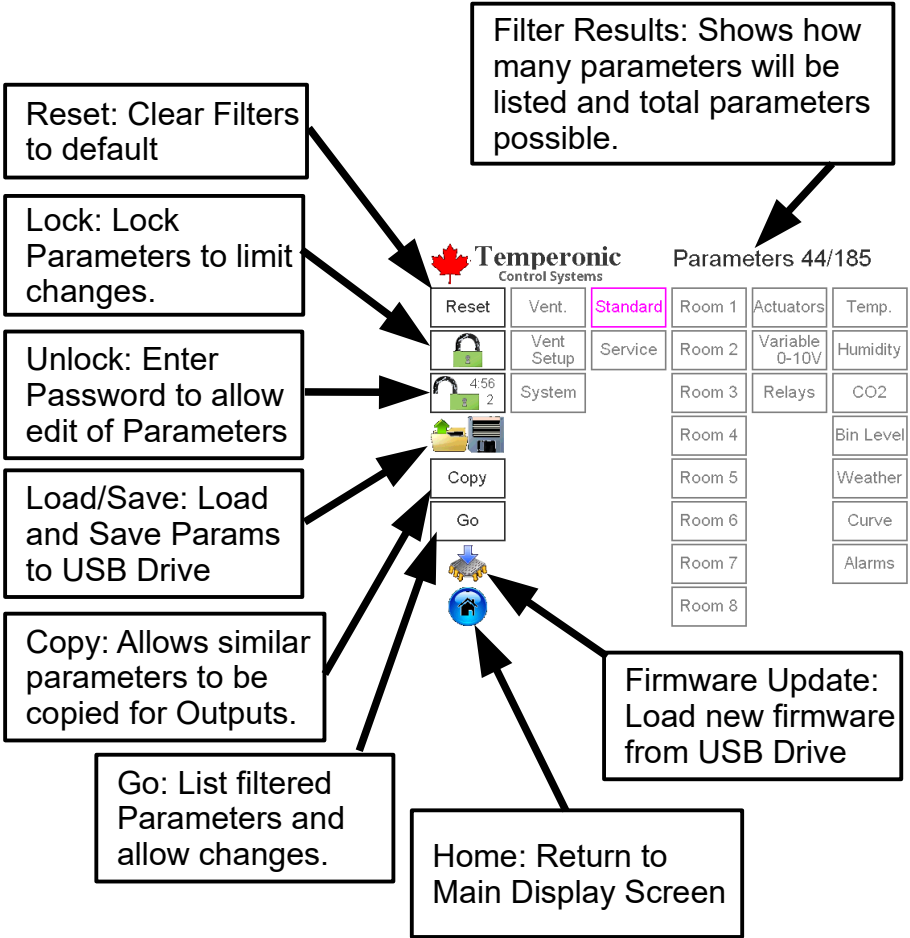
Main Display Screen

This control utilizes a coloured touch screen. All data entry is managed through the touch screen interface.



Settings:

This control has many parameters that can be adjusted. In order to quickly locate the relevant parameters, a filter system has been implemented.



Select filter options using the buttons. Once the filter is correct, touch the Go button. The filter is based on an “and” algorithm. Only parameters that match all of the filter conditions will appear for editing.

Unlocking the Parameters

To unlock the parameters, click on the Unlock Button.

Unlock Timer shows time left before lock.



Password Level appears here.

The following entry screen will appear:

Enter Password


The password entry screen features a red maple leaf icon on the left. In the center, there are four input fields, each containing an up arrow above a '0' and a down arrow below it. To the right of these fields is a 'Save' button with a green checkmark and a 'Cancel' button with a red X. On the left side, there are three rows of settings: 'Minimum 0', 'Maximum 9999', and 'Factory 0'. Below these settings is a numeric keypad with buttons for 7, 8, 9, 4, 5, 6, 0, 1, 2, 3, and a decimal point.

Minimum 0		7	8	9		
Maximum 9999		4	5	6	-	
Factory 0	0	1	2	3	.	






The default password for the TS32MZ control is 1111. This can be entered in a couple of different ways. The up and down arrows can be used to change each digit. Alternatively, the numeric keypad can be used to enter a value. The Minimum, Maximum and Factory values are also buttons and touching one of those will change the value to match.

Initial Setup

There are a number of parameters that should be setup first. To simplify this process, use the Vent Setup Filter.



Parameters 49/185

Reset	Vent.	Standard	Room 1	Actuators	Temp.
	Vent Setup	Service	Room 2	Variable 0-10V	Humidity
	System		Room 3	Relays	CO2
			Room 4		Bin Level
Copy			Room 5		Weather
Go			Room 6		Curve
			Room 7		Alarms
			Room 8		

This will pull up all of the parameters needed to do a quick setup of the control for a single room. If the control must be set up for multiple rooms, the Vent Service filter must be used instead of the Vent Setup Service filter. It is still recommended to start with the Vent Setup Service filter and then go through the Vent Service parameters following the Vent Setup.

Actuator Calibration

Actuator position is determined using the run time of the actuators. Using the current sensors, this control is able to automatically determine the time measurement. This process only needs to be completed once upon installation or if the rotary switch board in the control is replaced. Installation of a new or replacement actuator or changes made to the end limits would also require a re-calibration of the actuator.

Step 1: Begin with the actuator selection switch in the Auto position.

Step 2: Repeat the following 5 times. Rotate the knob from Auto Off and back to Auto.

Step 3: Leave the switch in Auto and the actuator will then calibrate by running open a short distance, then fully closed, then fully open.

Parameters to Configure Curtains.

201.1 Room 1 Ventilation On/Off	On	221.1 Variable Output 1 Configure	Off
202 Deg F or C	° C	221.2 Variable Output 2 Configure	Off
204 Time Zone	-5	221.3 Variable Output 3 Configure	Off
211 Rooms	1	221.4 Variable Output 4 Configure	Off
212 Variable Outputs	8	221.5 Variable Output 5 Configure	Off
213 Relay Outputs	16	221.6 Variable Output 6 Configure	Off
214 Actuators	8	221.7 Variable Output 7 Configure	Off
220.1 Room 1 Leakage	0 CFM	221.8 Variable Output 8 Configure	Off



Begin by setting the temperature units. This Vent Setup process is a simplified setup process. If multiple rooms are to be set up, use the full Vent Service Filter.

The number of Variable Outputs, Relay Outputs and Actuators can be adjusted. This is optional and can help to hide some parameters. If only Actuators 1 and 3 are used, it will be necessary to specify Actuators = 3, (not 2).

Touch any of the parameter descriptions to edit the parameter.

Variable Outputs can be configured using Parameters 2180.1 – 2180.8. Firmware Version 5.06 supports the Var Fan, Actuator, Large Circ Fan, Var Fan + Tunnel. Other configurations will be available through a firmware update in the near future.

Relay Outputs

223.1 Relay Output 1 Configure	Off	223.9 Relay Output 9 Configure	Off
223.2 Relay Output 2 Configure	Off	223.10 Relay Output 10 Configure	Off
223.3 Relay Output 3 Configure	Off	223.11 Relay Output 11 Configure	Off
223.4 Relay Output 4 Configure	Off	223.12 Relay Output 12 Configure	Off
223.5 Relay Output 5 Configure	Off	223.13 Relay Output 13 Configure	Off
223.6 Relay Output 6 Configure	Off	223.14 Relay Output 14 Configure	Off
223.7 Relay Output 7 Configure	Off	223.15 Relay Output 15 Configure	Off
223.8 Relay Output 8 Configure	Off	223.16 Relay Output 16 Configure	Off

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226.1 Actuator Output 1 Configure	Side Curtain Timed	244.1 Actuator 1 Probes to use	1,2,3,4,5,6,
226.2 Actuator Output 2 Configure	Side Curtain Timed	244.2 Actuator 2 Probes to use	1,2,3,4,5,6,
226.3 Actuator Output 3 Configure	Side Curtain Timed	244.3 Actuator 3 Probes to use	1,2,3,4,5,6,
226.4 Actuator Output 4 Configure	Side Curtain Timed	244.4 Actuator 4 Probes to use	1,2,3,4,5,6,
226.5 Actuator Output 5 Configure	Side Curtain Timed	244.5 Actuator 5 Probes to use	1,2,3,4,5,6,
226.6 Actuator Output 6 Configure	Side Curtain Timed	244.6 Actuator 6 Probes to use	1,2,3,4,5,6,
226.7 Actuator Output 7 Configure	Side Curtain Timed	244.7 Actuator 7 Probes to use	1,2,3,4,5,6,
226.8 Actuator Output 8 Configure	Side Curtain Timed	244.8 Actuator 8 Probes to use	1,2,3,4,5,6,

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Actuators may be configured using Parameters 2240.1-2240.8. For firmware version 5.06, Side Curtain Timed, Chimney Baffle Timed, Tunnel Curtain, Air Inlet, Side Curtain Position, Chimney Baffle Position, Low Dual Timed, Side Cur + Tunnel Timed, Side Cur + Tunnel Pos are operational. The other functions will be available in future firmware updates.

Each output can be assigned to use specific probes in calculating temperatures. Be sure to set temperature probes to use for each Actuator, Variable and Relay Output.

Weather Station:



Parameters 35/217

Use the Vent, Service, Weather filter to pull up the Parameters relevant to the Weather Station.

Reset	Vent.	Standard	Room 1	Actuators	Temp.
	Vent Setup	Service	Room 2	Variable 0-10V	Humidity
4:46 2	System		Room 3	Relays	CO2
			Room 4		Bin Level
Copy			Room 5		Weather
Go			Room 6		Curve
			Room 7		Alarms
			Room 8		

301 Weather Station On/Off	On	302.8 Curtain 8 Direction	N
302.1 Curtain 1 Direction	N	303 Weather Station Direction	N
302.2 Curtain 2 Direction	N	304 Wind Direction Smoothing Factor	25
302.3 Curtain 3 Direction	N	311 Wind Level Difference 1 Multiplier	100 %
302.4 Curtain 4 Direction	N	312 Wind Level Difference 2 Multiplier	75 %
302.5 Curtain 5 Direction	N	313 Wind Level Difference 3 Multiplier	50 %
302.6 Curtain 6 Direction	N	314 Wind Level Difference 4 Multiplier	25 %
302.7 Curtain 7 Direction	N	315 Wind Level Difference 5 Multiplier	0 %

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Set the direction that the curtains are facing. Also be sure to configure Parameter 3030 so that direction readings from the weather station will be correctly adjusted to account for how the wind direction sensor has been mounted.

Parameters 3110 to 3150 specify how much effect the wind has when approaching from an angle. When the wind direction is an exact match to the curtain direction, 100% of the wind speed will be used. If the direction is off by 1, 2, 3, 4 or 5 levels (where there are 16 levels on the compass), then the wind speed will be reduced by the percentage specified in these Parameters. For example, if the wind is coming from the North East and a curtain faces East the North East wind speed would be reduced by 0.75 when performing

calculations on the East-facing curtain. The wind is from the NE and to get to E, we have NE, ENE then E. This would be considered 2 levels.

318 Wind Speed Smoothing Factor	25	327 Wind Speed Differential	4.0 km/h
319 Wind High Temperature Override	30.0 °C	328 Wind Level Change Time Delay	600 Secs
321 Wind Speed Reduction 1	10 km/h	330 Wind+Rain High Temperature Override	30.0 °C
322 Wind Speed 1 Max % Open	50 %	331 Wind+Rain Speed Reduction 1	8 km/h
323 Wind Speed Reduction 2	15 km/h	332 Wind+Rain Speed 1 Max % Open	25 %
324 Wind Speed 2 Max % Open	30 %	333 Wind+Rain Speed Reduction 2	12 km/h
325 Wind Speed Reduction 3	20 km/h	334 Wind+Rain Speed 2 Max % Open	15 %
326 Wind Speed 3 Max % Open	15 %	335 Wind+Rain Speed Reduction 3	15 km/h



Parameter 3190 provides a high temperature over-ride. When above this temperature inside the room, curtains are no longer restricted by the wind speed. When rain is detected, Parameter 3300 would specify the high temperature over-ride.

There are 3 levels of wind speed that can be set (3210 - 3260). There is a second set of 3 levels that can be set for when it is raining (3310 - 3360).

When the Effective Wind Speed on a curtain exceeds the value in 3210, the curtain opening will be limited to the value in 3220. The other 2 wind speed levels can be found in parameters 3230 – 3260. Parameter 3270 specifies how much the wind speed must drop before the maximum opening will be allowed to increase. Parameter 3280 specifies how long the wind speed must remain below this threshold in order for the maximum curtain opening to be increased again.

Set Parameter 2670 Curtain Calibrate Frequency to enable the control to run the actuator fully closed from time-to-time. If a value of 168 hours is used, then each actuator will run to the fully closed position once every week. The control will stagger the calibration operation so that several curtains do not calibrate at the same time.

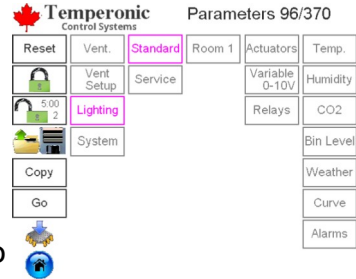
Lighting:

The control now supports on/off lights using relay outputs. The Parameters for this may seem a bit confusing but the structure for controlling lights has been set up to eventually provide for a full dusk to dawn lighting control system that can adjust the lighting program over several days using a combination of 0-10V channels for light dimming as well as on/off relays to manage non-dimming channels.

For now, to simply have lights turn on and off up to 3 times per day, follow the instructions found here.

Step 1. Configure 1 or more relay outputs as Lights in the service parameters for Relays.

Step 2. Use Lighting, Standard Parameters to Configure 1 or more records to define light turn-on and turn-off times. This is done using a Time of Day when the sequence starts then up to 3 sets of hours light, hours dark to allow the lights to turn on and off up to 3 times in a 24 hour period.



4030.1 Record 1 Channels	R9,
4040.1 Record 1 Start Time	05:00:00
4060.1 Record 1 Hours Light 1	02:00:00 time=05:00 - 07:00
4070.1 Record 1 Hours Dark 1	12:00:00 time=07:00 - 19:00
4080.1 Record 1 Hours Light 2	03:00:00 time=19:00 - 22:00
4090.1 Record 1 Hours Dark 2	07:00:00 time=22:00 - 05:00
4100.1 Record 1 Hours Light 3	00:00:00
4110.1 Record 1 Hours Dark 3	00:00:00

Select the outputs(s) to be driven by this record. Up to 4 outputs may be selected.

Enter the time of day that this record begins. 5:00am has been entered here.

Enter up to 3 sets of Hours of Light and Hours of Dark. This specifies HH:MM:SS of time duration, NOT a time of day. 02:00:00 means the lights will be on for 2 hours. Then 12:00:00 means they'll be off for 12 hours after that.

The Smaller text below the duration indicates the time of day spanned by the Light or Dark periods. The second time the lights turn on will be from 7pm to 10pm (19:00 – 22:00).

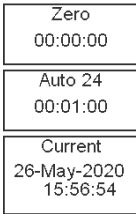
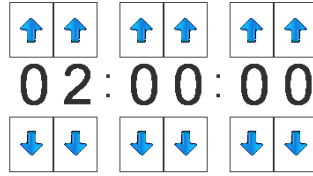
This record only turns the lights on and off twice in a day so the 3rd Light and Dark periods are set at 00:00:00

Total of all Light and Dark periods should total 24 hours. $2+12+3+7 = 24$

When editing the hours light and hours dark entries, the buttons on the left will be quite helpful.



4060.1 Record 1 Hours Light 1



Use the Zero button to start with a nice, clean 00:00:00 for setting the length of a light or dark period. It's also helpful to clear out the unused light and dark periods.

Each Record should cover a total of 24 hours. On the final Dark period, simply press the Auto 24 button to have the control enter the correct Dark time to ensure the Record covers exactly 24 hours.

3500 Proportional Curtain Curves – Page 1

The control allows for up to 8 temperature / position curves to be defined. Usually only 1 curve is needed. To fine-tune the temperature / position curve, step 1 is to make the curve visible.

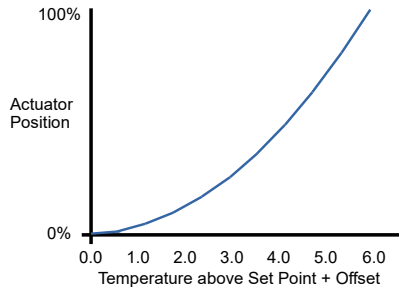
Use parameter 3500 to make the position curve values visible. When set to 0, parameters 3520 and 3530 are hidden.

Use parameter 3510 to specify a proportional band for each curtain position curve. This value is really just a guide for specifying curve position points. The proportional band for each individual curtain (Parameter 1660 as found in the standard actuator parameters) will be used as the actual proportional band for a given actuator and the curve will be compressed or expanded to match the value specified in 1660 for each actuator.

3500 Proportional Curtain Curves – Page 2

Use Parameters 3520 to define the curtain positions for each of the temperature points. Normally, the temperature / position relationship will follow a curve (not just a straight line).

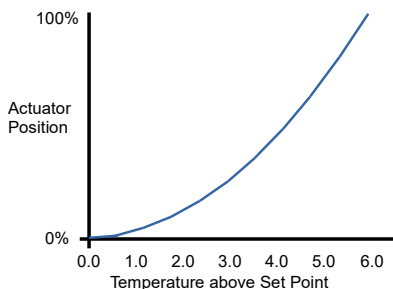
When using proportional positioning, it is necessary to limit how often the curtain changes position. Parameter values in 3530 specify how much of a change in temperature is required before the actuator will move. If the actuator moves too much, increase the values in 3530. If the temperature changes too much before the actuator moves, reduce the values in 3530.



3500 Proportional Curtain Curves – Page 3

Using parameter 2240, a curtain can be set to Side Curtain Position or Chimney Baffle Position. This configures the curtain (or chimney) for proportional position mode. The actuator will move to a position based on temperature. Parameters 3500 to 3530 are used to define the relationship between temperature and position. The default relationship graph is shown here.

When using proportional positioning, it is necessary to limit how often the curtain changes position. Parameters 3530.1 to 3530.11 specify how much of a change in temperature is required before the actuator will move. If the actuator moves too much, increase the values in 3530. If the temperature changes too much before the actuator moves, reduce the values in 3530.



Proportional Curtain Curves – Page 4

Steps to configure curtains for proportional positioning:

1. Using Service+Actuators Parameter 2240, set the actuator to either “Side Curtain Position” if wind speed and direction may affect actuator position or “Chimney Baffle Position” if wind speed and direction are not a factor.
2. Set Parameter 2242 to the correct Room Number
3. Set Parameter 2258 to the position curve (normally 1)
4. Set Parameter 2290 probes to use for actuator.
5. Parameters 2830 – 2860 should be set up for winter max positions.
6. Parameters 2862 – 2863 can be used to set curtain minimum positions.
7. Set weather station parameters 3020 - 3380
8. Return to Filters and using Standard+Actuators and set 1610, Actuator Offset
9. Parameter 1650, Actuator Off time can be set to ensure actuator positions are updated periodically even if the temperature doesn't change too much.
10. Parameter 1660 defines the proportional band. At Set Point + Offset, the curtain will be fully closed (or at the minimum 2862 if set). At Set Point + Offset + P1660 the curtain will be fully open if not limited by winter maximum or weather station.
11. Set Amperage limits for actuators (Parameter 2270, 2280).

Feed System Activation – Page 1

A feed auger can be controlled by the TS32MZ. It is highly recommended that a current sensor be connected to monitor the feed auger amperage draw. The TS32MZ can support up to 16 external current transformers. Part Number is CT20.

1. Using parameter 2200, configure a relay output to be an "Auger".
2. Select the room number using parameter 2202.
3. Note that it's possible to halt an auger using a high wind speed block (3400). This would be unusual but it is possible for situations where a feed system should stop during high wind speeds. Set 2204 if this is needed
4. Select the amperage channel to use for this Auger. Use 0 to disable the amperage features for this auger.
5. Set 2225 to 0 if there is no need to alarm for high amperage draw. Otherwise, enter an amperage value that should not be exceeded.
6. Set 2226 to the number of seconds of continuous high amperage readings needed to trigger the high amperage alarm. A 0 will alarm immediately.

Feed System Activation – Page 2

7. Set 2227 to a minimum run time. If the auger runs for less than the time specified here, an alarm will be triggered. A minimum run alarm will not impact the next feeding event. Set the time in HH:MM:SS.
8. Set 2228 to a maximum run time. If the auger runs for longer than the time specified here, an alarm will be triggered, the relay output will shut off and the control will NOT attempt to activate the feed system again till the alarm has been cleared.
9. In Standard Relay parameters, set Parameter 1250 to the number of feeding times per day (between 1 and 8).

Note that it is possible to set the number of feedings per day on the growth curve.

A feeding event can be manually triggered with the on/off/auto switch. Move the switch to the on position and the feed system will start. Move the switch back off, then to auto within 2 seconds and after a brief delay, a feed event will be started. If the switch is left in the off position for more than 2 seconds, a feed event will not take place.

Feed System Activation – Page 4

In some cases, the operator will want to have the feed system start up at the same time every day instead of evenly spaced start-up times over a 24 hour period. To enable this, Parameter 3600 can be turned on which then allows adjustment of Parameters 3610. Parameter 3610 allows start times to be specified for each feeding time, depending on the number of feedings per day from 1 to 8. If n is the number of feedings per day from 1 to 8, and if the very first feeding time (3610.n.1) is set to 00:00:00, then the system will continue to use the feed activations evenly spread throughout the 24 hour period. However, if the first entry is not 00:00:00 then the system will activate the feed system at the time of day specified in the list of start times. If the first start time in a list is not 00:00:00 then it is important to specify separate start times for all the entries in that list. Otherwise a feeding will be missed.

2200 Relay Configure = Wind Trigger

When Configured as a wind trigger, a relay will turn on or off based on the wind speed block (see 3400 to 3460).

A Wind Trigger has 4 additional configuration options.

Normal = The relay will follow the Wind Speed Block

Inverted = The relay will be the opposite of the Wind Speed Block

Pulse On = When the Wind Block goes from off to on, the relay will pulse on for the time specified by 2208.

Pulse Off = When the Wind Block goes from on to off, the relay will pulse off for the time specified by 2208.

2800 Actuator Not Moving Alarm Level

This parameter can be set to a value from 0 to 3.

0 = Off, will not detect if an actuator draws no current when opening or closing.

1 = Only alarm if actuator fails to move open and closed multiple times.

2 = Alarm if actuator fails to move open and closed at least once each direction.

3 = Alarm if actuator does not draw current when attempting to move in either direction.

Growth Curve – Page 1

The TS32MZ can support 1 or more growth curves.

1. Use filters Service, Growth Curve to list the service parameters for the growth curve.
2. Set parameter 2140 to 1 (or more).
3. Using parameter 2150, specify which growth curve to use for each room. Setting the growth curve for a room to 0 will specify that a growth curve is NOT used for that room.
4. Specify the growth curve start date using parameter 2155. When setting up the growth curve for the first time, it is recommended that 2155 be set to the current date.

Growth Curve – Page 2

5. Use filters Standard, Growth Curve to list the standard growth curve parameters.
6. Set parameter 1910 to select the number of points on the growth curve (up to 8)
7. Use Parameter 1920 to specify the number of days between each point
8. Use Parameter 1930 to specify Set Point at each point on the curve.
9. Use Parameter 1940 to specify the Minimum Ventilation rate for each point.
10. Use Parameter 1960 to specify the number of feed events per day for each point.

It is recommended that the final point on the growth curve be set to maintain a final temperature, minimum vent and feed time frequency for a number of days beyond the end of the growth curve. If the difference between the current date and the start date for the curve exceeds the length of the curve, an alarm will be activated and the values in the final point of the curve will be used for up to 30 days beyond the end of the curve. After that, the system will use the non-curve Set Point and Minimum ventilation rates.

To re-start the growth curve, modify the Service Growth Curve parameter 2155 (Growth Curve Start Date).

Limited Warranty

Veldhuis Digital Engineering Ltd. hereby warrants that should this unit prove defective, Veldhuis Digital Engineering Ltd. will repair the unit free of charge but subject to the following conditions and a time period of 1 year at 100% coverage of parts and labour to repair or replace the unit as determined by Veldhuis Digital Engineering Ltd.. Veldhuis Digital Engineering Ltd. assumes no responsibility for losses resulting directly or indirectly from the use of this control unit beyond the replacement or repair of the control unit.

1. The unit must have been installed in accordance with the installation instructions contained in this manual, such that the contents of the control are protected from moisture and dust using liquid tight connections on all wiring into the control housing. Any holes cut into top or side of control enclosure void warranty of controller.
2. No modification of the control has been done by anyone other than qualified Veldhuis Digital Engineering Ltd. personnel.
3. The control unit must not have been subject to abuse, misuse or accident or operated other than as specified in this manual. Any decision on this condition by Veldhuis Digital Engineering Ltd. will be final.
4. Warranty will only be provided to the original purchaser of this product and proof of purchase must be provided at the time of a warranty request. Warranty period begins at date of manufacture on the control unit unless date of sale is clearly indicated on proof of purchase documents.
5. This warranty is only applicable to control unit TS32MZ
6. All shipping charges are the responsibility of the purchaser.
7. For best warranty service, return a defective control unit to your local dealer along with proof of purchase of the unit.

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