Suretrol Manufacturing Inc.

TCU-2025

Operation Manual

1.00

Table of Contents

Legal 1
Limited Warranty 1
Introduction 2
Dimensions and Electrical 3
Mechanical 3
Exterior Dimensions 3
Electrical 3
Controller Power 3
Damper Motor 3
User 3
Keypad 3
Display 3
Operation 4
Keypad 4
Display 4
LCD 4
SET 5
ULT 5
ADR 5
ADC 5
AST 6
DMP% 6
DRY 6
HRS 7
B 7
WET 7
AUTO 7
MAN 8
Status LEDs 8
Programming 8
Setting Ranges 8
ULT, ADR, SET, ADC/AST 8

Switching between AUTO/MANUAL 9
AUTO -> MAN 10
MAN -> AUTO 11
Starting a Cure 11
Parts List 11
Sensor 11
Power Supply 12
Main Board 12
Keypad 12
Damper Motor 13
Contacts 13
USA 13
Canada 13

Revision History

1.00	Initial release	24-2-2026

Legal

Limited Warranty

Suretrol Manufacturing warrants each new

TCU2025 controller manufactured to be free from defects in material and workmanship under normal use and service for the period of one year from the date of initial purchase.

All warranty part replacement and repairs must be made by authorized service representatives of Suretrol Manufacturing. Any outside work or alterations without the written approval from the factory will render this LIMITED WARRANTY void.

The obligations by Suretrol Manufacturing specifically excludes any liability for consequential damages, delays, loss of income, expenses, damage to goods or property used in connection with the product sold from whatsoever cause, whether or not such loss is due to negligence of the selling dealer or Suretrol Manufacturing. AT NO TIME SHALL SURETROL MANUFACTURING BE LIABLE FOR DAMAGES GREATER IN AMOUNT IN AGGREGATE THAN THE PURCHASE PRICE OF THE PRODUCT IN RESPECT OF WHICH DAMAGES ARE CLAIMED.

This LIMITED WARRANTY shall not apply to any item, which has been operated in a manner not recommended by Suretrol Manufacturing.

THE FORE GOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR MERCHANTABILITY, FITNESS OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. SURETROL MANUFACTURING SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT TORT OR OTHERWISE.

THIS UNIT IS ELECTRONIC AND AS SUCH SHOULD HAVE A BACKUP SAFETY THERMOSTAT WHICH IS MECHANICAL. ON ALL RETROFIT BARNS OUR INSTALLERS WILL CONNECT THE OLD MECHANICAL THERMOSTAT AS A BACKUP SAFETY WHICH SHOULD BE SET 10 DEGREES HIGHER DURING THE CURE. THE INSTALLER WILL EXPLAIN THE USE OF THIS BACK UP AND IT IS THE RESPONSIBILITY OF THE USER TO USE THIS BACKUP AND IF NOT, THE USER TAKES THE RESPONSIBILITY OF ANY DAMAGE TO THE CONTENTS OF THE BARN DUE TO OVER TEMPERATURE. IF A BARN HAS NO EXISTING MECHANICAL THERMOSTAT, THEN THE INSTALLER WILL INSTALL ONE AT A NOMINALCOST. IF THE USER INTENDS TO INSTALL THE UNIT HIMSELF THEN THESE PRACTICES SHOULD BE FOLLOWED TO MAINTAIN WARRANTY.

Introduction

The Suretrol Manufacturing TCU-2025 temperature controller is the next generation of controller based on the highly reliable NSC104-A, MA052X and MA014X units. It is a unique product developed specifically to control the temperature and humidity during the tobacco curing process. This compact controller provides a completely digital solution for accurate control and monitoring of the temperature and humidity in today's demanding environment.

The major overhaul was focused on the user interface. The move to an LCD and keypad will allow users faster access to controller status and programming. This has been move away from the well-known three toggle switch and red/green seven segment design of the family. This new interface allows the introduction of features and methods that were previously impossible.

The controller is programmed via a custom numeric keypad. The controller is easy to setup and operate; minimum effort is required for setup and changes. The controller is easy to install on existing or new bulk barns and replaces all the functions of existing controllers while providing a simultaneous numeric display of current conditions and settings.

The TCU2025 controller can be monitored remotely via wireless communication on the internet and cell phones for even greater flexibility.

The controller has been developed through years of experience. Similar units from the product family have been in operation for decades with excellent reliability and performance.

Suretrol Manufacturing is proud that you have chosen our product for your demanding application.

Every effort has been made to supply you with a reliable product.

Dimensions and Electrical

Mechanical

Exterior Dimensions

Insert some sort of figures and description of connectors here.

Electrical

Controller Power

The controller uses a single 5x20mm glass fuse from Littelfuse. P/N 0235003.HXP

The burner control is provided by a dry contact 30A relay. This contact is provided by two red wires.

Type	Range	Unit
Voltage	70 – 270	Volts AC
Current	1 – 2	Amps
Frequency	50 – 60	Hertz

Damper Motor

Type	Range	Unit
Voltage	24	Volts DC
Control Signal	2-10	Volts DC
Total Power	10	Watts

User

Keypad

Type	Description
Switch Type	Conductive Rubber
Temperature	-10° to 85°C (15° to 185°F)
Ingress Protection	IP54
Operational Life	2,000,000 presses

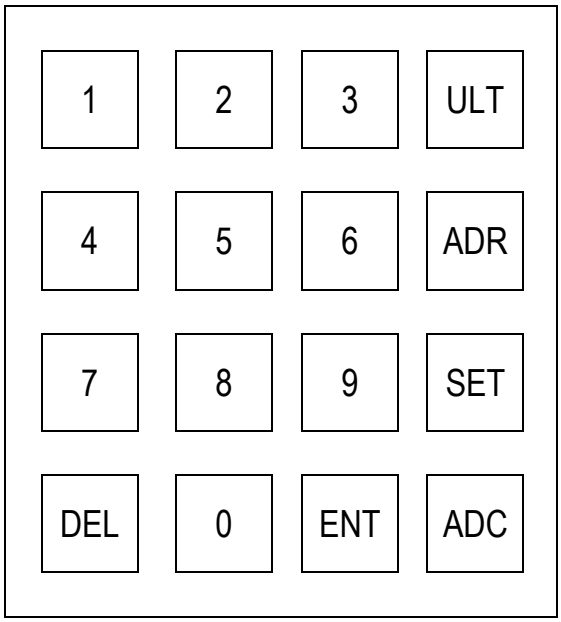
Display

Type	Description
Characters	80
Layout	20x4
Character Format	5x8
Temperature	-20° to 70°C (-4° to 158°F)

Operation

Keypad

The TCU-2025 is programmed through the use of a numeric key pad. This layout was designed to be intuitive by matching the function of the previous models. The value to change is selected through the control buttons on the right side. The desired value is directly entered by the user via the number keys. The remaining keys allow for these values to be controlled. The following diagram indicates the layout of the keys.



The keys are used as follows:

Key	Usage
0 – 9	Numerical value
ULT	Upper Limit Temperature
ADR	Advance Rate
SET	Set desired temperature
ADC	Automatic Damper Control
ENT	Enter value
DEL	Delete entry, start cure

Display

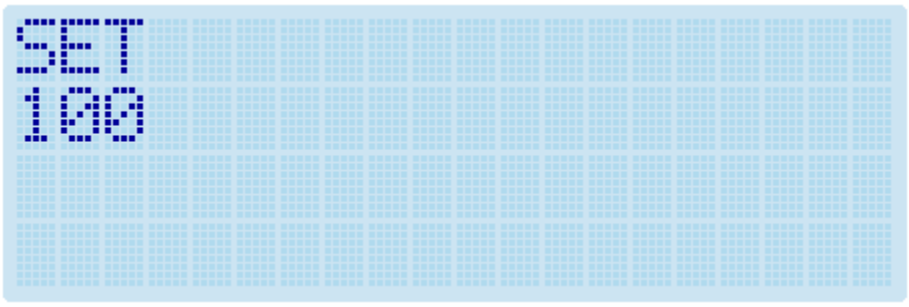
LCD

The LCD displays a full set of real time data. This includes both user settings and real time conditions. The display will automatically shut of the backlight to increase its lifespan, it can be turned on by pressing any key.

The user settings occupy the top row as follows.

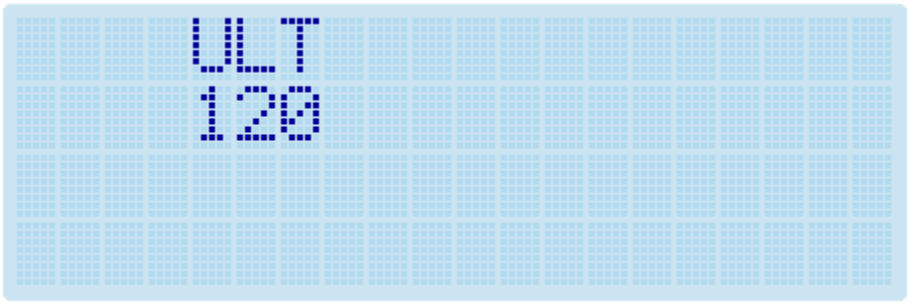
SET

SET is the temperature setting that the controller is currently heating at:



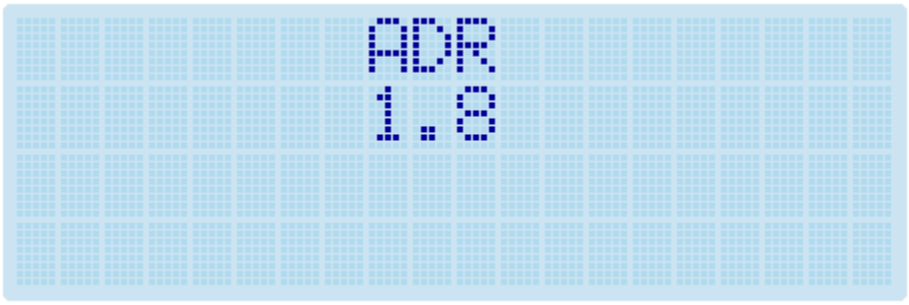
ULT

ULT is the temperature setting that the advance is headed to:



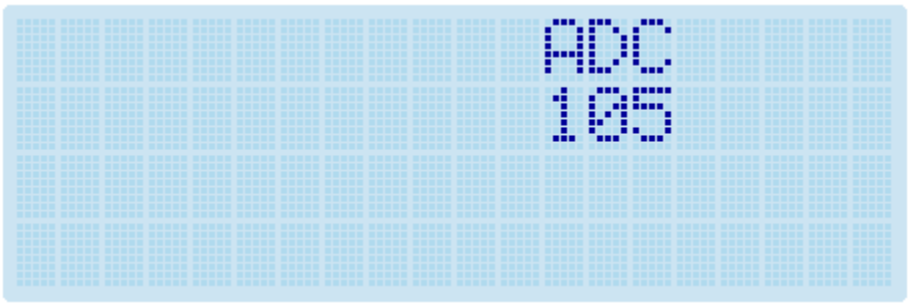
ADR

ADR is the setting for the advance rate (°F/HR):



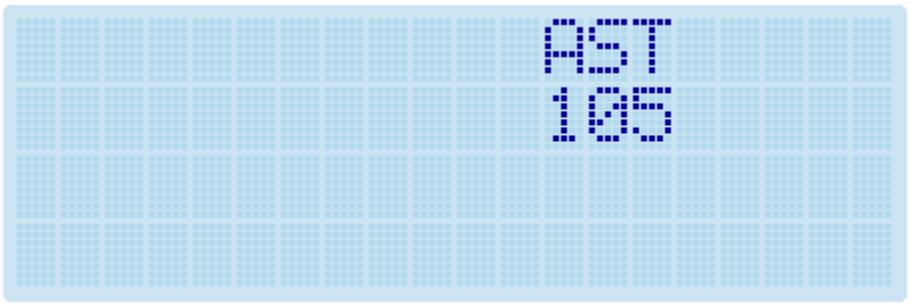
ADC

ADC is the temperature setting for the wet bulb:

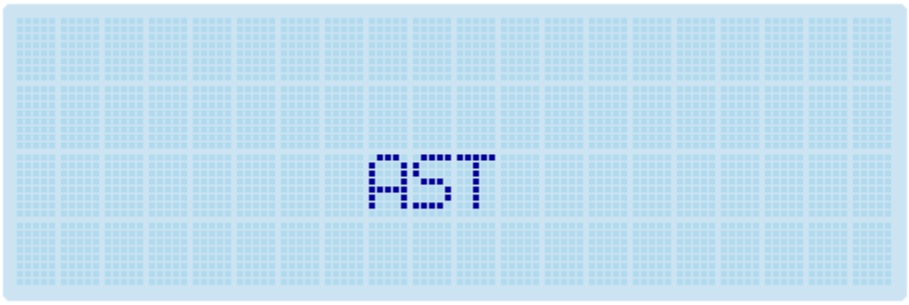


AST

AST is the temperature setting for the advance stop when the damper is in manual:

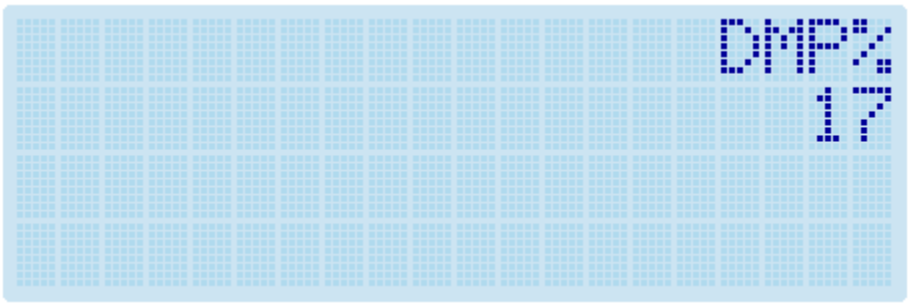


Additionally, when the barn is in an AST hold, the display section will flash:



DMP%

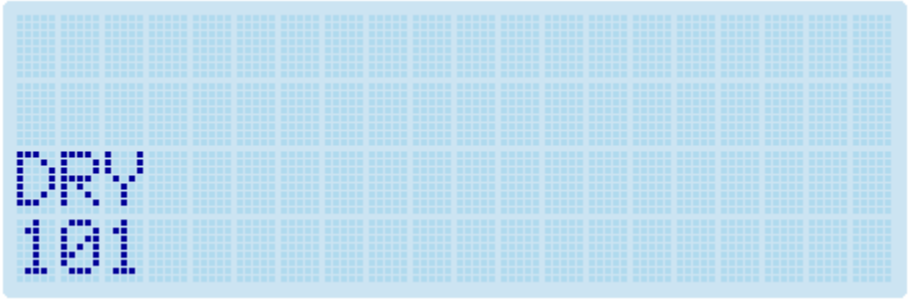
DMP% is the percent open that the controller is asking the motor for:



The live data is shown along the bottom as follows:

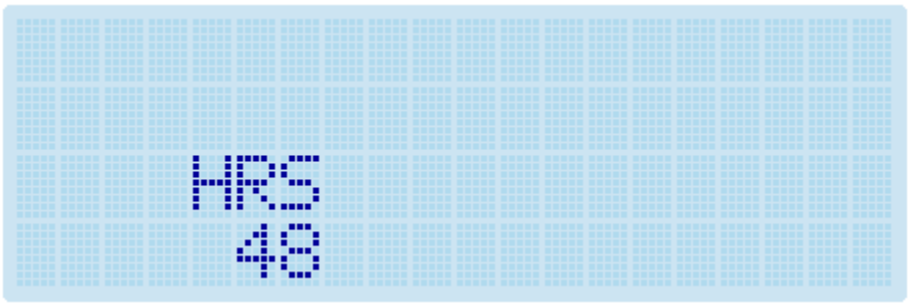
DRY

The current dry temperature (°F):



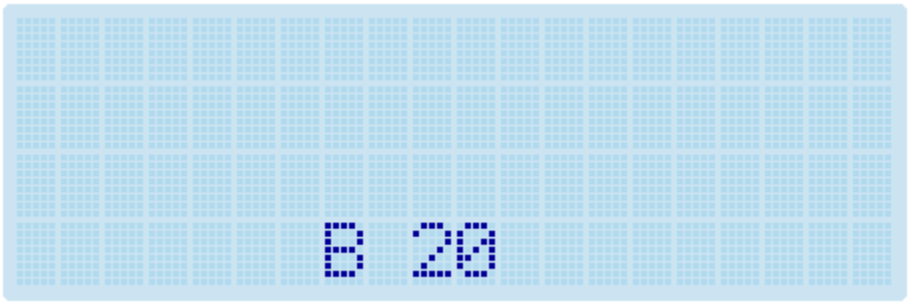
HRS

The number of hours the barn has run:



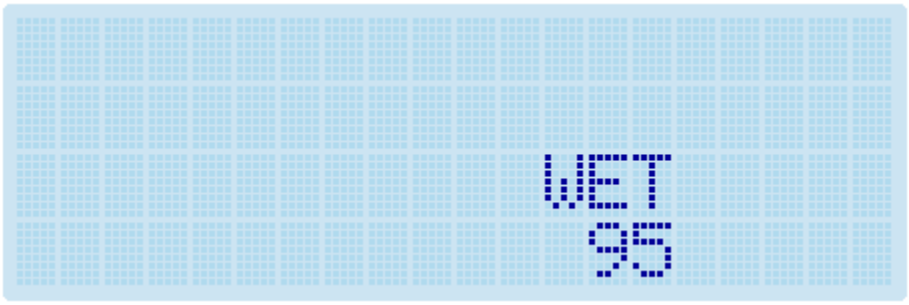
B

The barn number (monitoring system):



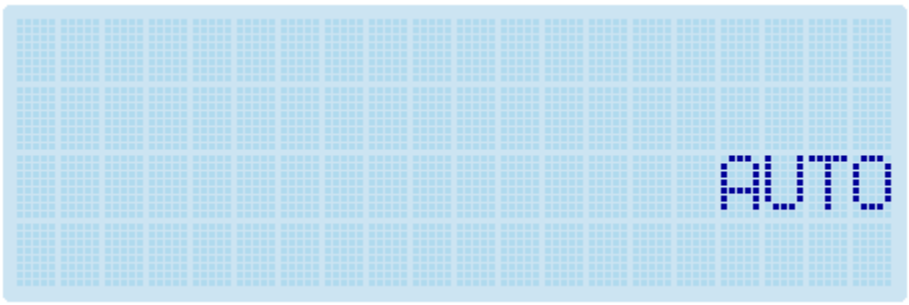
WET

The current wet bulb temperature (°F):



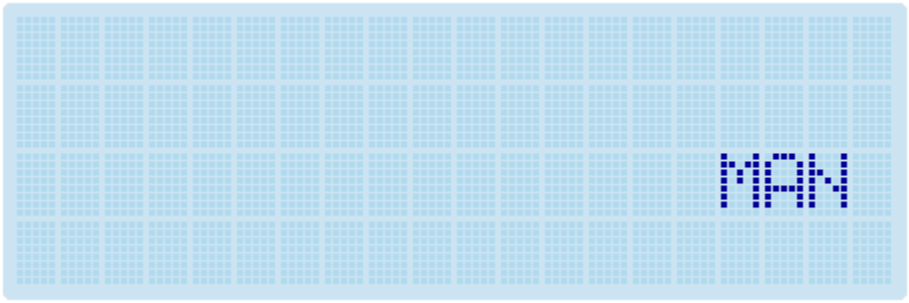
AUTO

Indicates that the damper is running in auto mode:



MAN

Indicates that the damper is running in manual mode:



Status LEDs

There are 5 status LEDs along the right side of the display. There function are as follows, from top to bottom:

Label	Color	Function
RF Available	Green	Indicates that an RF server has been detected and connected
RF Active	Red	Indicates that the controller is currently transmitting or receiving data
Advance Status	Red	OFF – Not advancing ON – Advancing Flashing – Advance hold (AST reached)
Burner Status	Red	OFF – Burner off ON – Burner on
Burner Enable	Red	OFF – System has detected a potential error and disabled the burner ON – All systems nominal

Programming

To program the controller, simply press the button that corresponds with the desired setting. The keypad works best with firm presses.

Setting Ranges

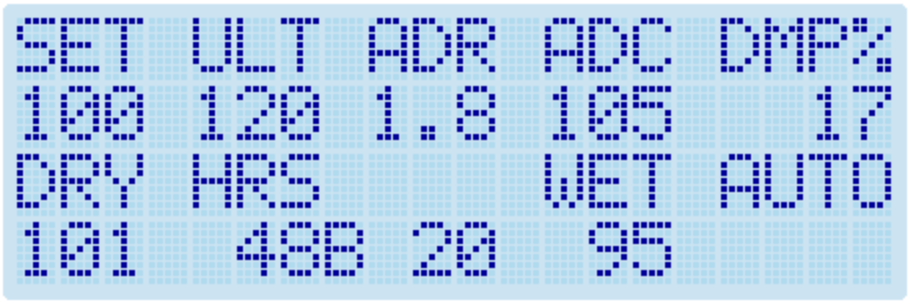
The controller has different data ranges depending on the setting. These are listed in the following table:

Setting	Range	Unit
ULT	20 – 170	°F
ADR	0.1 – 9.9	°F/HR
SET	20 – 170	°F
ADC	20 – 170	°F
AST	0 – 99	% Open

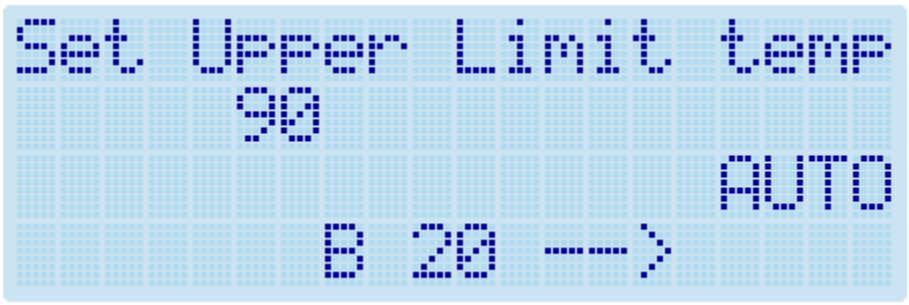
ULT, ADR, SET, ADC/AST

In the following example, we will set a new ULT (Upper Limit Temperature).

The controller defaults to a display similar to the following:

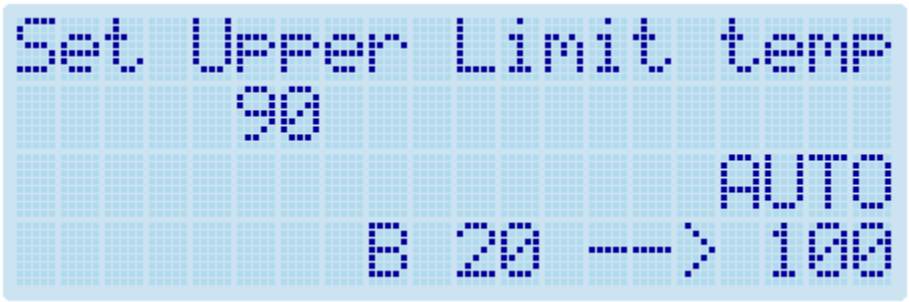


Pressing the ULT button will bring up the following screen:



The first line lists the setting that has been requested for change. The second line lists the previous value (90). The third line lists the damper mode (this matters for changing AUTO/MANUAL setting). The fourth line is for data entry; it lists the barn number and allows space in the bottom right for the user to see the value being entered. A value can now be entered using the number keys.

A value of 100 will be used in this example:



Press the ENT key and the controller will return to the home screen. The changed setting can now be reviewed and verified.

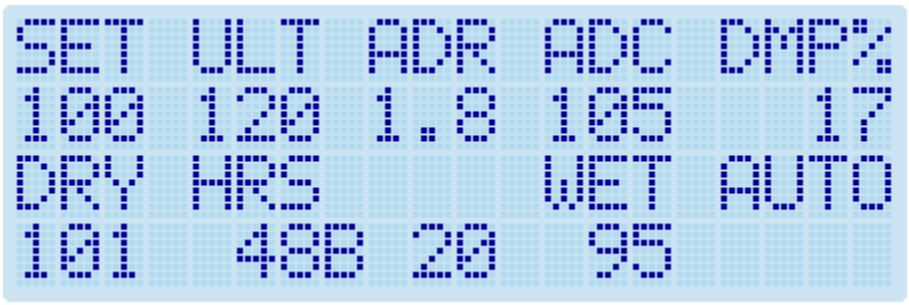
This procedure can be followed to change all settings on the controller. The only exception to direct entry is the advance rate. If a setting less than 1.0 °F/HR is required, the preceding 0 must be entered first.

Switching between AUTO/MANUAL

The TCU-2025 allows the user to set any advance stop when operating the damper in manual mode. This is a major difference from previous units. This change must be taken into account when moving from automatic to manual mode.

AUTO -> MAN

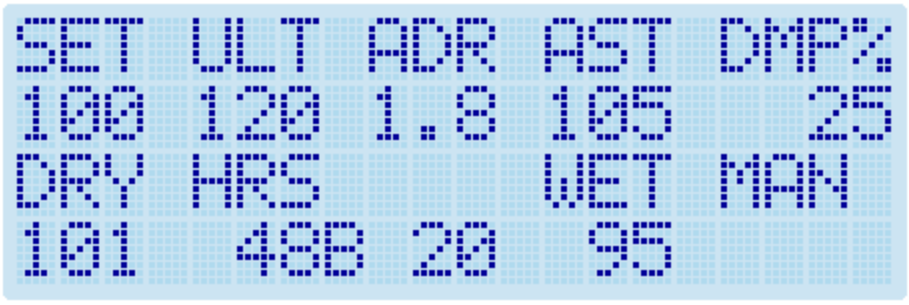
When changing from automatic to manual damper control, an advance stop value must first be selected. This value is saved from the previously entered ADC setting. To start, set the desired AST value in the ADC setting, using the method described in the previous section (170 is recommended if no stop is wanted). In this example, an AST of 105 is being used:



Press the ADC button on the keypad 3 times. The controller will ask for a percent opening:

Enter the required opening, example will be 25%:

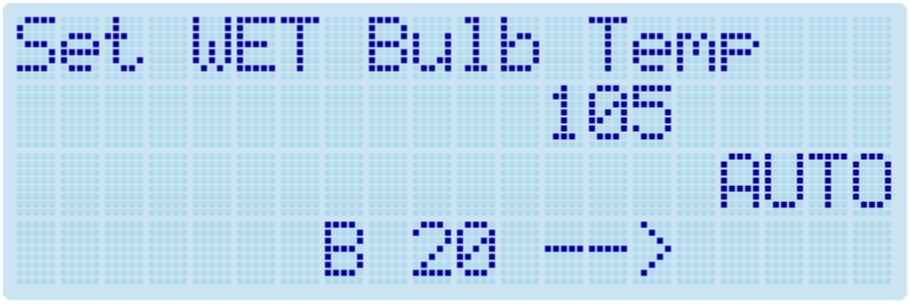
Press enter, the controller will return to the home screen:



The controller is now set to advance to 120°F at 1.8°F/HR, pausing the advance if the wet bulb rises to 105°F, maintaining a damper opening of 25%.

MAN -> AUTO

When the user wants to return to automatic damper, simply press the ADC button three times. The controller will ask the user what setting is required:



Enter the desired wet bulb value and press ENT. The controller will return to the home screen where all entered data can be verified.

Starting a Cure

To start a cure, press the DEL key 5 times. This will read the current temperature in the barn, store them in the SET and ULT settings, and reset the hour counter. The controller can then be programmed to the user's desired settings.

Parts List

Sensor

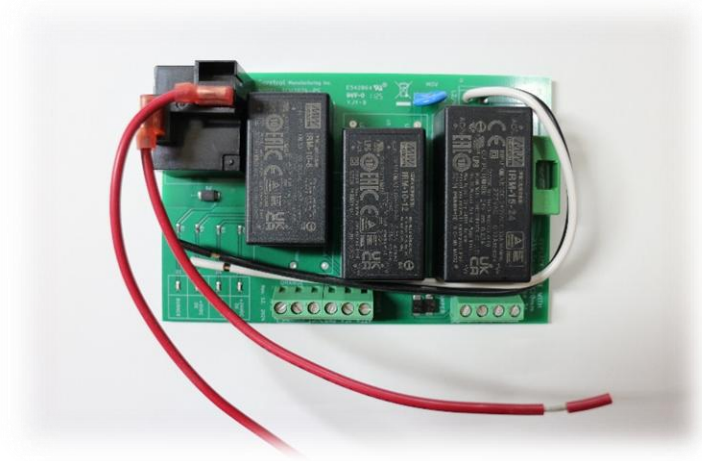
The TCU-2025 has been shipped and installed with the DWS2025. This is the latest version of the popular waterless sensor, it has been updated to be completely digital. This provides complete immunity from electrical noise. This has also allowed a substantial drop in part count from previous versions. These changes will enhance longevity and durability while increasing accuracy.

The TCU-2025 **WILL NOT** work with any previous versions of the waterless sensor (SDS2019 or SM2010). The DWS2025 **WILL NOT** work directly with the NSC104-A and MA052X controllers. An adaptor is available to use the new sensor on older models.

All sensors can be easily identified by their text color:

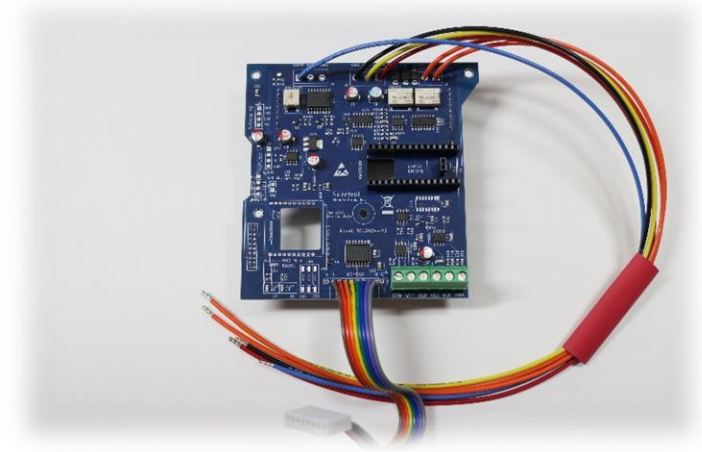
Model Number	Text Color	Notes
DWS2025	Blue	Latest digital sensor
SDS2019	Green	Last production of analog sensor
SM2010	Red	Should be replaced

Power Supply



The TCU-2025 has a more complex set of voltage requirements. A new power supply was required to provide these voltages. Older model supplies are not compatible with the controller.

Main Board



The TCU2024-MB is the new mainboard.

Keypad

The KP-0886 keypad is custom built for the TCU-2025 application. It can be replaced by removing the four nuts.

Damper Motor

The Belimo NMX-24SR has proven itself reliable and will continue to be standard equipment in the TCU-2025. Damper motors from previous controllers will still function on the new unit as the plug is pin compatible. The TCU-2025 is capable of driving any motor with similar electrical characteristics.

Contacts

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