

Microprocessor Controller Series 5100 & 5200 Operating Manual

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Products described in this manual are designed and assembled in the U.S.A. by

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I. Important Safety Information

SAFETY INSTRUCTIONS

The equipment described in this Manual is designed and manufactured to operate within defined design limits. Any misuse may result in injury, electric shock, or damage to the equipment. For safe operation, the following rules should be observed for installation, use, and maintenance. **Read the following safety instructions before operating the instrument.**

POWER

POWER CORD: Use only the power cord specified for this equipment and certified for the country of use. If the power (mains) plug is replaced, follow the wiring connections specified for the country of use. When installing or removing the power plug, **hold the plug, not the cord.**

GROUNDING: The power cord provided is equipped with a **3-prong grounded plug (a plug with a third grounding pin)**. This is both a safety feature to avoid electrical shock and a requirement for correct equipment operation. If the outlet to be used does not accommodate the 3-prong plug, either change the outlet or use a grounding adapter.

FUSE: Replace the main fuse only with an identical 3/8 Amp Slo-Blo fuse. If a second fuse blows, consult the factory for assistance. **DO NOT** use overrated or makeshift fuses or short the fuse holder. This could cause a shock or fire hazard or severely damage the instrument.

OPERATION

CAUTION

DO NOT OPERATE WITH COVERS OR PANELS REMOVED. Voltages inside the equipment consist of line (mains) that can be anywhere from 100 to 240VAC.

DO NOT OPERATE WITH SUSPECTED EQUIPMENT FAILURES. If any odor or smoke becomes apparent, turn off the equipment and unplug it immediately. Failure to do so may result in electrical shock, fire or permanent damage to the equipment. Contact the factory for further instructions.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE: Operating the equipment in the presence of flammable gases or fumes **constitutes a definite safety hazard**. For equipment designed to operate in such environments the proper safety devices must be used such as dry air or inert gas purge, intrinsic safe barriers and/or explosion-proof enclosures.

IF YOUR SYSTEM INCLUDES AN OPTIONAL LIQUID GAS COOLING SYSTEM, MODEL 5463 OR MODEL 5466, REVIEW ALL SAFETY INFORMATION IN THE OPERATING MANUAL FOR THOSE UNITS.

DO NOT USE IN ANY MANNER NOT SPECIFIED OR APPROVED BY THE MANUFACTURER: Unapproved use may result in damage to the equipment or present an electrical shock or fire hazard.

II. Description of Contents

Standard Model 5100-5200:

Item	Qty.	Description
Controller unit	1	The Model 5100 or 5200 - an enclosed electronic unit with control switches and displays on the front and power connections on the rear. Wrapped in bubble wrap.
Sensor	1	Standard chamber sensor is a Model 556 Humidity and Temperature probe, which includes a cable for connection to the controller. Operational range is -40 C to +60 C and 0 %RH to 100 %RH. Your system may include a Model 557 Extended Range sensor.
Documentation	1 1 1	Certificate of Calibration Test Data Sheet PID operating manual Flash drive containing: <ul style="list-style-type: none">Controller Operating Manual D00039
Cabling	1	Standard North American power cable, 3 conductor, 6 feet length



III. Setup Guide

Setup Guide



Step 1 – Unpack and inspect. Unpack the controller and sensor and inspect for visible damage. If no damage is observed, then proceed to the next step.



Step 2 – Select Location. Place on a level surface on top of or near the chamber, providing access to buttons and visibility of displays as shown.

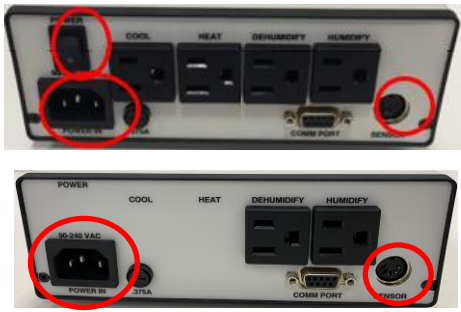
NOTE: Your controller may be a Dual controller, e.g. Temperature and Humidity, or a Single function controller, e.g. Humidity only.

Single function controller instructions will be shown in [brackets]



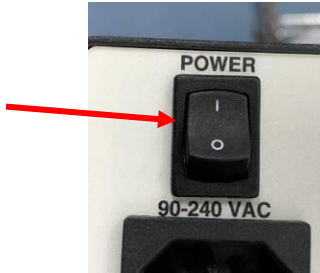
Step 3 - Switch all front panel switches to the OFF (0) position.

If your controller is a dual-function controller, it will have four function switches. [A single function controller will have two function switches and the POWER switch on the front panel as shown.]



Step 4– Connect Sensor and AC Power.

- On the back panel of the Controller, Plug sensor cable into the round receptacle at right.
- Plug the AC power cable into the female 3-prong receptacle at left.
- [Switch the POWER switch to the OFF (0) position.]



Step 4 - Initial Check Out

- Switch the controller ON. After a couple of seconds the display will measure the appropriate ambient parameter(s).
- For a humidity system, gently breathe onto the sensor. A change in humidity should be observed.
- For a temperature system, hold the sensor for several seconds in a closed hand. A change in temperature should be observed.
- After several seconds, the reading(s) should return to ambient.



Step 4 – Install the Sensor

- Ensure that the sensor and its cable are firmly connected together.
- For installation in an ETS chamber, loosen the 3/4 NPT fitting located on the right panel of the chamber and insert the sensor from the outside, in.
- Position the sensor as shown and tighten the fitting nut by hand only - Do not use tools



Step 5 – Connect equipment Power. (Up to 4 AC plugs labeled as follows):

1. COOL – To the system cooling device
2. HEAT – To the system heating device
3. DEHUMIDIFY – To the drying device
4. HUMIDIFY – To the Humidifier.

IV. Quick Start Guide

Quick Start is described for a standard 5200 Controller temperature and humidity system.

Quick Start Guide

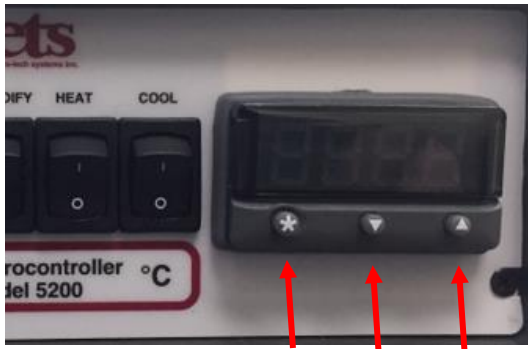


Step 1 – Turn on Power

Verify that the system is set up as described in the previous section.

Turn POWER to ON (I = on).

Note: On a 5100 controller, Power switch is on the front panel

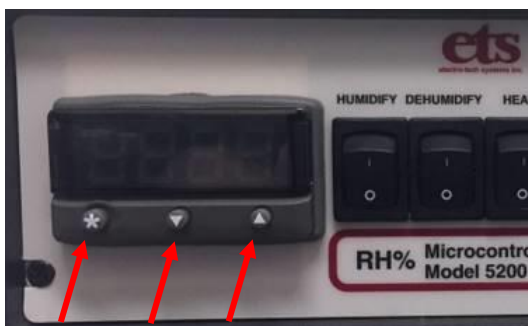


Step 2 – Set Temperature on the °C side of the controller.

A 9500P control unit displays the present setpoint in amber.

On a 3300 unit, press and hold the “* ” key to view the setpoint.

To change the set point, press and hold the “* ” key and use the INCREASE (▲) and DECREASE (▼) buttons to adjust to your desired temperature.

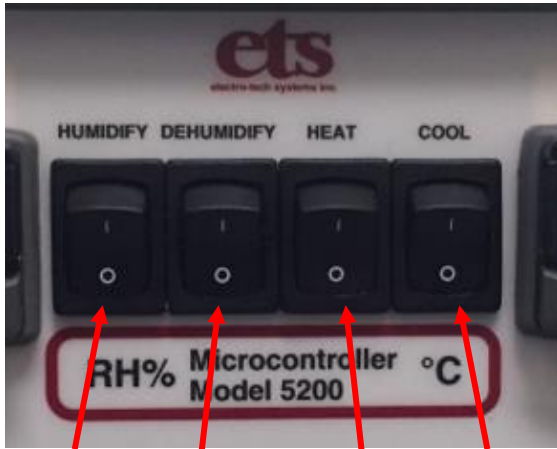


Step 3– Set Humidity on the %RH side of the controller.

A 9500P control unit displays the present setpoint in amber.

On a 3300 control unit, press and hold the “* ” key to view the setpoint.

To change the set point, press and hold the “* ” key and use the INCREASE (▲) and DECREASE (▼) buttons to adjust to your desired humidity.



Step 4 – Turn on Operating Systems

If your controller is not equipped with LN₂ Cooling, flip all four operating system switches to the ON position (I = on).



If LN₂ Cooling is in use, the controller will have an additional switch and outlet for the LN₂ equipment. In this case, leave the front panel COOL switch in the OFF position (0), turn the LN₂ COOL switch on the side of the controller to the ON position (I).

V. Functionality

5.1 Functions of the Controller and Sensor

Many applications require the accurate measurement and precise control of relative humidity, temperature, or other engineering parameters in controlled environments. The Series 5100/5200 Controllers utilize microprocessor-based technology to control these parameters. The controlled 115/230 VAC, solid-state outputs enable the controllers to operate individual operating systems to increase or decrease the required system parameters.

The controllers are typically used to manage temperature and relative humidity; however, they can control any desired parameter where the measuring sensor provides a linear voltage signal, and the respective operating system operates from 115/230 VAC power. The parameter can be controlled precisely at the location of the sensor. The ultimate precision and uniformity of the system will be affected by the level of circulation within the chamber, the process being controlled, and the effect of any other parameters also being controlled.

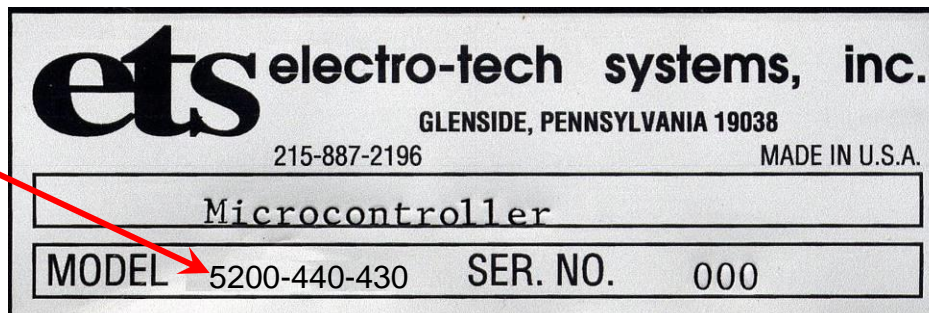
5.2 Controller Configuration

The expanded line of controllers now being offered by ETS allows for many different configurations to meet a variety of customer requirements. The first 4 digits of the Model Number printed on the front panel designates whether the Controller is a single unit (5100) or a dual unit (5200)



Model 5200 Controller

Each Controller is configured at the factory for specific functions such as temperature control. These are denoted by additional 3-digit codes in the model number. The complete model number is printed on the label located on the bottom of the unit. An example is shown below.



The table below designates the specific controller function indicated by each 3-digit code in the model number:

CONTROLLER MODEL NUMBERING SYSTEM

Stand-alone Controller Options:

- M 5100-230 w/3300 Single PID, Temperature Control
- M 5100-240 w/3300 Single PID, Humidity Control
- M 5100-241 w/3300 Single PID, Humidity Control w/ RS485
- M 5100-242 w/3300 Single PID, Humidity Control w/ RS232
- M 5100-441 w/9500 Single PID, Humidity Control w/RS485
- M 5200-240-030 w/3300 1-PID, 1-Monitor, Hum Control/Temp monitor only
- M 5200-240-230 w/3300 dual PIDs, Humidity & Temp
- M 5200-241-231 w/3300 dual PIDs, Hum and Temp Control w/RS485
- M 5200-441-431 w/9500 dual PIDs, Hum and Temp Control w/RS485
- M 5200-8504 w/9500 dual PIDs, Hum and Temp Control, 3rd ch., M 557 extended range sensor

5.3 Control Functions

The Controller accepts the operator's instructions as to the desired parameter value, and then operates the increase or decrease equipment to achieve the requested condition.

- **Setpoint – Increase - Decrease**

Enter the setpoint or target value via buttons on the front panel of the Controller. AC power outlets on the rear panel make AC power available to the operating system being controlled. For each control module there is one outlet that provides power to increase a parameter and one outlet that provides power to decrease a parameter. (For example: Humidify/Dehumidify, Heat/Cool.). The microprocessor system makes judicious use of its on and off functions to regulate the parameter to the requested value. When the microprocessor activates the decrease function, the red LED on the control module display will light. When the microprocessor activates the increase function, the green LED on the display will light.

The 3300 module continuously displays the measured parameter. A function button must be pressed to display and change the setpoint. The 3300 is also capable of performing a single ramp/soak sequence.

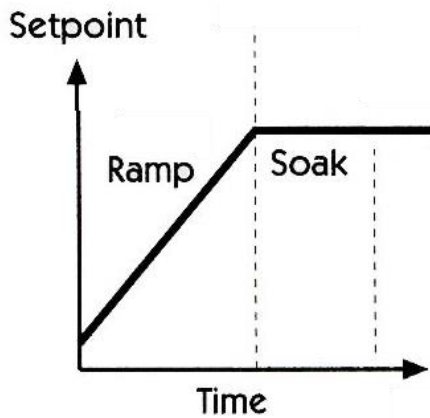
The 9500P module displays both the measured parameter (green display) and the user selected set point (amber display) simultaneously. It has the capability of performing multiple ramp/soak cycles as programmed by the user. It also has a third set point for special functions such as alarming.

- Ramp and Soak

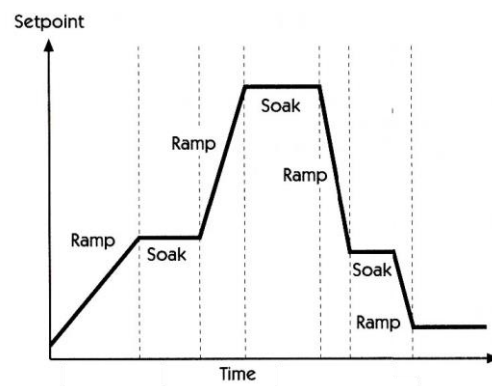
A Ramp is a controlled increase or decrease to a setpoint, and a Soak indicates static regulation at a setpoint.

The 3300 control units provide a single ramp-soak sequence. Controllers configured with the 9500P control module can provide a sequence of ramp and soak operations as shown below.

Instructions for programming these operations are given in Appendix A of this manual.



3300 Single Ramp & Soak



9500P Multiple Ramp & Soak

- **Controller Front Panel and Manual Disable Switches:**

The switches on the front panel allow the user to manually disable individual controlled outputs. This is very convenient if the user wants to shut off an operating system without having to disturb the control module settings.

Shown below is a Model 5200 controller configured with 3300 control units for standard Humidity and Temperature control.



Item	Description	Functionality
1	“HUMIDIFY” Switch	Allows the user to manually disable the Humidification System. Pushing this switch to the (‘0’) is “Off”
2	“DEHUMIDIFY” Switch	Allows the user to manually disable the Dehumidification System. Pushing this switch to the (‘0’) is “Off”
3	“HEAT” Switch	Allows the user to manually disable the Temperature Heating System. Pushing this switch to the (‘0’) is “Off”
4	“COOL” Switch	Allows the user to manually disable the Temperature Cooling System. Pushing this switch to the (‘0’) is “Off”
5,6,7	HUMIDITY CONTROLLER Buttons	The temperature controller includes a * button along with down and up arrows to allow selecting and changing the setpoint and other settings.
8,9,10	TEMPERATURE CONTROLLER Buttons	The humidity controller includes a * button along with down and up arrows to allow selecting and changing the setpoint and other settings.

- **Controller rear panel and connectivity**

All connections to the Controller are made on the rear panel. The 5200 controller also has the main power switch located on the rear panel.

Shown below is a Model 5200 configured for standard Humidity / Temperature control.



Item	Description	Functionality
11	“POWER” Switch	This switch disconnects all power going to the Chamber Systems. “I” is “ON”, “O” is “OFF”.
12	“POWER IN” Socket	Connect incoming AC power here.
13	“SENSOR” Socket	Attach the Model 557 Temperature and RH Sensor here.
14	“COOL” Socket	Provides power to cooling system when needed.
15	“HEAT” Socket	Provides power to heating system when needed.
16	“DEHUMIDIFY” Socket	Provides power to dehumidification system when needed.
17	“HUMIDIFY” Socket	Provides power to humidification system when needed.
18	“.375A”	Fuse for internal electronics, .375 A
19	“COMM PORT”	DB9 connector for communications to a computer

- **Power Switch**

The main power switch for the Series 5100 Controllers is located on the front panel. The main power switch for the 5200 Series is on the back panel. “1” is ON, “0” is OFF.

5.4 The Sensor

- **ETS Humidity/Temperature Sensor**

Most controllers are supplied with the standard Model 556 Sensor, shown below. The 556 provides precision measurement of both humidity and temperature. For special applications such as LN2 cooling, the Model 557 extended range sensor is used.

When configured for humidity control, the 556 sensor is capable of measuring over the entire 0-100% RH range with an accuracy better than $\pm 2\%$ RH.



Model 556 Temperature Compensated Humidity Sensor

The electronics incorporated within the sensor housing utilize the temperature information to compensate the humidity reading for changes in temperature. This improves accuracy when measuring relative humidity levels at temperatures significantly above or below ambient (72°F/23°C), which is the standard calibration point.

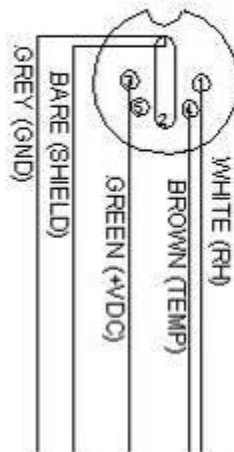
When the Controller is configured for temperature, the 556 temperature signal output provides a measurement range of -40°C to +60°C with an accuracy of $\pm 0.2^\circ\text{C}$ (0.4°F).

The 556 sensor is housed in a flame-retardant polycarbonate housing. The complete assembly consists of a sensor/electronics section and a cable/connector section that measures .625" (16 mm) diameter x 5" (13 cm) long. It is designed to mount through the wall of a chamber using a 3/4" NPT or metric equivalent compression fitting.

The standard sensor cable length is 6'6" (2 m), terminated with a 5-Pin DIN connector that mates with the 5-Pin receptacle on the rear of the control unit.

The operating range of the 556 sensor is -40 to $+60^{\circ}\text{C}$ (-40 to 140°F). The Model 557 sensor can accommodate a -50 to $+90$ range (-58 to $+194^{\circ}\text{F}$). The control module(s) is preset at the factory to display $^{\circ}\text{C}$, unless otherwise specified. The temperature display is easily changed from $^{\circ}\text{C}$ to $^{\circ}\text{F}$.

RELATIVE HUMIDITY / TEMPERATURE SENSOR 5-PIN DIN JACK WIRING DIAGRAM



Sensor input connector wiring

- Other Sensors (Not included)

The Series 5100/5200 Controllers can control virtually any engineering parameter that is measured by a sensor having a linear voltage output scalable to 0-to-1 Volt, corresponding to the measurement range required. Typical measurement parameters that can be controlled are Oxygen concentration, CO_2 , N_2 , pH, Air Velocity, RPM etc.

Actual sensor technology can be chosen for accuracy, range, and stability. Some interface electronics is generally necessary to convert and linearize the sensor output, providing the 0-to-1 V range compatible with the controller.

Controllers are set up at the factory to work in terms of parameter units – for example 0-to-1 Volts from a temperature sensor can be displayed by the controller as -40°C to $+60^{\circ}\text{C}$. The controller will then display the measured condition and accept setpoint instructions in terms of the convenient parameter units. Instructions are included to allow matching a sensor's parameter range of operation to the 0-to-1 V range of the controller input.

5.5 Supported Operating Equipment

The controllers are designed to control AC-powered operating systems such as ETS products:

- Desiccant/Pump and Dry Gas Dehumidification (Models 5461, 5463, 5471 & 5478),
- Ultrasonic Humidification (Models 5462 & 5472),
- Cooling (Models 5463, 5466, 5473 & 5475), and
- Heating (Model 5464 & 5474).

They can also be used with any other system that operates within the power output capabilities of the controllers.

- **Communications**

The COMM PORT allows the microprocessor to communicate with a PC running CALGrafix or user-generated software, using either RS232, RS485 or USB communications. The Comm Port is the 9-pin jack located on the back panel to the left of the SENSOR Input jack. The Comm Port will only be active if the controller is ordered with the COMMS option and a specified communication protocol. Refer to Appendix B for computer control options and capabilities.

VI. System Performance

6.1 Specifications

General:

Aluminum chassis box mounts up to 2 electronic control circuits.
Front panel display of control circuit measurements and targets.
Front panel switches individually disable operating systems.
Rear panel connectors for Sensor, AC power input, and controlled outputs.

Control Circuit:

Microprocessor control circuit with PID and user interface software installed.
Type 1: 3300 Standard control and setpoint regulation, display 1 parameter.
Type 2: 9500, Multiple ramp/soak cycle and regulation, display parameter and target.
Regulation by switching Increase/Decrease pair of AC circuits.
Display Resolution: 0.1% / 0.1° of displayed value
Recorder Out: 0-1 vdc Analog.

Software:

PC chart & data collection: CALGrafix (optional)
Computer Interface: MODBUS proto. via RS485 or RS232
PC with W98, NT, W Pro 7, or higher

Power Requirement:

Voltage: 115 VAC, 10 Amps, 50/60Hz, or 230 VAC, 5 Amps, 50/60 Hz

Power Controlled:

Solid state relay control, ON/OFF 4 outputs, configured for temperature and humidity as follows:

	<u>Heat</u>	<u>Cool</u>	<u>Humidify</u>	<u>Dehumidify</u>
Relay	10A	10A	5A	3A
Fuse installed	8A	8A	4A	2A

Sensor: Model 556

Probe, Temperature Compensated RH and Temperature
RH: Capacitive film, 0 to 100%, non-condensing
Accuracy: +1.5 %RH @ 72°F (22 °C)
Temperature: RTD, -40 to +140 °F (-40 to 60 °C)
Accuracy +0.5 °F (+0.3°C)

Applications Software and Computer Control

The ETS controllers can operate as “stand-alone” units or in conjunction with a computer:

Stand alone: The controllers do not need PC supervision for their normal function. They can control a process without dependance on a communications loop.

COMM option: The controllers can also operate in conjunction with a computer for control or data collection. Communications is provided with the COMM option using an RS485 or a USB connection with a computer. The communication protocol must be specified in the order: RS485 or USB. The COMM PORT is a 9-pin subminiature D connector (“DB9”) located on the rear panel. A 6 ft. (2 m) cable appropriate for the protocol is supplied with the COMM package.

CALgrafix: The Series 5100/5200 Controllers support an optional software package: CALgrafix Process Monitoring & Configuration Software that allows up to 32 individual controllers to be controlled and monitored remotely. CALgrafix requires Windows 98/NT/ME/2000/XP with at least 450 MHz and 128MB RAM. The software offers the capability of remote adjustment, instrument configuration, cloning, saving, and retrieving instrument settings to files together with logging and charting in real time.

The controllers can also be integrated with third party software or coded to the user’s custom software. The document entitled “CAL 3300/9300/9400/9500 Modbus RTU Communications guide” is available from West Control Solutions in Gurnee, Illinois, at 800 866 6659. This document explains in detail how to communicate with the control modules. **ETS does not directly provide support for customer software generation. This support is provided by West Control Solutions.**

VII. Maintenance & Calibration

CALIBRATION

As with all measuring instruments, the Series 5100/5200 Controllers should be calibrated periodically. ETS provides full calibration services for these instruments. Generally, this should be performed once a year and the appropriate certificate of calibration issued. A reminder sticker is also placed on the unit with a recommended recalibration date.

The Model 556 Temperature Compensated Humidity Sensor is an integral part of the controller and both units together must be calibrated at the factory. This requires calibrated environments plus appropriate computer software. **This sensor cannot be calibrated manually.** Contact ETS to obtain the necessary RMA authorization.

MAINTENANCE

The Series 5100/5200 Controllers should operate reliably for many years without any maintenance, except for periodic calibration, if used with operating systems compatible with the AC output. The controllers contain only one user replaceable part.

If the Controller stops working and the displays are dark, check the 3/8 Amp fuse on the back panel of the unit. This fuse supplies AC power to the internal electronics. If this is blown, replace it with a 3/8 Amp Slo-Blo fuse. There is always a reason why a fuse blows, so if the problem persists, arrange to return the Controller to ETS for service.

If any individual output stops working or the front panel controls are not functioning properly, this is not a user-serviceable condition. Arrange to return the unit to ETS for service.

VIII. WARRANTY

Limited Warranties. Electro-Tech Systems (“Seller”) warrants that all goods manufactured and delivered hereunder shall (a) conform to any samples, drawings, specifications, or other written documents provided to Seller by Buyer, or approved by Buyer to Seller and (b) be free from all defects in workmanship and material. Buyer’s sole remedy against Seller for breach of either of the specifically mentioned warranty shall be the repair or replacement, at Seller’s sole option, of the defective workmanship or material. Seller expressly disclaims all other warranties, express and/or implied, including but not limited to those of merchantability and fitness for a particular purpose. In no event shall Seller be liable, under either warranty or otherwise, to Buyer in excess of the purchase price of the products paid to Seller by Buyer. In no event shall Seller be liable for any loss or damage arising directly or indirectly from the use of the product or for consequential or incidental damages. Seller’s specified warranties will expire and lapse (i) for renewable items (such as gloves, iris ports and desiccants), sixty (60) days from date of shipment and (ii) for all standard equipment and otherwise nonrenewable items, one year from date of shipment.

APPENDIX A - PROGRAMMING THE MICROPROCESSOR

The factory-programmed values are optimized for general purpose use with ETS chambers. Changes to the values could help optimize performance for your application, but also run the risk of degrading performance. It is strongly recommended that you first take the time to understand a parameter and document its current value before changing it.

The following outlines access to the microprocessor program parameters. More detailed instructions for programming the control modules are contained in the operating manuals that are included along with this manual.

Programming for the 3300 and 9500P control modules are similar. The FUNCTIONS MENU, LEVL's 1, 2,3, 4 and C are identical. The 9500P has additional LEVL's A (scaling) and P (ramp/soak programming).

A.1 Accessing the Programming Menu

1. To access the Controller Program Menu, press the INCREASE (▲) and DECREASE (▼) buttons simultaneously for three (3) seconds. The controller will enter the Menu on Level 1 in the "tunE" function. (If using the CALCOMM Computer Program, see the "CALCOMM" section of the Manual).
2. To scroll to different parameters within a Level, press the "▲" button to scroll right and the "▼" button to scroll left.
3. To change a parameter or change Levels, press and hold the "*" button. Then press the "▲" or "▼" buttons to change the parameter.

NOTE: The factory programmed values are optimized for general purpose use of ETS chambers. Changes to the values may help optimize performance for your specific application but also creates a risk of degrading performance. It is strongly recommended to document the current values before changing them.

4. To exit the menu, press and hold "▲▼" for three seconds.

For parameter details, consult the PID operating manual included with the system.

APPENDIX B - COMPUTER SOFTWARE

B.1 Summary

Comprehensive control, charting, ramp/soak programming, audible/visual alarming, and networking of multiple controllers is possible with the 5100/5200 Controllers. For full-feature performance, it is recommended that the system be configured with 9500P control modules with the communications capability COMM option for communications with a PC, and the CALGraphix software package.

If user-generated or other software is to be used, the Series 5100/5200 Controllers may also be ordered without CALGraphix but with the COMM Option for connection to a PC.

Communication with a PC is provided by the COMM PORT. The COMM PORT is the 9-pin subminiature-D jack (sub-D) located on the back panel of the controller to the left of the SENSOR Input jack. This connector will only be active if the COMM option is ordered.

The communications protocol is specified by the controller model number selected – either RS232, RS485, or USB. The RS232 option is offered for compatibility with earlier equipment. RS485 is an accepted method of connection to computers or equipment in an industrial or laboratory setting, providing noise-resistant performance. USB provides connectivity to commonly available PCs. A 6-foot communications cable is included.

RS485 offers the ability to control multiple controllers with a single PC. When used with multiple controllers the COMM PORTs are wired in parallel by the user to form the RS-485 link. One RS485 computer input will handle up to 32 controllers. For connecting multiple controllers, refer to the Communications Application Guide.

All controllers are capable of standalone operation. They can control a process without use of a PC or communications, with the capability to ramp to a setpoint and regulate at a setpoint.

B.2 CALGraphix

CALGraphix is an optional graphic Windows based software package designed for PC supervision of CAL 3300 and 9500 Controllers. (Windows 10 Professional version is required.) It offers the capability of remote adjustment, instrument configuration, cloning, saving and retrieving instrument settings to files, together with logging and charting in real time. CALGraphix offers a smooth trouble-free way to achieve both control and data collection.

For CALGraphix installation and operation, refer to the Instructions supplied with the software.

B.3 COMM PORT

The COMM PORT is typically configured at the factory for RS485 Interface, with an RS485 comm board & jumpers installed internally. The RS485 pins are as follows:

- pin 7 (Tx/Rx [+])
- pin 2 (Tx/Rx [-])
- pin 4 connected to ground (shield).

The following items are available for communication hook-up:

USB Adapter, 485 to USB Converter	ETS #485-USB-2
Communications Cable, DB9 male to female	ETS # 6492

B.4 Connections

RS485:

1. Connect the supplied 9-pin male/female sub-D cable to the COMM PORT on the rear of the controller.
2. Connect the other end of the cable to the RS485 connector on compatible computers or equipment. An optional RS485/USB converter (ETS #485-USB-2) may be needed.

USB:

1. Connect the supplied 9-pin male/female sub-D cable to the COMM PORT on the rear of the controller.
2. Connect the other end of the cable to the DB9 side of the RS485/USB converter.
(Optional ETS # 485-USB-2)
3. Connect the USB-A side of the converter into a USB Port on the PC.

B.5 MODBUS Addresses

The address of a single Control unit is set to 2 at the factory. If two control units are installed, Temperature will be Modbus address 1, and Humidity will be Modbus address 2.

B.6 Software Support

Full support for the CALgrafx software is available from West Control Solutions in Gurnee, Illinois, at 800 866 6659. On the web they can be reached at www.west-cs.com.