

3110 SERIES I BUTTONOLOGY

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WATER JACKET INCUBATOR CONTROL PANEL

The new water jacket incubator, Model 31X0 has four basic modes which allow incubator setup. The modes are as follows: Run, Set points, Calibration, and System Configuration. Run mode is the default mode in which the incubator will normally be in during operation. Set points are used to enter system set points for incubator operation. Calibration is used to calibrate various system parameters to a customer's satisfaction. System configuration allows custom setup of many options that a customer may purchase.

RUN MODE: When the incubator is in run mode, the default message SYSTEM OK will appear in the message center of the control panel. This message will change only in an alarm condition. See alarm section for further explanation.

SET POINTS MODE:

TEMP XX.X C Temperature setpoint between 10.0 and 55.0 degrees for a T/C CO2 unit, 10.0 to 50.0 degrees for an IR CO2 unit, and 10.0 to 45.0 degrees for an O2 unit, to which the incubator will control within 0.1 degrees C of setpoint. A setting of 10.0 degrees will turn off all heaters and temperature control and disable all temperature alarms. The system default is 10.0 degrees C.

OTEMP XX.X C Overtemp setpoint from 10.0 to 60.0 degrees C. This is an independent safety feature that will cause the incubator to turn off all heaters should the temperature be out of acceptable range. This feature is intended only as a safety and cannot be set closer than 0.5 degrees C to the temperature setpoint. If a TEMP setpoint is entered that is greater than the existing OTEMP setpoint, a new OTEMP setpoint of TEMP + 1 degree will be automatically entered in the system. The system default is 40.0 degrees C.

CO2 XX.X % CO2 control setpoint from 0.0 to 20.0 % CO2. The incubator will control to within 0.1% of CO2 setpoint. This setting will be used for either a thermal conductivity CO2 sensor or an Infrared CO2 sensor. A setting of 0.0% will turn off CO2 control and turn off all CO2 alarms. The system default is 0.0%.

O2 XX.X % O2 control setpoint from 2.0 to 21.0 % O2. The system will control within 0.1% of O2 setpoint. This Setpoint will appear in the Set Points mode only if the customer has purchased the O2 option. A setting of 21.0 % will turn off all O2 control and disable all O2 alarms. System default is 21.0%.

CALIBRATE MODE:

TEMP XX.X C Adjusting this will allow the user to calibrate the displayed temperature. This is an offset only.

CO2 ZR XX.X% This is used to zero the displayed value for CO2 to a known value. It is used to remove long-term drift of the cabinet's thermal conductivity CO2 sensor. This will be available if the customer has a T/C CO2 sensor rather than an IR CO2 sensor.

CO2 SP XX.X% This is used to span the displayed value for CO2 to a known value, and is available if the customer has a T/C CO2 sensor rather than an IR CO2 Sensor.

IR CO2 XX.X% This is used to calibrate the displayed value for CO2 to a known value, and is available if the customer has an IR CO2 sensor rather than a T/C Sensor.

O2 XX.X% Adjusting this will allow the user to calibrate the O2 display to a known value, and is available only if the customer has an O2 option.

RH XX% Adjusting this will allow the user to calibrate the RH display to a known value, and is available only if the customer has an RH option. This is an offset only.

SYSTEM CONFIGURATION MODE:

AUDIBLE ON/OFF When this option is off, all audible alarms will be disabled. The key press tone will be audible regardless of the selection. System default is ON.

ACC CODE XXX This allow the user to enter an access code that will prohibit any one from changing any system parameters without first entering the access code. The default is 000, which disables the access code.

TEMP LO XX.X Temperature low tracking alarm setpoint from -0.5 to -5.0 degrees C, allows the user to enter a temperature setpoint that is the low limit to which the incubator can control temperature from setpoint before going into alarm. The system default is -1.0 degrees C.

TEMP HI XX.X Temperature high tracking alarm setpoint from 0.5 to 5.0 degrees C, allows the user to enter a temperature setpoint that is the high limit to which the incubator can control temperature from setpoint before going into alarm. The system default is 1.0 degrees C.

TEMP RLY ON/OFF Gives the user the option to allow temperature alarms to engage the alarm relay contacts, which are standard on the incubator. The system default is ON.

CO2 LO XX.X CO2 low tracking alarm setpoint from -0.5 to -5.0 %CO2, allows the user to enter a CO2 setpoint that is the low limit to which the incubator can control CO2 from setpoint before going into alarm. The system default is - 1.0 % CO2.

CO2 HI XX.X CO2 high tracking alarm setpoint 0.5 to 5.0 %CO2, allows the user to enter a CO2 setpoint that is the high limit to which the incubator can control CO2 from setpoint before going into alarm. The system default is 1.0% CO2.

CO2 RLY ON/OFF Gives the user the option to allow CO2 alarms to engage the alarm relay contacts, which are standard on the incubator. The system default is ON.

T/C ZR#+XXXX & T/C SP#+XXXX All T/C CO2 sensors are pre-calibrated at the factory at 37.0 degrees C, 5.0 to 10.0 % CO2 and 90 % humidity. A sticker is put on each sensor with a Z and S number that can be entered to allow the sensor to be in calibration if the customer is running at these parameters. These numbers can range from -9999 to + 9999.

IR Z&S XX.X provides the user with the ability to Fyrite a cabinet and enter the value. Upon pressing enter, the incubator will go though an auto-zero cycle and zero the IR sensor hardware, then automatically span the sensor and adjust the hardware. The process can take up to 10 minutes, but is typically 3 - 5 minutes. Is available only on IR CO2 units.

RH LO XX.X RH low limit alarm setpoint from 0 to 90% RH allows the user to enter a RH setpoint that is the low limit of the incubator's RH before going into alarm. The system default is 0 % RH.

RH RLY ON/OFF Gives the user the option to allow RH alarms to engage the alarm relay contacts, which are standard on the incubator. The system default is ON.

O2 LO XX.X O2 low tracking alarm setpoint -0.5 to -5.0 %O₂, allows the user to enter a O₂ setpoint that is the low limit to which the incubator can control O₂ from setpoint before going into alarm. The system default is -1.0 % O₂.

O2 HI XX.X O2 high tracking alarm setpoint 0.5 to 5.0 %O₂, allows the user to enter a O₂ setpoint that is the high limit to which the incubator can control O₂ from setpoint before going into alarm. The system default is 1.0 % O₂.

O2 RLY ON/OFF Gives the user the option to allow O₂ alarms to engage the alarm relay contacts, which are standard on the incubator. The system default is ON.

NEW O2 CELL Pressing <ENTER> causes a manual AUTO CAL of the systems O₂ sensor. The procedure will take approximately 75 seconds, and the message AUTO CAL will be displayed during the procedure. (O₂ option only) (This screen is in Test mode in all versions of software prior to 5)

DISP TEMP ON/OFF & DISP RH ON/OFF The top 7 Segment Display on the control panel is used to toggle between TEMP and RH displays. If DISP TEMP is on and DISP RH is off, temperature will be displayed continually. If DISP TEMP is off and DISP RH is on, RH will be displayed continually. If both options are turned on, the display will toggle between the two parameters every 5 seconds. These displays will be available only if the user has the RH option. If no RH option is present, the display will read TEMP continually and no setup is necessary. The system will default to TEMP display only.

DISP CO2 ON/OFF & DISP O2 ON/OFF The bottom 7 Segment Display on the control panel is used to toggle between CO₂ and O₂ displays. If DISP CO₂ is on and DISP O₂ is off, CO₂ will be displayed continually. If DISP CO₂ is off and DISP O₂ is on, O₂ will be displayed continually. If both options are turned on, the display will toggle between the two parameters every 5 seconds. These displays will be available only if the user has the O₂ option. If no O₂ option is present, the display will read CO₂ continually and no setup is necessary. The system will default to CO₂ display only.

O2 COMP ON/OFF If the user has a T/C CO₂ cell and an O₂ option, the incubator is capable of compensating the CO₂ reading based upon the level of O₂ in the cabinet. Turning this ON will allow this to happen. This should only be turned on if the O₂ cell has been calibrated and is working properly. The system default is OFF.

RS485 XX This allows the user to enter an incubator address from 0 to 24 for communication with the 1535 alarm system. The system default address is 0, which will not allow the incubator to communicate with the 1535.

TANK SEL X This option is available only if the customer has purchased the GAS GUARD option. It allows the user to manually select the tank that provides gas to the incubator. The system default is 1. For further explanation of the GAS GUARD option see the alarms section.

GAS GRD ON/OFF Turning this option OFF will cause the GAS GUARD system to be disabled should it not be in use. All GAS GUARD alarms will also be disabled is the option is OFF. The system default is OFF.

DR HEAT XX% The incubator has a heater built into the inner glass door of the unit. This setpoint, which ranges from 0 to 100%, is the amount of time that heat will be applied to the glass door in relation to the main heater. System default is 50%.

ALARMS

The new incubator has a total of 20 different alarms conditions that can exist. Listed below are these conditions, followed by delay time and alarm ring back time.

Description	Message	Delay	Ring back
No alarm condition exist	SYSTEM OK	-----	-----
Temp > OTEMP Setpoint	SYS IN OTEMP	0 min.	15 min.
Water Temp Sensor Fault	H2O SENS ERR	0 min.	15 min.
Air Temp Sensor Fault	AIR SENS ERR	0 min.	15 min.
CO2 Sensor Fault	CO2 SENS ERR	0 min.	15 min.
O2 Sensor Fault (O2 option only)	O2 SENS ERR	0 min.	15 min.
O2 Sensor < 6mV @ room air (O2 option only)	REPLACE O2	15 min.	15 min.
Water low in Jacket	ADD WATER	0 min.	15 min.
Inner Door is Open	DOOR OPEN	15 min.	15 min.
CO2 > CO2 High Tracking Alarm	CO2 IS HIGH	15 min.	15 min.
CO2 < CO2 Low Tracking Alarm	CO2 IS LOW	15 min.	15 min.
TEMP > TEMP High Tracking Alarm	TEMP IS HIGH	0 min.	15 min.
TEMP < TEMP Low Tracking Alarm	TEMP IS LOW	15 min.	15 min.
O2 > O2 High Tracking Alarm (O2 option only)	O2 IS HIGH	15 min.	15 min.
O2 < O2 Low Tracking Alarm (O2 option only)	O2 IS LOW	15 min.	15 min.
RH < RH Low Limit Alarm (RH option only)	RH IS LOW	30 min.	15 min.
RH Sensor Fault (RH option only)	RH SENS ERR	15 min.	15 min.
Auto zero pump problem (IR or O2 option)	PUMP FAILURE	0 min.	15 min.
IR sensor out of calibration (IR option only)***	CAL CO2 SNSR	0 min.	15 min.
Tank 1 and 2 are low (Gas Guard Only)	TANK 1&2 LOW	0 min.	15 min.
Tank1 is low, switch to tank 2 (Gas Guard only)	TANK 1 LOW	0 min.	N/A
Tank2 is low, switch to tank 1 (Gas Guard only)	TANK 2 LOW	0 min.	N/A

*** Added in gas processor version 3140-03 and higher

The message will appear in the LED message center of the display board when the alarm is active. The visual and audible alarms will go active after the delay period is met. When an alarm or alarms is active, and silence is pressed, the visual alarm will continue, while the audible alarm will be disabled for the 15-minute ring back period. If multiple alarm conditions should occur, the active messages will displayed in the message center one at a time, updating every 5 seconds. Pressing silence during multiple alarm conditions will cause all active alarms to be silenced, and ring back in 15 minutes.

All alarms are momentary alarms only. If a condition occurs that causes the incubator to go into alarm and then return to a normal condition the incubator will automatically clear the message center and alarm condition.

Temperature alarms are disabled whenever the Temp Setpoint is 10.0 degrees. CO2 alarms are disabled whenever the CO2 Setpoint is 0.0%. O2 alarms are disabled whenever the O2 Setpoint is 21.0%. The low temp alarm and low RH alarm delay is set to 9 hours automatically on system power up. This will allow the user to avoid nuisance alarms when the system is first turned on. If the temp or RH comes within alarm limits prior to the 9-hour delay, the alarms will be enabled. Setting AUDIBLE in the system config menu to OFF can turn off all audible alarms.

ALARM CONTACTS

There is one set of alarm contacts on the new incubator. The contacts will be tripped on any Overtemp alarm condition and are programmable in the system config menu for the following: Temp HI or LOW tracking, CO2 HI or LOW tracking, and RH LOW limit alarms. A setting of ON will enable these alarms to trip the contacts, the system default for all programmable alarms contacts is ON.

ADD WATER ALARM

The add water alarm works slightly different than the typical alarm condition. When the unit is first turned the unit will go into an ADD WATER alarm that will be a pulsing audible and visual. Pressing silence will cause the audible alarm to be shut off and it will stay off unless the cabinet is not full in the next 15 minutes. When the cabinet is full, the audible alarm will sound a continuous tone for 10 seconds to let the user know that it is full. After this tone, the alarm condition will be cleared.

GAS GAURD ALARMS

If a customer has the GAS GAURD option, there will be a menu in the system config mode that allow the user to select which tank of gas is being used to control the system. If the tank goes low that is being used, the unit will automatically switch to the opposite tank, but will still activate an alarm condition indicating that the tank is low. When silence is pressed the alarm condition will be cleared and will not ring back. There is a warning light however, on the display that will remain lit until the tank is replaced and both tanks are normal. This alarm light is on the display, as one tank being low is not really an alarm condition that can cause system problems but rather something that the user should be continually reminded of so that the tank is replaced promptly. If a tank goes low that is not being used, the warning light will light up, but there will be no other audible or visual alarm. If both tanks go low, an alarm condition that will ring back will be enabled, and will act like a typical alarm condition.

TEST MODE:

There is also a special test/service mode built into the incubator control panel. This mode is intended to be used as a production tool during testing and a service tool for installing and/or troubleshooting problems with the incubator. When in test mode, all incubator control is disabled. This mode should be used by qualified personnel only. To get into test mode the <- and -> arrow keys should be pressed simultaneously and held. The incubator's microprocessor only checks for this key sequence every 5 seconds, so the keys should be held until the display reads " Test Mode -> ". Listed below are the options available in test mode. To exit test mode, press the mode key and the system will resume normal operation.

MAX LOAD ON/OFF Manually turns ON/OFF all heaters, and valves so that the unit is under full load.

MAIN HT ON/OFF Manually turns ON/OFF the main chamber heater.

DOOR HT ON/OFF Manually turns ON/OFF the glass door heater.

MOTOR ON/OFF Manually turns ON/OFF the blower motor.

GG VALVE ON/OFF Manually toggles the Gas Guard Valve. (Gas Guard option only)

CO2 VALVE ON/OFF Manually toggles the CO2 Valve.

PUMP ON/OFF Manually turns ON/OFF the IR & O2 Auto Zero pump. (IR or O2 option, was eliminated in IR units with release of DCS IR sensor)

O2 LRGE ON/OFF Manually turns ON/OFF the large O2 valve. (O2 option only)

O2 SML ON/OFF Manually turns ON/OFF the small O2 valve. (O2 option only)

ALM CNTS ON/OFF Manually toggles the remote alarm contacts.

PULSE 485 sends a 2 second long data stream out the 485 connector.

WTEMP XX.X C Displays the cabinet water temperature.

TMPOFF XX.X C Displays the offset amount that the air temperature has been changed during calibration.

RHOFF XX % Displays the offset amount that the RH has been changed during calibration. (RH option only)

O2CORR XX.X % Displays the amount of correction that is being added/subtracted to the CO2 display if the O2 compensation is enabled. (O2 option only)

NEW O2 CELL Pressing <ENTER> causes a manual AUTO CAL of the systems O2 sensor. The procedure will take approximately 75 seconds, and the message AUTO CAL will be displayed during the procedure. (O2 option only) (This screen has moved to Config mode in all versions of software after 4)

O2 XX.X MV Used to display the O2 cell millivolt reading. (O2 option only)

FORCE AUTOZ Generates a new zero value by going through the standard auto-zero that is normally done every 12 hours. (IR option only, removed in all versions of software including IR units after release of DCS sensor)

IRZERO X.XX Used to adjust the IR CO2 sensor's voltage level in a zero condition. (IR option only, removed in all versions of software including IR units after release of DCS sensor)

IRSPAN X.XX Used to adjust the IR CO2 sensor's voltage level in a span condition. (IR option only, removed in all versions of software including IR units after release of DCS sensor)

LASTZ X.XXV Displays the IR zero voltage generated by the last auto-zero cycle. (IR option only, removed in all versions of software including IR units after release of DCS sensor)

DIGIZERO XXX Displays the digital setting of the digital potentiometer that is used in the zero adjustment of the IR sensor. (IR option only, removed in all versions of software including IR units after release of DCS sensor)

DIGISPAN XXX Displays the digital setting of the digital potentiometer that is used in the span adjustment of the IR sensor. (IR option only, removed in all versions of software including IR units after release of DCS sensor)

ACLIN XXX Allow the ACLINE voltage on the micro board to be calibrated in 1 V increments.

MTR +/- XXX A number from - 300 to +300, which is used to calibrate the line voltage to the motor to the appropriate, setting.

MNHT Z XX.X % XX.X displays the amount of time that the main heater was on prior to going into test mode. Z displays a status bit that indicates how the incubator is controlling temperature.

DRHT Z XX.X % XX.X displays the amount of time that the door heater was on prior to going into test mode. Z displays a status bit that indicates how the incubator is controlling temperature.

RESETS XX Displays the number of times the units have been powered up. This can be cleared by pressing the up arrow and can be used to troubleshoot possible power problems. (i.e. brownouts, resets)

DFLT MAIN EE Pressing < ENTER > reloads the entire contents of the Main Micro Processors non-volatile memory to defaults. When < ENTER > is pressed the message **ARE YOU SURE** will appear, press < ENTER > to perform the default, otherwise press any other key to cancel. **Caution: This should only be used if problems indicate that the memory has been corrupted or erased. Default the entire contents of the micro board non-volatile memory.**

DFLT SETP Pressing < ENTER > reloads all system set points in non-volatile memory to defaults. **Caution: Defaults all previous set points that have been programmed into the unit.**

DFLT CALIB Pressing < ENTER > reloads all system software calibration in non-volatile memory to defaults. **Caution: Defaults all previous software calibration.**

DFLT HW CAL Pressing < ENTER > reloads all system hardware calibration in non-volatile memory to defaults. **Caution: Defaults all previous hardware calibration.**

DFLT GASP EE Pressing < ENTER > reloads the IR/O2 board's microprocessor's non-volatile memory. (IR or O2 option). (Removed from all units except O2 after release of DCS sensor) **Caution: Defaults the entire contents of the Gas Processor's Non-Volatile memory.**

MN VERS XX Displays the main boards software version number.

MN CKSM XXXX Displays the main boards software checksum number. (Removed in all versions of software after 4)

GP VERS XX Displays the IR/O2 gas processor board's software version number. (IR or O2 Option) (Removed from all units except O2 after release of DCS sensor)

GP CKSM XXXX Displays the IR/O2 gas processor board's software checksum number. (IR or O2 option, removed in all versions of software after 4) (Removed from all units except O2 after release of DCS sensor)

Note: When in test mode, the processor will check if the analog board option exists. If it does, the processor will write out the following information to the analog board during any test mode menu: 20.0 degrees C, 20.0 %CO2, 20% RH, and 20.0% O2.

Note: When in run mode with SYSTEM OK showing in the display, pressing the down arrow will cause the water temperature to be displayed in the lower 7-segment display. Pressing the up arrow will cause AC line voltage to the micro board to be displayed in the upper 7-segment display.