

# 3110 SERIES II W/J INCUBATOR CONTROL PANEL

The 3110 Series II water jacket incubator has four basic modes which allow incubator setup. The modes are as follows: Run, Setpoints, Calibration, and System Configuration. Run mode is the default mode in which the incubator will normally be in during operation. Setpoints is used to enter system setpoints 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 or CLASS 100 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 CO<sub>2</sub> unit, 10.0 to 50.0 degrees for an IR CO<sub>2</sub> unit, and 10.0 to 45.0 degrees for an O<sub>2</sub> 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 can not 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.

**CO<sub>2</sub> XX.X %** CO<sub>2</sub> control setpoint from 0.0 to 20.0 % CO<sub>2</sub>. The incubator will control to within 0.1% of CO<sub>2</sub> setpoint. This setting will be used for either a thermal conductivity CO<sub>2</sub> sensor or an Infrared CO<sub>2</sub> sensor. A setting of 0.0% will turn off CO<sub>2</sub> control and turn off all CO<sub>2</sub> alarms. The system default is 0.0%.

**O<sub>2</sub> XX.X %** O<sub>2</sub> control setpoint from 1.0 to 21.0 % O<sub>2</sub>. The system will control within 0.1% of O<sub>2</sub> setpoint. This Setpoint will appear in the Set Points mode only if the customer has purchased the O<sub>2</sub> option. A setting of 21.0 % will turn off all O<sub>2</sub> control and disable all O<sub>2</sub> 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.

**CO<sub>2</sub> CAL XX.X%** This is used to calibrate the displayed value for CO<sub>2</sub> to a known value. It is offset only and is used to remove long term drift of the cabinet's thermal conductivity CO<sub>2</sub> sensor. This will be available if the customer has a T/C CO<sub>2</sub> sensor rather than a IR CO<sub>2</sub> sensor.

**IR CAL XX.X%** This is used to calibrate the displayed value for CO<sub>2</sub> to a known value, and is available if the customer has an IR CO<sub>2</sub> sensor rather than a T/C Sensor.

**O<sub>2</sub> CAL@20.7%** This is used to calibrate the O<sub>2</sub> system to a known ambient value of 20.7%, and is available only if the customer has an O<sub>2</sub> option. The life of the sensor is checked with this procedure. This should be used whenever a new sensor is installed. Press <ENTER> to start the procedure.

**O<sub>2</sub> OFFS XX.X%** Adjusting this will allow the user to calibrate the O<sub>2</sub> display to a known value, and is available only if the customer has an O<sub>2</sub> 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 keypress tone will be audible regardless of the selection. System default is ON.

**NEW HEPA XXX** This is used whenever a new HEPA filter is installed to reset the HEPA filter replacement timer. The number displayed is the remaining days before the HEPA filter replacement time specified runs out.

**REPL HEPA XX** This allows the user to specify the number of months from 1 to 12 for the HEPA filter replacement timer. The system default is 6.

**ACC CODE XXX** This allows 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.

**CO<sub>2</sub> LO XX.X** CO<sub>2</sub> low tracking alarm setpoint from -0.5 to -5.0 %CO<sub>2</sub>, allows the user to enter a CO<sub>2</sub> setpoint that is the low limit to which the incubator can control CO<sub>2</sub> from setpoint before going into alarm. The system default is - 1.0 % CO<sub>2</sub>.

**CO<sub>2</sub> HI XX.X** CO<sub>2</sub> high tracking alarm setpoint 0.5 to 5.0 %CO<sub>2</sub>, allows the user to enter a CO<sub>2</sub> setpoint that is the high limit to which the incubator can control CO<sub>2</sub> from setpoint before going into alarm. The system default is 1.0% CO<sub>2</sub>.

**CO<sub>2</sub> RLY ON/OFF** Gives the user the option to allow CO<sub>2</sub> 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 .

**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.

**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.

**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.

**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.

# ALARMS

The incubator has a total of 21 different alarm conditions that can exist. Listed below are these conditions, followed by delay time and alarm ringback time.

Description	Message	Delay	Ringback
No alarm condition exist	SYSTEM OK or CLASS 100	-----	-----
CO2 System in Auto Calibration	CO2 AUTO CAL	-----	-----
Temp > OTEMP Setpoint	SYS IN OTEMP	0 min.	15 min.
Temp Control Sensor Fault	TSNSR2 ERR	0 min.	15 min.
Over Temp Sensor Fault	TSNSR1 ERR	0 min.	15 min.
CO2 Sensor Fault	CO2 SNSR ERR	0 min.	15 min.
O2 Sensor Fault ( O2 option only )	O2 SNSR ERR	0 min.	15 min.
O2 Sensor < 6mV @ room air ( O2 option only)*	REPLACE O2	15 min.	15 min.
CO2 Sensor Cannot be Calibrated	REPL IR SNSR	0 min.	15 min.
Replace HEPA filter reminder – set time expired*	REPLACE HEPA	0 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.
CO <sub>2</sub> Auto-Zero Fault ( IR option only )	IR AUTOZ ERR	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

\* visual only, no audible alarm

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 ringback 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 ringback 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 powerup. 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. All audible alarms can be turned off by setting AUDIBLE in the system config menu to OFF.

## 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 alarm 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 GUARD ALARMS

If a customer has the GAS GUARD 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 ringback. 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.

**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%.

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

**CO2 VALVE ON/OFF** Manually toggles the CO2 Valve.

**CO2 SPAN** Used when a span adjustment of the T/C CO2 sensor is necessary.

**O2 VLVE ON/OFF** Manually turns ON/OFF the 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.

**OT CAL XX.X C** Used to calibrate the over temperature probe.

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

**O2OFF** Displays the offset amount that the O<sub>2</sub> has been changed during calibration. ( O<sub>2</sub> option only )

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

**O2 XX.X MV** Used to display the O2 cell millivolt reading for a given O<sub>2</sub> level. ( O2 option only )

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

**C100 ON/OFF** Used to turn the Class 100 display ON/OFF.

**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. Defaults the entire contents of the micro board non-volatile memory.**

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

**MN VERS XX** Displays the main board's software version number.

**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 %CO<sub>2</sub>, 20% rH, and 20.0% O<sub>2</sub>.

**Note:** When in run mode with SYSTEM OK or CLASS 100 showing in the display, pressing the down arrow will cause the over temp temperature to be displayed in the lower 7 segment display.