

# JC Systems Model 620A

## *EZ* Reference Guide



This guide is a pictorial progression through the various display screens with basic descriptions of each display field and brief definitions of each. More detailed information on the JC Systems Model 620A manufactured by TMC Services is also available in the Model 620A Manual.

# Model 620A by TMC Services Training By Compass Services

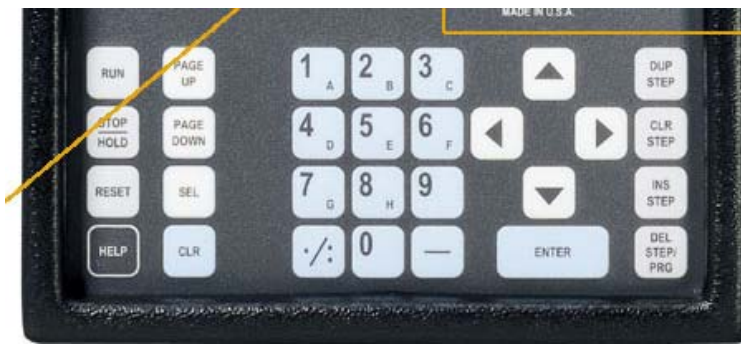
The front panel displayed is referred to as the “Home or Run” Screen.



## Overview: Front Panel displays, and indicators.

- 1: CH1 & CH2 Inc/Dec LED's. Indicate “ON/OFF” Time Proportioned output.  
INC, up arrow (heat, humidify, climb, etc.) and DEC, down arrow (Cool, de-humidify, dive, etc.)
- 2: Displays Program # (1 – 99), Step # (1 – 200), and Time Remaining in current program step.
- 3: Displays Interface, LCL (Local, front panel) or RMT (Remote, external computer) and Mode (RUN, STP, EOP, GS1, GS2, etc.)
- 4: Line 1: Displays CH1 & CH2 SP (Setpoint) and status of first eight event outputs (1 – 8)  
Line 2: Displays CH1 & CH2 PV (Process value) and status of next eight event outputs (A – H)  
(SP and PV are displayed in units configured for that channel (deg C, F, %RH, Alt/FT etc.)
- 5: ALM – 4 possible flashing displays: S1 – S2 – L1 – L2.  
S1 & S2 – Setpoint Alarm. Setpoint is out of configured controller span or input is open.  
CH1 or CH2 PV will display “RANGE” setpoint out of range or “P.OP” – Probe Open.  
  
L1 & L2 – DEV Limit Alarm. Channel is out of programmed +/- DEV span.  
Each channel can be configured for the program to continue running or stop during alarm, and for the alarm display and output to reset manually or automatically.  
CH1 & CH2 share a common Logic low output from the 620A.

## Overview: Front Panel Keypad.



**NOTE:** Keypad is fully functional for entry or change only in the LCL mode. Screens can be viewed but parameters can not be changed in RMT mode.

**RUN:** Push to run a new program or resume a program after the Stop/Hold button is pushed.

**STOP/HOLD:** STOPS the running program and HOLDS the parameter values, Setpoints, Events and Time. Push RUN to resume operation or RESET to reset current program back to step # 1.

**RESET:** In STOP (STP) mode resets program pointer to step 1 of selected program. Returns display to the “HOME/RUN” screen from “any” screen or menu selection. If the operator is on a screen they do not recognize or are unsure of, it is recommended to push RESET. This returns to the HOME/RUN screen and allows access to the Main Menu. Pushing any other button could result in changing an operating parameter.

**HELP:** Not much is available.

**PAGE UP:** Moves to previous page of menus, configurations, editing, calibration, PID tuning, etc.

**PAGE DOWN:** Moves to next page of menus, configurations, editing, calibration, PID tuning, etc. In LCL\_STP mode of the Home/Run screen, pushing Page Down accesses the Main Menu.

**SEL:** Used to scroll through selections of a field on a page.

**CLR:** Clears the value or selection of the selected field on a Page.

**ALPHA NUMERIC:** Used for entering numeric data or selecting lettered events. Cursor must be in the letter event field to select letter events.

**ARROW KEYS (Up, Dn, Right, Left):** Used to navigate cursor to different fields on a Page.

**ENTER:** Enters value of current field and advances cursor to next field on the Page, or to the next Page if entering from the last field on that page.

### EDIT ONLY KEYS:

**DUP STEP:** Insert a step into the next location and copy current step information. All following steps advance x1.

**CLR STEP:** Clears all information in the current step to default values.

**INS STEP:** Insert a blank step into the next location. All following steps advance x1.

**DEL STEP/PRG:** With cursor over step number deletes the step. All following steps move back x1. With the cursor over the PRG number the entire program is deleted from memory.

Examples: Advance x1: Steps 3 now 4, 4 now 5, etc.. Back x1: Steps 3 now 2, 4 now 3, etc.

## **1 Main Menu Section 1 - The following section contains:**

### **Pg1**

**Main Guide screen:**

**Main Menu structure (w/o Item 4 details)**

**Power on screen**

### **Pg 2**

**Run screen**

**Run infor screen 1**

### **Pg3**

**Run info screen 2**

**Run info screen 3**

### **Pg4**

**Alarms**

**POP, Range, Deviation**

### **Pg5**

**Response to Dev Alarm and Config.**

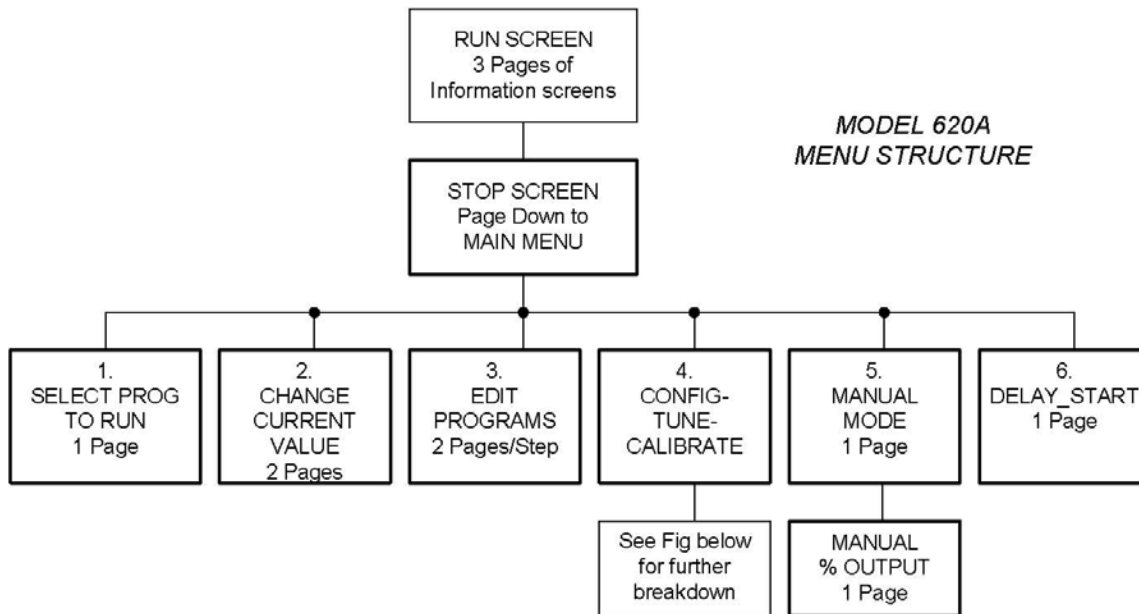
### **Pg 6**

**Stop Screen**

**Main menu screen**

## Menu Guide

The menu for the Model 620A controller is a three level menu containing 6 major selection screens. The figure below (Figure X-X) highlights the Model 620A Menu Structure.



### POWER ON SCREEN

When the Model 620A is turned on or the power is cycled the following display appears for 10 to 15 seconds during boot up.

**Firmware Version and Date:** Please provide this information when contacting the factory regarding any issues with the Model 620A. This information does not indicate the age of the instrument. The firmware version may have been previously updated.



The Model 620A will boot up into either the STP or RUN mode of operation and display screen. If the unit was running a program when the power was removed. It will perform the operation selected in the Power Fail Recovery Mode. If a program was not running it will boot up on the Stop screen on the last program and step number accessed.

## RUN SCREEN

This screen displays real time running information.

The Main Menu is not available from the Run Mode.

Pushing <Page Down> sequences the display through three Run Time Information screens (shown below).

The information screens will time out after appx. 15 seconds and the display returns to the Run Screen.

Line 1:        CH1   — CH2   — Events  
              Setpoint Setpoint 1 - 8



Line 2:

CH1 — CH2 — Events  
Process Process A - H  
Value Value

Line 3:

Prog # — Step # — Time Remaining  
in Step

Line 4: INTERFACE: — MODE: — ALM:

LCL - Local	RUN	S1 - Setpoint Alarm CH1
Front Panel	STP	S2 - Setpoint Alarm CH2
	EOP	L1 - Deviation Alarm CH1
RMT -	DEV	L2 - Deviation Alarm CH2
Remote	GS1(2)	
Ext Computer	MAN	
	OFF	

## RUN INFORMATION SCREEN 1 - PAGE DOWN FROM RUN SCREEN

Line 1:        CH1   — CH2   — CH1 FINAL  
              DEV   DEV   SP VALUE



Line 2:

CH1 — CH2 — CH1 FINAL  
UNITS UNITS SP VALUE

Line 3:

DISPLAY ONLY

Line 4: NEXT PROGRAM# AND STEP#

<PAGE DOWN> FOR RUN SCREEN 2



## RUN INFO SCREEN 2

Line 1: — CH1 HI — CH2 Hi — CH1 %  
Limit Limit output



Line 2:

CH1 Lo — CH2 Lo — CH2 %  
Limit Limit output

Line 3:

PROG. MODE: — CH1 PID SET IN USE  
1 Channel STAG1 (SET 1)  
2 Channel STAG2 (SET 2)  
FASTTRAC  
PASSTHRU

Line 4: CH2 PID SET IN USE  
STAG1 (SET 1)  
STAG2 (SET 2)

<PAGE DOWN> FOR RUN SCREEN 3

## RUN INFORMATION SCREEN 3

Line 1: Loops remaining in current nested Loop: \*See note below.



Line 2:

Cycles remaining in current program:  
\*See note below.

Line 3:

Guarantee Soak CH1

Line 4: Guarantee Soak CH2

\*NOTE: LOOP and CYCLE fields:

---- indicates the Loop or Cycle step has not been reached and the counter has not been updated.

A number represents the Loops (in the current nested loop) or Program Cycles remaining.

<PAGE DOWN> = no action <PAGE UP to SCREEN 2 or allow timeout.

**P.OP - Probe Open:**

The control channels probe is disconnected, is defective, or has an open junction.  
The control channel will read properly when the problem is corrected.

**P.OP ACTION:**

The PV field of the control channel will display **P.OP** and the controller INC and DEC outputs will be disabled.

A running program will freeze. The time, events and unaffected control channel will hold at their current values.

The program will resume operation when the problem is corrected.

**RANGE (S1 OR S2):**

The entered setpoint is outside the range allowed by the controller's span.  
Enter a valid setpoint or reconfigure the controllers span.

Note:

Changing the controller span is not recommended unless the attempted setpoints are valid and within the prescribed range of operation.

Prior to changing the controller span, record the channel's PBAND setting in the PID tuning section. After the new span is entered, return to the PID tuning section and enter the previously recorded PBAND value.

Do not change the PGAIN value. It will automatically adjust to the proper value.

**RANGE ACTION:**

The PV field of the control channel will display **RANGE** and the controller INC and DEC outputs will be disabled.

A flashing **S1** (CH1) or **S2** (CH2) will be displayed in the ALM field of line 4 on the Home (Run) screen.

The "**COMMON DEV ALARM**" output on TB1-7 will go low.

A running program will freeze. The time, events and unaffected control channel will hold at their current values.

The program will resume operation when the problem is corrected.

**DEVIATION (L1 OR L2):** Programmer or Manual Modes.

The DEV is entered as a parameter of a program step or in the Manual Mode.

The DEV alarm function tracks the SP vs PV error.

If the PV is outside of the +/- range entered for the DEV the following actions occur.

**DEVIATION ACTION:**

A flashing **L1** (CH1) or **L2** (CH2) will be displayed in the ALM field of line 4 on the Home (Run) screen.

The "**COMMON DEV ALARM**" output on TB1-7 will go low.



## **PROGRAMMER CONFIGURATION AND RESPONSE TO DEVIATION ALARM:**

The response to a DEV Alarm is independently configured for each channel In the Model 620A's programmer configuration section.

### **PROGRAMMER ACTION:**

**Stop during DEV:** The programmer stops when a deviation condition is detected. The time display stops decrementing, the controller setpoints and event outputs are latched.  
The controllers continue operating and maintain the latched setpoints.  
The alarm field display flashes and the alarm output TB1-7 goes low.

**Run during DEV:** The programmer continues to run.  
The alarm field display flashes and the alarm output TB1-7 goes low.

### **ALARM RESET ACTION:**

**AUTOMATIC:** If Stop during DEV is selected. The Model 620A will automatically resume operation. The alarm display and output will be automatically reset as soon as the out of limits condition has ended.

If Run during DEV is selected. The alarm display and output will be automatically reset as soon as the out of limits condition has ended.

**MANUAL:** The reset action occurs "only" when the out-of-limits condition has ended and the Model 620A RUN mode is enabled.  
The Run mode is enabled by pushing the Front Panel <RUN>, providing a run signal from the photoisolated Run input or issuing a Run command via the computer (in RMT mode only).

## STOP SCREEN

Pushing the <STOP/HOLD> button from the LCL\_RUN screen will freeze the time, hold all operating parameters at their current values, and display STP in the Mode Field.  
Active Setpoint (S1 or S2) or Dev Limit (L1 or L2) alarms will display in the ALM field.

Push <RUN> to resume operation.



Push <PAGE DOWN> to access the Main Menu.

## **MAIN MENU Selection Menus**

The menu of the 620A controller has 6 major selection screens. In the next sections each of these major menu screens will be explained in detail. The major selection screens are broken down as follows:



1. SELECT PROGRAM TO RUN Screen
2. CHANGE CURRENT VALUE Screen
3. EDIT PROGRAMS Screen
4. CONFIG-TUNE CALIBRATE
  - 4-1 CONFIGURE PROGRAMMER
  - 4-2 CONFIGURE CONTROLLERS
  - 4-3 CALIBRATE INPUTS
  - 4-4 CALIBRATE OUTPUTS
5. MANUAL MODE
  - Manual % OUTPUT
6. DELAY\_START

## Section 1 - SELECT PROGRAM TO RUN Screen

### 1 – SELECT A PROGRAM TO RUN:

From the Main Menu push <STOP>, <RESET>, <PAGE DOWN> , <1>.

The cursor will be flashing on the Program # field displaying the last program run.

Enter the program number you wish to run using the numeric keypad.



Note: If you wish to start the program on any step other than step# 1. Push the Right or Left <Arrow>. The cursor will toggle between the program and step number fields. In the step# field, enter the step number on which you would like the program to start.

Push <RUN>.

The programmer will immediately return to the “Home Screen” and begin running the program from the selected program and step number.

#### Caution:

You **MUST** select a starting step with a Step Type of Ramp/Soak. Pushing <RUN> on any other step type will cause the 620A to freeze on that step and not execute the program.

You **MUST** select a program# that has a valid program in that program# location. Selecting a program number without programmed information will cause the 620A to freeze on that program and not execute.

DO NOT select a step number higher than the last step (EOP) of the program. If a step number is entered higher than the last step (EOP) the display will cycle between “INVALID ENTRY” and the home screen display.

Pushing <RUN> will reset the step# to step 1 of the displayed program# and run the program.

Pushing <CLR> will reset the step# to step 1 and remain in “Select a program to Run.”

## Section 1-2 Change Current Values:

Page 1

Change current value screen pages 1 & 2

Page 2

Change current value definitions.

## Section 1-2 - CHANGE CURRENT VALUE Screen

### 2 – CHG\_CUR\_VAL (Change Current Value):

When <RUN> is pressed the displayed program step is placed in and operated from a location in RAM. Any operating parameter of the current running step can be modified and executed for the remainder of the step time without changing the original values programmed in memory.

Push <STOP>, <RESET>, <PAGE DOWN> , <2> (to Chg\_Cur\_Val screen).

Use the Left & Right <Arrow>, <Page Down> and <Page Up> to navigate to the field to be modified.

The following parameters can be modified in the CHG\_CUR\_VAL selection.

**Page 1:** CH1 Setpoint and DEV  
CH2 Setpoint and DEV



PROG #, STEP#, TIME: Time remaining in the current step  
EVT – On/Off status of the 16 programmable event outputs.

**Page 2:** LOOPS: number of loops to execute in the current loop sequence.  
CYCLES: number of cycles to repeat from the EOP step.



NEXT PGM: Program to execute when the current step time reaches zero.  
NEXT STEP: Starting step number of next program to execute.

Push <RUN> after all desired changes are made. The Model 620A will continue running the selected step with the new parameter values.

**RAMP STEP:** If the setpoint is changed in a Ramp step the 620A will calculate a new ramp rate based on the “new” setpoint and the time remaining in the step.

- i.e. If the original ramp was from 0 to 60 deg in 1 hr (1 deg/min) and the unit is stopped at 30 min the current running setpoint will be 30.  
If the setpoint is changed to 90 and <RUN> is pushed and new ramp is generated from 30 deg to 90 deg (60 deg change) in the remaining 30 min (2 deg/min).  
If the 1 deg rate of change is necessary then the TIME must also be changed to 60 min. prior to pushing <RUN>.

**SOAK STEP:** If the setpoint is changed in a Soak step the 620A will make an immediate change to the new setpoint (zero time). The time remaining in the step clocks down.

- i.e. If the original soak setpoint was 50 deg for 4 hrs and the unit is stopped with 2 hrs remaining the setpoint is held at 50. If a new setpoint value of 75 is entered and <RUN> is pushed, the setpoint of 75 is immediately executed the clock begins to time down from 2 hrs. The controller will control to and hold the new setpoint.

**CLR:** Clearing the setpoint will display ---.- in the setpoint display and immediately “kill” the controller outputs for that channel when the cursor is moved.  
The next step will always be a ramp to the next programmed setpoint from the current process value.

**DEVIATION:** The new deviation alarm value for the selected channel is active as soon as the value is entered and remains active for the duration of the step when <RUN> is pushed.

**TIME:** The new time entered will be used for the remainder of the current step after <RUN> is pushed. <CLR> will display the time as 00:00:00 and the unit will execute the next sequential program and step after <RUN> is pushed.

## **LOOPS/CYCLES:**

**LOOPS:** Only the number of Loops remaining for the current nested Loop can be changed.

If the Loop display shows either --- or 0, the unit has not yet reached the Loop step for that nested Loop and the Loops counter has not been updated.

If the ---- or 0 are displayed the number of loops may not be changed.

### **NOTE:**

DO NOT use the <0> or <CLR> to change the loops.  
Using 0 or CLR will have no effect.

No changes can be made if the loop counter indicates 1 loop remaining.  
The 620A will continue to the next sequential step of the program after the loop step is reached.

**CYCLES:** The number of programmed cycles may be changed.  
The cycles have the same requirements as the loops.



Section 1-3 – EDIT: Create new or edit existing programs in memory.  
 4 Programmer/Controller Configurations.  
 Single Channel, Two Channel, FastTRAC Standard and FastTRAC PassTHRU.

Push <STOP>, <RESET>, <PAGE DOWN> , <3> (to EDIT).

There are six Step\_Types. Each Ramp/Soak type step has two edit pages. All other Step\_Types have one edit page.

## RAMP/SOAK :

Page 1 – Ramp/Soak Step: Single, Two and FastTRAC modes.

Line 1: Step\_Type field - Use Sel button to scroll through six choices.

RAMP/SOAK ( default), EOP, LOOP, GOTO, GOTO\_IF, PAUSE



Line 2: Display only. Next step in program sequence.

Line 3: Prog # and Step #.  
 Step# is default when entering Edit mode.  
 Free Steps – Display only. Shows the number of steps available in memory of the original 200.

Line 4: Guarantee Soak. Value entered in controller units. CH2 GS is **not displayed** in single channel mode.

<PAGE DOWN> to page 2.

Page 2 – Ramp/Soak Step: Single and Dual Modes. See next picture for Page 2 in FastTRAC Mode.

Line 1: CH1 setpoint and Deviation Alarm value entry fields.



Line 2: CH2 setpoint and Deviation Alarm value entry fields.  
 This line is **not displayed** in Single channel mode.

Line 3: Prog # and Step # fields.

Step Time entry field. Time entered in HH : MM : SS.

Line 4: Events On/Off. Two entry fields. Use RT & Left Arrow key to move from number (1 – 8) to

Letter (A – H) event fields. Push the desired event number or letter (while in the appropriate

Field) to turn event On/Off. Event ON = number or letter displayed. Event OFF decimal displayed.

<PAGE DOWN> to page 1 of next step or <PAGE UP> page 1 of this step.

Line 1: CH1 setpoint and Deviation Alarm value entry fields.



Line 2: FastTRAC ThermoBoost Heat and Cool value entry fields.

Line 3: Prog # and Step # fields.

Step Time entry field. Time entered in HH : MM : SS.

Line 4: Events On/Off. Two entry fields. Use RT & Left Arrow key to move from number (1 – 8) to Letter (A – H) event fields. Push the desired event number or letter (while in the appropriate Field) to turn event On/Off. Event ON = number or letter displayed. Event OFF decimal displayed. <PAGE DOWN> to page 1 of next step or <PAGE UP> page 1 of this step.

## OTHER STEP TYPES:

**EOP STEP:** Cycle program.



Line 1: Displays EOP selected.

Line 2: Select Step # to cycle back to. Select # of cycles. Up to 9999 Includes first pass.

Line 3: Displays current Prog# & Step#.

<PAGE UP> to page 1 of previous step

<PAGE DOWN> this signifies the end of the program. The unit remains in the Edit mode and returns to step 1 of the selected program.

**LOOP STEP:** Nested Loop step.



Line 1: Displays LOOP selected.

Line 2: Select Step # to loop back to.  
Select # of loops. Up to 9999  
Includes first pass.

Line 3: Displays current Prog# & Step#.

<PAGE UP> to page 1 of previous step.  
<PAGE DOWN> to page 1 of next step.

**GOTO STEP:** Unconditional jump.



Line 1: Displays GOTO selected.

Line 2: Select the Prog# and Step# to GOTO  
when this step is reached.  
Unconditional jump (vector).

Line 3: Displays current Prog# & Step#.

<PAGE UP> to page 1 of previous step.  
<PAGE DOWN> to page 1 of next step. Any steps following a GOTO will not be executed unless the GOTO step is deleted.



## GOTO\_IF STEP: Conditional jump



Line 1: Displays GOTO\_IF selected.

Line 2: Select the Prog# and Step# to GOTO if the jump condition is true when this step is reached.

Conditional field. Select the true condition.  
Choices are: IN4 ON. Photo isolated input 4 is true (low) when this step is reached.

Or

A selected event, 1 – 8 or A – H, is programmed on for this step.

Line 3: Displays current Prog# & Step#.

<PAGE UP> to page 1 of previous step.  
<PAGE DOWN> to page 1 of next step.

## PAUSE STEP:



Line 1: Displays PAUSE selected.

Line 2: Displays next program step.

Line 3: Displays current Prog# & Step#.

<PAGE UP> to page 1 of previous step.  
<PAGE DOWN> to page 1 of next step.

## **Creating/Editing programs.**

The following are three simple programming examples of entering programs via the Model 620A front panel.

### **Single Channel:**

CH1 is most commonly used as the temperature control channel. In this mode the Ch2 Guarantee Soak, Setpoints and Dev are not displayed or accessible.

Program example  
Graph  
Entering program

### **Two Channel: (Not Shown)**

Ch1 is the temperature control channel, and CH2 can be used as a second temperature or other process related control function. Some common two channel systems are Temp/Temp such as thermal shock chambers. Temp/Relative Humidity using either wet bulb/ Dry Bulb or electronic sensors. The Model 620A internally contains the tables for WB/DB conversion, and Temp compensation for the Vaisala HMM30 RH sensor to providing direct % RH setpoint entry and process display values. Temp/Altitude. The Model 620A provides the conversion of altitude in feet from the popular Omegadyne PX41 series pressure sensors for 1-15 and 0-20PSIA.

Program Example  
Entering Program

### **FastTRAC & FastTRAC PassThru.: (Not Shown)**

When placed in the FastTRAC mode of operation and implementing the patented ThermoBoost feature. The Model 620A provides the ability to accelerate the device under test to the programmed test temperature and offers exceptional product temperature control.

Program Example  
Entering Program

**Single Channel Profile:** See graph on following page.

In this example the 620A is in the single channel mode and operating as a temperature only system. The controller units are in degrees C and three events are assigned as:  
Circulator - event 1, heat - event 2 and cool - event 3.

We have chosen 2 deg C/min as a ramp rate. To determine the ramp time we divide the ramp range by 2. The result is the step time entered in the program step.

**Profile:** The profile starts at 25 deg C. Events 1, 2 & 3 will be programmed “on” for each step. Steps 1 and 2 are for conditioning the chamber to 25C.

**Step 1 Ramp/Soak:** Ramp from current chamber temp to 25 C in 1 minute and wait for the process temp to be within 1 deg C ( $GS1 = 1$ ) of the 25 C setpoint before advancing to step 2.

**Step 2 Ramp/Soak:** Soak or dwell at 25 C for 15 minutes to allow the internal chamber temp to stabilize close to 25 C.

**Step 3 Ramp/Soak:** Ramp the temp from 25 C to 85 C in 30 minutes and wait for the process temp to be within 2 deg C ( $GS1 = 2$ ) of the 85 C setpoint before advancing to step 4.

NOTE: Ramp range,  $85 - 25 = 60$  C,  $60/2$  (ramp rate) = 30 minutes.

Step 3 will be our “Loop to” step later in the profile.

**Step 4 Ramp/Soak:** Soak at 85 C for 2 hours.

**Step 5 Ramp/Soak:** Ramp from 85 C to -35 C in 1 hour and wait for the process temp to be within 2 deg C ( $GS1 = 2$ ) of the -35 C setpoint before advancing to step 6.  
(Ramp range,  $85 - (-35) = 120$  C,  $120/2$  (ramp rate) = 60 minutes.

**Step 6 Ramp/Soak:** Soak at -35 for 2 hours.

**Step 7 Ramp/Soak:** Ramp from -35 C to 25 C in 30 min., and wait until for the process temp to be within 2 deg C ( $GS1 = 2$ ) of the 25 C setpoint before advancing to step 8.  
(Ramp range,  $25 - (-35) = 60$  C,  $60/2$  (ramp rate) = 30 minutes.

**Step 8 LOOP:** Loop back to step 3, for 50 loops (passes)

NOTE: The number of loops entered includes the first pass.

In our example we entered 50 loops. The first time the loop step is accessed the counter is decremented to 49. If the loop counter is greater than 0 we loop back to step 3. If the loop counter is equal to zero we proceed to the next programmed step. The LOOP counter default is 1.

**Step 9 Ramp/Soak:** This is a 15 minute soak step at 25 C following the final loop.

This allows the chamber to stabilize at ambient temperature prior to shutting it down. The desired soak time will be determined by the user for the size of the chamber and the prior soak step temperature.

**Step 10 Ramp/Soak:** This step is used to clear the controller setpoint, killing the controller outputs. This step is optional. If this step was not entered, the step 9 Setpoint and event parameters would be latched when the EOP step ends the program.

**Step 11 EOP:** Every program “Must” be terminated with an EOP step.

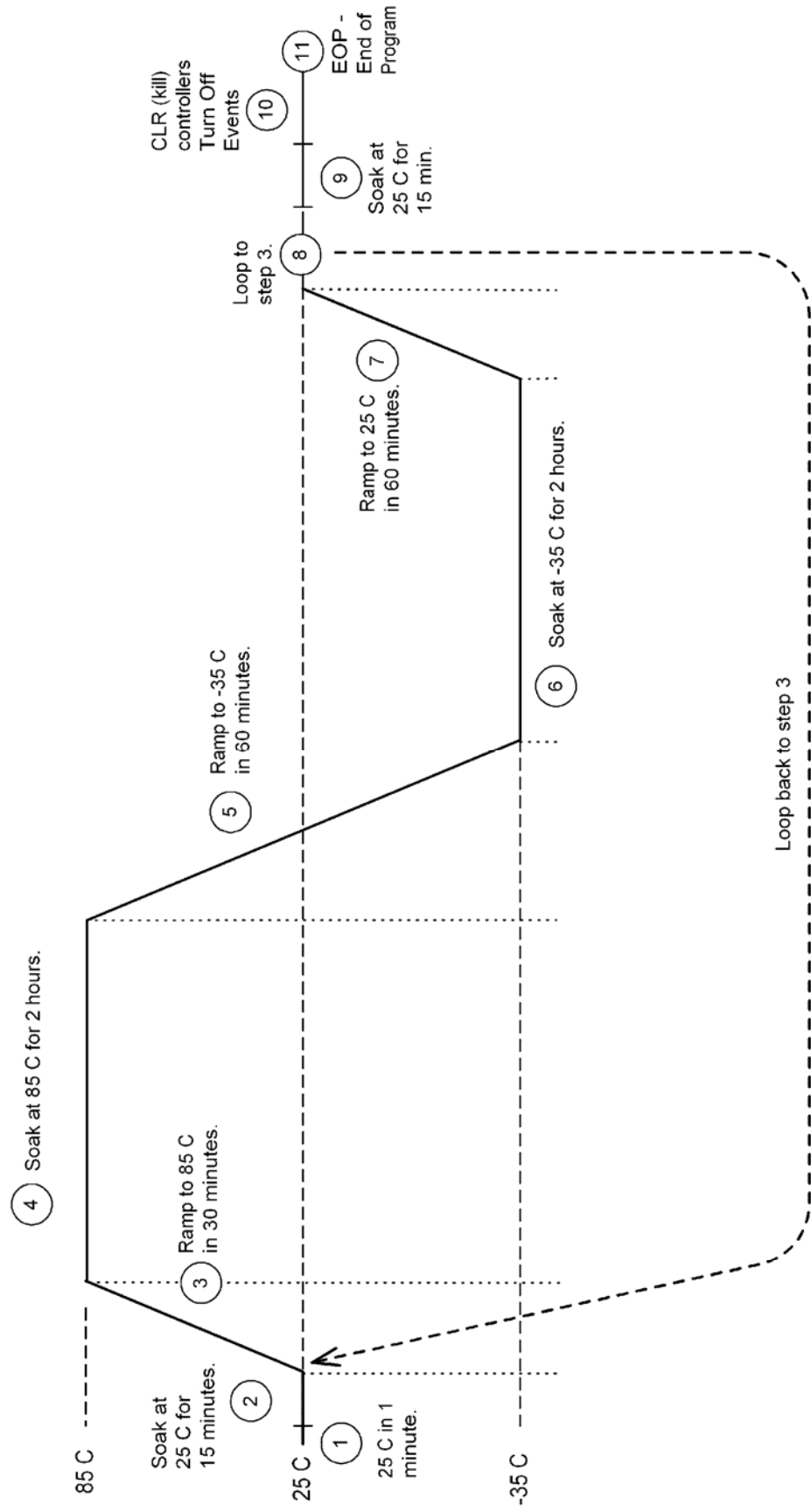
Similar to the Loop step, the EOP step can cycle back to a desired step.

When the EOP Cycle (Loop) counter reaches zero the program ends.

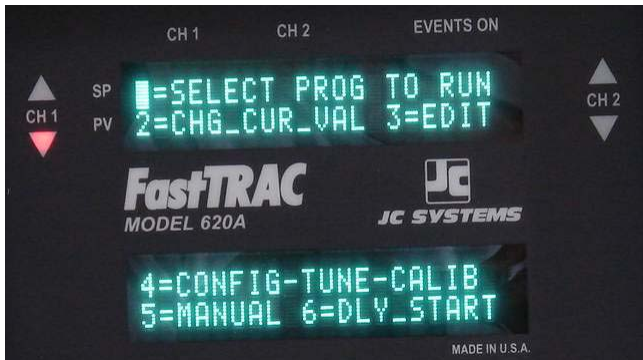
When the EOP cycle counter reaches zero the previous step’s setpoint and event status are latched.



## Single Channel Ramp/Soak Profile

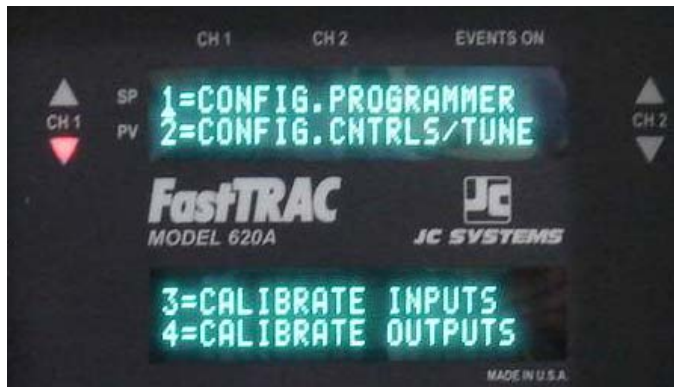


## Section 1-4 Config-Tune-Calibrate



From the Main Menu select Item 4

Push <4>.



### Section 4 - CONFIG-TUNE CALIBRATE

4-1 CONFIGURE PROGRAMMER

4-2 CONFIGURE CONTROLLERS

4-3 CALIBRATE INPUTS

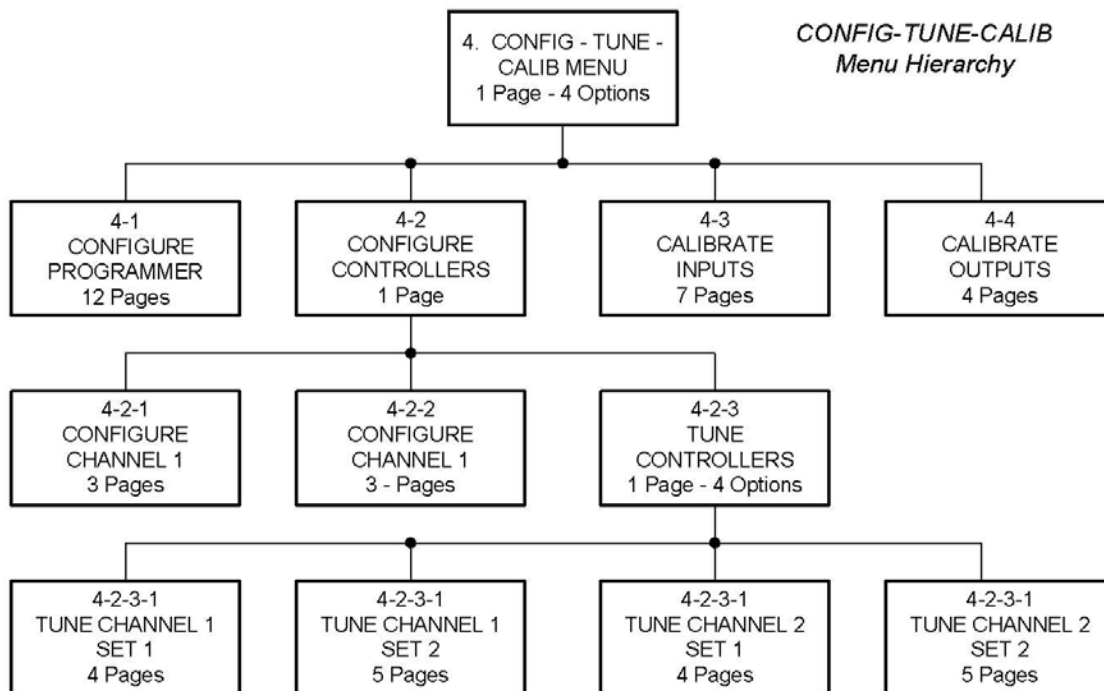
4-4 CALIBRATE OUTPUTS

Push <1> for CONFIG.PROGRAMMER

<2> for CONFIGURE CONTROLLERS

<3> for CALIBRATE INPUTS

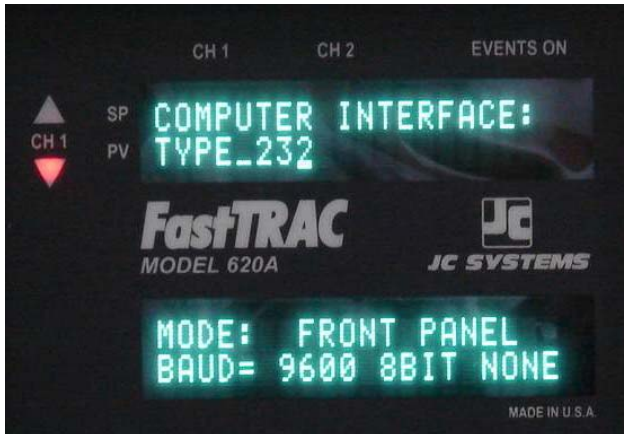
<4> for CALIBRATE OUTPUTS



## SECTION 4-1: CONFIGURE PROGRAMMER

Push <1> from the CONFIG-TUNE-CALIBRATE Menu.

### Page 1: COMPUTER INTERFACE.



Line 1: Display only

Line 2: Select Interface Type.

RS232 (not address sensitive)

RS422 and Address #

488 and Address # (optional interface)

Line 3: Select FRONT PANEL (LCL) or  
EXT\_COMPUTER (RMT)  
EXT\_RAMP\_SOAK (RSR)

Note: Unit must be in STP mode to make changes.

#### Line 4: RS232 or RS422 MODE:

Field 1 BAUD Rate: Select 300, 600, 1200, 2400, 4800, 9600, 19200 or 38400.

Field 2 PARITY: Select 8BIT NONE, 7 BIT EVEN, 7 BIT ODD, 7 BIT MARK, 7 BIT SPEC.

Factory Defaults: 9600 Baud, 8 BIT NONE>

**488 MODE** (IEEE-488): Select END OF LINE: LF or CR/LF. Factory Default LF

### Page 2: CONFIGURE PROGRAMMER.



Line 1: Display Only

Line 2: Select TWO CHANNEL  
SINGLE CHANNEL  
FASTTRAC\_PASSTHRU  
FASTTRAC\_STANDARD

Lines 3 & 4 Blank in Two and Single Channel Modes.



Lines 3 & 4 in FASTTRAC\_PASSTHRU and  
FASTTRAC\_STANDARD Modes:

Select the LO and HI Temp Limits.

These values represent the lowest and highest setpoints  
CH2 will receive from CH1, regardless of the Setpoint  
value entered for CH1.

Applies to both Program and Manual Modes of  
FastTRAC operation.

FASTRACK\_TEMP\_LIMIT values entered in the Standard or PassThru mode are common to both modes.

### Page 3: CH1 LIMITS:



Line 1: Display only  
Line 2: Select CH1 limit assignment.  
CH1 PROCESS  
CH2 PROCESS  
CH2 SETPOINT

Line 3: Enter Hi limit value  
Line 4: Enter Lo limit value.

The CH1 limit output is off if values are cleared as shown above.

Hi = 100 and LO = ----. The CH1 output will go active (low) only if the selected PV or SP is > 100

Hi = 100 and LO = 0. The ch1 output is active (low) only above 100 and below 0

Hi = ---- and LO = 0. The ch1 output is active (low) only below 0

Do not use a Hi value lower than the Lo or a Lo value higher than the HI. In these cases the output will never turn off.

#### NOTE:

If the CH1 Limit is assigned to CH2, both channels MUST be configured for the same units.

### Page 4: CH2 LIMITS:



Line 1: Display only  
Line 2: Select CH2 limit assignment.  
CH2 PROCESS  
CH1 PROCESS  
CH1 SETPOINT

Line 3: Enter Hi limit value  
Line 4: Enter Lo limit value.

The CH2 limit output is off if values are cleared as shown above.

Hi = 100 and LO = ----. The CH2 output will go active (low) only if the selected PV or SP is > 100

Hi = 100 and LO = 0. The ch2 output is active (low) only above 100 and below 0

Hi = ---- and LO = 0. The ch2 output is active (low) only below 0

Do not use a Hi value lower than the Lo or a Lo value higher than the HI. In these cases the output will never turn off.

#### NOTE:

If the CH2 Limit is assigned to CH1, both channels MUST be configured for the same units.

### Page 5: CH1 Deviation:



Line 1: Display only.

Line 2: Select action during CH1 DEV alarm.  
PROGRAM RUNS or PROGRAM STOPS

Line 3: Display only.

Line 4: Select CH1 alarm reset action.  
AUTOMATICALLY or MANUALLY

### Page 6: CH2 Deviation:



Line 1: Display only.

Line 2: Select action during CH2 DEV alarm.  
PROGRAM RUNS or PROGRAM STOPS

Line 3: Display only.

Line 4: Select CH2 alarm reset action.  
AUTOMATICALLY or MANUALLY

### Page 7: Programmer SYNC and SOFT START.



Line 1: Display only.

Line 2: Select programmer SYNC function.  
DISABLED (default) or ENABLED

Line 3: Display only.

Line 4: Select programmer SOFT START function.  
DISABLED or ENABLED (default)



## Page 8: ON INPUT #8 function.

Selects immediate action when the photoisolated input # 8 is activated.



Line 1: Display only.

Line 2: Select programmer action.  
DO NOTHING, RUN PROG # STEP # or  
DISABLE CONTROLLER

Input 8 is ignored.

## Page 8A



Line 1: Display only.

Line 2: RUN PROGRAM selected.

Line 3: Select Prog # and Step # to run.

Line 4: Blank

Program 98 step 1 is immediately executed upon a low input signal to Input 8.

## Page 8B



Line 1: Display only.

Line 2: DISABELE CONTROLLER selected.

Line 3: Blank

Line 4: Blank

When the signal to input 8 goes low. CH1 and CH2 controller outputs are “killed” (disabled) and the program step timer holds.

When the input signal to input 8 is removed the controller outputs and step timer are re-activated.



### Page 9: POWER FAIL RECOVERY MODE.

Three modes of recovering form a power failure are available.

NORMAL, HOLD CURRENT VALUES and RUN PROG # STEP#



Line 1: Display only.

Line 2: NORMAL MODE selected.

Line 3 & 4 INFORMATION

When power is restored the unit will continue operation form the same prog, step number or manual mode conditions that were operating when power was lost.

### Page 9A:



Line 1: Display only.

Line 2: HOLD CURREJT VALUE selected.

Line 3: CH1 TRIP VALUE select

Line 4: CH2 TRIP VALUE select

When power is restored operation will continue as stated above. Unless one of the SP vs. PV trip points are exceeded. In this case the unit will hold the last set of operating parameters and wait for user intervention.

### Page 9B:



Line 1: Display only.

Line 2: Select PROG # and STEP# to run

Line 3: CH1 TRIP VALUE select

Line 4: CH2 TRIP VALUE select

When power is restored operation will continue as stated above. Unless one of the SP vs. PV trip points are exceeded. In this case the unit will immediately run the selected program and step.

## Page 10: SITE ELEVATION FOR RH/WB

For relative humidity Wet Bulb/Dry Bulb calculations the elevation from sea level of the chamber is entered below and included in the calculation for direct % RH.



Line 1 & 2: Display only.

Line 3: Display only.

Line 4: Enter elevation from sea level in feet.

## Page 11: VIEWING ANGLE/BACKLITE and PROGRAMMER TIME BASE



Line 1 & 2: These features have no effect on the VFD and are not used.

Line 3: Display only.

Line 4: Select clock frequency to be used.

60HZ, 50HZ or Internal Crystal.

## Page 12: ACCESS CODE.

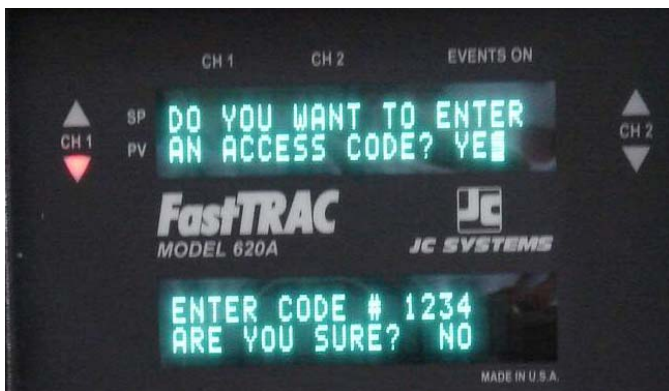
You can enter an access code to lock out Main Menu selection 4 (CONFIG-TUNE-CALIB). Once selected the code must be used to gain access to selection 4 from the Main Menu. The code can temporarily be disabled by selecting “NO” as shown in the screen above. You can return to this screen and select “YES” to re-enable the present code or change to a new one.



Line 2: Select No or Yes.

Line 3 and 4: Blank:

## Page 12A:



Line 1 & 2: Select No or Yes.

Line 3: Enter 4 digit code or keep current one.

Line 4: Select YES and push <ENTER>.  
The unit goes to the Selection 4 menu screen.

With the code enabled. Whenever Selection 4 is made from the Main Menu the screen below (12B) will appear. Enter the correct 4 digit code to access selection 4.

## Page 12B:



This screen will appear when selection 4 is made from the Main menu.

## LOST OR CHANGED CODE:

If for any reason the access code is changed or forgotten you must contact TMC Services to determine the correct code.

**Line 4: Access code reference number.**

Line 4 of this screen contains the reference number for the access code in the unit. Contact Ideal Aerosmith and provide the Access Code Reference number and Model 620A. The reference number will be entered into a program that will provide the current code.

## Section 4-2 Configure Controllers:

### Page 1:



### Page 2: 4-2-1 & 4-2-2

Both Channels have the same configuration parameter selections.

Line 1: Displays selected channel and UNIT's Field. Use <SEL> to scroll through choices .



DEG. C, DEG. F, RH/WB, LINEAR, RH VISALA, FT\_PSIA15, FT PSIA20

LINE 2: Use <SEL> to scroll through choices. TC's – Type T, J, K, R, S, E, B, RTD (alpha 385), LINEAR MV, LINEAR MA.

LINE 4: Use numeric keypad to enter MAX and MIN Span-Setpoints limits.

### Page 3: Loop 1 is assigned in the CH1 config. and Loop 2 is assigned in the CH2 config.

Line 1: Displays current Loop being assigned.



Line 2: Loop 1 can be assigned to CH1 or CH2. Loop 2 can be assigned to CH2 or CH1.

Line 3: Output current assignment: 4-20MA or 0-16MA.

Line 4: Output current action. Reverse (heat), Direct (cool), 12MA NULL (split band), Setpoint Retransmit, Process Retransmit, Dual Acting (Loop 1 assignment only).



#### Page 4: Compressor Timeout (MTO, and Lowpass Input filter.



Line 2: Max setting to 59 min: 59 sec.  
Can be set for CH1, CH2 or both

Line 4: Max setting 99.99 seconds.  
Factory setting 2.00 seconds

**MTO:** Independent settings for CH1 & CH2 share a common output (A2225, TB1 pin 8). Either one or both channels can trigger the MTO. The unused channel must be set to 0:00. A cool pulse from a selected channel will start the MTO timer and the MTO output will be active, any cool pulse during the run time will reset and restart the timer. If the MTO timer times out before the next cooling pulse, then the MTO output deactivates, but will reset the timer on the next cooling pulse. If both channels have MTO values, when one timer runs out the unit looks at the other. If they are both at zero the output is disabled. If the second channel is still running it will keep the MTO enabled until it's time expires. The unit checks again and if both are at zero the output is turned off.

**Page 5:** Automatic Gradient Offset. Used to offset gradient differences between the control sensor and an area within the enclosure.

DO NOT change the values unless you are certain of the operation.

To calibrate a control channel the default values shown below must be used.



A Low, Med and High point is selected. The controller is set to operate at each selection. A remote monitoring device can be used to record the remote value for each setting. The controller value and recorded value are entered on this screen.

The controller will generate a linear offset from one to the next.

### Section 4-2-3 Tune Controllers

Each control channel has two independent sets of Dual (Inc & dec) PID tuning parameters.

The tuning parameter screens are identical for all four sets with the exception of an additional screen and setting following the last page of CH1 set 2 & CH2 set 2.

This screen allows the selection of set 2 for use whenever a default event is turned on. Event G for CH1 set 2 and Event H for CH2 set 2. If the event is programmed off or the function disabled set 1 is in use.

#### Page 1: Select the Control channel and PID set to tune.



#### Page 2: Parameters 1 – 3 of 11.

Line 1 will always display the CH and Stage (set) being tuned.



Line 2: Select Cycle Time in seconds. 15 sec. Max.

Line 3: Proportional Band (P) in Control channel units.

Line 4: Proportional Gain in decimal units.

The Pband and Pgain value will automatically adjust when the other parameters value is changed.

Pband = SPAN/Pgain, Pgain = SPAN/Pband. The Span value is set in the controller configuration.

#### Page 3: Parameters 4 – 6 of 11.



Line 2: Select Reset (I) action. 0:00 to 99:99 sec

Line 3: Reset Windup Inhibit %. Select the % of the Pband to be used as the Max error for reset action.

Line 4: Unwind Factor. Multiplier of Reset (I) value for de-integration and reduce over integration.



#### Page 4: Parameters 7 – 9 of 11.



Line 2: Use only on very fast rate of change chambers. When the PV exceeds the SP by the ID\_Band value. “Clips” the controllers stored integral (I) value until the process stops moving.

Line 3: Rate (D) reduces the output power based on the rate of change of the process. Used mostly in systems with lag such as RH.

Line 4: Similar to a dead band. The I and D terms are used to allow the band to self adjust and “meet” and error so error correction can take place before the full ID Band value is reached..

#### Page 5: Parameters 10 & 11.



Setting range: 0 – 100%

Line 2: Min controller Inc or dec output regardless of error or if the other function is in use. “MUST” be set for 0 if the A2192 staging board is used.

Line 4: Maximum controller Inc or dec output regardless of the error.

#### Page 6: PID set 2 selection screen.

Selection screens are the same for CH1 set 2 or CH2 set 2.



Line 1: Displays CH and set 2. Use <SEL> to Enable or Disable function.

Line 2: CH1 set 2 is used if the function is enabled and Event G is turned ON.

CH2 set 2 is used if the function is enabled and Event H is turned ON.

## Section 1-5 - MANUAL MODE & MANUAL % OUTPUT:

There are two controller modes of operation, Programmer and Manual.

**Programmer:** The controller receives its setpoint from a profile programmed in the Model 620A's memory.

**Manual:** The controller receives its setpoint directly via front panel or computer command entry.  
The controller immediately controls to the new setpoint value.

### **NOTE:**

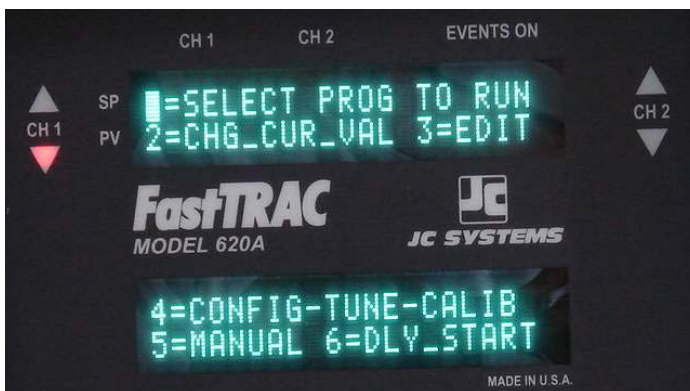
When a channel is placed in the Manual mode, the manual setting and setpoint will override any programmed information. To operate the channel in a programmed mode the channel must be reset from Manual Mode to Programmer mode of operation.

The event outputs will "always" operate as programmed. Leaving a channel in the Manual Mode and running a program will only maintain the controller channel's manual setpoint. The event status will follow the programmed settings.

When operating in the FastTRAC mode the CH2 controller must be in the Programmer mode.

**Manual % Output Mode:** This special function allows the user to set a fixed controller % output.

The % output is available on one screen only. Leaving the % output screen returns the controller channels back to the manual mode of operation with the setpoint cleared and outputs disabled.



From the Main Menu select Item 5.

Push <5>.

The process below shows Manual Setpoint control in the Single Channel Mode.

Manual setpoints can also be entered for each channel together or independently in the Two Channel Mode. In the FastTRAC Model of operation only the CH1 manual setpoint can be entered. The CH2 setpoint is generated internally and sent to CH2.

### **Page 1: Programmer/Manual mode selection screen.**

This screen shows the initial manual mode screen with the programmer in the single channel mode and selected for Programmer operation.

Line 1: CH1 setpoint, CH2 setpoint (blank in this mode), Event status (1 – 8)



Line 2: CH1 process value, CH2 process value and Event status (A – H).

Line 3: CH1 mode. Push <Sel> to toggle between Programmer and Manual.

Line 4: Blank in this mode. In two channel mode Programmer or Manual modes available.

## Manual Mode (single channel)

With the cursor flashing on the CH1 mode push the <SEL> button. The Mode will change to Manual and the Dev field will appear.

### NOTE:

When a channel is changed from Programmer to Manual mode, the decimal point in the setpoint field is changed to the lower case letter “m,” indicating the channel is in manual mode and the setpoint is cleared killing the Inc/Dec outputs.

The “m” will be displayed on all screens and displays.

## Setpoints in Manual Mode:

Use the arrow keys to position the cursor over the setpoint field or event fields. Enter the desired value and push <ENTER>. The cursor will remain in the current field. Use the arrow keys to move the cursor to a new field.

Line 1: CH1 manual setpoint field, CH2 setpoint field (blank in this mode), Event status (1 – 8).



Line 2: CH1 process value, CH2 process value and Event status (A – H).

Line 3: CH1 Manual mode. CH1 Dev alarm value. See definition of DEV alarm and operation.

Line 4: Blank in this mode. In two channel mode Programmer or Manual (+/- DEV) mode displayed.

## Events in Manual Mode.

The event outputs can be turned ON/OFF independently in the Manual Mode. Use the arrow keys to move the cursor onto the Number (line 1) or Letter (Line 2) field. Pushing the corresponding number or letter key will toggle the event output. Number or letter showing = event ON. Decimal in event field = event OFF. Pushing the <CLR> button on either event field will turn all the events in that field OFF.

In Two channel mode both channels must be in Manual to manipulate the event outputs.

Line 1: CH1 setpoint field, CH2 setpoint (blank in this mode) Events 1 – 8 cleared.



Line 2: CH1 process value, CH2 process value and Event status (A – H) cleared.

Line 3: CH1 Manual mode. CH1 Dev alarm value. See definition of DEV alarm and operation.

Line 4: Blank in this mode.

## Two Channel Mode:

Move the cursor to the CH2 mode field and push <SEL>



With both channels in Manual Mode move the cursor to the desired channels setpoint field and enter a setpoint. Pushing the <ENTER> button will enter the setpoint on the selected channel. The cursor will stay in the selected setpoint field.

To move the cursor to the other channel's setpoint field or an event field use the arrow keys.

In Two channel mode both channels must be in Manual to manipulate the event outputs.



## HOME SCREEN in Manual Mode:

If either channel is left in the Manual Mode the letter "m" will be displayed in the setpoint field.

The MAN will be replaced with STP when the <RESET> button is pushed.

If the <RUN> button is pushed in this configuration both channels will remain controlling at the Manual setpoint, the event outputs will be set to the programmed values and the clock will time down. The programmed profile will execute with the time and events status changing and fixed manual setpoints.





## Manual % Output:

The Model 620A “must” be in the two channel configuration.

The Manual Percent Output feature allows you to set the selected controller’s time and power proportioning output to a fixed percentage.

### Accessing % Output page:

1 - From the Manual Mode screen select one or both controller channels for Manual



CH1 selected for Manual

2 -Push <Page Down>. The CH1 and CH2 fields will change to C%1 and C%2.



3 - Position the cursor over the desired channel  
Line 3 for CH1 or Line 4 for CH2.

4 – Push <SEL>, the control channel field will display %\_OUTPUT

The setpoint field of the selected channel will display 0 (zero % output) and the controller Inc/Dec outputs will be Off.



CH1 selected for %\_output

5 - Move the cursor to the Setpoint field and enter the desired fixed % output.

0 to 100 = 0-100% Increase  
0 to -99 = 0-100% Decrease



### Time Proportioned outputs:

The front panel LED and corresponding time proportioned controller output will turn On/Off for the selected % output based on the controller Cycle time for the selected function.

For example: If the INC Cycle time is set for 4 seconds and the DEC Cycle time is set for 6 seconds.

Setting the % output for 25% will produce an INC output and INC (up arrow) LED “ON” time of 1 second and “OFF” time of 3 seconds.

Setting the % output for -50% will produce a DEC output and DEC (down arrow) LED “ON” time of 3 seconds and “OFF” time of 3 seconds.

### Power (analog) Proportioned outputs: A2216 TB3, Loop1 pins 1 (+) and 2 (-), Loop 2 pins 4 (+) and 5 (-).

Both Loop 1 and Loop 2 have five output selections.

Reverse (INC), Direct (DEC), 12MA Null, Setpoint retransmit and Process retransmit.

Loop1 has an additional output, DUAL, used only when the optional A2336 Dual Fast Analog board is used.

The % output mode only operates in the Reverse, Direct, and 12MA Null or for Loop1 only DUAL modes. If the Loop is assigned to either the Setpoint or Process retransmit this function has no effect on the output.

Each loop can be assigned to either channel. Determine which channel the loop is assigned to and that an appropriate output mode assignment is selected. For example: If loop1 is assigned to CH2, 4-20mA, and Reverse action. A % output setting of 50% on CH2 will produce an output of 12mA on loop 1.

Power Proportioning Outputs: Loop 1 & Loop 2 set for 4-20mA.

% Output setpoint	Reverse	Direct	12Mil Null	Dual (Loop1 only)
100	20mA	4mA	20mA	20mA
50	12mA	4mA	16mA	12mA
0	4mA	4mA	12mA	4mA
-50	4mA	12mA	8mA	12mA
-99	4mA	20mA	4mA	20mA



## Section 1- 6 - DELAY START

Page 1: ON/OFF



Push <SEL> to advance to the next screen and turn on the Delsyed Start function.

Page 2: Data Entry screen:



Line 1: On/Off

Line 2: instructions

Line 3: Enter Prog#, step# and delay start time in HH : MM : SS.

Line 4: instructions.

Page 3: Shows selected Prog#, Step# and delay time.



Page 4: After <ENTER> and <RUN> buttons are pushed this screen will display the count down time.

The instrument is normally left on this screen.

Or

Push <RESET> to go to the “HOME” screen.



Page 5: HOME screen after <RESET> pushed.



The Delay Start Prog# and Start# are displayed.

The controller Setpoints and Event outputs are latched at the last active values.

Note: These values are not the programmed values.

Anytime during the delay start countdown the Delay Start page can be accessed to review the time remaining in the sequence.

The Mode field displays “DLY” indicating the Delay Start function is active.

Page 6: When the Delay Start timer expires the Model 620A will run the Program from the selected Prog# and Step #.



The Mode field displays “RUN” indicating the selected Delay Start program is running.

## REGAIN LOCAL CONTROL WHEN THE COMPUTER COMMUNICATIONS ARE DISRUPTED, AND THE MODEL 620A IS IN THE “RMT-RUN” MODE.

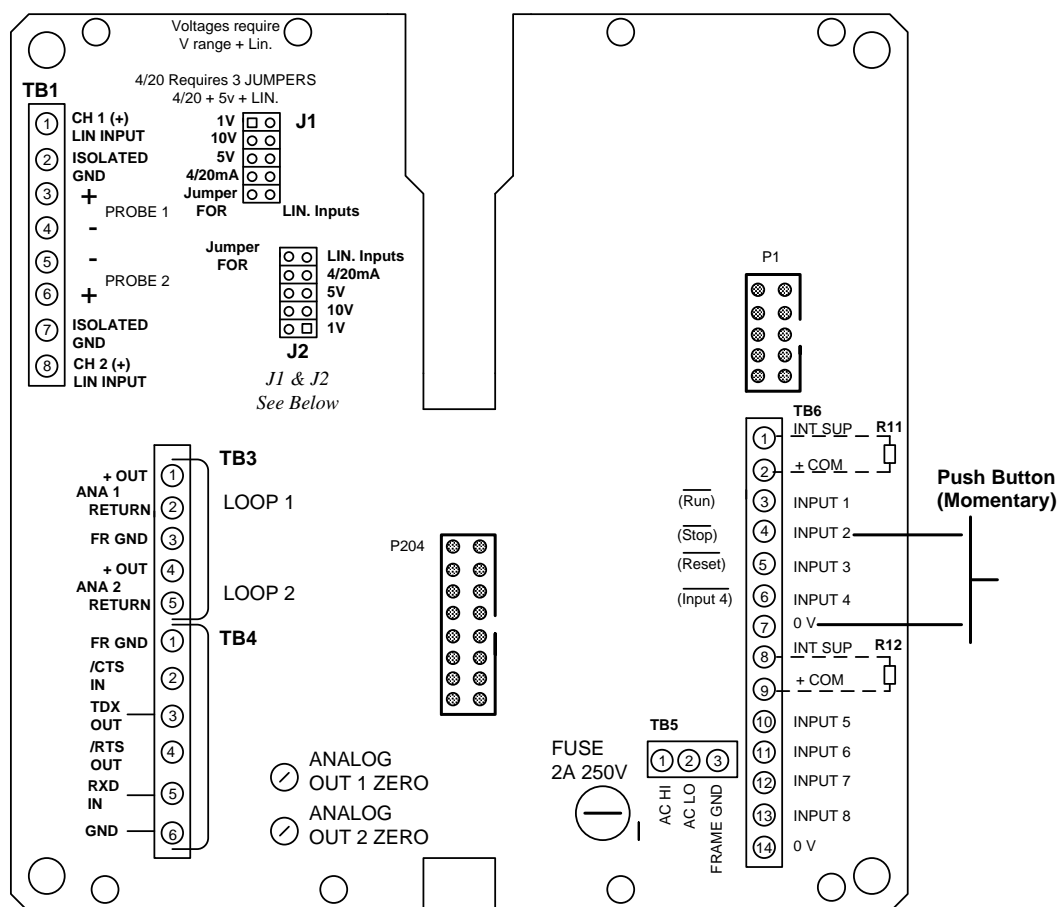
If computer communications are lost while the Model 620A is running a program in the Remote (Ext. Computer) mode, the unit must be stopped prior to regaining Local (LCL) mode of operation.

This is accomplished by installing a momentary switch to the input terminal block TB6 of the A2216 PCB between pins 4 (Input 2, Stop) and 7 (0 V).

Pushing the button will stop the program, however, the unit will remain in the RMT mode. Follow the sequence below to regain Local (LCL) control.

Push the <b>RMT STOP</b> button	(Installed on TB6)
Push the < <b>PAGE DOWN</b> > button	(To Main Menu)
Push the < <b>4</b> > button	(CONFIG-TUNE-CALIB)
Push the < <b>1</b> > button	(CONFIG-PROGRAMMER)
Push the < <b>V</b> > button ( <b>DOWN ARROW</b> )	(Moves cursor to MODE: EXT_COMPUTER)
Push < <b>SEL</b> > button ( <b>Twice</b> )	(To FRONT PANEL)
Push < <b>RESET</b> > button	(To the standard run screen in LCL mode)

You are now in the LCL (Front Panel) mode of operation  
All functions are now accessible from the front panel.



**A2216 Rear Interconnect PCB**

4/14/17