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OPERATION MANUAL

TZC2003-2 TWO-ZONE STAINLESS STEEL CONSOLE





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Two-Zone Console (TZC2003-2)

DESCRIPTION:

The TZC2003-2 two zone heat treatment console is designed to control various heat treatment processes by closely monitoring and adjusting the set point temperature and the ramp rate. It incorporates the latest microprocessor based technology and is simple to set up and operate. Control setting is by means of push switches and an LCD screen provides visual indication of the set point and the actual temperature.

The TZC2003-2 is equipped with a digital amp meter and a 2 position switch, which is the utmost importance for checking the current to the ceramic pad heaters to make sure they are all operating.

SPECIFICATIONS – Two-Zone Console (TZC2003-2):

Length: 25"
Width: 20"
Height: 17"
Weight: Approx. 200 lbs
Material: Stainless steel
Handling: Two lifting bars.

Inputs:

- **Voltage:** 460/575, 1 Phase
- **Current:** 30 amp
- **Power:** 14.5 KVA Isolated Copper Wound
- **Frequency:** 60 Hz

Output Per Zone:

- **Zones:** 2
- **Voltage:** 65 VAC/85 VAC, single phase
- **Current:** 104 amps @ 65 V
- **Power:** 7.25 KVA
- **Activation:** 200 amp contactor
- **Control per zone:** Digital temperature controller

Control Circuit:

- **Voltage:** 110 VAC, single phase
- **Current:** 5 amp fuse
- **Power:** 600 VA winding on power transformer
- **Auxiliary:** 110 VAC supply, single phase

Digital Temperature Controller (8600):

- **Temperature Range:** 0-2200°F or 0-1200°C
- **Thermocouple:** Type “K”
- **Resolution:** Measurement 0.1 degrees / Display 1.0 degree

Digital Amp Meter:

- **Primary Amperage:** Up to 200 amps
- **Secondary Amperage:** 5 amps

Protection:

- **120-VAC Control Circuit:** 5 amp fuse
- **Heater Power:** Isolation contactor for each zone
- **Console Power:** 30 amp main circuit breaker
- **Power Transformer:** 392°F (200°C) over temperature thermostat per phase
- **Cooling fan:** 2 x 50 CFM - Thermally protected

Maintenance Requirements:

Inspection and Cleaning:

<u>ITEM</u>	<u>INSPECTION</u>	<u>FREQUENCY</u>	<u>ACTION</u>
Contactors	Burned or Pitted	Every 6 months	Clean or replace contacts
Temperature Controllers	Calibration	Every 12 months	Check accuracy and adjust if required
System Cleanliness		Every 6 months	Vacuum with power disconnected
System Electrical	Loose connections	Every 6 months	Tighten all terminal connections
Air Vents and fan	Dust or dirt build up	Every 3 months	Clean with vacuum with power disconnected
Check bolts and screws	Loose	Every 6 months	Tighten

TZC2003-2 Two Zone Console Operating Instructions:

1. Switch 30 amp main circuit breaker to the “ON” position.
2. Make sure zones used are indicating the actual temperature on the controllers prior to start and then turn rocker switches to the “ON” position.
3. Decide on the heat treatment specification and set as follows:

Step 1: Press the scroll key (O) until rP appears, then set degrees per hour (**Ramp-Rate**) by using the up or down key. (^, v)

Step 2: Press the up to down key (^, v) to set the **Final Set-Point** ie.) the bottom display
 Note When the controller temperature reaches the **Final Set-Point** it will hold that temperature continuously.

Step 3: Make sure the **SPrP (set point-ramp/Initial Set-Point)** is the same as the actual temperature of the controller. If not, turn controller off then back on (by toggling the rocker switch, to off position, then back on CONT position). This will change the SPrP (Initial Set-Point) to the actual temperature.

Step 4: For heating or cooling turn the **Final Set-Point** up or down and adjust **Ramp-Rate** (rP) as per requirements.

Step 5: Turn percentage timer between 7-10 on scale if equipped.

NOTE: When the controller is turned on, it automatically sets the **SPrP (set point-ramp/Initial Set-Point)** from the thermocouple (t/c) temperature. At this point in time it starts to count up or down to the **Final Set-Point**. The **SPrP (set point-ramp/Initial Set-Point)** cannot be changed manually, except by turning the controller off, then on. – **ALWAYS:** Change the **Ramp-Rate** before changing the **Final Set-Point** when changing stages. The controller cannot be **paused/held** at a temperature during the ramp stage, except by changing the **Final Set-Point** to the desired temperature.

8600 CONTROLLER CALIBRATION INSTRUCTIONS:

$\frac{1}{4}$ -DIN, $\frac{1}{8}$ -DIN & $\frac{1}{16}$ -DIN Temperature Controllers - Input Calibration Procedure

$\frac{1}{4}$ -DIN, $\frac{1}{8}$ -DIN & $\frac{1}{16}$ -DIN TEMPERATURE CONTROLLERS INPUT CALIBRATION PROCEDURE

September 1996

NOTE: Calibration should be attempted only on Controllers on which calibration errors have been encountered (see **CALIBRATION CHECK**) and should only be performed by personnel who are technically competent and authorised to do so.

CALIBRATING THE UNIVERSAL INPUT

Equipment Required

1. Input source with an accuracy better than $\pm 0.05\%$ of reading:
 - (a) Thermocouple inputs - complete with 0°C reference facility, appropriate thermocouple functions and compensating leads (or equivalent).
 - (b) DC linear inputs - 0 - 5V and 0 - 20mA.
 - (c) RTD inputs - decade resistance box with connections for three-wire input (or equivalent)
2. Appropriate case assembly ($\frac{1}{4}$ -DIN, $\frac{1}{8}$ -DIN or $\frac{1}{16}$ -DIN) wired for appropriate input supply (90 - 264V AC 50/60Hz, 20 - 50V AC 50/60Hz or 22 - 65V DC).

Calibration Procedure

1. Ensure that the Controller is powered-off and that the mains (line) lead is disconnected. On the CPU PCB, fit the appropriate link jumpers (see Table 1 and Figure 1, Figure 2 or Figure 3 as appropriate to the type of Controller). Connect the appropriate input lead (see Figure 4 or Figure 5).
2. Connect the mains (line) lead to the Controller. Power-up the Controller and leave switched on for five minutes (for RTD and DC Linear inputs) or 30 minutes (for thermocouple inputs), then power-down.
3. Put the Controller in Calibration Mode by powering-up the Controller and, within 30 seconds of power-up, holding down the Lower and Function keys simultaneously for approximately five seconds. The upper display will then show Input Type Number, in the form:

IP_1

and the lower display will show:

CAL

Using the Raise/Lower keys, change the input type number as required (see Table 1).

NOTE: If required, only one input type may be calibrated. **Exception:** If it is required to calibrate the thermocouple input (Input Type 5), it is necessary first to calibrate the DC 0 - 50mV input (Input Type 1).

4. Press the Auto/Manual key to change the upper display to show:

After a few seconds, the upper display will either (a) return to the initial Input Type Number display if calibration was successful, or (b) display:

FAIL

In the latter case, the link jumpers and wiring should be checked.

Table 1 Universal Input Type Selection

Input Type No.	Input Type	Calibration Input	Link Jumper Settings		
			LJ1	LJ2	LJ3
1	DC - 0 - 50mV	50mV DC	Parked	Parked	Parked
2	DC 0 - 10V	10V DC	Fitted	Parked	Parked
3	DC 0 - 20mA	20mA DC	Parked	Fitted	Parked
4	RTD Three-wire	200Ω	Parked	Parked	Parked
5	Thermocouple	0°C "K"	Parked	Parked	Fitted

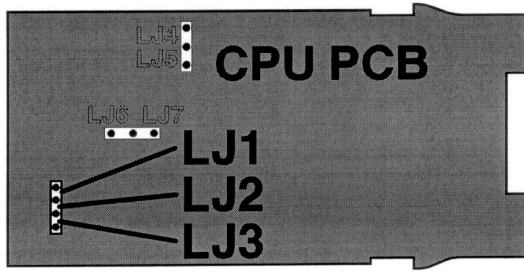


Figure 1 1/16-DIN Link Jumpers (Relay/SSR Output 1)

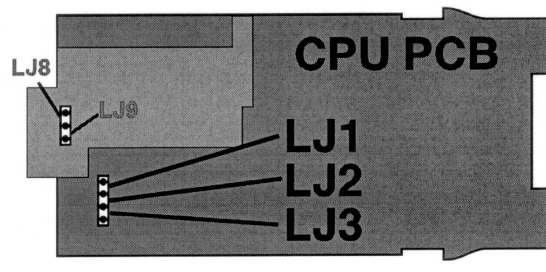


Figure 2 1/16-DIN Link Jumpers (DC Output 1)

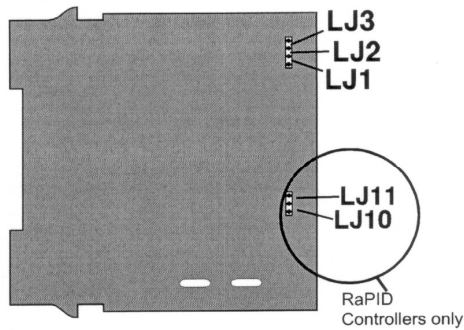


Figure 3 1/4-DIN/1/8-DIN Series Link Jumpers

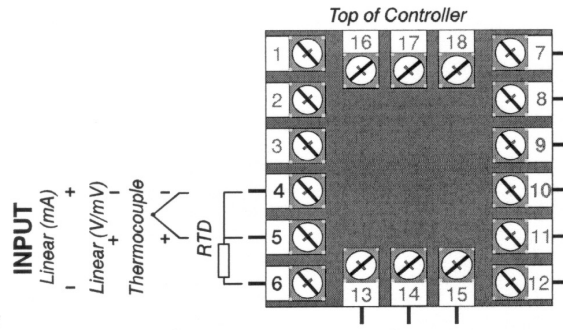


Figure 4 1/16-DIN Universal Input Connections

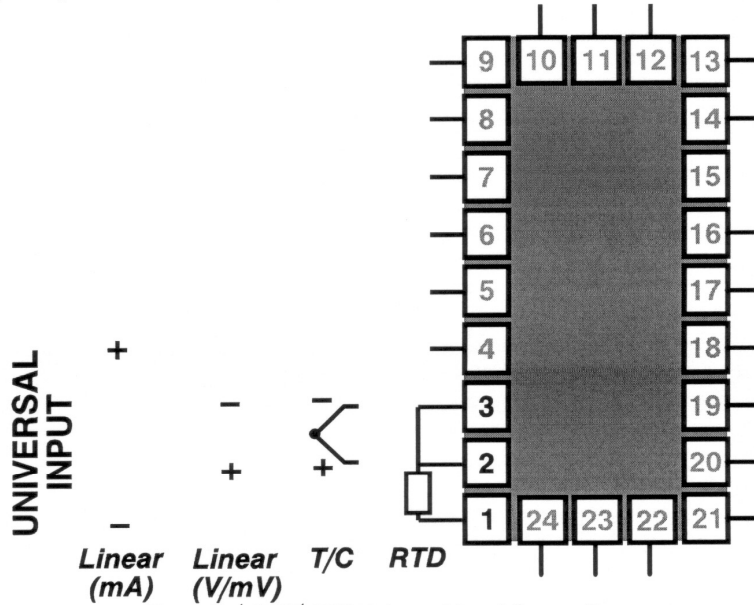


Figure 5 1/4-DIN/1/8-DIN Universal Input Connections

$\frac{1}{4}$ -DIN, $\frac{1}{8}$ -DIN & $\frac{1}{16}$ -DIN Temperature Controllers - Input Calibration Procedure

5. To calibrate all inputs, repeat Steps 1 to 4 for each of the other input types (see Table 1) until all five input types have been successfully calibrated.

NOTE: Input Type 5 should be calibrated using the appropriate Type K compensating lead (between Terminals 2 & 3 on $\frac{1}{4}$ -DIN/ $\frac{1}{8}$ -DIN Controllers, Terminals 4 & 5 on $\frac{1}{16}$ -DIN Controllers.). The Controller should be powered-up and remain powered up for at least 30 minutes with this lead connected before the input is calibrated.

The universal input calibration procedure is now complete.

CALIBRATING THE SECONDARY ANALOGUE INPUT (RAPID CONTROLLERS ONLY)

Equipment Required

1. DC linear input source (0 - 5V and 0 - 20mA) with an accuracy better than $\pm 0.05\%$ of reading.
2. Appropriate case assembly ($\frac{1}{4}$ -DIN or $\frac{1}{8}$ -DIN) wired for appropriate input supply (90 - 264V AC 50/60Hz, 20 - 50V AC 50/60Hz or 22 - 65V DC).

Calibration Procedure

1. Ensure that the Controller is powered-off and that the mains (line) lead is disconnected. On the CPU PCB, configure link jumpers LJ10 and LJ11 (see Table 2 and Figure 3). Connect the remote set-point input lead (see Figure 6).
2. Connect the mains (line) lead to the Controller. Power-up the Controller and leave switched on for five minutes, then power-down.
3. Put the Controller in Calibration Mode by powering-up the Controller and, within 30 seconds of power-up, holding down the Lower and Function keys simultaneously for approximately five seconds. The upper display will then show Input Type Number, in the form:

The upper display shows the text "IP_1" in a digital font.

and the lower display will show:

The lower display shows the text "CAL" in a digital font.

Using the Raise/Lower keys, change the input type number as required (see Table 2).

NOTE: If required, only one input type may be calibrated.

4. Press the Auto/Manual key to change the upper display to show:

The upper display shows four horizontal dashes "----" in a digital font.

After a few seconds, the upper display will either (a) return to the initial Input Type Number display if calibration was successful, or (b) display:

The upper display shows the text "FAIL" in a digital font.

In the latter case, the link jumpers and wiring should be checked.

5. To calibrate all inputs, repeat Steps 1 to 4 for each of the other input types (see Table 2) until all three secondary analogue input types have been successfully calibrated.

Table 2 Secondary Analogue Input Type Selection

Input Type No.	Input Type	Calibration Input	Link Jumper Settings	
			LJ10	LJ11
7	Remote Setpoint, Linear DC mV	50mV DC	Parked	Parked
8	Remote Setpoint, Linear DC V	10V DC	Parked	Fitted
9	Remote Setpoint, Linear DC mA	20mA DC	Fitted	Parked

NOTE: No calibration is required if the secondary analogue input is to be used as a Remote Setpoint Potentiometer input or for Dual Setpoint switching.

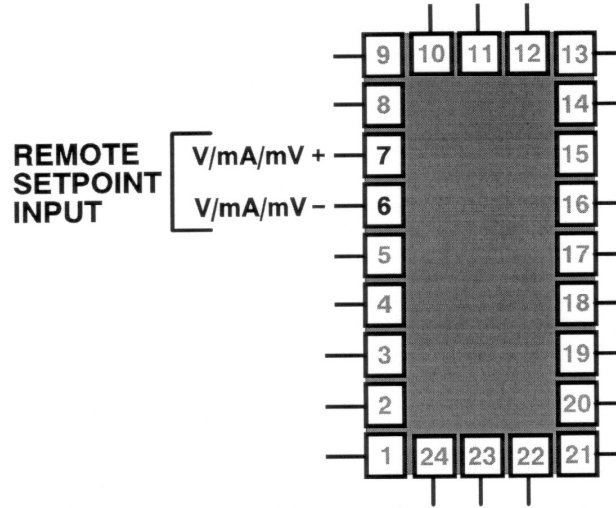


Figure 6 1/4-DIN/1/8-DIN Controllers - Secondary Analogue Input

EXIT FROM CALIBRATION MODE

To exit from Calibration Mode, press the Lower and Function keys simultaneously.

NOTE: An automatic exit is made from Calibration Mode if there is no key activity for two minutes.

CALIBRATION CHECK

1. Set the Controller to the required configuration (using link jumpers and front panel entry) as described in the appropriate Product Manual.
2. After the appropriate delay for stabilisation has elapsed, check the calibration by connecting the appropriate input source and checking a number of cardinal points.
3. Power-up the Controller and leave it powered-up for at least five minutes (for RTD and DC linear inputs) or at least 30 minutes (for thermocouple inputs).