

APRVD: JMC 02 AUG 21

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**Technical Note** 

# 1.0 SCOPE

1.1 Instructions for calibrating the conveyor belt on a TP Solar (TPS) infrared furnace.

# 2.0 TOOLS REQUIRED

- 2.1 Tape Measure
- 2.2 Stop Watch
- 2.3 Small Object to ride on belt

## 3.0 PROCEDURE

3.1 The belt speed is calibrated by first placing the furnace in the calibrate mode and after measuring the amount of time it takes for an object to travel from the entrance of the furnace to the exit, the speed is calculated and entered on the calibration screen.

## **Belt speed = distance / time**

s = d / t

## 4.0 DISTANCE MEASUREMENT

4.1 Note the belt speed units on the process screen (in/min, cm/min or mm/min). Measure the distance from the face of the inlet to the outlet of the furnace in the distance units shown on the process screen for belt speed (inches or centimeters).



Example: distance  $s = 315 \frac{1}{4}$  inches

## s = 315.25 inches

## 5.0 FURNACE CALIBRATION SCREEN

- 5.1 Start furnace normally.
- 5.2 In the furnace software, start belt and go to Service screen:
  - 1. To access the Calibration screens, click on <u>Service</u> button in the menu bar



Calibrate

Belt 1

0.0

Belt 1

Calibrate

0.0

2. The following screen will appear.

🛱 TPSolar	Date facilit	
TPSOLAR .COM		Exit
SMEMA Parts Counters	Select I Process State	Process Recipe User Default TPSOLAR
PID	Tuning	Belt 1 Belt 2   Calibrate Calibrate   Belt 1 0.0 none   Setpoint 25.0 63.5 0.0 0.0   Belt Hours Span Corr 0.982 1.000 none   Belt Hours Span Corr 0.982 1.000 none   Integrator 0.017 0.000 0.000   Integrator Timer 2.6 0.0 0.0   Control Volts 2.732 5.000   Feedback Volts 2.765 0.0 none   ScRr's 2 Test 0.1   Max Speed 90.0 none 50.0 none   ScR's 2 Test 0.1 2   Sone Power Auto- Sequence
	Close	
	Software Version: 16.01.20a Kernel Versio	on: R8.5d
Lamps Log-	On Process Recipe Alarr	n Service Profile IO Status Calculator Notepad Trends

Figure 5.2.1 Service Screen

#### PROCEDURE 6.0

In the Belt Calibration window, click on the 6.1



#### 6.2 Manually measure belt speed.

- 6.2.1 Place an object on the belt at the entrance of the furnace.
- 6.2.2 As the trailing edge of the object passes into the furnace start the stop watch timer.
- 6.2.3 As the object exits the furnace, stop the timer as the object trailing edge passes from the furnace.
- 6.2.4 Convert the time from minutes and seconds to minutes as in the following example:

#### t = 15 minutes 24 seconds = 15 +24/60 minutes = 15.40 minutes

6.2.5 Divide the distance travelled in primary units of the furnace (inches or centimeters) by the time to determine the speed.

Example: s = d / t

#### s = 315.25 in / 15.4 min = 20.4708 in/min

6.3 Click on Belt 1 field and enter the newly calculated speed in the Belt 1 field.

Belt 1		Test		Calibrate	1
	Belt 1	0.0		0.0	in/mi
	Setpoint	237.0		0.0	in/mi
Feedback	0.0	0.0	0.0	0.0	
Belt Hours	Gain	0.500		1.000	
	Offset	0.500		0.000	
3	Integrator	0.000		0.000	
Integrator Timer		19.8		0.0	
Control Volts		5.000		5.000	
Feedback Volts		0.0		0.0	
Design Max Speed		300		300	in/mi
Calc'd M	lax Speed	317.9	in/min	100.0	in/mi

Computer will adjust parameters and then switch TEST button back to CALIBRATE, belt speed will resume at setpoint and control volts will show values.

6.4 Belt speed calibration is complete.

#### 7.0 BELT SPEED CALIBRATION

Distance, inches (or cm), decimal	d	
Time, min-sec	t	
Time, minutes, decimal	t	
Speed, inches (or cm) per minute	s=d/t	

