PT326 – Process Trainer

Phase 1 (Part 1)

Objectives

1. Calibration of wattmeter
2. Obtain relationship between air temperature and heater power for different throttle settings

Procedure

1. Read chapter 1 of the manual and get familiar with the setup.
2. For calibration of wattmeter,
    a. Connect wattmeter to multimeters to measure voltage and current as shown in Figure 4.3.2 on page 20. Set the switch on left side to 'heater/wattmeter'. Power can be calculated using the following equation.

$$P = V_{rms} I_{rms}$$

    b. Connect port B on the front panel to another multimeter which provides voltage corresponding to set value.
    c. Keep changing set value from 0 to 10 V with an interval of 0.5 V and note the values of current (mA) and voltage (V) in Table 1.
    d. Plot set value (V) vs heater power (W) and find the relation between set value (V) and heater power (W).
    e. Comment on the relationship obtained.
3. To obtain relationship between air temperature and heater power for different throttle setting,
    a. Thermistor gives voltage (V) corresponding to the air temperature. Air temperature can be measured at three different sensor locations. For each sensor location, the thermistor output voltage (V) can be measured at port Y, connect it with an oscilloscope.
    b. Set throttle to the 20%. Keep changing set value from 0 to 10 V with an interval of 2 V and note the thermistor output voltage (V) in Table 2. **Wait for 2-3 second to stabilize the air temperature.**
    c. Plot heater power (W) vs air temperature rise (V) and find the relation between air temperature rise (V) and heater power (W).
    d. Repeat the experiment for throttle 50%, 80% and 100%.
    e. Comment on the relationship obtained.

Set value (V)	Wattmeter		Set value (V)	Wattmeter	
	Current (mA)	Voltage (V)		Current (mA)	Voltage (V)
0			5		
0.5			5.5		
1			6		
1.5			6.5		
2			7		
2.5			7.5		
3			8		
3.5			8.5		
4			9		
4.5			9.5		
			10		

Table 1 Calibration of wattmeter

Throttle (%)	Set value (V)	Air temperature (V)		
		Near to fan	Middle	Near to exit
20	0			
	2			
	4			
	6			
	8			
	10			
50	0			
	2			
	4			
	6			
	8			
	10			
80	0			
	2			
	4			
	6			
	8			
	10			
100	0			
	2			
	4			
	6			
	8			
	10			

Table 2 Relationship between air temperature and heater power