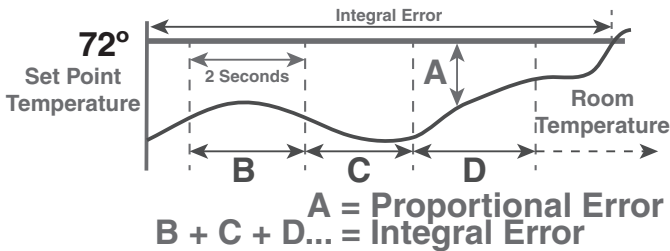


6. Basic Operation

6.1 PI Control

The 824 Control uses proprietary control schemes to provide comfort and energy efficiency. The Control senses indoor temperature and determines capacity needed based on the following parameters:

- Mode of operation
- Proportional Error - distance from setpoint
- Integral Error - Time away from setpoint



6.2 Load Value - Heating

The 824 Control uses proportional plus integral error to determine the amount of capacity required. The calculated capacity is displayed as load value. Load Value is a numerical representation of the needed capacity to maintain setpoint. The load value range is dependent on the applied system.

0-100	Single Stage Heat Pump Only
0-200	Two State Heat Pump Only
0-200	Single Stage Heat Pump + 1 Stage Electric/Wet Heat
0-300	Single Stage Heat Pump + 2 Stage Electric/Wet Heat
0-400	Single Stage Heat Pump + 3 Stage Electric/Wet Heat
0-300	Two Stage Heat Pump + 1 Stage Electric/Wet Heat
0-400	Two Stage Heat Pump + 2 Stage Electric/Wet Heat
0-500	Two Stage Heat Pump + 3 Stage Electric/Wet Heat
0-100	Single Stage Indoor Heat Only
0-200	Two Stage Indoor Heat Only
0-300	Three Stage Indoor Heat Only
0-175	Single Stage Heat Pump + 1 Stage Gas/Oil Heat
0-275	Single Stage Heat Pump + 2 Stage Gas/Oil Heat
0-375	Single Stage Heat Pump + 2 Stage Gas/Oil Heat
0-275	Two Stage Heat Pump + 1 Stage Gas/Oil Heat
0-375	Two Stage Heat Pump + 2 Stage Gas/Oil Heat
0-475	Two Stage Heat Pump + 3 Stage Gas/Oil Heat

6.3 Load Value - Cooling

0-100 Single Stage Compressor

0-200 Two-Stage Compressor

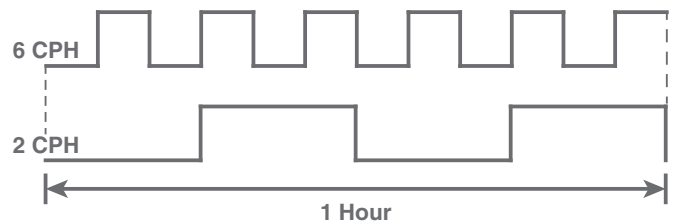
A Load Value of 50 represents a request of 50% demand for single stage cooling units (“Y”) or 50% demand for stage one of multistage cooling units (“Y1”).

A Load Value of 150 represents a request of 100% demand for stage one (“Y1”) and 50% demand of stage two (“Y2”) for multistage cooling units.

6.4 Duty Cycles

Indoor temperature control is achieved by duty cycling the equipment when the load value is less than 100% of the current stage of operation. The duty cycle rate is dependent on the calculated load value.

The duty cycle chart below indicates the number of cycles at 50% load (i.e. LV = 50).



As with all PI-based controls the indoor temperature will fluctuate above and below the user selected setpoint to maintain comfort in the space. Adjusting the factory set CPH (Cycles per Hour) can affect how tight the Control operates around the setpoint. The CPH can be adjusted in the Installer Setup>Equipment Settings (2 – 6 CPH)

- Factory default for compressor operation is 3 CPH
- Factory default for indoor heat is 5 CPH

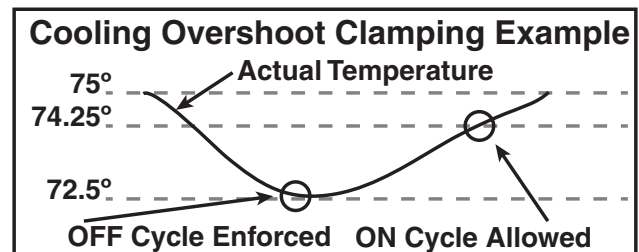
Effects of changing the cycle rates

Lower CPH results in longer run cycles with less cycling but the indoor temperature may deviate above and below setpoint.

Higher CPH results in tighter indoor temperature control but shorter, more frequent cycles.

6.5 Overshoot Clamp

The 824 Control will enforce an “off cycle” anytime the control overshoots more than 2.5°F. Once the indoor temperature is within 0.75°F of setpoint an “on cycle” is allowed dependent on load value and minimum off times.

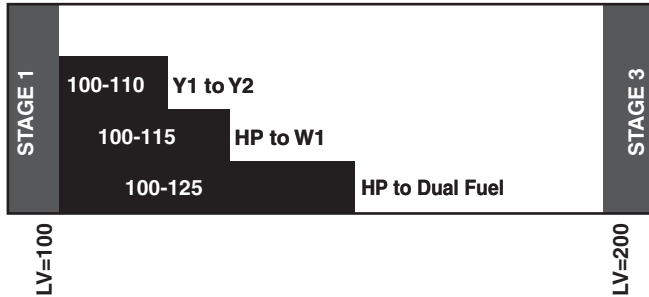


6.6 Stage Thresholds

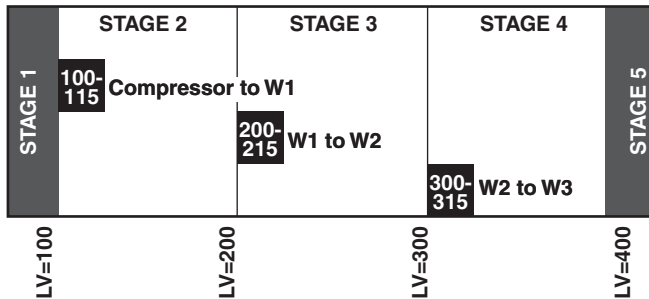
The threshold to allow operation is a Load Value greater than 5 and operation is always terminated with a Load Value less than 1.

Load Value also determines when additional stages of operation are requested. To prevent rapid cycling between stages, a stage threshold is enforced. The stage threshold is dependent on the applied system.

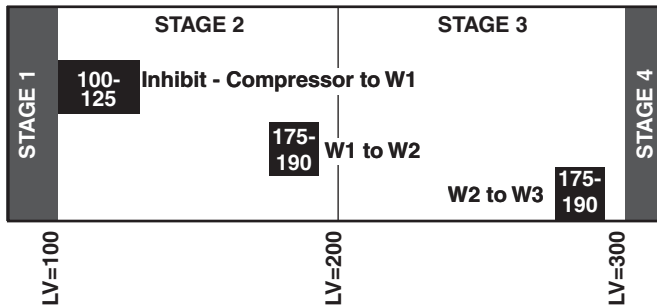
COMPRESSOR STAGING THRESHOLDS



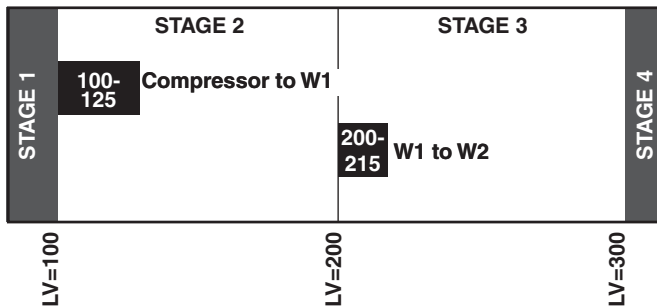
AUX ELECTRIC HEAT - STAGING THRESHOLDS



AUX FOSSIL HEAT - STAGING THRESHOLDS



AUX WET HEAT - STAGING THRESHOLDS

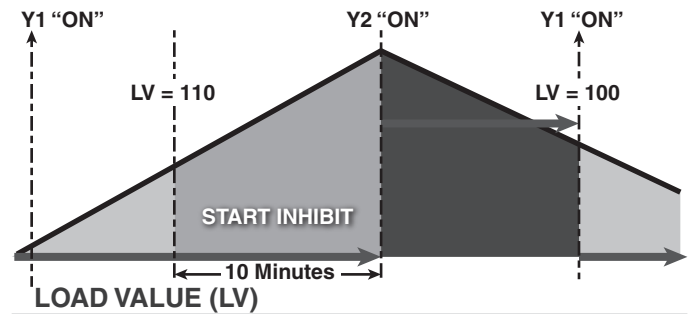


6.7 Stage Inhibits

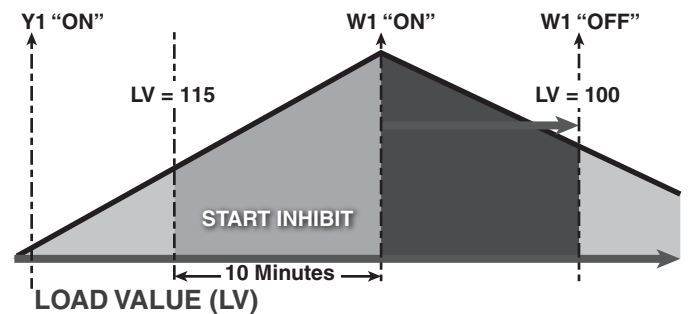
When the stage threshold is exceeded, a stage inhibit is applied. The stage inhibit calculates the rate of recovery over a 10-minute period and determines if the next stage is required to meet the current demand. If the rate of recovery is great enough, a new 10-minute inhibit is enabled. The Control will not go to the next stage of operation until it determines that the current stage cannot satisfy the current demand. Stage inhibits only apply between compressor stages and compressor heat to indoor heat. Stage inhibits do not apply to indoor heat stages.

Stage inhibits can be disabled in the 824 Control Installer Setup>Comfort Settings.

Stage Inhibits - Compressor Staging



Stage Inhibits - Compressor to Aux Heat



Stage Inhibits - Dual Fuel

