

## Controls for Industrial Direct Fired Heaters



### 401M Discharge Air Temperature Control

This control system is used for building exhaust-air replacement to maintain a constant supply air discharge temperature. The 401M control is most commonly used with the Constant Volume, Two Speed or Variable Air Volume Systems. By setting the desired discharge temperature on the remote set point dial, the burner flame modulates to compensate for change in outdoor temperatures. A manual SUMMER-OFF-WINTER selector switch controls the blower and burner operation, terminals are provided to integrate operation with exhaust system. The remote control panel comes complete with temperature selector dial, indicating lights and SUMMER-OFF/WINTER selector.



### 402M Room-Override Discharge Air Control

This control system is used for building exhaust-air replacement to maintain a constant supply air discharge temperature with the ability to supply supplemental space heating when needed. The 402M control is most commonly used with the Constant Volume, Two Speed or Variable Air Volume Systems. By setting the desired discharge temperature on the remote set point dial, the burner flame modulates to compensate for change in outdoor temperatures. At the same time a room override thermostat senses space temperature and will raise discharge set point for more heat to maintain space temperature. A manual SUMMER-OFF-WINTER selector switch controls the blower and burner operation, terminals are provided to integrate operation with exhaust system. The remote control panel comes complete with temperature selector dial, indicating lights and SUMMER-OFF/WINTER selector, along with a room override thermostat panel.



### 403M Constant Operation Room-Temperature Control

This control system is used for building exhaust-air replacement with modulated space-temperature control. The 403M control can be used with all of our systems when space temperature control is most important. A modulating space thermostat adjusts burner flame to maintain discharge-air temperature to compensate for changing building heat losses or gains. High and low discharge air sensor probes limit maximum and minimum discharge-air temperatures. A manual SUMMER-OFF-WINTER selector switch controls the blower and burner operation, terminals are provided to integrate operation with exhaust system. The remote control panel comes complete with modulating space thermostat, indicating lights and SUMMER-OFF/WINTER selector. A remote temperature sensor is also available so that control panel can be mounted in shop office or mechanical room.

### 403M Garage System

This automatic control system is used for building exhaust-air replacement with space temperature control in parking garages or similar spaces. The system comes with an "On-Off" space thermostat and a CO detector interlock as standard. On a call for heat from the "On-Off" space thermostat the discharge air is at the maximum discharge air temperature setting. On a call from the CO System the discharge air is at the minimum discharge air temperature setting. The "On-Off" space thermostat is shipped loose for mounting in the space. Summer-winter operation is controlled by a mild weather thermostat. No switching panel is provided.

### 403M On-Off System

This control system is used for building exhaust-air replacement with space temperature control. The system comes with an "On-Off" space thermostat and a CO detector interlock as standard. On a call for heat from the "On-Off" space thermostat the discharge air is at the maximum discharge air temperature setting. On a call from the CO System the discharge air is at the minimum discharge air temperature setting. The remote control panel comes complete with "On-Off" space thermostat, indicating lights and a SUMMER-OFF-WINTER switch to control the blower and burner operation.



#### 404M Day & Night Space Heating Control

This control system is used for building exhaust-air replacement or for a total building heat system using a modulating space-temperature control for day and night building heating. The 404M control is most commonly used with the 80/20 System to provide the most energy efficient operation. During day operation a modulating space thermostat adjusts burner flame to maintain discharge-air temperature to compensate for changing building heat losses or gains. High and low discharge air sensor probes limit maximum and minimum discharge-air temperatures. A manual SUMMER-OFF-WINTER selector switch controls the blower and burner operation, terminals are provided to integrate operation with exhaust system. During night operation a lower space temperature can be maintained using an On-Off room thermostat that cycles the heating system on to maintain minimum space temperature. Remote vented control panel comes complete with modulating space thermostat, On-Off night thermostat and time clock mounted inside panel with indicating lights and SUMMER-OFF/WINTER selector on face of control panel.



#### M-Series Discharge Air Temperature Control

This control system is used for building exhaust-air replacement to maintain a constant supply air discharge temperature. The M-Series control can be used with all of our systems however are most commonly used for paint booth and high temperature drying applications. By setting the desired discharge temperature on the remote set point touch pad, the burner flame modulates to compensate for change in outdoor temperatures. The M-Series control has the ability to be set for multiple temperature set points, ramp speed for burner modulation along with displaying discharge temperature on its digital display and more. A manual SUMMER-OFF-WINTER selector switch controls the blower and burner operation, terminals are provided to integrate operation with exhaust system. Remote control panel comes complete with digital readout with multiple set point and touch pad temperature control, indicating lights and SUMMER-OFF/WINTER selector.

#### NEW RE-CIRCULATING HEATER STANDARD

The direct gas fired industry has had some significant changes in listing requirements over the past few years. One of those changes was to the ANSI Z83.18 standard for Re-circulating direct gas fired heaters. Under this new standard, one of the restrictions is the amount of heat (temperature rise) you can add to the space, based on percentage of fresh air that is introduced into the building. After hours of research, design and testing, our engineering team came up with a new control system that will be used to meet this new requirement. This new control system has been designed with our customer's safety, ease of service and economics in mind. The name of the new control system is the RCS System which is an acronym for "Re-circulating Control System".

The RCS System monitors return air temperature, fresh air temperature, will limit return air damper percentage, and will limit maximum discharge temperature. There are different RCS Systems available to best fit your application. Below is a chart on the different RCS Systems to pick from.

#### How to pick the RCS System for your Application

1. What is your minimum Winter Design Condition? Use the chart below to see which system qualifies: if Minimum Outdoor Air Temperature is above temperature listed on chart, that system qualifies.
2. What is your Minimum Indoor Air Temperature? Look at qualified systems available (after step one) to see which system qualifies to meet this requirement.
3. After step one and two, your qualified system may be down to one selection; if not, you now have the choice of picking the system that best fits the application.

Note: Always pick the RCS System closest to your minimum temperature conditions for best performance.

#### Re-Circulating Heater Control Systems

RCS System	Minimum Outdoor Air Temperature	Minimum Indoor Air Temperature	Maximum Recirculation Percentage	Maximum Discharge Temperature
RCS5	-30°F	7°F	60%	90°F
RCS10	-30°F	25°F	50%	120°F
RCS15	-25°F	58°F	80%	90°F
RCS20	-25°F	54°F	60%	120°F
RCS25	-20°F	55°F	50%	140°F
RCS30	-15°F	47°F	60%	120°F
RCS35	0°F	52°F	80%	90°F
RCS40	0°F	35°F	50%	140°F

#### How does the RCS System work?

The Re-circulating heater will modulate the return air and fresh air bypass dampers based on the damper control selected: two-position, photohlic, or manual potentiometer. The RCS System is designed to limit percentage of return air and discharge temperature based on the system selected as shown in the chart above. If the temperature drops below minimum set points, the bypass dampers will drive to 100% fresh air for a short time until minimum set points are satisfied. Once the trip minimum set point is satisfied, the bypass dampers will return to normal operation.

It is important when sizing and designing your Re-circulating heater to select the RCS System that best meets the application. When ordering a Re-circulating system, please specify the RCS system you would like to use; otherwise, a RCS system will be selected for you.