

CONTROL INFORMATION

SEQUENCE OF OPERATION

The standard QFV sequence of operation has the induced air flow fan operating intermittently, providing supplemental ceiling plenum/return air to the space for heat.

HEATING MODE

When the zone is at maximum heating demand, the primary air damper maintains a minimum volume of primary airflow. The fan supplies a constant flow of air to the zone by inducing a maximum amount of warm air from the ceiling plenum. Electric or hot water heat, if supplied, operates at maximum capacity.

As zone temperature rises, the optional heat, if supplied, cycles off. The fan continues to induce the maximum amount of ceiling plenum air. As zone temperature reaches setpoint, the fan will cycle off and a minimum amount of air will be discharged from the unit.

COOLING MODE

As zone temperature rises above setpoint, the fan remains off and the primary air damper begins to modulate toward full open. Primary air passing over the backdraft device prevents airflow into the fan wheel which would otherwise lead to backward rotation of the wheel and loss of primary airflow into the plenum.

As the zone temperature continues to rise, the primary air damper will continue to modulate toward open. When the conditioned zone is at maximum cooling demand, the primary air damper will maintain a constant maximum flow setting. With pressure independent controls, the damper will maintain airflow settings regardless of central system pressure fluctuations.

CONTROL OPTIONS

- **Pneumatic Controls:** Pressure independent control packages are available with or without hot water or electric heat. All control arrangements include an inlet flow sensor, fan speed controller, fan PE switch, and control enclosure
- **Analog Controls:** Pressure independent control packages are available with or without hot water or electric heat, automatic night shutdown or night setback. All control arrangements include an inlet flow sensor, control enclosure, fan speed controller, transformer to 24 volts, fan relay and wall thermostat to match the control type
- **Direct Digital Controls:** Smart Equipment control packages are provided and programmed by the factory for in-house mounting, piping, and wiring.
 - BACnet Compatible: 7301-7309
 - Standalone: 6301-6309

Other digital control packages can be supplied to the factory for mounting, piping, and wiring.

Contact your Krueger representative for a complete list of direct digital control arrangements.

- **No Control Unit:** Units are factory supplied without controls, assuming that the unit is being used for field mounting of direct digital control equipment. This arrangement includes an inlet flow sensor, control enclosure, fan speed controller, transformer to 24 volts and fan relay.

The following list shows the standard control arrangements available with the QFV product offering. Each control approach offers a variety of pressure independent operating functions; combinations of control functions are identified by the Krueger control package number:

CONTROL INFORMATION (CONTINUED)

PNEUMATIC CONTROL ARRANGEMENTS

- 1400 - Single Function Controller; DA-NO with or without Hot Water or Electric Heat
- 1401 - Single Function Controller; RA-NC with or without Hot Water or Electric Heat
- 1402 - Multi-function Controller; DA-NO with or without Hot Water or Electric Heat
- 1403 - Multi-function Controller; RA-NO with or without Hot Water or Electric Heat
- 1404 - Multi-function Controller; DA-NC with or without Hot Water or Electric Heat
- 1405 - Multi-function Controller; RA-NC with or without Hot Water or Electric Heat

Pneumatic Control Legend:

DA - Direct Acting Thermostat

RA - Reverse Acting Thermostat

NO - Normally Open Damper Position

NC - Normally Closed Damper Position

Single Function Controller - Provides Single Function, DA-NO or RA-NC

Multi-function Controller - Capable of Providing DA-NO, DA-NC, RA-NC or RA-NO Functions

ANALOG CONTROL ARRANGEMENTS

- 2300 - Cooling with Sequenced Fan
- 2301 - Cooling with Sequenced Fan and Automatic Night Shutdown
- 2302 - Cooling with Sequenced Fan and Automatic Night Setback
- 2303 - Cooling with Sequenced Fan and On/Off Hot Water Heat
- 2304 - Cooling with Sequenced Fan, On/Off Hot Water Heat, and Automatic Night Shutdown
- 2305 - Cooling with Sequenced Fan, On/Off Hot Water Heat, and Automatic Night Setback
- 2306 - Cooling with Sequenced Fan and Proportional Hot Water Heat
- 2307 - Cooling with Sequenced Fan, Proportional Hot Water Heat, and Automatic Night Shutdown
- 2308 - Cooling with Sequenced Fan, Proportional Hot Water Heat, and Automatic Night Setback
- 2309 - Cooling with Sequenced Fan and Up to Two Steps of Electric Heat
- 2310 - Cooling with Sequenced Fan, Up to Two Steps of Electric Heat, and Automatic Night Shutdown
- 2311 - Cooling with Sequenced Fan, Up to 2 Steps of Electric Heat, and Automatic Setback
- 2313 - Cooling with Sequenced Fan and Proportional Electric Heat
- 2314 - Cooling with Sequenced Fan, Proportional Electric Heat, and Automatic Night Shutdown

DIRECT DIGITAL CONTROL ARRANGEMENTS

Visit Krueger's website at www.krueger-hvac.com or contact your Krueger representative for a complete list of factory mounted direct digital control arrangements.