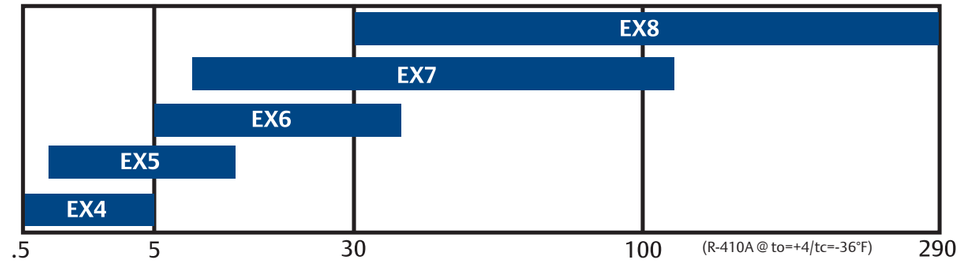
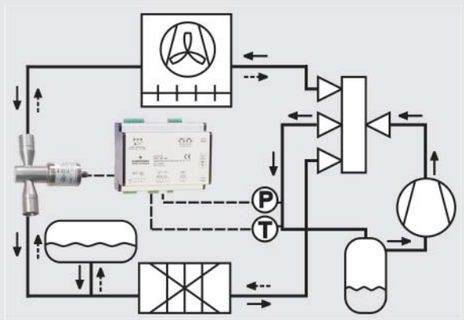
Electrical Control Valve Capacity Range



Other Applications

For heatpumps with reversing refrigerant flow **EX4, EX5, EX6, EX7** can be used to control flow in both directions:



PCN	Type	Description
097707	EC3-X33	Universal Superheat Controller
097708	EC3-X32	Universal Superheat Controller (TCP/IP)
097709	K03-X32	Terminal Kit for EC3 controllers
097710	EXD-U00	Universal Driver
097711	K09-U00	Terminal Kit for EXD-U00
097712	ECD-002	Display/Keyboard Unit
097713	ECC-N30	Ethernet Cable (3m)
097714	ECN-N60	Temperature Sensor
097715	PT4-07M	Pressure Transducer
097716	PT4-18M	Pressure Transducer For R-410A
097717	PT4-M60	Plug & Cable Assembly for PT4 (6 m)
097718	EX5-N60	EX 4 thru EX 7 Valve Cable Connector (6 m)
097719	EX4-I21	EX 4 Valve 3/8" x 5/8" ODF
097720	EX5-U21	EX 5 Valve 5/8" x 7/8" ODF
097721	EX6-I21	EX 6 Valve 7/8 x 1-1/8" ODF
097722	EX7-I21	EX 7 Valve 1-1/8" x 1-3/8" ODF
097723	EX8-I21	EX 8 Valve 1-5/8" x 1-5/8" ODF
097728	PT4-30M	Pressure Transducer for R-744

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How to Save Energy in Industrial Cooling and Air-Conditioning Processes?

Improving efficiency and reducing energy consumption is key in today's air-conditioning and refrigeration systems. Often systems are designed and optimized to operate at full load conditions or with fixed condensing pressures, and at these conditions both conventional and electronic control valves operate efficiently. However, under a partial load condition or varying condensing pressure (e.g. due to low ambient temperature) the condensing pressure decreases. Under these conditions, conventional thermal expansion valves tend to oscillate, resulting in poor system performance and/or decreased life. Systems with electronic control valves can operate at partial load in the same precise and stable way as under full load, and therefore can better exploit the potential to save energy due to low condensing pressure.

Control valves EX4 ... EX8 for capacities from .5 to 290 tons. (R-410A @ to=+4/tc = -36F)

Advantages of Electrical Control Valves

Emerson® electrical control valves **EX4, EX5, EX6, EX7** and **EX8** are optimized for the control of liquid or gaseous mass flow in refrigeration systems. The stepper motor, which produces a precise valve opening, is energized directly from the electrical power and therefore operates independent from differential pressure ensuring stable operation at low condensing pressures.

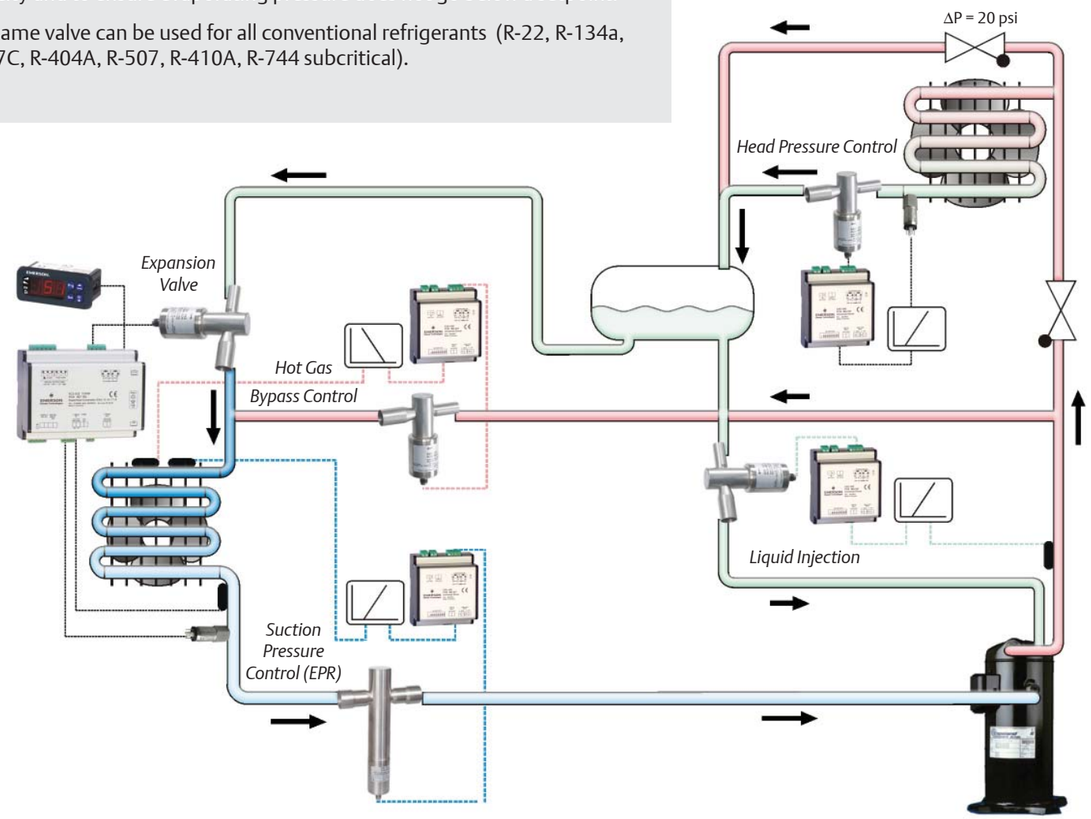
open *partial open* *closed*

The valve seat and slider are made of solid ceramic for long life, low operating force, low internal leak rate and to eliminate corrosion. The positive shut off function and fast response time eliminate the need for an additional solenoid valve. The special shape of the valve slide provides for proper flow through the valve and a highly linear capacity characteristic between 10% and 100% of maximum capacity.

Applications of Electrical Control Valves

The refrigeration circuit in the figure below demonstrates how the same type of control valve can be used for different tasks: expansion valve for superheat control, suction pressure control for capacity modulation, liquid injection for de-superheating of compressor, condensing pressure control for head pressure control and hot gas bypass control to compensate excess compressor capacity and to ensure evaporating pressure does not go below a setpoint.

The same valve can be used for all conventional refrigerants (R-22, R-134a, R-407C, R-404A, R-507, R-410A, R-744 subcritical).



Superheat Controller EC3-X33 with built-in backup battery and display unit ECD-002

The Electronic Valve Controllers from Emerson

Emerson® valve controllers are optimized for the requirements of refrigeration and air-conditioning. They perform all control tasks, which have been performed by conventional valves in the past, such as superheat control or capacity control .

The new electronic Superheat Controllers **EC3-X33** precisely regulate the superheat at the evaporator. A complete system consisting of Control Valve, Superheat Controller, and Temperature and Pressure Sensor, controls the superheat exactly to the setpoint, independent from condensing pressure. The MOP (Maximum Operating Pressure) function protects the compressor from dangerous overload conditions. The positive shut-off function eliminates the use of an additional solenoid valve, and the built-in backup battery closes the valve after power loss. The controllers can easily be adjusted for all refrigerant and valve types.

The Universal Stepper Motor Control **EXD-U** is used in all other commercial refrigeration and air-conditioning applications. Opening of the Electrical Control Valve follows the analog input signal of 0 - 10 V or 4 - 20 mA. The digital input signal is used to close the valve independent from the analog input. When the digital signal switches the controller on again, the valve opens to the setpoint specified by the analog input. The optional selectable "Start Mode" first opens the valve to 1/3 opening and then to the analog setpoint.

Stepper Motor Controller EXD-U