

# Electrical Control Valves Series EX4-8

## Features

- Multifunction as expansion valve, hot gas bypass, suction gas throttling, head pressure, liquid level actuator etc.
- Fully hermetic design (no thread joints between valve body and motor compartment)
- Applicable to all common refrigerants and for subcritical CO<sub>2</sub> applications
- Stepper motor driven
- Short opening and closing time
- Very fast full-stroke time
- High resolution and excellent repeatability
- Positive shut-off function to eliminate the need for additional solenoid valve
- Bi-flow versions for heat pump applications
- High linear flow capacity
- Extremely wide capacity range (10 ... 100%)
- Continuous modulation of mass flow, no stress (liquid hammering) in the refrigeration circuit
- Direct coupling of motor and valve for high reliability (no gear mechanism)
- Ceramic slide and port for highly accurate flow and minimal wear
- Europe patent No. 0743476, USA patent No. 5735501, Japan patent No. 28225789
- Balanced force design
- Corrosion resistant stainless steel body and stainless steel connections



## Selection Table (Capacities See Following Page)

| Type    | Part No. | Flow Pattern        | Capacity Range | Inlet Connection  | Outlet Connection | Electrical Connection |
|---------|----------|---------------------|----------------|-------------------|-------------------|-----------------------|
| EX4-I21 | 800 615  | Uni-flow            | 10 ... 100%    | 3/8" ODF          | 5/8" ODF          | M12 Plug              |
| EX4-M21 | 800 616  |                     |                | 10mm ODF          | 16mm ODF          |                       |
| EX5-U21 | 800 618  |                     |                | 5/8" (16mm) ODF   | 7/8" (22mm) ODF   |                       |
| EX6-I21 | 800 620  |                     |                | 7/8" ODF          | 1-1/8" ODF        |                       |
| EX6-M21 | 800 621  |                     |                | 22mm ODF          | 28 mm ODF         |                       |
| EX7-I21 | 800 624  |                     |                | 1 1/8" ODF        | 1-3/8" ODF        |                       |
| EX7-M21 | 800 625  |                     |                | 28mm ODF          | 35mm ODF          |                       |
| EX8-M21 | 800 629  |                     |                | 42mm ODF          | 42mm ODF          |                       |
| EX8-U21 | 800 630  |                     |                | 1 3/8" (35mm) ODF | 1 3/8" (35mm) ODF |                       |
| EX8-I21 | 800 631  |                     |                | 1-5/8" ODF        | 1-5/8" ODF        |                       |
| EX4-U31 | 800 617  | Bi-flow (Heat Pump) |                | 5/8" (16mm) ODF   | 5/8" (16mm) ODF   |                       |
| EX5-U31 | 800 619  |                     |                | 7/8" (22mm) ODF   | 7/8" (22mm) ODF   |                       |
| EX6-I31 | 800 622  |                     |                | 1-1/8" ODF        | 1 1/8" ODF        |                       |
| EX6-M31 | 800 623  |                     |                | 28mm ODF          | 28mm ODF          |                       |
| EX7-U31 | 800 626  |                     |                | 1 3/8" (35mm) ODF | 1 3/8" (35mm) ODF |                       |

## Cable Connector Assemblies

| Type    | Part No. | Temperature Range | Length | Connector Type to Valve | Connector Type to Driver or Controller | Illustration |
|---------|----------|-------------------|--------|-------------------------|--|--------------|
| EXV-M15 | 804 663  | -50 ... +80°C     | 1.5 m  | M12, 4 Pins             | Loose Wires                            |              |
| EXV-M30 | 804 664  |                   | 3.0 m  |                         |  |              |
| EXV-M60 | 804 665  |                   | 6.0 m  |                         |  |              |

## Capacity Data

Nominal capacities...

...as expansion valves and liquid injection valves, (kW) (10%...100%)

| Type | R410A | R134a | R22  | R404A / R507 | R407C | R1234ze | R448A | R449A | R450A | R513A | R744 | R124 | R23  |
|------|-------|-------|------|--------------|-------|---------|-------|-------|-------|-------|------|------|------|
| EX4  | 19.3  | 12.8  | 16.5 | 11.5         | 17.4  | 10.0    | 16.5  | 16.1  | 11.3  | 11.5  | 27.0 | 9.4  | 17.8 |
| EX5  | 58.1  | 39.0  | 50.0 | 35.0         | 53.0  | 30.2    | 49.9  | 48.7  | 34.1  | 34.9  | 82.0 | 28.7 | 54.0 |
| EX6  | 140   | 93    | 120  | 84           | 126   | 72      | 120   | 117   | 82    | 84    | 197  | 69   | 130  |
| EX7  | 385   | 255   | 330  | 230          | 347   | 199     | 329   | 321   | 225   | 230   | 540  | -    | -    |
| EX8  | 1028  | 680   | 880  | 613          | 925   | 531     | 877   | 857   | 600   | 614   | 1440 | -    | -    |

**Note 1:** Bi-flow versions are not released for use with R124 and R23 refrigerants.

**Note 2:** Bi-flow versions have identical capacity in both flow directions.

...as hot gas bypass regulator, (kW)

| Type | Kv [m³/h] | R410A | R134a | R22 / R407C | R404A / R507 | R1234ze | R448A | R449A | R450A | R513A |
|------|-----------|-------|-------|-------------|--------------|---------|-------|-------|-------|-------|
| EX4  | 0.21      | 7.3   | 3.4   | 4.9         | 4.7          | 2.6     | 5.7   | 5.6   | 3.0   | 3.3   |
| EX5  | 0.68      | 23.7  | 11.1  | 15.9        | 15.2         | 8.3     | 18.6  | 18.3  | 9.7   | 10.8  |
| EX6  | 1.57      | 55.0  | 25.8  | 36.9        | 35.4         | 19.3    | 43.2  | 42.5  | 22.6  | 25.2  |
| EX7  | 5.58      | 196   | 92    | 131         | 126          | 69      | 154   | 151   | 80    | 89    |
| EX8  | 16.95     | 594   | 278   | 399         | 382          | 209     | 466   | 459   | 244   | 272   |

**Note:** Bi-flow versions are not released for hot gas flow applications.

...as suction pressure regulator (evaporator or crankcase), (kW)

| Type | Kv [m³/h] | R410A | R134a | R22  | R404A | R507 | R407C | R1234ze | R448A | R449A | R450A | R513A |
|------|-----------|-------|-------|------|-------|------|-------|---------|-------|-------|-------|-------|
| EX6  | 1.57      | 5.0   | 3.1   | 4.1  | 3.5   | 3.5  | 3.9   | 2.5     | 3.9   | 3.8   | 2.8   | 3.0   |
| EX7  | 5.58      | 17.9  | 11.1  | 14.7 | 12.5  | 12.5 | 13.7  | 9.0     | 13.8  | 13.6  | 9.9   | 10.6  |
| EX8  | 16.95     | 54.5  | 33.6  | 44.5 | 38.1  | 37.9 | 41.8  | 27.4    | 42.0  | 41.4  | 30.1  | 32.2  |

**Note:** Bi-flow versions are not released for use below -40°C

...as condensing pressure regulator and liquid duty, (kW)

| Type | Kv [m³/h] | R407C | R134a | R22  | R404A | R507 | R1234ze | R448A | R449A | R450A | R513A |
|------|-----------|-------|-------|------|-------|------|---------|-------|-------|-------|-------|
| EX4  | 0.21      | 5.7   | 5.6   | 6.0  | 4.0   | 3.8  | 5.1     | 5.3   | 5.2   | 5.3   | 5.0   |
| EX5  | 0.68      | 18.5  | 18.3  | 19.6 | 12.9  | 12.5 | 16.5    | 17.1  | 16.8  | 17.0  | 16.3  |
| EX6  | 1.57      | 43.0  | 42.4  | 45.5 | 29.9  | 29.0 | 38.3    | 39.9  | 39.1  | 39.6  | 37.8  |
| EX7  | 5.58      | 153   | 151   | 162  | 106   | 103  | 136     | 142   | 139   | 141   | 134   |
| EX8  | 16.95     | 464   | 458   | 491  | 323   | 313  | 413     | 430   | 422   | 428   | 408   |

...for hot gas flow such as heat reclaim application, (kW)

| Type | Kv [m³/h] | R410A | R134a | R22 / R407C | R404A / 507 | R1234ze | R448A | R449A | R450A | R513A |
|------|-----------|-------|-------|-------------|-------------|---------|-------|-------|-------|-------|
| EX6  | 1.57      | 13.0  | 9.0   | 10.8        | 9.8         | 7.4     | 11.3  | 11.2  | 8.2   | 8.5   |
| EX7  | 5.58      | 46    | 32    | 38          | 34          | 26      | 40    | 40    | 29    | 30    |
| EX8  | 16.95     | 141   | 96    | 116         | 103         | 79      | 122   | 120   | 88    | 92    |

**Note:** Bi-flow versions are not released for hot gas flow applications.

The nominal capacity is based on the following conditions:

| Refrigerant                                    | Evaporating temperature | Condensing temperature          | Pressure drop (suction duty) | Pressure drop (liquid duty) | Pressure drop (hot gas flow duty) | Isentropic efficiency (For hot gas flow duty) |
|--|-------------------------|---------------------------------|------------------------------|-----------------------------|-----------------------------------|---|
| R124   | +20°C                   | +80°C                           | 0.15 bar                     | 0.35 bar                    | 0.5 bar                           | 80%   |
| R134a, R404A, R507, R22, R410A, R513A, R1234ze | +4°C dew point          | +38°C bubble/ +38°C dew point   |                              |                             |                                   |   |
| R407C  | +4°C dew point          | +38°C bubble/ +42.9°C dew point |                              |                             |                                   |   |
| R23  | -60°C                   | -25°C                           |                              |                             |                                   |   |
| R744   | -10°C                   | +10°C                           |                              |                             |                                   |   |
| R450A  |                         | +38°C bubble/ +38.6°C dew point |                              |                             |                                   |   |
| R448A, R449A                                   |                         | +38°C bubble/ +42.6°C dew point |                              |                             |                                   |   |

**Note:** For selection of other operating conditions, please use "Controls Navigator" selection program.