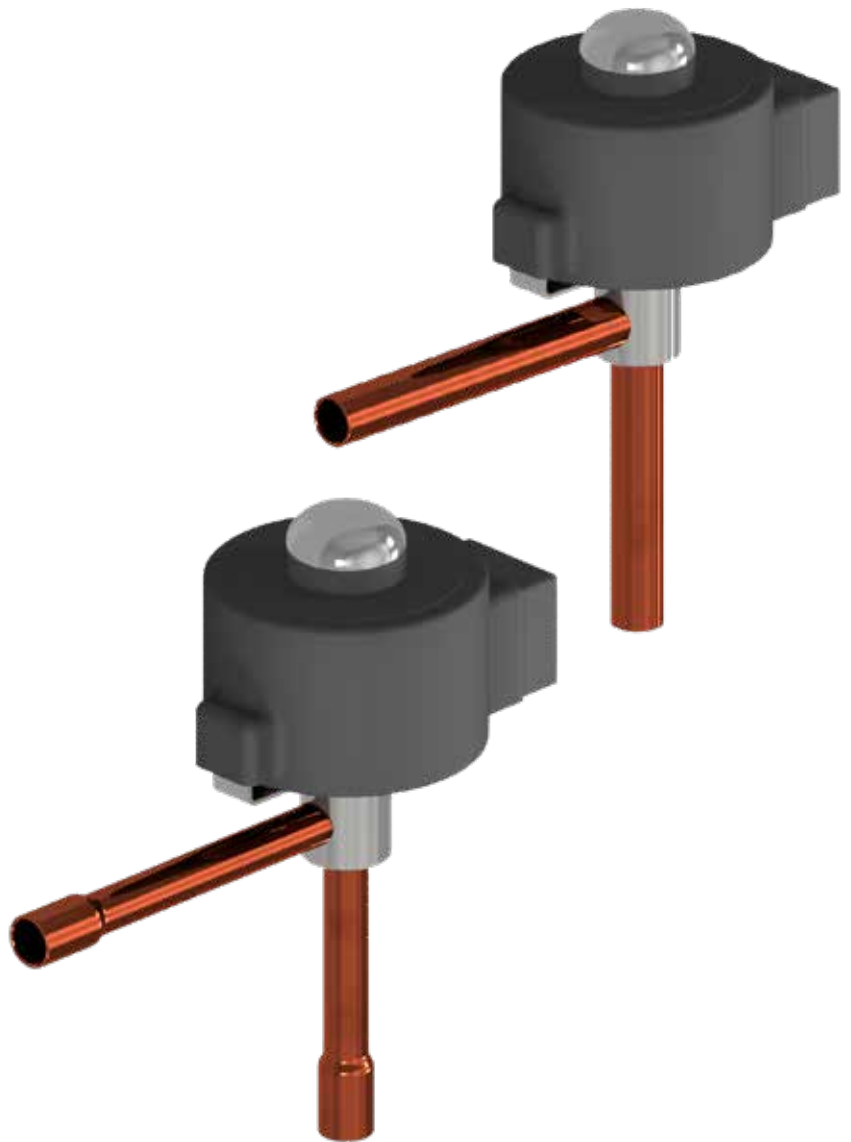




aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



# Electronic Expansion Valve CEV-S series

RACE Catalog CEV-S Series, May 2019



ENGINEERING YOUR SUCCESS.

#### **▲ WARNING - USER RESPONSIBILITY**

**Failure or improper selection or improper use of the products described herein or related items can cause death, personal injury and property damage.**

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

For safety information see the Safety Guide at [www.parker.com/safety](http://www.parker.com/safety)

#### **OFFER OF SALE**

Please, contact your Parker representation for a detailed **"Offer of Sale"**  
**FOR USE ON REFRIGERATION and/or AIR CONDITIONING SYSTEMS ONLY**

## **GENERAL INFORMATION**

### **EEV INSTRUCTION**

The EEV step motor expansion valve provides precise flow control for virtually every refrigeration, air- conditioning, and heat pump application, from basic to complex, and in a wide range of environments. This step motor expansion valve is the ideal choice due to its compatibility with a large availability of refrigerants, including HC, and most step motor controllers. Installation and operation of the highly reliable EEV is simple and straightforward; enabling any type system to be more efficient, more versatile and more reliable. The EEV step motor expansion valve provides maximum system value through precise, energy efficient flow control.

#### **EEV Features & Benefits:**

1. Highly reliable direct drive step motor
2. Precise 500 steps flow resolution
3. Tight shutoff for high efficiency systems
4. Efficient low power design; no holding current required
5. Rapid response; less than 6 seconds full stroke
6. Bi-flow capable for heat pump applications

### **VALVE OPERATION**

Proper positioning of valve opening is achieved by sending a series of electrical pulses to the EEV stator causing it to rotate open or closed. There are 500 steps of rotation in the most common single-phase stepping configuration. Of these 500 steps, 400 steps are in the linear control range. With 400 steps of resolution, incremental flow changes of 0.25% of full flow are possible. As few as 40 steps of resolution can achieve stable, efficient system operation on many applications. This allows the EEV to be used at just a fraction of its capacity.

Approximately 32 single-phase steps from full closed are required before the valve orifice begins to open. Beyond 500 steps, the flow rate does not significantly change. The usable flow range of the valve is from 32 to 500 steps and is the recommended design range for flow control.

The step motor controller should be configured and scaled to use 32 single phase steps (from step = 0 position) as the 0% capacity point, and to use 500 steps (from step = 0 position) as the 100% capacity point.

The initial opening steps (step = 0 to step = 32) position the valve in its fully closed position but with varying levels of seating force. This is due to

the spring compression biasing the needle (See figure 1) against the valve seat. Full seating force is achieved at the home position (step = 0), which is the fully overdriven position. The valve can be operated in both direct and reverse cycle (bi-flow feature), where the direct flow is intended with the refrigerant flowing from the inlet pipe (side pipe) to the outlet pipe (bottom pipe). It is suggested that in forward flow mode driving to step 32 will achieve sufficient seating force in most applications. It is not necessary to overdrive the valve to step = 0 to achieve full valve closure in forward flow mode, but it is necessary to achieve full closure when the valve is flowed in the reverse direction.

Because the valve needle is spring biased, the MOPD (Maximum Operating Pressure Differential) of the valve in reverse flow can be significantly lower than in forward flow mode. The MOPD, in reverse flow mode only, varies with orifice size. Exceeding the MOPD in reverse flow does not damage the valve; however, it will result in leakage through the valve seat until the pressure difference across the valve decreases below the MOPD. Maximum MOPD will always be achieved in forward flow mode.

## HYSTERESIS AND POWER UP

The EEV, however, does not experience the same limitations due to its unique design. Consequently, the EEV has almost no hysteresis when combined with an appropriate controller. The controller maintains a step count that is referenced to determine valve position. With proper configuration of the step motor controller, extremely accurate control can be achieved with flawless predictability and repeatability.

When the controller sends pulses beyond the fully overdriven (step = 0) position, the rotor will “slip” and the controller will no longer control an accurate position. For this reason most step motor valve controllers are configured with the usable step range, and an initialization routine to establish “home” (step = 0) position.

It is necessary for the controller to periodically overdrive the valve for a minimum of 600 pulses to re-establish the step = 0 position; this routine is typically a pre-programmed controller feature with some minor configuration necessary by the designer. This will ensure that the controller always uses accurate position information. Additionally, it is necessary, when recovering from a controller or valve power failure, to overdrive the valve in the exact same manner to re-establish the step = 0 position. Failure to perform this reset operation after a power loss or unexpected over/

under drive condition can result in incorrect valve position information and unpredictable valve operation.

## EEV CONFIGURED AS A UNIPOLAR – STEP MOTOR VALVE

The EEV valve is a unipolar (5 wire) type. The EEV unipolar motor utilizes two windings, each with a center tap. The two windings, plus a common center tap from each, form the five wire connection common to unipolar step motors (Orange, Red, Yellow, Black, Gray). The center tap (Gray) creates four independent phases, there are four regions with which a magnetic field is produced. The arrangement and sequence of energizing each of these four phases causes the field rotation to move the permanent magnet rotor. By selectively and sequentially energizing each stator phase, a magnetic pole (S) is created in the stator which attracts the opposite permanent magnet pole (N) on the rotor. To maximize resolution, two adjacent windings can be energized simultaneously, called half-stepping, to move the rotor to a region halfway between phases. An electrical logic diagram is shown in Table 1 to clarify single-phase stepping and the required selection and sequence for energizing the stator phases.

**Table 1: Unipolar Step Logic**

| Pulse | Steps Rotated | Phase      |         |            |           |
|-------|---------------|------------|---------|------------|-----------|
|       |               | O (Orange) | R (Red) | Y (Yellow) | B (Black) |
| 1     | 1             | Zero       | HI      | HI         | HI        |
| 2     | 2             | Zero       | Zero    | HI         | HI        |
| 3     | 3             | HI         | Zero    | HI         | HI        |
| 4     | 4             | HI         | Zero    | Zero       | HI        |
| 5     | 5             | HI         | HI      | Zero       | HI        |
| 6     | 6             | HI         | HI      | Zero       | Zero      |
| 7     | 7             | HI         | HI      | HI         | Zero      |
| 8     | 8             | Zero       | HI      | HI         | Zero      |

Note: Center taps at +12V or +24V at all times; “Zero” indicates Zero V. “HI” indicates high impedance of phase. Reverse the sequence to rotate in the opposite direction. Only 8 steps shown; for further rotation, sequence repeats.

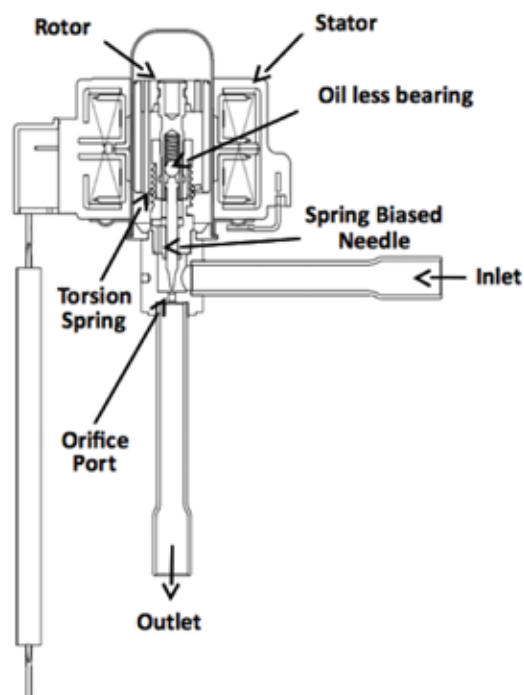
## Technical specifications

|                            | CEV body + 12 V coil                                                                       | CEV body + 24 V coil | CEV body + 12 V ATEX coil                                               |
|----------------------------|--------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------|
| Drive type                 | Permanent Magnet Step Motor Direct Drive                                                   |                      |                                                                         |
| Pulsing type               | Unipolar                                                                                   |                      |                                                                         |
| Flow path                  | Bi-flow                                                                                    |                      |                                                                         |
| Resolution                 | 500 Pulses                                                                                 |                      |                                                                         |
| Operating range            | 480 Pulses                                                                                 |                      |                                                                         |
| Open step                  | 32 ± 20 Pulses                                                                             |                      |                                                                         |
| Line travel / pulse        | 0.00625 mm                                                                                 |                      |                                                                         |
| Operating stroke           | 3.125 mm                                                                                   |                      |                                                                         |
| Step rate                  | 30 ~ 80 PPS                                                                                |                      |                                                                         |
| Full motion transit time   | 6.25 Sec (@80PPS) / 16.67 Sec (@30 PPS)                                                    |                      |                                                                         |
| Max. working pressure (PS) | 45 bar                                                                                     |                      |                                                                         |
| Media temp.                | -40°C/+85°C                                                                                | -40°C/+85°C          | -30°C/+70°C                                                             |
| Ambient temp.              | -40°C/+85°C                                                                                | -40°C/+85°C          | -30°C/+70°C                                                             |
| Relative humidity          | ≤ 95%                                                                                      |                      |                                                                         |
| Inter. leakage (Max)       | ≤ 250 cc/min @ 10 bar                                                                      |                      |                                                                         |
| Rated voltage              | 12 V DC ± 10%                                                                              | 24 V DC ± 10%        | 12 V DC ± 10%                                                           |
| Rated current              | 260 mA / Phase                                                                             | 187 mA / Phase       | 260 mA / Phase                                                          |
| Phase resistance           | 46 ± 3 Ohm                                                                                 | 114 ± 12 Ohm         | 46 ± 3 Ohm                                                              |
| Dielectric strength        | 1800 V AC, 1 Sec, (in air)                                                                 |                      |                                                                         |
| Insulation resistance      | > 100 MΩ @ 500 V DC                                                                        |                      |                                                                         |
| Insulation class           | Class E                                                                                    |                      |                                                                         |
| Compatible refrigerant     | R290, R32, R134a, R410A, R407C, R507, R452A, R452B, R454A, R454C, R513A                    |                      |                                                                         |
| Durability                 | > 140 Millions Pulses (135,000 cycles x 1040 pulses/cycles)<br>500 hours salt spray tested |                      |                                                                         |
| Materials                  | Body: stainless steel<br>Connections: copper                                               |                      |                                                                         |
| Approvals                  | PED Art. 4.3, RoHS, REACH, ISO 14903                                                       |                      | PED Art. 4.3, RoHS, ISO 14903,<br>ATEX II 3G Ex ec IIC Gc U (T4), REACH |

## Valve bodies technical data

| Model   | Port size [mm] | Connections size | MOPD [bar] | RMOPD [bar] | PS [bar] |
|---------|----------------|------------------|------------|-------------|----------|
| CEV10-S | 1.0            | 5/16" ODM        | 35         | 25          | 45       |
| CEV14-S | 1.4            | 5/16" ODM        | 35         | 25          | 45       |
| CEV16-S | 1.6            | 5/16" ODM        | 35         | 25          | 45       |
| CEV18-S | 1.8            | 5/16" ODM        | 35         | 25          | 45       |
| CEV24-S | 2.4            | 5/16" ODM        | 35         | 21          | 45       |
| CEV26-S | 2.6            | 5/16" ODM        | 23         | 15          | 45       |
| CEV30-S | 3.0            | 5/16" ODM        | 23         | 15          | 45       |
| CEV32-S | 3.2            | 5/16" ODM        | 23         | 15          | 45       |

## INTERNAL DESIGN



## NOMENCLATURE

### Valve

| CEV        | 26                       | - | S                   |
|------------|--------------------------|---|---------------------|
| CEV series | Orifice port size Ø2.6mm |   | Straight inlet tube |

### Stator

| CEC        | 100                     | X5             | - | 3           |
|------------|-------------------------|----------------|---|-------------|
| CEV stator | Lead wire length 1000mm | Connector type |   | Type suffix |

## TECHNICAL INFORMATION

### Valve

| Model*  | Nominal Capacity [kW] |       |       |      |      |       |       |       |       |       |       |       |
|---------|-----------------------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|
|         | R134a                 | R407C | R410A | R290 | R32  | R448A | R449A | R452A | R452B | R454A | R454C | R513A |
| CEV10-S | 3,7                   | 4,4   | 5,6   | 4,9  | 8,2  | 3,5   | 2,9   | 2,6   | 4,9   | 3,6   | 2,9   | 2,4   |
| CEV14-S | 6,4                   | 7,8   | 9,8   | 8,6  | 14,3 | 8,1   | 6,8   | 5,9   | 11,3  | 8,5   | 6,6   | 5,6   |
| CEV16-S | 8,5                   | 10,2  | 12,9  | 11,3 | 18,8 | 10,6  | 9,0   | 7,8   | 14,9  | 11,1  | 8,7   | 7,3   |
| CEV18-S | 10,5                  | 12,6  | 15,9  | 14,0 | 23,3 | 13,2  | 11,1  | 9,7   | 18,4  | 13,8  | 10,8  | 9,1   |
| CEV24-S | 17,6                  | 21,2  | 26,8  | 23,6 | 39,2 | 22,2  | 18,7  | 16,2  | 30,9  | 23,1  | 18,1  | 15,3  |
| CEV26-S | 19,5                  | 23,5  | 29,6  | 26,1 | 43,4 | 24,5  | 20,7  | 18,0  | 34,3  | 25,6  | 20,1  | 16,9  |
| CEV30-S | 24,8                  | 29,9  | 37,7  | 33,2 | 55,1 | 31,2  | 26,3  | 22,9  | 43,6  | 32,6  | 25,5  | 21,5  |
| CEV32-S | 26,8                  | 32,3  | 40,7  | 35,9 | 59,6 | 33,7  | 28,4  | 24,7  | 47,1  | 35,2  | 27,6  | 23,2  |

Nominal conditions:

5°C Evaporating temperature, 38°C Condensing temperature, 0 K Subcooling, 0 K Superheat.

\*Previous models of CEV - from 14 to 32 size - (90° bent inlet tube) available under request.

### Stator

| Model      | Rated voltage | ATEX | Connector type | Lead wire length |
|------------|---------------|------|----------------|------------------|
| CEC100X5   | 12 V DC±10%   | -    | XHP-5          | 1000 mm          |
| CEC100X5-1 | 24 V DC±10%   | -    | XHP-5          | 1000 mm          |
| CEC100Y5-3 | 12 V DC±10%   | ✓    | No connector   | 1000 mm          |

## SELECTION PROCEDURE

The proper selection of CEV valves should be based on the information generally required for any expansion valve:

- Determine the refrigerant to be used.** The CEV valves may be used on most common refrigerants. See the selection tables.
- Determine the capacity required for the valve.** This is normally the evaporator capacity at the desired conditions.
- Determine the pressure drop across valve.** Subtract the evaporating pressure from the condensing pressure. The condensing pressure used in this calculation should be the **minimum operating condensing pressure** of the system. From this value, subtract all the other pressure losses to obtain the net pressure drop across the valve. Be sure to consider all of the following possible sources of pressure drop: (1) friction losses through refrigeration lines including the evaporator and condenser; (2) pressure drop across liquid line accessories such as a solenoid valve and filterdrier; (3) static pressure loss (gain) due to the vertical lift (drop) of the liquid line and (4) pressure drop across a refrigerant distributor, if used.
- Determine the liquid temperature of the refrigerant entering the valve.** The EEV capacity tables are based on a liquid temperature of 38°C. For other liquid temperatures, multiply the nominal capacities by the correction factors given in the Liquid temperature correction factors table.
- Select the valve from the capacity tables.** Select a valve based on the design evaporating temperature and the available pressure drop across the valve. Be sure to apply the appropriate liquid temperature correction factor to the valve ratings shown in the tables. Once the desired valve capacity has been located, determine the valve model from the first column of the tables. On multiple evaporator systems, select each valve on the basis of individual evaporator capacity.

### Selection Example

| System data               |         |
|---------------------------|---------|
| Refrigerant type:         | R134a   |
| Condensing Temperature:   | 39°C    |
| Liquid Temperature:       | 32°C    |
| Evaporator Temperature:   | 5°C     |
| Liquid Line Loss:         | 0.5 bar |
| ΔP Distributor and Tubes: | 0.4 bar |
| Evaporator Load:          | 8.5 kW  |

### Calculations:

|                                |       |
|--------------------------------|-------|
| Condensing pressure [barg]     | 8.9 - |
| Liquid Line ΔP [bar]           | 0.5 - |
| Distributor and Tubes ΔP [bar] | 0.4 - |
| Evaporator Pressure [barg]     | 2.5 - |
| ΔP cross EEV [bar]             | 5.5   |

### Selection:

Entering into the proper selection table, the possible models are:

**CEV16-S** = 8.0 kW

**CEV18-S** = 9.9 kW

**R-134a**

| Valve Type | T <sub>e</sub> = 5°C             |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |
|            | 2,5                              | 4    | 5,5  | 7    | 8,5  | 10   | 11,5 | 13   |
| CEV10 - S  | 2,35                             | 2,97 | 3,49 | 3,93 | 4,33 | 4,70 | 5,04 | 5,36 |
| CEV14 - S  | 4,12                             | 5,21 | 6,11 | 6,90 | 7,60 | 8,2  | 8,8  | 9,4  |
| CEV16 - S  | 5,41                             | 6,85 | 8,0  | 9,1  | 10,0 | 10,8 | 11,6 | 12,3 |
| CEV18 - S  | 6,70                             | 8,5  | 9,9  | 11,2 | 12,4 | 13,4 | 14,4 | 15,3 |
| CEV24 - S  | 11,3                             | 14,3 | 16,7 | 18,9 | 20,8 | 22,5 | 24,2 | 25,7 |
| CEV26 - S  | 12,5                             | 15,8 | 18,5 | 20,9 | 23,0 | 25,0 | 26,8 | 28,5 |
| CEV30 - S  | 15,9                             | 20,1 | 23,5 | 26,6 | 29,3 | 31,7 | 34,0 | 36,2 |
| CEV32 - S  | 17,2                             | 21,7 | 25,4 | 28,7 | 31,6 | 34,3 | 36,8 | 39,1 |

A: Evaporator temperature

B: Pressure drop

C: Possible capacities

D: Possible valves selection

For R134a, the correction factor for a liquid temperature of 32°C is equal to 1.07.

| Refrigerant | Temperature °C |      |      |      |      |      |
|-------------|----------------|------|------|------|------|------|
|             | 27             | 32   | 38   | 43   | 49   | 54   |
| R-134a      | 1,14           | 1,07 | 1,00 | 0,93 | 0,86 | 0,78 |

By multiplying the above capacities by the correction factor, the corrected capacities result:

**CEV16-S** = 8.0 kW x 1.07 = 8.56 kW

**CEV18-S** = 9.9 kW x 1.07 = 10.59 kW

### Conclusion:

Since the corrected capacity closest to the required evaporator load is 8.56 kW, the proper selection is the **CEV16-S**.

## INSTALLATION

The EEV valves are installed before the distributor and evaporator just as one would install a Thermostatic Expansion Valve. Location should be planned to provide serviceability and to allow controller installation within the maximum cable length. The valve may be installed in the refrigerated space and may be mounted in any position except with the motor housing below the liquid line. Cable routing should avoid any sharp edges or other sources of potential physical damage such as defrost headers and fan blades. For neatness and protection, the cable may be fastened to the suction or liquid lines with nylon wire ties.

The installation of the EEV Step Motor Valve utilizes most of the same techniques and precautions used for assembly of other refrigeration components. As with any refrigerant system, safety and cleanliness must be a priority. Use of and upstream Parker filter-drier is highly recommended to prevent contamination of the expansion valve.

1. Properly reduce system pressure to atmospheric pressure using accepted industry guidelines.
2. Choose and installation location that is easily accessible, and minimizes external contamination from the environment. The EEV should be located downstream of any liquid line accessories (e.g. receiver, sight glass, service valve, etc...) and located as close to the evaporator/heat exchanger as possible.
3. For most installations the recommended flow direction utilizes the side fitting for liquid inlet; bottom fitting feeding the evaporator. If using the valve in reverse flow (bottom inlet) or in bi-flow operation; special controller settings must be used to ensure adequate valve shutoff. See Valve Operation section
4. Disassemble stator from valve body prior to brazing. The EEV valve is not position sensitive; however, it is recommended that the valve be installed with the stator at or above the body elevation to prevent accumulation of system contaminants with the valve. Installation should be such that valve weight or system vibration will not cause mechanical failure. Properly protect and restrain electrical connections.
5. Silver or phosphorous bearing copper brazing alloys can be used during installation. Minimal flux should be applied for copper- brass or copper-steel joints using silver bearing alloys; use flux on the joint exterior only. Clean all refrigerant lines and fittings as necessary prior to valve installation.
6. Minimize the heat applied to the valve by wrapping the valve with wet cloths and directing the heat away from the valve. The use of conductive paste or chill blocks should be considered for original equipment installations. The valve body temperature must be limited to 120°C during installation. Use of flowing dry nitrogen during installation is recommended to prevent the formation of toxic gases and copper oxides.
7. Once the valve has cooled, reinstall the stator. The coil stopper at base of the stator must engage one of the two retaining clips on the valve body. A 'click' detects good blocking.
8. Make electrical connections taking care to protect and secure all electrical connections from moisture, contamination, stress, etc. Extension wires may be attached to stator wiring provided that proper connections are made with 24 AWG or heavier stranded copper wire. Extension length should not exceed 30 meters between valve and step motor controller. The connections shall be made by using proper and compatible connectors.
9. Connect wiring to controller. Refer to controller manufacturer's instructions for proper wiring connections.

CAPACITY TABLES in kW (at evaporator temperature °C)

R134a

| Valve<br>Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      |
|---------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|               | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|               | 2,5                              | 4    | 5,5  | 7    | 8,5  | 10   | 11,5 | 13   | 2,5                  | 4    | 5,5  | 7    | 8,5  | 10   | 11,5 | 13   |
| CEV10-S       | 2,3                              | 3,0  | 3,5  | 3,9  | 4,3  | 4,7  | 5,0  | 5,4  | 2,2                  | 2,8  | 3,3  | 3,7  | 4,1  | 4,4  | 4,7  | 5,0  |
| CEV14-S       | 4,1                              | 5,2  | 6,1  | 6,9  | 7,6  | 8,2  | 8,8  | 9,4  | 3,9                  | 4,9  | 5,7  | 6,5  | 7,1  | 7,7  | 8,3  | 8,8  |
| CEV16-S       | 5,4                              | 6,8  | 8,0  | 9,1  | 10,0 | 10,8 | 11,6 | 12,3 | 5,1                  | 6,4  | 7,5  | 8,5  | 9,4  | 10,1 | 10,9 | 11,6 |
| CEV18-S       | 6,7                              | 8,5  | 9,9  | 11,2 | 12,4 | 13,4 | 14,4 | 15,3 | 6,3                  | 7,9  | 9,3  | 10,5 | 11,6 | 12,6 | 13,5 | 14,3 |
| CEV24-S       | 11,3                             | 14,3 | 16,7 | 18,9 | 20,8 | 22,5 | 24,2 | 25,7 | 10,6                 | 13,4 | 15,7 | 17,7 | 19,5 | 21,1 | 22,7 | 24,1 |
| CEV26-S       | 12,5                             | 15,8 | 18,5 | 20,9 | 23,0 | 25,0 | 26,8 | 28,5 | 11,7                 | 14,8 | 17,4 | 19,6 | 21,6 | 23,4 | 25,1 | 26,7 |
| CEV30-S       | 15,9                             | 20,1 | 23,5 | 26,6 | 29,3 | 31,7 | 34,0 | 36,2 | 14,9                 | 18,8 | 22,1 | 24,9 | 27,4 | 29,8 | 31,9 | 33,9 |
| CEV32-S       | 17,2                             | 21,7 | 25,4 | 28,7 | 31,6 | 34,3 | 36,8 | 39,1 | 16,1                 | 20,3 | 23,8 | 26,9 | 29,6 | 32,2 | 34,5 | 36,7 |

R407C

| Valve<br>Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|---------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|               | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|               | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S       | 2,9                              | 3,6  | 4,1  | 4,6  | 5,1  | 5,5  | 5,9  | 6,2  | 2,8                  | 3,4  | 3,9  | 4,4  | 4,8  | 5,2  | 5,5  | 5,9  | 2,6                  | 3,2  | 3,7  | 4,2  | 4,6  | 4,9  | 5,3  | 5,6  |
| CEV14-S       | 5,1                              | 6,3  | 7,3  | 8,1  | 8,9  | 9,6  | 10,3 | 10,9 | 4,8                  | 5,9  | 6,9  | 7,7  | 8,4  | 9,1  | 9,7  | 10,3 | 4,6                  | 5,7  | 6,6  | 7,3  | 8,0  | 8,7  | 9,3  | 9,8  |
| CEV16-S       | 6,7                              | 8,3  | 9,5  | 10,7 | 11,7 | 12,6 | 13,5 | 14,3 | 6,4                  | 7,8  | 9,0  | 10,1 | 11,0 | 11,9 | 12,7 | 13,5 | 6,1                  | 7,5  | 8,6  | 9,6  | 10,5 | 11,4 | 12,2 | 12,9 |
| CEV18-S       | 8,4                              | 10,2 | 11,8 | 13,2 | 14,5 | 15,6 | 16,7 | 17,7 | 7,9                  | 9,6  | 11,1 | 12,5 | 13,6 | 14,7 | 15,8 | 16,7 | 7,5                  | 9,2  | 10,7 | 11,9 | 13,1 | 14,1 | 15,1 | 16,0 |
| CEV24-S       | 14,0                             | 17,2 | 19,9 | 22,2 | 24,3 | 26,3 | 28,1 | 29,8 | 13,2                 | 16,2 | 18,7 | 20,9 | 22,9 | 24,8 | 26,5 | 28,1 | 12,7                 | 15,5 | 17,9 | 20,1 | 22,0 | 23,7 | 25,4 | 26,9 |
| CEV26-S       | 15,6                             | 19,0 | 22,0 | 24,6 | 26,9 | 29,1 | 31,1 | 33,0 | 14,7                 | 18,0 | 20,7 | 23,2 | 25,4 | 27,4 | 29,3 | 31,1 | 14,0                 | 17,2 | 19,9 | 22,2 | 24,3 | 26,3 | 28,1 | 29,8 |
| CEV30-S       | 19,8                             | 24,2 | 28,0 | 31,3 | 34,3 | 37,0 | 39,6 | 42,0 | 18,7                 | 22,8 | 26,4 | 29,5 | 32,3 | 34,9 | 37,3 | 39,6 | 17,9                 | 21,9 | 25,3 | 28,2 | 30,9 | 33,4 | 35,7 | 37,9 |
| CEV32-S       | 21,4                             | 26,2 | 30,2 | 33,8 | 37,0 | 40,0 | 42,7 | 45,3 | 20,2                 | 24,7 | 28,5 | 31,9 | 34,9 | 37,7 | 40,3 | 42,8 | 19,3                 | 23,6 | 27,3 | 30,5 | 33,4 | 36,1 | 38,6 | 40,9 |

R410A

| Valve<br>Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|---------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|               | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|               | 5                                | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   |
| CEV10-S       | 3,4                              | 4,3  | 5,0  | 5,6  | 6,2  | 6,7  | 7,2  | 7,7  | 3,3                  | 4,1  | 4,8  | 5,5  | 6,0  | 6,5  | 7,0  | 7,4  | 3,2                  | 4,0  | 4,7  | 5,3  | 5,9  | 6,3  | 6,8  | 7,2  |
| CEV14-S       | 5,9                              | 7,5  | 8,8  | 9,9  | 10,9 | 11,8 | 12,7 | 13,5 | 5,7                  | 7,2  | 8,5  | 9,6  | 10,5 | 11,4 | 12,3 | 13,0 | 5,6                  | 7,0  | 8,3  | 9,3  | 10,3 | 11,1 | 11,9 | 12,7 |
| CEV16-S       | 7,8                              | 9,8  | 11,5 | 13,0 | 14,3 | 15,5 | 16,7 | 17,7 | 7,5                  | 9,5  | 11,1 | 12,6 | 13,8 | 15,0 | 16,1 | 17,1 | 7,3                  | 9,2  | 10,8 | 12,2 | 13,5 | 14,6 | 15,7 | 16,7 |
| CEV18-S       | 9,6                              | 12,2 | 14,3 | 16,1 | 17,7 | 19,2 | 20,6 | 21,9 | 9,3                  | 11,8 | 13,8 | 15,6 | 17,1 | 18,6 | 19,9 | 21,2 | 9,1                  | 11,4 | 13,4 | 15,1 | 16,7 | 18,1 | 19,4 | 20,6 |
| CEV24-S       | 16,2                             | 20,5 | 24,0 | 27,1 | 29,8 | 32,4 | 34,7 | 36,9 | 15,6                 | 19,8 | 23,2 | 26,2 | 28,8 | 31,3 | 33,5 | 35,7 | 15,2                 | 19,3 | 22,6 | 25,5 | 28,1 | 30,4 | 32,7 | 34,7 |
| CEV26-S       | 17,9                             | 22,7 | 26,6 | 30,0 | 33,0 | 35,8 | 38,4 | 40,9 | 17,3                 | 21,9 | 25,7 | 29,0 | 31,9 | 34,6 | 37,1 | 39,5 | 16,9                 | 21,3 | 25,0 | 28,2 | 31,1 | 33,7 | 36,1 | 38,4 |
| CEV30-S       | 22,8                             | 28,8 | 33,8 | 38,1 | 42,0 | 45,6 | 48,9 | 52,0 | 22,0                 | 27,9 | 32,7 | 36,9 | 40,6 | 44,0 | 47,2 | 50,2 | 21,4                 | 27,1 | 31,8 | 35,9 | 39,5 | 42,9 | 46,0 | 48,9 |
| CEV32-S       | 24,6                             | 31,2 | 36,5 | 41,2 | 45,4 | 49,3 | 52,8 | 56,2 | 23,8                 | 30,1 | 35,3 | 39,8 | 43,9 | 47,6 | 51,0 | 54,3 | 23,2                 | 29,3 | 34,4 | 38,8 | 42,7 | 46,3 | 49,7 | 52,8 |

T<sub>E</sub> = evaporator temperature  
Capacity is based on 38°C condenser temperature and 0°C subcooling.

R290

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 3,6                              | 4,4  | 5,1  | 5,7  | 6,2  | 6,7  | 7,2  | 7,6  | 3,4                  | 4,1  | 4,8  | 5,3  | 5,8  | 6,3  | 6,7  | 7,2  | 3,2                  | 3,9  | 4,6  | 5,1  | 5,6  | 6,0  | 6,4  | 6,8  |
| CEV14-S    | 6,3                              | 7,7  | 8,9  | 9,9  | 10,9 | 11,8 | 12,6 | 13,3 | 5,9                  | 7,2  | 8,4  | 9,4  | 10,3 | 11,1 | 11,8 | 12,6 | 5,6                  | 6,9  | 8,0  | 8,9  | 9,8  | 10,6 | 11,3 | 12,0 |
| CEV16-S    | 8,3                              | 10,1 | 11,7 | 13,0 | 14,3 | 15,4 | 16,5 | 17,5 | 7,8                  | 9,5  | 11,0 | 12,3 | 13,5 | 14,5 | 15,5 | 16,5 | 7,4                  | 9,1  | 10,5 | 11,7 | 12,8 | 13,9 | 14,8 | 15,7 |
| CEV18-S    | 10,2                             | 12,5 | 14,5 | 16,2 | 17,7 | 19,1 | 20,4 | 21,7 | 9,6                  | 11,8 | 13,6 | 15,2 | 16,7 | 18,0 | 19,2 | 20,4 | 9,2                  | 11,2 | 13,0 | 14,5 | 15,9 | 17,2 | 18,4 | 19,5 |
| CEV24-S    | 17,2                             | 21,0 | 24,3 | 27,2 | 29,8 | 32,2 | 34,4 | 36,5 | 16,2                 | 19,8 | 22,9 | 25,6 | 28,0 | 30,3 | 32,4 | 34,3 | 15,4                 | 18,9 | 21,8 | 24,4 | 26,8 | 28,9 | 30,9 | 32,8 |
| CEV26-S    | 19,0                             | 23,3 | 26,9 | 30,1 | 33,0 | 35,6 | 38,1 | 40,4 | 17,9                 | 21,9 | 25,3 | 28,3 | 31,0 | 33,5 | 35,8 | 38,0 | 17,1                 | 20,9 | 24,2 | 27,0 | 29,6 | 32,0 | 34,2 | 36,3 |
| CEV30-S    | 24,2                             | 29,6 | 34,2 | 38,3 | 41,9 | 45,3 | 48,4 | 51,3 | 22,8                 | 27,9 | 32,2 | 36,0 | 39,5 | 42,6 | 45,6 | 48,3 | 21,8                 | 26,6 | 30,8 | 34,4 | 37,7 | 40,7 | 43,5 | 46,2 |
| CEV32-S    | 26,1                             | 32,0 | 37,0 | 41,3 | 45,3 | 48,9 | 52,3 | 55,5 | 24,6                 | 30,2 | 34,8 | 38,9 | 42,6 | 46,1 | 49,2 | 52,2 | 23,5                 | 29,5 | 33,2 | 37,2 | 40,7 | 44,0 | 47,0 | 49,9 |

| Valve Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |      |      |      |      |      |      |      | -40°C is allowable with standard CEC stators only (no ATEX stators). |  |  |  |  |  |  |  |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------------------------------------------------------|--|--|--|--|--|--|--|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                                                                      |  |  |  |  |  |  |  |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |                                                                      |  |  |  |  |  |  |  |
| CEV10-S    | 3,1                              | 3,8  | 4,3  | 4,9  | 5,3  | 5,7  | 6,1  | 6,5  | 2,9                  | 3,6  | 4,1  | 4,6  | 5,1  | 5,5  | 5,8  | 6,2  |                                                                      |  |  |  |  |  |  |  |
| CEV14-S    | 5,4                              | 6,6  | 7,6  | 8,5  | 9,3  | 10,1 | 10,8 | 11,4 | 5,1                  | 6,3  | 7,2  | 8,1  | 8,9  | 9,6  | 10,2 | 10,9 |                                                                      |  |  |  |  |  |  |  |
| CEV16-S    | 7,1                              | 8,7  | 10,0 | 11,2 | 12,2 | 13,2 | 14,1 | 15,0 | 6,7                  | 8,2  | 9,5  | 10,6 | 11,6 | 12,6 | 13,4 | 14,3 |                                                                      |  |  |  |  |  |  |  |
| CEV18-S    | 8,8                              | 10,7 | 12,4 | 13,8 | 15,2 | 16,4 | 17,5 | 18,6 | 8,3                  | 10,2 | 11,8 | 13,2 | 14,4 | 15,6 | 16,7 | 17,7 |                                                                      |  |  |  |  |  |  |  |
| CEV24-S    | 14,7                             | 18,0 | 20,8 | 23,3 | 25,5 | 27,6 | 29,5 | 31,2 | 14,0                 | 17,2 | 19,8 | 22,1 | 24,3 | 26,2 | 28,0 | 29,7 |                                                                      |  |  |  |  |  |  |  |
| CEV26-S    | 16,3                             | 20,0 | 23,1 | 25,8 | 28,2 | 30,5 | 32,6 | 34,6 | 15,5                 | 19,0 | 21,9 | 24,5 | 26,9 | 29,0 | 31,0 | 32,9 |                                                                      |  |  |  |  |  |  |  |
| CEV30-S    | 20,7                             | 25,4 | 29,3 | 32,8 | 35,9 | 38,8 | 41,5 | 44,0 | 19,7                 | 24,2 | 27,9 | 31,2 | 34,2 | 36,9 | 39,4 | 41,8 |                                                                      |  |  |  |  |  |  |  |
| CEV32-S    | 22,4                             | 27,4 | 31,7 | 35,5 | 38,8 | 41,9 | 44,8 | 47,5 | 21,3                 | 26,1 | 30,1 | 33,7 | 36,9 | 40,2 | 43,2 | 45,2 |                                                                      |  |  |  |  |  |  |  |

R32

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 5                                | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   |
| CEV10-S    | 4,9                              | 6,2  | 7,2  | 8,1  | 9,0  | 9,7  | 10,4 | 11,1 | 4,8                  | 6,1  | 7,1  | 8,0  | 8,9  | 9,6  | 10,3 | 11,0 | 4,7                  | 6,0  | 7,0  | 7,9  | 8,7  | 9,5  | 10,2 | 10,8 |
| CEV14-S    | 8,5                              | 10,8 | 12,7 | 14,3 | 15,7 | 17,1 | 18,3 | 19,5 | 8,4                  | 10,7 | 12,5 | 14,1 | 15,5 | 16,9 | 18,1 | 19,2 | 8,3                  | 10,5 | 12,3 | 13,9 | 15,3 | 16,6 | 17,8 | 19,0 |
| CEV16-S    | 11,2                             | 14,2 | 16,6 | 18,8 | 20,7 | 22,4 | 24,0 | 25,6 | 11,1                 | 14,0 | 16,4 | 18,5 | 20,4 | 22,1 | 23,7 | 25,2 | 10,9                 | 13,8 | 16,2 | 18,3 | 20,1 | 21,8 | 23,4 | 24,9 |
| CEV18-S    | 13,9                             | 17,6 | 20,6 | 23,2 | 25,6 | 27,8 | 29,8 | 31,6 | 13,7                 | 17,3 | 20,3 | 22,9 | 25,3 | 27,4 | 29,4 | 31,2 | 13,5                 | 17,1 | 20,1 | 22,6 | 24,9 | 27,0 | 29,0 | 30,8 |
| CEV24-S    | 23,3                             | 29,5 | 34,6 | 39,1 | 43,0 | 46,7 | 50,1 | 53,2 | 23,0                 | 29,1 | 34,2 | 38,6 | 42,5 | 46,1 | 49,4 | 52,5 | 22,7                 | 28,8 | 33,7 | 38,1 | 41,9 | 45,5 | 48,8 | 51,9 |
| CEV26-S    | 25,8                             | 32,7 | 38,3 | 43,2 | 47,6 | 51,7 | 55,4 | 58,9 | 25,5                 | 32,3 | 37,8 | 42,7 | 47,0 | 51,0 | 54,7 | 58,2 | 25,2                 | 31,8 | 37,3 | 42,1 | 46,4 | 50,4 | 54,0 | 57,4 |
| CEV30-S    | 32,9                             | 41,6 | 48,7 | 55,0 | 60,6 | 65,7 | 70,5 | 74,9 | 32,4                 | 41,0 | 48,1 | 54,3 | 59,8 | 64,9 | 69,6 | 74,0 | 32,0                 | 40,5 | 47,5 | 53,6 | 59,1 | 64,1 | 68,7 | 73,0 |
| CEV32-S    | 35,5                             | 44,9 | 52,7 | 59,4 | 65,5 | 71,0 | 76,1 | 81,0 | 35,1                 | 44,3 | 52,0 | 58,7 | 64,6 | 70,1 | 75,2 | 79,9 | 34,6                 | 43,8 | 51,3 | 57,9 | 63,8 | 69,2 | 74,2 | 78,9 |

| Valve Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |      |      |      |      |      |      |      | -40°C is allowable with standard CEC stators only (no ATEX stators). |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|            | 5                                | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV10-S    | 4,7                              | 5,9  | 6,9  | 7,8  | 8,6  | 9,3  | 10,0 | 10,6 | 4,6                  | 5,8  | 6,8  | 7,7  | 8,4  | 9,2  | 9,8  | 10,4 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV14-S    | 8,2                              | 10,4 | 12,1 | 13,7 | 15,1 | 16,4 | 17,6 | 18,7 | 8,0                  | 10,2 | 11,9 | 13,4 | 14,8 | 16,1 | 17,2 | 18,3 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV16-S    | 10,7                             | 13,6 | 15,9 | 18,0 | 19,8 | 21,5 | 23,1 | 24,5 | 10,5                 | 13,3 | 15,6 | 17,7 | 19,5 | 21,1 | 22,6 | 24,1 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV18-S    | 13,3                             | 16,8 | 19,7 | 22,3 | 24,5 | 26,6 | 28,5 | 30,4 | 13,1                 | 16,5 | 19,4 | 21,9 | 24,1 | 26,1 | 28,0 | 29,8 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV24-S    | 22,4                             | 28,3 | 33,2 | 37,5 | 41,3 | 44,8 | 48,0 | 51,0 | 22,0                 | 27,8 | 32,6 | 36,8 | 40,5 | 43,9 | 47,1 | 50,1 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV26-S    | 24,8                             | 31,3 | 36,8 | 41,5 | 45,7 | 49,6 | 53,2 | 56,5 | 24,3                 | 30,8 | 36,1 | 40,7 | 44,8 | 48,6 | 52,2 | 55,5 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV30-S    | 31,5                             | 39,9 | 46,8 | 52,8 | 58,1 | 63,1 | 67,6 | 71,9 | 30,9                 | 39,1 | 45,9 | 51,8 | 57,0 | 61,9 | 66,4 | 70,6 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CEV32-S    | 34,1                             | 43,1 | 50,5 | 57,0 | 62,8 | 68,1 | 73,0 | 77,7 | 33,4                 | 42,3 | 49,6 | 55,9 | 61,6 | 66,8 | 71,7 | 76,2 |                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |

T<sub>E</sub> = evaporator temperature  
Capacity is based on 38°C condenser temperature and 0°C subcooling.

9

R448A

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 2,2                              | 2,7  | 3,1  | 3,5  | 3,9  | 4,2  | 4,5  | 4,7  | 2,1                  | 2,6  | 3,0  | 3,3  | 3,7  | 4,0  | 4,2  | 4,5  | 2,0                  | 2,5  | 2,9  | 3,2  | 3,5  | 3,8  | 4,1  | 4,3  |
| CEV14-S    | 5,2                              | 6,3  | 7,3  | 8,2  | 9,0  | 9,7  | 10,4 | 11,0 | 4,9                  | 6,0  | 7,0  | 7,8  | 8,5  | 9,2  | 9,9  | 10,5 | 4,7                  | 5,8  | 6,7  | 7,5  | 8,2  | 8,9  | 9,5  | 10,1 |
| CEV16-S    | 6,8                              | 8,3  | 9,6  | 10,8 | 11,8 | 12,7 | 13,6 | 14,4 | 6,5                  | 7,9  | 9,2  | 10,2 | 11,2 | 12,1 | 12,9 | 13,7 | 6,2                  | 7,6  | 8,8  | 9,8  | 10,8 | 11,7 | 12,5 | 13,2 |
| CEV18-S    | 8,4                              | 10,3 | 11,9 | 13,3 | 14,6 | 15,8 | 16,8 | 17,9 | 8,0                  | 9,8  | 11,3 | 12,7 | 13,9 | 15,0 | 16,0 | 17,0 | 7,7                  | 9,4  | 10,9 | 12,2 | 13,4 | 14,4 | 15,4 | 16,4 |
| CEV24-S    | 14,2                             | 17,4 | 20,0 | 22,4 | 24,5 | 26,5 | 28,3 | 30,1 | 13,5                 | 16,5 | 19,1 | 21,3 | 23,3 | 25,2 | 27,0 | 28,6 | 13,0                 | 15,9 | 18,3 | 20,5 | 22,5 | 24,3 | 25,9 | 27,5 |
| CEV26-S    | 15,7                             | 19,2 | 22,2 | 24,8 | 27,2 | 29,3 | 31,4 | 33,3 | 14,9                 | 18,3 | 21,1 | 23,6 | 25,8 | 27,9 | 29,8 | 31,7 | 14,4                 | 17,6 | 20,3 | 22,7 | 24,9 | 26,9 | 28,7 | 30,5 |
| CEV30-S    | 20,0                             | 24,4 | 28,2 | 31,5 | 34,6 | 37,3 | 39,9 | 42,3 | 19,0                 | 23,2 | 26,8 | 30,0 | 32,9 | 35,5 | 38,0 | 40,3 | 18,3                 | 22,4 | 25,8 | 28,9 | 31,6 | 34,2 | 36,5 | 38,8 |
| CEV32-S    | 21,6                             | 26,4 | 30,5 | 34,1 | 37,3 | 40,3 | 43,1 | 45,7 | 20,5                 | 25,1 | 29,0 | 32,4 | 35,5 | 38,4 | 41,0 | 43,5 | 19,7                 | 24,2 | 27,9 | 31,2 | 34,2 | 36,9 | 39,5 | 41,9 |

| Valve<br>Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |      |      |      |      |      |      |      |
|---------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|               | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|               | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S       | 2,0                              | 2,4  | 2,8  | 3,1  | 3,4  | 3,7  | 3,9  | 4,2  | 1,9                  | 2,3  | 2,6  | 3,0  | 3,2  | 3,5  | 3,7  | 4,0  |
| CEV14-S       | 4,6                              | 5,6  | 6,4  | 7,2  | 7,9  | 8,5  | 9,1  | 9,7  | 4,3                  | 5,3  | 6,1  | 6,9  | 7,5  | 8,1  | 8,7  | 9,2  |
| CEV16-S       | 6,0                              | 7,3  | 8,5  | 9,5  | 10,4 | 11,2 | 12,0 | 12,7 | 5,7                  | 7,0  | 8,1  | 9,0  | 9,9  | 10,7 | 11,4 | 12,1 |
| CEV18-S       | 7,4                              | 9,1  | 10,5 | 11,7 | 12,8 | 13,9 | 14,8 | 15,7 | 7,1                  | 8,7  | 10,0 | 11,2 | 12,2 | 13,2 | 14,1 | 15,0 |
| CEV24-S       | 12,5                             | 15,3 | 17,6 | 19,7 | 21,6 | 23,3 | 24,9 | 26,4 | 11,9                 | 14,6 | 16,8 | 18,8 | 20,6 | 22,2 | 23,8 | 25,2 |
| CEV26-S       | 13,8                             | 16,9 | 19,5 | 21,8 | 23,9 | 25,8 | 27,6 | 29,3 | 13,2                 | 16,1 | 18,6 | 20,8 | 22,8 | 24,6 | 26,3 | 27,9 |
| CEV30-S       | 17,5                             | 21,5 | 24,8 | 27,7 | 30,4 | 32,8 | 35,1 | 37,2 | 16,7                 | 20,5 | 23,7 | 26,5 | 29,0 | 31,3 | 33,5 | 35,5 |
| CEV32-S       | 19,0                             | 23,2 | 26,8 | 30,0 | 32,8 | 35,5 | 37,9 | 40,2 | 18,1                 | 22,2 | 25,6 | 28,6 | 31,3 | 33,8 | 36,2 | 38,4 |

-40°C is allowable with standard CEC stators only (no ATEX stators).

R449A

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 2,3                              | 2,8  | 3,2  | 3,6  | 4,0  | 4,3  | 4,6  | 4,8  | 2,2                  | 2,7  | 3,1  | 3,4  | 3,8  | 4,1  | 4,3  | 4,6  | 2,1                  | 2,6  | 3,0  | 3,3  | 3,6  | 3,9  | 4,2  | 4,4  |
| CEV14-S    | 5,3                              | 6,5  | 7,5  | 8,4  | 9,2  | 9,9  | 10,6 | 11,3 | 5,1                  | 6,2  | 7,1  | 8,0  | 8,7  | 9,4  | 10,1 | 10,7 | 4,9                  | 6,0  | 6,9  | 7,7  | 8,4  | 9,1  | 9,7  | 10,3 |
| CEV16-S    | 7,0                              | 8,5  | 9,9  | 11,0 | 12,1 | 13,0 | 13,9 | 14,8 | 6,6                  | 8,1  | 9,4  | 10,5 | 11,5 | 12,4 | 13,3 | 14,1 | 6,4                  | 7,8  | 9,0  | 10,1 | 11,0 | 11,9 | 12,8 | 13,5 |
| CEV18-S    | 8,6                              | 10,6 | 12,2 | 13,6 | 14,9 | 16,1 | 17,3 | 18,3 | 8,2                  | 10,1 | 11,6 | 13,0 | 14,2 | 15,4 | 16,4 | 17,4 | 7,9                  | 9,7  | 11,2 | 12,5 | 13,7 | 14,8 | 15,8 | 16,8 |
| CEV24-S    | 14,5                             | 17,8 | 20,5 | 23,0 | 25,1 | 27,2 | 29,0 | 30,8 | 13,8                 | 16,9 | 19,5 | 21,8 | 23,9 | 25,8 | 27,6 | 29,3 | 13,3                 | 16,3 | 18,8 | 21,0 | 23,0 | 24,9 | 26,6 | 28,2 |
| CEV26-S    | 16,1                             | 19,7 | 22,7 | 25,4 | 27,8 | 30,1 | 32,1 | 34,1 | 15,3                 | 18,7 | 21,6 | 24,2 | 26,5 | 28,6 | 30,6 | 32,4 | 14,7                 | 18,0 | 20,8 | 23,3 | 25,5 | 27,5 | 29,4 | 31,2 |
| CEV30-S    | 20,4                             | 25,0 | 28,9 | 32,3 | 35,4 | 38,2 | 40,9 | 43,4 | 19,5                 | 23,8 | 27,5 | 30,8 | 33,7 | 36,4 | 38,9 | 41,3 | 18,7                 | 22,9 | 26,5 | 29,6 | 32,4 | 35,0 | 37,4 | 39,7 |
| CEV32-S    | 22,1                             | 27,1 | 31,2 | 34,9 | 38,3 | 41,3 | 44,2 | 46,9 | 21,0                 | 25,7 | 29,7 | 33,2 | 36,4 | 39,3 | 42,0 | 44,6 | 20,2                 | 24,8 | 28,6 | 32,0 | 35,0 | 37,8 | 40,4 | 42,9 |

| Valve Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 2,0                              | 2,5  | 2,8  | 3,2  | 3,5  | 3,8  | 4,0  | 4,3  | 1,9                  | 2,3  | 2,7  | 3,0  | 3,3  | 3,6  | 3,8  | 4,1  |
| CEV14-S    | 4,7                              | 5,7  | 6,6  | 7,4  | 8,1  | 8,7  | 9,3  | 9,9  | 4,5                  | 5,5  | 6,3  | 7,1  | 7,7  | 8,3  | 8,9  | 9,5  |
| CEV16-S    | 6,1                              | 7,5  | 8,7  | 9,7  | 10,6 | 11,5 | 12,3 | 13,0 | 5,9                  | 7,2  | 8,3  | 9,3  | 10,1 | 11,0 | 11,7 | 12,4 |
| CEV18-S    | 7,6                              | 9,3  | 10,7 | 12,0 | 13,1 | 14,2 | 15,2 | 16,1 | 7,3                  | 8,9  | 10,3 | 11,5 | 12,6 | 13,6 | 14,5 | 15,4 |
| CEV24-S    | 12,8                             | 15,6 | 18,0 | 20,2 | 22,1 | 23,9 | 25,5 | 27,1 | 12,2                 | 14,9 | 17,3 | 19,3 | 21,1 | 22,8 | 24,4 | 25,9 |
| CEV26-S    | 14,1                             | 17,3 | 20,0 | 22,3 | 24,5 | 26,4 | 28,3 | 30,0 | 13,5                 | 16,5 | 19,1 | 21,4 | 23,4 | 25,3 | 27,0 | 28,7 |
| CEV30-S    | 18,0                             | 22,0 | 25,4 | 28,4 | 31,1 | 33,6 | 35,9 | 38,1 | 17,2                 | 21,0 | 24,3 | 27,2 | 29,8 | 32,2 | 34,4 | 36,5 |
| CEV32-S    | 19,4                             | 23,8 | 27,5 | 30,7 | 33,6 | 36,3 | 38,8 | 41,2 | 18,6                 | 22,7 | 26,3 | 29,4 | 32,2 | 34,7 | 37,1 | 39,4 |

-40°C is allowable with standard CEC stators only (no ATEX stators).

T<sub>E</sub> = evaporator temperature  
Capacity is based on 38°C condenser temperature and 0°C subcooling.

R452A

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 1,6                              | 2,0  | 2,3  | 2,5  | 2,8  | 3,0  | 3,2  | 3,4  | 1,5                  | 1,8  | 2,1  | 2,4  | 2,6  | 2,8  | 3,0  | 3,2  | 1,4                  | 1,7  | 2,0  | 2,2  | 2,5  | 2,7  | 2,8  | 3,0  |
| CEV14-S    | 3,7                              | 4,6  | 5,3  | 5,9  | 6,5  | 7,0  | 7,5  | 7,9  | 3,5                  | 4,3  | 4,9  | 5,5  | 6,0  | 6,5  | 7,0  | 7,4  | 3,3                  | 4,0  | 4,7  | 5,2  | 5,7  | 6,2  | 6,6  | 7,0  |
| CEV16-S    | 4,9                              | 6,0  | 6,9  | 7,8  | 8,5  | 9,2  | 9,8  | 10,4 | 4,6                  | 5,6  | 6,5  | 7,2  | 7,9  | 8,6  | 9,1  | 9,7  | 4,3                  | 5,3  | 6,1  | 6,8  | 7,5  | 8,1  | 8,7  | 9,2  |
| CEV18-S    | 6,1                              | 7,4  | 8,6  | 9,6  | 10,5 | 11,4 | 12,2 | 12,9 | 5,7                  | 6,9  | 8,0  | 9,0  | 9,8  | 10,6 | 11,3 | 12,0 | 5,4                  | 6,6  | 7,6  | 8,5  | 9,3  | 10,0 | 10,7 | 11,4 |
| CEV24-S    | 10,2                             | 12,5 | 14,5 | 16,2 | 17,7 | 19,1 | 20,4 | 21,7 | 9,5                  | 11,7 | 13,5 | 15,1 | 16,5 | 17,8 | 19,0 | 20,2 | 9,0                  | 11,0 | 12,8 | 14,3 | 15,6 | 16,9 | 18,0 | 19,1 |
| CEV26-S    | 11,3                             | 13,9 | 16,0 | 17,9 | 19,6 | 21,2 | 22,6 | 24,0 | 10,5                 | 12,9 | 14,9 | 16,7 | 18,3 | 19,7 | 21,1 | 22,4 | 10,0                 | 12,2 | 14,1 | 15,8 | 17,3 | 18,7 | 20,0 | 21,2 |
| CEV30-S    | 14,4                             | 17,6 | 20,4 | 22,8 | 24,9 | 26,9 | 28,8 | 30,5 | 13,4                 | 16,4 | 19,0 | 21,2 | 23,2 | 25,1 | 26,8 | 28,4 | 12,7                 | 15,6 | 18,0 | 20,1 | 22,0 | 23,8 | 25,4 | 26,9 |
| CEV32-S    | 15,6                             | 19,0 | 22,0 | 24,6 | 26,9 | 29,1 | 31,1 | 33,0 | 14,5                 | 17,7 | 20,5 | 22,9 | 25,1 | 27,1 | 29,0 | 30,7 | 13,7                 | 16,8 | 19,4 | 21,7 | 23,8 | 25,7 | 27,4 | 29,1 |

| Valve Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |       |       |       |       |       |       |       | -40°C is allowable with standard CEC stators only (no ATEX stators). |  |  |  |  |  |  |  |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|-------|-------|-------|-------|-------|-------|-------|----------------------------------------------------------------------|--|--|--|--|--|--|--|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |       |       |       |       |       |       |       |                                                                      |  |  |  |  |  |  |  |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6     | 8     | 10    | 12    | 14    | 16    | 18    |                                                                      |  |  |  |  |  |  |  |
| CEV10-S    | 1,3                              | 1,6  | 1,9  | 2,1  | 2,3  | 2,5  | 2,7  | 2,8  | 1,25                 | 1,53  | 1,77  | 1,98  | 2,16  | 2,34  | 2,50  | 2,65  |                                                                      |  |  |  |  |  |  |  |
| CEV14-S    | 3,1                              | 3,8  | 4,4  | 4,9  | 5,4  | 5,8  | 6,2  | 6,6  | 2,91                 | 3,56  | 4,11  | 4,60  | 5,03  | 5,44  | 5,81  | 6,17  |                                                                      |  |  |  |  |  |  |  |
| CEV16-S    | 4,1                              | 5,0  | 5,8  | 6,5  | 7,1  | 7,6  | 8,2  | 8,7  | 3,82                 | 4,67  | 5,40  | 6,03  | 6,61  | 7,14  | 7,63  | 8,10  |                                                                      |  |  |  |  |  |  |  |
| CEV18-S    | 5,1                              | 6,2  | 7,1  | 8,0  | 8,8  | 9,5  | 10,1 | 10,7 | 4,73                 | 5,79  | 6,68  | 7,47  | 8,19  | 8,84  | 9,45  | 10,02 |                                                                      |  |  |  |  |  |  |  |
| CEV24-S    | 8,5                              | 10,4 | 12,0 | 13,4 | 14,7 | 15,9 | 17,0 | 18,0 | 7,95                 | 9,73  | 11,24 | 12,57 | 13,77 | 14,87 | 15,90 | 16,86 |                                                                      |  |  |  |  |  |  |  |
| CEV26-S    | 9,4                              | 11,5 | 13,3 | 14,9 | 16,3 | 17,6 | 18,8 | 20,0 | 8,80                 | 10,78 | 12,44 | 13,91 | 15,24 | 16,46 | 17,60 | 18,67 |                                                                      |  |  |  |  |  |  |  |
| CEV30-S    | 12,0                             | 14,7 | 16,9 | 18,9 | 20,7 | 22,4 | 23,9 | 25,4 | 11,19                | 13,71 | 15,83 | 17,70 | 19,39 | 20,94 | 22,39 | 23,74 |                                                                      |  |  |  |  |  |  |  |
| CEV32-S    | 12,9                             | 15,8 | 18,3 | 20,4 | 22,4 | 24,2 | 25,9 | 27,4 | 12,09                | 14,81 | 17,10 | 19,12 | 20,94 | 22,62 | 24,19 | 25,65 |                                                                      |  |  |  |  |  |  |  |

R452B

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 5                                | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   |
| CEV10-S    | 3,0                              | 3,8  | 4,5  | 5,1  | 5,6  | 6,1  | 6,5  | 6,9  | 3,0                  | 3,8  | 4,4  | 5,0  | 5,5  | 5,9  | 6,4  | 6,8  | 6,8                  | 8,5  | 10,0 | 11,3 | 12,5 | 13,5 | 14,5 | 15,4 |
| CEV14-S    | 7,1                              | 9,0  | 10,5 | 11,8 | 13,1 | 14,2 | 15,2 | 16,1 | 6,9                  | 8,7  | 10,2 | 11,5 | 12,7 | 13,8 | 14,8 | 15,7 | 6,8                  | 8,5  | 10,0 | 11,3 | 12,5 | 13,5 | 14,5 | 15,4 |
| CEV16-S    | 9,3                              | 11,8 | 13,8 | 15,6 | 17,1 | 18,6 | 19,9 | 21,2 | 9,1                  | 11,5 | 13,4 | 15,2 | 16,7 | 18,1 | 19,4 | 20,7 | 8,9                  | 11,2 | 13,2 | 14,8 | 16,4 | 17,7 | 19,0 | 20,2 |
| CEV18-S    | 11,5                             | 14,6 | 17,1 | 19,3 | 21,2 | 23,0 | 24,7 | 26,2 | 11,2                 | 14,2 | 16,6 | 18,8 | 20,7 | 22,4 | 24,1 | 25,6 | 11,0                 | 13,9 | 16,3 | 18,4 | 20,3 | 22,0 | 23,6 | 25,0 |
| CEV24-S    | 19,4                             | 24,5 | 28,7 | 32,4 | 35,7 | 38,7 | 41,5 | 44,1 | 18,9                 | 23,9 | 28,0 | 31,6 | 34,8 | 37,7 | 40,5 | 43,0 | 18,5                 | 23,4 | 27,4 | 30,9 | 34,1 | 36,9 | 39,6 | 42,1 |
| CEV26-S    | 21,4                             | 27,1 | 31,8 | 35,9 | 39,5 | 42,9 | 46,0 | 48,9 | 20,9                 | 26,4 | 31,0 | 35,0 | 38,5 | 41,8 | 44,8 | 47,6 | 20,5                 | 25,9 | 30,3 | 34,2 | 37,7 | 40,9 | 43,9 | 46,6 |
| CEV30-S    | 27,3                             | 34,5 | 40,4 | 45,6 | 50,3 | 54,5 | 58,5 | 62,2 | 26,6                 | 33,6 | 39,4 | 44,5 | 49,0 | 53,2 | 57,0 | 60,6 | 26,0                 | 32,9 | 38,6 | 43,5 | 48,0 | 52,0 | 55,8 | 59,3 |
| CEV32-S    | 29,5                             | 37,3 | 43,7 | 49,3 | 54,3 | 58,9 | 63,2 | 67,2 | 28,7                 | 36,3 | 42,6 | 48,0 | 52,9 | 57,4 | 61,6 | 65,5 | 28,1                 | 35,5 | 41,7 | 47,0 | 51,8 | 56,2 | 60,3 | 64,1 |

| Valve<br>Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |      |      |      |      |      |      |      | -40°C is allowable with standard CEC<br>stators only (no ATEX stators). |  |  |  |  |  |  |  |
|---------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|-------------------------------------------------------------------------|--|--|--|--|--|--|--|
|               | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                                                                         |  |  |  |  |  |  |  |
|               | 5                                | 8    | 11   | 14   | 17   | 20   | 23   | 26   | 5                    | 8    | 11   | 14   | 17   | 20   | 23   | 26   |                                                                         |  |  |  |  |  |  |  |
| CEV10-S       | 6,6                              | 8,3  | 9,8  | 11,0 | 12,1 | 13,2 | 14,1 | 15,0 | 6,4                  | 8,1  | 9,5  | 10,7 | 11,8 | 12,8 | 13,7 | 14,6 |                                                                         |  |  |  |  |  |  |  |
| CEV14-S       | 6,6                              | 8,3  | 9,8  | 11,0 | 12,1 | 13,2 | 14,1 | 15,0 | 6,4                  | 8,1  | 9,5  | 10,7 | 11,8 | 12,8 | 13,7 | 14,6 |                                                                         |  |  |  |  |  |  |  |
| CEV16-S       | 8,6                              | 10,9 | 12,8 | 14,5 | 15,9 | 17,3 | 18,5 | 19,7 | 8,4                  | 10,6 | 12,5 | 14,1 | 15,5 | 16,8 | 18,0 | 19,2 |                                                                         |  |  |  |  |  |  |  |
| CEV18-S       | 10,7                             | 13,5 | 15,9 | 17,9 | 19,7 | 21,4 | 22,9 | 24,4 | 10,4                 | 13,2 | 15,4 | 17,4 | 19,2 | 20,8 | 22,3 | 23,7 |                                                                         |  |  |  |  |  |  |  |
| CEV24-S       | 18,0                             | 22,8 | 26,7 | 30,1 | 33,2 | 36,0 | 38,6 | 41,0 | 17,5                 | 22,1 | 25,9 | 29,3 | 32,3 | 35,0 | 37,5 | 39,9 |                                                                         |  |  |  |  |  |  |  |
| CEV26-S       | 19,9                             | 25,2 | 29,5 | 33,3 | 36,7 | 39,8 | 42,7 | 45,4 | 19,4                 | 24,5 | 28,7 | 32,4 | 35,7 | 38,7 | 41,5 | 44,2 |                                                                         |  |  |  |  |  |  |  |
| CEV30-S       | 25,3                             | 32,1 | 37,6 | 42,4 | 46,7 | 50,7 | 54,3 | 57,8 | 24,6                 | 31,2 | 36,5 | 41,2 | 45,4 | 49,3 | 52,8 | 56,2 |                                                                         |  |  |  |  |  |  |  |
| CEV32-S       | 27,4                             | 34,6 | 40,6 | 45,8 | 50,5 | 54,8 | 58,7 | 62,4 | 26,6                 | 33,7 | 39,5 | 44,5 | 49,1 | 53,2 | 57,1 | 60,7 |                                                                         |  |  |  |  |  |  |  |

T<sub>E</sub> = evaporator temperature  
Capacity is based on 38°C condenser temperature and 0°C subcooling.

R454A

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 2,3                              | 2,8  | 3,2  | 3,6  | 4,0  | 4,3  | 4,6  | 4,8  | 2,2                  | 2,7  | 3,1  | 3,4  | 3,8  | 4,1  | 4,3  | 4,6  | 4,9                  | 6,0  | 7,0  | 7,8  | 8,5  | 9,2  | 9,8  | 10,4 |
| CEV14-S    | 5,3                              | 6,5  | 7,5  | 8,4  | 9,2  | 9,9  | 10,6 | 11,3 | 5,1                  | 6,2  | 7,1  | 8,0  | 8,7  | 9,4  | 10,1 | 10,7 | 4,9                  | 6,0  | 7,0  | 7,8  | 8,5  | 9,2  | 9,8  | 10,4 |
| CEV16-S    | 7,0                              | 8,5  | 9,9  | 11,0 | 12,1 | 13,0 | 13,9 | 14,8 | 6,6                  | 8,1  | 9,4  | 10,5 | 11,5 | 12,4 | 13,3 | 14,1 | 6,5                  | 7,9  | 9,1  | 10,2 | 11,2 | 12,1 | 12,9 | 13,7 |
| CEV18-S    | 8,6                              | 10,6 | 12,2 | 13,6 | 14,9 | 16,1 | 17,3 | 18,3 | 8,2                  | 10,1 | 11,6 | 13,0 | 14,2 | 15,4 | 16,4 | 17,4 | 8,0                  | 9,8  | 11,3 | 12,6 | 13,9 | 15,0 | 16,0 | 17,0 |
| CEV24-S    | 14,5                             | 17,8 | 20,5 | 23,0 | 25,1 | 27,2 | 29,0 | 30,8 | 13,8                 | 16,9 | 19,5 | 21,8 | 23,9 | 25,8 | 27,6 | 29,3 | 13,5                 | 16,5 | 19,0 | 21,3 | 23,3 | 25,2 | 26,9 | 28,5 |
| CEV26-S    | 16,1                             | 19,7 | 22,7 | 25,4 | 27,8 | 30,1 | 32,1 | 34,1 | 15,3                 | 18,7 | 21,6 | 24,2 | 26,5 | 28,6 | 30,6 | 32,4 | 14,9                 | 18,2 | 21,1 | 23,5 | 25,8 | 27,9 | 29,8 | 31,6 |
| CEV30-S    | 20,4                             | 25,0 | 28,9 | 32,3 | 35,4 | 38,2 | 40,9 | 43,4 | 19,5                 | 23,8 | 27,5 | 30,8 | 33,7 | 36,4 | 38,9 | 41,3 | 18,9                 | 23,2 | 26,8 | 30,0 | 32,8 | 35,4 | 37,9 | 40,2 |
| CEV32-S    | 22,1                             | 27,1 | 31,2 | 34,9 | 38,3 | 41,3 | 44,2 | 46,9 | 21,0                 | 25,7 | 29,7 | 33,2 | 36,4 | 39,3 | 42,0 | 44,6 | 20,5                 | 25,1 | 28,9 | 32,4 | 35,4 | 38,3 | 40,9 | 43,4 |

| Valve Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 4,7                              | 5,7  | 6,6  | 7,4  | 8,1  | 8,8  | 9,4  | 9,9  | 4,5                  | 5,5  | 6,4  | 7,2  | 7,8  | 8,5  | 9,0  | 9,6  |
| CEV14-S    | 4,7                              | 5,7  | 6,6  | 7,4  | 8,1  | 8,8  | 9,4  | 9,9  | 4,5                  | 5,5  | 6,4  | 7,2  | 7,8  | 8,5  | 9,0  | 9,6  |
| CEV16-S    | 6,2                              | 7,5  | 8,7  | 9,7  | 10,7 | 11,5 | 12,3 | 13,1 | 5,9                  | 7,3  | 8,4  | 9,4  | 10,3 | 11,1 | 11,9 | 12,6 |
| CEV18-S    | 7,6                              | 9,3  | 10,8 | 12,0 | 13,2 | 14,3 | 15,2 | 16,2 | 7,4                  | 9,0  | 10,4 | 11,6 | 12,7 | 13,8 | 14,7 | 15,6 |
| CEV24-S    | 12,8                             | 15,7 | 18,1 | 20,3 | 22,2 | 24,0 | 25,6 | 27,2 | 12,4                 | 15,1 | 17,5 | 19,6 | 21,4 | 23,1 | 24,7 | 26,2 |
| CEV26-S    | 14,2                             | 17,4 | 20,1 | 22,4 | 24,6 | 26,5 | 28,4 | 30,1 | 13,7                 | 16,8 | 19,4 | 21,6 | 23,7 | 25,6 | 27,4 | 29,0 |
| CEV30-S    | 18,0                             | 22,1 | 25,5 | 28,5 | 31,3 | 33,8 | 36,1 | 38,3 | 17,4                 | 21,3 | 24,6 | 27,5 | 30,2 | 32,6 | 34,8 | 36,9 |
| CEV32-S    | 19,5                             | 23,9 | 27,6 | 30,8 | 33,8 | 36,5 | 39,0 | 41,4 | 18,8                 | 23,0 | 26,6 | 29,7 | 32,6 | 35,2 | 37,6 | 39,9 |

-40°C is allowable with standard CEC stators only (no ATEX stators).

R454C

| Valve Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 1,9                              | 2,4  | 2,8  | 3,1  | 3,4  | 3,6  | 3,9  | 4,1  | 1,8                  | 2,2  | 2,6  | 2,9  | 3,2  | 3,4  | 3,7  | 3,9  | 4,1                  | 5,0  | 5,8  | 6,5  | 7,1  | 7,6  | 8,2  | 8,7  |
| CEV14-S    | 4,5                              | 5,5  | 6,4  | 7,2  | 7,8  | 8,5  | 9,1  | 9,6  | 4,3                  | 5,2  | 6,0  | 6,7  | 7,4  | 8,0  | 8,5  | 9,0  | 4,1                  | 5,0  | 5,8  | 6,5  | 7,1  | 7,6  | 8,2  | 8,7  |
| CEV16-S    | 5,9                              | 7,3  | 8,4  | 9,4  | 10,3 | 11,1 | 11,9 | 12,6 | 5,6                  | 6,9  | 7,9  | 8,9  | 9,7  | 10,5 | 11,2 | 11,9 | 5,4                  | 6,6  | 7,6  | 8,5  | 9,3  | 10,0 | 10,7 | 11,4 |
| CEV18-S    | 7,4                              | 9,0  | 10,4 | 11,6 | 12,8 | 13,8 | 14,7 | 15,6 | 6,9                  | 8,5  | 9,8  | 11,0 | 12,0 | 13,0 | 13,9 | 14,7 | 6,6                  | 8,1  | 9,4  | 10,5 | 11,5 | 12,4 | 13,3 | 14,1 |
| CEV24-S    | 12,4                             | 15,2 | 17,5 | 19,6 | 21,5 | 23,2 | 24,8 | 26,3 | 11,7                 | 14,3 | 16,5 | 18,4 | 20,2 | 21,8 | 23,3 | 24,7 | 11,2                 | 13,7 | 15,8 | 17,6 | 19,3 | 20,9 | 22,3 | 23,7 |
| CEV26-S    | 13,7                             | 16,8 | 19,4 | 21,7 | 23,8 | 25,7 | 27,4 | 29,1 | 12,9                 | 15,8 | 18,3 | 20,4 | 22,4 | 24,2 | 25,8 | 27,4 | 12,4                 | 15,1 | 17,5 | 19,5 | 21,4 | 23,1 | 24,7 | 26,2 |
| CEV30-S    | 17,4                             | 21,4 | 24,7 | 27,6 | 30,2 | 32,6 | 34,9 | 37,0 | 16,4                 | 20,1 | 23,2 | 26,0 | 28,5 | 30,7 | 32,9 | 34,8 | 15,7                 | 19,2 | 22,2 | 24,8 | 27,2 | 29,4 | 31,4 | 33,3 |
| CEV32-S    | 18,9                             | 23,1 | 26,7 | 29,8 | 32,7 | 35,3 | 37,7 | 40,0 | 17,7                 | 21,7 | 25,1 | 28,1 | 30,7 | 33,2 | 35,5 | 37,6 | 17,0                 | 20,8 | 24,0 | 26,8 | 29,4 | 31,8 | 34,0 | 36,0 |

| Valve Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      | T <sub>E</sub> -40°C |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|            | 4                                | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 4                    | 6    | 8    | 10   | 12   | 14   | 16   | 18   |
| CEV10-S    | 3,9                              | 4,8  | 5,5  | 6,1  | 6,7  | 7,3  | 7,8  | 8,2  | 3,7                  | 4,5  | 5,2  | 5,8  | 6,4  | 6,9  | 7,4  | 7,8  |
| CEV14-S    | 3,9                              | 4,8  | 5,5  | 6,1  | 6,7  | 7,3  | 7,8  | 8,2  | 3,7                  | 4,5  | 5,2  | 5,8  | 6,4  | 6,9  | 7,4  | 7,8  |
| CEV16-S    | 5,1                              | 6,2  | 7,2  | 8,1  | 8,8  | 9,5  | 10,2 | 10,8 | 4,8                  | 5,9  | 6,8  | 7,6  | 8,4  | 9,0  | 9,7  | 10,2 |
| CEV18-S    | 6,3                              | 7,7  | 8,9  | 10,0 | 10,9 | 11,8 | 12,6 | 13,4 | 6,0                  | 7,3  | 8,5  | 9,5  | 10,4 | 11,2 | 12,0 | 12,7 |
| CEV24-S    | 10,6                             | 13,0 | 15,0 | 16,8 | 18,4 | 19,8 | 21,2 | 22,5 | 10,1                 | 12,3 | 14,2 | 15,9 | 17,4 | 18,8 | 20,1 | 21,3 |
| CEV26-S    | 11,7                             | 14,4 | 16,6 | 18,6 | 20,3 | 22,0 | 23,5 | 24,9 | 11,1                 | 13,6 | 15,7 | 17,6 | 19,3 | 20,8 | 22,3 | 23,6 |
| CEV30-S    | 14,9                             | 18,3 | 21,1 | 23,6 | 25,9 | 28,0 | 29,9 | 31,7 | 14,2                 | 17,3 | 20,0 | 22,4 | 24,5 | 26,5 | 28,3 | 30,0 |
| CEV32-S    | 16,1                             | 19,8 | 22,8 | 25,5 | 28,0 | 30,2 | 32,3 | 34,2 | 15,3                 | 18,7 | 21,6 | 24,2 | 26,5 | 28,6 | 30,6 | 32,5 |

-40°C is allowable with standard CEC stators only (no ATEX stators).

T<sub>E</sub> = evaporator temperature  
Capacity is based on 38°C condenser temperature and 0°C subcooling.

R513A

| Valve<br>Type | T <sub>E</sub> 5°C               |      |      |      |      |      |      |      | T <sub>E</sub> -10°C |      |      |      |      |      |      |      | T <sub>E</sub> -20°C |      |      |      |      |      |      |      |
|---------------|----------------------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|----------------------|------|------|------|------|------|------|------|
|               | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |                      |      |      |      |      |      |      |      |
|               | 2,5                              | 4    | 5,5  | 7    | 8,5  | 10   | 11,5 | 13   | 2,5                  | 4    | 5,5  | 7    | 8,5  | 10   | 11,5 | 13   | 2,5                  | 4    | 5,5  | 7    | 8,5  | 10   | 11,5 | 13   |
| CEV10-S       | 1,5                              | 1,9  | 2,2  | 2,5  | 2,8  | 3,0  | 3,2  | 3,4  | 1,4                  | 1,8  | 2,1  | 2,3  | 2,6  | 2,8  | 3,0  | 3,2  | 3,1                  | 3,9  | 4,5  | 5,1  | 5,6  | 6,1  | 6,6  | 7,0  |
| CEV14-S       | 3,5                              | 4,4  | 5,2  | 5,9  | 6,5  | 7,0  | 7,5  | 8,0  | 3,2                  | 4,1  | 4,8  | 5,4  | 6,0  | 6,5  | 7,0  | 7,4  | 3,1                  | 3,9  | 4,5  | 5,1  | 5,6  | 6,1  | 6,6  | 7,0  |
| CEV16-S       | 4,6                              | 5,8  | 6,8  | 7,7  | 8,5  | 9,2  | 9,9  | 10,5 | 4,3                  | 5,4  | 6,3  | 7,1  | 7,8  | 8,5  | 9,1  | 9,7  | 4,0                  | 5,1  | 6,0  | 6,7  | 7,4  | 8,0  | 8,6  | 9,2  |
| CEV18-S       | 5,7                              | 7,2  | 8,4  | 9,5  | 10,5 | 11,4 | 12,2 | 13,0 | 5,3                  | 6,7  | 7,8  | 8,8  | 9,7  | 10,5 | 11,3 | 12,0 | 5,0                  | 6,3  | 7,4  | 8,3  | 9,2  | 9,9  | 10,7 | 11,3 |
| CEV24-S       | 9,6                              | 12,1 | 14,2 | 16,0 | 17,6 | 19,1 | 20,5 | 21,8 | 8,9                  | 11,2 | 13,1 | 14,8 | 16,3 | 17,7 | 19,0 | 20,2 | 8,4                  | 10,6 | 12,4 | 14,0 | 15,4 | 16,7 | 17,9 | 19,1 |
| CEV26-S       | 10,6                             | 13,4 | 15,7 | 17,7 | 19,5 | 21,2 | 22,7 | 24,2 | 9,8                  | 12,4 | 14,6 | 16,4 | 18,1 | 19,6 | 21,0 | 22,4 | 9,3                  | 11,7 | 13,7 | 15,5 | 17,1 | 18,5 | 19,9 | 21,1 |
| CEV30-S       | 13,5                             | 17,0 | 20,0 | 22,5 | 24,8 | 26,9 | 28,9 | 30,7 | 12,5                 | 15,8 | 18,5 | 20,9 | 23,0 | 25,0 | 26,8 | 28,5 | 11,8                 | 14,9 | 17,5 | 19,7 | 21,7 | 23,5 | 25,3 | 26,9 |
| CEV32-S       | 14,6                             | 18,4 | 21,6 | 24,4 | 26,8 | 29,1 | 31,2 | 33,2 | 13,5                 | 17,1 | 20,0 | 22,6 | 24,9 | 27,0 | 28,9 | 30,8 | 12,7                 | 16,1 | 18,9 | 21,3 | 23,5 | 25,4 | 27,3 | 29,0 |

| Valve Type | T <sub>E</sub> -30°C             |      |      |      |      |      |      |      |
|------------|----------------------------------|------|------|------|------|------|------|------|
|            | Pressure Drop Across Valve (bar) |      |      |      |      |      |      |      |
|            | 2,5                              | 4    | 5,5  | 7    | 8,5  | 10   | 11,5 | 13   |
| CEV10-S    | 2,9                              | 3,7  | 4,3  | 4,8  | 5,3  | 5,8  | 6,2  | 6,6  |
| CEV14-S    | 2,9                              | 3,7  | 4,3  | 4,8  | 5,3  | 5,8  | 6,2  | 6,6  |
| CEV16-S    | 3,8                              | 4,8  | 5,6  | 6,4  | 7,0  | 7,6  | 8,1  | 8,7  |
| CEV18-S    | 4,7                              | 5,9  | 7,0  | 7,9  | 8,7  | 9,4  | 10,1 | 10,7 |
| CEV24-S    | 7,9                              | 10,0 | 11,7 | 13,2 | 14,6 | 15,8 | 17,0 | 18,0 |
| CEV26-S    | 8,8                              | 11,1 | 13,0 | 14,7 | 16,1 | 17,5 | 18,8 | 20,0 |
| CEV30-S    | 11,1                             | 14,1 | 16,5 | 18,6 | 20,5 | 22,3 | 23,9 | 25,4 |
| CEV32-S    | 12,0                             | 15,2 | 17,9 | 20,1 | 22,2 | 24,1 | 25,8 | 27,4 |

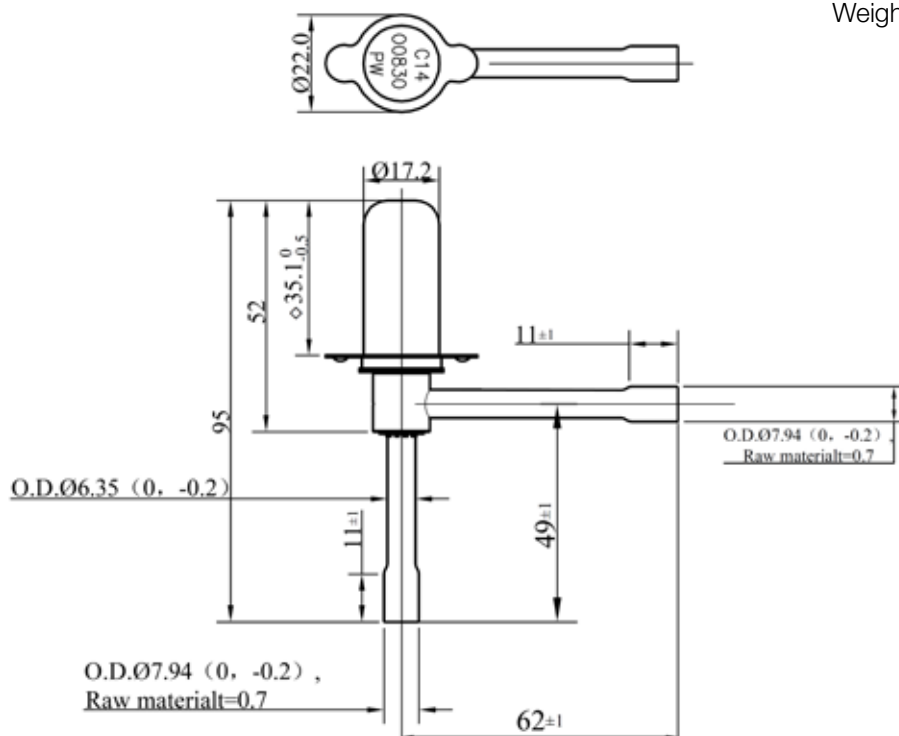
T<sub>E</sub> = evaporator temperature  
Capacity is based on 38°C condenser temperature and 0°C subcooling.

Liquid temperature correction factors (multipliers)

| Refrigerant | Liquid Temperature °C |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|             | -18                   | -12  | -7   | -1   | 4    | 10   | 16   | 21   | 27   | 32   | 38   | 43   | 49   | 54   | 60   |
| R134a       | 1,69                  | 1,63 | 1,56 | 1,49 | 1,42 | 1,35 | 1,28 | 1,21 | 1,14 | 1,07 | 1,00 | 0,93 | 0,86 | 0,78 | 0,71 |
| R407C       | 1,72                  | 1,65 | 1,58 | 1,51 | 1,44 | 1,37 | 1,30 | 1,22 | 1,15 | 1,08 | 1,00 | 0,92 | 0,85 | 0,77 | 0,69 |
| R410A       | 1,77                  | 1,70 | 1,62 | 1,55 | 1,48 | 1,40 | 1,32 | 1,25 | 1,17 | 1,09 | 1,00 | 0,92 | 0,83 | 0,73 | 0,63 |
| R290        | 1,69                  | 1,63 | 1,56 | 1,49 | 1,42 | 1,36 | 1,29 | 1,22 | 1,15 | 1,07 | 1,00 | 0,93 | 0,85 | 0,78 | 0,70 |
| R32         | 1,58                  | 1,53 | 1,47 | 1,41 | 1,36 | 1,30 | 1,24 | 1,19 | 1,13 | 1,06 | 1,00 | 0,94 | 0,87 | 0,80 | 0,73 |
| R448A       | 1,61                  | 1,55 | 1,50 | 1,44 | 1,38 | 1,32 | 1,26 | 1,20 | 1,13 | 1,07 | 1,00 | 0,93 | 0,86 | 0,79 | 0,71 |
| R449A       | 1,62                  | 1,56 | 1,50 | 1,44 | 1,38 | 1,32 | 1,26 | 1,20 | 1,13 | 1,07 | 1,00 | 0,93 | 0,86 | 0,78 | 0,70 |
| R452A       | 1,99                  | 1,90 | 1,80 | 1,70 | 1,61 | 1,51 | 1,41 | 1,31 | 1,21 | 1,11 | 1,00 | 0,89 | 0,79 | 0,68 | 0,56 |
| R452B       | 1,68                  | 1,61 | 1,55 | 1,48 | 1,42 | 1,35 | 1,28 | 1,22 | 1,15 | 1,07 | 1,00 | 0,93 | 0,85 | 0,77 | 0,69 |
| R454A       | 1,79                  | 1,71 | 1,63 | 1,56 | 1,48 | 1,40 | 1,33 | 1,25 | 1,17 | 1,08 | 1,00 | 0,92 | 0,83 | 0,74 | 0,65 |
| R454C       | 1,83                  | 1,75 | 1,67 | 1,59 | 1,51 | 1,43 | 1,34 | 1,26 | 1,17 | 1,09 | 1,00 | 0,91 | 0,82 | 0,73 | 0,64 |
| R513A       | 1,81                  | 1,73 | 1,65 | 1,57 | 1,49 | 1,41 | 1,33 | 1,25 | 1,17 | 1,08 | 1,00 | 0,92 | 0,83 | 0,75 | 0,66 |

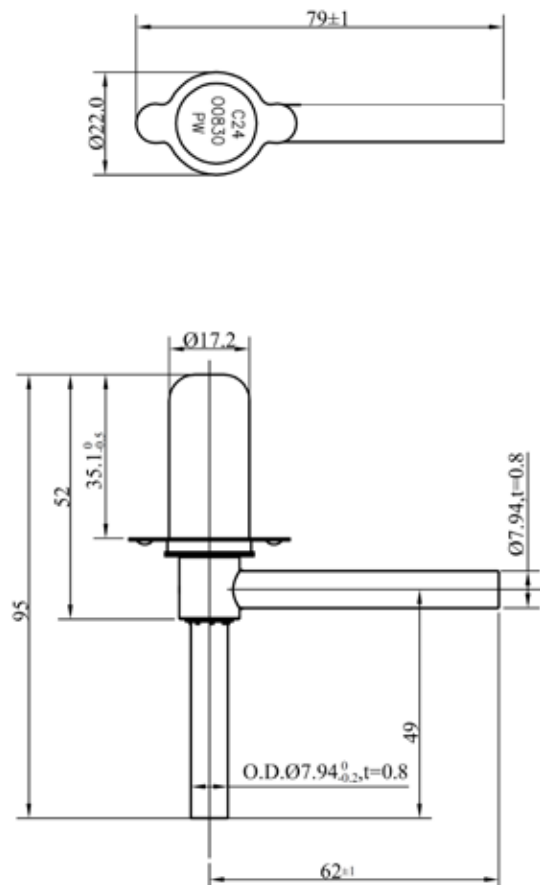
## DIMENSIONS AND WEIGHTS

### CEV S BODY [mm] - CEV10-S to CEV18-S



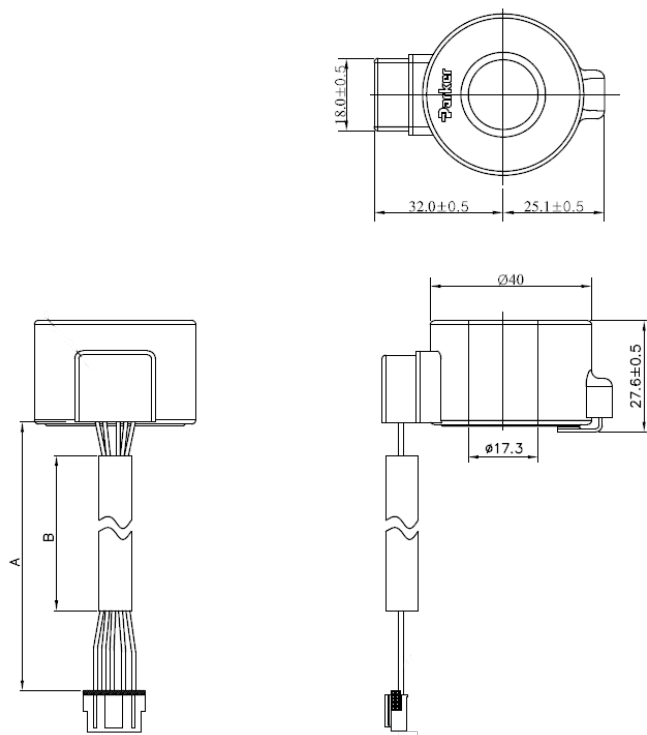
Weight: 50 g

### CEV S BODY [mm] - CEV24-S to CEV32-S



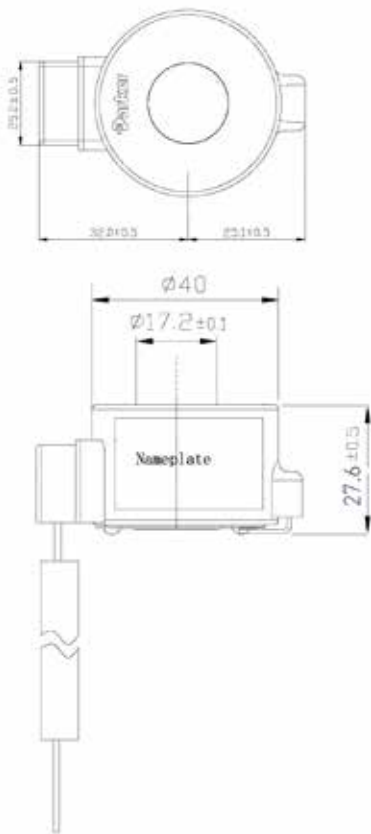
Weight: 52 g

STANDARD COIL [mm]



Weight: 117 g

ATEX COIL [mm]



Weight: 117 g

ATEX nameplate detail



Parker Hannifin Motion and Control (Wuxi) Company Ltd.

Type: CEV series  
Date Code: XXXXX

 II 3G Ex ec IIC Gc U

Ambient And Fluid Temp.: -30℃~+70℃  
U<sub>N</sub>=12V DC, I<sub>N</sub>: ≤0.26A (Each phase)

No.200, Furong Zhong Si Road, Xishan Economic Development Zone, Wuxi 214192, Jiangsu, China

# Parker Worldwide

## **United Arab Emirates**

### **Middle East**

**Sarkis OHANNESSIAN**

Tel +961 3334622

sohannessian@parker.com

## **Germany, Austria and German speaking part of Switzerland**

**Francesco GALANTE**

Tel +49 (0)175 5756 032

francesco.galante@parker.com

## **Spain and Portugal**

**Alberto PEÑA**

Tel +34 609 153 154

alberto.pena@parker.com

## **France, Belgium, French speaking part of Switzerland**

**Goska WARNECK**

Tel + 33 (0)6 73 89 36 08

gwarneck@parker.com

## **Italy, Greece, Malta, Cyprus Italian speaking part of Switzerland**

**Andrea BRAGA**

Tel +39 334 6944386

abraga@parker.com

## **Baltic Countries, Eastern and Central Europe, Africa**

**Eliane EMERIT-BONNOT**

Tel +33 (0)6 73 89 36 01

ebonnot@parker.com

## **Turkey**

parker.turkey@parker.com

## **UK and**

### **Northern Europe**

**Kenny ADAMSON**

Tel +44 77853 71229

kadamson@parker.com

## **Customer Service:**

### **Parker Hannifin Ltd**

*Instrumentation Group*

*Refrigeration and*

*Air Conditioning Europe*

Manvers House

Office 21

Pioneer Close

Wath Upon Dearne

Rotherham S63 7JZ

United Kingdom

Tel +44 (0) 1709 774600

Fax +44 (0) 1709 774601

racecustomerservice@parker.com

www.parker.com/race

Your local authorized Parker distributor

