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Electronic Expansion Valve CEV Series

RACE Catalog CEV Series, April 2018

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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 step 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. It is suggested that in forward flow mode (flow entering side fitting) 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. Maxi-mum 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

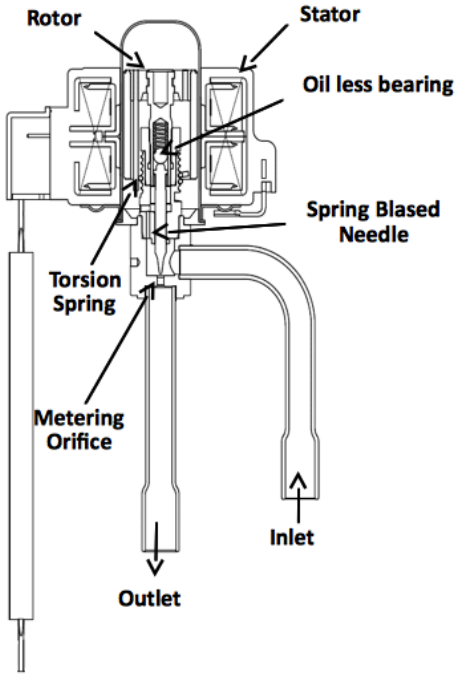
The EEV valve is a unipolar (5 wire) type. The EEV unipolar motor utilizes two windings, each with a center tap. The two windings, plus a common center tap from each, form the five wire connection common to unipolar step motors (Orange, Red, Yellow, Black, Gray). The center tap (Gray) creates four independent 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

		Phase			
Pulse	Steps Rotated	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 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.

INTERNAL VIEW



NOMENCLATURE

Valve

CEV	26
CEV Series	Port Size Ø2.6mm

Stator

CEC	42	Y	5
CEV Stator	Lead Wire Length 420mm	YST Connector	Number of Pins

Stator Atex Approved

CEC	150	Y	5	3
CEV Stator	Lead Wire Length 1500mm		Number of Pins	Series number

TECHNICAL INFORMATION

Valve

Model	Port Size [Ømm]	Nominal Capacity	
		R-410A	
		Tons	kW
CEV14	1.4	2.5	8.8
CEV16	1.6	3.3	11.5
CEV18	1.8	4.1	14.3
CEV24	2.4	6.8	24.0
CEV26	2.6	7.6	26.6
CEV30	3	9.6	33.8
CEV32	3.2	10.4	36.5

Nominal condition:
R-410A (11 bar Pressure drop, 5°C Evaporating temperature, 38°C Condensing temperature)

Stator

Model	Lead Wire Length	Rated Voltage	Wire diameter
CEC42Y5-2	420mm	12VDC±10%	Ø0.15mm
CEC150Y5-3	1500mm	12VDC±10%	Ø0.15mm

Technical Specifications

CEV Body + Standard Coil / + ATEX Approved

	CEV Body + standard coil	CEV Body + ATEX Approved
Drive Type	Permanent Magnet Step Motor Direct Drive	
Pulsing Type	Unipolar	
Flow Path	Bi-flow Capable	
Resolution	500 ± 20 PPS	
Open Step	32 ± 20 PPS	
Line Travel / Pulse	0.00625mm	
Operating Stroke	3.125 mm	
Step Rate	30 ~ 80 PPS	
Full Motion Transit Time	6.25 Sec (@80PPS) / 16.67 Sec (@30PPS)	
MOPD	34 Bar	
MOP	45 Bar	
Media Temp.	(40)°C + 70°C	(30)°C + 70°C
Ambient Temp.	(40)°C + 70°C	(30)°C + 70°C
Moisture / Humidity	≤ 95%RH	
Inter. Leakage (Max)	≤ 250cc/min @ 10Bar	
Rated Voltage	12 V DC ± 10%	
Rated Current	260mA / Phase	
Phase Risistance	46 ± 3 Ohm	
Dielectric Strength	1800 VAC, 1 Sec, (in air)	
Insulation Resistance	> 100MΩ @ 500V DC	
Insulation Class	Class E	
Compatible Refrigerant	R290, R32, R134a, R410A, R407C, R507	
ATEX Mark	NA	II 3G Ex ec IIC Gc

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 of forty feet. 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 121°C during installation. Use of flowing dry nitrogen during installation is recommended to prevent the formation of toxic gases and copper oxides.
7. Once valve has cooled, replace stator. Both tabs at base of stator must engage retaining ring on valve body.
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 18 AWG or heavier stranded copper wire. Extension length should not exceed 100 feet between valve and step motor controller.
9. Connect wiring to controller. Refer to controller manufacturer's instructions for proper wiring connections.

CAPACITY TABLES in kW (at evaporator temperature °C)

R-134a

Valve Type	5°C								-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
CEV-14	4,12	5,21	6,11	6,90	7,60	8,2	8,8	9,4	3,86	4,89	5,73	6,47	7,13	7,7	8,3	8,8
CEV-16	5,41	6,85	8,0	9,1	10,0	10,8	11,6	12,3	5,07	6,42	7,5	8,5	9,4	10,1	10,9	11,6
CEV-18	6,70	8,5	9,9	11,2	12,4	13,4	14,4	15,3	6,28	7,9	9,3	10,5	11,6	12,6	13,5	14,3
CEV-24	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
CEV-26	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
CEV-30	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
CEV-32	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

R-404A

Valve Type	5°C								-10°C								-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
CEV-14	3,69	4,52	5,22	5,84	6,40	6,9	7,4	7,8	3,43	4,20	4,85	5,43	5,94	6,4	6,9	7,3	3,24	3,97	4,58	5,13	5,61	6,1	6,5	6,9
CEV-16	4,85	5,94	6,9	7,7	8,4	9,1	9,7	10,3	4,51	5,52	6,4	7,1	7,8	8,4	9,0	9,6	4,26	5,21	6,0	6,7	7,4	8,0	8,5	9,0
CEV-18	6,01	7,4	8,5	9,5	10,4	11,2	12,0	12,7	5,58	6,8	7,9	8,8	9,7	10,4	11,2	11,8	5,27	6,5	7,5	8,3	9,1	9,9	10,5	11,2
CEV-24	10,1	12,4	14,3	16,0	17,5	18,9	20,2	21,4	9,4	11,5	13,3	14,8	16,3	17,6	18,8	19,9	8,9	10,9	12,5	14,0	15,4	16,6	17,7	18,8
CEV-26	11,2	13,7	15,8	17,7	19,4	20,9	22,4	23,7	10,4	12,7	14,7	16,4	18,0	19,4	20,8	22,0	9,8	12,0	13,9	15,5	17,0	18,4	19,6	20,8
CEV-30	14,2	17,4	20,1	22,5	24,6	26,6	28,4	30,2	13,2	16,2	18,7	20,9	22,9	24,7	26,4	28,0	12,5	15,3	17,7	19,7	21,6	23,4	25,0	26,5
CEV-32	15,4	18,8	21,7	24,3	26,6	28,8	30,7	32,6	14,3	17,5	20,2	22,6	24,7	26,7	28,6	30,3	13,5	16,5	19,1	21,3	23,4	25,2	27,0	28,6

Valve Type	-30°C							
	Pressure Drop Across Valve (bar)							
	4	6	8	10	12	14	16	18
CEV-14	3,03	3,71	4,29	4,79	5,25	5,7	6,1	6,4
CEV-16	3,98	4,87	5,6	6,3	6,9	7,4	8,0	8,4
CEV-18	4,93	6,0	7,0	7,8	8,5	9,2	9,9	10,5
CEV-24	8,3	10,1	11,7	13,1	14,4	15,5	16,6	17,6
CEV-26	9,2	11,2	13,0	14,5	15,9	17,2	18,3	19,5
CEV-30	11,7	14,3	16,5	18,4	20,2	21,8	23,3	24,8
CEV-32	12,6	15,4	17,8	19,9	21,8	23,6	25,2	26,7

R-407C

Valve Type	5°C								-10°C								-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
CEV-14	5,14	6,29	7,26	8,12	8,90	9,6	10,3	10,9	4,84	5,93	6,85	7,66	8,39	9,1	9,7	10,3	4,64	5,68	6,56	7,33	8,03	8,7	9,3	9,8
CEV-16	6,74	8,26	9,5	10,7	11,7	12,6	13,5	14,3	6,36	7,79	9,0	10,1	11,0	11,9	12,7	13,5	6,09	7,46	8,6	9,6	10,5	11,4	12,2	12,9
CEV-18	8,35	10,2	11,8	13,2	14,5	15,6	16,7	17,7	7,88	9,6	11,1	12,5	13,6	14,7	15,8	16,7	7,54	9,2	10,7	11,9	13,1	14,1	15,1	16,0
CEV-24	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
CEV-26	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
CEV-30	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
CEV-32	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

Capacity is based on 38°C condenser temperature and 0°C subcooling.

R-410a

Valve Type	5°C								-10°C								-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
CEV-14	5,92	7,49	8,78	9,91	10,92	11,8	12,7	13,5	5,72	7,23	8,48	9,57	10,55	11,4	12,3	13,0	5,57	7,04	8,26	9,32	10,27	11,1	11,9	12,7
CEV-16	7,77	9,83	11,5	13,0	14,3	15,5	16,7	17,7	7,51	9,50	11,1	12,6	13,8	15,0	16,1	17,1	7,31	9,25	10,8	12,2	13,5	14,6	15,7	16,7
CEV-18	9,62	12,2	14,3	16,1	17,7	19,2	20,6	21,9	9,30	11,8	13,8	15,6	17,1	18,6	19,9	21,2	9,05	11,4	13,4	15,1	16,7	18,1	19,4	20,6
CEV-24	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
CEV-26	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
CEV-30	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
CEV-32	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

R-507

Valve Type	5°C								-10°C								-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
CEV-14	3,62	4,43	5,11	5,72	6,26	6,8	7,2	7,7	3,35	4,10	4,74	5,30	5,81	6,3	6,7	7,1	3,17	3,89	4,49	5,02	5,50	5,9	6,3	6,7
CEV-16	4,75	5,81	6,7	7,5	8,2	8,9	9,5	10,1	4,40	5,39	6,2	7,0	7,6	8,2	8,8	9,3	4,17	5,11	5,9	6,6	7,2	7,8	8,3	8,8
CEV-18	5,88	7,2	8,3	9,3	10,2	11,0	11,8	12,5	5,45	6,7	7,7	8,6	9,4	10,2	10,9	11,6	5,16	6,3	7,3	8,2	8,9	9,7	10,3	10,9
CEV-24	9,9	12,1	14,0	15,6	17,1	18,5	19,8	21,0	9,2	11,2	13,0	14,5	15,9	17,1	18,3	19,4	8,7	10,6	12,3	13,7	15,0	16,2	17,4	18,4
CEV-26	10,9	13,4	15,5	17,3	19,0	20,5	21,9	23,2	10,1	12,4	14,3	16,0	17,6	19,0	20,3	21,5	9,6	11,8	13,6	15,2	16,6	18,0	19,2	20,4
CEV-30	13,9	17,1	19,7	22,0	24,1	26,1	27,8	29,5	12,9	15,8	18,3	20,4	22,4	24,1	25,8	27,4	12,2	15,0	17,3	19,3	21,2	22,9	24,5	25,9
CEV-32	15,0	18,4	21,3	23,8	26,1	28,1	30,1	31,9	13,9	17,1	19,7	22,0	24,2	26,1	27,9	29,6	13,2	16,2	18,7	20,9	22,9	24,7	26,4	28,0

Valve Type	-30°C							
	Pressure Drop Across Valve (bar)							
	4	6	8	10	12	14	16	18
CEV-14	2,98	3,66	4,22	4,72	5,17	5,6	6,0	6,3
CEV-16	3,92	4,80	5,5	6,2	6,8	7,3	7,8	8,3
CEV-18	4,85	5,9	6,9	7,7	8,4	9,1	9,7	10,3
CEV-24	8,2	10,0	11,5	12,9	14,1	15,3	16,3	17,3
CEV-26	9,0	11,1	12,8	14,3	15,7	16,9	18,1	19,2
CEV-30	11,5	14,1	16,3	18,2	19,9	21,5	23,0	24,4
CEV-32	12,4	15,2	17,6	19,6	21,5	23,2	24,8	26,3

R-290

Valve Type	5°C								-10°C								-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
CEV-14	6,29	7,70	8,89	9,94	10,89	11,76	12,57	13,33	5,92	7,25	8,37	9,36	10,25	11,07	11,84	12,55	5,65	6,92	7,99	8,93	9,79	10,57	11,30	11,99
CEV-16	8,25	10,11	11,67	13,05	14,29	15,44	16,50	17,51	7,77	9,52	10,99	12,29	13,46	14,54	15,54	16,48	7,42	9,09	10,49	11,73	12,85	13,88	14,84	15,74
CEV-18	10,22	12,52	14,45	16,16	17,70	19,12	20,44	21,68	9,62	11,78	13,61	15,21	16,66	18,00	19,24	20,41	9,19	11,25	12,99	14,52	15,91	17,18	18,37	19,49
CEV-24	17,19	21,05	24,31	27,18	29,77	32,15	34,37	36,46	16,18	19,82	22,89	25,59	28,03	30,28	32,37	34,33	15,45	18,92	21,85	24,43	26,76	28,90	30,90	32,77
CEV-26	19,03	23,30	26,91	30,09	32,96	35,60	38,06	40,36	17,92	21,94	25,34	28,33	31,03	33,52	35,83	38,01	17,10	20,95	24,19	27,04	29,63	32,00	34,21	36,28
CEV-30	24,20	29,64	34,23	38,27	41,92	45,28	48,41	51,34	22,79	27,91	32,23	36,03	39,47	42,64	45,58	48,34	21,76	26,65	30,77	34,40	37,68	40,70	43,51	46,15
CEV-32	26,15	32,02	36,98	41,34	45,29	48,92	52,30	55,47	24,62	30,15	34,82	38,93	42,64	46,06	49,24	52,23	23,50	28,79	33,24	37,16	40,71	43,97	47,01	49,86

Capacity is based on 38°C condenser temperature and 0°C subcooling.

R-290

Valve Type	-30°C							
	Pressure Drop Across Valve (bar)							
	4	6	8	10	12	14	16	18
CEV-14	5,39	6,60	7,62	8,52	9,33	10,08	10,77	11,42
CEV-16	7,07	8,66	10,00	11,18	12,25	13,23	14,14	15,00
CEV-18	8,76	10,72	12,38	13,84	15,16	16,38	17,51	18,57
CEV-24	14,73	18,04	20,83	23,28	25,51	27,55	29,45	31,24
CEV-26	16,30	19,97	23,06	25,78	28,24	30,50	32,61	34,58
CEV-30	20,74	25,40	29,33	32,79	35,92	38,80	41,48	43,99
CEV-32	22,40	27,44	31,68	35,42	38,81	41,91	44,81	47,53

Valve Type	-40°C							
	Pressure Drop Across Valve (bar)							
	4	6	8	10	12	14	16	18
CEV-14	5,12	6,27	7,24	8,10	8,87	9,58	10,24	10,87
CEV-16	6,72	8,24	9,51	10,63	11,65	12,58	13,45	14,27
CEV-18	8,33	10,20	11,78	13,17	14,42	15,58	16,65	17,66
CEV-24	14,01	17,15	19,81	22,15	24,26	26,20	28,01	29,71
CEV-26	15,51	18,99	21,93	24,52	26,86	29,01	31,01	32,89
CEV-30	19,72	24,16	27,89	31,19	34,16	36,90	39,45	41,84
CEV-32	21,31	26,10	30,13	33,69	36,91	39,86	42,62	45,20

-40°C are recommended with standard CEV Coil (no Atex Compliant).

R-32

Valve Type	5°C								-10°C								-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
CEV-14	8,53	10,80	12,66	14,28	15,74	17,07	18,30	19,46	8,43	10,66	12,50	14,10	15,54	16,85	18,07	19,22	8,32	10,52	12,34	13,92	15,34	16,63	17,84	18,97
CEV-16	11,21	14,17	16,62	18,75	20,66	22,41	24,03	25,55	11,06	13,99	16,41	18,51	20,40	22,13	23,73	25,23	10,92	13,81	16,20	18,27	20,14	21,84	23,42	24,90
CEV-18	13,88	17,55	20,58	23,22	25,58	27,75	29,76	31,64	13,70	17,33	20,32	22,92	25,26	27,40	29,38	31,24	13,52	17,10	20,06	22,63	24,93	27,04	29,00	30,83
CEV-24	23,34	29,52	34,62	39,05	43,03	46,67	50,05	53,22	23,04	29,15	34,18	38,56	42,49	46,09	49,42	52,55	22,74	28,77	33,73	38,06	41,94	45,49	48,78	51,86
CEV-26	25,84	32,68	38,32	43,23	47,64	51,67	55,41	58,92	25,51	32,27	37,84	42,69	47,04	51,02	54,71	58,17	25,18	31,85	37,35	42,13	46,43	50,36	54,00	57,42
CEV-30	32,86	41,57	48,75	54,99	60,60	65,73	70,49	74,94	32,45	41,05	48,13	54,30	59,83	64,90	69,60	74,00	32,03	40,51	47,51	53,59	59,06	64,06	68,69	73,04
CEV-32	35,51	44,91	52,66	59,41	65,47	71,01	76,15	80,96	35,06	44,34	52,00	58,66	64,64	70,11	75,19	79,94	34,60	43,77	51,32	57,90	63,80	69,20	74,21	78,90

Valve Type	-30°C							
	Pressure Drop Across Valve (bar)							
	5	8	11	14	17	20	23	26
CEV-14	8,19	10,36	12,14	13,70	15,10	16,37	17,56	18,67
CEV-16	10,75	13,6	15,9	17,99	19,82	21,50	23,05	24,51
CEV-18	13,31	16,84	19,74	22,27	24,54	26,62	28,55	30,35
CEV-24	22,39	28,32	33,20	37,46	41,28	44,77	48,01	51,05
CEV-26	24,78	31,35	36,76	41,47	45,70	49,57	53,16	56,52
CEV-30	31,53	39,88	46,76	52,75	58,13	63,05	67,61	71,89
CEV-32	34,06	43,08	50,52	56,99	62,80	68,12	73,05	77,66

Capacity is based on 38°C condenser temperature and 0°C subcooling.

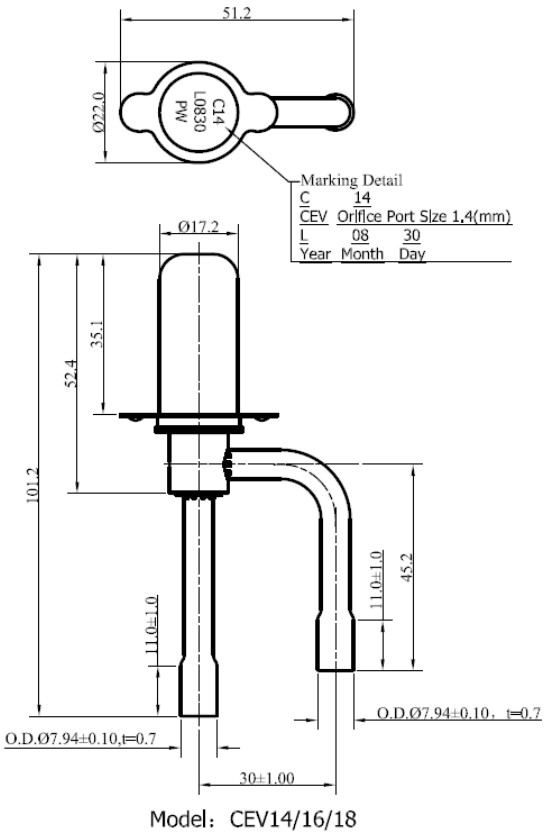
Valve Type	-40°C							
	Pressure Drop Across Valve (bar)							
	5	8	11	14	17	20	23	26
CEV-14	8,03	10,16	11,92	13,44	14,81	16,07	17,23	18,32
CEV-16	10,55	13,34	15,65	17,65	19,45	21,10	22,62	24,05
CEV-18	13,06	16,52	19,37	21,86	24,09	26,12	28,01	29,79
CEV-24	21,97	27,79	32,59	36,76	40,51	43,94	47,12	50,10
CEV-26	24,32	30,77	36,08	40,70	44,85	48,64	52,17	55,46
CEV-30	30,94	39,13	45,89	51,77	57,05	61,88	66,36	70,55
CEV-32	33,42	42,28	49,58	55,93	61,63	66,85	71,69	76,22

-40°C are recommended with standard CEV Coil (no Atex Compliant).

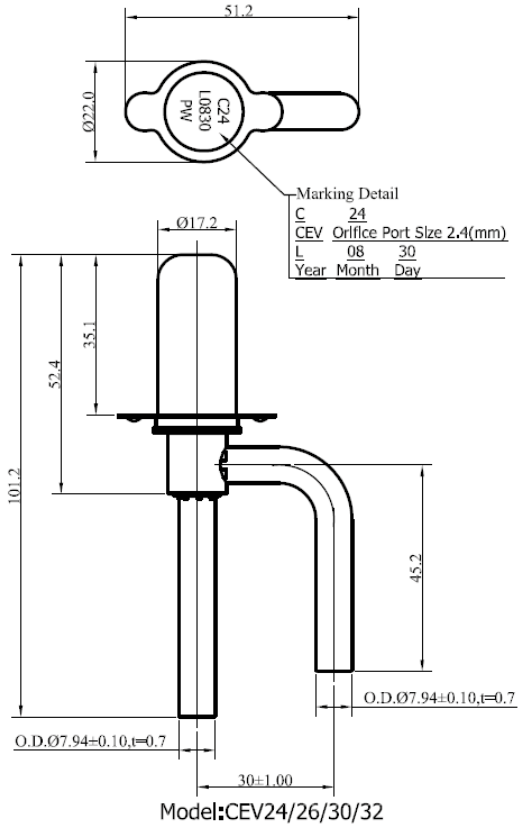
Liquid temperature correction factors

Refrigerant	Temperature °C														
	-18	-12	-7	-1	4	10	16	21	27	32	38	43	49	54	60
R-134a	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
R-404A	2,01	1,92	1,82	1,72	1,62	1,52	1,42	1,32	1,22	1,11	1,00	0,89	0,78	0,66	0,54
R-407C	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
R-410A	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
R-507	2,05	1,95	1,85	1,75	1,64	1,54	1,44	1,33	1,22	1,11	1,00	0,89	0,77	0,65	0,52
R-290	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
R-32	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

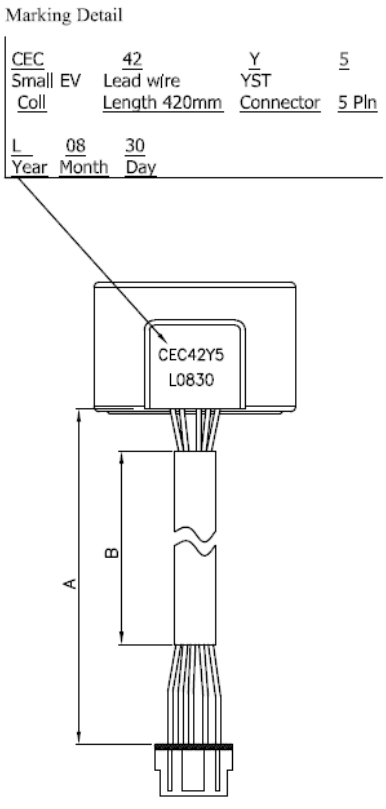
EXTERNAL DIMENSION [mm] CEV BODY + STANDARD COIL

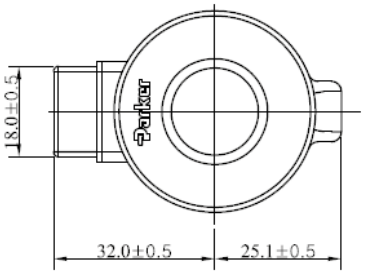


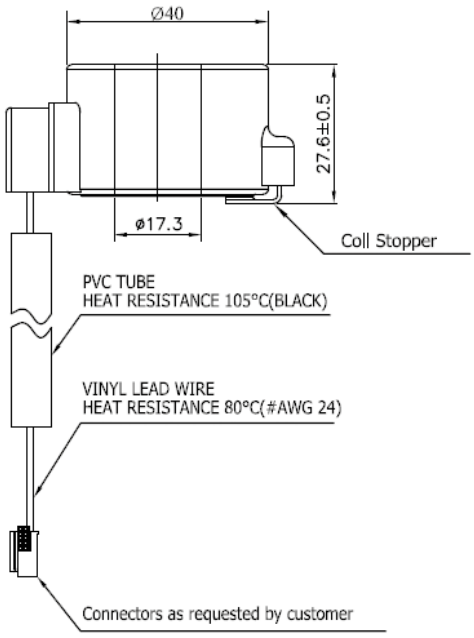
Model：CEV14/16/18



Model:CEV24/26/30/32







EXTERNAL DIMENSION [mm] CEV BODY + ATEX COIL

Fig. 2 Rough tube ODϕ6.35mm

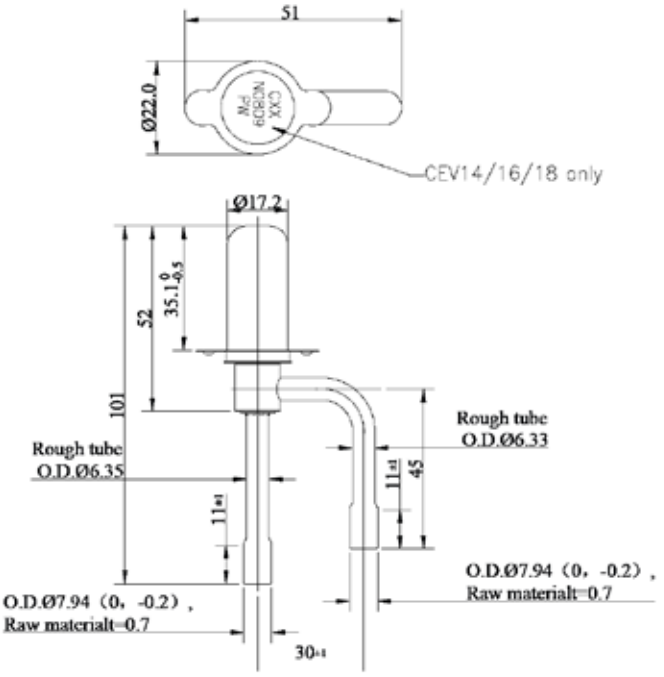
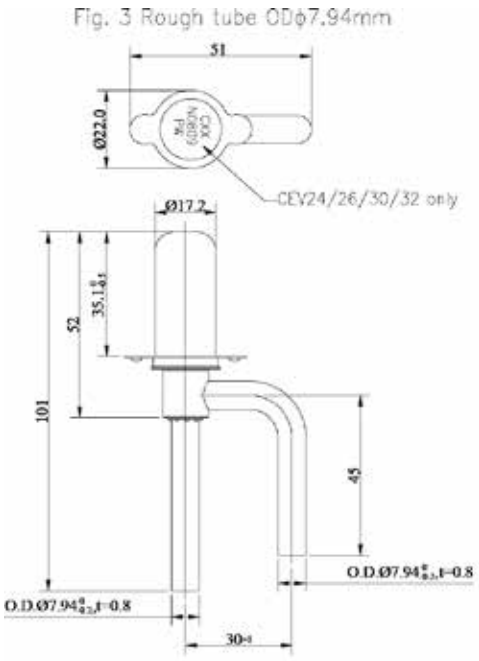
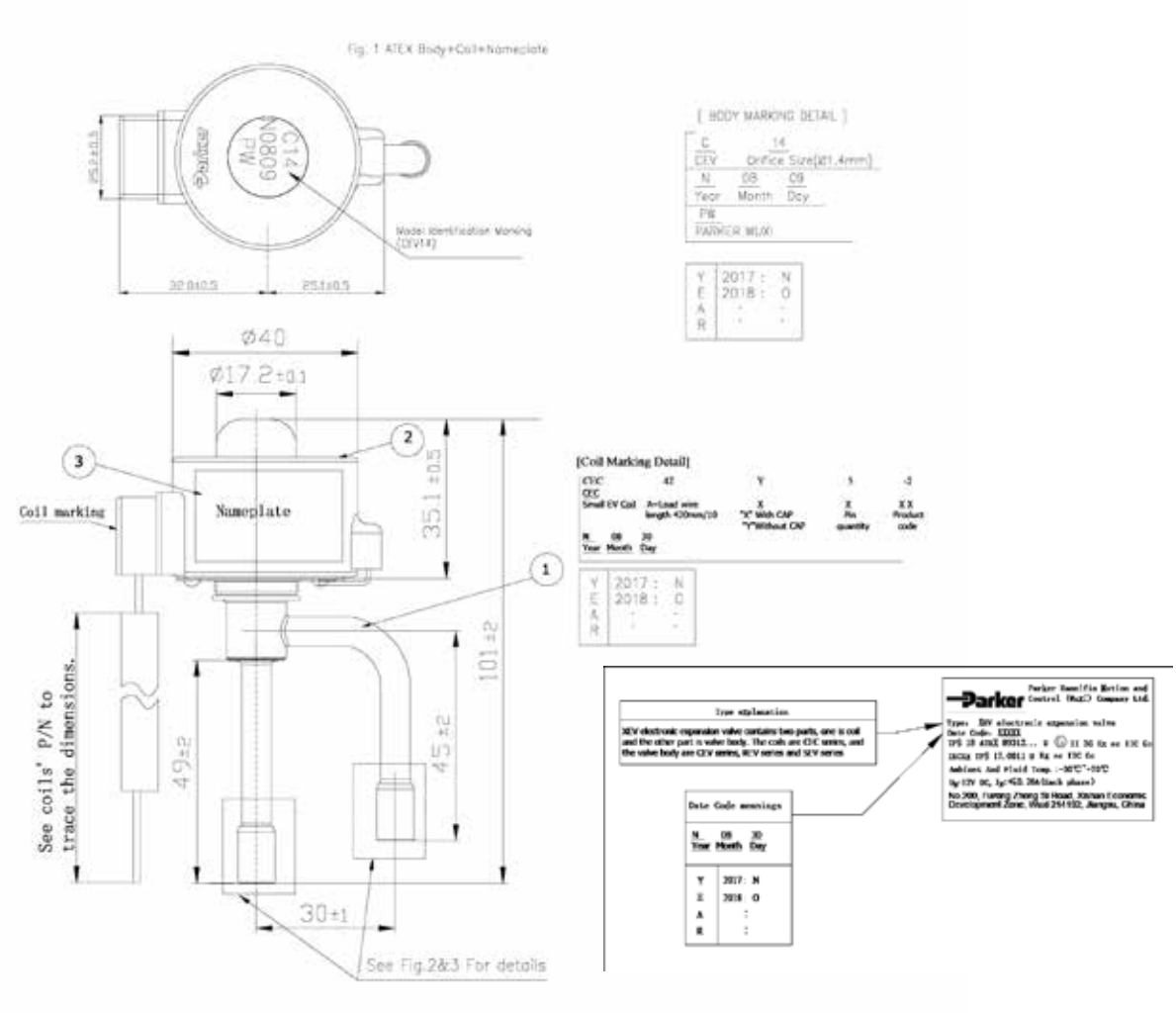


Fig. 3 Rough tube ODϕ7.94mm





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