Alco Controls

Electronic Expansion Valve CX2

Technical Bulletin

ALCO Controls CX2 Series is an electronically controlled expansion device. The capacity is defined through pulse width modulation. The CX2 can be driven by any electronic system having Triac output and providing the necessary electric power. The primary application is for display cases in commercial refrigeration such as supermarkets as well as small cold rooms.

CX2

Features

- Maximum working pressure 90 bar
- Factory test pressure 129 bar (100% of production)
- Burst pressure above 290 bar
- High MOPD up to 65 bar pressure differential
- Pulse width modulated
- Gate type port made from ceramic for high MOPD, longer life time and high reliability
- Shut off function eliminates the necessity of a separate solenoid valve
- Dampened plunger reduces noise and effects of water hammer
- One valve body can be combined with 6 orifices to make 7 capacity ranges, up to 35 kW (R744)
- Application CO_2 systems
- Inlet strainer mesh size 100
- Standard ASC coils (to be ordered separately)

Selection table

Description	Type	Part No.	Nominal capacity at 100% pulse period (open valve) kW, R 744	Remark
Valve without orifice 3/8" x 1/2" ODF	CX2-I00	801 090	35	Valve without orifice
Orifice 4	EXO-004	801 089	22.2	6 Interchangeable orifices with single valve CX2-I00
Orifice 3	EXO-003	801 088	14.6	
Orifice 2	EXO-002	801 087	8.7	
Orifice 1	EXO-001	801 086	6.5	
Orifice 0	EXO-000	801 085	3.3	
Orifice X	EXO-00X	801 084	1.8	

Remarks:

1) Nominal capacity at -25°C evaporating temperature, +15°C liquid temperature and 1K subcooling. For other operating conditions, please see quick selection table and correction factors.
2) The table quotes capacities at 100% duty cycle, i.e. valve open continuously. However, it is recommended to operate the valve at partial load (50-80%) to allow for system load fluctuations. When used with an EC2 case controller, the valve operates with a 6 second pulse width cycle.

Accessories

Description	Type	Part No.	
Coil 24 VAC / 50-60 Hz	ASC 24	801 062	-
Coil 230 VAC / 50-60 Hz	ASC 230	801 064	-
Connector Cable Assembly	ASC-N15	804 570	1.5 m cable length
	ASC-N30	804 571	3.0 m cable length
	ASC-N60	804 572	6.0 m cable length

EMERSON Climate Technologies

Quick Selection table

Condensing temperature ℃	Evaporating temperature ℃												Orifice/ valve
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	
	Capacity, kW R744												
15	0.6	0.9	1.2	1.3	1.5	1.6	1.7	1.8	1.9	1.9	2.0	2.0	**EXO-00X**
	1.1	1.7	2.1	2.4	2.7	2.9	3.0	3.2	3.3	3.4	3.5	3.5	**EXO-000**
	2.2	3.3	4.1	4.8	5.3	5.7	6.1	6.4	6.6	6.8	7.0	7.1	**EXO-001**
	2.9	4.5	5.6	6.4	7.1	7.7	8.2	8.6	8.9	9.2	9.4	9.5	**EXO-002**
	4.9	7.5	9.3	10.8	11.9	12.9	13.7	14.4	14.9	15.3	15.7	15.9	**EXO-003**
	7.4	11.3	14.1	16.3	18.1	19.5	20.8	21.8	22.6	23.2	23.7	24.1	**EXO-004**
	11.6	17.8	22.2	25.7	28.5	30.8	32.8	34.3	35.6	36.6	37.4	38.0	**CX2-I00**
10		0.6	1.0	1.2	1.4	1.6	1.7	1.8	1.9	1.9	2.0	2.0	**EXO-00X**
		1.1	1.8	2.2	2.5	2.8	3.0	3.2	3.3	3.4	3.5	3.6	**EXO-000**
		2.3	3.5	4.4	5.0	5.6	6.0	6.4	6.6	6.9	7.1	7.2	**EXO-001**
		3.1	4.7	5.9	6.8	7.5	8.1	8.5	8.9	9.2	9.5	9.7	**EXO-002**
		5.2	7.9	9.8	11.3	12.5	13.5	14.3	14.9	15.5	15.9	16.2	**EXO-003**
		7.8	12.0	14.9	17.1	18.9	20.4	21.6	22.6	23.4	24.0	24.5	**EXO-004**
		12.3	18.9	23.5	27.0	29.9	32.2	34.1	35.7	36.9	37.9	38.7	**CX2-I00**
5			0.7	1.0	1.3	1.5	1.6	1.7	1.8	1.9	2.0	2.0	**EXO-00X**
			1.2	1.8	2.3	2.6	2.9	3.1	3.3	3.4	3.5	3.6	**EXO-000**
			2.4	3.6	4.5	5.2	5.7	6.2	6.5	6.8	7.0	7.2	**EXO-001**
			3.2	4.9	6.1	7.0	7.7	8.3	8.7	9.1	9.4	9.7	**EXO-002**
			5.3	8.2	10.2	11.7	12.9	13.9	14.6	15.3	15.8	16.2	**EXO-003**
			8.1	12.4	15.4	17.7	19.5	21.0	22.2	23.1	23.9	24.5	**EXO-004**
			12.7	19.6	24.3	27.9	30.8	33.1	35.0	36.5	37.7	38.6	**CX2-I00**
0				0.7	1.0	1.3	1.5	1.6	1.8	1.9	1.9	2.0	**EXO-00X**
				1.2	1.9	2.3	2.6	2.9	3.1	3.3	3.4	3.5	**EXO-000**
				2.4	3.7	4.6	5.3	5.8	6.2	6.6	6.9	7.1	**EXO-001**
				3.2	5.0	6.2	7.1	7.8	8.4	8.9	9.2	9.5	**EXO-002**
				5.4	8.4	10.4	11.9	13.1	14.0	14.8	15.4	15.9	**EXO-003**
				8.2	12.7	15.7	18.0	19.8	21.3	22.4	23.4	24.1	**EXO-004**
				12.9	20.0	24.8	28.4	31.3	33.6	35.4	36.9	38.0	**CX2-I00**
-5					0.7	1.1	1.3	1.5	1.6	1.8	1.9	1.9	**EXO-00X**
					1.2	1.9	2.3	2.7	2.9	3.1	3.3	3.4	**EXO-000**
					2.4	3.7	4.6	5.3	5.8	6.3	6.6	6.9	**EXO-001**
					3.2	5.0	6.2	7.1	7.9	8.4	8.9	9.2	**EXO-002**
					5.4	8.4	10.4	12.0	13.1	14.1	14.8	15.4	**EXO-003**
					8.1	12.7	15.8	18.1	19.9	21.3	22.5	23.3	**EXO-004**
					12.8	20.1	25.0	28.6	31.4	33.7	35.4	36.8	**CX2-I00**
-10						0.7	1.0	1.3	1.5	1.6	1.7	1.8	**EXO-00X**
						1.2	1.9	2.3	2.6	2.9	3.1	3.3	**EXO-000**
						2.3	3.7	4.6	5.3	5.8	6.2	6.5	**EXO-001**
						3.1	5.0	6.2	7.1	7.8	8.4	8.8	**EXO-002**
						5.2	8.4	10.4	11.9	13.1	14.0	14.7	**EXO-003**
						7.9	12.7	15.8	18.0	19.8	21.2	22.3	**EXO-004**
						12.5	20.0	24.9	28.5	31.2	33.4	35.1	**CX2-I00**

Condensing temperature ℃	Evaporating temperature ℃												Orifice/ valve
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	
	Capacity, kW R744												
-15							0.6	1.0	1.3	1.5	1.6	1.7	**EXO-00X**
							1.1	1.8	2.3	2.6	2.9	3.1	**EXO-000**
							2.2	3.7	4.6	5.2	5.7	6.1	**EXO-001**
							3.0	4.9	6.1	7.0	7.7	8.2	**EXO-002**
							5.0	8.2	10.3	11.8	12.9	13.8	**EXO-003**
							7.6	12.5	15.5	17.8	19.5	20.8	**EXO-004**
							12.0	19.7	24.5	28.1	30.8	32.9	**CX2-I00**
-20								0.6	1.0	1.3	1.4	1.6	**EXO-00X**
								1.1	1.8	2.2	2.6	2.8	**EXO-000**
								2.1	3.6	4.5	5.1	5.6	**EXO-001**
								2.8	4.8	6.0	6.9	7.5	**EXO-002**
								4.7	8.0	10.0	11.5	12.6	**EXO-003**
								7.2	12.1	15.2	17.4	19.1	**EXO-004**
								11.3	19.1	24.0	27.4	30.1	**CX2-I00**
-25									0.5	1.0	1.2	1.4	**EXO-00X**
									1.0	1.7	2.2	2.5	**EXO-000**
									1.9	3.4	4.3	4.9	**EXO-001**
									2.6	4.6	5.8	6.6	**EXO-002**
									4.3	7.7	9.7	11.1	**EXO-003**
									6.6	11.7	14.7	16.9	**EXO-004**
									10.4	18.4	23.2	26.6	**CX2-I00**
-30										0.5	0.9	1.2	**EXO-00X**
										0.9	1.6	2.1	**EXO-000**
										1.7	3.2	4.1	**EXO-001**
										2.3	4.4	5.5	**EXO-002**
										3.8	7.3	9.3	**EXO-003**
										5.8	11.1	14.1	**EXO-004**
										9.2	17.4	22.2	**CX2-I00**
-35											0.4	0.9	**EXO-00X**
											0.7	1.5	**EXO-000**
											1.4	3.0	**EXO-001**
											1.9	4.1	**EXO-002**
											3.2	6.8	**EXO-003**
											4.8	10.3	**EXO-004**
											7.6	16.3	**CX2-I00**

Subcooling, K										
0	5	10	15	20	25	30	35	40	45	50
Correction factors										
1	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6

Selection method

Multiply the required cooling capacity by correction factors as well as 0.8 (80% duty cycle) to obtain required nominal capacity. Search the corresponding value from quick selection table by considering operating evaporating and condensing temperatures.

Example:

Cooling capacity 6 kW

Evaporating temperature -30℃
Condensing temperature 0℃
Subcooling 5K
Qn=6 8(kW) x0.8(duty cycle) x1.1 (subcooling factor)=5.28 kW
The solution is orifice EXO-001 with 6.2 kW from quick selection table at -30℃ and 0℃ condensing temperature

Electronic Expansion Valve CX2

Technical data

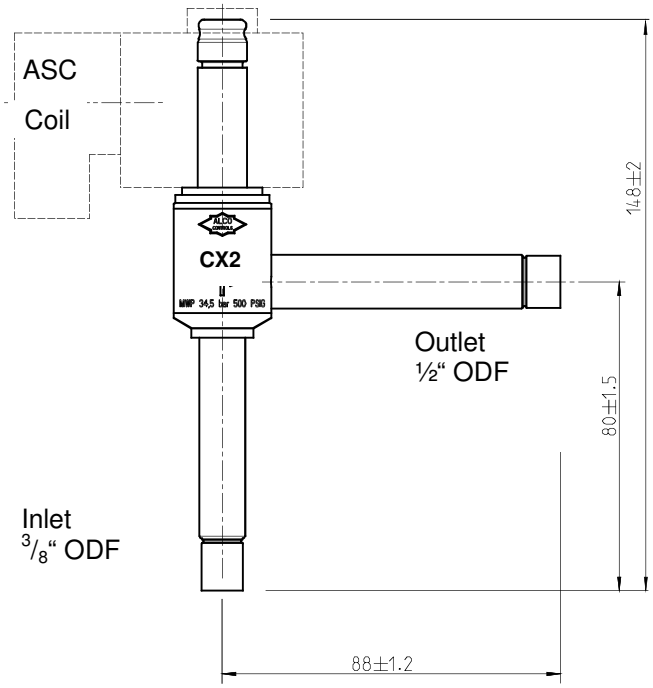
Maximum working pressure	90 bar
Factory test pressure	129 bar
Burst pressure	>290 bar
MOPD (maximum operating pressure differential)	45, 50, 60 and 65 bar (see below table*)
Medium Temperature	-40° … +50°C
CE marking	Valve: Not required Coil: according low voltage directive
Delivery	Single package

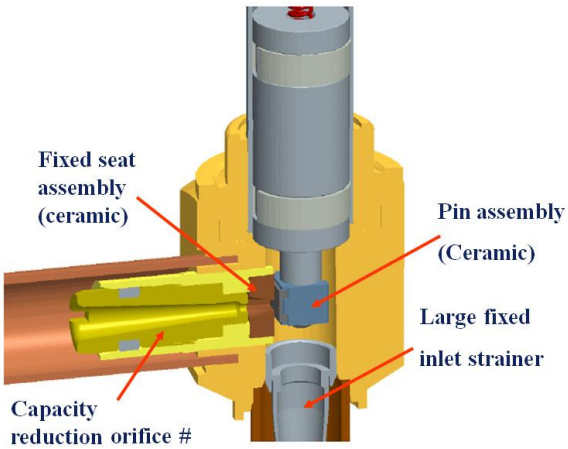
Applied coil	ASC 24 VAC or 230 VAC
Nominal supply voltage to coil	24 VAC 50/60Hz 230 VAC 50-60HZ
Function	Pulse width modulation (recommended 6 seconds pulse cycle)
Lifetime with EC2	>40 Million cycles
Seat leakage	< 4cc/min. Nitrogen with 10 bar differential pressure
CX2 Weight	0,25 kg

*) MOPD level is dependent on supply voltage to coil. Lower supply voltage will reduce the MOPD level as follows:

MOPD	Supply voltage to coil	Supply voltage to coil
65 bar	24 VAC nominal voltage	230 VAC nominal voltage
60 bar	24 at -5% = 22.8 VAC	230 at -5% = 218.5 VAC
50 bar	24 at -10% = 21.6 VAC	230 at -10% = 207 VAC
45 bar	24 at -15% = 20.4 VAC	230 at -15% = 195.5 VAC

Dimensions (mm)





CX2 cross sectional view

Gate type port made from ceramic provides the followings advantageous features/functions:

- Tighter seat when the valve is closed
- Enables high MOPD with low wattage coil
- Longer life expectancy