

Mechanical pressure regulators

Basic terms and technical information

Capacity regulators

Regulator series ACP and CPHE are hot gas bypass regulators and serve the purpose of compensating excess compressor capacity. Thus they prevent the generation of evaporator pressures below predetermined levels.

In case of hot gas injection into the suction line, a liquid injection valve in conjunction with a solenoid valve is required to desuperheat the excessively hot suction gas. The capacity should not be reduced below 60% of maximum in this application to avoid oil return problems.

With hot gas injection at the evaporator inlet, no liquid injection valve is necessary. The injection must be such that the incremental gas volume is taken into account. No problems with oil return should be expected even when regulating 100% of capacity.

Evaporator pressure regulators

Series PRE regulators serve the purpose of maintaining evaporator pressure above certain predetermined levels. The most important application is the use of several evaporators with different evaporating temperatures in conjunction with a common suction line.

The freezing of water in water chillers and air conditioning systems can be safely prevented if evaporating temperatures are kept above 0°C, even when loads are greatly reduced.

Crankcase pressure regulators

Series PRC regulators serve the purpose of preventing excessively high suction pressures to protect compressor motors from overloading.

Excessively high suction pressures can occur at start-up of a refrigeration circuit in case of high loads and after defrost. Crankcase regulators are adjusted to the maximum allowed suction pressure rating of the compressors as given by the compressor manufacturers.

Selection guide for pressure regulators

Selection Criteria	Series			
	ACP	CPHE	PRE	PRC
Capacity Regulator	+	+		
Evaporator Pressure Regulator			+	
Crankcase Pressure Regulator				+



Hot gas bypass regulators series ACP

Features

- High-quality materials and processes for high reliability and long lifetime
- Internal equalization
- Compact size

Technical data

Adjustment Range	0 ... 5 bar
Factory Setting	2.7 bar
Max. Allowable Pressure PS	31 bar
Medium Temperature Range TS	-40 ... 120°C
Ambient Temperature Range	-40 ... 50°C
Transport Temperature Range	-40 ... 70°C



ACP

Capacity data

Type	Part No.	Connection. Angle Solder/ODF inch	Nominal Bypass Capacity (kW)			
			R134a	R22	R407C	R404A / R507
ACP 1	047 680	1/4 x 3/8"	0.2	0.4	0.4	0.3
ACP 3	047 283	1/4 x 3/8"	0.5	0.8	0.9	0.7
ACP 5	053 374	3/8 x 3/8"	1.2	1.8	2.1	1.6

Note 1: Nominal capacities at +38°C condensing temperature, +4°C evaporating temperature (saturated temperatures / dew point) and 1 K liquid subcooling at the inlet of the expansion valve. For other operating conditions, please use Copeland Select software.

Hot gas bypass regulators series CPHE

Features

- High-quality materials and processes for high reliability and long lifetime
- Superior partial load performance due to double seat orifice design (CPHE3 to CPHE6)
- Modular design for economical logistics and easy assembly and servicing
- External equalization

Specific connection sizes and flanges available on request.

For selection see last page of "Thermo-Expansion Valves" chapter.

CPHE



Technical data

Adjustment Range	-0.4 ... 5 bar
Factory Setting	1.4 bar
Max. Allowable Pressure PS	35 bar
Medium Temperature Range TS	-40 ... 120°C
Ambient Temperature Range	-40 ... 50°C
Transport Temperature Range	-40 ... 70°C

Capacity data CPHE

Type	Nominal Bypass Capacity (kW)									Orifice	Standard Flange Solder/ODF		Power Assembly
	R134a	R22	R407C	R404A / R507	R450A	R513A	R448A	R449A	R1234ze		mm	Inch	
CPHE - 1X	3.5	5.0	5.8	4.5	3.4	2.6	5.9	5.8	3.1	X 22440-B5B	C 501 - 7 mm 12 x 16	C 501 - 7 1/2 x 5/8	X7818 - 1
CPHE - 2X	6.4	9.0	10.4	8.1	6.2	4.8	10.6	10.5	5.6	X 22440-B8B	A 576 mm 16 x 22 (22 x 28 ODM)	A 576 5/8 x 7/8 (7/8 x 1-1/8 ODM)	
CPHE - 3X	12.0	17.0	20.0	15.0	12.0	9.0	20.0	20.0	10.0	X 11873-B5B	10331 22 x 22	10331 7/8 x 7/8 (1-1/8 x 1-1/8 ODM)	
CPHE - 3.5X	13.0	19.0	22.0	17.0	13.0	10.0	22.0	22.0	12.0	X 9117-B7B	9153 mm 22 x 22	9153 7/8 x 7/8	
CPHE - 4X	16.0	23.0	27.0	21.0	16.0	12.0	27.0	26.0	14.0	X 9117-B9B			
CPHE - 5X	21.0	29.0	34.0	26.0	20.0	15.0	35.0	34.0	18.0	X 9166-B10B			
CPHE - 6X	35.0	50.0	58.0	45.0	34.0	26.0	59.0	58.0	31.0	X 9144-B13B	9149 22 x 22	9149 7/8 x 7/8	

Note1: Nominal capacities at +38°C Condensing temperature, +4°C Evaporating temperature (saturated temperatures / dew point) and 1 K Liquid Subcooling at the inlet of the expansion valve. For other operating conditions, please use Copeland Select software.

Note2: Specific connection sizes and flanges available on request. For Selection, see last page of "Thermo-Expansion Valves" chapter.

Evaporator and crankcase pressure regulator series PRE and PRC

Features

- Compact design permits minimal space requirements
- Schrader valve on inlet for ease of setting
- Direct operated regulator
- Balanced port design provides accurate pressure control
- Copper tubes for easy soldering



Technical data

Refrigerants	HFC, HCFC
Oil Compatibility	Mineral, Alkyl Benzene and Polyol-Ester (POE) Lubricants
Max. Allowable Pressure PS Max. Test Pressure PT	25 bar 30 bar
Material Housing	CW509L (EN12420)
Temperature Range	Storage -30 ... 80°C Medium TS -30 ... 80°C Ambient -30 ... 80°C

Pressure Change Per Turn: Valve Size 1 Valve Size 2	0.6 bar 0.4 bar
Pressure Range Factory Setting	0.5 ... 6.9 bar 2 bar
Weight: PRC/PRE-1.. PRC/PRE-2..	0.6 kg 1.3 kg

Evaporator pressure regulator series PRE

Selection table

Type	Part No.	Tube Connection ODF	Nominal Capacity (kW)			
			R134a	R404A / R507	R407C	R22
PRE - 11A	800 380	16 mm - 5/8"	3.0	4.5	4.5	4.8
PRE - 11B	800 381	22 mm - 7/8"				
PRE - 21C	800 382	28 mm	7.4	11.1	11.1	11.9
PRE - 21D	800 383	1-1/8"				

Note 1: Nominal Capacities are Based on Evaporating Temperature +4°C, Condensing Temperature +38°C and a Pressure Drop of 1K.

Note 2: For other operating conditions, please use Copeland Select software.

Crankcase pressure regulator series PRC

Selection

Type	Part No.	Tube Connection ODF	Nominal Capacity (kW)			
			R134a	R404A / R507	R407C	R22
PRC - 11A	800 384	16 mm - 5/8"	3.0	4.5	4.5	4.8
PRC - 11B	800 385	22 mm - 7/8"				
PRC - 21C	800 386	28 mm	7.4	11.1	11.1	11.9
PRC - 21D	800 387	1-1/8"				
PRC - 21E	800 388	35 mm - 1-3/8"				

Note 1: Nominal Capacities are Based on Evaporating Temperature +4°C and Condensing Temperature +38°C and a Pressure Drop of 1 K.

Note 2: For other operating conditions, please use Copeland Select software.

Capacity table

Refrigerant	Evaporating Temperature °C	Capacity (kW) Valve Setting °C													
		Valve Size 1: PRC-11x							Valve Size 2: PRC-21x						
		-20	-15	-10	-5	0	+5	+10	-20	-15	-10	-5	0	+5	+10
R22	-29	2.3	3.4	4.4	4.8	4.9			5.8	8.8	10.0	10.0	10.0		
	-21		2.4	4.1	5.4	5.8				6.5	12.1	12.1	12.1		
	-14			2.7	4.9	6.2					8.1	13.8	13.8		
	-8				3.5	5.3						9.0	15.4		
	-3					3.1							9.9		
R407C	-6				3.1	4.8						7.9	13.9		
	-1					2.9							9.2		
R134a	-6					2.1	3.9	5.3					5.2	10.3	12.9
	1						2.4	4.7						6.1	12.2
	7							3.3							8.1
R404A / R507	-27	1.6	2.9	3.7	3.9				4.8	8.2	8.2	8.2			
	-20		1.9	3.5	4.5					5.7	9.8	9.8			
	-14			2.2	4.5						6.8	11.6			
	-10				3.1							8.1			

Note: Selection for Operating Conditions other than +38°C / +4°C and 1 K Liquid Subcooling at the inlet of the valve: (Capacities are based on a Pressure Drop of 0.07 bar).