HANSEN TECHNOLOGIES

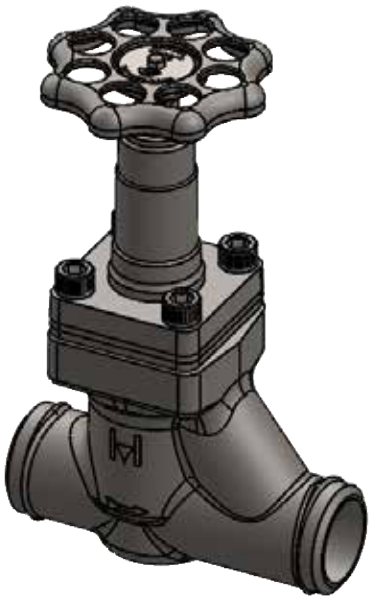
Bulletin G510b
DEC 2024

Specifications, Applications, Service Instructions & Parts

HAND EXPANSION VALVES (REGULATORS)

Welding 1/2" through 1-1/2" (13mm through 40mm) Globe or Angle for refrigerants

TSG Certified



1¼" CRT125H Globe Hand Expansion Valve

INTRODUCTION

These precision-calibrated, adjustable, slotted plug flow regulating valves (hand expansion valves) are ideal for metering or flashing expansion of liquid refrigerants. Their slotted plugs are more tolerant of dirt particles than are common metal-seated tapered-plug expansion valves, and are less susceptible to wire drawing. All valves have near linear flow characteristics per turn open and are tight closing with Teflon seats. These valves have stainless steel stems with back seating for seal replacement. The patented non-leak seal plus packing design permits low torque operation for valve adjustments since the packing nut requires little tightening. Suitable for ammonia , CO2, or halocarbons.

APPLICATIONS

Liquid feed or circulating liquid overfeed evaporators

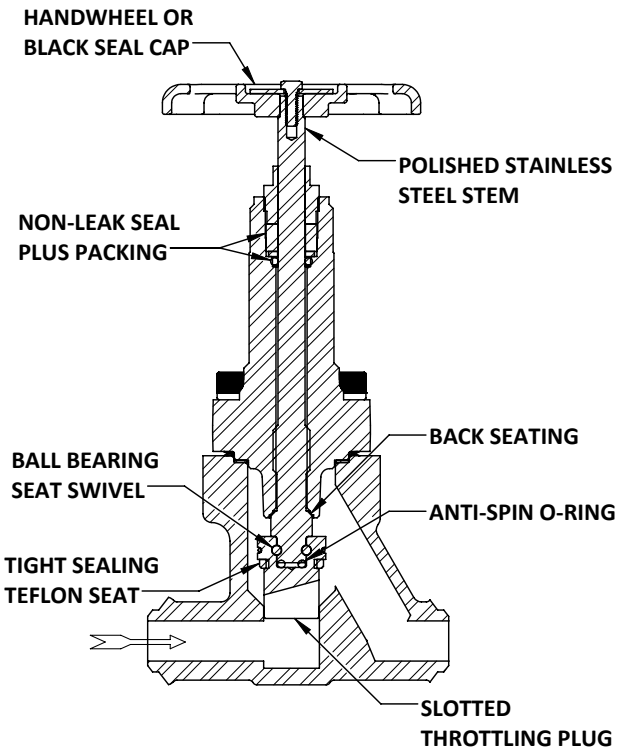
High pressure or intermediate pressure liquid feed to accumulators, intercoolers, or recirculators

Defrost condensate relief

Hot gas feed to evaporators

Equalize evaporator to suction pressure after defrost

KEY FEATURES



CAPACITIES, TONS (kW)

REFRIGERANT & APPLICATION		NOMINAL SIZE inch (mm)									
		1/2 (13)		3/4 (20)		1 (25)		1-1/4 (32)		1-1/2 (40)	
		min	max	min	max	min	max	min	max	min	max
R717	Circulating 4:1	1.5 (6.3)	17 (63)	1.5 (6.3)	37 (130)	1.5 (6.3)	62 (220)	1.5 (6.3)	110 (390)	9.2 (31)	150 (530)
	Liquid Makeup	7.4 (30)	60 (210)	7.4 (30)	110 (390)	7.4 (30)	180 (630)	7.4 (30)	330 (1200)	45 (150)	450 (1600)
R22	Circulating 2:1	0.7 (2.8)	7.7 (28)	0.7 (2.8)	18 (63)	0.7 (2.8)	29 (100)	0.7 (2.8)	52 (180)	4.2 (14)	72 (250)
	Liquid Makeup	1.6 (6.7)	12 (42)	1.6 (6.7)	23 (81)	1.6 (6.7)	38 (130)	1.6 (6.7)	68 (240)	9.8 (33)	93 (330)

Circulating capacities assume a 10 psi (0.7 bar) drop. See page 2 for more detailed information on conditions and sizing.

MATERIAL SPECIFICATIONS

Body:

1/2"–1-1/4" (13mm–32mm): Forged steel, ASTM A350 Grade LF2; 1-1/2"–4" (40mm–100mm): Cast steel, ASTM A352 Grade LCB

Bonnet:

1/2"–1-1/2" (13mm–40mm): Forged Steel, ASTM A350 Grade LF2.

Bonnet Seal:

1/2"–1-1/2" (13mm–40mm): Non-asbestos graphite composite

Stem: Polished stainless steel

Stem Packing: Graphite Composite plus neoprene O-ring in series

Packing Nut: Zinc plated steel

Throttling Plug, 1/2"–1-1/4" (10mm–32mm): Stainless steel; 1-1/2" (40mm): Zinc plated steel

Seat Disc: Retained PTFE Teflon

Ball Bearings: Stainless steel

Seal Cap: 1/2"–1-1/4" (10mm–32mm): Glass-filled polymer, Neoprene O-ring seal, safety vented; 1-1/2"–4" (40mm–100mm): Zinc plated steel, painted

Operating Temperature:

Standard, -60°F to 240°F (-51°C to 115°C).

Safe Working Pressure: 754 psig (52 bar g) standard.

Connection Dimensions: Welded 1/2"–1-1/2" Match Schedule 80 pipe; 2"–3" Match Schedule 40 pipe

VALVE SIZING AND SETTING

To properly size and set hand expansion valves, determine the refrigerant, estimated pressure drop through the valve (not the system), evaporator load in tons (kW) and the circulating rate, or desired capacity of liquid makeup in tons (kW). In general, the valve size selection should be based on the valve adjusted to ½ open. Select liquid line sizes so that velocity is limited to 7 ft/s (2.1 m/s) for ammonia, and 5 ft/s (1.5 m/s) for R22, to reduce the potential for liquid velocity shock (water hammer). For more convenient valve sizing, please consult the Hansen sizing and quoting tool located on the Hansen website

For Circulating Liquid Overfeed: The steps below determine the required flow coefficient, Cv (Kv), and required turns open. The circulating capacities assume 0°F (–18°C) evaporator temperature liquid. For other evaporator temperatures these values will change only slightly due to density and latent heat variations.

1. Evaporator load, tons(kW) times the circulating rate **= equivalent load, tons (kW) =**_____.
2. **Tons/Cv (kW/Kv)** from table below =_____.
3. **Equivalent load, tons (kW)** divided by **tons/Cv (kW/Kv) = required flow coefficient Cv (Kv) =** _____.
4. Refer to Cv (Kv) Per Turns Open table. **Valve size and turns open =** _____.

TONS/Cv (kW/kV) CIRCULATING LIQUID OVERFEED

REFRIG	TEMP	PRESSURE DROP (ΔP)*				
		5 psi (0.3 bar)	10 psi (0.7 bar)	15 psi (1.0 bar)	20 psi (1.4 bar)	30 psi (2.0 bar)
R717	0°F (-18°C)	43 (165)	61 (250)	75 (301)	86 (350)	106 (426)
R22	0°F (-18°C)	10 (39)	14 (55)	18 (70)	20 (80)	25 (100)

For Liquid Makeup: Maximum capacities are possible with appropriate line sizing. The valve should be sized for intermittent flow. For example, a valve open 50% of the time feeding a 100 ton (350 kW) accumulator should be sized for 200 tons (700 kW). When the required valve size is greater than 1½" (40mm), two expansion valves and solenoid valves staged in parallel should be used to help reduce the potential of liquid velocity shock (water hammer).

To determine required flow coefficient, Cv (Kv), estimate the approximate capacity in tons (kW) of liquid makeup desired and divide by 74.2 tons per Cv (302 kW per Kv) for ammonia, 16.4 tons per Cv (66.7 kW per Kv) for R22. These ratings are based on 86°F (30°C) saturated liquid and 0°F (–18°C) evaporating temperature. Refer to the table Cv (Kv) Per Turns Open for the appropriate valve size and turns open. For other evaporator temperatures, the values will change only slightly.

Add the Cv (Kv) Per Turns Open Table back but remove the screwed bonnet section and 2” and larger from the bolted bonnet section.

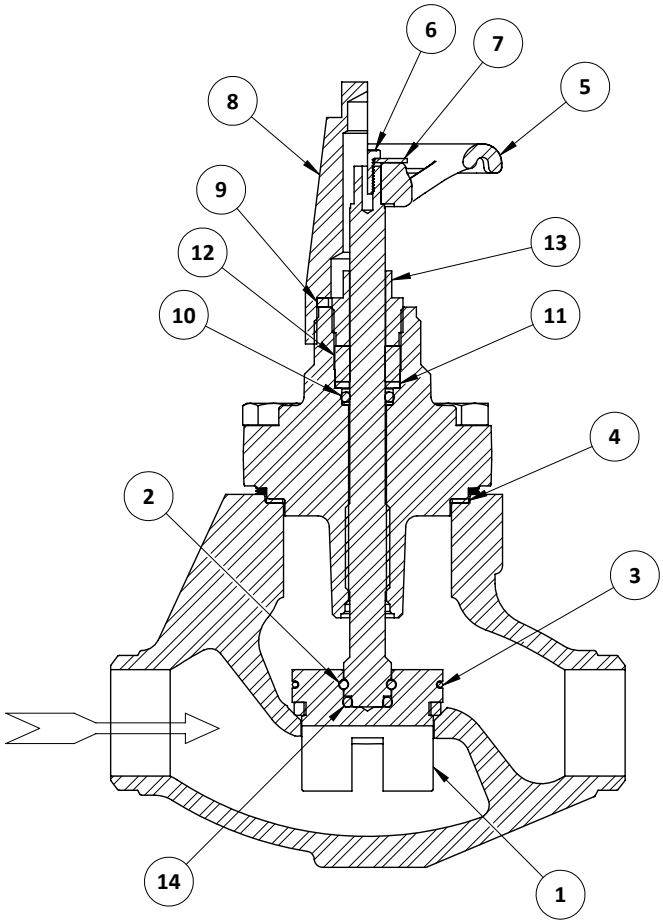
INSTALLATION

Valves should only be installed with the direction of flow matching the direction of the arrow on the valve body. Installing the valve in reverse orientation is not recommended Valves should be installed with the stem horizontal or upright. For liquid makeup, valves should be located within 2 ft (0.6 m) of the upstream solenoid valve. The available pressure drop should occur across the hand expansion valve, not through the solenoid valve. Proper pipe sizing is essential for optimal control.

BOLTED BONNET 1/2"–1-1/2" (13mm–40mm)

DESCRIPTION	NOMINAL SIZE inch (mm)				
	1/2 (13)	3/4 (20)	1 (25)	1-1/4 (32)	1-1/2 (40)
Throttling Plug Kit	50-1505	50-1506	50-1507	50-1508	50-1046
Handwheel Kit	50-1509	50-1510	50-1511	50-1512	50-1513
Seal Cap Kit	50-1515	50-1515	50-1515	50-1515	50-1048
Gasket Kit	50-1514	50-1514	50-1514	50-1514	50-1023

BOLTED BONNET
1/2" to 1-1/2" (13 mm to 40 mm)



PARTS LIST

ITEM	DESCRIPTION
	Throttling Plug Kit:
1	Throttling Plug
2	Ball Bearings
3	Ball Retainer
4	Bonnet Gasket
	Handwheel Kit:
5	Handwheel
6	Screw
7	Washer
	Seal Cap Kit:
8	Seal Cap (black)
9a	Seal Cap O-Ring
9b	Seal Cap Gasket
	Gasket Kit:
4	Bonnet Gasket
9a	Seal Cap O-Ring
9b	Seal Cap Gasket
10	Stem O-Ring
11	Stem Washer
12	Graphite Packing
13	Packing Nut
14	Anti-Spin O-Ring

SERVICE AND MAINTENANCE

Hansen hand expansion valves require practically no service or maintenance due to the combination of polished stainless steel stems and reliable o-ring stem seals plus graphite composite packing. This almost entirely eliminates stem leakage.

VALVE SEAT

To inspect or replace the valve throttling plug, isolate the valve from the system and safely pump out all refrigerant to zero pressure. With the stem open several turns, carefully remove the bonnet assembly. If the conical seat surface in the body is marred, remove the marks with emery paper. If the valve throttling plug is damaged, replace the entire throttling plug by first removing the ball retainer ring and ball bearings. Install a new throttling plug assembly including new bearings and retainer ring. Install new stem packing, stem o-ring, and bonnet o-ring/gasket, if necessary. Reassemble the bonnet into the valve body with the stem open several turns. Hansen assembles valves with bonnet cap screws factory tightened as folllows: 1/2" to 1-1/4" (13mm to 32mm)–15 ft-lb (20 Nm); 1-1/2" (40mm) - 30 ft-lb (41 Nm). Test for leaks and reset the valve to the correct number of turns open before returning it to service. Refer also to the current edition of Hansen shut-off valve bulletins:

G359 – Butt Weld Shut-off Valves.

CAUTION

Hansen valves are for refrigeration systems only. These instructions must be completely read and understood before selecting, using or servicing Hansen valves and electronics. Only knowledgeable, trained refrigeration mechanics should install, operate, or service. Stated temperature and pressure limits should not be exceeded. Bonnets should not be removed from valves unless system has been evacuated to zero pressure. See also Safety Precautions in the current List Price Schedule and the Safety Precautions Sheet supplied with the product.

WARRANTY

All Hansen products, except electronics, are guaranteed against defective materials or workmanship for one year F.O.B. factory. Electronics are guaranteed against defective materials or workmanship for 90 days F.O.B. factory. No consequential damages or field labor is included.

TYPICAL SPECIFICATIONS

“Refrigerant hand expansion (flow regulating) valves shall have slotted or characterized throttling plugs, tight-closing Teflon seats, stainless steel stems, back-seating design for packing replacement, exterior bonnet threads for installation of stem seal caps on any valve, and be suitable for a safe working pressure are available as manufactured by Hansen Technologies Corporation or approved equal.”

ORDERING INFORMATION

NOMINAL SIZE inch (mm)	DESCRIPTION	CAT NO
1/2 (13)	Globe, Seal Cap	C-RWB052C
	Globe, Handwheel	C-RWB052H
	Angle, Seal Cap	C-VWB051C
	Angle, Handwheel	C-VWB051H
3/4 (20)	Globe, Seal Cap	C-RWB077C
	Globe, Handwheel	C-RWB077H
	Angle, Seal Cap	C-VWB076C
	Angle, Handwheel	C-VWB076H
1 (25)	Globe, Seal Cap	C-RWB102C
	Globe, Handwheel	C-RWB102H
	Angle, Seal Cap	C-VWB101C
	Angle, Handwheel	C-VWB101H
1-1/4 (32)	Globe, Seal Cap	C-RWB127C
	Globe, Handwheel	C-RWB127H
	Angle, Seal Cap	C-VWB126C
	Angle, Handwheel	C-VWB126H
1-1/2 (40)	Globe, Seal Cap	C-RW151C
	Globe, Handwheel	C-RW151H
	Angle, Seal Cap	C-VW151C
	Angle, Handwheel	C-VW151H

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