HANSEN TECHNOLOGIES

Bulletin C429b
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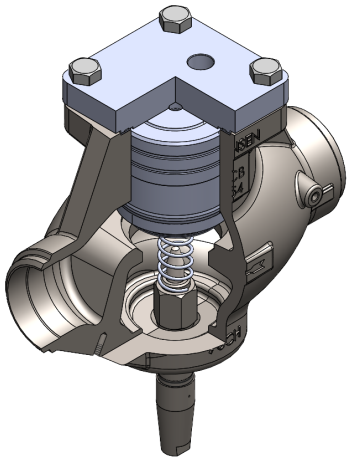
Specifications, Applications, Service Instructions & Parts

CHCK5DW GAS-POWERED, 2-STEP SUCTION STOP VALVE 1-1/2″ THRU 3″ PORT (40 MM THRU 80 MM)

1-1/2″ thru 3″
BW Standard
for refrigerants



CHCK5DW
2-Step Gas-Powered Suction Stop Valve

CRN
Canadian Registration
TS Certified

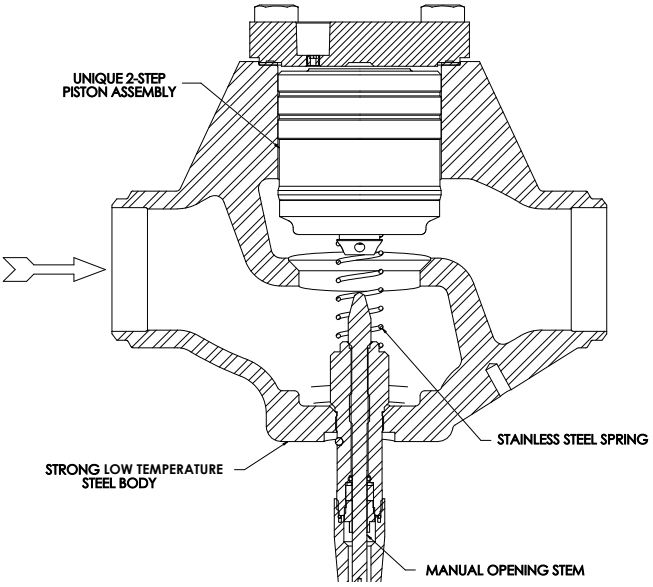
INTRODUCTION

These heavy-duty, gas-powered, 2-step suction stop valves are designed to control the flow of refrigerant in large industrial and commercial refrigeration systems. They remain normally open via a spring and require no pressure drop to operate. A single pilot solenoid valve is required to control a higher pressure refrigerant gas which closes these valves during defrosting. The CHCK5DW valve has an internal, controlled bleed-down (equalize) feature which will not allow the main seat to open until the pressure across the valve is at a lower, safer pressure differential. This eliminates the need for a separate bleed-down solenoid valve, greatly simplifying piping and reducing installation costs. If a loss of power occurs during defrost, evaporator pressure is utilized to keep the main valve seat closed until bleed-down is complete.

APPLICATIONS

The CHCK5DW valve is ideally suited for positive closure of suction, liquid overfeed, and flooded evaporator gas return lines during defrost in low temperature applications. These valves can be installed in horizontal or vertical lines and are best installed on their sides for improved conveyance of liquid and oil. Because they are gas-powered to close, the valves operate reliably even under viscous oil conditions. They are suitable for Ammonia, Halocarbons, CO2 and other Hansen approved refrigerants and gases.

KEY FEATURES



ADDITIONAL FEATURES

Internal, self-equalizing piston assembly
Requires only one pilot solenoid valve for operation
Remains closed until pressure is equalized, during loss of power
Adjustable bleed rate via orificed plugs
No pressure drop required to open
Durable metal-to-metal seating
Lower cost of installation
Drop-in for standard Hansen HCK2 Gas powered suction stop valve
CHCK5DW, Weld-In-Line Standard

MATERIAL SPECIFICATIONS

Body: Cast Steel ASTM A352, grade LCB
Top Cover: Steel, ASTM A516 GR70N
Piston Seat: ASTM A536
Spring: Steel
Gaskets: Non-asbestos, graphite composite
Stem: Stainless Steel
Stem Seal: O-ring plus graphite composite packing
Seal Cap: Steel, zinc chromate plated
Safe Working Pressure: 754 psig (52 bar) for CO2
Operating Temperature: –60°F to +240°F (–50° to 115°C)

OPERATION

These valves are normally held fully open by means of a spring. When a high pressure refrigerant gas is introduced to the valve through the pilot line inlet, the Upper Piston and Lower Piston are forced down, compressing the Opening Spring and seating the Lower Piston firmly on the valve body taper seat. While the CHCK5D is designed to withstand the shock of quick closing, if the noise or system or piping shock is excessive, a lower controlled refrigerant gas pressure may be advisable. Use an outlet pressure regulator, a hand expansion valve, or an orifice. For CHCK5DW valves, an orifice is included as standard in the cover plate. This orifice should not be removed or modified.

For valve equalization, the high pressure gas source is interrupted and the upstream pressure raises the Upper Piston while continuing to firmly force the Lower Piston against the valve body taper seat. This allows the refrigerant on the inlet side of the valve to escape in a controlled manner, through four orificed plugs.

The valve will fully open when the downward force on the Lower Piston caused by the difference in pressure between the valve inlet and the outlet is reduced below the upward force due to the compression of the Opening Spring. This typically occurs in the range of 8-12 psi differential. It is advisable to allow ample time for the valve to equalize to a differential pressure below this range so the valve can open. For most applications 4 minutes should be adequate. If necessary, orificed plugs can be enlarged or removed to decrease bleed down time. Observation in the field may yield a more accurate bleed down time as the valve action is very repeatable.

Because of the constant bleed around the Upper Piston when fully closed, these valves are recommended where closure is for short periods, such as during defrost, or where bleed to suction is not objectionable. When a constant bleed to suction is not desired, use a Hansen HS9B gas powered solenoid valve having a piston seal ring and dual pilot solenoid valves.

INSTALLATION

Protect the interior of the valves from dirt and moisture during storage and installation. These valves may be installed upright or on their sides in either a vertical or horizontal line. The arrow on the valve body should be in the normal direction of refrigerant flow. The System should be free of dirt, weld slag, and rust particles.

An orifice is included in the cover as standard for CHCK5DW valves to dampen the impact of the piston during the initiation of defrost. For CO2 systems, special care must be taken to ensure that adequate pressure is maintained on the top of the piston during defrost so that the valve stays closed because of this orifice and the smaller ratio between the pilot source pressure and the defrost pressure in CO2 systems compared to typical ammonia systems. It is recommended that the minimum hot gas source pressure is at least 20 PSI higher than the maximum defrost pressure at the valve inlet. The cover orifice should not be removed or modified during valve operation.

It is recommended that at least a ½" diameter solenoid valve (CHS8W) with strainer and ¾" pipe line should be used for the pilot line. The field installed pilot solenoid valve must be connected upstream of any hot gas defrost solenoid valve and should be located as close as possible to the main valve. There should be no major flow obstructions or excessive fittings installed in the pilot line. This will help maintain full high- pressure gas to the top of the piston/seat and minimize the amount of high- pressure gas to be relieved past the piston/seat upon termination of the high pressure source. Where two CHCK5D valves are to be operated simultaneously, a 1/2˝ port pilot solenoid valve and pilot line strainer assembly should be installed in each pilot line. If excessive pressure drops occur in the pilot line, the pressure difference between hot gas source and valve inlet during defrost may need to be increased.

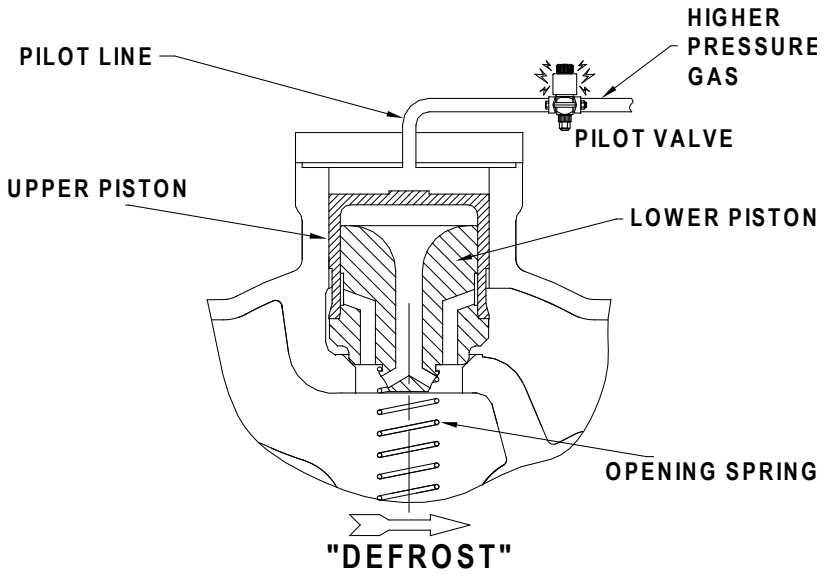
The CHCK5DW valve has a female ½" NPT connection directly on the cover plate and does not include a nipple, flanges, or disc strainer to allow customer specified installation criteria. It is recommended that at least 6" of clearance or flexibility is available above the valve cover to allow for the valve piston to be removed for servicing. Part number 75-4067 socket weld union is available as an optional accessory. Care should be taken when designing the pilot line since it is subjected to pressure and temperature cycling.

SUCTION VAPOR CAPACITIES - TONS (KW)

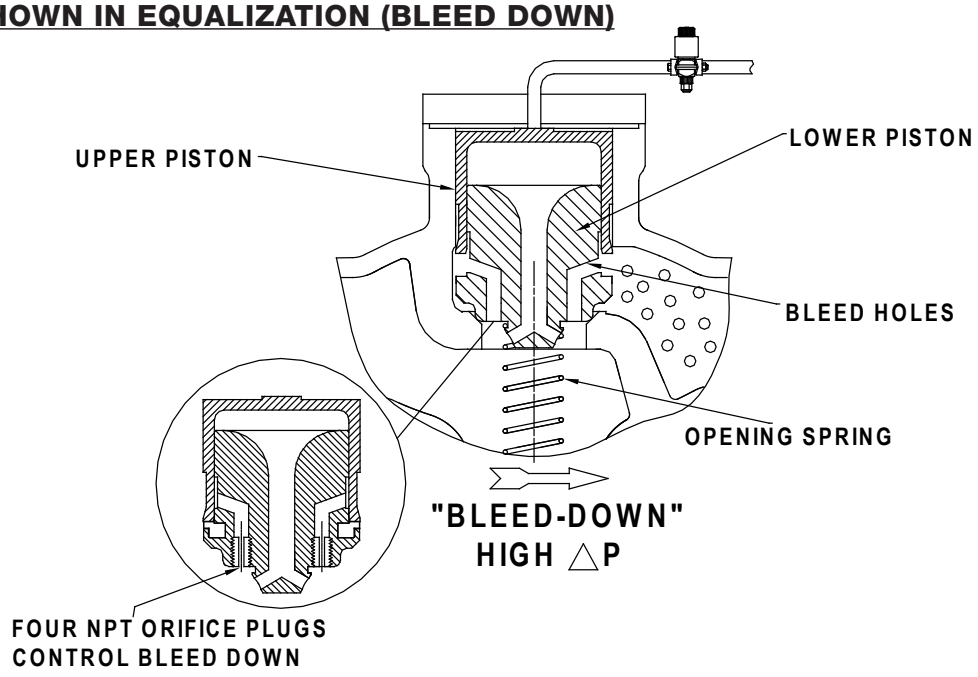
(1 Ton=12,000 Btu/hr=3.517 kW)

APPLICATION		PORT SIZE (MM)			
		1-1/2˝ (40)	2˝ (50)	2-1/2˝ (65)	3˝ (80)
CO2	+20°F (-6.7°C)	59 (208)	69 (244)	112 (394)	159 (558)
	0°F (-17.8°C)	55 (194)	64 (227)	104 (367)	148 (520)
	-20°F (-28.9°C)	50 (175)	58 (205)	94 (332)	134 (470)
	-40°F (-40.0°C)	44 (154)	51 (181)	83 (292)	118 (414)
Cv (Kv)		47 (40)	55 (47)	89 (76)	126 (108)

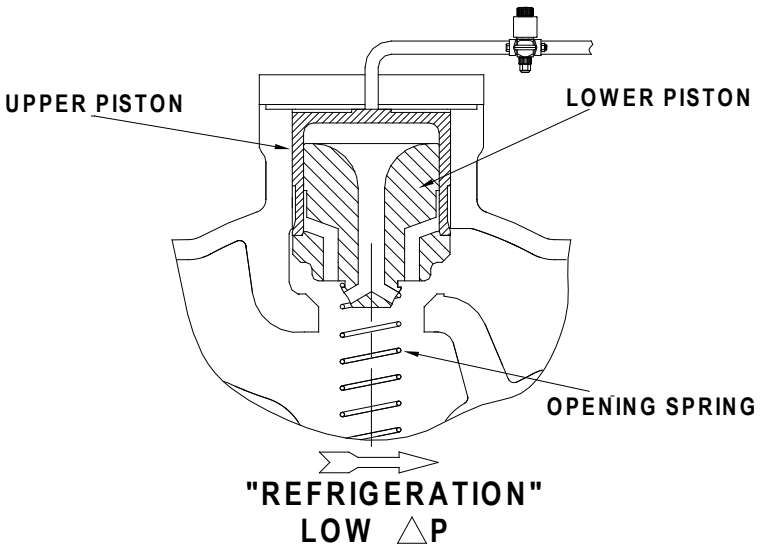
VALVE SHOWN IN DEFROST (VALVE CLOSED)



VALVE SHOWN IN EQUALIZATION (BLEED DOWN)



VALVE SHOWN IN REFRIGERATION (VALVE OPEN)

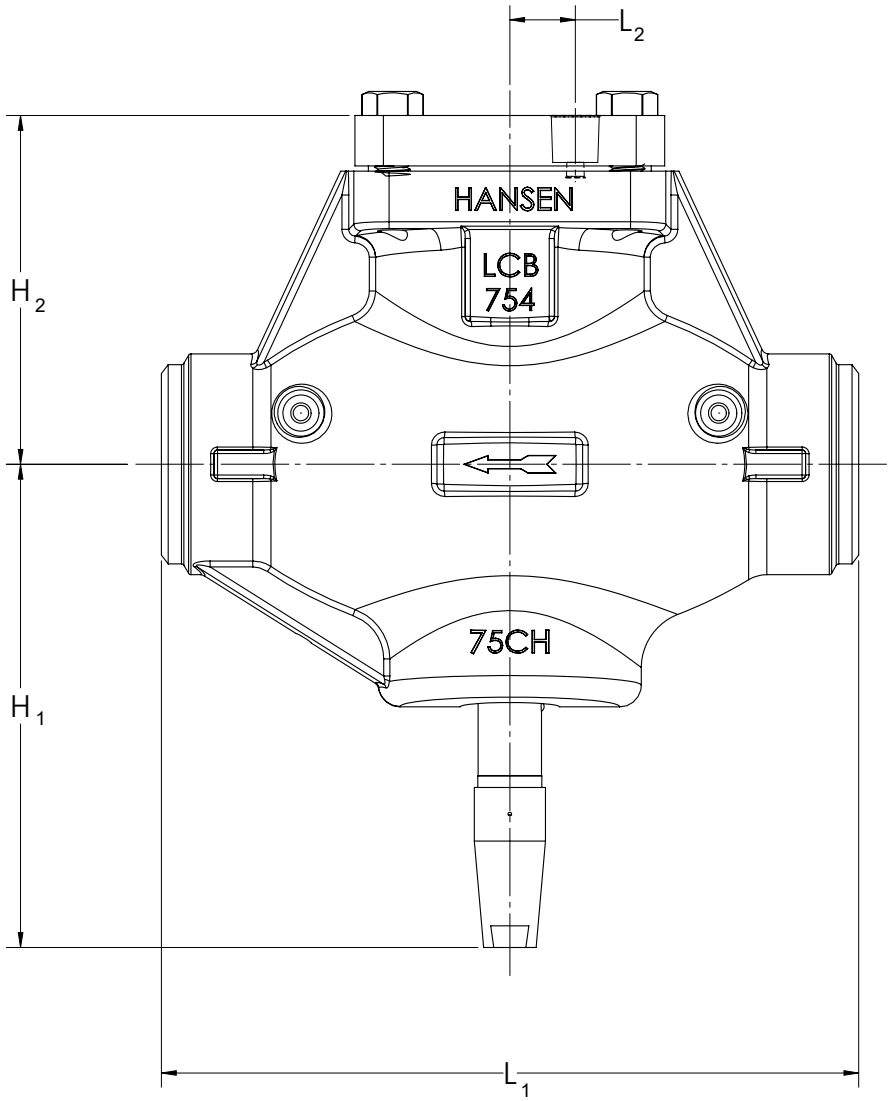


PORT SIZE (MM)	DIMENSIONS (MM)							
	H_1*	H_4	L		L_1	L_2	L_4	W
			SW	WN, ODS				
1-1/2″, 2″ (40), (50)	7.12″ (107)	9.55″ (243)	12.39″ (315)	13.39″ (340)	9.88″ (251)	0.86″ (22)	10.89″ (277)	4.50″ (114)
2-1/2″ (65)	8.06″ (205)	10.23″ (260)	13.01″ (330)	14.03″ (356)	9.88″ (251)	1.15″ (29)	11.01″ (280)	5.62″ (143)
3″ (80)	8.38″ (213)	10.57″ (268)	15.38″ (391)	16.40″ (417)	12.25″ (311)	1.15″ (29)	13.38″ (340)	6.50″ (165)

*Allow additional 2.75″ (70 mm) for seal cap removal. W= maximum width of valve.

PORT SIZE (MM)	WELD IN LINE DIMENSIONS (MM)				
	H_1*	H_4	L***		W
			SW	BW	
1-1/2″, 2″ (40), (50)	7.12″ (107)	9.55″ (243)	10.38″ (264)	10.44″ (265)	4.50″ (114)
2-1/2″ (65)	8.06″ (205)	10.23″ (260)	11.38″ (289)	11.43″ (290)	5.62″ (143)
3″ (80)	8.38″ (213)	10.57″ (268)	–	12.25″ (311)	6.50″ (165)

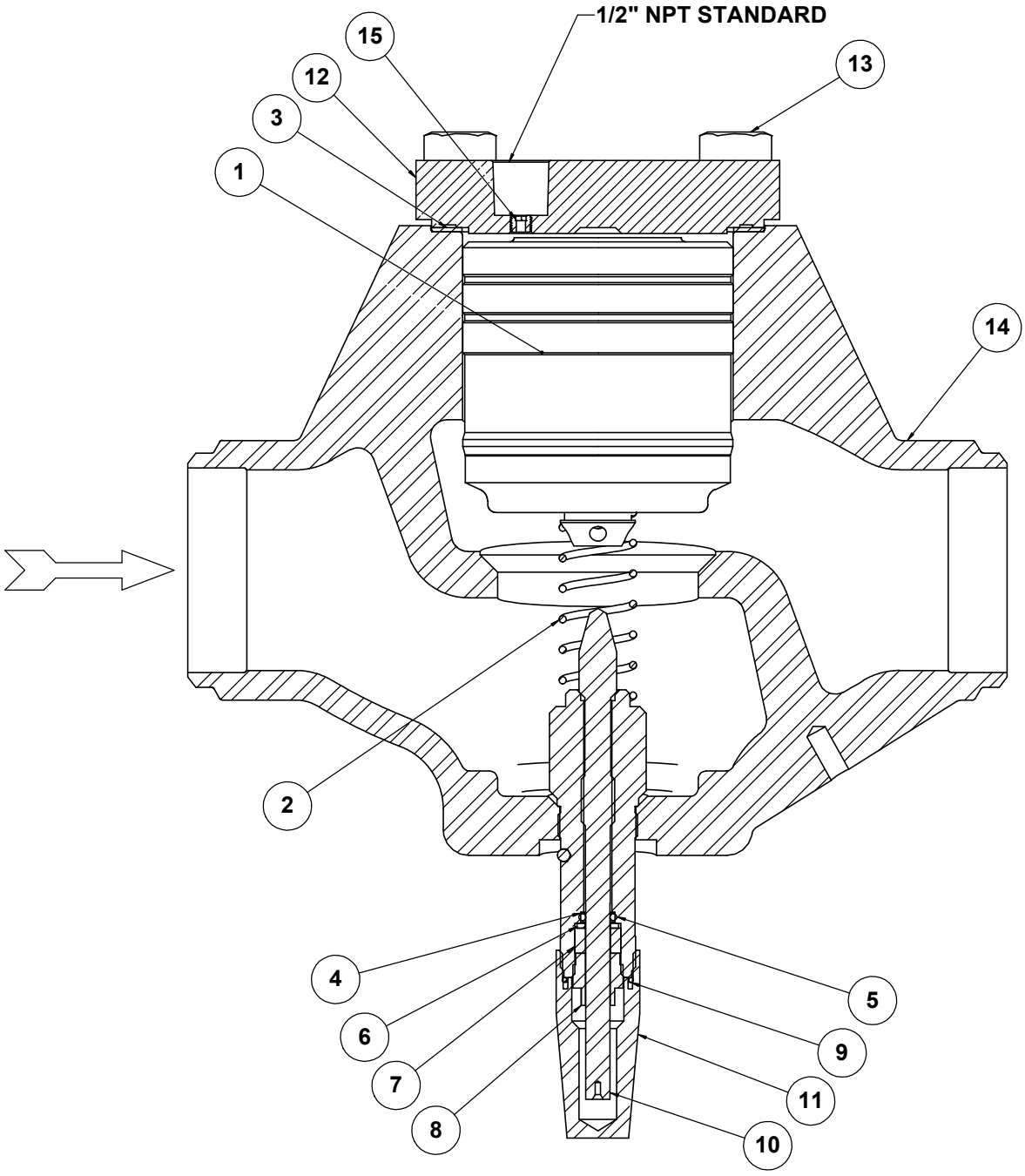
*Allow additional 2.75″ (70 mm) for seal cap removal. W= maximum width of valve.
*** Length for weld in line models refers to the length of the valve from end to end



CO2 CHCK5DW PARTS LIST

1-1/2″ THRU 4″ (40 MM THRU 100 MM)

CHCK5DW



CO2 HCK5D PARTS LIST

1-1/2″ THRU 3″ (40 MM THRU 75 MM)

ITEM	DESCRIPTION	QTY	KIT NO
	1-1/2", 2" Gasket Kit consists of:		**75-1509**
	2-1/2" Gasket Kit consists of:		**75-1510**
	3" Gasket Kit consists of:		**75-1511**
3	Cover Gasket	1	
4	Back-up washer	1	
5	Stem O-ring	1	
6	Stem washer	1	
7	Packing	1	
8	Packing Nut	1	
9	Seal Cap O-ring/Gasket	1	
20	Disc Strainer Gasket (Not Used)	2	
15	Flange Gasket (Not Used)	2	
	1-1/2", 2" Cover Orifice Kit consists of:		**75-4065**
	2-1/2", 3" Cover Orifice Kit consists of:		**75-4066**
26	Orifice Plug	1	
	1-1/2" thru 3" Seal Cap Kit consists of:		**75-1014**
11	Seal Cap	1	
9	Seal Cap O-ring/Gasket	1	

ITEM	DESCRIPTION	QTY	KIT NO
	1-1/2, 2" Piston/Seat Kit consists of:		**75-1216**
	2-1/2" Piston/Seat Kit consists of:		**75-1217**
	3" Piston/Seat Kit consists of:		**75-1218**
1	Piston/Seat	1	
2	Spring	1	
3	Cover Gasket	1	
20	Disc Strainer Gasket	2	
10	Stem	1	
12	Cover	1	
13	Cover Hex Screws	1	
14	Body	1	

TROUBLESHOOTING

FAILURE TO CLOSE

- Pilot solenoid valve is not opening due to an electrical problem.
- Disc strainer, high pressure pilot line, or cover orifice may be plugged.
- Pilot orifice pressure source may not be high enough. It should be at least 20 psi (1.4 bar) above the pressure through the main valve.
- Manual opening stem is turned in.
- Dirt may have lodged between the upper piston and the valve body piston bore.

FAILURE TO OPEN

- Pilot solenoid is jammed open with dirt.
- Pilot solenoid manual opening stem is turned in.
- Valve differential pressure is not being allowed to fall below 8 psi during bleed down. Increase bleed down time or remove one or more plugs.
- Pilot pressure and pressure through the main valve are not equalizing.
- Check for reverse installation of the main valve.
- Dirt may be lodged between the upper piston and valve body piston bore.
- The opening spring may be damaged or broken

VALVE NOISY OR CHATTERS

- Pilot pressure gas and evaporator pressure difference is too small. Adjust the defrost relief pressure regulator setting. Check for an undersized pilot solenoid valve (½" CHS8W recommended) and/or an undersized hot gas pilot line. Check for a plugged cover orifice.

VALVE SLAMS ON CLOSING

- Pilot pressure too high. Replace disc strainer in pilot line with disc strainer/orifice. (Part number 78-0065) or add a hand expansion valve to meter flow. CHCK5DW valve has an orifice installed as standard. If additional reduction of slamming is required add a hand expansion valve to meter flow.

SERVICE AND MAINTENANCE

MANUAL OPERATION

If it is necessary to manually hold open the CHCK5DW valve:

- Cautiously remove the seal cap.
- Turn the manual opening stem inward (clockwise) as far as possible.
- The entire piston should be mechanically held open and the valve will not close until the manual opening stem is turned out (counterclockwise).
- Do not operate the CHCK5DW automatically when the manual opening stem is turned in or else the stem may break after repeated cycles.
- Do not attempt to use the manual opening stem to lift the piston against more than 175 psig differential.

LOSS OF POWER

The CHCK5DW, when used with a normally closed solenoid will equalize before opening in the event of loss of power to the pilot solenoid coil.

DISASSEMBLY

If it is necessary to remove or disassemble the valve for servicing, be sure the high pressure pilot line and main valve are completely isolated from the refrigeration system and all refrigerant is removed (pumped out to zero pressure). Be sure to follow refrigeration system safety procedures. Disconnect the pilot line, and clean or replace the orifice assembly as necessary.

To inspect the valve interior, after removing pressure, slowly loosen the cover bolts equally and break the gasket seal, being careful to avoid any refrigerant which may still remain. Remove the cover bolts and cover. Use the tapped hole in the top of upper piston to remove it. Use the same procedure to remove the lower piston. In most cases, the cover bolts can be used. A 5/8˝-11 bolt is required to remove the 2˝ lower piston. Clean and inspect the 4 orifice holes. Verify that the path is clear in each. Clean and inspect the following surfaces for wear and damage:

- Taper seat in valve body
- Contact surfaces of lower piston
- Contact surfaces of upper piston

BONNET BOLT TORQUE SPECIFICATIONS

PORT SIZE (mm)	CHCK5DW VALVE BOLT TORQUE FT-LB (Nm)
1-1/2˝ - 2˝ (40, 50)	40 (55)
2-1/2˝ (65)	100 (140)
3˝ (80)	100 (140)

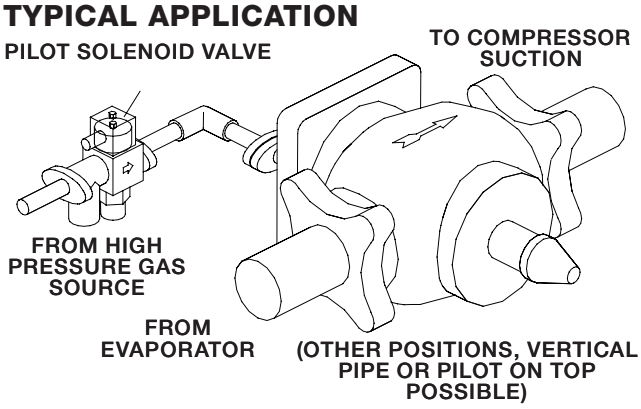
CAUTION

Hansen valves are only for refrigeration systems. These instructions must be completely read and understood before selecting, using or servicing Hansen valves. Only knowledgeable, trained refrigeration mechanics should install, operate, or service these valves. Stated temperature and pressure limits should not be exceeded. Bonnets, solenoid tubes, etc. should not be removed from valves unless system has been evacuated to zero pressure. You must also see Safety Precautions in the current List Price Bulletin and Safety Precautions Sheet supplied with the product. Escaping refrigerant might cause personal injury, particularly to the eyes and lungs.

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.

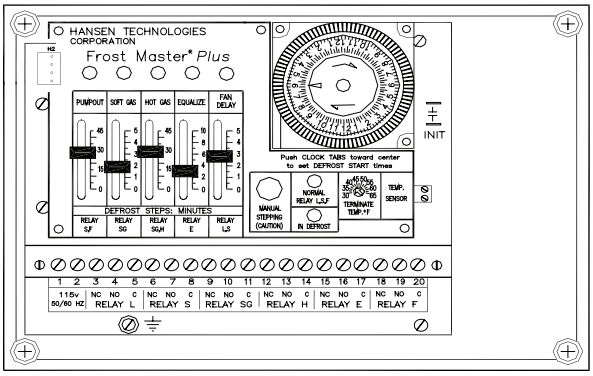
TYPICAL APPLICATION



DEFROST CONTROL

Control of the entire defrost process of large, low temperature evaporators, including those using CHCK5DW Gas-Powered Suction Stop Valves is ideally accomplished by the use of a Hansen Frost Master® or Frost Master® Plus Defrost Controller. In general, the Frost Master® is able to reduce the amount of cold liquid in the coil at the start of defrost, reduce the initial shock of hot gas entry (soft gas), efficiently terminate hot gas stage and to permit the evaporator to return to low pressure with minimum shock to the system and its piping and evaporator.

FROST MASTER® PLUS



ORDERING INFORMATION

PORT SIZE INCHES (MM)	CONNECTION STYLE & SIZES
	BW
	STD
1-1/2″ (40)	1-5/8"
2″ (50)	2-1/8"
2-1/2″ (65)	2-5/8"
3″ (80)	3-1/8"

TO ORDER: Specify type CHCK5DW and port size. For pilot solenoid valve: specify CHS8W connection style and size: ½" BW standard: 230VAC, 50/60Hz coil is available.

TYPICAL SPECIFICATIONS

"Gas-powered suction stop valves shall be normally open, 2-step opening, self-equalizing, operated with a single remote pilot pressure solenoid, with manual opening stem, and suitable for a safe working pressure of 754 psig (52 bar) as manufactured by Hansen Technologies Corporation or approved equal."

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