

PILOT OPERATED FIXED OR ADJUSTABLE LEVEL

Size: 1/2" - 4"

For Ammonia (R-717) and Halocarbon Refrigerants

Features

- **Pressure Rating: 300PSI (-20°F – +240°F)**
- **ASTM A536 Gr. 65-45-12 Ductile Iron Body and Bonnet**
- **Modulating Level through Metering Pilot**
- **Normally Closed**
- **Manual Lifting Stem**
- **Strainer Available**
- **Teflon Seat Disks are Replaceable**

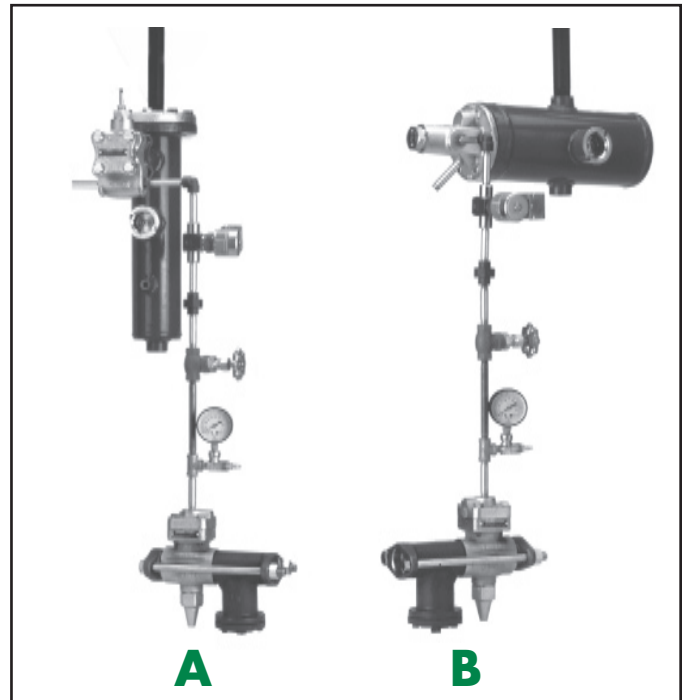
Description

The Phillips® Series 701S Low Side valves are pilot-operated piston-type valves which meter the flow of liquid refrigerant to an evaporator or pressure vessel in response to liquid level requirements. The 701S is controlled by a float valve which responds to changing requirements, providing a modulating control arrangement.

The 701S valves are flanged and may be supplied with a mating strainer. A metering plug and spring are selected for specific operating conditions. A manual opening stem, for raising the metering plug off the internal port, and a replaceable PTFE seat disc are standard.

In fixed level applications, the 701S is typically controlled by a 301E float valve. The 301E is mounted in a welded steel chamber, external to the vessel where the level is being controlled. The chamber is equipped with a Phillips® Level Eye® for visual indication of the liquid level. See Bulletin 301E. (A Series 300 float valve, which mounts internal to the vessel being controlled, will also serve as a pilot float. See Bulletin 300H.)

In adjustable level applications, the 701S is controlled by a 101 float valve. The 101 valve has an adjusting stem which permits the operator to change the level being controlled in the vessel or evaporator. This valve is also mounted in a welded steel chamber external to the vessel, and is equipped with a Level Eye®. See Bulletin 101.



- A** 701S Valve with 101 Valve and Chamber Pilot Operated Level Control (Adjustable Level)
- B** 701S Valve with 301E Valve and Chamber Pilot Operated Level Control (Fixed Level)

Design Function

The 701S valve is actuated by controlling the pressure above the internal piston. A drop in liquid level, detected by the pilot float valve, reduces pressure in the pilot line as the pilot float orifice opens. This drop in pressure causes the 701S piston to rise and open slots in the metering plug. Conversely, a rise in liquid level closes the pilot float orifice and increases the pressure in the pilot line. This moves the 701S piston and metering plug toward the closed position.

Flow in the pilot line is from the top of the 701S to the pilot float valve. On a 101 valve, the pilot line must be connected to the port toward the "tail" of the arrow cast into the 101 valve body. On a 301 valve, the pilot line may be connected to either of the valve inlet connections on the sides of the valve body. The pilot line must be 1/4"

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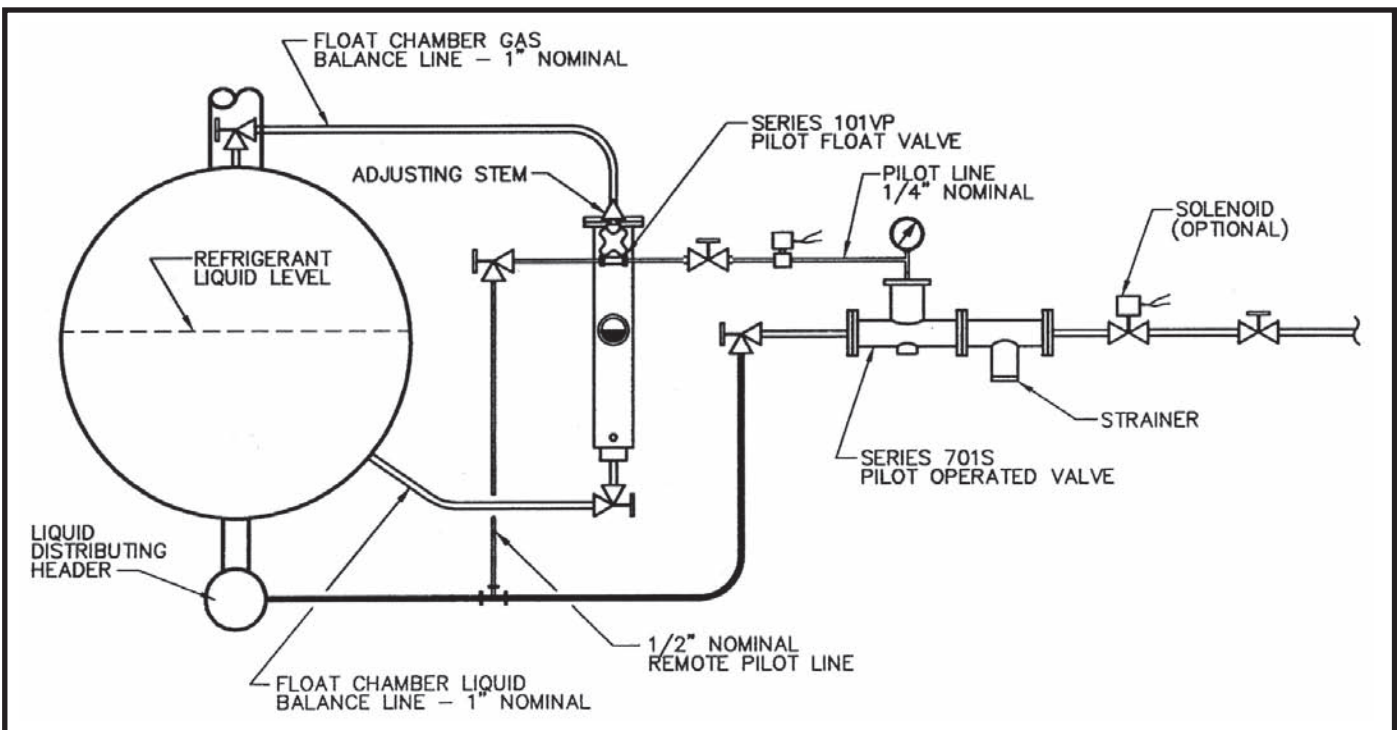
Design Function- continued from page 1

Nominal Pipe for proper operation of the 701S (3/8" OD copper tubing is also acceptable for halocarbon applications). A pressure gauge and shut-off valve in the pilot line are essential for indicating proper valve action. A solenoid valve in the pilot line will provide instantaneous shut-off of the 701S, and prevent liquid from flowing to the vessel or evaporator when the compressors are not operating.

On ammonia applications, the float chamber's lower "balance line" should not permit oil to collect and impair valve function. The "remote" pilot line, running from the outlet of the float valve to the downstream side of the 701S or to the vessel, should be 1/2" Nominal Pipe.

Isolation valves and a liquid bypass line with hand expansion valve will allow system operation during service or maintenance of the 701S valve.

General Application for Series 701S Pilot Operated Valve with Series 101 Adjustable Level Pilot Float Valve



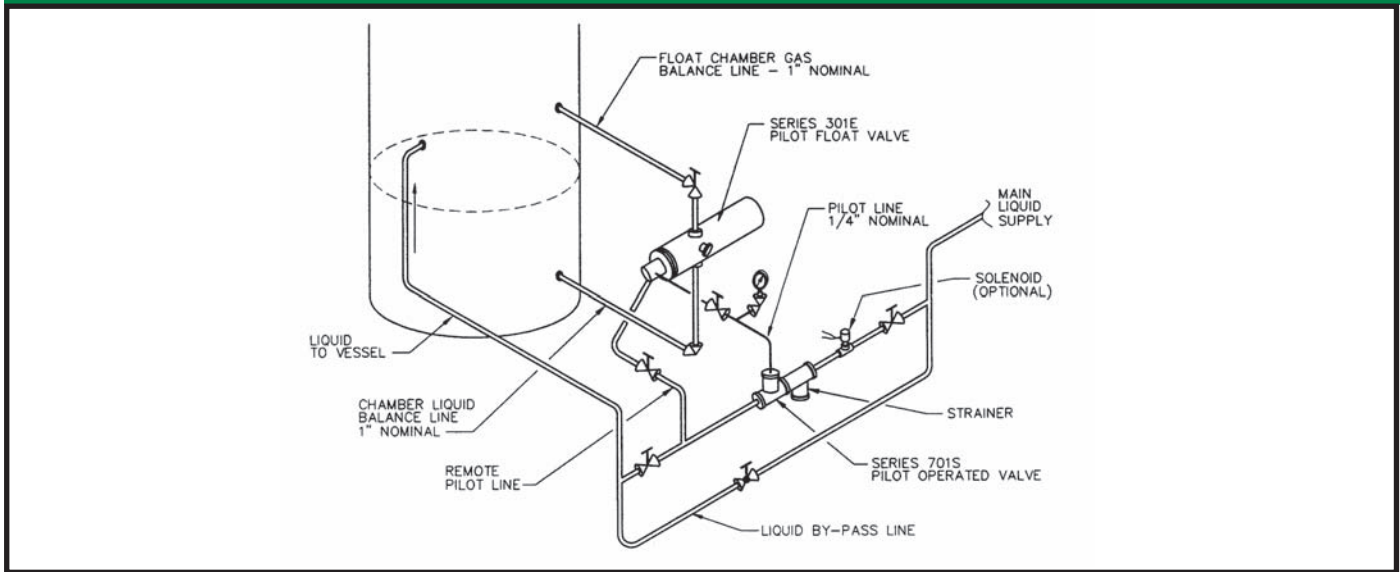
SERIES 701 & SERIES 101 VALVE CORRELATION - SIZES & WEIGHTS

PILOT OPERATED VALVE*	STRAINER	SERIES 701 PORT	PILOT FLOAT VALVE WITH CHAMBER		AVAILABLE CONNECTIONS			SHIPPING WEIGHT (LBS.)		
			NUMBER	ORIFICE	I.P.S.; THD. OR SOCKET	I.P.S.; WELD NECK	O.D. COPPER	PILOT OPERATED VALVE	P.O. VALVE WITH STRAINER	P.O. VALVE STR. & FLOAT
701JRS	S701JR	3/8"	101VP18	3/32"	1/2", 3/4", 1"	1/2", 3/4", 1"	1-1/8", 1-3/8"	16	25	85
		9/16"								
701S	S701	9/16"	101VP18	3/32"	1", 1-1/4"	1", 1-1/4"	1-5/8"	20	30	90
		23/32"								
701AS	S701A	23/32"	101VP26	1/8"	1-1/2", 2"	1-1/2", 2"	2-1/8"	40	70	150
		7/8"								
701BS	S701B	1-1/4"	101VP26	5/32"	3***	3"	3-1/8"	78	154	234
701BXS	S701B	1-9/16"	101VP26	3/16"	--	4"	--	86	162	242

* 'F' suffix on a valve number indicates use with halocarbon refrigerant.

**Socket only

General Application for Series 701S Pilot Operated Valve with Series 301 Fixed Level Pilot Float Valve



SERIES 701 & SERIES 301 VALVE CORRELATION - SIZES & WEIGHTS

PILOT OPERATED VALVE*	SERIES 701 PORT	STRAINER	PILOT FLOAT VALVE WITH CHAMBER		AVAILABLE CONNECTIONS			SHIPPING WEIGHT (LBS.)		
			NUMBER	ORIFICE	I.P.S.; THD. OR SOCKET	I.P.S.; WELD NECK	O.D. COPPER	PILOT OPERATED VALVE	P.O. VALVE WITH STRAINER	P.O. VALVE STR. & FLOAT
701JRS	3/8" 9/16"	S701JR	301E	3/32" 1/8"	1/2", 3/4", 1"	1/2", 3/4", 1"	1-1/8", 1-3/8"	16	25	65
701S	9/16" 23/32"	S701	301E	3/32" 1/8"	1", 1-1/4"	1", 1-1/4"	1-5/8"	20	30	70
701AS	23/32" 7/8"	S701A	301E	9/64"	1-1/2", 2"	1-1/2", 2"	2-1/8"	40	70	110
701BS	1-1/4"	S701B	301G	5/32"	3***	3"	3-1/8"	78	154	195
701BXS	1-9/16"	S701B	301J	3/16"	--	4"	--	86	162	203

* 'F' suffix on a valve number indicates use with halocarbon refrigerant.

**Socket only.

VALVE CAPACITIES - TONS

PILOT OPERATED VALVE**	ORIFICE IN INCHES	CV	METERING PLUG	AMMONIA (R-717)					R22				
				INLET PRESSURE--PSIG					INLET PRESSURE--PSIG				
				80†	100	125	160	200	80†	100	125	160	200
701JRS	3/8	1.33	230.25	74	80	90	99	110	18	19	21	23	24
		2.37	430.25	--	--	--	--	--	32	34	37	41	43
		2.98	445.25	--	--	--	--	--	41	43	47	51	54
701S	9/16	1.7	245.25	95	100	115	125	140	23	24	26	28	31
		3.1	445.25	175	185	210	230	260	42	45	49	53	57
		5.2	445.38	--	--	--	--	--	71	75	82	89	95
701AS	23/32	6.7	445.43	--	--	--	--	--	92	97	105	115	120
		5.8	245.32	320	350	395	430	485	79	84	91	99	105
		8.4	445.32	470	505	570	625	700	115	120	130	145	155
701BS	1-1/4	11.1	845.32	620	670	755	825	925	150	160	175	190	200
		16.5	845.40	--	--	--	--	--	225	240	260	280	300
		6.5	245.50	360	390	440	480	540	89	94	100	110	120
701BXS	1-9/16	11.0	445.50	610	660	750	815	915	150	160	175	190	200
		14.1	645.50	782	846	962	1050	1173	192	205	224	244	256
		22.5	845.50	1260	1350	1530	1670	1870	310	325	355	385	410
		23.9	1045.50	1330	1440	1630	1770	1990	325	345	375	410	440
701BXS	1-9/16	35	60°	1950	2100	2370	2590	2900	475	500	550	590	645

**Add suffix 'F' when ordering a valve for use with a halocarbon refrigerant.

Consult H. A. Phillips & Co. if special applications, other refrigerants, or unusual liquid conditions prevail.

Calculated for operation with saturated liquid at the valve inlet. To develop these capacities, the pressure drop across the valve must be greater than one-half the inlet Absolute pressure. When liquid is subcooled, valve capacity will increase.

† Valve capacities at 20 to 25 PSIG are 50% of these ratings.

Outlet pressure must be 0 PSIG or less.

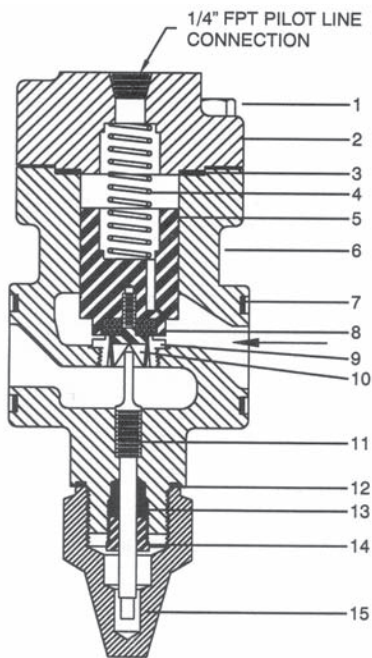
SPRING SELECTION TABLE

VALVE TYPE	PRESSURE DROP AVAILABLE ACROSS VALVE, PSI				
	10-20*	20-40	40-60	60-100	100-160
701JRS & 701 S	705-5L	705-10L	705-20L	705-35R	705-60R
701AS	705A-10L	705A-20L	705A-30L	705A-60L	705A-110L
701BS & 701BXS	705B-10L	705B-30L	705B-60L	705B-100L	705B-160L
Pilot Pressure Drop to Open (PSIG)	5-6	10-12	16-20	30-40	50-70

* Buna-N rubber seat discs available for tighter shut-off at low pressure drop.

LIQUID SUB-COOLING FACTORS

°F of Sub-Cooling	5	10	20	30	50
Factor	1.25	1.47	1.75	1.9	2.2

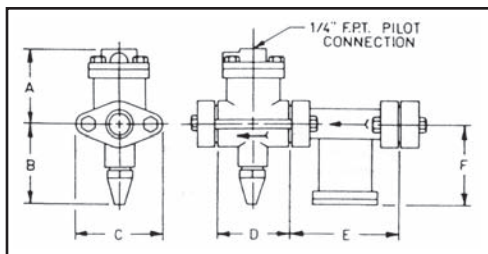


SERIES 701S PILOT OPERATED VALVES PARTS

ITEM NO.	PART	PART NUMBER				
		701JRS	701S	701AS	701BS	701BXS
1	Cap Screw (4)	325	325	718	1459	1459
2	Bonnet	702JRS	702S	702AS	702BS	702BXS
3*	Gasket, Bonnet	710JR	710	710A	710B	710B
4*	Spring	705**	705**	705A**	705B**	705B**
5	Piston	704JR	704	704A	704B	704BXS
6	Valve Body	701JRS	701	701AS	701BS	701BXS
7*	Gasket, Flange (2)	506	725N	73	326Y	326Y
8*	Seat Disc	703JR	703	703A	703B	703BXS
9	Seat	706JR	706	706A	706B	--
10	Metering Plug	707JR	707	707A	707B	707BXS
11	Lifting Stem	711	711	711A	711B	711B
12	Gasket, Seal Cap	720	720	720	720B	720B
13	Packing Ring	775	775	775	777BN	777BN
14	Gland	8	8	8	8B	8B
15	Seal Cap	714	714	714	714B	714B

*Recommended spare parts

**See Spring Table above



SERIES 701S VALVE DIMENSIONS (INCHES)

Series 701S Valve	Flange Type	A	B	C	D	E	F
701JRS	Oval	4.19	4.50	4.13	3.50	5.88	4.50
701S	Oval	4.19	4.50	5.00	4.00	6.13	4.50
701AS	Square	5.38	5.25	4.75	8.75	8.50	7.75
701BS/BXS	Square	6.88	6.88	6.00	10.00	12.00	10.00

ORDERING INSTRUCTIONS

Specify:

- | | |
|--|---|
| <ul style="list-style-type: none"> 1) Pilot Operated Valve 2) With/Without Strainer 3) Size & Type of Flanges | <ul style="list-style-type: none"> 4) Refrigerant, Capacity, & Pressures 5) Sub-cooling (if any) 6) Pilot Float Valve 7) With/Without Chamber |
|--|---|

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