

SPF 系列电子膨胀阀

SPF Series electronic expansion valve



SPF12.5/25



SPF50/100



SPF250/400

产品概述 Product Description

SPF系列电子膨胀阀适用于商用冷柜、大型冷库和热泵等制冷系统中，精确控制系统中制冷剂流量，使系统始终在最佳状态下运行，达到快速制冷，实现精准控制和节能的目的。

SPF series electronic expansion valve is suitable for refrigeration systems such as commercial refrigerators, large refrigeration storages and heat pumps. It can accurately control the refrigerant flow in the system, so that the system can always run in the best state, achieve rapid cooling, and achieve the goal of precise control and energy saving.

特点 Features

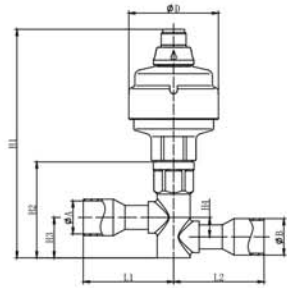
- 集电磁阀、膨胀阀、视液镜功能于一体，性能稳定可靠；
- 反应和动作速度快，调节精准；
- 膨胀阀新结构设计，易拆卸清理，噪音低；
- SPF系列产品采用平衡口设计，逆向开阀压力高，具有双向截止功能；
- 适用于少油或无油系统。

- Integrated with the function of solenoid valve, expansion valve and sight glass, stable and reliable performance;
- Fast response and action, precise adjustment;
- New structure design of expansion valve, easy to dismantle and clean, low noise;
- SPF series products apply a balanced port design with high reverse valve opening pressure, and have bidirectional cut-off function;
- Suitable for systems with little oil or no oil.

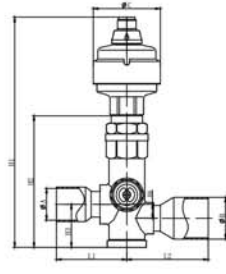
技术参数 Technical Parameters

适用制冷剂 Applicable refrigerant	HCFC或HFC
名义容量 Nominal capacity	43~1936KW
介质温度 Medium temperature	-40~+65℃
环境温度 Environment temperature	-40℃~+60℃
环境湿度 Environment humidity	95%RH以下
全开脉冲 Full open pulse	2620~3800 (详见选型表) see model select table for detail
额定电压 Rated voltage	12V DC (±10%)，矩形波 rectangular wave
励磁方式 Excitation mode	2-2相励磁，双极驱动 2-2 phase excitation, double pole drive
励磁速度 Excitation speed	250pps/300pps, 电压/电流 voltage/ current
结束励磁模式保持 Finishing excitation mode keeps	0.1~1.0s
驱动电流 Drive current	230mA
线圈电阻 Coil resistance	52Ω/相
线圈绝缘等级 Coil insulation grade	E级
防护等级 Protect grade	IP65

外型尺寸 Overall dimension

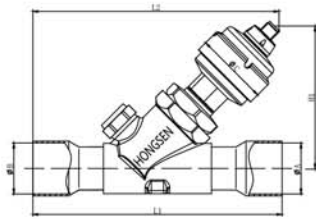


SPF12.5/25

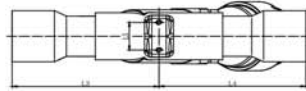


SPF50/100

Model	H1	H2	H3	H4	L1	L2	A	B	C
SPF12.5-5-5	152.5	64	27	13	60.5	60.5	16.1	16.1	60
SPF12.5-7-7	152.5	64	27	13	60.5	60.5	22.3	22.3	60
SPF25-5-5	152.5	64	27	13	60.5	60.5	16.1	16.1	60
SPF25-7-7	152.5	64	27	13	60.5	60.5	22.3	22.3	60
SPF50-7-7	206.3	118	38.5	12.5	56	56	22.3	22.3	60
SPF50-9-9	206.3	118	38.5	12.5	63	63	28.7	28.7	60
SPF50-7-9	206.3	118	38.5	12.5	56	63	22.3	28.7	60
SPF50-9-11	206.3	118	38.5	12.5	63	73	28.7	35.2	60
SPF100-9-9	206.3	118	38.5	12.5	63	63	28.7	28.7	60
SPF100-9-11	206.3	118	38.5	12.5	63	73	28.7	35.2	60



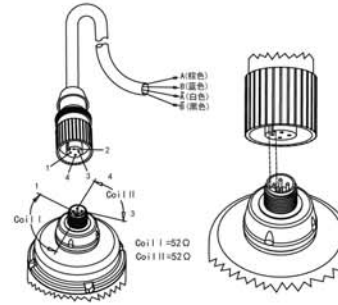
SPF250/400



型号 Model	H1	L1	L2	L3	L4	L5	A	B	C
SPF250-9-9	206.3	168.5	184.3	84.3	84.3	24	28.7	28.7	60
SPF250-11-11	206.3	203	189.3	89.3	89.3	24	35.2	35.2	60
SPF400-13-13	206.3	203	201.5	101.5	101.5	24	41.5	41.5	60
SPF400-17-17	206.3	242	221	121	121	24	54.2	54.2	60

注：接管尺寸可以根据要求定制。 Note: dimension of connecting pipe can be customized according to requirements

驱动时序 Driving Schedule



相序	1	2	3	4
A (棕色)	no	no	off	off
B (蓝色)	no	off	off	no
A̅ (白色)	off	off	no	no
B̅ (黑色)	off	no	no	off

关阀：1 → 2 → 3 → 4
开阀：1 → 2 → 3 → 4

步进电机原理图

连接线缆总成 Connecting cable assembly

型号 Model	温度范围 Temperature range	长度 Length	接头规格 Connector specification	与控制连接方式 Connecting mode with control	示意图 Schematic pic.
M124×Z1MD	-40°C ~ +80°C	1米	M12×1 (防水)	引出线4×0.18mm ²	

选型表 Model selection

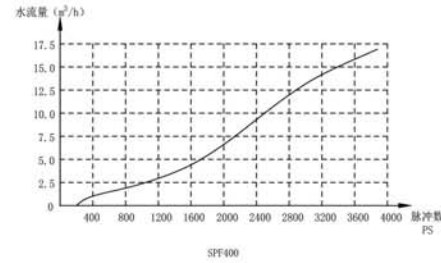
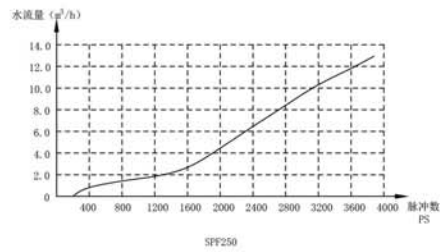
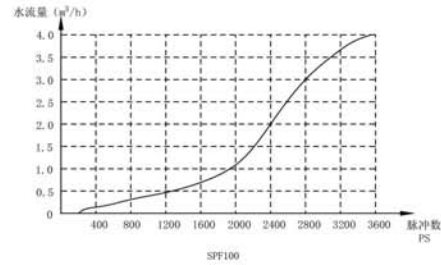
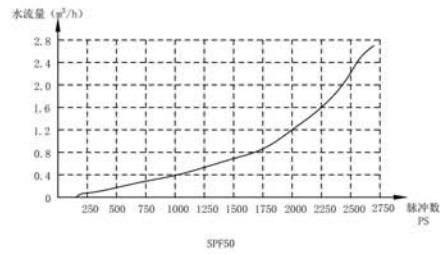
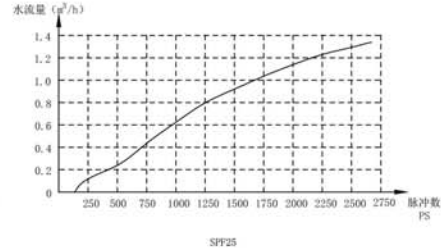
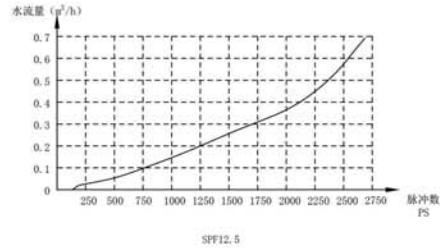
产品系列 Product series	全开步数 Full open steps	通径 Diameter	Kv ¹⁾	名义容量 [KW] ¹⁾ Nominal capacity					最大工作压力 Max. working pressure	最大工作压差 Max. working pressure difference	逆向开阀压差 Reverse valve opening pressure difference
		[mm]	[m ³ /h]	R22	R134a	R407C ²⁾	R404A/R507	R410A ³⁾	[MPa]	[MPa]	[MPa]
SPF12.5	2620	4.50	0.70	57	45	63	43	70	4.5	3.5	≥3.5
SPF25	2620	8.00	1.30	112	89	124	84	139	4.5	3.5	≥3.5
SPF50	2620	11.5	2.30	226	182	265	173.5	274	4.5	3.5	≥3.5
SPF100	3500	16.0	3.90	408	325	455	308	496	4.5	3.5	≥3.5
SPF250	3800	24.0	12.2	1092	862	1203	817	/	3.5	3.0	≥3.0
SPF400	3800	30.0	17.0	1768	1397	1936	1324	/	3.5	3.0	≥3.0

名义工况:

- 额定能力基于: R407C 冷凝温度Tc: +32°C; 蒸发温度Te: +5°C; 阀前液体温度Ti: +28°C;
- Kv值: 基于密度为1T/m³的水, 阀门两端压差等于100KPa时的正向流动能力。

Nominal condition:

- Rated capacity is based on: R407C condensing temperature Tc: +32°C; evaporating temperature Te: +5°C; liquid temperature before valve Ti: +28°C;
- Kv value: the pressure difference based on the two sides between water with density 1T/m³ and the valve is equal to the positive flow capacity at 100Kpa.



额定能力 (kW) Rated capacity

	te[°C]	正向流额定能力[KW] Positive flow rated capacity															
		SPF12.5								SPF25							
		压降 ΔP[bar] Pressure drop															
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
R22	-40	39.6	50.6	57.1	61.2	64.1	65.9	67.0	67.6	82.0	105.4	118.5	126.6	133.6	137.0	139.3	140.9
	-30	39.2	50.6	57.3	61.7	64.7	66.7	68.1	68.8	81.8	104.5	119.3	128.7	134.0	139.2	141.5	143.4
	-20	38.5	50.1	57.1	61.7	64.9	67.1	68.6	69.4	80.3	104.3	118.9	128.7	134.8	140.0	143.0	144.7
	-10	37.5	49.2	56.3	61.2	64.5	66.9	68.5	69.5	78.1	102.5	117.0	127.5	134.6	138.5	142.8	144.6
	-5	36.9	48.6	55.8	60.7	64.1	66.5	68.2	69.2	76.9	101.1	116.3	126.2	133.3	138.8	142.2	144.4
	10	34.7	40.3	53.3	58.3	62.0	64.4	66.2	67.4	72.3	96.2	111.3	121.7	129.2	134.4	138.2	140.6
R134a	-40	35.1	42.6	46.1	47.8	48.3	47.9	47.0	45.6	73.1	88.8	95.8	99.7	100.6	99.9	98.0	94.9
	-30	35.3	43.4	47.3	49.3	50.0	49.9	49.2	47.9	73.5	90.4	98.5	102.6	104.2	104.0	102.4	99.9
	-20	35.1	43.7	48.1	50.4	51.3	51.4	50.9	49.9	73.3	91.1	100.2	104.8	107.0	107.2	106.2	104.0
	-10	34.7	43.7	48.4	50.9	52.2	52.5	52.2	51.3	72.3	91.0	100.8	106.2	108.7	109.5	108.9	107.0
	-5	34.3	43.5	48.3	51.0	52.4	52.9	52.6	51.8	71.6	90.6	100.7	106.4	109.3	110.3	109.8	108.2
	10	32.8	42.2	47.4	50.5	52.2	52.9	53.0	52.4	68.3	87.6	98.9	105.1	108.9	110.4	110.5	109.3
R404A	-40	31.4	39.0	42.8	44.5	45.2	45.1	44.4	43.2	65.7	81.4	89.2	93.0	94.3	94.0	92.5	90.0
	-30	31.1	38.9	43.0	45.1	46.0	46.0	45.5	44.4	64.7	81.2	89.7	94.0	95.9	96.1	94.9	92.8
	-20	30.3	38.4	42.7	45.0	46.2	46.4	46.1	45.2	63.0	80.1	89.1	94.0	96.3	96.9	96.1	94.3
	-10	29.1	37.4	41.9	44.4	45.7	46.2	46.0	45.2	60.7	78.0	87.4	92.7	95.4	96.3	95.9	94.4
	-5	28.5	36.8	41.3	44.0	45.3	45.8	45.6	44.9	59.4	76.6	86.1	91.6	94.5	95.5	95.2	93.8
	10	26.1	34.1	38.6	41.3	42.9	43.5	43.5	43.9	54.3	71.0	80.3	86.0	89.2	90.5	90.4	89.3
R407C	-40	41.5	52.0	57.7	61.1	63.0	64.0	64.1	63.7	86.0	108.0	120.2	127.0	131.4	132.8	133.2	132.5
	-30	41.3	52.2	58.3	62.1	64.2	65.3	65.7	65.4	85.5	108.5	121.0	128.9	133.3	135.8	137.1	136.1
	-20	40.6	52.0	58.4	62.5	64.8	66.2	66.8	66.8	84.2	108.0	121.4	129.7	134.8	137.7	138.9	138.8
	-10	39.6	51.2	57.9	62.2	64.9	66.5	67.3	67.4	82.0	106.4	119.9	129.2	134.9	138.7	139.8	140.6
	-5	39.0	50.7	57.5	61.9	64.6	66.3	67.2	67.4	81.3	105.2	120.0	128.4	134.9	138.4	139.7	140.6
	10	36.6	48.2	55.2	59.7	62.8	64.5	65.7	66.1	76.3	100.5	114.5	124.6	130.9	134.2	137.1	137.9
R410A	-40	45.7	59.1	67.1	72.4	76.2	78.7	80.4	81.4	94.9	122.7	139.0	150.6	157.8	163.1	166.6	168.3
	-30	44.5	58.1	66.3	71.9	75.8	78.5	80.4	81.5	91.9	120.7	137.9	149.0	157.1	162.8	165.2	169.3
	-20	43.0	56.6	64.9	70.6	74.7	77.5	79.5	80.8	89.6	117.1	135.4	146.4	154.8	161.0	165.4	167.6
	-10	41.0	54.4	62.8	68.6	72.7	75.7	77.7	79.1	85.5	113.5	131.0	143.1	151.7	157.9	162.2	165.0
	-5	39.9	53.1	61.5	67.3	71.4	74.4	76.5	77.8	83.3	109.7	127.2	139.1	147.9	154.6	158.5	162.5
	10	36.2	48.5	56.5	62.1	66.1	69.1	71.1	72.4	74.9	101.2	116.8	128.5	136.9	143.0	147.3	151.2

额定能力 (kW) Rated capacity																	
	te[°C]	正向流量额定能力[KW] Positive flow rated capacity															
		SPF50								SPF100							
		压降-ΔP[bar] Pressure drop															
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
R22	-40	151.8	194.3	218.1	234.1	245.6	252.1	256.8	258.9	282.1	360.6	406.6	436.7	456.6	469.7	478.0	482.4
	-30	150.0	193.1	218.0	236.0	247.8	255.7	260.2	263.6	279.1	359.8	407.6	439.4	461.2	475.5	485.2	490.4
	-20	147.1	191.7	218.0	236.0	248.6	256.8	262.6	266.3	274.0	356.5	406.4	439.5	462.5	478.4	488.7	494.7
	-10	143.1	187.9	215.1	233.9	246.9	255.9	262.4	265.8	266.8	349.7	401.0	435.3	459.4	477.2	487.9	495.1
	-5	140.9	185.8	213.6	232.0	245.1	254.2	260.9	264.8	262.9	345.9	397.2	432.2	456.4	473.7	485.8	493.4
	10	132.7	176.6	204.0	223.0	236.9	246.8	253.6	257.8	246.6	328.3	379.7	415.5	441.3	458.9	472.0	480.3
R134a	-40	133.1	162.4	175.7	181.8	183.2	182.1	178.8	173.7	247.9	301.7	326.8	338.6	342.0	339.5	332.7	322.9
	-30	135.0	164.9	179.9	187.6	190.0	189.8	187.9	183.6	249.5	306.7	334.7	348.7	353.7	352.9	347.9	339.4
	-20	134.2	167.1	183.8	191.6	195.0	196.2	194.2	190.3	248.5	309.4	340.4	356.5	363.4	364.2	360.7	353.3
	-10	131.9	166.0	184.9	194.8	198.7	199.8	198.7	195.6	245.5	309.2	342.7	360.9	369.2	371.6	369.3	363.3
	-5	130.7	166.1	184.8	194.5	199.6	201.5	201.0	197.6	242.6	307.4	341.9	361.1	370.8	374.1	372.4	367.0
	10	124.8	160.7	181.1	192.5	198.7	201.6	202.2	199.7	231.8	298.5	335.5	357.2	369.3	374.6	374.8	371.1
R404A	-40	119.9	149.3	163.4	169.9	173.2	172.5	169.6	164.9	223.4	276.7	303.3	316.2	320.9	320.4	315.4	306.8
	-30	118.0	148.1	163.9	172.4	175.1	176.3	173.8	169.9	219.7	276.0	304.7	319.7	326.2	326.9	323.2	316.1
	-20	115.5	146.1	162.8	171.9	176.0	177.1	175.9	173.3	214.3	272.4	302.8	319.7	327.6	329.7	328.0	322.0
	-10	110.9	142.2	159.8	169.2	174.7	176.1	175.2	173.4	206.4	265.4	297.5	315.4	324.6	328.2	326.6	322.6
	-5	108.7	139.9	157.1	167.7	173.3	174.8	174.1	172.4	201.8	260.3	292.7	311.4	321.4	325.1	324.2	319.7
	10	99.7	129.9	147.1	157.8	163.2	165.9	165.9	164.9	185.4	241.6	273.9	294.4	304.4	309.1	308.6	305.3
R407C	-40	158.8	199.7	222.5	236.4	243.9	248.6	249.9	249.6	295.6	371.7	413.3	438.7	454.2	462.1	464.9	464.0
	-30	157.8	200.7	224.2	239.2	249.3	253.9	257.1	256.6	293.5	373.4	417.8	445.9	462.7	472.5	477.1	477.5
	-20	155.2	199.8	225.0	241.5	251.1	257.7	260.8	261.2	289.4	371.7	419.0	448.8	468.1	479.5	485.5	486.9
	-10	151.9	196.9	223.2	240.2	251.8	258.8	263.3	264.0	282.6	366.6	416.4	447.8	468.4	481.8	488.8	491.8
	-5	149.2	194.9	222.4	239.1	250.9	258.1	262.7	264.6	278.5	363.0	413.1	445.4	466.9	480.9	488.6	492.4
	10	140.4	186.4	214.1	231.8	244.5	253.2	257.7	255.5	261.9	345.8	397.3	431.3	454.6	469.8	479.2	484.5
R410A	-40	174.4	224.8	254.6	275.8	288.8	299.6	306.4	310.3	324.1	418.7	475.4	513.3	539.1	557.2	569.5	576.8
	-30	169.2	221.9	252.7	273.8	288.2	298.8	305.9	310.6	315.4	411.8	469.8	509.2	536.9	556.1	569.5	577.6
	-20	163.2	215.0	247.9	268.8	284.1	295.5	302.8	308.2	304.4	400.8	459.4	500.8	529.3	549.2	565.8	572.8
	-10	156.0	206.9	239.4	265.8	276.8	289.0	295.9	301.5	290.8	385.4	444.6	485.7	515.7	536.1	555.7	561.0
	-5	151.9	202.0	234.4	259.0	271.8	283.5	291.5	296.7	282.9	373.4	435.6	461.8	505.8	527.0	542.2	552.2
	10	137.3	184.8	214.0	236.1	252.3	262.9	271.8	276.0	256.1	343.5	399.9	439.9	464.3	489.7	503.8	513.9

额定能力 (kW) Rated capacity																	
	te[°C]	正向流量额定能力[KW] Positive flow rated capacity															
		SPF250								SPF400							
		压降 ΔP[bar] Pressure drop															
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16
R22	-40	778.5	995.0	1121.0	1205.0	1259.5	1297.0	1318.5	1328.5	1249.2	1595.0	1799.0	1931.6	2021.1	2079.4	2115.6	2133.6
	-30	771.0	992.5	1126.0	1213.5	1273.0	1262.5	1339.0	1351.5	1236.2	1593.0	1805.0	1945.7	2041.2	2105.5	2146.7	2169.8
	-20	755.5	984.0	1120.5	1213.0	1276.0	1320.0	1348.5	1364.5	1213.1	1576.9	1798.0	1944.7	2046.2	2116.5	2161.8	2148.9
	-10	737.0	966.0	1107.0	1201.5	1269.0	1315.0	1347.0	1366.0	1180.9	1548.7	1774.8	1927.6	2034.2	2108.5	2158.8	2189.9
	-5	723.0	954.0	1095.0	1193.0	1260.5	1308.0	1341.0	1360.0	1161.8	1529.6	1756.8	1912.5	2021.1	2097.5	2149.7	2181.9
	10	680.5	905.0	1049.0	1146.0	1218.0	1267.0	1303.0	1323.0	1091.4	1453.2	1681.4	1839.2	1951.7	2032.1	2088.4	2124.6
R134a	-40	683.5	832.0	901.5	934.0	942.5	936.0	918.5	890.5	1097.5	1334.7	1446.2	1497.5	1512.6	1501.5	1472.4	1429.1
	-30	687.0	846.0	924.0	963.0	976.0	974.5	960.0	935.0	1103.5	1357.8	1481.4	1542.7	1565.8	1562.8	1539.7	1501.5
	-20	683.5	853.5	938.0	983.0	1002.0	1004.0	994.5	973.5	1099.5	1368.8	1505.5	1576.9	1608.0	1611.0	1595.0	1562.8
	-10	676.0	853.0	944.0	995.0	1020.0	1025.5	1020.0	1002.0	1135.4	1366.8	1514.6	1595.0	1635.2	1645.2	1635.2	1608.0
	-5	669.5	849.0	942.5	997.0	1023.0	1033.0	1029.0	1012.5	1074.4	1360.8	1513.5	1599.0	1642.2	1656.3	1649.2	1625.1
	10	640.0	823.5	927.0	987.0	1020.0	1033.5	1033.0	1022.5	1026.1	1321.6	1485.4	1581.9	1635.2	1658.3	1659.3	1643.2
R404A	-40	615.0	763.0	836.0	871.0	884.0	881.0	867.0	844.0	985.9	1223.1	1339.7	1397.0	1417.1	1413.0	1389.9	1352.7
	-30	606.0	761.0	840.0	881.0	899.0	900.0	890.0	870.0	971.9	1220.1	1346.7	1413.0	1441.2	1443.2	1426.1	1394.0
	-20	591.0	750.0	835.0	881.0	903.0	908.0	901.0	884.0	946.7	1203.0	1338.7	1412.1	1447.2	1455.3	1444.2	1417.1
	-10	569.0	731.0	819.0	869.0	894.0	903.0	899.0	884.0	912.6	1171.8	1312.5	1392.9	1433.1	1447.2	1440.2	1418.1
	-5	556.0	718.0	807.0	858.0	885.0	895.0	892.0	879.0	891.5	1150.8	1293.5	1375.9	1419.1	1435.2	1430.1	1409.0
	10	510.0	665.0	754.0	806.0	836.5	849.0	849.0	836.5	818.1	1067.3	1210.1	1294.5	1341.7	1361.8	1360.8	1342.7
R407C	-40	810.5	1016.0	1128.0	1194.0	1232.0	1248.5	1251.0	1242.5	1300.5	1630.1	1810.0	1914.6	1973.4	2002.0	2007.0	1994.0
	-30	805.5	1021.0	1140.0	1211.5	1255.0	1276.0	1284.0	1278.0	1292.4	1637.2	1829.1	1943.7	2012.0	2047.2	2059.3	2051.2
	-20	792.5	1016.0	1142.5	1220.0	1268.0	1294.0	1306.0	1303.0	1272.3	1629.1	1832.1	1956.8	2033.1	2075.4	2093.4	2092.4
	-10	772.5	1002.0	1133.0	1216.0	1268.0	1298.0	1315.0	1315.5	1241.2	1606.0	1817.1	1949.7	2034.2	2083.4	2107.5	2111.5
	-5	761.5	990.0	1123.0	1207.5	1264.0	1296.0	1314.0	1317.0	1221.1	1587.9	1802.0	1938.7	2026.1	2078.4	2105.5	2112.5
	10	715.0	940.5	1076.5	1167.0	1226.0	1262.5	1284.5	1291.5	1146.7	1509.5	1727.6	1871.3	1965.8	2026.1	2059.3	2072.3
R410A	-40	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	-30	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	-20	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	-10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	-5	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/