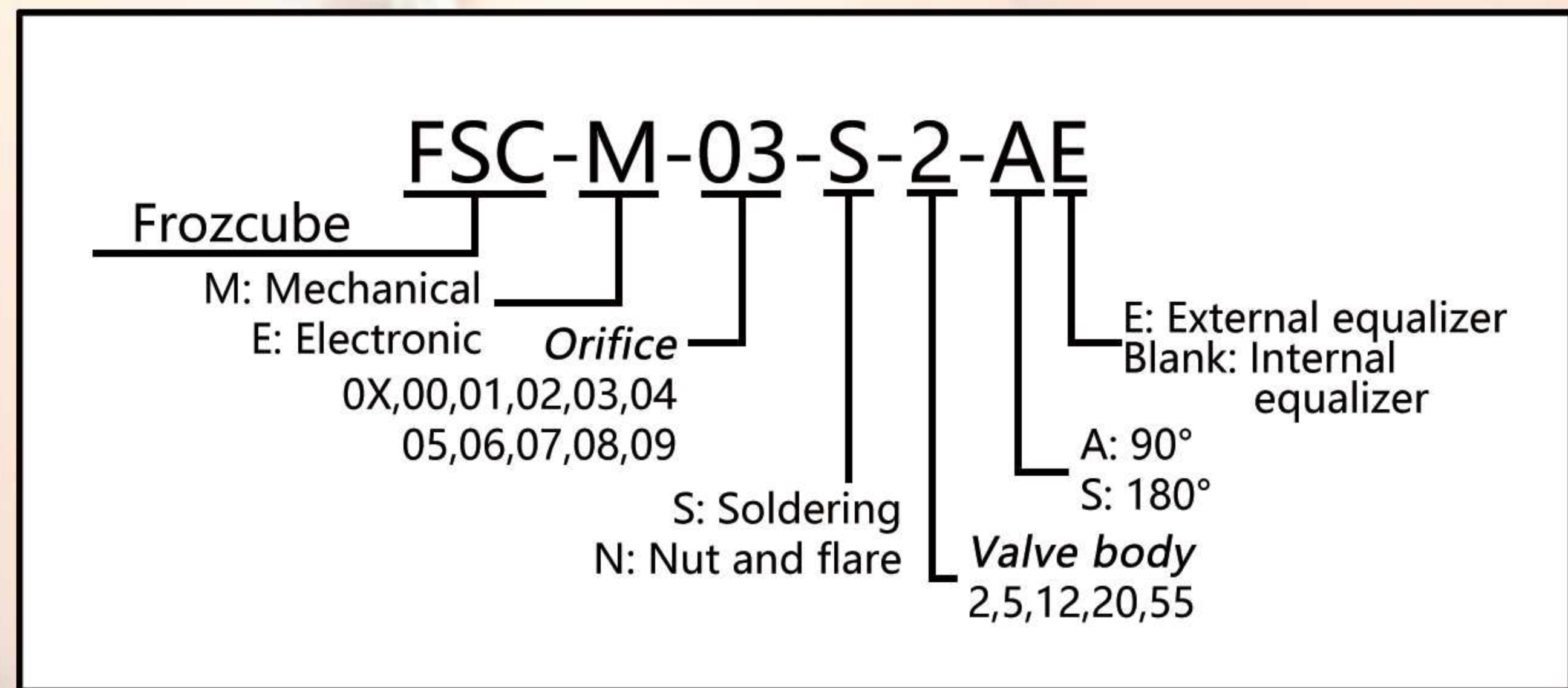


Expansion Valve



Act as a throttle between the high pressure and the low pressure sides of refrigeration systems, Frozcube thermostatic valves control the superheat of refrigerant vapor at the outlet of the evaporator and ensure the refrigerant flow rate into the evaporator exactly matches evaporation's rate of liquid refrigerant in the evaporator. Therefore, the evaporator is fully utilized and no liquid refrigerant will be inhaled to the compressor. The expansion valves perceive the superheat of gas refrigerant in the evaporator's outlet via sensing bulb, thus auto regulate the refrigerant flow that enters the evaporator. Therefore, the valves are especially suitable for liquid injection in "dry" evaporators, where the superheat at the evaporator outlet is proportional to evaporator load.

Sebagai peranti sempadan antara bahagian tekanan tinggi dan rendah dalam sistem penyejuk, injap termostatik Frozcube mengawal suhu bekuan wap agen penyejuk pada saluran keluar penguap dan memastikan kadar aliran agen penyejuk cecair ke dalam penguap sepadan dengan kadar pengewapan agen penyejuk cecair dalam penguap. Oleh itu, penguap digunakan sepenuhnya dan tiada agen penyejuk cecair akan dihirup oleh pemampat. Injap pengembangan mengesan suhu bekuan gas agen penyejuk dalam saluran keluar penguap melalui buli pendeteksi, dengan itu mengawal pengaliran agen penyejuk cecair yang masuk ke dalam penguap secara automatik. Oleh itu, injap-injap ini terutamanya sesuai untuk suntikan cecair dalam penguap "kering", di mana suhu bekuan di saluran keluar penguap berkadar langsung dengan beban penguap.

Orifice assembly

The rated capacity is based on:

Evaporating temperature

$t_e = +4.4^\circ\text{C}$

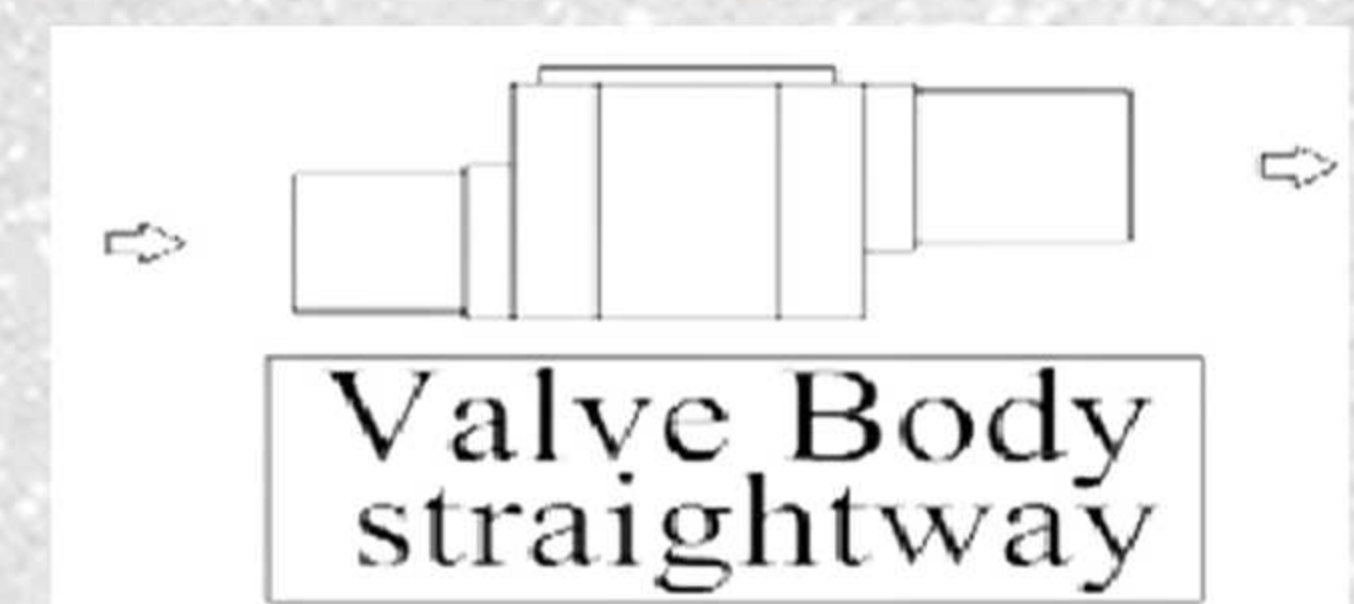
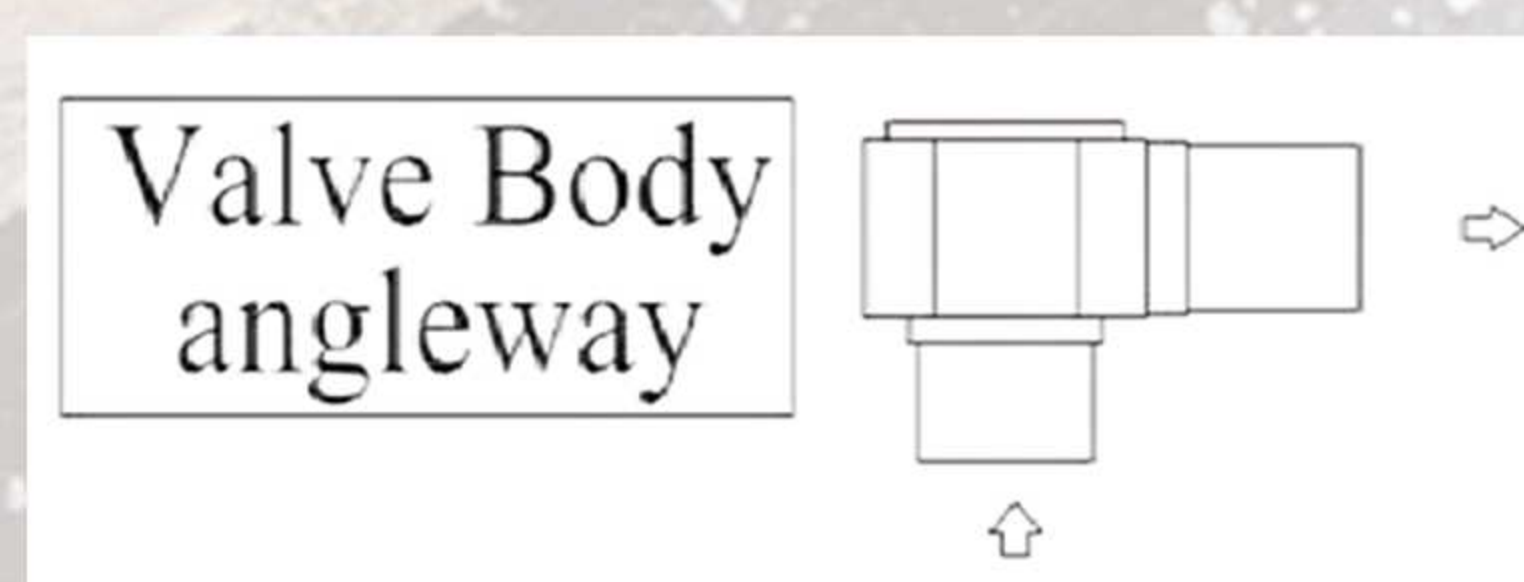
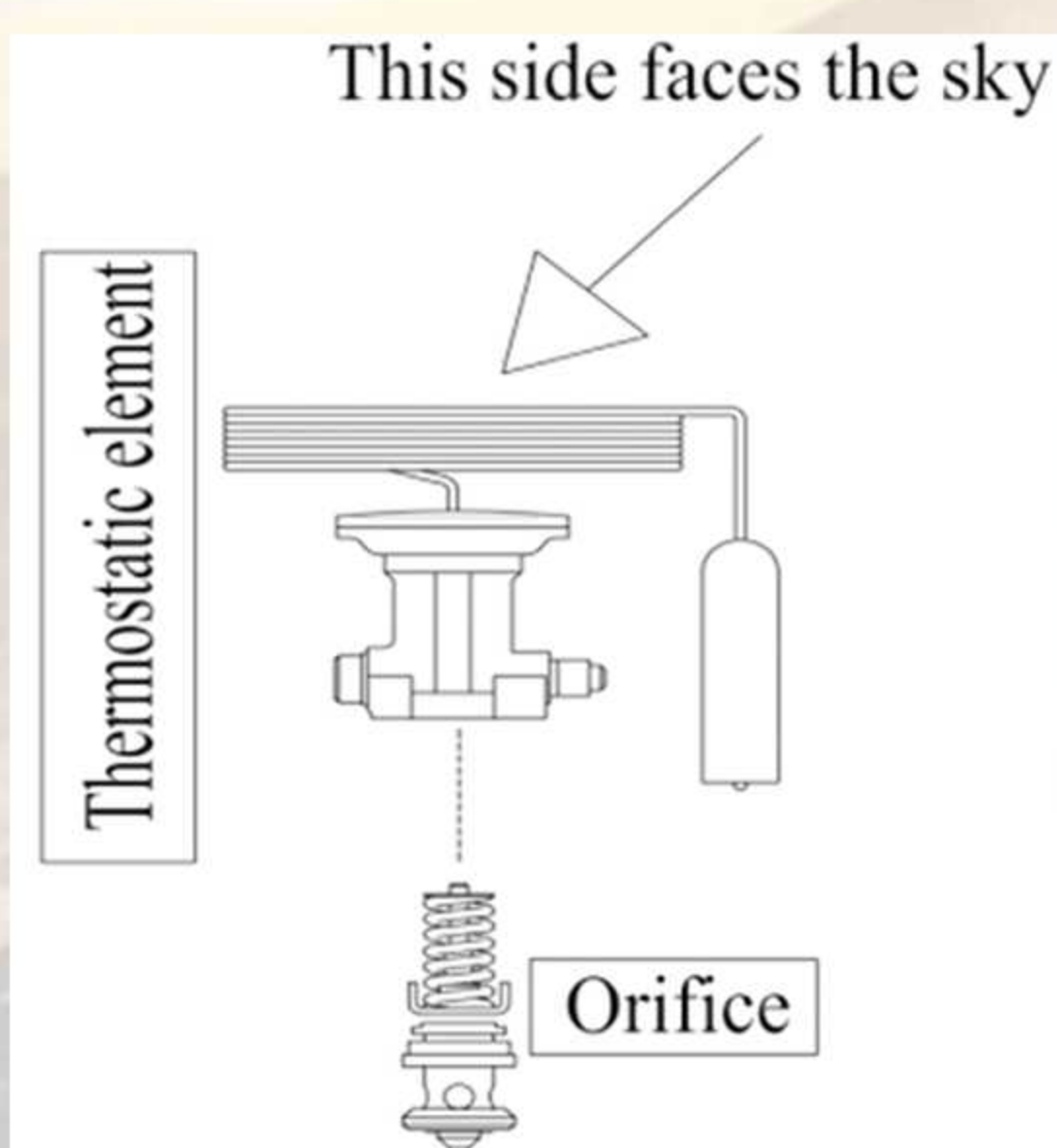
Condensing temperature

$t_c = +38^\circ\text{C}$

Refrigerant temperature ahead of valve

$t_l = +37^\circ\text{C}$

Model	R134a		R404A/R507		R407C		R22		R410A	
	kW	TR	kW	TR	kW	TR	kW	TR	kW	TR
FSC-M-03-N-2-AE	4.3	1.2	6.3	1.8	8.1	2.3	8.00	2.3	-	-
FSC-M-06-N-2-AE	10.1	2.9	15.5	4.4	19.7	5.6	19.7	5.6	-	-
FSC-M-01-S-5-AE	12.2	3.5	14.8	4.2	19.6	5.6	19	5.4	-	-
FSC-M-02-S-5-AE	17.0	4.8	20.4	5.8	27.1	7.7	26.3	7.5	-	-
FSC-M-04-S-5-AE	29.7	8.5	35.5	10.1	47.3	13.5	45.9	13.1	-	-
FSC-M-05-S-12-AE	37.7	10.7	50	14.3	56	16.0	57	16.2	-	-
FSC-M-06-S-12-AE	50.0	14.3	64	18.2	74	21.1	76	21.7	-	-



Valve body

When the subcooling $\neq 4$ K then:
Plant capacity / Factor = Table value

Example:

Refrigerant = R404A

Qnom = 10 kW

te = -10°C

tc = 45°C

Dtsub = 25 K

Selection :

10 kW / 1.46 = 6.85 kW → FSC-M-01-S-5-AE

Model	Orifice	Connection Inlet × Outlet		Body	Equalizer
		in.	mm		
FSC-M-S-2	0.5, 01, 02 03 04 05	3/8×1/2	- - - -	A/S	E
FSC-M-S-2	0.5, 01, 02 03 04 05	- - - -	10×12		
FSC-M-S-5	0.5, 01, 02 03 04 05	1/2×5/8 1/2×7/8 5/8×7/8 7/8×11/8	- - - -		
FSC-M-S-5	0.5, 01, 02 03 04 05	- - - -	12 × 16 12 × 22 16 × 22 22 × 28		

Capacity in kW, range N -40 ° C to +10 ° C. Opening superheat sh= 4.4 K

Model	Cond. temp. 1) [° C]	R134a					R404A/R507A					R407C					R22			
		Capacity in [kW]					Capacity in [kW]					Capacity in [kW]					Capacity in [kW]			
		Evaporating temp. [° C]					Evaporating temp. [° C]					Evaporating temp. [° C]					Evaporating temp. [° C]			
		-30	-10	-5	0	5	-40	-35	-30	-10	0	-10	-5	0	5	10	-35	-30	0	5
FSC-M-03-N-2-AE	25	1.7	2.9	3.2	3.5	3.7	1.9	2.2	2.7	4.7	5.5	5.7	6.4	7.1	7.6	7.9	2.9	3.3	6.4	6.7
FSC-M-06-N-2-AE		3.9	6.7	7.5	8.2	8.7	4.2	5	6	11.2	13.4	13.2	15	16.8	18.5	19.4	6.4	7.4	15.4	16.2
FSC-M-01-S-5-AE		6.1	9.2	9.8	10.3	10.6	6.8	7.7	8.8	12.7	13.7	15.7	16.8	17.6	18.2	18.2	9.4	10.5	16.2	16.2
FSC-M-02-S-5-AE		8.6	12.8	13.7	14.4	14.6	9.5	10.9	12.3	17.6	18.8	21.8	23.3	24.4	25	24.9	13.2	14.8	22.3	22.2
FSC-M-04-S-5-AE		14.9	22.5	24.2	25.4	25.9	16.1	18.5	21.1	30.8	33.1	38.2	40.9	42.9	44	43.7	22.6	25.5	39.3	38.9
FSC-M-05-S-12-AE		19.3	29	31.2	33	33.9	20.7	24.2	27.9	43.9	48.9	45.1	49.2	53	55	56	27.7	31.2	51	51
FSC-M-06-S-12-AE		25.2	38.4	41.4	43.9	45.2	24.9	29.3	34.1	55	62	59	65	70	73	75	35.8	40.5	67	68
FSC-M-03-N-2-AE	35	1.8	3.1	3.5	4	4.4	1.8	2.1	2.6	4.9	6.1	6	6.8	7.6	8.4	9	3	3.5	7.4	8
FSC-M-06-N-2-AE		4.1	7.2	8.2	9.2	10.2	4	4.8	5.8	11.7	14.9	13.8	15.9	18.1	20.4	22.2	6.8	7.8	17.9	19.7
FSC-M-01-S-5-AE		6.29	9.85	10.8	11.6	12.4	6.3	7.3	8.37	12.9	14.8	16.2	17.7	19	20.1	20.9	9.69	10.9	18.4	19.1
FSC-M-02-S-5-AE		8.83	13.8	15	16.2	17.1	8.9	10.3	11.8	18	20.4	22.6	24.6	26.4	27.8	28.7	13.6	15.3	25.4	26.2
FSC-M-04-S-5-AE		15.2	24	26.3	28.4	30.1	14.9	17.3	19.9	31.2	35.7	39.1	42.7	46	48.6	50	22.9	25.9	44.5	45.9
FSC-M-05-S-12-AE		19.5	30.3	33.3	36.1	38.5	18.6	21.8	25.3	42.3	51	44.2	49.2	54	58	62	27.7	31.2	55	58
FSC-M-06-S-12-AE		25.1	39.8	43.9	47.8	51	22.3	26.3	30.7	53	64	58	64	71	77	82	35.4	40.1	74	77
FSC-M-03-N-2-AE	45	1.8	3.3	3.7	4.2	4.7	1.6	2	2.4	4.8	6.2	6	6.9	7.8	8.7	9.5	3.1	3.6	8.1	8.9
FSC-M-06-N-2-AE		4.2	7.5	8.6	9.8	11.1	3.7	4.5	5.4	11.4	15.4	13.9	16.1	18.7	21.3	23.6	7.1	8.2	19.5	22
FSC-M-01-S-5-AE		6.3	10.1	11.2	12.3	13.4	5.65	6.6	7.6	12.3	14.7	15.9	17.6	19.2	20.7	22.1	9.76	11	19.5	20.7
FSC-M-02-S-5-AE		8.8	14.1	15.7	17.2	18.6	7.94	9.3	10.7	17.2	20.4	22.4	24.6	26.8	28.9	30.5	13.7	15.4	27.2	28.7
FSC-M-04-S-5-AE		14.9	24.3	27.1	29.8	32.4	13	15.3	17.7	29.4	35.4	38	42.2	46.3	50	53	22.7	25.7	47.1	49.9
FSC-M-05-S-12-AE		19	30	33.3	36.7	40.1	16.1	18.8	21.9	37.8	47.4	40.9	46	51	57	61	27.1	30.3	56	60
FSC-M-06-S-12-AE		24.3	39.1	43.7	48.5	53	19	22.5	26.4	46.9	60	53	60	67	75	82	34.2	38.6	74	80
FSC-M-03-N-2-AE	55	1.8	3.3	3.8	4.3	4.9	1.4	1.7	2.1	4.3	5.8	5.8	6.7	7.7	8.7	9.6	3.2	3.7	8.5	9.5
FSC-M-06-N-2-AE		4.3	7.5	8.7	10	11.4	3.3	4	4.8	10.3	14.3	13.6	15.9	18.5	21.3	24	7.3	8.4	20.3	23.2
FSC-M-01-S-5-AE		6.1	10	11.1	12.4	13.6	4.8	5.6	6.4	10.8	13.3	14.9	16.6	18.3	20	21.7	9.7	10.9	19.8	21.3
FSC-M-02-S-5-AE		8.5	14	15.6	17.3	19	6.7	7.9	9.1	15.2	18.6	21.1	23.4	25.8	28.1	30.3	13.5	15.3	27.8	29.7
FSC-M-04-S-5-AE		14.3	23.7	26.6	29.6	32.7	10.8	12.7	14.8	25.5	31.9	35.1	39.4	43.8	48.2	52	22.1	25	47.5	51
FSC-M-05-S-12-AE		18	28.3	31.7	35.2	39	13.3	15.5	18	31.1	39.9	36	40.6	45.6	51	56	26.1	29	53	58
FSC-M-06-S-12-AE		22.8	36.8	41.4	46.4	52	15.5	18.3	21.4	38.4	50	46.4	53	60	67	75	32.6	36.5	71	78

1) Condensing temperature at bubble point.

Subcooling correction factor 'fsub' 'fsub' = saturated condensing temp. - liquid temp. at valve inlet

Refrigerant	Subcooling[K]										
	2	4	10	15	20	25	30	35	40	45	50
R134a	0.98	1	1.08	1.13	1.19	1.25	1.31	1.37	1.42	1.48	1.54
R404A/R507	0.96	1	1.1	1.2	1.29	1.37	1.46	1.54	1.63	1.7	1.78
R407C	0.97	1	1.08	1.14	1.21	1.27	1.33	1.39	1.45	1.51	1.57
R22	0.98	1	1.06	1.11	1.15	1.2	1.25	1.3	1.35	1.39	1.44

Valve body 2

Refrigerant	Subcooling[K]										
	2	4	10	15	20	25	30	35	40	45	50
R134a	0.97	1	1.09	1.16	1.23	1.3	1.37	1.44	1.51	1.58	1.65
R404A/R507	0.97	1	1.1	1.19	1.27	1.35	1.43	1.52	1.6	1.68	1.76
R407C	0.97	1	1.08	1.15	1.22	1.29	1.36	1.43	1.5	1.57	1.64
R22	0.98	1	1.07	1.13	1.19	1.25	1.3	1.36	1.42	1.47	1.53

Valve body 5/12