

Datasheets

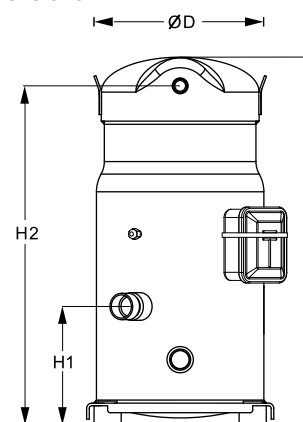
# Danfoss scroll compressors **SM / SY / SZ / SH / WSH**



**General Characteristics**

Model number (on compressor nameplate)		<b>SM090S4VC</b>
Code number for Singlepack*		SM090-4V1
Code number for Industrial pack**		SM090-4VM
Drawing number		8552036b
Suction and discharge connections		Brazed
Suction connection		1-1/8" ODF
Discharge connection		3/4" ODF
Oil sight glass		Threaded
Oil equalisation connection		3/8" flare SAE
Oil drain connection		None
LP gauge port		Schrader
IPR valve		None
Swept volume		120,5 cm <sup>3</sup> /rev
Displacement @ Nominal speed		21.0 m <sup>3</sup> /h @ 2900 rpm - 25.3 m <sup>3</sup> /h @ 3500 rpm
Net weight		65 kg
Oil charge		3,25 litre, Mineral - 160P
Maximum system test pressure Low Side / High side		25 bar(g) / 32 bar(g)
Maximum differential test pressure		24 bar
Maximum number of starts per hour		12
Refrigerant charge limit		8,5 kg
Approved refrigerants		R22, R417A-160SZ

**Dimensions**

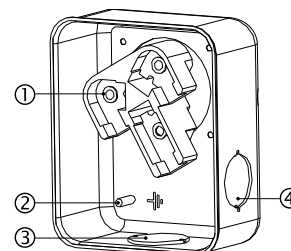


D=254 mm  
H=508 mm  
H1=141,9 mm  
H2=464,5 mm  
H3=- mm

**Electrical Characteristics**

Nominal voltage	380-400V/3/50Hz - 460V/3/60Hz
Voltage range	340-440 V @ 50Hz - 414-506 V @ 60Hz
Winding resistance (between phases) +/- 7% at 25°C	1.48 Ω
Rated Load Amps (RLA)	13.2 A
Maximum Continuous Current (MCC)	18.5 A
Locked Rotor Amps (LRA)	98 A
Motor protection	Internal overload protector

**Terminal box**



IP54 (with cable gland)  
1: Power connection, 3 x 4.8 mm (3/16")  
2: Earth M4-12  
3: Knock-out Ø 29 mm (1.14")  
4: Knock-out Ø 25.5 mm (1.00")

**Recommended Installation torques**

Oil sight glass	50 Nm
Power connections / Earth connection	3 Nm / 2 Nm
Mounting bolts	21 Nm

**Parts shipped with compressor**

Mounting kit with grommets, bolts, nuts, sleeves and washers
Initial oil charge
Installation instructions

**Approvals** : CE certified, UL certified (file SA6873), -

\*Singlepack: Compressor in cardboard box

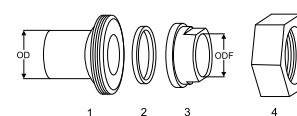
\*\*Industrial pack: 8 Unboxed compressors on pallet (order per multiples of 8)

**Rotolock accessories, suction side**
**Code no.**

Solder sleeve, P02 (1-3/4" Rotolock, 1-1/8" ODF)	8153004
Angle adapter, C02 (1-3/4" Rotolock, 1-1/8" ODF)	8168005
Rotolock valve, V02 (1-3/4" Rotolock, 1-1/8" ODF)	8168028
Gasket, 1-3/4"	8156132

**Rotolock accessories, discharge side**
**Code no.**

Solder sleeve, P04 (1-1/4" Rotolock, 3/4" ODF)	8153008
Angle adapter, C04 (1-1/4" Rotolock, 3/4" ODF)	8168006
Rotolock valve, V04 (1-1/4" Rotolock, 3/4" ODF)	8168029
Gasket, 1-1/4"	8156131

**Solder sleeve adapter set**


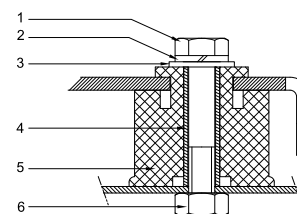
- 1: Rotolock adapter (Suc & Dis)
- 2: Gasket (Suc & Dis)
- 3: Solder sleeve (Suc & Dis)
- 4: Rotolock nut (Suc & Dis)

**Rotolock accessories, sets**
**Code no.**

Solder sleeve adapter set (1-3/4" Rotolock, 1-1/8" ODF), (1-1/4" Rotolock, 3/4" ODF)	7765005
Angle adapter set, C02 (1-3/4"~1-1/8"), C04 (1-1/4"~3/4")	7703014
Valve set, V02 (1-3/4"~1-1/8"), V04 (1-1/4"~3/4")	7703009
Gasket set, 1-1/4", 1-3/4", 2-1/4", OSG gaskets black & white	8156013

**Oil / lubricants**
**Code no.**

Mineral oil, 160P, 2 litre can	7754001
Mineral oil, 160P, 5 litre can	7754002

**Mounting kit**


- 1: Bolt (4x)
- 2: Lock washer (4x)
- 3: Flat washer (4x)
- 4: Sleeve (4x)
- 5: Grommet (4x)
- 6: Nut (4x)

**Crankcase heaters**
**Code no.**

Surface sump heater + bottom insulation, 48 W, 24 V, CE mark, UL	120Z0361
Surface sump heater + bottom insulation, 48 W, 230 V, CE mark, UL	120Z0380
Surface sump heater + bottom insulation, 48 W, 400 V, CE mark, UL	120Z0381
Surface sump heater + bottom insulation, 48 W, 460 V, CE mark, UL	120Z0382
Belt type crankcase heater, 65 W, 460 V, CE mark, UL	120Z0466
Belt type crankcase heater, 65 W, 230 V, CE mark, UL	7773107
Belt type crankcase heater, 65 W, 400 V, CE mark, UL	7773117
Belt type crankcase heater, 65 W, 400 V, CE mark, UL	120Z0039

**Miscellaneous accessories**
**Code no.**

Electronic soft start kit, MCI 15 C	7705006
Acoustic hood for scroll compressor S084-S090-S100	7755011
Bottom insulation for scroll compressor	120Z0356
Discharge thermostat kit	7750009

**Spare parts**
**Code no.**

Mounting kit for 1 scroll compressor including 4 grommets, 4 sleeves, 4 bolts, 4 washers	8156138
Oil sight glass with gaskets (black & white)	8156019
Gasket for oil sight glass (white teflon)	8156129
Service kit for terminal box 96 x 115 mm, including 1 cover, 1 clamp	8156135
T block connector 52 x 57 mm	8173230

Performance data at 50 Hz, EN 12900 rating conditions

R22

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)							
	-20	-15	-10	-5	0	5	10	15

Cooling capacity in W

30	8 547	10 771	13 376	16 398	19 872	23 834	28 318	33 360	-
35	8 048	10 216	12 751	15 687	19 061	22 906	27 259	32 154	-
40	7 524	9 627	12 082	14 923	18 186	21 905	26 116	30 855	-
45	-	9 005	11 370	14 106	17 248	20 831	24 891	29 462	-
50	-	-	10 614	13 235	16 247	19 684	23 582	27 976	-
55	-	-	-	12 311	15 182	18 464	22 190	26 396	-
60	-	-	-	-	14 055	17 170	20 713	24 721	-
65	-	-	-	-	12 864	15 801	19 151	22 948	-

Power input in W

30	3 895	3 930	3 961	3 985	4 000	4 004	3 995	3 971	-
35	4 324	4 357	4 384	4 405	4 415	4 414	4 399	4 368	-
40	4 810	4 840	4 863	4 879	4 884	4 877	4 856	4 817	-
45	-	5 383	5 402	5 413	5 413	5 399	5 371	5 324	-
50	-	-	6 007	6 012	6 006	5 986	5 949	5 895	-
55	-	-	-	6 682	6 669	6 641	6 597	6 533	-
60	-	-	-	-	7 407	7 371	7 318	7 246	-
65	-	-	-	-	8 225	8 182	8 120	8 037	-

Current consumption in A

30	9.14	9.19	9.23	9.26	9.28	9.28	9.26	9.22	-
35	9.60	9.65	9.69	9.71	9.72	9.71	9.69	9.63	-
40	10.15	10.19	10.22	10.24	10.24	10.23	10.19	10.13	-
45	-	10.82	10.85	10.86	10.85	10.83	10.78	10.70	-
50	-	-	11.57	11.57	11.56	11.53	11.47	11.38	-
55	-	-	-	12.40	12.38	12.33	12.26	12.16	-
60	-	-	-	-	13.30	13.25	13.16	13.05	-
65	-	-	-	-	14.36	14.29	14.19	14.07	-

Mass flow in kg/h

30	184	229	281	340	407	482	567	662	-
35	180	226	278	337	405	481	566	661	-
40	176	221	274	334	402	478	564	659	-
45	-	216	269	329	397	474	560	655	-
50	-	-	263	324	392	468	554	650	-
55	-	-	-	316	384	461	547	642	-
60	-	-	-	-	375	452	537	632	-
65	-	-	-	-	364	440	525	620	-

Coefficient of performance (C.O.P.)

30	2.19	2.74	3.38	4.12	4.97	5.95	7.09	8.40	-
35	1.86	2.34	2.91	3.56	4.32	5.19	6.20	7.36	-
40	1.56	1.99	2.48	3.06	3.72	4.49	5.38	6.40	-
45	-	1.67	2.10	2.61	3.19	3.86	4.63	5.53	-
50	-	-	1.77	2.20	2.71	3.29	3.96	4.75	-
55	-	-	-	1.84	2.28	2.78	3.36	4.04	-
60	-	-	-	-	1.90	2.33	2.83	3.41	-
65	-	-	-	-	1.56	1.93	2.36	2.86	-

Nominal performance at to = 5 °C, tc = 50 °C

Cooling capacity	19 684	W
Power input	5 986	W
Current consumption	11.53	A
Mass flow	468	kg/h
C.O.P.	3.29	

Pressure switch settings

Maximum HP switch setting	28	bar(g)
Minimum LP switch setting	0.5	bar(g)
LP pump down setting	1.3	bar(g)

Sound power data

Sound power level	70	dB(A)
With acoustic hood	62	dB(A)

to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

Rating conditions : Superheat = 10 K , Subcooling = 0 K

All performance data +/- 5%

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Performance data at 50 Hz, ARI rating conditions

R22

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)							
	-20	-15	-10	-5	0	5	10	15

Cooling capacity in W

30	9 070	11 421	14 173	17 362	21 026	25 200	29 921	35 227	-
35	8 570	10 870	13 556	16 664	20 232	24 296	28 892	34 058	-
40	8 044	10 283	12 893	15 911	19 374	23 317	27 779	32 794	-
45	-	9 660	12 185	15 103	18 450	22 264	26 580	31 436	-
50	-	-	11 431	14 239	17 462	21 136	25 298	29 985	-
55	-	-	-	13 320	16 408	19 933	23 931	28 439	-
60	-	-	-	-	15 290	18 655	22 479	26 799	-
65	-	-	-	-	14 106	17 303	20 944	25 065	-

Power input in W

30	3 895	3 930	3 961	3 985	4 000	4 004	3 995	3 971	-
35	4 324	4 357	4 384	4 405	4 415	4 414	4 399	4 368	-
40	4 810	4 840	4 863	4 879	4 884	4 877	4 856	4 817	-
45	-	5 383	5 402	5 413	5 413	5 399	5 371	5 324	-
50	-	-	6 007	6 012	6 006	5 986	5 949	5 895	-
55	-	-	-	6 682	6 669	6 641	6 597	6 533	-
60	-	-	-	-	7 407	7 371	7 318	7 246	-
65	-	-	-	-	8 225	8 182	8 120	8 037	-

Current consumption in A

30	9.14	9.19	9.23	9.26	9.28	9.28	9.26	9.22	-
35	9.60	9.65	9.69	9.71	9.72	9.71	9.69	9.63	-
40	10.15	10.19	10.22	10.24	10.24	10.23	10.19	10.13	-
45	-	10.82	10.85	10.86	10.85	10.83	10.78	10.70	-
50	-	-	11.57	11.57	11.56	11.53	11.47	11.38	-
55	-	-	-	12.40	12.38	12.33	12.26	12.16	-
60	-	-	-	-	13.30	13.25	13.16	13.05	-
65	-	-	-	-	14.36	14.29	14.19	14.07	-

Mass flow in kg/h

30	184	228	279	338	405	480	564	658	-
35	179	224	276	335	402	478	563	657	-
40	175	220	273	332	399	475	560	655	-
45	-	215	268	328	395	471	557	652	-
50	-	-	262	322	390	466	551	646	-
55	-	-	-	315	382	459	544	639	-
60	-	-	-	-	373	449	534	629	-
65	-	-	-	-	362	438	522	616	-

Coefficient of performance (C.O.P.)

30	2.33	2.91	3.58	4.36	5.26	6.29	7.49	8.87	-
35	1.98	2.49	3.09	3.78	4.58	5.50	6.57	7.80	-
40	1.67	2.12	2.65	3.26	3.97	4.78	5.72	6.81	-
45	-	1.79	2.26	2.79	3.41	4.12	4.95	5.90	-
50	-	-	1.90	2.37	2.91	3.53	4.25	5.09	-
55	-	-	-	1.99	2.46	3.00	3.63	4.35	-
60	-	-	-	-	2.06	2.53	3.07	3.70	-
65	-	-	-	-	1.71	2.11	2.58	3.12	-

Nominal performance at to = 7.2 °C, tc = 54.4 °C

Cooling capacity	21 788	W
Power input	6 542	W
Current consumption	12.20	A
Mass flow	496	kg/h
C.O.P.	3.33	

Pressure switch settings

Maximum HP switch setting	28	bar(g)
Minimum LP switch setting	0.5	bar(g)
LP pump down setting	1.3	bar(g)

Sound power data

Sound power level	70	dB(A)
With acoustic hood	62	dB(A)

to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

Rating conditions : Superheat = 11.1 K , Subcooling = 8.3 K

All performance data +/- 5%

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Performance data at 60 Hz, EN 12900 rating conditions

R22

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)							
	-20	-15	-10	-5	0	5	10	15

Cooling capacity in W

30	10 535	13 186	16 299	19 917	24 082	28 839	34 229	40 296	-
35	9 941	12 521	15 543	19 050	23 085	27 692	32 912	38 789	-
40	9 337	11 832	14 751	18 135	22 027	26 470	31 507	37 181	-
45	-	11 124	13 926	17 174	20 911	25 178	30 020	35 477	-
50	-	-	13 072	16 172	19 740	23 819	28 452	33 680	-
55	-	-	-	15 131	18 518	22 396	26 806	31 792	-
60	-	-	-	-	17 247	20 910	25 086	29 815	-
65	-	-	-	-	15 930	19 365	23 291	27 750	-

Power input in W

30	4 708	4 757	4 804	4 846	4 883	4 913	4 932	4 940	-
35	5 201	5 247	5 290	5 328	5 360	5 382	5 394	5 394	-
40	5 756	5 799	5 837	5 870	5 896	5 911	5 915	5 906	-
45	-	6 419	6 453	6 480	6 498	6 506	6 502	6 483	-
50	-	-	7 142	7 163	7 174	7 174	7 161	7 132	-
55	-	-	-	7 927	7 930	7 922	7 899	7 860	-
60	-	-	-	-	8 774	8 755	8 722	8 672	-
65	-	-	-	-	9 710	9 682	9 639	9 577	-

Current consumption in A

30	8.66	8.75	8.83	8.90	8.96	8.99	9.00	8.97	-
35	9.12	9.21	9.29	9.36	9.40	9.43	9.43	9.40	-
40	9.67	9.76	9.83	9.89	9.94	9.96	9.95	9.92	-
45	-	10.41	10.48	10.54	10.57	10.59	10.58	10.53	-
50	-	-	11.24	11.29	11.32	11.33	11.31	11.26	-
55	-	-	-	12.17	12.19	12.19	12.16	12.10	-
60	-	-	-	-	13.20	13.19	13.15	13.08	-
65	-	-	-	-	14.36	14.34	14.29	14.21	-

Mass flow in kg/h

30	227	280	342	412	492	583	685	799	-
35	223	277	339	410	490	581	683	797	-
40	218	272	335	406	487	578	680	794	-
45	-	267	330	401	482	573	675	789	-
50	-	-	324	395	476	567	669	782	-
55	-	-	-	389	469	559	660	773	-
60	-	-	-	-	460	550	650	763	-
65	-	-	-	-	451	539	639	750	-

Coefficient of performance (C.O.P.)

30	2.24	2.77	3.39	4.11	4.93	5.87	6.94	8.16	-
35	1.91	2.39	2.94	3.58	4.31	5.14	6.10	7.19	-
40	1.62	2.04	2.53	3.09	3.74	4.48	5.33	6.30	-
45	-	1.73	2.16	2.65	3.22	3.87	4.62	5.47	-
50	-	-	1.83	2.26	2.75	3.32	3.97	4.72	-
55	-	-	-	1.91	2.34	2.83	3.39	4.04	-
60	-	-	-	-	1.97	2.39	2.88	3.44	-
65	-	-	-	-	1.64	2.00	2.42	2.90	-

Nominal performance at to = 5 °C, tc = 50 °C

Cooling capacity	23 819	W
Power input	7 174	W
Current consumption	11.33	A
Mass flow	567	kg/h
C.O.P.	3.32	

Pressure switch settings

Maximum HP switch setting	28	bar(g)
Minimum LP switch setting	0.5	bar(g)
LP pump down setting	1.3	bar(g)

Sound power data

Sound power level	75	dB(A)
With acoustic hood	67	dB(A)

to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

Rating conditions : Superheat = 10 K , Subcooling = 0 K

All performance data +/- 5%

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Performance data at 60 Hz, ARI rating conditions

R22

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)							
	-20	-15	-10	-5	0	5	10	15

Cooling capacity in W

30	11 180	13 982	17 270	21 088	25 480	30 492	36 168	42 551	-
35	10 587	13 322	16 524	20 236	24 504	29 372	34 884	41 085	-
40	9 982	12 638	15 741	19 335	23 466	28 177	33 513	39 518	-
45	-	11 933	14 925	18 388	22 369	26 910	32 057	37 855	-
50	-	-	14 079	17 399	21 216	25 576	30 522	36 098	-
55	-	-	-	16 371	20 013	24 178	28 909	34 253	-
60	-	-	-	-	18 763	22 720	27 224	32 322	-
65	-	-	-	-	17 468	21 205	25 470	30 309	-

Power input in W

30	4 708	4 757	4 804	4 846	4 883	4 913	4 932	4 940	-
35	5 201	5 247	5 290	5 328	5 360	5 382	5 394	5 394	-
40	5 756	5 799	5 837	5 870	5 896	5 911	5 915	5 906	-
45	-	6 419	6 453	6 480	6 498	6 506	6 502	6 483	-
50	-	-	7 142	7 163	7 174	7 174	7 161	7 132	-
55	-	-	-	7 927	7 930	7 922	7 899	7 860	-
60	-	-	-	-	8 774	8 755	8 722	8 672	-
65	-	-	-	-	9 710	9 682	9 639	9 577	-

Current consumption in A

30	8.66	8.75	8.83	8.90	8.96	8.99	9.00	8.97	-
35	9.12	9.21	9.29	9.36	9.40	9.43	9.43	9.40	-
40	9.67	9.76	9.83	9.89	9.94	9.96	9.95	9.92	-
45	-	10.41	10.48	10.54	10.57	10.59	10.58	10.53	-
50	-	-	11.24	11.29	11.32	11.33	11.31	11.26	-
55	-	-	-	12.17	12.19	12.19	12.16	12.10	-
60	-	-	-	-	13.20	13.19	13.15	13.08	-
65	-	-	-	-	14.36	14.34	14.29	14.21	-

Mass flow in kg/h

30	226	279	340	410	490	580	681	794	-
35	222	275	337	407	488	578	680	793	-
40	217	271	333	404	484	575	676	790	-
45	-	266	328	399	479	570	671	785	-
50	-	-	323	393	473	564	665	778	-
55	-	-	-	387	466	556	657	769	-
60	-	-	-	-	458	547	647	758	-
65	-	-	-	-	448	536	635	745	-

Coefficient of performance (C.O.P.)

30	2.37	2.94	3.60	4.35	5.22	6.21	7.33	8.61	-
35	2.04	2.54	3.12	3.80	4.57	5.46	6.47	7.62	-
40	1.73	2.18	2.70	3.29	3.98	4.77	5.67	6.69	-
45	-	1.86	2.31	2.84	3.44	4.14	4.93	5.84	-
50	-	-	1.97	2.43	2.96	3.56	4.26	5.06	-
55	-	-	-	2.07	2.52	3.05	3.66	4.36	-
60	-	-	-	-	2.14	2.59	3.12	3.73	-
65	-	-	-	-	1.80	2.19	2.64	3.16	-

Nominal performance at to = 7.2 °C, tc = 54.4 °C

Cooling capacity	26 369	W
Power input	7 820	W
Current consumption	12.07	A
Mass flow	600	kg/h
C.O.P.	3.37	

Pressure switch settings

Maximum HP switch setting	28	bar(g)
Minimum LP switch setting	0.5	bar(g)
LP pump down setting	1.3	bar(g)

Sound power data

Sound power level	75	dB(A)
With acoustic hood	67	dB(A)

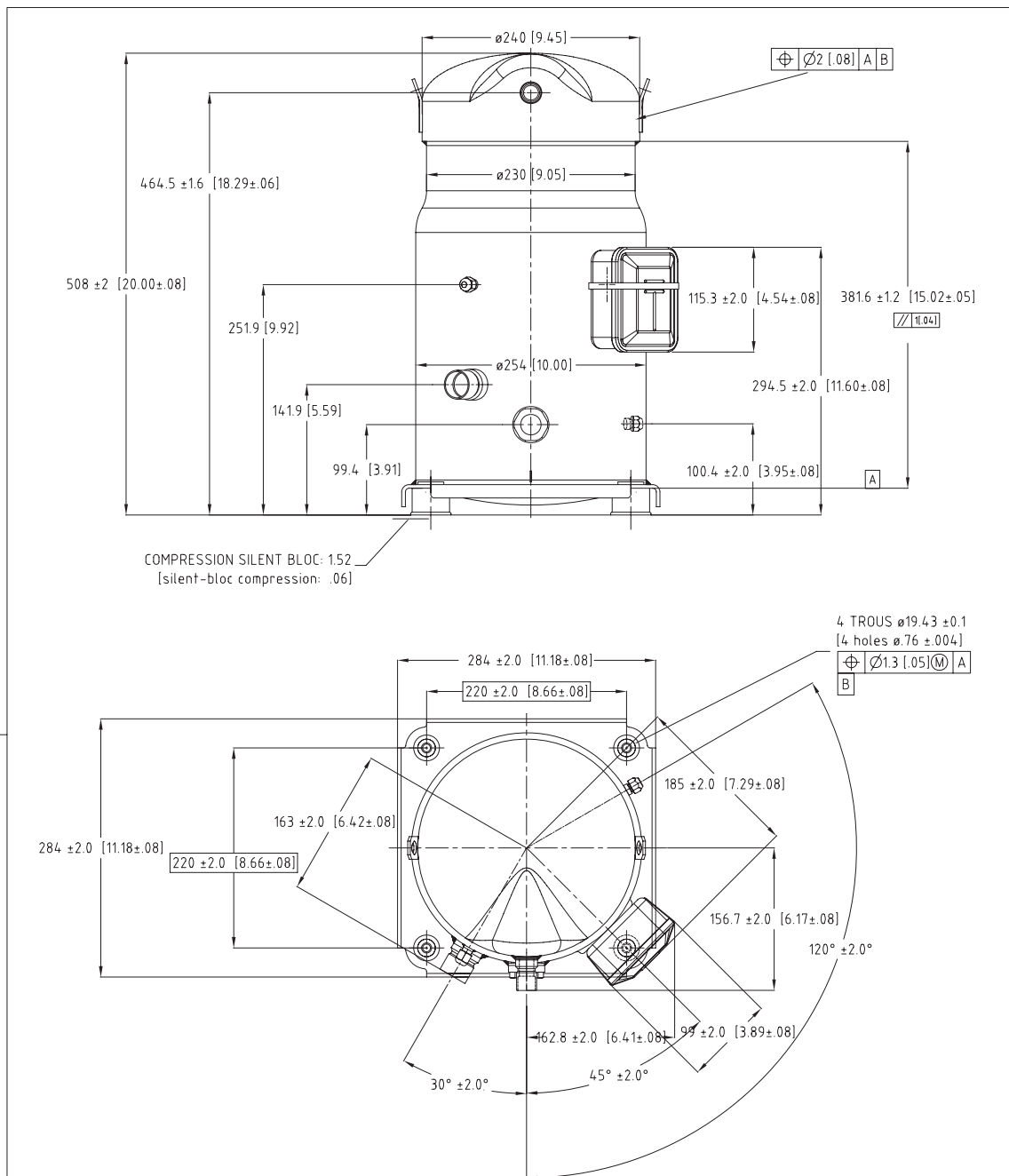
to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

Rating conditions : Superheat = 11.1 K , Subcooling = 8.3 K

All performance data +/- 5%

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B	PEP	13/06/00	MAP	DM 980927
A	PEP	22/09/99	SOP	CREATION DM990234
IND	RT	PAR	DATE	APPROBATIONS
				OBSERVATIONS
MATERIE:				
Ech.: 1/4	Tol.gén.: ± 0.8 [ ± .03 ] ± 2°			
<b>ENCOMBREMENT S084/090/100 - V</b>				<b>Danfoss Maneurop S.A.</b> Z.I. de REYRIEUX - B.P. 331F 01603 TREVOUX - FRANCE
<b>S084/090/100 - V OUTLINE</b>				
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