

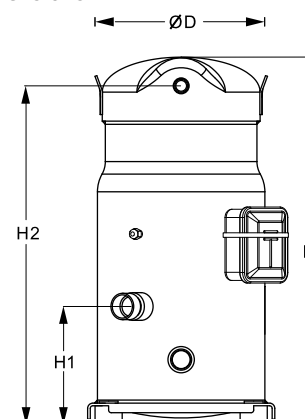
Datasheets

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



General Characteristics

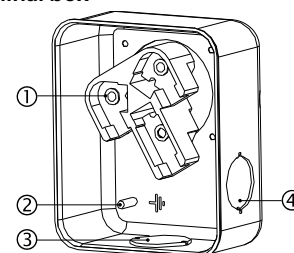
Model number (on compressor nameplate)		SM120S4VC
Code number for Singlepack*		SM120-4V1
Code number for Industrial pack**		SM120-4VM
Drawing number		8552037b
Suction and discharge connections		Brazed
Suction connection		1-3/8" ODF
Discharge connection		7/8" ODF
Oil sight glass		Threaded
Oil equalisation connection		3/8" flare SAE
Oil drain connection		None
LP gauge port		Schrader
IPR valve		None
Swept volume		166,6 cm ³ /rev
Displacement @ Nominal speed		29.0 m ³ /h @ 2900 rpm - 35.0 m ³ /h @ 3500 rpm
Net weight		73 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		10 kg
Approved refrigerants		R22, R417A-160SZ

Dimensions


D=254 mm
H=558 mm
H1=178,4 mm
H2=514,5 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	1.05 Ω
Rated Load Amps (RLA)	20.7 A
Maximum Continuous Current (MCC)	29 A
Locked Rotor Amps (LRA)	130 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, P10 (1-3/4" Rotolock, 1-3/8" ODF)	8153003
Rotolock valve, V10 (1-3/4" Rotolock, 1-3/8" ODF)	8168022
Gasket, 1-3/4"	8156132

Rotolock accessories, discharge side
Code no.

Rotolock valve, V05 (1-1/4" Rotolock, 7/8" ODF)	8168030
Gasket, 1-3/4"	8156132

Rotolock accessories, sets
Code no.

Solder sleeve adapter set (1-3/4" Rotolock, 1-3/8" ODF), (1-1/4" Rotolock, 7/8" ODF)	120Z0405
Valve set, V10 (1-3/4"~1-3/8"), V05 (1-1/4"~7/8")	7703392
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

Crankcase heaters
Code no.

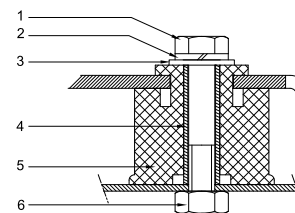
Surface sump heater + bottom insulation, 48 W, 24 V, CE mark, UL	120Z0361
Surface sump heater + bottom insulation, 48 W, 230 V, CE mark, UL	120Z0380
Surface sump heater + bottom insulation, 48 W, 400 V, CE mark, UL	120Z0381
Surface sump heater + bottom insulation, 48 W, 460 V, CE mark, UL	120Z0382
Belt 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 25 C	7705007
Soft start kit with statoric resistors, prewired box, SCR03	7705001
Acoustic hood for scroll compressor S110-S120	7755010
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

Mounting kit


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

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	11 897	15 100	18 788	22 999	27 769	33 135	39 132	45 798	-
35	11 123	14 251	17 844	21 939	26 573	31 782	37 603	44 072	-
40	10 337	13 375	16 860	20 826	25 311	30 351	35 982	42 240	-
45	-	12 474	15 837	19 662	23 984	28 842	34 269	40 304	-
50	-	-	14 776	18 445	22 592	27 253	32 464	38 261	-
55	-	-	-	17 177	21 135	25 586	30 566	36 111	-
60	-	-	-	-	19 612	23 839	28 574	33 853	-
65	-	-	-	-	18 022	22 011	26 486	31 484	-

Power input in W

30	5 371	5 364	5 359	5 356	5 354	5 354	5 356	5 358	-
35	5 981	5 970	5 959	5 949	5 940	5 931	5 922	5 913	-
40	6 672	6 656	6 639	6 622	6 604	6 585	6 566	6 545	-
45	-	7 432	7 408	7 383	7 356	7 326	7 295	7 261	-
50	-	-	8 274	8 240	8 202	8 161	8 117	8 070	-
55	-	-	-	9 201	9 152	9 100	9 042	8 980	-
60	-	-	-	-	10 214	10 149	10 077	10 000	-
65	-	-	-	-	11 396	11 317	11 230	11 137	-

Current consumption in A

30	12.34	12.33	12.32	12.31	12.29	12.26	12.23	12.19	-
35	12.94	12.93	12.92	12.90	12.87	12.84	12.80	12.75	-
40	13.67	13.65	13.63	13.61	13.58	13.54	13.49	13.44	-
45	-	14.51	14.49	14.46	14.42	14.38	14.33	14.26	-
50	-	-	15.50	15.47	15.42	15.37	15.31	15.24	-
55	-	-	-	16.64	16.59	16.53	16.46	16.38	-
60	-	-	-	-	17.95	17.88	17.80	17.70	-
65	-	-	-	-	19.50	19.42	19.33	19.23	-

Mass flow in kg/h

30	256	321	394	476	568	670	783	908	-
35	249	315	389	472	564	667	781	906	-
40	241	308	383	466	559	663	777	902	-
45	-	300	375	459	553	657	771	897	-
50	-	-	367	451	545	649	763	889	-
55	-	-	-	441	535	639	753	878	-
60	-	-	-	-	523	627	741	866	-
65	-	-	-	-	510	613	726	851	-

Coefficient of performance (C.O.P.)

30	2.21	2.81	3.51	4.29	5.19	6.19	7.31	8.55	-
35	1.86	2.39	2.99	3.69	4.47	5.36	6.35	7.45	-
40	1.55	2.01	2.54	3.14	3.83	4.61	5.48	6.45	-
45	-	1.68	2.14	2.66	3.26	3.94	4.70	5.55	-
50	-	-	1.79	2.24	2.75	3.34	4.00	4.74	-
55	-	-	-	1.87	2.31	2.81	3.38	4.02	-
60	-	-	-	-	1.92	2.35	2.84	3.39	-
65	-	-	-	-	1.58	1.94	2.36	2.83	-

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

Cooling capacity	27 253	W
Power input	8 161	W
Current consumption	15.37	A
Mass flow	649	kg/h
C.O.P.	3.34	

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 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	12 625	16 011	19 907	24 351	29 381	35 034	41 348	48 361	-
35	11 845	15 163	18 970	23 305	28 206	33 711	39 857	46 681	-
40	11 051	14 286	17 992	22 205	26 965	32 308	38 272	44 896	-
45	-	13 382	16 973	21 052	25 657	30 825	36 595	43 004	-
50	-	-	15 914	19 845	24 282	29 263	34 826	41 008	-
55	-	-	-	18 585	22 841	27 622	32 964	38 906	-
60	-	-	-	-	21 335	25 902	31 010	36 699	-
65	-	-	-	-	19 762	24 103	28 965	34 387	-

Power input in W

30	5 371	5 364	5 359	5 356	5 354	5 354	5 356	5 358	-
35	5 981	5 970	5 959	5 949	5 940	5 931	5 922	5 913	-
40	6 672	6 656	6 639	6 622	6 604	6 585	6 566	6 545	-
45	-	7 432	7 408	7 383	7 356	7 326	7 295	7 261	-
50	-	-	8 274	8 240	8 202	8 161	8 117	8 070	-
55	-	-	-	9 201	9 152	9 100	9 042	8 980	-
60	-	-	-	-	10 214	10 149	10 077	10 000	-
65	-	-	-	-	11 396	11 317	11 230	11 137	-

Current consumption in A

30	12.34	12.33	12.32	12.31	12.29	12.26	12.23	12.19	-
35	12.94	12.93	12.92	12.90	12.87	12.84	12.80	12.75	-
40	13.67	13.65	13.63	13.61	13.58	13.54	13.49	13.44	-
45	-	14.51	14.49	14.46	14.42	14.38	14.33	14.26	-
50	-	-	15.50	15.47	15.42	15.37	15.31	15.24	-
55	-	-	-	16.64	16.59	16.53	16.46	16.38	-
60	-	-	-	-	17.95	17.88	17.80	17.70	-
65	-	-	-	-	19.50	19.42	19.33	19.23	-

Mass flow in kg/h

30	255	319	392	474	565	666	779	902	-
35	248	313	387	469	561	663	776	901	-
40	240	306	381	464	556	659	772	897	-
45	-	298	373	457	550	653	767	891	-
50	-	-	365	449	542	645	759	883	-
55	-	-	-	439	532	635	749	873	-
60	-	-	-	-	520	623	737	861	-
65	-	-	-	-	507	609	722	846	-

Coefficient of performance (C.O.P.)

30	2.35	2.98	3.71	4.55	5.49	6.54	7.72	9.03	-
35	1.98	2.54	3.18	3.92	4.75	5.68	6.73	7.89	-
40	1.66	2.15	2.71	3.35	4.08	4.91	5.83	6.86	-
45	-	1.80	2.29	2.85	3.49	4.21	5.02	5.92	-
50	-	-	1.92	2.41	2.96	3.59	4.29	5.08	-
55	-	-	-	2.02	2.50	3.04	3.65	4.33	-
60	-	-	-	-	2.09	2.55	3.08	3.67	-
65	-	-	-	-	1.73	2.13	2.58	3.09	-

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

Cooling capacity	30 114	W
Power input	8 957	W
Current consumption	16.36	A
Mass flow	685	kg/h
C.O.P.	3.36	

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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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	14 888	18 609	22 936	27 919	33 610	40 060	47 320	55 441	-
35	14 055	17 682	21 889	26 728	32 248	38 501	45 538	53 411	-
40	13 201	16 718	20 789	25 466	30 799	36 839	43 637	51 244	-
45	-	15 718	19 636	24 135	29 264	35 074	41 616	48 941	-
50	-	-	18 433	22 737	27 645	33 209	39 478	46 503	-
55	-	-	-	21 273	25 943	31 243	37 222	43 930	-
60	-	-	-	-	24 159	29 178	34 848	41 221	-
65	-	-	-	-	22 292	27 011	32 355	38 374	-

Power input in W

30	6 395	6 431	6 471	6 516	6 565	6 619	6 676	6 737	-
35	7 097	7 129	7 165	7 204	7 246	7 292	7 341	7 392	-
40	7 888	7 916	7 947	7 979	8 015	8 052	8 091	8 132	-
45	-	8 801	8 826	8 851	8 879	8 907	8 936	8 965	-
50	-	-	9 810	9 828	9 847	9 865	9 883	9 901	-
55	-	-	-	10 919	10 928	10 936	10 943	10 948	-
60	-	-	-	-	12 131	12 128	12 122	12 114	-
65	-	-	-	-	13 464	13 449	13 431	13 409	-

Current consumption in A

30	11.22	11.28	11.35	11.42	11.50	11.57	11.64	11.71	-
35	11.95	12.01	12.07	12.13	12.20	12.26	12.32	12.38	-
40	12.80	12.85	12.91	12.97	13.02	13.07	13.12	13.17	-
45	-	13.84	13.89	13.93	13.98	14.02	14.06	14.09	-
50	-	-	15.01	15.05	15.08	15.11	15.14	15.15	-
55	-	-	-	16.33	16.35	16.37	16.38	16.38	-
60	-	-	-	-	17.80	17.80	17.79	17.77	-
65	-	-	-	-	19.44	19.42	19.40	19.36	-

Mass flow in kg/h

30	321	396	481	578	687	810	947	1 099	-
35	315	391	477	575	685	808	946	1 098	-
40	308	385	472	570	680	804	942	1 095	-
45	-	378	465	564	674	798	936	1 089	-
50	-	-	457	556	667	790	928	1 080	-
55	-	-	-	546	657	780	917	1 069	-
60	-	-	-	-	645	767	904	1 054	-
65	-	-	-	-	630	752	887	1 037	-

Coefficient of performance (C.O.P.)

30	2.33	2.89	3.54	4.28	5.12	6.05	7.09	8.23	-
35	1.98	2.48	3.06	3.71	4.45	5.28	6.20	7.23	-
40	1.67	2.11	2.62	3.19	3.84	4.58	5.39	6.30	-
45	-	1.79	2.22	2.73	3.30	3.94	4.66	5.46	-
50	-	-	1.88	2.31	2.81	3.37	3.99	4.70	-
55	-	-	-	1.95	2.37	2.86	3.40	4.01	-
60	-	-	-	-	1.99	2.41	2.87	3.40	-
65	-	-	-	-	1.66	2.01	2.41	2.86	-

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

Cooling capacity	33 209	W
Power input	9 865	W
Current consumption	15.11	A
Mass flow	790	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	78	dB(A)
With acoustic hood	70	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	15 799	19 732	24 302	29 561	35 561	42 357	50 000	58 544	-
35	14 968	18 814	23 271	28 392	34 230	40 837	48 268	56 573	-
40	14 114	17 857	22 185	27 152	32 810	39 214	46 414	54 465	-
45	-	16 862	21 045	25 841	31 304	37 486	44 441	52 221	-
50	-	-	19 853	24 462	29 713	35 658	42 350	49 842	-
55	-	-	-	23 016	28 038	33 729	40 142	47 330	-
60	-	-	-	-	26 282	31 702	37 819	44 686	-
65	-	-	-	-	24 445	29 578	35 383	41 913	-

Power input in W

30	6 395	6 431	6 471	6 516	6 565	6 619	6 676	6 737	-
35	7 097	7 129	7 165	7 204	7 246	7 292	7 341	7 392	-
40	7 888	7 916	7 947	7 979	8 015	8 052	8 091	8 132	-
45	-	8 801	8 826	8 851	8 879	8 907	8 936	8 965	-
50	-	-	9 810	9 828	9 847	9 865	9 883	9 901	-
55	-	-	-	10 919	10 928	10 936	10 943	10 948	-
60	-	-	-	-	12 131	12 128	12 122	12 114	-
65	-	-	-	-	13 464	13 449	13 431	13 409	-

Current consumption in A

30	11.22	11.28	11.35	11.42	11.50	11.57	11.64	11.71	-
35	11.95	12.01	12.07	12.13	12.20	12.26	12.32	12.38	-
40	12.80	12.85	12.91	12.97	13.02	13.07	13.12	13.17	-
45	-	13.84	13.89	13.93	13.98	14.02	14.06	14.09	-
50	-	-	15.01	15.05	15.08	15.11	15.14	15.15	-
55	-	-	-	16.33	16.35	16.37	16.38	16.38	-
60	-	-	-	-	17.80	17.80	17.79	17.77	-
65	-	-	-	-	19.44	19.42	19.40	19.36	-

Mass flow in kg/h

30	319	394	479	575	684	806	942	1 093	-
35	313	389	474	572	681	804	940	1 092	-
40	307	383	469	567	677	800	937	1 088	-
45	-	376	463	561	671	794	931	1 082	-
50	-	-	455	553	663	786	923	1 074	-
55	-	-	-	543	653	776	912	1 063	-
60	-	-	-	-	641	763	898	1 048	-
65	-	-	-	-	627	748	882	1 031	-

Coefficient of performance (C.O.P.)

30	2.47	3.07	3.76	4.54	5.42	6.40	7.49	8.69	-
35	2.11	2.64	3.25	3.94	4.72	5.60	6.58	7.65	-
40	1.79	2.26	2.79	3.40	4.09	4.87	5.74	6.70	-
45	-	1.92	2.38	2.92	3.53	4.21	4.97	5.82	-
50	-	-	2.02	2.49	3.02	3.61	4.28	5.03	-
55	-	-	-	2.11	2.57	3.08	3.67	4.32	-
60	-	-	-	-	2.17	2.61	3.12	3.69	-
65	-	-	-	-	1.82	2.20	2.63	3.13	-

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

Cooling capacity	36 710	W
Power input	10 805	W
Current consumption	16.21	A
Mass flow	835	kg/h
C.O.P.	3.40	

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	78	dB(A)
With acoustic hood	70	dB(A)

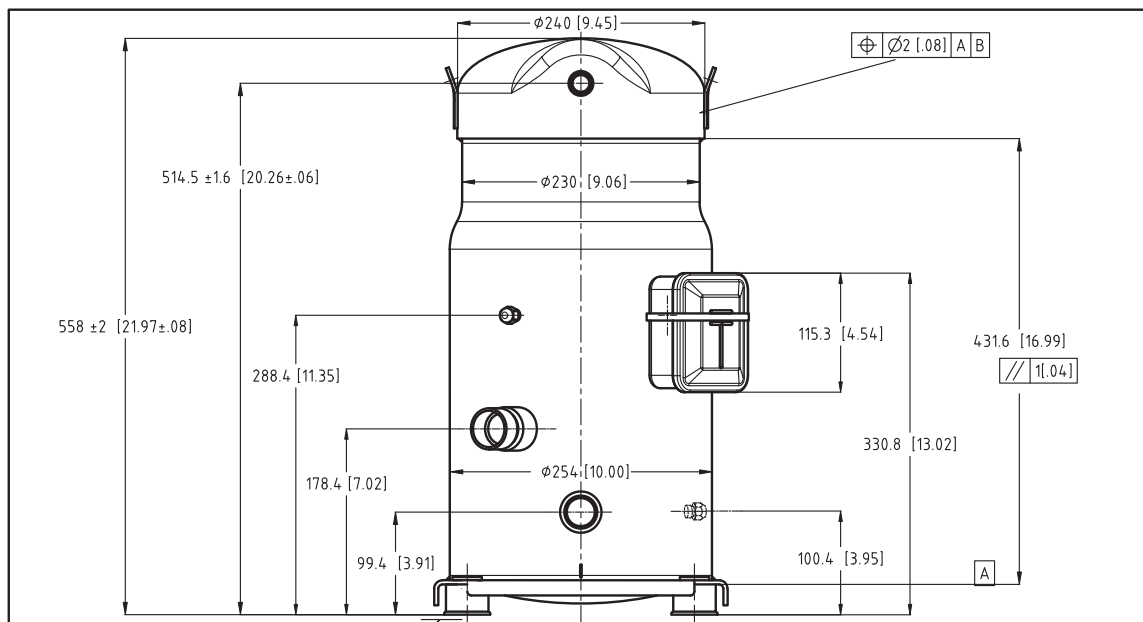
to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

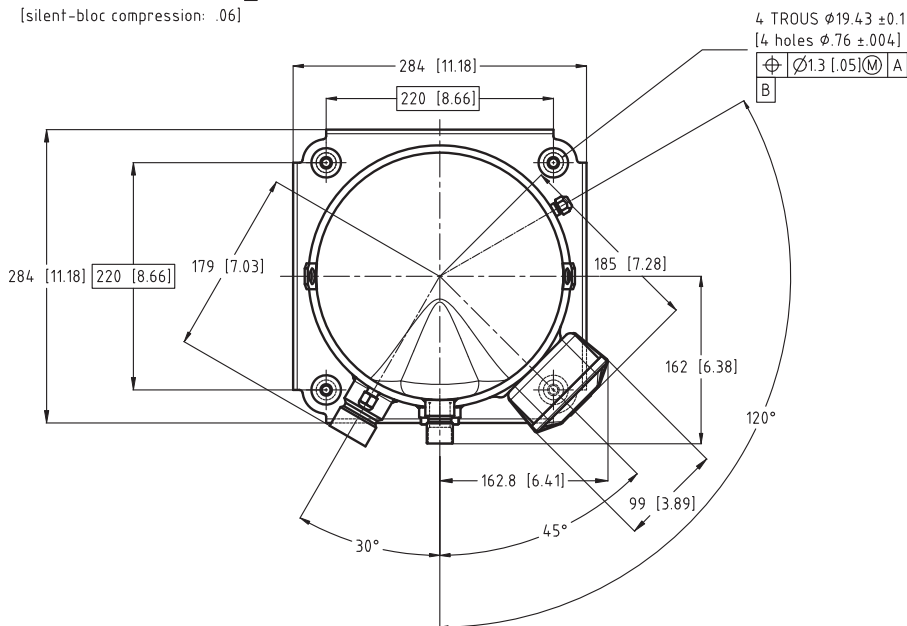
Rating conditions : Superheat = 11.1 K , Subcooling = 8.3 K

All performance data +/- 5%

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COMPRESSION SILENT BLOC: 1.52
[silent-bloc compression: .06]



B	PEP	13/06/00	MAP	DM 980927	
A	PEP	22/09/99	SOP	CREATION DM 990234	
IND	RT	PAR	DATE	APPROBATIONS	OBSERVATIONS
MATERIE:					
Ech: 1/4	Tol.gén.: ± 0.8 [± .03] ± 2°				Danfoss Maneurop S.A. Z.I. de REYRIEUX - B.P. 331F 01603 TREVOUX - FRANCE
ENCOMBREMENT S110/120 - V					
S110/120 - V OUTLINE					
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				85 52 037	