

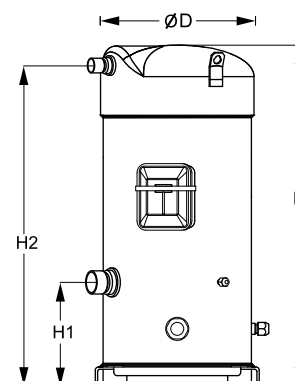
Datasheets

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



**General Characteristics**

Model number (on compressor nameplate)		<b>SM161T4VC</b>
Code number for Singlepack*		SM161-4VAI
Code number for Industrial pack**		SM161-4VAM
Drawing number		8551106b
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		216,6 cm <sup>3</sup> /rev
Displacement @ Nominal speed		37.7 m <sup>3</sup> /h @ 2900 rpm - 45.5 m <sup>3</sup> /h @ 3500 rpm
Net weight		88 kg
Oil charge		3,6 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		12,5 kg
Approved refrigerants		R22, R417A-160SZ

**Dimensions**


D=266 mm

H=591 mm

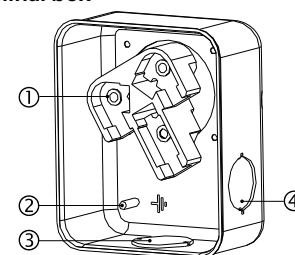
H1=180 mm

H2=556 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	0,94 Ω
Rated Load Amps (RLA)	22,9 A
Maximum Continuous Current (MCC)	32 A
Locked Rotor Amps (LRA)	145 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: 6 Unboxed compressors on pallet (order per multiples of 6)

**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)	7765006
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.**

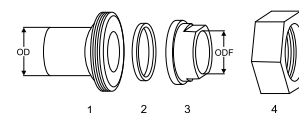
Electronic soft start kit, MCI 25 C	7705007
Acoustic hood for scroll compressor S148-S161 (except code 3)	7755017
Bottom insulation for scroll compressor	120Z0356
Discharge thermostat kit	7750009

**Spare parts**

**Code no.**

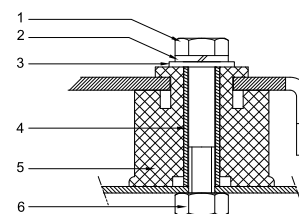
Mounting kit for 1 scroll compressor including 4 grommets, 4 sleeves, 4 bolts, 4 washers	8156138
Oil sight glass with gaskets (black & white)	8156019
Gasket for oil sight glass (white teflon)	8156129
Service kit for terminal box 96 x 115 mm, including 1 cover, 1 clamp	8156135
T block connector 52 x 57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

**Solder sleeve adapter set**



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

**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	15 913	19 818	24 360	29 615	35 657	42 562	50 405	59 263	-
35	15 060	18 857	23 264	28 356	34 209	40 897	48 497	57 082	-
40	14 164	17 838	22 096	27 012	32 661	39 117	46 457	54 755	-
45	-	16 772	20 866	25 590	31 020	37 231	44 296	52 291	-
50	-	-	19 583	24 102	29 298	35 246	42 022	49 699	-
55	-	-	-	22 554	27 502	33 173	39 643	46 985	-
60	-	-	-	-	25 639	31 018	37 166	44 158	-
65	-	-	-	-	23 719	28 788	34 598	41 221	-

Power input in W

30	6 751	6 798	6 849	6 900	6 949	6 991	7 024	7 043	-
35	7 517	7 555	7 600	7 650	7 700	7 748	7 789	7 822	-
40	8 385	8 409	8 444	8 486	8 533	8 581	8 627	8 666	-
45	-	9 378	9 397	9 428	9 466	9 510	9 554	9 596	-
50	-	-	10 480	10 493	10 518	10 551	10 589	10 628	-
55	-	-	-	11 699	11 706	11 724	11 750	11 782	-
60	-	-	-	-	13 047	13 045	13 055	13 074	-
65	-	-	-	-	14 562	14 534	14 522	14 523	-

Current consumption in A

30	14.74	14.82	14.86	14.86	14.86	14.86	14.90	14.99	-
35	15.54	15.64	15.68	15.69	15.69	15.70	15.73	15.81	-
40	16.47	16.58	16.64	16.66	16.66	16.66	16.69	16.76	-
45	-	17.68	17.75	17.78	17.78	17.79	17.81	17.88	-
50	-	-	19.04	19.08	19.09	19.10	19.12	19.18	-
55	-	-	-	20.58	20.60	20.61	20.63	20.69	-
60	-	-	-	-	22.35	22.36	22.38	22.43	-
65	-	-	-	-	24.35	24.37	24.39	24.44	-

Mass flow in kg/h

30	342	420	510	612	728	860	1 007	1 173	-
35	336	415	506	609	725	857	1 005	1 171	-
40	330	409	500	603	720	852	1 000	1 167	-
45	-	402	493	596	713	845	994	1 160	-
50	-	-	484	587	704	836	985	1 151	-
55	-	-	-	577	694	825	973	1 139	-
60	-	-	-	-	681	812	960	1 125	-
65	-	-	-	-	667	798	944	1 109	-

Coefficient of performance (C.O.P.)

30	2.36	2.92	3.56	4.29	5.13	6.09	7.18	8.41	-
35	2.00	2.50	3.06	3.71	4.44	5.28	6.23	7.30	-
40	1.69	2.12	2.62	3.18	3.83	4.56	5.39	6.32	-
45	-	1.79	2.22	2.71	3.28	3.92	4.64	5.45	-
50	-	-	1.87	2.30	2.79	3.34	3.97	4.68	-
55	-	-	-	1.93	2.35	2.83	3.37	3.99	-
60	-	-	-	-	1.97	2.38	2.85	3.38	-
65	-	-	-	-	1.63	1.98	2.38	2.84	-

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

Cooling capacity	35 246	W
Power input	10 551	W
Current consumption	19.10	A
Mass flow	836	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	79.5	dB(A)
With acoustic hood	72	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	16 887	21 015	25 811	31 356	37 726	45 002	53 260	62 580	-
35	16 038	20 064	24 733	30 122	36 312	43 379	51 403	60 462	-
40	15 143	19 053	23 580	28 800	34 794	41 639	49 414	58 197	-
45	-	17 993	22 363	27 400	33 183	39 791	47 302	55 795	-
50	-	-	21 092	25 931	31 489	37 846	45 079	53 267	-
55	-	-	-	24 403	29 722	35 813	42 753	50 622	-
60	-	-	-	-	27 892	33 702	40 335	47 870	-
65	-	-	-	-	26 009	31 524	37 835	45 022	-

Power input in W

30	6 751	6 798	6 849	6 900	6 949	6 991	7 024	7 043	-
35	7 517	7 555	7 600	7 650	7 700	7 748	7 789	7 822	-
40	8 385	8 409	8 444	8 486	8 533	8 581	8 627	8 666	-
45	-	9 378	9 397	9 428	9 466	9 510	9 554	9 596	-
50	-	-	10 480	10 493	10 518	10 551	10 589	10 628	-
55	-	-	-	11 699	11 706	11 724	11 750	11 782	-
60	-	-	-	-	13 047	13 045	13 055	13 074	-
65	-	-	-	-	14 562	14 534	14 522	14 523	-

Current consumption in A

30	14.74	14.82	14.86	14.86	14.86	14.86	14.90	14.99	-
35	15.54	15.64	15.68	15.69	15.69	15.70	15.73	15.81	-
40	16.47	16.58	16.64	16.66	16.66	16.66	16.69	16.76	-
45	-	17.68	17.75	17.78	17.78	17.79	17.81	17.88	-
50	-	-	19.04	19.08	19.09	19.10	19.12	19.18	-
55	-	-	-	20.58	20.60	20.61	20.63	20.69	-
60	-	-	-	-	22.35	22.36	22.38	22.43	-
65	-	-	-	-	24.35	24.37	24.39	24.44	-

Mass flow in kg/h

30	340	418	507	609	725	855	1 002	1 166	-
35	335	413	503	605	721	852	999	1 164	-
40	328	407	497	600	716	847	995	1 160	-
45	-	400	490	593	709	841	988	1 153	-
50	-	-	482	584	701	832	979	1 144	-
55	-	-	-	574	690	821	968	1 133	-
60	-	-	-	-	678	808	955	1 119	-
65	-	-	-	-	664	793	939	1 102	-

Coefficient of performance (C.O.P.)

30	2.50	3.09	3.77	4.54	5.43	6.44	7.58	8.88	-
35	2.13	2.66	3.25	3.94	4.72	5.60	6.60	7.73	-
40	1.81	2.27	2.79	3.39	4.08	4.85	5.73	6.72	-
45	-	1.92	2.38	2.91	3.51	4.18	4.95	5.81	-
50	-	-	2.01	2.47	2.99	3.59	4.26	5.01	-
55	-	-	-	2.09	2.54	3.05	3.64	4.30	-
60	-	-	-	-	2.14	2.58	3.09	3.66	-
65	-	-	-	-	1.79	2.17	2.61	3.10	-

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

Cooling capacity	39 021	W
Power input	11 587	W
Current consumption	20.43	A
Mass flow	885	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	79.5	dB(A)
With acoustic hood	72	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	19 495	24 194	29 668	36 007	43 303	51 646	61 128	71 840	-
35	18 522	23 087	28 395	34 537	41 601	49 681	58 865	69 246	-
40	17 502	21 915	27 039	32 964	39 779	47 576	56 444	66 475	-
45	-	20 688	25 610	31 300	37 847	45 343	53 877	63 539	-
50	-	-	24 120	29 556	35 818	42 993	51 173	60 447	-
55	-	-	-	27 744	33 700	40 536	48 343	57 209	-
60	-	-	-	-	31 504	37 981	45 394	53 832	-
65	-	-	-	-	29 237	35 336	42 334	50 321	-

Power input in W

30	8 129	8 242	8 340	8 429	8 517	8 612	8 719	8 847	-
35	8 989	9 118	9 226	9 322	9 413	9 505	9 605	9 721	-
40	9 935	10 082	10 205	10 310	10 406	10 498	10 594	10 701	-
45	-	11 147	11 287	11 404	11 507	11 603	11 697	11 799	-
50	-	-	12 483	12 615	12 729	12 830	12 926	13 024	-
55	-	-	-	13 955	14 082	14 192	14 292	14 390	-
60	-	-	-	-	15 576	15 698	15 805	15 906	-
65	-	-	-	-	17 224	17 360	17 477	17 583	-

Current consumption in A

30	13.95	14.06	14.15	14.23	14.32	14.45	14.63	14.89	-
35	14.81	14.95	15.05	15.14	15.23	15.34	15.50	15.72	-
40	15.81	15.99	16.11	16.21	16.31	16.41	16.55	16.74	-
45	-	17.19	17.35	17.47	17.57	17.68	17.80	17.98	-
50	-	-	18.75	18.90	19.02	19.13	19.26	19.42	-
55	-	-	-	20.52	20.67	20.80	20.93	21.08	-
60	-	-	-	-	22.52	22.67	22.81	22.96	-
65	-	-	-	-	24.57	24.75	24.92	25.08	-

Mass flow in kg/h

30	418	513	621	745	885	1 043	1 222	1 421	-
35	414	509	617	741	882	1 041	1 220	1 420	-
40	408	503	612	736	877	1 036	1 216	1 416	-
45	-	496	605	729	870	1 029	1 209	1 409	-
50	-	-	596	720	861	1 020	1 199	1 400	-
55	-	-	-	710	850	1 009	1 187	1 387	-
60	-	-	-	-	837	995	1 173	1 372	-
65	-	-	-	-	822	979	1 156	1 354	-

Coefficient of performance (C.O.P.)

30	2.40	2.94	3.56	4.27	5.08	6.00	7.01	8.12	-
35	2.06	2.53	3.08	3.70	4.42	5.23	6.13	7.12	-
40	1.76	2.17	2.65	3.20	3.82	4.53	5.33	6.21	-
45	-	1.86	2.27	2.74	3.29	3.91	4.61	5.39	-
50	-	-	1.93	2.34	2.81	3.35	3.96	4.64	-
55	-	-	-	1.99	2.39	2.86	3.38	3.98	-
60	-	-	-	-	2.02	2.42	2.87	3.38	-
65	-	-	-	-	1.70	2.04	2.42	2.86	-

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

Cooling capacity	42 993	W
Power input	12 830	W
Current consumption	19.13	A
Mass flow	1 020	kg/h
C.O.P.	3.35	

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	84	dB(A)
With acoustic hood	76	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	20 689	25 655	31 435	38 124	45 817	54 607	64 590	75 860	-
35	19 725	24 565	30 188	36 687	44 159	52 696	62 393	73 346	-
40	18 711	23 408	28 854	35 146	42 378	50 643	60 037	70 654	-
45	-	22 195	27 447	33 513	40 486	48 462	57 534	67 797	-
50	-	-	25 978	31 799	38 496	46 164	54 896	64 787	-
55	-	-	-	30 018	36 421	43 762	52 135	61 636	-
60	-	-	-	-	34 272	41 268	49 264	58 357	-
65	-	-	-	-	32 061	38 694	46 296	54 961	-

Power input in W

30	8 129	8 242	8 340	8 429	8 517	8 612	8 719	8 847	-
35	8 989	9 118	9 226	9 322	9 413	9 505	9 605	9 721	-
40	9 935	10 082	10 205	10 310	10 406	10 498	10 594	10 701	-
45	-	11 147	11 287	11 404	11 507	11 603	11 697	11 799	-
50	-	-	12 483	12 615	12 729	12 830	12 926	13 024	-
55	-	-	-	13 955	14 082	14 192	14 292	14 390	-
60	-	-	-	-	15 576	15 698	15 805	15 906	-
65	-	-	-	-	17 224	17 360	17 477	17 583	-

Current consumption in A

30	13.95	14.06	14.15	14.23	14.32	14.45	14.63	14.89	-
35	14.81	14.95	15.05	15.14	15.23	15.34	15.50	15.72	-
40	15.81	15.99	16.11	16.21	16.31	16.41	16.55	16.74	-
45	-	17.19	17.35	17.47	17.57	17.68	17.80	17.98	-
50	-	-	18.75	18.90	19.02	19.13	19.26	19.42	-
55	-	-	-	20.52	20.67	20.80	20.93	21.08	-
60	-	-	-	-	22.52	22.67	22.81	22.96	-
65	-	-	-	-	24.57	24.75	24.92	25.08	-

Mass flow in kg/h

30	416	510	618	741	880	1 037	1 215	1 413	-
35	411	506	614	737	877	1 035	1 213	1 412	-
40	406	500	609	732	872	1 031	1 209	1 408	-
45	-	493	602	725	865	1 024	1 202	1 401	-
50	-	-	593	717	856	1 015	1 192	1 391	-
55	-	-	-	706	846	1 003	1 180	1 379	-
60	-	-	-	-	833	989	1 166	1 364	-
65	-	-	-	-	818	974	1 149	1 346	-

Coefficient of performance (C.O.P.)

30	2.54	3.11	3.77	4.52	5.38	6.34	7.41	8.57	-
35	2.19	2.69	3.27	3.94	4.69	5.54	6.50	7.55	-
40	1.88	2.32	2.83	3.41	4.07	4.82	5.67	6.60	-
45	-	1.99	2.43	2.94	3.52	4.18	4.92	5.75	-
50	-	-	2.08	2.52	3.02	3.60	4.25	4.97	-
55	-	-	-	2.15	2.59	3.08	3.65	4.28	-
60	-	-	-	-	2.20	2.63	3.12	3.67	-
65	-	-	-	-	1.86	2.23	2.65	3.13	-

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

Cooling capacity	47 625	W
Power input	14 065	W
Current consumption	20.64	A
Mass flow	1 080	kg/h
C.O.P.	3.39	

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	84	dB(A)
With acoustic hood	76	dB(A)

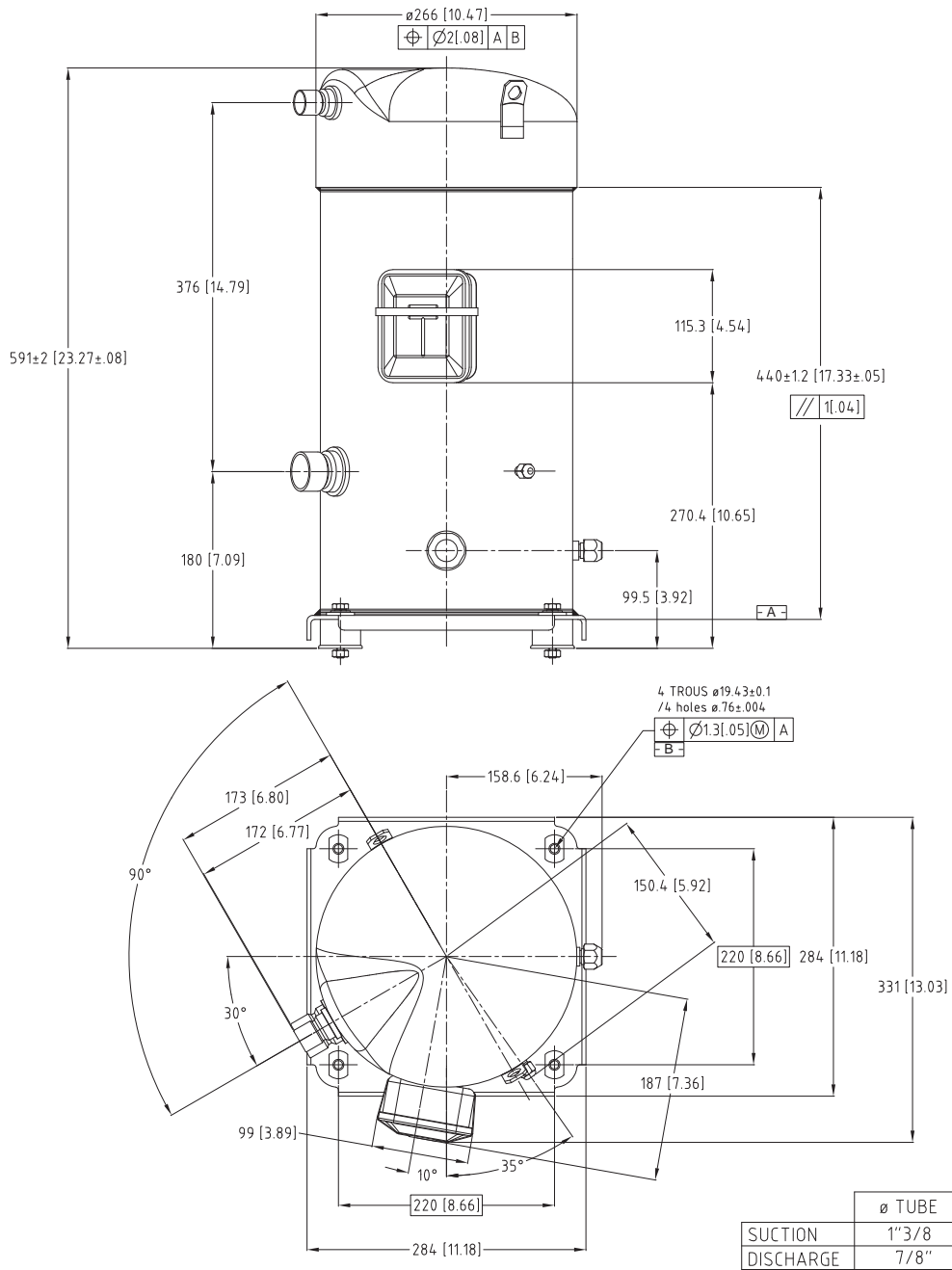
to: Evaporating temperature at dew point

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	JAP	19/11/02	DOM	DC 1020770
A	PEP	02/06/99	MAP	CREATION PLAN SERIE
IND	RT	PAR	DATE	APPROBATION
MATERIE:				Danfoss Maneurop S.A.
Ech.:	1/4	Tol.gén.:	± 0.8 [ ± .03 ] ± 2°	Z.I. de REYRIEUX - B.P. 331F 01603 TREVOUX - FRANCE
<b>ENCOMBREMENT S148/161-4V</b>				<b>85 51 106</b>
<b>S148/161-4V OUTLINE</b>				
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