

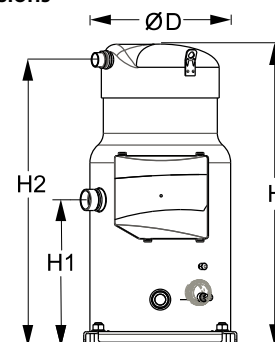
Datasheets

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



**General Characteristics**

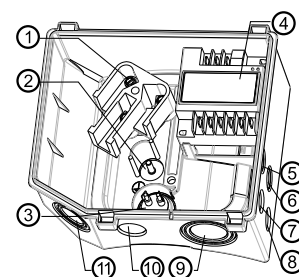
Model number (on compressor nameplate)		<b>SH180B4AAF</b>
Code number for Singlepack*		120H0267
Code number for Industrial pack**		120H0268
Drawing number		8556089g
Suction and discharge connections		Brazed
Suction connection		1-5/8" ODF
Discharge connection		1-1/8" ODF
Oil sight glass		Threaded
Oil equalisation connection		2-1/4" Rotolock
Oil drain connection		1/4" flare
LP gauge port		Schrader
IPR valve		None
Reverse rotation protection		Electronic module
Swept volume	170.2 cm <sup>3</sup> /rev	
Displacement @ Nominal speed	29.6 m <sup>3</sup> /h @ 2900 rpm - 35.7 m <sup>3</sup> /h @ 3500 rpm	
Net weight	108 kg	
Oil charge	6.7 litre, POE - 160SZ	
Maximum system test pressure Low Side / High side	33.3 bar(g) / 48.7 bar(g)	
Maximum differential test pressure	37 bar	
Maximum number of starts per hour	12	
Refrigerant charge limit	13.5 kg	
Approved refrigerants	R410A	

**Dimensions**


D=317.5 mm  
 H=682.5 mm  
 H1=331 mm  
 H2=647.5 mm  
 H3=- mm

**Electrical Characteristics**

Nominal voltage	380-400V/3/50Hz - 460V/3/60Hz
Voltage range	342-440 V @ 50Hz - 414-506 V @ 60Hz
Winding resistance (between phases) +/- 7% at 25°C	0.801 Ω
Rated Load Amps (RLA)	27.0 A
Maximum Continuous Current (MCC)	38 A
Locked Rotor Amps (LRA)	170 A
Motor protection	Electronic protection module, 24 V AC

**Terminal box**

**IP54 (with cable gland)**

- 1: Power connection, 3 x 4.8 mm (3/16")
- 2: Earth M5
- 3: Thermistor connector
- 4: Electronic protection module
- 5: Double knock-out Ø 22.5 mm (7/8") & Ø 16.5 mm (0.65")
- 6: Double knock-out Ø 22.5 mm (7/8") & Ø 16.5 mm (0.65")
- 7: Knock-out Ø 20.7 mm (0.81")
- 8: Knock-out Ø 20.7 mm (0.81")
- 9: Triple knock-out Ø 50.8 mm (2") & Ø 43.7 mm (1.72") & Ø 34.5 mm (1.35")
- 10: Knock-out Ø 25.5 mm (1.00")
- 11: Triple knock-out Ø 40.5 mm (1.59") & Ø 32.2 mm (1.27") & Ø 25.5 mm (1")

**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 rigid grommets, bolts, nuts, sleeves and washers
Electronic protection module mounted in terminal box
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, P03 (2-1/4" Rotolock, 1-5/8" ODF)	8153006
Rotolock valve, V03 (2-1/4" Rotolock, 1-5/8" ODF)	8168026
Rotolock adapter (2"1/4 Rotolock, 1"5/8 ODF)	120Z0432
Gasket, 2-1/4"	8156133

**Rotolock accessories, discharge 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
Rotolock adapter (1-3/4" Rotolock, 1-1/8" ODF)	120Z0364
Gasket, 1-3/4"	8156132

**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, (2-1/4" Rotolock, 1-5/8" ODF), (1-3/4" Rotolock, 1"1/8 ODF)	7765028
Valve set, V03 (2-1/4"~1-5/8"), V02 (1-3/4"~1-1/8")	7703383
Gasket set, 1-1/4", 1-3/4", 2-1/4", OSG gaskets black & white	8156013

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

POE lubricant, 160SZ, 1 litre can	7754023
POE lubricant, 160SZ, 2.5 litre can	120Z0571

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

Surface sump heater + bottom insulation, 56 W, 24 V, CE mark, UL	120Z0360
Surface sump heater + bottom insulation, 56 W, 230 V, CE mark, UL	120Z0376
Surface sump heater + bottom insulation, 56 W, 400 V, CE mark, UL	120Z0377
Surface sump heater + bottom insulation, 56 W, 460 V, CE mark, UL	120Z0378
Belt type crankcase heater, 75 W, 230 V, CE mark, UL	7773108
Belt type crankcase heater, 75 W, 400 V, CE mark, UL	7773118
Belt type crankcase heater, 75 W, 460 V, CE mark, UL	120Z0464

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

Electronic soft start kit, MCI 50 CM	037N0401
Mounting kit for 1 scroll compressor including 4 grommets, 4 sleeves, 4 bolts, 4 washers	8156138
Acoustic hood for scroll compressor	120Z0022
Acoustic bottom insulation for scroll compressor	120Z0353
Discharge thermostat kit	7750009

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

Electronic motor protection module, 24 V AC	120Z0584
Mounting kit for 1 scroll compressor including 4 hexagon rigid grommets, 4 sleeves, 4 bolts, 4 washers	7777045
Oil sight glass with gaskets (black & white)	8156019
Gasket for oil sight glass (white teflon)	8156129
Terminal box 210 x 190 incl. cover	120Z0458
T block connector 60 x 75 mm	8173021

**Performance data at 50 Hz, EN 12900 rating conditions**
**R410A**

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)								
	-25	-20	-15	-10	-5	0	5	10	15

**Cooling capacity in W**

30	15 063	18 920	23 492	28 862	35 117	42 340	50 617	60 033	70 672
35	13 888	17 657	22 092	27 278	33 301	40 245	48 196	57 237	67 454
40	-	16 362	20 624	25 589	31 343	37 971	45 557	54 187	63 945
45	-	-	19 069	23 776	29 224	35 498	42 683	50 864	60 126
50	-	-	17 411	21 822	26 927	32 810	39 556	47 251	55 979
55	-	-	-	19 708	24 433	29 888	36 158	43 330	51 486
60	-	-	-	-	21 724	26 713	32 471	39 082	46 630
65	-	-	-	-	-	-	28 477	34 489	41 393

**Power input in W**

30	8 123	8 158	8 184	8 210	8 243	8 288	8 353	8 445	8 570
35	9 040	9 085	9 116	9 140	9 162	9 191	9 233	9 295	9 384
40	-	10 111	10 148	10 171	10 186	10 200	10 220	10 254	10 308
45	-	-	11 304	11 328	11 337	11 338	11 339	11 346	11 367
50	-	-	12 609	12 635	12 640	12 630	12 613	12 595	12 584
55	-	-	-	14 117	14 119	14 100	14 066	14 026	13 985
60	-	-	-	-	15 799	15 772	15 724	15 662	15 593
65	-	-	-	-	-	-	17 610	17 528	17 433

**Current consumption in A**

30	16.47	16.71	16.79	16.80	16.78	16.82	16.97	17.29	17.86
35	17.56	17.82	17.92	17.92	17.88	17.88	17.97	18.22	18.70
40	-	19.05	19.16	19.16	19.10	19.06	19.10	19.29	19.68
45	-	-	20.58	20.58	20.51	20.44	20.43	20.55	20.86
50	-	-	22.21	22.22	22.15	22.05	22.00	22.06	22.30
55	-	-	-	24.15	24.07	23.96	23.87	23.88	24.05
60	-	-	-	-	26.35	26.22	26.10	26.06	26.17
65	-	-	-	-	-	-	28.74	28.65	28.70

**Mass flow in kg/h**

30	309	387	477	579	696	830	983	1 156	1 351
35	303	382	472	576	694	829	982	1 156	1 352
40	-	375	466	570	688	824	978	1 152	1 349
45	-	-	457	561	681	816	971	1 145	1 342
50	-	-	446	551	670	806	960	1 135	1 332
55	-	-	-	538	657	792	946	1 121	1 317
60	-	-	-	-	641	776	929	1 103	1 299
65	-	-	-	-	-	-	909	1 082	1 277

**Coefficient of performance (C.O.P.)**

30	1.85	2.32	2.87	3.52	4.26	5.11	6.06	7.11	8.25
35	1.54	1.94	2.42	2.98	3.63	4.38	5.22	6.16	7.19
40	-	1.62	2.03	2.52	3.08	3.72	4.46	5.28	6.20
45	-	-	1.69	2.10	2.58	3.13	3.76	4.48	5.29
50	-	-	1.38	1.73	2.13	2.60	3.14	3.75	4.45
55	-	-	-	1.40	1.73	2.12	2.57	3.09	3.68
60	-	-	-	-	1.38	1.69	2.07	2.50	2.99
65	-	-	-	-	-	-	1.62	1.97	2.37

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

Cooling capacity	39 556	W
Power input	12 613	W
Current consumption	22.00	A
Mass flow	960	kg/h
C.O.P.	3.14	

**Pressure switch settings**

Maximum HP switch setting	46.1	bar(g)
Minimum LP switch setting	1.5	bar(g)
LP pump down setting	1.7	bar(g)

**Sound power data**

Sound power level	80	dB(A)
With accoustic hood	74	dB(A)

to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

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

Tolerance according EN12900

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**Performance data at 50 Hz, ARI rating conditions**
**R410A**

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)								
	-25	-20	-15	-10	-5	0	5	10	15

**Cooling capacity in W**

30	16 267	20 411	25 318	31 076	37 775	45 506	54 358	64 420	75 781
35	15 095	19 169	23 957	29 550	36 038	43 511	52 060	61 773	72 742
40	-	17 899	22 532	27 924	34 164	41 343	49 553	58 885	69 427
45	-	-	21 026	26 180	32 137	38 988	46 826	55 741	65 826
50	-	-	-	24 306	29 946	36 436	43 870	52 340	61 937
55	-	-	-	22 294	27 587	33 688	40 692	48 691	57 780
60	-	-	-	-	25 078	30 772	37 330	44 848	53 422
65	-	-	-	-	-	-	33 920	40 981	49 076

**Power input in W**

30	8 123	8 158	8 184	8 210	8 243	8 288	8 353	8 445	8 570
35	9 040	9 085	9 116	9 140	9 162	9 191	9 233	9 295	9 384
40	-	10 111	10 148	10 171	10 186	10 200	10 220	10 254	10 308
45	-	-	11 304	11 328	11 337	11 338	11 339	11 346	11 367
50	-	-	-	12 635	12 640	12 630	12 613	12 595	12 584
55	-	-	-	14 117	14 119	14 100	14 066	14 026	13 985
60	-	-	-	-	15 799	15 772	15 724	15 662	15 593
65	-	-	-	-	-	-	17 610	17 528	17 433

**Current consumption in A**

30	16.47	16.71	16.79	16.80	16.78	16.82	16.97	17.29	17.86
35	17.56	17.82	17.92	17.92	17.88	17.88	17.97	18.22	18.70
40	-	19.05	19.16	19.16	19.10	19.06	19.10	19.29	19.68
45	-	-	20.58	20.58	20.51	20.44	20.43	20.55	20.86
50	-	-	-	22.22	22.15	22.05	22.00	22.06	22.30
55	-	-	-	24.15	24.07	23.96	23.87	23.88	24.05
60	-	-	-	-	26.35	26.22	26.10	26.06	26.17
65	-	-	-	-	-	-	28.74	28.65	28.70

**Mass flow in kg/h**

30	307	385	474	576	692	825	976	1 147	1 340
35	301	380	469	572	689	823	975	1 147	1 341
40	-	373	463	566	684	818	971	1 144	1 338
45	-	-	454	558	676	811	964	1 137	1 332
50	-	-	-	547	666	800	953	1 127	1 321
55	-	-	-	534	652	787	940	1 113	1 307
60	-	-	-	-	637	771	923	1 095	1 289
65	-	-	-	-	-	-	903	1 074	1 267

**Coefficient of performance (C.O.P.)**

30	2.00	2.50	3.09	3.78	4.58	5.49	6.51	7.63	8.84
35	1.67	2.11	2.63	3.23	3.93	4.73	5.64	6.65	7.75
40	-	1.77	2.22	2.75	3.35	4.05	4.85	5.74	6.74
45	-	-	1.86	2.31	2.83	3.44	4.13	4.91	5.79
50	-	-	-	1.92	2.37	2.88	3.48	4.16	4.92
55	-	-	-	1.58	1.95	2.39	2.89	3.47	4.13
60	-	-	-	-	1.59	1.95	2.37	2.86	3.43
65	-	-	-	-	-	-	1.93	2.34	2.82

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

Cooling capacity	44 500	W
Power input	13 865	W
Current consumption	23.62	A
Mass flow	1 015	kg/h
C.O.P.	3.21	

**Pressure switch settings**

Maximum HP switch setting	46.1	bar(g)
Minimum LP switch setting	1.5	bar(g)
LP pump down setting	1.7	bar(g)

**Sound power data**

Sound power level	80	dB(A)
With acoustic hood	74	dB(A)

to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

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

Tolerance according EN12900

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**Performance data at 60 Hz, EN 12900 rating conditions**
**R410A**

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)								
	-25	-20	-15	-10	-5	0	5	10	15

**Cooling capacity in W**

30	18 198	22 983	28 619	35 213	42 876	51 715	61 840	73 360	86 385
35	16 907	21 544	26 980	33 326	40 687	49 174	58 893	69 954	82 466
40	-	19 995	25 196	31 253	38 275	46 370	55 644	66 205	78 162
45	-	-	23 276	29 007	35 650	43 312	52 099	62 119	73 477
50	-	-	21 229	26 593	32 815	40 001	48 258	57 690	68 403
55	-	-	-	24 010	29 765	36 429	44 105	52 897	62 910
60	-	-	-	-	26 472	32 555	39 588	47 674	56 914
65	-	-	-	-	-	-	34 561	41 839	50 196

**Power input in W**

30	9 724	9 753	9 781	9 810	9 838	9 865	9 891	9 916	9 939
35	10 816	10 852	10 888	10 925	10 961	10 998	11 034	11 070	11 105
40	-	12 073	12 108	12 143	12 179	12 216	12 253	12 291	12 328
45	-	-	13 484	13 509	13 535	13 563	13 592	13 622	13 652
50	-	-	15 060	15 066	15 074	15 084	15 095	15 108	15 122
55	-	-	-	16 859	16 839	16 821	16 806	16 793	16 782
60	-	-	-	-	18 874	18 820	18 769	18 721	18 675
65	-	-	-	-	-	-	21 028	20 935	20 846

**Current consumption in A**

30	16.34	16.58	16.66	16.67	16.65	16.69	16.83	17.16	17.72
35	17.43	17.69	17.78	17.78	17.74	17.74	17.83	18.08	18.55
40	-	18.90	19.01	19.01	18.96	18.92	18.95	19.14	19.53
45	-	-	20.42	20.42	20.35	20.28	20.27	20.39	20.70
50	-	-	22.04	22.05	21.97	21.88	21.83	21.89	22.13
55	-	-	-	23.96	23.89	23.77	23.69	23.70	23.87
60	-	-	-	-	26.14	26.01	25.90	25.86	25.96
65	-	-	-	-	-	-	28.51	28.43	28.48

**Mass flow in kg/h**

30	378	473	582	707	850	1 014	1 200	1 412	1 650
35	371	467	577	703	847	1 012	1 199	1 412	1 652
40	-	458	569	695	840	1 006	1 194	1 408	1 648
45	-	-	558	685	830	996	1 185	1 399	1 640
50	-	-	544	672	817	983	1 172	1 385	1 626
55	-	-	-	655	800	966	1 154	1 367	1 607
60	-	-	-	-	780	945	1 132	1 344	1 584
65	-	-	-	-	-	-	1 106	1 317	1 556

**Coefficient of performance (C.O.P.)**

30	1.87	2.36	2.93	3.59	4.36	5.24	6.25	7.40	8.69
35	1.56	1.99	2.48	3.05	3.71	4.47	5.34	6.32	7.43
40	-	1.66	2.08	2.57	3.14	3.80	4.54	5.39	6.34
45	-	-	1.73	2.15	2.63	3.19	3.83	4.56	5.38
50	-	-	1.41	1.77	2.18	2.65	3.20	3.82	4.52
55	-	-	-	1.42	1.77	2.17	2.62	3.15	3.75
60	-	-	-	-	1.40	1.73	2.11	2.55	3.05
65	-	-	-	-	-	-	1.64	2.00	2.41

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

Cooling capacity	48 258	W
Power input	15 095	W
Current consumption	21.83	A
Mass flow	1 172	kg/h
C.O.P.	3.20	

**Pressure switch settings**

Maximum HP switch setting	46.1	bar(g)
Minimum LP switch setting	1.5	bar(g)
LP pump down setting	1.7	bar(g)

**Sound power data**

Sound power level	85	dB(A)
With acoustic hood	81	dB(A)

to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

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

Tolerance according EN12900

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**Performance data at 60 Hz, ARI rating conditions**
**R410A**

Cond. temp. in °C (tc)	Evaporating temperature in °C (to)								
	-25	-20	-15	-10	-5	0	5	10	15

**Cooling capacity in W**

30	19 653	24 794	30 843	37 913	46 122	55 582	66 410	78 721	92 629
35	18 377	23 389	29 258	36 101	44 031	53 164	63 615	75 499	88 931
40	-	21 874	27 528	34 105	41 720	50 488	60 525	71 945	84 864
45	-	-	25 665	31 939	39 203	47 570	57 155	68 075	80 444
50	-	-	-	29 620	36 494	44 422	53 520	63 902	75 684
55	-	-	-	27 160	33 608	41 061	49 634	59 442	70 599
60	-	-	-	-	30 560	37 500	45 511	54 708	65 204
65	-	-	-	-	-	-	41 167	49 715	59 513

**Power input in W**

30	9 724	9 753	9 781	9 810	9 838	9 865	9 891	9 916	9 939
35	10 816	10 852	10 888	10 925	10 961	10 998	11 034	11 070	11 105
40	-	12 073	12 108	12 143	12 179	12 216	12 253	12 291	12 328
45	-	-	13 484	13 509	13 535	13 563	13 592	13 622	13 652
50	-	-	-	15 066	15 074	15 084	15 095	15 108	15 122
55	-	-	-	16 859	16 839	16 821	16 806	16 793	16 782
60	-	-	-	-	18 874	18 820	18 769	18 721	18 675
65	-	-	-	-	-	-	21 028	20 935	20 846

**Current consumption in A**

30	16.34	16.58	16.66	16.67	16.65	16.69	16.83	17.16	17.72
35	17.43	17.69	17.78	17.78	17.74	17.74	17.83	18.08	18.55
40	-	18.90	19.01	19.01	18.96	18.92	18.95	19.14	19.53
45	-	-	20.42	20.42	20.35	20.28	20.27	20.39	20.70
50	-	-	-	22.05	21.97	21.88	21.83	21.89	22.13
55	-	-	-	23.96	23.89	23.77	23.69	23.70	23.87
60	-	-	-	-	26.14	26.01	25.90	25.86	25.96
65	-	-	-	-	-	-	28.51	28.43	28.48

**Mass flow in kg/h**

30	376	470	578	702	845	1 007	1 192	1 401	1 638
35	369	464	573	698	842	1 005	1 191	1 402	1 639
40	-	455	565	691	835	999	1 186	1 398	1 636
45	-	-	554	681	825	990	1 177	1 389	1 627
50	-	-	-	667	812	976	1 164	1 375	1 614
55	-	-	-	651	795	959	1 146	1 357	1 595
60	-	-	-	-	775	938	1 124	1 335	1 572
65	-	-	-	-	-	-	1 098	1 308	1 544

**Coefficient of performance (C.O.P.)**

30	2.02	2.54	3.15	3.86	4.69	5.63	6.71	7.94	9.32
35	1.70	2.16	2.69	3.30	4.02	4.83	5.77	6.82	8.01
40	-	1.81	2.27	2.81	3.43	4.13	4.94	5.85	6.88
45	-	-	1.90	2.36	2.90	3.51	4.21	5.00	5.89
50	-	-	-	1.97	2.42	2.95	3.55	4.23	5.00
55	-	-	-	1.61	2.00	2.44	2.95	3.54	4.21
60	-	-	-	-	1.62	1.99	2.42	2.92	3.49
65	-	-	-	-	-	-	1.96	2.37	2.85

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

Cooling capacity	54 300	W
Power input	16 584	W
Current consumption	23.44	A
Mass flow	1 238	kg/h
C.O.P.	3.27	

**Pressure switch settings**

Maximum HP switch setting	46.1	bar(g)
Minimum LP switch setting	1.5	bar(g)
LP pump down setting	1.7	bar(g)

**Sound power data**

Sound power level	85	dB(A)
With acoustic hood	81	dB(A)

to: Evaporating temperature at dew point

tc: Condensing temperature at dew point

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

Tolerance according EN12900

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