

Datasheets

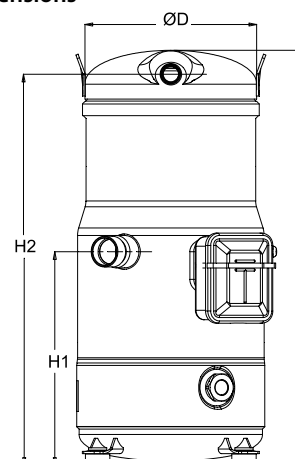
Danfoss scroll compressors **SM / SY / SZ / SH / WSH**



General Characteristics

Model number (on compressor nameplate)		SH090A4ALC
Code number for Singlepack*		120H0003
Code number for Industrial pack**		120H0004
Drawing number		8560004f
Suction and discharge connections		Brazed
Suction connection		1-1/8" ODF
Discharge connection		7/8" ODF
Oil sight glass		Threaded
Oil equalisation connection		1-3/4" Rotolock
Oil drain connection		None
LP gauge port		Schrader
IPR valve		None
Swept volume		88.4 cm ³ /rev
Displacement @ Nominal speed		15.4 m ³ /h @ 2900 rpm - 18.6 m ³ /h @ 3500 rpm
Net weight		58 kg
Oil charge		3 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		5.9 kg
Approved refrigerants		R410A

Dimensions

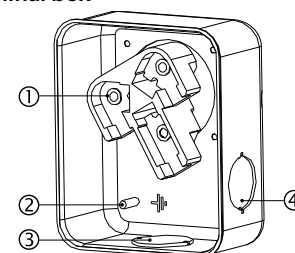


D=243 mm
H=482 mm
H1=235 mm
H2=451 mm
H3=- mm

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	1.47 Ω
Rated Load Amps (RLA)	14.3 A
Maximum Continuous Current (MCC)	22 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	15 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.

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, 1-1/8" ODF), (1-1/4" Rotolock, 7/8" ODF)	120Z0125
Valve set, V02(1"3/4~1"1/8), V05(1"1/4~7/8")	120Z0403
Gasket set, 1", 1-1/4", 1-3/4", OSG gaskets black & white	8156009

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, 80 W, 24 V, CE mark, UL	120Z0388
Surface sump heater, 80 W, 230 V, CE mark, UL	120Z0389
Surface sump heater, 80 W, 400 V, CE mark, UL	120Z0390
Surface sump heater, 80 W, 460 V, CE mark, UL	120Z0391

Miscellaneous accessories

Code no.

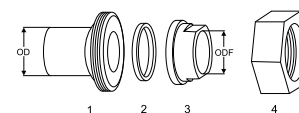
Acoustic hood for scroll compressor SH090	120Z0034
Gasket, 1-3/4"	8156132
Discharge thermostat kit	7750009

Spare parts

Code no.

Mounting kit for 1 scroll compressor including 4 grommets, 4 sleeves, 4 bolts, 4 washers	120Z0066
Oil sight glass with gaskets (black & white)	8156019
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)

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	7 649	9 618	11 943	14 669	17 843	21 511	25 718	30 511	35 935
35	7 063	8 966	11 199	13 809	16 841	20 342	24 357	28 932	34 114
40	-	8 319	10 447	12 926	15 802	19 122	22 931	27 275	32 200
45	-	-	9 673	12 007	14 714	17 838	21 427	25 526	30 181
50	-	-	8 865	11 040	13 563	16 478	19 833	23 672	28 042
55	-	-	-	10 012	12 337	15 029	18 135	21 701	25 773
60	-	-	-	-	11 024	13 479	16 322	19 601	23 359
65	-	-	-	-	-	-	14 382	17 358	20 790

Power input in W

30	3 976	4 061	4 147	4 229	4 304	4 366	4 414	4 441	4 444
35	4 443	4 520	4 600	4 681	4 758	4 827	4 884	4 924	4 944
40	-	5 027	5 099	5 174	5 250	5 321	5 383	5 433	5 467
45	-	-	5 661	5 728	5 798	5 867	5 932	5 987	6 029
50	-	-	6 307	6 361	6 421	6 485	6 547	6 604	6 652
55	-	-	-	7 092	7 139	7 194	7 250	7 305	7 354
60	-	-	-	-	7 971	8 012	8 059	8 107	8 154
65	-	-	-	-	-	-	8 992	9 031	9 070

Current consumption in A

30	9.35	9.40	9.45	9.50	9.55	9.61	9.65	9.70	9.74
35	9.79	9.85	9.91	9.97	10.03	10.08	10.14	10.19	10.24
40	-	10.37	10.44	10.50	10.57	10.63	10.69	10.75	10.80
45	-	-	11.06	11.13	11.20	11.27	11.34	11.40	11.45
50	-	-	11.80	11.87	11.95	12.02	12.09	12.15	12.21
55	-	-	-	12.74	12.82	12.89	12.96	13.03	13.09
60	-	-	-	-	13.83	13.91	13.98	14.05	14.11
65	-	-	-	-	-	-	15.16	15.23	15.29

Mass flow in kg/h

30	158	198	243	294	354	422	499	587	686
35	155	194	240	291	351	419	496	584	683
40	-	191	236	288	347	415	492	580	679
45	-	-	232	283	342	410	487	575	673
50	-	-	227	278	337	405	481	568	667
55	-	-	-	273	332	399	475	561	659
60	-	-	-	-	325	392	468	554	651
65	-	-	-	-	-	-	459	545	642

Coefficient of performance (C.O.P.)

30	1.92	2.37	2.88	3.47	4.15	4.93	5.83	6.87	8.09
35	1.59	1.98	2.43	2.95	3.54	4.21	4.99	5.88	6.90
40	-	1.66	2.05	2.50	3.01	3.59	4.26	5.02	5.89
45	-	-	1.71	2.10	2.54	3.04	3.61	4.26	5.01
50	-	-	1.41	1.74	2.11	2.54	3.03	3.58	4.22
55	-	-	-	1.41	1.73	2.09	2.50	2.97	3.50
60	-	-	-	-	1.38	1.68	2.03	2.42	2.86
65	-	-	-	-	-	-	1.60	1.92	2.29

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

Cooling capacity	19 833	W
Power input	6 547	W
Current consumption	12.09	A
Mass flow	481	kg/h
C.O.P.	3.03	



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	70	dB(A)
With acoustic hood	64	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

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alternations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

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

Cooling capacity in W

30	8 261	10 376	12 871	15 794	19 194	23 119	27 619	32 740	38 533
35	7 678	9 734	12 145	14 959	18 225	21 993	26 310	31 226	36 789
40	-	9 101	11 414	14 105	17 224	20 820	24 942	29 640	34 961
45	-	-	10 666	13 221	16 180	19 592	23 507	27 973	33 042
50	-	-	-	12 297	15 083	18 299	21 995	26 221	31 027
55	-	-	-	11 326	13 930	16 940	20 409	24 386	28 923
60	-	-	-	-	12 726	15 527	18 765	22 493	26 762
65	-	-	-	-	-	-	17 131	20 625	24 649

Power input in W

30	3 976	4 061	4 147	4 229	4 304	4 366	4 414	4 441	4 444
35	4 443	4 520	4 600	4 681	4 758	4 827	4 884	4 924	4 944
40	-	5 027	5 099	5 174	5 250	5 321	5 383	5 433	5 467
45	-	-	5 661	5 728	5 798	5 867	5 932	5 987	6 029
50	-	-	-	6 361	6 421	6 485	6 547	6 604	6 652
55	-	-	-	7 092	7 139	7 194	7 250	7 305	7 354
60	-	-	-	-	7 971	8 012	8 059	8 107	8 154
65	-	-	-	-	-	-	8 992	9 031	9 070

Current consumption in A

30	9.35	9.40	9.45	9.50	9.55	9.61	9.65	9.70	9.74
35	9.79	9.85	9.91	9.97	10.03	10.08	10.14	10.19	10.24
40	-	10.37	10.44	10.50	10.57	10.63	10.69	10.75	10.80
45	-	-	11.06	11.13	11.20	11.27	11.34	11.40	11.45
50	-	-	-	11.87	11.95	12.02	12.09	12.15	12.21
55	-	-	-	12.74	12.82	12.89	12.96	13.03	13.09
60	-	-	-	-	13.83	13.91	13.98	14.05	14.11
65	-	-	-	-	-	-	15.16	15.23	15.29

Mass flow in kg/h

30	157	196	241	293	352	419	496	583	681
35	154	193	238	290	348	416	493	580	678
40	-	190	234	286	345	412	489	576	673
45	-	-	230	282	340	407	484	570	668
50	-	-	-	277	335	402	478	564	662
55	-	-	-	271	329	396	472	557	654
60	-	-	-	-	323	389	464	550	646
65	-	-	-	-	-	-	456	541	637

Coefficient of performance (C.O.P.)

30	2.08	2.55	3.10	3.73	4.46	5.29	6.26	7.37	8.67
35	1.73	2.15	2.64	3.20	3.83	4.56	5.39	6.34	7.44
40	-	1.81	2.24	2.73	3.28	3.91	4.63	5.46	6.40
45	-	-	1.88	2.31	2.79	3.34	3.96	4.67	5.48
50	-	-	-	1.93	2.35	2.82	3.36	3.97	4.66
55	-	-	-	1.60	1.95	2.35	2.82	3.34	3.93
60	-	-	-	-	1.60	1.94	2.33	2.77	3.28
65	-	-	-	-	-	-	1.91	2.28	2.72

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

Cooling capacity	22 300	W
Power input	7 185	W
Current consumption	12.88	A
Mass flow	509	kg/h
C.O.P.	3.10	

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	70	dB(A)
With acoustic hood	64	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

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alternations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

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

Cooling capacity in W

30	8 859	11 271	14 101	17 406	21 244	25 674	30 754	36 542	43 096
35	8 222	10 562	13 293	16 474	20 163	24 416	29 292	34 848	41 143
40	-	9 810	12 423	15 460	18 978	23 033	27 685	32 989	39 003
45	-	-	11 496	14 369	17 695	21 532	25 937	30 966	36 678
50	-	-	10 516	13 203	16 316	19 912	24 048	28 779	34 162
55	-	-	-	11 962	14 838	18 169	22 010	26 416	31 443
60	-	-	-	-	13 247	16 282	19 796	23 843	28 476
65	-	-	-	-	-	-	17 332	20 968	25 153

Power input in W

30	4 943	4 982	5 024	5 072	5 126	5 188	5 259	5 342	5 437
35	5 490	5 525	5 564	5 608	5 660	5 719	5 789	5 870	5 964
40	-	6 140	6 173	6 211	6 257	6 312	6 377	6 454	6 545
45	-	-	6 867	6 897	6 935	6 982	7 041	7 111	7 196
50	-	-	7 662	7 682	7 709	7 747	7 795	7 857	7 933
55	-	-	-	8 582	8 597	8 622	8 658	8 708	8 773
60	-	-	-	-	9 614	9 624	9 646	9 681	9 732
65	-	-	-	-	-	-	10 774	10 793	10 828

Current consumption in A

30	9.41	9.50	9.57	9.61	9.64	9.66	9.69	9.72	9.77
35	9.93	10.01	10.07	10.12	10.16	10.19	10.24	10.29	10.37
40	-	10.62	10.67	10.71	10.75	10.79	10.84	10.91	11.01
45	-	-	11.39	11.42	11.45	11.48	11.54	11.61	11.72
50	-	-	12.26	12.27	12.28	12.31	12.35	12.43	12.53
55	-	-	-	13.30	13.29	13.29	13.32	13.38	13.48
60	-	-	-	-	14.50	14.47	14.47	14.51	14.60
65	-	-	-	-	-	-	15.85	15.86	15.92

Mass flow in kg/h

30	184	232	287	349	421	503	597	703	823
35	180	229	284	347	420	503	597	703	824
40	-	225	280	344	417	500	594	701	822
45	-	-	275	339	412	495	590	697	818
50	-	-	270	333	406	489	584	691	812
55	-	-	-	326	399	482	576	683	803
60	-	-	-	-	390	472	566	673	793
65	-	-	-	-	-	-	555	660	780

Coefficient of performance (C.O.P.)

30	1.79	2.26	2.81	3.43	4.14	4.95	5.85	6.84	7.93
35	1.50	1.91	2.39	2.94	3.56	4.27	5.06	5.94	6.90
40	-	1.60	2.01	2.49	3.03	3.65	4.34	5.11	5.96
45	-	-	1.67	2.08	2.55	3.08	3.68	4.35	5.10
50	-	-	1.37	1.72	2.12	2.57	3.08	3.66	4.31
55	-	-	-	1.39	1.73	2.11	2.54	3.03	3.58
60	-	-	-	-	1.38	1.69	2.05	2.46	2.93
65	-	-	-	-	-	-	1.61	1.94	2.32

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

Cooling capacity	24 048	W
Power input	7 795	W
Current consumption	12.35	A
Mass flow	584	kg/h
C.O.P.	3.08	

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	72	dB(A)
With acoustic hood	66	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

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alternations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

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	9 567	12 159	15 196	18 740	22 853	27 594	33 027	39 212	46 211
35	8 937	11 466	14 416	17 846	21 820	26 397	31 640	37 610	44 369
40	-	10 731	13 573	16 871	20 686	25 079	30 113	35 849	42 348
45	-	-	12 676	15 821	19 458	23 649	28 454	33 936	40 155
50	-	-	-	14 706	18 145	22 113	26 670	31 878	37 799
55	-	-	-	13 531	16 754	20 479	24 769	29 684	35 286
60	-	-	-	-	15 292	18 756	22 758	27 360	32 624
65	-	-	-	-	-	-	20 645	24 915	29 822

Power input in W

30	4 943	4 982	5 024	5 072	5 126	5 188	5 259	5 342	5 437
35	5 490	5 525	5 564	5 608	5 660	5 719	5 789	5 870	5 964
40	-	6 140	6 173	6 211	6 257	6 312	6 377	6 454	6 545
45	-	-	6 867	6 897	6 935	6 982	7 041	7 111	7 196
50	-	-	-	7 682	7 709	7 747	7 795	7 857	7 933
55	-	-	-	8 582	8 597	8 622	8 658	8 708	8 773
60	-	-	-	-	9 614	9 624	9 646	9 681	9 732
65	-	-	-	-	-	-	10 774	10 793	10 828

Current consumption in A

30	9.41	9.50	9.57	9.61	9.64	9.66	9.69	9.72	9.77
35	9.93	10.01	10.07	10.12	10.16	10.19	10.24	10.29	10.37
40	-	10.62	10.67	10.71	10.75	10.79	10.84	10.91	11.01
45	-	-	11.39	11.42	11.45	11.48	11.54	11.61	11.72
50	-	-	-	12.27	12.28	12.31	12.35	12.43	12.53
55	-	-	-	13.30	13.29	13.29	13.32	13.38	13.48
60	-	-	-	-	14.50	14.47	14.47	14.51	14.60
65	-	-	-	-	-	-	15.85	15.86	15.92

Mass flow in kg/h

30	183	231	285	347	419	500	593	698	817
35	179	227	282	345	417	499	593	698	818
40	-	223	279	342	414	497	590	696	816
45	-	-	274	337	410	492	586	692	812
50	-	-	-	331	404	486	580	686	806
55	-	-	-	324	396	478	572	678	797
60	-	-	-	-	388	469	562	668	787
65	-	-	-	-	-	-	551	656	774

Coefficient of performance (C.O.P.)

30	1.94	2.44	3.02	3.69	4.46	5.32	6.28	7.34	8.50
35	1.63	2.08	2.59	3.18	3.86	4.62	5.47	6.41	7.44
40	-	1.75	2.20	2.72	3.31	3.97	4.72	5.55	6.47
45	-	-	1.85	2.29	2.81	3.39	4.04	4.77	5.58
50	-	-	-	1.91	2.35	2.85	3.42	4.06	4.76
55	-	-	-	1.58	1.95	2.38	2.86	3.41	4.02
60	-	-	-	-	1.59	1.95	2.36	2.83	3.35
65	-	-	-	-	-	-	1.92	2.31	2.75

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

Cooling capacity	27 100	W
Power input	8 569	W
Current consumption	13.22	A
Mass flow	618	kg/h
C.O.P.	3.16	

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	72	dB(A)
With acoustic hood	66	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

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alternations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

