

Datasheets

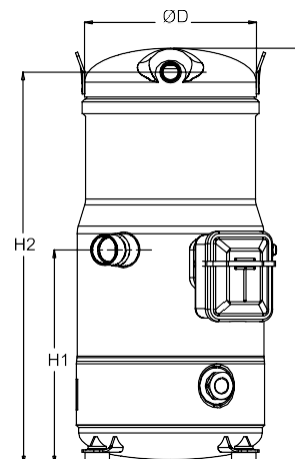
Danfoss scroll compressors SM / SY / SZ / SH / WSH



General Characteristics

Model number (on compressor nameplate)		SH161A4ALC
Code number for Singlepack*		120H0023
Code number for Industrial pack**		120H0024
Drawing number		8560003h
Suction and discharge connections		Brazed
Suction connection		1-3/8" 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		151.7 cm ³ /rev
Displacement @ Nominal speed		26.4 m ³ /h @ 2900 rpm - 31.9 m ³ /h @ 3500 rpm
Net weight		69 kg
Oil charge		3.3 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		7.9 kg
Approved refrigerants		R410A

Dimensions

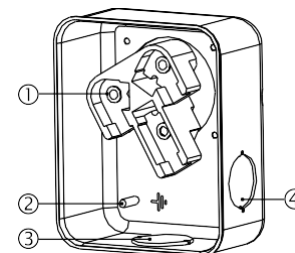


D=243 mm
H=540 mm
H1=278 mm
H2=509 mm
H3=- mm

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	0.83 ▲
Rated Load Amps (RLA)	23.6 A
Maximum Continuous Current (MCC)	35 A
Locked Rotor Amps (LRA)	158 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, 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.
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 SH105-161 & SM124, SM147	120Z0035
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

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	13 655	17 030	21 004	25 657	31 065	37 306	44 460	52 605	61 817
35	12 664	15 950	19 795	24 277	29 476	35 468	42 333	50 148	58 991
40	-	14 827	18 507	22 785	27 739	33 447	39 988	47 438	55 878
45	-	-	17 134	21 172	25 847	31 236	37 417	44 468	52 469
50	-	-	15 665	19 429	23 790	28 824	34 611	41 229	48 755
55	-	-	-	17 548	21 559	26 204	31 562	37 711	44 729
60	-	-	-	-	19 146	23 367	28 262	33 907	40 380
65	-	-	-	-	-	-	24 700	29 806	35 702

Power input in W

30	6 992	7 037	7 077	7 119	7 172	7 246	7 347	7 486	7 671
35	7 798	7 843	7 878	7 912	7 953	8 011	8 093	8 209	8 367
40	-	8 757	8 785	8 809	8 837	8 877	8 939	9 030	9 159
45	-	-	9 823	9 835	9 847	9 869	9 907	9 972	10 071
50	-	-	11 014	11 013	11 008	11 008	11 022	11 059	11 126
55	-	-	-	12 365	12 342	12 320	12 308	12 314	12 348
60	-	-	-	-	13 872	13 826	13 786	13 761	13 759
65	-	-	-	-	-	-	15 480	15 422	15 383

Current consumption in A

30	14.45	14.45	14.48	14.51	14.56	14.63	14.72	14.83	14.95
35	15.35	15.35	15.37	15.40	15.44	15.50	15.58	15.67	15.79
40	-	16.42	16.42	16.44	16.47	16.52	16.58	16.66	16.76
45	-	-	17.68	17.68	17.70	17.72	17.77	17.83	17.90
50	-	-	19.18	19.16	19.16	19.16	19.18	19.22	19.27
55	-	-	-	20.93	20.90	20.88	20.87	20.88	20.90
60	-	-	-	-	22.96	22.91	22.87	22.84	22.83
65	-	-	-	-	-	-	25.22	25.15	25.10

Mass flow in kg/h

30	283	350	427	515	616	732	863	1 012	1 181
35	278	346	423	512	614	730	862	1 012	1 181
40	-	340	418	507	609	726	858	1 008	1 178
45	-	-	410	500	602	718	851	1 001	1 170
50	-	-	401	490	592	708	840	990	1 159
55	-	-	-	478	579	695	826	976	1 144
60	-	-	-	-	564	679	809	958	1 125
65	-	-	-	-	-	-	789	936	1 102

Coefficient of performance (C.O.P.)

30	1.95	2.42	2.97	3.60	4.33	5.15	6.05	7.03	8.06
35	1.62	2.03	2.51	3.07	3.71	4.43	5.23	6.11	7.05
40	-	1.69	2.11	2.59	3.14	3.77	4.47	5.25	6.10
45	-	-	1.74	2.15	2.62	3.17	3.78	4.46	5.21
50	-	-	1.42	1.76	2.16	2.62	3.14	3.73	4.38
55	-	-	-	1.42	1.75	2.13	2.56	3.06	3.62
60	-	-	-	-	1.38	1.69	2.05	2.46	2.93
65	-	-	-	-	-	-	1.60	1.93	2.32

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

Cooling capacity	34 611	W
Power input	11 022	W
Current consumption	19.18	A
Mass flow	840	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	73.5	dB(A)
With acoustic hood	67.5	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	14 746	18 372	22 637	27 624	33 416	40 096	47 746	56 449	66 286
35	13 766	17 316	21 466	26 299	31 898	38 346	45 727	54 122	63 616
40	-	16 220	20 220	24 864	30 236	36 418	43 496	51 551	60 669
45	-	-	18 892	23 313	28 423	34 307	41 048	48 732	57 443
50	-	-	-	21 641	26 457	32 010	38 386	45 669	53 945
55	-	-	-	19 850	24 342	29 536	35 519	42 377	50 196
60	-	-	-	-	22 102	26 917	32 490	38 909	46 262
65	-	-	-	-	-	-	29 421	35 417	42 329

Power input in W

30	6 992	7 037	7 077	7 119	7 172	7 246	7 347	7 486	7 671
35	7 798	7 843	7 878	7 912	7 953	8 011	8 093	8 209	8 367
40	-	8 757	8 785	8 809	8 837	8 877	8 939	9 030	9 159
45	-	-	9 823	9 835	9 847	9 869	9 907	9 972	10 071
50	-	-	-	11 013	11 008	11 008	11 022	11 059	11 126
55	-	-	-	12 365	12 342	12 320	12 308	12 314	12 348
60	-	-	-	-	13 872	13 826	13 786	13 761	13 759
65	-	-	-	-	-	-	15 480	15 422	15 383

Current consumption in A

30	14.45	14.45	14.48	14.51	14.56	14.63	14.72	14.83	14.95
35	15.35	15.35	15.37	15.40	15.44	15.50	15.58	15.67	15.79
40	-	16.42	16.42	16.44	16.47	16.52	16.58	16.66	16.76
45	-	-	17.68	17.68	17.70	17.72	17.77	17.83	17.90
50	-	-	-	19.16	19.16	19.16	19.18	19.22	19.27
55	-	-	-	20.93	20.90	20.88	20.87	20.88	20.90
60	-	-	-	-	22.96	22.91	22.87	22.84	22.83
65	-	-	-	-	-	-	25.22	25.15	25.10

Mass flow in kg/h

30	281	348	424	512	612	727	857	1 005	1 172
35	276	344	421	509	610	725	856	1 005	1 172
40	-	338	415	504	605	721	852	1 001	1 169
45	-	-	408	496	598	713	845	994	1 162
50	-	-	-	487	588	703	834	983	1 150
55	-	-	-	475	576	690	821	969	1 135
60	-	-	-	-	561	674	804	951	1 116
65	-	-	-	-	-	-	784	929	1 094

Coefficient of performance (C.O.P.)

30	2.11	2.61	3.20	3.88	4.66	5.53	6.50	7.54	8.64
35	1.77	2.21	2.72	3.32	4.01	4.79	5.65	6.59	7.60
40	-	1.85	2.30	2.82	3.42	4.10	4.87	5.71	6.62
45	-	-	1.92	2.37	2.89	3.48	4.14	4.89	5.70
50	-	-	-	1.97	2.40	2.91	3.48	4.13	4.85
55	-	-	-	1.61	1.97	2.40	2.89	3.44	4.07
60	-	-	-	-	1.59	1.95	2.36	2.83	3.36
65	-	-	-	-	-	-	1.90	2.30	2.75

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

Cooling capacity	38 800	W
Power input	12 145	W
Current consumption	20.66	A
Mass flow	885	kg/h
C.O.P.	3.19	

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	73.5	dB(A)
With acoustic hood	67.5	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	16 905	20 964	25 722	31 277	37 728	45 171	53 706	63 430	74 442
35	15 781	19 703	24 282	29 615	35 799	42 931	51 110	60 432	70 995
40	-	18 369	22 739	27 819	33 706	40 496	48 287	57 175	67 257
45	-	-	21 097	25 894	31 452	37 868	45 238	53 658	63 224
50	-	-	19 356	23 837	29 034	35 042	41 956	49 871	58 883
55	-	-	-	21 641	26 440	32 002	38 421	45 790	54 204
60	-	-	-	-	23 637	28 707	34 581	41 351	49 108
65	-	-	-	-	-	-	30 299	36 386	43 396

Power input in W

30	8 223	8 348	8 475	8 609	8 751	8 905	9 073	9 259	9 464
35	9 105	9 222	9 342	9 467	9 602	9 748	9 909	10 086	10 284
40	-	10 222	10 330	10 444	10 566	10 700	10 849	11 015	11 200
45	-	-	11 466	11 563	11 670	11 788	11 921	12 070	12 240
50	-	-	12 776	12 854	12 940	13 038	13 150	13 279	13 429
55	-	-	-	14 340	14 402	14 475	14 563	14 668	14 793
60	-	-	-	-	16 083	16 127	16 187	16 263	16 360
65	-	-	-	-	-	-	18 047	18 091	18 155

Current consumption in A

30	13.62	13.75	13.88	14.01	14.15	14.31	14.50	14.74	15.03
35	14.53	14.68	14.81	14.94	15.08	15.23	15.41	15.63	15.90
40	-	15.76	15.90	16.03	16.16	16.30	16.47	16.67	16.91
45	-	-	17.18	17.31	17.43	17.56	17.71	17.89	18.11
50	-	-	18.69	18.81	18.93	19.05	19.18	19.33	19.52
55	-	-	-	20.58	20.69	20.79	20.90	21.03	21.19
60	-	-	-	-	22.75	22.83	22.92	23.02	23.15
65	-	-	-	-	-	-	25.28	25.35	25.44

Mass flow in kg/h

30	351	431	523	628	748	886	1 043	1 221	1 422
35	346	427	519	624	745	884	1 041	1 220	1 421
40	-	421	513	619	740	879	1 037	1 216	1 418
45	-	-	506	611	733	871	1 029	1 208	1 410
50	-	-	496	602	723	861	1 019	1 197	1 399
55	-	-	-	590	711	848	1 005	1 184	1 385
60	-	-	-	-	696	833	989	1 166	1 367
65	-	-	-	-	-	-	970	1 146	1 345

Coefficient of performance (C.O.P.)

30	2.06	2.51	3.03	3.63	4.31	5.07	5.92	6.85	7.87
35	1.73	2.14	2.60	3.13	3.73	4.40	5.16	5.99	6.90
40	-	1.80	2.20	2.66	3.19	3.78	4.45	5.19	6.00
45	-	-	1.84	2.24	2.70	3.21	3.79	4.45	5.17
50	-	-	1.52	1.85	2.24	2.69	3.19	3.76	4.38
55	-	-	-	1.51	1.84	2.21	2.64	3.12	3.66
60	-	-	-	-	1.47	1.78	2.14	2.54	3.00
65	-	-	-	-	-	-	1.68	2.01	2.39

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

Cooling capacity	41 956	W
Power input	13 150	W
Current consumption	19.18	A
Mass flow	1 019	kg/h
C.O.P.	3.19	

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	77	dB(A)
With acoustic hood	71	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	18 257	22 616	27 721	33 676	40 584	48 550	57 675	68 066	79 823
35	17 153	21 391	26 332	32 081	38 741	46 415	55 207	65 221	76 561
40	-	20 095	24 844	30 357	36 739	44 093	52 523	62 132	73 023
45	-	-	23 262	28 511	34 586	41 591	49 629	58 803	69 218
50	-	-	-	26 550	32 289	38 915	46 531	55 242	65 151
55	-	-	-	24 480	29 854	36 072	43 238	51 456	60 829
60	-	-	-	-	27 288	33 069	39 755	47 452	56 261
65	-	-	-	-	-	-	36 090	43 235	51 451

Power input in W

30	8 223	8 348	8 475	8 609	8 751	8 905	9 073	9 259	9 464
35	9 105	9 222	9 342	9 467	9 602	9 748	9 909	10 086	10 284
40	-	10 222	10 330	10 444	10 566	10 700	10 849	11 015	11 200
45	-	-	11 466	11 563	11 670	11 788	11 921	12 070	12 240
50	-	-	-	12 854	12 940	13 038	13 150	13 279	13 429
55	-	-	-	14 340	14 402	14 475	14 563	14 668	14 793
60	-	-	-	-	16 083	16 127	16 187	16 263	16 360
65	-	-	-	-	-	-	18 047	18 091	18 155

Current consumption in A

30	13.62	13.75	13.88	14.01	14.15	14.31	14.50	14.74	15.03
35	14.53	14.68	14.81	14.94	15.08	15.23	15.41	15.63	15.90
40	-	15.76	15.90	16.03	16.16	16.30	16.47	16.67	16.91
45	-	-	17.18	17.31	17.43	17.56	17.71	17.89	18.11
50	-	-	-	18.81	18.93	19.05	19.18	19.33	19.52
55	-	-	-	20.58	20.69	20.79	20.90	21.03	21.19
60	-	-	-	-	22.75	22.83	22.92	23.02	23.15
65	-	-	-	-	-	-	25.28	25.35	25.44

Mass flow in kg/h

30	349	429	520	624	743	880	1 036	1 212	1 411
35	344	424	516	620	741	878	1 034	1 211	1 411
40	-	418	510	615	735	873	1 029	1 207	1 407
45	-	-	503	608	728	866	1 022	1 199	1 400
50	-	-	-	598	718	855	1 012	1 189	1 389
55	-	-	-	587	706	843	998	1 175	1 374
60	-	-	-	-	692	827	982	1 158	1 356
65	-	-	-	-	-	-	963	1 138	1 335

Coefficient of performance (C.O.P.)

30	2.22	2.71	3.27	3.91	4.64	5.45	6.36	7.35	8.43
35	1.88	2.32	2.82	3.39	4.03	4.76	5.57	6.47	7.44
40	-	1.97	2.41	2.91	3.48	4.12	4.84	5.64	6.52
45	-	-	2.03	2.47	2.96	3.53	4.16	4.87	5.66
50	-	-	-	2.07	2.50	2.98	3.54	4.16	4.85
55	-	-	-	1.71	2.07	2.49	2.97	3.51	4.11
60	-	-	-	-	1.70	2.05	2.46	2.92	3.44
65	-	-	-	-	-	-	2.00	2.39	2.83

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

Cooling capacity	47 150	W
Power input	14 428	W
Current consumption	20.73	A
Mass flow	1 075	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	77	dB(A)
With acoustic hood	71	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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