

BDN45F-A Direct Current Compressor R134a, R1234yf 12/24V DC



General

Code number (without electronic unit)	109Z0445
Electronic unit - Automotive	101N2720, 40 pcs: 101N2721
Compressors on pallet	240

Application

Application range	LBP/MBP
Voltage range	VDC 8.5 - 17 / 19 - 34

Cooling requirements

Application	LBP	MBP
32°C / 38°C / 43°C	S	S

Absolute maximum ratings

Compressor compartment operating temperature	°C	-10 to 55
Max. compressor tilt angle for temporary operation		±30°
Operating pressure range		see diagram to the right

Compressor Compartment Temperature Protection¹ is available, please refer to controller instruction sheet. Any levels of stress exceeding the absolute maximum value of machine compartment temperature range or operating pressure range or tilt angle may damage the device. Prolonged exposure to stress above the recommended operating conditions may also affect the device's reliability.

Motor

Motor type		permanent magnet, brushless DC
Speed	rpm	variable speed
Resistance, each of the three windings (25°C)	Ω	3.1

Design

Displacement	cm ³	1.42
Oil quantity (type)	cm ³	53 (polyolester)
Maximum refrigerant charge	g	70
Free gas volume in compressor	cm ³	472
Weight - Compressor/Electronic unit	kg	1.37 / 0.14

Standard battery protection settings

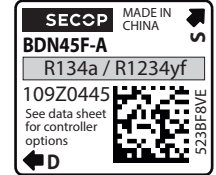
Voltage (0.1 steps)			Default	Min. value	Max. value
12V	± 0.3V DC, all values	Cut out level	VDC 10.4	8.5	17
24V	± 0.3V DC, all values	Cut out level	VDC 22.8	19	32
Single range	± 0.3V DC, all values	Cut out level	VDC 10.4	8.5	32
Battery cut-in difference			VDC 1.3	0.5	10

Dimensions

Height	mm	A	89.0
		B	82.4
		B1	48.7
		B2	45.8
Suction connector	location/I.D. mm angle	C	6.2 5°
	material comment		Copper Rubber plug
Process connector	location/I.D. mm angle	D	6.2 77.9°
	material comment		Copper Rubber plug
Discharge connector	location/I.D. mm angle	E	5.0 86.9°
	material comment		Cu-plated steel Rubber plug
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20

Remarks:

Please follow the brazing instructions on page 4 (Product Bulletin DES.N.101.M1).

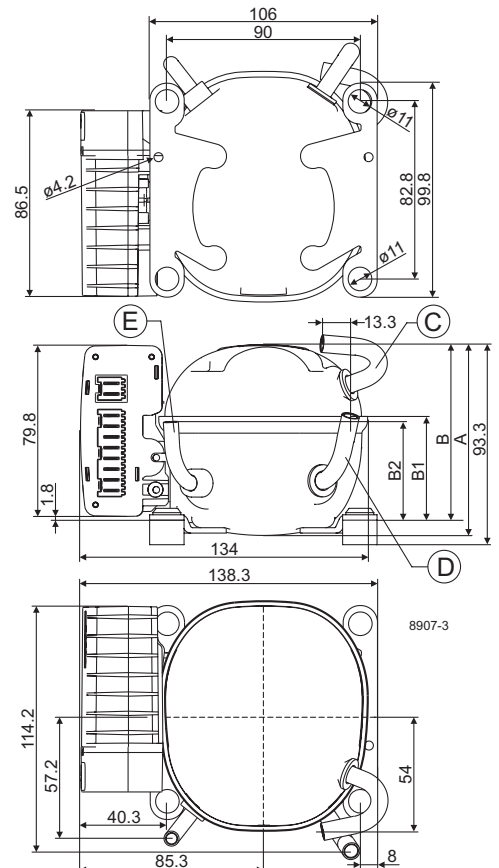
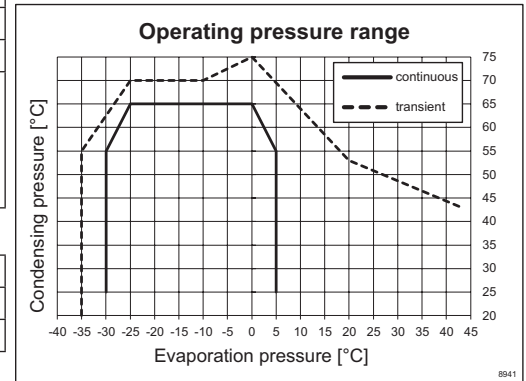


Approvals and warning label

S = Static cooling normally sufficient

Note: In case fan cooling is used:

condenser => fan => electronic => compressor



Performance Data with Refrigerant R134a

Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	14.3	19.9	22.2	27.1	36.0	47.0	60.1	75.6	93.8
3,000	18.5	26.2	29.4	36.4	49.0	64.0	81.5	102	
4,000	25.2	36.6	41.2	50.9	67.6	86.5	107.4	129.9	
4,500	28.7	42.0	47.3	58.4	77.4	98.4	121.2		

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	17.9	24.9	27.6	33.7	44.8	58.4	74.7	94.1	116.7
3,000	23.1	32.7	36.6	45.2	60.8	79.5	101.3	126.3	
4,000	31.4	45.5	51.1	63.1	83.8	107.3	133.3	161.4	
4,500	35.7	52.2	58.7	72.4	95.9	122.0	150.4		

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	15.9	19.0	20.2	22.6	26.5	30.8	35.3	40.1	45.1
3,000	19.2	23.3	24.8	28.0	33.1	38.4	43.6	48.6	
4,000	25.1	31.3	33.5	37.9	44.7	51.4	57.6	62.9	
4,500	28.8	36.1	38.7	43.9	51.8	59.3	66.2		

Current consumption (for 24V applications the following must be halved)

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	1.40	1.70	1.81	2.03	2.40	2.79	3.21	3.66	4.12
3,000	1.62	1.98	2.11	2.39	2.83	3.29	3.75	4.18	
4,000	2.10	2.61	2.79	3.15	3.71	4.26	4.77	5.21	
4,500	2.39	2.99	3.21	3.64	4.28	4.91	5.47		

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	0.90	1.05	1.10	1.20	1.36	1.52	1.70	1.88	2.08
3,000	0.96	1.13	1.18	1.30	1.48	1.67	1.87	2.09	
4,000	1.00	1.17	1.23	1.34	1.51	1.68	1.86	2.06	
4,500	1.00	1.16	1.22	1.33	1.49	1.66	1.83		

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	1.13	1.31	1.37	1.49	1.69	1.90	2.11	2.34	2.59
3,000	1.20	1.40	1.47	1.62	1.84	2.07	2.32	2.60	
4,000	1.25	1.45	1.53	1.66	1.87	2.09	2.31	2.56	
4,500	1.24	1.45	1.52	1.65	1.85	2.06	2.27		

Operational errors (TOOL4COOL® or LED flashes)

Error code or LED flashes	Error type
	Can be read out in the software TOOL4COOL®
7	Communication error (Communication of master controller stopped for 15 minutes (default))
6	Thermostat failure (If a NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
5	Thermal cut-out of electronic unit (PCB or compressor compartment temperature exceeds minimum or maximum limits).
4	Minimum motor speed error (If the refrigeration system is too heavily loaded, the motor cannot maintain min. speed at approximately 2,150 rpm).
3	Motor start error (The rotor is blocked or the differential pressure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan is overloading the electronic unit).
1	Battery protection cut-out (The voltage is outside the cut-out setting).

A Wire Dimensions DC

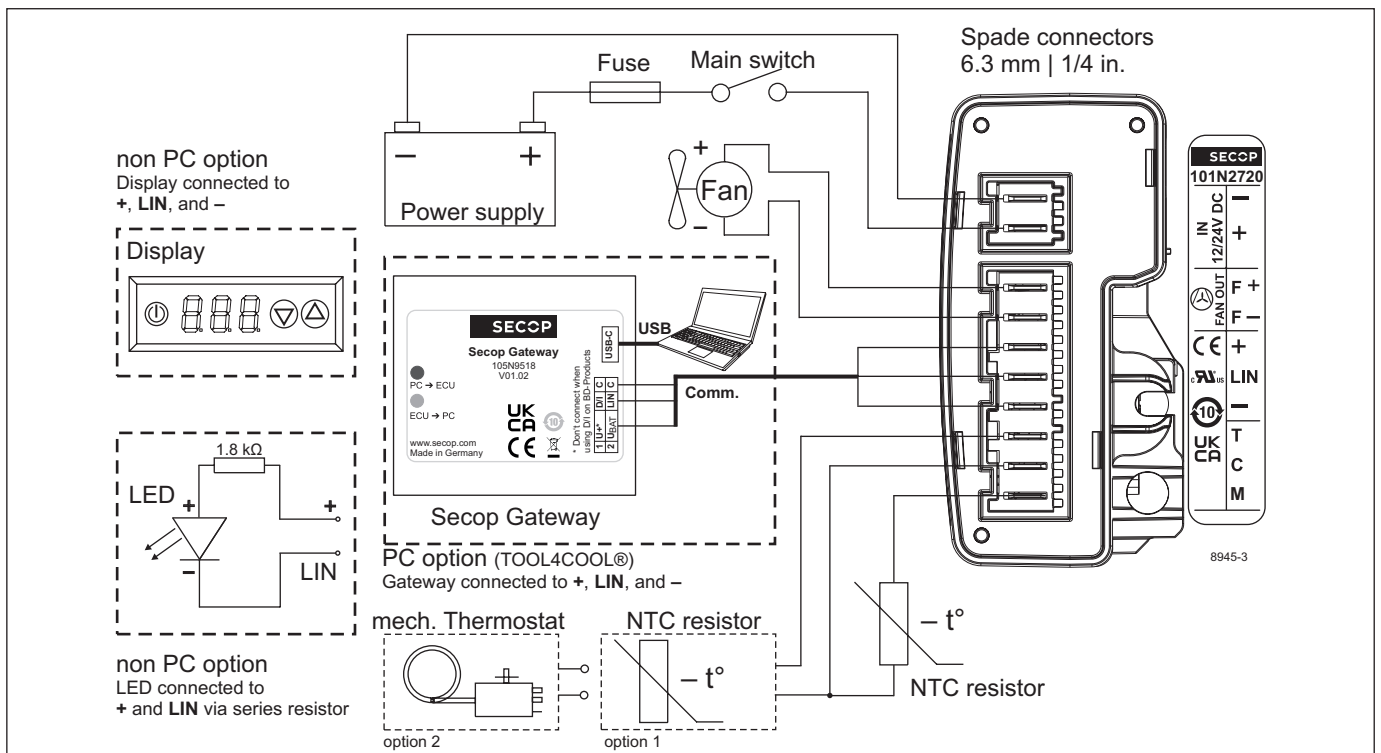
Cross section	Size		Max. length* 12V operation		Max. length* 24V operation	
	AWG	[Gauge]	[m]	[ft.]	[m]	[ft.]
2.5	12		2.5	8	5	16
4	12		4	13	8	26
6	10		6	20	12	39
10	8		10	33	20	66

*Length between battery and electronic unit

Accessories for BDN45F-A

Mounting	Code number
Bolt joint for one compressor	118-1960
Snap-on for one compressor	118-1959
Secop Gateway	105N9518

Test conditions	EN 12900 CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C



Performance Data with Refrigerant R1234yf

Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling watt									
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	15.8	21.2	23.4	28.1	36.5	46.7	58.8	72.9	89.2
3,000	20.4	28.0	31.0	37.7	49.6	63.7	79.8	98.0	
4,000	27.8	39.0	43.4	52.7	68.5	86.1	105.1	125.3	
4,500	31.7	44.8	49.8	60.4	78.2	97.7	118.5		

Capacity (ASHRAE LBP) 12V DC, static cooling watt									
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	20.6	27.7	30.5	36.5	47.5	60.7	76.4	94.8	116.2
3,000	26.6	36.3	40.3	48.9	64.4	82.6	103.6	127.4	
4,000	36.1	50.6	56.3	68.3	88.7	111.5	136.4	162.9	
4,500	41.2	58.0	64.5	78.2	101.2	126.5	153.7		

Power consumption 12V DC, static cooling watt									
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	18.0	20.9	21.9	24.1	27.6	31.5	35.6	39.9	44.2
3,000	21.6	25.4	26.9	29.8	34.5	39.3	44.0	48.4	
4,000	28.3	34.1	36.2	40.3	46.6	52.6	58.1	62.7	
4,500	32.5	39.3	41.8	46.6	53.8	60.6	66.6		

Current consumption (for 24V applications the following must be halved)									
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	1.60	1.86	1.96	2.16	2.50	2.86	3.24	3.63	4.04
3,000	1.83	2.16	2.29	2.54	2.95	3.37	3.78	4.16	
4,000	2.37	2.85	3.02	3.35	3.87	4.36	4.81	5.19	
4,500	2.70	3.26	3.46	3.86	4.45	5.01	5.51		

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling W/W									
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	0.88	1.02	1.07	1.17	1.32	1.48	1.65	1.83	2.02
3,000	0.94	1.10	1.15	1.27	1.44	1.62	1.81	2.03	
4,000	0.98	1.14	1.20	1.31	1.47	1.64	1.81	2.00	
4,500	0.98	1.14	1.19	1.30	1.45	1.61	1.78		

COP (ASHRAE LBP) 12V DC, static cooling W/W									
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5
2,300	1.15	1.33	1.39	1.52	1.72	1.93	2.15	2.38	2.63
3,000	1.23	1.43	1.50	1.64	1.87	2.10	2.36	2.63	
4,000	1.28	1.48	1.55	1.69	1.90	2.12	2.35	2.60	
4,500	1.27	1.47	1.54	1.68	1.88	2.09	2.31		

Operational errors (TOOL4COOL® or LED flashes)

Error code or LED flashes	Error type
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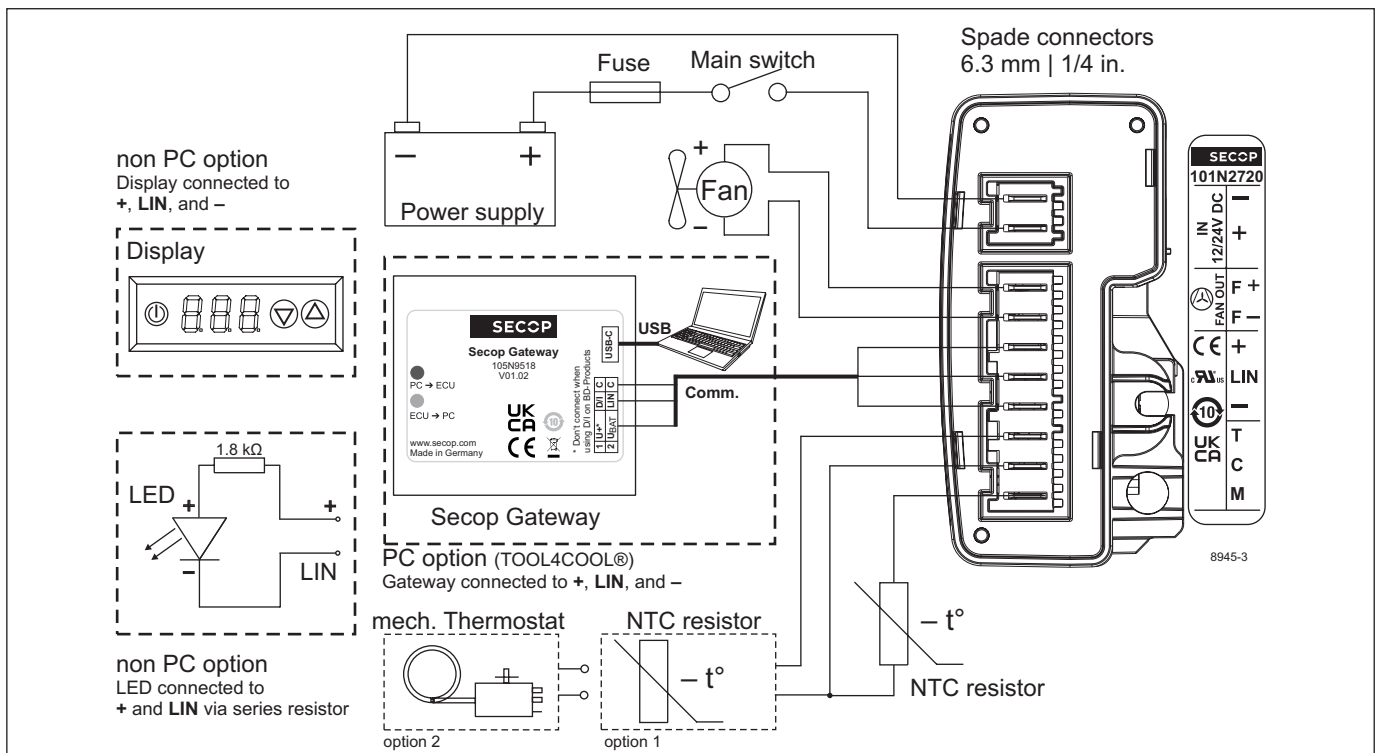
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	mm ²	AWG [Gauge]	[m]	[ft.]	[m]	[ft.]
2.5	12	2.5	8	5	16	
4	12	4	13	8	26	
6	10	6	20	12	39	
10	8	10	33	20	66	

*Length between battery and electronic unit

Accessories for BDN45F-A

Mounting	Code number
Bolt joint for one compressor	118-1960
Snap-on for one compressor	118-1959
Secop Gateway	105N9518

Test conditions	EN 12900 CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

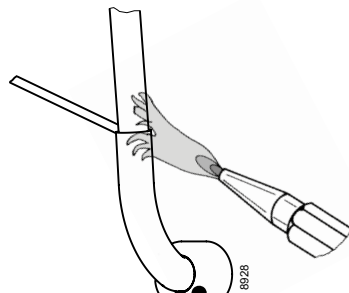


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Brazing on Discharge Connector (BDN45F, BDN50K, BDN45F-A, and MB3CKV)

The BDN45F, BDN50K, and MB3CKV compressors use a special discharge connector element (see figure 2) that is directly connected to the discharge tube to optimize energy consumption. This element is made from plastic and sensitive to high heat exposure.

When brazing a tube into the discharge connector (see figure 1) please ensure that the area with the discharge connector element never exceeds 150°C / 302°F. Don't heat up the bottom of the connector directly.



! max. 150°C/302°F !
at socket
 brazing solder: silver with flux

Use a fork burner (see figure 3) and/or a damp cloth, if necessary. A protective plate can also serve to protect the discharge connector element from direct heat from a flame. Do not braze longer than 10 seconds and wait for 5 minutes for the next soldering attempt.

Further information:

Product Bulletin – Brazing Technique for Compressor Connectors (DES.N.600.A1.02)



Fig.1 BDN45F discharge connector

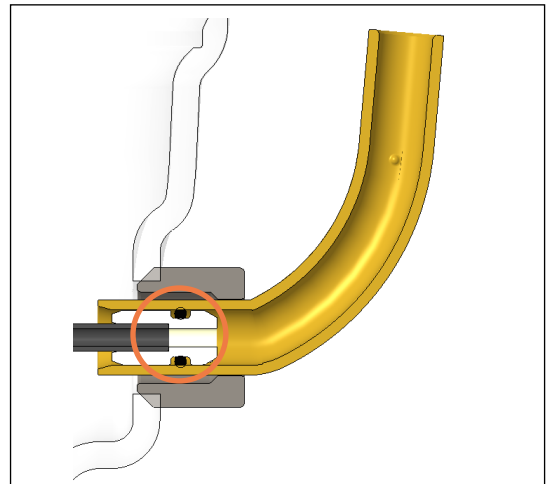


Fig.2 Discharge connector element

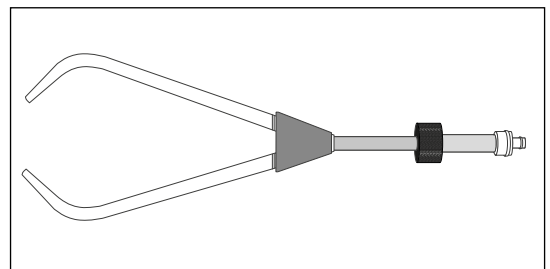


Fig.3 Fork burner