



**Collection of Datasheets** 

Direct Current Compressors R134a • 12-24V • 10-45V (Solar) R600a • 10-45V (Solar)

REFRIGERATION AND AIR CONDITIONING

Danfoss

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General

Danfoss variable speed refrigeration compressors type BD35F, BD50F and BD80F are designed for connection to 12V and 24V DC power supply and for refrigerant R134a (CF<sub>2</sub>-CH<sub>2</sub>F).

The compressors are intended especially for use in mobile applications, e.g. cooling boxes, boats, caravans, trucks, vans, buses, etc. Due to their low energy consumption and the option for a wide supply voltage range, the compressors are also very suitable for stationary applications powered by photovoltaic solar panels.

The compressors can be used in refrigerators and freezers designed for capillary tube and TEV as the throttling device.

The BD35K is especially designed for refrigeration systems using isobutane, refrigerant R600a ( $C_4H_{10}$ ). R600a is classified as a flammable refrigerant of class A3 according to ANSI/ASHRAE 34. Accordingly, special safety regulations must be complied with. For domestic appliances a special Test Schedule has been integrated in the European Standard EN 60335-2-24 and IEC 60335-2-24. For commercial refrigerators IEC 60335-2-89 will include flammable refrigerants.

The BD35K must only and exclusively be used in appliances certified for R600a according to these or later regulations. This means that the compressors must not be used in appliances which are not originally designed and certified for R600a.

This compressor was designed for stationary use only.

The BD compressor concept includes an electronic unit which features overload protection and battery protection. The electronic unit has internal voltage recording and calibration to the applied voltage. The electronic unit may also be powered directly from certain types of electronic power supply units and thus no battery is required.

In addition to being especially quiet in operation, the compressors have a high COP value. They will operate under continual heeling of 30° such as occurs on boats.

The BD compressors must be mounted in a dry and clean place. The compressors will withstand storage temperatures down to -35°C.

Condensing temperatures:

Max. 60°C at stable conditions and max. 70°C at peak load.

Ambient temperatures: Min. -10°C, max. 55°C



#### **Electric circuit**

The BD compressors are fitted with a brushless direct current motor which is electronically commutated by an electronic unit.

The electronic unit is delivered separately and must be mounted on the compressor, please see instructions page 20. The electronic unit must always be connected directly to the battery poles or power supply unit terminals. For the protection of the installation an external fuse must be installed in the power supply cable close to the battery or power supply unit. Establish a special wiring for the BD power supply using direct one-piece cables and avoid to use the existing wiring. If the chassis is used as a conductor, a proper connection between cable and chassis must be estable.

lished.

Wrong polarity applied to the electronic unit does not destroy the unit, however, the compressor does not work.

If the compressor is planned to be stopped for a longer period, a main switch can be installed. The switch must have a contact system rated min. 20A, otherwise the voltage drop over the contacts will cause the battery protection to cut off the compressor earlier than intended.



Voltage range

**BD35/50/80F:** 12V systems: From 10.4V (9.6V) to 17V; 24V systems: From 22.8V (21.3V) to 31.5V. **BD35F/BD35K:** Solar systems: 10V - 45V

The low voltage limits stated in brackets () can be established if a connection is made between the terminals C and P, please see also the passage **Optional battery protection settings** page 5.

The electronic unit will calibrate to the applied voltage. This means that if the battery voltage is less than 17V, the electronic unit assumes that it is working in a 12V system. If the voltage is higher than 17V, the electronic unit assumes that it is working in a 24V system. Consequently, the compressor does not run at power supply voltages between about 17V and the desired battery protection cut-out voltage for 24V systems.

A continuous voltage range from 9.6V to 31.5V can be established if a  $220k\Omega$  resistor (wiring diagram item 9) is connected between the terminals C and P. This wide voltage range makes the BD compressors very suitable for photovoltaic powering.

#### **Cable dimensions**

To ensure correct start and operating conditions, the following cable dimensions must be observed:

#### BD35F / BD50F / BD35K Solar / BD35F Solar

Cross section mm <sup>2</sup>	Max length* m 12V operation	Max length* m 24V operation				
2.5	2.5	5				
4	4	8				
6	6	12				
10	10	20				

DDOVI		
Cross section mm <sup>2</sup>	Max length* m 12V operation	Max length* m 24V operation
6	2.5	5

\*Length between battery and electronic unit

#### Wiring diagram



#### **Thermostat connection**

BD compressors can operate with normal mechanical type thermostats as used in refrigeration appliances, or with electronic thermostats. Always use new thermostats.

The thermostat is connected between the terminals C and T of the electronic unit.

The compressor current does not flow through the thermostat contacts.

When the thermostat is cut out there will still be power on to the electronic unit.

A system with no stand-by power consumption can be established if the thermostat (7) is replaced by a jumper between the terminals C and T, and the main switch (4) is replaced by a thermostat. In this case the full current to the compressor flows through the thermostat, which must be rated accordingly.

#### **Compressor speed**

Without any resistor in the control circuit, the compressor will run with a fixed speed of **2,000 rpm** when the thermostat is switched on, depending on the electronic unit version (see tables below).

Other fixed speeds in the range between **2,000** and **3,500/4,400rpm** can be obtained when a resistor (8) is installed to adjust the current (mA) of the contol circuit, please see wiring diagrammes page 3.

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

BD35F	/ BD50F
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Electronic	Resistor	Motor	Contr.circ.
unit	R1 (8)	speed	current
	Ω	rpm	mA
20	0	2,000	5
202,20	277	2,500	4
1011 NOV	692	3,000	3
101N0210 101N0220	1523	3,500	2
	0	AEO	6
200	173	2,000	5
NO to	450	2,500	4
10110300 101101000	865	3,000	3
<b>3</b> .	1696	3,500	2

BD80F
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Electronic		Motor	Contr.circ.			
unit	R1 (8)	speed	current			
	Ω	rpm	mA			
	0	AEO	6			
280	203	2,500	5			
1Nº AFO	451	3,100	4			
101w0280	867	3,800	3			
	1700	4,400	2			

#### BD35F Solar / BD35K Solar

Electronic	Resistor	Motor	Contr.circ.
unit	R1 (8)	speed	current
	Ω	rpm	mA
	0	AEO	6
400	173	2,000	5
1Nº ato	450	2,500	4
101W0400 101withat0	865	3,000	3
	1696	3,500	2

#### **LED** connection

A 10mA Light Emitting Diode (LED) for compressor operation monitoring can be connected between the terminals + and D.

Operational errors will cause the LED to flash a number of times. The number of flashes depends on what kind of operational error was recorded.

Each flash will last ¼ second. After the actual number of flashes there will be a delay with no flashes, so that the sequence for each error recording is repeated every 4 seconds.

Operational errors shown by LED (optional):

#### BD35F/BD50F/BD35K Solar/BD35F Solar

Number of flashes	Error type		
5	<b>Thermal cut-out of electronic unit</b> (If the refrigeration system has been too heavily loaded, or if the ambient temperature is high, the electronic unit will run too hot).		
4	Minimum motor speed error (If the refrigeration system is too heavily loaded, the motor cannot maintain minimum speed at approximately 1,850 rpm).		
3	<b>Motor start error</b> (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).		
2	<b>Fan over-current cut-out</b> (The fan loads the electronic unit with more than $1A_{peak}$ ).		
1	Battery protection cut-out (The voltage is outside the cut-out setting).		

BD80F	
Number of flashes	Error type
5	Thermal cut-out of electronic unit (If the refrigeration system has been too heavily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo-aded, the motor cannot maintain minimum speed at approximately 2,450 rpm).
3	<b>Motor start error</b> (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 loads the electronic unit with more than 1A <sub>peak</sub> ).
1	Battery protection cut-out (The voltage is outside the cut-out setting).



Fan connection	If a fan is to be used, it m Always use a 12V fan, also voltage to 12V for the far	in 24V systems, as the e				
	Using the special solar ele The max. load on the elec current for the first 2 seco	ectronic unit 101N0400, stronic unit is 0.5A <sub>average</sub>				
	If the fan becomes overloa		pressor will be cut out by	the overload protection.		
Troubleshooting	Emitting Diode (LED) insta the electronic unit is prop of flashes emitted by the operation.	To diagnose why a compressor comes to an unintended stop, it is recommended to have a Light Emitting Diode (LED) installed between the terminals + and D, please see page 3 and 4. Provided that the electronic unit is properly connected to the power supply, and the thermostat is on, the number of flashes emitted by the LED will give a hint about the reason for the interruption of the compressor				
	The motor windings can lead-in pins. If the measur likely all right. The electronic unit is not	ed values between all 3	pins are approximately th			
Protection systems	The BD compressor prote failure, fan overload and When an overload prote attempts at about 60 seco	electronic unit overheati ction is activated, the c	ng as well as destructive ompressor enters a cycl	battery discharge. e in which it makes start		
Overload protections	The compressor overload speed drops below appro- motor speed is not reach activating could be exce difference. The fan overl 0.5A <sub>average</sub> or 1A <sub>peak</sub> . An overheating of the ele automatically when the te If a fan is installed, it will overheating.	oximately 1,850 rpm (Bl ned during the start set ss refrigeration system oad protection stops th ectronic unit heat sink w emperature has dropped	D35F/BD50F/BD35K) or 2 quence. Possible reasons pressures during operat he compressor and fan if ill cause the compressor d.	450 rpm (BD80F) or this for overload protection ion or too high pressure the fan current exceeds to stop. Restart will occur		
Voltage protection	If a voltage outside the sp or it stops if the voltage li about 1 minute after the If a fan is installed, it will	mit is exceeded during c supply voltage has reacl	pperation. The compressoned the reset voltage with	r will restart automatically hin the range in question.		
Battery protection (BD35F / BD50F / BD80F)	To ensure sufficient battery power for proper compressor operation or to avoid permanent damage to the battery because of heavy discharge, the BD electronic unit facilitates also a battery protection. The compressor is stopped and restarted again according to the decided voltage limits measured on the + and - terminals of the electronic unit.					
	Standard battery protecti	on settings				
	12V cut-out	12V cut-in	24V cut-out	24V cut-in		
	V 10.4	V 11.7	V 22.8	V 24.2		
	· · · · · · · · · · · · · · · · · · ·			•		

Other battery protection settings are optional if a connection, which includes a resistor, is established between terminals C and P, please see the wiring diagram page 3.

#### Optional battery protection settings

•						
Resistor (R9)	12V cut-out	12V cut-in	12V max.	24V cut-out	24V cut-in	24V max.
kΩ	V	V	voltage	V	V	voltage
0	9.6	10.9	17.0	21.3	22.7	31.5
1.6	9.7	11.0	17.0	21.5	22.9	31.5
2.4	9.9	11.1	17.0	21.8	23.2	31.5
3.6	10.0	11.3	17.0	22.0	23.4	31.5
4.7	10.1	11.4	17.0	22.3	23.7	31.5
6.2	10.2	11.5	17.0	22.5	23.9	31.5
8.2	10.4	11.7	17.0	22.8	24.2	31.5
11	10.5	11.8	17.0	23.0	24.5	31.5
14	10.6	11.9	17.0	23.3	24.7	31.5
18	10.8	12.0	17.0	23.6	25.0	31.5
24	10.9	12.2	17.0	23.8	25.2	31.5
33	11.0	12.3	17.0	24.1	25.5	31.5
47	11.1	12.4	17.0	24.3	25.7	31.5
82	11.3	12.5	17.0	24.6	26.0	31.5
220	9.6	10.9				31.5

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# BD35F **Direct Current Compressor** R134a 12 - 24V

Data Sheet (Replaces CD.46.A7.02)

					· <b>(</b> - <b>I</b> -		······-,
Code num	nbers						
BD35F wit	hout elect	ronic unit			101Z0200		
Electronic	unit 12-24	V DC - standa	ard	single: 101N	10210, 30 pc:	s: 101N0211	<u>A</u>
Electronic	unit 12-24	V DC - w. met	al shielding	single: 101N			
Electronic	unit 12-24	V DC - with A	EO	single: 101N	10300, 30 pc:	s: 101N0301	B
Applicatio	on			-			l Bi
Application				L	BP/MBP/(HE	3P)	G
Evaporating		ture range	°C		_		
Voltage ran	• •			12 - 2	-30 to 0 (10 24V DC / 31.		
-	-	artment temper	rature °C		55		
	•	bient temp.	43°C		S or F,*		
				*0	1	n application	
Design Displaceme	ont		cm <sup>3</sup>	-	2.00		1
•			cm <sup>3</sup>		150		
Oil quantity Maximum r		charge			300		s
Free gas vo	•	•	g cm <sup>3</sup>		870		0
			-		4.3/0.25		F,
	mpressor	/Electronic unit	t kg		4.3/0.25		
Motor							F <sub>2</sub>
Motor type					/ariable spee 2.3	ed	
Resistance	e, all 3 wir	ndings (25°C)	Ω				
Approvals				E4 72/245 95/			
Dimensio	ns						, T
Height			mm	A	137 135		8.5 8
				B B1	7		
				B2			
Suction co	nnector	locat	ion/I.D. mm		ø16		
Process co			ion/I.D. mm				
Discharge			ion/I.D. mm		6.2 ±0.09 .0 +0.12/+0.	20	
Compresso			pcs.		150	20	+
	-		•				
12V cut-		protection se 12V cut-in		V cut-out [V]		ut - in [V]	50
10.4		11.7	[V] 24	22.8		24.2	-
Optional b	pattery p	protection se	ettings				
Resistor (R2)	12V cut-c	out 12V cut-in	12V max.	24V cut-out	24V cut-in	24V max.	++0
[kΩ]	[V]	[V]	Voltage	[V]	[V]	Voltage	
0	9.6 9.7	10.9	17.0 17.0	21.3 21.5	22.7 22.9	31.5 31.5	
2.4	9.9	11.1	17.0	21.8	23.2	31.5	+
3.6	10.0	11.3	17.0	22.0	23.4	31.5	
4.7	10.1	11.4	17.0	22.3 23.7 31.5			105
6.2	10.2	11.5	17.0 17.0	22.5 23.9 31.5			Ť
8.2 11	10.4	11.7	17.0	22.8 23.0	24.2 24.5	31.5 31.5	
14	10.5	11.9	17.0	23.0 24.5 31.5			↓
18	10.8	12.0	17.0	23.6	25.0	31.5	
24	10.9	12.2	17.0	23.8	25.2	31.5	
33	11.0	12.3	17.0	24.1	25.5	31.5	
47	11.1	12.4	17.0	24.3	25.7	31.5	
82	9.6	12.5	17.0	24.6	26.0	31.5	
///	y n	109					



- (compressor compartment temperature equal to ambient temperature) = Fan cooling 3.0 m/s necessary



XÒ



 $\Box$ 28 123

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10.9

CD.46.A8.02

31.5

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#### Capacity (EN 12900/CECOMAF)

Capacity	(EN 12	2900/C	ECOM/	AF)						watt	
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10	
2,000	15.8	23.9	26.9	33.1	43.8	56.6	71.7	89.9	111	136	
2,500	20.2	29.9	33.5	41.2	54.6	70.7	89.7	112	139		
3,000	22.5	32.4	36.5	45.4	61.8	81.7	105	133			
3,500	26.2	35.9	40.4	50.5	69.8	93.6	122				
Capacity	(ASHF	RAE)								watt	
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10	
2,000	19.5	29.4	33.1	40.7	54.0	69.8	88.6	111	137	169	
2,500	24.9	36.8	41.3	50.7	67.3	87.1	111	139	172		
3,000	27.7	39.9	44.9	55.9	76.1	101	130	164			
3,500	32.2	44.2	49.7	62.2	86.0	115	150				
Power consumption w											
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10	
2,000	17.6	23.4	25.3	28.7	33.6	38.3	43.0	48.0	53.4	59.5	
2,500	23.3	30.9	33.3	37.8	44.1	50.2	56.2	62.3	68.7		
3,000	29.9	36.0	38.3	43.0	50.7	58.7	66.8	74.8			
3,500	36.0	42.8	45.4	50.8	59.5	68.9	78.5				
Current consumption (for 24V applications the following must be halved)											
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10	
2,000	1.5	2.0	2.1	2.4	2.8	3.2	3.6	4.0	4.5	5.0	
2,500	1.9	2.6	2.8	3.2	3.7	4.2	4.7	5.2	5.8		
3,000	2.5	3.0	3.2	3.6	4.2	4.9	5.6	6.2			
3,500	3.0	3.6	3.8	4.3	5.0	5.7	6.5				
COP (EN	12900	/CECO	MAF)							W/W	
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10	
2,000	0.90	1.02	1.06	1.15	1.31	1.48	1.67	1.87	2.08	2.29	
2,500	0.87	0.97	1.01	1.09	1.24	1.41	1.60	1.80	2.02		
3,000	0.75	0.90	0.95	1.06	1.22	1.39	1.58	1.78			
3,500	0.73	0.84	0.89	1.00	1.17	1.36	1.55				
COP (AS	HRAE)									W/W	
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10	
2,000	1.10	1.25	1.31	1.42	1.61	1.82	2.06	2.31	2.57	2.84	
2,500	1.07	1.19	1.24	1.34	1.53	1.74	1.97	2.23	2.50		
3,000	0.93	1.11	1.17	1.30	1.50	1.72	1.95	2.20			
3,500	0.89	1.03	1.09	1.23	1.44	1.68	1.91				
Test condition Condensing Ambient and Liquid tempo Static coolin	temperat d suction erature	gas temp	55	2° 2	ECOMA	= AS 55' 32' 32'	°C				



3,000	0.95	1.11	1.17								
3,500	0.89	1.03	1.09								
Test conditions											
Condensing temperature											
Ambient and	d suction	gas temp									
Liquid temp	erature										
Static cooling, 12V DC											
1 Watt = 0.86 kcal/h											

Compressor speed

Electronic	Resistor	Motor	Contr.circ.	
unit	(R1)	speed	current	
	Ω	rpm	mA	
101110210 101110220	0	2,000	5	
201 20	277	2,500	4	
01, Mor	692	3,000	3	
10	1523	3,500	2	
	0	AEO	6	
200	173	2,000	5	
NO EO	450	2,500	4	
to the solution of the solutio	865	3,000	3	
4	1696	3,500	2	

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

#### Accessories

Devices		BD35F
Standard auto DIN 7258		Not deliverable
2	24V: 7.5A	from Danfoss
Mounting acc	essories	
Bolt joint for or	ne compressor	118-1917
Bolt joint in qu	uantities	118-1918
Snap on in qu	118-1919	
Wire dimens	sions	
<b>O</b> <sup>1</sup>		

S	ize	Max le	ength*	Max length*			
AWG	Cross section	12V op	eration	24V operation			
Gauge	mm <sup>2</sup>	ft.	m	ft.	m		
12	2.5	8	2.5	16	5		
12	4	13	4	26	8		
10	6	19.5	6	39	12		
8	10	32.8	10	65.6	20		
	*Longth	hotwoon	hatton	nd alaatr	onio unit		

Number of	Error type
flashes	
5	Thermal cut-out of electronic unit (If the refrigeration system has been too hea- vily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo- aded, the motor cannot maintain minimum speed at approximately 1,850 rpm).
3	Motor start error (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan loads the electronic unit with more than $1A_{\text{peak}}$ ).
1	Battery protection cut-out (The voltage is outside the cut-out setting).

Danfoss

# **BD35F (Inch Connectors) Direct Current Compressor** R134a, 12 - 24V

Data Sheet (Replaces CD.46.C1.22)

nbers						
	nic unit			101Z0204		
unit 12-24V	DC - standa	ard	single: 101N	10210, 30 pc	s: 101N0211	BD35F <i>Danfoss</i> 101Z
unit 12-24V	DC - w. meta	al shielding	•			Application
		0	-			Rius string R134a
	bo wan A	LO	Single. To The	0000, 00 pc	3. 101110001	Blue stripe
			I F	BP/MBP/ [H	BP1	Barcode on
	re range	°E (°C)			•	Grey background
• •	•	1 ( 0)				
•	•	°E (°C)	12-2		.57 DC	Danfoss <sup>®</sup>
	•	. ,		. ,		
ing at ample	ent temp. Ti	0°F (43°C)	* d		n application	e 4 BD35F 12/24V DC
		in (3)	u			0277 00 THERMALLY
		. ,		. ,		
		. ,		. ,		EC approval mark (SYSTEM) (electronic unit) Approval mark
		oz. (g)		. ,		
ol. in compres	ssor	fl.oz. (cm <sup>3</sup> )		29.6 (870)		S = Static cooling normally sufficient
mpressor/E	lectronic uni	t Ibs. (kg)	9.5	/0.55 (4.3/0	).25)	$\begin{array}{rcl} O &= Oil cooling \\ F_{1} &= Fan cooling 1.5 \text{ m/s} \end{array}$
						(compressor compartment temperature equal to ambient temperature)
			V	ariable spe	ed	$F_2$ = Fan cooling 3.0 m/s necessary
, all 3 windi	ngs (77°F)	Ω		2.3		
(electronic u	unit)		E4 72/245 95/	54 0277 00, ULS	984, CSA-C22.2	0.63"(16)
ns						
		in. (mm)	A	. ,		
				, ,		
				• • •		
				. ,		
		. ,			,	1.10"(28) 4.84"(123)
onnector	location/I.	D. in. (mm)	D 0.252	2-0.259 (6.5	±0.09)	
connector	location/I.	D. in. (mm)	E 0.202-0	0.205 (5.0+0	.12/0.20)	
ors on a pal	let	pcs.		150		
		[V] 24'				
		ttinas	22.0		24.2	
			24V cut-out	24V cut-in	24V max.	
[V]	[V]	Voltage	[V]	[V]	Voltage	
						7.91"(201)
9.7	11.0	17.0	21.5	22.9	31.5	020
10.0	11.3	17.0	22.0	23.4	31.5	8.03"(204)
10.1	11.4	17.0	22.3	23.7	31.5	<u>6.70"(170)</u>
10.5	11.8	17.0	23.0	24.5	31.5	
10.6	11.9	17.0	23.3	24.7	31.5	
10.8	12.0	17.0	23.6 23.8	25.0 25.2	31.5	
11.0	12.2	17.0	23.0	25.2	31.5	
11.0	12.4	17.0	24.3	25.7	31.5	<u>ø0.63"(16)</u> <u>ø0.17"(4.2)</u> <u>ø0.</u>
	nout electro unit 12-24V unit 12-24V nit 12-24V n g temperatu ge / max. v ine compart ing at ambie ent efrigerant c d. in compre- mpressor/E , all 3 windi (electronic unit n nnector connector connector connector rs on a pal pattery pro 12V cut-out [V] 9.6 9.7 9.9 10.0 10.1 10.2 10.4 10.5 10.6 10.8	nout electronic unit           unit 12-24V DC - standa           unit 12-24V DC - w. meta           unit 12-24V DC - with Al           n           g temperature range           ge / max. voltage           ine compartment temp.           ing at ambient temp.           ine compartment temp.           ing at ambient temp.           ine compartment temp.           ing at ambient temp.           ine compressor           mpressor/Electronic uni           inector           ing at protection se           pattery protection se           pattery protection se           int 11.7           attery protection se           pattery 11.1           int 0.1           int 11.2           int 0.1           int 0.1           int 1.3 </td <td>nout electronic unit           unit 12-24V DC - standard           unit 12-24V DC - w. metal shielding           init 12-24V DC - with AEO           n           g temperature range         °F (°C)           ge / max. voltage           ine compartment temp.         °F (°C)           ing at ambient temp.         °F (°C)           ent         cu.in. (cm³)           effigerant charge         oz. (g)           i. in compressor         fl.oz. (cm³)           mpressor/Electronic unit         lbs. (kg)          , all 3 windings (77°F)         Ω           (electronic unit)         15           nnector         location/I.D. in. (mm)           onnector         location settings           12V cut-out         12V cut-in [V]         24'           11.7         ro.           attery protection settings         no.           10.0         11.3</td> <td>nout electronic unit         single: 101N           unit 12-24V DC - standard         single: 101N           unit 12-24V DC - with AEO         single: 101N           nit 12-24V DC - with AEO         single: 101N           n         LE           g temperature range         °F (°C)           ge / max. voltage         12 - 2           ine compartment temp.         °F (°C)           ing at ambient temp.         °F (°C)           ing at ambient temp.         °F (°C)           ent         cu.in. (cm³)           efrigerant charge         oz. (g)           i. in compressor         fl.oz. (cm³)           mpressor/Electronic unit lbs. (kg)         9.5          </td> <td>nout electronic unit         101Z0204           unit 12-24V DC - standard         single: 101N0210, 30 pc           unit 12-24V DC - with AEO         single: 101N0300, 30 pc           n         single: 101N0300, 30 pc           n         LBP/MBP/ [H           g temperature range         °F (°C)         -22 to 32 [50] (-30           ge / max. voltage         12 - 24V DC / 31           ine compartment temp.         °F (°C)         131 (55)           ing at ambient temp. 110°F (43°C)         S or F,*           * depending o         e* (cm³)         0.12 (2.00)           fl.oz. (cm³)         0.12 (2.00)           mpressor         fl.oz. (cm³)         0.12 (2.00)           fl.oz. (cm³)         0.12 (2.00)           mpressor         fl.oz. (cm³)         2.1 (150)           g tengerant charge         oz. (g)         10.5 (300)           ki nompressor         fl.oz. (cm³)         2.9 (670)           g tengerant charge         oz. (g)         2.3 (216)           g tengerant charge         oz. (g)         2.3 (216)</td> <td>nout electronic unit         101Z0204           anit 12-24V DC - standard         single: 101N0210, 30 pcs: 101N0211           anit 12-24V DC - w. metal shielding         single: 101N0220, 30 pcs: 101N0201           anit 12-24V DC - with AEO         single: 101N0300, 30 pcs: 101N0301           n         LBP/MBP/ [HBP]           g temperature range         °F (°C)           ing at ambient temp.         °F (°C)           figerant charge         oz. (g)           g terigerant charge         oz. (g)           g terigerant charge         oz. (g)           in compressor         fl.oz. (cm³)           g terigerant charge         oz. (g)           g all 3 windings (77°F)         Q           g terigerant charge         oz. (g)           in. (mm)         A           S         S           in. (mm)         A           S         S.32 (135)           B1         5.04 (128)           B2         2.87 (73)           neeto</td>	nout electronic unit           unit 12-24V DC - standard           unit 12-24V DC - w. metal shielding           init 12-24V DC - with AEO           n           g temperature range         °F (°C)           ge / max. voltage           ine compartment temp.         °F (°C)           ing at ambient temp.         °F (°C)           ent         cu.in. (cm³)           effigerant charge         oz. (g)           i. in compressor         fl.oz. (cm³)           mpressor/Electronic unit         lbs. (kg)          , all 3 windings (77°F)         Ω           (electronic unit)         15           nnector         location/I.D. in. (mm)           onnector         location settings           12V cut-out         12V cut-in [V]         24'           11.7         ro.           attery protection settings         no.           10.0         11.3	nout electronic unit         single: 101N           unit 12-24V DC - standard         single: 101N           unit 12-24V DC - with AEO         single: 101N           nit 12-24V DC - with AEO         single: 101N           n         LE           g temperature range         °F (°C)           ge / max. voltage         12 - 2           ine compartment temp.         °F (°C)           ing at ambient temp.         °F (°C)           ing at ambient temp.         °F (°C)           ent         cu.in. (cm³)           efrigerant charge         oz. (g)           i. in compressor         fl.oz. (cm³)           mpressor/Electronic unit lbs. (kg)         9.5	nout electronic unit         101Z0204           unit 12-24V DC - standard         single: 101N0210, 30 pc           unit 12-24V DC - with AEO         single: 101N0300, 30 pc           n         single: 101N0300, 30 pc           n         LBP/MBP/ [H           g temperature range         °F (°C)         -22 to 32 [50] (-30           ge / max. voltage         12 - 24V DC / 31           ine compartment temp.         °F (°C)         131 (55)           ing at ambient temp. 110°F (43°C)         S or F,*           * depending o         e* (cm³)         0.12 (2.00)           fl.oz. (cm³)         0.12 (2.00)           mpressor         fl.oz. (cm³)         0.12 (2.00)           fl.oz. (cm³)         0.12 (2.00)           mpressor         fl.oz. (cm³)         2.1 (150)           g tengerant charge         oz. (g)         10.5 (300)           ki nompressor         fl.oz. (cm³)         2.9 (670)           g tengerant charge         oz. (g)         2.3 (216)           g tengerant charge         oz. (g)         2.3 (216)	nout electronic unit         101Z0204           anit 12-24V DC - standard         single: 101N0210, 30 pcs: 101N0211           anit 12-24V DC - w. metal shielding         single: 101N0220, 30 pcs: 101N0201           anit 12-24V DC - with AEO         single: 101N0300, 30 pcs: 101N0301           n         LBP/MBP/ [HBP]           g temperature range         °F (°C)           ing at ambient temp.         °F (°C)           figerant charge         oz. (g)           g terigerant charge         oz. (g)           g terigerant charge         oz. (g)           in compressor         fl.oz. (cm³)           g terigerant charge         oz. (g)           g all 3 windings (77°F)         Q           g terigerant charge         oz. (g)           in. (mm)         A           S         S           in. (mm)         A           S         S.32 (135)           B1         5.04 (128)           B2         2.87 (73)           neeto

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CD.46.C2.22

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#### Capacity (ASHRAE) 0 00 Т

rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50
2,000	74	101	113	159	214	280	361	458	514	575
2,500	95	127	142	199	268	351	452	573	643	
3,000	104	138	155	222	307	410	535	681		
3,500	119	153	171	248	349	473	619			
Capacity (EN 12900/CECOMAF) watt										
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50
2,000	17.5	23.9	26.8	37.6	50.6	66.4	85.5	109	122	136
2,500	22.2	29.9	33.4	46.9	63.2	83.0	107	136	152	
3,000	24.5	32.4	36.4	52.3	72.4	97.0	126	161		
3,500	27.9	35.9	40.3	58.5	82.5	112	147			

#### Power consumption

Power consumption											
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50	
2,000	19.1	23.5	25.3	30.8	36.1	41.3	46.6	52.5	55.7	59.1	
2,500	25.2	31.0	33.3	40.7	47.4	54.0	60.7	67.7	71.5		
3,000	31.0	35.8	38.0	45.9	54.5	63.4	72.2	80.6			
3,500	37.5	42.9	45.4	54.5	64.4	74.9	85.7				

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

Current consumption (for 24V applications the following must be halved)										
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50
2,000	1.59	1.96	2.10	2.57	3.01	3.44	3.89	4.37	4.64	4.93
2,500	2.10	2.58	2.77	3.38	3.95	4.49	5.05	5.63	5.95	
3,000	2.61	3.01	3.19	3.86	4.58	5.32	6.06	6.76		
3,500	3.14	3.58	3.79	4.55	5.38	6.25	7.15			
EER (ASHRAE) Btu/										Btu/Wh

#### EER (ASHRAE)

EER (ASTINAE) Blu/V											
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50	
2,000	3.87	4.29	4.48	5.16	5.93	6.80	7.74	8.73	9.23	9.73	
2,500	3.75	4.09	4.26	4.89	5.64	6.50	7.45	8.47	8.99		
3,000	3.36	3.86	4.07	4.83	5.63	6.48	7.41	8.44			
3,500	3.16	3.56	3.77	4.56	5.42	6.31	7.23				

#### COP (EN 12900/CECOMAF)

rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50
2,000	0.92	1.02	1.06	1.22	1.40	1.60	1.82	2.06	2.17	2.29
2,500	0.89	0.97	1.01	1.15	1.33	1.53	1.76	2.00	2.12	
3,000	0.79	0.90	0.96	1.13	1.32	1.52	1.74	1.98		
3,500	0.75	0.84	0.89	1.07	1.28	1.49	1.70			

#### **Compressor speed**

Electronic	Resistor	Motor	Contr.circ.
unit	(R1)	speed	current
	Ω	rpm	mA
10110220 101010220	0	2,000	5
202 20	277	2,500	4
1011 NOV	692	3,000	3
10	1523	3,500	2
	0	AEO	6
<i></i>	173	2,000	5
NONEO	450	2,500	4
10110300 10110104E0	865	3,000	3
4	1696	3,500	2

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

#### Wire dimensions

Size AWG Cross section			Max length* 24V operation		
mm²	ft.	m	ft.	m	
2.5	8	2.5	16	5	
4	13	4	26	8	
6	19.5	6	39	12	
10	32.8	10	65.6	20	
	Cross section mm <sup>2</sup> 2.5 4 6	Cross section         12V op           mm <sup>2</sup> ft.           2.5         8           4         13           6         19.5	IzV operation           section           mm²           2.5         8           4         13           6         19.5	Cross section mm²         12V operation ft.         24V op m²           2.5         8         2.5         16           4         13         4         26           6         19.5         6         39	

#### Accessories

Devices	BD35F
Standard automobile fuse	Not
DIN 7258 12V: 15A	deliverable
24V: 7.5A	from Danfoss
Mounting accessories	
Bolt joint for one compressor	118-1917
Bolt joint in quantities	118-1918
Snap on in quantities	118-1919



#### Test conditions ASHRAE EN 12900 Condensing temperature 130°F (54,4°C) Ambient & suction gas temp. 90°F (32°C) 55°C (131°F) 32°C (90°F) W/W Static cooling, 12V DC 50 1 Watt = 3.41 Btu/h = 0.86 kcal/h 90°F (32°C) 55°C (131°F)

Btu/h

Number of flashes	Error type
5	Thermal cut-out of electronic unit (If the refrigeration system has been too hea- vily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo- aded, the motor cannot maintain minimum speed at approximately 1,850 rpm).
3	Motor start error (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan loads the electronic unit with more than $1A_{\text{peak}}$ ).
1	Battery protection cut-out (The voltage is outside the cut-out setting).

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# BD50F Direct Current Compressor R134a 12 - 24V

Data Sheet (Replaces CD.46.B5.02)

					、 I		
Code num	nbers						
BD50F wit	hout electro	nic unit		101Z1220			
Electronic	unit 12-24V	DC - standa	ard	single: 101N	10210, 30 pc	s: 101N0211	
Electronic	unit 12-24V	DC - w. met	al shielding	single: 101N0220, 30 pcs: 101N0221			
Electronic	unit 12-24V	DC - with A	single: 101N	10300, 30 pc:	s: 101N0301		
Applicatio	n				· •		
Application					BP/MBP/(HE	3P)	
••	g temperatu	ire range	°C		-30 to 0 (10	· ·	
	nge / max. v			12 - 2	24V DC / 31.	,	
-	-	tment tempe	erature °C	12 2	55		
	ling at ambi						
	ning at ambi	ent temp.	43°C		S or F <sub>1</sub> *		
Design				* c		n application	
Displacem	ent		cm <sup>3</sup>		2.50		
Oil quantity	y		cm <sup>3</sup>		150		
Maximum	refrigerant o	charge	g		300		
Free gas vo	ol. in compre	ssor	cm <sup>3</sup>		870		
Weight: Co	ompressor/E	Electronic un	it kg		4.3/0.25		
Motor							
Motor type	)			Variable speed			
Resistance	e, all 3 windi	ings (25°C)	Ω	2.0			
Approvals	(electronic	unit)		E4 72/245 95/	/54 0277 00, UL9	84, CSA-C22.2	
Dimensio	ns						
Height			mm	A	137		L LL
				В	135		β
				B1	128		
				B2	73		
Suction co	nnector	locat	ion/I.D. mm				<u>ø16</u>
Process c	onnector	locat	ion/I.D. mm				
Discharge	connector	locat	ion/I.D. mm	E 5	.0 +0.12/+0.	20	
Compresso	ors on a pal	llet	pcs.		150		
Standard	battery pr	otection se	ettings (no	connectio	on C - P)		
12V cut-		12V cut-in	[V] 24	V cut-out [V		ut - in [V]	120
10. Ontional k		11.7	Hingo	22.8	2	24.2	
•		tection set		0414	041/	041/	<u>↓</u> ‡
Resistor (R2) [kΩ]	12V cut-ou [V]	t 12V cut-in [V]	Voltage	24V cut-out [V]	[V]	24V max. Voltage	
0	9.6	10.9	17.0	21.3	22.7	31.5	
1.6	9.7 9.9	11.0	17.0	21.5 21.8	22.9 23.2	31.5	
2.4 3.6	10.0	11.3	17.0 17.0	21.8	23.2	31.5 31.5	_ Î
4.7	10.1	11.4	17.0	22.3	23.7	31.5	105
6.2 8.2	10.2	11.5 11.7	17.0 17.0	22.5 22.8	23.9 24.2	31.5 31.5	Ŧ
11	10.4	11.7	17.0	22.8	24.2	31.5	
14	10.6	11.9	17.0	23.3	24.7	31.5	<u>+</u>
18 24	10.8 10.9	12.0 12.2	17.0 17.0	23.6 23.8	25.0 25.2	31.5 31.5	
33	11.0	12.2	17.0	24.1	25.5	31.5	
47	11.1	12.4	17.0	24.3	25.7	31.5	
82	11 3	105	170	1 2/6	26.0	215	

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82

220

11.3

9.6

12.5

10.9

CD.46.B6.02

26.0





123



17.0

24.6

31.5

31.5

Danfoss

#### Capacity (EN 12900/CECOMAF)

Capacity	(EN 12	2900/C	ECOMA	۹F)						watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	20.1	31.0	34.9	42.8	56.3	72.2	91.6	115	144*	178*
2,500	27.0	39.0	43.4	52.7	68.9	88.9	113	144*	181*	
3,000	31.0	45.4	50.6	61.5	80.7	104	134*	171*		
3,500	38.1	53.2	59.1	71.9	95.0	124*	159*			
Capacity	(ASHF	RAE)								watt
rpm∖°C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	24.7	38.3	43.1	52.9	69.5	89.3	113	143	178*	221*
2,500	33.3	48.1	53.6	65.0	85.1	110	140	178*	224*	
3,000	38.2	56.0	62.5	75.9	100	129	166*	212*		
3,500	47.0	65.7	72.9	88.7	117	153*	196*			
Power co	onsum	otion								watt
rpm∖°C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	25.1	31.8	34.0	38.2	44.7	51.3	58.3	65.8	74.2*	83.5*
2,500	34.1	40.5	42.9	47.8	55.8	64.7	74.3	84.8*	96.1*	
3,000	39.9	49.2	52.2	57.8	66.5	76.4	88.4*	104*		
3,500	50.2	59.3	62.5	69.0	80.2	93.4*	109*			
Current o	consun	nption	(for 24V	applicati	ons the f	ollowing	must be	halved)		A
rpm∖°C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	2.2	2.6	2.8	3.1	3.8	4.4	5.1	5.8	6.4*	6.9*
2,500	2.9	3.4	3.6	4.0	4.7	5.4	6.2	7.0*	7.8*	
3,000	3.5	4.2	4.4	4.9	5.6	6.5	7.4*	8.5*		
3,500	4.2	4.9	5.2	5.8	6.7	7.8*	9.0*			
COP (EN	12900	/CECO	MAF)							W/W
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	0.80	0.98	1.03	1.12	1.26	1.41	1.57	1.75	1.94*	2.13*
2,500	0.79	0.96	1.01	1.10	1.24	1.37	1.53	1.70*	1.88*	
3,000	0.78	0.92	0.97	1.06	1.21	1.37	1.51*	1.65*		
3,500	0.76	0.90	0.95	1.04	1.19	1.32*	1.45*			
COP (AS	HRAE)									W/W
rpm∖°C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	0.99	1.21	1.27	1.38	1.56	1.74	1.94	2.16	2.40*	2.65*
2,500	0.98	1.19	1.25	1.36	1.53	1.70	1.89	2.10*	2.33*	
3,000	0.96	1.14	1.20	1.31	1.50	1.69	1.87*	2.04*		
3,500	0.94	1.11	1.17	1.28	1.46	1.64*	1.80*			



3,500	0.94	1.11	1.17	1
Test conditio	EN	112		
Condensing	55	55°C		
Ambient and	32°C			
Liquid temp	55	°C		
Static coolin				

Static conjung, 12V DC \* Fan cooling, of electronic unit compulsory 1 Watt = 0.86 kcal/h

#### **Compressor speed**

Electronic unit	Resistor (R1)	Motor speed	Contr.circ. current
	Ω	rpm	mA
10	0	2,000	5
202 20	277	2,500	4
101 NOV	692	3,000	3
1011021020 101010220	1523	3,500	2
	Ο	AEO	6
200	173	2,000	5
Nº HO	450	2,500	4
to the second	865	3,000	3
~	1696	3,500	2

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

ASHRAE 55°C 32°C 32°C

#### Accessories

Devices	BD50F
Standard automobile fuse DIN 7258 12V: 15A 24V: 7.5A	Not deliverable from Danfoss
Mounting accessories Bolt joint for one compressor Bolt joint in quantities Snap on in quantities	118-1917 118-1918 118-1919

#### Wire dimensions

Size		Max le		Max length*		
AWG	Cross section	12V op	eration	24V op	eration	
Gauge	mm²	ft.	m	ft.	m	
12	2.5	8	2.5	16	5	
12	4	13	4	26	8	
10	6	19.5	6	39	12	
8	10	32.8	10	65.6	20	
	*l enath	hetween	hatterv a	nd electr	onic unit	

Number of	Error type
flashes	
5	Thermal cut-out of electronic unit (If the refrigeration system has been too hea- vily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo- aded, the motor cannot maintain minimum speed at approximately 1,850 rpm).
3	Motor start error (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan loads the electronic unit with more than $1A_{peak}$ ).
1	Battery protection cut-out (The voltage is outside the cut-out setting).

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# **BD50F (Inch Connectors) Direct Current Compressor** R134a, 12 - 24V

Data Sheet (Replaces CD.46.D1.22)

Code numbe					1017000-					
BD50F without					101Z0203		BD50F Danfoss 101Z			
Electronic uni	nit 12-24V	DC - standa	ard	single: 101N	0210, 30 pcs	s: 101N0211	Application Application			
Electronic uni	it 12-24V	DC - w. meta	al shielding	single: 101N	0220, 30 pcs	s: 101N0221				
Electronic uni	nit 12-24V	DC - with A	EO	single: 101N	0300, 30 pc:	s: 101N0301	Blue stripe			
Application							CE © N 1297 0203			
Application				LE	BP/MBP/ [He	3P]	Barcode on white background			
Evaporating t	temperatu	re range	°F (°C)	-22 to 3	2 [50] (-30 t	to 0 [10])	Grey background			
Voltage range	e / max. vo	oltage		12 - 2	4V DC / 31.	5V DC	Danfoss			
Max. machine	e compart	ment temp.	°F (°C)		131 (55)		<u> </u>			
Comp. cooling	ng at ambie	ent temp. 11	0°F (43°C)		S or F,*		e 4 BD50F			
Design	•		. ,	* d	epending or	n application	12/24V DC			
Displacement	nt		cu.in. (cm <sup>3</sup> )		0.15 (2.50)					
Oil quantity			fl.oz. (cm <sup>3</sup> )		5.1 (150)		EC approval mark			
Maximum ref	frigerant o	harge	oz. (g)		10.5 (300)		(electronic unit) Approval marl			
Free gas vol. i			fl.oz. (cm <sup>3</sup> )		29.6 (870)					
			. ,	0.5	, ,	25)	S = Static cooling normally sufficient O = Oil cooling			
Weight: Com	ipressor/E	iectronic uni	il IDS. (KG)	9.5	/0.55 (4.3/0	.20)	$F_1 = Fan \text{ cooling 1.5 m/s}$			
Motor							(compressor compartment temperature) equal to ambient temperature)			
Motor type				V	ariable spee	ea	$F_2$ = Fan cooling 3.0 m/s necessary			
Resistance, a		• • •	Ω		2.0		0.60*(40)			
Approvals (el	electronic u	unit)		E4 72/245 95/5	54 0277 00, UL9	84, CSA-C22.2	0.63"(16)			
Dimensions	3					,				
Height			in. (mm)	А	5.39 (137)					
				B	5.32 (135)					
				B1	5.04 (128)		4.13			
				B2	2.87 (73)					
Suction conn	nector	location/I.	D. in. (mm)	C 0.252	-0.259 (6.5	±0.09)	1.10" (28)			
Process con	nector	location/I.	D. in. (mm)	D 0.252	-0.259 (6.5	±0.09)	<b>4.84</b> <sup>"</sup> (123) →			
Discharge co	onnector	location/I.	D. in. (mm)	E 0.202-0	.205 (5.0+0.	12/0.20)				
Compressors	s on a pall	let	pcs.		150		5.00"(127)			
Standard ba	attery pro	otection se	ettings (no	connectio	on C - P)					
12V cut-out	ıt [V]	12V cut-in	[V] 24'	V cut-out [V]		ut - in [V]				
10.4		11.7		22.8	2	24.2				
Optional bat					0.01/	0.01				
Resistor (R2) 12 [kΩ]	2V cut-out [V]	12V cut-in [V]	Voltage	24V cut-out [V]	24V cut-in [V]	24V max. Voltage				
0	9.6	10.9	17.0	21.3	22.7	31.5	7.91"(201)			
1.6	9.7	11.0	17.0	21.5	22.9	31.5	°, 7.91"(201) →			
2.4 3.6	9.9	11.1	17.0	21.8	23.2 23.4	31.5	8.03"(204)			
4.7	<u>10.0</u> 10.1	<u>11.3</u> 11.4	17.0 17.0	22.0 22.3	23.4 23.7	31.5 31.5	6.70"(170)			
6.2	10.2	11.5	17.0	22.5	23.9	31.5				
8.2	10.4	11.7	17.0	22.8	24.2	31.5				
11	10.5	11.8	17.0	23.0	24.5	31.5	3.00 <sup>°</sup> (78.5)			
	10.6	11.9 12.0	17.0 17.0	23.3 23.6	24.7 25.0	31.5 31.5				
14	10 ×	1 12.0		23.8	25.0	31.5				
14 18	10.8 10.9	12.2	17.0							
14	10.8 10.9 11.0	12.2 12.3	17.0 17.0	24.1	25.5	31.5	VUUU			
14 18 24	10.9				25.5 25.7 26.0	31.5 31.5 31.5	<u>Ø0.63"(16)</u> Ø0.17"(4.2)			

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CD.46.D2.22

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#### Capacity (ASHRAE)

rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50	
2,000	95	126	142	201	273	359	458	570	632*	697*	
2,500	119	157	176	247	335	442	570	723*	809*		
3,000	142	189	211	296	401	529	682*	863*			
3,500	167	220	245	342	464	612*	790*				
Capacity (EN 12900/CECOMAF) watt											
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50	
rpm \ °F 2,000	-20 22.6	-13 30.0	-10 33.6	0 47.7	10 64.9	20 85.2	30 109	40 135	45 150*	50 165*	
	-			-		-		-	-		
2,000	22.6	30.0	33.6	47.7	64.9	85.2	109	135	150*		
2,000 2,500	22.6 28.2	30.0 37.3	33.6 41.7	47.7 58.5	64.9 79.3	85.2 105	109 135	135 171*	150*		

#### **Power consumption**

Power co	onsum	otion								watt	
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50	
2,000	27.4	32.5	34.6	41.7	49.0	56.8	65.4	75.1	80.4*	86.2*	
2,500	34.3	41.4	44.3	54.0	63.4	73.0	82.8	93.1*	98.6*		
3,000	41.4	50.1	53.7	65.2	76.2	87.4	98.9*	111*			
3,500	49.6	58.8	62.6	75.5	88.7	103*	119*				
Current	Current consumption (for 24V applications the following must be halved)										

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

			• • •					,		
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50
2,000	2.28	2.69	2.87	3.50	4.18	4.90	5.65	6.45	6.87*	7.29*
2,500	2.86	3.41	3.65	4.45	5.26	6.10	6.94	7.81*	8.25*	
3,000	3.52	4.16	4.43	5.37	6.33	7.31	8.32*	9.34*		
3,500	4.20	4.88	5.18	6.24	7.39	8.61*	9.91*			

### FER (ASHRAE)

EER (AS	EER (ASHRAE) Bto											
rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50		
2,000	3.49	3.89	4.09	4.81	5.57	6.31	7.00	7.60	7.85*	8.09*		
2,500	3.47	3.81	3.97	4.58	5.28	6.05	6.88	7.76*	8.21*			
3,000	3.43	3.77	3.93	4.55	5.26	6.05	6.89*	7.76*				
3,500	3.37	3.74	3.91	4.54	5.23	5.94*	6.66*					
COP (EN	COP (EN 12900/CECOMAF)											

#### COP (EN 12900/CECOMAF)

rpm \ °F	-20	-13	-10	0	10	20	30	40	45	50
2,000	0.82	0.92	0.96	1.13	1.31	1.48	1.64	1.78	1.84*	1.90*
2,500	0.82	0.90	0.94	1.08	1.24	1.42	1.62	1.82*	1.93*	
3,000	0.81	0.89	0.93	1.07	1.24	1.42	1.62*	1.82*		
3,500	0.80	0.88	0.92	1.07	1.23	1.40*	1.56*			

#### **Compressor speed**

Electronic	Resistor (R1)	Motor speed	Contr.circ. current
Cint	Ω	rpm	mA
	32		
~~~	0	2,000	5
302.20	277	2,500	4
1011 NOV	692	3,000	3
101102100 10110020	1523	3,500	2
	0	AEO	6
200	173	2,000	5
NO FO	450	2,500	4
totho300	865	3,000	3
4	1696	3,500	2

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

#### Wire dimensions

Size AWG Cross section			ength* eration	Max length* 24V operation		
Gauge	mm <sup>2</sup>	ft.	m	ft.	m	
12	2.5	8	2.5	16	5	
12	4	13	4	26	8	
10	6	19.5	6	39	12	
8	10	32.8 10		65.6 20		
	*Length	between	battery a	nd electr	onic uni	

#### Accessories

Devices	BD50F
Standard automobile fuse	Not
DIN 7258 12V: 15A	deliverable
24V: 7.5A	from Danfoss
Mounting accessories	
Bolt joint for one compressor	
Bolt joint in quantities	118-1918
Snap on in quantities	118-1919



Btu/h

	Test conditions	ASHRAE	EN 12900
-	Condensing temperature	130°F (54,4°C)	55°C (131°F)
	Ambient & suction gas temp.	90°F (32°C)	32°C (90°F)
	Liquid temperature	90°F (32°C)	55°C (131°F)
N	Static cooling, 12V DC		

\* Fan cooling of electronic unit compulsory 1 Watt = 3.41 Btu/h = 0.86 kcal/h

Number of flashes	Error type
5	Thermal cut-out of electronic unit (If the refrigeration system has been too hea- vily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo- aded, the motor cannot maintain minimum speed at approximately 1,850 rpm).
3	Motor start error (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan loads the electronic unit with more than $1A_{peak}$ ).
1	Battery protection cut-out (The voltage is outside the cut-out setting).

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## BD80F **Direct Current Compressor** R134a 12 - 24V

Data Sheet (Replaces (CD.46.F1.02)

Code number	rs									
BD80F without	-	nic unit			101Z0280	]		BD80F	Danfoss	101Z
Electronic unit			urd	single: 101N	10280, 28 pc	s: 101N0281	Application		<i>O</i>	1012
				3	,				_	
Application					LBP		Blue stripe	×R134a	N 1297	0000
Application							Barcode or			0280
Evaporating te	•		°C		-30 to -5		white back	ground		
Voltage range /		•			24V DC / 31.	.5V DC	<u></u>		Ĺ	0.4
Max. machine					43					<b>e</b> 4
Comp. cooling	at ambie	ent temp.	43°C		S or F <sub>1</sub> *				C C	277 00
Design				* c	depending or	n application			EC	approval mai
Displacement			cm <sup>3</sup>	5	3.00		S	= Static cooling	normally suffi	cient
Oil quantity			cm³	5	150		0	= Oil cooling	-	
Maximum refrig	gerant c	harge	g		300		F <sub>1</sub>	<ul> <li>Fan cooling 1.3 (compressor c)</li> </ul>	ompartment t	
Free gas vol. in	compre	ssor	cm <sup>a</sup>	5	870		Fa	equal to ambie = Fan cooling 3.0		
Weight: Comp	ressor/E	lectronic uni	t kg	1	4.3/0.3		2			ui y
Motor										
Motor type				\	/ariable spe	ed				
Resistance, all	3 windi	ngs (25°C)	Ω		2.0			2	204	
Approvals (ele	ctronic ı	unit)		E4 72	/245 95/54 0	0277 00	-	<del>ا</del> ا	70	<b>&gt;</b>
Dimensions										
Height			mm	A	137		тщ		$\rightarrow$	$\bigcirc$
				В	135			য় ি ত	0	Å.
				B1	128		8		$\odot$	i JU
				B2	73				$\langle \rangle$	OA/
Suction connect	ctor	locati	ion/I.D. mm	С	6.2 ±0.09		ø16			
Process conne	ector	locat	ion/I.D. mm	D	6.2 ±0.09		<u> </u>	) <u>∕ø4.2</u>		
Discharge con	nector	locat	ion/I.D. mm	E 5	.0 +0.12/+0.	20	$\bigcirc$	´ \ <b> </b>	127	┥/ / ̄
Compressors of	on a pal	let	pcs.		150				$\overline{\bigcirc}$	& /
Standard batt	tery pro	otection se	ettings (no	connectio	on C - P)					
12V cut-out [		12V cut-in [		V cut-out [V	] 24V c	ut - in [V]	<mark>곱</mark> 34		/	Ø ↑ B
10.4		11.7		22.8		24.2		Θ	e	B2
Optional batt								<u> </u>		
Resistor (R2) 12V						24V max.	↓ <u>‡₽</u>	20	<u> </u>	<u> </u>
[kΩ] 0	[V] 9.6	[V] 10.9	Voltage 17.0	[V] 21.3	[V] 22.7	Voltage 31.5	<b>-</b>	20	0	→  
1.6	9.7	11.0	17.0	21.5	22.9	31.5			I.	16
2.4	9.9	11.1 11.3	17.0 17.0	21.8	23.2	31.5	1 24			
	10.0 10.1	11.3	17.0	22.0 22.3	23.4 23.7	31.5 31.5				K
	10.2	11.5	17.0	22.5	23.9	31.5	108			-15 +
	10.4 10.5	11.7 11.8	17.0 17.0	22.8 23.0	24.2 24.5	31.5 31.5				64 8
14	10.6	11.9	17.0	23.3	24.7	31.5		$\Psi $		@+ ``
	10.8	12.0	17.0	23.6	25.0	31.5	. 34	4.		©
	<u>10.9</u> 11.0	12.2 12.3	17.0 17.0	23.8 24.1	25.2 25.5	31.5 31.5	<b>↓</b>	131	→	
	11.1	12.3	17.0	24.1	25.5	31.5				
82	11.3	12.5	17.0	24.6	26.0	31.5				
220	9.6	10.9				31.5				

May 2004

CD.46.F2.02



#### Capacity (EN 12900/CECOMAF)

Capacity (			<b>.</b> .,				wall
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5
2,500	35.3	49.5	55.0	66.6	87.1	112	140
3,100	41.8	59.0	65.6	79.6	104	133	168
3,800	49.6	70.5	78.5	95.3	125	159	200
4,400	54.8	78.0	86.7	105	138	176	221
Capacity (	ASHRAE)	)					watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5
2,500	43.5	61.1	67.8	82.2	108	138	174
3,100	51.5	72.8	80.9	98.2	129	165	207
3,800	61.1	87.0	96.8	118	154	197	248
4,400	67.6	96.1	107	130	170	218	274
Power con	sumptior	า					watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5
2,500	40.0	50.0	53.4	60.3	71.3	83.1	96
3,100	48.7	61.2	65.4	73.8	87.0	101	118
3,800	59.5	75.0	80.2	90.3	106	124	145
4,400	69.0	87.0	93.0	105	123	144	168
Current co	onsumptio	<b>ON</b> (for 24V	application	s the follow	ing must be	halved)	Α
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5
2,500	3.3	4.2	4.5	5.0	5.9	6.9	8.0
3,100	4.1	5.1	5.5	6.1	7.2	8.5	9.8
3,800	5.0	6.3	6.7	7.5	8.9	10.3	12.1
4,400	5.8	7.2	7.7	8.7	10.3	12.0	14.0
COP (EN 1	2900/CEC	COMAF)					W/W
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5
2,500	0.88	0.99	1.03	1.10	1.22	1.34	1.46
3,100	0.86	0.96	1.00	1.08	1.20	1.31	1.42
3,800	0.83	0.94	0.98	1.06	1.17	1.28	1.39
4,400	0.79	0.90	0.93	1.01	1.12	1.22	1.32
COP (ASH	RAE)						W/W
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5
2,500	1.09	1.22	1.27	1.36	1.51	1.66	1.81
3,100	1.06	1.19	1.24	1.33	1.48	1.62	1.76
3,800	1.03	1.16	1.21	1.30	1.45	1.59	1.71
4,400	0.98	1.11	1.15	1.24	1.38	1.51	1.63
Test conditions Condensing te Ambient and s Liquid tempera Static cooling	emperature suction gas te ature	55 emp. 32	N 12900/CE0 °C °C °C	COMAF	ASHRAE 55°C 32°C 32°C		



Condensing temperature 55° Ambient and suction gas temp. 32° Liquid temperature 55° Static cooling, 12V DC Fan cooling of electronic unit integrated 1 Watt = 0.86 kcal/h

#### **Compressor speed**

Electronic unit	Resistor (R1) Ω	Motor speed rpm	Contr.circ. current mA
10110280 101 <sub>1011</sub> 10	0 203 451 867 1700	AEO 2,500 3,100 3,800 4,400	6 5 4 3 2

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

#### Wire dimensions

Cross	Max length*	Max length*	
section	m	m	
mm <sup>2</sup>	12V operation	24V operation	
6	2.5	5	

watt

\*Length between battery and electronic unit

#### Accessories

Devices	BD80F
Standard automobile fuse	Not
DIN 7258 12V: 30A	deliverable
24V: 15A	from Danfoss
Mounting accessories	
Bolt joint for one compressor	
Bolt joint in quantities	118-1918
Snap on in quantities	118-1919

Number of	Error type
flashes	
5	Thermal cut-out of electronic unit (If the refrigeration system has been too hea- vily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo- aded, the motor cannot maintain minimum speed at approximately 2,450 rpm).
3	Motor start error (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan loads the electronic unit with more than $1A_{peak}$ ).
1	Battery protection cut-out (The voltage is outside the cut-out setting).

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## BD35F Direct Current Compressor for Solar Applications R134a 10 - 45V

	Data Sheet	
Code numbers		
BD35F without electronic unit	101Z0210	BD35F Danford 101Z
Electronic unit 10-45V DC	single: 101N0400, 30 pcs: 101N0401	Application
		Blue stripe
		CE © N 1297 0210
Application		Barcode on white background
Application	LBP/MBP/(HBP)	Grey background
Evaporating temperature range °C	-30 to 0 (10)	e 4
Voltage range / max. voltage	10 - 45V DC	0277 00
Fan output	same as input voltage	EC approval m
Max. machine compartment temperature °C	55	
Comp. cooling at ambient temp. 43°C	S or F <sub>1</sub> *	S = Static cooling normally sufficient O = Oil cooling
	* depending on application	$F_1 = Fan \text{ cooling 1.5 m/s}$
Design		(compressor compartment temperature)
Displacement cm <sup>3</sup>	2.00	$F_2$ = Fan cooling 3.0 m/s necessary
Oil quantity cm <sup>3</sup>		
Maximum refrigerant chargegFree gas vol. in compressorcm³		
Weight: Compressor/Electronic unit kg		204
	4.3/0.23	170
Motor		
Motor type	Variable speed	
Resistance, all 3 windings (25°C) Ω	2.3	
Approvals (electronic unit)	E4 72/245 95/54 0277 00	
	]	<u>ø16</u> ø4.2
Dimensions	A 107	
Height mm	A 137 B 135	
5		
J.	B1 128	
·		
Suction connector location/I.D. mm	B1 128 B2 73	
	B1 128 B2 73 C 6.2 ±0.09	
Suction connector location/I.D. mm	B1         128           B2         73           C         6.2 ±0.09           D         6.2 ±0.09	



CD.46.E1.02

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### Capacity (EN 12900/CECOMAE)

Capacity	(EN 12	2900/C	ECOMA	۹F)						watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	15.8	23.9	26.9	33.1	43.8	56.6	71.7	89.9	111	136
2,500	20.2	29.9	33.5	41.2	54.6	70.7	89.7	112	139	
3,000	22.5	32.4	36.5	45.4	61.8	81.7	105	133		
3,500	26.2	35.9	40.4	50.5	69.8	93.6	122			
Capacity	(ASHF	RAE)								watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	19.5	29.4	33.1	40.7	54.0	69.8	88.6	111	137	169
2,500	24.9	36.8	41.3	50.7	67.3	87.1	111	139	172	
3,000	27.7	39.9	44.9	55.9	76.1	101	130	164		
3,500	32.2	44.2	49.7	62.2	86.0	115	150			
Power co	onsum	otion								watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	17.6	23.4	25.3	28.7	33.6	38.3	43.0	48.0	53.4	59.5
2,500	23.3	30.9	33.3	37.8	44.1	50.2	56.2	62.3	68.7	
3,000	29.9	36.0	38.3	43.0	50.7	58.7	66.8	74.8		
3,500	36.0	42.8	45.4	50.8	59.5	68.9	78.5			
Current	consur	nption	(for 24V a	applicatio	ons the fo	llowing r	nust be h	alved)		Α
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	1.5	2.0	2.1	2.4	2.8	3.2	3.6	4.0	4.5	5.0
2,500	1.9	2.6	2.8	3.2	3.7	4.2	4.7	5.2	5.8	
3,000	2.5	3.0	3.2	3.6	4.2	4.9	5.6	6.2		
3,500	3.0	3.6	3.8	4.3	5.0	5.7	6.5			
COP (EN	12900	/CECO	MAF)							W/W
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	0.90	1.02	1.06	1.15	1.31	1.48	1.67	1.87	2.08	2.29
2,500	0.87	0.97	1.01	1.09	1.24	1.41	1.60	1.80	2.02	
3,000	0.75	0.90	0.95	1.06	1.22	1.39	1.58	1.78		
3,500	0.73	0.84	0.89	1.00	1.17	1.36	1.55			
COP (AS	HRAE)	)								W/W
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	1.10	1.25	1.31	1.42	1.61	1.82	2.06	2.31	2.57	2.84
2,500	1.07	1.19	1.24	1.34	1.53	1.74	1.97	2.23	2.50	
3,000	0.93	1.11	1.17	1.30	1.50	1.72	1.95	2.20		
3,500	0.89	1.03	1.09	1.23	1.44	1.68	1.91			
Test conditions Condensing temperature Ambient and suction gas temp.			. 55°	С С	ECOMA	55' 32'	°C			
Liquid temperature			55	C		32	C			



Condensing temperature
Ambient and suction gas temp.
Liquid temperature
Static cooling, 12V DC
1 Watt = 0.86 kcal/h

Compressor speed Electronic Resistor

unit

101N0400

(R1) Ω

0

173

450

865

1696

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Motor

speed

rpm AEO

2,000

2,500

3,000

3,500

Contr.circ.

current

mA

6 5

4 3

2

#### Accessories

Devices	BD35F
Standard automobile fuse DIN 7258 15A	Not deliverable from Danfoss
Mounting accessories Bolt joint for one compressor Bolt joint in quantities Snap on in quantities	118-1917 118-1918 118-1919

#### Wire dimensions

Size AWG Cross section			ength* eration	Max length* 24V operation		
Gauge	mm²	ft.	m	ft.	m	
12	2.5	8	2.5	16	5	
12	4	13	4	26	8	
10	6	19.5	6	39	12	
8	10	32.8	10	65.6	20	
*Length between battery and electronic unit						

Operational errors	shown h	ontional)
	51100011 D	opuonar

Number of flashes	Error type
5	Thermal cut-out of electronic unit (If the refrigeration system has been too hea- vily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo- aded, the motor cannot maintain minimum speed at approximately 1,850 rpm).
3	Motor start error (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan loads the electronic unit with more than $1A_{peak}$ ).

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## BD35K **Direct Current Compressor for Solar Applications** (for stationary use only) R600a 10 - 45V

	Data Sheet	
Code numbers		
BD35K without electronic unit	101Z0211	BD35K Danford 101Z
Electronic unit 10-45V DC	single: 101N0400, 30 pcs: 101N0401	Application
	,,,,,,,	Red stripe
		CE © N 1297 0211
Application	1	Barcode on white background
Application	LBP/MBP/(HBP)	Grey background
Evaporating temperature range °C		
Voltage range / max. voltage	10 - 45V DC	
Fan output	same as input voltage	
Max. machine compartment temperature °C		S = Static cooling normally R600a
Comp. cooling at ambient temp. 43°C	S or F <sub>1</sub> *	Sufficient COUCA State Council State Counci
Design	* depending on application	F <sub>1</sub> = Fan cooling 1.5 m/s (compressor compartment temp. equal to ambient temp.)
Displacement cm <sup>3</sup>	3.00	F <sub>2</sub> = Fan cooling 3.0 m/s necessary
Oil quantity cm <sup>3</sup>	150	e4
Maximum refrigerant charge g	120	0277 00
Free gas vol. in compressor cm <sup>3</sup>	870	EC approval mark
Weight: Compressor/Electronic unit kg	4.3/0.25	204
Motor Motor type Resistance, all 3 windings (25°C) Ω Approvals (electronic unit)	Variable speed 1.8 E4 72/245 95/54 0277 00	
Dimensions	A 137	$\begin{array}{c} \underline{016} \\ \underline{04.2} \\ \underline{04.2} \\ \underline{0} \\ \underline{127} \\ \underline{0} \\$
Height mm	A 137 B 135	
	B1 128	
	B2 73	
Suction connector location/I.D. mm	C 6.2 ±0.09	
Process connector location/I.D. mm	D 6.2 ±0.09	
Discharge connector location/I.D. mm	E 5.0 +0.12/+0.20	
Compressors on a pallet pcs.	150	<u>201</u> 8269   16
lub/ 2002	CD 56 41 02	, <u>123</u> ,

CD.56.A1.02

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### ity (EN 12900/CECOMAE)

Capacity	(EN 12	2900/C	ЕСОМА	۹F)						watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	13.2	21.0	23.8	29.7	39.6	51.0	64.0	79.1	96.3	116
2,500	16.8	25.5	28.8	35.6	47.5	61.3	77.5	96.2	118	
3,000	20.7	30.5	34.3	42.3	56.3	72.9	92.4	115		
3,500	24.9	36.0	40.2	49.3	65.1	83.8	106			
Capacity	(ASHF	RAE)								watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	16.0	25.5	29.0	36.1	48.2	62.1	78.0	96.4	118	142
2,500	20.4	31.0	35.0	43.4	57.8	74.7	94.4	117	144	
3,000	25.2	37.1	41.7	51.4	68.5	88.7	113	140		
3,500	30.3	43.8	49.0	59.9	79.2	102	129			
Power co	onsum	otion								watt
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	18.5	22.5	23.9	26.4	30.3	34.2	38.0	41.8	45.7	49.6
2,500	23.8	28.5	30.0	32.9	37.2	41.5	45.8	50.2	54.9	
3,000	29.5	35.9	38.0	41.8	47.4	52.9	58.6	64.6		
3,500	35.1	42.7	45.2	49.7	56.4	63.0	69.7			
Current	consur	notion	(for 24V a	applicatio	ons the fo	llowina ı	nust be h	alved)		A
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	1.54	1.88	1.99	2.20	2.53	2.85	3.17	3.48	3.81	4.13
2,500	1.98	2.37	2.50	2.75	3.10	3.46	3.82	4.19	4.58	
3,000	2.46	2.99	3.16	3.48	3.95	4.41	4.88	5.38		
3,500	2.93	3.56	3.76	4.15	4.70	5.25	5.81			
COP (EN	12900	CECO	MAF)							W/W
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	0.71	0.93	1.00	1.12	1.31	1.49	1.69	1.89	2.11	2.34
2,500	0.71	0.90	0.96	1.08	1.28	1.48	1.69	1.92	2.15	
3,000	0.70	0.85	0.90	1.01	1.19	1.38	1.58	1.78		
3,500	0.71	0.84	0.89	0.99	1.15	1.33	1.52			
COP (ASHRAE) W/W										
rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	10
2,000	0.87	1.13	1.21	1.37	1.59	1.82	2.05	2.31	2.57	2.86
2,500	0.86	1.09	1.17	1.32	1.55	1.80	2.06	2.34	2.62	
3,000	0.85	1.03	1.10	1.23	1.44	1.68	1.92	2.17		
3,500	0.86	1.03	1.08	1.21	1.40	1.62	1.85			
Test condition			EN		ECOMA	= AS	HRAE			
Condensing			55			55				
	Ambient and suction gas temp.			°C		32				
Liquid temperature 55°C 32°C										



Condensing temperature Ambient and suction gas temp. Liquid temperature Static cooling, 12V DC 1 Watt = 0.86 kcal/h preliminary data

Compressor speed Electronic Resistor

(R1)

Ω

0

173

450

865

1696

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

unit

to those of

with AFO

Motor

speed

rpm AEO

2,000

2,500

3,000

3,500

Contr.circ.

current

mΑ

6

5

4

3

2

#### Accessories

Devices	BD35K
Standard automobile fuse DIN 7258 15A	Not deliverable from Danfoss
Mounting accessories Bolt joint for one compressor Bolt joint in quantities Snap on in quantities	118-1917 118-1918 118-1919

#### Wire dimensions

Size		Max le	ength*	Max length*		
AWG	Cross section	12V operation		24V operation		
Gauge	mm²	ft.	m	ft.	m	
12	2.5	8	2.5	16	5	
12	4	13	4	26	8	
10	6	19.5	6	39	12	
8	10	32.8	10	65.6	20	
	*I enoth between battery and electronic unit					

Operational	errors shov	vn by I F	D (optional)

Number of flashes	Error type
5	Thermal cut-out of electronic unit (If the refrigeration system has been too hea- vily loaded, or if the ambient temperature is high, the electronic unit will run too hot).
4	Minimum motor speed error (If the refrigeration system is too heavily lo- aded, the motor cannot maintain minimum speed at approximately 1,850 rpm).
3	Motor start error (The rotor is blocked or the differential pres- sure in the refrigeration system is too high (>5 bar)).
2	Fan over-current cut-out (The fan loads the electronic unit with more than $1A_{peak}$ ).

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#### **Data stamping**

- The data stamping is placed on the top of the compressor, e.g. Z02007 (6 characters) 114A01F (7 characters) <u>Composition of line 1</u> Z0200: Compressor type information (101Z0200 = Z0200) 7: internal Danfoss code <u>Composition of line 2</u> 11: Production week 4: Production year
  - A: Production day
  - A = Monday, B = Tuesday, C = Wednesday, etc.
  - **01**: Production hour 00 to 23 or shift code -1, -2, -3
  - F: Danfoss Compressors internal production location code A to G: Germany / K to N: Slovenia / R, S: Mexico

For the electronic unit, the code for date of manufacture is located on the printed circuit board, visible through the opening on the backside of the housing, where the cables get out.

#### Mounting the electronic unit





The cable plug of the electronic unit is mounted on the pins of the current lead-in on the compressor. Then the electronic unit itself is mounted on the bracket of the compressor. At first the left side is mounted, then the right side is pressed over the screw on the bracket. The electronic unit snaps on to the bracket and is now securely mounted on the compressor.

In case the electronic unit must be removed from the compressor, the screw has to be loosened.



The compressor is equipped with DANCON connectors which consist of a thick-walled, copperplated steel tube with high corrosion resistance, and a solderability equal to that of conventional copper connectors.

DANCON connectors are equipped with an aluminium cap (Capsolut) which gives a tight sealing.

The seal cap is easily removed with an ordinary pair of pliers or with a special tool.



Mounting accessories for BD compressors are supplied as a screw and nut assembly 118-1917. Each assembly 118-1917 is supplied in a bag containing four screws, nuts, washers, grommet sleeves and rubber grommets for mounting one compressor. The screw and nut assembly can be obtained in quantities under code no 118-1918.

#### **Filter drier selection**

**Mounting accessories** 

Only filter driers which are declared by the manufacturer to be suitable for mobile applications must be used in refrigeration systems with BD35F, BD50F and BD80F compressors. Filter material powder ending up in the compressor will lead to excessive wear of the piston and transmission parts, and metal particles deposited in the motor windings will cause the compressor to stop because the electric signal back to the electronic unit is disturbed.

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BD50F / Electronic Unit 101N0210

BD50F / Electronic Unit 101N0300



BD50F / Electronic Unit 101N0220



BD35F Solar / Electronic Unit 101N0400



BD35K Solar / Electronic Unit 101N0400



BD80F / Electronic Unit 101N0280



Compressors	Code no	Description
<ul> <li>BD35F mm Standard</li> </ul>	101Z0200	Standard compressor, mm tube connectors, UL recognized
BD35F mm Solar	101Z0210	Standard compressor, mm tube connectors
BD35F inch	101Z0204	Same as 101Z0200, inch tube connectors, UL recognized
• BD35K (R600a)	101Z0211	For stationary use only, mainly solar applications, mm tube connectors
• BD50F mm	101Z1220	Standard compressor, mm tube connectors, UL recognized
BD50F inch	101Z0203	Same as 101Z1220, inch tube connectors, UL recognized
• BD80F mm	101Z0280	Standard compressor, mm tube connectors

Electronic Single Pack	Code no	Description
Electronic standard	101N0210	for BD35F/BD50F, speed setting, battery protection
Electronic EMI	101N0220	for BD35F/BD50F, radiation extra shielded, speed setting, battery protection
Electronic extended EMI	101N0900	for BD35F/BD50F, radiation extra shielded, conduction extra shielded,
		speed setting, battery protection
Electronic AEO	101N0300	for BD35F/BD50F, Adaptive Energy Optimization, speed setting, battery protection
Electronic solar	101N0400	for BD35F/BD35K, optimized for direct solar panel operation, speed setting
Electronic BD50F high start	101N0230	for BD50F only, extra high start performance, speed setting, battery protection
Electronic BD80F	101N0280	for BD80F only, Adaptive Energy Optimization, speed setting, battery protection

Electronic I-pack	Code no	Description
Electronic standard	101N0211	for BD35F/BD50F, speed setting, battery protection, 30 pcs.
Electronic EMI	101N0221	for BD35F/BD50F, radiation extra shielded, speed setting, battery protection, 30 pcs.
Electronic AEO	101N0301	for BD35F/BD50F, Adaptive Energy Optimization, speed setting, battery protection, 30 pcs.
Electronic solar	101N0401	for BD35F/BD35K, optimized for direct solar panel operation, speed setting, 30 pcs.
Electronic BD50F high start	101N0231	for BD50F only, extra high start performance, speed setting, battery protection, 30 pcs.
Electronic BD80F	101N0281	for BD80F only, Adaptive Energy Optimization, speed setting, battery protection, 28 pcs.

## Compressor sectional view









# The Danfoss product range for the refrigeration and air conditioning industry

# Compressors for refrigeration and air conditioning

These products include hermetic reciprocating compressors, scroll compressors and fan-cooled condensing units. Typical applications are air conditioning units, water chillers and commercial refrigeration systems.

## **Compressors and Condensing Units**

This part of the range includes hermetic compressors and fan-cooled condensing units for household refrigerators and freezers, and for commercial units such as bottle coolers and drinks dispensers . We also offer compressors for heat pumps, and 12 and 24V compressors for refrigerators and freezers in commercial vehicles and boats.

## **Appliance controls**

For the regulation of refrigeration appliances and freezers Danfoss supplies a product range of electromechanical thermostats produced according to customer specifications; electronic temperature controls comprising models with and without displays; service thermostats – for servicing on all refrigerating and freezing appliances.

## **Refrigeration and air conditioning controls**

Our full product range covers all control, safety, system protection and monitoring requirements in mechanically and electronically controlled refrigeration and air conditioning systems. The products are used in countless applications within the commercial and industrial refrigeration and air conditioning sectors.

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