


101N0290
High Speed
Electronic
Unit



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Danfoss 101N0290 High Speed Electronic Unit



Specifications

- Product Name: High Speed Electronic Unit for BD Compressors
- Model Number: 101N0290
- Power Supply: 12- 24V DC

Product Usage Instructions

Installation

Connect the terminal plug from the electronic unit to the compressor terminal. Mount the electronic unit on the compressor by snapping the cover over the screw head (1).

Thermostat

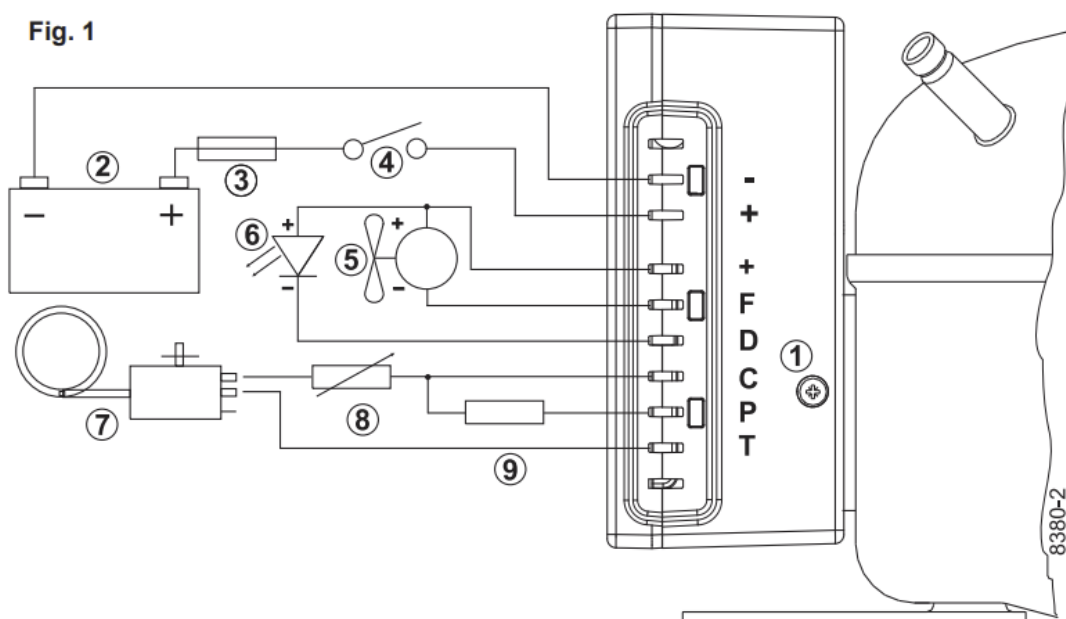
The thermostat (7) is connected between the terminals C and T. With the thermostat directly connected to terminal C, the electronic unit will adjust its speed to the actual cooling demand. Different fixed compressor speeds in the range between 2,500 and 4,400 rpm can be achieved by installing a resistor (8) to adjust the control circuit's current. Refer to Fig. 5 for resistor values for various motor speeds.

Fan (optional)

A fan (5) can be connected between the terminals + and F. Connect the plus to + and the minus to F. Use a 12V fan for both 12V and 24V power supply systems since the output voltage is regulated to 12V. The fan output can provide a continuous current of 0.5Aavg with allowance for higher current draw during start.

The electronic unit is a dual voltage device. This means that the same unit can be used in both 12V and 24V power supply systems. Maximum voltage is 17V for a 12V system and 31.5V for a 24V power supply system. Max. ambient temperature is 55°C. The electronic unit has a built-in thermal protection which is actuated and stops compressor operation if the electronic unit temperature gets too high.

Installation (Fig. 1)



Connect the terminal plug from the electronic unit to the compressor terminal. Mount the electronic unit on the compressor by snapping the cover over the screw head (1).

Power supply (Fig. 1)

The electronic unit must always be connected directly to the battery poles (2). Connect the plus to + and the minus to -, otherwise the electronic unit will not work. The electronic unit is protected against reverse battery connection.

For protection during installation, a fuse (3) must be mounted in the + cable as close to the battery as possible. 30A fuse for 12V and 15A fuse for 24V circuits are recommended.

If a main switch (4) is used, it should be rated for a minimum current of min. 30A. The wire dimensions in **Fig. 2** must be observed. Avoid extra junctions in the power supply system to prevent voltage drop from affecting the battery protection setting.

Wire dimensions

Size		Max l ength * 12V DC opera tion		Max l ength * 24V DC opera tion			
A W G	C r o s s s e c t i o n						
		Ft	m	ft.	m		
G a u g e	m m 2						
10	6	8	2.5	16	5		

Fig. 2 Length between the battery and the electronic unit

Battery protection (Fig. 1)

The compressor stops and starts again according to the designated voltage limits measured on the + and – terminals of the electronic unit.

The standard settings for 12V and 24V power supply systems appear in Fig. 3. Other settings (Fig. 4) are optional if a connection that includes a resistor (9) is established between terminals C and P. In AEO (Adaptive Energy Optimizing) speed mode, the BD compressor will always adapt its speed to the actual cooling demand within a random operation voltage of 9.6 to 31.5V.

Standard battery protection settings

12V cut-out V	12V cut-in V	24V cut-out V	24V cut-in V
10.4	11.7	22.8	24.2

Fig. 3

Optional battery protection settings, Fig. 4

Resistor (9) kΩ	12V cut-out V	12V cut-in V	12V max. Volt age	24V cut-out V	24V cut-in V	24V max. Volt age
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

Thermostat (Fig. 1)

The thermostat (7) is connected between the terminals C and T. With the thermostat directly connected to terminal C, the electronic unit will adjust its speed to the actual cooling demand. Other fixed compressor speeds in the range between 2,500 and 4,400 rpm can be obtained when a resistor (8) is installed to adjust the current (mA) of the control circuit. Resistor values for various motor speeds appear in **Fig. 5**.

Compressor speed

Electronic unit	Resistor (8) Ω (calculated)	Motor speed rpm	Contr. Circ. current mA
	0	AEO 2,500	6
	203	3,100	5
	451	3,800	4
	867	4,400	3
	1700		2

Fig. 5

Fan (optional, Fig. 1)

A fan (5) can be connected between the terminals + and F. Connect the plus to + and the minus to F. Since the output voltage between the terminals + and F is always regulated to 12V, a 12V fan must be used for both 12V and 24V power supply systems. The fan output can supply a continuous current of 0.5Aavg. A higher current draw is allowed for 2 seconds during start.

+ and F. Connect the plus to + and the minus to F. Since the output voltage between the terminals + and F is always regulated to 12V, a 12V fan must be used for both 12V and 24V power supply systems. The fan output can supply a continuous current of 0.5Aavg. A higher current draw is allowed for 2 seconds during start.

LED (optional, Fig. 1)

A 10mA light emitting diode (LED) (6) can be connected between the terminals + and D. In case the electronic unit records an operational error, the diode will flash several times. The number of flashes depends on what kind of operational error was recorded. Each flash will last 1/4 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.

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 loaded, the motor cannot maintain a minimum speed of 2,450 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 loads the electronic unit with more than 1A peak).
1	Battery protection cut-out (The voltage is outside the cut-out setting.)

VDE/UL Approvals for BD Compressors**Approved Compressor – Electronic Unit Combinations**

Compressors		Electronic nits					
		<i>tandard</i>	<i>E I</i>	<i>High start</i>	<i>high speed</i>	<i>AEO</i>	<i>AEO E I</i>
		101N0210	101N0220	101N0230	101N0290	101N0300	101N0320
BD35F mm	101Z0 200	L	L			L	
BD35F inch	101Z0 204	L	L			L	
BD35K (R6 00a)	101Z0 211						
BD50F mm	101Z1 220	L	L	L		L	
BD50F inch	101Z0 203	L	L	L		L	
BDB0F mm	101Z0 280						
BD250GH	101Z0 400						
BD250GH T win	101Z0 500						
BD100CN (R290)	101Z0 401						

Compressors		Electronic nits					
		<i>olar</i>	<i>A /O convert er</i>	<i>Automotive</i>	<i>Automotive</i>	<i>Telecommuni cation</i>	<i>Extended E I</i>
		101N0400	101N0500	101N0600	101N0630	101N0730	101N0900
BD35F mm	101Z0 200	L	VDE/ L				
BD35F inch	101Z0 204	L	VDE/ L				
BD35K (R6 00a)	101Z0 211						
BD50F mm	101Z1 220		VDE/ L				
BD50F inch	101Z0 203		VDE/ L				
BD250GH (4BV)	101Z0 402					L	

VDE/UL	= Combination possible, VDE or UL approval
	= Combination possible, but no approval
	= Combination not possible

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FAQs

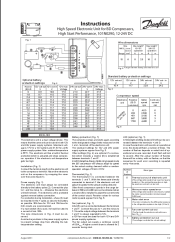
Q: What are the error types indicated by the number of flashes?

1. **flashes:** Thermal cut-out of the electronic unit – caused by heavy load or high ambient temperature.
2. **flashes:** Minimum motor speed error – occurs when the motor cannot maintain the minimum speed.
3. **flashes:** Motor start error – caused by a blocked rotor or high differential pressure in the refrigeration system.
4. **flashes:** Fan over-current cut-out – triggered when the fan draws more than 1A_{peak}.
5. **flash:** Battery protection cut-out – due to voltage outside the set range.

Q: Where can I find approved Compressor-Electronic Unit combinations?

You can find a list of approved Compressor-Electronic Unit combinations on compressors.danfoss.com under Approved Compressor-Electronic Unit Combinations.

Documents / Resources

	<p>Danfoss 101N0290 High Speed Electronic Unit [pdf] Instructions</p> <p>101N0290 High Speed Electronic Unit, 101N0290, High Speed Electronic Unit, Speed Electronic Unit, Electronic Unit</p>
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References

- [Compressors for refrigeration, A/C and heating | Danfoss](#)
- [User Manual](#)

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