Danfoss BD50F Electronic Unit for Compressors Instructions

Contents

Danfoss BD50F Electronic Unit for Compressors

Specifications

- Product: Electronic Unit for BD50F Compressors
- Model: 101N0230

Product Usage Instructions

- 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).
- The compressor stops and restarts according to the designated voltage limits measured on the + and – terminals of the electronic unit. Standard settings for 12V and 24V power supply systems are shown in Fig. 3. Optional settings (Fig. 4) can be implemented by establishing a connection with a resistor (9) between terminals C and P.
- Connect the thermostat (7) between terminals C and T.
- Without a resistor in the control circuit, the compressor runs at a fixed speed of 2,000 rpm when the thermostat is switched on.
- Different fixed compressor speeds between 2,000 and 3,500 rpm can be achieved by installing a resistor (8) to adjust the current (mA) of the control circuit. Refer to Fig. 5 for resistor values.
- 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, as the output voltage is regulated to 12V.
- The fan output can supply a continuous current of 0.5Aavg, with a higher current draw allowed for 2 seconds during start.

Introduction

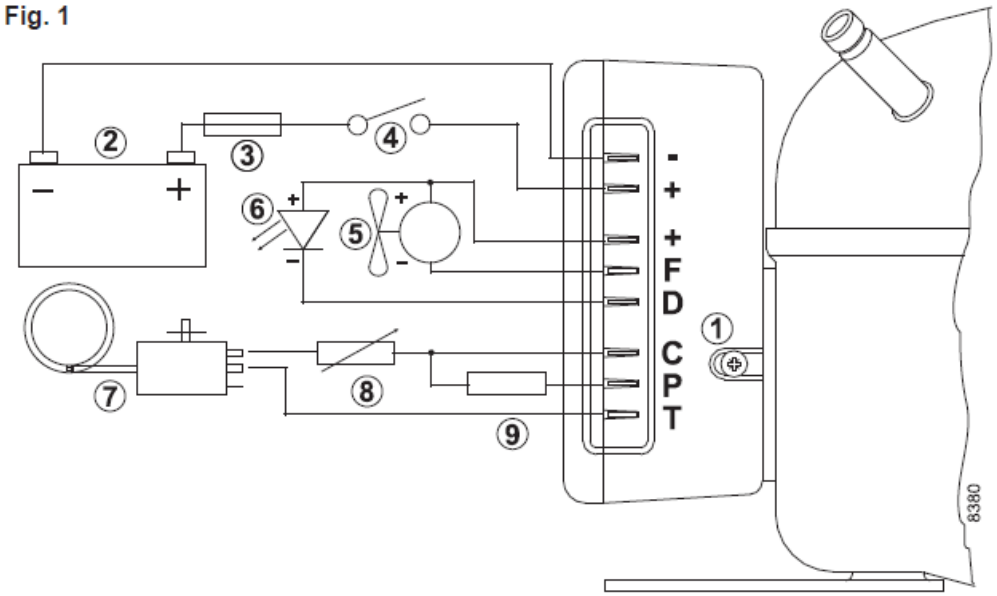
- The electronic unit is a dual-voltage device.
- This means that the same unit can be used in both 12V and 24V power supply systems.
- Maximum voltage is 17V for a 12V system and 31.5V for a 24V power supply system.

- Max.. ambient temperature is 55°C.
- The electronic unit has a built-in thermal protection that is actuated and stops compressor operation if the electronic unit temperature gets too high.

Installation

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

Fig. 1



Power supply

- 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. 15A fuse for 12V and 7.5A fuse for 24V circuits are recommended.
- If a main switch (4) is used, it should be rated to a minimum current of min. 20A.
- 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 AWG Gauge	Size Cross section mm²	Max length* 12V DC operation ft.	Max length* 12V DC operation m	Max length* 24V DC operation ft.	Max length* 24V DC operation m
12	2.5	8	2.5	16	5
12	4	13	4	26	8
10	6	20	6	39	12
8	10	33	10	66	20

Fig. 2 *Length between battery and electronic unit

Battery protection

- The compressor stops and restarts again according to the designated voltage limits meas- ured on the + and – terminals of the electronic unit.
- The standard settings for 12V and 24V power supply systems appear in Fig. 3.

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

- Other settings (Fig. 4) are optional if a connection that includes a resistor (9) is established between terminals C and P.

Optional battery protection settings

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

- The thermostat (7) is connected between the terminals C and T. 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.
- Other fixed compressor speeds in the range between 2,000 and 3,500 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
101N0230	0	2,000	5
	277	2,500	4
	692	3,000	3
	1523	3,500	2

Fig. 5

Fan optional

- 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 continous current of 0.5Aavg. A higher current draw is allowed for 2 seconds during start.

LED optional

- 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 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.

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 1,850 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 1Apeak).
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 Units					
		Standard	*EMI*	*High start*	*High speed*	*AEO*	*AEO EMI*
		101N0210	101N0220	101N0230	101N0290	101N0300	101N0320
BD35F mm	101Z0200	UL	UL			UL	
BD35F inch	101Z0204	UL	UL			UL	
BD35K (R600a)	101Z0211						
BD50F mm	101Z1220	UL	UL	UL		UL	
BD50F inch	101Z0203	UL	UL	UL		UL	
BD80F mm	101Z0280						
BD250GH	101Z0400						
BD250GH Twin	101Z0500						
BD100CN (R290)	101Z0401						

Compressors		Electronic Units					
		Solar	*AC/DC converter*	*Automotive*	*Automotive*	*Telecommunication*	*Extended EMI*
		101N0400	101N0500	101N0600	101N0630	101N0730	101N0900
BD35F mm	101Z0200	UL	VDE/UL				
BD35F inch	101Z0204	UL	VDE/UL				
BD35K (R600a)	101Z0211						
BD50F mm	101Z1220		VDE/UL				
BD50F inch	101Z0203		VDE/UL				
BD250GH (48V)	101Z0402					UL	

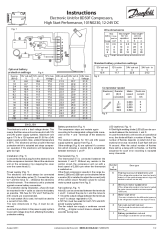
- VDE/UL = Combination possible, VDE or UL approval
- = Combination possible, but no approval
- = Combination not possible

Designed and manufactured by Secop for DANFOSS – DEHC.EI.100.J6.02 / 520N0276
compressors.danfoss.com – DEHC.EI.100.J6.02 / 520N0276

FAQ

- **Q: What are the error types indicated by the number of flashes on the electronic unit?**
  - Thermal cut-out of electronic unit – Indicates overheating due to heavy load or high ambient temperature.
  - Minimum motor speed error – Indicates heavy load causing motor speed to drop below minimum required (1,850 rpm).
  - Motor start error – Indicates rotor blockage or high differential pressure (>5 bar) in the refrigeration system.
  - Fan over-current cut-out – Indicates excessive current draw by the fan.

Documents / Resources

	Danfoss BD50F Electronic Unit for Compressors [pdf] Instructions BD50F Electronic Unit for Compressors, BD50F, Electronic Unit for Compressors, Unit for Compressors, for Compressors

References

- Compressors for refrigeration, A/C and heating | Danfoss
- User Manual