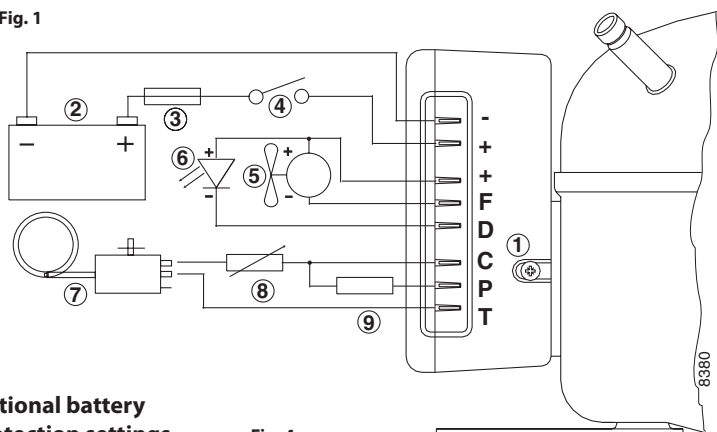


Instructions

Electronic Unit for BD35/50F Compressors,
101N0210, 101N0220, 101N0300 and 101N0320, 12-24V



Fig. 1



Optional battery protection settings

Fig. 4

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

Wire dimensions

Size AWG	Cross section mm ²	Max length* 12V DC operation		Max length* 24V DC operation	
		ft.	m	ft.	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

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

Compressor speed

Electronic unit	Resistor (8) Ω (calculated)	Motor speed rpm	Contr.circ. current mA
101N0210 101N0220	0	2,000	5
	277	2,500	4
	692	3,000	3
	1523	3,500	2
101N0300 101N0320 with AEO	0	AEO	6
	173	2,000	5
	450	2,500	4
	865	3,000	3
	1696	3,500	2

Fig. 5

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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 of the 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 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.

Battery protection (Fig. 1)

The compressor is stopped and re-started again

according to the decided voltage limits measured on the + and - terminals of the electronic unit.

The standard settings for 12V and 24V power supply systems appear from Fig. 3.

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

In solar applications without a battery a 220 kΩ resistor is recommended. 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.

Thermostat (Fig. 1)

The thermostat (7) is connected between the terminals C and T. Without any resistor in the control circuit, the compressor with electronic unit 101N0210 or 101N0220 will run with a fixed speed of **2,000 rpm** when the thermostat is switched on. *With the thermostat directly connected to terminal C the electronic unit 101N0300 will adjust its speed to the actual cooling demand.*

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 from 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.**

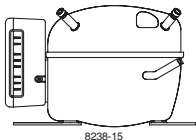
The fan output can supply a continuous current of **0.5A_{avg}**. A higher current draw is allowed for 2 seconds during start.

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 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 minimum speed 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 1A _{peak}).
1	Battery protection cut-out (The voltage is outside the cut-out setting).



Instructions

Electronic Units for BD Compressors



VDE/UL/CSA Approvals for BD Compressors

Approved Compressor - Electronic Unit Combinations

Compressors		Electronic Units									
		Standard	EMI	Extended EMI	AEO	AEO EMI	Solar	AC/DC conv.	High start	High speed	Automotive
		101N0210	101N0220	101N0900	101N0300	101N0320	101N0400	101N0500	101N0230	101N0290	101N0600
BD35F mm	101Z0200	UL/CSA	UL/CSA		UL/CSA		UL/CSA	VDE/UL/CSA			
BD35F inch	101Z0204	UL/CSA	UL/CSA		UL/CSA		UL/CSA	VDE/UL/CSA			
BD35K (R600a)	101Z0211										
BD50F mm	101Z1220	UL/CSA	UL/CSA		UL/CSA			VDE/UL/CSA	UL/CSA		
BD50F inch	101Z0203	UL/CSA	UL/CSA		UL/CSA			VDE/UL/CSA	UL/CSA		
BD80F mm	101Z0280										
BD250GH	101Z0400										
BD250GH Twin	101Z0500										
BD100CN (R290)	101Z0401										

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