

# Instructions stronic Unit for BD35F.2, BD3



Electronic Unit for BD35F.2, BD35K.2 Compressors, 101N0226, 12/24V DC



### Optional battery protection settings Fig. 4

Resistor (R2) [kΩ]	12V cut-out [V]	12V cut-in [V]	24V cut-out [V]	24V cut-in [V]
0.82	9.60	10.90	21.30	22.70
1.60	9.70	11.00	21.50	22.90
2.40	9.90	11.10	21.80	23.20
3.60	10.00	11.30	22.00	23.40
4.70	10.10	11.40	22.30	23.70
6.20	10.20	11.50	22.50	23.90
8.20	10.40	11.60	22.80	24.20
11.00	10.50	11.80	23.00	24.50
14.00	10.60	11.90	23.30	24.70
18.00	10.80	12.00	23.60	25.00
24.00	10.90	12.20	23.80	25.20
33.00	11.00	12.30	24.10	25.50
47.00	11.10	12.40	24.30	25.70
82.00	11.30	12.50	24.60	26.00
220.00	9.60	10.90	9.60	10.90

## ENGLISH

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 43°C. The electronic unit has a built-in thermal protection which is actuated and stops compressor operation if the electronic unit temperature rises above the specified limit.

#### 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

The electronic unit must always be connected directly to the battery poles (2). The electronic unit is protected against reverse battery connection. A fuse (3) must be mounted in the battery + cable as close to the battery as possible. 15A fuse for 12V and for 24V circuits is mandatory.

If a main switch (4) is used, the main switch 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.

## Fan (optional)

A fan (5) can be connected between the terminals F+ and F-. A 12V fan with up to 10W must be used for both 12V and 24V power supply systems.

#### **Battery protection**

The compressor stops and restarts according to the voltage measured on the + and - terminals of the electronic unit. The factory defaults appear from **Fig. 3**. Other settings (**Fig. 4**) are possible via connecting an optional resistor R2 (8) between terminals **C** and **P**.

#### Thermostat and speed selection

A mechanical thermostat (9) can be connected between the terminals C and T.

If a mechanical thermostat is used without any series resistor R1 (7), the compressor will run with a fixed speed of **2,000 rpm**.

Other fixed compressor speeds in the range between 2,000 and 3,500 rpm can be obtained by installing a series resistor R1 between the thermostat and **C** connection. Resistor values for various motor speeds appear from **Fig. 5**.

## Absolute maximum limits

- Operating voltage: 12/24V DC
- Output power: 100W
- · Start delay: 3s
- Error restart delay: 60s
- Start speed: 2,000 rpm
- Start duration: 30s
- Fan output: 12 ± 0.5V
- · Low speed cut-out: 1850 rpm
- High speed cut out: 3800 rpm
- Critical low voltage: 8 ± 0.5V
- Min. PCB temperature: -10°C
- Max. PCB Temperature: 110°C
- Start current: ≥ 20A

Fig. 2 Wire Dimensions DC						
Si	Size I		Max. length*		Max. length*	
Cross section	AWG	12V operation		24V operation		
[mm <sup>2</sup> ]	[Gauge]	[m]	[ft.]	[m]	[ft.]	
2.5	13	2.5	8	5	16	
4	12	4	13	8	26	
6	10	6	20	12	39	
10	8	10	33	20	66	
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\*Length between battery and electronic unit Fig. 3

#### Standard battery protection settings

			.9-
12V cut-out	12V cut-in	24V cut-out	24V cut-in
[V]	[V]	[V]	[V]
10.4	11.7	22.8	24.2
Fig. 5			

Compressor speed (calculated R1 values)

Resistor (R1) [Ω]	Motor speed [rpm]
0	2,000
51	2,100
100	2,200
150	2,300
200	2,400
277	2500
330	2,600
400	2,700
490	2,800
586	2,900
692	3,000
816	3,100
963	3,200
1137	3,300
1331	3,400
1523	3,500

#### LED

A 10mA light emitting diode (LED) (6) can be connected between the terminals F+ 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 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.

#### **Operational errors**

LED lashes	Error type
5	Thermal cut-out of electronic unit (If the refrigeration system has been too heavily loaded, or if the ambient temperature is higher or lower than 10°C, the electronic will cut out).
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	Motor start error (The rotor is blocked or the differential pressure in the refrigeration system is too high (>5 bar)).
2	Too many start attempts or fan over current (Too many compressor or fan starts in short time or fan current higher than 0.5A <sub>erg</sub> ).
1	Battery protection cut-out (The voltage is outside the cut-out setting).

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