

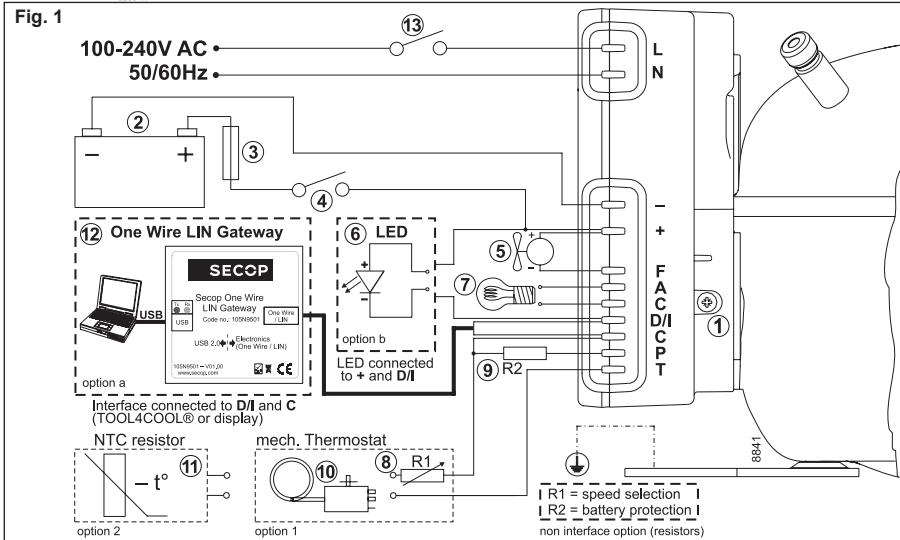
Instructions

Electronic Unit for BD35F/50F Compressors,
101N0510, 12/24V DC & 100-240V AC 50/60Hz

SECOP



Fig. 1



Optional battery protection settings Fig. 4

Resistor(9) kΩ	12V cut-out [V]	12V cut-in [V]	12V max. [V]	24V cut-out [V]	24V cut-in [V]	24V max. [V]
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
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

ENGLISH

The electronic unit is a multi voltage device. It can be used in both 12V/24V DC and 100-240V AC 50/60Hz power supply systems. Max. voltage is 17V DC for a 12V DC system and 31.5V DC for a 24V DC power supply system. Max. AC voltage is 265V AC and min. 85V AC for an AC power supply system. Max. ambient temperature is 55°C. The electronic unit has a built-in thermal protection which is actuated and stops the compressor operation if the electronic unit temperature becomes too high. **Power consumption is limited to 100W** in high ambient temperatures at low input voltage. See datasheet BD50F for details.

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)

DC: The electronic unit must always be connected directly to the battery poles (2). The electronic unit is protected against reverse battery connection. A standard auto fuse (3) must be mounted in the + cable as close to the battery as possible. Ratings of 15A in 12V systems and 7.5A in 24V systems 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.

AC: The wires must be connected to the terminal marked **L** and **N** on the electronic unit. Nominal voltages from 100 to 240 VAC 50/60Hz. Upper safety cut-out limit = 270V AC and lower limit 80V AC. If a main switch (13) is used, it should be rated to a current of min. 6A. The wire dimensions must be min. 0.75 mm² or AWG 18.

NB: Earth connection can be used if required.

General: Both the AC and the DC power supply can be connected to the electronic unit at the same time. In this case, AC will be preferred power supply

source. If the AC power supply is disconnected or drops below 85V AC on a **12V DC supply system**, a time delay of 1 min. will be activated before the compressor continues on DC power supply. If AC power supply is re-established, AC power will be used again.

Battery protection (Fig. 1)

The compressor stops and restarts according to the voltage measured on the + and - terminals of the electronic unit. The standard settings appear from Fig. 3. Other settings (Fig. 4) are optional if a R2 resistor (9) is connected between terminals **C** and **P**. In solar applications without a battery a 220 kΩ resistor is recommended.

Thermostat and speed selection (Fig. 1)

Either an NTC (electrical thermostat, 11) or a mechanical thermostat (10) can be connected between the terminals **C** and **T**.

If an NTC is used, the set point and speed can be set via a communication interface between terminals **C** and **D/I**. If a mechanical thermostat is used without any R1 resistor (8), 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 when a resistor (8) is installed. 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**. **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.

Lamp (optional, Fig. 1)

A 12V DC 5 Watt lamp (10) can be connected between the terminals **A** and **C**.

Protection against too many start attempts

The electronic is protected against too many start attempts. If more than ten starts occur in an unusual short time, the unit will blink with error code 2 and prevent further starts for 60s. After 60s normal operation will be resumed.

Wire Dimensions DC

Size	Cross section [mm ²]	AWG [Gauge]	Max. length* 12V operation		Max. length* 24V operation	
			[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

Fig. 2 *Length between battery and electronic unit

Wire Dimensions AC

Cross section min. 0.75 mm² or AWG 18

Standard battery protection settings DC

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

Electronit unit	Resistor (R1) [Ω]	Motor speed
Code number	calculated values	[rpm]
101N0510	0	2,000
	277	2,500
	692	3,000
	1523	3,500

Fig. 5

Communication interface, option a (Fig. 1)

A PC can be connected through the Secop One Wire/LIN Gateway (12) to the communication interface between terminal **D/I** and **C**. The software TOOL4COOL® allows you to create different settings and reads out several measurements. Settings can be copied from one unit to another in mass production.

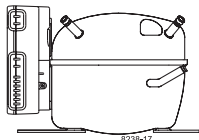
Alternatively a customer specific controller (e.g. display) can be connected to adjust the settings like set point and speed during operation.

LED, option b (Fig. 1)

A 10mA light emitting diode (LED) (6) can be connected between the terminals + and **D/I**. 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 (error codes)

LED flashes	Error type
	Can be read out in the software TOOL4COOL®
6	Thermostat failure (If the NTC thermistor is short-circuit or has no connection).
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 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 _{avg}).
1	Battery protection cut-out (The voltage is outside the cut-out setting).



Instructions

Electronic Units for BD Compressors

SECOP

VDE/CB/UL Approvals for BD Compressors

Approved Compressor - Electronic Unit Combinations

Compressors		Electronic Units						
		<i>Standard</i>	<i>AEO</i>	<i>High speed</i>	<i>Solar</i>	<i>AC/DC converter</i>	<i>Automotive</i>	<i>Telecommunication</i>
		101N0212	101N0340	101N0390	101N0420	101N0510	101N0650	101N0732
BD35F mm	101Z0200		CB / VDE		CB / VDE	UL / VDE	CB / VDE	
BD35F inch	101Z0204		CB / VDE		CB / VDE	UL / VDE	CB / VDE	
BD35F-B	101Z0205		CB / VDE		CB / VDE	UL / VDE	CB / VDE	
BD35F-HD mm	101Z0206						CB / VDE	
BD35F-HD inch	101Z0207						CB / VDE	
BD35K (R600a)	101Z0211		CB / VDE		CB / VDE		CB / VDE	
BD50F mm	101Z1220		CB / VDE			UL / VDE	CB / VDE	
BD50F inch	101Z0203		CB / VDE			UL / VDE	CB / VDE	
BD80F mm	101Z0280							
BD80CN (R290)	101Z0403		CB / VDE			UL / VDE	CB / VDE	
BD100CN (R290)	101Z0401							
BD250GH.2 (12/24V)	101Z0406							
BD250GH.2 (48V)	101Z0405							UL

VDE / CB / UL

= Combination possible, VDE, CB or UL approval

= Combination possible, but no approval

= Combination not possible