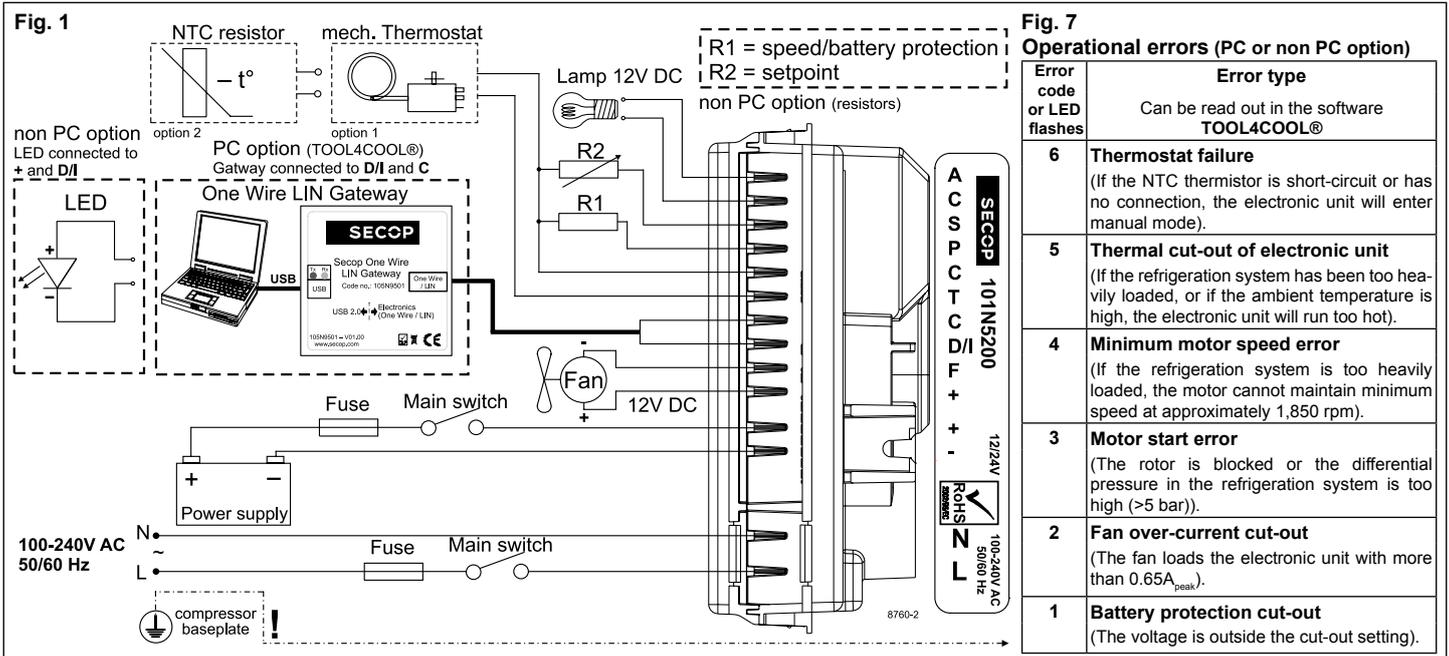


**TOOL4COOL®**  
Flexible control settings

# Instructions

**SECOP**

Electronic Unit for BD1.4F-FSD Compressor,  
101N5200, 12/24V DC & 100-240V AC 50/60Hz



## 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. 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 (100°C / 212°F on the PCB). It can be connected to a PC through the *Secop One Wire/LIN Gateway* communication interface on the terminal D/I and C (Fig. 1). Communication gateway modules incl. communication cables can be ordered at Secop. The PC interface allows you to create different settings and reads out several measurements by using the software tool **TOOL4COOL®** supplied by Secop.

### Installation (Fig. 1)

Mount the electronic unit directly on the compressor plug and fix it with screws.

### Power supply (Fig. 1)

**DC:** The electronic unit must always be connected directly to the battery poles. 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 must be mounted in the + cable as close to the battery as possible. It is recommended to use 15A fuses for 12V and 7.5A fuses for 24V circuits. If a main switch is used, it should be rated to a current of min. 20A. The wire dimensions in Fig. 4 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. A 4A fuse must be mounted in the live (L) cable to protect the installation.

If a main switch is used, it should be rated to a current of min. 6A. The wire dimensions must be min. 0.75 mm<sup>2</sup> 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 drop 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 there will be no delay in compressor operation.

### Battery protection (Fig. 2)

The compressor stops and restarts 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 are shown in Fig. 2. **(PC option)** Other settings are (Fig. 5) optional if a connection which includes a resistor (R1) is established between terminals C and P **(non PC option)**.

### Thermostat (Fig. 1)

The thermostat is connected between the terminals C and T. Either a NTC (electrical thermostat) or a mechanical thermostat can be connected. Three different thermostat modes can be chosen in the software - *Auto* (both NTC and mechanical), *NTC* or *Mechanical*. Standard setting is *Auto*. In case of using a NTC the set point in the range between -40°C and 40°C is set with the software and the temperature can also be seen by using the interface. When using the *Auto* setting in the software it is not possible to obtain NTC failures, so it is recommended to set the thermostat mode to *NTC* when using a NTC.

### Setpoint selection (Fig. 6)

In order to utilize the finally intergrated temperature control. You can connect a 10kΩ potentiometer between S and C (R2). Via this resistor a temperature setpoint between -20°C and 10°C can be selected. The compressor will stop when the set point is measured on the NTC and restart at set point +1kΩ or 3K **(non PC option)**.

### Compressor start and run speed

The compressor runs with a fixed speed of 3,000 rpm when the thermostat is switched on. By default the compressor will start with a speed of 2,500 rpm for the first 30 seconds.

### Fan (Fig. 1)

A fan can be connected between the terminals +(F) and F. Connect the plus to +(F) and the minus to F. Since the output voltage between the terminals +(F) 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 power of 6W<sub>avg</sub>. A higher current draw is allowed for 2 seconds during start.

Fan settings can be adjusted via **TOOL4COOL®**. The factory default setting in the controller is:

*Detect missing fan - Disabled.*

The unit has to be restarted when these settings have been changed. If a fan is used without adapting the **TOOL4COOL®** settings, the fan will run but no error signal will be sent in case of fan failure. It is also possible to set a start delay on the fan in the range from 0 – 240 seconds but only if a fan is connected and not running.

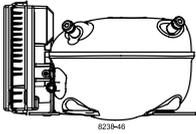
Factory default setting for a fan is 0 seconds. Fan speed can be adjusted through the interface from 40 – 100%.

### Lamp (Fig. 1)

A 12V DC 5 Watt lamp (for 12V and 24V power supply systems) can be connected between the terminals C and A. The output voltage between the terminals C and A is always regulated to 12V DC. The lamp output can supply a continuous current of 0.5A<sub>avg</sub>.

### Error handling (Fig. 7)

If the electronic unit records an operational error, the error can be read out in the software **(PC option)**. Error codes are defined as shown in Fig. 7. A 10mA light emitting diode (LED) can alternatively be connected between the terminals D/I and +. 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 **(non PC option)**.



**TOOL4COOL®**  
Flexible control settings

# Instructions

**SECOOP**

Electronic Unit for BD1.4F-FSD Compressor,  
101N5200, 12/24V DC & 100-240V AC 50/60Hz

**Fig. 2**

**Battery protection settings**

Voltage (0.1 steps)		Min. value	Default	Max. value
<b>12V</b>	± 0.3V DC, Cut out V DC	9.6	10.4	17
	all values, Cut in diff. V DC	0.5	1.3	10
<b>24V</b>	± 0.3V DC, Cut out V DC	19	21.3	27
	all values, Cut in diff. V DC	0.5	1.3	10

**Fig. 6**

Set point [°C]	R2 [Ω]
-20	0
-19	330
-18	670
-17	1000
-16	1330
-15	1670
-14	2000
-13	2330
-12	2670
-11	3000
-10	3330
-9	3670
-8	4000
-7	4330
-6	4670
-5	5000
-4	5330
-3	5670
-2	6000
-1	6330
0	6670
1	7000
2	7330
3	7670
4	8000
5	8330
6	8670
7	9000
8	9330
9	9670
10	10000

**Fig. 4**

**Wire Dimensions DC**

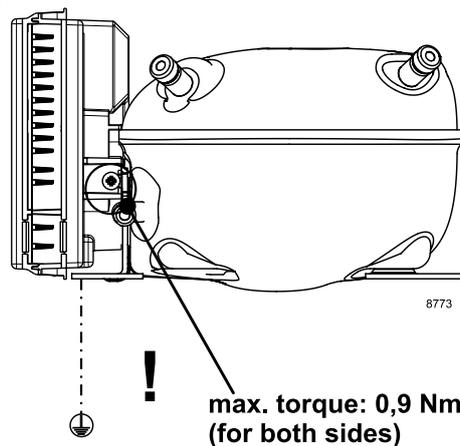
Cross section [mm <sup>2</sup> ]	Size AWG [Gauge]	Max. length* 12V operation		Max. length* 24V operation	
		[m]	[ft.]	[m]	[ft.]
2.5	12	2.5	8	5	16
4	12	4	13	8	26
6	10	6	20	12	39
10	8	10	33	20	66

\*Length between battery and electronic unit

**Fig. 5**

R1 [kΩ]	Duty Cycle [%]	Speed [RPM]	Cut in level [V]	Cut out level [V]	Cut in level [V]	Cut out level [V]
open	0	3,000	Maintain current value. Can be changed via Modbus.			
36	21	3,000	Reset battery to default value			
30	24	3,000	Reset battery to default value			
7.5	57	3,000	Maintain current value. Can be changed via Modbus.			
6.2	60	3,000	10.9	9.6	22.6	21.3
5.6	63	3,000	11.4	10.1	23.6	22.3
5.1	66	3,000	12.4	11.1	24.6	23.3
4.3	69	3,000	13.4	12.1	25.6	24.3

**Fig. 3**



Secop accepts no responsibility for possible errors in catalogs, brochures, and other printed material. Secop reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequent changes being necessary to specifications already agreed. All trademarks in this material are the property of the respective companies. Secop and the Secop logotype are trademarks of Secop GmbH. All rights reserved. [www.secop.com](http://www.secop.com)