

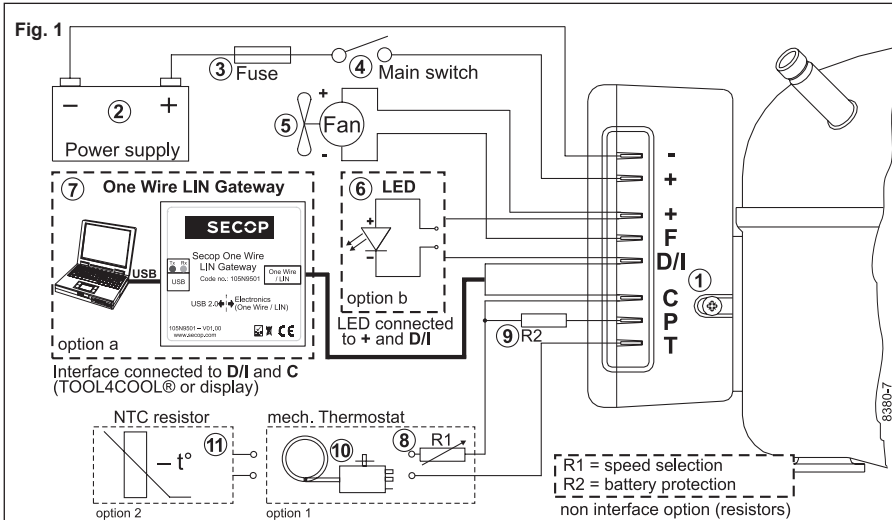
TOOL4COOL®
Flexible control settings

Instructions



Electronic Unit for BD35F/50F/35K Compressors,
101N0212, 101N0340 and 101N0650, 12/24V DC

SECOP



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				

Wire Dimensions DC

Cross section [mm ²]	Size 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

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

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0650	0	2,000
	277	2,500
	692	3,000
101N0340 with AEO	1523	3,500
	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

Fig. 5

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 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

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 + cable as close to the battery as possible. 15A fuse for 12V and 7.5A fuse 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.

Battery protection

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

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. With unit 101N0340 the compressor will run with variable speed, adjusting itself to the actual cooling demand (AEO). 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)

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.

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.

Communication interface (option a)

A PC can be connected through the Secop One Wire/LIN Gateway (7) 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.

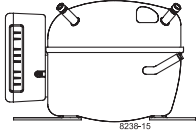
LED (option b)

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 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.

Operational errors

Error code or 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

Nidec

SECOP

UL/CB/VDE 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		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F inch	101Z0204		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F-B	101Z0205		UL / CB / VDE		CB / VDE	UL / VDE	UL / CB / VDE	
BD35F-HD.2	101Z0216						UL / CB / VDE	
BD35K (R600a)	101Z0211		UL / CB / VDE		CB / VDE		UL / CB / VDE	
BD50F mm	101Z1220		UL / CB / VDE			UL / VDE	UL / CB / VDE	
BD50F inch	101Z0203		UL / CB / VDE			UL / VDE	UL / CB / VDE	
BD80F	101Z0280							
BD80CN (R290)	101Z0403		UL / CB / VDE			UL	UL / CB / VDE	
BD100CN (R290)	101Z0401							
BD250GH.2 (12/24V)	101Z0406							
BD250GH.2 (48V)	101Z0405							UL

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