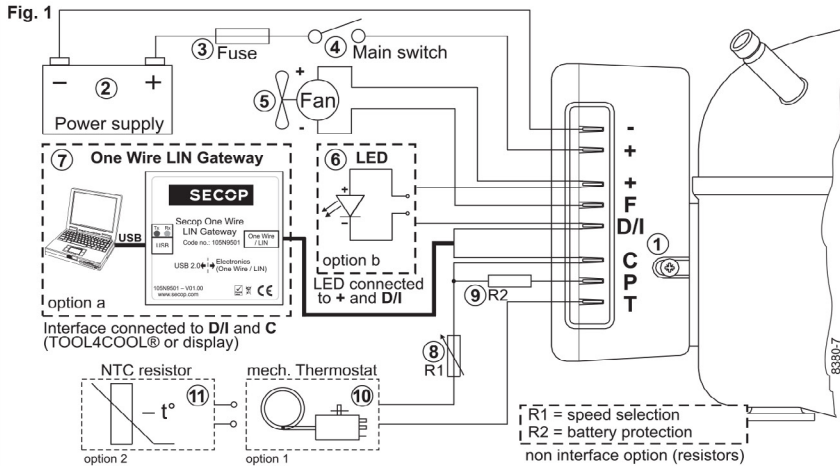


Instructions

Electronic unit BD35F/50F/35K compressors 101N0212 & 101N0650, 12-24V DC



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 |

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

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 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

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. 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.

Communication interface (option a)

A PC can be connected through the manufactured by Secop for Danfoss 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.

Wire Dimensions DC

| Cross section [mm²] | 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 | Control circuit current |
|-----------------------------|-------------------------------------|----------------|-------------------------|
| | | [rpm] | [mA] |
| 101N0212 101N0650 | 0 | 2,000 | 5 |
| | 277 | 2,500 | 4 |
| | 692 1523 | 3,000 3,500 | 3 2 |

Fig. 5

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 | Fan over-current cut-out (The fan loads the electronic unit with more than 0.5A _{avg}). |
| 1 | Battery protection cut-out (The voltage is outside the cut-out setting). |

VDE/UL Approvals for BD Compressors

Approved Compressor - Electronic Unit Combinations

| Compressors | | Electronic Units | | | | |
|----------------|----------|------------------|-------------------|-------------------|------------|----------------|
| | | <i>Standard</i> | <i>Automotive</i> | <i>High speed</i> | <i>AEO</i> | <i>AEO EMI</i> |
| | | 101N0212 | 101N0650 | 101N0290 | 101N0300 | 101N0320 |
| BD35F mm | 101Z0200 | | | | UL | |
| BD35F inch | 101Z0204 | | | | UL | |
| BD35K (R600a) | 101Z0211 | | | | | |
| BD50F mm | 101Z1220 | | | | UL | |
| BD50F inch | 101Z0203 | | | | UL | |
| BD80F mm | 101Z0280 | | | | | |
| BD250GH.2 | 101Z0406 | | | | | |
| BD100CN (R290) | 101Z0401 | | | | | |

| Compressors | | Electronic Units | | | | |
|-----------------|----------|------------------|------------------------|-------------------|-------------------|--------------------------|
| | | <i>Solar</i> | <i>AC/DC converter</i> | <i>Automotive</i> | <i>Automotive</i> | <i>Telecommunication</i> |
| | | 101N0400 | 101N0500 | 101N0600 | 101N0630 | 101N0732 |
| BD35F mm | 101Z0200 | UL | VDE/UL | | | |
| BD35F inch | 101Z0204 | UL | VDE/UL | | | |
| BD35K (R600a) | 101Z0211 | | | | | |
| BD50F mm | 101Z1220 | | VDE/UL | | | |
| BD50F inch | 101Z0203 | | VDE/UL | | | |
| BD250GH.2 (48V) | 101Z0405 | | | | | UL |

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