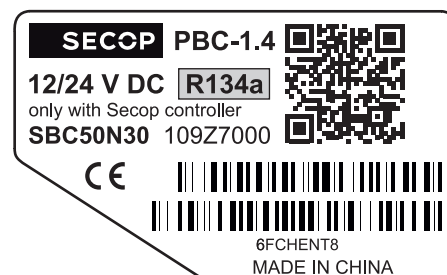


PBC-1.4 Compressor for 20-Litre Portable Cooling Boxes 12/24V DC R134a



GENERAL

Code number compressor with electronic unit	SBC50N30
Certificate	CE marking
Compressors on pallet	180

APPLICATION

Application	LBP/MBP
Evaporating temperature °C	-30 to 0
Voltage range DC VDC	9.6 - 17 / 19 - 34
Cooling requirements (max. 43°C ambient temp.)	Static cooling

MOTOR

Motor type	permanent magnet, brushless DC	
Speed rpm		3000
Resistance, all 3 windings (25°C) mΩ		210

DESIGN

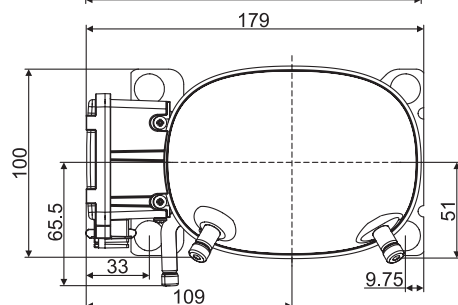
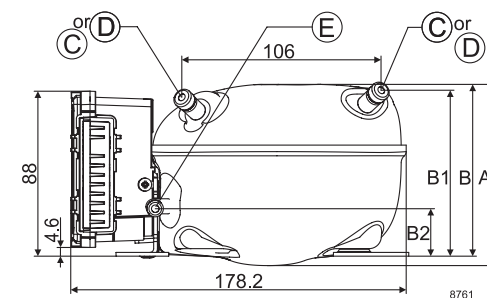
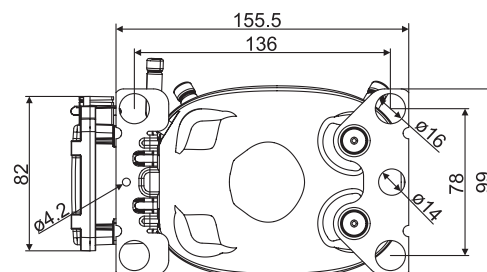
Displacement cm ³		1.41
Oil quantity (type) cm ³		75 (polyolester)
Maximum refrigerant charge g		150
Free gas volume in compressor cm ³		500
Weight - Compressor/Electronic unit kg		2.1 / 0.11

STANDARD BATTERY PROTECTION SETTINGS

12V	± 0.3V DC, all values	Cut out VDC	10.4
		Cut in diff. VDC	1.3
24V	± 0.3V DC, all values	Cut out VDC	21.3
		Cut in diff. VDC	1.3

DIMENSIONS

Height	mm	A	96.25
		B	91.25
		B1	88.00
		B2	25.20
Suction connector	location/I.D. mm angle	C	6.2 25°
	material comment		Cu-plated steel Al cap
Process connector	location/I.D. mm angle	D	6.2 25°
	material comment		Cu-plated steel Al cap
Discharge connector	location/I.D. mm angle	E	5.0 0°
	material comment		Cu-plated steel Al cap
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20



ELECTRONIC UNIT

Supply voltage	DC supply voltage range [V]	9.6 - 17 19 - 34
	Fuses (DIN 7258) required for 12/24V DC [A]	15 / 7.5
	Main switch [A]	min. 20

Ambient & enclosure	Ambient temperature operation [°C]	43
	Ambient temp. during storage/transport [°C]	-40 to 85
	IP Class	20
	Weight [kg]	0.11

Connectivity	Spade Connectors [mm]	6.3
	Fan [V/W _{max}]	12 / 6
	NTC sensor	yes
	LED (alarm)	yes
	Setpoint selection (mechanical thermostat -M /external resistor -R)	M / R

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

Optional battery protection settings

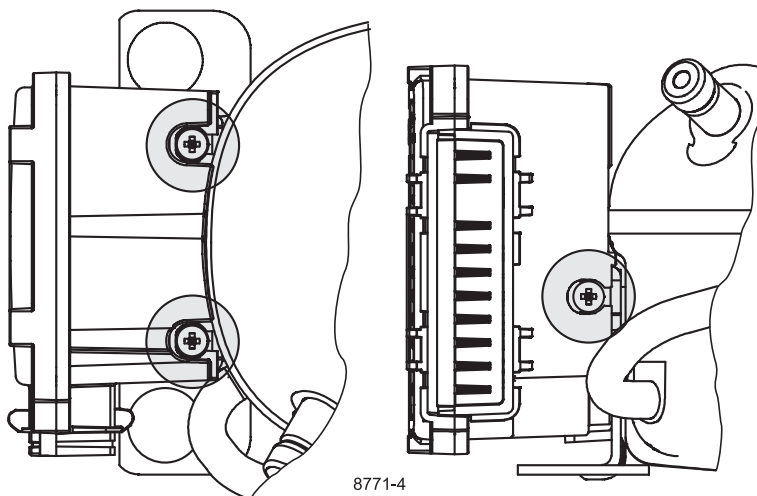
R1 [kΩ]	Duty Cycle [%]	Speed [RPM]	Cut in level [V]	Cut out level [V]	Cut in level [V]	Cut out level [V]
open	0	3,000	Maintain current value			
36	21	3,000	Reset battery to default value			
30	24	3,000	Reset battery to default value			
7.5	57	3,000	Maintain current value			
6.2	60	3,000	10.9	9.6	22.6	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

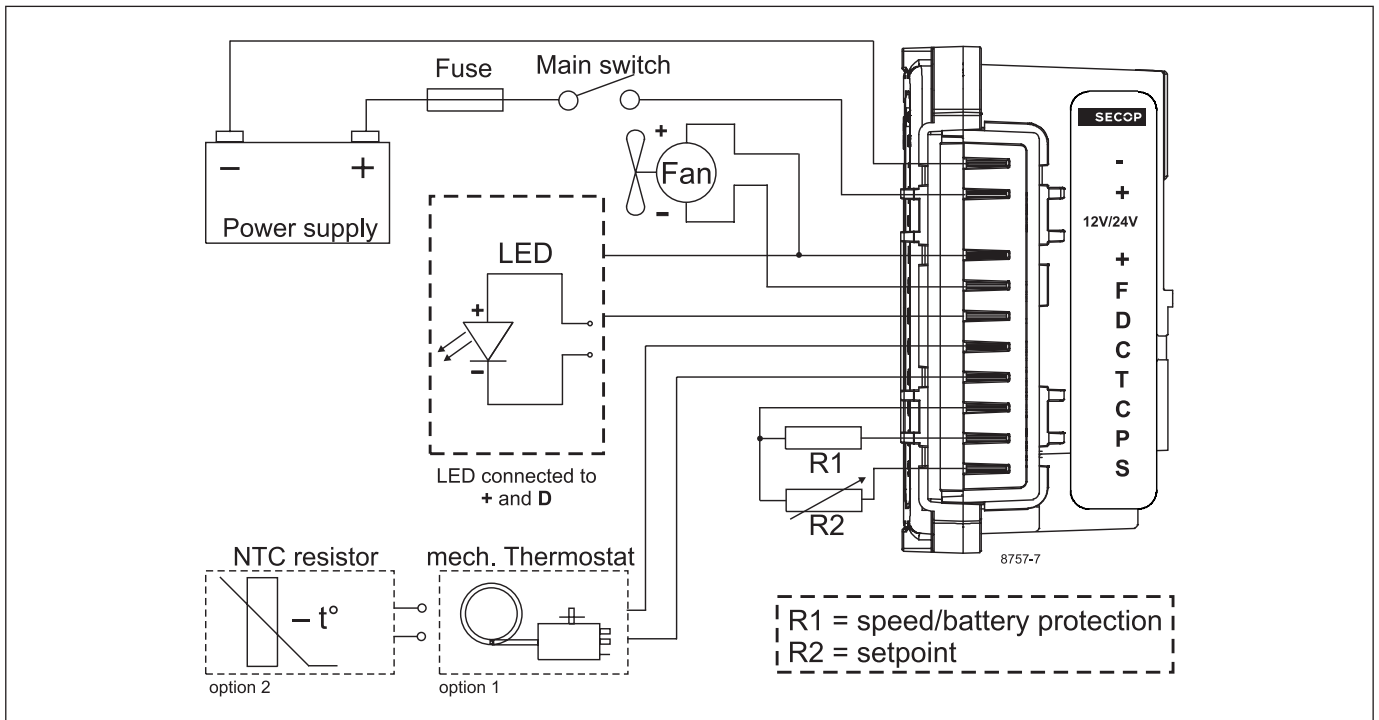
Setpoint selection

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

Mounting

Mount the electronic unit directly on the compressor plug and fix it with two screws (sideways or from above, marked in grey, max. torque: 0,9 Nm).





The electronic unit is a dual voltage device. This means that the same unit can be used in 12V or 24V power supply systems. Maximum voltage is 17V for a 12V system and 34V for a 24V power supply system. Max. ambient temperature is 45°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 (100°C/212°F on the PCB).

Installation

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

Power supply

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. A fuse must be mounted in the + cable as close to the battery as possible. A 15A fuse is recommended for 12V and 24V systems. If a main switch is used, it should be rated to a current of min. 20A. The wire dimensions (refer to page 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 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 on page 1. Optional settings are possible if a resistor (R1) is connected between terminals C and P (refer to page 2).

Thermostat

The thermostat is connected between the terminals C and T. Either a NTC (electrical thermostat, e.g. Epcos M800 / 5K or similar) or a mechanical thermostat can be connected.

Setpoint selection

In order to utilize the finally integrated temperature control, a 10kΩ potentiometer (R2) can be connected between S and C for setpoint selection. Via this resistor a temperature setpoint between -20°C and 10°C can be selected. If e.g. 0K (Kelvin) / 6670Ω is selected, the compressor will stop when -1K (Kelvin) is measured on the NTC and restarts at +1K (Kelvin).

Compressor start and run speed

When the thermostat is closed, the compressor starts with a speed of 2,500 rpm for the first 30s. After the start period it will run with a constant speed of 3,000 rpm until the thermostat opens.

Fan

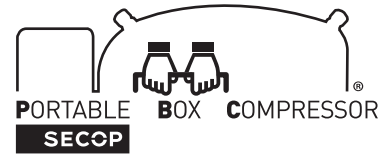
A fan can be connected between the terminals +(F) and F. Connect the plus to +(F) and the minus to F. Since the output voltage between the terminals +(F) and F is always regulated to 12V, a 12V fan must be used for both 12V and 24V power supply systems. The fan output can supply a continuous power of 6W_{avg}. A higher current draw is allowed for 2 seconds during start.

LED error handling

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

Operational errors

LED flashes	Error type
6	Thermostat failure (If the NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
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 0.65A _{avg}).
1	Battery protection cut-out (The voltage is outside the cut-out setting).



PERFORMANCE DATA

Speed	ASHRAE (International System of Units)							
	Tc=54.4°C, Tliq=32.2°C, Tsuc=32.2°C							
	LBP rating point -23.3°C / 54.4°C				MBP rating point -6.7°C / 54.4°C			
	Cooling capacity	COP	Power consumption	Current ** consumption	Cooling capacity	COP	Power consumption	Current ** consumption
[rpm]	[W]	[W/W]	[W]	[A]	[W]	[W/W]	[W]	[A]
3,000	20.8	0.83	24.9	1.89	74.8	1.75	42.6	3.23

Speed	ASHRAE (Imperial Units)							
	Tc=130°F, Tliq=90°F, Tsuc=90°F							
	LBP rating point -10°F / 130°F				MBP rating point 20°F / 130°F			
	Cooling capacity	EER	Power consumption	Current ** consumption	Cooling capacity	EER	Power consumption	Current ** consumption
[rpm]	[BTU/h]	[BTU/Wh]	[W]	[A]	[BTU/h]	[BTU/Wh]	[W]	[A]
3,000	70.7	2.84	24.9	1.89	256	5.99	42.7	3.24

** for 24V applications the values must be halved

MOUNTING ACCESSORIES

Bolt joint for one compressor	Ø:16 mm	118-1917		
Bolt joint in quantities	Ø:16 mm	118-1918		
Snap-on in quantities	Ø:16 mm	118-1919		

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