PBC-2.5 Compressor
for 70-Litre Portable Cooling Boxes
12/24V DC
R134a

GENERAL

Code number compressor with electronic unit	SBC02N21
Certificate	CE marking
Compressors on pallet	150

APPLICATION

Application		LBP/MBP
Evaporating temperature	°C	-30 to 0
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Cooling requirements (max. 43°C ambient temp.)		Static cooling

MOTOR

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	1.8

DESIGN

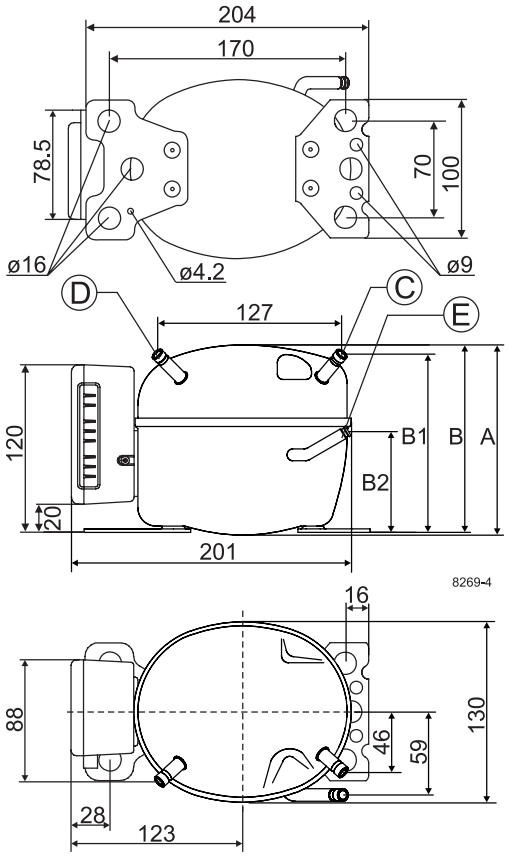
Displacement	cm^3	2.50
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3 / 0.19

STANDARD BATTERY PROTECTION SETTINGS

Voltage		12V	24V
Cut out	VDC	10.4	22.8
Cut in	VDC	11.7	24.2

DIMENSIONS

Height	mm	A	137
		B	135
		B1	128
		B2	73
Suction connector	location/I.D. mm | angle	C	6.2 | 40°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. mm | angle	D	6.2 | 45°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. mm | angle	E	5.0 | 21°
	material | comment		Cu-plated steel | Al cap
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20



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ELECTRONIC UNIT

Supply voltage	DC supply voltage range [V]	9.6 - 17 21.3 - 31.5
	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]	0.19

Connectivity	Spade Connectors [mm]	6.3
	Fan [V/W_{max}]	12 / 6
	NTC sensor	no
	LED (alarm)	yes
	Setpoint selection (mechanical thermostat -M /external resistor -R)	M / -

Compressor speed	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
	0	2,000
	277	2,500
	692	3,000
	1523	3,500

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

Optional battery protection settings

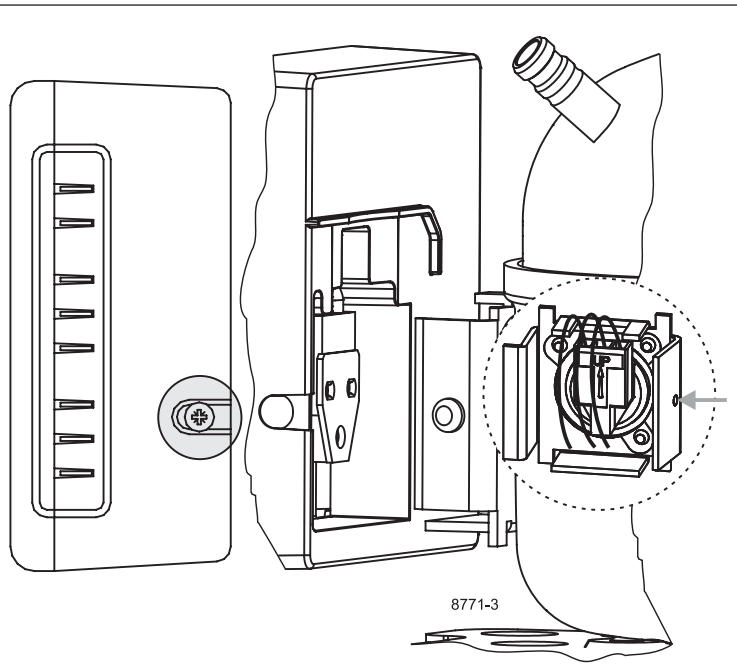
Resistor (8) kΩ	12V cut-out [V]	12V cut-in [V]	12V max. [V]	24V cut-out [V]	24V cut-in [V]	24V max. [V]
0	9.6	10.9	17.0	21.3	22.7	31.5
1.6	9.7	11.0	17.0	21.5	22.9	31.5
2.4	9.9	11.1	17.0	21.8	23.2	31.5
3.6	10.0	11.3	17.0	22.0	23.4	31.5
4.7	10.1	11.4	17.0	22.3	23.7	31.5
6.2	10.2	11.5	17.0	22.5	23.9	31.5
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

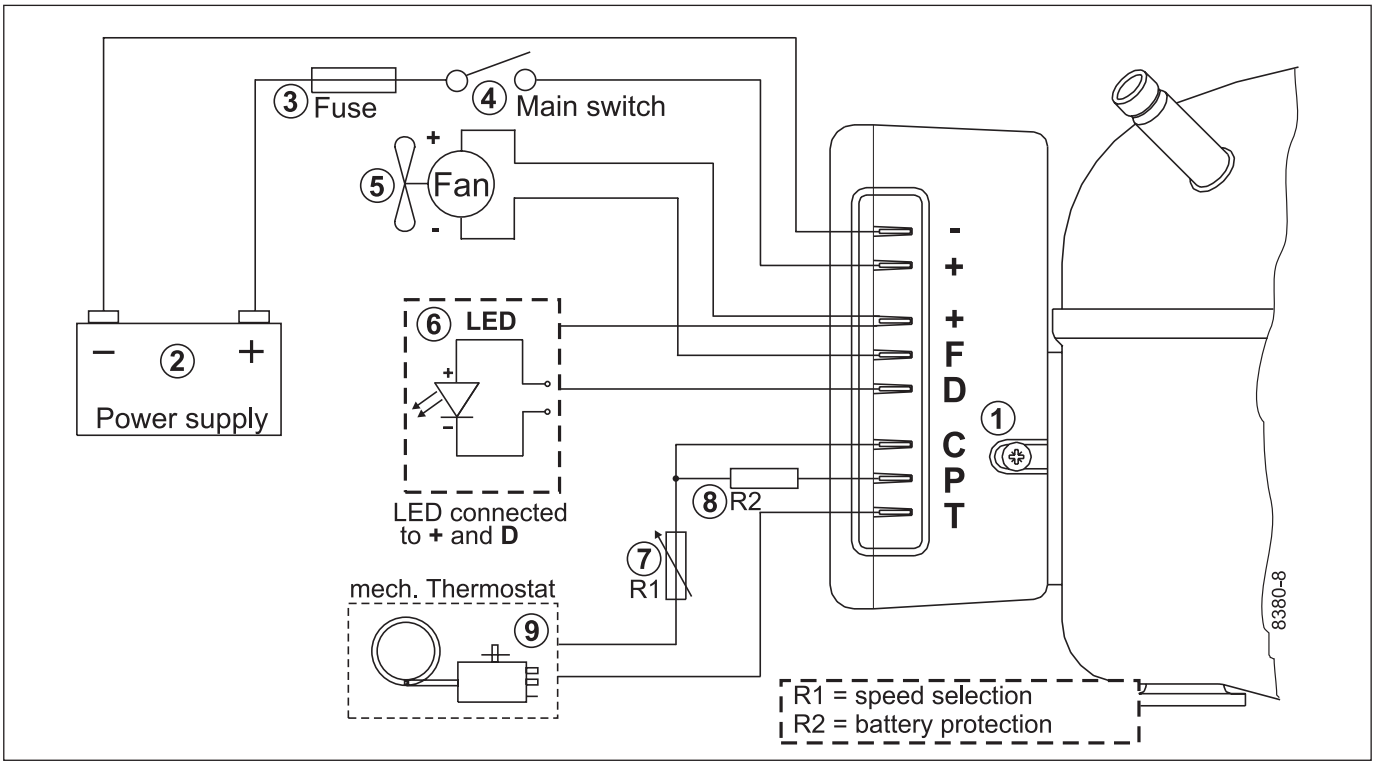
Mounting

The cable plug of the electronic unit is mounted on the pins of the current lead-in on the compressor.

Then the electronic unit itself is mounted on the bracket of the compressor. At first the left side is mounted, then the right side is pressed over the screw on the bracket (sideways, marked in grey).

The electronic unit snaps on to the bracket and is now securely mounted on the compressor.





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 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.

Installation
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 (refer to page 2) must be observed.
Avoid extra junctions in the power supply system to prevent voltage drop from affecting the batteryprotection setting.

Battery protection
The compressor stops and restarts according to the voltage measured on the **+** and **–** terminals of the electronic unit. The standard settings can be found on page 1.
Other settings are optional if a R2 resistor (8) is connected between terminals **C** and **P**.

Speed selection
A mechanical thermostat (9) can be connected between the terminals **C** and **T**.
If a mechanical thermostat is used without any R1 resistor (7), 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 (7) is installed. Resistor values for various motor speeds can be found on page 2.

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 continous current of **0.5A**$_{avg}$.
A higher current draw is allowed for 2 seconds during start.

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

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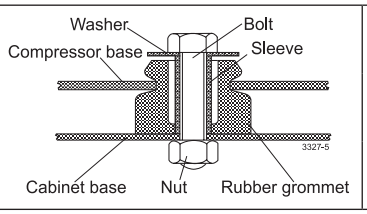
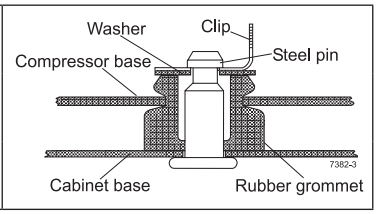
PERFORMANCE DATA

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]
2,000	41.8	1.25	33.8	2.8	105	1.93	54.7	4.7
2,500	51.3	1.21	42.4	3.5	129	1.85	70	5.9
3,000	62.0	1.21	51.6	4.3	155	1.85	83.8	6.5
3,500	71.6	1.18	60.7	5.0	179	1.82 ***	98.5 ***	8.3 ***

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]
2.000	142	4.24	33.5	2.8	360	6.57	54.8	4.7
2.500	174	4.12	42.3	3.5	442	6.30	70.2	5.9
3.000	211	4.10	51.4	4.3	531	6.32	84.0	7.0
3.500	244	4.03	60.5	4.5	613 ***	6.21 ***	98.7 ***	8.3 ***

** for 24V applications the values must be halfed
*** fan cooling of electronic unit compulsory

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		