

WE HAVE MORE THAN 40 YEARS OF EXPERIENCE DEVELOPING DIRECT CURRENT COMPRESSORS AND HELPING CUSTOMERS BENEFIT FROM THE OPPORTUNITIES OF MOBILE REFRIGERATION TECHNOLOGY.

WITH IN-DEPTH KNOWLEDGE OF USE ACROSS VARIOUS APPLICATIONS, WE HAVE EARNED A POSITION AS MARKET LEADER, WORKING WITH OEM CUSTOMERS.



MOBILE REFRIGERATION MAINTAIN THE COLD CHAIN

APPLICATION NOTE



30%

SAVINGS POSSIBLE
BY BUILDING A FLEXIBLE,
BATTERY DRIVEN
REFRIGERATION SYSTEM
THAT FOLLOWS FOOD TO
THE END OF THE COLD
CHAIN

Modern comfort is brought into life when leaving home. As people go mobile, so does food. The excellent performance of the BD series safeguards food preservation. With our outstanding DC compressors for cars, vans, boats, trucks, etc., Secop has transcended the barriers for mobile refrigeration.

MOBILE FOOD SERVICE COOLING IS CRITICAL



In a shrinking world, consumers take it for granted that their food arrives fresh - no matter how far it has travelled. Increasing pressure from consumers has led to many countries imposing strict regulations on food transport safety. The cold chain has become more important than ever. Ironically, it's the last link in an often-lengthy cold chain that can pose the greatest risk.

The journey from retailer to restaurant, from harbour to wholesaler, is often undertaken by smaller operators who trust to ice-packing or insulated boxes to hopefully maintain the required temperature for food safety. Even though food quality and shelf life deteriorate quickly when the temperature rises in the back of a car or van, investment in a dedicated refrigerated van is considered economically unviable by many local operators.

Fresh, safe and economical

However, an expensive, impractical, especially adapted refrigerated van is no longer the only option on the market. In recent years, mobile cooling solutions have become increasingly competitive – and the latest solutions are far more economical, practical and efficient.

The most economical and efficient solution for small-scale transport is to use a mobile refrigeration unit that easily fits into cars and vans, which powered by the car's own battery.

The advantages of such a solution are clear: it is no longer necessary to alter the vehicle. Cabinets can also be moved from vehicle to vehicle and even run on 220 V AC with the help of an inverter when the engine is turned off.

In addition the systems are more energy efficient and can be custom built to a wide range of sizes – depending on storage requirements.

What is HACCP?

HACCP stands for Hazard Analysis Critical Control Points. The guiding principle is that all critical points in the supply chain from farm to fork are closely monitored using regular spot checks.

Critical risks are always present when perishable food is exposed to high temperatures. For example, while shopping or delivering to a customer. HACCP defines limiting values for all critical points and continuously checks and monitors them.

A mobile refrigeration box with a built-in Secop BD compressor will smooth the way to achieving HACCP certification.

The positive outcomes

- Better quality with healthier and safer food
- More profit through better process management
- Prevention of legal risks and damage to reputation



Cafe au Lait

Global Fruit
Global Fruit
Global Fruit

Features

Runs directly on the van batteries



Keeps the goods active cooled, also when the van is stopped for loading and unloading.

High efficiency
Low current consumption



Energy savings. Makes it possible to cool also when the van's motor is stopped.

Variable speed/capacity



Energy savings. Adapt speed to cooling requirement.

Direct 12/24 V DC power supply



Same compressor can be used globally. One product covers the world.

Modbus communication connection



Customers can make their own control box including control of the BD compressor.

Electronic thermostat



Cost savings. No extra thermostat needed. Less components and failure modes.

Alarm and event logs



Make identification of errors fast and easy servicing. Reduced service costs.

Fan speed control 40-100%
Start/stop delays



Less components, less costs, less wiring, less installation costs.

Advanced battery protection function



Safety. The battery will never be drained Safe start of the van every time.

Benefits



- Van can be bought as standard and no extra work at car "Body-builder"
- Refrigeration when the engine is stopped
- Possible to use both battery and AC utility by means of a converter
- The box is mobile and can be handled separately.
Can be used as extra refrigerator and can be loaded directly in the cooling or freezer room
- Lower energy consumption (lower CO₂ emission per kilometer)
- When not used to carry refrigerated food the van can be used for other purposes
- Reselling of the van much easier
- No hygiene issues at the van itself
- "Streamlined" van (lower wind resistance – lower energy consumption – lower CO₂ emission)
- Operation and service much easier





Cooling trailers

Suppliers of food and beverages to marketplaces, parties, rallies or other events will benefit from a cooling trailer that will serve guests safe food and well-chilled beverages all day long.



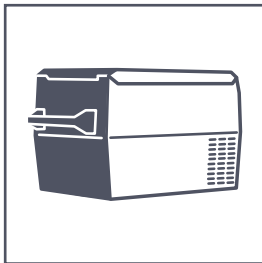
Van cooling boxes

With a refrigeration/freezer box in your van, you can deliver frozen and refrigerated goods without worrying about the temperature.



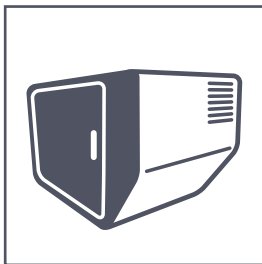
Supermarket cooling trolleys

A supermarket cooling trolley maintains storage temperature between the lorry and the refrigerator or frozen counter.



Portable cooling boxes

Blood, pharmaceuticals, vaccines and infusions are easily transported and kept at the correct temperature in a portable cooling box.



Air cargo containers

Controlling the temperature of food and beverages is essential for ensuring passengers' comfort, health and safety on long haul flights.



Simply cooler compressor

The BD compressor series from Secop makes it easy for retailers to comply with existing food safety regulations and standards. They are especially suited for use in mobile applications like delivery vans, small trucks, cars, trolleys or air cargo containers. The range now makes it possible to equip vehicles with transportable refrigerators and freezers that maintain storage temperatures during transportation.

With capacities up to 1,000 litres for refrigerators and 500 litres for freezers, the BD compressor range delivers outstanding temperature control that always maintains the temperature in the box. With a choice of refrigerants and multi-voltage options the compressors have been constructed to stand high ambient temperatures up to 55°C.

Economical

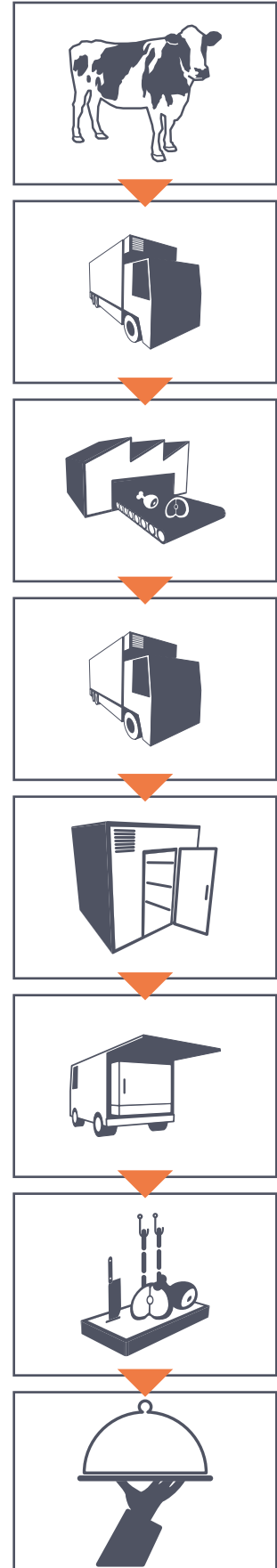
A refrigeration box can be supplied as a simple accessory from a car dealer because no mounting pre-work is required on the car. An average solution costs around 25% that of a conventional installation - and simple demounting means a good resale value is maintained.

Practical

To save energy, the car remains streamlined with no external parts, while the robust design of the compressors can withstand shocks and vibrations while driving. Running on AC and DC, refrigeration and freezer boxes operate even when the engine is switched off, and can be used both in the car or outside. They are also easy to clean and service.

Efficient

Active temperature control contributes to a highly efficiency system with low energy consumption and silent operation, while a choice of refrigerants and leak-proof design make it environmentally safe.



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CASE STORY

EUROENGEL

BJARKE DELIVERS FOOD WITH A GOOD CONSCIENCE



F0330 NDN container,
copyright Euroengel Srl

The local supermarket manager in Løgumkloster, Denmark, has bought a cooling box for his delivery van. This way, the beef stays refrigerated all the way from the local branch of the supermarket chain SuperBrugsen to Mrs Peterson's front door – and the manager is ready to meet future legislative requirements.

A Euro-pallet, an automatic timer at the price of three euros and a 12 volt plug – that is about all supermarket manager Bjarke Ibsen from Løgumkloster needed to make his new 330 liter delivery van cooling box work.

During the night, the cooling box is placed on the Euro-pallet in the warehouse. At 6 a.m., the timer turns on the power ensuring that the temperature is exactly 1 °C when Bjarke arrives at work in the morning. Then, all he has to do is fetch the pallet lifter, place the box inside the van, and plug in the 12 volt power supply.

“The box runs on the car battery, independently of the engine. It is very easy to operate and it improves the process of delivering food to private homes and businesses,” says Bjarke Ibsen.

TIGHTENING OF LEGAL REQUIREMENTS

Then there's the aspect of a good conscience. Not only retirees, kindergarten kids, and companies can enjoy refrigerated meals during summer, Bjarke is also certain that he is complying with existing and future food requirements of the Danish Ministry of Food, Agriculture, and Fisheries. Law requirements dictate that the temperature of fresh foods which shop or restaurant owners deliver to commercial customers must not exceed 5 °C.

“At the moment, random checks do not occur regularly, but I am sure this will change. The requirements of food safety are increasingly tightening and I prefer to be a co-player at the forefront of developments rather than trying to shirk my responsibility,” explains Bjarke Ibsen.

INSPIRATION THANKS TO A NEIGHBOUR

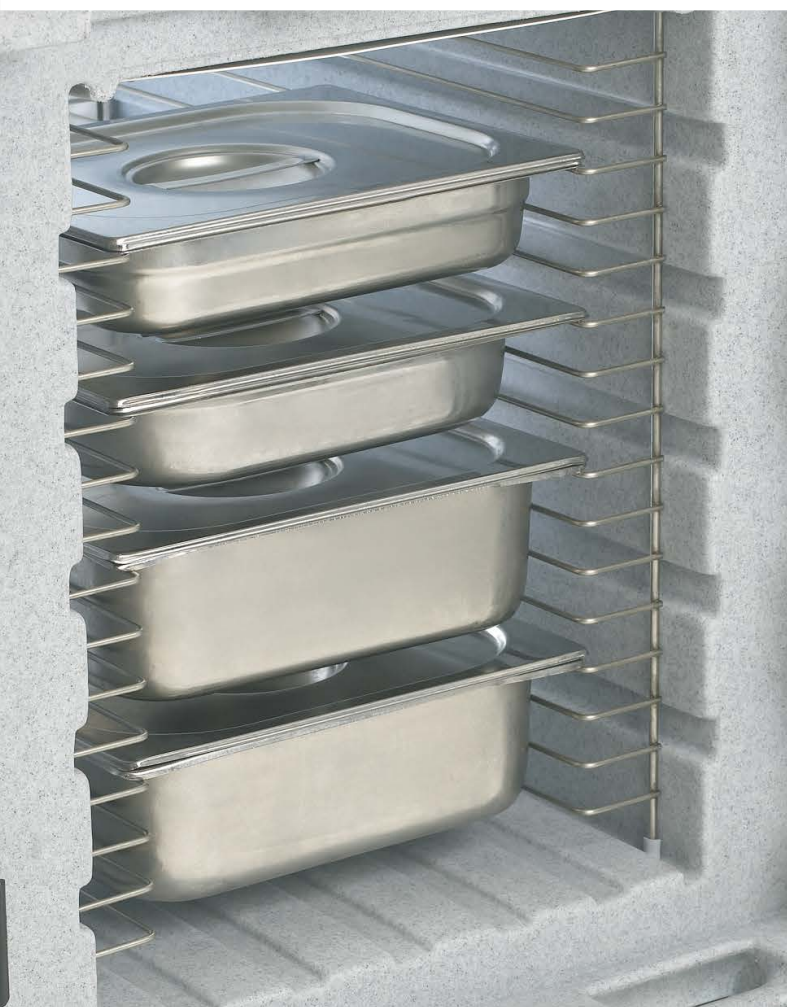
In spite of the obvious advantages of the cooling box, Bjarke did not even know it existed until a neighbour told him about it during a weekend chat.

Bjarke's neighbour works as an engineer at Secop (formerly Danfoss Compressors). When he heard that Bjarke wanted to maintain food temperature during transport, but could not afford a refrigerated van costing 35,000 euros, he immediately invited Bjarke to visit Secop.

“They had a ready-for-use demonstration model and it was a natural choice. I bought it on the spot and still wonder why I had not thought of that before. The box is considerably less expensive than a standard van rebuilt to transport refrigerated food,” says Bjarke Ibsen.

The Italian company Euroengel is the producer of the cooling box which is designed for mobile transport. The Secop BD50F compressor for mobile applications which operates the refrigeration system of the box runs on the car's 12 volt battery or 230 volt power supply networks.

The cooling box does not require a special van layout, so it will not be difficult for Bjarke Ibsen to re-sell it once the supermarket needs a new van.



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CASE STORY

VIBOCOLD/EUROENGEL

PORTABLE FREEZERS HAVE BECOME A COOL SOLUTION FOR THE DANISH HEALTH CARE SYSTEM



F0915 NDH container control board.
copyright Euroengel Srl

The Danish commercial refrigeration distributor Vibocold has successfully brought Euroengel's portable freezers to Denmark's health care system. With the use of Secop's hermetic compressors which are specifically designed for mobile use, the freezers have turned out to be extremely suitable for transportation of blood samples and other perishable goods.

The combination of new blood sample procedures and stricter regulations on medical transportation has created a demand for cooling solutions with greater precision and greater versatility. The portable freezers from Euroengel, which are based on innovative Secop compressor technology, have become a big success for Vibocold. So far, Vibocold has distribution in almost every region in Denmark. One of them – the region of Northern Jutland – has already 17 portable freezers in use.

CENTRALIZATION CREATES NEW TRANSPORTATION NEEDS

The decision to move the treatment of blood samples from the general practitioners to a few laboratories has created a need for high-quality portable freezers. During transportation from the clinic to the laboratory, the blood must have a constant temperature of 21 °C. Otherwise, the risk of delaying the sample or destroying increases. "The portable freezers from Euroengel prevent this due to an electronic thermostat, constant ventilation, and an integrated heater. This keeps the temperature within the range of +/- 1 °C – even under extreme weather conditions," explains Uffe Nitschke, Sales Consultant at Vibocold.

A PRODUCT WITH NUMEROUS BENEFITS

A number of things distinguish the portable freezers from Euroengel from other solutions. "First of all, there is the overall quality of the box. Then there is the rotomolded cabinet that makes the freezers very durable, hygienic, and easy to clean, which is very important when transporting such perishable goods. Moreover, it has had a positive effect on sales that the freezers are easy to mount and very competitive on price," continues Uffe Nitschke.

CUSTOMIZED SOLUTIONS AND ADJUSTMENTS

The versatility of the freezers using Secop's BD80F compressors, which is a result of the close cooperation between Euroengel and Secop, has also made it easy to create customized solutions and adjustments. "We can mount extra batteries with timer function so the freezers can start up by themselves in good time in the morning. We have also developed solutions with external batteries for small portable freezers used for short-distance transportation; i.e. transportation from one department to another in hospitals where the freezers ensure that the cooling chain is not broken on the way. For many of these purposes, we mount wireless temperature monitoring which has become something of a speciality for us," ends Uffe Nitschke.



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CASE STORY

COOL CONTAINERS

SECOB BD COMPRESSORS DELIVER RELIABLE TEMPERATURE CONTROL TO COLD CHAIN CONTAINER



PharmaPort 360™ container,
copyright Cool Containers

Global demand for biological-based drugs is increasing and with it, the demand for reliable, efficient, and cost-effective temperature-controlled transportation. Today's high value pharmaceuticals, vaccines, biologics, and other temperature-dependent materials require an unbroken cold chain from production to patient. They must also be capable to withstand wide fluctuations of ambient temperatures. To meet this demand, Cool Containers – Ohio (USA) recently introduced the PharmaPort 360™, an innovative, temperature-controlled freight container that uses Secop BD direct current compressors distributed by Danfoss. The PharmaPort 360™ exceeds rigorous health-care industry standards for temperature-sensitive compliance during transportation.

Until recently, manufacturers turned to a variety of shipping options that relied on gel packs, dry ice, and operating compressors to effectively cool their temperature-sensitive products during transport.

The PharmaPort 360™ container maintains strict temperatures, allowing it to tolerate a significantly wider range of extreme ambient temperature changes while eliminating the need for gel packs, dry ice, or compressors that run during transport.

The Secop BD compressors operate prior to shipment, freezing the container's cold plate so that cold energy can be stored and used during transport to maintain specified temperatures.

The innovative cargo container assures safe, door-to-door transport for optimum viability of contents upon arrival. Rather than moving from one cold transportation unit to the next, the container itself is moved, without the need for a refrigerated truck or temporary refrigerated holding locations.

APPROVED BY THE FAA

Cool Containers has secured approval from the U.S. Federal Aviation Administration (FAA) for use of the PharmaPort 360™ in commercial and military air transport. Because the unit's compressors and heaters are inactive during transport, the container is approved for use in lower decks of wide-body passenger aircrafts, and can also be loaded into upper-deck positions of narrow and wide-body freighter aircrafts.

In addition to FAA approval, the PharmaPort 360™ meets or exceeds World Health Organization "Cold Chain Storage and Distribution" guidelines. The containers are available from UPS Temperature True, the company's dedicated temperature-sensitive service.

EFFICIENT AND RELIABLE

Cool Containers are pleased with the energy performance of the unit and the compressors that support it. Cool Container's energy usage studies have shown that charging the PharmaPort system (with the Secop compressors running) over a 12-hour period requires less than six kilowatt-hours, or only about \$0.50 worth of electricity. Choosing Secop BD350GH compressors distributed by Danfoss to be part of the solution was not difficult. Cool Containers was looking for the best, most reliable transport compressor – and Cool Container already has a good experience with the Danfoss product line.

The compressors are tailored for mobile transport and are unbeatable when it comes to dealing with changing climatic conditions and vibrations under harsh road conditions around the world. They feature silent operation, a compact, lightweight design, speed/capacity control and energy optimization for efficient and reliable performance, which is so important to the design team. (Copyright Danfoss EnVisioneeringSM 2012)



BD50F • BD80F • BD250GH.2 • BD350GH • BD220CL compressors for mobile refrigeration units (60 - 1000 litres)

General	BD50F (R134a)	BD80F (R134a)
Compressor (without electronic unit)	101Z1220	101Z0280
Electronic unit	101N0510	101N0390

Application

Application	LBP/MBP/HBP	LBP
Evaporating temperature °C	-30 to -5 (0)	-30 to -5
Voltage range	12-24 V DC (9.6-17.0, 21.3-31.5 V DC) 100-240 V AC, 50/60 Hz	12-24 V DC (9.6-17.0, 21.3-31.5 V DC)

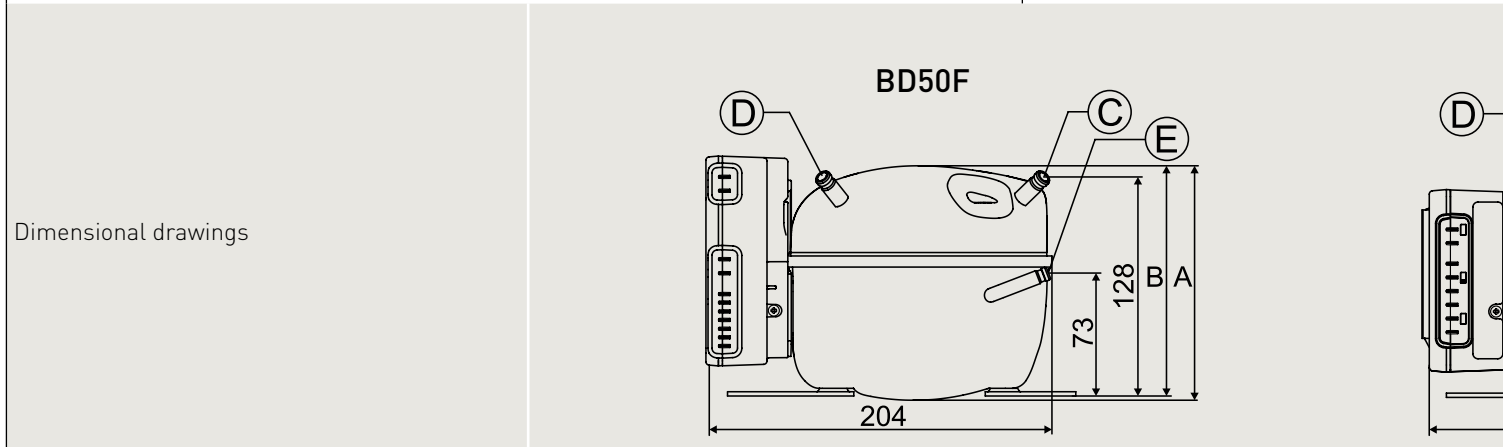
Performance data (CECOMAF, 12 V DC)*	3,500 rpm • static cooling				4,400 rpm • static cooling			
Evaporating temperature °C	-30	-20	-10	-5	-30	-20	-10	-5
Cooling capacity W	37	71	123	157	55	105	176	221
Power consumption W	45	68	91	104	66	100	138	161
Current consumption A	3.9	5.6	7.6	8.7	2.8	4.2	5.8	6.7
COP W/W	0.82	1.04	1.35	1.51	0.83	1.05	1.27	1.37

Performance data (ASHRAE, 12 V DC)*	3,500 rpm • static cooling				4,400 rpm • static cooling			
Evaporating temperature °C	-30	-20	-10	-5	-30	-20	-10	-5
Cooling capacity W	46	88	152	194	68	130	218	274
Power consumption W	45	68	91	104	66	100	138	161
Current consumption A	3.9	5.6	7.6	8.7	2.8	4.2	5.8	6.7
COP W/W	1.01	1.29	1.68	1.89	1.02	1.30	1.58	1.71

Performance data (ASHRAE, 12 V DC)*	3,500 rpm • static cooling				4,400 rpm • static cooling			
Evaporating temperature °F	-20	0	20	30	-20	0	20	30
Cooling capacity BTU/h	168	342	613	792	252	502	867	1106
Power consumption W	47.7	72.9	98.7	113	70	108	152	180
Current consumption A	4.0	6.0	8.3	9.5	5.9	9.0	12.7	15.0
EER BTU/Wh	3.53	4.69	6.21	6.99	3.58	4.65	5.69	6.12

Dimensions

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



BD250GH.2 (R134a)	BD350GH (R134a)	BD220CL (R404A/R507)
101Z0406	102Z3015	102Z3020
101N0390	101N0800 + 101N0820 (alt. 101N0830)	101N0800 + 101N0820 (alt. 101N0830)

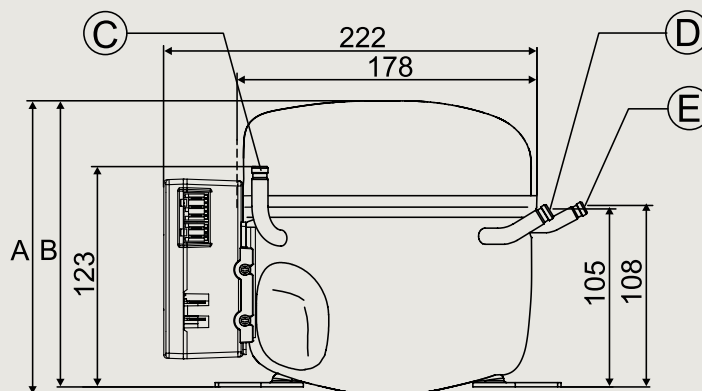
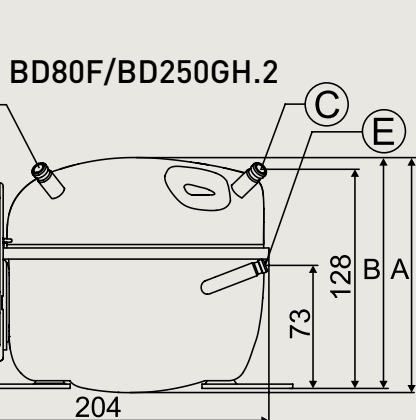
LBP/MBP/HBP -25 to 15	LBP/MBP/HBP -25 to 15	LBP -45 to -5
12-24 V DC (9.6-17.0, 21.3-31.5 V DC)	12 V DC (9.6-17.0 V DC)	12 V DC (9.6-17.0 V DC)

4,400 rpm • static cooling				4,000 rpm • fan cooling				4,000 rpm • fan cooling			
-25	-20	-10	0	-25	-20	-10	0	-45	-30	-20	-5
61	87	156	251	126	169	282	440	41	158	275	530
65	78	104	132	140	168	228	292	94	172	223	314
2.7	3.2	4.1	5.3	11.7	14.0	19.0	24.3	7.9	14.3	18.6	26.2
0.94	1.11	1.51	1.89	0.90	1.01	1.24	1.51	0.43	0.92	1.23	1.70

4,400 rpm • static cooling				4,000 rpm • fan cooling				4,000 rpm • fan cooling			
-25	-20	-10	0	-25	-20	-10	0	-45	-30	-20	-5
76	109	194	311	156	209	349	546	47	183	320	617
65	78	104	132	140	168	228	292	94	172	223	314
2.7	3.2	4.1	5.3	11.7	14.0	19.0	24.3	7.9	14.3	18.6	26.2
1.18	1.39	1.88	2.36	1.11	1.25	1.54	1.88	0.50	1.06	1.43	1.96

4,400 rpm • static cooling				4,000 rpm • fan cooling				4,000 rpm • fan cooling			
-13	0	20	30	-13	-4	14	32	-49	-22	-4	23
265	458	819	1044	531	713	1192	1864	161	624	1090	2105
72	96	121	130	140	167	226	290	94	172	223	314
2.6	3.5	5.0	5.7	11.7	13.9	18.9	24.2	7.9	14.3	18.6	26.2
3.67	4.78	6.76	8.05	3.80	4.27	5.26	6.42	1.71	3.62	4.89	6.69

137	173	173
135	169	169
6.2 40°	6.2 90°	6.2 90°
Cu-plated steel Al cap	Cu-plated steel Al cap	Cu-plated steel Al cap
6.2 45°	6.2 31.5°	6.2 31.5°
Cu-plated steel Al cap	Cu-plated steel Al cap	Cu-plated steel Al cap
5.0 21°	5.0 28°	5.0 28°
Cu-plated steel Al cap	Cu-plated steel Al cap	Cu-plated steel Al cap
±0.09, on 5.0 +0.12/+0.20	±0.09, on 5.0 +0.12/+0.20	±0.09, on 5.0 +0.12/+0.20



8740-3

BD350GH/BD220CL

ALWAYS THE RIGHT CHOICE

At Secop, we believe some of the refrigeration industry's most pressing challenges present an opportunity to do what we do best: engineer innovative refrigeration solutions that address the energy, environmental and food safety concerns of our customers.

By delivering the right people, products and tools, Secop can assist you in providing competitive, future-proof refrigeration units to your customers. The series of BD compressors is an example of this commitment.



OUR JOURNEY SO FAR

1956 Production facility and headquarters in Flensburg, Germany founded.	1970 Introduction of SC compressors. The birth of a standard-setting platform in the light commercial market.	1990 Introduction of NL compressors.	1992 Introduction of PL compressors.	1999 Start of production with natural refrigerant R290 (propane).	2005 Introduction of GS compressors.	2008 Production facility in Wuqing, China founded.	2013 Introduction of the XV compressor - opening a new chapter in refrigeration history. Secop acquires ACC Fürstenfeld, Austria.
1958 Start of production for PW compressors.	1972 Introduction of FR compressors.	1977 Introduction TL and BD compressors.	1993 Start of production with natural refrigerant R600a (isobutane). Production facility in Crnomelj, Slovenia founded.	2002 Production facility in Zlate Moravce, Slovakia founded.	2010 Introduction SLV-CNK.2 and SLV-CLK.2 variable speed compressors. Introduction BD1.4F Micro DC compressor. Introduction of DLX and NLU compressors.	2015 New generation of energy-efficient propane compressors. New variable speed platforms for household and light commercial applications.	



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