WE HAVE MORE THAN 40 YEARS OF EXPERIENCE IN 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.

SECOP

HERMETIC COMPRESSORS FOR DC VOLTAGE

PART I
BD COMPRESSORS – PRODUCT RANGE


TOOL4COOL®
Flexible control settings

TOOL4COOL® Software
Tool4Cool® is a unique PC software tool that enables you to precisely configure your Secop BD compressors to your cooling systems.
Via microprocessor-based controllers, Tool4Cool® gives you easy access to all parameters. These can be changed, monitored, downloaded or uploaded to get the optimum performance out of your cooling system.

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.










Compressors R134a R404A/R507 * R600a **, R290 *** R1234yf ****	Capacity [W] at max. speed ***** EN12900 Household/CECOMAF | ASHRAE Evaporating temperature [°C]													
	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
BD35F /-B /-HD.2			27 | 34	36 | 45	40 | 51	50 | 63	70 | 87	94 | 117	122 | 153					
BD50F			37 | 46	52 | 64	58 | 72	71 | 88	95 | 117	123 | 152	157 | 194					
BD80F			55 | 68	78 | 96	87 | 108	105 | 130	138 | 170	176 | 218	221 | 274					
BD250GH.2				61 | 76	69 | 86	87 | 108	119 | 148	156 | 194	200 | 249	251 | 311	308 | 383	336 | 418	373 | 465	446 | 556
BD250GH.2 /-HD (48V)				64 | 80	73 | 91	91 | 113	124 | 153	162 | 201	208 | 257	261 | 323	322 | 400	352 | 437	392 | 488	472 | 589
BD350GH (12V)				126 | 156	139 | 173	169 | 209	220 | 273	282 | 349	355 | 440	440 | 546	540 | 670	588 | 731	654 | 814	786 | 979
BD350GH (24V)				126 | 156	139 | 173	169 | 209	220 | 273	282 | 349	355 | 440	440 | 546	540 | 670	588 | 731	654 | 814	786 | 979
BD350GH (48V)				121 | 150	135 | 167	164 | 203	216 | 267	277 | 343	350 | 434	436 | 540	535 | 664	584 | 725	650 | 808	781 | 973
BD220CL *	83 | 96	121 | 140	166 | 193	220 | 255	240 | 279	283 | 328	355 | 413	439 | 511	535 | 624					
BD35K /-B **			25 | 31	36 | 44	40 | 49	49 | 60	65 | 79	84 | 102	106 | 129					
BD50K **			30 | 36	42 | 51	47 | 57	58 | 70	77 | 94	101 | 123	129 | 158	162 | 198	199 | 244	218 | 266	242 | 296	
BD80CN ***	31 | 35	45 | 51	62| 69	82 | 91	90 | 100	105 | 118	133 | 148	164 | 184						
BD100CN ***	44 | 49	62 | 70	83 | 93	108 | 120	117 | 131	137 | 153	170 | 190	209 | 233						
BD1.4F-VSD.2/.3 /-HD			12 | 15	23 | 29	27 | 34	36 | 45	52 | 65	71 | 88	92 | 114	116 | 144	142 | 177	155 | 193	172 | 214	203 | 254
BD1.4F-VSD.3 ****			13 | 17	24 | 32	29 | 38	38 | 50	54 | 70	71 | 93	91 | 118	111 | 145	134 | 174	144 | 188	158 | 206	182 | 239
BD1.4F-AUTO.3				16 | 20	19 | 24	26 | 32	37 | 47	51 | 64	67 | 84	85 | 106	105 | 131			
BD1.4F-AUTO.3 ****				17 | 23	21 | 27	27 | 35	39 | 50	52 | 68	67 | 87	83 | 108	100 | 130			

***** Please refer to the individual compressor data sheets for the complete application range.

Compressors R134a R404A/R507 * R600a **, R290 *** R1234yf ****	Code numbers	Power consumption [W] at max. speed ***** Evaporating temperature [°C]												
		-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
BD35F /-B /-HD.2	101Z0200 /204 /205 /216			35	41	44	49	57	66	75					
BD50F	101Z1220 /0203			45	57	61	68	80	91	104					
BD80F	101Z0280			66	83	89	100	118	138	161					
BD250GH.2	101Z0406				65	69	78	91	104	117	132	150	158	170	194
BD250GH.2 /-HD (48V)	101Z0405 /410				72	77	85	99	113	128	143	160	167	177	196
BD350GH (12V)	102Z3015				140	149	168	197	228	259	292	325	340	358	391
BD350GH (24V)	102Z3016				122	129	144	169	194	221	248	276	288	303	330
BD350GH (48V)	102Z3031				131	139	155	181	208	236	265	294	307	323	352
BD220CL *	102Z3020	121	147	173	200	209	227	255	284	314					
BD35K /-B **	101Z0211 /214			34	41	44	48	54	60	67					
BD50K **	101Z0213			42	50	53	59	68	77	86	94	103	107	111	
BD80CN ***	101Z0403	47	55	63	72	75	81	89	97						
BD100CN ***	101Z0401	55	66	78	89	93	100	110	120						
BD1.4F-VSD.2/.3 /-HD	109Z0206 /209 /250 /251			27	34	36	41	48	55	61	68	75	77	81	87
BD1.4F-VSD.3 ****	109Z0209			30	37	40	44	51	57	63	68	74	76	78	83
BD1.4F-AUTO.3	109Z0106				24	26	29	34	39	45	50	56			
BD1.4F-AUTO.3 ****	109Z0106				26	28	31	36	41	46	51	55			

BD COMPRESSORS
ELECTRONIC UNITS & APPLICATIONS

Compressors R134a R404A/R507 * R600a ** R290 ***	Code numbers	Electronic units (voltages & code numbers)										
		Standard 12-24V DC 101N0212	High Speed 12-24V DC 101N0390	AEO 12-24V DC 101N0340	Solar 10-45V DC 101N0420	AC/DC converter 12-24V DC & 100 -240V AC 101N0510	Automotive 12-24V DC 101N0650	101N08xxx 12V DC 101N0820+0800 (alt.: 101N0830)	101N8xxx 24V DC 101N0820+0810	101N07xx 24V DC 101N0715	Telecom 48V DC 101N0720	Telecom 48V DC 101N0732
BD35F	101Z0200	✓		✓	✓	✓	✓					
BD35F (inch con.)	101Z0204	✓		✓	✓	✓	✓					
BD35F-B	101Z0205	✓		✓		✓	✓					
BD35F-HD.2	101Z0216	✓		✓			✓					
BD50F	101Z1220	✓		✓		✓	✓					
BD50F (inch con.)	101Z0203	✓		✓		✓	✓					
BD80F	101Z0280		✓									
BD250GH.2	101Z0406		✓									
BD250GH.2 (48V)	101Z0405											✓
BD250GH.2-HD (48V)	101Z0410											✓
BD350GH (12V)	102Z3015							✓+✓				
BD350GH (24V)	102Z3016								✓+✓	✓		
BD350GH (48V)	102Z3031										✓	
BD220CL *	102Z3020							✓+✓				
BD35K /-B **	101Z0211 /214	✓		✓	✓	✓	✓					
BD50K **	101Z0213		✓									
BD80CN ***	101Z0403	✓		✓		✓	✓					
BD100CN ***	101Z0401		✓									
TOOL4COOL® applicable		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Compressors R134a R134a/R1234yf *	Code numbers	Electronic units		
		Variable Speed (VSD) 12-24V DC 101N2100	Variable Speed (VSD) w. AC/DC converter 12-24V DC & 100 -240V AC 101N5100	Automotive 12V DC 101N1010
BD1.4F-AUTO.3 *	109Z0106			✓
BD1.4F-VSD.3 *	109Z0209	✓		
BD1.4F-VSD-HD	109Z0250	✓		
BD1.4F-VSD.2 (inch connectors)	109Z0206	✓	✓	
BD1.4F-VSD-HD (inch connectors)	109Z0251	✓		
TOOL4COOL® applicable		✓	✓	✓

Applications	Compressors													
	BD1.4F-AUTO.3	BD1.4F-VSD.2	BD1.4F-VSD-HD	BD35F	BD35F-B	BD35F-HD.2	BD35K /-B	BD50K	BD50F	BD80F	BD80CN	BD100CN	BD250GH.2	BD350GH	BD220CL
Truck refrigerators		✓	✓	✓		✓	✓	✓	✓		✓				
Boat refrigerators		✓		✓			✓	✓	✓	✓	✓	✓			
Bus refrigerators		✓		✓	✓		✓	✓			✓				
Portable boxes		✓		✓			✓	✓	✓	✓					
Car minbars (high end)	✓	✓		✓			✓								
Car minibars (SUV, MPV)		✓		✓			✓								
Spot cooling (e.g. trucks)													✓	✓	
Van boxes									✓	✓	✓	✓	✓	✓	✓
Battery cooling													✓	✓	
Solar cabinets				✓			✓	✓	✓		✓	✓			

BD1.4F-AUTO.3 and BD1.4F-VSD.3
R134a / R1234yf, -30°C, +5 and +15 / 0°C evap. temp.
In-car cabinets and all mobile applications for portable boxes, boats, trucks etc.,
14-108 W and 7-218 W / 5-85 W cooling capacity*.

BD80/100CN
R290, -40°C, -10°C evap. temp.
Freezer application (not approved for vehicles), solar-powered systems, ice cream boxes up to 200 l,
20-164 W / 31-209 W cooling capacity*.

BD35K Multivoltage and BD50K
R600a, -30°C, +10°C evap. temp.
Solar-powered vaccine coolers etc., 100-250 l coolers, 13-242 W cooling capacity*.
BD35K can be powered with AC and DC, 85-240 V AC 50/60 Hz, 12-24 V DC,
automatic selection of AC when available.

BD250GH.2
R134a, -25°C, +15°C evap. temp.
Designed for cabin cooling in trucks during nighttime, very silent operation,
32-446 W cooling capacity*.

BD35F/50F Multivoltage
R134a, -30°C, +10°C evap. temp.
All mobile applications for portable boxes, boats, trucks etc., can be powered with AC and DC,
85-240 V AC 50/60 Hz, 12-24 V DC, automatic selection of AC when available,
15-152 W / 20-191 W cooling capacity*.

BD35F/50F/80F Basic
R134a, -30°C, +10°C evap. temp.
All mobile applications for portable boxes, boats, trucks etc.,
15-152 W / 20-191 W / 35-221 W cooling capacity*.

BD350GH
R134a, -25°C, +15°C evap. temp.
Tailored for spotcooling systems in sleeping compartments in trucks, caravans, golf buggies etc.,
85-786 W cooling capacity*.

* Test conditions	EN 12900/CECOMAF
Condensing temperature	55°C
Ambient temperature	32°C
Suction gas temperature	32°C
Liquid temperature	no subcooling

CODE NUMBERS

BD35/50/80F | BD250GH.2
BD35F-HD.2 | BD35F-B
BD35/50K | BD80/100CN

Compressors	Code number	Description
BD35F	101Z0200	standard compressor, mm tube connectors
BD35F inch	101Z0204	same as 101Z0200, inch tube connectors
BD35F-B	101Z0205	optimized for rough vehicle motions (especially in buses), mm tube connectors
BD35F-HD.2	101Z0216	heavy duty version which can handle extreme vibrations, mm tube connectors
BD35K (R600a)	101Z0211	mainly solar applications, mm tube connectors
BD35K-B (R600a)	101Z0214	optimized for rough vehicle motions (especially in buses), other HD applications, mm tube connectors
BD50K (R600a)	101Z0213	standard compressor, mm tube connectors
BD50F	101Z1220	standard compressor, mm tube connectors
BD50F inch	101Z0203	same as 101Z1220, inch tube connectors
BD80F	101Z0280	standard compressor, mm tube connectors
BD250GH.2	101Z0406	mm tube connectors, HBP compressor
BD80CN (R290)	101Z0403	mm tube connectors
BD100CN (R290)	101Z0401	mm tube connectors

Electronic Unit Single Pack	Code number	Description
Standard (2nd generation) for gateway or sensors refer to page 9	101N0212	for BD35F/BD50F/BD35K, speed setting, battery protection, ECO function, communication interface for PC software Tool4Cool®, high starting torque (HST), reduced EMI and leakage current
AEO	101N0340	for BD35F/BD50F/BD80CN, Adaptive Energy Optimization
High speed	101N0390	for BD80F/BD250GH.2/etc., Adaptive Energy Optimization, speed setting, battery protection
Solar 10-45 V DC	101N0420	for BD35F/BD35K, optimized for direct solar panel operation, speed setting
AC/DC converter	101N0510	for BD35F/BD50F/BD35K, speed setting, battery protection, integrated AC/DC converter
Automotive (2nd generation) for gateway or sensors refer to page 9	101N0650	for BD35F/BD50F, speed setting, battery protection, ECO function, communication interface for PC software Tool4Cool®, high starting torque (HST), significant reduced EMI and leakage current
Remote kit with cable	105N9100	bracket, cover, 750 mm cable with two plugs
Remote kit without cable	105N9210	bracket, cover, two plugs

Electronic Unit I - Pack	Code number	Description
Standard (2nd generation) for gateway or sensors refer to page 9	101N0213 101N0215	for BD35F/BD50F/BD35K, speed setting, battery protection, ECO function, communication interface for PC software Tool4Cool®, high starting torque (HST), reduced EMI and leakage current, 30 pcs.
AEO	101N0341	for BD35F/BD50F/BD80CN, Adaptive Energy Optimization, 30 pcs.
High speed	101N0391	for BD80F/BD250GH.2/etc., Adaptive Energy Optimization, speed setting, battery protection, 30 pcs.
Solar 10-45 V DC	101N0421	for BD35F/BD35K, optimized for direct solar panel operation, speed setting, 30 pcs.
AC/DC converter	101N0511	for BD35F/BD50F/BD35K, speed setting, battery protection, integrated AC/DC converter, 28 pcs.
Automotive	101N0601	for BD35F, speed setting, battery protection, lamp output, 30 pcs.
Automotive (harness connector)	101N0631	for BD35F, speed setting, battery protection, lamp output, 30 pcs.
Automotive (2nd generation) for gateway or sensors refer to page 9	101N0651	for BD35F/BD50F, speed setting, battery protection, ECO function, communication interface for PC software Tool4Cool®, high starting torque (HST), significant reduced EMI and leakage current, 30 pcs.
Remote kit without cable	105N9200	bracket, cover and two plugs, 200 pcs.

CODE NUMBERS
BD250GH.2 | BD350GH
WITH 101N07XX SERIES CONTROLLERS

	Item	Code number	Description
Compressors	BD250GH.2 48 V DC supply	101Z0405	for telecommunication applications (battery cooling)
	BD350GH 24 V DC supply	102Z3016	for cooling and comfort cooling in trucks and vans
	BD350GH 48 V DC supply	101Z3031	for telecommunication applications (battery cooling)
Single-Pack	Electronic unit 24 V DC	101N0715	for BD350GH (24 V), 40/60 W fan output, ECO function
	Electronic unit 48 V DC	101N0732	for BD250GH.2 (48 V), 60 W fan output, ECO function
	Electronic unit 48 V DC	101N0720	for BD350GH (48 V), 60 W fan output, ECO function
	48 V DC line cord, 900 mm, 6mm^2	105N9542	accessories
	48 V DC line cord, 2000 mm, 6 mm^2	105N9540	accessories
	48 V DC line cord, 5000 mm, 6 mm^2	105N9538	accessories
	Temperature sensor, 470 mm, spade connectors	105N9612	accessories
	Temperature sensor, 1000 mm, spade connectors	105N9614	accessories
	Temperature sensor, 1500 mm, spade connectors	105N9616	accessories
	Secop One Wire/LIN gateway with cables & driver	105N9501	accessories
Industrial-Pack (I-Pack)	Electronic unit 24 V DC	101N0714	for BD350GH (24 V), 36 pcs.
	Electronic unit 48 V DC	101N0733	for BD250GH.2 (48 V), 36 pcs.
	Electronic unit 48 V DC	101N0721	for BD350GH (48 V), 36 pcs.
	Communication cable, 1500 mm, AMP connector	105N9545	100 pcs.
	Communication cable, 3000 mm, AMP connector	105N9547	50 pcs.
	48 V DC line cord, 900 mm, 6 mm^2	105N9543	36 pcs.
	48 V DC line cord, 2000 mm, 6 mm^2	105N9541	36 pcs.
	48 V DC line cord, 5000 mm, 6 mm^2	105N9539	36 pcs.
	Temperature sensor, 470 mm, spade connectors	105N9613	200 pcs.
	Temperature sensor, 1000 mm, spade connectors	105N9615	100 pcs.
	Temperature sensor, 1500 mm, spade connectors	105N9617	100 pcs.
	Temperature sensor, 400 mm, AMP connector	105N9611	200 pcs.
Software	Tool4Cool® LabEdition	download from: **https://www.secop.com/solutions/application-show/variable-speed-drive-software-tool4cool**	

CODE NUMBERS
BD350GH | BD220CL
WITH 101N08XX SERIES CONTROLLERS

	Item	Code number	Description
Compressors	BD350GH 12 V DC supply	102Z3015	for cooling and comfort cooling in trucks and vans
	BD350GH 24 V DC supply	102Z3016	for cooling and comfort cooling in trucks and vans
	BD220CL 12 V DC supply	102Z3020	for mobile refrigeration units (boxes, containers, trolleys)

Single-Pack	Electronic unit (compressor module) 12 V DC	101N0800	electronic module (to be used together with 101N0820)
	Electronic unit (compressor module) 24 V DC	101N0810	electronic module (to be used together with 101N0820)
	Electronic unit (application module) 12 & 24 V DC	101N0820	electronic module (to be used together with 101N800/810)
	Electronic unit (single solution) 12 V DC	101N0830	electronic unit (no fan control)
	Temperature sensor, 470 mm, spade connectors	105N9612	accessories
	Temperature sensor, 1000 mm, spade connectors	105N9614	accessories
	Temperature sensor, 1500 mm, spade connectors	105N9616	accessories
	Secop One Wire/LIN gateway with cables & driver	105N9501	accessories
	One Wire/LIN gateway communication cable	105N9524	accessories (for 101N8xxx series)

Industrial-Pack (I-Pack)	Electronic unit (compressor module) 12 V DC	101N0801	30 pcs.
	Electronic unit (compressor module) 24 V DC	101N0811	30 pcs.
	Electronic unit (application module) 12 & 24 V DC	101N0821	30 pcs.
	Electronic unit (single solution) 12 V DC	101N0831	30 pcs.
	Compressor communication cable assembly 1500 mm	105N9553	80 pcs.
	Compressor communication cable assembly 3000 mm	105N9554	45 pcs.
	Temperature sensor, 470 mm, spade connectors	105N9613	200 pcs.
	Temperature sensor, 1000 mm, spade connectors	105N9615	100 pcs.
	Temperature sensor, 1500 mm, spade connectors	105N9617	100 pcs.
	Display cable assembly without fuse 1500 mm	105N9557	65 pcs.
	Display cable assembly without fuse 3000 mm	105N9558	35 pcs.

Software	Tool4Cool® LabEdition	download from: **https://www.secop.com/solutions/application-show/variable-speed-drive-software-tool4cool**

CODE NUMBERS
BD1.4F-AUT0.3 | BD1.4F-VSD.2/.3
BD1.4F-VSD-HD

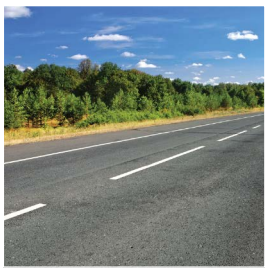
Compressors	Code number	Description
BD1.4F-AUTO.3 mm	109Z0106	automotive compressor, mm tube connectors
BD1.4F-VSD.3 mm	109Z0209	variable speed drive compressor, mm tube connectors
BD1.4F-VSD.2 inch	109Z0206	similar as 109Z0209, inch tube connectors
BD1.4F-VSD-HD mm	109Z0250	variable speed drive compressor (heavy duty), mm tube connectors, for trucks and buses
BD1.4F-VSD-HD inch	109Z0251	same as 109Z0250, inch tube connectors, for trucks and buses

Electronic Single Pack	Code number	Description
Automotive	101N1010	for BD1.4F-AUTO.3, battery protection, 12 V, fixed speed (3,000 rpm)
Variable Speed (VSD)	101N2100	for BD1.4F-VSD.2/.3, BD1.4F-VSD-HD, speed setting, battery protection, 12/24 V, ECO function
VSD with AC/DC converter	101N5100	for BD1.4F-VSD.2, speed setting, battery protection, 12/24 V DC & 100 - 240 V AC, ECO function

Electronic I - Pack	Code number	Description
Automotive	101N1011	for BD1.4F-AUTO.3, battery protection, 12 V, fixed speed (3,000 rpm), 30 pcs.
Variable Speed (VSD)	101N2101	for BD1.4F-VSD.2/.3, BD1.4F-VSD-HD, speed setting, battery protection, 12/24 V, ECO function, 30 pcs.
VSD with AC/DC converter	101N5101	for BD1.4F-VSD.2, speed setting, battery protection, 12/24 V DC & 100-240 V AC, ECO function, 24 pcs.

Software	Location
Tool4Cool® LabEdition	download from: **https://www.secop.com/solutions/application-show/variable-speed-drive-software-tool4cool**

PART II
APPLICATION EXAMPLES



BD compressors bring comfort at work and leisure
The direct current compressors BD35F/50F/80F for 12/24 V DC power supply can be used in mobile refrigerators and freezers with refrigerant R134a.
The BD250GH.2 and the BD350GH compressors in 12/24 or 48 V DC versions are R134a HBP compressors used for mobile spot cooling systems or telecommunication cooling. BD35/50K (R600a) and BD80/100CN (R290) are compressors using HFC-free refrigerants.

All compressors are equipped with an electronic unit with built-in protection against shortages, operation outside temperature limits and destructive battery discharge. The advanced micro controller technology enables new functions like:
electronic thermostat, fan speed, ECO function, alarm log, event log and software main switch.

Second to none – even cooling "without power supply"
Thanks to an extensive voltage rate the BD compressors are ideal for solar energy supply.
The exceptionally low starting current eliminates the need for current batteries if an ice bank is used for energy storage. When storing the sun energy in ice packs the cabinet can be kept at desired temperatures both night and day.
This feature offers numerous uses in areas without power supply like storage and transportation of drugs, ice cream stands in holiday resorts, food preservation under off road conditions, refrigerators in boats to name only a few.

BD1.4F-AUTO.3 (BD Micro)
The BD1.4F-AUTO.3 is the latest generation of BD Micro compressors especially designed for high end car minibars.
It features an optimized noise level and it is also released for refrigerant R1234yf.

BD1.4F-VSD.3 (BD Micro Variable Speed Drive)
The BD1.4F-VSD.3 (new BD Micro generation with optimized noise level and released for refrigerant R1234yf) is 60% smaller than previous models and weighs in at only 2.3 kilos.

Perfect for 10-30 litre in car / van / boat cabinets or portable boxes that need to fit into tight spaces without compromising storage space.
Specially designed for maximum efficiency and reliability this powerhouse of a compressor makes it easier than ever to provide leading class mobile refrigerators.

Enabling the variable speed function increases the system's COP. Low energy consumption is good for car/ boat/ van batteries – as well as the environment. The optimized, low noise motor ensures outstanding performance when you want to provide that extra degree of luxury on the move.
The electronic thermostat (NTC sensor support) provides an accurate temperature while the failure detection allows a fast fault diagnosis. The computer interface makes it easier for customization.

BD35F-HD.2, BD250GH.2-HD, BD1.4F-VSD-HD (Heavy Duty)
BD35F-HD.2, BD250GH.2-HD (48V) and BD1.4F-VSD-HD and are new versions which can handle extreme vibrations.

BD35F-B, BD35K-B (Bus-optimized)
The BD35F-B and the BD35K-B are special versions optimized for rough vehicle motions, especially in buses.

BD50K (Isobutane, R600a)
The new BD50K offers 25 % additional cooling capacity compared to the BD35K compressor.

Secop BD compressors mean: extraordinary performance at minimum power consumption, superbly silent running, reliable operation even when tilted up to 30 degrees, problem-free operation at 12/24/48 volts and more than 40 years' of experience in mobile refrigeration.
Transport stable, speed/capacity stable, multifunctional electronic, silent, high COP and compact design.

COMFORT COOLING IN TRUCKS

In the USA, Australia, Asia, South America, and Europe many of the heavy trucks are equipped with sleeping compartments. The cab gives the driver the opportunity to respond to spontaneous transport tasks and to plan his own work day.
To ensure a good night sleep it is important to keep the temperature and humidity in the cabin at a comfortable level also during night time when the engine is shut off and the air conditioning system is not running. Many states and countries have abandoned idle cooling, meaning the diesel engine is not allowed to run when the truck is parked.

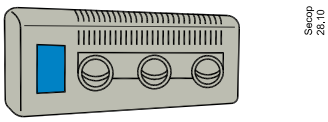
To keep a comfortable temperature during the hot summer nights, a small DC-driven comfort cooler system could be the solution. It cools down the cabin and at the same time lowers the humidity to a comfortable level.

BD250GH.2 and BD350GH compressors are tailored to workplaces where driving is required.
They are universal for 12 V and 24 V DC power supplies. In addition, they are unsurpassed when it comes to tolerating changeable climatic conditions and vibrations under harsh road conditions all over the world.

BD compressors cover a capacity range from 180 W to 850 W at Te +15 °C and are specially designed for high back pressure applications.

The compressors are controlled by an electronic unit that also offers protection against overload and hazardous battery discharge. The unit also features an internal voltage recorder as well as calibration to the applied voltage (compressor monitoring) plus many other smart features in order to save energy and maximize performance.

Features	Benefits
• Silent operation	• The driver can sleep without being disturbed by a noisy compressor.
• High efficiency. Low current consumption	• Energy-saving. Less battery power needed to cool overnight.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling needs.
• Direct 12 V/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. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Lower service costs.
• Fan speed control 40-100 %. Start/stop delays	• Less noise during night. Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Truck can be started safely every time.
• No APU necessary	• Runs directly on battery. No additional cost for an auxiliary power unit. Lower costs and failure modes.
• Transport stable	• Designed to resist vibrations, shocks, and bumping roads. Design lifetime 10 years. Lower service costs.



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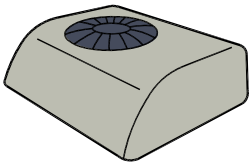

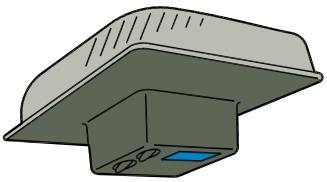

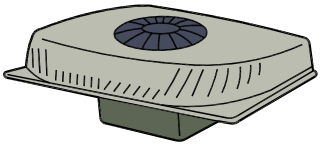

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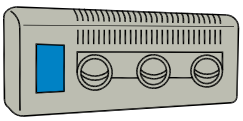

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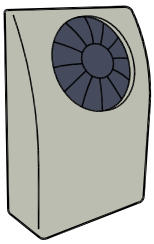


COOLING IN MARITIME APPLIANCES

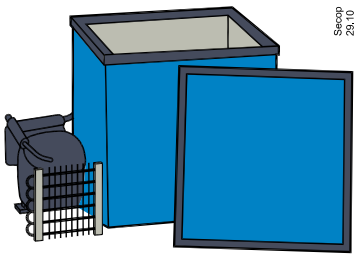
The BD compressor series is specially designed for refrigeration in boat applications. A sturdy design enables it to resist vibrations, hard impacts, and heavy seas.
BD compressors cover a capacity range from 20 to 180 Watt. They are ideal for low and medium back pressure applications and refrigerator sizes up to 180 liters and freezers up to 90 liters.
The compressor's capacity can be adjusted manually. A special version of the electronic unit will adapt the capacity of the compressor automatically (AEO) to the actual load on the refrigeration system. The algorithm will adjust the speed of the compressor to achieve a running time of approximately 30 minutes. This is the most energy efficient way to operate the compressor.
The BD1.4F-VSD.3 and BD35F/BD50F (with second generation electronic unit 101N0212) offer an ECO function which adapts the speed of the compressor so that it runs at an optimal level.

Furthermore, these functions protect the compressor from short cycling in low load situations and also reduce the number of starts and thus saving battery life. An optional LED (diode) will flash and the following faults will be indicated by a blinking light: low battery voltage, fan overload, minimum speed exceeded, thermal cut-out, motor start error.

The new BD1.4F-VSD.3 has additional features such as fan speed control, built in electronic thermostat, communication interface which makes programming the controller easy without requiring resistors or extra wiring.

The electronic unit provides protection against electromagnetic interference (EMI) which will allow communication and navigation equipment to work unproblematically without any disturbance.

Features	Benefits
• Silent operation	• No compressor noise at night when sleeping next to the refrigerator in the boat.
• High efficiency. Low current consumption	• Energy-saving. Operates on a smaller battery.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling needs.
• Direct 12 V/24 V DC power supply	• Same compressor can be used globally. One product covers the world.
• Modbus communication connection	• Customized settings and fast programming on the production line are possible.
• Electronic thermostat	• Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Lower service costs.
• Fan speed control 40-100 %. Start/stop delays	• Less noise during night. Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained to a dangerously low level.
• AC/DC module available as option	• When staying in a port the refrigerator can be powered by shore power (100–240 V AC, 50/60 Hz).
• Transport stable	• Designed to resist conditions on the sea such as vibrations, shocks, and inclement weather. Design lifetime 10 year. Lower service costs.



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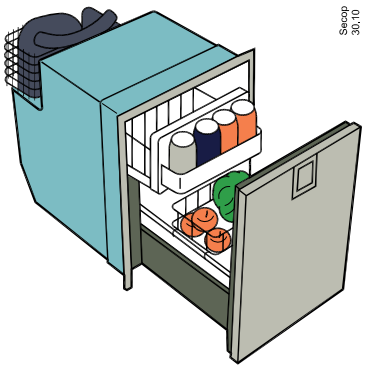

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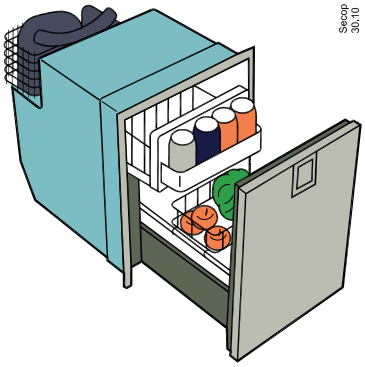
COOLING IN RECREATIONAL VEHICLES (RV)

Everybody wants to bring modern comfort with them when going on vacation or a weekend tour.
BD compressors make it possible to go on vacation in recreational vehicles all over the world and to bring along a refrigerator and a freezer – even in "off grid" places without power supply. The compressors are universal for 12 and 24 V DC power supply and can be used in recreational vehicles like luxury coaches, diesel motor homes, mini motor homes, travel trailers, and fifth wheels, truck campers, etc. They are unsurpassed when it comes to tolerating changeable climatic conditions and vibrations under harsh road conditions.

The BD1.4F-VSD.3, BD35F, BD50F and BD80F compressors cover a capacity range from 20 to 180 W. They are ideal for low and medium back pressure applications and refrigerator sizes up to 180 liters and freezers up to 90 liters.

A special version of the electronic unit adapts the capacity of the compressor automatically (AEO) to the actual load on the refrigeration system. The algorithm adjusts the speed of the compressor to achieve a running time of approximately 30 minutes. This is the most energy efficient way to operate the compressor. The BD1.4F-VSD.3 and BD35F/BD50F (with second generation electronic unit 101N0212) offer an ECO function which adapts the speed of the compressor so that it runs at an optimal level. It has additional features such as fan speed control, built in electronic thermostat, communication interface which makes programming the controller easy, without resistors and extra wiring.
The compressors are controlled by an electronic unit that also offers protection against overload and hazardous battery discharge. The unit also features an internal voltage recorder as well as calibration to the applied voltage (compressor monitoring).

Features	Benefits
• Silent operation	• No compressor noise during night when sleeping next to the refrigerator in the RV.
• High efficiency. Low current consumption	• Energy-saving. Operates on a smaller battery. Three times less energy consumption compared to absorption and fast pull down.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling requirement.
• Direct 12 V/24 V DC power supply	• Same compressor can be used globally. One product covers the world.
• Modbus communication connection	• Customized settings and fast programming on the production line are possible.
• Electronic thermostat	• Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Reduced service costs.
• Fan speed control 40-100 %. Start/stop delays	• Less noise during night. Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained to a dangerously low level.
• Transport stable	• Designed to resist vibrations, shocks, mountain terrain, and bumping roads. Design lifetime 10 year. Reduced service costs.
• AC/DC module available as option	• During a stay at a campsite the refrigerator can be powered by mains power (100–240 V AC, 50/60 Hz).



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REFRIGERATORS IN TRUCKS

Most truck drivers are on the road for many days at a time. To keep their food and beverages cold they need refrigerators that can be built into the cab.

The BD compressors are tailored for the driving workplaces. BD35F-HD.2 and BD1.4F-VSD-HD are special versions designed to meet even harder road conditions where the refrigerator is mounted on the chassis of the truck. They are universal for 12 V and 24 V DC power supply.

Besides this they are unsurpassed in their ability to tolerate changeable climatic conditions and vibrations under harsh road conditions all over the world.

BD35F and BD50F compressors can be used for both refrigerators and freezers.

The compressors cover a capacity range from 20 to 180 W. They are ideal for low, medium and high back pressure applications and refrigerator sizes up to 80 liters incl. freezer compartment.

The compressors are controlled by an electronic unit that also offers protection against overload and hazardous battery discharge.
The unit also features an internal voltage recorder as well as calibration to the applied voltage (compressor monitoring).

The new BD1.4F-VSD.3 and the BD35F-HD.2 have additional features such as fan speed control, built-in electronic thermostat, communication interface which makes programming the controller easy without requiring resistors or extra wiring.

Features	Benefits
• Silent operation	• The driver can sleep without being disturbed by a noisy compressor.
• High efficiency. Low current consumption	• Energy saving. Less batteries needed to cool overnight.
• Variable speed/capacity	• Energy-savings. Adapts speed to cooling requirement.
• Direct 12 V/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. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Lower service costs.
• Fan speed control 40-100 %. Start/stop delays	• Reduces noise. Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Trucks can be started safely every time.
• Meets EMI standards	• The electronic unit meets automotive standards and in most cases no additional EMI filters are needed.

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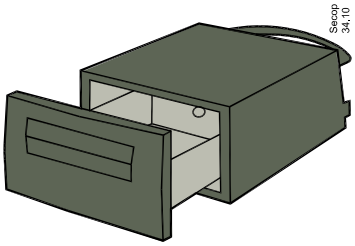

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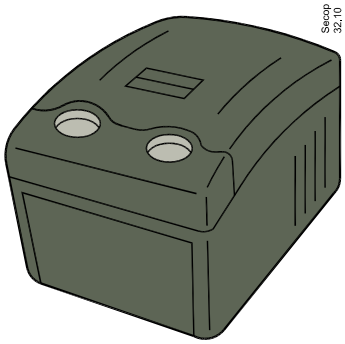

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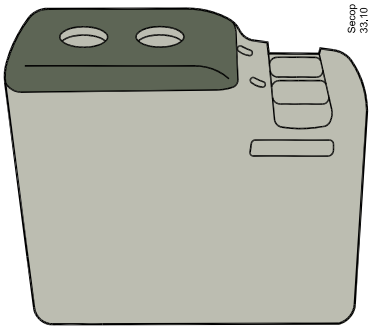

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COOLING IN MEDI BOXES

Manufacturers and users of transport equipment for medicines, vaccines, blood plasma, and organs know how critically important it is to store these products at the right temperature during transport. Vaccines and stored blood for example may only be given, if the temperature gradient during transport can be completely proven. Similar high requirements apply to protein medicines, dialysis preparations, and organs.

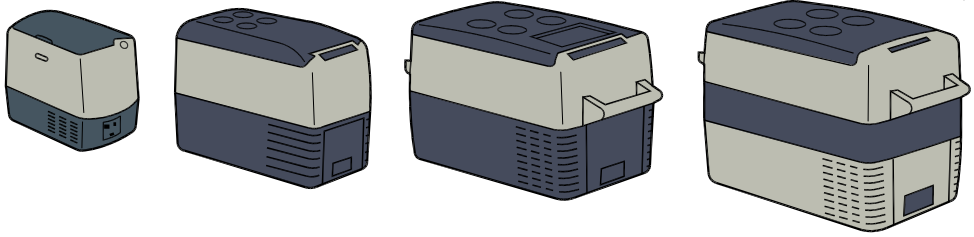
The BD35F and BD50F compressors have been specially designed for temperature controlled transportation. They ensure that the temperature can be kept at a constant temperature within the range of -18 °C to +8 °C and are therefore unsurpassed to be used in medi boxes for transporting medicines from main pharmacies to drugstores and organs from donor to recipient as well as storing medicines and vaccines in ambulances, for example.

BD compressors are universal for 12 V and 24 V DC power supply and can be used in medi boxes up to 150 liters.
The compressors cover a capacity range from 20 to 180 W. They are ideal for low and medium back pressure applications.

An electronic unit including protection against overload and hazardous battery discharge controls the compressors.
The unit also features an internal voltage recorder as well as calibration to the applied voltage (compressor monitoring).

The new BD1.4F-VSD.3 has additional features such as fan speed control, built in electronic thermostat, communication interface which makes programming the controller easy without requiring resistors or extra wiring.

Features	Benefits
• Reliable compressor. More than 40 years in the market.	• High level of security. No damage to vaccines, etc. due to too high temperatures.
• High efficiency. Low current consumption	• Energy-saving. Less battery consumption needed to cool overnight.
• Variable speed/capacity	• Energy savings. Adapt speed to cooling requirement.
• Direct 12 V/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. Temperatures can be logged via communication interface.
• Electronic thermostat	• Very accurate temperature control. Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Reduced service costs.
• Fan speed control 40-100 %. Start/stop delays	• Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Vans can be started safely every time.
• Lightweight compressor	• Easy to carry a smaller medical box to small towns, even with a small battery mounted in the box.



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SOLAR ASSISTED COOLING

With its BD35F and BD35K solar compressors, Secop offers a refrigeration solution for places with poor or no power supply. Thanks to the exceptionally low starting current, batteries are not required if an ice bank is used for energy storage.

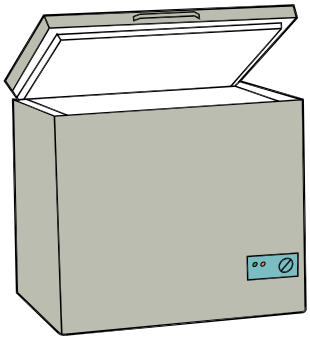
BD35F and BD35K solar compressors offer numerous functions for manufacturers within the rapidly growing area of mobile and stationary refrigeration. For example, storage and transportation of drugs, storage of food under difficult conditions without power supply, ice cream stands in holiday resorts, remote bottle coolers, refrigerators in boats, just to name a few.
At times when there is no sun, the ice packs keep the cabinet at the set temperatures.

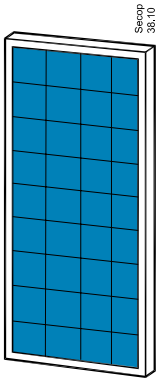
Its wide voltage range (10–45 V DC) makes the BD very suitable for powering photovoltaic systems.

The new BD50K with its High Speed controller needs an addional capacitor or battery but offers higher cooling capacity.

An example on the latter was displayed at a UN summit in Johannesburg, South Africa. On this occasion, we supplied the compressor for a solar cabinet, complying with the tough demands of WHO (storage for 3 days without power supply).
The concept is well accepted by WHO and UNICEF today.

Features	Benefits
• Reliable compressor. More than 40 years in the market.	• High level of security. No damage to vaccines, etc. due to too high temperatures.
• High efficiency. Low current consumption	• Energy-saving. Less batteries needed to cool overnight.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling requirement.
• Direct 12 V/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. Temperatures can be logged via communication interface.
• Electronic thermostat	• Very accurate temperature control. Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Lower service costs.
• Fan speed control 40-100 %. Start/stop delays	• Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Vehicles can be started safely every time.
• Very low weight of compressor	• Easy to carry a smaller medical box to small towns, even with a small battery mounted in the box.

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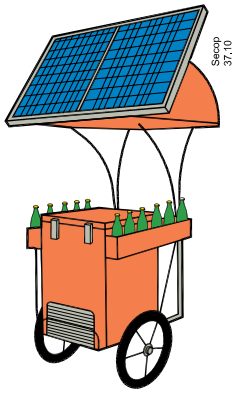
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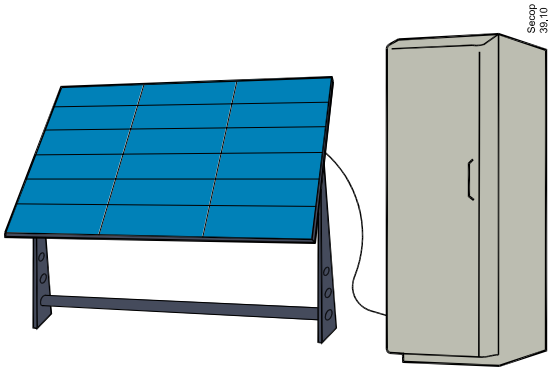
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COOLING IN PORTABLE COOLING BOXES

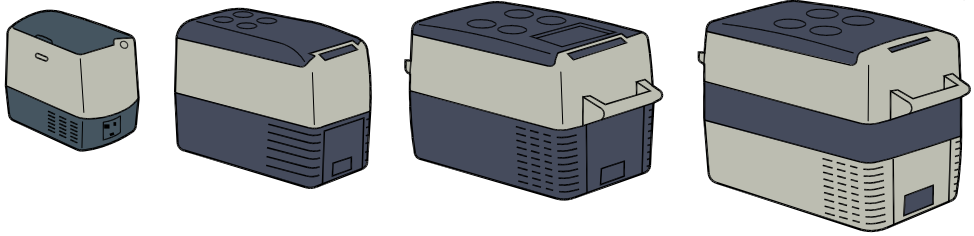
Today, more and more people want to spend their vacation in places that are off the beaten track where there is no electricity power, yet they still want to be able to cool their food and beverages. This has created a demand for a market for portable cooling boxes.

The BD35F compressor is the ideal choice for this application. It is battery-powered, compact, light, and easy to carry around. It also functions as an independent compressor to refrigerate a cooler in the car during family outings. What's more, it's also nice for a salesperson to always have chilled food and beverages at hand.
The BD35F is universal for 12 and 24 V DC power supply. The compressors cover a capacity range from 20 to 130 W. They are ideal for low and medium back pressure applications. Cooling boxes from 18-150 liters.

The electronic unit is mounted on the compressor – this means no additional mounting costs.
The compressors operate with electronic as well as standard mechanical thermostats. They can be powered directly from an AC/DC unit. A switch in the power supply cables can be mounted to eliminate standby power consumption.

The BD compressors have an internal voltage recorder and calibration to the applied voltage as well as adjustable battery protection settings. The capacity can be varied by regulating motor speed. An electronic unit including protection against overload and hazardous battery discharge controls the compressors. The new BD1.4F-VSD.3 has additional features such as fan speed control, built-in electronic thermostat, communication interface which makes programming the controller easy, without requiring resistors or extra wiring.

Features	Benefits
• Low weight	• The smallest BD compressor weighs only 2.3 kg, making it easy to carry.
• Small and compact	• 60 % less volume on BD1.4F-VSD.3 compared to BD35F. Increase net volume of the box.
• Silent operation	• The owner can sleep close to the box without being disturbed by a noisy compressor.
• High efficiency. Low current consumption	• Energy-saving. Less battery capacity needed to keep the goods cooled.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling requirement.
• Direct 12 V/24 V DC power supply	• Same compressor can be used globally. One product covers the world.
• AC/DC module available as option	• If grid power is available, the box can be powered by mains power (100–240 V AC, 50/60 Hz).
• Electronic thermostat	• Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Reduced service costs.
• Fan speed control 40-100 %. Start/stop delays	• Reducing noise. Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Cars can be started safely every time.



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CONTROL YOUR COLD CHAIN
BD VAN BOXES

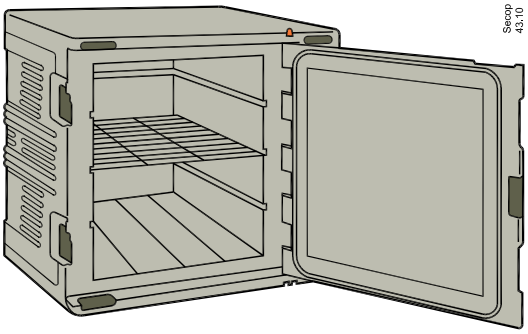
The most economical and efficient solution for small-scale transport is a mobile refrigeration unit that fits easily into cars and vans, and is powered by the car's own battery.

The advantages of such a solution are clear:
The vehicle does not need to be altered. Cabinets can also be moved from vehicle to vehicle and even run on 220 V AC with the help of an AC/DC converter 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.

Finally, an expensive, impractical, specially 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. This is the most flexible and cost effective solution for meeting the HACCP guidelines.

- Vans can be bought in standard model version and no extra bodywork on van is required
- Refrigeration when the engine is not running
- Both battery and AC utility can be used via 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 CO_2 emission per kilometer)
- The can can be used for other purposes when not being used to carry refrigerated food
- Van can be resold much easier
- No hygiene issues with the car itself
- "Streamlined" car lower wind resistance, lower energy consumption, lower CO_2 emission
- Operation and service much easier

Features	Benefits
• Runs directly on the car batteries	• Keeps the goods active cooled also when the van is stopped for loading and unloading.
• High efficiency. Low current consumption	• Energy-saving. 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 V/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. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Reduced service costs.
• Fan speed control 40-100 %. Start/stop delays	• Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Vans can be started safely every time.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TELECOM COOLING
INCREASE BATTERY LIFETIME

When power fails, battery cooling systems must draw on their batteries' power. Since the compressor is the main power consumer, a lot can be gained with a solution that is extremely efficient without being overly power hungry.

By using a battery powered direct current (DC) compressor, it is possible to build a cooling system that can run on batteries, solar cells, and wind turbines without needing to convert to alternating current (AC).

The BD250GH.2 and BD350GH compressors are unique as they are constructed with integrated fan control and electronic thermostat. In this way, it is possible to simplify the design of the overall system and still ensure maximum performance.

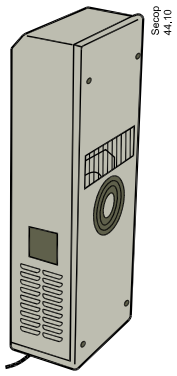
With battery drain being a big issue, it is important to use an energy efficient compressor with the highest COP possible.

Compared to other solutions that rely on AC and 230 V AC conversion, the BD250GH.2 and BD350GH compressors save up to 250 W per hour.

In areas that rely on battery power for up to 16 hours a day, you can be certain that Secop BD compressors will ensure that batteries will last as long as possible.

The optimal temperature for batteries is 25 °C. Anything above this will shorten their life expectancy and provide their owners with an inconvenient replacement cost.

Features	Benefits
• Higher COP with DC compressors	• Better efficiency.
• Direct power supply to the compressor (32–62 V DC)	• Fast installation and fewer failure modes.
• 100 % cooling, also at grid power failure	• Maintaining lifetime of batteries save up to 20.000 USD over 8 years.
• Up to 90 % less failure modes on BD compressors compared to AC solutions.	• Reduced service costs and much better "up-time" of the BTS station.
• Modbus communication connection	• Customers can make their own control box including control of the BD compressor. Remote monitoring possible.
• Electronic thermostat	• Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Reduced service costs.
• Fan speed control 40-100 %. Start/stop delays	• Fewer components, fewer costs, less wiring, fewer installation costs.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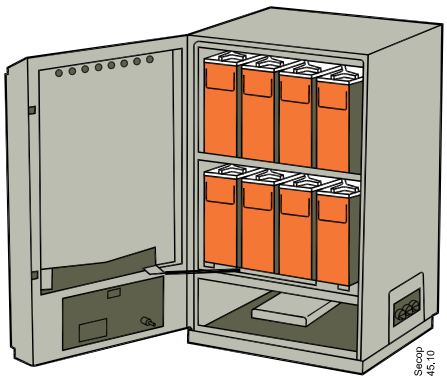
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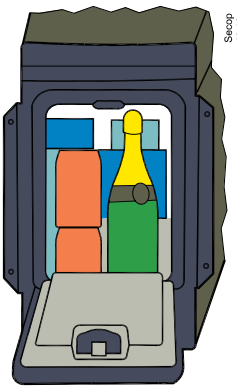
MOBILE REFRIGERATION IN CARS

The demand for mobile refrigeration in cars has increased due to the increasing amount of time that people spend in them. With its compact design, low noise level, and robustness against vibrations, the BD compressor is the perfect solution for cool boxes in cars offering the driver and passengers the comfort not to stop every time they want food or something to drink. And when not on the road, the storage box keeps items cold for up to five hours after the car engine has been turned off. There are number of areas to place a cool box in a car. The center console area is possibly the most obvious location, but the cool box can also be put under the passenger seat or even within the front passenger seat — where access is via a lift-up seat cushion.
Lose excess weight and use the extra space for what really matters. The new BD1.4F-AUTO.3 and the BD1.4F-VSD.3 from Secop are 60 % smaller than previous models and weigh in at only 2.3 kilos. Perfect for 10–15 liter in-car cabinets that need to fit into tight spaces without compromising storage space.

Specially designed for maximum efficiency and reliability, this tiny powerhouse of a compressor makes it easier than ever to provide leading class mobile fridges to the discerning automobile manufacturers. The optimized, low-noise motor ensures outstanding performance when you want to provide that extra degree of luxury on the move.

Cool beverages on demand make driving so much more of an experience. Fridges using the BD1.4F-AUTO.3 or the BD1.4F-VSD.3 take up less space and allow small fridges to fit easily with maximum storage space for snacks and beverages. Low energy consumption is good for car batteries and the environment.

Features	Benefits
• Low weight	• Only 2.3 kg for the smallest BD compressor. Overall weight reduction in the car.
• Small and compact	• 60 % less volume on BD1.4F-AUTO.3/-VSD.3 compared to BD35F. Increase net volume of the box.
• Silent operation	• The owner can sleep close to the box without being disturbed by a noisy compressor.
• High efficiency. Low current consumption	• Energy-saving. Less battery capacity needed to keep the goods cooled.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling requirement.
• Direct power supply	• Same compressor can be used globally. One product covers the world.
• Transport stable	• Long lifetime. Minimum of spare parts.
• Electronic thermostat	• Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Reduced service costs.
• Fan speed control 40-100 %. Start/stop delays	• Reducing noise. Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Cars can be started safely every time.
• Meets EMI standards	• The electronic unit meets automotive standards.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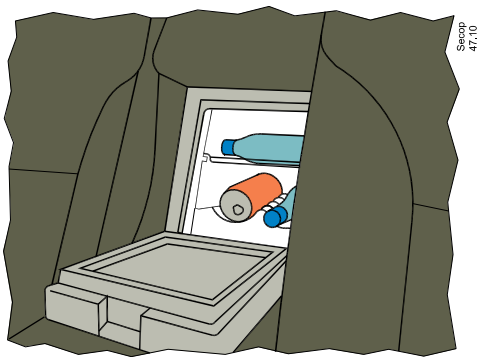
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MOBILE REFRIGERATION IN BUSES

Many coaches offer passengers to buy cold beverages during a long tour. BD compressors are universal for 12 V and 24 V DC power supply and can be used in all kind of busses. They are unsurpassed in tolerating changeable climatic conditions and vibrations under harsh road conditions. The BD1.4F-VSD.3, BD35F, BD35F-B and BD35K-B compressors cover a capacity range from 20 to 180 W. They are ideal for low and medium back pressure applications.

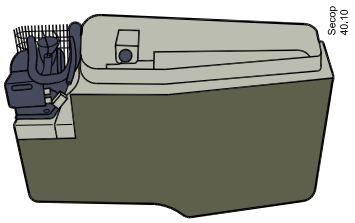
A special version of the electronic unit adapts the capacity of the compressor automatically (AEO) to the actual load on the refrigeration system. The algorithm adjusts the speed of the compressor to achieve a running time of approximately 30 minutes. This is the most energy efficient way to operate the compressor.

The BD1.4F-VSD.3 and BD35F/BD35F-B/BD35K-B (with second generation electronic unit 101N0212) offer an ECO function which adapt the speed of the compressor to an optimum level.
It has additional features such as fan speed control, built-in electronic thermostat, communication interface which makes programming the controller easy, without requiring resistors or extra wiring.

Ideal for refrigerator sizes up to 30–50 liters with freezer compartment. The compressors are controlled by an electronic unit including protection against overload and hazardous battery discharge.

The unit also features an internal voltage recorder as well as calibration to the applied voltage (compressor monitoring).

Features	Benefits
• Low weight	• Only 2.3 kg for the smallest BD compressor makes it easy to carry.
• Small and compact	• 60 % less volume on BD1.4F-VSD.3 compared to BD35F. Increase net volume of the box.
• Silent operation	• The owner can sleep close to the box without being disturbed by a noisy compressor.
• High efficiency. Low current consumption	• Energy-saving. Less battery capacity needed to keep the goods cooled.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling requirement.
• Direct 12 V/24 V DC power supply	• Same compressor can be used globally. One product covers the world.
• Special designed BD for buses.	• BD35F-B and BD35K-B reduce any noise from the compressor to an absolute minimum even on very bumpy roads.
• Electronic thermostat	• Cost savings. No extra thermostat needed. Fewer components and failure modes.
• Alarm & event logs	• Makes identifying errors fast and is easy to service. Reduced service costs.
• Fan speed control 40-100 %. Start/stop delays	• Reducing noise. Fewer components, fewer costs, less wiring, fewer installation costs.
• Advanced battery protection function	• Safety. The battery will never be drained. Busses can be started safely every time.
• Meets EMI standards	• The electronic unit meets automotive standards and in most cases no additional EMI filters are required.



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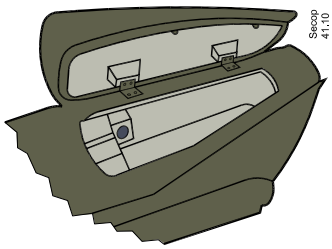

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AIR FREIGHT COOLING

Transporting pharmaceutical products by air around the world under safe and temperature-controlled conditions can mean the difference between life and death. Especially in the globalized world that we live in, reliable cooling of airfreight is vital for the patients who depend on effective medication. Having a dependable cold chain during the whole transportation is key to keeping the number of wasted pharmaceuticals due to a broken cold chain as low as possible.

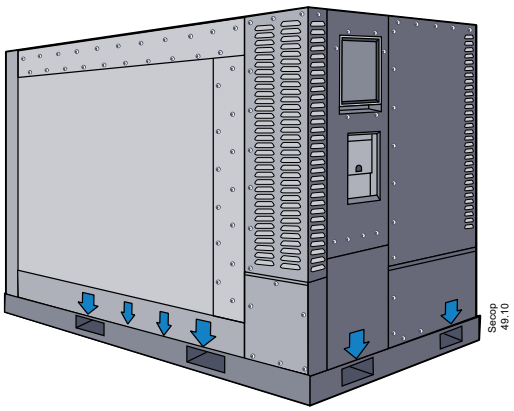
On many occasions, temperature fluctuations around 2 °C can make the difference regarding the viability of vaccines. To maintain these strict temperature conditions, Secop offers a multitude of DC-powered compressors to equip specialized containers. While the usual transportation methods rely on gel packs, dry ice, or operating compressors during transportation to cool goods, the installed BD series compressor operates prior to transport to freeze the container's eutectic plates.

Thereby the current containers are able to get FAA approval while exceeding the World Health Organization's "Cold Chain Storage and Distribution" guidelines.

The BD series compressors use approximately 6 kilowatts of energy to freeze the cooling plates prior to the transportation which reduces the cost down to $ 0.50. The eutectic cooling plates can keep the goods cool for days while the containers can be moved without any additional necessary equipment.

Our BD series compressors are able to withstand harsh changes in climate conditions and are unsurpassed in tolerating vibrations.
Our compressor models BD350GH and BD250GH.2 have been used for many years specifically for cooling airfreight. The installed electronic control unit is proven to be very robust while maintaining accurate temperatures and meeting the EMC requirements for aviation.

Features	Benefits
• Runs directly on batteries.	• Active cooling through the whole cold chain.
• High efficiency. Low current consumption.	• Energy-saving. Batteries will last longer.
• Variable speed/capacity	• Energy savings. Adapts speed to cooling requirement.
• No need for insulated packaging.	• Eliminates the need for a refrigerated truck. Saves time and costs.
• Modbus communication	• Customers can communicate with the compressor for monitoring and control.
• Internally powered during transport.	• Always active cooling.
• Precise temperature control.	• No scrap or damaged pharmaceutical products.
• No need for dry ice.	• Eliminates HAZMAT costs.
• Advanced battery protection function	• Safety. The battery will never be drained.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PART III
DC COMPRESSORS BASICS

1.
SECOP VARIABLE SPEED COMPRESSORS FOR DIRECT CURRENT

Secop variable speed compressors type BD (battery driven) **BD1.4F-AUTO.3/-VSD.3**, **BD35F**, **BD50F**, **BD80F**, **BD250GH.2**, **BD350GH** and **BD220CL** are designed for connection to 12 - 24V DC and 48V DC power supply and for refrigerant types R134a or R404A/R507 and prepared for R513A, R452A and/or R1234yf.

The compressors are intended especially for use in mobile applications, e.g. cooling boxes, boats, caravans, trucks, vans, buses and cars. Due to their low energy consumption and the option for a wide supply voltage range, the compressors are also very suitable for stationary applications powered by photovoltaic solar panels.
The compressors can be used in refrigerators and freezers using either capillary tube or TEV as the throttling device.

The compressors **BD35K, BD50K, BD80CN** and **BD100CN** are especially designed for refrigeration systems using isobutane, refrigerant R600a and propane, refrigerant R290, respectively, as can be seen from the individual type label information. Isobutane and propane are also called hydrocarbons.
Hydrocarbons are not implicated in ozone depletion (ODP), and the majority of hydrocarbon refrigerants have a GWP rating (Global Warming Potential) of 3.
The role of hydrocarbon refrigerant systems in reducing harmful greenhouse gases is twofold: Firstly, direct greenhouse gas (CO_2) emissions are significantly decreased thanks to the low GWP rating of hydrocarbons. And secondly, the features of a hydrocarbon system (lower condensing point, positive thermodynamic attributes, and superior COP) act in combination to optimize energy-efficient operation.
Assisted by the cheap availability of hydrocarbons produced as a by-product of gas and oil working, and by many studies demonstrating the energy savings hydrocarbon systems can deliver, hydrocarbons have proved to be viable replacements for fluorocarbons and other environmentally harmful refrigerants.
R600a and R290 are classified as flammable refrigerants of class A3 according to ANSI/ASHRAE 34. Accordingly, special safety regulations must be complied with. A special test schedule has been integrated in the European standards EN 60335-2-24 for domestic and EN 60335-2-89 for commercial appliances and in the corresponding international standards IEC 60335-2-24 and IEC 60335-2-89.
The compressors **BD35K, BD50K, BD80CN** and **BD100CN** must only and exclusively be used in appliances certified for flammable refrigerants according to these or later regulations.

BD Micro

BD P-Housing

BD T-Housing

CCD® COOL CAPACITY DRIVE

Secop BD compressors are intended for use in mobile and stationary applications e.g. portable cooling boxes, boats, caravans, trucks, parking cooling in trucks, vans, buses, cars and battery and shelter cooling in telecom stations. Due to the low power consumption and the option for a wide supply voltage range, the compressors are also suitable for stationary applications powered by photovoltaic solar panels, or fuel cells.
In bus applications a special version of **BD35F-B** has been developed. It is designed to minimize noise when the bus is driving.
In truck applications special versions, **BD35F-HD.2** and **BD1.4F-VSD-HD**, have been made to meet truck standards in regards to shock and vibration.

1.1 Refrigerants

Refrigerants with certain molecular structures have been identified as substances that can be harmful to the environment. Two properties are critical: the ozone depleting potential (ODP) and the global warming potential (GWP). The first negative property is covered by the Montreal Protocol ('Montreal Protocol on Substances that Deplete the Ozone Layer') from 1987 which is an international agreement designed to protect the earth's ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. The result was the replacement of HCFC (halogenated chlorofluorocarbon, R22) refrigerants with HFC (hydrofluorocarbon, e.g. R134a) refrigerants which have an ODP of zero (or close to zero). The significant downside of HFC refrigerants is their high global warming potential since they belong to the category of greenhouse gases. This fact was discovered after the Montreal Protocol was adopted and was recently covered by an amendment adopted in Kigali in October 2016. Before this amendment, the United States and the EU had introduced regulations to define the phase down and replacement of these HFCs on a federal level.

Secop has been a pioneer and early adopter of hydrocarbons as refrigerants and believes the most efficient and economical friendly substances for use in cooling appliances are isobutane (R600a) and propane (R290). Secop recommends the first one as a replacement for household appliances and small capacities in the light commercial segment and the latter one for medium to large light commercial applications. Secop is also aware that the transition towards hydrocarbons is challenging for manufacturers as well as for service providers and not always feasible in the short term.

Tests have so far shown good results with refrigerant R452A as a drop-in replacement for R404A and R507. Based on this information, Secop allows the use of R452A on all its R404A and R507 released compressors. It is the customer's responsibility to validate the application, and they should carefully consider the requirements and drawbacks when changing from R404A/R507 to R452A in their application.

The HFO (hydrofluoroolefin) R1234yf can be used as drop-in for replacing R134a in the short-term for most of the applications. R1234yf is classified as flammable according to relevant safety standards. It is more expensive than R134a, however, it holds remarkably less greenhouse potential than R134a. Our R134a compressors can be used for testing with this refrigerant, and we will be more than happy to assist you in discovering that right solution for you and when it comes to the approval procedure. Investigations into material compatibility have so far shown good results with refrigerant R1234yf in Secop R134a compressors. These results must be confirmed in ongoing long-term tests. Currently, testing system performance can be conducted using compressors originally designed for R134a. The same application limits as described on the R134a data sheet may be used, however, partly with changed electrical equipment. Since R1234yf is classified as a flammable refrigerant, the compressors must be used with starting equipment approved for flammable refrigerants. The compressors designed for R134a do not have a safety approval for flammable refrigerants like R1234yf.

1.2 Handling of refrigerants

To ensure reasonable refrigeration system life, the refrigerant must have a maximum moisture content of 20 ppm (20 mg/kg). Do not fill the refrigerant from a large container into a filling bottle through several container sizes, as with every drawing-off the water content in the refrigerant is increased considerably.

1.3 Charging with refrigerant

Normally, charging with refrigerant is no problem with a suitable charge, provided that the charging amount of the refrigeration system equipment is known.

Always charge the refrigerant amount and type stated by the refrigerator manufacturer. In most cases this information is stated on the refrigerator type label. The different compressor brands contain different amounts of oil, so when converting to another brand it may be advisable to correct the amount of refrigerant. Charge of refrigerant can be made by weight or volume.

Flammable refrigerants like R600a and R290 must always be charged by weight. Charging by volume must be made with a refrigerant charging cylinder. The refrigerant R404A and all other refrigerants in the 400 series must always be charged as liquid.

If the charging amount is unknown, charging must be done gradually until the temperature distribution above the evaporator is correct. However, mostly it will be more appropriate to overcharge the system and then gradually draw off refrigerant until the correct charge has been obtained. The refrigerant charge must be made with the compressor running, the refrigerator without load and with the door closed.

The correct charge is characterized by the temperature being the same from the inlet to the outlet of the evaporator. At the compressor suction connector the temperature must be approx. ambient temperature. Thus transfer of moisture to the refrigerator insulation is avoided.

Systems with an expansion valve must be charged with refrigerant until there are no bubbles in the sight glass, which should be placed as close to the expansion valve as possible.

1.4 HFC refrigerants (R134a)

The HFC refrigerant R134a and HFC mixtures require Polyester type oil. Contamination of components and systems with mineral oil and alkylbenzols must be avoided. Greasy substances and other long-chained, high molecular substances not dissolved must not be present. Manufacturing processes which require a lubricant can be done with Polyester oil approved for the compressors. Procedures for mounting, evacuation and charging must be carried out in such a way that contamination with chlorine refrigerants is avoided. HFC refrigeration systems must always have a drier with 3 Angstrom Molecular Sieves.

1.5 Flammable refrigerants R290 and R600a

R600a and R290 are hydrocarbons. These refrigerants are flammable and are only allowed for use in appliances which fulfil the requirements laid down in the latest revision of EN/IEC 60335-2-24. (To cover potential risk originated from the use of flammable refrigerants). Consequently, R600a and R290 are only allowed to be used in household appliances designed for this refrigerant and fulfil the above-mentioned standard. R600a and R290 are heavier than air and the concentration will always be highest at the floor. R600a must only be stored and transported in approved containers and must be handled according to existing guidelines.

Do not use open fire near the refrigerants R600a and R290. The refrigeration systems must be opened with a tube cutter.

The flammability limits are approx. as follows,

Refrigerant	R600a	R290
Lower limit	1.5 % by vol. (38 g/m³)	2.1 % by vol. (39 g/m³)
Upper limit	8.5 % by vol. (203 g/m³)	9.5 % by vol. (177 g/m³)
Ignition temperature	460 °C	470 °C

In order to carry out service and repair on R600a and R290 systems the service personnel must be properly trained to be able to handle flammable refrigerants. This includes knowledge on tools, transportation of the compressor and refrigerant, and the relevant regulations and safety precautions when carrying out service and repair.

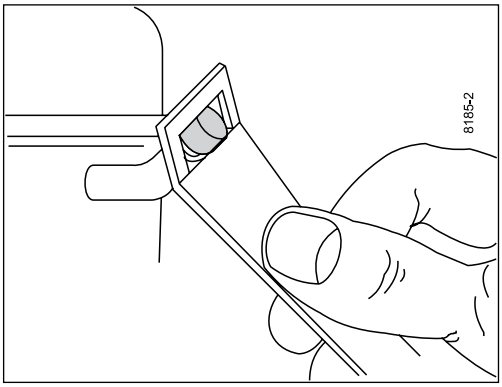
Do not use open fire when working with refrigerants R600a and R290!

Conversions from refrigerants R12 or R134a to R600a is not permitted, as the refrigerators are not approved for operation with flammable refrigerants, and the electrical safety has not been tested according to existing standards either. The same applies to conversions from refrigerants R22, R502 or R134a to R290.

Secop compressors for the flammable refrigerants R600a and R290 are equipped with a yellow warning label as shown.

1.6 Connectors

BD compressors are supplied with sealed connectors, which consist of a thick walled copper plated steel tube with great corrosion resistance and good braze ability. The connectors are welded in the compressor housing and thus the welding cannot be destroyed by overheating during brazing operations. The sealing is an aluminium cap which gives a tight sealing. The seal is easily removed with an ordinary pair of pliers or with the tool shown in the figure.



Most BD compressors are supplied with millimetre tubes, but some variants supplied with inch tubes.

All connectors have a shoulder to provide optimal brazing conditions. Drifting of the connectors for more than 0.3 mm is not allowed.

For the refrigerants R600a and R290, process tubes can be closed with a LOKRING® connection.
Brazing is not allowed during servicing systems with flammable refrigerants.

1.7 Advantages of direct current compressors

Secop direct current compressors can be used in applications using either capillary tube or TEV as the throttling device.
The BD compressor must be mounted in a dry and clean place. The compressors will withstand storage temperatures down to -25°C and up to +70°C.
Condensing temperatures:
Max. 60°C at stable conditions and max. 70°C at peak load.
Ambient temperatures: Min. -10°C, max. 43°C

The BD compressor concept includes an electronic unit which features overload protection, battery protection, wrong polarity protection, evaporator and condenser fan control, LED diagnosis signal, light bulb connection, load dump protection, mechanical or electronic thermostat, ECO function, AEO (Adapative Energy Optimizing) function and bus communication interface. These features are model dependant. The electronic module has internal voltage recording and calibration to the applied voltage. The electronic module may also be powered directly from certain types of electronic power supply units and thus no battery is required.

In addition to being especially quiet in operation – ranging from 33 dB(A) to 38 dB(A)- depending on model and speed of compressor, all BD compressors have high COP values.

1.7.1 Tilt angle

The BD compressors are designed to be mounted in a horizontal position. However they are also designed to operate temporarily in conditions with heeling up to 30° such as can occur in boats, car and trucks driving in mountains. Under such heeling conditions the compressor can be noisy when internal compressor parts knock against the compressor shell.

Key to DC-Compressor Type Designation (BD-Series)

1	2		3		4	5
Compressor design	**Compressor size**		**Application range**	**Refrigerant**	**Special features (optional, can be used in combination)**	**Generation**
	Capacity at rating point	**Displacement**				
BD P/T-Housing	**35 50 80 100 250 350**		**CN = LBP CL = LBP F = LBP/MBP/HBP GH = (LBP/MBP)/HBP K = LBP/(MBP)**	**R290 R404A/507 R134a R134a/R1234yF R134a R600a**	**- AUTO = automotive - VSD = variable speed drive - HD = heavy duty (can handle extreme vibrations) - B = bus-optimized (optimized for rough vehicle motions)**	**Blank → first generation .2 → second generation .3 → third generation**
BD Micro		**1.4**				

1.8 Denomination

1 The first letter of the denomination indicates compressor series
2 For BD-Micro compressors a number indicates the displacement in cm^3, but for BD compressors based on P/T housing the number indicates the nominal capacity.
3 The letter after the displacement indicates which refrigerant must be used as well as the field of application for the compressor.
LBP (Low Back Pressure) indicates the range of low evaporating temperatures, typically -10°C down to -35°C or even -45°C.
MBP (Medium Back Pressure) indicates the range of medium evaporating temperatures, typically -20°C up to 0°C.
HBP (High Back Pressure) indicates high evaporating temperatures, typically -5°C up to +15°C.
R134a or **R134a/R1234yf → F**: BD Compressors with denominations ending with F are primarily designed for lowevaporating temperatures (LBP/MBP) but will also work with high evaporating temperatures (HBP).
R134a → GH: Compressors with denominations ending with GH are designed for high evaporating temperatures (HBP).
R290 → CN: Compressors with denominations ending with CN are designed for low evaporating temperatures (LBP) and medium evaporating temperatures (MBP).
R404A/R507 → CL: Compressors with denominations ending with CL are primarily designed for low evaporating temperatures (LBP).
R600a → K: All compressors for R600a have denominations ending with K after the number for displacement or capacity. They are designed for low operating temperatures (LBP).
4 The next letter in the compressor denomination provides information on special features the BD compressor offers.
5 The final letter (separated by a dot) mentions the generation of the compressor.

1.9 Date code format & country of origin

Secop compressors have a manufacturing date code stamping on the housing.
The content of the coding (Fig.1) is in two lines according to the example below:

H4485C (6 characters)
051D11R (7 characters, 8 characters for BD Micro)

<u>Composition of line 1</u>

H4485: Compressor type information (102H4485 = H4485)
C: Internal Secop code

<u>Composition of line 2</u>

05: Production week
1: Production year
D: Production day
A = Monday, B = Tuesday,
C = Wednesday, D=Thursday, etc.
11: Production hour 00 to 23 or shift code -1, -2, -3
R: Internal production location code
A to G, U Germany:
A until week 50/2005
D until week 35/2006
U until week 08/2010
K to N Slovenia:
K until week 39/2012
L until week 34/2011
M until week 02/2012
N until week 02/2012
A, D, L,M, R, U Slovakia:
A from week 01/2006
D from week 38/2006
L from week 45/2011
M from week 09/2012
R from week 01/2005
U from week 12/2010
S, R Mexico:
R up to week 27/2004
W to Z China

Fig.1 Needle print coding on compressor housing and country of origin on type label

1.10 Country of origin on typelabel

On BD Micro compressors (code number 109Z....), the production year is indicated by two digits, e.g. "11" for 2011 and a serial number behind the location code.

The country of origin (in capital letters) or the manufacturer will also be marked on the typelabel, examples:

MADE IN SLOVAKIA
- for compressors made in Slovakia (Fig.2)

Made by Secop | optional label "Made in China"
- for compressors made in China (Fig.3)
- "Made by Nidec" from 05/2018 to 12/2019

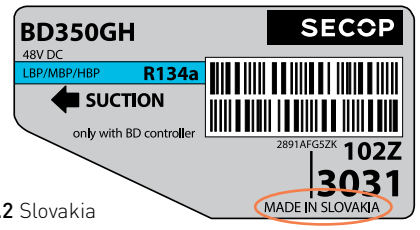


Fig.2 Slovakia

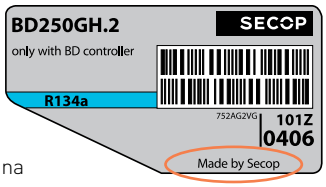
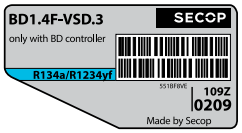
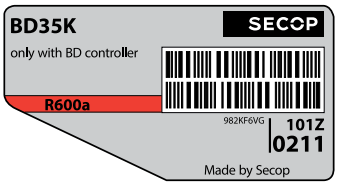
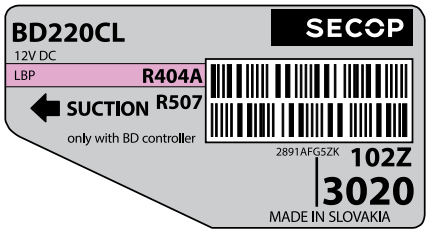


Fig.3 China

1.11 Typelabels overview

BD Micro Series	Label Width = 47 mm	Example
Background colour	grey	
Coloured stripe for refrigerant	R134a/R1234yf or R134a: blue	
Barcode	on white background	
Approvals printed on label	yes	
Voltage printed on label	no	
Application printed on label	no	

BD Series based on **P-Housing**	Label Width = 67 mm	Example
Background colour	grey	
Coloured stripe for refrigerant	R134a: blue, R600a or R290: red	
Barcode	on white background	
Approvals printed on label	yes (except UL)	
Voltage printed on label	no	
Application printed on label	no	

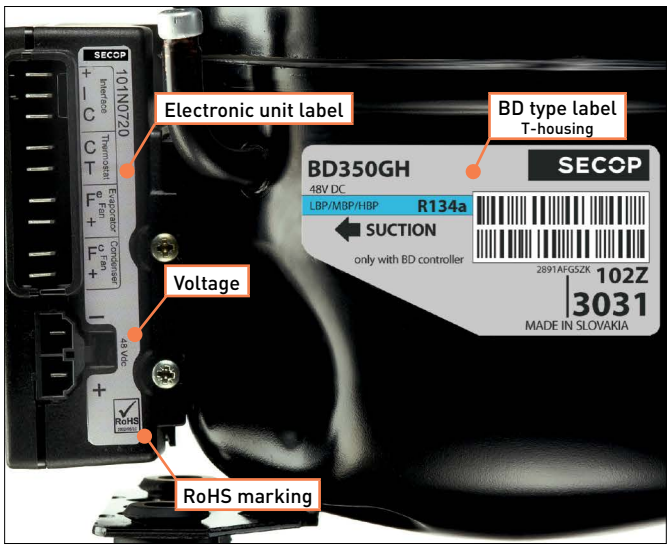
BD Series based on **T-Housing**	Label Width = 85 mm	Example
Background colour	grey	
Coloured stripe for refrigerant	R134a: blue, R404A/R507: lilac	
Barcode	on white background	
Approvals printed on label	yes (except UL)	
Voltage printed on label	yes	
Application printed on label	yes	

Note: The remark "only with BD controller" was introduced on all BD compressors in the mid of 2013.

1.12 Labels on electronic units

Labels on electronic units	Examples
Labels on electronic units consist of a 2D Data Matrix code area and a number of lines with informations. The 2D Data Matrix Code is always built up with 62 characters containing information about type, code number, product version, product revision, unit ID, supplier, part number and text. Text information on the label: Line 1: **ID:** PLYYWWssssss (unique number) Line 2: **Date:** YYWW Line 3: **Ver.:** VV Line 4: **Text:** text Meaning: **PL** Production location, 01 ... 99 **YY** Year, 12 = 2012 **WW** Week number, 01 ... 52 **ssssss** Serial number, 000001 ... 999999 **VV** Version, 00 ... 99	 

1.13 Label design



A lot of our BD compressors have UL approvals. Approved compressor - electronic unit combinations can be found in the table below.

UL approval mark

Nominal voltage has been removed from BD compressor type labels based on the P-housing and moved to the electronic unit.
Application marking (LBP/MBP/HBP) has been removed on BD compressors based on the P- and BD-Micro housings.

1.14 VDE/CB/UL approved compressor - electronic unit combinations (BD P-Housing)

Compressors		Electronic Units						
		Standard	AEO	High speed	Solar	AC/DC	Automotive	Telecomm.
		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**	**CB / VDE**	**UL / CB / VDE**	
BD35K-B (R600a)	101Z0214		**UL / CB / VDE**		**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**	
BD50K (R600a)	101Z0213							
BD80F mm	101Z0280							
BD80CN (R290)	101Z0403		**UL / CB / VDE**			**UL**	**UL / CB / VDE**	
BD100CN (R290)	101Z0401							
BD250GH.2 (12/24V)	101Z0406							
BD250GH.2 (48V)	101Z0405							**UL**

UL / CB / VDE = Combination possible, VDE, CB or UL approval

= Combination possible, but no approval

= Combination not possible

2.
ELECTRONIC UNITS

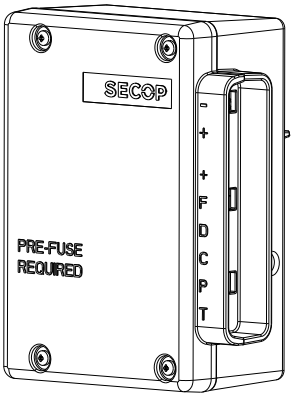
Technical data		Electronic units (code number)						
		BD, P-Housing						
		Standard (2nd generation) 101N0212	High Speed 101N0390	AEO 101N0340	Solar 101N0420	AC/DC converter 101N0510	Automotive 2nd generation) 101N0650	Telecom 101N0732
Approvals	Approvals and certificates *	-	-	UL/VDE/CB	UL/VDE/CB	UL/VDE	UL/ VDE/CB UN-ECE-R10	UL
	Type approval (E-marking) 2004/104/EC	-	-	-	-	e4 03 1588	-	-
	EU declaration 2014/30/EU and RoHS declaration 2011/65/EU	yes	yes	yes	yes	yes	yes	yes
	Further EMC tests	CISPR25/1 CISPR14	CISPR25/1	CISPR25/1	CISPR25/1	-	CISPR25/5	-
Supply voltage	DC supply voltage range (V)	(9) 9.6 - 17, 21.3 - 31.5	(9) 9.6 - 17, 21.3 - 31.5	(9) 9.6 - 17, 21.3 - 31.5	10 - 45	(9) 9.6 - 17, 21.3 - 31.5	(9) 9.6 - 17, 21.3 - 31.5	32 - 60
	AC supply voltage range (V)	-	-	-	-	100 -240	-	-
	Frequency (Hz)	-	-	-	-	50-60	-	-
	Fuses required for e.g. 12/24V DC usage (A)	15 / 7.5	30 / 15	15 / 7.5	15	15 / 7.5	15 / 7.5	15
	Fuse required AC usage	-	-	-	-	4	-	-
Environments	Ambient temperature operation (°C)	55	55	55	55	55	55	55
	Ambient temp. during storage/transport (°C)	-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85
Enclosure	IP Class	20	20	20	20	20	20	20
	Weight (kg)	0.19	0.26	0.19	0.19	0.40	0.19	0.24
Connectivity	Connectors	6.3 mm	6.3 mm	6.3 mm	6.3 mm	6.3 mm	6.3 mm	6.3 mm, Molex
	Fan (V/W_{max})	12 / 6	12 / 6	12 / 6	12 / 6	12 / 6	6 / 12	48 / 60+60
	NTC sensor	yes	yes	yes	yes	yes	yes	yes
	Bus communication	1 wire	1 wire	1 wire	1 wire	1 wire	1 wire	1 wire
	Light (V/W)	-	-	-	-	12 / 5	-	-
	LED (alarm)	yes	yes	yes	yes	yes	yes	-
	TOOL4COOL®	yes	yes	yes	yes	yes	yes	yes
	Setpoint selection (mechanical thermostat -M / (external resistor -R / TOOL4COOL® - T)	M / - / T	M / - / T	M / - / T	M / - / T	M / - / T	M / - / T	M / - / T

* please refer to table: **VDE/CB/UL approved compressor - electronic unit combinations**

– TECHNICAL DATA

	BD, T-Housing				BD-Micro		
101N8xxx-Series 101N0820+0800	**101N8xxx-Series 101N0820+0810**	**101N8xxx-Series 101N0830**	**101N07xx-Series 101N0715**	**Telecom 101N0720**	**Variable Speed (VSD) 101N2100**	**Variable Speed (VSD) AC/DC conv. 101N5100**	**Automotive (AUTO) 101N1010**
-	-	-	-	-	-	UL	-
-	-	-	-	-	compliant	compliant	compliant
yes	yes	yes	yes	yes	yes	yes	yes
CISPR25/1	-	-	CISPR25/3	-	CISPR25/1	CISPR25/1	VW 80101
9.6 - 17	19 - 31.5	9.6 - 17	19 - 31.5	32 - 60	9.6 - 17 19 - 34	9.6 - 17 19 - 34	8.5 - 17
- -	- -	- -	- -	- -	- -	100 - 240 50 - 60	- -
30 + 2 x 60	15 + 2 x 30	60	30	15	15 / 7.5	15 / 7.5	12
-	-	-	-	-	-	4	-
55	55	55	55	55	55	55	55
-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85	-40 to 85
20	20	20	20	20	42	42	40
0.28 + 0.33	0.28 + 0.25	0.28	0.27	0.27	0.11	0.29	0.17
6.3 spades, 9.5 mm spades	6.3 spades, 9.5 mm spades	6.3 spades, 9.5 mm spades	6.3 spades, 9.5 mm spades	6.3 mm, Molex	6.3 mm	6.3 mm	Tyco Electronics
12-24 / 200+100	12-24 / 200+100	-	12+24 / 60+40	48 / 60+60	12 / 6	12 / 6	12 / 7.8
yes	yes	yes	yes	yes	yes	yes	yes
1 wire, LIN, Modbus	1 wire, LIN, Modbus	1 wire	1 wire	1 wire	1 wire	1 wire	1 wire
-	-	-	-	-	-	12 / 5	LED
-	-	-	-	-	yes	yes	yes
yes	yes	yes	yes	yes	yes	yes	yes
M / - / T	M / - / T	M / - / T	M / - / T	M / - / T	M / R / T	M / R / T	M / R / T

3.
ELECTRONIC UNITS

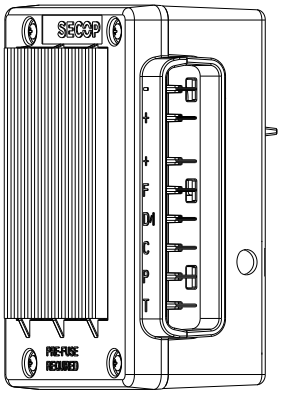


Standard
101N0212

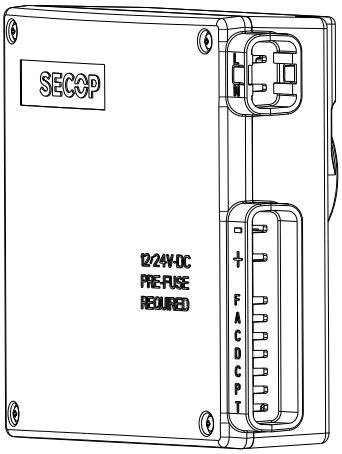
AEO
101N0340

Automotive
101N0650

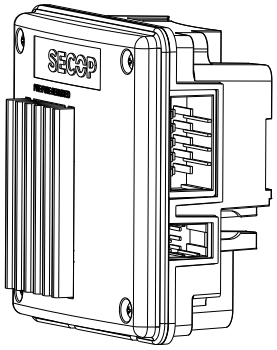
Solar
101N0420



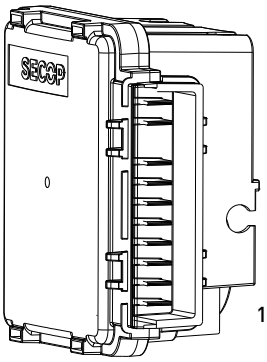
High Speed
101N0390



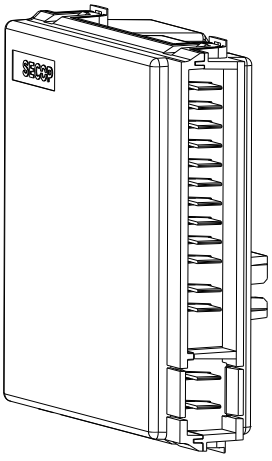
AC/DC converter
101N0510



Automotive (AUTO)
101N1010

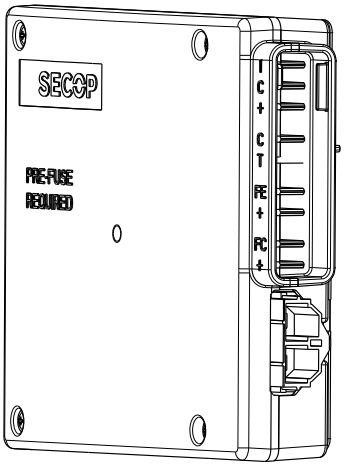


VSD
101N2100

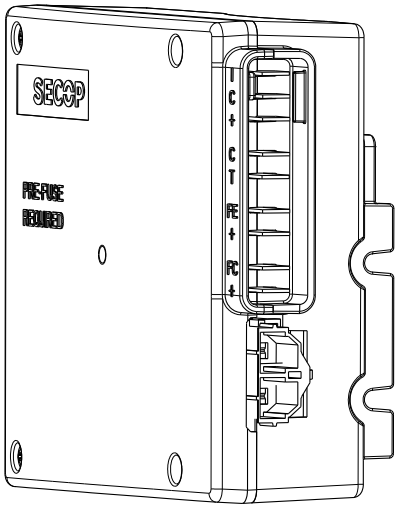


VSD w. AC/DC converter
101N5100

– HOUSINGS

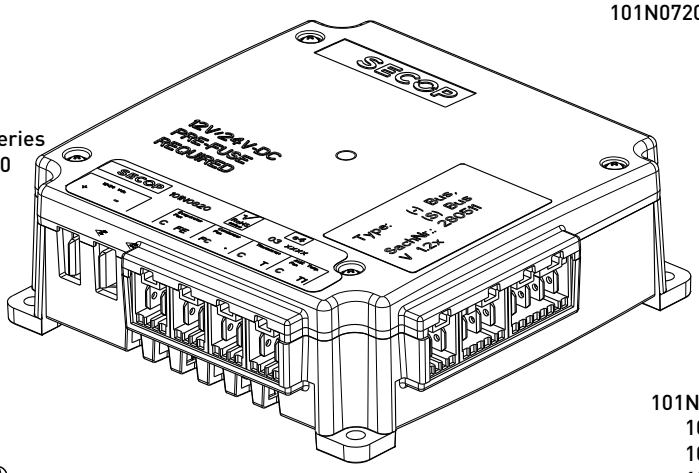


Telecom
101N0732

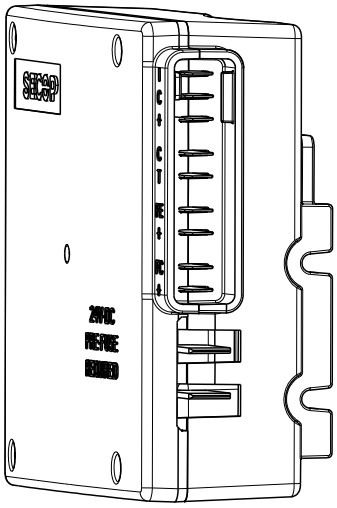


Telecom
101N0720

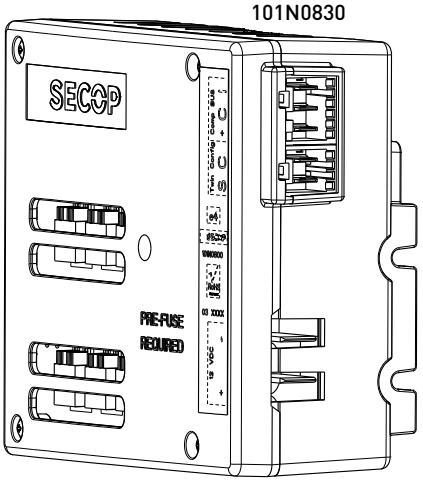
101N8xxx-Series
101N0800



101N07xx-Series
101N0715



101N8xxx-Series
101N0810
101N0820
101N0830



4.
ELECTRONIC UNITS – FEATURES

Secop BD compressors are fitted with brushless direct current motors (BLDCM) which are electronically commutated by an electronic unit.
The electronic unit is delivered separately and for most of the units, be mounted on the compressor. A few units must be mounted separately from the compressor. Please follow our Instructions. The electronic unit must always be connected directly to the battery poles or power supply unit terminals. For the protection of the installation an external fuse must be installed in the power supply cable close to the battery or power supply unit. If the chassis is used as a conductor, a proper connection between cable and chassis must be established. Wrong polarity applied to the electronic unit does not destroy the unit - however, the compressor will not work.
Some electronic units can run on either 12 V DC or 24 V DC. The electronic unit will be calibrated to the applied voltage. This means that if the battery voltage is less than 17 V, the electric unit assumes that it is working in a 12 V DC system. If the voltage is higher than 17 V DC the electronic unit assumes that it is working in a 24 V DC system. Voltages are measured on the power supply terminals of the electronic unit. If the compressor is planned to be stopped for long periods, a main switch can be installed.

For detailed function descriptions of the individual unit please, refer to our Instructions for that specific unit.

4.1 Voltage ranges with compressors

BD Compressors with various electronic units (P-Housing)	**Voltage range**
BD35F /-HD.2 /-B	9.6 – 31.5 V DC
BD35F AC/DC	85 – 265 V AC, 50/60 Hz 9.6 – 31.5 V DC
BD35F Solar	9.6 - 45 V DC
BD50F	9.6 – 31.5 V DC
BD50F AC/DC	85 – 265 V AC, 50/60 Hz 9.6 – 31.5 V DC
BD80F	9.6 – 31.5 V DC
BD35K	9.6 – 31.5 V DC
BD35K AC/DC	85 – 265 V AC, 50/60 Hz 9.6 – 31.5 V DC
BD35K Solar	9.6 - 45 V DC
BD50K	9.6 – 31.5 V DC
BD80CN	9.6 – 31.5 V DC
BD100CN	9.6 – 31.5 V DC
BD250GH.2 12/24V	9.6 – 31.5 V DC
BD250GH.2 48V	32 – 60 V DC

BD Compressors with various electronic units (T-Housing)	**Voltage range**
BD350GH 24V	19 – 31.5 V DC
BD350GH 12/24V	9.6 – 31.5 V DC
BD350GH 48V	32 - 60 V DC
BD220CL	9.6 - 17 V DC

BD Compressors with various electronic units (Micro Series)	**Voltage range**
BD1.4F-AUTO.3	8.5 - 17 V DC
BD1.4F-VSD.2/.3 **BD1.4F-VSD-HD**	9.6 – 34 V DC
BD1.4F-VSD.2 AC/DC	85 – 265 V AC, 50/60 Hz 9.6 – 34 V DC

4.2 Cable dimensions

To ensure correct starting and operating conditions, the cable dimensions must be observed and sized correctly.
We recommend a maximum voltage drop of 0.3 V in the cable between power supply source and supply terminals on the electronic module.

Calculation of voltage drop = 0.0175 * (cable length in meter / cable square in mm^2) * 2 * current in Ampere

Example:
Cable length = 5 meter
Cable square = 4 mm^2
Current consumption = 6.5 A
Voltage drop = 0.0175 * (5/4) * 2 * 6.5 = 0.28 V.

4.3 Compressor speed control

All BD compressors have brushless DC motors and therefore speed/capacity control can be made in an easy way. The applied voltage to the motor inside is proportional with compressor speed.
Note - the voltage applied to the motor inside the compressor is not the same as supply voltage!
On BD35F/K, BD50F/K, BD80F/CN, BD100CN and BD250GH.2 the speed can be set via an external resistor in series with the thermostat circuit between terminal C & T.
For further details on the different electronic units please refer to the Instruction and Data Sheets for specific models.
On electronic units with communication interface the speed can be selected via PC software Tool4Cool®.
Depending on the electronic unit the speed range varies. All compressor models offer speed control by means of Tool4Cool® or by means of an external resistor.
Please refer to Instructions and Operating Instructions for specific units.

For each electronic unit there is a built in protection function for over and under speed which stops the compressor when these limits are exceeded.

4.4 Thermostat connection

The electronic unit on the BD compressor can operate with normal mechanical type thermostats as used in refrigeration appliances, or with electronic thermostats. The thermostat is connected between the terminals C and T of the electronic unit. The compressor current does not flow through the thermostat contacts. When the thermostat is cut out there will still be power on to the electronic unit. A system with no stand-by power consumption can be established if the thermostat is replaced by a jumper between the terminals C and T, and the main switch is replaced by a thermostat. In this case the full current to the compressor flows through the thermostat, which must be rated accordingly.

Electronic units with communication interface have a built in electronic thermostat that controls the temperature via an NTC sensor connected to terminal C & T on the electronic unit. Recommended NTC sensor type Epcos M800/5K.
The thermostat can be adjusted via communication interface and PC software Tool4Cool®.
BD1.4F-VSD.2/.3 compressor model offers thermostat adjustment feature by means of PC software Tool4Cool® or by means of an external resistor.
For further details on thermostat function for the individual electronic units please refer to our Instructions.

4.5 Adaptive Energy Optimization (AEO) function

The AEO function is very suitable for tropical applications, systems with huge load variations and applications where energy is an important issue. Furthermore it can be an advantage to use it when it is difficult to determine at what speed the compressor should run.
Customers producing condensing units see this as the preferred solution. The function will prevent short cycling of the compressor and thereby protect the battery. The AEO is built into electronic modules with separate code numbers.
The AEO function can be overruled by means of a resistor to set a fixed speed.
See Instructions for details on resistor size.

4.6 AEO function for BD35F/K, BD50F, BD80F, BD250GH.2 and BD100CN

If no resistors are connected between C and T, speed control is done by AEO. The AEO function can be adapted via four setpoint parameters:

- **AEO Runtime setpoint:**
  The target runtime for the compressor during cut-in

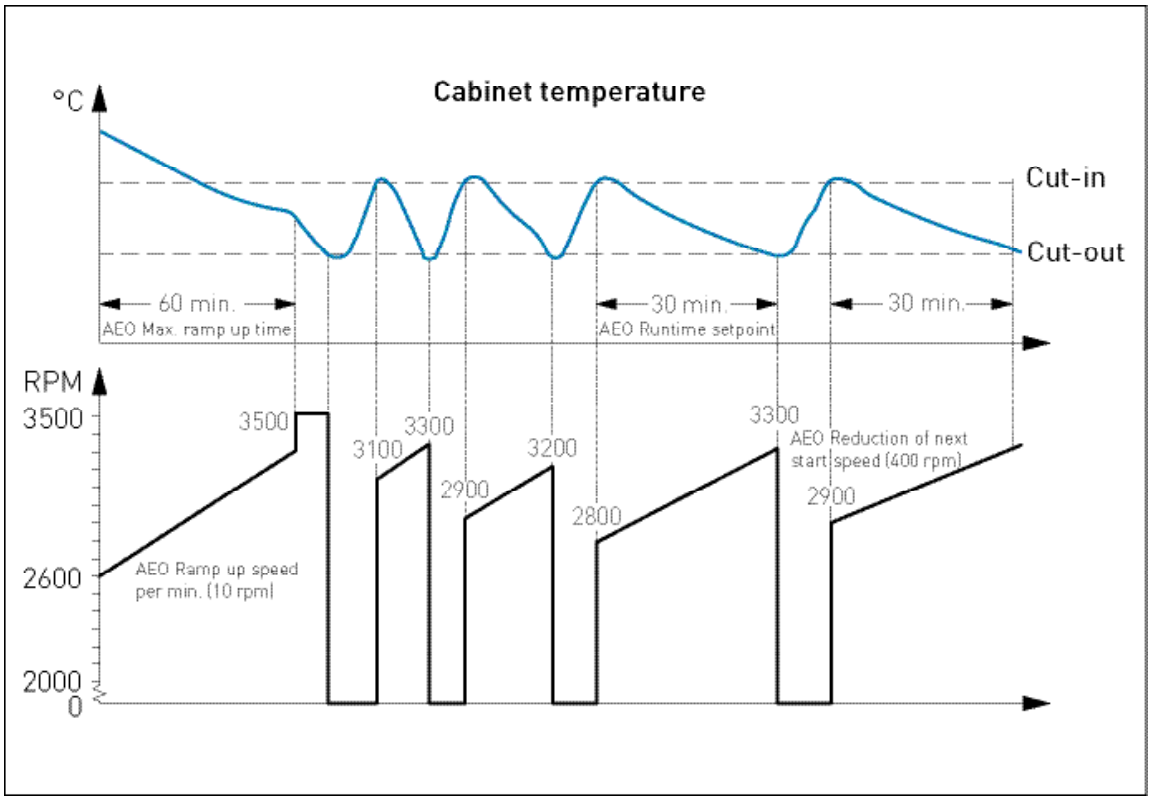
- **AEO Start speed at power up:**
  The start speed of compressor in AEO mode, overruled by fixed speed with 2500 rpm for 30 sec

- **AEO Max. ramp up time:**
  The maximum time that the speed is ramping up before reaching maximum speed for the compressor (3500 rpm for 101N0340 and 4400 rpm for 101N0390)

- **AEO Reduction of next start speed:**
  The parameter defines how much the next start speed shall be reduced at next thermostat cut-in

	Motor speed [rpm]	Resistor R1 [Ohm]
101N0340 101N0420 with AEO	AEO	0
	2000	173
	2500	450
	3000	865
	3500	1696

	Motor speed [rpm]	Resistor R1 [Ohm]
101N0390 with AEO	AEO	0
	2500	203
	3100	451
	3800	867
	4400	1700



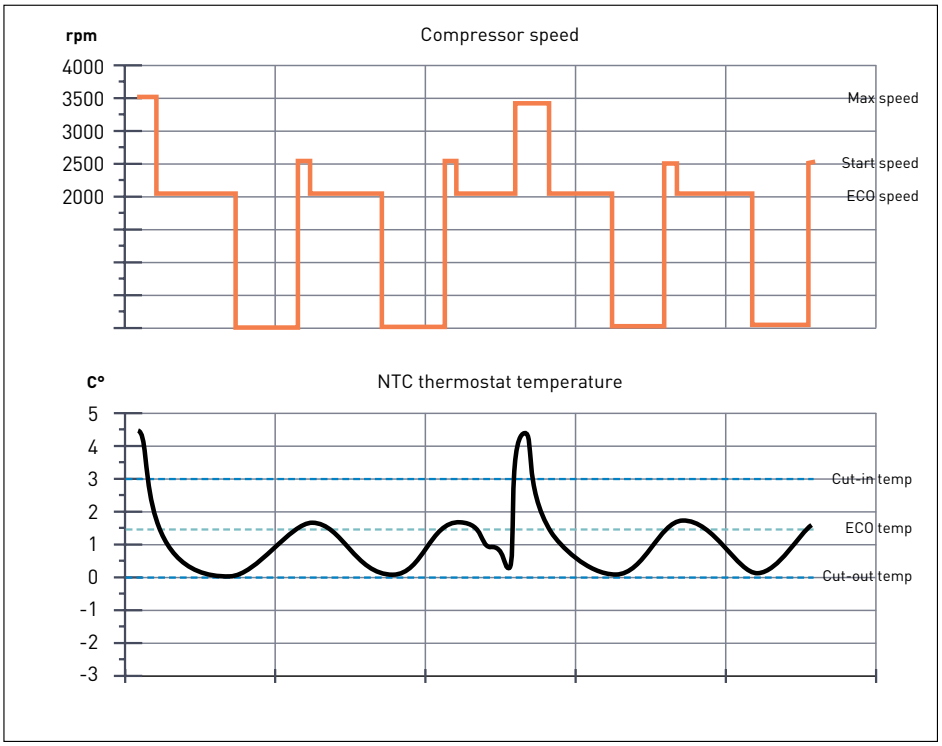
4.7 ECO function

NTC and ECO Speed

"NTC and ECO speed set via Tool4Cool® / communication interface" would be used if a NTC is used to control the temperature inside the cabinet. This is the most advanced function of the new controllers. The compressor speed is automatically adapted to the current cooling requirement.

Operation in ECO mode reduces energy consumption and noise by controlling compressor speed as a function of temperature.
The Eco Temperature is automatically calculated to be in the middle between cut in temperature and cut out temperature:
- when operating below ECO temperature, compressors run at the set ECO speed (often 2000 rpm)
- when operating above ECO temperature, the compressors run at Requested speed (often 3500 rpm)

The temperatures can be adjusted in the "Thermostat" section within Tool4Cool®.



4.8 Fan connections

BD35F/K, BD50F/K, 80F/CN, 100CN and BD250GH.2
If a condenser fan is to be used, it must be connected to the electronic unit terminals + and F. Always use a 12V fan, even in 24V systems, as the electronic unit will automatically reduce the applied voltage to 12V for the fan.
The max. load on the electronic unit is 0.5A $_{avg}$ or 1A $_{peak}$.
The fan is allowed to start with a higher current for the first 2 seconds. If the fan becomes overloaded, both fan and compressor will be cut out by the overload protection.

BD350GH, BD220CL, BD250GH.2 48 V, and BD1.4F-xxx
Electronic units with communication interface via Tool4Cool® have fan speed control in the range from 40 to 100 % controlled via a PWM signal.
Some of these controllers have the possibility to control both a condenser and evaporator fan via 2 fan outlets on the electronic unit.
Besides speed control it is possible to define a start and stop delay of the fans related to thermostat function.
The table below shows the different settings that can be made via PC software Tool4Cool®. This varies from unit to unit.

Name	Default	Max. value	Min. value	Step	Unit
Cond. Fan voltage	24	31	12	1	Volt
Fan speed	100	100	40	10	%
Fan start delay	0	240	0	1	Seconds
Fan stop delay	0	240	0	1	Seconds
Fan forced ON	OFF	ON	OFF	1	-
Detect missing fan	OFF	ON	OFF	1	-

4.9 Fan output power

Electronic Unit Code number	Fan output (Watt) and voltage (V)
101N0212	6 / 12
101N0390	5 / 12
101N0340	6 / 12
101N0420	6 / 12
101N0510	6 / 12
101N0650	6 / 12

Electronic Unit Code number	Fan output (Watt) and voltage (V)
101N0715	60/40 / 12 or 24
101N0720	60 / 48
101N0732	60 / 48
101N0800	100/200 / 12
101N0810	100/200 / 24

Electronic Unit Code number	Fan output (Watt) and voltage (V)
101N1010	6 / 12
101N2100	6 / 12
101N5100	6 / 12

4.10 Lamp connection

A 12V DC 5 Watt lamp can be connected between the terminals A and C on electronic unit 101N0510 and 101N5100. The output voltage between the terminals A and C is always regulated to 12V DC. A 12V DC lamp must be used for both 12V and 24V power supply systems. The lamp output can supply a continuous current of 0.5A $_{avg}$

4.11 Fault detection and diagnosis

BD35F/K, BD50F/K, 80F/CN, 100CN and BD250GH.2 12/24 V
To diagnose why a compressor comes to an unintended stop, it is recommended to have a 10 mA Light Emitting Diode (LED) installed between the terminals + and D. Provided that the electronic unit is properly connected to the power supply, and the thermostat is on, 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.

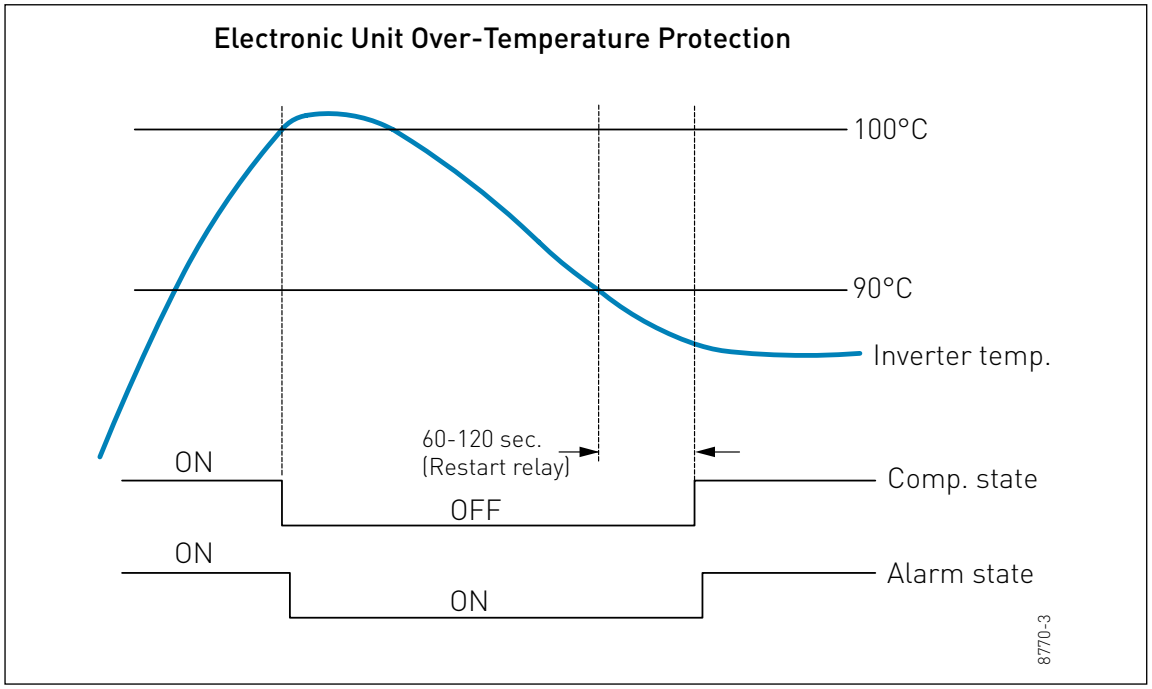
LED flashes when:
Battery voltage low: Battery must be charged. Hereafter start delay of 60 sec
Fan is overloaded: Restart made after 60 sec
Motor start error: Restart made after 60 sec
Compressor speed too low: Restart made after 60 sec
PCB temperature too high: Temperature must be below 90 / 100 °C. Hereafter delay of 60 sec

Electronic unit with communications interface via Tool4Cool® shows actual alarm message on the PC screen. Alarm messages (depending on electronic unit):
No error
Voltage failure
Fan failure
Motor failure
Min. speed failure
Max. speed failure
Thermal failure
NTC Sensor Failure

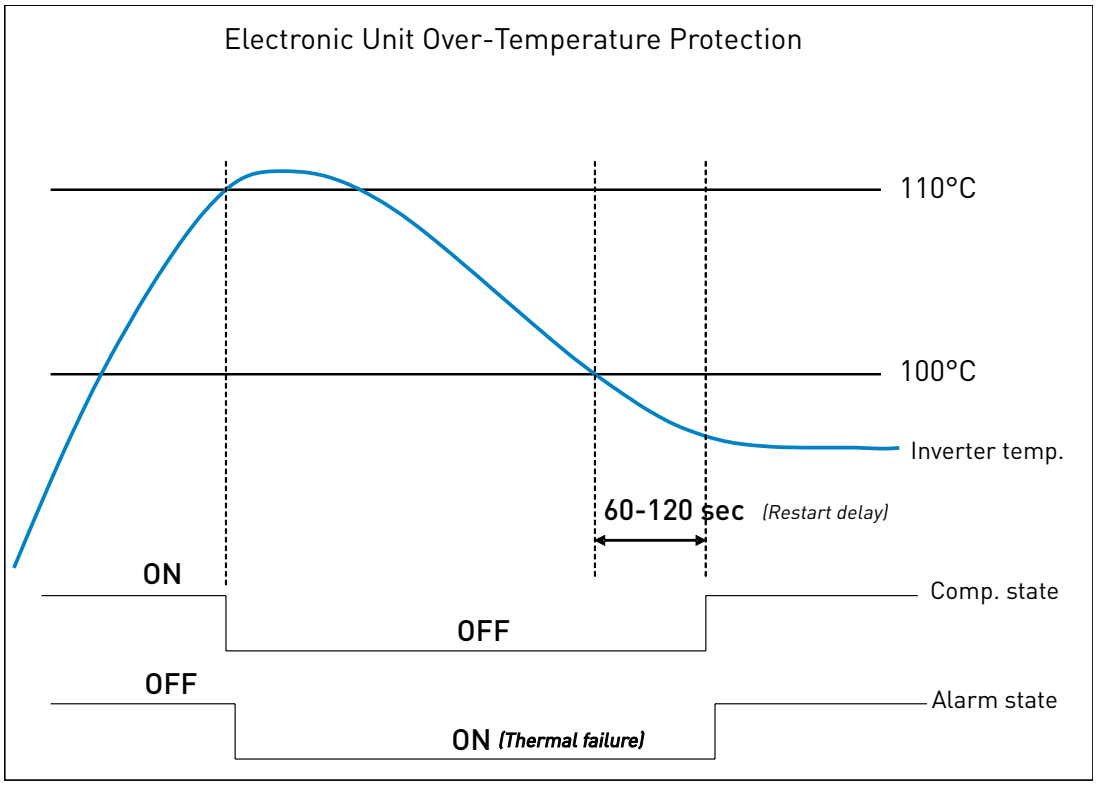
Some units also offer the possibility to connect an LED in order to get a flash pattern to identify the error. For details please refer to the Instructions for a specific unit.

4.12 Overload protections

In order to protect the electronic unit from destruction due to overheating a built in temperature sensor monitors the PCB temperature.
If the temperature exceeds 100 °C the compressor is stopped until the PCB temperature has dropped below 90 °C. For the second generation electronic units 101N0212 and 101N0650 the temperature limits are 10 °C above these values. The compressor is stopped until the PCB temperature has dropped below 100 °C. Hereafter the compressor will start again with a delay of approx. 1 minute (depends on the electronic unit).
The heat influencing the PCB comes from its surrounding temperature and the temperature generated in the PCB due to load, meaning that a higher load is possible when surrounding temperature is low and vice versa.



101N0212, 101N0340. 101N0390, 101N0420, 101N0510
When the unit reaches 110 °C the system will shut down and an alarm error **(Alarm 6: Thermal failure)** will be sent.
The system restarts automatically after the temperature has dropped below 100 °C. Hereafter the set delay **Compressor restart delay** must be terminated. The default duration is 60 sec.



4.13 Battery protection

The battery protection prevents permanent damage to the battery by discharge.

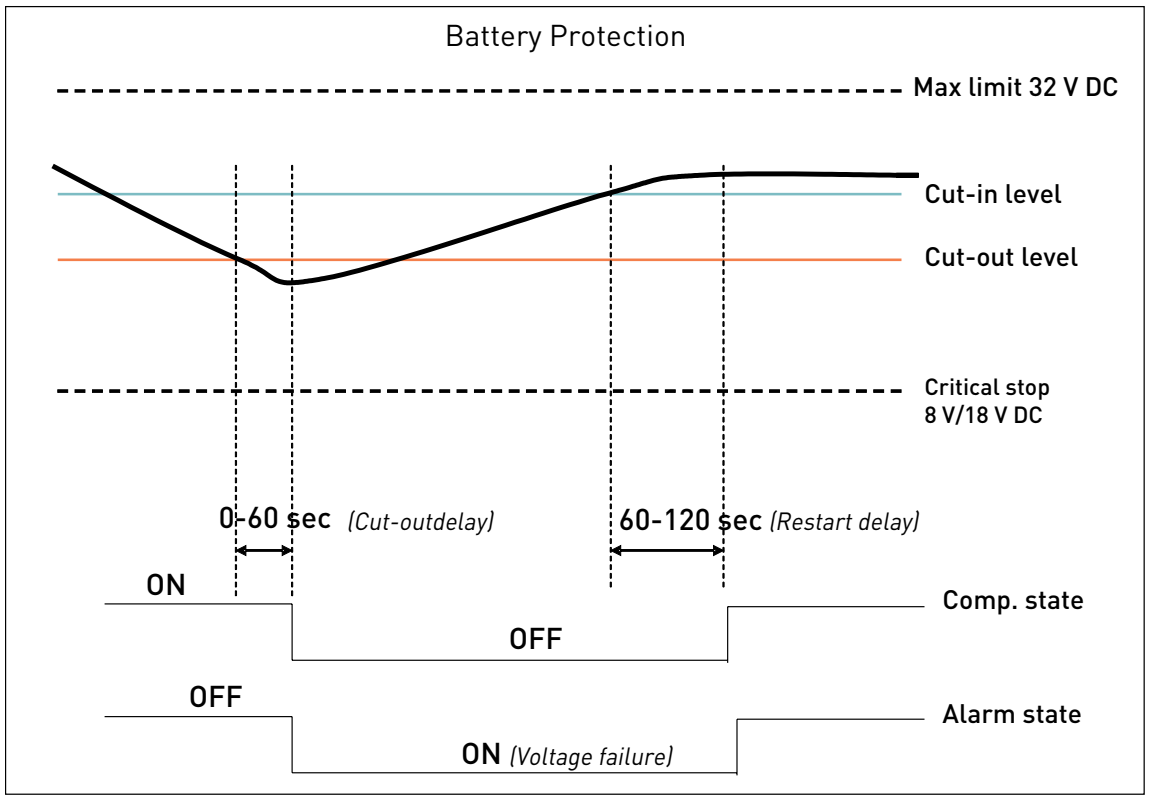
The setting range is 9-17 V DC for 12 V DC systems, and 19 to 27 V DC for 24 V DC systems.
The cut out values and cut in differences can be set individual for 12 V systems and 24 V systems.
Battery protection function is disabled in Solar controller 101N0420 (fixed range 10 to 45 V DC).

If the voltage remains below the cut-out voltage for the time specified in the parameter "Cut-out delay" (default 3s), compressor and fan are stopped.

Compressor and fan are stopped immediately, if the voltage drops below 8 V in 12 V systems and below 18 V in 24 V systems (critical stop).

If Solar mode is enabled, the electronic will be able to run over the entire input voltage range (9-32 V), without stopping between 12 V and 24 V range.

Tolerances are ± 0.30 V DC.



Settings

Name	Default	Max value	Min value	Step	Unit
Battery cutout level 12 V DC	10.4	17	9	0.1	Volt
Battery cut-in diff. 12 V DC	1.3	10	0.5	0.1	Volt
Battery cut-out level 24 V DC	22.8	32	19	0.1	Volt
Battery cut-in diff. 24 V DC	1.3	10	0.5	0.1	Volt
Battery Solar mode on/off	Disable	Enable	Disable	-	-
Cutout delay	3	60	0	1	Seconds

4.13.1 Battery protection for electronic units 101N0212, 101N0390, 101N0340, 101N0510, and 101N0650

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

Optional battery protection settings

Resistor [kΩ] terminals **C** - **P**	12V cut-out [V]	12V cut-in [V]	12V max. Voltage	24V cut-out [V]	24V cut-in [V]	24V max. Voltage [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
8.2	10.4	11.7	17.0	22.8	24.2	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

4.13.2 Battery protection for electronic unit 101N1010

Standard battery protection settings

12V cut-out [V]	12V cut-in [V]
8.5	9.0

Optional battery protections settings

Resistor [kΩ] terminals **S2** - **C**	12V cut-out [V]	12V cut-in [V]	12V max. Voltage [V]
0	9.60	10.90	17.0
0.17	9.73	11.03	17.0
0.34	9.86	11.16	17.0
0.54	10.00	11.30	17.0
0.75	10.12	11.42	17.0
0.97	10.25	11.55	17.0
1.23	10.38	11.68	17.0
1.50	10.52	11.82	17.0
1.81	10.65	11.95	17.0
2.15	10.78	12.08	17.0
2.53	10.91	12.21	17.0
2.96	11.04	12.34	17.0
3.44	11.17	12.47	17.0
3.99	11.30	12.60	17.0

4.13.3 Standard battery protection settings for electronic units 101N2100 / 101N5100

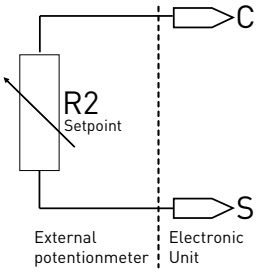
Voltage (0.1 steps)				Min. value	Default
12V	± 0.3V DC, all values	Cut-out	VDC	9.6	10.4
		Cut-in diff.	VDC	0.5	1.3
24V	± 0.3V DC, all values	Cut-out	VDC	19	21.3
		Cut-in diff.	VDC	0.5	1.3

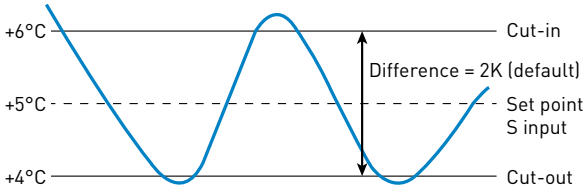
4.13.4 Optional battery protection settings for electronic units 101N2100 / 101N5100

Resistor [kΩ] terminals **C - P**	Duty Cycle [%]	Speed [RPM]	Cut-out level [V]	Cut-in level [V]	Cut-out level [V]	Cut-in level [V]	
open	0	Maintain	Maintain current value. Can be changed via Modbus				
220	3	-	Maintain current value. Can be changed via Modbus				**ITC**
130	6	-	Maintain current value. Can be changed via Modbus				**ITC off**
91	9	-	Maintain current value. Can be changed via Modbus				**ECO**
68	12	-	Maintain current value. Can be changed via Modbus				**ECO off**
51	15		9.6 - 34 V DC				**Solar**
43	18		Default				**Solar off**
36	21		Reset battery only				
30	24		Reset battery and speed to default value				
27	27	4000	Maintain current value. Can be changed via Modbus				
22	30	4000	9.6	10.9	21.3	22.6	
20	33	4000	10.1	11.4	22.3	23.6	
18	36	4000	11.1	12.4	23.3	24.6	
15	39	4000	12.1	13.4	24.3	25.6	
13	42	3500	Maintain current value. Can be changed via Modbus				
12	45	3500	9.6	10.9	21.3	22.6	
11	48	3500	10.1	11.4	22.3	23.6	
9.1	51	3500	11.1	12.4	23.3	24.6	
8.2	54	3500	12.1	13.4	24.3	25.6	
7.5	57	3000	Maintain current value. Can be changed via Modbus				
6.2	60	3000	9.6	10.9	21.3	22.6	
5.6	63	3000	10.1	11.4	22.3	23.6	
5.1	66	3000	11.1	12.4	23.3	24.6	
4.3	69	3000	12.1	13.4	24.3	25.6	
3.9	72	2500	Maintain current value. Can be changed via Modbus				
3.3	75	2500	9.6	10.9	21.3	22.6	
2.7	78	2500	10.1	11.4	22.3	23.6	
2.2	81	2500	11.1	12.4	23.3	24.6	
1.8	84	2500	12.1	13.4	24.3	25.6	
1.5	87	2000	Maintain current value. Can be changed via Modbus				
1.0	90	2000	9.6	10.9	21.3	22.6	
0.68	93	2000	10.1	11.4	22.3	23.6	
0.36	96	2000	11.1	12.4	23.3	24.6	
0.051	99	2000	12.1	13.4	24.3	25.6	

4.14 Set point selection during standalone operation (w/o Tool4Cool®) for electronic unit 101N2100

Set point [°C]	R2 [Ohm]	Set point [°C]	R2 [Ohm]	Set point [°C]	R2 [Ohm]	Set point [°C]	R2 [Ohm]
-20	0	-12	2667	-4	5333	4	8000
-19	333	-11	3000	-3	5667	5	8333
-18	667	-10	3333	-2	6000	6	8667
-17	1000	-9	3667	-1	6333	7	9000
-16	1333	-8	4000	0	6667	8	9333
-15	1667	-7	4333	1	7000	9	9667
-14	2000	-6	4667	2	7333	10	10000
-13	2333	-5	5000	3	7667		





Example: R2 = 8330 Ω ~ +5°C
Difference 2K (default value, can be changed via T4C)
Cut-out = +4°C
Cut-in = +6°C

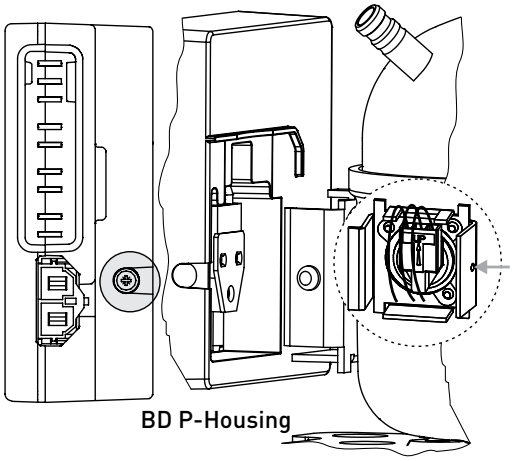
- Cut-out value will be written into EEPROM
- If R2 resistor is removed, Cut-out will continue to be 4°C and difference 2K

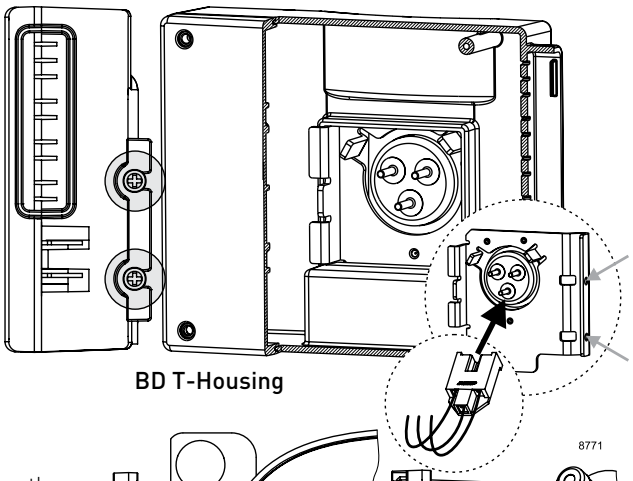
In order to utilize the integrated temperature control, connect a 10K potentiometer (or fixed resistor), between S and C (R2). Via the resistance, a temperature set point between -20 °C and 10 °C can be selected as per the table above.

The resistance adjusts the temperature set point around which the Cut-in and Cut-out occurs. It is defined as the average value between Cut-in and Cut-out.

The temperature set point will not change the Cut-in difference, but only adjust the Cut-out based on the temperature set point and the actual Cut-in diff setting.
(Cut-out = temperature set point – Cut-in diff / 2).

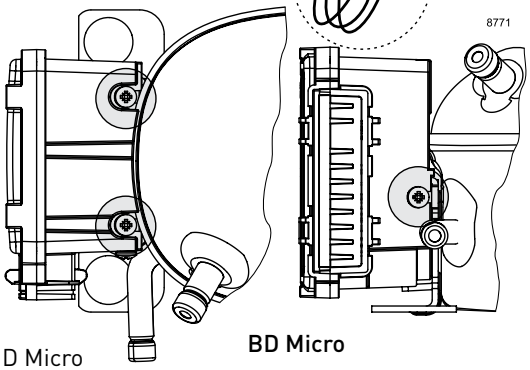
4.15 Mounting the electronic unit





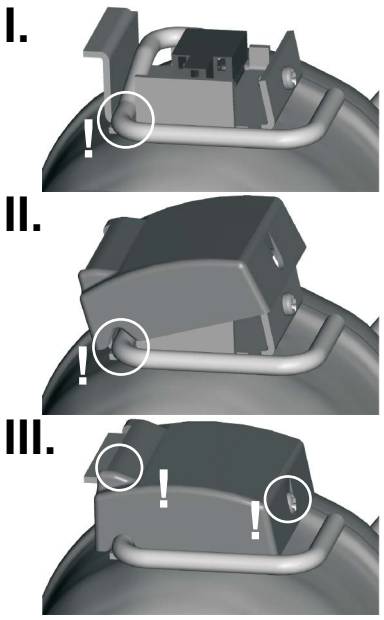
BD P-Housing
The cable plug of the electronic unit is mounted on the pins of the current lead-in on the compressor.
Then the electronic unit itself is mounted on the bracket of the compressor. At first the left side is mounted, then the right side is pressed over the screw on the bracket (sideways, marked in grey). The electronic unit snaps on to the bracket and is now securely mounted on the compressor. Earth connection (via compressor baseplate) can be used if required.

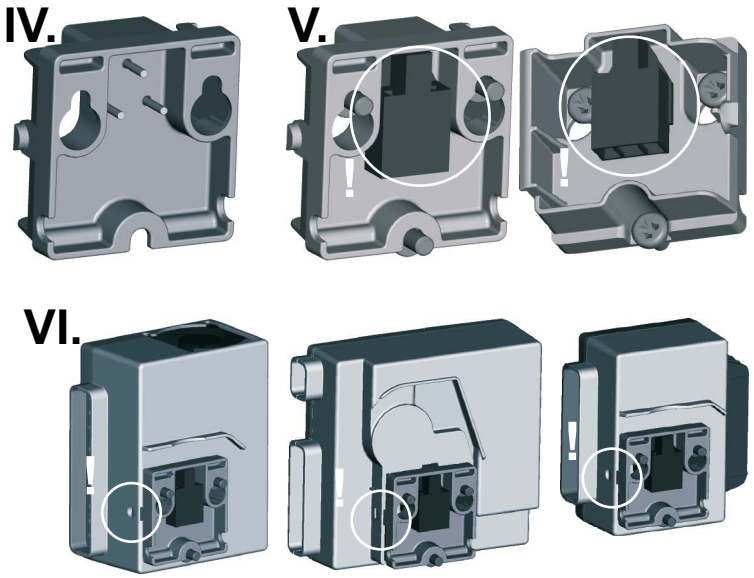
BD T-Housing
Connect the terminal plug from the electronic unit to the compressor terminal. Mount the electronic unit on the compressor and fix it with two screws (sideways, marked in grey).



BD Micro
Mount the electronic unit directly on the compressor plug and fix it with two screws (sideways or from above, marked in grey)

4.16 Mounting the remote kit





The remote kit was originally designed to be used together with the BD250GH twin compressor.
It is applicable to all electronic units used with the BD P-Housing compressor platform.
The remote kit supports in mounting the electronic unit in small machine compartments.
The electronits unit can be placed next to the compressor.

5.
PRECONDITION FOR LONG OPERATING LIFE

In order to achieve trouble free operation and long operating life for a hermetic compressor, the following preconditions should be observed:

1. Sufficient starting torque of the compressor motor to allow the motor to start at the pressure conditions in the refrigeration system.
2. Sufficient breakdown torque to allow the motor to handle the load conditions at start up and during operation.
3. When the refrigeration system is in operation, the temperature in the compressor should not rise to levels which could damage its components. Consequently, condensing and compression temperatures should be kept as low as possible.
4. Precise dimensioning of the refrigeration system in question and careful evaluation of the operating conditions of the compressor at expected maximum loads.
5. Sufficient cleanliness and low residual humidity in the circuit.

5.1 Motor overload

Compressor start up is influenced by the starting and/ or breakdown torque of the motor. If starting and/ or breakdown torque is insufficient, the compressor either cannot start or the start will be hampered and delayed because the motor protector is activated. Repeated start attempts subject the motor to overload, which sooner or later will result in failure. Faults of this kind can mostly be avoided by using the correct compressor/ motor combination. Secop offers the best solution for nearly all applications. It is a question of selecting the correct compressor for difficult fields of application.

5.2 Thermal overload

Operating conditions resulting in thermal decomposition of the materials used in the compressor must be avoided to ensure long compressor life. The materials relevant in this relation are motor insulation, refrigerant and oil.

The motor insulation consists of the insulating enamel for the copper wires, the slot liner of the stator iron, bandages and feeder cables.

As early as 1960, Secop (Danfoss Compressors) introduced fully synthetic insulation materials on all its compressors and the enamel for the wire insulation and the insulating system itself has improved continuously ever since. The result is constantly improved protection against motor overload. Like all other CFC gases, R12 and R502 were found to be harmful to the environment and were consequently prohibited. These refrigerants were used together with mineral oils. A so called Spauschus reaction between oil and refrigerant could consequently occur at high temperatures, which led to valve coking, especially at high residual humidity.

6.
DESIGN LIMITS

In order to secure a satisfying lifetime of the compressor, some design criteria for the appliances must be fulfilled. Both the condensing temperature and the compressor temperature should be kept as low as possible. This can be done by using well dimensioned condenser surfaces and by ensuring good ventilation around the compressor under all operating conditions.

In order to protect the compressor against overload, the compressor must start and work properly through pressure peaks obtained in the highest ambient temperature and lowest working voltage. These limitations ensure a protection of valves, gaskets, oil, and motor insulation. Refrigerants R134a, R404A or R507 need polyester oils (POE).

Because of these oil types and the application of the above mentioned refrigerants there is – in practice – no longer any danger of valve coking.
Restrictions on condensing and motor temperatures are now set to protect the motor and thus increase its life.

For the application of Secop compressors in household, commercial and mobile refrigeration using the available refrigerants, we recommend the following rules to be observed:

6.1 Coil temperature

Coil temperature must not exceed 125°C during continuous operation.

For limited periods of time, e.g. during compressor start up or in the case of short load peaks, the temperature should not exceed 135°C.

For commercial refrigeration with R134a the same limits as for household refrigeration apply.

However, fan cooling of the compressor is recommended.

6.2 Condensing temperature

When using R600a or R134a the condensing temperature during continuous operation must not exceed 60°C. During limited load peaks the temperature must not exceed 70°C. In commercial refrigeration using R404A and R507 the condensing temperature limit is 48°C during continuous operation and 58°C in the case of load peaks.

7.
MOISTURE AND IMPURITIES/ FILTER DRIER SELECTION

The compressors are dried to a maximum moisture content of 60 to 75 mg depending on the compressor size. The maximum impurity content is 40 to 50 mg depending on the compressor size.

Secop compressors leave the factories with a moisture load less or equal 125 ppm. This ppm rate includes a safety factor for a storing time up to one year or longer. In addiction of storing time and storing conditions the moisture level will increase. A level between 200 and 250 ppm in general is not critical and will not harm the compressors or systems, where the compressors will be implemented.

Measurement method

Test parameters	Demand
Conditioning	24 h, room temperature
Condition of compressor	charged with oil
Measurement temperature	room temperature
Measurement time	1-2 min
Medium	dew point
Measurement cell	electrical hydrometer
Demand	max.125 ppm H_2O

With this measurement method, the total moisture in the air volume will be measured. The water, which is fixed in the plastic structure and the oil, will only be measured indirectly. Within 24 hours equilibrium between the humidity contents of the air and compressor parts is reached.
The limit of 125 ppm is very low, if we consider that the surrounding air contains approx. 8000 ppm at 22°C and a relative humidity load of 40 %.

7.1 Filter drier selection

Only filter driers which are declared by the manufacturer to be suitable for mobile applications must be used in refrigeration systems with BD compressors. Filter material powder ending up in the compressor will lead to excessive wear of the piston and transmission parts, and metal particles deposited in the motor windings will cause the compressor to stop because the electric signal back to the electronic unit is disturbed.
The common desiccant is a molecular sieve, a zeolite. For R134a, R404A, R290 and R600a a material with 3 Å pores is recommended, e.g. UOP, XH 9 or XH 11, Grace 594, CECA Siliporite H3R. Pencil driers for R134a can possibly be used for R290, if they are tested according to IEC / EN 60 335 burst pressure demands.

In systems using a TEV valve it can be recommend using a combo drier, which is a drier with a free volume that functions as receiver.

8.
CONDITION AT DELIVERY/ WARNINGS

The compressors are delivered without mounted starting devices on pallets. The standard pack can be stacked and is intended for transport by forklift truck. The bottom pallet has the dimensions 1144 x 800mm.

Quantities per pallets are specified in the individual data sheets.
Electrical equipment is packed in separate boxes.

The most important performance controls carried out during manufacturing are,
- A high potential insulation test with 1650V for 1 second
- Pumping capacity
- Tightness of discharge side and discharge valve
- Tightness of compressor housing
- Check of the right oil charge
- Noise test

The compressors are supplied with sealed connectors and the sealing should not be removed before the system assembly takes place. (max. 15 minutes with open connectors).

The compressors are supplied charged with dried and degassed oil, which is normally sufficient for the lifetime of the compressor. The refrigeration systems and the system components must be dimensioned in such a way that the oil can be lead back continuously to the compressor housing without accumulating in the system, e.g. without the oil pockets and with sufficient gas velocity. The compressors use polyolester or mineral oils and are approved only for these oils and **for the refrigerant to be used.** The oil charge is specified in the individual data sheets.

A high potential test with 1650V for 1 second is carried out on all compressors before delivery.
No high potential test or start tests must be carried out while the compressor is under vacuum.
No attempt must be made to start the compressor without a complete starting device.

Allow the compressor to reach a temperature above 10°C before starting the first time in order to avoid starting problems.

Anti freeze agents must not be used in the compressors as such agents are damaging to several of the materials used. In particular, the ethyl or methyl alcohol contents of such anti freeze agents have a destructive effect on the synthetic motor insulation

9.
MAX. REFRIGERANT CHARGE

R134a, R600, R290, and R404A/R507

Only the refrigerant amount which is necessary for the system to function must be charged. The refrigerant amount may be critical, regarding oil foaming and liquid hammer after long standstill periods. Because of this, limitations of refrigerant charges have been introduced.

If the permissible limit of refrigerant charge stated in the compressor data sheet is exceeded the oil will foam in the compressor after a cold start and may result in a damaged valve system in the compressor. The refrigerant charge must never exceed the amount that can be contained in the condenser side of the system.

If these limitations cannot be complied with, the risk may be reduced if a crankcase heater is properly used or if a pump down system is established.

Please refer to the compressor data sheets, as the maximum refrigerant charge may deviate on single types from the statements in the form. The maximum charge of 150g for R600a, R290 and R1234yf is an upper safety limit of the appliance standards, whereas the other weights are stated to avoid liquid hammer.

Compressor type	Max. refrigerant charge				
	R134a	R1234yf	R600a	R290	R404A/R507
BD, P-Housing	300 g	150 g	120 g	120 g	-
BD, T-Housing	400 g	150 g	-	-	400 g
BD Micro	70 g	70 g	-	-	-

According to the European Standard EN 60335-2-24 or draft IEC 60335-2-89, which must be complied with, the refrigerant charge must not exceed 150g.

Commercially available R600a and R290 must not be used because the fuel grades of these products are of a variable composition. These products may also contain impurities which could significantly reduce the reliability and performance of the system and lead to premature failure. All Secop compressors for R600a and R290 are released for a base purity of 97 % or better. Impurity limits shall comply with DIN 8960 of 1998 (extended version of ISO 916).

All users of refrigerant R600a should refer to the chemical data safety sheets for full information on the safe handling of R600a and R290.

In general the charge of R600a or R290 is approximately 40-50 % by weight than that for HFC.

The refrigerant charge must never be too large to be contained on the condenser side of the refrigeration system. Only the refrigerant amount which is necessary for the system to function must be charged.

10.
CONVERSIONS

From R404A to R452A

At Secop, product development is focused on high efficiency and eco-friendly products. We believe – as all the major market stakeholders – that hydrocarbon refrigerants (isobutane R600a and propane R290) are the best solution for DC-powered applications.
The use of R404A is under pressure due to global regulations, however special attention is given to F-gas regulation in Europe. Secop recommends the move to hydrocarbon refrigerant solutions (R600a and R290) which perfectly meet the increasing market demand for high efficiency while utilizing natural refrigerants with very low GWPs.
We understand that there is a transition period, where specific applications will use different refrigerants while application redesign to hydrocarbons is not possible in a short time. Tests have so far shown good results with refrigerant R452A as a drop-in replacement for R404A.
Based on this information, Secop allows the use of R452A on all its R404A released compressors. It is the customer's responsibility to validate the application and they should carefully consider the requirements and constrains when changing the R404A to R452A in their application.
(Please refer to Product Bulletin "Refrigerant R452A in Secop Compressors")

From R134a to R600a or R290

Conversions from refrigerants R134a to R600a are not permitted as 1:1 replacements, as the refrigerator must be approved for operation with flammable refrigerants, and the electrical safety has to be tested according to existing standards. The same applies to conversions from refrigerants R502 or R134a to R290. In many cases of transition from non-flammable to flammable refrigerants the appliance cabinet must be modified for safety or other reasons.
Refrigerant containing system parts according to IEC / EN 60335 must withstand a specified pressure without leaking. High pressure side must withstand saturation overpressure of 70 °C times 3.5, low pressure side must withstand saturation overpressure of 20 °C times 5.
Secop (formerly Danfoss Compressors) has been a pioneer and early adopter of hydrocarbons as refrigerants and offers a variety of suitable compressors for R600a and R290.
(Please refer to Application Guideline "Practical Application of Refrigerants R600a and R290 in Small Hermetic Systems").

From R134a to R1234yf or R513A and R452A

R1234yf is a future refrigerant candidate in auto air conditioning replacing R134a. Likewise it might be used in DC-powered applications where redesign of the system to propane is not possible.
R1234yf is classified as flammable in the relevant safety standards. It is more expensive than R134a, however holds remarkably less greenhouse potential than R134a.
Our R134a compressors can be used for testing with this refrigerant and we are ready to support you in your investigation and approval procedure.
Investigations on material compatibility have so far shown good results with refrigerant R1234yf in Secop R134a compressors. These results must be confirmed in the ongoing long term tests.
At present, testing system performance can be carried out with the compressors originally designed for R134a. The same application limits as described on the R134a data sheet may be used.
The compressors designed for R134a do currently (03/2020) not have a safety approval for flammable refrigerants like R1234yf, but might be available in approved variants within the near future.
(Please refer to Product Bulletin "Refrigerant R1234yf in Secop Compressors")

Various new refrigerant types have been developed by the chemical industry to offer alternative solutions to hydrocarbons while some high-GWP refrigerants are to be phased out due to global regulations.
R513A and R452A are refrigerants which are designed to work as "drop-in" or replacement refrigerants for R134a and R404A. Secop ran development projects to verify that existing compressor types are compatible with these new refrigerants. As a result, most of Secop R134a compressors have now been additionally released for R513A and most R404A compressors have been released for R452A (all including approvals by the relevant authorities).
(Please refer to Product Bulletin "Multi-Refrigerant Release of Secop Compressor Types, R513A and R452A")

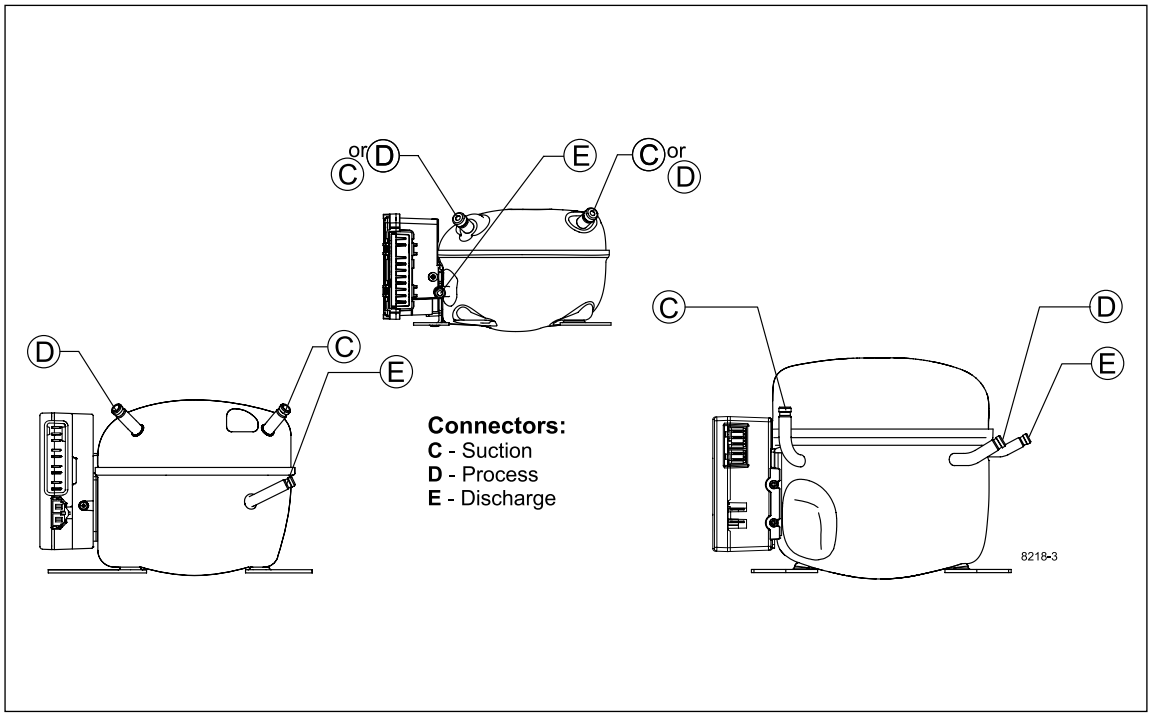
11.
MOUNTING THE COMPRESSOR

Brazing problems caused by oil in the connectors can be avoided by placing the compressor on its base plate some time before brazing it into the system.
The compressor must never be placed upside down when mounting the rubber grommets in the base plate. Instead place the compressor on its side with
the connectors upwards.
The system should be closed within 15 minutes to avoid moisture and dirt penetration.

Tightening torque for M6 bolt joint mountings should be 5 Nm ± 0,5 (hand-tight).

The positions of connectors are found in the sketches. **C** means suction and must always be connected to the suction line. **E** means discharge and must be connected to the discharge line. **D** means process and is used for processing the system.

11.1
Connector positions



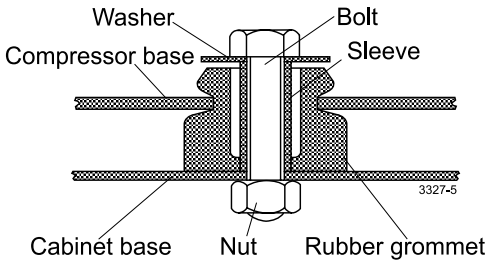
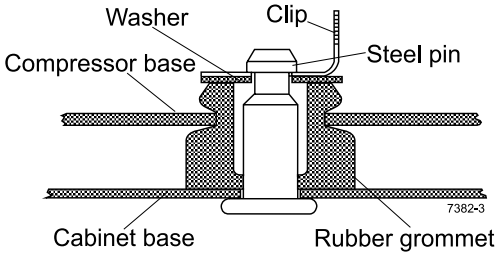
Secop BD compressors are equipped with tube connectors of thick-walled, copper-plated steel tube which have a brazeability which comes up to that of conventional copper connectors.
The connectors are welded into the compressor housing and weldings cannot be damaged by overheating during brazing.
These copper-plated steel connectors have an aluminium cap sealing which gives a tight sealing. The sealing secures that the compressors have not been opened after leaving Secop's production lines. In addition to that, the sealing makes a protecting charge of nitrogen superfluous.

12.
MOUNTING ACCESSORIES

Mounting	Code number	Bolt / pin dimension	Compressor base hole	Parts list	Type of packaging
Bolt joint	118-1917	M6 metric	16 mm	I	Single pack for one compressor
Bolt joint	118-1918	M6 metric	16 mm	I	Industrial pack in any quantity
Snap-on *	118-1947	Ø 7.3 mm	16 mm	II	Single pack for one compressor
Snap-on *	118-1919	Ø 7.3 mm	16 mm	II	Industrial pack in any quantity

* not applicable to BD80F, BD100CN and BD250GH.2 using electronic units 101N0290 or 101N0732

Parts list		Code number
I	Sleeve Ø 8 mm x 6.4 mm x 0.8 mm	112-2052
	Washer Ø 20 mm x Ø 6.7 mm x 1 mm	112-2053
	Bolt M6 x 25 mm	681X1130
	Nut M6	118-3659
	Rubber grommet 16 mm	118-3661
II	Steel pin	118-3586
	Washer Ø 21 x Ø 8.1 mm x 0.9 mm	118-3588
	Clip	118-3585
	Rubber Grommet 16 mm	118-3661

Bolt joint	Snap-on
	

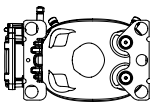
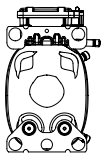
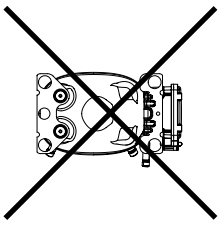
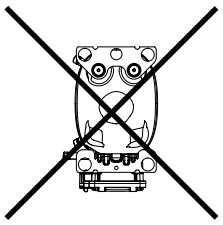
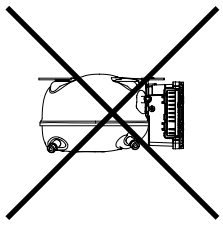
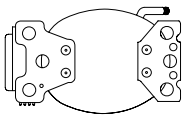
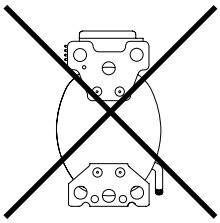
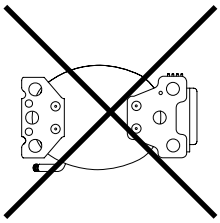
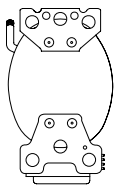
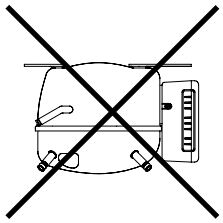
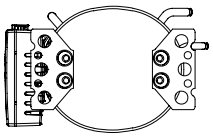
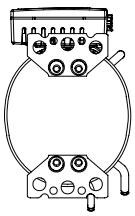
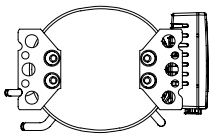
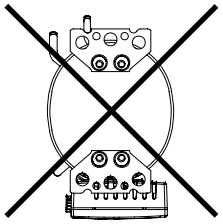
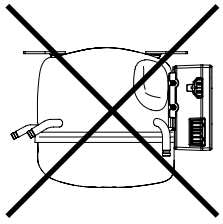
13.
SHIPMENT POSITIONS

Shipment of refrigeration appliances in horizontal position

When refrigeration appliances are shipped in the normal vertical position, this will normally not cause any damage to the compressor. If transported in horizontal position, the compressor must be oriented as shown in the table on the next page to prevent the accumulation of oil in the muffler and subsequent risk of damage. It is important to note that the compressor must be securely fastened and well supported during transportation.

Refrigeration appliances can be safely transported in horizontal position:

- with trucks on roads and motorways in good condition
- by ship in containers
- on railways in good condition

Compressors Verdichter Compresors	Shipment positions of refrigeration appliances - Position X must not be used				
	Connectors up	Electrical lead-in up	Connectors down	Electrical lead-in down	Base plate up
BD Micro - Series					
BD - Series (P-Housing)					
BD - Series (T-Housing)					

APPENDIX
DATA SHEETS

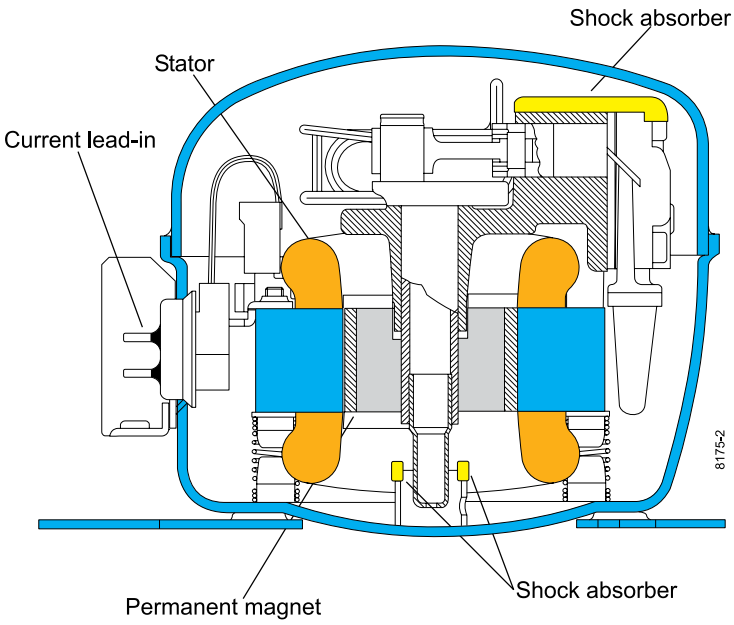
R134a:

R600a:

R290:

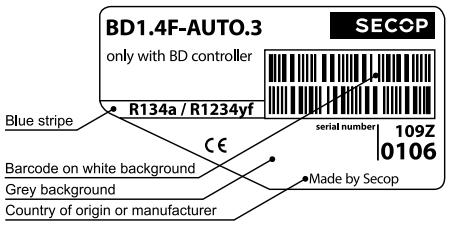
R404A/R507:

Cutaway drawing BD35F:



BD1.4F-AUTO.3
Direct Current Compressor
R134a, R1234yf
12V DC

TOOL4COOL® Flexible control settings



General

Code number (without electronic unit)	109Z0106
Electronic unit - Automotive	101N1000, 30 pcs: 101N1001
Electronic unit - Automotive	101N1010, 30 pcs: 101N1011
Approvals	–
Compressors on pallet	180

Application

Application		LBP/MBP
Evaporating temperature	°C	-25 to 5
Voltage range	VDC	8.5 - 17
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	–
38°C	S	S	–
43°C	S	S	–
Remarks on application: **- New generation with optimized noise level** **- New generation also released for R1234yf**			

Motor

Motor type		permanent magnet, brushless DC
Speed	rpm	3,000
Resistance, all 3 windings (25°C)	mΩ	370

Design

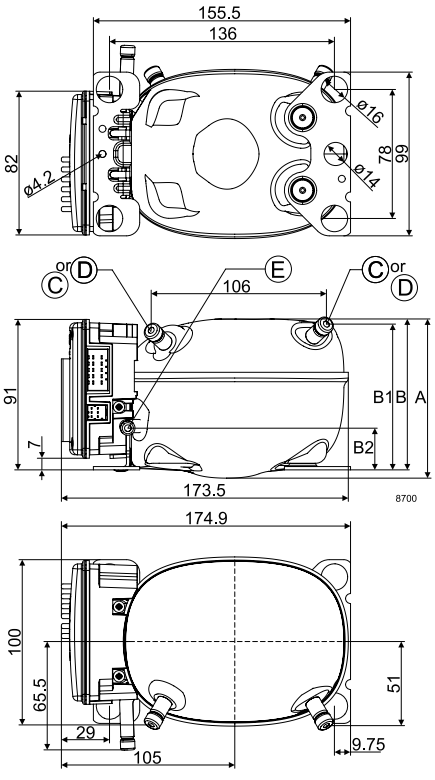
Displacement	cm^3	1.41
Oil quantity (type)	cm^3	75 (polyolester)
Maximum refrigerant charge	g	70
Free gas volume in compressor	cm^3	500
Weight - Compressor/Electronic unit	kg	2.1/0.17

Standard battery protection settings (refer to 101N1000 *Instructions* for optional settings)

Voltage			Min. value	Default	Max. value
Cut out	(0.1 steps)	VDC	8.5	8.5	17
Cut in diff.	(0.1 steps)	VDC	0.5	0.5	8

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
Remarks			



Performance Data with Refrigerant R134a & R1234yf

EN 12900 Household (CECOMAF), R134a

Evap. temp. in °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5
Capacity in W	16.1	19.2	25.7	37.4	51.2	61.5	67.1	85.2	105.4
Power cons. in W	24.1	25.7	29.0	34.1	39.3	42.9	44.7	50.3	56.0
Current cons. in A	1.84	1.96	2.20	2.59	2.99	3.26	3.40	3.84	4.29
COP in W/W	0.67	0.74	0.89	1.10	1.30	1.43	1.50	1.69	1.88

EN 12900 Household (CECOMAF), R1234yf

Evap. temp. in °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5
Capacity in W	17.4	20.5	27.2	38.8	52.0	61.5	66.7	82.7	99.9
Power cons. in W	26.5	28.2	31.4	36.3	41.1	44.3	45.9	50.6	55.2
Current cons. in A	2.02	2.15	2.39	2.76	3.13	3.37	3.50	3.86	4.22
COP in W/W	0.66	0.73	0.87	1.07	1.26	1.39	1.45	1.63	1.81

ASHRAE LBP, R134a

Evap. temp. in °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5
Capacity in W	20.2	23.9	32.0	46.5	63.7	76.4	83.5	106.0	131.3
Power cons. in W	24.0	25.7	29.0	34.0	39.2	42.8	44.6	50.1	55.8
Current cons. in A	1.84	1.96	2.20	2.59	2.98	3.25	3.40	3.82	4.27
COP in W/W	0.84	0.93	1.11	1.37	1.62	1.79	1.87	2.12	2.35

ASHRAE LBP, R1234yf

Evap. temp. in °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5
Capacity in W	22.7	26.8	35.4	50.4	67.5	80.0	86.7	107.7	130.4
Power cons. in W	26.4	28.1	31.3	36.2	41.0	44.1	45.7	50.4	54.9
Current cons. in A	2.37	2.53	2.85	3.34	3.83	4.16	4.33	4.81	5.29
COP in W/W	0.93	1.02	1.20	1.45	1.69	1.84	1.92	2.13	2.32

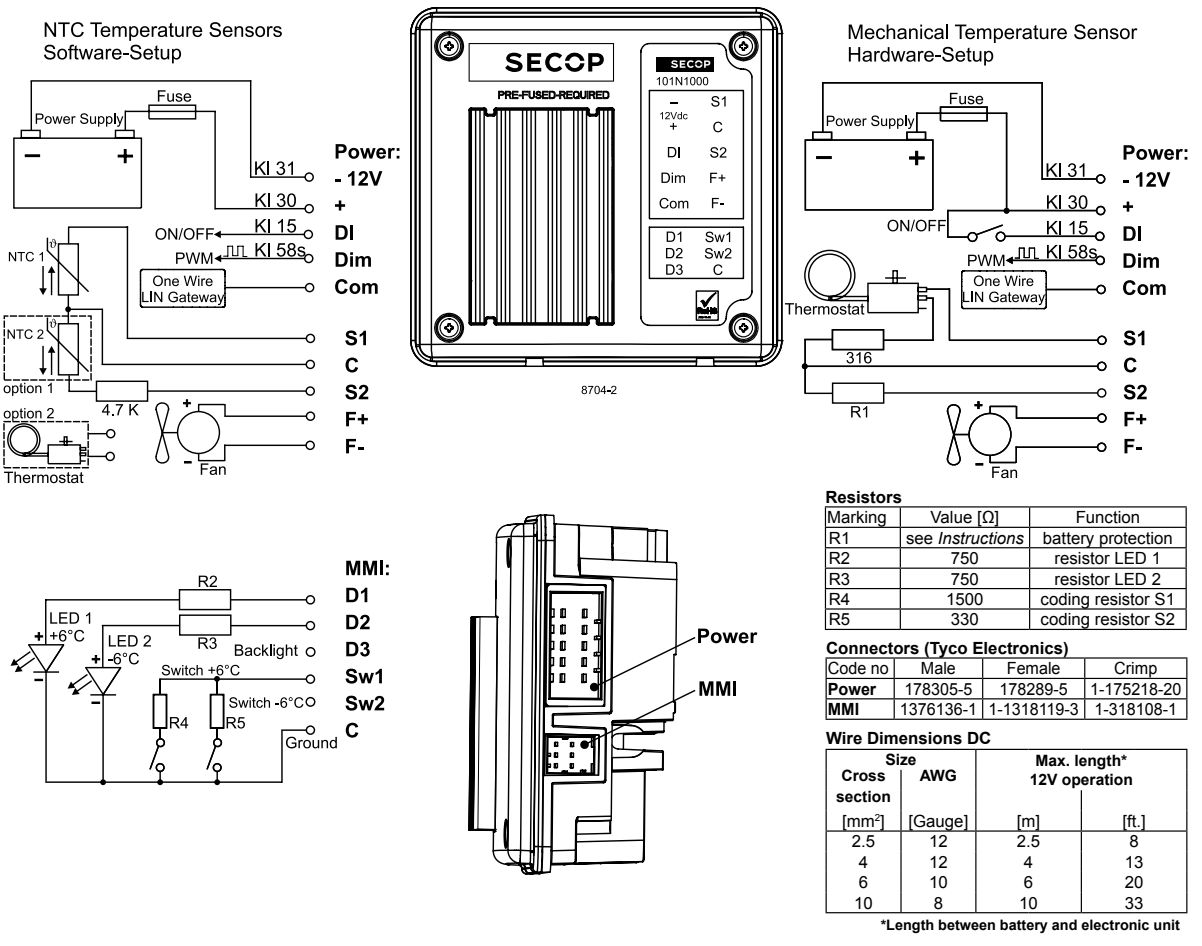
Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Operational errors

Error code	Error type Can be read out in the software **TOOL4COOL®**
7	**Communication failure**
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 $0.65A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

Accessories for BD1.4F-AUTO.3

Mounting		Code number
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
One Wire/LIN gateway		105N9501
Not deliverable from Secop		
Automobile fuse	DIN 7258	15A



Resistors

Marking	Value [Ω]	Function
R1	see *Instructions*	battery protection
R2	750	resistor LED 1
R3	750	resistor LED 2
R4	1500	coding resistor S1
R5	330	coding resistor S2

Connectors (Tyco Electronics)

Code no	Male	Female	Crimp
Power	178305-5	178289-5	1-175218-20
MMI	1376136-1	1-1318119-3	1-318108-1

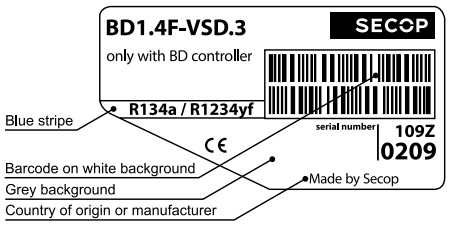
Wire Dimensions DC

Size		Max. length* 12V operation	
Cross section [mm²]	AWG [Gauge]	[m]	[ft.]
2.5	12	2.5	8
4	12	4	13
6	10	6	20
10	8	10	33

***Length between battery and electronic unit**

BD1.4F-VSD.3
Direct Current Compressor
R134a, R1234yf
12/24V DC

TOOL4COOL® Flexible control settings



General

Code number (without electronic unit)	109Z0209
Electronic unit - Variable Speed	101N2100, 30 pcs: 101N2101
Compressors on pallet	180

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 15
Voltage range DC	VDC	9.6 - 17 / 19 - 34
Voltage range AC	V/Hz	100 - 240 / 50 - 60
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: **- New generation with optimized noise level** **- New generation also released for R1234yf**			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		permanet magnet, brushless DC
Speed	rpm	variable speed
Resistance, all 3 windings (25°C)	mΩ	210

Design

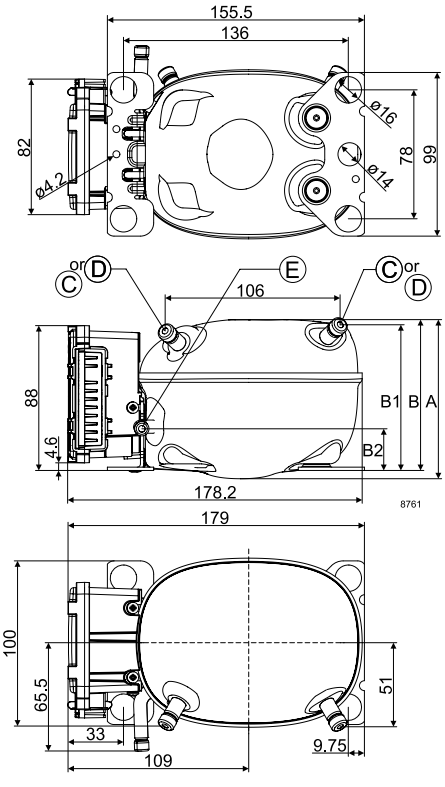
Displacement	cm^3	1.41
Oil quantity (type)	cm^3	75 (polyolester)
Maximum refrigerant charge	g	70
Free gas volume in compressor	cm^3	500
Weight - Compressor/Electronic unit	kg	2.1 / 0.11

Standard battery protection settings (refer to 101N2100 *Instructions* for optional settings)

Voltage (0.1 steps)				Min. value	Default	Max. value
12V	± 0.3V DC, all values	Cut out	VDC	9.6	10.4	17
		Cut in diff.	VDC	0.5	1.3	10
24V	± 0.3V DC, all values	Cut out	VDC	19	21.3	27
		Cut in diff.	VDC	0.5	1.3	10

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



Performance Data with Refrigerant R134a

Capacity (EN 12900 Household/CECOMAF), R134a 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		9	11	15	22	31	42	54	68	75	84	101
3,000	9	16	19	26	37	51	67	85	105	115	128	152
3,500	10	20	23	31	45	61	80	101	124	135	150	178
4,000	12	23	27	36	52	71	92	116	142	155	172	203

Capacity (ASHRAE LBP), R134a 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		12	14	19	28	39	52	68	85	93	105	126
3,000	11	20	24	32	47	64	83	106	131	143	159	190
3,500	13	24	29	38	56	76	99	125	154	168	186	222
4,000	15	29	34	45	65	88	114	144	177	193	214	254

Power consumption, R134a 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		16	17	19	22	25	29	34	39	41	44	50
3,000	19	24	26	29	34	39	45	50	56	59	62	68
3,500	23	29	31	35	41	47	53	59	65	68	71	78
4,000	27	34	36	41	48	55	61	68	75	77	81	87

Current consumption, R134a (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		1.25	1.33	1.48	1.74	2.02	2.33	2.66	3.02	3.18	3.40	3.81
3,000	1.49	1.84	1.96	2.20	2.59	2.99	3.40	3.84	4.29	4.49	4.75	5.24
3,500	1.77	2.19	2.34	2.62	3.07	3.53	4.00	4.48	4.98	5.20	5.49	6.01
4,000	2.09	2.58	2.75	3.08	3.59	4.11	4.64	5.17	5.71	5.95	6.26	6.82

COP (EN 12900 Household/CECOMAF), R134a 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		0.59	0.66	0.81	1.03	1.24	1.43	1.60	1.76	1.82	1.90	2.03
3,000	0.45	0.67	0.74	0.89	1.10	1.30	1.50	1.69	1.88	1.96	2.06	2.24
3,500	0.46	0.68	0.75	0.89	1.10	1.30	1.51	1.70	1.90	1.99	2.10	2.29
4,000	0.45	0.68	0.75	0.89	1.09	1.30	1.50	1.70	1.91	2.00	2.12	2.32

COP (ASHRAE LBP), R134a 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		0.74	0.83	1.01	1.29	1.55	1.79	2.01	2.21	2.29	2.39	2.56
3,000	0.57	0.84	0.93	1.11	1.37	1.62	1.87	2.12	2.35	2.46	2.59	2.82
3,500	0.58	0.85	0.94	1.11	1.37	1.62	1.87	2.12	2.37	2.48	2.63	2.88
4,000	0.58	0.85	0.94	1.11	1.36	1.61	1.87	2.12	2.38	2.5	2.65	2.92

Operational errors (TOOL4COOL® or LED flashes)

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, 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 $0.65A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

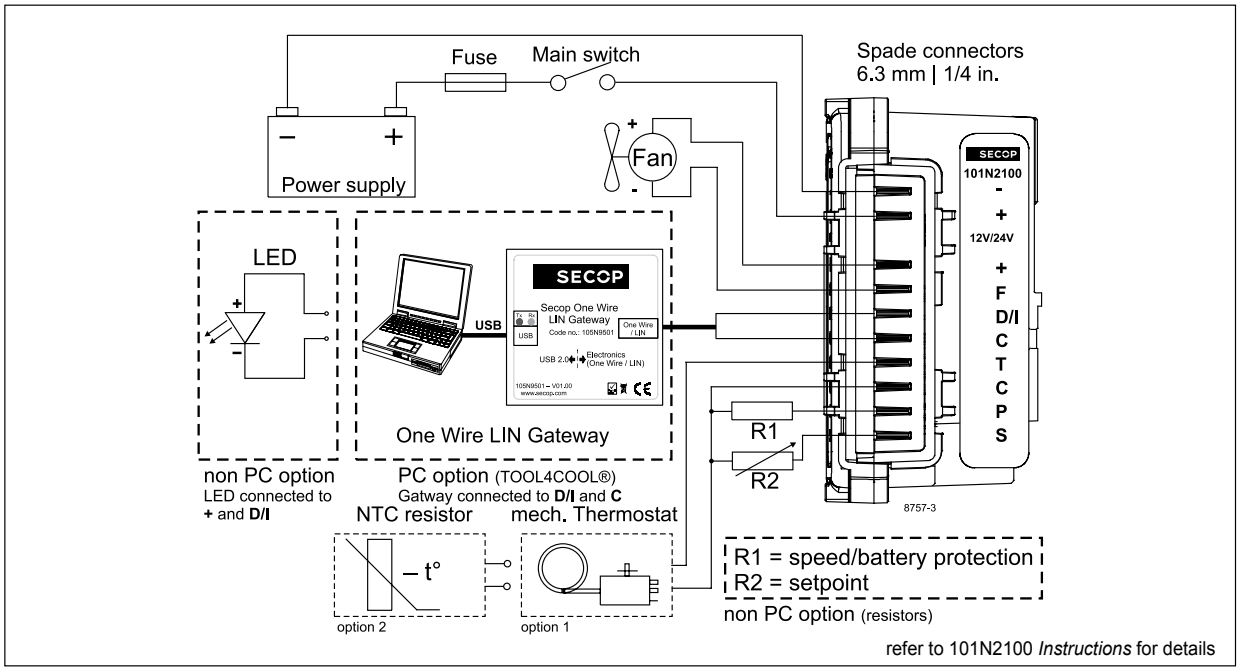
Wire Dimensions DC

Size Cross section	AWG	Max. length* 12V operation		Max. length* 24V operation	
[mm²]	[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

Accessories for BD1.4F-VSD.3		Code number
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
Terminal cover for electronic unit		105N9120
Automoblie fuse DIN 7258	12V: 15A 24V: 15A	Not deliverable from Secop
Main switch	min. 20A	

Test conditions	EN 12900 CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C



Performance Data with Refrigerant R1234yf

Capacity (EN 12900 Household/CECOMAF), R1234yf 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		10	12	16	23	32	42	53	65	70	78	91
3,000	10	17	21	27	39	52	67	83	100	108	118	137
3,500	11	20	24	32	45	60	78	97	118	128	141	166
4,000	13	24	29	38	54	71	91	111	134	144	158	182

Capacity (ASHRAE LBP), R1234yf 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		13	15	21	30	42	55	69	85	92	102	120
3,000	13	23	27	35	50	68	87	108	130	141	155	180
3,500	14	26	31	41	58	78	101	126	154	167	184	217
4,000	17	32	38	50	70	93	118	145	174	188	206	239

Power consumption, R1234yf 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		17	18	20	23	27	30	34	38	40	42	46
3,000	22	27	28	31	36	41	46	51	55	57	60	64
3,500	26	31	33	37	43	49	54	59	64	67	69	74
4,000	30	37	40	44	51	57	63	68	74	76	78	83

Current consumption, R1234yf (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		1.39	1.47	1.62	1.88	2.14	2.41	2.69	2.97	3.09	3.25	3.53
3,000	1.66	2.02	2.15	2.39	2.76	3.13	3.50	3.86	4.22	4.38	4.58	4.93
3,500	1.98	2.40	2.54	2.82	3.24	3.66	4.08	4.50	4.92	5.11	5.34	5.76
4,000	2.34	2.83	3.00	3.32	3.81	4.28	4.75	5.20	5.64	5.83	6.06	6.47

COP (EN 12900 Household/CECOMAF), R1234yf 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		0.58	0.65	0.79	1.00	1.20	1.38	1.55	1.70	1.76	1.84	1.97
3,000	0.44	0.66	0.73	0.87	1.07	1.26	1.45	1.63	1.81	1.89	1.98	2.15
3,500	0.42	0.64	0.71	0.84	1.05	1.25	1.44	1.64	1.84	1.93	2.04	2.24
4,000	0.43	0.66	0.73	0.86	1.06	1.25	1.44	1.63	1.82	1.90	2.01	2.20

COP (ASHRAE LBP), R1234yf 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		0.75	0.85	1.03	1.3	1.56	1.81	2.03	2.24	2.33	2.44	2.62
3,000	0.59	0.86	0.95	1.13	1.39	1.65	1.9	2.14	2.38	2.48	2.61	2.84
3,500	0.55	0.83	0.92	1.09	1.36	1.62	1.88	2.14	2.40	2.52	2.67	2.94
4,000	0.58	0.86	0.95	1.13	1.38	1.63	1.88	2.13	2.38	2.49	2.63	2.90

Operational errors (TOOL4COOL® or LED flashes)

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, 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 $0.65A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

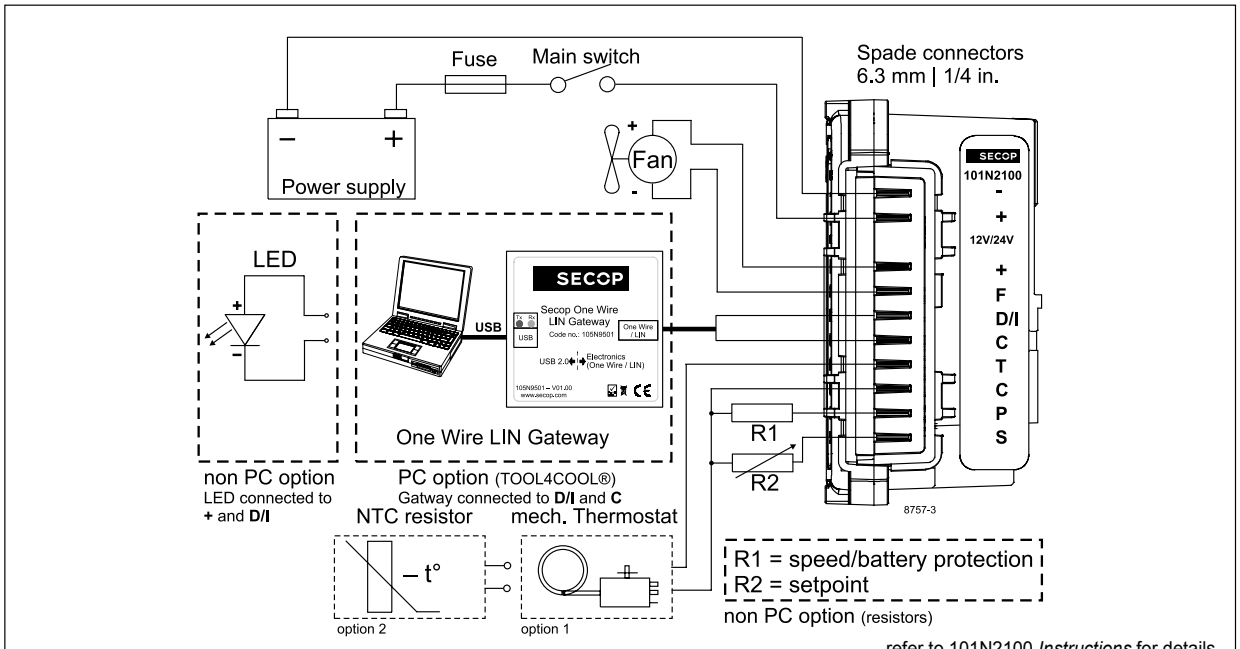
Wire Dimensions DC

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[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

Accessories for BD1.4F-VSD.3		Code number
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
Terminal cover for electronic unit		105N9120
Automoblie fuse DIN 7258	12V: 15A 24V: 15A	Not deliverable from Secop
Main switch	min. 20A	

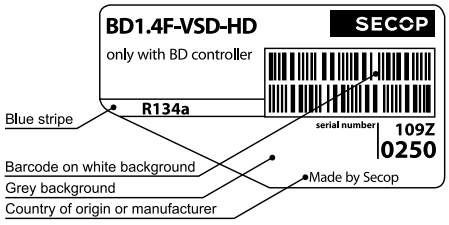
Test conditions	EN 12900 CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C



refer to 101N2100 *Instructions* for details

BD1.4F-VSD-HD
Heavy Duty
Direct Current Compressor
R134a, 12/24V DC

TOOL4COOL® Flexible control settings



General

Code number (without electronic unit)	109Z0250
Electronic unit - Variable Speed	101N2100, 30 pcs: 101N2101
Approvals	–
Compressors on pallet	180

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 15
Voltage range	VDC	9.6 - 17 / 19 - 34
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: **HD (Heavy Duty) version of the BD1.4F-VSD which can handle extreme vibrations.**			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		permanet magnet, brushless DC
Speed	rpm	variable speed
Resistance, all 3 windings (25°C)	mΩ	210

Design

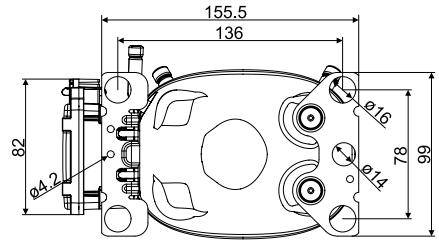
Displacement	cm^3	1.41
Oil quantity (type)	cm^3	75 (polyolester)
Maximum refrigerant charge	g	70
Free gas volume in compressor	cm^3	500
Weight - Compressor/Electronic unit	kg	2.1/0.11

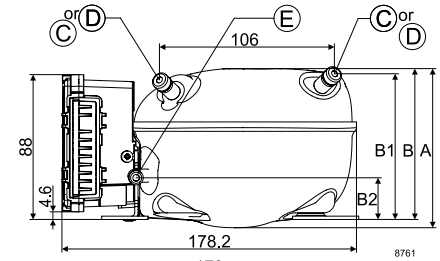
Standard battery protection settings (refer to 101N2100 *Instructions* for optional settings)

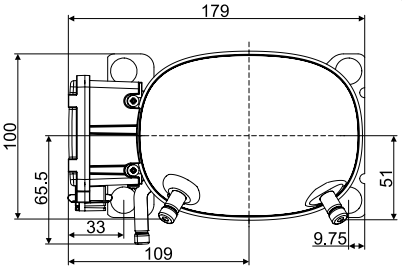
Voltage (0.1 steps)				Min. value	Default	Max. value
12V	± 0.3V DC, all values	Cut out	VDC	9.6	10.4	17
		Cut in diff.	VDC	0.5	1.3	10
24V	± 0.3V DC, all values	Cut out	VDC	19	21.3	27
		Cut in diff.	VDC	0.5	1.3	10

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







Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		9	11	15	22	31	42	54	69	76	86	106
2,500	7	13	15	20	30	41	55	70	87	96	109	134
3,000	9	16	19	26	37	51	67	85	105	116	131	161
3,500	10	20	23	31	45	61	80	101	124	137	154	190
4,000	12	23	27	36	52	71	92	116	144	158	178	218

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		12	14	19	28	39	52	68	86	95	107	132
2,500	9	16	19	25	37	51	68	87	109	120	135	167
3,000	11	20	24	32	47	64	84	106	131	144	163	201
3,500	13	24	29	39	56	76	99	125	155	170	192	237
4,000	15	29	34	45	65	88	114	144	179	197	222	272

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		16	17	19	22	25	29	34	40	42	43	45
2,500	16	20	21	24	28	32	37	42	48	50	52	54
3,000	19	24	26	29	34	39	45	50	57	59	61	63
3,500	23	29	31	35	41	47	53	59	66	69	72	77
4,000	27	34	36	41	48	55	61	68	76	79	83	90

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		1.25	1.33	1.48	1.74	2.02	2.32	2.65	2.74	2.85	3.00	3.28
2,500	1.25	1.53	1.63	1.83	2.15	2.48	2.84	3.22	3.69	3.84	4.00	4.20
3,000	1.49	1.84	1.96	2.20	2.59	2.98	3.40	3.82	4.38	4.56	4.77	5.09
3,500	1.77	2.19	2.34	2.63	3.07	3.53	4.00	4.47	5.06	5.26	5.51	5.89
4,000	2.08	2.58	2.75	3.08	3.59	4.10	4.63	5.16	5.87	6.07	6.31	6.63

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		0.59	0.66	0.81	1.03	1.24	1.43	1.60	1.72	1.83	1.99	2.36
2,500	0.43	0.64	0.72	0.86	1.08	1.29	1.48	1.67	1.83	1.94	2.10	2.46
3,000	0.45	0.67	0.74	0.89	1.10	1.30	1.50	1.69	1.84	1.97	2.14	2.54
3,500	0.46	0.68	0.75	0.89	1.10	1.30	1.51	1.70	1.88	1.99	2.15	2.47
4,000	0.45	0.68	0.75	0.89	1.09	1.30	1.50	1.70	1.88	1.99	2.14	2.42

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000		0.74	0.83	1.01	1.29	1.55	1.79	2.01	2.17	2.31	2.52	2.98
2,500	0.54	0.80	0.89	1.07	1.34	1.60	1.84	2.08	2.29	2.43	2.64	3.10
3,000	0.57	0.84	0.93	1.11	1.37	1.62	1.87	2.11	2.35	2.47	2.70	3.20
3,500	0.58	0.85	0.94	1.11	1.36	1.62	1.87	2.12	2.36	2.49	2.69	3.11
4,000	0.58	0.85	0.94	1.11	1.36	1.61	1.87	2.12	2.36	2.50	2.68	3.05

Operational errors (TOOL4COOL® or LED flashes)

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, 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 $0.65A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

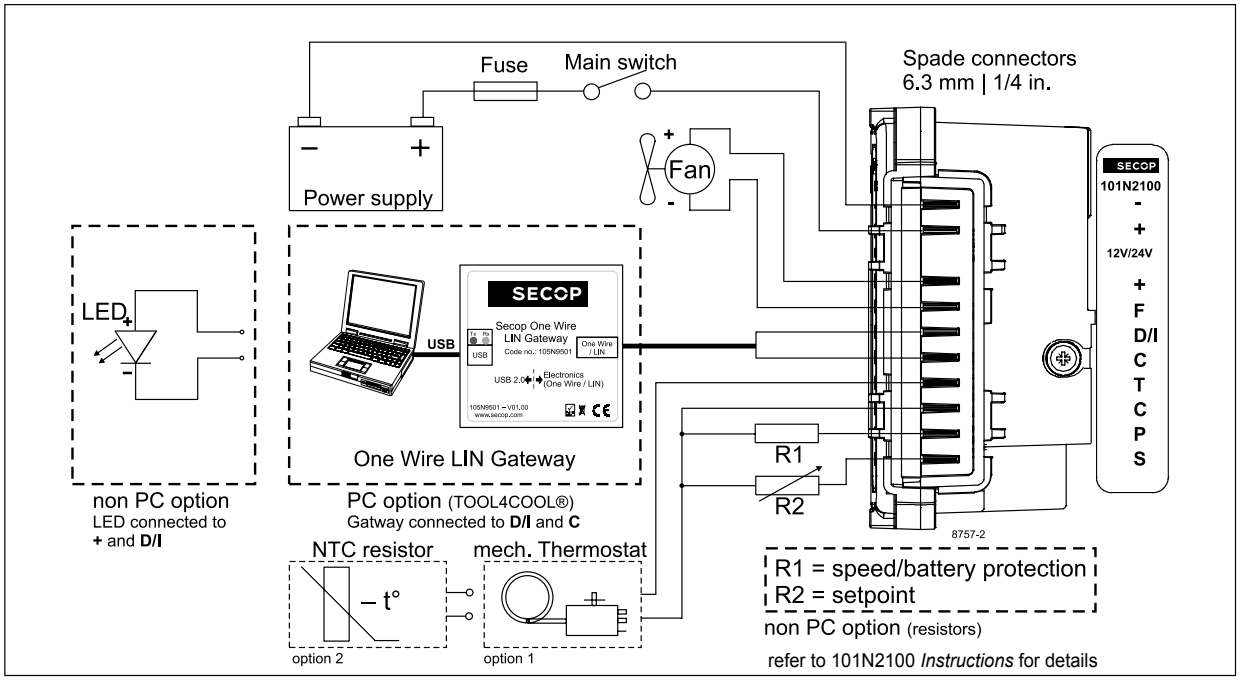
Wire Dimensions DC

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[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

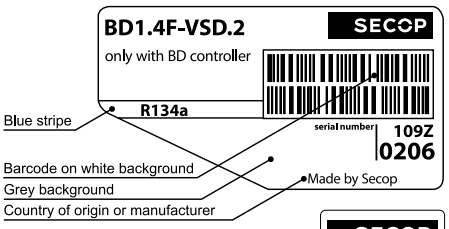
Accessories for BD1.4F-VSD-HD		Code number
Bolt joint for one compressor	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Terminal cover for electronic unit		105N9120
Automoblie fuse DIN 7258	12V: 15A 24V: 15A	Not deliverable from Secop
Main switch	min. 20A	

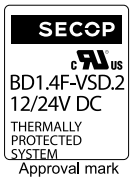
Test conditions	EN 12900 CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C



BD1.4F-VSD.2
Direct Current Compressor
R134a, 12/24V DC
& 100-240V AC 50/60Hz

TOOL4COOL® Flexible control settings





Approval mark

General

Code number (without electronic units)	109Z0206
Electronic unit - Variable Speed	101N2100, 30 pcs: 101N2101
Electronic unit - Variable Speed w. AC/DC converter	101N5100, 24 pcs: 101N5101
Approvals	UL
Compressors on pallet	180

Application

Application		LBP/MBP/HBP
Evaporating temperature	°F	-20 to 59
Voltage range DC	VDC	9.6 - 17 / 19 - 34
Voltage range AC	V/Hz	100 - 240 / 50 - 60
Max. condensing temperature continuous (short)	°F	140 (158)
Max. winding temperature continuous (short)	°F	257 (275)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: **New generation with optimized noise level during rough vehicle motions.**			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		permanet magnet, brushless DC
Speed		variable speed
Resistance, all 3 windings (25°C)	mΩ	210

Design

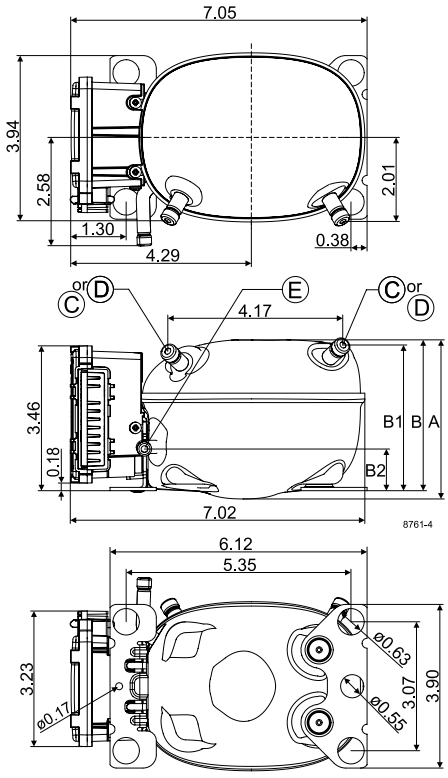
Displacement	cu.in.	0.086
Oil quantity (type)	fl.oz.	2.64 (polyolester)
Maximum refrigerant charge	oz.	2.47
Free gas volume in compressor	fl.oz.	17.60
Weight - Compressor/Electronic unit	lbs.	4.63 / 0.24 (DC) / 0.64 (AC/DC)

Standard battery protection settings (refer to 101N2100/5100 *Instructions* for optional settings)

Voltage (0.1 steps)				Min. value	Default	Max. value
12V	± 0.3V DC, all values	Cut out	VDC	9.6	10.4	17
		Cut in diff.	VDC	0.5	1.3	10
24V	± 0.3V DC, all values	Cut out	VDC	19	21.3	27
		Cut in diff.	VDC	0.5	1.3	10

Dimensions

Height	inch	A	3.79
		B	3.59
		B1	3.46
		B2	0.99
Suction connector	location/I.D. inch | angle	C	0.252-0259 | 25°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. inch | angle	D	0.252-0259 | 25°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. inch | angle	E	0.202-0.205 | 0°
	material | comment		Cu-plated steel | Al cap
Remarks: **inch connectors**			



Capacity (ASHRAE LBP) 12V DC, static cooling **BTU/h**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		39	47	77	116	133	162	219	290	319	357	431
3,000	44	69	82	130	190	217	261	344	448	488	543	648
3,500	52	83	98	156	227	258	309	406	525	573	635	756
4,000	61	98	115	182	264	300	358	468	604	657	728	865

Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		9	11	18	27	31	38	51	68	75	84	101
3,000	10	16	19	31	45	51	61	81	105	115	128	152
3,500	12	20	23	37	54	61	73	96	124	135	150	178
4,000	14	23	27	43	62	71	85	110	142	155	172	203

Power consumption 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		16	17	20	24	25	28	33	39	41	44	50
3,000	20	24	26	31	37	39	43	49	56	59	62	68
3,500	24	29	31	37	44	47	51	58	65	68	71	78
4,000	28	34	36	44	52	55	59	67	75	77	81	87

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		1.25	1.33	1.59	1.89	2.02	2.22	2.58	3.02	3.18	3.40	3.81
3,000	1.56	1.84	1.96	2.37	2.81	2.99	3.26	3.74	4.29	4.49	4.75	5.24
3,500	1.86	2.19	2.34	2.82	3.33	3.53	3.84	4.38	4.98	5.20	5.49	6.01
4,000	2.19	2.58	2.75	3.31	3.88	4.11	4.46	5.05	5.71	5.95	6.26	6.82

EER (ASHRAE LBP) 12V DC, static cooling **BTU/h**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2.000		2.51	2.83	3.87	4.89	5.27	5.83	6.69	7.54	7.82	8.16	8.73
3.000	2.15	2.87	3.18	4.17	5.15	5.53	6.09	7.03	8.03	8.38	8.83	9.61
3.500	2.17	2.89	3.19	4.17	5.14	5.52	6.09	7.05	8.10	8.47	8.95	9.81
4.000	2.18	2.89	3.19	4.15	5.12	5.50	6.07	7.04	8.12	8.52	9.03	9.95

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2.000		0.59	0.66	0.91	1.15	1.24	1.37	1.57	1.76	1.82	1.90	2.03
3.000	0.50	0.67	0.74	0.98	1.21	1.30	1.43	1.65	1.88	1.96	2.06	2.24
3.500	0.51	0.68	0.75	0.98	1.21	1.30	1.44	1.66	1.90	1.99	2.10	2.29
4.000	0.50	0.68	0.75	0.98	1.21	1.30	1.43	1.66	1.91	2.00	2.12	2.32

Operational errors (TOOL4COOL® or LED flashes)

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, 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 $0.65A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

Wire Dimensions DC

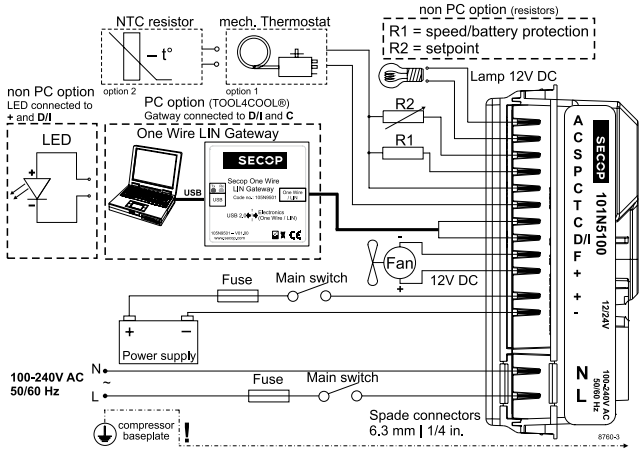
Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[Gauge]	[m]	[ft.]	[m]	[ft.]
2.5	12	2.5	8	5	16
4	12	4	13	8	26
6	10	6	20	12	39
10	8	10	33	20	66

*Length between battery and electronic unit

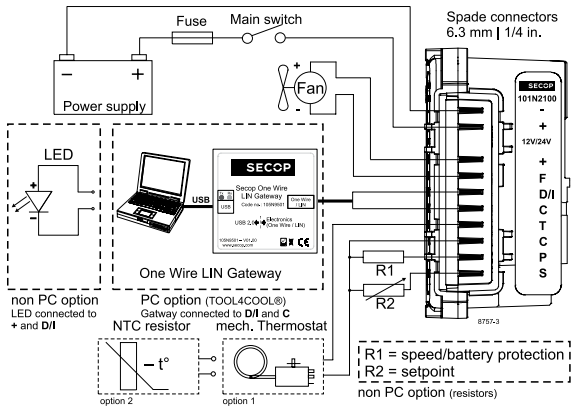
Accessories for BD1.4F-VSD		Code number
Bolt joint for one compressor	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Terminal cover for electronic unit		105N9120
Automoblie fuse DIN 7258	12V: 15A 24V: 15A	Not deliverable from Secop
Main switch	min. 20A	

Test conditions	EN 12900 CECOMAF	ASHRAE LBP
Condensing temperature	131°F	130°F
Ambient temperature	90°F	90°F
Suction gas temperature	90°F	90°F
Liquid temperature	no subcooling	90°F

101N5100



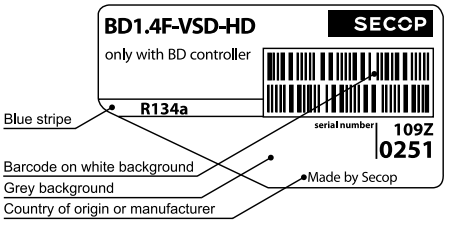
101N2100



refer to 101N2100 and 101N5100 *Instructions* for details

BD1.4F-VSD-HD
Heavy Duty
Direct Current Compressor
R134a, 12/24V DC

TOOL4COOL® Flexible control settings



General

Code number (without electronic units)	109Z0251
Electronic unit - Variable Speed	101N2100, 30 pcs: 101N2101
Approvals	–
Compressors on pallet	180

Application

Application		LBP/MBP/HBP
Evaporating temperature	°F	-20 to 59
Voltage range	VDC	9.6 - 17 / 19 - 34
Max. condensing temperature continuous (short)	°F	140 (158)
Max. winding temperature continuous (short)	°F	257 (275)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: **HD (Heavy Duty) version of the BD1.4F-VSD which can handle extreme vibrations.**			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		permanet magnet, brushless DC
Speed		variable speed
Resistance, all 3 windings (25°C)	mΩ	210

Design

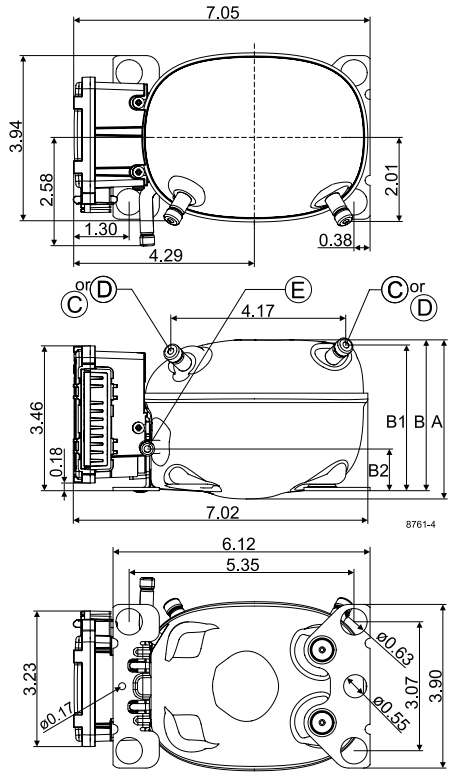
Displacement	cu.in.	0.086
Oil quantity (type)	fl.oz.	2.64 (polyolester)
Maximum refrigerant charge	oz.	2.47
Free gas volume in compressor	fl.oz.	17.60
Weight - Compressor/Electronic unit	lbs.	4.63/0.24

Standard battery protection settings (refer to 101N2100 *Instructions* for optional settings)

Voltage (0.1 steps)				Min. value	Default	Max. value
12V	± 0.3V DC, all values	Cut out	VDC	9.6	10.4	17
		Cut in diff.	VDC	0.5	1.3	10
24V	± 0.3V DC, all values	Cut out	VDC	19	21.3	27
		Cut in diff.	VDC	0.5	1.3	10

Dimensions

Height	inch	A	3.79
		B	3.59
		B1	3.46
		B2	0.99
Suction connector	location/I.D. inch | angle	C	0.252-0259 | 25°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. inch | angle	D	0.252-0259 | 25°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. inch | angle	E	0.202-0.205 | 0°
	material | comment		Cu-plated steel | Al cap
Remarks: **inch connectors**			



Capacity (ASHRAE LBP) 12V DC, static cooling **BTU/h**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		39	47	77	116	133	162	219	290	319	357	431
3,000	44	69	82	130	190	217	261	344	448	488	543	648
3,500	52	83	98	156	227	258	309	406	525	573	635	756
4,000	61	98	115	182	264	300	358	468	604	657	728	865

Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		9	11	18	27	31	38	51	68	75	84	101
3,000	10	16	19	31	45	51	61	81	105	115	128	152
3,500	12	20	23	37	54	61	73	96	124	135	150	178
4,000	14	23	27	43	62	71	85	110	142	155	172	203

Power consumption 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		16	17	20	24	25	28	33	39	41	44	50
3,000	20	24	26	31	37	39	43	49	56	59	62	68
3,500	24	29	31	37	44	47	51	58	65	68	71	78
4,000	28	34	36	44	52	55	59	67	75	77	81	87

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2,000		1.25	1.33	1.59	1.89	2.02	2.22	2.58	3.02	3.18	3.40	3.81
3,000	1.56	1.84	1.96	2.37	2.81	2.99	3.26	3.74	4.29	4.49	4.75	5.24
3,500	1.86	2.19	2.34	2.82	3.33	3.53	3.84	4.38	4.98	5.20	5.49	6.01
4,000	2.19	2.58	2.75	3.31	3.88	4.11	4.46	5.05	5.71	5.95	6.26	6.82

EER (ASHRAE LBP) 12V DC, static cooling **BTU/h**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2.000		2.51	2.83	3.87	4.89	5.27	5.83	6.69	7.54	7.82	8.16	8.73
3.000	2.15	2.87	3.18	4.17	5.15	5.53	6.09	7.03	8.03	8.38	8.83	9.61
3.500	2.17	2.89	3.19	4.17	5.14	5.52	6.09	7.05	8.10	8.47	8.95	9.81
4.000	2.18	2.89	3.19	4.15	5.12	5.50	6.07	7.04	8.12	8.52	9.03	9.95

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °F	-20	-13	-10	0	10	14	20	30	41	45	50	59
2.000		0.59	0.66	0.91	1.15	1.24	1.37	1.57	1.76	1.82	1.90	2.03
3.000	0.50	0.67	0.74	0.98	1.21	1.30	1.43	1.65	1.88	1.96	2.06	2.24
3.500	0.51	0.68	0.75	0.98	1.21	1.30	1.44	1.66	1.90	1.99	2.10	2.29
4.000	0.50	0.68	0.75	0.98	1.21	1.30	1.43	1.66	1.91	2.00	2.12	2.32

Operational errors (TOOL4COOL® or LED flashes)

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, 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 $0.65A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

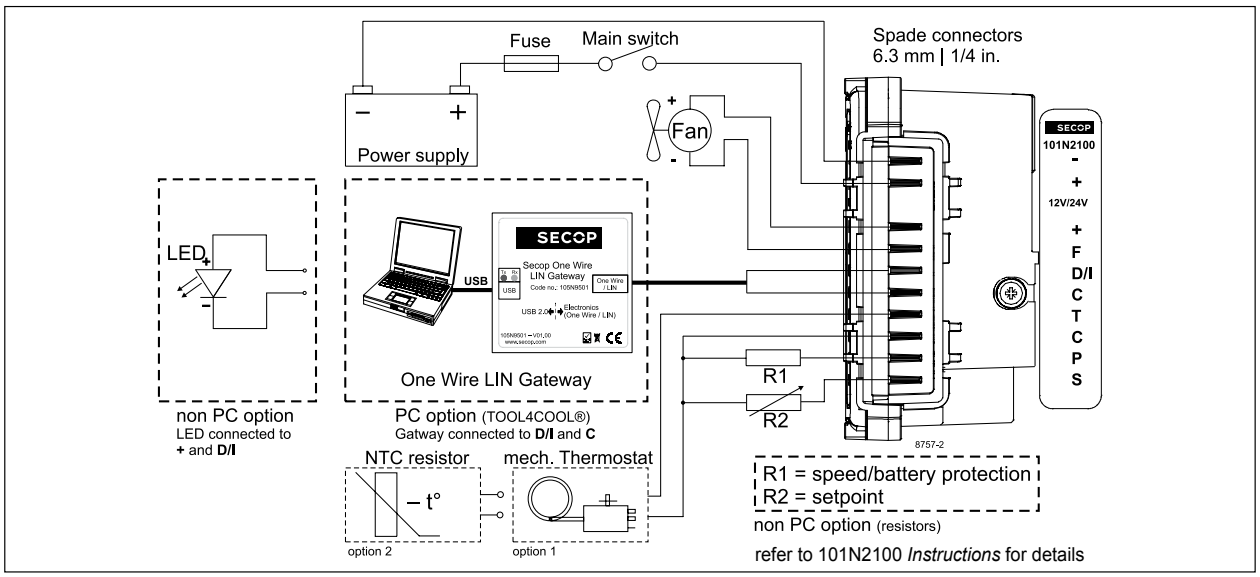
Wire Dimensions DC

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[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

Accessories for BD1.4F-VSD-HD		Code number
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
Terminal cover for electronic unit		105N9120
Automoblie fuse DIN 7258	12V: 15A 24V: 15A	Not deliverable from Secop
Main switch	min. 20A	

Test conditions	EN 12900 CECOMAF	ASHRAE LBP
Condensing temperature	131°F	130°F
Ambient temperature	90°F	90°F
Suction gas temperature	90°F	90°F
Liquid temperature	no subcooling	90°F



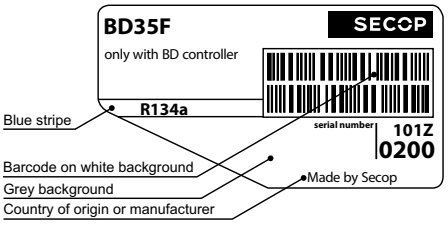
BD35F
Direct Current Compressor
R134a, 12/24V DC, 10-45V DC Solar & 100-240V AC 50/60Hz

TOOL4COOL® Flexible control settings

General

Code number (without electronic units)	101Z0200	**Approvals**
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	UL / VDE / CB
Electronic unit 10-45V DC - Solar	101N0420, 30 pcs: 101N0421	VDE / CB
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	UL / VDE
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	UL / VDE / CB
Compressors on pallet	150	

Approval mark



Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 0 (10)
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50/60
Voltage range for solar applications	VDC	10 - 45
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: Fan cooling F_1 depending on application and speed.			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	2.2

Design

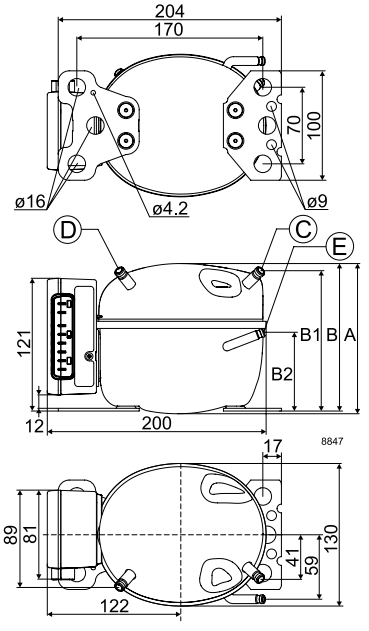
Displacement	cm^3	2.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3 / 0.19 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	16.0	23.8	26.7	32.9	43.7	56.5	71.8	89.8	111	121	136	
2,500	18.8	29.9	33.9	41.9	55.4	71.1	89.8	112	139	152		
3,000	22.4	32.9	37.1	46.1	62.5	82.2	106	133				
3,500	27.0	35.9	40.2	50.3	69.8	93.9	122					

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	20.0	29.8	33.4	41.2	54.6	70.6	89.7	112	139	152	169	
2,500	23.6	37.5	42.4	52.4	69.2	88.8	112	140	173	190		
3,000	28.1	41.3	46.5	57.9	78.2	103	132	166				
3,500	33.9	45.1	50.5	63.1	87.3	117	153					

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	17.7	22.9	24.6	27.7	32.2	36.7	41.3	46.2	51.6	54.3	57.8	
2,500	22.1	29.7	32.0	36.3	42.4	48.1	53.8	59.7	66.1	69.1		
3,000	29.3	34.6	36.7	41.2	48.7	56.5	64.5	72.0				
3,500	34.5	41.3	43.8	48.9	57.3	66.2	75.4					

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.4	1.9	2.0	2.3	2.7	3.1	3.4	3.8	4.3	4.5	4.8	
2,500	1.8	2.5	2.7	3.0	3.5	4.0	4.5	5.0	5.5	5.8		
3,000	2.4	2.9	3.1	3.4	4.0	4.7	5.3	6.0				
3,500	2.9	3.4	3.6	4.1	4.8	5.5	6.3					

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.90	1.04	1.09	1.19	1.36	1.54	1.74	1.94	2.15	2.24	2.35	
2,500	0.85	1.01	1.06	1.15	1.31	1.48	1.67	1.88	2.10	2.20		
3,000	0.76	0.95	1.01	1.12	1.28	1.45	1.64	1.85				
3,500	0.78	0.87	0.92	1.03	1.22	1.42	1.62					

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.13	1.30	1.36	1.49	1.70	1.93	2.18	2.44	2.70	2.81	2.95	
2,500	1.07	1.26	1.33	1.45	1.64	1.86	2.10	2.36	2.64	2.77		
3,000	0.96	1.19	1.27	1.41	1.61	1.83	2.06	2.32				
3,500	0.98	1.09	1.15	1.29	1.53	1.78	2.03					

Test conditions with electronic units	101N0212 101N0650	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature		55°C	54.4°C
Ambient temperature		32°C	32°C
Suction gas temperature		32°C	32°C
Liquid temperature		no subcooling	32°C

Accessories for BD35F			Code number
Bolt joint for one comp.		Ø:16 mm	118-1917
Bolt joint in quantities		Ø:16 mm	118-1918
Snap-on in quantities		Ø:16 mm	118-1919
Remote kit (without cable)			105N9210
One Wire/LIN gateway			105N9501
DC usage:	Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
	Main switch	min. 20A	
AC usage:	Fuse, 100-240V		
	Main switch	min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 101N0420 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[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

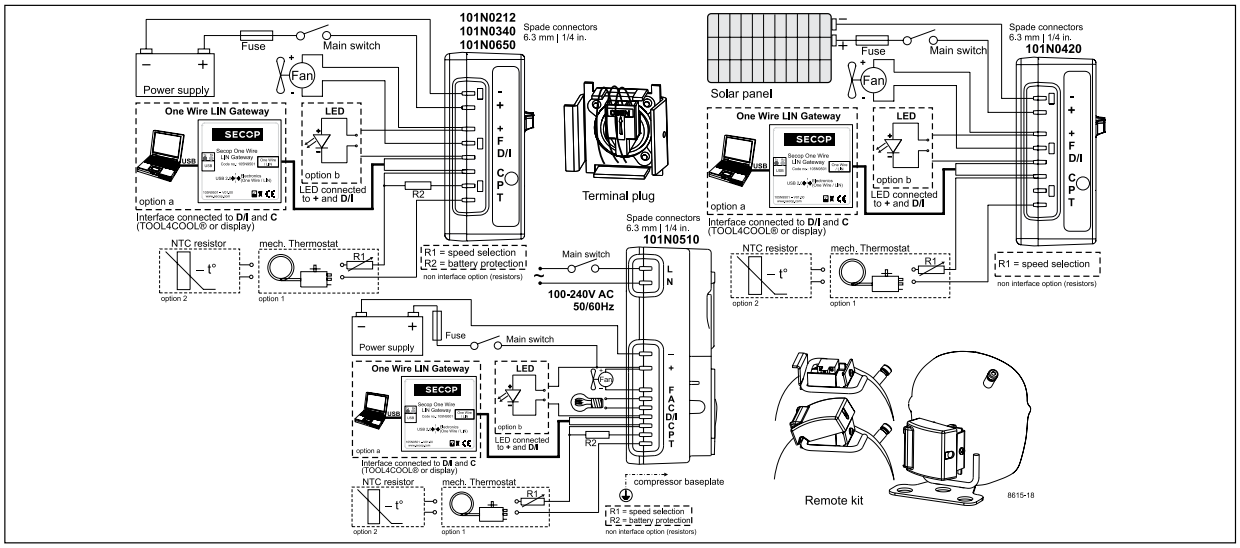
*Length between battery and electronic unit

Wire dimensions AC

Cross section min. 0.75 mm² or AWG 18

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).



SECOP

BD35F
Direct Current Compressor
R134a, 12/24V DC, 10-45V DC Solar & 100-240V AC 50/60Hz

TOOL4COOL® Flexible control settings

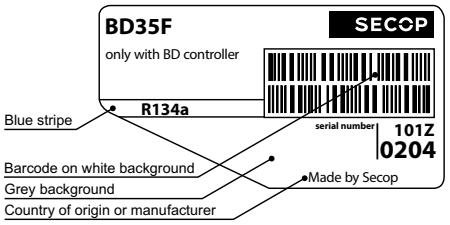
General

		Approvals
Code number (without electronic units)	101Z0204	
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	UL / VDE / CB
Electronic unit 10-45V DC - Solar	101N0420, 30 pcs: 101N0421	VDE / CB
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	UL / VDE
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	UL / VDE / CB
Compressors on pallet	150	

Approval mark

Application

Application		LBP/MBP/HBP
Evaporating temperature	°F	-20 to 50
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50 - 60
Voltage range for solar applications	VDC	10 - 45
Max. condensing temperature continuous (short)	°F	140 (158)
Max. winding temperature continuous (short)	°F	257 (275)



Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: Fan cooling F_1 depending on application and speed.			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	2.2

Design

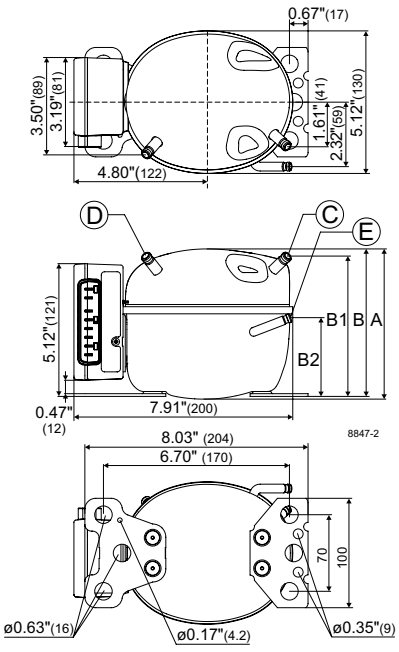
Displacement	cu.in.	0.12
Oil quantity (type)	fl.oz.	5.1 (polyolester)
Maximum refrigerant charge	oz.	10.5
Free gas volume in compressor	fl.oz.	29.6
Weight - Compressor/Electronic unit	lbs.	9.5 / 0.42 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional settings)

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

Dimensions

Height	inch	A	5.39
		B	5.32
		B1	5.04
		B2	2.87
Suction connector	location/I.D. inch | angle	C	0.252-0259 | 40°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. inch | angle	D	0.252-0259 | 45°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. inch | angle	E	0.202-0.205 | 21°
	material | comment		Cu-plated steel | Al cap
Remarks: **inch connectors**			



Capacity (ASHRAE LBP) 12V DC, static cooling **BTU/h**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	75.2	101	114	160	215	241	283	364	462	472	517	577
2,500	90.9	128	144	203	272	303	354	455	577	591	649	
3,000	105	141	158	226	311	350	415	539	685			
3,500	122	154	172	249	352	400	479	626				

Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	17.7	23.8	26.7	37.4	50.5	56.5	66.4	85.5	108	111	121	136
2,500	21.3	29.9	33.8	47.6	63.8	71.1	83.2	107	136	139	152	
3,000	24.5	32.9	37.0	53.0	73.0	82.2	97.4	127	161			
3,500	28.5	35.9	40.1	58.4	82.6	93.9	112	147				

Power consumption 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	19.0	22.9	24.5	29.6	34.6	36.5	39.5	44.8	50.7	51.4	54.0	57.5
2,500	23.9	29.7	31.9	39.0	45.4	47.9	51.6	58.0	65.0	65.7	68.8	
3,000	30.4	34.6	36.6	44.3	52.8	56.3	61.5	70.0	77.6			
3,500	36.0	41.3	43.7	52.5	62.0	65.9	72.0	82.2				

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	1.51	1.87	2.02	2.47	2.89	3.05	3.30	3.73	4.20	4.25	4.46	4.74
2,500	1.99	2.47	2.66	3.25	3.79	4.00	4.31	4.84	5.42	5.48	5.74	
3,000	2.49	2.88	3.05	3.70	4.39	4.67	5.10	5.81	6.49			
3,500	2.99	3.42	3.63	4.36	5.15	5.48	5.99	6.85				

EER (ASHRAE LBP) 12V DC, static cooling **BTU/Wh**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	3.97	4.42	4.63	5.38	6.23	6.59	7.15	8.12	9.10	9.20	9.58	10.05
2,500	3.80	4.31	4.51	5.21	5.98	6.32	6.86	7.84	8.89	9.00	9.43	
3,000	3.45	4.06	4.31	5.11	5.89	6.22	6.74	7.70	8.83			
3,500	3.39	3.73	3.93	4.75	5.68	6.07	6.65	7.62				

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	0.93	1.04	1.09	1.26	1.46	1.54	1.67	1.90	2.13	2.15	2.24	2.35
2,500	0.89	1.01	1.06	1.22	1.40	1.48	1.60	1.83	2.08	2.10		
3,000	0.81	0.95	1.01	1.19	1.38	1.45	1.58	1.80	2.06			
3,500	0.79	0.87	0.92	1.11	1.33	1.42	1.55	1.78				

Test conditions with electronic units		EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	101N0212 101N0650	131°F	130°F
Ambient temperature		90°F	90°F
Suction gas temperature		90°F	90°F
Liquid temperature		no subcooling	90°F

Accessories for BD35F		Code number
Bolt joint for one comp.	Ø: 5/8 in.	118-1917
Bolt joint in quantities	Ø: 5/8 in.	118-1918
Snap-on in quantities	Ø: 5/8 in.	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
DC usage: Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
DC usage: Main switch	min. 20A	
AC usage: Fuse, 100-240V		
AC usage: Main switch	min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 101N0420 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

Size Cross section [mm²]	AWG [Gauge]	Max. length* 12V operation [m]	[ft.]	Max. length* 24V operation [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

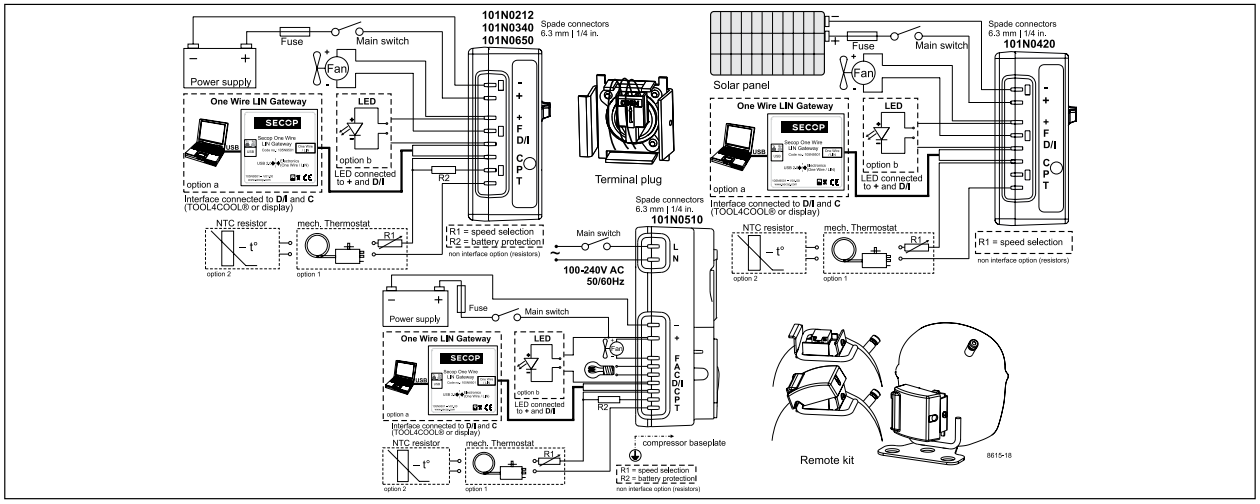
*Length between battery and electronic unit

Wire dimensions AC

Cross section min. 0.75 mm² or AWG 18

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).



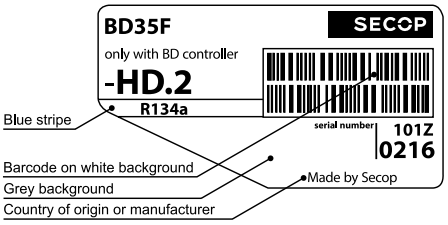
BD35F-HD.2
Heavy Duty
Direct Current Compressor
R134a, 12/24V DC

TOOL4COOL® Flexible control settings

General

Code number (without electronic units)	101Z0216	**Approvals**
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	UL / VDE / CB
Compressors on pallet	150	

Approval mark



Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 0 (10)
Voltage range	VDC	9.6 - 17 / 21.3 - 31.5
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: Fan cooling F_1 depending on application and speed. **HD (Heavy Duty) version of the BD35F which can handle extreme vibrations. New generation with optimized noise level during rough vehicle motions.**			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	2.2

Design

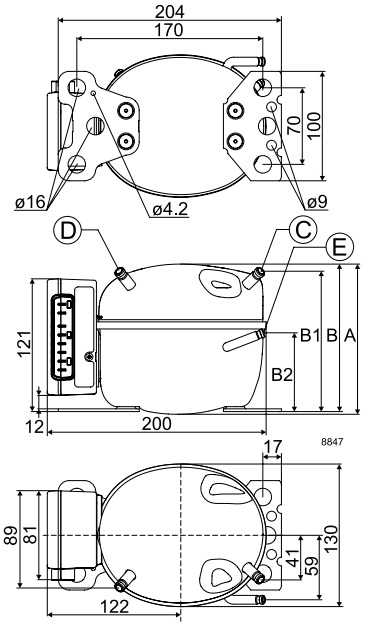
Displacement	cm^3	2.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3/0.19

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	16.0	23.8	26.7	32.9	43.7	56.5	71.8	89.8	111	121	136	
2,500	18.8	29.9	33.9	41.9	55.4	71.1	89.8	112	139	152		
3,000	22.4	32.9	37.1	46.1	62.5	82.2	106	133				
3,500	27.0	35.9	40.2	50.3	69.8	93.9	122					

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	20.0	29.8	33.4	41.2	54.6	70.6	89.7	112	139	152	169	
2,500	23.6	37.5	42.4	52.4	69.2	88.8	112	140	173	190		
3,000	28.1	41.3	46.5	57.9	78.2	103	132	166				
3,500	33.9	45.1	50.5	63.1	87.3	117	153					

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	17.7	22.9	24.6	27.7	32.2	36.7	41.3	46.2	51.6	54.3	57.8	
2,500	22.1	29.7	32.0	36.3	42.4	48.1	53.8	59.7	66.1	69.1		
3,000	29.3	34.6	36.7	41.2	48.7	56.5	64.5	72.0				
3,500	34.5	41.3	43.8	48.9	57.3	66.2	75.4					

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.4	1.9	2.0	2.3	2.7	3.1	3.4	3.8	4.3	4.5	4.8	
2,500	1.8	2.5	2.7	3.0	3.5	4.0	4.5	5.0	5.5	5.8		
3,000	2.4	2.9	3.1	3.4	4.0	4.7	5.3	6.0				
3,500	2.9	3.4	3.6	4.1	4.8	5.5	6.3					

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.90	1.04	1.09	1.19	1.36	1.54	1.74	1.94	2.15	2.24	2.35	
2,500	0.85	1.01	1.06	1.15	1.31	1.48	1.67	1.88	2.10	2.20		
3,000	0.76	0.95	1.01	1.12	1.28	1.45	1.64	1.85				
3,500	0.78	0.87	0.92	1.03	1.22	1.42	1.62					

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.13	1.30	1.36	1.49	1.70	1.93	2.18	2.44	2.70	2.81	2.95	
2,500	1.07	1.26	1.33	1.45	1.64	1.86	2.10	2.36	2.64	2.77		
3,000	0.96	1.19	1.27	1.41	1.61	1.83	2.06	2.32				
3,500	0.98	1.09	1.15	1.29	1.53	1.78	2.03					

Test conditions with electronic unit	101N0212 101N0650	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature		55°C	54.4°C
Ambient temperature		32°C	32°C
Suction gas temperature		32°C	32°C
Liquid temperature		no subcooling	32°C

Accessories for BD35F-HD.2		Code number
Bolt joint for one comp.	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
Main switch	min. 20A	

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
	1523	3,500

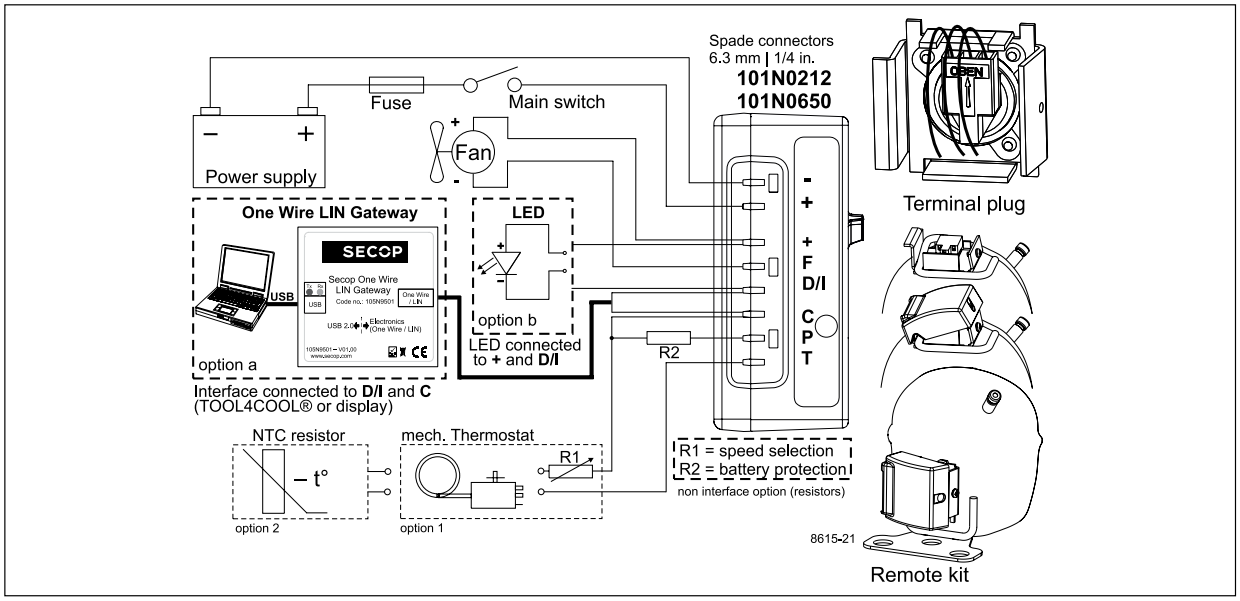
Wire dimensions

Size Cross section [mm²]	Size AWG [Gauge]	Max. length* 12V operation [m]	Max. length* 12V operation [ft.]	Max. length* 24V operation [m]	Max. length* 24V operation [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

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).



BD35F-B
Bus-optimized
Direct Current Compressor
R134a, 12/24V DC & 100-240V AC 50/60Hz

TOOL4COOL® Flexible control settings

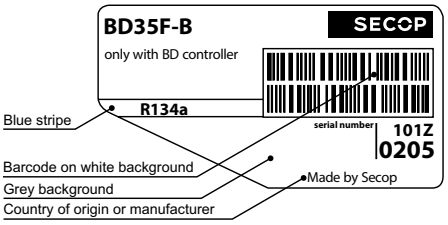
General

Code number (without electronic units)	101Z0205	**Approvals**
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	UL / VDE / CB
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	UL / VDE
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	UL / VDE / CB
Compressors on pallet	150	

Approval mark

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 0 (10)
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50/60
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)



Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S

Remarks on application: Fan cooling F_1 depending on application and speed.
Special version of the BD35F optimized for rough vehicle motions, especially in buses.

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	2.2

Design

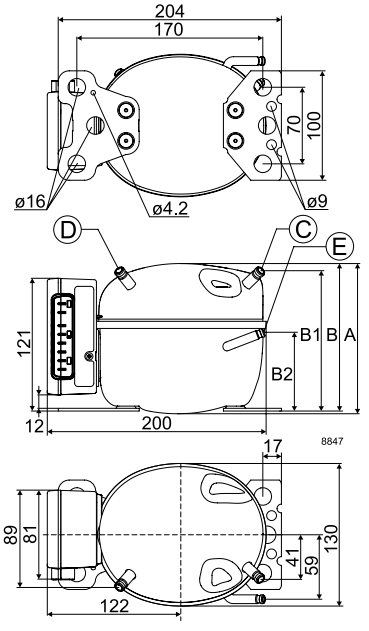
Displacement	cm^3	2.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3 / 0.19 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional settings)

		12V	24V
Voltage			
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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	16.0	23.8	26.7	32.9	43.7	56.5	71.8	89.8	111	121	136	
2,500	18.8	29.9	33.9	41.9	55.4	71.1	89.8	112	139	152		
3,000	22.4	32.9	37.1	46.1	62.5	82.2	106	133				
3,500	27.0	35.9	40.2	50.3	69.8	93.9	122					

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	20.0	29.8	33.4	41.2	54.6	70.6	89.7	112	139	152	169	
2,500	23.6	37.5	42.4	52.4	69.2	88.8	112	140	173	190		
3,000	28.1	41.3	46.5	57.9	78.2	103	132	166				
3,500	33.9	45.1	50.5	63.1	87.3	117	153					

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	17.7	22.9	24.6	27.7	32.2	36.7	41.3	46.2	51.6	54.3	57.8	
2,500	22.1	29.7	32.0	36.3	42.4	48.1	53.8	59.7	66.1	69.1		
3,000	29.3	34.6	36.7	41.2	48.7	56.5	64.5	72.0				
3,500	34.5	41.3	43.8	48.9	57.3	66.2	75.4					

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.4	1.9	2.0	2.3	2.7	3.1	3.4	3.8	4.3	4.5	4.8	
2,500	1.8	2.5	2.7	3.0	3.5	4.0	4.5	5.0	5.5	5.8		
3,000	2.4	2.9	3.1	3.4	4.0	4.7	5.3	6.0				
3,500	2.9	3.4	3.6	4.1	4.8	5.5	6.3					

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.90	1.04	1.09	1.19	1.36	1.54	1.74	1.94	2.15	2.24	2.35	
2,500	0.85	1.01	1.06	1.15	1.31	1.48	1.67	1.88	2.10	2.20		
3,000	0.76	0.95	1.01	1.12	1.28	1.45	1.64	1.85				
3,500	0.78	0.87	0.92	1.03	1.22	1.42	1.62					

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.13	1.30	1.36	1.49	1.70	1.93	2.18	2.44	2.70	2.81	2.95	
2,500	1.07	1.26	1.33	1.45	1.64	1.86	2.10	2.36	2.64	2.77		
3,000	0.96	1.19	1.27	1.41	1.61	1.83	2.06	2.32				
3,500	0.98	1.09	1.15	1.29	1.53	1.78	2.03					

Test conditions with electronic units	101N0212 101N0650	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature		55°C	54.4°C
Ambient temperature		32°C	32°C
Suction gas temperature		32°C	32°C
Liquid temperature		no subcooling	32°C

Accessories for BD35F-B			Code number
Bolt joint for one comp.		Ø:16 mm	118-1917
Bolt joint in quantities		Ø:16 mm	118-1918
Snap-on in quantities		Ø:16 mm	118-1919
Remote kit (without cable)			105N9210
One Wire/LIN gateway			105N9501
DC usage:	Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
	Main switch	min. 20A	
AC usage:	Fuse, 100-240V		
	Main switch	min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

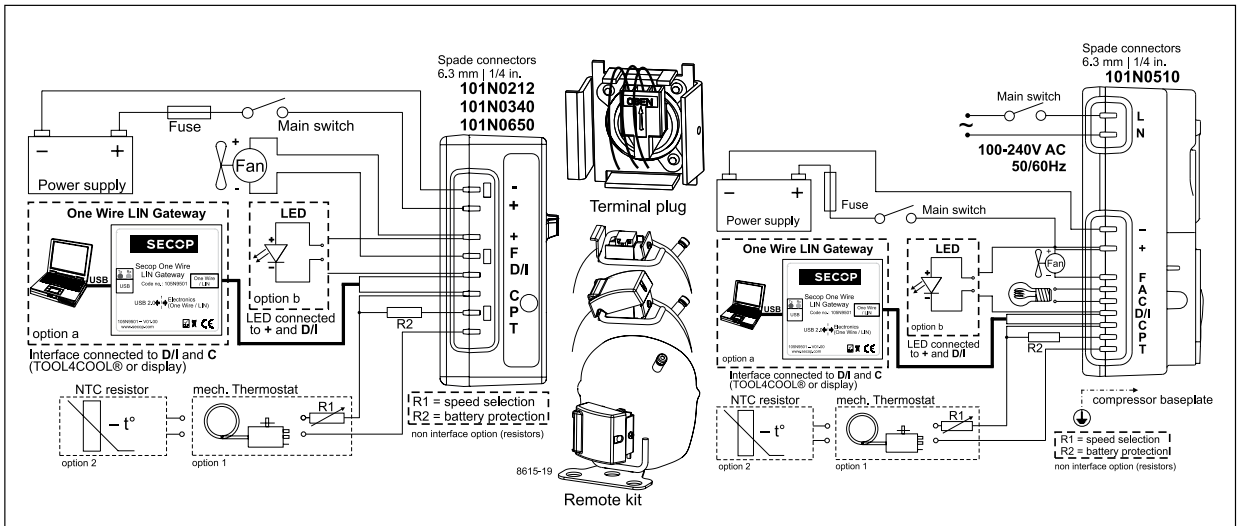
Size Cross section [mm²]	AWG [Gauge]	Max. length* 12V operation [m]	[ft.]	Max. length* 24V operation [m]	[ft.]
2.5	12	2.5	8	5	16
4	12	4	13	8	26
6	10	6	20	12	39
10	8	10	33	20	66

*Length between battery and electronic unit

Wire dimensions AC
Cross section min. 0.75 mm² or AWG 18

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).



BD50F
Direct Current Compressor
R134a, 12/24V DC
& 100-240V AC 50/60Hz

TOOL4COOL® Flexible control settings

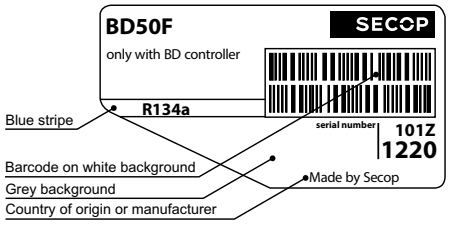
General

		Approvals
Code number (without electronic units)	101Z1220	
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	UL / VDE / CB
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	UL / VDE
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	UL / VDE / CB
Compressors on pallet	150	

Approval mark

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 0 (10)
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50 - 60
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)



Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	F_1
38°C	S	S	F_1
43°C	S	S	F_1
Remarks on application: Fan cooling F_1 depending on application and speed.			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

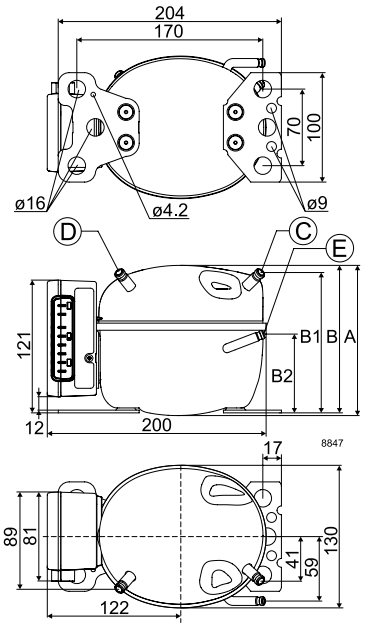
Displacement	cm^3	2.50
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3 / 0.19 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	20.9	30.1	33.8	41.8	56.1	72.8	92.1	114	138*	150*	165*	
2,500	26.1	37.0	41.4	50.9	68.0	88.7	113	142*	175*	191*		
3,000	31.2	44.8	50.2	61.8	82.4	107	136*	169*				
3,500	37.0	52.0	58.0	71.1	94.7	123*	157*					

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	25.9	37.2	41.8	51.7	69.3	90.0	114	141	171*	185*	205*	
2,500	32.3	45.9	51.3	63.1	84.3	110	140	176*	217*	237*		
3,000	38.5	55.4	62.0	76.4	102	132	168*	210*				
3,500	45.5	64.2	71.6	87.8	117	152*	194*					

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	25.0	31.6	33.8	38.0	44.3	50.8	57.7	65.3	73.8*	77.9*	83.5*	
2,500	30.7	39.5	42.4	48.0	56.5	64.9	73.4	82.0*	90.9*	94.9*		
3,000	37.4	48.1	51.6	58.3	68.3	78.1	87.9*	98.0*				
3,500	45.0	56.8	60.7	68.2	79.5	91.2*	104*					

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	2.07	2.58	2.76	3.12	3.70	4.31	4.94	5.62	6.32*	6.64*	7.05*	
2,500	2.62	3.24	3.47	3.92	4.63	5.38	6.13	6.88*	7.63*	7.95*		
3,000	3.20	3.99	4.27	4.80	5.63	6.48	7.34*	8.23*				
3,500	3.86	4.70	4.99	5.60	6.56	7.58*	8.67*					

COP (EN 12900 Household/CECOMAF) **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.84	0.95	1.00	1.10	1.27	1.43	1.60	1.74	1.87*	1.92*	1.97*	
2,500	0.85	0.94	0.98	1.06	1.20	1.37	1.54	1.73*	1.92*	2.01*		
3,000	0.83	0.93	0.97	1.06	1.21	1.37	1.54*	1.72*				
3,500	0.82	0.92	0.96	1.04	1.19	1.35*	1.51*					

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.04	1.19	1.25	1.37	1.58	1.79	1.99	2.18	2.34*	2.40*	2.47*	
2,500	1.05	1.16	1.21	1.32	1.50	1.70	1.93	2.16*	2.41*	2.52*		
3,000	1.03	1.15	1.21	1.32	1.50	1.71	1.93*	2.16*				
3,500	1.01	1.13	1.18	1.29	1.48	1.68*	1.89*					

* fan cooling of electronic unit compulsory

Test conditions with electronic units	101N0212 101N0650	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature		55°C	54.4°C
Ambient temperature		32°C	32°C
Suction gas temperature		32°C	32°C
Liquid temperature		no subcooling	32°C

Accessories for BD50F			Code number
Bolt joint for one comp.		Ø:16 mm	118-1917
Bolt joint in quantities		Ø:16 mm	118-1918
Snap-on in quantities		Ø:16 mm	118-1919
Remote kit (without cable)			105N9210
One Wire/LIN gateway			105N9501
DC usage:	Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
	Main switch	min. 20A	
AC usage:	Fuse, 100-240V		
	Main switch	min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

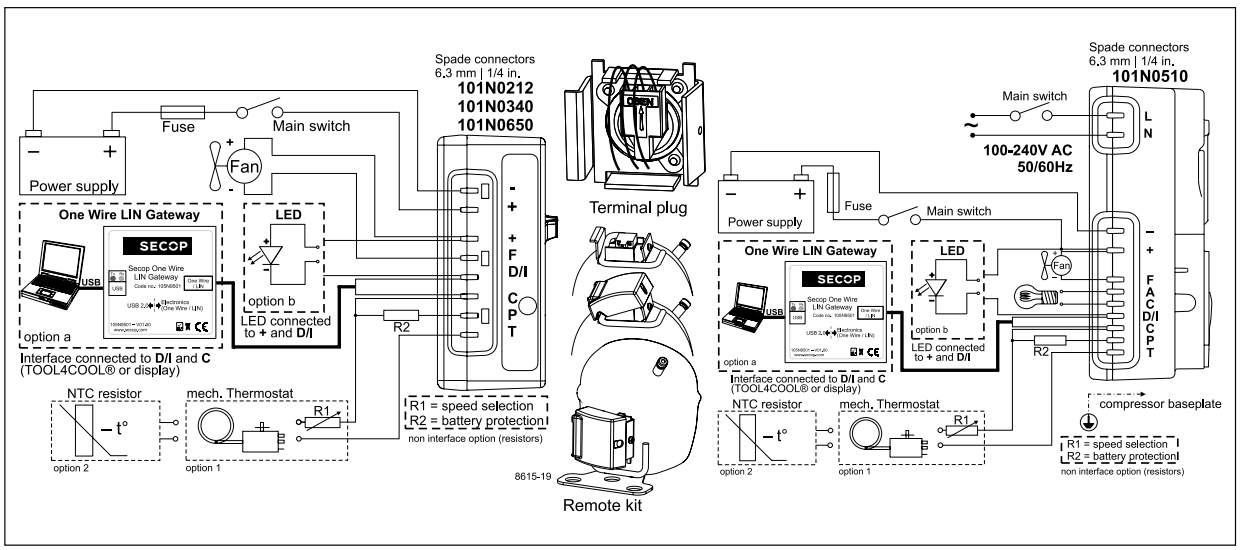
Size Cross section [mm²]	AWG [Gauge]	Max. length* 12V operation [m]	[ft.]	Max. length* 24V operation [m]	[ft.]
2.5	12	2.5	8	5	16
4	12	4	13	8	26
6	10	6	20	12	39
10	8	10	33	20	66

*Length between battery and electronic unit

Wire dimensions AC
Cross section min. 0.75 mm² or AWG 18

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).



BD50F
Direct Current Compressor R134a, 12/24V DC & 100-240V AC 50/60Hz

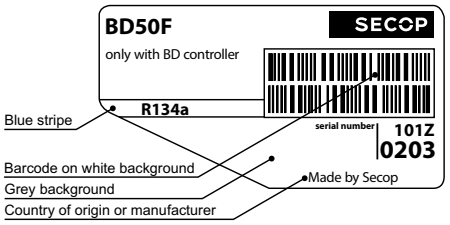
General

		Approvals
Code number (without electronic units)	101Z0203	
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	UL / VDE / CB
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	UL / VDE
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	UL / VDE / CB
Compressors on pallet	150	

Approval mark

Application

Application		LBP/MBP/HBP
Evaporating temperature	°F	-20 to 50
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50 - 60
Max. condensing temperature continuous (short)	°F	140 (158)
Max. winding temperature continuous (short)	°F	257 (275)



Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	F_1
38°C	S	S	F_1
43°C	S	S	F_1
Remarks on application: Fan cooling F_1 depending on application and speed.			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

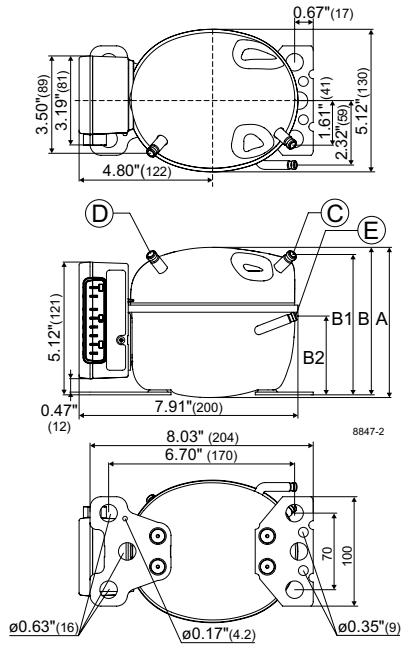
Displacement	cu.in.	0.15
Oil quantity (type)	fl.oz.	5.1 (polyolester)
Maximum refrigerant charge	oz.	10.5
Free gas volume in compressor	fl.oz.	29.6
Weight - Compressor/Electronic unit	lbs.	9.5 / 0.42 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional settings)

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

Dimensions

Height	inch	A	5.39
		B	5.32
		B1	5.04
		B2	2.87
Suction connector	location/I.D. inch | angle	C	0.252-0259 | 40°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. inch | angle	D	0.252-0259 | 45°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. inch | angle	E	0.202-0.205 | 21°
	material | comment		Cu-plated steel | Al cap
Remarks: **inch connectors**			



Capacity (ASHRAE LBP) 12V DC, static cooling **BTU/h**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	96	127	142	202	274	307	360	459	572	584*	633*	698*
2,500	119	156	174	245	334	375	442	572	724	741*	810*	
3,000	143	189	211	297	403	452	531	682	858*			
3,500	168	219	244	342	464	520*	613*	792*				

Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	22.8	30.1	33.7	47.8	65.1	72.8	85.4	109	135	138*	150*	165*
2,500	28.2	37.0	41.3	58.1	79.1	88.7	105	135	171	175*	191*	
3,000	33.9	44.8	50.1	70.5	95.6	107	126	161	203*			
3,500	40.0	52.0	57.9	81.0	110	123*	145*	187*				

Power consumption 12V DC, static cooling **watt**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	26.4	31.4	33.5	40.5	47.4	50.3	54.8	63.0	72.2	73.2*	77.3*	82.8*
2,500	32.8	39.5	42.3	51.7	60.9	64.6	70.2	79.6	89.3	90.3*	94.4*	
3,000	39.9	48.0	51.4	62.5	73.2	77.5	84.0	95.0	107*			
3,500	47.7	56.7	60.5	72.9	85.4	90.6*	98.7*	113*				

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	2.19	2.58	2.76	3.37	4.01	4.29	4.70	5.43	6.20	6.28*	6.60*	7.01*
2,500	2.76	3.25	3.47	4.23	5.03	5.36	5.86	6.69	7.51	7.59*	7.91*	
3,000	3.38	3.99	4.26	5.16	6.08	6.46	7.03	7.99	8.98*			
3,500	4.04	4.69	4.98	6.00	7.09	7.55*	8.27*	9.51*				

EER (ASHRAE LBP) 12V DC, static cooling **BTU/Wh**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	3.64	4.04	4.24	4.98	5.78	6.10	6.57	7.29	7.92	7.98*	8.19*	8.43*
2,500	3.64	3.96	4.12	4.75	5.49	5.80	6.30	7.18	8.11	8.20*	8.58*	
3,000	3.58	3.93	4.10	4.76	5.51	5.82	6.32	7.18	8.06*			
3,500	3.53	3.86	4.03	4.69	5.43	5.74*	6.21*	6.99*				

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °F	-20	-13	-10	0	10	14	20	30	40	41	45	50
2,000	0.86	0.95	1.00	1.17	1.36	1.43	1.54	1.71	1.86	1.87*	1.92*	1.97*
2,500	0.86	0.94	0.97	1.12	1.29	1.37	1.48	1.69	1.90	1.92*	2.01*	
3,000	0.85	0.93	0.97	1.12	1.30	1.37	1.49	1.68	1.89*			
3,500	0.84	0.92	0.95	1.11	1.28	1.35*	1.46*	1.64*				

* fan cooling of electronic unit compulsory

Test conditions with electronic units	101N0212 101N0650	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature		131°F	130°F
Ambient temperature		90°F	90°F
Suction gas temperature		90°F	90°F
Liquid temperature		no subcooling	90°F

Accessories for BD50F			Code number
Bolt joint for one comp.		Ø: 5/8 in.	118-1917
Bolt joint in quantities		Ø: 5/8 in.	118-1918
Snap-on in quantities		Ø: 5/8 in.	118-1919
Remote kit (without cable)			105N9210
One Wire/LIN gateway			105N9501
DC usage:	Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
	Main switch	min. 20A	
AC usage:	Fuse, 100-240V		
	Main switch	min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

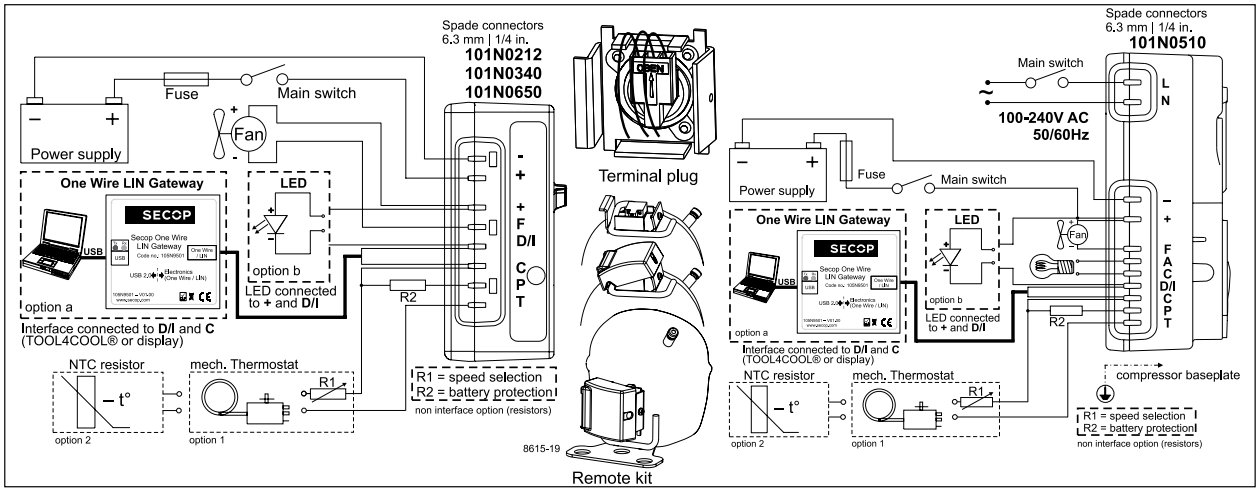
Size Cross section [mm²]	AWG [Gauge]	Max. length* 12V operation [m]	[ft.]	Max. length* 24V operation [m]	[ft.]
2.5	12	2.5	8	5	16
4	12	4	13	8	26
6	10	6	20	12	39
10	8	10	33	20	66

*Length between battery and electronic unit

Wire dimensions AC
Cross section min. 0.75 mm² or AWG 18

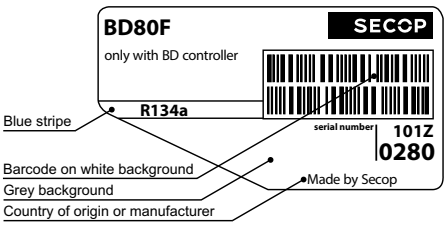
Operational errors

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).



BD80F
Direct Current Compressor
R134a
12/24V DC

TOOL4COOL® Flexible control settings



General

Code number (without electronic units)	101Z0280
Electronic unit - High Speed	101N0390, 30 pcs: 101N0391
Compressors on pallet	150

Application

Application		LBP
Evaporating temperature	°C	-30 to -5
Voltage/max. voltage	VDC	9.6 - 17 / 21.3 - 31.5
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	–	–
38°C	S	–	–
43°C	S	–	–
Remarks on application:			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

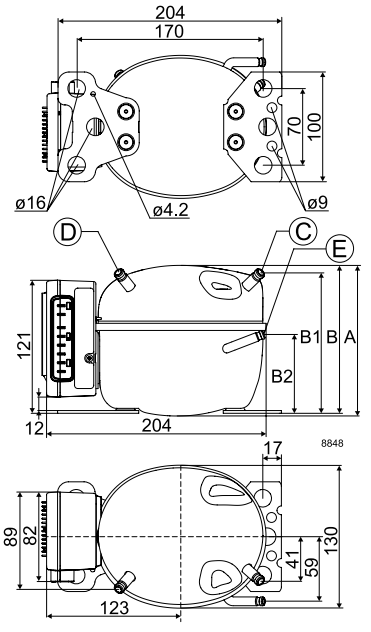
Displacement	cm^3	3.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.4/0.32

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 24V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	35.2	49.8	55.3	67.0	87.3	112	140					
3,100	41.9	59.2	65.8	79.8	104	133	168					
3,800	50.1	70.8	78.7	95.4	125	159	200					
4,400	54.9	78.1	86.8	105	138	176	221					

Capacity (ASHRAE LBP) 24V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	43.7	61.8	68.6	83.1	108	138	174					
3,100	52.0	73.4	81.6	98.8	129	165	208					
3,800	62.1	87.8	97.5	118	154	197	248					
4,400	68.1	96.7	108	130	171	218	274					

Power consumption 24V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	38.4	47.9	51.2	57.8	68.2	79.5	91.9					
3,100	46.9	58.9	62.9	70.8	83.4	97.3	113					
3,800	57.5	72.0	76.9	86.5	102	119	139					
4,400	66.3	83.5	89.2	100	118	138	161					

Current consumption (for 12V applications the following must be doubled) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	1.6	2.0	2.1	2.4	2.8	3.3	3.8					
3,100	1.9	2.4	2.6	3.0	3.5	4.1	4.7					
3,800	2.4	3.0	3.2	3.6	4.3	5.0	5.8					
4,400	2.8	3.5	3.7	4.2	4.9	5.8	6.7					

COP (EN 12900 Household/CECOMAF) 24V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	0.92	1.04	1.08	1.16	1.28	1.40	1.53					
3,100	0.89	1.01	1.05	1.13	1.25	1.37	1.48					
3,800	0.87	0.98	1.02	1.10	1.22	1.34	1.44					
4,400	0.83	0.94	0.97	1.05	1.16	1.27	1.37					

COP (ASHRAE LBP) 24V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	1.14	1.29	1.34	1.44	1.59	1.75	1.90					
3,100	1.10	1.25	1.30	1.40	1.55	1.70	1.85					
3,800	1.07	1.22	1.27	1.37	1.52	1.66	1.80					
4,400	1.02	1.16	1.21	1.30	1.45	1.58	1.71					

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Accessories for BD80F		Code number
Bolt joint for one comp.	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
Automobile fuse, DIN 7258	12V: 30A | 24V: 15 A	Not deliverable from Secop
Main switch	min. 30A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0390 with AEO	0	AEO
	203	2,500
	451	3,100
	867	3,800
	1700	4,400

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

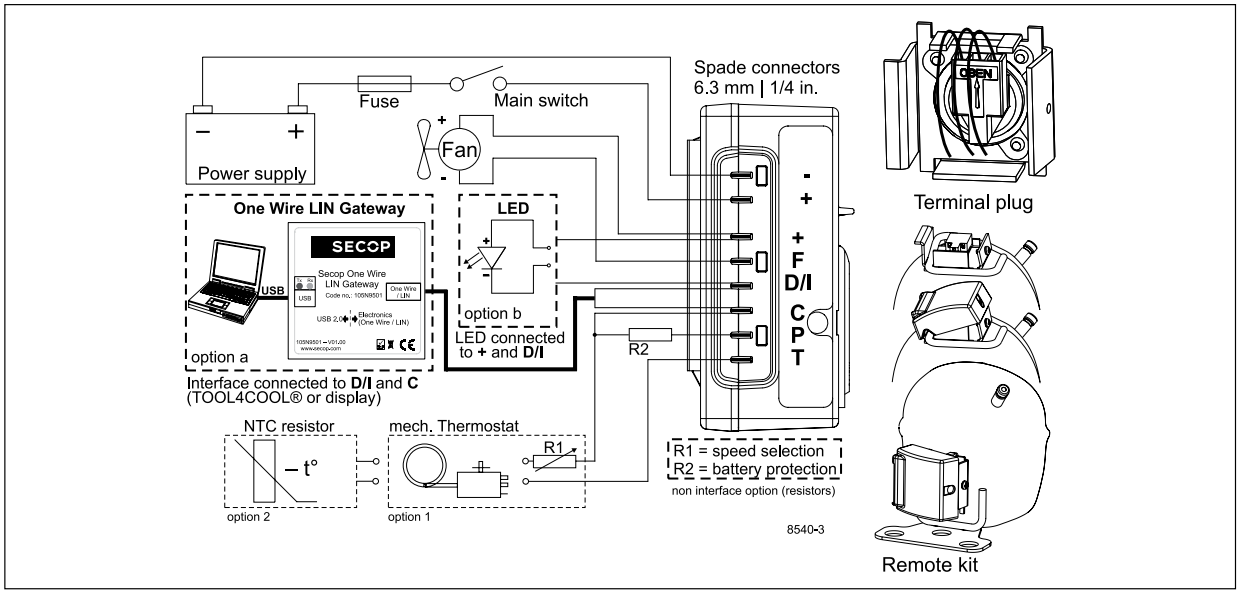
Wire dimensions

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[Gauge]	[m]	[ft.]	[m]	[ft.]
6	10	2.5	8	5	16

*Length between battery and electronic unit

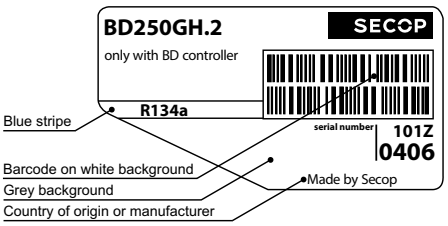
Operational errors

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).



BD250GH.2
Direct Current Compressor
R134a
12/24V DC

TOOL4COOL® Flexible control settings



General

Code number (without electronic units)	101Z0406
Electronic unit - High Speed	101N0390, 30 pcs: 101N0391
Compressors on pallet	150

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-25 to 15
Voltage range	VDC	9.6 - 17 / 21.3 - 31.5
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application:			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

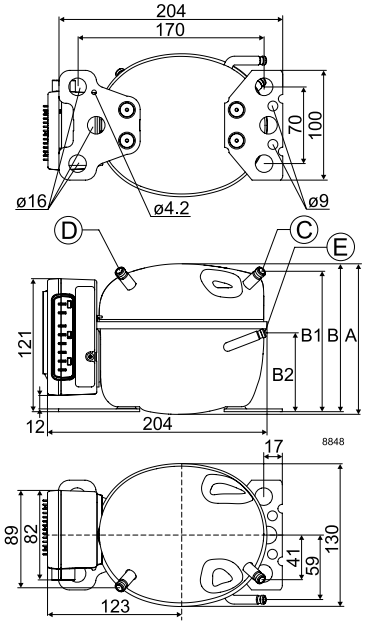
Displacement	cm^3	2.50
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.4/0.32

Standard battery protection settings (refer to electronic unit *Instructions* for optional settings)

		12V	24V
Voltage			
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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 24V DC, static cooling **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	31.3	38.1	50.8	70.0	90.5	106	114	142	177	194	219	271
3,100	42.9	48.5	61.0	83.5	111	132	143	181	225	246	275	332
3,800	54.6	61.9	77.7	106	140	165	179	225	278	303	337	404
4,400	61.2	69.4	87.2	119	156	184	200	251	308	336	373	446

Capacity (ASHRAE LBP) 24V DC, static cooling **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	38.3	46.8	62.6	86.6	112	131	142	177	220	242	274	340
3,100	53.4	60.4	75.9	104	138	164	178	225	280	307	343	415
3,800	68.1	77.1	96.7	132	173	205	223	280	345	377	420	504
4,400	76.3	86.5	109	148	194	229	249	311	383	418	465	556

Power consumption 24V DC, static cooling **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	38.1	42.0	48.5	55.9	61.4	64.4	65.9	70.7	76.6	79.9	84.8	96.4
3,100	42.0	46.0	53.1	62.4	70.8	76.2	79.0	87.8	98	103	110	125
3,800	55.0	59.4	67.6	79.0	90.2	97.7	102	114	129	136	146	167
4,400	64.8	69.5	78.2	91	104	113	117	132	150	158	170	194

Current consumption (for 12V applications the following must be doubled) **A**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.7	1.8	2.0	2.3	2.5	2.6	2.6	2.8	3.0	3.2	3.3	3.7
3,100	2.0	2.1	2.3	2.7	3.0	3.2	3.3	3.7	4.1	4.3	4.6	5.1
3,800	2.5	2.6	2.9	3.3	3.7	4.0	4.2	4.7	5.3	5.6	6.0	6.8
4,400	2.7	2.9	3.2	3.6	4.1	4.5	4.7	5.3	6.0	6.4	6.8	7.8

COP (EN 12900 Household/CECOMAF) 24V DC, static cooling **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	0.82	0.91	1.05	1.25	1.47	1.64	1.73	2.01	2.31	2.43	2.58	2.82
3,100	1.02	1.05	1.15	1.34	1.56	1.73	1.81	2.06	2.30	2.40	2.51	2.66
3,800	0.99	1.04	1.15	1.34	1.55	1.69	1.76	1.97	2.15	2.22	2.30	2.42
4,400	0.94	1.00	1.11	1.31	1.51	1.64	1.71	1.89	2.06	2.12	2.20	2.30

COP (ASHRAE LBP) 24V DC, static cooling **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.01	1.11	1.30	1.56	1.84	2.05	2.17	2.53	2.91	3.07	3.26	3.55
3,100	1.27	1.31	1.43	1.67	1.95	2.15	2.26	2.58	2.88	3.00	3.14	3.35
3,800	1.24	1.30	1.43	1.67	1.93	2.11	2.20	2.46	2.69	2.78	2.88	3.04
4,400	1.18	1.24	1.39	1.63	1.88	2.04	2.13	2.36	2.57	2.65	2.75	2.88

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Accessories for BD250GH.2		Code number
Bolt joint for one comp.	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
Automobile fuse, DIN 7258	12V: 30A | 24V: 15 A	Not deliverable
Main switch	min. 30A	from Secop

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0390 with AEO	0	AEO
	203	2,500
	451	3,100
	867	3,800
	1700	4,400

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

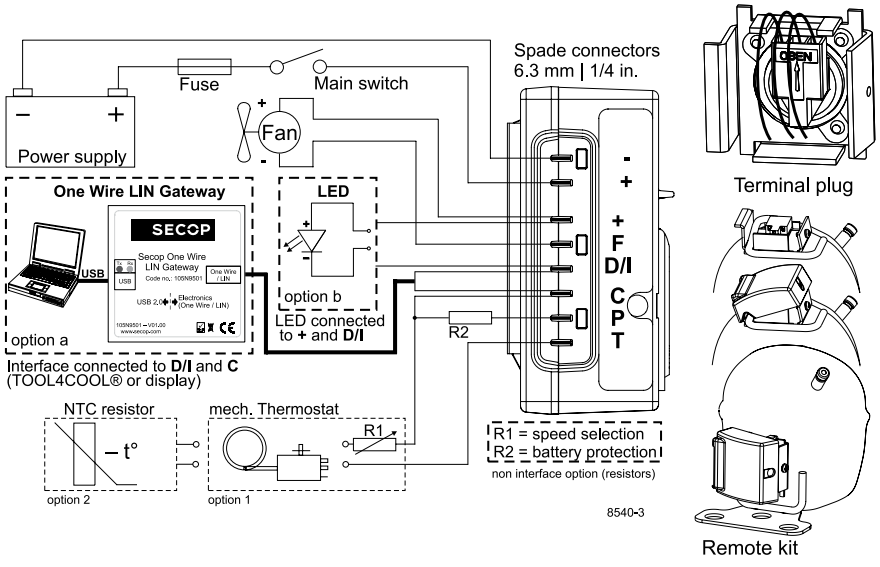
Wire dimensions

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[Gauge]	[m]	[ft.]	[m]	[ft.]
6	10	2.5	8	5	16

*Length between battery and electronic unit

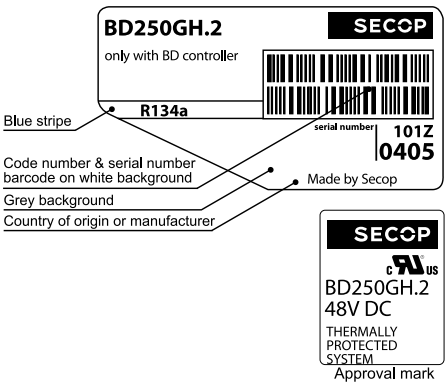
Operational errors

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).



BD250GH.2
Direct Current Compressor
R134a
48V DC

TOOL4COOL® Flexible control settings



Approval mark

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

General

Code number (without electronic units)	101Z0405
Electronic unit - Telecom	101N0732, 36 pcs: 101N0733
Approvals	UL
Compressors on pallet	150

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-25 to 15
Voltage range	VDC	32 - 60
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	F_1
Remarks on application:			

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	1.03

Design

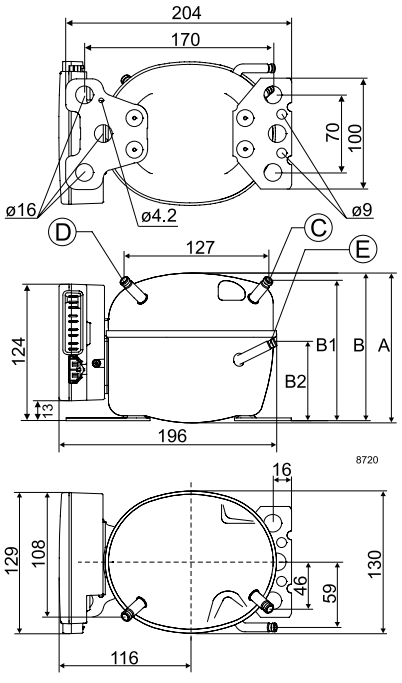
Displacement	cm^3	2.50
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	300
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.4/0.24

Battery protection settings

Voltage			Min. value	Default	Max. value
Cut out	(0.1 steps)	VDC	32	36	60
Cut in diff.	(0.1 steps)	VDC	0.5	4.0	10.0

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
Remarks: Clearance between electronic unit and baseplate does not allow the snap-on option for mounting.			



Capacity (EN 12900 Household/CECOMAF) 53V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	31.4	36.6	47.2	65.5	87.0	103	112	143	178	195	219	267
3,100	42.9	49.1	62.1	84.8	112	132	144	181	224	246	275	333
3,800	55.0	62.4	78.3	106	139	165	179	224	277	303	337	408
4,400	64.3	72.8	91.1	124	162	191	208	261	322	352	392	472

Capacity (ASHRAE LBP) 53V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	40.1	46.3	59.3	81.8	108	129	140	177	222	243	273	334
3,100	54.0	61.6	77.6	106	139	164	178	225	279	306	342	416
3,800	68.7	77.9	97.4	132	173	204	222	279	345	377	421	509
4,400	80.0	90.5	113	153	201	237	257	323	400	437	488	589

Power consumption 53V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	40.8	44.1	50.1	58.5	66.0	70.4	72.5	78.5	83.9	86.1	88.7	93.1
3,100	46.5	50.1	57.0	66.9	76.5	82.6	85.7	94.7	103	107	112	121
3,800	58.2	62.2	70.0	81.7	93.7	102	106	119	132	137	145	159
4,400	72.4	76.7	85.3	98.8	113	122	128	143	160	167	177	196

Current consumption 53V DC, fan cooling F_1 **A**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	0.78	0.86	1.01	1.23	1.43	1.55	1.60	1.75	1.87	1.91	1.95	1.98
3,100	0.65	0.74	0.90	1.14	1.38	1.52	1.59	1.79	1.97	2.04	2.12	2.23
3,800	0.87	0.96	1.13	1.40	1.67	1.85	1.94	2.20	2.45	2.55	2.68	2.89
4,400	1.36	1.45	1.64	1.93	2.24	2.44	2.55	2.86	3.17	3.30	3.47	3.76

COP (EN 12900 Household/CECOMAF) 53V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	0.77	0.83	0.94	1.12	1.32	1.47	1.55	1.82	2.12	2.27	2.47	2.87
3,100	0.92	0.98	1.09	1.27	1.46	1.60	1.67	1.91	2.17	2.29	2.45	2.74
3,800	0.94	1.00	1.12	1.30	1.49	1.62	1.68	1.89	2.11	2.21	2.33	2.57
4,400	0.89	0.95	1.07	1.25	1.44	1.56	1.63	1.82	2.01	2.10	2.21	2.41

COP (ASHRAE LBP) 53V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	0.98	1.05	1.19	1.41	1.66	1.84	1.95	2.28	2.67	2.86	3.12	3.63
3,100	1.16	1.23	1.37	1.59	1.83	2.00	2.09	2.39	2.72	2.87	3.07	3.45
3,800	1.18	1.25	1.40	1.62	1.85	2.01	2.10	2.36	2.64	2.76	2.92	3.22
4,400	1.10	1.18	1.33	1.55	1.79	1.94	2.02	2.27	2.51	2.62	2.76	3.02

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Operational errors

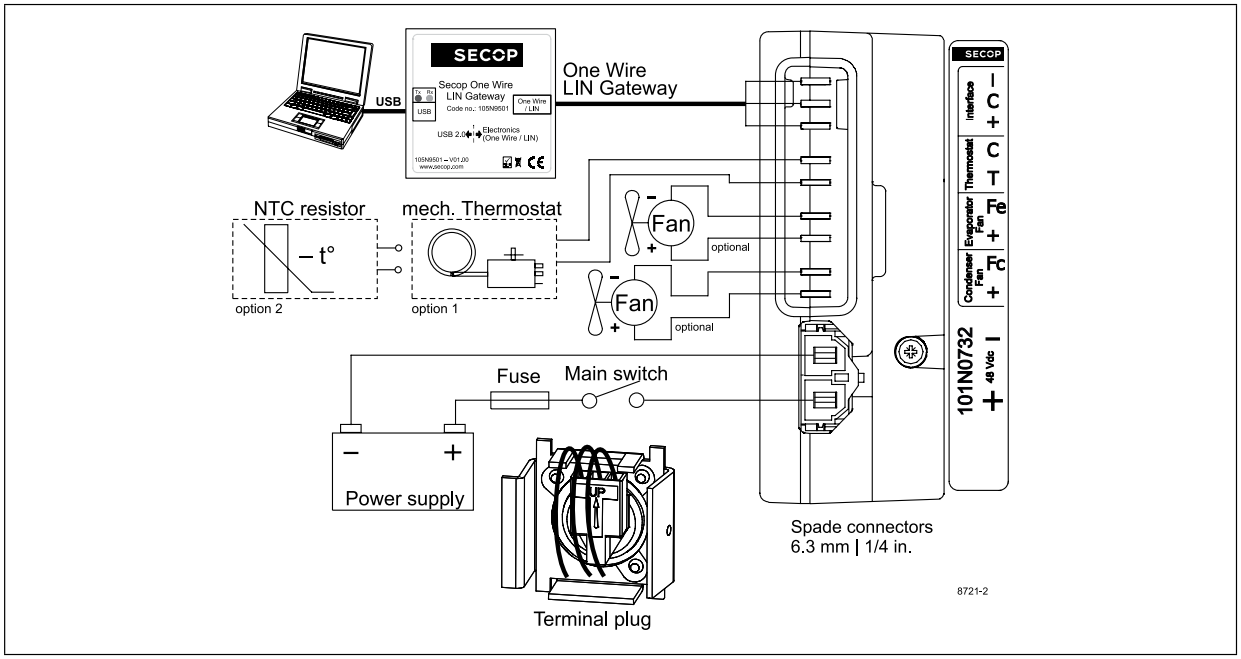
Error code	Error type Can be read out in the software **TOOL4COOL®**
6	**Thermostat failure** (If the NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
5	**Thermal cut-out of electronic unit** (If the refrigeration system has been too heavily loaded, or 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).
2	**Fan over-current cut-out** (The fan loads the electronic unit with more than $1.8A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

Accessories for BD250GH.2

Mounting		Code number
Bolt joint for one compressor	Ø: 16 mm	118-1917
Bolt joint in quantities	Ø: 16 mm	118-1918

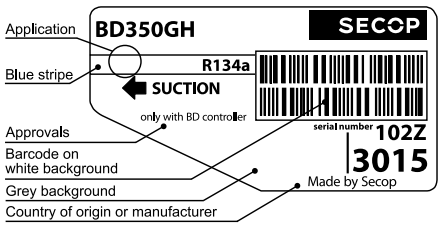
Electrical (cables, sensors, etc.)	Code number	
	Single pack	I - Pack
DC line cord, 900 mm	105N9542	105N9543, 36 pcs.
DC line cord, 2000 mm	105N9540	105N9541, 36 pcs.
DC line cord, 5000 mm	105N9538	105N9539, 36 pcs.
Temperature sensor 470 mm	105N9612	105N9613, 200 pcs.
Temperature sensor 1000 mm	105N9614	105N9615, 100 pcs.
Temperature sensor 1500 mm	105N9616	105N9617, 100 pcs.
One Wire/LIN gateway	105N9501	–
Comm. cable, 1500 mm	–	105N9545, 100 pcs.
Comm. cable, 3000 mm	–	105N9547, 50 pcs.

Not deliverable from Secop	
Slow-blow fuse	16A
Main switch	rated to min. 25A



BD350GH
Direct Current Compressor
R134a
12V DC - with 101N08xx Series Controllers

TOOL4COOL® Flexible control settings



General

Code number (without electronic units)	102Z3015
Compressor module	101N0800, 30 pcs: 101N0801
Application module	101N0820, 30 pcs: 101N0821
Alternative (one interface only): Electronic Unit (no fan connection/no twin option)	101N0830, 30 pcs: 101N0831
Approvals	–
Compressors on pallet	125

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-25 to 15
Voltage range	VDC	9.6 - 17
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	F_1	F_1	F_1
38°C	F_1	F_1	F_1
43°C	F_1	F_1	F_1
Remarks on application: - evaporator fan max. 200W - condenser fan max. 100W - starting ability: LST (low starting torque) only			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		Variable speed
Resistance, all 3 windings (25°C)	Ω	0.1

Design

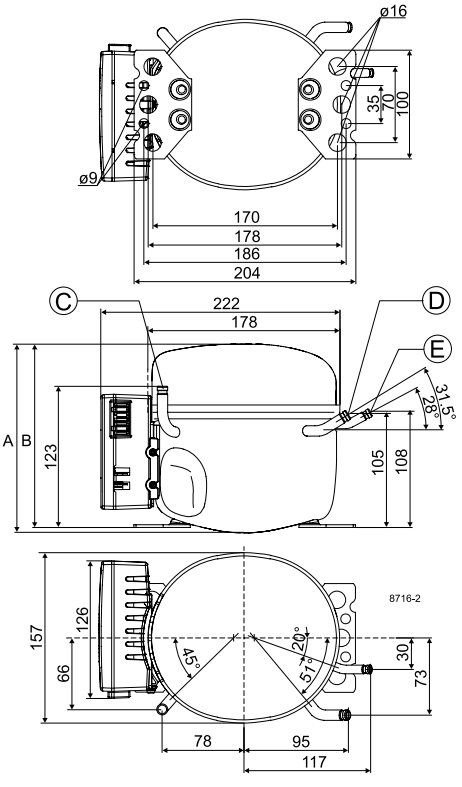
Displacement	cm^3	5.08
Oil quantity (type)	cm^3	280 (polyolester)
Maximum refrigerant charge	g	400
Free gas volume in compressor	cm^3	1690
Weight - Compressor/Electronic unit	kg	7.9 / 0.33 / 0.28 (101N820)

Battery protection settings

Voltage			Min. value	Default	Max. value
Cut out	(0.1 steps)	VDC	9.6	10.4	17
Cut in diff.	(0.1 steps)	VDC	0.5	1.3	10

Dimensions

Height	mm	A	173
		B	169
		B1	–
		B2	–
Suction connector	location/I.D. mm | angle	C	6.2 | 90°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. mm | angle	D	6.2 | 31.5°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. mm | angle	E	5.0 | 28°
	material | comment		Cu-plated steel | Al cap
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20



Capacity (EN 12900 Household/CECOMAF) 12V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	87.5	96.9	117	152	194	226	244	302	370	403	448	538
3,000	101	112	136	177	225	262	283	351	430	468	521	625
3,500	114	126	152	198	254	296	319	396	485	528	588	706
4,000	126	139	169	220	282	329	355	440	540	588	654	786

Capacity (ASHRAE LBP) 12V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	108	120	145	188.3	240	280	302	375	459	501	557	670
3,000	126	139	168	219	279	325	351	435	534	582	648	778
3,500	141	156	188	246	314	366	395	491	602	656	731	879
4,000	156	173	209	273	349	407	440	546	670	731	814	979

Power consumption 12V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	90.5	95.6	106	123	140	152	156	177	196	204	215	233
3,000	108	114	127	148	169	184	192	215	238	248	261	284
3,500	122	130	146	170	197	214	224	252	280	292	308	335
4,000	140	149	168	197	228	249	259	292	325	340	358	391

Current consumption 12V DC, fan cooling F_1 **A**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	7.71	8.15	9.03	10.45	11.93	12.95	13.48	15.06	16.65	17.36	18.25	19.82
3,000	8.99	9.52	10.60	12.32	14.12	15.35	16.00	17.92	19.86	20.71	21.79	23.70
3,500	10.46	11.10	12.39	14.47	16.65	18.13	18.91	21.23	23.57	24.60	25.90	28.21
4,000	11.70	12.46	13.98	16.41	18.97	20.72	21.63	24.35	27.10	28.31	29.84	32.55

COP (EN 12900 Household/CECOMAF) 12V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	0.97	1.01	1.10	1.24	1.38	1.48	1.54	1.71	1.89	1.97	2.09	2.30
3,000	0.94	0.98	1.07	1.20	1.33	1.43	1.48	1.63	1.81	1.89	1.99	2.20
3,500	0.93	0.97	1.04	1.16	1.29	1.38	1.43	1.57	1.73	1.81	1.91	2.10
4,000	0.90	0.93	1.01	1.12	1.24	1.32	1.37	1.51	1.66	1.73	1.83	2.01

COP (ASHRAE LBP) 12V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.20	1.26	1.37	1.54	1.72	1.85	1.92	2.13	2.36	2.47	2.61	2.89
3,000	1.17	1.22	1.33	1.49	1.66	1.78	1.84	2.04	2.26	2.36	2.50	2.76
3,500	1.15	1.20	1.30	1.45	1.61	1.72	1.78	1.96	2.17	2.26	2.39	2.64
4,000	1.11	1.16	1.25	1.39	1.54	1.65	1.70	1.88	2.08	2.17	2.29	2.53

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Operational errors

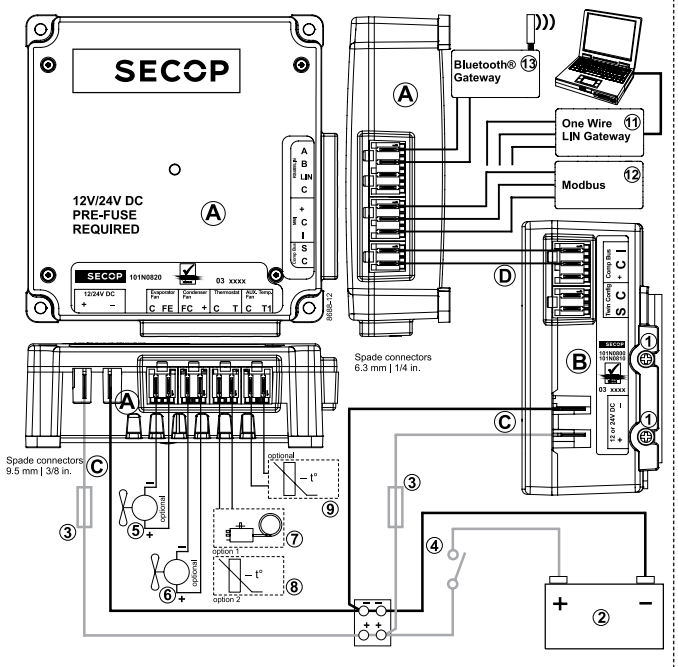
Error code	Error type Can be read out in the software **TOOL4COOL®**
6	**Thermostat failure** (If the NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
5	**Thermal cut-out of electronic unit** (If the refrigeration system has been too heavily loaded, or 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).
2	**Fan over-current cut-out** (The fan loads the electronic unit with too high current).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

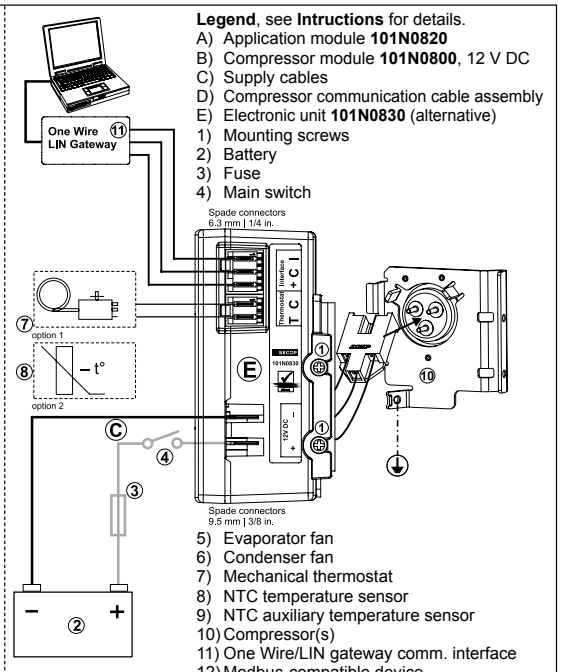
Accessories for BD350GH

Mounting		Code number
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

Electrical (cables, sensors, etc.)	Code number	
	Single pack	I - Pack
One Wire/LIN gateway	105N9501	–
communication cable	105N9524	–
Bluetooth® gateway	105N9502	–
communication cable	105N9525	–
Temperature sensor 470 mm	105N9612	105N9613, 200 pcs.
Temperature sensor 1000 mm	105N9614	105N9615, 100 pcs.
Temperature sensor 1500 mm	105N9616	105N9617, 100 pcs.
Comm. cable, 1500 mm	–	105N9553, 80 pcs.
Comm. cable, 3000 mm	–	105N9554, 45 pcs.
Display cable, 1500 mm	–	105N9557, 65 pcs.
Display cable, 3000 mm	–	105N9558, 35 pcs.

Not deliverable from Secop	
Slow-blow fuse compressor module	60A
Slow-blow fuse application module	30A
Main switch	rated to min. 100A

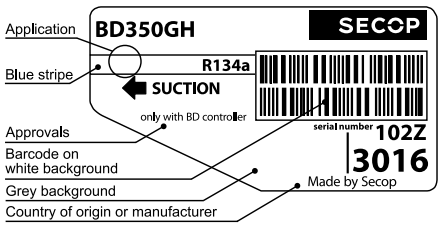




Legend, see **Intructions** for details.
A) Application module **101N0820**
B) Compressor module **101N0800**, 12 V DC
C) Supply cables
D) Compressor communication cable assembly
E) Electronic unit **101N0830** (alternative)
1) Mounting screws
2) Battery
3) Fuse
4) Main switch
5) Evaporator fan
6) Condenser fan
7) Mechanical thermostat
8) NTC temperature sensor
9) NTC auxiliary temperature sensor
10) Compressor(s)
11) One Wire/LIN gateway comm. interface
12) Modbus-compatible device
13) Bluetooth® gateway comm. interface

BD350GH
Direct Current Compressor
R134a
24V DC - with 101N07xx Series Controllers

TOOL4COOL® Flexible control settings



General

Code number (without electronic units)	102Z3016
Electronic unit	101N0715, 36 pcs: 101N0714
Approvals	–
Compressors on pallet	125

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-25 to 15
Voltage range	VDC	19 - 31.5
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Cooling requirements

Application	LBP	MBP	HBP
32°C	F_1	F_1	F_1
38°C	F_1	F_1	F_1
43°C	F_1	F_1	F_1
Remarks on application: - evaporator fan max. 60W - condenser fan max. 40W - starting ability: LST (low starting torque) only			

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	0.2

Design

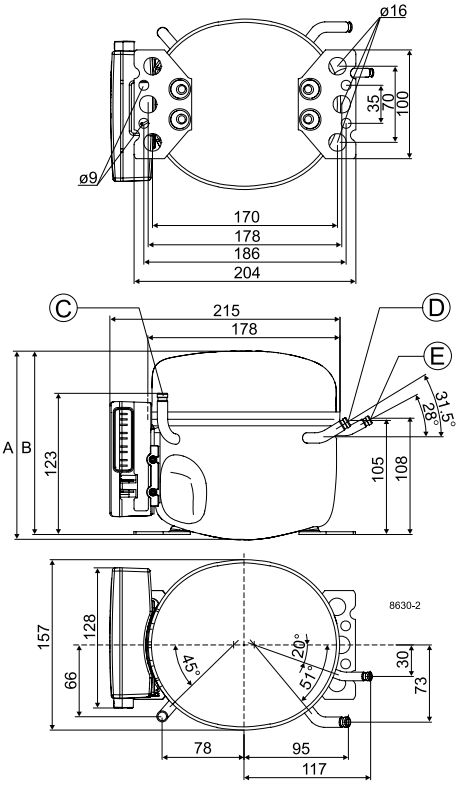
Displacement	cm^3	5.08
Oil quantity (type)	cm^3	280 (polyolester)
Maximum refrigerant charge	g	400
Free gas volume in compressor	cm^3	1690
Weight - Compressor/Electronic unit	kg	7.9/0.27

Battery protection settings

Voltage			Min. value	Default	Max. value
Cut out	(0.1 steps)	VDC	19.0	21.1	27.0
Cut in diff.	(0.1 steps)	VDC	0.5	3.9	10.0

Dimensions

Height	mm	A	173
		B	169
		B1	–
		B2	–
Suction connector	location/I.D. mm | angle	C	6.2 | 90°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. mm | angle	D	6.2 | 31.5°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. mm | angle	E	5.0 | 28°
	material | comment		Cu-plated steel | Al cap
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20
Remarks			



Capacity (EN 12900 Household/CECOMAF) 24V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	84.7	93.7	113	147	188	219	236	292	358	390	434	520
3,000	101	112	136	176	225	262	283	351	430	468	521	625
3,500	114	126	152	198	254	296	319	396	485	528	588	706
4,000	126	139	169	220	282	329	355	440	540	588	654	786

Capacity (ASHRAE LBP) 24V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	105	116	140	182	233	271	292	363	445	485	539	648
3,000	126	139	168	219	279	325	351	435	534	582	648	779
3,500	141	156	188	246	314	366	395	491	602	656	731	879
4,000	156	173	209	273	349	407	440	546	670	731	814	979

Power consumption 24V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	77.4	81.8	90.8	105	120	130	136	152	168	175	184	200
3,000	95.5	101	112	129	148	160	167	186	206	215	226	245
3,500	109	115	128	149	171	186	194	217	241	251	264	288
4,000	122	129	144	169	194	212	221	248	276	288	303	330

Current consumption 24V DC, fan cooling F_1 **A**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	3.23	3.41	3.78	4.38	5.01	5.43	5.66	6.32	7.00	7.29	7.67	8.33
3,000	3.98	4.20	4.66	5.39	6.15	6.67	6.95	7.76	8.58	8.94	9.40	10.21
3,500	4.52	4.79	5.34	6.21	7.12	7.75	8.08	9.05	10.03	10.46	11.01	11.98
4,000	5.07	5.38	6.02	7.03	8.10	8.82	9.20	10.34	11.48	11.99	12.63	13.75

COP (EN 12900 Household/CECOMAF) 24V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.09	1.15	1.25	1.40	1.56	1.68	1.74	1.93	2.13	2.23	2.36	2.60
3,000	1.06	1.11	1.21	1.37	1.53	1.64	1.70	1.88	2.09	2.18	2.31	2.55
3,500	1.05	1.09	1.19	1.33	1.48	1.59	1.65	1.82	2.01	2.10	2.22	2.45
4,000	1.03	1.08	1.17	1.31	1.45	1.55	1.61	1.77	1.96	2.05	2.16	2.38

COP (ASHRAE LBP) 24V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.36	1.42	1.55	1.74	1.95	2.09	2.17	2.40	2.67	2.79	2.95	3.27
3,000	1.32	1.38	1.51	1.70	1.90	2.04	2.12	2.35	2.61	2.73	2.89	3.20
3,500	1.30	1.36	1.48	1.66	1.85	1.98	2.05	2.27	2.52	2.63	2.79	3.08
4,000	1.28	1.34	1.45	1.62	1.81	1.93	2.00	2.22	2.45	2.56	2.71	2.99

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Operational errors

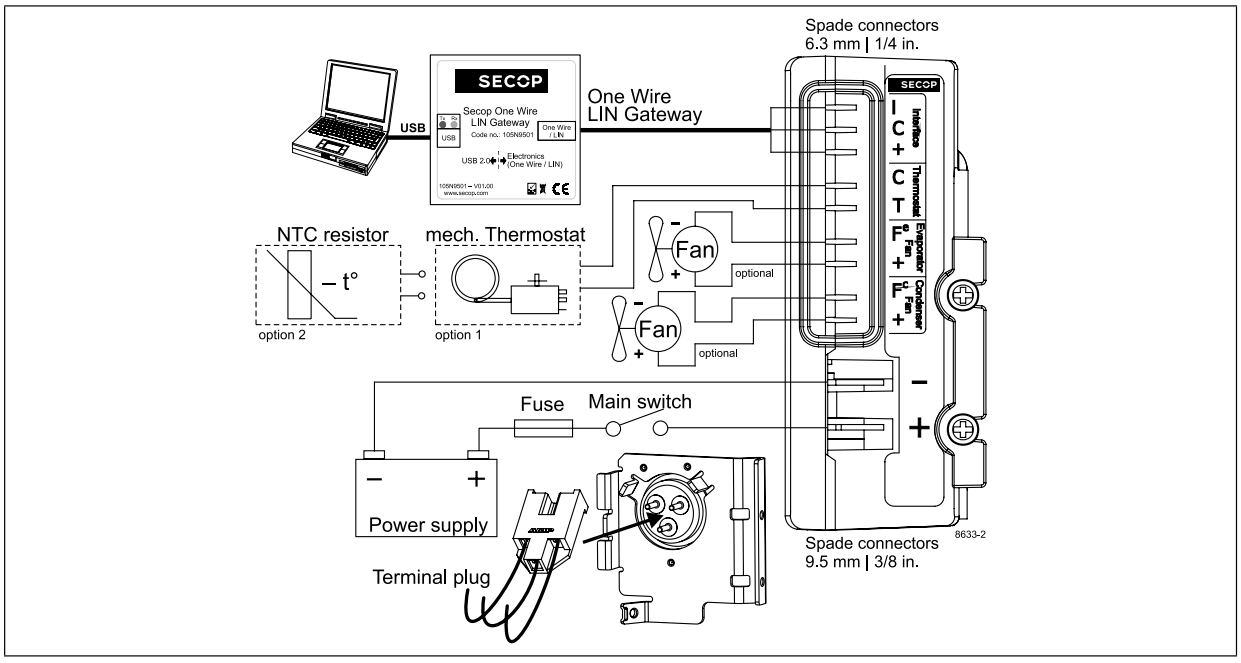
Error code	Error type Can be read out in the software **TOOL4COOL®**
6	**Thermostat failure** (If the NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
5	**Thermal cut-out of electronic unit** (If the refrigeration system has been too heavily loaded, or 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.
2	**Fan over-current cut-out** (The evaporator fan loads the electronic unit with more than $1.8A_{peak}$ / the condenser fan loads the electronic unit with more than $2.5A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

Accessories for BD350GH

Mounting		Code number
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

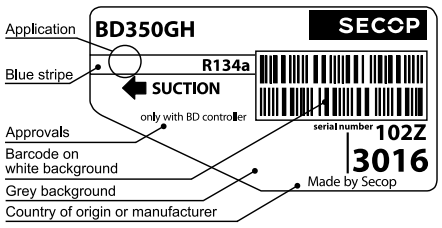
Electrical (cables, sensors, etc.)	Code number	
	Single pack	I - Pack
Temperature sensor 470 mm	105N9612	105N9613, 200 pcs.
Temperature sensor 1000 mm	105N9614	105N9615, 100 pcs.
Temperature sensor 1500 mm	105N9616	105N9617, 100 pcs.
One Wire/LIN gateway	105N9501	–
Comm. cable, 1500 mm	–	105N9545, 100 pcs.
Comm. cable, 3000 mm	–	105N9547, 50 pcs.

Not deliverable from Secop	
Slow-blow fuse	30A
Main switch	rated to min. 50A



BD350GH
Direct Current Compressor
R134a
24V DC - with 101N08xx Series Controllers

TOOL4COOL® Flexible control settings



General

Code number (without electronic units)	102Z3016
Compressor module	101N0810, 30 pcs: 101N0811
Application module	101N0820, 30 pcs: 101N0821
Approvals	–
Compressors on pallet	125

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-25 to 15
Voltage range	VDC	19 - 31.5
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Cooling requirements

Application	LBP	MBP	HBP
32°C	F_1	F_1	F_1
38°C	F_1	F_1	F_1
43°C	F_1	F_1	F_1
Remarks on application: - evaporator fan max. 200W - condenser fan max. 100W - starting ability: LST (low starting torque) only			

Motor

Motor type		Variable speed
Resistance, all 3 windings (25°C)	Ω	0.1

Design

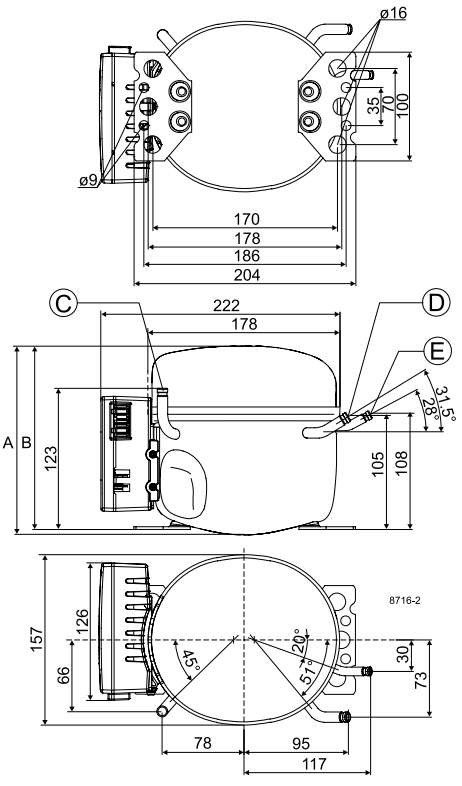
Displacement	cm^3	5.08
Oil quantity (type)	cm^3	280 (polyolester)
Maximum refrigerant charge	g	400
Free gas volume in compressor	cm^3	1690
Weight - Compressor/Electronic unit	kg	7.9 / 0.25 / 0.28 (101N820)

Battery protection settings

Voltage			Min. value	Default	Max. value
Cut out	(0.1 steps)	VDC	19.0	21.1	27.0
Cut in diff.	(0.1 steps)	VDC	0.5	3.9	10.0

Dimensions

Height	mm	A	173
		B	169
		B1	–
		B2	–
Suction connector	location/I.D. mm | angle	C	6.2 | 90°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. mm | angle	D	6.2 | 31.5°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. mm | angle	E	5.0 | 28°
	material | comment		Cu-plated steel | Al cap
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20



Capacity (EN 12900 Household/CECOMAF) 24V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	84.7	93.7	113	147	188	219	236	292	358	390	434	520
3,000	101	112	136	176	225	262	283	351	430	468	521	625
3,500	114	126	152	198	254	296	319	396	485	528	588	706
4,000	126	139	169	220	282	329	355	440	540	588	654	786

Capacity (ASHRAE LBP) 24V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	105	116	140	182	233	271	292	363	445	485	539	648
3,000	126	139	168	219	279	325	351	435	534	582	648	779
3,500	141	156	188	246	314	366	395	491	602	656	731	879
4,000	156	173	209	273	349	407	440	546	670	731	814	979

Power consumption 24V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	77.4	81.8	90.8	105	120	130	136	152	168	175	184	200
3,000	95.5	101	112	129	148	160	167	186	206	215	226	245
3,500	109	115	128	149	171	186	194	217	241	251	264	288
4,000	122	129	144	169	194	212	221	248	276	288	303	330

Current consumption 24V DC, fan cooling F_1 **A**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	3.23	3.41	3.78	4.38	5.01	5.43	5.66	6.32	7.00	7.29	7.67	8.33
3,000	3.98	4.20	4.66	5.39	6.15	6.67	6.95	7.76	8.58	8.94	9.40	10.21
3,500	4.52	4.79	5.34	6.21	7.12	7.75	8.08	9.05	10.03	10.46	11.01	11.98
4,000	5.07	5.38	6.02	7.03	8.10	8.82	9.20	10.34	11.48	11.99	12.63	13.75

COP (EN 12900 Household/CECOMAF) 24V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.09	1.15	1.25	1.40	1.56	1.68	1.74	1.93	2.13	2.23	2.36	2.60
3,000	1.06	1.11	1.21	1.37	1.53	1.64	1.70	1.88	2.09	2.18	2.31	2.55
3,500	1.05	1.09	1.19	1.33	1.48	1.59	1.65	1.82	2.01	2.10	2.22	2.45
4,000	1.03	1.08	1.17	1.31	1.45	1.55	1.61	1.77	1.96	2.05	2.16	2.38

COP (ASHRAE LBP) 24V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.36	1.42	1.55	1.74	1.95	2.09	2.17	2.40	2.67	2.79	2.95	3.27
3,000	1.32	1.38	1.51	1.70	1.90	2.04	2.12	2.35	2.61	2.73	2.89	3.20
3,500	1.30	1.36	1.48	1.66	1.85	1.98	2.05	2.27	2.52	2.63	2.79	3.08
4,000	1.28	1.34	1.45	1.62	1.81	1.93	2.00	2.22	2.45	2.56	2.71	2.99

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Operational errors

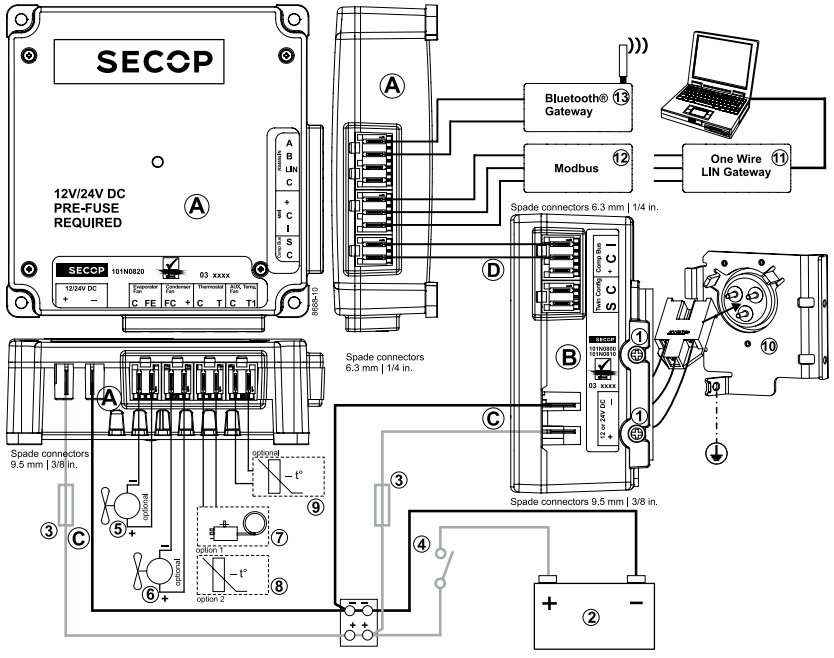
Error code	Error type Can be read out in the software **TOOL4COOL®**
6	**Thermostat failure** (If the NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
5	**Thermal cut-out of electronic unit** (If the refrigeration system has been too heavily loaded, or 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).
2	**Fan over-current cut-out** (The fan loads the electronic unit with too high current).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

Accessories for BD350GH

Mounting		Code number
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

Electrical (cables, sensors, etc.)	Code number	
	Single pack	I - Pack
One Wire/LIN gateway communication cable	105N9501 105N9524	– –
Bluetooth® gateway communication cable	105N9502 105N9525	– –
Temperature sensor 470 mm	105N9612	105N9613, 200 pcs.
Temperature sensor 1000 mm	105N9614	105N9615, 100 pcs.
Temperature sensor 1500 mm	105N9616	105N9617, 100 pcs.
Comm. cable, 1500 mm	–	105N9553, 80 pcs.
Comm. cable, 3000 mm	–	105N9554, 45 pcs.
Display cable, 1500 mm	–	105N9557, 65 pcs.
Display cable, 3000 mm	–	105N9558, 35 pcs.

Not deliverable from Secop	
Slow-blow fuse compressor module	60A
Slow-blow fuse application module	30A
Main switch	rated to min. 100A



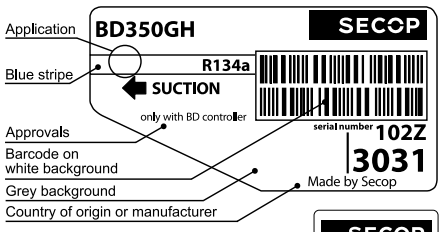
Legend, see **Intructions** for details.

A) Application module **101N0820**
B) Compressor module **101N0810**, 24 V DC
C) Supply cables
D) Compressor communication cable assembly

1) Mounting screws
2) Battery
3) Fuse
4) Main switch
5) Evaporator fan
6) Condenser fan
7) Mechanical thermostat
8) NTC temperature sensor
9) NTC auxiliary temperature sensor
10) Compressor(s)
11) One Wire/LIN gateway comm. interface
12) Modbus-compatible device
13) Bluetooth® gateway comm. interface

BD350GH
Direct Current Compressor
R134a
48-56V DC

TOOL4COOL® Flexible control settings



Approval mark

General

Code number (without electronic units)	102Z3031
Electronic unit - Telecom	101N0720, 36 pcs: 101N0721
Approvals	UL, CCC
Compressors on pallet	125

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-25 to 15
Voltage range	VDC	32 - 60
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	F_1	F_1	F_1
38°C	F_1	F_1	F_1
43°C	F_1	F_1	F_1
Remarks on application: - evaporator fan max. 60W - condenser fan max. 40W - starting ability: LST (low starting torque) only			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	0.4

Design

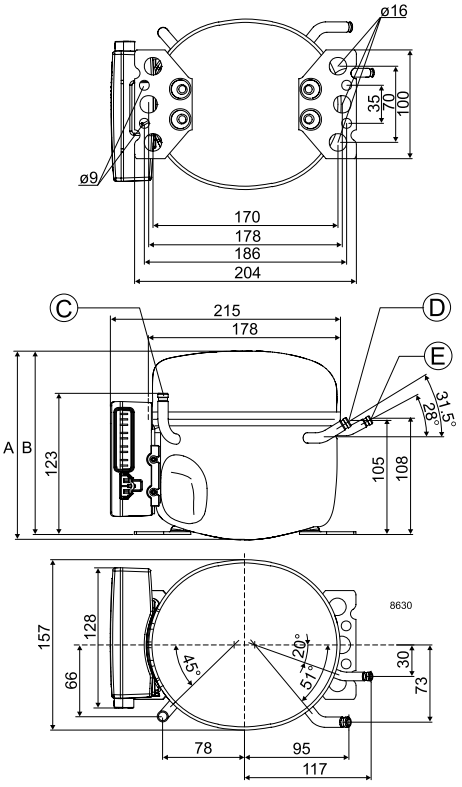
Displacement	cm^3	5.08
Oil quantity (type)	cm^3	280 (polyolester)
Maximum refrigerant charge	g	400
Free gas volume in compressor	cm^3	1690
Weight - Compressor/Electronic unit	kg	7.9/0.27

Battery protection settings

Voltage			Min. value	Default	Max. value
Cut out	(0.1 steps)	VDC	32	36	60
Cut in diff.	(0.1 steps)	VDC	0.5	4.0	10.0

Dimensions

Height	mm	A	173
		B	169
		B1	–
		B2	–
Suction connector	location/I.D. mm | angle	C	6.2 | 90°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. mm | angle	D	6.2 | 31.5°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. mm | angle	E	5.0 | 28°
	material | comment		Cu-plated steel | Al cap
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20
Remarks			



Capacity (EN 12900 Household/CECOMAF) 56V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	84,7	93,7	113	147	188	219	236	292	358	390	434	520
3,000	101	112	135	176	224	261	282	349	428	466	518	622
3,500	112	125	151	196	251	293	316	392	480	523	582	698
4,000	121	135	164	216	277	324	350	436	535	584	650	781

Capacity (ASHRAE LBP) 56V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	105	116	140	182	233	271	292	363	444	484	539	648
3,000	125	138	167	217	278	324	349	433	531	579	644	775
3,500	139	154	186	243	311	362	391	486	596	650	723	870
4,000	150	167	203	267	343	401	434	540	664	725	808	973

Power consumption 56V DC, fan cooling F_1 **watt**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	85.2	89.6	98.3	112	127	137	142	158	174	181	190	205
3,000	95.0	100	111	129	147	159	166	185	205	214	225	244
3,500	107	114	127	147	169	184	192	215	238	249	262	285
4,000	131	139	155	181	208	226	236	265	294	307	323	352

Current consumption 56V DC, fan cooling F_1 **A**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.52	1.60	1.76	2.01	2.27	2.45	2.54	2.82	3.11	3.23	3.39	3.67
3,000	1.70	1.79	1.99	2.30	2.62	2.85	2.96	3.31	3.66	3.81	4.01	4.35
3,500	1.92	2.03	2.26	2.63	3.02	3.29	3.43	3.84	4.26	4.44	4.67	5.08
4,000	2.34	2.48	2.77	3.23	3.71	4.04	4.22	4.73	5.25	5.48	5.77	6.28

COP (EN 12900 Household/CECOMAF) 56V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	0.99	1.05	1.15	1.31	1.48	1.59	1.66	1.85	2.06	2.16	2.29	2.53
3,000	1.06	1.11	1.21	1.37	1.53	1.64	1.70	1.88	2.09	2.18	2.31	2.55
3,500	1.05	1.09	1.19	1.33	1.48	1.59	1.65	1.82	2.01	2.10	2.22	2.45
4,000	0.92	0.97	1.06	1.19	1.33	1.43	1.48	1.64	1.82	1.90	2.01	2.22

COP (ASHRAE LBP) 56V DC, fan cooling F_1 **W/W**

rpm \ °C	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15
2,500	1.23	1.30	1.43	1.63	1.84	1.98	2.06	2.31	2.57	2.70	2.86	3.18
3,000	1.32	1.38	1.51	1.70	1.90	2.04	2.12	2.35	2.61	2.73	2.89	3.20
3,500	1.30	1.36	1.48	1.66	1.85	1.98	2.05	2.27	2.52	2.63	2.79	3.08
4,000	1.15	1.21	1.31	1.48	1.66	1.78	1.85	2.05	2.28	2.38	2.52	2.79

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Operational errors

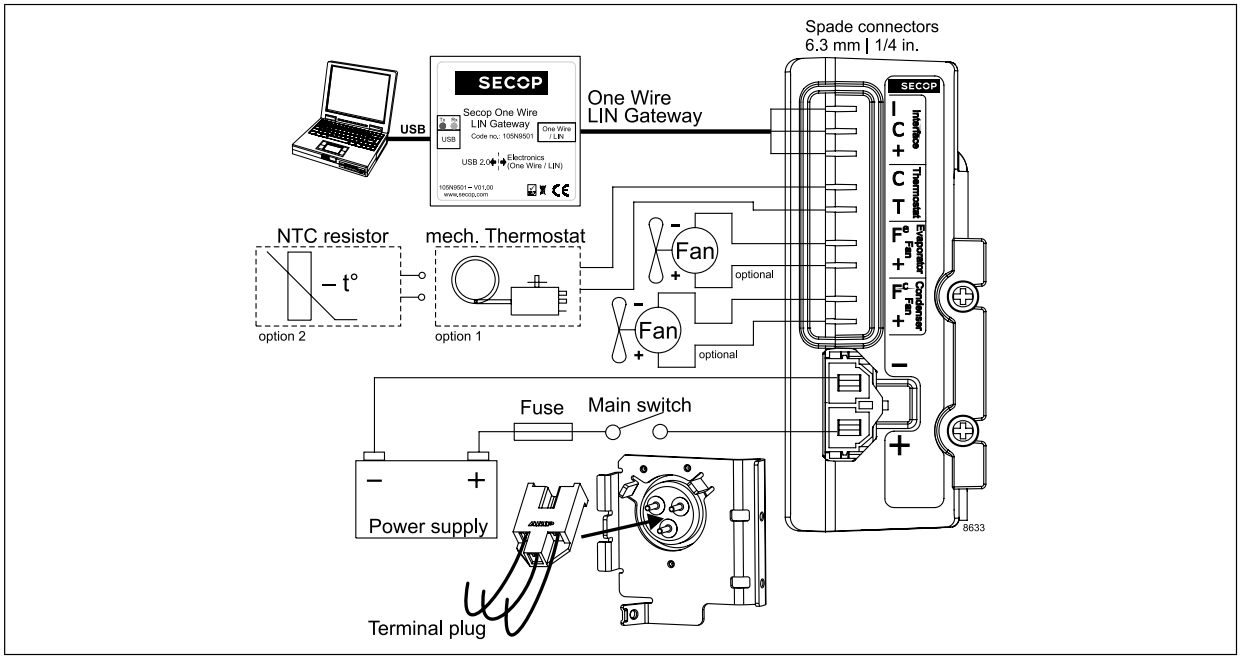
Error code	Error type Can be read out in the software **TOOL4COOL®**
6	**Thermostat failure** (If the NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
5	**Thermal cut-out of electronic unit** (If the refrigeration system has been too heavily loaded, or 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.
2	**Fan over-current cut-out** (The fan loads the electronic unit with more than $1.8A_{peak}$).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

Accessories for BD350GH

Mounting		Code number
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

Electrical (cables, sensors, etc.)	Code number	
	Single pack	I - Pack
DC line cord, 900 mm	105N9542	105N9543, 36 pcs.
DC line cord, 2000 mm	105N9540	105N9541, 36 pcs.
DC line cord, 5000 mm	105N9538	105N9539, 36 pcs.
Temperature sensor 470 mm	105N9612	105N9613, 200 pcs.
Temperature sensor 1000 mm	105N9614	105N9615, 100 pcs.
Temperature sensor 1500 mm	105N9616	105N9617, 100 pcs.
One Wire/LIN gateway	105N9501	–
Comm. cable, 1500 mm	–	105N9545, 100 pcs.
Comm. cable, 3000 mm	–	105N9547, 50 pcs.

Not deliverable from Secop	
Slow-blow fuse	16A
Main switch	rated to min. 25A



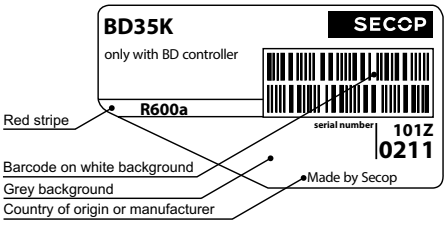
BD35K
Direct Current Compressor R600a,12/24V DC, 10-45V DC Solar, & 100-240V AC 50/60Hz

TOOL4COOL® Flexible control settings

General

Code number (without electronic units)	101Z0211	**Approvals**
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	CB / VDE
Electronic unit 10-45V DC - Solar	101N0420, 30 pcs: 101N0421	CB / VDE
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	CB / VDE
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	CB / VDE
Compressors on pallet	150	

Yellow warning label



Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 0 (10)
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50/60
Voltage range for solar applications	VDC	10 - 45
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: Fan cooling F1 depending on application and speed.			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

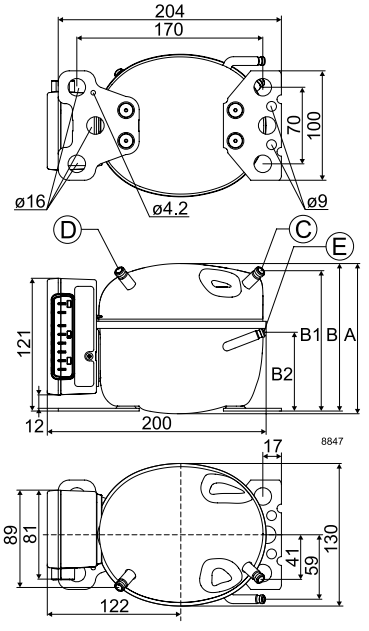
Displacement	cm^3	3.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	120
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3 / 0.19 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	13.1	20.9	23.8	29.8	39.7	51.1	64.1	79.1	96.2	104	116	
2,500	16.8	25.2	28.4	35.2	47.0	60.9	77.2	96.0	118	128		
3,000	21.1	30.6	34.3	42.2	56.2	72.7	92.2	115				
3,500	25.0	36.0	40.2	49.1	65.0	83.8	106					

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	16.0	25.6	29.1	36.3	48.5	62.4	78.4	97	118	128	142	
2,500	20.7	30.9	34.8	43.1	57.5	74.5	94.3	117	144	157		
3,000	25.8	37.4	42.0	51.6	68.6	88.9	113	140				
3,500	30.6	43.9	49.0	60.0	79.2	102	129					

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	17.5	21.5	22.8	25.4	29.1	32.8	36.5	40.2	44.1	45.8	48.0	
2,500	22.9	27.2	28.6	31.3	35.4	39.5	43.6	48.0	52.5	54.5		
3,000	28.9	34.6	36.4	40.0	45.4	50.9	56.5	62.5				
3,500	33.7	41.1	43.5	47.8	54.1	60.4	67.1					

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.48	1.80	1.91	2.12	2.43	2.74	3.04	3.35	3.65	3.79	3.97	
2,500	1.90	2.28	2.40	2.63	2.98	3.32	3.67	4.02	4.40	4.57		
3,000	2.36	2.87	3.03	3.34	3.79	4.23	4.69	5.16				
3,500	2.81	3.42	3.61	3.98	4.52	5.04	5.58					

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.75	0.97	1.04	1.17	1.36	1.56	1.76	1.97	2.18	2.28	2.41	
2,500	0.73	0.93	1.00	1.12	1.33	1.54	1.76	1.99	2.23	2.34		
3,000	0.73	0.89	0.94	1.05	1.24	1.43	1.63	1.84				
3,500	0.74	0.87	0.92	1.03	1.20	1.39	1.58					

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.91	1.19	1.27	1.43	1.67	1.91	2.15	2.41	2.69	2.81	2.97	
2,500	0.90	1.14	1.22	1.38	1.63	1.89	2.16	2.45	2.74	2.87		
3,000	0.89	1.08	1.15	1.29	1.51	1.75	2.00	2.26				
3,500	0.90	1.07	1.13	1.26	1.47	1.70	1.94					

Test conditions with electronic units	101N0212 101N0650	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature		55°C	54.4°C
Ambient temperature		32°C	32°C
Suction gas temperature		32°C	32°C
Liquid temperature		no subcooling	32°C

Accessories for BD35K			Code number
Bolt joint for one comp.		Ø:16 mm	118-1917
Bolt joint in quantities		Ø:16 mm	118-1918
Snap-on in quantities		Ø:16 mm	118-1919
Remote kit (without cable)			105N9210
One Wire/LIN gateway			105N9501
DC usage:	Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
	Main switch	min. 20A	
AC usage:	Fuse, 100-240V		
	Main switch	min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 101N0420 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[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

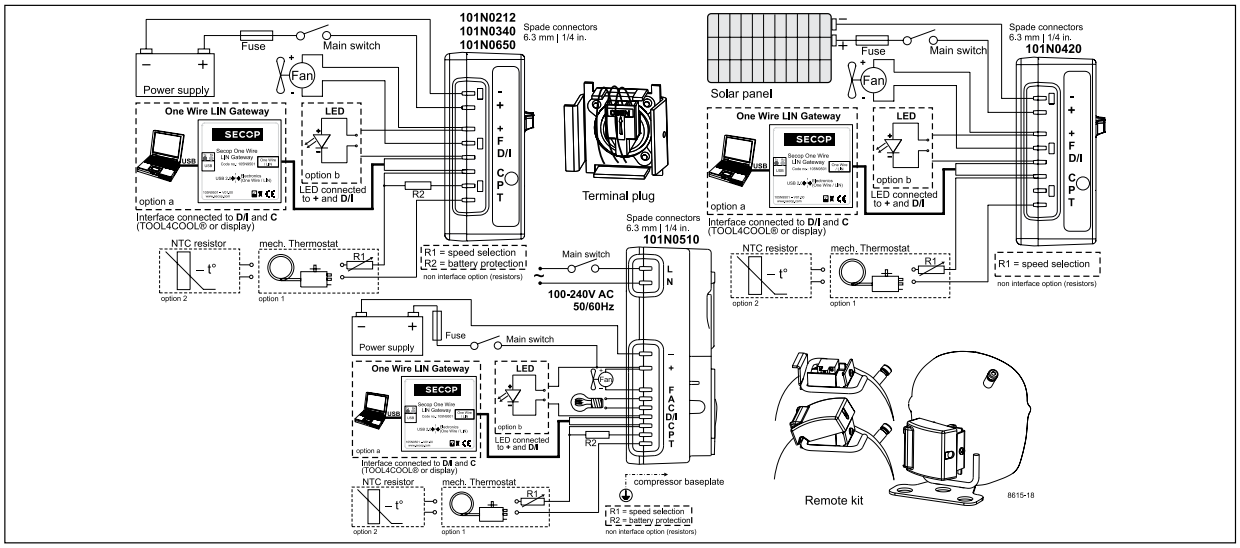
*Length between battery and electronic unit

Wire dimensions AC

Cross section min. 0.75 mm² or AWG 18

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).



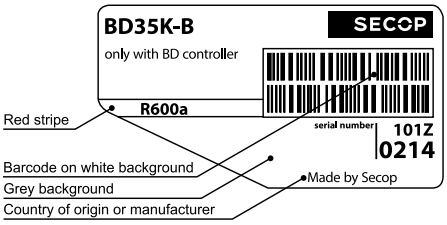
BD35K-B
Direct Current Compressor R600a,12/24V DC, 10-45V DC Solar, & 100-240V AC 50/60Hz

TOOL4COOL® Flexible control settings

General

Code number (without electronic units)	101Z0214	**Approvals**
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	CB / VDE
Electronic unit 10-45V DC - Solar	101N0420, 30 pcs: 101N0421	CB / VDE
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	CB / VDE
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	CB / VDE
Compressors on pallet	150	

Yellow warning label



Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 0 (10)
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50/60
Voltage range for solar applications	VDC	10 - 45
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application: Fan cooling F1 depending on application and speed. **Special version of the BD35K optimized for rough vehicle motions, especially in buses or other heavy duty applications.**			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

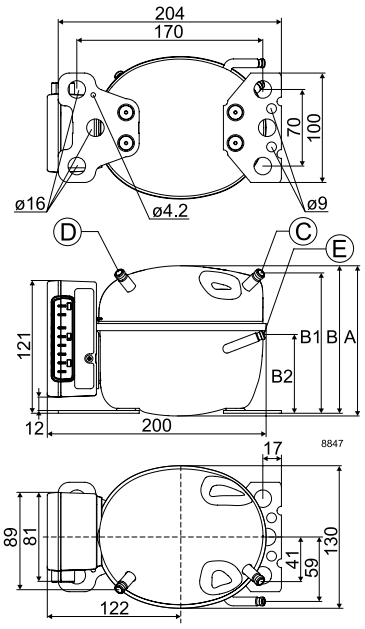
Displacement	cm^3	3.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	120
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3 / 0.19 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	13.1	20.9	23.8	29.8	39.7	51.1	64.1	79.1	96.2	104	116	
2,500	16.8	25.2	28.4	35.2	47.0	60.9	77.2	96.0	118	128		
3,000	21.1	30.6	34.3	42.2	56.2	72.7	92.2	115				
3,500	25.0	36.0	40.2	49.1	65.0	83.8	106					

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	16.0	25.6	29.1	36.3	48.5	62.4	78.4	97	118	128	142	
2,500	20.7	30.9	34.8	43.1	57.5	74.5	94.3	117	144	157		
3,000	25.8	37.4	42.0	51.6	68.6	88.9	113	140				
3,500	30.6	43.9	49.0	60.0	79.2	102	129					

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	17.5	21.5	22.8	25.4	29.1	32.8	36.5	40.2	44.1	45.8	48.0	
2,500	22.9	27.2	28.6	31.3	35.4	39.5	43.6	48.0	52.5	54.5		
3,000	28.9	34.6	36.4	40.0	45.4	50.9	56.5	62.5				
3,500	33.7	41.1	43.5	47.8	54.1	60.4	67.1					

Current consumption (for 24V applications the following must be halfed) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	1.48	1.80	1.91	2.12	2.43	2.74	3.04	3.35	3.65	3.79	3.97	
2,500	1.90	2.28	2.40	2.63	2.98	3.32	3.67	4.02	4.40	4.57		
3,000	2.36	2.87	3.03	3.34	3.79	4.23	4.69	5.16				
3,500	2.81	3.42	3.61	3.98	4.52	5.04	5.58					

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.75	0.97	1.04	1.17	1.36	1.56	1.76	1.97	2.18	2.28	2.41	
2,500	0.73	0.93	1.00	1.12	1.33	1.54	1.76	1.99	2.23	2.34		
3,000	0.73	0.89	0.94	1.05	1.24	1.43	1.63	1.84				
3,500	0.74	0.87	0.92	1.03	1.20	1.39	1.58					

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,000	0.91	1.19	1.27	1.43	1.67	1.91	2.15	2.41	2.69	2.81	2.97	
2,500	0.90	1.14	1.22	1.38	1.63	1.89	2.16	2.45	2.74	2.87		
3,000	0.89	1.08	1.15	1.29	1.51	1.75	2.00	2.26				
3,500	0.90	1.07	1.13	1.26	1.47	1.70	1.94					

Test conditions with electronic units	**101N0212 101N0650**	**EN 12900/CECOMAF**	**ASHRAE LBP**
Condensing temperature		55°C	54.4°C
Ambient temperature		32°C	32°C
Suction gas temperature		32°C	32°C
Liquid temperature		no subcooling	32°C

Accessories for BD35K-B		**Code number**
Bolt joint for one comp.	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
DC usage: Automobile fuse, DIN 7258	12V: 15A | 24V: 7.5 A	Not deliverable from Secop
DC usage: Main switch	min. 20A	
AC usage: Fuse, 100-240V		
AC usage: Main switch	min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 101N0420 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

Size Cross section [mm²]	**AWG** [Gauge]	**Max. length* 12V operation** [m]	[ft.]	**Max. length* 24V operation** [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

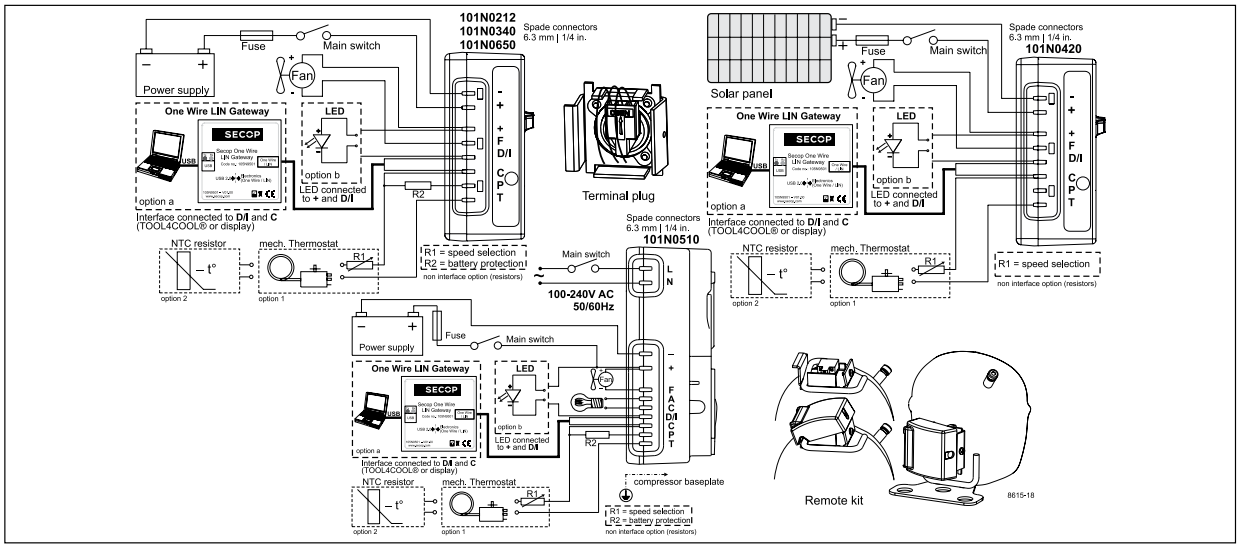
*Length between battery and electronic unit

Wire dimensions AC

Cross section min. 0.75 mm² or AWG 18

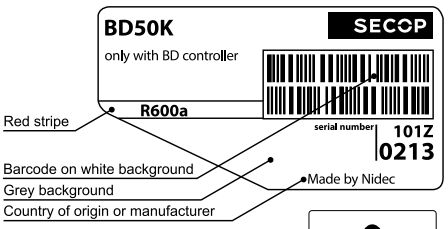
Operational errors

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).



BD50K
Direct Current Compressor
R600a
12/24V DC

TOOL4COOL® Flexible control settings



Yellow warning label

General

Code number (without electronic units)	101Z0213
Electronic unit 12/24V DC - High Speed	101N0390, 30 pcs: 101N0391
Compressors on pallet	150

Application

Application		LBP/MBP/HBP
Evaporating temperature	°C	-30 to 10
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Max. condensing temperature continuous (short)	°C	60 (70)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	S
38°C	S	S	S
43°C	S	S	S
Remarks on application:			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

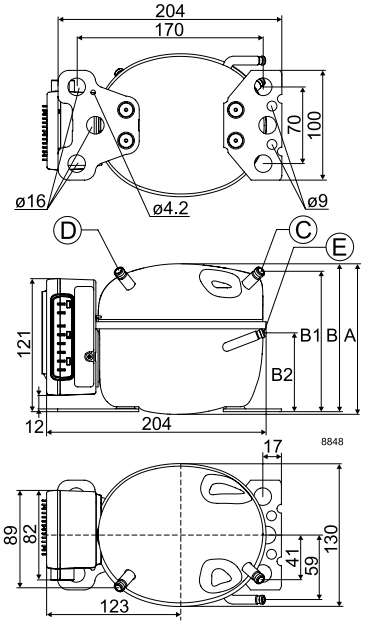
Displacement	cm^3	3.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	120
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.4 / 0.32

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 24V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	16.9	23.8	26.6	32.7	43.8	57.2	73.1	91.7	113	123	137	
3,100	21.3	29.9	33.4	41.1	55.0	71.9	91.9	115	142	155	173	
3,800	25.9	36.4	40.7	50.1	67.0	87.6	112	140	173	189	210	
4,400	29.9	42.0	46.9	57.7	77.3	101	129	162	199	218	242	

Capacity (ASHRAE LBP) 24V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	20.6	29.0	32.4	39.9	53.4	69.8	89.3	112	138	151	168	
3,100	25.9	36.4	40.7	50.1	67.1	87.7	112	141	174	189	211	
3,800	31.5	44.4	49.6	61.1	81.8	107	137	171	211	231	257	
4,400	36.4	51.2	57.2	70.4	94.3	123	158	198	244	266	296	

Power consumption 24V DC, static cooling **watt**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	24.9	26.8	27.6	29.3	32.4	35.8	39.6	43.6	47.6	49.4	51.7	
3,100	32.4	35.5	36.8	39.6	44.4	49.8	55.6	61.6	67.6	70.2	73.5	
3,800	37.4	43.1	45.2	49.5	56.6	64.1	71.9	79.6	87.3	90.5	94.6	
4,400	41.6	50.0	53.0	58.8	67.7	76.7	85.7	94.4	103	107	111	

Current consumption (for 12V applications the following must be doubled) **A**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	0.6	0.8	0.8	1.0	1.2	1.4	1.7	1.9	2.2	2.2	2.4	
3,100	0.8	1.0	1.1	1.3	1.6	1.9	2.3	2.7	3.0	3.1	3.3	
3,800	1.1	1.4	1.5	1.7	2.1	2.5	2.9	3.3	3.7	3.8	4.0	
4,400	1.6	1.9	2.0	2.3	2.6	3.0	3.4	3.8	4.1	4.2	4.4	

COP (EN 12900 Household/CECOMAF) 24V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	0.68	0.89	0.96	1.11	1.35	1.60	1.85	2.10	2.37	2.50	2.66	
3,100	0.66	0.84	0.91	1.04	1.24	1.44	1.65	1.87	2.10	2.21	2.35	
3,800	0.69	0.85	0.90	1.01	1.18	1.37	1.56	1.76	1.98	2.09	2.22	
4,400	0.72	0.84	0.89	0.98	1.14	1.32	1.51	1.71	1.94	2.04	2.18	

COP (ASHRAE LBP) 24V DC, static cooling **W/W**

rpm \ °C	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2	10	15
2,500	0.83	1.08	1.17	1.36	1.65	1.95	2.26	2.58	2.91	3.07	3.27	
3,100	0.80	1.02	1.10	1.26	1.51	1.76	2.02	2.29	2.58	2.71	2.89	
3,800	0.84	1.03	1.10	1.23	1.45	1.67	1.91	2.16	2.43	2.56	2.73	
4,400	0.87	1.02	1.08	1.20	1.39	1.61	1.84	2.10	2.38	2.51	2.68	

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	55°C	54.4°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Accessories for BD50K		Code number
Bolt joint for one comp.	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
Automobile fuse, DIN 7258	12V: 30A | 24V: 15 A	Not deliverable from Nidec GA Compressors
Main switch	min. 30A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0390 with AEO	0	AEO
	203	2,500
	451	3,100
	867	3,800
	1700	4,400

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

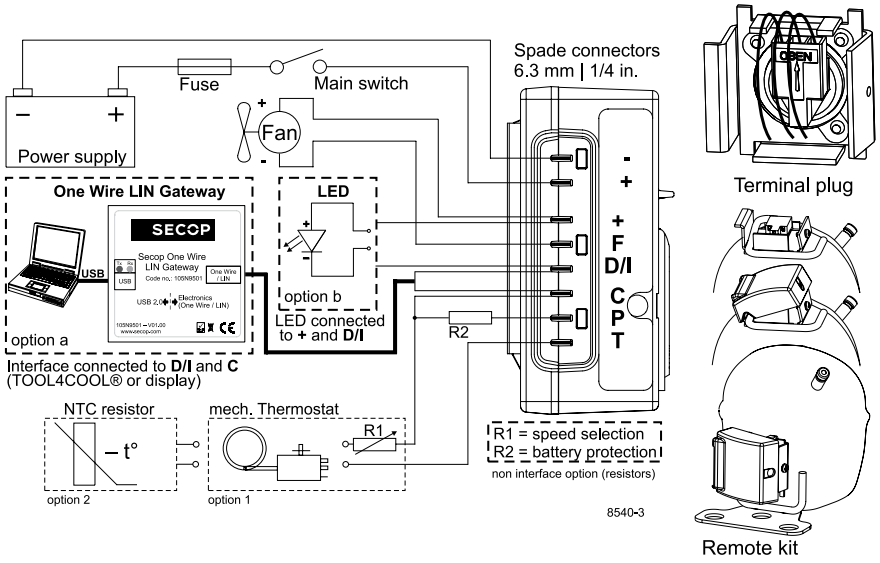
Wire dimensions

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[Gauge]	[m]	[ft.]	[m]	[ft.]
6	10	2.5	8	5	16

*Length between battery and electronic unit

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).

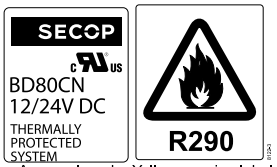


BD80CN
Direct Current Compressor
R290, 12/24V DC
& 100-240V AC 50/60Hz

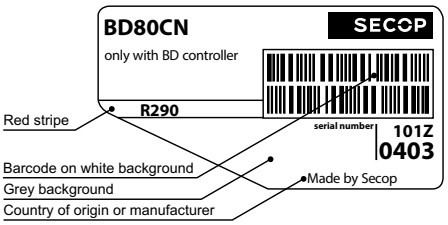
TOOL4COOL®
Flexible control settings

General

		Approvals
Code number (without electronic units)	101Z0403	
Electronic unit 12/24V DC - Standard	101N0212, 30 pcs: 101N0213	–
Electronic unit 12/24V DC - AEO	101N0340, 30 pcs: 101N0341	UL / VDE / CB
Electronic unit 12/24V DC & 100-240V AC 50/60Hz	101N0510, 28 pcs: 101N0511	UL
Electronic unit 12/24V DC - Automotive	101N0650, 30 pcs: 101N0651	UL / VDE / CB
Compressors on pallet	150	



Approval mark Yellow warning label



Application

Application		LBP/MBP
Evaporating temperature	°C	-40 to -5 (5)
Voltage range DC	VDC	9.6 - 17 / 21.3 - 31.5
Voltage range AC	V/Hz	100 - 240 / 50 - 60
Max. condensing temperature continuous (short)	°C	55 (65)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	F_1	–
38°C	S	F_1	–
43°C	S	F_1	–
Remarks on application:			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

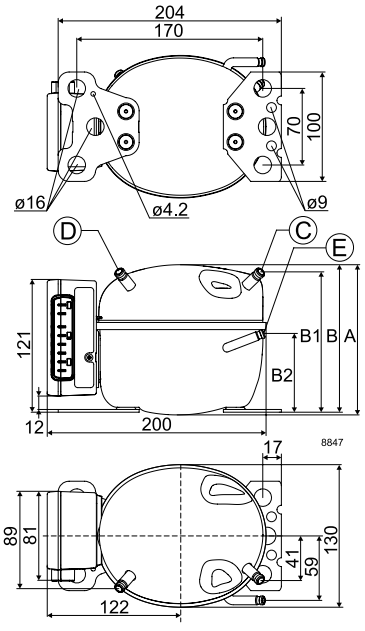
Displacement	cm^3	2.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	120
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3 / 0.19 (Standard)

Standard battery protection settings (refer to electronic unit *Instructions* for optional settings)

		12V	24V
Voltage			
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
Remarks			



Capacity (EN 12900 Household/CECOMAF) 12V DC, static cooling **watt**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,000	16.4	24.7	34.6	46.4	50.8	60.2	76.2	94.8	116	140	167	
2,500	20.2	29.0	40.7	55.5	61.2	73.0	95.0	119	147	179	215	
3,000	26.3	39.6	54.4	71.6	78.0	92.0	116	144	178	217		
3,500	31.1	45.6	62.3	82.0	89.0	105	132	165	203			

Capacity (ASHRAE LBP) 12V DC, static cooling **watt**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,000	18.2	27.5	38.6	51.7	56.7	67.2	85.1	106	130	157	187	
2,500	22.5	32.3	45.4	61.9	68.0	82.0	106	133	165	200	240	
3,000	29.3	44.1	60.7	80.0	87.0	102	129	161	199	243		
3,500	34.7	50.8	69.5	91.0	100	117	148	184	227			

Power consumption 12V DC, static cooling **watt**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,000	27.3	29	31.8	35.5	36.9	39.8	44.3	48.9	53.3	57.1	60.1	
2,500	31.5	35.9	41.1	46.9	49.0	53.0	58.9	64.4	69.2	72.9	75.1	
3,000	42.9	45.3	51.0	58.8	61.6	67.3	75.2	81.4	85.0	89.0		
3,500	45.3	52.2	60.4	69.3	72.4	78.2	87.0	93.0	98.0			

Current consumptiom (for 24V applications the following must be halfed) **A**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,000	2.13	2.25	2.47	2.78	2.89	3.13	3.51	3.89	4.23	4.52	4.73	
2,500	2.84	3.20	3.60	4.03	4.18	4.48	4.93	5.36	5.76	6.11	6.40	
3,000	3.60	3.78	4.25	4.89	5.13	5.60	6.27	6.78	7.02	7.20		
3,500	3.31	3.99	4.56	5.08	5.26	5.63	6.28	7.10	8.17			

COP (EN 12900 Household/CECOMAF) 12V DC, static cooling **W/W**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,000	0.60	0.85	1.09	1.31	1.38	1.51	1.72	1.94	2.18	2.45	2.78	
2,500	0.64	0.81	0.99	1.18	1.25	1.39	1.61	1.85	2.13	2.46	2.85	
3,000	0.61	0.87	1.07	1.22	1.27	1.36	1.54	1.77	2.10	2.43		
3,500	0.69	0.87	1.03	1.18	1.23	1.34	1.53	1.76	2.06			

COP (ASHRAE LBP) 12V DC, static cooling **W/W**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,000	0.67	0.95	1.21	1.46	1.54	1.69	1.92	2.16	2.43	2.75	3.12	
2,500	0.71	0.90	1.10	1.32	1.40	1.55	1.79	2.07	2.38	2.75	3.20	
3,000	0.68	0.97	1.19	1.36	1.41	1.52	1.72	1.98	2.35	2.73		
3,500	0.77	0.97	1.15	1.32	1.38	1.50	1.71	1.97	2.30			

Test conditions	**EN 12900/CECOMAF***	**ASHRAE LBP***
Condensing temperature	45°C	45°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Accessories for BD80CN		**Code number**
Bolt joint for one comp.	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
DC usage:	Automobile fuse, DIN 7258 12V: 15A | 24V: 7.5 A	Not deliverable from Secop
	Main switch min. 20A	
AC usage:	Fuse, 100-240V	
	Main switch min. 6A	

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0212 101N0510 101N0650	0	2,000
	277	2,500
	692	3,000
	1523	3,500
101N0340 with AEO	0	AEO
	173	2,000
	450	2,500
	865	3,000
	1696	3,500

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

Wire dimensions DC

Size		**Max. length* 12V operation**		**Max. length* 24V operation**	
Cross section	**AWG**				
[mm²]	[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

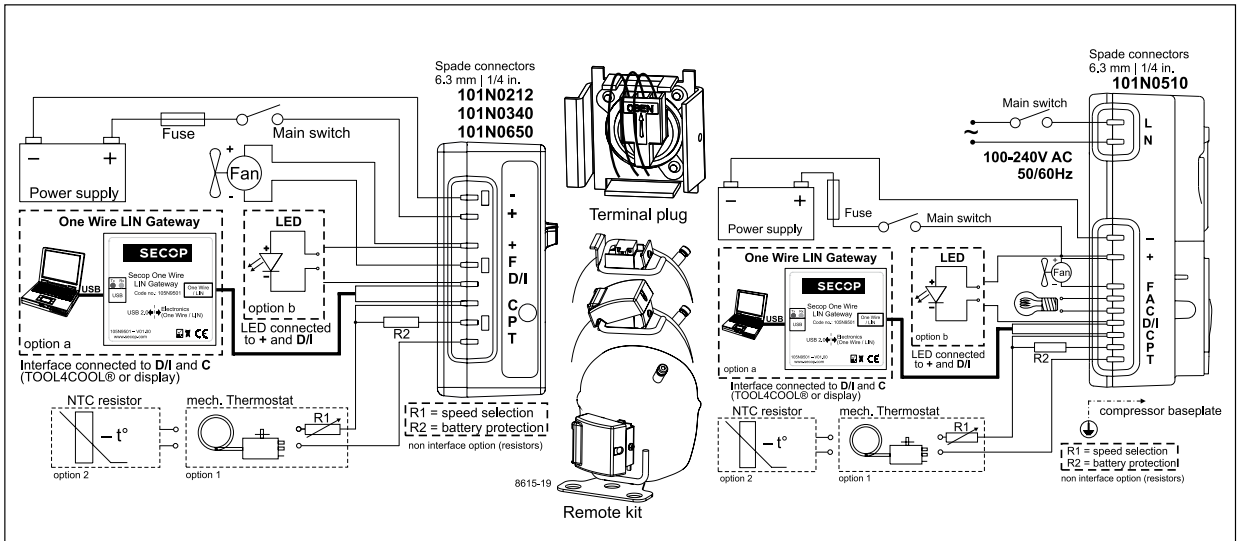
*Length between battery and electronic unit

Wire dimensions AC

Cross section min. 0.75 mm² or AWG 18

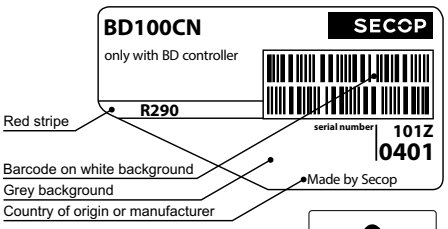
Operational errors

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).



BD100CN
Direct Current Compressor
R290
12/24V DC

TOOL4COOL® Flexible control settings



Yellow warning label

General

Code number (without electronic units)	101Z0401
Electronic unit - High Speed	101N0390, 30 pcs: 101N0391
Compressors on pallet	150

Application

Application		LBP/MBP
Evaporating temperature	°C	-40 to -5 (5)
Voltage/max. voltage	VDC	9.6 - 17 / 21.3 - 31.5
Max. condensing temperature continuous (short)	°C	55 (65)
Max. winding temperature continuous (short)	°C	125 (135)

Cooling requirements

Application	LBP	MBP	HBP
32°C	S	S	–
38°C	S	S	–
43°C	S	S	–
Remarks on application:			

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Motor

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

Design

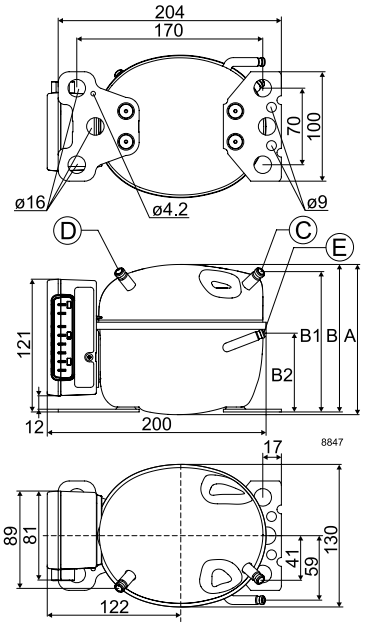
Displacement	cm^3	2.00
Oil quantity (type)	cm^3	150 (polyolester)
Maximum refrigerant charge	g	120
Free gas volume in compressor	cm^3	870
Weight - Compressor/Electronic unit	kg	4.3/0.32

Standard battery protection settings (refer to electronic unit *Instructions* for optional 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
Remarks:			



Capacity (EN 12900 Household/CECOMAF) 24V DC, static cooling **watt**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,500	20.2	31.8	50.9	67.6	73.0	83.7	101	121	146	178	217	
3,100	27.2	43.9	64.0	84.1	91.2	106	130	159	194	236	287	
3,800	42.9	58.5	77.0	98.6	107	124	153	185	223	264		
4,400	47.2	61.3	83.4	108	118	137	169	207	250			

Capacity (ASHRAE LBP) 24V DC, static cooling **watt**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,500	22.5	35.5	56.7	75.4	81.5	93.4	113	135	163	199	243	
3,100	29.3	49.0	71.4	93.8	102	118	145	177	216	264	321	
3,800	47.8	65.2	85.9	110	119	138	170	207	249	296		
4,400	52.7	68.4	93.1	121	131	153	189	231	280			

Power consumption 24V DC, static cooling **watt**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,500	33.6	38.3	43.3	48.5	50.3	53.8	58.9	63.7	68.1	72.0	75.2	
3,100	36.9	45.5	53.8	61.5	64.1	68.9	75.9	82.7	89.2	95.5	102	
3,800	44.8	55.5	65.7	75.5	78.7	84.7	93.2	101	108	115		
4,400	51.7	65.4	77.8	89.3	93.0	99.9	110	119	129			

Current consumption (for 12V applications the following must be doubled) **A**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,500	2.51	3.05	3.57	4.05	4.21	4.51	4.93	5.32	5.67	5.99	6.27	
3,100	3.10	3.81	4.49	5.14	5.35	5.75	6.34	6.90	7.43	7.94	8.42	
3,800	3.99	4.74	5.51	6.28	6.54	7.04	7.77	8.44	9.04	9.54		
4,400	5.64	6.05	6.64	7.37	7.64	8.18	9.05	9.92	10.70			

COP (EN 12900 Household/CECOMAF) 24V DC, static cooling **W/W**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,500	0.60	0.83	1.17	1.39	1.45	1.56	1.72	1.90	2.15	2.47	2.89	
3,100	0.74	0.96	1.19	1.37	1.42	1.53	1.71	1.92	2.17	2.47	2.82	
3,800	0.96	1.05	1.17	1.31	1.36	1.46	1.64	1.83	2.05	2.30		
4,400	0.91	0.94	1.07	1.21	1.26	1.37	1.54	1.73	1.95			

COP (ASHRAE LBP) 24V DC, static cooling **W/W**

rpm \ °C	-40	-35	-30	-25	-23.3	-20	-15	-10	-5	0	5	7.2
2,500	0.67	0.93	1.31	1.55	1.62	1.74	1.92	2.13	2.40	2.76	3.23	
3,100	0.79	1.08	1.33	1.52	1.59	1.71	1.91	2.15	2.43	2.76	3.16	
3,800	1.07	1.18	1.31	1.46	1.51	1.63	1.83	2.05	2.30	2.58		
4,400	1.02	1.05	1.20	1.35	1.41	1.53	1.72	1.94	2.18			

Test conditions	EN 12900/CECOMAF*	ASHRAE LBP*
Condensing temperature	45°C	45°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Accessories for BD100CN		Code number
Bolt joint for one comp.	Ø:16 mm	118-1917
Bolt joint in quantities	Ø:16 mm	118-1918
Snap-on in quantities	Ø:16 mm	118-1919
Remote kit (without cable)		105N9210
One Wire/LIN gateway		105N9501
Automobile fuse, DIN 7258	12V: 30A | 24V: 15 A	Not deliverable
Main switch	min. 30A	from Secop

Compressor speed

Electronit unit Code number	Resistor (R1) [Ω] calculated values	Motor speed [rpm]
101N0390 with AEO	0	AEO
	203	2,500
	451	3,100
	867	3,800
	1700	4,400

In AEO (Adaptive Energy Optimizing) speed mode the BD compressor will always adapt its speed to the actual cooling demand.

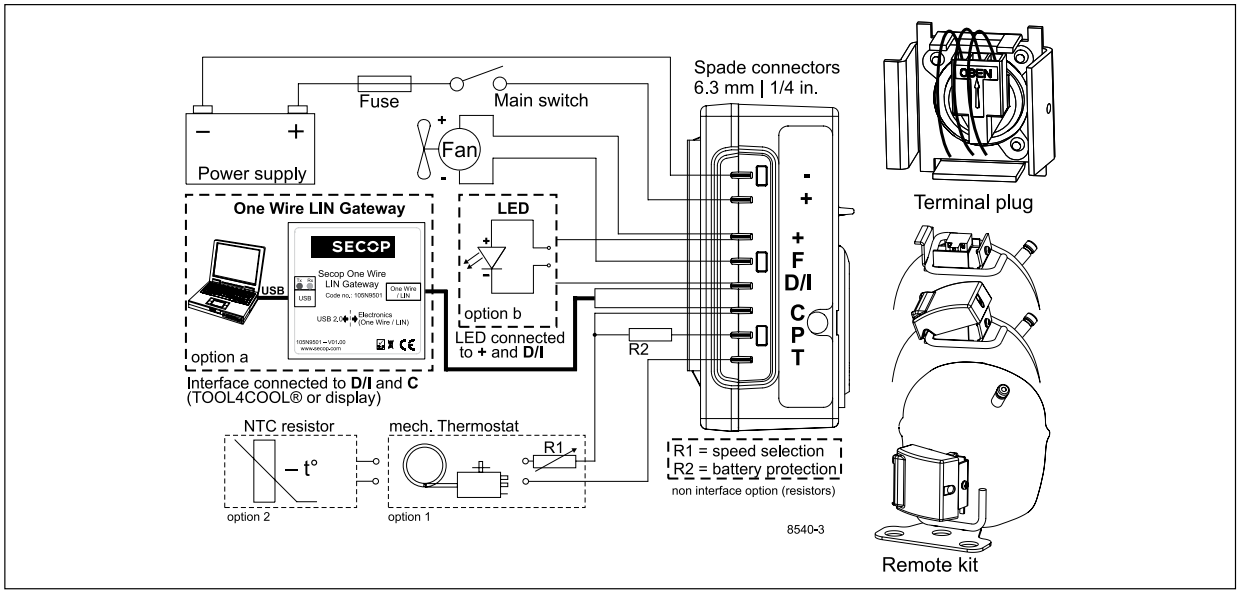
Wire dimensions

Size		Max. length* 12V operation		Max. length* 24V operation	
Cross section	AWG				
[mm²]	[Gauge]	[m]	[ft.]	[m]	[ft.]
6	10	2.5	8	5	16

*Length between battery and electronic unit

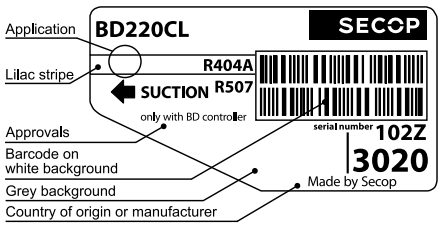
Operational errors

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).



BD220CL
Direct Current Compressor
R404A/R507
12V DC - with 101N08xx Series Controllers

TOOL4COOL® Flexible control settings



General

Code number (without electronic units)	102Z3020
Compressor module	101N0800, 30 pcs: 101N0801
Application module	101N0820, 30 pcs: 101N0821
Alternative (one interface only): Electronic Unit (no fan connection/no twin option)	101N0830, 30 pcs: 101N0831
Approvals	–
Compressors on pallet	125

Application

Application		LBP
Evaporating temperature	°C	-45 to -5
Voltage range	VDC	9.6 - 17
Max. condensing temperature continuous (short)	°C	50 (60)
Max. winding temperature continuous (short)	°C	125 (135)

S = Static cooling normally sufficient
O = Oil cooling
F_1 = Fan cooling 1.5 m/s (compressor compartment temperature equal to ambient temperature)
F_2 = Fan cooling 3.0 m/s necessary
SG = Suction gas cooling normally sufficent
– = not applicable in this area

Cooling requirements

Application	LBP	MBP	HBP
32°C	F_1	–	–
38°C	F_1	–	–
43°C	F_1	–	–
Remarks on application: - evaporator fan max. 200W - condenser fan max. 100W			

Motor

Motor type		variable speed
Resistance, all 3 windings (25°C)	Ω	0.1

Design

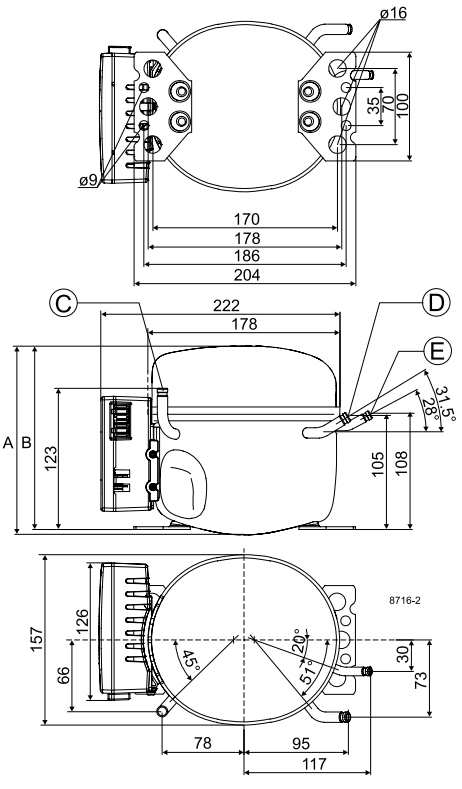
Displacement	cm^3	3.86
Oil quantity (type)	cm^3	280 (polyolester)
Maximum refrigerant charge	g	400
Free gas volume in compressor	cm^3	1690
Weight - Compressor/Electronic unit	kg	7.9 / 0.33 / 0.28 (101N820)

Battery protection settings

Voltage			Min. value	Default	Max. value
Cut out	(0.1 steps)	VDC	9.6	10.4	17
Cut in diff.	(0.1 steps)	VDC	0.5	1.3	10

Dimensions

Height	mm	A	173
		B	169
		B1	–
		B2	–
Suction connector	location/I.D. mm | angle	C	6.2 | 90°
	material | comment		Cu-plated steel | Al cap
Process connector	location/I.D. mm | angle	D	6.2 | 31.5°
	material | comment		Cu-plated steel | Al cap
Discharge connector	location/I.D. mm | angle	E	5.0 | 28°
	material | comment		Cu-plated steel | Al cap
Connector tolerance	I.D. mm		±0.09, on 5.0 +0.12/+0.20



Capacity (EN 12900 Household/CECOMAF) 12V DC, fan cooling F_1 **watt**

rpm \ °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0
2,500	26.4	47.1	71.9	101	136	149	177	224	278	318	340	
3,000	31.4	56.0	85.5	121	162	178	210	266	331	379	405	
3,500	36.3	64.9	99.2	140	188	206	244	309	384	439	470	
4,000	40.8	73.1	112	158	212	232	275	349	433	495	530	

Capacity (ASHRAE LBP) 12V DC, fan cooling F_1 **watt**

rpm \ °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0
2,500	31	55	83	117	158	173	205	260	323	370	396	
3,000	36	65	99	140	188	206	244	310	385	441	472	
3,500	42	75	115	162	218	239	284	360	447	512	547	
4,000	47	85	130	183	246	270	320	405	504	577	617	

Power consumption 12V DC, fan cooling F_1 **watt**

rpm \ °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0
2,500	65.2	82.8	98.9	114	129	133	143	158	174	185	191	
3,000	75.2	96.0	115	134	152	158	170	190	210	225	233	
3,500	84.3	108	131	152	174	181	196	219	245	263	272	
4,000	94.3	121	147	172	197	206	223	251	281	303	314	

Current consumption 12V DC, fan cooling F_1 **A**

rpm \ °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0
2,500	5.43	6.90	8.24	9.50	10.71	11.12	11.92	13.16	14.48	15.40	15.90	
3,000	6.27	8.00	9.62	11.16	12.67	13.19	14.20	15.81	17.53	18.75	19.42	
3,500	7.03	9.02	10.89	12.69	14.48	15.10	16.32	18.27	20.38	21.89	22.71	
4,000	7.86	10.12	12.26	14.34	16.43	17.15	18.59	20.90	23.41	25.22	26.20	

COP (EN 12900 Household/CECOMAF) 12V DC, fan cooling F_1 **W/W**

rpm \ °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0
2,500	0.41	0.57	0.73	0.89	1.06	1.12	1.23	1.42	1.60	1.72	1.78	
3,000	0.42	0.58	0.74	0.90	1.07	1.12	1.23	1.40	1.57	1.68	1.74	
3,500	0.43	0.60	0.76	0.92	1.08	1.14	1.25	1.41	1.57	1.67	1.72	
4,000	0.43	0.60	0.76	0.92	1.08	1.13	1.23	1.39	1.54	1.64	1.68	

COP (ASHRAE LBP) 12V DC, fan cooling F_1 **W/W**

rpm \ °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0
2,500	0.47	0.66	0.84	1.03	1.23	1.30	1.43	1.65	1.86	2.00	2.07	
3,000	0.48	0.68	0.86	1.05	1.24	1.30	1.43	1.63	1.83	1.96	2.02	
3,500	0.50	0.69	0.88	1.07	1.26	1.32	1.45	1.64	1.83	1.95	2.01	
4,000	0.50	0.70	0.88	1.06	1.25	1.31	1.43	1.62	1.79	1.91	1.96	

Test conditions	EN 12900/CECOMAF	ASHRAE LBP
Condensing temperature	45°C	45°C
Ambient temperature	32°C	32°C
Suction gas temperature	32°C	32°C
Liquid temperature	no subcooling	32°C

Operational errors

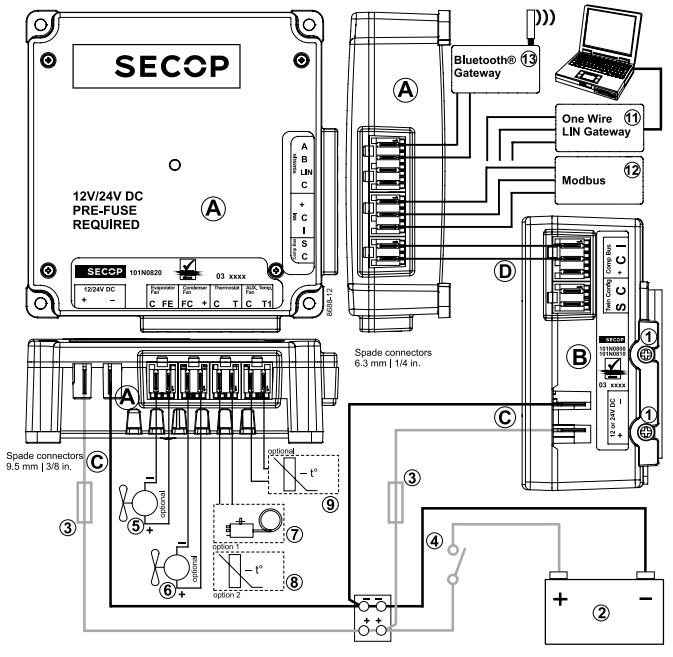
Error code	Error type Can be read out in the software **TOOL4COOL®**
6	**Thermostat failure** (If the NTC thermistor is short-circuit or has no connection, the electronic unit will enter manual mode).
5	**Thermal cut-out of electronic unit** (If the refrigeration system has been too heavily loaded, or 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).
2	**Fan over-current cut-out** (The fan loads the electronic unit with too high current).
1	**Battery protection cut-out** (The voltage is outside the cut-out setting).

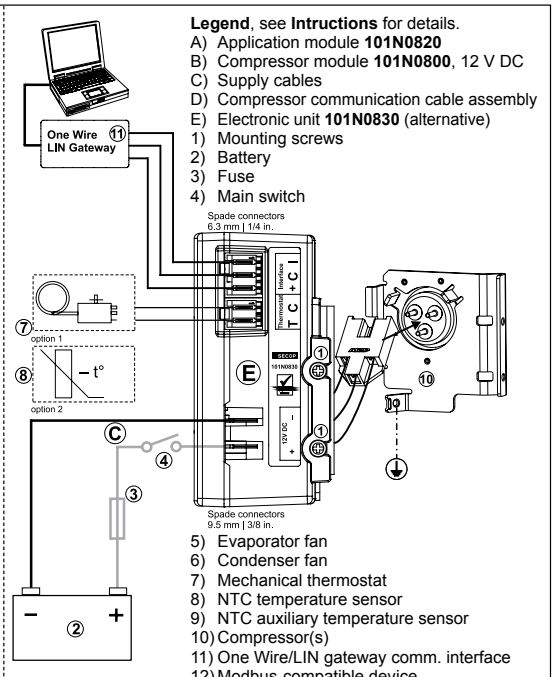
Accessories for BD220CL

Mounting		Code number
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

Electrical (cables, sensors, etc.)	Code number	
	Single pack	I - Pack
One Wire/LIN gateway	105N9501	–
communication cable	105N9524	–
Bluetooth® gateway	105N9502	–
communication cable	105N9525	–
Temperature sensor 470 mm	105N9612	105N9613, 200 pcs.
Temperature sensor 1000 mm	105N9614	105N9615, 100 pcs.
Temperature sensor 1500 mm	105N9616	105N9617, 100 pcs.
Comm. cable, 1500 mm	–	105N9553, 80 pcs.
Comm. cable, 3000 mm	–	105N9554, 45 pcs.
Display cable, 1500 mm	–	105N9557, 65 pcs.
Display cable, 3000 mm	–	105N9558, 35 pcs.

Not deliverable from Secop	
Slow-blow fuse compressor module	60A
Slow-blow fuse application module	30A
Main switch	rated to min. 100A





Legend, see **Intructions** for details.
A) Application module **101N0820**
B) Compressor module **101N0800**, 12 V DC
C) Supply cables
D) Compressor communication cable assembly
E) Electronic unit **101N0830** (alternative)
1) Mounting screws
2) Battery
3) Fuse
4) Main switch
5) Evaporator fan
6) Condenser fan
7) Mechanical thermostat
8) NTC temperature sensor
9) NTC auxiliary temperature sensor
10) Compressor(s)
11) One Wire/LIN gateway comm. interface
12) Modbus-compatible device
13) Bluetooth® gateway comm. interface

NOTES

NOTES

DC-VOLTAGE MOBILE REFRIGERATION COMPRESSORS

Secop BD compressors provide extraordinary performance with minimal power consumption, extremely silent running, reliable operation even when tilted up to 30°, problem-free operation at 12/24/48 V and more than 40 years of experience in mobile refrigeration.
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.




OUR JOURNEY SO FAR

1956 Production facility and headquarters in Flensburg, Germany founded.

1958 Start of production for PW compressors.

1970 Introduction of SC compressors. The birth of a standard-setting platform in the light commercial market.

1972 Introduction of FR compressors.

1977 Introduction TL and BD compressors.

1990 Introduction of NL compressors.

1992 Introduction of PL compressors.

1993 Start of production with natural refrigerant R600a (isobutane). Production facility in Crnomelj, Slovenia founded.

1999 Start of production with natural refrigerant R290 (propane).

2002 Production facility in Zlate Moravce, Slovakia founded.

2005 Introduction of GS compressors.

2008 Production facility in Wuqing, China 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.

2013 Introduction of the XV compressor - opening a new chapter in refrigeration history. Secop acquires ACC Fürstenfeld, Austria.

2015 New generation of energy-efficient propane compressors. New variable speed platforms for household and light commercial applications.

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