

Single Pack BD50F 12/24V DC PM

Single pack code number: **195B4243**

| Position | Title | Code | Amount |
|----------|--|----------|--------|
| 1 | Compressor BD50F | 101Z0203 | 1 |
| 2 | Bolt joint for one compressor M6 ø16mm | 118-1917 | 1 |

BD50F Direct Current Compressor R134a, R1234yf, 12/24V DC & 100-240V AC 50/60Hz



General

| | |
|---|----------------------------|
| Code number (without electronic units) | 101Z0203 |
| Electronic unit 12/24V DC - Standard | 101N0242, 30 pcs: 101N0243 |
| Electronic unit 12/24V DC - AEO | 101N0340, 30 pcs: 101N0341 |
| Electronic unit 12/24V DC & 100-240V AC 50/60Hz | 101N0510, 28 pcs: 101N0511 |
| Electronic unit 12/24V DC - Automotive | 101N0680, 30 pcs: 101N0681 |
| Compressors on pallet | 150 |

Approvals
R134a **R134a/R1234yf**

| | |
|-----|---------|
| – | – |
| VDE | UL / CB |
| VDE | UL / CB |
| – | UL / CB |



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 F₁ depending on application and speed.

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) |

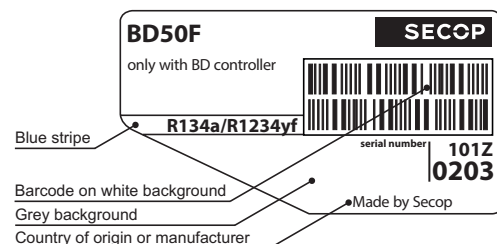
Standard battery protection settings (refer to electronic unit *Instructions* for optional settings)

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

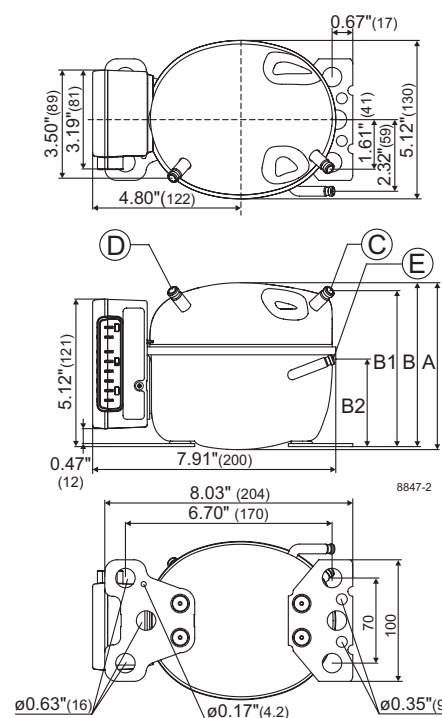
Dimensions

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

Remarks: **inch connectors**



- S = Static cooling normally sufficient
- O = Oil cooling
- F₁ = Fan cooling 1.5 m/s
(compressor compartment temperature equal to ambient temperature)
- F₂ = Fan cooling 3.0 m/s necessary
- SG = Suction gas cooling normally sufficient
- = not applicable in this area



Performance Data with Refrigerant R134a

| 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 | | | | |
| 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 | | | | |
| 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 | | | | |
| 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 halved) | | | | | | | | | | | | 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 | | | | |
| 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/W |
|------------------|------|------------------------|------|------|------|-------|-------|-------|------|-------|-------|-------|
| 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 | | | | |
| 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 | | | | |
| 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 | | EN 12900/CECOMAF | ASHRAE LBP |
|---------------------------------------|----------------------|------------------|------------|
| Condensing temperature | 101N0242 101N0680 | 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 |
| Secop Gateway | | 105N9518 |
| DC usage: | Automobile fuse, DIN 7258 12V: 15A 24V: 7.5 A Main switch min. 20A | Not deliverable from Secop |
| AC usage: | Fuse, 100-240V Main switch min. 6A | |

Compressor speed

| Electronit unit | Resistor (R1) [Ω] | Motor speed |
|----------------------------------|-------------------|-------------|
| Code number | calculated values | [rpm] |
| 101N0242 101N0510 101N0680 | 0 | 2,000 |
| | 277 | 2,500 |
| | 692 | 3,000 |
| 101N0340 with AEO | 1523 | 3,500 |
| | 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

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

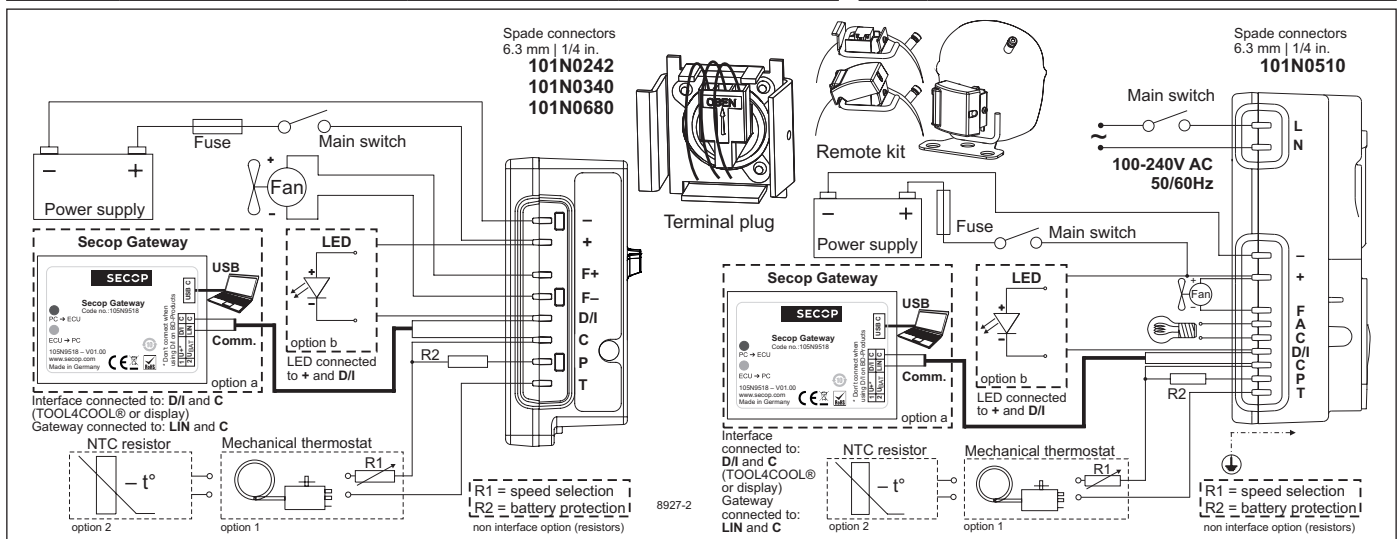
*Length between battery and electronic unit

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). |



Performance Data with Refrigerant R1234yf

| 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 | 110 | 142 | 158 | 216 | 286 | 317 | 368 | 462 | 568 | 579* | 625* | 686* |
| 2,500 | 137 | 174 | 193 | 262 | 348 | 388 | 452 | 576 | 720 | 736* | 801* | |
| 3,000 | 164 | 211 | 233 | 318 | 421 | 468 | 544 | 688 | | | | |
| 3,500 | 199 | 253 | 279 | 378 | 498 | 553* | 641* | 809* | | | | |

| 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 | 25.1 | 32.3 | 35.8 | 49.0 | 65.0 | 72.1 | 83.5 | 105 | 129 | 131* | 142* | 155* |
| 2,500 | 31.0 | 39.5 | 43.7 | 59.5 | 79.0 | 87.9 | 102 | 130 | 163 | 166* | 181* | |
| 3,000 | 37.4 | 47.9 | 53.1 | 72.2 | 95.5 | 106 | 123 | 156 | | | | |
| 3,500 | 45.2 | 57.5 | 63.6 | 86.0 | 113 | 125* | 145* | 183* | | | | |

| 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 | | | | |
| 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 halved) | | | | | | | | | | | | 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 | | | | |
| 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/W |
|------------------|------|------------------------|------|------|------|-------|-------|-------|------|-------|-------|-------|
| rpm \ °F | -20 | -13 | -10 | 0 | 10 | 14 | 20 | 30 | 40 | 41 | 45 | 50 |
| 2,000 | 3.94 | 4.33 | 4.52 | 5.17 | 5.85 | 6.12 | 6.54 | 7.22 | 7.88 | 7.95* | 8.21* | 8.52* |
| 2,500 | 3.88 | 4.15 | 4.29 | 4.84 | 5.50 | 5.79 | 6.27 | 7.13 | 8.10 | 8.20* | 8.62* | |
| 3,000 | 3.86 | 4.15 | 4.30 | 4.87 | 5.54 | 5.83 | 6.29 | 7.13 | | | | |
| 3,500 | 3.86 | 4.22 | 4.39 | 4.99 | 5.64 | 5.90* | 6.31* | 7.00* | | | | |

| 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 | 0.89 | 0.98 | 1.02 | 1.16 | 1.32 | 1.38 | 1.47 | 1.62 | 1.77 | 1.78* | 1.84* | 1.90* |
| 2,500 | 0.88 | 0.94 | 0.97 | 1.09 | 1.24 | 1.31 | 1.41 | 1.60 | 1.81 | 1.84* | 1.93* | |
| 3,000 | 0.88 | 0.94 | 0.98 | 1.10 | 1.25 | 1.31 | 1.41 | 1.60 | | | | |
| 3,500 | 0.88 | 0.96 | 1.00 | 1.13 | 1.27 | 1.33* | 1.42* | 1.57* | | | | |

* fan cooling of electronic unit compulsory

| Test conditions with electronic units | | EN 12900/CECOMAF | ASHRAE LBP |
|---------------------------------------|----------------------------------|------------------|------------|
| Condensing temperature | 101N0242 101N0510 101N0680 | 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 |
| Secop Gateway | | 105N9518 |
| DC usage: | Automobile fuse, DIN 7258 12V: 15A 24V: 7.5 A Main switch min. 20A | Not deliverable from Secop |
| AC usage: | Fuse, 100-240V Main switch min. 6A | |

Compressor speed

| Electronit unit | Resistor (R1) [Ω] | Motor speed |
|----------------------------------|-------------------|-------------|
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| 101N0242 101N0510 101N0680 | 0 | 2,000 |
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| | 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

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

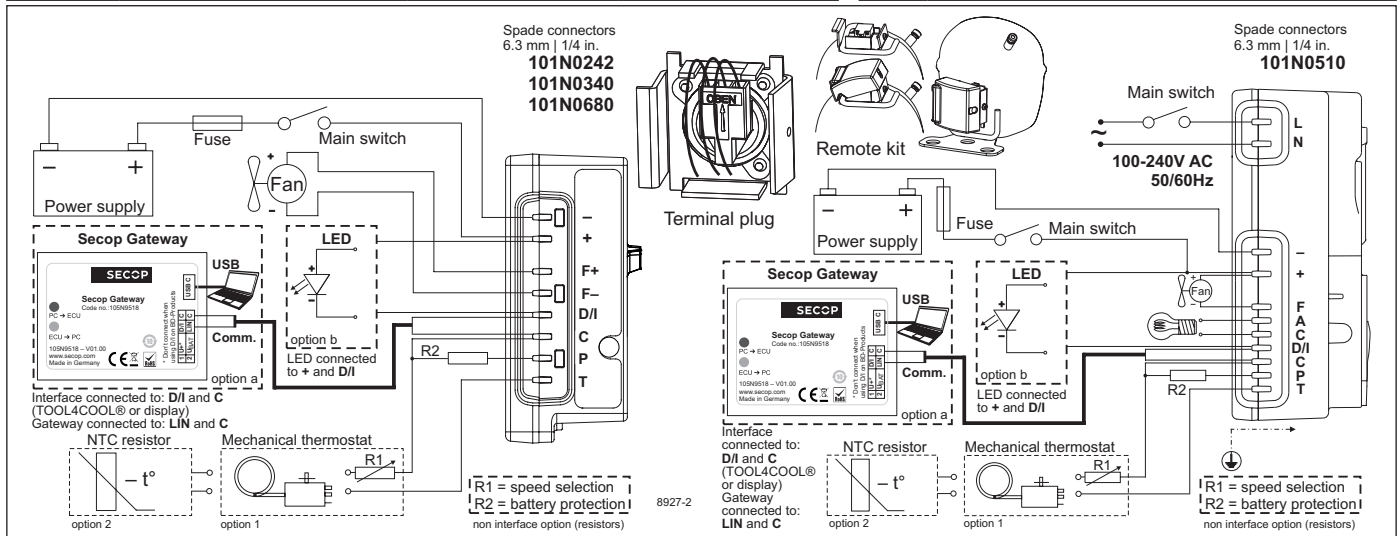
*Length between battery and electronic unit

Wire dimensions AC

Cross section min. 0.75 mm² or AWG 18

Operational errors

| Error code or LED flashes | Error type |
|---------------------------|--|
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| 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). |



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Instructions for Electronic Units
are available for download on
www.secop.com



BD Compressors



Service/Repair



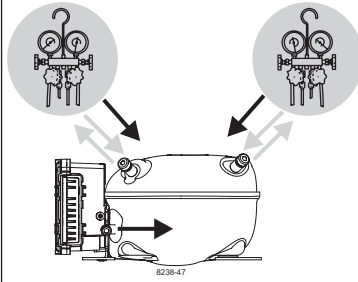
BD Nano



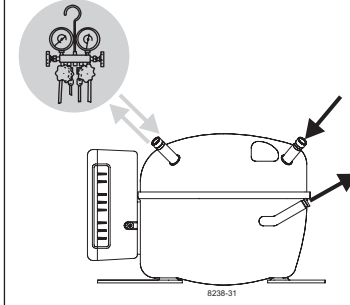
**! max. 150°C/302°F !
at socket**
brazing solder: silver with flux

Do not heat up the bottom of the discharge connector directly.
Do not braze longer than 10 seconds and wait for 5 minutes for the next soldering attempt (Product Bulletin DES.N.101.M1).

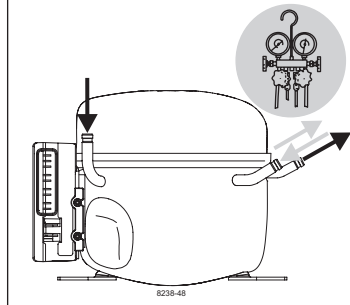
BD Micro



BD P-Housing



BD T-Housing



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