

Application guidelines

# DC Compressors **DL, DK, VDL, VDK**

Compressors for mobile applications  
12 - 24V Direct Current Compressor  
R134a, R600a, R1234yf





|                                                              |           |
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## Compressor Overview

Many vehicles for transportation of goods or recreation, such as trucks, caravans, boats, cars, etc. are often equipped with cooling appliances. The compressors for such mobile applications must be designed to operate from a low voltage DC power supply. These compressors must also be compact in their dimensions, highly reliable and yield high performances.

DL, DK, VDL, VDK compressors are the answer to the users' needs requiring comfort and reliability in their travelling, either on holidays, at work or in any other circumstance where Direct current is required for cooling.

These compressors are designed to operate silently, efficiently and reliably even up to angles of tilt of 30°, working with refrigerant R134a.

The series of compressors are not designed for off-road applications. Special approval is required by Danfoss Commercial Compressors for this type of application. The maximum tilt angle allowed in DL compressors (stopped or running) is 30°.

DL, DK, VDL, VDK compressors can be powered at any voltage within the 12 to 24V DC range, and are designed for capillary tube expansion.

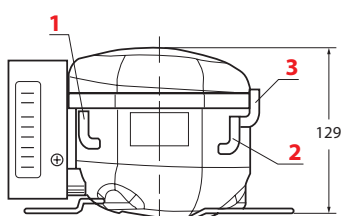
## Technical specification

|                                                                     |                                     |                                       |
|---------------------------------------------------------------------|-------------------------------------|---------------------------------------|
| Refrigerant                                                         | R134a *                             | R600a                                 |
| oil type                                                            | ISO VG 15 ESTER                     | MINERAL OIL GRD10B                    |
| Expansion                                                           | capillary tube                      | capillary tube                        |
| Application                                                         | LBP/ MBP / HBP                      | LBP                                   |
| Evaporation temperature range                                       | -35°C to + 10°C                     | -35°C to - 10°C                       |
| Condensation temperature range                                      | up to 65°C (Pull-down peak: 70°C)   | up to 65°C (Pull-down peak: 70°C)     |
| Ambient temperature range                                           | -10 to 60°C **                      | -10 to 60°C **                        |
| voltage range DC                                                    | 9.6 - 17 / 21.3 - 31.5 VDC          | 9.6 - 17 / 21.3 - 31.5 VDC            |
| motor speed range                                                   | 2000 - 3500 rpm                     | 2000 - 3500 rpm                       |
| Consumption of the electronic driver when the compressor is stopped | 0.5W                                | 0.5W                                  |
| Comp. displacement DL19H/DL22H/DL30H                                | 1.9 / 2.2 / 3 / 3.5 cm <sup>3</sup> | 3 / 3.5 / 5.2 / 7 / 9 cm <sup>3</sup> |
| Weight DL19H/DL22H/DL30H+ Electronic unit                           | 3.9kg / 4.2kg / 4.2 kg + 0.2 kg     | 3.9kg / 4.2kg / 4.2 kg + 0.2 kg       |
| Suction connector I.D.                                              | 6.1 - 6.2 mm (1)                    | 6.1 - 6.2 mm (1)                      |
| Service connector I.D.                                              | 6.1 - 6.2 mm (2)                    | 6.1 - 6.2 mm (2)                      |
| Discharge connector I.D.                                            | 4.9 mm (3)                          | 4.9 mm (3)                            |

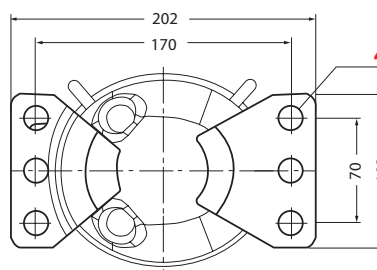
\* Compatible refriger. R1234yf

\*\* In case of ambient temperature lower than 0°C. an oil heater will be needed.

## Fixings and Silent blocks (Mounting Accessories)

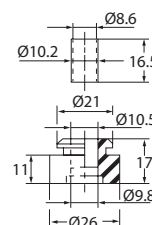


1. Suction 6.2 mm
2. Service 6.2 mm
3. Discharge 4.9 mm
4. 6 holes Ø16 (170 X 70 net)



## Standard

6 holes Ø16  
(170 X 70 net)



## Application Guidelines DC compressors

| Model  | Refrigerant | Displacement (cc) | Application | Voltage (V)           |
|--------|-------------|-------------------|-------------|-----------------------|
| DL19H  | R134a       | 1.9               | LMHBP       | 12-24 DC              |
| DL22H  | R134a       | 2.2               | LMHBP       | 12-24 DC              |
| DL30H  | R134a       | 3.0               | LMHBP       | 12-24 DC              |
| DL35H  | R134a       | 3.5               | LBP         | 12-24 DC              |
| DL30C  | R600a       | 3.0               | LBP         | 12-24 DC              |
| DL35C  | R600a       | 3.5               | LBP         | 12-24 DC              |
| DK52C  | R600a       | 5.2               | LBP         | 12-24 DC              |
| DK70C  | R600a       | 7.0               | LBP         | 12-24 DC              |
| DK90C  | R600a       | 9.0               | LBP         | 12-24 DC              |
| VDL19H | R134a       | 1.9               | LBP         | 12-24 DC / 100-240 AC |
| VDL22H | R134a       | 2.2               | LBP         | 12-24 DC / 100-240 AC |
| VDL30C | R600a       | 3.0               | LBP         | 12-24 DC / 100-240 AC |
| VDL35C | R600a       | 3.5               | LBP         | 12-24 DC / 100-240 AC |
| VDK52C | R600a       | 5.2               | LMBP        | 12-24 DC / 100-240 AC |

## R134a

**Table 1: Cooling Capacity [W] ASHRAE**

| Type / Code      | rpm  | Cooling Capacity [W] ASHRAE °C |     |     |       |     |     |     |     |     |     |     |     |
|------------------|------|--------------------------------|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|
|                  |      | -35                            | -30 | -25 | -23.3 | -20 | -15 | -10 | -5  | 0   | 5   | 7.2 | 10  |
| DL19H / 123F1905 | 2000 | 10                             | 16  | 26  | 29    | 37  | 52  | 70  | 91  | 114 | 141 | 154 | 171 |
|                  | 2500 | 13                             | 22  | 35  | 40    | 50  | 69  | 91  | 115 | 144 | 174 | 190 | 209 |
|                  | 3000 | 15                             | 25  | 38  | 44    | 57  | 79  | 103 | 135 | 168 | 208 | 227 | 253 |
|                  | 3500 | 16                             | 30  | 50  | 57    | 73  | 100 | 131 | 167 | 208 | 252 | 273 | 301 |
| DL22H / 123F1906 | 2000 | 14                             | 22  | 34  | 38    | 49  | 66  | 87  | 110 | 138 | 169 | 183 | 201 |
|                  | 2500 | 17                             | 27  | 40  | 45    | 57  | 78  | 104 | 133 | 165 | 202 | 220 | 243 |
|                  | 3000 | 22                             | 33  | 48  | 54    | 68  | 93  | 123 | 158 | 196 | 241 | 262 | 289 |
|                  | 3500 | 28                             | 41  | 59  | 66    | 83  | 113 | 148 | 190 | 236 | 288 | 314 | 348 |
| DL30H / 123F1907 | 2000 | 21                             | 30  | 45  | 49    | 64  | 88  | 116 | 149 | 187 | 229 | 103 | 276 |
|                  | 2500 | 24                             | 37  | 56  | 63    | 79  | 108 | 144 | 184 | 230 | 283 | 306 | 340 |
|                  | 3500 | 34                             | 53  | 79  | 89    | 110 | 147 | 188 | 235 | 287 | 344 | 369 | 407 |

**Table 2: Power consumption [W] ASHRAE**

| Type / Code      | rpm  | Power consumption [W] ASHRAE °C |      |      |       |      |      |      |      |      |      |      |      |
|------------------|------|---------------------------------|------|------|-------|------|------|------|------|------|------|------|------|
|                  |      | -35                             | -30  | -25  | -23.3 | -20  | -15  | -10  | -5   | 0    | 5    | 7.2  | 10   |
| DL19H / 123F1905 | 2000 | 0.58                            | 0.75 | 0.99 | 1.08  | 1.26 | 1.56 | 1.88 | 2.22 | 2.56 | 2.91 | 3.07 | 3.27 |
|                  | 2500 | 0.56                            | 0.80 | 1.07 | 1.16  | 1.35 | 1.65 | 1.95 | 2.25 | 2.56 | 2.87 | 3.01 | 3.18 |
|                  | 3500 | 0.54                            | 0.83 | 1.12 | 1.21  | 1.4  | 1.68 | 1.95 | 2.22 | 2.48 | 2.74 | 2.85 | 2.99 |
| DL22H / 123F1906 | 2000 | 0.66                            | 0.85 | 1.08 | 1.16  | 1.33 | 1.60 | 1.89 | 2.18 | 2.49 | 2.80 | 2.95 | 3.13 |
|                  | 2500 | 0.67                            | 0.86 | 1.10 | 1.19  | 1.37 | 1.66 | 1.96 | 2.25 | 2.55 | 2.84 | 2.97 | 3.13 |
|                  | 3500 | 0.80                            | 0.94 | 1.15 | 1.23  | 1.39 | 1.65 | 1.93 | 2.21 | 2.50 | 2.78 | 2.97 | 3.07 |
| DL30H / 123F1907 | 2000 | 0.78                            | 0.93 | 1.14 | 1.22  | 1.38 | 1.64 | 1.90 | 2.17 | 2.43 | 2.69 | 2.80 | 2.94 |
|                  | 2500 | 0.74                            | 0.93 | 1.17 | 1.26  | 1.43 | 1.71 | 1.99 | 2.26 | 2.53 | 2.79 | 2.9  | 3.04 |
|                  | 3500 | 0.77                            | 0.96 | 1.17 | 1.24  | 1.39 | 1.62 | 1.87 | 2.12 | 2.39 | 2.66 | 2.79 | 2.95 |

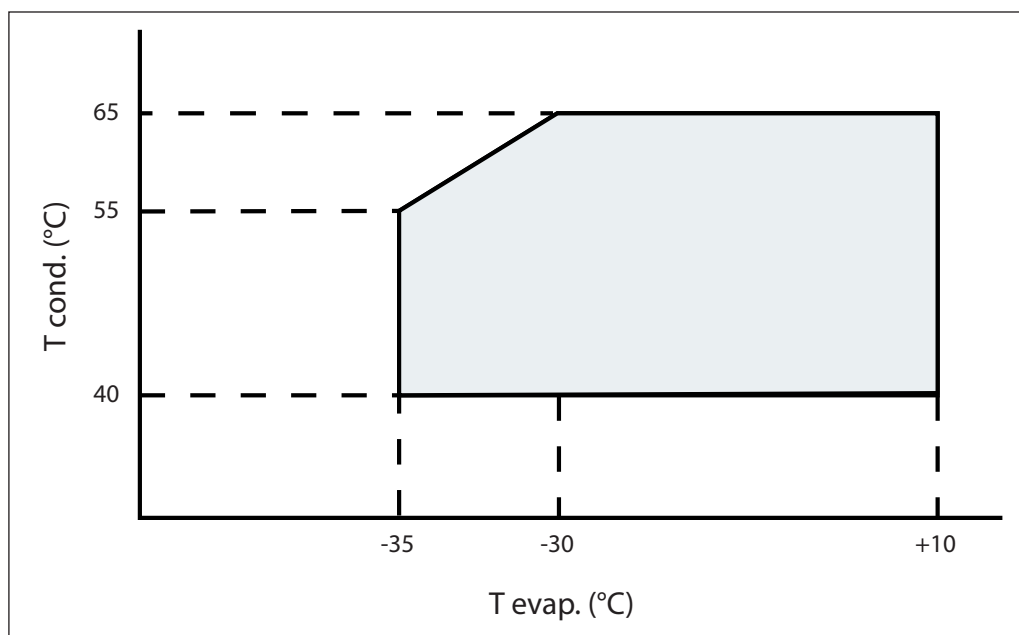
**Table 3: COP [W/W] ASHRAE**

| Type / Code      | rpm  | COP [W/W] ASHRAE °C |      |      |       |      |      |      |      |      |      |      |      |
|------------------|------|---------------------|------|------|-------|------|------|------|------|------|------|------|------|
|                  |      | -35                 | -30  | -25  | -23.3 | -20  | -15  | -10  | -5   | 0    | 5    | 7.2  | 10   |
| DL19H / 123F1905 | 2000 | 0.58                | 0.75 | 0.99 | 1.08  | 1.26 | 1.56 | 1.88 | 2.22 | 2.56 | 2.91 | 3.07 | 3.27 |
|                  | 2500 | 0.56                | 0.80 | 1.07 | 1.16  | 1.35 | 1.65 | 1.95 | 2.25 | 2.56 | 2.87 | 3.01 | 3.18 |
|                  | 3500 | 0.54                | 0.83 | 1.12 | 1.21  | 1.4  | 1.68 | 1.95 | 2.22 | 2.48 | 2.74 | 2.85 | 2.99 |
| DL22H / 123F1906 | 2000 | 0.66                | 0.85 | 1.08 | 1.16  | 1.33 | 1.60 | 1.89 | 2.18 | 2.49 | 2.80 | 2.95 | 3.13 |
|                  | 2500 | 0.67                | 0.86 | 1.10 | 1.19  | 1.37 | 1.66 | 1.96 | 2.25 | 2.55 | 2.84 | 2.97 | 3.13 |
|                  | 3500 | 0.80                | 0.94 | 1.15 | 1.23  | 1.39 | 1.65 | 1.93 | 2.21 | 2.50 | 2.78 | 2.97 | 3.07 |
| DL30H / 123F1907 | 2000 | 0.78                | 0.93 | 1.14 | 1.22  | 1.38 | 1.64 | 1.90 | 2.17 | 2.43 | 2.69 | 2.80 | 2.94 |
|                  | 2500 | 0.74                | 0.93 | 1.17 | 1.26  | 1.43 | 1.71 | 1.99 | 2.26 | 2.53 | 2.79 | 2.9  | 3.04 |
|                  | 3500 | 0.77                | 0.96 | 1.17 | 1.24  | 1.39 | 1.62 | 1.87 | 2.12 | 2.39 | 2.66 | 2.79 | 2.95 |

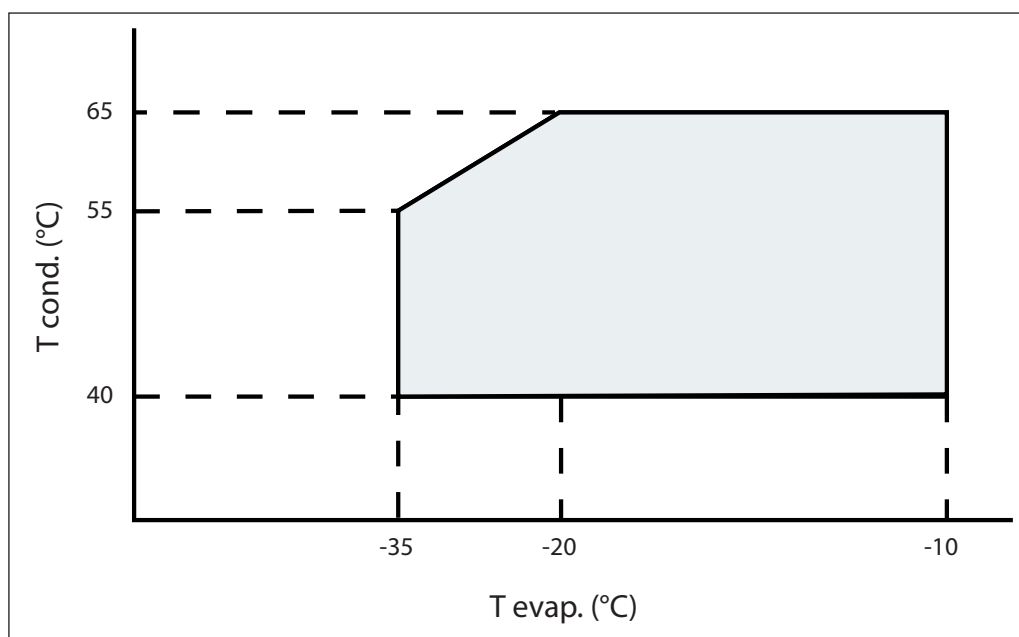
## R600a

| TYPE / CODE          | DISPLACEMENT<br><br>cm <sup>3</sup> | APPLICATION | CPR COOLING | VOLTAGE<br>FREQUENCY     | MOTOR | EXPANSION | SPEED<br><br>rpm | REFRIGERATION CAPACITY                                                    |     |     |      |     |        |      | WEIGHT<br><br>Kg | DESIGN |
|----------------------|-------------------------------------|-------------|-------------|--------------------------|-------|-----------|------------------|---------------------------------------------------------------------------|-----|-----|------|-----|--------|------|------------------|--------|
|                      |                                     |             |             |                          |       |           |                  | COP in W/W<br>1W=0,864 kcal/h = 3,415 BTU/h<br>Evaporating Temperature °C |     |     |      |     |        |      |                  |        |
|                      |                                     |             |             |                          |       |           |                  | CECOMAF (W)                                                               |     |     |      |     | Ashrae |      |                  |        |
|                      |                                     |             |             |                          |       |           |                  | -35                                                                       | -30 | -25 |      | -10 | -23.3  |      |                  |        |
|                      |                                     |             |             |                          |       |           |                  |                                                                           |     | W   | COP  |     | W      | COP  |                  |        |
| DL30C /<br>123F4901  | 3.00                                | LBP         | S           | 12-24V DC                | BLDC  | C         | 2000             | 9                                                                         | 15  | 23  | 0.91 | 58  | 32     | 1.20 | 4.20             | DLb    |
|                      |                                     |             |             |                          |       |           | 2500             | 12                                                                        | 19  | 29  | 0.91 | 73  | 39     | 1.22 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 16                                                                        | 23  | 35  | 0.92 | 83  | 51     | 1.24 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 19                                                                        | 28  | 40  | 0.93 | 97  | 55     | 1.25 |                  |        |
| DL35C /<br>123F4902  | 3.50                                | LBP         | S           | 12-24V DC                | BLDC  | C         | 2000             | 11                                                                        | 18  | 28  | 0.99 | 71  | 39     | 1.30 | 4.20             | DLb    |
|                      |                                     |             |             |                          |       |           | 2500             | 15                                                                        | 23  | 35  | 0.99 | 89  | 48     | 1.32 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 19                                                                        | 29  | 42  | 1.00 | 101 | 62     | 1.34 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 24                                                                        | 35  | 51  | 1.01 | 123 | 70     | 1.35 |                  |        |
| DK52C /<br>123F4903  | 5.20                                | LBP         | S           | 12-24V DC                | BLDC  | C         | 2000             | 17                                                                        | 28  | 43  | 0.99 | 109 | 60     | 1.30 | 4.00             | DKb    |
|                      |                                     |             |             |                          |       |           | 2500             | 23                                                                        | 36  | 54  | 0.99 | 136 | 74     | 1.32 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 29                                                                        | 44  | 65  | 1.00 | 155 | 96     | 1.34 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 35                                                                        | 50  | 73  | 1.01 | 176 | 100    | 1.35 |                  |        |
| DK70C /<br>123F4905  | 7.00                                | LBP         | S           | 12-24V DC                | BLDC  | C         | 2000             | 23                                                                        | 38  | 57  | 1.06 | 145 | 80     | 1.40 | 4.00             | DKb    |
|                      |                                     |             |             |                          |       |           | 2500             | 31                                                                        | 48  | 72  | 1.06 | 182 | 98     | 1.42 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 39                                                                        | 59  | 87  | 1.07 | 206 | 128    | 1.44 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 47                                                                        | 68  | 98  | 1.08 | 237 | 135    | 1.45 |                  |        |
| DK90C /<br>123F4906  | 9.00                                | LBP         | S           | 12-24V DC                | BLDC  | C         | 2000             | 29                                                                        | 47  | 71  | 1.06 | 182 | 100    | 1.40 | 4.00             | DKb    |
|                      |                                     |             |             |                          |       |           | 2500             | 38                                                                        | 60  | 90  | 1.06 | 227 | 123    | 1.42 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 49                                                                        | 73  | 109 | 1.07 | 258 | 160    | 1.44 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 61                                                                        | 88  | 127 | 1.08 | 308 | 175    | 1.45 |                  |        |
| VDL30C /<br>123F4907 | 3.00                                | LBP         | S           | 12-24V DC<br>100-240V AC | BLDC  | C         | 2000             | 9                                                                         | 15  | 23  | 0.91 | 58  | 32     | 1.20 | 4.40             | VDLb   |
|                      |                                     |             |             |                          |       |           | 2500             | 12                                                                        | 19  | 29  | 0.91 | 73  | 39     | 1.22 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 16                                                                        | 23  | 35  | 0.92 | 83  | 51     | 1.24 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 19                                                                        | 28  | 40  | 0.93 | 97  | 55     | 1.25 |                  |        |
| VDL35C /<br>123F4908 | 3.50                                | LBP         | S           | 12-24V DC<br>100-240V AC | BLDC  | C         | 2000             | 11                                                                        | 18  | 28  | 0.99 | 71  | 39     | 1.30 | 4.40             | VDLb   |
|                      |                                     |             |             |                          |       |           | 2500             | 15                                                                        | 23  | 35  | 0.99 | 89  | 48     | 1.32 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 19                                                                        | 29  | 42  | 1.00 | 101 | 62     | 1.34 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 24                                                                        | 35  | 51  | 1.01 | 123 | 70     | 1.35 |                  |        |
| VDK52C /<br>123F4909 | 5.20                                | LBP         | S           | 12-24V DC<br>100-240V AC | BLDC  | C         | 2000             | 17                                                                        | 28  | 43  | 0.99 | 109 | 60     | 1.30 | 4.00             | DKb    |
|                      |                                     |             |             |                          |       |           | 2500             | 23                                                                        | 36  | 54  | 0.99 | 136 | 74     | 1.32 |                  |        |
|                      |                                     |             |             |                          |       |           | 3000             | 29                                                                        | 44  | 65  | 1.00 | 155 | 96     | 1.34 |                  |        |
|                      |                                     |             |             |                          |       |           | 3500             | 35                                                                        | 50  | 73  | 1.01 | 176 | 100    | 1.35 |                  |        |

**LMHBP application**



**LBP application**



## General rules and wiring connections

DL, DK, VDL, VDK series must always be powered through the dedicated electronic driver, which is supplied with the compressor as a separate device.

- Never connect the compressor's hermetic pins (fusite) to the terminals of a battery or any other dc or ac source directly.
- Do not try to fit an electronic driver different than the electronic driver supplied with the compressor. the compressor will not operate and irreversible damage may occur.
- Always respect the polarity of the battery with the power input terminals of the electronic driver

- “-” Power input terminal of the electronic driver should be connected to the chassis of the vehicle as well as the appliance frame
- A fuse must be placed between the “+” pole of the battery or dc power supply and the “+” power input terminal of the electronic driver according to the table below.

| Model           | Fuse (A) |     |
|-----------------|----------|-----|
|                 | 12V      | 24V |
| DL / VDL SERIES | 15       | 7.5 |
| DK / VDK SERIES | 20       | 10  |

## Voltage drop in the power leads

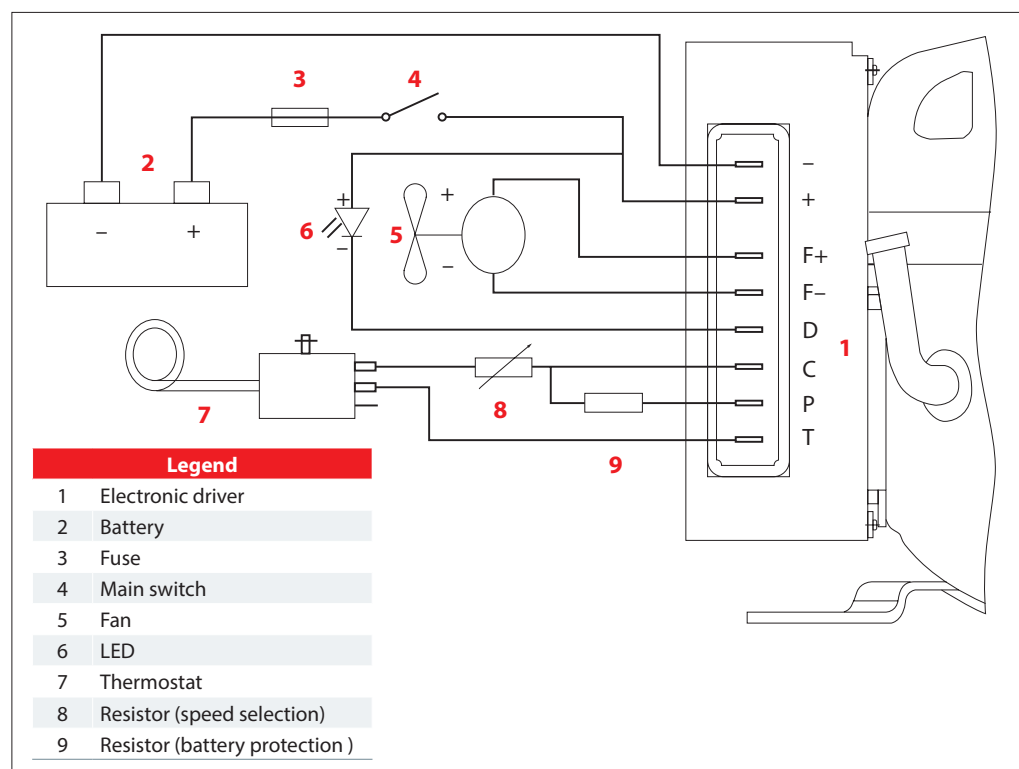
To avoid excessive voltage drop in the leads, their length and cross section must be related to the voltage supply as indicated in Table below.

**Table 4**

| Cross section<br>mm² | Rated Operating Range |     |
|----------------------|-----------------------|-----|
|                      | Length (m)            |     |
|                      | 12V                   | 24V |
| 2.5                  | 2.5                   | 5   |
| 4                    | 4                     | 8   |
| 6                    | 6                     | 12  |
| 10                   | 10                    | 20  |

## Terminal lay out Wiring Diagram

The electronic driver features a terminal board where all connections are made. The terminal lay out is described in the wiring diagram.



## Application Guidelines

## Electronic Driver controlled through resistance

### External fan

As shown on the scheme, positive side of the fan is connected to the (F +) end of the controller, and the negative terminal of the controller is connected to the (F-) terminal of the controller. A terminal of the controller (F +) and (F-) can be connected with a 12V DC fan. When the input voltage of the controller exceeds 12V, the output value between the terminals (F +) and (F-) is always kept at 12V.

Regardless of whether the input voltage system is 12V or 24V, the fan must be a 12V DC fan. The controller can continue to output 0.5A fan drive capability.

### Operating voltage

DL, DK, VDL, VDK series are designed to operate in a wide range of DC voltages, supplied either by a battery or by any other kind of filtered DC power supply.

DC voltage supply allowed: 9.6V to 31.5V. Controller itself detect if is connected to 12V or 24V.

**Table 5: Operating Voltage Setting Table**

| External resistance | 12V Stop value | 12V Boot value | 12V High pressure stop value | 24V Stop value | 24V Boot value | 24V High pressure stop value |
|---------------------|----------------|----------------|------------------------------|----------------|----------------|------------------------------|
| KΩ                  | V              | V              | V                            | V              | V              | 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           | 17.0                         | 21.3           | 22.7           | 31.5                         |

### Battery protection system

There is a protection system for the battery that prevents the compressor from operating if the available voltage becomes too low. The electronic driver will start and stop the compressor as needed by detection of the voltage between the input terminals (+) and (-) to protect the different power supply batteries.

The recommended standard battery protection values are listed in table 6. Other voltage can be set by adjusting the controller terminal (C) and (P) connection resistance (9), the specific value of Table 5.

**Table 6: Limits of battery protection parameters**

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

### Temperature Switch

The temperature switch (7) e.g. mechanical or electronic thermostat is connected to C and T pins and determine compressor ON and OFF operation.

**Speed determination**

If there is no resistor between C and T pins compressor's running speed will be 2000rpm. Table 7 shows the compressor running speed according to the resistance value connected between pins C and T.

**Table 7**

| Compressor speed | C/T Resistance | C/T Current |
|------------------|----------------|-------------|
| rpm              | $\Omega$       | mA          |
| 2000             | 0              | 5           |
| 2100             | 51             | 4.8         |
| 2200             | 100            | 4.6         |
| 2300             | 150            | 4.4         |
| 2400             | 200            | 4.2         |
| 2500             | 277            | 4           |
| 2600             | 330            | 3.8         |
| 2700             | 400            | 3.6         |
| 2800             | 490            | 3.4         |
| 2900             | 586            | 3.2         |
| 3000             | 692            | 3           |
| 3100             | 816            | 2.8         |
| 3200             | 963            | 2.6         |
| 3300             | 1137           | 2.4         |
| 3400             | 1331           | 2.2         |
| 3500             | 1523           | 2           |

**Protections and alarms**

DL series are electronically protected against a number of possible malfunctions and failures. As shown in Terminal lay out Wiring Diagram:

- The controller terminal (+) and (D) can be connected between a 10mA LED (6) for the display fault, LED anode connected to the controller (+) side, the cathode connected to the controller (D) end.
- When the failure occurs, LED every 3 seconds for the cycle, continuous flash in each cycle, according to different failures flash different times, each flashing for 0.4 seconds, continuous flashing for 3.2 minutes. The number of specific codes and blinks is shown in Table 8.

**Table 8: Alarm codification**

| No. of blinks | Fault type                                                                                        |
|---------------|---------------------------------------------------------------------------------------------------|
| 1             | Voltage fault - The input voltage is outside the set range                                        |
| 2             | Fan current fault - fan current output current greater than 1A                                    |
| 3             | Compressor start fault - compressor motor stall or system pressure too large                      |
| 4             | Compressor minimum speed fault - The compressor is overloaded or the motor speed is too small.    |
| 5             | Controller temperature fault - controller housing temperature too high ( $> 85^{\circ}\text{C}$ ) |
| 6             | Controller hardware failure - The controller has detected an abnormal parameter                   |

### Packaging and Ordering

Compressors are packed in industrial pack on polyester trays (25pcs each) on the pallet.

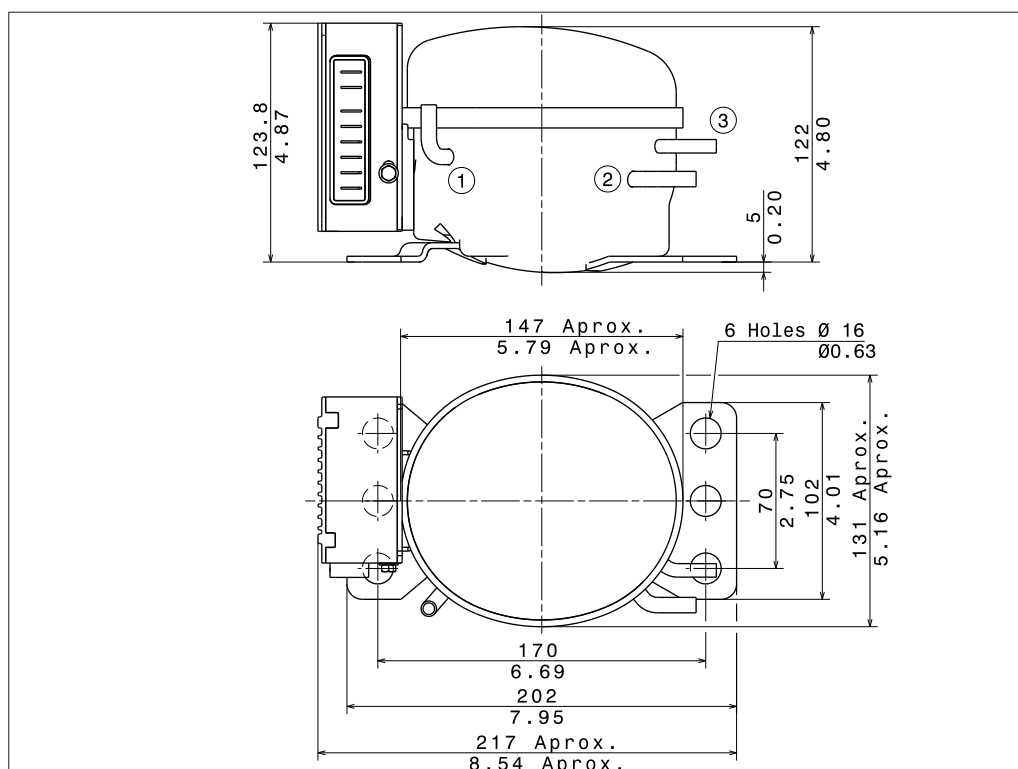
| code     | Model                              | Electronic driver type          | Industrial pack |              |            | Pallet dimensions (mm) |       |
|----------|------------------------------------|---------------------------------|-----------------|--------------|------------|------------------------|-------|
|          |                                    |                                 | Qty/Level       | Nb of levels | Qty/Pallet | Length                 | Wight |
| 123F1905 | DL19H including electronic driver  | Controller DL Series SZ018      | 25              | 6            | 150        | 1135                   | 830   |
| 123F1906 | DL22H including electronic driver  | Controller DL Series SZ018      | 25              | 6            | 150        | 1135                   | 830   |
| 123F1907 | DL30H including electronic driver  | Controller DL Series SZ018      | 25              | 6            | 150        | 1135                   | 830   |
| 123B1908 | DL35H including electronic driver  | Controller DL Series SZ018      | 25              | 5            | 125        | 1135                   | 830   |
| 123B1909 | VDL19H including electronic driver | Controller VDL Series SZ021     | 25              | 5            | 125        | 1135                   | 830   |
| 123B1910 | VDL22H including electronic driver | Controller VDL Series SZ021     | 25              | 5            | 125        | 1135                   | 830   |
| 123B4901 | DL30C including electronic driver  | Controller DL Series SZ018      | 25              | 5            | 125        | 1135                   | 830   |
| 123B4902 | DL35C including electronic driver  | Controller DL Series SZ018      | 25              | 5            | 125        | 1135                   | 830   |
| 123B4903 | DK52C including electronic driver  | Controller DK Series SZ056      | 25              | 5            | 125        | 1135                   | 830   |
| 123B4905 | DK70C including electronic driver  | Controller DK Series SZ056      | 25              | 5            | 125        | 1135                   | 830   |
| 123B4906 | DK90C including electronic driver  | Controller DK Series SZ056      | 25              | 5            | 125        | 1135                   | 830   |
| 123B4907 | VDL30C including electronic driver | Controller VDL/VDK Series SZ021 | 25              | 5            | 125        | 1135                   | 830   |
| 123B4908 | VDL35C including electronic driver | Controller VDL/VDK Series SZ021 | 25              | 5            | 125        | 1135                   | 830   |
| 123B4909 | VDK52C including electronic driver | Controller VDL/VDK Series SZ021 | 25              | 5            | 125        | 1135                   | 830   |

Compressor ordering code e.g. 123F1906 always consist of: compressor, electronic driver and mounting accessories.

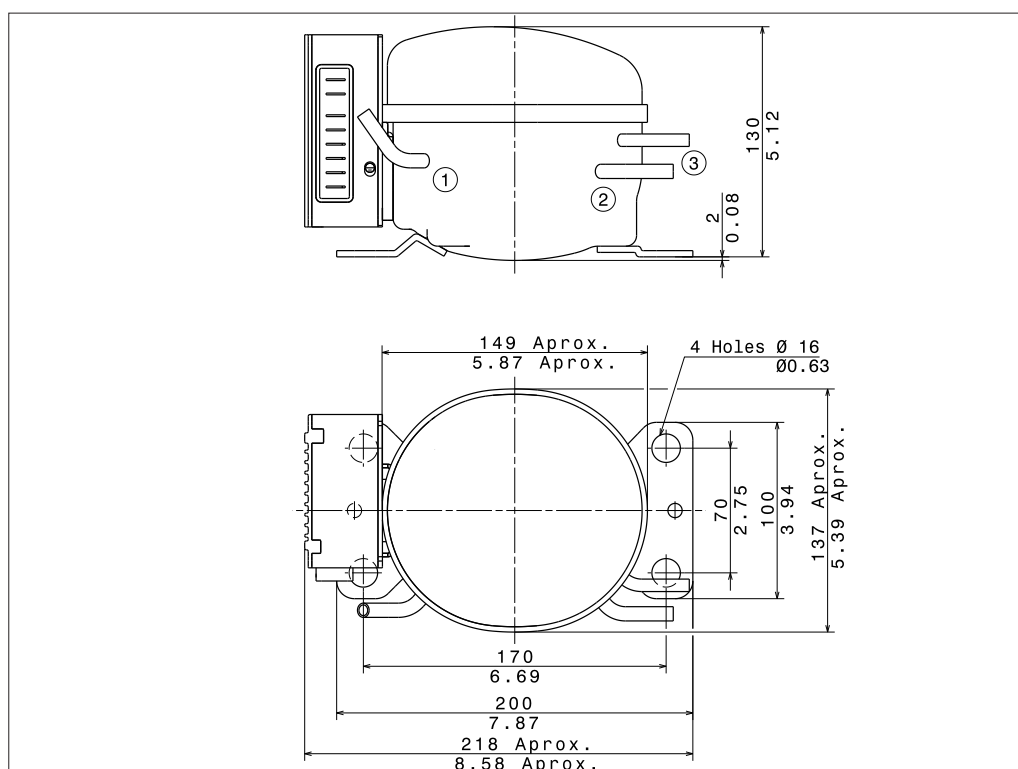
### Spare parts

| code     | Model                                              |
|----------|----------------------------------------------------|
| 123B9605 | Controller DL Series SZ018                         |
| 123B9607 | Controller DK Series SZ056                         |
| 123B9606 | Controller VDL/VDK Series SZ021                    |
| 123B9909 | Mountings accesories 16mm - standard (for 1 comp.) |

DL, VDL series



DK series







# Danfoss Commercial Compressors

is a worldwide manufacturer of compressors and condensing units for refrigeration and HVAC applications. With a wide range of high quality and innovative products we help your company to find the best possible energy efficient solution that respects the environment and reduces total life cycle costs.

We have 40 years of experience within the development of hermetic compressors which has brought us amongst the global leaders in our business, and positioned us as distinct variable speed technology specialists. Today we operate from engineering and manufacturing facilities spanning across three continents.



Danfoss Scrolls



Danfoss Light Commercial Refrigeration Compressors



Danfoss Inverter Scrolls



Danfoss Maneurop Reciprocating Compressors



Danfoss Turbocor Compressors



Danfoss Optyma Condensing Units

Our products can be found in a variety of applications such as rooftops, chillers, residential air conditioners, heatpumps, coldrooms, supermarkets, milk tank cooling and industrial cooling processes.

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