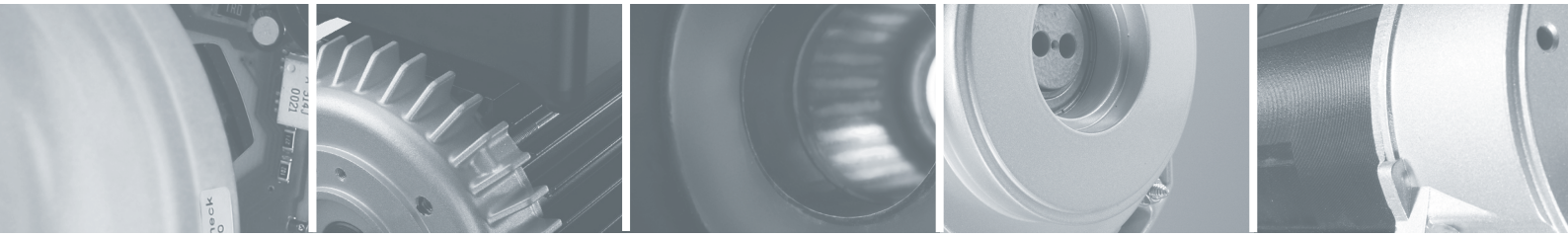
HANNING

moving ideas

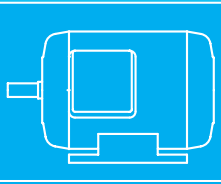
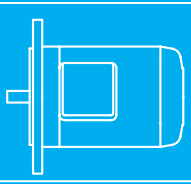
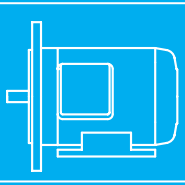
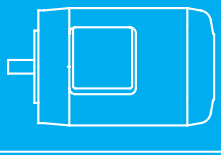
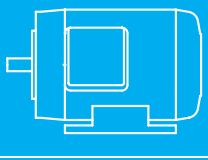
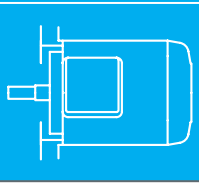
# hamotic pro data sheet



## Mechanical design

### Type of protection

All motors are delivered in IP54. They can also be made available with a higher protection.

| Designs according to DIN EN 50347 | | |
|---|---|---|
| Design | Picture | Explanation |
| With feet |  | 2 end shields, housing with feet, free shaft end, installation on base |
| With FF flange |  | 2 end shields, housing without feet, free shaft end,<br>FF flange near bearing on drive end, flange connection |
| With feet and FF flange |  | 2 end shields, housing with feet, free shaft end, FF mounting flange near bearing on drive end, installation on base for flange connection |
| With FT flange |  | 2 end shields, housing without feet, free shaft end,<br>FT mounting flange near bearing on drive end, flange connection |
| With feet and FT flange |  | 2 end shields, housing with feet, free shaft end, FT mounting flange near bearing on drive end, installation on base for flange connection |
| |  | 1 end shield, housing without feet, free shaft end, without end shield (also without rolling contact bearing) on drive end, installation on drive end front plate |

# Mechanical design

## Fits

The shaft ends and the diameters of the centering shoulder listed in the table below comply with the following fits. Bores in couplings and pulleys must have at least one fit according to ISO-H7.

| Fits | |
|---|---|
| Size | ISO fits according to DIN 7160, DIN 7161, DIN EN 50347 |
| D up to 28 mm Ø | j 6* |
| D between 30 and 48 mm Ø | k 6 |
| N up to 230 mm Ø | j 6 |

* According to DIN 748 k 6 (old version)

## Tolerances

The following tolerances apply to the sizes A, B, M and H indicated in the table.
Keyways and keys (F and GA) correspond to DIN 6885.

| Tolerances | | |
|---|---|---|
| Size | Dimensions | Tolerance |
| A and B | ≤ 250 mm | ± 0.75 mm |
| M | ≤ 200 mm<br>200 mm - 500 mm | ± 0.25 mm<br>± 0.5 mm |
| H | ≤ 250 mm | - 0.5 mm |

## Shaft ends

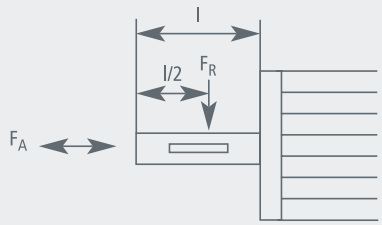
Center holes 60° according to DIN 332 part 2.

| Shaft ends | |
|---|---|
| **Shaft diameter (mm)** | **Thread (mm)** |
| ≤ 16 | M 5 |
| ≤ 21 | M 6 |
| ≤ 24 | M 8 |
| ≤ 30 | M 10 |
| ≤ 38 | M 12 |

## Maximum axial load

If the maximum radial load $F_R$ is applied, an axial load of $F_A = 0.3 \times F_R$ is permissible.

**Maximum axial load**




**Permissible radial load**

| Frame size | Type | Number of poles | Permissible radial load | Distance l/2 |
|---|---|---|---|---|
| | | | $F_r$ [N] | [mm] |
| 56 | 5z2<br>5y4 | 2<br>4 | 260<br>320 | 10<br>10 |
| 63 | 6KB2<br>6A4 | 2<br>4 | 380<br>480 | 11.5<br>11.5 |
| 71 | 7D2<br>7KC4 | 2<br>4 | 380<br>480 | 15<br>15 |
| 80 | 8G2<br>8F4 | 2<br>4 | 620<br>780 | 20<br>20 |
| 90 | 9LI2<br>9LH4 | 2<br>4 | 660<br>850 | 25<br>25 |
| 100 RL | 10RLK2<br>10RLK4 | 2<br>4 | 890<br>1140 | 30<br>30 |
| 112 | 11MN2S<br>11ML4 | 2<br>4 | 950<br>1140 | 30<br>30 |
| 132 | –<br>13MN4 | 2<br>4 | 1420<br>1760 | 40<br>40 |

## Balancing

The rotors are dynamically balanced with half key at the shaft end. The standard motor design complies with the vibration severity grade N to ISO 2373. Optionally HANNING industrial motors are also available in vibration severity grade R.

# Technical data

## Three-phase industrial motors

| Three-phase AC motors at 400 V, 50 Hz | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated power | Frame size | Type | Weight | Rated speed | Rated currend | cosφ | Efficiency η load | | | Effici-ency class | Rated torque | Rel. starting torque | Rel. stalling torque | Rel. starting current | Moment of inertia |
| [kW] | | | [kg] | [1/min] | [A] | | 100% | 75% | 50% | IE | [Nm] | $M_A/M_N$ | $M_K/M_N$ | $I_A/I_N$ | J[kgm²] |
| **3000 rpm in no-load operation** | | | | | | | | | | | | | | | |
| 0.09 | 56 | 5y2 | 3.4 | 2750 | 0 | 0.82 | 56.1 | 55.5 | 48.7 | – | 0.3 | 2.3 | – | 3.1 | 0.00013 |
| 0.12 | 56 | 5z2 | 3.6 | 2750 | 0.4 | 0.77 | 58.0 | 53.8 | 44.9 | – | 0.4 | 2.8 | 2.9 | 4.0 | 0.00019 |
| 0.18 | 63/63K* | 6A2/6KA2 | 4.2/4.0 | 2860 | 0.6 | 0.77 | 65.7 | 62.4 | 54.0 | – | 0.6 | 2.7 | 3.2 | 4.1 | 0.00035 |
| 0.25 | 63/63K* | 6B2/6KB2 | 4.2/4.0 | 2840 | 0.9 | 0.77 | 68.2 | 65.5 | 55.0 | – | 0.8 | 2.8 | 2.6 | 4.0 | 0.00035 |
| 0.37 | 71F** | 7KC2 | 6.2 | 2840 | 1 | 0.84 | 71.0 | 69.2 | 63.3 | – | 1.2 | 2.9 | 3.0 | 5.7 | 0.00040 |
| 0.55 | 71 | 7D2 | 6.5 | 2840 | 1.5 | 0.82 | 74.1 | 73.3 | 68.7 | – | 1.9 | 2.7 | 2.7 | 5.1 | 0.00050 |
| 0.75 | 80 | 8F2S4 | 9.2 | 2835 | 1.7 | 0.82 | 81.0 | 81.7 | 80.2 | 2 | 2.5 | 3.4 | 3.3 | 6.3 | 0.00060 |
| 1.1 | 80 | 8G2S2 | 9.6 | 2820 | 2.4 | 0.83 | 81.1 | 82.4 | 81.3 | 2 | 3.7 | 3.4 | 3.4 | 6.0 | 0.00079 |
| 1.5 | 90S | 9SH2S2 | 14 | 2840 | 3.2 | 0.83 | 81.9 | 83.5 | 82.0 | 2 | 5.0 | 2.0 | 3.0 | 6.4 | 0.00157 |
| 2.2 | 90L | 9LI2S2 | 17.2 | 2890 | 4.7 | 0.80 | 85.8 | 85.5 | 83.2 | 2 | 7.3 | 3.2 | 3.5 | 7.5 | 0.00217 |
| 3 | 100RL | 10RLKS2 | 20.1 | 2890 | 6.2 | 0.81 | 86.6 | 86.4 | 84.2 | 2 | 9.9 | 3.3 | 3.8 | 8.2 | 0.00291 |
| 4 | 112M | 11ML2S2 | 31 | 2935 | 7.9 | 0.84 | 86.9 | 85.6 | 82.1 | 2 | 13.0 | 2.9 | 4.0 | 9.5 | 0.00765 |
| 5.5 | 112[1)] | 11MM2S | 31.8 | 2890 | 12.2 | 0.83 | 86.0 | 86.3 | 83.6 | 1*** | 18.2 | 2.4 | 3.0 | 7.7 | 0.00765 |
| 7.5 | 112[1)] | 11MN2S | 40.8 | 2880 | 15.5 | 0.88 | 87.3 | 87.7 | 84.2 | 1*** | 24.9 | 2.1 | 2.6 | 6.6 | 0.01072 |
| **1500 rpm in no-load operation** | | | | | | | | | | | | | | | |
| 0.06 | 56 | 5v4 | 3.4 | 1300 | 0.3 | 0.66 | 44.0 | 39.8 | 31.5 | – | 0.4 | 2.5 | – | 2.2 | 0.00019 |
| 0.09 | 56 | 5y4 | 3.6 | 1360 | 0.5 | 0.6 | 53.2 | 51.5 | 38.4 | – | 0.6 | 2.7 | 2.4 | 2.4 | 0.00019 |
| 0.12 | 63/63K* | 6z4/6Kz4 | 4.5/4.3 | 1380 | 0.5 | 0.65 | 54.3 | 52.0 | 39.9 | – | 0.8 | 2.7 | 2.6 | 2.9 | 0.00035 |
| 0.18 | 63 | 6A4 | 5 | 1380 | 0.8 | 0.61 | 56.5 | 54.7 | 41.8 | – | 1.3 | 3.2 | 3.0 | 3.5 | 0.00049 |
| 0.25 | 71K** | 7B4/7KB4 | 5.8 | 1400 | 0.8 | 0.7 | 64.8 | 62.1 | 55.9 | – | 1.7 | 2.7 | 2.5 | 3.9 | 0.00074 |
| 0.37 | 71 | 7C4/7KC4 | 6.4 | 1390 | 1.2 | 0.7 | 72.0 | 69.5 | 64.2 | – | 2.5 | 3.2 | 3.0 | 3.9 | 0.00092 |
| 0.55 | 80 | 8D4 | 7.3 | 1400 | 1.6 | 0.72 | 73.1 | 71.2 | 64.3 | – | 3.8 | 2.5 | 2.7 | 4.3 | 0.00110 |
| 0.75 | 80 | 8F4S2 | 10.5 | 1410 | 2 | 0.68 | 79.6 | 79.5 | 76.3 | 2 | 5.1 | 3.2 | 3.4 | 5.3 | 0.00175 |
| 1.1 | 90 | 9SG4S2 | 14.2 | 1432 | 2.7 | 0.74 | 82.6 | 82.4 | 78.1 | 2 | 7.3 | 2.9 | 3.3 | 6.2 | 0.00320 |
| 1.5 | 90L | 9LH4S2 | 17.8 | 1433 | 3.6 | 0.75 | 83.5 | 83.9 | 81.3 | 2 | 10.0 | 3.3 | 3.6 | 6.5 | 0.0044 |
| 2.2 | 100RL | 10RLI4S2 | 23.9 | 1440 | 5.2 | 0.73 | 84.4 | 83.3 | 82.6 | 2 | 14.6 | 2.9 | 3.3 | 7.1 | 0.0060 |
| 3 | 100RL | 10RLK4 | 23.9 | 1400 | 7.3 | 0.81 | 83.0 | 84.3 | 80.6 | 1*** | 20.5 | 3.1 | 3.2 | 6.2 | 0.0060 |
| 4 | 112M | 11ML4 | 34.5 | 1430 | 8.5 | 0.85 | 86.4 | 86.9 | 83.5 | 1*** | 26.7 | 2.7 | 3.2 | 7.4 | 0.01905 |
| 5.5 | 132S | 13SM4 | 52 | 1460 | 11.5 | 0.83 | 86.7 | 85.7 | 82.5 | 1*** | 36.0 | 3.0 | 3.5 | 8.8 | 0.04060 |
| 7.5 | 132M | 13MN4 | 63 | 1450 | 15.3 | 0.84 | 87.0 | 87.5 | 84.2 | 1*** | 49.4 | 2.7 | 3.4 | 7.7 | 0.05413 |
| **1000 rpm in no-load operation** | | | | | | | | | | | | | | | |
| 0.12 | 71K** | 7Kz6 | 5.0 | 900 | 0.5 | 0.70 | 52.1 | 47.3 | 38.4 | _ | 1.3 | 2.0 | 2.1 | 2.5 | 0.00055 |
| 0.18 | 71K** | 7KA6 | 6.2 | 870 | 0.8 | 0.71 | 63.9 | 60.1 | 52.8 | – | 1.9 | 2.2 | 2.4 | 3.1 | 0.00074 |
| 0.25 | 71 | 7B6 | 6.4 | 920 | 1.0 | 0.63 | 66.3 | 65.9 | 59.0 | – | 2.6 | 2.2 | 2.5 | 3.2 | 0.00092 |
| 0.37 | 80 | 8C6 | 9.3 | 900 | 1.4 | 0.67 | 66.2 | 64.3 | 57.9 | – | 4.0 | 2.0 | 2.2 | 3.1 | 0.00110 |
| 0.55 | 80 | 8D6 | 10.2 | 900 | 1.9 | 0.68 | 65.9 | 67.8 | 61.9 | – | 5.9 | 2.3 | 2.4 | 3.2 | 0.00147 |
| 0.75 | 90S | 9SF6 | 14.0 | 930 | 2.5 | 0.71 | 69.1 | 66.1 | 58.5 | 1*** | 7.7 | 2.3 | 2.7 | 4.7 | 0.00468 |
| 1.1 | 90L | 9LG6 | 17.0 | 915 | 3.2 | 0.79 | 72.3 | 71.8 | 67.2 | 1*** | 11.5 | 2.1 | 2.6 | 4.9 | 0.00623 |
| 1.5 | 100RL | 10RLH6 | 21.6 | 920 | 4.1 | 0.77 | 76.1 | 74.4 | 70.4 | 1*** | 15.6 | 2.5 | 2.5 | 4.5 | 0.00810 |
| 2.2 | 112M | 11MI6 | 36.0 | 950 | 5.2 | 0.78 | 79.6 | 77.2 | 71.6 | 1*** | 22.2 | 2.4 | 3.1 | 6.0 | 0.01904 |
| 3 | 132S | 13SK6 | 41.0 | 930 | 7.5 | 0.78 | 80.2 | 78.1 | 73.4 | 1*** | 31.0 | 2.2 | 2.6 | 4.7 | 0.02975 |
| 4 | 132M | 13ML6 | 53.0 | 955 | 9.3 | 0.81 | 80.8 | 78.7 | 74.0 | 1*** | 40.0 | 1.8 | 2.6 | 5.6 | 0.04060 |
| 5.5 | 132M | 13MM6 | 65.0 | 955 | 13.5 | 0.74 | 85.0 | 84.4 | 81.3 | 1*** | 55.0 | 2.2 | 2.4 | 6.2 | 0.05413 |

1) Frame size not according to IEC standard

* Frame size 63 K = mounting dimensions as frame size 63, total length shorter (K) with flange motors only

** Frame size 71 K = mounting dimensions as frame size 71, total length shorter (K)

*** only available as variant for specific operation according to EuP 640-2009

## Three-phase industrial motors, pole changing

| Three-phase AC motors at 400 V, 50 Hz | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rated power | Frame size | Type | Weight | Rated speed | Rated current | Rel. starting torque | Rel. starting current | Moment of intertia |
| [kW] | | | [kg] | [1/min] | [A] | $M_A/M_N$ | $I_A/I_N$ | J [kgm²] |
| 1000/1500 rpm in no-load operation, two separate windings | | | | | | | | |
| 0.12/0.18 | 71K** | 7Kz6–4 | 6.50 | 945/1430 | 0.6/0.7 | 2.0/2.0 | 2.8/3.1 | 0.00079 |
| 0.20/0.30 | 71 | 7A6–4 | 7.80 | 930/1430 | 1.0/1.3 | 2.3/2.6 | 2.2/4.2 | 0.00129 |
| 0.30/0.45 | 80 | 8B6–4 | 9.50 | 935/1445 | 1.2/1.6 | 2.2/1.8 | 3.0/3.4 | 0.00175 |
| 0.40/0.60 | 90S | 9SC6–4 | 13.20 | 965/1440 | 2.0/2.5 | 2.2/1.3 | 3.3/3.5 | 0.00470 |
| 0.60/0.90 | 90L | 9LD6–4 | 17.00 | 945/1430 | 1.9/2.2 | 2.1/1.6 | 3.9/4.3 | 0.00399 |
| 1.10/1.60 | 100L | 10RLG6–4 | 21.50 | 930/1425 | 3.3/3.8 | 2.0/1.8 | 3.3/4.3 | 0.00599 |
| 1.50/2.20 | 112M | 11MH6–4 | 35.00 | 970/1460 | 4.6/5.9 | 2.5/2.0 | 4.8/3.8 | 0.02823 |
| 1.80/2.50 | 112M | 11MI6–4 | 36.00 | 950/1440 | 5.8/7.2 | 2.2/2.1 | 5.0/5.7 | 0.02823 |
| 2.20/3.30 | 132S | 13SI6–4 | 51.00 | 980/1475 | 6.2/8.8 | 1.5/1.8 | 4.0/7.5 | 0.04060 |
| 3.00/4.50 | 132M | 13MK6–4 | 62.00 | 975/1470 | 7.4/9.7 | 2.5/2.2 | 6.1/8.2 | 0.05413 |
| 1500/1300 rpm in no-load operation, Dahlander circuit | | | | | | | | |
| 0.18/0.25 | 71K** | 7KA42 | 6.20 | 1415/2830 | 0.8/1.1 | 3.1/2.7 | 4.1/4.8 | 0.00092 |
| 0.25/0.37 | 71 | 7B42 | 7.00 | 1420/2785 | 1.0/1.4 | 3.4/3.1 | 4.0/4.3 | 0.00110 |
| 0.37/0.55 | 80 | 8C42 | 8.40 | 1410/2800 | 1.2/1.8 | 2.9/2.8 | 4.4/4.2 | 0.00129 |
| 0.55/0.75 | 80 | 8D42 | 8.40 | 1360/2830 | 1.7/1.9 | 2.4/2.5 | 3.8/5.2 | 0.00175 |
| 0.90/1.10 | 90S | 9SF42 | 13.00 | 1400/2800 | 2.2/2.4 | 1.9/2.2 | 4.5/5.4 | 0.00260 |
| 1.20/1.50 | 90L | 9LG42 | 16.50 | 1430/2860 | 2.9/3.5 | 2.6/2.7 | 5.6/5.2 | 0.00399 |
| 1.80/2.20 | 100L | 10RLHI42 | 21.00 | 1440/2910 | 5.3/6.8 | 2.4/2.9 | 5.3/5.2 | 0.00599 |
| 2.601/3.00 | 112M | 11MI42 | 35.00 | 1450/2920 | 5.9/6.9 | 2.4/3.1 | 6.0/7.8 | 0.01905 |
| 3.30/4.00 | 112M | 11MK42 | 35.00 | 1460/2840 | 7.2/10.0 | 2.6/2.9 | 5.5/8.0 | 0.02381 |
| 4.00/5.50 | 132S | 13SL42 | 52.00 | 1450/2890 | 8.5/11.6 | 2.5/2.3 | 7.6/8.1 | 0.04060 |
| 6.00/7.50 | 132M | 13MM42 | 62.00 | 1455/2910 | 12.2/15.1 | 2.2/2.5 | 8.1/9.3 | 0.05413 |
| 750/1500 rpm in no-load operation, Dahlander circuit | | | | | | | | |
| 0.15/0.25 | 71 | 7zA84 | 7.80 | 695/1410 | 1.0/0.7 | 2.3/2.0 | 2.2/3.9 | 0.00129 |
| 0.25/0.37 | 80 | 8B84 | 9.40 | 665/1390 | 1.2/1.0 | 1.5/1.6 | 2.3/3.8 | 0.00175 |
| 0.37/0.55 | 90S | 9SC84 | 13.20 | 715/1435 | 1.7/1.4 | 2.0/1.8 | 3.5/5.7 | 0.00468 |
| 0.60/1.10 | 90L | 9LD84 | 16.60 | 710/1400 | 2.3/2.4 | 2.1/1.6 | 3.6/4.7 | 0.00623 |
| 0.75/1.10 | 100R | 10RLF84 | 21.00 | 700/1400 | 2.5/2.4 | 1.6/1.6 | 3.3/4.7 | 0.00623 |
| 1.10/1.50 | 112M | 11MG84 | 30.00 | 705/1430 | 3.7/3.3 | 1.7/1.9 | 3.9/5.6 | 0.02150 |
| 1.50/2.20 | 112M | 11MH84 | 35.00 | 715/1430 | 4.3/4.9 | 1.3/1.6 | 3.5/4.5 | 0.02733 |
| 2.20/3.00 | 132S | 13SI84 | 55.00 | 730/1470 | 6.6/6.5 | 1.4/1.8 | 4.8/4.6 | 0.03950 |
| 3.00/4.00 | 132M | 13MK84 | 67.00 | 720/1430 | 9.4/8.2 | 1.9/2.7 | 4.8/8.7 | 0.07750 |

** Frame size 71 K = mounting dimensions as frame size 71, total length shorter (K)

Different number of pole pairs on request

# Technical data

## Single-phase industrial motors

| AC motors with running capacitors at 230 V, 50 Hz | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rated power | Frame size | Type | Weight | Rated speed | Rated current | Starting current | Rel. starting torque | Rated torque | Running capacitor | Moment of inertia |
| [kW] | | | [kg] | [1/min] | [A] | [A] | $M_A / M_N$ | [Nm] | [µF] | J [kgm²] |
| **3000 rpm in no-load operation** | | | | | | | | | | |
| 0.06 | 56 | E5v2B | 3.6 | 2700 | 0.8 | 2.0 | 1.0 | 0.2 | 4 | 0.00019 |
| 0.09 | 56 | E5y2B | 3.8 | 2730 | 1.0 | 2.4 | 1.1 | 0.3 | 5 | 0.00019 |
| 0.12 | 63/63K* | E6z2B/E6Kz2B | 4.1/3.9 | 2790 | 1.3 | 3.3 | 0.7 | 0.4 | 4 | 0.000245 |
| 0.18 | 63/63K* | E6A2B/E6KA2B | 4.3/4.1 | 2760 | 1.7 | 4.6 | 0.9 | 0.7 | 8 | 0.000350 |
| 0.25 | 63 | E6B2B | 4.5 | 2770 | 2.0 | 6.0 | 0.7 | 0.9 | 8 | 0.000490 |
| 0.37 | 71K** | E7KC2B | 7.0 | 2850 | 3.4 | 14.1 | 0.5 | 1.2 | 12 | 0.000496 |
| 0.55 | 71 | E7D2B | 8.0 | 2810 | 4.2 | 13.5 | 0.5 | 1.9 | 16 | 0.000595 |
| 0.75 | 80 | E8F2B | 10.0 | 2870 | 5.1 | 22.4 | 0.3 | 2.5 | 16 | 0.000794 |
| 1.10 | 80 | E8G2B2 | 11.0 | 2730 | 7.3 | 27.0 | 0.5 | 3.9 | 30 | 0.000992 |
| 1.50 | 90L | E9LH2B | 19.0 | 2850 | 9.8 | 44.0 | 0.3 | 5.0 | 40 | 0.001389 |
| **1500 rpm in no-load operation** | | | | | | | | | | |
| 0.06 | 56 | E5v4B | 3.8 | 1380 | 0.9 | 1.6 | 1.0 | 0.4 | 5 | 0.000157 |
| 0.09 | 63/63K* | E6y4B/E6Ky4B | 4.0 | 1380 | 1.0 | 2.2 | 0.6 | 0.6 | 6 | 0.000350 |
| 0.12 | 63 | E6z4B | 4.1 | 1410 | 1.2 | 3.4 | 0.8 | 0.8 | 6 | 0.000490 |
| 0.18 | 71K** | E7KA4B | 5.5 | 1370 | 1.8 | 4.6 | 0.8 | 1.2 | 8 | 0.000735 |
| 0.25 | 71K** | E7KB4B | 5.7 | 1400 | 1.9 | 5.8 | 0.6 | 1.7 | 12 | 0.000919 |
| 0.37 | 71 | E7C4B1 | 6.0 | 1400 | 3.0 | 9.0 | 0.7 | 2.5 | 16 | 0.001103 |
| 0.55 | 80 | E8D4B | 8.5 | 1360 | 4.6 | 15.2 | 0.5 | 3.8 | 16 | 0.001746 |
| 0.75 | 90S | E9SF4B | 12.4 | 1360 | 6.2 | 17.0 | 0.6 | 5.1 | 30 | 0.002996 |
| 1.10 | 90L | E9LG4B | 18.0 | 1370 | 7.0 | 25.0 | 0.6 | 7.7 | 40 | 0.003995 |

* Frame size 63 K = mounting dimensions as frame size 63, total length shorter (K) with flange motors
** Frame size 71 K = mounting dimensions as frame size 71, total length shorter (K)

| AC motors with starting, running capacitors, DriveSAS electronic centrifugal switch at 230 V, 50 Hz | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated power | Frame size | Type | Weight | Rated speed | Rated current | Starting current | Rel. starting torque | Rel. torque | Running capacitor | Starting capacitor | Moment of inertia |
| [kW] | | | [kg] | [1/min] | [A] | [A] | $M_A / M_N$ | [Nm] | [µF] | [µF] | J [kgm²] |
| **3000 U/min in no-load operation** | | | | | | | | | | | |
| 0.37 | 71K** | E7KC2AB | 8.0 | 2850 | 3.0 | 12.8 | 1.5 | 1.2 | 16 | 16 | 0.000496 |
| 0.55 | 71 | E7D2AB | 9.0 | 2810 | 3.9 | 13.5 | 1.7 | 1.9 | 12 | 40 | 0.000595 |
| 0.75 | 80 | E8F2AB | 11.0 | 2870 | 5.1 | 23.0 | 1.4 | 2.5 | 16 | 40 | 0.000794 |
| 1.1 | 80 | E8G2AB6 | 12.0 | 2840 | 7.0 | 32.8 | 1.7 | 3.7 | 30 | 100 | 0.000942 |
| 1.5 | 90S | E9SH2AB | 15.0 | 2870 | 10.0 | 44.4 | 1.7 | 5.0 | 40 | 100 | 0.00182 |
| **1500 U/min in no-load operation** | | | | | | | | | | | |
| 0.18 | 71K** | E7KA4AB | 6.5 | 1370 | 1.8 | 4.0 | 1.5 | 1.3 | 6 | 16 | 0.000735 |
| 0.25 | 71K** | E7KB4AB | 6.7 | 1400 | 1.9 | 7.0 | 1.8 | 1.7 | 10 | 20 | 0.000919 |
| 0.37 | 71 | E7C4AB1 | 7.0 | 1370 | 3.0 | 10.8 | 2.1 | 2.6 | 12 | 30 | 0.001103 |
| 0.55 | 80 | E8D4AB | 9.5 | 1360 | 4.6 | 13.4 | 1.9 | 3.9 | 16 | 30 | 0.001746 |
| 0.75 | 80 | E8F4AB | 12.0 | 1370 | 5.5 | 18.0 | 1.6 | 5.2 | 20 | 40 | 0.001746 |
| 1.1 | 90S | E9SG4AB1 | 14.0 | 1430 | 6.5 | 27.8 | 2.1 | 7.3 | 40 | 100 | 0.00300 |
| 1.5 | 90L | E9LH4AB | 19.0 | 1415 | 10.8 | 36.0 | 1.4 | 10.1 | 40 | 80 | 0.00400 |

* Frame size 63 K = mounting dimensions as frame size 63, total length shorter (K) with flange motors
** Frame size 71 K = mounting dimensions as frame size 71, total length shorter (K)

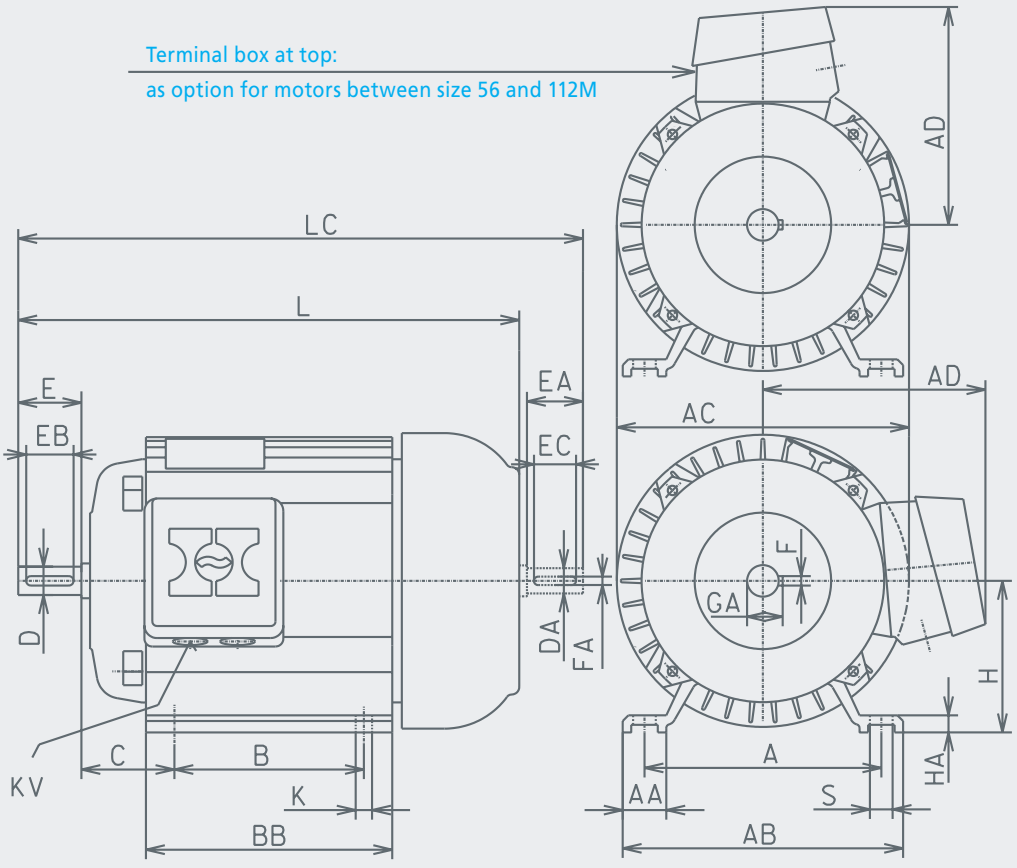
# Dimension sheets

## Designs

| Dimensions for foot design | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | H | L | LC | AD* | AC | A | B | C | K | S | AA | AB | HA | BB | D/DA | E/EA | EB/EC | GA | F/FA | KV |
| 56M | 56 | 195.5 | 219 | 90 | 107 | 90 | 71 | 36 | 6.1/(M5) | 9 | 16 | 106 | 6 | 110.0 | 9 | 20 | 14 | 10.2 | 3 | M16 x 1.5 |
| 63S | 63 | 188.5 | 217 | 103 | 123 | 100 | 80 | 25 | 7/(M6) | 9 | 25 | 125 | 8 | 95.0 | 11 | 23 | 15 | 12.5 | 4 | |
| 63M | 63 | 222.5 | 251 | 103 | 123 | 100 | 80 | 40 | 7/(M6) | 9 | 25 | 125 | 8 | 129.0 | 11 | 23 | 15 | 12.5 | | |
| 71S | 71 | 209.0 | 242 | 128(111) | 141 | 112 | 60 | 45 | 7/(M6) | 9 | 18 | 130 | 8 | 88.0 | 14 | 30 | 20 | 16 | 5 | M20 x 1.5 |
| 71M | 71 | 239.0 | 272 | 128(111) | 141 | 112 | 90 | 45 | 7/(M6) | 9 | 18 | 130 | 8 | 118.0 | 14 | 30 | 20 | 16 | 5 | |
| 80M | 80 | 272.0 | 306 | 128(111) | 156 | 125 | 100 | 50 | 10/(M8) | 12 | 23 | 148 | 9 | 130.0 | 19/14 | 40/30 | 30/20 | 21.5 | 6 | |
| 90S | 90 | 301.5 | 354 | 141(126) | 178 | 140 | 100 | 56 | 10/(M8) | 12 | 24 | 164 | 10 | 127.0 | 24/19 | 50/40 | 40/30 | 27 | 8 | |
| 90L | 90 | 326.5 | 379 | 141(126) | 178 | 140 | 125 | 56 | 10/(M8) | 12 | 24 | 164 | 10 | 152.0 | 24/19 | 50/40 | 40/30 | 27 | 8 | |
| 100RL | 100 | 375.0 | 430 | 159(143) | 194 | 160 | 140 | 63 | 12/(M10) | 15 | 27 | 187 | 12 | 190.0 | 28/24 | 60/50 | 45/40 | 31 | 8 | |
| 100L | 100 | 371.0 | 435 | 154 | 198 | 160 | 140 | 63 | 12/(M10) | 15 | 35 | 195 | 13 | 184.0 | 28 | 60 | 45 | 31 | 8 | |
| 112M | 112 | 393.5 | 458 | 167 | 222 | 190 | 140 | 70 | 12/(M10) | 15 | 35 | 225 | 14 | 177.5 | 28 | 60 | 45 | 31 | 8 | |
| 132S | 132 | 458.0 | 542 | 196 | 262 | 216 | 140 | 89 | 12/(M10) | 15 | 35 | 251 | 14 | 213.5 | 38 | 80 | 63 | 41 | 10 | M25 x 1.5 |
| 132M | 132 | 496.0 | 580 | 196 | 262 | 216 | 178 | 89 | 12/(M10) | 15 | 35 | 251 | 14 | 251.5 | 38 | 80 | 63 | 41 | 10 | |

* Dimensions for metal terminal box
( ) Dimensions for insulated terminal box

## Foot design



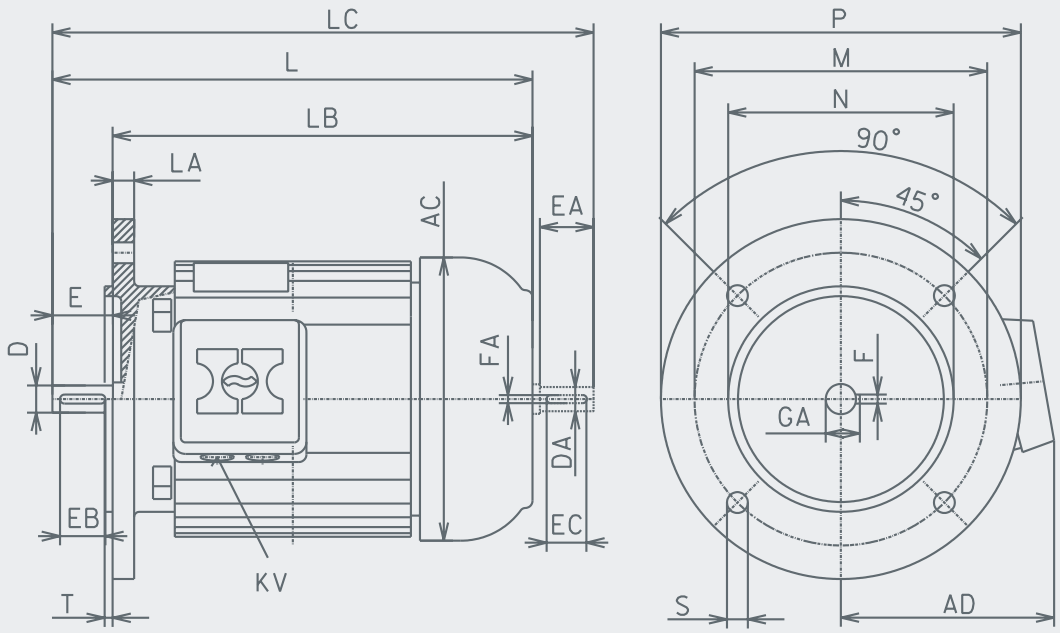
## Designs

### Dimensions for FF flange design

| Size | Flange | M | N | P | T | S | LA | L | LB | LC | AC | AD* | D/DA | E/EA | EB/EC | GA | F/FA | KV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63S | FF115 | 115 | 95 | 140 | 3.0 | 9 | 9 | 210.5 | 187.5 | 239 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | |
| | FF130 | 130 | 110 | 160 | 3.5 | 9 | 9 | 210.5 | 187.5 | 239 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | M16 x 1.5 |
| 63M | FF115 | 115 | 95 | 140 | 3.0 | 9 | 9 | 244.5 | 221.5 | 273 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | |
| | FF130 | 130 | 110 | 160 | 3.5 | 9 | 9 | 244.5 | 221.5 | 273 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | |
| 71S | FF130 | 130 | 110 | 160 | 3.5 | 9 | 9 | 224.0 | 194.0 | 257 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FF165 | 165 | 130 | 200 | 3.5 | 11 | 10 | 213.0 | 183.0 | 246 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| 71M | FF130 | 130 | 110 | 160 | 3.5 | 9 | 9 | 254.0 | 224.0 | 287 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FF165 | 165 | 130 | 200 | 3.5 | 11 | 10 | 243.0 | 213.0 | 276 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| 80M | FF130 | 130 | 110 | 160 | 3.5 | 9 | 9 | 283.0 | 243.0 | 317 | 156 | 128(111) | 19/14 | 40/30 | 30/20 | 21.5 | 6/5 | |
| | FF165 | 165 | 130 | 200 | 3.5 | 11 | 10 | 272.0 | 232.0 | 306 | 156 | 128(111) | 19/14 | 40/30 | 30/20 | 21.5 | 6/5 | |
| 90S | FF165 | 165 | 130 | 200 | 3.5 | 11 | 10 | 315.0 | 265.0 | 368 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | |
| 90L | FF165 | 165 | 130 | 200 | 3.5 | 11 | 10 | 340.0 | 290.0 | 393 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | M20 x 1.5 |
| The dimensions of 9LI2 and 9LH4 are the same as for size 90S | | | | | | | | | | | | | | | | | | |
| 100RL | FF215 | 215 | 180 | 250 | 4.0 | 13 | 11 | 375.0 | 315.0 | 430 | 194 | 159(143) | 28/24 | 60/50 | 45/40 | 31 | 8 | |
| 10RLK2 and 10RLI4 in short design = | | | | | | | | 345.0 | 275.0 | 400 | | | | | | | | |
| 100L | FF215 | 215 | 180 | 250 | 4.0 | 13 | 11 | 371.0 | 311.0 | 435 | 198 | 154 | 28 | 60 | 45 | 31 | 8 | |
| 112M | FF215 | 215 | 180 | 250 | 4.0 | 13 | 11 | 393.0 | 333.0 | 458 | 222 | 167 | 28 | 60 | 45 | 31 | 8 | |
| | FF265 | 265 | 230 | 300 | 3.5 | 13 | 12 | 393.0 | 333.0 | 458 | 222 | 167 | 28 | 60 | 45 | 31 | 8 | |
| 132S | FF215 | 215 | 180 | 250 | 4.0 | 13 | 11 | 479.0 | 399.0 | 563 | 262 | 196 | 38 | 80 | 63 | 41 | 10 | |
| | FF265 | 265 | 230 | 300 | 3.5 | 13 | 12 | 458.0 | 378.0 | 542 | 262 | 196 | 38 | 80 | 63 | 41 | 10 | M25 x 1.5 |
| 132M | FF215 | 215 | 180 | 250 | 4.0 | 13 | 11 | 517.0 | 437.0 | 601 | 262 | 196 | 38 | 80 | 63 | 41 | 10 | |
| | FF265 | 265 | 230 | 300 | 3.5 | 13 | 12 | 496.0 | 416.0 | 580 | 262 | 196 | 38 | 80 | 63 | 41 | 10 | |

* Dimensions for metal terminal box
( ) Dimensions for insulated terminal box

### FF flange design



# Dimension sheets

## Designs

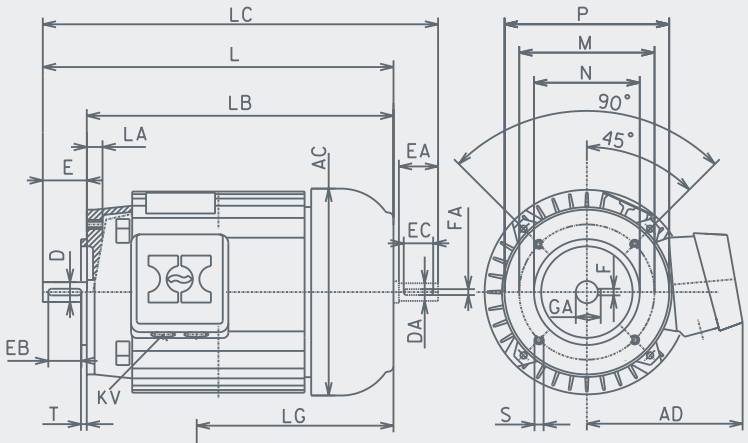
| Dimensions for FT flange design | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Flange | M | N | P | T | S | LA | L | LB | LC | AC | AD* | D/DA | E/EA | EB/EC | GA | F/FA | KV |
| 56M | FT65 | 65 | 50 | 80 | 2.5 | M5 | 7 | 195.5 | 175.5 | 219 | 107 | 90 | 9 | 20 | 14 | 10.2 | 3 | |
| | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 195.5 | 175.5 | 219 | 123 | 90 | 9 | 20 | 14 | 10.2 | 3 | |
| 63S | FT75 | 75 | 60 | 90 | 2.5 | M5 | 8 | 188.5 | 165.5 | 217 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | |
| | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 188.5 | 165.5 | 217 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | M16 |
| | FT100 | 100 | 80 | 120 | 3.0 | M6 | 9 | 210.5 | 187.5 | 239 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | x 1.5 |
| 63M | FT75 | 75 | 60 | 90 | 2.5 | M5 | 8 | 222.5 | 199.5 | 251 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | |
| | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 222.5 | 199.5 | 251 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | |
| | FT100 | 100 | 80 | 120 | 3.0 | M6 | 9 | 244.5 | 221.5 | 273 | 123 | 103 | 11 | 23 | 15 | 12.5 | 4 | |
| 71S | FT75 | 75 | 60 | 90 | 2.5 | M5 | 8 | 209.0 | 179 | 242 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 209.0 | 179 | 242 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT100 | 100 | 80 | 120 | 3.0 | M6 | 9 | 209.0 | 179 | 242 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT115 | 115 | 95 | 140 | 3.0 | M8 | 10 | 213.0 | 183.0 | 246 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 213.0 | 183.0 | 246 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| 71M | FT75 | 75 | 60 | 90 | 2.5 | M5 | 8 | 239.0 | 209.0 | 272 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 239.0 | 209.0 | 272 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT100 | 100 | 80 | 120 | 3.0 | M6 | 9 | 239.0 | 209.0 | 272 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT115 | 115 | 95 | 140 | 3.0 | M8 | 10 | 243.0 | 213.0 | 276 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 243.0 | 213.0 | 276 | 141 | 128(111) | 14 | 30 | 20 | 16 | 5 | |
| 80M | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 272.0 | 232.0 | 306 | 156 | 128(111) | 19/14 | 40/30 | 30/20 | 21.5 | 6/5 | |
| | FT100 | 100 | 80 | 120 | 3.0 | M6 | 9 | 272.0 | 232.0 | 306 | 156 | 128(111) | 19/14 | 40/30 | 30/20 | 21.5 | 6/5 | |
| | FT115 | 115 | 95 | 140 | 3.0 | M8 | 10 | 272.0 | 232.0 | 306 | 156 | 128(111) | 19/14 | 40/30 | 30/20 | 21.5 | 6/5 | |
| | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 272.0 | 232.0 | 306 | 156 | 128(111) | 19/14 | 40/30 | 30/20 | 21.5 | 6/5 | |
| 90S | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 301.5 | 251.5 | 354 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | |
| | FT100 | 100 | 80 | 120 | 3.0 | M6 | 9 | 301.5 | 251.5 | 354 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | M20 |
| | FT115 | 115 | 95 | 140 | 3.0 | M8 | 10 | 301.5 | 251.5 | 354 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | x 1.5 |
| | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 301.5 | 251.5 | 354 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | |
| 90L | FT85 | 85 | 70 | 105 | 2.5 | M6 | 8 | 326.5 | 276.5 | 379 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | |
| | FT100 | 100 | 80 | 120 | 3.0 | M6 | 9 | 326.5 | 276.5 | 379 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | |
| | FT115 | 115 | 95 | 140 | 3.0 | M8 | 10 | 326.5 | 276.5 | 379 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | |
| | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 326.5 | 276.5 | 379 | 178 | 141(126) | 24/19 | 50/40 | 40/30 | 27 | 8/6 | |
| The dimensions of 9LI2 and 9LH4 are the same as for size 90S | | | | | | | | | | | | | | | | | | |
| 100RL | FT115 | 115 | 95 | 140 | 3.0 | M8 | 10 | 375.0 | 315.0 | 430 | 194 | 159(143) | 28/24 | 60/50 | 45/40 | 31 | 8 | |
| | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 375.0 | 315.0 | 430 | 194 | 159(143) | 28/24 | 60/50 | 45/40 | 31 | 8 | |
| 10RLK2 and 10RLI4 in short design= | | | | | | | | 345.0 | 285.0 | 400 | | | | | | | | |
| 100L | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 371.0 | 311.0 | 435 | 198 | 154 | 28 | 60 | 45 | 31 | 8 | |
| 112M | FT115 | 115 | 95 | 140 | 3.0 | M8 | 10 | 393.5 | 333.5 | 458 | 222 | 167 | 28 | 60 | 45 | 31 | 8 | |
| | FT130 | 130 | 110 | 160 | 3.5 | M8 | 12 | 393.5 | 333.5 | 458 | 222 | 167 | 28 | 60 | 45 | 31 | 8 | |

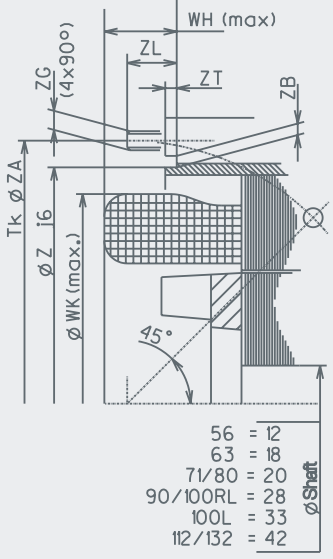
* Dimensions for metal terminal box
( ) Dimensions for insulated terminal box

## Designs

| Dimensions for FT flange design | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Size | Z | ZB | ZT | ZA | ZG | ZL | WK | WH | LG |
| 56M | 83 | 2.8 | 2.5 | 96 | M5 | 11.5 | 74 | 8 | 156.5 |
| 63S | 98 | 2.8 | 2.5 | 109 | M5 | 15 | 86 | 5 | 147.5 |
| 63M | 98 | 2.8 | 2.5 | 109 | M5 | 16 | 86 | 5 | 181.5 |
| 71S | 124 | 3 | 3 | 135 | M5 | 14 | 110 | 22 | 145 |
| 71M | 124 | 3 | 3 | 135 | M5 | 13 | 110 | 22 | 175 |
| 80M | 124 | 3 | 3 | 135 | M5 | 14 | 110 | 22 | 194 |
| 90S | 150 | 3.5 | 3 | 164 | M5 | 19.5 | 138 | 25 | 206 |
| 90L | 150 | 3.5 | 3 | 164 | M5 | 16.5 | 138 | 25 | 231 |
| The dimensions of 9LI2 and 9LH4 are the same as for size 90S | | | | | | | | | |
| 100RL | 150 | 3.5 | 3 | 164 | M6 | 16 | 138 | 28 | 274 |
| 10RLK2 and 10RLI4 in short design = | | | | | | | | | 244 |
| 100L | 172 | 4 | 3 | 182 | M6 | 17.5 | 156 | 24 | 267 |
| 112M | 195 | 4.5 | 3.75 | 210 | M6 | 17.5 | 180 | 33 | 278.5 |
| 132S | 236 | 5 | 3.75 | 251 | M6 | 17 | 220 | 33 | 343 |
| 132M | 236 | 5 | 3.75 | 251 | M6 | 21 | 220 | 33 | 381 |

## FT flange design

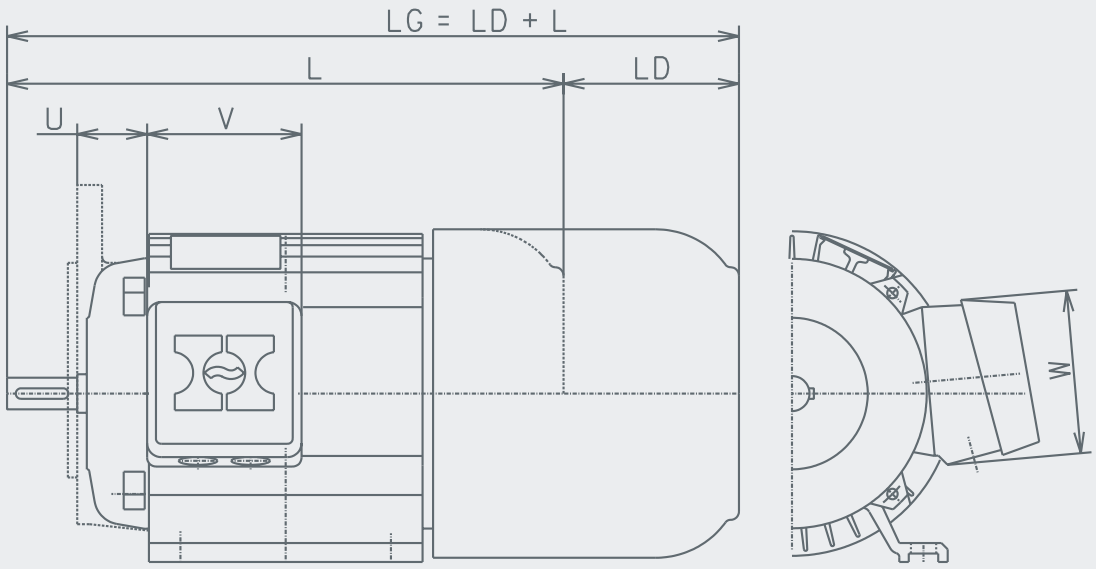



without end shield and shaft
(for customized connections)

# Options at a glance

| External fan – Technical data | | | | |
|---|---|---|---|---|
| Size | | | Terminal box | |
| | LD | V | W | U |
| 56 | 16 | 76 | 78 | 21.5 |
| 63 | 25 | 76 | 78 | 21.5 |
| 71 | 85 | 90 | 93 | 29 |
| 80 | 98 | 90 | 93 | 33 |
| 90 | 108 | 90 | 93 | 39.5 |
| 100RL | 108 | 90 | 93 | 33 |
| 100L | 108 | 88 | 91 | 40 |
| 112M | 108 | 88 | 91 | 51 |
| 132 | 108 | 118 | 125 | 48 |



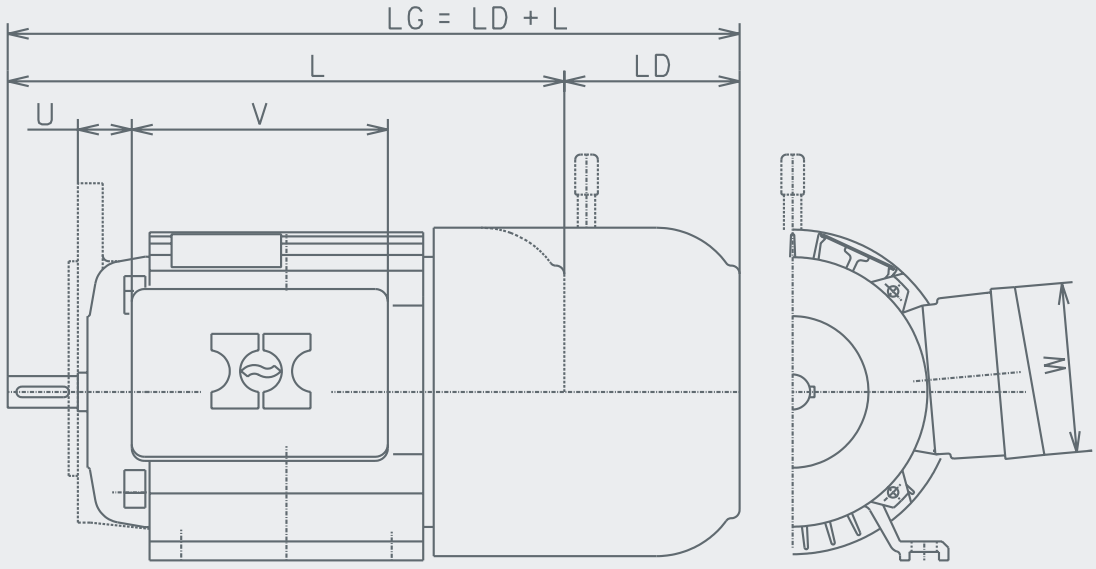
## Spring-loaded brake

The optional dual-surface spring-loaded brake is a fail-safe brake, i.e. the braking torque is built up when the brake is de-energized. A special friction surface treatment ensures that the rated torque is reached even after only a few braking operations. Therefore the brakes are frictionally engaged and are suitable for dry running. Low-wear and asbestos-free frictions linings are standard features and ensure a long service life.

The brake is electromagnetically released with DC voltage. It meets insulation class F and is suitable for 100% duty cycle (continuous operation). The brake coil can either be connected directly to a DC voltage or via a rectifier to the motor terminal box. A manual release can be retrofitted in all brakes.

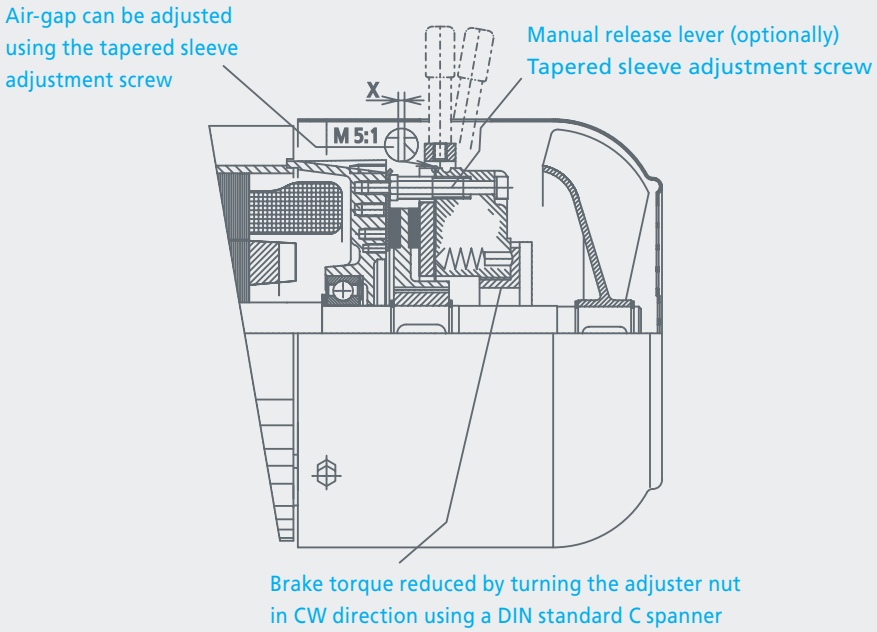
| Brake – Technical data | | | | | |
|---|---|---|---|---|---|
| Size | Brake motor | | Terminal box | | |
| | Torque Nm | LD | V | W | U |
| 56 | – | – | – | – | – |
| 63 | 4*/8 | 46 | 129 | 82 | 18.5 |
| 71 | 4*/8 | 60 | 144 | 96 | 21 |
| 80 | 4/8*/16 | 71 | 144 | 96 | 25 |
| 90 | 8/16*/32 | 73 | 144 | 96 | 31.5 |
| 100RL<br>100L | 16/32*/60<br>16/32*/60 | 80<br>80 | 144<br>144 | 96<br>96 | 25<br>31 |
| 112M | 16/32*/60/80 | 85 | 144 | 96 | 42 |
| 132 | 60*/80 | 85 | 118 | 125 | 48 |

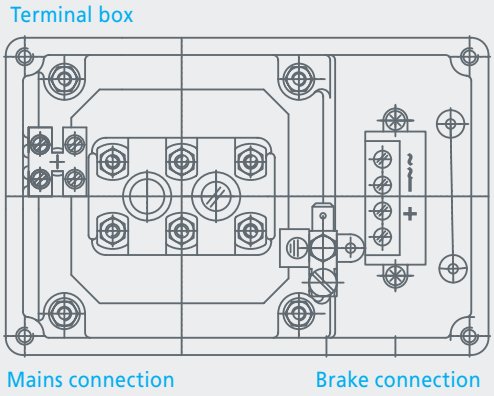
* standard torque



# Options at a glance

## Spring-loaded brake with manual release




| Nm[1] | Nm[2] | X[3] | X[4] |
|---|---|---|---|
| 4 | 0.1 | 0.2 | 0.5 |
| 8 | 0.36 | 0.2 | 0.5 |
| 16 | 0.6 | 0.2 | 0.5 |
| 32 | 1.2 | 0.3 | 0.7 |
| 60 | 1.5 | 0.3 | 0.8 |
| 80 | 2.1 | 0.3 | 1.0 |

[1] Rated torque
[2] Reduction/grid
[3] Rated air gap
[4] Max. air gap

# Standards and regulations

| IEC/CEI | EN/HD | DIN/VDE | Contents |
|---|---|---|---|
| IEC 60027-4 | – | DIN 1304-7 | Letter symbols to be used for electrical machines |
| IEC 60034-1 | EN 60034-1 | DIN EN 60034-1 / VDE 0530-1 | Rotating electrical machines:<br>Rating and performance |
| IEC 60034-2 | EN 60034-2 | DIN EN 60034-2 / VDE 0530-2 | Methods for determining losses and efficiency of rotating electrical machinery |
| IEC 60034-5 | EN 60034-5 | DIN EN 60034-5 / VDE 0530-5 | Degrees of protection by the integral design of rotating electrical machines (IP code) |
| IEC 60034-6 | EN 60034-6 | DIN EN 60034-6 / VDE 0530-6 | Methods of cooling (IP code) |
| IEC 60034-7 | EN 60034-7 | DIN EN 60034-7 / VDE 0530-7 | Classification of types of construction, mounting arrangements and terminal box position (IM code) |
| IEC 60034-8 | EN 60034-8 | DIN EN 60034-8 / VDE 0530-8 | Terminal markings and direction of rotation |
| IEC 60034-9 | EN 60034-9 | DIN EN 60034-9 / VDE 0530-9 | Noise limits |
| IEC 60034-11 | – | – | Integrated thermal protection |
| IEC 60034-12 | EN 60034-12 | DIN EN 60034-12 / VDE 0530-12 | Starting performance of single-speed three-phase cage induction motors except for pole changing motors |
| IEC 60034-14 | EN 60034-14 | DIN EN 60034-14 / VDE 0530-14 | Mechanical vibration of certain machines with shaft heights 56 mm and higher |
| IEC 60034-30 | EN 60034-30 | DIN EN 60034-30 / VDE 0530-30 | Efficiency classification of three-phase AC motors with squirrel cage, except pole-changing motors (IE code) |
| IEC 60038 | HD 472 S1 | DIN IEC 60038 / VDE 0175 | IEC standard voltages |
| IEC 60072 | EN 50347 | DIN EN 50347 | General purpose three-phase induction motors having standard dimensions and outputs – Frame numbers 56 to 315 and flange numbers 65 to 740 |
| IEC 60072 | – | DIN EN 50347 | Tolerances of shaft extension run-out and of mounting flanges for rotating electrical machinery |
| – | – | DIN EN 50347 | Mounting flanges for electrical machines |
| IEC 60085* | HD 566 | DIN IEC 60085 / VDE 0301-1 | Thermal evaluation and classification of electrical insulation |
| IEC 60445 | EN 60445 | DIN EN 60445 / VDE 0197 | Identification of equipment terminals and of terminations of certain designated conductors |

* IEC 15E / 205 / CD:2002

## Notes

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