# 9 Offset helical geared motors F

## 9.1 Overview

Offset helical geared motors with large axial distances

**Features**

| | |
|---|---|
| Power density | ★☆☆☆☆ |
| Backlash | ★★★☆☆ |
| Price category | € |
| Shaft load | ★★★☆☆ |
| Smooth operation | ★★★☆☆ |
| Torsional stiffness | ★★☆☆☆ |
| Mass moment of inertia | ★★★★★ |
| Helical gearing | ✓ |
| Maintenance-free | ✓ |
| FKM seal ring at the input | ✓ |
| Large axial distances, suitable for confined situations | ✓ |
| Compact and dynamic due to direct motor attachment | ✓ |

Key: ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

**Technical data**

| | |
|---|---|
| i | 4.3 – 274 |
| $M_{2acc}$ | 19 – 1100 Nm |
| $\Delta\phi_2$ | 5 – 11 arcmin |
| $\eta_{get}$ | ≤ 97 % |

# 9.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors
- Weight specification for installation position EL1, housing design G

An explanation of the formula symbols can be found in the Chapter [▷ 15.1].

| $n_{2N}$ [rpm] | $M_{2N}$ [Nm] | $M_{2,0}$ [Nm] | $a_{th}$ | S | Type | $M_{2acc}$ [Nm] | $M_{2NOT}$ [Nm] | i | $i_{exakt}$ | $n_{1maxDB}$ EL1,2,3,4 [rpm] | $n_{1maxDB}$ EL5,6 [rpm] | $n_{1maxDB}$ [rpm] | $J_1$ [$10^{-4}$ kgm²] | $\Delta\varphi_2$ [arcmin] | $C_2$ [Nm/ arcmin] | m [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **F1 ($n_{1N}$ = 3000 rpm, $M_{2acc,max}$ = 120 Nm)** | | | | | | | | | | | | | | | | |
| 65 | 104 | 112 | 2.5 | 1.2 | F102_0460 LM401U | 120 | 240 | 46.43 | 325/7 | 4000 | 4000 | 6000 | 1.8 | 11/6 | 7.7 | 16 |
| 86 | 78 | 84 | 2.4 | 1.4 | F102_0350 LM401U | 120 | 240 | 35.05 | 3575/102 | 4000 | 4000 | 6000 | 1.8 | 11/6 | 7.7 | 16 |
| 107 | 63 | 68 | 2.3 | 1.6 | F102_0280 LM401U | 120 | 200 | 28.17 | 169/6 | 4000 | 4000 | 6000 | 1.9 | 11/6 | 7.7 | 16 |
| 130 | 51 | 56 | 2.3 | 1.9 | F102_0230 LM401U | 100 | 170 | 23.08 | 3185/138 | 3700 | 3600 | 6000 | 1.9 | 11/6 | 7.7 | 16 |
| 130 | 101 | 104 | 4.4 | 0.95 | F102_0230 LM402U | 120 | 240 | 23.08 | 3185/138 | 3700 | 3600 | 6000 | 3.3 | 11/6 | 7.7 | 17 |
| 163 | 41 | 44 | 2.2 | 2.1 | F102_0185 LM401U | 81 | 130 | 18.46 | 1495/81 | 3700 | 3600 | 6000 | 2.0 | 11/6 | 7.7 | 16 |
| 163 | 81 | 83 | 4.2 | 1.1 | F102_0185 LM402U | 120 | 240 | 18.46 | 1495/81 | 3700 | 3600 | 6000 | 3.3 | 11/6 | 7.7 | 17 |
| 163 | 110 | 113 | 5.8 | 0.81 | F102_0185 LM403U | 120 | 240 | 18.46 | 1495/81 | 3700 | 3600 | 6000 | 4.6 | 11/6 | 7.7 | 19 |
| 221 | 30 | 33 | 2.1 | 2.6 | F102_0135 LM401U | 59 | 99 | 13.59 | 231/17 | 4000 | 4000 | 6000 | 1.9 | 11/8 | 6.5 | 16 |
| 221 | 59 | 61 | 4.0 | 1.3 | F102_0135 LM402U | 110 | 200 | 13.59 | 231/17 | 4000 | 4000 | 6000 | 3.2 | 11/8 | 6.5 | 17 |
| 221 | 81 | 83 | 5.5 | 0.99 | F102_0135 LM403U | 110 | 200 | 13.59 | 231/17 | 4000 | 4000 | 6000 | 4.5 | 11/8 | 6.5 | 19 |
| 275 | 24 | 26 | 2.0 | 2.6 | F102_0110 LM401U | 48 | 79 | 10.92 | 273/25 | 4000 | 4000 | 6000 | 2.0 | 11/8 | 6.5 | 16 |
| 275 | 48 | 49 | 3.9 | 1.6 | F102_0110 LM402U | 100 | 200 | 10.92 | 273/25 | 4000 | 4000 | 6000 | 3.3 | 11/8 | 6.5 | 17 |
| 275 | 65 | 67 | 5.3 | 1.1 | F102_0110 LM403U | 110 | 200 | 10.92 | 273/25 | 4000 | 4000 | 6000 | 4.6 | 11/8 | 6.5 | 19 |
| 335 | 20 | 22 | 1.9 | 2.6 | F102_0089 LM401U | 39 | 65 | 8.948 | 1029/115 | 3700 | 3600 | 6000 | 2.1 | 11/8 | 6.5 | 16 |
| 335 | 39 | 40 | 3.8 | 1.8 | F102_0089 LM402U | 84 | 200 | 8.948 | 1029/115 | 3700 | 3600 | 6000 | 3.4 | 11/8 | 6.5 | 17 |
| 335 | 53 | 55 | 5.1 | 1.3 | F102_0089 LM403U | 110 | 200 | 8.948 | 1029/115 | 3700 | 3600 | 6000 | 4.7 | 11/8 | 6.5 | 19 |
| 335 | 81 | 86 | 7.8 | 0.86 | F102_0089 LM503U | 110 | 200 | 8.948 | 1029/115 | 3700 | 3600 | 6000 | 11 | 11/8 | 6.5 | 22 |
| 419 | 16 | 17 | 1.9 | 2.6 | F102_0072 LM401U | 31 | 52 | 7.156 | 322/45 | 3700 | 3600 | 6000 | 2.3 | 11/8 | 6.5 | 16 |
| 419 | 31 | 32 | 3.6 | 2.1 | F102_0072 LM402U | 67 | 200 | 7.156 | 322/45 | 3700 | 3600 | 6000 | 3.6 | 11/8 | 6.5 | 17 |
| 419 | 42 | 44 | 4.9 | 1.5 | F102_0072 LM403U | 89 | 200 | 7.156 | 322/45 | 3700 | 3600 | 6000 | 4.9 | 11/8 | 6.5 | 19 |
| 419 | 65 | 69 | 7.5 | 1.0 | F102_0072 LM503U | 110 | 200 | 7.156 | 322/45 | 3700 | 3600 | 6000 | 11 | 11/8 | 6.5 | 22 |
| 464 | 28 | 29 | 3.6 | 2.2 | F102_0065 LM402U | 61 | 190 | 6.462 | 84/13 | 3500 | 3000 | 6000 | 3.8 | 11/8 | 6.5 | 17 |
| 464 | 38 | 39 | 4.8 | 1.6 | F102_0065 LM403U | 80 | 190 | 6.462 | 84/13 | 3500 | 3000 | 6000 | 5.1 | 11/8 | 6.5 | 19 |
| 464 | 58 | 62 | 7.4 | 1.1 | F102_0065 LM503U | 110 | 190 | 6.462 | 84/13 | 3500 | 3000 | 6000 | 11 | 11/8 | 6.5 | 22 |
| 696 | 9.6 | 10 | 1.7 | 2.6 | F102_0043 LM401U | 19 | 31 | 4.308 | 56/13 | 3500 | 3000 | 6000 | 3.2 | 11/8 | 6.5 | 16 |
| 696 | 19 | 19 | 3.3 | 2.9 | F102_0043 LM402U | 41 | 130 | 4.308 | 56/13 | 3500 | 3000 | 6000 | 4.5 | 11/8 | 6.5 | 17 |
| 696 | 26 | 26 | 4.5 | 2.1 | F102_0043 LM403U | 54 | 130 | 4.308 | 56/13 | 3500 | 3000 | 6000 | 5.8 | 11/8 | 6.5 | 19 |
| 696 | 39 | 41 | 6.9 | 1.4 | F102_0043 LM503U | 85 | 130 | 4.308 | 56/13 | 3500 | 3000 | 6000 | 12 | 11/8 | 6.5 | 22 |
| 696 | 56 | 64 | 10 | 0.97 | F102_0043 LM505U | 100 | 130 | 4.308 | 56/13 | 3500 | 3000 | 6000 | 18 | 11/8 | 6.5 | 26 |
| **F2 ($n_{1N}$ = 3000 rpm, $M_{2acc,max}$ = 270 Nm)** | | | | | | | | | | | | | | | | |
| 27 | 251 | 271 | 2.2 | 0.95 | F202_1130 LM401U | 270 | 480 | 112.7 | 1240/11 | 4000 | 3900 | 6000 | 1.7 | 11/6 | 18 | 24 |
| 32 | 209 | 226 | 2.0 | 1.1 | F202_0940 LM401U | 270 | 480 | 93.82 | 1032/11 | 4000 | 3900 | 6000 | 1.7 | 11/6 | 18 | 24 |
| 43 | 156 | 169 | 1.7 | 1.5 | F202_0700 LM401U | 270 | 430 | 70.13 | 5400/77 | 4000 | 3900 | 6000 | 1.8 | 11/6 | 18 | 24 |
| 53 | 248 | 255 | 3.0 | 0.97 | F202_0570 LM402U | 270 | 480 | 56.73 | 624/11 | 4000 | 3900 | 6000 | 3.2 | 11/6 | 18 | 25 |
| 64 | 105 | 113 | 1.4 | 2.3 | F202_0470 LM401U | 210 | 340 | 47.05 | 1035/22 | 4000 | 3900 | 6000 | 1.9 | 11/6 | 18 | 24 |
| 64 | 205 | 212 | 2.7 | 1.2 | F202_0470 LM402U | 270 | 480 | 47.05 | 1035/22 | 4000 | 3900 | 6000 | 3.2 | 11/6 | 18 | 25 |
| 85 | 79 | 85 | 1.3 | 2.6 | F202_0350 LM401U | 160 | 260 | 35.46 | 390/11 | 3800 | 3500 | 6000 | 2.0 | 11/6 | 18 | 24 |
| 85 | 155 | 160 | 2.6 | 1.4 | F202_0350 LM402U | 270 | 480 | 35.46 | 390/11 | 3800 | 3500 | 6000 | 3.4 | 11/6 | 18 | 25 |
| 85 | 210 | 216 | 3.6 | 1.0 | F202_0350 LM403U | 270 | 480 | 35.46 | 390/11 | 3800 | 3500 | 6000 | 4.7 | 11/6 | 18 | 27 |
| 107 | 123 | 127 | 2.5 | 1.7 | F202_0280 LM402U | 260 | 480 | 28.11 | 4020/143 | 3800 | 3500 | 6000 | 3.5 | 11/6 | 18 | 25 |
| 107 | 167 | 172 | 3.4 | 1.2 | F202_0280 LM403U | 270 | 480 | 28.11 | 4020/143 | 3800 | 3500 | 6000 | 4.8 | 11/6 | 18 | 27 |
| 128 | 52 | 56 | 1.2 | 2.6 | F202_0230 LM401U | 100 | 170 | 23.43 | 2320/99 | 3600 | 3100 | 6000 | 2.3 | 11/6 | 18 | 24 |
| 128 | 102 | 105 | 2.4 | 1.9 | F202_0230 LM402U | 220 | 480 | 23.43 | 2320/99 | 3600 | 3100 | 6000 | 3.7 | 11/6 | 18 | 25 |
| 128 | 139 | 143 | 3.3 | 1.4 | F202_0230 LM403U | 270 | 480 | 23.43 | 2320/99 | 3600 | 3100 | 6000 | 5.0 | 11/6 | 18 | 27 |
| 128 | 212 | 225 | 5.1 | 0.90 | F202_0230 LM503U | 270 | 480 | 23.43 | 2320/99 | 3600 | 3100 | 6000 | 11 | 11/6 | 18 | 30 |
| 161 | 81 | 84 | 2.4 | 2.2 | F202_0185 LM402U | 180 | 480 | 18.65 | 6360/341 | 3600 | 3100 | 6000 | 3.9 | 11/6 | 18 | 25 |
| 161 | 111 | 114 | 3.2 | 1.6 | F202_0185 LM403U | 230 | 480 | 18.65 | 6360/341 | 3600 | 3100 | 6000 | 5.2 | 11/6 | 18 | 27 |
| 161 | 169 | 179 | 4.9 | 1.0 | F202_0185 LM503U | 270 | 480 | 18.65 | 6360/341 | 3600 | 3100 | 6000 | 11 | 11/6 | 18 | 30 |
| 220 | 30 | 33 | 1.1 | 2.6 | F202_0135 LM401U | 60 | 99 | 13.63 | 109/8 | 3800 | 3500 | 6000 | 2.3 | 11/8 | 16 | 24 |
| 220 | 59 | 61 | 2.2 | 2.7 | F202_0135 LM402U | 130 | 400 | 13.63 | 109/8 | 3800 | 3500 | 6000 | 3.7 | 11/8 | 16 | 25 |
| 220 | 81 | 83 | 3.0 | 2.0 | F202_0135 LM403U | 170 | 400 | 13.63 | 109/8 | 3800 | 3500 | 6000 | 5.0 | 11/8 | 16 | 27 |
| 220 | 123 | 131 | 4.6 | 1.3 | F202_0135 LM503U | 210 | 400 | 13.63 | 109/8 | 3800 | 3500 | 6000 | 11 | 11/8 | 16 | 30 |

| $n_{2N}$ [rpm] | $M_{2N}$ [Nm] | $M_{2,0}$ [Nm] | $a_{th}$ | S | Type | $M_{2acc}$ [Nm] | $M_{2NOT}$ [Nm] | i | $i_{exakt}$ | $n_{1maxDB}$ EL1,2,3,4 [rpm] | $n_{1maxDB}$ EL5,6 [rpm] | $n_{1maxDB}$ [rpm] | $J_1$ [$10^{-4}$ kgm²] | $\Delta\varphi_2$ [arcmin] | $C_2$ [Nm/ arcmin] | m [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **F2 ($n_{1N}$ = 3000 rpm, $M_{2acc,max}$ = 270 Nm)** | | | | | | | | | | | | | | | | |
| 220 | 178 | 202 | 6.7 | 0.89 | F202_0135 LM505U | 210 | 400 | 13.63 | 109/8 | 3800 | 3500 | 6000 | 17 | 11/8 | 16 | 34 |
| 278 | 47 | 49 | 2.1 | 3.1 | F202_0110 LM402U | 100 | 310 | 10.80 | 7303/676 | 3800 | 3500 | 6000 | 4.0 | 11/8 | 16 | 25 |
| 278 | 64 | 66 | 2.9 | 2.3 | F202_0110 LM403U | 130 | 310 | 10.80 | 7303/676 | 3800 | 3500 | 6000 | 5.3 | 11/8 | 16 | 27 |
| 278 | 98 | 104 | 4.4 | 1.5 | F202_0110 LM503U | 210 | 310 | 10.80 | 7303/676 | 3800 | 3500 | 6000 | 11 | 11/8 | 16 | 30 |
| 278 | 141 | 160 | 6.4 | 1.0 | F202_0110 LM505U | 210 | 310 | 10.80 | 7303/676 | 3800 | 3500 | 6000 | 18 | 11/8 | 16 | 34 |
| 333 | 20 | 22 | 1.1 | 2.6 | F202_0090 LM401U | 39 | 66 | 9.006 | 3161/351 | 3600 | 3100 | 6000 | 3.0 | 11/8 | 16 | 24 |
| 333 | 39 | 41 | 2.1 | 3.5 | F202_0090 LM402U | 85 | 260 | 9.006 | 3161/351 | 3600 | 3100 | 6000 | 4.3 | 11/8 | 16 | 25 |
| 333 | 53 | 55 | 2.8 | 2.6 | F202_0090 LM403U | 110 | 260 | 9.006 | 3161/351 | 3600 | 3100 | 6000 | 5.6 | 11/8 | 16 | 27 |
| 333 | 82 | 86 | 4.3 | 1.7 | F202_0090 LM503U | 180 | 260 | 9.006 | 3161/351 | 3600 | 3100 | 6000 | 12 | 11/8 | 16 | 30 |
| 333 | 118 | 134 | 6.2 | 1.2 | F202_0090 LM505U | 210 | 260 | 9.006 | 3161/351 | 3600 | 3100 | 6000 | 18 | 11/8 | 16 | 34 |
| 333 | 171 | 190 | 9.1 | 0.81 | F202_0090 LM704U | 210 | 400 | 9.006 | 3161/351 | 3600 | 3100 | 6000 | 38 | 11/8 | 16 | 40 |
| 419 | 31 | 32 | 2.0 | 4.1 | F202_0072 LM402U | 67 | 210 | 7.167 | 5777/806 | 3600 | 3100 | 6000 | 4.9 | 11/8 | 16 | 25 |
| 419 | 43 | 44 | 2.7 | 3.0 | F202_0072 LM403U | 89 | 210 | 7.167 | 5777/806 | 3600 | 3100 | 6000 | 6.2 | 11/8 | 16 | 27 |
| 419 | 65 | 69 | 4.2 | 2.0 | F202_0072 LM503U | 140 | 210 | 7.167 | 5777/806 | 3600 | 3100 | 6000 | 12 | 11/8 | 16 | 30 |
| 419 | 94 | 106 | 6.0 | 1.4 | F202_0072 LM505U | 170 | 210 | 7.167 | 5777/806 | 3600 | 3100 | 6000 | 19 | 11/8 | 16 | 34 |
| 419 | 136 | 151 | 8.7 | 0.94 | F202_0072 LM704U | 210 | 400 | 7.167 | 5777/806 | 3600 | 3100 | 6000 | 38 | 11/8 | 16 | 40 |
| 540 | 106 | 117 | 8.4 | 1.1 | F202_0056 LM704U | 210 | 400 | 5.552 | 5341/962 | 3100 | 2600 | 5000 | 39 | 11/8 | 16 | 40 |
| 540 | 139 | 161 | 11 | 0.85 | F202_0056 LM706U | 210 | 400 | 5.552 | 5341/962 | 3100 | 2600 | 5000 | 57 | 11/8 | 16 | 47 |
| 641 | 28 | 29 | 2.5 | 3.9 | F202_0047 LM403U | 58 | 140 | 4.680 | 2616/559 | 3100 | 2600 | 5000 | 8.4 | 11/8 | 16 | 27 |
| 641 | 42 | 45 | 3.9 | 2.6 | F202_0047 LM503U | 92 | 140 | 4.680 | 2616/559 | 3100 | 2600 | 5000 | 14 | 11/8 | 16 | 30 |
| 641 | 61 | 69 | 5.6 | 1.8 | F202_0047 LM505U | 110 | 140 | 4.680 | 2616/559 | 3100 | 2600 | 5000 | 21 | 11/8 | 16 | 34 |
| 641 | 89 | 99 | 8.1 | 1.3 | F202_0047 LM704U | 190 | 340 | 4.680 | 2616/559 | 3100 | 2600 | 5000 | 41 | 11/8 | 16 | 40 |
| 641 | 117 | 136 | 11 | 0.95 | F202_0047 LM706U | 210 | 340 | 4.680 | 2616/559 | 3100 | 2600 | 5000 | 58 | 11/8 | 16 | 47 |
| **F3 ($n_{1N}$ = 3000 rpm, $M_{2acc,max}$ = 450 Nm)** | | | | | | | | | | | | | | | | |
| 16 | 406 | 438 | 1.8 | 0.98 | F303_1850 LM401U | 450 | 800 | 184.8 | 29939/162 | 4000 | 3900 | 6000 | 1.7 | 11/7 | 22 | 36 |
| 21 | 314 | 338 | 1.6 | 1.3 | F302_1410 LM401U | 450 | 620 | 140.6 | 7595/54 | 4000 | 3900 | 6000 | 1.7 | 11/6 | 22 | 31 |
| 32 | 409 | 421 | 2.5 | 0.98 | F302_0940 LM402U | 450 | 800 | 93.64 | 4214/45 | 4000 | 3900 | 6000 | 3.2 | 11/6 | 22 | 33 |
| 43 | 307 | 317 | 2.2 | 1.3 | F302_0700 LM402U | 450 | 800 | 70.36 | 2744/39 | 4000 | 3900 | 6000 | 3.3 | 11/6 | 22 | 33 |
| 43 | 418 | 429 | 3.0 | 0.96 | F302_0700 LM403U | 450 | 800 | 70.36 | 2744/39 | 4000 | 3900 | 6000 | 4.6 | 11/6 | 22 | 35 |
| 53 | 247 | 254 | 2.0 | 1.6 | F302_0560 LM402U | 450 | 800 | 56.49 | 4067/72 | 4000 | 3900 | 6000 | 3.4 | 11/6 | 22 | 33 |
| 53 | 335 | 345 | 2.7 | 1.2 | F302_0560 LM403U | 450 | 800 | 56.49 | 4067/72 | 4000 | 3900 | 6000 | 4.7 | 11/6 | 22 | 35 |
| 64 | 206 | 212 | 1.8 | 1.9 | F302_0470 LM402U | 440 | 800 | 47.19 | 1274/27 | 4000 | 3900 | 6000 | 3.5 | 11/6 | 22 | 33 |
| 64 | 280 | 288 | 2.4 | 1.4 | F302_0470 LM403U | 450 | 800 | 47.19 | 1274/27 | 4000 | 3900 | 6000 | 4.8 | 11/6 | 22 | 35 |
| 86 | 153 | 158 | 1.7 | 2.4 | F302_0350 LM402U | 330 | 800 | 35.03 | 7252/207 | 3700 | 3500 | 5500 | 3.8 | 11/6 | 22 | 33 |
| 86 | 208 | 214 | 2.3 | 1.7 | F302_0350 LM403U | 440 | 800 | 35.03 | 7252/207 | 3700 | 3500 | 5500 | 5.1 | 11/6 | 22 | 35 |
| 86 | 317 | 336 | 3.5 | 1.1 | F302_0350 LM503U | 450 | 800 | 35.03 | 7252/207 | 3700 | 3500 | 5500 | 11 | 11/6 | 22 | 38 |
| 106 | 123 | 127 | 1.7 | 2.7 | F302_0280 LM402U | 270 | 800 | 28.23 | 6860/243 | 3700 | 3500 | 5500 | 4.0 | 11/6 | 22 | 33 |
| 106 | 168 | 172 | 2.2 | 2.0 | F302_0280 LM403U | 350 | 800 | 28.23 | 6860/243 | 3700 | 3500 | 5500 | 5.3 | 11/6 | 22 | 35 |
| 106 | 255 | 271 | 3.4 | 1.3 | F302_0280 LM503U | 450 | 800 | 28.23 | 6860/243 | 3700 | 3500 | 5500 | 11 | 11/6 | 22 | 38 |
| 106 | 370 | 419 | 4.9 | 0.91 | F302_0280 LM505U | 450 | 800 | 28.23 | 6860/243 | 3700 | 3500 | 5500 | 18 | 11/6 | 22 | 42 |
| 128 | 103 | 106 | 1.6 | 3.1 | F302_0240 LM402U | 220 | 680 | 23.52 | 588/25 | 3500 | 3100 | 5000 | 4.4 | 11/6 | 22 | 33 |
| 128 | 140 | 144 | 2.2 | 2.3 | F302_0240 LM403U | 290 | 680 | 23.52 | 588/25 | 3500 | 3100 | 5000 | 5.7 | 11/6 | 22 | 35 |
| 128 | 213 | 226 | 3.3 | 1.5 | F302_0240 LM503U | 450 | 680 | 23.52 | 588/25 | 3500 | 3100 | 5000 | 12 | 11/6 | 22 | 38 |
| 128 | 308 | 349 | 4.8 | 1.0 | F302_0240 LM505U | 450 | 680 | 23.52 | 588/25 | 3500 | 3100 | 5000 | 18 | 11/6 | 22 | 42 |
| 160 | 357 | 395 | 6.7 | 0.83 | F302_0190 LM704U | 450 | 800 | 18.77 | 4900/261 | 3500 | 3100 | 5000 | 38 | 11/6 | 22 | 48 |
| 224 | 58 | 60 | 1.5 | 4.5 | F302_0135 LM402U | 130 | 390 | 13.38 | 7696/575 | 3700 | 3500 | 5500 | 4.3 | 11/8 | 20 | 33 |
| 224 | 79 | 82 | 2.0 | 3.3 | F302_0135 LM403U | 170 | 390 | 13.38 | 7696/575 | 3700 | 3500 | 5500 | 5.6 | 11/8 | 20 | 35 |
| 224 | 121 | 128 | 3.0 | 2.2 | F302_0135 LM503U | 260 | 390 | 13.38 | 7696/575 | 3700 | 3500 | 5500 | 12 | 11/8 | 20 | 38 |
| 224 | 175 | 199 | 4.4 | 1.5 | F302_0135 LM505U | 310 | 390 | 13.38 | 7696/575 | 3700 | 3500 | 5500 | 18 | 11/8 | 20 | 42 |
| 224 | 254 | 282 | 6.3 | 1.0 | F302_0135 LM704U | 350 | 650 | 13.38 | 7696/575 | 3700 | 3500 | 5500 | 38 | 11/8 | 20 | 48 |
| 278 | 64 | 66 | 1.9 | 3.8 | F302_0110 LM403U | 130 | 310 | 10.79 | 1456/135 | 3700 | 3500 | 5500 | 6.2 | 11/8 | 20 | 35 |
| 278 | 98 | 103 | 2.9 | 2.5 | F302_0110 LM503U | 210 | 310 | 10.79 | 1456/135 | 3700 | 3500 | 5500 | 12 | 11/8 | 20 | 38 |
| 278 | 141 | 160 | 4.2 | 1.7 | F302_0110 LM505U | 250 | 310 | 10.79 | 1456/135 | 3700 | 3500 | 5500 | 19 | 11/8 | 20 | 42 |
| 278 | 205 | 227 | 6.1 | 1.2 | F302_0110 LM704U | 350 | 650 | 10.79 | 1456/135 | 3700 | 3500 | 5500 | 38 | 11/8 | 20 | 48 |
| 278 | 270 | 313 | 8.1 | 0.91 | F302_0110 LM706U | 350 | 650 | 10.79 | 1456/135 | 3700 | 3500 | 5500 | 56 | 11/8 | 20 | 55 |
| 334 | 53 | 55 | 1.9 | 3.9 | F302_0090 LM403U | 110 | 260 | 8.986 | 5616/625 | 3500 | 3100 | 5000 | 6.9 | 11/8 | 20 | 35 |
| 334 | 81 | 86 | 2.8 | 2.6 | F302_0090 LM503U | 180 | 260 | 8.986 | 5616/625 | 3500 | 3100 | 5000 | 13 | 11/8 | 20 | 38 |
| 334 | 118 | 133 | 4.1 | 1.8 | F302_0090 LM505U | 210 | 260 | 8.986 | 5616/625 | 3500 | 3100 | 5000 | 19 | 11/8 | 20 | 42 |
| 334 | 171 | 189 | 5.9 | 1.3 | F302_0090 LM704U | 350 | 650 | 8.986 | 5616/625 | 3500 | 3100 | 5000 | 39 | 11/8 | 20 | 48 |
| 334 | 225 | 261 | 7.8 | 1.0 | F302_0090 LM706U | 350 | 650 | 8.986 | 5616/625 | 3500 | 3100 | 5000 | 56 | 11/8 | 20 | 55 |
| 418 | 136 | 151 | 5.7 | 1.6 | F302_0072 LM704U | 290 | 520 | 7.172 | 208/29 | 3500 | 3100 | 5000 | 40 | 11/8 | 20 | 48 |
| 418 | 179 | 208 | 7.5 | 1.2 | F302_0072 LM706U | 350 | 520 | 7.172 | 208/29 | 3500 | 3100 | 5000 | 58 | 11/8 | 20 | 55 |
| 524 | 109 | 120 | 5.5 | 1.8 | F302_0057 LM704U | 230 | 420 | 5.720 | 143/25 | 3000 | 2600 | 4500 | 42 | 11/8 | 20 | 48 |
| 524 | 143 | 166 | 7.3 | 1.4 | F302_0057 LM706U | 330 | 420 | 5.720 | 143/25 | 3000 | 2600 | 4500 | 60 | 11/8 | 20 | 55 |

| $n_{2N}$ [rpm] | $M_{2N}$ [Nm] | $M_{2,0}$ [Nm] | $a_{th}$ | S | Type | $M_{2acc}$ [Nm] | $M_{2NOT}$ [Nm] | i | $i_{exakt}$ | $n_{1maxDB}$ EL1,2,3,4 [rpm] | $n_{1maxDB}$ EL5,6 [rpm] | $n_{1maxDB}$ [rpm] | $J_1$ [$10^{-4}$ kgm²] | $\Delta\varphi_2$ [arcmin] | $C_2$ [Nm/ arcmin] | m [kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **F3 ($n_{1N}$ = 3000 rpm, $M_{2acc,max}$ = 450 Nm)** | | | | | | | | | | | | | | | | |
| 646 | 88 | 98 | 5.3 | 2.1 | F302_0046 LM704U | 190 | 340 | 4.644 | 4992/1075 | 3000 | 2600 | 4500 | 45 | 11/8 | 20 | 48 |
| 646 | 116 | 135 | 7.0 | 1.6 | F302_0046 LM706U | 270 | 340 | 4.644 | 4992/1075 | 3000 | 2600 | 4500 | 62 | 11/8 | 20 | 55 |
| **F4 ($n_{1N}$ = 3000 rpm, $M_{2acc,max}$ = 700 Nm)** | | | | | | | | | | | | | | | | |
| 11 | 603 | 651 | 1.4 | 1.2 | F403_2740 LM401U | 700 | 1400 | 274.4 | 59267/216 | 3800 | 3500 | 5500 | 1.7 | 10/6 | 39 | 44 |
| 14 | 482 | 520 | 1.2 | 1.5 | F403_2190 LM401U | 700 | 1400 | 219.2 | 94705/432 | 3800 | 3500 | 5500 | 1.8 | 10/6 | 39 | 44 |
| 16 | 404 | 436 | 1.1 | 1.7 | F403_1840 LM401U | 700 | 1180 | 183.9 | 39715/216 | 3800 | 3500 | 5500 | 1.8 | 10/6 | 39 | 44 |
| 43 | 634 | 672 | 2.8 | 1.1 | F402_0700 LM503U | 700 | 1400 | 70.06 | 1261/18 | 3800 | 3500 | 5500 | 11 | 10/5 | 39 | 46 |
| 54 | 507 | 537 | 2.5 | 1.4 | F402_0560 LM503U | 700 | 1400 | 55.97 | 2015/36 | 3800 | 3500 | 5500 | 11 | 10/5 | 39 | 46 |
| 64 | 425 | 450 | 2.4 | 1.6 | F402_0470 LM503U | 700 | 1370 | 46.94 | 845/18 | 3800 | 3500 | 5500 | 11 | 10/5 | 39 | 46 |
| 64 | 615 | 697 | 3.5 | 1.1 | F402_0470 LM505U | 700 | 1370 | 46.94 | 845/18 | 3800 | 3500 | 5500 | 18 | 10/5 | 39 | 50 |
| 107 | 532 | 589 | 4.7 | 1.0 | F402_0280 LM704U | 700 | 1400 | 27.99 | 2015/72 | 3500 | 3100 | 5000 | 38 | 10/5 | 39 | 56 |
| 129 | 441 | 489 | 4.6 | 1.2 | F402_0230 LM704U | 700 | 1400 | 23.21 | 325/14 | 3200 | 2800 | 4500 | 39 | 10/5 | 39 | 56 |
| 129 | 581 | 673 | 6.0 | 0.90 | F402_0230 LM706U | 700 | 1400 | 23.21 | 325/14 | 3200 | 2800 | 4500 | 56 | 10/5 | 39 | 63 |
| 161 | 354 | 392 | 4.4 | 1.4 | F402_0185 LM704U | 700 | 1350 | 18.62 | 3575/192 | 3200 | 2800 | 4500 | 40 | 10/5 | 39 | 56 |
| 161 | 466 | 540 | 5.8 | 1.0 | F402_0185 LM706U | 700 | 1350 | 18.62 | 3575/192 | 3200 | 2800 | 4500 | 57 | 10/5 | 39 | 63 |
| 221 | 258 | 286 | 4.2 | 1.7 | F402_0135 LM704U | 540 | 930 | 13.57 | 5984/441 | 3500 | 3100 | 5000 | 39 | 10/7 | 39 | 56 |
| 221 | 340 | 394 | 5.5 | 1.3 | F402_0135 LM706U | 550 | 930 | 13.57 | 5984/441 | 3500 | 3100 | 5000 | 56 | 10/7 | 39 | 63 |
| 277 | 206 | 228 | 4.0 | 2.0 | F402_0110 LM704U | 430 | 790 | 10.83 | 682/63 | 3500 | 3100 | 5000 | 40 | 10/7 | 39 | 56 |
| 277 | 271 | 314 | 5.3 | 1.5 | F402_0110 LM706U | 550 | 790 | 10.83 | 682/63 | 3500 | 3100 | 5000 | 57 | 10/7 | 39 | 63 |
| 334 | 171 | 189 | 3.9 | 2.2 | F402_0090 LM704U | 360 | 650 | 8.980 | 440/49 | 3200 | 2800 | 4500 | 41 | 10/7 | 39 | 56 |
| 334 | 225 | 260 | 5.1 | 1.7 | F402_0090 LM706U | 520 | 650 | 8.980 | 440/49 | 3200 | 2800 | 4500 | 59 | 10/7 | 39 | 63 |
| 417 | 137 | 152 | 3.8 | 2.6 | F402_0072 LM704U | 290 | 520 | 7.202 | 605/84 | 3200 | 2800 | 4500 | 43 | 10/7 | 39 | 56 |
| 417 | 180 | 209 | 4.9 | 2.0 | F402_0072 LM706U | 420 | 520 | 7.202 | 605/84 | 3200 | 2800 | 4500 | 61 | 10/7 | 39 | 63 |
| **F6 ($n_{1N}$ = 3000 rpm, $M_{2acc,max}$ = 1100 Nm)** | | | | | | | | | | | | | | | | |
| 27 | 1015 | 1076 | 2.6 | 1.1 | F602_1120 LM503U | 1100 | 2000 | 112.2 | 9425/84 | 3500 | 3200 | 5000 | 11 | 10/5 | 77 | 73 |
| 32 | 845 | 895 | 2.4 | 1.3 | F602_0930 LM503U | 1100 | 1870 | 93.33 | 280/3 | 3500 | 3200 | 5000 | 11 | 10/5 | 77 | 73 |
| 43 | 630 | 668 | 2.1 | 1.7 | F602_0700 LM503U | 1100 | 1590 | 69.64 | 975/14 | 3500 | 3200 | 5000 | 11 | 10/5 | 77 | 73 |
| 43 | 912 | 1034 | 3.0 | 1.2 | F602_0700 LM505U | 1100 | 1590 | 69.64 | 975/14 | 3500 | 3200 | 5000 | 18 | 10/5 | 77 | 77 |
| 64 | 888 | 983 | 3.5 | 1.2 | F602_0470 LM704U | 1100 | 2000 | 46.72 | 1495/32 | 3500 | 3200 | 5000 | 38 | 10/5 | 77 | 83 |
| 85 | 669 | 741 | 3.4 | 1.5 | F602_0350 LM704U | 1100 | 2000 | 35.21 | 845/24 | 3300 | 2800 | 4500 | 39 | 10/5 | 77 | 83 |
| 85 | 881 | 1021 | 4.4 | 1.1 | F602_0350 LM706U | 1100 | 2000 | 35.21 | 845/24 | 3300 | 2800 | 4500 | 57 | 10/5 | 77 | 90 |
| 107 | 532 | 589 | 3.3 | 1.7 | F602_0280 LM704U | 1100 | 2000 | 27.99 | 2015/72 | 3300 | 2800 | 4500 | 41 | 10/5 | 77 | 83 |
| 107 | 700 | 812 | 4.3 | 1.3 | F602_0280 LM706U | 1100 | 2000 | 27.99 | 2015/72 | 3300 | 2800 | 4500 | 58 | 10/5 | 77 | 90 |
| 129 | 442 | 490 | 3.2 | 2.0 | F602_0230 LM704U | 930 | 1690 | 23.27 | 1885/81 | 2900 | 2500 | 4000 | 42 | 10/5 | 77 | 83 |
| 129 | 582 | 675 | 4.1 | 1.5 | F602_0230 LM706U | 1100 | 1690 | 23.27 | 1885/81 | 2900 | 2500 | 4000 | 59 | 10/5 | 77 | 90 |
| 220 | 259 | 286 | 2.9 | 2.8 | F602_0135 LM704U | 540 | 920 | 13.61 | 871/64 | 3300 | 2800 | 4500 | 42 | 10/7 | 73 | 83 |
| 220 | 341 | 395 | 3.8 | 2.1 | F602_0135 LM706U | 740 | 920 | 13.61 | 871/64 | 3300 | 2800 | 4500 | 59 | 10/7 | 73 | 90 |
| 277 | 206 | 228 | 2.8 | 3.1 | F602_0110 LM704U | 430 | 790 | 10.82 | 2077/192 | 3300 | 2800 | 4500 | 44 | 10/7 | 73 | 83 |
| 277 | 271 | 314 | 3.7 | 2.3 | F602_0110 LM706U | 630 | 790 | 10.82 | 2077/192 | 3300 | 2800 | 4500 | 62 | 10/7 | 73 | 90 |
| 334 | 171 | 189 | 2.7 | 3.1 | F602_0090 LM704U | 360 | 650 | 8.995 | 1943/216 | 2900 | 2500 | 4000 | 47 | 10/7 | 73 | 83 |
| 334 | 225 | 261 | 3.5 | 2.3 | F602_0090 LM706U | 520 | 650 | 8.995 | 1943/216 | 2900 | 2500 | 4000 | 65 | 10/7 | 73 | 90 |

# 9.3 Dimensional drawings

In this chapter you can find the dimensions of the geared motors.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor dimensions and geared motor dimensions.

Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

You can download CAD models of our standard drives at http://cad.stoeber.de.

Combination options and the dimensions of forced ventilated geared motors can be found at http://cad.stoeber.de.

**Tolerances**

| Axis height in accordance with DIN 747 | Tolerance |
|---|---|
| Up to 50 mm | -0.4 mm |
| Up to 250 mm | -0.5 mm |
| Up to 630 mm | -0.6 mm |

| Solid shaft | Tolerance |
|---|---|
| Shaft ∅ fit ≤ 50 mm | DIN 748-1, ISO k6 |
| Shaft ∅ fit > 50 mm | DIN 748-1, ISO m6 |
| Feather keys | DIN 6885-1, high form A |

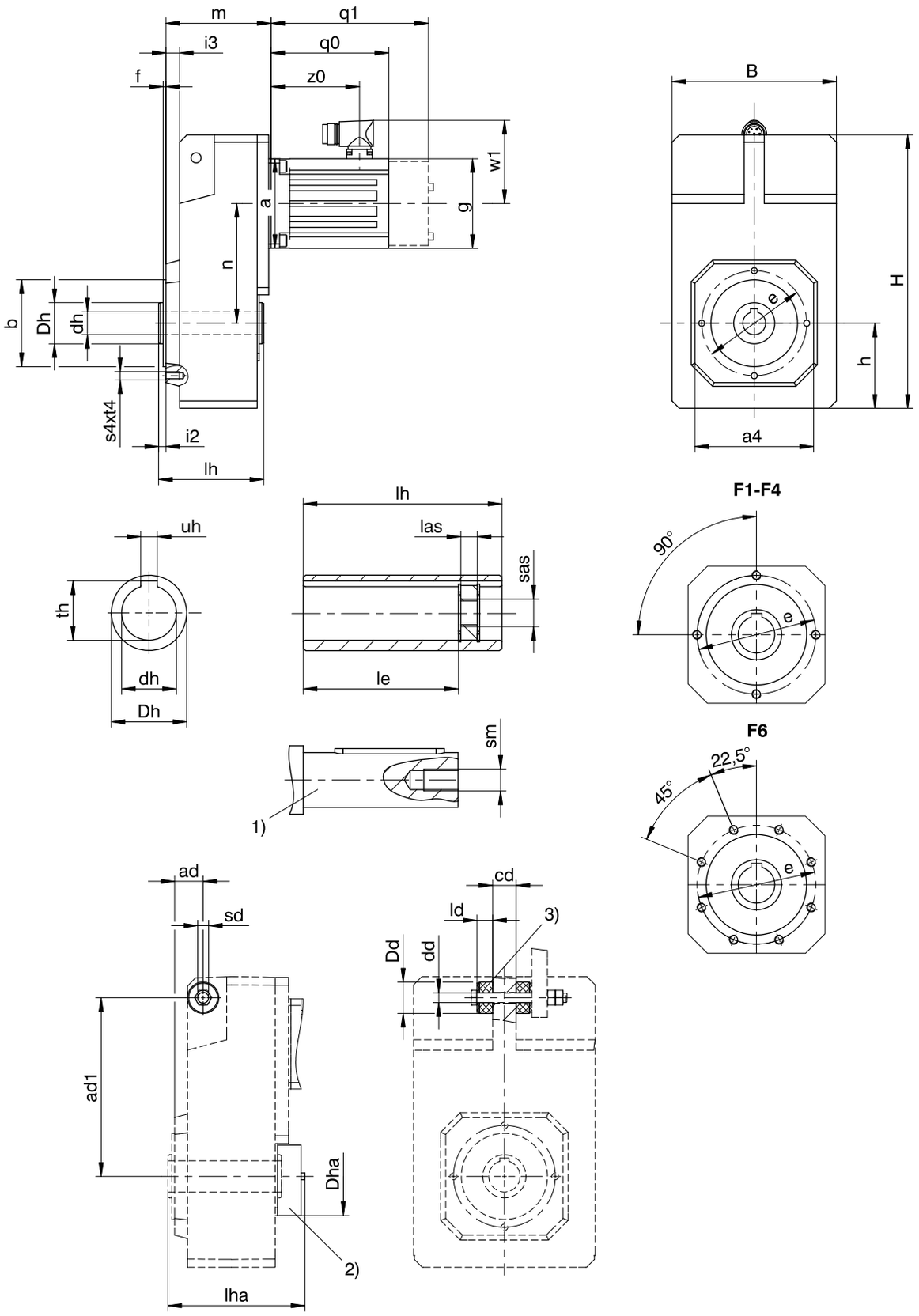
| Hollow shaft | Tolerance |
|---|---|
| Hollow shaft hole fit | ISO H7 |

| Flange | Pilot tolerance |
|---|---|
| Up to 300 mm | ISO j6 |
| Starting at 350 mm | ISO h6 |

**Centering holes in solid shafts in accordance with DIN 332-2, DR shape**

| Thread size | M4 | M5 | M6 | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|---|---|---|
| Thread depth [mm] | 10 | 12.5 | 16 | 19 | 22 | 28 | 36 | 42 | 50 |

## 9.3.1 A shaft design (hollow shaft), G housing design (pitch circle diameter)




| | | | |
|---|---|---|---|
| q0 | Applies to motors without brake. | q1 | Applies to motors with brake. |
| 1) | The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh. | 2) | Cover (optional) |
| 3) | Rubber buffer for torque arm (optional). Dimension ∅Dd = outer∅ of the rubber buffer when not tensioned. | | |

### Dimensions of gear units

| Type | □a4 | ad | ad1 | Øb | B | cd | Ødd | Ødh | ØDd | ØDh | ØDha | Øe | f | h | H | i2 | i3 | ld | le | lh | las | lha | s4 | sd | sm | sas | t4 | th | uh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 100 | 29.5 | 150 | $70_{j6}$ | 145 | 20 | $11.0^{+0,5}$ | $20^{H7}$ | 30 | 35 | 70 | 85 | 2.5 | 74 | 238.0 | 6.5 | 12.5 | 15 | 73 | 95 | 12 | 112 | M8 | M10 | M6 | M8 | 13 | 22.8 | $6^{JS9}$ |
| F2 | 130 | 33.0 | 181 | $95_{j6}$ | 180 | 22 | $11.0^{+0,5}$ | $25^{H7}$ | 30 | 45 | 82 | 115 | 3.0 | 93 | 299.0 | 8.0 | 15.0 | 15 | 92 | 115 | 12 | 130.5 | M8 | M10 | M10 | M12 | 13 | 28.3 | $8^{JS9}$ |
| F3 | 150 | 38.5 | 205 | $110_{j6}$ | 206 | 30 | $14.0^{+0,5}$ | $30^{H7}$ | 37 | 50 | 88 | 130 | 3.5 | 106 | 335.5 | 8.5 | 16.5 | 20 | 103 | 130 | 12 | 155.5 | M10 | M12 | M10 | M12 | 16 | 33.3 | $8^{JS9}$ |
| F4 | 150 | 38.5 | 228 | $110_{j6}$ | 230 | 30 | $14.0^{+0,5}$ | $40^{H7}$ | 37 | 55 | 100 | 130 | 3.5 | 116 | 370.0 | 8.5 | 16.5 | 20 | 114 | 145 | 12 | 174.5 | M10 | M12 | M16 | M20 | 16 | 43.3 | $12^{JS9}$ |
| F6 | 180 | 44.5 | 270 | $130_{j6}$ | 265 | 35 | $22.0^{+0,5}$ | $50^{H7}$ | 60 | 70 | 115 | 165 | 3.5 | 137 | 433.0 | 10.5 | 20.5 | 30 | 143 | 180 | 12 | 192.5 | M10 | M20 | M16 | M20 | 16 | 53.8 | $14^{JS9}$ |

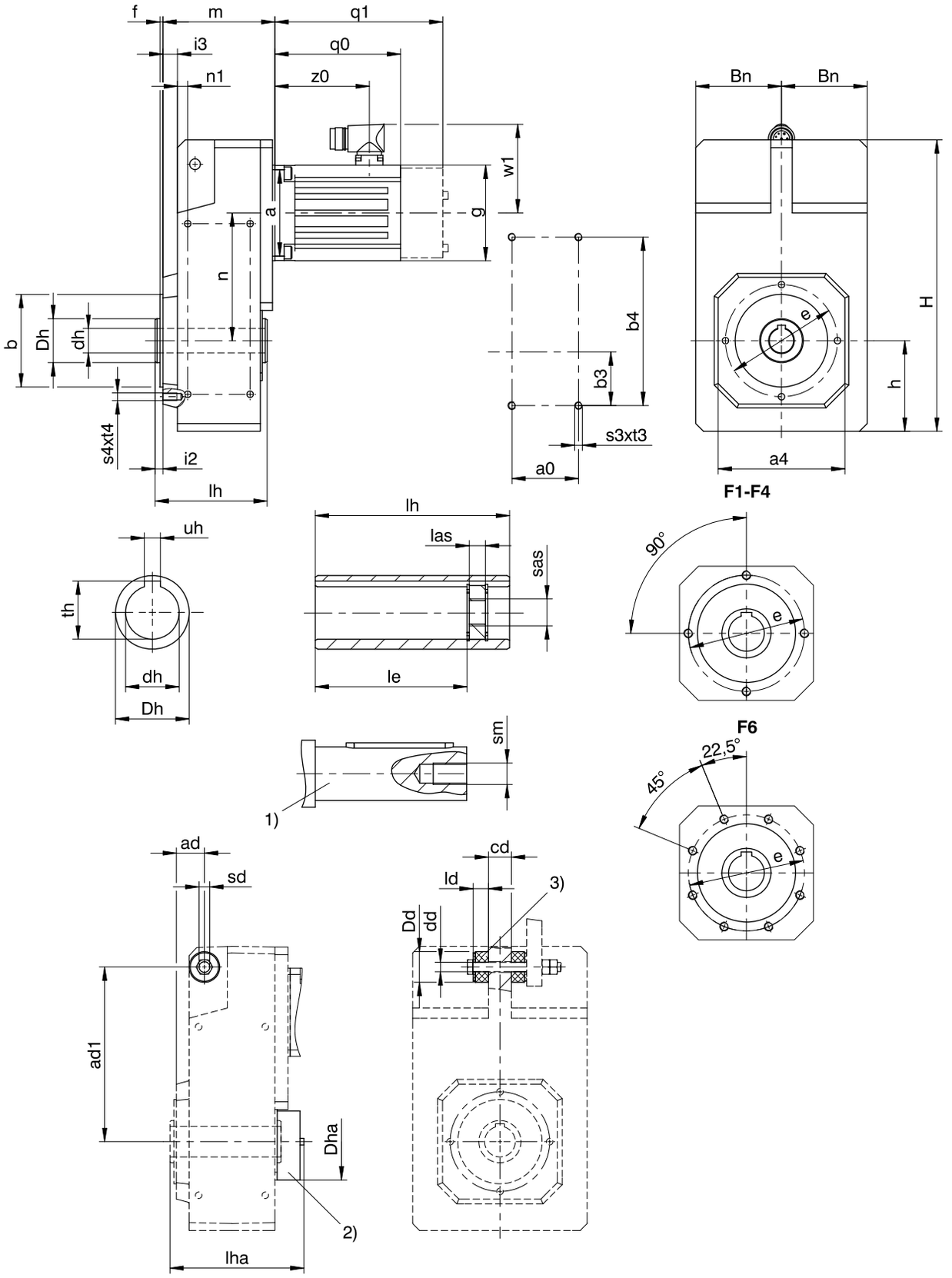
### Dimensions of motors

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

### Dimensions of geared motors

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 97.5 | 102.0 | □115 | 101.5 | 102.0 | – | – | – |
| F202 | □98 | 115.0 | 131.0 | □115 | 119.0 | 131.0 | □145 | 121.0 | 131.0 |
| F302 | ∅140 | 129.5 | 149.5 | □115 | 133.5 | 149.5 | □145 | 135.5 | 149.5 |
| F303 | ∅140 | 166.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 148.5 | 169.0 | □145 | 150.5 | 169.0 |
| F403 | ∅140 | 181.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 179.5 | 196.0 | □145 | 181.5 | 196.0 |

## 9.3.2 A shaft design (hollow shaft), GN housing design (pitch circle diameter + side fastening)




| | | | |
|---|---|---|---|
| q0 | Applies to motors without brake. | q1 | Applies to motors with brake. |
| 1) | The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh. | 2) | Cover (optional) |
| 3) | Rubber buffer for torque arm (optional). Dimension ∅Dd = outer∅ of the rubber buffer when not tensioned. | | |

### Dimensions of gear units

| Type | a0 | □a4 | ad | ad1 | Øb | b3 | b4 | Bn | cd | Ødd | Ødh | ØDd | ØDh | ØDha | Øe | f | h | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 50 | 100 | 29.5 | 150 | $70_{j6}$ | 40 | 140 | 71 | 20 | $11.0^{+0,5}$ | $20^{H7}$ | 30 | 35 | 70 | 85 | 2.5 | 74 | 238.0 |
| F2 | 64 | 130 | 33.0 | 181 | $95_{j6}$ | 55 | 175 | 88 | 22 | $11.0^{+0,5}$ | $25^{H7}$ | 30 | 45 | 82 | 115 | 3.0 | 93 | 299.0 |
| F3 | 72 | 150 | 38.5 | 205 | $110_{j6}$ | 60 | 200 | 102 | 30 | $14.0^{+0,5}$ | $30^{H7}$ | 37 | 50 | 88 | 130 | 3.5 | 106 | 335.5 |
| F4 | 87 | 150 | 38.5 | 228 | $110_{j6}$ | 70 | 220 | 114 | 30 | $14.0^{+0,5}$ | $40^{H7}$ | 37 | 55 | 100 | 130 | 3.5 | 116 | 370.0 |
| F6 | 108 | 180 | 44.5 | 270 | $130_{j6}$ | 85 | 270 | 131 | 35 | $22.0^{+0,5}$ | $50^{H7}$ | 60 | 70 | 115 | 165 | 3.5 | 137 | 433.0 |

| Type | i2 | i3 | ld | le | lh | las | lha | n1 | s3 | s4 | sd | sm | sas | t3 | t4 | th | uh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 6.5 | 12.5 | 15 | 73 | 95 | 12 | 112 | 10.0 | M6 | M8 | M10 | M6 | M8 | 11 | 13 | 22.8 | $6^{JS9}$ |
| F2 | 8.0 | 15.0 | 15 | 92 | 115 | 12 | 130.5 | 10.5 | M8 | M8 | M10 | M10 | M12 | 13 | 13 | 28.3 | $8^{JS9}$ |
| F3 | 8.5 | 16.5 | 20 | 103 | 130 | 12 | 155.5 | 12.5 | M10 | M10 | M12 | M10 | M12 | 16 | 16 | 33.3 | $8^{JS9}$ |
| F4 | 8.5 | 16.5 | 20 | 114 | 145 | 12 | 174.5 | 12.5 | M10 | M10 | M12 | M16 | M20 | 16 | 16 | 43.3 | $12^{JS9}$ |
| F6 | 10.5 | 20.5 | 30 | 143 | 180 | 12 | 192.5 | 15.5 | M12 | M10 | M20 | M16 | M20 | 19 | 16 | 53.8 | $14^{JS9}$ |

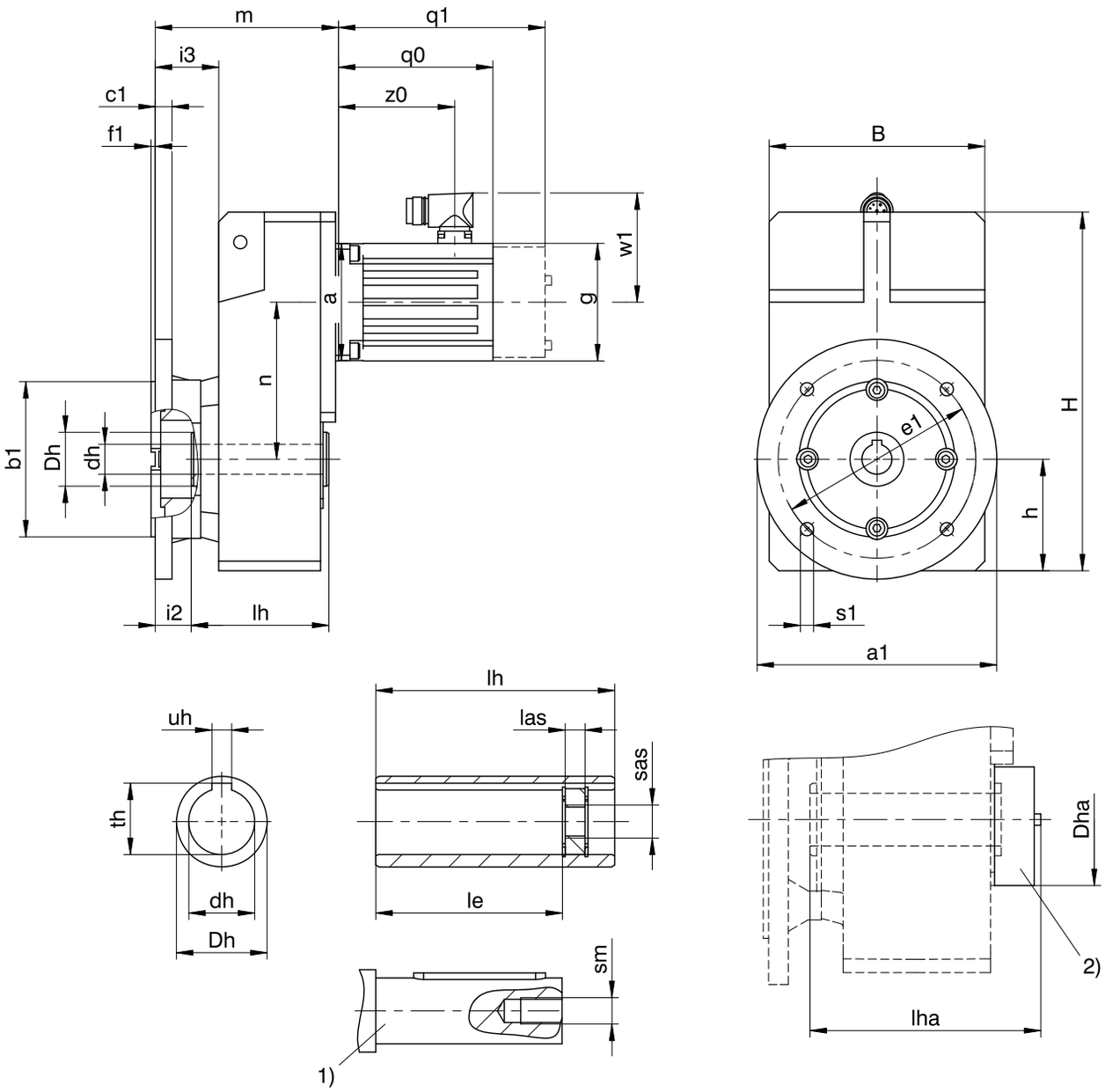
### Dimensions of motors

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

### Dimensions of geared motors

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 97.5 | 102.0 | □115 | 101.5 | 102.0 | – | – | – |
| F202 | □98 | 115.0 | 131.0 | □115 | 119.0 | 131.0 | □145 | 121.0 | 131.0 |
| F302 | ∅140 | 129.5 | 149.5 | □115 | 133.5 | 149.5 | □145 | 135.5 | 149.5 |
| F303 | ∅140 | 166.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 148.5 | 169.0 | □145 | 150.5 | 169.0 |
| F403 | ∅140 | 181.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 179.5 | 196.0 | □145 | 181.5 | 196.0 |

## 9.3.3 A shaft design (hollow shaft), F housing design (round flange)




| | | | |
|---|---|---|---|
| q0 | Applies to motors without brake. | q1 | Applies to motors with brake. |
| 1) | The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh. | 2) | Cover (optional) |

### Dimensions of gear units

| Type | Øa1 | Øb1 | B | c1 | Ødh | ØDh | ØDha | Øe1 | f1 | h | H | i2 | i3 | le | lh | las | lha | Øs1 | sm | sas | th | uh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 160 | $110_{j6}$ | 145 | 10 | $20^{H7}$ | 35 | 70 | 130 | 3.5 | 74 | 238.0 | 25.5 | 44.5 | 73 | 95 | 12 | 112 | 9 | M6 | M8 | 22.8 | $6^{JS9}$ |
| F2 | 200 | $130_{j6}$ | 180 | 14 | $25^{H7}$ | 45 | 82 | 165 | 3.5 | 93 | 299.0 | 30.0 | 53.0 | 92 | 115 | 12 | 130.5 | 11 | M10 | M12 | 28.3 | $8^{JS9}$ |
| F3 | 250 | $180_{j6}$ | 206 | 15 | $30^{H7}$ | 50 | 88 | 215 | 4.0 | 106 | 335.5 | 31.5 | 56.5 | 103 | 130 | 12 | 155.5 | 14 | M10 | M12 | 33.3 | $8^{JS9}$ |
| F4 | 250 | $180_{j6}$ | 230 | 15 | $40^{H7}$ | 55 | 100 | 215 | 4.0 | 116 | 370.0 | 31.5 | 56.5 | 114 | 145 | 12 | 174.5 | 14 | M16 | M20 | 43.3 | $12^{JS9}$ |
| F6 | 300 | $230_{j6}$ | 265 | 17 | $50^{H7}$ | 70 | 115 | 265 | 4.0 | 137 | 433.0 | 29.5 | 60.5 | 143 | 180 | 12 | 192.5 | 14 | M16 | M20 | 53.8 | $14^{JS9}$ |

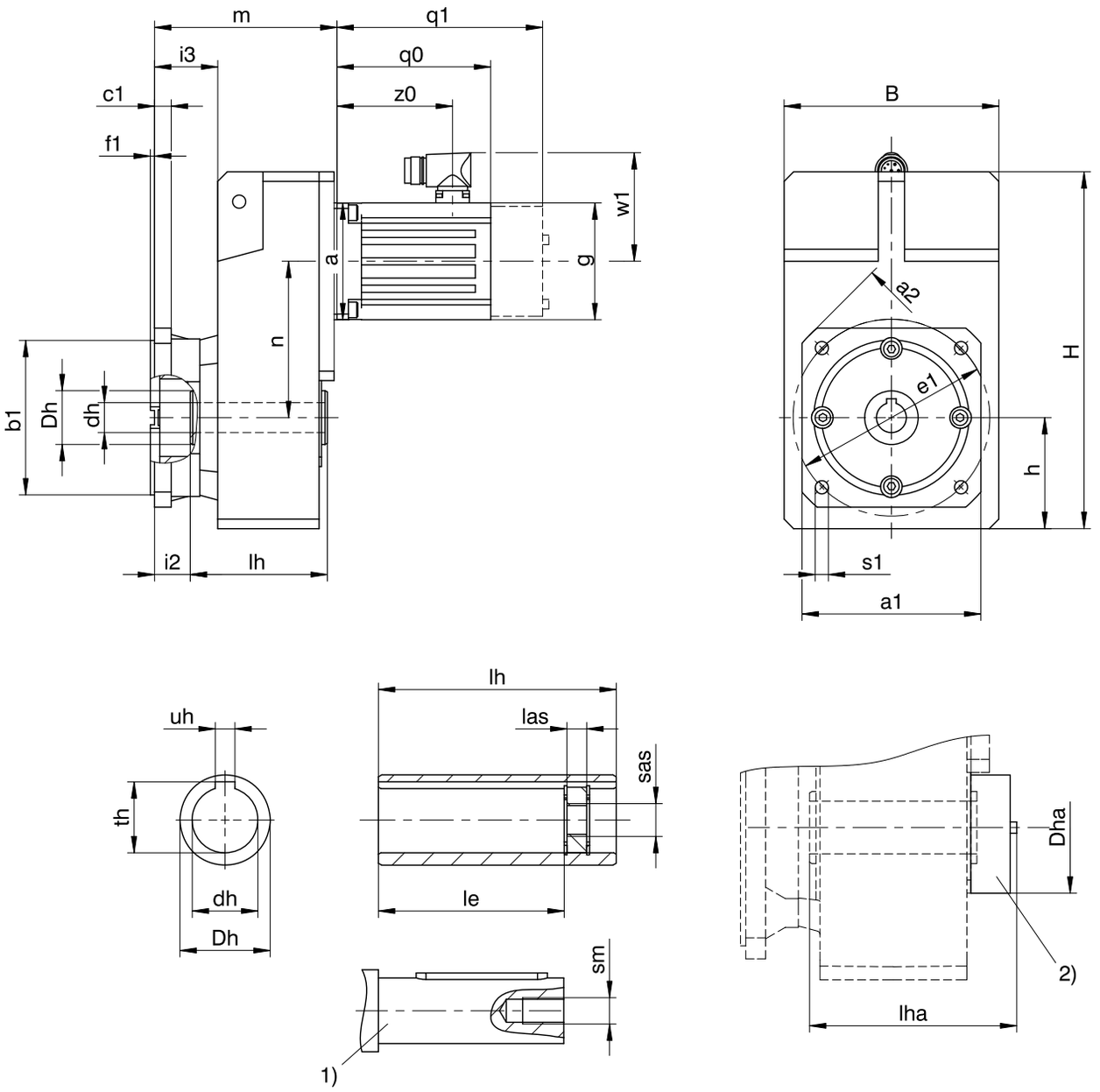
### Dimensions of motors

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

### Dimensions of geared motors

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 129.5 | 102.0 | □115 | 133.5 | 102.0 | – | – | – |
| F202 | □98 | 153.0 | 131.0 | □115 | 157.0 | 131.0 | □145 | 159.0 | 131.0 |
| F302 | ∅140 | 169.5 | 149.5 | □115 | 173.5 | 149.5 | □145 | 175.5 | 149.5 |
| F303 | ∅140 | 206.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 188.5 | 169.0 | □145 | 190.5 | 169.0 |
| F403 | ∅140 | 221.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 219.5 | 196.0 | □145 | 221.5 | 196.0 |

## 9.3.4 A shaft design (hollow shaft), Q housing design (square flange)




| | | | |
|---|---|---|---|
| q0 | Applies to motors without brake. | q1 | Applies to motors with brake. |
| 1) | The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh. | 2) | Cover (optional) |

### Dimensions of gear units

| Type | □a1 | □a2 | Øb1 | B | c1 | Ødh | ØDh | ØDha | Øe1 | f1 | h | H | i2 | i3 | le | lh | las | lha | Øs1 | sm | sas | th | uh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 125 | 160 | $110_{j6}$ | 145 | 10 | $20^{H7}$ | 35 | 70 | 130 | 3.5 | 74 | 238.0 | 25.5 | 44.5 | 73 | 95 | 12 | 112 | 9 | M6 | M8 | 22.8 | $6^{JS9}$ |
| F2 | 150 | 195 | $130_{j6}$ | 180 | 14 | $25^{H7}$ | 45 | 82 | 165 | 3.5 | 93 | 299.0 | 30.0 | 53.0 | 92 | 115 | 12 | 130.5 | 11 | M10 | M12 | 28.3 | $8^{JS9}$ |
| F3 | 200 | 260 | $180_{j6}$ | 206 | 15 | $30^{H7}$ | 50 | 88 | 215 | 4.0 | 106 | 335.5 | 31.5 | 56.5 | 103 | 130 | 12 | 155.5 | 14 | M10 | M12 | 33.3 | $8^{JS9}$ |
| F4 | 200 | 260 | $180_{j6}$ | 230 | 15 | $40^{H7}$ | 55 | 100 | 215 | 4.0 | 116 | 370.0 | 31.5 | 56.5 | 114 | 145 | 12 | 174.5 | 14 | M16 | M20 | 43.3 | $12^{JS9}$ |
| F6 | 250 | 325 | $230_{j6}$ | 265 | 17 | $50^{H7}$ | 70 | 115 | 265 | 4.0 | 137 | 433.0 | 29.5 | 60.5 | 143 | 180 | 12 | 192.5 | 14 | M16 | M20 | 53.8 | $14^{JS9}$ |

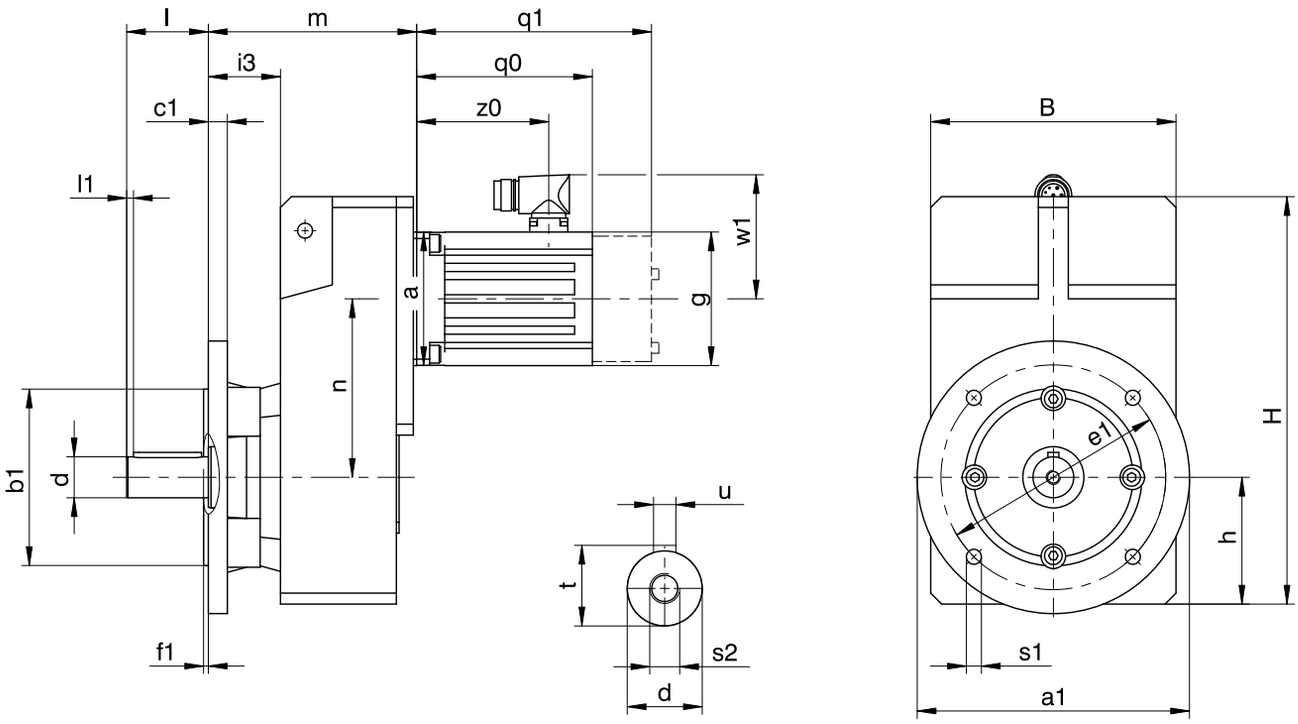
### Dimensions of motors

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

### Dimensions of geared motors

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 129.5 | 102.0 | □115 | 133.5 | 102.0 | – | – | – |
| F202 | □98 | 153.0 | 131.0 | □115 | 157.0 | 131.0 | □145 | 159.0 | 131.0 |
| F302 | ∅140 | 169.5 | 149.5 | □115 | 173.5 | 149.5 | □145 | 175.5 | 149.5 |
| F303 | ∅140 | 206.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 188.5 | 169.0 | □145 | 190.5 | 169.0 |
| F403 | ∅140 | 221.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 219.5 | 196.0 | □145 | 221.5 | 196.0 |

## 9.3.5 V shaft design (solid shaft), F housing design (round flange)




q0 Applies to motors without brake.

q1 Applies to motors with brake.

**Dimensions of gear units**

| Type | Øa1 | Øb1 | B | c1 | Ød | Øe1 | f1 | h | H | i3 | l | l1 | Øs1 | s2 | t | u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 160 | $110_{j6}$ | 145 | 10 | $25_{k6}$ | 130 | 3.5 | 74 | 238.0 | 44.5 | 50 | 5 | 9 | M10 | 28.0 | A8×7×40 |
| F2 | 200 | $130_{j6}$ | 180 | 14 | $30_{k6}$ | 165 | 3.5 | 93 | 299.0 | 53.0 | 60 | 5 | 11 | M10 | 33.0 | A8×7×50 |
| F3 | 250 | $180_{j6}$ | 206 | 15 | $35_{k6}$ | 215 | 4.0 | 106 | 335.5 | 56.5 | 70 | 5 | 14 | M12 | 38.0 | A10×8×60 |
| F4 | 250 | $180_{j6}$ | 230 | 15 | $40_{k6}$ | 215 | 4.0 | 116 | 370.0 | 56.5 | 80 | 5 | 14 | M16 | 43.0 | A12×8×70 |
| F6 | 300 | $230_{j6}$ | 265 | 17 | $50_{k6}$ | 265 | 4.0 | 137 | 433.0 | 60.5 | 100 | 5 | 14 | M16 | 53.5 | A14×9×90 |

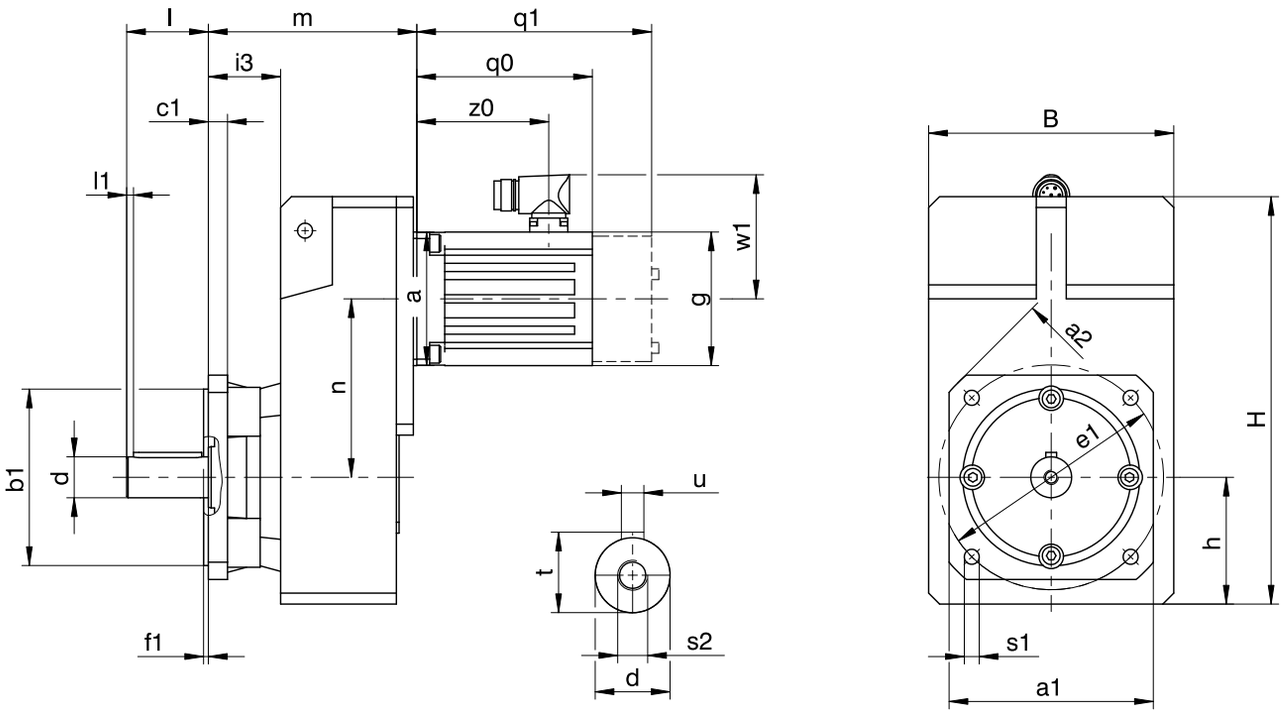
**Dimensions of motors**

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

**Dimensions of geared motors**

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 129.5 | 102.0 | □115 | 133.5 | 102.0 | – | – | – |
| F202 | □98 | 153.0 | 131.0 | □115 | 157.0 | 131.0 | □145 | 159.0 | 131.0 |
| F302 | ∅140 | 169.5 | 149.5 | □115 | 173.5 | 149.5 | □145 | 175.5 | 149.5 |
| F303 | ∅140 | 206.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 188.5 | 169.0 | □145 | 190.5 | 169.0 |
| F403 | ∅140 | 221.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 219.5 | 196.0 | □145 | 221.5 | 196.0 |

## 9.3.6 V shaft design (solid shaft), Q housing design (square flange)




q0 Applies to motors without brake.

q1 Applies to motors with brake.

**Dimensions of gear units**

| Type | □a1 | □a2 | Ø$b1_{j6}$ | c1 | B | Ø$d_{k6}$ | Ø$e1_{k6}$ | f1 | h | H | i3 | l | l1 | Ø$s1_{k6}$ | s2 | t | u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 125 | 160 | $110_{j6}$ | 10 | 145 | $25_{k6}$ | 130 | 3.5 | 74 | 238.0 | 44.5 | 50 | 5 | 9 | M10 | 28.0 | A8×7×40 |
| F2 | 150 | 195 | $130_{j6}$ | 14 | 180 | $30_{k6}$ | 165 | 3.5 | 93 | 299.0 | 53.0 | 60 | 5 | 11 | M10 | 33.0 | A8×7×50 |
| F3 | 200 | 260 | $180_{j6}$ | 15 | 206 | $35_{k6}$ | 215 | 4.0 | 106 | 335.5 | 56.5 | 70 | 5 | 14 | M12 | 38.0 | A10×8×60 |
| F4 | 200 | 260 | $180_{j6}$ | 15 | 230 | $40_{k6}$ | 215 | 4.0 | 116 | 370.0 | 56.5 | 80 | 5 | 14 | M16 | 43.0 | A12×8×70 |
| F6 | 250 | 325 | $230_{j6}$ | 17 | 265 | $50_{k6}$ | 265 | 4.0 | 137 | 433.0 | 60.5 | 100 | 5 | 14 | M16 | 53.5 | A14×9×90 |

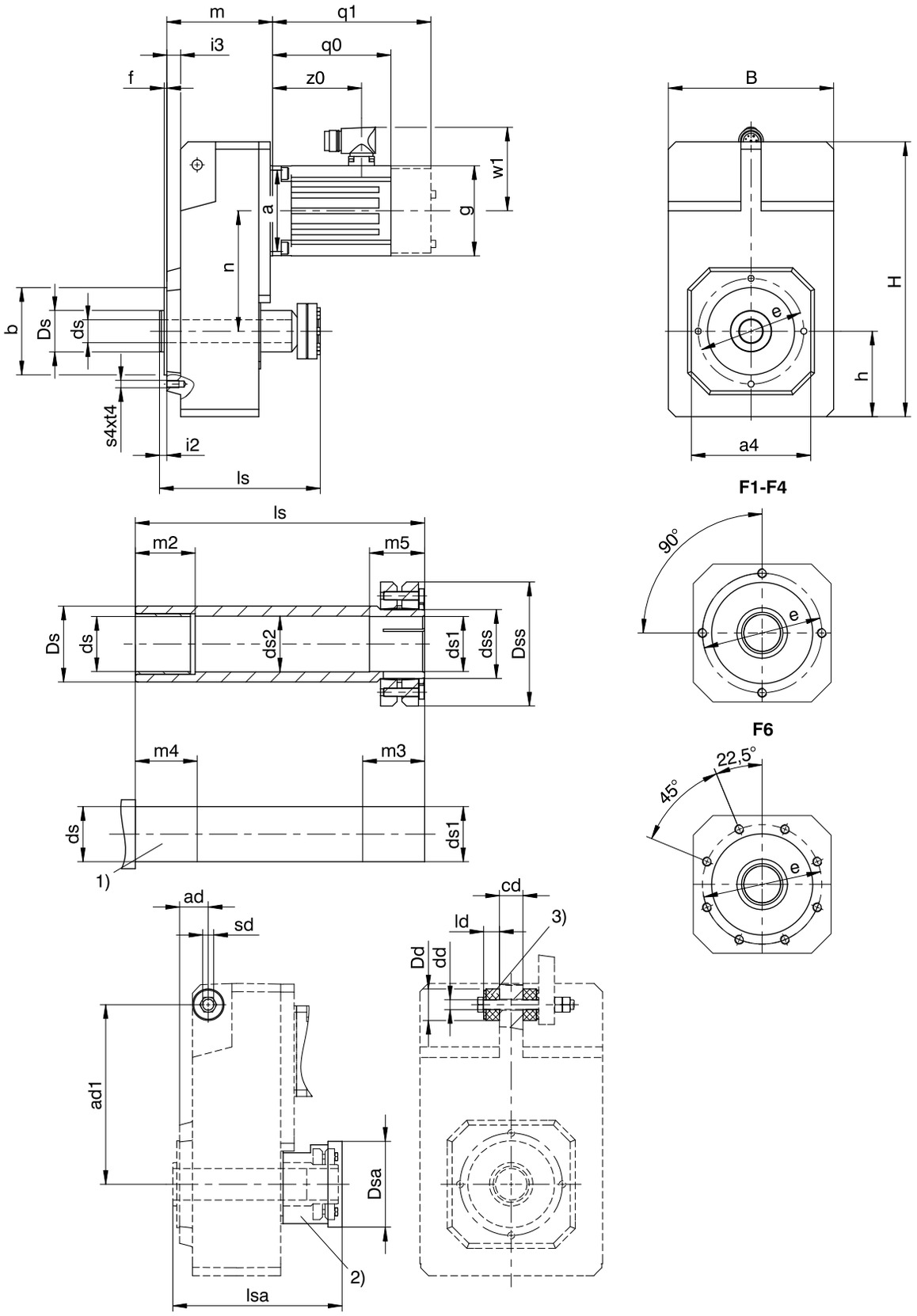
**Dimensions of motors**

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

**Dimensions of geared motors**

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 129.5 | 102.0 | □115 | 133.5 | 102.0 | – | – | – |
| F202 | □98 | 153.0 | 131.0 | □115 | 157.0 | 131.0 | □145 | 159.0 | 131.0 |
| F302 | ∅140 | 169.5 | 149.5 | □115 | 173.5 | 149.5 | □145 | 175.5 | 149.5 |
| F303 | ∅140 | 206.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 188.5 | 169.0 | □145 | 190.5 | 169.0 |
| F403 | ∅140 | 221.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 219.5 | 196.0 | □145 | 221.5 | 196.0 |

## 9.3.7 S shaft design (hollow shaft with shrink disk), G housing design (pitch circle diameter)




| | | | |
|---|---|---|---|
| q0 | Applies to motors without brake. | q1 | Applies to motors with brake. |
| 1) | Machine shaft: The dimension ls must meet or exceed the specified value. | 2) | Cover (optional) |
| 3) | Rubber buffer for torque arm (optional). Dimension ∅Dd = outer∅ of the rubber buffer when not tensioned. | | |

### Dimensions of gear units

| Type | □a4 | ad | ad1 | Øb | B | cd | Ødd | Øds | Øds1 | Øds2 | Ødss | ØDd | ØDs | ØDsa | ØDss | Øe | f | h | H | i2 | i3 | ld | ls | lsa | m2 | m3 | m4 | m5 | s4 | sd | t4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 100 | 29.5 | 150 | $70_{j6}$ | 145 | 20 | $11.0^{+0,5}$ | $20_{h9}$ | $20_{h9}^{H7}$ | 20.5 | 24 | 30 | 35 | 63 | 50 | 85 | 2.5 | 74 | 238.0 | 6.5 | 12.5 | 15 | 146 | 150 | 20 | 31 | 25 | 26 | M8 | M10 | 13 |
| F2 | 130 | 33.0 | 181 | $95_{j6}$ | 180 | 22 | $11.0^{+0,5}$ | $25_{h9}$ | $25_{h9}^{H7}$ | 25.5 | 30 | 30 | 45 | 73 | 60 | 115 | 3.0 | 93 | 299.0 | 8.0 | 15.0 | 15 | 175 | 180 | 20 | 37 | 25 | 32 | M8 | M10 | 13 |
| F3 | 150 | 38.5 | 205 | $110_{j6}$ | 206 | 30 | $14.0^{+0,5}$ | $30_{h9}$ | $30_{h9}^{H7}$ | 30.5 | 36 | 37 | 50 | 83 | 72 | 130 | 3.5 | 106 | 335.5 | 8.5 | 16.5 | 20 | 192 | 196 | 25 | 37 | 30 | 32 | M10 | M12 | 16 |
| F4 | 150 | 38.5 | 228 | $110_{j6}$ | 230 | 30 | $14.0^{+0,5}$ | $40_{h9}$ | $40_{h9}^{H7}$ | 40.5 | 50 | 37 | 55 | 108 | 90 | 130 | 3.5 | 116 | 370.0 | 8.5 | 16.5 | 20 | 210 | 215 | 40 | 45 | 45 | 40 | M10 | M12 | 16 |
| F6 | 180 | 44.5 | 270 | $130_{j6}$ | 265 | 35 | $22.0^{+0,5}$ | $50_{h9}$ | $50_{h9}^{H7}$ | 50.5 | 62 | 60 | 70 | 128 | 106 | 165 | 3.5 | 137 | 433.0 | 10.5 | 20.5 | 30 | 248 | 251 | 40 | 47 | 45 | 42 | M10 | M20 | 16 |

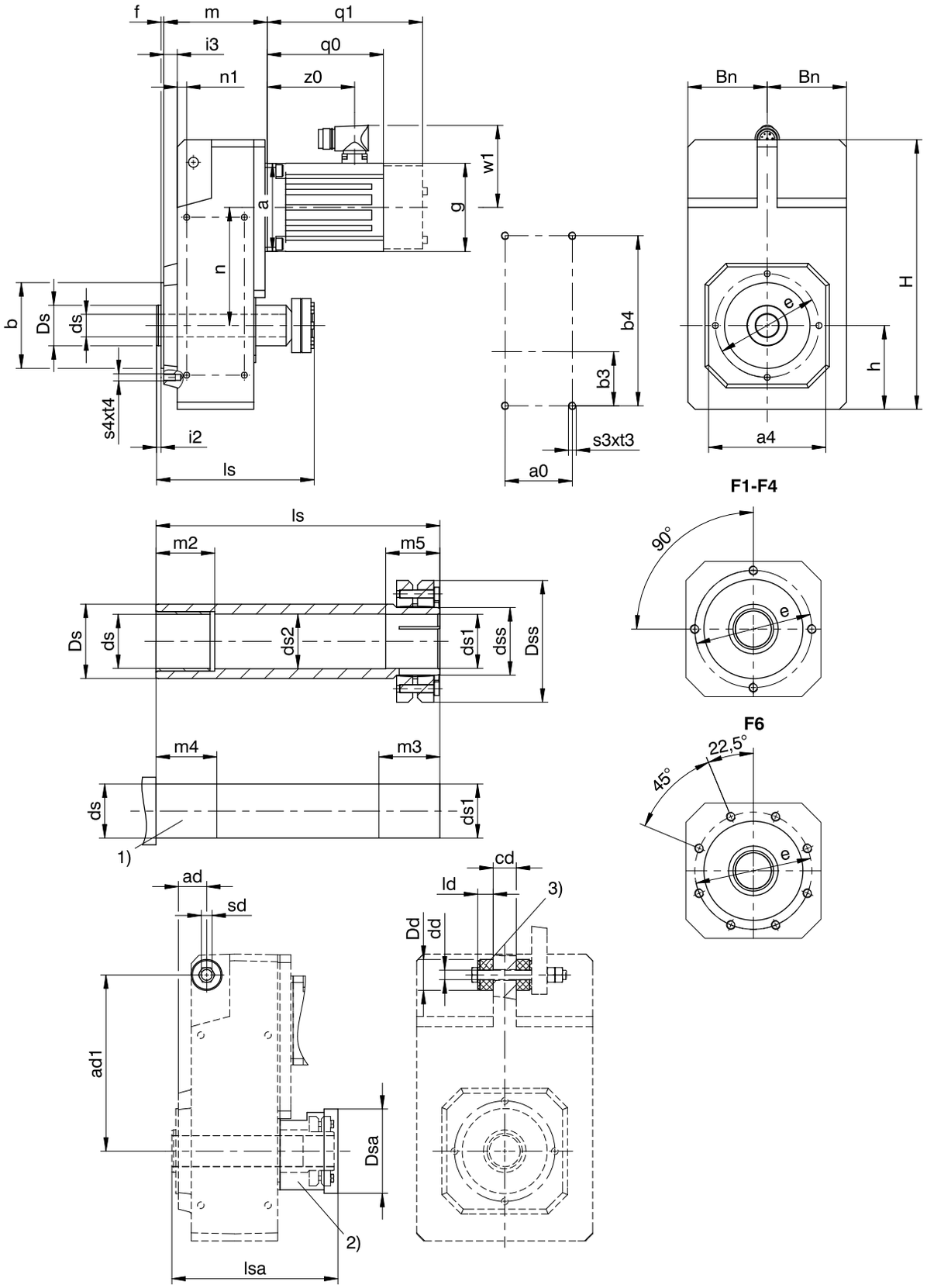
### Dimensions of motors

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

### Dimensions of geared motors

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 97.5 | 102.0 | □115 | 101.5 | 102.0 | – | – | – |
| F202 | □98 | 115.0 | 131.0 | □115 | 119.0 | 131.0 | □145 | 121.0 | 131.0 |
| F302 | ∅140 | 129.5 | 149.5 | □115 | 133.5 | 149.5 | □145 | 135.5 | 149.5 |
| F303 | ∅140 | 166.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 148.5 | 169.0 | □145 | 150.5 | 169.0 |
| F403 | ∅140 | 181.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 179.5 | 196.0 | □145 | 181.5 | 196.0 |

## 9.3.8 S shaft design (hollow shaft with shrink disk), GN housing design (pitch circle diameter + side fastening)




| | | | |
|---|---|---|---|
| q0 | Applies to motors without brake. | q1 | Applies to motors with brake. |
| 1) | Machine shaft: The dimension ls must meet or exceed the specified value. | 2) | Cover (optional) |
| 3) | Rubber buffer for torque arm (optional). Dimension ∅Dd = outer∅ of the rubber buffer when not tensioned. | | |

### Dimensions of gear units

| Type | a0 | □a4 | ad | ad1 | Øb | b3 | b4 | Bn | cd | Ødd | Øds | Øds1 | Øds2 | Ødss | ØDd | ØDs | ØDsa | ØDss |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 50 | 100 | 29.5 | 150 | $70_{j6}$ | 40 | 140 | 71 | 20 | $11.0^{+0,5}$ | $20_{h9}$ | $20_{h9}^{H7}$ | 20.5 | 24 | 30 | 35 | 63 | 50 |
| F2 | 64 | 130 | 33.0 | 181 | $95_{j6}$ | 55 | 175 | 88 | 22 | $11.0^{+0,5}$ | $25_{h9}$ | $25_{h9}^{H7}$ | 25.5 | 30 | 30 | 45 | 73 | 60 |
| F3 | 72 | 150 | 38.5 | 205 | $110_{j6}$ | 60 | 200 | 102 | 30 | $14.0^{+0,5}$ | $30_{h9}$ | $30_{h9}^{H7}$ | 30.5 | 36 | 37 | 50 | 83 | 72 |
| F4 | 87 | 150 | 38.5 | 228 | $110_{j6}$ | 70 | 220 | 114 | 30 | $14.0^{+0,5}$ | $40_{h9}$ | $40_{h9}^{H7}$ | 40.5 | 50 | 37 | 55 | 108 | 90 |
| F6 | 108 | 180 | 44.5 | 270 | $130_{j6}$ | 85 | 270 | 131 | 35 | $22.0^{+0,5}$ | $50_{h9}$ | $50_{h9}^{H7}$ | 50.5 | 62 | 60 | 70 | 128 | 106 |

| Type | Øe | f | h | H | i2 | i3 | ld | ls | lsa | n1 | m2 | m3 | m4 | m5 | s3 | s4 | sd | t3 | t4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 85 | 2.5 | 74 | 238.0 | 6.5 | 12.5 | 15 | 146 | 150 | 10 | 20 | 31 | 25 | 26 | M6 | M8 | M10 | 11 | 13 |
| F2 | 115 | 3.0 | 93 | 299.0 | 8.0 | 15.0 | 15 | 175 | 180 | 10.5 | 20 | 37 | 25 | 32 | M8 | M8 | M10 | 13 | 13 |
| F3 | 130 | 3.5 | 106 | 335.5 | 8.5 | 16.5 | 20 | 192 | 196 | 12.5 | 25 | 37 | 30 | 32 | M10 | M10 | M12 | 16 | 16 |
| F4 | 130 | 3.5 | 116 | 370.0 | 8.5 | 16.5 | 20 | 210 | 215 | 12.5 | 40 | 45 | 45 | 40 | M10 | M10 | M12 | 16 | 16 |
| F6 | 165 | 3.5 | 137 | 433.0 | 10.5 | 20.5 | 30 | 248 | 251 | 15.5 | 40 | 47 | 45 | 42 | M12 | M10 | M20 | 19 | 16 |

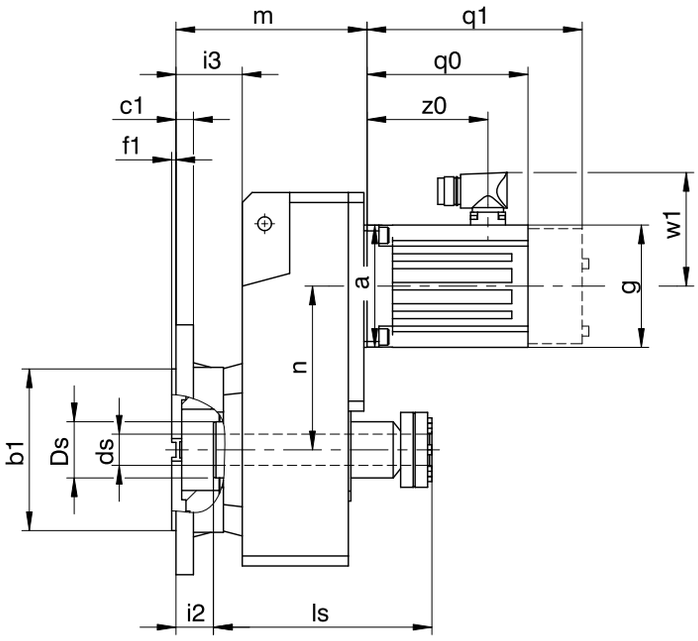
### Dimensions of motors

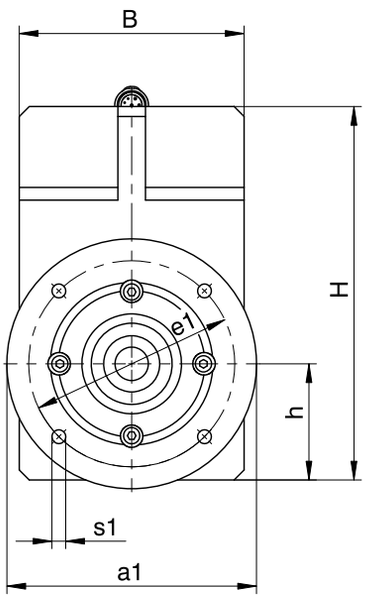
| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

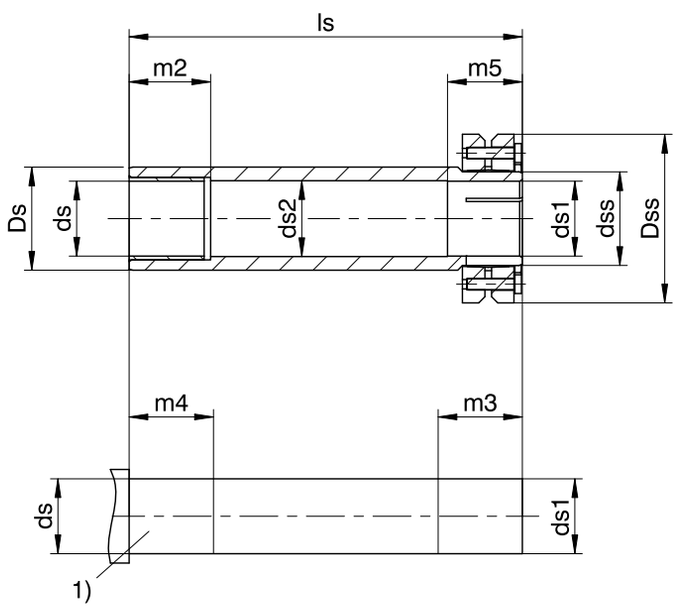
### Dimensions of geared motors

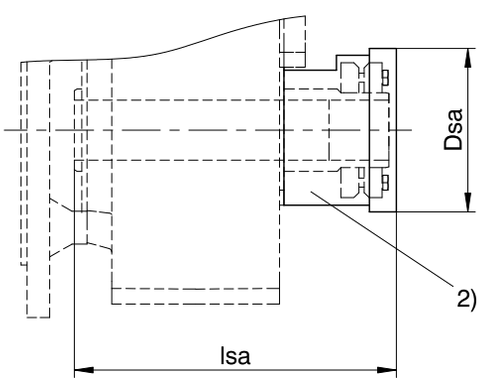
| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 97.5 | 102.0 | □115 | 101.5 | 102.0 | – | – | – |
| F202 | □98 | 115.0 | 131.0 | □115 | 119.0 | 131.0 | □145 | 121.0 | 131.0 |
| F302 | ∅140 | 129.5 | 149.5 | □115 | 133.5 | 149.5 | □145 | 135.5 | 149.5 |
| F303 | ∅140 | 166.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 148.5 | 169.0 | □145 | 150.5 | 169.0 |
| F403 | ∅140 | 181.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 179.5 | 196.0 | □145 | 181.5 | 196.0 |

## 9.3.9 S shaft design (hollow shaft with shrink disk), F housing design (round flange)




q0 Applies to motors without brake.

q1 Applies to motors with brake.

1) Machine shaft: The dimension ls must meet or exceed the specified value.

2) Cover (optional)

### Dimensions of gear units

| Type | Øa1 | Øb1 | B | c1 | Øds | Øds1 | Øds2 | Ødss | ØDs | ØDsa | ØDss | Øe1 | f1 | h | H | i2 | i3 | ls | lsa | m2 | m3 | m4 | m5 | Øs1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 160 | $110_{j6}$ | 145 | 10 | $20_{h9}$ | $20_{h9}^{H7}$ | 20.5 | 24 | 35 | 63 | 50 | 130 | 3.5 | 74 | 238.0 | 25.5 | 44.5 | 146 | 150 | 20 | 31 | 25 | 26 | 9 |
| F2 | 200 | $130_{j6}$ | 180 | 14 | $25_{h9}$ | $25_{h9}^{H7}$ | 25.5 | 30 | 45 | 73 | 60 | 165 | 3.5 | 93 | 299.0 | 30.0 | 53.0 | 175 | 180 | 20 | 37 | 25 | 32 | 11 |
| F3 | 250 | $180_{j6}$ | 206 | 15 | $30_{h9}$ | $30_{h9}^{H7}$ | 30.5 | 36 | 50 | 83 | 72 | 215 | 4.0 | 106 | 335.5 | 31.5 | 56.5 | 192 | 196 | 25 | 37 | 30 | 32 | 14 |
| F4 | 250 | $180_{j6}$ | 230 | 15 | $40_{h9}$ | $40_{h9}^{H7}$ | 40.5 | 50 | 55 | 108 | 90 | 215 | 4.0 | 116 | 370.0 | 31.5 | 56.5 | 210 | 215 | 40 | 45 | 45 | 40 | 14 |
| F6 | 300 | $230_{j6}$ | 265 | 17 | $50_{h9}$ | $50_{h9}^{H7}$ | 50.5 | 62 | 70 | 128 | 106 | 265 | 4.0 | 137 | 433.0 | 29.5 | 60.5 | 248 | 251 | 40 | 47 | 45 | 42 | 14 |

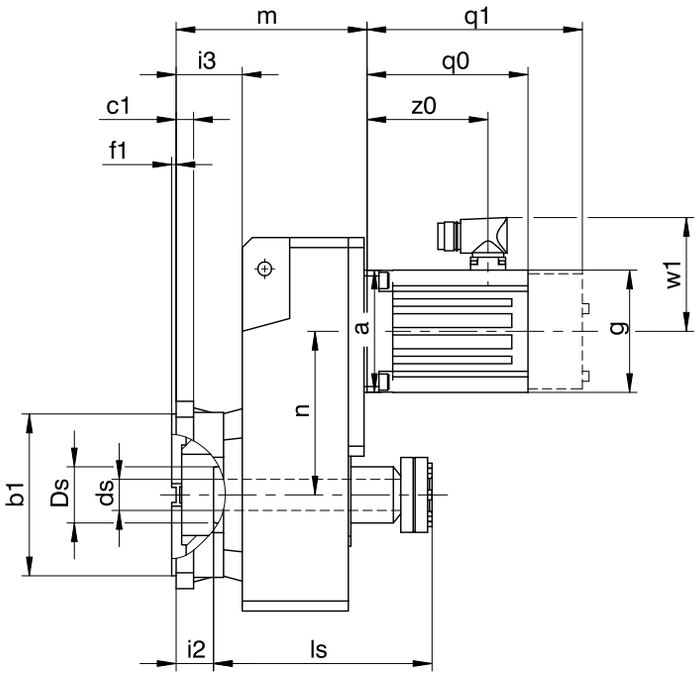
### Dimensions of motors

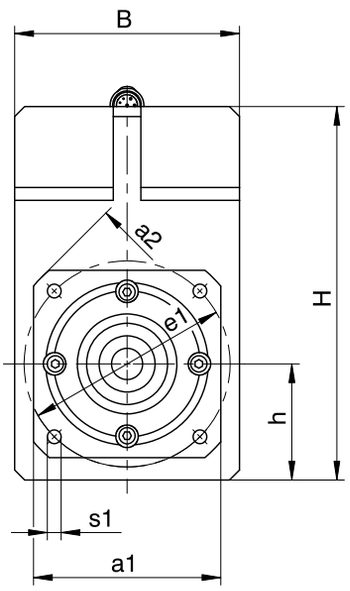
| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

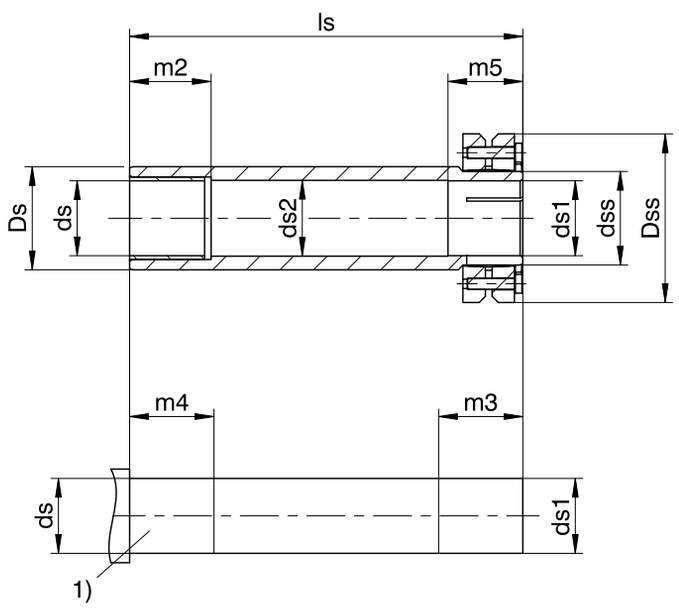
### Dimensions of geared motors

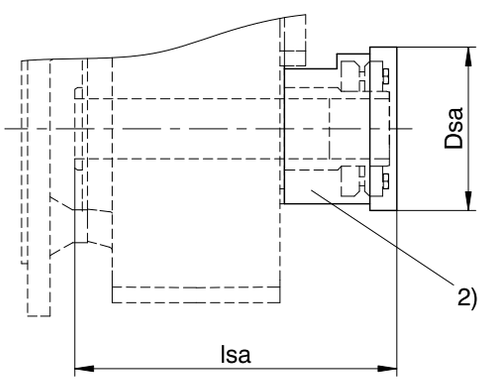
| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 129.5 | 102.0 | □115 | 133.5 | 102.0 | – | – | – |
| F202 | □98 | 153.0 | 131.0 | □115 | 157.0 | 131.0 | □145 | 159.0 | 131.0 |
| F302 | ∅140 | 169.5 | 149.5 | □115 | 173.5 | 149.5 | □145 | 175.5 | 149.5 |
| F303 | ∅140 | 206.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 188.5 | 169.0 | □145 | 190.5 | 169.0 |
| F403 | ∅140 | 221.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 219.5 | 196.0 | □145 | 221.5 | 196.0 |

## 9.3.10 S shaft design (hollow shaft with shrink disk), Q housing design (square flange)




| | | | |
|---|---|---|---|
| q0 | Applies to motors without brake. | q1 | Applies to motors with brake. |
| 1) | Machine shaft: The dimension ls must meet or exceed the specified value. | 2) | Cover (optional) |

### Dimensions of gear units

| Type | □a1 | □a2 | Ø$b1_{j6}$ | B | c1 | Ø$ds_{h9}$ | Ø$ds1_{h9}^{H7}$ | Øds2 | Ødss | ØDs | ØDsa | ØDss | Øe1 | f1 | h | H | i2 | i3 | ls | lsa | m2 | m3 | m4 | m5 | Øs1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 125 | 160 | $110_{j6}$ | 145 | 10 | $20_{h9}$ | $20_{h9}^{H7}$ | 20.5 | 24 | 35 | 63 | 50 | 130 | 3.5 | 74 | 238.0 | 25.5 | 44.5 | 146 | 150 | 20 | 31 | 25 | 26 | 9 |
| F2 | 150 | 195 | $130_{j6}$ | 180 | 14 | $25_{h9}$ | $25_{h9}^{H7}$ | 25.5 | 30 | 45 | 73 | 60 | 165 | 3.5 | 93 | 299.0 | 30.0 | 53.0 | 175 | 180 | 20 | 37 | 25 | 32 | 11 |
| F3 | 200 | 260 | $180_{j6}$ | 206 | 15 | $30_{h9}$ | $30_{h9}^{H7}$ | 30.5 | 36 | 50 | 83 | 72 | 215 | 4.0 | 106 | 335.5 | 31.5 | 56.5 | 192 | 196 | 25 | 37 | 30 | 32 | 14 |
| F4 | 200 | 260 | $180_{j6}$ | 230 | 15 | $40_{h9}$ | $40_{h9}^{H7}$ | 40.5 | 50 | 55 | 108 | 90 | 215 | 4.0 | 116 | 370.0 | 31.5 | 56.5 | 210 | 215 | 40 | 45 | 45 | 40 | 14 |
| F6 | 250 | 325 | $230_{j6}$ | 265 | 17 | $50_{h9}$ | $50_{h9}^{H7}$ | 50.5 | 62 | 70 | 128 | 106 | 265 | 4.0 | 137 | 433.0 | 29.5 | 60.5 | 248 | 251 | 40 | 47 | 45 | 42 | 14 |

### Dimensions of motors

| Type | □g | q0 | q1 | w1 | z0 |
|---|---|---|---|---|---|
| LM401U | 98 | 129.0 | 172.5 | 91 | 97 |
| LM402U | 98 | 168.0 | 211.5 | 91 | 136 |
| LM403U | 98 | 199.0 | 242.5 | 91 | 167 |
| LM503U | 115 | 205.5 | 253.5 | 100 | 175 |
| LM505U | 115 | 275.5 | 323.5 | 100 | 245 |
| LM704U | 145 | 259.5 | 318.5 | 115 | 227 |
| LM706U | 145 | 329.5 | 388.5 | 115 | 297 |

### Dimensions of geared motors

| Type | LM4 | | | LM5 | | | LM7 | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | m | n | a | m | n | a | m | n |
| F102 | □98 | 129.5 | 102.0 | □115 | 133.5 | 102.0 | – | – | – |
| F202 | □98 | 153.0 | 131.0 | □115 | 157.0 | 131.0 | □145 | 159.0 | 131.0 |
| F302 | ∅140 | 169.5 | 149.5 | □115 | 173.5 | 149.5 | □145 | 175.5 | 149.5 |
| F303 | ∅140 | 206.5 | 149.5 | – | – | – | – | – | – |
| F402 | – | – | – | ∅160 | 188.5 | 169.0 | □145 | 190.5 | 169.0 |
| F403 | ∅140 | 221.5 | 169.0 | – | – | – | – | – | – |
| F602 | – | – | – | ∅160 | 219.5 | 196.0 | □145 | 221.5 | 196.0 |

# 9.4 Type designation

In this chapter, you can find an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

**Sample code**

| F | 2 | 0 | 2 | A | G | 0280 | LM403U |
|---|---|---|---|---|---|---|---|

**Explanation**

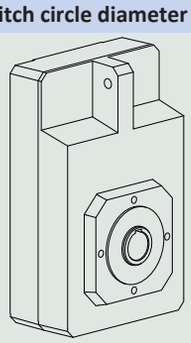
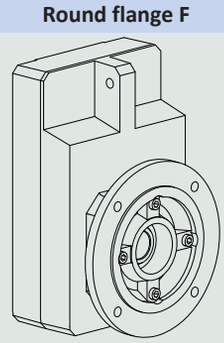
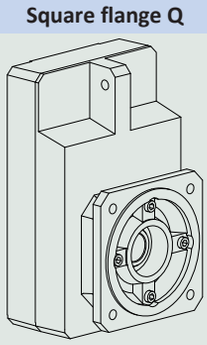
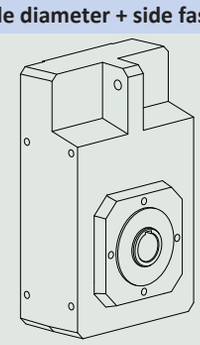
| Code | Designation | Design |
|---|---|---|
| **F** | Type | Offset helical gear unit |
| **2** | Size | 2 (example) |
| **0** | Generation | Generation 0 |
| **2** | Stages | Two-stage |
| 3 | | Three-stage |
| **A** | Shaft | Hollow shaft with keyway |
| S | | Hollow shaft with shrink disk |
| V | | Solid shaft |
| **G** | Housing | Pitch circle diameter |
| F | | Round flange |
| Q | | Square flange |
| GN | | Pitch circle diameter + side fastening |
| **0280** | Transmission ratio (i x 10) | i = 28 (example) |
| **LM403U** | Motor | LM Lean motor |

**In order to complete the type designation, also specify:**

- A detailed type designation of the motor, see the chapter [▶ 2]
- The installation position, see the chapter [▶ 9.5.4]
- The position of the plug connector, see the chapter [▶ 9.5.6]

# 9.5 Product description

## 9.5.1 Housing design

| Pitch circle diameter G | Round flange F |
|---|---|
|  |  |
| **Square flange Q** | **Pitch circle diameter + side fastening GN** |
|  |  |

| | G | F | Q | GN |
|---|---|---|---|---|
| F1 | ✓ | ✓ | ✓ | ✓ |
| F2 | ✓ | ✓ | ✓ | ✓ |
| F3 | ✓ | ✓ | ✓ | ✓ |
| F4 | ✓ | ✓ | ✓ | ✓ |
| F6 | ✓ | ✓ | ✓ | ✓ |

## 9.5.2 Combinatorial shaft/housing design

| | Housing design | | | | |
|---|---|---|---|---|---|
| **Shaft design** | **Code** | **G** | **F** | **Q** | **GN** |
| Hollow shaft with keyway | **A** | AG | AF | AQ | AGN |
| Hollow shaft with shrink disk | **S** | SG | SF | SQ | SGN |
| Solid shaft | **V** | – | VF | VQ | – |

## 9.5.3 Installation conditions

**Hollow shaft**

The hollow shaft hole tolerance is ISO H7. The tolerance of the machine shaft must be ISO k6.

Take care to align the machine shaft with the gear unit hollow shaft when attaching the gear unit.

Maximum deviation ≤ 0.03 mm.

For simpler assembly and disassembly of the machine shaft, the hollow shafts are equipped with a spiral groove (as a grease deposit).

A hardened, threaded dismounting disk is included in the scope of delivery. You also have the option to order the hollow shaft without a dismounting disk.

**Hollow shaft with shrink disk**

The tolerance of the hollow shaft hole is ISO H7.

The machine shaft must be ISO h9.

Select a material for the machine shaft with a permitted surface pressure of $p \geq 325\ N/mm^2$.

Possible materials:

- C45E +QT
- 42CrMo4

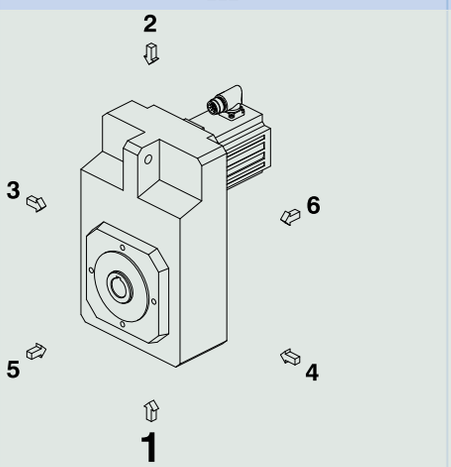
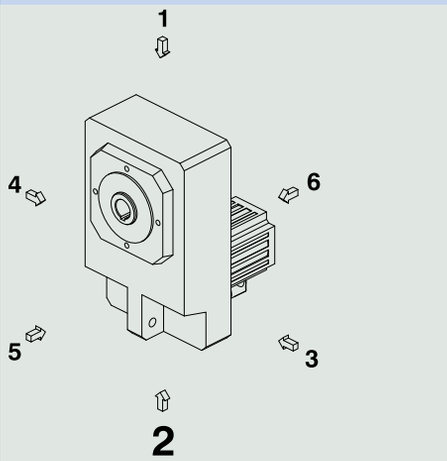
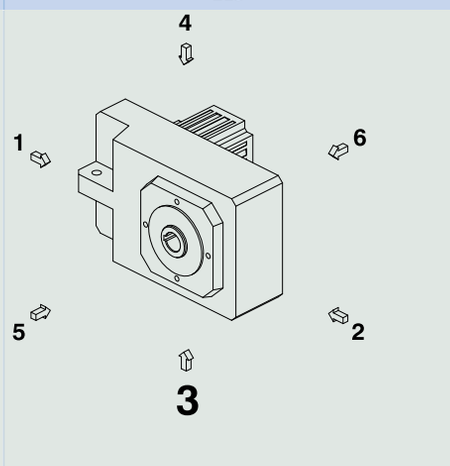
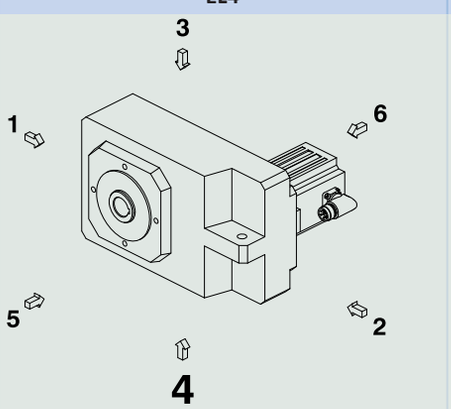
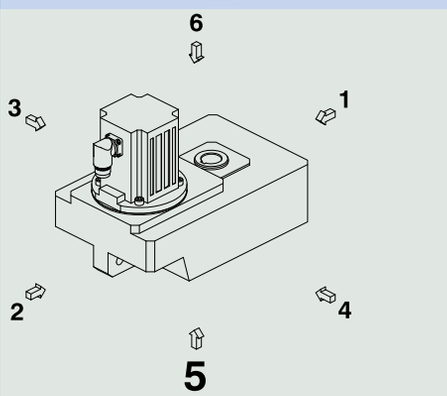
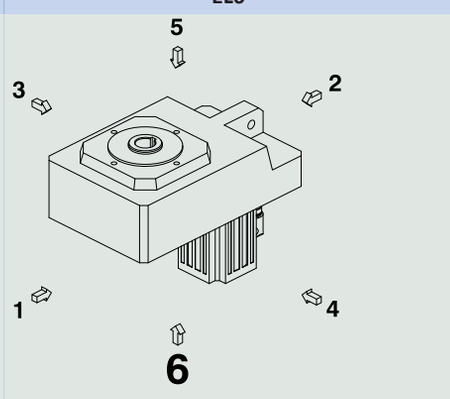
**Attaching the gear unit on the machine side using the pitch circle diameter**

The specified torques and forces only apply when attaching gear units at the machine side using screws of quality 10.9. In addition, the gear housing must be adjusted at the pilot (H7).

## 9.5.4 Installation positions

The following table shows the standard installation positions.

The numbers identify the gear unit sides. The installation position is defined by the gear side facing downwards.

| EL1 | EL2 | EL3 |
|---|---|---|
|  |  |  |
| **EL4** | **EL5** | **EL6** |
|  |  |  |

Since the lubricant filling volume of the gear unit depends on the installation position, the installation position must be specified when ordering.

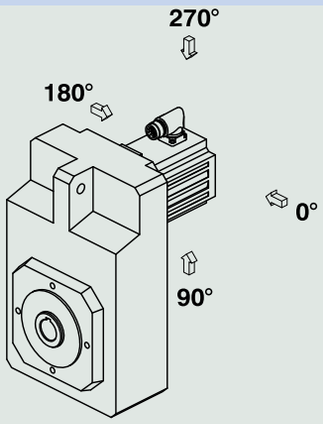
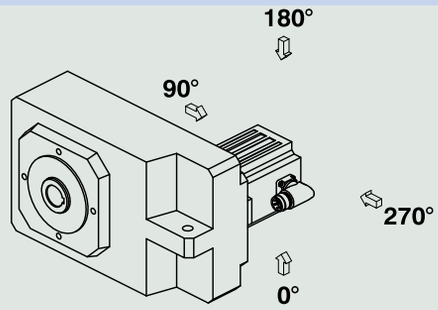
## 9.5.5 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the installation position.

Only install the gear units in the intended installation position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

Lubricant filling quantities for gear units, document ID 441871, can be found online at http://www.stoeber.de

### 9.5.6 Position of the plug connector

| Installation position EL1 | Installation position EL4 |
|---|---|
| Plug connector in 270° position (standard) | Plug connector in 270° position (standard) |
|  |  |

Indicate variations for your geared motor in the purchase order.

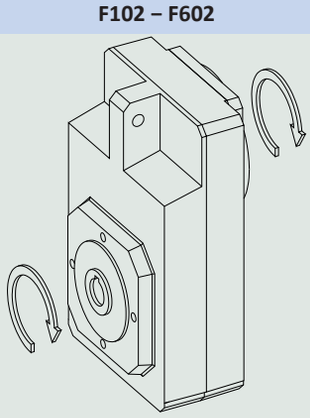
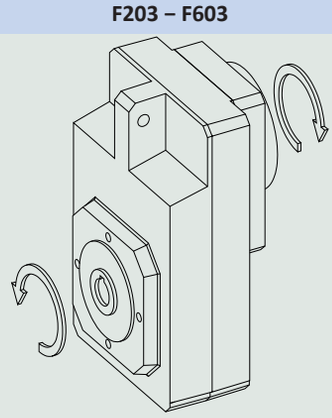
Note that the plug connector position rotates along with the geared motor if the geared motor is in another installation position.

### 9.5.7 Other product features

| Feature | Value |
|---|---|
| Max. permitted gear unit temperature (on the surface of the gear unit) | ≤ 80 °C |
| Paint | Black RAL 9005 |
| (ATEX) Directive 2014/34/EU | Not suitable |
| **Protection class:** [1] | |
| Gear unit | IP65 |
| Motor | IP56, optionally IP66 |

### 9.5.8 Direction of rotation

**Solid shaft (V), hollow shaft with keyway (A), hollow shaft with shrink disk (S)**

| F102 – F602 | F203 – F603 |
|---|---|
|  |  |
| The input and output rotate in the same direction. | The input and output rotate in opposite directions. |

The pictures show installation position EL1.

## 9.6 Project configuration

Project your drives using our SERVOsoft designing software. You can receive SERVOsoft for free from your adviser at one of our sales centers. Observe the limit conditions in this chapter to ensure a safe design for your drives.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

[1] Observe the protection class of all the components.

## 9.6.1 Calculation of the operating point

Check the following conditions for operating points other than the nominal point $M_{2N}$ specified in the selection tables.

**For installation positions EL1, EL2, EL3, EL4:**

$$n_{1m^*} \leq \frac{n_{1maxDBEL1,2,3,4}}{fB_T}$$

**For installation positions EL5, EL6:**

$$n_{1m^*} \leq \frac{n_{1maxDBEL5,6}}{fB_T}$$

**For all installation positions:**

$$n_{1max^*} \leq \frac{n_{1max\,ZB}}{fB_T}$$

$$M_{2eff^*} \leq M_{2th}$$

$$M_{2acc^*} \leq M_{2acc}$$

$$M_{2NOT^*} \leq M_{2NOT}$$

$$M_{2eq^*} \leq M_{2N} \cdot \frac{S}{fB_{op} \cdot fB_t}$$

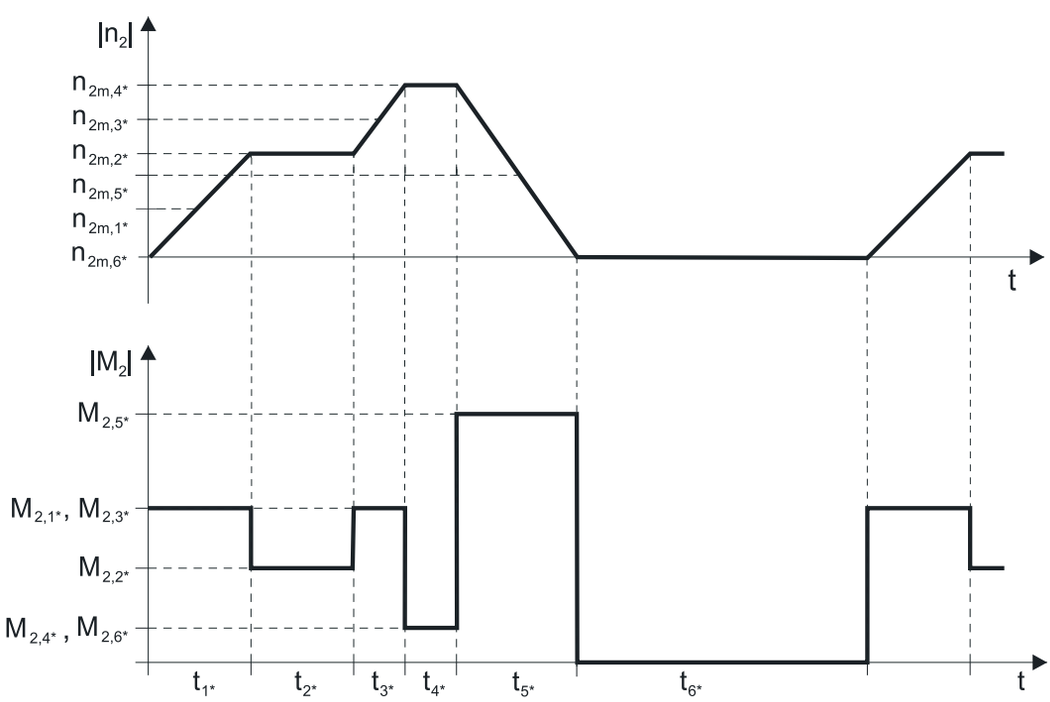
Refer to the selection table for the values for $n_{1maxDBEL1,2,3,4}$ and $n_{1maxDBEL5,6}$, $n_{1maxZB}$, $M_{2acc}$, $M_{2NOT}$, $M_{2N}$ and S.

The values for $fB_T$, $fB_{op}$ and $fB_t$ can be found in the corresponding tables in this chapter.

Calculate the thermal limit torque $M_{2th}$ for a duty cycle > 50%.

**Example of cyclic operation**

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:




**Calculation of the actual average input speed**

$$n_{1m^*} = n_{2m^*} \cdot i$$

$$n_{2m^*} = \frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}{t_{1^*} + \ldots + t_{n^*}}$$

If $t_{1^*} + \ldots + t_{5^*} \geq 20$ min, calculate $n_{2m^*}$ without the rest phase $t_{6^*}$.

The values for the ratio i can be found in the selection tables.

**Calculation of the actual effective torque**

$$M_{2eff^*} = \sqrt{\frac{t_{1^*} \cdot M_{2,1^*}{}^2 + \ldots + t_{n^*} \cdot M_{2,n^*}{}^2}{t_{1^*} + \ldots + t_{n^*}}}$$

**Calculation of the actual equivalent torque**

$$M_{2eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|M_{2,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|M_{2,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

**Calculation of the thermal limit torque**

Calculate the thermal limit torque $M_{2th}$ for a duty cycle $ED_{20} > 50\%$ and the actual average input speed $n_{1m^*}$. (At $K_{mot,th} \leq 0$ you must reduce the average input speed $n_{1m^*}$ accordingly or select another geared motor size.)

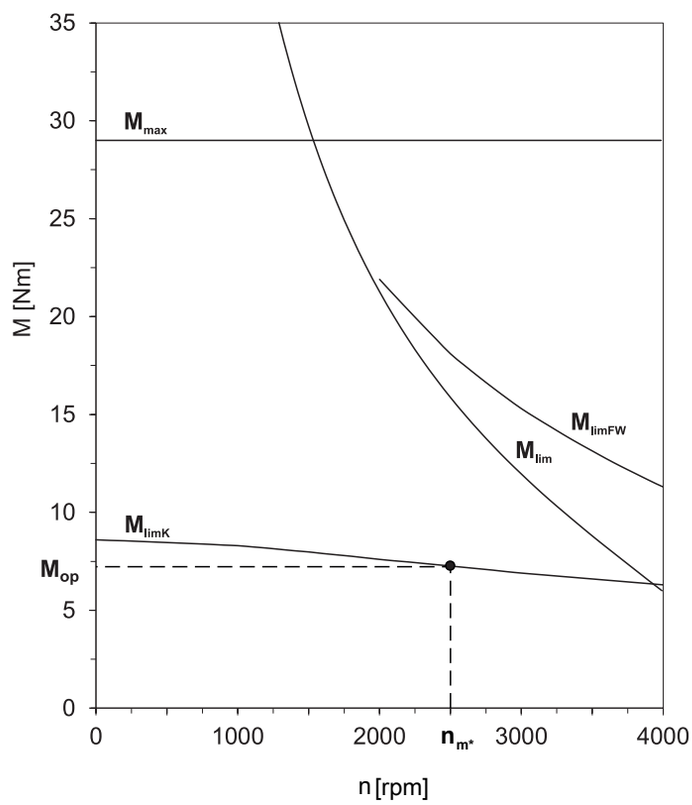
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}95 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m^*}}{1000}\right)^3$$

The values for i and $a_{th}$ can be found in the selection tables.

The values for $fB_T$ can be found in the corresponding table in this chapter.

The value for the torque of the motor at operating point $M_{op}$ with the determined average input speed $n_{1m^*}$ can be found in the motor curve of Chapter [▶ 2.3]. Note the size and nominal speed $n_N$ of the motor. The figure below shows an example of reading the torque $M_{op}$ of a motor with convection cooling at the operating point.



**Operating factors**

**Parameter $a_{thEL}$**

| Installation position | $a_{thEL}$ |
|---|---|
| EL1, 2, 5, 6 | 1.0 |
| EL3, 4 | 1.1 |

| Operating mode | $fB_{op}$ |
|---|---|
| Uniform continuous operation | 1.00 |
| Cyclic operation | 1.25 |
| Reversing load cyclic operation | 1.40 |

| Run time | $fB_t$ |
|---|---|
| Daily run time ≤ 8 h | 1.00 |
| Daily run time ≤ 16 h | 1.15 |
| Daily run time ≤ 24 h | 1.20 |

| Temperature | | $fB_T$ |
|---|---|---|
| **Motor cooling** | **Surrounding temperature** | |
| Motor with convection cooling | ≤ 20 °C | 1.0 |
| | ≤ 30 °C | 1.1 |
| | ≤ 40 °C | 1.25 |

**Notes**

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques ($M_{2acc}$, $M_{2NOT}$) in the selection tables.

## 9.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 20$ rpm ($F_{2axN} = F_{2ax20}$; $F_{2radN} = F_{2rad20}$; $M_{2kN} = M_{2k20}$)
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

### 9.6.2.1 V shaft design

**Permitted shaft loads for V shaft design (solid shaft)**

| Type | $z_2$ | $F_{2ax20}$ | $F_{2rad20}$ | $M_{2k20}$ |
|---|---|---|---|---|
| | [mm] | [N] | [N] | [Nm] |
| F1 | 35.0 | 1100 | 4200 | 260 |
| F2 | 41.0 | 1400 | 5400 | 400 |
| F3 | 43.0 | 1900 | 7500 | 600 |
| F4 | 44.0 | 2350 | 9250 | 800 |
| F6 | 44.0 | 3100 | 12500 | 1200 |

For other output speeds, download diagrams at http://products.stoeber.de.

**The following applies to output speeds $n_{2m*} > 20$ rpm:**

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}}$$

The values for $F_{2ax20}$, $F_{2rad20}$ and $M_{2k20}$ can be found in the table "Permitted shaft loads" in this chapter.

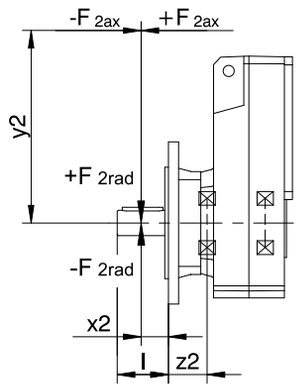



*Fig. 1:* Force application points for solid shaft

The specified values for $F_{2rad20}$ are based on application of force at the middle of the output shaft: $x_2 = l/2$.

Shaft dimensions can be found in the "Dimensional drawings" chapter.

**The following applies to other force application points:**

$$M_{2k^*} = \frac{2 \cdot F_{2ax^*} \cdot y_2 + F_{2rad^*} \cdot (x_2 + z_2)}{1000} \leq M_{2kN}$$

$$F_{2rad^*} \leq F_{2radN}$$

$$F_{2ax^*} \leq F_{2axN}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for $F_{2ax20}$, $F_{2rad20}$ and $M_{2k20}$ by a factor of two.

### 9.6.2.2 A and S shaft design

**Permitted shaft loads for A shaft design (hollow shaft with keyway)**

| Type | $z_2$ [mm] | $F_{2ax20}$ [N] | $F_{2rad20}$ [N] | $M_{2k20}$ [Nm] |
|---|---|---|---|---|
| F1 | 30.0 | 900 | 4200 | 175 |
| F2 | 33.0 | 1200 | 5400 | 250 |
| F3 | 33.0 | 1350 | 7500 | 375 |
| F4 | 39.0 | 1900 | 9250 | 550 |
| F6 | 45.0 | 2200 | 12500 | 800 |

**Permitted shaft loads for S shaft design (hollow shaft with shrink disk)**

| Type | $z_2$ [mm] | $F_{2ax20}$ [N] | $F_{2rad20}$ [N] | $M_{2k20}$ [Nm] |
|---|---|---|---|---|
| F1 | 30.0 | 900 | 4200 | 175 |
| F2 | 33.0 | 1200 | 5400 | 250 |
| F3 | 33.0 | 1350 | 7500 | 375 |
| F4 | 39.0 | 1900 | 9250 | 550 |
| F6 | 45.0 | 2200 | 12500 | 800 |

For other output speeds, download diagrams at http://products.stoeber.de.

**The following applies to output speeds $n_{2m^*}$ > 20 rpm:**

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m^*}}{20\ rpm}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m^*}}{20\ rpm}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m^*}}{20\ rpm}}}$$

The values for $F_{2ax20}$, $F_{2rad20}$ and $M_{2k20}$ can be found in the table "Permitted shaft loads" in this chapter.

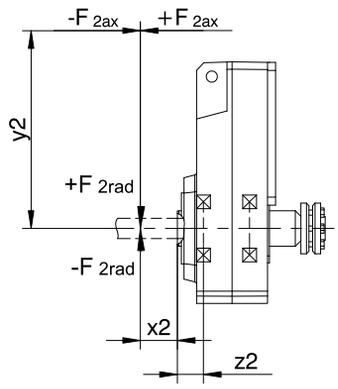



*Fig. 2:* Force application points for hollow shaft

You can determine the permitted radial forces from the permitted breakdown torque $M_{2kN}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces are in relation to the end of the hollow shaft (x2 = 0).

$$M_{2k*} = \frac{2 \cdot F_{2ax*} \cdot y_2 + F_{2rad*} \cdot (x_2 + z_2)}{1000} \leq M_{2kN}$$

$$F_{2ax*} \leq F_{2axN}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for $F_{2ax20}$, $F_{2rad20}$ and $M_{2k20}$ by a factor of two.

### 9.6.3 Radial shaft seal rings

**Leak-proofness**

Our gear units are equipped with high-quality radial shaft seal rings and checked for leak-proofness. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

## 9.7 Additional documentation

Additional documentation related to the product can be found at http://www.stoeber.de/en/download

Enter the ID of the documentation in the Search... field.

| Documentation | ID |
|---|---|
| Operating manual for C/F/K/S gear units and gear motors | 443027_en |
| Lubricant filling quantities for gear units | 441871 |

# 10 PKX right-angle planetary geared motors

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