



# 4

## Planetary geared motors

PHQ

### 4.1 Overview

Quattro-Power for maximum power density

#### Features

|                                                           |              |
|-----------------------------------------------------------|--------------|
| Power density                                             | ★★★★★        |
| Backlash                                                  | ★★★★★        |
| Price category                                            | €€€€         |
| Shaft load                                                | ★★★★★        |
| Smooth operation                                          | ★★★★☆        |
| Torsional stiffness                                       | ★★★★★        |
| Mass moment of inertia                                    | ★★★★★        |
| Helical gearing                                           | ✓            |
| Maintenance-free                                          | ✓            |
| Any mounting position (single/two stage)                  | ✓            |
| High power density                                        | ✓            |
| Continuous operation without cooling                      | ✓            |
| Stiff output bearings due to pretension                   | ✓            |
| Reinforced output bearing (PHQ4 – PHQ5)                   | ✓ (optional) |
| Compact and highly dynamic due to direct motor attachment | ✓            |

Key ★☆☆☆☆ good | ★★★★★ excellent

€ Economy | €€€€€ Premium

#### Technical data

|                |               |
|----------------|---------------|
| $i$            | 5.5 – 600     |
| $M_{2acc}$     | 72 – 22000 Nm |
| $\Delta\phi_2$ | 1 – 3 arcmin  |
| $\eta_{get}$   | 90 – 96 %     |

## 4.2 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 (e.g. EZ401U)

For the technical data on drives with forced ventilated motors (e.g. EZ401B), refer to

<https://configurator.stoeber.de/en-US/>.

In the case of the version with a reinforced bearing and gear ratios  $\leq 5$ , the maximum permitted input speed  $n_{1\max ZB}$  is reduced. You can find values at <https://configurator.stoeber.de/en-US/>

An explanation of the formula symbols can be found in Chapter [▶ 20.1](#).

| $n_{2N}$<br>[rpm]                                    | $M_{2N}$<br>[Nm] | $M_{2,0}$<br>[Nm] | $a_{th}$ | S   | Type               | $M_{2acc}$<br>[Nm] | $M_{2accHT}$<br>[Nm] | $M_{2NOT}$<br>[Nm] | i     | $i_{exakt}$ | $n_{1\max DB}$<br>[rpm] | $n_{1\max ZB}$<br>[rpm] | $J_1$<br>[kgcm <sup>2</sup> ] | $\Delta\phi_2$<br>[arcmin] | $\Delta\phi_{2red}$<br>[arcmin] | $C_2$<br>[Nm/<br>arcmin] | m<br>[kg] |
|------------------------------------------------------|------------------|-------------------|----------|-----|--------------------|--------------------|----------------------|--------------------|-------|-------------|-------------------------|-------------------------|-------------------------------|----------------------------|---------------------------------|--------------------------|-----------|
| PHQ4 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 200$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                         |                         |                               |                            |                                 |                          |           |
| 55                                                   | 48               | 49                | 0.6      | 2.7 | PHQ432_0550 EZ301U | 143                | 143                  | 400                | 55.00 | 55/1        | 4500                    | 8000                    | 0.21                          | 3.0                        | 1.0                             | 38                       | 5.8       |
| 55                                                   | 81               | 86                | 1.0      | 1.6 | PHQ432_0550 EZ302U | 200                | 247                  | 400                | 55.00 | 55/1        | 4500                    | 8000                    | 0.31                          | 3.0                        | 1.0                             | 38                       | 6.4       |
| 55                                                   | 106              | 112               | 1.3      | 1.2 | PHQ432_0550 EZ303U | 200                | 247                  | 400                | 55.00 | 55/1        | 4500                    | 8000                    | 0.42                          | 3.0                        | 1.0                             | 38                       | 6.9       |
| 78                                                   | 33               | 34                | 0.7      | 3.9 | PHQ432_0390 EZ301U | 100                | 100                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.22                          | 3.0                        | 1.0                             | 40                       | 5.8       |
| 78                                                   | 57               | 60                | 1.2      | 2.3 | PHQ432_0390 EZ302U | 179                | 179                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.32                          | 3.0                        | 1.0                             | 40                       | 6.4       |
| 78                                                   | 74               | 78                | 1.5      | 1.8 | PHQ432_0390 EZ303U | 200                | 246                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.43                          | 3.0                        | 1.0                             | 40                       | 6.9       |
| 78                                                   | 100              | 107               | 2.0      | 1.3 | PHQ432_0390 EZ401U | 200                | 246                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.96                          | 3.0                        | 1.0                             | 40                       | 8.3       |
| 109                                                  | 41               | 43                | 1.5      | 3.0 | PHQ432_0280 EZ302U | 128                | 128                  | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 0.35                          | 3.0                        | 1.0                             | 40                       | 6.4       |
| 109                                                  | 53               | 56                | 1.9      | 2.3 | PHQ432_0280 EZ303U | 179                | 179                  | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 0.46                          | 3.0                        | 1.0                             | 40                       | 6.9       |
| 109                                                  | 72               | 77                | 2.6      | 1.7 | PHQ432_0280 EZ401U | 200                | 217                  | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 0.99                          | 3.0                        | 1.0                             | 40                       | 8.3       |
| 136                                                  | 33               | 34                | 1.7      | 3.7 | PHQ432_0220 EZ302U | 102                | 102                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 0.39                          | 3.0                        | 1.0                             | 41                       | 6.4       |
| 136                                                  | 42               | 45                | 2.2      | 2.8 | PHQ432_0220 EZ303U | 143                | 143                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 0.50                          | 3.0                        | 1.0                             | 41                       | 6.9       |
| 136                                                  | 57               | 61                | 2.9      | 2.1 | PHQ432_0220 EZ401U | 174                | 174                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 1.0                           | 3.0                        | 1.0                             | 41                       | 8.3       |
| 136                                                  | 96               | 106               | 4.9      | 1.2 | PHQ432_0220 EZ402U | 200                | 238                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 1.7                           | 3.0                        | 1.0                             | 41                       | 9.4       |
| 545                                                  | 23               | 25                | 4.8      | 4.2 | PHQ431_0055 EZ501U | 84                 | 84                   | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 3.2                           | 3.0                        | 1.0                             | 44                       | 8.0       |
| 545                                                  | 25               | 27                | 5.2      | 3.8 | PHQ431_0055 EZ402U | 84                 | 84                   | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 1.9                           | 3.0                        | 1.0                             | 44                       | 8.1       |
| 545                                                  | 36               | 45                | 7.7      | 2.6 | PHQ431_0055 EZ404U | 153                | 153                  | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 3.2                           | 3.0                        | 1.0                             | 44                       | 10        |
| 545                                                  | 39               | 42                | 8.2      | 2.4 | PHQ431_0055 EZ502U | 164                | 164                  | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 5.5                           | 3.0                        | 1.0                             | 44                       | 9.5       |
| 545                                                  | 51               | 59                | 11       | 1.9 | PHQ431_0055 EZ503U | 200                | 220                  | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 7.8                           | 3.0                        | 1.0                             | 44                       | 11        |
| 545                                                  | 71               | 84                | 15       | 1.3 | PHQ431_0055 EZ505U | 200                | 220                  | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 12                            | 3.0                        | 1.0                             | 44                       | 14        |
| PHQ4 ( $n_{1N} = 6000$ rpm, $M_{2acc,max} = 200$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                         |                         |                               |                            |                                 |                          |           |
| 109                                                  | 46               | 49                | 0.7      | 2.3 | PHQ432_0550 EZ301U | 143                | 143                  | 400                | 55.00 | 55/1        | 4500                    | 8000                    | 0.21                          | 3.0                        | 1.0                             | 38                       | 5.8       |
| 109                                                  | 77               | 86                | 1.1      | 1.3 | PHQ432_0550 EZ302U | 200                | 247                  | 400                | 55.00 | 55/1        | 4500                    | 8000                    | 0.31                          | 3.0                        | 1.0                             | 38                       | 6.4       |
| 109                                                  | 100              | 115               | 1.5      | 1.0 | PHQ432_0550 EZ303U | 200                | 247                  | 400                | 55.00 | 55/1        | 4500                    | 8000                    | 0.42                          | 3.0                        | 1.0                             | 38                       | 6.9       |
| 156                                                  | 32               | 34                | 0.8      | 3.2 | PHQ432_0390 EZ301U | 100                | 100                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.22                          | 3.0                        | 1.0                             | 40                       | 5.8       |
| 156                                                  | 54               | 60                | 1.4      | 1.9 | PHQ432_0390 EZ302U | 179                | 179                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.32                          | 3.0                        | 1.0                             | 40                       | 6.4       |
| 156                                                  | 70               | 81                | 1.8      | 1.5 | PHQ432_0390 EZ303U | 200                | 246                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.43                          | 3.0                        | 1.0                             | 40                       | 6.9       |
| 156                                                  | 82               | 100               | 2.1      | 1.3 | PHQ432_0390 EZ401U | 200                | 246                  | 400                | 38.50 | 77/2        | 4500                    | 8000                    | 0.96                          | 3.0                        | 1.0                             | 40                       | 8.3       |
| 218                                                  | 23               | 24                | 1.0      | 4.2 | PHQ432_0280 EZ301U | 72                 | 72                   | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 0.25                          | 3.0                        | 1.0                             | 40                       | 5.8       |
| 218                                                  | 38               | 43                | 1.8      | 2.5 | PHQ432_0280 EZ302U | 128                | 128                  | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 0.35                          | 3.0                        | 1.0                             | 40                       | 6.4       |
| 218                                                  | 50               | 58                | 2.3      | 1.9 | PHQ432_0280 EZ303U | 179                | 179                  | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 0.46                          | 3.0                        | 1.0                             | 40                       | 6.9       |
| 218                                                  | 59               | 72                | 2.7      | 1.6 | PHQ432_0280 EZ401U | 200                | 217                  | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 0.99                          | 3.0                        | 1.0                             | 40                       | 8.3       |
| 218                                                  | 90               | 125               | 4.1      | 1.1 | PHQ432_0280 EZ402U | 200                | 246                  | 400                | 27.50 | 55/2        | 4500                    | 8000                    | 1.7                           | 3.0                        | 1.0                             | 40                       | 9.4       |
| 273                                                  | 31               | 34                | 2.0      | 3.1 | PHQ432_0220 EZ302U | 102                | 102                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 0.39                          | 3.0                        | 1.0                             | 41                       | 6.4       |
| 273                                                  | 40               | 46                | 2.6      | 2.4 | PHQ432_0220 EZ303U | 143                | 143                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 0.50                          | 3.0                        | 1.0                             | 41                       | 6.9       |
| 273                                                  | 47               | 57                | 3.0      | 2.0 | PHQ432_0220 EZ401U | 174                | 174                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 1.0                           | 3.0                        | 1.0                             | 41                       | 8.3       |
| 273                                                  | 72               | 100               | 4.6      | 1.3 | PHQ432_0220 EZ402U | 200                | 238                  | 400                | 22.00 | 22/1        | 4000                    | 8000                    | 1.7                           | 3.0                        | 1.0                             | 41                       | 9.4       |
| 1091                                                 | 18               | 23                | 4.8      | 4.2 | PHQ431_0055 EZ501U | 84                 | 84                   | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 3.2                           | 3.0                        | 1.0                             | 44                       | 8.0       |
| 1091                                                 | 18               | 26                | 4.9      | 4.1 | PHQ431_0055 EZ402U | 84                 | 84                   | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 1.9                           | 3.0                        | 1.0                             | 44                       | 8.1       |
| 1091                                                 | 27               | 41                | 7.3      | 2.8 | PHQ431_0055 EZ502U | 164                | 164                  | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 5.5                           | 3.0                        | 1.0                             | 44                       | 9.5       |
| 1091                                                 | 31               | 44                | 8.1      | 2.5 | PHQ431_0055 EZ404U | 153                | 153                  | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 3.2                           | 3.0                        | 1.0                             | 44                       | 10        |
| 1091                                                 | 33               | 56                | 8.7      | 2.3 | PHQ431_0055 EZ503U | 200                | 220                  | 400                | 5.500 | 11/2        | 3000                    | 6000                    | 7.8                           | 3.0                        | 1.0                             | 44                       | 11        |
| PHQ5 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 550$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                         |                         |                               |                            |                                 |                          |           |
| 55                                                   | 143              | 153               | 0.8      | 2.2 | PHQ532_0550 EZ401U | 435                | 435                  | 948                | 55.00 | 55/1        | 4000                    | 8000                    | 0.97                          | 3.0                        | 1.0                             | 95                       | 11        |
| 55                                                   | 220              | 240               | 1.2      | 1.5 | PHQ532_0550 EZ501U | 500                | 500                  | 948                | 55.00 | 55/1        | 4000                    | 8000                    | 2.9                           | 3.0                        | 1.0                             | 95                       | 12        |
| 55                                                   | 240              | 266               | 1.3      | 1.3 | PHQ532_0550 EZ402U | 500                | 500                  | 948                | 55.00 | 55/1        | 4000                    | 8000                    | 1.7                           | 3.0                        | 1.0                             | 95                       | 12        |
| 78                                                   | 100              | 107               | 0.9      | 3.2 | PHQ532_0390 EZ401U | 304                | 304                  | 948                | 38.50 | 77/2        | 4000                    | 8000                    | 1.0                           | 3.0                        | 1.0                             | 100                      | 11        |
| 78                                                   | 154              | 168               | 1.4      | 2.1 | PHQ532_0390 EZ501U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                    | 8000                    | 3.0                           | 3.0                        | 1.0                             | 100                      | 12        |
| 78                                                   | 168              | 186               | 1.5      | 1.9 | PHQ532_0390 EZ402U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                    | 8000                    | 1.7                           | 3.0                        | 1.0                             | 100                      | 12        |
| 78                                                   | 247              | 308               | 2.3      | 1.3 | PHQ532_0390 EZ404U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                    | 8000                    | 3.1                           | 3.0                        | 1.0                             | 100                      | 14        |

#### 4.2 Selection tables 4 PHQ planetary geared motors

| $n_{2N}$<br>[rpm]                                     | $M_{2N}$<br>[Nm] | $M_{2.0}$<br>[Nm] | $a_{th}$ | S   | Type               | $M_{2acc}$<br>[Nm] | $M_{2accHT}$<br>[Nm] | $M_{2NOT}$<br>[Nm] | i     | $i_{exakt}$ | $n_{1maxDB}$<br>[rpm] | $n_{1maxZB}$<br>[rpm] | $J_1$<br>[kgcm <sup>2</sup> ] | $\Delta\varphi_2$<br>[arcmin] | $\Delta\varphi_{2red}$<br>[arcmin] | $C_2$<br>[Nm/<br>arcmin] | m<br>[kg] |
|-------------------------------------------------------|------------------|-------------------|----------|-----|--------------------|--------------------|----------------------|--------------------|-------|-------------|-----------------------|-----------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------|-----------|
| PHQ5 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 550$ Nm)  |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 78                                                    | 265              | 286               | 2.4      | 1.2 | PHQ532_0390 EZ502U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                  | 8000                  | 5.3                           | 3.0                           | 1.0                                | 100                      | 14        |
| 109                                                   | 72               | 77                | 1.2      | 4.2 | PHQ532_0280 EZ401U | 217                | 217                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 1.1                           | 3.0                           | 1.0                                | 102                      | 11        |
| 109                                                   | 110              | 120               | 1.8      | 2.7 | PHQ532_0280 EZ501U | 409                | 409                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 3.1                           | 3.0                           | 1.0                                | 102                      | 12        |
| 109                                                   | 120              | 133               | 1.9      | 2.5 | PHQ532_0280 EZ402U | 409                | 409                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 1.8                           | 3.0                           | 1.0                                | 102                      | 12        |
| 109                                                   | 176              | 220               | 2.9      | 1.7 | PHQ532_0280 EZ404U | 540                | 562                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 3.1                           | 3.0                           | 1.0                                | 102                      | 14        |
| 109                                                   | 189              | 205               | 3.1      | 1.6 | PHQ532_0280 EZ502U | 540                | 562                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 5.4                           | 3.0                           | 1.0                                | 102                      | 14        |
| 109                                                   | 248              | 284               | 4.0      | 1.2 | PHQ532_0280 EZ503U | 540                | 562                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 7.7                           | 3.0                           | 1.0                                | 102                      | 15        |
| 136                                                   | 88               | 96                | 2.1      | 3.3 | PHQ532_0220 EZ501U | 327                | 327                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 3.2                           | 3.0                           | 1.0                                | 103                      | 12        |
| 136                                                   | 96               | 106               | 2.2      | 3.0 | PHQ532_0220 EZ402U | 327                | 327                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 1.9                           | 3.0                           | 1.0                                | 103                      | 12        |
| 136                                                   | 141              | 176               | 3.3      | 2.1 | PHQ532_0220 EZ404U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 3.2                           | 3.0                           | 1.0                                | 103                      | 14        |
| 136                                                   | 151              | 164               | 3.5      | 1.9 | PHQ532_0220 EZ502U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 5.5                           | 3.0                           | 1.0                                | 103                      | 14        |
| 136                                                   | 198              | 227               | 4.6      | 1.5 | PHQ532_0220 EZ503U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 7.8                           | 3.0                           | 1.0                                | 103                      | 15        |
| 136                                                   | 276              | 327               | 6.5      | 1.1 | PHQ532_0220 EZ505U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 12                            | 3.0                           | 1.0                                | 103                      | 18        |
| 545                                                   | 63               | 76                | 6.4      | 3.5 | PHQ531_0055 EZ702U | 216                | 216                  | 948                | 5.500 | 11/2        | 2500                  | 5000                  | 15                            | 3.0                           | 1.0                                | 107                      | 16        |
| 545                                                   | 87               | 110               | 8.8      | 2.6 | PHQ531_0055 EZ703U | 343                | 343                  | 948                | 5.500 | 11/2        | 2500                  | 5000                  | 22                            | 3.0                           | 1.0                                | 107                      | 18        |
| 545                                                   | 112              | 159               | 11       | 2.0 | PHQ531_0055 EZ705U | 549                | 549                  | 948                | 5.500 | 11/2        | 2500                  | 5000                  | 35                            | 3.0                           | 1.0                                | 107                      | 23        |
| PHQ5 ( $n_{1N} = 4500$ rpm, $M_{2acc,max} = 550$ Nm)  |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 164                                                   | 243              | 391               | 4.5      | 1.1 | PHQ532_0280 EZ505U | 540                | 562                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 12                            | 3.0                           | 1.0                                | 102                      | 18        |
| 205                                                   | 194              | 313               | 5.2      | 1.3 | PHQ532_0220 EZ505U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 12                            | 3.0                           | 1.0                                | 103                      | 18        |
| 818                                                   | 64               | 106               | 7.3      | 3.0 | PHQ531_0055 EZ703U | 343                | 343                  | 948                | 5.500 | 11/2        | 2500                  | 5000                  | 22                            | 3.0                           | 1.0                                | 107                      | 18        |
| 818                                                   | 87               | 158               | 10       | 2.2 | PHQ531_0055 EZ705U | 549                | 549                  | 948                | 5.500 | 11/2        | 2500                  | 5000                  | 35                            | 3.0                           | 1.0                                | 107                      | 23        |
| PHQ5 ( $n_{1N} = 6000$ rpm, $M_{2acc,max} = 540$ Nm)  |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 109                                                   | 118              | 143               | 0.8      | 2.2 | PHQ532_0550 EZ401U | 435                | 435                  | 948                | 55.00 | 55/1        | 4000                  | 8000                  | 0.97                          | 3.0                           | 1.0                                | 95                       | 11        |
| 109                                                   | 174              | 225               | 1.2      | 1.5 | PHQ532_0550 EZ501U | 500                | 500                  | 948                | 55.00 | 55/1        | 4000                  | 8000                  | 2.9                           | 3.0                           | 1.0                                | 95                       | 12        |
| 109                                                   | 179              | 251               | 1.2      | 1.4 | PHQ532_0550 EZ402U | 500                | 500                  | 948                | 55.00 | 55/1        | 4000                  | 8000                  | 1.7                           | 3.0                           | 1.0                                | 95                       | 12        |
| 156                                                   | 82               | 100               | 1.0      | 3.1 | PHQ532_0390 EZ401U | 304                | 304                  | 948                | 38.50 | 77/2        | 4000                  | 8000                  | 1.0                           | 3.0                           | 1.0                                | 100                      | 11        |
| 156                                                   | 122              | 158               | 1.4      | 2.1 | PHQ532_0390 EZ501U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                  | 8000                  | 3.0                           | 3.0                           | 1.0                                | 100                      | 12        |
| 156                                                   | 125              | 175               | 1.4      | 2.0 | PHQ532_0390 EZ402U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                  | 8000                  | 1.7                           | 3.0                           | 1.0                                | 100                      | 12        |
| 156                                                   | 186              | 279               | 2.1      | 1.4 | PHQ532_0390 EZ502U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                  | 8000                  | 5.3                           | 3.0                           | 1.0                                | 100                      | 14        |
| 156                                                   | 208              | 301               | 2.4      | 1.2 | PHQ532_0390 EZ404U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                  | 8000                  | 3.1                           | 3.0                           | 1.0                                | 100                      | 14        |
| 156                                                   | 222              | 380               | 2.6      | 1.1 | PHQ532_0390 EZ503U | 530                | 552                  | 948                | 38.50 | 77/2        | 4000                  | 8000                  | 7.7                           | 3.0                           | 1.0                                | 100                      | 15        |
| 218                                                   | 59               | 72                | 1.2      | 4.0 | PHQ532_0280 EZ401U | 217                | 217                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 1.1                           | 3.0                           | 1.0                                | 102                      | 11        |
| 218                                                   | 87               | 113               | 1.8      | 2.7 | PHQ532_0280 EZ501U | 409                | 409                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 3.1                           | 3.0                           | 1.0                                | 102                      | 12        |
| 218                                                   | 90               | 125               | 1.8      | 2.7 | PHQ532_0280 EZ402U | 409                | 409                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 1.8                           | 3.0                           | 1.0                                | 102                      | 12        |
| 218                                                   | 133              | 199               | 2.7      | 1.8 | PHQ532_0280 EZ502U | 540                | 562                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 5.4                           | 3.0                           | 1.0                                | 102                      | 14        |
| 218                                                   | 148              | 215               | 3.0      | 1.6 | PHQ532_0280 EZ404U | 540                | 562                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 3.1                           | 3.0                           | 1.0                                | 102                      | 14        |
| 218                                                   | 159              | 271               | 3.2      | 1.5 | PHQ532_0280 EZ503U | 540                | 562                  | 948                | 27.50 | 55/2        | 3700                  | 7500                  | 7.7                           | 3.0                           | 1.0                                | 102                      | 15        |
| 273                                                   | 47               | 57                | 1.4      | 4.9 | PHQ532_0220 EZ401U | 174                | 174                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 1.2                           | 3.0                           | 1.0                                | 103                      | 11        |
| 273                                                   | 70               | 90                | 2.1      | 3.3 | PHQ532_0220 EZ501U | 327                | 327                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 3.2                           | 3.0                           | 1.0                                | 103                      | 12        |
| 273                                                   | 72               | 100               | 2.1      | 3.2 | PHQ532_0220 EZ402U | 327                | 327                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 1.9                           | 3.0                           | 1.0                                | 103                      | 12        |
| 273                                                   | 106              | 160               | 3.1      | 2.2 | PHQ532_0220 EZ502U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 5.5                           | 3.0                           | 1.0                                | 103                      | 14        |
| 273                                                   | 119              | 172               | 3.5      | 1.9 | PHQ532_0220 EZ404U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 3.2                           | 3.0                           | 1.0                                | 103                      | 14        |
| 273                                                   | 127              | 217               | 3.7      | 1.8 | PHQ532_0220 EZ503U | 480                | 530                  | 948                | 22.00 | 22/1        | 3500                  | 7000                  | 7.8                           | 3.0                           | 1.0                                | 103                      | 15        |
| PHQ7 ( $n_{1N} = 2000$ rpm, $M_{2acc,max} = 1050$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 364                                                   | 231              | 349               | 12       | 2.2 | PHQ731_0055 EZ805U | 1050               | 1050                 | 2100               | 5.500 | 11/2        | 2200                  | 5000                  | 135                           | 3.0                           | 1.0                                | 235                      | 55        |
| PHQ7 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 1050$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 14                                                    | 554              | 594               | 0.2      | 1.2 | PHQ733_2200 EZ401U | 1050               | 1050                 | 2100               | 220.0 | 220/1       | 4000                  | 7000                  | 0.97                          | 3.0                           | 1.0                                | 222                      | 20        |
| 16                                                    | 485              | 520               | 0.2      | 1.4 | PHQ733_1930 EZ401U | 1050               | 1050                 | 2100               | 192.5 | 385/2       | 4000                  | 7000                  | 1.0                           | 3.0                           | 1.0                                | 223                      | 20        |
| 19                                                    | 388              | 416               | 0.3      | 1.8 | PHQ733_1540 EZ401U | 1050               | 1050                 | 2100               | 154.0 | 154/1       | 4000                  | 7000                  | 1.0                           | 3.0                           | 1.0                                | 223                      | 20        |
| 19                                                    | 596              | 651               | 0.4      | 1.1 | PHQ733_1540 EZ501U | 1050               | 1050                 | 2100               | 154.0 | 154/1       | 4000                  | 7000                  | 3.0                           | 3.0                           | 1.0                                | 223                      | 21        |
| 19                                                    | 651              | 721               | 0.4      | 1.0 | PHQ733_1540 EZ402U | 1050               | 1050                 | 2100               | 154.0 | 154/1       | 4000                  | 7000                  | 1.7                           | 3.0                           | 1.0                                | 223                      | 21        |
| 22                                                    | 347              | 371               | 0.3      | 2.0 | PHQ733_1380 EZ401U | 1050               | 1050                 | 2100               | 137.5 | 275/2       | 3700                  | 6500                  | 1.1                           | 3.0                           | 1.0                                | 224                      | 20        |
| 22                                                    | 532              | 582               | 0.4      | 1.3 | PHQ733_1380 EZ501U | 1050               | 1050                 | 2100               | 137.5 | 275/2       | 3700                  | 6500                  | 3.1                           | 3.0                           | 1.0                                | 224                      | 21        |
| 22                                                    | 582              | 644               | 0.4      | 1.2 | PHQ733_1380 EZ402U | 1050               | 1050                 | 2100               | 137.5 | 275/2       | 3700                  | 6500                  | 1.8                           | 3.0                           | 1.0                                | 224                      | 21        |
| 27                                                    | 277              | 297               | 0.3      | 2.5 | PHQ733_1100 EZ401U | 842                | 842                  | 2100               | 110.0 | 110/1       | 3300                  | 6000                  | 1.2                           | 3.0                           | 1.0                                | 224                      | 20        |
| 27                                                    | 426              | 465               | 0.5      | 1.6 | PHQ733_1100 EZ501U | 1050               | 1050                 | 2100               | 110.0 | 110/1       | 3300                  | 6000                  | 3.2                           | 3.0                           | 1.0                                | 224                      | 21        |
| 27                                                    | 465              | 515               | 0.5      | 1.5 | PHQ733_1100 EZ402U | 1050               | 1050                 | 2100               | 110.0 | 110/1       | 3300                  | 6000                  | 1.9                           | 3.0                           | 1.0                                | 224                      | 21        |
| 34                                                    | 222              | 238               | 0.3      | 3.1 | PHQ733_0880 EZ401U | 673                | 673                  | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 1.2                           | 3.0                           | 1.0                                | 224                      | 20        |
| 34                                                    | 341              | 372               | 0.5      | 2.0 | PHQ733_0880 EZ501U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 3.2                           | 3.0                           | 1.0                                | 224                      | 21        |
| 34                                                    | 372              | 412               | 0.6      | 1.8 | PHQ733_0880 EZ402U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 1.9                           | 3.0                           | 1.0                                | 224                      | 21        |
| 34                                                    | 546              | 681               | 0.8      | 1.2 | PHQ733_0880 EZ404U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 3.3                           | 3.0                           | 1.0                                | 224                      | 23        |
| 34                                                    | 586              | 634               | 0.9      | 1.2 | PHQ733_0880 EZ502U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 5.5                           | 3.0                           | 1.0                                | 224                      | 22        |
| 55                                                    | 220              | 240               | 0.7      | 3.1 | PHQ732_0550 EZ501U | 818                | 818                  | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 3.1                           | 3.0                           | 1.0                                | 213                      | 18        |
| 55                                                    | 379              | 409               | 1.1      | 1.8 | PHQ732_0550 EZ502U | 1050               | 1050                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 5.4                           | 3.0                           | 1.0                                | 213                      | 20        |

| $n_{2N}$<br>[rpm]                                     | $M_{2N}$<br>[Nm] | $M_{2.0}$<br>[Nm] | $a_{th}$ | S   | Type               | $M_{2acc}$<br>[Nm] | $M_{2accHT}$<br>[Nm] | $M_{2NOT}$<br>[Nm] | i     | $i_{exakt}$ | $n_{1maxDB}$<br>[rpm] | $n_{1maxZB}$<br>[rpm] | $J_1$<br>[kgcm <sup>2</sup> ] | $\Delta\varphi_2$<br>[arcmin] | $\Delta\varphi_{2red}$<br>[arcmin] | $C_2$<br>[Nm/<br>arcmin] | m<br>[kg] |
|-------------------------------------------------------|------------------|-------------------|----------|-----|--------------------|--------------------|----------------------|--------------------|-------|-------------|-----------------------|-----------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------|-----------|
| PHQ7 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 1050$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 55                                                    | 379              | 425               | 1.1      | 1.8 | PHQ732_0550 EZ701U | 1023               | 1023                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 8.7                           | 3.0                           | 1.0                                | 213                      | 22        |
| 55                                                    | 496              | 568               | 1.5      | 1.4 | PHQ732_0550 EZ503U | 1050               | 1050                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 7.7                           | 3.0                           | 1.0                                | 213                      | 21        |
| 55                                                    | 614              | 737               | 1.9      | 1.1 | PHQ732_0550 EZ702U | 1050               | 1050                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 14                            | 3.0                           | 1.0                                | 213                      | 24        |
| 78                                                    | 154              | 168               | 0.8      | 4.4 | PHQ732_0390 EZ501U | 573                | 573                  | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 3.2                           | 3.0                           | 1.0                                | 221                      | 18        |
| 78                                                    | 265              | 286               | 1.4      | 2.6 | PHQ732_0390 EZ502U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 5.5                           | 3.0                           | 1.0                                | 221                      | 20        |
| 78                                                    | 265              | 297               | 1.4      | 2.6 | PHQ732_0390 EZ701U | 716                | 716                  | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 8.8                           | 3.0                           | 1.0                                | 221                      | 22        |
| 78                                                    | 347              | 397               | 1.8      | 2.0 | PHQ732_0390 EZ503U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 7.9                           | 3.0                           | 1.0                                | 221                      | 21        |
| 78                                                    | 430              | 516               | 2.2      | 1.6 | PHQ732_0390 EZ702U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 14                            | 3.0                           | 1.0                                | 221                      | 24        |
| 78                                                    | 483              | 573               | 2.5      | 1.4 | PHQ732_0390 EZ505U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 12                            | 3.0                           | 1.0                                | 221                      | 24        |
| 78                                                    | 591              | 745               | 3.1      | 1.2 | PHQ732_0390 EZ703U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 22                            | 3.0                           | 1.0                                | 221                      | 26        |
| 109                                                   | 189              | 205               | 1.7      | 3.4 | PHQ732_0280 EZ502U | 793                | 793                  | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 5.8                           | 3.0                           | 1.0                                | 224                      | 20        |
| 109                                                   | 189              | 212               | 1.7      | 3.4 | PHQ732_0280 EZ701U | 512                | 512                  | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 9.1                           | 3.0                           | 1.0                                | 224                      | 22        |
| 109                                                   | 248              | 284               | 2.2      | 2.6 | PHQ732_0280 EZ503U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 8.2                           | 3.0                           | 1.0                                | 224                      | 21        |
| 109                                                   | 307              | 368               | 2.8      | 2.1 | PHQ732_0280 EZ702U | 1049               | 1049                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 14                            | 3.0                           | 1.0                                | 224                      | 24        |
| 109                                                   | 345              | 409               | 3.1      | 1.9 | PHQ732_0280 EZ505U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 13                            | 3.0                           | 1.0                                | 224                      | 24        |
| 109                                                   | 422              | 532               | 3.8      | 1.5 | PHQ732_0280 EZ703U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 22                            | 3.0                           | 1.0                                | 224                      | 26        |
| 109                                                   | 545              | 772               | 4.9      | 1.2 | PHQ732_0280 EZ705U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 35                            | 3.0                           | 1.0                                | 224                      | 32        |
| 136                                                   | 151              | 164               | 1.9      | 4.3 | PHQ732_0220 EZ502U | 634                | 634                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 6.2                           | 3.0                           | 1.0                                | 226                      | 20        |
| 136                                                   | 151              | 170               | 1.9      | 4.3 | PHQ732_0220 EZ701U | 409                | 409                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 9.5                           | 3.0                           | 1.0                                | 226                      | 22        |
| 136                                                   | 198              | 227               | 2.5      | 3.3 | PHQ732_0220 EZ503U | 880                | 880                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 8.5                           | 3.0                           | 1.0                                | 226                      | 21        |
| 136                                                   | 246              | 295               | 3.1      | 2.6 | PHQ732_0220 EZ702U | 839                | 839                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 15                            | 3.0                           | 1.0                                | 226                      | 24        |
| 136                                                   | 276              | 327               | 3.5      | 2.4 | PHQ732_0220 EZ505U | 900                | 1000                 | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 13                            | 3.0                           | 1.0                                | 226                      | 24        |
| 136                                                   | 338              | 426               | 4.2      | 1.9 | PHQ732_0220 EZ703U | 900                | 1000                 | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 226                      | 26        |
| 136                                                   | 436              | 618               | 5.5      | 1.5 | PHQ732_0220 EZ705U | 900                | 1000                 | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 226                      | 32        |
| 545                                                   | 118              | 196               | 6.6      | 4.0 | PHQ731_0055 EZ802U | 528                | 528                  | 2100               | 5.500 | 11/2        | 2200                  | 5000                  | 61                            | 3.0                           | 1.0                                | 235                      | 36        |
| 545                                                   | 140              | 254               | 7.9      | 3.4 | PHQ731_0055 EZ803U | 766                | 766                  | 2100               | 5.500 | 11/2        | 2200                  | 5000                  | 86                            | 3.0                           | 1.0                                | 235                      | 42        |
| PHQ7 ( $n_{1N} = 4500$ rpm, $M_{2acc,max} = 1050$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 82                                                    | 486              | 783               | 1.7      | 1.2 | PHQ732_0550 EZ505U | 1050               | 1050                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 12                            | 3.0                           | 1.0                                | 213                      | 24        |
| 117                                                   | 340              | 548               | 2.0      | 1.7 | PHQ732_0390 EZ505U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 12                            | 3.0                           | 1.0                                | 221                      | 24        |
| 117                                                   | 433              | 716               | 2.6      | 1.4 | PHQ732_0390 EZ703U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 22                            | 3.0                           | 1.0                                | 221                      | 26        |
| 117                                                   | 587              | 1074              | 3.5      | 1.0 | PHQ732_0390 EZ705U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 34                            | 3.0                           | 1.0                                | 221                      | 32        |
| 164                                                   | 243              | 391               | 2.5      | 2.3 | PHQ732_0280 EZ505U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 13                            | 3.0                           | 1.0                                | 224                      | 24        |
| 164                                                   | 309              | 512               | 3.2      | 1.8 | PHQ732_0280 EZ703U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 22                            | 3.0                           | 1.0                                | 224                      | 26        |
| 164                                                   | 419              | 767               | 4.3      | 1.4 | PHQ732_0280 EZ705U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 35                            | 3.0                           | 1.0                                | 224                      | 32        |
| 205                                                   | 194              | 313               | 2.8      | 2.9 | PHQ732_0220 EZ505U | 900                | 1000                 | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 13                            | 3.0                           | 1.0                                | 226                      | 24        |
| 205                                                   | 248              | 409               | 3.5      | 2.3 | PHQ732_0220 EZ703U | 900                | 1000                 | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 226                      | 26        |
| 205                                                   | 336              | 614               | 4.8      | 1.7 | PHQ732_0220 EZ705U | 900                | 1000                 | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 226                      | 32        |
| PHQ7 ( $n_{1N} = 6000$ rpm, $M_{2acc,max} = 1050$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 27                                                    | 455              | 554               | 0.2      | 1.2 | PHQ733_2200 EZ401U | 1050               | 1050                 | 2100               | 220.0 | 220/1       | 4000                  | 7000                  | 0.97                          | 3.0                           | 1.0                                | 222                      | 20        |
| 31                                                    | 398              | 485               | 0.2      | 1.4 | PHQ733_1930 EZ401U | 1050               | 1050                 | 2100               | 192.5 | 385/2       | 4000                  | 7000                  | 1.0                           | 3.0                           | 1.0                                | 223                      | 20        |
| 39                                                    | 319              | 388               | 0.3      | 1.7 | PHQ733_1540 EZ401U | 1050               | 1050                 | 2100               | 154.0 | 154/1       | 4000                  | 7000                  | 1.0                           | 3.0                           | 1.0                                | 223                      | 20        |
| 39                                                    | 471              | 610               | 0.4      | 1.1 | PHQ733_1540 EZ501U | 1050               | 1050                 | 2100               | 154.0 | 154/1       | 4000                  | 7000                  | 3.0                           | 3.0                           | 1.0                                | 223                      | 21        |
| 39                                                    | 485              | 679               | 0.4      | 1.1 | PHQ733_1540 EZ402U | 1050               | 1050                 | 2100               | 154.0 | 154/1       | 4000                  | 7000                  | 1.7                           | 3.0                           | 1.0                                | 223                      | 21        |
| 44                                                    | 285              | 347               | 0.3      | 1.9 | PHQ733_1380 EZ401U | 1050               | 1050                 | 2100               | 137.5 | 275/2       | 3700                  | 6500                  | 1.1                           | 3.0                           | 1.0                                | 224                      | 20        |
| 44                                                    | 421              | 545               | 0.4      | 1.3 | PHQ733_1380 EZ501U | 1050               | 1050                 | 2100               | 137.5 | 275/2       | 3700                  | 6500                  | 3.1                           | 3.0                           | 1.0                                | 224                      | 21        |
| 44                                                    | 433              | 606               | 0.4      | 1.2 | PHQ733_1380 EZ402U | 1050               | 1050                 | 2100               | 137.5 | 275/2       | 3700                  | 6500                  | 1.8                           | 3.0                           | 1.0                                | 224                      | 21        |
| 55                                                    | 228              | 277               | 0.3      | 2.4 | PHQ733_1100 EZ401U | 842                | 842                  | 2100               | 110.0 | 110/1       | 3300                  | 6000                  | 1.2                           | 3.0                           | 1.0                                | 224                      | 20        |
| 55                                                    | 337              | 436               | 0.5      | 1.6 | PHQ733_1100 EZ501U | 1050               | 1050                 | 2100               | 110.0 | 110/1       | 3300                  | 6000                  | 3.2                           | 3.0                           | 1.0                                | 224                      | 21        |
| 55                                                    | 347              | 485               | 0.5      | 1.6 | PHQ733_1100 EZ402U | 1050               | 1050                 | 2100               | 110.0 | 110/1       | 3300                  | 6000                  | 1.9                           | 3.0                           | 1.0                                | 224                      | 21        |
| 55                                                    | 515              | 772               | 0.7      | 1.0 | PHQ733_1100 EZ502U | 1050               | 1050                 | 2100               | 110.0 | 110/1       | 3300                  | 6000                  | 5.5                           | 3.0                           | 1.0                                | 224                      | 22        |
| 68                                                    | 182              | 222               | 0.3      | 3.0 | PHQ733_0880 EZ401U | 673                | 673                  | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 1.2                           | 3.0                           | 1.0                                | 224                      | 20        |
| 68                                                    | 269              | 348               | 0.5      | 2.0 | PHQ733_0880 EZ501U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 3.2                           | 3.0                           | 1.0                                | 224                      | 21        |
| 68                                                    | 277              | 388               | 0.5      | 1.9 | PHQ733_0880 EZ402U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 1.9                           | 3.0                           | 1.0                                | 224                      | 21        |
| 68                                                    | 412              | 618               | 0.8      | 1.3 | PHQ733_0880 EZ502U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 5.5                           | 3.0                           | 1.0                                | 224                      | 22        |
| 68                                                    | 459              | 665               | 0.9      | 1.2 | PHQ733_0880 EZ404U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 3.3                           | 3.0                           | 1.0                                | 224                      | 23        |
| 68                                                    | 491              | 840               | 0.9      | 1.1 | PHQ733_0880 EZ503U | 1050               | 1050                 | 2100               | 88.00 | 88/1        | 3300                  | 6000                  | 7.9                           | 3.0                           | 1.0                                | 224                      | 24        |
| 109                                                   | 174              | 225               | 0.7      | 3.1 | PHQ732_0550 EZ501U | 818                | 818                  | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 3.1                           | 3.0                           | 1.0                                | 213                      | 18        |
| 109                                                   | 266              | 399               | 1.0      | 2.0 | PHQ732_0550 EZ502U | 1050               | 1050                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 5.4                           | 3.0                           | 1.0                                | 213                      | 20        |
| 109                                                   | 266              | 404               | 1.0      | 2.0 | PHQ732_0550 EZ701U | 1023               | 1023                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 8.7                           | 3.0                           | 1.0                                | 213                      | 22        |
| 109                                                   | 317              | 542               | 1.2      | 1.7 | PHQ732_0550 EZ503U | 1050               | 1050                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 7.7                           | 3.0                           | 1.0                                | 213                      | 21        |
| 109                                                   | 368              | 731               | 1.4      | 1.5 | PHQ732_0550 EZ702U | 1050               | 1050                 | 2100               | 55.00 | 55/1        | 3700                  | 7000                  | 14                            | 3.0                           | 1.0                                | 213                      | 24        |
| 156                                                   | 122              | 158               | 0.8      | 4.4 | PHQ732_0390 EZ501U | 573                | 573                  | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 3.2                           | 3.0                           | 1.0                                | 221                      | 18        |
| 156                                                   | 186              | 279               | 1.2      | 2.9 | PHQ732_0390 EZ502U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 5.5                           | 3.0                           | 1.0                                | 221                      | 20        |
| 156                                                   | 186              | 283               | 1.2      | 2.9 | PHQ732_0390 EZ701U | 716                | 716                  | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 8.8                           | 3.0                           | 1.0                                | 221                      | 22        |
| 156                                                   | 222              | 380               | 1.4      | 2.4 | PHQ732_0390 EZ503U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 7.9                           | 3.0                           | 1.0                                | 221                      | 21        |

## 4.2 Selection tables 4 PHQ planetary geared motors

| $n_{2N}$<br>[rpm]                                     | $M_{2N}$<br>[Nm] | $M_{2.0}$<br>[Nm] | $a_{th}$ | S   | Type               | $M_{2acc}$<br>[Nm] | $M_{2accHT}$<br>[Nm] | $M_{2NOT}$<br>[Nm] | i     | $i_{exakt}$ | $n_{1maxDB}$<br>[rpm] | $n_{1maxZB}$<br>[rpm] | $J_1$<br>[kgcm <sup>2</sup> ] | $\Delta\varphi_2$<br>[arcmin] | $\Delta\varphi_{2red}$<br>[arcmin] | $C_2$<br>[Nm/<br>arcmin] | m<br>[kg] |
|-------------------------------------------------------|------------------|-------------------|----------|-----|--------------------|--------------------|----------------------|--------------------|-------|-------------|-----------------------|-----------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------|-----------|
| PHQ7 ( $n_{1N} = 6000$ rpm, $M_{2acc,max} = 1050$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 156                                                   | 258              | 512               | 1.7      | 2.1 | PHQ732_0390 EZ702U | 1050               | 1050                 | 2100               | 38.50 | 77/2        | 3700                  | 7000                  | 14                            | 3.0                           | 1.0                                | 221                      | 24        |
| 218                                                   | 133              | 199               | 1.5      | 3.9 | PHQ732_0280 EZ502U | 793                | 793                  | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 5.8                           | 3.0                           | 1.0                                | 224                      | 20        |
| 218                                                   | 133              | 202               | 1.5      | 3.9 | PHQ732_0280 EZ701U | 512                | 512                  | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 9.1                           | 3.0                           | 1.0                                | 224                      | 22        |
| 218                                                   | 159              | 271               | 1.8      | 3.3 | PHQ732_0280 EZ503U | 1050               | 1050                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 8.2                           | 3.0                           | 1.0                                | 224                      | 21        |
| 218                                                   | 184              | 366               | 2.1      | 2.8 | PHQ732_0280 EZ702U | 1049               | 1049                 | 2100               | 27.50 | 55/2        | 3500                  | 7000                  | 14                            | 3.0                           | 1.0                                | 224                      | 24        |
| 273                                                   | 106              | 160               | 1.7      | 4.8 | PHQ732_0220 EZ502U | 634                | 634                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 6.2                           | 3.0                           | 1.0                                | 226                      | 20        |
| 273                                                   | 106              | 162               | 1.7      | 4.8 | PHQ732_0220 EZ701U | 409                | 409                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 9.5                           | 3.0                           | 1.0                                | 226                      | 22        |
| 273                                                   | 127              | 217               | 2.0      | 4.1 | PHQ732_0220 EZ503U | 880                | 880                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 8.5                           | 3.0                           | 1.0                                | 226                      | 21        |
| 273                                                   | 147              | 293               | 2.3      | 3.5 | PHQ732_0220 EZ702U | 839                | 839                  | 1800               | 22.00 | 22/1        | 3000                  | 6000                  | 15                            | 3.0                           | 1.0                                | 226                      | 24        |
| PHQ8 ( $n_{1N} = 2000$ rpm, $M_{2acc,max} = 2800$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 52                                                    | 1565             | 2367              | 3.5      | 1.1 | PHQ832_0390 EZ805U | 2800               | 3300                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 134                           | 3.0                           | 1.0                                | 701                      | 80        |
| 73                                                    | 1118             | 1691              | 4.1      | 1.5 | PHQ832_0280 EZ805U | 2800               | 3300                 | 4964               | 27.50 | 55/2        | 2700                  | 5500                  | 135                           | 3.0                           | 1.0                                | 715                      | 80        |
| 91                                                    | 894              | 1352              | 4.6      | 1.9 | PHQ832_0220 EZ805U | 2800               | 3300                 | 4964               | 22.00 | 22/1        | 2500                  | 4500                  | 137                           | 3.0                           | 1.0                                | 720                      | 80        |
| PHQ8 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 2800$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 7.8                                                   | 1490             | 1629              | 0.1      | 1.1 | PHQ833_3850 EZ501U | 2800               | 3300                 | 4964               | 385.0 | 385/1       | 3700                  | 6500                  | 3.0                           | 3.0                           | 1.0                                | 699                      | 40        |
| 11                                                    | 1064             | 1163              | 0.1      | 1.6 | PHQ833_2750 EZ501U | 2800               | 3300                 | 4964               | 275.0 | 275/1       | 3700                  | 6500                  | 3.1                           | 3.0                           | 1.0                                | 707                      | 40        |
| 14                                                    | 851              | 931               | 0.1      | 2.0 | PHQ833_2200 EZ501U | 2800               | 3168                 | 4964               | 220.0 | 220/1       | 3700                  | 6500                  | 3.1                           | 3.0                           | 1.0                                | 705                      | 40        |
| 14                                                    | 1465             | 1584              | 0.2      | 1.2 | PHQ833_2200 EZ502U | 2800               | 3300                 | 4964               | 220.0 | 220/1       | 3700                  | 6500                  | 5.4                           | 3.0                           | 1.0                                | 705                      | 41        |
| 14                                                    | 1465             | 1643              | 0.2      | 1.2 | PHQ833_2200 EZ701U | 2800               | 3300                 | 4964               | 220.0 | 220/1       | 3700                  | 6500                  | 8.7                           | 3.0                           | 1.0                                | 705                      | 43        |
| 16                                                    | 745              | 814               | 0.1      | 2.3 | PHQ833_1930 EZ501U | 2772               | 2772                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 3.2                           | 3.0                           | 1.0                                | 710                      | 40        |
| 16                                                    | 1282             | 1386              | 0.3      | 1.3 | PHQ833_1930 EZ502U | 2800               | 3300                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 5.5                           | 3.0                           | 1.0                                | 710                      | 41        |
| 16                                                    | 1282             | 1438              | 0.3      | 1.3 | PHQ833_1930 EZ701U | 2800               | 3300                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 8.8                           | 3.0                           | 1.0                                | 710                      | 43        |
| 16                                                    | 1681             | 1923              | 0.3      | 1.0 | PHQ833_1930 EZ503U | 2800               | 3300                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 7.9                           | 3.0                           | 1.0                                | 710                      | 43        |
| 19                                                    | 596              | 651               | 0.2      | 2.9 | PHQ833_1540 EZ501U | 2218               | 2218                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 3.2                           | 3.0                           | 1.0                                | 710                      | 40        |
| 19                                                    | 1026             | 1109              | 0.3      | 1.7 | PHQ833_1540 EZ502U | 2800               | 3300                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 5.5                           | 3.0                           | 1.0                                | 710                      | 41        |
| 19                                                    | 1026             | 1150              | 0.3      | 1.7 | PHQ833_1540 EZ701U | 2772               | 2772                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 8.8                           | 3.0                           | 1.0                                | 710                      | 43        |
| 19                                                    | 1344             | 1538              | 0.4      | 1.3 | PHQ833_1540 EZ503U | 2800               | 3300                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 7.9                           | 3.0                           | 1.0                                | 710                      | 43        |
| 19                                                    | 1663             | 1996              | 0.5      | 1.0 | PHQ833_1540 EZ702U | 2800               | 3300                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 14                            | 3.0                           | 1.0                                | 710                      | 46        |
| 22                                                    | 532              | 582               | 0.2      | 3.2 | PHQ833_1380 EZ501U | 1980               | 1980                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 3.5                           | 3.0                           | 1.0                                | 711                      | 40        |
| 22                                                    | 916              | 990               | 0.3      | 1.9 | PHQ833_1380 EZ502U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 5.8                           | 3.0                           | 1.0                                | 711                      | 41        |
| 22                                                    | 916              | 1027              | 0.3      | 1.9 | PHQ833_1380 EZ701U | 2475               | 2475                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 9.1                           | 3.0                           | 1.0                                | 711                      | 43        |
| 22                                                    | 1200             | 1374              | 0.4      | 1.4 | PHQ833_1380 EZ503U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 8.2                           | 3.0                           | 1.0                                | 711                      | 43        |
| 22                                                    | 1485             | 1782              | 0.5      | 1.1 | PHQ833_1380 EZ702U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 14                            | 3.0                           | 1.0                                | 711                      | 46        |
| 22                                                    | 1671             | 1980              | 0.6      | 1.0 | PHQ833_1380 EZ505U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 13                            | 3.0                           | 1.0                                | 711                      | 46        |
| 27                                                    | 426              | 465               | 0.2      | 4.0 | PHQ833_1100 EZ501U | 1584               | 1584                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 3.9                           | 3.0                           | 1.0                                | 712                      | 40        |
| 27                                                    | 733              | 792               | 0.3      | 2.3 | PHQ833_1100 EZ502U | 2800               | 3069                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 6.2                           | 3.0                           | 1.0                                | 712                      | 41        |
| 27                                                    | 733              | 822               | 0.3      | 2.3 | PHQ833_1100 EZ701U | 1980               | 1980                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 9.5                           | 3.0                           | 1.0                                | 712                      | 43        |
| 27                                                    | 960              | 1099              | 0.4      | 1.8 | PHQ833_1100 EZ503U | 2800               | 3300                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 8.5                           | 3.0                           | 1.0                                | 712                      | 43        |
| 27                                                    | 1188             | 1426              | 0.6      | 1.4 | PHQ833_1100 EZ702U | 2800               | 3300                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 15                            | 3.0                           | 1.0                                | 712                      | 46        |
| 27                                                    | 1337             | 1584              | 0.6      | 1.3 | PHQ833_1100 EZ505U | 2800               | 3300                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 13                            | 3.0                           | 1.0                                | 712                      | 46        |
| 27                                                    | 1634             | 2059              | 0.8      | 1.0 | PHQ833_1100 EZ703U | 2800               | 3300                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 23                            | 3.0                           | 1.0                                | 712                      | 48        |
| 34                                                    | 341              | 372               | 0.2      | 5.0 | PHQ833_0880 EZ501U | 1267               | 1267                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 4.0                           | 3.0                           | 1.0                                | 712                      | 40        |
| 34                                                    | 586              | 634               | 0.4      | 2.9 | PHQ833_0880 EZ502U | 2455               | 2455                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 6.3                           | 3.0                           | 1.0                                | 712                      | 41        |
| 34                                                    | 586              | 657               | 0.4      | 2.9 | PHQ833_0880 EZ701U | 1584               | 1584                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 9.6                           | 3.0                           | 1.0                                | 712                      | 43        |
| 34                                                    | 768              | 879               | 0.5      | 2.2 | PHQ833_0880 EZ503U | 2800               | 3300                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 8.6                           | 3.0                           | 1.0                                | 712                      | 43        |
| 34                                                    | 950              | 1140              | 0.6      | 1.8 | PHQ833_0880 EZ702U | 2800               | 3247                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 15                            | 3.0                           | 1.0                                | 712                      | 46        |
| 34                                                    | 1069             | 1267              | 0.7      | 1.6 | PHQ833_0880 EZ505U | 2800               | 3300                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 13                            | 3.0                           | 1.0                                | 712                      | 46        |
| 34                                                    | 1307             | 1647              | 0.8      | 1.3 | PHQ833_0880 EZ703U | 2800               | 3300                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 23                            | 3.0                           | 1.0                                | 712                      | 48        |
| 34                                                    | 1687             | 2392              | 1.1      | 1.0 | PHQ833_0880 EZ705U | 2800               | 3300                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 35                            | 3.0                           | 1.0                                | 712                      | 53        |
| 55                                                    | 379              | 425               | 0.5      | 4.5 | PHQ832_0550 EZ701U | 1023               | 1023                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 9.2                           | 3.0                           | 1.0                                | 670                      | 42        |
| 55                                                    | 614              | 737               | 0.8      | 2.8 | PHQ832_0550 EZ702U | 2097               | 2097                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 670                      | 45        |
| 55                                                    | 844              | 1064              | 1.1      | 2.0 | PHQ832_0550 EZ703U | 2700               | 2990                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 22                            | 3.0                           | 1.0                                | 670                      | 47        |
| 55                                                    | 1089             | 1545              | 1.4      | 1.6 | PHQ832_0550 EZ705U | 2700               | 2990                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 670                      | 52        |
| 55                                                    | 1141             | 1898              | 1.5      | 1.5 | PHQ832_0550 EZ802U | 2700               | 2990                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 670                      | 61        |
| 55                                                    | 1361             | 2465              | 1.8      | 1.2 | PHQ832_0550 EZ803U | 2700               | 2990                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 84                            | 3.0                           | 1.0                                | 670                      | 67        |
| 78                                                    | 430              | 516               | 1.0      | 4.0 | PHQ832_0390 EZ702U | 1468               | 1468                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 15                            | 3.0                           | 1.0                                | 701                      | 45        |
| 78                                                    | 591              | 745               | 1.3      | 2.9 | PHQ832_0390 EZ703U | 2327               | 2327                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 701                      | 47        |
| 78                                                    | 763              | 1081              | 1.7      | 2.2 | PHQ832_0390 EZ705U | 2800               | 3300                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 701                      | 52        |
| 78                                                    | 798              | 1328              | 1.8      | 2.1 | PHQ832_0390 EZ802U | 2800               | 3300                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 701                      | 61        |
| 78                                                    | 952              | 1726              | 2.1      | 1.8 | PHQ832_0390 EZ803U | 2800               | 3300                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 85                            | 3.0                           | 1.0                                | 701                      | 67        |
| 109                                                   | 422              | 532               | 1.6      | 4.0 | PHQ832_0280 EZ703U | 1662               | 1662                 | 4964               | 27.50 | 55/2        | 2700                  | 5500                  | 24                            | 3.0                           | 1.0                                | 715                      | 47        |
| 109                                                   | 545              | 772               | 2.0      | 3.1 | PHQ832_0280 EZ705U | 2660               | 2660                 | 4964               | 27.50 | 55/2        | 2700                  | 5500                  | 37                            | 3.0                           | 1.0                                | 715                      | 52        |
| 109                                                   | 570              | 949               | 2.1      | 3.0 | PHQ832_0280 EZ802U | 2558               | 2558                 | 4964               | 27.50 | 55/2        | 2700                  | 5500                  | 61                            | 3.0                           | 1.0                                | 715                      | 61        |
| 109                                                   | 680              | 1233              | 2.5      | 2.5 | PHQ832_0280 EZ803U | 2800               | 3300                 | 4964               | 27.50 | 55/2        | 2700                  | 5500                  | 86                            | 3.0                           | 1.0                                | 715                      | 67        |
| 136                                                   | 436              | 618               | 2.3      | 3.9 | PHQ832_0220 EZ705U | 2128               | 2128                 | 4745               | 22.00 | 22/1        | 2500                  | 4500                  | 38                            | 3.0                           | 1.0                                | 720                      | 52        |

| $n_{2N}$<br>[rpm]                                     | $M_{2N}$<br>[Nm] | $M_{2.0}$<br>[Nm] | $a_{th}$ | S   | Type               | $M_{2acc}$<br>[Nm] | $M_{2accHT}$<br>[Nm] | $M_{2NOT}$<br>[Nm] | i     | $i_{exakt}$ | $n_{1maxDB}$<br>[rpm] | $n_{1maxZB}$<br>[rpm] | $J_1$<br>[kgcm <sup>2</sup> ] | $\Delta\varphi_2$<br>[arcmin] | $\Delta\varphi_{2red}$<br>[arcmin] | $C_2$<br>[Nm/<br>arcmin] | m<br>[kg] |
|-------------------------------------------------------|------------------|-------------------|----------|-----|--------------------|--------------------|----------------------|--------------------|-------|-------------|-----------------------|-----------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------|-----------|
| PHQ8 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 2800$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 136                                                   | 456              | 759               | 2.4      | 3.7 | PHQ832_0220 EZ802U | 2046               | 2046                 | 4964               | 22.00 | 22/1        | 2500                  | 4500                  | 62                            | 3.0                           | 1.0                                | 720                      | 61        |
| 136                                                   | 544              | 986               | 2.8      | 3.1 | PHQ832_0220 EZ803U | 2800               | 2967                 | 4964               | 22.00 | 22/1        | 2500                  | 4500                  | 88                            | 3.0                           | 1.0                                | 720                      | 67        |
| PHQ8 ( $n_{1N} = 4500$ rpm, $M_{2acc,max} = 2800$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 29                                                    | 1317             | 2121              | 0.4      | 1.1 | PHQ833_1540 EZ505U | 2800               | 3300                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 12                            | 3.0                           | 1.0                                | 710                      | 46        |
| 33                                                    | 1176             | 1893              | 0.4      | 1.3 | PHQ833_1380 EZ505U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 13                            | 3.0                           | 1.0                                | 711                      | 46        |
| 41                                                    | 941              | 1515              | 0.5      | 1.6 | PHQ833_1100 EZ505U | 2800               | 3300                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 13                            | 3.0                           | 1.0                                | 712                      | 46        |
| 41                                                    | 1198             | 1980              | 0.6      | 1.2 | PHQ833_1100 EZ703U | 2800               | 3300                 | 4964               | 110.0 | 110/1       | 3000                  | 5000                  | 23                            | 3.0                           | 1.0                                | 712                      | 48        |
| 51                                                    | 752              | 1212              | 0.6      | 2.0 | PHQ833_0880 EZ505U | 2800               | 3300                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 13                            | 3.0                           | 1.0                                | 712                      | 46        |
| 51                                                    | 958              | 1584              | 0.7      | 1.6 | PHQ833_0880 EZ703U | 2800               | 3300                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 23                            | 3.0                           | 1.0                                | 712                      | 48        |
| 51                                                    | 1299             | 2376              | 1.0      | 1.1 | PHQ833_0880 EZ705U | 2800               | 3300                 | 4964               | 88.00 | 88/1        | 3000                  | 5000                  | 35                            | 3.0                           | 1.0                                | 712                      | 53        |
| 82                                                    | 537              | 1765              | 0.8      | 2.8 | PHQ832_0550 EZ802U | 2700               | 2990                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 670                      | 61        |
| 82                                                    | 619              | 1023              | 0.9      | 2.4 | PHQ832_0550 EZ703U | 2700               | 2990                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 22                            | 3.0                           | 1.0                                | 670                      | 47        |
| 82                                                    | 839              | 1535              | 1.3      | 1.8 | PHQ832_0550 EZ705U | 2700               | 2990                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 670                      | 52        |
| 117                                                   | 376              | 1235              | 1.0      | 4.0 | PHQ832_0390 EZ802U | 2800               | 3300                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 701                      | 61        |
| 117                                                   | 433              | 716               | 1.1      | 3.4 | PHQ832_0390 EZ703U | 2327               | 2327                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 701                      | 47        |
| 117                                                   | 587              | 1074              | 1.5      | 2.5 | PHQ832_0390 EZ705U | 2800               | 3300                 | 4964               | 38.50 | 77/2        | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 701                      | 52        |
| 164                                                   | 309              | 512               | 1.3      | 4.8 | PHQ832_0280 EZ703U | 1662               | 1662                 | 4964               | 27.50 | 55/2        | 2700                  | 5500                  | 24                            | 3.0                           | 1.0                                | 715                      | 47        |
| 164                                                   | 419              | 767               | 1.8      | 3.5 | PHQ832_0280 EZ705U | 2660               | 2660                 | 4964               | 27.50 | 55/2        | 2700                  | 5500                  | 37                            | 3.0                           | 1.0                                | 715                      | 52        |
| 205                                                   | 336              | 614               | 2.0      | 4.4 | PHQ832_0220 EZ705U | 2128               | 2128                 | 4745               | 22.00 | 22/1        | 2500                  | 4500                  | 38                            | 3.0                           | 1.0                                | 720                      | 52        |
| PHQ8 ( $n_{1N} = 6000$ rpm, $M_{2acc,max} = 2800$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 16                                                    | 1178             | 1525              | 0.1      | 1.1 | PHQ833_3850 EZ501U | 2800               | 3300                 | 4964               | 385.0 | 385/1       | 3700                  | 6500                  | 3.0                           | 3.0                           | 1.0                                | 699                      | 40        |
| 22                                                    | 842              | 1089              | 0.1      | 1.6 | PHQ833_2750 EZ501U | 2800               | 3300                 | 4964               | 275.0 | 275/1       | 3700                  | 6500                  | 3.1                           | 3.0                           | 1.0                                | 707                      | 40        |
| 22                                                    | 1287             | 1931              | 0.2      | 1.0 | PHQ833_2750 EZ502U | 2800               | 3300                 | 4964               | 275.0 | 275/1       | 3700                  | 6500                  | 5.4                           | 3.0                           | 1.0                                | 707                      | 41        |
| 22                                                    | 1287             | 1955              | 0.2      | 1.0 | PHQ833_2750 EZ701U | 2800               | 3300                 | 4964               | 275.0 | 275/1       | 3700                  | 6500                  | 8.7                           | 3.0                           | 1.0                                | 707                      | 43        |
| 27                                                    | 673              | 871               | 0.1      | 2.0 | PHQ833_2200 EZ501U | 2800               | 3168                 | 4964               | 220.0 | 220/1       | 3700                  | 6500                  | 3.1                           | 3.0                           | 1.0                                | 705                      | 40        |
| 27                                                    | 1030             | 1544              | 0.2      | 1.3 | PHQ833_2200 EZ502U | 2800               | 3300                 | 4964               | 220.0 | 220/1       | 3700                  | 6500                  | 5.4                           | 3.0                           | 1.0                                | 705                      | 41        |
| 27                                                    | 1030             | 1564              | 0.2      | 1.3 | PHQ833_2200 EZ701U | 2800               | 3300                 | 4964               | 220.0 | 220/1       | 3700                  | 6500                  | 8.7                           | 3.0                           | 1.0                                | 705                      | 43        |
| 27                                                    | 1228             | 2099              | 0.3      | 1.1 | PHQ833_2200 EZ503U | 2800               | 3300                 | 4964               | 220.0 | 220/1       | 3700                  | 6500                  | 7.8                           | 3.0                           | 1.0                                | 705                      | 43        |
| 31                                                    | 589              | 762               | 0.1      | 2.3 | PHQ833_1930 EZ501U | 2772               | 2772                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 3.2                           | 3.0                           | 1.0                                | 710                      | 40        |
| 31                                                    | 901              | 1351              | 0.2      | 1.5 | PHQ833_1930 EZ502U | 2800               | 3300                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 5.5                           | 3.0                           | 1.0                                | 710                      | 41        |
| 31                                                    | 901              | 1369              | 0.2      | 1.5 | PHQ833_1930 EZ701U | 2800               | 3300                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 8.8                           | 3.0                           | 1.0                                | 710                      | 43        |
| 31                                                    | 1074             | 1836              | 0.3      | 1.3 | PHQ833_1930 EZ503U | 2800               | 3300                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 7.9                           | 3.0                           | 1.0                                | 710                      | 43        |
| 31                                                    | 1247             | 2477              | 0.3      | 1.1 | PHQ833_1930 EZ702U | 2800               | 3300                 | 4964               | 192.5 | 385/2       | 3700                  | 6500                  | 14                            | 3.0                           | 1.0                                | 710                      | 46        |
| 39                                                    | 471              | 610               | 0.2      | 2.9 | PHQ833_1540 EZ501U | 2218               | 2218                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 3.2                           | 3.0                           | 1.0                                | 710                      | 40        |
| 39                                                    | 721              | 1081              | 0.3      | 1.9 | PHQ833_1540 EZ502U | 2800               | 3300                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 5.5                           | 3.0                           | 1.0                                | 710                      | 41        |
| 39                                                    | 721              | 1095              | 0.3      | 1.9 | PHQ833_1540 EZ701U | 2772               | 2772                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 8.8                           | 3.0                           | 1.0                                | 710                      | 43        |
| 39                                                    | 859              | 1469              | 0.3      | 1.6 | PHQ833_1540 EZ503U | 2800               | 3300                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 7.9                           | 3.0                           | 1.0                                | 710                      | 43        |
| 39                                                    | 998              | 1982              | 0.4      | 1.4 | PHQ833_1540 EZ702U | 2800               | 3300                 | 4964               | 154.0 | 154/1       | 3700                  | 6500                  | 14                            | 3.0                           | 1.0                                | 710                      | 46        |
| 44                                                    | 421              | 545               | 0.2      | 3.2 | PHQ833_1380 EZ501U | 1980               | 1980                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 3.5                           | 3.0                           | 1.0                                | 711                      | 40        |
| 44                                                    | 644              | 965               | 0.3      | 2.1 | PHQ833_1380 EZ502U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 5.8                           | 3.0                           | 1.0                                | 711                      | 41        |
| 44                                                    | 644              | 978               | 0.3      | 2.1 | PHQ833_1380 EZ701U | 2475               | 2475                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 9.1                           | 3.0                           | 1.0                                | 711                      | 43        |
| 44                                                    | 767              | 1312              | 0.3      | 1.8 | PHQ833_1380 EZ503U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 8.2                           | 3.0                           | 1.0                                | 711                      | 43        |
| 44                                                    | 891              | 1770              | 0.4      | 1.5 | PHQ833_1380 EZ702U | 2800               | 3300                 | 4964               | 137.5 | 275/2       | 3500                  | 6000                  | 14                            | 3.0                           | 1.0                                | 711                      | 46        |
| 109                                                   | 368              | 731               | 0.6      | 3.7 | PHQ832_0550 EZ702U | 2097               | 2097                 | 4964               | 55.00 | 55/1        | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 670                      | 45        |
| PHQ9 ( $n_{1N} = 2000$ rpm, $M_{2acc,max} = 6600$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 21                                                    | 3776             | 5711              | 1.0      | 1.0 | PHQ943_0960 EZ805U | 6600               | 6600                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 137                           | 3.0                           | 1.0                                | 1207                     | 127       |
| 28                                                    | 2832             | 4283              | 1.2      | 1.3 | PHQ943_0720 EZ805U | 6600               | 6600                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 139                           | 3.0                           | 1.0                                | 1205                     | 127       |
| 33                                                    | 2438             | 3688              | 1.3      | 1.7 | PHQ942_0600 EZ805U | 6600               | 6600                 | 13200              | 60.00 | 60/1        | 2800                  | 4500                  | 136                           | 3.0                           | 1.0                                | 1149                     | 119       |
| 48                                                    | 1707             | 2582              | 1.4      | 2.6 | PHQ942_0420 EZ805U | 6600               | 6600                 | 13200              | 42.00 | 42/1        | 2800                  | 4500                  | 139                           | 3.0                           | 1.0                                | 1195                     | 119       |
| 67                                                    | 1219             | 1844              | 1.7      | 3.4 | PHQ942_0300 EZ805U | 5720               | 5720                 | 13200              | 30.00 | 30/1        | 2500                  | 4000                  | 145                           | 3.0                           | 1.0                                | 1214                     | 119       |
| 83                                                    | 975              | 1475              | 2.1      | 3.9 | PHQ942_0240 EZ805U | 4576               | 4576                 | 11506              | 24.00 | 24/1        | 2000                  | 3500                  | 152                           | 3.0                           | 1.0                                | 1225                     | 119       |
| PHQ9 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 6600$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 5.0                                                   | 3996             | 4482              | 0.1      | 1.1 | PHQ943_6000 EZ701U | 6600               | 6600                 | 13200              | 600.0 | 600/1       | 3000                  | 6000                  | 9.0                           | 3.0                           | 1.0                                | 1145                     | 90        |
| 7.1                                                   | 2797             | 3137              | 0.1      | 1.6 | PHQ943_4200 EZ701U | 6600               | 6600                 | 13200              | 420.0 | 420/1       | 3000                  | 6000                  | 9.1                           | 3.0                           | 1.0                                | 1184                     | 90        |
| 10                                                    | 1998             | 2241              | 0.1      | 2.1 | PHQ943_3000 EZ701U | 5400               | 5400                 | 13200              | 300.0 | 300/1       | 3000                  | 6000                  | 9.1                           | 3.0                           | 1.0                                | 1196                     | 90        |
| 10                                                    | 3240             | 3888              | 0.1      | 1.3 | PHQ943_3000 EZ702U | 6600               | 6600                 | 13200              | 300.0 | 300/1       | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 1196                     | 92        |
| 13                                                    | 1598             | 1793              | 0.1      | 2.4 | PHQ943_2400 EZ701U | 4320               | 4320                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 9.2                           | 3.0                           | 1.0                                | 1198                     | 90        |
| 13                                                    | 2592             | 3110              | 0.2      | 1.5 | PHQ943_2400 EZ702U | 6600               | 6600                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 1198                     | 92        |
| 13                                                    | 3564             | 4493              | 0.2      | 1.1 | PHQ943_2400 EZ703U | 6600               | 6600                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 22                            | 3.0                           | 1.0                                | 1198                     | 94        |
| 14                                                    | 1399             | 1569              | 0.1      | 3.0 | PHQ943_2100 EZ701U | 3780               | 3780                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 9.7                           | 3.0                           | 1.0                                | 1200                     | 90        |
| 14                                                    | 2268             | 2722              | 0.2      | 1.9 | PHQ943_2100 EZ702U | 6600               | 6600                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 15                            | 3.0                           | 1.0                                | 1200                     | 92        |
| 14                                                    | 3119             | 3931              | 0.2      | 1.3 | PHQ943_2100 EZ703U | 6600               | 6600                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 1200                     | 94        |
| 14                                                    | 4026             | 5708              | 0.3      | 1.0 | PHQ943_2100 EZ705U | 6600               | 6600                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 1200                     | 100       |
| 18                                                    | 1119             | 1255              | 0.1      | 3.4 | PHQ943_1680 EZ701U | 3024               | 3024                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 9.9                           | 3.0                           | 1.0                                | 1204                     | 90        |

#### 4.2 Selection tables 4 PHQ planetary geared motors

| $n_{2N}$<br>[rpm]                                     | $M_{2N}$<br>[Nm] | $M_{2.0}$<br>[Nm] | $a_{th}$ | S   | Type               | $M_{2acc}$<br>[Nm] | $M_{2accHT}$<br>[Nm] | $M_{2NOT}$<br>[Nm] | i     | $i_{exakt}$ | $n_{1maxDB}$<br>[rpm] | $n_{1maxZB}$<br>[rpm] | $J_1$<br>[kgcm <sup>2</sup> ] | $\Delta\varphi_2$<br>[arcmin] | $\Delta\varphi_{2red}$<br>[arcmin] | $C_2$<br>[Nm/<br>arcmin] | m<br>[kg] |
|-------------------------------------------------------|------------------|-------------------|----------|-----|--------------------|--------------------|----------------------|--------------------|-------|-------------|-----------------------|-----------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------|-----------|
| PHQ9 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 6600$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 18                                                    | 1814             | 2177              | 0.2      | 2.1 | PHQ943_1680 EZ702U | 6199               | 6199                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 15                            | 3.0                           | 1.0                                | 1204                     | 92        |
| 18                                                    | 2495             | 3145              | 0.3      | 1.5 | PHQ943_1680 EZ703U | 6600               | 6600                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 1204                     | 94        |
| 18                                                    | 3221             | 4566              | 0.4      | 1.2 | PHQ943_1680 EZ705U | 6600               | 6600                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 1204                     | 100       |
| 18                                                    | 3372             | 5610              | 0.4      | 1.1 | PHQ943_1680 EZ802U | 6600               | 6600                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 1204                     | 108       |
| 20                                                    | 999              | 1121              | 0.1      | 4.2 | PHQ943_1500 EZ701U | 2700               | 2700                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 11                            | 3.0                           | 1.0                                | 1202                     | 90        |
| 20                                                    | 1620             | 1944              | 0.2      | 2.6 | PHQ943_1500 EZ702U | 5535               | 5535                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 16                            | 3.0                           | 1.0                                | 1202                     | 92        |
| 20                                                    | 2228             | 2808              | 0.3      | 1.9 | PHQ943_1500 EZ703U | 6600               | 6600                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 24                            | 3.0                           | 1.0                                | 1202                     | 94        |
| 20                                                    | 2876             | 4077              | 0.4      | 1.5 | PHQ943_1500 EZ705U | 6600               | 6600                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 36                            | 3.0                           | 1.0                                | 1202                     | 100       |
| 20                                                    | 3011             | 5009              | 0.4      | 1.4 | PHQ943_1500 EZ802U | 6600               | 6600                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 60                            | 3.0                           | 1.0                                | 1202                     | 108       |
| 20                                                    | 3591             | 6507              | 0.5      | 1.2 | PHQ943_1500 EZ803U | 6600               | 6600                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 86                            | 3.0                           | 1.0                                | 1202                     | 114       |
| 25                                                    | 1296             | 1555              | 0.2      | 3.2 | PHQ943_1200 EZ702U | 4428               | 4428                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 18                            | 3.0                           | 1.0                                | 1203                     | 92        |
| 25                                                    | 1782             | 2246              | 0.3      | 2.4 | PHQ943_1200 EZ703U | 6600               | 6600                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 26                            | 3.0                           | 1.0                                | 1203                     | 94        |
| 25                                                    | 2300             | 3262              | 0.4      | 1.8 | PHQ943_1200 EZ705U | 6600               | 6600                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 38                            | 3.0                           | 1.0                                | 1203                     | 100       |
| 25                                                    | 2408             | 4007              | 0.4      | 1.7 | PHQ943_1200 EZ802U | 6600               | 6600                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 62                            | 3.0                           | 1.0                                | 1203                     | 108       |
| 25                                                    | 2873             | 5206              | 0.5      | 1.5 | PHQ943_1200 EZ803U | 6600               | 6600                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 88                            | 3.0                           | 1.0                                | 1203                     | 114       |
| 31                                                    | 1037             | 1244              | 0.3      | 3.7 | PHQ943_0960 EZ702U | 3542               | 3542                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 18                            | 3.0                           | 1.0                                | 1207                     | 92        |
| 31                                                    | 1426             | 1797              | 0.4      | 2.7 | PHQ943_0960 EZ703U | 5616               | 5616                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 26                            | 3.0                           | 1.0                                | 1207                     | 94        |
| 31                                                    | 1840             | 2609              | 0.5      | 2.1 | PHQ943_0960 EZ705U | 6600               | 6600                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 39                            | 3.0                           | 1.0                                | 1207                     | 100       |
| 31                                                    | 1927             | 3205              | 0.5      | 2.0 | PHQ943_0960 EZ802U | 6600               | 6600                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 63                            | 3.0                           | 1.0                                | 1207                     | 108       |
| 31                                                    | 2298             | 4164              | 0.6      | 1.7 | PHQ943_0960 EZ803U | 6600               | 6600                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 88                            | 3.0                           | 1.0                                | 1207                     | 114       |
| 42                                                    | 778              | 933               | 0.3      | 4.9 | PHQ943_0720 EZ702U | 2657               | 2657                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 20                            | 3.0                           | 1.0                                | 1205                     | 92        |
| 42                                                    | 1069             | 1348              | 0.5      | 3.6 | PHQ943_0720 EZ703U | 4212               | 4212                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 28                            | 3.0                           | 1.0                                | 1205                     | 94        |
| 42                                                    | 1380             | 1957              | 0.6      | 2.8 | PHQ943_0720 EZ705U | 6600               | 6600                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 40                            | 3.0                           | 1.0                                | 1205                     | 100       |
| 42                                                    | 1445             | 2404              | 0.6      | 2.6 | PHQ943_0720 EZ802U | 6480               | 6480                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 64                            | 3.0                           | 1.0                                | 1205                     | 108       |
| 42                                                    | 1724             | 3123              | 0.7      | 2.2 | PHQ943_0720 EZ803U | 6600               | 6600                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 90                            | 3.0                           | 1.0                                | 1205                     | 114       |
| 50                                                    | 1244             | 2070              | 0.7      | 2.9 | PHQ942_0600 EZ802U | 5580               | 5580                 | 13200              | 60.00 | 60/1        | 2800                  | 4500                  | 61                            | 3.0                           | 1.0                                | 1149                     | 100       |
| 50                                                    | 1484             | 2690              | 0.9      | 2.4 | PHQ942_0600 EZ803U | 6600               | 6600                 | 13200              | 60.00 | 60/1        | 2800                  | 4500                  | 87                            | 3.0                           | 1.0                                | 1149                     | 106       |
| 71                                                    | 1039             | 1883              | 0.8      | 4.3 | PHQ942_0420 EZ803U | 5664               | 5664                 | 13200              | 42.00 | 42/1        | 2800                  | 4500                  | 90                            | 3.0                           | 1.0                                | 1195                     | 106       |
| PHQ9 ( $n_{1N} = 4500$ rpm, $M_{2acc,max} = 6600$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 11                                                    | 3969             | 13041             | 0.1      | 1.1 | PHQ943_4200 EZ802U | 6600               | 6600                 | 13200              | 420.0 | 420/1       | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 1184                     | 108       |
| 15                                                    | 2835             | 9315              | 0.1      | 1.5 | PHQ943_3000 EZ802U | 6600               | 6600                 | 13200              | 300.0 | 300/1       | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 1196                     | 108       |
| 15                                                    | 3267             | 5400              | 0.1      | 1.3 | PHQ943_3000 EZ703U | 6600               | 6600                 | 13200              | 300.0 | 300/1       | 3000                  | 6000                  | 22                            | 3.0                           | 1.0                                | 1196                     | 94        |
| 19                                                    | 2268             | 7452              | 0.2      | 1.7 | PHQ943_2400 EZ802U | 6600               | 6600                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 1198                     | 108       |
| 19                                                    | 2614             | 4320              | 0.2      | 1.5 | PHQ943_2400 EZ703U | 6600               | 6600                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 22                            | 3.0                           | 1.0                                | 1198                     | 94        |
| 19                                                    | 3542             | 6480              | 0.2      | 1.1 | PHQ943_2400 EZ705U | 6600               | 6600                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 1198                     | 100       |
| 21                                                    | 1985             | 6521              | 0.2      | 2.1 | PHQ943_2100 EZ802U | 6600               | 6600                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 1200                     | 108       |
| 21                                                    | 2287             | 3780              | 0.2      | 1.8 | PHQ943_2100 EZ703U | 6600               | 6600                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 1200                     | 94        |
| 21                                                    | 3100             | 5670              | 0.2      | 1.4 | PHQ943_2100 EZ705U | 6600               | 6600                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 1200                     | 100       |
| 27                                                    | 1588             | 5216              | 0.2      | 2.4 | PHQ943_1680 EZ802U | 6600               | 6600                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 59                            | 3.0                           | 1.0                                | 1204                     | 108       |
| 27                                                    | 1830             | 3024              | 0.2      | 2.1 | PHQ943_1680 EZ703U | 6600               | 6600                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 23                            | 3.0                           | 1.0                                | 1204                     | 94        |
| 27                                                    | 2480             | 4536              | 0.3      | 1.5 | PHQ943_1680 EZ705U | 6600               | 6600                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 35                            | 3.0                           | 1.0                                | 1204                     | 100       |
| 30                                                    | 1418             | 4658              | 0.2      | 3.0 | PHQ943_1500 EZ802U | 6600               | 6600                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 60                            | 3.0                           | 1.0                                | 1202                     | 108       |
| 30                                                    | 1634             | 2700              | 0.2      | 2.6 | PHQ943_1500 EZ703U | 6600               | 6600                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 24                            | 3.0                           | 1.0                                | 1202                     | 94        |
| 30                                                    | 2214             | 4050              | 0.3      | 1.9 | PHQ943_1500 EZ705U | 6600               | 6600                 | 13200              | 150.0 | 150/1       | 2700                  | 5500                  | 36                            | 3.0                           | 1.0                                | 1202                     | 100       |
| 38                                                    | 1134             | 3726              | 0.2      | 3.7 | PHQ943_1200 EZ802U | 6600               | 6600                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 62                            | 3.0                           | 1.0                                | 1203                     | 108       |
| 38                                                    | 1307             | 2160              | 0.2      | 3.2 | PHQ943_1200 EZ703U | 6600               | 6600                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 26                            | 3.0                           | 1.0                                | 1203                     | 94        |
| 38                                                    | 1771             | 3240              | 0.3      | 2.4 | PHQ943_1200 EZ705U | 6600               | 6600                 | 13200              | 120.0 | 120/1       | 2500                  | 4500                  | 38                            | 3.0                           | 1.0                                | 1203                     | 100       |
| 47                                                    | 907              | 2981              | 0.2      | 4.2 | PHQ943_0960 EZ802U | 6600               | 6600                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 63                            | 3.0                           | 1.0                                | 1207                     | 108       |
| 47                                                    | 1045             | 1728              | 0.3      | 3.6 | PHQ943_0960 EZ703U | 5616               | 5616                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 26                            | 3.0                           | 1.0                                | 1207                     | 94        |
| 47                                                    | 1417             | 2592              | 0.4      | 2.7 | PHQ943_0960 EZ705U | 6600               | 6600                 | 13200              | 96.00 | 96/1        | 2500                  | 4500                  | 39                            | 3.0                           | 1.0                                | 1207                     | 100       |
| 63                                                    | 784              | 1296              | 0.3      | 4.8 | PHQ943_0720 EZ703U | 4212               | 4212                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 28                            | 3.0                           | 1.0                                | 1205                     | 94        |
| 63                                                    | 1063             | 1944              | 0.4      | 3.6 | PHQ943_0720 EZ705U | 6600               | 6600                 | 13200              | 72.00 | 72/1        | 2200                  | 4500                  | 40                            | 3.0                           | 1.0                                | 1205                     | 100       |
| PHQ9 ( $n_{1N} = 6000$ rpm, $M_{2acc,max} = 6600$ Nm) |                  |                   |          |     |                    |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 10                                                    | 2808             | 4266              | –        | 1.6 | PHQ943_6000 EZ701U | 6600               | 6600                 | 13200              | 600.0 | 600/1       | 3000                  | 6000                  | 9.0                           | 3.0                           | 1.0                                | 1145                     | 90        |
| 10                                                    | 3888             | 7722              | 0.1      | 1.2 | PHQ943_6000 EZ702U | 6600               | 6600                 | 13200              | 600.0 | 600/1       | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 1145                     | 92        |
| 14                                                    | 1966             | 2986              | 0.1      | 2.3 | PHQ943_4200 EZ701U | 6600               | 6600                 | 13200              | 420.0 | 420/1       | 3000                  | 6000                  | 9.1                           | 3.0                           | 1.0                                | 1184                     | 90        |
| 14                                                    | 2722             | 5405              | 0.1      | 1.7 | PHQ943_4200 EZ702U | 6600               | 6600                 | 13200              | 420.0 | 420/1       | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 1184                     | 92        |
| 20                                                    | 1404             | 2133              | 0.1      | 3.0 | PHQ943_3000 EZ701U | 5400               | 5400                 | 13200              | 300.0 | 300/1       | 3000                  | 6000                  | 9.1                           | 3.0                           | 1.0                                | 1196                     | 90        |
| 20                                                    | 1944             | 3861              | 0.1      | 2.2 | PHQ943_3000 EZ702U | 6600               | 6600                 | 13200              | 300.0 | 300/1       | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 1196                     | 92        |
| 25                                                    | 1123             | 1706              | 0.1      | 3.4 | PHQ943_2400 EZ701U | 4320               | 4320                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 9.2                           | 3.0                           | 1.0                                | 1198                     | 90        |
| 25                                                    | 1555             | 3089              | 0.1      | 2.4 | PHQ943_2400 EZ702U | 6600               | 6600                 | 13200              | 240.0 | 240/1       | 3000                  | 6000                  | 14                            | 3.0                           | 1.0                                | 1198                     | 92        |
| 29                                                    | 983              | 1493              | 0.1      | 4.3 | PHQ943_2100 EZ701U | 3780               | 3780                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 9.7                           | 3.0                           | 1.0                                | 1200                     | 90        |
| 29                                                    | 1361             | 2703              | 0.1      | 3.1 | PHQ943_2100 EZ702U | 6600               | 6600                 | 13200              | 210.0 | 210/1       | 3000                  | 6000                  | 15                            | 3.0                           | 1.0                                | 1200                     | 92        |
| 36                                                    | 786              | 1194              | 0.1      | 4.8 | PHQ943_1680 EZ701U | 3024               | 3024                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 9.9                           | 3.0                           | 1.0                                | 1204                     | 90        |
| 36                                                    | 1089             | 2162              | 0.1      | 3.5 | PHQ943_1680 EZ702U | 6199               | 6199                 | 13200              | 168.0 | 168/1       | 3000                  | 6000                  | 15                            | 3.0                           | 1.0                                | 1204                     | 92        |

| $n_{2N}$<br>[rpm]                                       | $M_{2N}$<br>[Nm] | $M_{2,0}$<br>[Nm] | $a_{th}$ | S   | Type                | $M_{2acc}$<br>[Nm] | $M_{2accHT}$<br>[Nm] | $M_{2NOT}$<br>[Nm] | i     | $i_{exakt}$ | $n_{1maxDB}$<br>[rpm] | $n_{1maxZB}$<br>[rpm] | $J_1$<br>[kgcm <sup>2</sup> ] | $\Delta\varphi_2$<br>[arcmin] | $\Delta\varphi_{2red}$<br>[arcmin] | $C_2$<br>[Nm/<br>arcmin] | m<br>[kg] |
|---------------------------------------------------------|------------------|-------------------|----------|-----|---------------------|--------------------|----------------------|--------------------|-------|-------------|-----------------------|-----------------------|-------------------------------|-------------------------------|------------------------------------|--------------------------|-----------|
| PHQ10 ( $n_{1N} = 2000$ rpm, $M_{2acc,max} = 10000$ Nm) |                  |                   |          |     |                     |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 13                                                      | 5900             | 8924              | 0.5      | 1.1 | PHQ1043_1500 EZ805U | 10000              | –                    | 20000              | 150.0 | 150/1       | 2500                  | 4000                  | 143                           | 3.0                           | –                                  | 2061                     | 166       |
| 17                                                      | 4720             | 7139              | 0.6      | 1.4 | PHQ1043_1200 EZ805U | 10000              | –                    | 20000              | 120.0 | 120/1       | 2000                  | 3500                  | 151                           | 3.0                           | –                                  | 2062                     | 166       |
| 21                                                      | 3776             | 5711              | 0.6      | 1.7 | PHQ1043_0960 EZ805U | 10000              | –                    | 20000              | 96.00 | 96/1        | 2000                  | 3500                  | 152                           | 3.0                           | –                                  | 2068                     | 166       |
| PHQ10 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 10000$ Nm) |                  |                   |          |     |                     |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 10                                                      | 6021             | 10017             | 0.2      | 1.1 | PHQ1043_3000 EZ802U | 10000              | –                    | 20000              | 300.0 | 300/1       | 2800                  | 4500                  | 61                            | 3.0                           | –                                  | 2054                     | 147       |
| 13                                                      | 4817             | 8014              | 0.2      | 1.3 | PHQ1043_2400 EZ802U | 10000              | –                    | 20000              | 240.0 | 240/1       | 2800                  | 4500                  | 61                            | 3.0                           | –                                  | 2055                     | 147       |
| 13                                                      | 5746             | 10411             | 0.2      | 1.1 | PHQ1043_2400 EZ803U | 10000              | –                    | 20000              | 240.0 | 240/1       | 2800                  | 4500                  | 86                            | 3.0                           | –                                  | 2055                     | 153       |
| 14                                                      | 4215             | 7012              | 0.2      | 1.5 | PHQ1043_2100 EZ802U | 10000              | –                    | 20000              | 210.0 | 210/1       | 2800                  | 4500                  | 63                            | 3.0                           | –                                  | 2059                     | 147       |
| 14                                                      | 5027             | 9110              | 0.3      | 1.3 | PHQ1043_2100 EZ803U | 10000              | –                    | 20000              | 210.0 | 210/1       | 2800                  | 4500                  | 89                            | 3.0                           | –                                  | 2059                     | 153       |
| 18                                                      | 3372             | 5610              | 0.3      | 1.9 | PHQ1043_1680 EZ802U | 10000              | –                    | 20000              | 168.0 | 168/1       | 2800                  | 4500                  | 64                            | 3.0                           | –                                  | 2064                     | 147       |
| 18                                                      | 4022             | 7288              | 0.3      | 1.6 | PHQ1043_1680 EZ803U | 10000              | –                    | 20000              | 168.0 | 168/1       | 2800                  | 4500                  | 89                            | 3.0                           | –                                  | 2064                     | 153       |
| 20                                                      | 3011             | 5009              | 0.3      | 2.2 | PHQ1043_1500 EZ802U | 10000              | –                    | 20000              | 150.0 | 150/1       | 2500                  | 4000                  | 69                            | 3.0                           | –                                  | 2061                     | 147       |
| 20                                                      | 3591             | 6507              | 0.3      | 1.8 | PHQ1043_1500 EZ803U | 10000              | –                    | 20000              | 150.0 | 150/1       | 2500                  | 4000                  | 94                            | 3.0                           | –                                  | 2061                     | 153       |
| 25                                                      | 2408             | 4007              | 0.3      | 2.7 | PHQ1043_1200 EZ802U | 10000              | –                    | 20000              | 120.0 | 120/1       | 2000                  | 3500                  | 76                            | 3.0                           | –                                  | 2062                     | 147       |
| 25                                                      | 2873             | 5206              | 0.4      | 2.3 | PHQ1043_1200 EZ803U | 10000              | –                    | 20000              | 120.0 | 120/1       | 2000                  | 3500                  | 102                           | 3.0                           | –                                  | 2062                     | 153       |
| 31                                                      | 1927             | 3205              | 0.3      | 3.4 | PHQ1043_0960 EZ802U | 8640               | –                    | 20000              | 96.00 | 96/1        | 2000                  | 3500                  | 77                            | 3.0                           | –                                  | 2068                     | 147       |
| 31                                                      | 2298             | 4164              | 0.4      | 2.8 | PHQ1043_0960 EZ803U | 10000              | –                    | 20000              | 96.00 | 96/1        | 2000                  | 3500                  | 103                           | 3.0                           | –                                  | 2068                     | 153       |
| PHQ10 ( $n_{1N} = 4500$ rpm, $M_{2acc,max} = 10000$ Nm) |                  |                   |          |     |                     |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 7.5                                                     | 5670             | 18630             | 0.1      | 1.1 | PHQ1043_6000 EZ802U | 10000              | –                    | 20000              | 600.0 | 600/1       | 2800                  | 4500                  | 60                            | 3.0                           | –                                  | 1969                     | 147       |
| 11                                                      | 3969             | 13041             | 0.1      | 1.6 | PHQ1043_4200 EZ802U | 10000              | –                    | 20000              | 420.0 | 420/1       | 2800                  | 4500                  | 61                            | 3.0                           | –                                  | 2036                     | 147       |
| 15                                                      | 2835             | 9315              | 0.1      | 2.3 | PHQ1043_3000 EZ802U | 10000              | –                    | 20000              | 300.0 | 300/1       | 2800                  | 4500                  | 61                            | 3.0                           | –                                  | 2054                     | 147       |
| 19                                                      | 2268             | 7452              | 0.1      | 2.9 | PHQ1043_2400 EZ802U | 10000              | –                    | 20000              | 240.0 | 240/1       | 2800                  | 4500                  | 61                            | 3.0                           | –                                  | 2055                     | 147       |
| 21                                                      | 1985             | 6521              | 0.1      | 3.3 | PHQ1043_2100 EZ802U | 10000              | –                    | 20000              | 210.0 | 210/1       | 2800                  | 4500                  | 63                            | 3.0                           | –                                  | 2059                     | 147       |
| 27                                                      | 1588             | 5216              | 0.1      | 4.1 | PHQ1043_1680 EZ802U | 10000              | –                    | 20000              | 168.0 | 168/1       | 2800                  | 4500                  | 64                            | 3.0                           | –                                  | 2064                     | 147       |
| PHQ11 ( $n_{1N} = 2000$ rpm, $M_{2acc,max} = 22000$ Nm) |                  |                   |          |     |                     |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 6.7                                                     | 11799            | 17847             | 0.2      | 1.1 | PHQ1143_3000 EZ805U | 22000              | –                    | 40000              | 300.0 | 300/1       | 2800                  | 4500                  | 136                           | 3.0                           | –                                  | 3490                     | 276       |
| 8.3                                                     | 9439             | 14278             | 0.2      | 1.4 | PHQ1143_2400 EZ805U | 22000              | –                    | 40000              | 240.0 | 240/1       | 2800                  | 4500                  | 137                           | 3.0                           | –                                  | 3495                     | 276       |
| 9.5                                                     | 8259             | 12493             | 0.2      | 1.6 | PHQ1143_2100 EZ805U | 22000              | –                    | 40000              | 210.0 | 210/1       | 2800                  | 4500                  | 140                           | 3.0                           | –                                  | 3506                     | 276       |
| 12                                                      | 6607             | 9994              | 0.3      | 2.0 | PHQ1143_1680 EZ805U | 22000              | –                    | 40000              | 168.0 | 168/1       | 2800                  | 4500                  | 140                           | 3.0                           | –                                  | 3520                     | 276       |
| 13                                                      | 5900             | 8924              | 0.3      | 2.2 | PHQ1143_1500 EZ805U | 22000              | –                    | 40000              | 150.0 | 150/1       | 2500                  | 4000                  | 146                           | 3.0                           | –                                  | 3511                     | 276       |
| 17                                                      | 4720             | 7139              | 0.3      | 2.8 | PHQ1143_1200 EZ805U | 22000              | –                    | 40000              | 120.0 | 120/1       | 2000                  | 3500                  | 156                           | 3.0                           | –                                  | 3514                     | 276       |
| 21                                                      | 3776             | 5711              | 0.3      | 3.4 | PHQ1143_0960 EZ805U | 17712              | –                    | 40000              | 96.00 | 96/1        | 2000                  | 3500                  | 158                           | 3.0                           | –                                  | 3533                     | 276       |
| PHQ11 ( $n_{1N} = 3000$ rpm, $M_{2acc,max} = 22000$ Nm) |                  |                   |          |     |                     |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 10                                                      | 6021             | 10017             | 0.1      | 2.2 | PHQ1143_3000 EZ802U | 22000              | –                    | 40000              | 300.0 | 300/1       | 2800                  | 4500                  | 61                            | 3.0                           | –                                  | 3490                     | 257       |
| 10                                                      | 7182             | 13014             | 0.1      | 1.8 | PHQ1143_3000 EZ803U | 22000              | –                    | 40000              | 300.0 | 300/1       | 2800                  | 4500                  | 87                            | 3.0                           | –                                  | 3490                     | 263       |
| 13                                                      | 4817             | 8014              | 0.1      | 2.7 | PHQ1143_2400 EZ802U | 21600              | –                    | 40000              | 240.0 | 240/1       | 2800                  | 4500                  | 62                            | 3.0                           | –                                  | 3495                     | 257       |
| 13                                                      | 5746             | 10411             | 0.1      | 2.3 | PHQ1143_2400 EZ803U | 22000              | –                    | 40000              | 240.0 | 240/1       | 2800                  | 4500                  | 87                            | 3.0                           | –                                  | 3495                     | 263       |
| 14                                                      | 4215             | 7012              | 0.1      | 3.1 | PHQ1143_2100 EZ802U | 18900              | –                    | 40000              | 210.0 | 210/1       | 2800                  | 4500                  | 65                            | 3.0                           | –                                  | 3506                     | 257       |
| 14                                                      | 5027             | 9110              | 0.1      | 2.6 | PHQ1143_2100 EZ803U | 22000              | –                    | 40000              | 210.0 | 210/1       | 2800                  | 4500                  | 90                            | 3.0                           | –                                  | 3506                     | 263       |
| 18                                                      | 3372             | 5610              | 0.1      | 3.9 | PHQ1143_1680 EZ802U | 15120              | –                    | 40000              | 168.0 | 168/1       | 2800                  | 4500                  | 66                            | 3.0                           | –                                  | 3520                     | 257       |
| 18                                                      | 4022             | 7288              | 0.2      | 3.2 | PHQ1143_1680 EZ803U | 21924              | –                    | 40000              | 168.0 | 168/1       | 2800                  | 4500                  | 91                            | 3.0                           | –                                  | 3520                     | 263       |
| 20                                                      | 3011             | 5009              | 0.1      | 4.3 | PHQ1143_1500 EZ802U | 13500              | –                    | 40000              | 150.0 | 150/1       | 2500                  | 4000                  | 71                            | 3.0                           | –                                  | 3511                     | 257       |
| 20                                                      | 3591             | 6507              | 0.2      | 3.6 | PHQ1143_1500 EZ803U | 19575              | –                    | 40000              | 150.0 | 150/1       | 2500                  | 4000                  | 97                            | 3.0                           | –                                  | 3511                     | 263       |
| 25                                                      | 2873             | 5206              | 0.2      | 4.5 | PHQ1143_1200 EZ803U | 15660              | –                    | 40000              | 120.0 | 120/1       | 2000                  | 3500                  | 106                           | 3.0                           | –                                  | 3514                     | 263       |
| PHQ11 ( $n_{1N} = 4500$ rpm, $M_{2acc,max} = 22000$ Nm) |                  |                   |          |     |                     |                    |                      |                    |       |             |                       |                       |                               |                               |                                    |                          |           |
| 15                                                      | 2835             | 9315              | –        | 4.6 | PHQ1143_3000 EZ802U | 22000              | –                    | 40000              | 300.0 | 300/1       | 2800                  | 4500                  | 61                            | 3.0                           | –                                  | 3490                     | 257       |