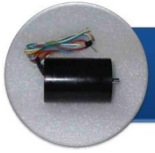
**BL2648IE****Report for Brushless Motor Testing Data Sheet****Series No: BL2648- -IE- - P 2**

| No.  | Testing Item                        |                     | Tested Values              |        |        |        |        | Unit                               |
|--|-------------------------------------|---------------------|----------------------------|--------|--------|--------|--------|------------------------------------|
| 1  | Nominal voltage                     | $U_N$               | 6                          | 12     | 12     | 15     | 15     | V                                  |
| 2  | Terminal resistance, phase to phase | R                   | 31                         | 6      | 4      | 18     | 4      | $\Omega$                           |
| 3  | Output power                        | $P_{2max}$          | 0.2                        | 5.4    | 8.4    | 2.8    | 13.2   | W                                  |
| 4  | Efficiency                          | $\eta_{max}$        | 37                         | 60     | 65     | 57     | 69     | %                                  |
| 5  | No-load speed                       | $n_o$               | 1020                       | 4640   | 6400   | 4620   | 8490   | rpm                                |
| 6  | No-load current                     | $I_o$               | 0.03                       | 0.1    | 0.11   | 0.05   | 0.11   | A                                  |
| 7  | Stall torque                        | $M_H$               | 7.76                       | 44.58  | 49.85  | 22.83  | 59.61  | mNm                                |
| 8  | Friction torque                     | MF                  | 1.42                       | 2.35   | 1.90   | 1.46   | 1.80   | mNm                                |
| 9  | Speed constant                      | $k_n$               | 201.18                     | 407.02 | 553.63 | 327.66 | 583.10 | rpm/V                              |
| 10   | Back-EMF constant                   | $k_E$               | 4.97                       | 2.46   | 1.81   | 3.05   | 1.71   | mV/rpm                             |
| 11   | Torque constant                     | $k_M$               | 47.47                      | 23.46  | 17.25  | 29.14  | 16.38  | mNm/A                              |
| 12   | Current constant                    | $k_I$               | 0.02                       | 0.04   | 0.06   | 0.03   | 0.06   | A/mNm                              |
| 13   | Slope of n-M curve                  | $\Delta n/\Delta M$ | 131.39                     | 104.09 | 128.39 | 202.37 | 142.42 | rpm/mNm                            |
| 14   | Mechanical time constant            | $\tau_m$            | 1.51                       | 1.20   | 1.48   | 2.33   | 1.64   | ms                                 |
| 15   | Rotor inertia                       | J                   | 1.10                       | 1.10   | 1.10   | 1.10   | 1.10   | gcm <sup>2</sup>                   |
| 16   | Angular acceleration                | $\alpha_{max}$      | 70.57                      | 405.25 | 453.16 | 207.54 | 541.92 | 10 <sup>3</sup> rad/s <sup>2</sup> |
| 17   | Sensor                              |                     | Sensorless                 |        |        |        |        |                                    |
| 18   | Driver                              |                     | DR1802                     |        |        |        |        |                                    |
| 19   | Weight                              |                     | 106                        |        |        |        |        | g                                  |
| 20   | Operating temperature range         |                     | -30~+85                    |        |        |        |        |                                    |
| 21   | Commutation                         |                     | Electronically commutation |        |        |        |        |                                    |
| 22   | Ball Bearing                        |                     | EZO & NMB                  |        |        |        |        |                                    |
| 23   | Housing material                    |                     | Aluminum, black anodized   |        |        |        |        |                                    |
| 24   | Magnet material                     |                     | Sintered Nd-Fe-B           |        |        |        |        |                                    |
| 25   | Direction of rotation               |                     | Electronically reversible  |        |        |        |        |                                    |
| <b>The Operating Data For <math>\eta_{max}</math> of Customer's Specifications</b> |                                     |                     |                            |        |        |        |        |                                    |
| 26   | Output Power                        | $P_{2opt}$          | 0.15                       | 3.15   | 4.42   | 1.69   | 6.52   | W                                  |
| 27   | Efficiency                          | $\eta_{opt}$        | 37                         | 60     | 65     | 57     | 69     | %                                  |
| 28   | Speed                               | $n_{opt}$           | 444                        | 2946   | 4345   | 2803   | 6010   | rpm                                |
| 29   | Load Current                        | $I_{opt}$           | 0.07                       | 0.44   | 0.56   | 0.20   | 0.63   | A                                  |
| 30   | Operating Torque                    | $M_{opt}$           | 3.32                       | 10.23  | 9.73   | 5.77   | 10.36  | mNm                                |

**Note:**

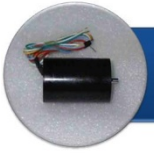
- (1) The  $I_o$  is pure current of motor in this data sheet that means it not included the driver's current.
- (2) This type of motor can be assemble for planetary Gearbox which type of IG32 and made from Shayang Ye Co., Taiwan, and please to see Gearbox' s sheet attached if you have need it.

**BL2648IE****Report for Brushless Motor Testing Data Sheet****Series No: BL2648- -IE- - P 2**

| No.  | Testing Item                        |                     | Tested Values              |        |        |        | Unit                               |
|--|-------------------------------------|---------------------|----------------------------|--------|--------|--------|------------------------------------|
| 1  | Nominal voltage                     | $U_N$               | 15                         | 16     | 18     | 18     | V                                  |
| 2  | Terminal resistance, phase to phase | $R$                 | 3.6                        | 3      | 8.9    | 6      | $\Omega$                           |
| 3  | Output power                        | $P_{2max}$          | 14.3                       | 19.9   | 7.9    | 11.8   | W                                  |
| 4  | Efficiency                          | $\eta_{max}$        | 63                         | 67     | 54     | 55     | %                                  |
| 5  | No-load speed                       | $n_o$               | 11640                      | 11340  | 6500   | 7760   | rpm                                |
| 6  | No-load current                     | $I_o$               | 0.18                       | 0.18   | 0.14   | 0.2    | A                                  |
| 7  | Stall torque                        | $M_H$               | 46.94                      | 67.09  | 46.33  | 57.89  | mNm                                |
| 8  | Friction torque                     | MF                  | 2.12                       | 2.34   | 3.45   | 4.13   | mNm                                |
| 9  | Speed constant                      | $k_n$               | 811.04                     | 733.51 | 387.97 | 461.90 | rpm/V                              |
| 10   | Back-EMF constant                   | $k_E$               | 1.23                       | 1.36   | 2.58   | 2.16   | mV/rpm                             |
| 11   | Torque constant                     | $k_M$               | 11.77                      | 13.02  | 24.61  | 20.67  | mNm/A                              |
| 12   | Current constant                    | $k_I$               | 0.08                       | 0.08   | 0.04   | 0.05   | A/mNm                              |
| 13   | Slope of n-M curve                  | $\Delta n/\Delta M$ | 247.98                     | 169.03 | 140.28 | 134.06 | rpm/mNm                            |
| 14   | Mechanical time constant            | $\tau_m$            | 2.86                       | 1.95   | 1.62   | 1.54   | ms                                 |
| 15   | Rotor inertia                       | $J$                 | 1.10                       | 1.10   | 1.10   | 1.10   | gcm <sup>2</sup>                   |
| 16   | Angular acceleration                | $\alpha_{max}$      | 426.72                     | 609.91 | 421.22 | 526.24 | 10 <sup>3</sup> rad/s <sup>2</sup> |
| 17   | Sensor                              |                     | Sensorless                 |        |        |        |                                    |
| 18   | Driver                              |                     | DR1802                     |        |        |        |                                    |
| 19   | Weight                              |                     | 106                        |        |        |        | g                                  |
| 20   | Operating temperature range         |                     | -30~+85                    |        |        |        |                                    |
| 21   | Commutation                         |                     | Electronically commutation |        |        |        |                                    |
| 22   | Ball Bearing                        |                     | EZO & NMB                  |        |        |        |                                    |
| 23   | Housing material                    |                     | Aluminum, black anodized   |        |        |        |                                    |
| 24   | Magnet material                     |                     | Sintered Nd-Fe-B           |        |        |        |                                    |
| 25   | Direction of rotation               |                     | Electronically reversible  |        |        |        |                                    |
| <b>The Operating Data For <math>\eta_{max}</math> of Customer's Specifications</b> |                                     |                     |                            |        |        |        |                                    |
| 26   | Output Power                        | $P_{2opt}$          | 7.97                       | 10.27  | 5.02   | 7.41   | W                                  |
| 27   | Efficiency                          | $\eta_{opt}$        | 63                         | 67     | 54     | 55     | %                                  |
| 28   | Speed                               | $n_{opt}$           | 7638                       | 7824   | 3794   | 4577   | rpm                                |
| 29   | Load Current                        | $I_{opt}$           | 0.85                       | 0.96   | 0.51   | 0.75   | A                                  |
| 30   | Operating Torque                    | $M_{opt}$           | 9.97                       | 12.54  | 12.64  | 15.47  | mNm                                |

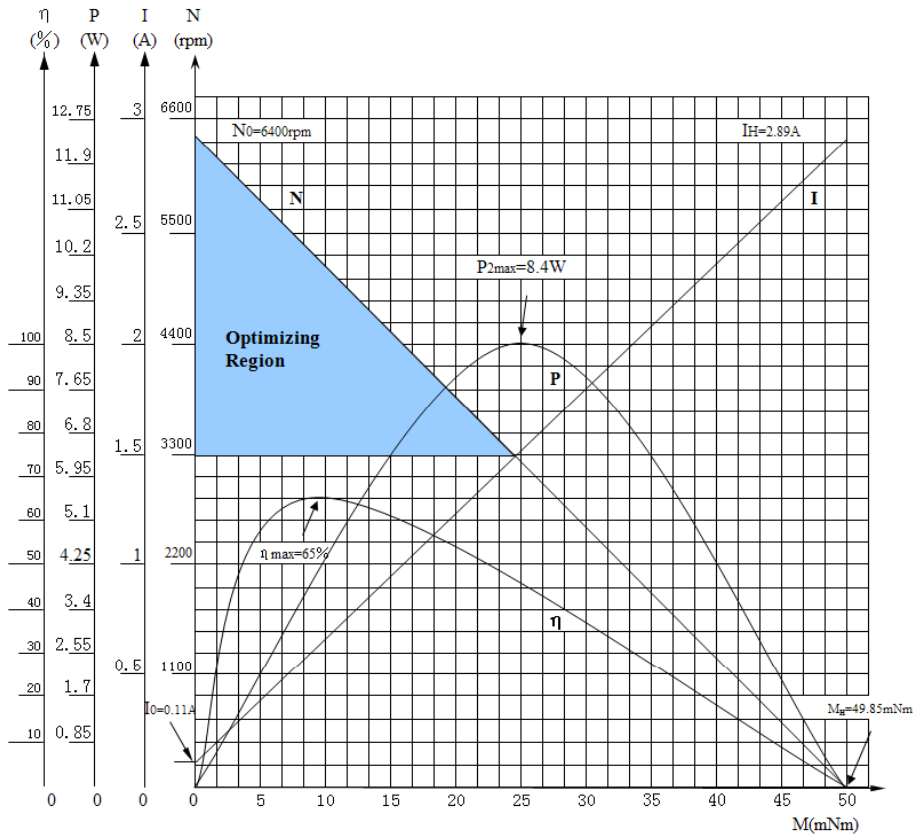
**Note:**

- (1) The  $I_o$  is pure current of motor in this data sheet that means it not included the driver's current.
- (2) This type of motor can be assemble for planetary Gearbox which type of IG32 and made from Shayang Ye Co., Taiwan, and please to see Gearbox' s sheet attached if you have need it.



**BL2648IE**

## Operating Curve



Note:(1)The  $I_0$  is pure current of motor in this curve drawing that means it not included the driver's current.

(2)We have suggested there has a optimizing region for this motor's operating as hatched in drawing.

## Drawing

