

 **MAVILOR**

INFRANOR GROUP COMPANY



Motors

ISSUE 2001

AC Servo Motors BL 40/50/70 Series

The BL Series are synchronous electrical servomotors, with 3 winding phases, supplied with Sinusoidal or Trapezoidal current wave forms. The Feed-Back devices that produce the synchronization signal and speed (position, also in the Sinusoidal case), are a Resolver (BLS Series) or a Hall Effect devices (BLT Series). This "BRUSHLESS" technology provides:

- High dynamic response.
- Full speed condition, not limited by the "Brush Sparking effect".
- High thermal and dynamic characteristics, because of the motor's windings which are located in the stators.
- Very low maintenance.

BLS ~ Technical Specifications

ALL CHARACTERISTICS MEASURED
AT 25°C AMBIENT TEMPERATURE

SYMBOLS UNITS

| | SYMBOLS | UNITS |
|--------------------------------------|-----------------|------------------------------------|
| MAX MECHANICAL SPEED | n | rpm |
| STALL TORQUE (1) ±10% | M _S | Nm |
| STALL CURRENT | I _S | A |
| PEAK TORQUE ±10% | M _J | Nm |
| TORQUE-WEIGHT RATIO | T _W | Nm/kg |
| EMF CONSTANT ±5% | K _E | Vs/rad |
| TORQUE CONSTANT ±5% | K _T | Nm/A |
| RELUCTANCE TORQUE (*) | T _R | Nm |
| WINDING RESISTANCE ±5% | R | Ω |
| WINDING INDUCTANCE ±5% | L | mH |
| ROTOR INERTIA | J | kg m ² 10 ⁻³ |
| MECHANICAL TIME CONSTANT | T _M | ms |
| ELECTRICAL TIME CONSTANT | T _E | ms |
| THERMAL TIME CONSTANT | T _{TH} | s |
| THERMAL RESISTANCE | R _{TH} | °C/W |
| MASS | M | kg |
| RADIAL LOAD (at mid-length of shaft) | F _R | N |
| AXIAL LOAD | F _A | N |
| INSULATION | | |
| PROTECTION | | |

(1) With an aluminium heat sink plate

(*) Respect to the Stall Torque

BLT ~ Technical Specifications

ALL CHARACTERISTICS MEASURED
AT 25°C AMBIENT TEMPERATURE

SYMBOLS UNITS

| | SYMBOLS | UNITS |
|--------------------------------------|-----------------|------------------------------------|
| MAX MECHANICAL SPEED | n | rpm |
| STALL TORQUE (1) ±10% | M _S | Nm |
| STALL CURRENT | I _S | A |
| PEAK TORQUE ±10% | M _J | Nm |
| TORQUE-WEIGHT RATIO | T _W | Nm/kg |
| EMF CONSTANT ±5% | K _E | Vs/rad |
| TORQUE CONSTANT ±5% | K _T | Nm/A |
| RELUCTANCE TORQUE (*) | T _R | Nm |
| WINDING RESISTANCE ±5% | R | Ω |
| WINDING INDUCTANCE ±5% | L | mH |
| ROTOR INERTIA | J | kg m ² 10 ⁻³ |
| MECHANICAL TIME CONSTANT | T _M | ms |
| ELECTRICAL TIME CONSTANT | T _E | ms |
| THERMAL TIME CONSTANT | T _{TH} | s |
| THERMAL RESISTANCE | R _{TH} | °C/W |
| MASS | M | kg |
| RADIAL LOAD (at mid-length of shaft) | F _R | N |
| AXIAL LOAD | F _A | N |
| INSULATION | | |
| PROTECTION | | |

(1) With an aluminium heat sink plate

(*) Respect to the Stall Torque

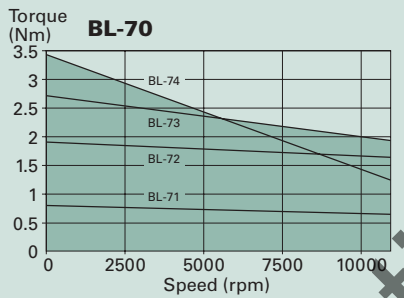
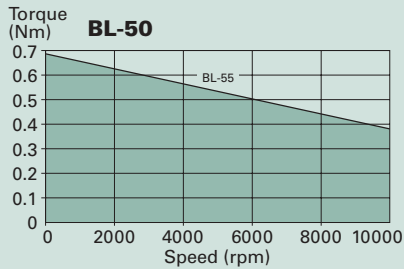
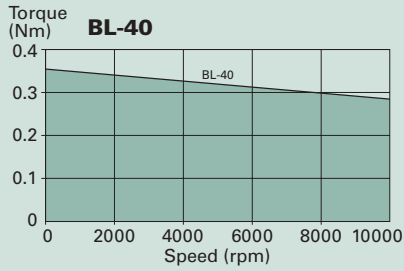


| BLS-40 | | BLS-55 | | BLS-71 | | BLS-72 | | BLS-73 | | BLS-74 | |
|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|
| 110 VAC | 220 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC |
| 10,000 | | 10,000 | | 11,000 | | 11,000 | | 11,000 | | 11,000 | |
| 0.36 | 0.36 | 0.7 | 0.7 | 0.8 | 0.8 | 1.9 | 1.9 | 2.7 | 2.7 | 3.4 | 3.4 |
| 2.57 | 1.24 | 1.4 | 0.77 | 2.11 | 1.13 | 3.96 | 2.37 | 3.91 | 2.2 | 4.2 | 2.25 |
| 1.44 | 1.44 | 2.8 | 2.8 | 3.2 | 3.2 | 7.6 | 7.6 | 10.8 | 10.8 | 13.6 | 13.6 |
| 0.6 | 0.6 | 0.5 | 0.5 | 0.53 | 0.53 | 1 | 1 | 1.17 | 1.17 | 1.21 | 1.21 |
| 0.08 | 0.17 | 0.29 | 0.53 | 0.22 | 0.41 | 0.28 | 0.46 | 0.4 | 0.71 | 0.47 | 0.87 |
| 0.14 | 0.29 | 0.5 | 0.91 | 0.38 | 0.71 | 0.48 | 0.8 | 0.69 | 1.23 | 0.81 | 1.51 |
| <6% | | <4% | | <3.5% | | <3.5% | | <3.5% | | <3.5% | |
| 6 | 24.4 | 14.7 | 47 | 10.7 | 33.8 | 5.3 | 15.5 | 6.4 | 18.9 | 5.7 | 18.6 |
| 3.23 | 12 | 18.6 | 61 | 7.4 | 24 | 5.4 | 13.2 | 6.4 | 20 | 6.7 | 22 |
| 0.0024 | 0.0024 | 0.017 | 0.017 | 0.027 | 0.027 | 0.051 | 0.051 | 0.074 | 0.074 | 0.097 | 0.097 |
| 1.19 | 1.19 | 1.72 | 1.66 | 3.46 | 3.14 | 2.01 | 2.15 | 1.72 | 1.6 | 1.45 | 1.37 |
| 0.54 | 0.49 | 1.27 | 1.3 | 0.69 | 0.71 | 1.02 | 0.85 | 1 | 1.06 | 1.18 | 1.18 |
| 1,190 | 1,190 | 1,120 | 1,120 | 1,100 | 1,100 | 1,280 | 1,280 | 1,560 | 1,560 | 1,990 | 1,990 |
| 1.53 | 1.53 | 1.99 | 2.06 | 1.21 | 1.34 | 0.69 | 0.69 | 0.59 | 0.63 | 0.57 | 0.61 |
| 0.6 | 0.6 | 1.4 | 1.4 | 1.5 | 1.5 | 1.9 | 1.9 | 2.3 | 2.3 | 2.8 | 2.8 |
| 150 | | 250 | | 216 | | 245 | | 274 | | 314 | |
| 80 | | 100 | | 98 | | 98 | | 98 | | 98 | |
| CLASS-F | | CLASS-F | | CLASS-F | | CLASS-F | | CLASS-F | | CLASS-F | |
| IP-65 | | IP-65 | | IP-65 | | IP-65 | | IP-65 | | IP-65 | |
| 300x300x10 | | 300x300x10 | | 300x300x10 | | 300x300x10 | | 300x300x10 | | 300x300x10 | |

| BLT-40 | | BLT-55 | | BLT-71 | | BLT-72 | | BLT-73 | | BLT-74 | |
|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|------------|---------|
| 110 VAC | 220 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC | 220 VAC | 400 VAC |
| 10,000 | | 10,000 | | 11,000 | | 11,000 | | 11,000 | | 11,000 | |
| 0.36 | 0.36 | 0.7 | 0.7 | 0.8 | 0.8 | 1.9 | 1.8 | 2.7 | 2.7 | 3.4 | 3.4 |
| 3 | 1.50 | 1.71 | 0.95 | 2.58 | 1.4 | 4.87 | 2.77 | 4.82 | 2.7 | 5.15 | 2.76 |
| 1.44 | 1.44 | 2.8 | 2.8 | 3.2 | 3.2 | 7.6 | 7.20 | 10.8 | 10.8 | 13.6 | 13.6 |
| 0.6 | 0.63 | 0.51 | 0.51 | 0.54 | 0.54 | 1.02 | 0.96 | 1.19 | 1.19 | 1.23 | 1.23 |
| 0.12 | 0.24 | 0.41 | 0.74 | 0.31 | 0.57 | 0.39 | 0.65 | 0.56 | 1 | 0.66 | 1.23 |
| 0.12 | 0.24 | 0.41 | 0.74 | 0.31 | 0.57 | 0.39 | 0.65 | 0.56 | 1 | 0.66 | 1.23 |
| <6% | | <4% | | <3.5% | | <3.5% | | <3.5% | | <3.5% | |
| 6 | 24.4 | 14.7 | 47 | 10.7 | 33.8 | 5.3 | 15.5 | 6.4 | 18.9 | 5.7 | 18.6 |
| 3.23 | 12 | 18.6 | 61 | 7.4 | 24 | 5.4 | 13.2 | 6.4 | 20 | 6.7 | 22 |
| 0.0024 | 0.0024 | 0.017 | 0.017 | 0.027 | 0.027 | 0.051 | 0.051 | 0.074 | 0.074 | 0.097 | 0.097 |
| 1.02 | 1.02 | 1.49 | 1.46 | 3.01 | 2.81 | 1.78 | 1.87 | 1.51 | 1.4 | 1.27 | 1.19 |
| 0.54 | 0.49 | 1.27 | 1.3 | 0.69 | 0.71 | 1.02 | 0.85 | 1 | 1.06 | 1.18 | 1.18 |
| 1,190 | 1,190 | 1,120 | 1,120 | 1,100 | 1,100 | 1,280 | 1,280 | 1,560 | 1,560 | 1,990 | 1,990 |
| 1.53 | 1.57 | 2.01 | 2.05 | 1.21 | 1.29 | 0.68 | 0.72 | 0.58 | 0.62 | 0.57 | 0.61 |
| 0.6 | 0.57 | 1.37 | 1.37 | 1.47 | 1.47 | 1.87 | 1.87 | 2.27 | 2.27 | 2.77 | 2.77 |
| 150 | | 250 | | 216 | | 245 | | 274 | | 314 | |
| 80 | | 100 | | 98 | | 98 | | 98 | | 98 | |
| CLASS-F | | CLASS-F | | CLASS-F | | CLASS-F | | CLASS-F | | CLASS-F | |
| IP-65 | | IP-65 | | IP-65 | | IP-65 | | IP-65 | | IP-65 | |
| 300x300x10 | | 300x300x10 | | 300x300x10 | | 300x300x10 | | 300x300x10 | | 300x300x10 | |

AC Servo Motors BL 40/50/70 Series

Performance Curves



Resolver Specifications

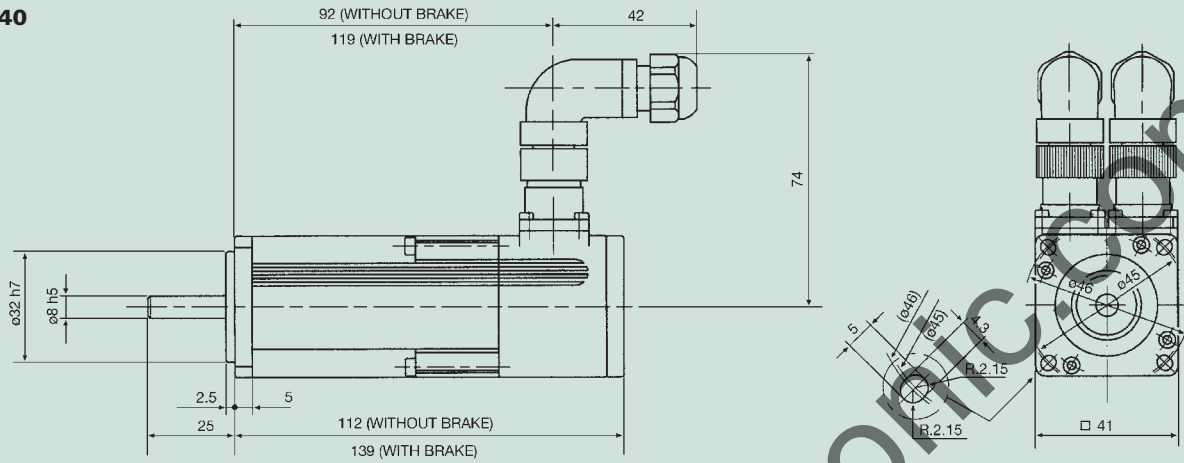
| | UNITS | BL-40 | BL-50 | BL-70 |
|-----------------------------|------------------------------------|-------------|------------|-------|
| 2T8 (Transmitter Speed 1) | | | | |
| Input Voltage/Frequency | V/kHz | 7/10 | 10/4.5 | |
| Primary Element | | Rotor | Rotor | |
| Number of Speed | | 1X | 1X | |
| Transformation Ratio | | 0.5 ± 5% | 0.5 ± 5% | |
| Electrical Error | minutes | ±10 max | ±10 max | |
| Dielectric Strength | VAC/1 minute | 500 | 500 | |
| Mass | kg | 0.04 | 0.13 | |
| Rotor Moment of Inertia | kg m ² 10 ⁻³ | 0.0006 | 0.0032 | |
| Operating Temperature Range | °C | -55 ~ + 155 | -55 ~ +155 | |

Brake Specifications

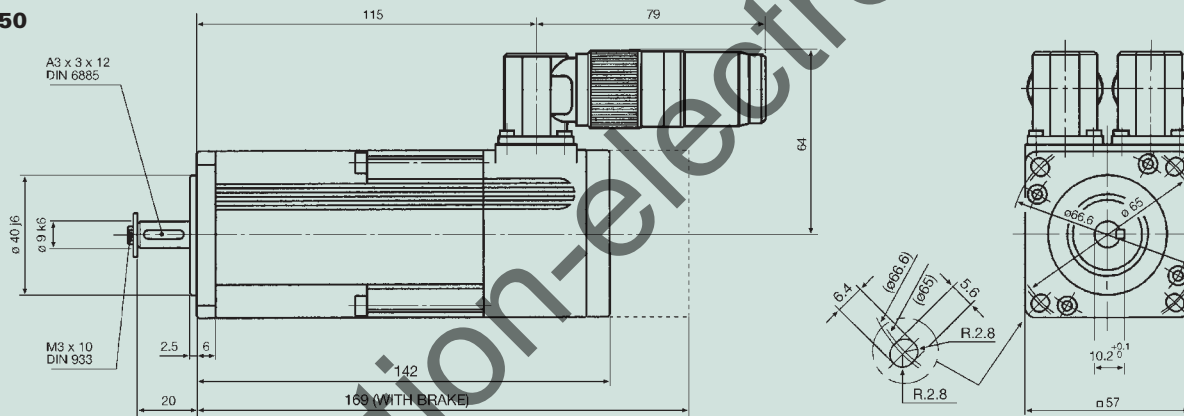
| | SIZE | TORQUE Nm | INERTIA kg cm ² | MASS kg |
|-------------------|------|-----------|----------------------------|---------|
| BL-40 | 01 | 0.4 | 0.016 | 0.10 |
| BL-55 | 02 | 0.75 | 0.021 | 0.15 |
| BL-71 / 72 | 03 | 1.5 | 0.068 | 0.18 |
| BL-73 / 74 | 06 | 3 | 0.38 | 0.30 |

The BL Series incorporates the option of a fail-safe holding brake within the structure of the motor. Brake option is not available for short length version.

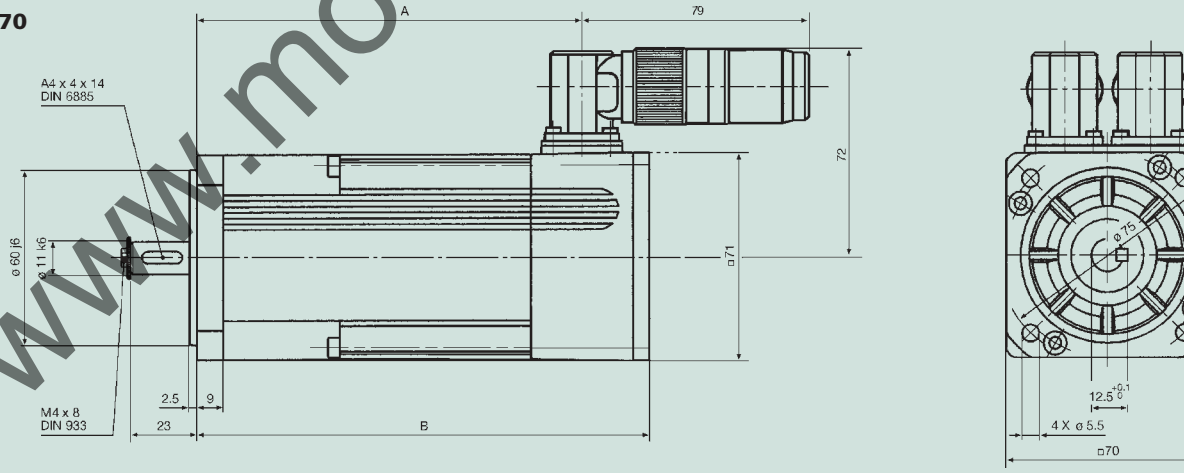
BL-40



BL-50



BL-70



SHORT LENGTH VERSION (Not available with brake option)

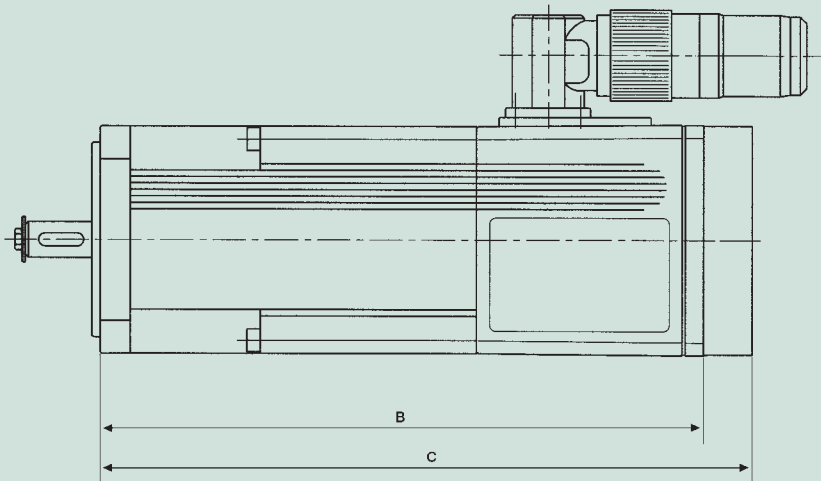
| | BL-71 | BL-72 | BL-73 | BL-74 |
|---|-------|-------|-------|-------|
| A | 76.5 | 96.5 | 114.5 | 132.5 |
| B | 100.5 | 120.5 | 138.5 | 156.5 |

STANDARD VERSION (With or without brake option)

| | BL-71 | BL-72 | BL-73 | BL-74 |
|---|-------|-------|-------|-------|
| A | 81 | 101 | 119 | 137 |
| B | 128.5 | 148.5 | 166.5 | 184.5 |

The short length version must be specifically indicated in the order, as the product code applies to the standard version only.

Optional Accessories



BL 50/70
With Fitted
Encoder

Dimensions

| WITHOUT BRAKE | BL-55 | BL-71 | BL-72 | BL-73 | BL-74 | |
|---------------|------------------|-------|-------|-------|-------|-------|
| B | 142 | 128.5 | 148.5 | 166.5 | 184.5 | |
| C | Encoder Type "A" | 142 | 147 | 167 | 185 | 203 |
| | Encoder Type "H" | 142 | 128,5 | 148,5 | 166.5 | 184.5 |
| | Encoder Type "K" | — | 128,5 | 148,5 | 166.5 | 184.5 |

| WITH BRAKE | BL-55 | BL-71 | BL-72 | BL-73 | BL-74 | |
|------------|------------------|-------|-------|-------|-------|-------|
| B | 180.5 | 128.5 | 148.5 | 166.5 | 184.5 | |
| C | Encoder Type "A" | 180.5 | 147 | 167 | 185 | 203 |
| | Encoder Type "H" | — | 136 | 156 | 166.5 | 184.5 |
| | Encoder Type "K" | — | 136 | 156 | 166.5 | 184.5 |

Encoder Specifications

| | TYPE "A" | TYPE "H" | TYPE "K" |
|-----------------------|---------------------------|--|----------|
| Waveform | Square Wave | Square Wave | |
| Line Counts | 500 ppr | 1000 ppr | 2048 ppr |
| Channels | A, B, Z Open-Collector | A, B, Z, \bar{A} , \bar{B} , \bar{Z} / U, V, W, \bar{U} , \bar{V} , \bar{W} Line drives (RS422) | |
| Supply Voltage | 5VDC \pm 10% | 5VDC \pm 10% | |
| Frequency Response | 100 kHz | 200 kHz | |
| Operating Temperature | -40 °C ~ +100 °C | -40 °C ~ +120 °C | |