

# Hybrid Stepper Motors

## Hybride Schrittmotoren

NEMA format 34 / NEMA Format (86x86 mm)

### 86BYGH



#### General Specifications / allgemeine Spezifikationen:

|                             |                            |                    |
|-----------------------------|----------------------------|--------------------|
| Step Angle.....             | Schrittwinkel.....         | 1.8°               |
| Step Accuracy .....         | Schrittgenauigkeit .....   | ± 5%               |
| Temperature Rise .....      | Erwärmung .....            | Δt = max. 80°C     |
| Ambient Temperature Range.  | Umgebungstemperatur ....   | -20°C – 50°C       |
| Insulation Resistance ..... | Isolationswiderstand ..... | 100MΩ min. 500V DC |
| Dielectric Strength .....   | Spannungsfestigkeit .....  | 500V AC/1 min      |

#### Electrical Specifications / elektrische Spezifikationen:

| Model                      |    | Motor Length | Holding Torque | Lead Wire     | Rated Current | Phase Resistance  | Phase Inductance    | Rotor Inertia         | Detent Torque | Shaft Ø d | Motor Weight  |
|----------------------------|----|--------------|----------------|---------------|---------------|-------------------|---------------------|-----------------------|---------------|-----------|---------------|
| Modell                     |    | Motor Länge  | Halte-kraft    | Anzahl Litzen | Nenn-strom    | Widerstand/ Phase | Induktivität/ Phase | Masse-trägheit        | Rast-moment   | Achs-Ø d  | Motor Gewicht |
|                            |    | (mm)         | (N·m)          |               | (A)           | (Ω)               | (mH)                | (kg·cm <sup>2</sup> ) | (N·cm)        | (mm)      | (kg)          |
|                            |    |              | Min.           |               |               | ±15%              | ±20%                | Typ.                  | Typ.          |           |               |
| 86BYGH250A-01              | B  | 65           | 3.1            | 4             | 6.0           | 0.34              | 1.72                | 1.2                   | 13.2          | 13        | 1.7           |
| 86BYGH250A-02              | B  | 65           | 3.4            | 4             | 4.0           | 0.73              | 3.8                 | 1.2                   | 13.2          | 14        | 1.7           |
| 86BYGH250A-04              | B  | 65           | 2.6            | 4             | 3.0           | 0.9               | 3.2                 | 1.2                   | 13.2          | 9.5       | 1.7           |
| 86BYGH250A-04A             | B  | 65           | 2.6            | 4             | 3.0           | 0.9               | 3.2                 | 1.2                   | 13.2          | 8         | 1.7           |
| 86BYGH250A-04B             | B  | 65           | 2.6            | 4             | 3.0           | 0.9               | 3.2                 | 1.2                   | 13.2          | 10        | 1.7           |
| 86BYGH250A-04C             | B  | 65           | 2.6            | 4             | 3.0           | 0.9               | 3.2                 | 1.2                   | 13.2          | 10        | 1.7           |
| 86BYGH250A-04D             | B  | 65           | 2.6            | 4             | 3.0           | 0.9               | 3.2                 | 1.2                   | 13.2          | 9.53      | 1.7           |
| 86BYGH250A-04E             | B  | 65           | 2.6            | 4             | 3.0           | 0.9               | 3.2                 | 1.2                   | 13.2          | 8         | 1.7           |
| 86BYGH250A-05              | B  | 65           | 3.4            | 4             | 4.0           | 0.84              | 4.2                 | 1.2                   | 13.2          | 10        | 1.7           |
| 86BYGH250A-06              | B  | 65           | 2.6            | 4             | 3.0           | 0.6               | 2.5                 | 1.2                   | 13.2          | 10        | 1.7           |
| 86BYGH450A-03              | U  | 65           | 2.5            | 8             | 3.0           | 1.25              | 3.2                 | 1.2                   | 13.2          | 14        | 1.7           |
|                            | BS |              | 3.5            |               | 2.1           | 2.50              | 12.8                |                       |               |           |               |
|                            | BP |              | 3.5            |               | 4.2           | 0.63              | 3.2                 |                       |               |           |               |
| 86BYGH450A-04              | U  | 65           | 2.7            | 8             | 4.0           | 0.7               | 1.86                | 1.2                   | 13.2          | 12.7      | 1.7           |
|                            | BS |              | 3.8            |               | 2.8           | 1.4               | 7.44                |                       |               |           |               |
|                            | BP |              | 3.8            |               | 5.6           | 0.35              | 1.86                |                       |               |           |               |
| 86BYGH250B-01              | B  | 77           | 5.2            | 4             | 6.0           | 0.4               | 3.07                | 1.7                   | 18.5          | 12.7      | 2.2           |
| 86BYGH250B-02R             | B  | 77           | 5.5            | 4             | 6.0           | 0.38              | 3.5                 | 1.7                   | 18.5          | 14        | 2.2           |
| 86BYGH250B-03              | B  | 77           | 5.8            | 4             | 4.2           | 1.54              | 11.5                | 1.7                   | 18.5          | 12        | 2.2           |
| 86BYGH250B-10R*            | B  | 77           | 5.5            | 4             | 6.0           | 0.38              | 3.5                 | 1.7                   | 18.5          | 14        | 2.2           |
| 86BYGH450B<br>86BYGH450BD* | U  | 77           | 3.9            | 8             | 4.2           | 0.75              | 3.5                 | 1.7                   | 18.5          | 12.7      | 2.2           |
|                            | BS |              | 5.5            |               | 2.95          | 1.5               | 14.0                |                       |               |           |               |
|                            | BP |              | 5.5            |               | 5.9           | 0.38              | 3.5                 |                       |               |           |               |
| 86BYGH450B-04              | U  | 77           | 3.9            | 8             | 4.2           | 0.75              | 3.5                 | 1.7                   | 18.5          | 14        | 2.2           |
|                            | BS |              | 5.5            |               | 2.95          | 1.5               | 14.0                |                       |               |           |               |
|                            | BP |              | 5.5            |               | 5.9           | 0.38              | 3.5                 |                       |               |           |               |
| 86BYGH450B-18*             | U  | 77           | 3.9            | 8             | 4.2           | 0.75              | 3.5                 | 1.7                   | 18.5          | 12.7      | 2.2           |
|                            | BS |              | 5.5            |               | 2.95          | 1.5               | 14.0                |                       |               |           |               |
|                            | BP |              | 5.5            |               | 5.9           | 0.38              | 3.5                 |                       |               |           |               |
| 86BYGH250D                 | B  | 96           | 5.4            | 4             | 4.0           | 0.41              | 3.4                 | 2.7                   | 20.6          | 14        | 3.0           |
| 86BYGH250D-02R             | B  | 96           | 8.2            | 4             | 6.4           | 0.47              | 4.2                 | 2.7                   | 20.6          | 14        | 3.0           |

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| Model                                               |    | Motor Length | Holding Torque | Lead Wire     | Rated Current | Phase Resistance  | Phase Inductance    | Rotor Inertia         | Detent Torque | Shaft Ø d | Motor Weight  |
|-----------------------------------------------------|----|--------------|----------------|---------------|---------------|-------------------|---------------------|-----------------------|---------------|-----------|---------------|
| Modell                                              |    | Motor Länge  | Halte-kraft    | Anzahl Litzen | Nenn-strom    | Widerstand/ Phase | Induktivität/ Phase | Masse-trägheit        | Rast-moment   | Achs-Ø d  | Motor Gewicht |
|                                                     |    | (mm)         | (N·m)          |               | (A)           | (Ω)               | (mH)                | (kg·cm <sup>2</sup> ) | (N·cm)        | (mm)      | (kg)          |
|                                                     |    |              | Min.           |               |               | ±15%              | ±20%                | Typ.                  | Typ.          |           |               |
| 86BYGH450D-02                                       | U  | 96           | 5.8            | 8             | 4.5           | 0.94              | 4.2                 | 2.7                   | 20.6          | 14        | 3.0           |
|                                                     | BS |              | 8.2            |               | 3.2           | 1.88              | 16.8                |                       |               |           |               |
|                                                     | BP |              | 8.2            |               | 6.4           | 0.47              | 4.2                 |                       |               |           |               |
| 86BYGH250E-01                                       | B  | 114          | 8.5            | 4             | 6.0           | 0.44              | 3.9                 | 3.5                   | 27            | 14        | 3.6           |
| 86BYGH250E-02                                       | B  | 114          | 10.8           | 4             | 5.0           | 1.18              | 11.1                | 3.5                   | 27            | 14        | 3.6           |
| 86BYGH250E-03BR                                     | B  | 114          | 10.8           | 4             | 5.0           | 1.18              | 11.1                | 3.5                   | 27            | 14        | 3.6           |
| 86BYGH450E-03<br>86BYGH450E-03B<br>86BYGH450E-03C*  | U  | 114          | 7.3            | 8             | 4.0           | 1.3               | 6.0                 | 3.5                   | 27            | 14        | 3.6           |
|                                                     | BS |              | 10.3           |               | 2.8           | 2.6               | 24.0                |                       |               |           |               |
|                                                     | BP |              | 10.3           |               | 5.6           | 0.65              | 6.0                 |                       |               |           |               |
| 86BYGH450G-02                                       | U  | 137          | 9.4            | 8             | 4             | 1.43              | 8.2                 | 3.3                   | 22.6          | 14        | 4.6           |
|                                                     | BS |              | 12             |               | 2.8           | 2.86              | 32.9                |                       |               |           |               |
|                                                     | BP |              | 12             |               | 5.6           | 0.72              | 8.2                 |                       |               |           |               |
| 86BYGH250H-02                                       | B  | 156          | 13.2           | 4             | 5.0           | 0.75              | 8.1                 | 4.9                   | 41.2          | 16        | 5.4           |
| 86BYGH250H-03                                       | B  | 156          | 13.4           | 4             | 5.0           | 1.27              | 10.6                | 4.9                   | 41.2          | 14        | 5.4           |
| 86BYGH250H-04                                       | B  | 156          | 13.2           | 4             | 5.0           | 0.85              | 8.7                 | 4.9                   | 41.2          | 12        | 5.4           |
| 86BYGH250H-06                                       | B  | 156          | 11.6           | 4             | 6.0           | 0.47              | 5.2                 | 4.9                   | 41.2          | 14        | 5.4           |
| 86BYGH250H-07                                       | B  | 156          | 14.7           | 4             | 4.2           | 2.76              | 29.8                | 4.9                   | 41.2          | 14        | 5.4           |
| 86BYGH450H-02<br>86BYGH450H-02B                     | U  | 156          | 12.0           | 8             | 5.0           | 1.26              | 7.1                 | 4.9                   | 41.2          | 16<br>14  | 5.4           |
|                                                     | BS |              | 14.9           |               | 3.50          | 2.52              | 28.4                |                       |               |           |               |
|                                                     | BP |              | 14.9           |               | 7.0           | 0.63              | 7.1                 |                       |               |           |               |
| 86BYGH450H-03<br>86BYGH450H-03A<br>86BYGH450H-03AA* | U  | 156          | 12.5           | 8             | 6.0           | 0.97              | 5.65                | 4.9                   | 41.2          | 14        | 5.4           |
|                                                     | BS |              | 15.3           |               | 4.2           | 1.94              | 22.5                |                       |               |           |               |
|                                                     | BP |              | 15.3           |               | 8.4           | 0.48              | 5.65                |                       |               |           |               |

U = Unipolar Connection / unipolarer Anschluss

B = Bipolar Connection / bipolarer Anschluss

BS = Bipolar Series Connection / bipolar serieller Anschluss

BP = Bipolar Parallel Connection / bipolar paralleler Anschluss

\* = with double shaft / mit Doppelwelle Ø8 x 25

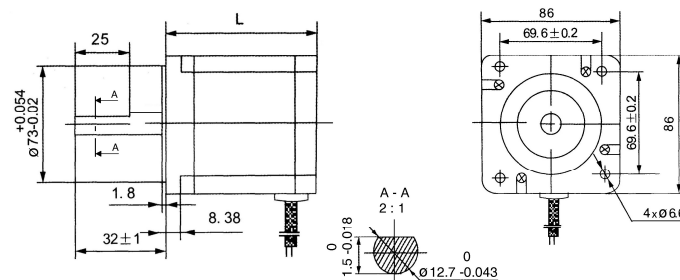
R = Shielded cable + cable grommet / geschirmtes Kabel + Kabelausführung bzw. Zugsicherung

For detailed product data please see single data sheet. / Technische Details entnehmen Sie bitte dem Einzeldatenblatt.

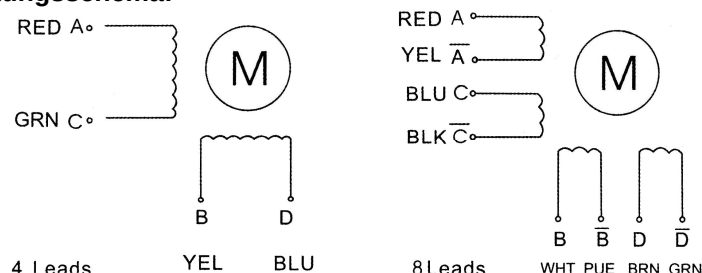
All stepper motors are available with double shaft or with double shaft and encoder. / Alle Motoren sind auf Kundenwunsch mit Doppelwelle oder mit Doppelwelle und Encoder lieferbar.

4-lead wire motors are optional available with shielded cable and shielded round 6-pin connector ready-for-use / 4-Drahtmotoren sind auch mit geschirmtem Kabel und vollgeschirmtem 6-Pin Rundstecker konfektioniert lieferbar.

### Mechanical Dimensions / mechanische Abmessungen:



### Wiring Diagram / Verdrahtungsschema:



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