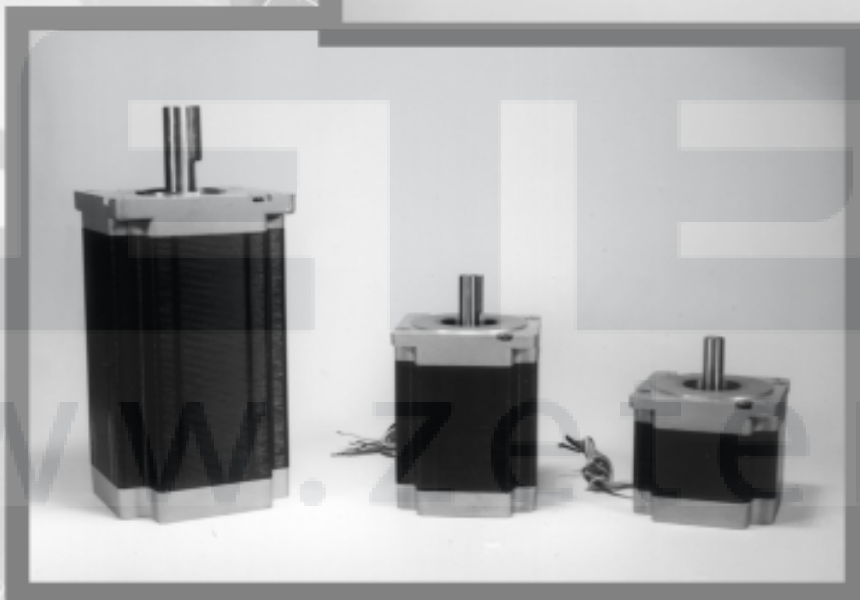
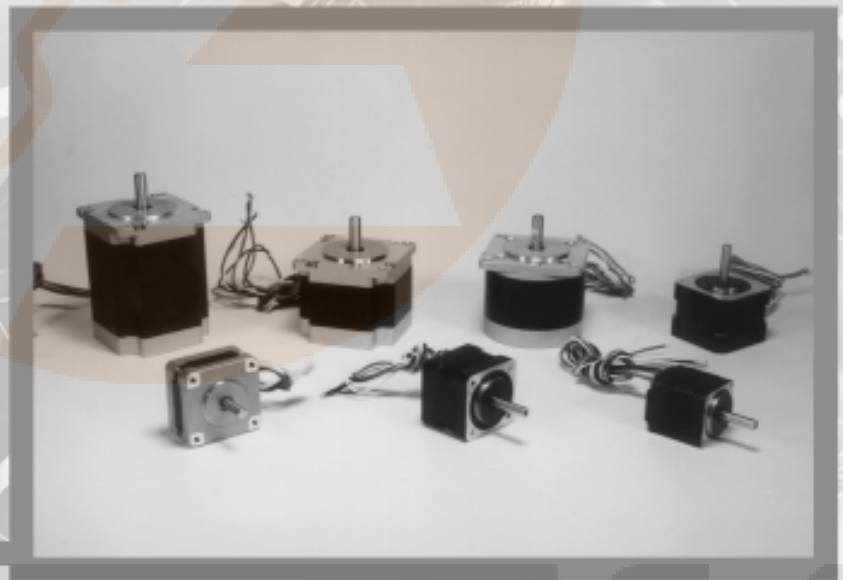
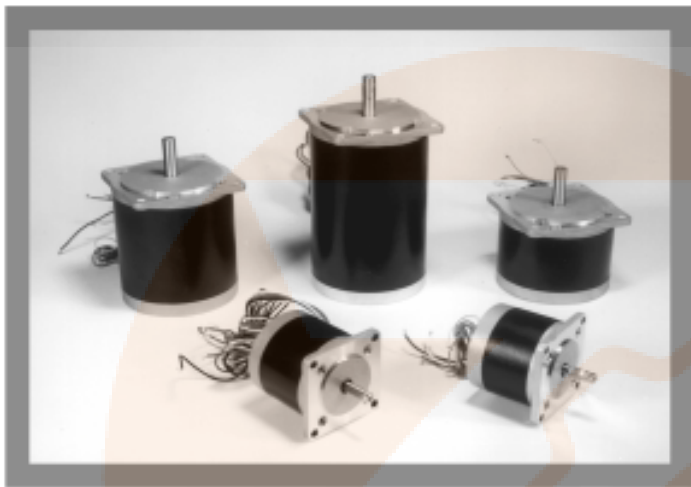
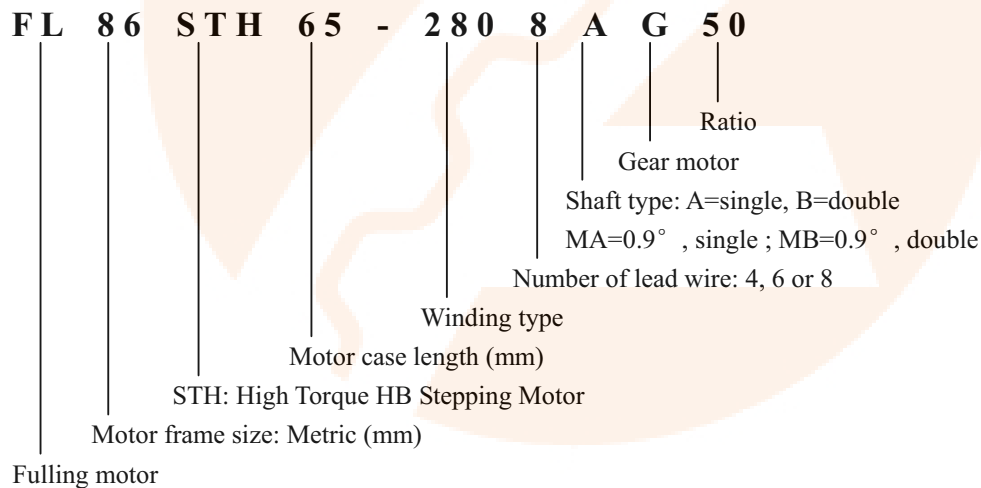
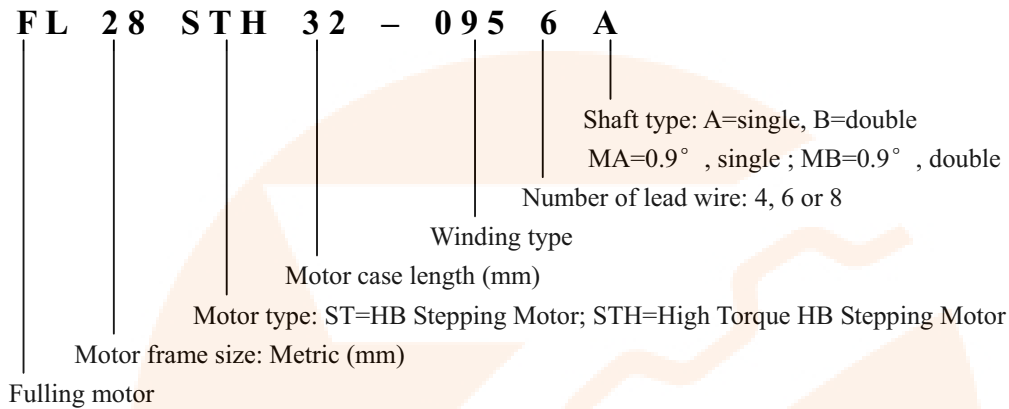


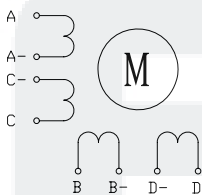


## ● Product Number Code For Hybrid Stepping Motor

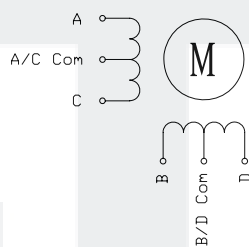


## ● Wiring diagram

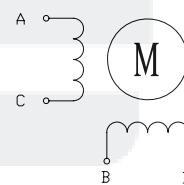
8 LEADS:



6 LEADS:

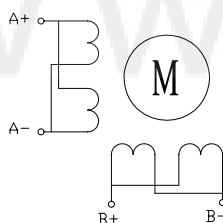


4 LEADS:

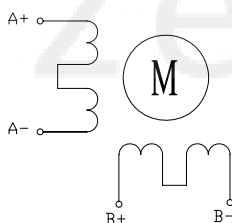


**8 LEADS:**

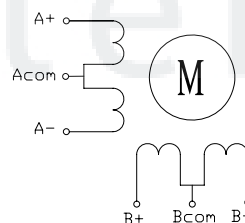
1. Bipolar (parallel) connection



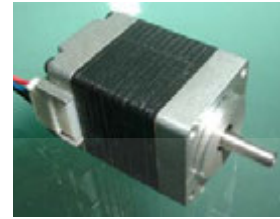
2. Bipolar (series) connection



3. Unipolar connection



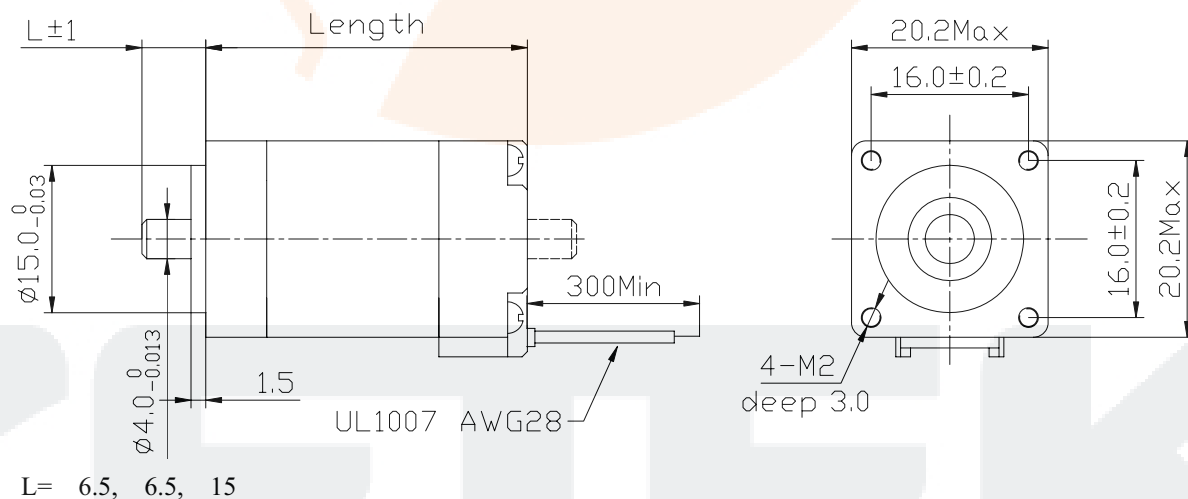
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ±5% (full step, no load)             |
| Resistance Accuracy   | ±10%                                 |
| Inductance Accuracy   | ±20%                                 |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 20N                                  |
| Max. axial force      | 2N                                   |



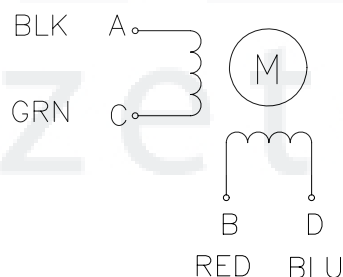
## ● Size 20mm High Torque Hybrid Stepping Motor Specifications

| Model No.       | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia        | Weight | Length |
|-----------------|---------------|----------------|-------------------|-------------------|----------------|------------|----------------------|--------|--------|
| Single Shaft    | V             | A              | Ω                 | mH                | g.cm           |            | kg-m <sup>2</sup>    | kg     | mm     |
| FL20STH30-0604A | 3.9           | 0.6            | 6.5               | 1.7               | 180            | 4          | 2.0x10 <sup>-7</sup> | 0.06   | 30     |
| FL20STH33-0604A | 3.9           | 0.6            | 6.5               | 1.7               | 180            | 4          | 2.0x10 <sup>-7</sup> | 0.06   | 33     |
| FL20STH42-0804A | 4.32          | 0.8            | 5.4               | 1.5               | 300            | 4          | 3.6x10 <sup>-7</sup> | 0.08   | 42     |

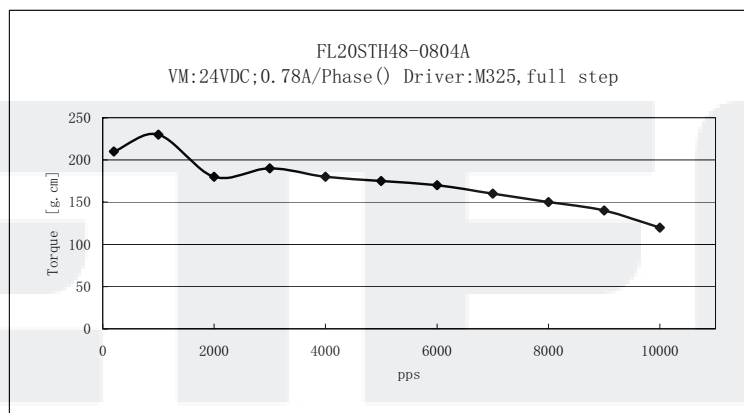
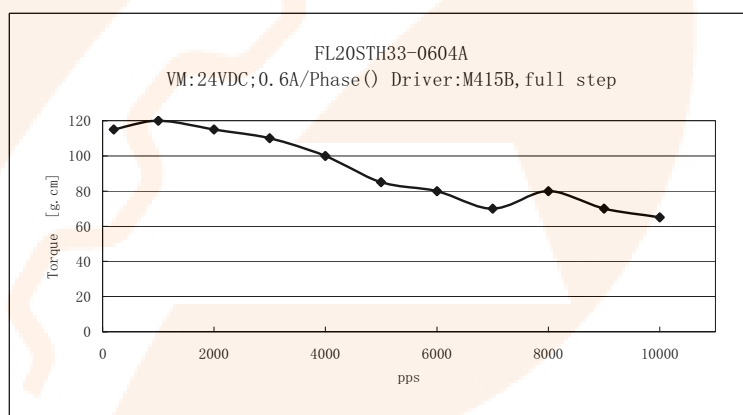
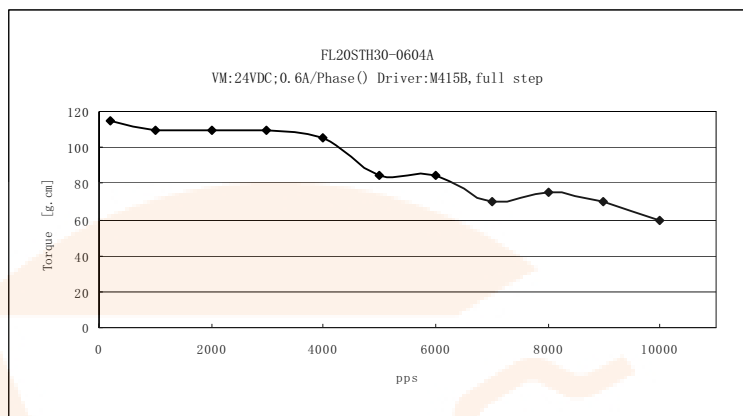
## ● Dimension: :



## ● Wiring Diagram:



- Pull out torque curve:



# 1.8° Size 28mm High Torque Hybrid Stepping Motor

A4

| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ±5% (full step, no load)             |
| Resistance Accuracy   | ±10%                                 |
| Inductance Accuracy   | ±20%                                 |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 28N (20mm from the flange)           |
| Max. axial force      | 10N                                  |

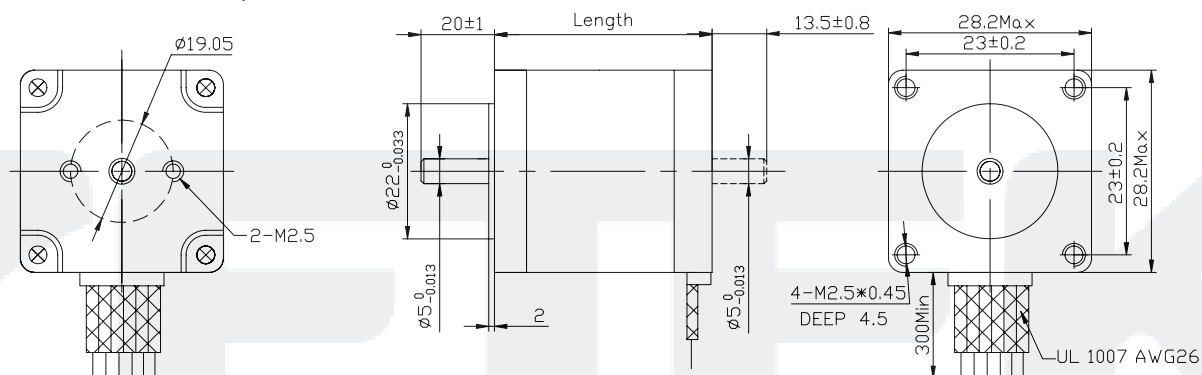


## ● Size 28mm High Torque Hybrid Stepping Motor Specifications

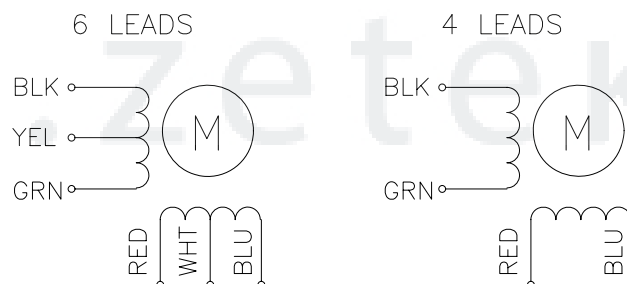
| Model No.       |                 | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia       | Weight | Length |
|-----------------|-----------------|---------------|----------------|-------------------|-------------------|----------------|------------|---------------------|--------|--------|
| Single Shaft    | Double Shaft    | V             | A              | Ω                 | mH                | g. cm          |            | kg-m <sup>2</sup>   | kg     | mm     |
| FL28STH32-0956A | FL28STH32-0956B | 2.66          | 0.95           | 2.8               | 0.8               | 430            | 6          | 9x10 <sup>-7</sup>  | 0.11   | 31.5   |
| FL28STH32-0674A | FL28STH32-0674B | 3.8           | 0.67           | 5.6               | 3.4               | 600            | 4          |                     |        |        |
| FL28STH45-0956A | FL28STH45-0956B | 3.4           | 0.95           | 3.4               | 1.2               | 750            | 6          | 12x10 <sup>-7</sup> | 0.14   | 44.5   |
| FL28STH45-0674A | FL28STH45-0674B | 4.56          | 0.67           | 6.8               | 4.9               | 950            | 4          |                     |        |        |
| FL28STH51-0956A | FL28STH51-0956B | 4.4           | 0.95           | 4.6               | 1.8               | 900            | 6          | 18x10 <sup>-7</sup> | 0.2    | 50.5   |
| FL28STH51-0674A | FL28STH51-0674B | 6.2           | 0.67           | 9.2               | 7.2               | 1200           | 4          |                     |        |        |

## ● Dimension

with double shaft only



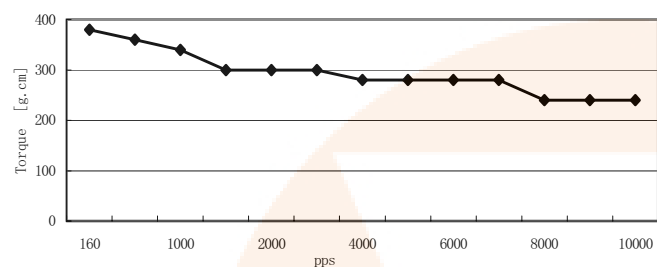
## ● Wiring Diagram:



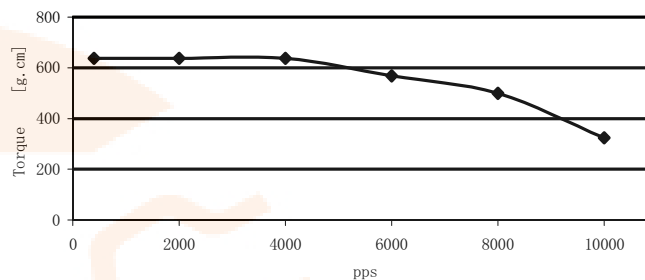
# Pull out torque:

A5

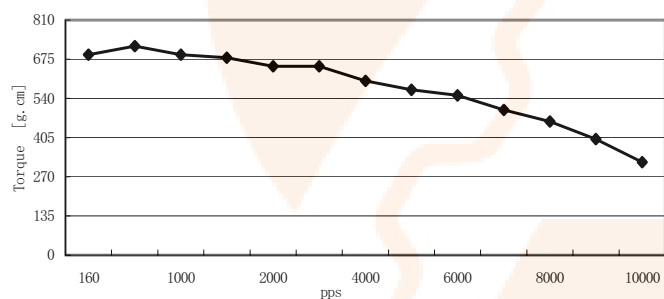
FL28STH32-0956A  
VM:24VDC;0.95A/Phase() Driver:M415B, half step



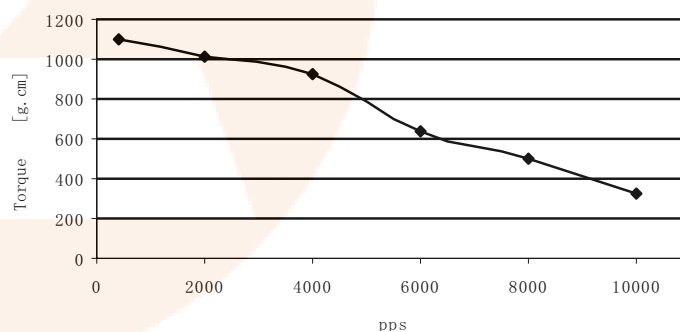
FL28STH32-0674A  
VM: 24VDC; 0.74A /Phase () Driver: M415B, half step



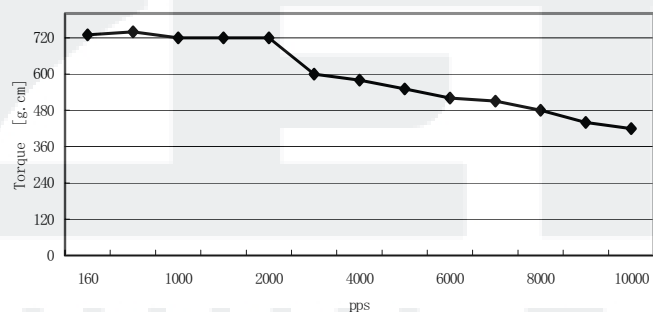
FL28STH45-0956A  
VM:24VDC;0.95A/Phase() Driver:M415B, half step



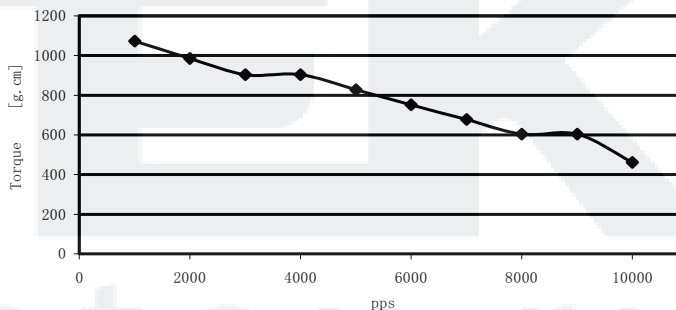
FL28STH45-0674A  
VM: 24VDC; 0.74A /Phase () Driver: M415B, half step



FL28STH51-0956A  
VM:24V;0.95A/Phase() Driver:M415B, half step



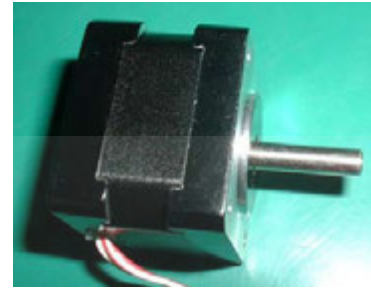
FL28STH51-0674A  
VM: 24V; 0.67A /Phase () Driver: M415B, half step



# 1.8° Size 35mm Hybrid Stepping Motor

A6

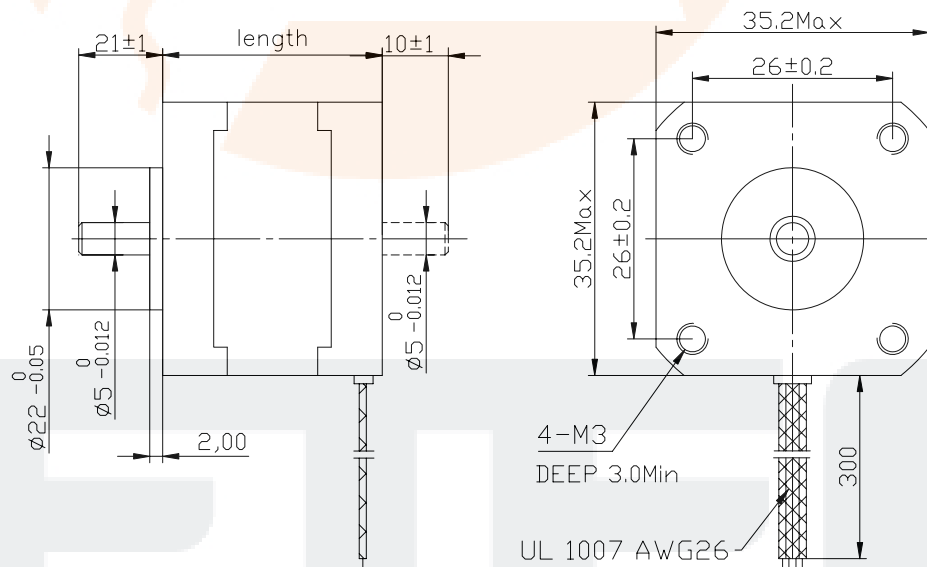
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ±5% (full step, no load)             |
| Resistance Accuracy   | ±10%                                 |
| Inductance Accuracy   | ±20%                                 |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 28N (20mm from the flange)           |
| Max. axial force      | 10N                                  |



## ● Size 35mm Hybrid Stepping Motor Specifications

| Model No.      |                | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|----------------|----------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single shaft   | Double shaft   | V             | A              | Ω                 | mH                | g-cm           | #          | g-cm <sup>2</sup> | kg     | g-cm          | mm     |
| FL35ST26-0284A | FL35ST26-0284B | 7.4           | 0.28           | 26                | 27                | 700            | 4          | 10                | 0.13   | 60            | 26     |
| FL35ST28-0504A | FL35ST28-0504B | 10            | 0.5            | 20                | 18                | 1000           | 4          | 11                | 0.14   | 80            | 28     |
| FL35ST36-1004A | FL35ST36-1004B | 2.7           | 1.0            | 2.7               | 4.3               | 1400           | 4          | 14                | 0.18   | 100           | 36     |

## ● Dimension

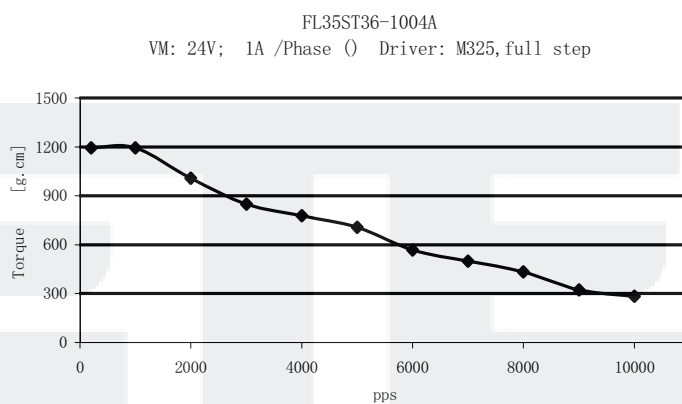
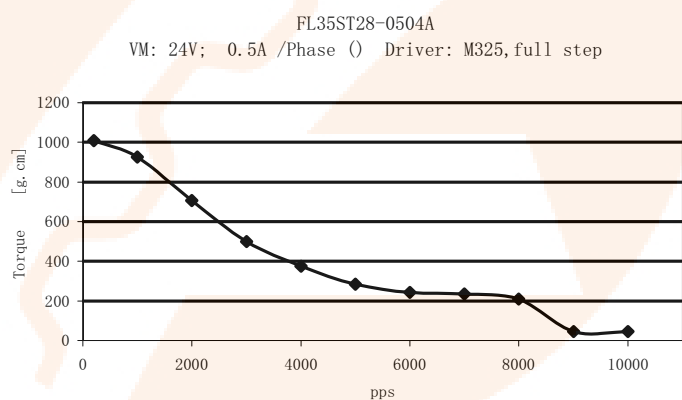
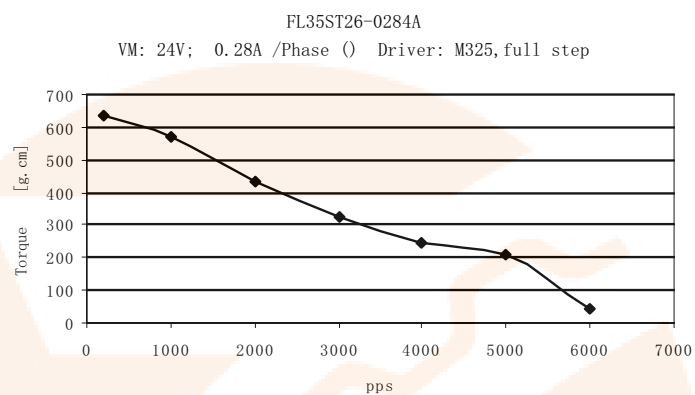


## ● Wiring Diagram



● Pull out torque curve

A7

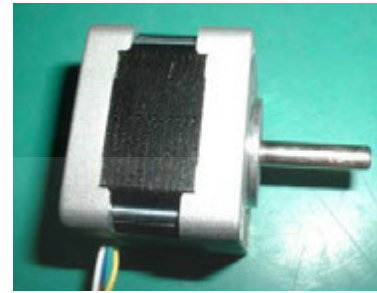




# 1.8° Size 39mm Hybrid Stepping Motor

A8

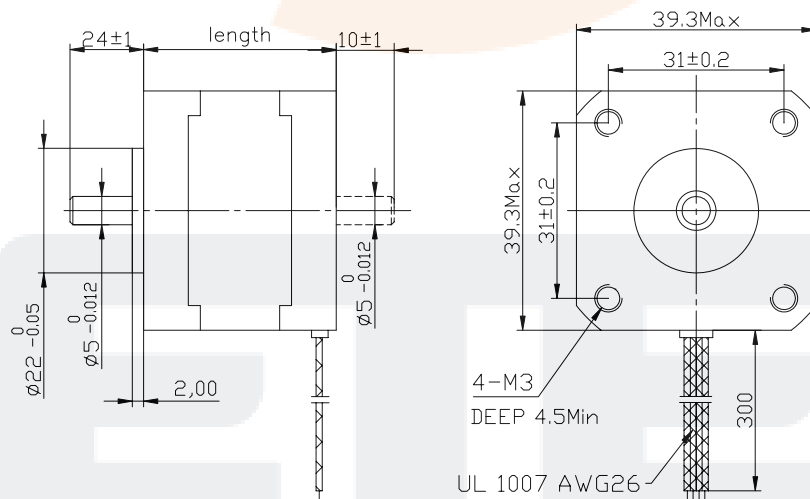
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 28N (20mm from the flange)           |
| Max. axial force      | 10N                                  |



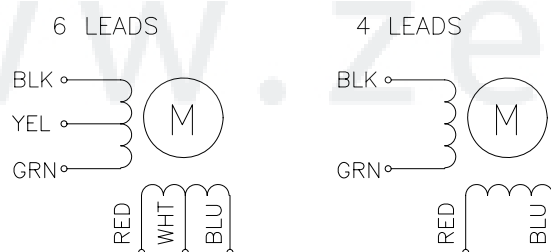
## ● Size 39mm Hybrid Stepping Motor Specifications

| Model No.      |                | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|----------------|----------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single shaft   | Double shaft   | V             | A              | Ω                 | mH                | g-cm           |            | g-cm <sup>2</sup> | kg     | g-cm          | mm     |
| FL39ST20-0404A | FL39ST20-0404B | 2.64          | 0.4            | 6.6               | 7.5               | 650            | 4          | 11                | 0.12   | 50            | 20     |
| FL39ST20-0506A | FL39ST20-0506B | 6.5           | 0.5            | 13                | 7.5               | 800            | 6          |                   |        |               |        |
| FL39ST34-0404A | FL39ST34-0404B | 12            | 0.4            | 30                | 32                | 2100           | 4          | 20                | 0.18   | 120           | 34     |
| FL39ST34-0306A | FL39ST34-0306B | 12            | 0.3            | 40                | 20                | 1300           | 6          |                   |        |               |        |
| FL39ST38-0504A | FL39ST38-0504B | 12            | 0.5            | 24                | 45                | 2900           | 4          | 24                | 0.2    | 180           | 38     |
| FL39ST38-0806A | FL39ST38-0806B | 6             | 0.8            | 7.5               | 6                 | 2000           | 6          |                   |        |               |        |
| FL39ST44-0304A | FL39ST44-0304B | 12            | 0.3            | 40                | 100               | 2800           | 4          | 40                | 0.25   | 250           | 44     |

## ● Dimension



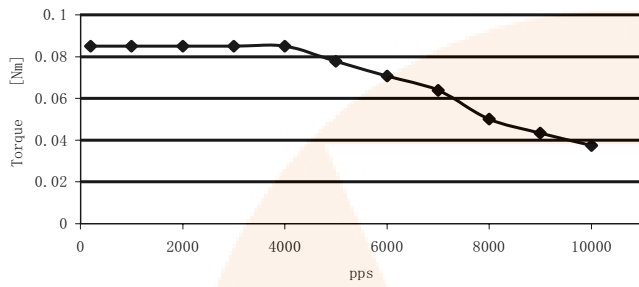
## ● Wiring Diagram



# ● Pull out Torque Curve

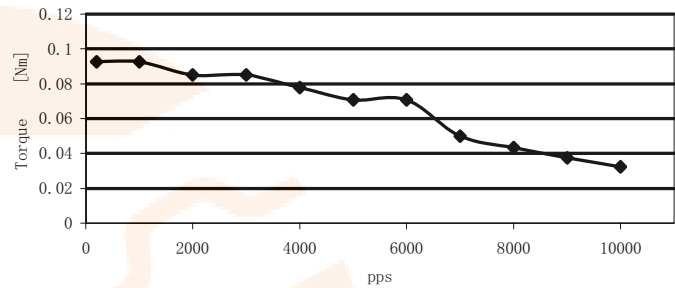
FL39ST20-0404A

VM: 24VDC; 0.445A /Phase () Driver: M415B half step



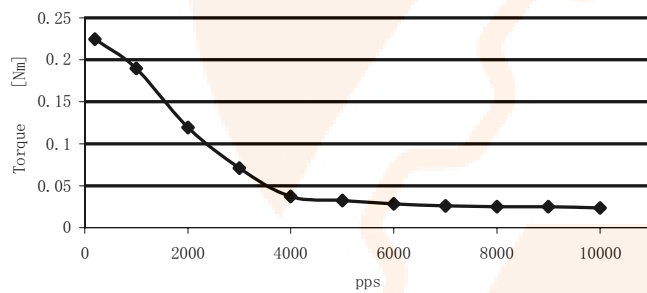
FL39ST20-0506A

VM: 24VDC; 0.5A /Phase () Driver: M325, half step



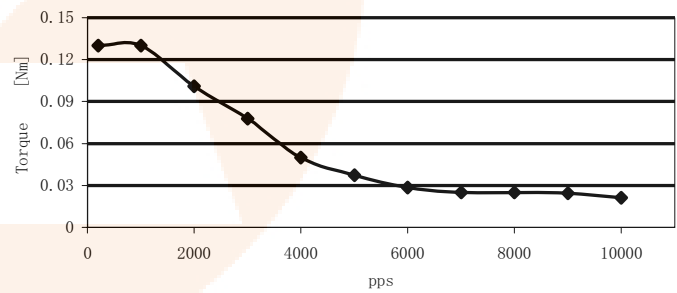
FL39ST34-0404A

VM: 24VDC; 0.445A /Phase () Driver: M415B half step



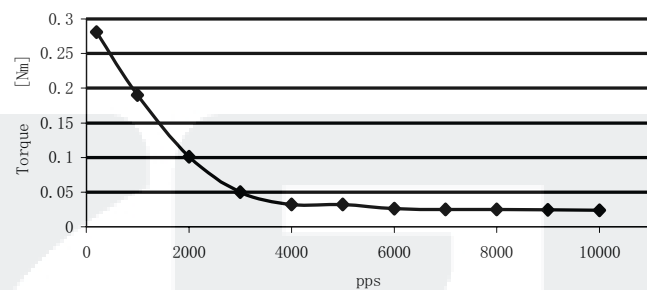
FL39ST34-0306A

VM: 24VDC; 0.226A /Phase () Driver: M415, half step



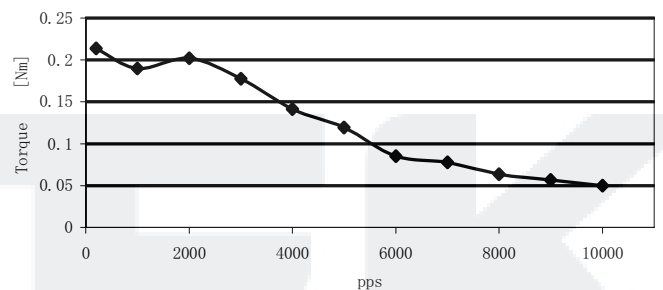
FL39ST38-0504A

VM: 24VDC; 0.502A /Phase () Driver: M325, half step



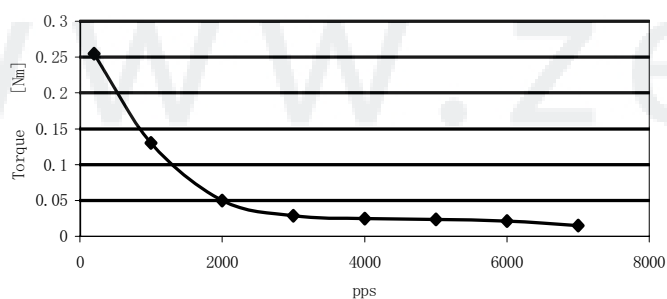
FL39ST38-0806A

VM: 24VDC; 0.78A /Phase () Driver: M415B half step

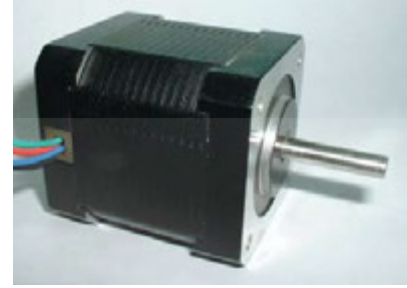


FL39ST44-0304A

VM: 24VDC; 0.226A /Phase () Driver: M415, half step



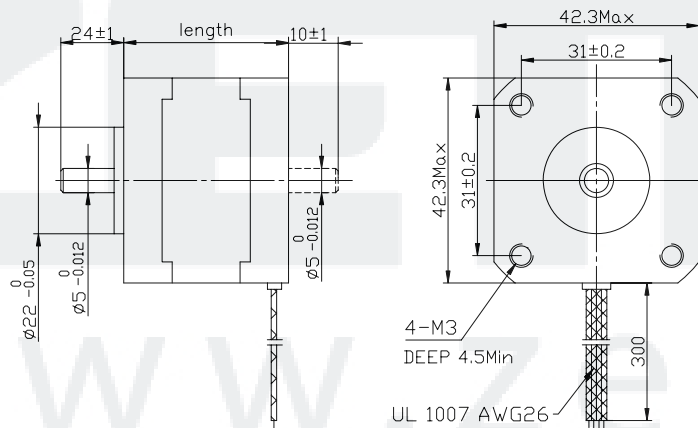
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 0.9°                                 |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 28N (20mm from the flange)           |
| Max. axial force      | 10N                                  |



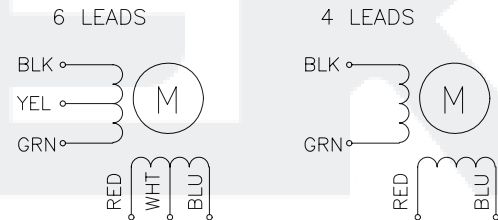
## ● Size 42mm High Torque Hybrid Stepping Motor Specifications

| Model No.        |                  | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|------------------|------------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single Shaft     | Double Shaft     | V             | A              | Ω                 | mH                | Kg-cm          |            | g-cm <sup>2</sup> | kg     | g-cm          | mm     |
| FL42STH33-0956MA | FL42STH33-0956MB | 4             | 0.95           | 4.2               | 4                 | 1.58           | 6          | 35                | 0.22   | 200           | 33     |
| FL42STH33-0606MA | FL42STH33-0606MB | 6             | 0.6            | 10                | 9.5               | 1.58           | 6          |                   |        |               |        |
| FL42STH33-0316MA | FL42STH33-0316MB | 12            | 0.31           | 38.5              | 33                | 1.58           | 6          |                   |        |               |        |
| FL42STH33-1334MA | FL42STH33-1334MB | 2.8           | 1.33           | 2.1               | 4.2               | 2.2            | 4          |                   |        |               |        |
| FL42STH38-1206MA | FL42STH38-1206MB | 4             | 1.2            | 3.3               | 3.4               | 2.59           | 6          | 54                | 0.28   | 220           | 39     |
| FL42STH38-0806MA | FL42STH38-0806MB | 6             | 0.8            | 7.5               | 6.7               | 2.59           | 6          |                   |        |               |        |
| FL42STH38-0406MA | FL42STH38-0406MB | 12            | 0.4            | 30                | 30                | 2.59           | 6          |                   |        |               |        |
| FL42STH38-1684MA | FL42STH38-1684MB | 2.8           | 1.68           | 1.65              | 3.2               | 3.3            | 4          |                   |        |               |        |
| FL42STH47-1206MA | FL42STH47-1206MB | 4             | 1.2            | 3.3               | 4                 | 3.17           | 6          | 68                | 0.35   | 250           | 47     |
| FL42STH47-0806MA | FL42STH47-0806MB | 6             | 0.8            | 7.5               | 10                | 3.17           | 6          |                   |        |               |        |
| FL42STH47-0406MA | FL42STH47-0406MB | 12            | 0.4            | 30                | 38                | 3.17           | 6          |                   |        |               |        |
| FL42STH47-1684MA | FL42STH47-1684MB | 2.8           | 1.68           | 1.65              | 4.1               | 4.4            | 4          |                   |        |               |        |

## Dimension



## Wiring Diagram

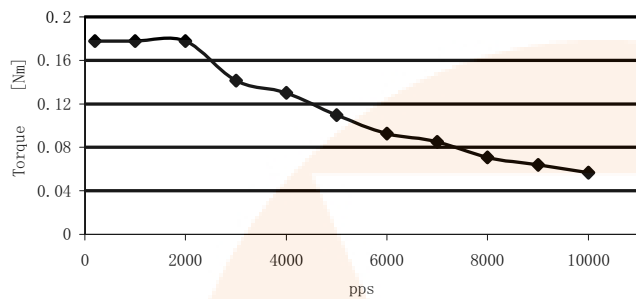


# ● Pull out Torque Curve

A11

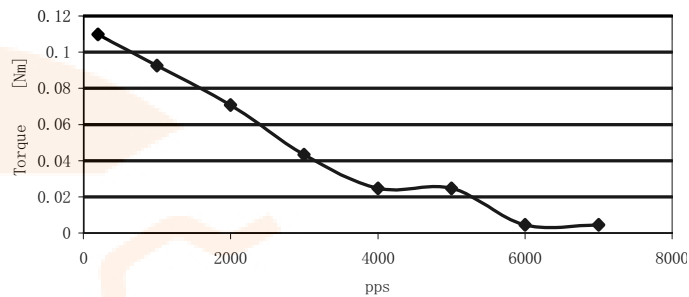
FL42STH33-0956MA

VM: 24VDC; 1.00A /Phase () Driver: M325, FULL step



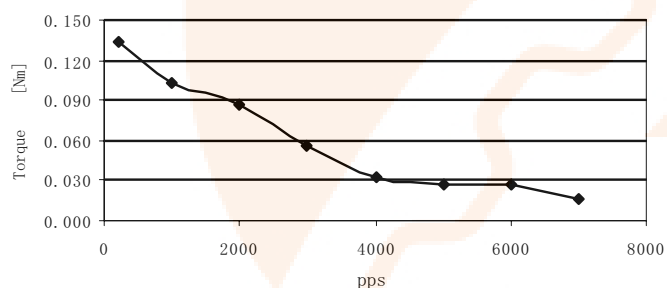
FL42STH33-0606MA

VM: 24VDC; 0.6A /Phase () Driver: M415B, full step



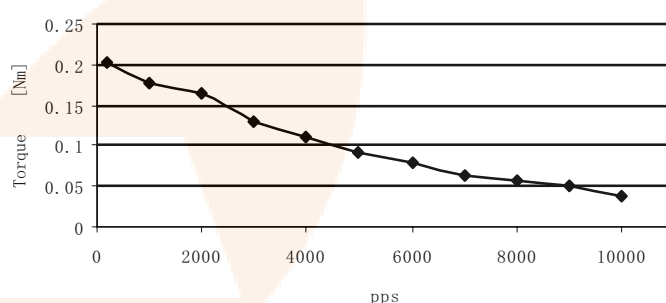
FL42STH33-0316MA

VM: 24VDC; 0.31A /Phase () Driver: M325, full step



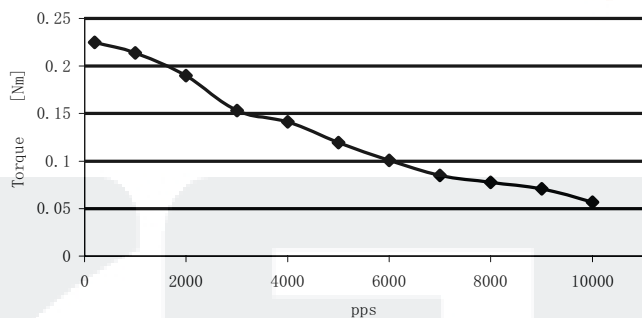
FL42STH33-1334MA

VM: 24VDC; 1.27A /Phase () Driver: HA335, full step



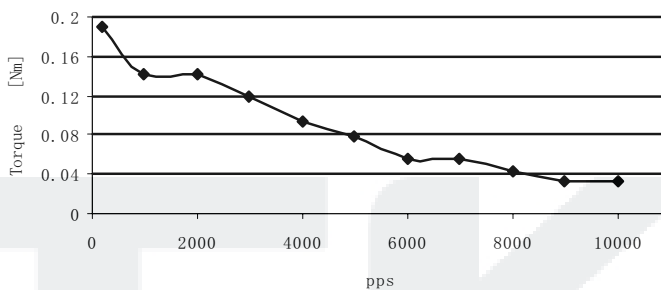
FL42STH38-1206MA

VM: 24VDC; 1.2A /Phase () Driver: HA335, full step



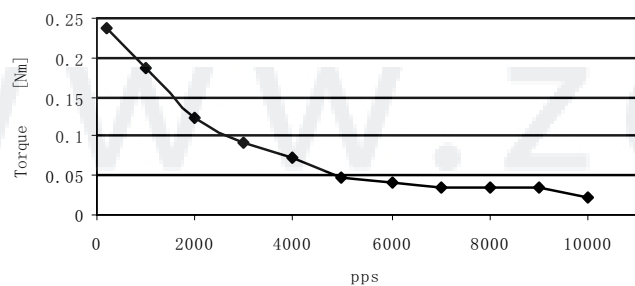
FL42STH38-0806MA

VM: 24VDC; 0.78A /Phase () Driver: M325, full step



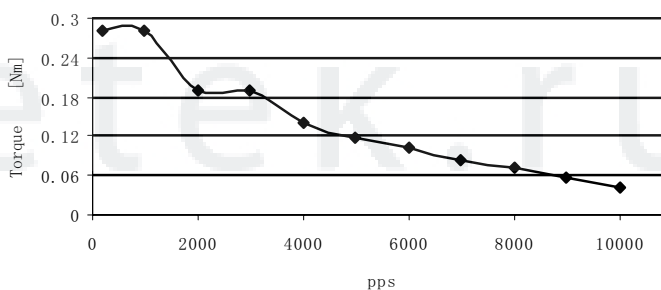
FL42STH38-0404MA

VM: 24VDC; 0.4A /Phase () Driver: M325, full step



FL42STH38-1684MA

VM: 24VDC; 1.68A /Phase () Driver: HA335, full step

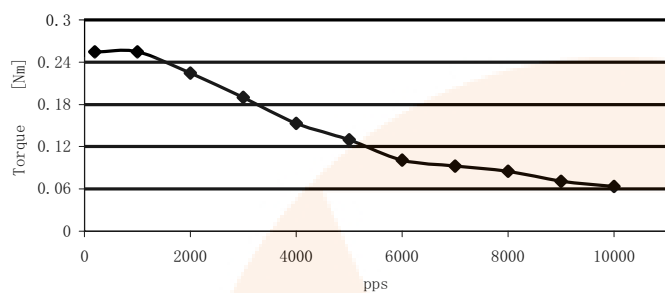


# ● Pull out Torque Curve

A12

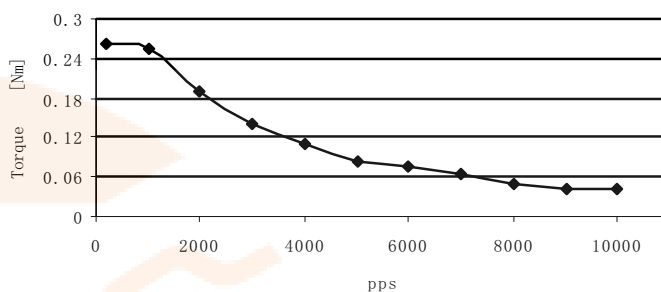
FL42STH47-1206MA

VM: 24VDC; 1.2A /Phase () Driver: HA335, full step



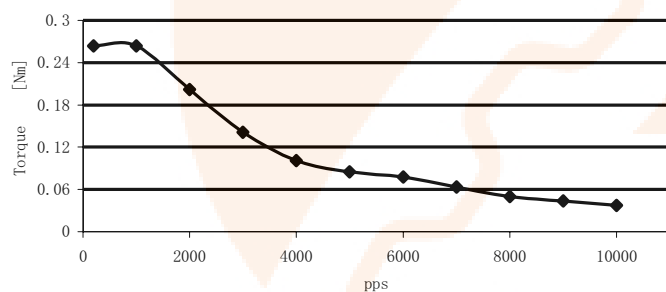
FL42STH47-0806MA

VM: 24V; 0.84A /Phase () Driver: HA335, full step



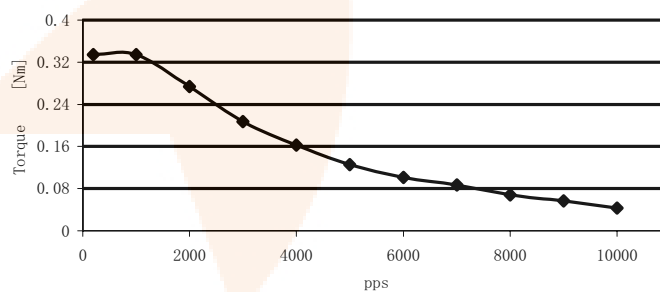
FL42STH47-0406MA

VM: 24VDC; 0.4A /Phase () Driver: M325, full step



FL42STH47-1684MA

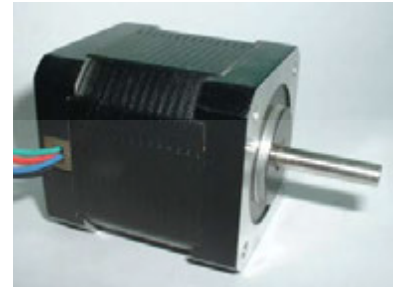
VM: 30VDC; 1.77A /Phase () Driver: HA335, full step



## 1.8° Size 42mm High Torque Hybrid Stepping Motor

A13

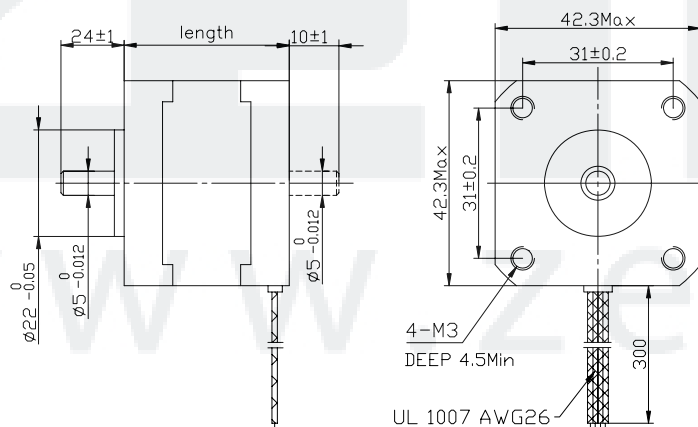
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 28N (20mm from the flange)           |
| Max. axial force      | 10N                                  |



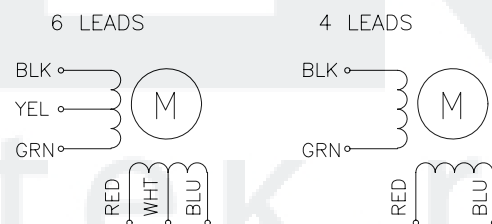
### ● Size 42mm High Torque Hybrid Stepping Motor Specifications

| Model No.       |                 | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|-----------------|-----------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single Shaft    | Double Shaft    | V             | A              | Ω                 | mH                | Kg-cm          |            | g-cm <sup>2</sup> | kg     | g-cm          | mm     |
| FL42STH25-0404A | FL42STH25-0404B | 9.6           | 0.4            | 24                | 36                | 1.7            | 4          | 20                | 0.15   | 75            | 25     |
| FL42STH33-0956A | FL42STH33-0956B | 4             | 0.95           | 4.2               | 2.5               | 1.6            | 6          | 35                | 0.22   | 120           | 34     |
| FL42STH33-0406A | FL42STH33-0406B | 9.6           | 0.4            | 24                | 15                | 1.6            | 6          |                   |        |               |        |
| FL42STH33-0316A | FL42STH33-0316B | 12            | 0.31           | 38.5              | 21                | 1.6            | 6          |                   |        |               |        |
| FL42STH33-1334A | FL42STH33-1334B | 2.8           | 1.33           | 2.1               | 2.5               | 2.2            | 4          |                   |        |               |        |
| FL42STH38-1206A | FL42STH38-1206B | 4             | 1.2            | 3.3               | 3.2               | 2.6            | 6          | 54                | 0.28   | 150           | 40     |
| FL42STH38-0806A | FL42STH38-0806B | 6             | 0.8            | 7.5               | 6.7               | 2.6            | 6          |                   |        |               |        |
| FL42STH38-0406A | FL42STH38-0406B | 12            | 0.4            | 30                | 30                | 2.6            | 6          |                   |        |               |        |
| FL42STH38-1684A | FL42STH38-1684B | 2.8           | 1.68           | 1.65              | 3.2               | 3.6            | 4          |                   |        |               |        |
| FL42STH47-1206A | FL42STH47-1206B | 4             | 1.2            | 3.3               | 2.8               | 3.17           | 6          | 68                | 0.35   | 200           | 48     |
| FL42STH47-0806A | FL42STH47-0806B | 6             | 0.8            | 7.5               | 6.3               | 3.17           | 6          |                   |        |               |        |
| FL42STH47-0406A | FL42STH47-0406B | 12            | 0.4            | 30                | 25                | 3.17           | 6          |                   |        |               |        |
| FL42STH47-1684A | FL42STH47-1684B | 2.8           | 1.68           | 1.65              | 2.8               | 4.4            | 4          |                   |        |               |        |
| FL42STH60-1206A | FL42STH60-1206B | 7.2           | 1.2            | 6                 | 7                 | 6.5            | 6          | 102               | 0.5    | 280           | 60     |

### Dimension

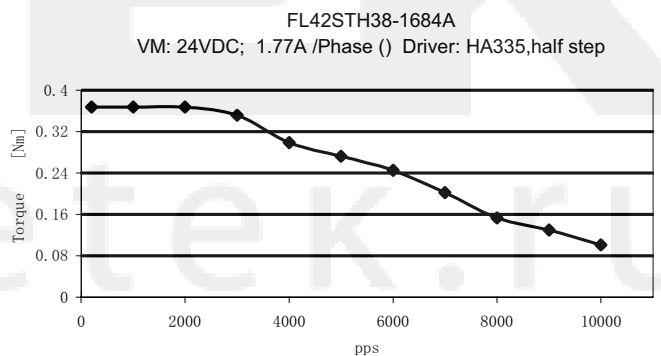
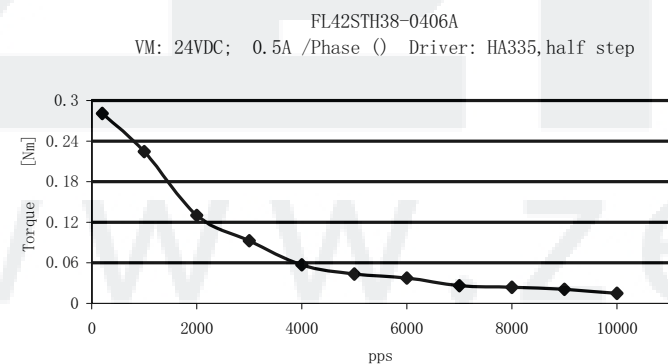
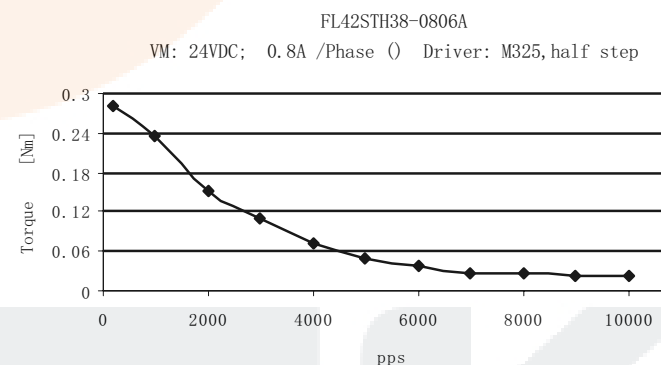
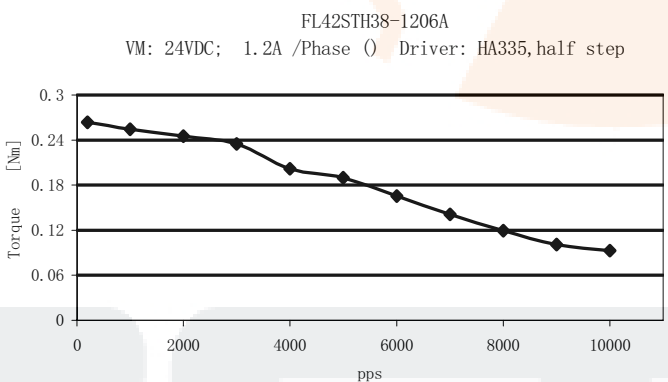
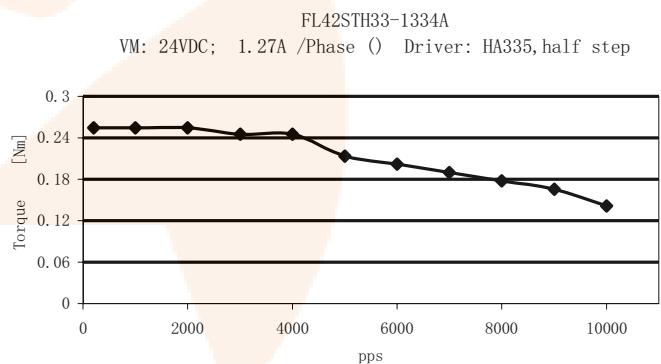
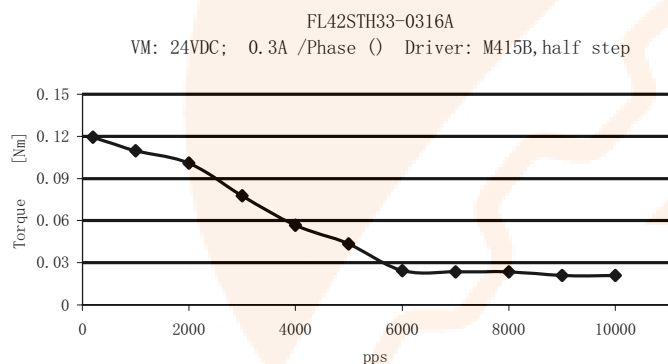
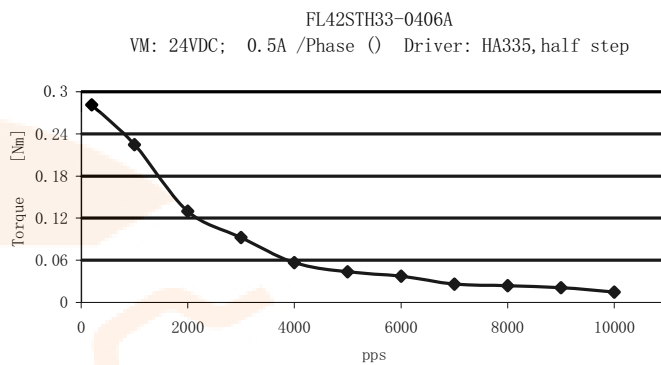
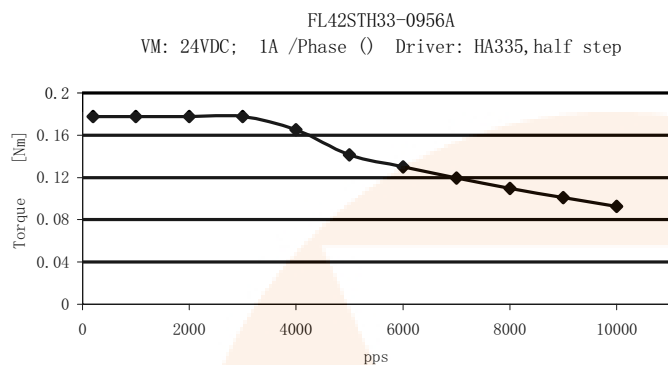


### Wiring Diagram



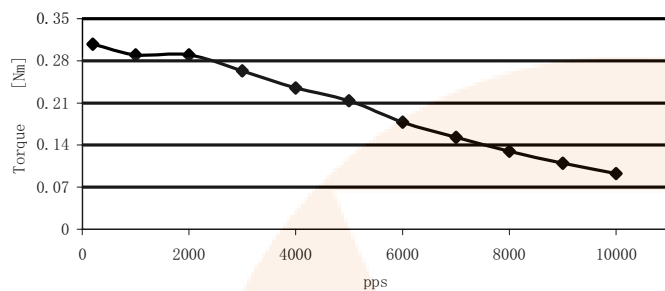
# ● Pull out Torque Curve

A14



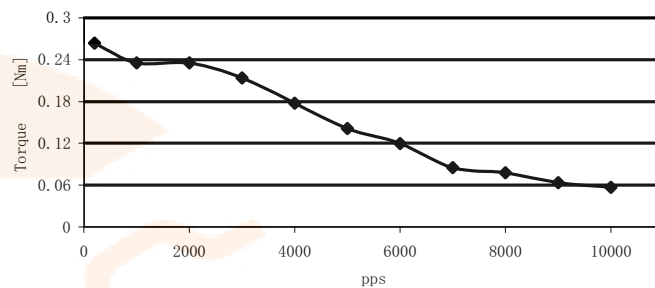
FL42STH47-1206A

VM: 24VDC; 1.2A /Phase () Driver: HA335, half step



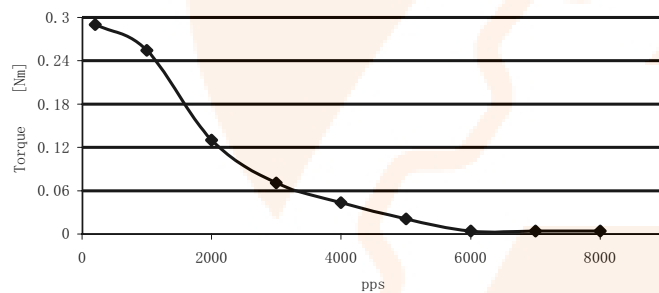
FL42STH47-0806A

VM: 24VDC; 0.8A /Phase () Driver: M325, half step



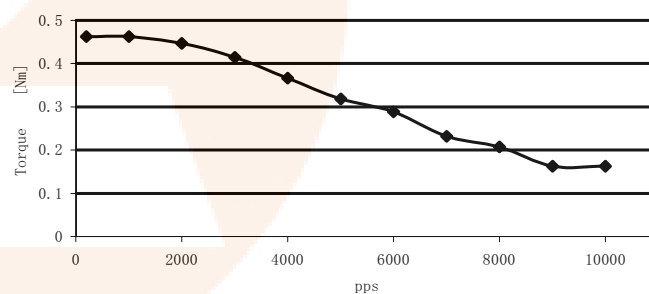
FL42STH47-0406A

VM: 24VDC; 0.44A /Phase () Driver: M415B, half step



FL42STH47-1684A

VM: 24VDC; 1.77A /Phase () Driver: HA335, half step





# 1.8° Size 42mm High Torque Hybrid Stepping Motor With Thread A15

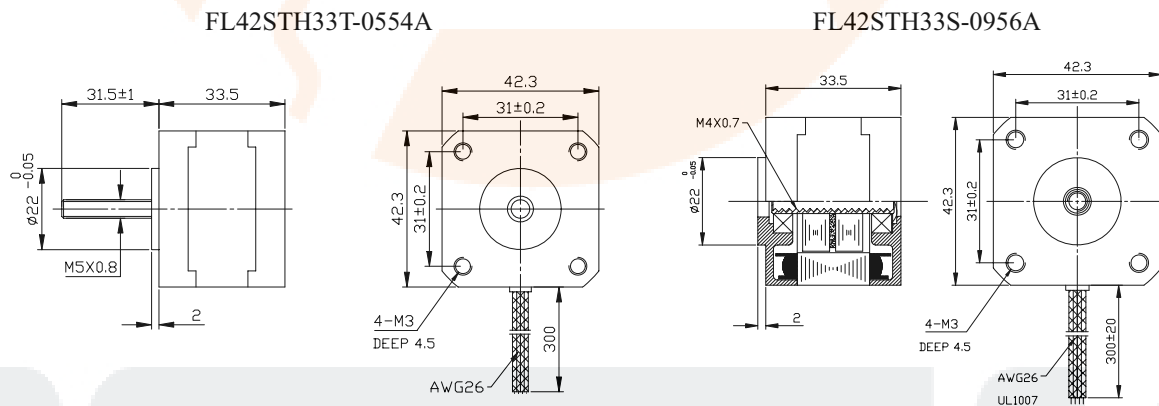
## ● General Specification for High Torque Hybrid Stepping Motor With Thread

| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ±5% (full step, no load)             |
| Resistance Accuracy   | ±10%                                 |
| Inductance Accuracy   | ±20%                                 |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Max. radial force     | 28N (20mm from the flange)           |
| Max. axial force      | 10N                                  |

## ● Size 42mm High Torque Hybrid Stepping Motor Specifications With Thread

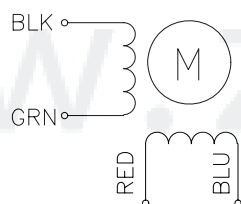
| Model No.        | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|------------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single Shaft     | V             | A              | Ω                 | mH                | g-cm           |            | g-cm <sup>2</sup> | kg     | g-cm          | mm     |
| FL42STH33T-0554A | 1.8           | 0.55           | 3.2               | 4.5               | 900            | 4          | 35                | 0.2    | 120           | 34     |
| FL42STH33S-0956A | 4.0           | 0.95           | 4.2               | 2.5               | 1580           | 6          | 35                | 0.2    | 120           | 34     |

## Dimension

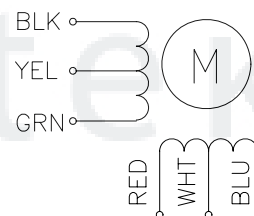


## ● Wiring Diagram

4 LEADS



6 LEADS



## ● General Specification for High Torque Hybrid Stepping Motor

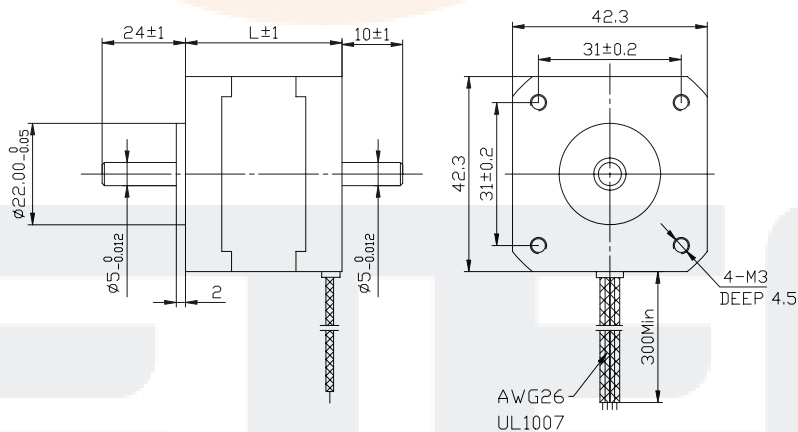
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 3.6°                                 |
| Step Angle Accuracy   | ±5% (full step, no load)             |
| Resistance Accuracy   | ±10%                                 |
| Inductance Accuracy   | ±20%                                 |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 28N (20mm from the flange)           |
| Max. axial force      | 10N                                  |



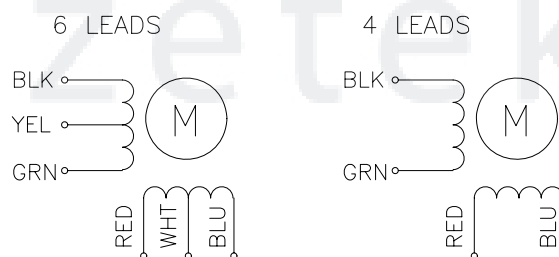
## ● Size 42mm Hybrid Stepping Motor Specifications

| Model No.       |                 | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|-----------------|-----------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single Shaft    | Double Shaft    | V             | A              | Ω                 | mH                | g-cm           |            | g-cm <sup>2</sup> | kg     | g-cm          | mm     |
| FL42ST33-0114DA | FL42ST33-0114DB | 14            | 0.114          | 123               | 130               | 780            | 4          | 20                | 0.2    | 150           | 34     |
| FL42ST33-0156DA | FL42ST33-0156DB | 15            | 0.15           | 100               | 60                | 500            | 6          | 20                | 0.2    | 150           | 34     |
| FL42ST33-0954DA | FL42ST33-0954DB | 9.31          | 0.095          | 98                | 200               | 530            | 4          | 20                | 0.20   | 150           | 34     |
| FL42ST38-0954DA | FL42ST38-0954DB | 9.98          | 0.095          | 105               | 330               | 700            | 4          | 23                | 0.23   | 150           | 38     |

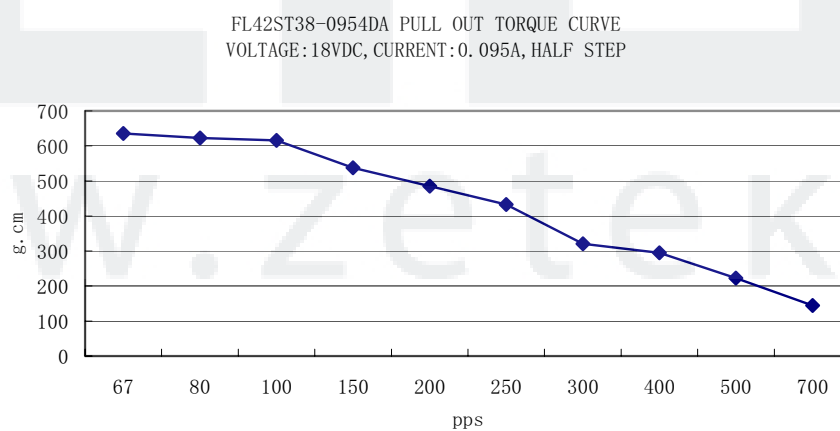
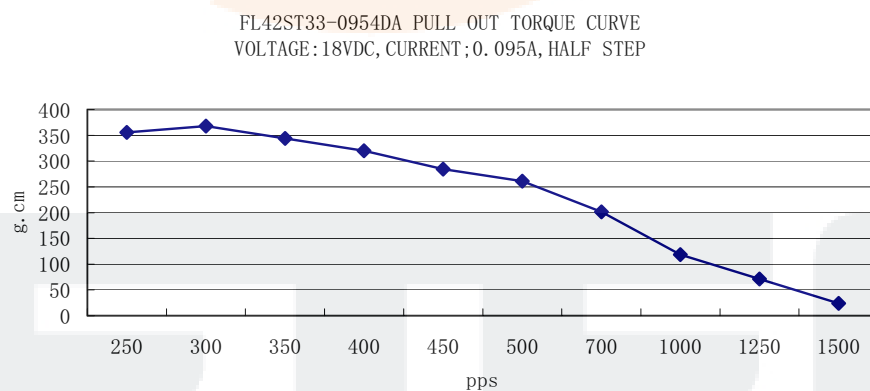
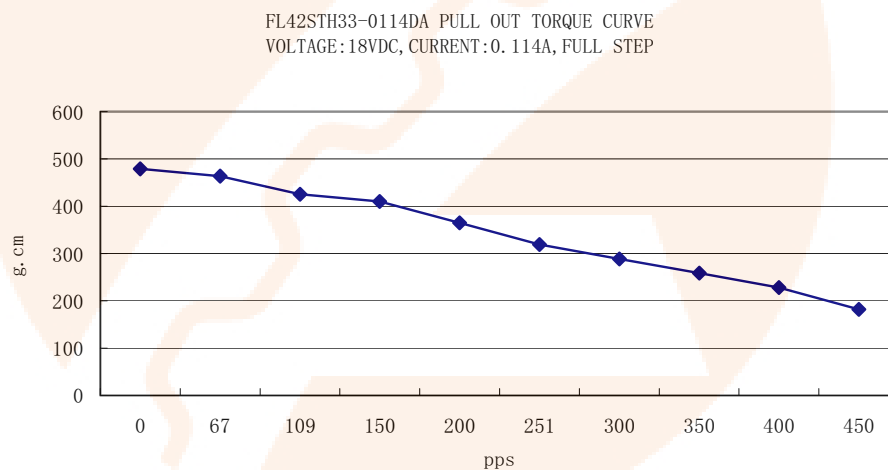
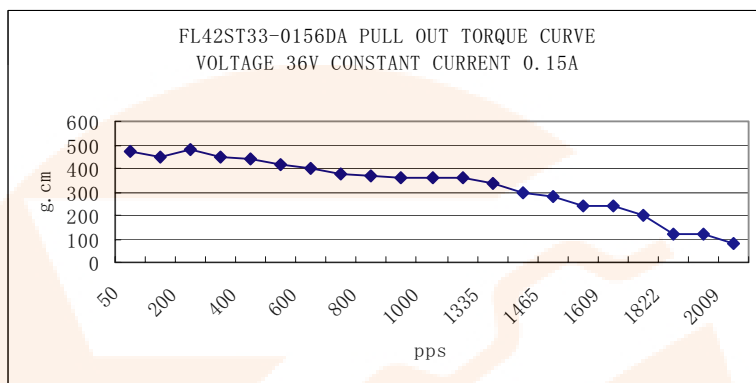
## ● Dimension



## ● Wiring Diagram:



● Pull out Torque Curve:



# 0.9° Size 57mm High torque Hybrid Stepping Motors

A18

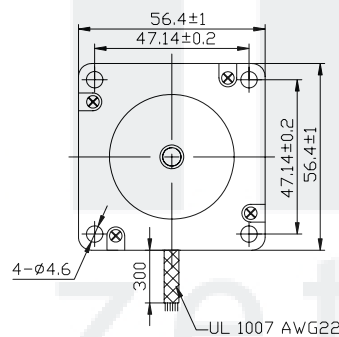
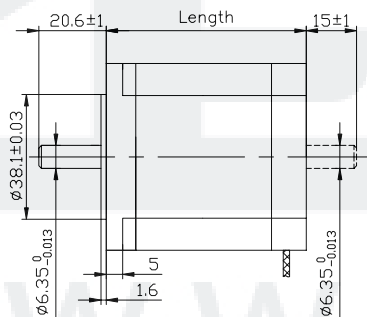
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 0.9°                                 |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 75N (20mm from the flange)           |
| Max. axial force      | 15N                                  |



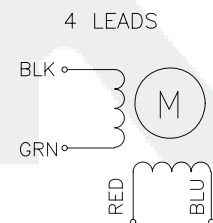
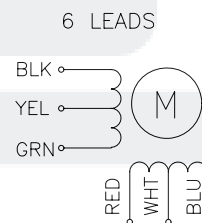
## ● Size 57mm High Torque Hybrid Stepping Motor Specifications

| Model No.        |                  | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|------------------|------------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single Shaft     | Double Shaft     | V             | A              | Ω                 | mH                | kg-cm          |            | g-cm <sup>2</sup> | kg     | kg-cm         | mm     |
| FL57STH41-1006MA | FL57STH41-1006MB | 5.7           | 1              | 5.7               | 8.0               | 3.9            | 6          | 120               | 0.45   | 0.21          | 41     |
| FL57STH41-2006MA | FL57STH41-2006MB | 2.8           | 2              | 1.4               | 2.2               | 3.9            | 6          |                   |        |               |        |
| FL57STH41-3006MA | FL57STH41-3006MB | 1.9           | 3              | 0.63              | 1.0               | 3.9            | 6          |                   |        |               |        |
| FL57STH41-2804MA | FL57STH41-2804MB | 2             | 2.8            | 0.7               | 2.2               | 5.5            | 4          |                   |        |               |        |
| FL57STH56-1006MA | FL57STH56-1006MB | 7.4           | 1              | 7.4               | 17.5              | 9.0            | 6          | 300               | 0.7    | 0.4           | 56     |
| FL57STH56-2006MA | FL57STH56-2006MB | 3.6           | 2              | 1.8               | 4.5               | 9.0            | 6          |                   |        |               |        |
| FL57STH56-3006MA | FL57STH56-3006MB | 2.3           | 3              | 0.75              | 1.9               | 9.0            | 6          |                   |        |               |        |
| FL57STH56-2804MA | FL57STH56-2804MB | 2.5           | 2.8            | 0.9               | 4.5               | 12.0           | 4          |                   |        |               |        |
| FL57STH76-1006MA | FL57STH76-1006MB | 8.6           | 1              | 8.6               | 23                | 13.5           | 6          | 480               | 1      | 0.68          | 76     |
| FL57STH76-2006MA | FL57STH76-2006MB | 4.5           | 2              | 2.25              | 5.6               | 13.5           | 6          |                   |        |               |        |
| FL57STH76-3006MA | FL57STH76-3006MB | 3             | 3              | 1                 | 2.6               | 13.5           | 6          |                   |        |               |        |
| FL57STH76-2804MA | FL57STH76-2804MB | 3.2           | 2.8            | 1.13              | 5.6               | 18.0           | 4          |                   |        |               |        |

## ● Dimension



## Wiring Diagram

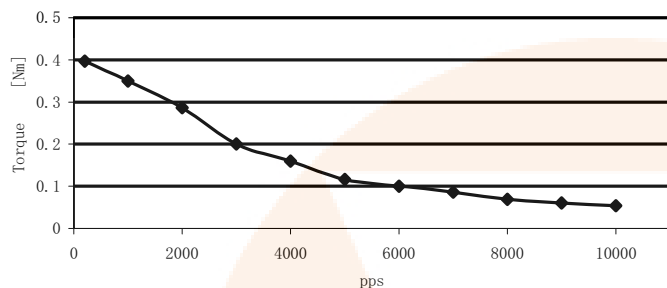


# ● Pull out Torque Curve

A19

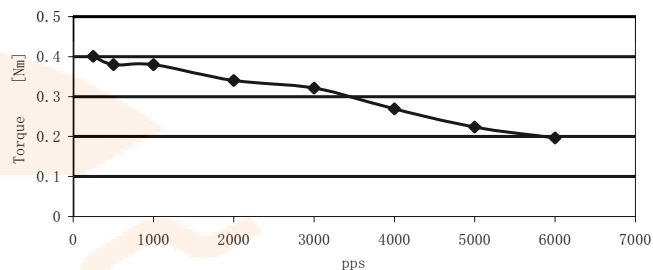
FL57STH41-1006MA

VM: 30VDC; 1A /Phase () Driver: HA335, full step



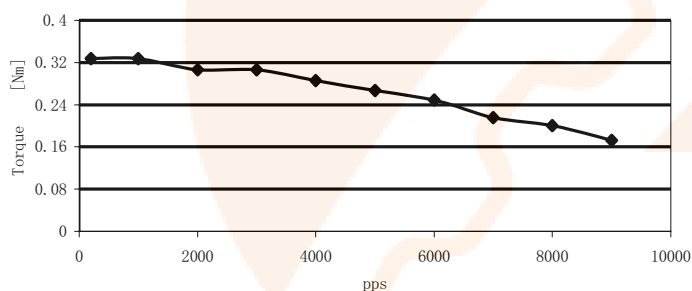
FL57STH41-2006MA

VM: 30V; 2A /Phase () Driver: M542, full step



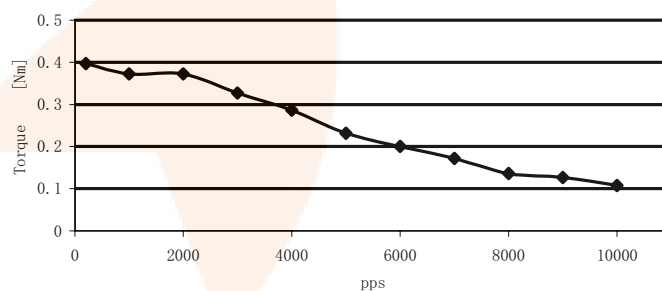
FL57STH41-3006MA

VM: 30VDC; 2.7A /Phase () Driver: H860B, full step



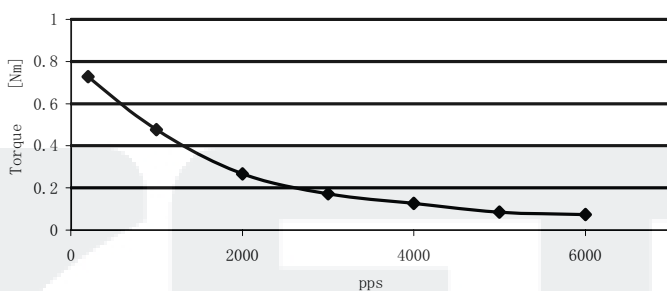
FL57STH41-2804MA

VM: 30VDC; 2.7A /Phase () Driver: H860B, full step



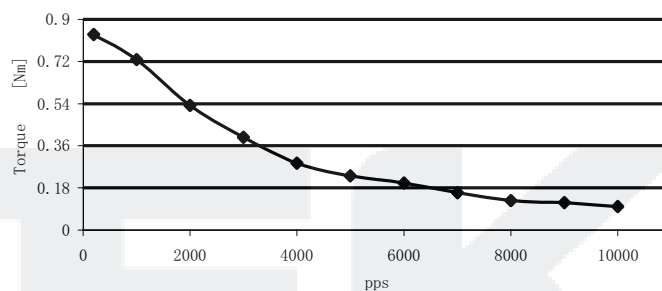
FL57STH56-1006MA

VM: 30VDC; 1A /Phase () Driver: HA335, full step



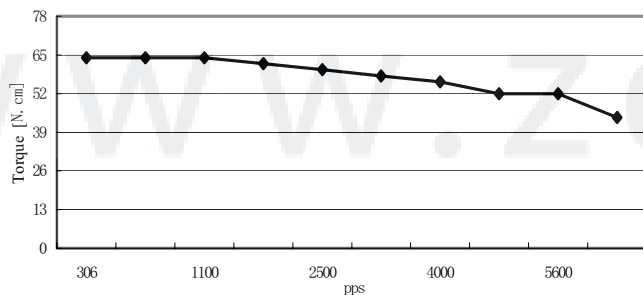
FL57STH56-2006MA

VM: 30VDC; 2.1A /Phase () Driver: HA335, full step



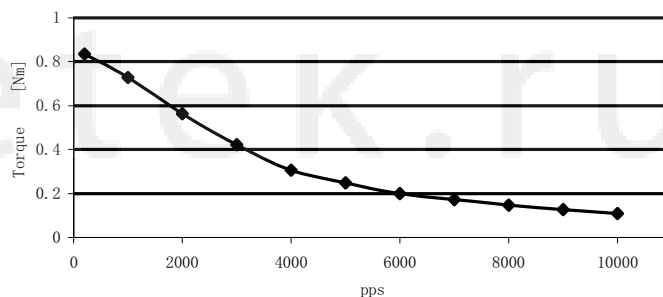
FL57STH56-3006MA

VM: 30VDC; 3A /Phase () Driver: M542, half step



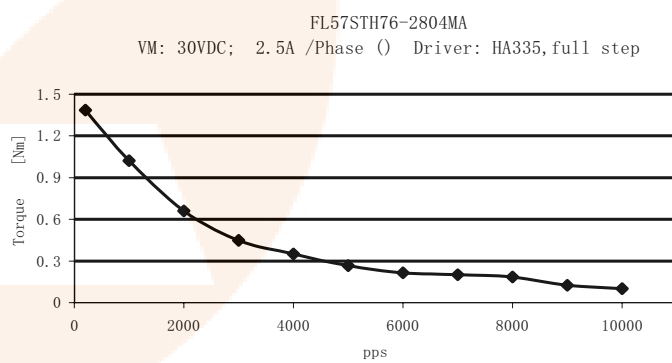
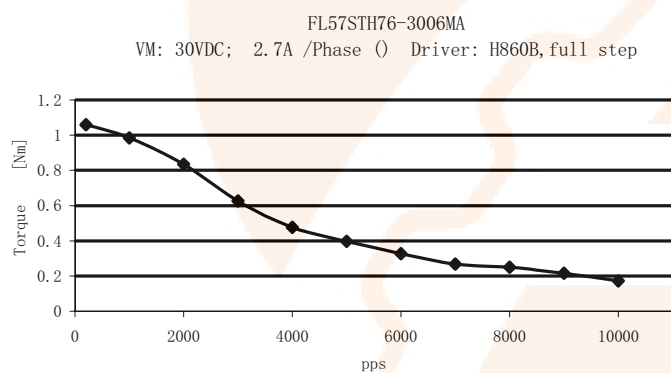
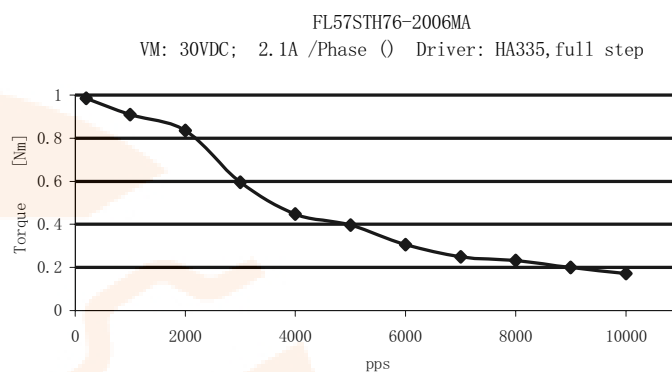
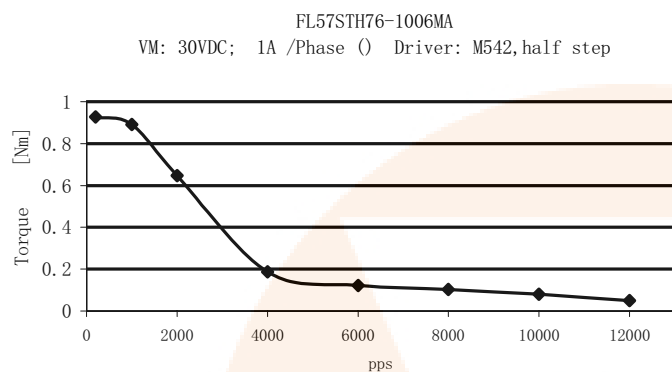
FL57STH56-2804MA

VM: 30VDC; 2.7A /Phase () Driver: H860B, full step



# ● Pull out Torque Curve

A20

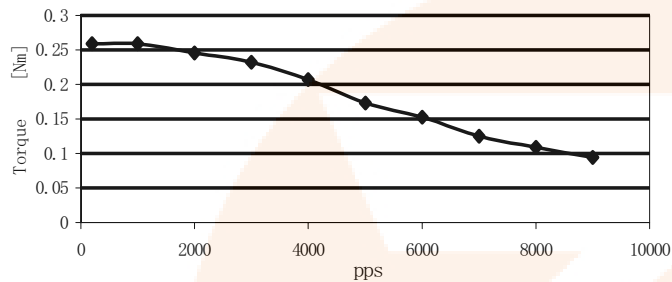




● Pull out Torque Curve

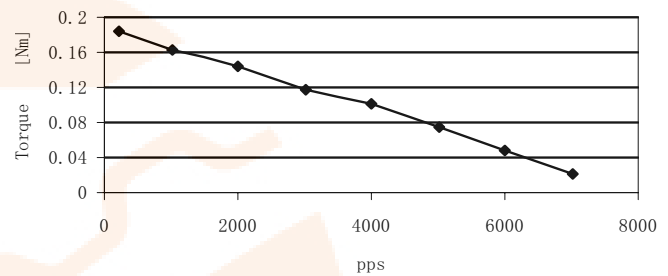
FL57ST41-1106A

VM: 30VDC; 1.1 /Phase () Driver: HA335 half step



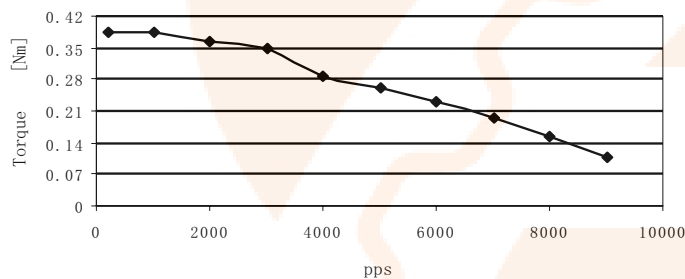
FL57ST41-0406A

VM: 30VDC; 0.4A /Phase () Driver: HA335 half step



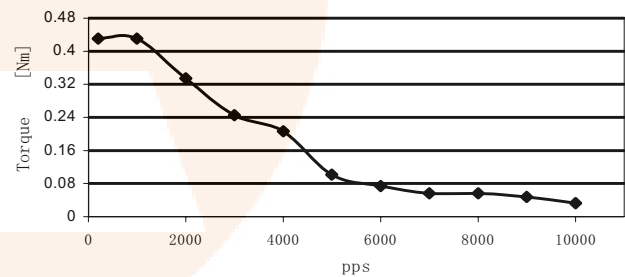
FL57ST41-1564A

VM: 30VDC; 1.4A /Phase () Driver: HA335 half step



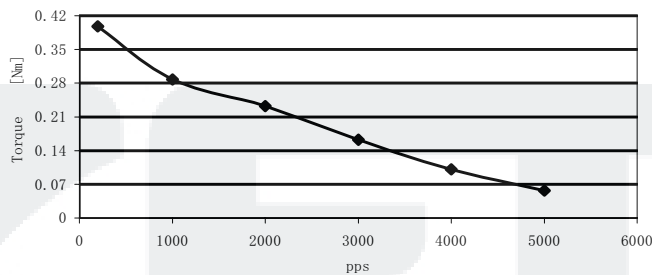
FL57ST51-0856A

VM: 30VDC; 0.85A /Phase () Driver: HA335 half step



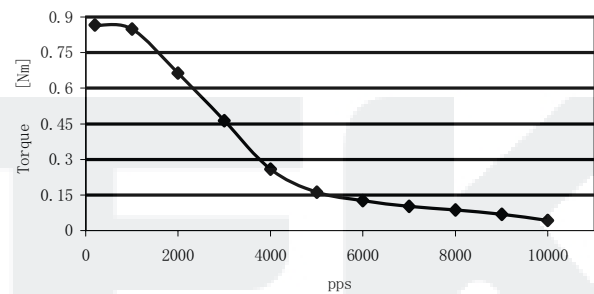
FL57ST51-0426A

VM: 30VDC; 0.5A /Phase () Driver: HA335 half step



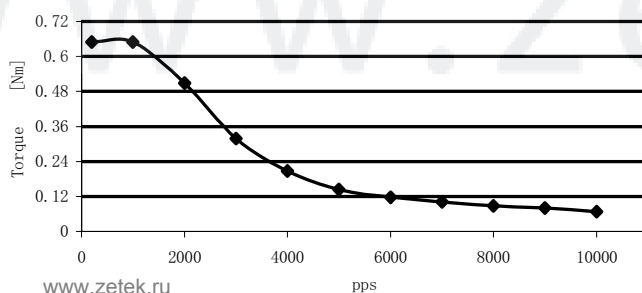
FL57STH76-1506A

VM: 30VDC; 1.4A /Phase () Driver: HA335 half step



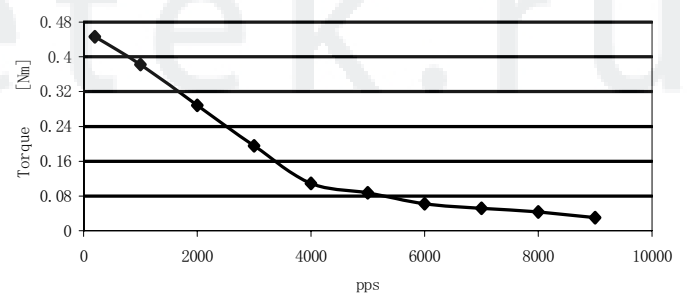
FL57ST56-1206A

VM: 30VDC; 1.2A /Phase () Driver: HA335 half step



FL57STH56-0606A

VM: 30VDC; 0.5 /Phase () Driver: HA335 half step

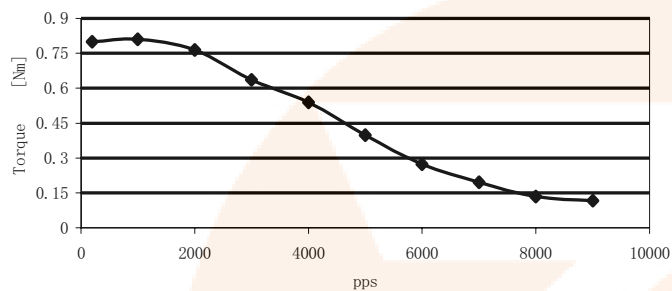




● Pull out Torque Curve

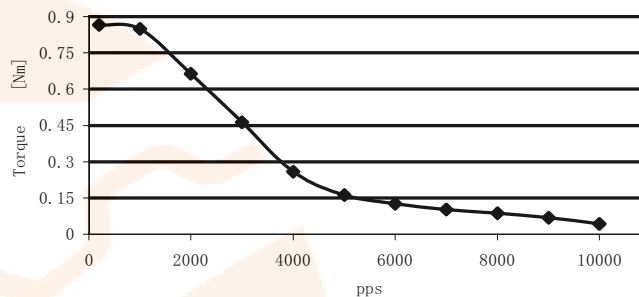
FL57ST56-2554A

VM: 30VDC; 2.5A /Phase () Driver: HA335 half step



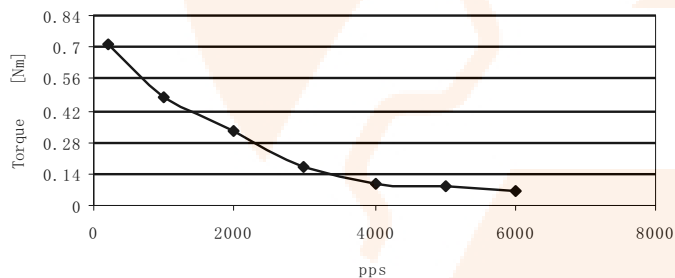
FL57STH76-1506A

VM: 30VDC; 1.4A /Phase () Driver: HA335 half step



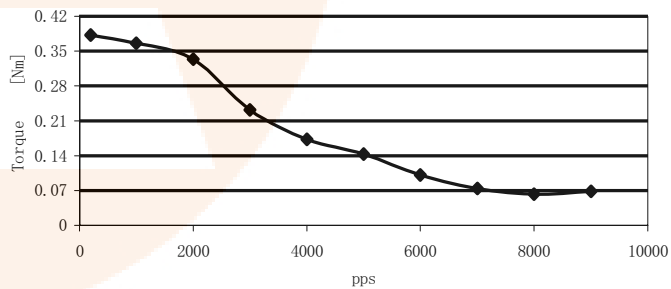
FL57ST76-0686A

VM: 30VDC; 0.7A /Phase () Driver: HA335 half step



FL57ST76-3304A

VM: 30VDC; 3.04A /Phase () Driver: MD556 half step

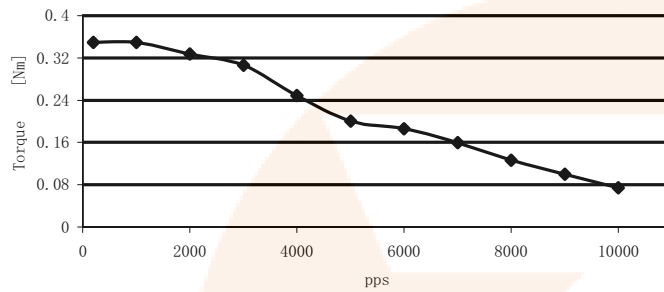




● Pull out Torque Curve

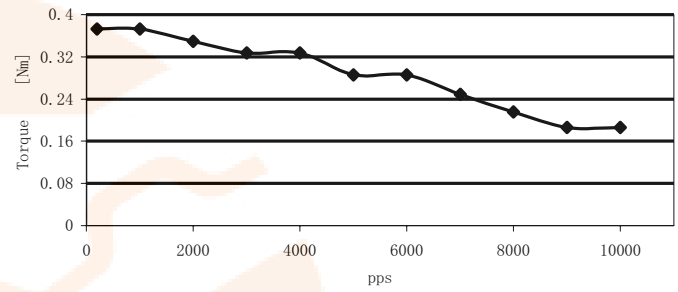
FL57STH41-1006A

VM: 30VDC; 1A /Phase () Driver: M542, half step



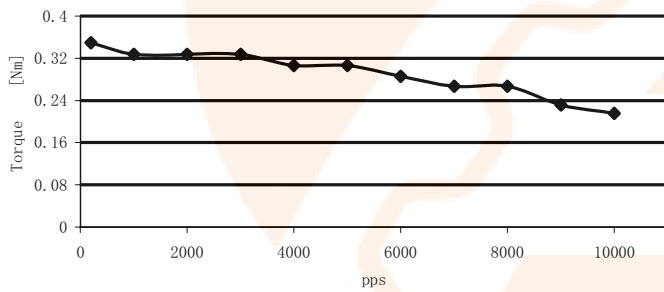
FL57STH41-2006A

VM: 30VDC; 2A /Phase () Driver: M542, half step



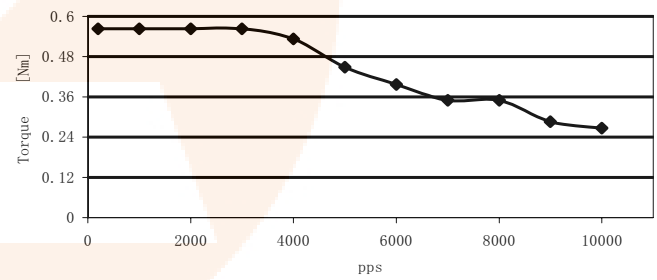
FL57STH41-3006A

VM: 30VDC; 3A /Phase () Driver: M542, half step



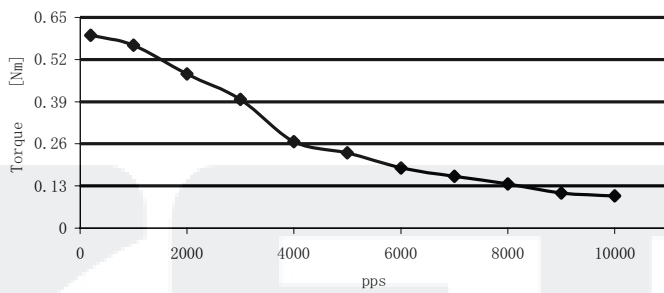
FL57STH41-2804A

VM: 30VDC; 2.7A /Phase () Driver: H860B, half step



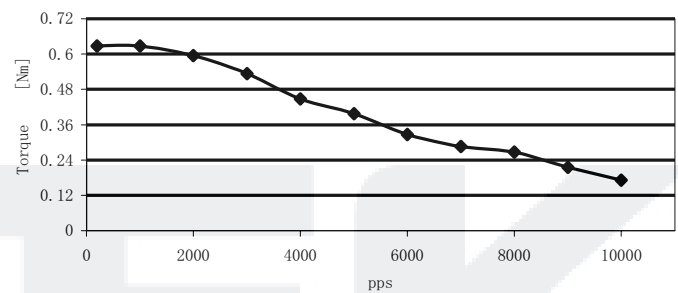
FL57STH51-1006A

VM: 30VDC; 1A /Phase () Driver: M542, half step



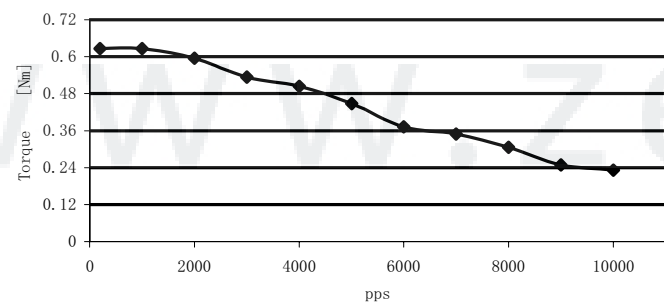
FL57STH51-2006A

VM: 30VDC; 2A /Phase () Driver: M542, half step



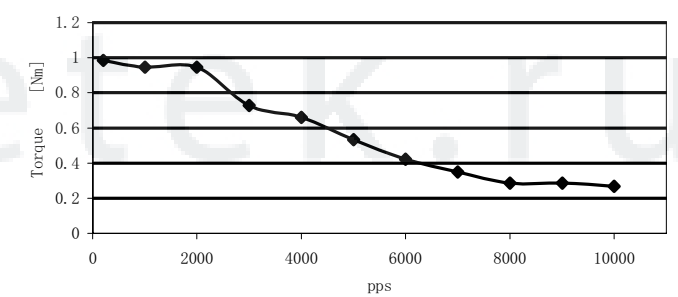
FL57STH51-3006A

VM: 30VDC; 3A /Phase () Driver: M542, half step

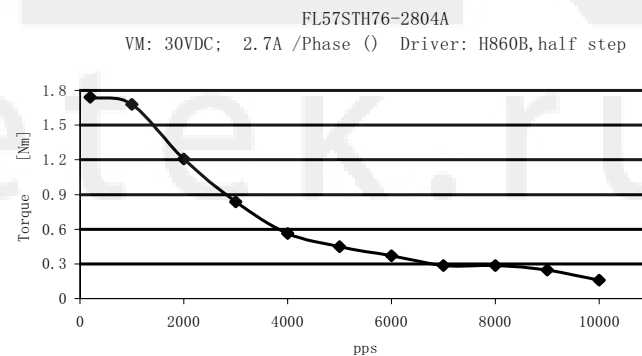
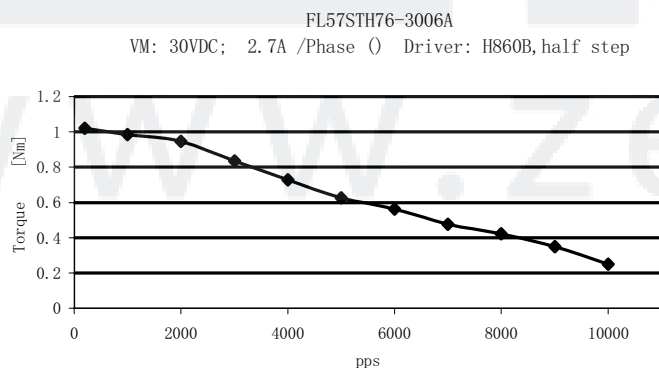
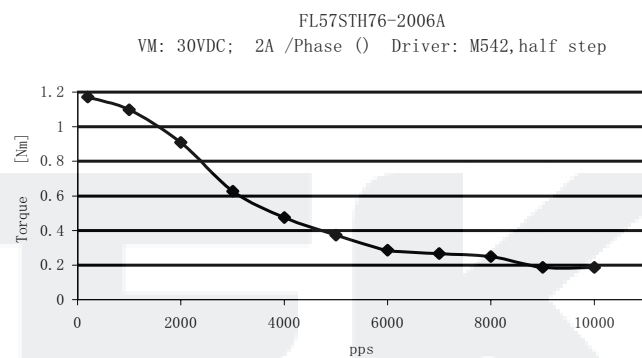
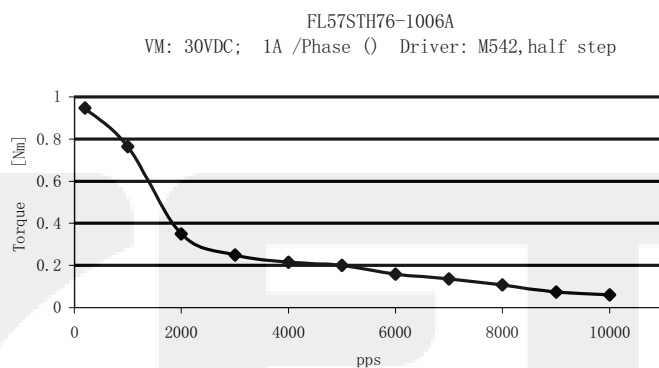
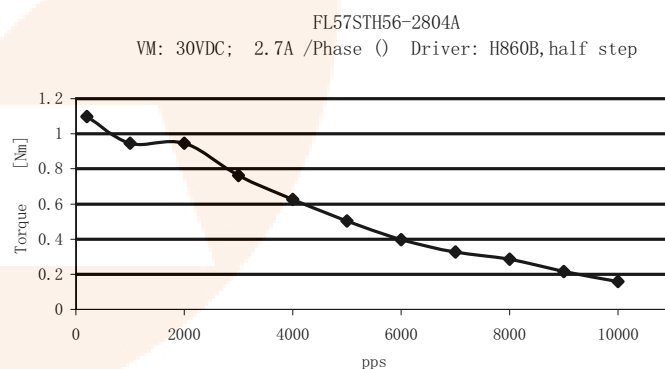
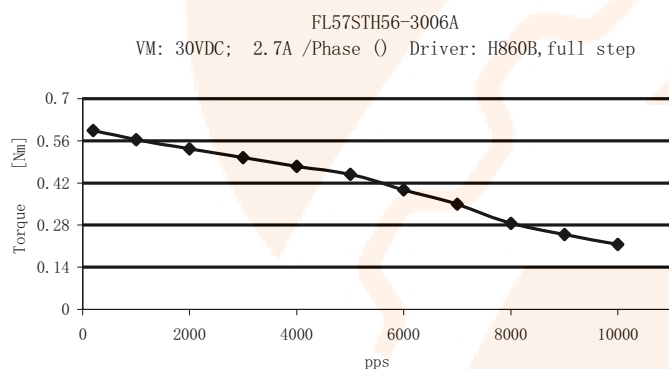
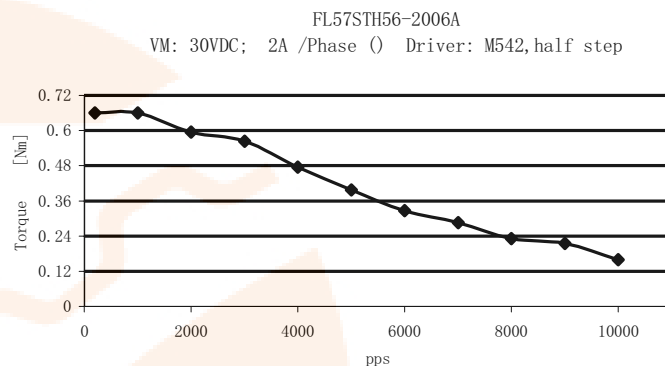
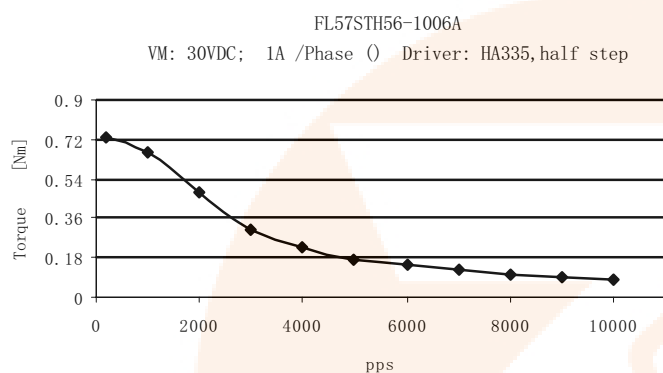


FL57STH51-2804A

VM: 30VDC; 2.7A /Phase () Driver: H860B, half step



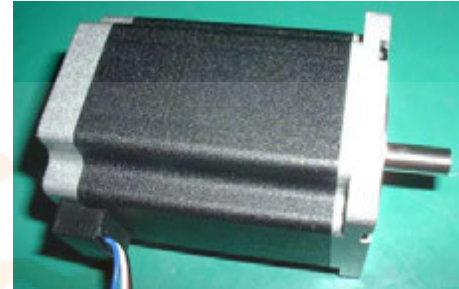
# ● Pull out Torque Curve



# 1.8° Size 60mm High Torque Hybrid Stepping Motor

A27

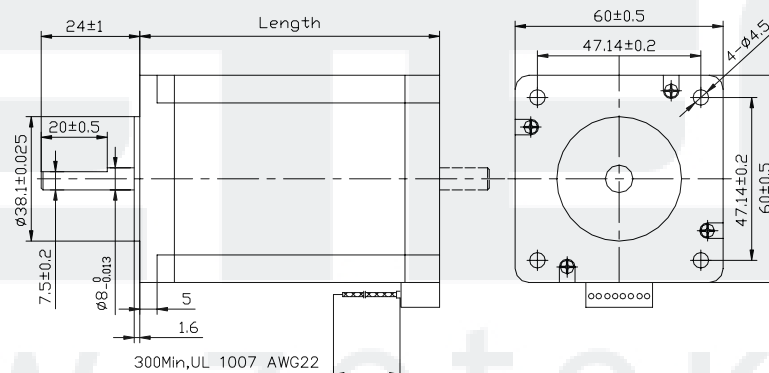
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 0.9°                                 |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 500VAC for one minute                |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 75N (20mm from the flange)           |
| Max. axial force      | 15N                                  |



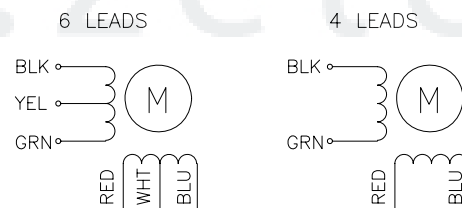
## ● Size 60mm High Torque Hybrid Stepping Motor Specifications

| Model No.        |                  |          | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|------------------|------------------|----------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single Shaft     | Double Shaft     |          | V             | A              | Ω                 | mH                | kg-cm          |            | g-cm <sup>2</sup> | kg     | kg-cm         | mm     |
| FL60STH45-2008AF | FL60STH45-2008BF | unipolar | 3             | 2              | 1.5               | 2                 | 7.8            | 8          | 275               | 0.6    | 0.5           | 47     |
|                  |                  | parallel | 2.1           | 2.8            | 0.75              | 2                 | 11             |            |                   |        |               |        |
|                  |                  | series   | 4.2           | 1.4            | 3.0               | 8                 | 11             |            |                   |        |               |        |
| FL60STH56-2008AF | FL60STH56-2008BF | unipolar | 3.6           | 2              | 1.8               | 3.6               | 11.7           | 8          | 300               | 0.77   | 0.7           | 56     |
|                  |                  | parallel | 2.52          | 2.8            | 0.9               | 3.6               | 16.5           |            |                   |        |               |        |
|                  |                  | series   | 5.04          | 1.4            | 3.6               | 14.4              | 16.5           |            |                   |        |               |        |
| FL60STH65-2008AF | FL60STH65-2008BF | unipolar | 4.8           | 2              | 2.4               | 4.6               | 15             | 8          | 570               | 1.2    | 0.9           | 67     |
|                  |                  | parallel | 3.36          | 2.8            | 1.2               | 4.6               | 21             |            |                   |        |               |        |
|                  |                  | series   | 6.72          | 1.4            | 4.8               | 18.4              | 21             |            |                   |        |               |        |
| FL60STH86-2008AF | FL60STH86-2008BF | unipolar | 6             | 2              | 3                 | 6.8               | 22             | 8          | 840               | 1.4    | 1.0           | 88     |
|                  |                  | parallel | 4.17          | 2.8            | 1.5               | 6.8               | 31             |            |                   |        |               |        |
|                  |                  | series   | 8.4           | 1.4            | 6                 | 27.2              | 31             |            |                   |        |               |        |

## ● Dimension



## ● Wiring Diagram

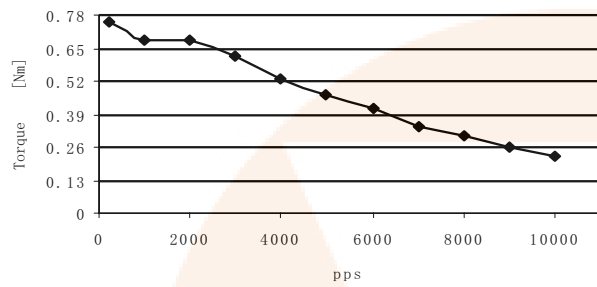


# ● Pull out Torque Curve

A28

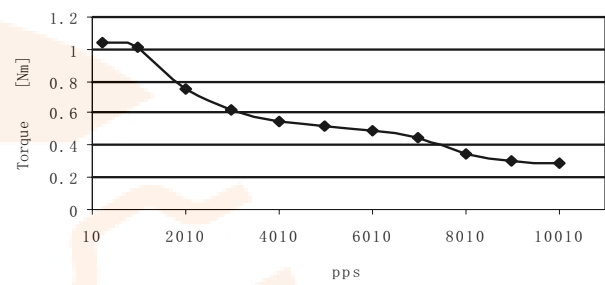
FL60STH45-2008AF

VM: 30VDC; 2.0A /Phase () Driver: M542,half step,parallel



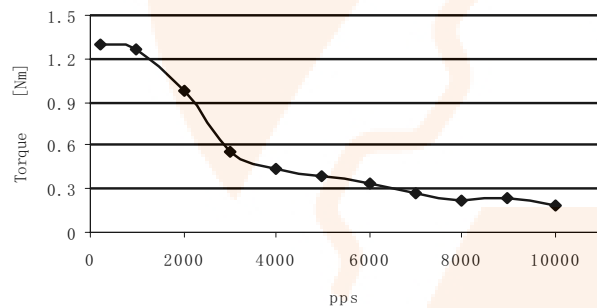
FL60STH56-2008AF

VM: 30VDC; 2.0A /Phase () Driver: M542,half step,parallel



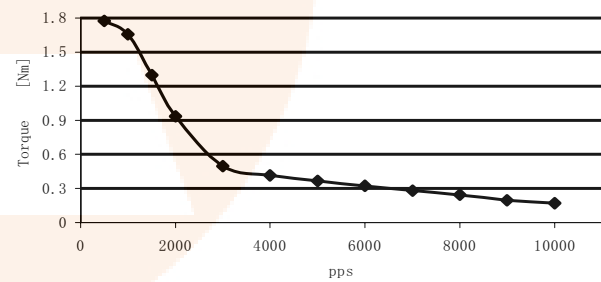
FL60STH65-2008AF

VM: 30VDC; 2.0A /Phase () Driver: M542,half step,parallel



FL60STH86-2008AF

VM: 30VDC; 2.0A /Phase () Driver: M542,half step,parallel



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# 1.8° Size 86mm Round High Torque Hybrid Stepping Motor

A29

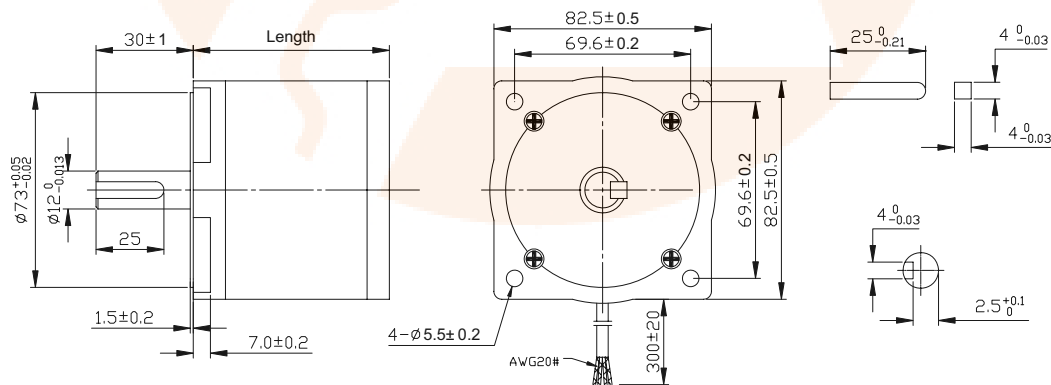
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ±5% (full step, no load)             |
| Resistance Accuracy   | ±10%                                 |
| Inductance Accuracy   | ±20%                                 |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 820VAC , 1s , 3mA                    |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 220N (20mm from the flange)          |
| Max. axial force      | 60N                                  |



## ● Size 86mm High Torque Hybrid Stepping Motor Specifications

| Model No.       | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|-----------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
|                 | V             | A              | Ω                 | mH                | Kg.cm          |            | g-cm <sup>2</sup> | kg     | kg-cm         | mm     |
| FL86ST67-2808A  | 3.64          | 2.8            | 1.3               | 5.1               | 28             | 8          | 660               | 1.6    |               | 67     |
| FL86ST94-2808A  | 4.76          | 2.8            | 1.7               | 7.7               | 48             | 8          | 1200              | 2.4    |               | 94     |
| FL86ST125-3508A | 4.97          | 3.5            | 1.42              | 7.9               | 76             | 8          | 1800              | 3.6    |               | 125    |

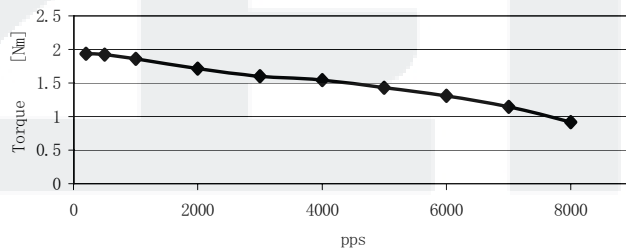
## ● Dimension



## ● Pull out Torque Curve

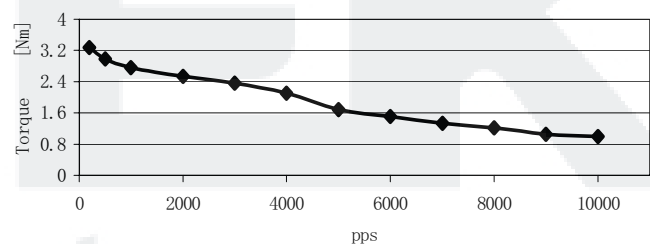
FL86ST67-2808A

VM:100VAC;3.96A /Phase() Driver:MD2278, 400pul/rev, PARALLEL



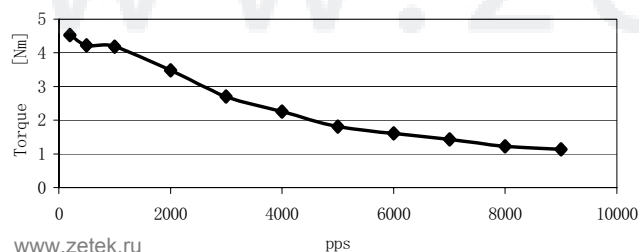
FL86ST94-2808A

VM:100VAC;3.96A /Phase() Driver:MD2278, 400pul/rev, PARALLEL



FL86ST125-3508A

VM:100VAC;4.71A /Phase() Driver:MD2278, 400pul/rev, PARALLEL



# 1.8° Size 86mm Round Standard Hybrid Stepping Motor A30

## ● General Specification for Hybrid Stepping Motor

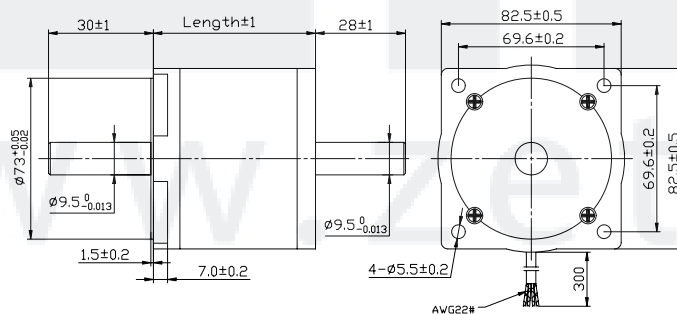
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 1500VAC for one minute               |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 220N (20mm from the flange)          |
| Max. axial force      | 60N                                  |
| Rotation              | CW( See from Front Flange)           |



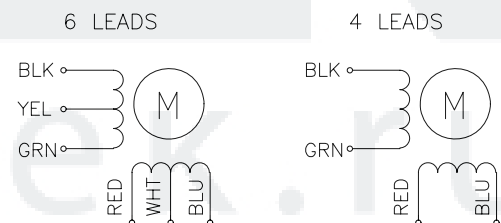
## ● Size 86mm High Torque Hybrid Stepping Motor Specifications

| Model No.       |                 | Rated Voltage | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | # of Leads | Rotor Inertia     | Weight | Detent Torque | Length |
|-----------------|-----------------|---------------|----------------|-------------------|-------------------|----------------|------------|-------------------|--------|---------------|--------|
| Single Shaft    | Double Shaft    | V             | A              | Ω                 | mH                | Kg.cm          |            | g-cm <sup>2</sup> | kg     | kg-cm         | mm     |
| FL86ST62-4506A  | FL86ST62-4506B  | 1.8           | 4.5            | 0.4               | 1.4               | 13             | 6          | 560               | 1.5    | 0.8           | 62     |
| FL86ST62-1256A  | FL86ST62-1256B  | 5.5           | 1.25           | 4.4               | 14                | 13             | 6          |                   |        |               |        |
| FL86ST62-1406A  | FL86ST62-1406B  | 0.7           | 14             | 20                | 60                | 13             | 6          |                   |        |               |        |
| FL86ST62-5904A  | FL86ST62-5904B  | 1.33          | 5.9            | 0.23              | 1.5               | 18             | 4          |                   |        |               |        |
| FL86ST94-4006A  | FL86ST94-4006B  | 3.0           | 4.0            | 0.75              | 4.5               | 26             | 6          | 1100              | 2.6    | 2.4           | 94     |
| FL86ST94-2006A  | FL86ST94-2006B  | 6.0           | 2.0            | 3.0               | 13                | 26             | 6          |                   |        |               |        |
| FL86ST94-1006A  | FL86ST94-1006B  | 12            | 1              | 12                | 72                | 26             | 6          |                   |        |               |        |
| FL86ST94-5604A  | FL86ST94-5604B  | 2.1           | 5.6            | 0.38              | 3.9               | 35             | 4          |                   |        |               |        |
| FL86ST134-6706A | FL86ST134-6706B | 3.0           | 6.7            | 0.45              | 2                 | 36             | 6          | 1800              | 3.6    | 3.6           | 134    |
| FL86ST134-4006A | FL86ST134-4006B | 5.0           | 4.0            | 1.25              | 6.6               | 36             | 6          |                   |        |               |        |
| FL86ST134-1806A | FL86ST134-1806B | 12            | 1.8            | 6.5               | 41                | 36             | 6          |                   |        |               |        |
| FL86ST134-5604A | FL86ST134-5604B | 3.5           | 5.6            | 0.63              | 6.6               | 50             | 4          |                   |        |               |        |

## ● Dimension

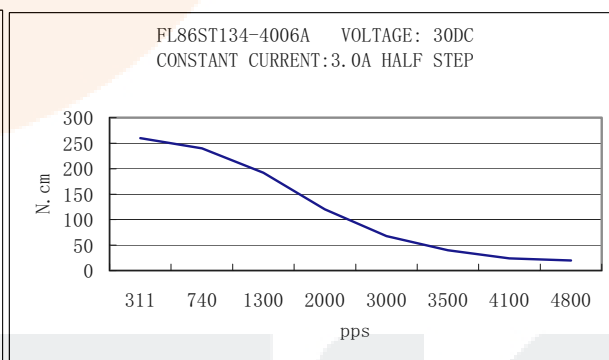
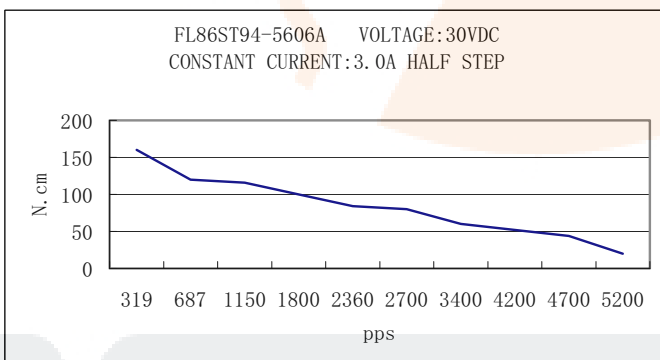
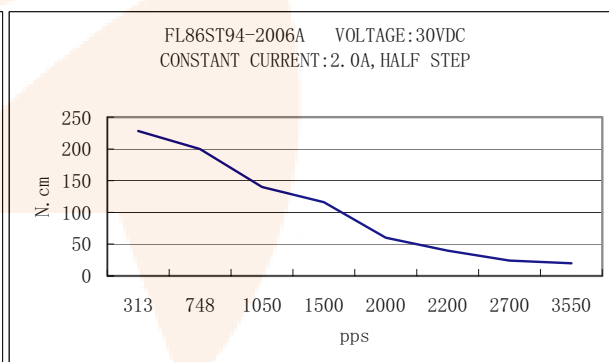
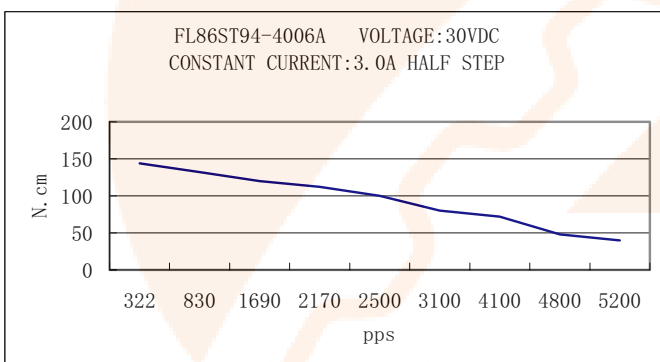
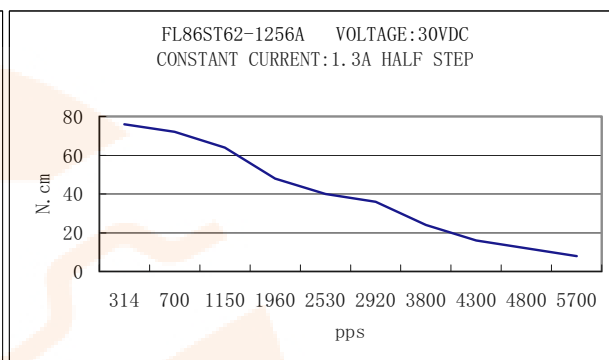
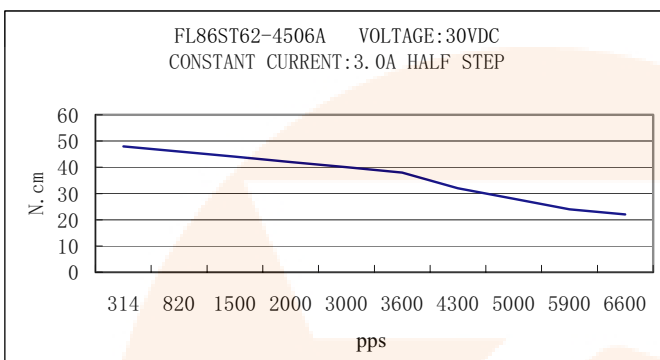


## Wiring Diagram





- Pull out Torque Curve



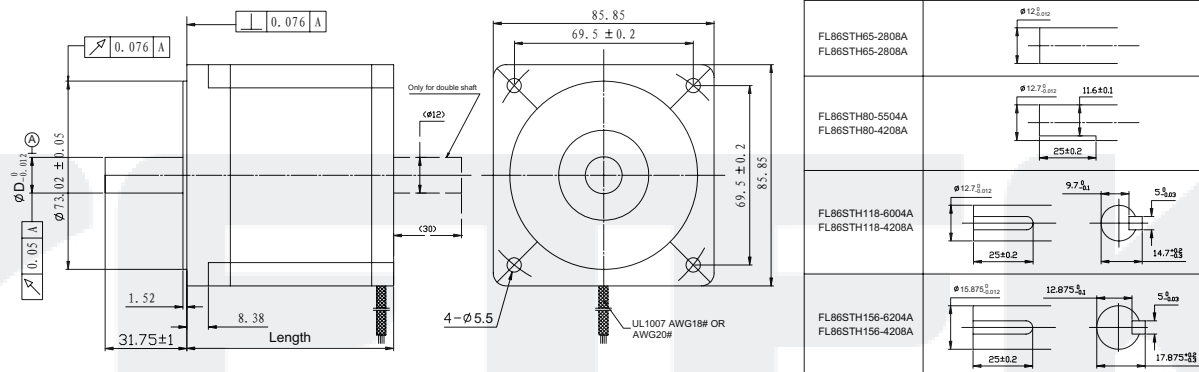
| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 1.8°                                 |
| Step Angle Accuracy   | ±5% (full step, no load)             |
| Resistance Accuracy   | ±10%                                 |
| Inductance Accuracy   | ±20%                                 |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 820VAC , 1s , 3mA                    |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 220N (20mm from the flange)          |
| Max. axial force      | 60N                                  |



## ● Size 86mm High Torque Hybrid Stepping Motor Specifications

| Model No.        |                  | Current<br>/Phase | Resistance<br>/Phase | Inductance<br>/Phase | Holding<br>Torque<br>(Bipolar) | # of<br>Leads | Rotor<br>Inertia  | Weight | Detent<br>Torque | Length |
|------------------|------------------|-------------------|----------------------|----------------------|--------------------------------|---------------|-------------------|--------|------------------|--------|
| Single Shaft     | Double Shaft     | A                 | Ω                    | mH                   | Kg.cm                          | #             | g-cm <sup>2</sup> | kg     | kg-cm            | mm     |
| FL86STH65-5904A  | FL86STH65-5904B  | 5.9               | 0.28                 | 1.7                  | 34                             | 4             | 1000              | 1.7    | 0.8              | 65     |
| FL86STH65-2808A  | FL86STH65-2808B  | 2.8               | 1.4                  | 3.9                  | 34                             | 8             |                   |        |                  |        |
| FL86STH80-5504A  | FL86STH80-5504B  | 5.5               | 0.46                 | 4                    | 46                             | 4             | 1400              | 2.3    | 1.2              | 80     |
| FL86STH80-4208A  | FL86STH80-4208B  | 4.24              | 0.75                 | 3.4                  | 46                             | 8             |                   |        |                  |        |
| FL86STH118-6004A | FL86STH118-6004B | 6                 | 0.6                  | 6.5                  | 87                             | 4             | 2700              | 3.8    | 2.4              | 118    |
| FL86STH118-4208A | FL86STH118-4208B | 4.2               | 0.9                  | 6                    | 87                             | 8             |                   |        |                  |        |
| FL86STH156-6204A | FL86STH156-6204B | 6.2               | 0.75                 | 9                    | 122                            | 4             | 4000              | 5.4    | 3.6              | 156    |
| FL86STH156-4208A | FL86STH156-4208B | 4.2               | 1.25                 | 8                    | 122                            | 8             |                   |        |                  |        |

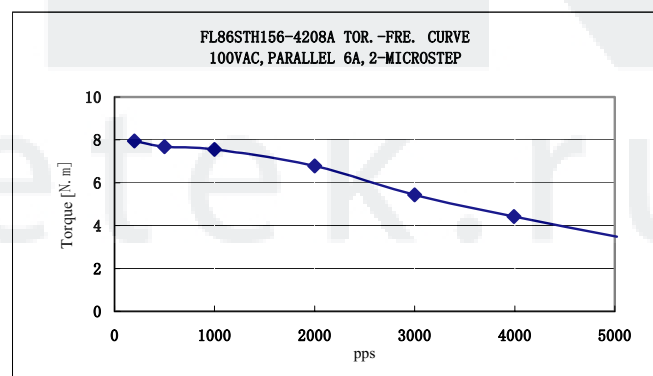
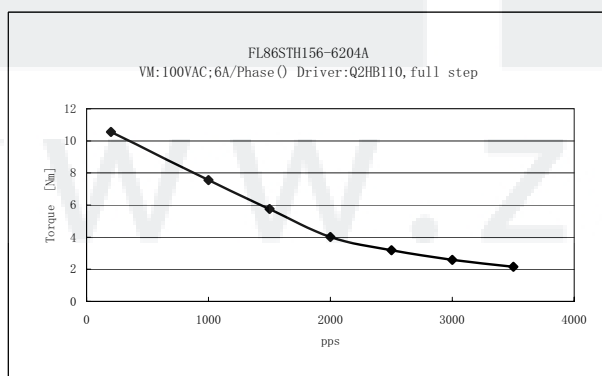
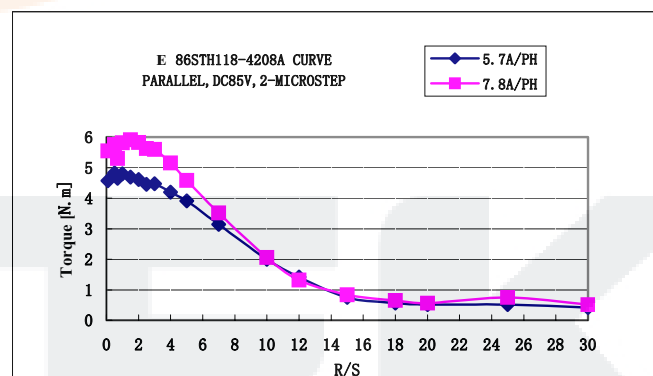
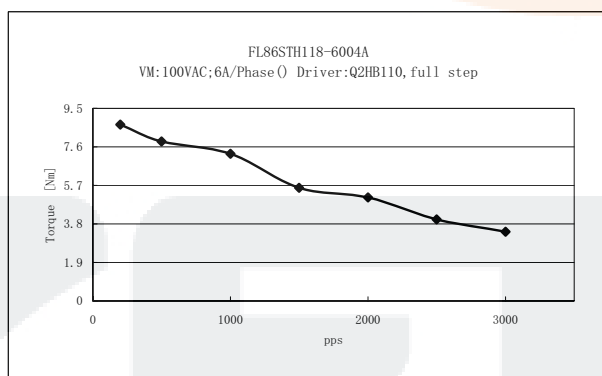
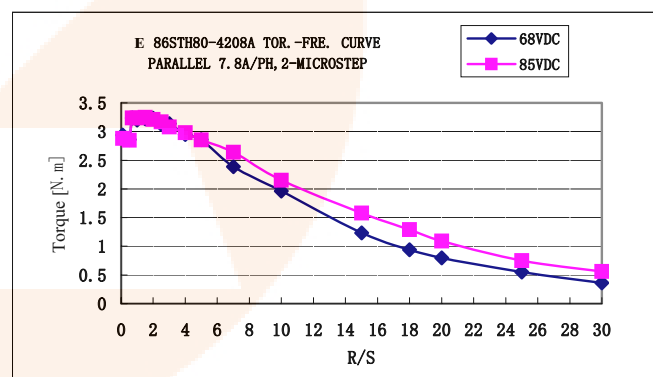
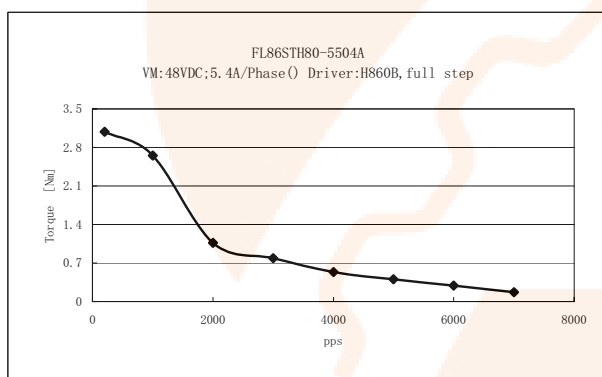
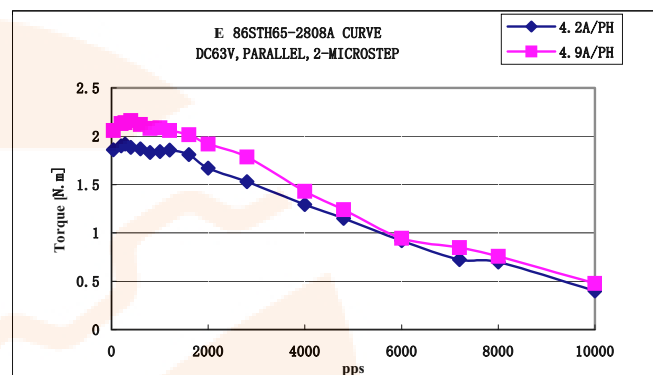
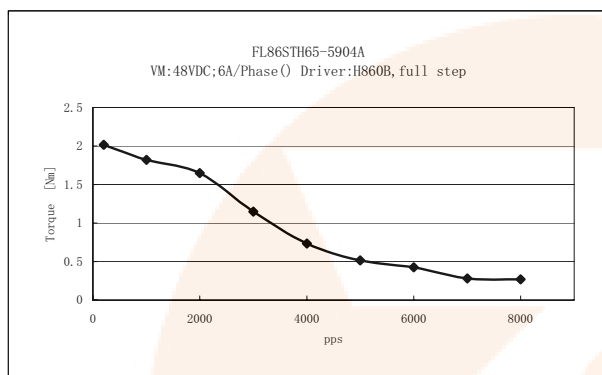
## ● Dimension



## ● WIRE DIAGRAM



## ● Pull out Torque Curve





| Model No.         | Current<br>/Phase | Resistance<br>/Phase | Inductance<br>/Phase | Holding<br>Torque | # of<br>Leads | Rotor<br>Inertia  | Weight | Detent<br>Torque | Length |
|-------------------|-------------------|----------------------|----------------------|-------------------|---------------|-------------------|--------|------------------|--------|
| Single shaft      | A                 | Ω                    | mH                   | N.m               | #             | g-cm <sup>2</sup> | kg     | kg-cm            | mm     |
| FL110STH99-5504A  | 5.5               | 0.9                  | 12                   | 11.2              | 4             | 5500              | 5      | 3                | 99     |
| FL110STH150-6504A | 6.5               | 0.8                  | 15                   | 21                | 4             | 10900             | 8.4    | 5.9              | 150    |
| FL110STH201-8004A | 8                 | 0.67                 | 12                   | 28                | 4             | 16200             | 11.7   | 7.5              | 201    |

Technical drawing of a mechanical part, showing front and top views with dimensions and tolerances.

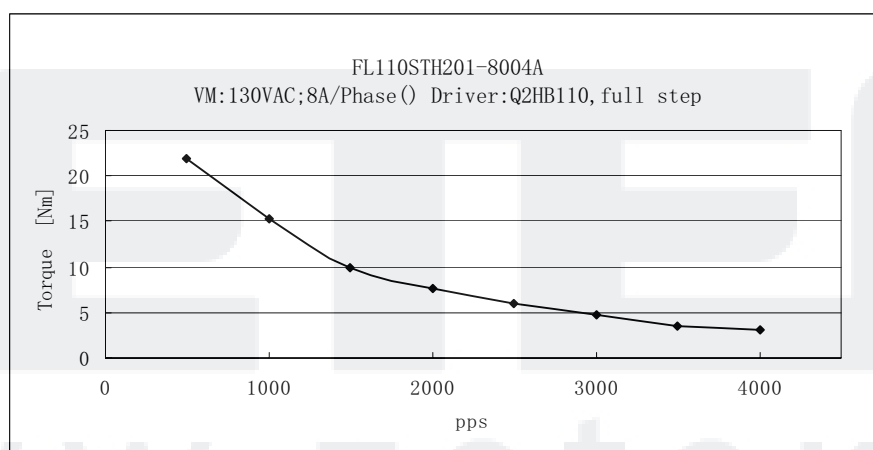
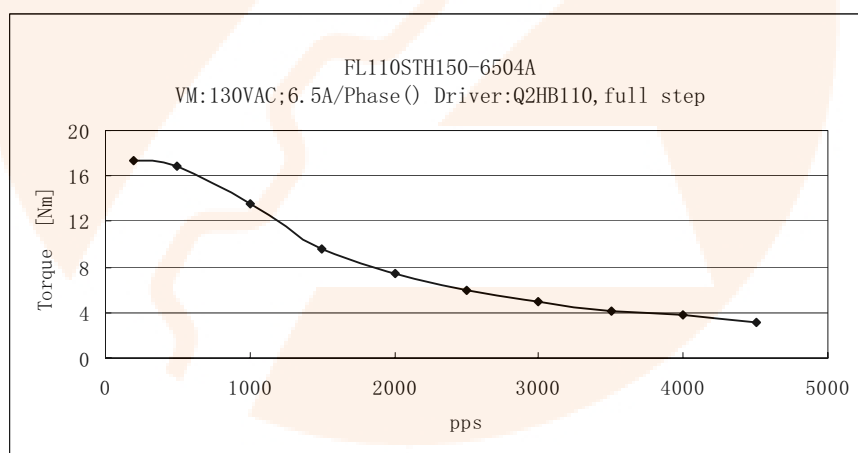
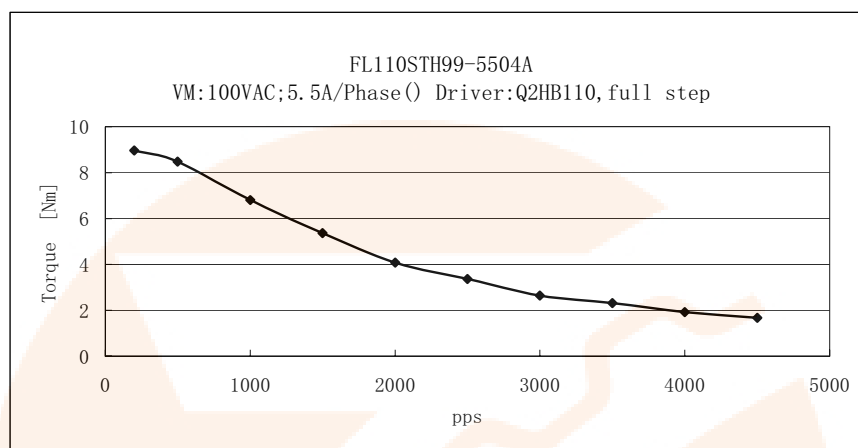
**Front View (Left):**

- Overall length:  $55.37 \pm 1$
- Overall width:  $55.52$
- Inner width:  $35 \pm 0.2$
- Bottom flange width:  $12.5$
- Bottom flange thickness:  $1.52$
- Top surface texture:  $0.076$  A
- Left side texture:  $0.05$  A
- Left side hole diameter:  $\varnothing 19_{-0.012}^0$
- Left side hole position:  $55.52$  from the left edge

**Top View (Right):**

- Overall width:  $109.86$
- Overall length:  $109.86$
- Inner square width:  $93.3 \pm 0.2$
- Inner square length:  $93.3 \pm 0.2$
- Inner square hole diameter:  $\varnothing 21.5$
- Inner square hole position:  $6$  from the center
- Four corner holes:  $4 \varnothing 8.5$
- Bottom flange thickness:  $310 \pm 10$
- Bottom flange material: AWG18#

### ● Pull out Torque Curve



# 0.72° , 1.2° , 1.5° and 1.8° Size 110mm Hybrid Stepping Motor A36

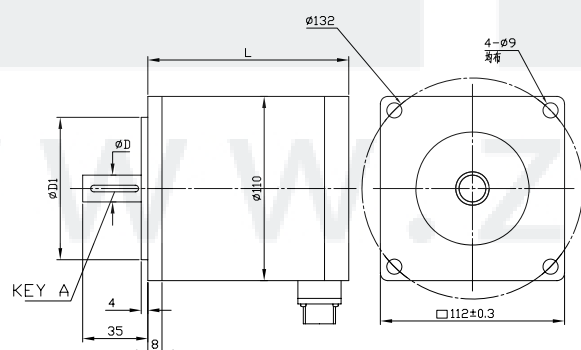
## ● General Specification for Hybrid Stepping Motor

| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 0.72/1.2/1.5/ 1.8°                   |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 1500VAC for one minute               |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 220N (20mm from the flange)          |
| Max. axial force      | 60N                                  |
| Rotation              | CW( See from Front Flange)           |

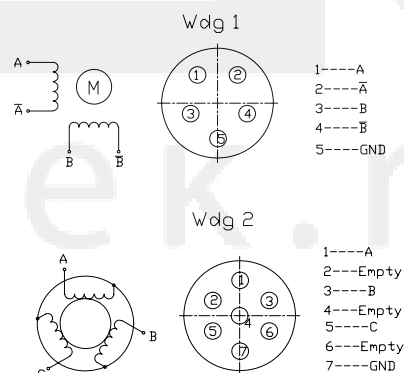
## ● Size 110mm Hybrid Stepping Motor Specifications

| Model No.    | No. of phase | Step angle | Rated Voltage | Current /Phase | No Load Run Frequency | Holding Torque | Rotor Inertia      | Length | Shaft Dimention Φ D             | Flange Dimention Φ D1      | KEY A | Wiring Diagram |
|--------------|--------------|------------|---------------|----------------|-----------------------|----------------|--------------------|--------|---------------------------------|----------------------------|-------|----------------|
| Single shaft |              | degree     | V             | A              | KHz                   | Kg.cm          | kg-cm <sup>2</sup> | mm     | mm                              | mm                         |       |                |
| FL110BYG2500 | 2            | 1.8        | 120-310       | 4.0            | ≥15                   | 8.0            | 6.0                | 86     | 16 <sup>-0.01<br/>-0.022</sup>  | 85 <sup>0<br/>-0.017</sup> | 4×9   | 1              |
| FL110BYG2501 | 2            | 1.8        | 120-310       | 4.0            | ≥15                   | 12.0           | 11.0               | 144    | 16 <sup>-0.01<br/>-0.022</sup>  | 85 <sup>0<br/>-0.017</sup> | 4×9   | 1              |
| FL110BYG2502 | 2            | 1.8        | 120-310       | 5.0            | ≥20                   | 20.0           | 15.0               | 182    | 16 <sup>-0.01<br/>-0.022</sup>  | 85 <sup>0<br/>-0.017</sup> | 4×9   | 1              |
| FL110BYG2600 | 2            | 1.5        | 120-310       | 4.0            | ≥15                   | 8.0            | 6.0                | 86     | 16 <sup>-0.01<br/>-0.022</sup>  | 85 <sup>0<br/>-0.017</sup> | 4×9   | 1              |
| FL110BYG2601 | 2            | 1.5        | 120-310       | 4.0            | ≥20                   | 12.0           | 11.0               | 142    | 16 <sup>-0.01<br/>-0.022</sup>  | 85 <sup>0<br/>-0.017</sup> | 4×9   | 1              |
| FL110BYG2602 | 2            | 1.5        | 120-310       | 5.0            | ≥20                   | 20.0           | 15.0               | 184    | 16 <sup>-0.01<br/>-0.022</sup>  | 85 <sup>0<br/>-0.017</sup> | 4×9   | 1              |
| FL110BYG3500 | 3            | 1.2        | 120-310       | 3.0            | ≥25                   | 8.0            | 6.0                | 100    | 19 <sup>-0.013<br/>-0.028</sup> | 85 <sup>0<br/>-0.017</sup> | 6×30  | 2              |
| FL110BYG3501 | 3            | 1.2        | 120-310       | 3.0            | ≥30                   | 12.0           | 11.0               | 144    | 19 <sup>-0.013<br/>-0.028</sup> | 85 <sup>0<br/>-0.017</sup> | 6×30  | 2              |
| FL110BYG3502 | 3            | 1.2        | 120-310       | 3.0            | ≥30                   | 16.0           | 15.0               | 182    | 19 <sup>-0.013<br/>-0.028</sup> | 85 <sup>0<br/>-0.017</sup> | 6×30  | 2              |
| FL110BYG3503 | 3            | 1.2        | 120-310       | 3.0            | ≥30                   | 20.0           | 18.0               | 261    | 19 <sup>-0.013<br/>-0.028</sup> | 85 <sup>0<br/>-0.017</sup> | 6×30  | 2              |
| FL110BYG5501 | 5            | 0.72       | 120-310       | 3.0            | ≥20                   | 10.0           | 11.0               | 144    | 16 <sup>-0.01<br/>-0.022</sup>  | 56 <sup>0<br/>-0.017</sup> | 5×25  | 1              |
| FL110BYG5502 | 5            | 0.72       | 120-310       | 5.0            | ≥20                   | 16.0           | 15.0               | 189    | 16 <sup>-0.01<br/>-0.022</sup>  | 56 <sup>0<br/>-0.017</sup> | 5×25  | 1              |
| FL110BYG5503 | 5            | 0.72       | 120-310       | 5.0            | ≥20                   | 20.0           | 18.0               | 231    | 19 <sup>-0.013<br/>-0.028</sup> | 56 <sup>0<br/>-0.017</sup> | 5×25  | 1              |

## Dimension



## Wiring Diagram



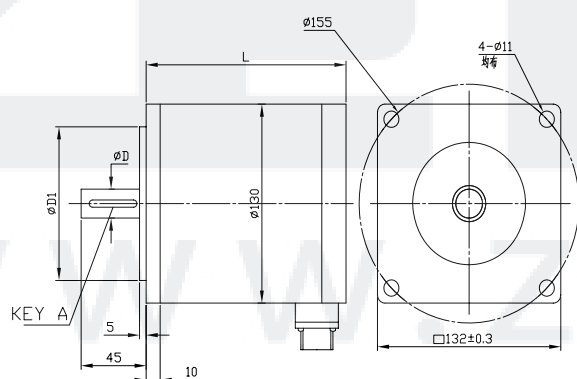
● General Specification for Hybrid Stepping Motor

| Item                  | Specifications                       |
|-----------------------|--------------------------------------|
| Step Angle            | 0.72° / 1.2° / 1.8°                  |
| Step Angle Accuracy   | ± 5% (full step, no load)            |
| Resistance Accuracy   | ± 10%                                |
| Inductance Accuracy   | ± 20%                                |
| Temperature Rise      | 80° C Max.(rated current,2 phase on) |
| Ambient Temperature   | -20° C~+50° C                        |
| Insulation Resistance | 100M Ω Min. ,500VDC                  |
| Dielectric Strength   | 1500VAC for one minute               |
| Shaft Radial Play     | 0.02Max. (450 g-load)                |
| Shaft Axial Play      | 0.08Max. (450 g-load)                |
| Max. radial force     | 220N (20mm from the flange)          |
| Max. axial force      | 60N                                  |
| Rotation              | CW( See from Front Flange)           |

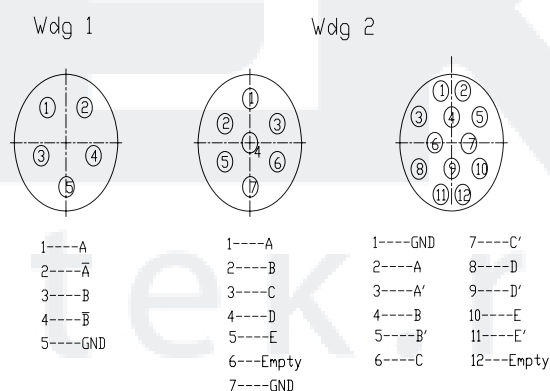
● Size 110mm Hybrid Stepping Motor Specifications

| Model No.    | No. of phase | Step angle | Rated Voltage | Current /Phase | No Load Run Frequency | Holdin g Torque | Rotor Inertia      | Length | Shaft Dimention Φ D             | Flange Dimention Φ D1       | KEY A | Wiring Diagram |
|--------------|--------------|------------|---------------|----------------|-----------------------|-----------------|--------------------|--------|---------------------------------|-----------------------------|-------|----------------|
| Single shaft |              | degree     | V             | A              | KHz                   | Kg.cm           | kg-cm <sup>2</sup> | mm     | mm                              | mm                          |       |                |
| FL130BYG2501 | 2            | 1.8        | 120-310       | 6.0            | ≥20                   | 27              | 33                 | 165    | 19 <sup>-0.013<br/>-0.028</sup> | 100 <sup>0<br/>-0.023</sup> | 5×25  | 1              |
| FL130BYG2502 | 2            | 1.8        | 120-310       | 7.0            | ≥15                   | 40              | 48                 | 230    | 19 <sup>-0.013<br/>-0.028</sup> | 100 <sup>0<br/>-0.023</sup> | 5×25  | 1              |
| FL130BYG2503 | 2            | 1.8        | 120-310       | 7.0            | ≥12                   | 50              | 60                 | 270    |                                 | 100 <sup>0<br/>-0.023</sup> |       | 1              |
| FL130BYG3501 | 3            | 1.2        | 80-325        | 6.0            | ≥15                   | 25              | 33                 | 165    | 19 <sup>-0.013<br/>-0.028</sup> | 100 <sup>0<br/>-0.023</sup> | 5×25  |                |
| FL130BYG3502 | 3            | 1.2        | 80-325        | 6.0            | ≥15                   | 37              | 48                 | 230    | 19 <sup>-0.013<br/>-0.028</sup> | 100 <sup>0<br/>-0.023</sup> | 5×25  |                |
| FL130BYG3503 | 3            | 1.2        | 80-325        | 6.0            | ≥15                   | 50              | 60                 | 270    |                                 | 100 <sup>0<br/>-0.023</sup> |       |                |
| FL130BYG5501 | 5            | 0.72       | 120-310       | 5.0            | ≥20                   | 20              | 33                 | 165    | 19 <sup>-0.013<br/>-0.028</sup> | 100 <sup>0<br/>-0.023</sup> | 5×25  | 2              |
| FL130BYG5502 | 5            | 0.72       | 120-310       | 5.0            | ≥20                   | 30              | 48                 | 230    | 19 <sup>-0.013<br/>-0.028</sup> | 100 <sup>0<br/>-0.023</sup> | 5×25  | 2              |
| FL130BYG5503 | 5            | 0.72       | 120-310       | 5.0            | ≥15                   | 40              | 60                 | 270    |                                 | 100 <sup>0<br/>-0.023</sup> |       | 2              |

Dimension



Wiring Diagram



## ● General Specification for High Torque Hybrid Stepping Motor

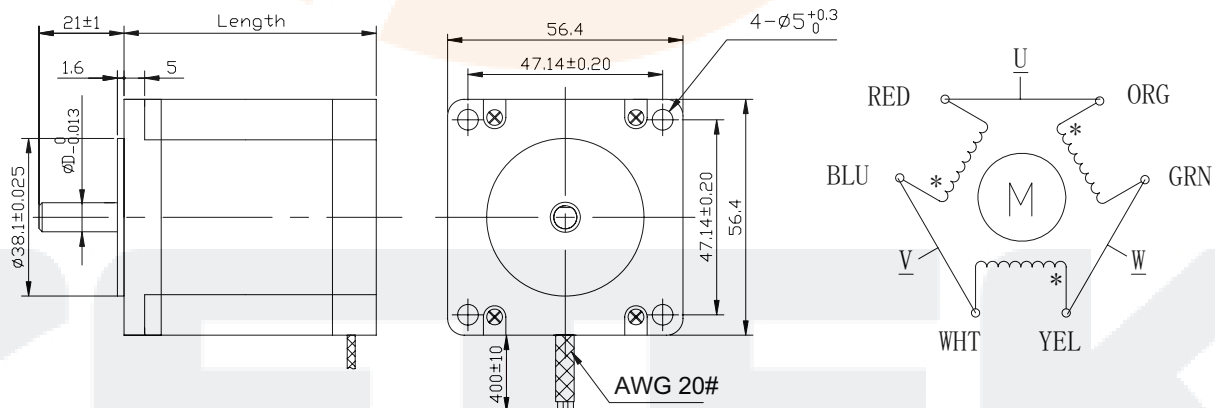
| Item                  | Specifications             |
|-----------------------|----------------------------|
| Step Angle            | 1.2°                       |
| Step Angle Accuracy   | ±5% (full step, no load)   |
| Resistance Accuracy   | ±10%                       |
| Inductance Accuracy   | ±20%                       |
| Temperature Rise      | 80° C Max.(rated current)  |
| Ambient Temperature   | -20° C~+50° C              |
| Insulation Resistance | 100M Ω Min. ,500VDC        |
| Dielectric Strength   | 500VAC for one minute      |
| Shaft Radial Play     | 0.02Max. (450 g-load)      |
| Shaft Axial Play      | 0.08Max. (450 g-load)      |
| Max. radial force     | 75N (20mm from the flange) |
| Max. axial force      | 15N                        |
| Insulation class      | F                          |



## ● Size 57mm 3-Phase Hybrid Stepping Motor Specifications

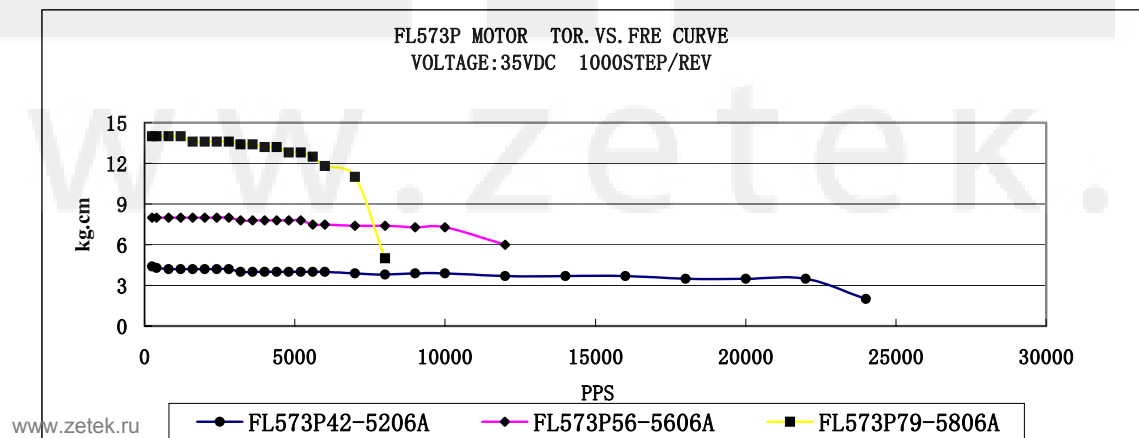
| Model No.      | Voltage /Phase | Inductance /Phase | Resistance /Phase | Current /Phase | Holding Torque | Detent Torque | Rotor Inertia     | Weight | Length ( L ) |
|----------------|----------------|-------------------|-------------------|----------------|----------------|---------------|-------------------|--------|--------------|
| unit           | V              | mH                | Ω                 | A              | N.m            | N.cm          | g-cm <sup>2</sup> | kg     | mm           |
| FL573P42-5206A | 6.76           | 1.4               | 1.3               | 5.2            | 0.45           | 2.1           | 110               | 0.45   | 42           |
| FL573P56-5606A | 4              | 1.7               | 0.7               | 5.6            | 0.90           | 4             | 300               | 0.75   | 56           |
| FL573P79-5806A | 6              | 2.4               | 1.05              | 5.8            | 1.5            | 6.8           | 480               | 1.10   | 79           |

## ● Dimension



For FL573P42-5206A & FL573P56-5606A, “D” is 6.35, for FL573P79-5806A, “D” is 8.

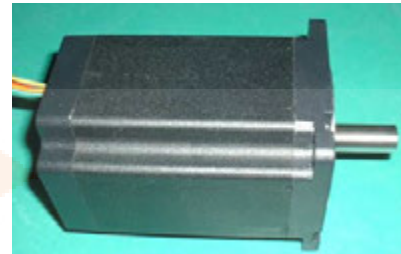
## ● Pull out Torque Curve





### ● General Specification for High Torque Hybrid Stepping Motor

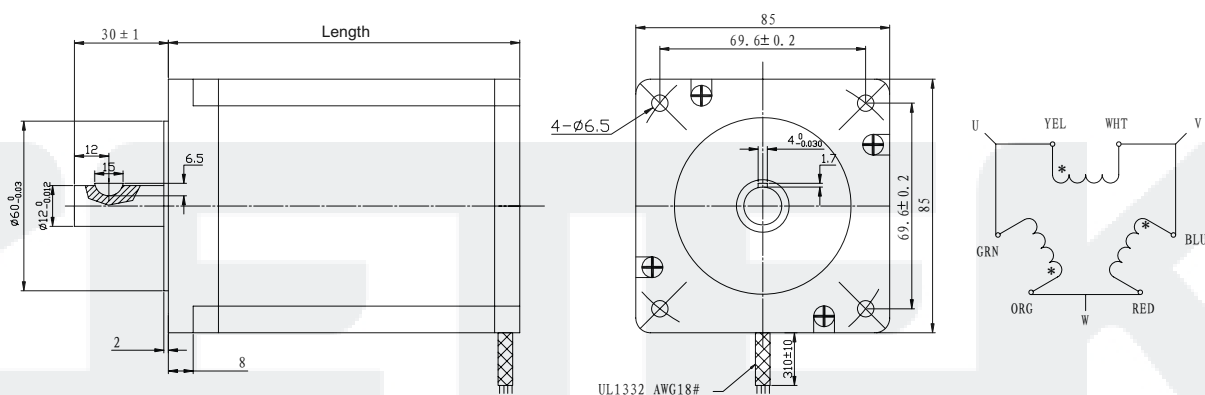
| Item                  | Specifications              |
|-----------------------|-----------------------------|
| Step Angle            | 1.2°                        |
| Step Angle Accuracy   | ±5% (full step, no load)    |
| Resistance Accuracy   | ±10%                        |
| Inductance Accuracy   | ±20%                        |
| Temperature Rise      | 80° C Max.(rated current)   |
| Ambient Temperature   | -20° C~+50° C               |
| Insulation Resistance | 100M Ω Min. ,500VDC         |
| Dielectric Strength   | 1800VAC , 1s , 3mA          |
| Shaft Radial Play     | 0.02Max. (450 g-load)       |
| Shaft Axial Play      | 0.08Max. (450 g-load)       |
| Max. radial force     | 220N (20mm from the flange) |
| Max. axial force      | 60N                         |
| Insulation class      | F                           |



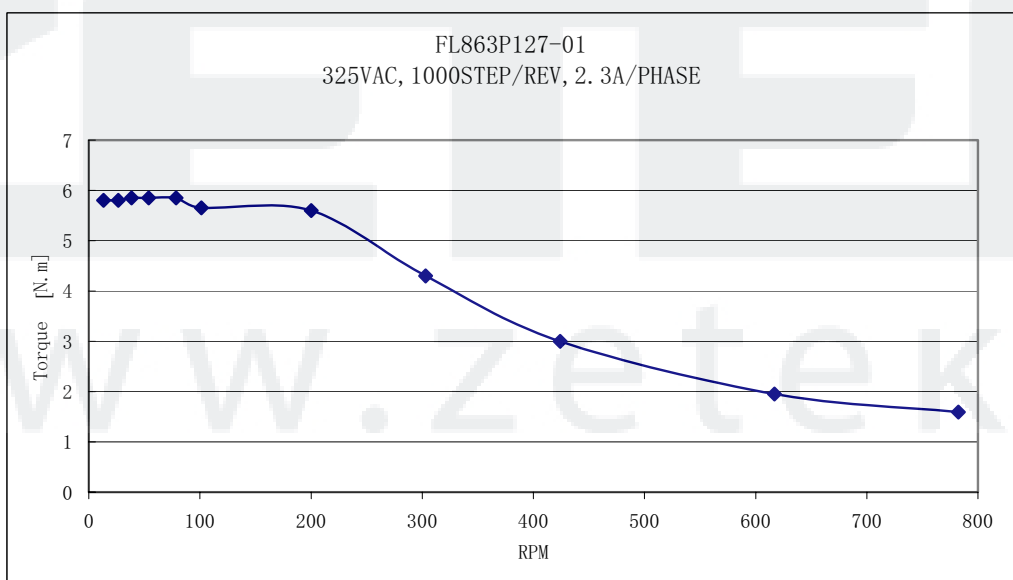
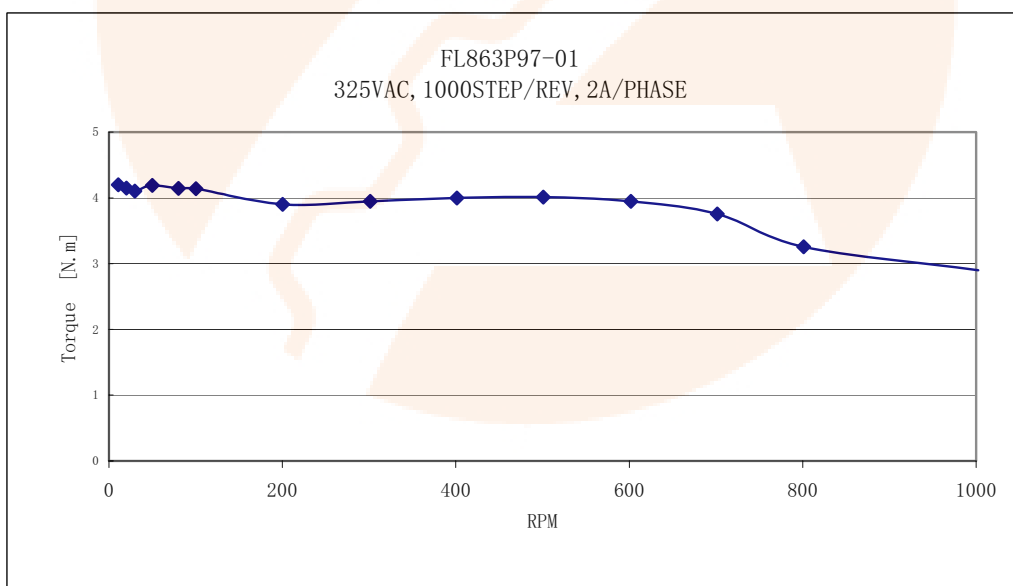
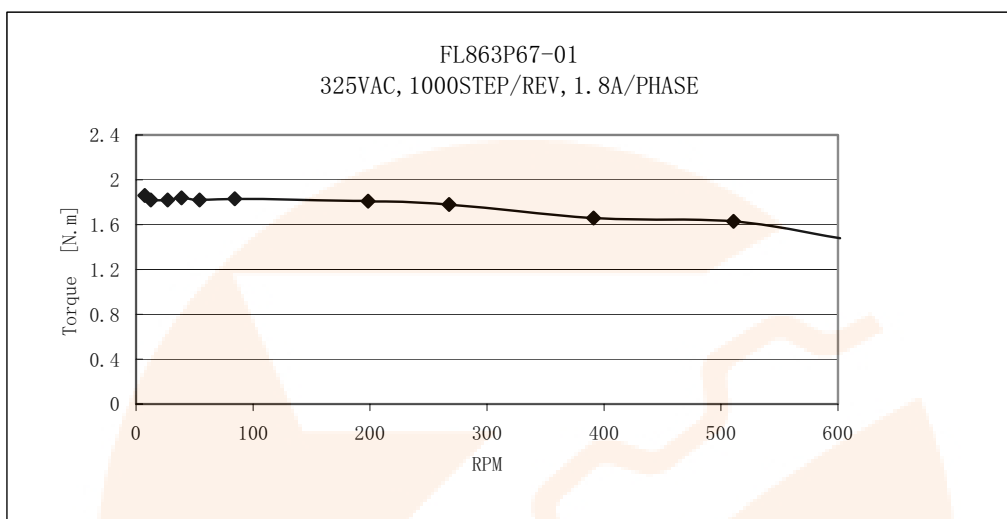
### ● Size 86mm 3-Phase Hybrid Stepping Motor Specifications

| Model No.    | Voltage /phase | Current /Phase | Resistance /Phase | Inductance /Phase | Holding Torque | Ratedng Torque | Rotor Inertia     | Weight | Length |
|--------------|----------------|----------------|-------------------|-------------------|----------------|----------------|-------------------|--------|--------|
| unit         | VDC            | A              | Ω                 | mH                | N.m            | N.m            | g-cm <sup>2</sup> | kg     | mm     |
| FL863P67-01  | 325            | 1.75           | 4.25              | 12.3              | 2.26           | 2              | 1100              | 1.65   | 67     |
| FL863P97-01  | 325            | 2              | 5.4               | 23                | 4.52           | 4              | 2320              | 2.7    | 97     |
| FL863P97-02  | 40             | 5.8            | 0.9               | 3.2               | 4.52           | 4              |                   |        |        |
| FL863P127-01 | 325            | 2.25           | 9                 | 41                | 6.78           | 6              | 3300              | 3.8    | 127    |
| FL863P127-02 | 40             | 5.2            | 2.75              | 13.7              | 6.78           | 6              |                   |        |        |

### ● Dimension



## Pull out Torque Curve



| Item                  | Specifications              |
|-----------------------|-----------------------------|
| Step Angle            | 1. 2°                       |
| Step Angle Accuracy   | ± 5% (full step, no load)   |
| Resistance Accuracy   | ± 10%                       |
| Inductance Accuracy   | ± 20%                       |
| Temperature Rise      | 80° C Max.(rated current)   |
| Ambient Temperature   | -20° C~+50° C               |
| Insulation Resistance | 100M Ω Min. ,500VDC         |
| Dielectric Strength   | 1800VAC , 1s ,5mA           |
| Shaft Radial Play     | 0.02Max. (450 g-load)       |
| Shaft Axial Play      | 0.08Max. (450 g-load)       |
| Max. radial force     | 220N (20mm from the flange) |
| Max. axial force      | 60N                         |
| Insulation class      | F                           |



| Model No.     | Max. starting speed | Voltage /Phase | Current /Phase | Holding Torque | Ratedng Torque | Rotor Inertia     | Weight | Length |
|---------------|---------------------|----------------|----------------|----------------|----------------|-------------------|--------|--------|
| unit          | Rpm/s               | VDC            | A              | N.m            | N.m            | g-cm <sup>2</sup> | kg     | mm     |
| FL1103P170-01 | 4.7                 | 325            | 4.1            | 13.92          | 12             | 10500             | 8      | 173    |

Technical drawing of a 3-phase motor, showing front and side views with dimensions and a wiring diagram.

**Dimensions:**

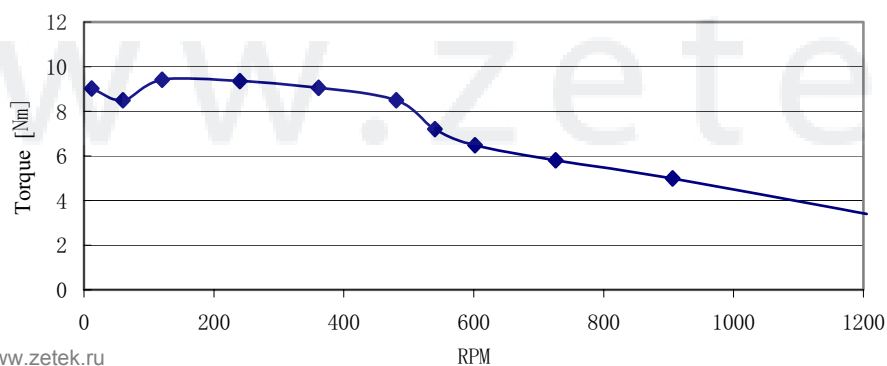
- Top flange diameter:  $\varnothing 56^{0}_{-0.03}$
- Top flange thickness: 22
- Motor body diameter:  $\varnothing 109.86$
- Motor body length: 109.86
- Motor body width: 89  $\pm$  0.2
- Motor body height: 89  $\pm$  0.2
- Motor body depth: 155  $\pm$  3
- Motor body width (bottom): 173
- Motor body depth (bottom): 12.19
- Motor body width (left): 40
- Motor body depth (left): 30
- Motor body width (right): 3
- Motor body depth (right): 12.19
- Motor body width (top): 22
- Motor body depth (top): 12.19
- Motor body width (bottom): 173
- Motor body depth (bottom): 12.19

**Wiring Diagram:**

The wiring diagram shows the motor's internal connections. The motor is a 3-phase motor with the following color coding:

- U PHASE - WHITE
- V PHASE - GREEN
- W PHASE - BLACK
- GRN (Ground)
- ORG (Orange)
- RED (Red)
- YEL (Yellow)
- WHT (White)
- BLU (Blue)

FL11039170-01  
VM:220VAC, 4A/PHASE, 1000STEP/REV

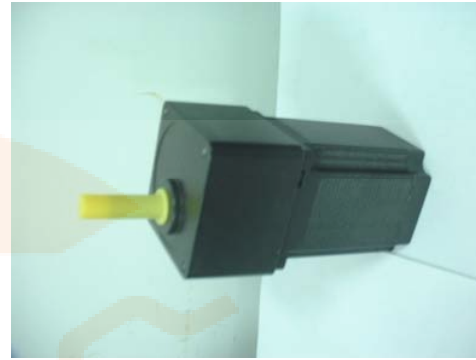


# FL57STHJB Gearbox Stepping Motor

A42

## ● Motor Specifications

Same as FL57STH series motor



## ● Gearbox Specifications

Output shaft radial load 12kg

Output shaft thrust load 24kg

| Ratio                      | 3      | 7.5 | 12.5 | 15       | 25 | 30 | 50     | 75 | 90 | 100    | 120 | 150 |
|----------------------------|--------|-----|------|----------|----|----|--------|----|----|--------|-----|-----|
| Number of gear trains      | 2      | 2   | 2    | 3        | 3  | 3  | 4      | 4  | 5  | 5      | 5   | 5   |
| Length(L) mm               | 32     | 32  | 32   | 32       | 42 | 42 | 42     | 42 | 42 | 42     | 42  | 42  |
| Peak torque kg.cm          | 50     |     |      |          |    |    |        |    |    |        |     |     |
| Average Backlash At Nolaod | 4 deg. |     |      | 3.5 deg. |    |    | 3 deg. |    |    | 2.5deg |     |     |

## ● Dimensions

