# **Stepping Motors**

Allowable Load ▶p. 71 Internal Wiring, Rotation Direction ▶p. 72 General Specifications ▶p. 73



14 mm sq.

1.8°/step

Ultra-compact RoHS

Bipolar winding, Lead wire type

#### Customizing

Hollow Shaft modification

Varies depending on the model number and quantity. Contact us for details.

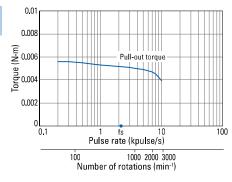
#### Bipolar winding, Lead wire type

| Model no.    |             | Holding torque at 2-phase energization | Rated current | Wiring resistance | Winding inductance | Rotor inertia | Mass  | Motor<br>length (L) |
|--------------|-------------|--|---------------|-------------------|--------------------|---------------|-------|---------------------|
| Single shaft | Dual shaft  | N·m min.                               | A/phase       | Ω/phase           | mH/phase           | ×10⁻⁴kg⋅m²    | kg    | mm                  |
| SH2141-5541  | SH2141-5511 | 0.0065                                 | 0.3           | 21                | 4.2                | 0.00058       | 0.03  | 30                  |
| SH2145-5641  | SH2145-5611 | 0.01                                   | 0.4           | 19                | 4                  | 0.0011        | 0.042 | 43.8                |

# Characteristics diagram

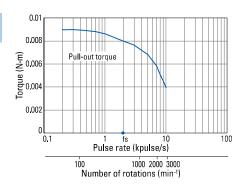
#### SH2141-5541 SH2141-5511

Constant current circuit Source voltage: 24 VDC Operating current: 0,3 A/phase, 2-phase energization (full-step) Pull-out torque: 1,i=0.01×10-4kg·m² (pulley balancer method) fs: Maximum self-start frequency when not loaded

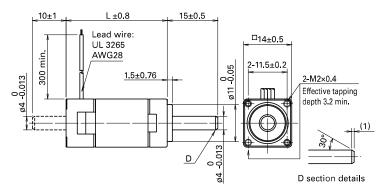


#### SH2145-5641 SH2145-5611

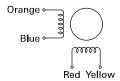
Constant current circuit Source voltage: 24 VDC Operating current: 0.4 A/phase, 2-phase energization (full-step) Pull-out torque: J.=0.01×10-4kg·m² (pulley balancer method) fs: Maximum self-start frequency when not loaded



# Dimensions (Unit: mm)



#### Internal wiring

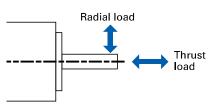


#### Compatible drivers

Driver is not included.

If you require assistance finding a driver, contact us for details.

# Allowable Radial/Thrust Load



|               |            | Distance f  | rom end of | shaft: mm |     | Thurst Innal         |
|---------------|------------|-------------|------------|-----------|-----|----------------------|
| Motor size    | Model no.  | 0           | 5          | 10        | 15  | - Thrust load<br>- N |
|               |            | Radial load |            | — IN      |     |                      |
| 14 mm sq.     | SH214 🗌    | 10          | 11         | 13        | _   | 0.7                  |
| 28 mm sq.     | SH228 🗌    | 42          | 48         | 56        | 66  | 3                    |
| 35 mm sq.     | SH353 🗌    | 40          | 50         | 67        | 98  | 10                   |
|               | SF242 □    | 20          | 29         | 49        | 68  | - 10                 |
| 42 mm sq.     | SH142 🗌    | 22          | 26         | 33        | 46  | - 10                 |
|               | SS242 🗌    | 10          | _          | _         | _   | 4.9                  |
| 50 mm sq.     | 103H670 🗌  | 71          | 87         | 115       | 167 | 15                   |
| 50 IIIII sq.  | SS250 🗌    | 8.5         | -          | _         | _   | 4.9                  |
| 56 mm sq.     | 103H712 🗌  | 52          | 65         | 85        | 123 | 15                   |
| 50 IIIII sq.  | 103H7128   | 85          | 105        | 138       | 200 | 15                   |
| 60 mm sq.     | 103H782 🗌  | - 70        | 87         | 114       | 165 | 20                   |
| oo iiiiii sq. | SH160 🗆    | ,,,         | 07         | 114       | 105 | 15                   |
| 86 mm sq.     | SM286 □    | 167         | 193        | 229       | 280 | 60                   |
| 00 mm 3q.     | SH286 🗆    | 107         | 100        | 220       | 200 | 00                   |
| °86 mm        | 103H822 🗌  | 191         | 234        | 301       | 421 | 60                   |
| °106 mm       | 103H8922 🗌 | 321         | 356        | 401       | 457 | 100                  |

# **Internal Wiring and Rotation Direction**

# **Unipolar winding**

Connector type model no.: SF242

# Internal wire connection

( ) connector pin number



# Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

|                |   | Connector pin no. |     |     |     |      |  |  |
|----------------|---|-------------------|-----|-----|-----|------|--|--|
|                |   | (3, 9)            | (1) | (7) | (5) | (11) |  |  |
|                | 1 | +                 | _   | -   |     |      |  |  |
| Exciting order | 2 | +                 |     | -   | -   |      |  |  |
| order          | 3 | +                 |     |     | -   | -    |  |  |
|                | 4 | +                 | _   |     |     | -    |  |  |

Connector type model no.: 103H782

# Internal wire connection

( ) connector pin number



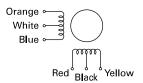
# Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

|                |   | Connector pin no. |     |     |     |     |  |  |
|----------------|---|-------------------|-----|-----|-----|-----|--|--|
|                |   | (1, 6)            | (4) | (3) | (5) | (2) |  |  |
|                | 1 | +                 | -   | -   |     |     |  |  |
| Exciting order | 2 | +                 |     | -   | -   |     |  |  |
| order          | 3 | +                 |     |     | -   | -   |  |  |
|                | 4 | +                 | -   |     |     | -   |  |  |

Lead wire type

# Internal wire connection



# Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

|          |   | Lead wire color  |   |      |        |        |  |  |
|----------|---|------------------|---|------|--------|--------|--|--|
|          |   | White, black Red |   | Blue | Yellow | Orange |  |  |
|          | 1 | +                | - | -    |        |        |  |  |
| Exciting | 2 | +                |   | -    | -      |        |  |  |
| order    | 3 | +                |   |      | -      | -      |  |  |
|          | 4 | +                | - |      |        | -      |  |  |

# **Bipolar winding**

Connector type model no.: SF242

### Internal wire connection

( ) connector pin number



#### Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

|                |   | Connect | or pin no. |     |     |
|----------------|---|---------|------------|-----|-----|
|                |   | (3)     | (7)        | (5) | (9) |
|                | 1 | -       | -          | +   | +   |
| Exciting       | 2 | +       | _          | -   | +   |
| Exciting order | 3 | +       | +          | -   | -   |
|                | 4 | _       | +          | +   | -   |

Connector type model no.: 103H782

# Internal wire connection

( ) connector pin number



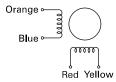
#### Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

|                | Connector pin no. |     |     |     |   |
|----------------|-------------------|-----|-----|-----|---|
|                | (3)               | (2) | (4) | (1) |   |
|                | 1                 | -   | -   | +   | + |
| Exciting order | 2                 | +   | -   | -   | + |
| order          | 3                 | +   | +   | -   | - |
|                | 4                 | _   | +   | +   | _ |

Lead wire type

# Internal wire connection



# Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

|                |   | Lead wir | e color |        |        |
|----------------|---|----------|---------|--------|--------|
|                |   | Red      | Blue    | Yellow | Orange |
|                | 1 | -        | -       | +      | +      |
| Exciting order | 2 | +        | -       | -      | +      |
| order          | 3 | +        | +       | -      | _      |
|                | 4 | _        | +       | +      | _      |

# **General Specifications**

| Motor model no.  | SH214 🗌  | SH228 🗌  | SH353 🗌   | SS242 🗌  | SH142 🗌   | SF242 🗌  | SS250 🗌   | 103H670 🗌   | 103H712 🗌   |
|--|--|--|---|--|---|--|---|---|---|
| Type   | -  | 311220   | 311333  | 33242  | 311142  | 31242  | 33230   | 10311070  | 10311712  |
| Operating ambient temperature  | -10 to +50°C   |  |   |  |   |  |   |   |   |
| Storage temperature  |  |  |   |  |   |  |   |   |   |
| Operating ambient humidity   |  | H (no conder   | nsation)  | ,  | ,   |  |   |   |   |
| Storage humidity   |  | to 95% RH (no condensation)  |   |  |   |  |   |   |   |
| Operation altitude   | /  | 000 m max. above sea level   |   |  |   |  |   |   |   |
| Vibration resistance   | Vibration fre  |  | 500 Hz, tota  |  |   |  | ration accele   | ration 150 m/s  | s² (70 to 500   |
| Impact resistance  | 500 m/s <sup>2</sup> of a  | cceleration fo   | r 11 ms with  | half-sine wav  | e applying th   | ree times for X  | (, Y, and Z axe   | s each, 18 time   | es in total.  |
| Thermal class  | Class B (+13   | 30°C)  |   |  |   |  |   |   |   |
| Withstandable<br>voltage   |  | At normal temperature and humidity, no failure with 500 VAC @50/60 Hz applied for one minute between motor winding and frame.  At normal temperature and humidity, no failure with 1000 @50/60 Hz applied for one minute between motor winding and frame.  |   |  |   | ure with 1000 VA0<br>ed for one minute   |   |   |   |
| Insulation resistance  | At normal to   | emperature a   | nd humidity   | , not less tha   | n 100 <b>M</b> Ω be   | tween windir   | ng and frame  | by 500 VDC n  | negger.   |
| Protection grade   | _  |  |   |  |   |  |   |   |   |
| Winding temperature rise   | 80 K max. (F   | Based on SAI   | NYO DENKI s   | standard)  |   |  |   |   |   |
| Static angle error   | ±0.09°   |  |   |  | ±0.054°   | ±0.09°   |   |   | ±0.054°   |
| Thrust play *1   | 0.075 mm<br>max.<br>(load: 0.35<br>N)  | 0.075 mm<br>max.<br>(load: 1.5 N)  | 0.075 mm<br>max.<br>(load: 5 N)   | 0.075 mm<br>max.<br>(load: 4 N)  | 0.075 mm<br>max.<br>(load: 5 N)   | 0.075 mm<br>(load: 5 N)  | 0.075 mm<br>max.<br>(load: 4 N)   | 0.075 mm<br>(load: 10 N)  | 0.075 mm<br>(load: 10 N)                              |
| Radial play *2   | 0.025 mm m   | nax. ( <b>l</b> oad: 5 l   | N)  |  | ,   |  |   |   |   |
| Shaft runout   | 0.025 mm   |  |   |  |   |  |   |   |   |
| Concentricity of mounting pilot relative to shaft  | ø0.05 mm   | ø0.05 mm   | ø0.075 mm   | ø0.075 mm  | ø0.05 mm  | ø0.05 mm   | ø0.075 mm   | ø0.075 mm   | ø0.075 mm   |
| Squareness of mounting surface relative to shaft   | 0.1 111111   | 0.1 mm   | 0.1 mm  | 0.1 mm   | 0.1 mm  | 0.1 mm   | 0.1 mm  | 0.075 mm  | 0.075 mm  |
| Direction of motor mounting  | Can be free  | ly mounted v   | ertically or h  | orizontally  |   |  |   |   |   |
| Motor model no.  | SH160 🗆  | 103H782 🗆  | SH286 □   | 103H8922   | SM286 □   | 103H712 🔲 -  | 6 🗆 0   103H822<br>CE Mod   |   | H8922 □ -63 □ 1<br>Model                              |
| Type   | _  |  |   |  | S1 (contir  | nuous operati  | on)   |   |   |
| Operating ambient temperature  |  |  |   |  | -10 to +40  |  |   |   |   |
| Storage temperature  |  |  |   |  | -20 to +60  |  |   |   |   |
| Operating ambient humidity   | 20 to 90% RH (no condensation) 95% RH max. at 40°C or less (no condensation)   |  |   |  |   |  | · · · · · · · · · · · · · · · · · · ·   |   |   |
|  | 20 to 30 /0 N  | 5 to 95% RH (no condensation)  95% RH max. at 40°C or less, 57% RH max. at 50°C or less, 35% RH max. at 60°C or less, (no condensation)  |   |  |   |  |   |   |   |
| Storage humidity   |  |  | sation)   |  |   |  | r less (no con  |   |   |
| <u> </u>   | 5 to 95% RH  | I (no condens  | level   |  | 35% RH n  | nax. at 60°C o   | ·   | densation)  | ·<br>   |
| Storage humidity Operation altitude Vibration resistance   | 5 to 95% RH<br>1000 m max<br>Vibration fre<br>500 Hz), swe   | I (no condens<br>c. above sea<br>equency 10 to<br>eep time 15 r  | level<br>500 Hz, tota<br>nin/cycle, 12  | sweeps in ea   | 35% RH n<br>1.52 mm (10<br>ach X, Y and   | to 70 Hz), vib<br>Z direction.   | ration accele   | densation)<br>ration 150 m/s  | s² (70 to   |
| Storage humidity Operation altitude  | 5 to 95% RH<br>1000 m max<br>Vibration fre<br>500 Hz), swe   | I (no condens<br>c. above sea<br>equency 10 to<br>eep time 15 r  | level<br>500 Hz, tota<br>nin/cycle, 12  | sweeps in ea   | 35% RH n<br>1.52 mm (10<br>ach X, Y and<br>ave applying   | to 70 Hz), vib<br>Z direction.   | ration accele   | densation)  | s² (70 to   |
| Storage humidity Operation altitude Vibration resistance   | 5 to 95% RH<br>1000 m max<br>Vibration fre<br>500 Hz), swe<br>500 m/s <sup>2</sup> of a<br>Class B (+13  | I (no condenses above sea lequency 10 to eep time 15 racceleration f   | level<br>o 500 Hz, tota<br>nin/cycle, 12<br>or 11 ms with   | sweeps in ean half-sine wa   | 35% RH n<br>1.52 mm (10<br>ach X, Y and   | to 70 Hz), vib<br>Z direction.   | ration accele<br>or X, Y and Z a  | densation)<br>ration 150 m/s  | s² (70 to   |
| Storage humidity Operation altitude Vibration resistance Impact resistance   | 5 to 95% RH<br>1000 m max<br>Vibration fro<br>500 Hz), swe<br>500 m/s² of a<br>Class B (+13<br>At normal terr<br>ure with 1000   | I (no condens<br>c. above sea<br>equency 10 to<br>eep time 15 r<br>acceleration f  | level<br>5 500 Hz, tota<br>nin/cycle, 12<br>or 11 ms with<br>umidity, no fail<br>applied for one                                      | sweeps in ean half-sine wa   | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C) temperature                              | to 70 Hz), vib<br>Z direction.<br>three times for<br>Class B (+  | ration accele<br>or X, Y and Z a<br>130°C)<br>y, no failure v   | densation) ration 150 m/s axes each, 18 vith 1500 VAC                             | s² (70 to<br>times in total                           |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance   | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute between  | I (no condense. above seal equency 10 to eep time 15 racceleration for acceleration for acc | level  5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for oni  | sweeps in ean half-sine wa   | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute in 100 MΩ be     | to 70 Hz), vib Z direction. three times for Class B (+   | ration accele<br>or X, Y and Z a<br>130°C)<br>y, no failure v<br>tor winding a  | densation) ration 150 m/s axes each, 18 vith 1500 VAC                             | s² (70 to<br>times in total<br>: @50/60 Hz            |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade  | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te  | I (no condense. above sea lequency 10 to eep time 15 racceleration foo colored by the colored by | level 5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame. nd humidity                           | sweeps in each half-sine was h | 35% RH n  1.52 mm (10 ach X, Y and ave applying Class F (+155°C) temperature                              | to 70 Hz), vib Z direction. three times for Class B (+   | ration accele<br>or X, Y and Z a<br>130°C)<br>y, no failure v<br>tor winding a  | densation) ration 150 m/s axes each, 18 with 1500 VAC nd frame.                   | s² (70 to<br>times in total<br>: @50/60 Hz            |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade Winding temperature rise   | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te  80 K max. (E  | I (no condense, above sea lequency 10 to eep time 15 racceleration f 80°C) International Part of the sea lead  | level 5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame. nd humidity                           | sweeps in each half-sine was h | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute in 100 MΩ be     | to 70 Hz), vib Z direction. three times for Class B (+ and humidit between mo  | or X, Y and Z and Z and Z and Z and Z and I and | ration 150 m/s axes each, 18 with 1500 VAC nd frame. by 500 VDC n                 | s² (70 to<br>times in total<br>: @50/60 Hz            |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error  | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te  80 K max. (E ±0.054°  | I (no condense above sea lequency 10 to eep time 15 racceleration f 80°C)  Interpretation and house and ho | level 5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame. nd humidity                           | sweeps in each half-sine was h | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute in 100 MΩ be     | to 70 Hz), vib Z direction. three times for Class B (+   | ration accele<br>or X, Y and Z a<br>130°C)<br>y, no failure v<br>tor winding a  | ration 150 m/s axes each, 18 with 1500 VAC nd frame. by 500 VDC n                 | s² (70 to<br>times in total<br>: @50/60 Hz            |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade Winding temperature rise   | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te  80 K max. (B ±0.054°  | I (no condense, above sea lequency 10 to eep time 15 racceleration f 80°C)  Interpretative and how the work of the | level 5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame. nd humidity                           | At normal applied for not less the standard)   | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute n 100 MΩ be IP43 | to 70 Hz), vib Z direction. three times for Class B (+ e and humidit between mostween windir ±0.054°   | or X, Y and Z and Z and Z and Z and Z and I and | ration 150 m/s axes each, 18 with 1500 VAC nd frame. by 500 VDC n                 | s² (70 to<br>times in total<br>c @50/60 Hz<br>negger. |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error  | 5 to 95% RH  1000 m max  Vibration fre 500 Hz), swe 500 m/s² of a  Class B (+13  At normal tem ure with 1000 minute betwee At normal te  - 80 K max. (E ±0.054°  0.075 mm m 0.025 mm (load: 5 N)                 | I (no condense above sea lequency 10 to eep time 15 racceleration f 80°C)  Interpretation and house and ho | level 5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame. nd humidity                           | sweeps in each half-sine was h | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute n 100 MΩ be IP43 | to 70 Hz), vib Z direction. three times for Class B (+ e and humidity between months where the control of the c | or X, Y and Z at 130°C)  y, no failure votor winding and frame  ±0.09°  | ration 150 m/s exes each, 18 with 1500 VAC nd frame. by 500 VDC n                 | s² (70 to<br>times in total<br>: @50/60 Hz            |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2 Shaft runout   | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te  80 K max. (E ±0.054° 0.075 mm m 0.025 mm                                    | I (no condense. above sea lequency 10 to eep time 15 racceleration for acceleration for acc | level 5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame. nd humidity NYO DENKI s  N)  0.025 mm | At normal applied for not less the standard)  0.025 mm   | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute n 100 MΩ be IP43 | to 70 Hz), vib Z direction. three times for Class B (+ e and humidity between months where the control of the c | or X, Y and Z at 130°C)  y, no failure votor winding and frame  ±0.09°  | ration 150 m/s exes each, 18 with 1500 VAC nd frame. by 500 VDC n                 | s² (70 to<br>times in total<br>c @50/60 Hz<br>negger. |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2 Shaft runout Concentricity of mounting pilot relative to shaft | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal terr ure with 1000 minute betwee At normal terr — 80 K max. (E ±0.054° 0.075 mm m 0.025 mm (load: 5 N) 0.025 mm ø0.075 mm | I (no condense. above sea lequency 10 to eep time 15 racceleration for acceleration for acc | level 5 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame. nd humidity NYO DENKI s  N)  0.025 mm | At normal applied for not less the standard)  0.025 mm   | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute n 100 MΩ be IP43 | to 70 Hz), vib Z direction. three times for Class B (+ e and humidity between months where the control of the c | or X, Y and Z at 130°C)  y, no failure votor winding and frame  ±0.09°  | ration 150 m/s exes each, 18 with 1500 VAC nd frame. by 500 VDC n                 | s² (70 to<br>times in total<br>c @50/60 Hz<br>negger. |
| Storage humidity Operation altitude Vibration resistance Impact resistance Thermal class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2 Shaft runout Concentricity of mounting                         | 5 to 95% RH 1000 m max Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te = 80 K max. (E ±0.054° 0.075 mm (load: 5 N) 0.025 mm Ø0.075 mm               | I (no condense, above sea lequency 10 to eep time 15 racceleration f 80°C) Inperature and h VAC @50/60 Hzen motor windigemperature a Based on SAI ±0.09° Inax. (load: 10 0.025 mm (load: 5 N)  | umidity, no fail applied for one g and frame. nd humidity  NYO DENKI s  N)  0.025 mm (load: 5 N)                                      | At normal applied for not less the standard)  0.025 mm (load: 10 N   | 35% RH n  1.52 mm (10 nch X, Y and ave applying Class F (+155°C)  temperature one minute n 100 MΩ be IP43 | to 70 Hz), vib Z direction. three times for Class B (+ e and humidity between months where the control of the c | ration accele or X, Y and Z a 130°C) y, no failure v tor winding a ng and frame  ±0.09°  0.025 )  | ration 150 m/s exes each, 18 with 1500 VAC nd frame. by 500 VDC n mm 0.0 5 N) (lo | s² (70 to<br>times in tota<br>c @50/60 Hz<br>negger.  |

# Safety standards

|            | -     |        |               |
|------------|-------|--------|---------------|
| Model no : | SM286 | CE/III | marked models |

| CE    | Standard category      |                      | Applicable standard    |  |
|-------|------------------------|----------------------|------------------------|--|
| (TÜV) | Low-voltage directives |                      | EN 60034-1, EN 60034-5 |  |
|       | Acquired standards     | Applicable standard  | File no.               |  |
| UL    | UL                     | UL 1004-1, UL 1004-6 | E179832                |  |
|       | UL for Canada          | CSA C22.2 No.100     | E1/9032                |  |

| Model no | .: 103H712 🗆 -6 🔲 0, 103H822 🗆 -6 🔲 0, 103H | 18922 🗌 -63 🗌 1 ( | CE marked model |
|----------|---|-------------------|-----------------|
|          |   |                   |                 |

| CE    | Standard category      | Applicable standard    |
|-------|------------------------|------------------------|
| (TÜV) | Low-voltage directives | EN 60034-1, EN 60034-5 |

<sup>\*1</sup> Thrust play: Shaft displacement under axial load.
\*2 Radial play: Shaft displacement under radial load applied 1/3rd of the length from the end of the shaft.