

SANMOTION

2-PHASE STEPPING SYSTEMS

F2

56 mm sq. 2-Phase Stepping Motors

DC Input

UL[®] US



Flange size: 56 mm

Motor length (motor only): 41.8, 53.8, 75.8, 85.8 mm

Unipolar winding / Bipolar winding

Single shaft / Dual shaft

Stepping motors / Geared / With electromagnetic brake / With encoder

High torque

Compared to our conventional model, torque performance has improved by approximately 40%.*
This contributes to shortening the positioning time and machine cycle time.

Low noise

These motors have noise levels approximately 3 dB lower than the current model, reducing the noise level of machines.*

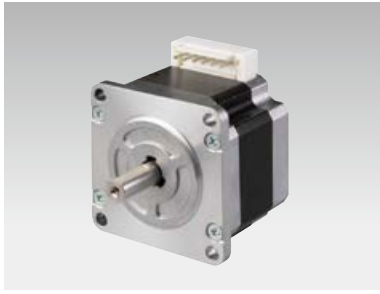
Energy-saving

Motor efficiency has been improved by approximately 3% compared to the current model.*
This contributes to reducing power consumption of machines and the motor's heat dissipation.

* A comparison between our current model 103H7123-5840 and new model SM2562C30B41.



SANYO DENKI



56 mm sq.

1.8°/step RoHS

Unipolar winding, connector type



Lineup → p. 7

Low-backlash gear model

Harmonic gear model

Electromagnetic brake model

Encoder model

Unipolar winding, connector type

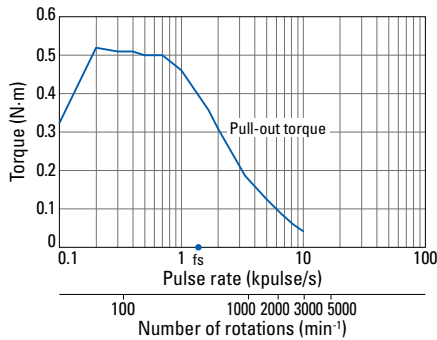
| Model no. | | Holding torque at 2-phase excitation N·m min. | Rated current A/phase | Wiring resistance Ω/phase | Winding inductance mH/phase | Rotor inertia ×10 ⁻⁴ kg·m ² | Mass kg | Motor length (L) mm |
|--------------|--------------|--|--------------------------|------------------------------|--------------------------------|--|------------|------------------------|
| Single shaft | Dual shaft | | | | | | | |
| SM2561C10U41 | SM2561C10U11 | 0.53 | 1 | 4.3 | 6.8 | 0.14 | 0.49 | 41.8 |
| SM2561C20U41 | SM2561C20U11 | 0.53 | 2 | 1.15 | 1.8 | 0.14 | 0.49 | 41.8 |
| SM2561C30U41 | SM2561C30U11 | 0.53 | 3 | 0.52 | 0.77 | 0.14 | 0.49 | 41.8 |
| SM2562C10U41 | SM2562C10U11 | 1.1 | 1 | 5.85 | 12.6 | 0.28 | 0.69 | 53.8 |
| SM2562C20U41 | SM2562C20U11 | 1.1 | 2 | 1.55 | 3.3 | 0.28 | 0.69 | 53.8 |
| SM2562C30U41 | SM2562C30U11 | 1.1 | 3 | 0.69 | 1.37 | 0.28 | 0.69 | 53.8 |
| SM2563C10U41 | SM2563C10U11 | 1.7 | 1 | 7.8 | 17 | 0.5 | 1.1 | 75.8 |
| SM2563C20U41 | SM2563C20U11 | 1.7 | 2 | 1.87 | 4.2 | 0.5 | 1.1 | 75.8 |
| SM2563C30U41 | SM2563C30U11 | 1.7 | 3 | 0.74 | 1.75 | 0.5 | 1.1 | 75.8 |
| SM2564C10U41 | SM2564C10U11 | 1.75 | 1 | 9 | 22 | 0.6 | 1.27 | 85.8 |
| SM2564C20U41 | SM2564C20U11 | 1.75 | 2 | 2.1 | 5.4 | 0.6 | 1.27 | 85.8 |
| SM2564C30U41 | SM2564C30U11 | 1.75 | 3 | 0.84 | 2.2 | 0.6 | 1.27 | 85.8 |

Motor cable: model no. 4837798-1

Characteristics diagram

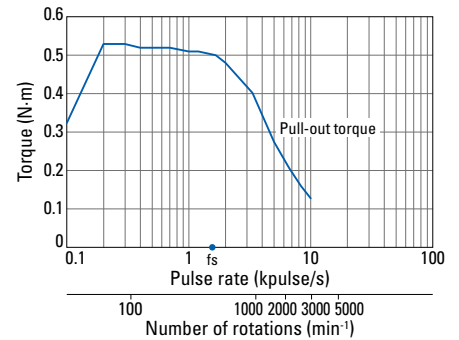
SM2561C10U41 SM2561C10U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



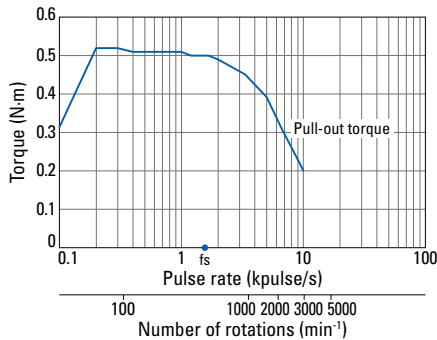
SM2561C20U41 SM2561C20U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



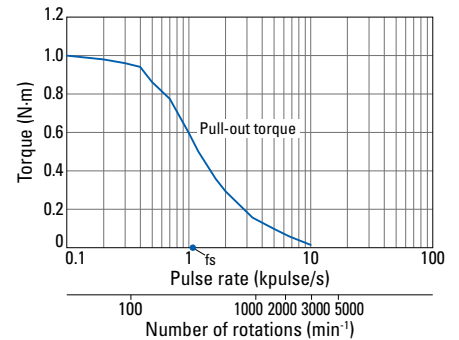
SM2561C30U41 SM2561C30U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



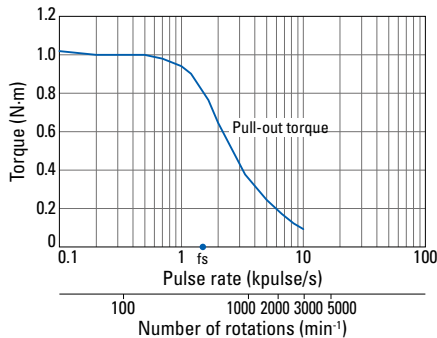
SM2562C10U41 SM2562C10U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



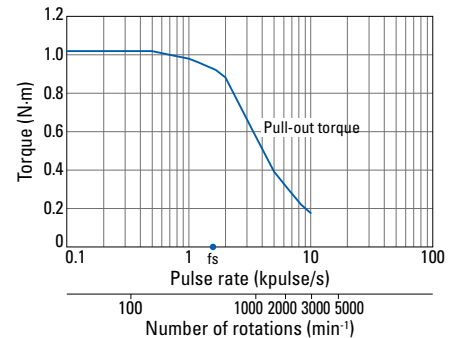
SM2562C20U41 SM2562C20U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



SM2562C30U41 SM2562C30U11

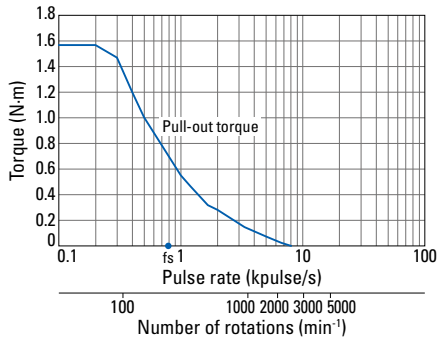
Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



Characteristics diagram

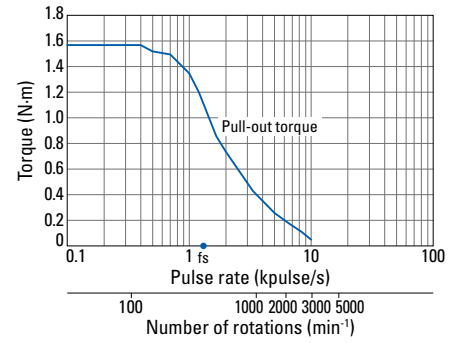
SM2563C10U41 SM2563C10U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



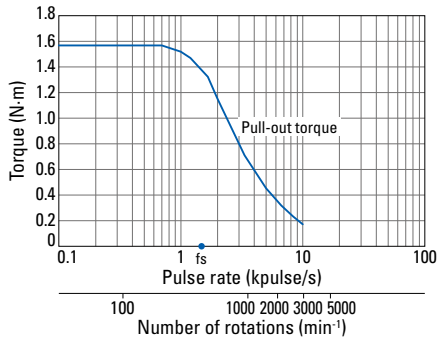
SM2563C20U41 SM2563C20U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



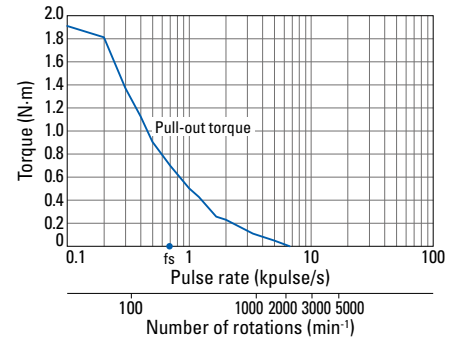
SM2563C30U41 SM2563C30U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



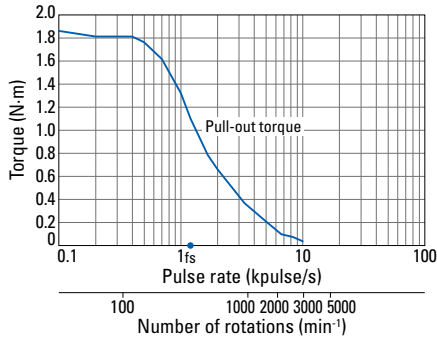
SM2564C10U41 SM2564C10U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



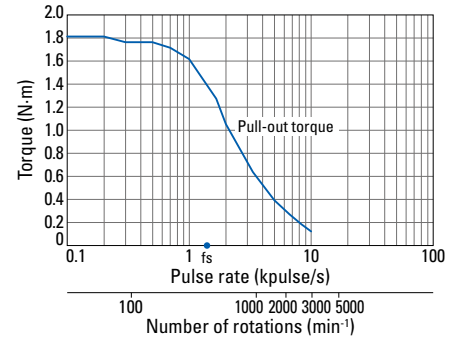
SM2564C20U41 SM2564C20U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded

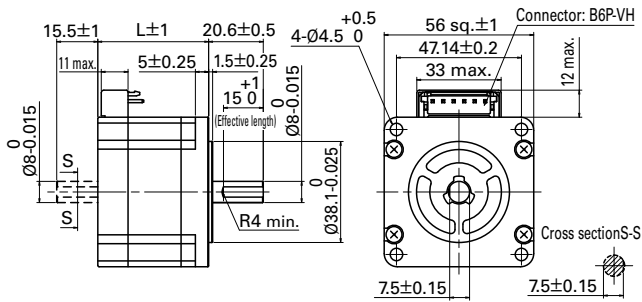


SM2564C30U41 SM2564C30U11

Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded

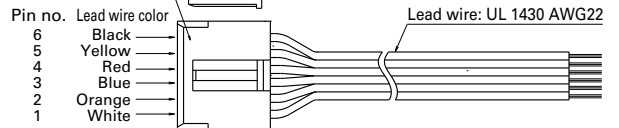


Dimensions (Unit: mm)

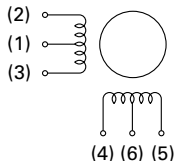


Option (sold separately): Unipolar motor cable 4837798-1

Manufacturer: J.S.T.
Housing: VHR-6N
Pin: SVH-21T-P1.1



Internal wiring () connector pin number



Compatible drivers

- For motors with model nos. SM256□C20U□1 (2 A/phase)
Model no.: US1D200P10 (DC input)
Operating current selection switch setting: 0
 - For motors other than the above.
We do not offer compatible drivers available.
If you require assistance finding a driver, contact us.
- Note: The motor characteristics shown above use our experimental circuit.*



56 mm sq.

1.8°/step RoHS

Bipolar winding, connector type



Lineup → p. 7

Low-backlash gear model

Harmonic gear model

Electromagnetic brake model

Encoder model

Bipolar winding, connector type

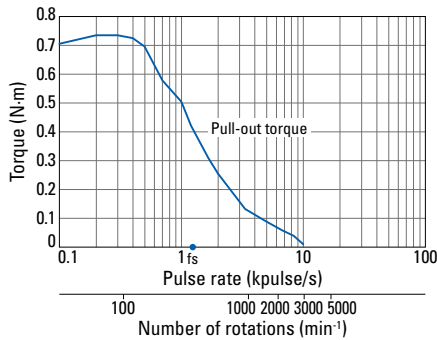
| Model no. | | Holding torque at 2-phase excitation N·m min. | Rated current A/phase | Wiring resistance Ω/phase | Winding inductance mH/phase | Rotor inertia ×10 ⁻⁴ kg·m ² | Mass kg | Motor length (L) mm |
|--------------|--------------|--|--------------------------|------------------------------|--------------------------------|--|------------|------------------------|
| Single shaft | Dual shaft | | | | | | | |
| SM2561C10B41 | SM2561C10B11 | 0.75 | 1 | 4.6 | 13.5 | 0.14 | 0.49 | 41.8 |
| SM2561C20B41 | SM2561C20B11 | 0.75 | 2 | 1.1 | 3.5 | 0.14 | 0.49 | 41.8 |
| SM2561C30B41 | SM2561C30B11 | 0.75 | 3 | 0.51 | 1.5 | 0.14 | 0.49 | 41.8 |
| SM2561C40B41 | SM2561C40B11 | 0.75 | 4 | 0.28 | 0.85 | 0.14 | 0.49 | 41.8 |
| SM2561C60B41 | SM2561C60B11 | 0.75 | 6 | 0.14 | 0.38 | 0.14 | 0.49 | 41.8 |
| SM2562C10B41 | SM2562C10B11 | 1.4 | 1 | 6.3 | 25.5 | 0.28 | 0.69 | 53.8 |
| SM2562C20B41 | SM2562C20B11 | 1.4 | 2 | 1.5 | 6.5 | 0.28 | 0.69 | 53.8 |
| SM2562C30B41 | SM2562C30B11 | 1.4 | 3 | 0.68 | 2.9 | 0.28 | 0.69 | 53.8 |
| SM2562C40B41 | SM2562C40B11 | 1.4 | 4 | 0.37 | 1.5 | 0.28 | 0.69 | 53.8 |
| SM2562C60B41 | SM2562C60B11 | 1.4 | 6 | 0.18 | 0.72 | 0.28 | 0.69 | 53.8 |
| SM2563C10B41 | SM2563C10B11 | 2.35 | 1 | 8.6 | 36 | 0.5 | 1.1 | 75.8 |
| SM2563C20B41 | SM2563C20B11 | 2.35 | 2 | 2.1 | 9.5 | 0.5 | 1.1 | 75.8 |
| SM2563C30B41 | SM2563C30B11 | 2.35 | 3 | 0.95 | 4.2 | 0.5 | 1.1 | 75.8 |
| SM2563C40B41 | SM2563C40B11 | 2.35 | 4 | 0.52 | 2.4 | 0.5 | 1.1 | 75.8 |
| SM2563C60B41 | SM2563C60B11 | 2.35 | 6 | 0.25 | 1.05 | 0.5 | 1.1 | 75.8 |
| SM2564C10B41 | SM2564C10B11 | 2.5 | 1 | 9.4 | 41 | 0.6 | 1.27 | 85.8 |
| SM2564C20B41 | SM2564C20B11 | 2.5 | 2 | 2.1 | 11 | 0.6 | 1.27 | 85.8 |
| SM2564C30B41 | SM2564C30B11 | 2.5 | 3 | 0.95 | 4.9 | 0.6 | 1.27 | 85.8 |
| SM2564C40B41 | SM2564C40B11 | 2.5 | 4 | 0.59 | 2.8 | 0.6 | 1.27 | 85.8 |
| SM2564C60B41 | SM2564C60B11 | 2.5 | 6 | 0.27 | 1.15 | 0.6 | 1.27 | 85.8 |

Motor cable: model no. 4837961-1

Characteristics diagram

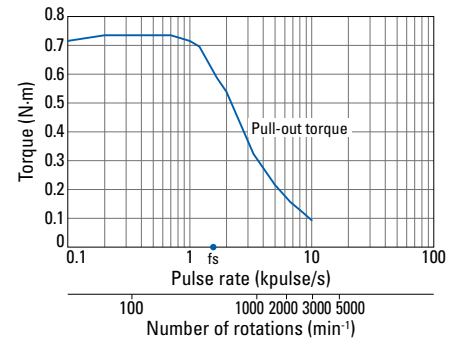
SM2561C10B41 SM2561C10B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



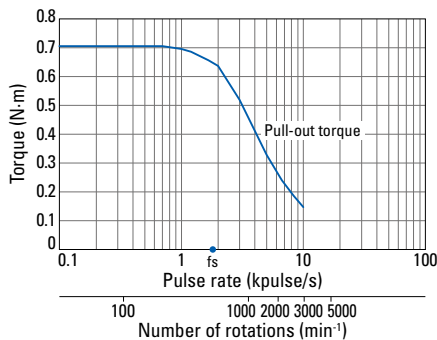
SM2561C20B41 SM2561C20B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



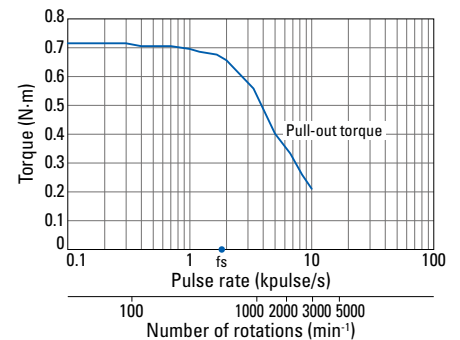
SM2561C30B41 SM2561C30B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



SM2561C40B41 SM2561C40B11

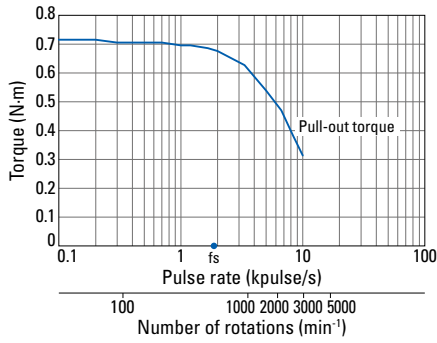
Constant current circuit
Source voltage: 24 VDC
Operating current:
4 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4}$ kg·m² (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



Characteristics diagram

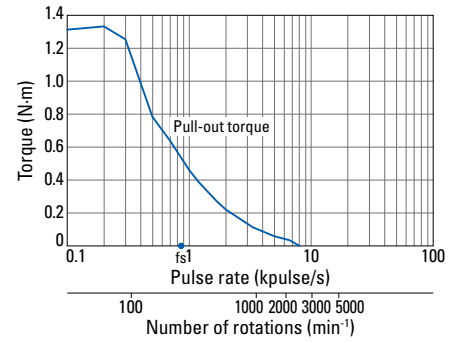
SM2561C60B41 SM2561C60B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
6 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=0.94 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



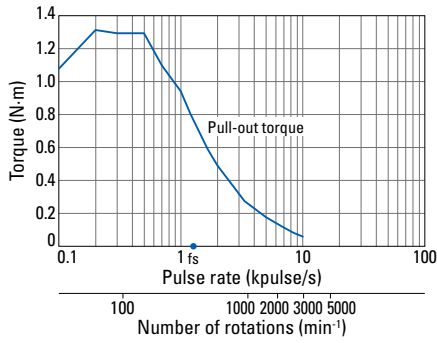
SM2562C10B41 SM2562C10B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
 f_s : Maximum self-start
frequency when not
loaded



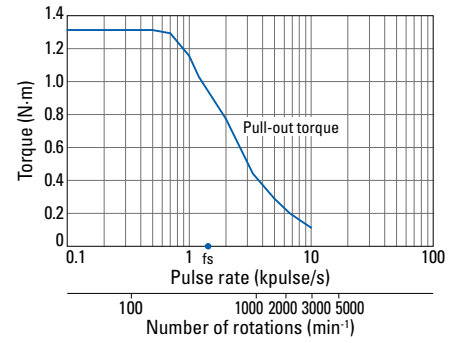
SM2562C20B41 SM2562C20B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



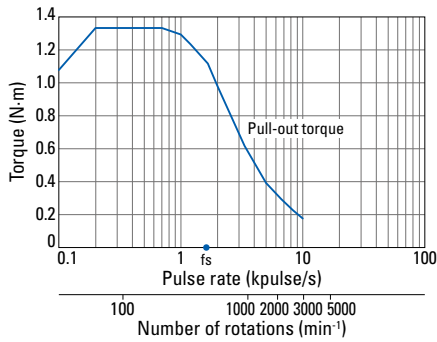
SM2562C30B41 SM2562C30B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



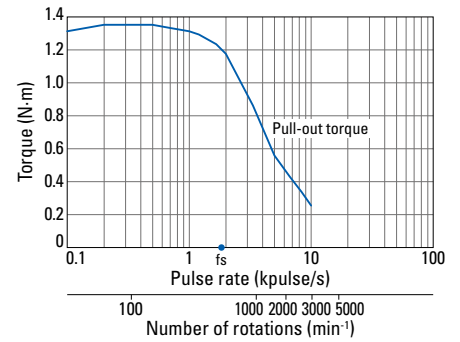
SM2562C40B41 SM2562C40B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
4 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



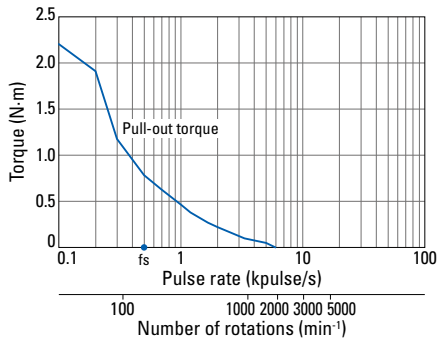
SM2562C60B41 SM2562C60B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
6 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=2.6 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



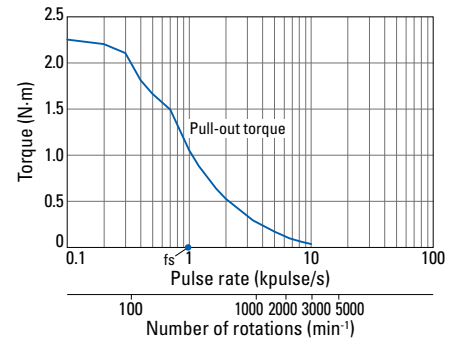
SM2563C10B41 SM2563C10B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



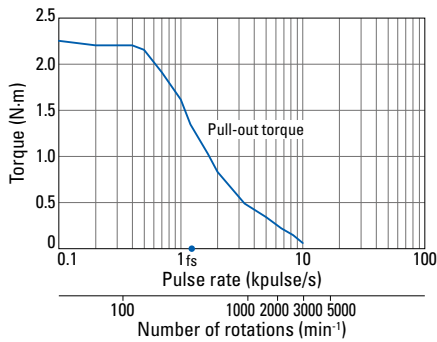
SM2563C20B41 SM2563C20B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



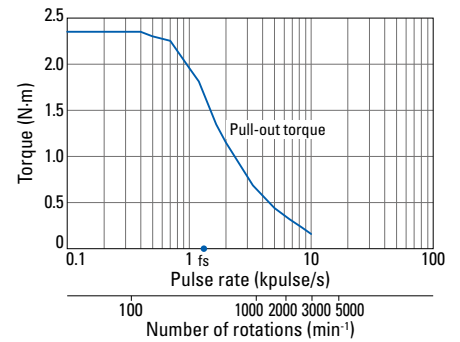
SM2563C30B41 SM2563C30B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



SM2563C40B41 SM2563C40B11

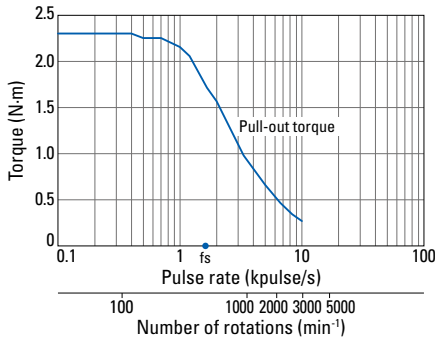
Constant current circuit
Source voltage: 24 VDC
Operating current:
4 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
 f_s : Maximum self-start
frequency when not
loaded



Characteristics diagram

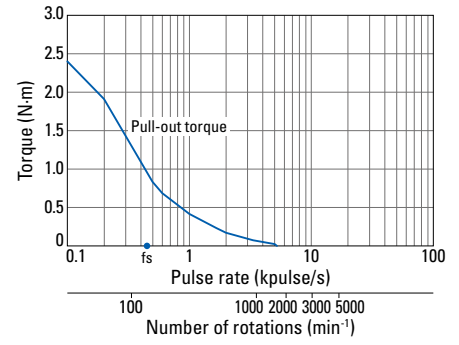
SM2563C60B41 SM2563C60B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
6 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



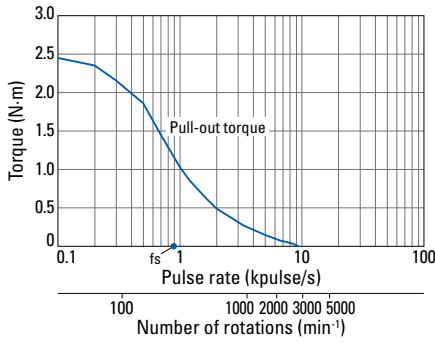
SM2564C10B41 SM2564C10B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



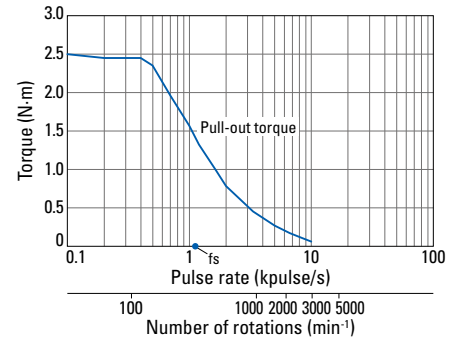
SM2564C20B41 SM2564C20B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
2 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



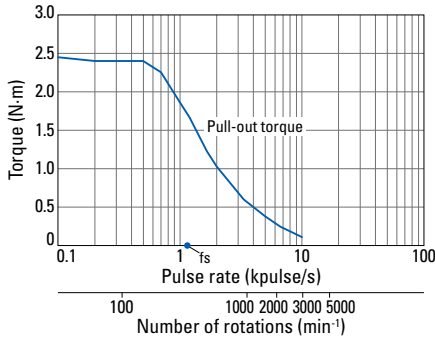
SM2564C30B41 SM2564C30B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
3 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
fs: Maximum self-start
frequency when not
loaded



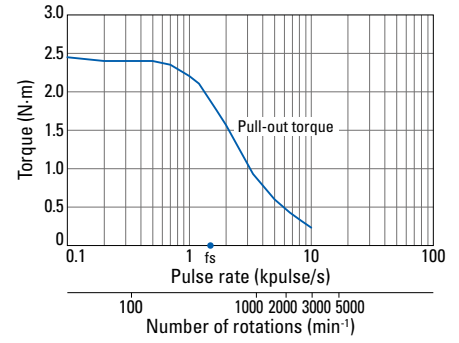
SM2564C40B41 SM2564C40B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
4 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded

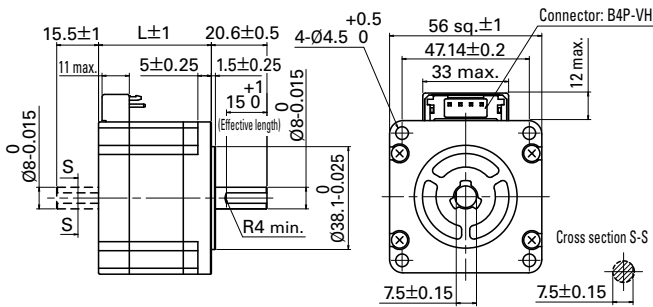


SM2564C60B41 SM2564C60B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
6 A/phase, 2-phase
excitation (full-step)
Pull-out torque:
 $J_L=7.4 \times 10^{-4} \text{kg}\cdot\text{m}^2$ (with
rubber coupling)
fs: Maximum self-start
frequency when not
loaded



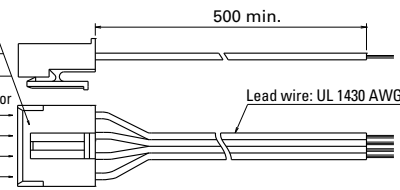
Dimensions (Unit: mm)



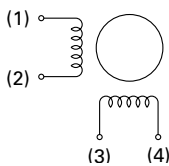
Bipolar motor cable 4837961-1

Manufacturer: J.S.T.
Housing: VHR-4N
Pin: SVH-21T-P1.1

| Pin no. | Lead wire color |
|---------|-----------------|
| 4 | Yellow |
| 3 | Red |
| 2 | Blue |
| 1 | Orange |



Internal wiring () connector pin number



Compatible drivers

- For motors with model nos. SM256 □ C20B □ 1 (2 A/phase)
Model no.: BS1D200P10 (DC input)
Operating current selection switch setting: 0
- For motors other than the above.
We do not offer compatible drivers available.
If you require assistance finding a driver, contact us.
Note: The motor characteristics shown above use our experimental circuit.

Rich motor lineup available for various needs

Geared models

Applicable models: S□2561

Low-backlash gear model

This model features low-backlash gear.

| | | | | | | | |
|--------------------------------------|-------------------|-------|-------|------|------|------|------|
| Allowable torque | N·m | 1.25 | 2.5 | 3 | 3.5 | 4 | 4 |
| Gear ratio | — | 1:3.6 | 1:7.2 | 1:10 | 1:20 | 1:30 | 1:36 |
| Backlash | ° max. | 0.55 | 0.25 | 0.25 | 0.17 | 0.17 | 0.17 |
| Allowable speed | min ⁻¹ | 500 | 250 | 180 | 90 | 60 | 50 |
| Allowable thrust load | N | 30 | 30 | 30 | 30 | 30 | 30 |
| Allowable radial load ⁽¹⁾ | N | 100 | 100 | 100 | 100 | 100 | 100 |

(1) When load is applied at 1/3 length from output shaft end.

· Directions of motor rotation and gear output shaft rotation are the same for models with gear ratios 1:3.6 and 1:7.2, and opposite for gear ratios 1:10, 1:20, 1:30, and 1:36.

Harmonic gear model

This model has extremely low backlash and superb positioning precision. The lineup has high gear ratios of up to 1:100 available.

| | | | |
|--------------------------------------|-------------------|-------------------------|--------------------------|
| Allowable torque | N·m | 5.5 | 8 |
| Allowable peak torque | N·m | 14 | 20 |
| Gear ratio | — | 1:50 | 1:100 |
| Lost motion | Arc min | 0.4 to 3 (at ±0.28 N·m) | 0.4 to 1.5 (at ±0.4 N·m) |
| Allowable speed | min ⁻¹ | 70 | 35 |
| Allowable peak speed | min ⁻¹ | 100 | 50 |
| Allowable thrust load | N | 400 | 400 |
| Allowable radial load ⁽²⁾ | N | 360 | 360 |

(2) When load is applied at 1/3 length from output shaft end.

The motor shaft and the gear output shaft rotate in the opposite directions.



Electromagnetic brake model

Applicable models: All models listed in this catalog

The non-excitation electromagnetic brake holds a workpiece when power is lost, preventing it from falling.

| | | |
|------------------------|----------|-------------------------------|
| Brake type | — | Non-excitation actuation type |
| Power supply voltage | — | 24 VDC±5% |
| Power consumption | W | 6 (at 75°C) |
| Static friction torque | N·m min. | 0.8 |
| Polarity | — | Red: +, Black: - |



Encoder models

Applicable models: All models listed in this catalog

This model can detect vibration and step-out by monitoring the motor's operation status such as position and speed.

| | | | | |
|-------------------------|---------|--------------------|--------|--------|
| Resolution | P/R | 1000 | 2000 | 4000 |
| Number of channels | CH | 3 | 3 | 3 |
| Output method | — | Line driver (CMOS) | | |
| Max. response frequency | kHz | 55 | 110 | 220 |
| Power supply voltage | — | 5 V±5% | 5 V±5% | 5 V±5% |
| Current consumption | mA max. | 100 | 100 | 100 |

