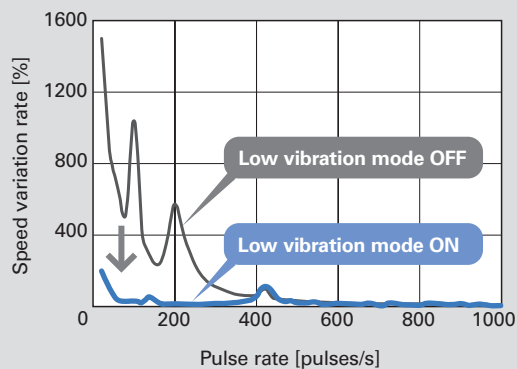


Set Orders

Features

Low vibration

Thanks to their low vibration mode, SANMOTION F2 stepping drivers can smoothly operate stepping motors even at low resolution settings such as full-step and half-step modes. Vibrations can be suppressed regardless of the host controller.



Microstepping drive

Resolution settings up to 16 subdivisions of the full step angle can be used, enabling smooth equipment operation with low vibration.

How to Read Specifications

Unipolar DC input driver (model: US1D200P10) and stepping motor

RoHS

Size		28 mm sq. (1.8° full step angle)		42 mm sq. (1.8° full step angle)	
		32 mm	51.5 mm	33 mm	39 mm
Single shaft	Set order no.	DU14S281S	DU14S285S	DU15S421S	DU15S422S
	Motor model no.	SH2281-5271	SH2285-5271	SF2421-12U41	SF2422-12U41
Dual shaft	Set order no.	DU14S281D	DU14S285D	DU15S421D	DU15S422D
	Motor model no.	SH2281-5231	SH2285-5231	SF2421-12U11	SF2422-12U11
Holding torque	N·m	0.055	0.115	0.22	0.33
Rotor inertia	$\times 10^{-4}$ kg·m ²	0.01	0.022	0.031	0.046
Rated current	A/phase	1	1	1.2	1.2
Motor mass ⁽¹⁾	kg	0.11	0.2	0.23	0.3
Allowable thrust load	N	3	3	10	10
Allowable radial load ⁽²⁾	N	42	49	39	37

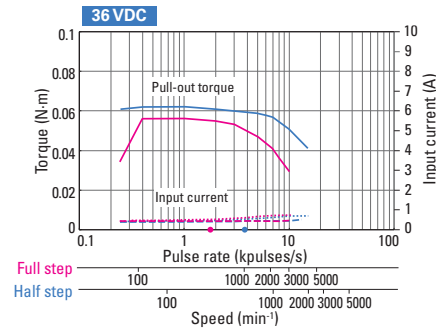
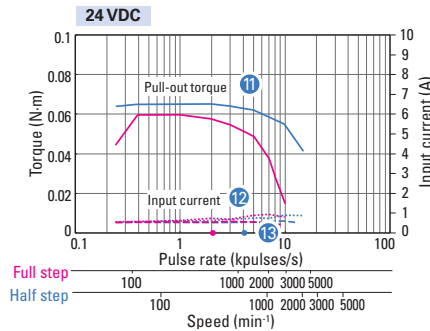
(1) For the driver mass, see p. 26 (2) Load is exerted to the shaft end.

Characteristics

With rubber coupling used

Pull-out torque Full step Half step fs: Maximum starting pulse rate with no load Full step Half step
Input current (with no load) Full step Half step Input current (with load) Full step Half step

DU14S281S
DU14S281D



- Model number of the driver included in the set.
- Flange size and length of the stepping motor included in the set. The full step angle is the angle at which the motor rotates with each pulse in full step mode. In half step mode, the motor rotates by a half the full step angle with each pulse.
- The set order number and the model number of the stepping motor included in the set. The model number varies depending on whether the motor's shaft is single shaft or dual shaft.
- This is the maximum torque that is generated when the stepping motor is rotated by exerting an external force on the shaft at 2-phase excitation at the rated current.
- This is the moment of inertia of the rotor.
- This is the rated current that flows to the motor winding.
- This is the mass of the stepping motor.
- This is the maximum allowable load to the shaft in the axial direction. Take care not to exceed this limit.
- This is the maximum allowable load to the shaft in the direction perpendicular to the axial direction. Take care not to exceed this limit.
- This graph shows the relationship between the pulse rate (frequency), motor speed, and torque. The driver's input current is shown in addition to the torque. Characteristics in full step mode is shown in red, and in half step mode is shown in blue.
- The pull-out torque is the maximum torque in which synchronized operation with command pulses can be maintained. If a torque that exceeds this value is applied to the stepping motor, it will be unable to syn-

chronize with command pulses. Thus, when selecting a motor, you should allow for a torque margin of 1.4 to 2 times, in order to avoid step-out.

- This graph shows the current value of the power supply powering the driver.

The red and blue dashed lines show the source current value when there is no load (motor by itself).

The red and blue dotted lines show the source current value when the maximum torque is applied to the stepping motor (with a load).

The required power supply capacity (W) is calculated from this graph.

- The red- and blue-colored dots in the lower part of the graph show the upper limit for the maximum starting pulse rate (fs) of the stepping motor by itself (with no load). Values in full step mode is shown in red, and in half step mode is shown in blue. The stepping motor will not operate normally if it is started using pulse rates that exceed these values. For this reason, it is necessary to start the stepping motor using pulse rates that are lower than these values. The maximum starting pulse rate with loads (f_L) can be determined using the expression below.

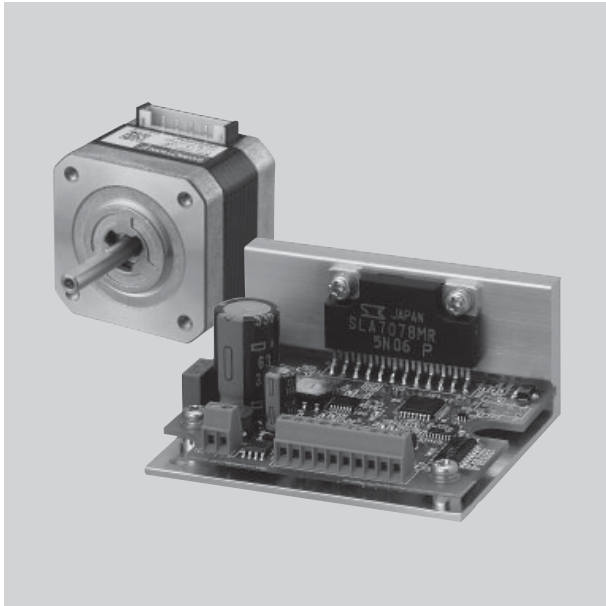
$$f_L = \frac{f_s}{\sqrt{1 + \frac{J_L}{J_M}}}$$

J_M: Rotor inertia
J_L: Load inertia
f_s: Maximum starting pulse rate with no load

DC Input Set Orders

Unipolar/Bipolar

Items included in a set...▶p. 12 Specifications/Characteristics...▶p. 13 to 21
 Motor dimensions...▶p. 22 to 23 Motor specifications...▶p. 24
 Driver dimensions...▶p. 26 Driver specifications...▶p. 26



Items included in a set **RoHS**

Driver Terminal block type



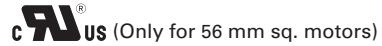
Unipolar Model no.: US1D200P10 Input voltage: 24/36 VDC

Bipolar Model no.: BS1D200P10 Input voltage: 24/36 VDC

- The Instruction Manual is available for download from our website.
- Drivers are available for separate purchase.

Connector-type drivers are also available. Contact us for details.

Motor



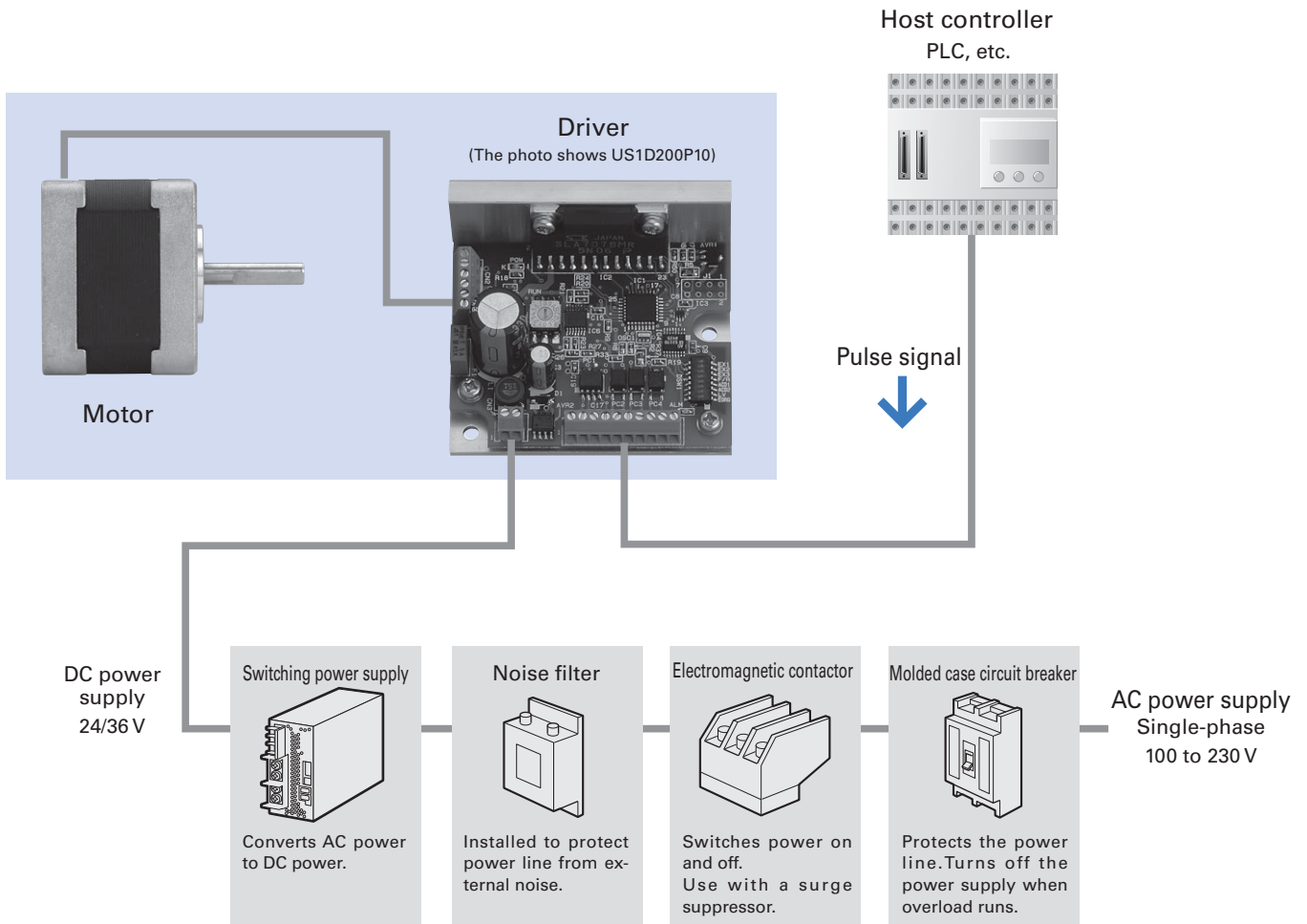
Unipolar motor sizes: 28 mm sq., 42 mm sq., 56 mm sq.

Bipolar motor sizes: 28 mm sq., 42 mm sq., 50 mm sq.,
56 mm sq., 60 mm sq.

Cable with connectors

Supplied only with connector-type motors

System Configuration



How to Read Set Order Numbers

Note that not all possible parameter combinations are valid. Contact us or see Items Included in a Set on the next page for details of the items included in individual sets.

e.g., The model number shown below is a set of a DC input driver (US1D200P10) and a motor (SM2561C20U41). The motor's specifications are: 56 mm sq. size, 41.8 mm length, and single shaft.

D U 1 6 M 71 1 S

Stepping motor shaft
S: Single shaft, D: Dual shaft

Stepping motor length

Name	Motor size											
	28 mm sq.		42 mm sq.				50 mm sq.		56 mm sq.		60 mm sq.	
	Motor model no.	Motor length [mm]	Motor model no.	Motor length [mm]	Motor model no.	Motor length [mm]	Motor model no.	Motor length [mm]	Motor model no.	Motor length [mm]	Motor model no.	Motor length [mm]
1	SH2281	32	SF2421	33	SH1421	33	103H6701	39.8	SM2561	41.8	SH1601	42
2			SF2422	39	SH1422	39			SM2562	53.8	SH1602	54
3			SF2423	48			103H6703	51.3	SM2563	75.8		
4			SF2424	59.5	SH1424	48			SM2564	85.8		
5	SH2285	51.5										

Motor size Full step angle
 28: 28 mm sq., 1.8°
 42: 42 mm sq., 1.8°
 14: 42 mm sq., 0.9°
 67: 50 mm sq., 1.8°
 71: 56 mm sq., 1.8°
 16: 60 mm sq., 0.9°

Stepping motor series
 H : H series
 S : SH or SF series
 M : SM series

Rated current
 4: 1 A/phase, 5: 1.2 A/phase, 6: 2 A/phase

Model

Windings
 U: Unipolar, B: Bipolar

D: DC input

Items Included in a Set These sets include a driver, motor, and motor cable with connectors.

Motors marked with (L) are lead-type motors. 300 mm or longer leads are attached to the motor.
 Motors marked with (C) are connector-type motors. The following motor cables with connectors are included.

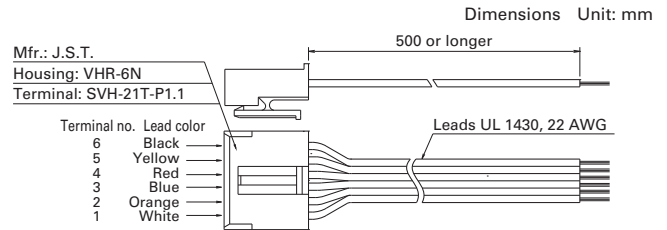
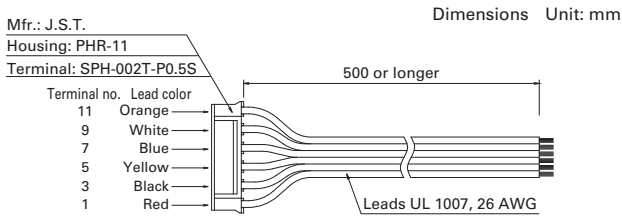
Unipolar Bundled driver model no.: US1D200P10

Motor size	Single shaft			Dual shaft			Full step angle	Rated current [A/phase]	Page	
	Set order no.	Items included in a set		Set order no.	Items included in a set				Specifi-cations	Dimen-sions
		Motor model no.	Motor cable with connectors model no.		Motor model no.	Motor cable with connectors model no.				
28 mm sq.	DU14S281S	SH2281-5271	L -	DU14S281D	SH2281-5231	L -	1.8°	1	p. 13	p. 22
	DU14S285S	SH2285-5271	L -	DU14S285D	SH2285-5231	L -	1.8°	1	p. 13	p. 22
42 mm sq.	DU15S421S	SF2421-12U41	C 4835774-1	DU15S421D	SF2421-12U11	C 4835774-1	1.8°	1.2	p. 13	p. 22
	DU15S422S	SF2422-12U41	C 4835774-1	DU15S422D	SF2422-12U11	C 4835774-1	1.8°	1.2	p. 13	p. 22
	DU15S423S	SF2423-12U41	C 4835774-1	DU15S423D	SF2423-12U11	C 4835774-1	1.8°	1.2	p. 14	p. 22
	DU15S424S	SF2424-12U41	C 4835774-1	DU15S424D	SF2424-12U11	C 4835774-1	1.8°	1.2	p. 14	p. 22
	DU15S141S	SH1421-0441	L -	DU15S141D	SH1421-0411	L -	0.9°	1.2	p. 14	p. 22
	DU15S142S	SH1422-0441	L -	DU15S142D	SH1422-0411	L -	0.9°	1.2	p. 14	p. 22
	DU15S144S	SH1424-0441	L -	DU15S144D	SH1424-0411	L -	0.9°	1.2	p. 15	p. 22
56 mm sq.	DU16M711S	SM2561C20U41	C 4837798-1	DU16M711D	SM2561C20U11	C 4837798-1	1.8°	2	p. 15	p. 23
	DU16M712S	SM2562C20U41	C 4837798-1	DU16M712D	SM2562C20U11	C 4837798-1	1.8°	2	p. 15	p. 23
	DU16M713S	SM2563C20U41	C 4837798-1	DU16M713D	SM2563C20U11	C 4837798-1	1.8°	2	p. 15	p. 23
	DU16M714S	SM2564C20U41	C 4837798-1	DU16M714D	SM2564C20U11	C 4837798-1	1.8°	2	p. 16	p. 23

• **Motor cable with connectors** Note: Included with connector-type motors only

For 42 mm sq. unipolar motors (Model no.: 4835774-1)

For 56 mm sq. unipolar motors (Model no.: 4837798-1)



Bipolar Bundled driver model no.: BS1D200P10

Motor size	Single shaft			Dual shaft			Full step angle	Rated current [A/phase]	Page	
	Set order no.	Items included in a set		Set order no.	Items included in a set				Specifi-cations	Dimen-sions
		Motor model no.	Motor cable with connectors model no.		Motor model no.	Motor cable with connectors model no.				
28 mm sq.	DB14S281S	SH2281-5771	L -	DB14S281D	SH2281-5731	L -	1.8°	1	p. 17	p. 22
	DB14S285S	SH2285-5771	L -	DB14S285D	SH2285-5731	L -	1.8°	1	p. 17	p. 22
42 mm sq.	DB14S421S	SF2421-10B41	C 4835775-1	DB14S421D	SF2421-10B11	C 4835775-1	1.8°	1	p. 17	p. 22
	DB14S422S	SF2422-10B41	C 4835775-1	DB14S422D	SF2422-10B11	C 4835775-1	1.8°	1	p. 17	p. 22
	DB14S423S	SF2423-10B41	C 4835775-1	DB14S423D	SF2423-10B11	C 4835775-1	1.8°	1	p. 18	p. 22
	DB14S424S	SF2424-10B41	C 4835775-1	DB14S424D	SF2424-10B11	C 4835775-1	1.8°	1	p. 18	p. 22
	DB16S141S	SH1421-5241	L -	DB16S141D	SH1421-5211	L -	0.9°	2	p. 18	p. 22
	DB16S142S	SH1422-5241	L -	DB16S142D	SH1422-5211	L -	0.9°	2	p. 18	p. 22
	DB16S144S	SH1424-5241	L -	DB16S144D	SH1424-5211	L -	0.9°	2	p. 19	p. 22
50 mm sq.	DB16H671S	103H6701-5040	L -	DB16H671D	103H6701-5010	L -	1.8°	2	p. 19	p. 23
	DB16H673S	103H6703-5040	L -	DB16H673D	103H6703-5010	L -	1.8°	2	p. 19	p. 23
56 mm sq.	DB16M711S	SM2561C20B41	C 4837961-1	DB16M711D	SM2561C20B11	C 4837961-1	1.8°	2	p. 19	p. 23
	DB16M712S	SM2562C20B41	C 4837961-1	DB16M712D	SM2562C20B11	C 4837961-1	1.8°	2	p. 20	p. 23
	DB16M713S	SM2563C20B41	C 4837961-1	DB16M713D	SM2563C20B11	C 4837961-1	1.8°	2	p. 20	p. 23
	DB16M714S	SM2564C20B41	C 4837961-1	DB16M714D	SM2564C20B11	C 4837961-1	1.8°	2	p. 20	p. 23
60 mm sq.	DB16S161S	SH1601-5240	L -	DB16S161D	SH1601-5210	L -	0.9°	2	p. 20	p. 23
	DB16S162S	SH1602-5240	L -	DB16S162D	SH1602-5210	L -	0.9°	2	p. 21	p. 23

• **Motor cable with connectors** Note: Included with connector-type motors only

For 42 mm sq. bipolar motors (Model no.: 4835775-1)

For 56 mm sq. bipolar motors (Model no.: 4837961-1)

