

Driver Specifications

General specifications

		Unipolar	Bipolar
Basic specifications	Model no.	US1D200P10	BS1D200P10
	Input source	24/36 VDC $\pm 10\%$	
	Source current	3 A	
	Environment	Protection class	Class III
		Operation environment	Installation category (over-voltage category): I, pollution degree: 2
		Ambient operation temperature	0 to +50°C
		Storage temperature	-20 to +70°C
		Operating ambient humidity	35 to 85% RH (no condensation)
		Storage humidity	10 to 90% RH (no condensation)
		Operation altitude	1000 m (3281 feet) or less above sea level
		Vibration resistance	Tested under the following conditions: 5 m/s ² frequency range 10 to 55 Hz, direction along X, Y and Z axes, for 2 hours each
		Impact resistance	Not influenced at NDS-C-0110 standard section 3.2.2 division "C".
		Withstandable voltage	Not influenced when 0.5 kVAC is applied between power input terminal and cabinet for one minute.
		Insulation resistance	10 M Ω min. when measured with 500 VDC megohmmeter between input terminal and cabinet.
	Mass	0.09 kg	
Functions	Selection functions	Step angle, pulse input mode, low vibration mode, step current, operating current, original excitation phase	
	Protection functions	Open phase protection, Main circuit power source voltage decrease	
	LED indication	Power monitor, alarm display	
I/O signals	Command pulse input signal	Photocoupler input system, input resistance: 220 Ω input-signal "H" level: 4.0 to 5.5 V, input-signal "L" level: 0 to 0.5 V Maximum input frequency: 150 kpulse/s	
	Power down input signal	Photocoupler input system, input resistance: 220 Ω input-signal "H" level: 4.0 to 5.5V, input-signal "L" level: 0 to 0.5 V	
	Phase origin monitor output signal	From the photocoupler by the open collector output Output specification: V _{ceo} = 40 V max., I _c = 10 mA max.	
	Alarm output signal	From the photocoupler by the open collector output Output specification: V _{ceo} = 40 V max., I _c = 10 mA max.	

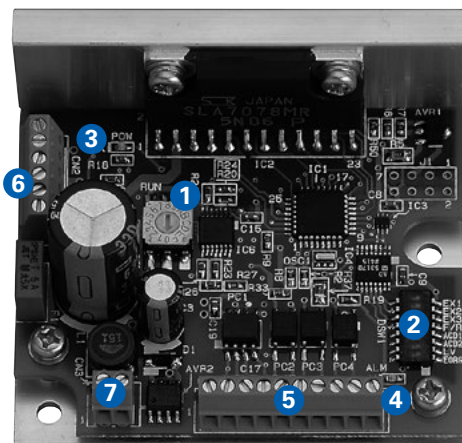
Safety standards

CE (TÜV)	Directives	Category	Standard	Name
	Low-voltage directives	—	EN 61010-1	—
EMC directives		Emission	EN 55011-A	Terminal disturbance voltage
			EN 55011-A	Electromagnetic radiation disturbance
		Immunity	EN 61000-4-2	ESD (Electrostatic discharge)
			EN 61000-4-3	RS (Radio-frequency amplitude modulated electromagnetic field)
			EN 61000-4-4	Fast transients/burst
			EN 61000-4-6	Conducted disturbances
UL	Acquired standards		Applicable standard	File no.
	UL		UL 508C	E179775
	UL for Canada			

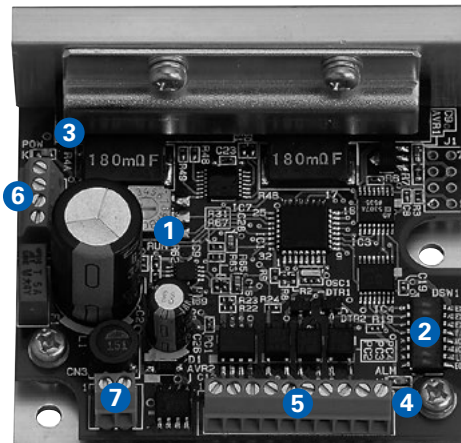
- EMC characteristics may vary depending on the configuration of the users' control panel, which contains the driver or stepping motor, or the arrangement and wiring of other electrical devices.
Parts for EMC noise suppression like noise filters and toroidal type ferrite cores may be required depending on circumstances.
- Validation test of driver has been performed for low-voltage EMC directives at TÜV (TÜV product service) for self-declaration of CE marking.
- Drivers are available for separate purchase. Connector-type drivers are also available. Contact us for details.

Driver Controls and Connectors

Unipolar



Bipolar



1 Operating current selection switch (RUN)

The value of the motor current can be set when operating.

Dial	0	1	2	3	4	5	6	7
Stepping motor current (A)	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3
Dial	8	9	A	B	C	D	E	F
Stepping motor current (A)	1.2	1.1	1.0	0.9	0.8	0.7	0.6	0.5

• The factory setting is F (0.5 A).

Select the current after checking the rated current of the combination motor.

2 Function selection DIP switchpack

Select the function depending on your specification.

Factory settings

	OFF	ON	
EX1	☐	☐	OFF
EX2	☐	☐	OFF
EX3	☐	☐	OFF
F/R	☐	☐	OFF
ACD1	☐	☐	OFF
ACD2	☐	☐	OFF
LV	☐	☐	OFF
EORG	☐	☐	OFF
			Partition number: 8
			Input method 2 (CW/CCW pulse input)
			Stopping current: 40% of driving current
			Micro step operation
			Phase origin

1. Step angle select (EX1, EX2, EX3)

Select the partition number of the basic step angle.

EX1	EX2	EX3	Partition no.
ON	ON	ON	1-division
OFF	ON	OFF	2-division
ON	OFF	OFF	4-division
OFF	OFF	OFF	8-division
OFF	OFF	ON	16-division

2. Input method select (F/R)

Select input pulse type.

F/R	Input pulse type
ON	1 input (CK, U/D)
OFF	2 input (CW, CCW)

3. Current selection when stopping (ACD1, ACD2)

Select the current value of the motor when stopping.

ACD2	ACD1	Current value of the motor
ON	ON	100% of driving current
ON	OFF	60% of driving current
OFF	ON	50% of driving current
OFF	OFF	40% of driving current

• Initial configuration of factory shipment is set to 40% of rated value. Driver and motor should be operated at around 50% of rated value to reduce heat.

4. Low-vibration mode select (LV)

Provides low-vibration, smooth operation even if resolution is coarse (1-division, 2-division, etc).

LV	Operation
ON	Auto-micro function
OFF	Micro-step

5. Excitation select (EORG)

The excitation phase when the power supply is engaged is selected.

EORG	Original excitation phase
ON	Excitation phase at power shut off
OFF	Phase origin

• By turning on the EORG, the excitation phase during power OFF will be saved. Therefore, there will be no shaft displacement when turning the power ON.

3 LED for power supply monitor (POW)

Lit up when the main circuit power supply is connected.

4 LED for alarm display (ALM)

Lights in the following conditions:

- Motor cable is broken.
- Switching element in driver is faulty.
- The main circuit voltage is out of specifications range (19 VDC max.).

When "ALM" is displayed, the winding current of the stepping motor is cut off and it is in a "non-excitation" state. At the same time, an output signal (photocoupler ON) is transmitted from the alarm output terminal (AL) to an external source. When the alarm circuit is operating, this state is maintained until it is reset by switching on the power supply again. When an alarm condition has occurred, please take corrective actions to rectify the cause of the alarm before switching on the power supply again.

5 I/O signal terminal block (CN1)

Connect the I/O signal.

6 Motor terminal block (CN2)

Connect the motor's power line.

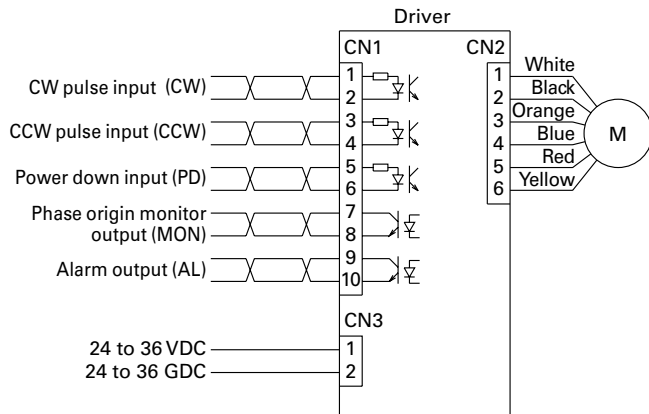
7 Power supply terminal block (CN3)

Connect the main circuit power supply.

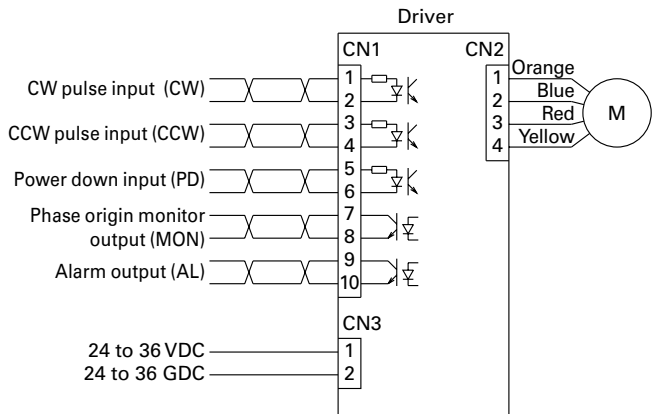
Connections and Signals

External wiring diagram

Unipolar



Bipolar



Applicable wire sizes

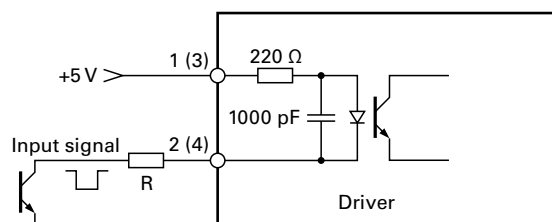
Part	Wire sizes	Allowable wire length
For power supply	AWG22 (0.3 mm ²)	2 m max.
For input/output signal	AWG24 (0.2 mm ²) to AWG22 (0.3 mm ²)	2 m max.
For motor	AWG22 (0.3 mm ²)	Under 3 m

Specification summary of input/output signals

Signal	CN1 Pin no.	Function summary
CW pulse input (CW) (Standard)	1 2	When in "2 input type", input the drive pulse that rotates in a CW direction.
Pulse train input (CK)	1 2	When in "1 input type", input the drive pulse train for motor rotation.
CCW pulse input (CCW) (Standard)	3 4	When in "2 input type", input the drive pulse train that rotates in a CCW direction.
Rotational direction input (U/D)	3 4	When in "1 input type", input the motor rotational direction signal. Internal photocoupler ON ... CW direction Internal photocoupler OFF ... CCW direction
Power down input (PD)	5 6	Inputting PD signal will cut off (power off) the current flowing to the motor (With DIP switch select, change to the Power low function is possible). PD input signal on (internal photocoupler on) ... PD function is valid. PD input signal off (internal photocoupler off) ... PD function is invalid.
Phase origin monitor output (MON)	7 8	When the excitation phase is at the origin (during power on) this function turns on. When FULL step, ON once for 4 pulses; when HALF step, ON once for 8 pulses.
Alarm output (AL)	9 10	When alarm circuits are actuated inside the driver, outputs signals to outside, after which the stepping motor changes to unexcited status.

· As for the motor rotational direction, CW direction is regarded as the clockwise rotation, and CCW direction is regarded as the counterclockwise rotation by viewing the motor from output shaft side.

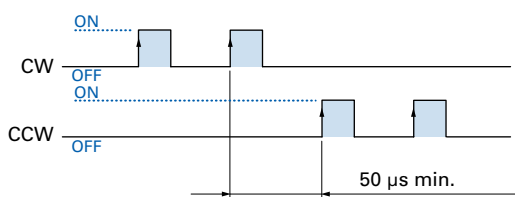
Circuit Configuration of Pulse Input CW (CK), CCW (U/D)



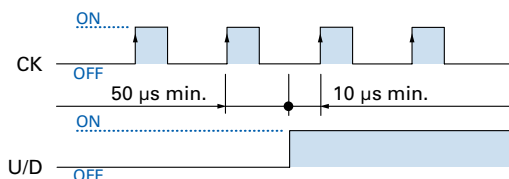
- Pulse duty 50% max.
- Maximum input frequency: 150 kpulse/s
- If the peak voltage of the input signal exceeds 5.5 V, please add an external current-limiting resistor R to limit the input current to around 15 mA. (Take the photocoupler forward voltage of 1.5 V into consideration.)

Timing of the command pulse

2 input mode (CW, CCW)



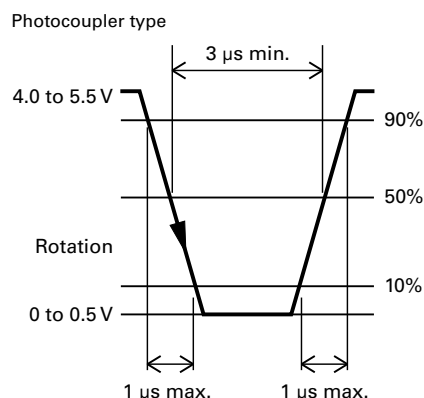
1 input mode (CK, U/D)



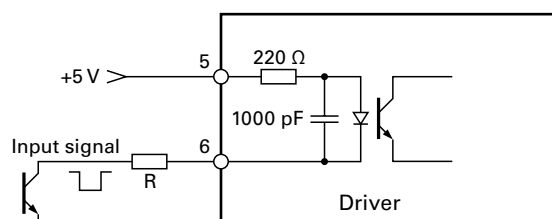
- Shaded area indicates internal photocoupler ON. Internal circuit (motor) starts operating at leading edge of the photocoupler ON.
- To apply pulse to CW, set CCW side internal photocoupler to OFF.
- To apply pulse to CCW, set CW side internal photocoupler to OFF.

- Shaded area indicates internal photocoupler ON. Internal circuit (motor) starts operating at leading edge of CK side photocoupler ON.
- Switching of U/D input signal must be done while CK side internal photocoupler is OFF.

Input signal specifications

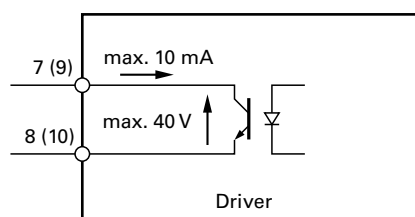


Input Circuit Configuration of Power Down Input (PD)

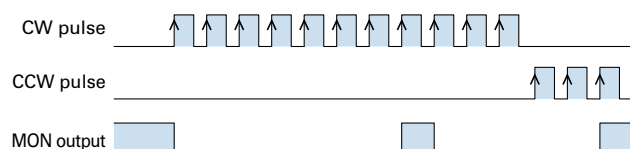


- If the peak voltage of the input signal exceeds 5.5 V, please add an external current-limiting resistor R to limit the input current to around 15 mA. (Take the photocoupler forward voltage of 1.5 V into consideration.)

Output Signal Configuration of Phase Origin Monitor Output (MON) and Alarm Output (AL)



MON output



- Photocoupler is set to ON at phase origin of motor excitation (setting when number of divisions is 2).
- MON output is taken at every 7.2 degrees of motor output shaft from phase origin.