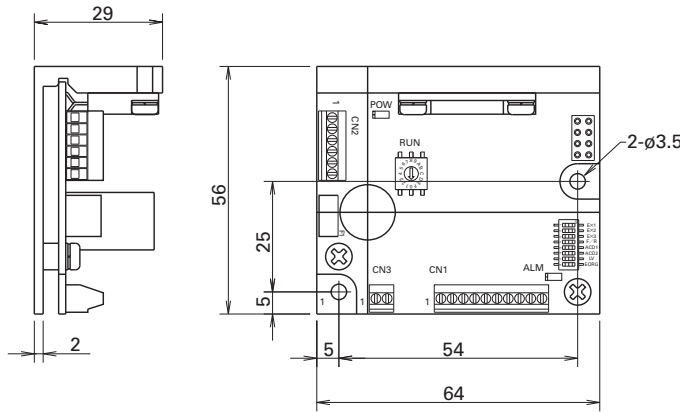


# Driver Dimensions Unit: mm



# Driver Specifications

## General specifications

		Unipolar	Bipolar	
Basic specifications	Model no.	<b>US1D200P10</b>	<b>BS1D200P10</b>	
	Input voltage	24/36 VDC ± 10%		
	Input current	0.5 A		
	Environment	Protection class	Class III	
		Operating environment	Installation category (Overvoltage category): I, pollution level: 2	
		Operating ambient temperature	0 to +50°C	
		Storage temperature	-20 to +70°C	
		Operating ambient humidity	35 to 85% RH (non-condensing)	
		Storage humidity	10 to 90% RH (non-condensing)	
		Operating altitude	Up to 1000 m above sea level	
		Vibration resistance	5 m/s <sup>2</sup> freq. range 10 to 55 Hz tested for 2 hours in each X, Y and Z-axis directions	
		Shock resistance	Not abnormality observed as per IEC 60068-2-27 category C.	
		Dielectric strength	500 VAC for one minute (between power input terminal and chassis)	
Insulation resistance	10 MΩ or more at 500 VDC (between power input terminal and chassis)			
Mass	0.09 kg			
Functions	Mode selection	Step angle mode, input pulse mode, low vibration mode, current at rest, operating current, initial excitation phase		
	Protective functions	Open phase, main circuit power supply undervoltage		
	LED indicators	Power supply monitoring, alarm indicator		
I/O signal	Command pulse input signal	Photocoupler input method; input resistance: 220 Ω, high-level input signal voltage: 4.0 to 5.5 V, low-level input signal voltage: 0 to 0.5 V, maximum starting pulse rate 150 pulses/s		
	Power down input signal	Photocoupler input method; input resistance: 220 Ω, high-level input signal voltage: 4.0 to 5.5 V, low-level input signal voltage: 0 to 0.5 V		
	Phase origin monitor output	Open-collector output through photo coupler, V <sub>ceo</sub> : 40 V or less, I <sub>c</sub> : 10 mA or less		
	Alarm output signal	Open-collector output through photo coupler, V <sub>ceo</sub> : 40 V or less, I <sub>c</sub> : 10 mA or less		

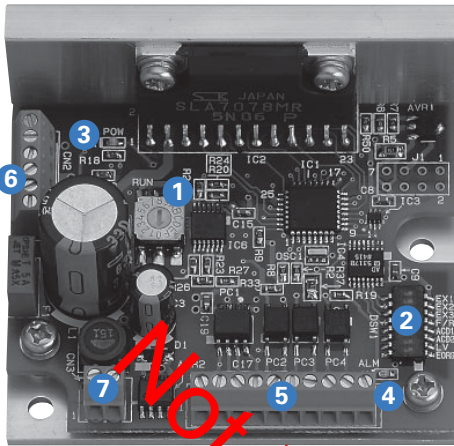
## Safety standards

CE(TÜV)		UKCA In compliance from July 2022 production onwards.		
Directive	Category	Directive	Standards	Name
Low Voltage Directive	—	Electrical Equipment (Safety) Regulations 2016	EN 61010-1	—
EMC Directive	Emission	Electromagnetic Compatibility Regulations 2016	EN 61000-6-4	Terminal disturbance voltage
			EN 61000-6-4	Electromagnetic radiation disturbance
	EN 61000-4-2		ESD (Electrostatic discharge)	
	EN 61000-4-3		Radiated, radio-frequency, electromagnetic field	
	EN 61000-4-4		Fast transients/burst	
	Immunity	EN 61000-4-6	Conducted disturbances	
RoHS	Directive		Standards	
	RoHS Directive 2011/65/EU		EN 63000:2018	
UL	Classification		Standards	File no.
	UL		UL 508C	E179775
	UL for Canada (cUL)			

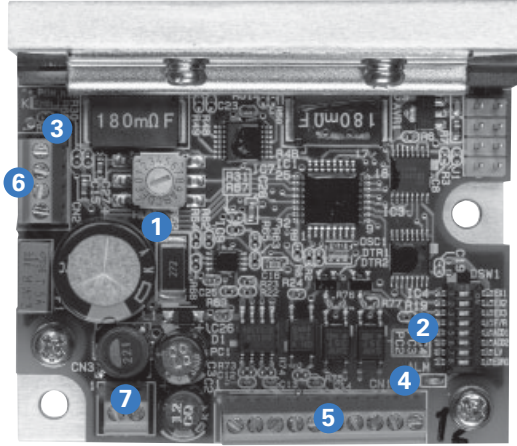
- Actual EMC levels vary depending on the configuration of the users' control panel where a driver and stepping motor are built in, and the placement layout of other electrical devices and wiring. EMC noise solution parts such as noise filters and toroidal type ferrite cores may be required in some cases.
- Validation test of drivers was performed as per Low-Voltage and EMC Directives at TÜV (TÜV product service) for self-declaration of CE and UKCA marking.
- Drivers can be purchased not only as a set but also as a single item. Connector-type drivers are also available. Contact us for details.

# Driver Part Names and Functions

## Unipolar



## Bipolar



### 1 Operating current selection switch (RUN)

The value of the motor operating current can be set with a rotary switch.

Dial	0	1	2	3	4	5	6	7
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
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 operating current after checking the rated current of the combination motor.

### 2 Function selection DIP switchpack

Functions can be selected to suit your application.

Factory settings

	OFF	ON	
EX1	<input type="checkbox"/>	<input type="checkbox"/>	8 subdivisions
EX2	<input type="checkbox"/>	<input type="checkbox"/>	
EX3	<input type="checkbox"/>	<input type="checkbox"/>	
F/R	<input type="checkbox"/>	<input type="checkbox"/>	2-input mode (CW, CCW pulse input)
ACD1	<input type="checkbox"/>	<input type="checkbox"/>	Current at rest: 40% of driving current
ACD2	<input type="checkbox"/>	<input type="checkbox"/>	
LV	<input type="checkbox"/>	<input type="checkbox"/>	Microstepping
EORG	<input type="checkbox"/>	<input type="checkbox"/>	Phase origin

#### 1. Step angle selection (EX1, EX2, EX3)

Number of full step angle subdivisions can be selected.

EX1	EX2	EX3	Microsteps
ON	ON	ON	1 subdivision
OFF	ON	OFF	2 subdivisions
ON	OFF	OFF	4 subdivisions
OFF	OFF	OFF	8 subdivisions
OFF	OFF	ON	16 subdivisions

#### 2. Input mode selection (F/R)

Input pulse mode can be selected.

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

#### 3. Current selection when stopping (ACD1, ACD2)

Select the current value of the motor when stopping.

ACD2	ACD1	Motor current
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 factory setting is 40% of the rated value. Driver and motor should be operated at around 50% of rated value to reduce heat.

### 4. Low vibration mode select (LV)

Motors can smoothly operate even at low resolution settings such as full-step (1 subdivision) and half-step (2 subdivisions) modes.

LV	Initial excitation phase
ON	Low vibration
OFF	Microstepping

### 5. Excitation selection (EORG)

The excitation phase at the time of power activation is selected.

EORG	Initial excitation phase
ON	Excitation phase at power shutdown
OFF	Phase origin

• By turning on EORG, the excitation phase at the time of power shutdown will be saved. Therefore, there will be no shaft displacement when the power is turned on next time.

### 3 Power supply monitoring LED (POW)

Lights up when the main circuit power supply is turned on.

### 4 Alarm indicator LED (ALM)

The LED lights up in either of the followings:

- Motor cable is damaged
- The switching device in the driver is damaged
- The main circuit power supply voltage is outside the specification range (below 19 VDC)

When "ALM" is lit, the winding current of the stepping motor is cut off and the status will shift to a "non-excitation" state. At the same time, an output signal (photocoupler ON) is transmitted from the alarm output terminal (AL) to outside. When the alarm circuit is activated, this state is maintained until it is reset by turning on the power supply again. When an alarm goes off, please take corrective actions to eliminate the cause of the alarm before turning on the power supply again.

### 5 I/O signal terminals (CN1)

For input/output signal connections.

### 6 Motor connection terminals (CN2)

For motor power connection.

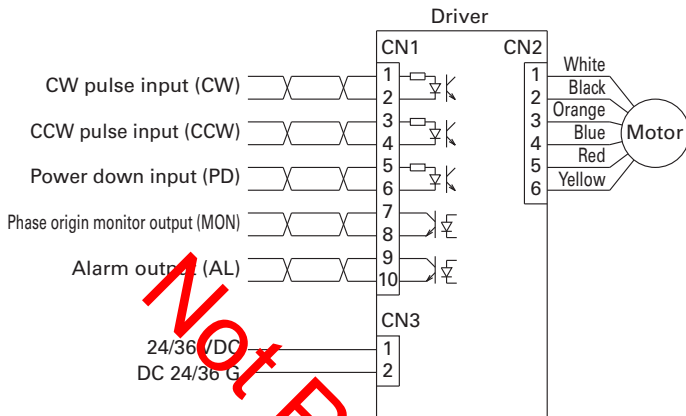
### 7 Power supply connection terminals (CN3)

For main circuit power supply connection.

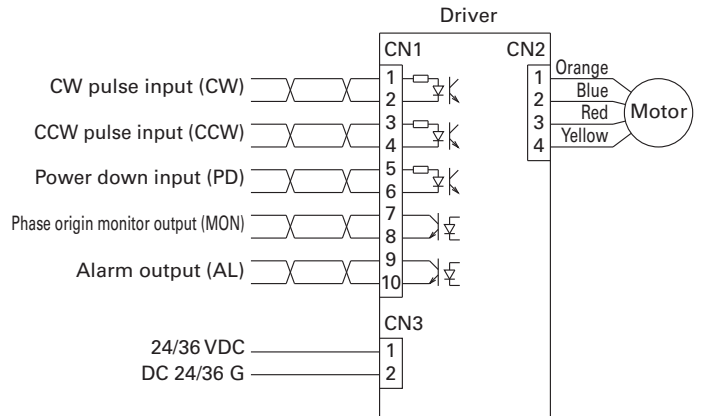
# Connections and Signals

## External wiring diagram

### Unipolar



### Bipolar



## Cable size

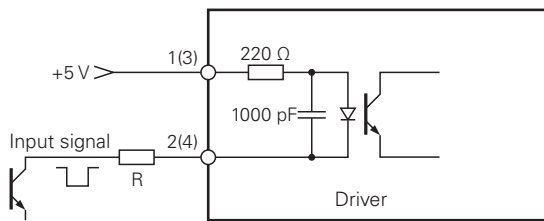
Type	Cable Size	Maximum length
Power cable	22 AWG (0.3 mm <sup>2</sup> )	2 m or less
I/O signal cable	24 AWG (0.2 mm <sup>2</sup> ) to 22 AWG (0.3 mm <sup>2</sup> )	2 m or less
Motor cable	22 AWG (0.3 mm <sup>2</sup> )	Below 3 m

## Input/output signal specification overview

Signal	CN1 Pin no.	Function overview
CW pulse input (CW) (Standard)	1 2	When in 2-input mode, a CW-direction pulse is input.
Drive pulse input (CK)	1 2	When in 1-input mode, a drive pulse is input to rotate the motor.
CCW pulse input (CCW) (Standard)	3 4	When in 2-input mode, a CCW-direction pulse is input.
Rotational direction input (U/D)	3 4	When in 1-input mode, a drive pulse is input to designate the rotational direction. Internal photocoupler ON ... CW direction Internal photocoupler OFF ... CCW direction
Power down input (PD)	5 6	A PD signal input will cut off (power off) the current flowing to the motor. PD input signal on (internal photocoupler on) ... PD function is enabled. PD input signal off (internal photocoupler off) ... PD function is disabled.
Phase origin monitor output (MON)	7 8	Turned on when the excitation phase is at the origin (when power is turned on). In full step mode, turned on once for 4 pulses. In half step mode, turned on once for 8 pulses.
Alarm output (AL)	9 10	When the alarm circuit is activated inside the driver, an alarm signal (photocoupler on) is output to outside, which turns the stepping motor to non-excited state.

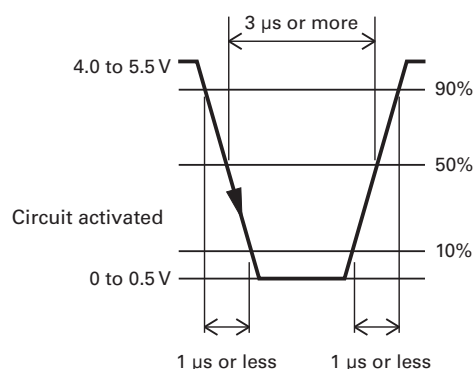
Note: The CW direction refers to the clockwise direction when the motor is viewed from the output shaft side.  
The CCW direction refers to the counter-clockwise direction when the motor is viewed from the output shaft side.

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



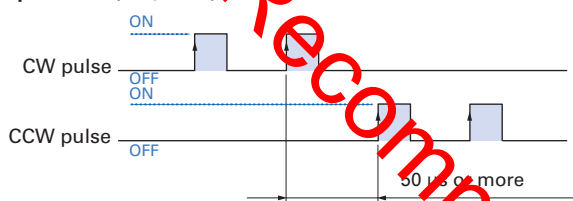
- Ensure that the pulse duty is 50% or less.
- Maximum starting pulse rate is 150 pulses/s.
- If the peak voltage of the input signal exceeds 5.5 V, add an external current-limiting resistor R to limit the input current to around 15 mA. (Take the photocoupler forward voltage of 1.5V into consideration.)

### Input signal specifications



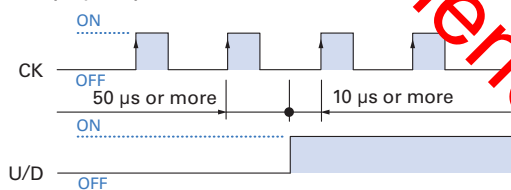
### Command pulse timing

#### 2-input mode (CW, CCW)



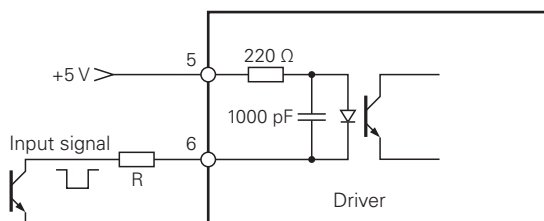
- Shaded areas indicate that internal photocoupler is ON. Internal circuit (motor) starts operating at leading edge of the photocoupler ON.
- When applying a pulse to CW, set the CCW side internal photocoupler to OFF.
- When applying a pulse to CCW, set the CW side internal photocoupler to OFF.

#### 1-input mode (CK, U/D)



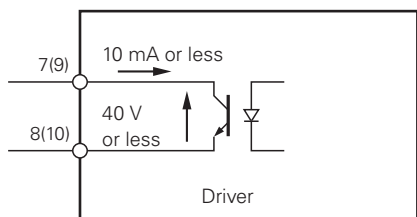
- Shaded areas indicate that internal photocoupler is ON. Internal circuit (motor) starts operating at leading edge of the CK-side photocoupler ON.
- Switching of U/D input signal must be done while the CK-side internal photocoupler is OFF.

## Circuit Configuration of Power Down (PD) Input

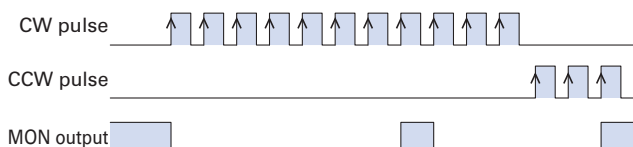


- If the peak voltage of the input signal exceeds 5.5 V, add an external current-limiting resistor R to limit the input current to around 15 mA. (Take the photocoupler forward voltage of 1.5V into consideration.)

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



### MON output



- Photo coupler is turned on when the motor's excitation phase is at the origin (when power is turned on).
- MON output is output every 7.2° rotation of the motor output shaft from the phase origin. (The figure on the left is for when the step angle setting is in a half-step mode)

Not Recommended for New Desings