



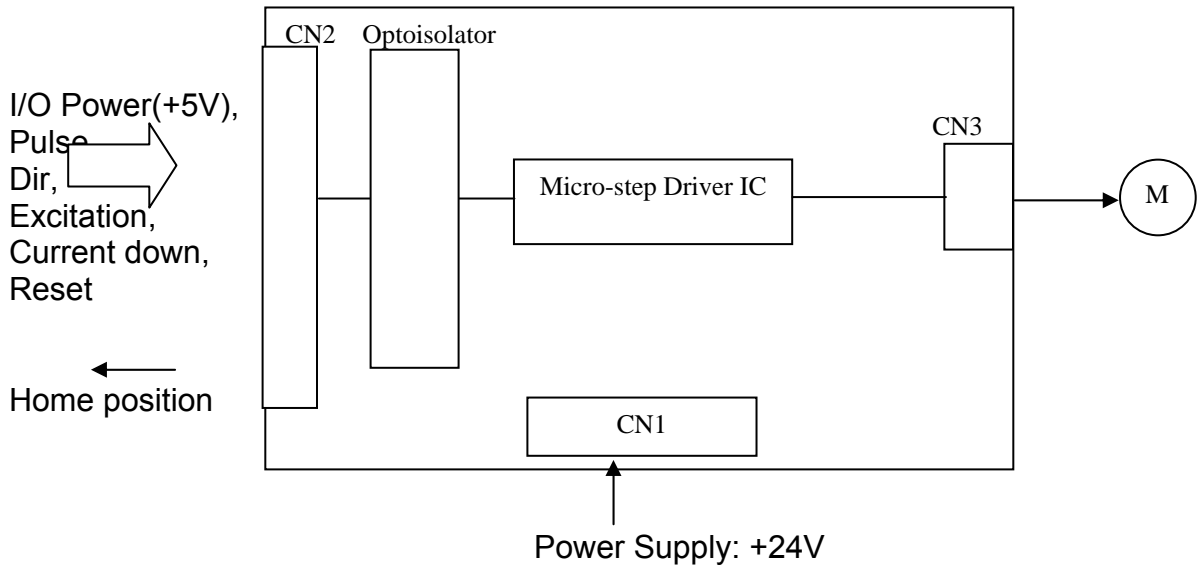
BCD4020FUT1

Unipolar Chopper Driver

1. General

The BCD4020FUT1 is one axis micro-step driver. It can control a 2-phase unipolar stepper motors and perform maximum 1/8 resolution micro-stepping.

2. Layout



3. Specification

| | | BCD4020FUT1 | |
|---------------------------|----------------|---|-------|
| Maximum Current per Phase | | 2A/phase | |
| Power Supply | | 24V +/-10% Capacity: Max 4A(at 2.0A/phase) Max 3A (at 1.5A/phase) Max 2A (at 1.0A/phase) | |
| Excitation Mode | | 1/1, 1/2, 1/4, 1/8 | |
| Max. Input Frequency | | 50KHz | |
| Min. Input PWM | | 10μs(duty40 -60%) | |
| Power Down Function | | Installed | |
| Home Position Monitor | | Installed | |
| Operation Temp. | | +5 to +40°C | |
| Storage Temp. | | -10 to +70°C | |
| Dimension (mm) | | W120xD90xH38 | |
| Accessories | | | |
| | CN1 Connector: | 5557-04R (Molex) | 1pcs |
| | CN1 Pin: | 5556TL (Molex) | 4pcs |
| | CN2 Connector: | PS-D4C16 (JAE) | 1pcs |
| | CN2 Pin: | PS-SF-C1-1 (JAE) | 16pcs |
| | CN3 Connector: | IL-6S-S3L-(N) (JAE) | 1pcs |
| | CN3 Pin: | IL-C2-10000 (JAE) | 6pcs |

4. Input/Output pin Function

1) Connector

CN1 (Molex:5569-04A1)

| Pin# | Signal Name |
|------|-------------|
| 1 | +24V |
| 2 | +24V |
| 3 | GND |
| 4 | GND |

CN3 (JAE:IL-6P-S3FP2)

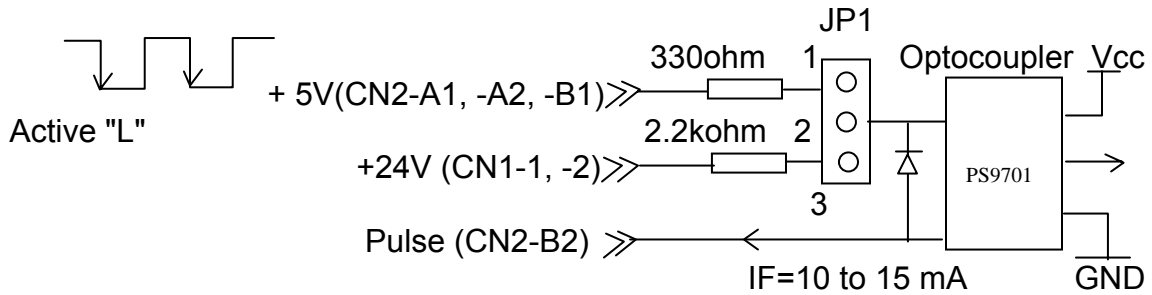
| Pin# | Signal Name |
|------|-------------|
| 1 | COM |
| 2 | COM |
| 3 | A |
| 4 | \bar{A} |
| 5 | B |
| 6 | \bar{B} |

CN2 (JAE:PS-34PE-D4LT1-LP1)

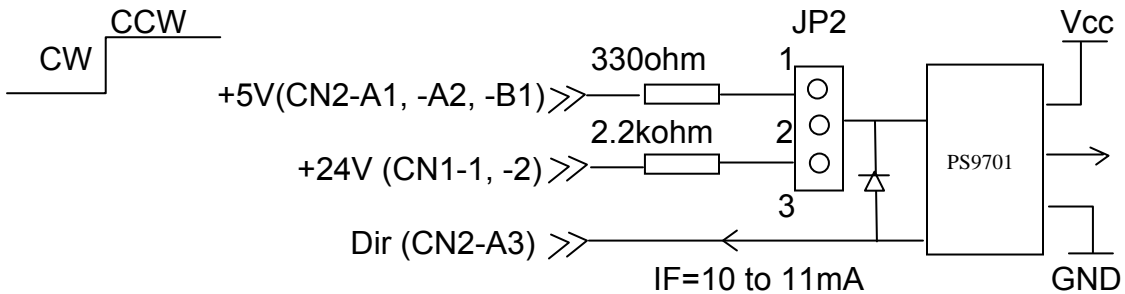
| Pin# | Signal Name | Pin# | Signal Name |
|------|-------------------------------|------|---------------|
| A1 | +5v | B1 | +5V |
| A2 | +5v | B2 | Pulse (Clock) |
| A3 | Direction | B3 | NC |
| A4 | Excitation ON/OFF | B4 | Current down |
| A5 | Reset | B5 | NC |
| A6 | Home position signal (output) | B6 | NC |
| A7 | GND | B7 | GND |
| A8 | GND | B8 | GND |

2) Input interface

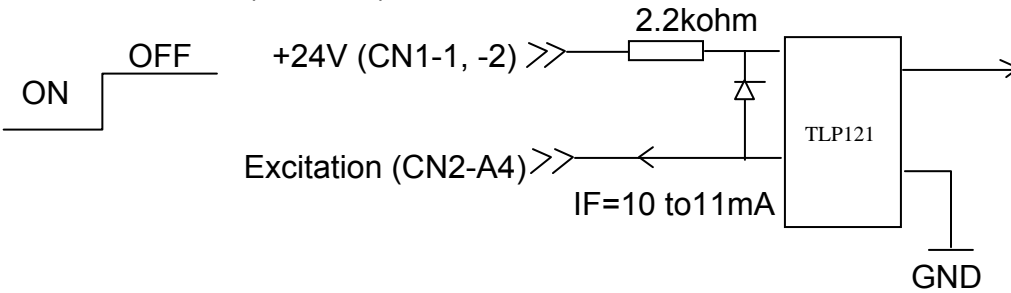
- 1. Pulse:



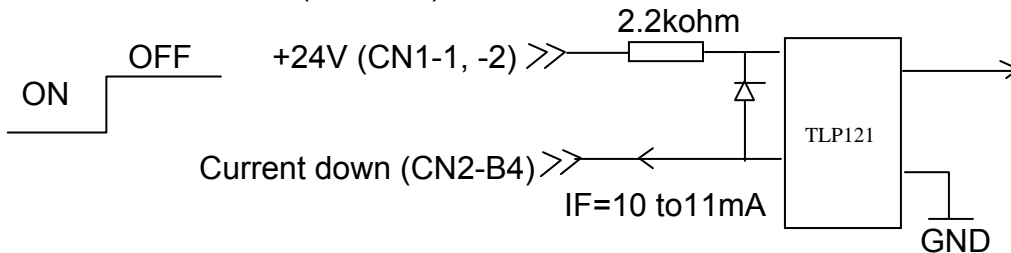
-2. Direction (CW/CCW):



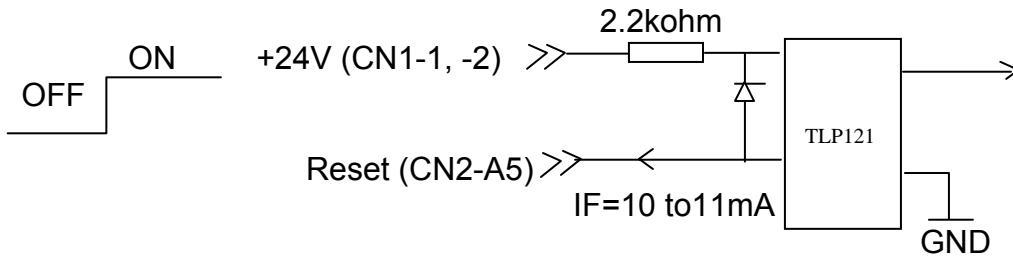
- 3. Excitation (ON/OFF):



-4. Current down (ON/OFF)

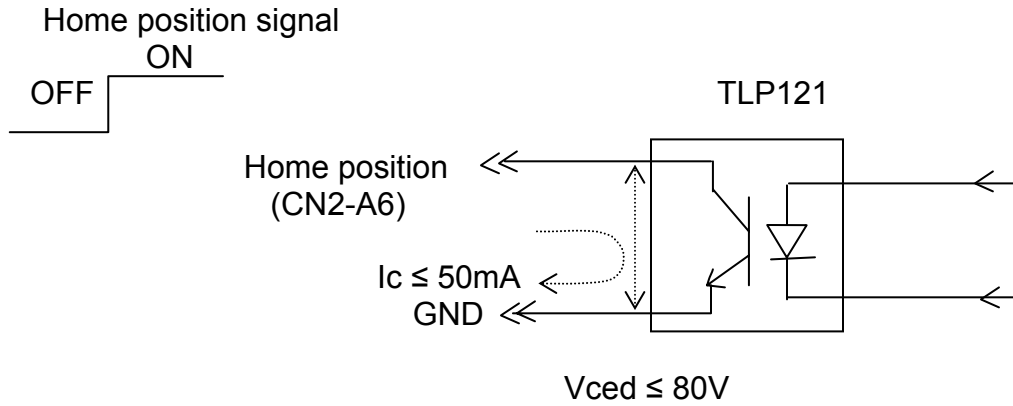


-5. Reset (RESET)



Initialize the sequence. (A and B phase excitation)

3) Output interface



This signal will turn on by the initial reset after the power on. The Home position signal becomes ON by the following cycle:

| Excitation Mode | Cycle of "ON" |
|-----------------|---------------|
| 1/1 | 4 pulse |
| 1/2 | 8 pulse |
| 1/4 | 16 pulse |
| 1/8 | 32 pulse |

5. Excitation Mode (Micro-step Resolution Selection)

Excitation mode can be set for each axis individually. The selection is made by the dip-switch, DSW1.

| Excitation Mode | DSW1 | DSW2 | DSW3 | DSW4 |
|-----------------|------|------|------|------|
| 1/1 | ON | ON | OFF | OFF |
| 1/2 | OFF | ON | OFF | OFF |
| 1/4 | ON | OFF | OFF | OFF |
| 1/8 | OFF | OFF | OFF | OFF |

DSW4 is not used, so it can be set to either ON or OFF.

6. Current Adjustment

1) Before the adjustment

- 1) You will need a measuring device to clock the DC voltage (dc voltmeter, tester, etc).
- 2) The adjustment will be made by the trimmer (VR) after measuring the DC voltage value using the check-pin (CP).

See the "Point of CP" table below and "Layout drawing" on the final page.

| Point of CP | VR |
|--------------------------|-----|
| Between CP2 and CP1(GND) | VR1 |

- 3) The minimum current value is 0.2 A/phase.
- 4) The rated current is within 2.0 A/phase when you use this at the continuous rating. Keep the temperature of the heat sink below 90°C.

2) Procedure

- 1) Turn the power off (CN1).
- 2) Remove CN2 and CN3 from the board.
- 3) Connect the tester probe to the check-pin of the axis that you want to adjust. Be sure to connect the minus probe (GND) to CP1
- 4) Turn on power.
- 5) Check and adjust the DC voltage value output at CP.
The equation of the voltage and motor current is:

$$V_{ref} (v) = I_o (A) \times 0.6$$

Example)

To set the current of #1 axis at 1.2A/phase:

*Calculation: $V_{ref} = 1.2 \times 0.6 = 0.72V$

*Adjust the voltage between CP2 and CP1 at 0.72V by the VR1 trimmer.

Tuning the trimmer at CW direction increases the voltage.

- 6) After the adjustment, turn the power off again and reconnect CN2 and CN3. Then confirm the operation of the motor by turning on the power.

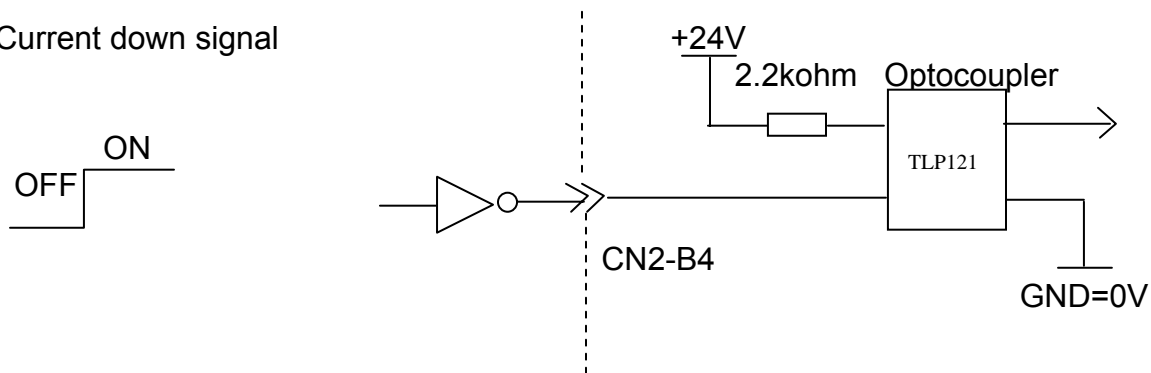
7. Confirmation of the value of the current down

This driver cannot adjust value itself so you need to check the value of current down.

- 1) Input the current down signal to the pin designated to each axis as follows:

| Pin# | Signal Spec. |
|--------|---|
| CN2-B4 | IF=10-11mA, Current down by optocoupler on. |

- Current down signal



- 2) Check the Vref value and calculate the current value (I_{opd}) by the following equation.

$$I_{opd} (A) = V_{ref} / 0.6$$

8. Position of Check-pin

