



TD2MN / TD3MN

2 Phase Micro Stepper Motor Driver

User's Manual

- Reverse-voltage protection function
- Unipolar constant current driving
- Signal input doesn't need external current limiting resistor



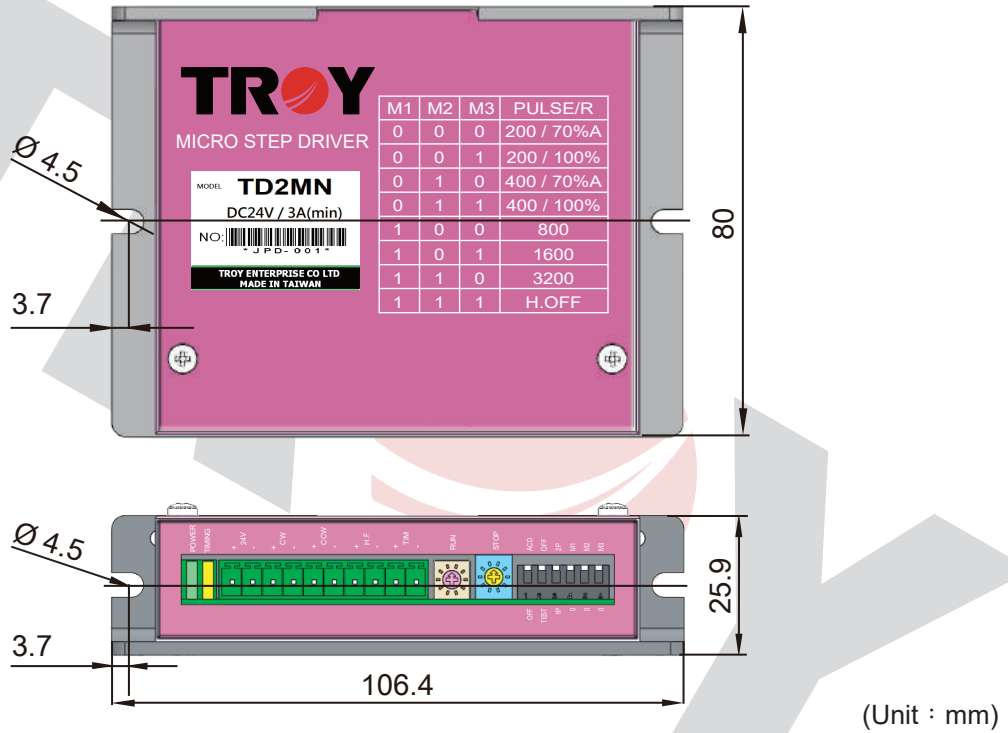
※ Scan with mobile to view on-line

1. Specs

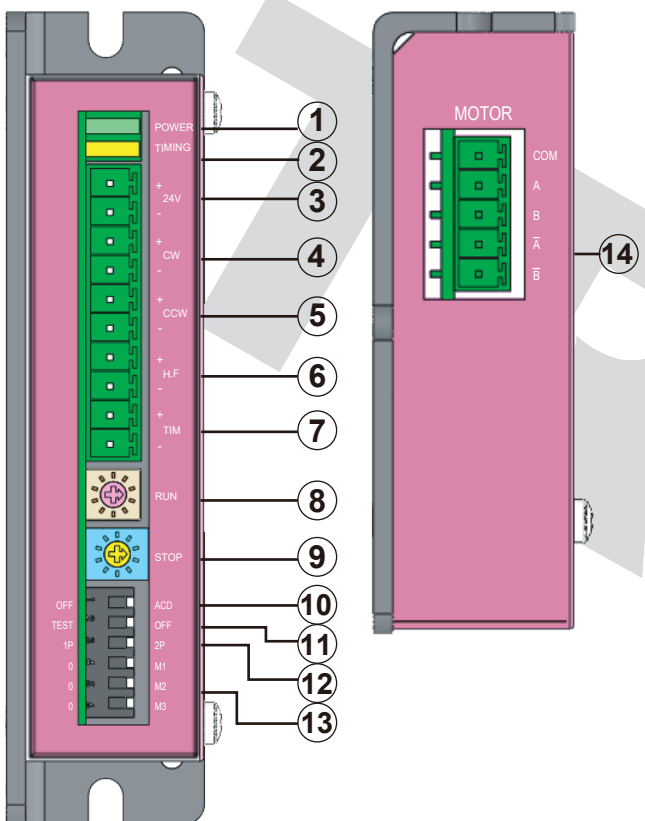
Driver Model	TD2MN	TD3MN
Input Power Voltage(V)	DC 24~36V Above 3A	DC 24~36V Above 3.6A
Driving Current(A)	0.23~2 A/Phase	0.52~3 A/Phase
Excitation Type	Micro-stepping(200,400,800,1600,3200)	
Signal Input Type	Photo coupling input interface	
Signal Output Type	Open collector output interface	
Signal Input	CW Input	2 Pulse mode: clockwise pulse input 1 Pulse mode: pulse input
	CCW Input	2 Pulse mode: counterclockwise pulse input 1 Pulse mode: rotation direction control
	H.OFF Input	Holding off input
Signal Output	TIMING Output	Asserts when excitation of phases cycles to phase origin Asserting continuously when subdivision is 200 Asserting once every 2 pulses when subdivision is 400 Asserting once every 4 pulses when subdivision is 800 Asserting once every 8 pulses when subdivision is 1600 Asserting once every 16 pulses when subdivision is 3200

Function	<ul style="list-style-type: none"> ● Automatic current down(ACD) ● Self-test function(TEST) ● Pulse input mode switch(2P/1P) ● Step angle switch(M1, M2, M3) 	
Protection Function	<ul style="list-style-type: none"> ● Reverse-voltage protection ● Phase loss / phase fault / short-circuit protection 	
Indicator Display	Power indicator TIMING excitation indicator	
Dimension(mm)	106.4(L)X80(W)X25.9(H)	
Weight(G)	163g	
Insulation Resistance	Resistance value between power input terminal and housing is above 100MΩ when testing by DC500V megohmmeter	
Insulation Voltage	No abnormality when applying a high voltage of AC1KV /60 Hz between power input terminal and housing for 1 minute	
Operation Ambience	Temperature & Humidity	0°C~+40°C under 85%RH
	Condition	Avoid moisture, dust, corrosive and flammable gases

2. Dimension



3. Function Description



No.	Panel Name	Function	Description
1	POWER	Power Indicator	Light "on" when power is inputted
2	TIMING	TIMING Indicator	Light "on" continuously when subdivision is 200 Light "on" once every 2 pulses when subdivision is 400 Light "on" once every 4 pulses when subdivision is 800 Light "on" once every 8 pulses when subdivision is 1600 Light "on" once every 16 pulses when subdivision is 3200
3	24V	Power Input(+) Power Input(-)	TD2MN : DC24~36V Above 3A TD3MN : DC24~36V Above 3.6A
4	CW	CW	2PULSE : Clockwise pulse signal input 1PULSE : Pulse input
5	CCW	CCW	2PULSE : Counterclockwise pulse signal input 1PULSE : Rotation direction control
6	H.F	Holding Off	Assert to stop energizing motor
7	TIM	TIMING Output	Phase origin signal output, please refer to section D of manual TIM output
8	RUN	Motor Operation Current	Knob to adjust phase current
9	STOP	Current-off Adjustment	Adjust current decreasing rate when current is off
10	ACD/OFF	Automatic Current Down	Automatically decreases current 0.1 seconds after input pulse stops
11	OFF/TEST	Self-test	CW operation at speed 2pps
12	2P/1P	Pulse Input Mode	2-Pulse mode for 2 pulse inputs 1-Pulse mode for 1 pulse inputs
13	M1/M2/M3	Step Angle Switch	Please refer to adjustment of micro-division
14	MOTOR	Motor Wiring	Connecting stepper motor

4 • Usage of Current Adjustment Switch

Table 1
"RUN" switch mark-current mapping table

Table 2
"STOP" VR mark-current decrease rate mapping table

Mark	TD2MN Current (A/Phase)	TD3MN Current (A/Phase)
0	0.23	0.52
1	0.23	0.52
2	0.25	0.6
3	0.38	0.8
4	0.49	1
5	0.61	1.2
6	0.73	1.36
7	0.86	1.56
8	1	1.76
9	1.13	1.88
A	1.28	2.16
B	1.43	2.32
C	1.58	2.48
D	1.73	2.64
E	1.89	2.84
F	2	3

Mark	TD2MN Current Decrease Rate(%)	TD3MN Current Decrease Rate(%)
1	10	10
2	10	10
3	20	20
4	30	30
5	40	40
6	48	48
7	52	52
8	58	58
9	60	60
10	64	64
11	65	65

1. Setting of motor operation current (Table 1)

A. Motor driving current adjustment "RUN" switch driving current.

TD2MN adjustment range 0.23A/Pulse~2A/Pulse.

TD3MN adjustment range 0.52A/Pulse~3A/Pulse.

B. Factory setting of current is at mark "A".

TD2MN current is 1.28A/ Phase, about 64% of rated current.

TD3MN current is 2.16A/ Phase, about 72% of rated current.

※Note that driver RUN current can't be adjusted to exceed rated A/ Pulse current of motor coil.

2. Motor Current-off Setting (Table 2)

A. Motor off current, adjust "STOP" VR switch(1~11) to different marks to change current decreasing rate when current is off, range from 10% to 65%.

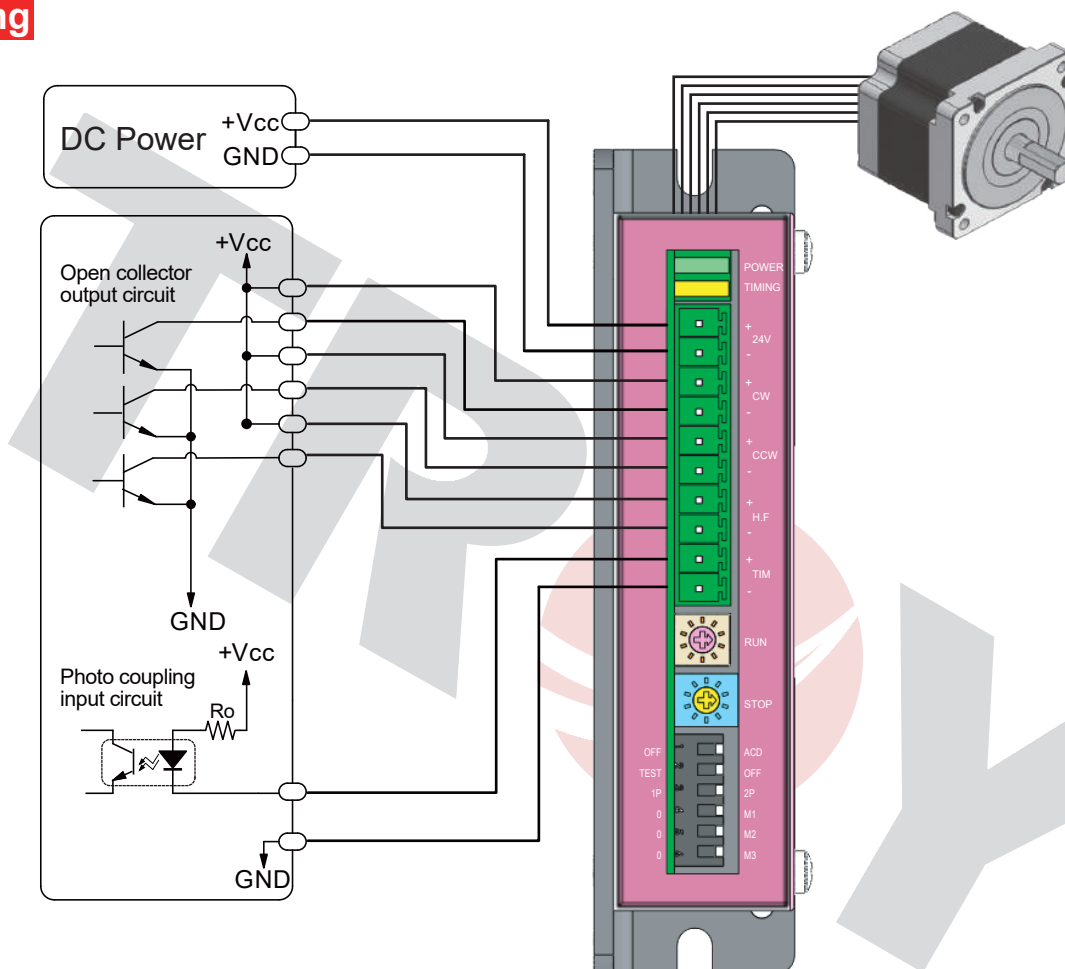
B. Factory setting is at 50% of VR.

※Note that when driver is off, value of holding torque is determined by decreasing rate of STOP setting.

Example: If TD2MN "RUN" switch is set to mark "A", "STOP" setting is 6, decreasing rate is 48%, phase current when current is off is 1.28A/ Phase X48%=0.61A/ Phase.

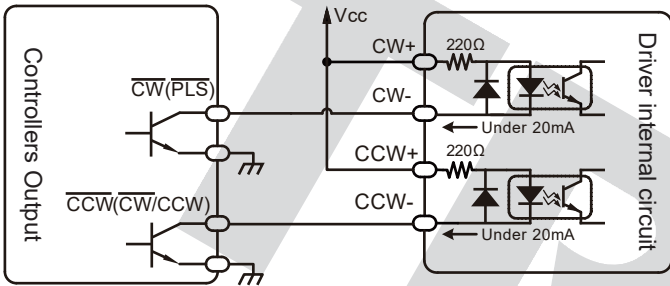
※Recommend to stay at mark "ACD" to avoid motor and driver temperature rising.

5 • Wiring



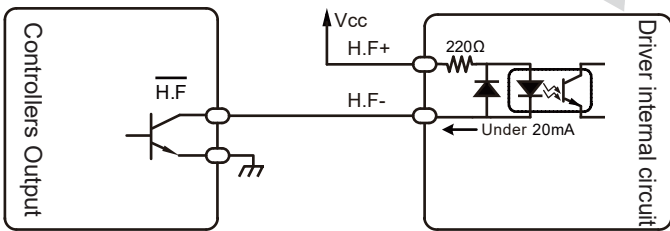
6 • Signal Wiring

➤ CW/CCW Input



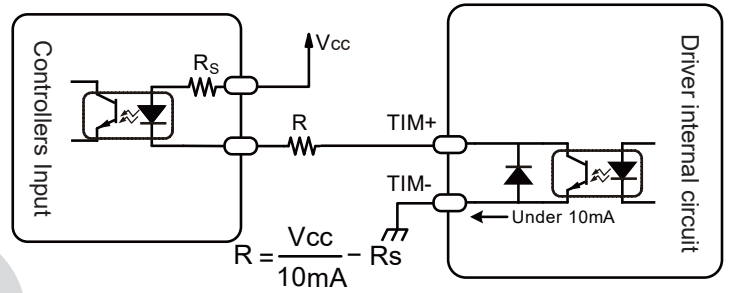
※ Signal input voltage V_{cc} range of the product is 5~24V, does not need external current limiting resistor.

➤ H.F Input



※ Signal input voltage V_{cc} range of the product is 5~24V, does not need external current limiting resistor.

➤ TIM Output



- A. 2 Pulse:
Motor clockwise steps 1 when 1 pulse is applied to CW terminal, and counterclockwise steps 1 when 1 pulse is applied to CCW terminal.
- B. 1 Pulse:
Apply pulse signal to the CW+, CW- terminal, and apply rotation direction to the CCW+, CCW- terminal. When CCW+ terminal is connected to V_{cc} , motor clockwise steps if CCW- terminal is conducted to 0V, and counterclockwise steps if CCW- terminal is not conducted to 0V (open).
- C. Pulse width longer than 5μsec, rising time and falling time shorter than 2μsec.
- D. TIM light "on" continuously when subdivision is 200.
TIM output every 2 pulses when subdivision is 400.
TIM output every 4 pulses when subdivision is 800.
TIM output every 8 pulses when subdivision is 1600.
TIM output every 16 pulses when subdivision is 3200.

7 • Micro-division Adjustment

M1	M2	M3	Subdivision Number	Step Angle
0	0	0	200(Subdivision Current70%)	1.8°
0	0	1	200(Subdivision Current100%)	1.8°
0	1	0	400(Subdivision Current70%)	0.9°
0	1	1	400(Subdivision Current100%)	0.9°
1	0	0	800	0.45°
1	0	1	1600	0.225°
1	1	0	3200	0.1125°
1	1	1	HOLD.OFF	

M1, M2, M3 : Micro-division mode (Factory setting : 101)

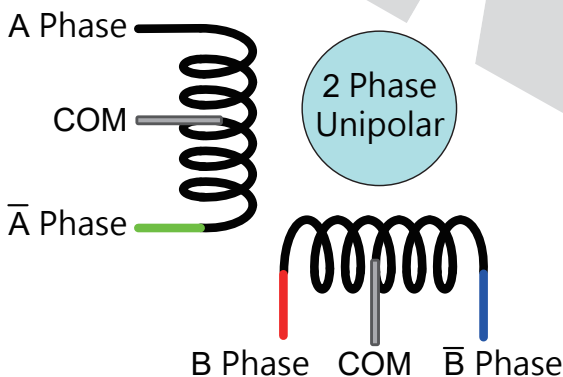
8 • Protection Function

Description	Symptom	Solution
Reverse-voltage protection	NO power indicator	Check if polarity of power input is correctly connected
Motor wiring phase loss protection	Power indicator flashing	Check if phase loss ※ occurs to motor wiring
Motor wiring phase fault protection	Power indicator flashing	Check if phase fault ※ occurs to motor wiring
Motor wiring short -circuit protection	Power indicator flashing	Check if motor phase sequence is correct

※When power indicator flashes, motor wiring must be incorrect, please recheck correctness of motor wiring.

9 • Motor Wiring

➤ Stepper Motor Internal Wiring Diagram



	TROY	Sanyo Denki	Tamagawa	Oriental Motor
A	Black	Orange	Black	Black
COM	Yellow	White	Yellow	Yellow
Ā	Green	Blue	Green	Green
B	Red	Red	Red	Red
COM	White	Black	White	White
B̄	Blue	Yellow	Blue	Blue

Motor wiring mapping table

Wiring Precautions

※ Important

- The input/output signal line should be a signal isolated line covered by a metal mesh. The metal mesh should be one-sided grounded at the common point. When wiring, please separate the power line and the motor line by a distance of more than 10cm. Avoid the same pipeline wiring to prevent malfunction caused by interference noises.
- If long distance wiring is required between the controller and the driver, or other high-power electric device is operating at the same time nearby, it is recommended to increase the DC power supply voltage to the input/output circuit (the recommended value is DC 24V) to increase the driving current for the signal during long-distance transmission and enhance the immunity against noises, thus ensuring the normal operation of the motor.
- When connecting to a PLC, please confirm the definition of +COM and -COM contacts, how to connect to the input/output contact, and provide the correct power supply voltage of the input/output circuit.
- This product adopts the instant plug-in terminal socket approved by CE/VDE safety standards. Please make sure to plug it tightly when connecting to avoid malfunction caused by poor contact.
- This product has reverse power protection. If the power is reversed during wiring, please turn off the power and eliminate the wiring fault, then the operation can be restarted.

※ For detailed product selection, please contact our sales offices or distributors in various regions.

⚠ Danger

※ The content in this column is “very likely to cause dangers including death, or serious injury, etc.”

Be sure to install an over current protection device, a leakage circuit breaker, an over temperature prevention device, an emergency stop device, etc.	⚠ To prevent electric shocks, accidental injuries, fire.
Don't use near moisture, corrosive gas, flammable gas or flammable materials.	⚠ May cause fire.
Don't damage the wires, apply strong pressure, place heavy objects, or insert foreign objects.	⚠ May cause electric shocks, failure or damages, etc.
To avoid damage caused by earthquake, fire, and human accident, be sure to install and fix it.	⚠ To prevent electric shocks, accidental injuries, fire, failure and damages.
In case of emergency, please stop operation immediately, and in order to cut off the power, please install an emergency stop circuit outside.	⚠ To prevent electric shocks, accidental injuries, fire, failure and damages.
The ground wires of driver and motor must be actually grounded.	⚠ To prevent electric shocks.
Don't approach or touch the driver terminals while the power is on.	⚠ May cause electric shocks.
Be sure to perform safety inspections after an earthquake.	⚠ To prevent electric shocks, accidental injuries, fire.
Wiring work must be performed correctly and reliably by a power specialist.	⚠ To prevent electric shocks, accidental injuries, fire and failure.
Be sure to cut off the power before moving and performing wiring work and inspection.	⚠ To prevent electric shocks, accidental injuries, fire and failure.
Never touch the inside of the driver with hands.	⚠ May cause burns or electric shocks.
Don't stand (sit) on the product or place heavy objects on top of the product.	⚠ May cause electric shocks, accidental injuries or damages.
Please correctly configure the motor phase sequence and wiring, such as power wires, etc.	⚠ To prevent accidental injuries, failure and damages.

※ When discarding this product, please treat it as an industrial waste.

⚠ Warning

※ May cause injury or only damage to items

For trial operation, please fix the motor, and assemble the machine after confirming the operation under the circumstances that the machinery is isolated.	⚠ To prevent accidental injuries.
Driver and motor temperatures rise, don't touch.	⚠ May cause burns.
Never modify, disassemble or repair.	⚠ May cause accidental injuries or damages.
Don't drop or place it upside down during transportation.	⚠ May cause accidental injuries or damages.
After the power is restored following a momentary stop, don't approach the machine because it is likely to start suddenly again	⚠ May cause accidental injuries.
Please observe the specified voltages.	⚠ To prevent electric shocks, accidental injuries, fire.
Don't cut in or cut off the main power frequently.	⚠ May cause failure.
Don't use broken speed controllers and motors.	⚠ May cause accidental injuries or fire.
Don't place obstacles that obstruct ventilation around the driver and motor.	⚠ May cause fire or burns.
When a trip occurs, remove the cause, and reset the trip and restart after ensuring the safety.	⚠ To prevent accidental injuries.
Perform maintenance and inspection by a specialist.	⚠ To prevent accidental injuries and electric shocks.
Don't block or put foreign objects into the heat dissipation holes of the speed controller.	⚠ May cause fire, electric shocks or failure.
Please use the specified combination of driver and motor.	⚠ To prevent fire.
Don't apply a strong impact force to the driver and motor shaft.	⚠ May cause failure.
When not in use for a long time, please cut off the power.	⚠ Accidental injury may be caused due to incorrect operation.
Please assemble with non-flammable items, such as metal.	⚠ To prevent fire.
Don't install an electromagnetic contactor at the main power terminal when the motor is running or stopped.	⚠ May cause failure.
Don't drive the motor shaft externally.	⚠ May cause fire, electric shocks and damages.

※ Responsibility for environmental protection:

The company is committed to the promotion of environmental protection. All packaging materials used can be recycled and resources can be reused. After the product has been used for a period of time, please follow the waste disposal procedures to carry out resource separation and recycling when it is necessary to replace the old one with the new one.

--- With your participation and concerns, let us protect the earth environment together. ---

In order to promote the improvement of product performance, any product design change performed by the company will not be notified individually. If you need more detailed information, please contact each sales office.

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