Manual no. CSMD2_440CE-ENG 991127

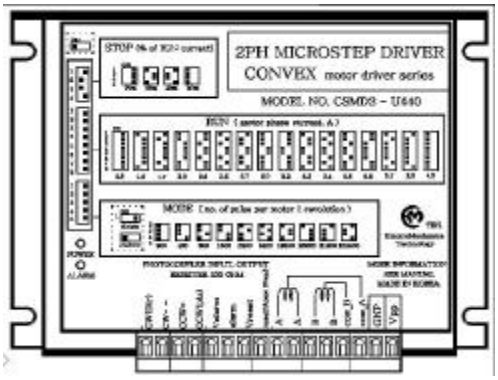
CONVEX Microstep Driver FOR 2PH Step Motor

CSMD2 – U440 (UNIPOLAR DRIVE)

CSMD2 – B440 (BIPOLAR DRIVE)

USERS' GUIDE

CE



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Thank you for choosing the Convex Microstep Drive CSMD2 series.
Please read this manual carefully so that the equipment is used to its optimum.
A copy of this manual should be forwarded to the end user.

1. Safety Cautions

● **You must read these cautions before using the product**.

● In connection with the use of this product, in addition to carefully reading this manual, it is also essential to pay attention to safety and handle the product correctly.

● These SAFETY CAUTIONS are classified into two grades: "**DANGER**" and "**CAUTION**".

DANGER

● **DANGER** safety caution given when incorrect handling could result in hazardous situations involving the possibility of death or serious injury.

CAUTION

● **CAUTION** safety caution given when incorrect handling could result in hazardous situations involving the possibility of moderate or light injury or damage to property.

● Note that, depending on the circumstances, failing to follow a CAUTION may also have very serious consequences. Both of these classes of safety caution are very important and must be observed. Store this manual carefully in a place where it is accessible for reference whenever necessary, and forward a copy of the manual to the end user.

DANGER

<GENERAL>

● Use the drive in the environment specified in this manual. Using it in an environment, which does not meet the general specifications, could cause electric shock, fire or malfunctions, and damage or deterioration of the drive.

● Power off before installing or removing the drive. Electric shock and damage to drive may occur.

● If there is overloaded condition, the step motor may stop abruptly or stall. When the motor stalls, the holding torque is very small. So that, when the motor is applied in vertical motion, before operation, be careful to calculate the load effect.

<CONNECTIONS>

● Connect correctly according to the connection diagram in this manual. Electric shock and fire may occur.

● The cable should not have excessive force applied to it and should not be bent beyond a 2.5cm radius of curvature during normal operation. Electric shock, excessive noise, and fire may occur.

● Never connect/disconnect the motor from the drive when power is applied. If you do, the motor connector may be damaged. Power should never be applied to the drive when all wires of motor are not connected.

● Verify that there are no wire whiskers that can short out the motor connections.

● Never probe the drive. Never connect anything other than the motor to the motor terminals. Probing or opening the drive in any other way will void the warranty. Hazardous voltages are present within drive. The terminal interface will be broken if you open the drive. The terminal interface is critical to reliability of the drive.

● The case of drive is electrically isolated with interior circuit by 0.1 uF capacitor for Earth. So you can use the case for Earth. Be sure to connect the earth to enhance the drive noise immunity. When you connect the Earth with wire, Use the thick wire and connect shortly.

<OPERATIONS>

● Never increase the current setting to more than 10% greater than the current specified for the motor you are using. Excessive current may cause the motor to overheat and result in motor failure.

● Before operation, read carefully this manual. After power OFF, set Current and Mode selection.

● When the drive generate the heat excessively high(case temperature 70°C), OFF the power immediately and check
  - if STOP CURRENT level is unnecessarily set high,
  - if the mounting is effective for cooling.
● Do not contact any material to modify drive set switches in operation.
● When the main power of factory or laboratory is OFF by various reasons, be sure to turn OFF the local power for step drive. The abrupt start of machine may occur when the main power OFF state is released.

<OTHERS>
● During 30 sec after main power OFF, do not contact the connectors of drive. There will be remained diminishing power. If power is left on, the drive will break down or malfunction.

CAUTIONS

<GENERAL>
● Be sure that drive current is not more than 10% of motor rated phase current.
● Take all possible measures to prevent chips or wire scraps from entering the drive. Entry of foreign material will cause fire, failure or malfunctions.

<MOUNTING>
● Do not place the other controller or material on the drives.
● Install the drive correctly in the holes of base mounting panel, incorrect installation could result in malfunctions, failure or detachment.

<OPERATION>
● Do not make abrupt stop the motor unnecessarily. The regenerated power of motor in sudden stop may break down the drives.
● When the abnormal operations or emergency occur, check the general points listed in the last chapter of this manual.
● To prevent the electric shock or drive fail, use the insulated material to modify dip-switches of drive.
● The motor torque increases according to RUN CURRENT set value. However, do not set run current larger than motor rated phase current, it will causes the vibration, mechanical noise, and excessive heating in motor. Finally it shortens the life of motors.
● During operation, modifying set switch of the drive may cause electric shock or drive failure.

<OTHERS>
● During the power on, do not contact the conduct area of the connectors.
● When external force or torque is applied to motor shaft, motor regenerates the electric power. So that, do not make the situation that , after motor wires are attached at drive, the shaft of motor is rotation over 1000rpm.
For example, when the motor is applied to open the door of machine and power is OFF, to open the door by hand will make the motor run over 1000rpm. Generally motor running at 1000rpm generates the power of 40volt.
● Repair, disassemble, and hardware modifications can be made only in factory. Users are not allowed to make such actions.
● Dispose of this product as industrial waste.

2. Unpacking and Inspection

● Carefully remove the contents of the carton in which the drive was shipped. Inspect the carton and the drive and make note of any apparent physical damage. If severe defect is present then you should consider rejecting the shipment and making contact with shipping company considering in-transit damage claims. We have made every effort at the factory before shipment to fully inspect, test, and properly package this product so that it reaches you defect free and without damage.

● All packaging materials should be saved and set aside in case a return shipment has to be made. The contents may include manual and drive. Immediately report any discrepancies to the shipping location.

3. Drive Configuration, Part name, and Its Function

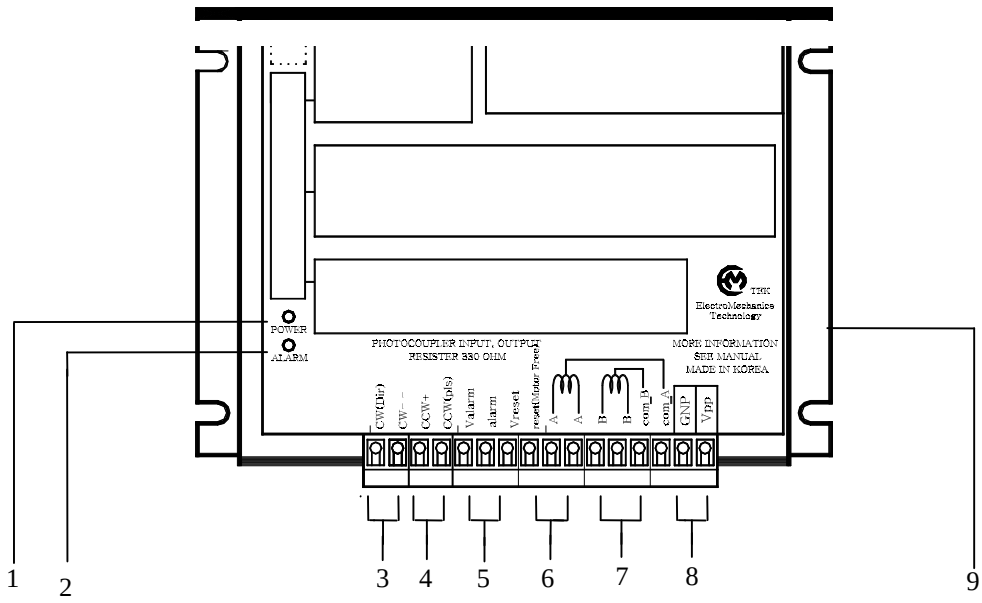


Fig. 1 drive up side view for part name

3. 1 LED indicate

name	LED	color	illumination condition
✂ **POWER**	Power on	Green	When the power is supplied normally
✁ **ALARM**	alarm state	Red	When abnormal state occur such as over current, arm short, over heat, abnormal motor connection.

3. 2 connectors

indication	name	function	
✍ **DIR +/-**	Dir + / - (1 pulse mode) CW + / - (2 pulse mode)	Direction of Rotation +/ -(MODE dip sw 1 : off) Clockwise pulse +/- (MODE dip sw 1 : on)	
🔔 **PLS +/-**	Pls + / - (1 pulse mode) CCW + / - (2 pulse mode)	Pulse input +/- (MODE dip sw 1 : off) Counterclockwise pulse +/- (MODE dip sw 1 : on)	
🕮 **Alarm +/-**	Alarm out +/-	When drive is abnormal state, with Alarm LED on, between +/- will be Low Impedance.	
🕯 **Reset +/-**	Reset input +/- Motor Free input +/-	Input for drive alarm release and motor free condition. Apply 8 –20mA current through +/-. At moment that current flow drive reset and in state that current flow motor is in free state.	
☎ **MOTOR**	Motor winding connector	Drive out to motor windings **For B440(bipolar drive) donot connect A_com,B_com**	
✆ **POWER**	Power input	DC 12 Volt ~ 36Volt Caution!! – Power polarity.	
✉ **FG**	Frame Ground	Case of drive is Frame Ground (FG).	

3. 3 Dip switch name and function

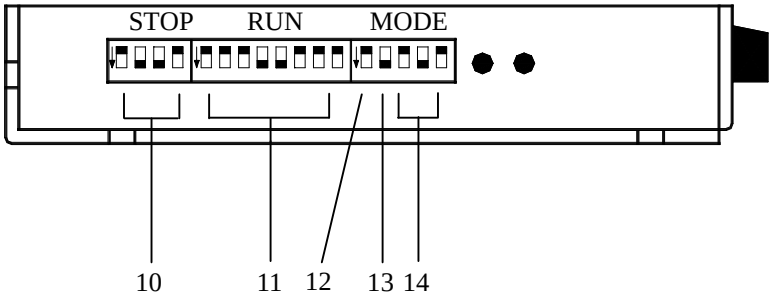


Fig. 2 side view for dip switch selection

indication	name	Initial setting	function	see
STOP	STOP current level selection	30%	1msec after motor stops, motor current is down as 30%	
RUN	RUN current value selection	0.9A/ phase	Drive supply set current to motion in rotation	
MODE (SW. no. 1)	Input pulse type selection	1 pulse mode (dir/pls mode)	OFF : 1 pulse type ON : 2 pulse type	
POWER SAVE	Power save ON/OFF	ON	ON : automatically power saved OFF : always 100% power	
MODE (SW no. 3-5)	microstep resolution selection	6400 Pulse/Motor 1 Revolution	Selection for microstep resolution of motor & drive	

4. Mounting

DANGER
● Do not use the drive in explosive, inflammable, caustic circumstance. Fire or drive fault may occur. ● Switch the power off before installing or removing the drive. Electric shock and damage for drive may occur. ● Only qualified service and installation personnel should mount this device. Electric shock may occur.

CAUTION
● Do not place the other controller or material on the drives. ● Install the drive correctly in the holes of base mounting panel, incorrect installation could result in malfunctions, failure, or detachment.

4. 1 environmental considerations

- Indoor use only
- Operating temperature : 0˚C ~ 40C
- In case when the surface temperature of the case of drive reaches 70˚C, external cooling is crucially needed.
- Do not use this drive in the place where drive can be easily contaminated by fluid such as water and oil easily
- The place where easy cooling is possible.

● Do not use this drive under the circumstance of continuous vibration and mechanical shock. Mount drive using shock-absorbing material.

● Do not use this drive under the presence of radiation, magnetic field or in vacuum.

● In case when there is unacceptable large noise, special cautions about shielding, grounding, and wiring will be required.

4. 2 drive attachment

● The Convex drive is a self-contained package requiring minimal concern for mounting methods and positions. A dimensional outline of CSMD2 series is given in Fig.3. The recommended mounting position is vertical with the heatsink exposed to allow convection and heat removal from the drive. It is recommended that you allow a minimum of 3 cm on all sides for airflow. The user should refrain from mounting where the heatsink is unexposed or where easy access to the connectors or adjustments is not practical.

● In general the drive should be positioned close to the motor although step motors are fairly tolerant of long lead lengths. Should the drive need to be positioned more than 2 m from motor, consult the factory for the availability of motors with longer lead lengths.

4. 3 dimensions

< Unit: mm>

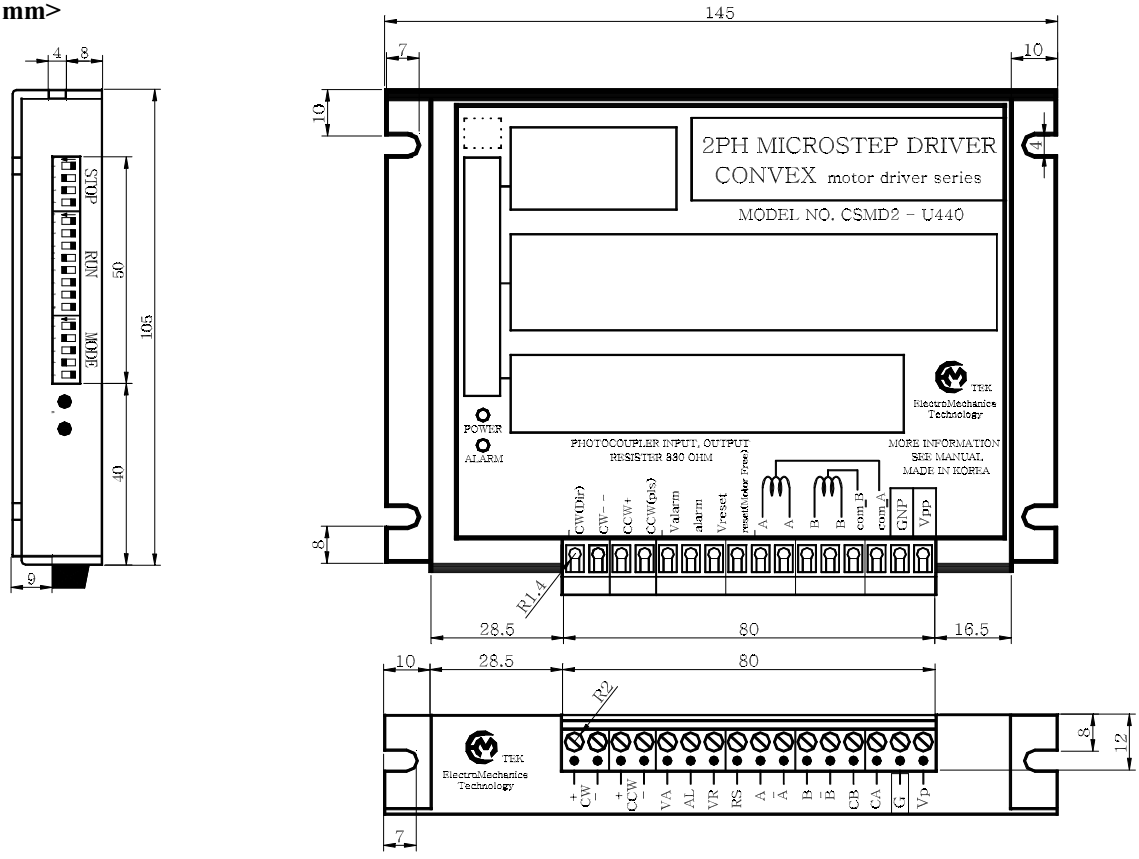


Fig. 3 drive dimension for mounting

5. Drive Current and Mode set

DANGER
● Switch the power off before current and mode set. Electric shock and damage for drive may occur. ● Before use or operation, be sure to carefully read this set method to prevent the drive and mechanical equipment from being damaged

CAUTION
● To prevent the electric shock or drive fail, use the insulated material to set drive dip switches.

● The drive has three sets of dip-switch. The first set will be referred to as RUN CURRENT set, the second set as STOP CURRENT set, and the third set as MODE SELECTION.

● Factory default settings are for 6400 pulses/(motor 1 revolution), Dir/pulse (1 pulse mode), 1.0A RUN CURRENT, 30% STOP CURRENT.

5. 1 RUN CURRNT set switch

CAUTION
● Never increase the current setting to more than 10% greater than the current specified for the motor you are using. Excessive current may cause the motor to overheat and result in motor failure. ● It is recommended that drive RUN current be set as same as rated motor phase current. ● The motor torque increases according to RUN CURRENT set value. However, do not set run current larger than motor rated phase current, the motor will run roughly and may overheat.

● The first thing that you must do is set the RUN current on the drive to match the motor that you are using. Use the directions below to set the dip-switch for your motor.

● If the closest current is within 10% of the rated current, it will probably suffice for most applications. Current settings 10% greater than the rated value should not be used unless special cooling precautions are taken or intermittent operation allows for.

● In general, If the run current of drive is set lower than motor phase current, less heating in motor, low audible noise, and more smooth motion of motor can be achieved but the motor torque will be smaller thanthe rated torque of the motor. So that, if you want the motor to move more smoothly, then select higher torque motor and apply lower current.

5. 2 STOP CURRENT set

CAUTION
● Do not set STOP CURRENT level unnecessarily high. High STOP CURRENT causes heating of motor and drive and finally it shortens the life of them. ● If STOP CURRENT level is set too low, at the moment of start and stop, motor can make a shock impact on machines or in vertical motion, moving carriage may fall slowly. ● It is recommended that STOP CURRENT is set as low as possible through experiments.

● The drive can be configured for automatic low power. The current supplied to the motor windings will be reduced to a certain value specified STOP CURRENT SET 100 msec after motion is complete. This operation is excellent to help

control heating and reduce power consumption when not in motion.

(For example) Current drive RUN CURRENT is set 3A and STOP CURRENT is set 40%. Then the motor current in motion is 3A and 100 msec after motor stop the motor current will become (3A × 40% =) 1.2A.

● When the frequency of drive input pulse is less than 0.1pps(0.1Hz), as the run current is alternating at every pulse input, motor torque is also alternating. In this application, set the resolution of drive higher and apply input pulse of higher frequency.

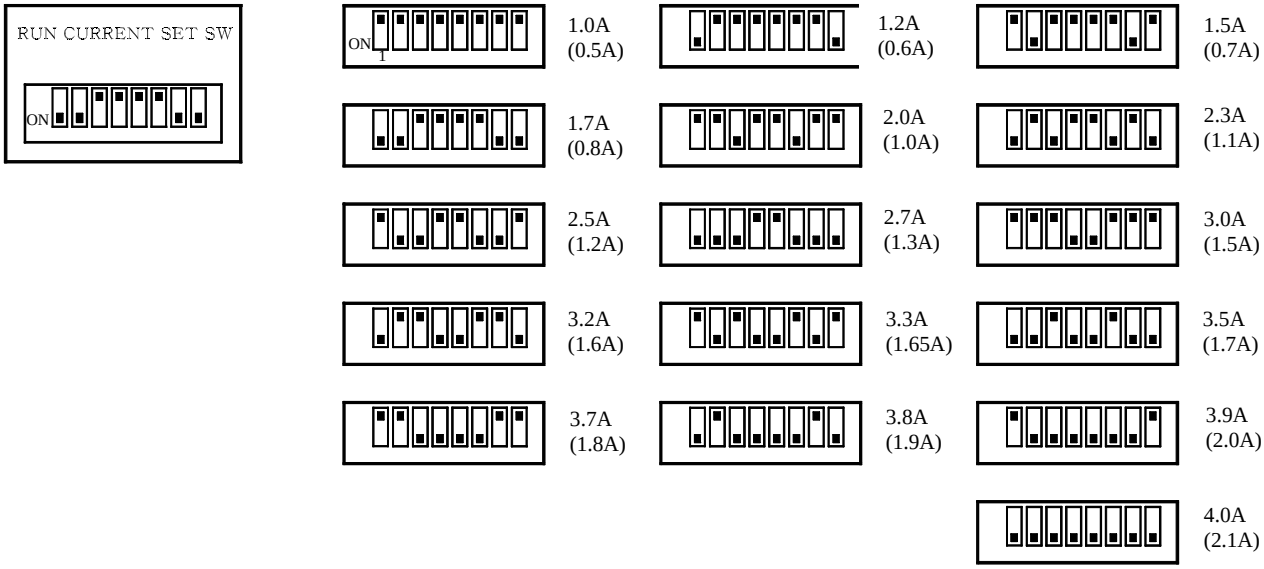


Fig.4 Run Current Set value

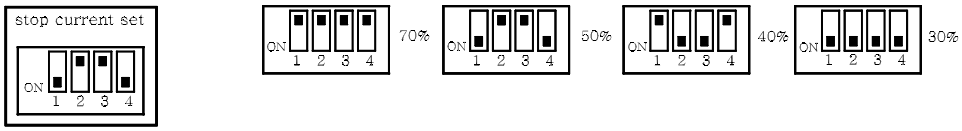


Fig. 5 Stop current set value

5. 3 pulse type selection switch

CAUTION
● Frequent mistakes occur. Be sure to read this manual carefully and set correctly. ● If this switch is set incorrectly, motor rotates only one direction or CW, CCW rotation speed is different at same input pulse speed.

5. 4 power save ON/OFF switch

● The power save function is helpful to reduce motor and drive heating, input power dissipation. So that in general general applications, be sure to use this function(power save on/off switch is on). But in case when the motor is applied at vertical motion and there is some sliding at motor stop state and IN-POSITION control, power save function is OFF.

5.5 microstep resolution set switch

● The resolution means the number of pulses per motor one turn.

● For example, if current drive resolution is 6400, then it means that drive requires 6400 pulses for motor to rotate 1 turn and 6400pps input made motor turn at the speed of 1 rps (revolution per sec)

● The drive allows the user the versatility to select a microstep resolution that best matches his application requirements. For a standard 1.8° step motor there are 8 selectable resolutions that range from 800 to 102400 pulses (decimal type : 400 – 50000 pulses) per revolution. Refer to the following Fig.6 and determine the resolution best meets your need and set switches as indicated.

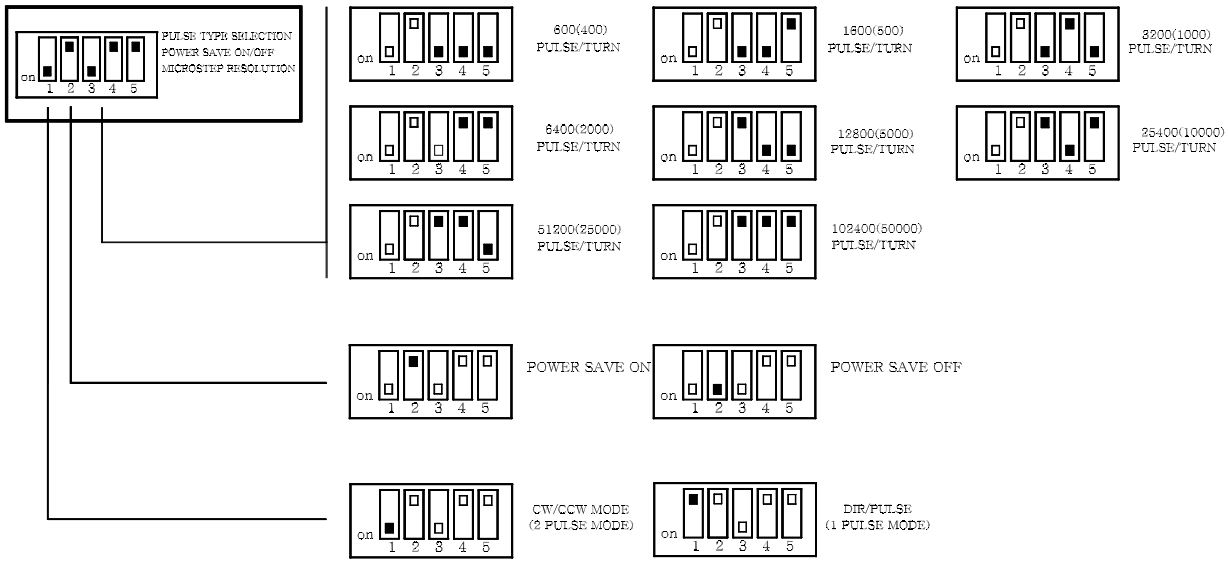


Fig.6 Mode selection switch

6. Input Pulse Timing Chart

6.1 direction/pulse input, cw/ccw input

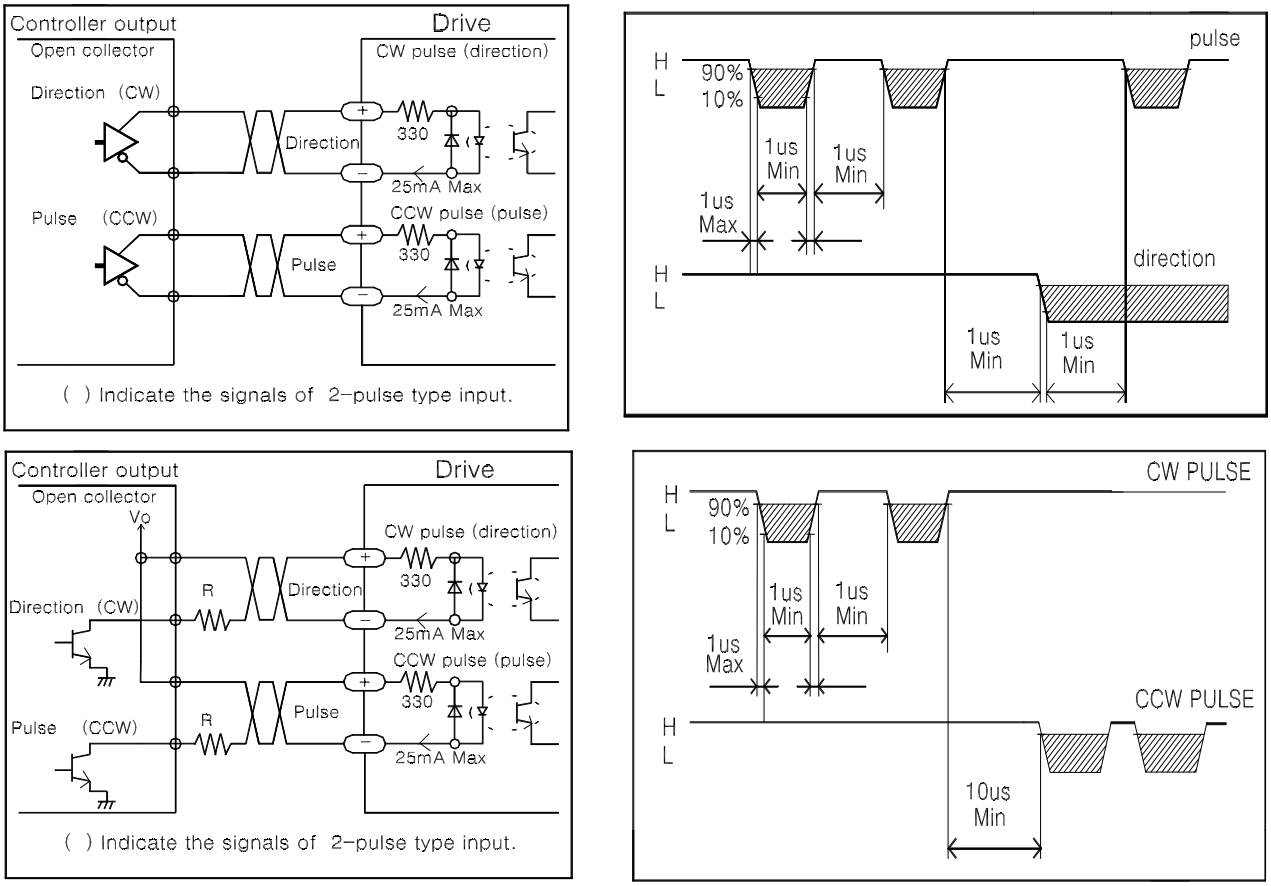


Fig.7 Input pulse timing chart

<GENERAL>

● ALL available logic inputs have two possible input states, which will be referred to as “High” and “Low”. When a logic terminal is open it is in a “High” state by default since it is clamped “ High” internally with a pull-up resistor.

● Pulse input – “pulse”, “cw”, “ccw”

The motor will step on the rising edge of each incoming pulse up to a rate of 500kHz(kpps). The minimum input pulse width is 1microsecond.

● Direction – “Dir”

A High or open connection on this terminal would cause a clockwise (CW) rotation of the motor as viewed from the output shaft end. When taken “ Low”, the direction will be counterclockwise (CCW). The direction input may be switched while the motor is rotating, but may cause the motor to loose synchronism if operating above its Start/Stop torque capability.

● The inputs are optically isolated and may be driven by providing a negative signal with respect to the + input. The output driver of controller must be capable of providing a minimum sink current of 10mA to ensure proper operation.

● When the output pulse type of controller is Line Driver, connect +/- signal directly to the +/- connectors of drive.

● Use the twisted pair cable for pulse inputs of drive. If you don' t have twisted pair cable, twist the +/- pulse input lines

● The line for pulses should be made as short as possible for electric noise immunity.

● For proper operation, when the input photo-diode is on, drive pulse input current should be 10mA – 25 mA. Check the current as follows:

(For example) the power supply voltage for pulse input is 5V, the voltage of - connector is measured as 1 Volt, then the diode current is calculated as

{5 volt – 1 volt – 1.2 volt (photocoupler diode on voltage)} / 330 ohm ≅ 8.5 mA

This may cause the malfunction of drive. Make the voltage of – connector be zero.

6.2 drive control signal: FAULT out, RESET(MF) in

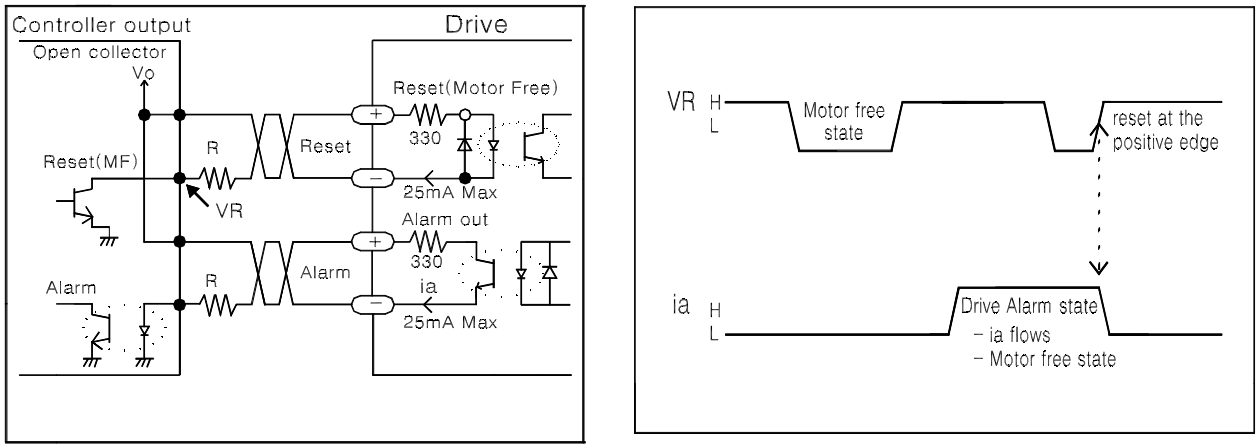


Fig.8 Drive in/out signal for control

● The drive has one dedicated hardware fault output. The output is an optically isolated open collector transistor. The Fig.8 is a schematic showing the optically isolated fault output. Refer to Fig.8, the alarm output transistor is normally cut-off state. The transistor turns on when alarm occurs. The following conditions will cause alarm output to turn on:

❑ over current (Current limit is 8A for 4A drive) ❑ overheat (heat limit is 70˚C at the case)

❑ arm short (short between power and motor connectors, between motor connectors)

❑ motor wire is not properly connected.

● Reset input can be used Motor free signal input. As shown in Fig.8, the drive alarm is reset at the negative falling edge of reset output of controller and the drive cuts off motor power in the low state(input photodiode of reset input of drive is turn on state)of reset output of controller.

7. Connection and Wiring

7. 1 motor, input signal, out signal, Power connections

DANGER
● All connections should be made with any power sources turn off and disconnected from the drive. Electric shock may occur. ● Only qualified service and installation personnel should install this device. ● The cable should not have excessive force applied to it and should not be bent beyond a 2.5cm radius of curvature during normal operation.

● Choose twisted pair wire for pulse input, reset input, and fault out and the length of these wires should be shorter than 1 m.

● Shield these wires ensure that the shield is taken to a low impedance earth ground.

● Specially, when current resolution of drive is set high and mid or high speed is required, more attention is crucially required to wiring pulse input signal.

● Choose motor and power connection wire sufficiently thick.

● Do not bundle the control wire and communication cable with the main circuit or power line.

● Keep the control wire and the communication cable at least 100 mm away from the main circuit or power line: otherwise, noise or malfunctions will occur.

● Failure to engage the connectors properly could result in faulty connection, leading to erroneous inputs and outputs.

● Engage the drive unit connector and peripheral device connector securely with the connectors on the drive.

● Shield the motor cable and ensure that the shield is taken to a low impedance earth ground.

● Earth the motor casing to a low impedance earth ground.

● Mount equipment that is sensitive to EMI as far as possible from the drive and motor.

7. 2 Frame Ground (FG)

DANGER
● The case of drive is electrically isolated with interior circuit by 0.1 uF capacitor for Earth. So you can use the case for Earth. Be sure to connect the earth to enhance the drive noise immunity. When you connect the Earth with wire, Use the thick wire and connect shortly ● If the panel is conductor that is connected at the earth of the main power, additional earth for drives is not required.

7. 3 power supply for drives

CAUTION
● Make the capacity of the power supply for drive sufficiently large. If possible, the output current of power supply is at least one half larger than the run current set value of drive. ● If the capacity of power is not sufficient for the drive and motor to run, drive may break down.

● For example, current motor phase current is 2A and RUN CURRENT of drive is set as 2A, then the output current of power supply is at least 3A (if possible, choose 4A).

● Power input voltage is 12-36Volt. The torque at high speed increases as the magnitude of input voltage. Be sure that the peak input voltage is less than 36 volt. Also, as the magnitude of ripple voltage of input power determines the life of

drive, so that make the voltage ripple of input power as small as possible.

● Choose the thick wire for power connection lines. Moreover important in wiring is that the line should be twisted.

● In case when the 2 or more drives are connected at one power supply, be sure to connect power for drive direct from power supply separately and for easy cooling make the room at 3cm between the drives and power. (**Serial connections are worst power connection**.)

7.4 Cooling

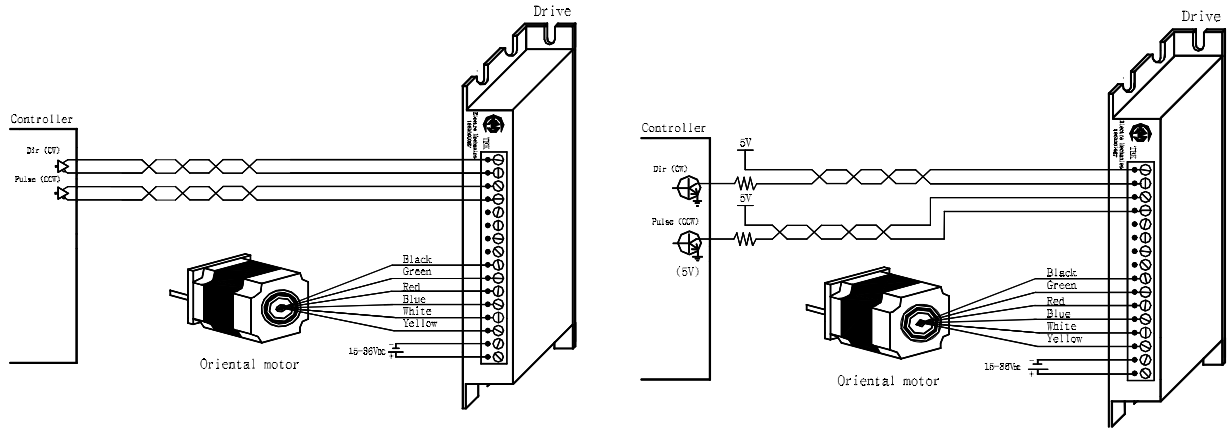
● The enclosure of CSMD drive is a heatsink, which allows for heat dissipation produced by the internal components. During operation the heatsink will become warm to the touch and should not be a concern to the user. An internal temperature sensor will shut down the drive if the internal air reaches 70˚C internally. If this Over-Temperature fault condition exists the alarm LED will be illuminated and the drive alarm out will be active. Additional air cooling devices are not required except where ambient temperatures are high or high current motors are used. Consult the factory if these conditions exist.

● The most fundamental rule to follow concerning proper cooling of the devices is to keep the heatsink surface temperature less than 70˚C. Since the drive is convection cooled, it is recommended that you allow a minimum of 3 cm on all sides for airflow. Operating in an enclosure area may require external cooling in order to keep the heatsink temperature less than 70˚C. As a rule of thumb if you are not able to measure interior temperature of drive: the heatsink temperature is within limits if you can comfortably hold your finger on it more than 3 seconds.

● Generally step motors are rate at 100˚C maximum allowable case temperature. When connected in parallel, motors can overheat if operated at high speeds for extended periods of time. Actual temperature rise is duty cycle dependent. Providing forced air cooling for motors will extend duty cycles but no case should the motor be allowed to exceed the rated maximums.

● In normal operating condition, as the heating in motor and drive depends mostly on operating conditions such as normal operating speed and ratio between run time and stop time. The worst case is that motor is programmed to run continuously at low speed. In that case, external cooling should be required.

7. 5 connection examples



***For Bipolar type drive(B440 type), do not use A_com, B_com**

Fig.9 simple and minimum connection for test.

● In case when collector voltage for pulse is not 5V, as shown in Fig.9, external resistor should be inserted so that the current through drive pulse or direction +/- circuit is less than 25mA.

Recommend:	when 5V	R = no
	12V	R = 1Kohm-1.5Kohm
	24V	R = 2Kohm-2.4Kohm

● If the motor is turns in the opposite direction (from the desired direction) after you connect motor wires to the drive, you can change the direction by reversing the leads going to A and $\underline{A}$ on the motor connector.

7. 6 POWER ON

DANGER

● Do not supply power to the drive without having all of the motor leads firmly connected to their appropriate terminals. Connect center tap wires to Phase COM_A and COM_B as required, connect the motor's shield to the terminal provided.
● When the main power of factory or laboratory is OFF by various reasons, be sure to turn OFF the local power for step drive. The abrupt start of machine may occur when the main power OFF state is released.
● During 30 sec after main power OFF, do not contact the connectors of drive. There will be remained diminishing power. If power is left on, the drive will break down or malfunction

CAUTION

● When the power applied properly, POWER ON LED is illuminated.
● Once the drive is properly mounted and all of the required connections have been made, the drive may be powered up. Initial power should be applied with no pulses being fed to the drive. The motor will lock into position at its rated static torque. If the automatic low-power mode has been selected then statistic torque will decrease to STOP % level of its rated static torque after 1 msec. Once the input pulse rate begins, the motor should begin to step in the step direction. At this point, If the motor does not have any torque or will not properly rotate, refer to Section 8 for troubleshooting and possible remedies.
● Do not make abrupt stop the motor unnecessarily. The regenerated power of motor in sudden stop may break down the drives.
● When the abnormal operations or emergency occur, check the general points listed in the last chapter of this manual.
● The motor torque increases according to RUN CURRENT set value. However, do not set run current 10% larger than motor rated phase current, it will causes the more vibration, mechanical noise, and excessive heating in motor. Finally it shortens the life of motors.
● To prevent the electric shock or drive fail, use the insulated material to modify the dip-switches of drive.
● During operation, modifying set switch of the drive may cause electric shock or drive failure.
● In any condition, the surface temperature of motor should be less than 100 °C.

8. Trouble Shootings

● If a problem occurs or your system does not function properly, the operator should immediately turn off and disconnect all power to the drive before attempting any troubleshooting or repair. Only when you have identified and isolated the problem, you can effectively begin to resolve the problem.

● Initial step in troubleshooting is to isolate each system component and verify that each component functions properly when operated independently. The motor should be disconnected from the load to isolate the drive from possible load related problems. You may have to dismantle your system then reassemble and test each component piece by piece to detect the problem. The following list of symptoms, causes, and corrections may help to guide the user through a problem solving session.

● Resonance exists in all step motor and is a function of motor' s mechanical construction. It can cause the motor to stall at low speeds. Most full step motor controllers jump the motor to a set minimum starting speed that is greater than the resonance region. The Convex microstep capability allows you to operate a motor smoothly even at low speeds.

● Motor that will not accelerate past 1 rps may be stalling due to resonance. You can add inertia to the motor shaft by putting a drill a chuck on shaft. The drill chuck may provide enough inertia to test the motor when it is not loaded. In extreme cases, a viscous damper may also be needed.

● If the motor fails to move, you should test the motor with an **ohmmeter** to examine the resistance between the motor connections. If the motor is not malfunctioning, the source of the problem is probably within the drive. If you operate a faulty drive with a reliable motor, you may damage the motor. If you find that the motor is not faulty, remove power, and remove motor from the drive. Use the following steps to test the motor.

① Remove power from the system. Detach the motor from the drive.

② With the motor detached from the system, use an ohmmeter to check the resistance between A and A_com and between A and A_com. **it should be approximately the same as resistance shown in motor catalog.**

③ Now use the ohmmeter to check the resistance across Phase B according to the same method in ②.

(the resistance across Phase A and Phase B should be nearly identical)

(for bipolar motor, check the resistance between A and A, B and B)

④ Use the ohmmeter to check the resistance between Phase A and Phase B. **It should be infinite**.

⑤ Use the ohmmeter to check the resistance between Phase A and Earth (the motor case shaft). **It should be infinite**.

⑥ Use the ohmmeter to check the resistance between Phase B and Earth (the motor case shaft). **It should be infinite**.

⑦ Turn the shaft manually. **There should not be any torque**.

Common Problems and Solutions

The following table contains common problems, probable cause, and solutions to the problems, It should help you eradicate most problems you might encounter.

Symptoms	Probable Causes	Solutions
The power LED is not on (illuminated).	The drive is not receiving DC voltage.	Verify that the connector on the drive is strongly fastened. Verify that there is DC voltage at the DC outlet that the drive is plugged into. Verify that there is DC voltage at the drive at the DC power connector.
Little or no holding torque. Power LED is on, motor fault LED is off.	The motor run current is set too low. The motor winding or cable is open. The Auto Power save is enabled. Motor free is enabled.	Check the RUN current select switches and verify that the RUN current is set correctly. Check motor and cable with an ohmmeter. Check the STOP current select switches and verify that the STOP current is set correctly. Disconnect the cables at Motor free connector of the drives.
The motor fault LED is on.	The motor cable is disconnected or not strongly fastened The motor cable is incorrectly connected at the drive. The drive has detected a motor/wiring short circuit. The internal drive temperature is greater than 70 C.	Check the motor cable. Check the motor wires are correctly connected according to their diagram. Check the motor and cable wiring. Remove drive cooling obstructions or add fan cooling to the drive.
Excessive electrical noise.		Verify the drive case is properly grounded (earthing).
The motor moves erratically at low speeds.	Motor current is set incorrectly. One motor phase open. Motor resolution is set for 200 or 400 steps per revolution.	Check the RUN current select switches and verify that the current is set correctly. With motor connector removed from the SX, use an ohmmeter to measure continuity of motor windings. Full and half step modes will cause the motor to run roughly at low speeds. Use microstep resolution.
The motor stalls at high speeds.	Motor RUN current is not set correctly. Motor is undersized for the application.	Check DIP switches verify that motor current is set correctly. Check the load conditions.
The motor stalls during acceleration.	Motor current is not set correctly. The acceleration is set too high. There is insufficient rotor inertia. Motor is undersized for the application.	Check the RUN current select switches and verify that the current is set correctly. Decrease the acceleration. Add inertia to the motor shaft. Verify that the motor is sized correctly.
The motor (unloaded) stalls at nominal speed.	There is insufficient rotor inertia.	Add inertia to the motor shaft.
The motor does not move the commanded distance.	The motor resolution is set incorrectly?	Ensure that the drive resolution setting is correct.
The drive moves the motor in the wrong direction.	The motor is not wired to the drive properly. The pulse output circuit of controller does not match the input photocoupler circuit of drive.	Verify motor connections. Swapping motor leads A+ and A- at the drive connector to change direction if necessary. Check input pulse timing and logic carefully.
Rotation speed and torque is different at CW, CCW motion	The pulse type selection SW is not correctly set.	Check that pulse type selection is same as that of controller.
Motor does not rotate smoothly.	The RUN current is set high. Th pulse output is not correctly received in drive.	
The motor makes a mechanical impact at the edge of motor start and stop.	The STOP current is set too low.	
The torque is small when motor stops.	The STOP current is set too low.	

9. Specifications

Model no.	CSMD2 – U440, CSMD2 – B440
Power input	DC 12V – 36Volt
Excitation method	Constant current, PWM, unipolar(U440), bipolar(B440)
Output current	1 ~ 4A / motor 1 phase
Microstep resolution	800, 1600, 3200, 6400, 12800, 25600, 51200, 102400 500, 1000, 2000, 4000, 5000, 10000, 20000, 50000
Input pulse type	Dir/pulse(1 pulse mode) CW/CCW(2 pulse mode)
Control input	Reset (Motor free), photocoupler isolated
Control out	Alarm out, photocoupler isolated
Function	Automatic power save
Protection	Over heat(over 70˚c), over current, arm short
LED display	Power on, Alarm
Temperature	0˚c ~ 40˚c
Weight	0.4 Kg
Dimension	145 × 105 × 20 UNIT = mm

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