

## BASIC FUNCTIONS

This guide will familiarize the user with the basic functions of the EDC Servo Drive and assist with start up. The guide will cover the following:

1. Restoring Parameters to Default
2. How to Jog the Servo Motor
3. Internal Speed Mode
4. Position Control Mode

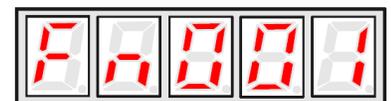
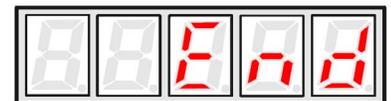
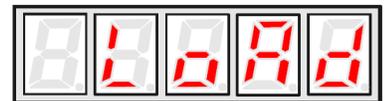
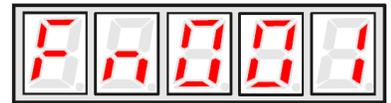
The descriptions below are for changing parameters with the handheld controller. When using the handheld controller, **please set the dial switch to '0'** on the front end of the panel. For more information on these functions and others please refer to the EDC User's Manual.

### 1. Restore Parameters to Default:

Upon initial startup, the EDC Servo Drive should contain factory settings. Should the user wish to default back to the factory settings, follow the steps below:

*Note: This function is used to return ALL the parameter values back to default.*

1. Press the MODE Key to select auxiliary function mode.
2. Press the INC or DEC Key to select the function number for restoring defaults (Fn001).
3. Press the ENTER Key to enter the parameter restoring mode.
4. Press and hold the ENTER Key for a second to restore all the parameters to their default values.
5. Release the ENTER Key to return to the function number display.
6. In step 3, the parameter operation can be cancelled or quit by a short press of the ENTER Key.

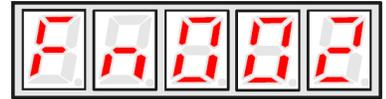


After following the steps above, ALL the parameters should be returned to their factory default value. A list of these values can be found in the EDC User's Manual.

**2. Jog Operation:**

Under this function, the motor is able to rotate clockwise or counterclockwise at a defined speed. This is an easy test to indicate proper connection of both motor and encoder wires to the servo drive and to also determine that both the motor and drive are functioning correctly. This mode is not available when the servo is on or when an alarm occurs.

1. Press the MODE Key to select auxiliary function mode.
2. Press the INC or DEC Key to select the function number for JOG Function (Fn002).



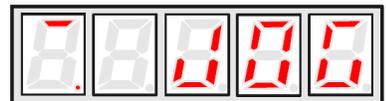
3. Press the ENTER Key to enter JOG Mode, meanwhile, servo is OFF (Motor Power is OFF).



*Note: The two lines on the left indicate the servo is OFF.*

4. Press the MODE Key to enable Servo ON.

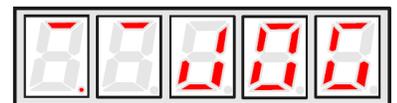
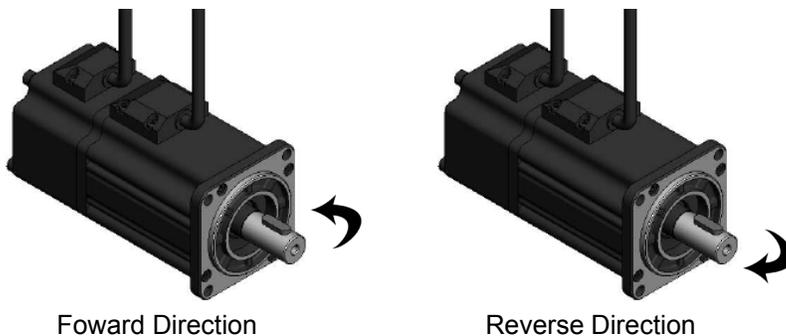
*Note: The single line on the left indicates the servo is ON and that the motor should RUN.*



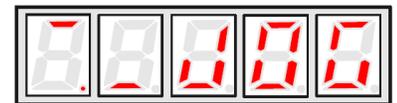
5. Press the MODE Key to toggle the Servo ON and OFF. To run the motor, Servo ON must be used.

6. Pressing and holding the INC or DEC Key will cause the motor to change directions and run at the speed previously defined by the user or the default value.

During the motor's FWD or REV direction, the LED display will show the following below:

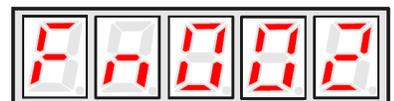


Foward Direction



Reverse Direction

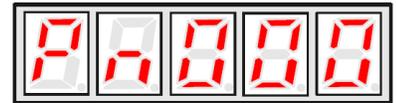
7. Press the ENTER Key to return to the function number display. At this moment the servo motor is turned OFF.



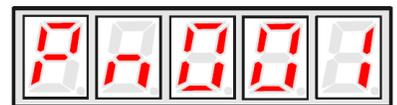
### 3. Internal Speed Mode:

By setting a few parameters in the EDC Servo Drive, the Servo Motor is able to run on power up. The parameters listed below indicate which parameter values need to be changed.

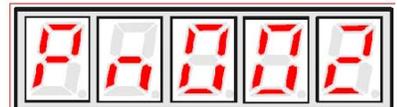
1. Press the Mode Key on the handheld controller to access the Parameter Setting Mode. To access Pn000, press the ENTER Key on the controller. Press the INC Key to increment Pn000 from 0 to 1 and press ENTER. This allows Servo ON (/S-ON) to be internally set. Press the ENTER Key one more time to go to Pn000.



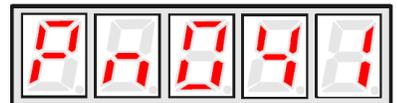
2. Press the INC Key to increment the Parameter Register from Pn000 to Pn001. Again, press the ENTER Key to access the data stored in Pn001. Increment the data stored in Pn001 from 0 to 1 by pressing the INC Key. This disables the hard limit switch going in the forward direction. Press the ENTER Key one more time to go back to Pn001.



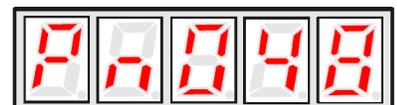
3. Press the INC Key to increment the Parameter Register from Pn001 to Pn002. Again, press the ENTER Key to access the data stored in Pn002. Increment the data stored in Pn002 from 0 to 1 by pressing the INC Key. This disables the hard limit switch going in the reverse direction. Press the ENTER Key one more time to go back to Pn002.



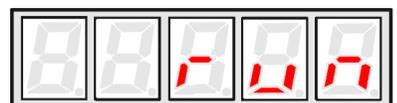
4. Press the INC Key to increment the Parameter Register from Pn002 to Pn041. Again, press the ENTER Key to access the data stored in Pn041. Increment the data stored in Pn041 from 0 to 2 by pressing the INC Key. This parameter sets the drive into internal speed control. It regulates the speed set in the parameter register Pn048. Press the ENTER Key one more time to go back to Pn041.



5. Press the INC Key to increment the Parameter Register from Pn041 to Pn048. Again, press the ENTER Key to access the data stored in Pn048. Increment the data stored in Pn048 from the default value of 500 (or other value if previously changed) up to 6000 by pressing the INC Key. This parameter sets the speed the motor will run. In this case, this will be the startup speed of the motor. Press the ENTER Key one more time to go back to Pn048.



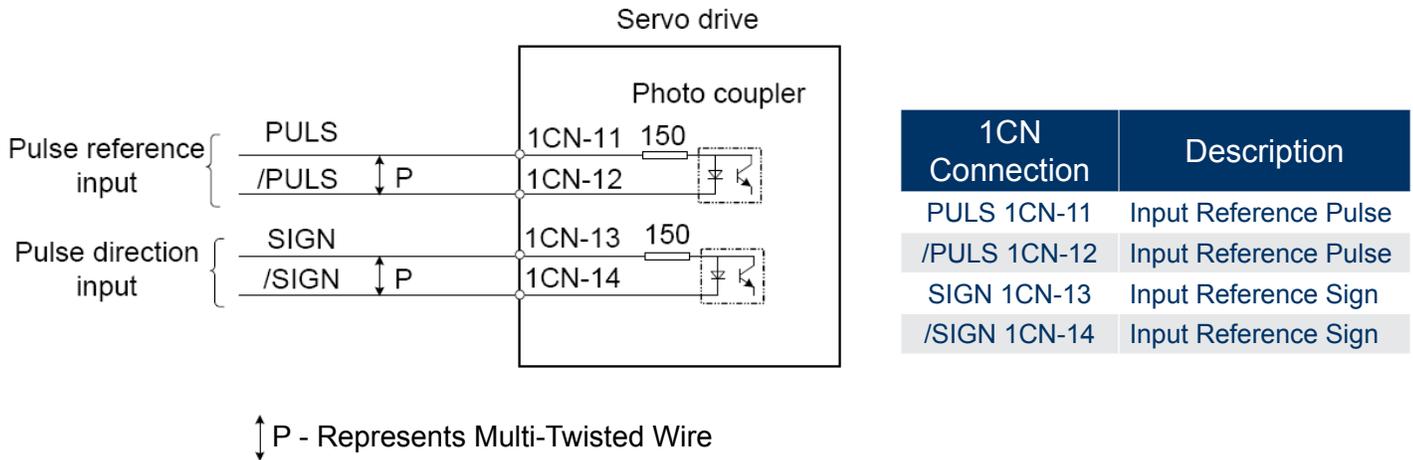
6. In order for the changes of the above parameters to take effect, remove power to the servo drive. When power is restored, the motor should run at the speed designated in register Pn048 and show 'RUN' on the display. To monitor the speed the motor is running, press the MODE Key until Un000 is selected. Press the ENTER Key to display the current speed the motor is running.



#### 4. Position Control:

In Position Control Mode (Pn041 = 0), the servo drive runs according to the position reference given by the host controller. It is required to select the optimal input according to the requirements of the host control device as follows:

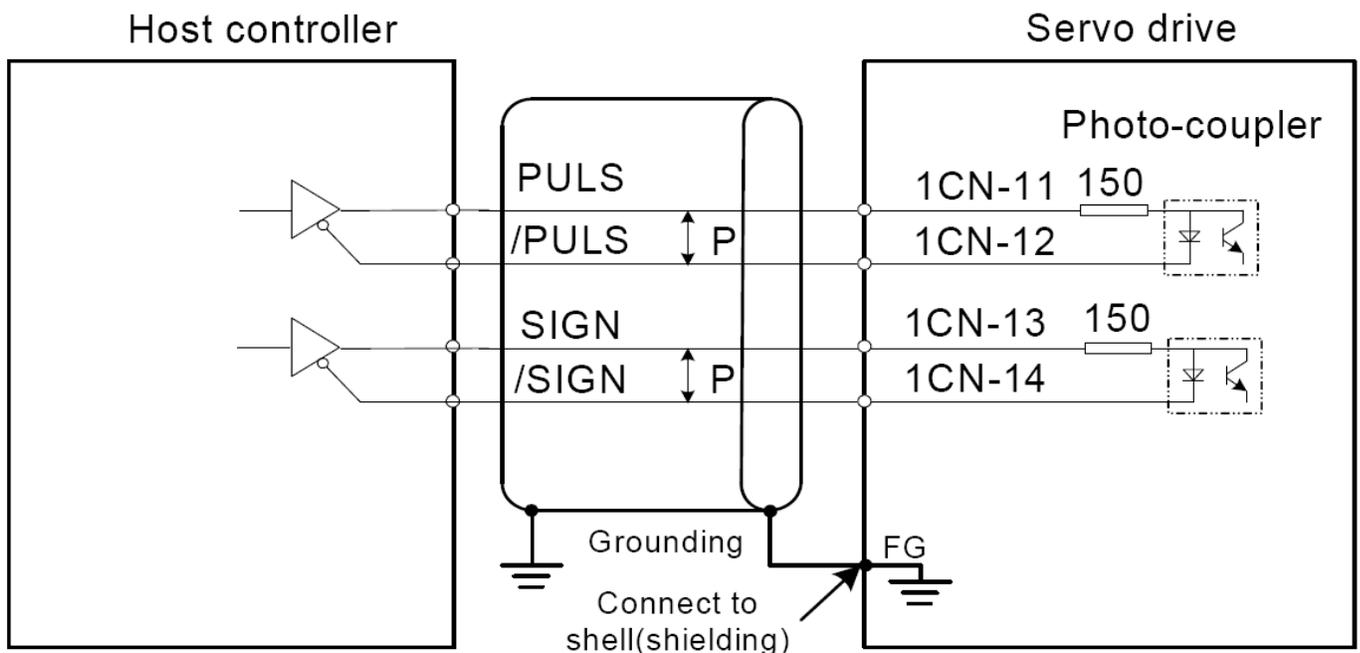
Pulse Input - Host device controls the rotation, speed, and position of the servo drive system by sending a series of pulse trains.



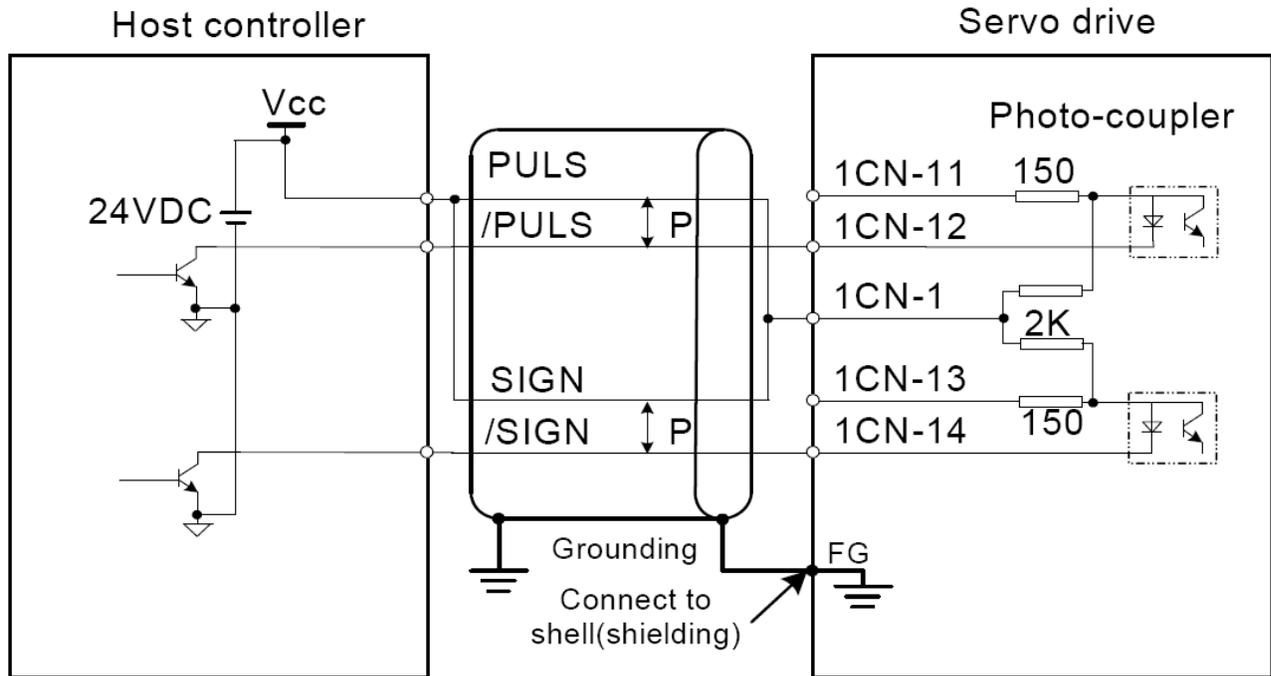
The host controller may give a pulse reference input to the servo drive of these three types:

- Linear Driving Output
- +24 VDC Open Collector Output
- +12 VDC and + 5 VDC Open Collector Output

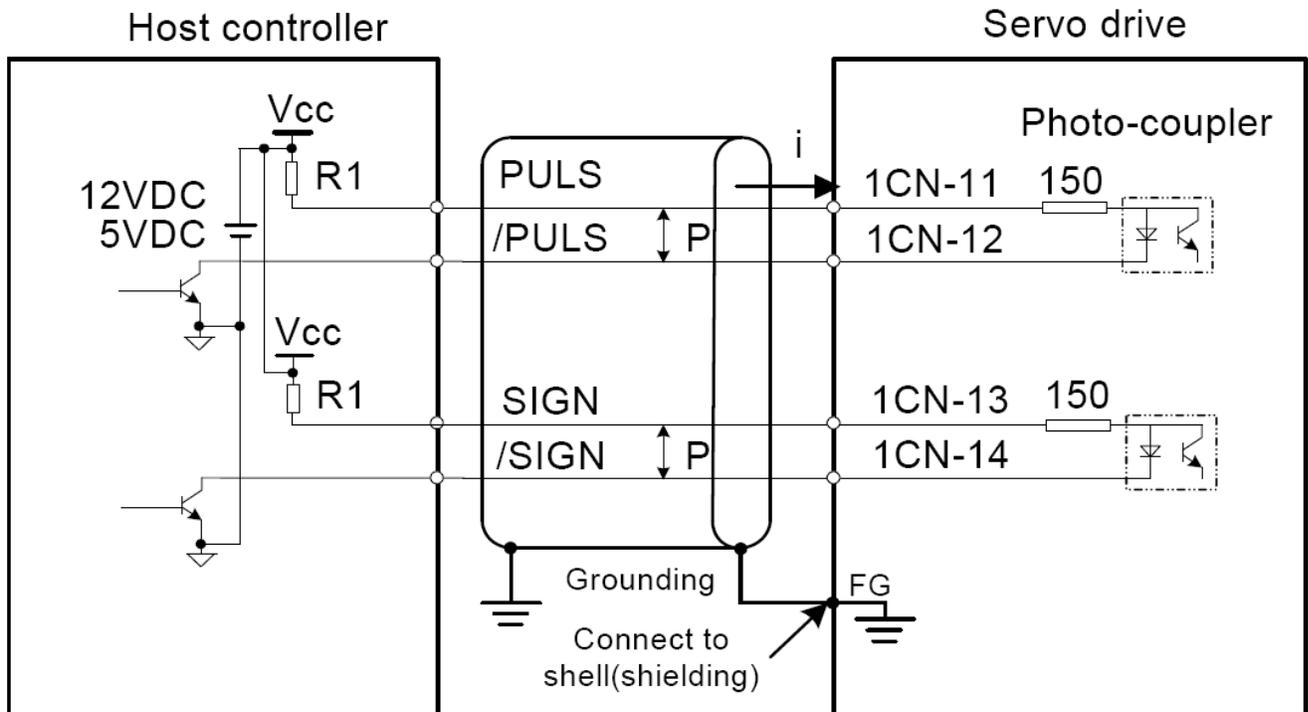
#### Linear Driving Output Host Controller Connection Example:



**+24 VDC Open Collector Output Host Controller Connection Example:**



**+12 or +5 VDC VDC Open Collector Output Host Controller Connection Example:**



The correct current limiting resistor R1 should be used according to the current requirements of  $i = 10\sim 15\text{mA}$ :

- When Vcc is 12 VDC,  $R1 = 560\sim 820\Omega$
- When Vcc is 5 VDC,  $R1 = 82\sim 200\Omega$

**Reference Pulse Mode: Use Parameter ‘Pn008’ and ‘Pn009’**

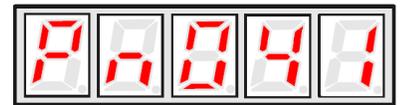
Parameter	Code	Comments	Unit	Range	Default
Pn008	--	Input Pulse Mode: [0]: SIGN + PULSE [1]: CW + CCW [2]: A + B (Perpendicular x 4)	--	0~2	0
Pn009	--	Reference Pulse Form: [0]: Does NOT invert PULSE Reference, Does NOT invert SIGN Reference [1]: Does NOT invert PULSE Reference, Inverts SIGN Reference [2]: Inverts PULSE Reference, Does NOT invert SIGN Reference [3]: Inverts PULSE Reference, Inverts SIGN Reference	--	0~3	0
Pn058	--	Pulse Input Frequency Selection: [0]: When PULSE is difference Input, Servo receiving pulse frequency ≤ 500K [1]: When PULSE is difference input, Servo receiving pulse frequency ≤ 300K [2]: When PULSE is difference input, Servo receiving pulse frequency ≤ 100K	--	0~2	0

**Position Control Mode with the Input Pulse Mode being SIGN + PULSE:**

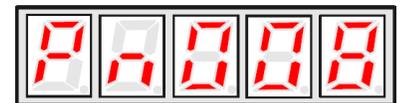
The first step is to set the necessary parameter registers to get into this the SIGN + PULSE Mode. By setting a few parameters in the EDC Servo Drive, the Servo Motor is able to run position mode. The parameters listed below indicate which parameter values need to be changed.

*Note: Any changes made to these registers requires a power reset in order for the parameter changes to take effect.*

1. Press the INC Key to increment the Parameter Register from Pn000 to Pn041. Press the ENTER Key to access the data stored in Pn041. The data stored in Pn041 will need to be ‘0’ (default) in order to run the servo drive in position control mode. This parameter sets up the servo drive to run according to the pulse train supplied by the host controller. Press the ENTER Key one more time to back to Pn041.



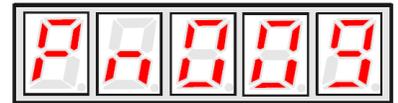
2. Press the DEC Key to decrement the Parameter Register from Pn041 to Pn008. Press the ENTER Key to access the data stored in Pn008. The data stored in Pn008 will need to be ‘0’ (default) which is the input pulse method to control position and direction of the servo motor as seen in the table on the next page.



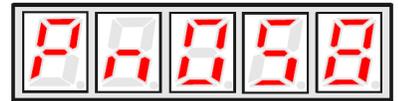
Pn008	Reference Style	Servo Motor Forward Run Reference	Servo Motor Reverse Run Reference
0	SIGN + PULSE TRAIN	PULS (1CN-11) SIGN (1CN-13)  "H"	PULS (1CN-11) SIGN (1CN-13)  "L"

Note: The user may specify whether or not the input signal is inverted by setting Pn009 according to their requirements.

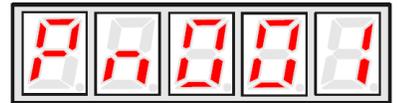
3. Press the INC Key to increment the Parameter Register from Pn008 to Pn009. Press the ENTER Key to access the data stored in Pn009. The data stored in Pn009 will need to be '0' (default) which either inverts or does nothing to the incoming reference or sign pulse.



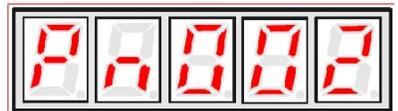
4. Press the INC Key to increment the Parameter Register from Pn009 to Pn058. Press the ENTER Key to access the data stored in Pn058. The data stored in Pn058 will need to be '0' (default) which indicates the maximum frequency fed to the servo drive on pin PULS 1CN-11. In this case, the max frequency which can be sent to the servo drive will be below 500kpps.



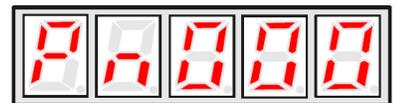
5. Press the INC Key to increment the Parameter Register from Pn000 to Pn001. Again, press the ENTER Key to access the data stored in Pn001. Increment the data stored in Pn001 from 0 to 1 by pressing the INC Key. This disables the hard limit switch going in the forward direction. Press the ENTER Key one more time to go back to Pn001.



6. Press the INC Key to increment the Parameter Register from Pn001 to Pn002. Again, press the ENTER Key to access the data stored in Pn002. Increment the data stored in Pn002 from 0 to 1 by pressing the INC Key. This disables the hard limit switch going in the reverse direction. Press the ENTER Key one more time to go back to Pn002.

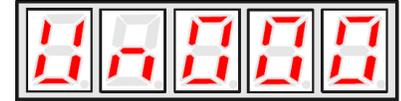


7. Press the INC Key to decrement the Parameter Register from Pn058 to Pn000. Press the ENTER Key to access the data stored in Pn000. Press the INC Key to increment Pn000 from 0 to 1 and press ENTER. This allows Servo ON (/S-ON) to be internally set. Press the Enter Key one more time to go to Pn000.



Note: To control the running of the motor using Pin 15 (/S-ON) of 1CN externally, first change Pn000 to 0 which disables the motor running on power up. Apply 11-24VDC to Pin 16 and connect Pin 15 (/S-ON) to ground.

8. In order for these parameter changes to take effect, remove power to the servo drive. When power is restored, the parameters should be saved. The motor will not run until the correct combination of PULS and SIGN are provided to the servo drive. On the following page is a table which provides the given speed the servo motor will run given a specific input frequency. To monitor the speed the motor is currently running at, press the MODE Key until Un000 is selected. Press the ENTER Key to display the current speed of the motor.



Please refer to the input pulse sequence to properly match the pulse reference level and timing sequence to ensure the servo motor operates correctly. Also, the relationship between the input frequency and the output speed of the motor is shown in the table below.

Relationship between motor speed and pulse frequency input:

Input Pulse Frequency (Hz) Pulse + Direction	Motor Frequency (rev/min)	Other
500K	3000	Electronic Gear Ratio is 1:1; Motor Encoder is 2,500 PPR
250K	1500	
100K	600	
50K	300	

**Pulse Input Sequence:**

Input of the pulse reference must meet the following conditions on level and sequence.

Pulse Form	Electrical Specification	Remark
<p>SIGN + PULS</p> <p>Max. Frequency: 500kpps (Open Collector: 200kpps)</p>	<p> <math>t1, t2 = 0.1\mu s</math>  <math>t3, t7 = 0.1\mu s</math>  <math>t4, t5, t6 &gt; 3\mu s</math>  <math>t = 1.0\mu s</math>  <math>(t/T) \times 100 = 50\%</math> </p>	<p>SIGN</p> <p>H = Forward L = Reverse</p>