

# PRONET-E Quick Start Guide



## BASIC FUNCTIONS

This guide will familiarize the user with the basic functions of the PRONET-E Servo Drive and assist with start up. The descriptions below are for changing parameters with the Panel Operator. The guide will cover the following:

1. *Parameter Setting Initialization (Factory Reset)*
2. *How to Jog the Servo Motor*
3. *Operating Using an Internally Set Speed*
4. *Analog Speed Control*
5. *Position Control Mode (Clock and Direction)*
6. *Internal Contact Position Control*

For more information on these functions and others please refer to the PRONET-E User's Manual.

### 1. Parameter Setting Initialization (Factory Reset)

Upon initial startup, the PRONET-E Servo Drive should contain factory settings. Should the user wish to default back to the factory settings after making changes, follow the steps below:

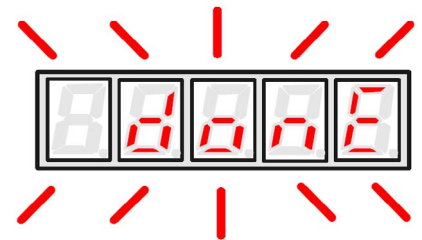
1. Press the MODE Key to select utility function mode. Press the INC or DEC Key to select the function number for restoring defaults (Fn001).



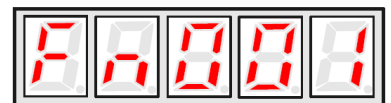
2. Press the ENTER Key to enter the parameter restoring mode.



3. Press and hold the ENTER Key for a second to restore all the parameters to their default values.



4. Release the ENTER Key to return to the function number display.



*Note: Pressing the ENTER Key during Servo ON **does not** initialize the parameter settings. Initialize the parameter settings with the Servo OFF or Resetting the power to the PRONET-E.*

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## 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).



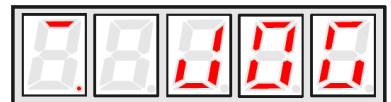
3. Press the ENTER Key to enter JOG Mode, meanwhile, servo is OFF (Motor Power is OFF).



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

4. Press the MODE Key to enable Servo ON.

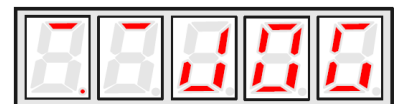
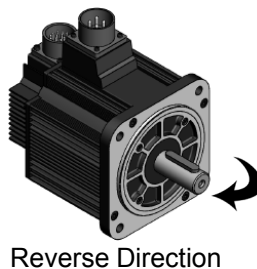
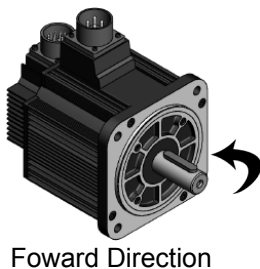
*Note: The single line on the left indicates the servo is ON and that the motor should RUN.*



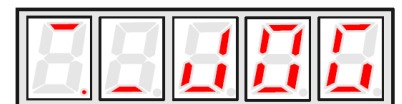
5. Press the MODE Key to toggle the Servo ON and OFF. To run the motor, Servo ON must be used.

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:

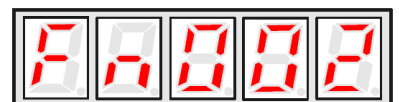


Foward Direction



Reverse Direction

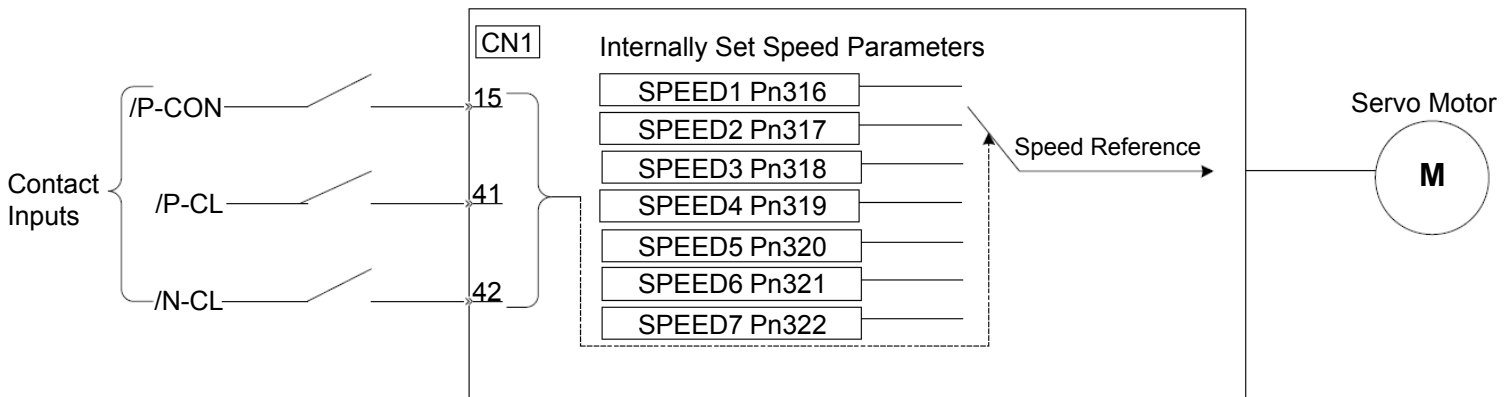
7. Press the ENTER Key to return to the function number display. At this moment the servo motor is turned OFF.



### 3. Operating Using an Internally Set Speed:

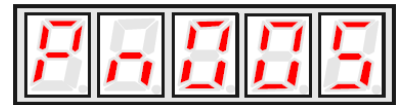
The function of internally set speed selection allows speed control operation by externally selecting an input signal from among seven servo motor speed setting parameters in the servo drive. The speed control operations within the three settings are valid, as shown below.

*Note: There is no need for an external speed or pulse generator.*

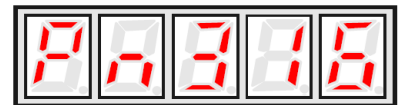


By setting Parameter number Pn005, the speed data stored in Pn316-Pn322 will allow the user to control the speed of the servo motor's external control inputs.

1. Press the Mode Key on the Panel Operator to access the Parameter Setting Mode. To access Pn005, press the ENTER Key on the controller. Press and Hold the Enter Key. A Red LED will blink in the bottom right. Press the Enter Key to move between the digits and Press the INC Key to change the individual digits. Change Pn005 from 0 to 0030 and press ENTER. Setting this value sets the servo drive into speed control mode (contact reference) using the three input signals /P-CON, /P-CL, and /N-CL. Press the MODE Key to return to the Parameter Display of Pn005.



2. Press the INC Key on the Panel Operator to increment the Parameter Register from Pn005 to Pn316. To access Pn316, press the ENTER Key on the Panel Operator. Press the INC or DEC Key to increment or decrement the data stored in Pn316 from the default value of 100 (or other value if previously changed) to +/-6000.



3-8: The same process will be used for Pn317-Pn322. Once these values are set, the effect is immediate and no restart of the servo drive is required. Refer to the diagram below for input signal combinations for the desired speed.

*Note: The servo motor's max speed will be used whenever a speed setting for Pn316-Pn322 exceeds the max speed.*

Parameter No.	Setting Range	Setting Unit	Factory Setting	Setting Validation
Pn316	-6000~6000	RPM	100	Immediately
Pn317	-6000~6000	RPM	200	Immediately
Pn318	-6000~6000	RPM	300	Immediately
Pn319	-6000~6000	RPM	-100	Immediately
Pn320	-6000~6000	RPM	-200	Immediately
Pn321	-6000~6000	RPM	-300	Immediately
Pn322	-6000~6000	RPM	500	Immediately

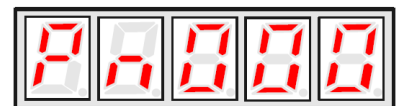
Use the ON/OFF combinations of the following input signals to operate with the internally set speeds. Setting Pn005.1 equal to 3: Selects the internally set speed (Contact Reference ↔ Speed Control (Zero Reference)).

/P-CON	Input Signal		Speed
	/P-CL	/N-CL	
OFF (H)	OFF (H)	OFF (H)	Speed Control (Zero Reference)
	OFF (H)	ON (L)	SPEED 1
	ON (L)	OFF (H)	SPEED 2
	ON (L)	ON (L)	SPEED 3
ON (L)	OFF (H)	OFF (H)	SPEED 4
	OFF (H)	ON (L)	SPEED 5
	ON (L)	OFF (H)	SPEED 6
	ON (L)	ON (L)	SPEED 7

Note: OFF = High Level; ON = Low Level

### Optional Run on Start-Up:

To run the servo motor on power up, Parameter Number Pn000 must be set to '0111'. This allows the servo motor to run on by powering up the servo driver rather than using the external switch S-ON (Pin14). This also disables the externally-controlled hard limit switches operating in both the forward and reverse direction. Power must be cycled after setting PN000.

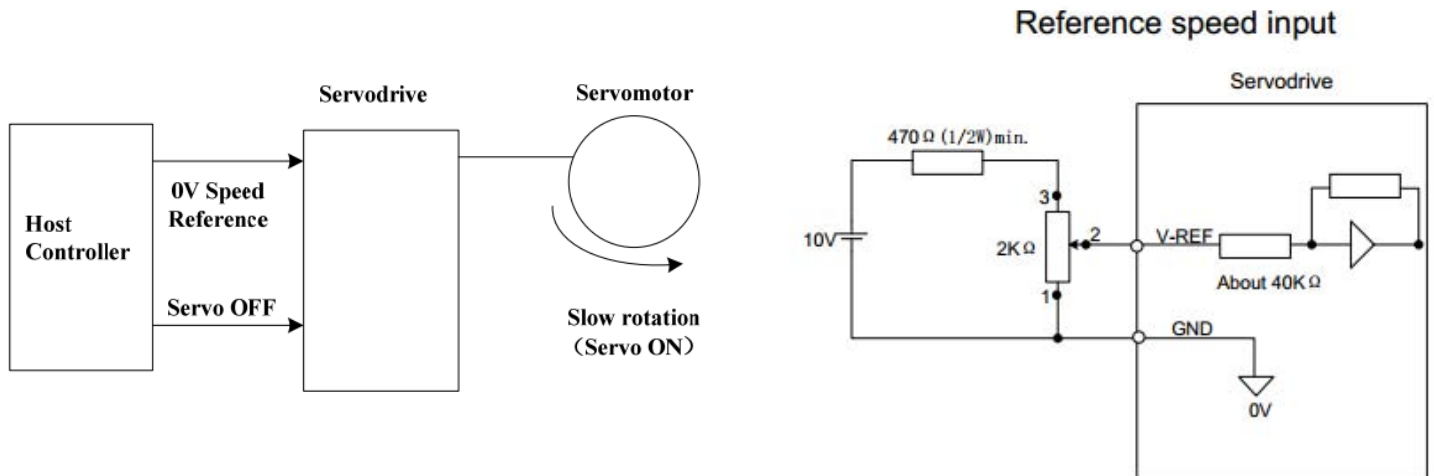


#### 4. Analog Speed Control:

To run the servo drive in Analog Speed Control Mode, Pn005 must be set to 0 (Default Value). This will allow the user to use an analog input reference ( $\pm 10\text{VDC}$ ) to run the Servo Motor.

##### 1. 1CN Connector Pins: 1 (V-REF+) and 2 (V-REF-)

When the Servo is Enabled and 0VDC input for the voltage reference, the servo motor may rotate due to a slight offset (in the unit of mV) in the reference voltage. Adjustments can be done manually or automatically by using the panel operator. Both adjustments will be explained below.



2. *Automatic Adjustment:* Apply 0VDC between V-REF+ and V-REF-. (Changing the polarity will change direction the motor rotates). Press the Mode Key until Fn003 is shown on the panel operator. Press the Enter Key and then Press Mode Key (Hold for 1-2 seconds and then let go. Done will be shown on the LEDs). This will calibrate the 0VDC given off from the power supply.

3. *Manual Adjustment:* If after using Fn003 to execute the automatic calibration the servo motor shaft continues to rotate the second alternative would be using Fn004 to manually calibrate the servo motor offset. Display Fn004 on the Panel Operator and then press the Enter Key. 0-SPD should be displayed. Hold the Enter Key for approximately 1 second and the offset value will be displayed. At this point you should see the servo motor rotating slightly. Increase or decrease using the Up or Down Key this value until you see the servo motor shaft come to a stop. Press the Enter Key to return back to display Fn004.

4. Next, setup Pn300 to the desired RPM/V speed gain. The motor speed will run accordingly to the analog input voltage supplied to V-REF+ and V-REF-.

### 5. Position Control (Clock and Direction):

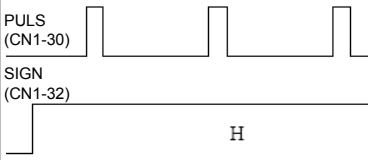
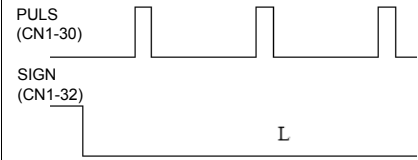
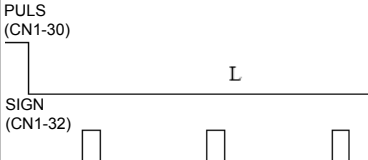
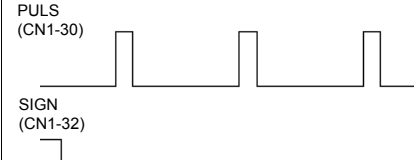
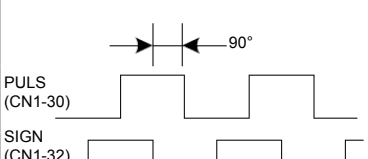
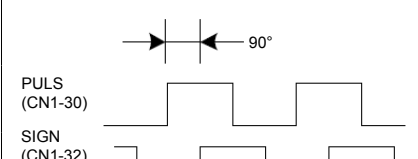
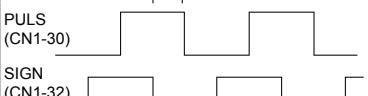
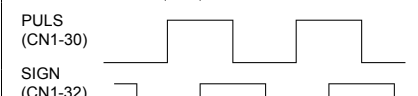


To run the servo drive in Position Control Mode, Pn005 must be set. In this example we will be setting Pn005.1 to 1 to control position through a pulse train. Press and Hold the Enter Key. A Red LED will blink in the bottom right. Press the Enter Key to move between the digits and Press the INC Key to change the individual digits. Press the MODE Key to return to the Parameter Display of Pn005. Pn005.3 will be set according to the motor used with the PRONET-E Servo Drive and is as follows: [0] for an EMJ, [1] for an EMG or [2] for an EML Servo Motor.

#### Setting a Reference Pulse Sign

Type	CN1 Connection	Description
Input	PULS CN1-30	Reference Pulse Input
	/PULS CN1-31	Reference Pulse Input
	SIGN CN1-32	Reference Sign Input
	/SIGN CN1-33	Reference Sign Input

#### Reference Pulse Mode: Use Parameter 'Pn004'

Set the input form for the servo drive using parameter Pn004.2 according to the host controller specifications. For this example, we will set Pn004.2 equal to 0 to use a pulse train for position control.

Parameter	Reference Pulse Form	Input Pulse Multiplier	Forward Rotation Reference	Reverse Rotation Reference
Pn004.2	0 SIGN + PULSE TRAIN (Factory Setting: Positive Logic)	--		
	1 CW + CCW (Factory Setting: Positive Logic)	--		
	2 Two-Phase Pulse Train with 90° Phase Differential (Factory Setting: Positive Logic)	x1		
	3	x2		
	4	x4		

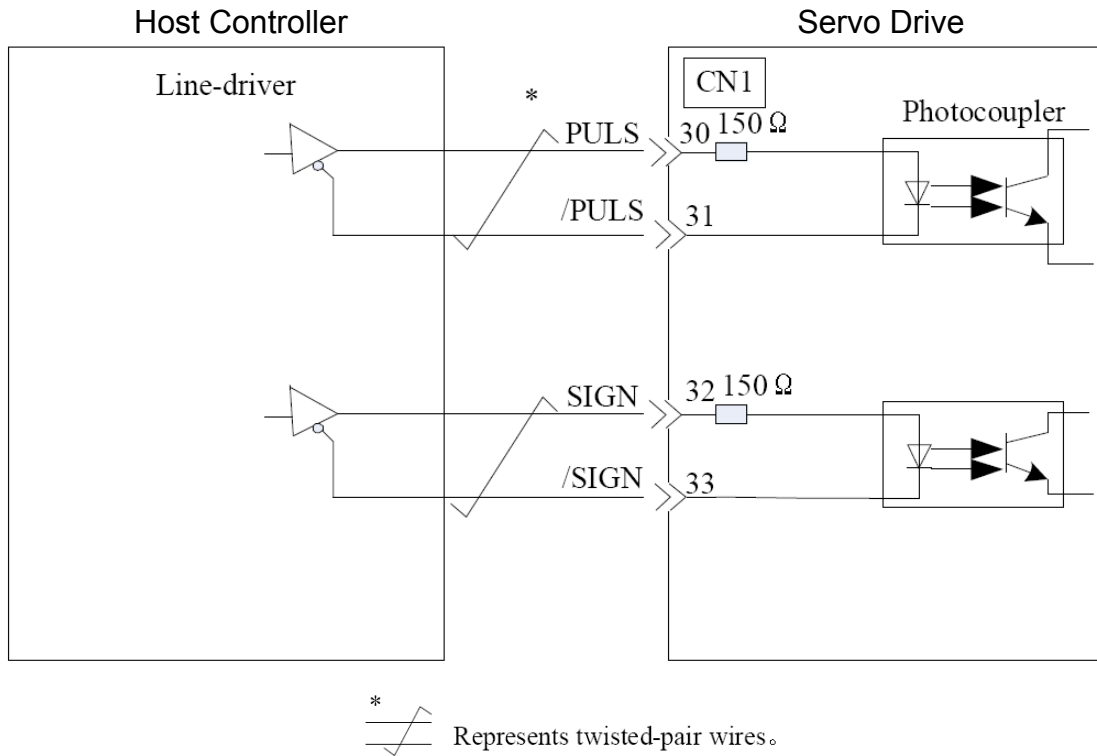
Parameter No.	Description
Pn004.3	0 Does not invert PULS Reference and SIGN Reference
	1 Does not invert PULS Reference; Inverts SIGN Reference
	2 Inverts PULS Reference; Does not invert SIGN Reference
	3 Inverts PULS Reference and SIGN Reference

Note: The user may specify whether or not the input signal is inverted by setting Pn004.3 according to their requirements.

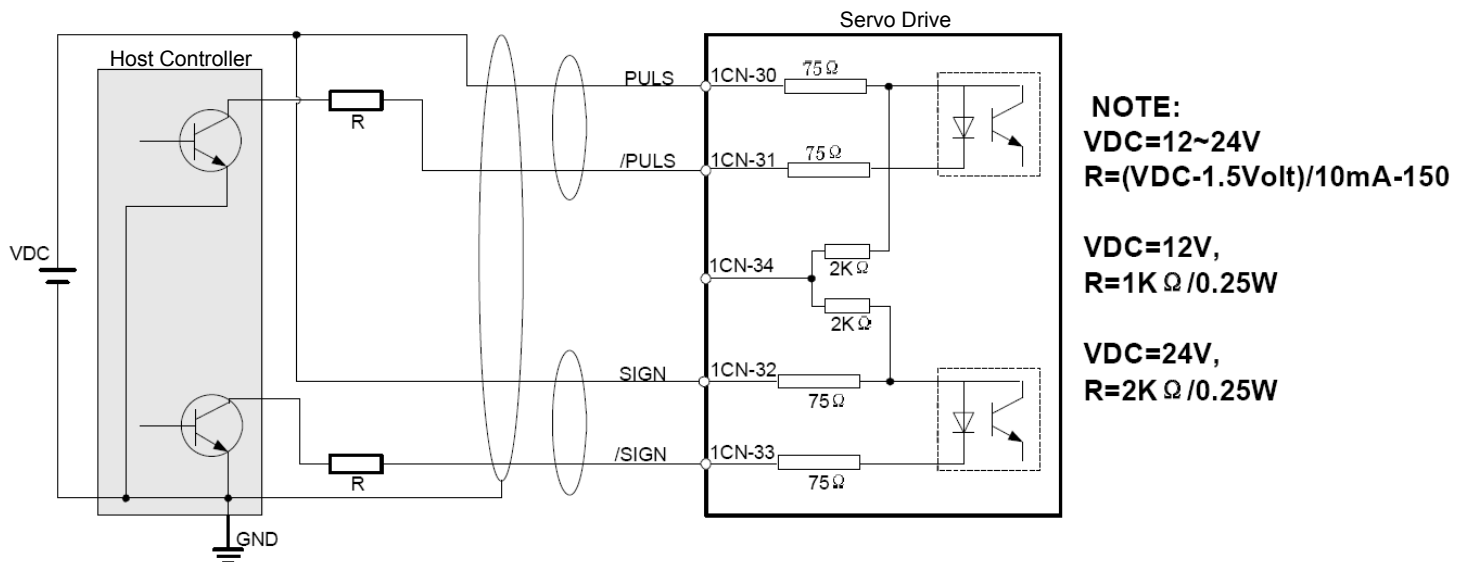
The host controller may give a pulse reference input to the servo drive of these three types:

- Line Driver Output
- +24 VDC Open Collector Output
- +12 VDC or +5 VDC Open Collector Output

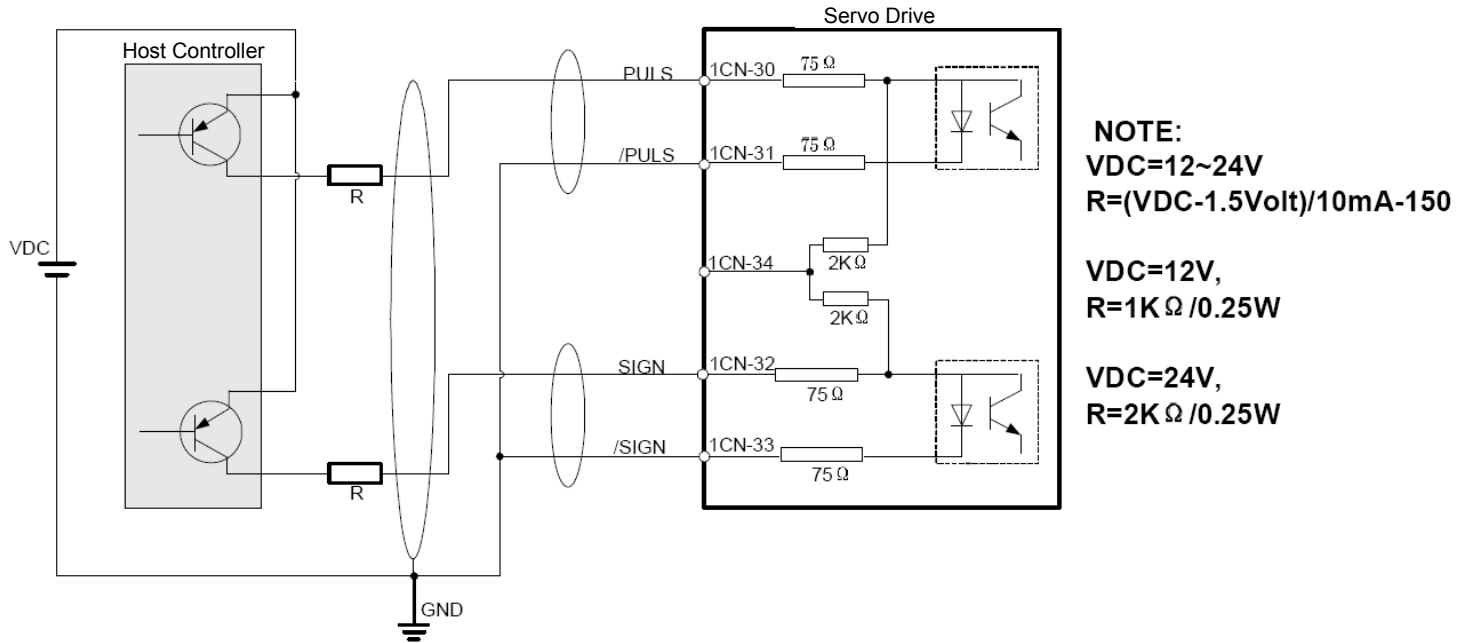
**Line Driver Output Connection Example:**



**NPN Open Collector Gate Output Example:**



**PNP Open Collector Gate Output Example:**



*Note: When the host controller applies an open-collector signal output, the input signal noise margin lowers. When a position error caused by the noise occurs, set the parameter Pn006.3.*

Setting Reference Input Filter for Open Collector Signal for Pn006.3

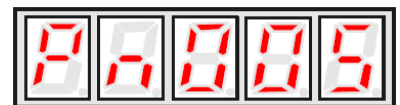
Parameter No.	Description
0	When pulse is difference input, servo receiving pulse frequency ≤ 4 MHz
Pn006.3	1 When pulse is difference input, servo receiving pulse frequency ≤ 650 kHz
	2 When pulse is difference input, servo receiving pulse frequency ≤ 150 kHz

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

By setting a few parameters in the ProNet Servo Drive, the Servo Motor is able to run in position mode. See below to determine which parameter values need to be changed.

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

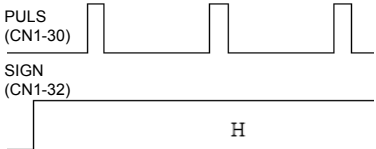
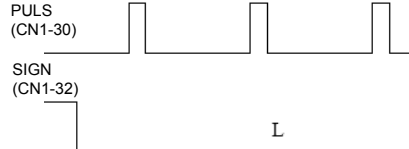
1. Press the INC Key to increment the Parameter Register from Pn000 to Pn005. Press the ENTER Key to access the data stored in Pn005. The data stored in Pn005 will need to be '0010' in order to run the servo drive in position control mode (pulse train). This parameter sets up the servo drive to run according to the pulse train supplied by the host controller with an EMJ motor. Press the ENTER Key one more time to return to Pn005.





2. Press the DEC Key to decrement the Parameter Register from Pn005 to Pn004. Press the ENTER Key to access the data stored in Pn004. The data stored in Pn004 will need to be '0001' in order to run the servo drive in SIGN + PULS mode. This parameter sets up the servo drive to run according to the input pulse method. This controls the position and direction of the servo motor as seen in the table below. Press the ENTER Key one more time to return to Pn004.



Pn004	Reference Pulse Form	Input Pulse Multiplier	Forward Rotation Reference	Reverse Rotation Reference
H. <input type="checkbox"/> 0 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<b>SIGN + PULSE TRAIN</b> (Factory Setting: Positive Logic)	--		

*Note: The user may specify whether or not the input signal is inverted by setting Pn004.3 according to their requirements.*

3. Press the INC Key twice to increment the Parameter Register from Pn004 to Pn006. Press the ENTER Key to access the data stored in Pn006. The data stored in Pn006 will need to be '0000' in order to set the maximum receiving pulse frequency. Press the ENTER Key one more time to return to Pn006.



*Note: In order for the changes made to the parameter data to take effect, remove power to the servo drive. When power is restored, the parameters should be saved.*

*This function was tested with a PRONET-E-02A Servo Driver, EMJ-02APA Servo Motor, and Anaheim Automation's Programmable Controller PCL601USB. The output for this controller is a NPN type. Connect the Clock Signal from the PCL601USB with a 2kohm (.25W) resistor in series to Pin 31 of the Servo and connect the direction signal with a 2kohm (.25W) resistor in series to Pin 33. Connect Pin 30 and 32 to +24VDC. If the frequency output is too small, Electronic Gearing can be used to increase the ratio. Pn201 and Pn202. Increasing Pn201 will increase the speed of the motor with the same frequency being sent to the Servo Drive.*

## **6. Internal Contact Position Control:**

Internal Contact Position Control uses 16 internal parameters for positioning without the need of a host controller. Users can set an absolute or relative position, single or cyclical runs, and delayed or signal initiated program. Along with position, the user can define the speed and acceleration/deceleration for when the position point is executed. Upon executing a position point, the user can also define a stop time before executing the next position point.

Procedure:

1. Set Pn000 to 0110  
Forward and Reverse Rotation Allowed
2. Set Pn005 to 00C0  
Sets up Internal Contact Position Control Mode
3. Set Pn600 – Pn631 for point to point position control
4. Set Pn632 – Pn647 for point to point speed control
5. Set Pn648 – Pn663 for point to point acceleration/deceleration
6. Set Pn664 - Pn679 for point to point stop time
7. Set Pn681 to 0010  
Set up Start Signals to look for Reference Point and run from position to position using an input signal
8. Set Pn682 to 0 – Relative position mode
9. Set Pn683 to 0 – Program start point
10. Set Pn684 to 0 – Program stop point
11. Set Pn685 to 25 – Search speed of servo motor in direction of travel switch
12. Set Pn686 to 50 – Search speed of servo motor leaving travel switch

Apply 24VDC to DICOM (Pin 13) and ground S-ON (Pin 14). Toggle /NCL (Servo motor searches for a Limit Switch). Toggle N-OT (hits Limit Switch and motor looks for C-Pulse). Toggle P-CON. This has the servo run through the internal program position points.