

# EV West Tach Driver User Manual

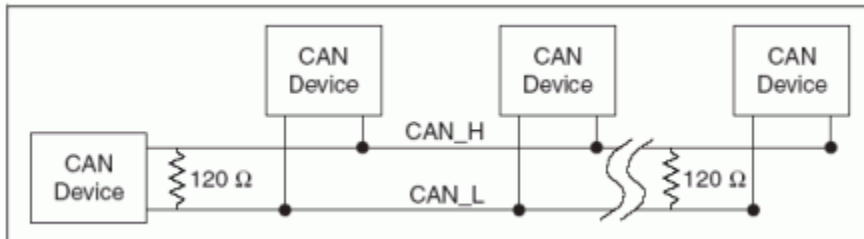


## Overview

In the past, some electric speed controllers have provided an analog tachometer output for legacy vehicles and hardware. However, more modern speed controllers have begun to drop the legacy support for ICE tachometers, and have opted for more modern, robust, digital outputs. The EV West Tach Driver interfaces with NetGain's HyPer-Drive X1 or X144 speed controller to read RPM, and outputs an analog signal for your analog tachometer. It is configurable for different types of analog tachometers and has an internal CAN bus termination resistor for easy setup.

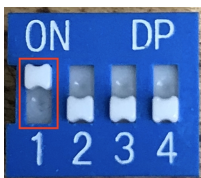
## Setup Instructions

### 0. CAN bus termination



In order for CAN to operate, the CAN high and CAN low signal wires must be terminated by two  $120\Omega$  resistors. The driver may not function properly if your controller's CAN bus is not terminated. Luckily, both this device and the HyPer-Drive X1/X144 have optional internal  $120\Omega$  terminating resistors. In order to enable the terminating resistor on the controller, connect CAN-H RES (pin 14 on the HyPer-Drive controller's K1 connector) to CAN-L RES (pin 3 on the K1 connector). See the attached K1 connector pinout.

To enable the terminating resistor on the tach driver, enable switch 1 in the driver box.








## 1. HyPer-Drive X1 or X144 Configuration

In order for the tach driver to function, the HyPer-Drive X1 or X144 must be configured to output RPM over the CAN bus.

- a. Couple the Null Modem Serial Cable to the Serial-USB adapter. Both cables should be provided with the HyPer-Drive controller.
- b. Connect USB end to PC loaded with SME Smartview Smarview Sys software.
- c. Connect female serial end to the controller's male serial K3 port.
- d. After ensuring that your car is in neutral, switch on the controller via key switch.
- e. Open SmartView DLR Sys software.
- f. Select Connection type: Normal or Wired. Then select the Serial Port your device driver was installed on.
- g. Once the SmartView software has detected the controller, you should see four options at the home page: **Monitor**, **Diagnose**, **Configure**, and **Manage**. Click **Configure**, then **System**, and select the **CAN Network** tab.
- h. In the **CAN Network** configuration, set the following parameters:
  - **My Role**: CO Node
  - **Baud Rate**: 250K
  - **My ID**: 1 (assuming there are no other HyPer-Drive controllers on the CAN bus)
  - **Net Composition**: All **Node IDs** should be set to 0, unless there are other HyPer-Drive controllers on the CAN bus
- i. Click the **Save** icon in the upper-right-hand corner of the screen. If you do not save the configuration to your controller before changing windows, the SmartView software will erase your changes.
- j. Select one of the Configurable TPDO tabs. In the Configurable TPDO tab, set the following parameters:
  - **Message ID [HEX]**: 25
  - Uncheck **Add My Node ID**. The **Real ID** should be 25.
  - Add the "word" Motor 1 - Speed Measured (ABS) [rpm] to the list of bytes and words such that it is the third and fourth bytes in the TPDO. This simply means that **there must be either two bytes or one word above Motor Speed**. If you do not wish to output any other data, the bytes or word can simply be set to 0.
  - Click the **Save** icon again in the upper-right-hand corner, and then click the blinking key icon in the lower-right-hand corner of the screen. The SmartView software will ask "Do you really want to key off?" Click **OK** to reboot the controller and apply the changes. If all was configured correctly, once the SmartView software detects the controller again, you should see a green thumbs up in the lower-left-hand corner of the screen followed by "ID 1 - 250kbps". If you see a green thumbs up, then your configuration is complete. You may check the **CAN Network** configuration once more to ensure that all of the parameters were saved correctly and exit. If you do not see a green thumbs up, then your controller is in a fault condition, and depending on the fault level, may not operate properly. Please follow these steps again exactly and refer to the example configurations below to see if you made a mistake that is causing the fault condition, and refer to the **Diagnose** section of the SmartView software to see the specific fault.

See example configuration below:





# Configure: System

Inverters

CAN Network

Battery

Mains

Operating Profiles

Generic Outputs

Display

Service

Settings

Configurable TPD01

Configurable TPD02

Configurable TPD03

Configurable TPD04

My Role

CO Node

Baud Rate

250K

Message / Heartbeat Speed

Fast

My ID

1

Node One

Max Network Startup Time

2000

ms

Net Composition

System Faults Remapping

Net Configuration

Node ID

0

Node ID

0

Node ID

0

Node ID

0

Blocking

Stopping

Blocking

Blocking

Stopping

Blocking

Blocking

Stopping

Blocking

Blocking

Stopping

Blocking

Blocking

Stopping

Blocking

Blocking

Stopping

Blocking

Soc:

Manager

Main Contactor:

Manager

Cfg PDO1:

Msg Id:25H

Cfg PDO2:

-

OP:

-

BMS:

-

Traction enable:

-



Traction limit:


-





ID 1 - 250kbps

AC TRACTION

ACX1 100V 750A







# Configure: System

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Settings

Configurable TPD01

Configurable TPD02

Configurable TPD03

Configurable TPD04

TPDO 1

Message ID [HEX]  
(0 to disable)

25

Real ID [HEX]

25

Add My Node ID

☐

Rate

50

ms

byte

0

byte

0

word

Motor 1 - Speed Measured (ABS) [rpm]

byte

0

byte

0

byte

0

byte

0

byte

0



byte

0

ID 1 - 250kbps








AC TRACTION

ACX1 100V 750A



## 2. Tach Driver Configuration

Analog tachometers are configured for an engine with a specific number of cylinders, as the speed of the analog input varies with the number of cylinders. As a result, the tach driver can be configured to simulate engines with various numbers of cylinders. The output is configured with switches 2, 3, and 4 as shown:

Image	Switch 2	Switch 3	Switch 4	# Cylinders
	OFF	OFF	OFF	<b>2</b>
	OFF	OFF	ON	<b>3</b>
	OFF	ON	OFF	<b>4</b>
	OFF	ON	ON	<b>5</b>
	ON	OFF	OFF	<b>6</b>
	ON	OFF	ON	<b>7</b>
	ON	ON	OFF	<b>8</b>
	ON	ON	ON	<b>10</b>

## 3. Wiring

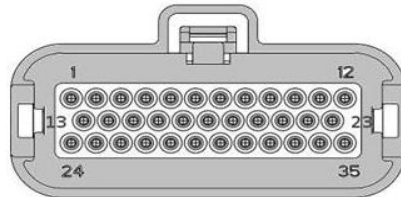
Connect the wires on the tach driver as follows:

Wire color	Connect to
Yellow	CAN high (pin 13 on K1 connector — see attached pinout)
Blue	CAN low (pin 2 on K1 connector — see attached pinout)
Red	12V +
Black	12V -
Green	Tachometer signal

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## Wire Harness K1 Pinout



### Pin Order Assignment

Length	Pin#	Size	Color
11 ft	1 — I/O Ground	18 AWG	BLK/BLU
11 ft	2 — CAN Low	20 AWG	GREY
11 ft	3 — CAN Terminate	20 AWG	BLK/WHT
11 ft	4 — Interlock	18 AWG	GREEN
11 ft	5 — Forward Switch	18 AWG	WHITE
11 ft	6 — Reverse Switch	18 AWG	YELLOW
7 ft	9 — Encoder Ground	20 AWG	BLACK
11 ft	10 — 12V +	18 AWG	RED/BLU
11 ft	11 — Throttle Wiper 1	18 AWG	YLW/WHT
11 ft	12 — Analog Ground	18 AWG	BLACK
11 ft	13 — CAN High	20 AWG	ORANGE
11 ft	14 — CAN Terminate	20 AWG	BLK/WHT
11 ft	15 — LIN I/O	18 AWG	PURPLE
11 ft	17 — Throttle Wiper 2	18 AWG	GRN/YLW
11 ft	18 — Trans. Reverse input	18 AWG	WHT/RED
7 ft	21 — Encoder 1 SIN	20 AWG	YELLOW
11 ft	22 — Brake Pot Wiper	18 AWG	YLW/RED
11 ft	24 — Key Switch In	18 AWG	BLUE
11 ft	25 — Coil Return +	18 AWG	BLU/WHT
11 ft	26 — Driver Out -	18 AWG	ORG/WHT
11 ft	30 — Deceleration Lights	18 AWG	ORG/RED
7 ft	32 — Motor Thermistor	20 AWG	BLUE
7 ft	33 — Encoder 1 COS	20 AWG	GREEN
11 ft	35 — 5 Volt +	18 AWG	RED

To Be Assigned in Clone file

To Be Assigned in Clone file

Figure 2 – Standard Pinout Order Assignment