Daytona Sensors LLC
Engine Controls and Instrumentation Systems

Installation Instructions for RTD-1 Retard Control Accessory

CAUTION: CAREFULLY READ INSTRUCTIONS BEFORE PROCEEDING. NOT LEGAL FOR SALE OR USE IN CALIFORNIA OR ON ANY POLLUTION CONTROLLED VEHICLES.

OVERVIEW

For use with the SmartSpark ignition, the RTD-1 retard control is required for driver adjustable retard (GPI3 analog retard mode). Refer the SmartSpark instructions for hookup details. **You can skip the remaining material in this instruction sheet.**

For use with the CD-1 ignition, the RTD-1 retard control is required for boost timing retard (BTR) mode (selected on the mode switch – refer to page 2 for details) and GPI1 analog retard mode (refer to page 3 for details). A manifold absolute pressure (MAP) sensor is also required for boost timing retard mode.

Figure 1 – RTD-1 Retard Control

ADDITIONAL REQUIRED PARTS

To connect a Delphi MAP sensor for boost timing retard mode, you will have to fabricate a wiring harness with the appropriate mating connector or use our MAP sensor harness kit P/N 102006. Recommended Delphi MAP sensors, and equivalent aftermarket parts are listed in the table below. Note that Wells is stocked by Autozone www.autozone.com) and SMP (Standard Motor Products) is stocked by RockAuto (www.rockauto.com).

Range	Delphi P/N	Aftermarket P/Ns
2 bar (0-15 psi boost)	16009886	Wells SU129 SMP AS4
3 bar (0-30 psi boost)	12223861	Wells SU504 SMP AS210

WIRING OVERVIEW

Deutsch Connector Signals		
Pin 3	GPI1	Connects to RTD-1 retard command signal
Pin 8	Sensor Ground	Connects to MAP sensor and RTD-1 ground
Pin 9	MAP Sensor	Connects to 0-5V MAP sensor signal
Pin 10	+5V Power	Connects to MAP sensor and RTD-1 power

INSTALLATION

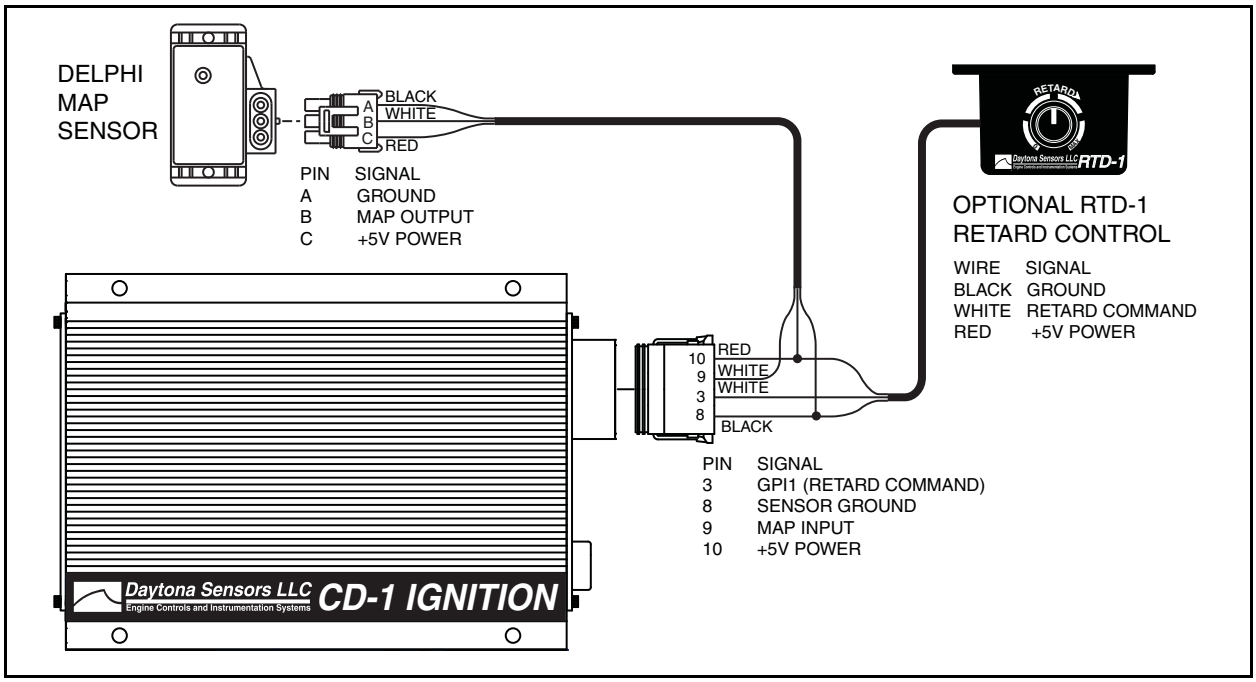
1. Turn off the ignition switch and disconnect the battery ground cable before proceeding.

1. **RTD-1 retard control**. Select a convenient mounting location. The RTD-1 unit is not waterproof and is intended for under dash mounting only. Connect the ground, retard command, and +5V power wires to the CD-1 as shown in Figure 2. The original orange wire at pin 3 is removed.

2. **MAP sensor**. The optional MAP sensor harness includes mating connector shells for Delphi 2 bar and 3 bar MAP sensors. Select the connector shell with the appropriate indexing features for your MAP sensor. Connect the ground, MAP signal, and +5V power wires as shown in Figure 2. If you are using the RTD-1 and MAP sensor together, splice the ground and +5V power wires from the MAP sensor to the same wires from the RTD-1 near the CD-1.

2. **Completing the installation**. Remove any unused wires from the Deutsch connector and install supplied terminal seals. Reconnect the battery. Set the CD-1 switches and upload any required setup program. Start engine and check timing.

Figure 2 – RTD-1 Retard Control and MAP Sensor Hookup



SWITCH SETTINGS AND STATUS LED

The left end panel of the CD-1 has five rotary switches used to set RPM limits and operating modes and a status LED. The status LED will illuminate when the ignition switch is turned on. If a fault condition occurs, such as a DC/DC converter (internal high voltage power supply used to charge the capacitor) fault or loss of trigger signal, the status LED will blink.

Launch RPM Limit Switch Settings

00 RPM limit disabled

01 RPM limit and multi-spark disabled

02 RPM limit, multi-spark, and timing functions disabled

03-04 Reserved (not used)

05 Boot load mode (used by factory to reprogram CD-1 module)

06-99 Launch RPM limit setting X100 (i.e. switch setting 35 = 3,500 RPM)

Maximum RPM Limit Switch Settings

The maximum RPM limit setting is offset 1,000 RPM to allow two switches to set the value between 1,000 and 10,900 RPM

00-99 Maximum RPM limit setting X100 + 1000 (i.e. switch setting 75 = 8,500 RPM and 99 = 10,900 RPM)

Mode Switch Settings

0 8 cylinder engine and normal operation

1 6 cylinder engine and normal operation

2 4 cylinder engine and normal operation

3 8 cylinder engine and boost timing retard mode with 2 bar MAP sensor

4 6 cylinder engine and boost timing retard mode with 2 bar MAP sensor

5 4 cylinder engine and boost timing retard mode with 2 bar MAP sensor

6 8 cylinder engine and boost timing retard mode with 3 bar MAP sensor

7 6 cylinder engine and boost timing retard mode with 3 bar MAP sensor

8 4 cylinder engine and boost timing retard mode with 3 bar MAP sensor

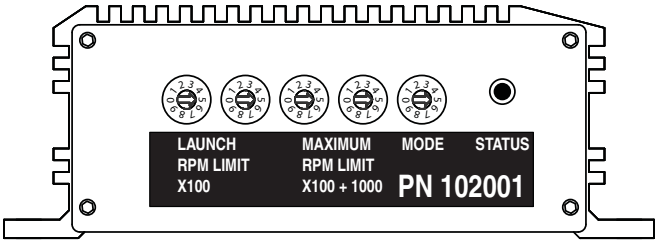
9 Reserved (not used)

Mode switch settings 0-2 are used during normal operation of the CD-1 and allow full functionality of any selections made with the PC Link software.

Boost timing retard (BTR) mode requires connection of a 2 bar or 3 bar MAP sensor and connection of the optional RTD-1 retard control to the GPI1 input as explained above. BTR mode allows easy setup of boost proportional retard without the use of the PC Link software to create a 3D timing table. The RTD-1 allows the user to dial in 0-3 degrees/psi boost retard with a 2 bar MAP sensor or 0-1.5 degrees/psi boost retard with a 3 bar MAP sensor as shown in Figures 4 and 5. Note that the RTD-1 dial has marks corresponding to ¼, ½, and ¾ scale settings.

Mode switch settings 3-8 for BTR mode override and disable any 2D or 3D timing table settings made with the PC Link software. When BTR mode is selected, the automatic start retard feature (if enabled) remains operational. BTR mode also overrides any selection made in the PC Link software for GPI1. The RTD-1 generates a zero to +5V analog signal on GPI1. This analog data is logged by the CD-1 and available for display with the CD Log software. Zero volts corresponds to zero boost retard and +5V corresponds to full scale boost retard.

Figure 3 – Switches and Status LED



GPI1 ANALOG RETARD MODE

Refer to Figure 2 for details. The RTD-1 retard control is connected to GPI1 on the Deutsch connector pin 3, the +5V reference supply on pin 10, and signal ground on pin 9. The RTD-1 can be used to dial in a zero to 10 degree retard. Zero volts on GPI1 corresponds to zero retard and +5V corresponds to 10 degrees retard. This mode can be used as a driver adjustable timing function. Use the PC Link CD software to configure GPI1 as shown in Figure 6.

Figure 4 – Boost Timing Retard with 2 bar MAP Sensor

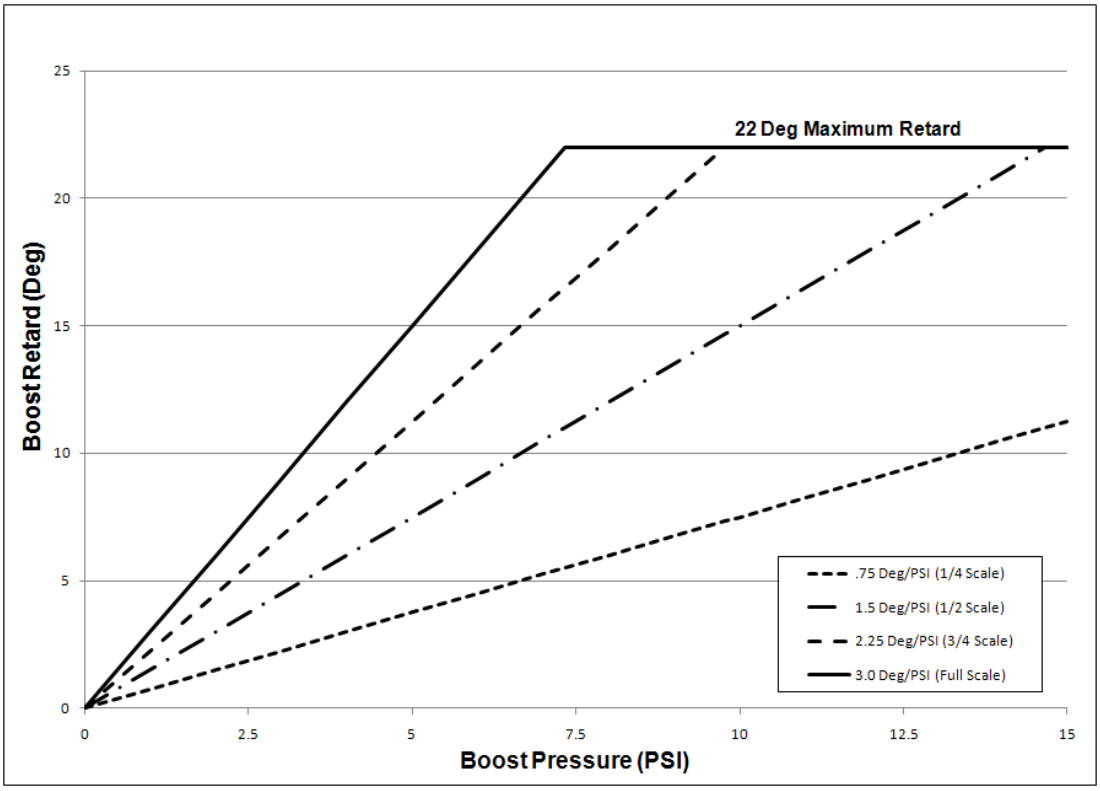


Figure 5 – Boost Timing Retard with 3 bar MAP Sensor

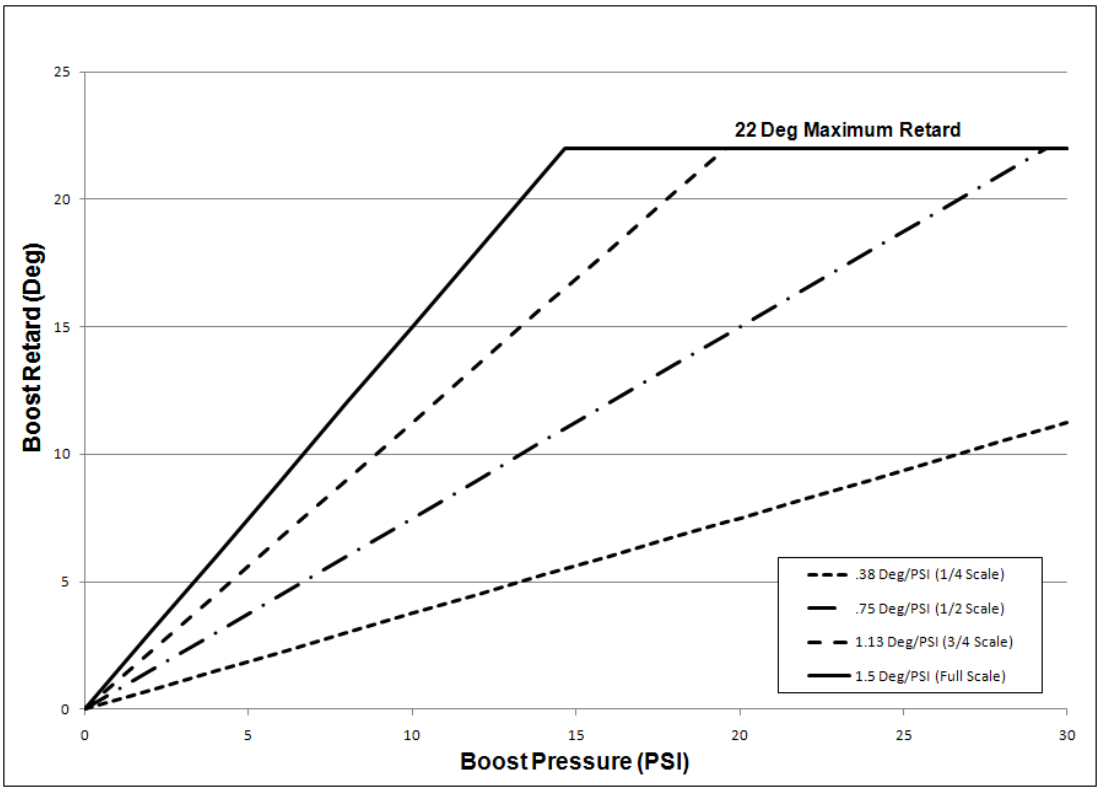


Figure 6 – GPI1 Setup for Analog Retard