AD5450 System Overview

A&D

System Configuration

Timing Measurement

Oscilloscope

Current Measurement

HiL Engine Simulation

AD5440

Cam Crank

AD5450

EDU

Current Probe

A — DENSO Injector

B — Bosch Injector

C,D,E,F — Simulated Injector

RPM

Remote Control

Injection Timing and Duration

PC

12V DC Power Supply
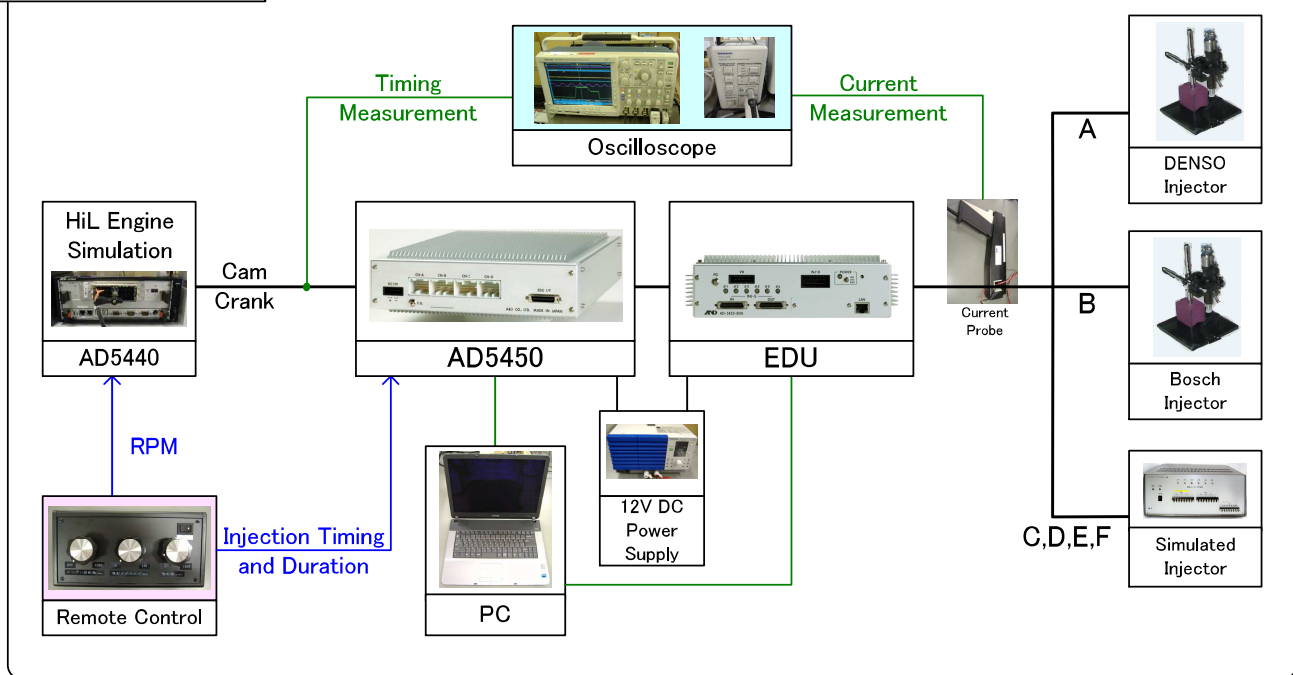
Operation
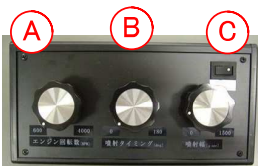
(A) **Engine Speed Control**
- Engine speed command: 600～4000RPM
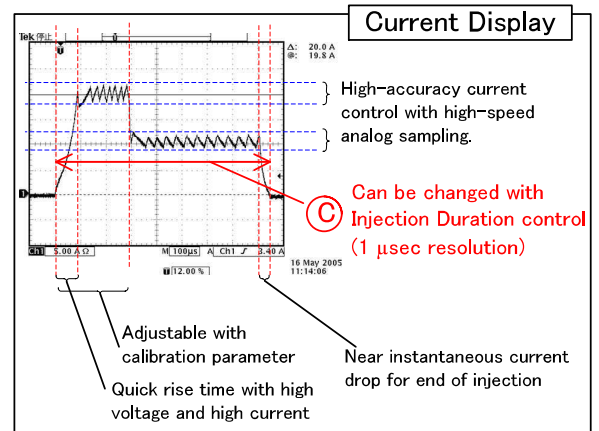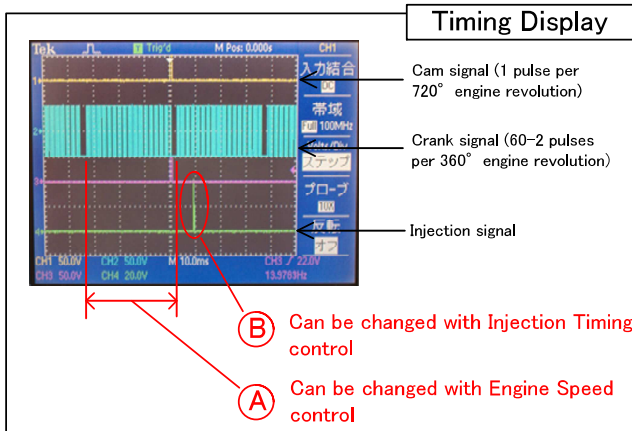- Change cam and crank and resulting injection frequency

(B) **Injection Timing**
- Start of injection command: 0～180°
- Change injection timing

(C) **Injection Duration**
- Injection duration command: 0～1.5msec
- Changes injection duration

Oscilloscope View

Timing Display

Cam signal (1 pulse per 720° engine revolution)

Crank signal (60-2 pulses per 360° engine revolution)

Injection signal

(B) Can be changed with Injection Timing control

(A) Can be changed with Engine Speed control

Current Display

High-accuracy current control with high-speed analog sampling.

(C) Can be changed with Injection Duration control (1 μsec resolution)

Adjustable with calibration parameter

Quick rise time with high voltage and high current

Near instantaneous current drop for end of injection
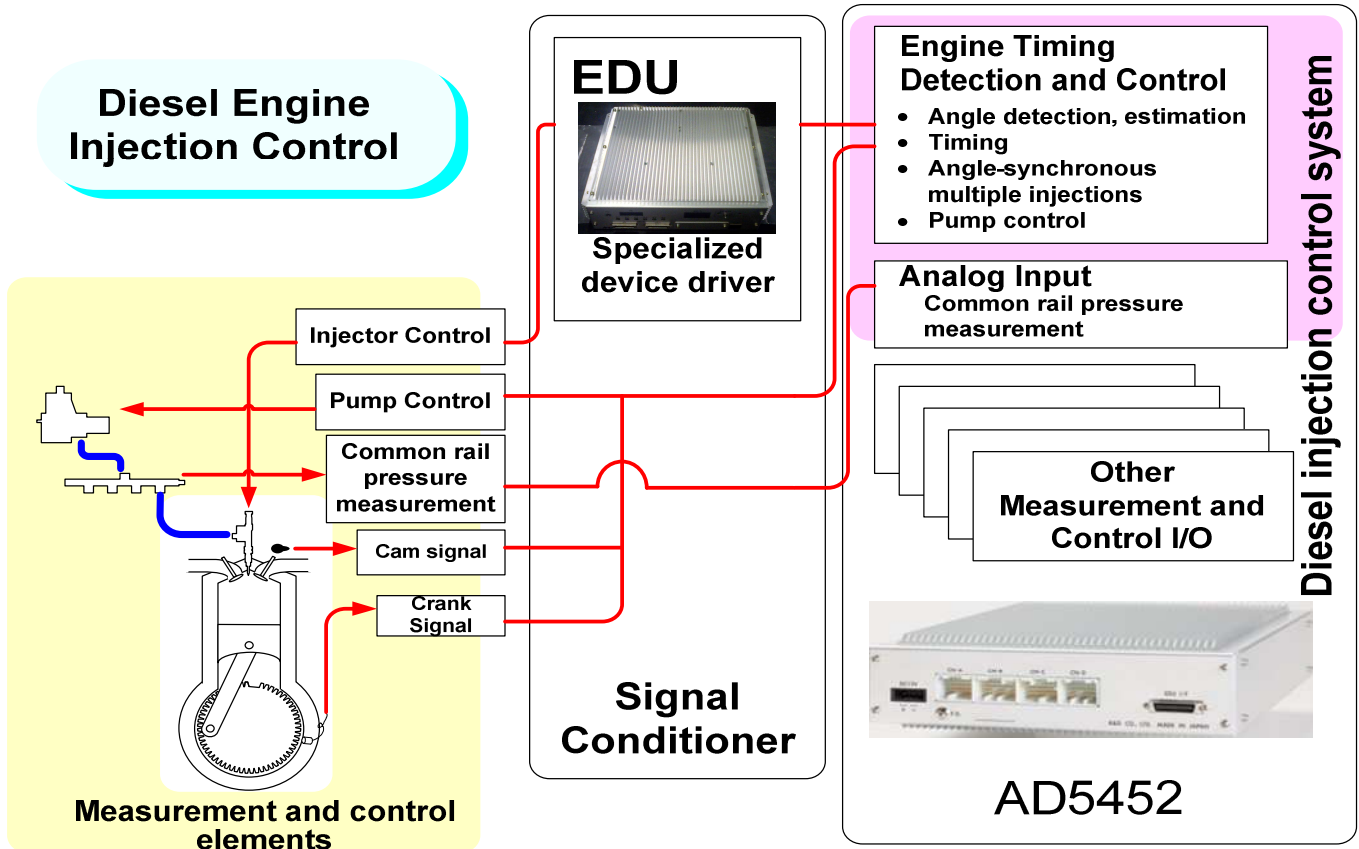
Features

Rapid prototyping engine controller with high-accuracy injector current control, underhood operation, and modular and configurable I/O in a stand-alone, embedded package. Ideally suited to a variety of engine applications and control strategies, including gasoline, diesel, natural gas, bio-fuels, HCCI, and direct injection.

AD5452 Diesel Engine Control

AND

Diesel Engine Injection Control

EDU
Specialized device driver

Measurement and control elements

- Injector Control
- Pump Control
- Common rail pressure measurement
- Cam signal
- Crank Signal

Engine Timing Detection and Control
- Angle detection, estimation
- Timing
- Angle-synchronous multiple injections
- Pump control

Analog Input
Common rail pressure measurement

Other Measurement and Control I/O

Signal Conditioner

AD5452

Diesel injection control system

Diesel Engine Injection Timing

Engine Angle	0°	180°	360°	540°	720°

Crank Signal

Timing Detection

Crank Timing

Injection schedule

Freely configurable multiple injections for each cylinder event

magnified

Crank Timing

Injection Order

Specified crank angle

Time lag from crack angle[μs]

Injection duration [μs]

20A

Fuel Injection

0A