Engine HILS

Engine Hardware-in-the-loop | HELIOS

A&D Discover Precision

Easy to Design environment for HILS verification

A&D's Engine HILS provides hardware and software that reduces the user's burden on ECU testing environment creation and dramatically shortens the development period.

Six features to shorten development period

- **Direct measurement of injector drive current**
  Measure the injector drive current and obtain injection time. Since the current can be directly measured, an external shunt resistance circuit is unnecessary. In addition, it supports both direct injection and port injection, and can be switched from software.
- **Direct measurement of solenoid current**
  The solenoid current of each actuator can also be measured directly. Furthermore, software can be set according to each solenoid.
- **External power supply for ECU is unnecessary**
  Supports up to 10 ECU's with one power supply board(VB-SW). In addition, it is possible to monitor current and voltage for each system.
- **Graphical pattern of creation**
  Crank · Cam · Knock patterns can be created while displaying the waveform.
- **Easy real load connection**
  A load box is provided that can store actual ECU loads. The user can connect the loads to HILS simply by wiring to the terminal blocks in the box. The user can lay out loads of various shapes using the included mounting brackets.
- **Easy altitude simulation**
  An optional negative pressure box can control the pressure on the ECU body. High altitude simulation up to altitude of 6000m can be easily performed.

Highlights:

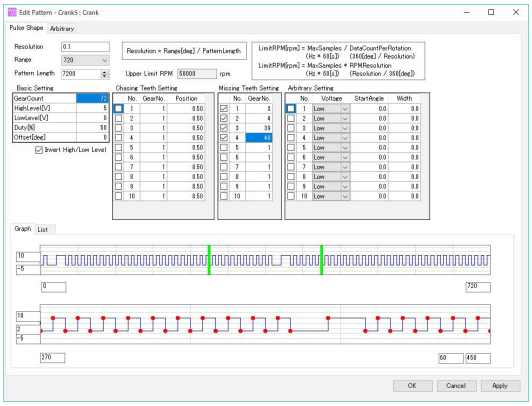
- Compact
- Measures the injection drive current directly and obtains the injection time
- Direct measurement of solenoid current
- Failure function(short to power/ground, open circuit)
- Self-diagnosis function for all I/O boards
- Built-in power supply in HELIOS chassis for driving ECU (600 W)
- Load box with free load layout (optional)
- Negative pressure box enabling high altitude simulation(optional)
- Multinode configuration with multiple HiLS supports tests requiring high computing requirements.
  - Scenario-based tests
  - High precision model execution
- Working with test bench
  - LabWorX collectively manages test data of bench test and HiLS test

Engine HILS

Engine Hardware-in-the-loop | HELIOS

Output signal pattern creation

Crank · Cam · Knock output signal patterns can be created graphically. It is also possible to import patternscreated in csv format.



Actual loads are stored in rack

Actual loads and resistance for the ECU can be stored in load box which is stored in HiLS rack. The temperature inside the box is monitored, and HiLS can be stopped safely when a temperature abnormality is detected.

I/O board specifications

Board	Channels	Description
ENG-IO	4CH: INJ meas	Injection angle/time measurement, input current range: 0-20A (isolated type), variable threshold, Direct injection/port injection compatible
	4CH: IGN meas	Ignition angle/time measurement, operation Input voltage range: 0 to 36V
	1CH: Crank angle out	Single-ended AMP output (range: ±10 V, output current: ±5mA) Open collector output (output level: 5V or VB, drive current: 100mA)
	4CH: Cam angle out	
	4CH: Pulse out	
	4CH: Knock sensor out	Single-ended AMP output (±10V), output current: ±5mA
PLS-IO	16CH: Pulse voltage meas	Comparator input (Range: 0-30V, Frequency: ~100kHz)/TTL input(Range: 0-5 V, Frequency: ~1MHz)
	16CH: Pulse voltage out	Push-pull output (range: 0-30V, drive current: ±100mA)/CMOS output(range: 0to5 V, drive current: 5mA
ACT-IO	12CH: Solenoid meas	Measurement current range: ±5A(isolated type), measurement voltage range: 0-30 V, frequency: 100kHz or less, resolution: 24bits
	2CH: Motor meas	Measurement current range: ±20 A(isolated type), measurement voltage range: 0-30 V, frequency: 100kHz or less, resolution: 24 bits
	2CH: Throttle sensor meas	Measurement voltage range: 0-5V
SENSOR-IO	16CH: Analog in	Single ended input, range: 0-5 V/0-30V/±10V switchable, filter switchable, resolution: 24bits
	16CH: Analog out	Single ended output, range: 0-5V/±10V switchable, output current: ±5mA (±100mA switchable), resolution: 16bits
COM-IO	6CH:CAN/CANFD	CANFD MAX 4Mbps, terminating resistance switchable
	2CH:CAN	MAX 1Mbps, terminating resistance switchable
	4CH:LIN	LIN 1.x/2.0/2.1/2.2A, bus voltage switchable
	1CH:K-Line	VB input range:6-36V, pull-up switchable
	2CH:Serial	RS232-C/RS422/RS485/TTL, terminating resistance switchable(120Ω/60Ω/none)
VB-SW	10CH: VB supply relay	Mechanical relay 60V/50A×1、60V/20A×9、Maximum total current: 50A, voltage/current monitor
	1CH: Sub battery input	MAX 30A

Americas

A&D Technology, Inc.
Ann Arbor, MI USA
Ph: +1 (734)973 1111
www.AandDTech.com

Europe

A&D Europe, GmbH
Griesheim, Germany
PH: +49 (0)6155-605 250
www.AandDEurope.com

A&D Europe - UK Branch
Abingdon, Oxon, UK
PH: +44 (0)1235-550 420
www.AandDEurope.com

Asia

A&D Technology Trading Co.
Shanghai, China
PH: +86 (0)21-3393 2340
www.AandDTech.com

A&D Company, Ltd·
Tokyo, Japan
PH: +81 (0)3-5391 2753
www.AandD.co.jp

Australia

A&D Australasia Pty Ltd.
Kensington, VIC, Australia
PH: +61 (0)3-9372 1522
www.andaustralasia.com.au