

Engine Combustion Pressure Analysis Package

For DL700 and WE7000

What customers want

The ability to analyze combustion pressure at lower cost.

Yokogawa's solution

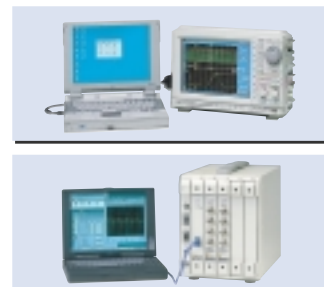
Combine the DL700 series or WE7000 with an engine combustion pressure analysis package.



Cylinder pressure

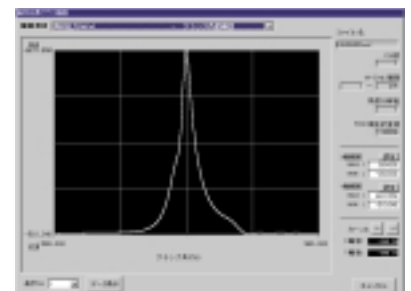
Top dead center (TDC) signal

Crank angle



◆ Data collection using general-purpose measuring instruments

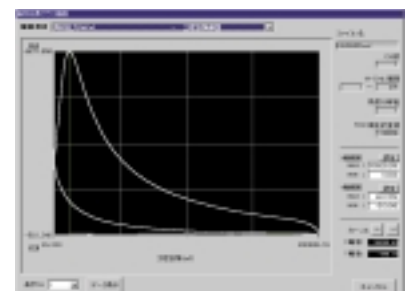
- With the engine combustion pressure analysis package, data are collected based on the standard specifications for the DL700 series and WE7000.
- Because general-purpose measuring instruments are used, they can be employed in applications other than combustion pressure analysis.



Graph of cylinder pressure vs. crank angle

◆ Advanced standard analysis functions

- A variety of engine analysis processes are included as standard features with the package.
- Analysis results are saved as text files (CSV file extension).
- Works with both 2-cycle and 4-cycle engines.
- Digital filter function
- 3D display function
- Can be used to analyze cylinder pressure signals as well as other signal types.
- The user can select the absolute pressure correction method (averaging or cycle-by-cycle).



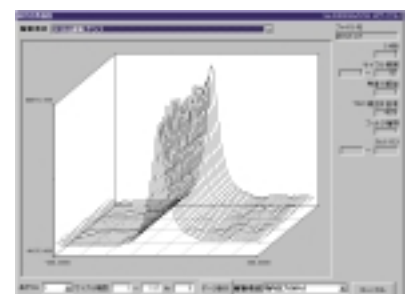
Graph of cylinder pressure vs. piston displacement

◆ Versions for both gasoline and natural-gas engines

- The natural-gas analysis package can be used to analyze the specific heat ratio and polytropic index required for natural gas engines.

◆ Real-time monitoring function

- The optional WE7000 Ethernet version of the analysis package supports real-time monitoring.



3D display function

Overview of specifications

1. Analysis Data

1.1 Measurement requirements

- Required signals: Top dead center (for TRIG)
Angle signal (for EXT-CLOCK; angle resolutions: 1.0, 0.5, 0.25 CA) ^{*(note 1)}
Combustion pressure (maximum 8 cylinders, 800 cycles) ^{*(note 2)}
- Measuring instruments: Measurements are based on EXT-CLOCK in DL708E, DL716, and WE7000.

1.2 Required Data

- Motoring data: Data for top dead center correction
- Combustion pressure measurement data: Data for combustion pressure analysis

Note 1: The maximum engine rpm value that can be measured at these angle resolutions depends on the specifications of each measuring instrument.
Note 2: The maximum for DL708E is six cylinders.

2. Software Configuration

2.1 Reading Measurement Data

Measurements and saved waveforms are read by your PC. This assumes that the location of the measurement data (floppy disk, MO disk, internal DL hard drive) can be recognized as a single drive in Windows NT or Windows 95/98 on your PC. The specified start and stop cycles are extracted from loaded data, and top dead center correction and analysis are performed on the data.

2.2 Filter (digital filter)

Collected data can be run through various filters (LPF, HPF, BPF).

2.3 Top Dead Center Correction

The top dead center is calculated from the monitoring data and corrected automatically. (It is also possible to manually enter a correction value.)

2.4 Physical Value Conversion

Sensor calibration coefficients are set channel by channel to convert voltage values to physical values.

2.5 Analysis Parameters

<Crank angle analysis parameters>		<Transient analysis parameters>	
Cylinder pressure	– Crank angle graph	Maximum cylinder pressure	– Cycle graph
Rate of cylinder pressure rise	– Crank angle graph	Angle at maximum cylinder pressure	– Cycle graph
Amount of heat release	– Crank angle graph	Rate of maximum cylinder pressure rise	– Cycle graph
Rate of heat release	– Crank angle graph	Angle at maximum rate of cylinder pressure rise	– Cycle graph
Combustion mass rate	– Crank angle graph	Indicated mean effective pressure	– Cycle graph
Combustion - chamber gas temperature	– Crank angle graph	Angle at maximum amount of heat release within cylinder	– Cycle graph
Cylinder pressure	– Piston displacement graph	Maximum amount of heat release	– Cycle graph
Logarithmic cylinder pressure	– Logarithmic piston displacement graph	Angle at maximum rate of heat release within cylinder	– Cycle graph
Other signal	– Crank angle graph	Maximum rate of heat release	– Cycle graph
Specific heat ratio	– Crank angle graph		
Polytrot index	– Crank angle graph		

2.6 Combustion Pressure Analysis Calculation/Results Display

- Select multiple combustion pressure analysis/calculation parameters and set the manually input data. Combustion pressure analysis/calculation is then performed.
- After the calculations are made, select calculated parameters one at a time to display them as combustion pressure analysis results in a graph.
- Results are recalculated when you reset manually input data or reselect analysis/calculation parameters.

2.7 Saving Analysis Data as Text Files (CSV file extension)

Combustion pressure analysis/calculation results can be saved as text files (CSV file extension). Test information can be set before a file is saved, but raw data are not saved.

(1) Source information

- Test information, measurement channel information, top dead center correction information, manually input information, engine information

(2) Calculation results

- Cylinder pressure analysis (relative to crank angle): 720 results
- Transient analysis (relative to cycles): Results for the number of cycles
- Analysis of single data item (standard deviation, rate of change, etc.)

3. List Prices

Model	Description	List price (USD)
707764	Combustion pressure analysis package (for gasoline engines)	
707765	Combustion pressure analysis package (for gas engines)	
	real-time monitoring function for WE7000	

CAUTION



- Read the product manual before using this product to ensure safe use.

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