YOKOGAWA ◆

WE7000 Series

Precision Data Acquisition

The picture is of the WE900.

New Features

- Easy Connection Using USB Communication
- High-Speed Data Communication Using USB 2.0
- Enhancements to the Station's Internal Data Processing
- Network Support through New Control Software

Modular Design for Easy Operation

High precision PC measurement with ease!
- **Easy Connection with a PC Using USB**
- **High-Speed Data Communication Using USB 2.0 (up to 480 Mbps)**
- **More than 18 Types of Extensive Measurement Modules**
- **High Precision Modules with Traceability**

WE500

WE900

External I/O connector

Ethernet interface
(100Base-TX/10Base-T)

USB 2.0 interface

USB connection example

Features

### • Multiple Measuring Instruments in a Single System

Two measuring stations are available, capable of holding five (WE500) or nine (WE900) measurement modules.

Wide variety of measurements is possible including those that are difficult on a single measuring instrument such as multi-channel measurements and linked measurements that combine different types of modules.

• Modular Design for Easy Configuration

Once the basic software (Control Software) is installed in the PC, the system automatically recognizes the attached modules and is ready to operate simply by connecting the measuring station to the PC. USB, Ethernet, and optical fiber are available for connecting the measuring station to the PC. When several modules of the same type are inserted, the software automatically links them together so they can be referenced as a single module. Measurements can be started on the day you receive the measuring station.

• Easy Expansion and Modification

Expansion and modification of measurement modules and measuring stations are automatically recognized, and the driver software of each module is automatically loaded from the module when it is inserted. There is no need to install driver software to the PC or restart the PC.

Plug → **Play**
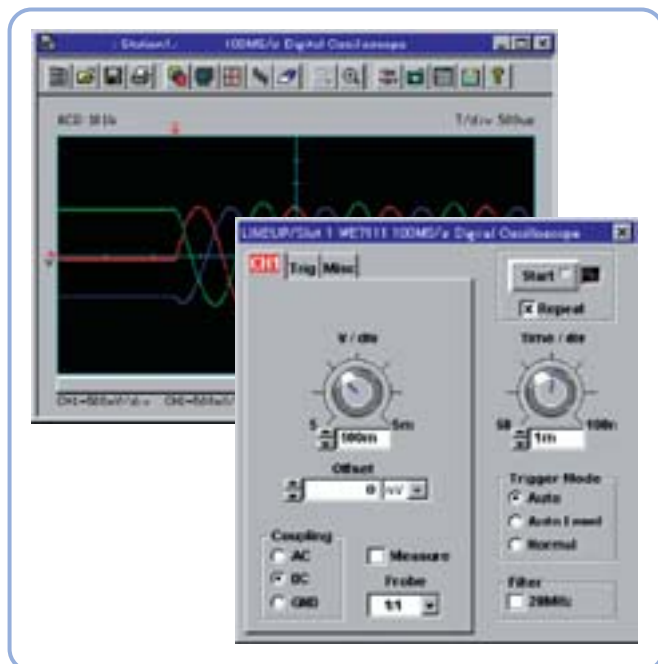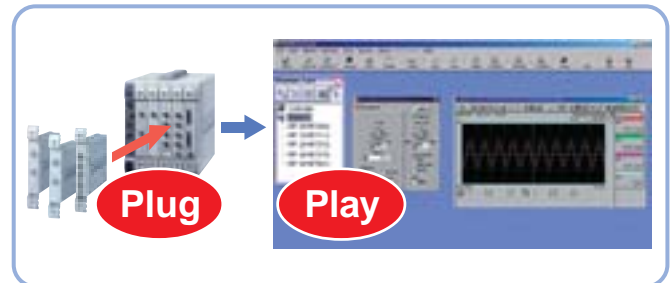
• High Precision

The measurement modules of the WE7000 are constructed on the same design basis as other standalone measuring instruments made by Yokogawa. The precision and reliability provided by these modules are clearly distinct from those of general low-cost measuring PC cards. Needless to mention, traceability is assured.

WE7000

Oscilloscope

Digital Multimeter

Recorder

Function Generator

Data Logger
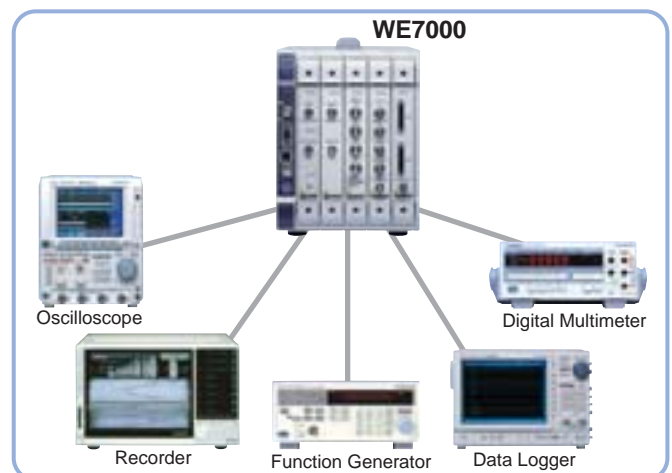
Modules for a Variety of Signals and Extensive Features

• Covers Various Applications from DC to 1 GS/s

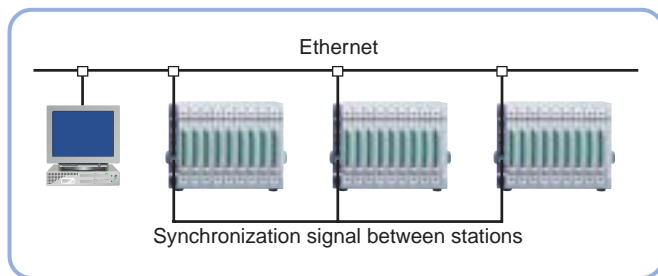### List of Modules

Analog voltage input	1-CH, 1 GS/s Digital Oscilloscope	WE7311
	1-CH, 100 MS/s Digital Oscilloscope	WE7111
	■ 2-CH, 12-Bit 20 MS/s Digitizer	WE7116
	■●2-CH, 14-Bit 1 MS/s Input Digitizer	WE7275
	■●4-CH, 16-Bit 100 kS/s Input Digitizer	WE7271/WE7272
	■●8-CH, 16-Bit 100 kS/s Input Digitizer	WE7273
	10-CH, 16-Bit 100 kS/s Multiplexed Digitizer	WE7251
Acceleration input	■ 4-CH, 100 kS/s Acceleration Measurement	WE7235
Strain input	■●4-CH, 100 kS/s Dynamic Strain Measurement	WE7245
Thermocouple input	●10-CH Temperature Measurement	WE7241
Pulse signal input	■ 4-CH Timing Measurement (Counter with Memory)	WE7521
	1-CH, 100 MHz Universal Counter	WE7141
Analog voltage output	1-CH, 100 MHz Function Generator	WE7121
	4-CH, 100 kS/s Output D/A	WE7281/WE7282
Digital I/O	32-Bit Digital I/O	WE7262
CAN Bus	CAN Bus Interface	WE7081

■Simultaneous Sampling
●Isolated Input

• Simultaneous Multi-Channel Measurement

Most digitizer modules have an A/D converter for each channel. Simultaneous sampling is possible on all channels using the module's synchronization function.

Ethernet

Synchronization signal between stations

• Source & Measure

Output modules are also provided. "Source & measure" is possible by combining output modules with measurement modules.

Source

Measure

Example: Excitation test
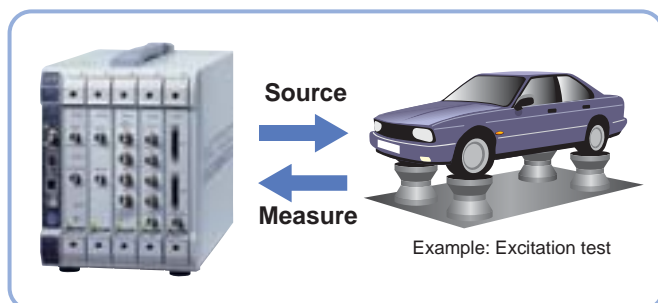
• Arbitrarily Link or Combine Modules

Automatically Link the Same Type of Modules

Automatically link

Slot 1
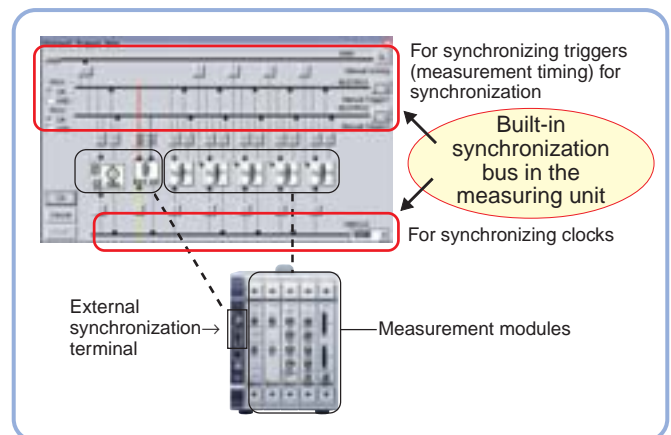Slot 2
Slot 3

←Slot 1
←Slot 2
←Slot 3
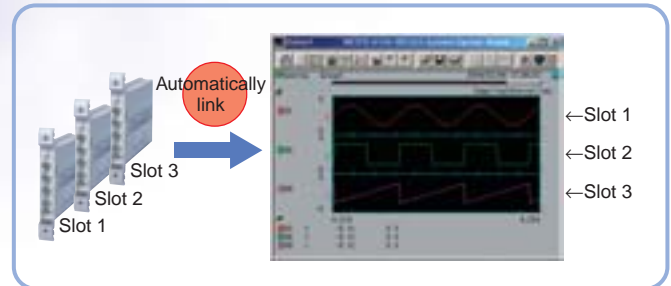
When multiple modules of the same type are inserted in adjacent slots, the modules are automatically recognized as if one module with multiple channels had been inserted. Of course, the modules can also operate independently.

Arbitrarily Combine Different Types of Modules

Temperature
Analog
Strain
Pulse
CAN

Combine

←Temperature
←Analog
←Strain
←Pulse
←CAN
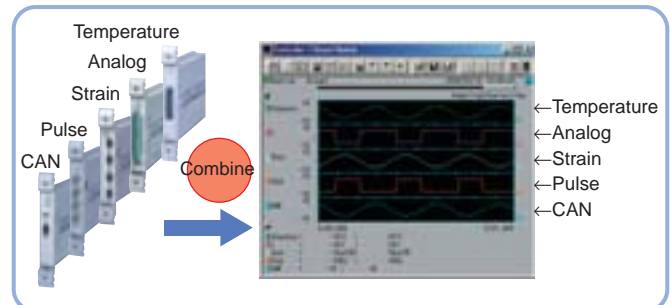
Different modules can operate as one group. Various signals such as temperature, analog, strain, pulse, and CAN can be measured simultaneously. For modules with slow sampling rate, the data is interpolated. The same number of data samples for each module is saved collectively to the same file.

Easy to Synchronize or Link Modules and External Devices

For synchronizing triggers (measurement timing) for synchronization

Built-in synchronization bus in the measuring unit

For synchronizing clocks

External synchronization→ terminal

Measurement modules

Since buses for synchronizing trigger timing and sampling clock are built into the station, there is no need to connect cables for synchronization.
A visual, intuitive screen is available for configuration and you simply select the direction of the arrows using the mouse on the screen.

3

Easily Control All Modules Using the Control Software

Control Software

Oscilloscope

Data Logger

Automatically recognizes modules

Arbitrarily combine different modules

- **Free standard package software (Control Software) is included with the measurement station!**
- **Absolutely no programming is required!**
- **Easy setup!**
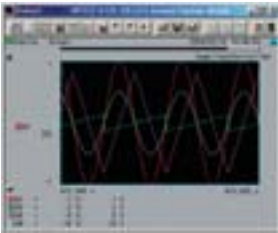 Simply install the Control Software in your PC and you are ready to go.

The Control Software can be updated for free from Yokogawa's website!

- **Control all modules as you wish**
- **Control up to three stations from a single PC**
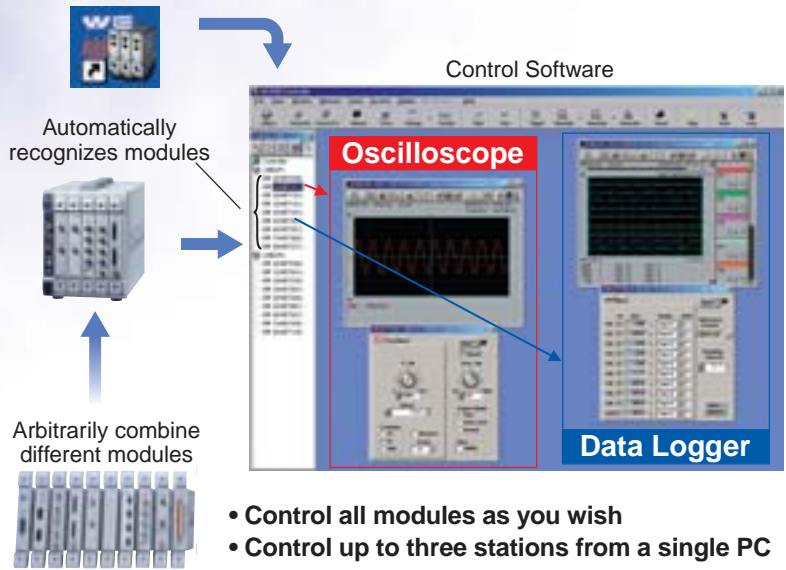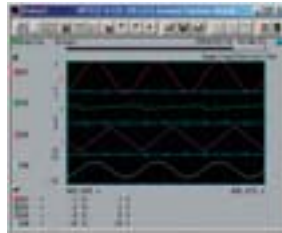
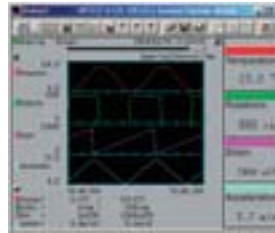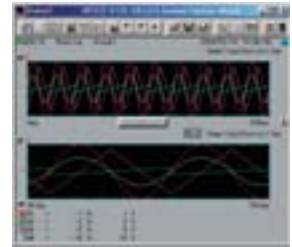## • Display Data Arbitrarily

Versatile Data Displays

All-channel full scale display

Split screens for each channel

Waveform/Instantaneous value display

Main/Zoom display

Instantaneous value display

24.9 ℃	-14.8 ℃	14.3 ℃
64.2 ℃	75.3 ℃	127.3 ℃
128.3 ℃	145.7 ℃	159.6 ℃

Graphical instantaneous value display

Waveforms and instantaneous values can be displayed in various styles according to your application.
Two display formats are available for the different measurement methods, continuous trend display analogous to a recorder and high-speed repetitive display analogous to an oscilloscope.

X-Y Display

Display up to four X-Y graphs overlapped
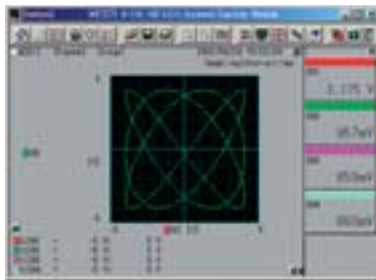
This feature is effective when evaluating the change in torque and fuel consumption rate (vertical axis) versus the number of rotations of the engine (horizontal axis) and the evaluation of DC motors using lissajous waveforms.

Group Multiple Channels and Switch the Display between Groups

Ideal for multi-channel measurements such as temperature measurements!

Group 1
CH1, 2, 3, and 4

One step to switch groups
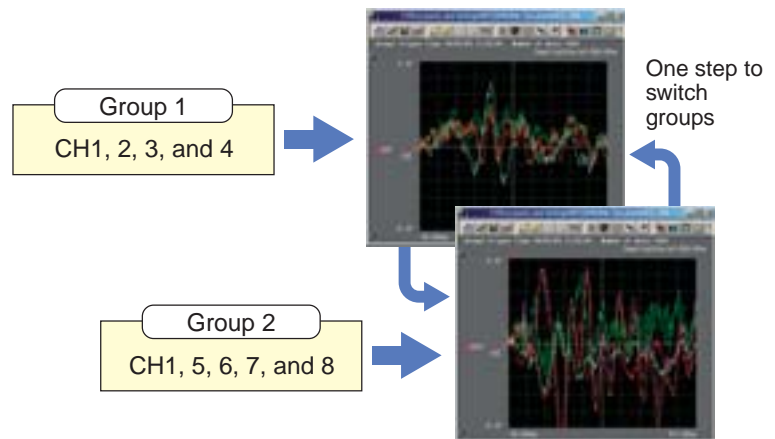
Group 2
CH1, 5, 6, 7, and 8

Up to 10 groups can be defined. A channel can belong to multiple groups

Control Software That Brings Out the Full Functionality of the WE7000

• Saving Data with Complete Control

Versatile Data Save Methods

Various data save methods are available in addition to saving the data collectively to a single file. Some methods include saving data at specified samples, at specified time intervals, or for each trigger. The data can be saved to separate files for each gate time. The data save operation can be started/stopped at specified times. These methods enable you to save only the necessary data efficiently.

• Cyclic Save Function
Optimum for endurance tests!

The data can be saved cyclically to the number of specified files, and only the necessary data immediately before the measurement is stopped can be saved.
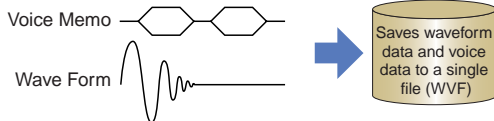
• Auto File Name Function
A sequence number is added automatically to the file name each time the data is saved.

Voice Memo Function

Records voice information like a data recorder

Voice Memo

Wave Form

Saves waveform data and voice data to a single file (WVF)

When waveforms are saved in real-time in free run mode, voice can be recorded simultaneously. Voice can be recorded any number of times during the measurement.
*The PC sound function is used to record and play voices.

Saves Data at High Speeds in Real-Time

Continuously measures waveforms and saves the data to the hard disk in real-time, as in a recorder.

When acquiring data on 4 channels on the WE7272 (1 module) Maximum sampling speed: 100kS/s*

Input signal → Uses the memory cyclically / Measurement memory in the module → Continuously saves the data
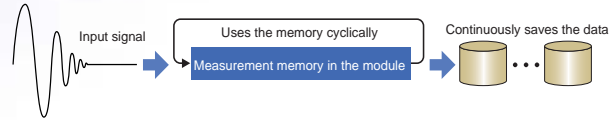
Measured data can be saved continuously at high speeds to the hard disk independent of the memory size of the module.
* The figure is a reference value. The maximum sampling speed depends on the PC's performance and measurement conditions.
Test conditions...Communication interface with the PC: USB 2.0, CPU: Pentium 2 GHz,
Memory: 512 MB, OS: Windows2000, Monitor display: enabled, File Format: binary,
File division: enabled (1 Msamples per file)

Standard Viewer Function
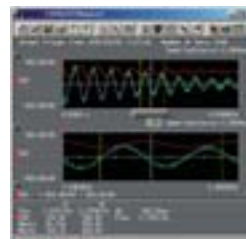
The data saved to a file can be analyzed later. Comparison by overlapping data with past data and complicated analysis using computation functions (option) are possible.

• Computation and Analysis with Complete Control

Linear Scaling

Measured values can be converted to physical values for direct reading. The computation below is performed automatically based on scaling coefficient A and offset B.
$Y = AX + B$ (where X is the measured value and Y is the linear scaling result)
The result is also applied to the saved data. Scale conversion is also possible by setting arbitrary scale values to the measured values of two arbitrary points.

Extensive Computation Function (Option)

User-defined computation (10 equations)

Waveform parameter measurement (20 types)

Equations can be defined using abundant functions including four arithmetic operations, trigonometric functions, differentiation, integration, digital filter, FFT, pulse width computation (duty and period). The computed result can be specified as a parameter in other equations.

Computes waveform parameters such as the maximum, minimum, and average of the data points between arbitrary cursors.

• Usability Pursued to the Limit for PC-Based Measurements

Excel Link Function

Automatically transfers the displayed waveform data to Excel

Automatically start Excel!

Transfer

Automatically execute macros!
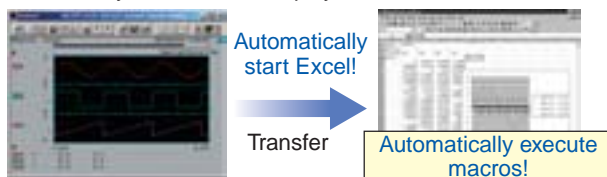
Excel is automatically started, and the current waveform data is automatically transferred to the cells on Excel. Furthermore, a specified macro can be executed automatically after the transfer.

Save the Current Measurement Conditions Entirely

Restore the conditions in one step the next time you make measurements.

Save

Restore

Restores the conditions completely including the window layout!

All the current conditions such as the measurement conditions and waveform display conditions, and equations of each module can be saved to an arbitrary file. Simply double-click the saved file to restore the conditions instantly. In addition, the measurement conditions of each module can be saved to separate files or to the memory in the module.

Network-Friendly Measuring Instrument

• Three Types of Interface for Your Application

There are three types of interface for communicating with the PC. The most suitable interface can be selected according to the measurement application or environment. Up to three measuring stations can be controlled from a single PC on any communication interface.

It is technically possible to connect more than three measuring stations. If you wish to do so, contact your nearest Yokogawa dealer.

USB2.0

• **Comes standard with the measuring station**
• **Simply connect a USB cable and communication is ready**
• **Provides high-speed data communication using USB 2.0 (up to 480 Mbps)**

A USB interface, convenient and easy for connecting PC peripheral devices, can be used to connect the PC to the WE7000. Simply connect the USB cable to the PC. The measuring station is automatically detected by Plug & Play, and configuration is absolutely unnecessary. Furthermore, the USB interface complies with USB 2.0 Hi-Speed mode providing high-speed data transfer. USB 1.1 is also connectable.
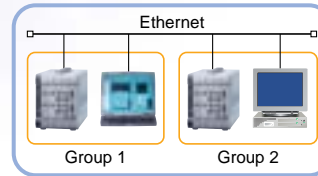
Ethernet (100Base-TX/10Base-T)

• **Comes standard with the measuring station**
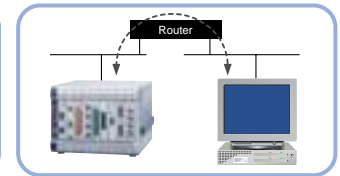• **Enables remote monitoring and measurement using the network such as a corporate LAN**

Grouping Function
Multiple PCs and WE7000s on the same network can be grouped arbitrarily.

Ethernet

Group 1   Group 2

Over a Router
Data acquisition is possible at a remote location over a router.

Router

### Optical Communication

• **Provides optical communication interface with outstanding noise resistivity**
  Best suitable for use under noisy environment such in a strong magnetic field
• **High-speed data communication up to 250 Mbps**

To use optical communication, an optical interface card must be installed to the PC, and an optical interface module is required in the measuring station (slot 0).

Optical interface card   Optical cable   Optical interface module
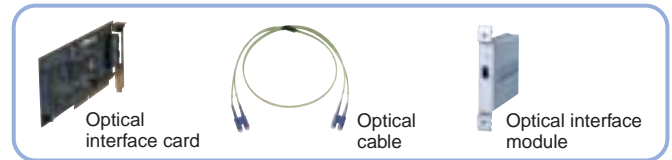
Web Monitor Function

Waveforms can be monitored at a remote location using a Web browser.
The WE7000 can be monitored from a remote location which eliminates the need to go to the test facility to check the data. The test efficiency improves greatly.

Control Software   Controller PC   Monitor PC   Web browser
Router   Ethernet
WE7000   Monitor PC
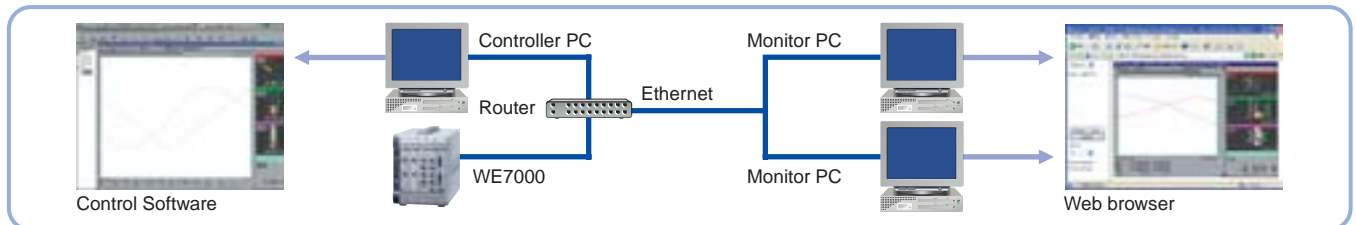
Utility Software for More Convenience

Computation Function Setup Software
7077 02
■ Software utility that adds data computation function to the WE7000 Control Software.
■ Enables four arithmetic operations, FFT analysis, filter functions, waveform parameter measurement, etc.
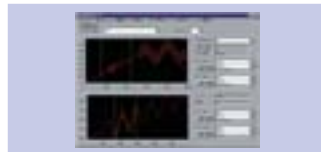
Arbitrary Waveform Editor
7077 51
■ Create and edit data for the WE7121 and WE7281/82
■ Can edit waveforms of up to 4 M data points
■ Can load measured data (WVF format) and Excel (CSV format) files
■ Edit data within the specified interval (functions and dots)

Computation Waveform Viewer
7077 14
■ Can display waveforms of the WE7000 or DL Series data as well as compute and analyze the data on the PC
■ Equipped with extensive computation functions
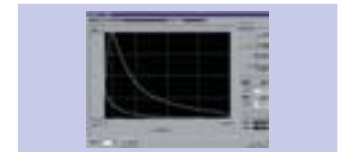
Engine Combustion Pressure Analysis Package
7077 61
■ Offline analysis software for the measured data for the WE7275
■ Supports 4- to 8-cylinder engines
■ Equipped with standard analysis items (functions) required for the combustion pressure analysis

WE7000 Utility Software

Type	Product	Model Number	Specifications
Added on to the Control Software	Computation Function Setup Software	707702	Adds computation functions to the Control Software
	Remote Monitor Add-On Software	707703	Adds remote monitor function to the Control Software
Package software	Computation Waveform Viewer	707714	Waveform Viewer for the WE7000, DL, etc.
	FFT Viewer	707721	8-CH simultaneous FFT analysis for the WE7275
	Data Viewer Pro for WE	707731	Offline data analysis and conversion for the WE7000
	Arbitrary Waveform Editor	707751	Arbitrary waveform data editor for the WE7121 and WE7281/82
	Engine Combustion Pressure Analysis Package	707761	Offline combustion pressure analysis for the WE7275
	Waveform Viewer for DL series	700919	Offline data analysis and conversion for the WE7000 (long data)

Transformation into Dedicated Measuring Instrument by Customization

Open Architecture

Software Customization

APIs are provided for controlling the WE7000 from Windows program development tools such as Visual Basic, Visual C++, LabVIEW, and MATLAB. This enables you to configure a measurement system for a particular application to suit your needs.

* The driver sample software for LabVIEW can be downloaded for free from Yokogawa's website.

Hardware Customization

To support a wide variety of measurement needs, module development kits are available with which the customer can create original measurement modules. (For details, contact your nearest Yokogawa dealer.)

Breadboard   Bus interface module   Module case   Configuration screen

Module development kit

General purpose | For creating a dedicated system

Control Software (comes standard)
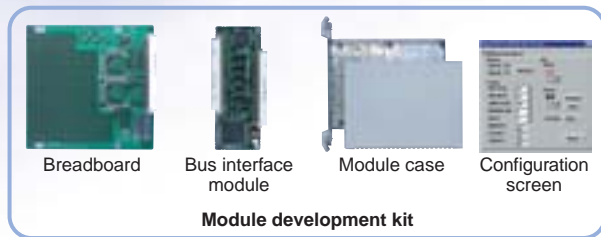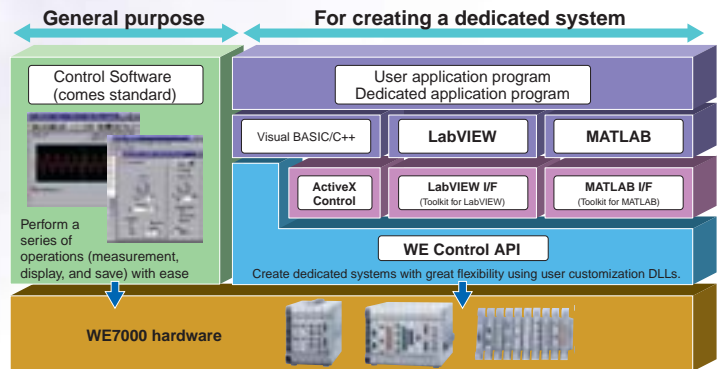
Perform a series of operations (measurement, display, and save) with ease

User application program / Dedicated application program

Visual BASIC/C++ | LabVIEW | MATLAB

ActiveX Control | LabVIEW I/F (Toolkit for LabVIEW) | MATLAB I/F (Toolkit for MATLAB)

WE Control API

Create dedicated systems with great flexibility using user customization DLLs.

WE7000 hardware

Software for developing user application programs

Product	Model Number	Specifications
WVF File Access API	707712	API for accessing WVF
WVF File Access Tool Kit for MATLAB	707713	MATLAB toolkit for accessing WVF
WE Control API	707741	Functions for controlling the WE7000
Add On Tool for WE API Vol. 1	707742	ActiveX controls for Visual Basic
Add On Tool for WE API Vol. 2	707743	ActiveX controls for Visual Basic (for display)
Control Tool Kit for LabVIEW	707746	Toolkit for LabVIEW
Control Tool Kit for MATLAB	707747	Toolkit for MATLAB

Embedded Modules That Enable High Speed and Independent Processing (Option)

An embedded module is a function that constructs a virtual module using software within the station and performs control, computation, judgement, and other operations on each module that is installed in the station. This enables highly real-time data processing, because there is no data transmission (communication) with the PC.(High-speed processing)

Display and operation on the Control Software are equivalent to those when a measurement module is added. Measurement modules are implemented by inserting the appropriate module in the WE station. Embedded modules are implemented by downloading a software module from a PC. (User-friendly I/F)
Since the embedded module that is downloaded is stored in the FLASH memory in the station and runs automatically the next time the power is turned ON, it can run in an environment without a PC. (Autonomous processing)
Below are some examples that become possible.

• A complicated level judgement can be performed on the measured values of various input modules such as a digitizer, and the result can be output from the DO terminal of the station.
⇒Achieve a high-speed GO/NO-GO judgement instrument

• The measured values of timing measurement modules can be processed and output to the voltage output module.
⇒Achieve a FV converter

• Measurements or judgements can be started simply by turning ON the power to the station without the need to send instructions from a PC.
⇒Achieve autonomous measuring instrument without a PC

Various other types of processing that were carried out on the PC can be performed in the station.
These embedded modules can be configured to meet the customer's needs like the application software.
Various functions become possible on the WE7000 by combining measurement modules and embedded modules.
For details on the functionality and the creation of embedded modules, contact your nearest Yokogawa dealer.

Download the embedded module   Install the measurement module

Embedded modules can also be configured from the GUI.

• When downloaded and registered, the module appears in the module list.
• Register and release the modules remotely from a PC as desired (up to four).
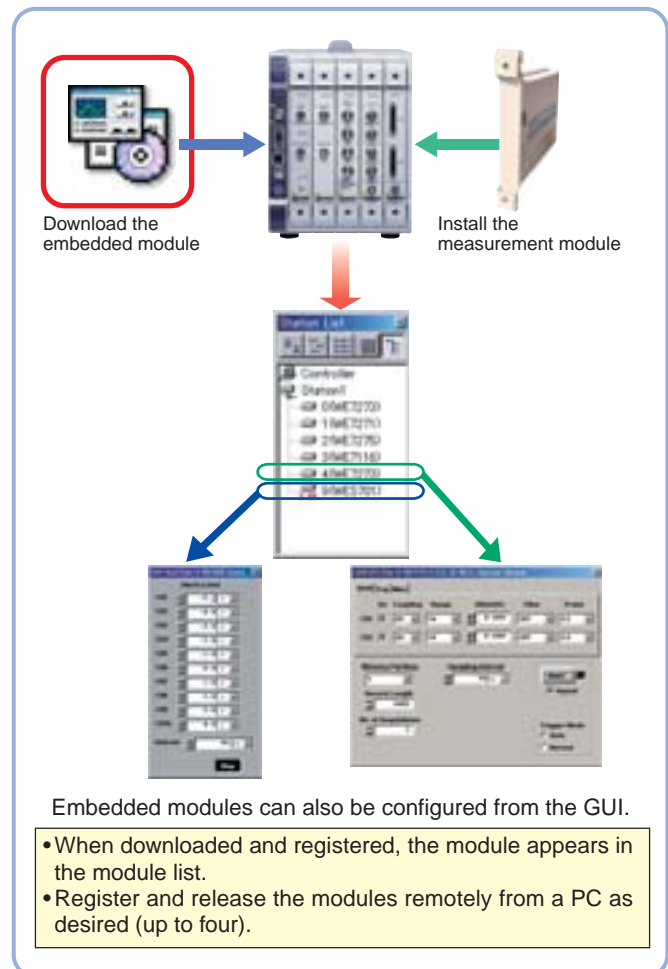
Specifications

WE7000 Control Software (Comes Standard with the WE500/WE900)

Plug & Play capability:	Automatic recognition of measuring stations and measurement modules
Remote control capability:	Switching station power ON/OFF (main power not included)
Number connectable units:	Up to 3 stations
Setup capability:	Recalls/Displays module setup screens and sets link, trigger, and external clock synchronization of measuring stations and measurement modules
Display features (see the list of module features):	
	Number of single waveforms: Up to 90 (when identical modules are linked together)
	Number of split-display waveforms: 10
	X-Y waveform display: Any 4 channels (Input channels of the same type of modules operating in link)
Monitor display:	Scroll display of trend waveforms Simultaneous main and zoom displays
Snapshot feature:	Leaves the displayed waveform path on the screen.
Cursor feature:	Displays the time, measured values, and difference using two markers
Scaling feature:	Can be specified on each channel (digitizer modules)
Data saving feature:	Saves data to floppy disks, hard disks, or MO disk on a PC
Measured data:	Saved in ASCII or binary (original) format. Continuous data saving, auto saving at triggers, and direct transfer of data to Excel are possible.
Image data:	Saves the waveform display in bitmap format.
Setup conditions:	Saves measurement conditions of modules, display settings, etc.
Data display feature:	Loads and displays the data in binary (original) format saved to floppy disks, hard disks, or MO disks.
Help feature:	Displays the specifications, features, and other information about individual modules
Maintenance feature:	Displays measuring station and module versions
PC system requirements:	Pentium II 400 MHz or higher PC running Windows 95/98/Me/XP or Windows NT 4.0/2000Pro with IE4 or later and at least 100 MB free hard disk space and at least 128 MB of RAM (for one WE500 unit with one or two measurement modules)

WE500/WE900 Measuring Stations

Number of slots:	WE500: 5 measurement modules or 4 measurement modules + 1 communication module (when using optical communication)
	WE900: 9 measurement modules or 8 measurement modules + 1 communication module (when using optical communication)

Signal I/O:	TRIG: BNC
	EXT. I/O: D-sub connector 15-pin (female)
USB connector type:	USB type B connector (receptacle)
Electrical and mechanical specifications:	Complies with USB Rev. 2.0 (operates as a USB 1.1 device if the USB on the PC is USB 1.1)
Baud rate:	480 Mbps maximum
Number of ports:	1
PC system supported:	PC running Windows 98SE, Windows ME, Windows 2000, or Windows XP with an USB port (a separate device driver is required to connect with the PC)

Ethernet communication

Number of communication ports:	1
Connection format:	Ethernet (10Base-T or 100Base-TX)
Baud rate:	10 Mbps or 100 Mbps auto detection

General specifications:

Rated source voltage:	100 to 120 VAC or 200 to 240 VAC (automatic switching)
Power consumption	WE500: 350 VA maximum (including modules), 160 VA (without modules)
	WE900: 570 VA maximum (including modules), 200 VA (without modules)
Rated source frequency:	50/60 Hz
Source harmonic current:	Complies with IEC1000-3-2
Accessories:	Power cord, CD-ROM (WE Control Software), connector (for EXT I/O), user's manual, cover plates (5 for WE500 and 9 for WE900), and USB cable

Station, Communication Modules, and Cards

Product	Model Number	Suffix Code	Specifications
WE500 Measuring Station	707003	−0	5 slots USB and Ethernet interface included
WE900 Measuring Station	707004	−0	9 slots USB and Ethernet interface included
WE7021 GP-IB Controller Module	707021		Controller for GP-IB devices
WE7037 Optical Interface Module	707037		For measuring station: 1 port *
WE7038 Optical Interface Module	707038		For measuring station: 2 ports *
WE7035 Optical Interface Card	707035		For PC (PCI bus): 1 port *
WE7036 Optical Interface Card	707036		For PC (PCI bus): 2 ports *

For details, see GS7070-00E or visit Yokogawa's website.

Measurement Modules

List of measurement module features

Product	Model Number	Bandwidth	Number of Channels	Isolation	Input Coupling	Range	Resolution bit	Maximum Memory (point)	Memory Partition	I/O Connector	Link Feature	Maximum number of waveforms displayed simultaneously	Scaling Feature	Other Features	Power Consumption	Number of Used Slots Weight
WE7311 1 GS/s Digital Oscilloscope Module	7073 11/HE	DC to 400 MHz	1	No	DC/AC /GND	5 mV/div to 500 mV/div (1-2-5 steps)	8	2M	Up to 4096	BNC	Yes	9 When 9 modules are linked	No		Approx.15VA	1 Approx.0.8kg
WE7111 100 MS/s Digital Oscilloscope Module	7071 11/HE	DC to 40 MHz	1	No	DC/AC /GND	5 mV/div to 5 V/div (1-2-5 steps)	8	100k	None	BNC	Yes	9 When 9 modules are linked	No	Automated measurement of waveform parameters Calibration signal output	Approx.15VA	1 Approx.0.9kg
WE7116 2-CH, 20 MS/s Digitizer Module	7071 16/HE	DC to 8 MHz	2	No	DC/AC /GND	±100 mV to 50 V	12	4M	Up to 1024	BNC	Yes	18 When 9 modules are linked	Yes	Calibration signal output	Approx.10VA	1 Approx.0.7kg
WE7275 2-CH, 1 MS/s Isolated Digitizer Module	7072 75/HE	DC to 400 kHz	2	Yes	DC/AC	±100 mV to 200 V (1-2-5 steps), 350 V	14	4M	Up to 256	BNC	Yes	18 When 9 modules are linked	Yes	Anti-aliasing filter OFF/20 Hz to 40 kHz (2-4-8 steps)	Approx.14VA	1 Approx.0.8kg
WE7273 8-CH, 100 kS/s Isolated Digitizer Module	7072 73/HE	DC to 40 kHz	8	Yes	DC/AC	±50 mV to 50 V (1-2-5 steps)	16	8M	Up to 256	Clamp terminal	Yes	72 When 9 modules are linked	Yes		Approx.20VA	1 Approx.0.9kg
WE7271 4-CH, 100 kS/s Isolated Digitizer Module	7072 71/HE	DC to 40 kHz	4	Yes	DC	±1 V to 20 V (1-2-5 steps), ±35 V	16	4M	Up to 256	Clamp terminal	Yes	36 When 9 modules are linked	Yes		Approx.12VA	1 Approx.0.7kg
WE7272 4-CH, 100 kS/s Isolated Digitizer Module	7072 72/HE	DC to 40 kHz	4	Yes	DC	±1 V to 20 V (1-2-5 steps), ±35 V	16	4M	Up to 256	BNC	Yes	36 When 9 modules are linked	Yes		Approx.12VA	1 Approx.0.7kg
WE7251 10-CH, 100 kS/s Digitizer Module	7072 51/HE	DC to 10 kHz	10	No L end common	DC	±1 V to 20 V (1-2-5 steps)	16	1M	Up to 256	Input unit sold separately	Yes	90 When 9 modules are linked	Yes	Multiplex type	Approx.8VA	1 Approx.0.7kg
WE7241 10-CH Thermometer Module	7072 41/HE	Scan interval 0.5 s or longer	10	Yes	DC	K, E, J, T, L, U, N, R, S, B, W, KPvsAU7Fe ±50 mV to 50 V (1-2-5 steps)	14	None	—	Input unit sold separately	Yes	90 When 9 modules are linked	Yes	Multiplex type	Approx.7VA	1 Approx.0.8kg
WE7245 4-CH, 100 kS/s Strain Module	7072 45/HE	DC to 20 kHz	4	Yes	DC	1000 μ to 20000 μ strain, ±100 mV to ±20 V (1-2-5 steps)	15	4M	Up to 256	Dsub (9-pin)	Yes	36 When 9 modules are linked	Yes	1, 2, or 4 gauges, DC bridge Gauge resistance 120 to 1 kΩ, auto balance	Approx.15VA	1 Approx.1kg
WE7235 4-CH, 100 kS/s Accelerometer Module	7072 35/HE	DC to 40 kHz	4	No	DC (voltage only) /AC	Gain: x1 (5 V) to x100 (50 mV) (1-2-5 steps)	16	4M	Up to 256	BNC	Yes	36 When 9 modules are linked	Yes	Anti-aliasing filter OFF/20 Hz to 40 kHz (2-4-8 steps)	Approx.12VA	1 Approx.0.8kg
WE7141 100 MHz Universal Counter Module	7071 41/HE	1 Hz 120 MHz	2	No	DC/AC	Period, time interval, pulse width, duty cycle, frequency ratio, totalize count measurements	—	None	—	BNC	No	1	Yes	D/A output	Approx.6VA	1 Approx.0.7kg
WE7521 4-CH Timing Measurement Module	7075 21/HE	100 ns to 20 s	4	No	DC/AC	Period, time interval, totalize count, up and down count, and frequency ratio measurements	—	4M	Up to 256	BNC	Yes	32 When 8 modules are linked	Yes	Time stamp measurement	Approx.8VA	1 Approx.0.7kg
WE7121 10 MHz Function Generator Module	7071 21/HE	1 μHz to 10 MHz	1	No	—	±10 V (resolution 1 mV)	12	16k	None	BNC	Yes	—	—	Arbitrary waveform output	Approx.7VA	1 Approx.0.7kg
WE7281 4-CH, 100 kS/s D/A module	7072 81/HE	DC to 20 kHz	4	Yes	—	±1 V to 10 V (1-2-5 steps)	16	4M	Up to 256	Clamp terminal	Yes	—	—	Sweep function, arbitrary waveform output	Approx.15VA	1 Approx.0.9kg
WE7282 4-CH, 100kS/s D/A Module	7072 82/HE	DC to 20 kHz	4	Yes	—	±1 V to 10 V (1-2-5 steps)	16	4M	Up to 256	BNC	Yes	—	—	Sweep function, arbitrary waveform output	Approx.15VA	1 Approx.0.7kg
WE7262 32-Bit Digital I/O Module	7072 62/HE	—	32	No	—	TTL level (input), CMOS level (output)	—	None	—	Dsub (25-pin)	No	32		2-MHz counter feature Connect the 707823/707824 and input/output contact signals	Approx.1.2VA	1 Approx.0.6kg
WE7081 CAN Bus Interface Module	7070 81/HE									Dsub (9-pin)	Yes	64		CAN data I/O	Approx.5VA	1 Approx.0.7kg

Measurement Modules

• Each Module Is a Single Measuring Instrument

Each module is designed to operate independently with separate A/D, memory, and trigger circuit on each module. The modules can be operated in link by exchanging trigger signals between modules.

Digital oscilloscopes

WE7311

1 GS/s Digital Oscilloscope Module

Number of input channels:	1
Input coupling settings:	DC (1 M/50 Ω), AC (1 M/50 Ω), and GND
Input connector:	BNC connector
Input impedance:	1 MΩ: ±1% (approx. 10 pF), 50 Ω: ±1%
Input voltage range:	5 mV/div to 500 mV/div (1-2-5 steps, set in DSO mode) ±25 mV to ±2.5 V range (1-2.5-5 steps, set in digitizer mode)
Vertical resolution:	8 bits
Maximum input voltage:	1 MΩ: ±42 V (DC + AC peak < 10 kHz) 50 Ω: ±5 VDC (500 mW) or 5 Vrms Overvoltage Category CAT I and II
Frequency characteristics:	DC to 400 MHz (10 mV/div to 500 mV/div or ±50 mV to ±2.5 V range) DC to 250 MHz (5 mV/div or ±25 mV range) -3dB point in the low frequency region during AC coupling: 10 Hz or less
Sampling interval:	1 ns to 10 ms (1-2-5 steps, set in digitizer mode) (1, 2, 2.5, 4, and 5 steps using the API)
Memory length:	100 to 2 MW (1 word unit, 1,000,001 words or more are only for single acquisition)

WE7111

100 MS/s Digital Oscilloscope Module

Number of input channels:	1
Input coupling settings:	AC, DC, and GND
Input connector:	BNC
Input impedance:	1 MΩ±1.5%, approx. 25 pF
Voltage-axis sensitivity setting: 5 mV/div to 5 V/div (1-2-5 steps)	
Maximum input voltage (at a frequency of 1 kHz or less): 250 V (DC+ACpeak) or 177 VACrms	
Frequency characteristics (when a sine wave with amplitude equivalent to ±4 div is applied): DC to 40 MHz(-1.5 dB attenuation point, no bandwidth limit, typical value)	
A/D conversion resolution:	8 bits (8 LSB/div)
Maximum sample rate:	100 MS/s
Maximum record length:	100 kW

Digitizers

WE7116

2-CH, 20 MS/s Digitizer Module

Number of input channels:	2
Input format:	Non-isolated unbalanced input
Connector type:	BNC
Input coupling:	DC/AC/GND
A/D resolution:	Equivalent to 12 bits (including the sign)
Input impedance:	Approx. 1 MΩ (approx. 28 pF)
Frequency characteristics (–3 dB point, when filter is OFF)	
DC coupling:	DC to 8 MHz (typical value)
AC coupling:	5 Hz to 8 MHz (typical value)
Range:	±100 mV to ±50 V (1-2-5 steps)
Input filter:	
Low-pass filter	
Cut-off frequency:	OFF/500 kHz/1 MHz
Filter characteristics:	5th order elliptic filter At 1.4 times the cutoff frequency -24 dB at twice the cutoff frequency -40 dB (typical value)
Acquisition mode:	Trigger only (normal/auto)
Sampling interval:	50 ns to 1 ms in 50-ns steps

WE7275

2-CH, 1 MS/s Isolated Digitizer Module

Number of input channels:	2
Input format:	Floating unbalanced input, isolation between

(continued) input and ground and between channels

Connector type:	Isolated BNC
Input coupling:	DC/AC
A/D resolution:	±100 mV to ±200 V range: Equivalent to 14 bits (including the sign) ±350 V range: Equivalent to 13 bits (including the sign)
Input impedance:	Approx. 1 MΩ
Frequency characteristics (–3 dB point, when filter is OFF)	
DC coupling:	DC to 500 kHz (typical value)
AC coupling:	1 Hz to 500 kHz (typical value)
Range:	±100 mV to ±200 V (1-2-5 steps) ±350 V
Input filter:	Low-pass filter
Cut-off frequency:	OFF/100 kHz/40 kHz/4 kHz/400 Hz (typical value)
Filter characteristics:	4th order Bessel (-24 dB/oct.)
Acquisition mode:	Trigger, free run, gate (level), and gate (edge)
Acquisition memory:	2 MW/CH (when using 2 channels) or 4 MW/CH (when using 1 channel)
Sampling interval:	1 μs to 1 s
Maximum common-mode voltage (between analog signal input L terminal and ground): ±250 VDC or 250 VACrms (when using the isolated BNC plug provided)	
Maximum voltage between channels (between L terminals of different channels of analog signal): ±250 VDC or 250 VACrms (when using the isolated BNC plug provided)	

WE7273

8-CH, 100 kS/s Isolated Digitizer Module

Number of input channels:	8
Input format:	Floating unbalanced input (Isolation between channels and between input and ground)
Connector type:	Clamp terminal
Input coupling:	DC/AC
A/D resolution:	16 bits
Input impedance:	Approx. 1 MΩ
Frequency characteristics (-1.5 dB point, when filter is OFF):	
DC coupling:	DC to 40 kHz (typical value)
AC coupling:	10 Hz to 40 kHz (typical value)
Range:	±50 mV to ±50 V (1-2-5 steps)
Input filter:	Low-pass filter
Cut-off frequency:	OFF/5 kHz/500 Hz/50 Hz (-3 dB attenuation point, typical value)
Filter characteristics:	2nd order Bessel (12 dB/oct.)
Acquisition mode:	Trigger, free run, gate (level), and gate (edge)
Acquisition memory:	8 MW (1 MW/channel when using 8 channels)
Sampling interval:	10 μs to 10 s
Maximum common-mode voltage (between ground and signal terminals): 300 VACrms or ±300 VDC	
Maximum voltage between channels:	
Between any two terminals of different channels in the same module: 100 VACrms or ±100 VDC	
Between any two terminals of channels on different modules: 300 VACrms or ±300 VDC	

WE7271/WE7272

4-CH, 100 kS/s Isolated Digitizer Module

Number of input channels:	4
Input format:	Floating unbalanced input (Isolation between channels and between input and ground)
Connector type:	
WE7271:	Clamp terminal (terminal block is detachable)
WE7272:	Isolated BNC
Input coupling:	DC
A/D resolution:	16 bits
Input impedance:	Approx. 1 MΩ
Input filter:	OFF/5 kHz/500 Hz (-3 dB point, typical value)
Frequency range:	DC to 40 kHz (-1.5 dB attenuation point, when filter is OFF, typical value)
Range:	±1 V to ±20 V (1-2-5 steps) ±35 V
Acquisition mode:	Trigger, free run, gate (level), and gate (edge)
Acquisition memory:	4 MW
Sampling interval:	10 μs to 10 s
Maximum common-mode voltage (between ground and L terminal):	
WE7271:	250 VACrms or ±250 VDC
WE7272:	±42.4 VDC + ACpeak
Maximum voltage between channels:	
WE7271:	250 VACrms or ±250 VDC (between any two terminals of different channels)
WE7272:	±42.4 VDC + ACpeak (between L terminals of different channels)

Measurement Modules

Digitizers

WE7251

10-CH, 100 kS/s Digitizer Module

Number of input channels:	10 (multiplex type)
Input format:	Floating unbalanced input

(Multiplex type, common shared by all channels, isolated between input and ground)

Connector type:	Uses the 707821 Input Terminal Block
Input coupling:	DC
Resolution:	16 bits
Input impedance:	Approx. 1 MΩ
Frequency range:	DC to 10 kHz (–3 dB point, when filter is OFF) (typical value)
Range:	±1 V to ±20 V (1-2-5 steps)
Input filter:	OFF/1 kHz (-3 dB point)
Acquisition mode:	Trigger, free run, and gate
Acquisition memory:	1 MW
Sampling interval:	
When input filter is OFF:	10 µs × the number of channels to 10 s (100 µs or greater when modules are linked regardless of the number of channels, 1 ms or greater during free run mode using the WE7000 Control Software)
When input filter is ON:	1 ms × the number of channels to 10 s (10 ms or greater when modules are linked regardless of the number of channels)
Maximum common-mode voltage (between ground and L terminal):	100 VACrms or ±100 VDC

Thermometers

WE7241

10-CH Digital Thermometer Module

Number of input channels:	10 (multiplex type)
Input format:	Floating unbalanced input, isolation between channels and between input and ground
Connector type:	Connect the 707821 Input Terminal Block sold separately
Input coupling:	DC
A/D resolution:	Equivalent to 14 bits (during DC voltage input)
Input resistance:	1 MΩ or more
Range:	K, E, J, T, L, U, N, R, S, B, W, KPvsAu7Fe ±50 mV to 50 V (1-2-5 steps)
Sampling interval:	0.5 s to 60 s (when using internal time base, selectable from 0.2 s, 0.3 s, and 0.4 s when the number of channels is 1 or 2 channels, 3 to 5 channels, and 6 or 7 channels, respectively) 2.0 s or greater (when using the WE bus time base signal (CMNCLK))
Alarm output:	Output triggers on the WE bus (BUSTRIG1/BUSTRIG2) on the AND/OR logic of the upper limit, lower limit, in-range, or out-of-range conditions of each channel

Digitizers supporting direct sensor input

WE7245

4-CH, 100 kS/s Strain Module

Number of input channels:	4
Input format:	Isolated differential input (strain), isolated unbalanced input (voltage) Isolation between input and ground and between channels (strain and voltage)
Input terminal:	D-sub 9-pin connector (female)
A/D resolution:	15 bits (including the sign)
Input impedance:	Approx. 1 MΩ (for voltage measurement)
Frequency range:	DC to 20 kHz

Strain measurement

Range:	1000 µ to 20000 µ strain
Applicable gauge resistance:	120 to 1000 Ω (bridge voltage 2 V) 350 to 1000 Ω (bridge voltage 5/10 V)

Voltage measurement

Range:	±100 mV to 20 V (1-2-5 steps)
Acquisition mode:	Trigger, free run, gate (level), and gate (edge)
Acquisition memory:	4 MW
Input filter:	Low-pass filter, filter can be turned ON/OFF
Cutoff frequency:	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, or OFF (20 kHz) Typ.
Cut-off characteristics:	-18 dB/octave
Maximum sample rate:	100 kS/s

WE7235

4-CH, 100 kS/s Accelerometer Module

Number of input channels:	4
Input format:	Non-isolated unbalanced input
Connector type:	BNC
Input coupling:	AC (acceleration), DC/AC (voltage)
A/D resolution:	16 bits
Frequency range:	DC to 40 kHz (-1.5 dB Typ.) for DC coupling 0.1 Hz to 40 kHz (-1.5dB Typ.) for AC coupling
Input filter:	
Low-pass filter	
Cut-off frequency:	OFF/40 Hz/100 Hz/400 Hz/1 kHz/4 kHz/10 kHz/40 kHz (-3 dB attenuation point, typical value)
Anti-aliasing filter	
Cut-off frequency:	OFF/20 Hz to 40 kHz (2-4-8 steps)
Acceleration measurement	
Range:	Automatically set according to the sensitivity specifications of the acceleration sensor
Input voltage range:	±5 V (gain × 1) to ±50 mV (gain × 100)
Applicable acceleration sensor:	Built-in amplifier type (low impedance type) PIEZOTRON®, ICP®, ISOTRON®, etc.
Sensor supply current:	4 mADC
Voltage measurement	
Range:	50 mV to 50 V (1, 2.5, and 5 steps)
Acquisition mode:	Trigger, free run, gate (level), and gate (edge)
Acquisition memory:	4 MW
Sampling interval:	10 µs to 1 s 1 µs steps

Counter and Time

WE7141

100 MHz Universal Counter Module

Number of input channels:	2 (A and B)
Input format:	Non-isolated, unbalanced
Connector type:	BNC
Input impedance:	1 MΩ, 40 pF (typical value)
Coupling:	DC and AC
Lower -3 dB point when AC coupled:	35 Hz (typical value)
Attenuator:	×1 and ×10
Trigger slope:	Rise or fall
Minimum input pulse width:	10 ns (excluding the case when the 1/2 prescaler is used)
Measurement function:	Frequency A, period A, time interval between A and B, pulse width A, duty cycle A, frequency ratio A/B, totalize count A, continuous measurement, and D/A output

WE7521

4-CH Timing Measurement Module

Number of inputs:	4
Input format:	Non-isolated, unbalanced
Connector type:	BNC
Input coupling:	DC/AC (-3 dB attenuation point when AC coupled: 10 Hz) (typical value)
Input impedance:	1 MΩ ± 1%
Input filter:	OFF/100 kHz/10 kHz/1 kHz (-3dB typical value)
Counter mode	
Number of counters:	4
Measurement function:	Period, time interval, totalize count, up and down count, frequency ratio, and frequency

Display resolution: 5 ns (during period/time interval measurement)
Minimum input pulse width: 50 ns
Minimum input edge interval: 50 ns (for all input edges during up and down count)
Acquisition mode: Trigger, free run, gate (level), gate (edge)
Function: Period, time interval, totalize count, up and down count, frequency ratio (input A/input B)
Acquisition
  Maximum record length: 1 Mpoint/CH
  Sampling interval: 2 μs to 10 s
Time stamp mode
  Number of inputs: 4
  Measurement slope: Rising edge, falling edge, and both
  Maximum measurement time: Approx. 360 hours (5 × 248[ns])
  Display resolution: 5 ns
  Minimum input pulse width: 200 ns
  Maximum record length: 4 Mpoints

Waveform Output

WE7121

10 MHz Function Generator Module

Waveform output
  Number of output channels: 1
  Standard output waveform: Sine/rectangular wave (duty cycle fixed to 50%), triangular, ramp, pulse (variable duty cycle), and inverted waveforms of each waveform

Arbitrary wave
  Output amplitude resolution: 12 bits
  Memory length: 16384 points (a portion of the points is not generated at an output frequency of 2.4 kHz or higher)

Output operation
  Continuous oscillation (CONT): Outputs waveforms continuously
  Trigger oscillation (TRIG): Outputs burst waveforms the specified number of times (integer count) in sync with the trigger
  Gate oscillation (GATE): Outputs integer number of burst waveforms during the gate enable period
  DC output (DC): Outputs DC voltage

Frequency
  Oscillation frequency range
    Sine/rectangular wave: 1 μHz to 10 MHz
    Triangular/pulse wave: 1 μHz to 200 kHz
    Ramp wave: 1 μHz to 200 kHz
    Arbitrary wave: 1 μHz to 200 kHz
  Oscillation frequency resolution: 1 μHz or up to 9 digits

Output characteristics
  Maximum output voltage: ±10 V

Amplitude
  Amplitude range: 20 Vp-p (resolution: 1 mVp-p)

Phase
  Target: Start/Stop phase for trigger oscillation and gate oscillation
  Selectable range: -10000 deg to +10000 deg (resolution: 0.01 deg)

WE7281/WE7282

4-CH, 100 kS/s D/A Module

Number of output channels: 4
Output format: Floating unbalanced output, isolation between channels
D/A resolution: 16 bits (including the sign)
Output range: ±1 V/±2 V/±5 V/±10 V
Maximum output current: ±10 mA (per channel)
Allowable load resistance: 1 kΩ or greater
Output impedance: 1 Ω or less
During DC output (DC): ±1 V to ±10 V (1-2-5 steps)
During function waveform output:
  Output waveform: Sine/pulse (variable duty cycle)/ramp/triangular/simple arbitrary/DC
  Oscillation frequency range: 1 mHz to 20 kHz (sine)/1 mHz to 10 kHz (waves other than sine)
During arbitrary waveform output:
  D/A update interval: 10 μS or longer
  Memory length: 4 MW/CH (for 1 channel)
Connector type:
  WE7281: Clamp terminal (terminal block is detachable)
  WE7282: Isolated BNC

Digital I/O

WE7262

32-Bit Digital I/O Module

I/O section
  Number of I/Os: 32
  Maximum output current: ±3.2 mA
  Output voltage: High level @ -3.2 mA: 3.8 Vmin
                  Low level @ 3.2 mA: 0.5 Vmax
  Input voltage: High level: 2.0 V min
                 Low level: 0.6 V max
  Maximum allowable input voltage: -3 V to +8 V
  Output impedance: Approx. 100 Ω
  Input impedance: Approx. 47 kΩ
  I/O format: Non-isolated, unbalanced
  Connector type: D-sub 25-pin (female)
    (Contact I/O is possible by connecting the 707823/24 16-Bit I/O Terminal Box sold separately)

Pattern match detection section
  Detection bit: Compare every 8 bits and generate up to 4 interrupts
  Chattering elimination: ON/OFF selectable
    (When ON, bounce signals of period 1 ms or less are eliminated)

Continuous measurement
  Sampling interval: 10 ms to 10 s
  Sampling interval resolution: 10 ms

Counter section
  Number of input channels: 2
  Input frequency: 2 MHz max
  Minimum input pulse width: 100 ns
  Input voltage: High level: 2.0 V min
                 Low level: 0.4 V max
  Maximum allowable input voltage: -3 V to +8 V
  Input impedance: Approx. 47 kΩ
  Input format: Non-isolated, unbalanced
  Maximum count: FFFE0000H (4294836224)

CAN Compatible

WE7081

CAN Bus Interface Module

Main features
CAN data acquisition
• Data measurement on data with certain IDs (up to 64 types, at 1 kS/s maximum)
• Id, Start bit, length, and Endian can be specified. Conversion to physical values is possible.
CAN data output
• Download data frames and output.
• Manually output data of a specified ID
• Construct a simple sequence function (up to 1024 digits, time resolution 0.1 s)
Module linking
• Display CAN bus data and signals of various measurement modules (analog signals) on the same time axis and perform comparison analysis.
Setup data
• Import CANdb setup data.

Standard specifications
  Number of ports: 1
  Connector type: D-Sub 9 pins (male)
  Controller: Philips SJA1000 CAN chip
  Transceiver: Built into the module
  Terminator: 124 Ω, Switch ON/OFF using the terminator switch on the front panel
  Data memory: 8 MB FIFO Buffer
  Output memory: 8 MB FIFO Buffer
  Supported protocols
    Physical layer: ISO-11898 (High Speed Communication)
    CAN in Automation: CAN 2.0B (Standard & extended message format)
  Data save format: Save to a binary file in WVF (Yokogawa measuring instrument standard) format, binary file in WCF (WE7000 CAN Binary) format, or ASCII file in CSV format
  Bit rate: 10 k, 20 k, 33.3 k, 50 k, 62.5 k, 83.3 k, 100 k, 125 k, 250 k, 500 k, 800 k, 1 Mbps, and Other Time quanta and sample point are selectable
  Endian: Little or Big selectable

Optional accessories

Product	Model Number	Specifications
Conversion adapter	366921	Banana (female)-BNC
Conversion adapter	366922	Banana (male)-BNC
Conversion adapter	366923	T type BNC
BNC cable	366924	BNC-BNC (1 m)
BNC cable	366925	BNC-BNC (2 m)
Measurement lead	366926	BNC-alligator clip (1 m)
Extension connector	707802	For the optical cable
16-Bit Digital Input Terminal Box	707823	For the 707262, contact input
16-Bit Digital Output Terminal Box	707824	For the 707262, contact output
150 MHz Passive Probe	700998	For the 707111
Probe	700944	For the 707311
Input Terminal Block	707821	For the 707241.707251
Bridge Head	700932/WE	707245 (120 Ω, 5 m)
Bridge Head	700933/WE	707245 (350 Ω, 5 m)
Bridge Head	700967	For 707245(120 Ω,5 m,with shunt Cal)
Bridge Head	700968	For 707245(350 Ω,5 m,with shunt Cal)
Optical fiber cable	707831	Optical fiber cable (2 m)
Optical fiber cable	707832	Optical fiber cable (5 m)
Optical fiber cable	707833	Optical fiber cable (10 m)
Optical fiber cable	707834	Optical fiber cable (1 m)

3669 21 3669 22 3669 23 3669 24 3669 25

3669 26 7009 98/44 7078 02 7078 21

7078 31/32/33/34 700932/WE 700933/WE 700967 700968 7078 23/24

* Pentium is a registered trademark of Intel Corporation.
* Windows 95/98/Me/XP, Windows NT 4.0/2000 Pro, MS-Excel, and MS-Word are registered trademarks of Microsoft Corporation

External Dimensions

Unit: mm

WE500 Weight Approx. 6.5 kg (excluding modules)

WE900 Weight Approx. 11kg (excluding modules)

Module   WE7035/WE7036 Weight Approx. 0.3 kg

For detailed specifications,
check the website at the following address.

http://www.yokogawa.com/tm/

NOTICE
● Before operating the product, read the instruction manual thoroughly for proper and safe operation.
● If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa sales offices.

YOKOGAWA ◆

YOKOGAWA CORPORATION OF AMERICA
20420 Century Blvd. Germantown, Maryland 20874, U.S.A.
Phone: (1)-301-916-0409, Fax: (1)-301-916-1498

YOKOGAWA EUROPE B.V.
Databankweg 20, 3821 AL, Amersfoort, THE NETHERLANDS
Phone: (31)-33-4641858, Fax: (31)-33-4641859

YOKOGAWA ENGINEERING ASIA PTE. LTD.
5 Bedok South Road, Singapore 469270
Phone: (65)-62419933, Fax: (65)-62412606

YOKOGAWA MEASURING INSTRUMENTS KOREA CORP.
Phone: (82)-2-551-0660, Fax: (82)-2-551-0665

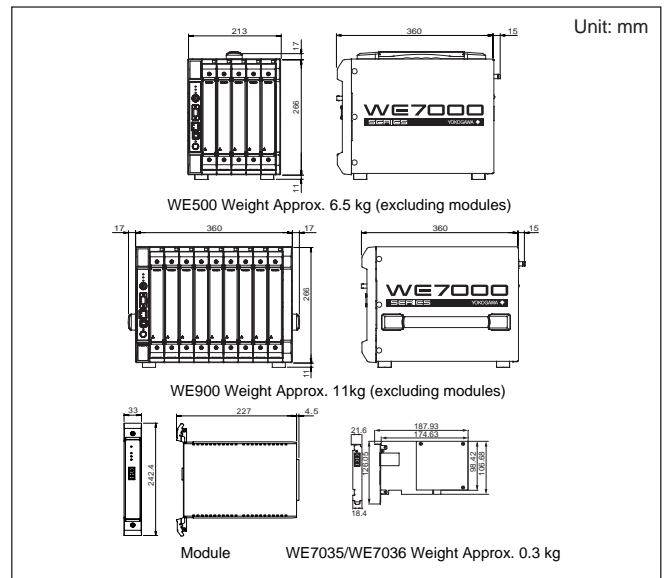**YOKOGAWA SHANGHAI TRADING CO., LTD.**
Phone: (86)-21-6880-8107, Fax: (86)-21-6880-4987

YOKOGAWA ELECTRIC CORPORATION
Communication & Measurement Business Headquarters
2-9-32 Nakacho, Musashino-shi, Tokyo, 180-8750 Japan
Phone: (81)-422-52-6768, Fax: (81)-422-52-6624

E-mail: tm@csv.yokogawa.co.jp

Represented by :

MM-14E

[Ed : 06/b]   Printed in Japan, 501(KP)