ScopeCorder

DL750

- Up to 16 analog channels and 16-bit logic input
- Up to 1 GigaWord total memory
- GIGAZoom function
- DualCapture function
- 10.4-inch SVGA color TFT liquid crystal display
- 10 MS/s, 12-bit A/D resolution, 2-channel isolation module
- Floppy disk, ZIP® disk and PC card drives available
- 20-GB internal hard drive (optional)

New Functions/New Modules

- DSP math function (optional)
- Voice memo function
- Wave window trigger
- High-speed 10 MS/s 12-bit non-isolation module (2 CH)
- Strain modules (2 CH)
- High-voltage 100 kS/s 16-bit isolation module (with RMS) (2 CH)

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ScopeCorder: A new measurement tool combining the functions of an oscilloscope for capturing instantaneous phenomena, and a data recorder for monitoring long-term trends.

Modules
Leading-Edge Mounting Technology and ASICs Reduce the Size of 2-Channel Modules

- High-Speed 10 MS/s 12-Bit Isolation Module (701250)
  Broad bandwidth (3 MHz) and high accuracy (0.5%) inputs
- High-Speed 1 MS/s 16-Bit Isolation Module (701251)
  High resolution inputs combined with high-sensitivity (1 mV/div)
- Temperature/High-Precision Voltage Module (701265)
  100 Hz frequency range, high-accuracy (0.08%) voltage measurements, and an ultra high-sensitivity range value (100 µV/div)
- High-Speed 10 MS/s 12-Bit Non-Isolation Module (701255)
  Non-isolated model with the same performance as the model 701250
- High-Voltage 100 kS/s 16-Bit Isolation Module (with RMS) (701260)
  850 V (DC+ACpeak) direct input, RMS mode
  Accuracy of 0.25%
- Strain Modules (701270 & 701271)
  NDIS-type (701270) and DSUB-type (701271)
  Wide range of bridge voltages (2 V, 5 V, & 10 V)
  Accuracy of 0.5%
Innovative Solutions for Long-Term Recording

GIGAZoom Function for Instantaneous Full-Length Display of 1 GW of Data

A large-scale, high speed ASIC was created to give the DL750 the ability to show the entire 1 GW of data on the display in real time. Two zoom windows are available for displaying up to 500 MW of data. Zooming can be done in real-time or after data recording has stopped.

DualCapture: A Powerful Tool for Durability Test Data Analysis

During durability testing, it is necessary to monitor the long-term trends of your data as well as capture the high speed transients that might occur. This presents a challenge as trend data is usually recorded at a slower sampling speed that might miss the transient phenomena. To meet this challenge, the DL750 offers the DualCapture function.

Using DualCapture, you can now record your trend data with a slow sampling speed and still be able to capture the transient phenomena with a faster sampling speed.

- Integration of a High-Speed Sampler (Oscilloscope) and Low-Speed Sampler (Recorder) in a Single Unit
- High-speed sampler: Trigger on abnormal high-speed phenomena
- Low-speed sampler: Roll recording (trend recording)
- Separate Memory Management for Each Sampler
  - Maximum memory for low-speed sampler: 100 MW
  - Maximum memory for high-speed sampler: 10 kW × 100 screens
- High-Speed Sampling Triggered Only by Abnormal Phenomena Occurring During Long-Term Observation (Low-Speed Sampling)
  - Effective for separately capturing data at high speed during measurements.

- Long Memory Equivalent to 1 Teraword
  - To acquire many hours of data at the higher sampling rate (10 MS/s) would require Terawords of memory
  - (8 hr × 240 hr) × 60 min × 60 sec × 10 MS/s × 16 channels
  - = 4.6-138 TW

The waveform shown above was captured at a sampling rate of 50 kS/s. The occurrence of noise can be confirmed in the graph, but the time resolution is too low to capture the waveform accurately.

With DualCapture, the user sets triggers for capturing sudden phenomena. Up to 100 phenomena can be collected in a memory length of 10 kW at a maximum sampling rate of 10 MS/s.

Voice Memo Function: Save Audio Comments along with Waveform Data and Images

Enables You to Record and Playback 2 Types of Voice Data

- **Voice Memo**
  - Simply press a switch to record your voice while simultaneously recording waveforms. Make multiple recordings per waveform (100 seconds total, min. 3 seconds per recording).

- **Voice Comment**
  - Record and save an explanatory comment (approx. 3-10 seconds) together with your image files.

The 701951 Earphone-Mic (with PUSH switch) is required to record voice memos and to listen to recorded voice memos.

<table>
<thead>
<tr>
<th>Sample Rate</th>
<th>Maximum Recording Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seconds</td>
</tr>
<tr>
<td>10 MS/s</td>
<td>100 seconds</td>
</tr>
<tr>
<td>1 MS/s</td>
<td>600</td>
</tr>
<tr>
<td>100 kS/s</td>
<td>9000</td>
</tr>
<tr>
<td>10 kS/s</td>
<td>72000</td>
</tr>
<tr>
<td>1 kS/s</td>
<td>864000</td>
</tr>
<tr>
<td>200 S/s</td>
<td>2592000</td>
</tr>
</tbody>
</table>

Amount of time data can be recorded with 1 GW memory.
Accurately Measure and Display Complex Signals

For Accurately Capturing Complex Signals or Long Waveforms
The DL750’s standard memory capacity is 50 MW (2.5 MW per channel). This can be expanded (optional) to as much as 1 GW (50 MW per channel).

Benefits of GigaWord Recording
You can record data for 10 days (1 day/div) on the main screen, while displaying 1-second recordings (100 ms/div) in real time on the zoom screen. The large memory capacity lets you capture all of your data while still maintaining a sample rate fast enough to see any abnormal phenomena.

Efficient Memory Use
Sufficient memory length is available even when 16 channels are used, so you can conduct extended observations on multiple channels (2.5 MW per channel with standard memory, 50 MW per channel with maximum memory).

A Wide Range of Trigger Functions for Accurately Capturing a Variety of Waveforms
Having a wide range of triggers is of course very useful for obtaining stable observations of variety of different waveforms. In addition, the GUI menu makes setting trigger conditions easy and intuitive.

Simple and Enhanced Triggers
- **Edge trigger**: Set a regular edge trigger
  - A + B (N): Triggers the n-th time that condition B goes true after condition A has gone true.
  - A Delay B: Triggers if condition B goes true after condition A has gone true and an interval at least equal to the delay setting has elapsed.
  - Edge on A: Activates an edge trigger on another input during the interval when trigger condition A is true.
  - OR: Triggers when any one of the individual channel conditions set with the patterns goes true.
  - B > TIME: Triggers when the pulse width is longer than the set time.
  - B < TIME: Triggers when the pulse width is less than the time.
  - B TIME OUT: Triggers when a preset time-out time is reached.
  - Period: Triggers when a trigger source enters or leaves a level set by two points.
  - Wave Window: Triggers when a signal leaves an automatically-defined “wave window” that surrounds the waveform.

Action-On Trigger
Automatically Save Measured Data
When this trigger is activated, the DL750 performs a specified action each time a waveform is captured and displayed on the screen. This feature is useful for saving data automatically and reliably (e.g., for data collection in automated, continuous tests).

Manual Trigger
A Trigger Can Be Activated with Press of a Button.
With this feature, a trigger can be executed whenever you like, separate from the preset trigger conditions.

Wave Window Trigger
Automatically Triggers on Abnormalities in Power Supply Waveforms
This function comes standard with the DL750 to allow observation power supply waveforms. In addition to traditional power supply troubles, such as sudden outages, sags, and surges, you can make efficient real time observations of frequency fluctuations and voltage drops. This trigger activates when a signal exceeds the allowable values determined by comparing a defined waveform (wave window) with an actual waveform in real time. Comparative waveforms can be automatically produced in real time based on measured waveforms. Detection on all 16 analog channels is available (with OR conditions).

History Memory and Smart Search for Effective Access to Large Amounts of Captured Data

History Memory and History Search (Zone Search)
Occasionally, you may capture an abnormal waveform and then have it quickly disappear from the display as new data is acquired. It is not always possible to manually Start and Stop data acquisition to catch the abnormal waveform and have it displayed.

The **History Memory** function was designed for such situations. It divides long memory into a number of blocks and automatically stores up to 2000 previously captured waveforms. This means you can reliably save displayed waveforms to memory even when there are phenomena for which trigger conditions cannot be set.

The **Zone Search** function lets you define zones on the screen, and find all previously captured waveforms that either pass or don’t pass through the user-defined zone. Up to four zones can be defined.

Search (Edge Search) and Zoom
The **Edge Search** counts rising and falling edges in the captured data. It automatically searches for the desired edges and displays them on a zoom screen.
Analyze Captured Waveform Data

DSP Channel Real-Time Math Function (with the /G3 Option)

New functions are now available with the DL750. Six digital signal processing (DSP) channels have been added. The DSP channels enable you to perform math and digital filtering in real-time while acquiring waveforms. Each DSP channel can perform up to four arithmetic operations and filtering at high speed, without slowing down waveform acquisitions.

Features:
- Real-time display of calculated waveforms in roll mode
- Triggers on calculated waveforms
- Calculated parameters such as cutoff of digital filtering and frequency can be changed in real-time
- Simultaneously display up to 16 channels (16 analog CH + 6 DSP CH)
- Provides the same memory length as with analog channels
- Arithmetic calculations between channels (addition, subtraction, multiplication, division), digital filtering (LPF, BFP, HPF), differentiation, and integration

Automatically Measure Waveform Parameters

Easily Find and Display Waveform Frequency, Rise Time, and Other Parameters

Waveform parameters such as voltage, frequency, and RMS are measured automatically. In addition to general parameter measurement function, the DL750 comes standard with functions such as the following:

Cycle Statistical Calculation

This function calculates statistical information about the waveform. Maximum value, minimum value, average value, and standard deviations are calculated automatically for each waveform parameter. In addition, you can instantaneously search for the cycle containing the maximum value and display it on the zoom screen. This cycle statistical calculation greatly improves your insight enabling you to analyze transient phenomena captured using the long recording memory.

Linear Scaling

Convert Measured Voltage Values to Physical Values for Direct Reading

This function automatically performs the following calculation based on a scaling coefficient \( A \) and offset \( B \): \( Y = AX + B \) (\( X \) is a measured value and \( Y \) is the scale value). The results of this calculation are reflected in cursor measurement values and waveform parameter measurement values. In addition, user-determined scale values can be defined for any two measurement, \( P1 \) and \( P2 \).

User-Defined Math Function (with the /G2 Option)

Perform Complex Calculations

The DL750 comes standard with basic arithmetic operations (addition, subtraction, multiplication, division), FFT (power spectrum), and phase shifting (calculating a phase shift between channels). For more flexible and complex calculations, an optional user-defined math function package is available. With this option, you can define up to eight different formulas using a wide range of functions, including a triangle function, differentiation, integration, square root, digital filter, and seven different FFT functions. You can also specify the results of a calculation as a parameter in another formula. With these capabilities, the DL750 makes it easy to perform complex calculations that, in the past, could only have been done by loading data onto a PC.

GO/NO-GO Judgment

Automatic Waveform Determinations

With this function, the user specifies a zone or waveform parameter for a measured waveform. The measurement signal is evaluated and a specified action is performed automatically based on the evaluation. Available actions include outputting a screenshot to a specified destination, saving waveform data to a specified storage medium, sounding a buzzer, and sending email.
Display and Data Recording Functions

Real-Time Hard Drive Recording (with the /C8 Option)

Recorder-Like Real-Time Data Recording over Extended Periods
With the optional internal hard drive, you can record measurements to the hard drive in real time. This makes it easier to manage and analyze data using PCs and other tools. Maximum data capacity: 1 GW
Maximum sampling rate: 100 kS/s (using 1 channel only)

Memory Backup Function

Protects Your Data Even If the Power Supply Goes Out
This function backs up about 10 hours of data saved to the acquisition memory immediately prior to power loss. Memory backup helps you avoid losing important data even if the power supply is unstable and gets cut off. (Backup time varies according to the usage environment. Four AA batteries are required for memory backup.)

Snapshot Function

Enables On-Screen Waveform Comparisons
Using the snapshot function, you can keep the currently displayed waveform with the touch of a button. Snapshots are useful for comparing a reference waveform with an input waveform. In addition, snapshots can be saved to and loaded from the storage media.

X-Y Display Function

Display an Overlay of up to Four X-Y Displays
This function lets you display multiple X-Y plots together, making relative phase comparisons easy. The X-Y display function is a powerful tool for applications such as evaluating DC motors based on a Lissajous waveform.

All-Channel Setup Menu

Quickly View the Setup of All Channels
This menu lets you review and modify all of the channel setups from a single screen display. Parameters such as voltage axis sensitivity, screen scale settings, and linear scaling can be configured for each channel.

Wide Waveform Display

Increase the Viewing Area of Display
With the SVGA color TFT liquid crystal display, the number of display pixels has been greatly increased. For wide waveform display, set the resolution to 750 × 512 pixels.
Complete Connectivity

- Voice memo input/output
  Earphone-Mic input/output
  Volume control for recording and playback
- GP-IB
- Ethernet (optional)
  Supports 100BASE-TX and 10BASE-T
- Video Out (SVGA)
  Outputs a video signal so waveform can be viewed on an external monitor
- SERIAL (RS232)
- Logic input (8 bits × 2)
- External trigger input
- Internal hard drive (optional):
  20 GB (FAT32)
- Drive (select one of three options)
  • Floppy
  • Zip® (250 MB/100 MB)
  • PC card (Flash ATA card, Compact Flash, Microdrive)¹
    (up to 5 GB)
- SCSI interface
- USB—PC jack (complies with USB Rev. 1.1)
  For use with a USB mouse/keyboard/printer
- USB peripheral jacks¹
- GO/NO-GO I/O
  External start/stop
- Voice memo input/output
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  For use with a USB mouse/keyboard/printer
- USB peripheral jacks¹
- GO/NO-GO I/O
  External start/stop
- Trigger output/external clock input (switch)
  Outputs TTL level trigger signals
  External clocks as fast as 1 MHz can be used (with 701250 or 701251).

1. Ask for information on compatible products.

USB

- Connecting to a PC
  (Supported operating systems: Windows 98 SE, Windows 2000 Pro, Windows Me)
  Just as for RS232 and GB-IB, you can write your own custom programs in Visual C++ 6.0 or Visual Basic 6.0 to control the DL750 through a USB interface.
  PC communications are made easy with the Waveform Viewer and Wirepuller software programs.

- Connecting USB Peripheral Equipment
  USB keyboards, USB mouse and USB printers can be directly connected to the DL750.

Ethernet (Optional)

- Connecting to a PC
  Web Server and FTP Server
  The DL750 has a variety of server functions that let you perform remote controls or download waveform data and screen images onto a PC. You can also access the DL750 through the Internet Explorer. Just as for RS232 and GB-IB, you can write your own custom programs in Visual C++ 6.0 or Visual Basic 6.0 to control the DL750 through a USB interface.

IMAGE SAVE Key and Thumbnail Screen Images

Simply press the IMAGE SAVE key to save image data to a CompactFlash card or other storage media. The saved image data (PNG, JPEG, BMP, or PostScript format) can then be displayed on the DL750’s screen as thumbnails.

The PRINT key lets you output images to the DL750’s build-in printer, a USB printer, or a network printer.
Advanced Networking and PC Connectivity

**Web Server Functions**

Connect the DL750 to your PC through the Ethernet connection. This allows for easy remote operation using Internet Explorer.

**FTP**

You can easily copy and paste files to and from a PC and the instrument's flash memory or other storage media.

**Data Capture**

Using Internet Explorer, you can periodically or manually download screen images to a PC for remote waveform monitoring. You can also download waveform data, start or stop a measurement, or setup a split display all from a PC.

**Software for Waveform Measurement on a PC**

**Wirepuller**

The Wirepuller software program displays a screen image of the DLs front panel on your PC so that you can monitor waveform signals. In addition, you can use the PC's mouse and keyboard to control the DL. The DL can be controlled via an Ethernet, USB, or GP-IB.

This software program can be downloaded from the following URL (requires registration):

http://www.yokogawa.com/tm/Bu/DLsoft/wire/

Further details are available at the YOKOGAWA web site.

**Software for Using Your PC to Check Waveform Data Captured in Long Memory**

**Waveform Viewer for DL Series**

The Waveform Viewer software program lets you view waveform signals on your PC just as they appear on the DL screen. This includes zoom display, X-Y display and the history memory thumbnail displays. In addition, data can be converted to CSV format for use in programs like Excel.

A trial version of this software program can be downloaded from the following URL:

http://www.yokogawa.com/tm/Bu/700919/

Further details are available at the YOKOGAWA web site.

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**Main Unit Specifications**

**Basic Specifications**

- **Input**
  - Type: Plug-in module (Each unit has a build-in A/D converter)
  - Slots: 8
  - Logic inputs: 16 (8 bits × 2)

- **Horizontal**
  - Maximum record length: 2.5 MW/CH, 50 MW total (standard)
    - 10 MW/CH, 250 MW total (with /M1 option)
    - 25 MW/CH, 500 MW total (with /M2 option)
    - 50 MW/CH, 1 GW total (with /M3 option)

  - Time axis accuracy:
    - ±0.005%
    - 500 ns to 5 sec/div (in steps of 1, 2, or 5), 10 sec/div, 20 sec/div, 30 sec/div
    - 3, 4, 6, 8, 10, 20, 30 sec/div
    - 1 to 10 min/div (1 min steps), 12 min/div, 15 min/div, 30 min/div
    - 1 to 10 h/div (1 h steps), 12 h/div

  - Sweep time:
    - 1 day/div, 2 days/div, 3 days/div

- **Acquisition modes**
  - Normal
  - Envelope
  - Box average
  - Averaging
  - Roll

- **Trigger**
  - Modes: AUTO, AUTO LEVEL, NORMAL, SINGLE, SINGLE (N), LOG 0 to 100% (in 0.1% step)
  - Pretrigger
  - Simple trigger source
  - Slope selection
  - Enhanced trigger source
  - Enhanced trigger type

- **Screen updating rate**
  - Maximum 30 screens/sec for a single waveform

- **Display**
  - Typical operating conditions: Ambient temperature of 23°C ± 5°C, ambient humidity (RH) of 55 ± 10%
Main Unit Specifications

1. The LCD may contain some pixels that are always off or always on. In addition, brightness may vary due to the characteristics of the liquid crystal display. This is not an indication of any problem with the display.

Recorder

- Built-in printer
- Printing method: Thermal line-dot printing
- Paper width: 112 mm
- Effective recording width: 104 mm
- Functions: Screen printing, long printing
- Real-time hard drive recording (with /C8 option)
- Data capacity: 1 GB (for one time record)
- Maximum sampling rate: 100 kS/s (using 1 channel)

DualCapture

This function captures the same waveform data at two different sampling rates. Main (low-speed) maximum sampling rate: 10 kS/s, Sub (high-speed) maximum sampling rate: 100 MS/s.

Analysis Functions

- Channel-to-channel calculation function
- Definable math waveforms: 8
- Calculable record length: 800 kS (using MATH1 only)
- Standard operators: Addition, subtraction, multiplication, division, binary, conversion, phase shifting, FFT
- FFT type: PS (Power Spectrum)
- Number of points: 1000, 2000, 10,000
- Window functions: Rectangular, Hanning, Flat-Top
- User-defined math function (with /G3 option)
- Operators: AB, SQR, LOG, EXP, NEG, SIN, COS, TAN, ATAN, PH, DIF, DFIF, INTG, BIN, P2, P3, F1, F2, FV, PWHL, PWHL, PWHL, PWXX, FILT1, FILT2, HLB, MEAN, MAG, LOGMAG, PHASE, REAL, IMAG

DSP Channel Function (with the /G3 option)

- DSP channels: 6
- Maximum sampling rate: 100 kS/s (when exceeding 100 kS/s, the sampling rate is resampled at 100 kS/s)
- Operators: Calculation between channels (addition, subtraction, multiplication, division), differentiation (w/ LFF), integration, digital filtering (LPF/HPF/BPF, FIR type, IIR type, variable cutoff frequency)
- Digital filtering cutoff setting range: FIR type: 0.2 to 30% of sampling frequency
- Calculation delay: 1

Waveform Measurement Functions

- Cursors Types: Horizontal 2 cursors, Vertical 2 cursors
- Marker: Four markers
- Degree: Cursor measurement on the horizontal axis is displayed in a degree. (for TV display only)
- H/V: (for XY display only)
- Automatic measurement of waveform parameters
- Maximum number of measured parameters: 24
- Measured parameters: P-P, Max, Min, High, Low, Avg, Rms, Amp, StdDev, +Oshoth, -Oshoth, Rise, Fall, Freq, Period, +Duty, +Width, -Width, Pulse Burst1, Burst2, Avg Freq, Avg Period, Delay, Int1TY, Int2TY, Int1XY, Int2XY
- Cycle statistical process
- Maximum number of cycles: 24,000 (for one parameter)
- Maximum number of parameters: 24,000 (total measured results)
- Statistical values: Maximum/minimum/average/standard deviations/number of samples
- Maximum measurement range: 10 MW
- Search function: Edge, voice, auto scroll
- History search function: Zone
- GO/NO-GO Judgment Parameter: Make judgments using combinations of 16 waveform parameters.
- Actions: One or more of the followings: outputs screen image data, saves waveform data, sounds a buzzer, sends email

Screen Data Output (Printer)

- Destinations: Built-in printer, external USB printer, or network printer (with /C10 option)
- Formats: Normal, Long
- Outputs hard copy of screen shot. Zooms displayed waveform along time axis and outputs (The zoom factor differs depending on the time/div.)

Screen Data Output (Image Saving)

- Destinations: Installed drive (floppy drive, Zip® drive, or PC card), external SCSI drive, internal hard drive (with /C8 option), network drive (with /C10 option)
- Formats: PNG, JPEG, BMP, PostScript

External I/O

- LOGIC input specifications
- Input points: 8 bits x 2
- Maximum sampling rate: 10 MS/s
- Compatible probes: 8-bit non-isolated (700986), 8-bit isolated (700987)
- EXT TRIG IN/EXT TRIG OUT
- Connector: RCA pin jack
- Input level: TTL (0 to 5 V)
- Input frequency: Up to 1 MHz (for module 701250/701251/701255), up to 100 kHz (for module 701260/701270/701271, DSP-CH), up to 500 Hz (for module 701265)
- Communication interface: GP-IB, USB peripheral equipment jacks (USB keyboards and USB printers), USB (complies with Rev. 1.1, for connection to PC), Ethernet (complies with 100BASE-TX and 10BASE-T; with /C10 option), serial (RS232), and SCSI
- GO/NO-GO I/O
- Connector type: Modular jack (RJ12)
- I/O level: TTL (0 to 5 V)
- Probe power terminal (with /P4 option)
- Maximum number of probes powered: 4
- Compatible probes: Current probes 700937 (15 Apeak) and 701930 (150 Arms)
- Maximum number of current probes that can be used at one time: 4 (for module 700937), 2 (for module 701930)

Voice Memo Function

- Voice memo Record (roll mode): Flexible: Multiple recording (min. 3 sec up to 100 sec, total 100 sec)
- Fixed: Select from 5 sec x 20, 10 sec x 10, 25 sec x 4, 50 sec 2, 100 sec x 1
- Save: Save together with waveform data (binary, same file)
- Playback: Voice data loaded on the main unit is outputted from microphone terminal and speaker output terminal (GO/NO-GO)
- Voice comment
- Record: 3 to 100 sec
- Save: When image saving is executed (separate file)
- Playback: Playback from microphone terminal and speaker output terminal (GO/NO-GO)

Acquisition Memory Backup

- Batteries: Four AA alkaline dry cells (AA/R6) / US (type name: LR6) or four nickel metal-hydride rechargeable batteries
- Backed up data: Acquisition waveform, waveform data, voice data
- Backup duration (reference value): Approximately 10 hours (with /M3 option)
- 2. Actual backup duration will vary according to the usage conditions.

Media Drives

- Internal media drives: Floppy drive, Zip® drive, or PC card (choose one), and 20 GB hard drive (with /C8 option)

General Specifications

- Rated supply voltage: 100 to 120 VAC/200 to 240 VAC (automatically switched)
- Rated frequency: 50/60 Hz
- Power consumed: 1500 VAC for one minute across power supply and ground
- Insulating resistance: 10 MΩ or greater at 500 VDC across power supply and ground
- Exterior: 355 x 250 x 180 mm (WHD), excluding knobs and protrusions
- Weight: Approx. 6.5 kg (main unit with full options, including M3, C8, C10, and P4) *
- Approx. 9 kg (main unit and eight 701250 modules)

For detailed specifications, go to the following URL: http://www.yokogawa.com/tm/Bu/DL750/
### Plug-In Module Specifications

#### High-Speed 10 Ms/s 16-Bit Isolation Module (701251)

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<thead>
<tr>
<th>Input channels</th>
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</thead>
<tbody>
<tr>
<td>Input couplings</td>
<td>A, DC, GND</td>
</tr>
<tr>
<td>Maximum sampling rate</td>
<td>10 Ms/s</td>
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<tr>
<td>AD conversion resolution</td>
<td>12 bits (150 LSB/div)</td>
</tr>
<tr>
<td>Input type</td>
<td>Isolated unbalanced</td>
</tr>
<tr>
<td>Frequency range (–3 dB)</td>
<td>up to 3 MHz</td>
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<tr>
<td>Input range</td>
<td>(10:1) 10 mV/div to 200 V/div (in steps of 1, 2, or 5)</td>
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<tr>
<td>DC offset</td>
<td>±5 mV</td>
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<tr>
<td>Temperature coefficient</td>
<td>±0.05% of 10 div</td>
</tr>
<tr>
<td>Gain</td>
<td>1 M ± 1%, approx. 35 pF</td>
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#### High-Speed 10 Ms/s 12-Bit Isolation Module (701255)

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<td>Maximum sampling rate</td>
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<td>AD conversion resolution</td>
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<td>Input type</td>
<td>Isolated unbalanced</td>
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<tr>
<td>Frequency range (–3 dB)</td>
<td>up to 3 MHz</td>
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<tr>
<td>Input range</td>
<td>(10:1) 10 mV/div to 200 V/div (in steps of 1, 2, or 5)</td>
</tr>
<tr>
<td>DC offset</td>
<td>±5 mV</td>
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<tr>
<td>Temperature coefficient</td>
<td>±0.05% of 10 div</td>
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<tr>
<td>Gain</td>
<td>1 M ± 1%, approx. 35 pF</td>
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#### High-Voltage 100 kV/s 16-Bit Isolation Module (with RMS) (701260)

<table>
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<tbody>
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<td>Input couplings</td>
<td>A, DC, GND, AC-RMS, DC-RMS</td>
</tr>
<tr>
<td>Maximum sampling rate</td>
<td>100 kVs</td>
</tr>
<tr>
<td>AD conversion resolution</td>
<td>16 bits (2400 LSB/div)</td>
</tr>
<tr>
<td>Input type</td>
<td>Isolated unbalanced</td>
</tr>
<tr>
<td>Frequency range (–3 dB)</td>
<td>up to 3 MHz</td>
</tr>
<tr>
<td>RMS measurement mode</td>
<td>DC, 40 Hz to 1 kHz</td>
</tr>
<tr>
<td>Input range</td>
<td>(10:1) 20 mV/div to 200 V/div (in steps of 1, 2, or 5)</td>
</tr>
<tr>
<td>DC offset</td>
<td>±5 mV</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±0.05% of 10 div</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>±200 to +1300°C</td>
<td>±0.5% of reading + 1.5°C (typical)</td>
</tr>
<tr>
<td>±200 to +800°C</td>
<td>expt. –200°C to 0°C</td>
</tr>
<tr>
<td>±200 to +1100°C</td>
<td>±0.2% of reading + 1.5°C</td>
</tr>
<tr>
<td>±200 to +400°C</td>
<td>±0.2% of reading + 1.5°C</td>
</tr>
<tr>
<td>±200 to +900°C</td>
<td>±0.2% of reading + 1.5°C</td>
</tr>
<tr>
<td>±200 to +400°C</td>
<td>±0.2% of reading + 1.5°C</td>
</tr>
<tr>
<td>0°C to 1300°C</td>
<td>±0.1% of reading + 2°C</td>
</tr>
</tbody>
</table>

### Temperature/Humidity Measurement Module (701265)

<table>
<thead>
<tr>
<th>Input channels</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input couplings</td>
<td>TC (thermocouple), DC, GND</td>
</tr>
<tr>
<td>Input type</td>
<td>Isolated unbalanced</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±0.02% of 10 div/°C</td>
</tr>
<tr>
<td>Voltage accuracy</td>
<td>±0.02% of 10 div/°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement range/measurable range</th>
<th>±0.02% of 10 div/°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>±10 to 50 K 200°C (±0.1% of reading + 1°C)</td>
<td></td>
</tr>
<tr>
<td>±50 to 300 K 400°C (±0.1% of reading + 1°C)</td>
<td></td>
</tr>
</tbody>
</table>

### Strain Module (NDIS) (701270)

<table>
<thead>
<tr>
<th>Input channels</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input couplings</td>
<td>DC bridge input (automatic balancing), balanced differential input, DC amplifier (floating)</td>
</tr>
<tr>
<td>Maximum allowable input (1 kHz or less)</td>
<td>42 V (DC) (w/ 5 m cable)</td>
</tr>
<tr>
<td>Input range (for 10 div display)</td>
<td>100 µV/div to 10 V/div (in steps of 1, 2, or 5)</td>
</tr>
<tr>
<td>Input connector</td>
<td>Binding post</td>
</tr>
<tr>
<td>Input impedance</td>
<td>Approx. 1 MΩ</td>
</tr>
<tr>
<td>Input filter</td>
<td>OFF, 2 Hz, 8 Hz, 30 Hz</td>
</tr>
<tr>
<td>Temperature coefficient (for voltage)</td>
<td>±0.1% of 10 div/°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement range/measurable range</th>
<th>±0.1% of 10 div/°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>±100 mV to 50 V (±0.5% of reading + 1°C)</td>
<td></td>
</tr>
<tr>
<td>±500 mV to 2500 V (±0.5% of reading + 1°C)</td>
<td></td>
</tr>
</tbody>
</table>

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* It is very dangerous to use cables that do not comply with the safety standard. Please use 701901 (1:1 safety adaptor lead) or 700929 (10:1 safety probe), which complies with the safety standard.
Plug-In Module Specifications

**Strain Module (DSUB, Shunt-call) (701271)**

- **Input channels**: 8
- **Input types**: DC bridge input (automatic balancing), balanced differential input, DC amplifier (floating)
- **Automatic balancing method**: Electronic auto-balance
- **Bridge voltages**: Select from 2 V, 5 V, 10 V
- **Gauge resistances**: 120 to 1000 Ω
- **Bridge voltages**: Select from 2 V, 5 V, or 10 V
- **Recommended bridge head (DSUB, Shunt-call) (sold separately)**
- **Accessory (a set of connector shell for solder connection)**
- **Input connector**: DSUB
- **Internal filter**: OFF, 1 kHz, 100 Hz, 10 Hz
- **Response time**: 1 µs or less
- **Maximum input voltage (1 kHz or less)**
- **Threshold levels**: DC input 10 V DC, AC input 10 V AC

**Isolated Logic Probe (700987)**

- **Number of inputs**: 8
- **Input types**: Isolated (all individual bits are isolated)
- **Input connector**: Safety connector (banana plug) × 8
- **Input switching capability**: AC/DC input switching for each bit
- **Applicable input ranges**: DC input 10 V DC, AC input 10 V AC
- **Threshold levels**: DC input 6 V DC ± 50%, AC input 50 V AC ± 50%
- **Response times**: DC input 1 ms or less, AC input 20 ms or less
- **Maximum input voltage (1 kHz or less)**
- **Maximum allowable in-phase voltage**: 250 Vrms (CAT I and II)
- **Maximum allowable voltage between bits**: 250 Vrms (CAT I and II)
- **Input impedance**: Approximately 100 kΩ

**Accessories**

- Isolated probe (700929)
- Passive probe for DL730 (701940)
- Alligator clip (701954)
- Differential probe (700924)
- High-speed logic probe (700966)
- Isolated logic probe (700987)
- Bridge head (701955 & 701956)
- Conversion adaptor (366928)
- Earphone Mic (w/ PUSH switch) (701951)

Measuring inverter I/O signals and control signals using the 10 MS/s high-speed 12-bit isolated module, current probe 700937 and isolated probe 700929

The model 700937 can be powered when the /P4 option is selected.

**Warning**

Do not exceed the maximum input voltage, withstand voltage, or surge current. In order to prevent electric shock, be sure to ground the main unit. In order to prevent electric shock, be sure to tighten the module’s screws. Electrical protective functions and mechanical protective functions will not be effective.
### DL750 Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model/Options</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701210</td>
<td>DL750 ScopeCorder&lt;sup&gt;®&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Power cable</td>
<td>I</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>VDE standard</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>BS standard</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>SAA standard</td>
</tr>
<tr>
<td>Internal media drive</td>
<td>-J</td>
<td>Floppy drive&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>-J2</td>
<td>Zip&lt;sup&gt;®&lt;/sup&gt; drive&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>-J3</td>
<td>PC card interface&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td>Help language</td>
<td>-HE</td>
<td>English and Japanese online help&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>-HJ</td>
<td>Japanese and English online help&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td>Memory expansion</td>
<td>F</td>
<td>Memory expansion to 10 MW&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>M1</td>
<td>Memory expansion to 25 MW&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>M2</td>
<td>Memory expansion to 50 MW&lt;sup&gt;®&lt;/sup&gt;</td>
</tr>
<tr>
<td>Others</td>
<td>C8</td>
<td>Internal 20 GB hard drive (FAT32)</td>
</tr>
<tr>
<td></td>
<td>C10</td>
<td>Ethernet interface</td>
</tr>
<tr>
<td></td>
<td>G2</td>
<td>User-defined math function</td>
</tr>
<tr>
<td></td>
<td>G3</td>
<td>DSP channel function</td>
</tr>
<tr>
<td></td>
<td>P4</td>
<td>Probe power (4-output)</td>
</tr>
</tbody>
</table>

1. Plug-in modules are not included.  2. Choose one.  3. Choose one.  4. Choose one.

#### Standard Accessories

<table>
<thead>
<tr>
<th>Product</th>
<th>Order Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cable</td>
<td>1</td>
</tr>
<tr>
<td>User’s manuals</td>
<td>1</td>
</tr>
<tr>
<td>Transparent cover</td>
<td>1</td>
</tr>
<tr>
<td>Printer roll paper</td>
<td>10 meters</td>
</tr>
<tr>
<td>Cover panels</td>
<td>8</td>
</tr>
<tr>
<td>Rubber feet</td>
<td>4 per set</td>
</tr>
<tr>
<td>Soft case</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Plug-In Module Model Numbers<sup>®</sup>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701250</td>
<td>High-speed 10 MS/s 12-bit isolation module (2 CH)</td>
</tr>
<tr>
<td>701251</td>
<td>High-speed 16-bit isolation module (2 CH)</td>
</tr>
<tr>
<td>701255</td>
<td>High-speed 10 MS/s 12-bit non-isolation module (2 CH)</td>
</tr>
<tr>
<td>701260</td>
<td>High-voltage 10 kV/s 16-bit isolation module (with RMS) (2 CH)</td>
</tr>
<tr>
<td>701265</td>
<td>Temperature/high-precision voltage module (2 CH)</td>
</tr>
<tr>
<td>701270</td>
<td>Strain module (NDIS, 2 CH)</td>
</tr>
<tr>
<td>701271</td>
<td>Strain module (DSUB, Shunt-cal, 2 CH)</td>
</tr>
</tbody>
</table>

1. Probes are not included with any modules. Probes must be purchased separately as accessories if required.

### Related Products

#### DL7440/DL7480 Digital Oscilloscopes

- **Model No.** 701901  1000 Vrms CAT II for 701250, 701251, and 701260 (10:1)  1.1 BNC safety adapter/lead (with combination with followings)
- **Model No.** 701902  10000 Vrms CAT II for 701250, 701251, and 701260 (10:1)
- **Model No.** 701903  10000 Vrms CAT II (2 per set, 1:1 BNC safety adapter/lead)
- **Model No.** 701904  10000 Vrms CAT II (2 per set, 1:1 BNC safety adapter/lead: 30 V)
- **Model No.** 701905  10000 Vrms CAT II (2 per set, 1:1 BNC safety adapter/lead: 30 V)

#### DL1620/DL1640/DL1640L Digital Oscilloscopes

- **Model No.** 701907  10000 Vrms CAT II (BNC-BNC)  1:1 BNC safety adapter/lead
- **Model No.** 701908  10000 Vrms CAT II (BNC-BNC)  1:1 BNC safety adapter/lead (with combination with followings)

### Yokogawa’s Approach to Preserving the Global Environment

Yokogawa’s products are developed and produced in facilities that have received ISO14001 approval.

In order to protect the global environment, Yokogawa’s electrical products are designed in accordance with Yokogawa’s Environmentally Friendly Product Design Guidelines and Product Design Assessment Criteria.

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**NOTICE**

- Before operating the product, read the user’s 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.

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