Achieve New Measurement Capabilities with Higher Speeds, Isolation, Channel Count, and CAN.

Introducing Our Ultra-Fast Memory Recorder!

- High-speed (up to 100 MS/s), High Resolution (up to 12-bit), Isolated (up to 1kV*)
- Multi-channel, up to 128 voltage or 128 logic bits
- Continuous hard disk recording at 100 kS/s simultaneously on 16 channels*2
- CAN bus monitoring and trend waveform display (DL850V only)
- 15 plug-in modules

*1. With the isolated probe (700929 or 701947)
*2. With the /HD0 or /HD1 option
Measure Fast Signals with High Accuracy and Time Resolution

The DL850 ScopeCorder Series are modular, waveform recording instruments that can measure voltage, current, strain, acceleration, and other phenomena—simultaneously. With high speed sampling, high isolation withstand voltage, and multichannel measurements, the DL850 Series offers powerful support in the development, evaluation, and quality control of energy efficient devices.

For increasingly fast inverter signals

Yokogawa’s isoPRO technology offers industry-leading isolation performance at the highest speeds. The isoPRO core technology is designed with energy savings applications in mind. It gives you the performance needed to develop high efficiency inverters, which employ high voltages, large currents, and high operating speeds.

Example: Measuring inverter output

Accurately observe inverter startup waveforms with sufficient time resolution. You can confirm that no excessive overshoots occurred.

Advanced—even more measurement points

Up to 128 CH of voltage input, and 128 bits of logic input

The 16-CH Voltage Input Module (scanner type) can measure at 10 kS/s sample rate even when using all 16 channels. With this module populating all 8 input module slots, the DL850 performs 128-CH voltage measurements.

The Logic Input Module supports everything from TTL levels, to high voltage contact closures at up to 10 MS/s*. With eight logic modules, the DL850 can monitor and capture 128 bits of logic.

Example: Measuring a multi-output power source

Power supplies used in home computing electronics have many outputs. With a multichannel module, you are not limited to voltage measurements; a single unit can also measure everything from PC control signals to AC fan operation and slow to high-speed signals.

With 15 unique plug-in module types, the DL850 can handle nearly any measurement task.

The DL850 is backwards-compatible with all modules of its predecessor, the DL750. In addition, four new modules have been added to the lineup. Combine modules at will to measure anything from minute voltages to high-speed, high withstand voltages.

- High-speed voltage
- High voltage
- High-precision voltage
- Multichannel voltage
- Temperature
- Strain
- Acceleration
- Frequency
- Logic input
- CAN monitoring (with the DL850V)

The DL850V is backwards-compatible with all modules of its predecessor, the DL750. In addition, four new modules have been added to the lineup. Combine modules at will to measure anything from minute voltages to high-speed, high withstand voltages.

High-speed 100 MS/s 12-Bit Isolation Module

(Max. four (4) modules can be installed in a main unit.)

Rising waveform not completely captured

Rising waveform accurately captured

Example: Same inverter output waveform measured at 10 MS/s and 100 MS/s

* A response time for the logic input varies according as the probe.
Display and Record Vast Amounts of Data with Long Memory and Easy Operation

Jog shuttle
The large, high resolution LCD screen displays multiple channels in precise detail.

4 directional cursor keys
With large pop-up menus and 4 directional cursor keys, it is easy to enter and modify settings with many parameters.

One Button SAVE
Select data or image format you wish to save in advance, then simply press one button to save everything at once.

ALL CH key
A spreadsheet style view of all channel settings is displayed for easy editing.

Dedicated vertical axis and zoom knobs
Direct accessibility means faster and easier settings!

Panel sheets in your language
Select an adhesive sheet in any of 8 languages for the instrument’s front panel.

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Efficiency from Settings to Measurement, Analysis, and Saving

1. Enter input conditions in a full-screen menu
2. Easily zoom to a location of interest
3. Analyze using cursors
4. Save data for reports

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Key Point 1
If an abnormality occurs during a long duration continuous test, you can analyze the saved measured data without having to stop measurement!

• At the same measurement time...
• At the same sampling rate...

Key Point 2
Easily duplicate critical measured data on the main unit and a PC

Large [2 GPoint] memory offers long duration measurement and two instantaneous zoom locations —2 GPoint memory ([M2 option])—

Comes standard with 250 MPoints of memory, expandable with 1 or 2 GPoint options. Large capacity memory does not simply provide longer durations of measurement.

| Measurements possible with a 2 GPoint long memory |
| Sample rate | With 1 ch | With 16 ch |
| 100 MS/s | 20 sec. | 2 sec. (using 8 ch) |
| 10 MS/s | 3 min. 20 sec. | 10 sec. |
| 1 MS/s | 30 min. | 1 min. 40 sec. |
| 100 kS/s | 5 hours | 10 min. |
| 10 kS/s | 50 hours | 2 hours 30 min. |
| 200 S/s | 30 days | 50 hours |
| 20 S/s | 30 days |

*30 days is maximum.

Zoom to 2 locations instantaneously

Zoom to 2 locations instantaneously

Long memory does not guarantee better efficiency if the memory handling and display engine is slow. Our faster than ever GIGAZoom 2 Engine instantaneously zooms into two locations.

Long Duration, Continuous Saving of Waveforms —Hard disk recording ([HD0, /HD1 option])—

Measured data can be streamed directly to a built-in 160 GB hard disk ([HD1 option]) or through the external HDD interface ([HD0 option])*. With long duration evaluation testing, measurements can be performed at 100 kS/s on 16 channels simultaneously for 10 hours**.

| Measurements possible with a 2 GPoint long memory |
| Sample rate | With 1 ch | With 16 ch |
| 1 MS/s | 10 hours | 6 hours |
| 200 kS/s | 60 hours | 20 hours |
| 100 kS/s | 5 days | 10 hours |
| 20 kS/s | 20 days | 2.5 days |
| 1 kS/s | 30 days* | 30 days* |

* With the [M2 option], the maximum duration depends on the memory length.
** Real time hard disk recording can be performed for a maximum of 30 days.

Key Point 1
If an abnormality occurs during a long duration continuous test, you can analyze the saved measured data without having to stop measurement!

• At the same measurement time...
• At the same sampling rate...

Performs waveform analysis without stopping measurement

Data being continuously recorded on the DL850/DL850V’s built-in HDD or external HDD can be transferred to a PC without stopping measurement. You can display and analyze the transferred waveform data using Xviewer, an accessory program for the PC.

• At the same measurement time...
• At the same sampling rate...

Efficiency from Settings to Measurement, Analysis, and Saving

1. Enter input conditions in a full-screen menu
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Performs waveform analysis without stopping measurement

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• At the same measurement time...
• At the same sampling rate...
Catch transients in durability with high-speed sampling  — Dual capture —

To visualize long term trends in durability testing and other situations, data is typically acquired at low-speed sample rates. On the other hand, suddenly-occurring transitional phenomena should be captured at high-speed sample rates.

The "Dual Capture" feature resolves these conflicting requirements by recording at two different sampling rates.

**Example: Parts durability testing**

Parts used in automobiles and other transportation vehicles must be highly reliable. The "Dual Capture" function is very effective when performing vibration testing of connectors under varying temperatures.

**Recall Past Waveforms**  — History Function —

When you spot an abnormal phenomenon during repetitive high speed measurements, often the anomaly has disappeared from the screen by the time you press Stop.

Always active, the "History" function automatically divides the long memory into up to 5,000 "history waveforms" that can be redisplayed at any time.

**Searching history waveforms**

When you want to extract specific abnormal phenomena, you can perform condition-based searches inside the history waveforms. You can create a rectangular zone on screen and extract only waveforms that pass through or do not pass through the zone. You can also extract data based on parameters such as amplitude or RMS.

**Key Point**

The History function requires no action during measurement. You can recall data at any time after measurement has been completed. Once waveforms have been recalled, you can zoom locations of interest or perform parameter measurements.
Armed with an array of trigger functions

— Simple & Enhanced Triggers —

The DL offers easy-to-use “Simple” triggers, or lets you combine various “Enhanced” triggers for even more advanced capturing. Enhanced trigger conditions are set up intuitively in advanced, easy-to-understand graphical user interfaces.

**SIMPLE**

- **Edge:** Trigger on a single trigger source condition (rising, falling, rising/falling)
- **Time:** Trigger at a specified time or fixed interval

**ENHANCED**

- **A -> B(N):** Trigger when condition B is true N times after condition A becomes true
- **A Delay B:** After condition A becomes true, trigger the first time condition B becomes true after a set time has passed
- **Edge On A:** Trigger on an OR condition of an edge trigger while the A trigger is true
- **OR:** Trigger if at least one trigger condition of multiple trigger sources is true
- **AND:** Trigger if all trigger conditions of multiple trigger sources are true
- **Period:** Trigger when a condition regarding the waveform period becomes true
- **Pulse Width:** Trigger on a condition relating a pulse width condition being true with a specified time width condition.
- **Wave Window:** Trigger when the signal passes outside of a real-time template “Wave Window”

— Wave Window trigger —

The Wave Window trigger is useful for diagnosing typical power supply troubles such as momentary loss, sags, and surges. It can also detect frequency changes, voltage drops, and other phenomena, with support for AC waveforms of 40 to 1,000 Hz. A reference waveform (Real time template) is compared with the current waveform, and a trigger activates if the current waveform falls outside of the allowable range. The reference waveform is generated automatically from the previous waveform in real time.

— Action ON trigger —

To capture infrequently occurring phenomena, you can use an “Action ON Trigger” to perform multiple actions that are specified in advance when a trigger occurs.

You can specify “e-mail transmission” for immediate notification in a remote location when a phenomenon occurs.

- Beep sounds
- Prints out screenshots
- Saves waveform data
- Sends e-mails to a specified address

Superior noise rejection

Excellent noise rejection performance is achieved through meticulous low-noise design. Floating voltage switching waveforms in inverter circuits can also be captured with precision.

**CMRR:**

-90dB typ @100 kHz

Example: Measuring inverter gate signals

Model 701250 Voltage Input Module
Hardware Accelerated Data Processing and Math

Processes noise rejection and executes power computations in real time — Real time Math (/G3 option) —

The DL850 is armed with a dedicated DSP (digital signal processor) for computations that enables between-channel math during waveform capture. These between-channel computations are powerful because they can be set up separately from filter computations. In addition to FIR, IIR, Gauss, and moving average digital filters, you can use maximum 30 equations such as arithmetic with coefficients, integrals and differentials, and higher-order equations.

- Display any combination of measured and math waveforms (up to 16 total).
- You can even assign channels without modules.

Example: 3-phase power computation

Power is calculated as the integral of the product of voltage and current over time (an average based on the period). Using the Realtime Math function, you can display 3-phase 4-wire power waveforms in real time.

\[ P_n = \frac{1}{2} \int v(t) \cdot i(t) \, dt \]

3-phase 4-wire power calculation

\[ \sum P^* = P_1 + P_2 + P_3 \]

* Summing the three results after performing calculation of each \( P_n \).

A wealth of functions gets you right to the waveform you want — User defined computation (/G2 option) —

The DL comes standard with arithmetic, time shift, FFT, and other computations that enable you to display waveforms with offsets and skew corrections. And with user defined computations (/G2 option), you can create equations using a combination of differentials and integrals, digital filters, and a wealth of other functions.

Example: Amplitude analysis using FFT

With the User Defined Computation function (option) included, you can perform various types of FFT analysis using two FFT windows. In applications such as vibration and shock tests, you can easily evaluate abnormal vibrations while simultaneously measuring other signals.

Key Point

Computations occur in real time even when in Roll mode. Computed waveforms can also be used to activate triggers. Any vacant slots (CHs) can be utilized for the realtime math definition. Consequently, pre-computation waveform and post-computation waveform can be displayed simultaneously.

Automatically extract waveform amplitude, frequency, and other parameters — Waveform parameter and statistical computation —

Extract and display up to 24 of the 26 available waveform parameters (amplitude, frequency, etc.) simultaneously. Menus can be shown as lists of easy-to-read icons.

Statistical computation

The DL can automatically extract cycle waveforms and find the standard deviation and other statistics. Computations can be performed on history waveforms as well.

Example: 3-phase power computation

Power is calculated as the integral of the product of voltage and current over time (an average based on the period). Using the Realtime Math function, you can display 3-phase 4-wire power waveforms in real time.

Active power \( P_n = \frac{1}{2} \int v(t) \cdot i(t) \, dt \)

3-phase 4-wire power calculation

\[ \sum P^* = P_1 + P_2 + P_3 \]

* Summing the three results after performing calculation of each \( P_n \).

Detect abnormal waveforms, notify users, and determine pass/fail — GO/NO-GO determination —

The DL can determine whether waveforms or computed values of waveform parameters meet (GO) or do not meet (NO-GO) conditions that are specified in advance. Upon judgment of the measured results, a pre-set action is performed and users are notified that an abnormal waveform was observed, along with the pass/fail determination. This is a very useful function for such things as studying signals from manufacturing lines of electronic devices and tracing abnormal phenomena.

Example: Evaluating motor startup characteristics

Parameter measurement is taken of the time until reaching a reference RPM after motor start, and the subsequent GO/NO-GO (pass/fail) determination is made.
New Functions, New Possibilities

Synchronize multiple units performing simultaneous measurements

Synchronized measurement across multiple DL850 units is made possible by inputting an IRIG time code signal.* The DL850/DL850V’s internal clock is also synchronized (locked) to the IRIG signal. Therefore, timing comparisons are highly precise even when continuously recording over long periods of time.

Example: Synchronous measurements for large transport vehicles
Simultaneously measuring both tips of airplane wings, or between railroad cars requires synchronizing multiple measuring instruments in time. With a single IRIG cable, the acquisition time of all data is made the same.

[Diagram: Coaxial (BNC) cable, IRIG reference, Signal generator, IRIG signal]

Key Point
You can make periodic observations remotely by connecting commercially available GPS receivers that have IRIG output and using the Time Trigger function.

The flexibility of an external hard drive

With an external hard drive interface, you can connect a commercially available eSATA standard hard drive. The DL can record to an external drive in real time (see p. 5) just like it can with the built-in hard drive. After saving waveforms, you can switch the DL850/DL850V from the PC to the external drive and use the waveform data immediately.

Key Point
(1) Ensures security
Simply remove the drive after measurement to protect data. Or, keep restricted data only at the measurement site.

(2) Increases capacity
If the external hard drive becomes full, you can simply switch to a new one (requires a restart).

(3) Hi-speed data transfer
A data can be transferred at high speed between a PC and a hard drive.

*IRIG (Inter-Range Instrumentation Group) started as an American military standard, and is now used in data recorders in the aerospace industry. The carrier frequency is a 1 kHz/10 kHz ASK (amplitude shift keying) modulating signal with a synchronizing precision of as high as 1 µs.
DL850 support formats: A002, B002, A132, B122

Check the relationship between hysteresis and phase

You can confirm the relationship between two signals using the X-Y display. This can be applied to measurements such as the phase angle of two sine waves.

You can select four combinations on the X and Y axes, and therefore display multiple X-Y waveforms simultaneously and find relationships between them.

Simultaneous observation of X-Y waveforms and normal T-Y waveforms (waveform display using voltage and time axes) is also possible.

Example: Computing dynamic BH characteristics of a magnetic substance
On the DL850 you can measure voltage and current, then analyze hysteresis of magnetic flux density B and magnetic field strength H. Energy loss generated by magnetostriction can be evaluated by measuring dynamic BH characteristics.

Special Functions

Snapshots
With the push of “SNAP SHOT” key, you can save a “snapshot” of the measured waveform (the waveform displayed on screen). The waveform remains saved even if you restart measurement, therefore you can easily compare the snapshot with any newly measured waveforms. Snapshots can also be saved and loaded as files.

Web server
The Web Server function displays the screen of any networked DL850/DL850V on a PC via Ethernet. From this screen, you can remotely start or stop measurement, update the DL’s display, and take snapshots (capture images) of the screens.

Multilanguage support
Adhesive front panel key label sheets (“panel sheets”) are available in eight different languages. Multilanguage support is also provided for menus and error messages.

Saving screen images and displaying thumbnails
Screen images can be saved to a specified storage medium in PNG, JPEG, or BMP format. These screen images can be imported into reports or other PC-created documents.

Accessory software (sold separately)
Xviewer (701992)
Xviewer is a high cost-performance, integrated waveform analysis tool offering centralized control of the ScopeCorder, measurement, data transfer, waveform observation, and analysis. The program displays waveforms measured by the DL850/DL850V on a PC and performs analysis. Waveform data (files) can be transferred from the DL850/DL850V to Xviewer via SD memory card or other media, USB, or Ethernet interface. The program supports a variety of functions for the PC including zoom display, cursor measurements, waveform parameter computation, data conversion to CSV and other formats, creation of reports, and printing. The program not only displays and analyzes waveforms, but also displays an image of the DL850/DL850V front panel on a PC (a “control image”) using the GP-IB/Ethernet/USB interface that allows you to control the instrument remotely as if you were operating its actual keys.

Model Numbers and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>701992</td>
<td>-SP01</td>
<td>Xviewer Standard Edition 1 license</td>
</tr>
<tr>
<td></td>
<td>-SP03</td>
<td>Xviewer Math Edition 1 license</td>
</tr>
<tr>
<td>Option</td>
<td>-JS01</td>
<td>DL850 Advanced Utility 1 license</td>
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</tbody>
</table>

For details on accessory software, visit https://y-link.yokogawa.com/YL000.po
Also, you can download free software and trial versions of retail software from this site.
CAN bus is a standard in-vehicle serial bus used for control networks. The DL850V ScopeCorder Vehicle Edition can include a CAN Monitor Module (model 720240) that enables monitoring of CAN protocol communication data as analog values, from which triggers can be activated.

Correlations can be identified between communication data on the CAN bus; voltage, temperature, sensor signals, and other analog data; and ECU control logic signals—this lets you evaluate the overall CAN system.

You can also use DBC database files (.dbc) to specify the data to be monitored. Database (definition) files can be loaded and edited by our free Symbol Editor program for conversion to an .sbl file that can be read by the DL850V. Instead of digital code (hex or numeric), you can monitor CAN signals using Messages, Signal names, and physical units.

Example: Comparison and verification of actually measured signals and CAN bus signals

You can check physical value trends of CAN bus data and the corresponding actually measured waveforms on the same screen at once. For example, ignition switch ON/OFF signal and the ignition command’s corresponding CAN signal can be displayed together with the actually-measured signal from the related voltage sensor or other devices in order to verify any correlation between these signals.

Model 720240 CAN Bus Monitor module Main specifications
- Input ports: 2 (16 signals x 2 ports)
- Connector type: D-sub 9 pin (male)
- Supported protocols:
  - Physical layer: ISO-11898 (High Speed Communication)
  - CAN in Automation: CAN2.0B (Standard & extended message format)
- Bit rates: 10 k, 20 k, 33.3 k, 50 k, 62.5 k, 66.7 k, 83.3 k, 100 k, 125 k, 250 k, 500 k, 800 k, 1 Mbps
- Note: Max. two (2) modules can be installed in a DL850V main unit.
Example of accessory combinations

- **High-speed 10 MS/s, 12-Bit Isolation Module** 701250
- **Acceleration/Voltage Module (with AAF)** 701275
- **Warning:** Connect the probe earth cable to ground (grounding potential) when using these differential probes with isolation modules.

- **Universal (Voltage/ Temp.) Module** 701261
- **Universal (Voltage/ Temp.) Module with AAF** 701262
- **Temperature, High Precision Voltage Isolation Module** 701265

- **High-Speed Logic Probe** 700986
- **Isolation Logic Probe** 700987

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**Passive Probe** 701940
**BNC Cable** 366924/366925
**1:1 BNC-Alligator Cable** 366926

**±500V/15MHz Differential Probe** 700924
**±1400V/100MHz Differential Probe** 700925

**Alligator Clip Adaptor Set** 758922
**Fork Terminal Adaptor Set** 758921

**Shunt Resistor for 4-20 mA Measurement**
- 438920 (250 Ω ±0.1%)
- 438921 (100 Ω ±0.1%)
- 438922 (10 Ω ±0.1%)

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**High-Speed 100 MS/s, 12-Bit Isolation Module** 701255

**High-Voltage 100 kS/s, 16-Bit Isolation Module** 701260

**Frequency Module** 701280

**Current Probe 30 Arms DC to 50 MHz** 701933
**Current Probe 150 Arms DC to 10 MHz** 701930

**Current Probe 500 Arms DC to 2 MHz** 701931

**Bridge Head (NDIS)** 120 Ω: 701966
350 Ω: 701965

**Bridge Head (DSUB, Shunt-Cal)** 120 Ω: 701967
350 Ω: 701968

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**Measurement Lead Set** 758917
**Safety BNC Cable**
- 1 m: 701902
- 2 m: 701903

**Alligator Clip Adaptor Set** 758929

**1:1 Safety BNC Adapter Lead** 701901

**100:1 Isolation Probe** 701947
**10:1 Isolation Probe** 700929
Module Selection

<table>
<thead>
<tr>
<th>Input</th>
<th>Model No.</th>
<th>Sample Rate</th>
<th>Resolution</th>
<th>Bandwidth</th>
<th>Number of Channels</th>
<th>Isolation</th>
<th>Maximum Input Voltage (DC+AC peak)</th>
<th>DC Accuracy</th>
<th>Note</th>
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<tbody>
<tr>
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<td>720210</td>
<td>100 MS/s</td>
<td>12-Bit</td>
<td>20 MHz</td>
<td>2</td>
<td>Isolated</td>
<td>1000 V&lt;sup&gt;*&lt;/sup&gt;</td>
<td>±0.5%</td>
<td>High speed · High voltage · Isolated Max. four (4) modules can be installed in a main unit.&lt;sup&gt;*&lt;/sup&gt;</td>
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<tr>
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<td>701250?</td>
<td>10 MS/s</td>
<td>12-Bit</td>
<td>3 MHz</td>
<td>2</td>
<td>Isolated</td>
<td>600 V&lt;sup&gt;*&lt;/sup&gt;</td>
<td>±0.5%</td>
<td>High noise immunity</td>
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<td>701251</td>
<td>1 MS/s</td>
<td>16-Bit</td>
<td>300 kHz</td>
<td>2</td>
<td>Isolated</td>
<td>600 V&lt;sup&gt;*&lt;/sup&gt;</td>
<td>±0.25%</td>
<td>High sensitivity range (1mv/div), low noise (&lt;100 µV/µs), and high noise immunity.</td>
</tr>
<tr>
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<td>701255?</td>
<td>10 MS/s</td>
<td>12-Bit</td>
<td>3 MHz</td>
<td>2</td>
<td>Non-Isolated</td>
<td>600 V&lt;sup&gt;*&lt;/sup&gt;</td>
<td>±0.5%</td>
<td>non-isolation version of model 701250</td>
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<td>100 kS/s</td>
<td>16-Bit</td>
<td>40 kHz</td>
<td>2</td>
<td>Isolated</td>
<td>100V&lt;sup&gt;*&lt;/sup&gt;</td>
<td>±0.25%</td>
<td>with RMS, and high noise immunity</td>
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<td>702220</td>
<td>200 kS/s</td>
<td>16-Bit</td>
<td>5 kHz</td>
<td>16</td>
<td>Isolated</td>
<td>16 isolated/D60 terminal, non-isolated (GND terminal) 42V&lt;sup&gt;*&lt;/sup&gt;</td>
<td>±0.3%</td>
<td>15kHz voltage measurement (Scan-type)</td>
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<td>701261</td>
<td>100 kS/s (Voltage), 300 S/s (Temperature)</td>
<td>16-Bit (Voltage), 0.1C Temperature</td>
<td>100 kHz (Temperature)</td>
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<td>Isolated</td>
<td>42 V</td>
<td>±0.25% (Voltage)</td>
<td>thermocouple K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel</td>
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<td>Analog Voltage</td>
<td>701262</td>
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<td>100 kHz (Temperature)</td>
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<td>Isolated</td>
<td>42 V</td>
<td>±0.25% (Voltage)</td>
<td>thermocouple K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel</td>
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<td></td>
<td>701265</td>
<td>500 S/s (Voltage), 300 S/s (Temperature)</td>
<td>16-Bit (Voltage), 0.1C Temperature</td>
<td>100 kHz</td>
<td>2</td>
<td>Isolated</td>
<td>42 V</td>
<td>±0.08 (Voltage)</td>
<td>thermocouple K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel, high sensitivity range (0.1mv/div), and low noise (&lt;100 µV/µs).</td>
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<tr>
<td>Temperature</td>
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<td>100 kS/s</td>
<td>16-Bit</td>
<td>20 kHz</td>
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<td>Isolated</td>
<td>10 V</td>
<td>±0.5% (Strain)</td>
<td>Supports strain NDIS, 2, 5, 10 V built-in bridge power supply</td>
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<td>100 kS/s</td>
<td>16-Bit</td>
<td>20 kHz</td>
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<td>Isolated</td>
<td>10 V</td>
<td>±0.5% (Strain)</td>
<td>Supports strain DISLB, 2, 5, 10 V built-in bridge power supply, and shunt CAL</td>
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<td>Strain</td>
<td>701275</td>
<td>100 kS/s</td>
<td>16-Bit</td>
<td>40 kHz</td>
<td>2</td>
<td>Isolated</td>
<td>42 V</td>
<td>±0.25% (Voltage)</td>
<td>built-in anti-aliasing filter, Supports built-in amp type acceleration sensors (4 mA/22 V)</td>
</tr>
<tr>
<td></td>
<td>701280</td>
<td>25 kS/s</td>
<td>16-Bit</td>
<td>resolution 50 ns</td>
<td>2</td>
<td>Isolated</td>
<td>420 V&lt;sup&gt;*&lt;/sup&gt;</td>
<td>±0.1% (Frequency)</td>
<td>Measurement frequency of 0.01 Hz to 200 kHz, Measured parameters (frequency, rpm, period, duty, power supply frequency, distance, speed)</td>
</tr>
<tr>
<td>Frequency</td>
<td>720230</td>
<td>10 MS/s</td>
<td>—</td>
<td>—</td>
<td>8-bit x 2 ports</td>
<td>non-isolated</td>
<td>8-bit/2(16-bit) x 2, compatible with four-type of logic probe (sold separately)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logic</td>
<td>720240</td>
<td>100 kS/s</td>
<td>—</td>
<td>—</td>
<td>(Integrated port)</td>
<td>Isolated</td>
<td>10V</td>
<td>—</td>
<td>CAN Data of max. 32-bit allowable It is available for DL850V only. Max two (2) modules can be installed in a main unit.&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

For DL850/DL850V plug-in modules specifications, see the “Bulletin DL850-01En” catalog.

Variety of Connection Interfaces

- **Video signal output (VIDEO OUT)**
  Confirm waveforms on an analog RGB (XGA) external display.

- **EXT I/O**
  GO/NO-GO determinations can be output, and you can perform control based on start/stop and other external signals.

- **External clock I/O (EXT CLK IN)**
  Perform sampling timed to an external signal (up to 0.5 MHz).

- **External trigger input (EXT TRIG IN)**
  External trigger output (EXT TRIG OUT)

- **USB peripheral connection terminal**
  Supports USB storage, keyboards, and mouse input.

- **Ethernet 1000BASE-T**
  Comes standard

- **SD card slot**
  SD, SDHC compliant, comes standard

- **USB-PC connection terminal**
  Enables control from a PC.

- **GP-IB (optional)**
  Inputting an external time signal lets you synchronize multiple DL850s.

- **IRIG (optional?)**
  Connect an eSATA standard hard drive.

- **External hard drive IF (optional?)**
  Inputting an external time signal lets you synchronize multiple DL850s.

- **External clock I/O (EXT CLK IN)**
  Perform sampling timed to an external signal (up to 0.5 MHz).

- **External trigger input (EXT TRIG IN)**
  GO/NO-GO determinations can be output, and you can perform control based on start/stop and other external signals.

- **External trigger output (EXT TRIG OUT)**

- **Video signal output (VIDEO OUT)**
  Confirm waveforms on an analog RGB (XGA) external display.

*1: Probes are not included with any modules.  *2: In combination with 10:1 probe model 700939  *3: Direct input  *4: In combination with 10:1 probe model 701940  *5: Some of the models 701250/701255 shipped on or before July, 2007 may require factory rework.  *6: Any other modules can be installed in the remaining slots.

*1: Built-in hard disk and external hard disk IF are not available together.  *2: The GP-IB is also available when IRIG (/C20) option is specified.
Main Specifications (Main Unit)

**Input Section**
- Plug-in module
- Number of slots: Max 4 for 720201 modules, Max 2 for 720204 modules (for DL750i only)
- Number of input channels:
  - DL750i: 16CH/8x8, 12CH/Unit
  - DL75R: 12CH/8x8, 36CH/Unit
  - (Maximum simultaneous display waveform is 64 waveforms x 4 screen selectable)

**Function**

- **Main waveform (low speed)**: Maximum sample rate 100kS/s (roll mode region)
- **Capture waveform (high speed)**: Maximum sample rate 100MS/s
- **Realtime hard disk recording**:
  - (HD0/HD1 option) Capacity
    - Maximum sample rate
      - Maximum sample rate
    - Maximum point
- **Conversion**
  - Analog to digital
    - Linear scaling
      - AX+b mode or P1-P2 mode independently for CHn
  - Digital filter
    - Gaussian (LPF), Sharp (LPF/HPF), IIR (LPF/HPF/2P), FILT1, PWHL, PWL, PWXX, DUTY, DUTYL, FLLT, FLLT2, HLT, MEAN, L5, P5, P5D, C5, CH, MAG, LOGMAG, PHASE, REAL, MAG

- **Zoom**
  - Expand the displayed waveform along time axis (up to 2 locations using separate zoom rates)
  - Expanded display 100Ns/div to 1/2 of Main waveform

- **Search and zoom**
  - Auto zoom: Automatically scrolls the zoom position.

- **History search function**
  - Search for and display waveforms from the history memory that satisfies specified conditions. Zone search/parameter search

- **Waveform parameters**
  - Up to 24 items can be displayed
    - P, Pn, X, Y, Z, Delay B, A, Delay C, Edge on A, OR, AND, Period, Pulse
    - PWHL, PWL, PWXX, DUTY, DUTYL, FLLT, FLLT2, HLT, MEAN, L5, P5, P5D, C5, CH, MAG

- **Statistical processing**
  - Maximum of 16 waveform parameters
  - Maximum number of cycles 64,000 cycles (when the number of parameters is 1)
  - Maximum measurement range: 100M points

- **Computing (MATH)**
  - Maximum of 8 Definable MATH waveforms
  - Maximum of 64,000 waveform parameters
  - Calculation record length
    - Max. 1M point
  - Operators
    - +, -, *, /, unary computation, shift, and power spectrum
  - User-defined computation
    - Calculation setting is available by combining any following operators and parameter measurement items.
    - ABS, SQRT, LOG, EXP, NEG, SIN, COS, TAN, ATAN, PH, IDEF, DDF, INTG, INTRL, B\(n\), P2, P3, F1, F2, FV, PWHL, PWL, PWXX, DUTY, DUTYL, FLLT, FLLT2, HLT, MEAN, L5, P5, P5D, C5, CH, MAG

- **Output**
  - Screen image data output
  - Waveform data storage
  - Buzzer

- **FREEZE**
  - Subject to be computed
    - CHn, MATHn
  - Number of channels
    - 1 (G2 option)
  - Computation points
    - 1k/5k/10k/20k/50k/100k
  - Time window
    - Rect/Hanning/Hamming/FlatTop, Exponential

- **Actions**
  - Screen image data output, waveform data storage, buzzer notification, and e-mail transmission

- **COPY**
  - Subject to be computed
    - CHn, MATHn
  - Number of channels
    - 1 (G2 option)
  - Computation points
    - 1k/5k/10k/20k/50k/100k
  - Time window
    - Rect/Hanning/Hamming/FlatTop, Exponential

- **GQA(GD) determination**
  - Operate selected actions based on the determination criteria to the captured waveform.

- **Zone**
  - Determination using combination of up to 6 waveform parameters
  - Determination using combinations of 16 waveform parameters

- **Actions**
  - Screen image data output, waveform data storage, buzzer notification, and e-mail transmission

- **Screen image data output**
  - Prints hard copy of screens.

- **External printer**
  - Outputs the screen image to an external printer via Ethernet network.

- **File output data format**
  - PNG, JPEG, BMP

- **Other functions**
  - Mail transmission function
    - Transmission function by SMTP

- **RUL key**
  - Key protection is available to prevent from careless or unexpected operation.

- **Built-in printer (80S option)**
  - Prints hard copy of screens.

- **External printer**
  - Outputs the screen image to an external printer via Ethernet network.

- **File output data format**
  - PNG, JPEG, BMP

- **Other functions**
  - Mail transmission function
    - Transmission function by SMTP

- **RUL key**
  - Direct input of numerical numbers is available.

- **Built-in printer (80S option)**
  - Prints hard copy of screens.

- **External printer**
  - Outputs the screen image to an external printer via Ethernet network.

- **File output data format**
  - PNG, JPEG, BMP

- **Other functions**
  - Mail transmission function
    - Transmission function by SMTP

- **RUL key**
  - Direct input of numerical numbers is available.

- **Built-in printer (80S option)**
  - Prints hard copy of screens.
Main Specifications (Main Unit)

External HDD/HD0 option
- Hard disc conforms to eSATA
Built-in HDD/HD1 option
- 2.5 inch, 160GB, FAT32

USB peripheral interface
- Connector type: USB type A connector (receptacle) x 2
- Electrical, mechanical specifications: Conforms to USB Rev.2.0
- USB connection: Conforms to USB Rev.2.0
  - Supported protocol: USB Full Speed mode (12Mbps)
  - Supported system: Windows 7 (32bit)/Vista (32bit)/XP SP2 or later, 32bit

Main Unit
- USB-PC connection
  - Connector type: USB type B connector (receptacle) x 1
  - Electrical, mechanical specifications: Conforms to USB Rev.2.0
  - Transmission system: Conforms to IEEE802.3
  - Communication protocol: TCP/IP
  - Supported services: FTP, Telnet, TFTP

Ethernet
- Connector type: RJ-45 modular jack x 1
- Electrical, mechanical specifications: Conforms to IEEE802.3
- Communication protocol: Conforms to IEEE 802.3
- Supported services: FTP, Telnet, TFTP

GM-B (C1, C20 option)
- Connector type: BNC connector x 1
- Supported signals: A002, B002, A132, B122
- Input impedance: 50±/92Ω selectable

Maximum input voltage: ±8V
Function: Main unit time synchronization, sample block synchronization
Clock synchronization range: ±80ppm
Accuracy after synchronization: ±5ppm

Auxiliary I/O section
- EXT CLK IN
  - BNC connector, TTL level, minimum pulse width 50ns, 9.5MHz or less
- EXT TRG IN
  - BNC connector, TTL level, rising/falling
- EXT TRG OUT
  - BNC connector, 5VCMOS level, fallen when triggered, and rising when acquisition completed
- EXT I/O
  - Connector type: RJ-11 modular jack
  - GO/NO-GO determination I/O
  - Input level: TTL or contact input
  - Output level: 5V CMOS

Display section
- EXT start/stop input
  - Manual event
  - TTL or contact input

Video signal output
- D-Sub 15 pin receptacle
  - Analog RGB, quasi XGA output 1024×768 dot, approx 60Hz Vsync

General specifications
- Rated power supply voltage: 100 to 120VAC to 240VAC (automatic switching)
- Rated power supply frequency: 50/60Hz
- Maximum power consumption: 200VA
- Maximum power consumption: 1500 VAC between power supply and earth for 1 minute
- Insulation resistance: 10MΩ or higher at 500V DC between power supply and earth
- Externed dimensions: Approx.355mm(W)×259mm(H)×180mm(D), excluding other projections
- Weight: Approx.6.3kg, for main unit only, include /B5/M2/HD1/P4 option
- Operating temperature range: 5 to 40 °C

Standard operation conditions
- Ambient temperature: 23 ±5 °C
- Ambient humidity: 20 to 80 %RH
- Errors in power supply voltage/frequency: Within ±1% of rated voltage, within ±1% of rated frequency
- Warm-up of 30 min. or more, after calibration.

DL750P ScopeCorder
- Comes with 210 mm wide chart paper
- Realtime printing function

SL1400 ScopeCorder
- Easy operation
- Multilanguage key labels

SL1000 High-Speed Data Acquisition Unit
- High speed transfer of data to a PC
- 100 MS/s simultaneously on 16-Ch
- 8 units linked
### Model/Suffix Code

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL850</td>
<td></td>
<td>DL850 main unit, 250MHz/16W memory</td>
</tr>
<tr>
<td>DL850V</td>
<td></td>
<td>DL850V main unit, 250MHz/32W memory</td>
</tr>
</tbody>
</table>

### Power Code

- O: UL and CSA standard
- TR: AS standard
- Q: BS standard
- N: CE standard

### Languages

- ENG: English menu and panel
- JP: Japanese menu and panel
- KO: Korean menu and panel
- FR: French menu and panel
- IT: Italian menu and panel
- ES: Spanish menu and panel

### Options

- IP2: Built-in printer (112mm)
- M1: Memory expansion to 1G Peak
- M2: Memory expansion to 2G Peak

### Plug-in Module Model Numbers

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701229</td>
<td>High-speed 10 MHz, 16-bit Isolation Module (2 ch)</td>
</tr>
<tr>
<td>701231</td>
<td>High-speed 10 MHz, 16-bit Isolation Module (2 ch)</td>
</tr>
<tr>
<td>701260</td>
<td>High-voltage 100 kV/16-bit Isolation Module with RMS, 2 ch</td>
</tr>
<tr>
<td>701261</td>
<td>Universal Module (2 ch)</td>
</tr>
<tr>
<td>701262</td>
<td>Universal Module with Anti-Aliasing Filter, 2 ch</td>
</tr>
<tr>
<td>701265</td>
<td>Temperature/high-precision voltage Module (2 ch)</td>
</tr>
<tr>
<td>701270</td>
<td>Stream Module (IND, 2 ch)</td>
</tr>
<tr>
<td>701271</td>
<td>Stream Module (ESLB, Shunt CAL, 2 ch)</td>
</tr>
<tr>
<td>701275</td>
<td>Acceleration/Voltage Module (with Anti-Aliasing Filter, 2 ch)</td>
</tr>
<tr>
<td>701281</td>
<td>Frequency Module (2 ch)</td>
</tr>
<tr>
<td>702270</td>
<td>High-speed 100 MHz, 16-bit Isolation Module (2 ch)</td>
</tr>
<tr>
<td>702272</td>
<td>Voltage Input Module (16 ch)</td>
</tr>
<tr>
<td>702273</td>
<td>Logic Input Module (16 ch)</td>
</tr>
<tr>
<td>702240</td>
<td>CAN Bus Monitor Module (32 ch, available DL850V only)</td>
</tr>
</tbody>
</table>

* Probes are not included with any modules.

### Probes, Cables, and Converters

<table>
<thead>
<tr>
<th>Product</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001 Isolation Probe</td>
<td>701947</td>
<td>1000V (DC+Acpeak) CAT II</td>
</tr>
<tr>
<td>101 Probe for Isolated BNC Input</td>
<td>700929</td>
<td>1000V VRms-CAT II</td>
</tr>
<tr>
<td>Safety BNC Adapter Lead (in combination with followings)</td>
<td>701901</td>
<td>1000V VRms-CAT II</td>
</tr>
<tr>
<td>Safety Mini-Clip (Hock type)</td>
<td>701958</td>
<td>1000V VRms-CAT II, 1 set each of red and black</td>
</tr>
<tr>
<td>Large Alligator-Clip Isolation Module</td>
<td>701954</td>
<td>1000V VRms-CAT II, 1 set each of red and black</td>
</tr>
<tr>
<td>Alligator Clip Adapter Set (Rated Voltage 1000 V)</td>
<td>758292</td>
<td>1000V VRms-CAT II, 1 set each of red and black</td>
</tr>
<tr>
<td>Alligator Clip Adapter Set (Rated Voltage 300 V)</td>
<td>758282</td>
<td>300V VRms-CAT II, 1 set each of red and black</td>
</tr>
<tr>
<td>Fork Terminal Adapter Set</td>
<td>758281</td>
<td>1000V VRms-CAT II, 1 set each of red and black</td>
</tr>
<tr>
<td>Passive Probe</td>
<td>701940</td>
<td>Non-isolated 60V (102/520)</td>
</tr>
<tr>
<td>1BNC-Alligator Clip</td>
<td>368926</td>
<td>Non-isolated 42V or less, 1 m</td>
</tr>
<tr>
<td>1B Banana-Alligator Cable</td>
<td>368901</td>
<td>Non-isolated 42V or less, 1.2 m</td>
</tr>
<tr>
<td>Current Probe</td>
<td>701933</td>
<td>30 Arms, DC to 60 MHz, supports probe power</td>
</tr>
<tr>
<td>Current Probe</td>
<td>701930</td>
<td>150 Arms, DC to 10 MHz, supports probe power</td>
</tr>
<tr>
<td>Current Probe</td>
<td>701931</td>
<td>500 Arms, DC to 20 MHz, supports probe power</td>
</tr>
<tr>
<td>Probe Power Supply</td>
<td>701934</td>
<td>Large current output, external probe power supply (4 outputs)</td>
</tr>
<tr>
<td>Shunt Resistor</td>
<td>439920</td>
<td>250 mΩ±0.1%</td>
</tr>
<tr>
<td>Shunt Resistor</td>
<td>439921</td>
<td>100 mΩ±0.1%</td>
</tr>
<tr>
<td>Shunt Resistor</td>
<td>439922</td>
<td>10 µΩ±0.1%</td>
</tr>
<tr>
<td>Differential Probe</td>
<td>750924</td>
<td>1400 Vpk, 1000 Vrms-CAT II</td>
</tr>
<tr>
<td>Differential Probe</td>
<td>700925</td>
<td>50 Vpk, 350 Vrms (For 701255)</td>
</tr>
<tr>
<td>Differential Probe</td>
<td>701926</td>
<td>1000 Vpk, 5000 Vrms</td>
</tr>
<tr>
<td>Bridge Head (NBS, 120 µm/350 m)</td>
<td>701955/56</td>
<td>With 5 m cable</td>
</tr>
<tr>
<td>Bridge Head (ESLB, Shunt CAL, 120 µm/350 m)</td>
<td>701967/58</td>
<td>With 5 m cable</td>
</tr>
<tr>
<td>Safety BNC-banana Adapter</td>
<td>758924</td>
<td>500V VRms-CAT II</td>
</tr>
<tr>
<td>Printer Roll Paper</td>
<td>899989AE</td>
<td>For DL750, DL850, DL850V, 10 m x 10</td>
</tr>
<tr>
<td>Logic Probe</td>
<td>700991</td>
<td>8-Bit, 1 m, non-isolated, TTL level/Contact Input</td>
</tr>
<tr>
<td>Logic Probe</td>
<td>700992</td>
<td>8-Bit, 1 m, non-isolated, TTL level/Contact Input</td>
</tr>
<tr>
<td>High-speed Logic Probe</td>
<td>700998</td>
<td>8-Bit, non-isolated, response speed 1 μs</td>
</tr>
<tr>
<td>Isolated Logic Probe</td>
<td>700987</td>
<td>8-Bit, each channel isolated</td>
</tr>
<tr>
<td>Measurement Lead Set</td>
<td>758917</td>
<td>Measurement leads (2 per set)</td>
</tr>
<tr>
<td>Safety BNC-BNC Cable (1 m)</td>
<td>701902</td>
<td>1000 Vrms CAT II (BNC-BNC)</td>
</tr>
<tr>
<td>Safety BNC-BNC Cable (2 m)</td>
<td>701903</td>
<td>1000 Vrms CAT II (BNC-BNC)</td>
</tr>
<tr>
<td>External I/O Cable</td>
<td>720911</td>
<td>For external I/O connection</td>
</tr>
<tr>
<td>Plug-On Clip</td>
<td>701948</td>
<td>For 700987 and 701947</td>
</tr>
<tr>
<td>Long Test Clip</td>
<td>702907</td>
<td>For 700987 and 701947</td>
</tr>
<tr>
<td>Terminal</td>
<td>A1890U2D</td>
<td>For 702200 input terminal, one (1) piece</td>
</tr>
<tr>
<td>Soft Carrying Case</td>
<td>701963</td>
<td>For DL850/DL850V/VOL/750</td>
</tr>
</tbody>
</table>

* Actual allowable voltage is the lower of the voltages specified for the main unit and cable.

Yokogawa’s Approach to Preserving the Global Environment

- Yokogawa’s electrical 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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