DL850 ScopeCorder

DL850V ScopeCorder Vehicle Edition

High Speed, Multichannel and Isolated
Noise-resistant, Ultra-fast Memory Recorder

- High-speed (up to 100 MS/s), High Resolution (up to 16-bit), Isolated (up to 1kV*)
- Multichannel, 128-CH voltage/temperature, 128-bit logic measurement
- Continuous hard disk recording at 100 kS/s simultaneously on 16 channels*
- Monitors CAN and LIN buses to display trend waveforms (DL850V only)
- 17 types of 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 saving applications in mind. It gives you the performance needed to develop inverter 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

The DL850 ScopeCorder Series 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.

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.

DL850V / DL850

ScopeCorder Vehicle Edition

ScopeCorder

For dedicated module functions and specifications, see the module catalog (Bulletin DL850-01EN). For the 100 MS/s High-speed, 12-bit Isolation Module (model: 720210), a maximum of four modules can be installed in a single main unit.
Display and Record Vast Amounts of Data with Long Memory and Easy Operation

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

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

<table>
<thead>
<tr>
<th>Sample rate</th>
<th>With 1 ch</th>
<th>With 16 ch</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 MS/s</td>
<td>20 sec.</td>
<td>2 sec.</td>
</tr>
<tr>
<td>10 MS/s</td>
<td>3 min, 20 sec.</td>
<td>10 sec.</td>
</tr>
<tr>
<td>1 MS/s</td>
<td>30 min, 1 min, 40 sec.</td>
<td></td>
</tr>
<tr>
<td>100 kS/s</td>
<td>5 hours</td>
<td>10 min.</td>
</tr>
<tr>
<td>10 kS/s</td>
<td>50 hours</td>
<td>2 hours 30 min.</td>
</tr>
<tr>
<td>200 S/s</td>
<td>30 days</td>
<td>50 hours</td>
</tr>
<tr>
<td>20 S/s</td>
<td>30 days*</td>
<td>30 days</td>
</tr>
</tbody>
</table>

*1 or
*2 The /HD0 and /HD1 options cannot be specified together.
*2 It depends on the external hard disk connected when using the /HD0 option.

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.

* This function is Xviewer’s option

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

**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!
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.

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.

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.**

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.

**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.**

**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.
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 FR, IR, GAUSS, and moving average digital filters, you can choose from 35 unique functions such as arithmetic, 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.

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.

Automatic trigger circuit
- External trigger input (IRIG)?
- Programmable internal clock
- Time-base
- Random number
- External trigger
- Software trigger
- Hard drive

Automatically extract waveform amplitude, frequency, and other parameters
- Waveform parameter and statistical computation
- Extract and display up to 32 parameters (amplitude, frequency, etc. including delay) 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: Evaluating motor startup characteristics
Parameter measurement is taken over the time until reaching a reference RPM after motor start, and the subsequent (GO/NO-GO) pass/fail determination is made.

Current Probe
- AC/DC

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

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 X-Y waveforms (waveform display using voltage and time axis) 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 magnetostriiction can be evaluated by measuring dynamic BH characteristics.

Example: Computing dynamic BH characteristics

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.

Waveforms can also be displayed simultaneously.

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Example: Computing dynamic BH characteristics

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.

Waveforms can also be displayed simultaneously.
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.

You can compare waveforms from varied conditions.

Example: Comparison of a 300 mV waveform (black) with another waveform.

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.

Screen images saved to storage media are shown on screen as thumbnails for easy identification.

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.

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.

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.

Utilization of Vehicle-installed Network Definition Files (CAN DBC, LIN LDF)

Data to be acquired using a bus monitor module (720240 or 720241) can be specified not only in digital code (hexadecimal or numeric), but also loaded from a network definition file (CAN DBC or LIN LDF).

Data frame input

CAN bus

Monitor Module

[Example of comparison and verification of a measured signal and CAN bus signal]

You can trend the physical value of CAN bus data and the corresponding measured waveforms on the same screen at once. For example, an ignition switch ON/OFF signal, a CAN bus data signal and a physical value such as pressure (an analog sensor’s voltage signal) of CAN bus data such as voltage, temperature, and sensor signals or the ECU’s control logic signal, a vehicle’s overall LAN system can be evaluated.

Support for both AC and DC power (/DC option, DL850V only)

- Low noise
- Low power consumption of 60 – 120 VA (typ.)
- Can be driven by external DC power such as the vehicle’s battery 12 V DC (10 – 18 V)
- Can also be driven by AC power: 100 V AC (100 – 120 V) 200 V AC (200 – 240 V)

The DL850V Vehicle Edition can be driven by a 12 V DC battery, vehicle’s cigarette lighter, or ordinary AC power. (We provide accessories for DC driving; see the list of accessories at the end of the catalog.)
### Main Specifications (Main Unit)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Section</strong></td>
<td>Plug-in module</td>
</tr>
<tr>
<td><strong>Number of input channels</strong></td>
<td>14 (DL850V) / 8 (DL850)</td>
</tr>
<tr>
<td><strong>Connectors</strong></td>
<td>RJ-11 modular jack, USB type B connector (receptacle) x1, Micro-B (receptacle) x1, DB-9 female receptacle x1, Mini DIN 25-pole receptacle (x2), RJ-45 x2, 12 V DC power (+DC option)</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>10.4-inch TFT color LCD monitor, 1024×768 (XGA)</td>
</tr>
<tr>
<td><strong>Environmental specifications</strong></td>
<td>Operating temperature range 5 to 40 ºC, Relative humidity 95% or less (non-condensing), Power consumption Approx. 150 VA maximum, Weight Approx. 6.5kg (main unit only, including /B5, M2, HD1, P4 options)</td>
</tr>
</tbody>
</table>

### Measurement and Range Definition

- **Measurement Range and Display Range**
  - Measurement range for the ScopeCorder is ±10 V, 0 V is the reference point at the input of the instrument.
  - Display range on the monitor is ±1 V, 0 V is the reference point at the input of the instrument.

### Measurement Range and Display Range

- **Averaging and Instantaneous**
  - Averaging: 2 to 65536 (2^n steps) with Auto mode, 1 step with Manual mode
  - Instantaneous: 100ms/div.

### Other Functions

- **Capture**
  - Single trigger, Repeated trigger, Manual trigger (DL850V only)
  - Capture range 150ns/div to 1/2 of Main waveform, Capture range 100ns/div to 1/2 of Main waveform
- **Real-time hard drive recording**
  - Maximum number of channels: 16 (16CH used) 8 (8CH used)
  - Maximum recording length 100min (100s of recording time)

### Outline drawing

![Outline drawing](image-url)
### 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, 250Mpts(W) memory</td>
</tr>
<tr>
<td>DL850V</td>
<td></td>
<td>DL850V main unit, 250Mpts(W) memory</td>
</tr>
<tr>
<td>EN</td>
<td></td>
<td>EN voltage standard</td>
</tr>
<tr>
<td>IR</td>
<td></td>
<td>IR standard</td>
</tr>
<tr>
<td>IQ</td>
<td></td>
<td>IQ B standard</td>
</tr>
<tr>
<td>IN</td>
<td></td>
<td>IN G6B standard</td>
</tr>
<tr>
<td>HE</td>
<td></td>
<td>HE English menu and panel</td>
</tr>
<tr>
<td>HI</td>
<td></td>
<td>HI Japanese menu and panel</td>
</tr>
<tr>
<td>HK</td>
<td></td>
<td>HK Chinese menu and panel</td>
</tr>
<tr>
<td>HG</td>
<td></td>
<td>HG German menu and panel</td>
</tr>
<tr>
<td>HF</td>
<td></td>
<td>HF French menu and panel</td>
</tr>
<tr>
<td>HL</td>
<td></td>
<td>HL Italian menu and panel</td>
</tr>
<tr>
<td>HS</td>
<td></td>
<td>HS Spanish menu and panel</td>
</tr>
<tr>
<td>IB</td>
<td></td>
<td>IB Built-in primary (112mm)</td>
</tr>
</tbody>
</table>

### Languages

- HE: English menu and panel
- HI: Japanese menu and panel
- HK: Chinese menu and panel
- HG: German menu and panel
- HF: French menu and panel
- HL: Italian menu and panel
- HS: Spanish menu and panel

### Options

- *1: The main unit is not supplied with a plug-in module.
- *2: Up to two 720240 or 720241 modules in total can be installed in a single DL850 main unit.
- *3: Max. four(4) 720210 modules can be installed in a main unit.
- *4: Any number of external powered modules can be used.
- *5: Includes one of each B89691RX and B89697RX connection leads.
- *6: Additionally, 758917 and either the 758922 or 758929 are required for measurement.

### Plug-in Module Model Numbers

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>720221</td>
<td>High-speed 10 MSA/12 B 8-bit Isolation Module (2 ch)</td>
</tr>
<tr>
<td>720226</td>
<td>Voltage Input Module (1 ch)</td>
</tr>
<tr>
<td>701953-L1</td>
<td>16-Ch Temperature/Voltage Input Module</td>
</tr>
<tr>
<td>701953-L3</td>
<td>16-Ch Scanner Box (provided with 3 m cable)</td>
</tr>
<tr>
<td>702230</td>
<td>Logic Input Module (1 ch)</td>
</tr>
<tr>
<td>720241</td>
<td>CAN &amp; LIN Bus Monitor Module (32 ch, available DL850V only)</td>
</tr>
<tr>
<td>701250</td>
<td>High-voltage 100 MSA/16 B Isolation Module (2 ch)</td>
</tr>
<tr>
<td>701251</td>
<td>High-voltage 10 MSA/16 B Isolation Module (2 ch)</td>
</tr>
<tr>
<td>701260</td>
<td>High-voltage 100 MSA/16 B non-Isolation Module (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 (NDIS, 2 ch)</td>
</tr>
<tr>
<td>701271</td>
<td>Signal Module (DI/DO, Short-CAL, 2 ch)</td>
</tr>
<tr>
<td>701275</td>
<td>Acceleration/Voltage Module (with Anti-aliasing Filter, 2 ch)</td>
</tr>
<tr>
<td>701280</td>
<td>Frequency Module (2 ch)</td>
</tr>
</tbody>
</table>

### Probes, Cables, and Converters

<table>
<thead>
<tr>
<th>Product</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100:1 Probe Isolation</td>
<td>701947</td>
<td>1000 V (DC+ACpeak) CAT II</td>
</tr>
<tr>
<td>1:1 Safety BNC Adapter Lead (in combination with followings)</td>
<td>701901</td>
<td>1000 Vrms CAT II</td>
</tr>
<tr>
<td>Safety Mini-Clip (Hook type)</td>
<td>701959</td>
<td>1000 Vrms CAT II (1 set each of red and black)</td>
</tr>
<tr>
<td>Large Alligator-Clip (Dipshank type)</td>
<td>701954</td>
<td>1000 Vrms CAT II (1 set each of red and black)</td>
</tr>
<tr>
<td>Alligator Clip Adapter Set (Rated Voltage 1000 V)</td>
<td>705829</td>
<td>1000 Vrms CAT II (1 set each of red and black)</td>
</tr>
<tr>
<td>Alligator Clip Adapter Set (Rated Voltage 300 V)</td>
<td>758922</td>
<td>300 Vrms CAT II (1 set each of red and black)</td>
</tr>
<tr>
<td>Fork Terminal Adapter Set</td>
<td>758921</td>
<td>1000 Vrms CAT II (1 set each of red and black)</td>
</tr>
<tr>
<td>Passive Probe*</td>
<td>701940</td>
<td>Non-isolated 600 Vpk (701255/70/1)</td>
</tr>
<tr>
<td>1:1 BNC-Alligator Cable</td>
<td>365925</td>
<td>Non-isolated 42 V or less, 1 m</td>
</tr>
<tr>
<td>1:1 BNC-Alligator Cable</td>
<td>365961</td>
<td>Non-isolated 42 V or less, 1.2 m</td>
</tr>
<tr>
<td>Current Probe*</td>
<td>701903</td>
<td>150 Arms, DC to 5 MHZ, supports probe power</td>
</tr>
<tr>
<td>Current Probe*</td>
<td>701905</td>
<td>150 Arms, DC to 10 MHZ, supports probe power</td>
</tr>
<tr>
<td>Current Probe*</td>
<td>701901</td>
<td>150 Arms, DC to 5 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>
</tbody>
</table>

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

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

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