Test&Measurement

YOKOGAWA ◆

DLM 5000

More channels, more possibilities, more insight

DLM5000 Series
Mixed Signal Oscilloscope

Precision Making

As the creator of the world's first 8 channel oscilloscope, and with over 100 years of industry experience, the DLM5000 is Yokogawa's latest addition to our line-up and takes you beyond 8 channels. Adaptability is a key requirement during the development of high-performance and intelligent power-semiconductor technologies and mechatronics applied in a modern electric vehicles, motor controls and energy efficient electronic designs.

Combining a large, highly responsive touchscreen and a traditional oscilloscope panel, the 4 to 8 channel DLM5000 mixed signal oscilloscope allows users to easily navigate through a wealth of analysis features at the touch of their fingertips.

Simple – With a highly responsive touchscreen, users can intuitively navigate through a variety of menus, access zoom features, and search for and identify specific events in a waveform, while still having access to the traditional oscilloscope control panel. The DLM5000 is compact 8-channel scope, making it ideal for your laboratory and design environments.

Adaptable – With up to 8 analog channels and 32 bits of logic, along with additional math channels, vehicle serial bus, and other analysis features, the DLM5000 provides the flexibility users need to capture every measurement. Additionally, DLMsync supports multi-unit synchronization extending measurements up to 16 channels to gain even more application insights.

Dependable – Yokogawa is committed to measurement quality, and the DLM5000 features low residual noise, extensive voltage ranges and a variety of real-time low pass filters to ensure signal fidelity. The history memory allows users to save and analyze each trigger captured, ensuring no data will be lost. Its purpose-built operating system makes the DLM5000 stable and reliable.
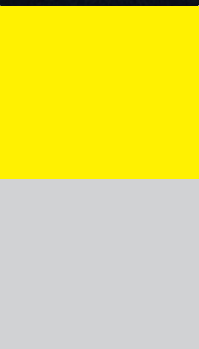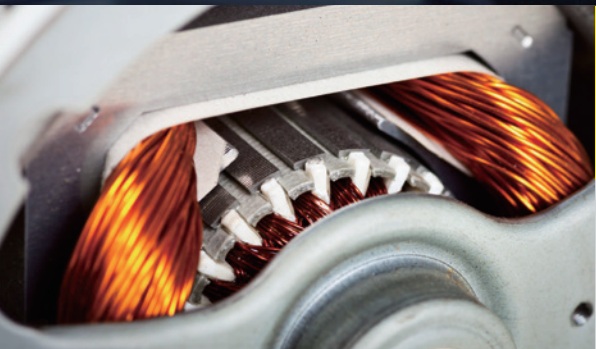
1.6 MHz
POWER SUPPLY SWITCHING FREQUENCY

0.35 WATT
POWER LOSS

500 kbps
CAN BUS BIT RATE

145 H
CAN IDENTIFIER

19.2 kbps
CXPI BUS BIT RATE

465.55357 km
SUBURBAN MAXIMUN RANGE

14.6 Wh/100km
POWER LOSS

40.28 °C
BATTERY TEMPERATURE

89kWh LITHIUM-ION
BATTERY PACK

74.235 %

**38,266.596** s
TIME BEFORE NEXT CHARGE

LITHIUM ATOM

LITHIUM-ION
BATTERY

Basic functions ideal for circuit evaluation/software debugging

8 Analog ch + 32 bits of logic are collectively measured by one unit.

A single DLM5000 has 8 analog channels and 32 bits of logic, which usually requires two mixed signal oscilloscopes. By viewing sensor signals and amplifier inputs and outputs on the analog channels and serial/parallel bus signals on the logic channel, one unit is sufficient for embedded system debugging. The 4 ch model has been newly added to the series lineup.
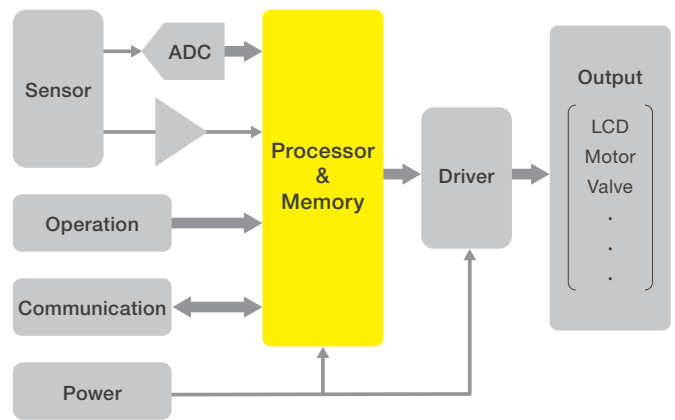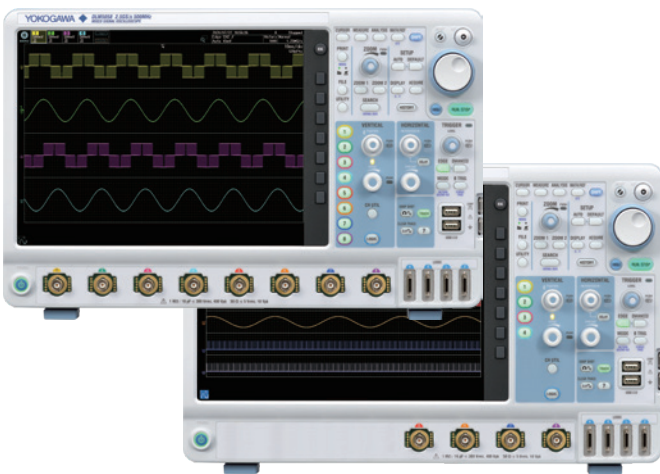
12.1 inch large screen provides a comfortable debugging environment

Equipped with a 12.1-inch large touch screen.
The large screen is useful for observing analog signals in detail and displaying information for debugging, such as parameters, zoom screen, XY display, and FFT analysis results.

Easy to carry and measures quickly

While the DLM5000 is a large screen model with multi-channel inputs, it comes in a portable, thin & lightweight design. The instrument starts up from OFF to waveform display in 12 seconds. You can start measurement work immediately.
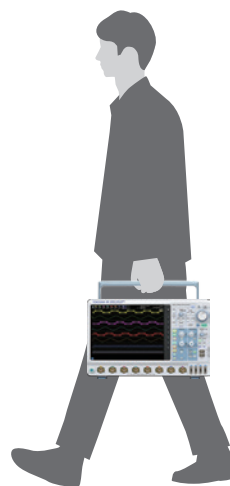
DLM5000

180 mm

DLM3000

193 mm

Modest 180 mm depth
Thinner than the 193 mm DLM3000

Portable

Up to 2.5 GS/s (8 channels at the same time)
Up to 500 Mpoints long memory

The evaluation of an embedded system requires the verification of its operation over a relatively long period of time with software commands and the simultaneous viewing of waveforms of high-speed signals such as clock noise.
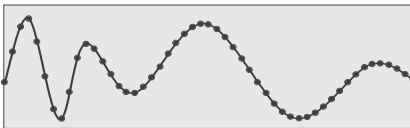
The DLM5000 is equipped with a memory that allows waveform capture of 50 Mpoints in single mode/12.5 Mpoints in repeat mode. You can observe waveforms with very few omissions.

If 500 Mpoints memory (optional) is installed, 0.2 seconds waveform can be captured even at 2.5 GS/s sample rate.

Sample rate is too low.
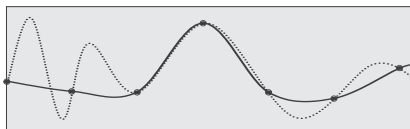
Sample rate is fairly high.

More memory is needed to use higher sample rates and capture the most accurate waveform representation.

**Relationship between measuring time and sample rate in for 500 Mpoints**

Sample rate	Maximum measuring time
2.5 GS/s	0.2 s
250 MS/s	2 s
25 MS/s	20 s
2.5 MS/s	200 s
250 kS/s	2000 s
100 kS/s	5000 s

Maximum record length (Points)

	Repeat	Single (when odd ch only)
Standard model	12.5 M	50 M (125M)
/M1 or /M1S	25 M	125 M (250 M)
/M2 or /M2S	50 M	250 M (500 M)

Two-unit connection function "DLMsync" in response to the request for more channels (/SYN option)

Connecting two DLM5000s (with /SYN option) with a dedicated cable (701982) enables synchronous measurement of up to 16 channels. Captured waveforms are displayed on each unit. Triggers operate in common, and common items, such as record length, sampling rate, acquisition settings and horizontal axis scale settings, are linked, so they can be used like a single 16-channel oscilloscope. You can connect 4 ch models too, so "8 + 4 = 12 channels" or "4 + 4 = 8 channels" is also possible.
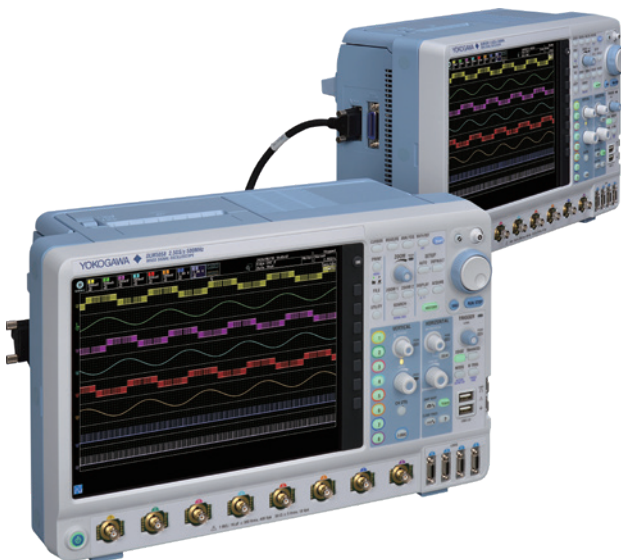
Connecting two DLM5000s with a dedicated cable enables synchronous measurement of up to 16 analog channels. Captured waveforms are displayed on each unit. Triggers operate in common, and common items, such as record length, sampling rate, acquisition settings and horizontal axis scale settings, are linked, so they can be used like a single 16-channel oscilloscope.

Multi-channel measurement application

Motor control & inverter circuit development

4 ch **Limitation of 4 ch scope**
Whole-system measurement is impossible with a four channel scope; the real difficulty is measuring the timing between IGBT gate signals within the inverter. Voltage and current measurements between 3 phases and the IO of the motor driver IC is a very challenging test with a four channel scope. The truly practical solution is an eight channel MSO.

Electronic control unit & mechatronic test

4 ch **Limitation of 4 ch MSO**
The additional logic inputs of a four-channel MSO mixed signal oscilloscope provides enough channels, but this method has a blind-spot. Digital waveform analysis using logic inputs alone cannot reveal anomalies such as voltage drift, noise, distortion or ringing, and measure rise-fall times. ECU testing requires stringent examination of all digital waveforms – and analog input channels are the best tool for the job.
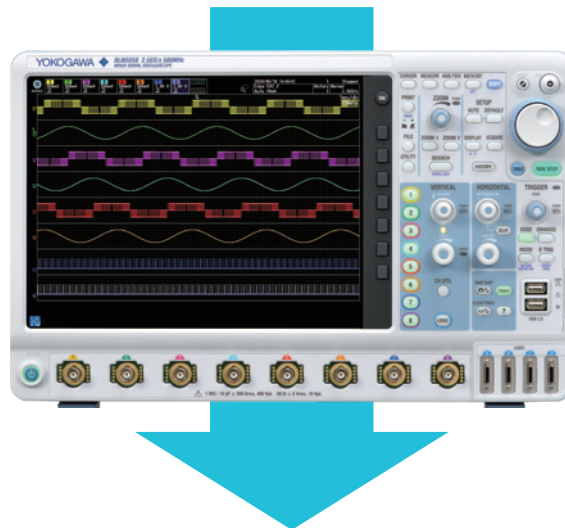

8 ch The key to efficient and reliable high performance electric motors is the modern inverter design, or 'Intelligent Power Module'. Multi-channel, high-speed waveform measurement is an absolute necessity. Four channels are simply not enough. Boasting eight true analog inputs, the DLM5000 empowers today's engineer with a convenient and comprehensive measurement system.

8 ch Numerous I/O analog, digital, and serial-bus waveforms surrounding the Electronic Control Unit (ECU) must be measured. The DLM5000 offers ample channel-count and architecture to monitor eight analog channels and up to 32-bits of logic input while simultaneously performing protocol analysis such as UART, I^2C, SPI, CAN, CAN FD, LIN, CXPI and FlexRay. The DLM5000 can speed up the R&D process when four channels are not enough.
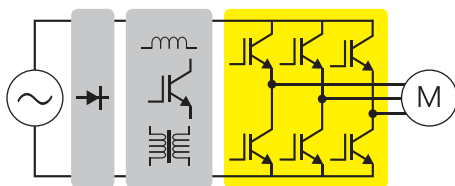
Example: 3 voltage & 3 current measurements of a 3-phase motor
Measurement of the gate-drive signals of six IGBTs within the inverter
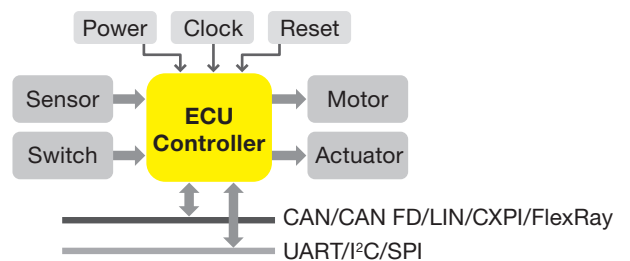
Example: Analog I/O and serial bus controller signals Stringent real time test of digital waveforms in the analog domain.

DLM5000's functions and features

You can replay waveforms later on, so you'll never miss an abnormal waveform

Original history function

Automatically save previously captured waveforms

With the DLM5000 series, up to 100000 previously captured waveforms can be saved in the acquisition memory. With the History function, you can display just one or all of the previously captured waveforms (history waveforms) on screen.

You can also perform cursor measurement, computation, and other operations on history waveforms. Using the History function, you can analyze rarely-occurring abnormal signals even when an appropriate trigger condition is hard to find because its waveform shapes are not constant.
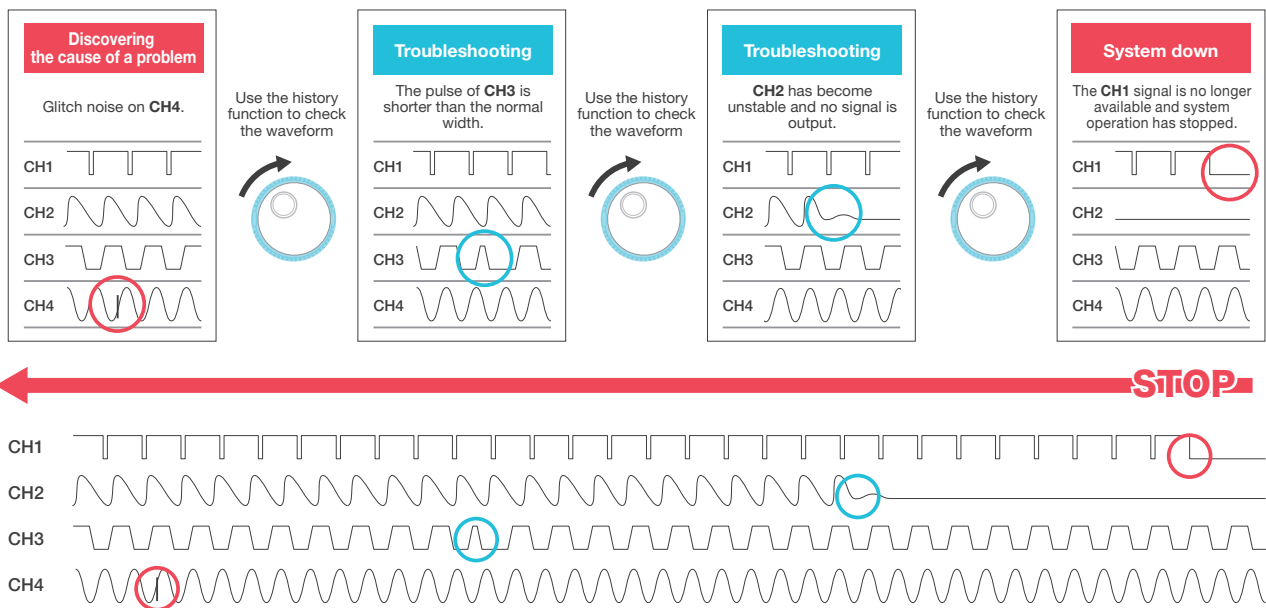
History search function

Various and powerful search methods are available to search up to 100000 waveforms for events meeting your custom requirements.

Intuitive and simple waveform search functions are provided. For example, you can specify a rectangular zone that captures a part of a waveform on the screen, a zone that covers an entire measured waveform, or a polygonal zone. If you know a value of interest, such as an abnormal value of voltage or pulse width, you can search history waveforms using waveform parameters.
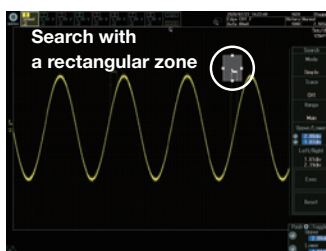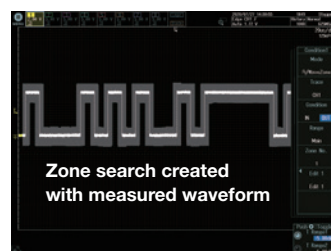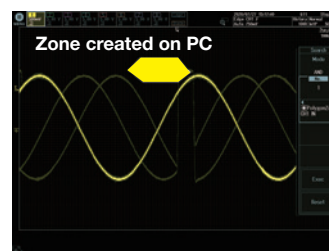
RectZone   WaveZone   PolygonZone   Parameter

Zoom & search function

Multi-channel waveforms captured in the long memory need to be zoomed in vertically and horizontally for detailed viewing. The DLM5000 has the dedicated zoom keys and knob, allowing you to quickly zoom in on the part you want to see. You can also specify the area you want to zoom in on by using the the touch screen.

Zoom two locations simultaneously

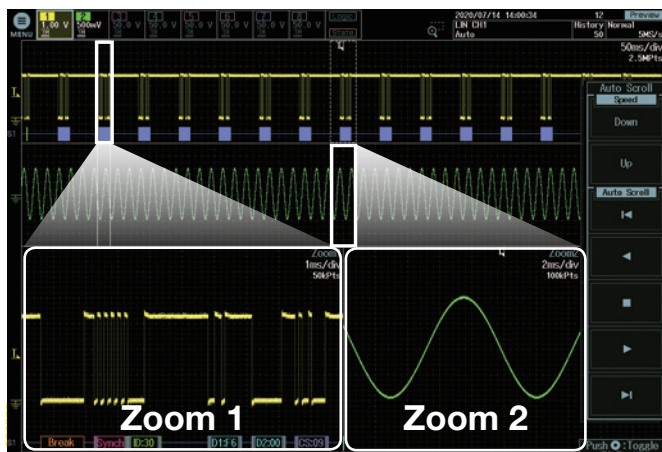You can display two zoomed waveforms with different time axis scales at the same time. Also, use Auto Scroll to sweep the zoom window across the waveforms automatically. Being able to zoom in on two distant locations at the same time, such as "cause" and "effect" of a certain event, or to display them with different zoom factors is very useful for software debugging.

Zoom Search function

Use several search criteria to automatically find and zoom into features in the waveform for further inspection. The locations of the found waveforms are marked on screen (▾shows the current location).

Waveform search criteria

Edge, edge (qualified), state/pattern, pulse width, state width, serial bus (only on models with the serial bus analysis option)
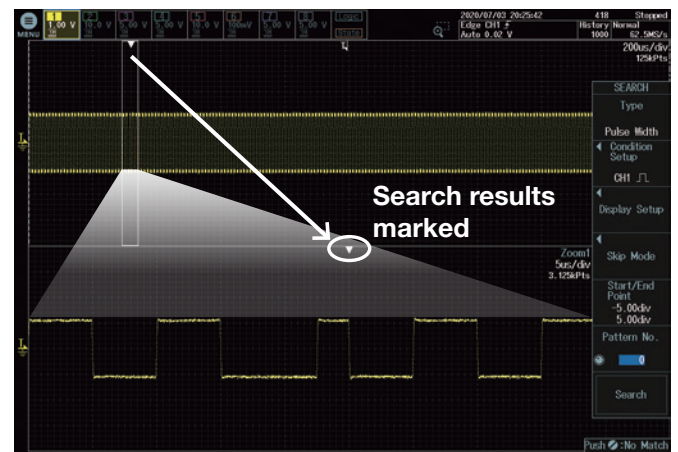
Waveform search using edge criterion

Touchscreen

By using the touchscreen to move the waveform position, change the scale, move the cursor, and such, you can operate the instrument without taking your eyes off the waveform.
If you want to zoom in a part of the waveform, use Rect Zoom for easy zooming by swiping your finger diagonally across the screen to specify the area.
To select items on the dialog box, you can directly touch them, which eliminates the trouble of using select keys.
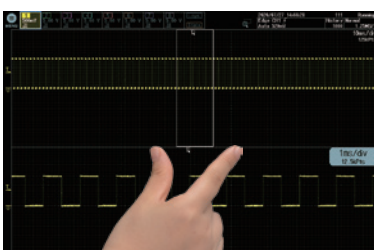
Changing zoom ratio by pinching in and out
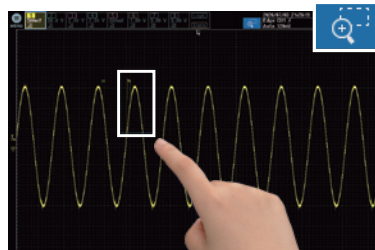
Rect Zoom

Selecting waveform parameter items

Large selection of triggers — Trigger function captures combined analog/digital complex waveforms —

The DLM5000 series comes with a variety of easy-to-configure triggers combining analog and logic inputs such as edge, enhanced, and B triggers. By using a digital trigger system, trigger errors are minimized.

Trigger types

Edge trigger ————————————— Edge
                                                    (Rise/Fall/Both)

Enhanced
triggers
- Edge OR ——————— Edge OR
- Pattern ——————— Pattern
- Pulse Width ——————— Pulse width
- Rise/Fall Time ——————— Rise/Fall time
- Runt ——————— Runt
- Timeout ——————— Timeout
- Window ——————— Window
- Window OR ——————— Window OR
- Interval ——————— Interval
- Serial ——————— Serial (optional)
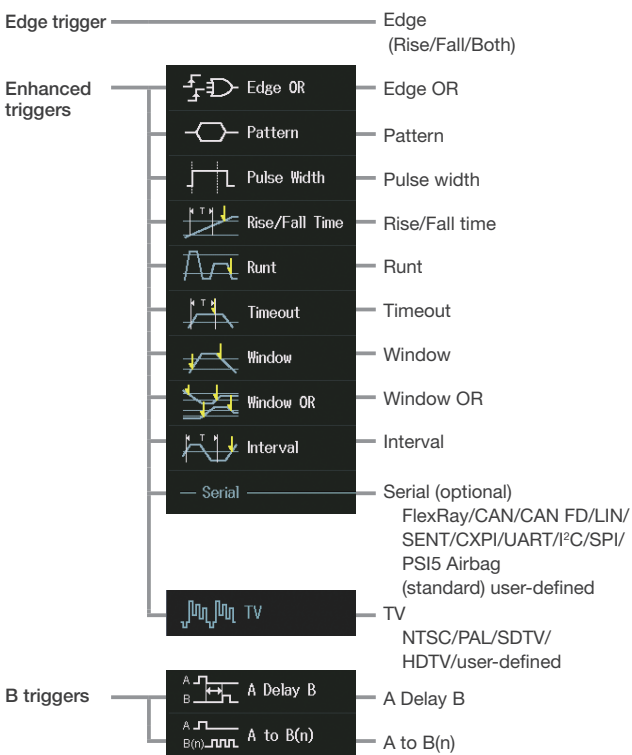   FlexRay/CAN/CAN FD/LIN/
                SENT/CXPI/UART/I²C/SPI/
                PSI5 Airbag
                (standard) user-defined
- TV ——————— TV
                NTSC/PAL/SDTV/
                HDTV/user-defined

B triggers
- A Delay B ——————— A Delay B
- A to B(n) ——————— A to B(n)

Runt trigger

In a circuit that synchronizes external input signals with a clock, metastable phenomena can cause problems, such as narrowing the pulse width or generating abnormal waveforms where the signal level does not reach the specified value.
A runt trigger is useful to trigger on such phenomena. Runt trigger can be used to trigger on a constant pulse train, for example, when the signal level does not rise to the specified high level and then falls to the specified level. It detects and triggers a halfway pulse (runt pulse) that has fallen to a low level.
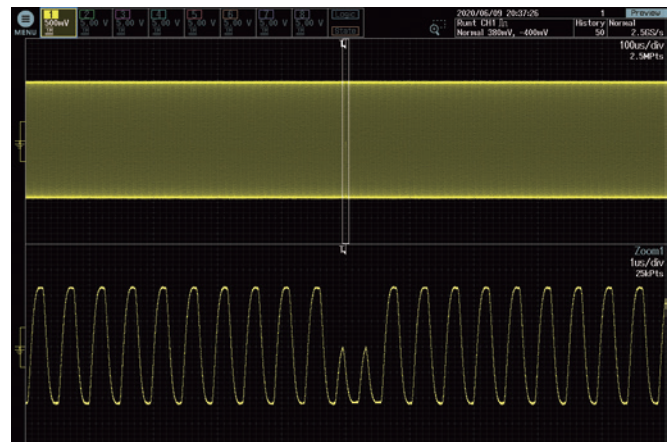
Triggers on multiple channels (Edge OR / Pattern)

Multiple channels can be monitored simultaneously and triggered by the timing of any edge change or a combination of High and Low conditions.

Edge OR trigger

When CH1 = ⌐ and CH2 = ⌐

CH1

CH2

Trigger   Trigger   Trigger
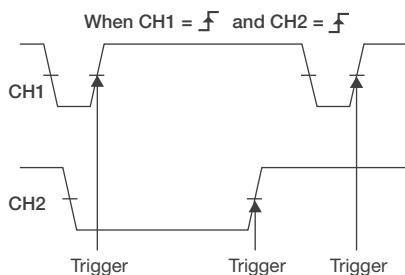
Although normal edge trigger targets only one channel, edge OR trigger targets all input channels and can be triggered when there is a change in any of them.
This is a powerful tool in cases where it is not possible to specify in advance which channel the change will occur.

Triggers on a range set by upper level and lower level. (Window)

It sets two signal levels, an upper and lower limit, and triggers on the condition of whether or not it is IN / OUT of range and how long it stays in that range.

OUT

Upper Level –

                                                    Window   IN

Lower Level –

OUT
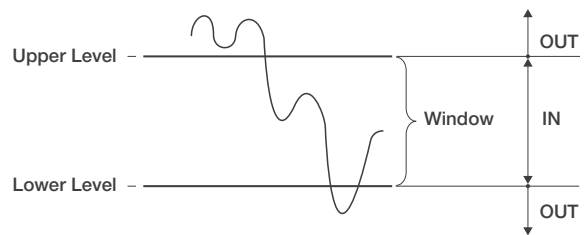
In case of normal edge trigger, only one level can be set, but in case of window trigger, two levels can be set, Upper and Lower.
This is very useful for checking whether the voltage is within the upper and lower limits.

Filter functions

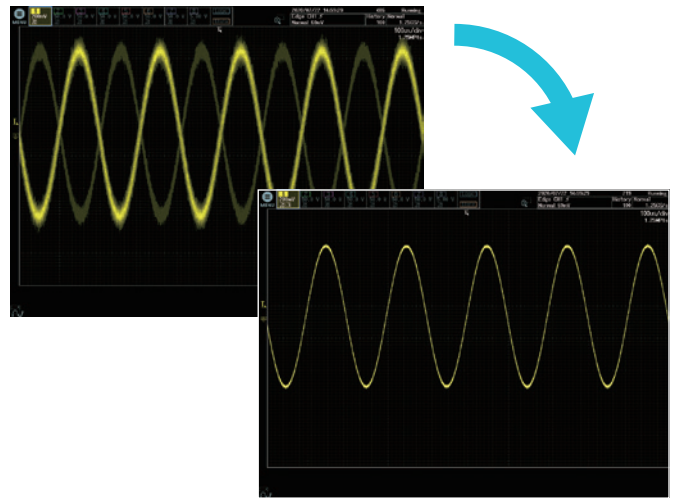**Real time filter with optimum noise reduction supports a wide range of frequencies — from 8 kHz to 200 MHz —** Each channel has 14 low pass filters available with cutoff frequencies from 8 kHz to 200 MHz. Waveforms are filtered prior to storage in memory. Real-time filters allow for stable triggering of superimposed noise signals.

Processing with Real time filters

Stable trigger as a result of noise reduction

Logic signal measurement and analysis

The flexible MSO inputs are included as standard. This enables the DLM5000 to be converted to a 8 analog and 16 digital input MSO. With the /L32 option, up to 32 logic signals can be measured. Bus/State display and optional DA calculation function, which is useful for evaluating AD/ DA converters, are also provided.

Display by bus notation
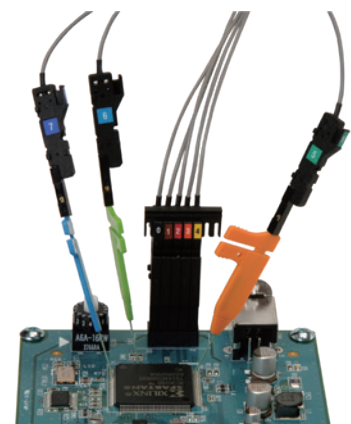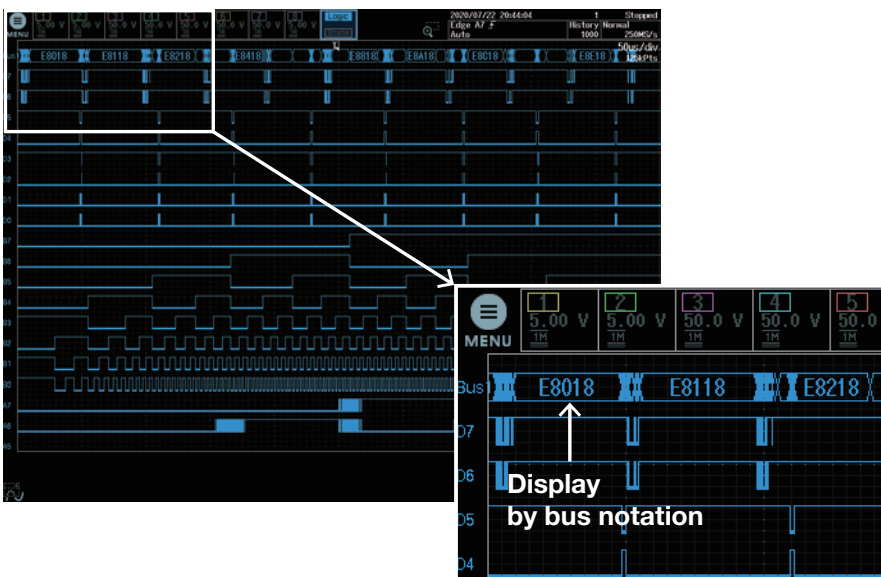
Features designed for productivity

Measure function and statistics

Twenty-nine waveform parameter measurements are included.

Automated measurement of up to 30 simultaneous measurements is available. Statistical values can also be measured continuously, cycle-by-cycle or using history memory. In addition, cycle-by-cycle parameter measurement is possible to calculate fluctuations of a captured waveform.

FFT analysis

Up to 4 FFT analyses can be performed simultaneously. FFT can be performed on computed waveforms in addition to the actual waveforms on CH1 to CH8. The peak detection function that automatically detects the spurious frequency is a useful feature for searching for a noise source, such as clock and power supply switching noise.
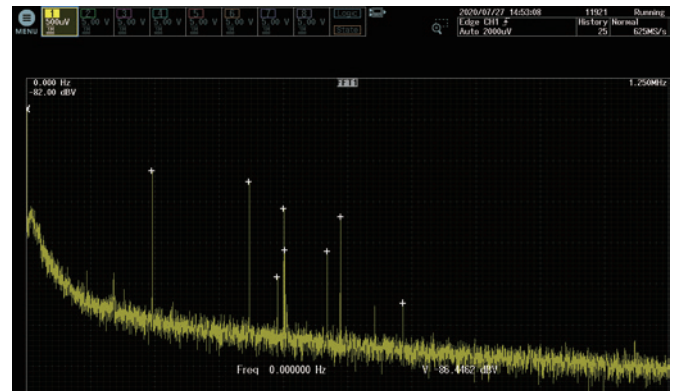
Statistical calculation of waveform parameters

For repetitive waveforms, a large number of periodic waveforms are captured on the memory. The DLM5000 can statistically analyze the parameters of repetitive waveforms. Jitter measurement and level fluctuation analysis are possible.

Normal statistical processing

The waveform parameters for each successive trigger are calculated and statistically processed.

Histogram Display

Small ← → Large ↕ frequency
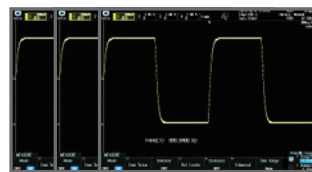
Statistical Processing of History Waveforms

Calculates and statistically processes the waveform parameters of each trigger waveform in history memory.

HISTORY

Trend Display

Time elapsed → ↕ Large Small

CSV format file

Cyclic Statistical Processing

The waveform displayed on the screen is divided into each cycle and the waveform parameters are calculated and statistically processed individually.

Waveform parameters for each cycle in the captured waveform

	:Max	:Min	:Mean	:σ	:Count
Freq(C1)	1.000416kHz	999.5522 Hz	999.9917 Hz	102.0595mHz	1357
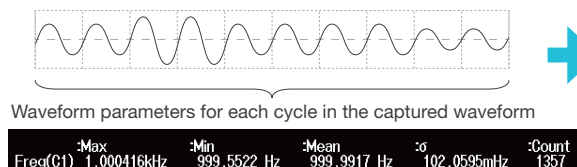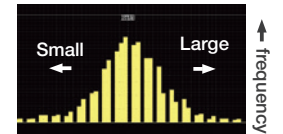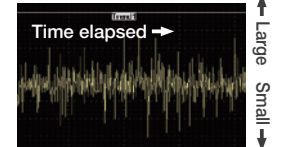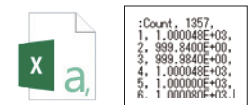
Waveform parameter statistics
- Maximum / Minimum
- Mean / Standard deviation

Snapshot

By pressing the "camera" key to the lower right of the screen, you can freeze a white trace of the currently displayed waveform on the screen. You can press the key repeatedly and conveniently leave traces for comparing multiple waveforms.
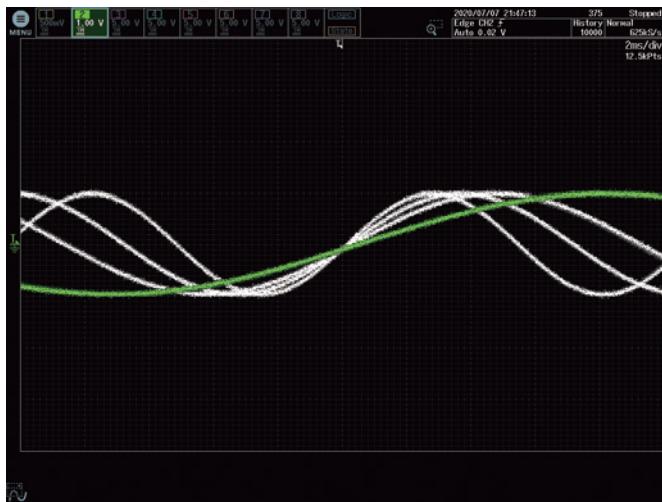
Thumbnails of saved files

Display thumbnails of saved waveforms, waveform images, and Wave Zone files for easier browsing, copying or deleting. A full-size view shows even more details.
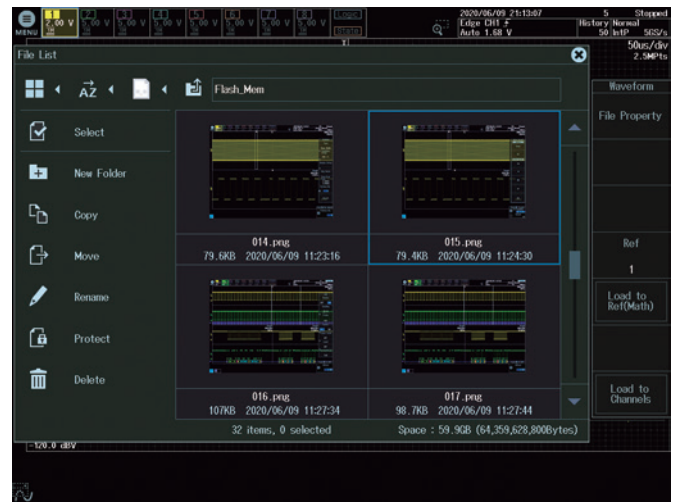
Action on trigger, GO/NO-GO

GO/NO-GO automates pass or fail determination for trigger conditions, waveforms, measured parameters, and other criteria. Actions automate buzzer sounds, file saving, or email notification. Waveforms in which an abnormality occurred can be saved for confirmation and analysis of the phenomena at a later time.

Abnormal waveform detected

Action specified for NO-GO

Buzzer

Save waveform data file

Output to printer

E-mail transmission
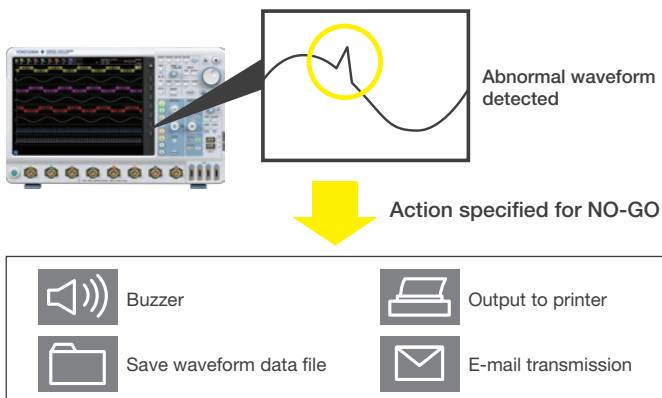
Graphical online help

Get help without having to find the user manual. Pressing the "?" key opens detailed graphical explanations of the oscilloscope's functions.
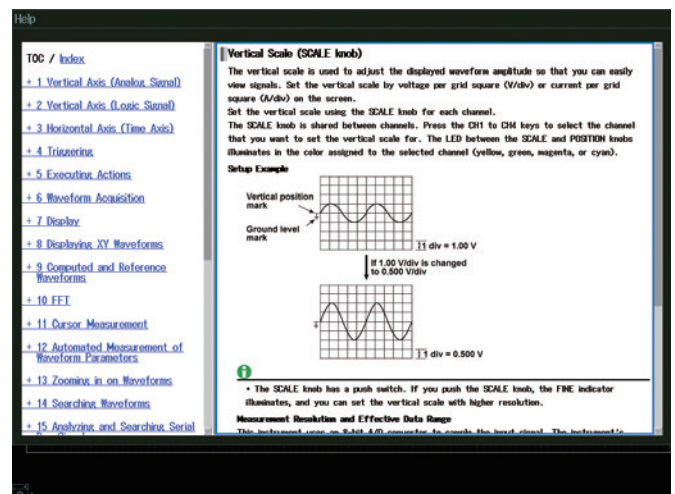
Application-specific analysis options

Serial analysis function options (/F01 to /F06)

UART (RS232) /I²C/SPI/CAN/CAN FD/LIN/FlexRay/SENT/CXPI/PSI5 Airbag

Dedicated trigger and analysis options are available for various serial buses of both in-vehicle and embedded systems. Logic input can also be used for I²C/SPI/UART/SENT. When it is not necessary to observe waveform quality of a bus, decoding or analysis using logic inputs is possible.

Unique auto setup

Yokogawa's proprietary auto setup function automatically analyzes the input signal and complex parameters such as bit rate and threshold level, selecting the optimal settings in seconds. This feature not only saves time but is also a powerful debugging feature when the bit rate and other parameters are unknown.

Simultaneous analysis of up to 4 buses

Perform high-speed simultaneous analysis on up to four different serial buses operating at different speeds. Extensive search capabilities enhance the usability, allowing the user to find specific data in the very long memory. The dual-zoom facility means that different buses can be viewed and debugged alongside each other.

4-bus list display

Waveform display and decode results
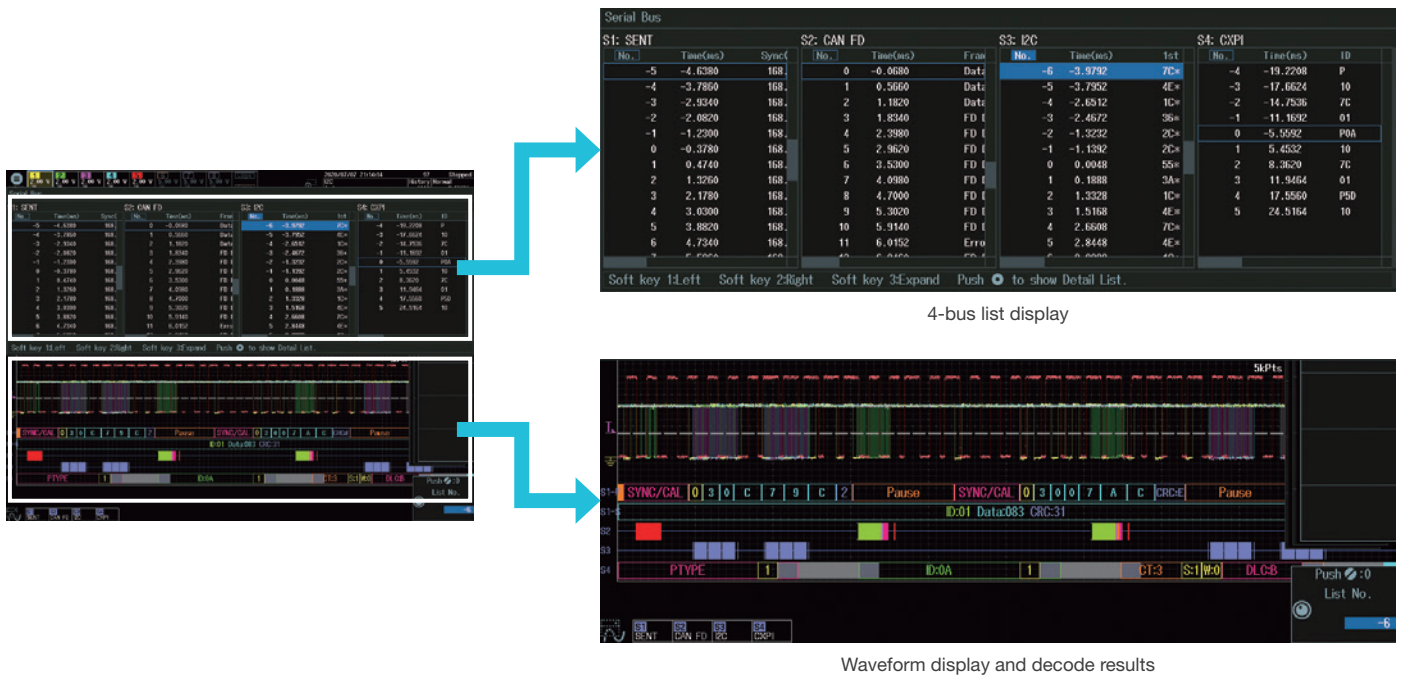
Related accessories (sold separately)

Differential probe PBDH0500 (701925)

DC to 500 MHz bandwidth1 MΩ, approximately 1.1 pF
Maximum differential input voltage range: ±25 V

Logic probe PBL100/PBL250 (701988/701989)

100 MHz/250 MHz toggle frequency 1 MΩ, 10 pF/100 kΩ, 3 pF
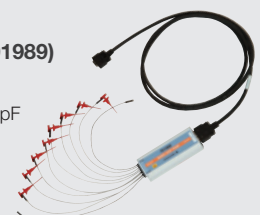
User defined math option (/G02)

Equations can be arbitrarily created using a suite of operators such as trigonometric and logarithmic operators, integration and differentiation, pulse width operators, phase measurement and digital to analog conversion.

Power supply analysis option (/G03)

Switching loss analysis

Calculate switching loss [V(t) × i(t)] over long test cycles utilizing the long built-in memory. A wide variety of switching loss analyses are supported, including turn-on/off loss calculation, loss including continuity loss, and loss over long cycles of 50 Hz/60 Hz power line.
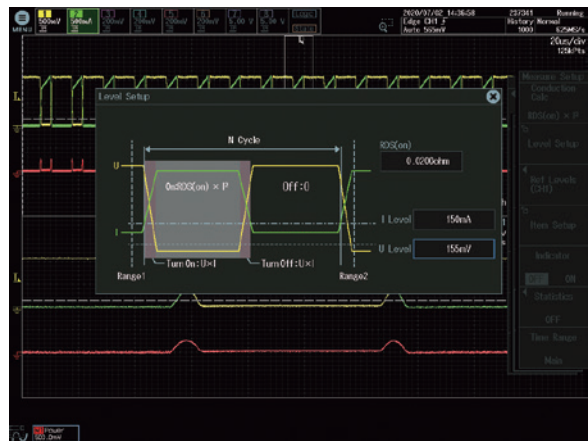
Power parameter measurement

Measure power parameters automatically for up to four pairs of voltage and current waveforms, such as active power, apparent power, power factor, and more. Cycle statistics and history statistics can also be calculated.

<div style="background:#eee">
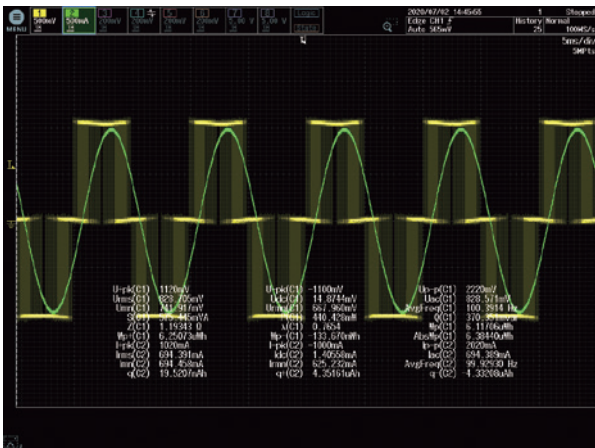
Related accessories
(sold separately)

Differential probe PBDH0150 (701927)

DC to 150 MHz
1000 Vrms/ ±1400 Vpeak
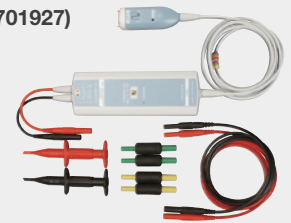
Current probe PBC100/PBC050 (701928/701929)

DC to 100 MHz (701928)
DC to 50 MHz (701929)
30 Arms

</div>
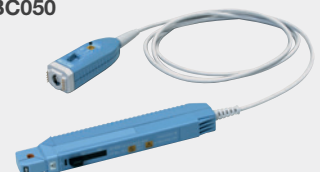
Intuitive control panel and connectivity
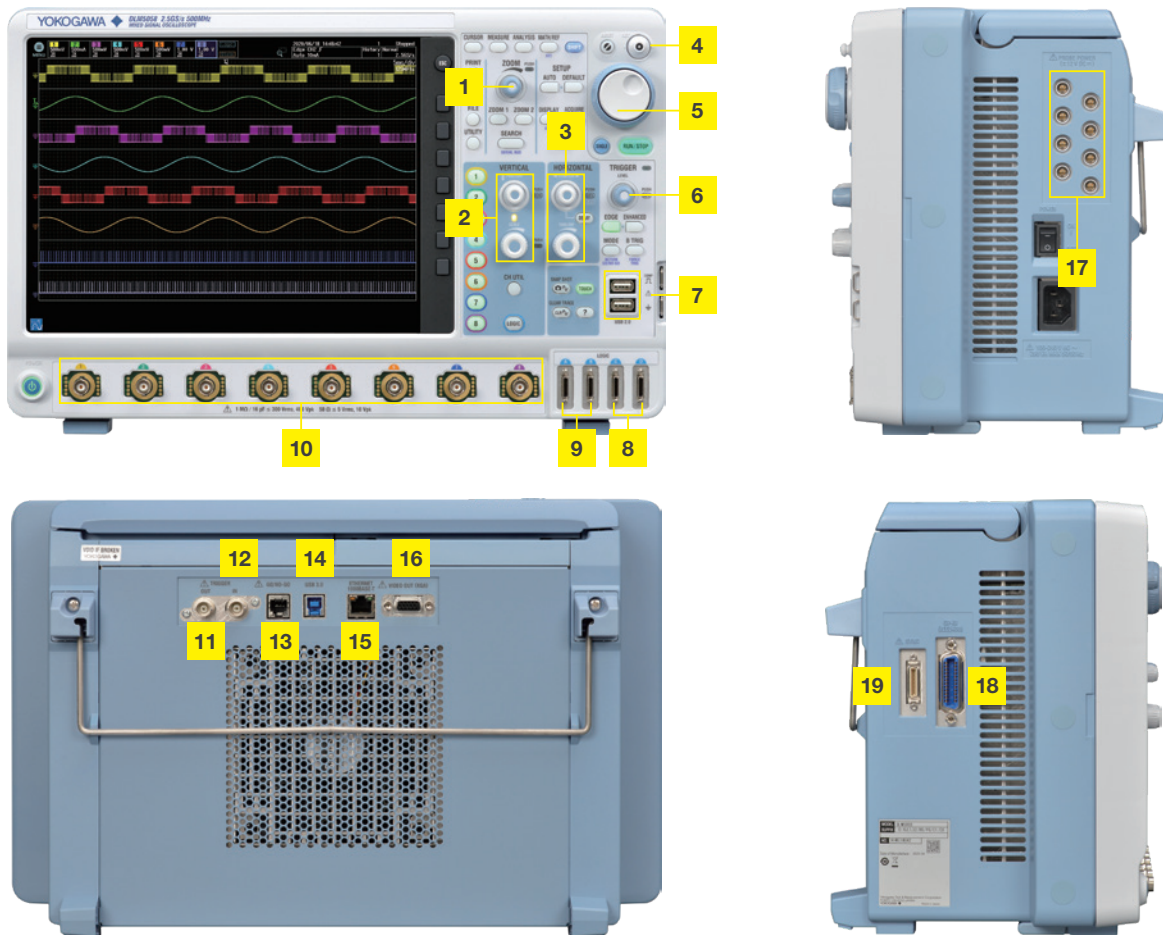
* The photo shows the 8-channel model.

1	Dedicated Zoom Knob
2	Vertical Position and Scale Knob
3	Horizontal Position and Scale Knob
4	Four-Direction Selector Button Select key moves the cursor up/down/left/right
5	Jog Shuttle and Rotary Knob
6	Dedicated Trigger Level Knob
7	USB peripheral connection terminal × 2
8	Logic input connector 16 bit (optional)
9	Logic input connector 16 bit (standard)
10	Eight Analog Input Channels[*1]

11	External trigger output
12	External trigger input
13	GO/NO-GO output terminal
14	USB-PC connection terminal
15	1000 BASE-T Ethernet
16	RGB video output terminal
17	Probe power supply terminal × 8 (optional)[*2]
18	GP-IB connection terminal (optional)
19	Synchronous operation terminal (for DLMsync[*3])

*1: Four ch model has 4 analog inputs
*2: Four ch model has 4 terminals
*3: Option is required for feature activation

Wide range of interfaces and software

Increase work efficiency by using PC

Gigabit Ethernet and USB 3.0[*1] as standard communication interfaces

DLM5000's long memory is useful for suppressing failure in capturing waveforms, such as the history function, but it takes time to transfer data to a PC.

With the standard-equipped Gigabit Ethernet and USB 3.0, the DLM5000 is approximately 10 times faster at saving data to the internal storage and at transferring data to a PC.[*2]

Get answers faster, even with large data sets.

USB3.0

*1: USB function only. USB host function uses USB 2.0 communication.
*2: When /C8 option (SSD) is installed for internal storage and USB 3.0 mass storage connection is used for transfer. Compare with the conventional model (DLM4000).

Purpose-built operating system to realize stability and reliability

1000BASE-T/100BASE-TX/10BASE-T compliant adapters (hubs and routers)

Sends waveform, screen, and settings data
Remote control
Mail transmission
(GO/NO-GO action)

Sends waveform, screen, and settings data
Remote control

Ethernet (Standard)

USB 3.0 (Standard on rear panel)

Supports USB storage, USB mouse and keyboard.

Mouse   Keyboard

On PCs
DLM5000's internal storage can be recognized by a PC as an external USB storage device. Transferring files is easy even when a USB thumb drive can't be used.

IS8000 Integrated Software Platform

Unify high precision instruments and measurement data to accelerate engineering workflow

- Combines power measurement, high-speed waveform logging, and analysis software in a single platform.
- Seamlessly completes a series of operations from data collection and analysis to report generation.

Download the free 30-day trial <https://tmi.yokogawa.com/p/is8000/>

Device control	Measurement	Analysis	Export
Device Settings	High-speed Acquisition	Enhanced Viewer	Export to CSV
Remote Monitoring	Power & Waveform Sync.	FFT Analysis	Export to MDF
Application Control Interface	High-Speed Cam. Sync.	Enhanced Math	Report Generator
Connect to Multi units	IEC Harmonic/Flicker Test & Analysis		

■ Standard functions of the software platform ■ Add-on Functions ■ Only available in IS8011/8012

Other software

Correspondence: Yes   Incompatible: No

Category	Software	Features/Description	Off-line waveform display and analysis	Waveform monitoring on a PC	Data transfer to a PC	Command control Custom software development
Optional Software	IS8000 Integrated Software Platform	An integrated solution that accelerates engineering workflow	Yes	Yes	Yes	Yes[*1]
	Xviewer[*2] **Trial version available**	Remote control of the instruments using the PC. Waveform observation and analysis • Cursor, Parametric Measure • Statistical Analysis • Multiple file display • Comment, marking, printing and making report • Optional Math computation feature • On-line communication functions • Remote monitor • Transferring waveform & image files	Yes	Yes	Yes	No
Free Software	XviewerLITE	Free version of Xviewer. Zoom, V-cursor, conversion to CSV format	Yes	No	No	No
	XWirepuller	Control the DL (M) series from the PC	No	Yes	Yes	No
	Control library "TMCTL"	Create programs and control the instrument remotely	No	No	No	Yes
	DL-Term	Command line tool for the DL series library	No	No	No	Yes
	LabVIEW drivers (for DLM5000/950)	Instrument driver for DL950 and DLM5000 *Program development environment provided by National Instruments (NI)	No	No	No	Yes
	MATLAB WDF Access ToolBox	Access to waveform data files saved in WDF format on MATLAB*. *MathWorks's product.	No	No	No	Yes

*1: Support for APIs   *2: Download site: <https://tmi.yokogawa.com/p/xviewer/>

Specifications

(On the 4-channel model, CH8 should be read as CH4 and M8 should be read as M4.)

Models

Model name	Frequency bandwidth	Analog input	Logic input	Max. sample rate
DLM5038	350 MHz	8 channels	16 bit (Standard) or 32 bit (/L32)	2.5 GS/s
DLM5058	500 MHz			
DLM5034	350 MHz	4 channels		
DLM5054	500 MHz			

Analog Signal input

Input channels
Analog input DLM50x8: CH1 to CH8
DLM50x4: CH1 to CH4

Input coupling setting AC 1 MΩ, DC 1 MΩ, DC 50 Ω

Input impedance
Analog input	1 MΩ	±1.0%, approximately 16 pF
	50 Ω	±1.0% (VSWR 1.4 or less, DC to 500 MHz)
Voltage axis sensitivity setting range	1 MΩ	500 µV/div to 10 V/div (steps of 1-2-5)
	50 Ω	500 µV/div to 1 V/div (steps of 1-2-5)
Max. input voltage	1 MΩ	Must not exceed 300 Vrms or 400 Vpeak
	50 Ω	Must not exceed 5 Vrms or 10 Vpeak

Max. DC offset setting range
1 MΩ	500 µV/div to 50 mV/div	±1 V
	100 mV/div to 500 mV/div	±10 V
	1 V/div to 10 V/div	±100 V
50 Ω	500 µV/div to 50 mV/div	±1 V
	100 mV/div to 1 V/div	±5 V

Vertical-axis (voltage-axis)
DC accuracy[1]	500 µV/div	±(3.0% of 8 div + offset voltage accuracy)
	1 mV/div to 10 V/div	±(1.5% of 8 div + offset voltage accuracy)

Offset voltage accuracy[1]
500 µV to 50 mV/div	±(1% of setting + 0.2 mV)
100 mV to 500 mV/div	±(1% of setting + 2 mV)
1 V to 10 V/div	±(1% of setting + 20 mV)

Frequency characteristics (–3 dB attenuation when inputting a sinewave of amplitude ±3 div)[1][2]

		DLM503x	DLM505x
1 MΩ (when using attached 10:1 passive probe)	20 mV to 100 V/div	350 MHz	500 MHz
	10 mV/div	350 MHz	350 MHz
	5 mV/div	200 MHz	200 MHz
50 Ω	2 mV to 1 V/div	350 MHz	500 MHz
	1 mV/div	350 MHz	350 MHz
	500 µV/div	200 MHz	200 MHz

Isolation between channels	Maximum bandwidth: –34 dB (typical value)
Residual noise level[3]	The larger of 0.2 mVrms or 0.05 div rms (typical value)
A/D resolution	8 bit (25 LSB/div) Max. 12 bit (in High Resolution mode)
Bandwidth limit	FULL, 200 MHz, 100 MHz, 20 MHz, 10 MHz, 5 MHz, 2 MHz, 1 MHz, 500 kHz, 250 kHz, 125 kHz, 62.5 kHz, 32 kHz, 16 kHz, 8 kHz (can be set for each channel)

Maximum sample rate
Real time sampling mode	2.5 GS/s
Repetitive sampling mode	250 GS/s

Maximum record length (Points)

	Repeat	Single (when odd ch only)
Standard model	12.5 M	50 M (125M)
/M1 or /M1S	25 M	125 M (250 M)
/M2 or /M2S	50 M	250 M (500 M)

Ch-to-Ch deskew	±1 µs
Time axis setting range	1 ns/div to 500 s/div (steps of 1-2-5)
Time base accuracy[1]	±2.5 ppm (at shipping or calibration), ±1.0 ppm/year (ageing)
Dead time in N Single mode	Approx. 0.9 µs

Logic Signal Input

Number of inputs	16 bit (/L32: 32 bit)
Maximum toggle frequency[1]	Model 701988: 100 MHz, Model 701989: 250 MHz
Compatible probes	701988, 701989 (8 bit input)
Min. input voltage	701988: 500 mVp-p, 701989: 300 mVp-p
Input range	Model 701988: ±40 V Model 701989: threshold ±6 V
Max. nondestructive input voltage	Model 701988: ±42 V (DC + ACpeak) or 29 Vrms Model 701989: ±40 V (DC + ACpeak) or 28 Vrms
Threshold level setting range	Model 701988: ±40 V (setting resolution of 0.05 V) Model 701989: ±6 V (setting resolution of 0.05 V)
Input impedance	701988: Approx. 1 MΩ/approx. 10 pF, 701989: Approx. 100 kΩ/approx. 3 pF
Maximum sampling rate	1.25 GS/s

Maximum record length (Points)

		Repeat	Single
Standard		12.5 M	50 M (125 M)
/M1 or /M1S		25 M	125 M (250 M)
/M2 or /M2S		50 M	250 M (500 M)

When selected in parentheses, only logic ports A and B are valid.

Triggers

Trigger modes Auto, Auto Level, Normal, Single, N-Single, Force trigger

Trigger type, trigger source

A triggers	Edge	CH1 to CH8, Logic, EXT, LINE
	Edge OR	CH1 to CH8
	Pulse Width	CH1 to CH8, Logic
	Timeout	CH1 to CH8, Logic
	Pattern	CH1 to CH8, Logic
	Runt	CH1 to CH8
	Rise/Fall Time	CH1 to CH8
	Interval	CH1 to CH8, Logic
	Window	CH1 to CH8
	Window OR	CH1 to CH8
	TV	CH1 to CH8
	Serial Bus	I²C (optional) CH1 to CH8, Logic
		SPI (optional) CH1 to CH8, Logic
		UART (optional) CH1 to CH8, Logic
		FlexRay (optional) CH1 to CH8
		CAN (optional) CH1 to CH8
		CAN FD (optional) CH1 to CH8
		LIN (optional) CH1 to CH8
		SENT (optional) CH1 to CH8, Logic
		CXPI (optional) CH1 to CH8
		PSI5 Airbag (optional) CH1 to CH8
		User Define CH1 to CH8
AB triggers	A Delay B	10 ns to 10 s
	A to B(n)	1 to 10⁹

Trigger level setting range	CH1 to CH8	±4 div from center of screen
Trigger level setting resolution	CH1 to CH8	0.01 div (TV trigger: 0.1 div)
Trigger level accuracy[1]	CH1 to CH8	±0.04 div

Display

Display[4] 12.1-inch TFT LCD with a capacitive touch screen, 1024 × 768 (XGA)

Functions

Waveform acquisition modes Normal, Envelope, Average

High Resolution mode Max. 12 bit

Sampling modes Real time, interpolation, repetitive

Accumulation Select OFF, Intensity (waveform frequency by brightness), or Color (waveform frequency by color)
Accumulation time: 100 ms to 100 s, Infinite

Roll mode Enabled at 100 ms/div to 500 s/div (depending on the record length setting)

Zoom function Two zooming windows can be set independently (Zoom1, Zoom2)
Zoom factor	×2 to 2.5 points/10 div (in zoom area)
Scroll	Auto Scroll
Search functions	Edge, Pulse Width, Timeout, Pattern, I²C (optional), SPI (optional), UART (optional), CAN (optional), CAN FD (optional), LIN (optional), FlexRay (optional), SENT (optional), CXPI (optional), PSI5 Airbag (optional), User Define

History memory Max. data (record length 1.25 k Points, with)
/M2 or /M2S: 100000, /M1 or /M1S: 50000,
Standard: 20000
History search	Select Rect, Wave, Polygon, or Parameter mode
Replay function	Automatically displays the history waveforms sequentially
Display	Specified or average waveforms

Cursor Types ΔT, ΔV, ΔT & ΔV, Marker, Degree

Snapshot Currently displayed waveform can be retained on screen

Computation and Analysis Functions

Parameter Measurement Max, Min, P-P, High, Low, Amplitude, Rms, Mean, Sdev, IntegTY+, IntegTY, +Over, –Over, Pulse Count, Edge Count, V1, V2, ΔT, Freq, Period, Avg Freq, Avg Period, Burst, Rise, Fall, +Width, –Width, Duty, Delay

Statistical computation of parameters Max, Min, Mean, σ, Count

Statistics modes Continuous, Cycle, History

Trend/Histogram display of wave parameters Up to 2 trend or histogram display of specified wave parameters

Computations (MATH)	+, −, ×, Filter (Delay, Moving Avg, IIR Lowpass, IIR Highpass), Integ, Count (Edge, Rotary), user defined math (optional)
Computable no. of traces	8 (M1 to M8) (4 trace for 4 ch model) (mutually exclusive with REF trace)
Max. computable memory length	Same as the maximum record length
Reference function	Up to 8 traces (Ref1 to Ref8) of saved waveform data can be displayed and analyzed (4 trace for 4 ch model) (mutually exclusive with MATH trace)
Action-on-trigger	Actions: Buzzer, Print, Save, Mail
GO/NO-GO	Modes: Rect, Wave, Polygon, Parameter Actions: Buzzer, Print, Save, Mail
X-Y	Displays XY1 to XY4 and T-Y simultaneously (XY1, XY2 and T-Y for 4ch model)
FFT	Number of points: 1.25 k, 2.5k, 12.5 k, 25 k, 125 k, 250 k, 1.25 M Window functions: Rectangular, Hanning, Flat-Top FFT Types: PS (LS, RS, PSD, CS, TF, CH are available with /G02 option)
Histogram	Displays a histogram of acquired waveforms
User-defined math (/G02 option)	The following operators can be arbitrarily combined in equations: +, −, ×, /, SIN, COS, TAN, ASIN, ACOS, ATAN, INTEG, DIFF, ABS, SQRT, LOG, EXP, LN, BIN, DELAY, P2 (power of 2), PH, DA, MEAN, HLBT, PWHH, PWLL, PWHL, PWLH, PWXX, FV, DUTYH, DUTYL, FILT1, FILT2 The maximum record length that can be computed is the same as the standard math functions.

Power supply analysis (/G03 option)

Power analysis		Selectable from 4 analysis types Deskweing between the voltage and current waveforms can be executed automatically.
	Switching loss	Measurement of total loss and switching loss, power waveform display, Automatic measurement and statistical analysis of power analysis items (PTurn On, PTurn Off, POn, PTotal, WpTurn On, WpTurn Off, Wp On, WpTotal, Cycle Count)
	Safety operation area	SOA analysis by X-Y display, using voltage as X axis, and current as Y axis is possible
	Harmonic analysis	Basic comparison is possible with following standard Harmonic emission standard IEC61000-3-2 edition 4.0, EN61000-3-2 (2006), IEC61000-4-7 edition 2.1
	Joule integral	Joule integral (I²t) waveform display, automatic measurement and statistical analysis is possible
Power Measurement		Automated measurement of power parameters for up to four pairs of voltage and current waveforms. Values can be statistically processed and calculated.
	Measurement parameters	Urms, Umn, Udc, Urmn, Uac, U+pk, U−pk, Up−p, Irms, Imn, Idc, Irmn, Iac, I+pk, I−pk, Ip−p, P, S, Q, Z, λ, Wp, Wp+, Wp−, Abs.Wp, q, q+, q−, Abs.q, Avg Freq (voltage, current)

Common Features of Serial Bus Signal Analysis Functions

Analysis result display	Decoded information is displayed together with waveforms or in list form.
Auto setup function	A threshold value, time axis scale, voltage axis scale and other bus-specific parameters such as a bit rate and recessive level are automatically detected. Trigger conditions are set based on the detected result and decoded information is displayed. (The type of a bus signal needs to be specified in advance.)
Search function	Search of all waveforms for a position that matches a pattern or condition specified by data information.
Analysis result saving function	Analysis list data can be saved to CSV-format files.

I²C Bus Signal Analysis Functions (/F01 Option)

Applicable bus	I²C bus	Bus transfer rate: 3.4 Mbit/s max. Address mode: 7 bit/10 bit
	SM bus	Complies with System Management Bus
Analyzable signals		CH1 to CH8, Logic input, or M1 to M8
I²C trigger modes		Every Start, Address & Data, NON ACK, General Call, Start Byte, HS Mode
Analyzable no. of data		300000 bytes max.
List display items		Analysis no., time from trigger position [Time (ms)], 1st byte address, 2nd byte address, R/W, Data, Presence/absence of ACK, information

SPI Bus Signal Analysis Functions (/F01 Option)

Trigger types	3 wire, 4 wire After assertion of CS, compares data after arbitrary byte count and triggers.
Analyzable signals	CH1 to CH8, Logic input, M1 to M8
Byte order	MSB, LSB
Analyzable no. of data	300000 bytes max.
List display items	Analysis no., time from trigger position [Time (ms)], Data 1, Data 2

UART Signal Analysis Functions (/F01 Option)

Bit rate	115200 bps, 57600 bps, 38400 bps, 19200 bps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, User Define (an arbitrary bit rate from 1 k to 10 Mbps with resolution of 100 bps)
Analyzable signals	CH1 to CH8, Logic input, or M1 to M8
Data format	Select a data format from the following 8 bit (Non Parity), 7 bit Data + Parity, 8 bit + Parity
UART trigger modes	Every Data, Data, Error
Analyzable no. of data	300000 bytes max.
List display items	Analysis no., time from trigger position [Time (ms)], Data (Bin, Hex) display, ASCII display, Information.

CAN Bus Signal Analysis Functions (/F02 Option)

Applicable bus	CAN version 2.0A/B, Hi-Speed CAN (ISO11898), Low-Speed CAN (ISO11519-2)
Analyzable signals	CH1 to CH8, M1 to M8
Bit rate	1 Mbps, 500 kbps, 250 kbps, 125 kbps, 83.3 kbps, 33.3 kbps, User Define (an arbitrary bit rate from 10 kbps to 1 Mbps with resolution of 100 bps)
CAN bus trigger modes	SOF, ID/Data, ID OR, Error, Message and signal (enabled when loading physical values/symbol definitions)
Analyzable no. of frames	100000 frames max.
List display items	Analysis no., time from trigger position [Time (ms)], Frame type, ID, DLC, Data, CRC, presence/absence of Ack, Information
Auxiliary analysis functions	Field jump functions

CAN FD Bus Signal Analysis Functions (/F02 Option)

Applicable bus		CAN FD (ISO 11898-1:2015 and non-ISO)
Analyzable signals		CH1 to CH8, M1 to M8
Bit rate	Arbitration	1 Mbps, 500 kbps, 250 kbps, User Define (an arbitrary bit rate from 20 kbps to 1 Mbps with resolution of 100 bps)
	Data	8 Mbps, 5 Mbps, 4 Mbps, 2 Mbps, 1 Mbps, 500 kbps, User Define (an arbitrary bit rate from 250 kbps to 10 Mbps with resolution of 100 bps)
CAN FD bus trigger modes		SOF, Error, ID/Data, ID OR, FDF, ESI, Message (enabled when loading physical values/symbol definitions)
Analyzable no. of frames		50000 frames max.
List display items		Analysis no., time from trigger position [Time (ms)], Frame type, ID, DLC, Data, CRC, presence/absence of Ack, Information
Auxiliary analysis functions		Field jump functions

LIN Bus Signal Analysis Functions (/F02 Option)

Applicable bus	LIN Rev. 1.3, 2.0, 2.1
Analyzable signals	CH1 to CH8, M1 to M8
Bit rate	19.2 kbps, 9.6 kbps, 4.8 kbps, 2.4 kbps, 1.2 kbps, User Define (an arbitrary bit rate from 1 kbps to 20 kbps with resolution of 10 bps)
LIN bus trigger modes	Break Synch, ID/Data, ID OR, Error
Analyzable no. of frames	100000 frames max.
List display items	Analysis no., time from trigger position [Time (ms)], ID, ID-Field, Data, Checksum, Information
Auxiliary analysis functions	Field jump functions

FlexRay Bus Signal Analysis Functions (/F03 Option)

Applicable bus	FlexRay Protocol Version 2.1
Analyzable signals	CH1 to CH8, M1 to M8
Bit rate	10 Mbps, 5 Mbps, 2.5 Mbps
FlexRay bus trigger modes	Frame Start, Error, ID/Data, ID OR
Analyzable no. of frames	5000 frames max.
List display items	Analysis no., time from trigger position [Time (ms)], Segment (Static or Dynamic), Indicator, FrameID, PayLoad length, Cycle count, Data, Information

SENT Signal Analysis Functions (/F04 Option)

Applicable standard		J2716 APR2016 and older
Analyzable signals		CH1 to CH8, Logic input, or M1 to M8
Clock period		1 μs to 100 μs with resolution of 0.01 μs
Data type	Fast channel	Nibbles/User Defined
	Slow channel	Short/Enhanced
SENT trigger modes		Every Fast CH, Fast CH Status & Communication, Fast CH Data, Every Slow CH, Slow CH ID/Data, Error
Analyzable no. of frames		100000 frames max.
List display items	Fast channel	Analysis no., time from trigger position [Time (ms)], Sync/Cal period, Tick, Status & Comm, Data, CRC, frame length, Information
	Slow channel	Analysis no., time from trigger position [Time (ms)], ID, Data, CRC, information
Auxiliary analysis functions		Trend functions (up to 4 trend waveforms)

CXPI Bus Signal Analysis Functions (/F05 Option)

Applicable bus	CXPI JASO D 015-3:2015
Analyzable signals	CH1 to CH8, M1 to M8
Bit rate	19.2 kbps, 9.6 kbps, 4.8 kbps, User Define (an arbitrary bit rate from 4 kbps to 50 kbps with resolution of 10 bps)
Analyzable no. of frames	10000 frames max.
List display items	Analysis no., time from trigger position [Time (ms)], ID, DLC, W/S, CT, Data, CRC, error information, Wakeup/Sleep

PSI5 Signal Analysis Functions (/F06 Option)

Applicable standard	PSI5 Airbag[5]
Analyzable signals	CH1 to CH8, M1 to M8
Bit rate	189 kbps, 125 kbps, User Define (10.0 k to 1000.0 kbps, with resolution of 0.1 kbps)
PSI5 Airbag Trigger modes	Sync, Start Bit, Data, Frame In Slot, Error
Analyzable no. of frames	400000 frames max.
List display items	Analysis no., time from trigger position, time from Sync, slot no., Data, Parity/CRC, Information
Auxiliary analysis function	Trend functions (up to 4 trend waveforms)

GP-IB (/C1 Option)

Electromechanical specifications	Conforms to IEEE std. 488-1978 (JIS C 1901-1987)
Protocol	Conforms to IEEE std. 488.2-1992

Auxiliary Input

Rear panel I/O signal	External trigger input, External trigger output, GO/NO-GO output, Video output
Probe interface terminal (front panel)	8 terminals (DLM50x8), 4 terminals (DLM50x4)
Probe power terminal (side panel)	8 terminals (/P8 option), 4 terminals (/P4 option)
Synchronous Operation I/O (SYNC)	26-pin half pitch (female) Dedicated synchronous operation cable (701982-01, -02)

Internal Storage (Standard model, /C8 Option)

Capacity	Standard model: Approx. 1.7 GB, /C8 option: Approx. 64 GB

Built-in Printer (/B5 Option)

Built-in printer	112 mm wide, monochrome, thermal

Synchronous Operation (/SYN Option)

Connection method	Connect two DLM5000 units with the dedicated cable for synchronous operation (701982-01, -02).
Synchronization items	Measurement start/stop, Sampling clock, Time, Trigger
Sampling skew between units	20.20 ns with 701982-01 (Typical) 27.90 ns with 701982-02 (Typical) Adjustable to within ±50 ps (De-skew)
Skew adjustment between units (De-skew)	Adjustable sampling skew between units Adjustment range: 15.0 ns to 35.0 ns (0.05 ns resolution)

USB Peripheral Connection Terminal

Connector	USB type A connector × 2 (front panel × 2)
Electromechanical specifications	USB 2.0 compliant
Supported transfer standards	High Speed, Full Speed, Low Speed
Supported devices	USB Printer Class Ver. 1.0 compliant HP (PCL) inkjet printers, USB Mass Storage Class Ver. 1.1 compliant mass storage devices (Usable capacity: 8 TB, Partition format: GPT/MBR, File format: exFAT/FAT 32/FAT 16) · Please contact your local YOKOGAWA sales office for model names of verified devices

USB-PC Connection Terminal

Connector	USB type B connector × 1
Electromechanical specifications	USB 3.0 compliant
Supported transfer standards	Super Speed, High Speed, Full Speed
Supported class	Mass Storage Class Ver. 1.1 USBTMC-USB488 (USB Test and Measurement Class Ver. 1.0)

Ethernet

Connector	RJ-45 connector × 1
Transmission methods	Ethernet (1000BASE-T/100BASE-TX/10BASE-T)
Supported services	Server: FTP, VXI-11, Socket Client: FTP, SMTP, SNTP, LPR, DHCP, DNS
PTP	Protocol IEEE1588-2008 (PTPv2) (client only)
	Synchronization accuracy ±200 ns (typical) when 1000BASE-T is used and an Ethernet switch is not used
	Synchronization items Built-in time, sampling clock

General Specifications

Rated supply voltage	100 to 120 VAC/220 to 240 VAC (Automatic switching)
Rated supply frequency	50 Hz/60 Hz
Maximum power consumption	290 VA
External dimensions	426 (W) × 266 (H) × 180 (D) mm (when printer cover is closed, excluding protrusions)
Weight	Approx. 7.3 kg, With no options
Operating temperature range	5℃ to 40℃

*1: Measured under standard operating conditions after a 30-minute warm-up followed by calibration.
   Standard operating conditions: Ambient temperature: 23℃±5℃, Ambient humidity: 55±10% RH
   Error in supply voltage and frequency: Within 1% of rating
*2: Value in the case of repetitive phenomenon. The frequency bandwidth of a single-shot phenomenon is the smaller of the two values, DC to sampling frequency/2.5 or the frequency bandwidth of the repetitive phenomenon.
*3: When the input section is shorted, the acquisition mode is set to Normal, accumulation is OFF, and the probe attenuation is set to 1:1.
*4: The LCD may include a few defective pixels (within 3 ppm over the total number of pixels including RGB).
*5: Support for analysis of ECU synchronization signals and sensor signals.

External Dimensions

Unit: mm

426   266   9   17.4   180   23
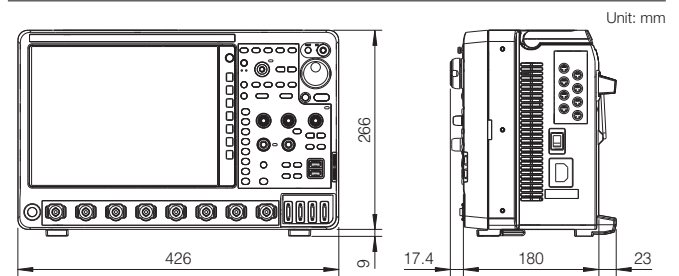
Model and Suffix Codes

Model[1]	Suffix code	Description
DLM5038		Mixed Signal Oscilloscope: 8 ch, 350 MHz
DLM5058		Mixed Signal Oscilloscope: 8 ch, 500 MHz
DLM5034		Mixed Signal Oscilloscope: 4 ch, 350 MHz
DLM5054		Mixed Signal Oscilloscope: 4 ch, 500 MHz
Power cord	-D	UL/CSA Standard and PSE compliant
	-F	VDE/Korean Standard
	-Q	British Standard
	-R	Australian Standard
	-H	Chinese Standard
	-N	Brazilian Standard
	-T	Taiwanese Standard
	-B	Indian Standard
	-U	IEC Plug Type B
Language	-HJ	Japanese message and panel
	-HE	English message and panel
	-HC	Chinese message and panel
	-HG	German message and panel
	-HF	French message and panel
	-HK	Korean message and panel
	-HL	Italian message and panel
	-HS	Spanish message and panel
Option	/L32	Expansion logic 16 bit (Total 32 bit)
	/B5	Built-in printer (112 mm)
	/M1[2]	Memory expansion option (8 ch model only) During continuous measurement: 25 Mpoints; Single mode: 125 Mpoints/250 Mpoints[3]
	/M2[2]	Memory expansion option (8 ch model only) During continuous measurement: 50 Mpoints; Single mode: 250 Mpoints/500 Mpoints[3]
	/M1S[2]	Memory expansion option (4 ch model only) During continuous measurement: 25 Mpoints; Single mode: 125 Mpoints/250 Mpoints[3]
	/M2S[2]	Memory expansion option (4 ch model only) During continuous measurement: 50 Mpoints; Single mode: 250 Mpoints/500 Mpoints[3]
	/P8[4]	8 probe power terminals (for 8 ch model)
	/P4[4]	4 probe power terminals (for 4 ch model)
	/C1	GP-IB interface
	/C8	Internal storage (64 GB)
	/SYN[5]	Synchronous Operation
	/G02	User-defined math function
	/G03	Power supply analysis function
	/F01	UART + I²C + SPI trigger and analysis
	/F02	CAN + CAN FD + LIN trigger and analysis
	/F03	FlexRay trigger and analysis
	/F04	SENT trigger and analysis
	/F05	CXPI trigger and analysis
	/F06	PSI5 trigger and analysis
	/E1[6]	Four additional 701937 probes (8 in total) (for 8 ch model)
	/E2[6]	Attach four 701949 probes
	/E3[6]	Attach eight 701949 probes (for 8 ch model)

Standard Main Unit Accessories
Power cord, Passive probe[7], Protective front cover, Panel sheet[8], Soft carrying case for probes, Printer roll paper (for /B5 option), User's manuals[9]

*1:   Standard memory capacity: During continuous measurement: 12.5 Mpoints; Single mode: 50 Mpoints/125 Mpoints (when odd channels only)
Logic probes sold separately.
*2,*4,*6: When selecting from these options, please select only one.
*3:   When odd channels only
*4:   Specify this option when using current probes or other differential probes that don't support probe interface.
*5:   /SYN option for both main and sub unit and a 701982 connection cable are required for synchronous operation.
*7:   Four 701937 except /E2 or /E3.
*8:   Except suffix code "-HE".
*9:   Start guide as the printed material, and User's manual as CD-ROM are included.

Accessory Models

Name	Model	Specification
Logic probe (PBL100)	701988	1 MΩ, toggle freq. of 100 MHz
Logic probe (PBL250)	701989	100 kΩ, toggle freq. of 250 MHz
Passive probe[1]	701937	10 MΩ (10:1), 500 MHz, 1.3 m
Miniature passive probe	701949	10 MΩ (10:1), 500 MHz, 1.3 m
Passive probe (Wide temperature range)	702907	10 MΩ (10:1), 200 MHz, 2.5 m –40°C to +85°C
FET probe[1]	700939	DC to 900 MHz BW, 2.5 MΩ/1.8 pF
100:1 voltage probe	701944	DC to 400 MHz BW, 1.2 m, 1000 Vrms
100:1 voltage probe	701945	DC to 250 MHz BW, 3 m, 1000 Vrms
Differential probe	701977	DC to 50 MHz BW, max. ±7000V
Differential probe	701978	DC to 150 MHz BW, max. ±1500V
Differential probe (PBDH1000)	701924	DC to 1 GHz BW, 1MΩ, max. ±25 V
Differential probe (PBDH0500)	701925	DC to 500 MHz BW, max. ±25V
Differential probe (PBDH0150)	701927	DC to 150 MHz BW, max. ±1400 V
Current probe[2]	701917	DC to 50 MHz BW, 5 Arms
Current probe[2]	701918	DC to 120 MHz BW, 5 Arms
Current probe (PBC050)[2]	701929	DC to 50 MHz BW, 30 Arms
Current probe (PBC100)[2]	701928	DC to 100 MHz BW, 30 Arms
Current probe[2]	701930	DC to 10 MHz BW, 150 Arms
Current probe[2]	701931	DC to 2 MHz BW, 500 Arms
Current probe[2]	702915	DC to 50 MHz BW, 0.5, 5, 30Arms
Current probe[2]	702916	DC to 120 MHz BW, 0.5, 5, 30Arms
Deskew correction signal source	701936	For deskew correction
Go/No-Go Cable	366973	For GO/NO-GO output terminal
Printer roll paper	B9988AE	Lot size is 10 rolls, 10 meters each
Probe stand	701919	Round base, 1 arm
Soft carrying case	701968	With 3 pockets for storage
Rack mount kit	701969-E	EIA standard-compliant
Rack mount kit	701969-J	JIS standard-compliant
Connection cable	701982-01	Connection cable for DLM 1.0 m
Connection cable	701982-02	Connection cable for DLM 2.8 m

*1: Please refer to the Probes and Accessories brochure for probe adapters.
*2: Current probes' maximum input current may be limited by the number of probes used at a time.

Accessory Software

Model	Name	Specification
701992-SP01	Xviewer	Standard edition
701992-GP01		Math edition
IS8001[1]	IS8000 Integrated Software Platform	Subscription (Annual license)
IS8002[1]		Perpetual (Permanent license)

*1: See Bulletin IS8000-01EN for more detail about IS8000.

Additional Option License for DLM5000

Model	Suffix code	Description
709821	-G02	User defined math
	-G03	Power supply analysis function
	-F01	UART + I²C + SPI trigger and analysis
	-F02	CAN + CAN FD + LIN trigger and analysis
	-F03	FlexRay trigger and analysis
	-F04	SENT trigger and analysis
	-F05	CXPI trigger and analysis
	-F06	PSI5 trigger and analysis
	-SYN	Synchronous Operation

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┌─ NOTICE ─
● Before operating the product, read the user's manual thoroughly for proper and safe operation.

This is a Class A instrument based on Emission standards EN61326-1 and EN55011, and is designed for an industrial environment. Operation of this equipment in a residential area may cause radio interference, in which case users will be responsible for any interference which they cause.