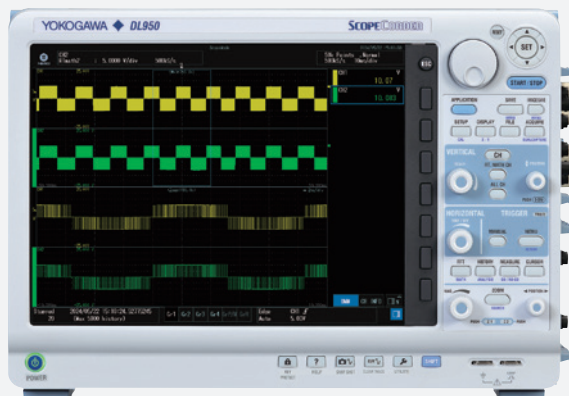




SCOPECORDER

Versatility to discover more

DL950

ScopeCorder

SL2000

High-Speed Data Acquisition Unit



Precision Making

Bulletin DL950-SL2000-01EN



Efforts to protect the global environment, as represented by the United Nations Sustainable Development Goals (SDGs), are spreading on a global scale. In order to achieve a decarbonized society and eliminate the need for fossil fuels, new renewable energy sources and energy efficient technologies for transportation, home, and industrial appliances are being developed.

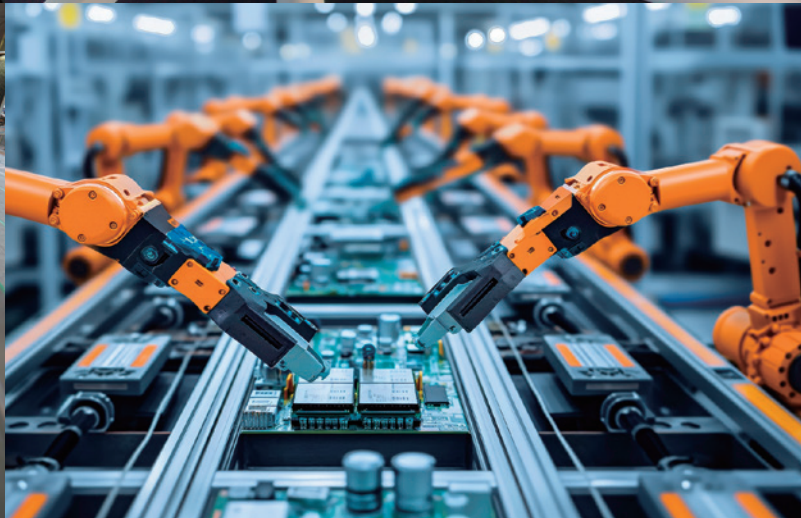
To reduce energy loss and improve design efficiency, engineers need deep insights into both electrical and mechanical system behavior. The DL950 and SL2000 captures and analyzes a wide variety of electrical, physical sensor signals and serial buses. It offers a unique combination of high sampling rates, for a detailed view and long recording times to monitor trends over time.

The DL950 and SL2000 will quickly become the most valued instrument in your lab.

Insight – Analyze detailed waveforms while continuously monitoring multiple channels over extended periods. The DL950 and SL2000 offer a unique combination of high-speed sampling and signal fidelity of an oscilloscope and the long-term data recording capabilities of a recorder. The DL950 and SL2000 measure signals at a high bit resolution and secures data in the harshest environments with superior noise-immunity and isolation technology.

Versatility – The eight input slots support over 20 module types, enabling simultaneous measurement of electrical signals, mechanical sensor outputs, and vehicle serial bus data. For even more channels, up to five DL950s or SL2000s can be synchronized.

Usability – A new application menu streamlines test setup, and a large touchscreen enhances ease of operation and visibility.



Building on Legacy: The Pinnacle of Isolated High-Speed



DL950

1984



3655E
Analyzing recorder

1993



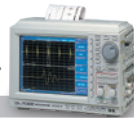
OR1400
Oscillographic Recorder

1994



AR1200
Analyzing recorder

1997



DL708/DL716
ScopeCorder

2002

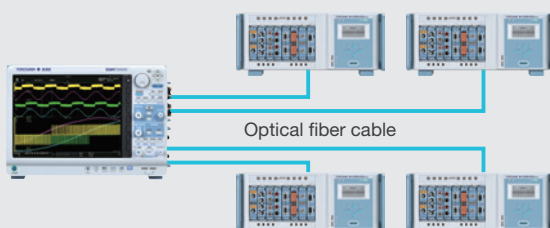


DL750/DL750P
ScopeCorder

Up to 160 channels

(4 CH Module, 5-unit Synchronized Connection /C50 Option)

Capture signals at speeds up to 200 MS/s, and scale to 160 channels by linking as many as five synchronized units.



Real-time math function, Power math function, Motor dq analysis function

(/G03, /G05, /MT1 option)

Real-time waveform calculation, power calculation, and motor dq analysis are supported-including trigger conditions based on computed results.



Oscilloscopes

SCOPECORDER



- ✓ 200 MS/s High-Speed Sample Rate
- ✓ 8 G Point Memory
Large Capacity Memory
- ✓ Up to 160 Channels
(when 5 units are linked and synchronized)
- ✓ 10 Gbps Ethernet
High-Speed Data Transfer

SL2000

2007



SL1000
High-Speed Data Acquisition Unit

2025



SL2000
High-Speed Data Acquisition Unit

2006



SL1400
ScopeCorder Lite

2010



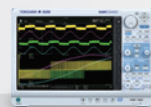
DL850/DL850V
ScopeCorder

2013



DL850E/DL850EV
ScopeCorder

2021



DL950
ScopeCorder

Plugin Module for ScopeCorder

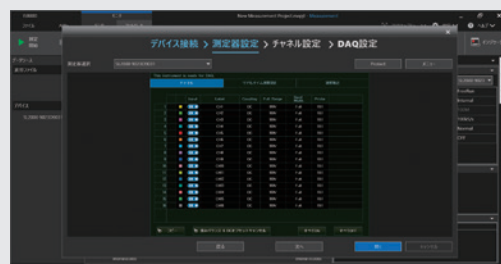
Plugin Modules for ScopeCorder

A variety of plug-in modules are available to measure signals such as voltage, temperature, acceleration, strain, and CAN bus data.



Control Software Suitable for Long-Term Recording

IS8000 makes it easy to configure instruments and recording settings for standardized and long duration tests-without the need for complex programming.



Versatile and integrated measurements

High-speed sampling, multi-channel acquisition, and synchronized measurements-delivered by two platforms.

The DL950 is ideal for oscilloscope-style operation and waveform observation, while the rack-mountable SL2000 is designed for high-channel-count measurements, PC-based control, and long-term data recording.



Plugin module for ScopeCorder please see pages 19, 20 and 21



200 MS/s 14 Bit Isolation Module 720212

- Isolated input of up to 1000 V
- ADC resolution 14-bit
- Wide band of 40 MHz
- Up to 20 seconds of continuous acquisition



4-CH 10 MS/s 16 Bit Isolation Module 720256

- ADC resolution 16-bit
- Multipoint measurement of up to 32-CH by using eight slots
- Up to 160-CH by synchronizing multiple DL950s



Voltage
100 MS/s
720211



Voltage
10 MS/s
720250



Voltage
1 MS/s
701251



Voltage
1 MS/s,
4-CH input
720254



Voltage
10 MS/s,
Non-isolated
701255



Voltage
1 MS/s,
High voltage
720268



Voltage
200 kS/s,
16 CH
720220



Voltage,
Temperature
100 kS/s
701261



Voltage,
Temperature
100 kS/s, with AAF
701262



Voltage,
Temperature
High sensitivity
701265



Voltage, Temperature
High sensitivity,
Low noise
720266



Voltage,
Temperature
(scan method)
720221



Strain
NDIS
701270



Strain
DSUB
701271



Acceleration,
Voltage
701275



Frequency
720281



Logic
720230



CAN/
CAN FD/
LIN
720245



SENT
720243



Voltage
1 MS/s
720252



Power
720301

Comparison of ScopeCorder products

	DL950	SL2000	DL350
Product			
Number of slots	8		2
Maximum analog channels	32 (4 CH module × 8) 128 (16 CH module × 8)		8 (4 CH module × 2) 32 (16 CH module × 2)
Maximum number of connected units	5		N/A
Maximum sample rate	200 MS/s		100 MS/s
Multi-sample	per channel		N/A
ADC resolution	12/14/16 bit		12/16 bit
Maximum input voltage	1000 V		
Maximum record length	4 G points		100 M points by module
PC streaming	10 GbE, Ethernet, USB		N/A
Input signal (Module types)	Voltage/Current, Temperature, Acceleration, Strain, Pulse, Logic* CAN/ CAN FD/ LIN/ SENT		
Included software	—	Includes 1 License for IS8002 Software (except when the /SN option is included)	—

* Use a current probe for current measurement

Advanced plugin module



1 MS/s 16 Bit Power Module 720301

- Voltage: Isolated input up to 1000 V
- ADC resolution: 16 bit
- Bandwidth: DC, 0.1 Hz to 300 kHz

*To perform calculations for RMS values or power values with guaranteed accuracy, the /G05 or /MT1 option is required.



1 MS/s 16 Bit Isolation Module (with Offset Adjust) 720252

- ADC resolution: 16 bit
- Equipped with high-sensitivity range (1 mV/div)
- Offset range
1 MΩ mode:
Up to ±140 V (500 mV/div to 20 V/div)
Up to ±5 V (1 mV/div to 200 mV/div)
- High-Z mode for input impedance suitable for battery measurements.

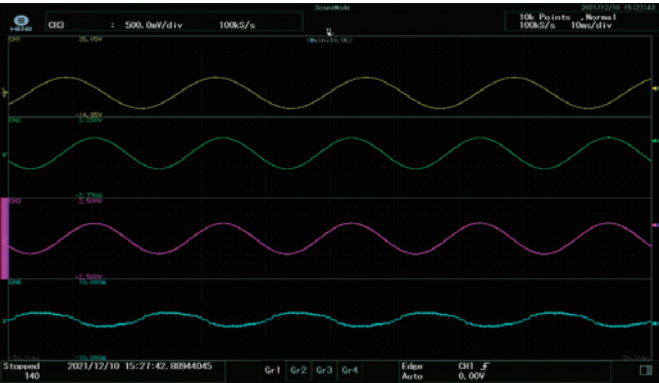
Distinctive Features

Two Operational Modes: Oscilloscope and Recorder

We offer two modes, "Scope Mode" and "Memory Recorder Mode," to suit various environments and applications.

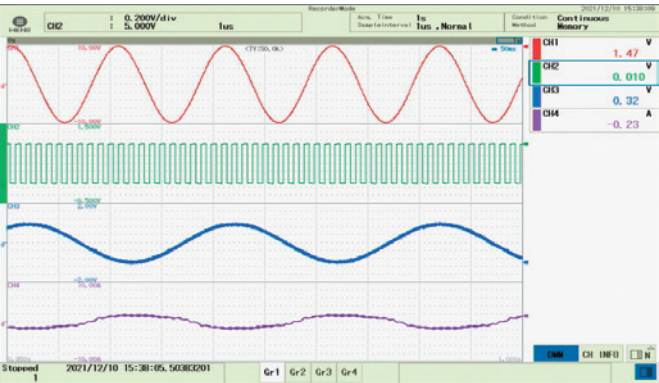
Scope Mode

This mode is ideal for capturing high-speed signals and repetitive waveforms. Like an oscilloscope, it records waveforms based on trigger events, using the configured timebase (T/Div) and sampling point settings. The vertical axis is displayed in scale units (V/Div).



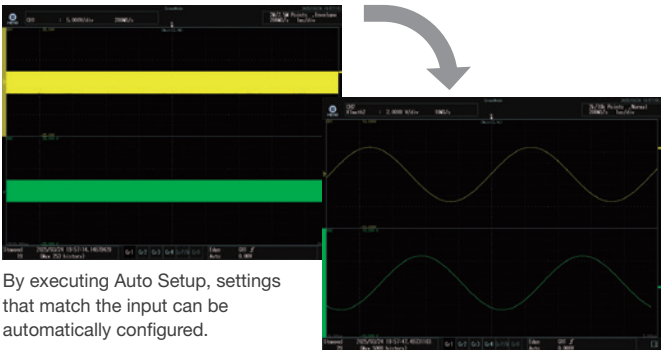
Memory Recorder Mode

Ideal for long-duration waveform recording, this mode is similar to a data logger or recorder. It supports one-shot measurements based on predefined conditions or continuous logging by specifying the sampling interval and recording duration. The measurement range is displayed relative to the full scale, using upper and lower limits.



Auto Setup Function for Stress-Free Configuration

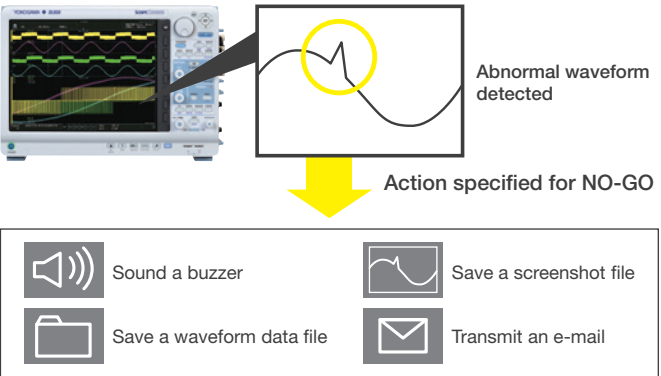
If the signal amplitude or period is unknown, pressing 'Auto Setup' will automatically adjust the vertical and horizontal scales. Channels without an input will be automatically turned off.



*Note: Some modules do not support Auto Setup.

Action on trigger and GO/NO-GO judgement

The Action on Trigger function automatically performs predefined tasks-such as saving data files, activating a buzzer, or sending email notifications-when a trigger condition is met. Additionally, it can perform pass/fail (GO/NO-GO) evaluations based on waveform parameters such as shape or amplitude, and execute actions based on the result.





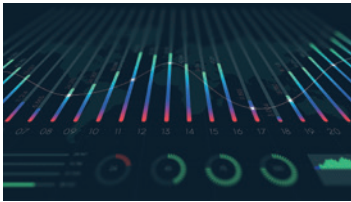
Motor dq analysis (/MT1 option)

With the /MT1 option, the DL950 performs Park and Clarke transformations using motor voltage/current, battery DC signals, and rotational position. It can be calculated alongside other motor parameters, power measurement, and harmonic analysis. A single DL950 can also integrate additional measurements such as vibration, temperature, and CAN data. Utilizing a power module enables accuracy assurance for power as well as RMS values of voltage and current.



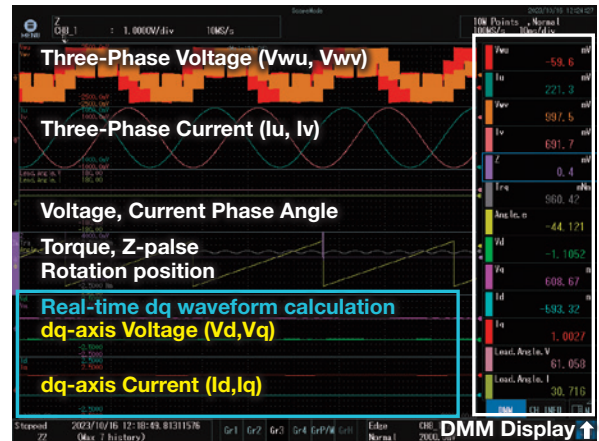
Power and harmonics analysis (/G05 or /MT1 option)

The DL950 or SL2000 supports comprehensive system evaluation by calculating power and conversion efficiency, analyzing harmonic distortion, and capturing mechanical variations such as speed and torque. This all-in-one capability makes it ideal for characterizing the dynamic behavior of power systems. Utilizing a power module enables accuracy assurance for power as well as RMS values of voltage and current.



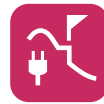
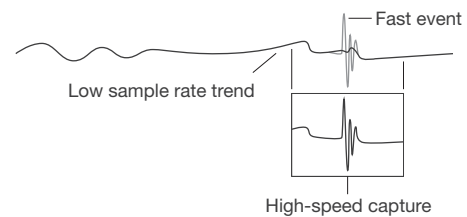
Encoder rotary angle (/G03 or /G05 or /MT1 option)

The DL950/SL2000 can calculate the rotation angle from the pulses output from an encoder and display the trend of the rotation angle as a waveform. The rotation angle and its control signal can be simultaneously observed and inspected for abnormalities.



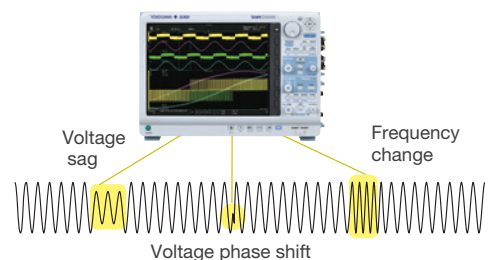
Dual capture function

Durability testing requires capturing fast transient events with a high sample rate, even while monitoring low-speed signals to observe long-term trends. The dual capture function uniquely resolves these conflicting requirements by simultaneously recording at two different sample rates.



Power line abnormality detection (Wave Window Trigger)

Special triggers are used to detect frequency fluctuations, voltage drops, and other phenomena that are difficult to detect with ordinary triggers. These triggers can also be used to detect typical power supply problems such as momentary power loss, sags, and surges.



8 G points large memory (/M2 option)

With up to 8 G points of memory and 20 seconds of continuous capturing, even at 200 MS/s, no signal changes are missed.

*Up to 4 G points of memory is allocated per channel.

SSD recording (/ST1 or /ST2 option)

The 512 GB internal SSD can record for long periods of time at up to 2 MS/s. Waveforms from dual capture can also be recorded, which is useful for in-vehicle endurance testing and capturing rare spontaneous events.

Flash acquisition (/ST2 option)

Long time recording at up to 20 MS/s, which is 100 times faster than the previous model, is available. You can capture data anywhere you cannot bring a PC such as on-vehicle or field testing. The flash memory is non-volatile, so the captured data stays in the instrument even after turning off the power. Data can later be transferred to a PC.

Multi-sample rates

Sample rates can be set by channel. Reducing the sample rate reduces the amount of data even when modules with high and low sample rates are mixed together. This allows for less memory space to be used and improves the transfer speed.

Available Data Storage

- Built-in SSD 512 GB
 - SD Memory Card (SD/SDHC/SDXC)
- USB Storage up to 8 TB
 - Network Drive

Maximum capturable time to memory (with /M2 option)

Sample Rate	For 1 CH	For 2 CH	For 4 CH	For 8 CH	For 16 CH	For 32 CH
200 MS/s	20 s	20 s	10 s	5 s	2 s	1 s
100 MS/s	40 s	40 s	20 s	10 s	5 s	2 s
50 MS/s	1 m	1 m	40 s	20 s	10 s	5 s
20 MS/s	3 m 20 s	3 m 20 s	1 m 40 s	50 s	20 s	10 s
10 MS/s	5 m	5 m	3 m 20 s	1 m 40 s	50 s	20 s
1 MS/s	1 h	1 h	30 m	10 m	5 m	3 m 20 s

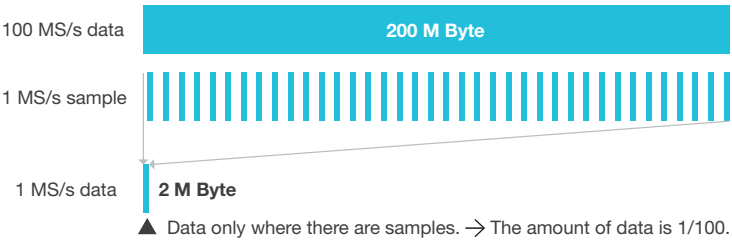
Maximum capturable time to SSD (with /M2 option)

Sample Rate	For 1 CH	For 2 CH	For 4 CH	For 8 CH	For 16 CH	For 32 CH
2 MS/s	5 h	—	—	—	—	—
1 MS/s	10 h	10 h	—	—	—	—
200 kS/s	60 h	60 h	60 h	40 h	20 h	—
100 kS/s	5 days	5 days	5 days	3 days	40 h	20 h
10 kS/s	50 days	50 days	50 days	30 days	10 days	5 days
1 kS/s	50 days	50 days	50 days	50 days	50 days	50 days

Maximum capturable time by Flash acquisition (with /M2 option)

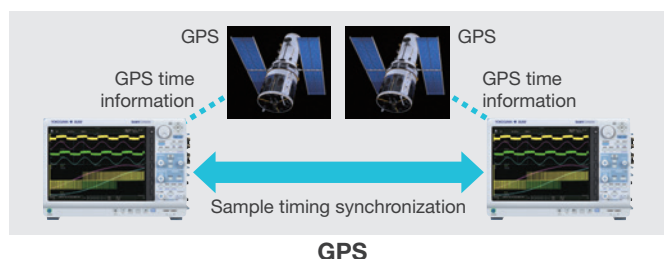
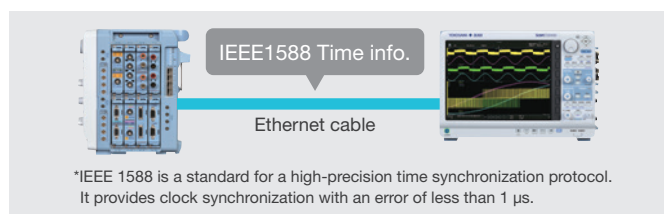
Sample Rate	For 1 CH	For 2 CH	For 4 CH	For 8 CH	For 16 CH	For 32 CH
20 MS/s	10 m	10 m	10 m	5 m	—	—
10 MS/s	30 m	30 m	30 m	10 m	5 m	—
5 MS/s	1 h	1 h	1 h	30 m	10 m	5 m
2 MS/s	2 h	2 h	2 h	1 h	40 m	10 m
1 MS/s	5 h	5 h	5 h	2 h	1 h	30 m

Deletion of the recorded data on the flash memory is not done for each recorded data but for all the data at once. When transferring recorded data to a PC, please use the IS8000 or re-save the data in WDF format.



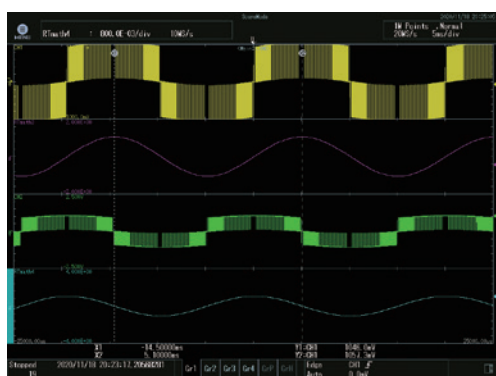
Accurate time synchronization (/C35, /C40 option)

Time synchronization with IEEE1588 signals is available. With the /C40 option, the DL950 can output IEEE1588 master signals. Time synchronization using IRIG and GPS is also available (/C35 option).



Real-time mathematical computation (/G03 or /G05 or /MT1 option)

Various calculations are performed on captured signals and the results are displayed on the screen in real time. Perform triggers, automatic waveform parameter measurements, and cursor measurements. Independent input channels, real-time calculation results of 32 input channels plus 16 real time math channels can be displayed and analyzed simultaneously.



Example: Demodulation of PWM signal

Real-time data transfer to PC (/C60 option)

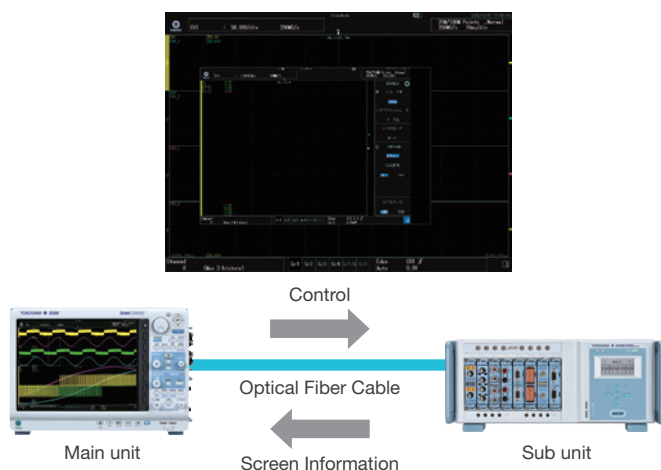
Using 10 Gbps Ethernet, up to 20 MS/s of data can be stored in real time on a PC. An SFP+ module, a fiber optic cord, and the PC software IS8000 are used for data transfer.



*Please use a commercially available SFP+ module and a 10 GE fiber optic cord.
*When transferring files, high speed transfer is not possible.

Channel expansion through synchronized operation (/C50 Option)

In multi-unit synchronization, up to four sub-units can be connected. Along with synchronized start/stop control and time alignment between units, the main unit can remotely display and operate the screen of one sub-unit at a time. Synchronization is supported between DL950 and SL2000 units in any combination. This function is also compatible with IS8000, the built-in web server, and video signal output.



Additional Features

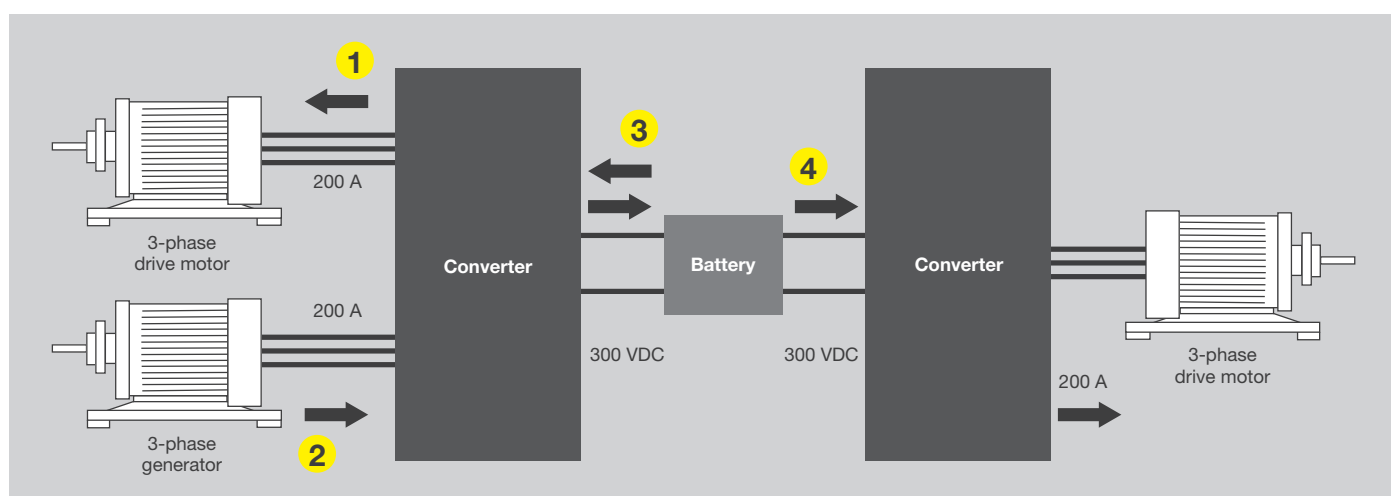
- Up to 8 Current Probe Power Supplies (/P4 or /P8 option)
- Connection for USB Mouse & Keyboard & External Printer

Example Applications

Other application examples are on the Yokogawa Web site.

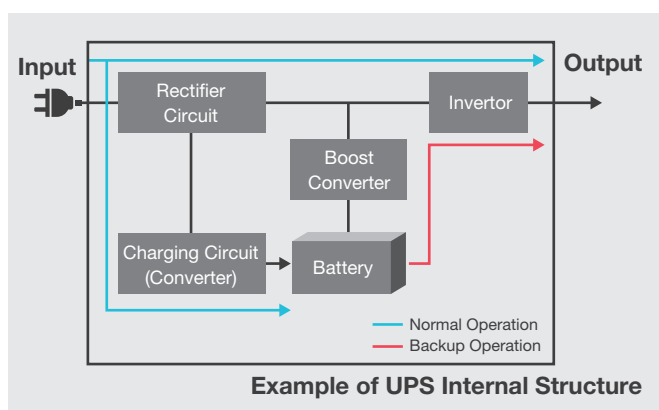
2-motor/4-motor system test for EV

In Hybrid Electric Vehicle (HEV) development, two or four motor systems, with each motor connected to a driving wheel, are commonly used. This design eliminates traditional powertrains, simplifying the overall system and alleviating concerns when driving a 4WD on snowy roads. The multi-channel, high-speed, isolated DL950 can simultaneously capture and analyze signals from these multi-motor setups.



Performance testing of UPS (Uninterruptible Power Supply) and ESS (Energy Storage System)

UPS (Uninterruptible Power Supply) and ESS (Energy Storage System) are attracting attention as solutions for maintaining power quality, enabling peak shifting, and providing backup power in facilities that operate continuously, such as data centers. In the development of these devices, evaluating the impact of power fluctuations and analyzing power quality are critical. The DL950/SL2000, with its power analysis function, can calculate RMS values and power values for each half-cycle and full cycle of voltage in real time. Furthermore, by using the measure function, it can automatically measure the time from power loss to recovery.



Modules, accessories, and functions needed

Power Measurement Module
Power math function (/G05 option)

Vibration and Acoustic Analysis

Vibration is inherent to "moving objects" such as motors and engines. Analyzing the frequency of vibrations to identify abnormal areas is an essential test in the development of "moving objects." By using multiple acceleration modules, Vibrations at multiple points can be simultaneously captured and up to eight vibration frequencies can be analyzed using FFT functionality to identify faulty components.

Modules, accessories, and functions needed

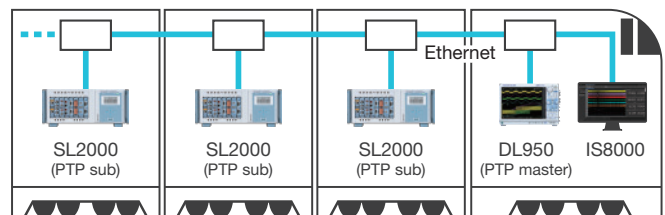
Acceleration module
User-defined math function (/G02 option)
Sensor (Acceleration · Noise Analysis)



Railway Vehicle Running Test

By using the DL950 and SL2000, we can simultaneously record the voltage, current, and rotational speed of the battery, inverter, and drive motor, as well as the vibration and interior temperature of railway vehicles.

- Simultaneous measurement of remote devices with a synchronization accuracy of ± 150 ns (typ) when using the /C40 option.
- Distributed synchronous measurement with up to 160 channels
- Simultaneous recording of strain and sound (using voltage output microphones or sound level meters) is also possible
- Using power calculations and motor dq analysis, power efficiency and motor performance can be evaluated.



Modules, accessories, and functions needed

Voltage, Temperature, Acceleration and Frequency Modules
IEEE1588 Master Function (/C40 option)
Multi-unit Synchronization Interface (/C50 option)
Power Calculation (/G05 option)

Vehicle Serial Bus Data Recording and Driving Trajectory Display

You can simultaneously view the trends of physical values from CAN/CAN FD bus data alongside the corresponding measured waveforms on the same screen. For example, you can verify the correlation between the ON/OFF signal of the ignition switch, the corresponding CAN/CAN FD signal, and the actual signals from related pressure sensors, all on the same screen. By connecting a GPS unit, Latitude, longitude, altitude, speed, direction, and time information can be added to the measurement data. Using DIAdem, you can simultaneously display the measurement data and driving position. With IoT gateways or M2M routers, remote control and data monitoring can be performed wirelessly.



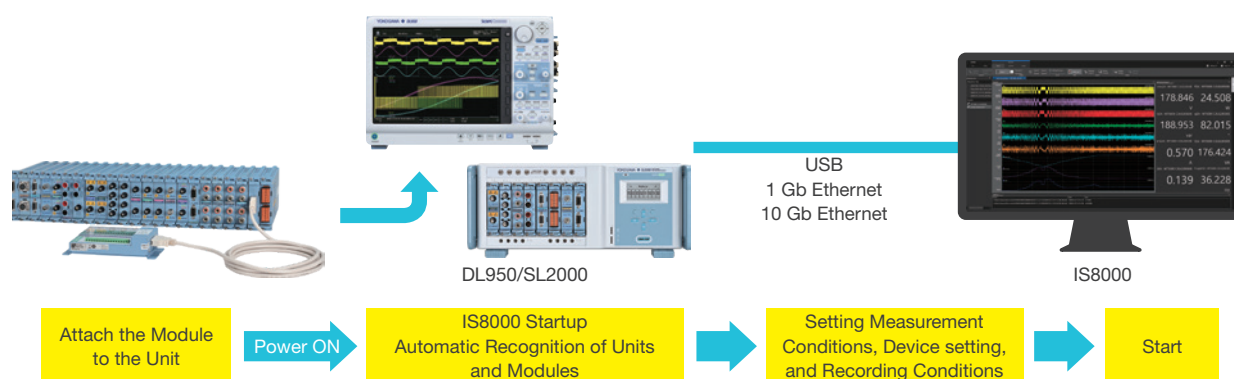
Modules, accessories, and functions needed

CAN FD/LIN Monitor module, GPS unit, IIRIG, GPS interface (/C35 option), serial bus analysis function (/VCE option)

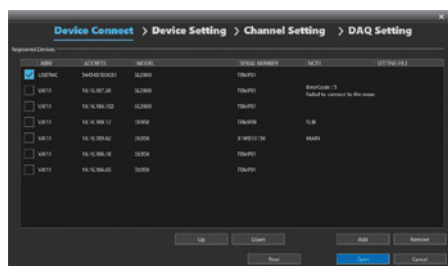
Software

Intuitive Acquisition Software

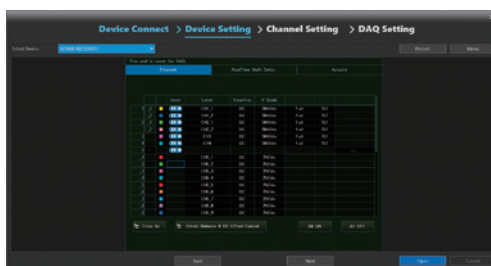
By using IS8000, you can start measurements immediately without complex settings. System setup, measurement conditions, display, and recording conditions can be easily configured through four wizard screens to begin measurements. The SL2000 includes IS8002 (1 license) bundled with it (excluding the /SN option).



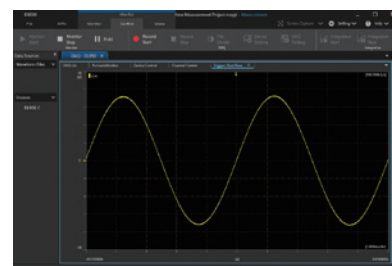
Software Screen



Device Connect Wizard



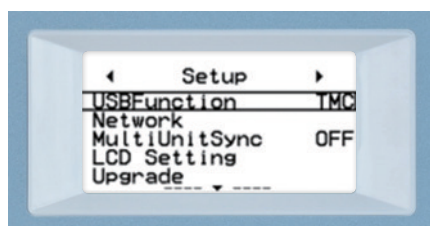
Device Setting Wizard



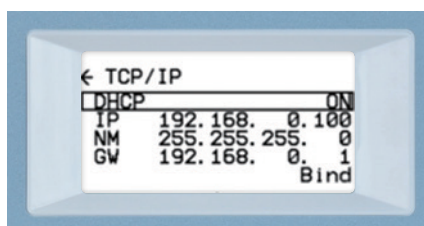
Measuring Screen

We have simplified the configuration of essential settings for PC communication on the SL2000 main unit, ensuring seamless software connectivity. This allows you to get started quickly without the need for complicated setups.

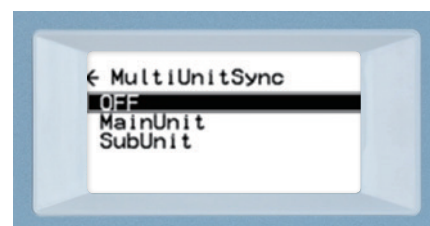
- Switching between USB mass storage function and USB communication control
- Setting the Ethernet IP address
- Selecting Main/Sub unit when connecting multiple units



SL2000 Main Unit Configuration Screen



Ethernet IP Address Configuration Screen



Multiple Unit Connection Configuration Screen

Integrated measurement software platform IS8000

The IS8000 enables synchronized measurements with DL950/SL2000, Yokogawa power meters, other manufacturers' high-speed cameras, and other equipment. It supports measurement setting, remote monitoring, comparative analysis, and MDF file saving to reduce test system development time.

There is dedicated waveform display software called IS8002CDV Classic Data Viewer.

SY1 Option

This option is necessary for controlling more than two measuring instruments and simultaneous data analysis.

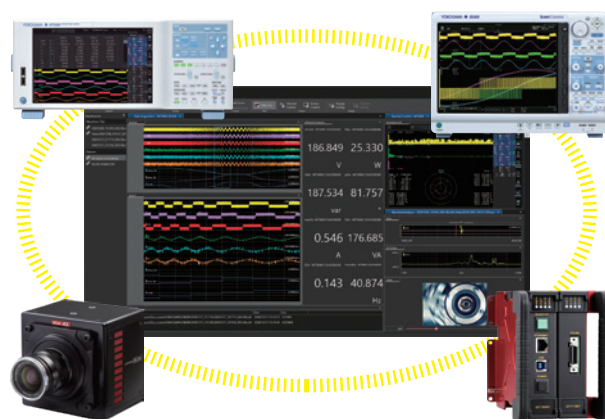
MH1 Option

It is ideal for comparing and calculating multi-channel vibration and acoustic waveforms.

SB1 Option

For CAN bus communication data analysis, decoding, frame display, and search are possible.

For detailed specifications of IS8000, please refer to Bulletin IS8000-01EN.



ScopeCorder SDK (Software Development Kit)

This software offers an API (Application Programming Interface) for waveform data acquisition with DL950/SL2000, the API is provided as a Dynamic Link Library (DLL). By integrating this DLL into your custom application, you can easily leverage the API for automated measurements via PC control. It supports four key operations:

Free Run Mode:

Continuously acquires data from the start to the stop of the waveform capture.

Trigger Mode:

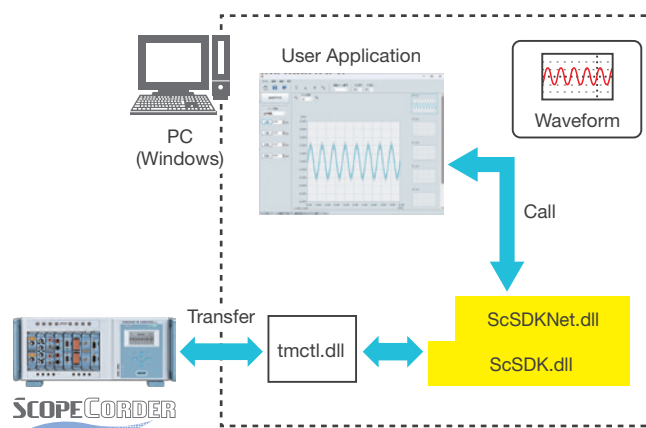
Captures waveforms based on a specified trigger event.

Flash Acquisition Data Access Library Functionality:

Transfers recorded flash acquisition waveforms from the DL950/SL2000 to a PC.

File Operation and Transfer Functionality:

Transfers recorded waveforms from the DL950/SL2000 to a PC.



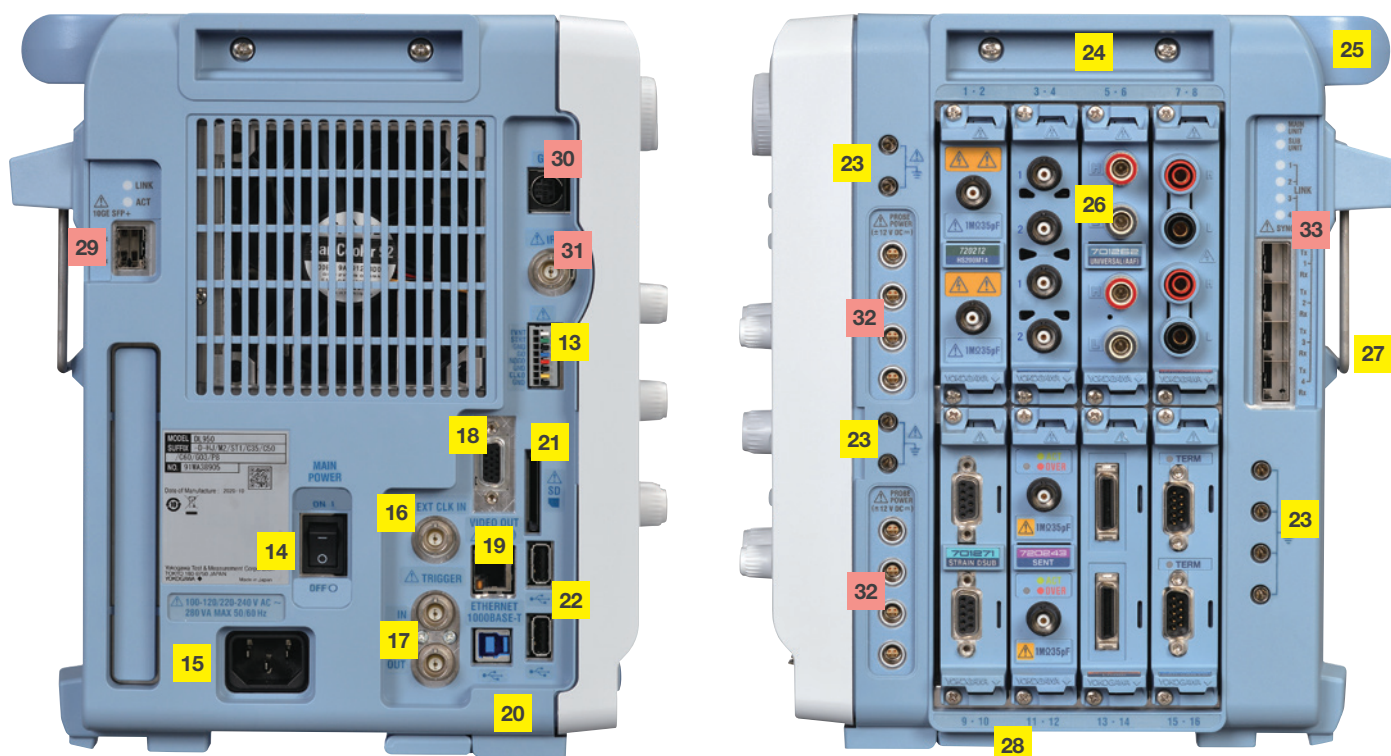
DL950

Intuitive control panel and connectivity



Standard equipment

- | | |
|--|--|
| <p>1 High resolution 12.1-inch touch screen</p> <p>2 ESC key and soft keys
For moving in the menu and operating the soft menu</p> <p>3 Jog dial</p> <p>4 Capture start/stop key</p> <p>5 Application key</p> <p>6 Vertical axis setting keys/knobs
For input channel, real time math, and vertical axis resolution setting</p> | <p>7 Horizontal axis control keys/knobs
For setting the time axis and trigger</p> <p>8 Analysis keys
For setting the FFT, cursor measurement, and so on</p> <p>9 Zoom control keys/knobs
For setting the zoom display and zoom magnitude</p> <p>10 Power switch</p> <p>11 Other keys
Key protect, waveform screenshot, and utility menus</p> <p>12 Probe compensation signal output terminal</p> |
|--|--|



Standard equipment

- 13 External I/O terminals**
For outputting Go/No-Go result and control measurement start/stop signals
- 14 Main power switch**
- 15 Power cord connector**
- 16 External clock input terminal**
For sampling based on an external signal
- 17 External trigger I/O terminals**
- 18 Video signal output terminal (D-sub 15-pin)**
- 19 1000BASE-T Ethernet terminal**
- 20 USB-PC connection terminal (USB3.0)**
- 21 SD card slot**
- 22 USB ports for peripherals**

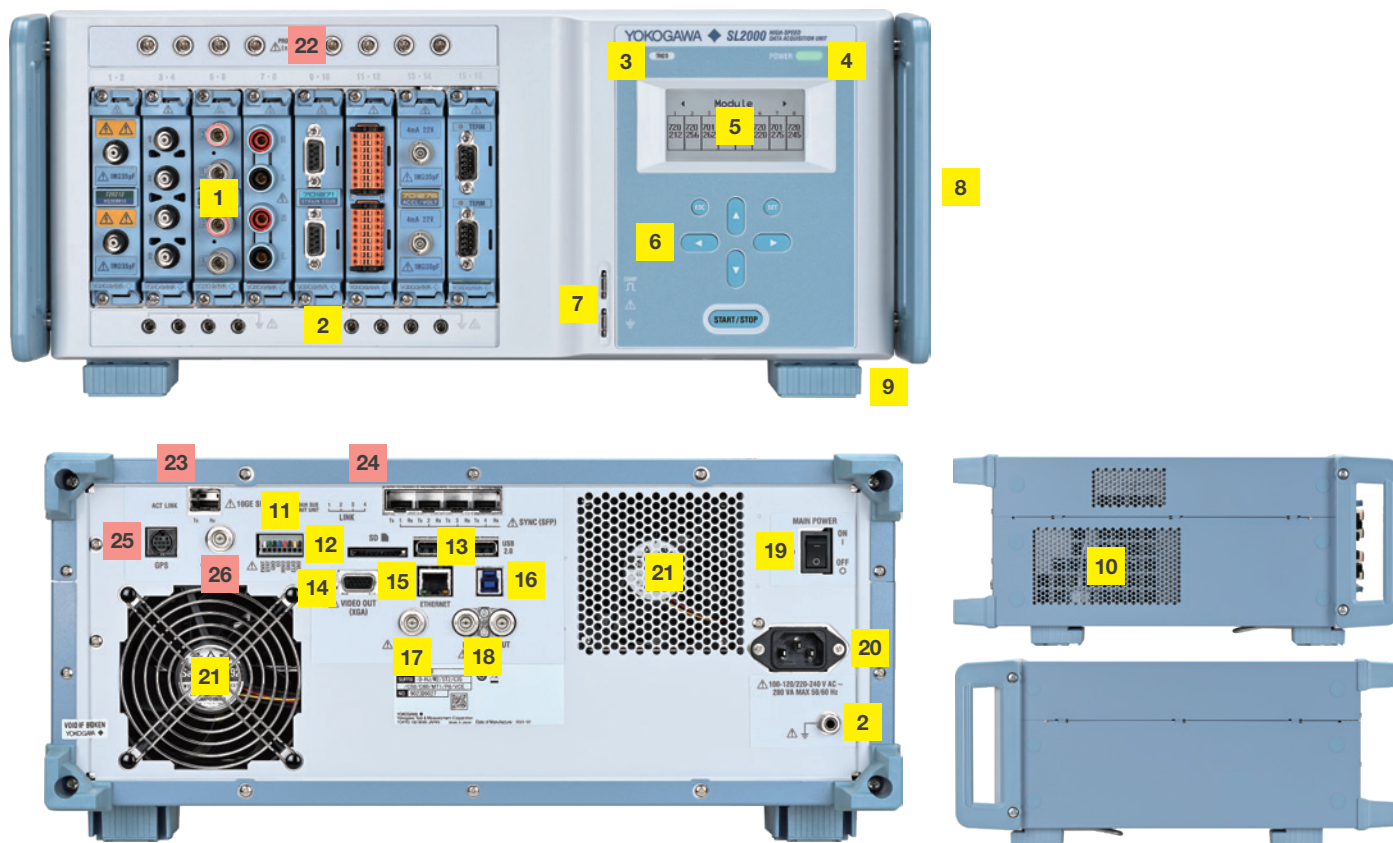
- 23 Functional ground terminals**
- 24 Side grips**
- 25 Bar handle**
- 26 Input module slots**
- 27 Rear stand**
- 28 Tilt legs**

Option

- 29 10 Gbps Ethernet terminal (/C60)**
- 30 GPS interface (/C35)**
- 31 IRIG interface (/C35)**
- 32 Probe power supply terminals (/P4 or /P8)**
- 33 Multi-unit synchronization interface (/C50)**

SL2000

Intuitive control panel and connectivity



Standard equipment

- | | |
|--|---|
| 1 Input module slots | 9 Tilt legs |
| 2 Functional ground terminals | 10 Air Intake |
| 3 Trigger Indicator
Displays the trigger status. | 11 External I/O terminals For outputting
Go/No-Go result and control measurement start/stop signals |
| 4 Power Indicator
Displays the power status. | 12 SD card slot |
| 5 Screen
Displays the status of this device, communication parameters. | 13 USB ports for peripherals (USB2.0) |
| 6 Operation Keys | 14 Video signal output terminal (D-sub 15-pin) |
| 7 Probe compensation signal output terminal | 15 1000BASE-T Ethernet terminal |
| 8 Handle | 16 USB-PC connection terminal (USB3.0) |
| | 17 External clock input terminal
For sampling based on an external signal |

- | |
|--|
| 18 External trigger I/O terminals |
| 19 Main power switch |
| 20 Power cord connector |
| 21 Cooling Fan (Exhaust) |

Option

- | |
|---|
| 22 Probe power supply terminals (/P4 or /P8) |
| 23 10 Gbps Ethernet terminal (/C60) |
| 24 Multi-unit synchronization interface (/C50) |
| 25 GPS interface (/C35) |
| 26 IRIG interface (/C35) |

Plug-in modules

Input	Model No.*1	Sample rate	Resolution	Bandwidth	Number of channels	Isolation	Maximum input voltage*10 (DC + ACpeak)	DC accuracy	Note
Analog Voltage	720212*3	200 MS/s	14 bit	40 MHz	2	Isolated	1000 V ² , 200 V ⁵	±0.5%	High speed, High voltage, Isolated
	720211*9	100 MS/s	12 bit	20 MHz	2	Isolated	1000 V ² , 200 V ⁵	±0.5%	High speed, High voltage, Isolated
	720250	10 MS/s	12 bit	3 MHz	2	Isolated	800 V ² , 200 V ⁵	±0.5%	high noise immunity
	701251	1 MS/s	16 bit	300 kHz	2	Isolated	600 V ² , 140 V ⁵	±0.25%	High sensitivity range (1 mV/div), low noise (±100 µVtyp.), and high noise immunity
	720252	1 MS/s	16 bit	300 kHz	2	Isolated	600 V ² , 140 V ⁵	±0.25%	High sensitivity range (1 mV/div), low noise (±100 µVtyp.), and high noise immunity, offset adjustment
	720256	10 MS/s	16 bit	3 MHz	4	Isolated	600 V ² , 200 V ⁵	±0.25%	4 CH BNC input low noise, high noise immunity
	720254	1 MS/s	16 bit	300 kHz	4	Isolated	600 V ² , 200 V ⁵	±0.25%	4 CH BNC inputlow noise, high noise immunity
	701255	10 MS/s	12 bit	3 MHz	2	Non-Isolated	600 V ⁴ , 200 V ³	±0.5%	High speed · Non isolated
	720268	1 MS/s	16 bit	300 kHz	2	Isolated	1000 V ¹¹	±0.25%	With AAF, RMS, and high noise immunity
Power	720220	200 kS/s	16 bit	5 kHz	16	Isolated (GND-terminal) non-isolated (CH-CH)	20 V ³	±0.3%	16 CH voltage measurement (Scan-type)
	720301	1 MS/s	16 bit	300 kHz	Voltage 1 Current sensor 1	Isolated	1000 V ¹¹ (voltage) 10 V (Current)	±0.14%	Accuracy guaranteed range: DC, 0.1 Hz to 100 kHz ¹²
Analog Voltage & Temperature	701261	100 kS/s (Voltage), 500 S/s (Temperature)	16 bit (Voltage), 0.1°C (Temperature)	40 kHz (Voltage), 100 Hz (Temperature)	2	Isolated	42 V	±0.25% (Voltage)	Thermocouple (K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel)
	701262	100 kS/s (Voltage), 500 S/s (Temperature)	16 bit (Voltage), 0.1°C (Temperature)	40 kHz (Voltage), 100 Hz (Temperature)	2	Isolated	42 V	±0.25% (Voltage)	Thermocouple (K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel), with AAF
	701265	500 S/s (Voltage), 500 S/s (Temperature)	16 bit (Voltage), 0.1°C (Temperature)	100 Hz	2	Isolated	42 V	±0.08 (Voltage)	Thermocouple (K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel), high sensitivity range (0.1 mV/div)
	720266	125 S/s (Voltage), 125 S/s (Temperature)	16 bit (Voltage), 0.1°C (Temperature)	15 Hz	2	Isolated	42 V	±0.08 (Voltage)	Thermocouple (K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel), high sensitivity range (0.1 mV/div), Low noise
	720221*8	10 S/s	16 bit	600 Hz	16	Isolated	20 V	±0.15% (Voltage)	16 CH voltage or temperature measurement (scan method) Thermocouple (K, E, J, T, L, U, N, R, S, B, W, Au-Fe-chromel)
Strain	701270	100 kS/s	16 bit	20 kHz	2	Isolated	10 V	±0.5% (Strain)	Supports strain NDIS, 2, 5, 10 V built-in bridge power supply
	701271	100 kS/s	16 bit	20 kHz	2	Isolated	10 V	±0.5% (Strain)	Supports strain DSUB, 2, 5, 10 V built-in bridge power supply, and shunt CAL
Analog Voltage, Acceleration	701275	100 kS/s	16 bit	40 kHz	2	Isolated	42 V	±0.25% (Voltage) ±0.5% (Acceleration)	Built-in anti-aliasing filter, Supports built-in amp type acceleration sensors (4 mA/22 V)
Frequency	720281	1 MS/s	16 bit	resolution 625 ps	2	Isolated	420 V ² , 42 V ³	±0.1% (Frequency)	Measurement frequency of 0.01 Hz to 500 kHz, Measured parameters (frequency, RPMs, RPSs, period, duty cycle, power supply frequency, pulse width, pulse integration, and velocity)
Logic	720230	10 MS/s	—	—	8 bit × 2 ports	Non-Isolated	depend on logic probe used.	—	(8 bit/port) × 2, compatible with four-type of logic probe (sold separately)
CAN/ CAN FD/ LIN	720245	100 kS/s	—	—	(60 signals × 2) port	Isolated	10 V (CAN port) 18 V (LIN port)	—	CAN/CAN FD port × 2, CAN/CAN FD Data of maximum 32-bit allowable, LIN port × 2 CAN FD/LIN switchable on each port separately Available for DL950/VCE and DL350 /VE option. ^{6, 7}
SENT	720243	100 kS/s	—	—	11 data × 2 ports	Isolated	42 V	—	Supported protocol: SAE J2716. ^{6, 7}

*1: Probes are not included with any modules. *2: In combination with 700929, 702902 or 701947 probe. *3: Direct input *4: In combination with 10:1 probe model 701940 *5: In combination with 701901 + 701954.
*6: Any other modules can be installed in the remaining slots. *7: When using these modules with DL950/VCE, up to four CAN/CAN FD Monitor Modules (720242), CAN & LIN Bus Monitor Modules (720241), CAN FD/LIN Monitor Module (720245) or SENT Monitor Module (720243) in total can be used on a single main unit. For the CAN FD/LIN Monitor Module (720245), CAN/CAN FD Monitor Module (720242) and CAN & LIN Bus Monitor Module (720241), up to two in total can be used on a single main unit. 720241,720242 and 720245 can be installed in slots 7 and 8. 720243 can be installed in slots 5 to 8. *8: The 16 CH Scanner Box (701953) is required for measurement. *9: Class 1 Laser Product, IEC60825-1:2014+A11:2021, IEC 60825-1:2014, GB 7247.1-2024 *10: See the main specifications for voltage-axis sensitivity setting and measurement range. *11: In combination with 758933 and 701954. 1000 Vrms (1000 VDC or 1414 Vpeak maximum) See Bulletin DL950-02EN for more details about the modules. *12: To perform calculations for RMS values or power values with guaranteed accuracy, the /G05 or /MT1 option is required. For details, please refer to Bulletin DL950-02EN.

The DL950, SL2000, 720212 and 720211 use an Internal laser light source.



Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.
4-9-8 Myojin-cho, Hachioji-shi, Tokyo 192-8566, Japan

Combination of modules and probes/accessories

High-speed
200 MS/s
14 Bit Isolation
Module
720212

High-speed
100 MS/s
12 Bit Isolation
Module
720211

High-speed
10 MS/s
12 Bit Isolation
Module
720250

High-speed
1 MS/s
16 Bit Isolation
Module
701251

High-Voltage
1 MS/s
16 Bit Isolation
Module
(with AAF, RMS)
720268

Frequency
Module
720281

4 CH 10MS/s
16 Bit Isolation
Module
720256

4 CH 1 MS/s
16 Bit Isolation
Module
720254

1 MS/s
16 Bit Isolation
Module
720252

10:1 Probe
(for isolated BNC input)
702902

100:1 Probe
(for isolated BNC input)
701947

10:1 Probe
(for isolated BNC
input) 702902

1:1 Safety BNC
adapter lead
701901

Measurement
lead set
758933

1:1 Safety
adapter lead
701904

Safety BNC cable
1 m: 701902
2 m: 701903

Current probe
0.5, 5, 30 Arms,
702915 (DC to 50 MHz),
702916 (DC to 120 MHz)

Current probe 30 Arms,
701933 (DC to 50 MHz),
701932 (DC to 100 MHz)

Current probe
701930
(150 Arms, DC to 10 MHz),
701931
(500 Arms, DC to 2 MHz)

Current probe
5 Arms,
701917 (DC to 50 MHz),
701918 (DC to 120 MHz)

Clamp-on probe
50 Arms, 40 Hz to 3.5 kHz
720930

Clamp-on probe
200 Arms, 40 Hz to 3.5 kHz
720931

Conversion cable
For Differential probe
701905

Plug on clip
701948

Long test clip
701906

Large alligator clips
(dolphin type)
701954

Pinchers tip
(hook type)
758928

Alligator adapters
758922

Alligator adapters
758929

Fork terminal adapters
758921

Probe power 4-output
701934

±7000 V, 50 MHz
Differential probe
701977

±1500 V, 150 MHz
Differential probe
701978

Acceleration/Voltage Module
(with AAF)
701275

High-speed 10 MS/s 12 Bit
Non-isolation Module
701255

Passive probe
701940

BNC cable
1 m: 366924
2 m: 366925

BNC-alligator cable
366926

±7000 V, 50 MHz
Differential probe
701977

±1500 V, 150 MHz
Differential probe
701978

Strain Module (NDIS)
701270

Strain Module
(DSUB Shunt-CAL)
701271

Bridge head (NDIS)
120 Ω: 701955
350 Ω: 701956

Bridge head
(DSUB, Shunt-CAL)
120 Ω: 701957
350 Ω: 701958

Logic input
Module
720230

High-speed
logic probe
700986

Isolated logic
probe
700987

Logic Probe
(TTL level/
contact input)
1 m: 702911
3 m: 702912

16 CH Temp./Voltage
Input Module
720221

Scanner box
701953 (provided with a
connecting cable)

Temperature/High-precision Voltage
Isolation Module (Low noise)
720266

Universal Module
701261

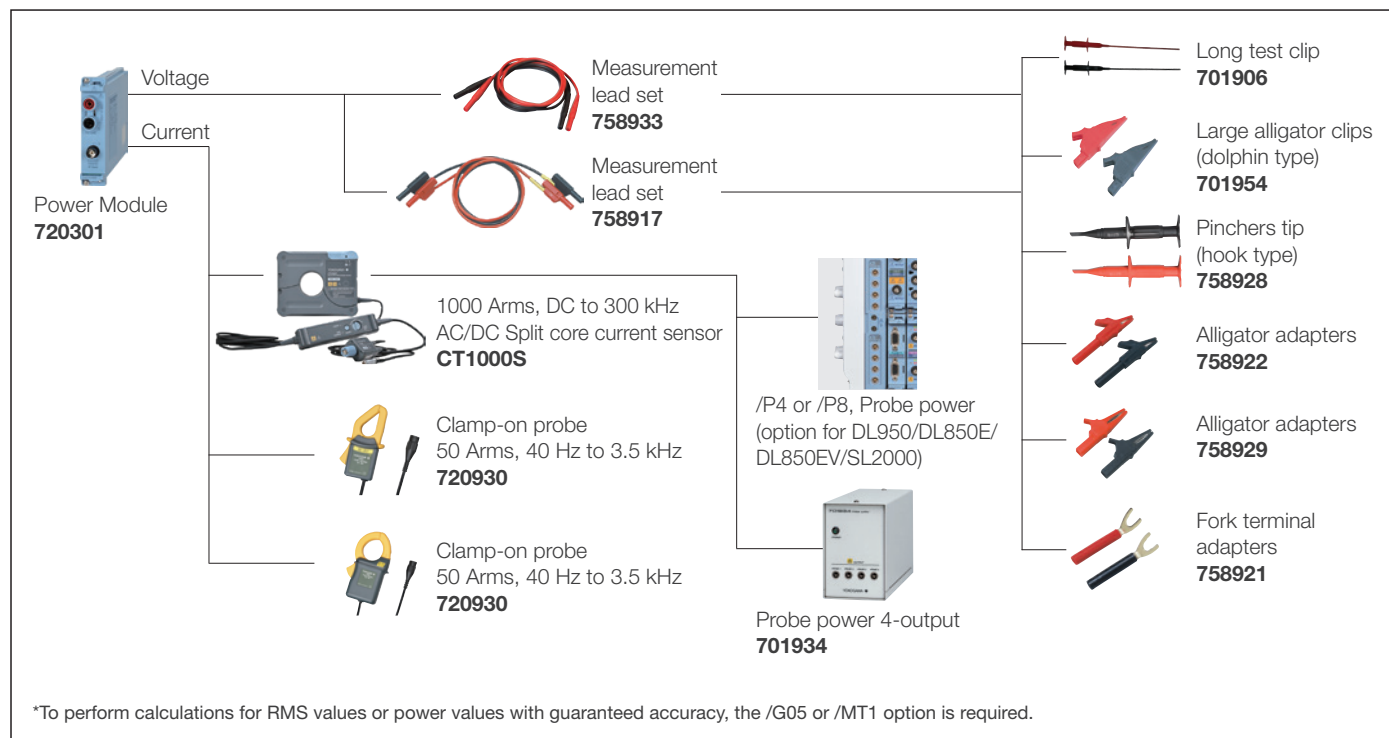
Universal Module
(with AAF)
701262

1:1 Banana-alligator cable
366961

Temperature/High-precision Voltage
Isolation Module (Low noise)
720266

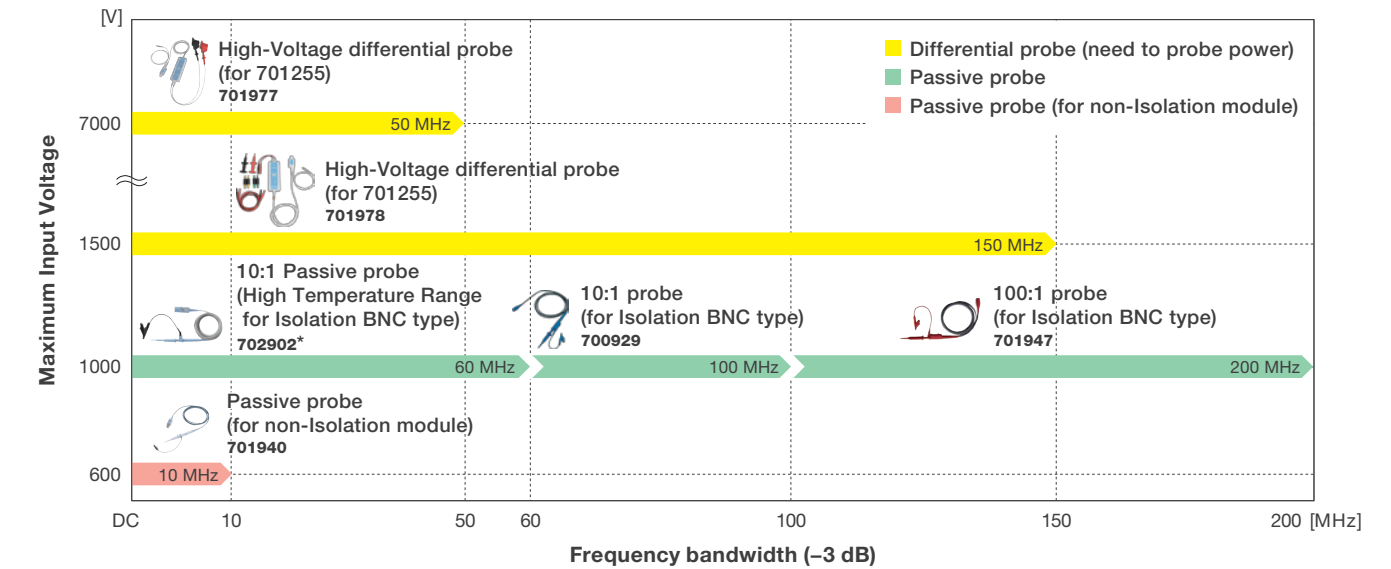
Temperature/High-precision Voltage
Isolation Module (Low noise)
720266

* /P4 or /P8 option or 701934 is necessary to use 701977 and 701978.

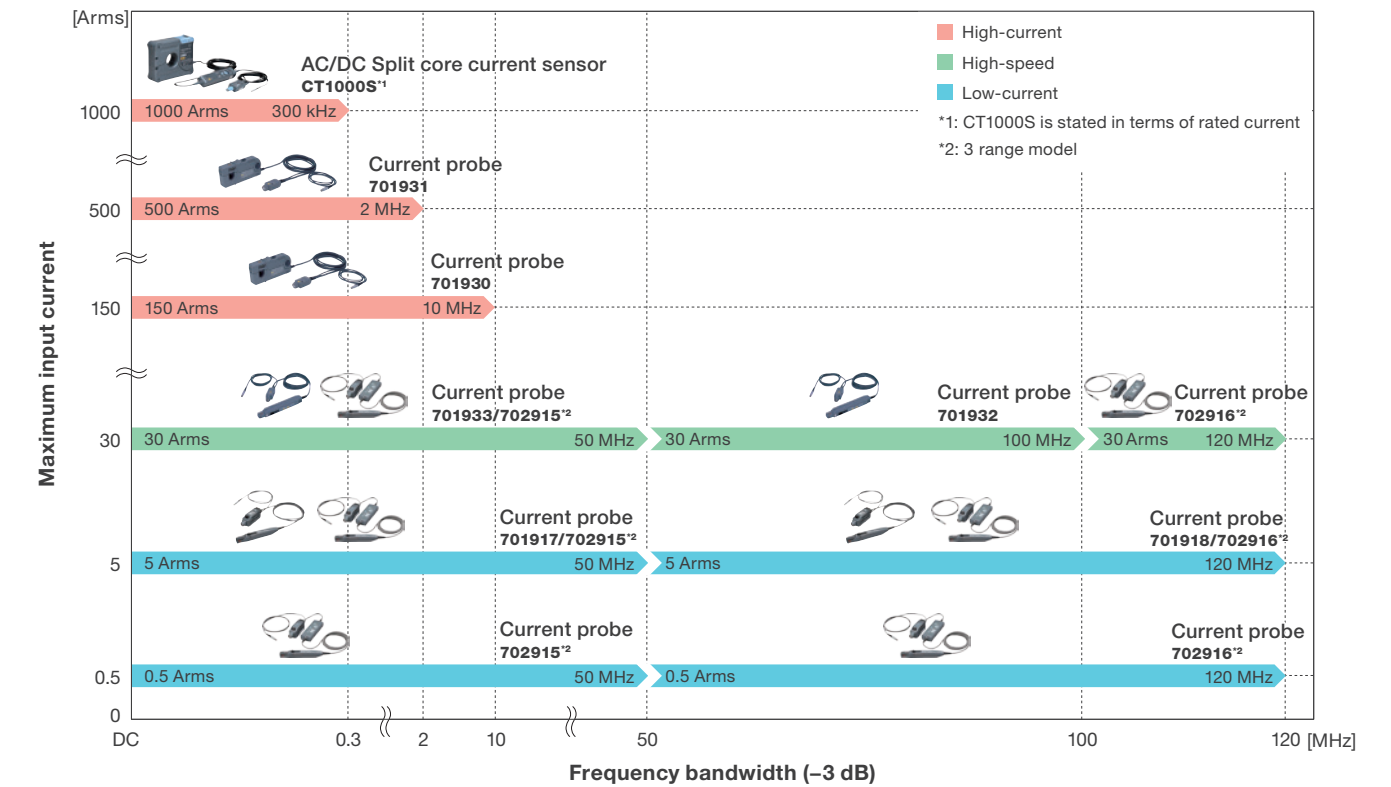


Sensor

Voltage probe



Current probe/Current sensor



Specifications (Main unit)

For the plug-in modules specifications, see the “Bulletin DL950E-02EN”.

Signal Input Section	
Type	Plug-in input unit
Number of slots	8
Maximum number of input channels	32 channels (when 4-CH modules are used in all slots) 128 channels (when 16 CH temperature/voltage modules are used in all slots)
Memory size	Standard: 1 Gpoint (up to 500 Mpoints per channel) /M1 option: 4 Gpoints (up to 2 Gpoints per channel) /M2 option: 8 Gpoints (up to 4 Gpoints per channel)
Scope Mode Features	
Waveform Acquisition and Display	
Acquisition mode	Normal Normal waveform acquisition
Envelope	Holds peak values at the maximum sample rate, regardless of the time axis setting
Averaging	Average count: 2 to 65536 (2 ⁿ steps), Infinite (attenuation constant: 2 to 256, 2 ⁿ steps)
Record length	Standard model 10 k, 25 k, 50 k, 100 k, 250 k, 500 k, 1 M, 2.5 M, 5 M, 10 M, 25 M (32 CH), 50 M (16 CH), 100 M (8 CH), 250 M (4 CH), 500 M (2 CH) /M1 10 k, 25 k, 50 k, 100 k, 250 k, 500 k, 1 M, 2.5 M, 5 M, 10 M, 25 M, 50 M, 100 M (32 CH), 250 M (16 CH), 500 M (8 CH), 1 G (4 CH), 2 G (2 CH) /M2 10 k, 25 k, 50 k, 100 k, 250 k, 500 k, 1 M, 2.5 M, 5 M, 10 M, 25 M, 50 M, 100 M, 250 M (32 CH), 500 M (16 CH), 1 G (8 CH), 2 G (4 CH), 4 G (2 CH)
Sample rate	Can be set up to the module's maximum sample rate for each channel (there are limitations based on the record length)
Selectable time scale range	100 ns/div to 1 s/div (1-2-5 steps), 2 s/div, 3 s/div, 4 s/div, 5 s/div, 6 s/div, 10 s/div, 20 s/div, 30 s/div, 1 min/div to 6 min/div (1 min steps), 10 min/div, 12 min/div, 30 min/div, 1 h/div to 6 h/div (1 h steps), 8 h/div, 10 h/div, 12 h/div, 1 day/div to 5 day/div (1 day steps)
Action performed at the end of acquisition	Waveform data saving (simultaneous saving in binary, ASCII, and MATLAB formats) Image saving, measurement result saving, mail transmission, buzzer notification
Event recording	Records up to 100 events using the event input terminal
Zoom	Two windows
Display format	1, 2, 3, 4, 5, 6, 8, 12, 16 split displays (set for each display group)
Maximum number of displayed traces	Up to 64 traces for each display group
Display interpolation	Off, Sine interpolation, linear interpolation, pulse interpolation
X-Y display	Number of windows: 2 Number of X-Y traces: In quad mode, up to 8 traces (up to 4 traces/window) In single mode, up to 32 traces (up to 16 traces/window) Select the X- and Y-axes (in quad mode) from CHn, CHn_m, RtMathn, and MATHn.
Accumulation	Waveform accumulation: Infinite, 2, 4, 8, 16, 32, 64, 128
History function	Maximum number of histories: 5000 Display mode: Single waveform display, all waveform display, average display
Dual capture	
Data acquisition of the same waveform is possible at two different sample rates	
Low-speed sampling	Maximum sample rate: 100 kS/s Selectable time scale range: 1 s/div to 5 day/div
High-speed sampling	Maximum sample rate: Module's maximum sample rate Selectable time scale range: 100 ns/div to 1 min/div Maximum record length: 50 M (/M2)
SSD recording (/ST1 or /ST2)	
Maximum sample rate	Depends on the number of used channels. 2 MS/s (when 1 CH is used), 200 kS/s (when 16 CH is used) maximum
Maximum record length	50 G (/M2 8 CH)
Flash acquisition (/ST2)	
Maximum sample rate	Depends on the number of used channels. 20 MS/s (when 8 CH is used), 10 MS/s (when 16 CH is used) maximum
Maximum record length	20 G (/M2 4 CH)
Vertical and Horizontal Control	
Channel on/off	CHn, CHn_m, RTMATHn, and MATHn can be turned on and off separately
Vertical axis zooming	×0.1 to ×100 (varies depending on the module type) By setting the scale using upper and lower limits
Vertical position setting	Waveforms can be moved in the range of ±5 div
Linear scaling	Can be set to Ax+B mode or P1-P2 mode (only for voltage, stress, and frequency)
Roll mode display	When the trigger mode is set to auto, single, or on-start, and the time axis setting is greater than or equal to 100 ms/div
Deskewing	±1 μs (modules with sample rates at 10 MS/s or faster)

Triggering Section	
Trigger mode	Auto, Auto Level, Normal, Single, Single (N), On-start
Selectable trigger level range	0 ±10 div
Manual trigger	Input through dedicated keys or communication commands
Simple trigger	
Trigger source	CHn, CHn_m (specified input channel, specified bit for logic), RTMATHn, external, time, line
Trigger slope	Rising, falling, both edges (rising, falling only for logic)
Clock trigger	Date (year/month/day), time (hour/minute/second), time interval (10 seconds to 24 hours)
Enhanced trigger	
Trigger source	CHn, CHn_m (specified input channel, specified bit for logic), RTMATHn, external
Trigger type	A→B (N), A Delay B, Edge on A, AND, OR, Period, Pulse Width, WaveWindow
Analysis	
Cursors	T-Y waveforms: Horizontal / Vertical / H&V / Marker / Degree X-Y waveforms: Horizontal / Vertical / H&V / Marker FFT waveforms: Marker / Peak / Peak List
Automated measurement of waveform parameters	
Measured parameters	
Analog waveform, Math	PP, Amp, Max, Min, High, Low, Avg, Mid, Rms, Sdev, +Over, -Over Rise, Fall, Freq, Period, +Width, -Width, Duty, Pulse, Burst1, Burst2, Avg.Freq, AvgPeriod, Int1TY, Int2TY, Int1XY, Int2XY, Delay
Logic waveform	Freq, Period, Pulse, Duty, Avg.Freq, Delay
Statistical processing	
Statistical items	Max, Min, Avg, Sdv, Cnt
Maximum number of cycles	64000
Maximum measurement range	4 Gpoints (memory recording), 100 Mpoints (internal storage)
Continuous statistical processing	Statistical processing is performed while waveforms are acquired
Cyclic statistical processing	Automatically measures the waveform parameters once per cycle and performs statistical processing on the parameters
History statistical processing	Automatically measures the waveform parameters on the data of each history waveform and performs statistical processing on the parameters
Waveform computation	
Operators	Basic arithmetic with coefficients, binarization, shift
Number of computations	Up to 8
Computation length	Up to 2 Mpoints (when one waveform is used), 250 kpoints (when eight waveforms are used)
User-defined math function (/G02 option)	
Operators	Equations can be created using the following operators. ABS, SQRT, LOG, EXP, NEG, SIN, COS, TAN, ATAN, PH, DIF, DDIF, INTG, IINTG, BIN, P2, P3, F1, F2, FV, PWHL, PWHLH, PWLL, PWXX, DUTYH, DUTYL, FILT1, FILT2, HLBT, MEAN
Set the average	Simple average, exponential average, cycle average, peak computation
FFT	
Waveform to be computed	CHn, CHnm, RTMATHn, MATHn
Number of windows	2
Number of FFT waveforms	Up to eight waveforms (up to four waveforms/window)
Computation range	From the specified computation time start point until the specified number of points have been computed
Math points	1 k / 2 k / 5 k / 10 k / 20 k / 50 k / 100 k
Time window	Hanning, Hamming, FlatTop, Rectangle, Exponential (/G02 option)
Average setting (/G02 option)	Domain: Time axis, frequency axis Type: Simple average, exponential average, peak computation
GO/NO-GO determination	
A selected operation can be performed according to the determination condition on the acquired waveform.	
Zone determination	Number of determination zones: Up to 6 Number of source waveforms: Up to 16 Combinations: AND, OR
Parameter determination	Number of determination parameters: Up to 16 Combinations: AND, OR
Operation after determination	
Screen capture data saving, waveform data saving, buzzer notification, mail transmission	
Zooming and searching	
You can search for and then expand and display a portion of the displayed waveform.	
Type	Edge: Searches by counting the number of rising and falling edges Logic pattern: Searches by counting the logic pattern Event: Searches for an event number Time: Searches for a date and time
History search	
Searches through history waveforms for specified conditions	
Zone search	Number of determination zones: Up to 4 Combinations: AND, OR
Parameter search	Number of determination parameters: Up to 4 Combinations: AND, OR

Recorder Mode Features	
Waveform Acquisition and Display	
Record conditions	
Preset time recording	Records data for the specified time period from the start point
Continuous recording	Records data for the specified time period before stopping
Trigger recording	Records data based on trigger position setting
Acquisition mode	
Memory recording	Records waveforms to internal memory
Saving during and at the end of memory recording	
Records to internal memory and then saves waveform data or screen capture data to files	
SSD recording (/ST1 or /ST2)	
Records waveforms to internal SSD storage	
Flash acquisition (/ST2)	
Records waveforms in the storage for flash acquisition	
Acquisition mode	
Normal	Normal waveform acquisition
Envelope	Holds peak values at the maximum sample rate, regardless of the time axis setting
Recording time	1 s to 50 days
Sampling interval	100 ns to 200 ms (1-2-5 series)
Action performed at the end of recording	
Waveform data saving (binary, ASCII, and MATLAB formats)	
Screen capture data saving, measurement results saving, buzzer notification, mail transmission	
SSD recording (/ST1 or /ST2)	
Minimum sampling interval	Depends on the number of used channels. 500 ns (when 1 CH is used), 5 μ s (when 16 CH is used) minimum
Maximum number of recorded points	
20 Gpoints, 50 Gpoints (/M1, /M2) (there are limitations based on the number of used channels)	
Flash acquisition (/ST2)	
Minimum sampling interval	Depends on the number of used channels. 100 ns (when 16 CH is used), 200 ns (when 32 CH is used) minimum
Maximum number of recorded points	
10 Gpoints, 20 Gpoints (/M1, /M2) (there are limitations based on the number of used channels)	
Event recording	Records up to 100 events using the event input terminal
Display time range	10 μ s to 10 s (1-2-5 steps), 20 s, 30 s, 40 s, 50 s, 60 s, 100 s, 200 s, 300 s, 10 min to 60 min (10 min steps), 100 min, 2 hour, 5 hour, 10 hour to 60 hour (10 hour steps), 80 hour, 100 hour, 5 day, 10 day, 20 day, 30 day, 40 day, 50 day
Zoom	One window
Display format	1, 2, 3, 4, 5, 6, 8, 12, 16 split displays (set for each display group) of TY display
Maximum number of displayed traces	
Up to 64 traces for each display group	
X-Y display	Number of windows: 2
	Number of X-Y traces: In quad mode, up to 8 traces (up to 4 traces/window) In single mode, up to 32 traces (up to 16 traces/window)
	Select the X- and Y-axes (in quad mode) from CHn, CHn_m, RtiMathn, and MATHn.
Vertical and Horizontal Control	
Channel on/off	CHn, CHn_m, RTMATHn, and MATHn can be turned on and off separately.
Vertical axis zooming	By setting the scale using upper and lower limits
Linear scaling	Can be set to Ax+B mode or P1-P2 mode (only for voltage, stress, and frequency)
Deskewing	± 1 μ s (modules with sample rates at 10 MS/s or faster)
Triggering Section	
Selectable trigger level range	0 $\pm$ measurement range
Manual trigger	Using a dedicated key
Trigger source	CHn, CHn_m (specified input channel, specified bit for logic), RTMATHn, external trigger, time
Trigger type	Edge, Time, OR, AND
Analysis	
Cursors	
T-Y waveforms: Horizontal / Vertical / H&V / Marker / Degree	
X-Y waveforms: Horizontal / Vertical / H&V / Marker	
FFT waveforms: Marker / Peak / Peak List	
Automated measurement of waveform parameters	
Measured parameters	
Analog waveform, Math	PP, Amp, Max, Min, High, Low, Avg, Mid, Rms, Sdev, +Over, -Over Rise, Fall, Freq, Period, +Width, -Width, Duty, Pulse, Burst1, Burst2, Avg.Freq, AvgPeriod, Int1TY, Int2TY, Int1XY, Int2XY, Delay
Logic waveform	Freq, Period, Pulse, Duty, Avg.Freq, Delay
Statistical processing	
Statistical items	Max, Min, Avg, Sdv, Cnt
Maximum number of cycles	
64000	
Maximum measurement range	
4 Gpoints (memory recording), 100 Mpoints (SSD recording)	

Cyclic statistical processing	
Automatically measures the waveform parameters once per cycle and performs statistical processing on the parameters	
Waveform computation	
Operators	Basic arithmetic with coefficients, binarization, shift
Number of computations	Up to 8
Computation length	Up to 2 Mpoints (when one waveform is used), 250 kpoints (when eight waveforms are used)
User-defined math function (/G02 option)	
Operators	Equations can be created using the following operators ABS, SQRT, LOG, EXP, NEG, SIN, COS, TAN, ATAN, PH, DIF, DDIF, INTG, IINTG, BIN, P2, P3, F1, F2, FV, PWHH, PWHL, PWLH, PWLL, PWXX, DUTYH, DUTYL, FILT1, FILT2, HLBt, MEAN
Set the average	None
FFT	
Waveform to be computed	CHn, MATHn
Number of windows	2
Number of FFT waveforms	Up to eight waveforms (up to four waveforms/window)
Computation range	From the specified computation time start point until the specified number of points have been computed
Math points	1 k / 2 k / 5 k / 10 k / 20 k / 50 k / 100 k
Time window	Hanning, Hamming, FlatTop, Rectangle, Exponential (/G02 option)
Set the average	None
Zooming and searching	
You can search for and then expand and display a portion of the displayed waveform	
Type	Edge: Searches by counting the number of rising and falling edges Logic pattern: Searches by counting the logic pattern Event: The instrument searches for an event number Time: The instrument searches for a date and time

Real Time Math (/G03, /G05, /MT1)	
Math expression	Real time math using hardware
Max. number of math channels	16 (separate from the input channels)
Computation result storage format	Single-precision floating-point (32 bit)
Real time math function	
Math rate	Max. math rate: 10 MS/s or 1 MS/s for polynomials
Math type	Basic arithmetic with coefficients, Angle math, Quartic polynomial, Coefficient multiplied by addition or subtraction of sources, Logic signal/analog waveform conversion, Differentiation, Integration, Common logarithm, Square root, Frequency, Period, Edge count, Demodulation of PWM signal, Torque, Rms value, Effective power, Effective power integration, Cosine, Sine, Arc tangent, Angle of rotation, Electrical angle, Knocking filter (only when the /VCE option is installed), Resolver, 3 phase resolver, IIR filter, CAN ID (only when the /VCE option is installed), Bin, Peak, Edge sampling, Phase difference, Clark transform (only when the /MT1 option is installed), Temperature coefficient of resistance compensation (only when the /MT1 option is installed)
Math source waveforms	All input channels including sub channels. (there are limitations based on the operator) Math results can be specified as sources of another channel. However, you can only specify math results of channels whose numbers are smaller than the channel that you are specifying sources for.
Math delay	A uniform delay for each math operation, regardless of the number of math channels
Filter on math results	IIR low-pass filter all math results Full, cutoff frequencies 128 kHz, 64 kHz, 32 kHz, 16 kHz, 8 kHz, 4 kHz, 2 kHz, 1 kHz, 500 Hz, 250 Hz, 125 Hz, 62.5 Hz
Vertical scale	Set based on the specified top and bottom scale values, simultaneous use of zooming using the scale knob and moving using the position knob

Digital filter	
Digital filter for input channels. Math can be performed on up to 16 channels at the same time	
Target input modules	720212, 720211, 701250, 701255, 720250, 701251, 720252, 720268, 720301, 701261, 701262, 701265, 720266, 701275, 701270, 701271
Filter types	Mean (moving average), Gauss, Sharp, IIR, IIR-Lowpass

Power Math (/G05, /MT1), Motor dq analysis (/MT1)	
Math expression	Real time math using hardware
Math source channels	Voltage input channels excluding the 720220 and 720221
Max. math rate	10 MS/s
Min, analysis period	0.1ms (10 kHz)
Math result output channels	
Power analysis math: Real time math RTMATH13, RTMATH14 Motor dq analysis function: Real time math RTMATH13, RTMATH14 Harmonic analysis math: Real time math RTMATH15, RTMATH16	
Computed result	Single-precision floating-point (32 bit)
Max. number of analyzable systems	
Up to two three-phase systems can be computed simultaneously	
Max. number of simultaneous math parameters	
118 when one system is measured 58 $\times$ 2 systems when power math function two systems are measured 62 $\times$ 2 systems when motor dq analysis function two systems are measured	

Supported wiring systems Single-phase two-wire (1P2W), single-phase three-wire (1P3W) (only when the Power math or Harmonic analysis is activated), three-phase three-wire (3P3W), three-phase three-wire system that uses a three-voltage three-current method (3V3A, 3V3AR, 3V3AS), three-phase four-wire system (3P4W)	
Delta math function Three-phase three-wire (3P3W) → three-phase three-wire system that uses a three-voltage three-current method (3V3A) Three-phase four-wire system (3P4W) → three-phase three-wire (3V3A) (star → delta) Three-phase three-wire (3V3A) → three-phase four-wire system (3P4W) (delta → star) Three-phase three-wire system that uses a three-voltage three-current method (3P3W) → threephase four-wire system (3P4W) (delta → star) Three-phase three-wire system that uses a three-voltage three-current method (3V3AR) → threephase four-wire system (3P4W) (delta → star) Three-phase three-wire system that uses a three-voltage three-current method (3V3AS) → three-phase four-wire system (3P4W) (delta → star)	
Supported Position Sensors Incremental Encoder, Absolute Encoder, Resolver, 3-Phase Resolver, 1 Pulse	
Power math items (only when the /G05 or /MT1 option is installed) Rms voltage and current of each phase, Voltage and current simple average of each phase (DC), AC voltage and current components of each phase (AC), Active power, Apparent power, Reactive power, Power factor, Current phase difference, Voltage and current frequencies, Maximum voltage and current, minimum voltage and current, Maximum power, minimum power, Integrated watt-hour, integrated watt-hour of each polarity (positive and negative), Integrated ampere-hour, integrated ampere-hour of each polarity (positive and negative), Apparent energy, Reactive energy, Impedance of the load circuit, Series resistance of the load circuit, Series reactance of the load circuit, Parallel resistance of the load circuit, Parallel reactance of the load circuit, Three-phase voltage unbalanced factor, Three-phase current unbalanced factor, Motor output math, Power efficiency	
Motor dq analysis function items (only when the /MT1 option is installed) Rms voltage and current of each phase, Active power, Apparent power, Reactive power, Power factor, Current phase difference, Maximum power, Minimum power, integrated watt-hour of each polarity (positive and negative), Integrated ampere-hour, integrated ampere-hour of each polarity (positive and negative), Apparent energy, Reactive energy, Maximum voltage and current, minimum voltage and current, Rotation frequency, Voltage and current fundamental analysis component, Voltage and current fundamental component phase difference, dq-axis current and voltage, dq-axis inductance, salient ratio, dq-axis armature flux linkage, Torque, Motor electric power, Motor power, DC voltage and current, DC power, DC integrated watt-hour, DC ampere-hour, Efficiency, Integration time, Electric angle frequency	
Rms math system Select true rms value or rectified mean value calibrated to the rms value	
Math sync Mode Edge Computed using zero-crossings of the edge detection source. Edge detection sources: voltage, current, other channels (any computation target channel for Power math), or rotation period (for Motor dq analysis). Slope: select from rising, falling, or both. Hysteresis: select from ±0.1 div, ±0.5 div, ±1 div. Edge source filter (LPF): select from OFF, 128 kHz, 64 kHz, 32 kHz, 16 kHz, 8 kHz, 4 kHz, 2 kHz, 1 kHz, 500 Hz, 250 Hz, 125 Hz, 62.5 Hz.	
Timer	Computed at specified time intervals. Updated interval 0.1 ms–500 ms.
Auto Timer	Available only for Power math.
Transient	Select a signal. Computation starts at the first zero-crossing (both edges).
dq voltage and current waveform display id, iq, vd, vq, voltage and current waveforms (output to RTMATH channel after dq conversion)	
Harmonic analysis Max. number of analyzable systems 1 Max. number of analyzable frequencies Fundamental wave 1 kHz FFT points 4096 Math mode Rms analysis mode, power analysis mode Math items Rms analysis mode Rms percentage content of the 1st to 40th harmonic, Phase angles of the 1st to 40th harmonic, Total rms value, Distortion factor (IEC), Distortion factor (CSA) Power analysis mode Active powers from the 1st to the 35th harmonic, Active power percentage content from the 1st to the 35th harmonic, Phase angles of the 1st to 35th harmonic, Total active powers, Total reactive powers, Total apparent powers, Power factor, 1st harmonic rms voltage, 1st harmonic rms current, 1st harmonic voltage phase angle, 1st harmonic current phase angle Edge detection source Rms analysis mode: Analysis source channel Power analysis mode: Select one channel from voltage and current. Edge source filter Low-pass filter can be selected Cutoff frequency: Select from 128 kHz, 64 kHz, 32 kHz, 16 kHz, 8 kHz, 4 kHz, 2 kHz, 1 kHz, 500 Hz, 250 Hz, 125 Hz, and 62.5 Hz.	
Time Axis Time axis accuracy ±4.6 ppm External clock input Clock input through the external clock input terminal	
Display Display 12.1-inch color TFT LCD (capacitive touch panel) Display format T-Y, X-Y, FFT, harmonics (/G05) Display resolution 1024×768 (XGA) Resolution of the waveform display 801×656 (normal), 1001×656 (wide) Defective pixels 3 ppm or less of the total number of pixels including RGB	

Saving Data	
Saving Data Types of saved data Measured data, analysis results, settings, screen capture Measured data format Binary (.WDF), MATLAB (.MAT), text (.CSV) Maximum file size (MAT, CSV format): 2 GByte Data storage device Internal storage, SD memory card, USB storage, network drive	
Saving Screen Captures Screen capture data format PNG, JPEG, BMP Screen capture data color Monochrome, color, color (reverse), grayscale Data storage device Internal storage, SD memory card, USB storage, network drive	
PC Data Streaming Connection type USB, Ethernet, 10 G Ethernet (/C60) Maximum sample rate Depends on the number of used channels. 2 MS/s (when 1 CH is used), 200 kS/s (when 16 channels are used) maximum (USB, Ethernet) 20 MS/s (when 8 channels are used), 10 MS/s (when 16 channels are used) (10 G Ethernet)	
Multi-Unit Synchronization (/C50) Connector type SFP Ports 4 (up to four sub units can be connected to a main unit) Synchronization accuracy ±(30 ns + 1 sample) (typical value) Function Start and stop from the main unit, combination trigger across units Maximum cable length 20 m	
Storage Internal storage (/ST1 or /ST2 option) Number of drives 1 Media type SSD Available space 512 GB Storage for flash acquisition (/ST2) Available space Acquisition data 160 GB Memory backup Automatically saves the acquisition memory data at power-off by the front panel switch SD memory card Number of slots 1 Compatible cards SD, SDHC, and SDXC memory cards USB storage Compatible USB storage devices Mass storage devices that comply with USB Mass Storage Class Ver. 1.1 Available space 8 TB max. Partition format: MBR, GPT; format type: FAT16/FAT32/exFAT	
USB Ports for Peripherals Connector type USB type A (receptacle) Electrical and mechanical USB Rev. 2.0 compliant Supported transfer modes HS (High Speed; 480 Mbps), FS (Full Speed; 12 Mbps), LS (Low Speed; 1.5 Mbps) Compatible devices Mass storage devices that comply with USB Mass Storage Class Ver. 1.1 104 or 109 keyboards that comply with USB HID Class Ver. 1.1 Mouse devices that comply with USB HID Class Ver. 1.1 HP Inkjet printers compatible with USB Printer Class Ver. 1.0, BrotherPocketJET printers Number of ports 2 Power supply 5 V, 500 mA (for each port) External Printer Output Supported models Brother Pocket JET printers, 300 dpi models HP inkjet printers, single function models For details on models, see the catalog or website Output format Screen hard copy, monochrome or color (color available only with HP printers)	
Auxiliary I/O Section External Trigger Input Terminal Connector type BNC Input level TTL (0 to 5 V) Minimum pulse width 100 ns Detected edge Rising or falling Trigger Output Terminal Connector type BNC Output level 5 V CMOS Output delay time 4.5 μs + 1 sample (typical value) Applies to 1 MS/s or faster modules. Output format Normal format Logic: Falls when a trigger occurs and rises when a signal acquisition is completed Output hold time: 100 ns or more	

Pulse format	
Logic: Transmits a pulse when a trigger occurs	
Pulse width: 1 ms, 50 ms, 100 ms, 500 ms	
External Clock Input Terminal	
Connector type	BNC
Input level	TTL (0 to 5 V)
Maximum input frequency	9.5 MHz, 100 kHz (for envelope)
Minimum pulse width	50 ns
Detected edge	Rising
Video signal output	
Connector type	D-sub 15 pin, receptacle
Output format	Analog RGB
Output resolution	XGA-compliant output, 1024 × 768 dots Approx. 60-Hz Vsync (66 MHz dot clock frequency)
GO/NOGO Output	
Connector type	Screwless terminal block
Output level	5 V CMOS
External Start/Stop Input	
Connector type	Screwless terminal block
Input level	TTL (0 to 5 V) or contact input
Event Input	
Connector type	Screwless terminal block
Input level	TTL (0 to 5 V) or contact input
Sample clock output	
Connector type	Screwless terminal block
Output level	5 V CMOS
Output operation	Outputs a clock signal at the specify frequency
Frequency range	5 Hz to 200 kHz (1-2-5 steps)
COMP Output (Probe Compensation Signal Output Terminal)	
Output signal frequency	1 kHz±1%
Output amplitude	1 Vp-p±10%
Probe power (/P4 or /P8 option)	
Output terminals	4 (/P4), 8 (/P8)
Output power	±12 V
Output current	Up to a total of 2.4 A (/P4), up to a total of 4.8 A (/P8)
GPS Interface (/C35 option)	
Input connector	9-pin Mini DIN
Compatible GPS unit	720940 (optional accessory)
Function	
Instrument clock synchronization, Sample clock synchronization, GPS data acquisition (latitude, longitude, altitude, velocity, movement direction, GPS position information)	
Synchronization accuracy*	
±200 ns (typical value when locked to GPS signal)*	
*The figure is based on results obtained when the GPS unit is installed in a location with good line of sight to GPS satellites. The accuracy may not be attained depending on the measurement location, the location of satellites when the measurement is taken, the weather, and influence caused by obstruction.	
IRIG Interface (/C35 option)	
Input connector	BNC
Number of input connectors	1
Compatible IRIG signals	A006, B006, A136, B126
Input impedance	50 Ω/5 kΩ switchable
Maximum input voltage	±8 V
Used for	Instrument clock synchronization Sample clock synchronization
Clock sync range	±60 ppm
Synchronization accuracy	No drift from the input signal
Computer Interface	
USB-PC Connection	
Connector type	USB type B (receptacle)
Electrical and mechanical specifications	
USB Rev. 3.0 compliant	
Supported transfer modes	
FS (Full Speed) mode (12 Mbps), HS (High Speed) mode (480 Mbps), SS (Super Speed) mode (5 Gbps)	
Number of ports	1
Supported protocols	
Functions as a device that conforms to one of the following two protocols.	
USBTMC-USB488 (USB Test and Measurement Class Ver. 1.0)*	
Communication commands can be used through USB.	
*A separate driver is required	
Mass Storage Class Ver.1.1	
Only reading is possible from the instrument's internal storage through PC access. (Operations, such as formatting, are not possible.)	
PC system requirements	Windows8.1, Windows10, Windows11
Ethernet	
Connector type	RJ-45 modular jack
Ports	1

Electrical and mechanical specifications	
IEEE802.3 compliant	
Transmission system	Ethernet (1000BASE-T/100BASE-TX/10BASE-T)
Communication protocol	TCP/IP
Supported services	DHCP, DNS, SNMP client, SMTP client, FTP client, FTP server, Web server, LPR, VXI-11, HiSLIP, Socket PTP slave, PTP master (/C40 option)
Time synchronization feature	
Sync source	Supports IEEE1588-2008 (PTP v2). Supports PTP packets of Layer3 (UDP/IPv4) and Layer2 (Ethernet), Slave feature only (without the /C40 option), Slave and master features (with the /C40 option), Supports Ordinary Clock, Supports E2E delay correction, Supports 2-step Sync messages
Sync targets	Instrument clock, sample clock
Synchronization accuracy	±150 ns (typical value) when 1000BASE-T is used and an Ethernet switch is not used
Master sync clock (/C40 option)	
Internal clock, GPS (/C35 option)	
10 G Ethernet (/C60)	
Connector type	SFP+
Ports	1
Electrical and mechanical specifications	
IEEE802.3 compliant	
Transmission system	Ethernet (10GBASE-R)
Communication protocol	TCP/IP
Supported services	DHCP, DNS, SNMP client, SMTP client, FTP client, FTP server, Web server, Socket, VXI-11, HiSLIP

General Specifications**Standard operating conditions**

Ambient temperature: 23±5°C
 Ambient humidity: 20 to 80%RH
 Supply voltage and frequency errors Within ±1% of rating
 After a 30 minute warm-up and after calibration

Recommended calibration period

1 year

Warm-up time

At least 30 minutes

Operating environment

Temperature: 5°C to 40°C
 Humidity: 20 to 85%RH (no condensation)
 Altitude: 2000 m or less

Storage environment

Temperature: -20°C to 60°C
 Humidity: 20 to 85%RH (no condensation)

Power supply

Rated supply voltage: 100 to 120 VAC, 220 to 240 VAC (auto switching)
 Permitted supply voltage range: 90 to 132 VAC, 198 to 264 VAC
 Rated supply frequency range: 48 Hz to 63 Hz
 Maximum power consumption: 280 VA
 Withstand voltage 1500 VAC for 1 minute between the power supply and case
 Insulation resistance 10 MΩ or higher at 500 VDC between the power supply and case

DL950

Installation orientation	Vertical, horizontal, tilted
External dimensions	Approx. 375 mm (W) × 259 mm (H) × 202 mm (D), excluding the handle and protrusions
Weight	Approx. 7.5 kg (main unit only, no options)

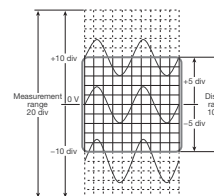
SL2000

Installation orientation	Vertical, tilted
External dimensions	Approx. 426 mm (W) × 177 mm (H) × 380 mm (D), excluding the handle and protrusions
Weight	Approx. 8.5 kg (main unit only, no options)

Measurement Range and Display Range

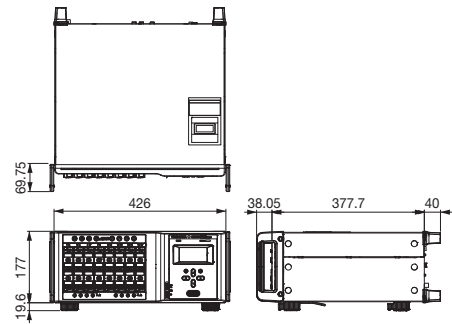
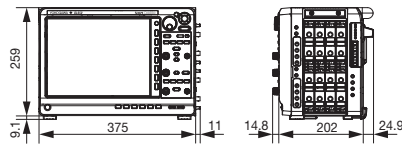
The measurement range of the ScopeCorder is ±10 divisions (20 divisions of absolute width (span)) around 0 V. The display range of the screen is ±5 divisions (10 divisions of span). The following functions can be used to move the displayed waveform and display the waveform outside the display range by expanding/reducing the displayed waveform.

- Move the vertical position.
- Set an offset voltage.
- Zoom in or out of the vertical axis (expand/reduce).



Outline Drawing

DL950 Unit: mm SL2000 Unit: mm



Plug-in module model numbers

Model	Description
720212	High-speed 200 MS/s 14 Bit Isolation Module
720211	High-speed 100 MS/s 12 Bit Isolation Module
720250	High-speed 10 MS/s 12 Bit Isolation Module
701251	High-speed 1 MS/s 16 Bit Isolation Module
720252	1 MS/s 16 Bit Isolation Module (with Offset adjust)
720256	4 CH 10 MS/s 16 Bit Isolation Module
720254	4 CH 1 MS/s 16 Bit Isolation Module
701255	High-speed 10 MS/s 12 Bit non-Isolation Module
720268	High-Voltage 1 MS/s, 16 Bit Isolation Module (with AAF, RMS)
720220	Voltage Input Module (16 CH)
720301	Power measurement 1 MS/s 16 Bit Isolation Module
701261	Universal Module
701262	Universal Module (with Anti-Aliasing Filter)
701265	Temperature/High-Precision Voltage Module
720266	Temperature/High-Precision Voltage Isolation Module (Low Noise)
720221	16 CH Temperature/Voltage Input Module
701953-L1	16 CH Scanner Box (provided with 1 m cable)
701953-L3	16 CH Scanner Box (provided with 3 m cable)
701270	Strain Module (NDIS)
701271	Strain Module (DSUB, Shunt-CAL)
701275	Acceleration/Voltage Module (with Anti-Aliasing Filter)
720281	Frequency Module
720230	Logic Input Module
720245	CAN FD/LIN Monitor Module
720243	SENT Monitor Module

*Probes are not included with any modules.

*The External Scanner Box (model 701953) is required to use the 720221 module.

*Firmware update may be required when using these modules.

*The specifications of these modules are expressed differently in the case of the SL1000.
See the SL1000 user's manual.

This is a Class A instrument based on Emission standards EN61326-1, 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.

See previous page for detail about probes, cables, and converters.

Optional Accessories

 Optical Transceiver Module 1000BASE-SX SFP module 850 nm 720941	 Conversion cable (for differential probe) 701905
 Optical Fiber Cord Multi mode optical fiber (LC-LC/3 m) 720941	 Probe stand 701919
 GPS Unit 720940	 Soft carrying case for DL950 701972

Probes, cables, and converters*8

Model	Product	Description ¹
701947	100:1 Probe	1000 V (DC+ACpeak) CAT II, 1.5 m
702902	10:1 Probe	Operating temp. range: -40 to 85°C, 2.5 m
700929	10:1 Probe	1000 V (DC+ACpeak) CAT II, 1.5 m
701901	1:1 Safety BNC adapter lead	1000 Vrms CAT II
701904	1:1 Safety Adapter Lead	1000 Vrms CAT II, 600 Vrms CAT III
(in combination with the following)		
758928	Pinchers tip (Hook type)	1000 Vrms CAT III, 1 set each of red and black
701954	Large alligator-clip (Dolphin type)	1000 Vrms CAT III, 1 set each of red and black
758929	Alligator clip adaptor set	1000 Vrms CAT II, 1 set each of red and black
758922	Alligator clip adaptor set	300 Vrms CAT II, 1 set each of red and black
758921	Fork terminal adapter set	1000 Vrms CAT II, 1 set each of red and black
701940	Passive probe ²	Non-isolated 600 Vpk (701255) (10:1)
366926	1:1 BNC-alligator cable	Non-isolated 42 V or less, 1 m
366961	1:1 Banana-alligator cable	Non-isolated 42 V or less, 1.2 m
702915	Current probe ^{3,4}	0.5, 5, 30 Arms, DC to 50 MHz
702916	Current probe ^{3,4}	0.5, 5, 30 Arms, DC to 120 MHz
701917	Current probe ^{3,4}	5 Arms, DC to 50 MHz
701918	Current probe ^{3,4}	5 Arms, DC to 120 MHz
701932	Current probe ^{3,4}	30 Arms, DC to 100 MHz
701933	Current probe ^{3,4}	30 Arms, DC to 50 MHz
701930	Current probe ^{3,4}	150 Arms, DC to 10 MHz
701931	Current probe ^{3,4}	500 Arms, DC to 2 MHz
720930	Clamp-on probe	AC 50 Arms, 40 Hz to 3.5 kHz
720931	Clamp-on probe	AC 200 Arms, 40 Hz to 3.5 kHz
CT1000S-L03	AC/DC Split core current sensor ^{3,4}	1000 Arms, DC to 300 kHz (Cable length 3 m)
CT1000S-L05	AC/DC Split core current sensor ^{3,4}	1000 Arms, DC to 300 kHz (Cable length 5 m)
CT1000S-L10	AC/DC Split core current sensor ^{3,4}	1000 Arms, DC to 300 kHz (Cable length 10 m)
A1339EZ	Shunt resistor BOX	1 Ω, ±0.5% For use in combination with DL950, SL2000, CT1000A, and CT2000A
701934	Probe power supply	External probe power supply (4 outputs)
701977	Differential probe ^{3,4}	7000 Vpeak, 5000 Vrms (For 701255)
701978	Differential probe ^{3,4}	1500 Vpeak, 1000 Vrms (For 701255)
701905	Conversion cable	for Differential probe
701955	Bridge head (NDIS, 120 Ω)	With 5 m cable
701956	Bridge head (NDIS, 350 Ω)	With 5 m cable
701957	Bridge head (DSUB, 120 Ω)	Shunt-CAL with 5 m cable
701958	Bridge head (DSUB, 350 Ω)	Shunt-CAL with 5 m cable
758924	Safety BNC-banana adapter	500 Vrms CAT II
702911	Logic probe ⁵	8 bit, 1 m, non-Isolated, TTL level/Contact Input
702912	Logic probe ⁵	8 bit, 3 m, non-Isolated, TTL level/Contact Input
700986	High-speed logic probe ⁵	8 bit, non-Isolated, response speed: 1 μs (typ.)
700987	Isolation logic probe ⁶	8 bit, each channel isolated
758917	Measurement lead set ⁷	0.75 m, Stackable type (2 per set) Separate alligator clips are required.
758933	Measurement lead set ⁷	1000 V/19 A/1 m length Separate alligator clips are required.
701902	Safety BNC-BNC cable (1 m)	1000 Vrms CAT II (BNC-BNC)
701903	Safety BNC-BNC cable (2 m)	1000 Vrms CAT II (BNC-BNC)
701948	Plug-on clip	For 700929 and 701947
701906	Long test clip	For 701977, 701978 and 701901
720941	Optical Transceiver Module	For multi-unit connection
720942	Optical Fiber Cord	For multi-unit connection, 3 m
701972	Soft carrying case	For DL950
720940	GPS unit	For DL950, SL2000 and DL350
751542-E4	Rack mounting kit	For an EIA-compliant Single-housing Rack
751542-J4	Rack mounting kit	For an JIS-compliant Single-housing Rack

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

*2: 30 Vrms is safe when using the 701940 with an isolated type BNC input. *3: The number of current probes that can be powered from the main unit's power supply is limited. *4: Either the probe power option of the main unit or the probe power supply (701934) is required. *5: Includes one of each of the B9879PX and B9879KX connection leads. *6: Additionally, 758917 and either the 758922 or 758929 are required for measurement. *7: Alligator clips are required. *8: Refer to the bulletin and user's manual of each product to confirm the compatibility with the main unit.

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.

DL950 Model and suffix code

Model	Suffix codes	Description
DL950		ScopeCorder, 1 G Points memory ^{*1}
Power cord	-D	UL/CSA standard and PSE compliant
	-F	VDE/Korean standard
	-R	Australian standard
	-Q	British standard
	-H	Chinese standard
	-N	Brazilian standard
	-T	Taiwanese standard
	-B	Indian standard
Language	-U	IEC Plug Type B
	-HJ	Japanese menu and panel
	-HE	English menu and panel
	-HC	Chinese menu and panel
	-HK	Korean menu and panel
	-HG	German menu and panel
	-HF	French menu and panel
	-HL	Italian menu and panel
Option	-HS	Spanish menu and panel
	-HR	Russian menu and panel
	/M1 ^{*2}	Memory expansion to 4 G Points ^{*7}
	/M2 ^{*2}	Memory expansion to 8 G Points ^{*8}
	/ST1 ^{*3}	Internal storage (512 GB)
	/ST2 ^{*3}	Internal storage (512 GB) + Flash Acquisition function
	/C35	IRIG and GPS interface
	/C40	IEEE1588 Master function
	/C50	Multi-unit synchronization interface
	/C60	10 Gbps Ethernet interface
	/G02	User-defined math function
	/G03 ^{*4}	Real time math function

Standard Main Unit Accessories

Power cord, front cover, panel sheet, 8 slot cover panels, soft case, user's manuals^{*8}

^{*1}: The main unit requires plug-in module (s). Max. 500 M Points/CH. ^{*2},^{*3},^{*4},^{*5}: Only one of these can be selected. ^{*6}: The Start Guide is provided as a printed document. ^{*7}: Max. 2 G Points/CH ^{*8}: Max. 4 G Points/CH

Binary files saved by DL950 cannot be opened by Xviewer. Please use IS8000.

Additional option license for DL950*

Model	Suffix code	Description
709831	-C40	IEEE1588 Master function
	-G02	User-defined math function
	-G05	/G03 -> /G05 (Add power math function) /G03 needs to be already installed on the DL950.
	-MT1	/G05->/MT1 (Add motor dq analysis function) /G05 needs to be already installed on the DL950.
	-VCE	Vehicle edition

*Separately sold license product (customer-installable).

SL2000 Model and suffix code

Model	Suffix codes	Description
SL2000		1 G Points memory ^{*1} High-Speed Data Acquisition Unit, 1 G Point memory ^{*1}
Power cord	-D	UL/CSA standard and PSE compliant
	-F	VDE/Korean standard
	-R	Australian standard
	-Q	British standard
	-H	Chinese standard
	-N	Brazilian standard
	-T	Taiwanese standard
	-B	Indian standard
Language	-U	IEC Plug Type B
	-HJ	Japanese menu
	-HE	English menu
	-HC	Chinese menu
	-HK	Korean menu
	-HG	German menu
	-HF	French menu
	-HL	Italian menu
Option	-HS	Spanish menu
	-HR	Russian menu
	/M1 ^{*2}	Memory expansion to 4 G Points ^{*7}
	/M2 ^{*2}	Memory expansion to 8 G Points ^{*8}
	/ST1 ^{*3}	Internal storage (512 GB)
	/ST2 ^{*3}	Internal storage (512 GB) + Flash Acquisition function
	/C35	IRIG and GPS interface
	/C40	IEEE1588 Master function
	/C50	Multi-unit synchronization interface
	/C60	10 Gbps Ethernet interface
	/G02	User-defined math function
	/G03 ^{*4}	Real time math function

Standard Main Unit Accessories

Power cord, front cover, panel sheet, 8 slot cover panels, soft case, user's manuals^{*8}

^{*1}: The main unit requires plug-in module (s). Max. 500 M Points/CH. Includes one license of IS8002. ^{*2},^{*3},^{*4},^{*5}: Only one of these can be selected. ^{*6}: The Start Guide is provided as a printed document. ^{*7}: Max. 2 G Points/CH ^{*8}: Max. 4 G Points/CH

Additional option license for SL2000*

Model	Suffix code	Description
709833	-C40	IEEE1588 Master function
	-G02	User-defined math function
	-G05	/G03 -> /G05 (Add power math function) /G03 needs to be already installed on the DL950.
	-MT1	/G05->/MT1 (Add motor dq analysis function) /G05 needs to be already installed on the DL950.
	-VCE	Vehicle edition

*Separately sold license product (customer-installable).

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<sup>*Any company's names and product names mentioned in this document are trade names, trademarks or registered trademarks of their respective companies.
User's manuals: Start guide (booklet), function/operation, communication manuals (electric file)</sup>

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.

NOTICE

- Before operating the product, read the user's manual thoroughly for proper and safe operation.



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