

16.1 Input Section

Item	Specifications
Number of Input Channels	4 (CH1 to CH4), or 2 (CH1 to CH2) for the DL1620
Input Coupling Settings	AC 1 M Ω , DC 1 M Ω , GND
Input Connector	BNC
Input Impedance	1 M Ω \pm 1.0%, approx. 28 pF
Voltage Axis Sensitivity Setting	1 M Ω input : 2 mV/div to 10 V/div (1-2-5 steps)
Maximum Input Voltage	1 M Ω input (at 1 kHz or less): 300 V DC or 300 V RMS CAT I, 424 V peak
DC Offset Range (Max)	2 mV/div to 50 mV/div : \pm 1 V
(At 1 : 1 probe attenuation)	100 mV/div to 500 mV/div : \pm 10 V
	1 V/div to 5 V/div : \pm 100 V
	10 V/div : \pm 50 V
Vertical (Voltage) Axis Precision	
DC Precision ^{*1}	2 mV/div to 5 mV/div : \pm (2% of 8 div + offset voltage precision)
	10 mV/div to 10 V/div : \pm (1.5% of 8 div + offset voltage precision)
Offset Axis Precision ^{*1}	2 mV/div to 50 mV/div : \pm (1% of set value + 0.2 mV)
	100 mV/div to 500 mV/div : \pm (1% of set value + 2 mV)
	1 V/div to 10 V/div : \pm (1% of set value + 20 mV)
Frequency Characteristics ^{*1*2}	1 M Ω input (BNC terminal)
(-3 dB point when sine wave of amplitude \pm 4 div is input)	1 V/div to 10 mV/div : DC to 200 MHz
	5 mV/div to 2 mV/div : DC to 80 MHz
	1 M Ω input (defined at the tip of the probe when using the passive probe 700960)
	10 V/div to 10 mV/div : DC to 200 MHz
	5 mV/div to 2 mV/div : DC to 80 MHz
-3 dB Point for AC Coupling Used	10 Hz or less (When using the 10 : 1 probe (standard accessory), 1 Hz or less)
Interchannel Skew (with identical settings)	1 ns or less
Residual Noise ^{*3}	Larger of \pm 1.25 mV or \pm 0.15 div (typical ^{*4})
Interchannel Isolation (at identical voltage sensitivity)	200 MHz : -35 dB (typical ^{*4})
A/D Conversion Resolution	8 bits (24 LSB/div)
Probe Attenuation Settings	1 : 1, 10 : 1, 100 : 1, 1000 : 1, 10 A : 1 V ^{*5} , 100 A : 1 V ^{*6}
Bandwidth	10 kHz to 20 MHz band limit ON/OFF
Maximum Sample Rate	Realtime sampling mode : 200 MS/s Repetitive sampling mode: 50 GS/s
Maximum Record Length	High-resolution mode ON : (DL1620/DL1640) 4 Mwords/CH, (DL1640L) 16 Mwords/CH High-resolution mode OFF : (DL1620/DL1640) 8 Mwords/CH, (DL1640L) 32 Mwords/CH

*1 As measured following calibration (after 30-minute warmup), with internal-clock timebase, under standard operating conditions as described on section 16.11.

*2 For repetitive events
The frequency region for single shot is DC to sampling frequency/2.5 or the frequency region for the repetitive event, whichever is less.

*3 Measured under following conditions: input block shorted; 10 kWord record length; Normal acquisition mode; accumulation OFF; 1 : 1 probe attenuation

*4 The typical value is a representative or standard value. It is not a warranted value.

*5, *6 Setting automatically made to match the type of optional current probe being used, respectively 700937 and 701930.

16.2 Trigger Section

Item	Specifications
Trigger Mode	Auto, Auto Level, Normal, Single, Single(N)
Trigger Source	CH1 to CH4 (or CH1 to CH2 for the DL1620), EXT, LINE
Trigger Coupling	CH1 to CH4 (or CH1 to CH2 for the DL1620) : DC, AC EXT : DC
HF Rejection	Trigger source band limit (OFF, DC to approx. 15 kHz) selection (CH1 to CH4, or CH1 to CH2 for the DL1620)
Trigger Hysteresis	Select the trigger hysteresis width
Trigger Level Setting Range	CH1 to CH4 : ± 4 div from screen center (CH1 to CH2 for the DL1620) EXT : ± 2 V for the DL1640/DL1640L : ± 1 V for the DL1620 with the ± 1 V range selected : ± 10 V for the DL1620 with the ± 10 V range selected
Trigger Level Resolution	CH1 to CH4 : 0.01 div for the DL1640/DL1640L (CH1 to CH2 for the DL1620) EXT : 5 mV for the DL1640/DL1640L : 5 mV for the DL1620 with the ± 1 V range selected : 50 mV for the DL1620 with the ± 10 V range selected
Trigger Level Precision ^{*1}	CH1 to CH4 ^{*1} : $\pm(1 \text{ div} + 10\% \text{ of trigger level})$ (CH1 to CH2 for the DL1620) EXT ^{*2} : $\pm(50 \text{ mV} + 10\% \text{ of trigger level})$ for the DL1640/DL1640L : $\pm(50 \text{ mV} + 10\% \text{ of trigger level})$ for the DL1620 with the ± 1 V range selected : $\pm(500 \text{ mV} + 10\% \text{ of trigger level})$ for the DL1620 with the ± 10 V range selected
External-Trigger Probe Attenuation	1 : 1, 10 : 1
Trigger Sensitivity ^{*2}	CH1 to CH4 : 1 divp-p (at DC to 200 MHz) (CH1 to CH2 for the DL1620) EXT : 300 mVp-p (at DC to 100 MHz) for the DL1640/DL1640L : 100 mVp-p (at DC to 100 MHz) for the DL1620 with the ± 1 V range selected : 1 Vp-p (at DC to 100 MHz) for the DL1620 with the ± 10 V range selected
Trigger Position	Can be set in 1% increments of record length
Trigger Delay Setting Range	0 to 4 s
Hold Off Time Range	80 ns to 10 s
Trigger Slope	Rise, Fall, Rise/Fall (with edge trigger)

Item	Specifications
Trigger Type	<p>Edge : Activate the trigger on the edge of a single trigger source.</p> <p>A → B(N) : Trigger occurs nth time condition B becomes true after condition A becomes true. Count : 1 to 10⁸ Condition A : Enter, Exit Condition B : Enter, Exit</p> <p>A Delay B : Trigger occurs first time condition B becomes true after specified delay following condition A true. Delay : 5 ns to 5 s Condition A : Enter, Exit Condition B : Enter, Exit, Both</p> <p>OR : Trigger occurs on the OR of trigger conditions that are specified on multiple trigger sources. The trigger condition can either be edge or window. Rise (IN), Fall (OUT), or Don't Care can be specified on each channel from CH1 to CH4.</p> <p>Pattern : Trigger occurs on the edge of the clock channel based on the True/False condition of the parallel pattern that is specified on multiple trigger sources. If the clock channel is set to Don't Care, then the trigger occurs only on the True or False condition (Enter or Exit) of the parallel pattern. The parallel pattern is the AND of the channel states of each channel.</p> <p>Pulse Width : Trigger occurs on the width of the True/False condition of the parallel pattern that is specified on multiple trigger sources. The parallel pattern is the AND of the channel states of each channel or the AND of the window conditions of each channel.</p> <p>Pulse>T : Triggers when the width above is greater than T. Setting range: 0.005 μs to 1000000.000 μs</p> <p>Pulse<T : Triggers when the width above is less than T. Setting range: 0.0075 μs to 1000000.000 μs</p> <p>T1<PLS<T2 : Triggers when the width above is greater than T1 and less than T2. Setting range T1: 0.005 μs to 999999.995 μs T2: 0.010 μs to 1000000.000 μs</p> <p>$\overline{T1<PLS<T2}$: Triggers when the width above is greater than T1 and T2. Setting range T1: 0.0075 μs to 999999.995 μs T2: 0.010 μs to 1000000.000 μs</p> <p>Time out : Triggers when the width above exceeds Time. Setting range 0.005 μs to 1000000.000 μs</p> <p>Time accuracy*¹ : ±(0.5% of setting*³ + 1 ns) Minimum detectable time*² : 5 ns (typical value*⁴)</p> <p>TV : Trigger for video signal, in NTSC, PAL, 1080/60i, 1080/50i, 720/60p, 480/60p, 1080/25p, 1080/24p, 1080/24sF, or 1080/60ps format. Input channel must be CH1. User can select field no. and line no.</p> <ul style="list-style-type: none"> • Conditions A and B are parallel pattern conditions that are set separately to High, Low, or "Don't Care" for each channel and for EXT input.

*1 As measured immediately after calibration, under standard operating conditions (see section 16.11), with machine warmed up.

*2 As measured under standard operating conditions (see section 16.11) after warmed up.

*3 When set to T1<Pulse<T2, the value of T2.

*4 The typical value is a representative or standard value. It is not a warranted value.

16.3 Time Axis

Item	Specifications
Time Axis Range	DL1620/DL1640 2 ns/div to 800 s/div (record length is 8 Mwords) 2 ns/div to 500 s/div (record length is 100 kword or 1 Mwords) 2 ns/div to 50 s/div (record length is 10 kwords) 2 ns/div to 5 s/div (record length is 1 kwords) DL1640L 2 ns/div to 800 s/div (record length is 16 Mwords(high resolution mode) or 4 Mwords) 2 ns/div to 640 s/div (record length is 32 Mwords(high resolution mode is OFF)) 2 ns/div to 500 s/div (record length is 100 kwords, 1 Mwords, or 10 Mwords) 2 ns/div to 50 s/div (record length is 10 kwords) 2 ns/div to 5 s/div (record length is 1 kwords)
Timebase Precision ^{*1}	±(0.005%)
Time Axis Precision ^{*1}	±(0.005% + 50 ps + 1 digit) ^{*2}
EXT CLOCK IN	Connector Type BNC Maximum Input Voltage ±40 V(DC + ACpeak) or 28 Vrms, 10 kHz or less Input Frequency Range 40 Hz to 5 MHz (continuous clock only) Sampling Jitter ±10 ns or less Minimum Input Level 0.3 Vp-p for the DL1640/DL1640L 0.1 Vp-p for the DL1620 with the ±1 V range selected 1 Vp-p for the DL1620 with the ±10 V range selected Threshold Level ±2 V (5 mV resolution) for the DL1640/DL1640L ±1 V (5 mV resolution) for the DL1620 with the ±1 V range selected ±10 V (50 mV resolution) for the DL1620 with the ±10 V range selected Input Impedance Approx. 1 MΩ, 28 pF Minimum Pulse Width At least 10 ns (for both High and Low)

*1 As measured under standard operating conditions (see section 16.11) after warmed up.

*2 1 digit may be unreliable depending on the sampling.

16.4 Display

Item	Specifications
Display	6.4-inch color TFT liquid crystal display
Screen Size	130.6 mm (width) × 97.0 mm (height)
Total Picture Elements ^{*1}	640 × 480 dots
Waveform Picture Elements	500 × 384 dots

*1 The liquid crystal display (LCD) may contain a number of defective pixels. (Up to 40 pixels per million of the color LCD may be defective.) Therefore, there may be a small number of "lit" or "dead" pixels on the LCD. This is not a malfunction.

16.5 Functions

Acquisition/Display

Item	Specifications
Acquisition Mode	Select from four modes: Normal, Averaging, Envelope.
Sampling Mode	Select realtime or repetitive sampling. (Availability depends on time axis settings.)
High-resolution Mode	If combined with a filter, improves the S/N ratio up to a maximum of 13 bits.
Record Length	DL1620/DL1640 : 1 kword, 10 kwords, 100 kwords, 1 Mword, 8 Mwords DL1640L : 1 kword, 10 kwords, 100 kwords, 1 Mword, 4 Mwords, 10 Mwords, 32 Mwords
Zoom	Can zoom up to 2 time axis ranges of displayed waveform(s).
Display Format	1, 2, or 4 waveform windows.
Interpolation	Display samples using dot display, "sine" interpolation, linear interpolation, or pulse interpolation.

Item	Specifications
Graticule	Select from three graticule types.
Auxiliary Display Items	Select display or nondisplay of scale values, waveform labels, or trigger mark.
X - Y Display	Display two X-Y waveform (XY1 or XY2).
Accumulation	Displays multiple iterations of waveform, in either "persistence mode" or "color-grade mode."
Snapshot	Freezes the current waveform on screen. Saves or loads the snapshot waveforms.
Trace Clear	Removes the currently displayed waveform.

Vertical/Horizontal Axis Setting

Item	Specifications																									
Channel ON/OFF	Independent ON or OFF for each channel.																									
Input Filter	Set a 20 MHz, 1.28 MHz, 640 kHz, 320 kHz, 160 kHz, 80 kHz, 40 kHz, 20 kHz, or 10 kHz band limit ON or OFF independently for each channel.																									
Vertical Position Setting	Waveforms can be moved vertically in the range ± 4 div from the center of the waveform display frame.																									
Linear Scaling	Set scaling coefficient, offset, and unit separately for each channel.																									
Roll Mode	The roll display mode is enabled when the trigger mode is auto, auto-level, or single and the time axis is as follows. <table border="1" data-bbox="526 840 1372 1131"> <thead> <tr> <th>Model</th> <th>Record Length</th> <th>T/div</th> </tr> </thead> <tbody> <tr> <td rowspan="3">DL1620/</td> <td>1 kwords</td> <td>50 ms/div to 5 s/div</td> </tr> <tr> <td>10 kwords</td> <td>50 ms/div to 50 s/div</td> </tr> <tr> <td>100 kwords to 1 Mwords</td> <td>50 ms/div to 500 s/div</td> </tr> <tr> <td rowspan="5">DL1640L</td> <td>8 Mwords</td> <td>200 ms/div to 800 s/div</td> </tr> <tr> <td>1 kwords</td> <td>50 ms/div to 5 s/div</td> </tr> <tr> <td>10 kwords</td> <td>50 ms/div to 50 s/div</td> </tr> <tr> <td>100 kwords to 1 Mwords</td> <td>50 ms/div to 500 s/div</td> </tr> <tr> <td>4 Mwords</td> <td>100 ms/div to 800 s/div</td> </tr> <tr> <td>10 Mwords</td> <td>500 ms/div to 500 s/div</td> </tr> <tr> <td>32 Mwords</td> <td>1 s/div to 640 s/div(500 ms/div to 800 s/div)</td> </tr> </tbody> </table> <p>Ranges in parentheses () take effect in high resolution mode.</p>	Model	Record Length	T/div	DL1620/	1 kwords	50 ms/div to 5 s/div	10 kwords	50 ms/div to 50 s/div	100 kwords to 1 Mwords	50 ms/div to 500 s/div	DL1640L	8 Mwords	200 ms/div to 800 s/div	1 kwords	50 ms/div to 5 s/div	10 kwords	50 ms/div to 50 s/div	100 kwords to 1 Mwords	50 ms/div to 500 s/div	4 Mwords	100 ms/div to 800 s/div	10 Mwords	500 ms/div to 500 s/div	32 Mwords	1 s/div to 640 s/div(500 ms/div to 800 s/div)
Model	Record Length	T/div																								
DL1620/	1 kwords	50 ms/div to 5 s/div																								
	10 kwords	50 ms/div to 50 s/div																								
	100 kwords to 1 Mwords	50 ms/div to 500 s/div																								
DL1640L	8 Mwords	200 ms/div to 800 s/div																								
	1 kwords	50 ms/div to 5 s/div																								
	10 kwords	50 ms/div to 50 s/div																								
	100 kwords to 1 Mwords	50 ms/div to 500 s/div																								
	4 Mwords	100 ms/div to 800 s/div																								
10 Mwords	500 ms/div to 500 s/div																									
32 Mwords	1 s/div to 640 s/div(500 ms/div to 800 s/div)																									

Analysis

Item	Specifications
Search and Zoom Function	Search for, then expand and display a portion of the displayed waveform. Choose from the following five search methods. <ul style="list-style-type: none"> Edge : Count the rising or falling edges, and automatically search either edge. Serial Pattern : Automatically search a serial pattern (up to 64 bits) with a synchronized or unsynchronized clock. Parallel Pattern : Automatically search a parallel pattern from CH1-CH4, Math1, Math2(CH1-CH2, Math1 for the DL1620) Pulse Width : Automatically search for parts where a pulse width meets specified conditions. Auto Scroll : Automatically scroll the zoom position.
History Search Function	You can search for and display waveforms from the history memory that satisfy specified conditions. Choose from the following two search methods. <ul style="list-style-type: none"> Zone : Set an area on the screen, then extract and display only those waveforms that pass through the area (Pass mode), or do not pass through the area (By Pass mode). Parameter : Extract and display only the automatic measurement results of the waveform parameters which meet the specified conditions.
Cursor Measurement Function	Allows selection of cursor type from Marker, Horiz, Vertical, H&V, Degree, and Vertical History.
Automatic Measurement of Waveform Parameters Function	Capable of performing automated measurement of waveform parameters. Automated measurement of waveform parameters within one period (P-P through Int2XY), statistical processing of waveform parameters, and statistical processing on the waveform parameters of historical data. <ul style="list-style-type: none"> P-P, Max, Min, Ave, Rms, Sdev, High, Low, +OShot, -OShot, Int1TY, Int2TY, Int1XY, Int2XY, Freq, Period, Rise, Fall, +Width, -Width, Duty, Burst1, Burst2, Pulse, AvgFreq, AvgPeriod, and Delay (between channels). Statistical processing results. Statistics: Min, Max, Avg, Cnt, and Sdv. Waveform parameter computation. Operation between waveform parameters and constants. Operators are +, -, *, and /. Measure waveform parameters in different areas on the same channel.

16.5 Functions

Item	Specifications
Computing Functions	+, -, χ , power spectrum However, select the range for the power spectrum (1 kword or 10 kwords).
Phase Shift	The phase of CH1 to CH4 (or CH1 to CH2 for the DL1620) can be shifted for monitoring. Computation is performed using the phase-shifted result.
GO/NO-GO Function	Judgment is made on the automatically measured value of waveform parameters and the results are output to the printer or to a storage medium, buzzer, or send a mail. ^{*1}

^{*1} This function can be used when the Ethernet interface (option) is installed.

Screen Data Output

Item	Specifications
Built-in Printer (Option)	Outputs hard copy of screen.
External Printer	Print the screen image to an external parallel printer (through the USB PERIPHERAL terminal or Ethernet ^{*1}). Supports ESC/P, ESC/P2, LIPS3, PCL5, BJ commands, and PostScript (Ethernet interface option ^{*1}).
Floppy Disk ^{*2} /Zip Disk ^{*2} / PC Card ^{*2} / Internal Flash Memory/ Network Drive ^{*1}	Output data formats : PostScript, TIFF, BMP, PNG, JPEG

^{*1} This function can be used when the Ethernet interface (option) is installed.

^{*2} Any of the built-in drives (floppy disk drive, Zip drive, or PC card drive) can be selected.

Data Storage

Item	Specifications
History Memory	DL1620/DL1640 : Retains max. 4000 waveforms recorded. DL1640L : Retains max. 16000 waveforms recorded.
Floppy Disk ^{*2} /Zip Disk ^{*2} / PC Card ^{*2} / Internal Flash Memory/ Network Drive ^{*1}	Save and restore waveform data, settings, other data.

^{*1} This function can be used when the Ethernet interface (option) is installed.

^{*2} Any of the built-in drives (floppy disk drive, Zip drive, or PC card drive) can be selected.

Other Functions

Item	Specifications
Initialization Function	Automatically resets key settings to the factory settings. (Excludes date/time settings, settings related to the communication interface, settings stored to the internal memory using the store/recall function, and setting the message language.)
Auto setup Function	Automatically sets key settings to the optimum values for the input signals.
Store/Recall	Store and recall up to three arbitrary settings.
Preset Function	Presets for the CMOS (5 V), CMOS (3.3 V), and user settings.
Action on Trigger	Hard Copy, Save to File, Buzzer and Send Mail are performed every time a trigger is activated.
Send Mail ^{*1}	Sending mails for DL1620/DL1640/DL1640L condition via the Ethernet interface.
Calibration	Auto calibration and manual calibration are possible.
Environment Setting Function	Allows setting of screen color, date/time, message language, click sound ON/OFF.
Probe Compensation Signal Output Function	Outputs a square calibration waveform signal (approx. 1 Vp-p, approx. 1 kHz) from the probe compensation signal output terminal on the front panel.
Overview Function	Shows system configuration.
Self Test Function	Allows memory test, key test, printer test, FD drive test, Zip drive test, PC card drive test, or an accuracy test.
Help Function	Displays help about settings.
Thumbnail	Displays the thumbnail preview window containing screen image files.

^{*1} This function can be used when the Ethernet interface (option) is installed.

16.6 Built-in Printer (Option)

Item	Specifications
Printing System	Thermal line dot method
Dot Density	8 dots/mm
Paper Width	112 mm

16.7 Storage

Built-in Storage

• Floppy Disk Drive

Item	Specifications
No. of Drives	1
Drive Size	3.5 inches
Capacity	720 KB, 1.44 MB

• Zip Drive

Item	Specifications
No. of Drives	1
Capacity	100 MB, 250 MB

• PC Card Interface

Item	Specifications
No. of Slots	1
Compatible Cards	Flash ATA card (PC card TYPE II)

• Internal Flash Memory

Item	Specifications
No. of Drives	1
Capacity	2 MB
No. of Rewrites	Less than approximately 100000

16.8 Keyboard, Printer, and Mouse Interfaces

Item	Specification
Connector Type	Type A connector (receptacle)
Electrical and Mechanical Specifications	Conforms to USB Rev.1.0
Supported Keyboards	104 keyboard (US) and 109 keyboard (Japanese) that conform to USB HID Class Ver.1.1
Supported Printers	ESC/P, ESC/P2, LIPS3, PCL5, and BJ (can be used on models that support the BJC-35V native commands) that support USB (USB Printer Class Ver.1.0)
Supported Mouses	Mouse that conforms to USB HID Class Ver. 1.1
Power Supply	5 V, 100 mA (per port)
Number of Ports	2

16.9 Auxiliary Input/Output Section

External Trigger Input^{*1}

Item	Specifications
Connector Type	BNC
Input Bandwidth	External Trigger Input : DC to 100 MHz
Input Impedance	Approx. 1 M Ω , 28 pF
Maximum Input Voltage	± 40 V (DC + AC peak) or 28 V _{rms} , 10 kHz or less
Trigger Level	± 2 V (5 mV measurement resolution) for the DL1640/DL1640L ± 1 V (5 mV measurement resolution) for the DL1620 with the ± 1 V range selected ± 10 V (50 mV measurement resolution) for the DL1620 with the ± 10 V range selected

*1 The EXT TRIG IN terminal also operates as an EXT CLOCK IN terminal. Specifications for external clock input appear in section 16.3. This terminal is labeled "EXT CLOCK IN/EXT TRIG IN" on the DL1640/DL1640L or "EXT." on the DL1620

Trigger Output (TRIG OUT)

Item	Specifications
Connector Type	BNC
Output Level	TTL
Output Logic	Negative logic
Output Delay Time	50 ns max.
Output Hold Time	1 μ s min. for low level, 100 ns min. for high level

RGB Video Signal Output (RGB VIDEO OUT)

Item	Specifications
Connector Type	D-Sub 15-pin socket
Output Type	VGA compatible

GO/NO-GO Input/Output (NO-GO OUT, GO OUT)

Item	Specifications
Connector Type	RJ-11 modular jack
Input/Output Level	START-IN input : TTL (0-5 V), switch input possible GO-OUT/NOGO-OUT output : CMOS (0-5 V)
Signal	START-IN, NOGO-OUT, GO-OUT
Cable	Four-wire modular cable

Power Connectors for the Probes (Option)

Item	Specifications
Number of Output	4
Output Voltage	± 12 V
Usable Probe	Current probe 700937 and 701930

CH1 OUT Signal

Item	Specifications
Connector Type	BNC
Output Level	20 mV/div $\pm 30\%$ (50 Ω termination)
Frequency Range	DC to 20 MHz (-3 dB attenuation point)

16.10 Computer Interface

GP-IB (Option)

Item	Specifications
Electrical and Mechanical Specifications	Conforms to IEEE St'd 488-1978 (JIS C 1901-1987).
Interface Functions	SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0
Protocol	Conforms to IEEE St'd 488.2-1992.
Code	ISO (ASCII) code
Mode	Addressable mode
Address Setting	Listener and talker addresses 0 to 30 are settable.
Remote Mode Clear	Remote mode can be cleared by pressing the SHIFT key + the CLEAR TRACE key (except when local lockout has been set).

For details refer to the Communication Interface User's Manual (IM701610-17E).

Serial (RS-232, Standard)

Item	Specifications
Connector Type	Half pitch interface cable (D-Sub 9-pin plug)
Electrical Specifications	Conforms to EIA 574 Standard (EIA-232 (RS-232) Standard for 9-pin)
Connection Format	Point to point
Communication Format	Full duplex
Synchronizing Format	Start-stop asynchronous transmission
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600

For details refer to the Communication Interface User's manual (IM701610-17E).

USB (Option)

Item	Specifications
Connector	Type B connector (receptacle)
Electrical and Mechanical Specifications	Conforms to USB Rev.1.0
Speed	Max. 12 Mbps
Number of Ports	1
Supported Systems	Models with standard USB ports that run Windows 98 SE, Windows Me, Windows 2000, or Windows XP. (A separate device driver is required for connecting to a PC.)

Ethernet (Option)

Item	Specifications
Communication Port Number	1
Electrical-Mechanical Specifications	IEEE 802.3 standards
Transmission Method	Ethernet (100BASE-TX, 10BASE-T)
Transmission Rate	Max. 100 Mbps
Communication Protocol	TCP/IP
Supported Services	FTP server, FTP client (network drive), LPR client (network printer), SMTP client (mail transmission), DHCP, DNS.
Connector Type	RJ-45 connector

16.11 General

Item	Specifications
Standard Operating Conditions	Ambient Temperature : 23 ±5°C Ambient Humidity : 55 ±10% RH Power Voltage and Frequency : Less than 1% of the rated voltage/frequency fluctuation
Warm-up Time	30 min. or more
Storage Conditions	Temperature : -20 to 60°C, -20 to 50°C (-J2 (built-in Zip drive) model) Humidity : 20 to 80% RH (no condensation allowed)
Operating Conditions	Temperature : 5 to 40°C Humidity : 20 to 80% RH (without a printer) 35 to 80% RH (with a printer)
Storage Altitude	3000 m or below
Operating Altitude	2000 m or below
Rated Supply Voltage	100 to 120 VAC, 220 to 240 VAC
Permissible Supply Voltage Range	90 to 132 VAC, 198 to 264 VAC
Rated Supply Voltage Frequency	50Hz, 60 Hz
Permissible Supply Voltage Frequency	48 to 63 Hz
Fuse	Internal Replacement not possible.
Maximum Power Consumption	100 VA (when the built-in printer is used)
Withstand Voltage (between power supply and case)	1.5 kVAC for 1 minute
Insulation Resistance (between power supply and case)	10 MΩ or more at 500 VDC
External Dimensions (details on page 16-11)	220 (W) × 266 (H) × 224 (D) mm (with printer cover closed, projections excluded)
Weight	Approx. 3.9 kg (options excluded)
Cooling Method	Forced air cooling, air discharged from rear
Installation Position	Horizontally (the stand can be used), vertically (cannot use the Zip drive), and no stacking.
Battery Backup	Setup data and internal clock are backed up by a built-in lithium battery. Battery life: approx. 5 years (at ambient temperature of 23°C)
Accessories	<ul style="list-style-type: none"> • 1 power cord • 200 MHz passive probes (4) • 1 roll of printer paper (Only on models with "/B5" suffix) • 4 rubber pads for bottom legs : B9989EX • Front cover stickers (4) : B9989FA • User's Manual (this manual) • Operation Guide • Communication Interface Manual (CD-ROM)

Item	Specifications
Safety standard	<p>Complying standard EN61010-1</p> <ul style="list-style-type: none"> • Overvoltage category(Installation category) II*¹ Input terminal: Overvoltage category(Installation category) I • Pollution degree 2*²
Emission	<p>Complying standard</p> <ul style="list-style-type: none"> • EN61326 Class A, C-Tick AS/NZS 2064(apply for 701605, 701610, 701620, 700960, 700937, 701930) • EN61000-3-2 • EN61000-3-3 This product is a Class A (for industrial environment) product. Operation of this product in a domestic environment may cause radio interference in which case the user is required to correct the interference. <p>Cable requirement</p> <ul style="list-style-type: none"> • External trigger/ External clock input terminal Use a BNC cable*³. Attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) to the end of the cable on the instrument side. • Trigger output terminal Same as the above external trigger input terminal. • CH1 OUT connector Same as the above external trigger input terminal. • RGB VIDEO OUT terminal Use a D-Sub 15-pin VGA shielded cable*³. • Serial(RS-232)interface connector Use an RS-232 shielded cable*³ and attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN)to the end of the cable on the instrument side. • USB PERIPHERAL connector Use a USB cable*³. Attach a ferrite core (TDK: ZCAT1325-0530A, YOKOGAWA: A1181MN) to the end of the cable on the instrument side. • USB interface connector Use a USB cable*³. Attach a ferrite core (TDK: ZCAT1325-0530A, YOKOGAWA: A1181MN) to the end of the cable on the instrument side. • GO/NO-GO output terminal Use a GO/NOGO cable (YOKOGAWA model 366973, sold separately). Attach a ferrite core (TDK: ZCAT1325-0530A, YOKOGAWA: A1181MN) to the end of the cable on the instrument side. • Ethernet connector Use a Ethernet cable*³. Attach a ferrite core (TDK: ZCAT1325-0530A, YOKOGAWA: A1181MN) to the end of the cable on the instrument side. • Power connectors for the probes Attach a ferrite core (TDK: ZCAT1325-0530A, YOKOGAWA: A1181MN) to the end of the cable on the instrument side.
Immunity*1	<p>Complying standard EN61326 Industrial environment(apply for 701605, 701610, 701620, 700960, 700937, 701930)</p> <p>Influence in the immunity environment</p> <ul style="list-style-type: none"> • Noise increase <ul style="list-style-type: none"> • $\leq \pm 80$ mV, when using 700960 • $\leq \pm 400$ mA, when using 700937 • $\leq \pm 4$ A, when using 701930 • Test condition <ul style="list-style-type: none"> When using 700960 200 MS/s, envelope mode, 20 MHz BWL, 20 mV/div (probe attenuation setting: 10:1), terminate the probe at 50 MΩ. When using 700937 200 MS/s, envelope mode, 20 MHz BWL, 0.1 A/div (probe setting: 700937). Attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) to each end of the signal cable. When using 701930 200 MS/s, envelope mode, 20 MHz BWL, 1 A/div (probe setting: 701930). Attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) to each end of the signal cable. • Cable requirement Same requirement as above for emission.

*1 "Overvoltage category(Installation category)" describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand voltage. "II" applies to electrical equipment which is supplied from the fixed installation like distribution board.

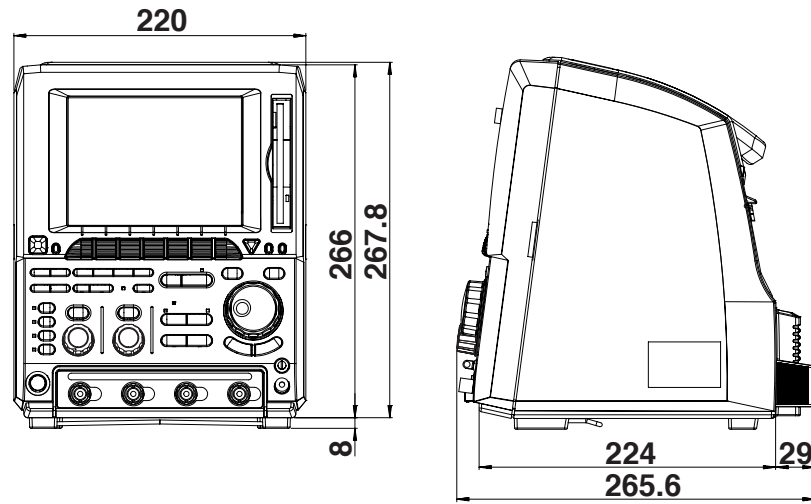
*2 "Pollution degree" describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. "2" applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs.

*3 The cable length is less than 3 m.

Applies to products manufactured after August 2002 having the CE Mark. For all other products, please contact your nearest YOKOGAWA representative.

16.12 External Dimensions

Dimensions: mm



Unless otherwise specified, tolerance is $\pm 3\%$.

(Tolerance is always ± 0.3 mm when the dimension is under 10 mm.)