

16.1 Input Section

Item	Specifications
Number of input channels	16 channels + 16-bit log (8 bits x2)
Type	Plug-in input unit
Number of slots	8 (2 channels per slot)
Maximum Record Length	Standard 2.5 MW/CH (16 analog channels + 6 DSP channels + 16-bit logic), 50 MW/CH max. /M1 option 10 MW/CH (16 analog channels + 6 DSP channels + 16-bit logic), 250 MW/(1CH) max. /M2 option 25 MW/CH (16 analog channels + 6 DSP channels + 16-bit logic), 500 MW/(1CH) max. /M3 option 50 MW/CH (16 analog channels + 6 DSP channels + 16-bit logic), 1 GW/(1CH) max.
DSP channel (optional)	6 dedicated computation channels (DSP channels) provided internal to the DL750. Performs realtime computation of addition, subtraction, multiplication, and division (with or without coefficients), filtering, differentiation, and integration using the 16 analog input channels as computation sources. (For detailed specifications of the computation function of the DSP channels, see section 16.5, "Function.") Below are the characteristics of the DSP channels <ul style="list-style-type: none"> • The allocation of the acquisition memory of DSP channels is the same as analog input channels. • Can be used in all acquisition modes. • Can be used as a trigger source of simple triggers. • Computed waveform can be displayed in realtime even during roll mode display. • Can be used as a target waveform of cursor measurements and automated measurement of waveform parameters. • Can be used as a target channel for the dual capture function.

16.2 Trigger Section

Item	Specifications
Trigger mode	Auto, auto-level, normal, single, single(N), and log
Trigger level range	CH1 to CH16: ± 10 div around 0
Trigger hysteresis	When observing voltage: Select ± 0.1 div, ± 0.5 div, or ± 1 div of the trigger level When observing temperature: When observing temperature: Select $\pm 0.5^\circ$ C, $\pm 1.0^\circ$ C, or $\pm 2.0^\circ$ C.
Trigger position	Can be set in 0.1% increments of the display record length
Trigger delay range	0 to 10 s (resolution is 100 ns)
Hold off time range	0 to 10 s (resolution is 100 ns)
Manual trigger key	Dedicated manual trigger key is available
Simple trigger	
Trigger source	CH1 to CH16, EXT (signal input from the TRIG IN terminal), LINE (commercial power supply signal that is connected), Logic A, Logic B, Time, and DSP1 to DSP6
Trigger slope	CH1 to CH16 and DSP1 to DSP6: Rising, falling, or rising/falling EXT, LOGIC A, LOGIC B: Rising or falling
Time trigger	Date (year/month/day), time (hour/minute), time interval (1 minute to 24 hours)
Enhanced trigger	
Trigger source	CH1 to CH16, Logic A, and Logic B (AND and OR possible on each logic bit)
Trigger type	A -> B(N): Trigger occurs nth time condition B becomes true after condition A becomes true. Count: 1 to 255 Condition A: Enter/Exit Condition B: Enter/Exit A Delay B: Trigger occurs first time condition B becomes true after specified delay following condition A true. Delay: 0 to 10 s (resolution is 100 ns) Condition A: Enter/Exit Condition B: Enter/Exit

16.2 Trigger Section

Item	Specifications
Edge on A:	Trigger occurs on the OR condition of the edge while condition A is true. Condition A: True/False
OR:	Trigger occurs on the OR of trigger conditions that are specified on multiple trigger sources. The OR condition can also be specified on each logic bit.
B > Time:	Trigger occurs when time of satisfaction of (pulse width trigger) condition B (time during which the condition is satisfied) is greater than or equal to a specified time. Specified time: 100 ns to 10 s (resolution is 100 ns)
B < Time:	Trigger occurs when time of satisfaction of (pulse width trigger) condition B is less than or equal to a specified time. Specified time: 100 ns to 10 s (resolution is 100 ns)
B Time Out:	Trigger occurs when the satisfaction of (timeout trigger) condition B reaches a specified time. Specified time: 100 ns to 10 s (resolution is 100 ns)
Period:	Periodic trigger. The following four types are available.
T > Time:	Trigger occurs when the period of condition T is greater than or equal to a specified time. Specified time: 100 ns to 10 s (resolution is 100 ns)
T < Time:	Trigger occurs when the period of condition T is less than or equal to a specified time. Specified time: 100 ns to 10 s (resolution is 100 ns)
T < T1 < T2:	Trigger occurs when the period of condition T is within a specified time range. Specified time: Time1: 100 ns to 10 s Time2: 200 ns to 10 s (resolution is 100 ns)
T < T1, T2 < T:	Trigger occurs when the period of condition T is outside a specified time range. Specified time: Time1: 100 ns to 10 s Time2: 200 ns to 10 s (resolution is 100 ns)
Window:	Trigger occurs when the trigger source enters or exits the range specified by two points. Window OR of multiple channels is possible. Logic bits can also be included in the edge OR condition.
Wave Window:	Trigger for monitoring the power supply. A realtime template is created by setting a tolerance (window width) to a waveform derived by averaging 1 to 4 cycles of waveforms before the current waveform. The current waveform is compared against the realtime template. If the current waveform falls outside the realtime template, a trigger is activated. <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 (CH1 to CH16), Logic A, and Logic B. • OR conditions can be set to \uparrow, \downarrow, or "Don't Care" for CH1 to CH16, Logic A, and Logic B. • Hold off time cannot be specified for period triggers.

16.3 Time Axis

Item	Specifications
Time axis range	Displayed using s/div, min/div, h/div, day/div. 500 ns/div to 1 s/div (in 1-2-5 steps), 2 s/div, 3 s/div, 4 s/div, 5 s/div, 6 s/div, 8 s/div, 10 s/div, 20 s/div, 30 s/div, 1 min/div to 10 min/div (in 1 min steps), 12 min/div, 15 min/div, 30 min/div, 1 h/div to 10 h/div (in 1 h steps), 12 h/div, 1 day/div, 2 day/div, 3 day/div
Time axis accuracy ¹	±(0.005%)
External clock input	Connector type: RCA jack Input level: TTL level (0 to 5 V) Valid edge: Rising edge Frequency range: 1 MHz or less Minimum pulse width: 400 ns or more for high and low

1. Under standard operating conditions (see section 16.11) after the warm-up

16.4 Display

Item	Specifications
Display	10.4" color TFT LCD monitor
Display screen size	211.2 × 158.4 mm
Display resolution ¹	SVGA 800×600 dots
Display resolution of the waveform display	650×512 (normal waveform display) or 750×512 (wide waveform display) selectable
Display format	Windows: Zoom: MAIN/MAIN&Z1/MAIN&Z2/MAIN&Z1&Z2/Z1only/Z2only Z1&Z2 X-Y: TY/XY/TY&XY
Maximum display update rate	30 times/s when a single waveform is displayed

1. Liquid crystal display may include few defective pixels. (Within 5 ppm (6 points) of the total number of pixels (including RGB)) The LCD is a high technology device made up of more than 1.44 million pixels. There may be pixels that do not turn ON or those that remain ON at all times. However, these cases are not malfunction.

16.5 Function

Acquisition and Display

Item	Specifications
Acquisition mode	Normal: Normal waveform acquisition Envelope: Maximum sampling rate regardless of the T/div setting, holds the peak value Averaging: Average count 2 to 65536 (2 ⁿ steps) Box average: Increase the A/D resolution up to 4 bits (16 bits max.)
Record length	1 kW, 2.5 kW, 5 kW, 10 kW, 25 kW, 50 kW, 100 kW, 250 kW, 500 kW, 1 MW, 2.5 MW, 5 MW, 10 MW, 25 MW, 50 MW, 100 MW (/M1, /M2, or /M3 option), 250 MW (/M1, /M2, or /M3 option), 500 MW (/M2 or /M3 option), 1000 MW (/M3 option)
Zoom	Expand the displayed waveform along the time axis (up two locations using separate zoom rates)
Display format	1, 2, 3, 4, or 8 analog waveform windows
Display interpolation	Display samples using dot display, sine interpolation, or linear interpolation.
Graticule	Select from three graticule types.
Auxiliary display ON/OFF	Turn ON/OFF scale values, waveform labels, extra window, level indicator/numeric display.
X-Y display	Select the X axis and Y axis from CH1 to CH16, DSP1 to DSP6, MATH1 to MATH8 (up to 4)
Accumulation	Accumulates waveforms on the display (persistence mode)
Snapshot	Retains the current displayed waveform on the screen. Snapshot waveforms can be saved and loaded.
Clear trace	Clears the displayed waveform.
Dual capture	Performs data acquisition on the same waveform at two different sampling rates.
Main waveform (low speed)	Maximum sample rate: 100 kHz (roll mode region) Maximum memory length: 100 MW
Sub waveform (high speed)	Maximum sample rate: 10 MS/s Maximum memory length: 10 kW (fixed)
Realtime hard disk recording	Maximum sample rate: 100 kS/s (for 1 CH) max. Capacity: Up to 1 GW per operation Features: Restore process not required. Saved to a format that can be loaded directly.
Voice memo	Records a voice as a memo while waveforms are being acquired (when in roll mode display). The recorded voice memo can be saved along with the waveform data. Maximum record time is 100 s.
Voice comment	Saves screen image data by attaching a voice comment (separate data from screen image data). The maximum length of voice comment that can be attached to a single screen image data is 10 s. Plays the voice comment from the File List window.

16.5 Function

Vertical/Horizontal Axis Settings

Item	Specifications
Channel ON/OFF	Independently turn ON/OFF CH1 to CH16, DSP1 to DSP6, LOGIC A, LOGIC B, and EVENT.
ALL CH menu	Set all channels while displaying waveforms. Operation using the USB keyboard is possible.
Vertical axis expansion/reduction	Expand or reduce the vertical axis for each channel.
Variable	Upper/Lower limit scaling when variable is ON.
Input filter	Set for each channel.
Vertical position setting	Waveforms can be moved vertically in the range of ± 5 div from the center of the waveform display frame.
Linear scaling	Set AX+B mode or P1-P2 mode independently for CH1 to CH16.
Roll mode	The roll mode is enabled when the trigger mode is set to auto, auto-level, single, or log, and the time axis setting is greater than or equal to 100 ms/div.

Analysis

Item	Specifications
Search & zoom function	Search for, then expand and display a portion of the displayed waveform. Choose from the following two search methods.
Edge:	Counts the rising and falling edges and automatically searches an arbitrary edge
Auto scroll:	Automatically scrolls the zoom position.
History search function	Search for and display waveforms from the history memory that satisfy specified conditions.
Zone search:	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).
Cursor measurement	The following cursors are selectable. Horizontal, Vertical, H&V (only during X-Y waveform display), Degree (only during T-Y waveform display), and Marker
Automated measurement of waveform parameters	Capable of performing automated measurement of waveform parameters. Automated measurement of waveform parameters within one period (P-P through Int2XY). Up to 24 items can be displayed. P-P, Amp, Max, Min, High, Low, Avg, Mid, Rms, Sdev, +OvrShoot, -OvrShoot, Rise, Fall, Freq, Period, +Width, -Width, Duty, Pulse, Burst1, Burst2, AvgFreq, AvgPeriod, Int1TY, Int2TY, Int1XY, Int2XY, Delay (between channels)
Statistical processing	Statistical processing per cycle (cycle statistical computation) is possible. Extracts a periodic waveform (cycle) from the acquisition memory and automatically calculates waveform parameters per cycle. Applicable items: Automated measured values of waveform parameters described above. Statistics: Max, Min, Avg, Sdv, and Cnt Maximum number of cycles: 24000 cycles (when the number of parameters is 1) Maximum total number of parameters: 24000 (total number of results) Maximum measurement range: 10 MW
Computation (standard)	Operators: +, -, \times , /, binary computation, phase shift, and power spectrum
User-defined computation(optional)	Equations obtained by arbitrarily combining 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, FILT1, FILT2, HLBT, MEAN, LS-, PS-, PSD-, CS-, TF-, CH-, MAG, LOGMAG, PHASE, REAL, IMAG
Phase shift	Monitor waveforms by shifting the phase of CH1 to CH16. Computation is performed on the phase-shifted result.
GO/NO-GO determination	The following two types of GO/NO-GO determination are available <ul style="list-style-type: none"> • Determination using zones on the screen • Determination using the result of the automated measurement of waveform parameters Specify an action for GO or NO-GO result. Possible actions are screen image data output, waveform data storage, buzzer notification, and e-mail transmission. ¹

1. When the Ethernet interface option is installed

DSP Channel Computation (Optional)

Item	Specifications
Maximum computation rate	100 kS/s (6 channels simultaneously)
Computed result	16 bits (2400 LSB/div: reference range)
Applicable modules	701250 (HS10M12), 701251 (HS1M16), 701255 (NONISO_10M12), 701260 (HV (with RMS)), and 701265 (TEMP/HPV) voltage input only
Computation types	
Addition, subtraction, multiplication, and division between channels +, −, ×, and ÷ (without coefficients)	
Filters	
	<ul style="list-style-type: none"> • Sharp filter <ul style="list-style-type: none"> Filter format: FIR Filter type: LPF/HPF/BPF Filter order: 8 to 194 orders (varies depending on the type and cutoff frequency. For details, see appendix 6.) Characteristics: Steep cutoff, linear phase, and little overshoot LPF: Cutoff frequency: 2% to 30% of fs (0.2% resolution) (fs = sampling frequency) HPF: Cutoff frequency: 2% to 30% of fs (0.2% resolution) BPF: Center frequency: 3% to 30% of fs (0.2% resolution), Bandwidth: 2% of fs 4.6% to 30% of fs (0.2% resolution), Bandwidth: 5% of fs 7% to 30% of fs (0.2% resolution), Bandwidth: 10% of fs 9.6% to 30% of fs (0.2% resolution), Bandwidth: 15% of fs 12% to 30% of fs (0.2% resolution), Bandwidth: 20% of fs Cutoff characteristics: −40 dB at 2fc (LPF), −40 dB at 0.5fc (HPF) (fc = cutoff frequency) Phase: Linear phase characteristics • Gauss filter <ul style="list-style-type: none"> Filter format: FIR Filter type: LPF Filter order: 5th to 49th order (varies depending on the type and cutoff frequency. For details, see appendix 6.) Characteristics: Smooth cutoff characteristics, linear phase, and no overshoot LPF: Cutoff frequency: 2% to 30% of fs (0.2% resolution) (fs = sampling frequency) Cutoff characteristics: $-3.0 \times (f/f_c)^2$ dB (f: frequency, fc: cutoff frequency) Phase: Linear phase characteristics • IIR (Butterworth) filter <ul style="list-style-type: none"> Filter format: IIR (Butterworth) Filter type: LPF/HPF/BPF Filter order: 4th order Characteristics: Characteristics close to an analog filter, flat pass band, and overshoot LPF: Cutoff frequency: 0.2% to 30% of fs (0.2% resolution) (fs = sampling frequency) HPF: Cutoff frequency: 0.2% to 30% of fs (0.2% resolution) BPF: Center frequency 0.6% to 30% of fs (0.2% resolution) Bandwidth: 1% of fs 1.2% to 30% of fs (0.2% resolution) Bandwidth: 2% of fs 2.6% to 30% of fs (0.2% resolution) Bandwidth: 5% of fs 5.2% to 30% of fs (0.2% resolution) Bandwidth: 10% of fs 7.6% to 30% of fs (0.2% resolution) Bandwidth: 15% of fs 10.2% to 30% of fs (0.2% resolution) Bandwidth: 20% of fs Cutoff characteristics: −24 dB/Oct Phase: Nonlinear phase characteristics • MEAN (moving average) <ul style="list-style-type: none"> Filter format: FIR (moving average) Filter type: LPF Filter order: Select from 2, 4, 8, 16, 32, 64, and 128 Characteristics: Comb-shaped cutoff characteristics, high noise suppression effect, and no overshoot
Differentiation	LPF (bandwidth limit) ON/OFF possible LPF (sharp): Cutoff frequency: 2% to 30% of fs (0.2% resolution)
Integration/Summation	Reset condition of integration: Acquisition start and ON/OFF of the channel Selectable reset conditions <ul style="list-style-type: none"> Over Limit (± 10div): When the computed value exceeds +10 divisions or −10 divisions of the Value/Div setting Zero Cross to Positive: When the source signal produces a positive edge at the zero-crossing point Zero Cross to Negative: When the source signal produces a negative edge at the zero-crossing point

16.5 Function

Item	Specifications
	<p>Addition, subtraction, multiplication, and division between channels with coefficients</p> <p>Expression: +, -, ×, and ÷</p> <p>Computation format: A, B, C can be defined</p> <p>Addition: $(A \times S1) + (B \times S2) + C$</p> <p>Subtraction: $(A \times S1) - (B \times S2) + C$</p> <p>Multiplication: $(A \times S1) \times (B \times S2) + C$</p> <p>Division: $(A \times S1) \div (B \times S2) + C$</p> <p>Selectable range of coefficients A, B, and C: $\pm 9.9999E+30$ to $\pm 9.9999E-30$</p>
Variable ON/OFF	<p>When variable is set to OFF (zooming in or out by setting the zoom rate)</p> <p>Value/Div: 123 Value/Div settings can be specified using the V/DIV knob (1-2-5 steps). 10.00E-21 [Value/Div] to 500.0E+18 [Value/Div]</p> <hr/> <p>When variable is set to ON (vertical zoom/expand according to the upper and lower limits of the display range)</p> <p>Upper and lower limits: $\pm 5.0000E+22$ [Value/Div]/$\pm 1.0000E-23$ [Value/Div]</p> <p>Display range: Up to $\pm 5.0000E+21$. (500.0E+18 [Value/Div] × 10 [Div]) The display will be clipped at higher values.</p> <p>Computation delay: [4 samples + the computation delay of the digital filter] (For details, see appendix 6.) The computation time of filters is proportional to the sample rate of the DSP channel. If the output result is specified as a source of another DSP channel, the computation delay increases.</p> <p>Can specify analog channels (CH1 to CH16) as computation sources. The computed result of a DSP channel can also be specified as a computation source of another DSP channel. However, only DSP channels with a channel number smaller than itself can be specified. The maximum sample rate of analog channels is 5 MS/s when a DSP channel is turned ON.</p>

Screen Image Data Output

Item	Specifications
Built-in printer	Outputs a hard copy of the screen
External printer	Outputs the screen image to an external printer via the USB PERIPHERAL terminal or the Ethernet network ¹ . Supports ESC-P, ESC-P2, LIPS3, PCL5, BJ commands, and PostScript (only via the Ethernet network ¹)
Floppy disk, Zip disk, PC card, SCSI, internal HDD (optional), Network drive ¹	Output data format: PNG, JPEG, BMP, and PostScript

1. When the Ethernet interface option is installed (against a printer server supporting TCP/IP)

Data Storage

Item	Specifications
History memory	Automatically holds up to 2000 pages of waveforms (depending on the memory length)
Floppy disk, Zip disk, PC card, SCSI, internal HDD (optional), Network drive ¹	Saves waveform data, setup data, and various data

1. When the Ethernet interface option is installed

Acquisition Memory Backup

Item	Specifications
Batteries	4 AAA alkaline dry cells (AA/R6) (JIS, IEC model: LR6) 4 nickel hydride rechargeable batteries
Backup time (reference value)	Reference value for A1070EB (LR6JE CPT alkaline battery by Toshiba) × 4 at an ambient temperature of 23° C On models with the /M3 option Approx. 10 h On models with the /M2 option Approx. 15 h On models with the /M1 option Approx. 32 h On the standard model Approx. 150 h
Backup function	Enable/Disable using the ON/OFF switch
Contents that are backed up	Acquisition memory waveform data (history memory data and sub waveform data of the dual capture function) and voice memo data

Other Functions

Item	Specifications
Initialization	Resets settings to the factory default (excluding date/time setting, communication interface settings, SCSI ID number setting, language setting, time difference from the GMT, and the ON/OFF setting of the internal hard disk motor)
Auto setup	Automatically sets the voltage axis, time axis, trigger level, etc.
Action-on-trigger	Outputs screen image data, saves waveform data, activates buzzer notification, or sends e-mail messages each time a trigger occurs.
Mail transmission function ¹	Sends the DL750 status periodically to a specified mail address via the Ethernet network. Also sends information as an action for GO/NO-GO determination and action-on-trigger.
Calibration	Auto calibration and manual calibration available
System settings	Sets the screen color, date/time, message language, and click sound ON/OFF
Probe compensation signal output	Outputs a signal (rectangular signal of approx. 1 Vp-p and approx. 1 kHz) from the probe compensation output terminal on the front panel
Overview	Shows system specifications
Self test	Memory test, key test, printer test, FDD/Zip drive/PC card drive test, internal HDD (optional) test, and SCSI test
Help function	Displays help concerning the settings (English/Japanese/Chinese switchable)
Thumbnail	Shows thumbnails of the screen image data
PROTECT key	Disables keys to prevent inadvertent errors in operation.
NUM key	Direct input of numeric values.

1. When the Ethernet interface option is installed

16.6 Built-in Printer

Item	Specifications
Printing system	Thermal line dot system
Paper width	112 mm
Effective printing width	104 mm (832 dots)
Dot density	8 dots/mm
Feeding direction resolution	For normal print: 13 dots/mm. For long print: 10 dots/mm
Function	Normal print and long print
Maximum paper feeding speed	Approx. 10 mm/s maximum during hard copy (depends on the head temperature when normal printing is started and the print rate)

16.7 Storage

Built-in Storage

• Floppy Disk Drive

Item	Specifications
Number of drives	1
Size	3.5 inch
Capacity	720 KB or 1.44 MB

• Zip Drive

Item	Specifications
Number of drives	1
Capacity	100 MB or 250 MB

• PC Card Drive

Item	Specifications
Number of drives	1
Maximum capacity	5 GB
Supported cards	Flash ATA memory card (PC card TYPE II)PC card type, CF card + adapter card, and HDD PC card.

For details on the compatible cards, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

Internal Hard Disk (Optional)

Item	Specifications
Number of drives	1
Size	2.5 inch
HDD capacity used	20 GB, FAT32, 2 partitions by factory default
File name	Supports long file names (ANK16 characters)
Function	Mount the internal HD via the SCSI port

External Storage Interface

• SCSI

Item	Specifications
Standard	SCSI (Small Computer System Interface).ANSIX3.131-1986
Connector	Half pitch 50 pins
Connector pin assignment	Unbalanced (single-ended)

16.8 USB Interface

Item	Specifications
Connector type	USB type A connector (receptacle)
Electrical and mechanical specifications	Conforms to USB Rev.1.1
Supported keyboards	104 keyboard/89 keyboard (US) and 109 keyboard/89 keyboard (Japanese) conforming 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 mouse	Mouse (with wheel) that supports USB HID Class Ver.1.1
Power supply	5 V, 500 mA (per port)
Number of ports	2

For details on the compatible USB devices, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

16.9 Auxiliary I/O Section

Logic Input

Item	Specifications
Number of inputs	8 bits ×2
Connector type	26-pin half-pitch connector ×2
Maximum sample rate	10 MS/s
Compatible probes	Non-isolated (700986 (8 bits)) or isolated (700987 (8 bits))

External Trigger Input

Item	Specifications
Connector type	RCA jack
Input level	TTL (0 to 5 V) input
Minimum pulse width	500 ns
Logic	Rising edge or falling edge selectable
Trigger delay time	Within 200 ns + 1 sample
Externally synchronized operation	Possible (by connecting TRIG IN and TRIG OUT on two DL750s)

Trigger Output (TRIG OUT)¹

Item	Specifications
Connector type	RCA jack, shared with the external sampling clock
Output level	CMOS level (0 to 5 V) output
Logic	Falls when the trigger is activated, rises after completing acquisition
Output delay time	Within 1 μs + 1 sample
Output hold time	200 ns or more

1. This terminal is also used as an external clock input terminal.

16.9 Auxiliary I/O Section

Video Signal Output (VIDEO OUT (SVGA))

Item	Specifications
Connector type	15-pin D-Sub receptacle
Output type	Analog RGB output
Output resolution	SVGA output 800 × 600 dots/60 Hz Vsync

GO/NO-GO Determination I/O (GO/NO-GO)

Item	Specifications
Connector type	Modular jack (RJ-12)
I/O level	START IN input: TTL (0 to 5 V), SW input possible GO-OUT/NOGO-OUT: CMOS (0 to 5 V)
Signal	START IN, GO-OUT, and NOGO-OUT
Compatible cable	Four-wire modular cable for telephone lines (GO/NO-GO cable (YOKOGAWA: 366973))

External Start/Stop¹

Item	Specifications
Connector	Shared with the GO/NO-GO start terminal (used exclusively). Can be used as start/stop input when GO/NO-GO I/O is not used.
Input	TTL (0 to 5 V) or switch input Start on low, stop on high
Compatible cable	Four-wire modular cable for telephone lines (GO/NO-GO cable (YOKOGAWA: 366973))

1. The terminal is also used as a GO/NO-GO Terminal.

COMP Output (Rectangular Signal Output for Probe Compensation)

Item	Specifications
Output frequency	1 kHz±1%
Output amplitude	1 V±10%

Voice Input/Output (VOICE IN/OUT/SW)¹

Item	Specification
Compatible earphone microphone	Earphone microphone with a PUSH switch (YOKOGAWA: 701951)
Dynamic inner earphone	Input impedance: 32 Ω Frequency range: 100 to 20 kHz Maximum input: 40 mW
Electric condenser microphone	Output impedance: 1.6 kΩ Frequency characteristics: 100 to 10 kHz Directional characteristics: Omnidirectional Code: 1.2 m, φ2.5, with 4-pin plug Weight: Approx. 16 g
Earphone microphone jack input/output	Jack: 4-pin jack Microphone input: Electric condenser microphone, input impedance of approx. 5 kΩ Earphone output: Dynamic, impedance of 32 Ω Switch input: 10-kΩ pull-up (3.3 V)

1. The specifications above apply to the optional earphone microphone with a PUSH switch (701951) that is sold separately. Operation of other earphone microphones are not guaranteed.

Speaker Output¹

Item	Specification
Connector	Shared with the GO/NO-GO Determination I/O (used exclusively). Can be used as speaker output when GO/NO-GO I/O is not used.
Compatible cable	External connection possible using the speaker cable (YOKOGAWA: 701952).
Compatible speaker	Impedance: 8 Ω

1. The terminal is also used as a GO/NO-GO Determination I/O terminal.

Probe Power Output (Optional)

Item	Specifications
Number of output terminals	4
Output voltage	± 12 V 2 outputs (up to a total of 800 mA)
Probes that can be used	Current probe (700937(15 A)) up to 4 probes Current probe (701930(150 A)) up to 2 probes

16.10 Computer Interface

GP-IB¹

Item	Specifications
Electrical and mechanical specifications	Conforms to IEEE St'd 488-1978 (JIS C 1901-1987)
Functional specifications	SH1, AH1, T5, L4, SR1, RL1, PP0, DC1, DT0, and C0
Protocol	Conforms to IEEE St'd 488.2-1992
Code	ISO (ASCII) code
Mode	Addressable mode
Address	Specify a talker/listener address between 0 and 30
Clear remote mode	Remote mode can be cleared using SHIFT+CLEAR TRACE (except during Local Lockout).

Serial (RS-232)¹

Item	Specifications
Connector type	9-pin D-Sub plug
Electrical Characteristics	Conforms to EIA-574 (9-pin EIA-232 (RS-232))
Connection	Point-to-point
Transmission mode	Full-duplex
Synchronization	Start-stop synchronization
Baud Rate	Select from the following rates. 1200, 2400, 4800, 9600, 19200, 38400, and 57600 If unstable, use 19200 or less.

USB-PC Connection¹

Item	Specifications
Connector type	USB type B connector (receptacle)
Electrical and mechanical specifications	Conforms to USB Rev.1.1
Data rate	12 Mbps max.
Number of ports	1
Supported service	Remote control ²
PC system supported	PCs with standard USB ports running Windows 98 SE or Windows 2000. (A separate driver ¹ is required for connecting to a PC.)

Ethernet Connector (Optional)¹

Item	Specifications
Number of communication ports	1
Electrical and mechanical specifications	Conforms to IEEE802.3
Transmission system	Ethernet (100BASE-TX/10BASE-T)
Transmission rate	100 Mbps max.
Communication protocol	TCP/IP
Supported services	FTP server, FTP client (network drive), LPR client (network printer), SMTP client (mail transmission), DHCP, DNS, Web server, and remote control
Connector type	RJ-45 connector

1. For details on the specifications, see the Communication Interface User's Manual (IM 701210-17E).
2. The DL750 can be controlled remotely from a host such as a PC. For details, see the Communication Interface User's Manual (IM 701210-17E). A separate driver is needed to use this function. The driver can be downloaded from the following Web site.
<http://www.yokogawa.com/tm/Bu/software.htm>

16.11 General Specifications

Item	Specifications																														
Standard operating conditions	Ambient temperature: 23±5° C Ambient humidity: 55±10% RH Within 1% of the rated error of the power supply voltage and frequency After a 30-minute warm-up and after calibration																														
Recommended calibration period	1 year																														
Warm-up time	At least 30 minutes																														
Storage temperature	-20° C to 60° C																														
Storage humidity	20% to 85% RH (no condensation)																														
Storage altitude	3000 m or less																														
Operating temperature range	5° C to 40° C																														
Operating humidity range	20 to 85% RH (when not using the printer), 35 to 85% RH (when using the printer)																														
Operating altitude	2000 m or less																														
Rated supply voltage	100 to 120 VAC or 200 to 240 VAC (automatic switching)																														
Rated supply voltage frequency	50/60 Hz																														
Permitted supply voltage	90-132 VAC/180-264 VAC																														
Permitted supply voltage frequency range	48 to 63 Hz																														
Maximum power consumption	Approx. 200 VAMAX (Maximum power when the printer is OFF and 16 channels are running is 135 VA (reference value))																														
Withstand voltage	1500 VAC for 1 minute across the power supply and earth																														
Insulation resistance	10 MΩ or more at 500 VDC across the power supply and ground																														
External dimensions	355 mm (W) × 250 mm (H) × 180 mm(D) (excluding the handle and other projections)																														
Weight	Approx. 6.6 kg (only the DL750 with all options (/M3/C8/C10/P4 options)) Approx. 300 g (701250 High-Speed 10 MS/s, 12-Bit Isolation Module) Approx. 9 kg (DL750 + 701250 × 8)																														
Instrument's cooling method	Forced air cooling. Exhaust on the left side panel and top. Inlet on the bottom.																														
Battery backup	Setup parameters and clock are backed up with the internal lithium battery																														
Battery backup Battery life	Approx. 5 years (at ambient temperature of 25° C)																														
Fuse	Inside the power supply unit (cannot be replaced from the outside of the instrument)																														
Standard accessories for the DL750	<table border="0"> <tr> <td>Front panel protection cover</td> <td>1</td> <td>B8023EA</td> </tr> <tr> <td>Soft case</td> <td>1</td> <td>B9946EB</td> </tr> <tr> <td>Cover panels</td> <td>8</td> <td>B8023EN</td> </tr> <tr> <td>Power cord</td> <td>1</td> <td></td> </tr> <tr> <td>Printer roll paper</td> <td>3</td> <td>B9988AE (10-m roll)</td> </tr> <tr> <td>AAA Alkaline batteries (for waveform memory backup)</td> <td>4</td> <td>A1070EB (LR6JECPT by Toshiba)</td> </tr> <tr> <td>Rubber hind feet</td> <td>1</td> <td>B9989EX(4 pieces (1 sheet))</td> </tr> <tr> <td>User's Manual</td> <td>1</td> <td></td> </tr> <tr> <td>Operation Guide</td> <td>1</td> <td></td> </tr> <tr> <td>Communication Interface User's Manual</td> <td>1</td> <td>B8023YZ (CD-ROM)</td> </tr> </table>	Front panel protection cover	1	B8023EA	Soft case	1	B9946EB	Cover panels	8	B8023EN	Power cord	1		Printer roll paper	3	B9988AE (10-m roll)	AAA Alkaline batteries (for waveform memory backup)	4	A1070EB (LR6JECPT by Toshiba)	Rubber hind feet	1	B9989EX(4 pieces (1 sheet))	User's Manual	1		Operation Guide	1		Communication Interface User's Manual	1	B8023YZ (CD-ROM)
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Operation Guide	1																														
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16.11 General Specifications

Item	Specifications
Safety standard ¹	<p>Complying standard EN61010-1</p> <ul style="list-style-type: none"> • Installation category (overvoltage category) II² • Pollution degree 2³ <p>Already certified (701210, 701250, 701251, 701265, 700986, and 700987)</p> <p>Certification planned in March 2003¹ (701255, 701260, 701270, 701271, 701955, 701956, 701957, and 701958)</p>
Emission ¹	<p>Complying standard EN61326:1997+Am1:1998</p> <ul style="list-style-type: none"> • This product is a Class A (for commercial environment) product. Operation of this product in a residential area may cause radio interference in which case the user is required to correct the interference. <p>Test Item</p> <ol style="list-style-type: none"> 1. Power supply terminal noise EN61326:ClassA 2. Electromagnetic radiation disturbance EN61326:ClassA 3. power supply harmonics restriction EN61000-3-2:1995/A14:2000 4. Supply voltage fluctuation & flicker EN61000-3-3:1995 <p>Cable condition</p> <ul style="list-style-type: none"> • Shared external trigger/external clock input terminal Use the BNC-RCA adapter (YOKOGAWA: 366928) and a BNC cable⁴ and attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) on one end (DL750 side). • Trigger output terminal Same as the external trigger input terminal above. • Video signal output (VIDEO OUT (SVGA)) terminal Use a 15-pin D-Sub VGA shielded cable⁴. • GP-IB interface connector Use shielded GP-IB cables⁴. • Serial (RS-232) interface connector Use an shielded RS-232 cable⁴ and attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) on one end (DL750 side). • SCSI interface connector Use shielded SCSI cable⁴ and attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) on one end (DL750 side). • USB peripheral connector Use shielded USB cables⁴. • USB interface connector When connecting a USB keyboard or mouse using a shielded cable or when connecting to a USB printer, use shielded USB cables⁴. • GO/NO-GO I/O terminal Use a dedicated GO/NO-GO cable (YOKOGAWA: 366937) sold separately. • Ethernet connector Use category 5 Ethernet cables⁵ or better cables. • Probes connected to modules and wiring Use twisted pair cables when connecting items other than probes to the module. Attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) to the probes and cables that are connected to the modules. Wrap the cable around the ferrite core once. • Logic probe input Attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) on one end (DL750 side) of the cable to be connected to the logic probe input terminal. • Current probe (700937 and 701930) When connecting a current probe to the input terminal and probe power terminal of the module, attach a ferrite core (TDK: ZCAT2035-0930A, YOKOGAWA: A1190MN) on one end (DL750 side) of the two cables together. • Voice memo terminal Earphone microphone with a switch⁴ (4-pin jack microphone connectable to NTT DOCOMO portable phones) (Cannot be used on the current software version that you are using.) • Bridge Head for the Strain Module When using the 701270, use the 701955 or the 701956; when using the 701271, use the 701957 or the 701958.

Item	Specifications
Immunity ¹	<p>Complying standard EN61326:1997+Am1:1998 Already certified (701210, 701250, 701251, 701265, 700986, and 700987) Certification planned in March 2003¹ (701255, 701260, 701270, 701271, 701955, 701956, 701957, and 701958)</p> <ul style="list-style-type: none"> Influence in the immunity environment (performance criterion A) <ul style="list-style-type: none"> 701250: $\leq \pm 5$ mV (1:1 input, 5 mV/div conversion) 701251: $\leq \pm 3$ mV (1:1 input, 1 mV/div conversion) 701255: $\leq \pm 25$ mV (1:1 input, 5 mV/div conversion) 701260: $\leq \pm 30$ mV (1:1 input, 20 mV/div conversion) 701265: $\leq \pm 0.05$ mV 701270: $\leq \pm 100$ μ STR (when equivalent to ± 100 mV, gauge factor = 2, and bridge voltage = 2 V) 701271: $\leq \pm 100$ μ STR (when equivalent to ± 100 mV, gauge factor = 2, and bridge voltage = 2 V) <p>Test condition</p> <p>701250: 10 MS/s, envelope mode, 50 mV/div, no input filter, with the tip of the probe (700929 (10:1)) shorted</p> <p>701251: 1 MS/s, envelope mode, 10 mV/div, no input filter, with the tip of the probe (700929 (10:1)) shorted</p> <p>701255: 10 MS/s, envelope mode, 50 mV/div, no input filter, with the tip of the probe (701940 (10:1)) shorted</p> <p>701260: 100 kS/s, envelope mode, 20 mV/div, no input filter, with the tip of the probe (700929 (10:1)) shorted</p> <p>701265: 100 kS/s, envelope mode, 0.1 mV/div, no input filter, With the end of the 3-m twisted-pair cable shorted</p> <p>701270: 100 kS/s, envelope mode, 500 μ STR, gauge factor: 2.0, no input filter, 701955 bridge voltage: 2 V, 701956 bridge voltage: 10 V</p> <p>701271: 100 kS/s, envelope mode, 500 μ STR, gauge factor: 2.0, no input filter, 701957 bridge voltage: 2 V, 701958 bridge voltage: 10 V</p> <p>Test Item</p> <ol style="list-style-type: none"> Electrostatic discharge EN61000-4-2 Air discharge: ± 8 kV, contact discharge: ± 4 kV, criteria B Radiated immunity EN61000-4-3 80 MHz to 1 GHz, 1.4 GHz to 2 GHz, 10 V/m Criteria A Conducted immunity EN61000-4-6 3 V, criteria A Electrical fast transient/burst EN61000-4-4 Power line: ± 2 kV, signal line: ± 1 kV, criteria B Power frequency magnetic field EN61000-4-8 30 A/m, 50 Hz, criteria A Surge immunity EN61000-4-5 Between lines: ± 1 kV, common: ± 2 kV, criteria B Voltage dip and interruption EN61000-4-11 0.5 cycle, both polarities, 100%, criteria A <p>Definitions of criteria A and B</p> <ul style="list-style-type: none"> Criteria A Aforementioned "Influence in the immunity environment" is met during the test. Criteria B This apparatus continues to operate without hang-up or falling into uncontrollable conditions during the test. No change of actual operating state or stored data is allowed.

- CE marks of a portion of the listed modules and bridge heads are planned to be obtained in March 2003. For information on the status of the CE mark, contact your nearest YOKOGAWA dealer.
- The Overvoltage Category (Installation Category) is a value used to define the transient overvoltage condition and includes the impulse withstand voltage regulation. I applies to electrical equipment that is powered by a circuit with overvoltage control. II applies to electrical equipment that is powered by a fixed installation such as a distribution board. The DL750 and this user's manual denote Overvoltage Category I and Overvoltage Category II as CAT I and CAT II, respectively.
- Pollution Degree: Applies to the degree of adhesion of a solid, liquid, or gas which deteriorates withstand voltage or surface resistivity. Pollution Degree 2 applies to normal indoor atmospheres (with only non-conductive pollution).
- Use cables of length 3 m or less.
- Use cables of length 30 m or less.

16.12 Module Specifications

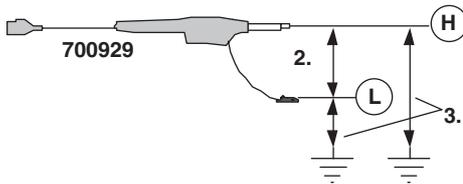
High-Speed 10 MS/s, 12-Bit Isolation Module (701250) Specifications

Item	Specifications
Standard operating conditions	Temperature: 23° C±5° C Humidity: 55%±10% RH After a 30-minute warm-up and after calibration
Effective measurement range	20 div (±10 div around 0 V, display range: 10 div, when Variable is OFF)
Number of input channels	2
Input coupling	AC, DC, and GND
Maximum sample rate	10 MS/s
Input format	Isolated unbalanced
Frequency characteristics ¹	(-3 dB point when sine wave of amplitude)DC to 3 MHz
Voltage-axis sensitivity setting	When using 10:1 probe attenuation: 50 mV/div to 200 V/div (1-2-5 steps) When using 1:1 probe attenuation: 5 mV/div to 20 V/div (1-2-5 steps)
Maximum input voltage (at a frequency of 1 kHz or less)	Combined with the 700929 (10:1) ² : 600 V (DC+ACpeak) Combined with the 701901+701954 (1:1) ⁴ : 250 V (DC+ACpeak) Direct input or cable not complying with the safety standard ⁶ : 250 V (DC+ACpeak)
Maximum allowable common mode voltage (at a frequency of 1 kHz or less)	Working voltage of safety standard Combined with the 700929 (10:1) ³ or combined with the 701901+701954 (1:1) ⁵ : 400 Vrms (CAT I), 300 Vrms (CAT II) Direct input or cable not complying with the safety standard ⁷ : 42 V (DC+ACpeak) (CAT I and CAT II, 30 Vrms)
DC offset maximum selectable range	±5 div
Vertical (voltage) axis accuracy	
DC accuracy ¹	for 5 mV/div to 20 V/div: ±(0.5% of 10 div)
Input connector	BNC connector (isolated type)
Input impedance	1 MΩ ±1%, approx. 35 pF
-3 dB point when AC coupled/low frequency attenuation point	10 Hz or less (1 Hz or less when using the 700929)
Common mode rejection ratio	80 dB (50/60 Hz) or more (typical ⁸)
Residual noise level (Input section shorted)	±400 μ V or ±0.06 div, whichever is greater (typical ⁸)
Withstand voltage	1500 Vrms for 1 minute (across each terminal and earth) (60 Hz)
Allowable transient surge voltage (instantaneous)	±2100 Vpeak (across each input terminal and earth)
Insulation resistance	500 VDC, 10 MΩ or more (across each input terminal and earth)
A/D conversion resolution	12 bit (150 LSB/div)
Temperature coefficient	Zero point: 5 mV/div to 20 V/div: ±(0.05% of 10 div)/° C (typical ⁸) Gain: ±(0.02% of 10 div)/° C (typical ⁸)
Bandwidth limit	Select from OFF, 500 kHz, 50 kHz, 5 kHz, and 500 Hz Cut-off characteristics: -18 dB/OCT (typical ⁸)
Probe attenuation setting	Voltage probe: 1:1, 10:1, 100:1, 1000:1 Current probe: 10 A: 1 V (for the 700937), 100 A: 1 V (for the 701930)

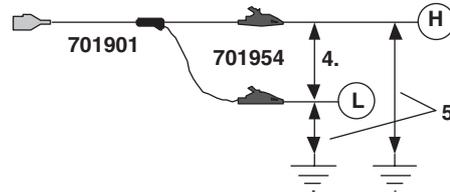
Item	Specifications
Compatible probes/cables	Voltage probe (10:1 safety probe): Recommended 700929 (10:1 safety probe).20 to 45 pF: For measuring 600 Vpeak or less Current probe (power can be supplied from the DL750) 700937 (15 A), 701930 (150 A) High voltage differential probe (connect the GND cable provided with the probe to the DL750 case) 700924 (1000:1, 100:1/1400Vpeak): For measuring 1400 Vpeak or less Connection cable (for high voltage 1:1) 701901 (isolated type BNC-safety alligator clip adapter x2: For measuring 250 Vpeak or less), a separate alligator clip (701954) is required Connection cable (for low voltage 1:1) 366926 (non-isolated type BNC-alligator clip x2: For measuring low voltage less than or equal to 42 Vpeak)

1. Value measured under standard operating conditions (section 16.11).

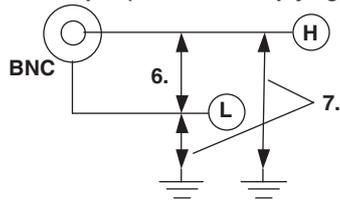
Combined with the 700929



Combined with the 701901+701954



Direct input (cable not complying with the safety standard)



Withstand voltage: 1500 Vrms for 1 minute
 Allowable transient surge voltage: ±2100 Vpeak
 (between earth and input)

8. The typical value is a representative or standard value. It is not strictly warranted.



WARNING

- Do not apply input voltage exceeding the maximum input voltage, withstand voltage, or allowable surge voltage.
- To prevent the possibility of electric shock, be sure to furnish protective earth grounding of the DL750.
- To prevent the possibility of electric shock, be sure to fasten the module screws. Otherwise, the electrical and mechanical protection functions will not be activated.
- Avoid continuous connection under an environment in which the allowable surge voltage or higher voltage may occur.
- To prevent the possibility of electric shock, be sure to connect the GND lead of the differential probe (700924/700925) to the DL750.

16.12 Module Specifications

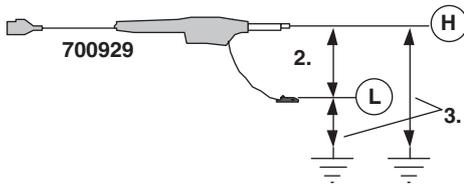
High-Speed High-Resolution 1 MS/s, 16-Bit Isolation Module (701251) Specifications

Item	Specifications
Standard operating conditions	Temperature: 23° C±5° C Humidity: 55%±10% RH After a 30-minute warm-up and after calibration
Effective measurement range	20 div (±10 div around 0 V, display range: 10 div, when Variable is OFF)
Number of input channels	2
Input coupling	AC, DC, and GND
Maximum sample rate	1 MS/s
Input format	Isolated unbalanced
Frequency characteristics ¹	(-3 dB point when a sine wave of amplitude ±3 divisions is input) For 5 mV/div to 20 V/div: DC to 300 kHz 2 mV/div, 1 mV/div: DC to 200 kHz
Voltage-axis sensitivity setting	When using 10:1 probe attenuation: 10 mV/div to 200 V/div (1-2-5 steps) When using 1:1 probe attenuation: 1 mV/div to 20 V/div (1-2-5 steps)
Maximum input voltage (at a frequency of 1 kHz or less)	Combined with the 700929 (10:1) ² : 600 V (DC+ACpeak) Combined with the 701901+701954 (1:1) ⁴ : 140 V (DC+ACpeak) Direct input or cable not complying with the safety standard ⁶ : 140 V (DC+ACpeak)
Maximum allowable common mode voltage (at a frequency of 1 kHz or less)	Working voltage of safety standard Combined with the 700929 (10:1) ³ or combined with the 701901+701954 (1:1) ⁵ : 400 Vrms (CAT I), 300 Vrms (CAT II) Direct input or cable not complying with the safety standard ⁷ : 42 V (DC+ACpeak) (CAT I and CAT II, 30 Vrms)
DC offset maximum selectable range	±5 div
Vertical (voltage) axis accuracy	
DC accuracy ¹	For 5 mV/div to 20 V/div: ±(0.25% of 10 div) 2 mV/div: ±(0.3% of 10 div) 1 mV/div: ±(0.5% of 10 div)
Input connector	BNC connector (isolated type)
Input impedance	1 MΩ ±1%, approx. 35 pF
-3 dB point when AC coupled low frequency attenuation point	1 Hz or less (0.1 Hz or less when using the 700929)
Common mode rejection ratio	80 dB (50/60 Hz) or more (typical ⁸)
Residual noise level (Input section shorted)	±100 μ V or ±0.01 div, whichever is greater (typical ⁸)
Withstand voltage	1500 Vrms for 1 minute (across each terminal and earth) (60 Hz)
Allowable transient surge voltage (instantaneous)	±2100 Vpeak (across each input terminal and earth)
Insulation resistance	500 VDC, 10 MΩ or more (across each input terminal and earth)
A/D conversion resolution	16 bit (2400 LSB/div)
Temperature coefficient	Zero point: 5 mV/div to 20 V/div: ±(0.02% of 10 div)/° C (typical ⁸) 2 mV/div: ±(0.05% of 10 div)/° C (typical ⁸) 1 mV/div: ±(0.10% of 10 div)/° C (typical ⁸) Gain: 1 mV/div to 20 V/div: ±(0.02% of 10 div)/° C (typical ⁸)
Bandwidth limit	Select from OFF, 40 kHz, 4 kHz, and 400 Hz Cut-off characteristics: -12 dB/OCT (typical ⁸)
Probe attenuation setting	Voltage probe: 1:1, 10:1, 100:1, 1000:1 Current probe: 10 A: 1 V (for the 700937), 100 A: 1 V (for the 701930)

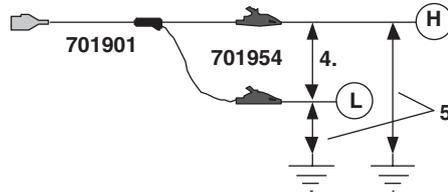
Item	Specifications
Compatible probes/cables	Voltage probe (10:1 safety probe): Recommended 700929 (10:1 safety probe).20 to 45 pF: For measuring 600 Vpeak or less Current probe (power can be supplied from the DL750) 700937 (15 A), 701930 (150 A) High voltage differential probe (connect the GND cable provided with the probe to the DL750 case) 700924 (1000:1, 100:1/1400 Vpeak): For measuring 1400 Vpeak or less Connection cable (for high voltage 1:1) 701901 (isolated type BNC-safety alligator clip adapter x2: For measuring 250 V peak or less), a separate alligator clip (701954) is required Connection cable (for low voltage 1:1) 366926 (non-isolated type BNC-alligator clip x2: For measuring low voltage less than or equal to 42 Vpeak)

1. Value measured under standard operating conditions (section 16.11).

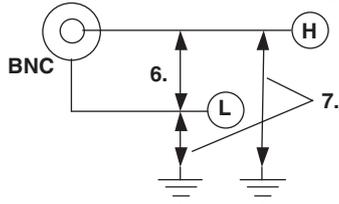
Combined with the 700929



Combined with the 701901+701954



Direct input (cable not complying with the safety standard)



Withstand voltage: 1500 Vrms for 1 minute
 Allowable transient surge voltage: ± 2100 Vpeak
 (between earth and input)

8. The typical value is a representative or standard value. It is not strictly warranted.



WARNING

- Do not apply input voltage exceeding the maximum input voltage, withstand voltage, or allowable surge voltage.
- To prevent the possibility of electric shock, be sure to furnish protective earth grounding of the DL750.
- To prevent the possibility of electric shock, be sure to fasten the module screws. Otherwise, the electrical and mechanical protection functions will not be activated.
- Avoid continuous connection under an environment in which the allowable surge voltage or higher voltage may occur.
- To prevent the possibility of electric shock, be sure to connect the GND lead of the differential probe (700924/700925) to the DL750.

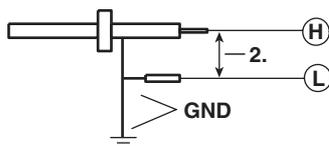
16.12 Module Specifications

High-Speed 10 MS/s, 12-Bit Non-Isolation Module (701255) Specifications

Item	Specifications
Standard operating conditions	Temperature: 23° C±5° C Humidity: 55%±10% RH After a 30-minute warm-up and after calibration
Effective measurement range	20 div (±10 div around 0 V, display range: 10 div, when Variable is OFF)
Number of input channels	2
Input coupling	AC, DC, and GND
Maximum sample rate	10 MS/s
Input format	Non-isolated, unbalanced
Frequency characteristics ¹	(-3 dB point when a sine wave of amplitude ±3 divisions is input) DC to 3 MHz
Voltage-axis sensitivity setting	When using 10:1 probe attenuation: 50 mV/div to 200 V/div (1-2-5 steps) When using 1:1 probe attenuation: 5 mV/div to 20 V/div (1-2-5 steps)
Maximum input voltage (at a frequency of 1 kHz or less)	Combined with 701940 (10:1) ² : 600 V (DC+ACpeak) Direct input (1:1) ³ : 250 V (DC+ACpeak)
DC offset maximum selectable range	±5 div
Vertical (voltage) axis accuracy DC accuracy ¹	5 mV/div to 20 V/div: ±(0.5% of 10 div)
Input connector	BNC connector (metallic type)
Input impedance	1 MΩ ±1%, approx. 35 pF
Lower -3 dB point when AC coupled	10 Hz or less (1 Hz or less when using the 701940)
Common mode rejection ratio	80 dB (50/60 Hz) or more (typical ⁴)
Residual noise level	±400 mV or ±0.06 div, whichever is greater (typical ⁴) (Input section shorted)
A/D conversion resolution	12 bit (150 LSB/div)
Temperature coefficient	Zero point: 5 mV/div to 20 V/div: ±(0.05% of 10 div)/° C (typical ⁴) Gain: ±(0.02% of 10 div)/° C (typical ⁴)
Bandwidth limit	Select from OFF, 500 kHz, 50 kHz, 5 kHz, and 500 Hz Cut-off characteristics: -18 dB/OCT (typical ⁴)
Probe attenuation setting	Voltage probe: 1:1, 10:1, 100:1, 1000:1 Current probe: 10 A:1 V (for the 700937), 100 A:1 V (for the 701930)
Compatible probes/cables	Voltage probe (10:1 passive probe): Recommended 701940, 17 to 46 pF: For measuring 600 V (DC+ACpeak) or less Current probe (power can be supplied from the DL750) 700937 (15A), 701930 (150A) High voltage differential probe (connect the GND cable provided with the probe to the DL750 case) 700924 (1000:1, 100:1/1400 Vpeak): For measuring 1400 Vpeak or less Connection cable (for low voltage 1:1) 366926 (non-isolated type BNC-alligator clip × 2: For measuring low voltage less than or equal to 42 Vpeak)

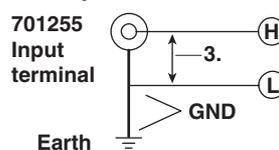
1. Value measured under standard operating conditions (section 16.11).

Recommended:
Combined with the 10:1 passive probe (701940)



GND is connected to the case potential.

Direct input
(When a cable that does not comply with the safety standard is connected)



GND is connected to the case potential.

4. Typical value represents a typical or average value. It is not strictly warranted.

**WARNING**

- Do not apply input voltage exceeding the maximum input voltage, withstand voltage, or allowable surge voltage.
- To prevent the possibility of electric shock, be sure to furnish protective earth grounding of the DL750.
- To prevent the possibility of electric shock, be sure to fasten the module screws.
- The module screws must be fastened for the module to function as a non-isolation module. In addition, all electrical and mechanical protection functions are activated only when the screws are fastened.
- The maximum input voltage of the module is valid only when all the screws are fastened, and the protection path of the metal BNC is secured.

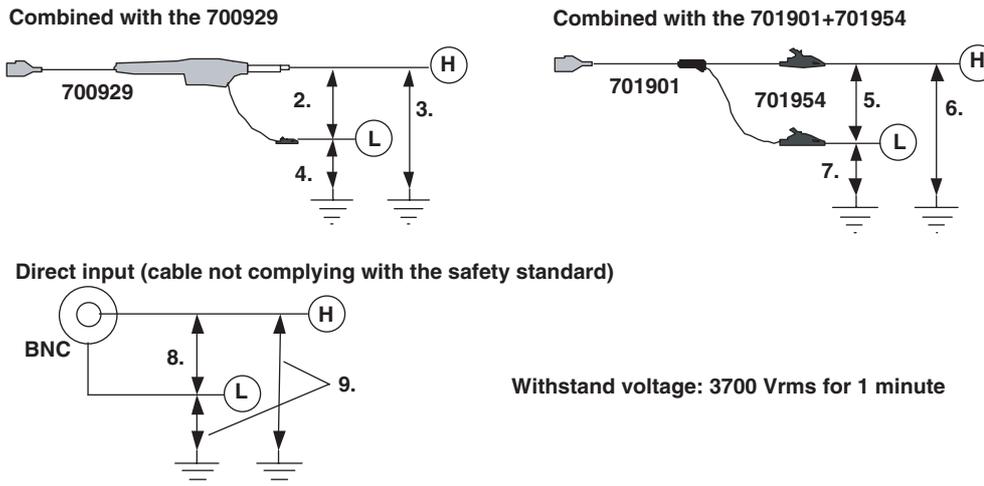
16.12 Module Specifications

High-Voltage 100 kS/s, 16-Bit Isolation Module (with RMS) (701260) Specifications

Item	Specifications
Standard operating conditions	Temperature: 23° C±5° C Humidity: 55%±10% RH After a 30-minute warm-up and after calibration
Effective measurement range	20 div (±10 div around 0 V, display range: 10 div, when Variable is OFF)
Number of input channels	2
Input coupling	AC, DC, GND, AC-RMS, and DC-RMS
Maximum sample rate	100 kS/s
Input format	Isolated unbalanced
Frequency characteristics ¹	(-3 dB point when a sine wave of amplitude ±3 divisions is input) Waveform observation mode: DC to 40 kHz RMS observation mode: DC, 40 Hz to 10 kHz
Voltage-axis sensitivity setting	When using 10:1 probe attenuation: 200 mV/div to 2000 V/div (1-2-5 steps) When using 1:1 probe attenuation: 20 mV/div to 200 V/div (1-2-5 steps)
Maximum input voltage (at a frequency of 1 kHz or less)	Combined with 700929 (10:1) ² : 1000 V (DC+ACpeak) Combined with 701901(1:1)+701954 ⁵ : 850 V (DC+ACpeak) Direct input or cable not complying with the safety standard ⁸ : 850 V (DC+ACpeak)
Maximum allowable common mode voltage (at a frequency of 1 kHz or less)	Working voltage of safety standard Combined with the 700929 (across probe tip H and earth ³): 1000 Vrms (CAT II) (across probe tip L and earth ⁴): 400 Vrms (CAT II) Combined with 701901(1:1)+701954 (across tip H and earth ⁶): 700 Vrms (CAT II) (across tip L and earth ⁷): 400 Vrms (CAT II) Direct input or cable not complying with the safety standard ⁹ : 30 Vrms (42 VDC+ACpeak) (across the input terminal, H or L, and earth)
DC offset maximum selectable range	±5 div
Vertical (voltage) axis accuracy ¹	Waveform observation mode DC accuracy ±(0.25% of 10 div) RMS observation mode DC accuracy ±(1.0% of 10 div) AC accuracy (when a sine wave is input) ±(1.5% of 10 div) AC accuracy (when the crest factor is 2 or less) ±(2.0% of 10 div) AC accuracy (when the crest factor is 3 or less) ±(3.0% of 10 div) } At frequency of 40 Hz to 1 kHz
Input connector	BNC connector (isolated type)
Input impedance	1 MΩ ±1%, approx. 35 pF
Lower -3 dB point when AC coupled	1 Hz or less (0.1 Hz or less when using the 700929)
Common mode rejection ratio	80 dB (50/60 Hz) or more (typical ¹⁰)
Residual noise level (Input section shorted)	±1 mV or ±0.02 div, whichever is greater (typical ¹⁰)
Withstand voltage	3700 Vrms for 1 minute (across each terminal and earth) (60 Hz)
Allowable transient surge voltage (instantaneous)	±5200 Vpeak (across each input terminal and earth)
Insulation resistance	500 VDC, 10 MΩ or more (across each input terminal and earth)
A/D conversion resolution	16 bit (2400 LSB/div)
Temperature coefficient (only when observing waveforms)	Zero point: ±(0.02% of 10 div)/° C (typical ¹⁰) Gain: ±(0.02% of 10 div)/° C (typical ¹⁰)
Response time (only when observing RMS)	Rising (0 to 90% of 10 div): 100 ms (typical ¹⁰) Falling (100 to 10% of 10 div): 250 ms (typical ¹⁰)
Bandwidth limit	Select from OFF, 10 kHz, 1 kHz, and 100 Hz Cut-off characteristics: -12 dB/OCT (typical ¹⁰)
Probe attenuation setting	Voltage probe: 1:1, 10:1, 100:1, 1000:1 Current probe: 10 A:1 V (for the 700937), 100 A:1 V (for the 701930)

Item	Specifications
Compatible probes/cables	Connection cable (for high voltage 1:1): Recommended 1 701901 (isolated type BNC-safety alligator clip adapter × 2: For measuring 850 V (DC+ACpeak) or less), 701954 (alligator clip (dolphin type) red/black 2-piece set) is required separately Voltage probe (10:1 safety probe): Recommended 2 700929 (10:1 safety probe) .20 to 45 pF: For measuring 1000 V (DC+ACpeak) or less Current probe (power can be supplied from the DL750) 700937 (15 A), 701930 (150 A)

1. Value measured under standard operating conditions (section 16.11).



10. Typical value represents a typical or average value. It is not strictly warranted.



WARNING

- When applying high voltage using this module, use the 1:1 safety cable (combination of 701901 and 701954) or the isolated probe (700929).
- The Overvoltage Category of the direct input of this module is 400 Vrms-CAT II on the low side and 700 Vrms-CAT II on the high side. Use caution because the overvoltage category differs between the low and high sides.
- Do not apply input voltage exceeding the maximum input voltage, withstand voltage, or allowable surge voltage.
- To prevent the possibility of electric shock, be sure to furnish protective earth grounding of the DL750.
- To prevent the possibility of electric shock, be sure to fasten the module screws. Otherwise, the electrical and mechanical protection functions will not be activated.
- Avoid continuous connection under an environment in which the allowable surge voltage or higher voltage may occur.

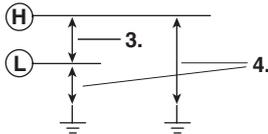
16.12 Module Specifications

Temperature, High Precision Voltage Isolation Module (701265) Specifications

Item	Specifications	
Standard operating conditions	Temperature: 23° C±5° C Humidity: 55%±10% RH After a 30-minute warm-up and after calibration	
Function	Temperature (thermocouple) or voltage measurement (switchable)	
Number of input channels	2	
Input coupling	TC, DC, and GND TC: Temperature (thermocouple) measurement DC: Voltage measurement (DC coupling)	
Data update rate	500 Hz	
Input format	Isolated unbalanced	
Measurement range	[Voltage measurement]	Voltage sensitivity: 100 µ V/div to 10 V/div (1-2-5 steps)
	[Temperature measurement]	TC: K, E, J, T, L, U, N, R, S, B, W, and Au7Fe
Measurement range/accuracy ¹	[Voltage measurement]	Voltage sensitivity: 100 µ V/div to 10 V/div (1-2-5 steps) Voltage accuracy: ±(0.08% of 10 div + 2 µ V)
	[Temperature measurement] ²	
	Type	Measurement Range
	K	-200 to 1300° C
	E	-200 to 800° C
	J	-200 to 1100° C
	T	-200 to 400° C
	L	-200 to 900° C
	U	-200 to 400° C
	N	0 to 1300° C
	R	0 to 1700° C
	S	0 to 1700° C
	B	0 to 1800° C
	W	0 to 2300° C
	Au7Fe	0 to 300 K
		Accuracy
		±(0.1% of reading+1.5° C)
		However, for -200° C to 0° C:
		±(0.2% of reading+1.5° C)
		±(0.1% of reading+3° C)
		However, for 0 to 200° C: ±8° C:
		200 to 800° C: ±5° C
		±(0.1% of reading+2° C)
		However for 400 to 700° C: ±8° C
		Effective range is 400 to 1800° C
		±(0.1% of reading+3° C)
		0 to 50K: ±4 K
		50 to 300K: ±2.5 K
Frequency characteristics ¹	(-3 dB point when a sine wave of amplitude of ±3 divisions is input) [Voltage measurement]: DC to 100 Hz [Temperature measurement]: DC to 100 Hz	
Maximum input voltage ³ (at a frequency of 1 kHz or less)	For both temperature and voltage input: 42 V (DC+ACpeak)	
Maximum common mode voltage ⁴ (at a frequency of 1 kHz or less)	For both temperature and voltage input: 42 V (DC+ACpeak) (CAT I and CAT II, 30 Vrms)	
DC offset maximum selectable range	[Temperature measurement]: ±5 div	
Vertical Resolution	[Voltage measurement]:	When applying voltage: 2400 LSB/div
	[Temperature measurement]:	When measuring temperature: 0.1° C
Input connector	Binding post	
Input impedance	Approx. 1 MΩ	
Common mode rejection ratio	[Voltage measurement]:	80 dB (50/60 Hz) or more (typical ⁵)
	[Temperature measurement]:	120 dB or more (50/60 Hz, with 2-Hz filter ON, signal source resistance of 500 Ω or less) (typical ⁵)
Residual noise level (input section shorted)	[Voltage measurement]: ±4 µ V or ±0.01 div, whichever is greater (typical ⁵)	
A/D conversion resolution	[Voltage measurement]: 16 bits (2400 LSB/div) 20 div (±10 div around 0 V, display range: 10 div, when Variable is OFF)	
Temperature coefficient	Zero point:	±(0.01% of 10 div)/° C + 0.05 mV/° C (typical ⁵)
[Voltage measurement]	Gain:	±(0.02% of 10 div)/° C (typical ⁵)

Item	Specifications
Reference junction compensation accuracy (when the input terminal temperature is balanced)	K, E, J, T, L, U, and N: $\pm 1^\circ \text{C}$ R, S, B, and W: $\pm 1.5^\circ \text{C}$ Au7Fe: $\pm 1 \text{ K}$
Bandwidth limit (digital filter)	Select from OFF, 30 Hz, 8 Hz, and 2 Hz
Input bias current	20 nA or less The zero point appears to be offset when the input is open due to the effects of bias current on this module. However, this is not a malfunction. Connect the input to the object to be measured.

- Value measured under standard operating conditions (section 16.11).
- Does not include the reference junction temperature compensation accuracy.



- The typical value is a representative or standard value. It is not strictly warranted.



WARNING

- Do not apply input voltage exceeding the maximum input voltage or allowable common mode input voltage.
- To prevent the possibility of electric shock, be sure to furnish protective earth grounding of the DL750.
- To prevent the possibility of electric shock, be sure to fasten the module screws. Otherwise, the electrical and mechanical protection functions will not be activated.

16.12 Module Specifications

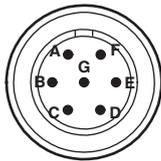
Strain Module (NDIS) (701270) Specifications

Item	Specifications
Standard operating conditions	Temperature: 23° C±5° C Humidity: 55%±10% RH After a 30-minute warm-up and after calibration and auto balance
Effective measurement range	–FS to +FS (set using upper and lower limits)
Number of input channels	2
Maximum sample rate	100 kS/s
Input format	DC bridge (auto balancing), balanced differential input, and isolated
Auto balance type	Electronic auto balance
Auto balance range	±10000 μ STR (1 gauge method)
Bridge voltage	Select from 2 V, 5 V, and 10 V.
Gauge resistance	120 Ω to 1000 Ω (bridge voltage: 2 V) 350 Ω to 1000 Ω (bridge voltage: 2 V, 5 V, and 10 V)
Gauge factor	1.90 to 2.20 (set in 0.01 steps)
Frequency characteristics ¹	(–3 dB point when a sine wave of amplitude ±3 divisions is input) DC to 20 kHz
mV/V range support	Supports the strain gauge transducer unit system. mV/V range = 0.5×(μ STR range/1000)
Measurement range (FS) and measurement range	
	When using STR range
	Measurement Range (FS) Measurement Range
	500 μ STR –500 μ STR to +500 μ STR
	1000 μ STR –1000 μ STR to +1000 μ STR
	2000 μ STR –2000 μ STR to +2000 μ STR
	5000 μ STR –5000 μ STR to +5000 μ STR
	10000 μ STR –10000 μ STR to +10000 μ STR
	20000 μ STR –20000 μ STR to +20000 μ STR
	When using mV/V range
	Measurement Range (FS) Measurement Range
	0.25 mV/V –0.25 mV/V to +0.25 mV/V
	0.5 mV/V –0.5 mV/V to +0.5 mV/V
	1 mV/V –1 mV/V to +1 mV/V
	2.5 mV/V –2.5 mV/V to +2.5 mV/V
	5 mV/V –5 mV/V to +5 mV/V
	10 mV/V –10 mV/V to +10 mV/V
DC accuracy ¹	±(0.5% of FS+5 μ STR)
Maximum input voltage	Between Input+ and Input– 10 V (DC+ACpeak) (At 1 kHz or less)
Maximum allowable common mode voltage (At 1 kHz or less)	Between each terminal and earth ground 42 V (DC+ACpeak) (CAT I and CAT II, 30 Vrms)
Input connector	NDIS connector (Recommended by JSNDI (The Japanese Society for Non-destructive Inspection))
Common mode rejection ratio	80 dB (50/60 Hz) or more (typical ²)
A/D conversion resolution	16 bit (4800 LSB/div: Upper = +FS, Lower = –FS)
Temperature coefficient	Zero point: ±5 μ STR/° C (typical ²) Gain: ±(0.02% of FS)/° C (typical ²)
Bandwidth limit	Select from OFF, 1 kHz, 100 Hz, and 10 Hz Cutoff characteristics: –12 dB/OCT (typical ²)
Function	mV/V support. Supports the strain gauge transducer unit system.
Standard accessories	NDIS connector (for external connection: PRC03-12A10-7M10.5 by Tajimi) A1002JC: 2 pieces
Compatible accessories (sold separately)	Recommended bridge head 701955 (NDIS 120 Ω, enhanced shield version, comes with a 5-m cable) Recommended bridge head 701956 (NDIS 350 Ω, enhanced shield version, comes with a 5-m cable)

Item	Specifications
Precautions	<ul style="list-style-type: none"> Highly sensitive measurements are made in the μV level in strain measurements. Therefore, take measures against noise at the strain sensor perimeter, bridge head, and cable wiring. Depending on the noise environment, an error may result in the balance. Check the influence before making measurements. The bridge head specified by YOKOGAWA has high noise resistance. Some of the strain gauge sensors and bridge heads made by other manufacturers do not have sensing wires connected. (No such problems with bridge heads made by YOKOGAWA.) If such products are used, an error may result in the bridge voltage leading to measurement errors, because sensing does not work effectively. If possible, it is desirable that sensing be done very close to the bridge. However, if this is not possible, use the NDIS conversion cable (DV450-001) that is sold separately by YOKOGAWA. <p>Outline specifications of the DV450-001: Sensing cable, NDIS male-female, 30 cm in length, insert it as close to the bridge as possible</p> <ul style="list-style-type: none"> The connector shell is connected to the case potential. When a bridge head (701955 or 701956) is used, the connector shell, cable shield, and the bridge head case are all connected to the case potential of the DL750. When a bridge head (701955 or 701956) is used, the floating GND is connected to the bridge head case inside the bridge head. Be sure to execute balancing again when you change the range or the bridge voltage.

- Value measured under standard operating conditions (section 16.11).
- Typical value represents a typical or average value. It is not strictly warranted.

Module front View



- A: Bridge+ (positive bridge voltage)
- B: Input- (negative measurement signal)
- C: Bridge- (negative bridge voltage)
- D: Input+ (positive measurement signal)
- E: Floating common
- F: Sense+ (positive bridge voltage sensing)
- G: Sense- (positive bridge voltage sensing)

The connector shell is connected to the case potential.



WARNING

- Do not apply input voltage exceeding the maximum input voltage, withstand voltage, or allowable surge voltage.
- To prevent the possibility of electric shock, be sure to furnish protective earth grounding of the DL750.
- To prevent the possibility of electric shock, be sure to fasten the module screws. Otherwise, the electrical and mechanical protection functions will not be activated.
- Avoid continuous connection under an environment in which the allowable surge voltage may occur.

16.12 Module Specifications

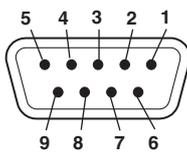
Strain Module (DSUB, Shunt-Cal) (701271) Specifications

Item	Specifications														
Standard operating conditions	Temperature: 23° C±5° C Humidity: 55%±10% RH After a 30-minute warm-up and after calibration and auto balance														
Effective measurement range	–FS to +FS (set using upper and lower limits)														
Number of input channels	2														
Maximum sample rate	100 kS/s														
Input format	DC bridge (auto balancing), balanced differential input, and isolated														
Auto balance type	Electronic auto balance														
Auto balance range	±10000 μ STR (1 gauge method)														
Bridge voltage	Select from 2 V, 5 V, and 10 V.														
Gauge resistance	120 Ω to 1000 Ω (bridge voltage: 2 V) 350 Ω to 1000 Ω (bridge voltage: 2 V, 5 V, and 10 V)														
Gauge factor	1.90 to 2.20 (set in 0.01 steps)														
Frequency characteristics ¹	(–3 dB point when a sine wave of amplitude ±3 divisions is input) DC to 20 kHz														
mV/V range support	Supports the strain gauge transducer unit system. mV/V range = 0.5×(μ STR range/1000)														
Measurement range (FS) and measurement range															
	When using STR range														
	<table border="1"> <thead> <tr> <th>Measurement Range (FS)</th> <th>Measurement Range</th> </tr> </thead> <tbody> <tr> <td>500 μ STR</td> <td>–500 μ STR to +500 μ STR</td> </tr> <tr> <td>1000 μ STR</td> <td>–1000 μ STR to +1000 μ STR</td> </tr> <tr> <td>2000 μ STR</td> <td>–2000 μ STR to +2000 μ STR</td> </tr> <tr> <td>5000 μ STR</td> <td>–5000 μ mSTR to +5000 μ STR</td> </tr> <tr> <td>10000 μ STR</td> <td>–10000 μ STR to +10000 μ STR</td> </tr> <tr> <td>20000 μ STR</td> <td>–20000 μ STR to +20000 μ STR</td> </tr> </tbody> </table>	Measurement Range (FS)	Measurement Range	500 μ STR	–500 μ STR to +500 μ STR	1000 μ STR	–1000 μ STR to +1000 μ STR	2000 μ STR	–2000 μ STR to +2000 μ STR	5000 μ STR	–5000 μ mSTR to +5000 μ STR	10000 μ STR	–10000 μ STR to +10000 μ STR	20000 μ STR	–20000 μ STR to +20000 μ STR
Measurement Range (FS)	Measurement Range														
500 μ STR	–500 μ STR to +500 μ STR														
1000 μ STR	–1000 μ STR to +1000 μ STR														
2000 μ STR	–2000 μ STR to +2000 μ STR														
5000 μ STR	–5000 μ mSTR to +5000 μ STR														
10000 μ STR	–10000 μ STR to +10000 μ STR														
20000 μ STR	–20000 μ STR to +20000 μ STR														
	When using mV/V range														
	<table border="1"> <thead> <tr> <th>Measurement Range (FS)</th> <th>Measurement Range</th> </tr> </thead> <tbody> <tr> <td>0.25 mV/V</td> <td>–0.25mV/V to +0.25 mV/V</td> </tr> <tr> <td>0.5 mV/V</td> <td>–0.5mV/V to +0.5 mV/V</td> </tr> <tr> <td>1 mV/V</td> <td>–1mV/V to +1 mV/V</td> </tr> <tr> <td>2.5 mV/V</td> <td>–2.5mV/V to +2.5 mV/V</td> </tr> <tr> <td>5 mV/V</td> <td>–5mV/V to +5 mV/V</td> </tr> <tr> <td>10 mV/V</td> <td>–10mV/V to +10 mV/V</td> </tr> </tbody> </table>	Measurement Range (FS)	Measurement Range	0.25 mV/V	–0.25mV/V to +0.25 mV/V	0.5 mV/V	–0.5mV/V to +0.5 mV/V	1 mV/V	–1mV/V to +1 mV/V	2.5 mV/V	–2.5mV/V to +2.5 mV/V	5 mV/V	–5mV/V to +5 mV/V	10 mV/V	–10mV/V to +10 mV/V
Measurement Range (FS)	Measurement Range														
0.25 mV/V	–0.25mV/V to +0.25 mV/V														
0.5 mV/V	–0.5mV/V to +0.5 mV/V														
1 mV/V	–1mV/V to +1 mV/V														
2.5 mV/V	–2.5mV/V to +2.5 mV/V														
5 mV/V	–5mV/V to +5 mV/V														
10 mV/V	–10mV/V to +10 mV/V														
DC accuracy ¹	±(0.5% of FS+5 μ STR)														
Maximum input voltage	Between Input+ and Input– 10 V (DC+ACpeak) (At 1 kHz or less)														
Maximum allowable common mode voltage (At 1 kHz or less)	Between each terminal and earth ground 42 V (DC+ACpeak) (CAT I and CAT II, 30 Vrms)														
Input connector	9-pin D-Sub connector (female)														
Common mode rejection ratio	80 dB (50/60 Hz) or more (typical ²)														
A/D conversion resolution	16 bit (4800 LSB/div: Upper = +FS, Lower = –FS)														
Temperature coefficient	Zero point: ±5 μ STR/° C (typical ²) Gain: ±(0.02% of FS)/° C (typical ²)														
Bandwidth limit	Select from OFF, 1 kHz, 100 Hz, and 10 Hz Cutoff characteristics: –12 dB/OCT (typical ²)														
Function	mV/V support. Supports the strain gauge transducer unit system. Shunt calibration support. Built-in shunt calibration relay (1 gauge method).														
Standard accessories	Connector shell set for soldering A1520JD (9-pin D-Sub): 2 pieces, A1618JD (connector shell): 2 pieces														
Compatible accessories (sold separately)	Recommended bridge head 701957 (D-Sub 120 Ω, shunt-Cal, comes with a 5-m cable) Recommended bridge head 701958 (D-Sub 350 Ω, shunt-Cal, comes with a 5-m cable)														

Item	Specifications
Precautions	<ul style="list-style-type: none"> Highly sensitive measurements are made in the μV level in strain measurements. Therefore, take measures against noise at the strain sensor perimeter, bridge head, and cable wiring. Depending on the noise environment, an error may result in the balance. Check the influence before making measurements. The bridge head specified by YOKOGAWA has high noise resistance. When executing shunt calibration, be sure to calculate the shunt resistance in advance, and execute it in a range so that the measured values do not exceed the range even when the shunt resistance is ON. Some of the strain gauge sensors and bridge heads made by other manufacturers do not have sensing wires connected. (No such problems with bridge heads made by YOKOGAWA.) If such products are used, an error may result in the bridge voltage leading to measurement errors, because sensing does not work effectively. Perform sensing as close to the bridge head as possible. (There is no conversion cable for sensing on D-Sub connector types.) The connector shell is connected to the case potential. When a bridge head (701957 or 701958) is used, the connector shell, cable shield, and the bridge head case are all connected to the case potential of the DL750. When a bridge head (701957 or 701958) is used, the floating GND is connected to the bridge head case inside the bridge head. Be sure to execute balancing again when you change the range or the bridge voltage.

- Value measured under standard operating conditions (section 16.11).
- Typical value represents a typical or average value. It is not strictly warranted.

Module front View



- Floating common
- Sense- (positive bridge voltage sensing)
- Shuntcal- (negative shunt signal)
- Shuntcal+ (positive shunt signal)
- Sense+ (positive bridge voltage sensing)
- Bridge- (negative bridge voltage)
- Input- (negative measurement signal)
- Input+ (positive measurement signal)
- Bridge+ (positive bridge voltage)



WARNING

- Do not apply input voltage exceeding the maximum input voltage, withstand voltage, or allowable surge voltage.
- To prevent the possibility of electric shock, be sure to furnish protective earth grounding of the DL750.
- To prevent the possibility of electric shock, be sure to fasten the module screws. Otherwise, the electrical and mechanical protection functions will not be activated.
- Avoid continuous connection under an environment in which the allowable surge voltage may occur.

16.13 Logic Probe Specifications

High-Speed Logic Probe (700986) Specifications

Item	Specifications
Number of input points	8
Input format	Non-isolated (the earth of each bit are common, the earth of the DL750 and the earth of each bit are common)
Maximum input voltage	42 V (DC+ACpeak)(CAT I and CAT II, 30 Vrms), across probe tip and earth (at a frequency of 1 kHz or less)
Response time	1 μ s or less
Input impedance	100 k Ω or more
Threshold level	approx. 1.4 V

Isolation Logic Probe (700987) Specifications

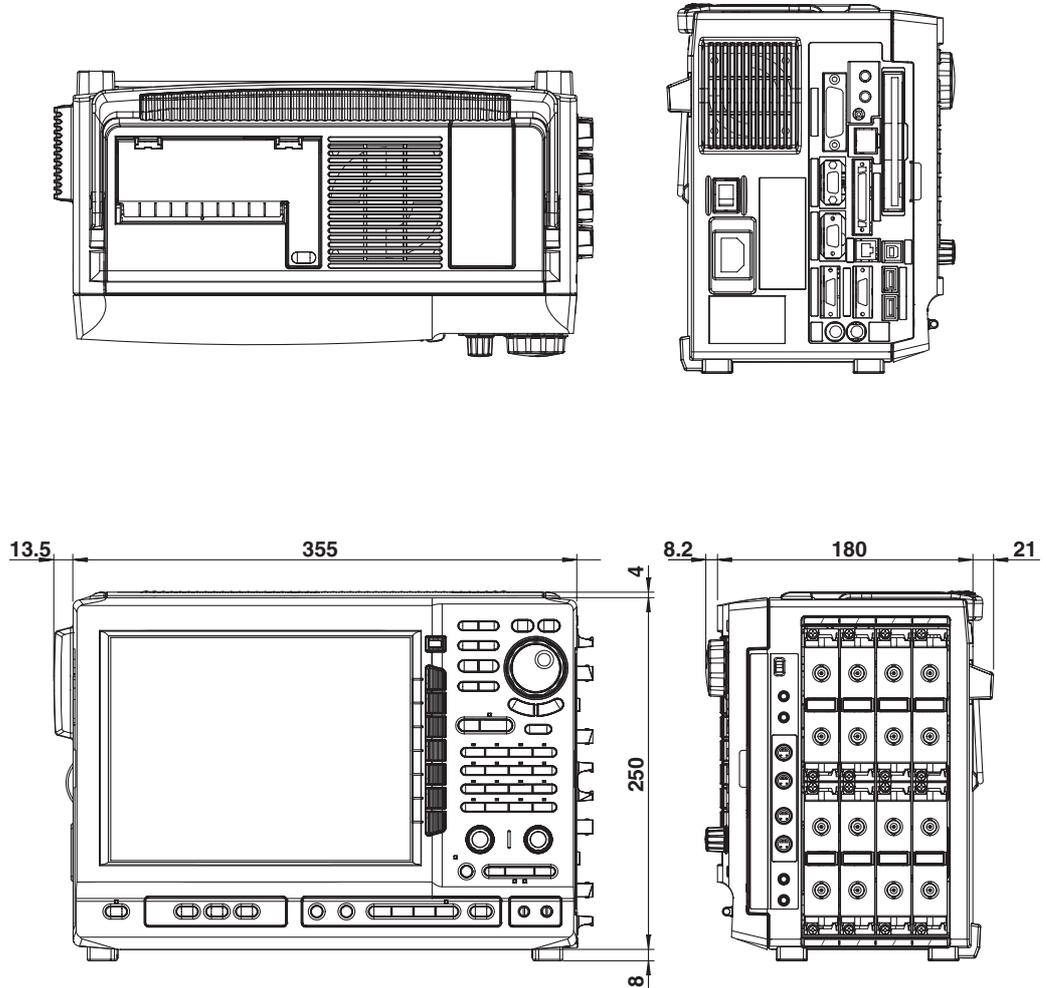
Item	Specifications										
Number of input points	8										
Input format	Isolated (all bits are isolated)										
Input connector	Safety terminal type (for banana plug) \times 8										
Input switching	Can switch between AC/DC input for each bit										
Input signal display	Can confirm H/L with the LED for each bit (lights when H)										
Applicable input range	During DC input: H/L detection of 10 VDC to 250 VDC During AC input: H/L detection of AC type of 80 VAC to 250 VAC 50/60 Hz										
Threshold level	During DC input: 6 V \pm 50% (Hi level: 10 to 250 VDC, Lo level: 0 to 3 VDC) During AC input: 50 VAC \pm 50% (Hi level: 80 to 250 VDC, Lo level: 0 to 20 VAC)										
Response time	During DC input: within 1 ms During AC input: within 20 ms										
Input impedance	approx. 100 k Ω										
Maximum input voltage (across H and L of each bit)	250 Vrms ¹ (CAT I and II)										
Maximum allowable common mode voltage (across input terminal H or L and earth)	250 Vrms ¹ (CAT I and II)										
Maximum allowable voltage between bits	250 Vrms ¹ (CAT I and II)										
Withstand voltage (across input terminal and earth)	2000 VAC for 1 minute										
Isolation resistance (across input terminal and earth)	500 VDC, 10 M Ω or more										
Fuse ²	<table border="1"> <thead> <tr> <th>location</th> <th>max. rated voltage</th> <th>max. rated current</th> <th>type</th> <th>standard</th> </tr> </thead> <tbody> <tr> <td>H side of input terminal</td> <td>250 V</td> <td>50 mA</td> <td>time lag</td> <td>VDE/SEMKO</td> </tr> </tbody> </table>	location	max. rated voltage	max. rated current	type	standard	H side of input terminal	250 V	50 mA	time lag	VDE/SEMKO
location	max. rated voltage	max. rated current	type	standard							
H side of input terminal	250 V	50 mA	time lag	VDE/SEMKO							

1. Make sure the ACpeak voltage does not exceed 350 V and the DC voltage does not exceed 250 V when the frequency is 1 kHz or less.
2. Because the fuses used by this instrument are all inside the case, they cannot be exchanged by the user. If you believe the fuse inside the case is blown, please contact your nearest YOKOGAWA dealer listed on the back cover of this manual.

16.14 External Dimensions

DL750

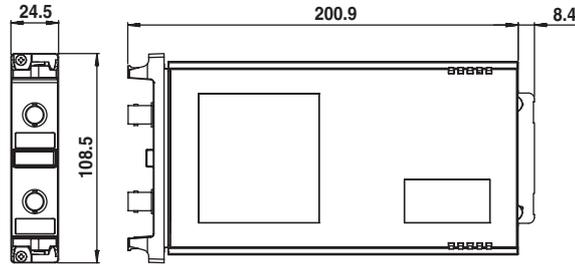
Unit: mm



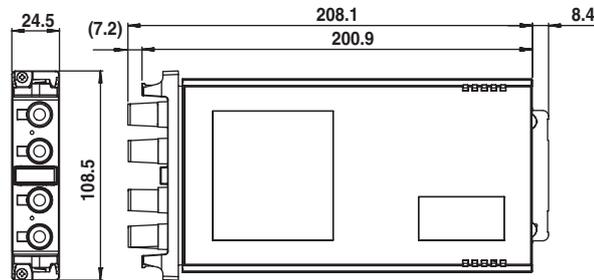
If not specified, the tolerance is $\pm 3\%$. However, in cases of less than 10 mm, the tolerance is ± 0.3 mm.

Module

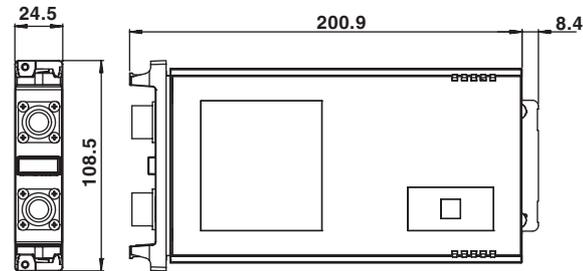
- High-Speed 10 MS/s, 12-Bit Isolation Module (701250)
- High-Speed High-Resolution 1 MS/s, 16-Bit Isolation Module (701251)
- High-Speed 10 MS/s, 12-Bit Non-Isolation Module (701255)
- High-Voltage 100kS/s, 16-Bit Isolation Module(with RMS) (701260)



Temperature, High Precision Voltage Isolation Module (701265)



Strain Module(NDIS) (701270)



Strain Module(DSUB, Shunt-Cal) (701271)

