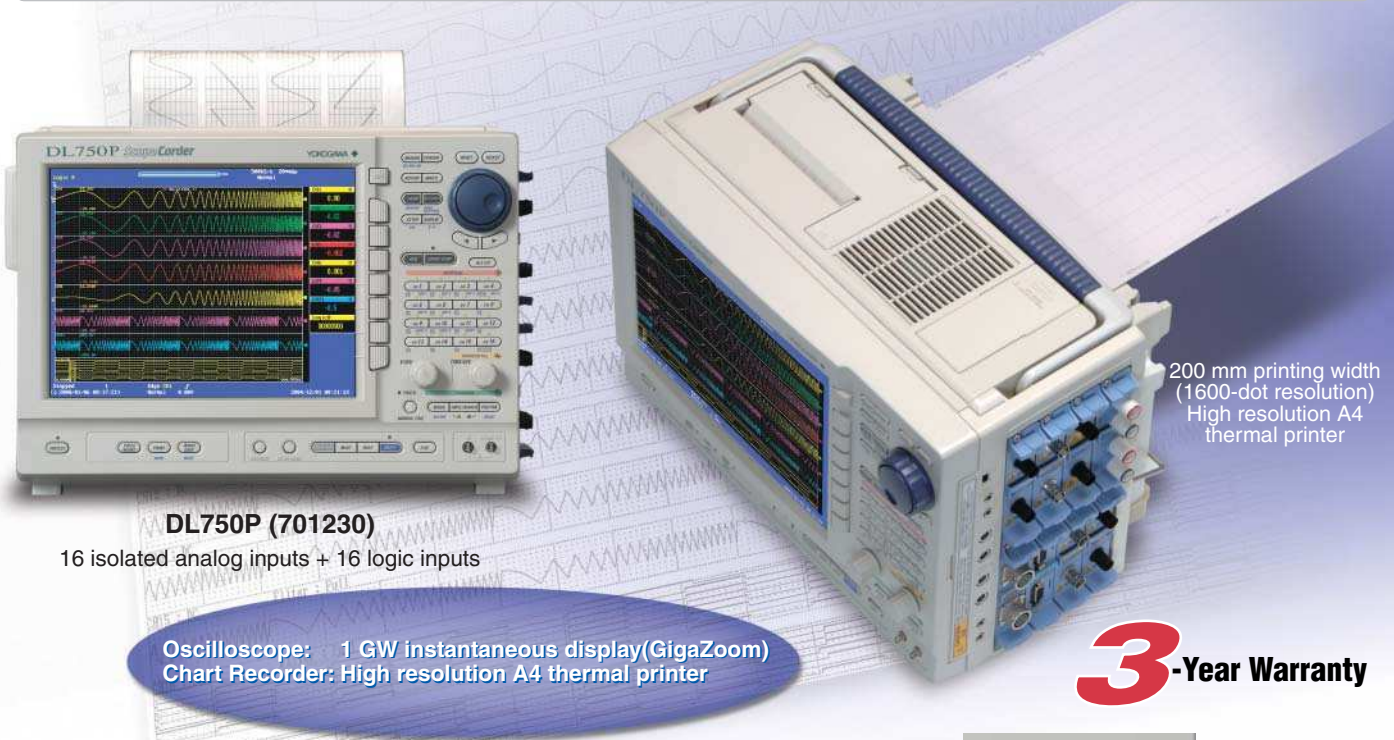*ScopeCorder*

YOKOGAWA ◆

DL750P

Scope & Chart Recorder Two-in-One

**Sometimes an Oscilloscope, Sometimes a Chart Recorder!
The DL750P is equipped with a fully functional scope and chart recorder.**

200 mm printing width
(1600-dot resolution)
High resolution A4
thermal printer

DL750P (701230)

16 isolated analog inputs + 16 logic inputs

Oscilloscope: 1 GW instantaneous display(GigaZoom)
Chart Recorder: High resolution A4 thermal printer

3-Year Warranty

■ Chart Recorder Function

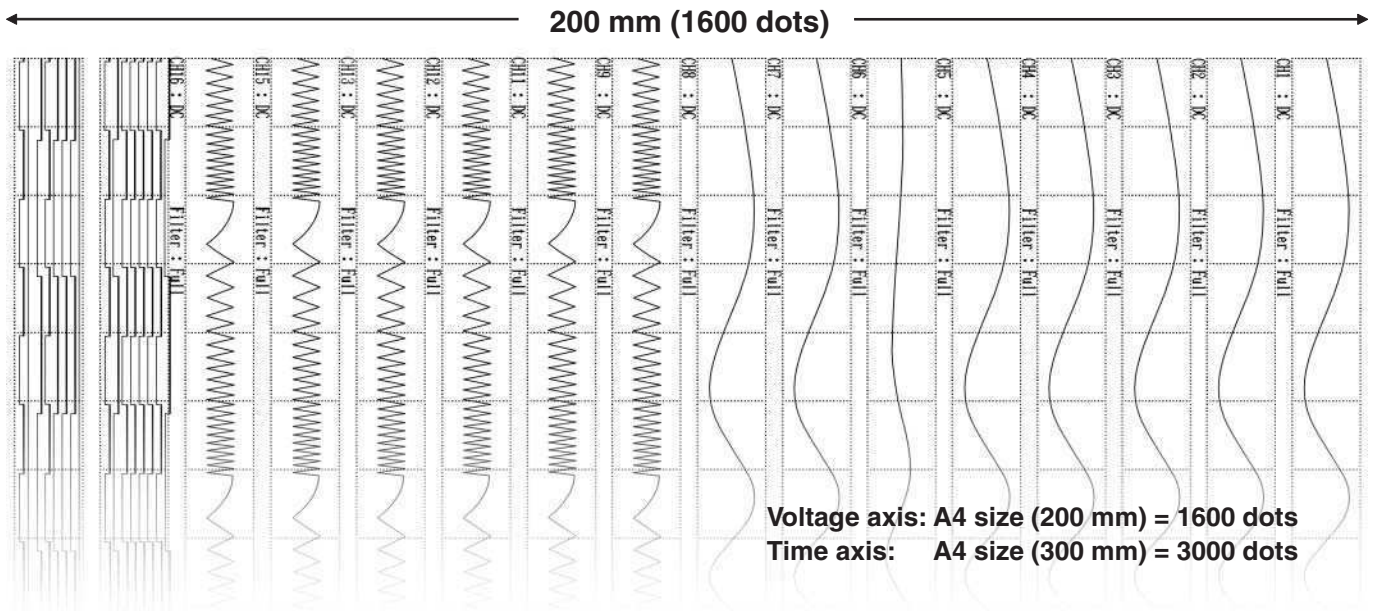### Access Settings Directly with the "*RECORDER*" Key →

- **Set chart speed, chart length, and other settings in menu just like a chart recorder**

- **Automatic recording to memory**
  During real-time printing, the DL750P also automatically records the waveforms to memory in the background. Up to approximately 10 meters (1000 div) can be saved.

- **"Reprint" function**
  Once measurement completed, you can change the print format, length, or other parameters and print the data again. The Reprint function means never worrying about printer failure or running out of paper.

■ The DL750P enables you to...

□ **Check results immediately while on site**
  High speed printer outputs an A4 size sheet in approximately 15 seconds (20 mm/sec)

□ **View multi-channel data in high resolution**
  The A4 size printer records all channels together, with 1600-dot vertical resolution.

□ **Print only what you need**
  Using the DL750's GigaZoom function, you can instantly print out only the portions of waveforms that you need, thus saving paper.

□ **Record for long periods of time with high reliability**
  Waveforms can be printed out continuously in real time while the electronic data is also automatically saved (up to 1000 div or 10 meters).
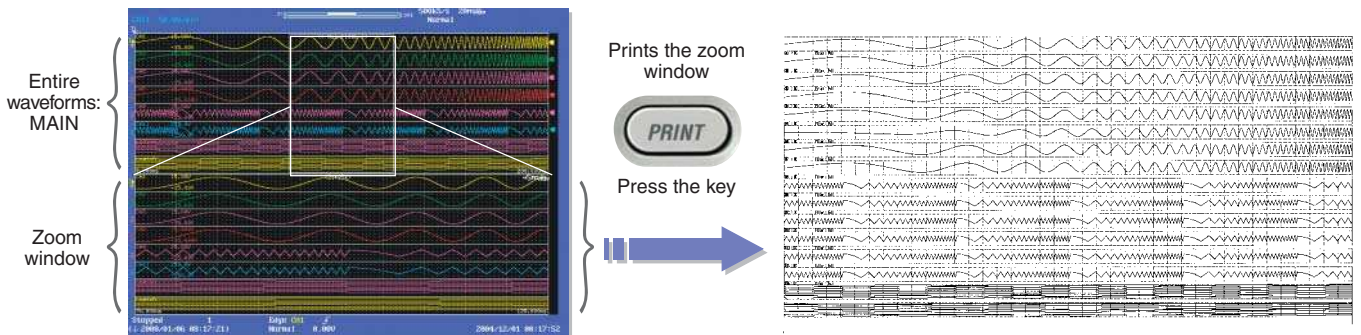
www.valuetronics.com

■ DL750P Printout Example (A4 Size, High Resolution)

← **200 mm (1600 dots)** →

Voltage axis: A4 size (200 mm) = 1600 dots
Time axis: A4 size (300 mm) = 3000 dots

■ GigaZoom function + A4 Printer

The GigaZoomEngine instantly displays up to 1 GW of data and zoom windows at the same time

Print any length of the zoomed waveforms in high resolution "Zoom Print" function

Entire waveforms: MAIN

Zoom window

Prints the zoom window

PRINT

Press the key

■ Prints XY Plots in High Resolution

- **Includes dedicated mode for emulating an XY recorder (XY Recorder mode)**
- **Prints A4 size plots (200 mm x 200 mm) in high resolution**
- **Prints up to 4 pairs(of waveforms) at the same time**
- **Replaces XY recorders**

DL750P

XY recorder

200 mm = 1600 dots

200 mm = 1600 dots

■ Universal Modules

- **Multiple inputs of general-use voltage (100 kS/s, 16-bit) and temperature (thermocouple)**
  Two isolated inputs (voltage: 100 kS/s, 16-bit; temperature: 500 S/s)
  Two types of modules available: with or without AAF (anti-aliasing filter)

- **Key Specifications**
  Voltage range: 20 V/div-5 mV/div (for 10 div display, in steps of 1-2-5)
  Temperature: Thermocouple
                (K, E, J, T, L, U, N, R, S, B, W, iron-doped, gold/chromel)
  Filters: AUTO (AAF), 4 kHz, 400 Hz, 40 Hz

Universal
701261

Universal with AAF
701262

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■ DL750P Applications

☐ **Maintenance (steel plants, power plants, cogeneration systems)**

☐ **On-board testing for railroads and other vehicles**

☐ **Heavy machinery development (industrial machinery, robotics, semiconductor manufacturing equipment)**

☐ **Multichannel on-site observations (automobiles, automobile parts)**

☐ **Replacement for Yokogawa's AR, OR, and LR instruments (former models)**

Main Unit Specifications

Basic Specifications

• Input		
	Type	Plug-in module (each unit has a built-in A/D converter)
	Number of Slots	8 (up to 16 channels)
	Maximum sampling rate[1]	10 MS/s (701250/701255), 1MS/s (701251)
		100 kS/s (701260/61/62/70/71/75), 25 kS/s (701280), 500 S/s (701265)
	Logic inputs	16 (8 bits × 2)
• Max. record length	Standard	2.5 MW/CH, 50 MW total
	/M1	10 MW/CH, 250 MW total
	/M2	25 MW/CH, 500 MW total
	/M3	50 MW/CH, 1 GW total
	Time axis accuracy[2]	±0.005%
	Time axis setting range	500 ns-30 sec/div, 1 min-30 min/div, 1 h-12 h/div, 1 day-3 days/div (up to 30 days)
• Acquisition modes		Normal, Envelope, Averaging, Box average

Triggers

	Modes	AUTO, AUTO LEVEL, NORMAL, SINGLE, SINGLE (n)
	Simple trigger source	CH1 to CH16, DSP1 to DSP6, LINE, EXT, LOGIC_A, LOGIC_B, Time
	Enhanced trigger source	A→B(n), A delay B, B > Time, B < Time, B Time Out, Period, Window, Wave Window

Display

Display[3]		10.4-inch color TFT liquid crystal display (SVGA 800 × 600 dots)
Display modes	Split	Single, Dual, Triad, Quad, Octal, Hexadecimal (DL750P)
	Zoom	Main, Main&Z1, Main&Z1&Z2, Main&Z2, Z1 ONLY, Z2 ONLY, Z1&Z2
	XY	Single Mode (X is fixed, Y is set by user), Quad Mode (XY1, XY2, XY3, XY4)
	Accumulation	PERSIST Overlays in one color

Printer (DL750P)

• Built-in printer		
	Printing method	Thermal line-dot printing
	Paper	A4 size roll (210 mm (W) × 20 meters)
	Effective print width	200 mm (1600 dots)
	Functions	Real-time printing, XY printing, Screen printing
	High resolution printing of specified range	Zoom print, Fine print (print specified range in high resolution)
	Maximum printing speed	20 mm/sec (500 ms/div)
• Real-time printing (chart recorder mode)		
	Functions	Print (record) waveforms in real time, and save automatically to memory (up to 1000 div) in background
	Resolution Vertical	8 dots/mm A4 size (200 mm)=1600 dots
	Horizontal	10 dots/mm A4 size (300 mm)=3000 dots
	Waveform printing Speeds	20 mm/s (500 ms/div), 10 mm/s, 5 mm/s, 2 mm/s, 1 mm/s
		100 mm/min, 50 mm/min, 25 mm/min, 20 mm/min, 10 mm/min, 5 mm/min, 2 mm/min, 1 mm/min
		100 mm/h, 50 mm/h, 25 mm/h, 20 mm/h, 10 mm/h
	Print length (shot length)	Continuous, 20 cm, 50 cm, 1 m, 2 m
	Memory length	2.5 M/CH fixed, max. 1000 div (depends on chart speed)
	Numerical printing Digital values	Intervals: 1 s, 2 s, 5 s, 10 s, 15 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 15 min, 20 min, 30 min, 60 min
		Print directions: Standard or rotated 180 degrees
	Print format Vert. axis divisions	Select from 1, 2, 3, 4, 8, or 16
		Flexible zone function available when 1 division selected
	Vert. axis format	Select 1 div=10 div printed or 1div=10 mm printed
	Extra information	Gague display, upper/lower limits, channel markers, time
	Annotations	CH information, messages, CH data
	Reprint function	Reprints after STOP (enables resetting of format and range specification)
		PDF file output function
	Print start/stop	Specified length printed upon trigger (Single mode, Repeat(Normal) mode)
	Ext. terminal	GO/NO-GO terminal can be used for start/stop input (L=start, H=stop)
• XY recorder mode		
	Functions	Prints XY plots in high resolution: emulates an XY plotter.
	Resolution Vertical	8 dots/mm × 200 mm=1600 dots
	Horizontal	8 dots/mm × 200 mm=1600 dots
	Max. no. of recordable waveforms	Any group of 4
	Sampling rate	5 kS/s max.
	Memory length	1 MW/CH
	Record format	XY single (fixed, T-Y not available)
• Zoom Print/Fine print function		
	Functions	Waveforms can be printed in high resolution, also when not in real-time mode
	Zoom print	Quickly prints the portion zoomed with the GigaZoomEngine in high resolution
	Fine print	Prints the cursor-specified range in high resolution
	Print format Vertical	Same format as in real-time mode
	Horizontal	Print length can be specified

Screen Data Output (Image Saving)

Output formats	PNG, JPEG, BMP, PostScript

Analysis Functions

• Ch-to-ch calculation function		Definable math waveforms: 8
	Calculable record length	Up to 800 kW (MATH1 only), up to 100 KW (MATH 1-8)
	Standard: Operators	Addition, subtraction, multiplication, division, binary conversion, phase shifting, FFT
	FFT types	PS (1000, 2000, 5000, 10000, 20000, 50000, or 100000 points)
	FFT window	Rectangular, Hanning, Flattop, Exponential

User-defined math function (with /G2 option)		
	Operators	ABS, SQR, LOG, EXP, NEG, SIN, COS, TAN, ATAN, PH, DIF, DDIF, INTG, BIN
		P2, P3, F1, F2, FV, PWHH, PWHL, PWLH, PWLL, PWXX
		FILT1, FILT2, HLBT, MEAN,
		MAG, LOGMAG, PHASE, REAL, IMAG
	FFT types	LS, PS, PSD, CS, TF, CH
	Number of FFT points	1000, 2000, 5000, 10000, 20000, 50000, 100000
	FFT window	Rectangular, Hanning, Flattop, Exponential

Waveform Measurement Functions

• Numerical monitoring function		Numerically displays the waveform level (instantaneous) for approximately 1 sec interval.
• Cursors		Horizontal, Vertical, Marker, Degree, H&V
• No. of auto-measured waveform parameters		24
	Operations	P-P, Max, Min, High, Low, Avg, Rms, Amp, StdDiv, +Oshot, -Oshot,
		Rise, Fall, Freq, Period, +Duty, +Width, -Width, Pulse,
		Burst1, Burst2, Avg, Freq, Avg, Period
		Rdelay, Fdelay, Int1TY, Int2TY, Int1XY, Int2XY
• Cycle/history statistical processing		Max. no. of cycles: 48,000 (max. no. of parameters: 48,000)
• History search functions		Zone, Parameter
• GO/NO-GO	Judgement	Parameter (16), Zone (4)
	Actions	Print, Save (Binary/ASCII), Beep, Mail

External I/O

• LOGIC input specifications		8 bits × 2 (26 pin connector × 2)
	Maximum sampling rate	10 MS/s
	Compatible probes	8-bit non-isolated (700986), 8-bit isolated (700987)
• EXT TRIG IN/EXT TRIG OUT		RCA pin jack (TTL (0 to 5 V) input)
• EXT Clock IN		RCA pin jack (TTL (0 to 5 V) input)
• USB peripheral terminal	USB	USB mouse, USB keyboard, USB printer
(Complies with Rev1.1)		DL750P only (USB memory, USB storage)
	USB to PC	For control from PC via USB
• Ethernet (with /C10 option)		Complies with 100BASE-TX, 10BASE-T
• Other communication interfaces		GP-IB, SERIAL (RS232), SCSI
• GO/NO-GO I/O		Modular jack (RJ11), TTL (0-5 V input)
• Probe power terminal (with /P4 option)		
	Max. no. of probes powered	4
	Compatible probes	Current probes: 701933 (30 A), 701930 (150 A), 701931 (500 A), others
	Max. no. of current probes allowed	See: http://www.yokogawa.com/tm/dl/probe_index/tm-dlprobe.htm

Media Drives

Internal media drives	FDD/PC card	Selectable form floppy drive or PC card (Zip not available with the DL750P)
	HDD	40 GB hard drive (with /C8 option)

DSP Channel Function (with the /G3 Option)

DSP channels	6
Maximum sampling rate	100 kS/s (when exceeding 100 kS/s, the data is resampled at 100 kS/s)
Operators	■ Calculation of 2 items between channels (addition, subtraction, multiplication, division) ■ Differentiation (w/ LPF) ■ Integration ■ Digital filtering (LPF, HPF, BPF, FIR type, IIR type, variable cutoff frequency) ■ Knocking filter function (filter calculations and bulb noise rejection function)

Real-Time Hard Disk Recording (with /C8 Option)

Max usable space per single save	1 GW
Maximum sampling rate	100 kS/s (1 CH)

DualCapture Function

This function captures the same waveform data at two different sampling rates.

Main (low-speed)	Max. sampling rate: 100 kS/s, max. memory length: 100 MW
Sub (high-speed)	Max. sampling rate: 10 MS/s, max. memory length: 10 KW (fixed)
Sub maximum no. of captured screens	500 (/M3, /M2), 250 (/M1), 100 (with standard memory)

Voice Memo Function

• Voice memo	Stores voice data during roll mode, plays back from microphone terminal and speaker output terminal.
• Voice comment	Stores voiced comments when saving images.

Acquisition Memory Backup

	Functions	Backs up acquisition memory and voice data, maintained by four AA alkaline batteries
	Backup duration (reference value)[2]	Approximately 10 hours (with /M3 option)

General Specifications

Rated supply voltage		100 to 120 VAC/200 to 240 VAC (automatically switched)
Rated supply frequency		50/60 Hz
Power consumption		Approximately 200 VA-MAX
Withstand voltage		1500 VAC for one minute across power supply and ground
Insulating resistance		10 MΩ or greater at 500 VDC across power supply and ground
Exterior dimensions	DL750P	355 mm (W) × 250 mm (H) × 225 mm (D) excluding handle and protrusions
Weight	DL750P	Approx 7.9 kg (main unit only), approx 10.3 kg (main unit + 701250 × 8)
	Modules	Approximately 300 g per module (average)
Operating temperature range		5 to 40°C

1. Maximum sampling rate depends on the type of modules used.
   If the sampling frequency exceeds the max. sampling rate of the module, the same data is inserted.
2. Standard operating conditions: ambient temp. 23°C ±5°C, ambient humidity 55 ±10%RH
3. Some pixels of the LCD display may be permanently illuminated or non-illuminated. Also, due to the characteristics of LCDs there may be gradients in brightness. Please understand that these phenomena do not indicate a defective display.

Universal (Voltage/Temperature) Modules (701261/701262)

Input channels		2
Input signals		Voltage or temperature (thermocouple)
AAF (anti-aliasing filter)		701261: none, 701262: included
Input couplings		TC (thermocouple), DC, AC, GND
Input typesl		Isolated unbalanced
Maximum sampling rate	Voltage	100 kS/s
Data updating rate	Temperature	500 Hz
A/D conversion resolution		Voltage: 16 bits (2400 LSB/div); temperature: 0.1°C
Frequency range (-3 dB)[1]	Voltage	DC to 40 kHz
	Temperature	DC to 100 Hz
Input range	Voltage (1:1)	5 mV/div to 20 V/div (10 div display, in steps of 1-2-5)
	Temperature	K, E, J, T, L, U, N, R, S, B, W, iron-doped gold/chromel
Effective measurement range (voltage)		20 div (display range 10 div)
DC offset (voltage)		±5 div
DC accuracy[1] (voltage)		±(0.25% of 10 div)

Temp. measured range/accuracy[1,2]

Type	Measured Range	Accuracy
K	-200°C to 1300°C	±(0.1% of reading + 1.5°C)
E	-200°C to 800°C	However, for -200°C to 0°C,
J	-200°C to 1100°C	±0.2% of reading + 1.5°C)
T	-200°C to 400°C	
L	-200°C to 900°C	
U	-200°C to 400°C	
N	0°C to 1300°C	
R, S	0°C to 1700°C	±(0.1% of reading + 3°C) However, 0°C for 200°C: ±8°C 200°C for 800°C: ±5°C
B	0°C to 1800°C	±(0.1% of reading + 2°C) However, 400°C to 700°C: ±8°C Effective range.: 400°C to 1800°C
W	0°C to 2300°C	±(0.1% of reading + 3°C)
Gold/chromel K	0 K to 300 K	0 to 50 K: ±4 50 to 300 K: ±2.5 K

Max. input voltage (1 kHz or less)		42 V (DC+ACpeak): for satisfying safety standards[3] 150 V (DC+ACpeak): allowable maximum[4]
Max. allowable common mode volt. (1 kHz or less)		42 V (DC+ACpeak): (CAT I & CAT II, 30 Vrms)
Input connector		Binding post
Input impedance		Approximately 1 MΩ
Input filters	Voltage	OFF, AUTO (AAF), 4 kHz, 400 Hz, 40 Hz (-12 dB/oct except AUTO)
	Temperature	OFF, 30 Hz, 8 Hz, 2 Hz
AAF (anti-aliasing filter)[5]	701262 only	Cutoff frequency fc = fs (sampling frequency) × 40% fc automatically linked with the sampling frequency. Cutoff characteristics: -65 dB at 2 Xfc (typical value)
Temp. coefficient (for voltage)[6]	Zeropoint	±(0.01% of 10 div)/°C (typical value)
	Gain	±(0.02% of 10 div)/°C (typical value)
Compatible cable		366961 (banana-to-alligator 1:1)

1. Under reference operating conditions (ambient temp. of 23°C ±5°C, ambient humidity of 55% ±10%RH, after 30-minute warmup period and calibration).
2. Does not include reference junction/temperature compensation accuracy.
3. Since the input connector is of a binding post type, it is possible to touch the metal part of the connector. Therefore, for safety reasons, the maximum value is 42 V (DC+ACpeak).
4. Maximum value at which the input circuit will not be damaged.
5. When fs= 50 Hz to 100 KHz. When fs≤50 Hz, fc=20 Hz (fixed).
6. Except when filters set to AUTO.

DL750/DL750P Model Numbers and Suffix Codes

Model	Suffix Code		Description
701210			"DL750 main unit (16 isolated channels + 16-bit logic)[1] 112 mm width A6 thermal printer built-in"
701230			"DL750P main unit (16 isolated channels + 16-bit logic)[1] 210 mm width A4 thermal printer built-in"
Power cable	-D		UL/ CSA standard
	-F		VDE standard
	-R		AS standard
	-Q		BS standard
	-H		GB standard(Complied with CCC)
Internal media drive[2]	-J1		Floppy drive
	-J2		Zip® drive (available for the DL750 only)[3]
	-J3		PC card drive
Default Help language	-HE		English online help
	-HJ		Japanese online help
	-HC		Chinese online help
	-HG		German online help
	-HF		French online help
	-HL		Italian online help
	-HK		Korean online help
Memory expansion	/M1		Memory expansion to 10 MW/CH[4]
	/M2		Memory expansion to 25 MW/CH[4]
	/M3		Memory expansion to 50 MW/CH[4]
Other specifications	/C8		Internal 40 GB hard drive (FAT32)
		/C10	Ethernet interface
		/G2	User-defined math function
		/G3	DSP channel function
		/P4	Probe power (4-output)
		/DC	DC12 V power (DC10-18 V) (DL750 only)[3]

1. Plug-in modules are not included.
2. Choose only one.
3. Zip drive and DC12V power supply cannot be specified together with the DL750P.
4. Cannot be specified together.

Standard Accessories

Product		Order Qty.
Power cable		1
User's manuals (one set)		1
Transparent front cover		1
Printer roll paper	DL750 (A6 10 m/roll)	3
	DL750P (A4 20 m/roll)	1
Cover panel (for blank module slots)		8
Rubber feet (four per set)		1
Soft case (for storing accessories)		1

Zip is a registered trademark of Iomega Corporation in the United States and/or other countries. Other company names and product names appearing in this document are trademarks or registered trademarks of their respective companies.

Plug-in Module Model Numbers[5]

Model No.	Description
701250	High-speed 10 MS/s 12-bit isolation module (2 CH)
701251	High-speed 1 MS/s 16-bit isolation module (2 CH)
701255	High-speed 10 MS/s 12-bit non-isolation module (2 CH)
701260	High-voltage 100 kS/s 16-bit isolation module (2 CH, with RMS)
701261	Universal Module (2 CH)
701262	Universal Module (with AAF 2 CH)
701265	Temperature/high-precision voltage module (2 CH)
701270	Strain module (NDIS, 2 CH)
701271	Strain module (DSUB, Shunt-CAL, 2 CH)
701275	Acceleration/voltage module (with AAF, 2 CH)
701280	Frequency module (2 CH)

5. Probes are not included with any modules.
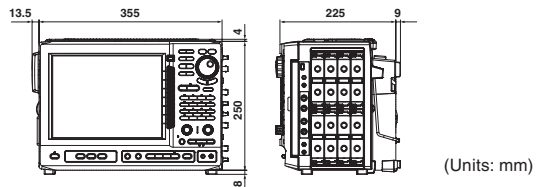6. The latest firmware for the DL750 series is available on our Web site.

DL750/DL750P Accessories

Product	Model No.	Description1
Isolated probe	700929	1000 Vrms-CATII for 701250, -51, and -60 (10:1)
"1:1 BNC safety adapter lead (in combination with the following)"	701901	1000 Vrms-CATII for 701250, -51, and -60
Safety mini clip (hook type)	701959	1000 Vrms-CATII, 1 set each of red and black
Large Alligator clip (dolphin type)	701954	1000 Vrms-CATII, 1 set each of red and black
Alligator adapter (rated volt.: 1000 V)	758929	1000 Vrms-CATII, 1 set each of red and black
Alligator adapter (rated volt.: 300 V)	758922	300 Vrms-CATII, 1 set each of red and black
Fork terminal adapter	758921	1000 Vrms-CATII, 1 set each of red and black
Passive probe for DL750/750P[2]	701940	Non-isolated 600 Vpk (701255) 42 V or less (other) (10:1)
1:1 BNC-alligator cable	366926	Non-isolated 42 V or less, for 701250, -51, -55, 1 m
1:1 Banana-alligator cable	366961	Non-isolated 42 V or less, for 701261, -62, -65, 1.2 m
Current probe[3]	701933	30 Arms, DC to 50 MHz, supports probe power
Current probe[3]	701930	150 Arms, DC to 10 MHz, supports probe power
Current probe[3]	701931	500 Arms, DC to 2 MHz, supports probe power
Probe power[4]	701934	Large current output, external probe power supply (4 outputs)
Differential probe	700924	1400V pk, 1000 Vrms-CAT II
Bridge head (NDIS, 120 Ω/350 Ω)	701955/56	With 5 m cable
"Bridge head (DSUB, Shunt-cal 120 Ω/350 Ω)"	701957/58	With 5 m cable
GO/NO-GO cable	366973	For GO/NO-GO I/O and start input
Safety BNC-banana adapter	758924	500 Vrms-CATII, for 701250, -51, -55, -60
Printer roll paper	B9988AE	DL750, A6 size (120 mm wide × 10m), include 10 rolls
Printer roll paper	701966	DL750P, A4 size (210 mm wide × 20m), include 6 rolls
High-speed logic probe[5]	700986	8-bit, non-isolated, response speed: 1μs
Isolated logic probe[6]	700987	8-bit, each channel isolated, response speed: 20 ms (for AC)
Isolated logic measurement leads	758917	"Isolated logic measurement leads (2 per set) Alligator clip required separately. "
Conversion adaptor	366928	BNC (jack)-RCA (plug) conversion
Safety BNC cable (1 meter)	701902	1000 Vrms-CATII (BNC-BNC)
Safety BNC cable (2 meters)	701903	1000 Vrms-CATII (BNC-BNC)
Soft carrying case	701963	For DL750, with 3 storage pockets
Soft carrying case	701967	For DL750P, with 3 storage pockets

1. Actual allowable voltage is the lower of the voltages specified for the main unit and the cable
2. 42 V is safe when using the 701940 with a Non isolated type BNC input.
3. The number of current probes that can be powered from the main unit probe power is limited. See the following for details. http://www.yokogawa.com/tm/probe/
4. There is no limit to the number of externally powered probes that can be used.
5. One of each connection lead (B9879PX and B9879KX) is included.
6. 758917, and either 758922 or 758929 is required for measurement.

External Dimensions

13.5   355   225   9   4   250   8

(Units: mm)

Note

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

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