

DL Series

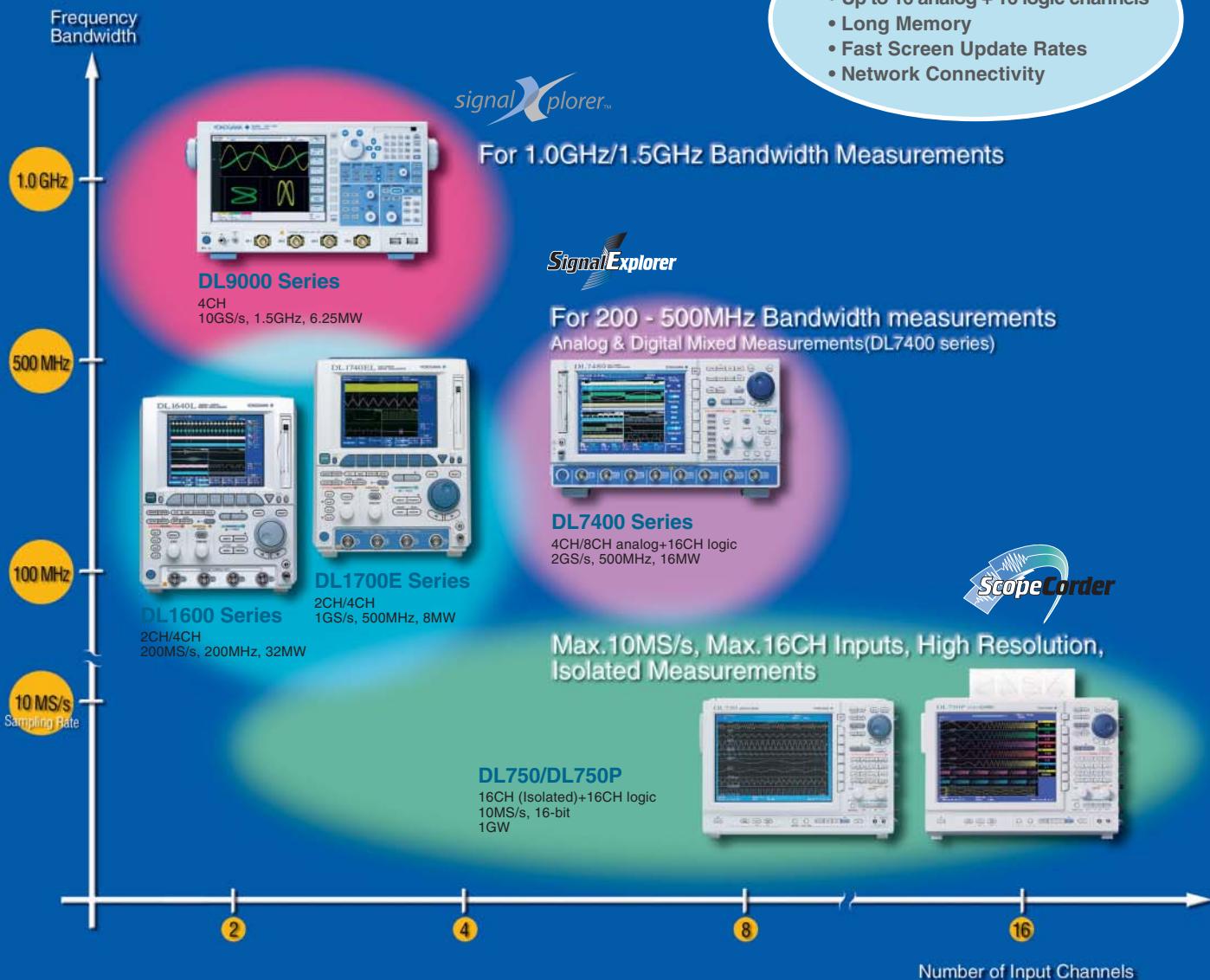
Digital Oscilloscopes
ScopeCorders



Yokogawa's DL series of instruments consists of digital oscilloscopes and hybrid ScopeCorders. The digital oscilloscopes have high-speed sampling and a wide range of bandwidths that can be utilized for design and development of electronic devices. The ScopeCorders have the advantages of both a digital oscilloscope and a multi-channel data recorder.

The DL series consists of a range of solutions designed to meet you current and future measurement needs.

DL Series Lineup



Select the “best” DL for your application

For full 1GHz/1.5GHz bandwidth measurements

▼ Gigahertz-band digital oscilloscopes offer high performance and portability at an affordable price.

DL9000 Series



- Max. 10GS/s (DL9240/DL9240L)
- 1GHz (DL9140, DL9140L) / 1.5GHz (DL9240, DL9240L) analog bandwidth
- Max. Record length 2.5MW/CH (DL9140, DL9140L) 6.25MW/CH (DL9240, DL9240L)
- Max. 2.5M waveforms/sec/ch fast acquisition rate

- Compact and light weight, 18cm (7.1") depth, 6.5kg (14.5lbs)
- I²C and SPI bus analysis (optional)
- 8.4-inch color TFT LCD (XGA)

Application Examples :Design and development of AV equipment, digital home electronics, mobile phones and other embedded devices

For 500 MHz bandwidth analog and digital mixed-signal measurements

▼ The DL7400 series is designed to make complex analog & digital measurements easily.

DL7400 Series



- Max. 2GS/s
- 500MHz analog bandwidth
- DL7440 4CH analog inputs
- DL7480 8CH analog inputs
- Max. 16MW memory
- 8.4-inch color TFT LCD (VGA)

- 16-bit logic inputs
- Power analysis function (optional)
- Serial bus (I²C,CAN,SPI) analysis functions (optional)

Application Examples :ASIC system design
:Software debugging for equipment controlled by a microcomputer.

For 200 - 500MHz bandwidth measurements

▼ These compact, lightweight models offer high-speed sampling and long memory.

DL1700E Series



- Max. 1GS/s
- 500MHz analog bandwidth
- DL1740E/EL 4CH analog inputs
- DL1720E 2CH analog inputs
- Max. 8MW memory
- 6.4-inch color TFT LCD (VGA)

- PC card interface or FDD (select one)
- Supports USB mass storage
- I²C+SPI bus analysis function (optional)

Application Examples :Production line for DVD manufacturing
:Evaluation of embedded systems controlled by I²C bus

▼ Our best-selling models support 3-mode power supplies, and weight just 3.9 kg.

DL1600 Series



- Max. 200MS/s
- 200MHz analog bandwidth
- DL1640/DL1640L 4CH analog inputs
- DL1620 2CH analog inputs
- Max. 32MW memory
- 6.4-inch color TFT LCD (VGA)
- Real-time digital filtering and high-resolution mode

- I²C and CAN bus analysis functions (optional)
- 3-mode power supplies (AC, DC12V, battery)
- Compact and lightweight, just 3.9kg (base model)

Application Examples :Measurement of energy consumption of RFIC in mobile phone.
:CAN physical layer analysis for in-vehicle testing

Up to 10MS/s sampling rate, max 16CH inputs for various kinds of signals such as voltage, temperature, strain, frequency, etc.

▼ 11 different plug-in modules can be combined to meet a variety of measurements needs.

DL750/DL750P



- Max. 10MS/s (using 701250 module)
- Max. 16-bit A/D resolution (using 701251, 701260 module)
- Max. analog 16-ch + logic 16-bit inputs
- Max. 1GW memory
- 10.4-inch color TFT LCD (SVGA)
- 30GB internal HDD (optional)
- Dual capture function
- 200 mm printing width high resolution A4 thermal printer (DL750P)
- DC12V Power supplies available (DL750)

DL750/DL750P Plug-In Modules

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

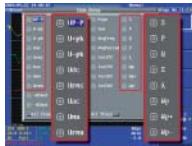
Application Examples :Automobiles (engine combustion pressure, brakes, transmission control signals)
:Motors, Inverters, Press machine, Hydraulic equipment, Printer...)

Special functions for specific applications

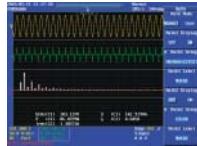
Power analysis functions

(Available as an option on the DL7400 series)

With a single measuring instrument, you can perform a variety of measurement functions that are indispensable for power supply design, such as harmonic analysis, switching loss, power factor, and energy.



Automatic parameters available

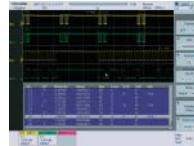


Harmonic analysis

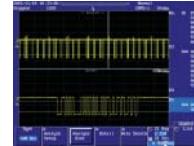
Serial bus analysis functions

(Available as options on the DL9000, DL7400, DL1700E and DL1600 series)

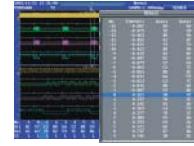
These options provide physical-layer observation and analysis of serial bus signals. Evaluations from such analyses are essential to solve communication failures resulting from signal deterioration and unpredictable external noise. Dedicated triggers and analysis for I²C, CAN and SPI bus signals are available.



I²C bus analysis results



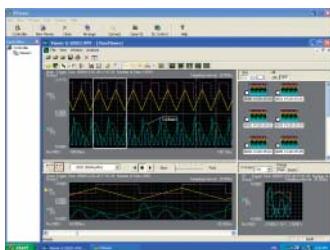
CAN bus analysis results



SPI bus analysis results

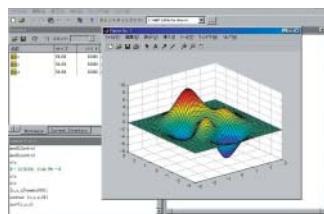
Software Tools

Xviewer (701992)



Xviewer is a PC software application designed to work with the DL series digital oscilloscopes and the DL750 series ScopeCorders. Xviewer allows you to display DL-acquired waveform data (using the "Viewer" function), perform file transfers, and control DL series instruments remotely.

MATLAB tool kit (701991)



The MATLAB tool kit for the DL series is a plug-in for MATLAB software. The toolkit can be used to control supported DL series instruments using MATLAB or to acquire data from a DL series instrument for use in MATLAB via the following communication interfaces:GP-IB, USB, Ethernet.

You can download a trial version of Xviewer from YOKOGAWA's web site at: <http://www.yokogawa.com/tm/701992/>

You can download a trial version of the MATLAB tool kit from YOKOGAWA's web site at: <http://www.yokogawa.com/tm/701991/>

DL series • Selection Guide*1

Item	Model	DL9140/DL9140L/ DL9240/DL9240L	DL7440/DL7480	DL1720E/DL1740E/ DL1740EL	DL1620/DL1640/ DL1640L	DL750/DL750P
Features		<ul style="list-style-type: none"> • 1GHz/1.5GHz Analog Bandwidth • Compact & lightweight, 4CH Inputs • Max. 10GS/s • Max. 2.5M waveforms/sec/ch Acquisition Rate • I²C and SPI bus analyzer • History Memory & History Replay • USB Mass Storage, USB mouse/keyboard available 	<ul style="list-style-type: none"> • Fast Screen Update & All Points Display • High speed 8CH + 16 bits Logic Input • Max. 2GS/s • Web server function • Serial bus analysis functions • Power Analysis Functions • USB Mass Storage, USB mouse/keyboard available • Probe Power Connectors 	<ul style="list-style-type: none"> • Fast Screen Update & All Points Display • Compact & Lightweight, 4CH • Max. 1GS/s • I²C, SPI bus analysis functions • Probe Power Connectors • Web Server Functions • USB Mass Storage, USB mouse/keyboard • Web Server Functions 	<ul style="list-style-type: none"> • Fast Screen Update & All Points Display • Compact 4 ch, 200 MS/s • Max. 32MW memory (4ch) • Web Server Functions • Serial Bus Analysis Functions (CAN,I²C,SPI) • USB Mass Storage, USB mouse/keyboard • Probe Power Connectors 	<ul style="list-style-type: none"> • Compact, 16CH Isolated Inputs • GigaZoomEngine /DualCapture • Eleven different Plug-in Input Modules • Max. 1GW memory • 200mm printing width high resolution A4 thermal printer (DL750P) • Web Server Functions • USB mouse / keyboard • Probe Power Connectors
Max. Sampling Speed		10 GS/s ^(*)	2 GS/s	1 GS/s	200 MS/s	10 MS/s ^(*)
Bandwidth		1.5 GHz ^(*)	500 MHz	500 MHz	200 MHz	3 MHz ^(*)
Number of Analog Input Channels		4	DL7440: 4 ; DL7480: 8	DL1720E: 2 ; DL1740E/40EL: 4	DL1620: 2 ; DL1640/40L: 4	Up to 16 (isolated)
Logic Inputs		—	16-bit (8 bits × 2)	—	—	16 (8 bits × 2)
Vertical Sensitivity (1:1)		2 mV/div	2 mV/div	2 mV/div	2 mV/div	100 μV/div ^(*)
Vertical Axis Resolution		8 bit	8 bit	8 bit	8 bit	Max. 16 bits ^(*)
Max. Sweep Sensitivity		500 ps/div	1 ns/div	1 ns/div	2 ns/div	500 ns/div ^(*)
Max. Record Length	St'd	DL9140/DL9240: 2.5 MW DL9140L/DL9240L: 6.5 MW	701450/701470: 4 MW 701460/701480: 16 MW	DL1740EL: 8 MW DL1740E: 2 MW DL1720E: 1 MW	DL1620/DL1640: 8 MW DL1640L: 32 MW	50 MW max / 2.5 MW (16 ch)
	Option	—	—	—	—	1 GW max / 50 MW (16 ch)
Internal Media Drive	St'd	PC card (2)	PC card	—	—	—
	Option	—	FDD, Zip TM	FDD, PC card	PC card, FDD, Zip TM	PC card, FDD, Zip TM (DL750 only)
Internal HDD	Option	30 GB (FAT32)	—	—	—	30GB (FAT32)
Interface	St'd	USB	USB/GP-IB	USB/GP-IB	RS232	USB/GP-IB/RS232/SCSI
	Option	Ethernet	Ethernet/SCSI	Ethernet	USB/Ethernet/GP-IB	Ethernet
Internal Printer	St'd / Opt	Optional: 112mm width	Optional: 112mm width	Optional: 112mm width	Optional: 112mm width	St'd 112mm width (DL750) St'd 210mm width (DL750P)
Others	Options	<ul style="list-style-type: none"> ■ I²C bus Analysis and SPI Bus Analysis ■ Power Analysis ■ 2 Probe Power Connectors 	<ul style="list-style-type: none"> ■ I²C Bus Analysis ■ CAN Bus Analysis ■ SPI Bus Analysis ■ User-defined Math ■ Power Analysis ■ Four Additional Probe Power Connectors (total: 8)^(*) 	<ul style="list-style-type: none"> ■ I²C & SPI Bus Analysis ■ 2/4 Output Probe Power Connectors 	<ul style="list-style-type: none"> ■ I²C bus Analysis ■ CAN bus Analysis ■ 2/4 Probe Power Connectors ■ DC/Battery powered model (DC 12V + Battery Box) 	<ul style="list-style-type: none"> ■ Eleven kinds of Plug-in Modules ■ 6 DSP Channel ■ User-Defined Math Computations ■ Probe Power Connectors ■ DC12V Drive Model Available (DL750)
Display (TFT LCD)		8.4-inch color, XGA	8.4-inch color, VGA	6.4-inch color, VGA	6.4-inch color, VGA	10.4-inch color, SVGA
W * H * D (mm)		350 × 200 × 178	373 × 211 × 355	220 × 266 × 264	220 × 266 × 224	355 × 250 × 180 (DL750) 355 × 250 × 225 (DL750P)
Approx. Weight (kg)		6.5	10	6	3.9 (base model)	6.6 (DL750, ^(*)) , 7.9 (DL750P, ^(*))

*1: See each product catalog for more detailed specifications

*2: Depends on input module

*3: The DL7400 series comes standard with four probe power connectors.

*4: Main unit only (plug-in module not included)

*5: Depends on model

DL9140/DL9240 Model Number and Suffix Codes

Model	Suffix Codes	Description
701310		Digital Oscilloscope DL9140 4 ch, 1 GHz, max. 5 GS/s (2.5 GS/s/ch), 2.5 Mword/ch
701311		Digital Oscilloscope DL9140L 4 ch, 1 GHz, max. 5 GS/s (2.5 GS/s/ch), 6.25 Mword/ch
701312		Digital Oscilloscope DL9240 4 ch, 1.5 GHz, max. 10 GS/s (5 GS/s/ch), 2.5 Mword/ch
701313		Digital Oscilloscope DL9240L 4 ch, 1.5 GHz, max. 10 GS/s (5 GS/s/ch), 6.25 Mword/ch
Power cable	-D -F -Q -R -H	UL/CSA standard VDE standard BS standard AS standard GB standard
Help menu language	-HE	English Help
Options	/B5	Built-in printer
	/P2	Probe power connections on rear panel ¹ (2 outputs for current probes, differential probes)
	/C10	Ethernet interface ²
	/C8	30GB Built-in HDD + Ethernet interface ²
	/F5	I ² C + SPI bus analyzer ³

1: Please order /P2 option if you use either current probes or differential probes from Yokogawa. For 2.5 GHz active probe and 5 GHz low capacitance probe, this option is not necessary.

2: Choose either one

3: I²C and SPI triggers are standard.

DL7440/DL7480 Model Number and Suffix Codes

Model	Suffix Code	Description
701450		DL7440 Digital Oscilloscope with 4 CH input and maximum 4 MW memory
701460		DL7440 Digital Oscilloscope with 4 CH input and maximum 16 MW memory
701470		DL7480 Digital Oscilloscope with 8 CH input and maximum 4 MW memory
701480		DL7480 Digital Oscilloscope with 8 CH input and maximum 16 MW memory
Power cable	-D	UL/CSA standard
	-F	VDE standard
	-Q	BS standard
	-R	AS standard
Internal storage drive	-H	GB standard
	-J1	Floppy disk drive ¹
Options	-J2	Zip [®] drive ¹
	/B5	built-in printer
	/E4	Four additional passive probes (701470, 701480 only) ²
	/EX4	Attach four 701941 probes ^{3,9}
	/EA4	Add four 701941 probes ^{8,9}
	/P4	Four additional probe power connectors (701470, 701480 only) ³
	/N3	Logic input for 701450/701470 ⁴ (Standard option)
	/N4	Logic input for 701460/701480 ⁴ (Standard option)
	/C7	SCSI interface
	/C10	Ethernet interface
Options	/G2	User-defined math function ⁵
	/G4	Power Supply Analysis Function ⁵
	/F5	I ² C + SPI Bus Analyzer ⁶
	/F7	CAN + SPI Bus Analyzer ⁶
	/F8	I ² C + CAN + SPI Bus Analyzer ⁶
	/F9	I ² C + CAN + SPI Bus Analyzer ⁶

1: Select one only.

2: The DL7400 Series is standard-equipped with four passive probes (700988).

3: The DL7400 Series is standard-equipped with four probe power connectors.

4: Select /N3 for models 701450 and 701470, and /N4 for models 701460 and 701480. Logic probes are sold separately.

These options can be installed free of charge.

5: /G2 and /G4 cannot be ordered together. /G4 includes /G2.

6: Option /F5, /F7, and /F8 cannot be specified together. Select one only.

The SPI Bus Analysis and Search functions are Standard feature. The SPI Bus Triggers are available only as an option.

7: Four 700988 probes are not included when this option is specified.

8: This option can be specified with model 701470, 701480 only.

9: When the option /E4 is specified, neither /EX4 nor /EA4 can be specified together.

DL1720E/DL1740E/DL1740EL Model Number and Suffix Codes

Model	Suffix Code	Description
701715		DL1720E Digital Oscilloscope with 2 ch input and maximum 1 MW memory
701730		DL1740E Digital Oscilloscope with 4 ch input and maximum 2 MW memory
701740		DL1740EL Digital Oscilloscope with 4 ch input and maximum 8 MW memory
Power cable	-D	UL/CSA standard
	-F	VDE standard
	-Q	BS standard
	-R	AS standard
Internal storage drive	-H	GB standard
	-J1	Floppy disk drive ¹
Options	-J3	PC card interface (type II) ¹
	/B5	Built-in printer
	/P2	Probe power for model 701715 ²
	/P4	Probe power for models 701730 and 701740 ²
	/C10	Ethernet interface
	/F5	I ² C + SPI bus analysis function ³
	/EX2	Add two 701941 probes ⁴
	/EX4	Add four 701941 probes ⁵

The instrument comes standard with passive probes (700988). Four probes are included with the 701730 and 701740, and two probes are included with the 701715.

1: One or the other must be selected.

2: Select /P2 for model 701715, or /P4 for models 701730 and 701740.

3: Option for models 701730 and 701740 only.

4: Option for model 701715 only. The 700988 probes are not included when this option is specified.

5: Option for models 701730, 701740 only. The 700988 probes are not included when this option is specified.

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DL1620/DL1640/DL1640L Model Numbers and Suffix Codes

Model/Options	Suffix code	Description
701605		DL1620 Digital Oscilloscope
701610		DL1640 Digital Oscilloscope
701620		DL1640L Digital Oscilloscope
Power cable	-AC	100–120 V & 220–240 V
	-DC ¹	12 VDC
	-D	UL/CSA standard
	-F	VDE standard
	-Q	BS standard
	-R	AS standard
Internal media drive	-H	GB standard
	-Y	No power cable
	-J1	Floppy Disk drive ²
	-J2	Zip [®] drive ²
	-J3	PC card drive (Type II) ²
	/B5	Built-in printer
Options	/P2	Probe power for 701605
	/P4	Probe power for 701610 and 701620
	/C1	GP-IB + USB ³
	/C10	Ethernet + USB ³
	/F5	I ² C bus analysis function ⁴
	/F7	CAN bus analysis function ⁵

The main unit comes standard with four passive probes (700960) for 701610/701620 and two passive probes for 701605.

1: Select "-Y" for the DC power model. Available only for model 701610 and 701620.

2: Choose one.

3: Choose one.

4: The I²C bus analysis function (/F5) includes the SPI analysis function. This option only be specified for model 701610 and 701620.

5: The CAN bus analysis function (/F7) includes the SPI analysis function. This option only be specified for model 701610 and 701620.

DL750/DL750P Model Number 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 Disk 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
Memory expansion	-HK	Korean online help
	/M1	Memory expansion to 10 MW/CH ⁴
	/M2	Memory expansion to 25 MW/CH ⁴
	/M3	Memory expansion to 50 MW/CH ⁴
Options	/C8	Internal 30 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.

DL750/DL750P Plug-in Module Model Numbers¹

Model No.	Description	Firmware ²
701250	High-speed 10 MS/s 12-bit isolation module (2 CH)	1.07 or later
701251	High-speed 1 MS/s 16-bit isolation module (2 CH)	1.07 or later
701255	High-speed 10 MS/s 12-bit non-isolation module (2 CH)	2.02 or later
701260	High-voltage 100 kS/s 16-bit isolation module (2 CH, with RMS)	2.02 or later
701261	Universal Module (2 CH)	5.01 or later
701262	Universal Module (with AAF 2 CH)	5.01 or later
701265	Temperature/high-precision voltage module (2 CH)	1.07 or later
701270	Strain module (NDIS, 2 CH)	2.02 or later
701271	Strain module (DSUB, Shunt-CAL, 2 CH)	2.02 or later
701275	Acceleration/voltage module (with AAF, 2 CH)	3.01 or later
701280	Frequency module (2 CH)	3.01 or later

1: Probes are not included with any modules.

2: The latest firmware for the DL750 series is available on our Web site.

<http://www.yokogawa.com/tm/ln/750/>

Software

Model	Suffix codes	Description
701992	-SP01 -GP01	Xviewer Standard Edition (1 license) Math Edition (1 license)
701991	-	MATLAB Tool Kit

CAUTION

• Read the product manual before using this product to ensure safe use.

NOTICE

• Before operating the product, read the instruction manual thoroughly for proper and safe operation.

• If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa sales offices.

Subject to change without notice.

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