

# General Specifications

## DAQSTATION DX100L Special Housing Model



GS 04L04A01-00E

### OVERVIEW

The DX100L was developed as a replacement for recorders with different panel cut dimensions, or depth dimensions, such as the Foxboro (SPE200), SRHD, NRE, or  $\mu$ R100F.

The DX100L is a DAQSTATION that displays real-time measured data on a color LCD and saves data on a 3.5-inch floppy disk, PCMCIA ATA flash memory card or Zip disk, and it can be hooked up to network via Ethernet or Modbus (RS-422-A/485). It comes with a two, four, six or twelve-channel. As the input signal, a DC voltage, thermocouple, resistance temperature detector, or contact signal can be set to each channel. The data saved on a floppy disk can be converted by data conversion software to Lotus 1-2-3, Excel, or ASCII format file, facilitating processing on a PC. Not only this, the Viewer software allows a PC to display waveforms on its screen and to print out waveforms.



GS 04L04A01-00E

### STANDARD SPECIFICATIONS

#### General Specifications

##### Construction

###### Mounting :

Flush panel mounting (on a vertical plane)  
Mounting may be inclined downward up to 30 degrees from a horizontal plane.

###### Allowable Panel Thickness :

2 to 20 mm

###### Material :

Case : Drawn steel  
Keyboard : Polycarbonate

###### Color :

Case : Lamp black  
(Munsell 0.8Y 2.5/0.4 or equivalent)  
Keyboard : Lamp black  
(Munsell 0.8Y 2.5/0.4 or equivalent)

###### Dimensions :

See dimensional drawings

###### Weight :

(approx.)

	2 ch	4 ch	6 ch	12 ch
DX100L-1	3.5 Kg	3.6 Kg	3.6 Kg	3.6 Kg
DX100L-2	7.0 Kg	7.1 Kg	7.1 Kg	7.1 Kg
DX100L-3	7.5 Kg	7.6 Kg	7.6 Kg	7.6 Kg

##### Input

###### Number of Inputs :

DX102L : two channels  
DX104L : four channels  
DX106L : six channels  
DX112L : twelve channels

###### Measurement Interval :

DX102L, DX104L : 125 ms  
DX106L, DX112L : 1 s (2 s when an A/D integration time is set to 100 ms)

##### Inputs :

VDC (DC voltage), TC (thermocouple), RTD (resistance temperature detector), DI (digital input for event recording), DCA (DC current with external shunt resistor attached)

Input type	Range	Measuring range	
DCV	20 mV	-20.00 to 20.00 mV	
	60 mV	-60.00 to 60.00 mV	
	200 mV	-200.0 to 200.0 mV	
	2 V	-2.000 to 2.000 V	
	6 V	-6.000 to 6.000 V	
	20 V	-20.00 to 20.00 V	
TC	R <sup>1</sup>	0.0 to 1760°C	32 to 3200°F
	S <sup>1</sup>	0.0 to 1760°C	32 to 3200°F
	B <sup>1</sup>	0.0 to 1820°C	32 to 3200°F
	K <sup>1</sup>	-200.0 to 1370°C	-328 to 2498°F
	E <sup>1</sup>	-200.0 to 800°C	-328.0 to 1472.0°F
	J <sup>1</sup>	-200.0 to 1100°C	-328.0 to 2012.0°F
	T <sup>1</sup>	-200.0 to 400°C	-328.0 to 752.0°F
	N <sup>1</sup>	0.0 to 1300°C	32 to 2372°F
	W <sup>2</sup>	0.0 to 2315°C	-328.0 to 4199°F
	L <sup>3</sup>	-200.0 to 900°C	-328.0 to 1652.0°F
	U <sup>3</sup>	-200.0 to 400°C	-328.0 to 752.0°F
RTD <sup>5</sup>	Pt100 <sup>4</sup>	-200.0 to 600°C	-328.0 to 1112.0°F
	JPt100 <sup>4</sup>	-200.0 to 550°C	-328.0 to 1022.0°F
DI	DCV input	OFF : less than 2.4 V	
	(TTL)	ON : more than 2.4 V	
	Contact input	Contact on/off	

\*1 R, S, B, K, E, J, T, N : IEC584-1 (1995), DIN IEC584, JIS C1602-1995

\*2 W : W-5% Rd/W-26% Rd (Hoskins Mfg. Co.), ASTM E988

\*3 L : Fe-CuNi, DIN43710, U : Cu-CuNi, DIN43710

\*4 Pt100 : JIS C1604-1997, IEC751-1995, DIN IEC751-1996  
JPt100 : JIS C1604-1989, JIS C1606-1989

\*5 Measuring current : i = 1 mA

##### A/D Integration Time :

Fixed to 20 ms (50 Hz), 16.7 ms (60 Hz), 100 ms (50/60 Hz for DX106L/DX112L), or AUTO selectable (automatic selection by detection of power supply frequency)

- Thermocouple Burnout :  
Burnout upscale/downscale function can be switched on/off (for each channel). Burnout upscale/downscale selectable
- Filter :  
DX102L, DX104L :  
On/off selectable for each channel  
Time constant : selectable from 2, 5, and 10 seconds  
DX106L, DX112L :  
Moving average on/off selectable for each channel, moving average cycles 2 to 16 selectable
- Calculation :  
Differential computation :  
Between any two channels  
Available for VDC, TC, and RTD ranges.  
Linear scaling :  
Available for VDC, TC, and RTD ranges.  
Scaling limits : -30000 to 30000  
Decimal point : user-selectable  
Engineering unit : user-definable, up to 6 characters  
Square root :  
Available for VDC range.  
Scaling limits : -30000 to 30000  
Decimal point : user-selectable  
Engineering unit : user-definable, up to 6 characters
- Display**  
Display unit :  
5.5-inch TFT color LCD  
(QVGA, 320 x 240 pixels)  
Display color :  
Trend/Bargraph : Selectable from 12 colors  
Background : White or black selectable  
Trend display :  
Trend display direction : vertical or horizontal selectable  
Number of indication channels : 6 channels per display (maximum)  
All channels indication : 12 channels (maximum)  
Number of display : 4 displays (4 groups)  
Line width : 1, 2, and 3 pixels selectable  
Waveform span rate : 1, 2, 5, 10, 20, 30 min., 1, 2, 4 hours/div selectable  
Bargraph display :  
Direction : Vertical or horizontal selectable  
Number of indication channels : 6 channels per display (maximum)  
Number of display : 4 displays (4 group)  
Scales : 4 to 12 selectable  
Reference position : Left, right or center (only for horizontal)  
Display renewal rate : 1 s  
Digital indication :  
Number of indication channels : 6 channels per display (maximum)  
Number of display : 4 displays (4 group)  
Display renewal rate : 1 s  
Overview display :  
Number of indication channels : Measuring values and alarm status of all channels
- Information display :  
Alarm summary display : Display the list of alarm summary  
Message summary display : Display the list of messages and time. Jump to trend display by cursor pointing.  
Memory information : Display the file list in internal memory. Jump to trend display by cursor pointing.  
Medium information : Display the file list in external memory. Jump to trend display by cursor pointing.  
Tags : Number of characters : 16 characters maximum  
Other display contents :  
Memory status, Scale values, (0 and 100%, display on/off selectable), Scales (maximum 6 scales), grid lines (number of divisions selectable from 4 to 12), hour : minutes on grid, trip levels (line widths are selectable from 1, 2 and 3 pixels), messages (up to eight different messages of up to 16 characters for each), alarm indication  
Data referencing function :  
Display the retrieved data (display data or event data) from internal or external memory.  
Display format : Whole display or divided to 2 areas  
Time axis operation : Display magnification or reduction, scroll by key operation  
Display auto scroll function :  
Display group of monitor display (trend display, bargraph display and digital display) automatically changes in a preset interval (5, 10, 20, 30 s and 1 min).  
LCD saver function :  
The LCD backlight automatically dims if no key is touched for a certain preset time (can be set from 1, 2, 5, 10, 20 and 60 min).  
Temperature unit :  
°C or °F selectable  
Language :  
English, French and German selectable
- Data Saving Function**  
External storage medium :  
Selectable from :  
1) 3.5-inch floppy disk (2HD, 1.44 MB)  
2) PCMCIA ATA flash memory card  
3) Zip disk (100 MB)  
Saving method :  
Manual or automatic selectable  
Manual saving :  
Data saving by inserting external memory medium  
Automatic saving :  
Display data : Periodic saving (10 min to 31 days) or key operation to external memory  
Event data :  
In case of trigger free...Periodic saving (3 min to 31 days) or key operation to external memory  
In case of using trigger...Save the data when sampling is finished  
Data Saving Period :  
Display data file : Linked with the waveform span rate  
Event file : Linked with the specified sampling period

Event File Sampling Period :  
 DX102L, DX104L : Selectable from 125, 250, 500 ms, and 1, 2, 5, 10, 30, 60, 120 s  
 DX106L, DX112L : Selectable from 1, 2, 5, 10, 30, 60 and 120 s

Measurement data File :

The following two file types can be created.

- Event file (stores instantaneous values sampled periodically at a specified sampling rate)
- Display data file (stores the maximum and minimum values for each waveform span rate from among measured data sampled at measurement intervals)

Files can be created in the following combinations.

- Event file (only for trigger mode) + display data file
- Display data file only
- Event file only

Data format : YOKOGAWA standard format (Binary)

Data per channel :

Display data file : Measurement data...4 byte/data, mathematical data...8 byte/data  
 Event data file : Measurement data...2 byte/data, mathematical data...4 byte/data

Sampling time :

The sampling time per file (or floppy disk) during manual data saving can be determined by the formula "number of data items per channel x interval of data saving." This logic is explained in more detail below :

1) When handling display data files only

If we assume that the number of measuring channels is 12, the number of computing channels is 6, and the display update interval is 30 min/div (60 sec waveform span rate), then :

Number of data items per channel = 1,200,000 bytes / (12 x 4 bytes + 6 x 8 bytes) = 12,500 data items\*

\*Maximum number of data is 100,000.

Sampling time per file = 12,500 x 60 sec = 750,000 sec = approx. 8 days

2) When handling event files only

If we assume that the number of measuring channels is 12, the number of computing channels is 6, and the data saving interval is 1 sec, then :

Number of data items per channel = 1,200,000 bytes / (12 x 2 bytes + 6 x 4 bytes) = 25,000 data items\*

\*Maximum number of data is 120,000.

Sampling time per file = 25,000 x 1 sec = 25,000 sec = approx. 7 hours

3) When handling both display data files and event files

The sampling time is calculated by defining the size of data items in a display data file as 900,000 bytes and the size of data items in an event data file as 300,000 bytes. The method of calculation is the same as shown above.

\*Maximum number of data for display data file is 75,000.

Maximum number of data for event file is 30,000.

If a Zip drive or an ATA memory card is being used, at least two volumes of the above-mentioned files (the quantity depends on the medium's capacity) are saved in that medium.

Examples of Sampling Time :

In case measurement ch = 4 ch, mathematical ch = 0 ch

Only display data file (approx.)

Waveform span rate (min/div)	1 min	5 min	20 min	30 min	60 min	240 min
Data saving period (s)	2 s	10 s	40 s	60 s	120 s	480 s
Sampling time	41 h	8 days	34 days	52 days	104 days	416 days

Only event data file (approx.)

Data saving period	125ms	500ms	1 s	5 s	30 s	120 s
Sampling time	4.2 h	16 h	33 h	6 days	41 days	166 days

Display data file + Event data file

Display data file (approx.)

Waveform span rate (min/div)	1 min	5 min	20 min	30 min	60 min	240 min
Data saving period (s)	2 s	10 s	40 s	60 s	120 s	480 s
Sampling time	31 h	6 days	26 days	39 days	78 days	312 days

Event data file (approx.)

Data saving period	125ms	500ms	1 s	5 s	30 s	120 s
Sampling time	1 h	4.2 h	8.3 h	41 h	10 days	41 days

In case measurement ch = 6 ch, mathematical ch = 0 ch

Only display data file (approx.)

Waveform span rate (min/div)	1 min	5 min	20 min	30 min	60 min	240 min
Data saving period (s)	2 s	10 s	40 s	60 s	120 s	480 s
Sampling time	27 h	5 days	23 days	34 days	69 days	277 days

Only event data file (approx.)

Data saving period	1 s	5 s	10 s	30 s	60 s	120 s
Sampling time	27 h	5 days	11 days	34 days	69 days	138 days

Display data file + Event data file

Display data file (approx.)

Waveform span rate (min/div)	1 min	5 min	20 min	30 min	60 min	240 min
Data saving period (s)	2 s	10 s	40 s	60 s	120 s	480 s
Sampling time	20 h	4 days	17 days	26 days	52 days	208 days

Event data file (approx.)

Data saving period	1 s	5 s	10 s	30 s	60 s	120 s
Sampling time	6.9 h	34 h	2 days	8 days	17 days	34 days

Manual sample data :

Trigger : Key operation or remote contact

Data format : ASCII

Max. number of data : 50 data

TLOG data (only for MATH option) :  
 Trigger : Time up of TLOG interval  
 Report data (only for MATH option) :  
 Types : Hourly, daily, daily + monthly and  
 daily + weekly  
 Data format : ASCII  
 Trigger function :  
 Event file : Selectable from FREE, TRIG or  
 ROTATE  
 Display data file + Event file : Selectable  
 from TRIG or ROTATE  
 Display hard copy :  
 Trigger : Key operation  
 Data format : png format  
 Output : External memory medium or  
 communication interface

**Alarm Function**

Number of alarm levels :  
 Up to four levels for each channel  
 Alarm types :  
 High and low limits, differential high and low  
 limits, high and low rate-of-change limits and  
 delay high and low  
 Interval time of rate-of-change alarms :  
 The measurement interval times 1 to 15  
 Alarm delay time :  
 1 to 3600 s  
 Display :  
 The alarm status (type) is displayed in the  
 digital value display area upon occurrence of  
 an alarm. A common alarm indication is  
 also displayed. The alarming behavior :  
 non-hold or hold-type can be selectable for  
 common to all channels.  
 Hysteresis :  
 On (0.5% of display span)/off selectable  
 (common to all channels and alarm levels)  
 Outputs :  
 Number of points : 2, 4 or 6 points (optional)  
 Relay action : Energized/deenergized and  
 hold/non-hold selectable.  
 Memory :  
 The times of alarm occurrences/recovers,  
 alarm types, etc. are stored in the memory.  
 (Up to 120 latest alarm events are stored.)

**Communication Functions**

Connection :  
 Ethernet (10BASE-T)  
 Protocols :  
 TCP/IP  
 File transport function :  
 Automatic file transport from DX  
 (FTP client protocol)  
 Manual file transport from host computer  
 (FTP server protocol)  
 Protocols for real time monitor function :  
 YOKOGAWA private protocol  
 Files can be transported :  
 Display data, event data and report data  
 FTP server functions :  
 Directory operation, file output, file delete  
 and inform the rest of memory size in  
 medium

**Power Supply**

Rated power supply :  
 100 to 240 VAC (automatic switching)

Allowable power supply voltage range :  
 90 to 132 or 180 to 250 VAC  
 Rated power supply frequency :  
 50/60 Hz (automatic switching)  
 Power consumption :

Supply voltage	LCD save mode	Normal	Max.
100 VAC	17 VA	20 VA	38 VA
240 VAC	26 VA	30 VA	53 VA

**Other Specifications**

Clock :  
 With calendar function (year of grace)  
 The time can be adjusted by a remote  
 contact (with the remote option).  
 Summer/winter time :  
 Summer and wintertime can be set.  
 Accuracy of clock :  
 ±100 ppm, excluding a delay (of 1 second,  
 maximum) caused each time the power is  
 turned on.  
 Memory backup :  
 A built-in lithium battery backs up the setup  
 parameters (battery life : approximately ten  
 years at room temperature).  
 Key lock function :  
 ON/OFF and password can be set.  
 Log in function :  
 Power on with log out mode and all key  
 operations are not permitted.  
 "User name", "User ID" and "password" are  
 required to enter the operation mode.  
 And key lock by password can be set to  
 prevent to change settings.  
 Insulation resistance :  
 Each terminal to ground terminal :  
 20 MΩ or greater (at 500 VDC)  
 Dielectric strength :  
 Power supply to ground terminal :  
 1500 VAC (50/60 Hz), 1 min  
 Contact output terminal to ground terminal :  
 1500 VAC (50/60 Hz), 1 min  
 Measuring input terminal to ground terminal :  
 1500 VAC (50/60 Hz), 1 min  
 Between measuring input terminals :  
 1000 VAC (50/60 Hz), 1 min  
 (except for b-terminal of RTD  
 input of DX106L and DX112L)  
 Between remote control terminal to ground  
 terminal : 500 VDC, 1 min

**Safety and EMC Standards (only for DX1□□L-1\*)**

\* Please contact us about the detail specification of  
 DX1□□L-2, -3.  
 Safety standards :  
 Certified by CSA22.2 No. 1010.1, Complies  
 with EN61010-1  
 Installation category (Overvoltage category)  
 II<sup>1</sup>  
 Pollution degree 2<sup>2</sup>  
 \*1 "Installation category (Overvoltage category)"  
 describes a number which defines a transient  
 overvoltage condition. It implies the regulation for  
 impulse withstand voltage. "II" applies to electrical  
 equipment which is supplied from the fixed  
 installation like distribution board.  
 \*2 "Pollution degree" describes the degree to which a  
 solid, liquid, or gas which deteriorates dielectric  
 strength or surface resistivity is adhering. "2"  
 applies to normal indoor atmosphere. Normally,  
 only non-conductive pollution occurs.

EMC standards :  
Complies with EN61326-1

**Normal Operating Conditions**

Power voltage :  
90 to 132 or 180 to 250 VAC  
Power supply frequency :  
50 Hz  $\pm$  2%, 60 Hz  $\pm$  2%  
Ambient temperature :  
0 to 50°C (when using FDD or Zip : 5 to 40°C)  
Ambient humidity :  
20% to 80% RH (at 5 to 40°C)  
Vibration :  
10 to 60 Hz, 0.2 m/s<sup>2</sup> or less  
Shock :  
Not acceptable  
Magnetic field :  
400 AT/m or less (DC and 50/60 Hz)  
Noise (only for DX1□□L-1\*) :  
Normal mode (50/60 Hz) :

VDC : The peak value including the signal must be less than 1.2 times the measuring range.

TC : The peak value including the signal must be less than 1.2 times the measuring thermal electromotive force.

RTD : 50 mV or less

Common mode noise voltage (50/60 Hz) :  
250 Vrms AC or less for all ranges

Maximum noise voltage between channels (50/60 Hz) :  
250 Vrms AC or less

\* please contact us about the detail specifications of DX1□□L-2, -3.

Mounting position :

Can be inclined up to 30 deg backward.  
Mounting at an angle away from the perpendicular is not acceptable.

Warm-up time :

At least 30 min after power on

**Standard Performance**

Measuring and Recording Accuracy :

The following specifications apply to operation of the recorder under standard operation conditions.

Temperature : 23  $\pm$  2°C

Humidity : 55%  $\pm$  10% RH

Power supply voltage : 90 to 132 or 180 to 250 VAC

Power supply frequency : 50/60 Hz  $\pm$  1%

Warm-up time : At least 30 min.

Other ambient conditions such as vibration should not adversely affect recorder operation.

Input	Range	Measurement accuracy (digital display)	Max. resolution of digital display
DCV	20 mV	$\pm(0.1\%$ of rdg + 2 digits)	10 $\mu$ V
	60 mV		10 $\mu$ V
	200 mV		100 $\mu$ V
	2 V		1 mV
	6 V		1 mV
	20 V		10 mV
TC (Excluding the reference junction compensation accuracy)	R	$\pm(0.15\%$ of rdg + 1°C) However, R, S : $\pm 3.7^\circ\text{C}$ at 0 to 100°C, $\pm 1.5^\circ\text{C}$ at 100 to 300°C	0.1°C
	S	B : $\pm 2^\circ\text{C}$ at 400 to 600°C (Accuracy at less than 400°C is not guaranteed.)	
	B	$\pm(0.15\%$ of rdg + 0.7°C) However, $\pm(0.15\%$ of rdg + 1°C) at -200 to -100°C	
	K	$\pm(0.15\%$ of rdg + 0.5°C)	
	E	$\pm(0.15\%$ of rdg + 0.5°C)	
	J	However, $\pm(0.15\%$ of rdg + 0.7°C) at -200 to -100°C	
	T	$\pm(0.15\%$ of rdg + 0.7°C)	
	N	$\pm(0.15\%$ of rdg + 1°C)	
	W	$\pm(0.15\%$ of rdg + 0.5°C)	
	L	However, $\pm(0.15\%$ of rdg + 0.7°C) at -200 to 100°C	
RTD	Pt100	$\pm(0.15\%$ of rdg + 0.3°C)	
	JPt100		

Measurement accuracy in case of scaling (digits) :  
 = measurement accuracy (digits) x scaling span (digits)/measurement span (digits) + 2 digits  
 Decimals are rounded off to the next highest number.

Reference junction compensation :  
 INT (internal)/EXT (external) selectable (common for all channels)

Reference junction compensation accuracy (above 0°C) :  
 Types R, S, B, W :  $\pm 1^\circ\text{C}$   
 Types K, J, E, T, N, L, U :  $\pm 0.5^\circ\text{C}$

Maximum allowable input voltage :  
 $\pm 10$  V DC (continuous) for less than 2 V DC ranges and TC ranges  
 $\pm 30$  V DC (continuous) for 6 V DC and 20 V DC ranges

Input resistance :  
 Approximately 10 M $\Omega$  or more for DCV ranges of 2 V DC or less and TC  
 Approximately 1 M $\Omega$  for 6 V DC and 20 V DC ranges

Input source resistance :  
 VDC, TC : 2 k $\Omega$  or less  
 RTD : 10  $\Omega$  or less per wire (The resistance of all three wires must be equal.)

Input bias current :  
 10 nA or less

Maximum common mode noise voltage\* :  
 250 Vrms AC (50/60 Hz)

Maximum noise voltage between channels\* :  
 250 Vrms AC (50/60 Hz)

Interference between channels\* :  
 120 dB (when the input source resistance is 500  $\Omega$  and the inputs to other channels are 30 V)

Common mode rejection ratio\* :  
 120 dB (50/60 Hz  $\pm 0.1\%$ , 500  $\Omega$  imbalance between the minus terminal and ground)

Normal mode rejection ratio\* :  
 40 dB (50/60 Hz  $\pm 0.1\%$ )

\* Only for DX1□□L-1. please contact us about the detail specifications of DX1□□L-2, -3

### Effects of Operating Conditions

Ambient temperature :  
 With temperature variation of 10°C :  
 $\pm(0.1\%$  of rdg + 1 digit) or less  
 Excluding the error of reference junction compensation

For RTD inputs :  
 $\pm(0.1\%$  of rdg + 2 digits) or less

Power supply :  
 With variation within 90 to 132 V and 180 to 250 VAC (50/60 Hz) :  
 $\pm 1$  digit or less  
 With variation of  $\pm 2$  Hz from rated power frequency (at 100 VAC) :  
 $\pm(0.1\%$  of rdg + 1 digit) or less

Magnetic field :  
 AC (50/60 Hz) and DC 400 A/m fields :  
 $\pm(0.1\%$  of rdg + 10 digits) or less

Input source resistance :

- (1) VDC range  
 With variation of +1 k $\Omega$  :  
 Ranges of 2 V or less : within  $\pm 10$   $\mu\text{V}$   
 Ranges of 6 V or greater :  $-0.1\%$  of rdg or less
- (2) TC range  
 With variation of +1 k $\Omega$  :  
 Within  $\pm 10$   $\mu\text{V}$  ( $\pm 100$   $\mu\text{V}$  when the burnout upscale/downscale function is switched on)
- (3) RTD range (Pt100)  
 With variation of 10  $\Omega$  per wire (resistance of all three wires must be equal) :  
 $\pm(0.1\%$  of rdg + 1 digit) or less  
 With maximum difference of 40 m  $\Omega$  between wires :  
 approximately  $\pm 0.1^\circ\text{C}$

### Transport and Storage Conditions

The following specifies the environmental conditions required during transportation from shipment to the start of service and during storage as well as during transportation and storage if this instrument is temporarily taken out of service.

No malfunction will occur under these conditions without serious damage, which is absolutely impossible to repair; however, calibration may be necessary to recover normal operation performance.

Ambient temperature :  
 $-25^\circ$  to  $60^\circ\text{C}$

Humidity :  
 5% to 95% RH (No condensation is allowed.)

Vibration :  
 10 to 60 Hz, 4.9 m/s<sup>2</sup> maximum

Shock :  
 392 m/s<sup>2</sup> maximum (while being packed)

## ■ SPECIFICATIONS OF OPTIONAL FUNCTIONS

### Alarm Output Relays (/AR1, /AR2, /A3) :

An alarm signal is output from the rear panel as a relay contact signal.

/AR1 and /AR2 includes remote control functions (/R1)

Relay contact rating :

250 VDC/0.1 A (for resistance load) 250 VAC (50/60 Hz)/3 A

Terminal configuration :

SPDT (NO-C-NC). Energized-at-alarm/deenergized-at-alarm, AND/OR, and hold/non-hold actions are selectable.

### Serial Communication Interface (/C2, /C3) :

This interface allows the host computer to control and make settings for the recorder as well as receive data from the recorder.

Connection :

EIA RS-232 (/C2) or RS-422-A/485 (/C3)

Protocols :

YOKOGAWA private protocol, Modbus protocol

Synchronization method :

Start-stop asynchronous transmission

Connection method (RS-422-A/485) :

4-wire half-duplex multi-drop connection (1 : N where N = 1 to 31)

Transmission speed :

1200, 2400, 4800, 9600, 19200 or 38400 bps

Data length :

7 or 8 bits

Stop bit :

1 bit

Parity :

Odd, even, or none

Communication distance (RS-422-A/485) :

Up to 1.2 km

Communication mode :

ASCII for input/output for control and setting  
ASCII or binary for output of measured data

Modbus :

Mode : RTU SLAVE

Data type : Data read, data write

Wiring : 4 wires (for RS-422-A/485)

### Fail/Memory End Output (/F1) :

The relay contact output on the rear panel indicates the occurrence of a system error and the time specified until end of memory (selectable from 1, 2, 5, 10, 20, 50 or 100 hours) before the data in a continuously storing file are overwritten.

Relay contact rating :

250 VDC/0.1 A (for resistance load) 250 VAC (50/60 Hz)/3 A

### Clamped Input Terminal (/H2) :

Clamped input terminal is used for input terminal.

### Mathematical Functions (/M1) :

Used for calculating data, displaying trends and digital values, and recording calculated data assigned to channels.

Channel assignable to calculated data :

DX102L, DX104L : Up to 4 channels

DX106L, DX112L : Up to 12 channels

Operation :

General arithmetic operations : Four arithmetic operations, square root, absolute, common logarithm, exponential, power, relational operations (>, ≥, <, ≤, =, ≠), logic operations (AND, OR, NOT, XOR)

Statistical operations : Average, maximum, minimum and summation

Special operations : Long term rolling average

Constant :

Available (Up to 12 constants)

Digital data input via communication :

Digital data via communication can be used in mathematical expression (Up to 12 data)

Remote status input :

Remote input status (0/1) can be used in mathematical expression (Up to 8 inputs)

Report functions :

Report type : Hourly, daily, daily + monthly and daily + weekly

Operation : Average, maximum, minimum and summation

Data format : ASCII

**Cu10, Cu25 RTD Input /3 leg isolated RTD Input (/N1) :**

This option allows Cu10 and Cu25 inputs to be added to the standard input types. A,B,b legs are of isolated input type for DX106L and DX112L.

	Input type	Measuring range
RTD (measurement current : i = 1.25 mA)	Cu10 (GE)	-200 to 300°C
	Cu10 (L&N)	
	Cu10 (WEED)	
	Cu10 (BAILEY)	
	Cu10 : $\alpha = 0.00392$ at 20°C	
	Cu10 : $\alpha = 0.00393$ at 20°C	
	Cu25 : $\alpha = 0.00425$ at 0°C	

Input type	Accuracy guaranteed range	Measurement accuracy
Cu10 (GE)	-70 to 170°C	±(0.4% of rdg + 1.0°C)
Cu10 (L&N)	-75 to 150°C	
Cu10 (WEED)	-200 to 260°C	
Cu10 (BAILEY)	-200 to 300°C	
Cu10 : $\alpha = 0.00392$ at 20°C		
Cu10 : $\alpha = 0.00393$ at 20°C		
Cu25 : $\alpha = 0.00425$ at 0°C		±(0.3% of rdg + 0.8°C)

\* In case that /N1 is specified, the measurement accuracy of Pt100/JPt100 RTD input will be ; ±(0.3% of rdg + 0.6°C)

**3 legs Isolated RTD Input (/N2) :**

A, B, b legs are of isolated input type.  
\*Can be specified only for DX106L and DX112L.  
A,B,b legs of DX102L and DX104L are isolated as standard.

**24 VDC/AC Power Supply (/P1) :**

Rated power supply :  
24 VDC/AC  
Allowable power supply voltage range :  
21.6 to 26.4 VDC/AC  
Dielectric strength :  
Power supply to ground terminal :  
500VAC  
Power Consumption :

Supply voltage	LCD save mode	Normal	Max.
24 VDC	10 VA	11 VA	30 VA
24 VAC	18 VA	21 VA	45 VA

**Remote Control (/R1) :**

This option allows the following eight functions to be controlled remotely by a contact input:

- Start/stop of memory (level)
- Trigger for event file (trigger, 250 ms or longer)
- Time adjustment (adjusting the time to a preset time upon contact signal, trigger, 250 ms or longer)

Time of trigger-on	Processing
hh:00:00 to hh:01:59	Cut off reading of less than one minute. e.g. 10:00:50 is corrected as 10:00:00
hh:58:00 to hh:59:59	Round up reading of less than one minute. e.g. 10:59:50 is corrected as 11:00:00
hh:02:00 to hh:57:59	No process is to be performed.

- Start/stop of computation (level)
- Reset of computation data (trigger, 250 ms or longer)
- Manual data sample (trigger, 250 ms or longer)
- Message display (Up to 8 different messages can be set, trigger, 250 ms or longer)
- Load of setting parameters (Up to 3 settings can be set, trigger, 250 ms or longer)
- Alarm acknowledgement (trigger, 250 ms or longer)

**Batch Function (/BT1) :**

Batch number function are available.

Batch number function :

Batch number (max. 16 characters + 4 figures lot number) and comment (max. 32 characters x 3 lines) can be set in the operation mode.

Auto increment of serial number by each batch start is available.

Pre-set application name, supervisor name and manager name can be referred in the batch number entry display.

Data file :

Following information are added to the display/event data file as headers.

- User name
- Application name
- Supervisor name
- Manager name
- Batch number
- comment

---

## ■ APPLICATION SOFTWARE

### DAQSTANDARD

#### Operating environment

- OS : Microsoft Windows 95/98/NT4.0/2000
- Processor : Pentium133 MHz or higher (Pentium II 200 MHz or higher recommended)
- Memory : 32 MB or more  
(64 MB or more recommended)
- Disk : 3.5" floppy disk drive (1.44 MB format)
- Hard disk : Free area of at least 100 MB
- Display card : Compatible with Windows 95/98/NT4.0/2000  
Can display 32,000 colors or higher  
(64,000 colors or higher recommended)
- Printer : A printer and printer driver compatible with Windows 95/98/NT4.0/2000
- Basic function (packages) :
- Setting of DX  
(via external memory medium or communication)
  - Data viewer
  - Print out of retrieved data
  - File conversion to ASCII, Lotus 1-2-3 or MS-Excel format

### DAQEXPLORER

#### Operating environment

- OS : Microsoft Windows 95/98/NT4.0/2000
- Processor : MMX Pentium166 MHz or higher (Pentium II 266 MHz or higher recommended)
- Memory : 64 MB or more  
(128 MB or more recommended)
- Disk : 3.5" floppy disk drive (1.44 MB format)
- Hard disk : Free area of at least 100 MB
- Display card : Compatible with Windows 95/98/NT4.0/2000  
Can display 32,000 colors or higher  
(64,000 colors or higher recommended)
- Printer : A printer and printer driver compatible with Windows 95/98/NT4.0/2000
- Basic function (packages) :
- DAQ Desktop (Operating of DX on the PC desktop)
  - Data monitor
  - Setting of DX  
(via external memory medium or communication)
  - Data viewer
  - Print out of retrieved data
  - File conversion to ASCII, Lotus 1-2-3 or MS-Excel format

## MODEL AND SUFFIX CODES

Model code	Suffix code	Optional code	Description
DX102L			DAQSTATION DX100L (2 ch)
DX104L			DAQSTATION DX100L (4 ch)
DX106L			DAQSTATION DX100L (6 ch)
DX112L			DAQSTATION DX100L (12 ch)
Housing types	-1		For Foxboro SPEC 200 (except Single Shelf)
	-2		For SRHD/μR-F
	-3		For NRE/SRHD long housing
External memory	-1		FDD
	-2		Zip (with medium)
	-3		ATA flash memory card (with medium)
Display language	-2		English/Germany/French, deg F & Summer/winter time (with English DX standard software)
Options		/AR1	Alarm output 2 points/Remote control *1
		/AR2	Alarm output 4 points/Remote control *1
		/A3	Alarm output 6 points *1
		/C2	RS-232 interface *2
		/C3	RS-422-A/485 interface *2
		/F1	Fail/memory end detection and output *3
		/H2	Clamped input terminal
		/M1	Mathematical function (with report function)
		/N1	Cu10, Cu25 RTD input/3 legs isolated RTD
		/N2	3 legs isolated RTD *4
		/P1	24 VDC/AC power supply
		/R1	Remote control
	/BT1	Batch function	

\*1 /AR1, /AR2, /A3 cannot be specified together

\*2 /C2 and /C3 cannot be specified together

\*3 If /F1 is specified, /A3 cannot be specified

\*4 /N2 can be specified only for DX106L, DX112L

### Optional feature(Available for DX1 □□L-2, -3)

Optional code	Description
/H6	Mounting kit for single panel mounting
/H7	Bezel color: Mansell 7.5BG4/1.5 (/H6 must be specified)

### Application Software

Model code	Description	OS
DXA100-02	DAQSTANDARD	Windows 95/98/2000/NT4.0
DXA200-02	DAQEXPLORER	Windows 95/98/2000/NT4.0
DXA310-021	DAQ-PharmBio	Windows 95/98/2000/NT4.0
VA510-01-2	DAQLOGGER (400ch)	Windows 95/98/2000/NT4.0
VA510-02-2	DAQLOGGER (1000ch)	Windows 95/98/2000/NT4.0
VA510-03-2	DAQLOGGER (1600ch)	Windows 95/98/2000/NT4.0
VA520-01-2	DAQLOGGER Client	Windows 95/98/2000/NT4.0

## STANDARD ACCESSORIES

Item (s)	Quantity	
Mounting brackets	for DX1□□L-2	2
	for DX1□□L-3	1
Fuse	1	
Terminal screws	5	
Instruction manual	1	
Zip disk (100 MB)	1*1	
PCMCIA ATA flash memory card (20 MB)	1*2	

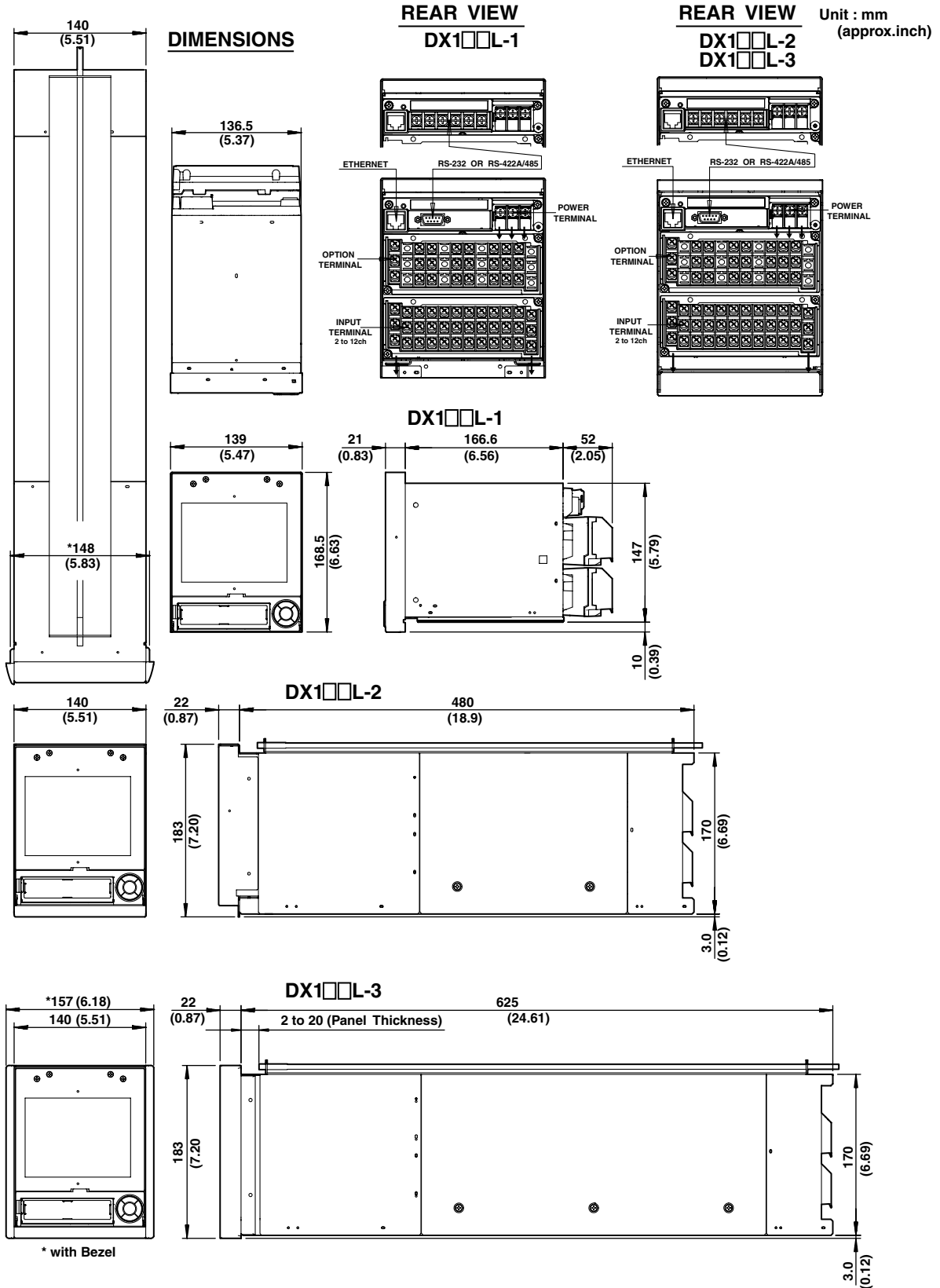
\*1 : Only for DX1[ ] [ ]-2 model

\*2 : Only for DX1[ ] [ ]-3 model

**OPTIONAL ACCESSORIES**

Item (s)	Model (part) number	Specification
Shunt resistors (for screw input terminal)	415920	250 Ω ± 0.1%
	415921	100 Ω ± 0.1%
	415922	10 Ω ± 0.1%
Shunt resistors (for clamped input terminal, /H2)	438920	250 Ω ± 0.1%
	438921	100 Ω ± 0.1%
	438922	10 Ω ± 0.1%
3.5-inch floppy disks	705900	2HD (10 disks)
Zip disk	A1053MP	100 MB
PCMCIA ATA flash memory card	A1134UN	20 MB
Fuse	A1347EF	250 V, 1 A TL
	A1352EF	250 V, 4 A TL (for /P1)
Mounting bracket	E9710CM	For DX1□□L-2
	E9710CT	For DX1□□L-3

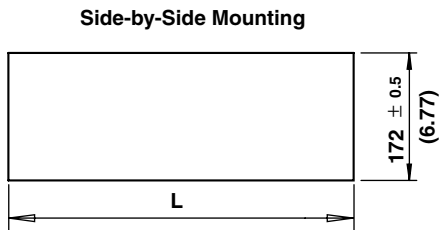
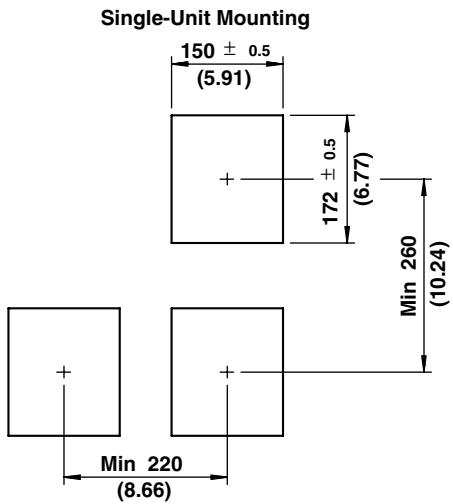
**DIMENSIONS**



Note : If not specified, the tolerance is  $\pm 3\%$ .  
However, for dimensions less than 10 mm, the tolerance is  $\pm 0.3$  mm.

**Panel Cutout & Spacing (only for DX1□□L-2, 3)**

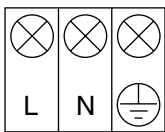
Unit : mm  
(approx.inch)



Units	2	3	4	5	6	7	8
L (mm)	291 <sup>+1</sup> <sub>0</sub>	433 <sup>+1.5</sup> <sub>0</sub>	574 <sup>+1.5</sup> <sub>0</sub>	714 <sup>+1.5</sup> <sub>0</sub>	855 <sup>+1.5</sup> <sub>0</sub>	996 <sup>+1.5</sup> <sub>0</sub>	1136 <sup>+2</sup> <sub>0</sub>

Note : If not specified, the tolerance is ±3%.  
However, for dimensions less than 10 mm, the tolerance is ±0.3 mm.

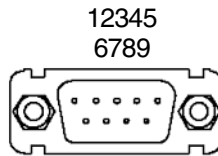
**Power Supply Terminal**



**RS-422-A/485 Terminal**



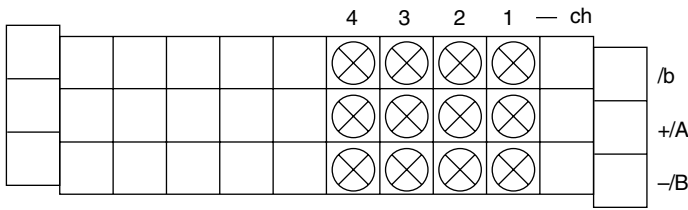
**RS-232 Terminal**



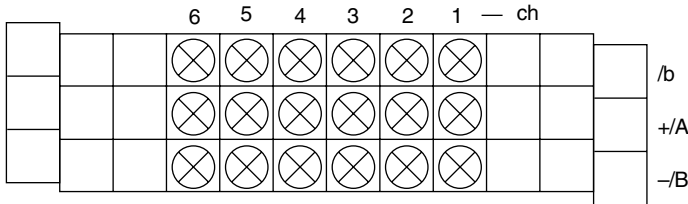
1	N.C.
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	N.C.

## Input Terminals

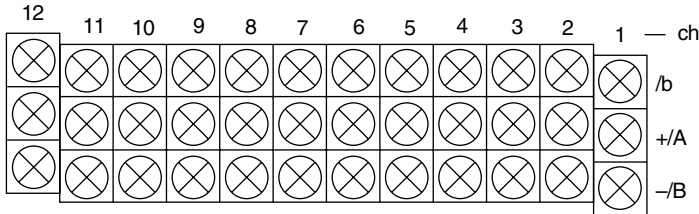
DX102L, DX104L Screw-On Terminals



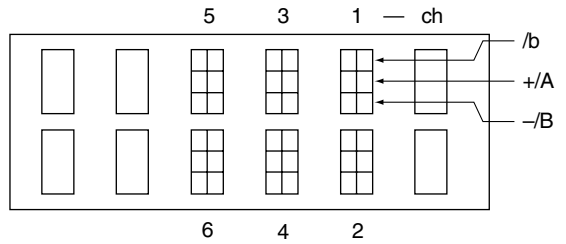
DX106L Screw-On Terminals



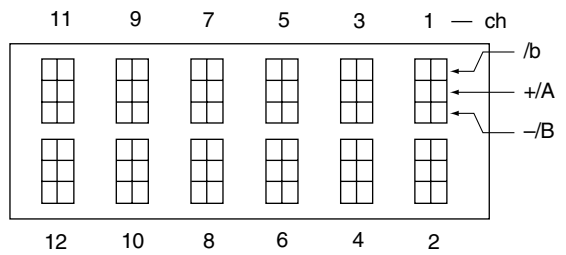
DX112L Screw-On Terminals



DX102L, DX104L, DX106L Clamped Terminals (/H2)

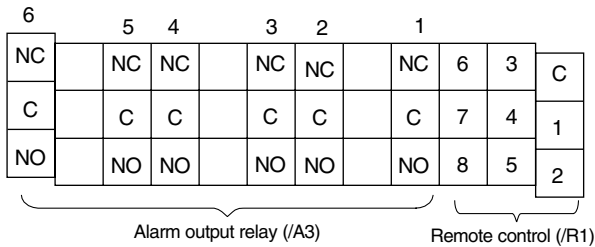


DX112L Clamped Terminals (/H2)

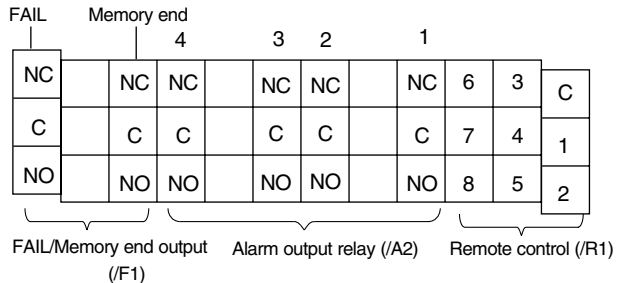


## Option Terminals

/A3/R1 Combination



/A2/F1/R1 Combination



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- Modbus is a registered trademark of AEG Schneider
- Zip is a registered trademark of Iomega Corporation USA.
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