General Specifications

Paperless recorder
AX100

GS 04N03A01-00E

■ OVERVIEW

The AX100 is a Paperless Recorder that displays real-time measured data on a monocolor LCD and saves data on a 3.5inch floppy disk.It can communicate with Modbus.

It comes with a two,four,six or ten-channel.As the input signal,a DC voltage,thermocoup;e,risistance 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 on a PC.Not only this,the Viewer software allows a the to display waveforms on its screen and to print out waveforms.

■ 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 26 mm
Material: Case: Drawn steel
Bezel: Polycarbonate
Color: Case: blue grey light (Munsell 3.1GY6.1/0.2 or equivalent)
Bezel: Charcoal grey light (Munsell 10B 3.6/0.3 equivalent)
Dimensions:
144(W) × 144(H) × 239(D) mm
Weight: AX102:approx. 3.0 kg
AX104:approx. 3.0 kg
AX106:approx. 3.0 kg
AX110:approx. 3.0 kg

Input

Number of Inputs:

AX102: two channels
AX104: four channels
AX106: six channels
AX110: ten channels

Measurment Interval:

AX102, AX104: 125 ms or 250 ms
AX106, AX110: 1 s or 2 s (2 s when an A/D integration time is set to 100 ms)

Inputs:

Volt (DC voltage), TC (thermocouple), RTD (resistance temperature detector), DI(digital input), DC current (with external shunt resistor attached)

Input type	Range	Measuring range
DCV	20mV	-20.00 to 20.00mV
	60mV	-60.00 to 60.00mV
	200mV	-200.0 to 200.0mV
	2V	-2.000 to 2.000V
	6V	-6.000 to 6.000V
	20V	-20.00 to 20.00V
	50V	-50.00 to 50.00V
TC	R*1	0.0 to 176.0°C
	S*1	0.0 to 176.0°C
	B*1	0.0 to 1820.0°C
	K*1	-200.0 to 1370.0°C
	E*1	-200.0 to 800.0°C
	J*1	-200.0 to 1100.0°C
	T*1	-200.0 to 400.0°C
	N*1	0.0 to 1300.0°C
	WRe*6	0.0 to 2400.0°C
	W*2	0.0 to 2315.0°C
	L*3	-200.0 to 900.0°C
	U*3	-200.0 to 400.0°C
RTD*5	Pt100*4	-200.0 to 600.0°C
	JPt100*4	-200.0 to 550.0°C
DI	DCV input	OFF : <2.4V ON : >2.4V
	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 = 1mA
*6 WRe 3-25

A/D Integration Time:

Selectable from 20 ms (50 Hz), 16.7 ms (60 Hz), 100 ms (50/60 Hz for AX106/110), or AUTO (automatic selection from 20 ms and 16.7 ms by detection of power supply frequency)

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Thermocouple Burnout:
Burnout upscale/downscale function can be switched ON/OFF (for each channel).
Burnout upscale/downscale selectable

Filter:
AX102, AX104:
Signal damping
On/off selectable for each channel
Time constant:
selectable from 2, 5, and 10 seconds

AX106, AX110: Moving average
On/off selectable for each channel
Number of samples to be averaged is selectable from 2 to 16

Computation:
Differential computation:
Between any two channels
Available for Volt, TC, RTD, and DI ranges.
Linear scaling:
Available for Volt, TC, RTD, and DI ranges.
Scaling limits: -30000 to 30000
Decimal point: user selectable
Engineering unit: user definable, up to 6 characters
Square root:
Square root computation and linear scaling
Available for Volt range.
Scaling limits: -30000 to 30000
Decimal point: user selectable
Engineering unit: user definable, up to 6 characters

Display Specifications

Display unit:
5-inch STN monocolor LCD (240 × 320 dot resolution)
Background: White or blue selectable

Trend screen:
Direction: vertical or horizontal selectable
Number of indication channels:
6 channels per screen (maximum)
Number of group screens: 4
All channels indication:
20 channels (maximum, including computation channels)
Line width: 1, 2, and 3 dots selectable
Display update rate:
Waveform: (One division has 30 dots.)
· AX102, AX104: 15 s, 30 s, 1, 2, 5, 10, 20, 30 min., 1, 2, 4 hours/div selectable
· AX106, AX110: 1, 2, 5, 10, 20, 30 min., 1, 2, 4 hours/div selectable
Numerical value: 1 s
(2 s when the scan interval is 2 s.)
Contents:
Waveform, Numerical value (numerical display section can be turned ON/OFF), scale (scale display can be turned ON/OFF), grid lines (number of divisions selectable from 4 to 12), hours : minutes on time axis, trip lines (line widths are selectable from 1, 2 and 3 dots), messages (up to eight different messages of up to 16 characters for each), alarm indication. Zone display and partial expanded display are available.

Bar graph screen:
Direction: Vertical or horizontal selectable
Number of indication channels:
6 channels per screen (maximum)
Number of group screens: 4
Scales: 4 to 12 divisions selectable
Base position of bar:
Left, right or center (only for horizontal display)
Display update rate:
1 s (2 s when the scan interval is 2 s)
Contents: Bar graph, numerical value, unit, scale, alarm indication

Digital screen:
Number of indication channels:
6 channels per screen (maximum)
Number of group screens: 4
Display update rate:
1 s (2 s when the scan interval is 2 s)
Contents: Numerical value, unit, alarm indication

Automatic display switching:
The displayed group can be automatically changed on the trend, digital, and bar graph screens. The display switching interval is selectable from 5 s, 10 s, 20 s, 30 s, and 1 min.

Overview screen:
Number of indication channels:
Measured values and alarm status of all channels

Information screen:
Alarm summary:
Displays the list of alarms. Capable to switch to historical trend screen by cursor pointing.
Message summary:
Display the list of messages and time. Capable to switch to historical trend screen by cursor pointing.
Memory summary:
Display the file list in internal memory. Capable to switch to historical trend screen by cursor pointing.
Tags:
Number of characters:
16 characters maximum
Historical trend screen:
Display the retrieved data from internal or external memory.

Display format:
Whole screen display or divided into 2 areas (only when displaying the historical trend of the display data)
Time axis operation:
Can be expanded, reduced, and scrolled
Memory information:
The following information of the retrieved data are displayed:
File name, serial number of the AX which is used to acquire data, starting and ending time of data acquisition, user name (when using key login function), information

Log display:
Display the logs of error messages, key login/ logout, communication interface commands.

System screen:
Display the number of input points, capacity of the internal memory, options, and firmware version number.

Backlight saver function:
The LCD backlight automatically dims if no key is pressed for a certain preset time (can be set from 1, 2, 5, 10, 20 and 60 minutes).

Display language:
Selectable from English, Chinese and Japanese.

Temperature unit:
°C or °F selectable

Data Save Function

External storage medium:
Selectable from:
3.5-inch floppy disk (2HD, 1.44 MB)
CompactFlash memory card (32-512MB)

Saving method:
Manual or automatic selectable

Manual saving:
Data saving by inserting external storage medium

Automatic saving:
Display data:
Periodic saving (10 min to 31 days) to external storage medium
Event data:
In case of trigger free...Periodic saving (3 min to 31 days) to external storage mediumIn case of using trigger...Save the data when data acquisition is finished

Sampling Interval:
Display data:
Linked with the waveform display update rate
Event data:
Linked with the specified sampling interval

Sampling Interval for Event Data:
A sampling interval that is faster than the scan interval cannot be specified.
AX102, AX104:
Selectable from 125, 250, 500 ms, and 1, 2, 5, 10, 30, 60, 120s
AX106, AX110:
Selectable from 1, 2, 5, 10, 30, 60, 120s

File types:
The following two file types can be created.
· Event data file (stores instantaneous values acquired periodically at a specified sampling interval)
· Display data file (stores the maximum and minimum values for each sampling interval from among measured data acquired at scan intervals)
Files can be created in the following combinations.
· Event data file (only for trigger mode) + display data file
· Display data file only
· Event data file only
Data format: Binary
Data size per channel:
Display data:
Measurement data...4 bytes/ datum, computation data...8 bytes/datum
Event data:
Measurement data...2 bytes/datum, computation data...4 bytes/datum

Modes for event data:
Event data only:
Selectable from Free, Trigger or Rotate
Display data + Event data:
Selectable from Trigger or Rotate

Sampling length:
The sampling length (the maximum data length) can be derived from the following equation.

Sampling length = the maximum number of data points per channel × sampling interval

Maximum number of data points per channel:
calculated from internal memory capacity, types of data, data size, and number of measurement or computation channels data to be stored

IInternal memory capacity

Data type	Capacity of internal memory
Display data only	1.2 MB
Display data and event data	Display data: 0.9 MB Event data: 0.3 MB
Event data only	1.2 MB

Maximum number of data points per channel that can be stored

Data type	Maximum number of data points per channel
Display data only	1,200,000 bytes/(number of measurement channels × 4 + number of computation channels × 8)Except, the maximum number of data points is 100,000
Display data and event data	• Display data 900,000 bytes/(number of measurement channels × 4 + number of computation channels × 8) Except, the maximum number of data points is 75,000 • Event data 300,000 bytes/(number of measurement channels × 2 + number of computation channels × 4) Except, the maximum number of data points is 30,000
Event data only	1,200,000 bytes/(number of measurement channels × 2 + number of computation channels × 4) Except, the maximum number of data points is 120,000

This logic is explained in more detail below:

1) When acquiring display data only
If we assume that the number of measuring channels is 10, the number of computing channels is 10, and the display rate is 30 min/div (60 sec sampling interval), then:
Number of data per channel = 1,200,000 bytes/(10 × 4 bytes + 10 × 8 bytes) = 10,000 data*
* Maximum number of data points is 100,000.
Sampling length per file =10,000 × 60 sec = 600,000 sec = approx. 7 days

2) When acquiring event data only
If we assume that the number of measuring channels is 10, the number of computing channels is 10, and the the sampling interval is 1 sec, then:
Number of data per channel = 1,200,000 bytes/(10 × 2 bytes + 10 × 4 bytes) = 20,000 data*
* Maximum number of data points is 100,000.
Sampling length = 20,000 × 1 sec = 20,000 sec = approx. 5.6 hours

3) When acquiring both display data and event data
The sampling length is calculated by defining the capacity for display data as 900,000 bytes and the capacity for event data as 300,000 bytes. The method of calculation is the same as shown above. Except, the maximum number of data points is 75,000 for display data and 30,000 for event data.

Example of sampling length:
In case measurement ch = 4 ch, mathematical ch = 0 ch

Display data file only (approx.)

Display rate (min/div)	1min	5min	20min	30min	60min	240min
Sampling interval (s)	2s	10s	40s	60s	120s	480s
Sampling length	41h	8 days	34 days	52 days	104 days	416 days

Event data file only (approx.)

Sampling interval	125ms	500ms	1s	5s	30s	120s
Sampling length	4.2h	16h	33h	6 days	41 days	166 days

Display data file + Event data file
Display data file (approx.)

Display rate (min/div)	1min	5min	20min	30min	60min	240min
Sampling interval (s)	2s	10s	40s	60s	120s	480s
Sampling length	31h	6 days	26 days	39 days	78 days	312 days

Event data file (approx.)

Sampling interval	125ms	500ms	1s	5s	30s	120s
Sampling length	1h	4.2h	8.3h	41h	10 days	41 days

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

Display data file only (approx.)

Display rate (min/div)	1min	5min	20min	30min	60min	240min
Sampling interval (s)	2s	10s	40s	60s	120s	480s
Sampling length	27h	5 days	23 days	34 days	69 days	277 days

Event data file only (approx.)

Sampling interval	1s	5s	10s	30s	60s	120s
Sampling length	27h	5 days	11 days	34 days	69 days	138 days

Display data file + Event data file

Display data file (approx.)

Display rate (min/div)	1min	5min	20min	30min	60min	240min
Sampling interval (s)	2s	10s	40s	60s	120s	480s
Sampling length	20h	4 days	17 days	26 days	52 days	208 days

Event data file (approx.)

Sampling interval	1s	5s	10s	30s	60s	120s
Sampling length	6.9h	34h	2 days	8 days	17 days	34 days

Manual sampled data:

Trigger: Key operation, communication command, or remote input signals (/R1 option)

Data format:
ASCII

Max. number of data sets internal memory can hold:
50

TLOG data (/M1 option):

Trigger: Timeout of the timer

Data format:
Binary

Max. number of data sets or files internal memory can hold: 400 data sets or 16 files (number of START/STOP operations)

Report data (/M1 option):

Types: Hourly, daily, daily + monthly and daily + weekly

Data format:
ASCII

Max. number of report data internal memory can hold:
40

Screen image data:

Trigger: Key operation, communication command

Data format:
png format

Output: External storage medium or communication interface

Alarm Function

Number of alarms:

Up to four alarms for each channel

Alarm types:

Upper and lower limits, delay upperand lower limits, difference upper and lower limits, and upper limit and lower on rate-of-change

Alarm delay time:

Selectable from 1 s to 3600 s for each channel

Interval time of rate-of-change alarms:

The scan interval times 1 to 15, common to all channels.

Display:

The alarm status (type) is displayed in the numerical value display area upon occurrence of an alarm.
A common alarm indication is also displayed in the status display section.
The alarm indication behavior:
non-hold or hold-type can be selectable for common to all channels.

Hysteresis:

On (0.5% of display span)/off selectable (applied to upper and lower limits alarms, common to all measurement channels)

Relay outputs (option):

Number of points: 2, 4, 6 points
Relay action:
Energized/de-energized, hold/non-hold, AND/OR, reflash actions selectable.
The alarm relay condition is heldeven in the basic setting mode.

Alarm information:

The date and time of alarm occurrences/recoveries, alarm types, etc.
Up to 120 latest alarms are stored in the internal memory.
Displayed on the alarm summary screen.

Standard Performance

Power Supply

Rated power supply:
100 to 240 VAC (automatic switching)
Allowable power supply voltage range:
90 to 132 or 180 to 264 VAC
Rated power supply frequency:
50/60 Hz (automatic switching, for AC)
Rated Power consumption: 53 VA
Power consumption:

Supply voltage	LCD save mode	Normal	Max.
100VAC	14.6VA	15.3VA	40VA
240VAC	20.0VA	21.0VA	53VA

Other Specifications

Clock: With calendar function (year of grace)
The time can be adjusted by a remote contact (with the remote control option).
Daylight saving:
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.

Key login 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.
Insulation resistance:
Each terminal to ground terminal:
20 MW or greater (at 500 VDC)
Dielectric strength:
Power supply to ground terminal:
1500 VAC (50/60 Hz), 1 minute
Contact output terminal to ground terminal:
1500 VAC (50/60 Hz), 1 minute
Measuring input terminal to ground terminal:
1500 VAC (50/60 Hz), 1 minute
Between measuring input terminals:
1000 VAC (50/60 Hz), 1 minute (except for b-terminal of RTD)
Between remote control terminal to ground terminal:
500 VDC, 1 minute

Safety and EMC Standards

Safety standards:
Certified by CSA22.2 No. 1010.1 and UL3111-1 (CSA NRTL/C)
Complies with EN61010-1
Installation category (Overvoltage category) II*1
Pollution degree 2*2
*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: 1997 +A1: 1998
EN5501: 1998, Class A, Group 1
EN61000-3-2: 1995 +A1: 1998 +A2: 1998 +A14: 2000, Class A
EN61000-3-3: 1995

Normal Operating Conditions

Power supply voltage:
90 to 132 or 180 to 250 VAC
Power supply frequency:
50 Hz ±2%, 60 Hz ±2%
Ambient temperature:
0 to 50°C (when using FDD : 5 to 40°C)
Ambient humidity:
20% to 80% RH (at 5 to 40°C)
Vibration:
10 to 60 Hz, 0.2 m/s2 or less
Shock:
Not acceptable
Magnetic field:
400 A/m or less (DC and 50/60 Hz)
Noise:
Normal mode (50/60 Hz):
Volt:
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 (50/60 Hz):
250 Vrms AC or less for all ranges
Maximum noise voltage between channels (50/60 Hz):
250 Vrms AC or less
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 minutes after power on
Altitude:
2000 m or less above sea level

Measuring Accuracy

The following specifications apply to operation of the AX100 under standard operation conditions:
Temperature:
23 ± 2°C
Humidity:
55% ± 10% RH
Power supply voltage:
90 to 132 or 180 to 250 VAC
Power supply frequency:
50/60 Hz ± 1%
Warm-up time:
At least 30 minutes.
Other ambient conditions such as vibration should not adversely affect the operation of the AX100.
Measuring accuracy in case of scaling (digits):
Accuracy during scaling (digits) =measuring ccuracy (digits) × multiplier + 2 digits (rounded up) where the multiplier = scaling span (digits)/ measuring span (digits).
Example:
Assuming that
· range: 6 V
· measuring span: 1.000 to 5.000 V
· scaling span: 0.000 to 2.000

Then,
Measuring accuracy = ±(0.1% × 5 V + 2 digits) = ±(0.005 V [5 digits] + 2) = ±(7 digits)
Multiplier = 2000 digits (0.000 to 2.000)/4000 digits (1.000 to 5.000 V) = 0.5
Accuracy during scaling = 7 digits × 0.5 + 2 = 6

Reference junction compensation:
Internal/External selectable for each channel

Reference junction compensation accuracy (above 0°C):
Types R, S, B, W, WRe: ±1°C
Types K, J, E, T, N, L, U: ±0.5°C

Maximum allowable input voltage:
±10 V DC (continuous) for ranges of 0.2 V or less and TC ranges
±60 V DC (continuous) for 2 V DC, 6 V DC and 20 V DC ranges

Input resistance:
Approximately 10 MW or more for ranges of 0.2 V DC or less and TC
Approximately 1 MW for 2 V DC,6 V DC,and 20 VDC ranges

Input source resistance:
Volt, TC: 2 kW or less
RTD: 10 W 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 W and the inputs to other channels are 60 V)

Common mode rejection ratio:
120 dB (50/60 Hz ±0.1%, 500 W imbalance, between the minus terminal and ground)

Normal mode rejection ratio:
40 dB (50/60 Hz ±0.1%)

Measuring and Recording Accuracy:

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

Temperature: 23 ±2°C, Humidity: 55% ±10% RH, Power supply voltage: 90 to 132 or 180 to 250 VAC

Power supply frequency: 50/60 Hz ±1%, Warm-up time: At least 30 min.

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

Input	Range	Measurement accuracy (digtal display)	Max. resolution of digital display
DCV	20mV	± (0.2% of rdg + 2 digits)	10µV
	60mV		10µV
	200mV		100µV
	2V		1mV
	6V		1mV
	20V		10mV
	50V		
TC (Excluding the reference compensation accuracy)	R	±(0.2% of rdg + 1°C) R, S: 0 to 100°C, ±3.7°C 100 to 300°C, ±1.5 B: 400 to 600°C, ±2°C, (Accuracy at less than 400°C is not guaranteed)	0.1°C
	S		
	B		
	K	±(0.2% of rdg + 0.7°C) –200 to –100°C ±(0.2% of rdg + 1°C)	
	E	±(0.2% of rdg + 0.5°C)	
	J	±(0.2% of rdg + 0.5°C) –200 to –100°C ±(0.2% of rdg + 0.7°C)	
	T		
	N	±(0.2% of rdg + 0.7°C)	
	W	±(0.2% of rdg + 1°C)	
	WRe	±(0.2% of rdg + 1°C)	
	L	±(0.2% of rdg + 0.5°C) –200 to 100°C ±(0.2% of rdg + 0.7°C)	
	U		
RTD	Pt100	±(0.2% of rdg + 0.3°C)	
	JPt100		

Effects of Operating Conditions

Ambient temperature:
With temperature variation of 10°C:
±(0.1% of rdg + 1 digit) or less for Volt and TC ranges
Excluding the error of reference junction compensation
±(0.1% of rdg + 2 digit) or less for RTD ranges
Power supply:
With variation within 90 to 132 V and 180 to 250 VAC (50/60 Hz):
±1 digit or less
With variation of ±2 Hz from rated power frequency (at 100 VAC):
±(0.1% of rdg + 1 digit) or less
Magnetic field:
AC (50/60 Hz) and DC 400 A/m fields:
±(0.1% of rdg + 10 digits) or less
Input source resistance:
Volt range
With variation of +1 kW:
Ranges of 2 V or less: within ±10 mV
Ranges of 6 V or greater: –0.1% of rdg or less
TC range With variation of +1 kW:
Within ±10 mV (±100 mV when the burnout upscale/downscale function is switched on)
RTD range (Pt100)
With variation of 10 W per wire (resistance of all three wires must be equal):
±(0.1% of rdg + 1 digit) or less
With maximum difference of 40 mohms between wires:
approximately 0.1°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 the AX100 is temporarily taken out of service.
No malfunction will occur under these conditions with serious damage, which is impossible to repair; however, calibration may be necessary to recover normal operation performance.
Ambient temperature:
–25°C to 60°C
Humidity: 5% to 95% RH (No condensation is allowed).
Vibration: 10 to 60 Hz, 4.9 m/s2 maximum
Shock: 392 m/s2 maximum (while being packed)

■ SPECIFICATIONS OF OPTIONAL FUNCTIONS

Alarm Output Relays (/A1, /A2, /A3):

An alarm signal is output from the rear panel as a relay contact signal.
/A1 and /A2 includes remote control functions (/R1)
Relay contact rating:
250 VAC (50/60 Hz)/3 A, 250 VDC/0.1 A (for resistance load)
Terminal configuration:
SPDT (NO-C-NC). Energized-at-alarm/ de-energized-at-alarm, AND/OR, hold/non-hold, and reflash actions are selectable.

Serial Communication Interface (/C3):

This interface allows the host computer to control and make settings for the AX100 as well as receive data from the AX100.
Connection:
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 1200 m
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 and data write by the master device
Wiring:
4 wires (for RS-422-A/ 485)

FAIL/Memory End Output (/F1):

The relay contact output on the rear panel informs of the occurrence of a system error.
Another relay contact output informs of the time until end of the internal memory space (selectable from 1, 2, 5, 10, 20, 50 or 100 hours) before the data is overwritten, or of the time when the remaining space on the external storage medium reaches to 10% of whole capacity.

Relay: De-energized on system error Energized on memory end

Contact specification:
250 VDC/0.1 A (resistive load), 250 VAC (50/60 Hz)/3 A

Computation Functions (/M1):

Can perform computation, display the computed data assigned to channels in trends and numerical values, and store computed data.

Channels assignable to computed data:

AX102, AX104:
Up to 8 channels

AX106, AX110:
Up to 10 channels

Operation:

General arithmetic operations:
Four arithmetic operations, square root, absolute, common logarithm, exponential, power, relational operations (<, >, =, ∞), logical operations (AND, OR, NOT, XOR)

Special operations:
Rolling average (moving average on computed results)

Constant: Available (Up to 10 constants)

Digital input data via communication:
Digital data via communication can be used in calculation expression (Up to 10 data)

Remote input status:
Remote input status (0/1) can be used in calculation expression (Up to 5 inputs)

Report functions:

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

Operation:
Average, maximum, minimum and summation

Data format:
ASCII

Remote Control (/R1):

This option allows the following functions to be controlled remotely by a contact or an open collector input (up to five inputs):

- Alarm acknowledgment (trigger, 250 ms or longer)
- Start/stop of data acquisition (rising and falling edge)
- Trigger for event data acquisition (trigger, 250 ms or longer)
- Time adjustment (adjusting the internal clock to the nearest hour upon remote 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 (rising and falling edge, /M1 option)
- Reset of computation data (trigger, 250 ms or longer, /M1 option)
- Manual sampling (trigger, 250 ms or longer)
- Writing messages (up to 8 different messages can be set, trigger, 250 ms or longer)
- Load of setting parameters (up to 3 setup data files can be set, trigger, 250 ms or longer)

24 VDC Transmitter Power Supply (/TPS2):

Number of loops: 2

Output voltage:
22.8 to 25.2 VDC (under rated output current)

Rated output current:
4 to 20 mADC

Maximum output current:
25 mADC (overcurrent protection operation current: approximately 68 mA DC.)

Allowable cable resistance:
RL ≤ (17.8 – minimum operation voltage of transmitter) /0.02 A
Where 17.8 V = 22.8 V – 5.0 V
22.8 V: Minimum output voltage
5 V: Maximum voltage across the load resistor (250 Ω)

Maximum length of cable:
2 km (when using CEV cable)

Insulation resistance:
20 MΩ or more (500 VDC) between output terminal and ground terminal

Withstand voltage:
500 VAC (50/60 Hz, I=10 mA) for one minute between output terminal and ground terminal 500 VAC (50/60 Hz, I=10 mA) for one minute between output terminals

■ APPLICATION SOFTWARE

DAQSTANDARD for AX software

Operating environment

OS: Microsoft Windows 98/Me/NT4.0/2000

Processor:
MMX Pentium 166 MHz or higher (Pentium II 266 MHz or higher recommended)

Memory:
32 MB or more (64 MB or more recommended)

Disk device:
3.5 inch floppy disk drive (1.44 MB format)

Hard disk:
Free area of at least 10 MB (100 MB or higher recommended)

Display card:
Compatible with Windows 98/Me/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 98/Me/NT4.0/2000

Basic funtion (packages)

Configuration software:

external memory medium:
configuration of setup and set mode

Configuration via communication configuration of seetup and set mode without communication configuration

Data viewer:

numbers of display channels:
32 channels for each group,at most 30 grop

display function:
waveform display,digital display,circular display,list display,TLOG display,report display etc.

File connection display:
connect data files that are divided because of auto-save during continuous data collecting or power failur,and then display (can connect up to total a million)

Section computation:
Max. value, Min. value, average value, effective value, p-p value.

Data conversion:
File conversion to ASII,Lotus 1-2-3 or MS-Excel format

Print out:
Print out retrieved data

■ MODEL AND SUFFIX CODES

Model code	Suffix code	Optional code	Description
AX102			IT RECORDER AX100 2ch High speed
AX104			IT RECORDER AX100 4ch High speed
AX106			IT RECORDER AX100 6ch
AX110			IT RECORDER AX100 10ch
External memory	–1		FDD
	–4		CF card
Display language	–2		English
Options		/A1	Alarm output 2 points*1
		/A2	Alarm output 4 points*1
		/A3	Alarm output 6 points*1,*2
		/C3	RS-422-A/485 interface (including Modbus Slave protocol)*4
		/F1	Fail/ Memory End*2
		/M1	Mathematical function (with report function)
		/TPS2	24 VDC transmitter power supply (2 loops)*3
		/R1	Remote control

*1 /A1, /A2, and /A3 cannot be specified together.
*2 If /A3 is specified, /F1 cannot be specified.
*3 In case that /TPS2 is specified, /A3, /F1, /R1 can not be specified together.

Application Software

Model code	Description	OS
AXA100-02	DAQSTANDARD for AX software	Windows 98/Me/NT4.0/2000

■ STANDARD ACCESSORIES

Item	Quantity
DAQSTANDARD for AX software	1
Mounting brackets	2
Terminal screws	5
Instruction manual	1
CF card (32MB)*1	1

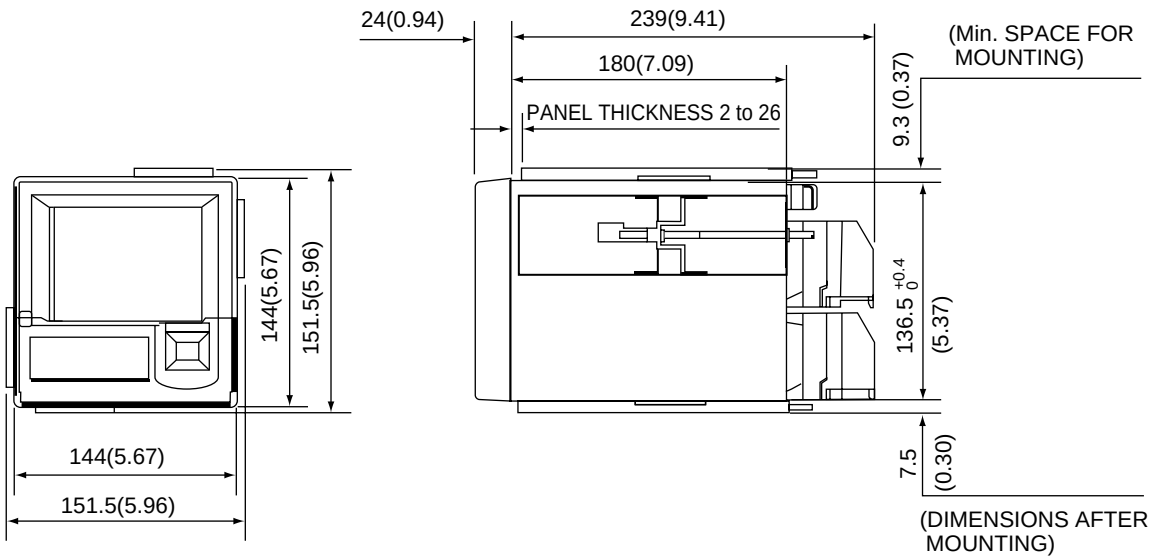
*1 Provided only when the suffix code for External storage medium is “4”.

■ OPTIONAL ACCESSORIES

Item	Model (part) number	Specification
Shunt resisters (for screw input terminal)	415930	250 Ω ±0.1%
	415931	100 Ω ±0.1%
	415932	10 Ω ±0.1%
3.5-inchi floppy disks	415933	2HD (10 disks)
Mounting bracket	415934	—
CF memory card	415935	32MB
	415936	64MB
	415937	128MB
	415938	256MB
	415939	512MB

■ DIMENSIONAL DRAWINGS

Unit:mm (approx:inch)

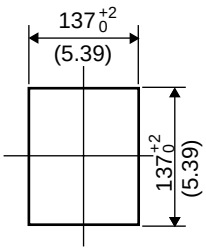


Note

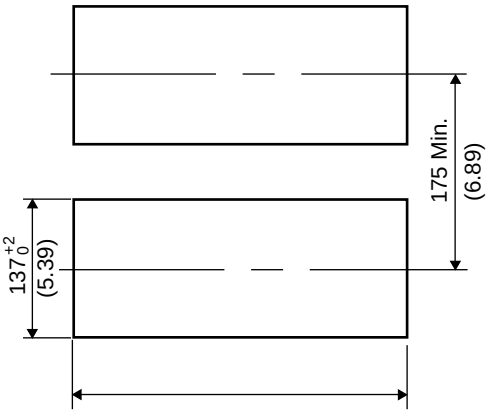
- When mounting to a panel, use two brackets, one each of the top and bottom of the AX100, or on the left and right sides.
- The dimensional tolerance is ±3% unless otherwise specified. (However, the tolerance for dimensions less than 10 mm is ±0.3 mm).

Panel Cutout

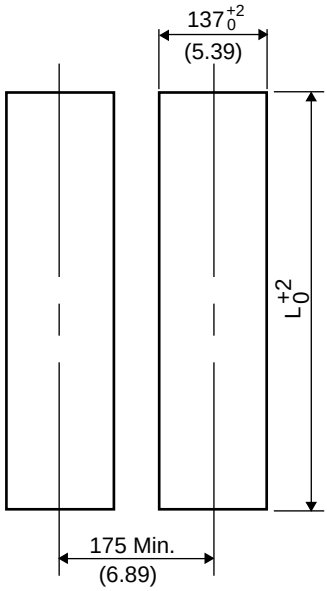
Singht-Unit Mounting



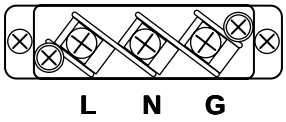
Side-by-side Mounting (horizontally)



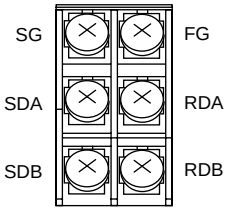
Side-by-side Mounting (vertically, max. 3 units)



Power Supply Terminal

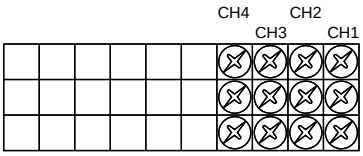


RS-422-A/485 Terminal



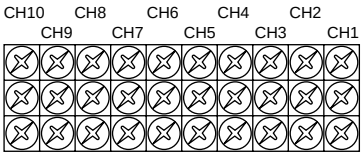
Input Terminal

AX102, AX104 Screw-On Terminals



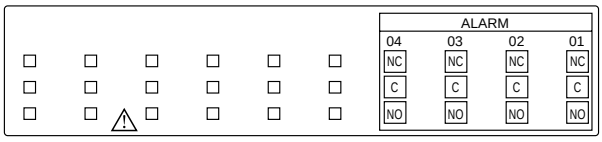
AX106 Screw-On Terminals

AX110 Screw-On Terminals

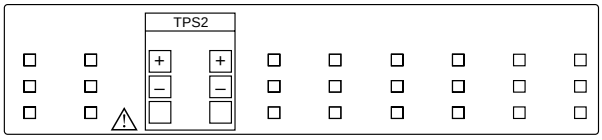


Option Terminal

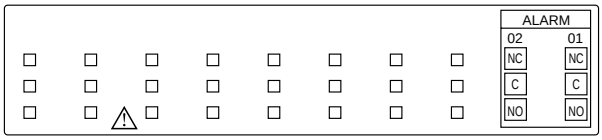
/A1



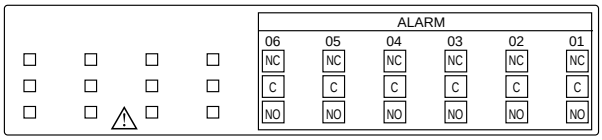
/ TPS2



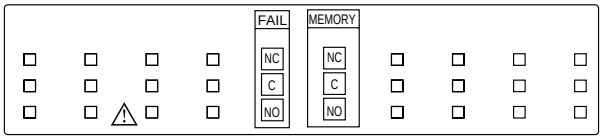
/A2



/A3



/F1



/R1