TEAC®

Integrated Recorder

GX-1

Everybody's problem: Accelerated product development.
Our goal: Decreasing the period between data acquisition and data analysis.
Our solution: For data recording systems, the GX-1.

Fast Collection of Valuable Data

The GX-1 Integrated Recorder is a compact, A4-size, data recording system with signal change from Question to Statement. Now you can accelerate the recording and transfer of valuable information from data-acquisition sites to data processing and analysis groups. With the goal of decreasing various data-recording overheads, the GX-1 provides an integrated solution in a single system: integrating such functions as connecting sensors, recording data, viewing recorded data on site, and transferring data to high-level processing and analysis systems. To let you use the GX-1 from the day it is installed, we supply the GX Navi software, which provides unified control of sensing, calibration, data recording, monitoring, and transfer of data to PC.

Connecting — Input/output components using card slots

You can select from a wide range of input/output cards that can be inserted into the main unit. For example: input amp cards that enable direct input with DC, acceleration sensors, strain gages, measuring microphones, thermocouples,etc.—with 16-bit A/D converters built into each channel; analog output amp cards with built-in16-bit D/A converters; digital input/output. Each input/output card has 2 channels, with 8 slots in the main unit giving 16 channels. If you need more channels, by using an expansion unit that has the same size as the main unit, you can build a recording system that has a maximum of 64 channels.

Recording — 1 machine, 2 roles: An A/D converter with a built-in signal conditioner, or a data recorder with a choice of recording media

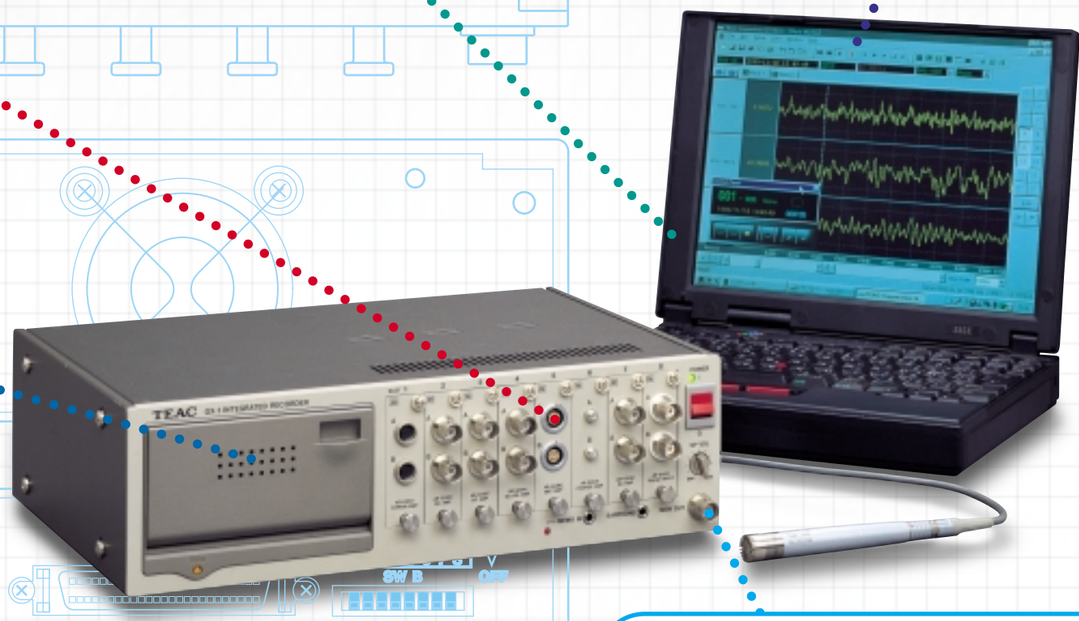
You can record directly to a PC connected via the main-unit's SCSI interface, with the main unit acting as the front end for measuring. In addition to recording to memory, you can record onto 3 types of removable media that can be accessed directly from a PC drive: MO (magneto-optical) disks, AIT (Advanced Intelligent Tape) cassettes, and PC cards. You can choose the recording medium that best suits your needs: for example, recording low-speed phenomena over a long period, or recording high-speed phenomena that occur intermittently.

Transferring — Save recorded data in the convenient TAFFmat format for data processing on a PC

Recorded data is saved in the TAFFmat (TEAC Data Acquisition File Format) format. TAFFmat files combine binary data files with header files that contain the input/output amp card settings and recording conditions. One binary data file and one header file are produced each time a recording is saved. You can transfer data via the SCSI interface on the main unit, or use a PC's drive to read data that the GX-1 recorded onto an MO disk, tape, or PC card.

Viewing — Real-time monitoring—great for on-site checking of data

If you connect to a notebook computer, in addition to setting signal conditioner parameters and controlling recording behavior, you can monitor and display in real-time, and switch among waveform, bar graph, and FFT windows. In addition, for environments where a PC cannot be used, or for experiments in vehicles, a dedicated LCD controller can provide real-time monitoring. (This controller is for use in systems that use the AIT, MO disk, or PC card media for recording.)



Actual size

Convenient features from earlier data recorders are preserved

The main unit contains the channel parts required for analog output amp cards, so you can perform analog playback of data recorded onto some media. Also, you can still record and play back voice memos, which enables you to use the GX-1 in the same way as earlier data recorders.

3 power sources for reliable recording in the field

You can select from a DC power source (11 to 30 V), internal AC power pack, or a built-in battery pack. Using a combination of DC and an AC power pack, or DC and a battery pack, provides power backup for redundant operation.

Connecting

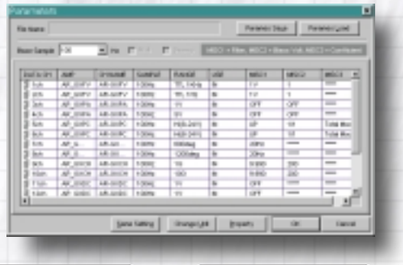
Combine our wide selection of input/output amp cards, and build a system of up to 64 channels!

You can select the input/output amp card that best matches what you want to measure. Each input/output amp card contains 2 channels. The GX-1 main unit has 8 slots and 16 channels, and you can add up to three 8-slot AU-GXEPIO expansion units, to provide a system with a maximum of 64 channels.

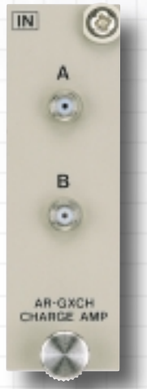
●The GX-1 main unit and the expansion input/output unit AU-GXEPIO

●Setting recording parameters

The supplied GX Navi software enables easy operation from a PC connected via the main unit's SCSI interface: you can calibrate and specify parameter settings such as the input range of input/output cards, sampling frequency, filters, etc. Because you can save the recording parameters as a file, by simply loading the file you can reduce the work required to apply the settings each time.



AR-GXCH Charge Amp

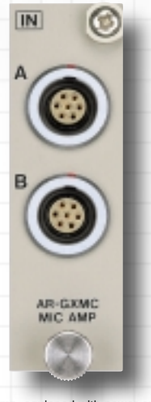


This amp can be connected directly to a charge accelerometer. The amp has an electric charge sensitivity of 0.1 to 999 pC/G, a maximum measurement range of 500 G (however the 100 G and 500 G range cannot be used when the electric charge sensitivity is 100 pC/G or higher), and a maximum frequency range of 30 kHz. (1 G = 9.81 m/s²)

AR-GXPA Voltage output acceleration sensor input amp

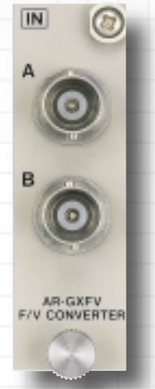
This amp can supply sensor power to an ICP-type acceleration sensor. The amp can also be used as a general DC input amp with a maximum input range of ±20 Vp, and a maximum frequency characteristic of 80 kHz (with filtering of 40% of the sampling frequency).

AR-GXMC Microphone input amp



This amp, equipped with power output for microphones, can be connected directly to a noise-measuring microphone. The amp has a maximum input range of 130 dB, and a maximum frequency characteristic of 20 kHz.

AR-GXFV F/V input amp



This amp has a TTL mode with a maximum frequency range of 500 kHz, and an AC mode with a maximum of 10 to 20 kHz. You can set a pulse count from 1 to 255.

Actual size

AR-GXTCK AR-GXTCJ Thermocouple input amp

Two types of thermocouple input cards are available: the J type and K type.

AR-GXST Dynamic strain input amp

This strain amp has an input range up to a maximum strain of 10,000 μ, and a maximum frequency characteristic of 30 kHz.

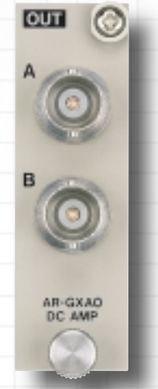
AR-GXPC Pulse input amp

This amp is used for input of pulses divided up by a photo-coupler. You can select a mode for counting the number of pulses in a gate period, or a total count mode that counts the total number of pulses from the start to the stop of recording.

AR-GXDIO Digital input/output amp

This amp has 16-bit digital input/output for each channel. The amp also allows input of signals for triggered recordings.

AR-GXAO Analog output amp



This amp can provide ±1 to 5 V analog output. The frequency range is to a maximum of 80 kHz.

●For details on each input/output card, see the specifications.

●The maximum recording and playback rate for a channel configuration composed of a combination of various types of input/output amp cards is restricted by the maximum transfer rate for the entire system.

Recording

Transfer to a PC in real time, or record directly to various media

You can transfer and record data directly to a PC connected via the main-unit's SCSI interface. Or, you can record data onto a recording medium in the main unit, and then send the data to the PC. Or, you can first record the data onto media such as an MO disk, AIT cartridge, or PC card, and then insert this media into a PC drive for reading. You can select the method that best suits your experimental environment, goals, the frequency bandwidth of what you want to measure, and the required recording time.

In the real-time mode, the usable sampling frequency and the length of the recording time may vary depending on the data processing speed at the PC. When recording to a recording medium, maximum recording transfer rates differ with the medium, as shown in the following table. However, the maximum sampling frequency of the built-in input/output card is the upper limit.

Recording times (at maximum transmission rate) depending on the type of media and the sampling frequency **(Up to 32 channels)**

Media (recording capacity)	Sampling frequency x number of channels (at maximum)	Recording time (at maximum transmission rate)
Memory (when 256 MB)	3200 k (200 k x 16 ch etc.)	Approx. 40 sec.
AIT (25 GB)	1600 k (50 k x 32ch etc.)	Max. of approx. 138 min.
MO (1.3 GB)	200 k (20 k x 10 ch etc.)	Max. of approx. 50 min.
Real-time transfer	1600 k (50 k x 32ch etc.)	Depends on the type of media at the PC

(From 33 to 64 channels)

Media (recording capacity)	Sampling frequency x number of channels (at maximum)	Recording time (at maximum transmission rate)
Memory (when 256 MB)	2500 k (50 k x 50 ch etc.)	Approx. 50 sec.
AIT (25 GB)	1280 k (20 k x 64 ch etc.)	Max. of approx. 170 min.
MO (1.3 GB)	200 k (20 k x 10 ch etc.)	Max. of approx. 50 min.
Real-time transfer	1280 k (20 k x 64ch etc.)	Depends on the type of media at the PC

External sampling

You can record by synchronizing with an external sampling frequency up to the maximum sampling frequency of a built-in input amp card. Perform data processing on the recorded data as a file.

Multi-sampling

When sampling is based on an internal clock, you can set a sampling frequency that is different for each input card. (However, the maximum value of the sampling frequency set for each input card must be within 10 times of the minimum value.) When fast and slow phenomena coexist, multi-sampling enables efficient recording.

Recording by trigger conditions

You can use the supplied GX Navi software to set recording intervals based on pre-triggers, post-triggers, level triggers, repeat recordings, or times. You can also record by using a combination of these trigger conditions.

Recording voice memos

When recording voice memos, you can record to internal memory or an AIT cartridge as one channel.*1 To convert a recorded voice memo to a WAV file and listen to the file, you can download a free Windows PC utility from the TEAC home page. You can also record a voice memo as a WAV file onto an MO disk, to internal memory, or onto a PC card. You can use the Windows media player to listen to such voice-memo WAV files.

Two types of remote control units

Two types of remote control units can be connected to the GX-1 main unit.

●DK-GXLCD: Remote control unit with LCD *2

This control unit with a 640 x 480 pixel LCD color display is very convenient in environments where you cannot use a PC. In addition to enabling you to set recording parameters, start and specify settings for recordings, and attach event marks to data, this remote control unit has the same display functions as a PC screen used for real-time monitoring during recording.

●ER-GXRC: Handy remote control unit *3

After using a PC to specify settings, you can use this remote control unit to start and stop recording, and to attach event marks to data.

The optional CL-GXRC cable is available for using external controllers in the same way as for this handy remote control unit: connections use the remote control unit connector. The ER-GXRC can also be used with a PC.

KH-2ST battery charger for the internal battery HP-30A

The internal battery can operate for more than 40 minutes at a sampling frequency of 50 kHz in a configuration with an AIT drive, DC input amp card, and 16 channels. When the main unit is working off DC power, this battery will maintain operation if power fails. Use the dedicated charger to recharge the internal battery.

*1: To record a voice clearly, set the sampling frequency for the plug-in input module to 5 kHz or higher.
*2: A power source exclusively for this unit is required. (An AC adapter and a DC input terminal are provided. When using a battery, request the TZ-GXDKM tilting table and the HP-30A battery pack.)
*3: You cannot confirm settings, or perform monitoring during recording, etc.

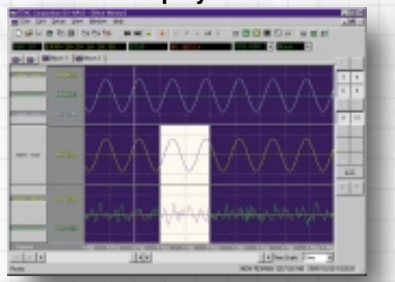
Viewing

Use multiple windows for real-time checking of data recorded over multiple channels

By using PC windows or the DK-GXLCD remote control unit with an LCD, you can perform real-time monitoring of data during recording. Also, you can check data after sensor calibration, and perform an on-site review of data after a recording. By switching among time-series waveforms, FFT, and parameter windows, and by displaying multiple channels simultaneously, you can reduce the costs and labor required to carry oscilloscopes and FFT analyzers to a site. When a PC is connected via a SCSI interface to the GX-1 main unit, you can use the supplied GX Navi software to achieve real-time monitoring.

- With sampling frequencies that exceed 50 kHz, there are limitations on the monitoring display functions when recording or playing back.
- When monitoring during recording based on external sampling, there are limitations on separate displays.
- When using the AR-GXAO analog output amp, the playback display shows the waveform display only.
- When using the remote control unit DK-GXLCD with the LCD, the playback display shows the waveform display only.

Waveform display window



You can display selected channels (up to 16) in a single window. Also, you can set the channels being monitored by increasing the number of displayed pages, and by switching among each displayed page. When displaying data after recording to memory, you can perform operations such as reading data by using the cursor line, scrolling the display, or zooming into a specified range of a waveform.

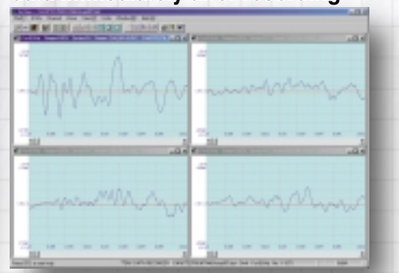
FFT window

You can show FFT displays of selected channels (up to 16) in a single window. Selectable items include linear scale or log scale, peak hold, average-value display, and window functions.

Bar graph display window

You can show all channels in one window. This window includes a peak-hold function. When a set range is exceeded, an overload indicator function displays the problem in red.

Use the GX View program to check data immediately after recording



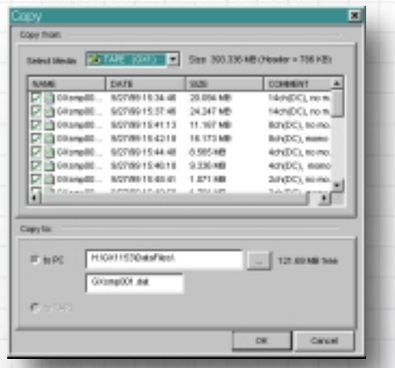
The GX View program is a utility for playing back recorded data in a PC window. You can use a PC to read data that was recorded on an AIT cartridge, and have multiple waveform displays of channel data, or X-Y displays of selected channels. Part of a waveform can be cut, and that part can be converted to a file: for example, into ASCII data. To enable data files recorded by GX-1 to be read by commercially available programs that specialize in analysis of measurement data, we have a library of file converters for various file formats.

Transferring

Perform fast PC-based data processing and analysis

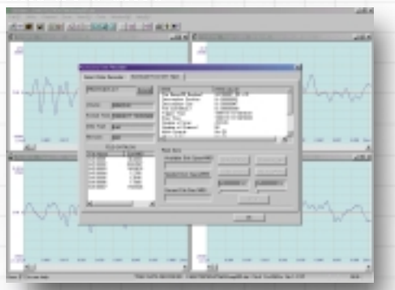
Recorded data is saved in the TAFFmat (TEAC Data Acquisition File Format) format common to the TEAC digital data recorders. Because recorded data can be processed directly on a PC, you can expect fast analysis of experiment data. Also, an analog output card is available for cases that require playback of analog signals.

Transfer recorded data from the GX-1 main unit to a PC



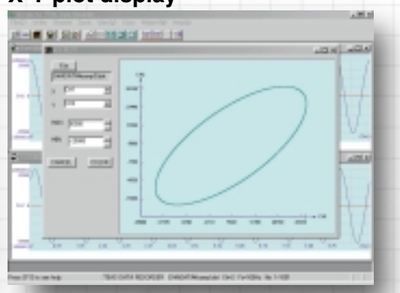
Using the supplied GX Navi software, you can copy data files (recorded to memory, or onto an AIT cartridge, MO disk, or PC card) to the hard disk of a PC connected via a SCSI interface.

Read directly from media inserted into a PC drive

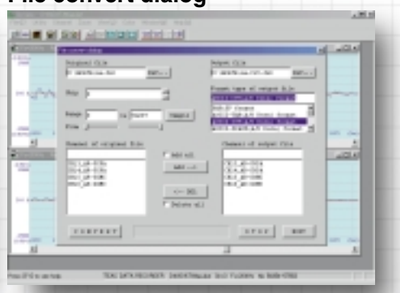


After using a GX-1 to record data onto an AIT cartridge, you can insert the cartridge into a PC drive and (at the PC) use the GX-View utility to directly read the recorded data files from the tape. Similarly, when data is recorded onto an MO disk or PC card, you can directly read the recorded files after inserting the disk or card into a PC drive.

X-Y plot display



File convert dialog



SPECIFICATIONS

GX-1 Main Unit

Signal conditioner slots:	8
Recording device slot:	1 (for AIT, MO or PC card drive selectable)
Memory:	256 MB max.
Interface:	SCSI (connector 50-pin half size x 1, built-in terminator)
Contact-point control:	START, STOP, EVENT, REC STANDBY
Expansion bus connector:	1 (common)
DIGITAL CONTROL connector:	1 (IRIG-B time code, external sampling clock input)
Monitor channel analog output:	1
Microphone jack:	1
Speaker/earphone jack:	1 each
Sampling frequencies:	
External clock:	Up to the maximum sampling frequency of each signal conditioner
Internal clock:	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz 1, 2, 5, 10, 20, 50, 100, 200, 500 kHz, 1MHz
Multi sampling:	10:1 Note: The value [sampling-frequency x number-of-channels] must not exceed 3,200 kHz (in Memory type) and 1,500 kHz (in AIT type) up to 32 channels.
Power:	+11 to 30 V DC, approx. 45 W (Memory-type, all channels DC signal conditioner installed) Built-in AC adaptor (separate adaptors for 100 V and 200 V) * Regulations: FCC Part 15 class A, CE Battery (option)
Power consumption:	Approx. 45 W (w/ DC input signal conditioner installed for all channels, w/o AIT drive) Approx. 58 W (w/ AIT)
Operating temperature:	0 to 40˚C (32 to 104˚F) 5 to 35˚C (41 to 95˚F, w/AIT)
Storage temperature:	–20 to 60˚C (–4 to 140˚F)
Operating humidity:	20 to 80% RH (non-condensing)
Vibration:	MIL-STD-810D Figure 514.3-1, 2, 3 MIL-STD-810C Figure 514.2-6 V Curve (1.5 G, vertical) w/AIT
External dimensions:	approx. 300W x 85H x 200D (mm) [approx. 11-13/16" W x 3-3/8"H x 7-7/8"D] (excluding protruding parts)
Mass:	approx. 5 kg (11.02 lbs.), approx. 5.75 kg (w/AIT) (including 8 DC input amps and an AC adaptor)

Battery Pack (HP-30A)

Supply voltage:	13.2 V
Capacity:	3.7 Ah
Size:	NP-1 type
Battery life:	Approx. 1 year (depending on number of charges and frequency)

Battery charger (KH-2ST)

Power supply:	100 V AC (Automatic switching to 200 V AC)
Number of slot for battery pack:	4 slots (each 2 packs rechargeable at the same time) * Regulations: UL, CSA, CE

Display Keyboard Unit (DK-GXLCD)

Display:	Color TFT liquid crystal display, 640 x 480 pixels
Functions:	monitoring, settings, control,
Dimensions:	Approx. 250W x 36H x 160D (mm) [9-13/16" W x 1-1/16"H x 6-5/16"D] (excluding protruding parts)
Power:	+11 to 30 V DC, External AC adaptor 100 to 240 V AC, Battery (connecting to tilting table) * Tilting table TZ-GXDKM (option, mass: approx. 800 g)

Remote Controller (ER-GXRC)

Function:	Record, Playback (Start, Stop, Event and Record) * Using contact control
Cable length:	1.5 m (approx. 59")

Expansion Unit (AU-GXEPIO)

Signal conditioner slots:	8
Power:	+11 to 30 V DC Internal AC adaptor (separate adaptors for 100 V and 200 V) Battery (optional, same as for main unit)
External dimensions:	Approx. 300W x 85H x 200D (mm) [Approx. 11-13/16" W x 3-3/8" H x 7-7/8" D] (excluding protruding parts)
Mass:	Approx. 5 kg (11.02 lbs.)

Signal Conditioners

Charge Amp (AR-GXCH)

Number of channels:	2
Electric charge sensitivity:	0.1 to 999 pC/G
Range:	1, 5, 10, 50, 100, 500 G (100 G and the 500 G range cannot be used when the electric charge sensitivity is 100 pC/G or higher) (1 G and the 5 G range cannot be used when the electric charge sensitivity is lower than 1 pC/G)
Frequency range:	1 Hz to 30 kHz (–3 dB)
Low pass filer:	100, 200, 500, 1 k, 2 k, 5 k, 10 k Hz (–48 dB/oct., Butterworth)
A/D converter:	16-bit
Sampling frequency:	1 Hz to 200 kHz
Power consumption:	Approx. 2.16 W
Input connector:	MICRO DOT 10-32UNF

DC/ICP Input Amp (AR-GXPA)

Number of channels:	2
Input format:	Unbalanced
Input coupling:	DC (DC mode)/AC (PA mode)
Input impedance:	100 k ohms
Input range:	±0.5, 1, 2, 5, 10, 20 Vp (DC mode) ±0.1, 0.2, 0.5, 1, 2, 5, 10, 20 Vp (PA mode)
Low pass filer:	Attached filter of 40% of sampling frequency Filter type: Butterworth (–48 dB/oct.)
Sensor power supply:	18 V DC/0.5, 3, 5 mA (PA mode)
Frequency response:	DC to 80 kHz (DC mode) 0.1 Hz to 80 kHz (PA mode)
A/D converter:	16-bit, successive approximation type
Sampling frequency:	1 Hz to 200 kHz
Input connector:	BNC

Microphone Input Amp (AR-GXMC)

Number of channels:	2
Input format:	Unbalanced
Input coupling:	AC
Input impedance:	11 k ohms
Applicable microphone:	B&K (only for 50 mV/Pa type)
Input range:	80, 90, 100, 110, 120, 130 dB
Weighting filter:	A type, C type, flat
Frequency response:	20 Hz to 20 kHz
Power output for microphone:	200 V DC for bias, 28 V DC for preamp
A/D converter:	16-bit, successive approximation type
Sampling frequency:	1 Hz to 200 kHz
Power consumption:	Approx. 3.18 W
Input connector:	LEMO FGG-1B-307-CLAD62

F/V Input Amp (AR-GXFV)

Number of channels:	2
Input:	TTL or AC switching
Input impedance:	10 k ohms
Sensitivity (at AC input):	±50 mV, ±100 mV, ±500 mV, ±1 V
Frequency range:	TTL mode: 1, 100, 1 k, 10 k, 100 k, 500 k Hz (max. 575 kHz) AC mode: 10 to 200, 10 to 500, 10 to 1 k, 10 to 10 k, 10 to 20 k Hz (max. 230 kHz) (Maximum permissible input voltage: ±10V)
Response time:	10 msec
Pulse count:	1 to 255 (pulses/rotate x frequency-range ≤ 500 kHz)TTL (pulses/rotate x frequency-range ≤ 20 kHz)AC
Setting for moving average:	1 to 16
Transformation precision:	±[(input-frequency/1000) + (set-frequency-range/3125)] Hz
Sampling frequency:	1 Hz to 200 kHz
Power consumption:	Approx. 1.44 W
Input connector:	BNC

Digital Input/Output Amp (AR-GXDIO)

Number of channels:	2
Input format:	CMOS level, 16 bits each channel
Output format:	Open drain, 16 bits each channel
Input/Output switching:	Slot by slot
Sampling frequency:	1 Hz to 200 kHz
Trigger:	AND/OR selectable for specified bits
Input/Output connector:	JAE TX20A-36R-D2LT1-A1LH (amp side)

Dynamic Strain Input Amp (AR-GXST)

Number of channels:	2
Input format:	Balanced difference input
Input coupling:	DC
Input resistance:	1 M ohms
Gage ratio:	2.0
Excitation voltage:	2 V, 5 V DC within ±0.2% Has remote sensing.
Range:	±200, 500, 1000, 2000, 5000, 10000 μST
Balance adjustment method:	Electronic
Frequency response :	DC to 30 kHz (±3 dB)
Low pass filter:	25, 50, 250, 500, 2.5 k, 5 k, 24 k Hz, PASS (–48 dB/oct., Butterworth)
A/D converter:	16-bit, successive approximation type
Sampling frequency:	1 Hz to 200 kHz
Power consumption:	Approx. 3.4 W
Input connector:	HR25-7P-8P (cable side) from Hirose Electric Co., Ltd.
Input cable:	NDIS conversion cable (option) With remote sense: CL-GXST2RS Without remote sense: CL-GXST2

Pulse Input Amp (AR-GXPC)

Number of channels:	2
Input format:	Insulated by photocoupler
Input voltage range:	4 to10 V/8 to 24 V switching (8 mA or more input current required)
Responsive frequency:	2 MHz max.
Sampling frequency:	1 Hz to 200 kHz
Counting method:	Division rate: 1/1 to 1/255 Count: 0 to 32767 (16 bits with a sign) Gate mode: Counts pulses within a gate period. Gate period is specified by the sampling period multiplied by 1 to 255. The output keeps the same count until the next gate.The count keeps 32767 when overflows. Total mode: Counts total number of pulses from recording start to stop. Outputs the current total number of pulses during measuring. Restarts from 0 when overflows.
Counting accuracy:	Gate mode: ±5 counts Total mode: ±1 count
Input connector:	Insulated BNC

Analog Output Amp (AR-GXAO)

Number of channels:	2
Output format:	Unbalanced
Output coupling:	DC
Output level:	±1 to 5 V (variable in 0.1 V steps)
Zero shift:	0 to ±5 V (in 0.1 V steps)
Frequency response:	DC to 80 kHz
Low pass filer:	Attached filter of 40% of sampling frequency Filter type: Butterworth (–48 dB/oct.)
D/A converter:	16-bit, without oversampling
Output connector:	BNC

Thermocouple Input Amp (AR-GXTCK/J)

Number of channels:	2
Applicable thermocouple:	K (AR-GXTCK), J (AR-GXTCJ)
Zero point compensation:	Electronic
Range:	AR-GXTCK: –50 to 300, –50 to 600, –50 to 1200 ˚C AR-GXTCJ: –50 to 150, –50 to 300, –50 to 600 ˚C
Low pass filter:	5, 10, 20 Hz, PASS (Butterworth,–48 dB/oct.)
A/D converter:	16-bit, successive approximation type
Sampling frequency:	1 Hz to 200 kHz
Power consumption:	Approx. 1.2 W
Input connector:	GIM-K1 (AR-GXTCK) from Omega GIM-J1 (AR-GXTCJ) from Omega

Precautions

- Do not place the product in a wet, humid, steamy, dirty, or smoky location, otherwise fire, electrical shorting, or damage, etc. may occur.
- To ensure safe handling and operation, read the Instruction Manual before use.

- These specifications are subject to change without notice. For details, contact your nearest dealer or sales center.
- Company names or product names are the copyright of the respective companies.

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