General Specifications

DR230 Hybrid recorder
stand-alone type (Style number: S8)

DARWIN

GS 04M01C01-11E

Refer to the following cautionary notes before you configure your system.
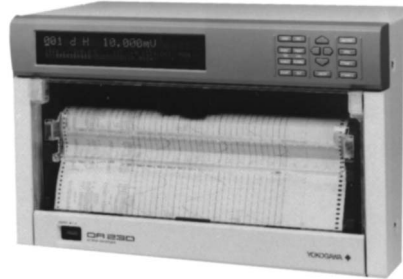
DARWIN is a system comprising a number of data-acquisition equipment components.

In the course of system growth, new models, software, various input/output modules and optional features are added to the family to enhance the systems expandability and flexibility. You can check the versions of your equipment and software by referring to the style number: Sn* shown on the nameplate of the main unit. When configuring a system, you must confirm that the style number of each componentunit and software meets the following requirements:

* release number in the case of software: Rn

(1) The style number of each input/output module must be the same as or lower thanthat of the main unit or sub-unit to which the module is connected.

(2) The release number of a dedicated software package must be the same as or higherthan the style number of the main unit or sub-unit where the package is installed and where it performs control.

Any equipment/software not meeting these requirements is incompatible with your system configuration.

For information on how to upgrade to compatible equipment/software, consult our sales personnel.

■ Outline

The DR230 is a highly reliable desktop type hybrid recorder that contains a high withstand voltage semiconductor relay developed by Yokogawa. It uses small input modules to record measured industrial variables, physical variables such as temperature signals in realtime in the field, and can also transfer the measured data to a personal computer.

The stand-alone type is a general purpose hybrid recorder which can accept measurement data between 10 and 30 channels. Although the number of input channels cannot be increased or the kinds of inputs changed, the main unit is integral with the input and output sections, hence this recorder has excellent cost performance

In addition, by using the dedicated package software, the measurement conditions can be set and continuous data acquisition performed easily.

■ Standard Specifications

General Specifications
Construction
Materials:
Steel plate, aluminum alloy, plastic moldings
Paint color:
Display: Slate Gray light (equivalent to Munsell 0.1 PB 4.6/0.2)
Core: Ice White (equivalent to Munsell 6.6Y 7.9/0.5)
External dimensions:
Approx. 438 (W) × 291 (H) × 336* (D) mm
* : When specifying DC power operation model, this number is changed to 381 mm.

Input
Measurement range:

Input	Type	Measurement range	
DC voltage	20 mV	–20.000 to 20.000 mV	
	60 mV	–60.00 to 60.00 mV	
	200 mV	–200.00 to 200.00 mV	
	2 V	–2.0000 to 2.0000 V	
	6 V	–6.000 to 6.000 V	
	20 V	–20.000 to 20.000 V	
	50 V	–50.00 to 50.00 V	
TC (Note that accuracy of reference junction compensation is not considered.)	R[1]	0.0 to 1760.0°C	
	S[1]	0.0 to 1760.0°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	
	L[2]	–200.0 to 900.0°C	
	U[2]	–200.0 to 400.0°C	
	N[3]	0.0 to 1300.0°C	
	W[4]	0.0 to 2315.0°C	
	KPvsAu7Fe	0.0 to 300.0K	
RTD	Pt100 (1 mA)[5]	–200.0 to 600.0°C	
	Pt100 (2 mA)[5]	–200.0 to 250.0°C	
	JPt100 (1 mA)[5]	–200.0 to 550.0°C	
	JPt100 (2 mA)[5]	–200.0 to 250.0°C	
	Pt50 (2 mA)[5]	–200.0 to 550.0°C	
	Ni100 (1 mA)[6] SAMA	–200.0 to 250.0°C	
	Ni100 (1 mA) DIN[6]	–60.0 to 180.0°C	
	Ni120 (1 mA)[7]	–70.0 to 200.0°C	
	J263*B	0.0 to 300.0K	
	Cu10 GE	–200.0 to 300.0°C	–84.4 to 170.0°C[8]
	Cu10 L&N		–75.0 to 150.0°C[8]
	Cu10 WEED		–20.0 to 250.0°C[8]
	Cu10 BAILEY		–20.0 to 250.0°C[8]
High resolution RTD	Pt100 (1 mA)[5]	–140.00 to 150.00°C	
	Pt100 (2 mA)[5]	–70.00 to 70.00°C	
	JPt100 (1 mA)[5]	–140.00 to 150.00°C	
	JPt100 (2 mA)[5]	–70.00 to 70.00°C	
Contact	Voltage input	Off for a voltage of less than 2.4 V. On for a voltage of 2.4 V or more. (TTL)	
	Contact input	On/off of contact	

*1 R, S, B, K, E, J, T : ANSI, IEC 584, DIN IEC 584, JIS C 1602-1981
*2 L : Fe-CuNi, DIN 43710, U : Cu-CuNi, DIN 43710
*3 N : Nicrosil-Nisil, IEC 584, DIN IEC 584
*4 W : W • 5% Re-w • 26% Re (Hoskins Mfg Co)
*5 Pt50 : JIS C 1604-1981, JIS C 1606-1989
   Pt100 : JIS C 1604-1989, JIS C 1606-1989, IEC 751, DIN IEC 751
   JPt100 : JIS C 1604-1981, JIS C 1606-1989
*6 SAMA/DIN, *7 McGRAW EDISON, *8 range of guarantee the accuracy

YOKOGAWA ◆

Weight:

Approx. 13* kg (with 30 input channels and alarm output installed)

* : When specifying DC power operation model, this number is changed to 14.5kg.

Measurement interval:

Select an interval from 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60 seconds.

max 30 channels/2 sec

A/D integration period:

Selectable or automatic switchover between 20 ms (50 Hz), 16.7 ms (60 Hz) and 100 ms (10 Hz)

Minimum measurement interval:

Filter ON/OFF Cut off freq Channels	Low-Pass Filter OFF		Low-Pass Filter ON	
	50/60 Hz	10 Hz	50/60 Hz	10 Hz
10	2 sec	5 sec	3 sec	12 sec
20	2 sec	5 sec	4 sec	15 sec
30	2 sec	6 sec	4 sec	20 sec

Input method:

floating unbalanced input, each channel mutually isolated(channel independent)

The RTD range has a common potential (terminal b).

A/D resolution:

±20000

The standard operating conditions are:

23 ± 2°C, 55 ± 10% RH, warming-up time 30 minutes or more, vibration and others not affecting instrument operation.

Compensation for the reference junction:

switchable internally or externally for each channel.

Compensation accuracy for the reference junction:

(measured at 0°C, used for a bundle line of thermocouple at ±0.5 or less.when the input terminals are balanced Frontwards:0°C Backwards:0°C horizontal)

Type R, S, B, W: ±1°C

Type K, J, E, T, N, L, U: ±0.5°C

Maximum allowable input voltage:

2 VDC range or lower, thermocouple, RTD, DI (CONT): ±10 VDC

6 VDC range or greater, DI (LEVEL): ±60 VDC Normal mode voltage:

voltage, thermocouple: 1.2 times or less (at peak value, including 50 or 60 Hz signal component)

RTD: 50 mV or lower (at peak value)

Normal mode rejection ratio:

40 dB or greater (50/60 Hz ±0.1%)

Common mode noise voltage:

250 VAC rms (50/60 Hz)

Common mode rejection ratio:

120 dB or greater (50/60 Hz ± 0.1%, 500 Ω unbalanced, between the negative measurement terminal and ground)

Maximum noise between channels:

150 VAC rms (50/60 Hz)

(except for RTD)

Noise rejection:

rejection by integration type A/D, lowpass filter, or moving averaging.

Lowpass filter:

50/60/10 Hz

Input resistance:

Min. 10 MΩ at 2 VDC or lower, thermocouple range

Approx. 1 MΩ at 6 VDC or higher

Power off: 10 MΩ or more

Insulation resistance:

Min. 20 MΩ at 500 VDC between the input terminal and ground

Input bias current:

max.: 10 nA

Dielectric strength:

1000 VAC (50/60 Hz) for 1 minute:between input terminals, (except for RTD)

1500 VAC (50/60 Hz) for 1 minute:between an input terminal and ground

Input source resistance:

DCV, thermocouple: 2 kΩ or lower

RTD: 10 Ω or lower per line (Pt 100 Ω)

              5 Ω or lower per line (Pt 50 Ω)

              1 Ω or lower per line (Cu 10 Ω)

the same resistance including 3-line.

Temperature coefficient:

zero: 0.01% of range/°C

full span: 0.01% of range/°C

              (0.02% of span/°C for Cu 10 Ω)

Thermocouple burn out:

detected in a thermocouple range (On/Off enabled), current of 4 µA, detectable pulse width of approx. 5 ms.

2 kΩ or lower is considered to be 'Normal'

100 kΩ or greater is considered to be 'Disconnected'

Recording

Recording method:

Raster scan method, 10-color wire dot recording

Number of recording points:

Measurement results: 30 points + AC 6 or 2 points

Computation results: 30 points

Recording paper:

Ordinary recording chart, Z-fold chart (total width 342.5 mm, total length 30 m)

Effective recording width: 250 mm (when dot-print recording)

Recording accuracy:

Dot recording: ±(0.1% of recording span + measurement accuracy)

Digital print: Depends on measurement accuracy.

Max recording resolution:

Dot recording: ±0.1 mm

Digital print: Depends on measurement resolution

Recording color:

Analog trend mode

Dot recording: Purple, red, green, blue, brown, black, navy blue, yellow-green, red-purple, orange (You can specify a color for each channel.)

Digital printing: black

Alarm printing: Red (Alarm release mark : blue)

Logging mode

Digital printing: Purple

Recording interval:

Analog recording interval for analog trend recording

FIX: Recording takes place at intervals of between 2 and 60 seconds (Min 2 s)

AUTO: Linked to chart speed and measurement interval(Min 2 s)

Digital printout interval for analog trend recording

MULTIPLE: Specify for each channel from 6 kinds of intervals (Specify in 1-minute intervals between 1 minute and 24 hours.)

SINGLE: Determined automatically from the chart speed and the number of channels used to print digital values.

Digital value printing interval in the logging mode:

MULTIPLE: Specify for each channel from 6 kinds of intervals. (Specify in 1-minute intervals between 1 minute and 24 hours.)

SINGLE: Common to all points (Specify in 1-minute intervals between 1 minute and 24 hours.)

Recording interval change: 2 kinds
Changes by event / action function

Chart paper feed:

Chart speed: 1 to 1500 mm/hour

Chart speed change: 2 kinds (Changes by event / action function)

Chart method: Pulse motor

Chart feed accuracy: ±0.1% of length (When recording is performed continuously for at least 1000 mm; Does not include elongation or shrinkage of paper.)

Recording modes:

NORMAL: Starting and stopping of recording by means of a key operation

Alarm channel trend:

TRIGGER ... Recording starts only for the channel in which an alarm was detected. Recording stops when a key operation is performed.

LEVEL ... Recording takes place only for the channel in which an alarm was detected. (Recording starts when the alarm is detected, and stops when the alarm is cleared.)

Group trend: The measurement channels are grouped, and recording performed only for channels that belong to the specified group. The selection of the group to be recorded can be changed over by means of event / action function.

printing function:

Common: Relation between the chart speed and recording interval analog trend mode.

Chart speed (mm/hour) dot recording interval (s) must be no more than 3000.

Chart speed	Channel No. TAG	Digital print	Alarm scale message
1 to 9 mm/h	Record enabled	Record disabled	Record enabled
10 to 1500 mm/h	Record enabled	Record enabled	Record enabled

Recording interval for digital printout and cart speed when the recording interval is SINGLE.

Cart speed(mm/hour) × dot recording interval must not exceed 3000.

when the recording interval is MULTIPLE set by timer

Chart speed	Number of digital print rows (Unit: hour)			
	1row	2row	3row	4row
10 to 24 mm/h	12	6	4	3
25 to 49 mm/h	4	2	2	1
50 to 99 mm/h	2	1	1	1
100 to 1500 mm/h	1	1	1	1

Time printing: Hours and minutes

Unit printing (UNIT): Can be set freely using no more than 6 characters.

Channel or TAG No. printing: 7 characters to 16 characters selectable.

Alarm printing: Channel No., alarm kind, ON/OFF time (Hours and minutes)

Scale value printing: 0, 100%/0, 50, 100%/every 20%

Message printing: 12 kinds of messages (16 characters) and the time are recorded. Printing is started by a periodic printing command, key operation, event / action function.

Others:

Recording time specification: The starting and stopping times of recording can be set.

Manual printing: One scan's worth of data can be digitally printed by a key operation, remote control signal (/R1 option) or by an alarm status. Analog trend recording is interrupted.

Header printing: A character string consisting of 80 characters) × 5 lines is printed (it is interrupted while measured values are being recorded). Printing is started by a key operation, event / action function.

List printing: The set contents are printed.

Zone recording: The recording width and recording positions (0% and 100% positions) can be set in mm units for each point.

Partial compression: Can be set for each channels (1 break point)

Event / Action function:

Recorning canbe stared,or the chart speed changed by alarm output status/remote control/signal/chart end signal/timer or key operation.

Memory Function
Data Save/Load Function
Media for data save/load:

Buffer memory (internal SRAM)

Capacity: 512 Kbytes

Data backup: Around 10 years (backup with lithium battery, at room temperature while power is off)

Specified data length:
10, 20, 30, 40, 50, 100, 200, 300, 400, 500, 1 k, 2 k, 3 k, 4 k, 5 k, 10 k, 20 k, 30 k, 40 k, and 50 kdata/ch (Total memory lengt must be within the free memory size.)

3.5-inch floppy disk
Number of drives: 1
Disk types: 2HD, 2DD
Supported formats:
1.2 Mbytes, 1.44 Mbytes, and 720 Kbytes

Applicable data:

Setting values, measured values, and computed values (only possible when optional math function is specified).

The calculated data by /M3 option can not be stored in the buffer memory and floppy disk.

Method to save to the floppy disk:

Copies data stored in the buffer memory to the floppy disk, except for setting values which can be directly saved to the floppy disk.

Method to load from floppy disk:

Copies data from the floppy disk to the buffer memory except for settin values which can be directly loaded from the floppy disk.

Printing and outputing loaded data:

Able to print captured data saved in the buffer memory or output to a communication interface.

Data save format:

Setting values: ASCII
Measured/computed values:
binary (except ASCII (CSV Format) is also possible when saving to floppy disk.)

Data capacity

Setting values:

Stand-alone type: Maximum about 50 kbytes (in case when saving the setting values of an operation mode with 30ch inputs and 30ch computations.)

Measured values:

Binary data: 2 bytes / 1 data
ASCII data: 12 bytes / 1 data

Computed values:

Binary data: 4 bytes / 1 data
ASCII data: 12 bytes / 1 data

Equation to calculate the total data capacity:

Stand-alone type: $256 + 64 \times$ (number of measured ch + number of computation ch) + (number of measured ch $\times 2$ + number of computation ch $\times 4 + 6$) $\times$ specified data length

Save interval of measured/computed values:

Measurement interval of the recorder, or select from 1 min/2 min/5 min/10 min (By combining with the event/action function, it can also sample 1 data at a time e.g. at each M.FUNC key or remote control signal input.)

Selection of the saving method of measured/computed values (WRITE MODE):

Direct: Start saving the data when key operation occurs. After saving specified length of data, stop the

Trigger single: Start saving the data when the trigger condition is met. After saving a specified length of data, stop the saving process.

Trigger repeat: Start saving the data when the trigger condition is met. Repeat the process of saving a specified length of data to 1 file, until there is no more area in the memory.

Trigger condition:

All Trigger conditions are configured with the event/action/function.

Trigger condition when saving the measured/computed values:
Event/actio function (such as key operation, remote control signal, alarm status, and chart end)

Trigger condition when loading the measured/computed values (from buffe memory):
Event/action function (such as key operation, remote control signal, and alarm status)

Pretrigger: 0 to 100% (can be specified in 10% intervals)

Filename when saving data:

8 ASCII characters input. However, when saving the measured/computed values using trigger repeat, 5 ASCII characters input (last 3 letters are set automatically from 001 to 208.)

Data conversion

When specify with DARWIN DAQ32 Software

File conversion: Conversion to Lotus 1-2-3(R1A), ASCII(CSV),Excel(Ver. 4.0).
Range of Conversion : specify for data points.
OS Environment : Windows 98/Me/NT4.0/2000/XP
PC : IBM PC/AT or Compatible machine

Display function

Display section:

Display: VFD display (5×7 dot matrix, 3 rows)
Number of characters: 22 characters (large/1 row), 40 small characters (2 rows)

Displayed contents:

Digital value display:
Data for freely selected channels can be displayed on each line (1 channel per line, max 5 rows). The CH/TAG No. (7 characters), and also the alarm status, measured value and unit for each channel are displayed simultaneously.

Measured value bar graph display:
The data is displayed as 0 to 100% in the specified lines.

Auxiliary data: Clock, alarm status, alarm relay status, battery consumption, record ON/OFF, key lock ON/OFF, recorder operation (print format)

Alarms

Number of settings:

Up to four settings can be made for each channel.

Kinds of alarms: Selection from higher limit, lower limit, difference higher limit, difference lower limit, higher limit of rate of change, lower limit of rate of change However, only upper limit and lower limit alarms are output for totalized results.

Rate of change alarm time interval: Can be set to measurement interval $\times 1$ to 15 (Common to both rising and falling limits.)

Output mode

Excitation/non-excitation selection, AND/OR mode selection, and output hold/non-hold specification can be made. (common to all channels)

A maximum of 6 reflash alarm output points can be specified.

Number of alarm output points

Max 12(when equipped with both / A4 and / R1 options).

Alarm data recording

Analog Trend mode:
The channel number, kind of alarm and ON/OFF time (hours and minutes) are printed in the right margin.

Logging mode: The kind of alarm is printed when the measured data are recorded.

Display alarm data

Alarm status indication:
When an alarm is detected, the status indicator lights. The indicator can also be made to flash depending on the setting.

Alarm acknowledge indication: The alarm indicator stops flashing when a key operation is performed.

Standard computation functions

Kinds of computation

Difference between arbitrarily selected channels, linear scaling (scaling), moving average

Linear scaling:

Scalable range: DC voltage, thermocouple, RTD, contact
Scaling range: –30000 to +30000
Decimal point: Arbitrarily set

Measurement accuracy for scaling:
Measurement accuracy for scaling (digits) = Measurement accuracy (digits) $\times$ Scaling span (digits)/Measurement span (digits) + 2 digits (Numbers below the decimal point are discarded.)

Moving average:

The moving average results for between 2 to 64 scans are computed.

AC power supply

Rated supply voltage: 100 to 240 VAC (free supply voltage
selection)

Usable supply voltage range: 90 to 250 VAC

Rated supply frequency: 50/60 Hz

Power consumption:max approx. 130 VA
(when 5 modules are installed)

DC power supply section (Optional, AC and DC power supply can coexist)

Rated supply voltage: 12 to 28 VDC

Usable supply voltage range: 10 to 32 VDC

Power consumption: Approx. 80 V max.

Terminal: Dedicated connector

Other: When both AC and DC power are connected to a DC power supply model,which of the power supplies is used depends on the voltage of the DC power supply connected as follows.

DC Power Supply	Voltage Power Supply Used
≤ 20 V	AC power supply
20 to 28 V	Indeterminate
28 to 32 V	DC power supply

Others

Clock: With calendar function (Western calendar)

Clock accuracy: ±100 ppm. However, this does not include the delay (less than 1 second) caused when the power is switched ON and OFF once.

System fault alarm: Contact output (when /R1 option is selected)

Set value backup: Lithium battery backup (approx. 10 years at ambient temperature of 23°C), excluding clock function

Key Lock: Software setting

Insulation resistance:
At least 20 MΩ between the power supply and ground, between each terminal and ground, and between each input terminal (measured with 500 VDC)

Withstand voltage:
Between AC power supply terminal and ground of DR230 main unit: 1500 VAC (50/60 Hz) for one minute
Between DC power supply terminal and ground of DR230 main unit: 500 VAC (50/60 Hz) for one minute
Between input terminal and ground of DR230 main unit: 1500 VAC (50/60 Hz) for one minute
Between output terminal and ground of DR230 main unit:2300 VAC(50/60 Hz)for one minute

Standard Performance

Measurement and recording accuracy

The standard operating conditons:

23 ± 2°C, 55 ± 10% RH, power supply voltage 90 to 250 VAC, power supply frequency 50/60 Hz within ±1%, warming-up time 30 minutes or more, vibration and others not affecting instrument operation.

Input	Type	Measuring (digital display)		Recording (analog)	
		Measurement accuracy	Maximum resolution	Recording accuracy	Maximum resolution
DC voltage	20 mV	±(0.05% of rdg + 5 digits)	1 µV		
	60 mV	±(0.05% of rdg + 2 digits)	10 µV		
	200 mV	±(0.05% of rdg + 2 digits)	10 µV		
	2 V	±(0.05% of rdg + 2 digits)	100 µV		
	6 V	±(0.05% of rdg + 2 digits)	1 mV		
	20 V	±(0.05% of rdg + 2 digits)	1 mV		
	50 V	±(0.05% of rdg + 2 digits)	10 mV		
TC (Note that accuracy of reference junction compensation is not considered.)	R[*1]	±(0.05% of rdg + 1°C) However R, S: 0 to 100°C, ±3.7°C	0.1°C	±(0.1 of recording span) not including measurement accuracy	±0.1 mm
	S[*1]	100 to 300°C, ±1.5°C			
	B[*1]	B: 400 to 600°C, ±2°C accuracy less than 400°C is not specified			
	K[*1]	±(0.05% of rdg + 0.7°C) However, K attains an accuracy of ±(0.05% of rdg. + 1°C) within the range between –200 and –100°C.			
	E[*1]	±(0.05% of rdg + 0.5°C) However, J and L attain an accuracy of ±(0.05% of rdg. + 0.7°C) within the range between –200 and –100°C.			
	J[*1]				
	T[*1]				
	L[*2]				
	U[*2]				
	N[*3]	±(0.05% of rdg + 0.7°C)			
	W[*4]	±(0.05% of rdg + 1°C)			
	KPvsAu7Fe	±(0.05% of rdg + 0.7K)	0.1K		
RTD	Pt100 (1 mA)[*5] Pt100 (2 mA)[*5] JPt100 (1 mA)[*5] JPt100 (2 mA)[*5]	±(0.05% of rdg + 0.3°C)	0.1°C		
	Pt50 (2 mA)[*5]	±(0.05% of rdg + 0.3°C)			
	Ni100 (1 mA)[*6] SAMA	±(0.05% of rdg + 0.3°C)			
	Ni100 (1 mA) DIN[*6] Ni120 (1 mA)[*7]	±(0.05% of rdg + 0.3°C)			
	J263*B	±(0.05% of rdg + 0.3K)	0.1K		
	Cu10 GE	±(0.2% of rdg + 0.7°C)	–84.4 to 170.0°C[*8]	0.1°C	
	Cu10 L&N		–75.0 to 150.0°C[*8]		
	Cu10 WEED		–20.0 to 250.0°C[*8]		
	Cu10 BAILEY		–20.0 to 250.0°C[*8]		
High resolution RTD	Pt100 (1 mA)[*5]	±(0.05% of rdg + 0.3°C)	0.01°C		
	Pt100 (2 mA)[*5]	±(0.05% of rdg + 0.3°C)			
	JPt100 (1 mA)[*5]	±(0.05% of rdg + 0.3°C)			
	JPt100 (2 mA)[*5]	±(0.05% of rdg + 0.3°C)			
Contact	Voltage input	Off for a voltage of less than 2.4 V. On for a voltage of 2.4 V or more. (TTL)			
	Contact input	On/off of contact			

*1 R, S, B, K, E, J, T : ANSI, IEC 584, DIN IEC 584, JIS C 1602-1981
*2 L   : Fe-CuNi, DIN 43710, U : Cu-CuNi, DIN 43710
*3 N   : Nicrosil-Nisil, IEC 584, DIN IEC 584
*4 W : W • 5%Re-w • 26%Re (Hoskins Mfg Co)
*5 Pt50   : JIS C 1604-1981, JIS C 1606-1989
     Pt100 : JIS C 1604-1989, JIS C 1606-1989, IEC 751, DIN IEC 751
     JPt100 : JIS C 1604-1981, JIS C 1606-1989
*6 SAMA/DIN
*7 McGRAW EDISON
*8 range of guarantee the accuracy

Normal Operation Conditions

Supply voltage: 90 to 250 VAC
Supply frequency: 50 Hz ± 2%, 60 Hz ± 2%
Ambient temperature: 0 to 50°C (Floppy disk operation 5 to 40°C)
Ambient humidity:

Temperature	Humidity
0 to 40°C	20 to 80 % RH
40 to 50°C	10 to 50 % RH
* No ice formation	

Vibration: 10 to 60 Hz 0.2 m/s^2
Shock: Not allowed
Magnetic field: 400 A/m max(50/60 Hz)
Position: The unit should be mounted left-right horizontally or vertically, as a general rule.
Warmup time: At least 30 minutes after switch-on.
Installation location: Room
Installation height: Altitude up to 2,000 m
Installation category: II (according to CSA22.2 No.1010.1)
Measurement category: II (according to IEC61010-1)
Degree of pollution: 2

Effect of Operation Conditions

Ambient temperature: Variation for a temperature change of 10°C
within ±(0.1% of rdg + 1 digit)
±(0.2% of span + 1 digit) for Cu 10 Ω
Voltage variation: Within ±1 digit over the range of 90 to 132, or 180 to 250 VAC (frequency 50/60 Hz)
External magnetic field: Variation with respect to AC (50/60 Hz) and DC magnetic fields of 400 A/m ... Within ± (0.1% of rdg + 10 digits)
Radio wave: Within ±(1% of span) at 1m from 150 MHz or 460 MHz field
Signal source resistance:
Variation with respect to signal source resistance + 1 kΩ change
(1) Voltage 2 V range or below ... Within ±10 μV
6 V range or above ... Within ±0.1% of rdg
(2) Thermocouple
Within ±10 μV; However, it must be within ±100 μ when burnout is specified.
(3) RTD Variation with respect to change of 10 Ω per wire (when all three wires are the same resistance value)
Indication ... Within ±(0.1% of rdg + 1 digit)
Variation in indication with respect to a difference of 40 mΩ in the resistance between conductors (max difference between 3 wires) ... Approx. 0.1°C
Mounting position:
Variation when the unit is mounted horizontally on a panel ... Within ±(0.1% of rdg + 1 digit) excluding RJC error
Vibration: Variation when sinusoidal vibration of acceleration 0.2 m/s^2 is applied for 2 hours in each of the 3 axial directions over a frequency range of 10 to 60 Hz ... Within ±(0.1% of rdg + 1 digit)

Transportation and Storage Conditions

These refer to the environmental conditions existing during transportation and storage from the time of shipment from the factory until commencement of use, and also during transportation and storage in the case of a temporary period of non-use.
If the environmental conditions are maintained within the specified range, the unit will not incur permanent damage, and can be returned to a normal working condition (re-adjustment may be required in some cases).

Ambient temperature: –25 to 60°C
Humidity: 5 to 95% RH
Vibration: 10 to 60 Hz 4.9 m/s^2 max
Shock: 392 m/s^2 max (in packed condition)

Supported Standards

CSA	Obtained CSA22.2 No.1010.1, Installation category (Overvoltage category): II, Degree of pollution: 2	
UL	Obtained UL3111-1 (CSA NRTL/C)	
CE	EMC directive	EN61326 EN61000-3-2 EN61000-3-3 EN55011 Class A Group 1
	Low voltage directive	EN61010-1 Measurement category: II, Degree of pollution: 2
C-Tick	AS/NZS 2064 Class A Group 1	

■ Optional specifications

/C1: GP-IB Communication
Functions:
Measured value output, set value output, setting of measurement conditions, controlling starting/stopping of measurement
Outline specifications:
Electrical and mechanical specifications: Based on IEEE standard 488-1978
Code used: ISO (ASCII) code
Addresses: 0 to 15

/C2: RS-232-C Communication
Functions:
Measured value output, set value output, setting of measurement conditions, controlling starting/stopping of measurement
Outline specifications:
Electrical and mechanical specifications: Based on EIA RS-232C
Connection method: Point-to-point
Communications format: half duplex
Synchronization: Start-stop synchronization (synchronization by means of the start and stop bits)
Baud rate: 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 bps
Start bit: 1 bit fixed
Data length: 7 or 8 bits (selectable)
Parity: Even, odd, none (selectable)
Stop bit: 1 or 2 bits (selectable)
Transmission distance: Max 15 m
Connector: D-sub 25-pin connector

/C3S: RS-422-A/RS-485 Communication
Electrical and mechanical specifications: conform to standard EIA RS-422-A, EIA RS-485
Connection method: Multi-drop 1: n (n = 1 to 31)
Communication method: Half duplex, 4 wire or 2 wire
Synchronization mode:
Synchronous mode (synchronized by a start and a stop bit)
Baud rate: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 bps
Response speed: 0, 1, 2, 5, 10, 20, 50, 100 msec (effective for 2 wire communication)
Start bit: Fixed at 1 bit
Data length: 7 or 8 bits, selectable
Parity bit: EVEN, ODD, or none, selectable
Stop bit: 1 or 2, selectable
Transfer distance: max. 1200 m
Connector: 6 screws
Capacity of a receiving buffer: 250 bytes
ESC sequence: can be used for reception only
Talker functions
output of measurement data (ASCII, binary) and setting values (ASCII)
NOTE

Binary output is not available in 2 wires and multi-drop application.

Listener functions

setting of measurement conditions, control of measurement start and stop, specifying causes of 'ESC S'(output of a status byte).

(excludes the setting and control of power on/off)

Contents of 'Status':

syntax error, chart end, completion of A/D conversion, operations of interval timer, completion of saving in memory devices

Outside dimensions & Weight:

Model and suffix code	Outside dimensions (W) × (H) × (D)	Weight (kg)
DT300-31	Approx :57 × 136.7 × 53.8	0.27

/C7: Ethernet Communication

Electrical and mechanical specifications: Conform to standard IEEE802.3

Number of communication port: 1

Connection method: Ethernet

Transfer specification: 10 Base-T (CSMA/CD, 10 Mbps, Base band)

Transfer speed: 10 Mbps

Communication protocol: TCP, UDP, IP, ARP, ICMP

PC number that is able to gain access to 1 Darwin unit: Max. 4 units

Input data: ASCII A RS-232-C module (DT300-21) Of the supports of all the commands

Output data: ASCII, Binary

/A4: Alarm Output Option

Outline specifications:

Number of outputs: 10 points

Contact mode: A contact: Normally open and common terminal

Output mode: Can be switched between excited and non-excited.

Can be switched between hold and non-hold.

Reflash alarm output points: Max of 6 points can be specified.

Contact capacity: 250 VDC/0.1 A (with a resistive load)

250 VAC/2 A (with a resistive load)

30 VDC/2 A (with a resistive load)

/R1: DI/DO Interface Option

Outline specifications:

This is a combined module, which consists of an alarm contact output (two points) module, a remote control signal input terminal, a failure output device upon detecting a system error, and a detection signal output for end of the recording paper (chart end).

Alarm contact output:

Number of outputs: 2

Output refresh rate: every measurement interval

Contact mode: Transfer contact (normal open / common /normal close)

Output mode: excitation/non excitation switchable

hold/non-hold switchable

Reflash alarm on recurrence of failure can be set

Contact capacity: 250 VDC/0.1 A (with a resistive load)

250 VAC/2 A (with a resistive load)

30 VDC/2A (with a resistive load)

Dielectric strength: between an output terminal and ground: 2300 VAC (50/60 Hz) for one minute

Remote control for the recorder functions:

Functions: Function control by contact-input is enabled

- alarm acknowledge
- alarm reset
- timer reset
- starting / stopping recording
- manual printout
- digital printout
- message printout
- message display
- changing chart speed / recording interval
- group trend recording

Input signal: no voltage contact, open-collector driven by a TTL or transistor

Rated voltage: 0 to 5 VDC (input impedance 4.7 kΩ, 5 VDC pull up)

Maximum input (allowable range) : −2 to 7 VDC

input conditions :on voltage 0.5V max.(30 mA DC)

leakage carrent at OFF state 0.25 mA max.

Duration of input signal: one second or longer (input singul detection internal : :approx.0.5 seconds)

Dielectric strength: between an input terminal and ground: 1500 VAC (50/60 Hz) for one minute

Failure output:

Functions: The output terminal for a failure becomes non-excited when an error is detected in the system.

Contact mode: Transfer contact (normal open / common /normal close)switching from 'excitation' to 'non-excitation', or vice versa is disabled.

Contact capacity: 250 VDC/0.1 A (with a resistive load)

250 VAC/2 A (with a resistive load)

30 VDC/2 A (with a resistive load)

Dielectric strength: between an output terminal and ground: 2300 VAC (50/60 Hz) for one minute

Output of 'Chart End':

Functions: The 'Chart End' output becomes excited when the end of recording paper is detected.

Contact mode: Transfer contact (normal open / common / normal close)switching from 'excitation' to 'non-excitation', or vice versa is disabled.

Contact capacity: 250 VDC/0.1 A (with a resistive load)

250 VAC/2 A (with a resistive load)

30 VDC/2 A (with a resistive load)

Dielectric strength: between an output terminal and ground: 2300 VAC (50/60 Hz) for one minute.

/H1: Internal Illumination

Clear internal illumination for easy distinction of traces.

/H5: Handle for Carrying

Easy to carry. It is user-friendly and ideal for many fields of applications.

/D2: Deg F Display Function

This function converts measured data into ˚F, and displays it on the display monitor of a DR.

/M1: MATH Function
Computation types
Types:

Four arithmetical operations, SQR (square root), ABS (absolute value), LOG (common logarithm), LN (natural logarithm), EXP (exponent), statistical computation*, logical computation (AND, OR, NOT, and XOR), relational computation, exponentiation, previously-measured value reference, hold**, and reset

*Statistical computation

CLOG: Computation process of simultaneously measured values within a group (total, maximum, minimum, average, and maximum - minimum)

TLOG: Computation process of a specific channel over time axis (total, maximum, minimum, average, and maximum - minimum)

Statistical computation interval:

Set by the event/action function

**Hold Temporary suspending of computation and temporary hold of the computed result

During statistical computation, resume the computation from the hold point after the hold is released.

Number of channels for computing (Number of channels that can be allocated for computational purposes.):

Stand-alone type: 30ch maximum

Expandable type: 60ch maximum

Computation interval:

Every measurement interval (except when the computation becomes too difficult to be processed every measured interval, in which case an alarm is generated)

Significant digits during computation:

$\pm 10^{38}$

Significant digits of the computed result:

-9999999 to +99999999 (Decimal point can be set to have 1 to 4 digits on the right of the decimal point)

Input from communication interface:

Digital value (ASCII numerical array) input from the communication interface can be handled as computational data

Computation start/stop:

Can be controlled by communication commands, M.FUNC key operation, and event/action function (such as M.FUNC key operation, remote control signal, time specified, and alarm status)

Other functions included in the math function:

Remote RJC

Input type: Thermocouple (TC)

Accuracy: (Twice the measurement accuracy of the standard thermocouple input) + (temperature difference between the terminal of the remote terminal section and thermocouple section for measuring the remote terminal temperature)

Thermocouple burnout: not selectable

/M3: Report Function
Outline:

This function assigns measurement and/or computation channels as report channels, and creates statistical information. The report computation can be selected from an hourly, daily, or monthly report. Chart printing takes place automatically whenever the report creation time (in the case of the DR recorder) is reached. The results of report computation can also be output by communication. Refer to GS 04M01B01-31E

Kinds of report computations:

Hourly report: Statistical information for one hour (starting on the hour)

Hourly report: Statistical information for one hour (starting on the hour)

Daily report: Statistical information for one day (starting from a reference time)

Monthly report: Statistical information for one month (starting from a reference date and time)

Each of the hourly, daily, and monthly reports can be set to ON or OFF.

/N7: Power Monitor Input (for Single Phase)
/N8: Power Monitor Input (for 3 Phase)
Outline

This option accepts AC voltage and current signals, and measures RMS values, active power, frequency, and so on. It is available as a single phase (/N7) version and also as a 3-phase (/N8) version.

Model and suffix code	Application (input channel)	Terminal shape	Measurement interval
/N7	Single-phase version (Voltage 1 ch, Current 1 ch)	clamp*	2 sec
/N8	3-phase version (Voltage 3 ch, Current 3 ch)	clamp[*1, *2]	2 sec

*1: 4-terminal push-in type

*2: Cannot be used as 3 single-phase inputs.

General specifications
Input format:

Transformer-isolated input

Measurement range

Voltage range: 25 Vrms or 250 Vrms

Current range: 0.5 A or 5 A

For 3-phase measurement or single-phase 3-wire measurement, the voltage and current ranges for each phase and each wire must be equal.

Measurement frequency:

45 to 65 Hz

Connection methods

/N7: Single-phase 2-wire method

/N8: Single-phase 2-wire method, single-phase 3-wire method, 3-phase 3-wire (2 voltages, 2 currents) method, 3-phase, 3-wire (3 voltages, 3 currents) method, and 3-phase 4-wire method

Measurement item:

Up to six items per module can be selected from RMS voltage, RMS current, active power, apparent power, reactive power, frequency, power factor and phase angle. The selected measurement items are assigned to measurement channels xx1 to xx6, displayed and recorded. Note that the combination of measurement items depends upon the input wiring method used (see the Measurement Item Combination Table).

Crest factor:
   3 or less (600 V peak)
Input resistance
   ACV: 300 kΩ min
   ACI: 1 Ω max
Filter:
   Utilizes the moving average function.
Power factor integration:
   Utilizes the /M1 computation function.
Insulation resistance:
   Between input and ground 20 MΩ min (500 VDC)
Withstand voltage:
   Between input terminals:
                1500 VAC (50/60 Hz) 1 minute
   Between each input terminal and ground:
                2300 VAC (50/60 Hz) 1 minute
Working temperature/humidity range:
   0 to 50°C 5 to 90% RH (Between 40 and 50°C, the humidity range
   must be between 10 and 50% RH.)
Measurement accuracy and resolution:

Measurement item	Measurement accuracy		Resolution
RMS voltage	±(0.5% of span)		0.01 Vrms (25 V range)
			0.1 Vrms (250 V range)
RMS current	±(0.5% of span)		0.0001 Arms (0.5 A range)
			0.001 Arms (5 A range)
Active power	±(1% of span)	$\phi = 0$	0.01 W (span:12.5 W/25 W/37.5 W)
	±(2.5% of span)	$0 < |\phi| \le 30$	0.1 W (span:125 W/250 W/375 W)
	±(5% of span)	$30 < |\phi| \le 80$	1 W (span:1250 W/2500 W/3750 W)
Apparent power	±(1% of span)	$0 \le |\phi| \le 80$	0.01 VA (span:12.5 VA/25 VA/37.5 VA)
			0.1 VA (span:125 VA/250 VA/375 VA)
			1 VA (span:1250 VA/2500 VA/3750 VA)
Reactive power	±(5% of span)	$0 \le |\phi| < 60$	0.01 Var(span:12.5 Var/25 Var/37.5 Var)
	±(2.5% of span)	$60 \le |\phi| \le 80$	0.1 Var (span:125 Var/250 Var/375 Var)
			1 Var (span:1250 Var/2500 Var/3750 Var)
Frequency	±0.1 Hz		0.01 Hz
Power factor	±(2% of span)	$0 \le |\phi| \le 80$	0.01
Phase angle	±5 deg	$0 \le |\phi| \le 80$	0.1 deg

span: equal to the maximum value of the measuring span describing
         in setting items and measuring span table.

10

■ Measurement item combination table

Combinations of measurement items that can be selected every two channels (channels 1 & 2, channels 3 & 4, channels 5 & 6, and so on) are fixed.

Select combination pairs from these measurement items, and assign them to each channel (2-channel group).

Shown below is a list of combinations that can be selected.

1. Single-phase 2-wire method

ch1 − ch2		ch3 − ch4		ch5 − ch6	
P1	VA1	V1	I1	Var1	PF1
				PF1	PH1

Select one couple

2. Single-phase 3-wire method, 3-phase 3-wire (2 voltages, 2 currents) method

ch1 − ch2		ch3 − ch4		ch5 − ch6	
P1	VA1	V1	I1	PF1	PH1
P3	VA3	V3	I3	PF3	PH3
P13	VA13			PF13	PH13
				V1	I1
				V3	I3
				V13	I13
				FREQ	V1
				Var1	PF1
				Var3	PF3
				Var13	PF13

Select one couple

3. 3-phase 3-wire (3 voltages, 3 currents) method

ch1 − ch2		ch3 − ch4		ch5 − ch6	
P1	VA1	V1	I1	PF1	PH1
P2	VA2	V2	I2	PF2	PH2
P3	VA3	V3	I3	PF3	PH3
P13	VA13			PF13	PH13
				V1	I1
				V2	I2
				V3	I3
				V13	I13
				FREQ	V1
				Var1	PF1
				Var2	PF2
				Var3	PF3
				Var13	PF13

Select one couple

ch1 − ch2		ch3 − ch4		ch5 − ch6	
V0	I0	V1	I1	V1	I1
V1	I1	V2	I2	V2	I2
V2	I2	V3	I3	V3	I3
V3	I3				

Select one couple

4. 3-phase 4-wire method

ch1 − ch2		ch3 − ch4		ch5 − ch6	
P0	VA0	V1	I1	PF0	PH0
P1	VA1	V2	I2	PF1	PH1
P2	VA2	V3	I3	PF2	PH2
P3	VA3	P0	VA0	PF3	PH3
		P1	VA1	V1	I1
		P2	VA2	V2	I2
		P3	VA3	V3	I3
				FREQ	V1
				Var0	PF0
				Var1	PF1
				Var2	PF2
				Var3	PF3
				P0	VA0
				P1	VA1
				P2	VA2
				P3	VA3

Select one couple

ch1 − ch2		ch3 − ch4		ch5 − ch6	
V0	I0	V1	I1	V1	I1
V1	I1	V2	I2	V2	I2
V2	I2	V3	I3	V3	I3
V3	I3				

Select one couple

Setting items and measuring span table

Setting items	Measuring span	Display span
Effective voltage (RMS value) V1, V2, V3, V0, V13	0.00 to 25.00 V 0.00 to 25.00 V 0.0 to 250.0 V 0.0 to 250.0 V	0.00 to 26.25 V 0.00 to 26.25 V 0.0 to 262.5 V 0.0 to 262.5 V
Effective current (RMS value) I1, I2, I3, I0, I13	0.0000 to 0.5000 A 0.000 to 5.000 A 0.0000 to 0.5000 A 0.000 to 5.000 A	0.0000 to 0.5250 A 0.000 to 5.250 A 0.0000 to 0.5250 A 0.000 to 5.250 A
Active power P1, P2, P3	–12.50 to 12.50 W –125.0 to 125.0 W –125.0 to 125.0 W – 1250 to 1250 W	–13.75 to 13.75 W –137.5 to 137.5 W –137.5 to 137.5 W –1375 to 1375 W
Active power (single-phase 3-wire/3-phase 3-wire) P13	–25.00 to 25.00 W –250.0 to 250.0 W –250.0 to 250.0 W –2500 to 2500 W	–27.50 to 27.50 W –275.0 to 275.0 W –275.0 to 275.0 W –2750 to 2750 W
Active power (3-phase 4-wire) P0	–37.50 to 37.50 W –375.0 to 375.0 W –375.0 to 375.0 W –3750 to 3750 W	–41.25 to 41.25 W –412.5 to 412.5 W –412.5 to 412.5 W –4125 to 4125 W
Apparent power VA1, VA2, VA3	0.00 to 12.50 VA 0.0 to 125.0 VA 0.0 to 125.0 VA 0 to 1250 VA	0.00 to 13.75 VA 0.0 to 137.5 VA 0.0 to 137.5 VA 0 to 1375 VA
Apparent power (single-phase 3-wire/3-phase 3-wire) VA13	0.00 to 25.00 VA 0.0 to 250.0 VA 0.0 to 250.0 VA 0 to 2500 VA	0.00 to 27.50 VA 0.0 to 275.0 VA 0.0 to 275.0 VA 0 to 2750 VA
Apparent power (3-phase 4-wire) VA0	0.00 to 37.50 VA 0.0 to 375.0 VA 0.0 to 375.0 VA 0 to 3750 VA	0.00 to 41.25 VA 0.0 to 412.5 VA 0.0 to 412.5 VA 0 to 4125 VA
Reactive power Var1, Var2, Var3	0.00 to 12.50 Var 0.0 to 125.0 Var 0.0 to 125.0 Var 0 to 1250 Var	0.00 to 13.75 Var 0.0 to 137.5 Var 0.0 to 137.5 Var 0 to 1375 Var
Reactive power (single-phase 3-wire/3-phase 3-wire) Var13	0.00 to 25.00 Var 0.0 to 250.0 Var 0.0 to 250.0 Var 0 to 2500 Var	0.00 to 27.50 Var 0.0 to 275.0 Var 0.0 to 275.0 Var 0 to 2750 Var
Reactive power (3-phase 4-wire) Var0	0.00 to 37.50 Var 0.0 to 375.0 Var 0.0 to 375.0 Var 0 to 3750 Var	0.00 to 41.25 Var 0.0 to 412.5 Var 0.0 to 412.5 Var 0 to 4125 Var
Power factor PF1, PF2, PF3, PF0, PF13	–1.00 to 1.00	–1.00 to 1.00
Phase angle PH1, PH2, PH3, PH0, PH13	–80.0 to 80.0 deg	89.0 to 89.0 deg
Frequency FREQ	45.00 to 65.00 Hz	41.00 to 69.00 Hz

Each value described left is corresponding to the current value described below, from upper to lower.
25 V - 0.5 A range
25 V - 5 A range
250 V - 0.5 A range
25 0V - 5 A range

/L1: Winter/Summer Time
Winter and summer time can be set.

■ Type name and specification code

DR230 Stand-alone type

Model	Suffix Code			Optional Code	Description
DR231					250 mm, Desk-top hybrid recorder
Memory	-0				No memory device
	-1				3.5" FD
Software		0			No DARWIN DAQ32 software
		2			DARWIN DAQ32 software (English) attach
No. of Inputs			-1		10ch
			-2		20ch
			-3		30ch
Input and Screw Type			1		Universal input (screw input terminal)
			2		Universal input (clamped input terminal)
			3		DC V/TC/DI input (screw input terminal)
			4		DC V/TC/DI input (clamped input terminal)
Power Supply			-1		100 VAC to 240 VAC
Power Inlet & Power Cable				D	3-pin power inlet w/UL,CSA cable
				F	3-pin power inlet w/VDE cable
				H	3-pin power inlet w/CCC cable
				R	3-pin power inlet w/SAA cable
				S	3-pin power inlet w/BS cable
Optional Features				/M1	Math function (including RRJC)
				/M3	Report function
				/C1	GP-IB interface	Must not coexist
				/C2	RS-232-C interface
				/C3S	RS-422-A/RS-485
				/C7	Ethernet
				/N7	Power monitor (for single phase)	Must not coexist
				/N8	Power monitor (for 3 phase)
				/A4	Alarm relay output (10 points)
				/R1	Remote, alarm, fail/chart end (screw)
				/H1	Internal illumination
				/H5	Carring handle
				/L1	Winter/Summer time
				/D2	Deg. F display
				/P6	DC power supply operation (AC/DC power coexist)
				/FC	DARWIN DAQ 32 is supplied with floppy disks

Accesories

Model Code	Description
DV300-011	Shunt resistor 10 Ω for screw input terminal
DV300-012	Shunt resistor 10 Ω for clamped input terminal
DV300-101	Shunt resistor 100 Ω for screw input terminal
DV300-102	Shunt resistor 100 Ω for clamped input terminal
DV300-251	Shunt resistor 250 Ω for screw input terminal
DV300-252	Shunt resistor 250 Ω for clamped input terminal
DV400-011	Rack mount kit (DA100 exp./DS400) for ANSI
DV400-012	Rack mount kit (DA100 stand./DS600) for ANSI
DV400-013	Rack mount kit (DR230) for ANSI

Package Software

Model Code	Description
DP120-13	DARWIN DAQ 32 software (Windows 98/Me/NT 4.0/2000/XP) (comes standard)
WX102/CD1	DARWIN DAQ 32 Plus software (Windows 98/Me/NT 4.0/2000/XP) (optional)
WX101/CD1	DAQLOGGER for multi-channel data logging software (Windows 98/Me/NT 4.0/2000/XP) (optional)

■ Dimensions

unit: mm

Panel Cutout and Spacing

424

Rear panel

DC power connector

AC power connector

Power fuse

Intput terminal section

Output terminal section

266

25

30   207*1   98.8
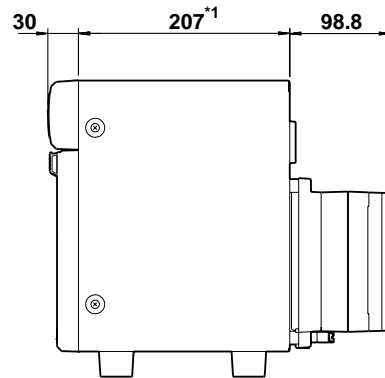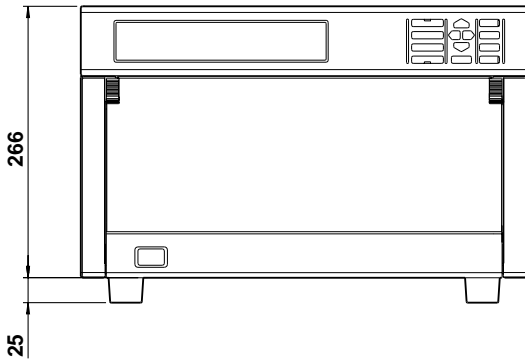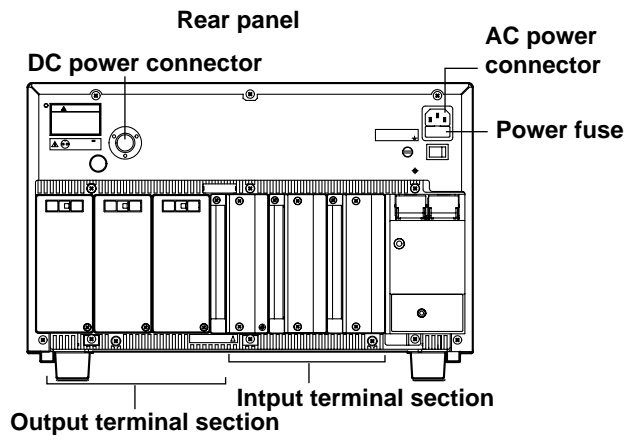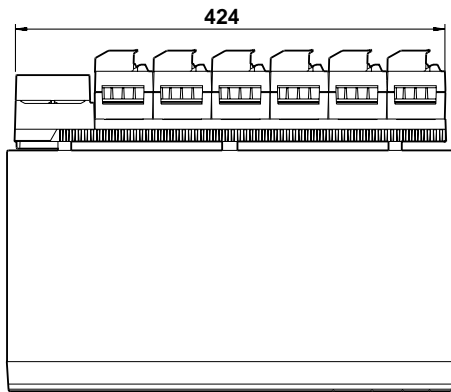
***1: When specifying DC power opration,
this number is changed to approx. 252 mm.**

Rack Mounting Dimensions

482.6 ±1

11.3   11.3   30

Panel face

6.8   6.8

265.9 ±1   190.5 ±0.5   190.5 ±0.5   265.9 ±1

37.7   37.7

1   2   1

1&2: Removed

GS 04M01C01-11E
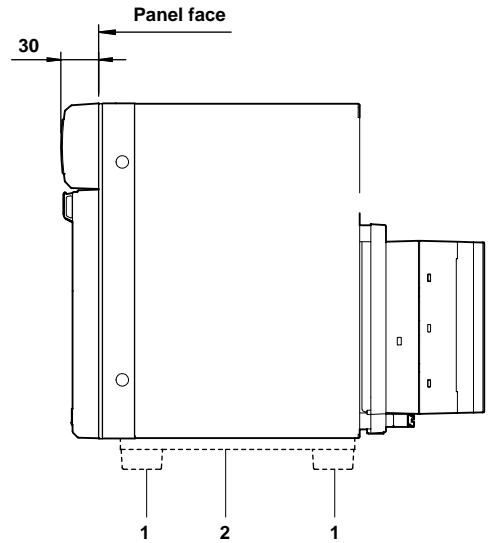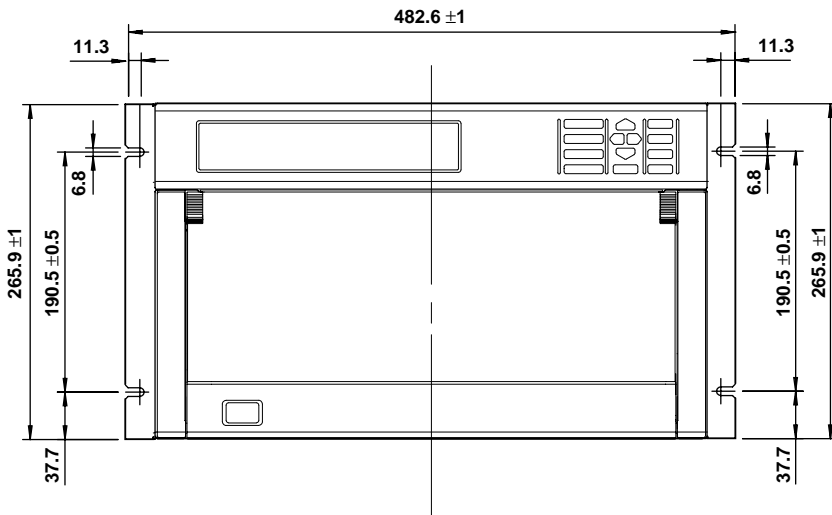
Wiring Input Signal Lines (to Universal and DCV/TC/DI input modules)

Terminals

Screw type terminal   **Clamp type terminal**

- + — **DC voltage • TC • contact**

b B A — **RTD***

***There are no RTD input terminals on the DCV/TC/DI input module.**

CH1
CH2

CH2
CH4
CH10

A +
B -
b

CH1
CH3
CH9

CH10

Wiring Diagram

DC voltage input/DI input (contact)   **DC input**

- +   - +

+ **DC voltage input** -   + **DC current input** -

Shunt resistor

Note: For 4 to 20 mA input, shunt resistance value should be 250 $\Omega \pm 0.1\%$

TC input   **RTD input**

- +   **b B A**

Compensation lead

b
A
B

10 Ω* max./leadwire Three wire resistances should be approx. equal.

***10 Ω max. for Pt 100 Ω and Pt 50 Ω, 1 Ω max. for Cu 10 Ω.**

Wiring Alarm Output Signal Lines (to /R1 and /A4 option)

Terminals

/R1 option   **/A4 option**

NO C NC   **NO C**

Terminal arrangement

Contact capacity:

250 VDC/0.1 A (with a resistor load)

250 VAC/2 A (with a resistor load)

30 VDC/2 A (with a resistor load)

Fail output:

becomes de-activated when an error is detected in the system.

Failure output (transfer-contact)
Chart end output (transfer-contact)

Remote control signal input (12 contact terminals)

ALM output 1 (transfer-contact)
ALM output 2 (transfer-contact)

FAIL NO C NC
CHART NO C NC
1 C 2
3 C 4
5 C 6
REM 7 C 8
9 C 10
11 C 12
ALM1 NO C NC
ALM2 NO C NC

1
2
10

Alarm output (make contact)