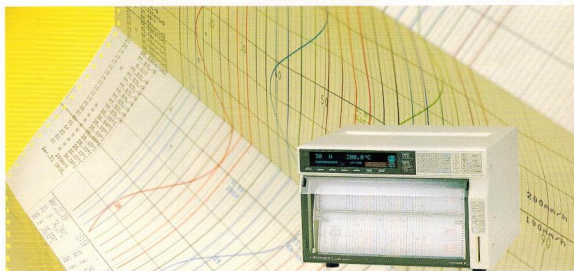YOKOGAWA ◆

High-speed scanning of 30 points/s
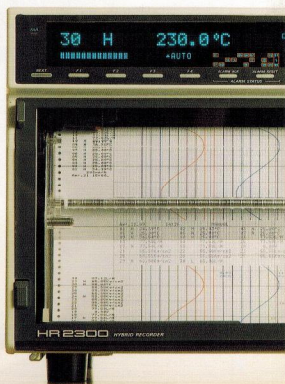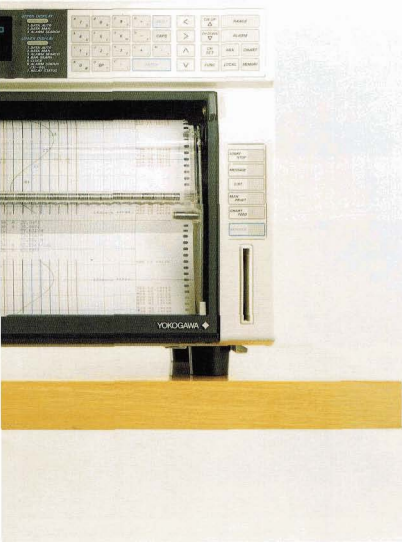High-speed recording of 60 points/2 s
Ten-color analog traces

HR

HYBRID RECORDER HR 2300

Accurate, High-Speed Hybrid Recorder

Ideal for laboratory applications.

The YOKOGAWA HR2300 is a new Hybrid Recorder with high-speed scanning of 30 points/ second, and high-speed recording of 60 points/ 2 seconds.

This interactive menu-driven recorder with it's powerful analytical functions, is ideal for many fields of R&D and laboratory applications.

High-Speed Scanning of 30 Points/s
(High-Speed Model)
● Provided with a YOKOGAWA-developed high breakdown voltage solid state relay.

High-Speed Recording of 60 Points/2 s
● 30 points for computation and other features are available in addition to 30 input points.

Programmable Ten-Color Recorder
● Recording colors can be assigned to designated channels.

Powerful Computing Functions (Optional)
● +, −, ×, ÷, statistical, logical and relational computation.

IC Memory Card (Optional)
● Saving and loading of settings, measured and computed data.

Computer Friendly (Optional)
● Bidirectional communications via GPIB or RS-232-C interface.

Alarm Functions
● Up to 6 types of alarm set points.

Maximum Scanning Speed and Relay Life
through the Use of YOKOGAWA-Original Solid State Relay.

High-Speed Scanning: 30 Points/Second

Retained analysis is possible because digital data which is sampled every second can be transferred to IC memory card or to a supervisory computer via a GP-IB or RS-232-C interface.

YOKOGAWA has developed a high breakdown voltage solid state relay with the following advantages:

● Higher scanning speed than electromagnetic relay.
● Long relay life. In addition, there is no relay noise.
● YOKOGAWA-original solid state relay has high normal mode breakdown voltage (1,500 V DC), and high common mode breakdown voltage (250 V AC).

(YOKOGAWA-original high break down solid state relay)

High-Speed Recording: 60 Points/2 Seconds

In two seconds, 30 input points – in addition to another 30 points for computed data, digital inputs and memory card data – can be recorded in analog form. You can select the most important data from a variety of input data, and record it in analog form.

Data analysis is easy because the printout density is higher than conventional models.
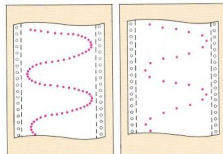
HR2300   Model 3081
(Conventional model)

Ten-Color Recording

Each channel is recorded in one of ten distinct colors; black, blue, navy blue (new), green, yellowish green (new), purplish red (new), brown, orange (new), red and purple.

Zone recording, partially expanded-scale printout, message printout, Tag No., header printout (80 characters × 5 lines) are also selectable.

● Color can easily be designated for each channel.
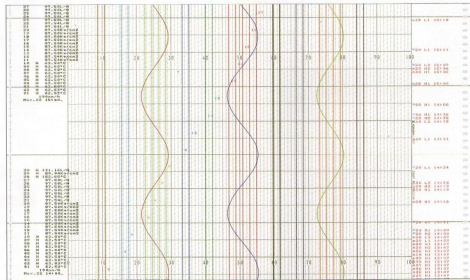
● The most important measurement data can be quickly identified with selected colors.

● LOGGING printout

Full Line of Convenient Features....

Computing, IC Memory Card, Communication and Alarm Functions.

Multiple Computing Functions (Optional)

It features the following computing functions: +, −, ×, ÷, SQR, absolute value, common logarithm, and exponential computation, relational computation (<, >, =, ≠), TLOG (maximum, minimum, average, and total values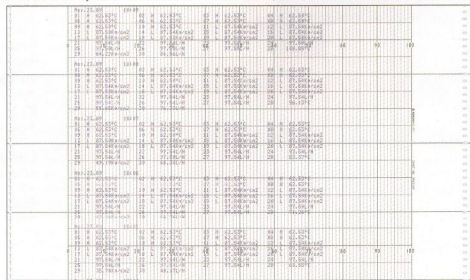 and the difference between the maximum and the minimum values can be determined as time-series data in the specified channel), CLOG (maximum, minimum, average, and total values, the difference between the maximum and the minimum values, and standard deviation can be determined in a specified channel group).

Temperature oven — HR2300 — Recording — Analysis

Temperature oven — HR2300 — Recording/analysis
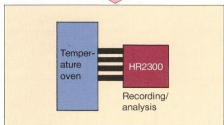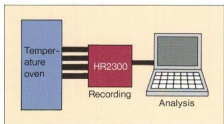
AC Inputs (Optional)

The following AC inputs can be measured without using converter.
/AC 2 : AC V 1 point, AC current 1 point.
/AC 6 : AC V 3 points, AC current 3 points.
Max. Voltage : 250V or 25V.
Max. Current : 2.5A or 0.25A.

Universal Input Types

- DC Voltages : 20 mV to 50 V DC
- TC : Type R, S, B, K, E, J, T, N, W, L, U, and KP vs Au7Fe
- RTD : Pt100, JPt100 (1mA), Pt100 (2mA), Pt50 (2mA), Ni100 (SAMA, DIN), Ni120, J263∗B, and Cu10.
  High-sensitivity model (0.01% resolution for each Pt100 and JPt100 range) is also available.
- Contact status for event recording
- The above four types of inputs are freely selectable for each point.
- DC A : Shunt resistor (accessory) must be used.

IC Memory Card

- Large memory capacity of 512K bytes
- Data is composed of two bytes
- Data saving to the memory card can be started :
  - From the front panel
  - By alarm occurrence
  - By contact inputs at the rear
  - Out of chart
- Both setting and measured data can be stored
- Data prior to an alarm occurrence can also be collected using the pre-trigger functions.

Computer Friendly (Optional)

- Analog recording is also possible by transmitting digital data from a personal computer (/MATH required).
- Both data transfer from an HR2300 to a personal computer, and data setting to an HR2300 from a personal computer are available (bidirectional communications).

HR2300 — HR2300
Bidirectional (GPIB RS-232-C) — Digital data
Analysis
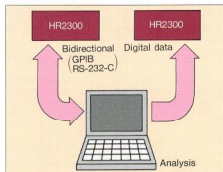
Wide Voltage Range Power Supply

90 to 250 V AC.

DC Power Source (Optional)

10 to 32V DC power source.

Hourly, Daily, or Monthly Report (Optional)

Summary of computations such as max., min., average, total values. can be printed.

Multiple Alarm Functions

Alarm types : High(H), low(L), delta high(ΔH), delta low(ΔL), high-rate of change(RH), low-rate of change(RL).
Alarm recording : Recorded at the right end of the chart.
  △01 H1 10:20 (△mark:red), alarm ON,
  ▽01 H1 9:20 (▽mark:blue), alarm OFF,
  channel No., alarm type, alarm level, time of alarm occurrence.

Alarm Output Relay (Optional)

Internal alarm relay : 12 points, external alarm relay : 60 points.
AND/OR and Reflash alarm relay output.

Analysis of data on automobile running tests

Temperature | Force of the Wind | Speed | Pressure | Weighting
HR2300
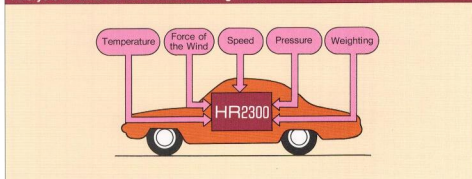
- High accuracy : ±0.05% of rdg+2 digits (2 V range)
- ΔT measuring, scaling function
- Highly visible vacuum fluorescent display
- Internal illumination for quick chart reading (optional)
- Versatile optional features and accessories
  GPIB, RS-232-C interface, remote control, mathematical functions, internal alarm output relay, external alarm output relay, memory card, reporting, user's linearization and remote RJC.

Ten-Color Hybrid Recorder....
Any Color can be Assigned for Each Channel.


```
30  H   66.76L/H
29  H   49.81Kg/cm2
28  H   84.02°C
27      97.54L/H
26      97.54L/H
25      97.54L/H
24      97.54L/H
23      97.54L/H
22      97.54L/H
21      97.54L/H
20      87.50Kg/cm2
19      87.50Kg/cm2
18      87.50Kg/cm2
17      87.54Kg/cm2
16      87.50Kg/cm2
15      87.50Kg/cm2
14      87.54Kg/cm2
13      87.54Kg/cm2
12      87.54Kg/cm2
11      87.54Kg/cm2
10  H   62.50°C
09      62.53°C
08  H   62.53°C
07  H   62.53°C
06  H   62.53°C
05      62.53°C
04      62.50°C
03  H   62.53°C
02      62.53°C
01  H   62.53°C
May.22  11:39
INTVL 1
```

11:42 Valve 001 Opened

```
MANUAL              May.22.89      11:39
01  H   62.53°C     02      62.53°C     03  H   62.53°C     04
05      62.50°C     06  H   62.53°C     07  H   62.53°C     08  H
09      62.53°C     10  H   62.50°C     11      87.54Kg/cm2
13      87.50Kg/cm2 14      87.50Kg/cm2 15      87.54Kg/cm2 16
17      87.50Kg/cm2 18      87.50Kg/cm2 19      87.54Kg/cm2 20
21      97.54L/H    22      97.54L/H    23      97.50L/H    24
25      97.54L/H    26      97.54L/H    27      97.54L/H    28  H
29  H   52.30Kg/cm2 30  H   70.54L/H
```

```
30  L   58.79L/H
29  L   43.60Kg/cm2
28  H   73.91°C
27      97.54L/H
26      97.54L/H
25      97.54L/H
24      97.54L/H
23      97.54L/H
22      97.54L/H
21      97.54L/H
20      87.54Kg/cm2
19      87.54Kg/cm2
18      87.54Kg/cm2
17      87.54Kg/cm2
16      87.54Kg/cm2
15      87.54Kg/cm2
14      87.54Kg/cm2
13      87.54Kg/cm2
12      87.54Kg/cm2
11      87.54Kg/cm2
10  H   62.53°C
09      62.53°C
08  H   62.53°C
07  H   62.53°C
06  H   62.53°C
05      62.53°C
04      62.53°C
03  H   62.53°C
02      62.53°C
01  H   62.53°C
May.22  11:14
INTVL 1
```
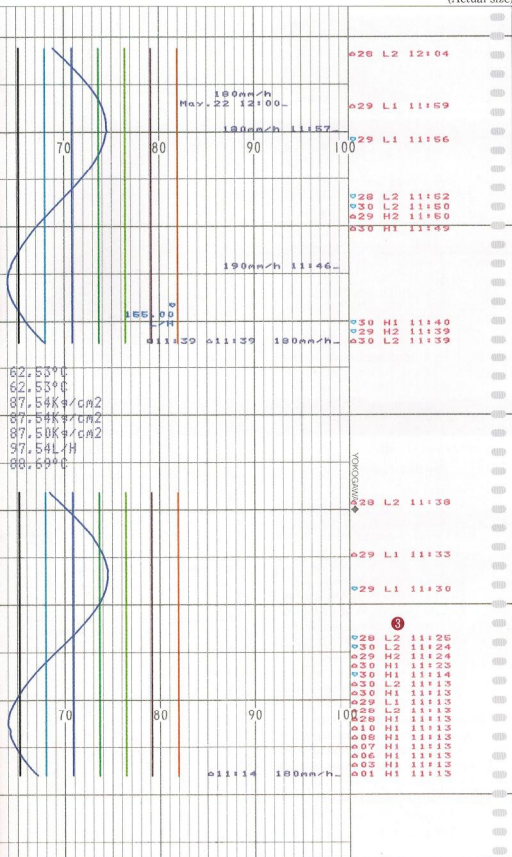
YOKOGAWA NEW HYBRID RECORDER

PRINTOUT CONFIGURATIONS of YOKOGAWA NEW HYBRID RECORDER
FEATURE 1: High Speed Scanning/High Speed Recording
FEATURE 2: Printout in Ten Colors(Color Specifiable)
FEATURE 3: IC Memory Card

HR2300

(Actual size)

Chart data annotations (from the recording chart):

```
⊚28 L2 12:04
180mm/h
May.22 12:00
180mm/h 11:57      ⊚29 L1 11:59
                   ⊚29 L1 11:56
70        80        90        100

                   ⊽28 L2 11:52
                   ⊽30 L2 11:50
190mm/h 11:46      ⊽29 H1 11:49

165.00
                   ⊽30 H1 11:40
                   ⊽29 H2 11:39
⊚11:39  ⊚11:39  180mm/h  ⊚30 L2 11:39

62.53°C
62.53°C
87.54Kg/cm2
87.54Kg/cm2
97.54L/H
88.69°C

                   ⊚28 L2 11:38

                   ⊚29 L1 11:33

                   ⊽29 L1 11:30

                   ③

                   ⊽28 L2 11:26
                   ⊽30 L2 11:24
                   ⊽29 H2 11:24
                   ⊽30 H1 11:23
                   ⊚30 H1 11:13
                   ⊽29 L1 11:13
70    80    90    100    ⊚28 L2 11:13
                   ⊚10 H1 11:13
                   ⊚08 H1 11:13
                   ⊚07 H1 11:13
                   ⊚06 H1 11:13
                   ⊚03 H1 11:13
⊚11:14  180mm/h    ⊚01 H1 11:13
```

● Relation of Chart Speed and Printing
(Digital printout; SINGLE Mode)

Chart Speed (mm/h)	CH No./ Tag No.	Date & Hr. Chart Speed Measured Data	Alarm Scale value Message (Title)
1 to 9	Printable	Non printable	Printable
10 to 500	Printable	Printable	Printable
501 to 1,500	Non printable	Non printable	Non printable

● Printing Intervals of Digital Data
(Analog recording & digital printout; SINGLE Mode)

Chart Speed (mm/h)	Printing intervals of digital data			
	1 line	2 line	3 line	4 line
10 to 24	12 h	6 h	4 h	3 h
25 to 49	4 h	2 h	1-2/3h	1 h
50 to 99	2 h	1 h	40 min	30 min
100 to 500	1 h	30 min	20 min	15 min

❶ Analog data
Input signals of up to 60 channels are printed out at specified intervals in ten colors in the calibrated width of 250mm (9-7/8″). (Color can be assigned to designated channel.)

❷ Digital printout
Measured data, date and time, hour and alarm status are printed in digital form at specified intervals (recording periods). 3 types of intervals can be programmed for each channel (Interval : MULTIPLE Mode).

❸ Alarm printout
At the time of alarm ON and OFF, the channel No., alarm type, and time are printed.

❹ Scale values printout
The scale values are printed for each channel every 5.0mm or 12.5mm in the same color as the analog data.

❺ Tag No. (or channel No.) printout
Tag No. (or channel No.) is printed at regular intervals in the same color as the analog data.

❻ Manual printout
When MAN PRINT key is depressed, digital data of single scan is printed out in place of analog printout.
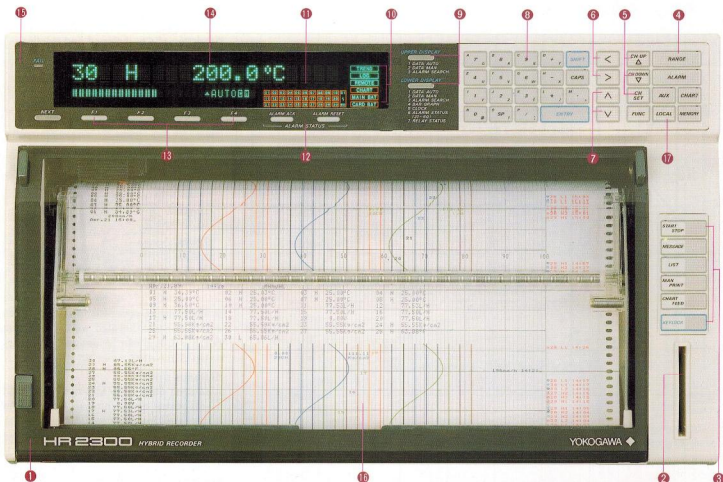
❼ Message printout
The message contents are printed periodically (title) by depressing FUNC Key, by external signal input or alarm ON.

❽ Header printout
Header information (80 characters × 5 lines) can be printed out through panel key switch.

Easy-to-Operate Design

Interactive Menu-Driven Setting with Large Multiple VFD Display.

❶ Power ON/OFF selector

❷ IC Memory card slot

❸ Recording mode keys
START/STOP: Start or stop of the chart drive.
HEADER: Used for header printout.
LIST: Used for program list printout.
MAN PRINT: Single-scan printing in logging format.
CHART FEED: Feeds the chart at a push of this key.
KEY LOCK: Used for locking setting entries.

❹ Setting mode keys
Programming mode keys to select RANGE, ALARM, CHART SPEED or memory card.

❺ Channel number selection keys

❻ Cursor keys

❼ Setting mode moving keys

❽ Alphanumeric keys

❾ Display mode keys
UPPER DISPLAY···Upper display mode changing key.

LOWER DISPLAY···Lower display mode changing key.
DATA AUTO···Display is automatically updated in 2s intervals.
DATA MAN···Displays the data of a designated channel.
ALARM SEARCH···Displays the channel data on alarm in 2s intervals.
BAR GRAPH···Measured data is shown on the LOWER DISPLAY as a bargraph.
CLOCK···Displays the date and time.
ALARM STATUS (31 to 60)···Displays the alarm status for each channel.
RELAY STATUS···Displays the alarm output relay status (internal: 12 points, external: 60 points, etc.).

❿ Recorder mode display area
Lights up to indicate recording mode (TREND, LOGGING), out of chart and low battery condition and REMOTE status for GPIB communication.

⓫ Alarm status display area
Displays alarm status of measurement or computation channel.

⓬ ALARM STATUS selection keys
ALARM ACK: Alarm display flashes when alarm occurs. Press ALARM ACK to display current alarm status.
ALARM RESET: Alarm status display and alarm output relay is reset.

⓭ Programming function keys
Simple programming with interactive display.

⓮ Measuring and setting display area
UPPER DISPLAY, LOWER DISPLAY

⓯ Recorder FAIL lamp

⓰ Recorded chart

⓱ LOCAL key
Switches the GPIB communication from REMOTE to LOCAL.

Setting Display

Interactive setting: Function key labels appear on the LOWER display.

The display shows the setting range.

Measurement Display
A variety of display modes are selectable.

Both UPPER and LOWER DISPLAYs show the measurement data in digital format.
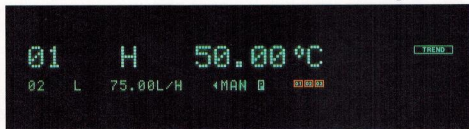
The UPPER DISPLAY shows the measurement data in digital format and LOWER DISPLAY, a bargraph.

The UPPER DISPLAY shows the measurement data in digital format, and the LOWER DISPLAY, the clock.

Simple Operation

Clamped Input Terminals Block
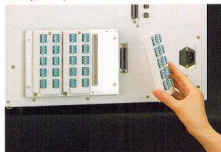
The clamped input terminal block can be removed for wiring. (You can also specify screw input terminal block)

Easy Chart Replacement

The chart replacement can be easily carried out by using a new chart cassette.

Rear Panel
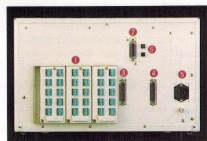
❶Input terminal block
❷GPIB or RS-232-C interface terminal
❸FAIL, chart end, remote terminal, alarm output relay terminal (/AK-02)
❹Alarm output relay terminal (/AK-12)
❺Power connector
❻Interface for external alarm output relay (/EAI)

SPECIFICATIONS

- **Number of Inputs**: Up to 20 or 30 points.
- **Input Types, Ranges, Accuracy and Resolution:**
  At 23 ± 2°C and 55 ± 10 % R.H.
  * Any of DC V, TC, RTD, and DI inputs can be selected for each input point.

Input Type	Range	Measurement (Digital display & printout) Accuracy	Resolution
DC V	20mV	± (0.05% of rdg + 5 digits)	1μV
	60mV	± (0.05% of rdg + 2 digits)	10μV
	200mV	± (0.05% of rdg + 2 digits)	10μV
	2V	± (0.05% of rdg + 2 digits)	100μV
	6V	± (0.05% of rdg + 2 digits)	1mV
	20V	± (0.05% of rdg + 2 digits)	1mV
	50V	± (0.05% of rdg + 2 digits)	10mV
TC	*1 R	± (0.05% of rdg + 1°C)	0.1°C
	*1 S	R,S 0 to 100°C ± 3.7°C 100 to 300°C ± 1.5°C B:400 to 600°C ± 2°C	
	*1 B		
	*1 K	± (0.05% of rdg + 0.7°C) −200 to −100°C ± (0.05% of rdg + 1°C)	0.1°C
	*1 E *1 J *1 T	± (0.05% of rdg + 0.5°C) J, L: −200 to −100°C ± (0.05% of rdg + 0.7°C)	0.1°C
	*2 L *2 U		
	*3 N	± (0.1% of rdg + 0.7°C)	0.1°C
	*4 W	± (0.1% of rdg + 1°C)	
	*5 KP vs Au7Fe	± (0.05% of rdg + 0.7K)	0.1K
RTD	*6 Pt100 (1mA, 2mA) *6 JPt100 (1mA, 2mA)	± (0.05% of rdg + 0.3°C)	0.1°C
	*7 Pt50 (2mA)	± (0.05% of rdg + 0.3°C)	0.1°C
	*8 Ni100 (1mA) *8 Ni120 (1mA)	± (0.09% of rdg + 0.3°C)	0.1°C
	*8 J263*B (1mA)	± (0.1% of rdg + 0.3K)	0.1K
	Cu10 GE, L&N WEED, BAILEY	± (0.2% of rdg + 0.7°C)	0.1°C
	Pt100 (1mA) Pt100 (2mA) JPt100 (1mA) JPt100 (2mA)	High-sensitivity model ± (0.05% of rdg + 0.3°C)	0.01°C

Contact Status (input signal : contact status or DC V)

*1 R,S,B,K,E,J,T : ANSI, IEC 584, DIN IEC 584 JIS C 1602-1981
*2 L, Fe-DuN, 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 KP vs Au7Fe : NBS Vol.76A
*6 Pt100 : JIS C 1604-1989, JIS C 1606-1989 IEC 751, DIN IEC 751
*6 JPt100 : JIS C 1604-1989, JIS C 1606-1989
*7 Pt50 : JIS C 1604-1981, JIS C 1606-1984
*8 Ni100 : SAMA, DIN 43760 Ni120 : McGRAW EDISON
*8 J263▪B (KP) : Cu) : YOKOGAWA

- **Recording Accuracy** (Analog trend): ± 0.1% of span (not including measurement accuracy).
- **Recording Resolution** (Analog trend): 0.04% of span.
- **Reference Junction Compensation Error**: ± 1°C (R, S, B, W), ± 0.5°C (K, J, E, T, N, **L, U,** KP vs Au7Fe)

- **Scan Cycle Time**: 1 to 60s selectable (1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60s).
- **Scanning Rate**: 60ms/channel.
- **A-D Integration Time**: 20ms (50Hz), 16.7 ms (60Hz), and 100ms (50/60Hz) are selectable via an internal DIP switch.
- **Input Impedance**: More than 10MΩ on 2V or lower ranges and TC, approx. 1MΩ on 6V or higher ranges.
- **Input Bias Current**: Less than 10nA.
- **TC Burnout Protection**: 2kΩ or less (normal), 100kΩ or more (open), current approx. 6μA, detection pulse width approx. 2ms, (ON or OFF selectable for each channel).
- **Temperature Coefficient**: Zero drift: 0.01 % of range/°C, Full span: 0.01% of range/°C.
- **Maximum Allowable Input Voltage**: 60V DC.
- **Maximum Common Mode Voltage**: 250 Vrms AC.
- **Common Mode Rejection**: More than 120 dB (50 or 60Hz ± 0.1%).
- **Normal Mode Rejection**: More than 40 dB (50 or 60Hz ± 0.1%).

PRINTOUT

- **Printing Technique**: Raster scan using a wire-dot printer and a 10-color ribbon.
- **Effective Recording Span**: 250mm (9-7/8") (analog data).
- **Chart**: Z-fold chart (342.5mm × 30m, 13-1/2" × 98ft) with calibrated width of 250mm.
- **Recording Colors**: Analog data (TREND mode)…10 colors (black, blue, navy blue, green, yellowish green, purplish red, brown, orange, red and purple), Color can be specified for every channel. Digital data (TREND mode)…channel number, measured data, date & time, chart speed (black), alarm (ON mark; red, OFF mark; blue), (LOG & LIST modes)…all data (purple).
- **Printout Format**: Analog trend/analog trend + digital/logging.
  In the trend mode…the following recording is available.
  Zone recording, partially expanded-scale printout assignable for every points.
  In the trend mode, recording can also be turned ON/OFF in every channel for the following items (panel setting), analog recording, measured value printing (1 to 4 rows), interpolation and moving average recording.
- **Chart Speeds**: 1 to 1,500mm/h.
- **Change of Chart Speed (Interval)**: Chart speed or logging interval is changed by remote control signals (optional) or alarm occurrence.
- **Print Cycle Time (Interval)**:
  Analog recording interval in the trend mode…FIX mode…Recording for interval is same as measuring interval (data is

recorded every two scans in 1s scanning). AUTO mode…Recording interval is determined in accordance with the chart speed.
Digital recording interval in the trend mode: MULTIPLE mode…selectable each channel from any of three values (1 min. to 24 hours). SINGLE mode…chart speed and the number of recording lines automatically determine digital interval.
Interval in the logging mode: MULTIPLE mode…Chosen and recorded from one of three types of interval for every channel (1 min. to 24 hours), SINGLE mode… Recorded at a determined interval.

- **Chart Drive**: Pulse motor drive.
- **Chart Speed Accuracy**: ± 0.1% (when running 1m or more continuously and not including paper expansion or contraction).
- **Start Time**: Programmable for measurement (scan) and printing start time or T LOG interval.
- **Printout Mode**:
  1. NORMAL: Printing starts when START/ STOP switch turned ON and stops when switch is turned OFF.
  2. PRINT ON ALARM (Either one of the following is settable): TRIGGER mode… Printing starts at set alarm *1 ON, and stops at START/STOP switch OFF (set on shipment from the factory). LEVEL mode…Printing starts at set alarm *1 ON, and stops at alarm OFF.
  3. CHART SP/INTVL CHANGE ON ALARM: Chart speed/interval changes at set alarm *1 ON, and restored at alarm OFF.
  * 1 : All of the OR alarms or the set alarm.
- **Standard Printing Functions**: Engineering units (up to 6 alphanumerics), tag number (up to 7 alphanumerics), alarms (channel number, alarm type, and the time of alarm ON/OFF), scale markings (0/100%, 0/50/ 100%, or 20% steps), program list, manual, message (max. 16 characters), and header (80 characters × 5 lines).

DISPLAY and CONTROLS

- **Type of Display**: Vacuum fluorescent display (5×7 dot matrix, blue), 2 lines (upper display…20 characters, larger size, lower display…28 characters, smaller size).
- **Data Display**: Measured data (channel number, alarm status, measured value, engineering unit), bargraph, clock, alarm status, relay status, programming data, battery status, and recording format (TREND/LOG).

CALCULATION (STANDARD)

- **Scaling**: Range…DCV/TC/RTD, input range…each range within the measuring range, scaling range…−20000 to +20000,

HR2300

decimal point···freely settable.

● **Difference Calculation (△T)**: Between any channels (within the same range).

● **Moving Average**: For every 8 scans (ON/OFF is selectable for every channel).
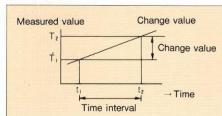
IC MEMORY CARD

● **Memory Data**: Setting data, measured data, communication input data and programmed parameter can be stored on a memory card (accessories).

● **Memory Capacity**: 512, 256 or 64K bytes.

● **Data Length (common settings to all channels)**: 500 / 1,000 / 2,000 / 4,000 / 8,000 / 16,000 / 32,000 data/channel, data length: 2 bytes/data.

● **Trigger Conditions**: In Writing······Chart end detection, alarm or external contact input (optional), In Reading···Alarm, external contact (optional).

● **Pre-Trigger**: 0 to 100% steps.

● **Output**: Outputs for communication and recording are possible.

● **Battery Backup**: Lithium battery, battery life (512K bytes)···about 10 months, 256K bytes···about 3 years, 64K bytes···5 years).

GROUPING

● **Number of Group Programmings**: Up to 6 groups (programmable for range, alarm, printing format and tag number), channel logging···optional (/MATH).

ALARMS

● **Number of Alarm Set Levels**: Up to 6 levels/channel.

● **Alarm Types**: High (H), low (L), high-rate of change (RH), low-rate of change (RL), delta high (△H), and delta low (△L). ＊high-rate of change (time interval): Measurement cycle×(1 to 15).

[Diagram showing alarm measured value, change value, time interval with labels T_2, T_1, Change value, Time, Time interval]

● **Recording**:

Trend mode: CH, No., alarm types, and ON/OFF times in the right margin.

Logging Mode: CH. No. and alarm types at the start of measured data.

● **Alarm Outputs (Option)**: Up to 12 points (internal), up to 60 points [separate case (s)]. AND or OR output as well as REFLASH output can be specified. REFLASH alarm output (500ms) using special internal alarm relay output.

● **Alarm Acknowledgement**: Pressing the

ACK key stops the alarm display flashing and resets the dedicated common relay output.

● **Alarm Reset**: Hold type relay output by pressing the RESET key.

● **Display**: The flashing display can be obtained for 30 point alarm statuses (ch. 1 to 30)＋one common point for computing channels (ch. 31 to 60).

CONSTRUCTION

● **Mounting**: Desk-top or flush panel mounting (may be inclined up to 30° backward from vertical).

● **Dimensions**: Approx. 438 (W)×266 (H) ×415 (D)mm, (17-1/4×10-1/2×16-3/8″).

● **Weight**: Approx. 15kg (33.0 lbs).

POWER REQUIREMENTS

● **Power Supply**: 90 to 250V AC (wide voltage range power supply), 50 and 60Hz (must be specified).

● **Power Consumption**: Approx. 80VA (230 V).

NORMAL OPERATING CONDITIONS

● **Ambient Temperature**: 5 to 40℃ (40 to 104℉).

● **Humidity Range**: 20 to 80% at 5 to 40℃.

● **Input Source Resistance**: Less than 2kΩ (DC V & TC inputs), less than 10Ω/wire (Pt100), less than 5Ω/wire (Pt50), or less than 1Ω/wire (Cu10).

GENERAL SPECIFICATIONS

● **Insulation Resistance**: More than 20MΩ at 500V DC between terminals and case.

● **Dielectric Strength**: 1,500V AC for one minute between power line and case, or 1,000V AC for one minute between contact output terminals and case, between measuring terminals and case, between measuring terminals.

● **Battery-Backup Memory**: Lithium battery, maintains all setting data for about 10 years.

● **FAIL Alarm**: FAIL lamp lights up when the recorder is in fail condition (FAIL output signal changes to non-inductive).

● **Chart End Detection**: When the chart reaches near its end, "CHART" appears on the display. When recording is automatically stopped, the recorder goes into the monitoring status, and the CHART END output relay is energized (transfer contact).

● **Clock**: With calendar function.

● **Key Lock**: KEY LOCK key used for locking setting entries.

● **Internal Illumination**: Fluorescent lamp (optional).

● **Input Terminals**: Clamped input terminal block (standard) and screw input terminal

block (optional).

● **Wiring**: The input terminal block can be removed from the mainframe for easier wiring.

STANDARD ACCESSORIES

Chart···1 chart (30m), color ribbon···1 pc., fuse···1 pc. (1.25A), power supply cord··· 1 pc., rack mounting kit···1 pc.

OPTIONAL FEATURES

● **GPIB Interface (/GP-IB)**: Conforms to IEEE St'd 488-1978.

● **RS-232-C Interface (/RS232C)**: Conforms to EIA RS-232-C.

● **Computation (/MATH)**:

Functions: ＋, －, ×, ÷, SQR (square root), ABS (absolute, value), LOG (common logarithm), EXP (exponential), Maximum, Minimum, Averages, Totals, Max. －Min., Standard deviation, Logic (AND, OR, NOT, XOR). C LOG. T LOG. Number of channels···Up to 30 channels.

● **Remote Control (/REM)**:

Input signal: TTL-level, open collector, and contact status.

● **Internal Alarm Output (/AK-□□, /FAI)**: 2 or 12 points, external box: Max. 30 or 60 points (external alarm box), contact rating: 30V AC, 2A (internal alarm). 240V AC, 1A. (external alarm). The length of life: 300K contact.

● **DC Power Source (/DC)**: 10 to 32V DC Power Source.

● **User's Linearization & Remote RJC (/ULN)**:

User's Linearization: Type of user's linearizing: 3 types, No. of separated lines: 32 lines, Input measuring range: DC V (20mV to 50V, span: −20000 to 20000)

Remote RJC (reference junction compensation): Accuracy: (2×accuracy of TC input measurement＋temperature difference between the terminal of remote terminal block and remote terminal measuring temperature of TC block at TC range.

● **Hourly, Daily, or Monthly Report (/RPT)**: Computation: max., min., average, total values.

Reporting function is executed with the interruption of analog recording.

● **AC Input (/AC 2, /AC 6)**:

/AC 2: AC V 1 point, AC current 1 point. /AC 6: AC V 3 points, AC current 3 points. Max. Voltage: 250V or 25V.

Max. current: 2.5A or 0.25A.

/AC 2: Channels of 29 and 30 [the rest of channels (to 28) are used for DC input & high break down solid state relay scanners].

/AC 6: Channels of 25 to 30 [the rest of channels (20 to 24) are used for DC input & high break down solid state relay scanners].

Note: Both /AC 2 and /AC 6 are available only for 2s input models.

MODEL AND SUFFIX CODES

Model	Suffix Codes		Description
3760		....	Hybrid recorder(HR2300)
No. of Inputs & Relay Types	21	....	20 points/1 s, (high breakdown voltage solid state relay)
	22	....	20 points/2 s, (high breakdown voltage solid state relay)
	31	....	30 points/1 s, (high breakdown voltage solid state relay)
	32	....	30 points/2 s, (high breakdown voltage solid state relay)
Power requirements	-0		90 to 250 V AC
Frequency		-1	50 Hz
		-2	60 Hz
Optional features		/□	Refer to Optional Features

OPTIONAL FEATURES

Option Code	Description
/GP-IB	GP IB interface
/RS232C	RS-232-C interface
/MATH	Mathematical functions
/REM	Remote controls
/AK-02	Alarms(internal, 2 points)
/AK-12	Alarms(internal, 12 points)
/SIT	Screw input terminal block
/EAI	Interface for external alarm relay (for 379101 and 379102 only)
/LMP	Internal illumination
/DF	°F display
/DC	Hourly, daily or monthly report
/DC	DC power source
/RPT	
/ULN	User's linearization and Remote RJC
/AC2	AC input (AC voltage 1 point, AC current 1 point)
/AC6	AC input (AC voltage 3 points, AC current 3 points)

OPTIONAL ACCESSORY

Code	Name		
378903	Memory card(setting & measured data), 64K bytes		
378904	Memory card(setting & measured data), 256K bytes		
378905	Memory card(setting & measured data), 512K bytes		
* 379101	External alarm output relay, 30 points		
* 379102	External alarm output relay, 60 points		
379812	Rack mounting kit for 3760 (JIS)		
379814	Rack mounting kit for 3760 (ANSI/EIA)		
379801	Clamped input terminal block (10 points)		
379802	Screw input terminal block (10 points)		
438920	Shunt resistor (For clamped input terminal block)	250 Ω	±0.1%
438921		100 Ω	±0.1%
438922		10 Ω	±0.1%
415920	Shunt resistor (For screw input terminal block)	250 Ω	±0.1%
415921		100 Ω	±0.1%
415922		10 Ω	±0.1%
B9857ZD	Cable for external alarm (1m)		
B9857ZE	Cable for external alarm (2m)		
B9857ZF	Cable for external alarm (5m)		
B9857ZG	Cable for external alarm (10m)		

*Specify an optional feature of /EAI when the HR2300 mainframe is used with external alarm output relay.

SPARES

Part No.	Name
B9627AZ	Ten-color ink ribbon
B9627RY	Z-fold chart(30m), 10mm div. on time axis
B9627AY	Z-fold chart(30m), 25mm div. on time axis

*Certified to NOT fall under COCOM regulations

DIMENSIONS

Unit: mm(approx. inch)

YOKOGAWA ◆

Represented by:

Subject to change without notice.