## OVERVIEW

CX1000 is a controller with up to 6 ch measurement channels and up to 2 embedded loops. By using Ethernet interface equipped as standard feature, it is possible to send e-mails, monitor the site remotely on the Web, and make an FTP-based file transfer.
CX1000 comes standard with control and measurement screens; CX1000 operation screen can be used with program-less. By using PV math/SP math or logic math for each loop, CX1000 can be used for variety purposes.

DISPLAY SPECIFICATIONS
Display unit: 5.5-inch TFT color LCD $(320 \times 240$ pixels)
Display color: Selectable from 12 options for trend/ bar graphs
Background color: Selectable from white or black

## - Display

## Control Screen

Control group display
Number of loops covered: 4 max.
Number of displays: 4 (4 groups)
Display style: Controller, faceplate and hybrid style
DIO operation: Display on control screen
Setting DIO number: up to 12
Tuning display: Capable of assigning up to 21 parameters
Overview screen: Control loop up to 6 loops
Measurement ch: up to 6 ch
DIO status: up to 6
DI/DO status display: DI display number: up to 6
DO display number: up to 6
Program control display:
Simultaneously displays the program operation status and current PV readings.
Number of loops covered: 2 Max.
Number of displays: 1 (1 group)
Display update interval:
Digital readings: 1 sec
Program readings: Same as the trend update interval
Program event display
Group display:
Up to 5 events and their names display
All display: All event display
All time events display:
All time events and the some events
names display
All PV events display:
All PV events and the some events names display
Internal SW status screen: Display number: 18


Number of display channels/kinds (Max)

| Input Type | Number of <br> Channels Covered |
| :--- | :---: |
| Internal loops | 6 <br> (Two loops x PV, SP and <br> OUT readings) |
| Green series communication <br> channels | 12 <br> (Four loops x PV, SP and <br> OUT readings) |
| Measurement channels | 6 |
| Computation channels (option) | 12 |

## Measurement Screen

Trend screen
Direction of view: Vertical or horizontal
Number of channels covered: 6 max./screen (group)
Number of trend views on all channels: 36 max.
Number of displays: 6 (6 groups)
Line width: Selectable from 1, 2 and 3 pixels
Screen update interval:
Selectable from $1 \mathrm{~min}, 2 \mathrm{~min}, 5 \mathrm{~min}, 10$ $\mathrm{min}, 20 \mathrm{~min}, 30 \mathrm{~min}, 1 \mathrm{hr}, 2 \mathrm{hr}, 4 \mathrm{hr}$, and $10 \mathrm{hr} / \mathrm{div}$
Bar graph display:
Direction of view: Vertical or horizontal
Number of channels covered: 6 channels max./display (group)
Number of displays: 6 ( 6 groups)
Scale: Configurable within a range from 4 to 12
Reference position = Edge or midpoint
Update interval: 1 sec
Digital display:
Number of channels covered:
6 channels max./display (group)
Number of displays: 6 (6 groups)
Update interval: 1 sec

Overview display:
18 channels max. (including computation channels) for measurement
Measured values and alarms for all channels. Information display:

Jumps to the trend view of a data item selected by the cursor.
Alarm summary display: Display the list of alarms.
Event summary display:
Display the list of events.
Control operation summary screen:
Display the list of control operation statuses.
Message summary display:
Display the list of message and time.
Memory summary display:
Display the list of internal memory.
Tag display: Tag names for measurement channels (up to 16 alphanumeric characters)
Tag names for control loops and DIO (up to 8 alphanumeric characters) Tag comments for control loops and DIO (up to 8 alphanumeric characters)
Other on-display elements:
Memory status, scale values ( $0 \%$, $100 \%$ can be turned on/off), scales ( 6 scales max.), grid (selectable from a range of 4 to 12 divisions) with hour:min indications, date and time (year/month/day and hour:minute:second indications), trip line (selectable from 1-, 2- and 3-pixel thickness options), messages (of up to 16 characters and 8 types), and alarm marks
Data reference function: Display the retrieved data.
Display format: Bisectional or full-screen view
Time axis: Can be upscaled, downscaled, and scrolled.
Automatic screen switching
Switching interval
$5 \mathrm{sec}, 10 \mathrm{sec}, 20 \mathrm{sec}, 30 \mathrm{sec}$, or 1 min
LCD back light saver function
Timer setpoint: $1,2,5,10,20$ or 60 min

## ■ CONTROL FUNCTIONS

Control mode
Singleloop, cascade control, and loop control with PV switching.

## Control computation functions

Continuous PID control, Relay on/off control, time proportional PID control
PID parameter: 8 sets/loop for each control mode Points of zone PID switching: 6 max.
"Super" function (overshoot prevention)
Tracking functions: SP tracking PV tracking
Anti-reset windup function
(over-integration prevention function)
Control interval: 250, 500 or 1000 ms

## Operation mode switching

- Switching among remote, local, and program modes
- Switching among manual, auto, and cascade modes
- Run/stop mode switching Stop mode: Outputs the preset output value.
- Switching between Execute/Stop options of auto-tuning Principle of auto-tuning: Limit cycle method

PID Control Method

| PID Control mode | Operation mode | Operating status | PID control method | Bump of control output |
| :---: | :---: | :---: | :---: | :---: |
| Standard PID control mode | Fixed point control operation | Local and cascade control except cascade secondary loop control | PV derivative type PID | Yes |
|  |  | Remote or secondary cascade loop control | Deviation derivative type PID | Yes |
|  | Programmed control operation | Local and cascade control except secondary cascade loop control, hold or soak | PV derivative type PID | Yes |
|  |  | During programmed operation (without status of hold or soak) or secondary cascade loop control | Deviation derivative type PID | Yes |
| Fixed point Control Mode | Fixed point control operation | Local and cascade control except cascade secondary loop control | PV derivative type PID | Yes |
|  |  | Remote or cascade secondary cascade loop control | PV derivative type PID | Yes |
|  | Programmed control operation | Local, hold and soak | PV derivative type PID | No |
|  |  | Programmed operation (without status of hold) or secondary cascade loop control | PV derivative type PID | Yes |

*The secondary cascade loop is secondary loop of cascade control that is selected from the cascade mode (auto, manual, cascade)

## Setting ranges of control parameters

Proportional band: 0.1 to $999.9 \%$
Integral time: 1 to 6000 sec , or off (for manual reset)
Derivative time: 1 to 6000 sec , or off
On-off control hysteresis wideth:
0.0 to $100.0 \%$ of measurement range

Preset output value: -5.0 to $105.0 \%$ of output
(Provided in case of control computation being stopped, PV input being in a burnout state, or instrument input being abnormal)
Output limiter:
Setting range: -5.0 to $105.0 \%$ for both high/low limits Shutdown function:

Can provide a manipulated output of up to 0 mA when in manual mode operation with 4-20 mA output (shuts down the output for values smaller than $-5.1 \%$ ).
Output rate-of-change limiter:
Off, or a value from 0.1 to $100.0 \% / \mathrm{sec}$

## - PV math/SP math function

Math expression can be assigned to PV and SP of each loop
Type of computation:
Four arithmetic operations, square root, absolute, common logarithm, exponential, power, relational operations ( $<, \leqq,>, \geqq,=, \infty$ ), logic operations (AND, OR, NOT, XOR), Statistical operations (average, Max. Min. Max.Min.) conditional operations( [expression 1 ? expression 2 ? expression 3 ])
Note: Conditional operators can be used with the other operands together
Available operands for arithmetic operations: Measurement data, measurement math data, embedded/external control data, communication input data, constant W01W12, control input data, control output DIO, expansion module DIO, measurement remote input, internal switch
Operation limitation: Within 120 characters
Available operands in an expression: less than 35
In error case: Over/Under selection
Over: Upper limit of PV/SP value
Under: Lower limit of PV/SP value

## - Logic Math

Available number of operations: Up to 12
Operation type:
Relational operations $(<, \leqq,>, \geqq,=, \infty)$, logic operations (AND, OR, NOT, XOR), conditional operations( [expression 1 ? expression 2 ? expression 3 ])
Note: Conditional operators can be used with the other operands together
Available operands in an expression: Same as PV math/SP math operands

## - Internal SW

Number of available internal SW: 18
Non-hold type only

## - Analog retransmission

Output type: Current output ( $4-20 \mathrm{~mA}, 0-20 \mathrm{~mA}, 20-4 \mathrm{~mA}$, 20-0mA), time proportional voltage pulse output, time proportional relay output
Display/record: Data is recorded/displayed as out value
Note: The loop of analog retransmission mode can calculate PID Math.
Available math operation: Same as PV math/SP math Available operands: Same as PV math/SP math

## - ALARM FUNCTIONS

## - Control Alarm

Types of control alarm: PV high limit, PV low limit, high limit of deviation, low limit of deviation, deviation high and low limits, deviation within high and low limits, SP high limit, SP low limit, OUT high limit, and OUT low limit
Other alarm type: Fault diagnosis, fail output
Stand-by action: Turns off PV/SP alarm from starting control until steady condition
Alarm output: 6 points/ 2 loops (transistor output 4 points, relay output 2 points)
Alarm setting: 4 types/ loop
Hysteresis: Can set each alarm setting
Display: The status is shown in the digital display in case of alarm. A common alarm indication is also displayed.
The alarm behavior: non-hold or hold-type selectable.

## - Measurement Alarm

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

## INPUT SECTION

## - Specifications Common to Control and Measurement Inputs

Thermocouple burnout:
Switchable between ON/OFF options of detection on a channel basis. Switchable between burnout upscale/ downscale options
Burnout condition:
Normal: less than $2 \mathrm{k} \Omega$
Burnout: more than $10 \mathrm{k} \Omega$
Integral time of $A / D$ converter:
Select from the options of $20 \mathrm{~ms}(50 \mathrm{~Hz})$, $16.7 \mathrm{~ms}(60 \mathrm{~Hz}) 100 \mathrm{~ms}(50 / 60 \mathrm{~Hz})$ and AUTO (automatic switching between 20 ms and 16.7 ms depending on the power supply frequency).

## - Control Input

Number of inputs:
5 max. (depends on model and control mode)
Input interval: 250, 500 or 1000 ms , synchronized with the control period
Input type: DC voltage (DCV), thermocouple (TC), resistance temperature detector (RTD), DC current (DCA) with external shunt resistor
Linear scaling:
Input ranges capable of scaling: Thermocouple (TC), resistance temperature detector (RTD), and DC voltage (DCV)
Available range of scaling: -30000 to 30000 , with a span smaller than 30000
Decimal point position: Selectable by user
Unit: Can be set by user, using up to 6 characters.
Burnout of standardized signals:
Burnout can be detected
Configuration of input/output signal
Measurement input computation: Input processing, square root extraction (0.0 to $5.0 \%$ low level cutoff), 10 -segment linealizer, and 10 -segment linearizer biasing, and bias addition (from -100.0 to $100.0 \%$ of measuring range), first order lag filter (time constant: 1 to 120 sec , or off)
Auxiliary computation input: Input processing, square root extraction (0.0 to $5.0 \%$ low level cutoff), bias addition (from -100.0 to $100.0 \%$ of measuring range), ratio multiplication ( 0.001 to 9.999 ), and first order lag filter (time constant: 1 to 120 sec , or off)
Table of Control Input Specifications

| Input type | Range | Measuring range |
| :---: | :---: | :---: |
| DCV <br> - applicable to linear scaling only | 20 mV | -20.00 to 20.00 mV |
|  | 60 mV | -60.00 to 60.00 mV |
|  | 200 mV | -200.0 to 200.0 mV |
|  | 2 V | -2.000 to 2.000 V |
|  | 6 V | -6.000 to 6.000 V |
|  | 20 V | -20.00 to 20.00 V |
|  | 50 V | -50.00 to 50.00 V |
| TC | $\mathrm{R}^{* 1}$ | 0.0 to $1760^{\circ} \mathrm{C}$ |
|  | $\mathrm{S}^{* 1}$ | 0.0 to $1760^{\circ} \mathrm{C}$ |
|  | $\mathrm{B}^{* 1}$ | 0.0 to $1820^{\circ} \mathrm{C}$ |
|  | K*1 | -200.0 to $1370^{\circ} \mathrm{C}$ |
|  | $\mathrm{E}^{* 1}$ | -200.0 to $800^{\circ} \mathrm{C}$ |
|  | $\mathrm{J}^{* 1}$ | -200.0 to $1100^{\circ} \mathrm{C}$ |
|  | $\mathrm{T}^{* 1}$ | -200.0 to $400^{\circ} \mathrm{C}$ |
|  | $\mathrm{N}^{* 1}$ | 0.0 to $1300^{\circ} \mathrm{C}$ |
|  | $\mathrm{W}^{*} 2$ | 0.0 to $2315^{\circ} \mathrm{C}$ |
|  | $L^{* 3}$ | -200.0 to $900^{\circ} \mathrm{C}$ |
|  | $\mathrm{U}^{*} 3$ | -200.0 to $400^{\circ} \mathrm{C}$ |
|  | PLATINEL | 0.0 to $1400.0^{\circ} \mathrm{C}$ |
|  | PR40-20*4 | 0.0 to $1900.0^{\circ} \mathrm{C}$ |
|  | W3Re/W25Re | 0.0 to $2400.0^{\circ} \mathrm{C}$ |
| RTD* ${ }^{\text {\% }}$ | Pt100*5 | -200.0 to $600.0^{\circ} \mathrm{C}$ |
|  | JPt100*5 | -200.0 to $550.0^{\circ} \mathrm{C}$ |
| Standardized signal | 1 to 5 V | 1.000 to 5.000 V |

*1: R, S, B, K, E, J, T, N : IEC584-1 (1995), DIN IEC584, JIS C1602-1995
*2: W : W-5\% Re/W-26\% Re (Hoskins Mfg. Co.), ASTM E988
*3: L : Fe-CuNi, DIN43710, U : Cu-CuNi - DIN43710
*4: PR40-20 : PtRh20\%-PtRh40\%(Johnson Matthey Plc)
*5: Pt100 : JIS C1604-1997, IEC751-1995, DIN IEC751-1996 JPt100 : JIS C1604-1989, JIS C1606-1989
*6: Measuring current : $\mathrm{i}=1 \mathrm{~mA}$

## - Measurement input

Number of inputs: 0 or 6
Measuring interval:
1 or $2 \sec (2 \mathrm{sec}$, if the integral time of $A / D$ converter is 100 ms )
Input type: DC voltage (DCV), thermocouple (TC), resistance temperature detector (RTD), Operation $\log$ (DI), DC current (DCA) with external shunt resistor
Measurement Input Ranges and Measuring Ranges

| Input type | Input Range | Measuring Range |
| :---: | :---: | :---: |
| DCV | 20 mV | -20.00 to 20.00 mV |
|  | 60 mV | -60.00 to 60.00 mV |
|  | 200 mV | -200.0 to 200.0 mV |
|  | 2 V | -2.000 to 2.000 V |
|  | 6 V | -6.000 to 6.000 V |
|  | 20 V | -20.00 to 20.00 V |
|  | 50 V | -50.00 to 50.00 V |
| TC | $\mathrm{R}^{* 1}$ | 0.0 to $1760.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{S}^{*} 1$ | 0.0 to $1760.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{B}^{* 1}$ | 0.0 to $1820.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{K}^{* 1}$ | -200.0 to $1370.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{E}^{* 1}$ | -200.0 to $800.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{J}^{*}$ | -200.0 to $1100.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{T}^{*} 1$ | -200.0 to $400.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{N}^{*}$ | 0.0 to $1300.0^{\circ} \mathrm{C}$ |
|  | W*1 | 0.0 to $2315.0^{\circ} \mathrm{C}$ |
|  | L*3 | -200.0 to $900.0^{\circ} \mathrm{C}$ |
|  | $\mathrm{U}^{*}$ | -200.0 to $400.0^{\circ} \mathrm{C}$ |
|  | PLATINEL | 0.0 to $1400.0^{\circ} \mathrm{C}$ |
|  | PR40-20*4 | 0.0 to $1900.0^{\circ} \mathrm{C}$ |
|  | W3Re/W25Re | 0.0 to $2400.0^{\circ} \mathrm{C}$ |
| RTD* ${ }^{6}$ | Pt100*5 | -200.0 to $600.0^{\circ} \mathrm{C}$ |
|  | JPt100*5 | -200.0 to $550.0^{\circ} \mathrm{C}$ |
| DI | DCV input | OFF: lower than 2.4 V <br> $\mathrm{ON}: 2.4 \mathrm{~V}$ or higher |
|  | Contact input | ON/OFF states |

*1: R, S, B, K, E, J, T, N : IEC584-1 (1995), DIN IEC584, JIS C1602-1995
*2: W : W-5\% Re/W-26\% Re (Hoskins Mfg. Co.), ASTM E988
*3: L : Fe-CuNi, DIN43710, U: Cu-CuNi - DIN43710
*4: PR40-20 : PtRh20\%-PtRh40\%(Johnson Matthey Plc)
*5: Pt100 : JIS C1604-1997, IEC751-1995, DIN IEC751-1996
JPt100 : JIS C1604-1989, JIS C1606-1989
*6: Measuring current : $i=1 \mathrm{~mA}$
Filter function: Switchable between ON/OFF options of moving average on a channel basis; selectable from 2 to 16 times for the frequency of moving average calculation
Computation
Difference computation: Allows for calculation of difference between any two channels.
Input ranges capable of difference computation:
DCV, TC and RTD
Linear scaling:
Input ranges capable of scaling: DCV, TC, RTD
Available range of scaling: -30000 to 30000
Decimal point position: Selectable by user
Engineering unit: Can be set by user up to 6 characters.
Square root scaling:
Input ranges capable of scaling: DCV
Available range of scaling: -30000 to 30000
Decimal point position: Selectable by user
Engineering unit: Can be set by user up to 6 characters.

## STORAGE FUNCTIONS

External storage medium:

- PCMCIA ATA flash memory card


## Storage functions:

Store internal control loops' data (PV, SP and OUT of internal loops), Green series communication loops' data (PV, SP and OUT of connected Green series communication), measurement ch data, and computation ch data.

PV, SP and OUT of internal loops: Assigned from 101 to 106 ch
PV, SP and OUT of Green series communication channels: Assigned from 201 to 212 ch

Data on 18 channels among the above-noted channels, as well as 6 measurement channels and 12 computation channels, are stored as data files.

Types of Recorded Data

| Data Type | Channel/Loop/System Included in Recording | Data Item |
| :---: | :---: | :---: |
| Display data (i.e., data for graphical screen views) | Measurement channels/computation channels/internal control loops/Green series communication | Minimum/maximum values during time-out period |
| Event data | Measurement channels/computation channels/internal control loops/Green series communication | Measured values for each sampling period |
| TLOG data | Measured/computation data | TLOG data values at TLOG time-out |
| Report data | Measurement channels/computation channels | Values of channels on an hourly/daily/weekly /monthly basis |
| Manual sampling data | Measurement channels/computation channels/internal control loops/Green series communication loops | ASCII-format data input with keys or remotely |
| Alarm summary data | Measurement channels/computation channels/internal control loops/Green series communication loops | Information on the occurrence/cancellation of alarms on channels being recorded |
| Event summary data | Events caused for the system | Occurrence/cancellation of time/PV events |
| Control mode summary data | System (program operation), or each internal control loop or green series communication loops for all other cases | Run/stop, local/remote, and manual/auto/cascade modes switching, hold/ cancellation of hold of programs, wait/ cancellation of wait |

Method of saving data
Saving method: Manual or automatic selectable
Manual saving: Data saving by inserting external memory medium
Automatic saving:
Display data: Periodic saving ( 10 min to 31 days) or key operation to external memory
Event data: In case of trigger free...Periodic saving ( $3 \min$ to 31 days) or key operation to external memory
In case of using trigger...Save the data
when sampling is finished
Data saving period:
Display data file:
Linked with the waveform span rate
Event file: Linked with the specified sampling period Event file sampling period:

Selectable from 1, 2, 5, 10, 30, 60, 120, 300 , and 600 s
Measurement data files:
(1) Event file

Instantaneous values are saved at a specified
sampling interval.
(2) Display data file

The maximum and minimum values found during
the display update interval are saved.
Combination of files to be created
(1) Event file (triggers only) and display data file
(2) Display data file only
(3) Event file only

Data format: Binary
Data size per channel:
Display data: Control data $=4$ bytes/data item Measurement data $=4$ bytes/data item
Computation data $=8$ bytes/data item
Event data: Control data = 2 bytes/data item Measurement data $=2$ bytes/data item Computation data $=4$ bytes/data item
Sampling time:
Tested for manual saving on a file.
When creating a display data file only:
Test conditions:
2 control loops, 6 measurement channels, 8 computation channels, $30 \mathrm{~min} / \mathrm{div}$ display update interval (data save interval of 60 sec )
Number of data items per channel $=1,200,000$ bytes/ $(2 \times 4$ bytes $+6 \times 4$ bytes $+8 \times 8$ bytes $)=$ approx. $12,500^{*}$

* Specified as 100,000 data items maximum.

Sampling time per file $=12,500 \times 60 \mathrm{sec}=750,000$ sec $=$ approx. 9 days
When creating an event file only:
Test conditions:

> 2 control loops, 6 measurement channels, 8 computation channels, 1 -sec data save interval
Number of data items per channel $=1,200,000$ bytes/ $(2 \times 2$ bytes $+6 \times 2$ bytes $+8 \times 4$ bytes $)=$ approx. 25,000*

* Specified as 120,000 data items maximum.

Sampling time per file $=25,000(1 \mathrm{sec}=25,000 \mathrm{sec}$ $=$ approx. 7 hours
When creating both a display data file and an event file: Display data file size $=900,000$ bytes, where a maximum number of data items is 75,000 Event data file size $=300,000$ bytes, where a maximum number of data items is 30,000 Note that the number of files created varies depending on the capacity of storage medium.

Examples of sampling time
Test conditions:
2 control loops, 6 measurement channels, and no computati on channels
Display Data File Only

| Display Update <br> Interval <br> (Min/Div) | 1 | 5 | 20 | 30 | 60 | 240 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Data save <br> interval (sec) | 2 | 10 | 40 | 60 | 120 | 480 |
| Sampling <br> time (Approx.) | 13 hrs | 69 hrs | 11 days | 17 days | 34 days | 138 days |

## Event Data File Only

| Data save <br> interval (sec) | 1 | 5 | 30 | 120 |
| :--- | :---: | :---: | :---: | :---: |
| Sampling <br> time (Approx.) | 13 hrs | 69 hrs | 17 days | 69 days |

Display Data File and Event Data File
Display Data File

| Display Update <br> Interval <br> (Min/Div) | 1 | 5 | 20 | 30 | 60 | 240 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Data save <br> interval (sec) | 2 | 10 | 40 | 60 | 120 | 480 |
| Sampling <br> time (Approx.) | 10 hrs | 2 days | 8 days | 13 days | 26 days | 104 days |

Event Data File Only

| Data save <br> interval (sec) | 1 | 5 | 30 | 120 |
| :--- | :---: | :---: | :---: | :---: |
| Sampling <br> time (Approx.) | 3 hrs | 17 hrs | 4 days | 17 days |

Manually sampled data
Storage trigger: Key input or contact input
Data format: ASCII
Maximum number of data items stored: 50
TLOG data (only when equipped with computation option)
Storage trigger: Data at the moment TLOG timeout is saved.
Report data (only when equipped with report option)
Report type: Hourly report, daily report, a combination of hourly reports and daily reports, a combination of daily and weekly reports, and a combination of daily and monthly reports
Data format: ASCII
Trigger functions:
Event file: Select the mode from FREE, TRIG and ROTATE options.
Display data and event files: Select the mode from TRIG and ROTATE options.
Display copy functions:
Copying method:
By means of key operation
Data format: PNG
Output destination:
External storage medium or communication output

## ■ HARDWARE

## - Construction

Angle of mounting:
Backward tilt of up to $30^{\circ}$; no tilt is allowed on either side, however.
Thickness of mounting panel: 2 to 26 mm
Material: $\quad$ Case $=$ Steel plate Bezel = Polycarbonate
Color of coating: Case = Pale cobalt blue
(equivalent to DIC 16 edition 102)
Bezel = Light charcoal gray
(equivalent to Munsell 10B3.6/0.3)
Front panel: Dust- and drip-proof (compliant to IEC529IP65, NEMA No. 250 Type 4 [except for icing tests])
External dimensions: $144 \mathrm{~mm}(\mathrm{~W}) \times 144 \mathrm{~mm}(\mathrm{H}) \times 223.6$ (D) mm CX1000: $2.6 \mathrm{~kg} \quad$ CX1006: 3.0 kg CX1200: $3.0 \mathrm{~kg} \quad$ CX1206: 3.1 kg

## - I/O Signal Specifications

## Control Output

Current output
Number of outputs: $2 / 2$ loops
Output signal: $\quad 4-20 \mathrm{~mA}$ DC or 0-20 mA DC
Load resistance: $\quad 600 \Omega$ max.
Output accuracy: $\pm 0.1 \%$ of span ( 1 mA or greater)
Temperature drift: $\pm 200 \mathrm{ppm} /{ }^{\circ} \mathrm{C}$ (tested for output section)
Voltage pulse output
Number of outputs: 2/2 loop
Output signal: On-state voltage: 12 V DC
Load resistance: $\quad 600 \Omega \mathrm{~min}$.
Resolution: $0.1 \%$
Relay contact output
Number of outputs: $2 / 2$ loops
Output signal: NC, NO, COM
Contact rating: $\quad 250 \mathrm{~V} \mathrm{AC} / 3 \mathrm{~A}$ or 30 V DC/3 A (resistive load)

## Contact input

Number of inputs: 6/2 loops
Input signal:Voltage-free contact or open collector (TTL or transistor)
Input condition:
On-state voltage: 0.5 V max. ( 30 mA DC )
Off input leakage current: 0.25 mA max.
Input configuration:
Photocoupler-isolated (two-point common)

## Contact output

Number of relay outputs: 2/2 loops
Relay contact rating: $250 \mathrm{~V} \mathrm{AC/1} \mathrm{~A} \mathrm{or} 30 \mathrm{~V}$ DC/1 A (resistive load)
Number of transistor outputs: 4/2 loops
Transistor contact rating: 24 V DC/50 mA

## Analog input section

Number of control inputs:
5 (number of contacts depends on model
and control mode)
Input interval: 250, 500 or 1000 ms
Number of measurement inputs:
6 (DCV, TC and DI inputs are isolated)
Input interval: 1 or 2 sec

## - Installation Environment Standards

Normal operating conditions:
Ambient temperature: 0 to $50^{\circ} \mathrm{C}$
Ambient humidity: 20 to $80 \%$ RH (at 5 to $40^{\circ} \mathrm{C}$ )
Vibration: 10 to $60 \mathrm{~Hz}, 0.2 \mathrm{~m} / \mathrm{s}^{2}$
Mechanical shock: Not allowed.
Noise:
Normal mode noise ( $50 / 60 \mathrm{~Hz}$ ):
DC current (DCA): The peak value including a signal component is less than 1.2 times the measuring range.
Thermocouple (TC): The peak value including a signal component is less than 1.2 times the thermal electromotive force.
Resistance temperature detector (RTD): 50 mV max.
Common mode noise voltage ( $50 / 60 \mathrm{~Hz}$ ): 250 V AC rms max. for all ranges
Inter-channel maximum noise voltage $(50 / 60 \mathrm{~Hz})$ : 250 V AC rms max.
Warm-up time: 30 min minimum after power-on Altitude: 2000 m max.
Transport and storage conditions:
Ambient temperature: -25 to $60^{\circ} \mathrm{C}$
Ambient humidity: 5 to $95 \%$ RH (non-condensing)
Vibration: 10 to $60 \mathrm{~Hz}, 4.9 \mathrm{~m} / \mathrm{s}^{2}$
Mechanical shock: $392 \mathrm{~m} / \mathrm{s}^{2}$ max. (when housed in a package)
Safety and EMC Standards
CSA: CSA22.2 No.61010-1 installation category $I I^{\star 1}$, pollution degree $2^{\star 2}$, Measurement category II*3 CSA NRTL/C (UL61010-1)
CE: CE marking was removed under the publication of the 3rd edition of IEC Standard.
C-Tick: EN 55011 Class A, Group 1
KC marking:
Electromagnetic wave interference prevention standard, electromagnetic wave
protection standard compliance
*1: Installation Category (Overvoltage Category) II
Describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand voltage. "ll" applies to electrical equipment which is supplied from fixed installations like distribution boards.
*2: Pollution Degree
Describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. " 2 " applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs.
*3: Measurement Category II Applies to measuring circuits connected to low voltage installation, and electrical instruments supplied with power from fixed equipment such as electric switchboards.

## Power Supply Section

Supply voltage: 100 to 110 V AC $\pm 10 \%$ or
200 to 220 V AC $\pm 10 \%$
Supply frequency: $50 \mathrm{~Hz} \pm 2 \%$ or $60 \mathrm{~Hz} \pm 2 \%$
Power consumption:

| Supply <br> Voltage | When LCD <br> Saver Is On | When in Normal <br> Operation | Maximum |
| :---: | :---: | :---: | :---: |
| 100 V AC | Approx. 20 VA | Approx. 23 VA | 39 VA |
| 240 V AC | Approx. 29 VA | Approx. 32 VA | 51 VA |

## Isolation

Insulation resistance: $20 \mathrm{M} \Omega$ min. between each terminal and ground (at 500 V DC)
Withstanding voltage:
Between power supply terminal and ground: 1500 V AC ( $50 / 60 \mathrm{~Hz}$ ), 1 min
Between relay contact output terminal and ground: 1500 V AC ( $50 / 60 \mathrm{~Hz}$ ), 1 min
Between measurement input terminal and ground: 1500 V AC ( $50 / 60 \mathrm{~Hz}$ ), 1 min
Between measurement input terminals: 1000 V AC ( $50 / 60 \mathrm{~Hz}$ ), 1 min
Between contact input terminal and ground: 500 V DC, 1 min
Between current output terminal and ground: 500 V AC ( $50 / 60 \mathrm{~Hz}$ ), 1 min
Between voltage pulse output terminal and ground: 500 V AC ( $50 / 60 \mathrm{~Hz}$ ), 1 min
Between transistor contact output terminal and ground: 500 V DC, 1 min
Grounding: Grounding resistance, less than $100 \Omega$

Control input terminals:
Isolated from other input/output terminals, with inter-channel isolation.
Measurement inputs:
Isolated from other input/output terminals, with inter-channel isolation (b terminal is common for optional RTD).
Voltage pulse control output terminals*:
Not isolated from DC output terminals but isolated from other input/output terminals.
Current output terminals*: Not isolated from
voltage pulse control output terminals but isolated from other input/output terminals.
Control output (relay) terminals*:
Isolated from other input/output terminals.
Contact input terminals: Not isolated from other contact input terminals but isolated from other input/output terminals.
Contact output (relay) terminals: Isolated from other input/output terminals.
Contact output (transistor) terminals:
Not isolated between transistor but isolated from other input/output terminals.
Alarm output terminals:
Isolated from other input/output terminals.
Alarm remote terminals: Not isolated from DI but
isolated from other input/output terminals.
RS-232C: Not isolated from case.
RS-422/485:
Isolated from other input/output terminals.
Ethernet: Isolated from other input/output terminals. Power terminals:

Isolated from other input/output terminals.
Grounding terminals: At case potential.
*: Control outputs have inter-loop isolation.

## - Standard Performance Data

| Input Type | Range | Measurement Accuracy (Digital Readings) | Max. resolution of digital display |
| :---: | :---: | :---: | :---: |
| DC voltage (DCV) | 20 mV | $\pm(0.1 \%$ of rdg +2 digits) | $10 \mu \mathrm{~V}$ |
|  | 60 mV |  | $10 \mu \mathrm{~V}$ |
|  | 200 mV |  | $100 \mu \mathrm{~V}$ |
|  | 2 V |  | 1 mV |
|  | 6 V |  | 1 mV |
|  | 20 V |  | 10 mV |
|  | 50 V | $\pm(0.1 \%$ of rdg + 3 digits) | 10 mV |
| Thermocouple (TC) - excluding the accuracy of reference junction compensation | R | $\pm\left(0.15 \%\right.$ of $\left.r d g+1^{\circ} \mathrm{C}\right)$, where $R$ and $\mathrm{S}= \pm 3.7^{\circ} \mathrm{C}$ over 0 to $100^{\circ} \mathrm{C}$ and $\pm 1.5^{\circ} \mathrm{C}$ over 100 to $300^{\circ} \mathrm{C} ; \mathrm{B}= \pm 2^{\circ} \mathrm{C}$ over 400 to $600^{\circ} \mathrm{C}$, and is not guaranteed for temperatures below $400^{\circ} \mathrm{C}$. | $0.1{ }^{\circ} \mathrm{C}$ |
|  | S |  |  |
|  | B |  |  |
|  | K | $\pm\left(0.15 \%\right.$ of $\left.r d g+0.7^{\circ} \mathrm{C}\right)$, where the accuracy is $\pm(0.15 \%$ of $r d g+1^{\circ} \mathrm{C}$ ) over -200 to $-100^{\circ} \mathrm{C}$. |  |
|  | E | $\pm\left(0.15 \%\right.$ of rdg $\left.+0.5^{\circ} \mathrm{C}\right)$ |  |
|  | $\begin{aligned} & \mathrm{J} \\ & \mathrm{~T} \end{aligned}$ | $\pm\left(0.15 \%\right.$ of $\left.r d g+0.5^{\circ} \mathrm{C}\right)$, where the accuracy is $\pm(0.15 \%$ of rdg $+0.7^{\circ} \mathrm{C}$ ) over -200 to $-100^{\circ} \mathrm{C}$. |  |
|  | N | $\pm\left(0.15 \%\right.$ of rdg $\left.+0.7^{\circ} \mathrm{C}\right)$ |  |
|  | W | $\pm\left(0.15 \%\right.$ of rdg $\left.+1^{\circ} \mathrm{C}\right)$ |  |
|  | L | $\pm\left(0.15 \%\right.$ of rdg $\left.+0.5^{\circ} \mathrm{C}\right)$, where the accuracy is $\pm(0.15 \%$ of |  |
|  | U | rdg $+0.7^{\circ} \mathrm{C}$ ) over -200 to $100^{\circ} \mathrm{C}$. |  |
|  | PLATINEL | 0.0 to $1400.0^{\circ} \mathrm{C}$ |  |
|  | PR40-20 | Not guaranteed over 0 to $450^{\circ} \mathrm{C}$ <br> $\pm\left(0.9 \%\right.$ of rdg $\left.+16.0^{\circ} \mathrm{C}\right)$ over 450 to $750^{\circ} \mathrm{C}$ <br> $\pm\left(0.9 \%\right.$ of $\left.r d g+6.0^{\circ} \mathrm{C}\right)$ over 750 to $1100^{\circ} \mathrm{C}$ <br> $\pm\left(0.9 \%\right.$ of rdg $+2.0^{\circ} \mathrm{C}$ ) over 1100 to $1900^{\circ} \mathrm{C}$ |  |
|  | W3Re/ W25Re | $\pm\left(0.3 \%\right.$ of rdg $\left.+2.8^{\circ} \mathrm{C}\right)$ |  |
| Resistance temperature detector (RTD) | Pt100 | $\pm\left(0.15 \%\right.$ of $\left.\mathrm{rdg}+0.3^{\circ} \mathrm{C}\right)$ |  |
|  | JPt100 |  |  |

Measurement/reading accuracy
Tested under the following conditions:
Standard operating conditions:
$23 \pm 2^{\circ} \mathrm{C}, 55 \pm 10 \% \mathrm{RH}$
Supply voltage range:
90 to 132 V AC; 180 to 250 V AC
Supply frequency range:
$50 / 60 \mathrm{~Hz} \pm 1 \%$ max.
Note: The accuracy performance is tested after a warmup time of at least 30 min and in a location free from such adverse effects on the instrument's operation as mechanical vibration.
Measurement accuracy during scaling: Measurement accuracy during scaling (digits) $=$ measurement accuracy (digits) +2 digits where the value is rounded up to the nearest whole number.
Reference junction compensation:
Switchable between INT (internal) and EXT
(external) options (common to all channels).
Reference junction compensation accuracy:
$\pm 1.0^{\circ} \mathrm{C}$ for types R, S, B, W, PR40-20 and W3Re/W25Re
$\pm 0.5^{\circ} \mathrm{C}$ for types K, J, E, T, N, L, U and
PLATINEL only (during measuring temperature that is no lower than $0^{\circ} \mathrm{C}$ )
Maximum input voltage:
$\pm 10$ V DC (continuous) for 2 V DC or lower
voltage ranges and TC input
$\pm 30 \mathrm{~V}$ DC (continuous) for 6 and 20 V DC voltage ranges
Input resistance:
$10 \mathrm{M} \Omega$ min. for 2 V DC or lower voltage ranges and TC input
Approx. $1 \mathrm{M} \Omega$ for $6 \mathrm{~V}, 20 \mathrm{~V}$, and 50 V DC voltage ranges
External input resistance:
$2 \mathrm{k} \Omega$ max. for DCV and TC inputs $10 \Omega$ max. per wire for RTD input (all three wires must have the same resistance)
Input bias current: 10 nA max.
Interference between channels:
120 dB (when external input resistance is
$500 \Omega$ and the level of input to other channels is 30 V )
Common mode rejection ratio:
$120 \mathrm{~dB}(50 / 60 \mathrm{~Hz} \pm 0.1 \%$, unbalanced $500 \Omega$ input resistance; tested between
negative input terminal and ground)
Normal mode rejection ratio:
$40 \mathrm{~dB}(50 / 60 \mathrm{~Hz} \pm 0.1 \%)$

## EFFECT ON OPERATING CONDITIONS

Ambient temperature:
Variations for a temperature change of $10^{\circ} \mathrm{C}$ :
Within $\pm(0.1 \%$ of rdg. +1 digit $)$

* Excluding reference junction compensation errors
$\pm(0.1 \%$ of rdg. +2 digits) for RTDs
Power supply variations:
Power supply within range of 90 to 132, 180 to 250 V
AC (frequency of $50 / 60 \mathrm{~Hz}$ ): Within $\pm 1$ digit
Variations for a change of $\pm 2 \mathrm{~Hz}$ in rated power supply frequency (for power voltage of 100 VAC ): Within $\pm(0.1 \%$ of rdg. +1 digit)
External magnetic field:
Variations for an AC $(50 / 60 \mathrm{~Hz})$ or DC external magnetic field of $400 \mathrm{~A} / \mathrm{m}$ : Within $\pm(0.1 \%$ of rdg. +10 digits)
Signal source resistance:
Variations for $\mathrm{a}+1 \mathrm{k} \Omega$ change in signal source resistance.
(1) DC voltage range

2 V DC and lower ranges: Within $\pm 10 \mu \mathrm{~V}$
6 V DC and higher ranges: Within $-0.1 \%$ of rdg.
(2) Thermocouple range

Within $\pm 10 \mu \mathrm{~V}$ (however, $\pm 100 \mu \mathrm{~V}$ when burnout is specified)
(3) RTD range (Pt100)
I) Variation for a $10 \Omega$ change in each wire (assuming all 3 wires have the same resistance): Within $\pm$ ( $0.1 \%$ of rdg. +1 digit)
II) Variation due to $40-\mathrm{m} \Omega$ difference in resistance between lead wires (maximum difference between all wires): Approx. $0.1^{\circ} \mathrm{C}$

## - Other Specification

Clock: Provided with calendar function; can be synchronized by means of external contact
Clock accuracy:
$\pm 100 \mathrm{ppm}$, excluding a time lag (less than 1 sec ) at the time of power-on
Key lock function:
Can be turned on or off; a password can be set for the function.
Login function:
The station can be logged in to by entering a user name, user ID and password. The station can be locked with a password.

## COMMUNICATION FUNCTIONS

## - Ethernet Communication

Medium: Ethernet (10BASE-T)
Basis protocol:
SMTP, HTTP1.0, FTP, TCP, UDP, IP, ARP and ICMP
E-mail function:
Recipient address:
2 address groups (two or more addresses can be specified for each group using no more than 150 characters)
Types of message:
The following pieces of information can be sent via e-mail; for each address group, a selection can be made as to whether or not to send the information.
Alarm inform:
Inform in occurring alarm/canceling alarm
System inform:
Inform in recovering power failure/inform the time of recovering, inform the rest of time before rewriting on inside memory (manual save mode), inform the rest of amount in reaching $90 \%$ of media volume (auto save mode)
Scheduled time inform:
Inform the moment value at a certain time or interval
Report inform:
Inform report data in report timeup (/M1 is equipped)
Web server function:
Shows screen images, alarms, instantaneous values and other information using Browser software (Internet Explorer 5.0). FTP client function: Transfers files automatically. FTP server function:

Acquires or deletes files, or manipulates directories from the host computer, and provides information on the remaining size of memory.
FTP server function:
Manipulates directories in an external storage medium, outputs or deletes files from the medium, and provides information on the remaining size of memory.
Real-time monitor function:
Real time monitoring CX data by communication (Yokogawa private protocol)
CX PC-UT gateway function:
By using CX as gateway, external UT parameters can be set from PC.

## - Serial Communication

This type of communication is used for ladder communication, digital indicating controller communication, and modbus communication.
Medium: EIA RS-232 (CX1xx0x-x-1-x) EIA RS-422A/485 (CX1xx0x-x-2-x)
Protocol: Dedicated protocol or Modbus protocol Synchronization: Start-stop synchronization
Communication method (RS-422A/485): Four-wire, half-duplex multi-drop connection (1:N, where $N=1$ to 31 )
Transfer rate:
$1200,2400,4800,9600,19200$, or 38400 bps
Data length: 7 or 8 bits
Number of stop bits: 1
Parity: ODD, EVEN or NONE
Overall communication distance (RS-422A/485): 1.2 km

Communication mode: ASCII for input/output of control and setting data ASCII or binary for output of measured data Modbus communication:
Operating mode: RTU MASTER or RTU SLAVE RTU MASTER:

Perform communication with temperature controller RTU SLAVE:

Outputs measured/computed data, alarm statuses, and so on.
Ladder communication:
Data input/output by means of BCD code

## - Green Series Communication

This function is for communicating with Yokogawa M\&C's UT series. Supported controller models are UT3x0, UT3x1, UT4x0, UT5x0, UT750, and other specific models (Only Read and record support).

## - Ladder Communication (Dedicated to RS-

 422A/485 Communication)Ladder communication is a communication protocol used to communicate with Programmable Logic Controllers (PLCs) that are capable of ladder communications.

## OPTIONS

## - Program Setting Functions (/PG1, /PG2)

## Program setting functions

Number of program patterns: 4 (/PG1), 30 (/PG2)
Number of segments per program pattern: 99 max.
Number of program segments:
300 max. (as the sum of segments for all program patterns)
Number of program events: 800 max
Number of program repetitions: 999 max. or infinite
Segment time: 0 min: 1 sec to $99 \mathrm{hr}: 59 \mathrm{~min}: 59 \mathrm{sec}$ Start/stop of program pattern:

A program pattern can be started(RUN), stopped(RESET), held(Hold) or advanced by means of contact input or instrument operation.
Switching among program patterns:
A program pattern can be switched to another by means of contact input or instrument operation.
Advance function: Forcibly moves the program to the next segment
Wait function:
Wait time: Off, or 0 min:1 sec to $99 \mathrm{hr}: 59 \mathrm{~min}: 59 \mathrm{sec}$
Wait zone: 0.0 to $100.0 \%$ of the span of measurement input range
PID parameters switching
Segment PID selection: PID-parameter numbers being used can be selected on a segment basis
Zone PID selection: PID parameter sets are switched depending on the value of the applied PV input

## Time event

The progress status of a program pattern is provided by means of contact output.(ON/OFF)
Number of events set: 16 max. per segment
Output: Provided after the lapse of a specified time from the moment of segment switchover.
Range of time lapse: 0 to $99 \mathrm{hr}: 59 \mathrm{~min}: 59 \mathrm{sec}$
PV event
Alarm function for measured values/deviations within a program pattern
Number of events set:16 max. per segment
Event type: PV high limit, PV low limit, high limit of deviation, low limit of deviation, deviation within high and low limits, SP high limit, SP low limit, Out high limit, Out low limit

## Control mode switching

RESET/RUN switching for program
operation: Run/stop status of program operation Hold/non-Hold options:

The progress of program operation can be placed in a Hold state or non-Hold state while in the Run status of a program.


Measurement Alarm Output Relay (/A6, /A6R, /A4F, /A4FR)
Number of outputs: 6 (/A6, /A6R, /A4F, /A4FR)
Number of inputs: 8 (for /A6R, A4FR option only)
Relay contact rating: 250 V DC/0.1 A (resistive load) or 250 V AC ( $50 / 60 \mathrm{~Hz}$ )/3 A
Output configuration: NO-C-NC (Energized-at-alarm/ deenergized-at-alarm, AND/OR, and hold/non-hold actions are selectable)
Remote Control (/A6R, /A4FR)
The following types of control are possible by means of contact input (configurable for up to 8 types):

- Start/stop of memory (signal edge)
- External trigger input for event files (trigger of 250 ms or longer)
- Synchronization (adjusts the clock to an appointed time by means of contact input; trigger of 250 ms or longer)
- Start/stop of computation (signal edge)
- Resetting of computed data ( 250 ms or longer trigger)
- Manual sampling ( 250 ms or longer trigger)
- Message writing (configurable for up to 8 messages; 250 ms or longer trigger)
- Load setting (configurable for up to 3 loads; 250 ms or longer trigger)
- Alarm acknowledgment (of 250 ms or longer trigger)

FAIL output/end-of-memory output (/A4F, /A4FR)
The relay contact output on the rear panel indicates the occurrence of a system error, the rest of memory media.
Manual save mode:
Relay output before the specified time of starting overwriting inside memory
(selectable from 1, 2, 5, 10, 20,50, or 100 hours)
Auto save mode: Relay output when the amount of memory media reaches 90\%
Relay contact rating:
250 VDC/0.1 A (for resistance load) 250
VAC ( $50 / 60 \mathrm{~Hz}$ )/3 A

## - Batch Header Function (/BT1)

Batch number function are available.
Batch number function: Batch number (max. 16 characters +4 figures lot number) and comment (max. 32 characters $\times 3$ lines) can be set in the operation mode.
Auto increment of serial number by each batch start is available.
Pre-set application name, supervisor name and manager name can be referred in the batch number entry display.
Data file: Following information are added to the display/event data file as headers.

- User name
- Application name
- Supervisor name
- Manager name
- Batch number
- comment
- Computation Functions (/M1)

With the "/M1" option, it is possible to show and record trend graphs/digital readings for the following types of computation on computation channels.
Number of computation channels: 12
Types of computation:
Standard computations:
Four fundamental arithmetic operations, square roots, absolute values, common logarithm, exponents, powers, relational operations ( $<, \leqq,>, \geqq,=, \infty$ ), logical operations (AND, OR, NOT, XOR)
Statistical computations:
Average, maximum, minimum, and total values of time-series data
Moving average computation:
A moving average calculation is performed on the results of computation.
Constants: Up to 30 constants can be set as necessary. Communication-based digital input:

This input can be applied to computational expressions other than statistical ones.
Number of communication-based digital data values: 30 Remote input:

A remote status ( $0 / 1$ ) can be used in a computational expression.
Number of remote-input data values: 8
Report functions:
Report type:
Hourly report, daily report, a combination of hourly and daily report, a combination of daily and weekly reports, and a combination of daily and monthly reports
Type of computation:
Average, maximum, minimum, total
Data format: ASCII

## - Three-legs Isolated RTD Input (/N2)

The "/N2" option is an RTD input, the RTD of which has electrically isolated $A, B$ and $b$ terminals.

## - 24 V DC/AC Power Supply (/P1)

Specifications of the "/P1" option are as follows:
Rated supply voltage:
24 V DC/AC
Operating supply voltage range:
21.6 to 26.4 V DC/AC

Withstanding voltage:
500 V AC between power supply terminal and ground
Power consumption:
Power Consumption

| Supply <br> voltage | When LCD <br> Saver Is On | When in Normal <br> Operation | Maximum |
| :--- | :---: | :---: | :---: |
| 24 V AC | Approx. 12 VA | Approx. 14 VA | 23 VA |
| 24 V AC | Approx. 20 VA | Approx. 23 VA | 37 VA |
| $(50 / 60 \mathrm{~Hz})$ |  |  |  |

Relation between Contact Inputs and Modules

| Contact Input Functions | Alarm/A6R 8 DI | Alarm/A4FR 8 DI | Control output <br> module 6 DI |  |
| :--- | :--- | :--- | :--- | :--- |
| Start and stop of memory |  |  |  |  |

*1: It is not available for contact output (DO) and internal switch.

Relation between Contact Inputs and Modules

|  | Alarm <br> /A6 | Alarm /A6R | Alarm /A4F | Alarm <br> /A4FR | Control Output module |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Measurement alarms (channels 1 to 6 and channels 31 to 42) | $\bigcirc$ | - | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| Control alarms (channels 101 to 106) |  |  |  |  | - |
| PV event, time event, and pattern event |  |  |  |  | - |
| FAIL |  |  | $\bigcirc$ | $\bigcirc$ | * ${ }^{\text {* }}$ |
| Self-diagnostics |  |  |  |  | ${ }^{* 2}$ |
| End of memory relay |  |  | $\bigcirc$ | $\bigcirc$ |  |

*1: Output from DO001
*2: Output from DO002

## APPLICATION SOFTWARE

## - DAQSTANDARD

System requirements:
OS
Windows 2000 SP4
Windows XP (Home Edition SP3, Professional SP3)*

* Except for Professional x64 Edition

Windows Vista (Home Premium SP1, SP2, Business SP1, SP2)*

* Except for 64-bits editions Windows 7 (Home Premium 32-bit and 64bit editions, Professional 32-bit and 64-bit editions)
Processor and main memory
2000/XP: Intel Pentium III, 600 MHz or faster x 64 or x86, 128MB or more
Vista: Intel Pentium 4, 3GHz or faster x64 or x86, 2GB or more
7: 32-bit edition Intel Pentium 4, 3GHz or faster x64 or x86, 2GB or more
64-bit edition Intel x64 processor that is equivalent to Intel Pentium 4, 3 GHz or
faster, 2 GB or more
Hard disk: 100MB or more of free space
Display: A video card that is recommended for the OS and a display that is supported by the OS, has a resolution of $1024 \times 768$ or higher, and that can show 65,536 colors (16-bit, high color) or more.

Main functions (as a package)
Configuration software:
External storage medium:
Configures the medium or sets it in set mode.
Configuration via communication:
Configures the station, excluding the communication setting (IP address), or sets it in set mode.
Data viewer:
Number of channels covered for display:
32 per group; 30 groups max.
Display functions:
Waveform views, digital readings, circular graphics, lists, TLOG views, report views, etc.
File connection display:
This function concatenates files created separately during continuous data acquisition because of auto-saving or power failure, and shows the concatenated file on the display (can concatenate files of up to $1,000,000$ data items).
Section computation:
Maximum, minimum, average, rms value, p -p value
Data conversion:
This function converts the data format to ASCII, Lotus 1-2-3, or Excel.
Printout: The data viewer prints replayed data.

## MODELS AND SUFFIX CODES

Note: The RS-422A/485 communication interface is required to use ladder communication. Also, the computation functions (/M1) are required to write data from a PLC to a CX through ladder communication.
(Style: S3)

| Model | Suffix Code | Option Code | Remarks |
| :--- | :--- | :--- | :--- |
| CX1000 |  |  | DAQSTATION CX1000 <br> (Embedded loops: 0 loop, Measurement channels: 0ch) |
| External storage <br> medium | -3 |  | ATA flash memory card provided with medium |
| Communication port | -0 |  | Ethernet |
|  |  | -1 |  |

${ }^{*}$ 2: Only one alternative choice is allowed.
(Style: S3)

| Model | Suffix Code | Option Code | Remarks |
| :---: | :---: | :---: | :---: |
| CX1006 |  |  | DAQSTATION CX1000 <br> (Embedded loops: 0 loop, Measurement channels: 6ch) |
| External storage medium | -3 |  | ATA flash memory card provided with medium |
| Communication po | t ${ }^{2}$ |  | Ethernet |
|  | -1 |  | RS-232C communication interface (including Modbus master/slave protocol functions) ${ }^{* 11}$ and Ethernet. |
|  | -2 |  | RS-422A/485 communication interface (including Modbus master/slave protocol functions) ${ }^{* 1}$ and Ethernet. |
| Language | -2 |  | English |
| Option |  | IA6 | Measurement alarm (6 DO terminals) ${ }^{2}$ |
|  |  | /A6R | Measurement alarm with remote control (8 DI and 6 DO terminals)*2 |
|  |  | /A4F | Measurement alarm (4 DO terminals, FAIL/end-of-memory output relays) ${ }^{* 2}$ |
|  |  | /A4FR | Measurement alarm with remote control (8 DI and 4 DO terminals, FAIL/end-of-memory output relays)* ${ }^{*}$ |
|  |  | /BT1 | Batch header function |
|  |  | /M1 | Computation functions (including report functions) |
|  |  | /N2 | Three-wire isolated RTD (measurement channels) |
|  |  | /P1 | 24 V DC/AC power supply |

*1: Be sure to select /M1 and communication port (RS-232C or RS-422A/485) if you intend to use the Modbus master function. *2: Only one alternative choice is allowed.


[^0]
## - Standard Accessories

| Product | Quantity |
| :--- | :---: |
| Mounting brackets | 2 |
| Terminal screws | 5 |
| User's manual | 1 |
| ATA flash memory card (128 MB,CF+ adapter ); only if model <br> has ATA flash memory card function | 1 |

## - Optional Accessories

| Product | Model (part) number | Specification |
| :--- | :---: | :---: |
| Shunt resistor <br> (for screw input terminals) | 415920 | $250 \Omega \pm 0.1 \%$ |
|  | 415921 | $100 \Omega \pm 0.1 \%$ |
|  | 415922 | $10 \Omega \pm 0.1 \%$ |
| Card adapter (not including CF card) | B 9968 NN | - |
| CF card (not including card adapter) | 772093 | 512 MB |
|  | 772094 | 1 GB |
|  | 772095 | 2 GB |
| Mounting bracket | B 9900 BX | - |


| Control output module | CXA900-01 |  |
| :--- | :--- | :--- |

## DIMENSIONS

## Dimensions



Rear View
Unit : mm
(approx. inch)


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

## Panel cutout

Unit : mm
(approx. inch)
Single-unit Mounting
Side-by-side Mounting (horizontally)


| Units | $\mathrm{L}^{+2} \mathbf{0}(\mathrm{~mm})$ |
| :---: | :---: |
| 2 | 282 |
| 3 | 426 |
| 4 | 570 |
| 5 | 714 |
| 6 | 858 |
| 7 | 1002 |
| 8 | 1146 |
| 9 | 1290 |
| 10 | 1434 |
| $n$ | $(144 \times \mathrm{n})-6$ |

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


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

## Power Supply Terminal



RS-422-A/485 Terminal


RS-232 Terminal


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

## FOUNDATION Fieldbus Terminal



## Measurement Input Terminals



## Control input terminals



$$
\begin{array}{rr}
(\mathrm{RSP}) \mathrm{PV} & (\mathrm{RSP}) \mathrm{PV} \\
\mathrm{PV} & (\mathrm{RSP}) \mathrm{PV} \\
\text { PV2 PV1 } & (\mathrm{RSP}) \mathrm{PV} 2 \mathrm{PV} 1
\end{array}
$$

## Control output and contact I/O terminals



## Option Terminals (CX1006)

/A6

| 6 |
| :--- |
| 6 |
| NC |
| C |
| NO |

Alarm output relays
/A6R


Alarm output relays
Remote control block
IA4FR
FAIL

| NC |  | NC | NC |  | NC | NC |  | NC | 6 | 3 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| C | C | C |  | C | C |  | C | 7 | 4 | 1 |
| NO | NO | NO |  | NO | NO |  | NO | 8 | 5 | 2 |


| 6 | 5 | 4 | 3 | 2 | 1 |  |  | C |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| NC | NC | NC | NC | NC | NC | 6 | 3 |  |
| C | C | C | C | C | C | 7 | 4 | 1 |
| NO | NO | NO | NO | NO | NO | 8 | 5 | 2 |

Memory end
IA4F

| FAIL |
| :--- |
| NC NC NC  NC NC  NC   <br> C  C C  C C  C  |
| NO | NO

Memory end

The TCP/IP software used in this product and the document for that TCP/IP software are based in part on BSD networking software, Release 1 licensed from The Regents of the University of California.

- Microsoft, MS and Windows are registered trademarks of Microsoft Corporation USA.
- Lotus and 1-2-3 are registered trademark of Lotus Development Corporation.
- MMX and Pentium are registered trademarks of Intel Corporation.
- Ethernet is a registered trademark of XEROX Corporation.
- Modbus is a registered trademark of AEG Schneider.
- The Logo mark of FOUNDATION ${ }^{\text {TM }}$ Fieldbus and Fieldbus foundation are registered trademark of Fieldbus foundation
- Other company and/or product names are registered trade mark of their manufactures.


[^0]:    *1: Be sure to select/M1 and communication port (RS-232C or RS-422A/485) if you intend to use the Modbus master function.
    *2: It can not be specified for CX1200 model.
    *3: Only one alternative choice is allowed.

