
**Service
Manual**

DAQSTATION CX1000/CX2000

SM 04L31A01-01E

Important Notice to the User

This manual contains information for servicing YOKOGAWA's DAQSTATION CX1000/CX2000. Check the serial number to confirm that this is the correct service manual for the instrument to be serviced. *Do not use the wrong manual.*

Before any maintenance and servicing, *read all safety precautions carefully.*

Only properly trained personnel may carry out the maintenance and servicing described in this service manual.

Do not disassemble the instrument or its parts, unless otherwise clearly permitted by this service manual.

Do not replace any part or assembly, unless otherwise clearly permitted by this service manual.

In principle, Yokogawa Electric Corporation (YOKOGAWA) does not supply parts other than those listed in the customer maintenance parts list in this service manual (mainly *modules* and *assemblies*). Therefore if an assembly fails, the user should replace the whole assembly and *not* components within the assembly (see "Note"). If the user attempts to repair the instrument by replacing individual components within the assembly, YOKOGAWA assumes no responsibility for any consequences such as defects in instrument accuracy, functionality, reliability, or user safety hazards.

YOKOGAWA does not offer more detailed maintenance and service information than that contained in this service manual.

All reasonable efforts have been made to assure the accuracy of the content of this service manual. However, there may still be errors such as clerical errors or omissions. YOKOGAWA assumes no responsibility of any kind concerning the accuracy or contents of this service manual, nor for the consequences of any errors.

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Note

YOKOGAWA instruments have been designed in a way that the replacement of electronic parts can be done on an assembly (module) basis by the user. YOKOGAWA instruments have also been designed in a way that troubleshooting and replacement of any faulty assembly can be done easily and quickly. Therefore, YOKOGAWA strongly recommends replacing the entire assembly over replacing parts or components within the assembly. The reasons are as follows:

- The instruments use high-performance microprocessors, large scale CMOS gate arrays, and surface-mount components to provide state-of-the-art performance and functions.
 - Repair of components can only be performed by specially trained and qualified maintenance personnel with special highly-accurate tools, including costly ones.
 - When taking the service life and cost of the instruments into consideration, the replacement of assemblies offers the user the possibility to use YOKOGAWA instruments more effectively and economically with a minimum in downtime.
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Introduction

This manual contains information for servicing YOKOGAWA's DAQSTATION CX1000/CX2000.

Note

This is the second edition of the manual, dated August 2002.

WARNING

This service manual is to be used by properly trained personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to the safety precautions prior to performing any service. Even if servicing is carried out according to this service manual, or by qualified personnel, YOKOGAWA assumes no responsibility for any result occurring from this servicing.

Safety Precautions

The following general safety precautions must be taken during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

Yokogawa Electric Corporation assumes no liability for the customer's failure to comply with these requirements.

WARNING

Use the Correct Power Supply

Ensure the source voltage matches the voltage of the power supply before turning ON the power.

Use the Correct Power Cord and Plug

To prevent an electric shock or fire, be sure to use the power supply cord recommend by YOKOGAWA. The main power plug must be plugged in an outlet with a protective grounding terminal. Do not invalidate protection by using an extension cord without protective grounding.

Connect the Protective Grounding Terminal

The protective grounding terminal must be connected to ground to prevent an electric shock before turning ON the power.

Do Not Impair the of Protective Grounding

Never cut off the internal or external protective grounding wire or disconnect the wiring of the protective grounding terminal. Doing so creates a potential shock hazard.

Do Not Operate with Defective Protective Grounding

Do not operate the instrument if you suspect the protective grounding might be defective.

Do Not Operate Near Flammable Materials

Do not operate the instrument in the presence of flammable liquids or vapors. Operation of any electrical instrument in such an environment constitutes a safety hazard.

Do Not Remove Any Covers

There are some areas components inside the instrument containing high voltage. Do not remove any cover, if the power supply is connected. The cover should be removed by qualified personnel only.

Ground the Instrument before Making External Connections

Connect the protective grounding before connecting the instrument to a measurement or control unit.

Furnish a switch (double-pole type) to separate the CX2000 from the main power supply in the power supply line. In addition, make sure to indicate that the switch is a power control for the CX2000 on the switch.

Switch Specifications

Steady-state current rating:1 A or more, inrush current rating:60 A or more
Connect a fuse between 2 A and 15 A in the power supply line.

Safety Symbols Used on Equipment and in Manuals



To avoid injury, death of personnel or damage to the instrument, the operator must refer to an explanation in the user's manual.



High temperature. To avoid injury caused by hot surfaces, the operator must not touch the heatsink.



Protective grounding terminal, to protect against electrical shock.

This symbol indicates that the terminal must be connected to ground before operation of equipment.



This symbol represents a functional grounding terminal. Such terminals should not be used as a protective grounding terminal.

WARNING

A WARNING sign calls attention to a procedure, practice, or condition, that could result in the injury or death of personnel if not correctly performed or adhered to.

CAUTION

A CAUTION sign calls attention to a procedure, practice, or condition, that could result in damage to or the destruction of part of the instrument if not correctly performed or adhered to.

Overview of This Manual

This manual is meant to be used by qualified personnel only. Make sure to read the safety precautions at the beginning of this manual as well as the warnings and cautions contained in the chapters relevant to any servicing you may be carrying out.

This manual contains the following chapters.

1 Principles of Operation

Provides an introduction and safety considerations.

2 Testing

Explains the tests for checking the performance of the instrument.

3 Adjustments

Explains the adjustments which can be performed by users.

4 Replacing Parts

Describes maintenance which can be performed by users.

5 Troubleshooting

Presents procedures for troubleshooting and how to proceed in case parts need to be replaced.

6 Schematic Diagram

Provides a system configuration diagram.

7 Customer Maintenance Parts List

Contains exploded views and a list of replaceable parts.

8 Procedures for Disassembly (CX1000)

Lists the steps required to remove parts from the instrument.

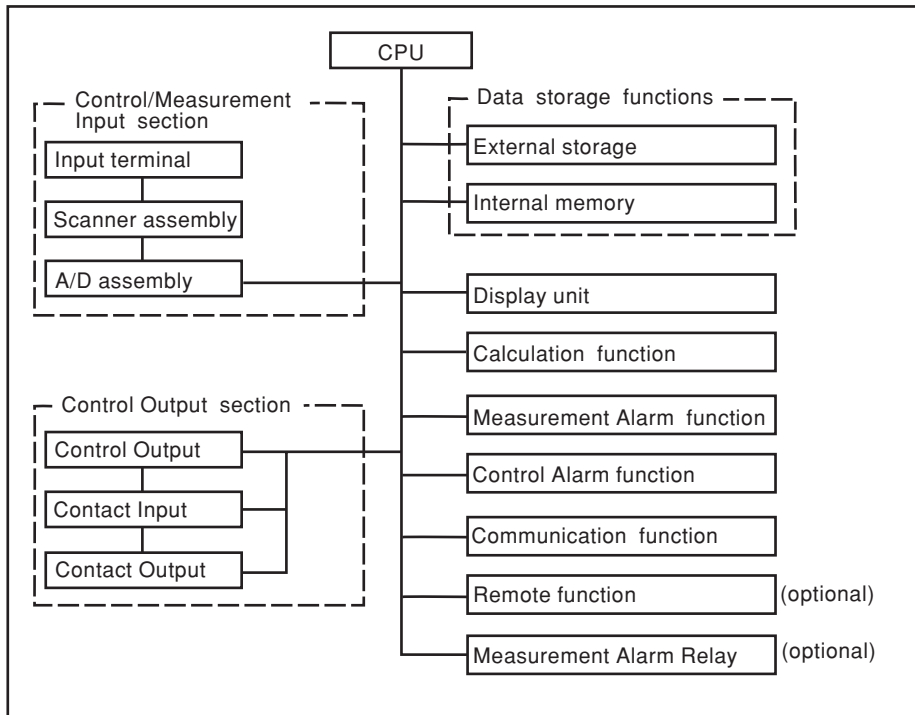
Specifications are not included in this manual. For specifications, refer to IM 04L31A01-01E or IM 04L31A01-03E.

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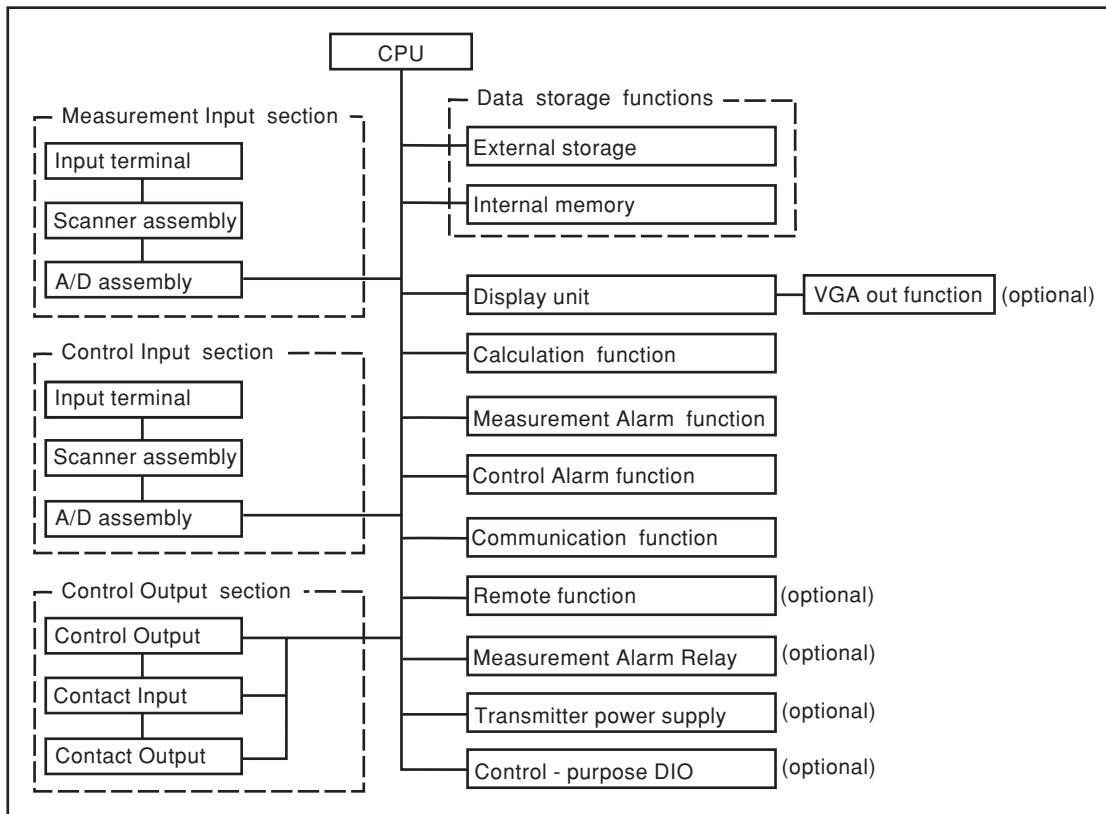
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1.1 Block Diagram of the CX1000/CX2000

Block Diagram of the CX1000



Block Diagram of the CX2000



Refer for details see schematic diagram page 6-1 and 6-2.

1.2 Input Section

A/D Assembly

The A/D assembly has items such as a programmable gain amp, voltage reference, PWM modulator, current source for RTD measurements, differential amp, voltage source for RJC, serial parallel converter, control logic, and an occurred scanner SSR control signal.

The A/D assembly uses a sinewave oscillating type self-resonant switching power supply (DC/DC converter), and noise filtering is achieved by signal integration.

The A/D assembly detects the frequency of the power while it is ON and the integrated time becomes 20 ms or 16.67 ms. Therefore it carries a very high rate of noise rejection for the power frequency (in auto mode).

In case the power frequency of the instrument and of the measured object are different, the appropriate integrated time is manually selectable. In case of the CX2000, the selection of 100 ms for 50/60 Hz is also available. A 16 bit resolution is achieved regardless of the integrated time.

Input Terminal

The internal printboard is isothermal because a print board with a metal core is being used. Therefore, stable reference junction compensation is realized.

Scanner Assembly

An in-house SSR (solid state relay) is being used for the scanner. The SSR, having a semiconductor switch, has a withstand voltage as high as 1500 V and a leakage current of only 1 nA. For that reason, it has the following features.

- Semi-infinite life due to the absence of mechanical contacts
- Silent operation
- No occurrence of thermoelectric power.

On the other hand, compared to a mechanical relay, the SSR has, the disadvantage of a bigger ON resistance and OFF capacity. As a result, RTD measurement and noise resistance characteristics are affected. Regarding RTD measurements, a differential amp was inserted into the previously mentioned analog circuit without increasing the number of parts, so that it would receive no influence from ON resistance.

For RTD measurements in Measurement input section there is generally no insulation between channels.

For RTD measurements in Control input section there is generally insulation between channels.

Data Storage Functions

For storing data, the CX1000/CX2000 has 1.2 MB of internal memory and is equipped with a Zip drive, or an ATA flash memory card drive. The measured data can also be saved to external storage media such as floppy disks, Zip disks, and ATA flash memory cards.

Display Unit

The CX has a 5.5-inch (CX1000) or 10.4-inch (CX2000) TFT color LCD on which it displays the measured results (240 (vertical) × 320 (horizontal) pixels for the CX1000 or 480 (vertical) × 640 (horizontal) pixels for the CX2000).

Calculation Function

The CX1000/CX2000 performs differential computation, linear scaling, and square roots using a microprocessor on the CPU board.

Measurement Alarm Function

The following eight alarm types can be set.

High limit (H), low limit (L), differential high limit (h), differential low limit (l), rate-of-change on increase (R), rate-of-change on decrease (r), alarm delay upper limit alarm (T), or alarm delay lower limit alarm (t).

Control Alarm Function

The following nine alarm types can be set.

PV high-limit, PV low-limit, Deviation high-limit, Deviation low-limit, Deviation high & low limit, SP high-limit, SP low-limit, Output high-limit, Output low-limit

Other Functions

- **Communication Function:**
Ethernet (standard)
RS-232/RS-422A interface added (optional).
- **Remote Function:**
The trigger, start/stop, time adjustment, and other functions can be controlled remotely (optional).
- **Measurement Alarm Relay:**
Measurement alarm output and memory end/fail output (option for CX1006 and CX2000).
- **Transmitter Power Supply:**
DC24 V output for transmitter (only CX2000's optional).
- **VGA Out Function (Option for CX2000 Only):**
The instrument's screen can be displayed on an external monitor via VGA output.
- **Control - Purpose DIO (CX2000 Only):**
Contact input
Input for designated operations such as start/stop. Activate using a no-voltage contact or open collector signal. This is a 12-point input.
Contact output
Control Alarm output consists of 12 points of transistor contact output.

Control Output Section

Control Output

The following types are available for universal control output.

- Current output (continuous PID control output)
Continuously output a current (analog signal) proportional to the calculated PID values.
- Time proportional PID voltage pulse output
Output an ON/OFF signal, having a pulse width proportional to the time, as a voltage per the calculated PID values.
- On/Off control relay contact output
 - Output an ON/OFF signal, having a pulse width proportional to the time, at a relay contact point per the calculated PID values.
 - Output an ON/OFF signal to a relay contact point corresponding to the sign (+/-) of the deviation in the measured value from the specified target value.

Contact Input

Input for designated operations such as start/stop. Activate using a no-voltage contact or open collector signal.

Contact Output

Control Alarm output consists of relay contact output and transistor contact output.

2.1 Overview of Tests

The following describes general testing procedures for DAQSTATION CX1000/CX2000 series instruments. For tests on specific modules or assemblies, see sections 2.3 and later.

Operating Conditions

Ambient Temperature: $23 \pm 2^\circ\text{C}$
Relative Humidity: $55 \pm 20\%$

Test Instruments

Instrument	Specifications
DC voltage generator	Accuracy: 0.005% of setting + 1 mV
DMM	Accuracy: 0.005% of rdg + 1 mV
Resistors	Accuracy: 0.01% or better
Insulation tester	500 VDC
Withstanding voltage tester	AC 1 to 3 kV, 500 VDC
External monitor (for test of /D5 option)	VGA monitor (H: 33.3 kHz, V: 60.168 Hz)
Oscilloscope	200 kS/s or more, isolated input
Thermostatic chamber	ZC-114 (Coper Electronics Co., Ltd.) or equivalent

Testing Conditions

The tests cover all included A/D converters.

The unit's analog input is in analog multiplexer format.

For the CX1000, channel group 1–6 of the measurement input section and channel group 7–11 of the control input section are each assigned to one A/D converter. For the CX2000, channel groups 1–5 and 6–10 of the control input section (slot 1) and channel groups 1–10 and 11–20 of the measurement input section (slots 2 and 3) are each assigned to one A/D converter.

Therefore, except for when specifying inputs linked to the same A/D converter, only one arbitrary channel within a group need be tested (for example, not channels 1–5 but only channel 1).

Tests

Insulation Resistance Test
Withstand Voltage Test
Measurement Accuracy Test
Error between Channels Test
Excessive Input Test
Burnout Test
Reference Junction Compensation Accuracy Test
Display Function Test
VGA Output Function Test (For /D5 Option Only)
Serial Communications Function Test (Only When The -1 Or -2 Suffix Code Is Specified For The Communications Port).
Battery Backup Function Test
Continuous Operation Test
Current Output Accuracy Test
Voltage Pulse Output Test
Control Output Relay Test
DIO Test
KEY Function Test
Media Function Test
Alarm Relay Output Function Test (Only If The /A6, /A6R, /A4F, Or /A4FR Option Is Installed)
Remote Function Test (Only If The /A6R Or /A4FR Option Is Installed)
Communications Function Test (Ethernet)
Test of 24 VDC Transmitter Power Output (Only If The /TPS4 Is Installed)

Consult your nearest Yokogawa representative regarding the following tests.

Power Supply Frequency Detection Function Test
Memory Test

2.2 Test Procedures

Insulation Resistance Test

Perform this test using a DC 500 V insulation resistance meter and confirm that the results meet the criteria below.

Terminals	Reference Values	Notes
Power terminal to earth terminal Measurement input terminal to earth terminal Control input terminal to earth terminal	100 MΩ or higher	Short all channels prior to test
RS-422-A/485 SG terminal to RS-422-A/485 FG terminal	100 MΩ or higher	Test only if the basic specification code for the communications port is -2.
Ethernet input/output terminal to earth terminal	100 MΩ or higher	Short all terminals prior to test

Withstand Voltage Test

Perform the test using a withstanding voltage tester and confirm that the results meet the criteria below, and that the instrument does not malfunction.

Terminal	Reference Values
AC power terminal to earth terminal*	Leakage current of 10 mA or less at 1.5 kV AC for 1 minute
DC power terminal to earth terminal (/P1)*	Leakage current of 10 mA or less at 0.5 kV AC for 1 minute
Measurement input terminal to earth terminal†	Leakage current of 2 mA or less at 1.5 kV AC for 1 minute
Control input terminal to earth terminal†	Leakage current of 2 mA or less at 1.5 kV AC for 1 minute
Between measuring input terminals‡	Leakage current of 1 mA or less at 1 kV AC for 1 minute
Between control input terminals‡	Leakage current of 1 mA or less at 1 kV AC for 1 minute
Current and voltage pulse to earth terminal§	Leakage current of 2 mA or less at 1 kV AC for 1 minute
Control relay terminal to earth terminal (2, 4, and 6 loop models)	Leakage current of 2 mA or less at 1.5 kV AC for 1 minute
DO relay terminal to earth terminal (2, 4, and 6 loop models)#	Leakage current of 2 mA or less at 1.5 kV AC for 1 minute
DO(Tr) terminal to earth terminal (2, 4, and 6 loop models or /CST1)**	Leakage current of 2 mA or less at 0.5 kV AC for 1 minute
D1 terminal to earth terminal (2, 4, and 6 loop models or /CST1)††	Leakage current of 2 mA or less at 0.5 kV AC for 1 minute
Alarm relay terminal to earth terminal (/A6, /A6R, /A4F, /A4FR)‡‡	Leakage current of 2 mA or less at 1.5 kV AC for 1 minute
Remote terminal to earth terminal (/A6R, /A4FR)§§	Leakage current of 2 mA or less at 0.5 kV AC for 1 minute
24 V transmitter power supply output to earth terminal (/TPS4)	Leakage current of 10 mA or less at 0.5 kV AC for 1 minute

* Short L and N (or +/- with the /P1 option)

† Short all channels

‡ Short the + and – input terminals (except for the RTD b terminal)
Short the even and odd channels (for example, short channels 1-3-5 and 2-4-6 on the CX1000 or channels 1-3-5-7-9 and channels 2-4-6-8-10 for the CX2000), and test the withstanding voltage between them.

§ Short mA, PULS, and C.

|| Short NO, NC, and C on CTRL OUT.

Short 1NO, 1C, and 2NO on DO.

** Short DO3—DO6 and C.

†† Short all DI terminals.

‡‡ Short all alarm relay terminals.

§§ Short all remote terminals.

||| Short all transmitter power supply output terminals (+/-).

2.2 Test Procedures

Measurement Accuracy Test (Measurement Input and Control Input)

Check that the specifications below are met given the following operating conditions: $23 \pm 2^\circ\text{C}$, $55 \pm 10\%$ RH, and a warm up time of 30 minutes.

Range	Input Value	Criterion	Specifications
20 mV	+20.00 mV	± 3 digits	$\pm(0.1\%$ of rdg + 2 digits)
	0.00 mV	± 2 digits	
	-20.00 mV	± 3 digits	
60 mV	+60.00 mV	± 6 digits	$\pm(0.1\%$ of rdg + 2 digits)
	0.00 mV	± 2 digits	
	-60.00 mV	± 6 digits	
200 mV	+200.0 mV	± 3 digits	$\pm(0.1\%$ of rdg + 2 digits)
	0.0 mV	± 1 digits	
	-200.0 mV	± 3 digits	
2 V	+2.000 V	± 3 digits	$\pm(0.1\%$ of rdg + 2 digits)
	0.000 V	± 1 digits	
	-2.000 V	± 3 digits	
6 V	+6.000 V	± 6 digits	$\pm(0.1\%$ of rdg + 2 digits)
	0.000 V	± 1 digits	
	-6.000 V	± 6 digits	
20 V	+20.00 V	± 3 digits	$\pm(0.1\%$ of rdg + 2 digits)
	0.00 V	± 1 digits	
	-20.00 V	± 3 digits	
50 V	+30.00 V	± 5 digits	$\pm(0.1\%$ of rdg + 3 digits)
	0.00 V	± 2 digits	
	-30.00 V	± 5 digits	
Pt100	18.52 Ω /-200 $^\circ\text{C}$	$\pm 0.4^\circ\text{C}$	$\pm(0.15\%$ of rdg + 0.3°C)
	100.00 Ω /0 $^\circ\text{C}$	$\pm 0.2^\circ\text{C}$	
	313.71 Ω /600 $^\circ\text{C}$	$\pm 0.9^\circ\text{C}$	

Error between Channels Test

Connect the (+), (-), and (b) terminals on all measurement and control input channels using thick leads, then check whether the following criteria are met.

Range	Input Value	Criterion
20 mV	Short (+) (-)	0.00 mV ± 2 digits
Pt100	103.9 Ω	Measured value: $10^\circ\text{C} \pm 0.2^\circ\text{C}$, difference between channels: 0.2°C or less

Note

- If the measurement error does not meet the criterion ($10^\circ\text{C} \pm 0.2^\circ\text{C}$), and unless you determine the cause to be the effect of the resistance in the test facility's RTD wiring, use the following measurement criteria.

Measured value: $10^\circ\text{C} \pm 0.5^\circ\text{C}$

Difference between channels: 0.2°C or less

- See your nearest Yokogawa representative for the error between channels in the control input section.

Excessive Input Test

- Connect the plus (+) and minus (-) sides of all measurement and control input channels.
- Set all channels to the 20 mV range.
- Apply 10 V between the plus and minus sides for 1 minute, and confirm that there is no malfunction.
- Set all channels to the Pt100 range.
- Apply ± 10 V between (A) and (B) for 1 minute, and confirm that there is no malfunction.

Burnout Test

1. Connect a 2 k Ω resistor between the plus (+) and minus (–) sides of an arbitrary channel.
2. Connect 56 k Ω resistor and a 0.1 μ F capacitor in parallel between the plus (+) and minus (–) sides of an arbitrary channel other than the one in step 1.
3. Set the range for the 2 connected channels to TC - TYPE K, and the Burnout to ON.
4. Check that the channel to which 2 k Ω was connected displays a temperature close to the room temperature.
5. Check that the channel to which the 56 k Ω resistor and the 0.1 μ F capacitor were connected in parallel displays Burnout (overrange).
6. Set Burnout to OFF.
7. Check that both channels in steps 1 and 2 do not display Overrange.

Reference Junction Compensation Accuracy Test

Perform 0°C measurement for TYPE - T on all control and measurement channels, and confirm that the result is below the following reference value.

Reference value: 0 \pm 0.5°C

CAUTION

- Use a calibrated non-insulated thermocouple without a terminal tip, having a Φ 0.5 mm or narrower strand. Also, be sure to take the level of calibration error into consideration during testing.
- Continuously monitor the thermostatic chamber, and check that the temperature remains at 0°C \pm 0.01°C.
- When using a 0°C thermostatic chamber (for example the ZC-114 by Coper Electronics Co. Ltd.) raise the tip of the thermocouple up 10 mm from the bottom.
- Conduct all tests in a stable environment.
- Install a windbreak if necessary.
- Allow a 15 minute warm up after wiring the thermocouple.
- Always use the terminal covers.

Display Function

Check the adjustment of the display color and backlight intensity using the following procedure.

1. Press the **MENU** key twice to enter Set mode. The Set mode screen is displayed.



2. Press the **Display** soft key.
3. Select **Color**.
4. The default color and color name is displayed for each channel; compare the colors and their names to make sure there are no discrepancies.

5. Press **ESC** to return to the previous screen.
6. Press the **View, Direction, LCD** soft key.
7. Move the cursor to **Brightness**.
8. For the CX1000, select **1** through **8** and confirm that each brightness level is brighter than the one before it. For the CX2000, select **1** through **4** and confirm that each brightness level is brighter than the one before it.
9. During other phases of testing as well, always be checking for any abnormalities in the display that may appear.
10. Set **Brightness** to **3**.

VGA Output Function Test (for the /D5 Option Only)

Connect a VGA monitor to the VGA output terminal on the back of the CX2000, then look at the screen to check the VGA output. Perform steps 1—10 above for the **display function** and check the results.

Serial Communications Function Test (Only If the -1 or -2 Suffix Code is Specified for the Communications Port)

During this test, actual communications are performed to check whether the RS-232, RS-422A/485, or other functions are operating properly. However, if you used serial communications successfully to carry out other tests, you don't need to perform this test. Perform the tests using the procedure below.

1. Connect a cable between the PC and the CX1000/CX2000.
If communications cannot be carried out via RS-422A/485, use an RS-232 adapter.
2. Send an arbitrary command from the PC using application software for CX1000/CX2000 series instruments or other software, and confirm that the expected result occurs.

Battery Backup Function Test

1. While the CX1000/CX2000 is ON, set the date and time (see section 3.3, "Setting the Date and Time" in manual IM 04L31A01-01E or IM 04L31A01-03E).
2. Turn the power OFF.
3. Wait at least one minute, then turn the power back ON.
4. Confirm that the date and time set in step 1 are correct.

Continuous Operation Test

1. Enter the following settings.
 - Enter AUTO SAVE to the media (see section 9.1 of the manual, IM 04L31A01-01).
 - Set all channels to a range of 20 V (see section 4.6 of the manual, IM 04L31A01-01).
 - Set input to open.
 - Set display type to waveform display (see section 1.16 of the manual, IM 04L31A01-01).
2. Press the **START** key.
3. Run the instrument continuously for 24 hours or more.
4. Press the **STOP** key.
5. Check the following:
 - That a data file was created in the MEDIA INFO screen (see section 4.6 of the manual, IM 04L31A01-01E).
 - That there is no abnormal variation in the straight line waveform.
 - That there is no other strange sound or odor coming from the instrument.

Current Output Accuracy

1. Change the mode to setup and choose **Control**, **Control action**, and then **Input setting**. Set the control mode to Single. Press the **ESC** key to return to the preceding menu, and choose Output processing.
2. Set the type of control output to **Current-output** and analog output to **4-20 mA** for all the loops, save the settings, and change the mode to normal (the cycle time can be set freely).
3. Press the **DISP/ENTER** key and choose **Control** and then **Control groups** to display the control display.
4. Choose a loop number to measure with a blue arrow using the arrow keys.
5. Press the **MODE** softkey, and change the operation mode to manual by choosing **MAN** with the up and down arrow keys and pressing **DISP/ENTER** key to confirm it.
6. Press the **RUN/STP** softkey, and start control operation by choosing **RUN** with the up and down arrow keys and pressing **DISP/ENTER** key to confirm it.
7. Press the **OUT** softkey. Set the output ratio to 0.0% and 100.0% with the up and down arrow keys and measure each output current with an ammeter or the like. Verify that the measured currents are within the ranges as shown in the table below.

Output Ratio	Reference Value	Allowable Range
0.0%	4 mA	3.984 to 4.016 mA
100.0%	20 mA	19.984 to 20.016 mA

(Load condition: 250 Ω \pm 1%)

Voltage Pulse Output

1. Choose **Output processing** by following the procedures in step 1 of "Current Output Accuracy."
2. Set the type of control output to **Voltage-pulse** and the cycle time to 1 second for all the loops, save the settings, and change the mode to normal (the type of analog output can be set freely).
3. Change the operation mode to manual and start control operation by following the procedures of steps 5 and 6 of "Current Output Accuracy."
4. Press the **OUT** softkey. Set the output ratio to 20.0% with the up and down arrow keys and observe the output voltage waveform on an oscilloscope or the like. Verify that a rectangular waveform is displayed at a 1-second interval (0.2-second high and 0.8-second low) and 12 V \pm 5%.

Control Relay Output

1. Choose **Output processing** by following the procedures in step 1 of "Current Output Accuracy."
2. Set the type of control output to **On/Off-control** for all the loops, save the settings, and change the mode to normal (the cycle time and type of analog output can be set freely).
3. Change the operation mode to manual and start control operation by following the procedures of steps 5 and 6 of "Current Output Accuracy."
4. Press the **OUT** softkey. Set the output ratio to 0.0% and 100.0% with the up and down arrow keys and verify that the relay outputs are as follows:

Output Ratio	NO-C	NC-C
0.0%	Break	Make
100.0%	Make	Break

Test of Digital Input/Output (not applicable for models CXx0xx)

Digital Input

1. Press the **DISP/ENTER** key and choose **CONTROL** and then **DI/DO STATUS**.
2. The digital input terminals are divided into blocks. Short-circuit between the common terminal and the terminals, and check the DI status display. The indicator is green for an open circuit and red for a short circuit.

Digital Output

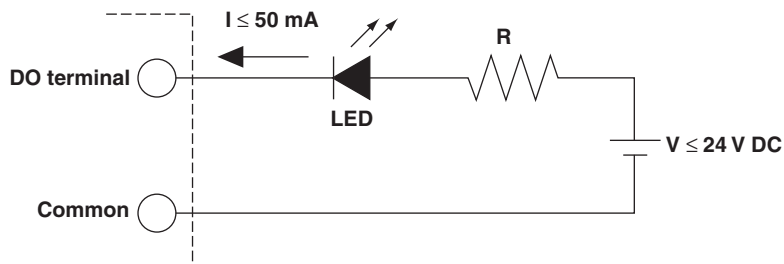
1. Short-circuit input terminals of all channels and adjust the range and alarm setting as follows:

Range	Mode	Voltage
	Range	2 V
	Span	-2.000 to 2.000
Alarm (Level 1)	On	
	Type	H
	Value	-1.000

2. Prepare the same input terminals step 1, and adjust the alarm relay output as follows:

Alarm (Level 1)	Relay Output	On
	No.	DOxxx and ROxxx where xxx: digital output number to test

3. Verify that a digital output turns on using an appropriate tester with the following circuit:



Test of Power Supply Voltage Switching

Change the power supply voltage to 240 V AC and verify that the UUT display does not malfunction.

Note that this test does not apply to the 24 V AC/DC-driven model (option code: /P1).

Test of Ethernet Interface

Use a computer in which the standard software “DAQSTANDARD for CX” is installed and that has an Ethernet communication function, for the following test.

Run the launcher program. Select Ethernet in the network settings and make the communication settings. Then, verify that the settings of the UUT, such as the ranges, can be set up correctly as well as those settings can be read from the computer using the settings software.

Test of Storage Drive

1. Insert a formatted disk into the drive of the UUT.
2. In the set mode*1, choose Save/Load, Clear data, and then Save settings. Save the current panel conditions under a desired filename.
3. In the set mode, choose Save/Load, Clear data, and then File list. Verify that the file saved in step 2 exists in the list.

Test of Storage Drive

1. Insert a formatted disk into the drive of the UUT.
2. In the set mode*1, choose Save/Load, Clear data, and then Save settings. Save the current panel conditions under a desired filename.
3. In the set mode, choose Save/Load, Clear data, and then File list. Verify that the file saved in step 2 exists in the list.

Test of Alarm Relay Contact Outputs (applicable to option codes /A6, /A6R, /A4F and /A4FR)

Insulation Resistance and Withstanding Voltage Tests

Item	Measured Point	Specification
Insulation resistance	Between relay output terminals and grounding terminal	No less than 20 M Ω at 500 V DC
Withstanding voltage	As above	Free from damage after applying 1500 V AC, 50/60 Hz for 1 minute (with breaking leakage current set to 2 mA)

Alarm Actions

1. Prepare the same input terminals and settings as step 1 in "Digital Output" (page 2-8), and also adjust the alarm relay output as follows:

Alarm (Level 1)	Relay Output	On/off
	No.	Ixx where xx: alarm output number to test

2. Verify that an alarm contact works as follows upon turning on/off the corresponding relay output.

Terminals	Normal	During Alarm	Remarks
NO-C	Break	Make	Where the output relay action is set to normally de-energized (factory set)
NC-C	Make	Break	

Test of Remote Control (applicable to option codes /A6R and /A4FR)

Insulation Resistance and Withstanding Voltage Tests

Item	Measured Point	Specification
Insulation resistance	Between remote control terminals and grounding terminal	No less than 20 M Ω at 500 V DC
Withstanding voltage	As above	Free from damage after applying 500 V DC for 2 minute (with breaking leakage current set to 2 mA)

Remote Control Actions

Assign individual functions to 8 remote control inputs, then short-circuit each of those inputs in turn and verify that the CX1000/CX2000 is controlled as specified.

Test of 24 VDC Transmitter Power Output (applicable to option code /TPS4)

Test of Insulation Resistance and Withstanding Voltage

Insulation resistance	Between 24 VDC output terminals and grounding terminal	No less than 20 M Ω at 500 VDC
	As above	Free from damage after applying 500 VAC, 50/60 Hz for 1 minute (with breaking leakage current set to 10 mA)
Withstanding voltage	Between 24VDC output terminals	Free from damage after applying 500 VAC, 50/60 Hz for 1 minute (with breaking leakage current set to 10 mA)

2.3 CTRL Module Assembly Tests

This section describes the test procedure for CTRL MODULE ASSY (B8700CL, B8700CM, B8700CN, and B8700FT) which is used on the CX2000. This test is not necessary if you will perform the general tests in section 2.2. Perform this test on the module by itself.

Test Instruments

Instrument	Specifications
DC current meter	Accuracy: 0.01% of rdg
Withstanding voltage tester	AC 1 to 3 kV, 500 VDC
Oscilloscope	200 kS/s or more, isolated input
Resistor	250 Ω \pm 1%
Jig	A measurement instrument having the same functions and characteristics as the CX2000 or CX1000.

Tests

- Withstand Voltage Test

Consult your nearest Yokogawa representative regarding the following tests.

- Output Accuracy Test
- Voltage Pulse Output Test
- Control Relay Output Test
- DI Test
- DO Test

Testing Environment

Ambient temperature of $23\pm 5^{\circ}\text{C}$, relative humidity of $55 \pm 20\%$

CAUTION

- Before starting the test, allow the instrument to warm up for 30 minutes or more.
- Make sure the module is installed in the CX1000/CX2000.

Test Procedure

Perform a withstand voltage test on the module installed in the CX1000/CX2000 at the points listed below.

Test Points	Reference Values
Current and voltage pulse output to earth terminal on the CX1000/CX2000*	Leakage current of 2 mA or less at 1 kV AC for 1 minute
Control relay terminal to CX1000/CX2000 earth terminal†	Leakage current of 2 mA or less at 1.5 kV AC for 1 minute
DO relay terminal to CX1000/CX2000 earth terminal‡	Leakage current of 2 mA or less at 1.5 kV AC for 1 minute
DO (Tr) relay terminal to CX1000/CX2000 earth terminal§	Leakage current of 2 mA or less at 0.5 kV AC for 1 minute
DI terminal to CX1000/CX2000 earth terminal	Leakage current of 2 mA or less at 0.5 kV AC for 1 minute

* Short mA, PULS, and C.

† Short NO, NC, and C.

‡ Short NO and C.

§ Short DO3—6 and C.

|| Short all DIs.

2.4 DIO Module Assembly Test

This section describes the test procedure for CTRL MODULE ASSY (B8700CY) which is used on the CX1000/CX2000. This test is not necessary if you perform the general tests in section 2.2. Perform this test when testing the module by itself.

Test Instruments

Instrument	Specifications
Withstanding voltage tester	AC 1 to 3 kV, 500 VDC
Jig	A measurement instrument having the same functions and characteristics as the CX1000/CX2000

Tests

- Withstand Voltage Test

Consult your nearest Yokogawa representative regarding the following tests.

- DI Test
- DIO Test

Testing Environment

Ambient temperature of $23 \pm 5^{\circ}\text{C}$, relative humidity of $55 \pm 20\%$

CAUTION

- The following assumes that the test will be performed with the module installed in the CX1000/CX2000.
- The test cannot be performed on models having no internal control loops with no DIO module installed.

Test Procedure

Perform a withstand voltage test on the module installed in the CX1000/CX2000 at the points listed below.

Test Points	Reference Values
DO terminal to CX1000/CX2000 earth terminal*	Leakage current of 2 mA or less at 0.5 kV AC for 1 minute
DI terminal to CX1000/CX2000 earth terminal†	Leakage current of 2 mA or less at 0.5 kV AC for 1 minute

* Short DO1—12 and C.

† Short all DIs.

3.1 Calibration of the Measuring Instrument's Input

Allow the instrument to warm up for at least 30 minutes prior to calibration.

Instruments for Calibration

DC voltage generator	Accuracy: 0.005% of setting +1 μ V
Resistor	100 Ω , 300 Ω (accuracy: 0.01% or less)

Overview

The structure of the A/D converter in the CX2000 differs depending on the model. Multiple channels (groups) share one A/D converter. All A/D converters must be calibrated, so calibration must be performed on each group.

CX1000

Monitor

No. of Inputs for Meas.	Measurement Interval	Total Number of Channels	No. of CH/AD	No. of A/D	Group
6ch	1s	6	6	1	(1—6)

* Group: a classification for all channels that share a single A/D converter

Control (1st Slot)

Number of Internal Control Loops	Measurement interval	Total Number of Channels	No. of CH/AD	No. of A/D	Group
0 loops	—	0	0	0	—
2 loops	250 mS	5	5	1	(1—5)

CX2000

Control (1st Slot)

Number of Internal Control Loops	Measurement interval	Total Number of Channels	No. of CH/AD	No. of A/D	Group*
0 loops	—	0	0	0	—
2 loops	250 mS	5	5	1	(1—5)
4 or 6 loops	250 mS	10	5	2	(1—5) (6—10)

* Group: a classification for all channels that share a single A/D converter

Monitor (2nd, 3rd Slot)

No. of Inputs for Meas.	Measurement Interval	Total Number of Channels	No. of CH/AD	No. of A/D	Group
10 ch	1s	10	10	1	(1—10)
20 ch	1s	20	10	2	(1—10) (11—20)

Ranges to Be Calibrated and Their Parameters

Range	Zero	Full Scale
20 mV	0 mV	20 mV
60 mV	0 mV	60 mV
200 mV	0 mV	200 mV
1 V	0 V	1V
2 V	0 V	2 V
6 V	0 V	6V
20 V	0 V	20 V
Pt100 [†]	100 Ω	300 Ω

[†] You must calibrate the 200 mV range before calibrating the RTD range.

3.1 Calibration of the Measuring Instrument's Input

Calibrating the Input Range

For each group, input the zero and full scale for the input range to the channels below and perform calibration.

CX1000

- **Voltage Range Control**

Number of Internal Control Loops	Group 2 (1—5ch)	
	Zero	Full Scale
0 loops	—	—
2 loops	CH1*	CH2*

* The expression channel is not used for control input, but for expediency the inputs are referred to (from right to left) as CH1 and CH2 respectively.

Monitor

No. of Inputs for Meas.	Group 1 (1—6ch)			
	Zero	Full Scale	Zero	Full Scale
6ch	CH1	CH2		

- **RTD Range Control**

Number of Internal Control Loops	Group 2 (1—5ch)	
	100 Ω	300 Ω
0 loops	—	—
2 loops	CH1*	CH2*

* The expression channel is not used for control input, but for expediency the inputs are referred to (from right to left) as CH1 and CH2 respectively.

Monitor

No. of Measurement Input Channels	Group 1 (1—6ch)	
	100 Ω	300 Ω
6ch	CH1	CH2

CX2000

- **Voltage Range Control (1st Slot)**

Number of Internal Control Loops	Group 1		Group 2	
	Zero	Full Scale	Zero	Full Scale
0 loops	—	—	—	—
2 loops	CH1	CH2	—	—
Loops 4,6	CH1	CH2	CH6	CH7

Monitor (2nd, 3rd Slot)

No. of Inputs for Meas.	Group 1		Group 2	
	Zero	Full Scale	Zero	Full Scale
10 ch	CH1	CH2	—	—
20 ch	CH1	CH2	CH11	CH12

• **RTD Range Control (1st Slot)**

Number of Internal Control Loops	Group 1		Group 2	
	100 Ω	300 Ω	100 Ω	300 Ω
0 loops	—	—	—	—
2 loops	CH1	CH2	—	—
Loops 4, 6	CH1	CH2	CH6	CH7

Monitor (2nd, 3rd Slot)

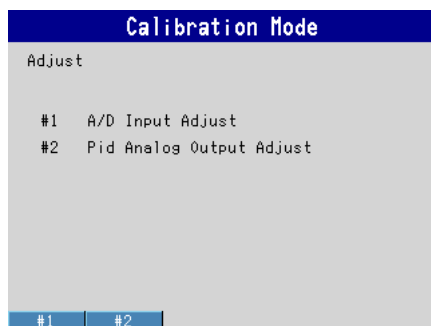
Model	Group 1		Group 2	
	100 Ω	300 Ω	100 Ω	300 Ω
10 ch	CH1	CH2	—	—
20 ch	CH1	CH2	CH11	CH12

Calibration Procedure

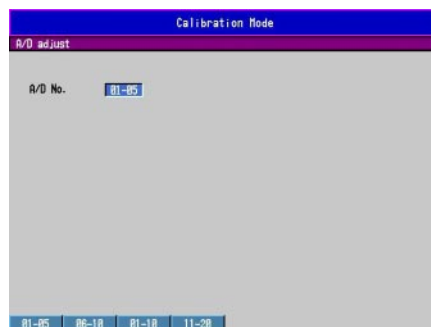
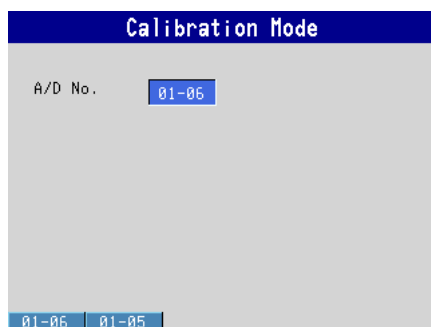
The calibration procedure can be carried out using keys on the instrument or communications commands.

Calibrating Using Keys

1. Turn ON the unit while holding down the UP arrow key. The calibration screen appears.



2. Press the **A/D Input Adjust** soft key. The A/D adjust screen is displayed.



01-05, 06-10 shows control input, and 01-10, 11-20 shows measurement input.

3. Select a group to calibrate (01—05, 06—10, 01—10, 11—20).

3.1 Calibration of the Measuring Instrument's Input

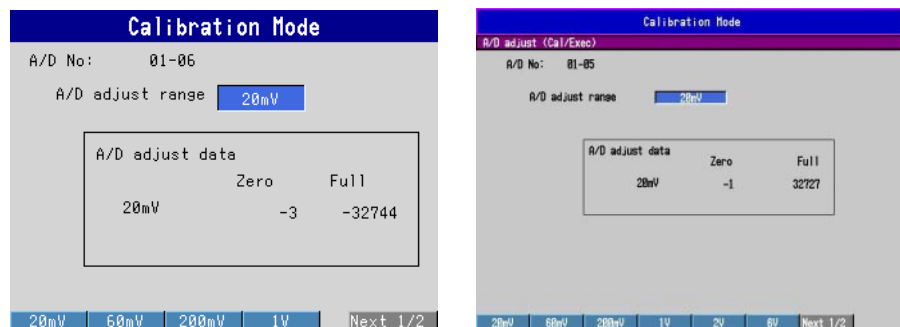
- Press the **ENTER** key. The A/D adjust screen is displayed.



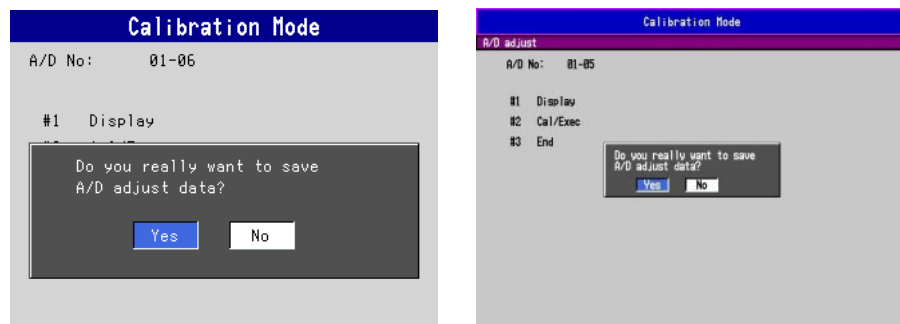
- Input the zero and full scale value to the calibration channels shown in "Calibrating the Input Range" (page 3-2).
- Press the **Cal/Exec** soft key. The A/D adjust (Cal/Exe) screen is displayed.

CAUTION

If you select Display in the A/D adjust screen, you can confirm the calibrated value and manually input values using keys. Key-based manual calibration has a large effect on measurement accuracy, so only perform the procedure if you think it is absolutely necessary.



- Press the soft key corresponding to the range to be calibrated (20 mV, 60 mV, 200 mV etc.).
- Press the **ENTER** key. The calibration begins.
- Repeat steps 5—8 and calibrate all ranges.
- Press **ESC**. You are returned to the A/D adjust screen.
- Press the **End** soft key. A dialog box appears asking you whether or not to save and exit.



- Select **Yes**. You are returned to the A/D adjust (Cal/Exe) screen.
- Repeat steps 3—12 to calibrate and save calibrated values for each group.
- When you are finished with all procedures, turn the power OFF.

Calibration Using Communications

The calibration process proceeds as follows:

1. Enter Calibration mode
2. Perform calibration
3. Store the calibrated values
4. Return to operation mode

The commands necessary for calibration are listed below.

For the input connection method, see "Input Range Calibration" on page 3-2.

DSp1 Switch to setting mode

- | | | |
|----|---|--------------------------------|
| p1 | 0 | Switch to operation mode |
| | 1 | Switch to Set up mode |
| | 2 | Switch to A/D calibration mode |

XZp1,p2,p3 Perform A/D calibration (Cal/Exe)

- | | |
|----|--|
| p1 | Group |
| | For control input: 01—05 for the CX1000, and 01—05 or 06—10 for the CX2000 |
| | For measurement input: 01—06 for the CX1000, and 01—10 or 11—20 for the CX2000 |
| p2 | Type of operation
Cal/Exec |
| p3 | Calibration range
20 mV, 60 mV, 200 mV, 1 V, 2 V, 6 V, 20 V, Pt100 |

XZp1,p2,p3,p4,p5 Manual correction of A/D calibration value (Display)

- | | |
|----|--|
| p1 | Group |
| | For control input: 01—05 for the CX1000, and 01—05 or 06—10 for the CX2000 |
| | For measurement input: 01—06 for the CX1000, and 01—10 or 11—20 for the CX2000 |
| p2 | Type of operation
Display |
| p3 | Calibration range
20 mV, 60 mV, 200 mV, 1 V, 2 V, 6 V, 20 V, Pt100 |
| p4 | Zero input value |
| p5 | Full scale input value |

XZp1,p2,p3 Store the calibrated values (exit)

- | | |
|----|--|
| p1 | Group |
| | For control input: 01—05 for the CX1000, and 01—05 or 06—10 for the CX2000 |
| | For measurement input: 01—06 for the CX1000, and 01—10 or 11—20 for the CX2000 |
| p2 | Type of operation: End |
| p3 | Data save selection
STORE Save to a file
ABORT Don't save |

XZp1,DISPLAY? Get information for calibrated values

- | | |
|----|--|
| p1 | Group |
| | For control input: 01—05 for the CX1000, and 01—05 or 06—10 for the CX2000 |
| | For measurement input: 01—06 for the CX1000, and 01—10 or 11—20 for the CX2000 |

3.2 Control Output Calibration

Allow the instrument to warm up for at least 30 minutes prior to calibration.

Instruments for Calibration

DC current meter Accuracy: 0.01% of rdg
Resistor 250 Ω \pm 1%

Overview of Calibration

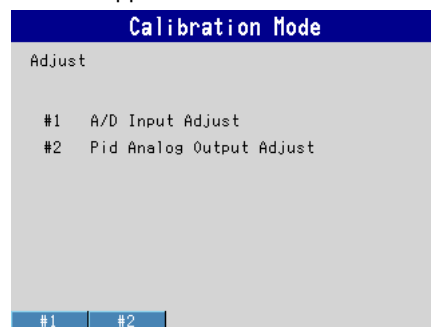
During calibration of the control output (current output terminal), each output is connected to one D/A converter, so you must calibrate the outputs separately. The module installed in the CX1000 is 01. In the CX2000, the modules are numbered in order (01, 02, 03) from top to bottom. Also within each module, output number 01 is assigned to loop 1, and output 02 to loop 2.

Calibration Procedure

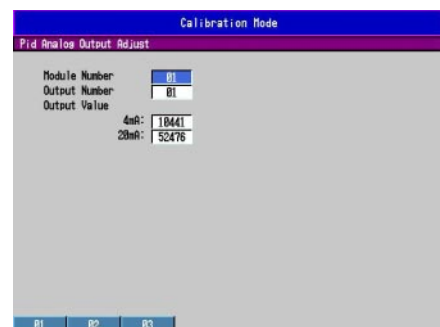
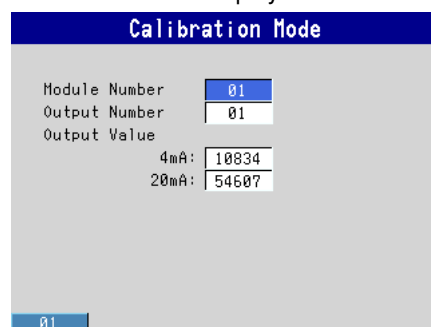
The calibration procedure can be carried out using keys or communications commands.

Calibration Using Keys

1. Connect a 250 Ω \pm 1% resistor and DC current meter in serial to the current output terminal.
2. Turn ON the unit while holding down the UP arrow key. The calibration screen appears.



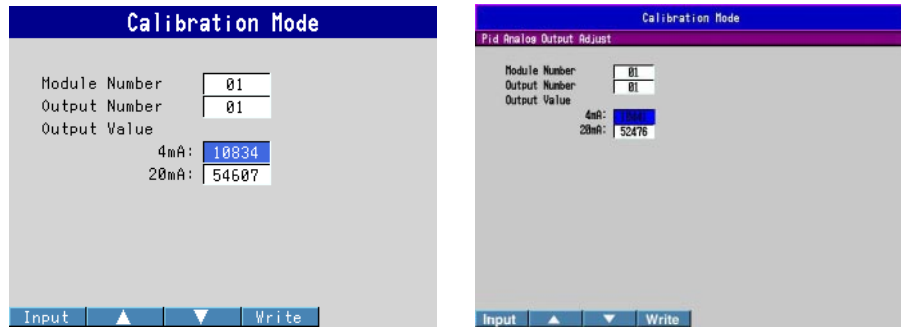
3. Press the **Pid Analog Output Adjust** soft key. The Pid Analog Output Adjust screen is displayed.



4. Use the arrow keys and soft keys to select the module number and output number to be calibrated.
5. While monitoring with a current meter, change the calibration value at each Output Value (4 mA and 20 mA) so that it falls within the calibration range shown in the following chart. The first digit of the calibration value corresponds to 0.366211 μ A.

Output Value	Calibration Range
4 mA	3.99 mA—4.01 mA
20mA	19.99 mA—20.01 mA

- Press the **Write** function key for each output number. The calibration values are saved.



- Repeat steps 4—6 and calibrate all module and output numbers.
- Press **ESC**. You are returned to the calibration screen.
- Turn OFF the power

Calibration Using Communications

The commands required for control output calibration are listed below.

For other necessary commands, see **Calibration Using Communications** (page 3-5) in section 3.1, “**Calibrating the Measuring Instrument Input.**”

Perform step 1 of **Calibration Using Keys** before using these commands for **calibration.**

For OUTPUT

ZZp1,p2,p3,p4

- | | |
|----|--|
| p1 | Action OUTPUT |
| p2 | Module number (1 for the CX1000, or 1—3 for the CX2000) |
| p3 | Output channels (1 and 2) |
| p4 | 4 mA/20 mA |
| p5 | Calibration value (For 4 mA, 9285—12561)
(For 20 mA, 46421—62804) |

For WRITE

ZZp1,p2,p3,p4

- | | |
|----|---|
| p1 | Action (OUTPUT/WRITE) |
| p2 | Module number (1 for the CX1000, or 1—3 for the CX2000) |
| p3 | Output channels (1 and 2) |
| p4 | (Calibration value for 4 mA, 9285—12561) |
| p5 | (Calibration value for 20 mA, 46421—12561) |

Note

When specifying WRITE, you can omit p4 and p5. If you do so, the currently set calibration value is written.

4.1 Replacement of the Control Output Terminal Block (Module)

WARNING

Replacement of terminal blocks and control relays are to be carried out by engineers authorized by YOKOGAWA. When replacement becomes necessary, please contact your nearest dealer or YOKOGAWA representative.

Parts List

CX1000

Part No.	Name	Option Code, Model
B8700GA	Alarm Module	/A6
B8700GB	Alarm Remote Module	/A6R
B8700GC	Alarm Fail Module	/A4F
B8700GD	Alarm Remote Fail Module	/A4FR
B8700FT	CTRL Module 2 Loop	CX1206
B8700FP	CTRL MEAS 0 Loop Module Assembly	CX1006 not /N2
B8700FQ	CTRL MEAS 2 Loop Module Assembly	CX1206 not /N2
B8700FR	CTRL MEAS 0 RTD Module Assembly	CX1006 /N2
B8700FS	CTRL MEAS 2 RTD Module Assembly	CX1206 /N2

CX2000

Part No.	Name	Option Code, Model
B8700CL	CTRL 2 Loop Module Assembly	CX22xx, CX24xx, CX26xx
B8700CM	CTRL 4 Loop Module Assembly	CX24xx, CX26xx
B8700CN	CTRL 6 Loop Module Assembly	CX24xx, CX26xx
B8700CY	DIO Module Assembly	/CST1
B8700CX	Alarm Terminal Assembly	/A6
B8700CZ	Alarm Terminal Assembly	/A6R
B8700CJ	Alarm Terminal Assembly	/TPS4
B8700DX	Alarm Terminal Assembly	/A4F
B8700DZ	Alarm Terminal Assembly	/A4FR
B8700CP	CTRL Input 2 Loop Module Assembly	CX22xx
B8700CQ	CTRL Input 4 Loop Module Assembly	CX24xx
B8700CR	CTRL Input 6 Loop Module Assembly	CX26xx
B8700CS	10ch Input Module Assembly	CX2x10, CX2x20
B8700CU	10ch 3RTD Input Assembly	CX2x10, CX2x20 /N2
B8700CT	20ch Input Module Assembly	CX2x20
B8700CV	20ch 3RTD Input Assembly	CX2x20 /N3

4.1 Replacement of the Control Output Terminal Block (Module)

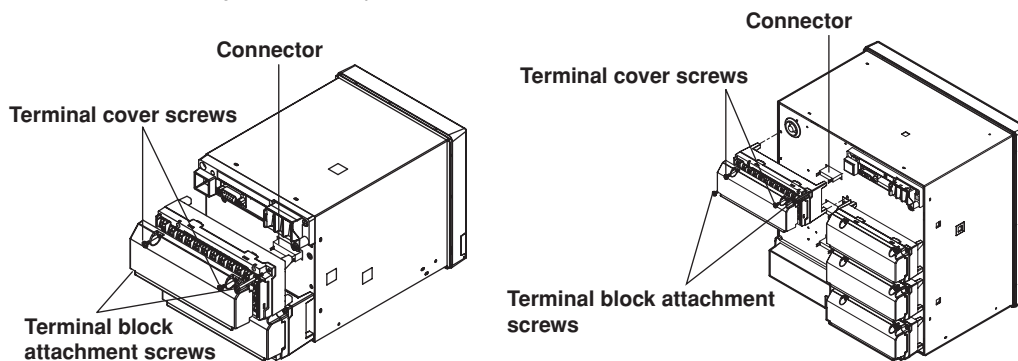
Replacement of Each Terminal Block (Module)

WARNING

- To prevent electric shock, cut the power to the main unit and disconnect any wiring that may be connected to it before replacing the terminal block.
 - To prevent electric shock when disconnecting wires, ensure the main power supply is turned OFF.
-

Follow the procedures below to replace the blocks.

1. Loosen (but do not completely remove) the 2 terminal cover screws, remove the cover, then remove the wiring from the terminal block. Ignore this step if the terminal block is not wired.



2. Loosen the 2 terminal block attachment screws.
3. Pull the terminal block straight out and away from the unit. Be careful not to bend the connector pins while removing the terminal block.
4. Check the angle of the terminal block, install it on the main unit, and then fasten by tightening the terminal block attachment screws.
5. Install the terminal cover, and fasten with the terminal cover screws.

When Replacing Only the Control Relay

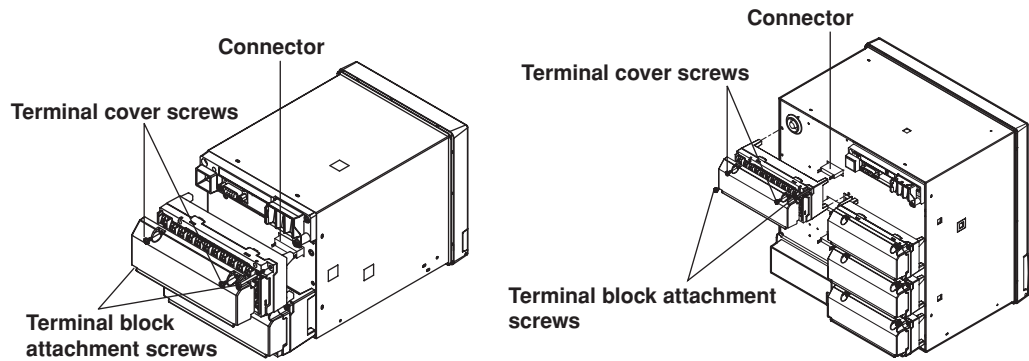
WARNING

- To prevent electric shock, unplug the main power cord before replacing the control relay.
 - To prevent electric shock when disconnecting wires, ensure the main power supply is turned OFF.
 - To prevent electric shock, use a withstanding voltage tester to check the withstanding voltage between the relay and the protective grounding after replacing the relay.
Withstand voltage: 1500 VAC, 1 minute
 - You must perform an insulation resistance test and withstand voltage test after replacing the control relay.
-

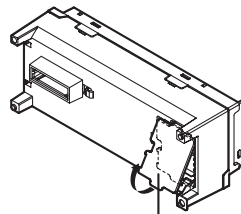
Follow the procedures below to replace the blocks.

1. Loosen (but do not completely remove) the 2 terminal cover screws, remove the cover, then remove the wiring from the terminal block. Ignore this step if the terminal block is not wired.

4.1 Replacement of the Control Output Terminal Block (Module)

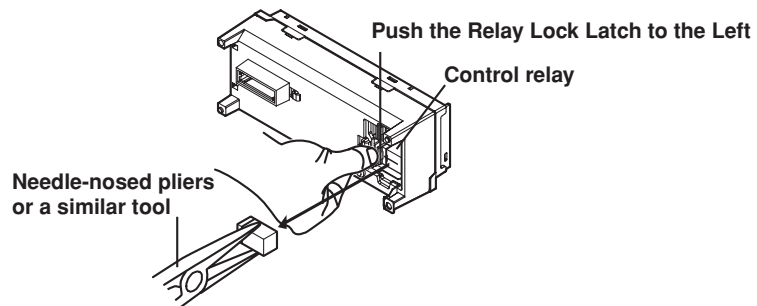


2. Loosen the 2 terminal block attachment screws.
3. Pull the terminal block straight out and away from the unit. Be careful not to bend the connector pins while removing the terminal block.
4. Open the back lid of the terminal block. The letters printed on the relays indicate the loops they correspond to: RL1 is for loops 1, 3, and 5, and RL2 is for loops 2, 4, and 6.



Back lid

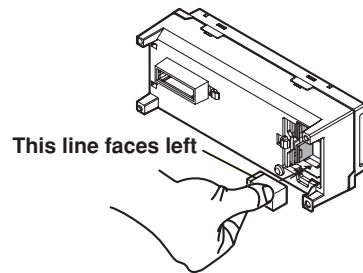
5. Using a tool such as a pair of needle-nosed pliers, grasp the relay and pull it directly outward. If you are not replacing the other relay, be careful not to damage it when removing the relay to be replaced.



Replace the relay with the following:
Matsushita Electronic Works, Ltd. Control Relay
Part No.: DSP1-DC12V
Web Site: <http://www.nais-e.com/>

4.1 Replacement of the Control Output Terminal Block (Module)

6. Insert the relay into the socket by hand, with the line on the top of the relay facing to the left.



7. Close the back lid of the terminal block.
8. Check the angle of the terminal block, install it on the main unit, and then fasten by tightening the terminal block attachment screws.
9. Install the terminal cover, and fasten with the terminal cover screws.
10. Confirm that the instrument functions properly, then perform a withstanding voltage test on the contact output terminal to protective ground of each control relay.

5.1 Procedure

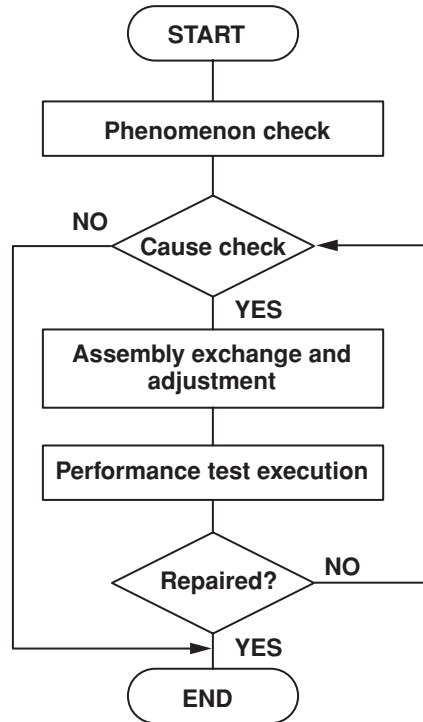
- 1 Determine the type of problem.
- 2 Check for possible user error. Check the connections and the settings of equipment to determine whether there was a handling mistake.
- 3 Execute the self diagnostic test by turning the power ON, and identify any problem items.
- 4 Analyze the cause of the problem according to the troubleshooting flow chart.

Do not touch the circuit or parts with live voltage because the power unit contains a high-voltage electrical circuit. The power unit is furnished with a dedicated cover to prevent electric shock. Do not remove this cover. Never touch any part not subject to adjustment.

Make sure to connect input terminals (voltage or current) correctly. The internal circuit may be damaged when wrongly connected.

5.2 Flow Chart

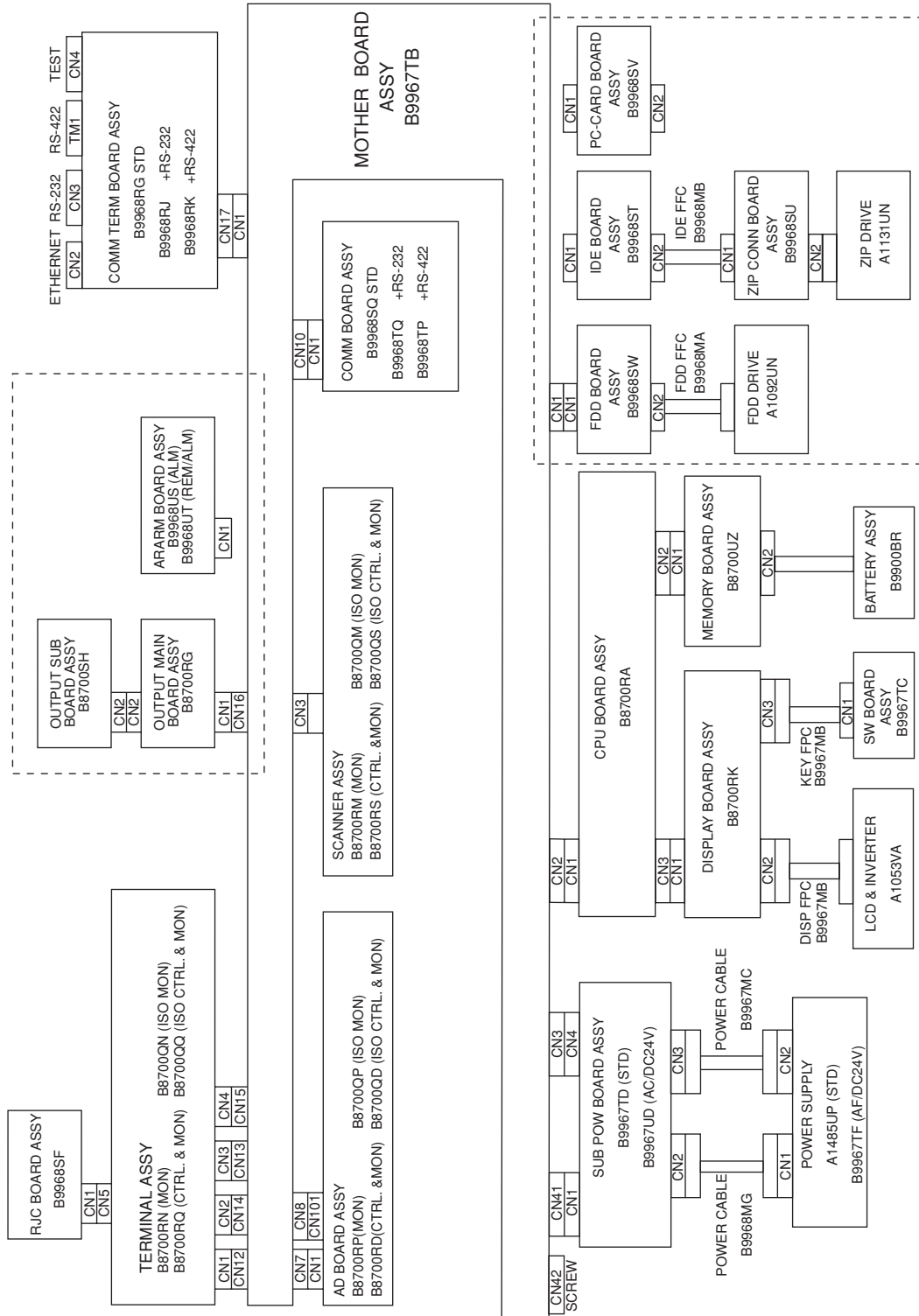
This flow chart consists of general service operations when a fault occurs. This chart is not always suitable for every kind of fault. However, it is recommended to perform operations according to the flow chart.



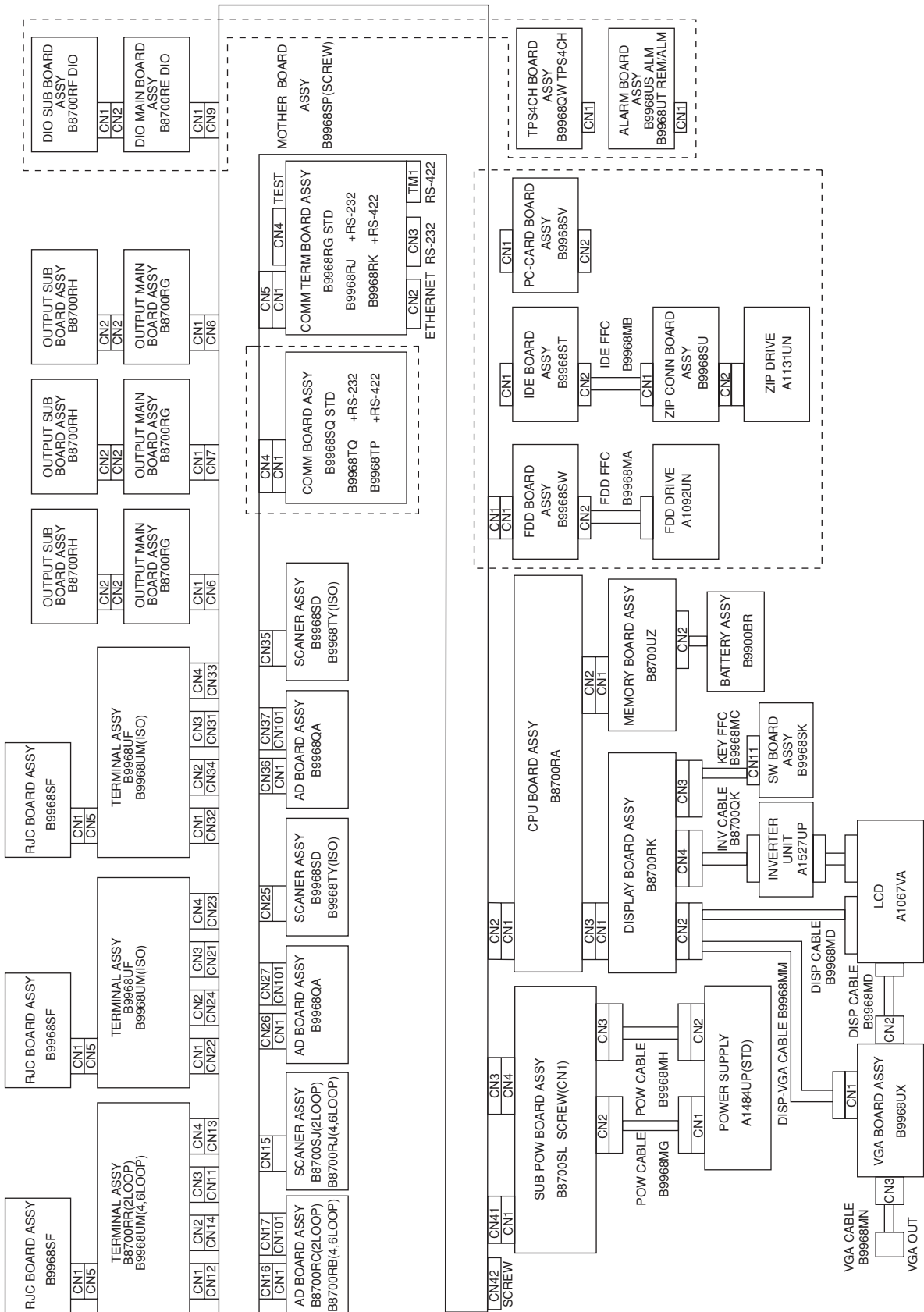
5.3 Troubleshooting Checklist

Trouble	Operational			Check Item
	Check	Adjust	Exchange	
Power is not turned ON	✓ ✓		✓ ✓ ✓ ✓ ✓	Power cable connection Fuse is blown (/P1 option only) Power ass'y CPU ass'y Memory ass'y Display ass'y
FAIL state			✓ ✓ ✓ ✓	CPU ass'y Memory ass'y Display ass'y Optional terminal ass'y
Memory cannot be backed up	✓ ✓		✓ ✓ ✓	Battery connector is disconnected? Battery voltage is low (less than +3.0V) CPU ass'y Memory ass'y Display ass'y
Panel key operation is not normal	✓		✓ ✓ ✓ ✓	FFC ass'y of the keyboard is disconnected/broken Keyboard ass'y CPU ass'y Memory ass'y Display ass'y
LCD is not normal	✓		✓ ✓ ✓ ✓	FFC ass'y of the LCD is disconnected/broken CPU ass'y Memory ass'y Display ass'y LCD ass'y
Measured value incorrect	✓ ✓	✓	✓ ✓	Input wiring is disconnected Noise A/D ass'y Scanner ass'y
Measured temperature is incorrect	✓ ✓ ✓ ✓	✓	✓ ✓ ✓	Input is disconnected Noise Terminal cover is removed RJC INT/EXT setting A/D board ass'y Input terminal Scanner board ass'y
Measured value fluctuates	✓ ✓			Power frequency setting is incorrect Noise
External storage media is not normal	✓		✓	Floppy disk/Zip disk/PC card drive unit

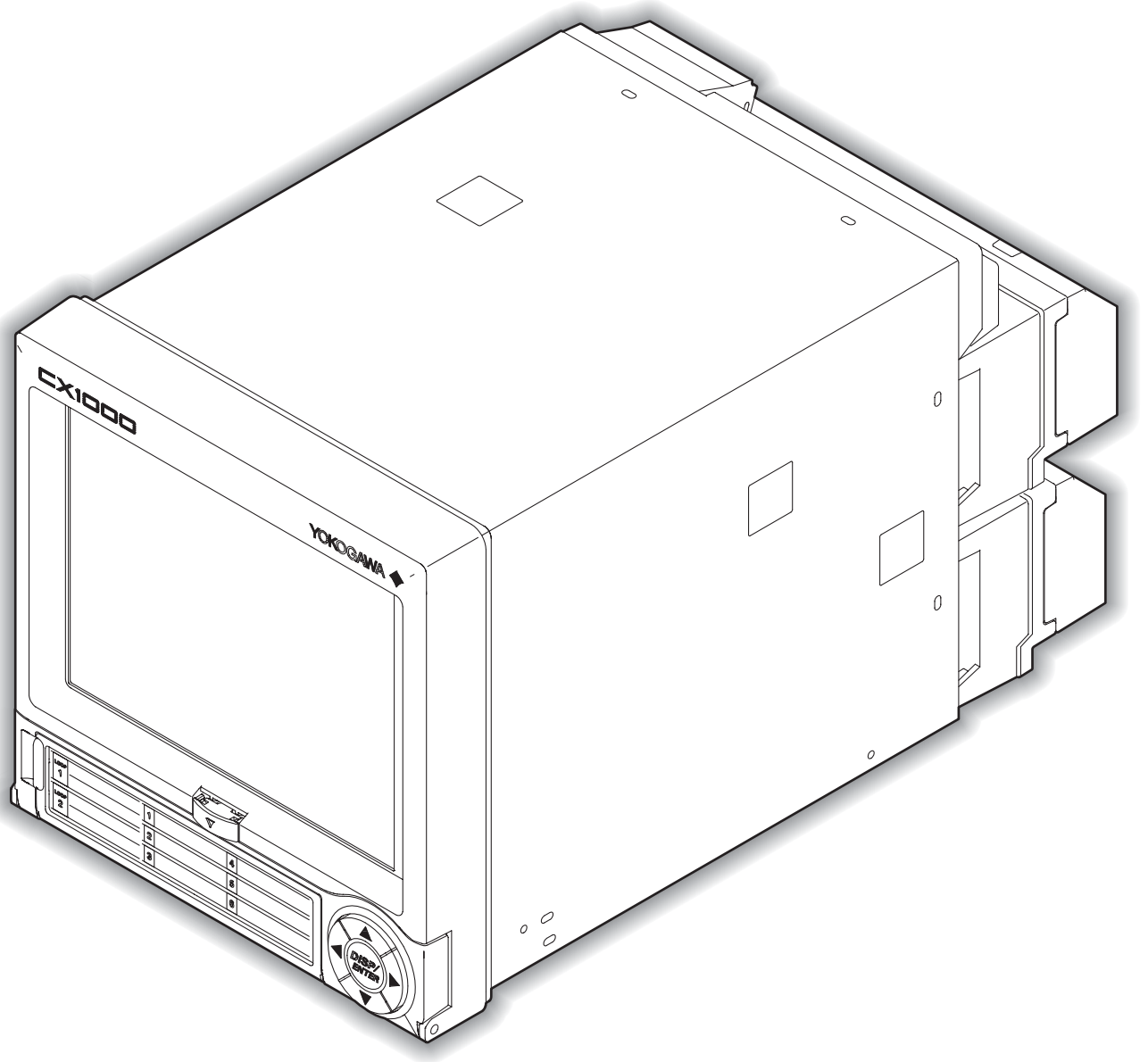
6.1 CX1000 Schematic Diagram



6.2 CX2000 Schematic Diagram



7.1 CX1000 Customer Maintenance Parts List

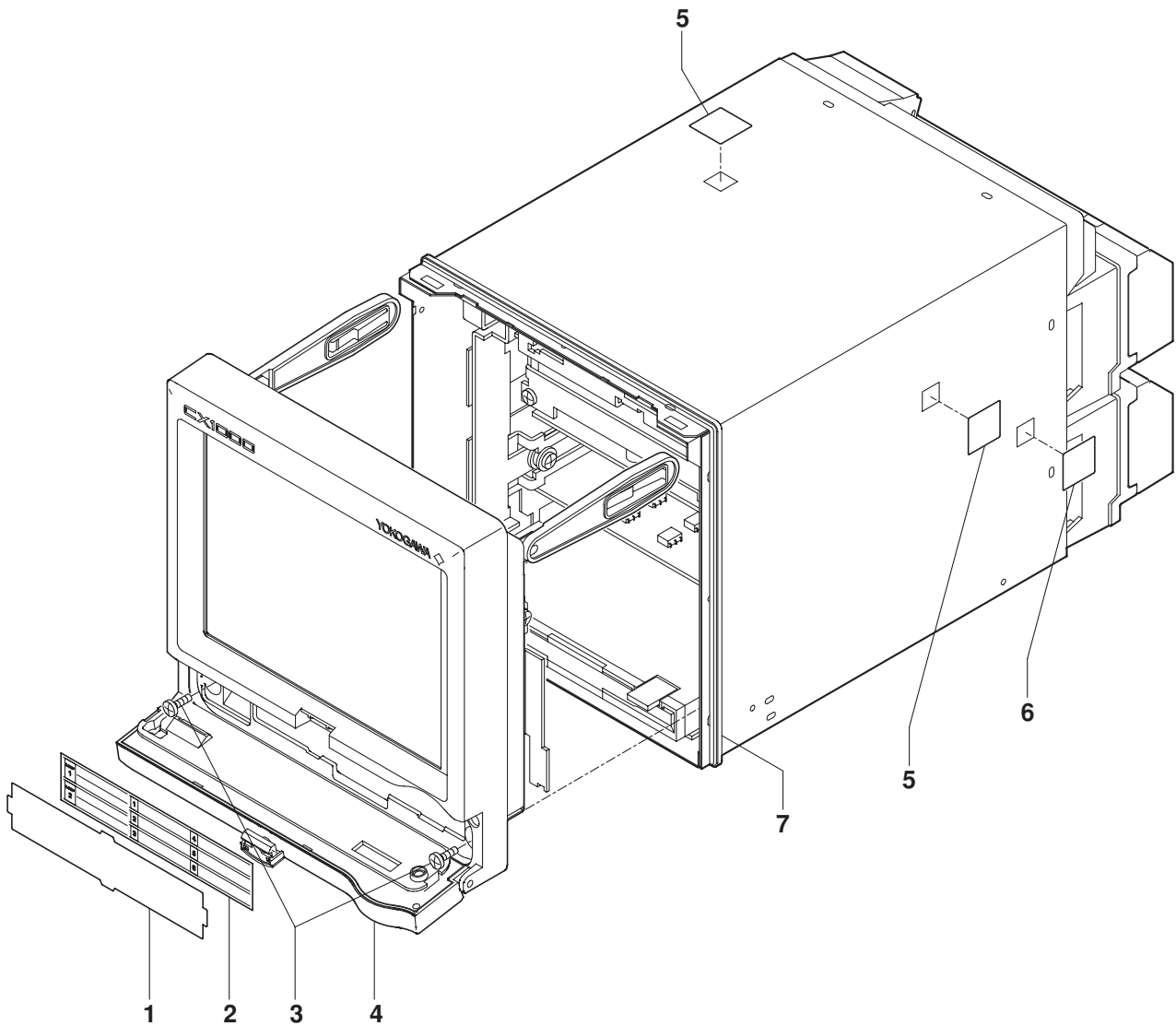


Note:

Parts marked with a © symbol are CMPL (Customer Maintenance Parts List) parts.

7.1 CX1000 Customer Maintenance Parts List

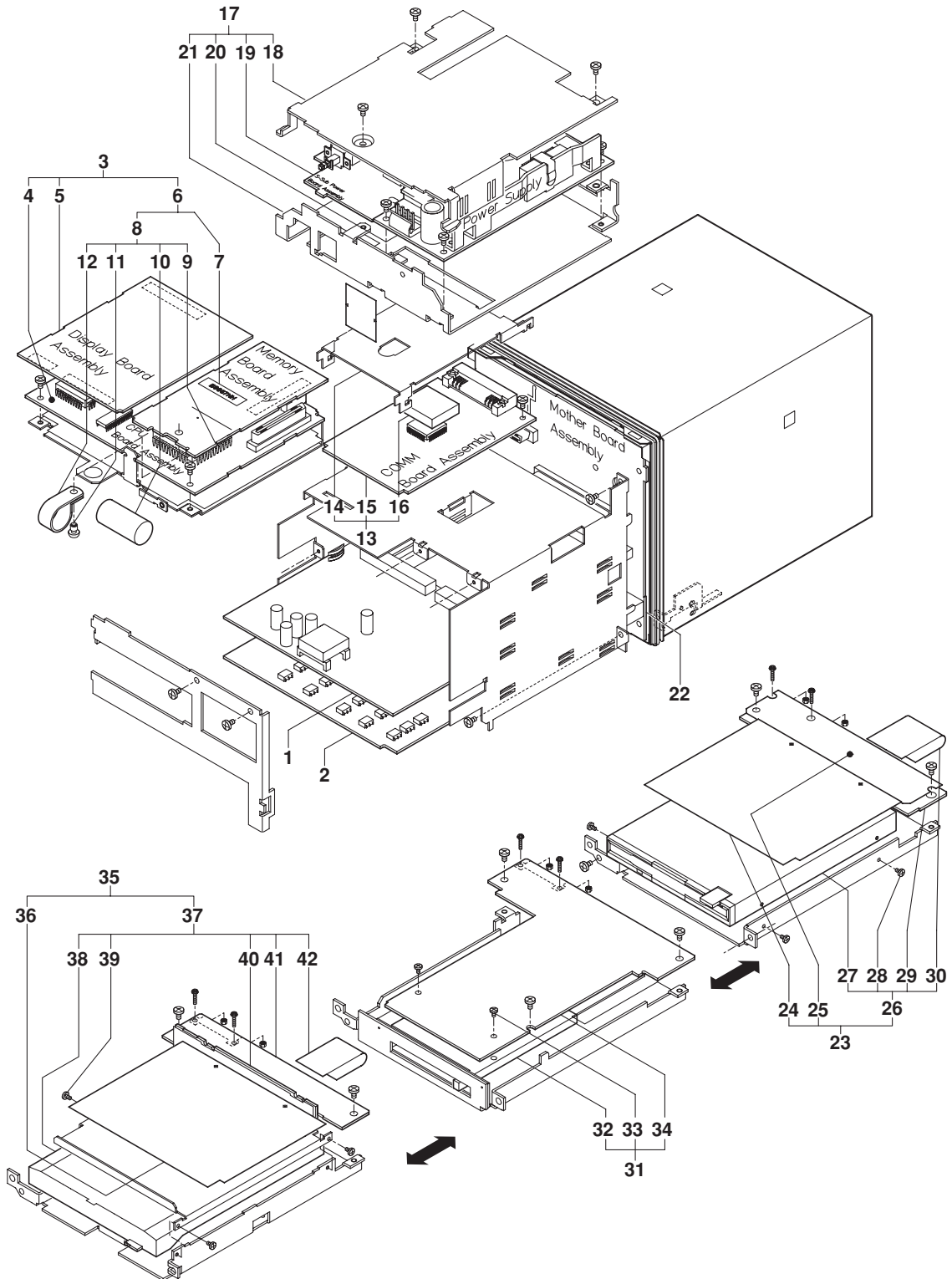
Complete Set



Item	Part No.	Qty	Description
⊙ 1	B9967AM	1	Tag Cover
⊙ 2	B8700EN	1	Tag Plate
⊙ 3	Y9308LB	2	B.H. Screw, M3x8
4	B8700FA	1	Bezel Assembly (see page 7-5)
⊙ 5	B9968AT	4	Sheet
⊙ 6	B8700DR	2	Sheet
7	B9967AX	1	Packing

Note:

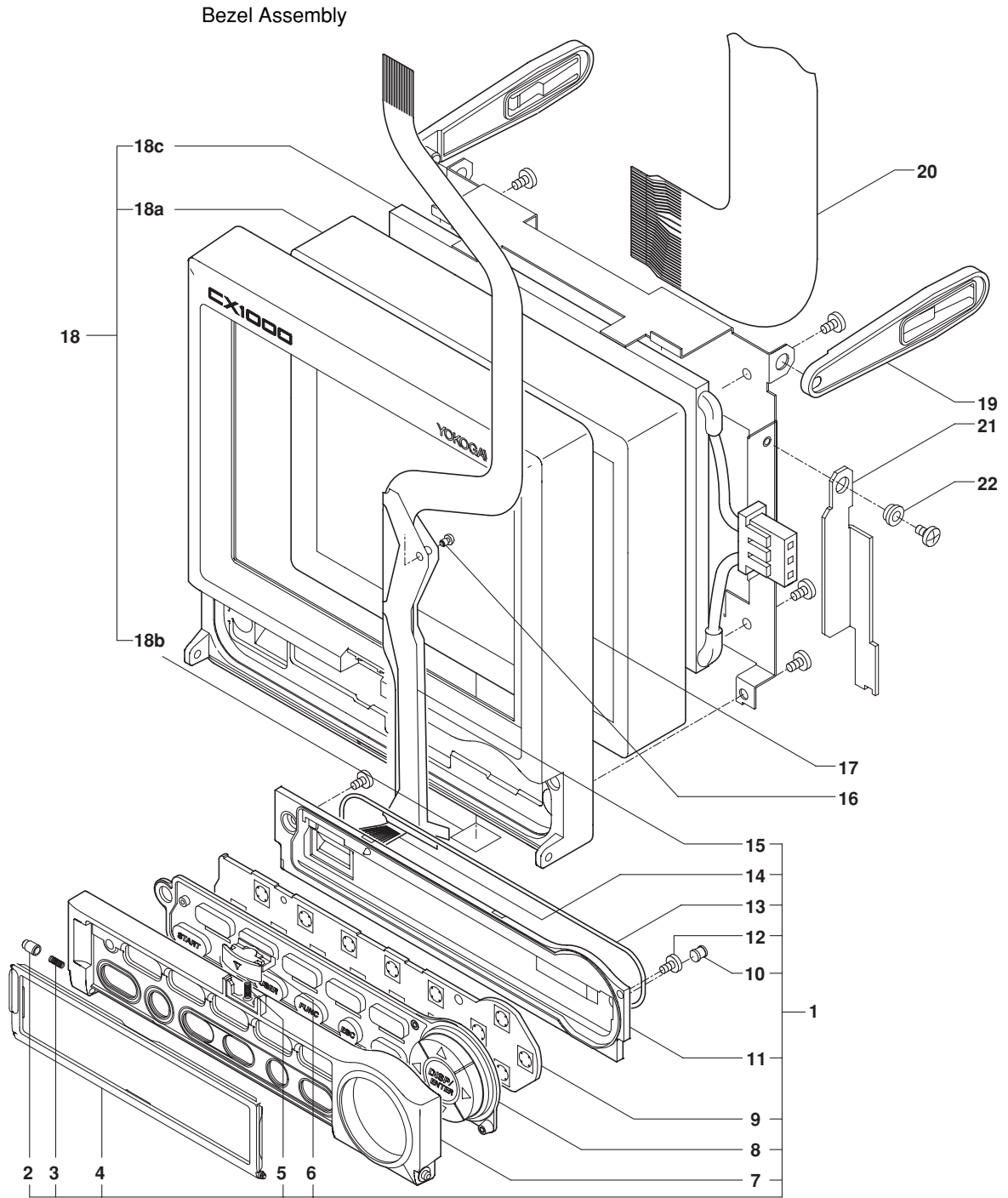
⊙ CMPL Parts



7.1 CX1000 Customer Maintenance Parts List

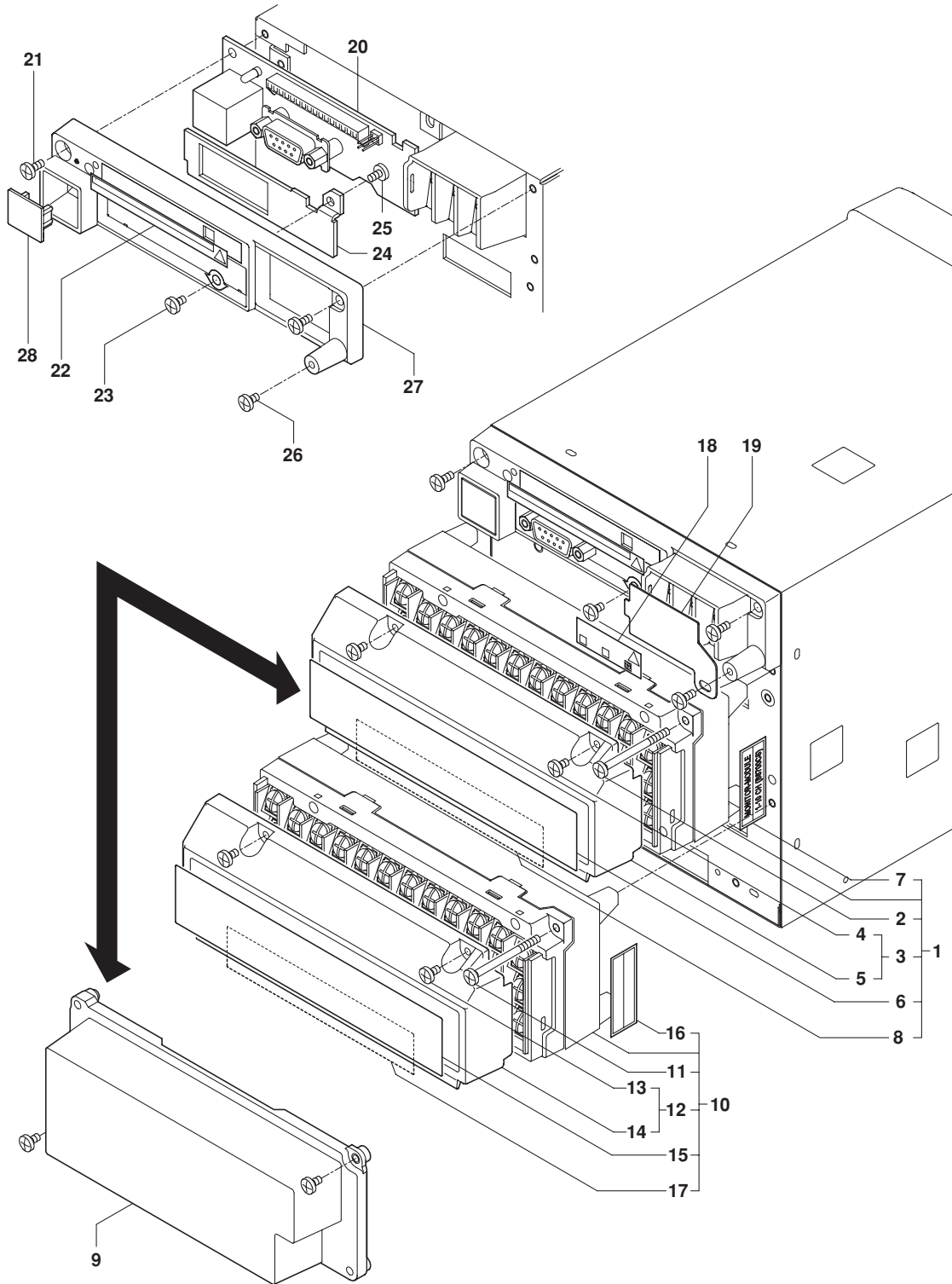
Item	Part No.	Qty	Description
1	B8700RP	1	MON AD Assembly (CX1006 not /N2)
	B8700RD	1	C&M AD Assembly (CX1206 not /N2)
	B8700QP	1	ISO MON AD Assembly (CX1006 /N2)
	B8700QD	1	ISO C&M AD Assembly (CX1206 /N2)
2	B8700RM	1	MON Scanner Assembly (CX1006 not /N2)
	B8700RS	1	C&M Scanner Assembly (CX1206 not /N2)
	B8700QM	1	ISO MON Scanner Assembly (CX1006 /N2)
	B8700QS	1	ISO C&M Scanner Assembly (CX1206 /N2)
3	B8700FF	1	CPU Board Assembly
4	B8700RA	1	CPU Board Assembly
5	B9967TA	1	Display Board Assembly
6	B8700NP	1	Memory Assembly
7	B8700EE	1	Name Plate
8	B8700QZ	1	Memory Board & Battery Assembly
9	B8700UZ	1	Memory Board Assembly
10	B9900BR	1	Battery Assembly
11	B9968EM	1	Rivet
12	A9069KY	1	Clamp
13	B9967DA	1	COMM Board Assembly (CX1□□6-□-1)
	B9967DB	1	COMM Board Assembly (CX1□□6-□-2)
	B9967DD	1	COMM Board Assembly (CX1□□6-□-0)
14	B9967DC	1	COMM Board Bracket
15	B9968TQ	1	COMM Board Assembly (CX1□□6-□-1)
	B9968TP	1	COMM Board Assembly (CX1□□6-□-2)
	B9968SQ	1	COMM Board Assembly (CX1□□6-□-0)
16	B9968CZ	1	Gel Sheet (CX1□□6-□-0), (CX1□□6-□-1)
	B9968CZ	2	Gel Sheet (CX1□□6-□-2)
17	B8700FG	1	S-Power Assembly (not /P1)
	B9967DV	1	S-Power Assembly (/P1)
18	B9967CW	1	Power Bracket Cover (not /P1)
	B9967DW	1	Power Bracket Cover (/P1)
19	B8700SL	1	Sub Pow Board Assembly (not /P1)
	B9967UD	1	24V Power Board Assembly (/P1)
20	A1485UP	1	Power Supply (not /P1)
	B9967TF	1	DC Power Board Assembly (/P1)
21	B9967CX	1	Power Bracket Base
22	B9967TB	1	Mother Board Assembly
23	B9967GA	1	FDD Drive Assembly (CX1□06-1)
24	B9967DM	1	Sheet
25	B9967DN	1	Sheet
26	B9968GA	1	FDD Drive Assembly
27	A1092UN	1	Memory System
28	Y9204LS	3	Screw
29	B9968SW	1	FDD Board Assembly
30	B9968MA	1	FDD FCC
31	B9968GL	1	ATA Drive Assembly (CX1□06-3)
32	A1492JS	1	Socket
33	Y9208LB	2	Screw
34	B9968SV	1	PC-Card Assembly
35	B9967GD	1	Zip Drive Assembly (CX1□06-2)
36	B9967DM	1	Sheet
37	B9968GD	1	Zip Drive Assembly
38	A1150UN	1	Memory System
39	Y9203LB	3	Screw
40	B9968SU	1	Zip Conn Board Assembly
41	B9968ST	1	IDE Board Assembly
42	B9968MB	1	IDE FCC

Note:
 © CMPL Parts



Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
1	B8700FH	1	Key Case Assembly	12	B9967BU	2	Screw
2	B9967BN	1	Hinge Pin	13	B9967AY	1	Packing
3	B9567AQ	1	Spring	14	B9967MA	1	Key FPC
4	B9967BP	1	Front Plate	15	B9967BT	1	FPC Guard
5	E9655AL	1	Spring	16	B9967BX	1	Rivet
6	B9967BM	1	Door Knob	17	B8700FB	1	Sub Bezel Assembly
7	B9967BJ	1	Front Cover	18	B9967BF	1	LCD Assembly
8	B8700FL	1	Key Top	18a	A1053VA	1	LCD
9	B9967TC	1	SW Board Assembly	18b	B9967AQ	1	Name Plate
10	B9967BZ	1	Micro SW Pin	18c	A1039VZ	1	Back Light Module
11	B9967BK	1	Front Case	19	B9968BM	2	Hinge Arm
				20	B9967MB	1	Display FFC
				21	B9967BY	1	Stay Bracket
				22	B9968EN	1	Bushing

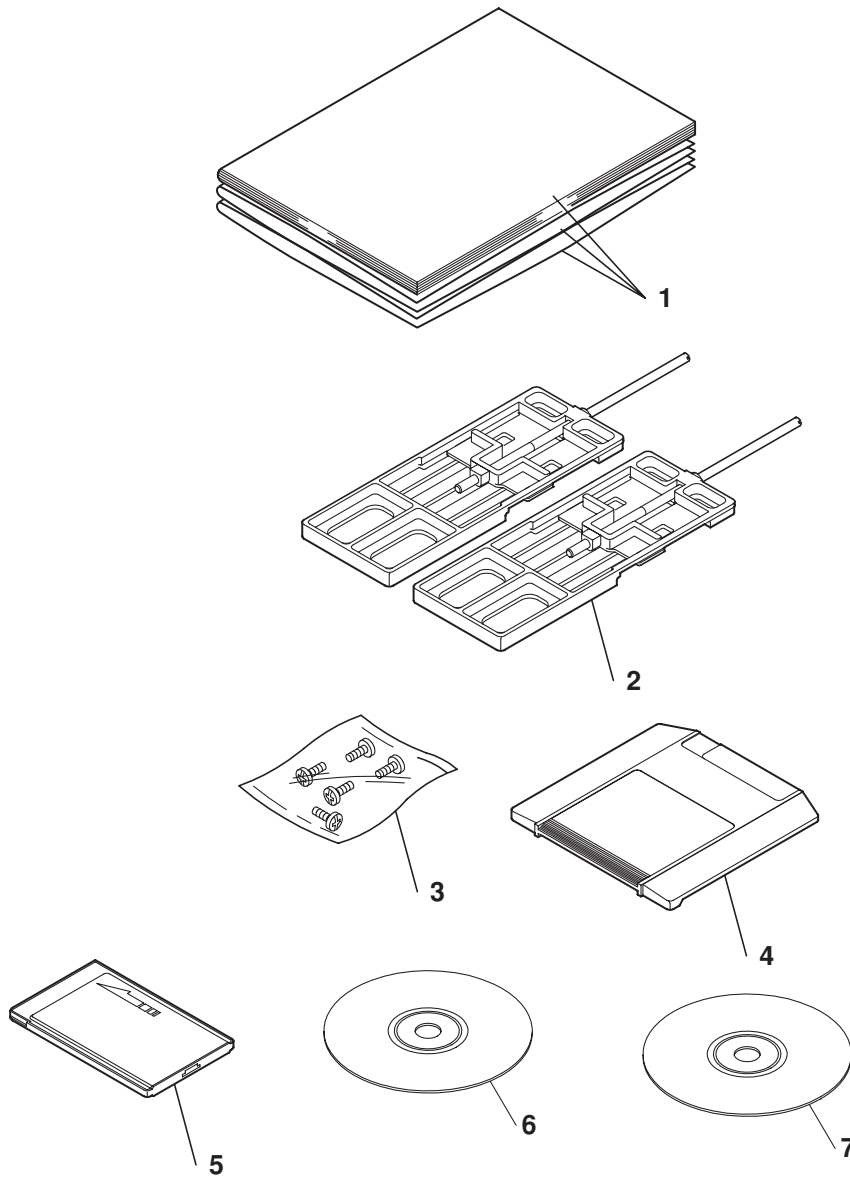
7.1 CX1000 Customer Maintenance Parts List



Item	Part No.	Qty	Description
1	B8700GA	1	Alarm Module (/A6)
	B8700GB	1	Alarm Remote Module (/A6R)
	B8700GC	1	Alarm Fail Module (/A4F)
	B8700GD	1	Alarm Remote Fail Module (/A4FR)
	B8700FT	1	CTRL Module 2 Loop (CX1206)
			} (select)
9	B9968DN	1	Conn Cover Assembly
2	B8700CK	2	Screw (CX1206)
	B9968DJ	2	Screw (/A6, /A6R, /A4F, /A4FR)
3	B9968DF	1	Cover Assembly
4	B9900SG	2	Screw
5	B9968DG	1	Cover
6	B8700GF	1	Name Plate (/A6)
	B8700GH	1	Name Plate (/A6R)
	B8700GK	1	Name Plate (/A4F)
	B8700GM	1	Name Plate (/A4FR)
			} (select)
	B8700EW	1	Name Plate (CX1206)
7	B8700GE	1	Name Plate (/A6)
	B8700GG	1	Name Plate (/A6R)
	B8700GJ	1	Name Plate (/A4F)
	B8700GL	1	Name Plate (/A4FR)
			} (select)
	B8700EV	1	Name Plate (CX1206)
8	B8700HJ	1	Name Plate (/A6)
	B8700HK	1	Name Plate (/A6R)
	B8700HG	1	Name Plate (/A4F)
	B8700HH	1	Name Plate (/A4FR)
			} (select)
	B8700HL	1	Name Plate (CX1206)
10	B8700FP	1	CTRL MEAS 0 Loop Module Assembly (CX1006 not /N2)
	B8700FQ	1	CTRL MEAS 2 Loop Module Assembly (CX1206 not /N2)
	B8700FR	1	CTRL MEAS 0 Loop RTD Module Assembly (CX1006 /N2)
	B8700FS	1	CTRL MEAS 2 Loop RTD Module Assembly (CX1206 /N2)
			} (select)
11	B9968DJ	2	Screw
12	B9968DF	1	Cover Assembly
13	B9900SG	2	Screw
14	B9968DG	1	Cover
15	B8700EH	1	Name Plate (CX1006 not /N2)
	B8700EL	1	Name Plate (CX1206 not /N2)
	B8700EQ	1	Name Plate (CX1006 /N2)
	B8700ET	1	Name Plate (CX1206 /N2)
16	B8700EG	1	Name Plate (CX1006 not /N2)
	B8700EK	1	Name Plate (CX1206 not /N2)
			} (select)
	B8700EP	1	Name Plate (CX1006 /N2)
	B8700ES	1	Name Plate (CX1206 /N2)
17	B8700EJ	1	Name Plate (CX1006 not /N2)
	B8700EM	1	Name Plate (CX1206 not /N2)
	B8700ER	1	Name Plate (CX1006 /N2)
			} (select)
	B8700EU	1	Name Plate (CX1206 /N2)
18	B8700ED	1	Name Plate (not /P1)
	B8700EF	1	Name Plate (/P1)
			} (select)
19	B9968EG	1	Power Plate
20	B9968RJ	1	COMM Term Board Assembly (CX1□□6-□-1)
	B9968RK	1	COMM Term Board Assembly (CX1□□6-□-2)
	B9968RG	1	COMM Term Board Assembly (CX1□□6-□-0)
			} (select)
21	Y9308LB	2	B.H. Screw, M3x8
22	B9968AJ	1	Sheet (CX1□□6-□-0)
	B9968AG	1	Name Plate (CX1□□6-□-1)
			} (select)
	B9968AH	1	Name Plate (CX1□□6-□-2)
23	Y9305LB	1	B.H. Screw, M3x5
24	B9968EH	1	Blind Bracket (CX1□□6-□-0)
	B9968EJ	1	RS-232 Bracket (CX1□□6-□-1)
			} (select)
25	Y9305TS	1	Tapping Screw (CX1□□6-□-1, -0)
26	Y9308LB	1	B.H. Screw, M3x8
27	B9968EE	1	Terminal
28	A1447JZ	1	Modular Cover

Note:
 ◎ CMPL Parts

7.2 CX1000 Standard Accessories

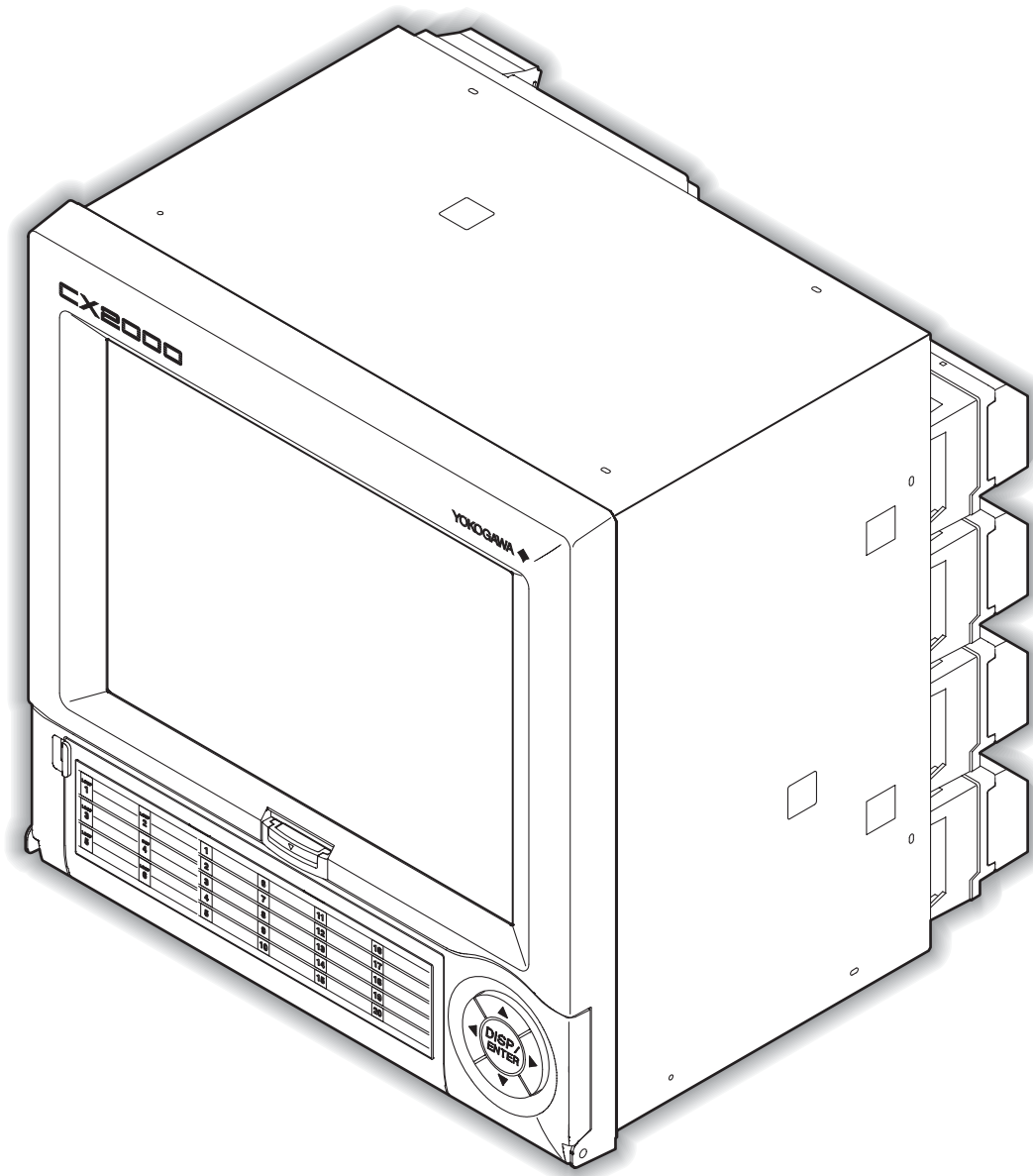


Item	Part No.	Qty	Description
1	IM04L31A01-03E	1	DAQSTATION CX1000 User's Manual
	IM04L31A01-04E	1	DAQSTATION CX1000 Operation Guide
	IM04L31A01-72E	1	Precautions on the Use of the CX1000/CX2000
	IM04L31A01-73E	1	CX1000 Installation and Connection Guide
◎ 2	B9900BX	2	Bracket Assembly
◎ 3	E9655FX	5	B.H. Screw, M4x6 (±)
◎ 4	A1053MP	1	Mag Memory :Zip 100MB disk (DX1□06-2)
◎ 5	B9968PK	1	Memory System :ATA flash memory card (DX1□06-3)
◎ 6	CXA100-01	1	DAQ Standard for CX
◎ 7	B8700MA	1	CX1000/CX2000 electric manual

Note:

◎ CMPL Parts

7.3 CX2000 Customer Maintenance Parts List

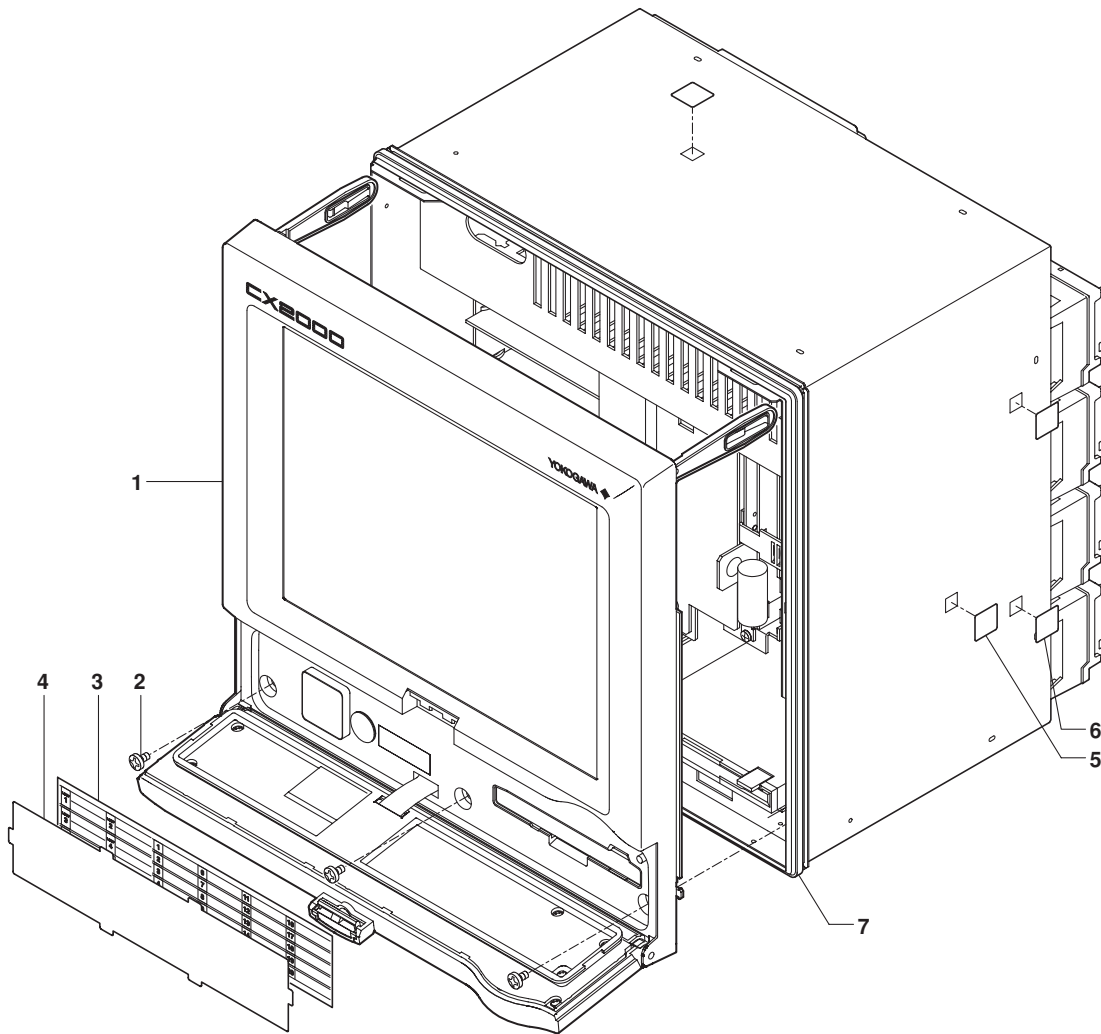


Note:

Parts marked with a © symbol are CMPL (Customer Maintenance Parts List) parts.

7.3 CX2000 Customer Maintenance Parts List

Complete Set



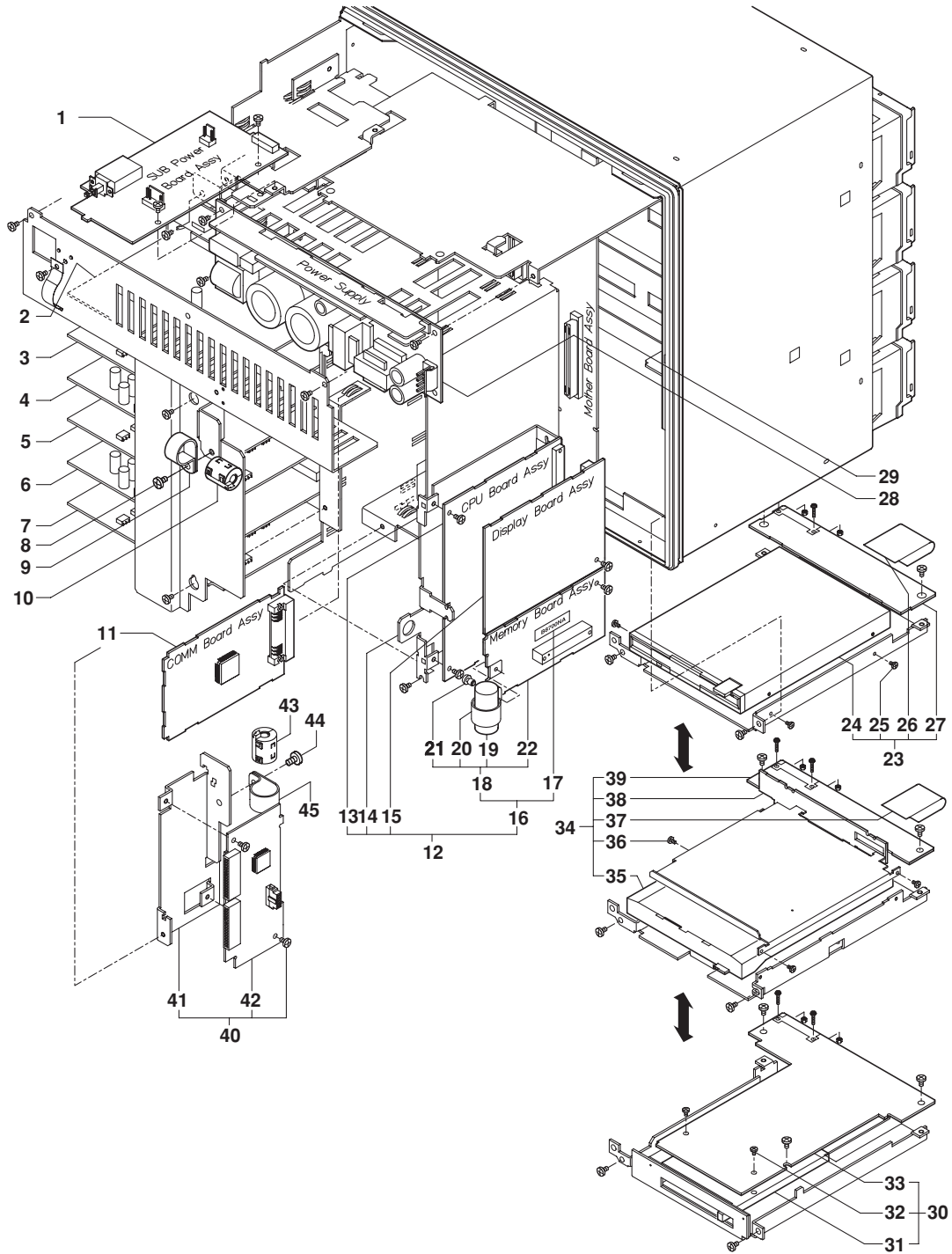
Item	Part No.	Qty	Description
1	B8700BA	1	Bezel Assembly†
	B8700BE	1	Bezel Assembly*
			(select) (see page 7-13)
2	Y9414LB	3	B.H. Screw, M4x14
⊙ 3	B8700AF	1	Tag Plate
⊙ 4	B9968AM	1	Tag Cover
⊙ 5	B9968AT	4	Sheet
⊙ 6	B8700DR	4	Sheet
7	B9968AX	1	Packing

Note:

* CX2 □□ 0-□-□-1

† CX2 □□ 0-□-□-2

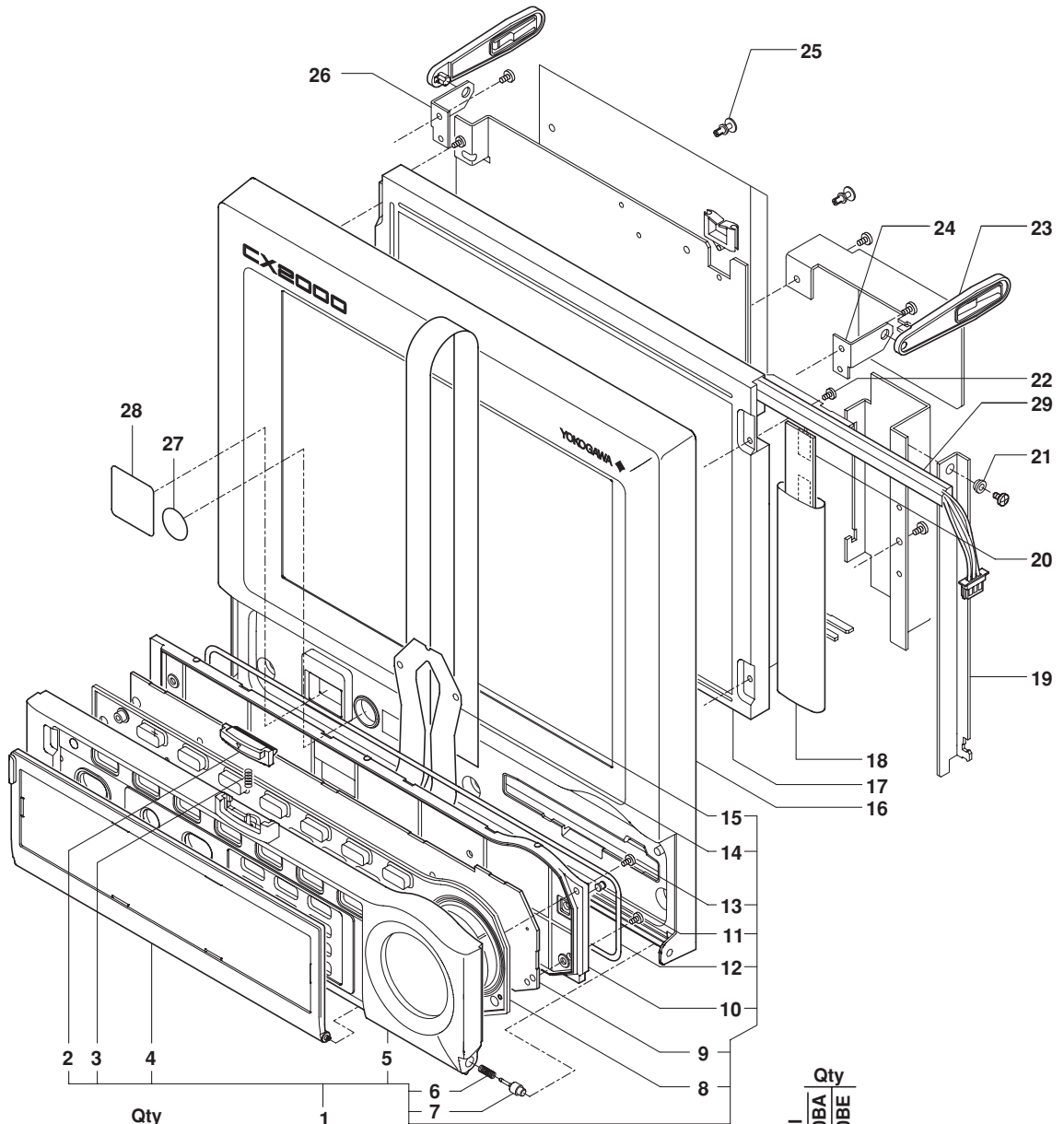
⊙ CMPL parts



7.3 CX2000 Customer Maintenance Parts List

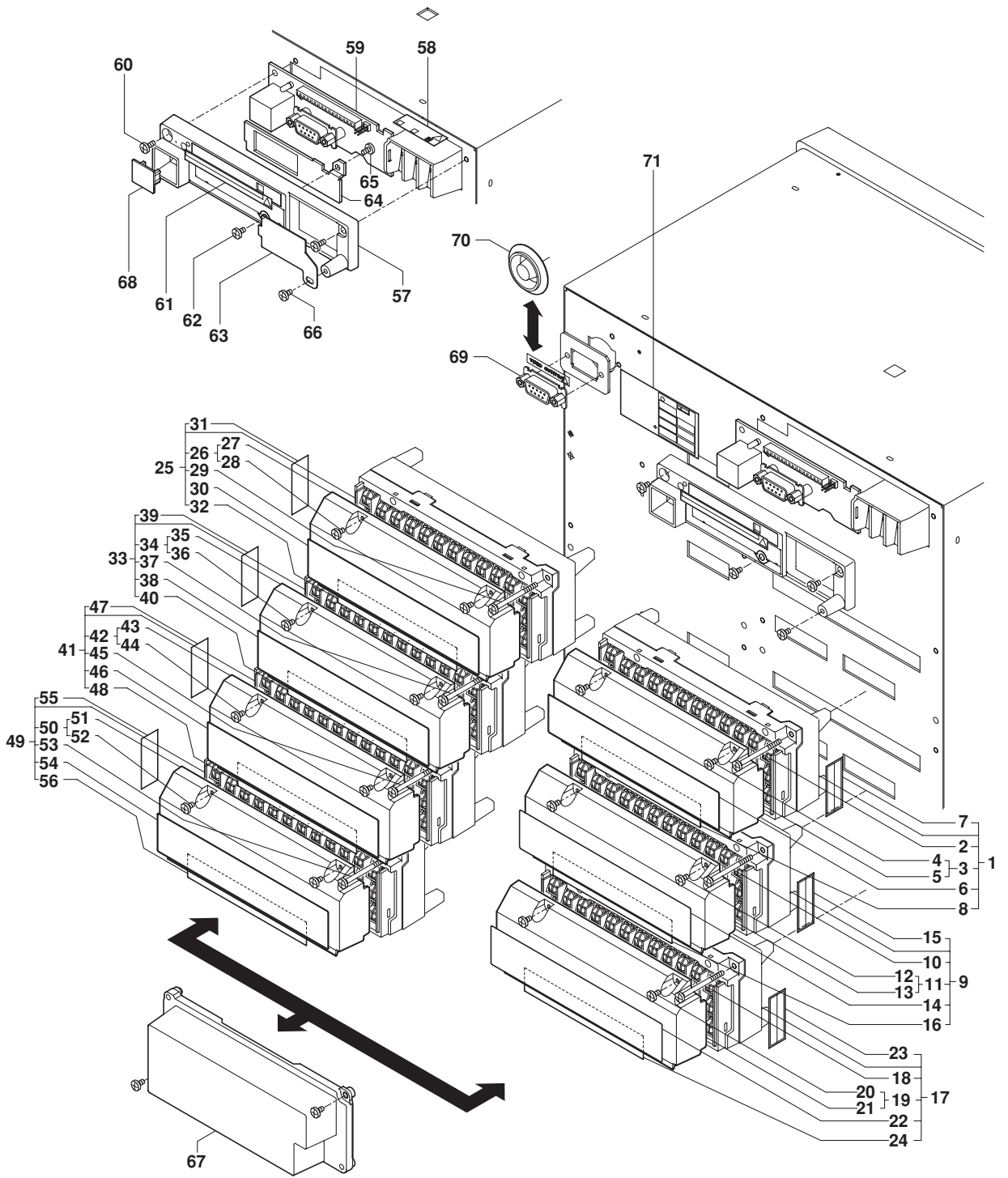
Item	Part No.	Qty	Description
1	B8700SL	1	Sub Power Board Assembly (not /P1) } (select)
	B9967UD	1	S24-Sub Power Board Assembly (/P1) }
2	B8700RC	1	2Loop AD Board Assembly (CX2210, 2220) } (select)
	B8700RB	1	4Loop AD Board Assembly (CX2410, 2420, 2610, 2620) }
3	B8700SJ	1	2Loop Scanner Assembly (CX2210, 2220) } (select)
	B8700RJ	1	4Loop Scanner Assembly (CX2410, 2420, 2610, 2620) }
4	B9968QA	1	Slow AD (PT) Assembly
5	B9968SD	1	10ch Scanner Assembly
	B9968TY	1	10ch ISO Scanner Assembly (/N2) } (select)
6	B9968QA	1	Slow AD (PT) Assembly (CX2 □ 20)
7	B9968SD	1	10ch Scanner Assembly (CX2 □ 20) } (select)
	B9968TY	1	10ch Scanner Assembly (CX2 □ 20 /N2) }
8	Y9414LB	1	B.H. Screw, M4x14
9	B9968EL	1	Clamp
10	A1193MN	1	Magnetic Parts
11	B9968TQ	1	Comm Board Assembly (CX2 □□ 0-1) } (select)
	B9968TP	1	Comm Board Assembly (CX2 □□ 0-2) }
	B9968SQ	1	Comm Board Assembly (CX2 □□ 0-0) }
12	B8700CW	1	CPU Board Assembly
13	B8700RA	1	CPU Board Assembly
14	B9968CX	1	CPU Bracket
15	B8700RK	1	Display Board Assembly
16	B8700NA	1	Memory Board Assembly
17	B8700AE	1	Name Plate
18	B8700QZ	1	Memory Board & Battery Assembly
19	B9900BR	1	Battery Assembly
20	A9069KY	1	Clamp
21	B9968EM	1	Rivet
22	B8700UZ	1	Memory Board Assembly
23	B9968GA	1	FDD Drive Assembly (CX2□□ 0-1)
24	A1092UN	1	Memory System
25	Y9204LS	3	Screw
26	B9968MA	1	FDD FCC
27	B9968SW	1	FDD Board Assembly
28	A1484UP	1	Power Supply (not /P1) } (select)
	B9968SZ	1	DC24 Power Assembly (/P1) }
29	B9968SP	1	Mother Board Assembly
30	B9968GL	1	ATA Drive Assembly (CX2□□ 0-3)
31	A1492JS	1	Socket
32	Y9208LB	2	Screw
33	B9968SV	1	PC-Card Board Assembly
34	B9968GD	1	Zip Drive Assembly (CX2□□ 0-2)
35	A1150UN	1	Memory System
36	Y9203LB	3	Screw
37	B9968MB	1	IDE FFC
38	B9968SU	1	Zip Conn Board Assembly
39	B9968ST	1	IDE Board Assembly
40	B9968HQ	1	VGA Board Assembly (/D5)
41	B9968HR	1	Bracket
42	B9968UX	1	VGA Board Assembly
43	A1193MN	1	Magnetic Parts (/D5)
44	Y9414LB	1	B.H. Screw, M4x14 (/D5)
45	B9968EL	1	Clamp (/D5)

Bezel Assembly



Item	Part No.	Qty		Description	Item	Part No.	Qty		Description
		Model B8700BA	B8700BE				Model B8700BA	B8700BE	
1	B8700BR B8700BV	1	1	Key Case Assembly (for English) Key Case Assembly (for Japanese) } (select)	14	B9968BU	1	1	FPC Guard
2	B9968BX	1	1	Door Knob	15	B9968MC	1	1	Key FFC
3	B9900NQ	1	1	Spring	16	B8700BB	1	1	Sub Bezel Assembly
4	B9968BW	1	1	Front Plate	17	A1067VA	1	1	LCD
5	B9968BS	1	1	Front Cover	29	A1046VZ	1	1	Back Light
6	B9567AQ	1	1	Spring	18	B9968ML	1	1	Inverter Cover
7	B9968BY	1	1	Hinge Pin	19	B9968BL	1	1	Stay Bracket
8	B8700BW B8700BY	1	1	Key Top (for English) Key Top (for Japanese) } (select)	20	A1527UP	1	1	Power Supply
9	B9968SK	1	1	Switch Board Assembly	21	B9968EN	1	1	Bushing
10	B9968BT	1	1	Front Case	22	B9988DL	2	2	Screw
11	B9968BZ	1	1	Micro Switch Pin	23	B9968BM	2	2	Hinge Arm
12	B9968AY	1	1	Packing	24	B9968BQ	1	1	Hinge Bracket
13	B9968GZ	5	5	Screw	25	B9543SQ	5	5	NRP-345
					26	B9968BP	1	1	Hinge Bracket
					27	B8700DD	1	1	Blind Sheet
					28	B8700DC	1	1	Blind Sheet

7.3 CX2000 Customer Maintenance Parts List

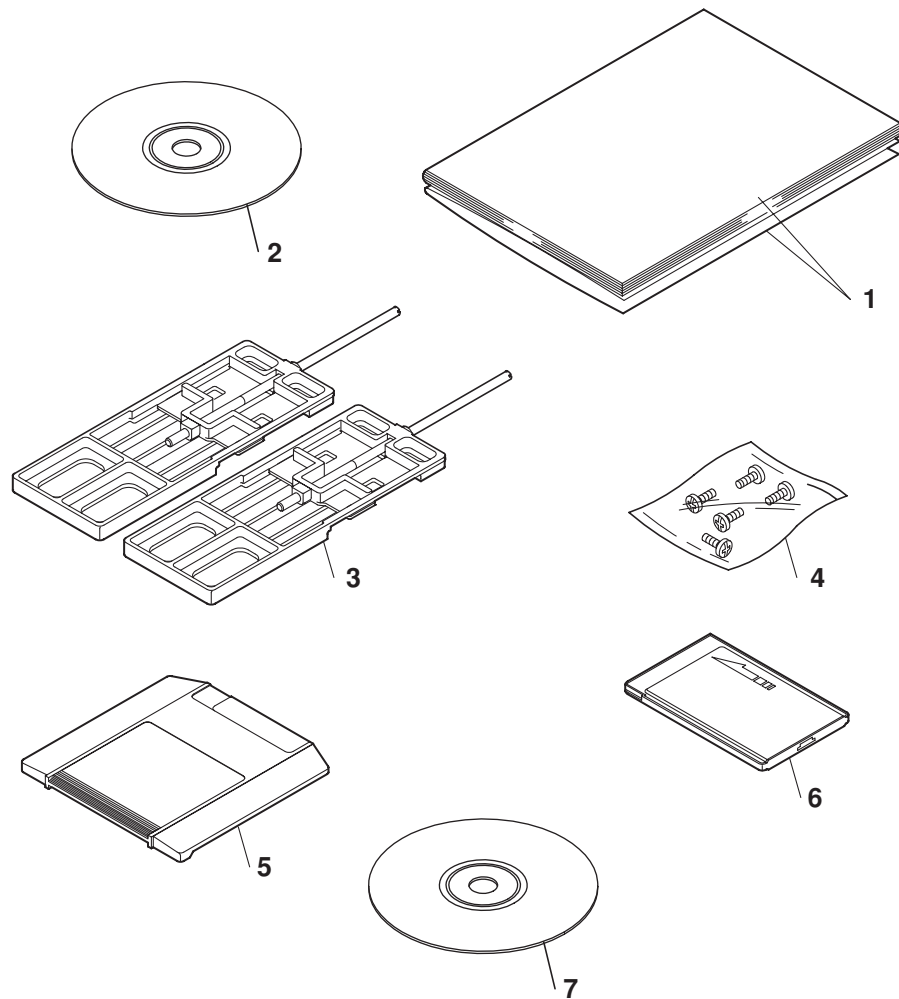


7.3 CX2000 Customer Maintenance Parts List

Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
1	B8700CP	1	CTRL IN MO. AS. 2L (CX22□□)	49	B8700CY	1	DIO Module Assembly (/CST1)
	B8700CQ	1	CTRL IN MO. AS. 4L (CX24□□)		B8700CX	1	Alarm Terminal Assembly (/A6)
	B8700CR	1	CTRL IN MO. AS. 6L (CX26□□)		B8700CZ	1	Alarm Terminal Assembly (/A6R)
67	B9968DN	1	Conn Cover Assembly (CX20□□)		B8700CJ	1	Alarm Terminal Assembly (/TPS4)
2	B9968DJ	2	Screw		B8700DX	1	Alarm Terminal Assembly (/A4F)
3	B9968DF	1	Cover Assembly		B8700DZ	1	Alarm Terminal Assembly (/A4FR)
4	B9900SG	2	Screw	67	B9968DN	1	Conn Cover Assembly
5	B9968DG	1	Cover	50	B9968DF	1	Cover Assembly
6	B8700AP	1	Name Plate (for B8700CP)	51	B9968DG	1	Cover
	B8700AQ	1	Name Plate (for B8700CQ)	52	B9900SG	2	Screw
	B8700AR	1	Name Plate (for B8700CR)	53	B8700CK	2	Screw (/CST1)
7	B8700AV	1	Name Plate (for B8700CP)		B9968DJ	2	Screw (/A6 /A6R /TPS4 /A4F /A4FR)
	B8700AW	1	Name Plate (for B8700CQ)	54	B8700AY	1	Name Plate (/CST1)
	B8700AX	1	Name Plate (for B8700CR)		B8700DJ	1	Name Plate (/A6)
8	B8700HP	1	Name Plate (for B8700CP)		B8700DK	1	Name Plate (/A6R)
	B8700HQ	1	Name Plate (for B8700CQ)		B8700HW	1	Name Plate (/TPS4)
	B8700HR	1	Name Plate (for B8700CR)		B8700DG	1	Name Plate (/A4F)
9	B8700CS	1	INPUT MO. AS. 10ch (CX2□10, 2□20)		B8700DH	1	Name Plate (/A4FR)
	B8700CU	1	3RTD INP. AS. 10ch (CX2□10, 2□20 /N2)	55	B8700AZ	1	Name Plate (/CST1)
10	B9968DJ	2	Screw		B8700BH	1	Name Plate (/A6)
11	B9968DF	1	Cover Assembly		B8700BJ	1	Name Plate (/A6R)
12	B9900SG	2	Screw		B8700HZ	1	Name Plate (/TPS4)
13	B9968DG	1	Cover		B8700DE	1	Name Plate (/A4F)
14	B8700DS	1	Name Plate (for B8700CS)		B8700DF	1	Name Plate (/A4FR)
	B8700DU	1	Name Plate (for B8700CU)	56	B8700HY	1	Name Plate (/CST1)
15	B8700AJ	1	Name Plate (for B8700CS)		B8700HJ	1	Name Plate (/A6)
	B8700BF	1	Name Plate (for B8700CU)		B8700HK	1	Name Plate (/A6R)
16	B8700HS	1	Name Plate (for B8700CS)		B8700HX	1	Name Plate (/TPS4)
	B8700HU	1	Name Plate (for B8700CU)		B8700HG	1	Name Plate (/A4F)
	B8700CT	1	INPUT MO. AS. 20ch (CX2□20)		B8700HH	1	Name Plate (/A4FR)
	B8700CV	1	3RTD INP. AS. 20ch (CX2□20 /N3)	57	B9968EE	1	Terminal
67	B9968DN	1	Conn Cover Assembly (CX2□10)	58	B9968AE	1	Name Plate (not /P1)
18	B9968DJ	2	Screw		B9968HM	1	Name Plate (/P1)
19	B9968DF	1	Cover Assembly	59	B9968RJ	1	COMM Term Board Assembly †
20	B9900SG	2	Screw		B9968RK	1	COMM Term Board Assembly ‡
21	B9968DG	1	Cover		B9968RG	1	COMM Term Board Assembly *
22	B8700DT	1	Name Plate (for B8700CT)	60	Y9308LB	2	B.H. Screw, M3x8
	B8700DV	1	Name Plate (for B8700CV)	61	B9968AG	1	Name Plate †
23	B8700AK	1	Name Plate (for B8700CT)		B9968AH	1	Name Plate ‡
	B8700BG	1	Name Plate (for B8700CV)		B9968AJ	1	Sheet *
24	B8700HT	1	Name Plate (for B8700CT)	62	Y9305LB	1	B.H. Screw, M3x5
	B8700HV	1	Name Plate (for B8700CV)	63	B9968EG	1	Power Plate
25	B8700CL	1	CTRL Module AS. 2L (CX22□□, CX24□□, CX26□□)	64	B9968EH	1	Blind Bracket *
67	B9968DN	1	Conn Cover Assembly (CX20□□)		B9968EJ	1	RS-232 Bracket †
26	B9968DF	1	Cover Assembly	65	Y9305TS	1	Tapping Screw
27	B9968DG	1	Cover	66	Y9308LB	1	B.H. Screw, M3x8
28	B9900SG	2	Screw	68	A1447JZ	1	Modular Cover
29	B8700CK	2	Screw	69	B9968MN	1	VGA Cable (/D5)
30	B8700AL	1	Name Plate	70	B9968EK	1	Cap (not /D5)
31	B8700AS	1	Name Plate	71	B8700AG	1	Name Plate
32	B8700HL	1	Name Plate				
33	B8700CM	1	CTRL Module AS. 4L (CX24□□, CX26□□)				
67	B9968DN	1	Conn Cover Assembly (CX20□□, CX22□□)				
34	B9968DF	1	Cover Assembly				
35	B9968DG	1	Cover				
36	B9900SG	2	Screw				
37	B8700CK	2	Screw				
38	B8700AM	1	Name Plate				
39	B8700AT	1	Name Plate				
40	B8700HM	1	Name Plate				
41	B8700CN	1	CTRL Module AS. 6L (CX26□□)				
67	B9968DN	1	Conn Cover Assembly (CX20□□, CX22□□, CX24□□)				
42	B9968DF	1	Cover Assembly				
43	B9968DG	1	Cover				
44	B9900SG	2	Screw				
45	B8700CK	2	Screw				
46	B8700AN	1	Name Plate				
47	B8700AU	1	Name Plate				
48	B8700HN	1	Name Plate				

Note:
 * CX2□□0-□-0
 † CX2□□0-□-1
 ‡ CX2□□0-□-2

7.4 CX2000 Standard Accessories



Item	Part No.	Qty	Description
1	IM 04L31A01-01E	1	DAQSTATION CX2000 User's Manual
	IM 04L31A01-02E	1	DAQSTATION CX2000 Operation Guide
	IM 04L31A01-71E	1	CX2000 Installation and Connection Guide
	IM 04L31A01-72E	1	Precaution on the Use of the CX1000/CX2000
⊙ 2	B8700MA	1	CD for Manual for CX
⊙ 3	B9900BX	2	Bracket Assembly
⊙ 4	E9655FX	5	B.H. Screw, M4x6 (±)
⊙ 5	A1053MP	1	Mag Memory :Zip 100MB disk (CX2□□0-2)
⊙ 6	B9968PK	1	Memory System :ATA flash memory card (CX2□□0-3)
⊙ 7	CXA100-01	1	DAQ Standard for CX

Note: ⊙ CMPL parts

8.1 Removing the Bezel

WARNING

The service manual is to be used by properly trained personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to the safety precautions prior to performing any servicing. Even if servicing is carried out according to this service manual, or by qualified personnel, YOKOGAWA assumes no responsibility for any result occurring from that servicing.

CAUTION

If removing the assembly, be sure to disconnect the power cable from the outlet before doing so.

Opening the Bezel

1. Open the Key Case Assembly then remove the two screws as shown.



2. The Bezel hooks on to holes in the top of the case. Pull the bottom of the bezel outward slightly, lift the entire bezel upwards to release it from the case, then swing the bottom of the bezel upwards to open it.

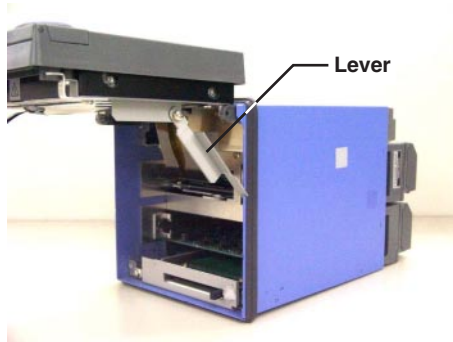
8.1 Removing the Bezel

Note

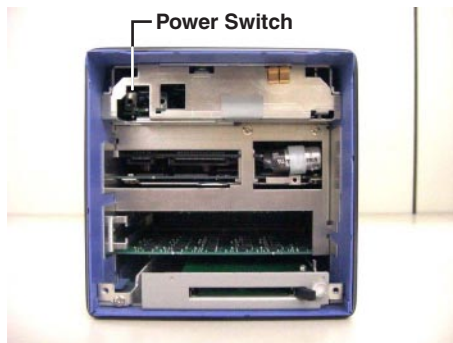
- A gasket is attached to the edge of the case. When reinstalling the bezel, be sure that the gasket is correctly fastened.



- A lever is attached to the right side of the bezel. By hooking the lever onto the side of the case, you can lock the bezel in the open position.

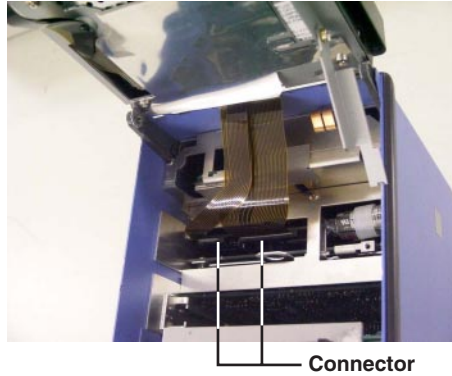


- The power switch is located in the upper left as you are facing the instrument. When this switch is turned OFF, it prevents power from being supplied to the instrument even when the power cord is connected. Therefore be sure to turn the power switch ON before you reassemble the instrument.

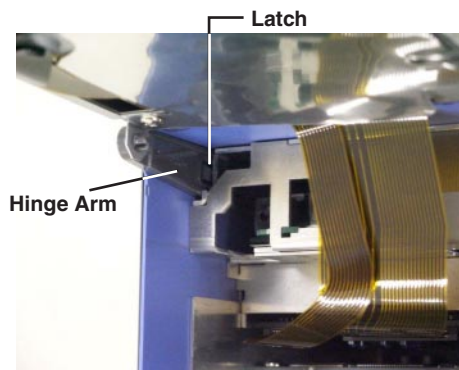


Removing the Bezel

3. Remove the two flexible cables that connect the bezel to the main unit. The connector utilizes a latch. Pull outwards on the left and right sides of the latch to release it, then pull out the cable.



4. Release the bezel by pushing the latches on the left and right hinge arms using a long pointed tools such as a Phillips head screw driver. With the latches pushed in, pull the bezel out and remove it from the main unit.



CX with the front bezel removed

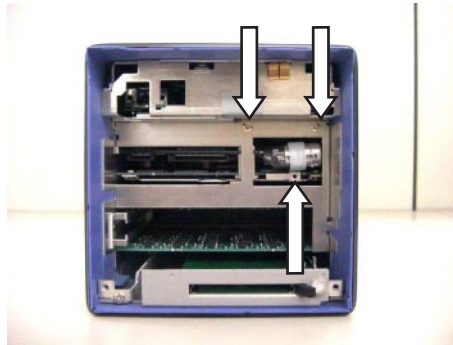


8.2 Removing the Board Assemblies and the Drive

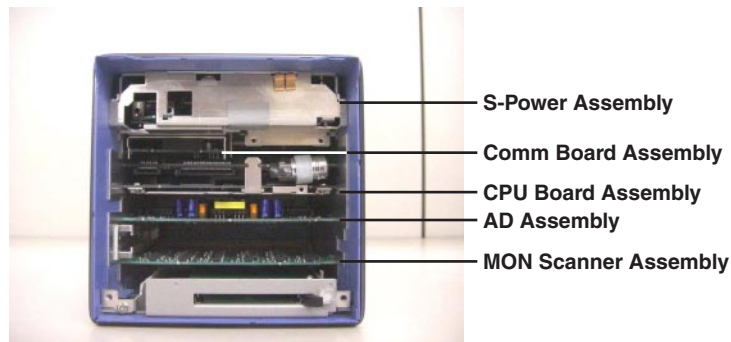
1. Remove the bezel (see section 8.1).

Removing the Board Assemblies

2. Remove the three bracket screws.



3. Slide the bracket down to pop it out of position, then remove it. Removing the bracket allows removal of all board assemblies. CX with the bracket removed.



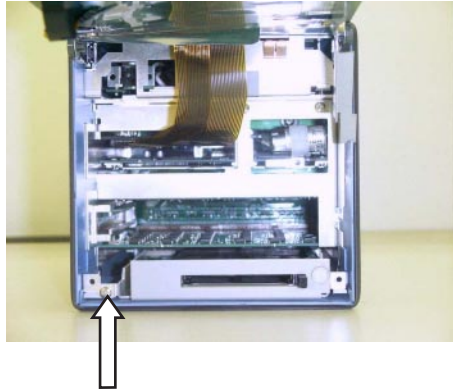
4. Pull out and remove the S-Power assembly, Comm Board assembly, and CPU Board assembly.
5. You may have to pull forcefully to remove the MON Scanner assembly and the AD assembly. You can pry them out gradually by inserting tools into the holes on either side of the board, then rocking the board side to side while pulling.

Note

- The connection where the AD assembly is inserted into the mother board may be tight. When reinserting the boards, make sure that they are completely inserted into the connectors.
 - If it is difficult to grasp the MON Scanner assembly, first remove the drive to provide extra space (see next page).
-

Removing the Drive

1. Remove the screw as shown in the figure below.



2. Remove the drive by pulling it outwards.

CAUTION

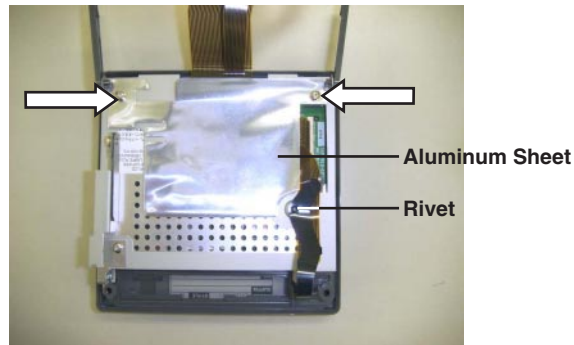
The ZIP drive has a thin transparent plate that can be sharp. Take care not to cut your fingers when removing the drive.

CX with all boards and the drive removed.



8.3 Removing the Keyboard

1. Remove the bezel (see section 8.1).
2. Remove the two screws attaching the aluminum sheet to the back of the bezel.
3. Remove the keyboard flat cable rivet.
When removing the rivet, first pull out the pin.



4. Use the tip of a pen to push in the hinge pin on the left side of the Key Case assembly, then pull the assembly toward you to remove it.
Be careful not to damage the flat cable when removing the assembly.



5. Remove the two front case screws from the back of the key board.
Tightening torque: 0.5—0.6 Nm (5—6 kgf cm)
6. The front case is snapped on to the front cover. Use a tool such as a flathead screwdriver to pry open the front case and remove it.

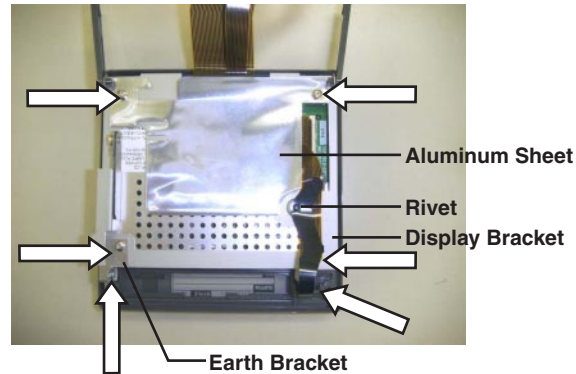


Disassembled Key Case Assembly



8.4 Replacing the Backlight

1. Remove the bezel (see section 8.1).
2. Remove the two screws attaching the aluminum sheet on the back of the bezel, and the rivet that fastens the flat cable (see section 8.3).



3. Remove screw numbers 1?3 as shown, then remove the Earth bracket.
4. Remove screw number 4, then remove the Display bracket.
5. Remove the LCD screen from the plastic screen cover, and set the LCD screen down on a static-proof surface.

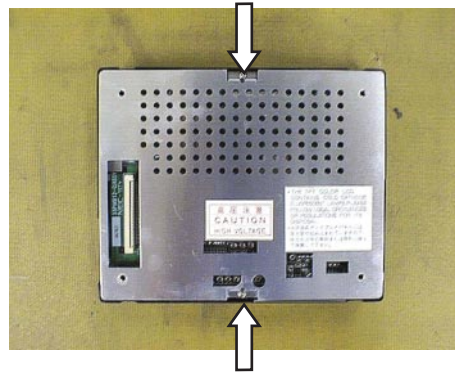
Note

Be careful not to scratch the LCD screen when handling it.

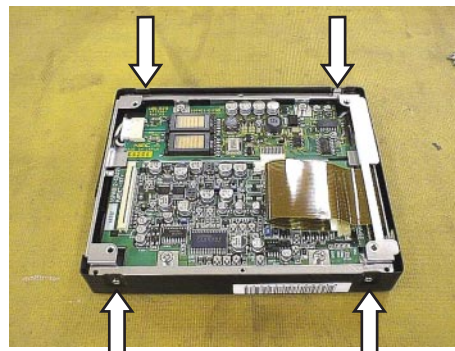
6. Remove the two screws as shown, then remove the rear cover.

Note

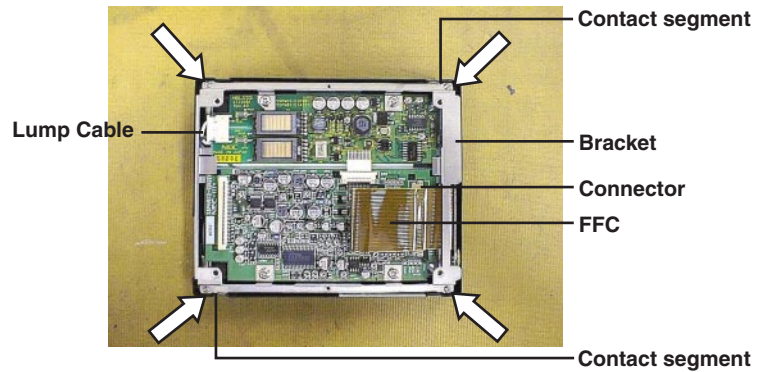
Only use a screw driver that precisely fits the screws.



7. Remove the four screws from the sides of the LCD screen as shown.



8. Remove the four screws from the inside corners of the LCD as shown.
9. Remove the two contact segments one at a time by grasping them with tweezers.

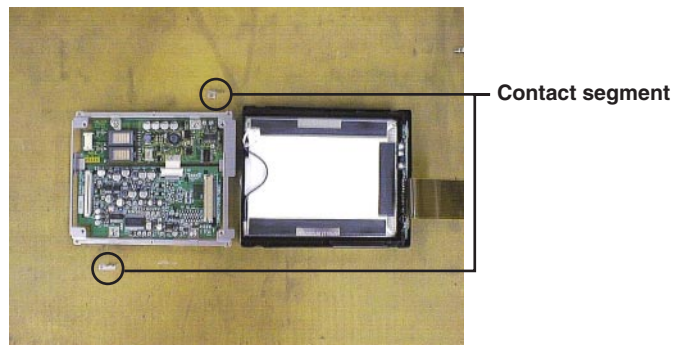


10. Remove the FFC and lump cable from their connectors.
11. Slowly lift the bracket upward to remove the bracket assembly.

Note

- Take care not to damage any components on the inverter or signal processing boards.
- Be careful not to damage the FFC.

LCD assembly with the bracket assembly removed



12. Being careful not to damage any surrounding parts, grasp the backlight and slowly pull it out.

Note

- If the backlight is broken, be careful not to touch any glass shards when removing it. Also, check for glass shards that may have fallen into the lamp holder or other areas, and remove them.
- Dirt and grime on the backlight and LCDs can cause unevenness in display intensity. Be sure to keep these devices clean as you handle them.

LCD assembly with the backlight removed



8.5 Removing the Terminal Assembly

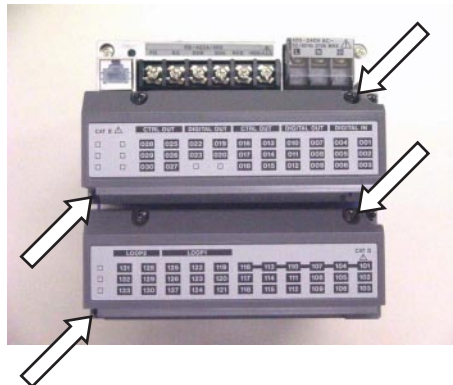
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CAUTION

When removing the assembly, be sure to disconnect the power cable from the outlet before doing so.

1. Remove the screws from the upper right and lower left of the two terminal assemblies.



2. Pull out the terminal assemblies.