
**Service
Manual**

**Model VR204, VR206
VR200 View Recorders**

SM 4N2A1-01E

IMPORTANT NOTICE TO THE USER

This manual contains information for servicing the YOKOGAWA VR100 View recorder. Confirm by serial number that this Service Manual covers 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 maintenance and servicing in accordance with and to the extent permitted by 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.

YOKOGAWA ELECTRIC CORPORATION (YOKOGAWA) does not in principle 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, or 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 trouble-shooting 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 micro-processors, large scale CMOS gate arrays and surface-mount components to provide state-of-art performance and functions.
- Repair of components can only be performed by specially trained and qualified maintenance personnel with special tools. In addition, repair of components requires various special parts and components, including costly ones. It also requires facilities where highly-accurate and expensive maintenance equipment and special tools are provided.
- 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 down-time.

INTRODUCTION

This manual contains information for servicing the YOKOGAWA VR200 View recorder.

NOTES This manual is the first edition, June 1997, and applies to products since 16th March 1997.

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 in case of servicing according to this Service Manual and carried out by qualified personnel, YOKOGAWA assumes no responsibility for any result occurring from this servicing.

SAFETY PRECAUTIONS

The following general safety precautions must be observed 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.

General definitions of safety symbols used on equipment and in manuals



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



Explanation: To avoid injury, death of personnel or damage to the instrument, the operator must refer to an explanation in the instruction manual.



Protective grounding terminal: To protect against electrical shock in case of a fault. This symbol indicates that the terminal must be connected to ground before operation of equipment.

WARNING

A **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death of personnel.

CAUTION

A **CAUTION** sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part of the product.

WARNING

Power Supply

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

Protective Grounding

Make sure to connect the protective grounding to prevent an electric shock before turning ON the power.

Necessity of Protective Grounding

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

Fuse

To prevent a fire, make sure to use the fuse with specified standard (current, voltage, type). Before replacing the fuse, turn off the power and disconnect the power source. Do not use a different fuse or short-circuit the fuse holder. See page 3-2 on Chapter 3

Do not Operate in an Explosive Atmosphere

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.

External Connection

To ground securely, connect the protective grounding before connecting to measurement or control unit.

HOW TO USE THIS MANUAL

This manual is meant to be used by qualified personnel only. Make sure to have read the safety precautions at the beginning of this manual and the warnings/cautions captured in the record chapter prior to carrying out any servicing.

This manual consists of the following chapter.

1 GENERAL INFORMATION

Describes the introduction, principle of operation, and safety considerations.

2 TESTING

Describes the method and interpretations of the acceptance, self diagnosis and performance tests.

3 REPLACING PARTS

Describes basic information concerning replaceable parts and the way to disassemble and re-assemble the VR204,VR206 View Recorders.

4 ADJUSTING

Describes the way to adjust specific items of the instrument after the tests and/or replacements.

5 TROUBLE-SHOOTING

Describes procedures for trouble-shooting.

6 SCHEMATIC DIAGRAMS

Contents the configuration diagrams.

7 CUSTOMER MAINTENANCE PARTS LISTS

Contains exploded view and a list of replaceable parts.

Specifications are not included in this manual; for specifications, refer to chapter 9 of IM 4N2A1-01E.

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Chapter 1 PRINCIPLE OF OPERATION

This chapter describes the principle of the operation for model VR204 and VR206 View Recorders. The description below corresponds to the figure 1.

1.1 Block diagram of the View Recorder

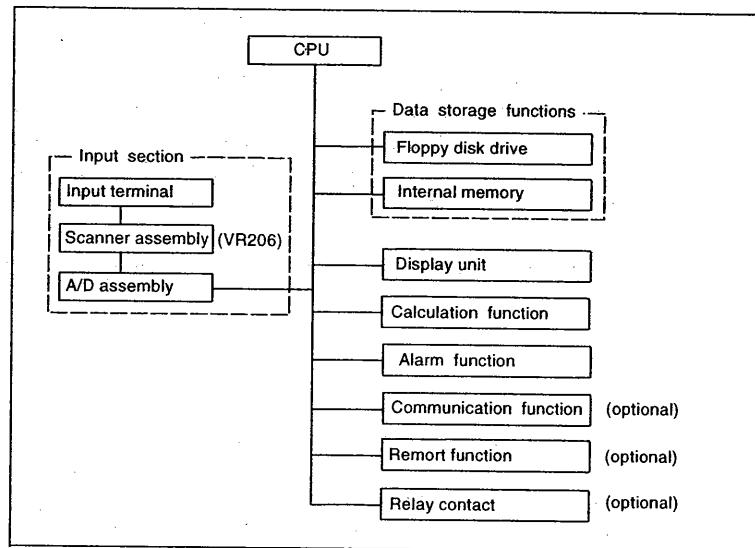


Figure 1 Block diagram

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

1.2 Input section

1.2.1 A/D assembly

The A/D converter is using the method of feedback pulse width modulation. To meet the requests of small size, small consumptive power, and low cost, almost all of the input terminal functions have been joined into the one chip analog ASIC. This ASIC is a full custom IC using BICMOS process and works as a MOS switch etc. which is necessary for excellent analog data and self calibration.

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

The A/D assembly is using self-resonant switching power supply (DC - DC convertor), which is of the sinewave oscillating type, noise filtering is achieved by signal integration.

The A/D assembly detects the frequency of the power while power on and the integrated time becomes 20 ms or 16.67 ms. So that carries a very high rate of noise rejection of the power frequency (case of 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 dot model, the selection of 100 ms for 50/60 Hz is also available. A 16 bit resolution is achieved regardless of the integrated time.

1.2.2 Input terminal

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

1.2.3 Scanner assembly (for VR206)

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

- 1) semi-infinite life because of no mechanical contacts
- 2) silent
- 3) no occurrence of thermoelectric power.

On the other hand, the SSR has, compared to a mechanical relay, the disadvantage of a bigger ON resistance and OFF capacity. As a result, this effects RTD measurement and noise resistance characteristics. Regarding RTD measurements, a differential amp was inserted into the previous mentioned analog ASIC, and a circuit was realized which receives no influence of ON resistance, without increasing the number of parts.

For RTD measurements there is generally non-insulation between channels.

1.3 Data storage functions

For storing data, this recorder has 1MB (VR204), 2MB (VR206) of internal memory and is equipped with a 3.5-inch floppy disk drive (1.2/1.44 MB 2HD). The measured data are always stored in the internal memory. Once the floppy disk is inserted, the recorder starts copying the measured data from the internal memory to the floppy disk automatically, together with the following data.

1.4 Display unit

This recorder has a 5.5-inch TFT color LCD on which it displays the measured results (240 (vertical) × 320 (horizontal) pixels).

1.5 Calculation function

This recorder calculates differential computation, linear scaling and square root by microprocessor on CPU board.

1.6 Alarm function

The following six 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), and rate-of-change on decrease(r)alarms.

1.7 Other functions

- 1 Communication function:
RS-422A interface added (optional).
- 2 Remote function:
The event trigger, writing of time-axis marks, and time adjustment functions to be controlled remotely (optional).
- 3 Relay contact:
Alarm output and memory end/fail out put(optional).

Chapter 2 TESTING

This chapter describes the following tests.

- 2.1 Acceptance test
- 2.2 Self Diagnosis test
- 2.3 Performance test

2.1 Acceptance Test

This section describes the procedure to perform the acceptance test.

- 1 Read preface 'CHECKING THE PACKAGE CONTENTS' of the Instruction Manual and verify that the VR200 is complete with accessories.
- 2 Make sure to understand the operating procedures as described in the Instruction Manual.
- 3 Check each function using the Instruction manual.
- 4 Read and implement section 2.2 'Self Diagnosis Test'.
- 5 Read and implement section 2.3 'Performance Test'.

2.2 Self Diagnosis Test

The VR200 is provided with complete self diagnosis functions to enhance reliability in measurement and serviceability.

When you turn ON the power, the VR200 will automatically execute the following types of diagnoses alternately and display the results. After these tests are completed, the VR200 is in operating condition.

- 1 Main ROM sum test
- 2 Main RAM write/read test
- 3 A/D ROM sum test
- 4 A/D RAM write/read test
- 5 Main NV-RAM write/read test
- 6 A/D converter memory test
- 7 Acquisition memory test
- 8 Back-up battery voltage check

Table 2 show the order and results of the self diagnosis tests.

Table 2 Contents of the self diagnosis tests

Error Message	Description
E001:MAIN ROM ERROR	Main ROM failure
E101:MAIN RAM ERROR	Main RAM failure
E102:A/D ROM ERROR	A/D ROM failure
E103:A/D RAM ERROR	A/D RAM failure
E104:NV ERROR1	Failure of main non-volatile memory
E105:NV ERROR2	Failure of all input A/D converter memories
E11x:A/D NV ERRx	Failure of A/D converter memory for channel x
E12x:A/D ADJ ERRx	Failure of calibration data for A/D for channel x
E130:MEMORY ERROR	Acquisition memory failure
LOW BATTERY	Low voltage of back-up battery

2.3 Performance Test

This paragraph describes several tests to verify the operation of the VR200 performance against published specifications.

- 2.3.1 Before you begin
- 2.3.2 Measurement accuracy test
- 2.3.3 Reference Junction Compensation accuracy test

The performance tests needed not be performed in any specific order.

2.3.1 Before You Begin

Testing Conditions

When carrying out the performance tests described in the following pages, make sure the instruments is tested under the following conditions:

- Ambient temperature: $23 \pm 2^\circ\text{C}$
- Humidity: $55 \pm 10\% \text{RH}$
- Power supply voltage: 90 to 132 VAC, 180 to 250VAC
- Power supply frequency: $50/60\text{Hz} \pm 1\%$

Preparation

Before carrying out the performance tests described in the next pages, proceed as follows:

- 1 Turn ON the power supply and verify that the VR200 passes the self diagnostic function without any problems.
- 2 Allow a warm up time of at least 30 minutes for required instruments and Unit Under Test.

Instruments Required for Tests:

Instrument	Required Specifications	Recoumended
DC Voltage Generator	Accuracy: $\pm 50\text{ppm}$	YOKOGAWA 2552
Decade Resistance Box	Accuracy: $\pm 10\text{ppm}$	YOKOGAWA 279301
Thermostatic chamber	$\pm 0.01^\circ\text{C}$	
Thermocouple	Calibrated	

2.3.2 Measurement Accuracy Test

Connection

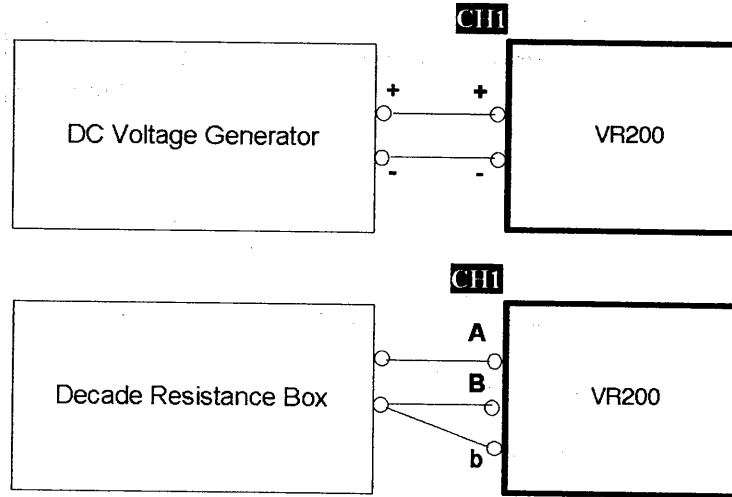


Figure 2.1 Connection diagram

Procedure

- 1 Connection the equipment as shown in Figure 2.1
- 2 Carry out the preparations as described in 2.3.1
- 3 Apply input voltage/resistance to the VR200 and verify that the measured value lies within the tolerance each range as mentioned table of tolerance.

Table of tolerance

Range	Input Voltage	Tolerance	Specification
20mV	-20mV	-19.93 to -20.07	±(0.2% of reading + 3digits)
	0mV	-0.03 to +0.03	
	+20mV	+19.93 to +20.07	
60mV	-60mV	-59.86 to -60.14	±(0.2% of reading + 2digits)
	0mV	-0.02 to +0.02	
	+60mV	+59.86 to 60.14	
200mV	-200mV	-199.4 to -200.6	±(0.2% of reading + 2digits)
	0mV	-0.2 to +0.2	
	+200mV	+199.4 to +200.6	
2V	-2V	-1.996 to -2.004	±(0.1% of reading + 2digits)
	-1V	-0.997 to -1.003	
	0V	-0.002 to +0.002	
	+1V	+0.997 to +1.003	
	+2V	+1.996 to +2.004	
6V	-6V	-5.979 to -6.021	±(0.3% of reading + 3digits)
	0V	-0.003 to +0.003	
	+6V	+5.979 to +6.021	
20V	-20V	-19.92 to -20.08	±(0.3% of reading + 2digits)
	0V	-0.02 to +0.02	
	+20V	+19.92 to +20.08	

Range	Temperature	Input Resistance	Tolerance	Specification
Pt100	-200°C	18.49 Ω	-200.6 to -199.4	±(0.15% of reading+0.3°C)
	0°C	100.00 Ω	-0.3 to +0.3	
	600°C	313.59 Ω	+598.8 to +601.2	

NOTE The error of a connected apparatus is not included in the tolerance.

2.3.3 Reference Junction Compensation accuracy Test

Connection

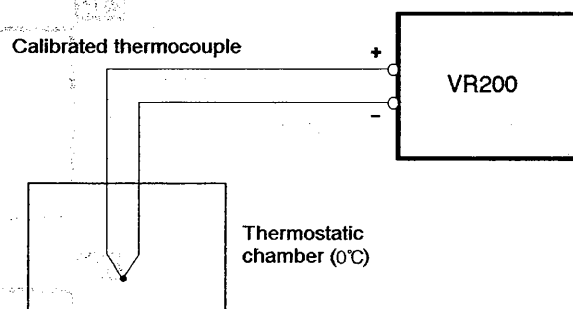


Figure 2.2 Connection diagram

Procedure

- 1 Connect the instruments as shown in Figure 2.2.
- 2 Carry out the preparations as described in 2.3.1.
- 3 Carry out stable ambience and must fix terminal cover for avoid for influence of wind.
- 4 Set the input range to the used thermocouple, and set the span to $\pm 50^{\circ}\text{C}$.
- 5 Verify that the measured value lies within the tolerance.

Tolerance

Temperature	Thermocouple	Tolerance
0°C	K,T	$\pm 0.5^{\circ}\text{C}$ *1*2

- *1 Actual temperature measured accuracy are consist of adding RJC compensation accuracy and temperature range accuracy. In other words, actual measured value lies within tolerance are consist of adding this value and 0°C measured accuracy (Tand K range).
- *2 Test should be done under stable ambience and fix terminal cover for avoid for influence of wind.

Chapter 3 REPLACING PARTS

This chapter describes how to handle in case parts need to be replaced, either because of preventive maintenance or because of failure.

- 3.1 Replaceable Parts
- 3.2 When Repair is necessary
- 3.3 Recommended Replacement Periodic Parts
- 3.4 Replacing the Fuse
- 3.5 Replacing the Battery

3.1 Replaceable Parts

When replacement of parts is necessary, we strongly recommend replacement with an assembly unit YOKOGAWA instruments have been designed in a way that the replacement of parts can be done on an assembly (module) basis by the user.

Parts supplied by YOKOGAWA are listed in the Customer Maintenance Parts List (CMPL), See chapter 7. Smaller parts than listed in the CMPL are not supplied. The CMPL comprises the following:

- number;
- YOKOGAWA part number;
- Item Quantity;
- Description.

3.2 When Repair is Necessary

When a repair is necessary, clearly state the information listed below and forward it to the nearest sales representative or service center. Addresses may found on the back cover of this manual.

- Your address.
- Name and telephone number of person in charge.
- Model code and suffix code of the instruments, which can be found on the name plate. The name plate is visible at the right inside of the recorder.
- Detailed explanation of the problem, including taken measures and displayed messages.

3.3 Recommended Replacement Periodic Parts

To maintain the reliability of this recorder and to allow this recorder to deliver outstanding performance for long time, periodic replacement of consumable parts is recommended.

The recommended replacement periods for consumable parts are shown in the following table. The periods shown in this table assume that the recorder is operating at the reference operating conditions. The periods to be applied to your recorder should be determined in consideration of the actual operating conditions.

Replacement of the LCD must be conducted by qualified YOKOGAWA staff. When required, contact your nearest Sales & Service Office; address may be found on the back of this manual.

Item	Replacement Period	Part Name	Part Number	Remarks	Quantity Used
Fuse *1	2 years	Fuse	A1360EF	250V/500mA time lag	1
Fuse *2	2 years	Fuse	A1102EF	250V/5A time lag	1
LCD unit	5 years	LCD module	B9960MS		1

*1:For standard, *2:For /P1

NOTE

The recommended replacement period for the LCD module is the period when the brightness falls to half (after approximately 20,000 hours of continuous use). The speed of the brightness varies depending on the operating conditions and the judgment is subjective.
The period recommended in this table should be used as a guideline when determining the actual replacement.

3.4 Replacing the Fuse

Replace the fuse at least once every two years for preventive maintenance. Before replacing the fuse, turn OFF the power supply and disconnect the power source. Use only the specified fuses (refer under explanation), which should be obtained from your nearest Sales & Service Office. Using any other fuses could cause fire.

Follow the procedure below to replace the fuse.

- 1 Turn OFF the power.
- 2 Disconnect the power source.
- 3 Remove the screw above the power switch and swing open the front panel.
- 4 The fuse carrier is visible in the right lower side of the internal hardware. Turn the knob of the fuse carrier counterclockwise, and the carrier will slide out together with the fuse.
- 5 Make sure that the new fuse rating is correct and mount the new fuse by turning the knob clockwise.
- 6 Close the front panel and fix it with the screw.

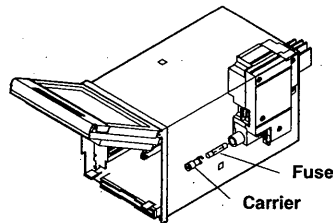


Figure 3.1 Fuse illustration

NOTE

Specified fuses

For standard:

YOKOGAWA part No. A1360EF

manufacturer: SHURTER

designation: F8003405223

For /P1:

YOKOGAWA part No. A1102EF

manufacturer: BEL FUSE INC

designation: 3SB5

3.5 Replacing the Battay

The message 'LOW BATTERY' displayed at the bottom on the screen warns that the lithium backup battery needs to be replaced.

This battery will last for ten years under normal operating conditions. For replacement, please contact your nearest Sales & Service Office; addresses may be found on the back cover of this manual.

To avoid injury, do not replace the lithium battery yourself nor disassemble this recorder to attempt the replacement.

Chapter 4 ADJUSTING

This chapter describes how to adjust a VR200 View Recorder. Adjustment is required when the performance test has resulted in excessive error in the tolerance or after replacing the CPU board, A/D board, or LCD module. This chapter consists of the following sections:

- 4.1 Clearing the Memory and Setting the Setup Data
- 4.2 Adjusting the A/D Board
- 4.3 Horizontally Aligning the LCD Screen

4.1 Clearing the Memory and Setting the Specification Data

After replacing the CPU board and main ROM, the data in the memory must be cleared and the specification data must be set.

4.1.1 Clearing the Memory

Procedure

Initialize the setup mode data for the main RAM and information file.

- 1 With the [←] and [↵] keys pressed, turn on the power to enter the SETUP mode.
- 2 Select to SETUP=**INIT**
- 3 Select to INIT=**YES**
- 4 The display *INIT SET* then appears. Press the [ESC] key to display SETUP=**INI** again. Clear the main NV-RAM memory.
- 5 Select to SETUP=**TEST**
- 6 Select to TEST=**NVINIT** The main NV RAM is cleared and the VR200 automatically restarts.

NOTE

The following settings are not initialized even if TEST=**NVINIT** is executed:

- Temperature unit (TEMP)
- A/D adjustment (ADADJ)
- Specification setting (SYSTEM)

4.1.2 Entering the Setup Data

Procedure

- 1 With the [←] and [.] keys pressed, turn on the power to enter the SETUP mode.
- 2 Select to SETUP=SYSTEM
- 3 Enter the password '4720' for No. =.
- 4 Select to AD_CARD=ON or OFF for the presence of the A/D card. (The default value is ON.)
- 5 Select to COMM_CARD=ON or OFF for the presence of the RS-422 option. (The default value is OFF.)
- 6 Select to CUI0=ON or OFF for the presence of the Cui0 option. (The default value is OFF.)
- 7 Select to DEG_F=ON or OFF for the presence of the temperature unit F. (The default value is OFF.)
- 8 Select to LANG=ON or OFF for the presence of the language support option. (The default value is OFF.)
- 9 Select to DST=ON or OFF for the presence of the daylight savings time option. (The default value is OFF.)
- 10 Select LONG_MEN=ON or OFF for the presence of the extension memory option. (The default value is OFF.)
- 11 *SYSTEM SET* appears.
- 12 Enter the additional system setup data, referring to Chapter 6 in the Instruction manual, IM 4N2A1-01E.
- 13 Press the [ESC] key to display SETUP=SYSTEM again.
- 14 Select to RETUP=END
- 15 Select to END&INIT.DATA=STORE
- 16 Press [MENU] key for 3 seconds to enter the SET mode.
- 17 Enter the basic system setup data referring to Chapter 4 in the Instruction manual, publication number IM 4N2A1-01E.
- 18 Turn off the power.

4.2 Adjusting the A/D Board

Adjustment of the A/D board is required when the performance test has resulted in excessive error in the tolerance or after replacing the A/D board.

4.2.1 Before You Begin

Conditions for Adjustment

When carrying out the adjustment described in the following pages, make sure the instruments is tested under the following conditions:

Ambient temperature : $23^{\circ}\pm 5^{\circ}\text{C}$
 Humidity: $55\pm 10\% \text{ RH}$
 Power supply voltage: 90 to 132 V AC, 180 to 250 V AC
 Power supply frequency: $50/60 \text{ Hz}\pm 1\%$

Preparation

Before carrying out the adjustment described in the following pages, proceed as follows:

- 1 Turn ON the power supply and verify that the VR200 passes the self diagnostic function without any problems.
- 2 Allow a warm up time of at least 30 minutes for required instruments and the adjustment recorder.

Instruments Required for adjustments:

Instrument	Requisite Specification	Recommended
DC voltage generator	Accuracy: $\pm 50 \text{ ppm}$	YOKOGAWA 2552
Decade resistance box	Accuracy: $\pm 10 \text{ ppm}$	YOKOGAWA 279301

4.2.2 Connection

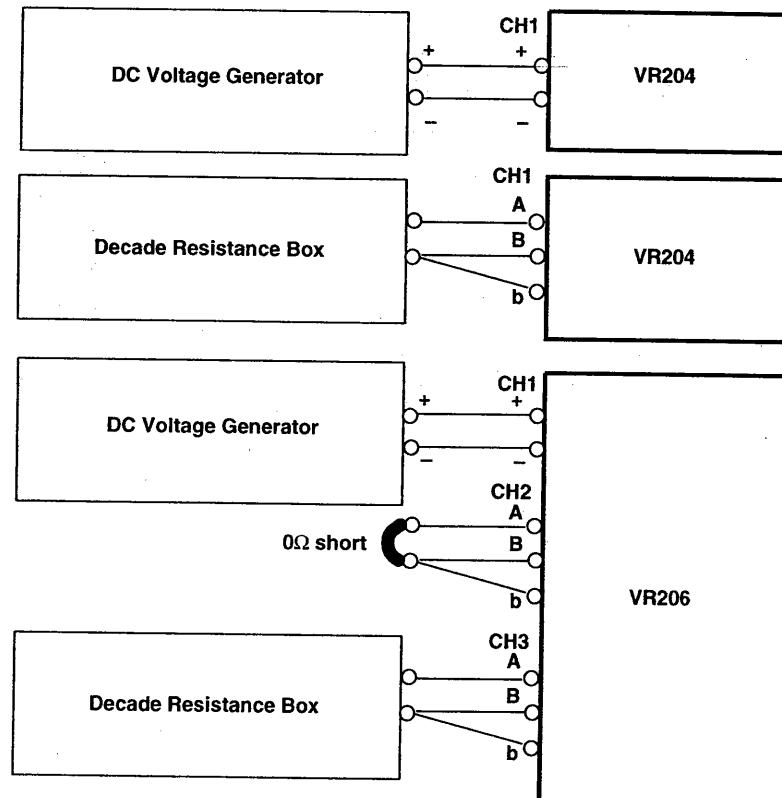


Figure 4.1 Connection Diagram (For every channel)

4.2.3 Procedure

NOTE

After completing the performance test, if the resulting error has exceeded the tolerance, adjust only the involved range.

- 1 With the [←] and [↵] keys pressed, turn on the power to enter the SETUP mode.
- 2 Select to SETUP=**ADADJ**.
- 3 Enter '2893' for No.=.
- 4 Select to ADADJ=**AVE**.
- 5 Select to ADJCH=**1** (only for VR204).

Adjustment for DC Voltage Range

DC voltage ranges must be adjusted following the table below:

Adjustment Range	Application	Zero-adjustment Command	Span-adjustment Command
20 mV	20mV DC TC types R, S, B, T, U	AVE= 20mVZ	AVE= 20mVS
60 mV	60 mV DC TC types K, E, J, N, W, L	AVE= 60mVZ	AVE= 60mVS
200 mV	200mV DC DI (type CONT)	AVE= 200mVZ	AVE= 200mVS
2 V	2 V DC	AVE= 2VZ	AVE= 2VS
6 V	6 V DC DI (type LEVEL)	AVE= 6VZ	AVE= 6VS
20V	20 V DC	AVE= 20VZ	AVE= 20VS

- 6 Select the zero adjustment command for the range to adjust.
- 7 Set the DC voltage generator output to 0 mV (or short it). As the measurement value becomes stable, press the [↵] key *AVESET* appears.
- 8 Select the span adjustment command for the range to adjust.
- 9 Make the output voltage of the DC voltage generator the range span value. As the measured value becomes stable, press the [↵] key. *AVESET* appears.
- 10 If there are other remaining target ranges to adjust, repeat the above procedure for each of them.

Adjusting the RTD Range

Adjust the following ranges:

Adjustment Range	Application	Zero-adjustment Command	Span-adjustment Command
30 W	RTD input	AVE= 30 Ω Z	AVE= 30 Ω S
90 W	RTD input	AVE= 90 Ω Z	AVE= 90 Ω S
300 W	RTD input	AVE= 300 Ω Z	AVE= 300 Ω S
3 kW	RTD input	AVE= 3k Ω Z	AVE= 3k Ω S
100 W*	Cul0 input	AVE= 100 Ω Z	AVE= 100 Ω S
1 kW*	Cul0 input	AVE= 1k Ω Z	AVE= 1k Ω S

* Execute when the N1 option (Cul0 input) is installed.

- 11 Select the zero-adjustment command for the range to adjust.
- 12 Short the terminal of the decade resistance box. As the measured value becomes stable, press the [↵] key. *AVESET* appears.
- 13 Select the span-adjustment command for the range to adjust.
- 14 Set the resistance of the decade resistance box to the span value for the range. As the measured value becomes stable, press the [↵] key. *AVESET* appears.
- 15 If there are other remaining target ranges to adjust, repeat the above procedure for each of them.

End of the adjustment

- 16 Press the [ESC] key to display SETUP=ADADJ again.
- 17 Select to ADADJ=END. *ADADJSET* then appears.
- 18 Press the [ESC] key to display SETUP=END again.
- 19 Select to END&INIT.DATA=STORE.

4.3 Horizontally Aligning the LCD Screen

After replacing the LCD module, the LCD screen may be aligned horizontally.

Procedure

- 1 With the [←] and [→] keys pressed, turn on the power to enter the SET UP mode.
- 2 Select to SETUP=LCDADJ.
- 3 Select to POSITION=0 to 7 by UP/DOWN keys, so that the displayed area is enclosed by red, green, and blue lines in the outermost frame.

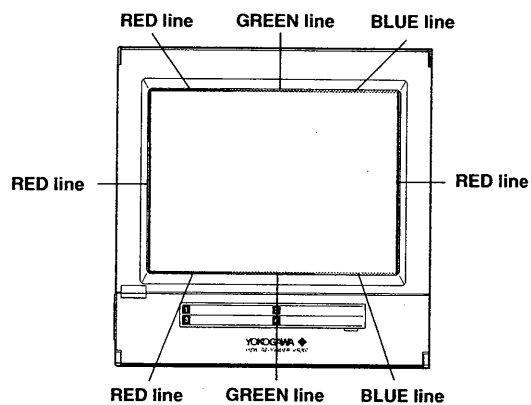


Figure 4.2 View of the LCD screen

Chapter 5 TROUBLE-SHOOTING

This chapter explains the causes of problems and how to determine faulty assemblies as a result of self diagnosis and trouble-shooting flow.

5.1 Procedure

- 1 Recognizing the trouble.
First of all, make sure what kind of trouble it is.
- 2 Check if it is a handling mistake or not.
Check the connections and the settings of equipment to determine if it is a handling mistake.
- 3 Execute self diagnosis.
Execute self diagnosis function by turning the power ON and find the problem items.
- 4 Analyze the cause of the problem according to the trouble-shooting flow chart.

WARNING

Do not touch the circuit and voltage live parts because the power unit contains the high-voltage electrical circuit.

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.

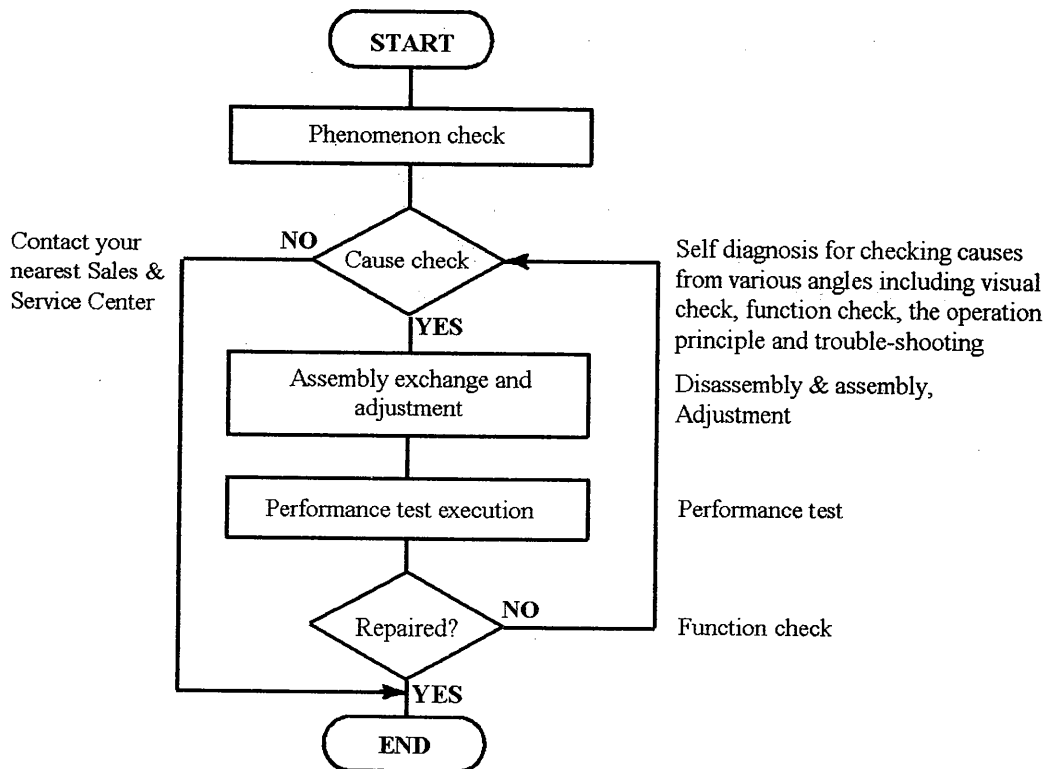
CAUTION

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

5 TROUBLE-SHOOTING

5.2 Flow Chart

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



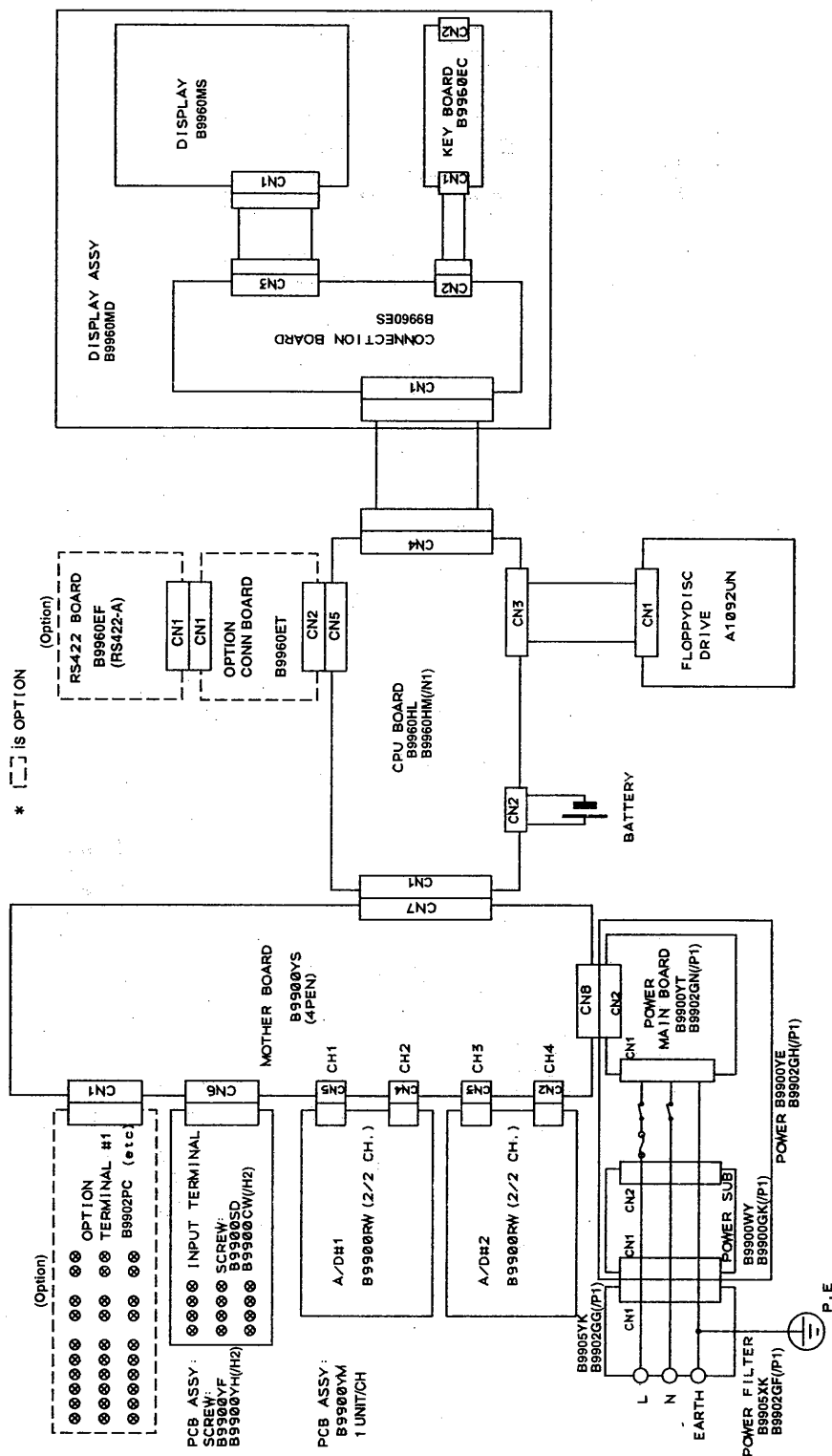
5.3 Trouble-Shooting List

Trouble	Operational			Check Item
	Check	Adjust	Exchange	
Power is not turned ON	• •			<ul style="list-style-type: none"> Power cable connection Fuse is blown Power ass'y CPU ass'y
FAIL state				<ul style="list-style-type: none"> CPU ass'y Optional Terminal ass'y
Memory cannot be backed up	• •			<ul style="list-style-type: none"> Battery connector is disconnected? Battery voltage is low (less than +3.0V) CPU ass'y
Panel key operation is not normal	• •			<ul style="list-style-type: none"> FFC ass'y of the key board is disconnected/broken Key board connector of Conne board ass'y Key board ass'y CPU ass'y
LCD is not normal	• •			<ul style="list-style-type: none"> Check connector of Conne board ass'y FFC ass'y of the LCD is disconnected/broken CPU ass'y LCD ass'y
Measured value incorrect	• •		•	<ul style="list-style-type: none"> Input wiring is disconnected Noise A/D ass'y Scanner ass'y (only for VR206)
Measured temperature is incorrect	• • • •		•	<ul style="list-style-type: none"> Input is disconnected Noise Terminal cover is removed RJC INT/EX T setting A/D board ass'y Input terminal Scanner board ass'y (only for VR206)
Measured value fluctuates	• •			<ul style="list-style-type: none"> power frequency setting is incorrect Noise
Floppy disk is not normal	•		•	Floppy disk drive unit

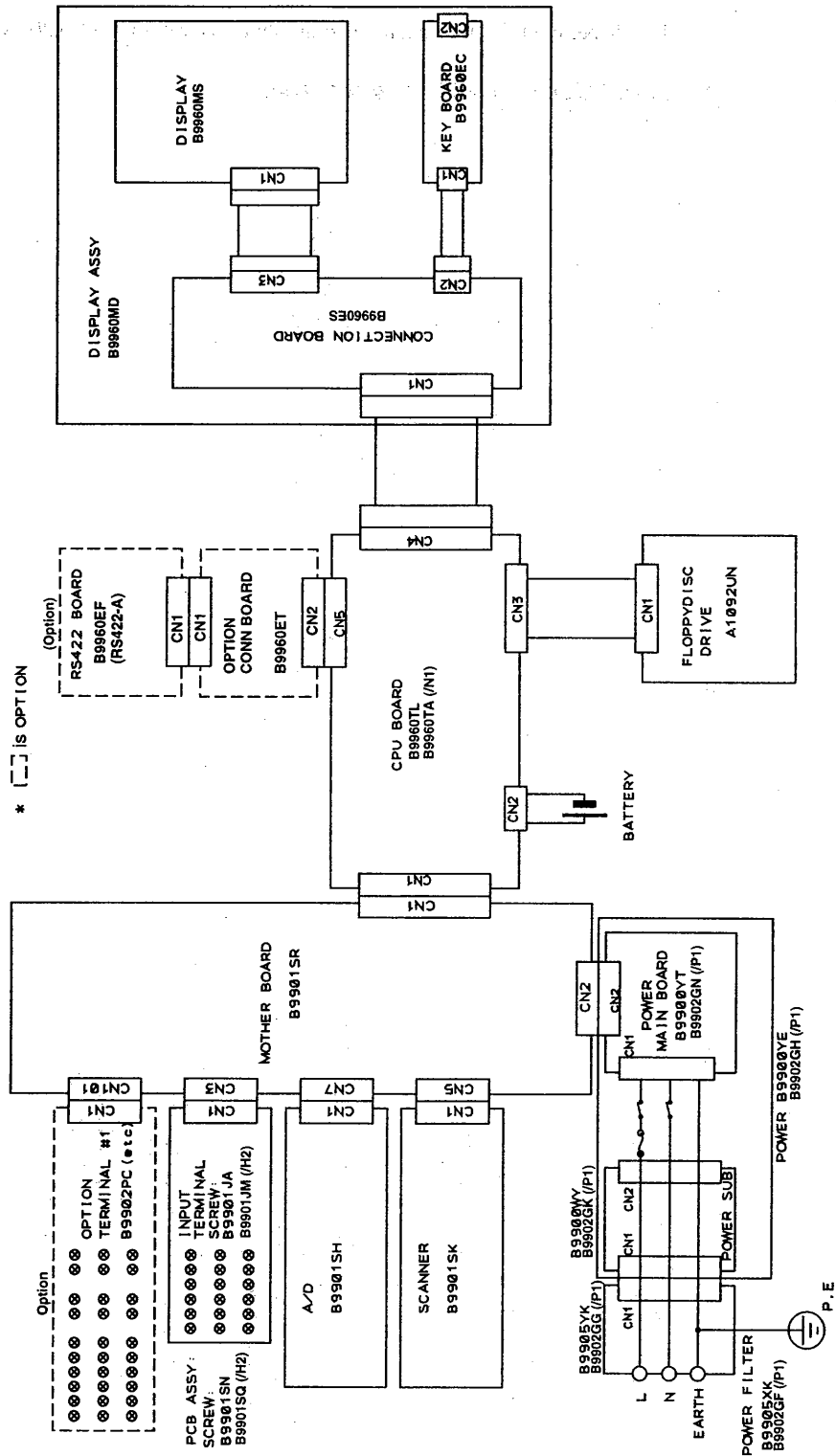
Chapter 6 SCHEMATIC DIAGRAMS

This chapter contains the schematic diagram of overall of the VR200 view recorders.

6.1 Schematic diagram of the Model VR204 View recorder.

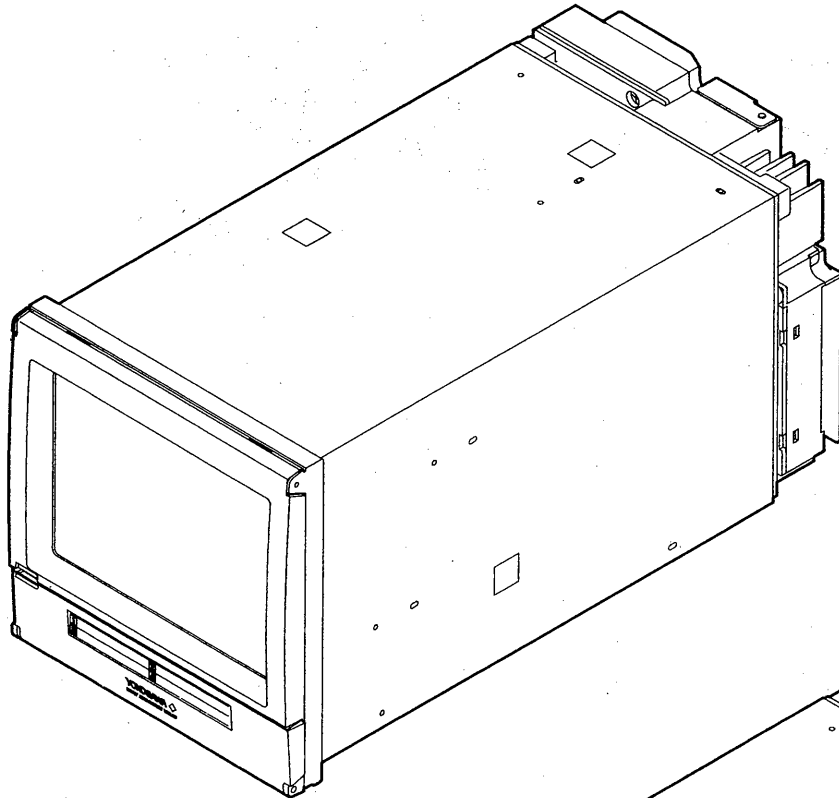


6.2 Schematic diagram of the Model VR206 View recorder.

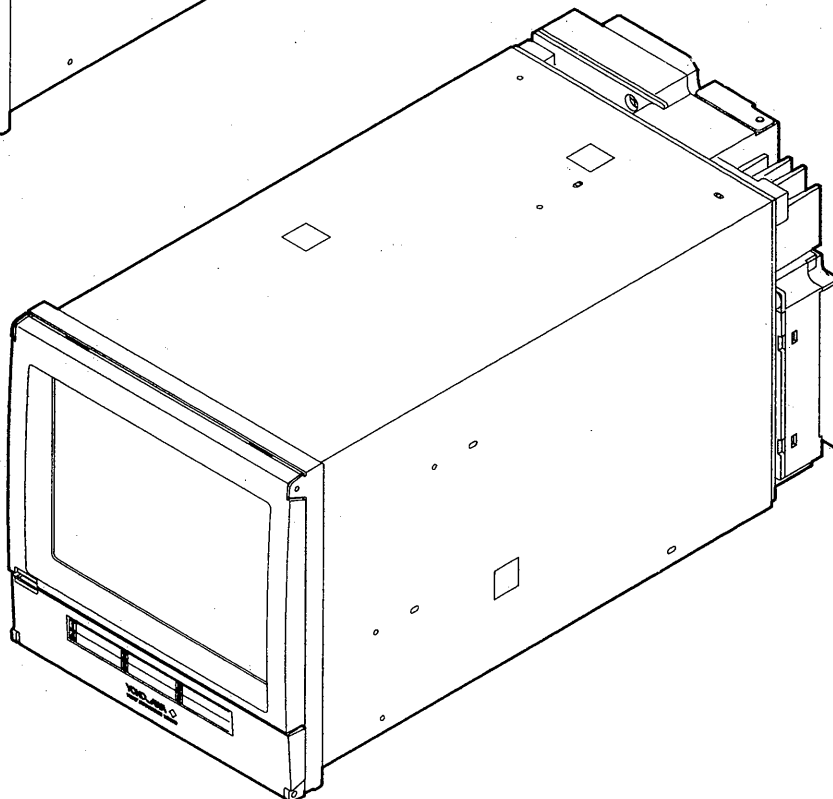


Chapter 7 CUSTOMER MAINTENANCE PARTS LISTS

7.1 Overview of the model



Model VR204

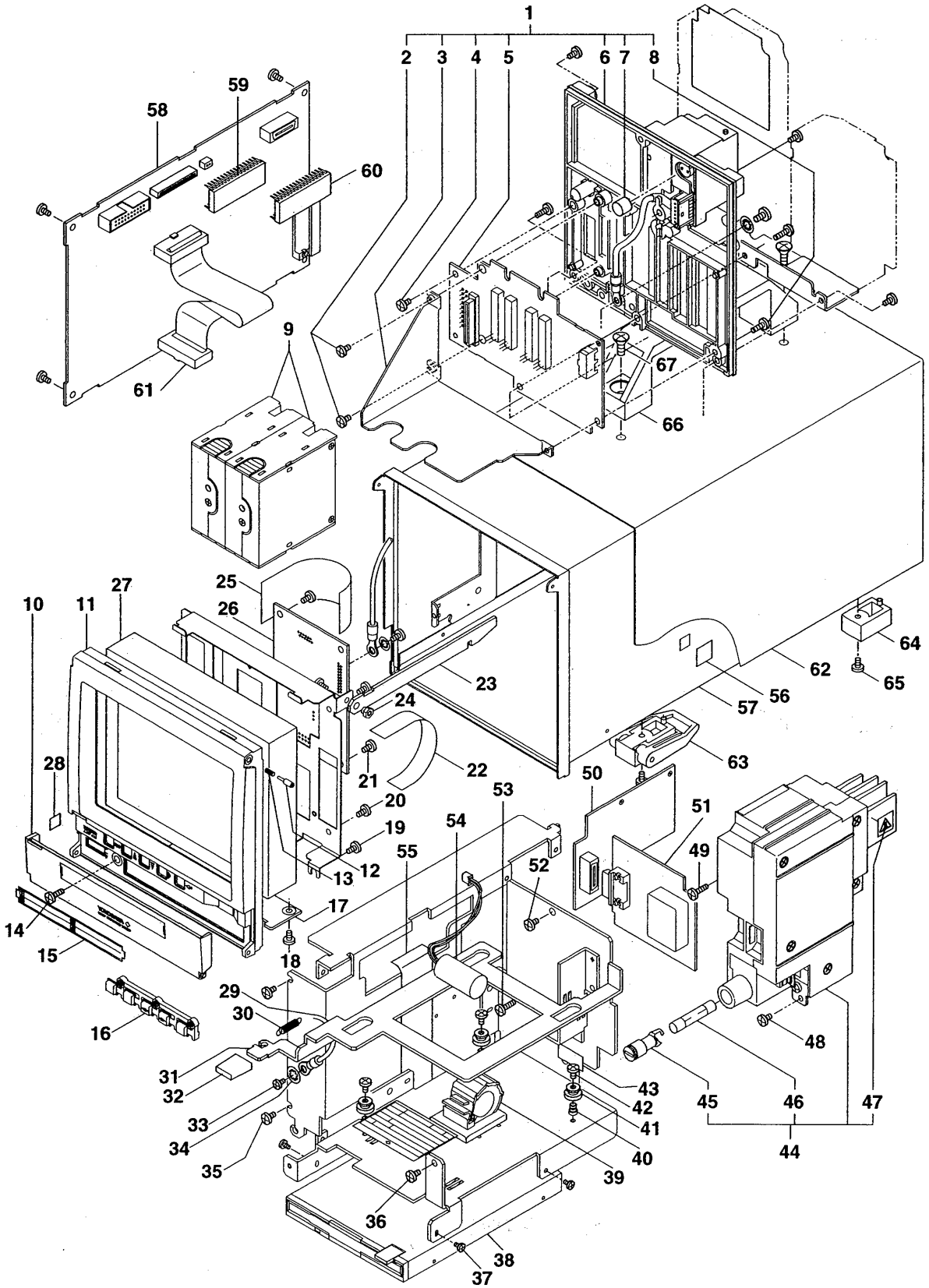


Model VR206

СМ 4Н2А1-01Е

7.2 Internal Assembly

VR 204 Assembly



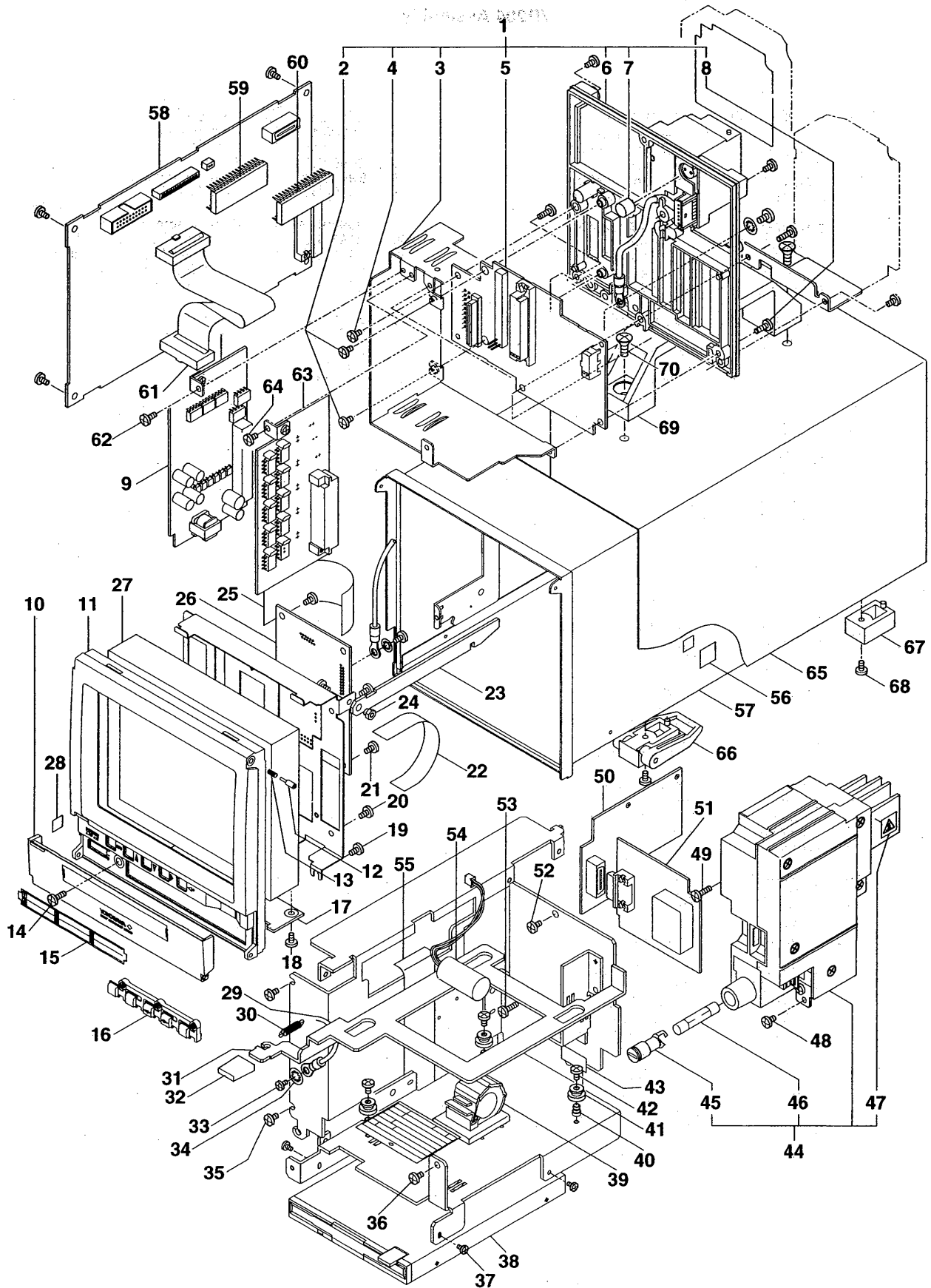
Internal Assembly Parts List

VR204 Assembly

Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
1	-	1	Panel Assembly	54	B9905WD	1	Battery Assembly
2	Y9308LB	2	B.H.Screw,M3x8	55	B9960EM	1	FDD FFC
3	B9900EF	1	Bracket	56	B9900CR	5	Sheet
4	Y9304LB	1	B.H.Screw,M3x4	57	B9960MA	1	Case Assembly
5	B9960ER	1	Mother Board Assembly	58	B9960HL	1	CPU Assembly (not/N1) } (select)
6	B9900EC	1	Panel Assembly		B9960HM	1	CPU Assembly (/N1)
7	A1435EF	1	Fuse	59	B9960KL	1	Main ROM Assembly
	A1450EF	1	Fuse (/P1) } (select)	60	B9960JB	1	ROM Assembly (not/N1) } (select)
8	Y9306LS	1	B.H.Screw,M3x6		B9960JC	1	ROM Assembly (/N1)
9	B9900RW	2	A/D Assembly } (select)	61	B9960EP	1	Cable Assembly
	B9902TC	2	A/D Assembly (/N1)	62	B9960LL	1	Case Assembly (/H5)
10	B9960MJ	1	Door	63	B9961BR	2	Front Foot (/H5)
11	B9960MG	1	Front Bezel	64	B9961BS	2	Rear Foot (/H5)
12	B9960BT	1	Shaft	65	Y9306LS	4	B.H.Screw,M3x6 (/H5)
13	B9567AQ	1	Spring	66	B9961BQ	1	Handle (/H5)
14	Y9312LE	1	B.H.Screw,M3x12	67	Y9412ES	2	B.H.Screw,M4x12 (/H5)
15	B9960AD	1	Tag Plate				
16	B9960ML	1	Key Top				
17	B9960EC	1	Key Board Assembly				
18	Y9304LB	2	B.H.Screw,M3x4				
19	B9900TX	2	Screw				
20	Y9304LB	2	B.H.Screw,M3x4				
21	Y9304LB	3	B.H.Screw,M3x4				
22	B9960EL	1	Key FFC				
23	B9960MQ	1	Plate				
24	B9960MR	1	Stud				
25	B9960EK	1	LCD FFC				
26	B9960ES	1	Conn Board Assembly				
27	B9960MS	1	LCD				
28	B9900HY	1	Name Plate				
29	B9960EQ	1	Earth Wire Assembly				
30	B9900FH	1	Spring				
31	B9960MW	1	SW Lever				
32	B9960CE	1	Knob				
33	Y9304LB	1	B.H.Screw,M3x4				
34	Y9301WL	1	Washer Tooth				
35	Y9304LB	2	B.H.Screw,M3x4				
36	Y9304LB	1	B.H.Screw,M3x4				
37	Y9204LS	3	B.H.Screw,M2.3x4				
38	A1092UN	1	Memory System				
39	B9905RW	1	Clamp				
40	B9960MX	3	Stud				
41	B9905CF	3	Roller				
42	Y9308LS	3	B.H.Screw,M3x8				
43	B9900AJ	1	Name Plate				
44	B9900YE	1	Power Assembly (not/P1) } (select)				
	B9902GH	1	Power Assembly (/P1)				
45	A1051EF	1	Fuse Carrier				
46	A1360EF	1	Fuse (Accessory) } (select)				
	A1102EF	1	Fuse (/P1)(Accessory)				
47	A9678ZJ	1	Name Plate				
48	Y9304LB	1	B.H.Screw,M3x4				
49	Y9310LB	1	B.H.Screw,M3x10				
50	B9960ET	1	Option Conn Board Assembly (/C3)				
51	B9960EF	1	RS-422 Board Assembly (/C3)				
52	Y9304LB	1	B.H.Screw,M3x4				
53	Y9310LB	2	B.H.Screw,M3x10				

7
CUSTOMER MAINTENANCE PARTS LIST

VR206 Assembly



Internal Assembly Parts List

VR206 Assembly

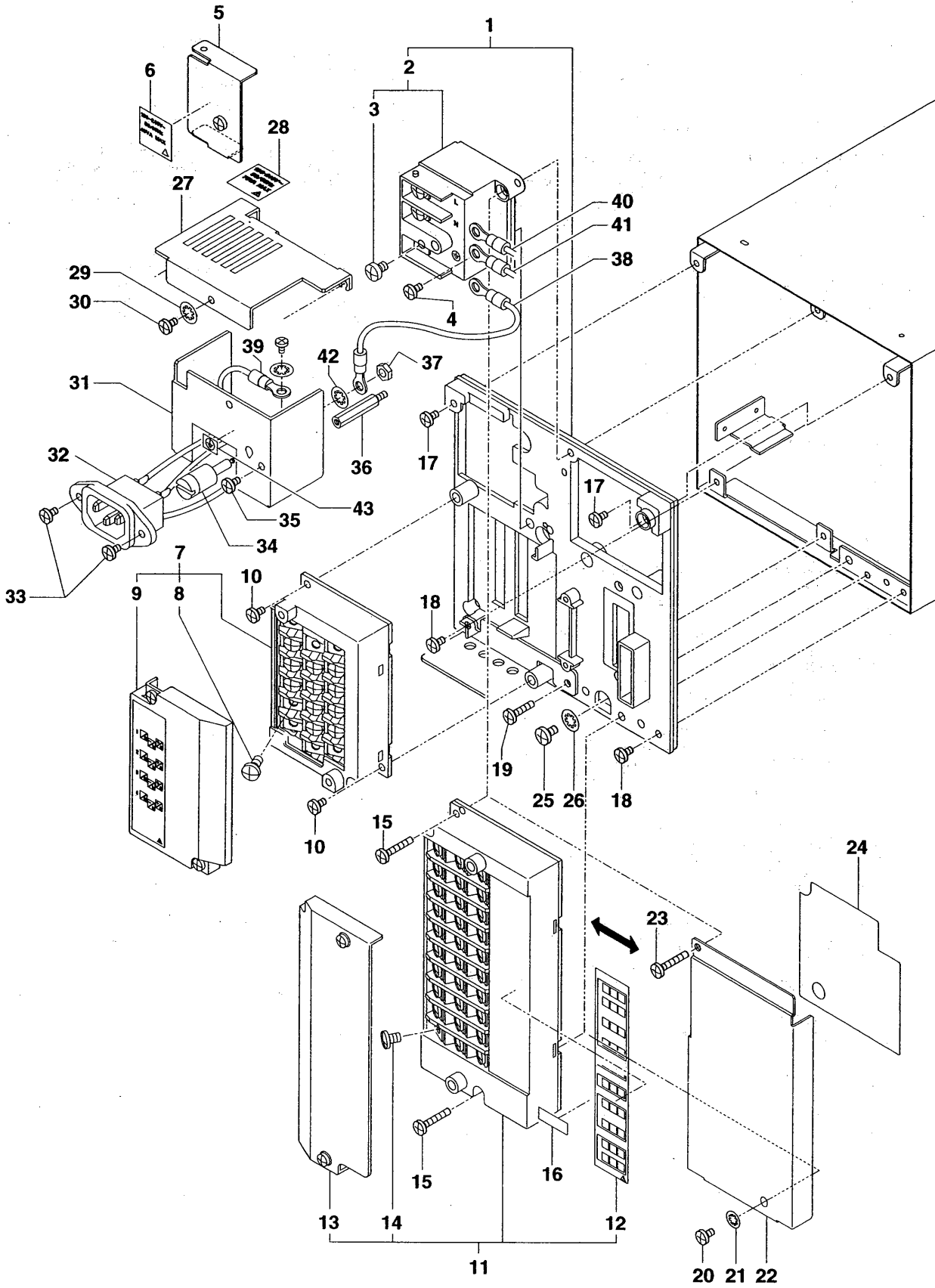
Item	Part No.	Qty	Description	Item	Part No.	Qty	Description
1	-	1	Panel Assembly	54	B9905WD	1	Battery Assembly
2	Y9308LB	2	B.H.Screw,M3x8	55	B9960EM	1	FDD FFC
3	B9900EC	1	Bracket	56	B9900CR	5	Sheet
4	Y9304LB	1	B.H.Screw,M3x4	57	B9960MA	1	Case Assembly
5	B9960PH	1	Mother Board Assembly	58	B9960TL	1	CPU Assembly (not/N1) } (select)
6	B9900EC	1	Panel Assembly		B9960TM	1	CPU Assembly (/N1) }
7	A1435EF	1	Fuse	59	B9960UA	1	Main ROM Assembly
	A1450EF	1	Fuse (/P1) } (select)	60	B9960SB	1	ROM Assembly (not/N1) }
8	Y9306LS	1	B.H.Screw,M3x6		B9960SC	1	ROM Assembly (/N1) } (select)
9	B9901SH	1	A/D Board Assembly (not/N1) } (select)	61	B9960EP	1	Cable Assembly
	B9902SA	1	A/D Board Assembly (/N1) }	62	Y9304LB	1	B.H.Screw,M3x4
10	B9960MJ	1	Door	63	B9901SK	1	Scanner Board Assembly
11	B9960MG	1	Front Bezel	64	Y9304LB	1	B.H.Screw,M3x4
12	B9960BT	1	Shaft	65	B9960LL	1	Case Assembly (/H5)
13	B9567AQ	1	Spring	66	B9961BR	2	Front Foot (/H5)
14	Y9312LE	1	B.H.Screw,M3x12	67	B9961BS	2	Rear Foot (/H5)
15	B9960NA	1	Tag Plate	68	Y9306LS	4	B.H.Screw,M3x6 (/H5)
16	B9960ML	1	Key Top	69	B9961BQ	1	Handle (/H5)
17	B9960EC	1	Key Board Assembly	70	Y9412ES	2	F.H.Screw,M4x12 (/H5)
18	Y9304LB	2	B.H.Screw,M3x4				
19	B9900TX	2	Screw				
20	Y9304LB	2	B.H.Screw,M3x4				
21	Y9304LB	3	B.H.Screw,M3x4				
22	B9960EL	1	Key FFC				
23	B9960MQ	1	Plate				
24	B9960MR	1	Stud				
25	B9960EK	1	LCD FFC				
26	B9960ES	1	Conn Board Assembly				
27	B9960MS	1	LCD				
28	B9900HY	1	Name Plate				
29	B9960EQ	1	Earth Wire Assembly				
30	B9900FH	1	Spring				
31	B9960MW	1	SW Lever				
32	B9960CE	1	Knob				
33	Y9304LB	1	B.H.Screw,M3x4				
34	Y9301WL	1	Washer Tooth				
35	Y9304LB	2	B.H.Screw,M3x4				
36	Y9304LB	1	B.H.Screw,M3x4				
37	Y9204LS	3	B.H.Screw,M2.3x4				
38	A1092UN	1	Memory System				
39	B9905RW	1	Clamp				
40	B9960MX	3	Stud				
41	B9905CF	3	Roller				
42	Y9308LS	3	B.H.Screw,M3x8				
43	B9900AJ	1	Name Plate				
44	B9900YE	1	Power Assembly (not/P1) } (select)				
	B9902GH	1	Power Assembly (/P1) }				
45	A1051EF	1	Fuse Carrier				
46	A1360EF	1	Fuse (Accessory) } (select)				
	A1102EF	1	Fuse (/P1)(Accessory) }				
47	A9678ZJ	1	Name Plate				
48	Y9304LB	1	B.H.Screw,M3x4				
49	Y9310LB	1	B.H.Screw,M3x10				
50	B9960ET	1	Option Conn Board Assembly (/C3)				
51	B9960EF	1	RS-422 Board Assembly (/C3)				
52	Y9304LB	1	B.H.Screw,M3x4				
53	Y9310LB	2	B.H.Screw,M3x10				

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7 CUSTOMER MAINTENANCE PARTS LISTS

7.3 Terminal Assembly

Terminal Assembly



Terminal Assembly Parts list

Item	Part No.	Qty	Description
1	-	1	Panel Assembly
2	B9905XK	1	Terminal Assembly
	B9902GF	1	Terminal Assembly (/P1) } (select)
3	E9655FX	3	B.H.Screw,M4x6(±)
4	Y9306LS	1	B.H.Screw,M3x6
5	B9900EQ	1	Cover Assembly
6	B9900ES	1	Name Plate
	B9902FD	1	Name Plate (/P1) } (select)
7	B9900SD	1	Input Terminal Assembly (VR204)
	B9901JA	1	Input Terminal Assembly (VR206) } (select) } (select)
	B9901JM	1	Input Terminal Assembly (/H2)(VR206) } (select)
8	E9655FX	12	B.H.Screw,M4x6(±)
9	B9900SE	1	Cover Assembly (VR204) } (select) } (select)
	B9901JC	1	Cover Assembly (VR206) } (select)
	B9901JP	1	Cover Assembly (VR206-/H2) } (select)
10	Y9306LS	2	B.H.Screw,M3x6
11	B9902PC	1	OPT Terminal Assembly *1
	B9902PD	1	OPT Terminal Assembly *2
	B9902PE	1	OPT Terminal Assembly *3
	B9902PF	1	OPT Terminal Assembly *4
	B9960DJ	1	OPT Terminal Assembly *5
	B9960DK	1	OPT Terminal Assembly *6
	B9960DL	1	OPT Terminal Assembly *7
	B9902PK	1	OPT Terminal Assembly *8
	B9902PL	1	OPT Terminal Assembly *9
	B9902PM	1	OPT Terminal Assembly *10
	B9902PN	1	OPT Terminal Assembly *11
	B9960DM	1	OPT Terminal Assembly *12
	B9960DN	1	OPT Terminal Assembly *13
	B9960DP	1	OPT Terminal Assembly *14
12	B9902DC	1	Name Plate *1
	B9902DD	1	Name Plate *2
	B9902DE	1	Name Plate *3
	B9902DF	1	Name Plate *4
	B9902DG	1	Name Plate *5
	B9902DH	1	Name Plate *6
	B9902DJ	1	Name Plate *7
	B9902DK	1	Name Plate *8
	B9902DL	1	Name Plate *9
	B9902DM	1	Name Plate *10
	B9902DN	1	Name Plate *11
	B9902DP	1	Name Plate *12
	B9902DQ	1	Name Plate *13
	B9902DR	1	Name Plate *14
13	B9902BA	1	Cover Assembly
14	E9655FX	30	B.H.Screw,M4x6(±)
15	Y9322JB	2	Pan H.Screw,M3x22
16	B9960CR	1	Name Plate *5,*6,*7,*12,*13,*14
17	Y9304LB	2	B.H.Screw,M3x4
18	Y9308LB	1	B.H.Screw,M3x16
19	Y9316LS	1	B.H.Screw,M3x16
20	Y9308LB	1	B.H.Screw,M3x8(select)
21	Y9301WL	1	Toothed Lockwasher (select)
22	B9900BQ	1	Bracket (select)
23	Y9322JB	1	Pan H.Screw,M3x22 (select)
24	B9910CQ	1	Plate
25	Y9405LB	1	B.H.Screw,M4x5
26	Y9401WL	1	Toothed Lockwasher
27	B9902LG	1	Bracket (/H5)
28	B9900ES	1	Name Plate (/H5)
29	Y9301WL	1	Toothed Lockwasher (/H5)
30	Y9304LB	1	B.H.Screw,M3x4 (/H5)
31	B9902LH	1	Bracket (/H5)
32	A1017JS	1	Socket & Holder (/H5)
33	Y9306LS	2	B.H.Screw,M3x6 (/H5)

Item	Part No.	Qty	Description
34	A9174ZH	1	Terminal Assembly (/H5)
35	Y9304LB	1	B.H.Screw,M3x4 (/H5)
36	B9902LM	1	Rod (/H5)
37	Y9401CB	1	Nut (/H5)
38	B9902LL	1	Wire Assembly (green)(/H5)
39	B9902LN	1	Wire Assembly (green)(/H5)
40	B9902LK	1	Wire Assembly (black)(/H5)
41	B9902LJ	1	Wire Assembly (white)(/H5)
42	Y9401WL	1	Toothed Lockwasher (/H5)
43	B9529AU	1	Name Plate (/H5)

Note

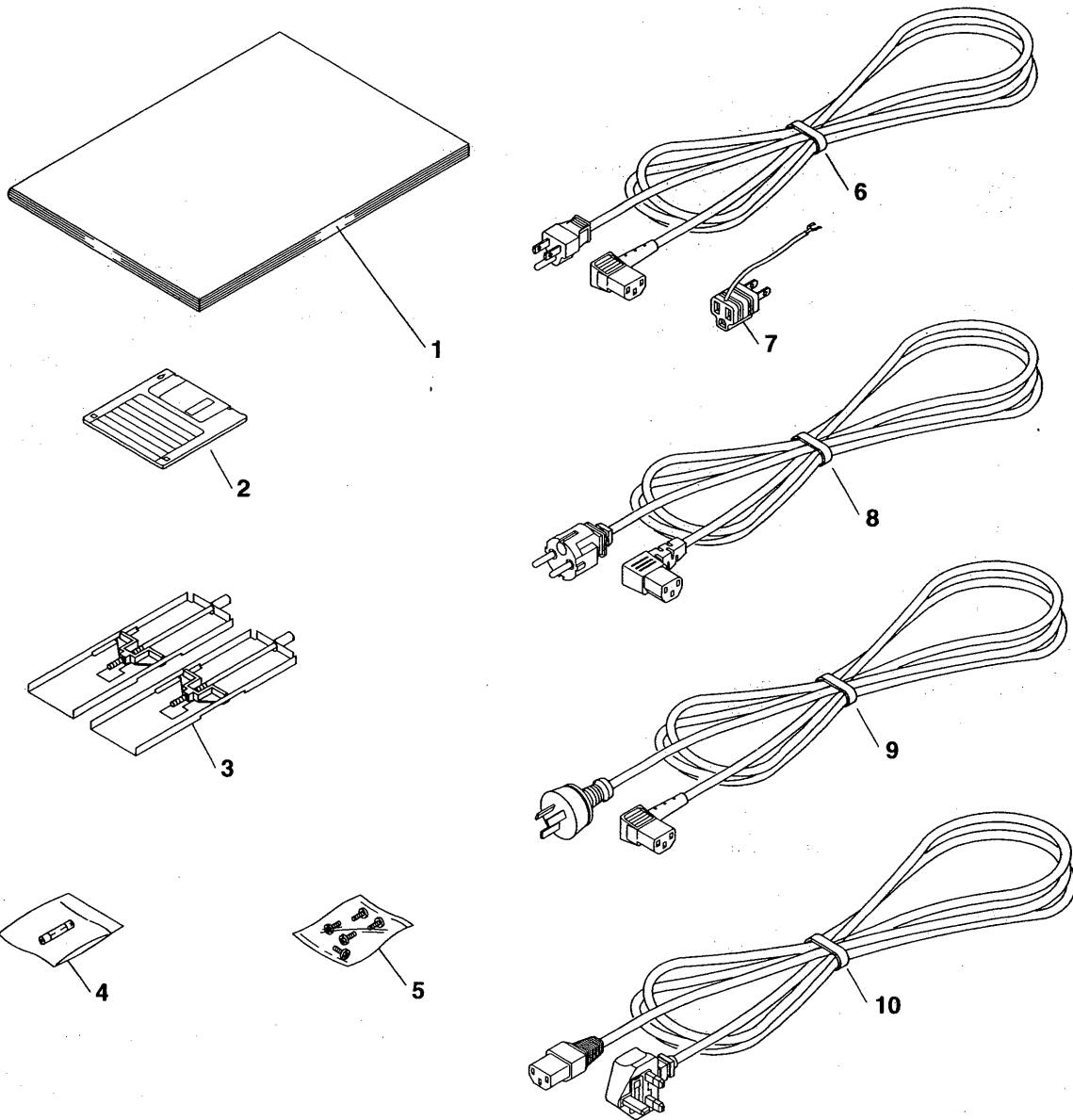
Model Code	Suffix Code(options)					
VR104□-□-□□	/A1			/C3	/H2	*1
	/A2			/C3		*2
	/A3			/C3		*3
				/C3		*4
		/F1		/C3		*5
	/A1	/F1		/C3		*6
	/A2	/F1		/C3		*7
	/A1		/R1	/C3		*8
	/A2		/R1	/C3		*9
	/A3		/R1	/C3		*10
			/R1	/C3		*11
		/F1	/R1	/C3		*12
	/A1	/F1	/R1	/C3		*13
	/A2	/F1	/R1	/C3		*14
						*15

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7 CUSTOMER MAINTENANCE PARTS LISTS

7.4 Standard Accessories

Standard Accessories



Item	Part NO.	Qty	Description
1	-	1	Instruction Manual
2	-	1	Software Package (Japanese) (-1)
	-	1	Software Package (English) (-2)
3	B9900CW	2	Bracket Assembly
4	A1360EF	1	Fuse(32mm T0.5A) (not/P1)
	A1102EF	1	Fuse(3SB5) (/P1)
5	E9655FX	5	B.H.Screw,M4×6 (±)
6	A1006WD	1	Power Supply Code(UL,CSA standard) *1,*2
7	A1253JZ	1	3P-2P Adapter *1
8	A1009WD	1	Power Supply Code(VDE standard) *3
9	A1024WD	1	Power Supply Code(SAA standard) *5
10	A1023WD	1	Power Supply Code(BS standard) *4

Note:

- *1 VR20□-/H5M
- *2 VR20□-/H5D
- *3 VR20□-/H5F
- *4 VR20□-/H5J
- *5 VR20□-/H5R