

KODEN

KODEN
SERVICE MANUAL

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DRILLING MONITOR

DM-602/604

**Instruction Manual
for Repairing of DM-602/604**

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Chapter 1 General descriptions

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Chapter1 General descriptions

1.1 General information

DM-602 and 604 are the revised versions of DM-682 and 684 respectively, and have the equivalent detecting performances and the following features:

1) Stable and correct measurement by automatic sensitivity adjusting function

Automatic sensitivity adjusting function is employed, and thus, appropriate setting of sensitivity is always obtainable, and stable correct results of measurement are provided.

Comparing the receiving conditions of sonic wave at each transmission/reception, the sensitivity will be corrected to an appropriate value without the operation of a sensitivity volume control necessary for the conventional models that needed fine adjustment of sensitivity control, and thus, clear and correct measurement is provided all the time.

2) Extensive information marks to facilitate confirmation

Besides scale marks, extensive information marks including date, time, No. of hole, diameter of a hole, distance scale interval and depth of bottom will be automatically recorded to facilitate quick and easy judgment of good or bad drilling conditions.

For the repair of DM-602 and 604, it would be essential, in the view of characteristics of this equipment, to have mechanical knowledge and experience on gears, chains, belts and bearings as well as knowledge and experience on electrical circuits.

Please do not disassemble and re-assemble this equipment without careful consideration to prevent malfunctioning of it.

General descriptions

1.2 Main performance

1.2.1 Recorder unit

Model name		DM-602 (For 2 directional measurement) DM-604 (For 4 directional measurement)			
Measuring method		By ultrasonic pulse transmission and reception			
Recording method	DM-602	Linear recording by using the belt		Measurement by 2-directional switching	
	DM-604			Simultaneous 4directional (X-X', Y-Y') measurement	
Recording paper		Electro-sensitive type, (DMP-250 A3-560)			
Transmitting frequency		88kHz			
Transmitting output		5W			
Beam angle		25° (Measured at half-power point)			
Pulse Repetition Rate (PRR)		15.000 times/min maximum at 0.5m range			
Measuring range (Radius)	Range	0.5 m	1 m	2 m	4 m
	Shift 0%	0 - 0.5 m	0 - 1 m	0 - 2 m	0 - 4 m
	Shift 50%	0.25 - 0.75 m	0.5 - 1.5 m	1 - 3 m	2 - 6 m
	Shift 100%	0.5 - 1 m	1 - 2 m	2 - 4 m	4 - 8 m
Paper speed	Constant	7.5 mm/min	15 mm/min	30 mm/min	60 mm/min
	Depth-proportional	1/40	25mm/1m (unit excursion length of the sensor unit)		
		1/50	20mm/1m		
		1/100	10mm/1m		
		1/200	5mm/1m		
Measurement accuracy		+/- 2%, F.S.			
Depth mark		Marks printed every 1m, numerals every 5m automatically			
Power protection circuit		Non-fuse breaker (2A, 8A), Leakage breaker (20A), Over-voltage protection circuit			
Power supply		AC100V 50/60Hz	AC110V 50/60Hz	AC220V 50/60Hz	AC440V 50/60Hz
Power consumption (Nominal)		Approx 500 VA	Approx 700VA	Approx 700VA	Approx 700 VA
Operating temperature		-10°C - +50°C			

1.2.2 Winch unit

Transgress speed	0 - 20m/min, continuously variable
Maximum transgress depth	100m
Bottom and casing arrival I detection	By a limit switch
Operating temperature	-10°C to +50°C

1.2.3 Common items

Operating temperature:	-10 °C to +50 °C
Storage temperature (High end):	+70 °C
Humidity:	93 ±3 % at +40 °C

1.2.4 Serial data

Signal level	RS-232C
Synchro system	Asynchronous
Communication speed	9600 bps
Character format	
Data bit	8 bits
Stop bit	1 bit
Parity bit	None

1.2.5 Details of output sentence**Hole data format****DM, XXXXX, XXX, XXX<CR><LF> Total 18 characters**

(1) Header: 2 characters (DM)

(2) Hole data:

Hole Number:	5 digits (0-9, A-E, other symbols, space)
Hole wall diameter X:	3 digits (0-9, space), Unit in cm
Hole wall diameter Y:	3 digits (0-9, space), Unit in cm
Limiter:	2 characters (CR, LF)

Measurement data format**DT, XXXXX, XXXX, XXXX, XXXX, XXXX <CR><LF> Total 30 characters**

(1) Header: 2 characters (DT)

(2) Depth: 5 digits (0-9, space), Unit in cm

Measurement data (Recording method, 4 channel to be output irrelevant to the selected measuring mode)

X side wall face distance:	4 digits (0-9, space), Unit in mm
X' side wall face distance:	4 digits (0-9, space), Unit in mm
Y side wall face distance:	4 digits (0-9, space), Unit in mm
Y' side wall face distance:	4 digits (0-9, space), Unit in mm
Limiter:	2 characters (CR, LF)

1.2.6 Output connector

Connector type: D sub 25-pin

Output signal:

Pin No.	Name of signal (JIS)	Pin No.	Name of signal (JIS)
2	SD	7	SG
3	RD	20	ER
6	DR		

General descriptions

1.3 Equipment configuration and interconnection diagram

1.3.1 Standard configuration

No	Item name	Type name	Remarks	Weight/Length	Q'ty
1	Recorder unit	DMR-602(DM-602) DMR-604(DM-604)	Contained in an aluminum case. ● With DMT-000/001/002 built-in ● With DMT-003 built in	57kg 59 kg	1
2	Transformer unit (Built into Recorder Unit)	DMT-000	For AC100V supply, contained in an aluminum case		1
		DMT-001	For AC110V supply, contained in an aluminum case		
		DMT-002	For AC220V supply, contained in an aluminum case		
		DMT-003	For AC440V supply, contained in an aluminum case		
3	Winch unit	DMW-001A(DM-602) DMW-002A(DM-604)	With a sensor unit and a sensor cable	121kg	1
4	Connecting cable	CW-558	A 15 pin connector on both ends	10m	1
5	AC Power cable	CW-71	A 3 pin connector on one end and fly leads on the other end	10m	1
6	Spare parts		Contained in an aluminum case		1 set
7	Operation manual		Common use for DM-602 and 604		1
8	Operating card	For DM-602	Contained in an aluminum case		1
		For DM-604	Contained in an aluminum case		

1.3.2 Spare parts list

No	Item name	Type name	Remarks	Q'ty
1	Recording paper	DMP-250	250mm×20m (A3-560)	2
2	Recording stylus	DMS-001	Contained in a PVC bag	2
3	Current feed stylus	DMS-002	Contained in a PVC bag	2

1.3.3 Optional items list

No.	Name of item	Rating/Type form	Remarks	Q'ty
1	RS-232C output port	CW-384	Output connector: D-sub 25-pin	1

1.3.4 External dimensions and weight

1.3.4.1 Recorder unit

Dimensions: 740 mm (Width) x 465 mm (Depth) x 465mm (Height)

Weight: 57 kg (For 100/110/220 VAC)

59 kg (For 440 VAC)

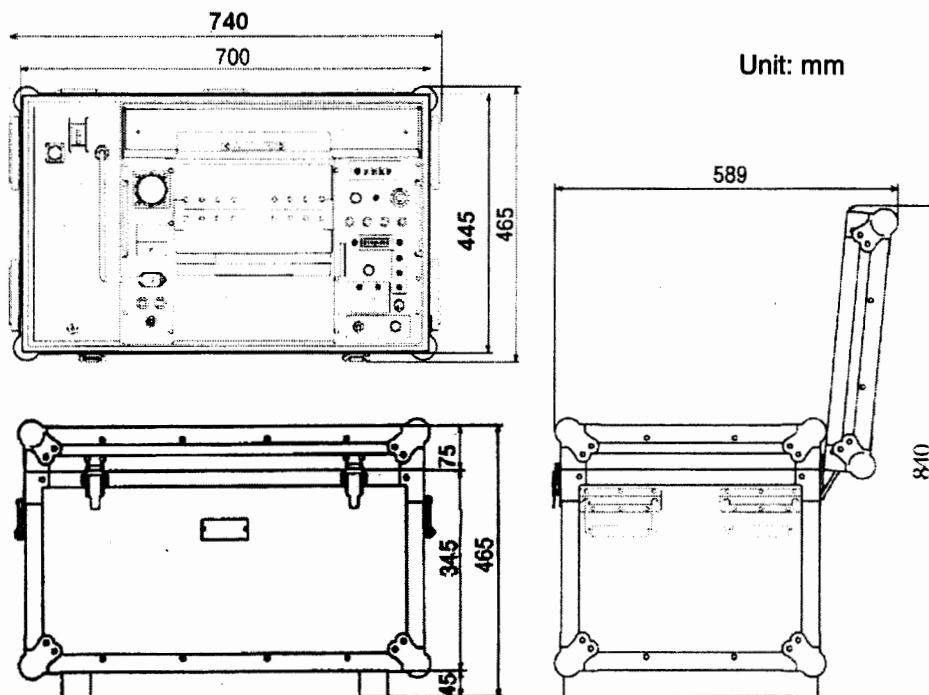


Figure 1.1 Outline drawings of Recorder unit

1.3.4.2 Winch unit

Dimensions: 1050 mm (Width) x 660 mm (Depth) x 750 mm (Height)

Weight: 121 kg

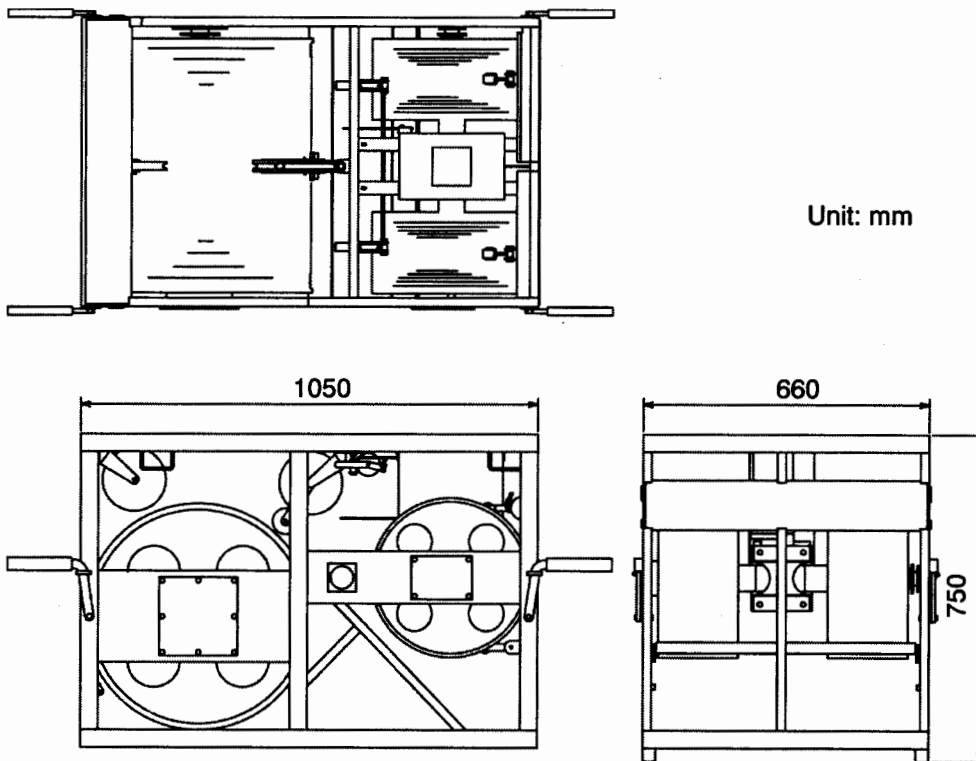


Figure 1.2 Outline drawings of Winch unit

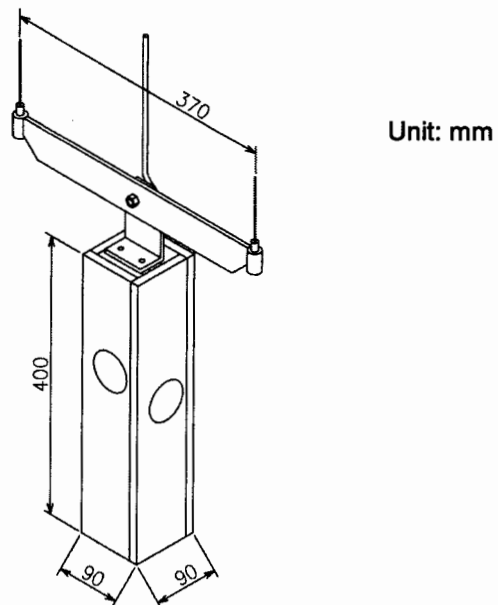


Figure 1.3 Outline drawings of Sensor unit

1.3.5 Interconnection diagram

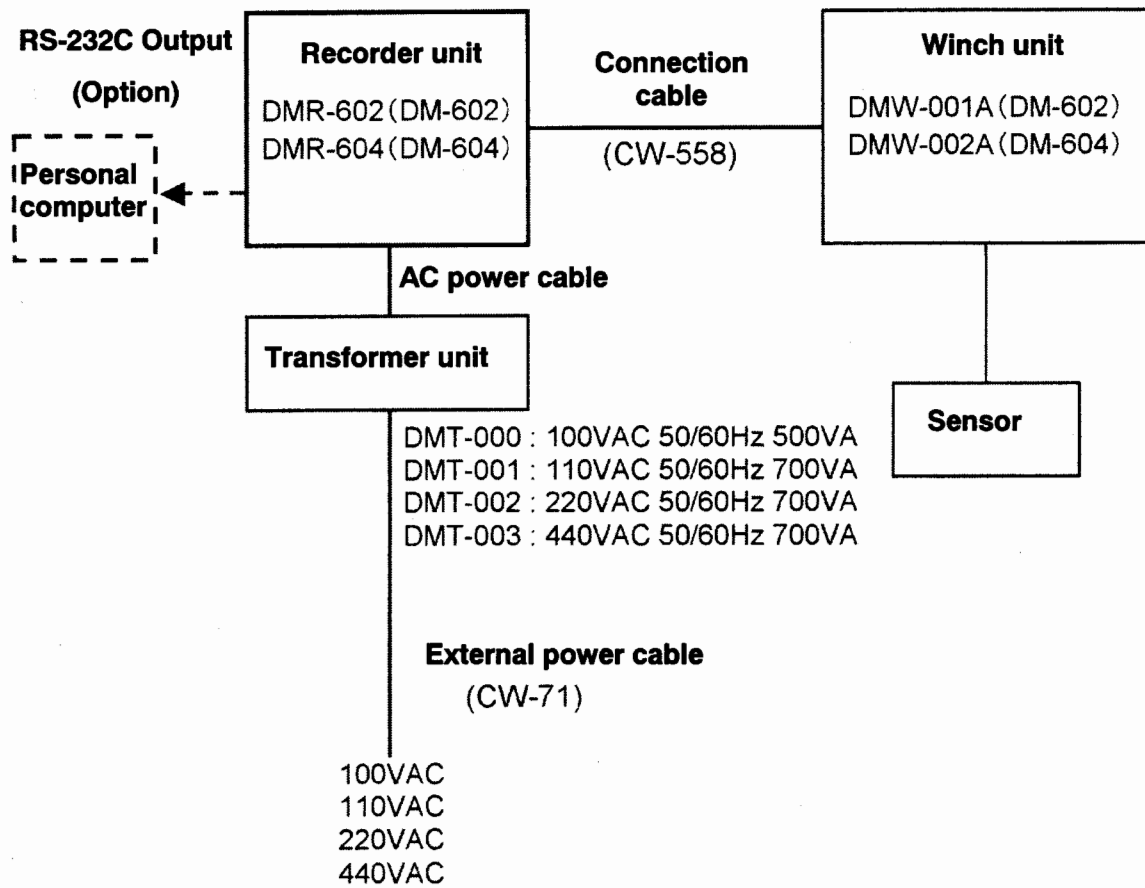


Figure 1.4 Interconnection diagram of DM-602/604

Note: The cable between a personnel computer and the recorder unit (dotted part) is required to be prepared by the user. The cable shall be a cross cable (or reverse cable).

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Chapter 2 Explanation of Operation

2.1 Operation of winch unit

2.1.1 Outline of operation

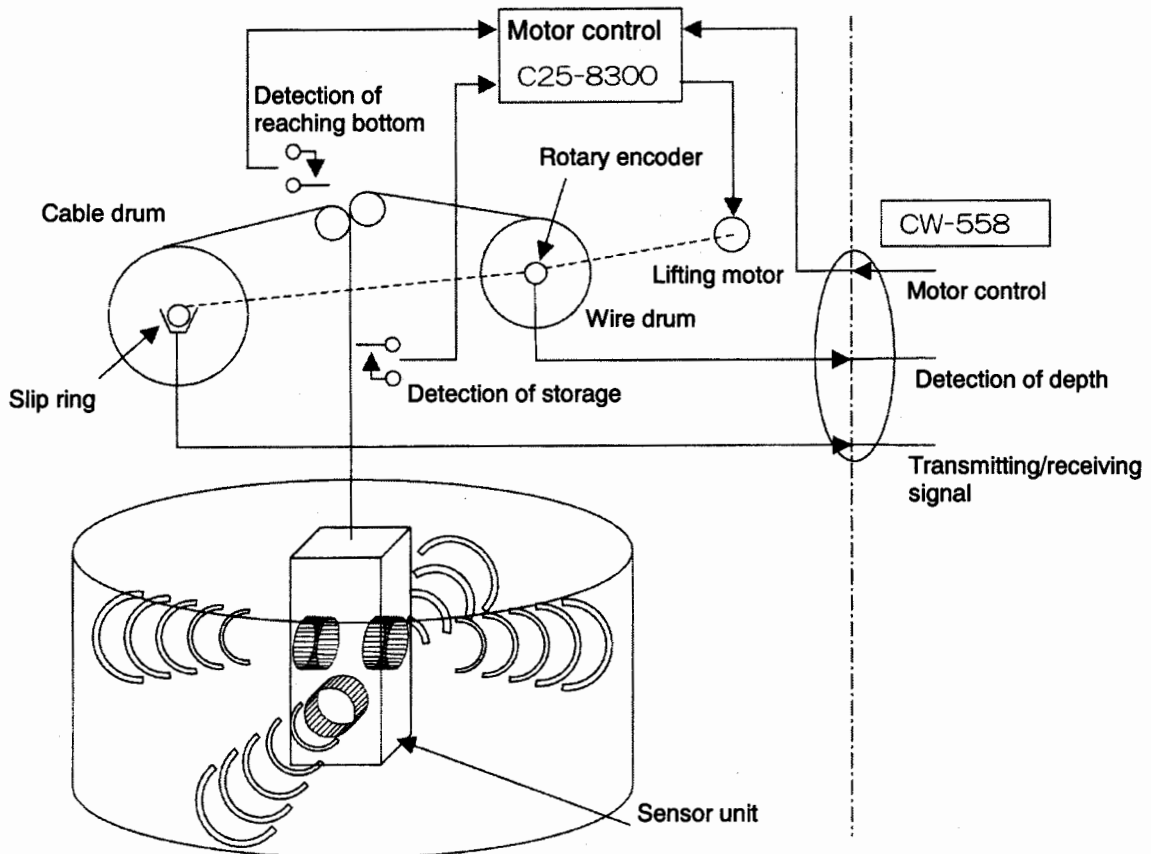
The winch switches between lifting and stop and controls the lifting speed at the recorder side.

The sensor unit is provided with 4 sensor elements. The signal from the sensor elements is transmitted to the transmitting and receiving circuit in the recorder through a 14-core cable (CW-558) via a slip ring.

The wire drum wound with the wire is driven by a lifting motor, and the cable drum is driven with a chain at the same time.

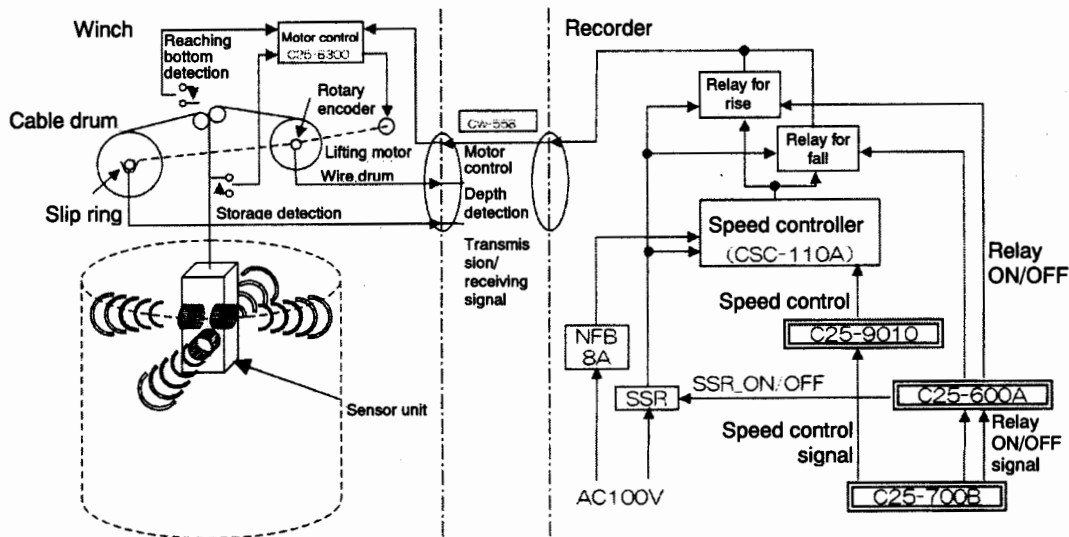
As the number of rotations of the wire drum is in proportion to the depth, the output of a rotary encoder mounted on the wire drum is used for depth detection.

The lifting motor is to automatically stop with limit switches when the sensor unit reaches at the bottom and when stored. The ON and OFF control of lifting motor with the limit switches is performed through the motor control printed circuit board (C25-8300).



Explanation of operation

The speed, switchover of up and down, and stop without signal from the limit switches of the lifting motor are controlled in the recorder as shown in the following drawing.



The circuit for over voltage protection (C25-600A) will operate at input voltage higher than 115 V - 120 V. In addition, at the input side of the recorder body's power supply, a NFB (Non-Fuse Breaker) is provided to shut off when an over current of 8 A and more passes.

When the NFB (2 A) for the recorder operates, the winch would not operate even if the NFB (8 A) at the winch side is in normal condition.

This is because that the SSR (Solid State Relay) remains to be OFF due to the inoperability of the over voltage protection circuit (C25-600A) in the recorder.

2.2 Operation of recorder unit

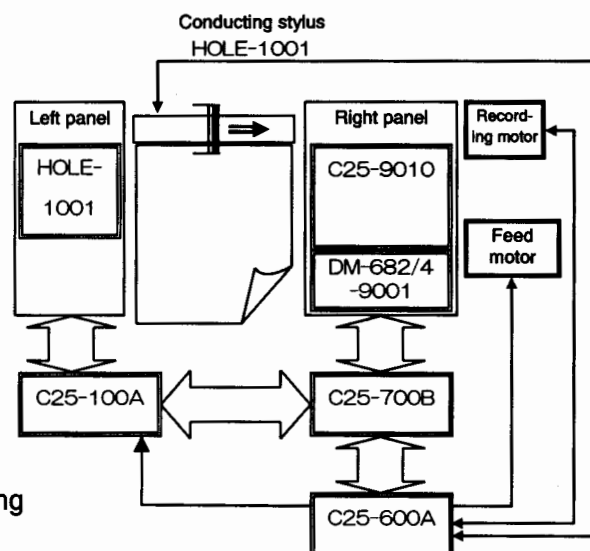
2.2.1 Outline of operation

The configuration of recording functions circuit of the recorder is shown in the right drawing.

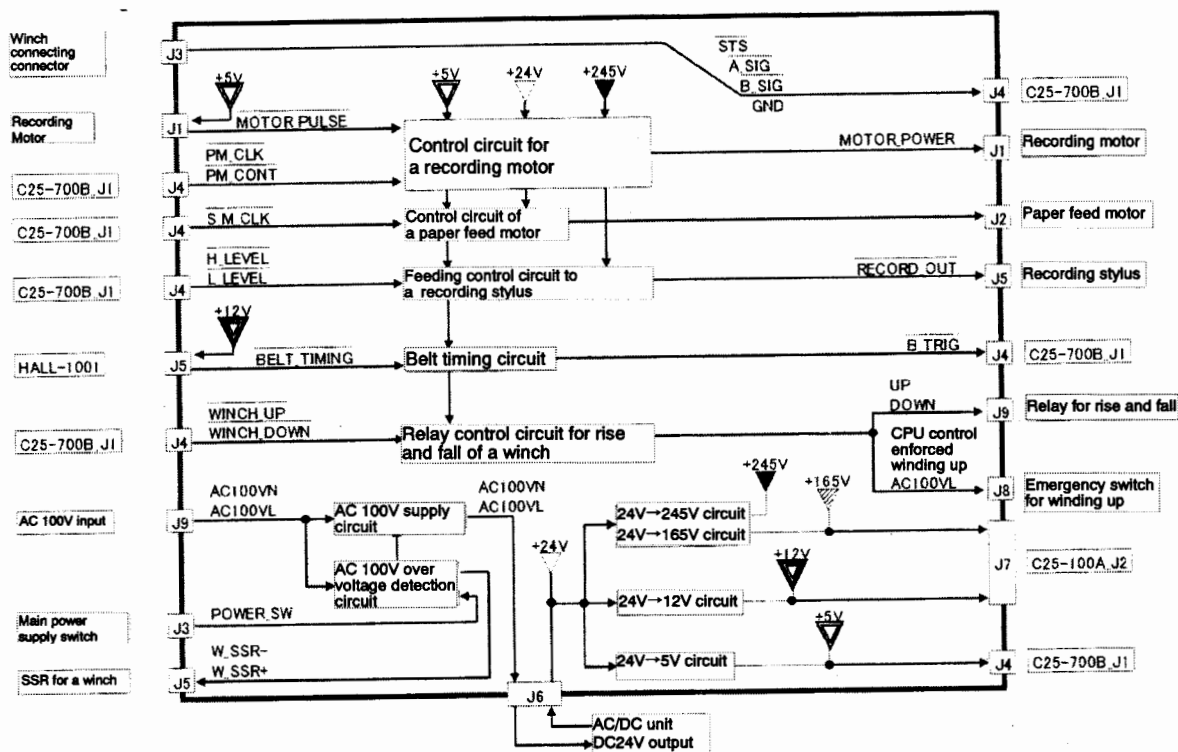
The recording functions of the recorder consist of the following 5 printed circuit boards:

- Printed circuit board for transmission and receiving (C25-100A)
- Printed circuit board for control (C25-700B)
- Printed circuit board for power supplies
- Printed circuit board for operational panel (C25-9010)
- Belt timing (HOLE-1001)

as well as AC/DC power supplies unit and recoding mechanism.



2.2.2 Printed circuit board for power supplies (C25-600A)



2.2.2.1 Circuit for depth detection and detection of reaching bottom

The outputs $\overline{A_SIG}$ and $\overline{B_SIG}$ of rotary encoder for depth detection of the winch and the signal of reaching bottom \overline{STS} are counted and acknowledged with the printed circuit board for control (C25-700B), but they pass through this printed circuit board owing to wiring conditions.

2.2.2.2 Control circuit for recording motor

This circuit is the circuit to keep the number of revolution of the recording motor at a constant speed (2,500 rpm) and capable of maintaining the rotation speed of recording belt with recording stylus at constant.

The configuration of circuit is a PLL (Phase locked loop) circuit to synchronize $\overline{PM_CLK}$ with the output of the rotary encoder ($\overline{MOTOR_PULSE}$) and is able to keep the same accuracy of rotation of the belt motor as that of reference frequency signal.

Normally, the recording motor is fed with around +16 V, but at the start, it is boosted for about 190 ms to raise quickly the number of rotation to 2,500 rpm.

The power supply voltage to the circuit is +24 V.

When the switch for stopping and starting of recording and data printing is at the OFF position, the recording stylus is controlled to rest at the backside of the conducting plate.

With this circuit, possible damages of the recording stylus at the exchange of recording paper may be prevented.

Explanation of operation**2.2.2.3 Control circuit of paper feed motor**

With this circuit, the 4-phase stepping motor for paper feed will be driven.

The paper feed can be performed through switching over between "NORMAL" and "TEST" with a switch "S1" on the printed circuit board.

The position of S1 is normally at the "NORMAL" position and the feeding speed can be selected with a paper feed switch on the operation panel. (Control of speed is performed on C25-700B.)

When the switch is turned to "TEST" position, the motor can be operated by a oscillation circuit (on C25-600A) for testing, and the operation of the circuit can be confirmed even without signal from C25-700B. (Selection of speed is not available).

When it is at depth proportion, the paper feed motor could not follow the lifting speed in the case that the lifting speed of the winch is faster than the speed of the recordable paper feed.

In that case, an indicator on the operation panel flickers, and then the lifting speed of the winch is to be normally limited not to exceed the theoretically recordable paper feeding speed with the control printed circuit board (C25-700B).

2.2.2.4 Feeding control circuit to recording stylus

This circuit is a circuit to amplify the recording signal transmitted by the control printed circuit board (C25-700B) to a necessary voltage for printing on the recording paper.

In addition, printing test with thick or thin lines on the whole of the recording paper can be performed through the switching over of TEST switch on the printed circuit board.

2.2.2.5 Belt timing circuit

This belt timing circuit is a circuit to decide the starting position of recording on the paper and a timing to rest the recording stylus at the backside at the stop of recording.

Based on the BELY_TIMIMG signal detected a magnet mounted on the recording belt with HOLE-1001, the circuit has the timing delayed for a given length of time.

2.2.2.6 Relay control circuit for rise and fall of winch

This circuit is a circuit to control the relay for rise or fall with signals of rise (WINCH_UP) or fall (WINCH_DOWN) transmitted by the control printed circuit board (C25-700B).

When the operation of the control printed circuit board (C25-700B) is abnormal, the operation of rise is only available with the emergency switch for winding up.

2.2.2.7 Power supply circuit

This power supply circuit is providing + 245 V, + 165 V, + 12 V and + 5 V.

For + 245 V and + 165 V circuits, over current protection is provided.

2.2.2.8 AC 100 V over voltage detection circuit and supply circuit

This circuit is a circuit to prevent burnout, etc. due to input over voltage.

When input voltage exceeds AC 115 V to AC 120 V, the power supply circuit will be shutdown and will recover after the voltage comes down to less than AC 110 V.

2.2.2.9 AC/DC unit

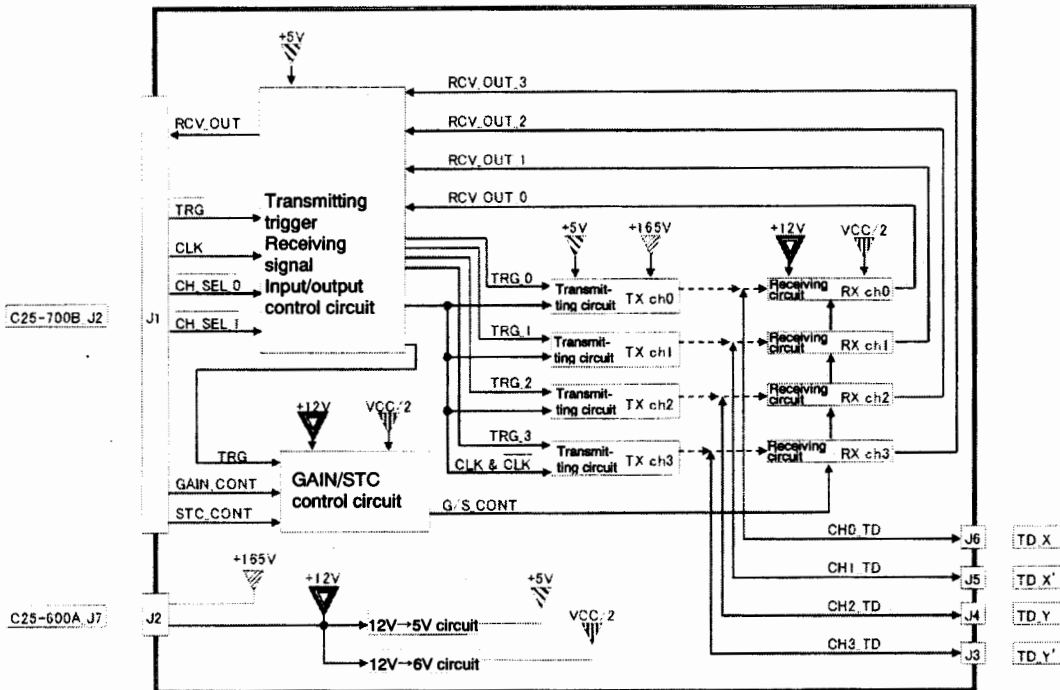
This unit produces DC 24 V from AC 100 V.

The AC 100 V is supplied through the above-mentioned AC 100 V over voltage detection and supply circuits.

All DC power supply is supplied from this DC 24 V.

2.2.3 Printed circuit board for transmission and receiving (C25-100A)

Four sets of transmitting and receiving circuits are incorporated into this printed circuit board.



2.2.3.1 Input/output control circuit

This circuit generates TRG_0 ~ TRG_3, CLK and $\overline{\text{CLK}}$ by using TRG, CLK, $\overline{\text{CH_SEL_0}}$ and $\overline{\text{CH_SEL_1}}$ transmitted from the control printed circuit board.

In addition, RCV_OUT_0 ~ RCV_OUT_3 is switched over by using $\overline{\text{CH_SEL_0}}$ and $\overline{\text{CH_SEL_1}}$, and it is output on RCV_OUT line.

2.2.3.2 Transmitting circuit

Transmitting circuit consists of a circuit to produce transmitting waveform from TRG_0 to TRG_3, CLK and $\overline{\text{CLK}}$, and a power amplitude circuit.

On this control printed circuit board (C25-700B), changeover of 4-circuit, changeover of pulse widths by ranges and changeover of transmitting and receiving are performed.

2.2.3.3 Receiving circuit

This circuit is a straight amplitude circuit with a wide band ($f_0 = 88 \text{ kHz}$, $B_w = 30 \text{ kHz}$).

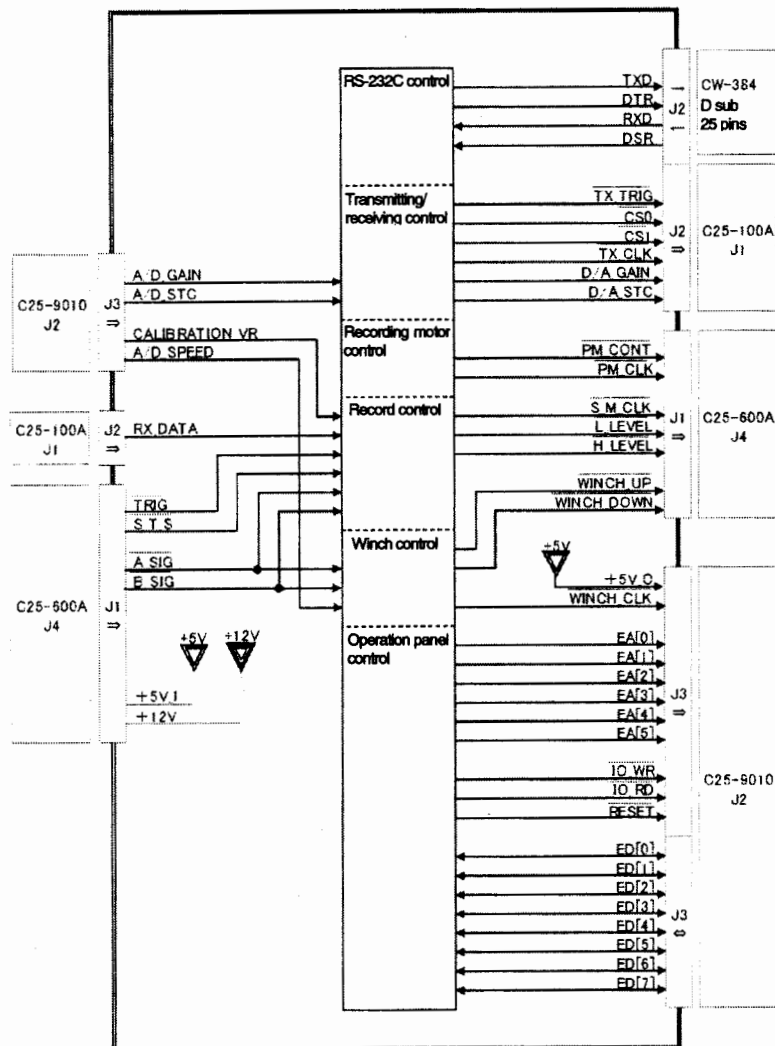
The amplitude degree and strength of this receiving circuit is controlled through producing G/S_CONT signal by using GAIN_CONT and STC_CONT signals transmitted from the control printed circuit board (C25-700B).

When the method of sensitivity control on the operation panel is manual, it is adjustable with a sensitivity control knob.

When the method is automatic, the sensitivity control knob serves for fine adjustment of an automatic sensitivity value.

The outputs of volume controls for sensitivity and limiting close distance are A/D converted on the control printed circuit board (C25-700B) and no direct signals will be input.

2.2.4 Printed circuit board for control (C25-700B)



2.2.4.1 RS-232C control

Output sentences are output from digitalized distance to wall and depth.

The winch control switch can output during rise and fall of the winch and cannot output during stoppage of it. When the data at stoppage of the sensor unit is required, the unit can stop with lifting speed switch while the winch control switch remains at up or down position.

In addition, a dedicated IC (RS-232 transceiver) is used as for input and output of RS-232C.

2.2.4.2 Transmission and receiving control

A switchover signal ($\overline{CS0}$, $\overline{CS1}$ for transmission trigger ($\overline{TX_TRIG}$), transmission frequency ($\overline{TX_CLK}$) and channel (X, X', Y, Y') will be output.

In addition, by detecting (A/D converted) voltage value of sensitivity volume control (A/D_GAIN) and close suppression volume control (A/D_STC) with the operation panel (C25-9010), D/A_GAIN and D/A_STC after D/A conversion of them per channel (X, X', Y, Y') will be output.

When the method of sensitivity control is automatic, D/A_GAIN and D/A_STC will be controlled by the CPU.

2.2.4.3 Recording motor control

In order to keep the number of revolutions of the recording motor at a constant (2,500 rpm), this recording motor control generates a reference oscillating frequency $\overline{\text{PM_CLK}}$ (4.2 kHz). In addition, the control outputs a $\overline{\text{PM_CONT}}$ signal to control the run and stop of recording motor.

2.2.4.4 Record control

A circuit to generate a clock for measurement is incorporated, and 3 MHz signal is output at TP 23 (CALIBRATION-CLK) when the scale on distance correction dial face is 8. This signal is asynchronous with the 16 MHz of CPU clock.

Based on this CALIBRATION-CLK, receiving clock signal, test data signal, receiving delay timer signal and receipt time signal are produced.

RX_DATA is incorporated at the timing of receiving clock signal and summarizes the receiving signals to transform them into receiving data by cutting off signals with less repetition as noise.

After combining receiving data, wall face detecting data, mark data and character data, thick ($\overline{\text{H_LEVEL}}$) and thin ($\overline{\text{L_LEVEL}}$) signals are separately output at the timing of write-position signal ($\overline{\text{TRIG}}$) of record. In addition, when a signal of arrival at bottom ($\overline{\text{S_T_S}}$) is detected, normal record printing is halted and the depth data of arrival at bottom (DEPTH) is printed.

At a constant paper feed speed, the paper feed motor control outputs a signal ($\overline{\text{S_M_CLK}}$) corresponding to the setting of operation panel.

In the case of depth proportion, the paper feed motor control outputs signal ($\overline{\text{S_M_CLK}}$) proportional to the depth based on encoder signals ($\overline{\text{A_SIG}}$, $\overline{\text{B_SIG}}$).

In addition, in the case of depth proportion, thick ($\overline{\text{H_LEVEL}}$) and thin ($\overline{\text{L_LEVEL}}$) signals are halted during the halt of encoder signals.

The lifting speed of the winch and depth data are calculated based on $\overline{\text{A_SIG}}$ and $\overline{\text{B_SIG}}$. Subtraction and addition of depth data based on lifting of sensor unit are detecting rise or fall from $\overline{\text{A_SIG}}$ and $\overline{\text{B_SIG}}$.

2.2.4.5 Winch control

Corresponding to the set conditions of raise/stop/fall switch on the operation panel, a signal $\overline{\text{WINCH_UP}}$ is output when the switch is at position of rise and a signal $\overline{\text{WINCH_DOWN}}$ when it at position of fall. When it is at stop position, the both signals $\overline{\text{WINCH_UP}}$ and $\overline{\text{WINCH_DOWN}}$ are not output. (Both are H level)

At the rise or fall of sensor unit, the voltage value (A/D_SPEED) of lifting speed volume control will be detected (converted in A/D) and a winch speed control signal ($\overline{\text{WINCH_CLK}}$) corresponding to the value of voltage is output. However, when paper feed speed is being recorded based on the depth proportion, the speed is controlled so as not to exceed the given normal recordable speed of the winch.

2.2.4.6 Operation panel control

This always monitors whether switches and volume controls on the operation panel are operated or not, and processes in accordance with the conditions of the operations during the free time of CPU processing. During recording (measuring), the depth and the lifting speed of the winch are updated to be displayed on real time. During halt of recoding, display of various menus is controlled by menu operation.

Chapter 3 Adjustment and tests

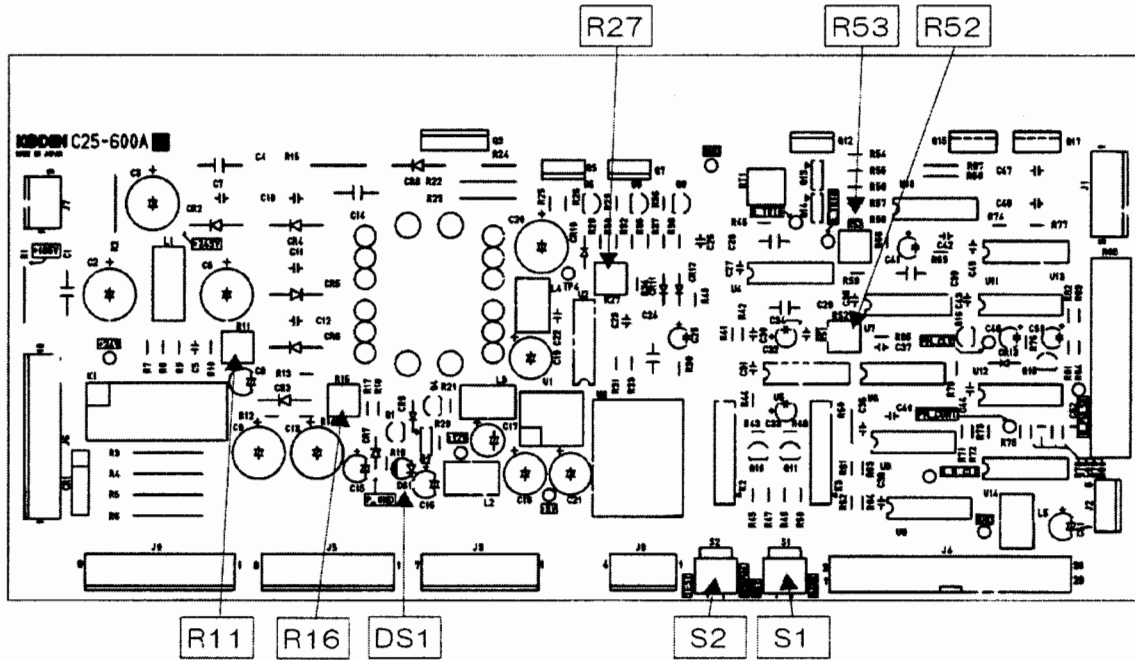
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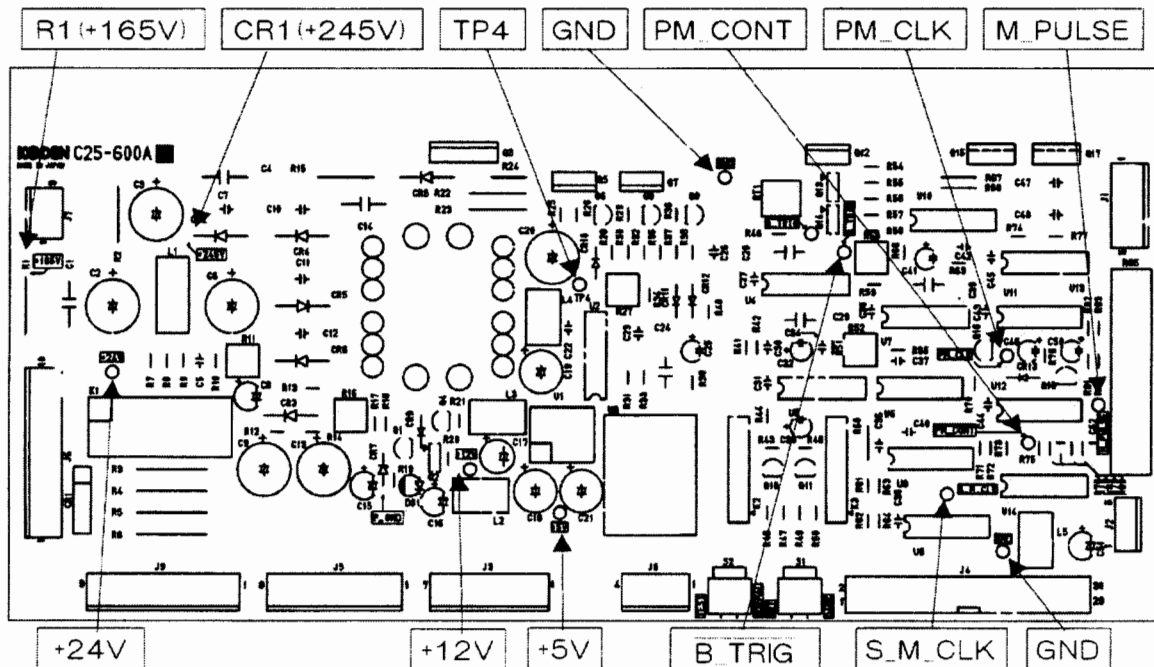
Chapter 3 Adjustment and tests

3.1 Printed circuit board for power supply (C25-600A)

3.1.1 Adjusting points on C25-600A



3.1.2 Checking points of terminals on C25-600A



Adjustment and tests**3.1.3 Over voltage protection circuit**

Set the main switch for a recorder to "OFF".

Set the rise/fall switch to "STOP".

Set the main breaker to "0 (Off)".

Connect AC 100 V to the power connector of the recorder.

Set the main breaker to "1 (ON)" position.

Confirm that LED DS1 on the printed circuit board is lighting for 1 to 2 seconds simultaneously at the time of "ON" of the main switch for the recorder and then the light goes out.

When LED DS1 keep lighting (the over voltage protection circuit acknowledges over voltage) or when the over voltage protection circuit is readjusted, follow the following procedures:

- Turn the volume control (R16) counterclockwise.
- Increase the input voltage to AC 117.5 V.
- Turn the volume control (R16) slowly clockwise, and stop at the position where LED DS1 lights.
- Return the input voltage to AC 100 V

3.1.4 Various power supplies circuit

Confirm the following voltages with a circuit tester:

- Display of check terminal (+ 5 V)
- Display of check terminal (+ 12 V)
- Display of check terminal (+ 24 V)
- CR2 cathode (+ 245 V)
- R1 (+ 165 V)

When readjusting + 245 V and + 165 V, use the volume control R11.

3.1.5 Record output circuit

Confirm that distance scales and each mark have been recoded on recording paper.

Confirm that marks with difference of thickness appear on the recording paper when switch S1 on the printed circuit board is placed at positions of "GRY" and "DARK".

In order to make the thin part on the paper thicker, adjust the volume R53 with confirming the thickness on the paper under "ON" condition of signal processing switch on the sub-panel.

Normally, it is to be at the middle position.

3.1.6 Paper feed motor control circuit

By switching the paper feed switch on the operation panel, confirm that the paper feed speed is as a set value of "constant speed feed".

Turn the switch S2 on the printed circuit board at "TEST", and confirm the paper feed speed is at a constant rate (approximately 60 mm/min). After the confirmation, the switch must to be returned to "NORMAL".

3.1.7 Belt timing circuit

Confirm that the distance scales are normally printed from the position about 15 mm away from the leading edge of the paper.

In order to adjust the starting point of the recording on the paper, turn the volume control R52 for the adjustment. After adjustment, print the manual marks to confirm that the printing does not run off the edge of the paper.

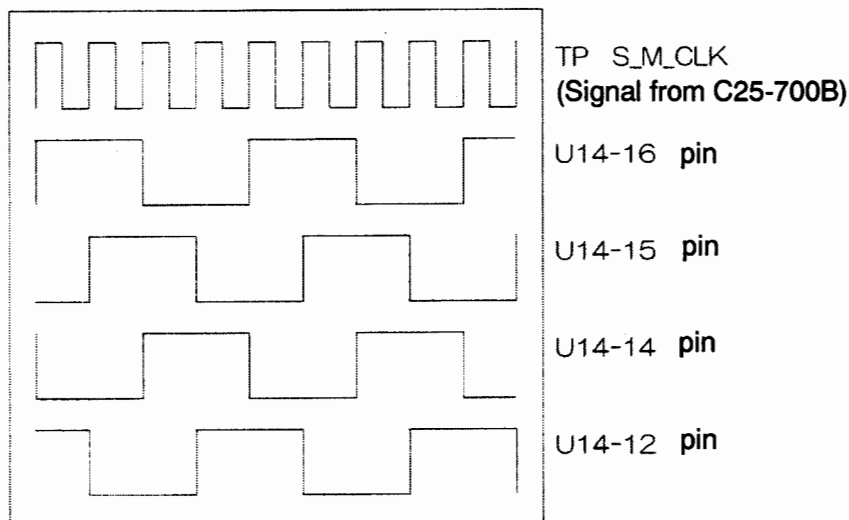
3.1.8 Recording motor control circuit

Confirm that the distance scales on the recording paper is at 5 mm pitch.

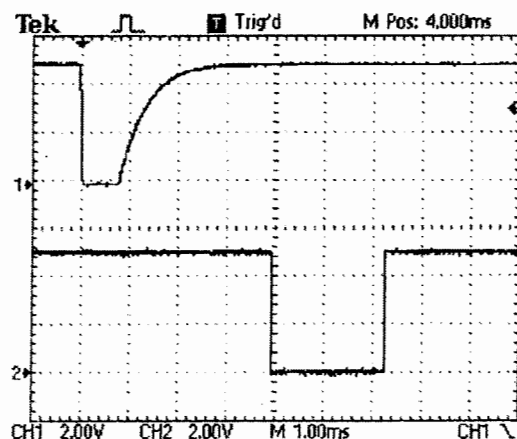
The reference frequency is supplied from the control printed circuit board (C25-700B), and controls the frequencies from U12 4-pin ($\overline{\text{PM_CLK}}$) and the rotation pulse from recoding motor U12 9-pin $\overline{\text{MOTOR_PULSE}}$ to be the same frequency (4.2 kHz).

3.1.9 Check points and waveforms

Paper feed motor control signal (Frequency may vary depending on paper feed rates)



Belt timing signal



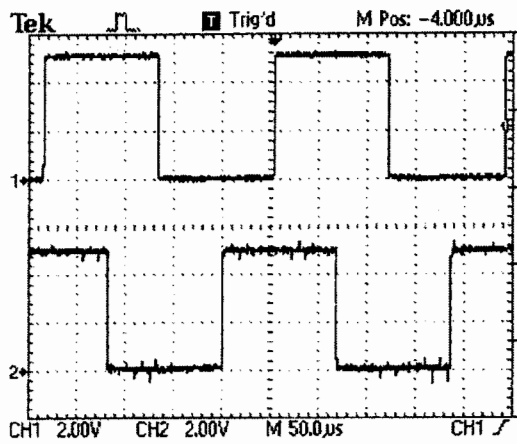
CH1: U4-5
(Signal from HOLE-1001)

(The pulse width varies according to the gap between the hall element and the magnet fixed on the recording belt.)

CH2: TP $\overline{\text{B_TRIG}}$

Adjustment and tests

Recording motor control signal

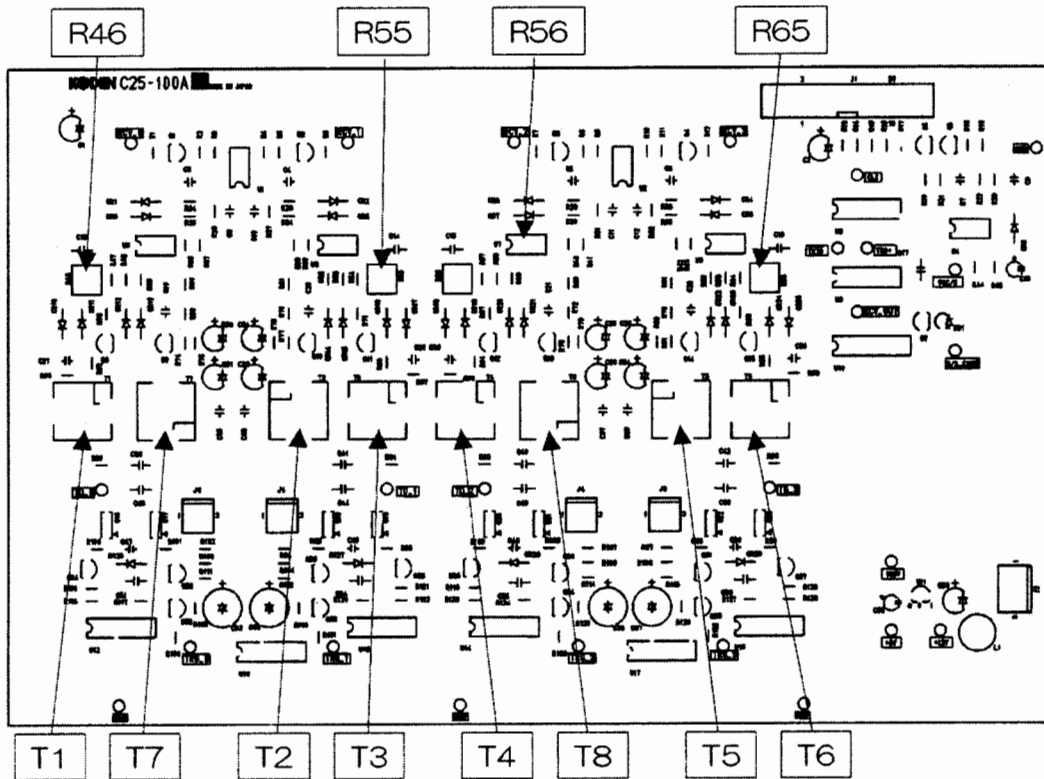


CH1: U12 4-pin (Signal from C25-700B)
(Always output when recorder power is ON.)

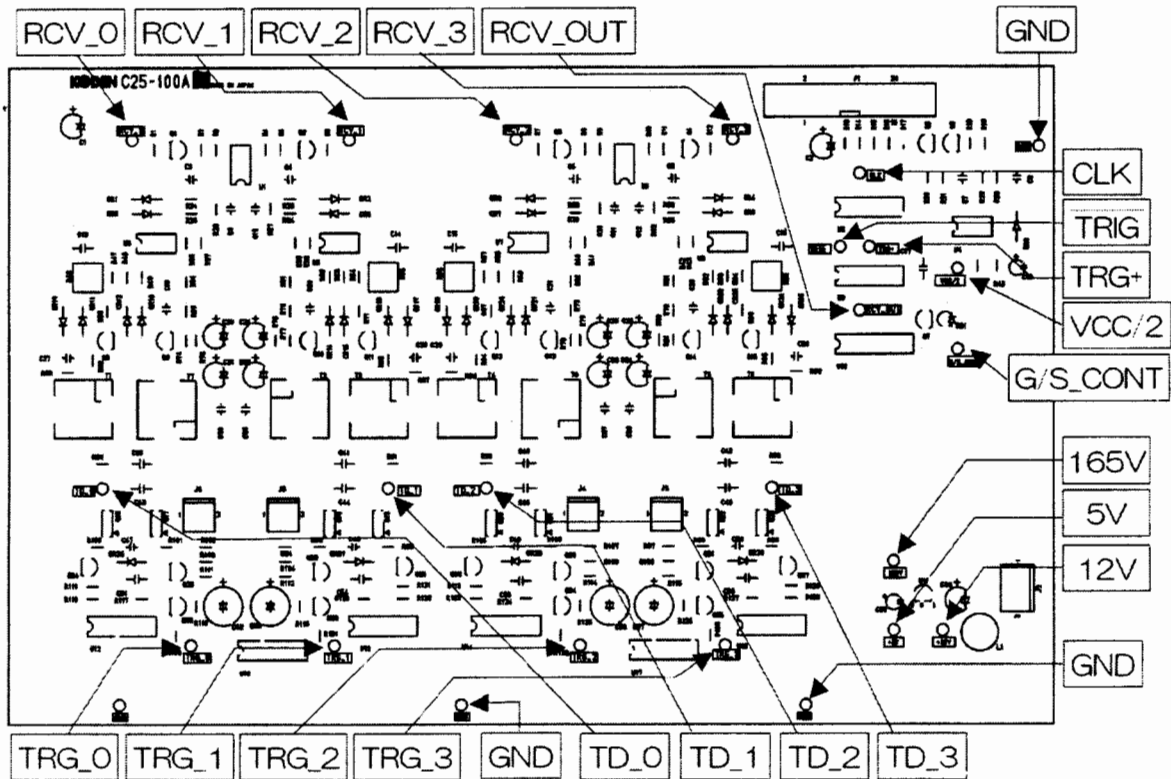
CH2: U12-9 pin (Signal from recoding motor)
(Output only at the operating of recording motor.)
(Fluctuation may be observed with actual visual check because of the signal to synchronize with CH1.)

3.2 Printed circuit board for transmission and receiving (C25-100A)

3.2.1 Adjustment points of C25-100A



3.2.2 Check points of terminals on C25-100A



Adjustment and tests

3.2.3 Transmission circuit

TRG+signal, CLK signal, $\overline{\text{CLK}}$ signal, TRG_0 signal, TRG_1 signal, TRG_2 signal and TRG_3 signal are generated on this transmission/receiving printed circuit board based on CLK signal, $\overline{\text{TRG}}$ signal, CH_SEL_0 signal and CH_SEL_1 signal supplied from C25-700B.

Based on these signals, transmission pulses for each channel are generated. There is no adjustment point.

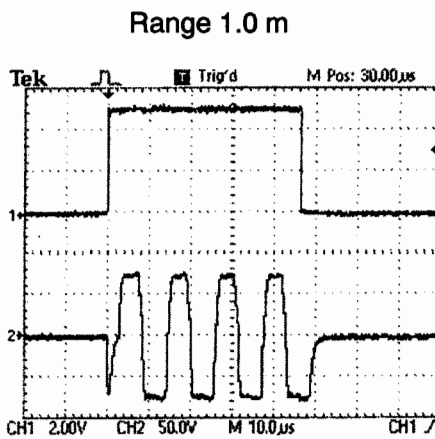
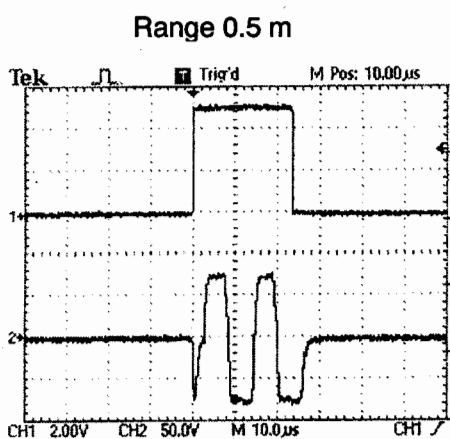
3.2.4 Receiving circuit

Volume controls R46, R55, R56 and R65 are used for adjustment of sensitivity of the receiving circuit. Care should be taken that there may be noises on the recording paper and walls of hole may disappear, when the sensitivity is changed.

G/S_CONT signal is generated based the GAIN_CONT signal and STC_CONT signal supplied by C25-700B. The value to be set and the range to be varied by the sensitivity control knobs and the close distance suppression control knob are controlled by this signal. When the method for control of sensitivity is automatic, GAIB_CONT signal is automatically controlled.

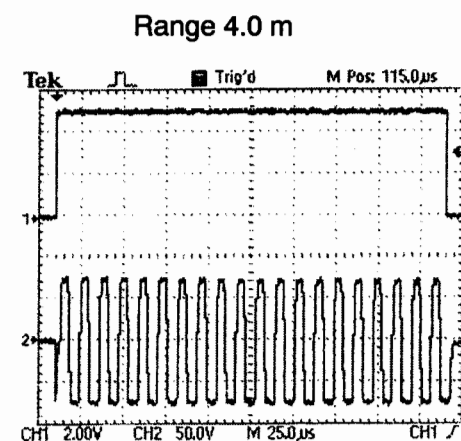
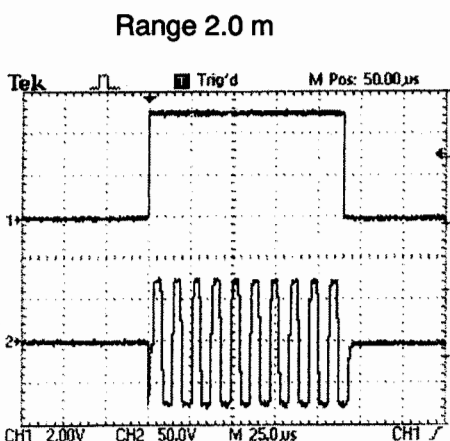
3.2.5 Check points and waveforms

TRG 0 (to TRG 3) and TD 0 (to TD 3)



CH1: TP TRG 0
(to TRG 3 is also the same.)

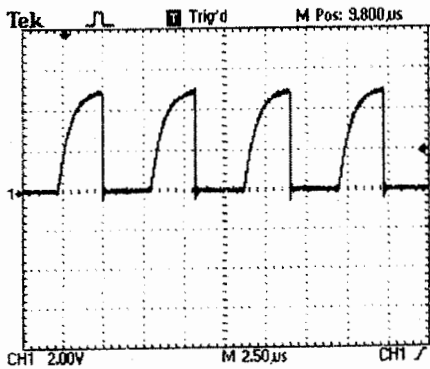
CH2: TP TD 0
(to TD 3 is also the same.)



CH1: TP TRG 0
(to TRG 3 is also the same.)

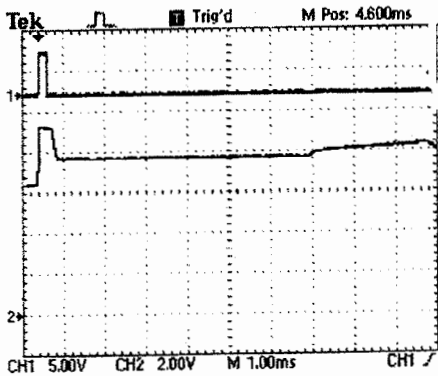
CH2: TP TD 0
(to TD 3 is also the same.)

TP CLK



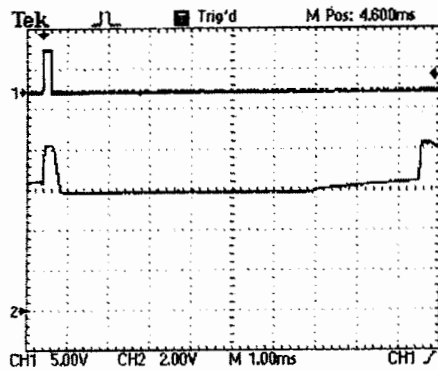
CH1: TP CLK

TRG 0 (to TRG 3) & G/S CONT
Range 4.0 m



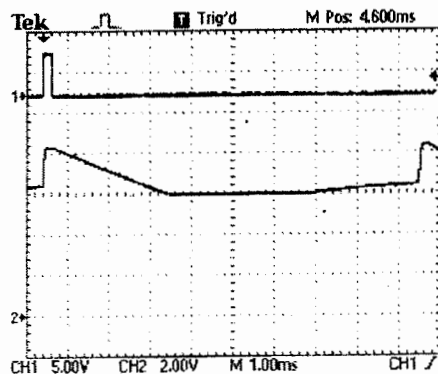
CH1: TP TRG 0
(to TRG 3 is also the same.)

In the case of manual sensitivity control:
CH2: TP G/S_CONT
Sensitivity volume control is the minimum.
STC volume control is the minimum.



CH1: TP TRG 0
(to TRG 3 is also the same.)

In the case of manual sensitivity control:
CH2: TP G/S_CONT
Sensitivity volume control is the maximum.
STC volume control is the minimum.



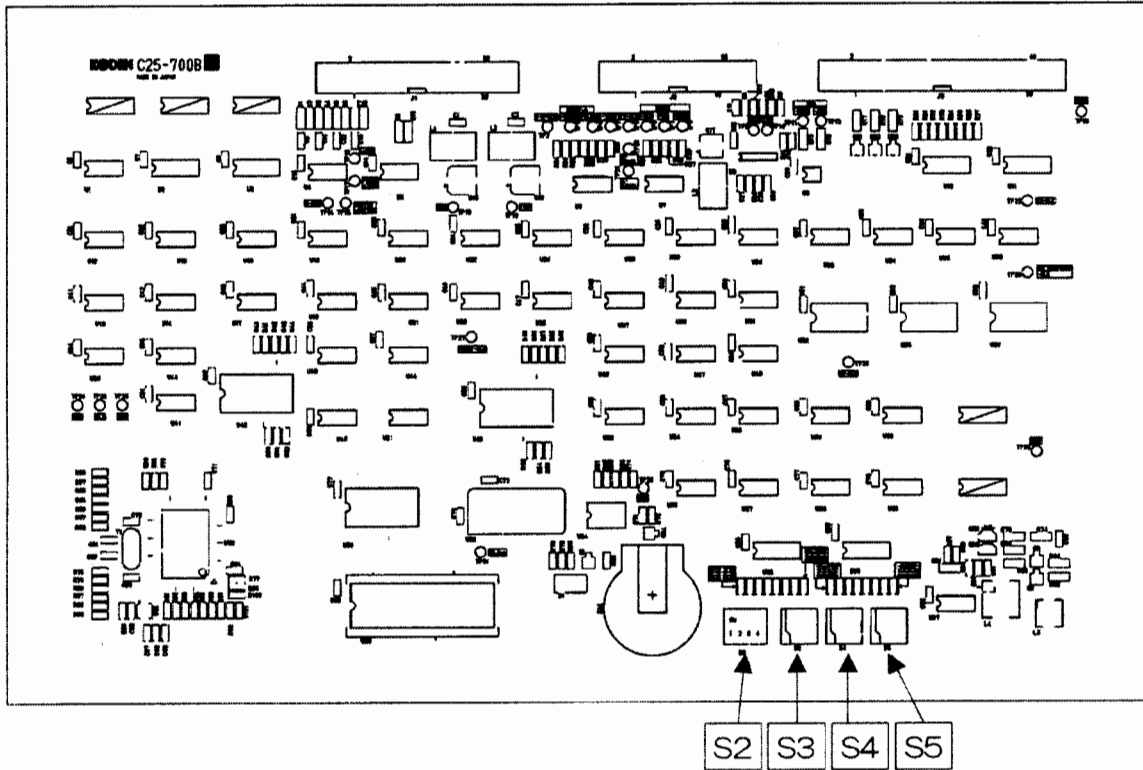
CH1: TP TRG 0
(to TRG 3 is also the same)

In the case of manual sensitivity control:
CH2: TP G/S_CONT
Sensitivity volume control is the maximum.
STC volume control is the maximum.

Adjustment and tests

3.3 Printed circuit board for control (C25-700B)

3.3.1 Adjustment points on C25-700B



3.3.2 Setting values of depth pulses

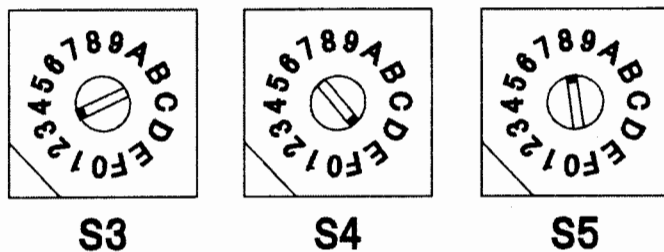
The set value of depth pulse is the number of pulses when the depth is acknowledged per 1 m.

These are set by the dipswitches, S3, S4 and S5, and are in hexadecimal code.

The set values of S3, S4 and S5 at delivery from the plant are 3E8 (hexadecimal) = 1,000 (decimal code).

The figure at the least significant in decimal code is to be one place of decimal (1,000 = 100.0).

Example



Set value of S3, S4 and S5 (in hexadecimal code)	Expression in decimal code	Meaning of a set value by S3, S4 and S5
3, E, 4	996	99.6 pulse/m
3, E, 5	997	99.7 pulse/m
3, E, 6	998	99.8 pulse/m
3, E, 7	999	99.9 pulse/m
3, E, 8	1000	100.0 pulse/m
3, E, 9	1001	100.1 pulse/m
3, E, A	1002	100.2 pulse/m
3, E, B	1003	100.3 pulse/m

3.3.3 Setting of S2

The set value of S2 is "1234" whole OFF.

3.3.4 Maintenance mode

When recording is stopped, select (MAINTEN-) of the paper feed speed (Menu) switch. If the menu/shift switch is turned over to the right side once, "MAINTEN-" is displayed. When the switch is turned to the right side once more, the whole display flickers.

When the "Decision" switch is turned to the right side, the display moves to the maintenance screen and "NON" will be displayed.

The change of items in the maintenance menu is done with the paper feed speed (menu) switch. When the paper feed speed switch is set to 1/200, the display returns to the normal display.

1. Maximum depth data

The maximum depth data is the maximum length (in m) that the winch can feed.

The display is as follows when the paper feed speed switch is changed over to 7.5 mm/min:

MAX D100 (Initial value at delivery from plant is 100.)

When a measured depth exceeds a set value (m), the winch stops falling. When the length of cable or wire is shortened due to repairing work, etc., the set value shall be modified. It is settable by 1 m.

Setting method:

After displaying the maximum depth data, move the cursor (flickering digit) to the place to be modified with the menu/shift switch, and modify the data with the figure/print switch. The new data are renewed with the decision switch. After the renewal with the decision switch, the display of cursor stop flickering.

When the display is changed over to any other menu item during the setting modification process, the data are not renewed.

2. Brightness control of LED

Brightness control of LED means brightness setting of the LED display device as follow:

Dim 27 % (Initial value at delivery from plant is 27 %.)

Settable brightness is 13 %, 20 %, 27 %, 40 %, 53 %, 80 % and 100 %.

Setting method:

After displaying the brightness data of the LED, the whole display flickers when the menu/shift switch is turned.

Display a brightness level to be required with figure/print switch and push the decision switch to renew the set value. After the renewal, flickering turn to lighting.

When the display is changed over to any other menu item during the setting process, the data are not renewed.

3. Menu for technical verification

When the paper feed speed switch is changed over to 30 mm/min, the following display is displayed, but no operation for technical verification shall be done.

000000 00

Adjustment and tests**4. Cumulative time of power ON period**

Cumulative time of power ON period means the time period cumulated of the period by 1-minute unit when power was ON. The cumulative time at 60 mm/min of paper feed speed switch is shown.

This cumulative time is protected by a backup battery power even at the time of power OFF of the main switch.

5. Others

When "1/40", "1/50" and "1/100" is selected with the paper feed speed switch, is displayed.

3.3.5 Other functions

As for other functions, their basic operation can be confirmed at test mode of functions at the time of power ON. See 3.5.2 "Test mode" for details.

3.4 Printed circuit board for operational panel (C25-9010)

This printed circuit board sends instructions of each switch and control knob to the control printed circuit board (C25-700B) and display depth data and menu information.

Their basic operation can be confirmed at test mode of functions at the time of power ON.

3.5 Functions at power supply ON

When power supply of recorder is OFF, certain operational switches are combined and the power is turned to ON under operational conditions, then, the following functions can be performed.

3.5.1 RAM clear

Turn the power to ON while the depth reset switch and the manual mark switch are ON. Then, the contents in the backup RAM are reset to the default values (at the delivery from the plant) and it moves to normal operation.

* However, there are some parts such as calendar and time that are not cleared. Especially, reset to normal operation may be impossible with this RAM clearing way due to the employment of the clock from a clock IC, when something is wrong in the clock RAM area.

In that case, remove the backup batteries once and insert them again after a few seconds and switch ON. It is necessary to reset calendar and time again because all RAM areas have been cleared. (There is no effect on measuring operations even without resetting.)

3.5.2 Test mode

While keeping the menu/shift switch and the decision switch turned to right side, switch ON the power.

Explanation of test mode:

1. At the time of entering in Test mode, is displayed on the LED first, and wait for starting:

Termination of Test mode is available only by power OFF.

From Test 1 to Test 4, test should follow the order and cannot be started from any one of them.

2. Test 1

When the figure/printing switch is turned, Test 1 operation will start. This is for confirmation of LED displays.

Set 8 digits of alphanumeric characters and signs displayed by LED simultaneously from the control printed circuit board, and confirm that all digits show the same indications. Also confirm that they blink on the way (A to).

After completion of indication of all codes, YY/MM/DD as the ROM version and modification date of the latest software are displayed and the operation has ended.

On the way, it is not possible to step over to the next step.

3. Test 2

After completion of Test 1, turn the figure/printing switch, and then Test 2 operation starts. Test 2 is for checking of RAM.

RAM2XCHK is displayed and 128 K of 200000 to 21FFFFh is checked.

Then, RAM4XCHK is displayed and 128 K of 400000 to 41FFFFh is checked.

When the both RAM areas are normal, RAM OK is displayed and the operation has ended.

When an error has occurred, □□□□□ER and generation address of the error are displayed and the operation has ended.

On the way, it is not possible to step over to the next step.

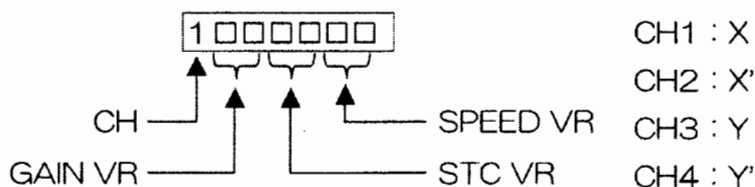
4. Test 3

After completion of Test 2, turn the figure/printing switch, and then Test 3 operation starts. Test 3 is for confirmation of operations of sensitivity, close distance suppression and lifting speed volume controls.

the figure at the top of the display shows the CH No. displayed.

When the corresponding volume controls are turned, the displayed values varies in the range of "00 ~ FF" (those are theoretical values and there may be some fluctuations).

To move to the next CH, turn the decision switch slowly to the right side. At every turn of the switch, the figure displayed at the top changes "1→2→3→4→1→2→..." to show the CH displayed.



When the menu/shift switch is turned to the right, NEXT is displayed and the operation has ended.

Test 3 ends whenever the menu/shift switch is turned to the right after start of Test 3.

After display of NEXT, it is not possible to return to Test 3.

Adjustment and tests

5. Test 4

After completion of Test 3 (display of **NEXT**), turn the figures/printing switch to the right and Test 4 operation start.

At first, **SW TEST** is displayed.

Test 4 is to display readings of each switch, calendar and clock data.

Turn the decision switch slowly to the right (for about 1 second), and then Test 4 starts. At every slow turn of the decision switch to the right (for about 1 second), the display is changed in the order as shown below:

There are total 22 displays, and their order and their formats are as shown below.

The given information in the table would be modified when the data varies at the time of switch operations.

01	SW11 XX	: XX is the set values of S4 and S5 on C25-700B (hexadecimal code)
02	SW12 XX	: XX is the set values of S2 and S3 on C25-700B (hexadecimal code)
03	TS0 XX	: XX is the ones digit of seconds of the clock
04	TS10 XX	: XX is the tens digit of seconds of the clock
05	TMO XX	: XX is the ones digit of minutes of the clock
06	TM10 XX	: XX is the tens digit of minutes of the clock
07	TH0 XX	: XX is the ones digit of hours of the clock
08	TH10 XX	: XX is the tens digit of hours of the clock
09	DD0 XX	: XX is the ones digit of days of calendar
10	DD10 XX	: XX is the tens digit of days of calendar
11	DM0 XX	: XX is the ones digit of months of calendar
12	DM10 XX	: XX is the tens digit of months of calendar
13	DY0 XX	: XX is the ones digit of the last two digits of the years of calendar
14	DY10 XX	: XX is the tens digit of the last two digits of the year of calendar
15	SW1 XX	: XX is the status of range, shift and MODE switches (hexadecimal code)

Name of switch	Set position	Upper X				Lower X			
		D7	D6	D5	D4	D3	D2	D1	D0
Mode	Test	L	H	*1	*1	Depends on range setting			
	Measurement	H	H	*1	*1	Depends on range setting			
Shift	100 %	*2	H	L	H	Depends on range setting			
	50 %	*2	H	H	H	Depends on range setting			
	0 %	*2	H	H	L	Depends on range setting			
Range	4.0 m	*1, *2				L	H	H	H
	2.0 m	*1, *2				H	L	H	H
	1.0 m	*1, *2				H	H	L	H
	0.5 m	*1, *2				H	H	H	L

*1: By shift switch.

*2: By MODE switch.

Adjustment and tests

- 16 **SW2 XX**: XX is the status of depth reset, manual mark, signal processing and elimination of oscillation lines switches and movement switch of width mark for hole wall radius (in hexadecimal code).

Name of switch	Set position	Upper X				Lower X			
		D7	D6	D5	D4	D3	D2	D1	D0
Depth reset	ON	*	*	*	*	*	*	*	L
Manual mark	ON	*	*	*	*	*	*	L	*
Signal processing	ON	*	*	*	*	*	L	*	*
Elimination of oscillating lines	ON	*	*	*	*	L	*	*	*
Movement of mark width of hole wall radius X (Movement of mark width of hole wall radius)	Right	*	*	*	L	*	*	*	*
	Left	*	*	L	*	*	*	*	*
Movement of mark width of hole wall radius Y (Changeover of direction)	Right (Y)	*	L	*	*	*	*	*	*
	Left (X)	L	*	*	*	*	*	*	*

* Set by other switches. At OFF or normal operation, it is set to H.

- 17 **SW3 XX**: XX is the status of figures/printing and sensitivity control method switches (in hexadecimal code).

Name of switch	Set position	Upper X				Lower X			
		D7	D6	D5	D4	D3	D2	D1	D0
Figures/Printing	+	H	H	*	*	H	H	H	L
	-	H	H	*	*	H	H	L	H
Decision	Right	H	H	*	L	H	H	*	*
Sensitivity method	Manual	H	H	H	*	H	H	*	*
	Automatic	H	H	L	*	H	H	*	*

* Set by other switches. At normal operation, it is set to H.

- 18 **SW4 XX**: XX is the status of rise/stop/fall, recording stop/start/ data printing switches (hexadecimal code).

Name of switch	Set position	Upper X				Lower X			
		D7	D6	D5	D4	D3	D2	D1	D0
Rise/Stop/Fall	Rise	H	H	H	H	*	*	H	L
	Stop	H	H	H	H	*	*	H	H
	Fall	H	H	H	H	*	*	L	H
Recording stop/Start/Data printing	Data printing	H	H	H	H	H	L	*	*
	Start	H	H	H	H	H	H	*	*
	Stop	H	H	H	H	L	H	*	*

* Set by other switches.

Adjustment and tests

- 19 **SW5 XX**: XX is the status of paper feed speed switch (hexadecimal code).

Name of switch	Set position	Upper X				Lower X				
		D7	D6	D5	D4	D3	D2	D1	D0	
Paper feed speed	Constant rate	7.5	H	H	H	H	H	H	H	L
		15	H	H	H	H	H	H	L	H
		30	H	H	H	H	H	L	H	H
		60	H	H	H	H	L	H	H	H
	Depth proportion	1/40	H	H	H	L	H	H	H	H
		1/50	H	H	L	H	H	H	H	H
		1/100	H	L	H	H	H	H	H	H
		1/200	L	H	H	H	H	H	H	H

- 20 **SWA5 XX**: XX is the status of the switch for setting of mark width of a hole wall radius and tens digit (Upper X) and ones digit (lower X) of Y side.
- 21 **SWA6 XX**: XX is the status of the switch for setting of mark width of a hole wall radius and ones digit of X side (Upper X) and hundreds digit (lower X) of X side.
- 22 **SWA7 XX**: XX is the status of the switch for setting of mark width of a hole wall radius and hundreds digit (Upper X) and tens digit (lower X) of Y side.

Next, return to **SW11 XX**.

When the menu/shift switch is turned to the right during operation of Test 4, Test 4 operation has ended and **NEXT** is displayed.

Whenever the menu/shift switch is turned to the right after starting of Test 4, Test 4 operation has ended.

After display of **NEXT**, it is not possible to return to Test 4.

Through turning the figure/printing switch to the right, it is possible to return to Test 1.

3.6 Printed circuit board for belt timing (HOLE-1001)

This printed circuit board detects the position of recording stylus by detecting magnetic field of a magnet attached to the recording belt with a hall element, and inform the control print board of the timing of record writing as well as the timing to stop the recording stylus at the stop of recording.

- (1) When this board has been replaced, push manually the recording belt toward the right (in the direction of an arrow) without fail before switching ON, and set the gap between the hall IC and the magnet at 1 ~ 2 mm and confirm that the stylus holder and the magnet would not touch each others.

3.7 Motor controller unit (CSC-001A)

This unit controls the speed of lifting motor and shall be adjusted with the following manner:

- (1) Disconnecting the winch, turn the rise/fall switch on the operation panel to "rise" or "fall", and turn the lifting speed knob counterclockwise fully.

At this time, confirm that about 50V appears between + terminal and - terminal of CSC-110A.

- (2) Then, confirm that about 70 V appears between + terminal and – terminal when fully turning the lifting speed knob counterclockwise.

Place the winch on the hole wall and adjust the speed of the lifting motor after connecting the motor and the recorder.

- (3) For adjustment at low speed, keep the rise/fall switch at "fall" position and turn the lifting speed knob fully counterclockwise, and stop the sensor unit with adjusting the volume control (MIN).

- (4) Adjustment at high speed is conducted during the sensor unit is in ascent.

Keep the rise/fall switch at "rise" position and turn the lifting speed knob fully counterclockwise, and adjust with the volume control (MAX) so that the ascent speed of the sensor unit becomes 20 m/min.

However, as the speed is controlled so as not to exceed 20 m/min with the control printed circuit board, attention should be paid not to turn the volume control too much. If the knob is turned too much, fine adjustment of lifting speed at measurement becomes difficult.

3.8 Method to confirm sensitivity in air

Please work in accordance with 8.2.2.2 "Sensitivity check in the air" of the instruction manual. When it is confirmed that the sensitivity is not good enough, it is assumed that sensor elements may be faulty or cable may be broken.

Adjustment and tests

3.9 Method to check whether sensor cables and sensor elements are good or bad

When it is confirmed that sensitivity is not good enough, please check whether the cable and sensor elements are good or not in accordance with the following procedures:

3.9.1 Confirmation of breakage of cables for sensor units

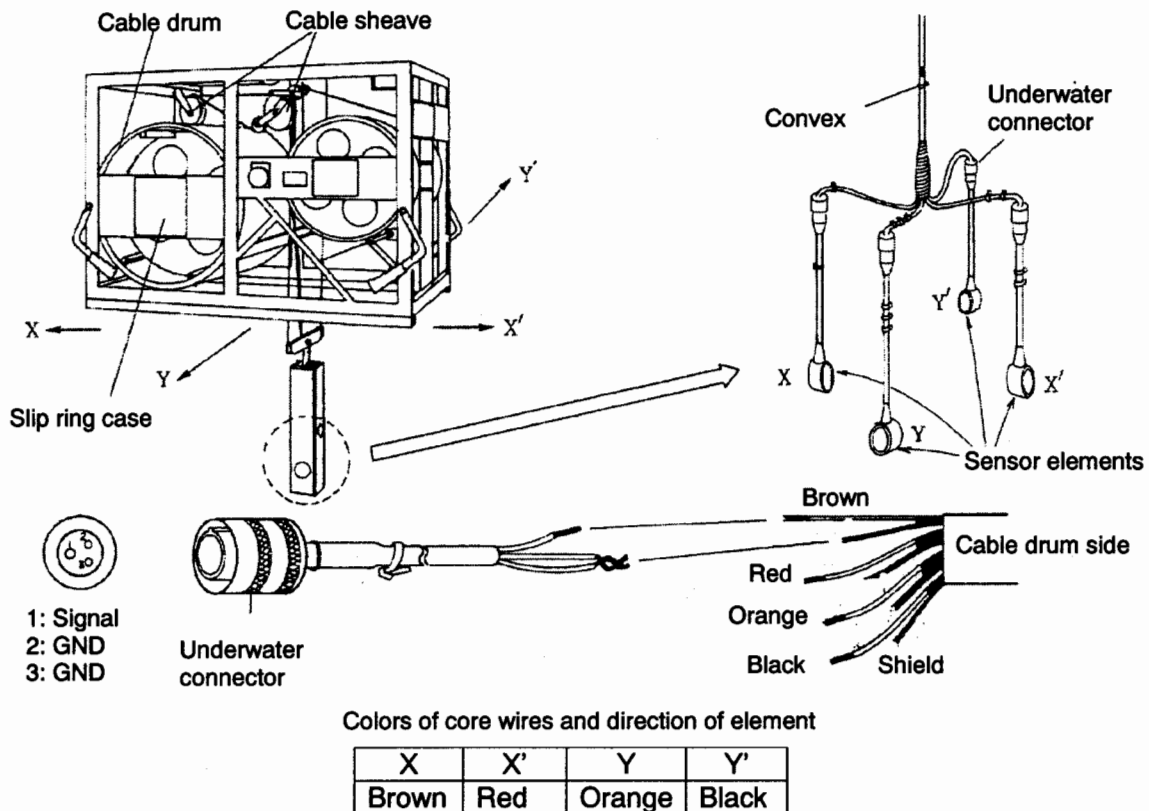
(1) Check visually whether there is any damage on the cable between sensors to the drum.

Especially, confirm that the cable at cable sheaves has not dwindled.

(2) Dismantle the sensor unit and measure (confirm) the continuity between the underwater connectors and the slip rings. Measure all HOT LINE and GND LINE (total 8 pieces)

(3) After measuring (confirming) the continuity, cut off the cable up to the point of breakage and renew the wiring.

(4) When there is no fault on cable, faults of sensor element or breakage of cables between the underwater connectors and the elements may be assumed.



3.9.2 Confirmation of faulty sensor elements and cable breakage

(1) Dismantle the sensor unit and disconnect the sensor element in the direction of no signal and the sensor element with signal from the underwater connectors, and then exchange them.

(2) When a sensor element is supposed to be faulty, measure the insulation resistance between the terminals of the underwater connector (normally, 1 MO and more).

Check whether there is any rust such as green rust on the terminals of the underwater connectors to cause contact failure.

Chapter 4 Maintenance

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Table of parts list

Name of component	Name of block	Exploded diagram No.	Pages parts list	Pages exploded view
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Cable	Configuration drawing		4-3	—
Recorder (2)	Shassis block (1)	C25BG11050.1*	4-3	4-11
Recorder (3)	Shassis block (2)	C25BG11050.2*	4-4	4-12
Recorder (4)	Left panel block	C25BG11040*	4-4	4-13
Recorder (5)	Right panel block	C25BG11030*	4-4	4-14
Recorder (6)	Recoding mechanism block	C25BG11020*	4-5	4-15
Recorder (7)	Recording belt	682-2325*	4-5	4-16
Recorder (8)	Step-down transformer unit	C25BG11070*	4-5	4-17
Winch (1)	Winch frame block (1)	C25BG51010*	4-6	4-18
Winch (2)	Winch frame block (2)	682-2352*	4-6	4-19
Winch (3)	Wire phasing device (1)	682-2353*	4-7	4-20
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Winch (5)	Cable phasing device (1)	682-2355*	4-8	4-22
Winch (6)	Cable phasing device (2)	682-2356*	4-8	4-23
Winch (7)	Sensor unit (transducer)	682-2357*	4-9	4-24
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Drawings and exploded diagrams

Name of component	Name of block	Exploded diagram No.	Pages exploded view	Pages parts list
Recorder (1)	Whole recorder unit	C25BG11010*	4-10	4-3
Recorder (2)	Shassis block (1)	C25BG11050.1*	4-11	4-3
Recorder (3)	Shassis block (2)	C25BG11050.2*	4-12	4-4
Recorder (4)	Left panel block	C25BG11040*	4-13	4-4
Recorder (5)	Right panel block	C25BG11030*	4-14	4-4
Recorder (6)	Recoding mechanism block	C25BG11020*	4-15	4-5
Recorder (7)	Recording belt	682-2325*	4-16	4-5
Recorder (8)	Step-down transformer unit	C25BG11070*	4-17	4-5
Winch (1)	Winch frame block (1)	C25BG51010*	4-18	4-6
Winch (2)	Winch frame block (2)	682-2352*	4-19	4-6
Winch (3)	Wire phasing device (1)	682-2353*	4-20	4-7
Winch (4)	Wire phasing device (2)	682-2354*	4-21	4-7
Winch (5)	Cable phasing device (1)	682-2355*	4-22	4-8
Winch (6)	Cable phasing device (2)	682-2356*	4-23	4-8
Winch (7)	Sensor unit (transducer)	682-2357*	4-24	4-9

Connection diagram (block diagram)

Name of component	Name of block	Diagram No.	Pages listed
Recorder	Recorder block diagram	C25CFA010*	4-25
Winch (1)	Winch (1/2) block diagram	C25CFA020*	4-26
Winch (2)	Winch (2/2) block diagram	C25CFA030*	4-27

Instructions to use parts list and notes

1. Notes

- 1-1 Only those parts encircled on exploded diagrams are listed in parts lists.
- 1-2 Compound components combined with parts are expressed in either units, ASSYs or alphabets like (A)

2. How to search parts

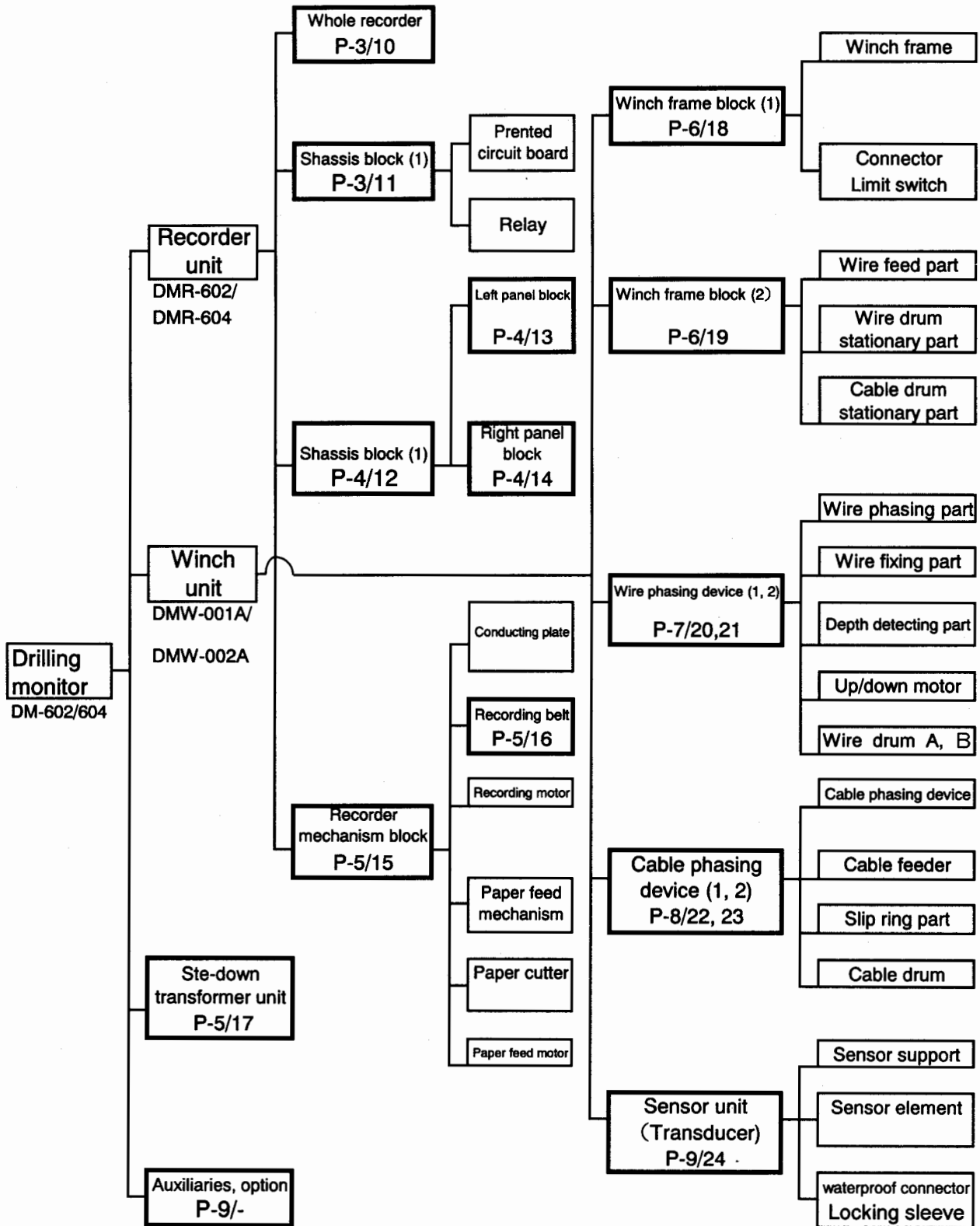
- 2-1 An exploded diagram of parts to be searched shall be identified by using the parts searching diagram (block diagram) and No. of the required part can be found.
- 2-2 For an circled part No., the item code and other information can be found in the corresponding parts list.
- 2-3 As the parts without circled are not listed in the parts lists, please follow 3-2 below.

3. Order of parts

- 3-1 At ordering of parts, please do fill in item code, name of the item, specification/drawing No. and quantity on the order form.
- 3-2 For a part which is not listed in the parts lists but whose No. can be found in an exploded diagram, please fill in the drawing No. and the part No.
- 3-3 For a part which is not described in exploded diagrams or whose No. can not be found, it is not prepared as a spare part. Please contact us in each case.

Parts searching diagram (block diagram)

Note: The page No. listed are the corresponding pages No. of the lists or diagrams.



Parts list

Revision	Registration No	
	Date	
1st edition	Registration No	
	Date	2007.03.15

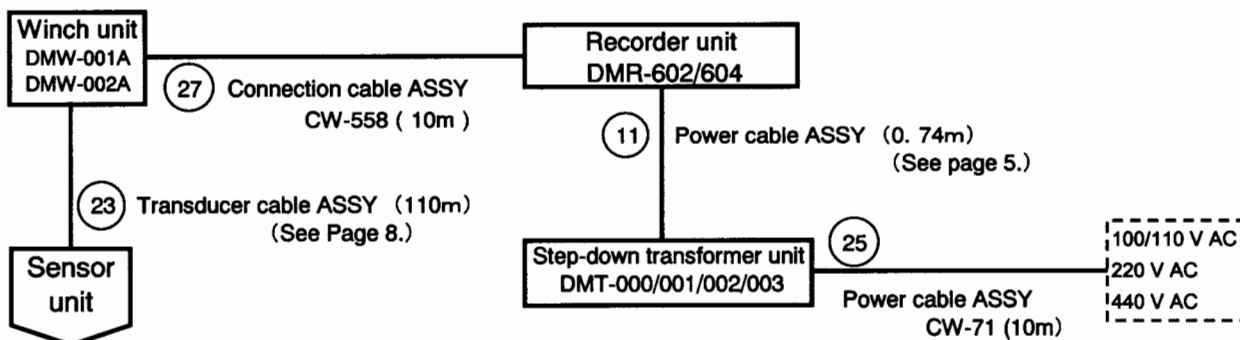
Recorder (1): Drawing of the whole recorder unit (C25BG11010*)

Exploded drawing is in page 4-10.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
1	80306604	Recorder cse (aluminum)	C19MB12017	
2	41370041	Step-down transformer unit	DMT-000-[100V]	100 V AC (with CW-71)
2	41370042	Step-down transformer unit	DMT-001-[110V]	110 V AC (with CW-71)
2	41370043	Step-down transformer unit	DMT-002-[220V]	220 V AC (with CW-71)
2	41370030	Step-down transformer unit	DMT-003	440 V AC (with CW-71)
8	87500041	Recording paper bearing	682-1300-9	
9	72660013	Recording paper	DMP-250 A3-560	Pater width 250 mm, length 20 m
10-1	93070161	Operation card (Japanese)	DM-602.OC.J	For DM-602
10-2	93070162	Operation card (English)	DM-602.OC.E	For DM-602
10-3	93070171	Operation card (Japanese)	DM-604.OC.J	For DM-604
10-4	93070172	Operation card (English)	DM-604.OC.E	For DM-604
11-1	82715671	Main name plate	C25MC11110	For DM-602
11-2	82715661	Main name plate	C25MC11100	For DM-604
12	82791649	Loden's sticker	686-4009	
13	85710194	Plastic cover	682-2311M1	

Configuration drawing of cables

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
25	35061806	Power cable assembly	CW-71 [364-3535]-10M	10m, with connector at one end
27	35285580	Connection cable assembly	CW-558-10M	10 m, with connectors at both ends



Recorder (2): chassis block (1) (Drawing No. C25BG11050.1*)

Exploded drawing is in page 4-11.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
27-1	61570120	Printed circuit board	C25-700B-[KM-D58]	Controller (with ROM) DM-602
27-2	61570130	Printed circuit board	C25-700B-[KM-D59]	Controller (with ROM) DM-604
16	61560060	Printed circuit board	C25-600A	Motor controller in power supply
15	61510120	Printed circuit board	C25-100A	Transmission/receiving part
10	59510303	Switching power source	PAA50F-24-JN [connector type]	24 V power supply part
22	59510025	Speed controller	DMC-001 [CSC-110A type]	with volume control
12	57988155	Solid state relay	G3NA-220B	For power supply
28	57423501	Relay socket	8PF [for MM2XP]	
29	57936123	Relay	MM-2XP AC 100 V	For lifting

This list may be changed without prior notice.

Parts list

Recorder (3): chassis block (2) (Drawing No. C25BG11050.2*) . Exploded drawing is in page 4-12.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
29	80203081	Cover	682-1464M2[682-1463]	Printed
33	83923060	Cover	682-1467 M1	
34	81515771	Panel	C25MC11090	Printed

Recorder (4): Left panel block (Drawing No. C25BG11040*). Exploded drawing is in page 4-13.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
3	57167415	Connector	NT-5015-RF	For connecting the winch
5	58810001	Voltmeter	KF48-type Type A	AC 0 V to 150 V
9	57296006	3-pin inlet	CM-11 Type C245	AC inlet
11	56184110	Circuit breaker	NRF-110-2A	For recorder
12	56184112	Circuit breaker	NRF-110-8A	For winch
13	57590221	Waterproof cap	AT-402A	
14	57511106	Toggle switch	S-6A	Power switch
16	81515761	Panel	C25MC11120	Printed (only in English)

Recorder (5): Right panel block (Drawing No. C25BG11030*). Exploded drawing is in page 4-14.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
2	82405614	Filter	C25MB11050	For indication of depth
8-1	61590100	Printed circuit board	C25-9010-602	Operation panel for DM-602
8-2	61590110	Printed circuit board	C25-9010-604	Operation panel for DM-604
13	70216052	Flat cap	3015112	For range, paper feed speed and lifting speed
14	70491161	Wing knob	2915602	For range, paper feed speed and up/down speed
16	70216061	Flat cap	3010112	For sensitivity
17	70491158	Knob	2710302	For sensitivity
18	70491159	Short knob	6715702BV385	For STC
15	70216062	Intermediate cap	3815102BV204	For STC
26-1	81515791	Panel	C25MC11080	For DN-602 in Japanese and English
26-2	81515971	Panel	C25MC11013	For DN-603 in Japanese and English
19	71510301	Analogue dial	D-12	For distance compensation
12	55539873	Potention meter	HP-16 [5KO]	For distance compensation
21	57590221	Waterproof cap	AT-402A	For lifting switch, printing control
9	57511308	Toggle switch	S-333	For lifting switch
10	55515143	Variable resistor	RV24YG20SB202	For lifting speed
23-1	57542501	Digital switch	DFCN-031B 3 digits	Width-setting switch for DM-602
23-2	57542501	Digital switch	DFCN-031B 6 digits	Width-setting switch for DM-604
25	61500050	Printed circuit board	DM682/4-9001M1	Digital switch part
20	57511302	Toggle switch	S-309	For printing control

This list may be changed without notice.

Parts list

Recorder (6): Recording mechanism block (Drawing No. C25BG11020*).

Exploded drawing is in page 4-15.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
10	80531323	Conducting plate plating	682-1318 M2	
27	84701204	Pulley (B)	682-1373M1[Z=26]	
A	—	Rotation part of belt unit		Assembly of part Nos. 31,32,33,34 and 35
31	83206244	Bearing holder	682-1347 with M1-04	
32	83946091	Insulation ring	682-1396	
33	77601060	Bearing	608ZZ 5 class	For pulleys
34	82101274	Spacer	682-1348M1-06	
35	83621114	Shaft (B)	682-1331M1-06	
36	77192037	C-type snap ring for shaft	STW-8	
37	84701214	Pulley ©	682-1374M1[Z=53]	
30	87500030	Recording belt assembly	682-1300-6	
47	83621104	Shaft (A)	682-1330 06	
48	77165047	C-type snap ring for hole	RTW-22	
49	84701224	Pulley (D)	682-1375M1[Z=53]	
59	61510100	Printed circuit board	C25-1001	
62	71411022	Timing belt	MM-91-6.4	
63	84701194	Pulley (A)	682-1372M3[Z=26]	
65	63500111	Recording motor assembly	364-3537M3	
17	83226584	cutter	682-2312 M1	
20	77506162	Lead in piece	682-1484 M2	
14	77500015	Spring ©	682-1383 M2	
83	83625164	Gear (B)	682-1358M1-06	
84	83621124	Shaft ©	682-1332M2-06	
85	77601050	Bearing	F608ZZ 5 class	
86	83621134	Shaft (D)	682-1333M2-06	
40	77192036	C-type snap ring for hole	STW-6	
42	83621154	Shaft (F)	682-1335M2-06	
45	63500121	Paper feed motor assembly	364-3525	
46	83625144	Gear (A)	682-1357M1	
50	77500011	Spring a (left)	682-1381-1M1	
53	77500012	Spring A (right)	682-1381-2M1	

Recorder (7): Recording belt (Drawing No. 682-2325*)

Exploded drawing is in page 4-16.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
1	85111020	Recording stylus	DMS-001	682-1378-1M2
2	85111030	Stylus	DMS-002	682-1378-2M2
44	87500030	Recording belt assembly	682-1300-6	

Recorder (8): Step-down transformer (Drawing No.C25BG11070*)

Exploded drawing is in page 4-17.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
8	57167310	Connector	NJW-243-RM	With spacer
10	79031702	Super lock	NSL-9	
11	56833229	Power cable assembly	VM1276-0.8M	0.74 m in length
12-1	56401345	Transformer	KCT-345	100/110/220 V AC (with tap)
12-2	56401555	Transformer	KCT-155	380/440 V AC (with tap)
18	57509102	Leakage breaker	BJS152100S1	

This list may be changed without prior notice.

Parts list

Winch (1): Winch frame block (1) (Drawing No. C25BG1010*) Exploded drawing is in page 4-18.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
3	83206290	Handle	DM688-467M2	with rubber
6	81401160	Frame main body	DM688-401M5	
7	80230330	Screw cover (A)	DM688-460	
9	80230340	Screw cover (B)	DM688-461 M1	
10	72300030	Wooden base for winch (sqaure log)	DM688-466 M2	One pair of two logs
12	57166615	Connector plug	NT-5015-CRM	
23	57509701	Limit switch	D4A-4503N	For arrival to bottom and storage (common)
20	82722424	Direction indicating plate	C25MB50031	
21	80245132	Cover	C25MP50020	
22	80245122	Motor case	C25MP50010	
25	63990170	Printed circuit board	C25-8300	

Winch (2): Winch frame block (2) (Drawing No. 682-2352*) Exploded drawing is in page 4-19.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
2	80600020	Holding plate	DM688-450 M2	
A	84901150	Wire side roller	DM688-438 M1	Assembly of part No. 4 and 5 into one unit
6	77302200	Hinge pin	DM688-424 M1	
8	77192015	E ring	E4U	
9-1	83221104	Wire sheave bracket	DM688-412-1M2	
9-2	83221114	Wire sheave bracket	DM688-412-2M2	
12	83621200	Limit switch shaft	DM688-468 M2	
13	77601110	Bearing	SS6-15ZZ	
14	84901160	Wire sheave	DM688-439	
15	77500033	Limit spring	DM688-458	
17	76900580	Wire sheave lock pin	DM688-428M1	
18	83441060	Holding arm (B)	DM688-408 M1	
20	84901200	Holding roller	DM688-443 M1	
21	83621190	Roller shaft	DM688-421 M1	
22	77500030	Holding spring	DM688-455	
24	77165009	Type C snap ring	SC-9S	
25	77601100	Bearing	SS10-19ZZ	
26	84800110	Sprocket (F)	DM688-435 M1	
27	71430020	Bush chain (B)	DM688-511(RS-25)	122 cm in length
28	83630550	Chain tensioner pin	DM688-413 M1	
30	84800100	Sprocket (E)	DM688-434 M1	

This list may be changed without notice.

Parts list

Winch (3): Wire phasing device (1) (drawing No. 682-2353*) Exploded drawing is in page 4-20.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
2	80600020	Holding plate	DM688-450 M2	
3	84402340	Collar (C)	DM688-453 M1	
A	84901150	Wire side roller	DM688-438 M1	Assembly of part No. 4 and 5 into one unit
8	83221040	Slide bracket (A)	688-409 M1	
9	77302200	Hinge pin	688-424 M1	
10	83441050	Holding arm (A)	688-407 M2	
11	77500031	Wire holding spring	688-456	
12	77601110	Bearing	SS6-15ZZ	
13	84901160	Wire sheave	688-439	
B	84901190	Wire holding roller	688-442 M1	Assembly of part No. 14 and 15 into one unit
16	83621170	Screw shaft (B)	688-419 M1	
17	83621180	Screw shaft ©	688-420 M3	
18	83631050	Coupling	688-459 M1	
20	83630600	Slide guide pin	688-422 M1	
21	84800080	Sprocket ©	688-432 M2	
22	71430010	Bush chain (A)	DM688-510 (RS25)	71 cm in length
23	77165015	Type C snap ring	RC15U	
24	77393023	Slip ring pin	SP3X20U	

Winch (4): Wire phasing device (2) (Drawing No. 682-2354*) Exploded drawing is in page 4-21.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
2	80552450	Cover for depth detection part	DM688-448 M2	
3	70213130	Packing (A)	DM688-463 M3	
5	84800130	Gear (B)	DM688-437 M1	
6	83110190	Rotary encoder bracket	DM688-449 M1	
7	53303110	Rotary encoder	EWTXA1S2050B	For depth detection
8	84800120	Gear (A)	DM688-436 M1	
9	77165032	C type snap ring	RC32S	
10	77601090	Bearing	#600ZZ	
12	80301600	Case for depth detector part	DM688-447 M2	
13	84402330	Collar (B)	DM688-452 M1	
14	84641054	Parallel key (round ends)	DM688-473 (S45C)	5 × 5 × 40 L
15	83630570	Wire drum pin (B)	DM688-415 M1	
16	84901130	Wire drum (A)	DM688-405M3	
17	56207015	Lifting motor	DTM-G6075	Without gear box
17 & 18	87500081	Lifting motor	DM688-515	With gear box
18	87500087	Only gearbox	MM60A8-M-180G	
19	84641044	Parallel key (round ends)	DM688-472 (S45C)	5 × 5 × 15 L
20	84901140	Wire drum (B)	DM688-406 M3	
22-1	56806001	Wire rope Z-twisted	DM688-512, SB-150 110M	110 m in length
22-2	56806002	Wire rope S-twisted	DM688-512, SB-150 110M	110 m in length
23	84641064	Parallel key	DM688-474 (S45C)	5 × 5 × 60 L
25	83630560	Wire drum pin (A)	DM688-414 M1	
26	84800070	Sprocket (B)	DM688-431 M1	
27	71430000	Roller chain	DM688-509 (RS35)	1.41 m in length
28	84402320	Collar (A)	DM688-451 M1	

This list may be changed without notice.

Parts list

Winch (5): Cable phasing device (1) (Drawing No. 682-2355*) Exploded drawing is in page 4-22.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
3	77500042	Cord tension spring	DM688-551-1	Winding direction: Right
4-1	83441070	Cord tension arm	DM688-550-1	One pair of right and left
4-2	83441080	Cord tension arm	DM688-550-2	
6	83502380	Stopper pin	DM688-426	
10	84901170	Cord sheave	DM688-440 M1	
11	83221060	Cord sheave bracket	DM688-411 M1	
12	77500052	Cord tension spring	DM688-551-2	Winding direction: Left
14	77302210	Tension arm pin	DM688-425 M1	
15	83502390	Cord tension pin	DM688-427 M1	
16	84901180	Cord tension roller	DM688-441 M1	
17	76900590	Rotary center pin	DM688-423 M1	
18	77601120	Bearing	ARF1015LD ルロン	
19	77165015	C type snap ring	RC15U	
20	77601110	Bearing	SS6-15ZZ	
21	83630600	Slide guide pin	DM688-422 M1	
22	83621160	Screw shaft (A)	DM688-418 M2	
24	83221050	Slide bracket (B)	DM688-410 M1	
26	84800090	Sprocket (D)	DM688-433 M2	
28	77302200	Hinge pin	DM688-424 M1	

Winch (6): Cable phasing device (2) (Drawing No. 682-2356*) Exploded drawing is in page 4-23.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
2	80552430	Slip ring cover	DM688-445 M2	
3	70213131	Packing (B)	DM688-464 M2	
4	87501003	Slip ring unit	364-3504	
6	77165015	C type snap ring	RC15U	
7	77601090	Bearing	#6002ZZ	
9	80301590	Slip ring case	DM688-444 M3	
11	80552440	Slip ring upper cover	DM688-446 M1	
12	70213132	Packing (C)	DM688-465 M1	
13	83630590	Cord drum pin (B)	DM688-417 M1	
14	84641054	Parallel key (Both ends are round.)	DM688-473 (S45C)	5 X 5 X 40 L
15	84901120	Cord drum	DM688-404 M2	
16	84641044	Parallel key (Both ends are round.)	DM688-472 (S45C)	5 X 5 X 15 L
18	83630580	Cord drum pin (A)	DM688-416 M1	
19	84800060	Sprocket (A)	DM688-430 M1	
20	84402320	Collar (A)	DM688-451 M1	
23	56813902	Transducer cable	HC-ESV-4-110M	110 m in length (16/0.12 twisted)

This list may be changed without prior notice.

Parts list

Winch (7): Sensor (Transducer) unit (Drawing No. 682-2357*) Exploded drawing is in page 4-24.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
1	83204054	Hanger	DM688-519-01M3	
2	83204044	Suspending angle	DM688-519-02M2	
3	79033205	Nylon clamp	NK-5N	
7	83502444	Collar	DM688-519-07M2	
8	75092005	Hexagon bolt	B10X25U	
9	77191083	Flat washer	W10U	
13	83502454	Joint	DM688-519-13	
16	83942093	Washer	DM688-519-16	
17	80501964	Top panel	DM688-519-17 M1	
28	58502021	Sensor elements assy (processed transducer itself)	NGM-50-88A	With connector, cable, sponge and cork plate
29	76091030	Lock nut	N10U、OSコート付き	
30	57291104	Waterproof connector	GL-20G3S-F-2	with cable (70 cm)
31	57298206	Locking sleeve	GL-20G402	
32	—	Sensor unit assy.	682-2357	Whole transducer except for cable, waire rope
33	87500097	Sensor fitting assy	C25MH50010	Sensor unit assy from which 4 sensor element assemblies (A) were dismantled

Recorder, winch, auxiliaries and option No exploded drawing is available.

Part No.	Item code	Name of item	Specification/Drawing No.	Remarks
Recorder (1)-2	41370040	Step-down transformer unit	DMT-000-[100/110/220V]	100/110/220V AC (with CW-71)
Recorder (1)-2	41370030	Step-down transformer unit	DMT-003 CW-71ツキ	440 V AC (with CW-71)
Recorder (1)-14	72660013	Recording paper	DMP-250 A3-560	Paper width: 250 mm, Length: 20 m
Recorder (4)-1	85111020	Recording stylus	DMS-001 (682-1378-1M2)	
Recorder (4)-2	85111030	Conducting stylus	DMS-002 (682-1378-2M2)	
Drwg of cable configuration-	35061806	Power cable assy	CW-71 [364-3535]	10 m with connectors at both ends
Drwg of cable configuration-	35285580	Connecting cable assy	CW-558-10M	10 m with connector
—	56841411	Connecting cable assy	FG-SV-11	10 m unit (for between recorder and winch)
—	57166415	Connector plug (bend type)	NT-5015-LPF12	Connecting cable (winch side)
—	57166515	Connector plug (bend type)	NT-5015-LPM12	Connecting cable (recorder side)
—	57166701	Connector cap (for plug)	NT-50-PCA	For connecting cable
—	57167310	Connector	NJW-243-RM	For step-down transformer
—	93170151	Instruction manual (Japan)	DM-602/604.OM.J	
—	93170152	Instruction manual (Englis)	DM-602/604.OM.E	
Winch (6)-23	56813902	Transducer cable	HC-ESV-4-110M	110 m
Winch (7)-31	57298206	Locking sleeve	GL-20G402	
Winch (7)-30	57291104	Waterproof connector	GL-20G3S-F-2	With cable (70 cm)
—	35283840	RS-232C output port assy	CW-384	
—	57298912	AC plug	WF7515	

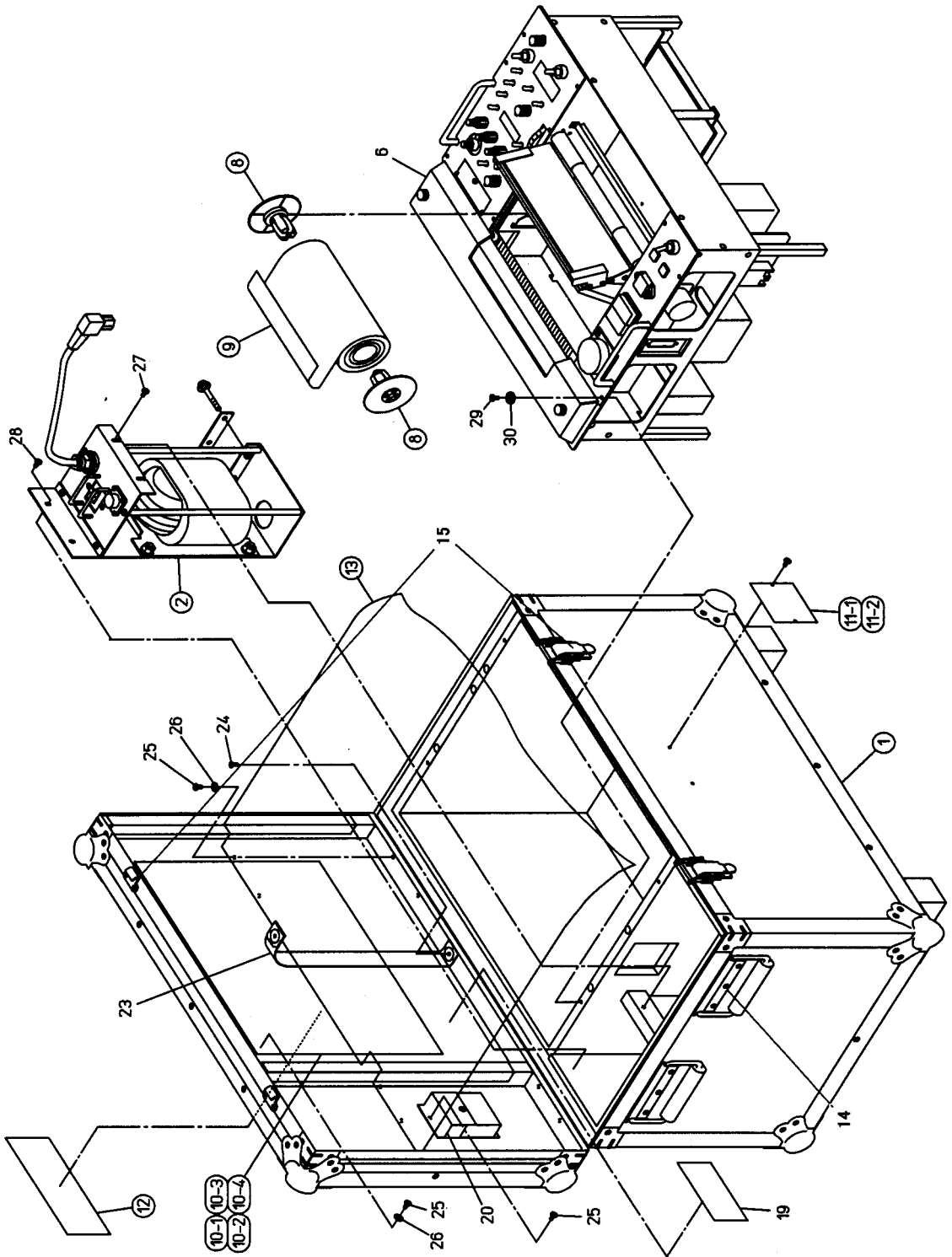
This list may be changed without prior notice.

分解図/Exploded view

記録機(1)/Recorder unit(1)

For Maintenance

保守用図面



Exploded view of recorder unit

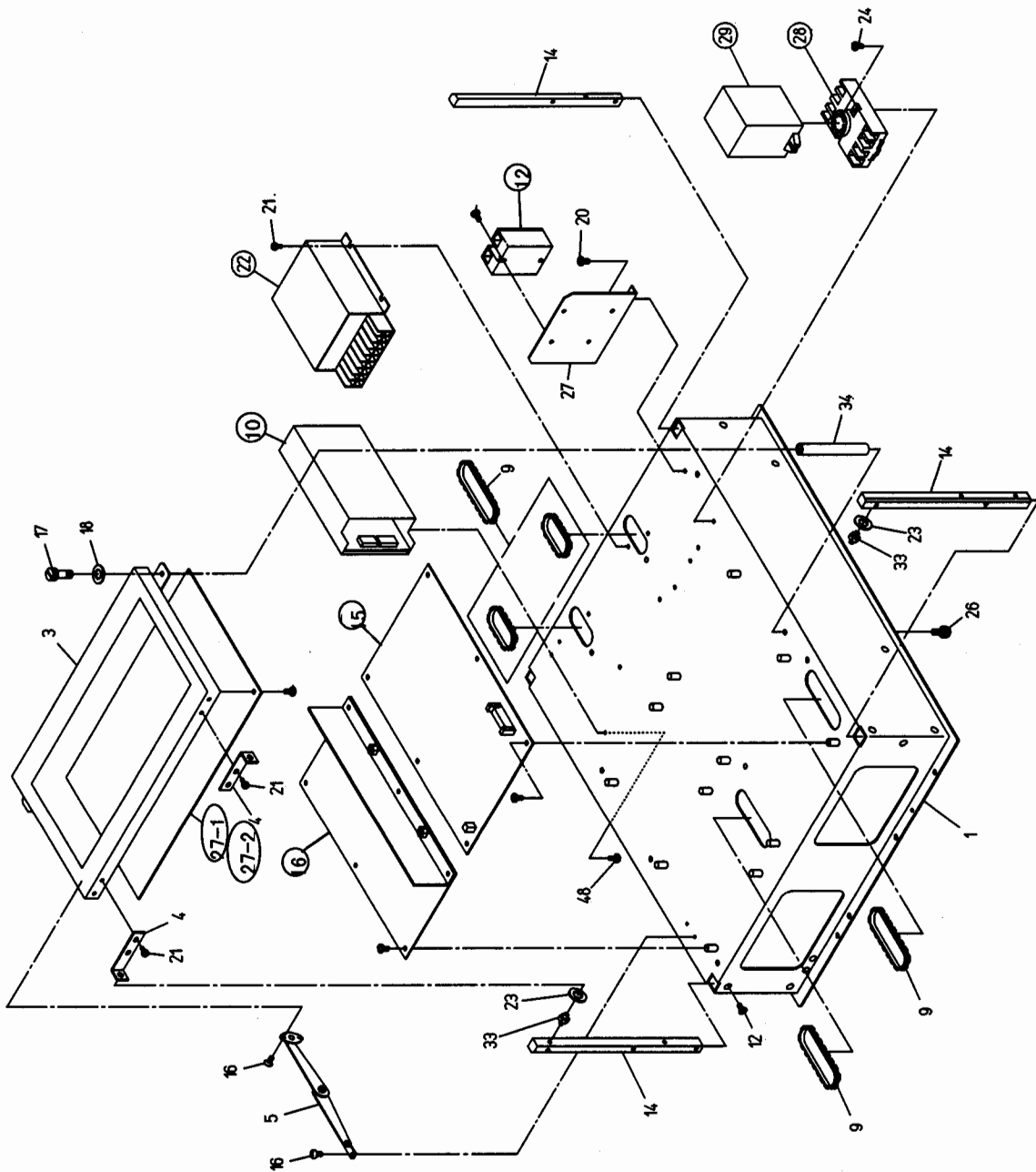
記録機全体図 DWG NO. C25BG11010*

分解図/Exploded view

記録機(2)/Recorder unit(2)

For Maintenance

保守用図面



Exploded view of Chassis block(1)

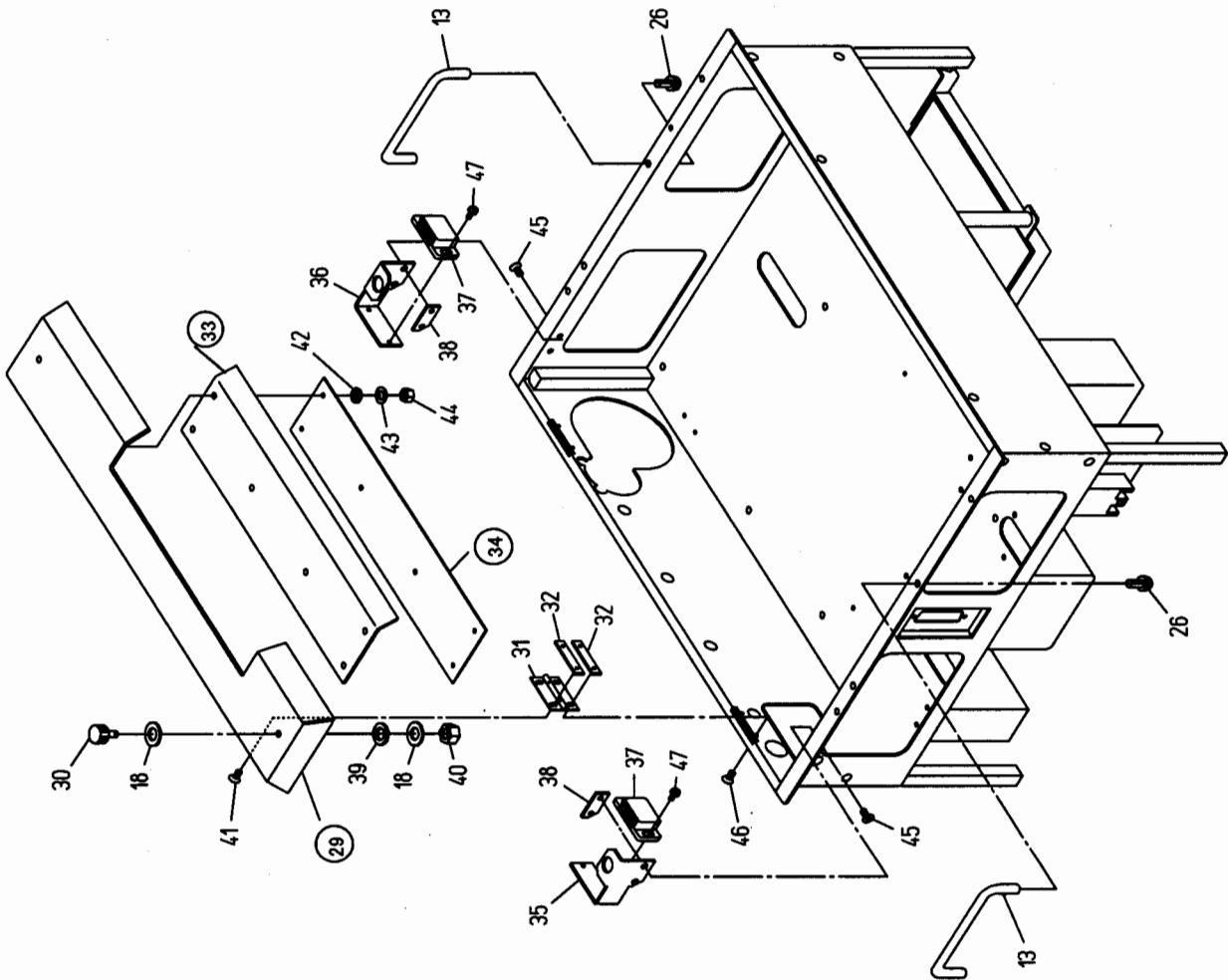
シャーシブロック(1) 分解図 DWG NO. C25BG11050.1 *

分解図/Exploded view

記録機(3)/Recorder unit(3)

For Maintenance Only

保守用図面



Exploded view of Chassis block (2)

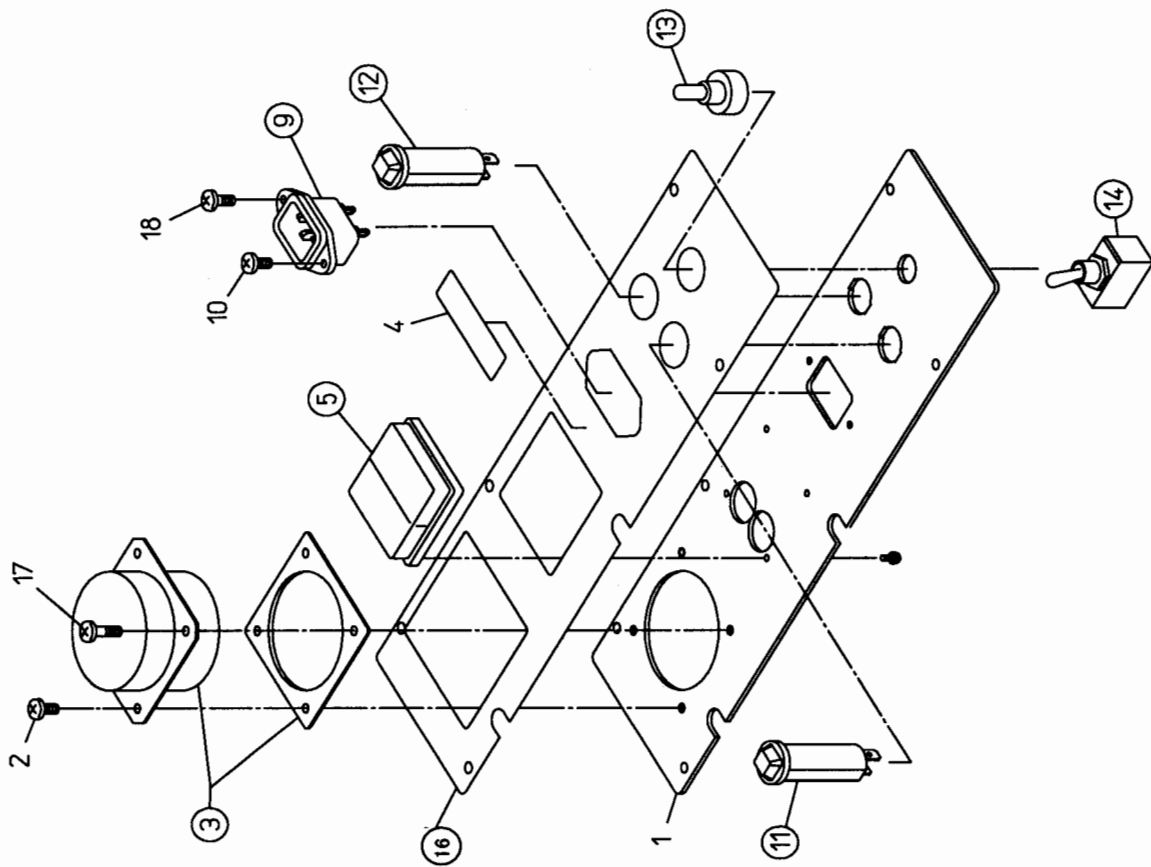
シャーシブロック(2) 分解図 DWG NO. C25BG11050.2 *

分解図/Exploded view

記録機(4)/Recorder unit(4)

For Maintenance Only

保守用図面

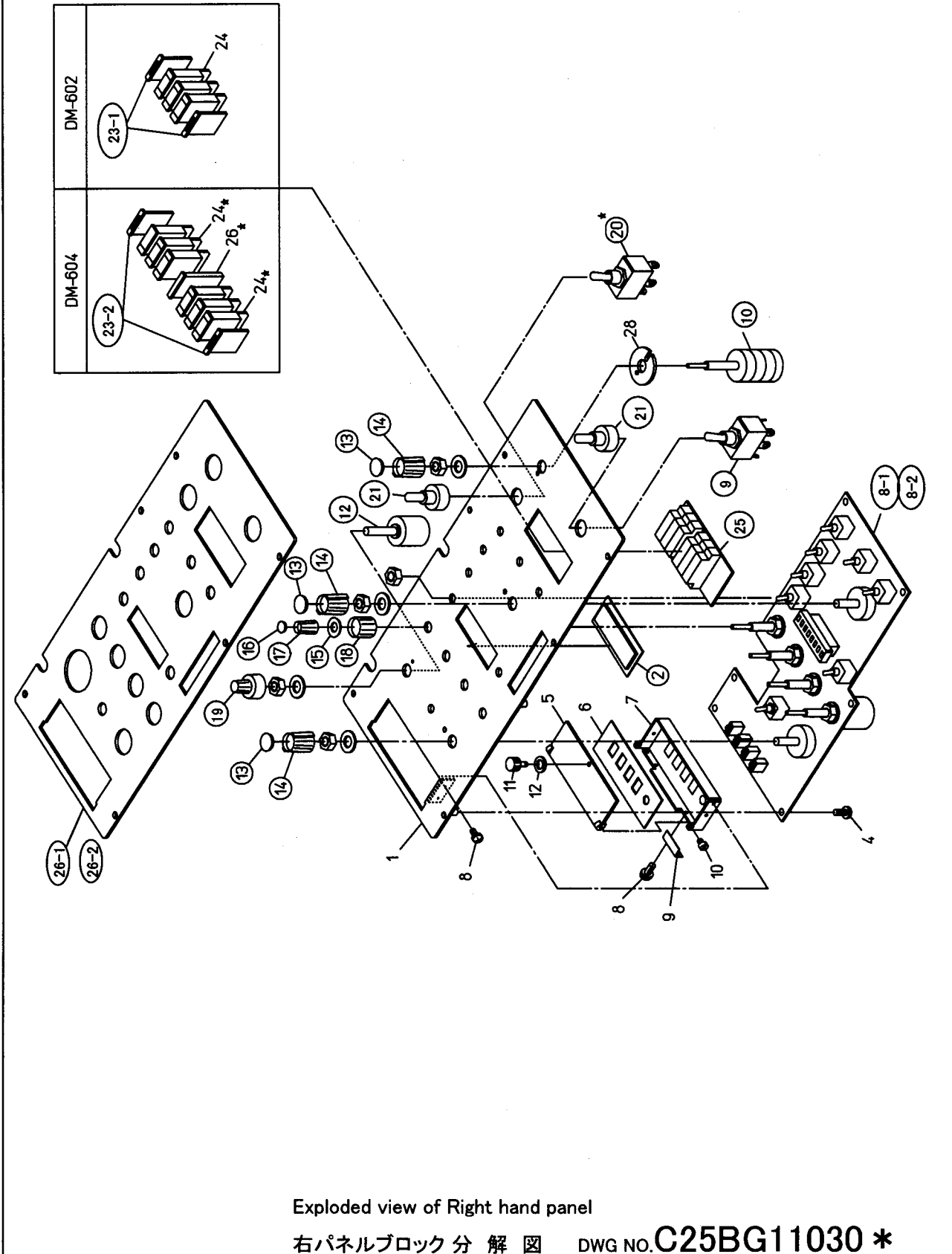


Exploded view of Left hand panel

左パネルブロック 分解図 DWG NO. C25BG11040 *

分解図/Exploded view
記録機(5)/Recorder unit(5)

For Maintenance Only
保守用図面

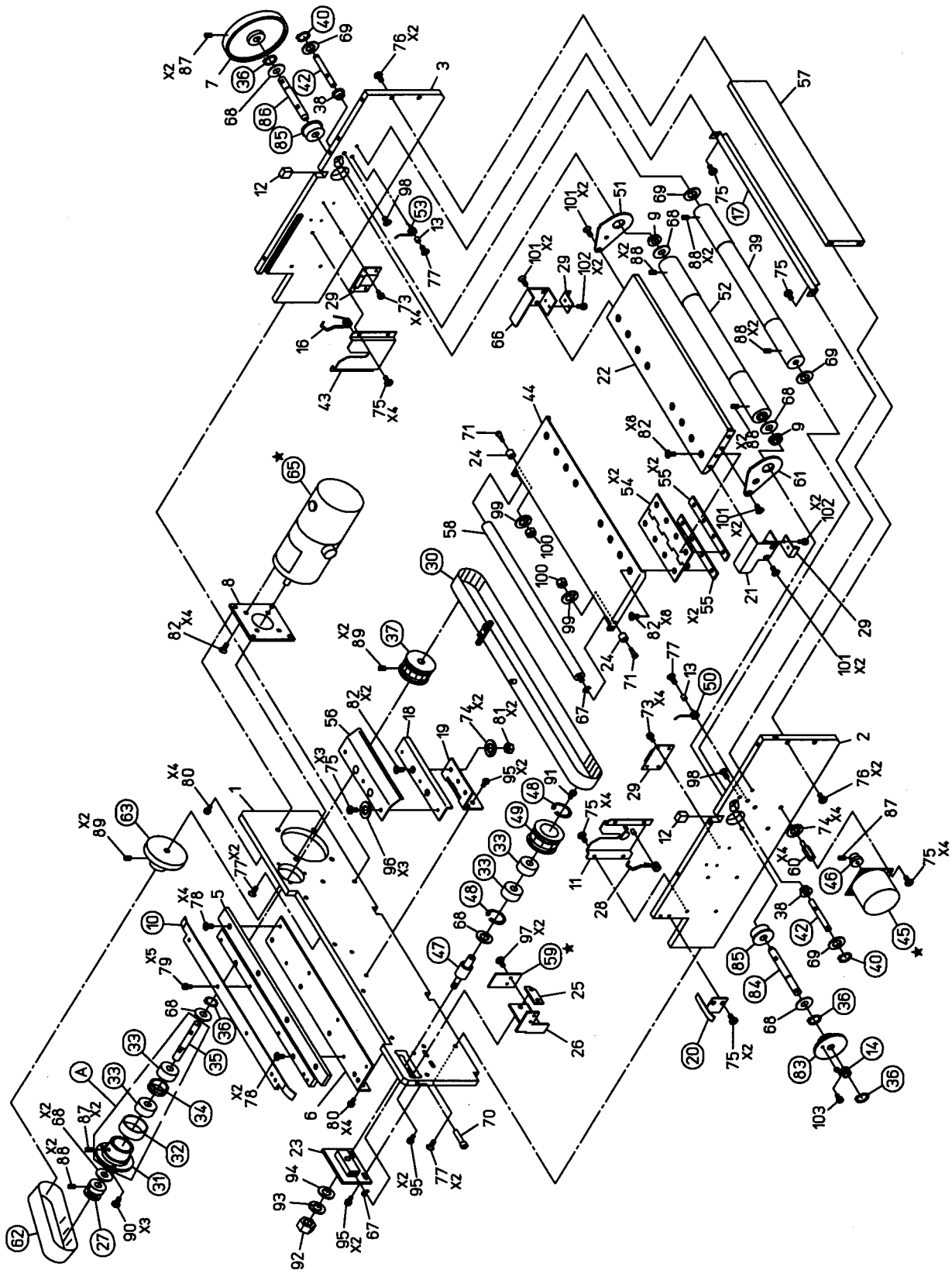


分解図/Exploded view

記録機(6)/Recorder unit(6)

For Maintenance Only

保守用図面



Exploded view of Recording assembly block(1)

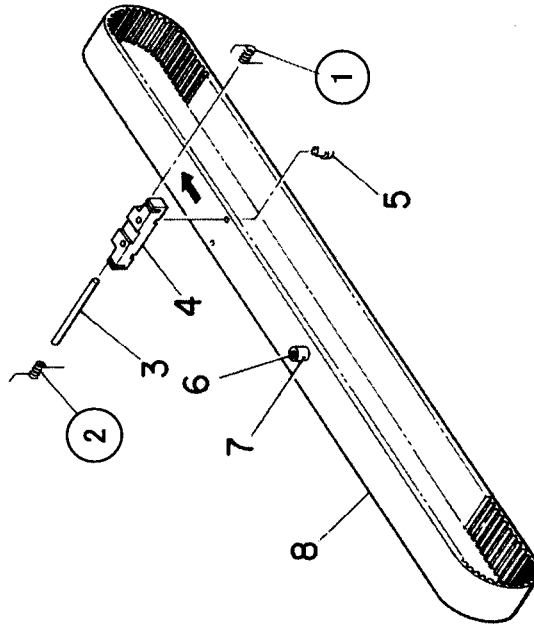
記録機構ブロック分解図 DWG NO. C25BG11020 *

分解図/Exploded view

記録機(7)/Recorder unit(7)

For Maintenance Only

保守用図面



Exploded view of Recording belt

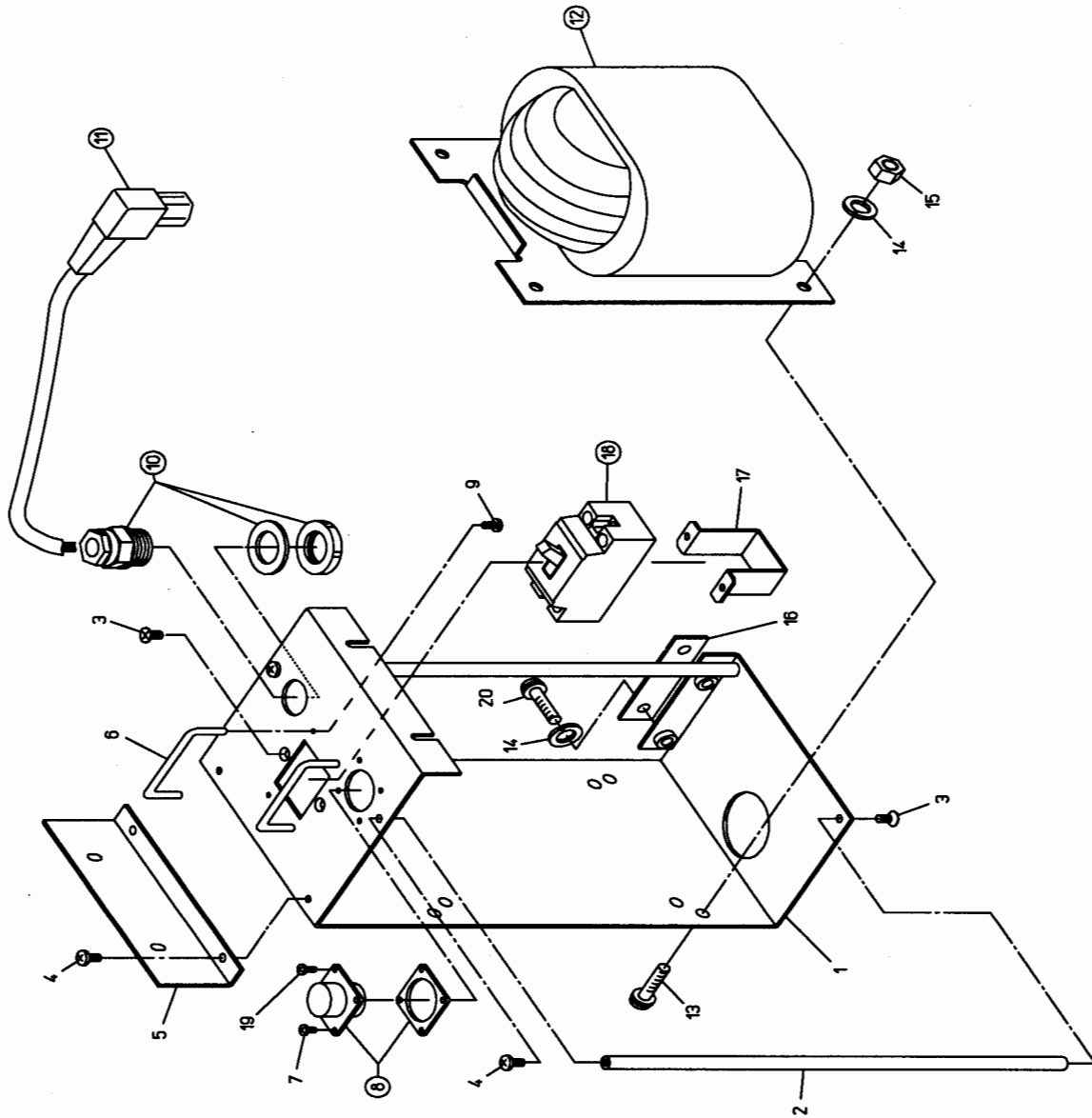
記録ベルト分解図 DWG NO. 682-2325 *

分解図/Exploded view

記録機(8)/Recorder unit(8)

For Maintenance Only

保守用図面

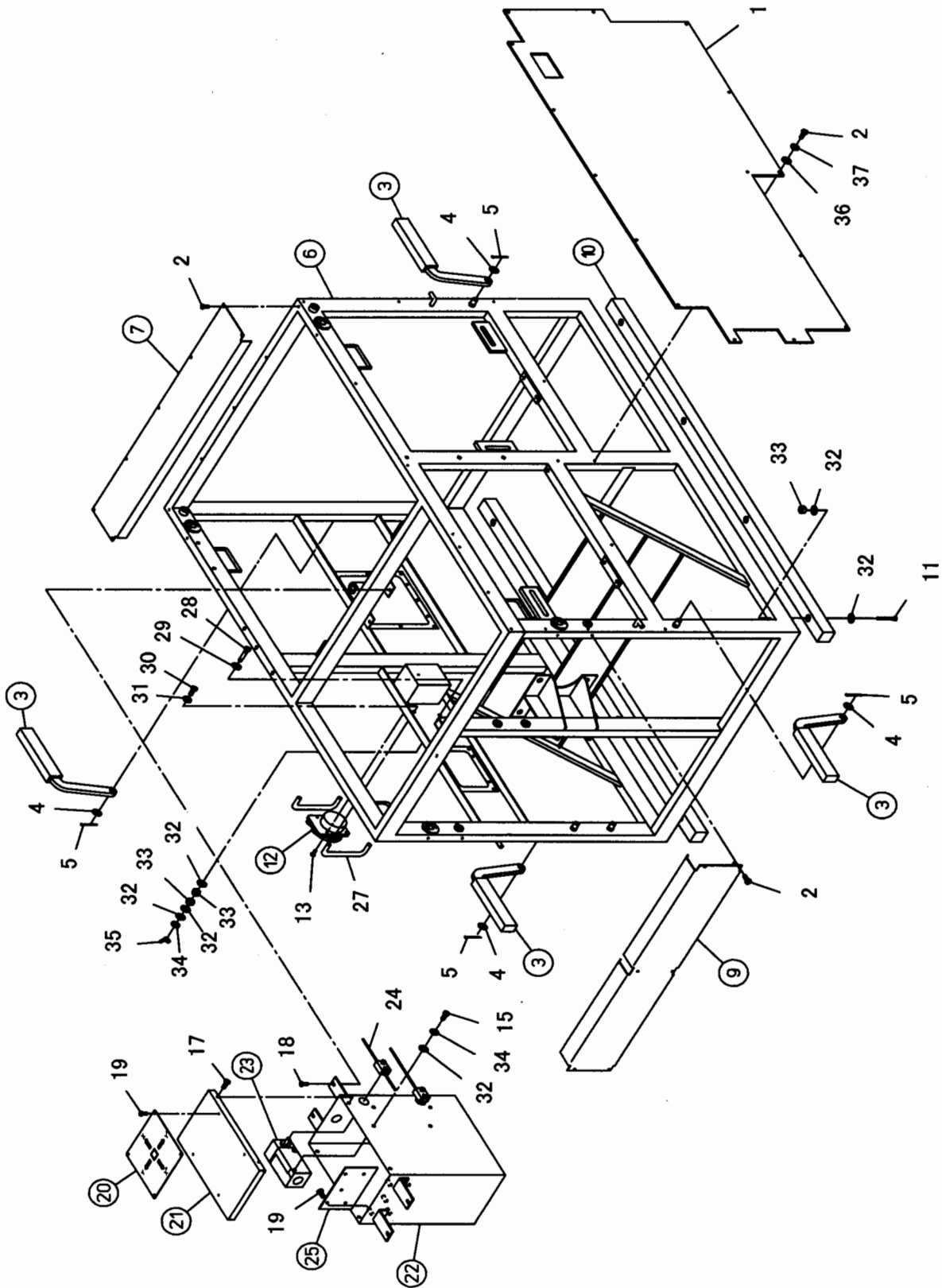


Exploded view of Power transformer unit

降圧トランスユニット 分解図 DWG NO. C25BG11070 *

分解図/Exploded view
ウインチ(1)/Winch unit(1)

For Maintenance Only
保守用図面



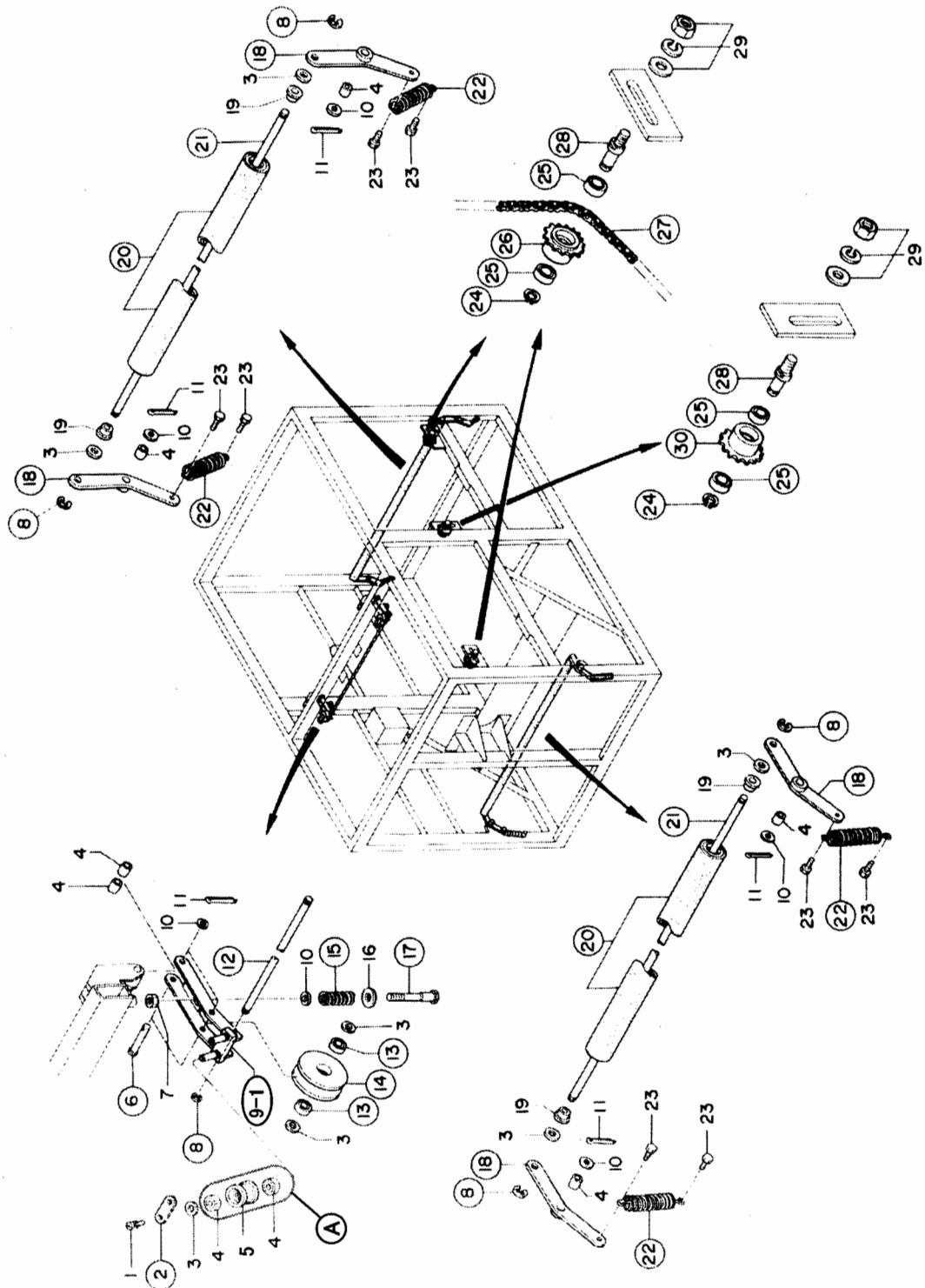
Exploded view of Winch frame block(1)

ウインチフレームブロック(1) 分解図 DWG NO. C25BG51010 *

分解図/Exploded view
ウインチ(2)/Winch unit(2)

For Maintenance Only

保守用図面

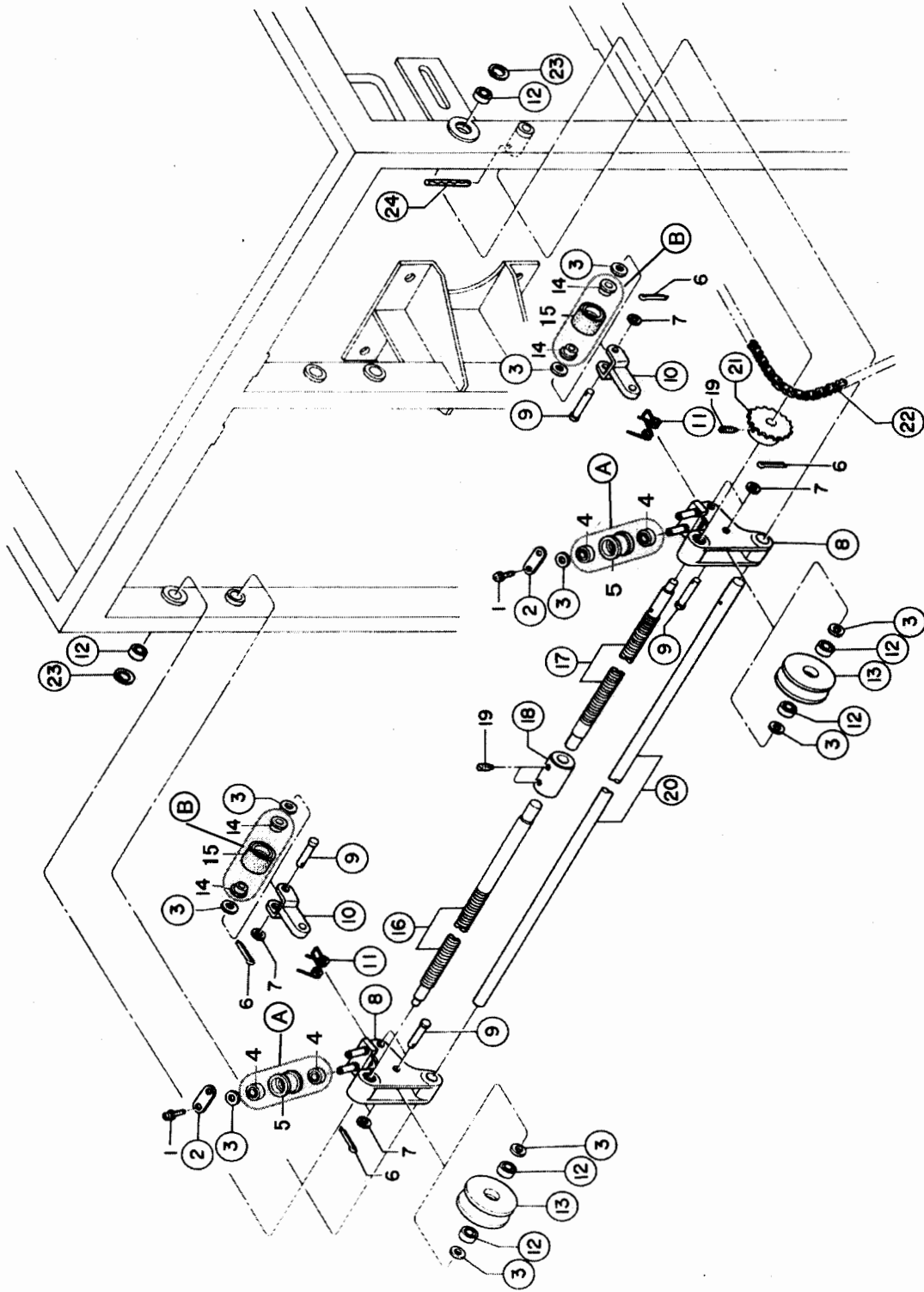


Exploded view of Winch frame block(2)

ウインチフレームブロック(2) 分解図 DWG NO. 682-2352 *

分解図/Exploded view
ウインチ(3)/Winch unit(3)

For Maintenance Only
保守用図面



Exploded view of Wire synchronization(1)

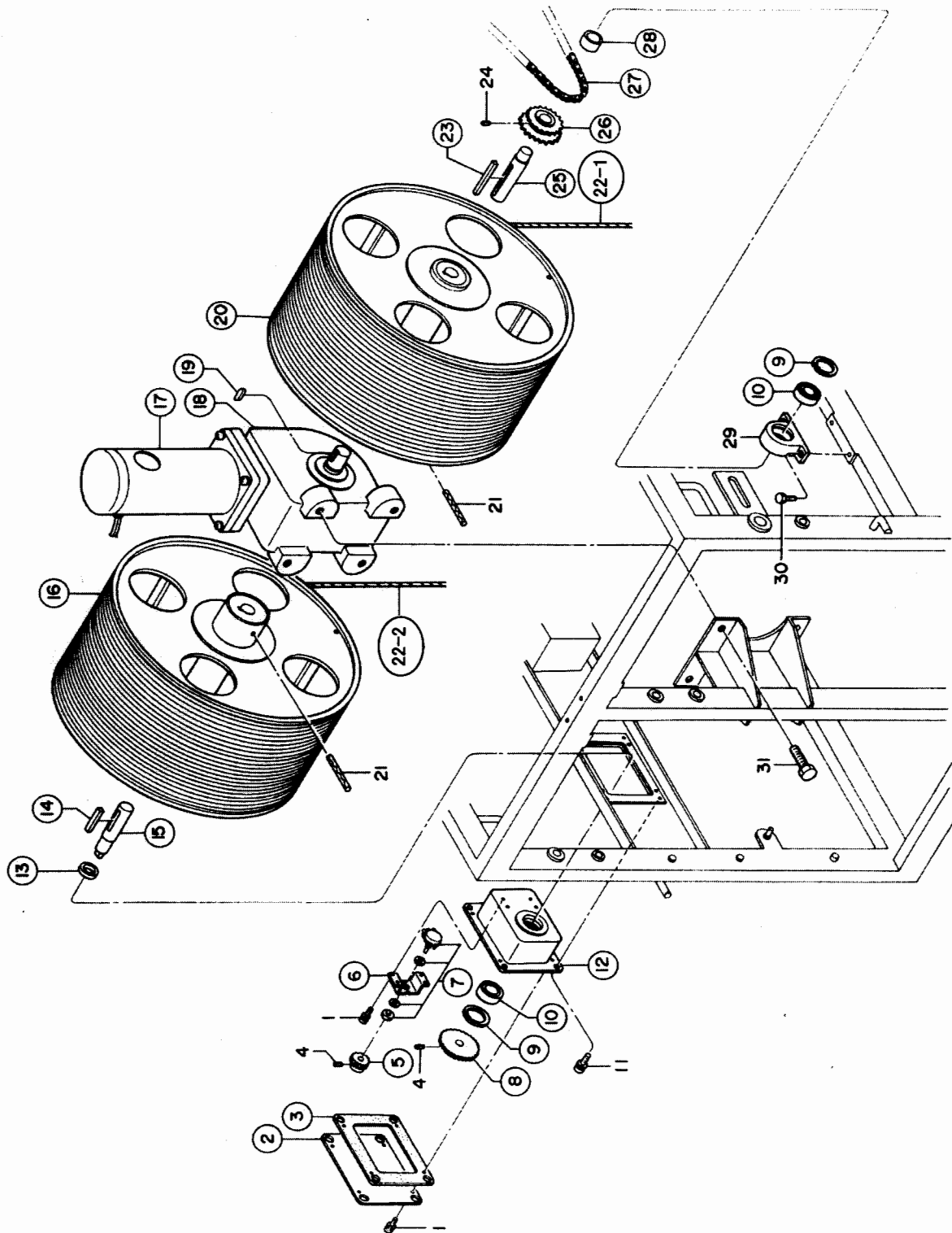
ワイヤ整相装置(1) 分解図 DWG NO 682-2353 *

分解図/Exploded view

ウインチ(4)/Winch unit(4)

For Maintenance Only

保守用図面



Exploded view of Wire synchronization(2)

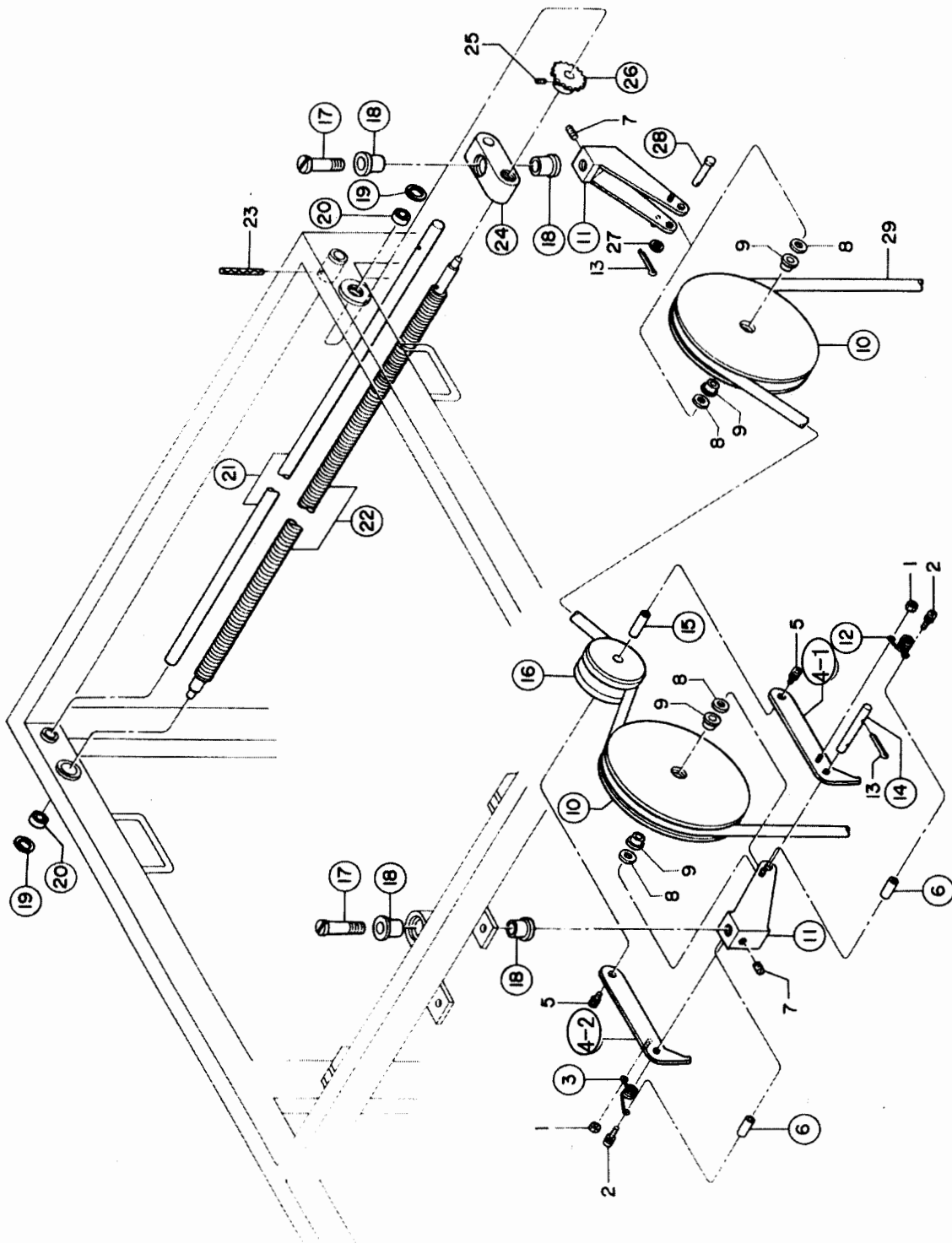
ワイヤ整相装置(2) 分解図 DWG NO 682-2354 *

分解図/Exploded view

ウインチ(5)/Winch unit(5)

For Maintenance Only

保守用図面



Exploded view of Cable synchronization(1)

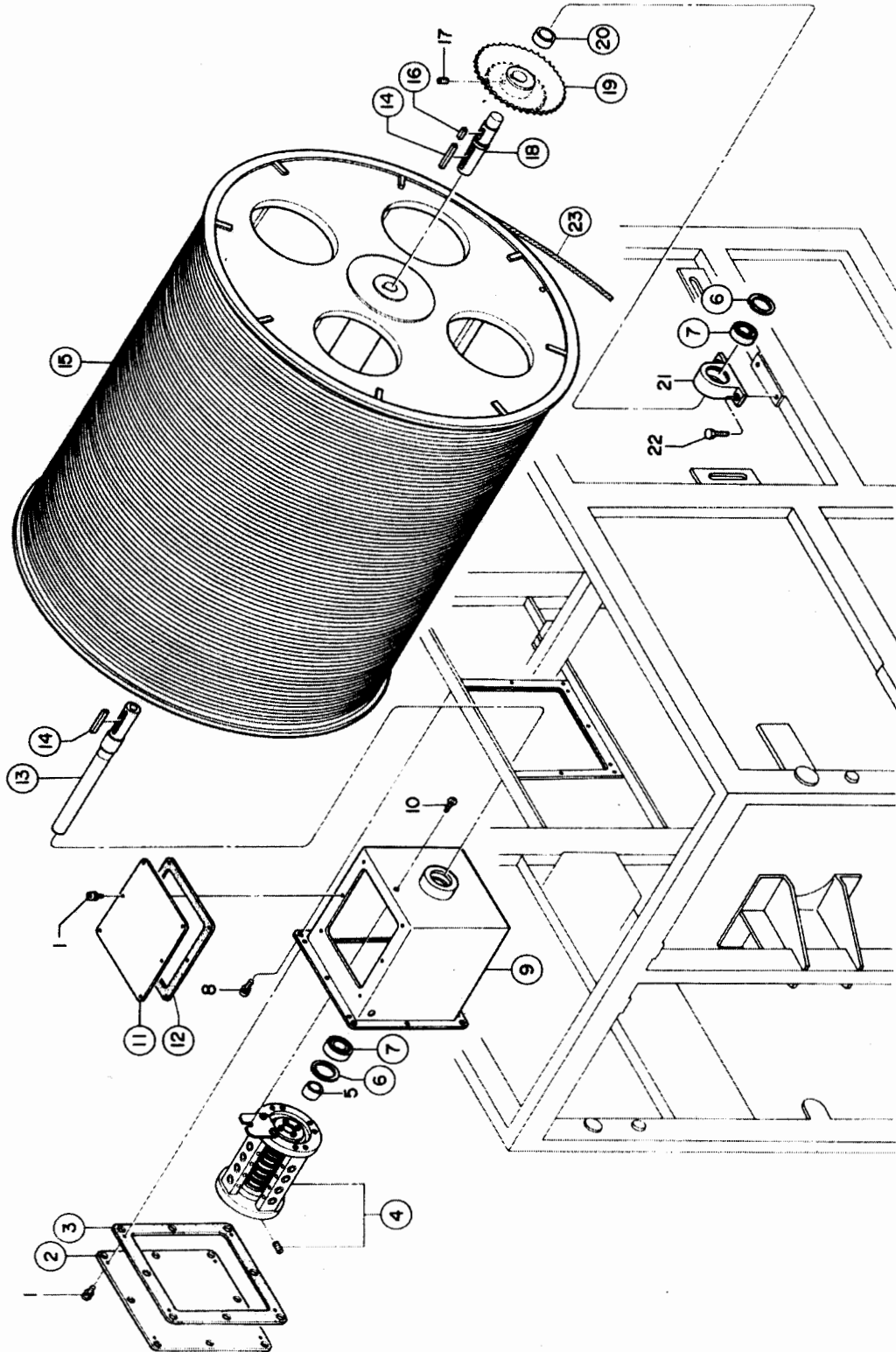
ケーブル整相装置(1) 分解図 DWG NO 682-2355 *

分解図/Exploded view

ウインチ(6)/Winch unit(6)

For Maintenance Only

保守用図面



Exploded view of Cable synchronization(2)

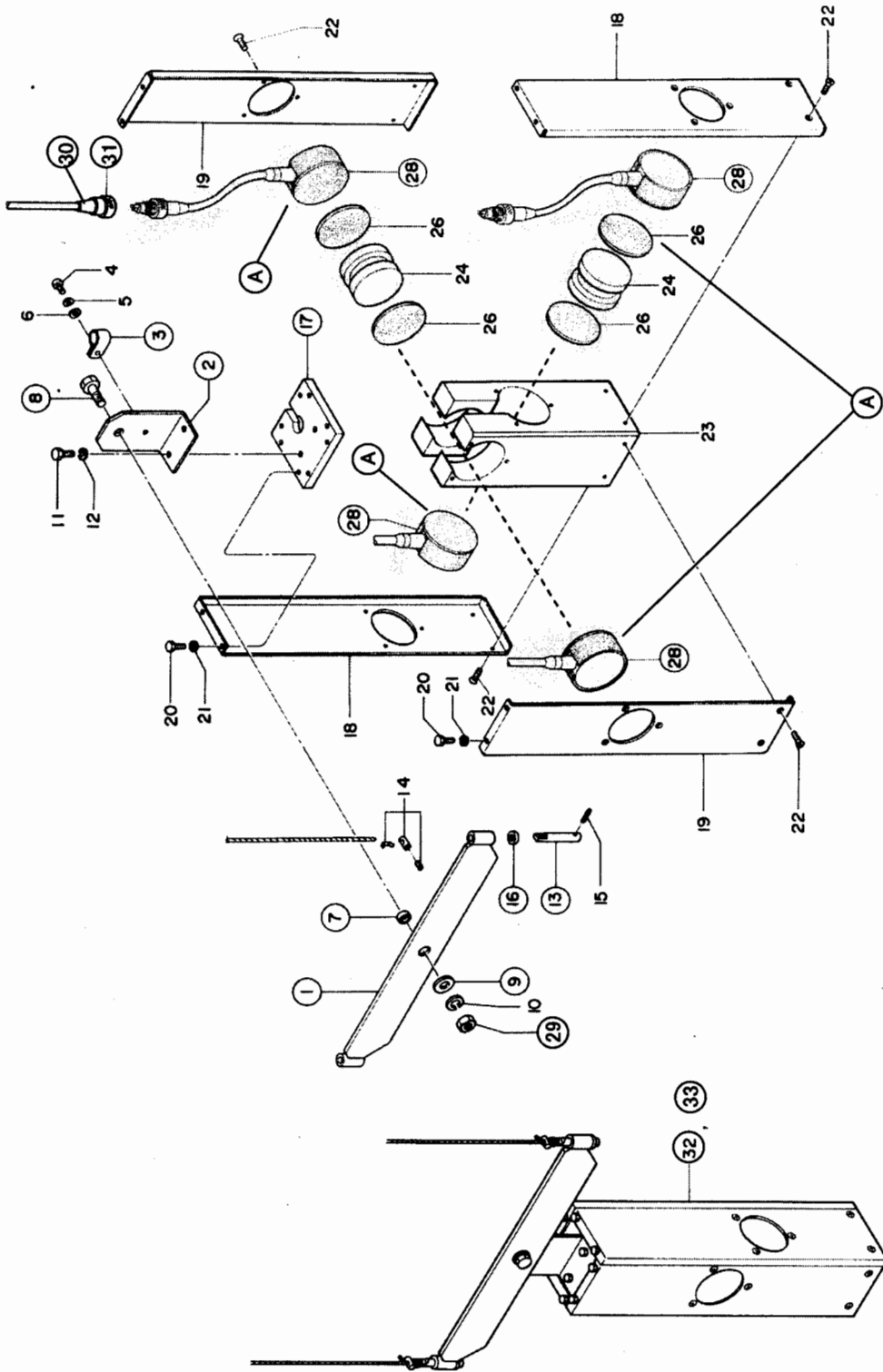
ケーブル整相装置(2) 分解図 DWG NO 682-2356 *

分解図/Exploded view

ウインチ(7)/Winch unit(7)

For Maintenance Only

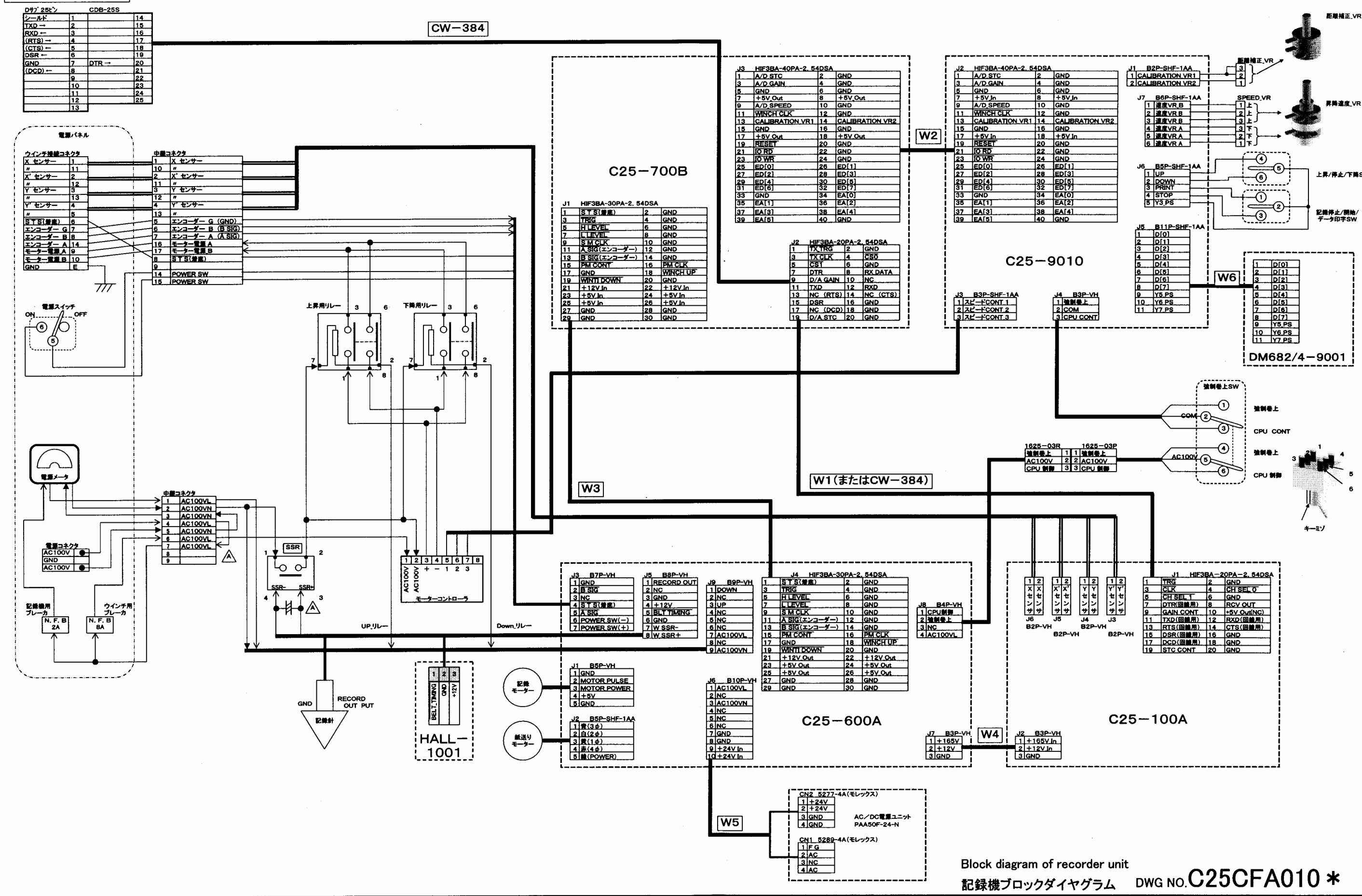
保守用図面



Exploded view of Sensor unit

センサユニット(送受波器) 分解図 DWG NO. 682-2357 *

For Maintenance Only
保守用図面

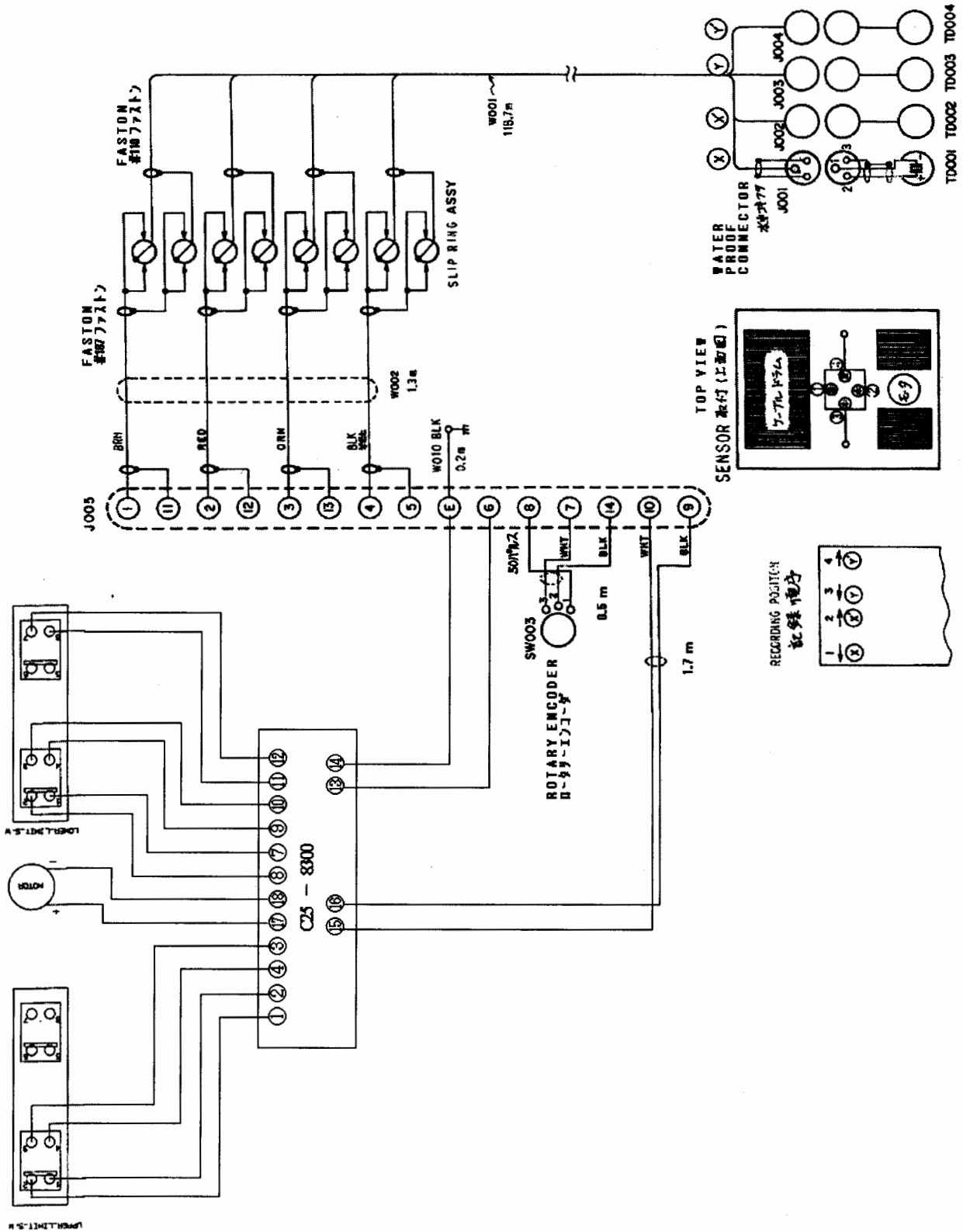


Block diagram of recorder unit
記録機ブロックダイアグラム DWG NO. C25CFA010 *

ウインチ(1)/Winch unit(1)

For Maintenance Only

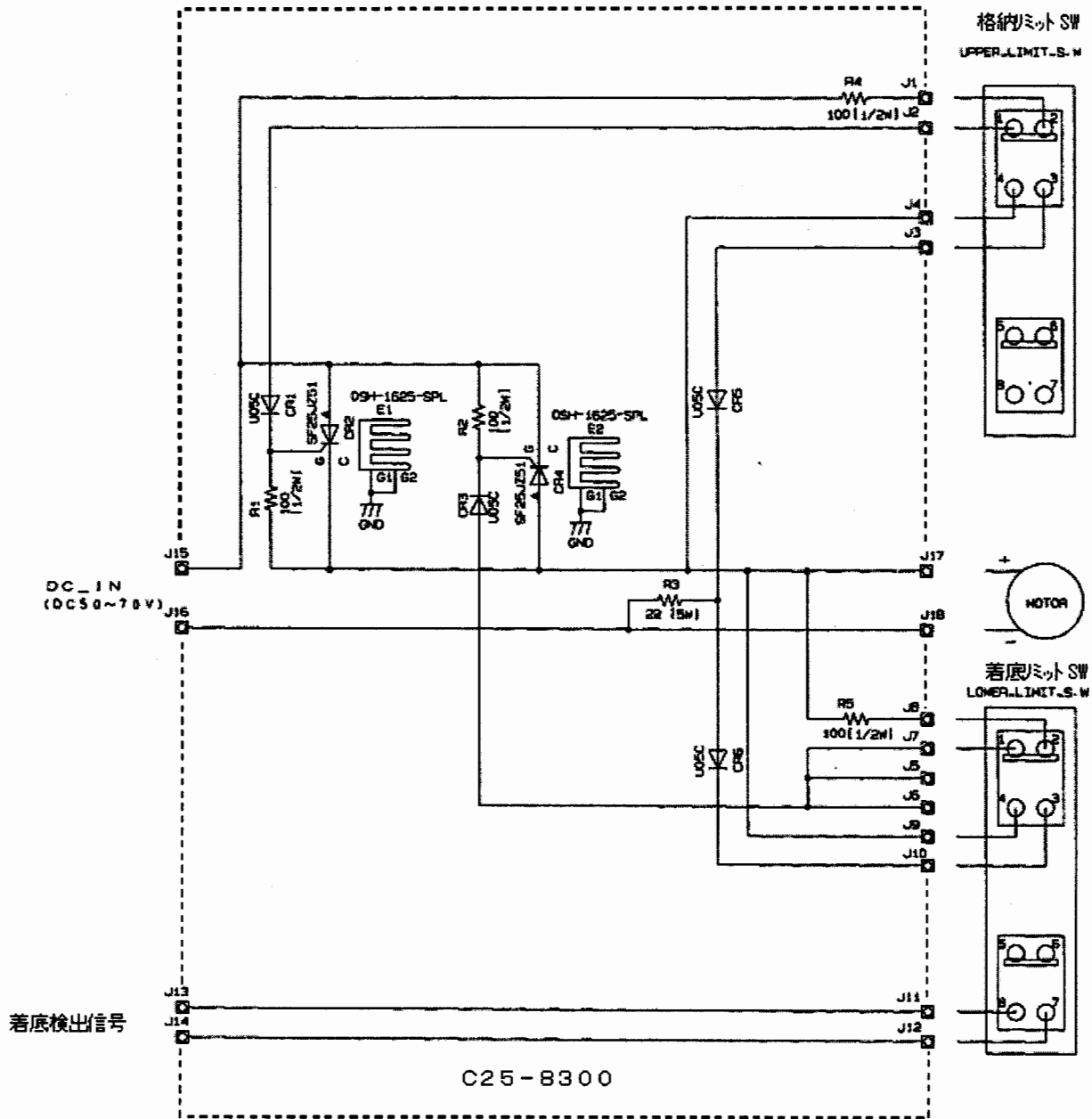
保守用図面



Block diagram of Winch unit(1/2)

ウインチ(1/2)ブロックダイアグラ DWG NO. C25CFA020 *

For Maintenance Only
保守用図面



Block diagram of Winch unit(2/2)

ウインチ(2/2)ブロックダイヤグラ DWG NO. C25CFA030 *

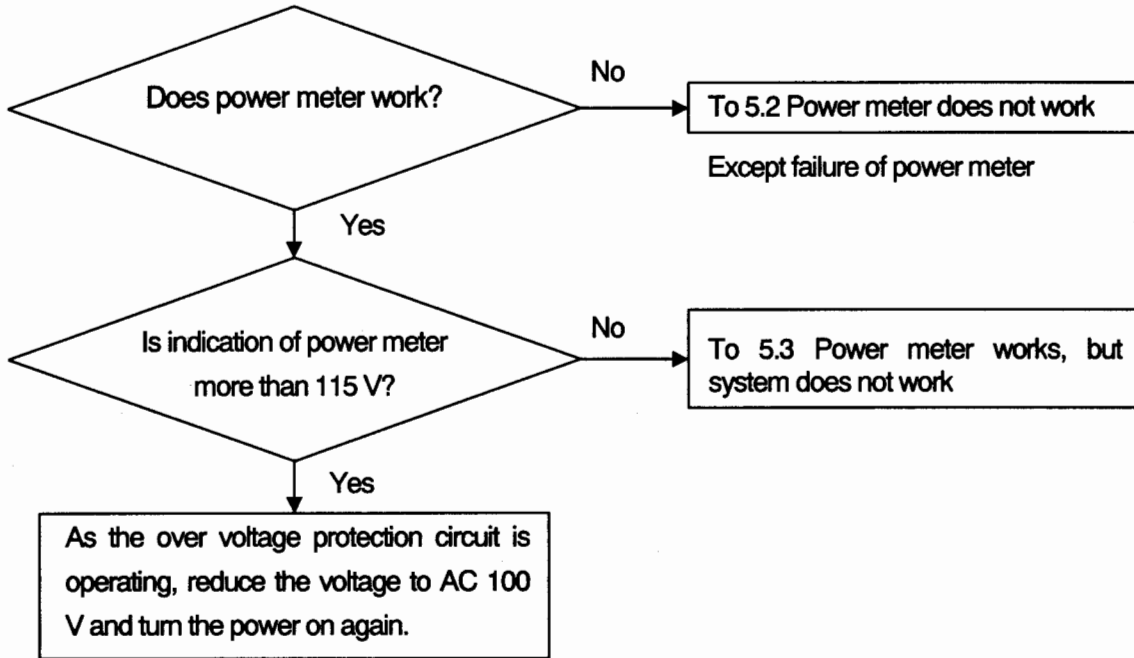
Chapter 5 Failure diagnosis

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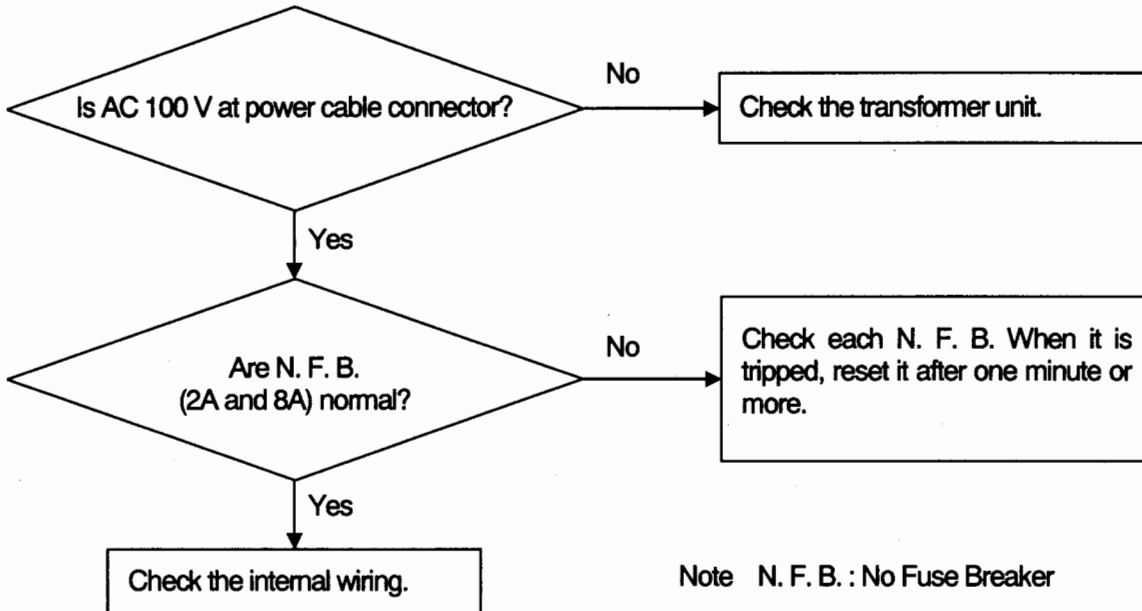
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Chapter 5 Failure diagnosis

5.1 Power cannot be turned on



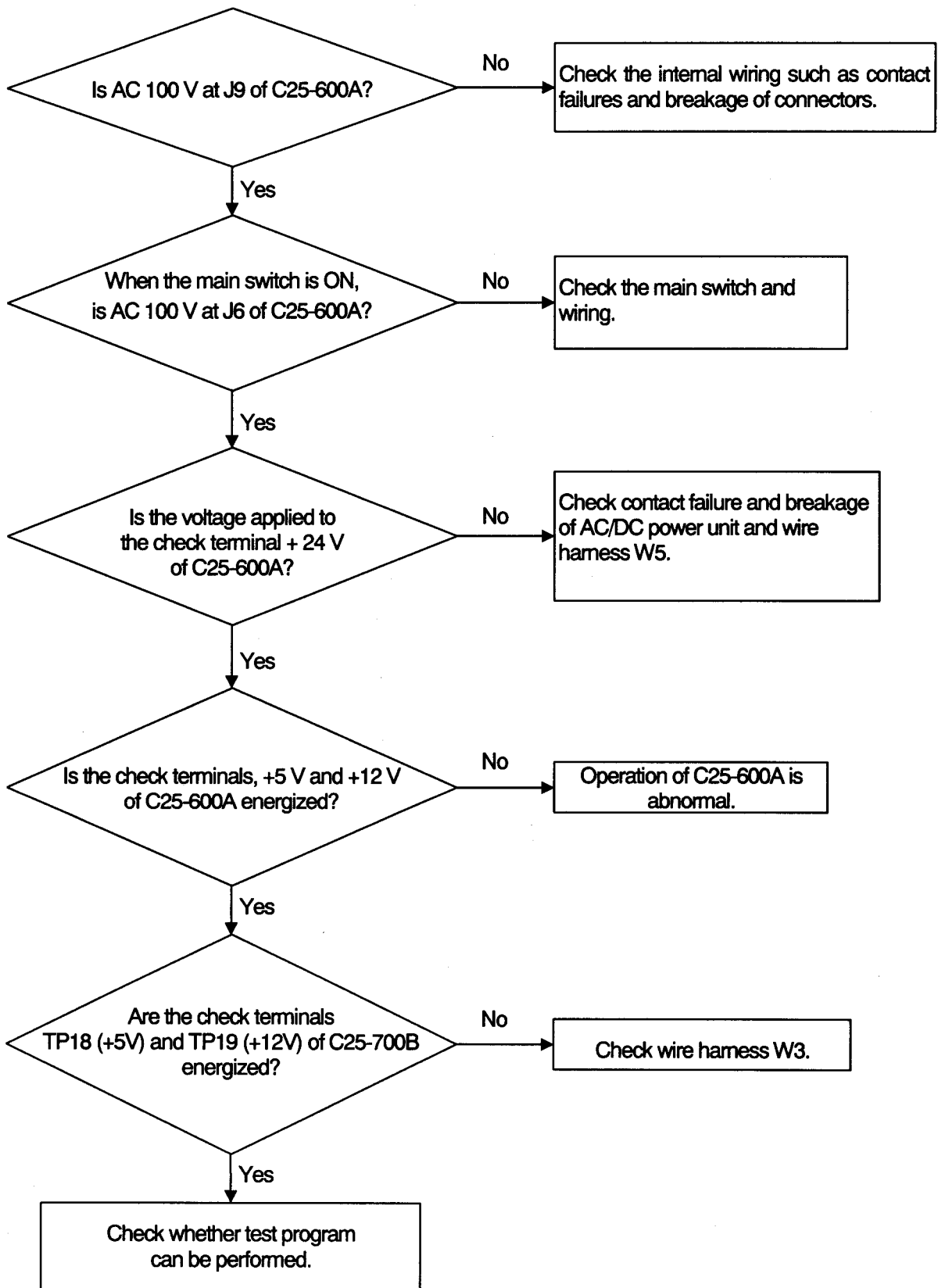
5.2 Power meter does not work



Failures diagnosis

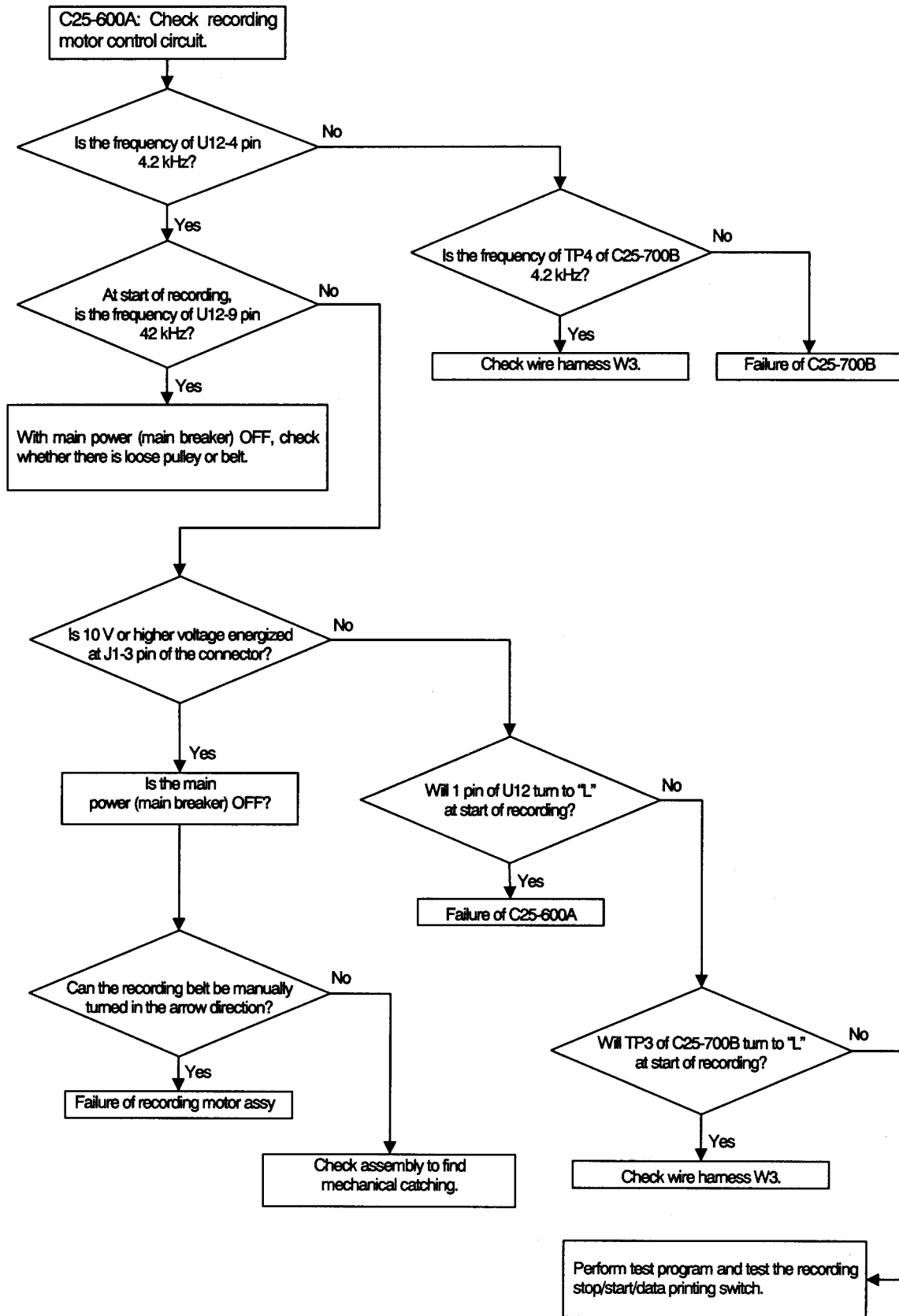
5.3 Power meter works, but system does not work

Note: The indication of the power meter shall not exceed AC 115 V. (Over voltage protection shall not be operating.)



5.4 Recording belt does not move

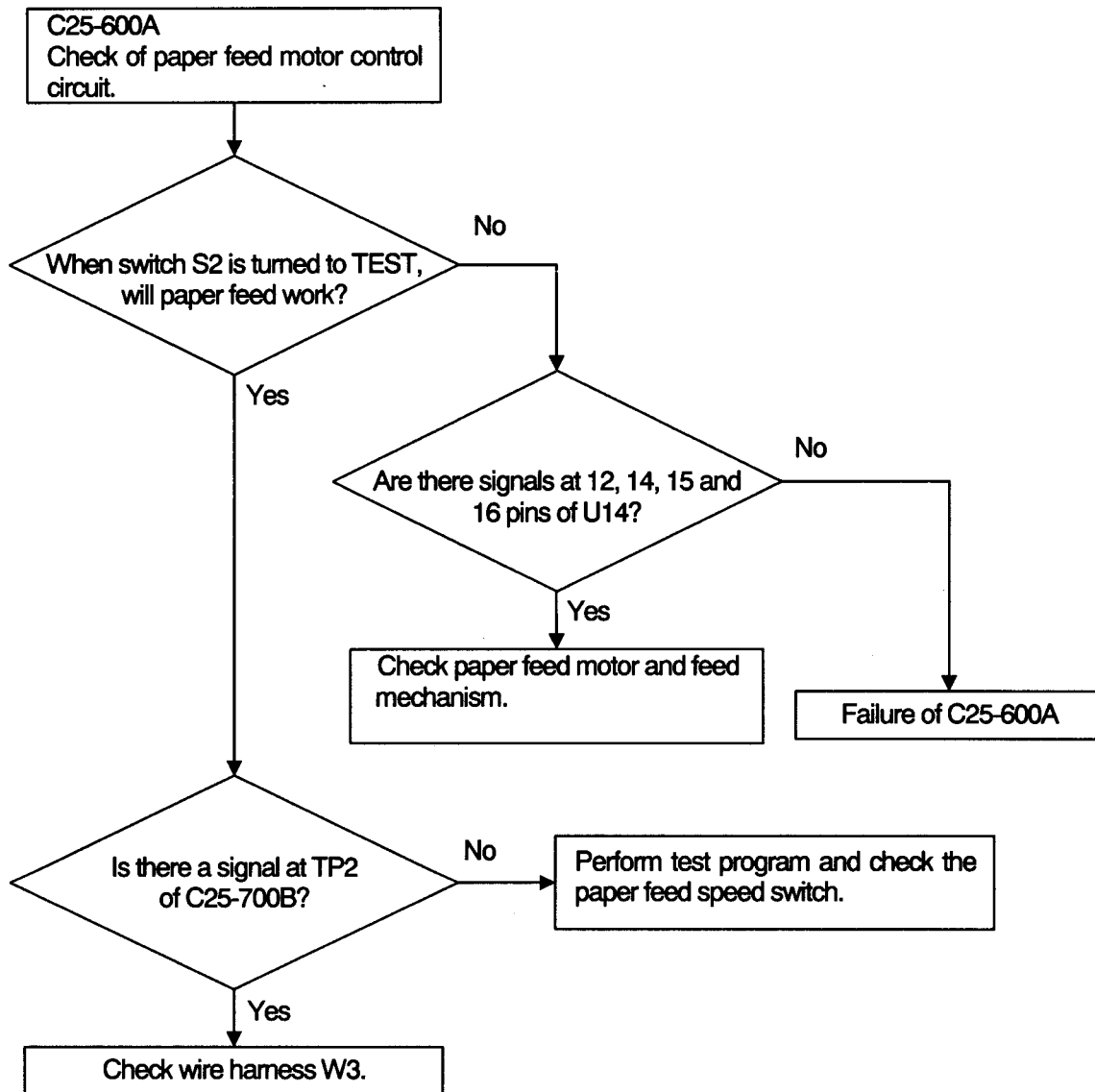
Note 1: Each power source voltage shall be normal.



5.5 Paper feed does not work either at constant rate or depth proportionate

Note 1: Each power source voltage shall be normal.

Note 2: When paper feed does not work at depth proportionate, go to 5.9 "There is no depth marks".



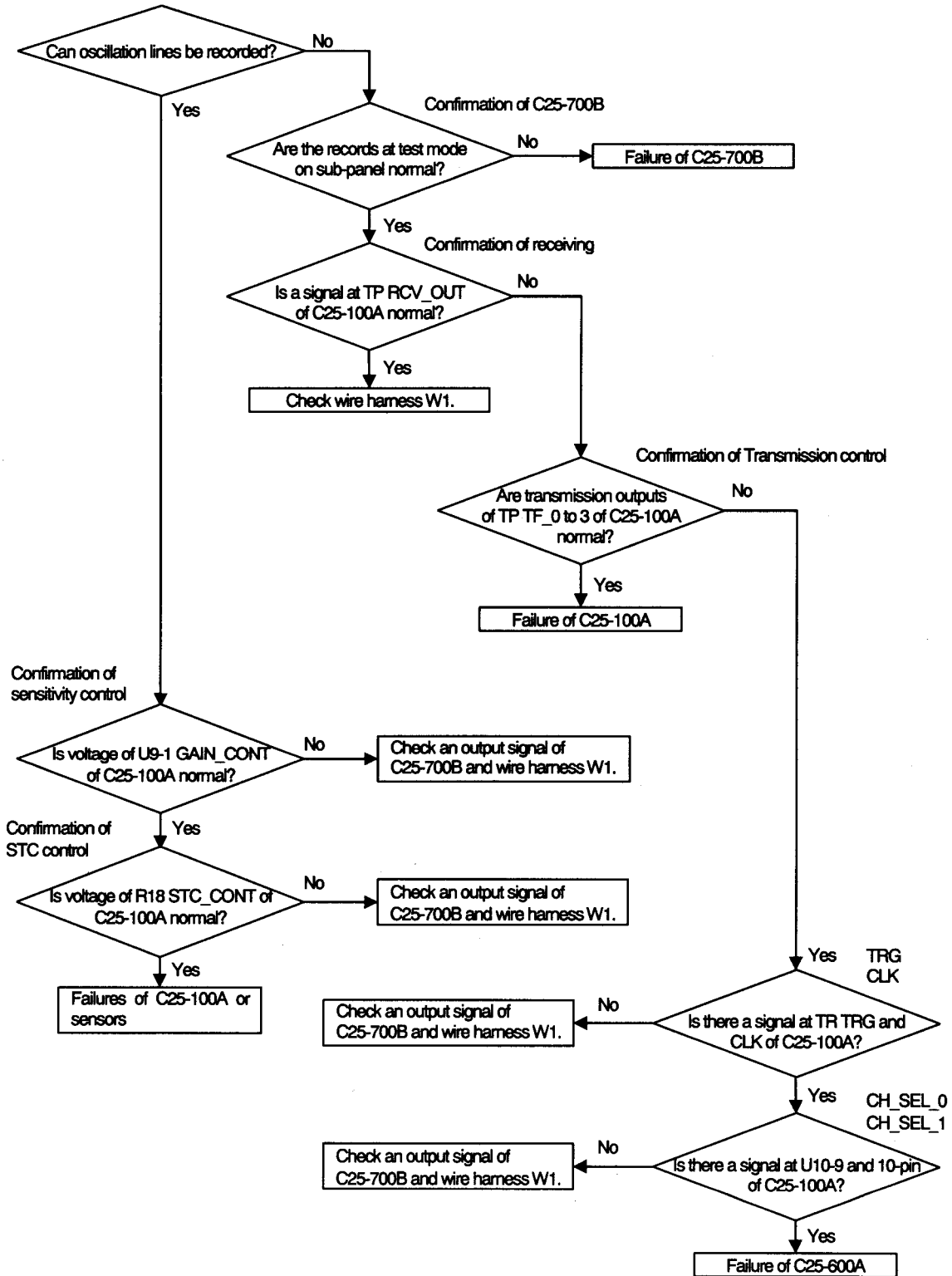
5.6 Various marks can be printed but records of hole wall can not

Note 1: The oscillation line switch shall be OFF.

Note 2: The shift switch shall be 0 %.

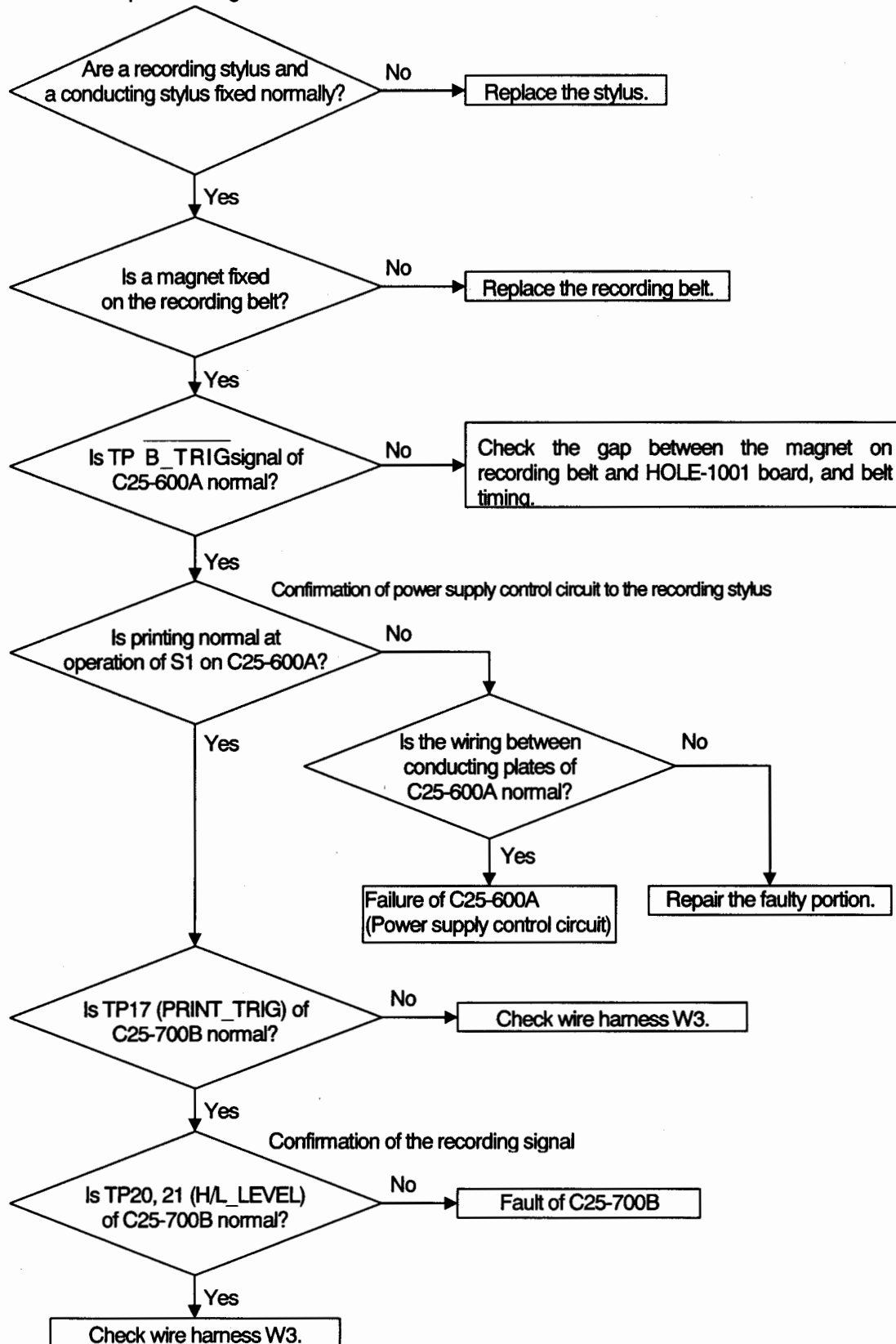
Note 3: Measuring range shall be larger than the distance between sensor and wall.

Note 4: Each power voltage shall be normal.



5.7 Neither various marks nor hole wall records can not be printed

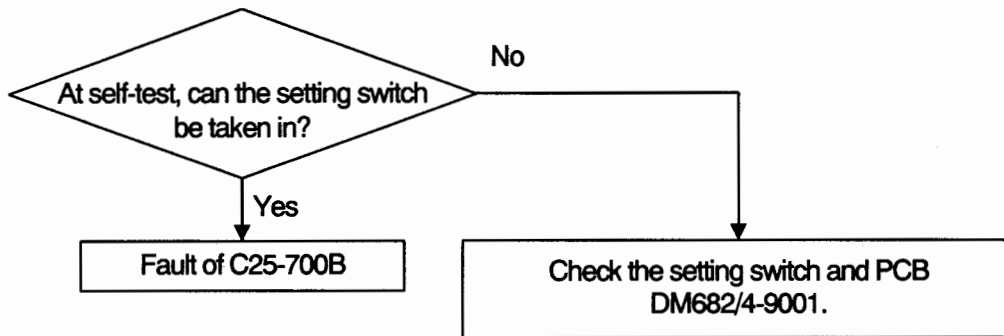
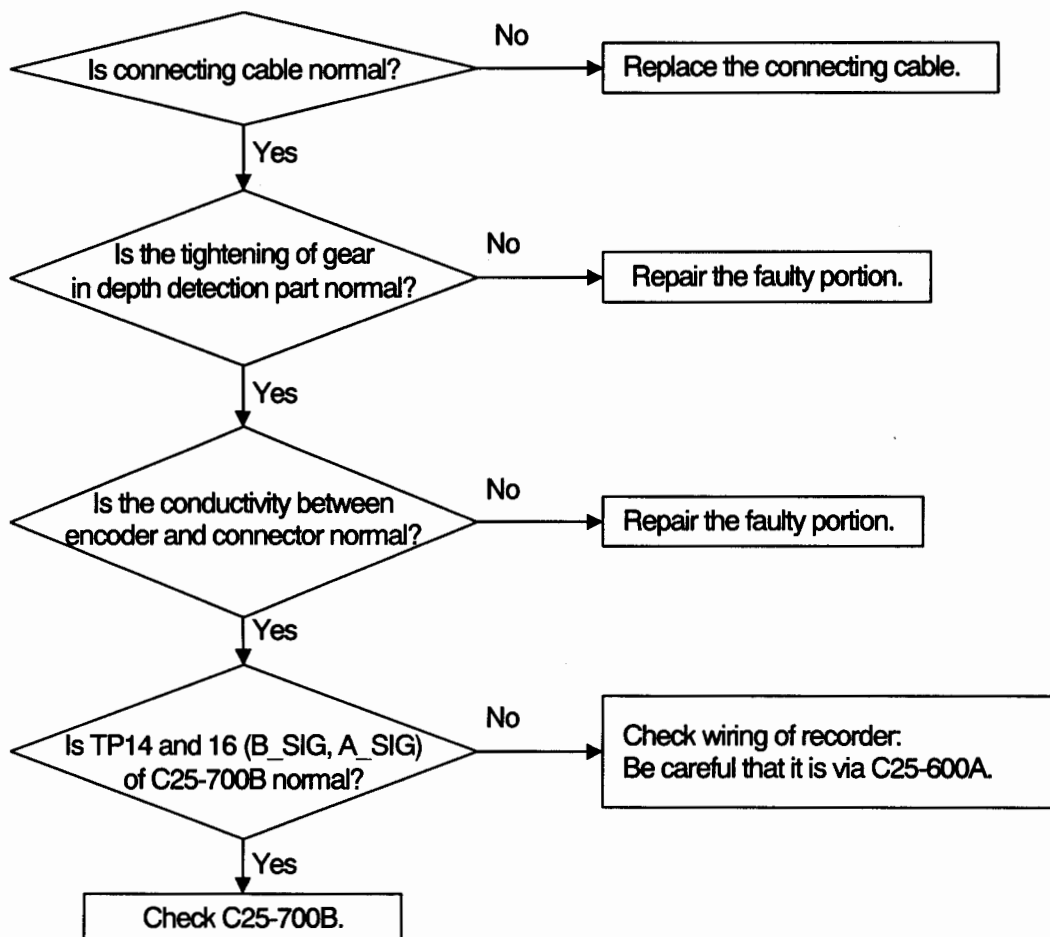
Note: Each power voltage shall be normal.



5.8 There is no hole wall marks (Information of hole wall radius marks can not be received)

Note 1: Each power voltage shall be normal.

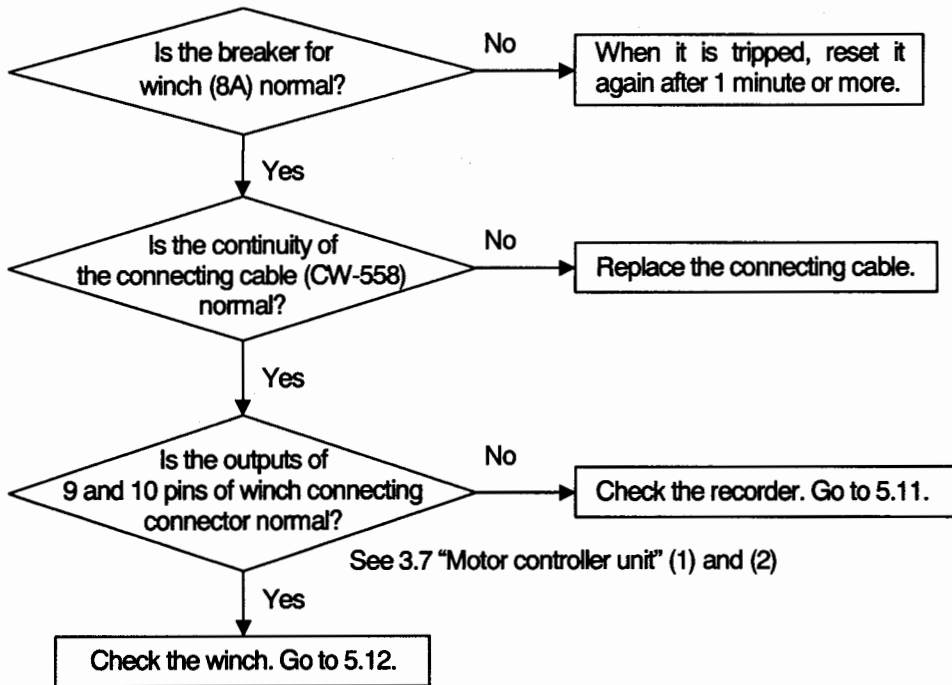
Note 2: Setting values shall be within the range given base on measuring range and shift switch.

**5.9 There is no depth marks (at depth proportionate, no paper feeds)**

Failures diagnosis

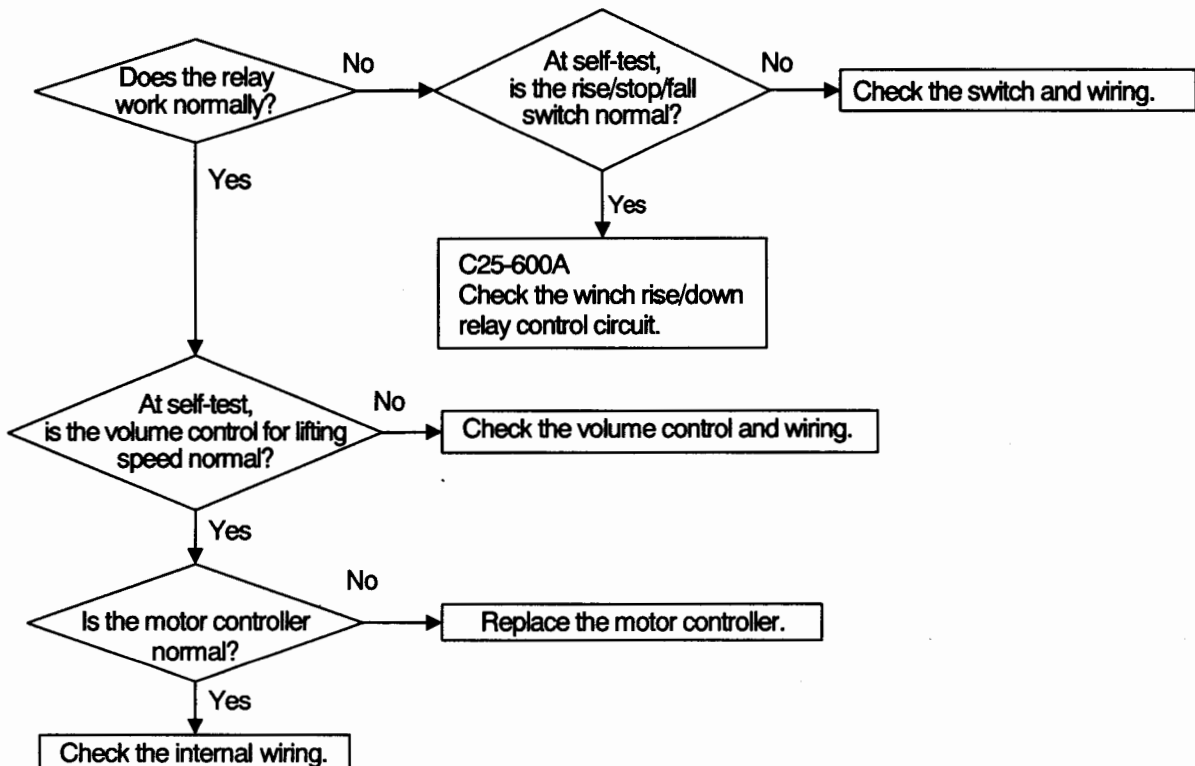
5.10 Winch does not work

Note: Main switch of recorder shall be ON.



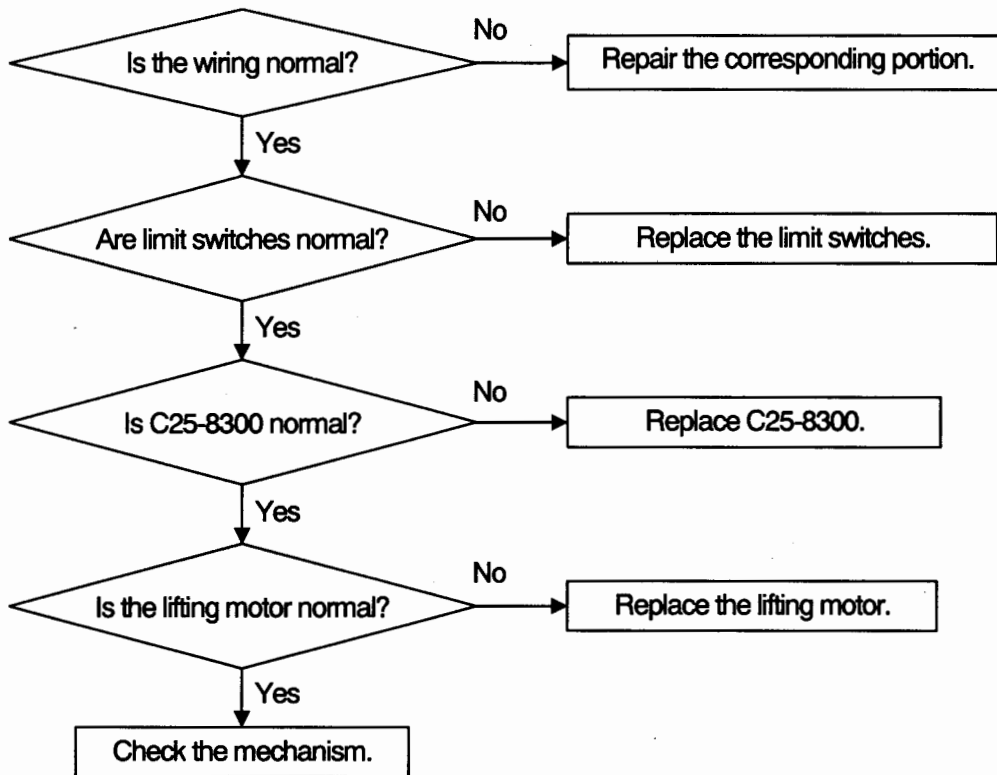
5.11 Winch does not work (Check of recorder)

Note: Continuation of 5.10 Winch does not work



5.12 Winch does not work (Check of winch)

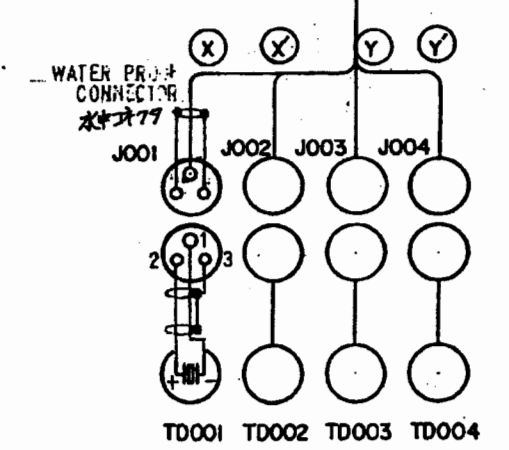
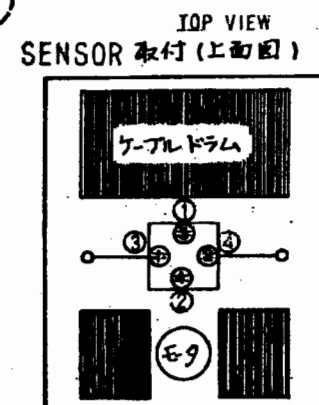
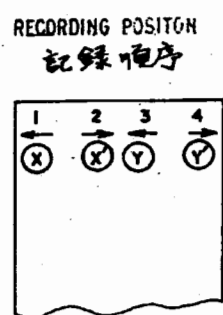
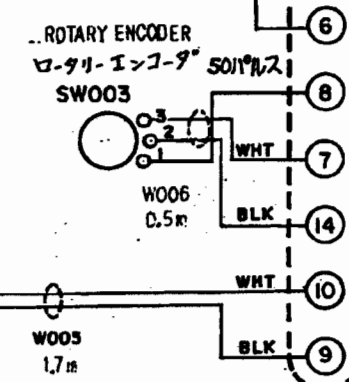
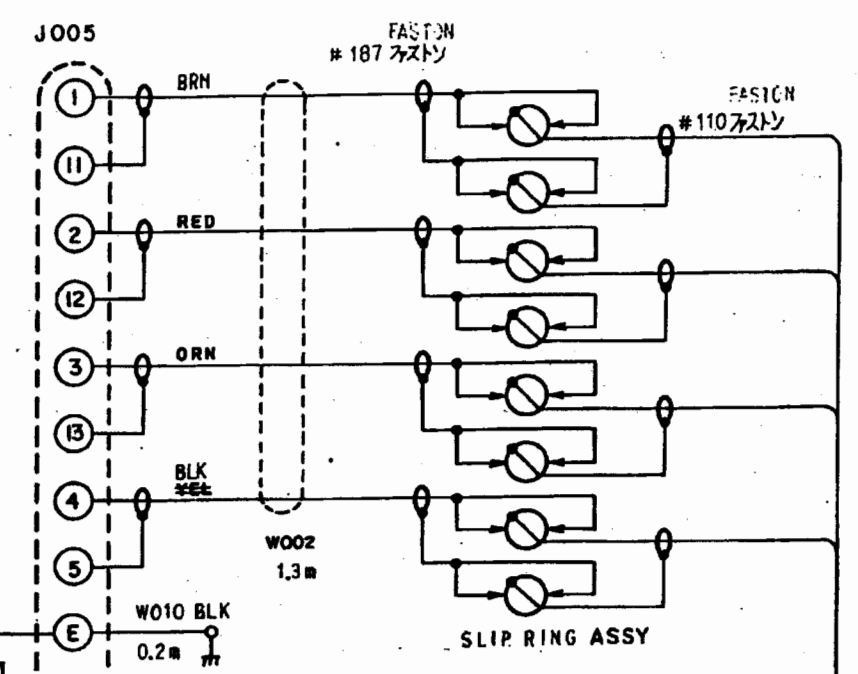
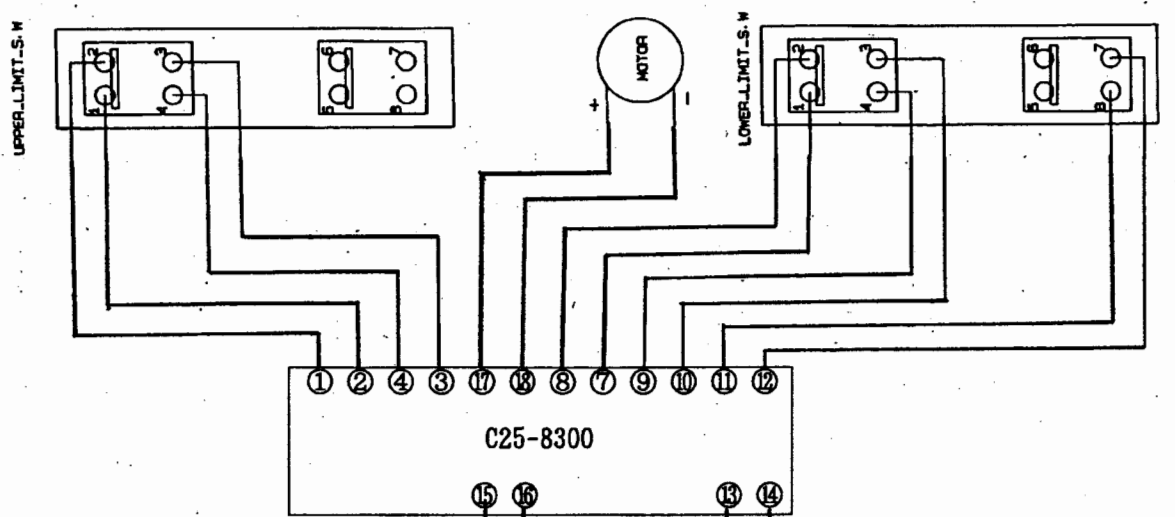
Note: Continuation of 5.10 Winch does not work



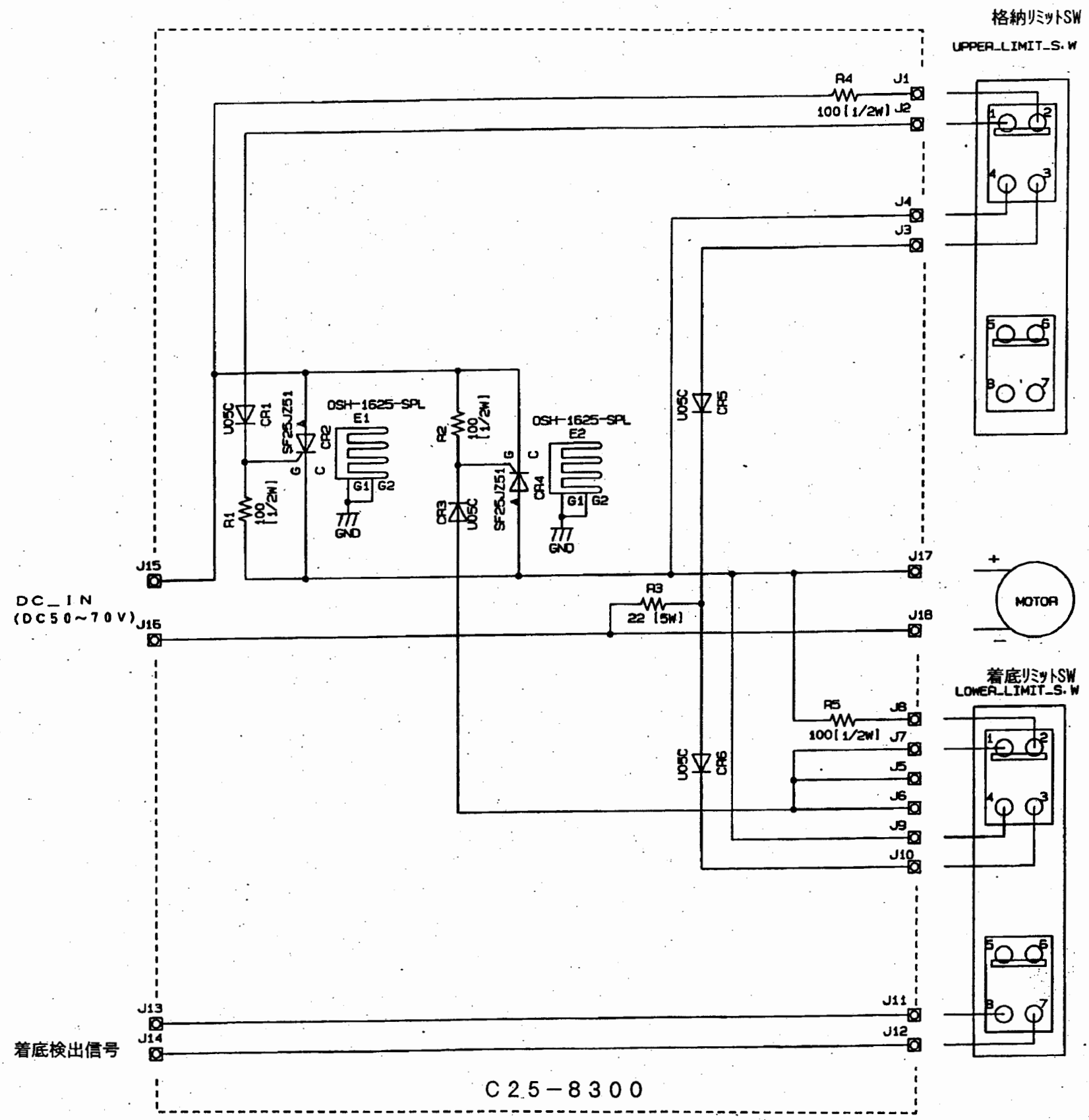
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6.4 Circuit diagram of C25-700B.....	C25CGA700C.001 to .006
6.5 Circuit diagram of C25-9010	C25CGA9010.001 to .002
6.6 Circuit diagram of DM-682/4-9001-M1	367-0017



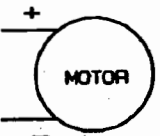
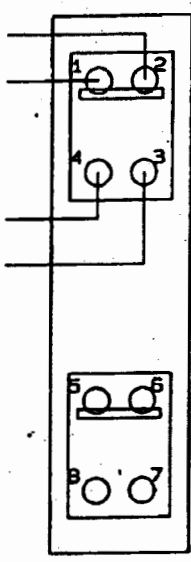
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17



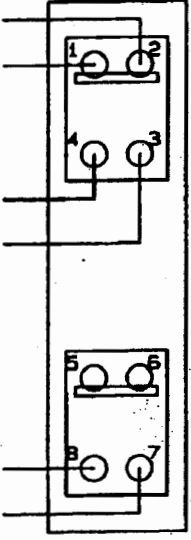
C25-8300

格納リミットSW

UPPER_LIMIT_S.W



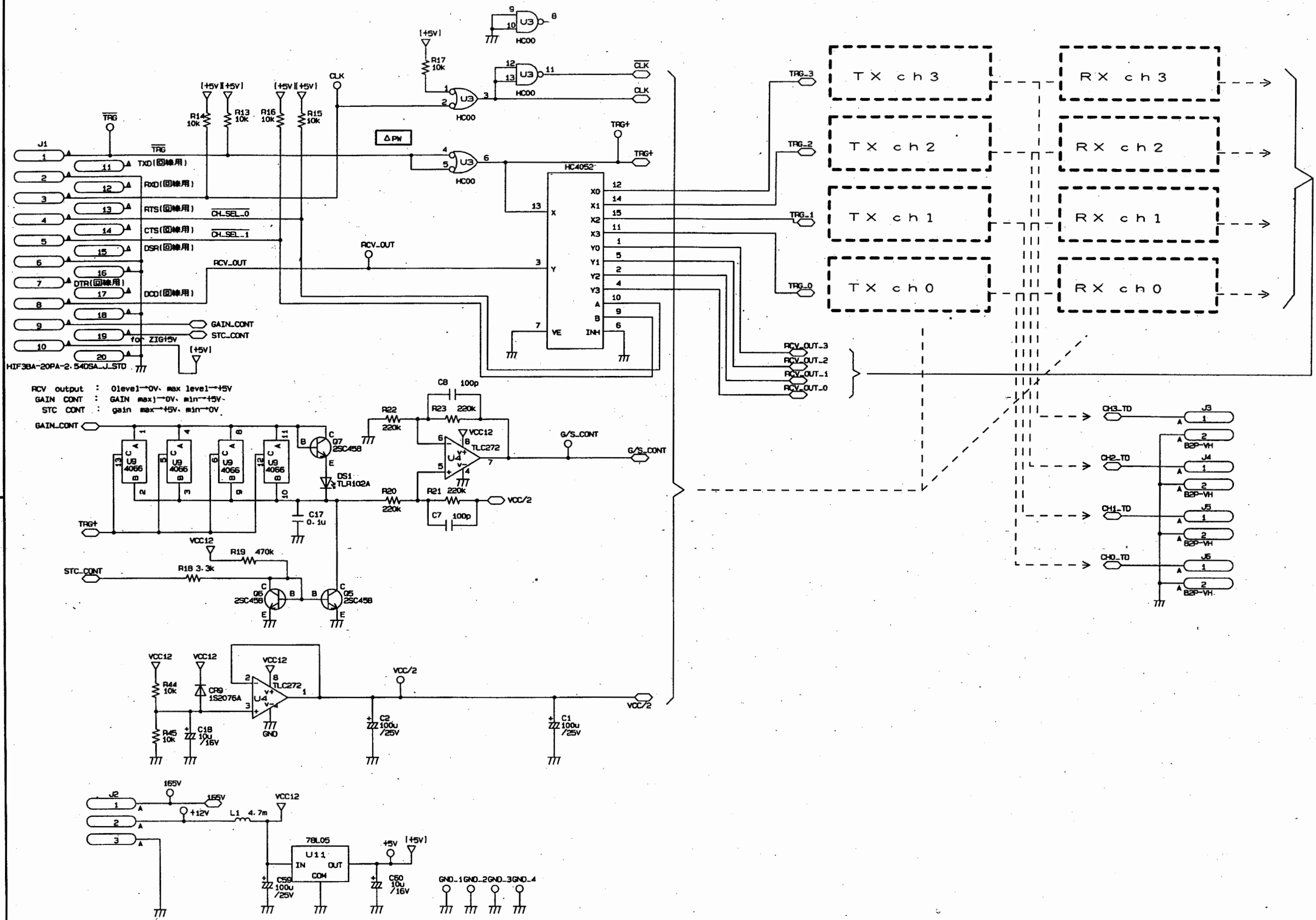
着底リミットSW
LOWER_LIMIT_S.W



DC_IN
(DC 50~70V)

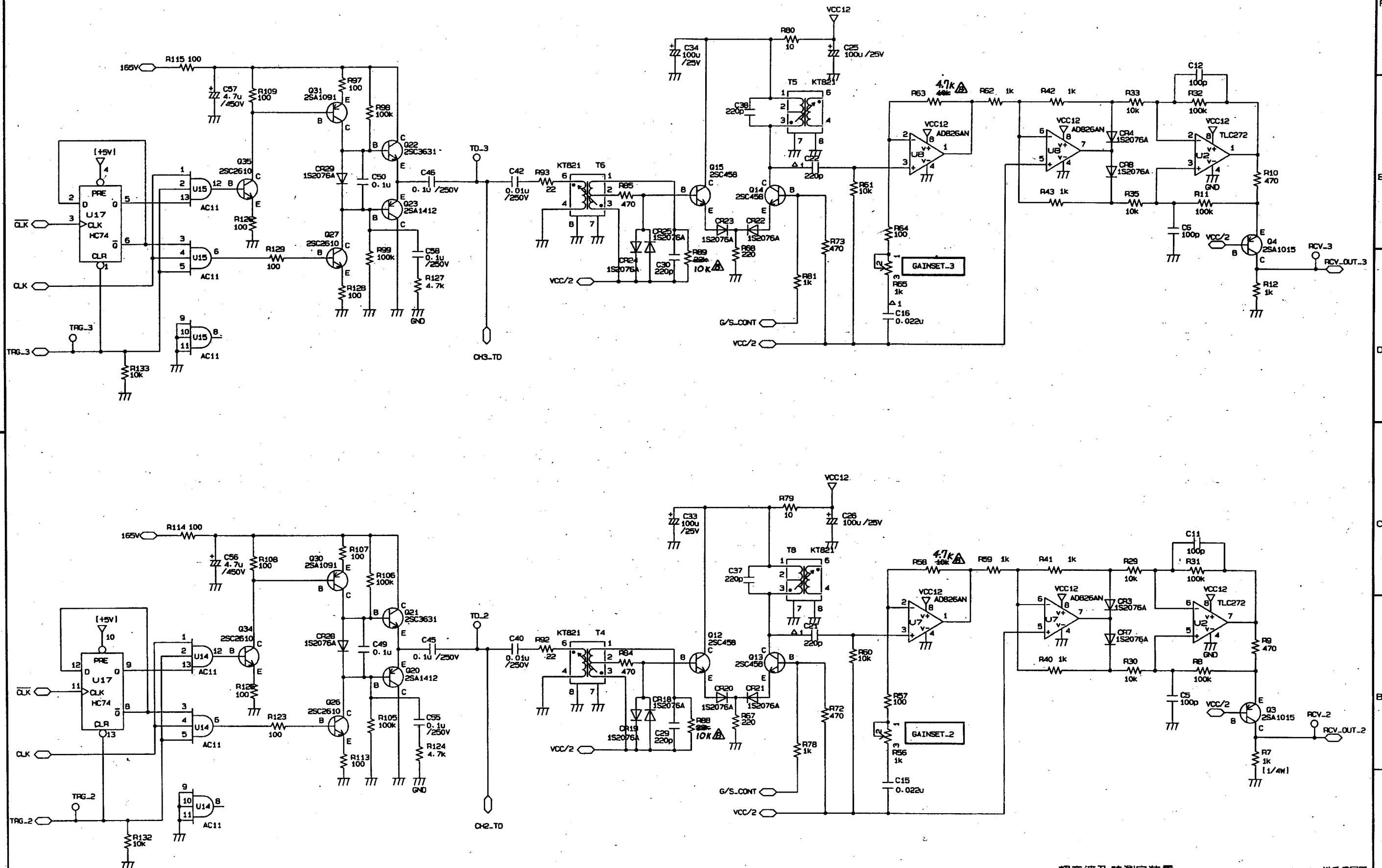
着底検出信号

記号	変	更	内	容	年月日	設計	検図	承認					機種 DM-602/604 KODEN 株式会社 光電製作所	名称 ウインチ(2/2)ブロックダイヤグラム 国番 C25CFA0300	薬番号
1	2	3	4	5	6	7	8	9							



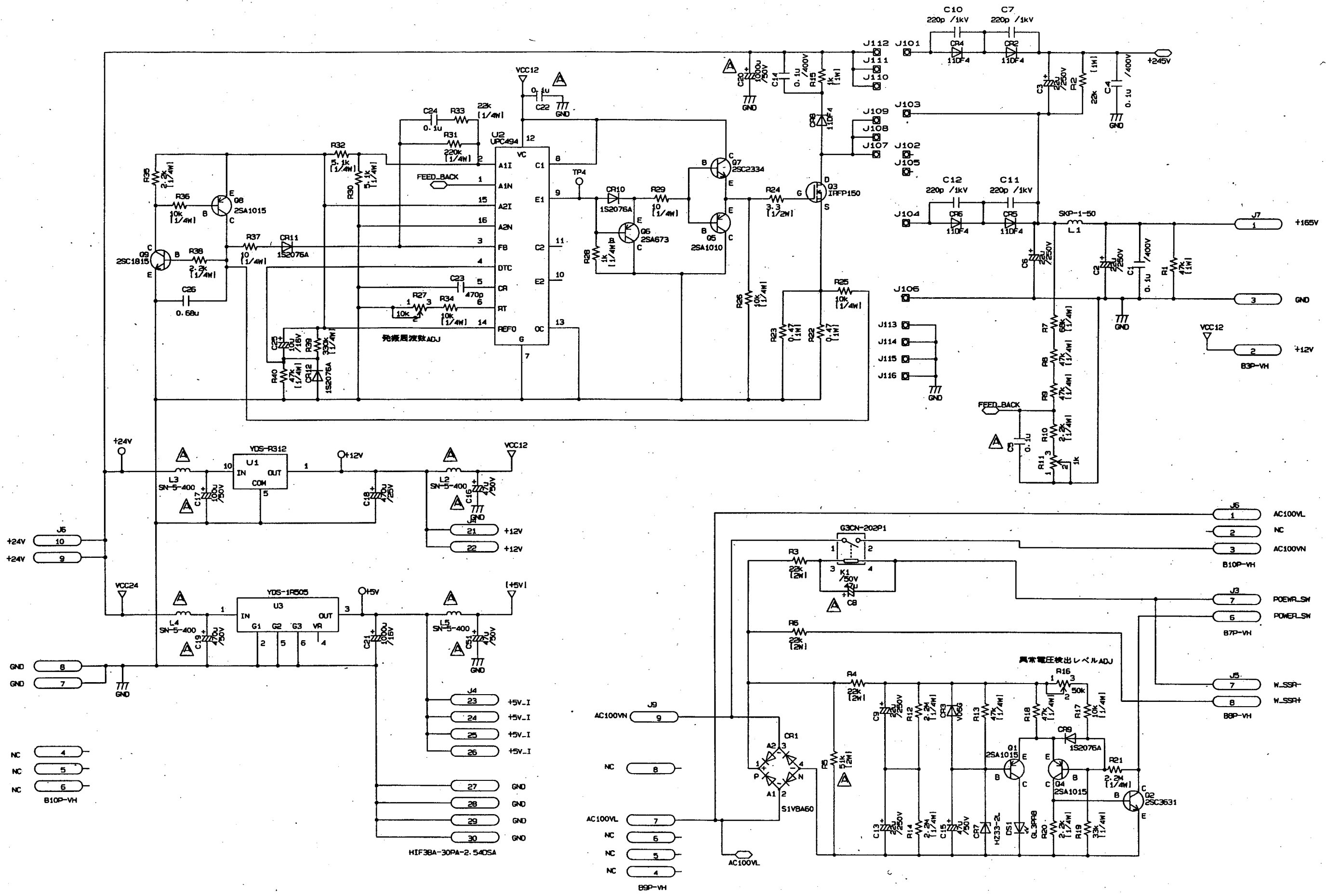
超音波孔壁測定装置 DM-602:2ch, 604:4ch G/S制御, ch切換回路

記号	変	更	内	容	年月日	設計	校	図	承認	製	図	設	機	種	名	番	号
△	2/3, 3/3	変更のため			04.6.15	川原	加藤	川原	加藤	川原	流郷	流郷	DM-602/604		C25-100A 送受信部 回路図		1/3
													KODEN	株式会社 光電製作所	C25CGA100A _B		

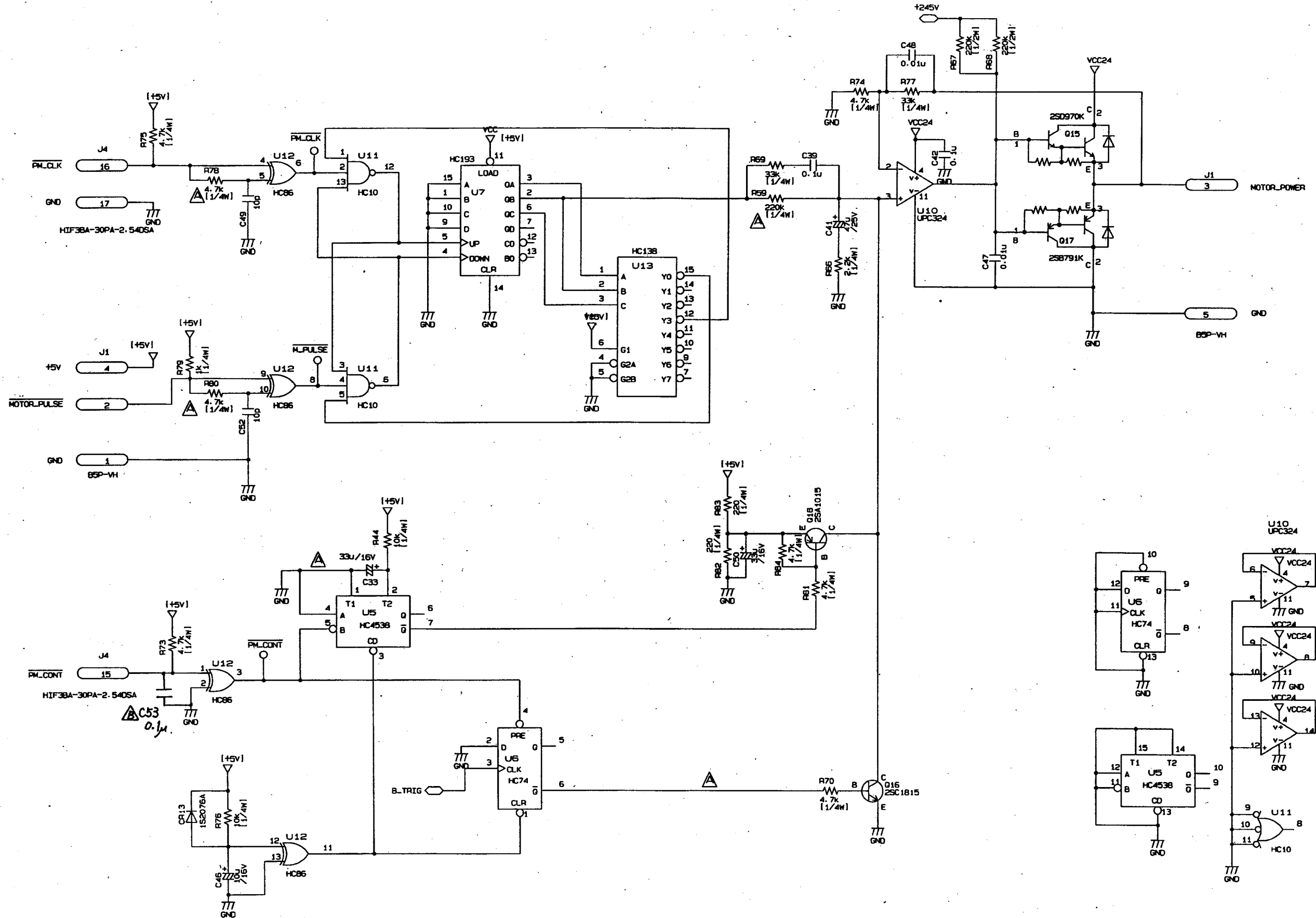


超音波孔壁測定装置 DM-602/2ch, 604/4ch CH2-CH3送受信回路

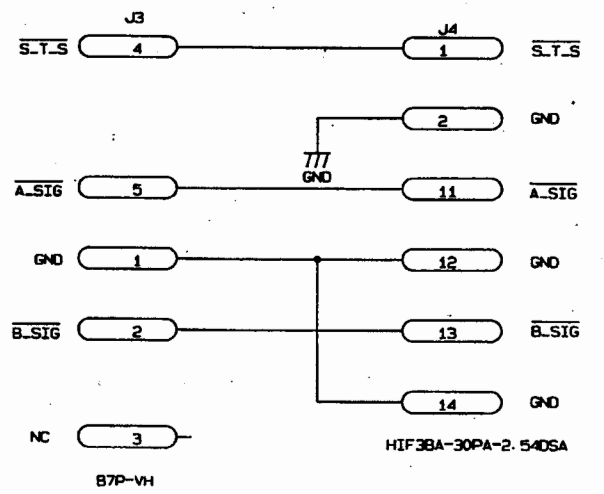
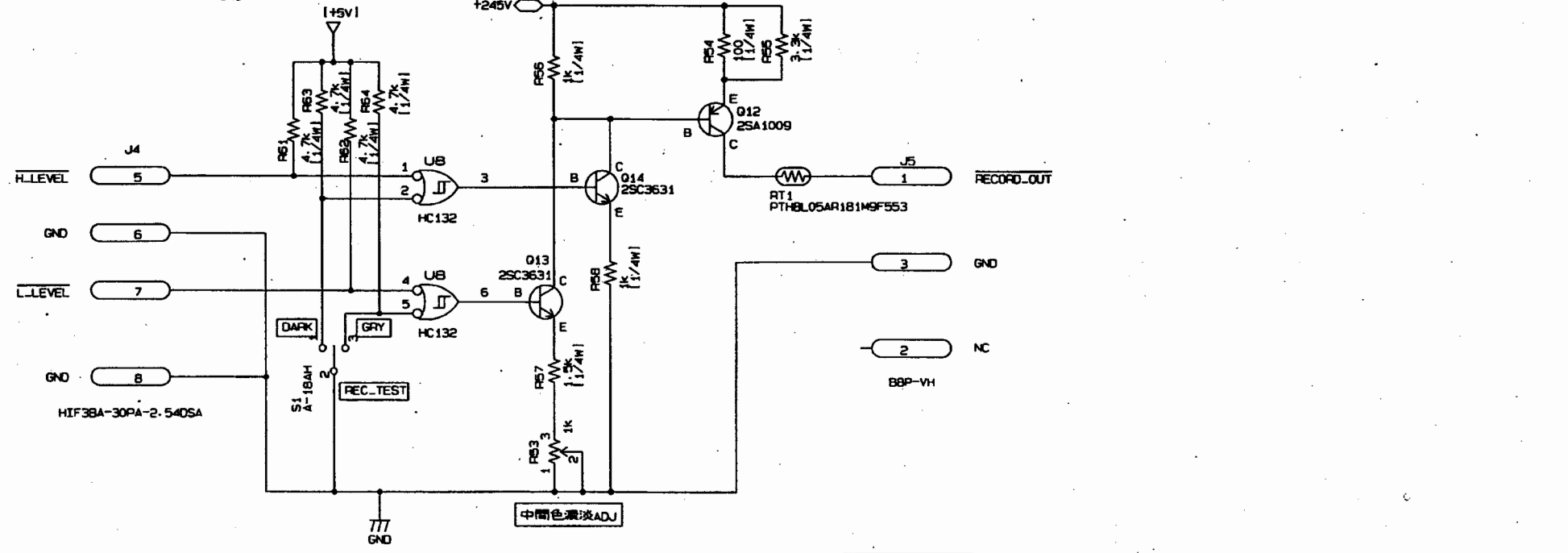
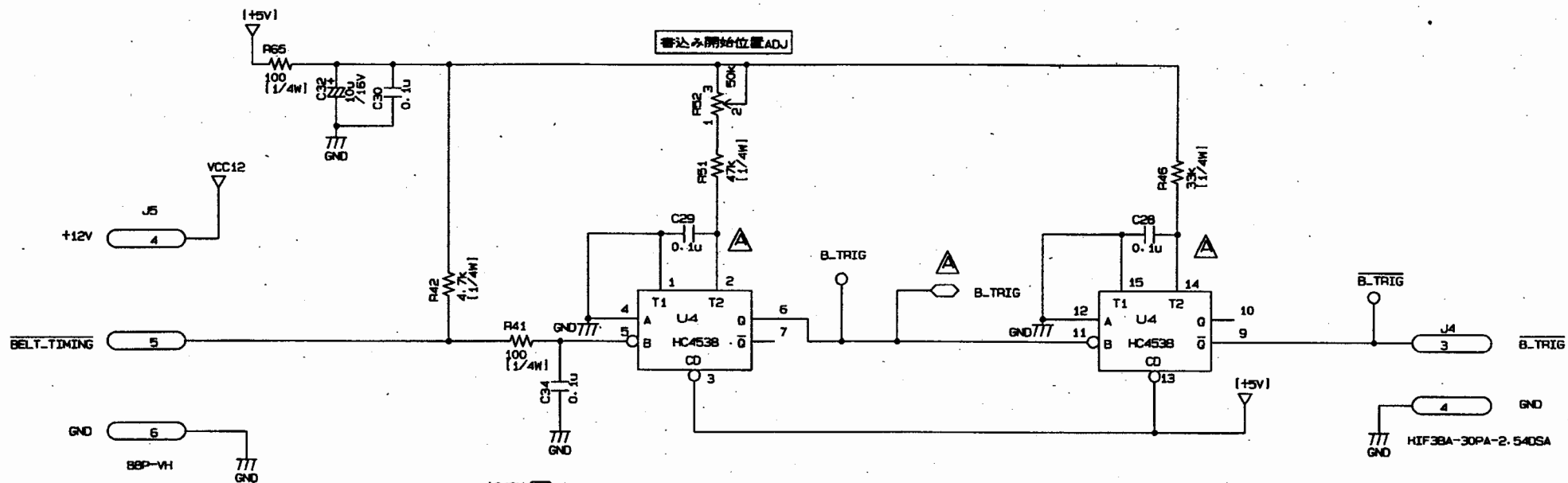
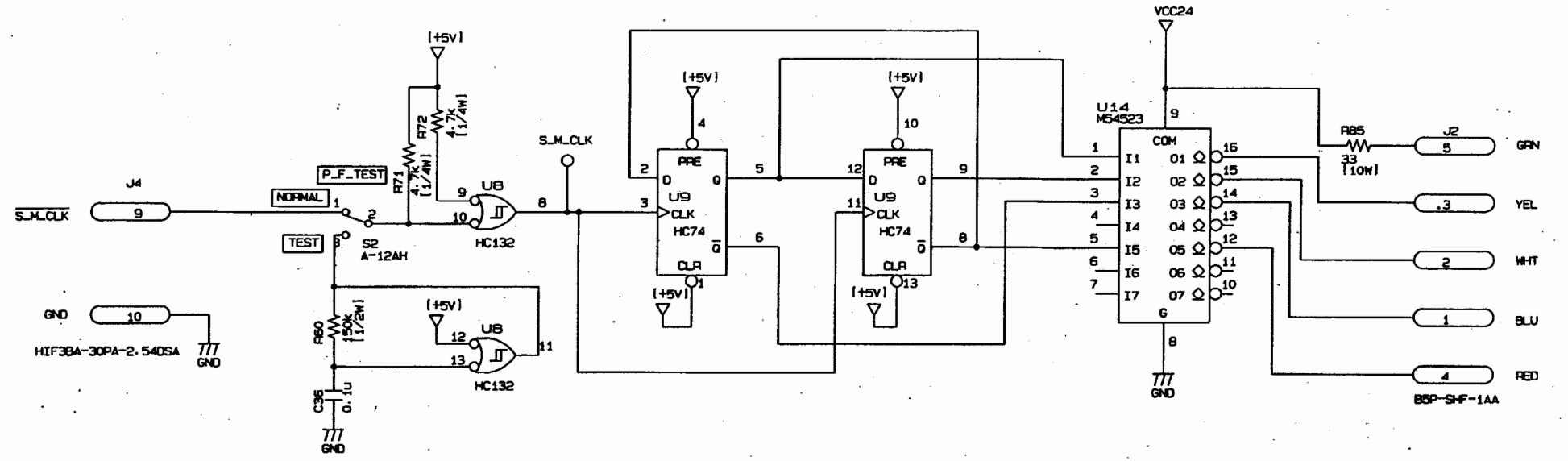
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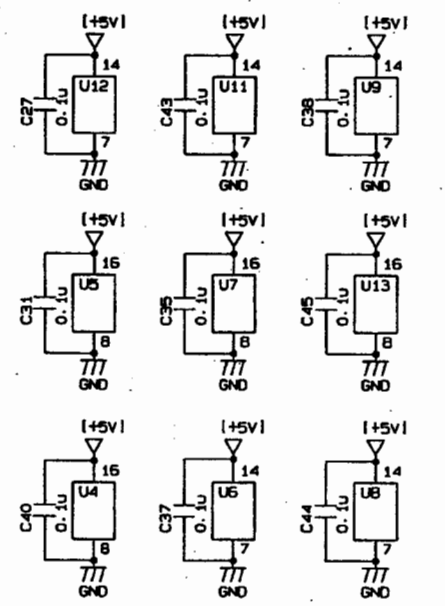
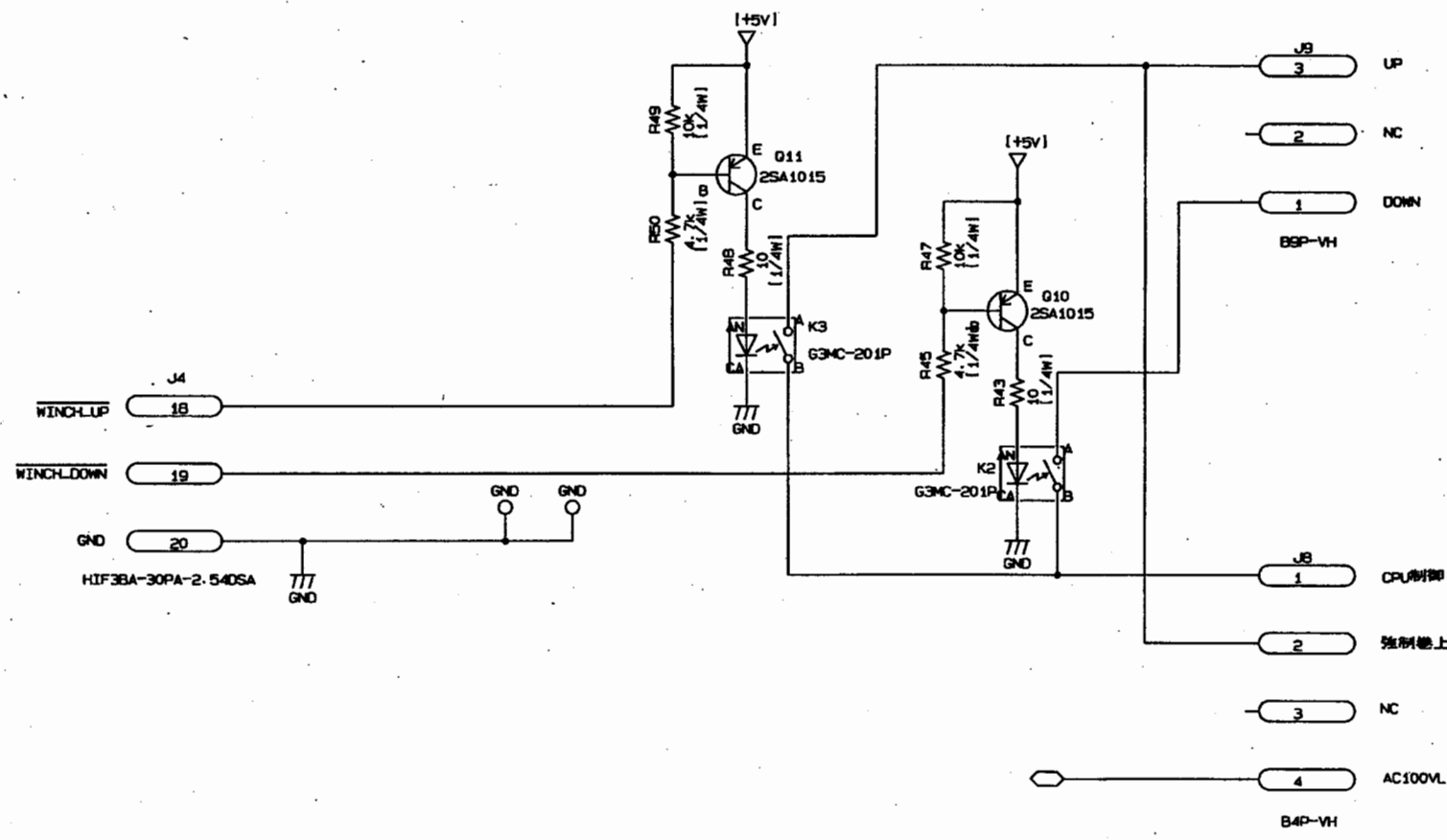
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△	.002	変更のため	01.12.25	川原	流郷	川原	川原	川原	KODEN 株式会社 光電製作所	C25CGA600	001	兼番号



△	性能向上のための回路変更	2001.12.13	川原 加藤	承認	校 園	製 園	設 計	機 種	名 称
△	C53追加 変指No. 6024-007	01.6.15	川原 加藤	承認	流 郷	川原	川原	DM-602/604	C25-600A 電源回路2/4
記号	変 更 内 容	年 月 日	設 計	校 園	承認	01.12.25	2000.12.06	2000.12.06	KODEN 株式会社 光電製作所
1	2	3	4	5	6	7	8	9	業 番 号 C25CGA600 002

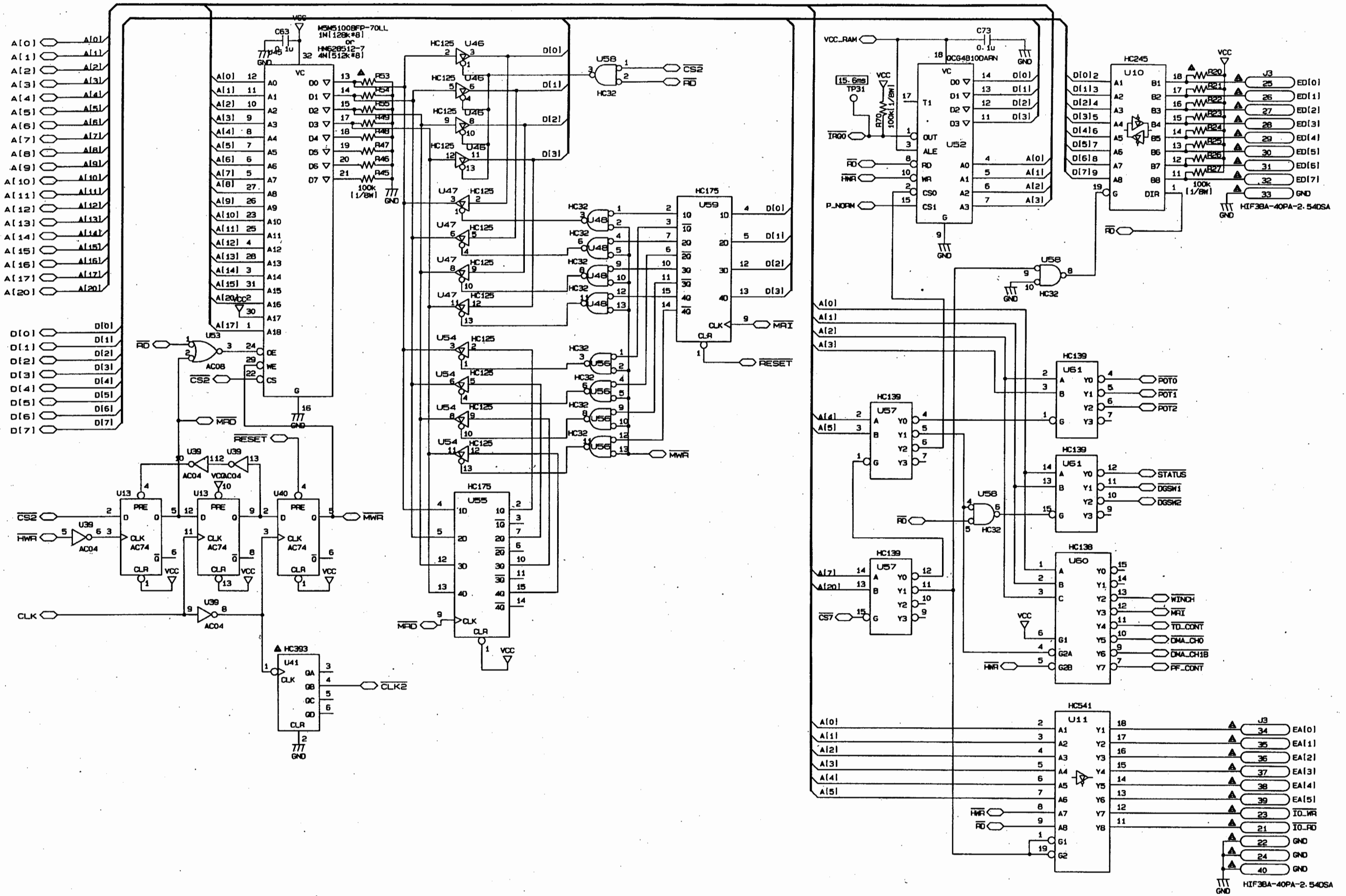


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△				性能向上のため回路変更	2001.12.13	川原	加藤	承認	製	設	機	名	番
△				.002 変更のため	02.6.15	川原	加藤	承認	製	設	機	名	番
記号	変	更	内	容	年月日	設計	検図	承認	製	設	機	名	番
△				性能向上のため回路変更	2001.12.13	川原	加藤	承認	製	設	機	名	番
△				.002 変更のため	02.6.15	川原	加藤	承認	製	設	機	名	番
記号	変	更	内	容	年月日	設計	検図	承認	製	設	機	名	番
△				性能向上のため回路変更	2001.12.13	川原	加藤	承認	製	設	機	名	番
△				.002 変更のため	02.6.15	川原	加藤	承認	製	設	機	名	番

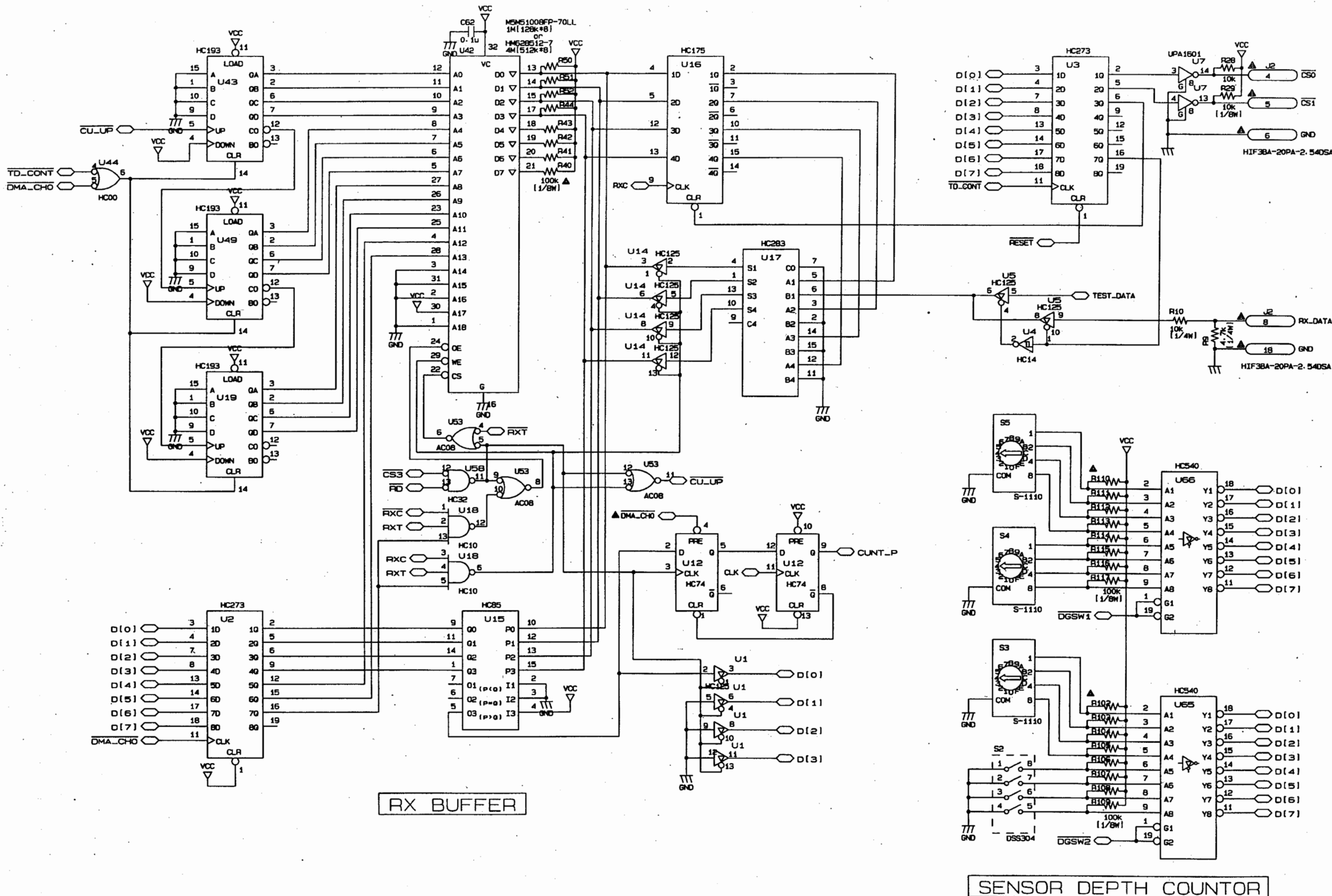


A	性能向上のための回路変更	2001.12.13	川原	承認	承認	校 図	製 図	設 計	機種 DM-602/604	名称 C25-600A 電源回路4/4
B	.002 変更のため	01.12.25	川原	承認	承認	校 図	製 図	設 計	KODEN 株式会社 光電製作所	図番 C25CGA600書.004
記号	変 更 内 容	年月日	設計	校 図	承認	校 図	製 図	設 計	機 種	名 称
1	2	3	4	5	6	7	8	9	10	11

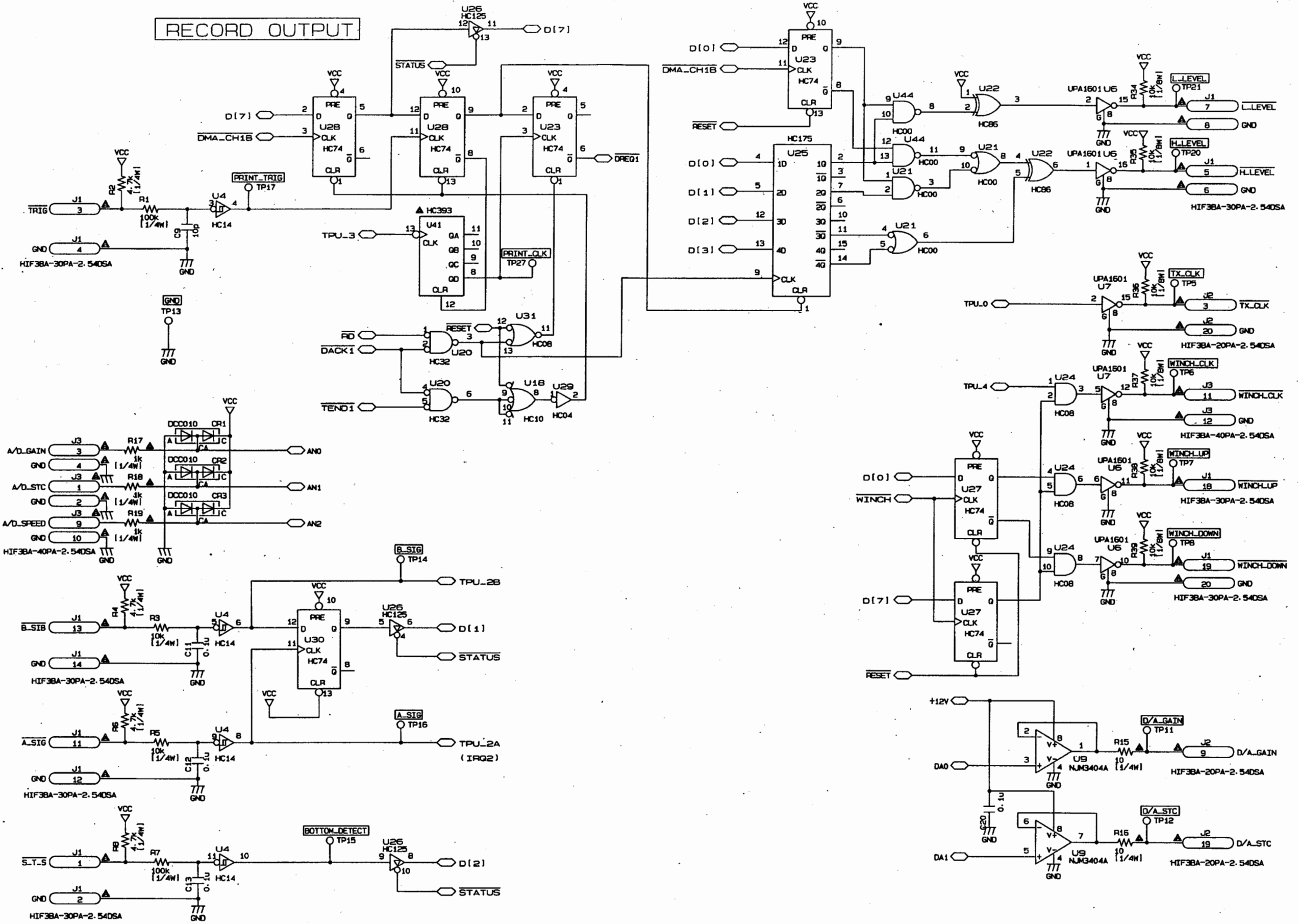
DATA BUFFER



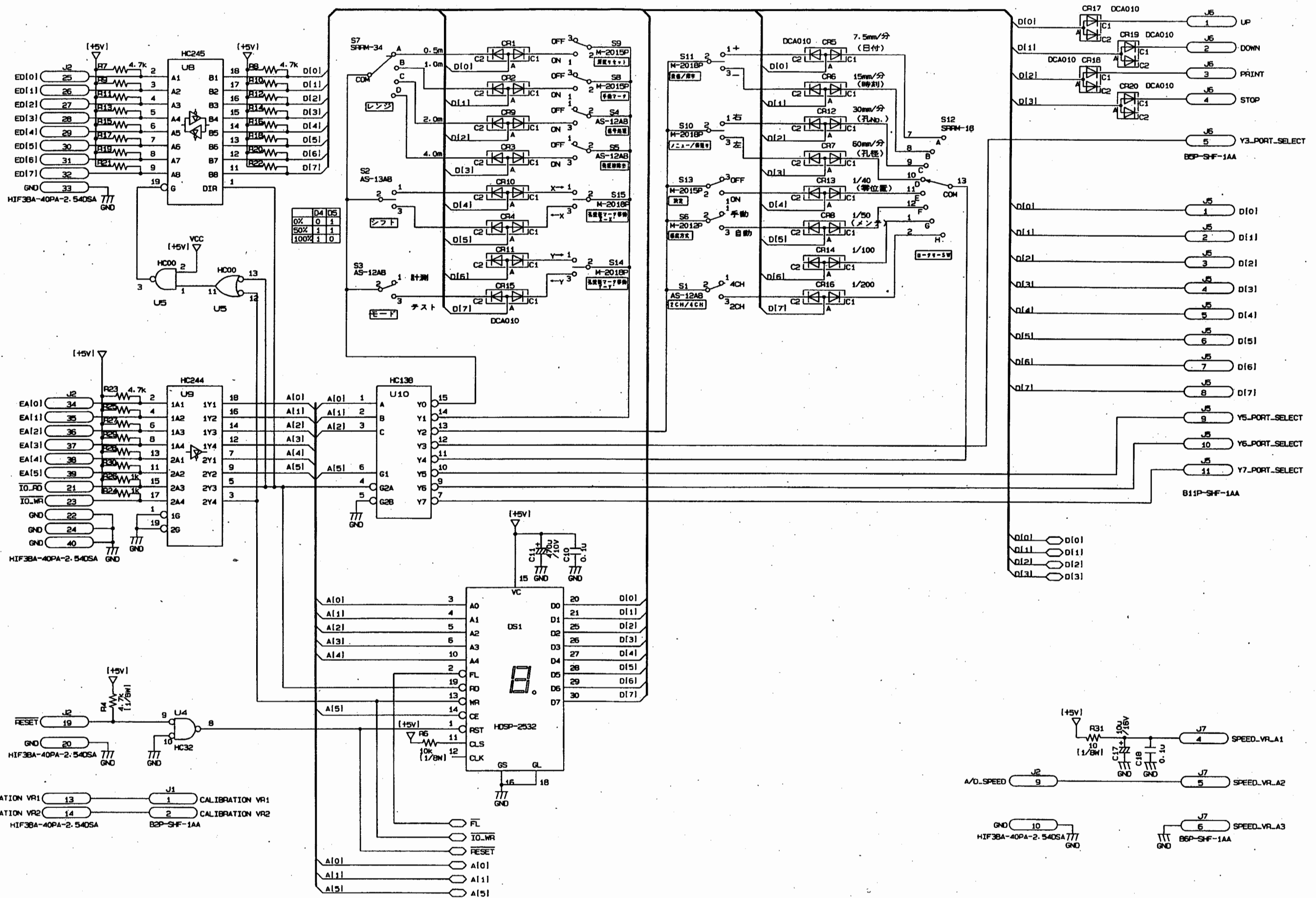
△ .004 変更のため	04.6.15	川原 (設計)	加藤	承認	校 図	製 図	設 計	機 種	DM-602/604	名 称	C25-700B CONTROL UNIT	業 番 号		
△ ピン番号変更 (△ 20個)	2002.02.12	濱田	川原	千馬 (校)	川原 (校)	濱田 (製)	濱田 (設)	機 種	DM-602/604	名 称	C25-700B CONTROL UNIT	業 番 号		
△ 回路変更 (△ 2個)	2001.12.19	濱田	川原	千馬 (校)	川原 (校)	濱田 (製)	濱田 (設)	機 種	DM-602/604	名 称	C25-700B CONTROL UNIT	業 番 号		
記号	変 更 内 容	年 月 日	設 計	校 図	承 認	2000.11.7	2000.11.7	2000.11.2	2000.11.2	機 種	DM-602/604	名 称	C25CGA700B.002	業 番 号



△ .004 変更のため	64.6.15	川原 (品)	加藤	承認	校 園	製 園	設 計	機 種	DM-602/604	名 称	C25-700B CONTROL UNIT			
△ ピン番号変更 (△ 5個)	2002.02.12	濱田	川原	千馬(監)	川原(秀)	濱田(憲)	濱田(憲)	機 種	DM-602/604	名 称	C25-700B CONTROL UNIT			
△ 回路変更 (△ 4個)	2001.12.19	濱田	川原	千馬	千馬(監)	川原(秀)	濱田(憲)	機 種	DM-602/604	名 称	C25-700B CONTROL UNIT			
記号	変 更 内 容	年 月 日	設 計	校 園	承 認	2000.11.7	2000.11.7	2000.11.2	2000.11.2	機 種	DM-602/604	名 称	C25CGA700B.003	葉 番 号

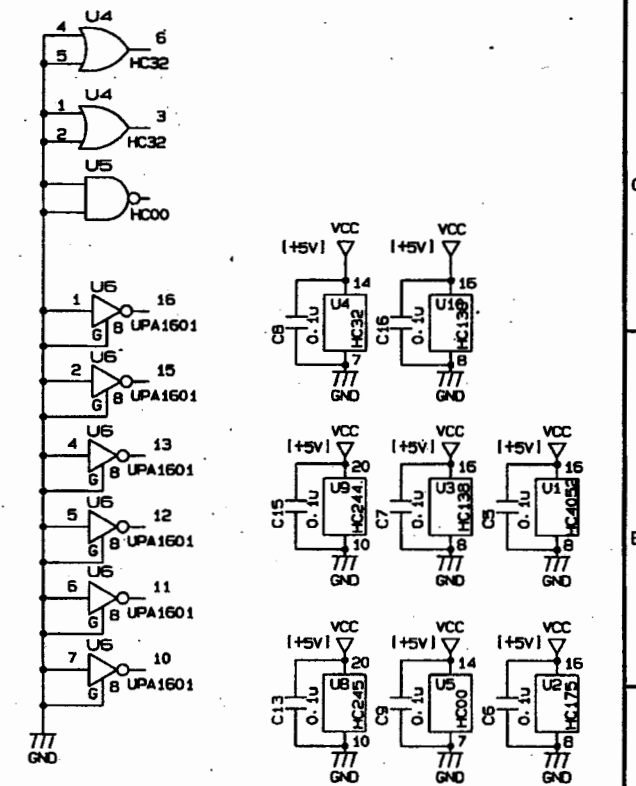
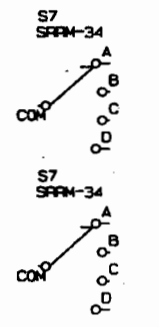
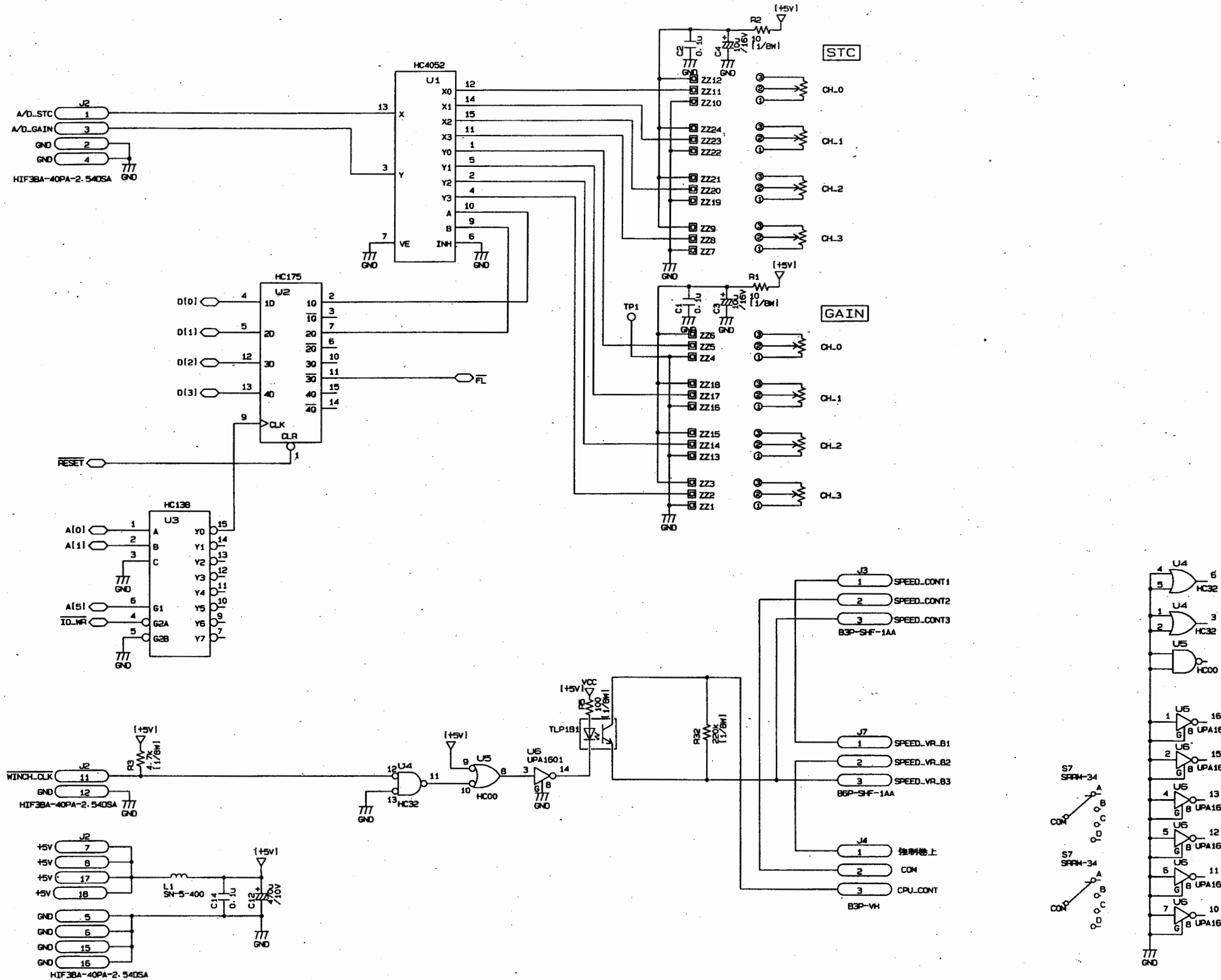


△	.004 変更のため	69.6.15	川原	(印)	川原	承認	校 園	製 園	設 計	機 種	DM-602/604	名 称	C25-700B CONTROL UNIT
△	ピン番号変更	(△ 27個)	2002.02.12	濱田	川原	千馬	川原	濱田	濱田	機 種	C25CGA700	番 号	005
△	回路変更	(△ 6個)	2001.12.19	濱田	川原	千馬	川原	濱田	濱田	機 種	C25CGA700	番 号	005
記号	変 更 内 容	年 月 日	設 計	校 園	承 認	2000.11.7	2000.11.7	2000.11.2	2000.11.2	KODEN 株式会社 光電製作所		葉 番 号	

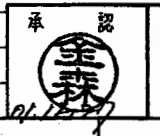


記号	変更	内容	年月日	設計	検閲	承認	承認	検閲	承認	機種	名称	図番	兼番号
1	2	3	4	5	6	7	8	9		DM-602/604	C25-9010 PANEL 1/2	C25CGA9010.001	

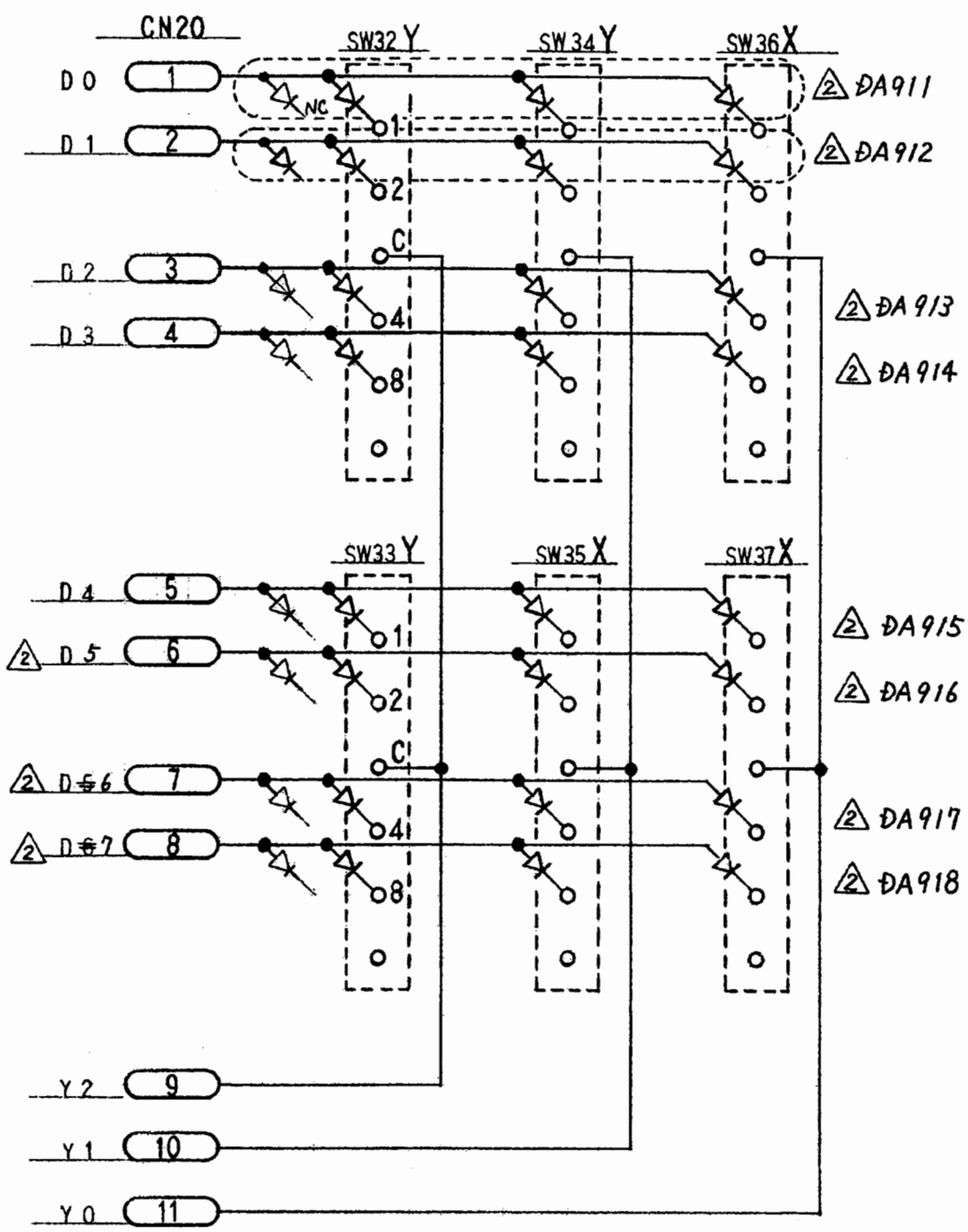
承認 株式会社 川原 (株) 川原 (株) 川原 (株)
 検 千馬 (株) 2001.12.27
 製 川原 (株) 2001.12.13
 設 川原 (株) 2001.12.13
 機 川原 (株) 2001.12.13
 種 DM-602/604
 名 株式会社 光電製作所
 称 C25-9010 PANEL 1/2
 図 川原 (株) 2001.12.13
 番 C25CGA9010.001
 兼 川原 (株) 2001.12.13
 号



記号	変	更	内	客	年月日	設計	校	因	承認	承認	校	因	製	因	設	計	機	種	名	稱	番	号
					01.12.27	川原(秀)	川原(秀)	川原(秀)	川原(秀)	川原(秀)	川原(秀)	川原(秀)	川原(秀)	川原(秀)	川原(秀)	川原(秀)	DM-602/604	C25-9010 PANEL 2/2	C25CGA9010.002			



承認 川原(秀) 2001.12.25
 校 川原(秀) 2001.12.25
 因 川原(秀) 2001.12.25
 製 川原(秀) 2001.12.25
 設 川原(秀) 2001.12.25
 機 種 DM-602/604
 名 稱 C25-9010 PANEL 2/2
 番 号 C25CGA9010.002
 業 号
KODEN 株式会社 光電製作所



△ダイオードアレイ, アドコモン, 4素子 917° DA911~DA918
 △DA914 (1素子 NC)
 Diode: DAP401x8
 SW(Connector): DAC-062x6

△	部品F711規格名確認	602/4-013	'06.12.13	川原	86.12.14				
△	生産中止により部品代替	094-91	H11.9.14	川原	子内				
記号	変更内容	年・月・日	担当	承認					
承認	検図	設計	名称	WIDTH MARKER P.C.B *DM-684-9001 M1					
'86.12.16	'96.12.16	T. Hanamoto	型式	DM-682/684					
進藤	磯野	12.04.86	図番	364-0017					
				M	2				
					1				