

AC SPINDLE DRIVE VS-626MT
(TYPE CIMR-MT)

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NTR0010

1. SPECIFICATIONS

TYPE		CIMR-MT7.5K	CIMR-MT11K	CIMR-MT15K
Nominal Rating		7.5KW	11KW	15KW
Applicable Motor	Continuous	5.5KW	7.5KW	11KW
	30 Minutes	7.5KW	11KW	15KW
Power Supply		3 Phase 50/60HZ 200/220V ($\pm 10\%$) 60 HZ 240V (+5%, -15%)		
Power Supply Capacity		12KVA	18KVA	22KVA
Main Circuit		3-Phase full wave rectification Transistorized PWM Inverter		
Maximum Output Voltage		160V		
Maximum Peak Output Current		55A	80A	100A
		60 Sec.		
Rated Output Current		45A	65A	85A
Speed Control Range		1:100		
Constant Output Range		1:3		
Rated Speed		4500 RPM or 6000 RPM		
Speed Fluctuation	Load Fluctuation Offset	$\pm 0.5\%$ 100% Load Fluctuation		
		0.1% at 10 to 100% Speed		
Acceleration Deceleration		0.5 to 6.5 sec. (every 0.5 sec)		
Operating and Braking Methods		Reversing Operation and regenerative Braking		
Cooling Method		Fan Cooled Type		
Ambient Temperature		-10 to +45°C (Under 80% relative humidity)		

2. INTERFACE

2.1 INPUT INTERFACE

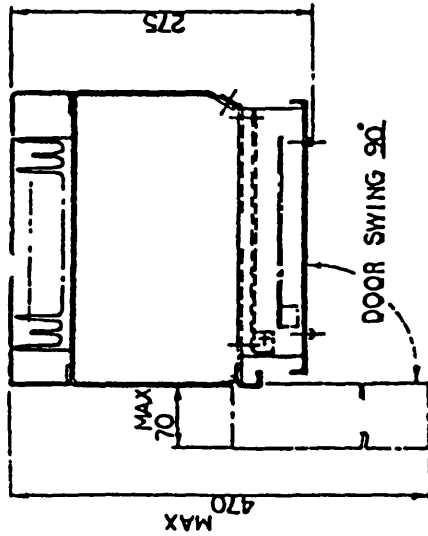
Rated Speed Reference	±10V DC
Input Resistance	15K Ohms
Running Signal	+12V Run ØV Stop
Torque Limit	+12V Low Torque ØV High Torque

2.2 OUTPUT INTERFACE

Zero Speed Detection	Contact closes when the motor speed drops to 1% or lower than the rated speed
Speed Agreement Detection	Contact closes when the motor speed is within ±15% of the commanded speed
Excessive Deviation Detection	Contact closes when the motor speed drops to 50% or less of the commanded speed.
Trouble Detection	Contact closes or opens when any trouble is detected.
Overload Detection	Contact closes when the current goes over the set current limit.
Speed Detection	Contact closes when the speed drops under the set speed
Speed Meter Drive	One way swing DC 1mA meter (Full scale at Max. speed)

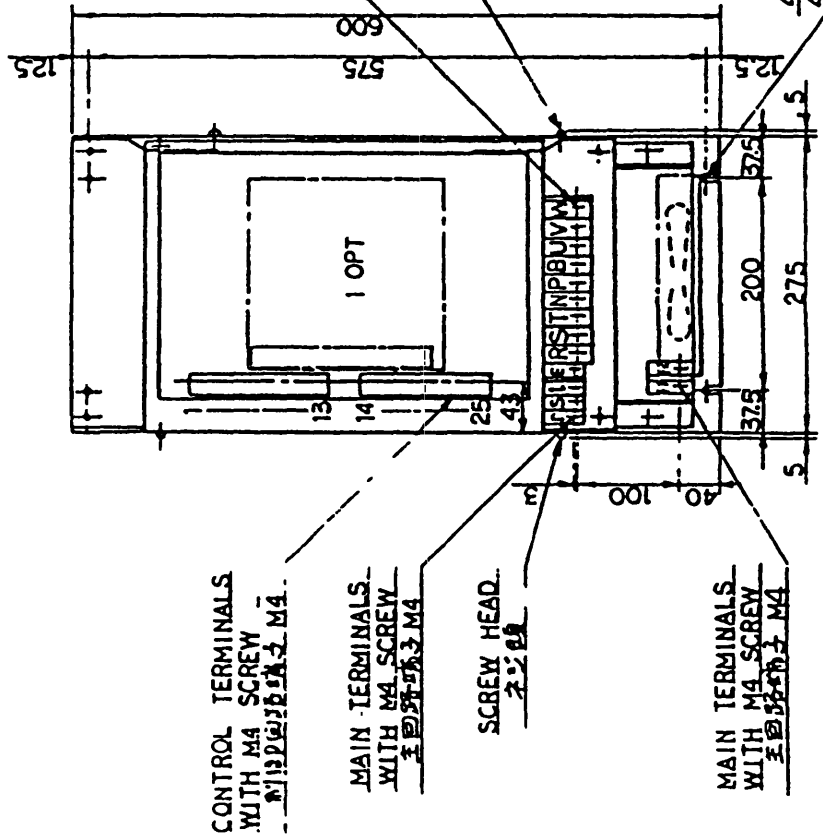
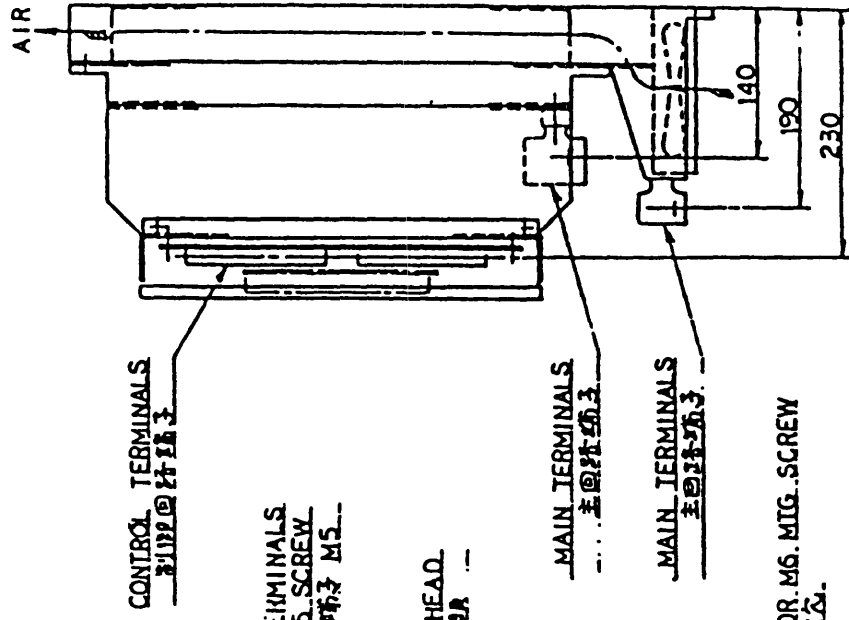
THIRD ANGLE PROJECTION
第三角法

5. DIMENSIONS DIAGRAMS



① DIMENSIONS IN mm

TYPE 形式	CIMR-MT-7.5K
PAINTING 涂装色	5Y7/1
APPROX. WEIGHT 概重量	26KG



CONTROL TERMINALS
WITH M4 SCREW
制御回路端子 M4

MAIN TERMINALS
WITH M4 SCREW
主回路端子 M4

SCREW HEAD
ネジ頭

MAIN TERMINALS
WITH M4 SCREW
主回路端子 M4

CONTROL TERMINALS
制御回路端子

MAIN TERMINALS
WITH M5 SCREW
主回路端子 M5

SCREW HEAD
ネジ頭

MAIN TERMINALS
主回路端子

MAIN TERMINALS
主回路端子

4-HOLES FOR M6 MIG. SCREW
4-M6用孔

DOOR SWING 90°

MAX

MAX

275

MAX

470

MAX

70

125

575

680

125

140

190

230

13

14

25

43

100

5

75

200

275

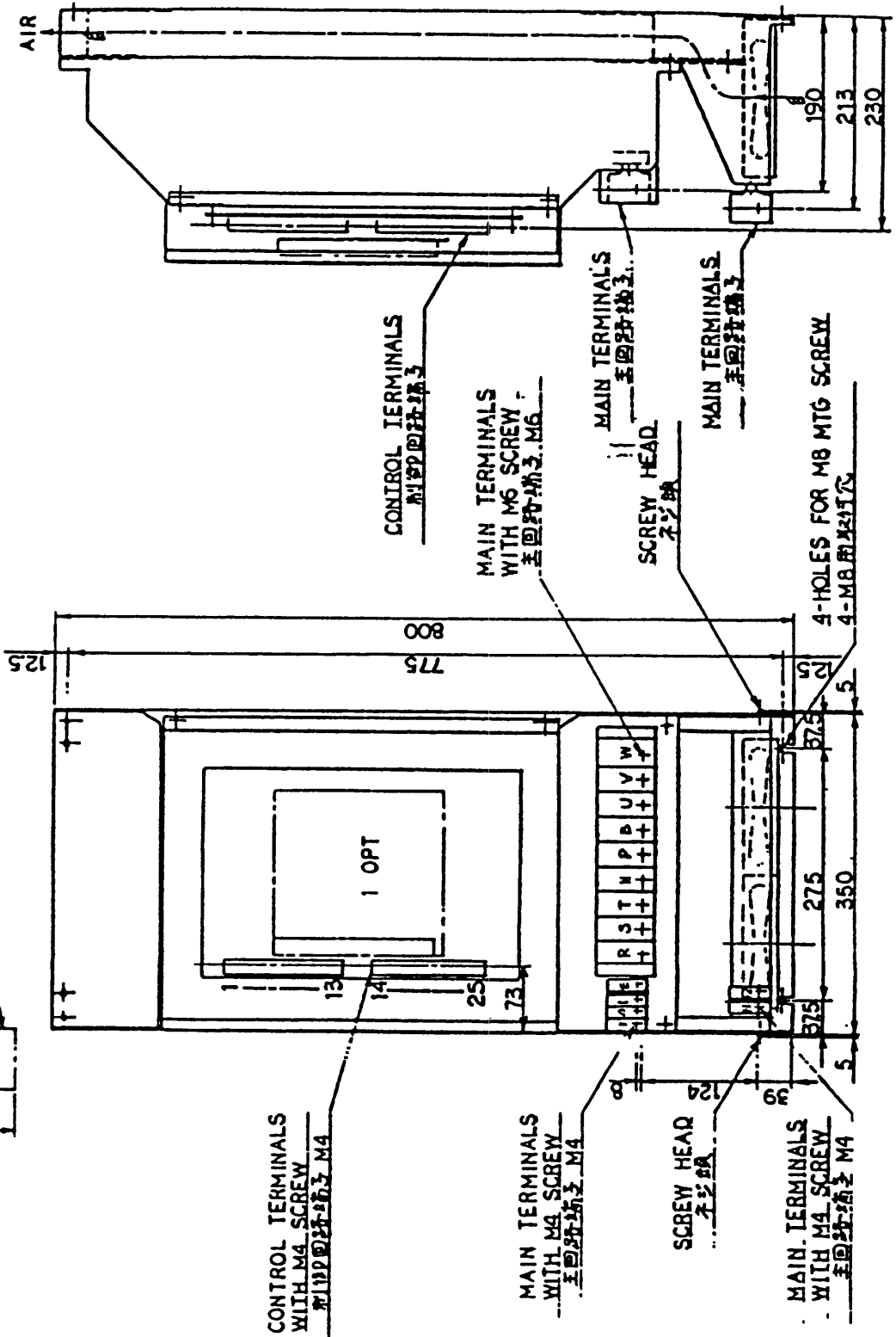
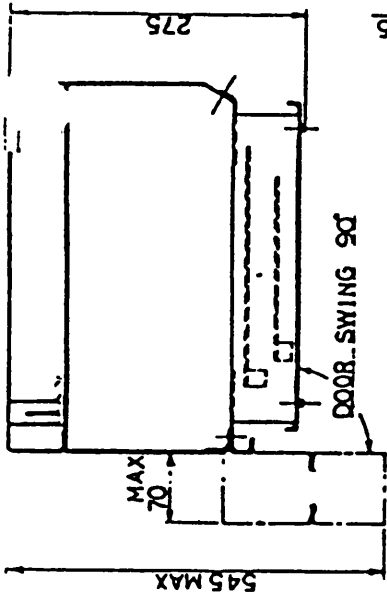
1.5

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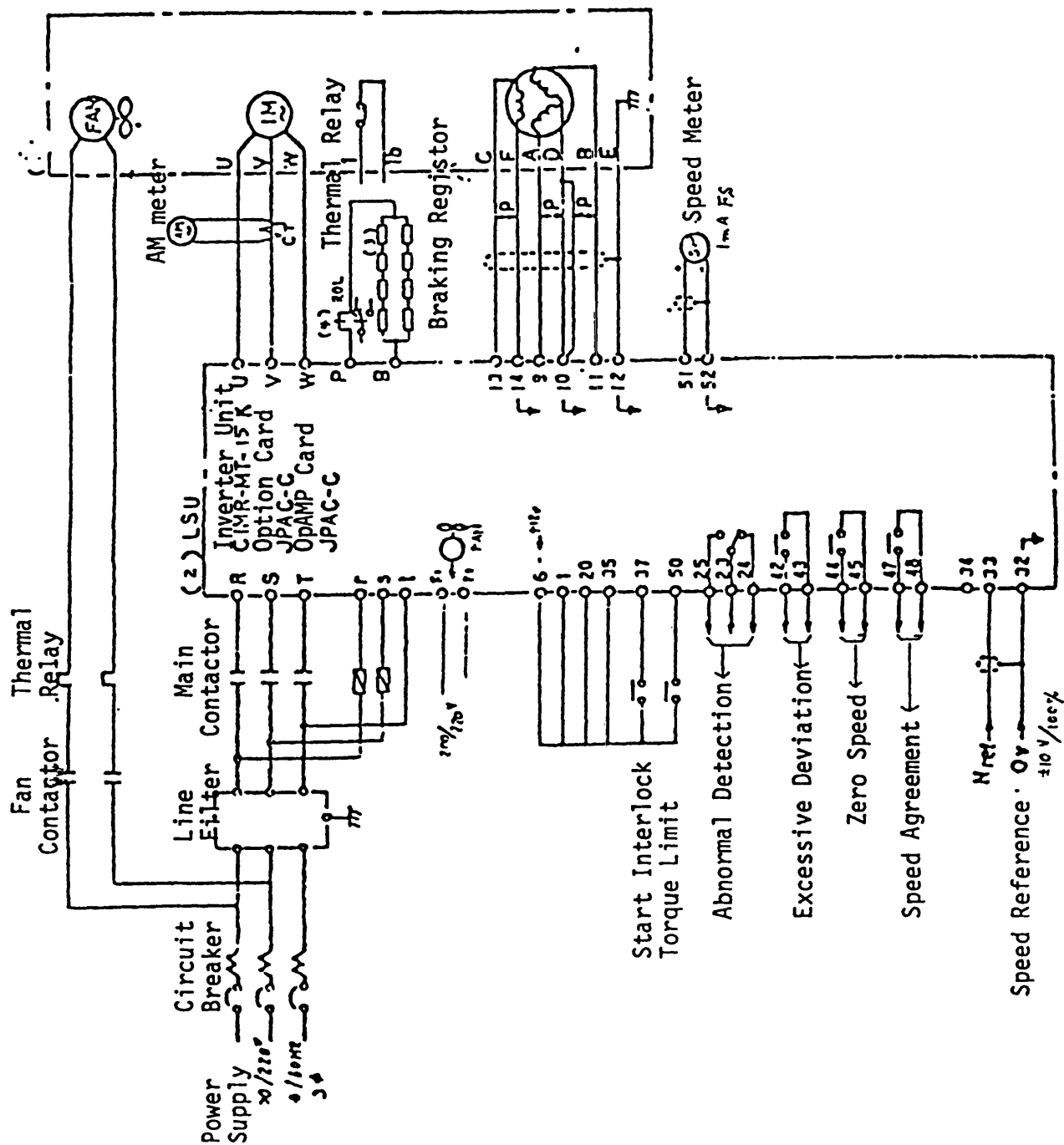
THIRD ANGLE PROJECTION
第三角法

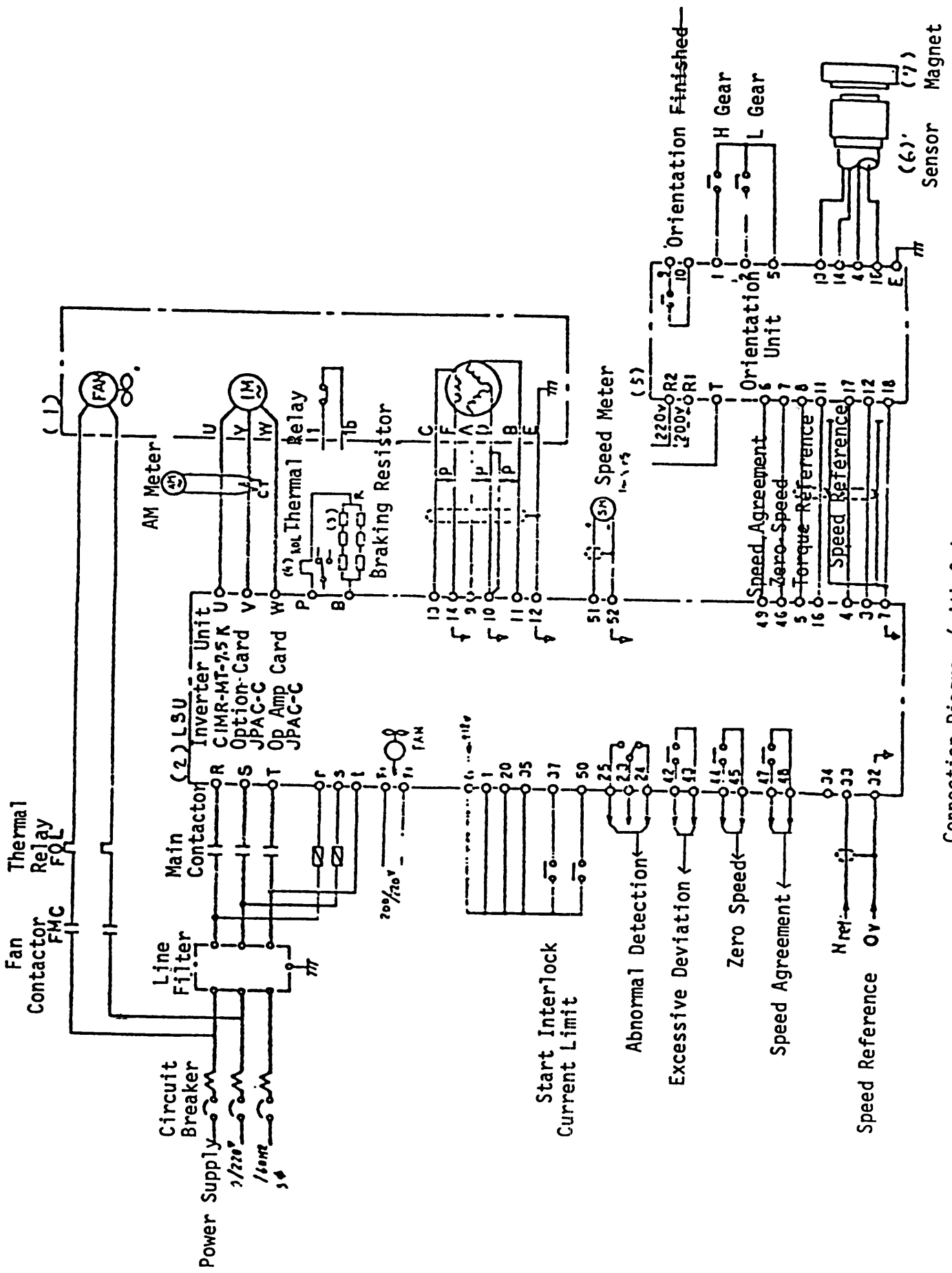
② DIMENSIONS IN mm

TYPE 形式	CIMR-MT-15K
PAINTING 塗装色	5Y7/1
APPROX. WEIGHT 概重量	45KG



6. Connection Diagram (without orientation unit)

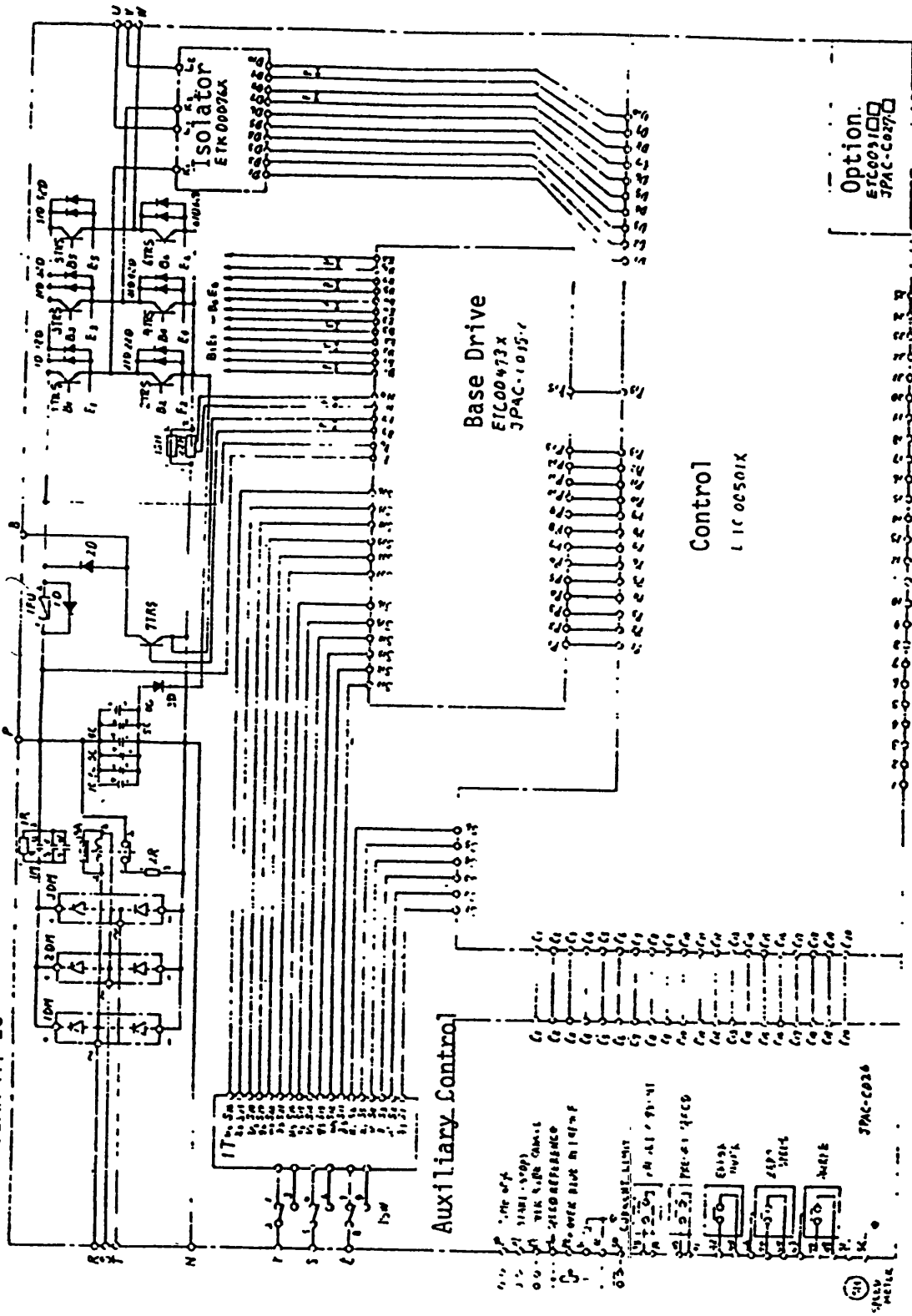




Connection Diagram (with Orientation Unit)

Elementary Diagram

CIMR-MT-15



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YASKAWA Electric Mfg. Co., Ltd.	Drawn: Checked: Appr.	Operator: K. Suzuki
Revision:		
Inverter Interlock Elementary Diagram		

8. External Terminal List

	Terminal Symbol	Name	Description
MAIN CIRCUIT	R, S, T	Main Power Input	3-phase 200/220 VAC $\pm 10\%$, 50/60 Hz.
	r, s, t	Control Power Input	3-phase, 200/220 VAC $\pm 10\%$, 50/60 Hz
	U, V, W	Motor Connection	Connect U, V, and W to the corresponding motor terminals.
	P, B	Resistor Connection	Connected before shipment.
CONTROL CIRCUIT	23, 25	Spindle Condition Detection	Normal condition: Open
	23, 24	Spindle Control Abnormal Detection	Detection of spindle control circuit abnormal condition: Closed
	33, 32	Speed Reference Input	32 is connected to 0V, 33 is connected to speed reference ($\pm 10V$)
	13, 14	Resolver Input	14 is connected to 0V, 13 to resolver terminal C, and 14 to F.
	9, 10	Resolver Phase A Excitation	10 is connected to 0V, 9 to resolver terminal A, and 10 to D.
	11	Resolver Phase B Excitation	11 to resolver terminal B
	12	Grounding	Connect E to resolver terminal E and ground it.
	6, 7, 8	$\pm 12V$ Output	7 is 0V common, 6 is $\pm 12V$, 8 is $-12V$. 10mA can be supplied. Usable for speed setting, etc.
	50	Torque Limit	When $+12V$ is applied to 50, torque limit is ineffect.
	37	Start Interlock	When $+12V$ is applied to 37 interlock is not ineffect

External Terminal List (CONT)

	Terminal Symbol	Name	Description
CONTROL CIRCUIT	51, 52	Output for Tachometer	DC 1mA with 52 negative and 51 positive.
	44, 45	Zero Speed Detection	44 and 45 are closed, when speed is detected.
	47, 48	Speed agreement Detection	47 and 48 are closed, when speed agrees with command.
	42, 43	Excessive Deviation Detection	When 42 and 43 are closed, excessive deviation is detected.
	49	Speed agreement for Orientation	When 49 is 0V, speed conforms.
	46	Zero speed for Orientation	When 46 is 0V, zero speed is detected.
	5	Torque reference to Orientation	
	16	Torque reference from Orientation	
	4	Speed reference to Orientation	
3	Speed reference from Orientation		

FOR TYPE VS-626 A.C. SPINDLE DRIVE

Instructions for Removal and Installation of the Spindle
Drive Circuit Boards

1. Shut off the Control and turn off the Main Power Switch
2. Open the door to the Spindle Drive Cabinet
3. Remove the clear plastic cover on the Spindle Drive.
4. Make a list of all the wires onto the terminal strips on both the large and small boards on the spindle drive. These strips are located on the left side of both boards and also there are some small terminals on the bottom of the small board.
5. Remove all wires from the board to be replaced
*CAUTION: Insure that your wire list is complete and correct before removing any wires
6. Remove all ribbon connectors and if necessary remove the connector with the yellow wires at the top of the large board (it has 5 straight pins in a row)
7. If the large board is to be removed: At the top of the board there are 2 pairs of Red and White wires (the wires are wound together as a twisted pair) Trace these back to their white connectors and pull the connectors apart.
*NOTE: These plugs are labeled 1 and 2.
8. The small board is held down by plastic squeeze tabs. To remove the board, squeeze the tabs together with a pair of needle-nose pliers while gently lifting the board. When the board is free, lift it gently away and set it aside.
*CAUTION: When handling circuit boards ensure that they are not set on a wet surface. If possible set them on plastic of some sort.
9. The large board is normally held down by 9 screws, 8 of which are located on the outside edge of the board. The remaining screw is located in the very middle of the board. Remove the screws and gently lift the board free.
10. To install the new boards simply reverse the above procedure. All of the Ribbon cables and all of the connectors are keyed to fit only in one direction in their appropriate sockets. Ensure that all of the wires on the terminal strip are in their proper location and that they are tightly screwed down.

If you have any questions or problems please call:

YASNAC Service Department

Phone Number (312) 564-0806

Please return the bad boards to:

YASNAC America Inc.

Attn: Field Service Department

305 Era Drive

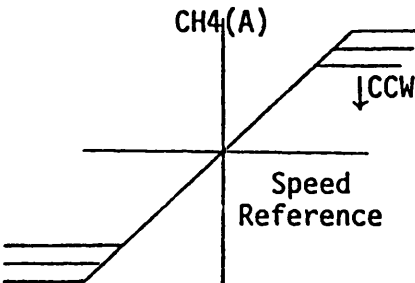
Northbrook, Illinois 60062

9. ADJUSTMENT

1. Adjustment of Speed Reference

(A) means part with a parenthesis are found on the JPAC-C026

(C) means part with a parenthesis are found on the JPAC-C051

SYMBOL	FUNCTION	ADJUSTMENT
1RH(A)	OFFSET adjustment of speed reference	Adjust CH4(A) within $\pm 3\text{mV}$ when speed reference is zero.
2RH(A)	LIMIT adjustment of speed reference	
3RH(A)	GAIN adjustment of forward reference	Adjust the CH4(A) to $+6.00\text{V}$ at 100% forward speed reference.
4RH(A)	GAIN adjustment of reverse reference	Adjust the CH4(A) to $-6.00\text{V} \pm 3\%$ at 100% reverse speed reference.

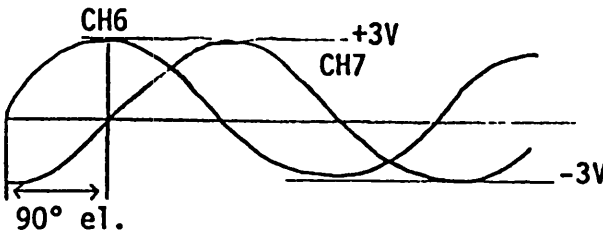
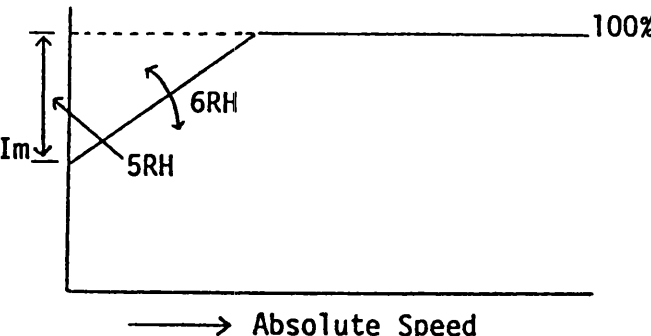
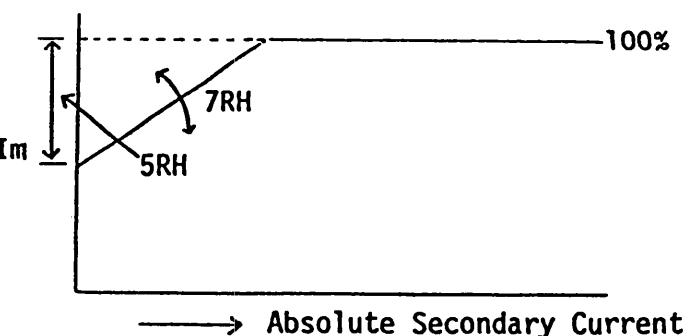
2. Adjustment of Speed Feedback

SYMBOL	FUNCTION	ADJUSTMENT
6RH(C)	ZERO adjustment of feedback	Adjust CH3(C) within $\pm 3\text{mV}$ when speed is zero.
5RH(C)	GAIN adjustment of feedback	Adjust CH3(C) to $\pm 6.00\text{V}$ at rated speed (-: forward, +: reverse)

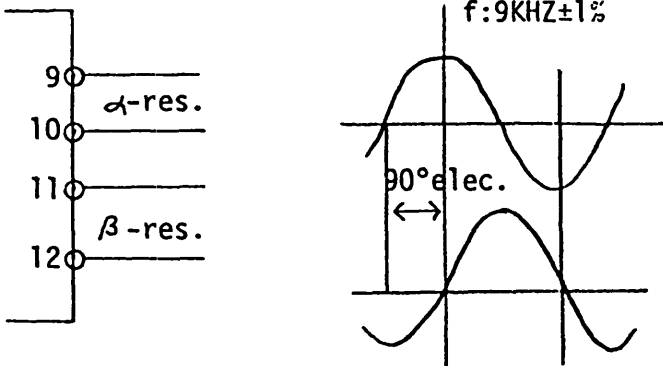
3. Adjustment of Speed

SYMBOL	FUNCTION	ADJUSTMENT
NFB(C)	Adjustment of Speed	Adjust to rated speed at rated speed reference. If there is a difference between forward and reverse, adjust by 4RH(A).
1RH(C)	OFFSET adjustment of Speed	If there is a difference between forward and reverse at low speed, adjust so they are equal.

4. Adjustment of Exciting Current

SYMBOL	FUNCTION	ADJUSTMENT
8RH(C)	Adjustment of excitation current	Adjust the CH6(C) and CH7(C) to $\pm 3V$ peak. 
5RH(A)	Adjustment of minimum excitation current	Adjust the excitation current at zero speed reference and zero torque reference.
6RH(A)	Inclination adjustment of excitation current against speed	
7RH(A)	Inclination adjustment of excitation current against secondary current	

5. Adjustment of Basic Circuit

SYMBOL	FUNCTION	ADJUSTMENT
2RH(C)	Voltage adjustment of DC supply (+12V)	Adjust so CH1(A) is +12.00V \pm 0.1V
3RH(C)	Voltage adjustment of DC supply (-12V)	Adjust so CH3(A) is -12.00V \pm 0.1V
7RH(C)	Frequency adjustment of logic circuit	Adjust so CH11(C) is 144KHZ \pm 1%
11RH(C)	Balance adjustment of resolver excitation voltage	Adjust so that α -res. voltage is the same level as β -res. voltage. 
19RH(C)	Offset adjustment of phase α current amp	Adjust to remove the DC component from the AC output current.
20RH(C)	Offset adjustment of phase β current amp	
16RH(C)	Carrier frequency adjustment of PWM	Adjust to 2KHZ-3KHZ according to the specification.
17RH(C)	Carrier frequency adjustment of PWM	Usually this function is not used. Set full CCW.
18RH(C)	Carrier frequency adjustment against speed	
T LIMIT (C)	Level adjustment of current limit	Adjust to 125% of the 30 minute rated current.
SLIP FREQ(C)	Slip frequency adjustment	
4RH(C)	Slip frequency adjustment against speed	
12RH(C)	Current level adjustment of OVERLOAD detection	Adjust to 105% of the 30 minute rated current.

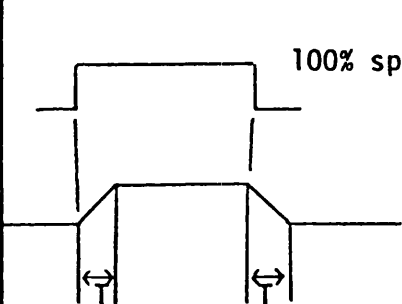
5. Cont.

SYMBOL	FUNCTION	ADJUSTMENT
13RH(C)	Time adjustment of OVERLOAD detection	Adjust to 60-120 sec. according to specification.
10RH(C)	Level adjustment of Over Speed detection	Adjust to 110% of rated speed.
15RH(C)	Level adjustment of Low Voltage detection	Adjust to 84% of rated voltage.

6.

SYMBOL	FUNCTION	ADJUSTMENT
9RH(A)	Level adjustment of zero speed detection	Adjust within 1% of rated speed.
AGREE(A)	Level adjustment of speed agree detection	Adjust to $\pm 15\%$ of commanded speed
10RH(A)	Offset adjustment of speed agree detection (-15%)	Adjust to -15% of commanded speed at low speed range.
11RH(A)	Offset adjustment of speed agree detection (+15%)	Adjust to +15% of the commanded speed at low speed.
DEV-A(A)	Level adjustment of deviation detection	Adjust to 50% of the commanded speed

7.

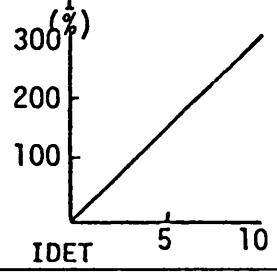
SYMBOL	FUNCTION	ADJUSTMENT
TIME(A)	Selection of acc/dec time limit	 <p>100% speed reference</p> <p>T is equal to the time set by the DIP switch.</p>

7. Cont.

SYMBOL	FUNCTION	ADJUSTMENT
8RH(A)	Level adjustment of current limit at deceleration	Normally the current is not limited during deceleration. (8RH is set to full CCW) But if the load has a large inertia and a large current flow through braking circuit at deceleration, 8RH should be adjusted to reduce the current.

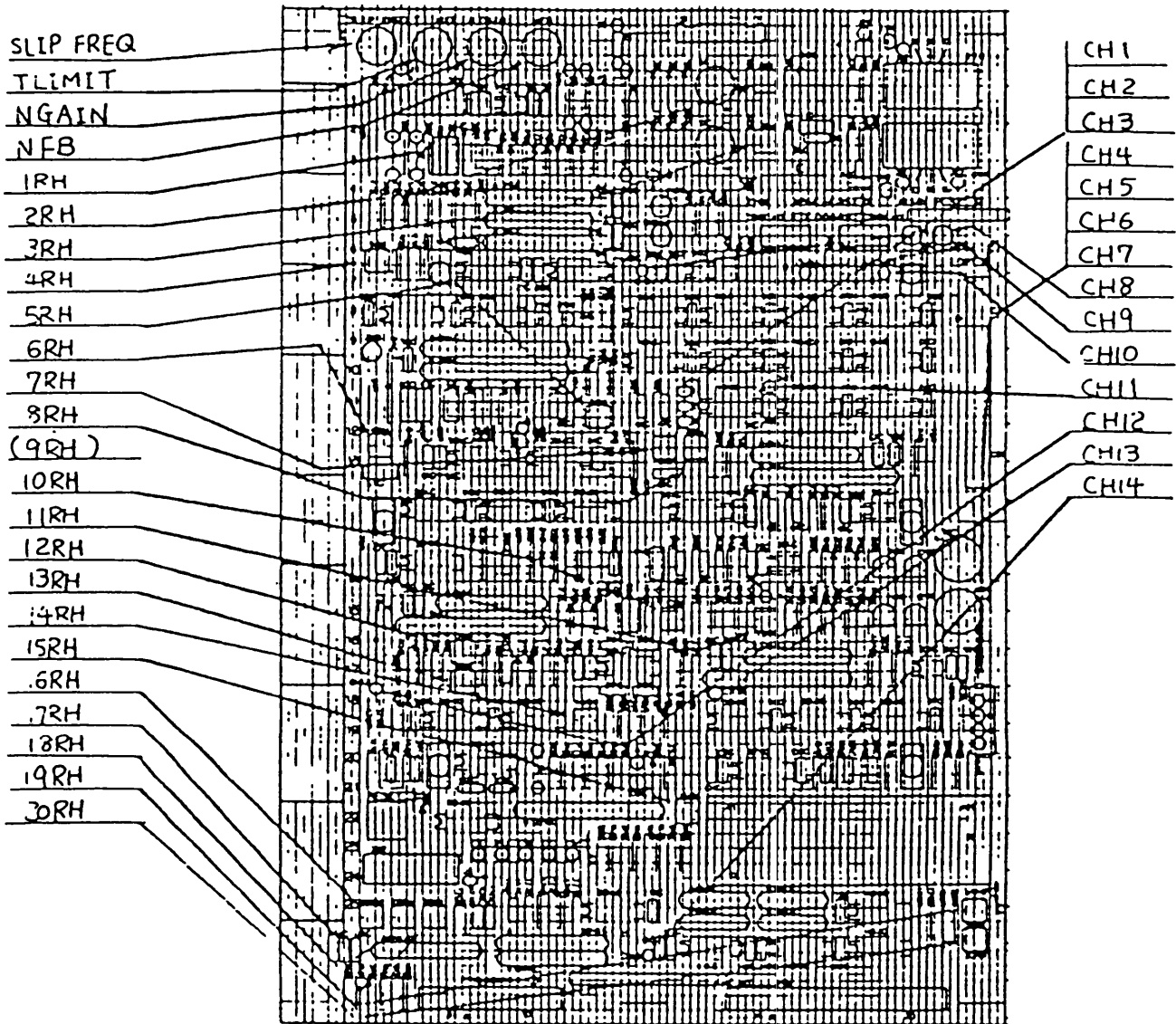
8.

SYMBOL	FUNCTION	ADJUSTMENT
METER(A)	Scale adjustment of Tachometer	Adjust the tachometer at rated speed. A 1ma DC full scale ammeter should be used for the tachometer.
NDET(A)	Level adjustment of speed detection	Adjust to 10-30% of rated speed. (0.6V-1.8V at CH8(A)) If the speed goes under the set level, terminals 40 and 41(A) will be closed.
IDET(A)	Level adjustment of current detection	Adjust to 0-200% of rated current. If current goes over set level, terminals 38 & 39(A) will close.
ILIM(A)	Level adjustment of current limit	Can adjust 10-100% of rated current when 12V is applied at terminal 50(A), otherwise it is set by TLIM.



10 Locations of Pots and Check Points

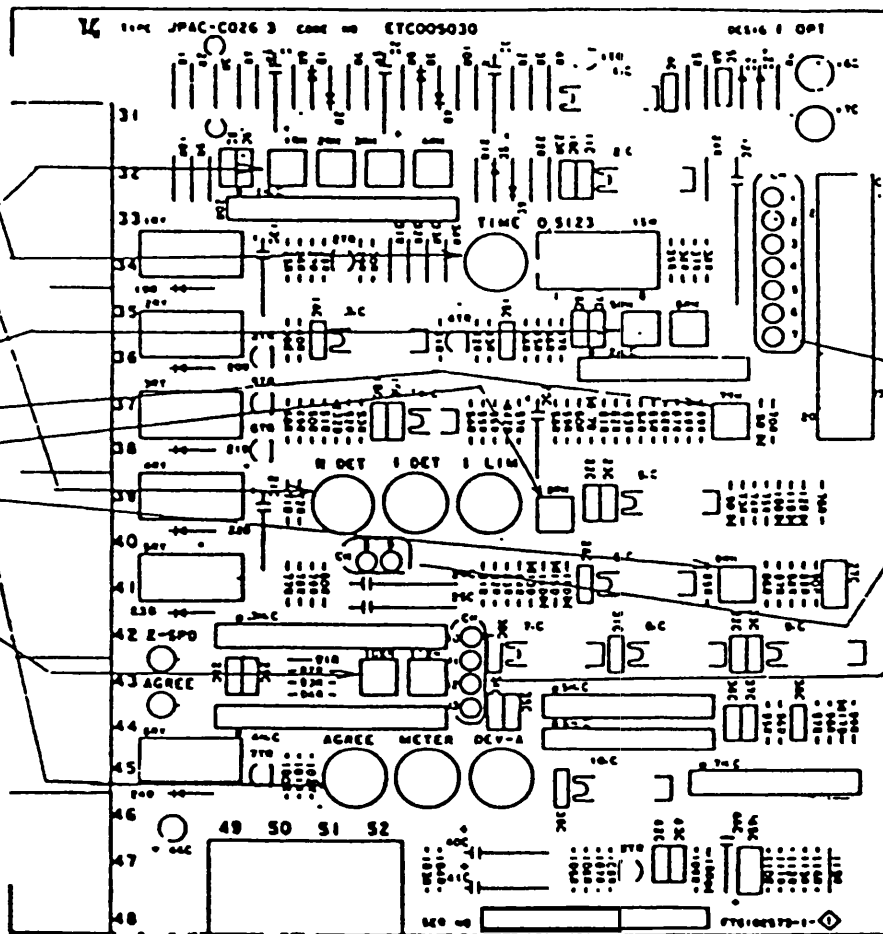
1. Control Board



2. Auxiliary Board

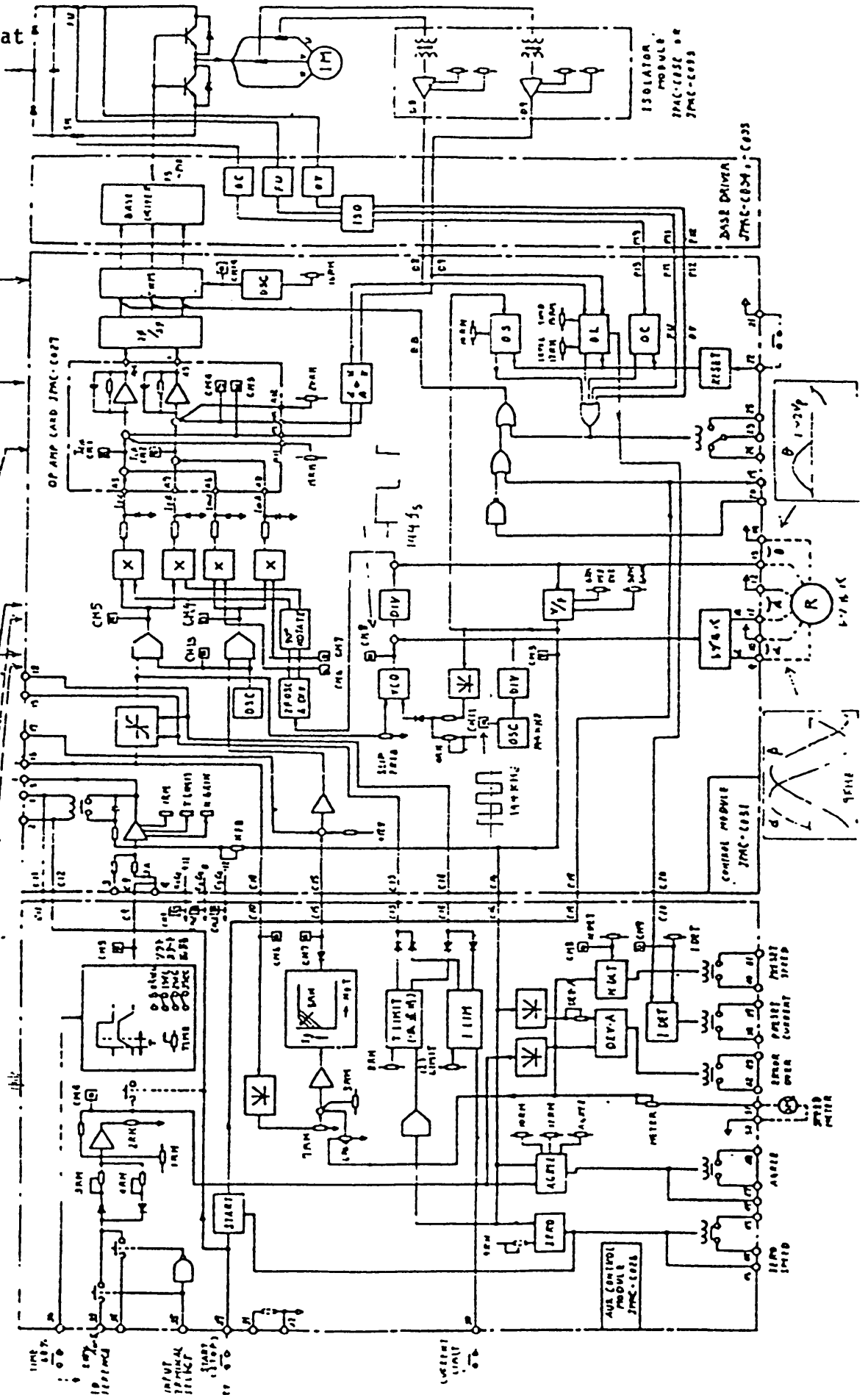
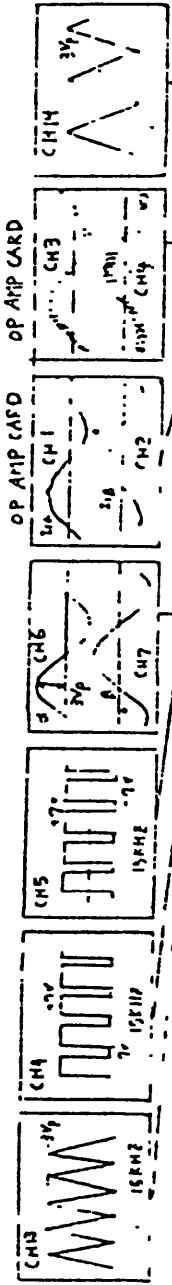
TIME
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DEV-A

1RH
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6RH
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9RH
10RH
11RH

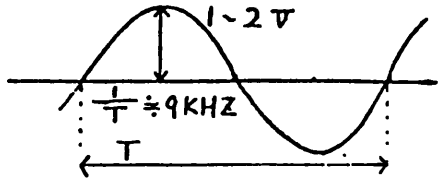


CH1
CH2
CH3
CH4
CH5
CH6
CH7
CH8
CH9
CH10
CH11
CH12
CH13

Block Diagram
and waveforms at
check points



12. TROUBLE SHOOTING

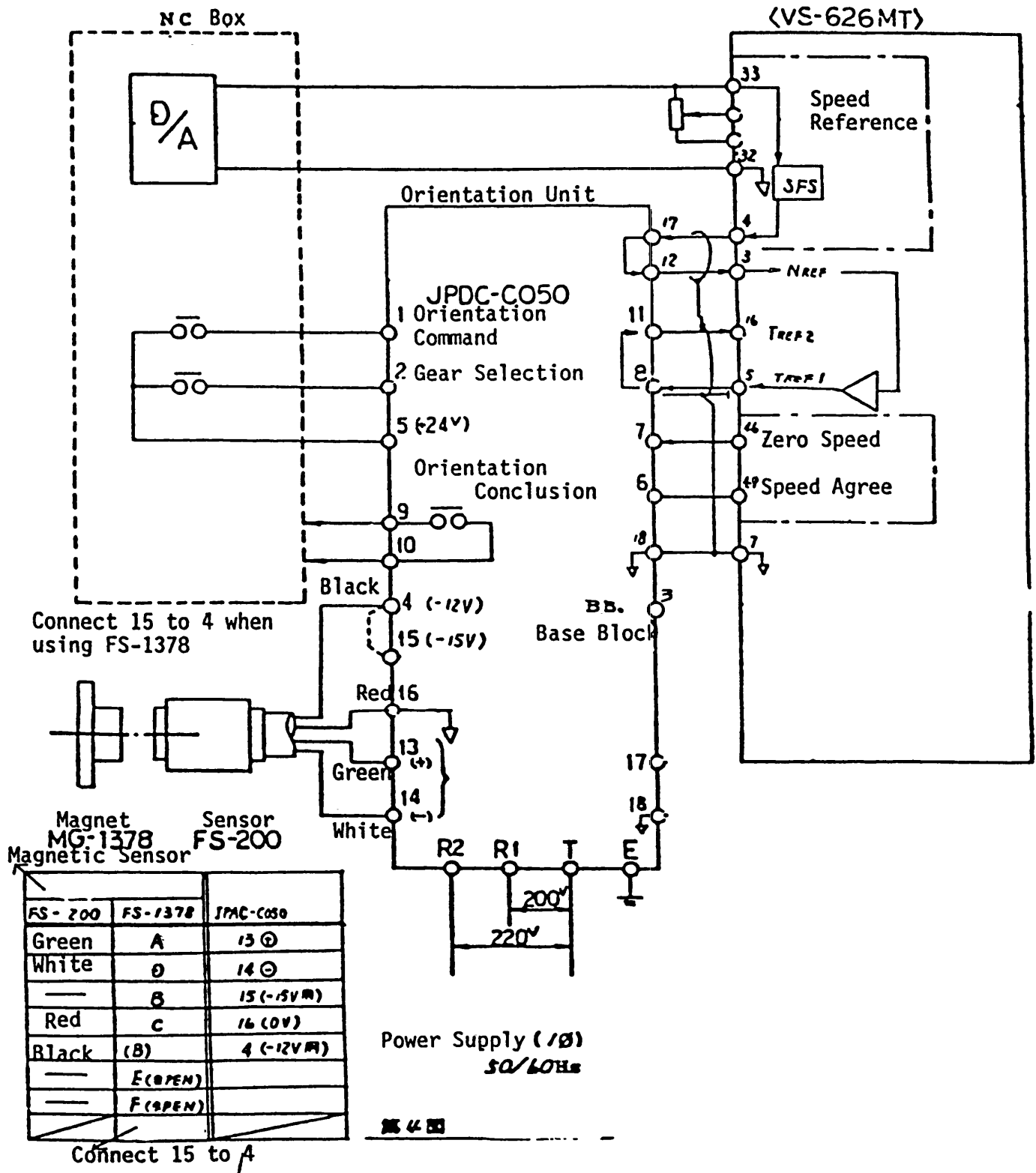
Trouble	Check Item
1. QS alarm	<p>1. Check the resolver wiring The figure at the right shows the wave form between terminals 13 and 14 (C)</p>  <p>2. Check the speed reference from N/C (Terminal 33 (A)), output of speed AMP (CH4(A)) and speed feed back (CH 3(A))</p>
2. QL alarm	<p>1. Check the load to see if it exceeds the specifications of the drive unit</p> <p>2. Check the starting and stopping operation frequency</p>
3. OV alarm	<p>1. Adjust 8RH(A) if it occurs during deceleration</p> <p>2. Check the AC Main Supply Voltage</p> <p>3. Check the Power Transistors and wiring of the braking circuit When the power is turned on immediately after it has been turned off. There is a chance that the OV alarm will appear so wait three or four minutes before turning on again</p>
4. QC alarm	<p>1. Check the six Main Power Transistors</p> <p>2. Check the output circuit (including the motor) for shorts or excessive impedance to ground</p>
5. FU alarm	See Item 4
6. Motor does not start	<p>1. Check the alarm Leds if there are any alarms indicated refer to items 1 through 5</p> <p>2. Check the speed reference from N/C (Terminal 33(A)), the output of speed AMP (CH4 (A)) and the speed feed back (CH3 (A))</p> <p>3. Check the start interlock signal (Terminal 37 (A) should be 12V)</p> <p>4. Check the wiring of resolver and motor</p>
7. "Z-SPD" doesn't come at zero speed	<p>1. Check the resolver wiring</p> <p>2. Adjust 1RH(A) and / or 6RH(C)</p>
8. "Agree" doesn't come when speed is correct	<p>1. Adjust 1RH(A) and / or 6RH(C)</p>
9. The thermal relay in the braking circuit trips during deceleration	<p>1. Check the Power Transistor in the braking circuit</p> <p>2. Adjust 8RH (A)</p>

ORIENTATION UNIT (TYPE JPAC-C050)

1. Specification

Item	Specification	Terminal
Power Supply	Single-phase 200/220V (-15%~+10%) 50/60Hz	200V....R1-T 220V....R2-T
DC Power Supply For Magnetic Sensor	DC 12V ±10% 50mA (For Type FS-200)	-12V(Black)...4 0V(Red)....16
	DC 15V ±10% 50mA (For Type FSD-1378)	0V(C).....16 -15V(B).....15 Connect 4 to 15
Orientation Command	On at orientation start	1
Gear Position	On when in Low Gear Off when in High Gear	2
Speed Reference	±6V/±100% speed	17
Torque Reference	-3V/+100% Torque	8
Zero Speed Detection	On at zero speed	7
Speed Agree Detection	"L" at speed agree	6
Position Detection	6V p-p-16V p-p	13(+) 14(-)
Orientation Speed Reference		12
Orientation Torque Reference		11
Orientation Conclusion	Contact closes when orientation is finished	9 10
Orientation Speed Range	0-2.2% of rated speed in H gear 0-8.8% of rated speed in L gear	
Positioning Accuracy	±0.5mm or less on the circumference 120mm ∅	

2. Connection Diagram



第4图

No. EUAQD. 1. 001-1/1.

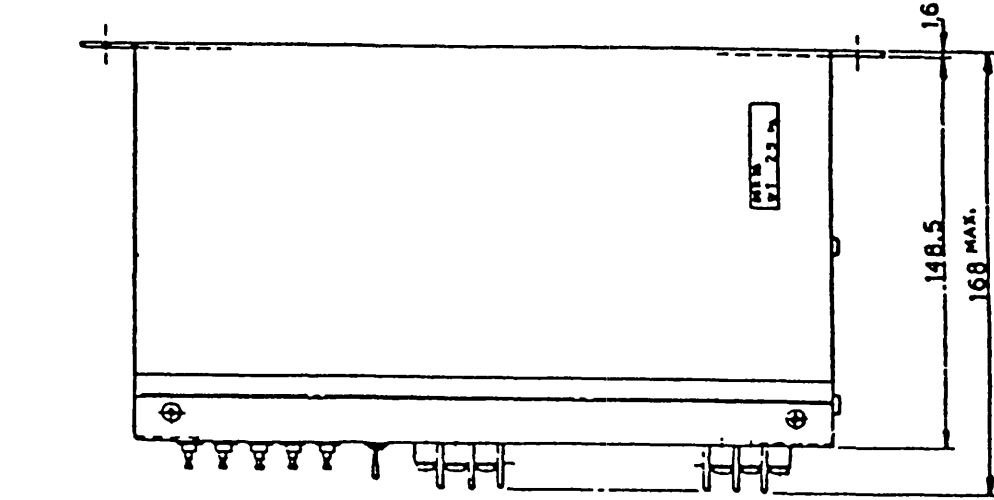
3. Dimension Diagram

THIRD ANGLE PROJECTION

DIMENSIONS IN

APPROX. WEIGHT : 2.5 Kg

ORIENT. SP.
FRIC-TURN
H. GAIN
L. GAIN
LEVEL
BIAS



VARIABLE RESISTOR

CHECK TERMINALS

COMPEN.

CONTROL SELECTOR SWITCH

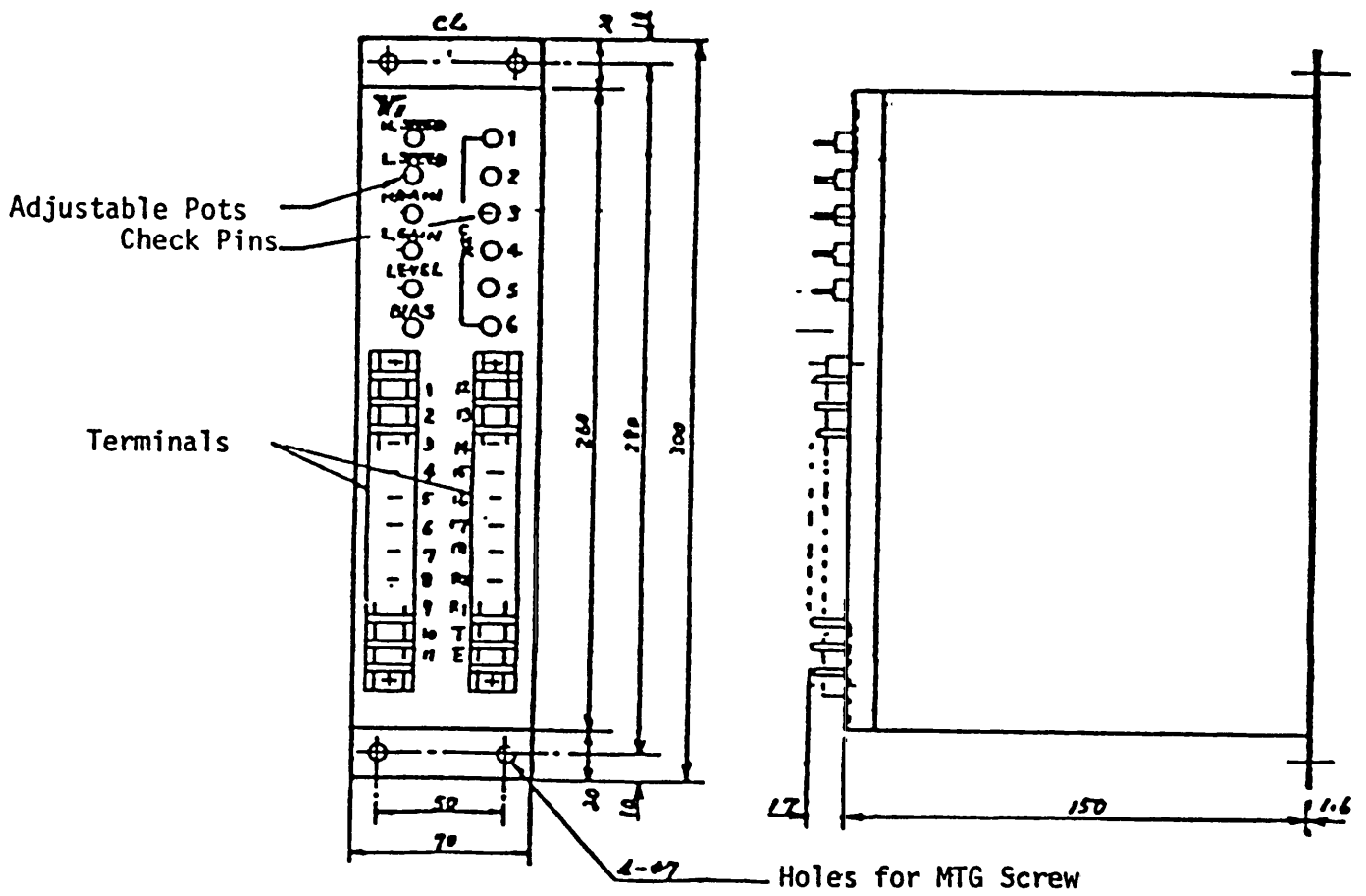
CONNECTION TERMINALS
WITH M4 SCREW

4-7 DIA MTG HOLES

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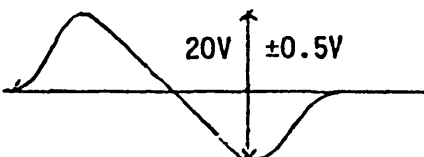
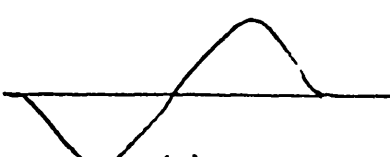
TYPE : JPAC-
CODE NO. : EUA00

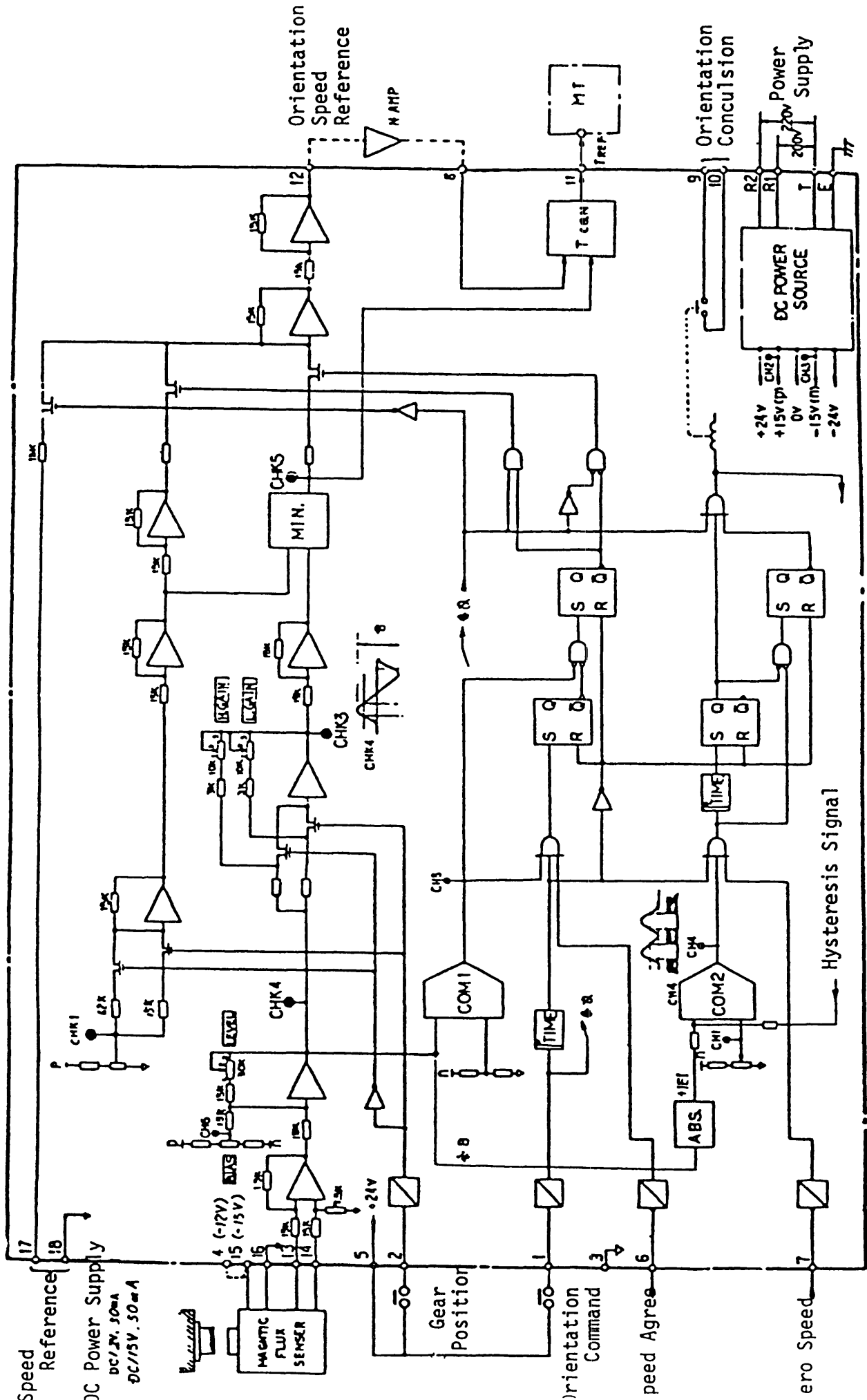
Draw.	Check.	Appr.
 YASKAWA Mfg. Co., Ltd.		



Dimension Diagram of Orientation Unit

4. ADJUSTMENT

Symbol & Function	Adjustment
<p>LEVEL</p> <p>Level adjustment of position detection</p>	<p>Move the motor in the <u>forward direction</u> slowly and check the waveform at CHK4. If the voltage isn't 20Vp-p $\pm 0.5V$, adjust Level to correct it.</p> <p>If the waveform is like (b): terminals 13, 14 should be switched</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>(a) Correct Waveform</p> </div> <div style="text-align: center;">  <p>(b) Wrong Waveform</p> </div> </div>
<p>ORIENT. SP</p> <p>Speed adjustment in orientation mode</p>	<p>Motor speed (not spindle speed) should be set over 30rpm in orientation mode.</p> <p>Orientation Speed Setting Example</p> <p>NH (Max. rated speed in H gear) = 4500rpm</p> <p>N REF (Max. rated speed reference) = 6V</p> <p>N OR (orientation speed) = 50rpm</p> <p>Orientation Speed = $\frac{NOR}{NH} * NREF * 20V$</p> <p>Reference (CHK1)</p> $= \frac{50}{4500} * 6 * 20 \approx 1.33 \checkmark$
<p>H. GAIN</p> <p>L. GAIN</p> <p>Gain adjustment of servo loop</p>	<p>Adjust the gain, so there is no hunting when the spindle stops in orientation position.</p> <p>Adjust H. Gain in H gear</p> <p>Adjust L. Gain in L gear</p>
<p>BIAS</p> <p>Fine adjustment of orientation position</p>	<p>Select L gear range, adjust so the spindle position coincides with the proper orientation position.</p>
<p>FRICTION</p> <p>Fine adjustment of orientation position in H Gear</p>	<p>Select H gear range, adjust so spindle position coincides with the proper orientation position.</p>



17 18 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16