HCG

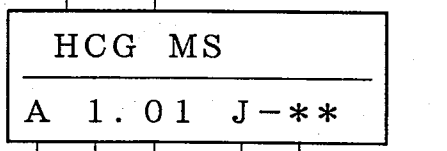
MULTI-HEAD ELECTRONIC EMBROIDERY MACHINE

MAINTENANCE MANUAL

(ELECTRIC RELATED)

Happy

INDEX



Machine model sign : This shows machine model to match

HCG	HCG type small type machine

Circuit board sign : This shows circuit board to be fixed

MS	HCG-8300 master side
SL	HCG-8301 slave side

Sign for optional items : Optional items to be fixed

No sign	thread cut, thread catch,borer

Display sign

J	Display in Japanese
E	Display in English

*3 Improvement number : This shows order of improvement

*2 Revised number : This shows order of revision

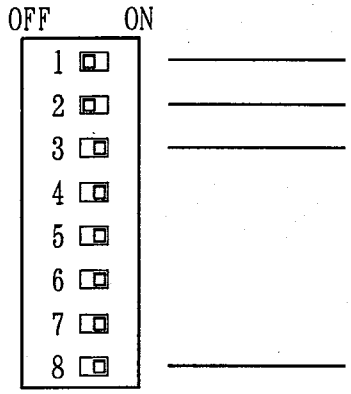
*1 Pair sign : This shows pair of master and slave

ATTENTION :

*1. When pair sign is different on the side of master and slave, the machine doesn't work properly. So please be sure to use same coded ROM.
*2. When the revision number is different, there is a case that the machine dosen't work properly. Therefore when you use other ROM than that fixed to the machine when it left factory, please contact us.
*3. Even if the improvement number is different, interchangeability is ensured.
4. When thread cut, thread catch and borer are fixed to the machine as optionals, please turn inner switch on slave circuit board.

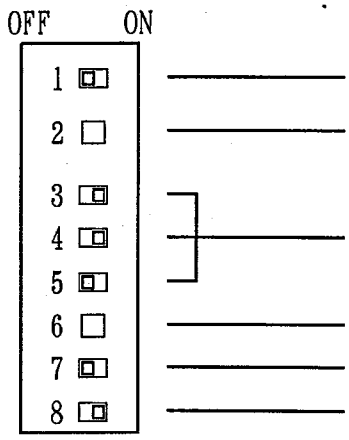
■ : This mark shows condition of the machine when it left factry.

1. DS1 (MASTER BOARD)



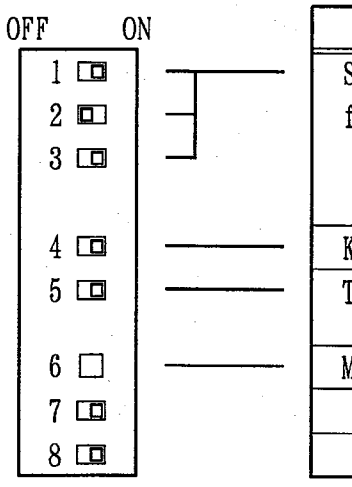
	OFF	ON
Cap frame	with	without
Ext.communication	with	without
H-TESS	with	without
	Unused	
	Unused	
	Unused	
	Unused	
Mode selection	Monitor mode	Drive mode

2. DS2 (SLAVE BOARD)



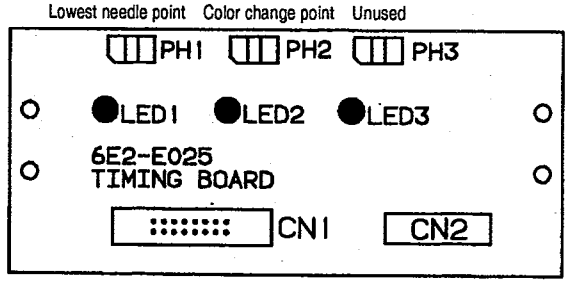
	OFF	ON
	Unused	
Thread break detecting	Rotary type	Spring type
Selection of needle number	ON 7 OFF 8 ON 10 OFF (12) OFF OFF ON ON ON ON OFF OFF	
Borer device	with	without
Thread cut device	with	without
	Unused	

3. DS3 (SLAVE BOARD)



	OFF		ON	
Start Angle for frame move	OFF	ON	OFF	ON
	ON	OFF	OFF	ON
	ON	ON	ON	OFF
	40°	"50°"	60°	70°
Keeper off timing	204°		184°	
Thread break detection	Adjustment mode		drive mode	
Model(Revolution)	HCG-1002 (1100rpm)		HCG-1004 (1000rpm)	
	Unused			
	Unused			

Adjustment of main shaft (upper shaft) timing



A. Allocation of timing sensor

B. Positioning of sensor for the lowest needle point

(PH1, LED1)

As this sensor is used to synchronize mechanical action and electric timing, please set so that tolerance comes within ±1 degree.

a. Set the main shaft to the lowest needle point (0 degree) with adjusting disc.

b. Turn slit plate for the lowest needle point toward direction (positive direction) where the main shaft revolves so that LED1 on timing circuit board comes to position where it lights.

c. Turn slit plate further to positive direction and lock fixing screw at position where LED1 went off.

d.Make the main shaft one turn by a hand and check if tolerance between adjusting disc and electric timing is within ±1 degree. If tolerance is large, please do same thing from the beginning.

C. Positioning of detecting sensor of color change point

(PH2, LED2)

This sensor is used to judge point at time of color change. When difference is large, error code E-50 will get to come out. Therefore adjust so that center of slit comes to "C" point on the adjusting disc.

a. Turn the main shaft toward positive direction and set to -7 degrees from color change point "C" with the adjusting disc.

b. Turn slit plate toward positive direction and set to where LED2 lights, and lock.

c. Turn the main shaft further toward positive direction and check that LED2 goes off in the vicinity of +7 degrees from color change point with the adjusting disc.

d. When there occurs inclination toward positive direction or negative direction, please conduct positioning in the following manner from the beginning.

Inclination to positive direction : When to set in a., set to larger figure than -7 degrees in negative direction.

Inclination to negative direction : When to set in a., set to smaller figure than -7 degrees in negative direction.

Note : In case position of right and left direction against center of sensor of slit plate inclines to either side, scope in which LED lights narrows or widens from +7 degrees to -7 degrees. Please re-adjust so that position comes to center of sensor.

D. Checking

a. When you stopped the machine with stop switch, please check more than ten times repeatedly if stop position comes within ±3 degrees of color change point "C Point".

b. When you stopped the machine with thread cut switch, please check more than ten times repeatedly if stop position comes within ±3 degrees of color change point "C Point".

c. When stop position always goes beyond color change point or stop before it, it is considered that positioning of the lowest needle point sensor may be not proper. Therefore please check.

d. In case stop position is irregular, see to it that speed to determine position reduces by adjusting speed control knob explained in other page.

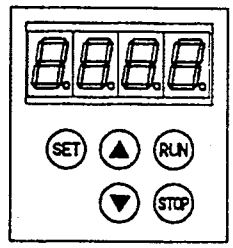
Note : Control of the main shaft is obtained by calculating from average figure of present stop position. For checking after adjustment of sensor, you need to repeat start and stop several times.

Adjustment of inverter unit (V5-07-3)

Basically no adjustment is required. Only necessary parameter described in the table below is set. There are many other parameters. In case you change setting unnecessarily, you may have unexpected trouble. Therefore if you need to adjust, please do with enough care.

*Note: Turn knob in the center of inverter fully to the right.

How to set parameter



1. Turn power on.
2. Press SET button. At this moment, when you don't touch switch for about 3 seconds, button will return to 00. Please press SET button again.
3. Press either ▲ or ▼ button, let selection of parameter number display and press SET button.
4. Press either ▲ or ▼ button, select setting figure and press SET button.

How to initialize parameters

If you changed parameter other than that in the setting table and the inverter worked improperly, please recover it in the following order.

1. Select parameter No. 86, let setting figure YES display and turn power off with this status as is.
2. After display disappeared, when you turned power on, parameter will be initialized and ----will be displayed.
3. Once again, please turn power on, then set parameter figure in the table below.

Main warning and abnormal monitor

When the machine stops by alarm (E-15) of inverter, following causes appears on display on the inverter. Please check causes on display as necessary measures must be taken according to causes.

Display	Cause
L	Shortage of power source voltage
OC	Trip of over current
OU	Trip of over voltage
Err	CPU error
EOU	Trip of over voltage at time of power input
CAU	Alteration and memory of parameter

Table of parameter setting

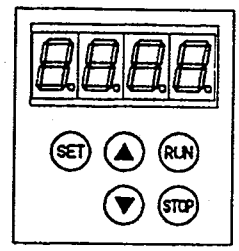
Disp No.	Par. No.	Name of parameter	Setting figures		
1	00			00	
2	*16	Selection of drive instruction		TER	
3	*18	Selection of drive mode		JOG	
4	19	Torque boost		80	
5	20	Jogging frequency		2.0 Hz	Positioning speed (20 rpm)
6	21	Accelerating time		0.5 sec	
7	25	Volume of direct current brake		100	
8	26	Time of direct current brake		0.5 sec	
9	27	Selection of direct current brake		POS	
10	29	Frequency for start of control		10 Hz	
11	30	Carrier frequency		0	
12	31	Decelerating time		0.0 sec	
13	35	Base frequency		60 Hz	
14	*73	Frequency when input 5V	1002	118 Hz	Maximum speed (1100rpm)
			1004	118 Hz	
15	75	Highest frequency		120 Hz	

Regarding parameters marked *. If you want to change parameters marked * and you input desired setting value, "CAU" appears. If your desired setting is correct, press ▲▼ switch at the same time, then you will get new setting completed.

Adjustment of inverter unit (V5-07-3)(Supplement)

A. Alteration of display order of parameter

1. Turn power on.
2. Press SET button to get 00 - - displayed.
3. Keep pressing ▲ button to get 99- - displayed.
4. Press SET button to get 01- - (display order) displayed and select display order with ▲ ▼ switch.
5. Further press SET button to tern display to - - 01 (parameter number) and select parameter number with ▲ ▼ switch.
6. Repeat 4 and 5 and set so that you get parameter number displayed in order in the list below.



B. Alteration of parameter

Normally 15 different parameters are set. If you want to conduct operation of C & D, change parameter in the following steps.

1. Turn power on.
2. Press SET button to get 00 - - displayed, then keep pressing ▼ switch for about 10 seconds.
3. Display will turn from 00_ _ to _ _ 15.
4. Set _ _15 to _ _50 with a ▲ ▼ switch.
5. Press SET button (display of 50 different parameters becomes possible).

C. How to initialize parameters

If you changed parameter other than that in the setting table and the inverter worked improperly, please recover it in the following order.

1. Select parameter No. 86, let setting figure YES display and turn power off with this status as is.
2. After display disappeared, when you turned power on, parameter will be initialized and ----will be displayed.
3. Once again, please turn power on, then set parameter figure in the table below.

D. Release of parameter lock

If you locked parameter mistakenly, release it in the following manner:

1. Turn power on while pressing SET button.
2. Press SET button to display 00 - - , then keep pressing ▲ and when you get 99- - displayed, release button.
3. If you further keep pressing ▲ for about 10 seconds, you will get - -NO displayed.
4. Press SET button.

Table of parameter setting

Disp No.	Par. No.	Name of parameter	Setting figures	
1	00			00
2	*16	Selection of drive instruction		TER
3	*18	Selection of drive mode		JOG
4	19	Torque boost		80
5	20	Jogging frequency		2.0 Hz
6	21	Accelerating time		0.5 sec
7	25	Volume of direct current brake		100
8	26	Time of direct current brake		0.5 sec
9	27	Selection of direct current brake		POS
10	29	Frequency for start of control		10 Hz
11	30	Carrier frequency		0
12	31	Decelerating time		0.0 sec
13	35	Base frequency		60 Hz
14	*73	Frequency when input 5V	1002	118 Hz
			1004	118 Hz
15	75	Highest frequency		120 Hz

Regarding parameters marked *. If you want to change parameters marked * and you input desired setting value, "CAU" appears.
If your desired setting is correct, press ▲▼ switch at the same time, then you will get new setting completed.

2. Adjustment of slave circuit board (ES-HCG-8301)

In order to adjust and set main shaft revolution speed, the machine must be switched to monitor mode.

Set DIP switch DS1-8 on master circuit board to off and turn power on.

A. Adjustment of highest speed (1100rpm) and adjustment of low speed (300 rpm).

a. Make sure that parameter No. 73 of inverter unit is set to 118 Hz (mentioned on page 5.0).

b. Turn knob on control box to "LEFT" to the full.

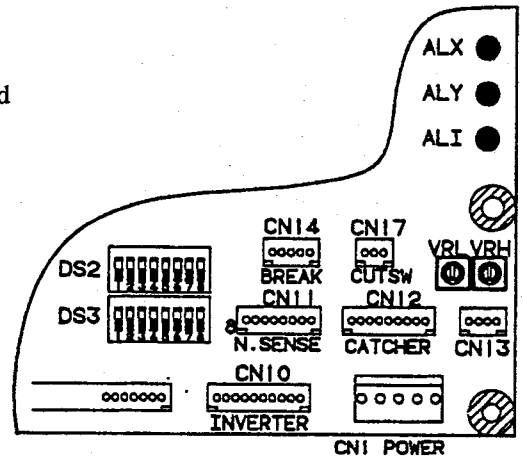
c. Turn VRH (figure at the right) on slave circuit board to "RIGHT" to the full.

d. Select "Slave" on monitor rode, start maximum speed (No. 20) and adjust with VRL so that LED display on inverter gets 32.8 and speed on control box shows 450rpm.

e. Turn VRH to "LEFT" to get 21.9 displayed on inverter, and confirm that speed is 300rpm.

f. Turn knob on control box to "RIGHT" to the full and make sure that maximum speed is 1100rpm.

g. If speed doesn't reach 1100rpm, make fine-tuning with VRH, VRL.



B. Automatic setting of speed control data

Teaching will automatically set control data that will automatically reduce speed in compliance with stitch width.

a. Adjust maximum speed and low speed in advance as mentioned in preceding A.

b. Turn knob on control box full to the right.

c. Select "Slave" on monitor mode to start automatic setting (No.21).

d. When machine started, it will increase speed gradually frame stop and make internal setting of control data. Setting will take 5 - 10 minutes and caves to automatic stop upon completion.

e. When you press escape key ⎡↰⎤ after pressing stop switch ⎡↵⎤, the machine will return to main menu.

C. Confirmation of speed control data

By pressing monitors Nos. 20, 6, 42-67, you can confirm speed that is automatically set as shown in the list below. There may be a difference of ±20 rpm between setting value in the list and actual speed save for Nos. 6 and 42, but this difference will produce no problem in function. As for details on middle speed, refer to TE9.0.

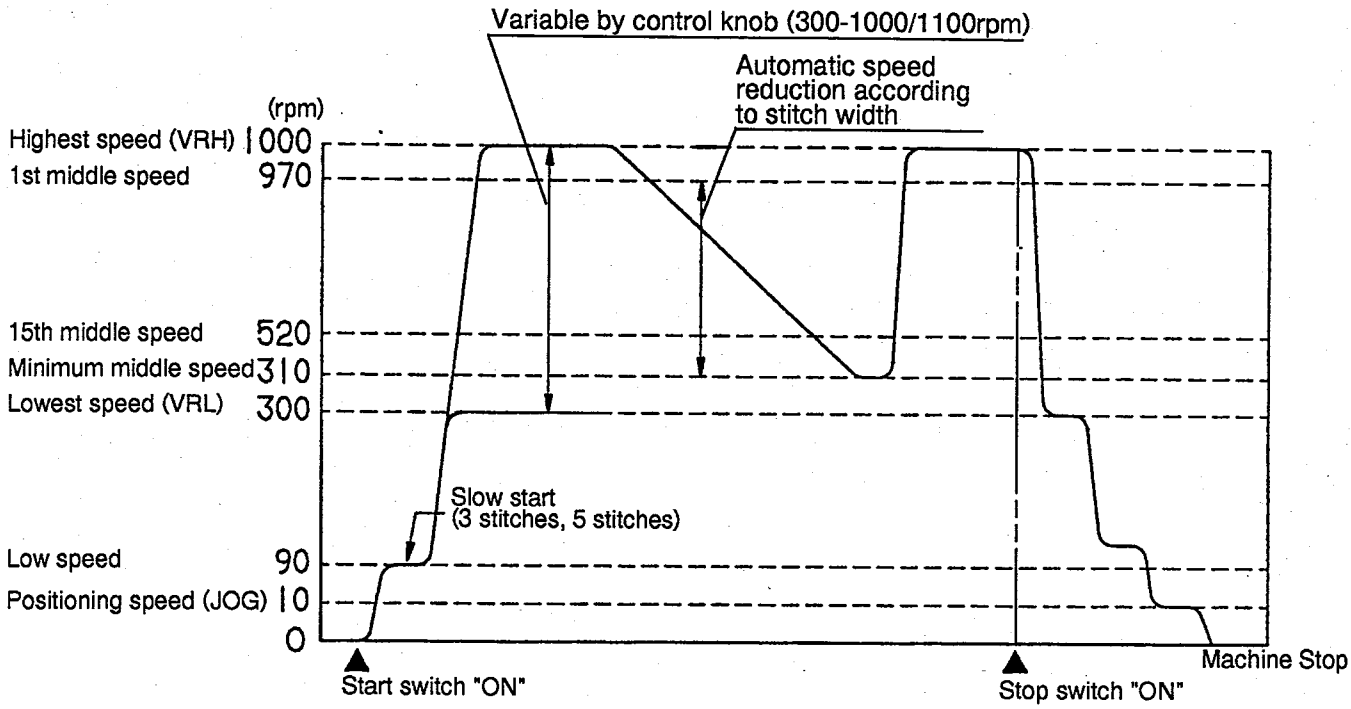
Speed setting table (rpm)

	Monitor No.	How to set	Set value
Maximum speed	Slave "20"	VRH	1000rpm
Low speed		VRL	300rpm
*Positioning speed	Slave " 6"	Inverter	10rpm
Start speed	Slave "42"	Automatic set	90rpm
Minimum middle speed	Slave "44"	Automatic set	300rpm
Middle speed	Slave "45"	Automatic set	400rpm
	~ "66"	Automatic set	~ 1070rpm

Settling of positioning speed is adjusted by inverter (To select parameter No. 20).

Note: Autocratically set control data is stored and retailed in memory of slave circuit board. When you exchange slave circuit board or you got "Error-121", you are required to reset.

3. Speed control sequence



Basic operation

A. Switch-over to and release of monitor mode

a. Set DIP switch DS1-8 on master circuit board (HCG-8300) to OFF and turn on power.

b. Check that display of drive mode lights on the control box and when you press < ✲ > switch, drive mode turns to monitor mode and next monitor menu is displayed.

SERVICE ■Angle : 0 Slave : 0 Card :

c. By pressing < ↰ > switch, monitor mode is released and returns to drive mode. but release is not made if < ↰ > switch dosen't show monitor menu.

ATTENTION :

Please be sure to set DIP switch DS1-8 to ON except for maintenance.

B. Function of switches on the cotrol box

< ✲ >	Calling out of monitor mode
< ↰ >	Release of monitor mode
< 0 - 9 >	Figure
< C >	Clearing of input figure
< ➡ >	Selection of menu
< ↵ >	Entry, stop of monitor

C. Selection of menu

Angle	—	Display of action angle
Slave	—	Action test of the machine
Card	—	Checking of memory circuit board

You can select menu by setting ■ mark on the screen with < ➡ > switch.

Order of operation

```
SERVICE   Angle : 0   ■Slave : 0   Card :
```

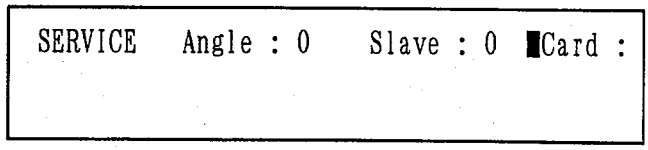
a. Set ■ mark on the screen to "Slave" position with < ➡ >switch.
b. Input test number shown below with number key.
c. Entry is made by pressing < ↵ > switch. When you press < ↵ > switch again, entry stops.
d. You can't move to other tests if entry has not been stopped.
e. When you finished action test, you should make sure that stop position of each unit is at regular position. Then you can move to next operation.

Test No.	Entry			
0	Total stop			
1	Maxim speed revolution of main shaft (control volume)	300 - 1000 rpm		
4	Confirmation for minimum middle speed revolution of main shaft	310		
5	Confirmation for low speed revolution of main shaft	90		
6	Positioning speed revolution of main shaftshaft (inverter unit)	10		
8	Jump solenoid ON			
9	Thread catch solenoid			
10	A series of thread catch motion			
11	Keeper solenoid ON			
12	Thread cut solenoid ON			
14	(Holder solenoid ON)			
15	(Holder solenoid OFF)			
20	Output of maximum speed			
21	Automatic setting of speed control data (No.40～67)			
	No.40～67 Confirmation of speed			
40	Confirmation of 0 rpm		55	Confirmation of 720 rpm
41	〃 10 rpm		56	〃 750 rpm
42	〃 90 rpm		57	〃 780 rpm
43	〃 120 rpm		58	〃 810 rpm
44	〃 300 rpm		59	〃 840 rpm
45	〃 400 rpm		60	〃 880 rpm
46	〃 430 rpm		61	〃 910 rpm
47	〃 460 rpm		62	〃 940 rpm
48	〃 490 rpm		63	〃 970 rpm
49	〃 520 rpm		64	〃 1000 rpm
50	〃 560 rpm		65	〃 1040 rpm
51	〃 590 rpm		66	〃 1070 rpm
52	〃 620 rpm		67	〃 1100 rpm
53	〃 650 rpm			
54	〃 680 rpm			

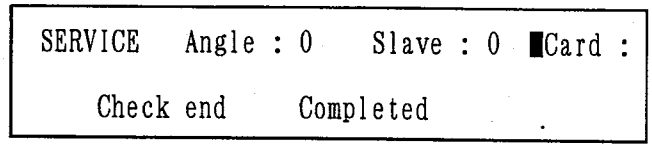
* Before operation

When you do this test, all the stored pattern data will be washed out and you will have to put in new pattern data. Please pay care to this point.

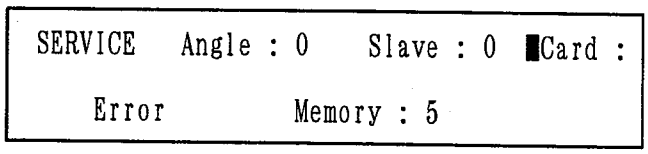
Order of operation



a. Set ▮ mark on the screen to "Card" position with < ➡ > switch.
b. Input number of memory module "2" under use in the machine with figure key.
c. You can start entry by pressing < ↵ > switch, however when you enter once, you can't do other operation until you finish checking.
d. Entry takes about 30 seconds per memory circuit board. When it is normal, the following display appears and test finishes.



e. When something unusual is found, memory tip number where abnormality occurred is displayed. In this case master circuit board must be exchanged.



Order of operation

```
SERVICE ■Angle : 0    Slave : 0    Card :
```

a. Set ■ mark on the screen to "Angle" position with < ➡ > switch.
b. Input test number shown below with number key.
c. When you press < ↵ > switch, display on the screen changes to the following display and angle that corresponds to the designated number is displayed.

```
SERVICE ■Angle : 0    Slave : 0    Card :
  — Angle Moniter —       Angle : 182
```

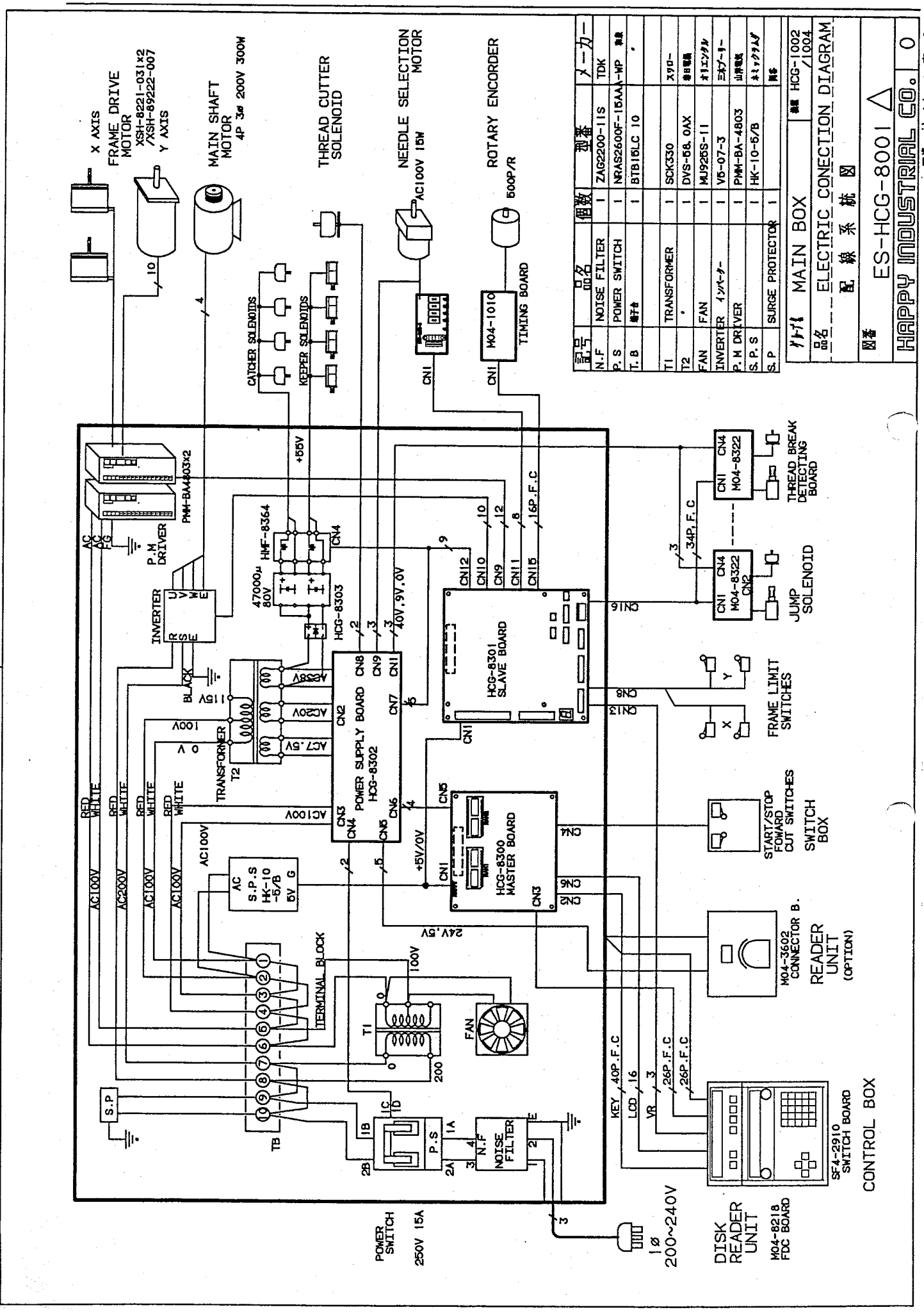
d. When you press < ↵ > switch again, timing display finishes and it returns to mode menu.
e. When you finish monitor mode and operate back in drive mode, angle the number of which you designated is displayed.

Test No.	Displays
0	Display of real time angle of the machine
1	Angle of frame move finish
2	Actual stop angle in case of normal stop
3	Actual stop angle in case of thread cut stop
4	Setting angle at time of frame move start
5	Brake setting angle at time of normal stop
6	Brake setting angle at time of thread cut stop
7	Angle to start frame move after mending
8	Initializing angle for main shaft stop point
9	Measuring angle for main shaft stop point
10	No definition

	HMS type	HCG type
Drawing No. list	ES-SF5-8000	ES-HCG-8000
Electric connection diagram	ES-SF5-8001	ES-HCG-8001

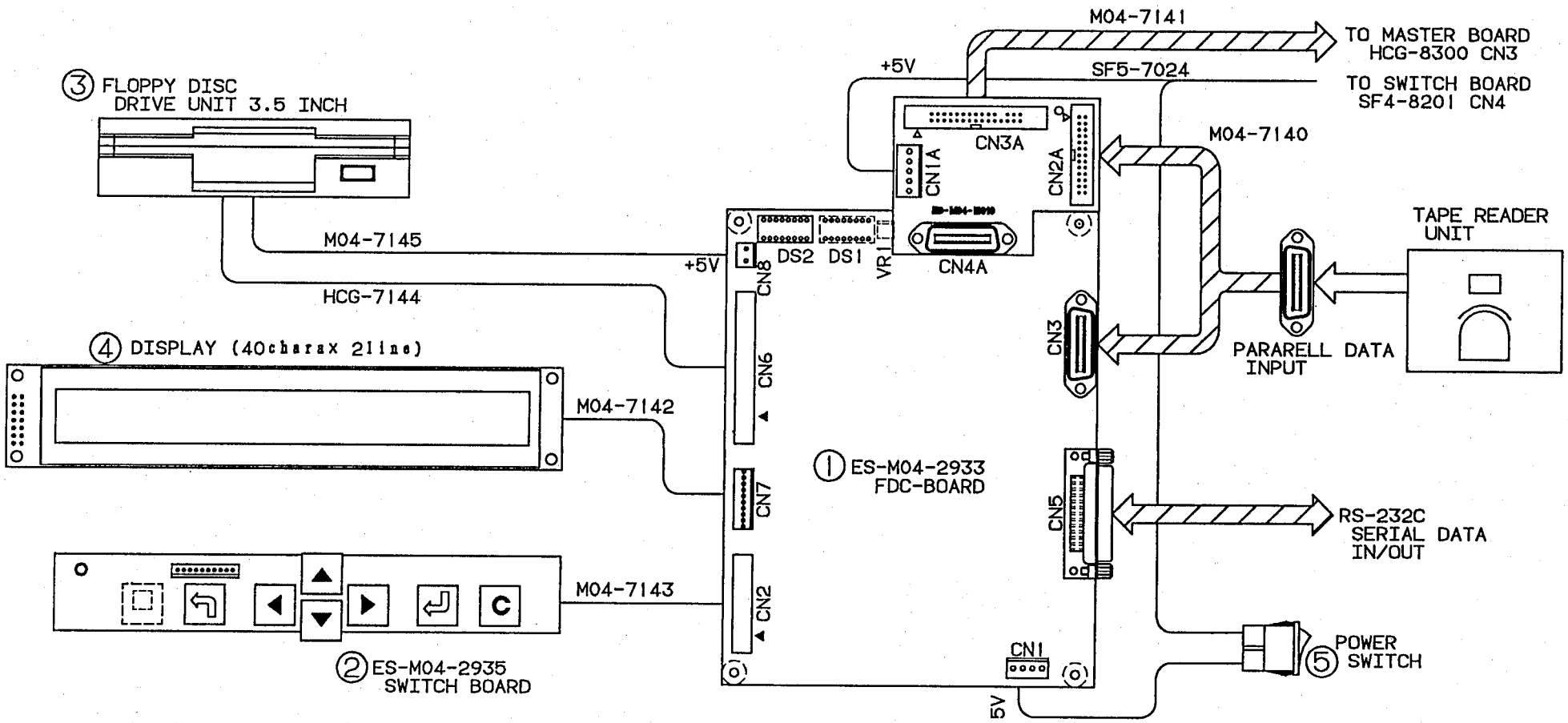
Connection diagram for unit parts	ES-SF5-81**	ES-HCG-81**
Connecting diagram for inverter	ES-SF5-8100	ES-HCG-8100
Connecting diagram for pulse motor	SF5-8101	HCG-8101
Connecting diagram for control box	SF5-8102	HCG-8102
Switch box	SF4-8104	HCG-8104
Thread catch unit	SF5-8103	HCG-8103
Reader unit	M04-8105	Same as left
Wiring & connection diagram for HDU-1000	M04-8108	Same as left

Circuit diagram for circuit board	ES-HMS-82**	ES-HCG-82**
Master circuit board	SF4-8200 (8300)	HCG-8200 (8300)
Slave circuit board	SF4-8201 (8301)	HCG-8201 (8300)
Memory circuit board	M04-8203 (2707)	-
Switch circuit board	SF4-8201 (2910)	Same as left
Power source circuit board	SF5-8202 (8302)	HCG-8203 (8303)
Thread catch circuit board	HMX-8209 (HMF-8364)	Same as left
Thread break detecting circuit board	M04-8222 (8322)	Same as left
Photo sensor circuit board (7 needles)	M04-8211 (4502)	
Photo sensor circuit board (8 needles)	M04-8212 (4503)	HMF-8212 (10針)
Thread cut solenoid circuit board	M04-8213	-
Needle bar selection detecting circuit board	M04-8214	HMX-8206 (HMF-8362)
Main shaft timing circuit board	M04-8215 (1010)	Same as left
DD switch circuit board	M04-8216 (2935)	Same as left
V25FDC circuit board	M04-8217 (2935)	Same as left
V25FDC expansion circuit board unit	M04-8218 (2933)	Same as left
Condenser connection circuit board	SF5-8216 (HMS-8303)	HCG-8303



記号	品名	個数	型番	メーカー
N.F	NOISE FILTER	1	ZAG2200-11S	TDK
P.S	POWER SWITCH	1	NRAS2600F-15AA-WP	富士
T.B	端子台	1	BTB15LC 10	'
T1	TRANSFORMER	1	SCK330	スワロー
T2	'	1	DVS-68.0AX	春日電機
FAN	FAN	1	MU9255-11	オリエンタル
INVERTER	インバーター	1	V6-07-3	ミネダー
P.M DRIVER		1	PMH-BA-4803	山洋電気
S.P.S		1	HK-10-5/B	オムックアノ
S.P	SURGE PROTECTOR	1		富士

名称	MAIN BOX
品名	ELECTRIC CONECTION DIAGRAM
図番	ES-HCG-8001 △
	HAPPY INDUSTRIAL CO. 0
	機種 HCG-1002 /1004
	配線系統図
	ハッピー工業株式会社



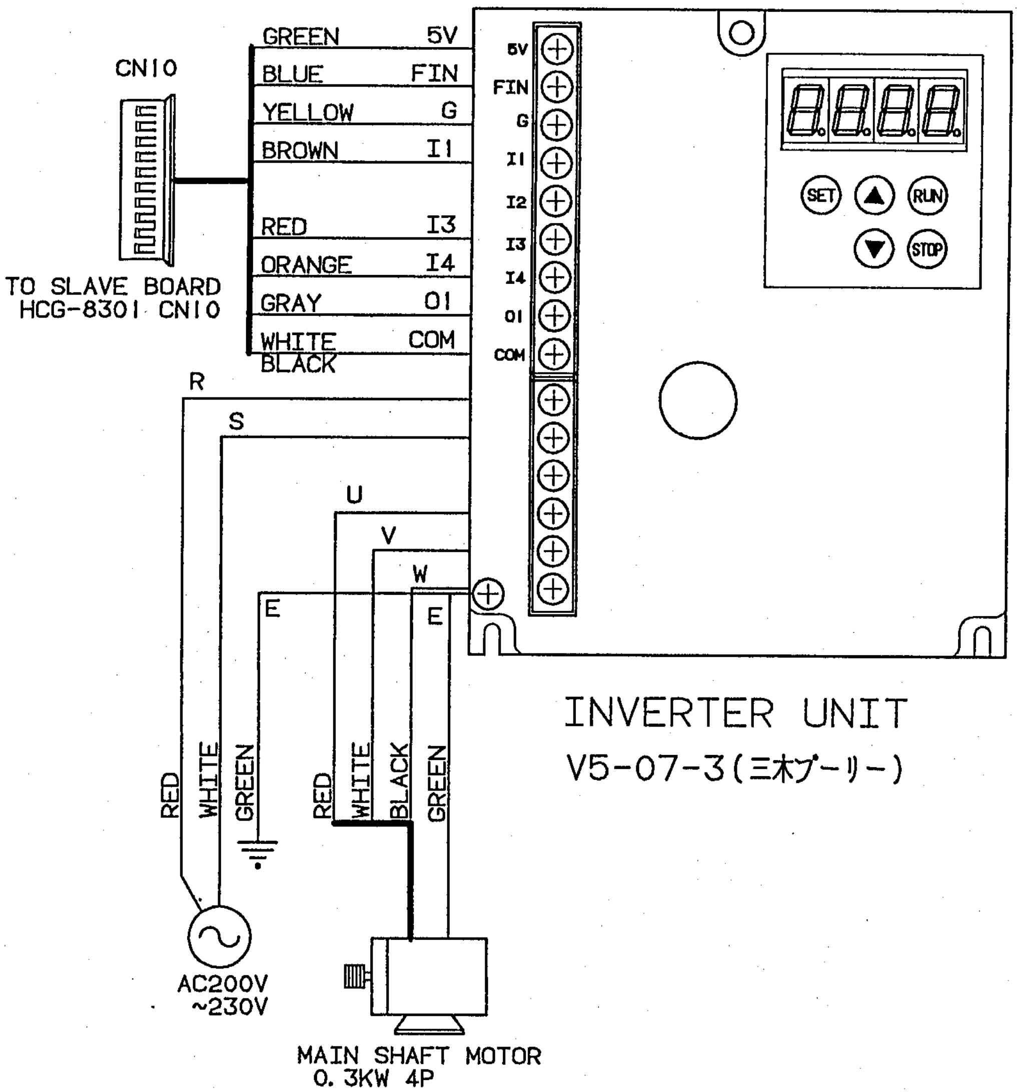
番号	品名	個数	型番	メーカー
①	FDC 拡張基板 組品	1	ES-M04-2933	
②	DDスイッチ基板 組品	1	ES-M04-2935	
③	フロッピーディスク装置	1	FD-235HG-7417	TEAC
④	液晶表示器(バックライト付き)	1	GMD4020ALG	スタンレー
⑤	スイッチ	1	A8CB-107-1A (黒)	オムロン
⑥				

グループ名	コントロール BOX	機種 HCG-1002 1004
品名	**	
	コントロール BOX 配線接続図	
図番	ES-HCG-8102-0	
HAPPY INDUSTRIAL CO.		A4

ハッピー工業(株) メカトロ 事業部

Happy HCG-1002 /1004 ハードウェア資料

TE 14.0



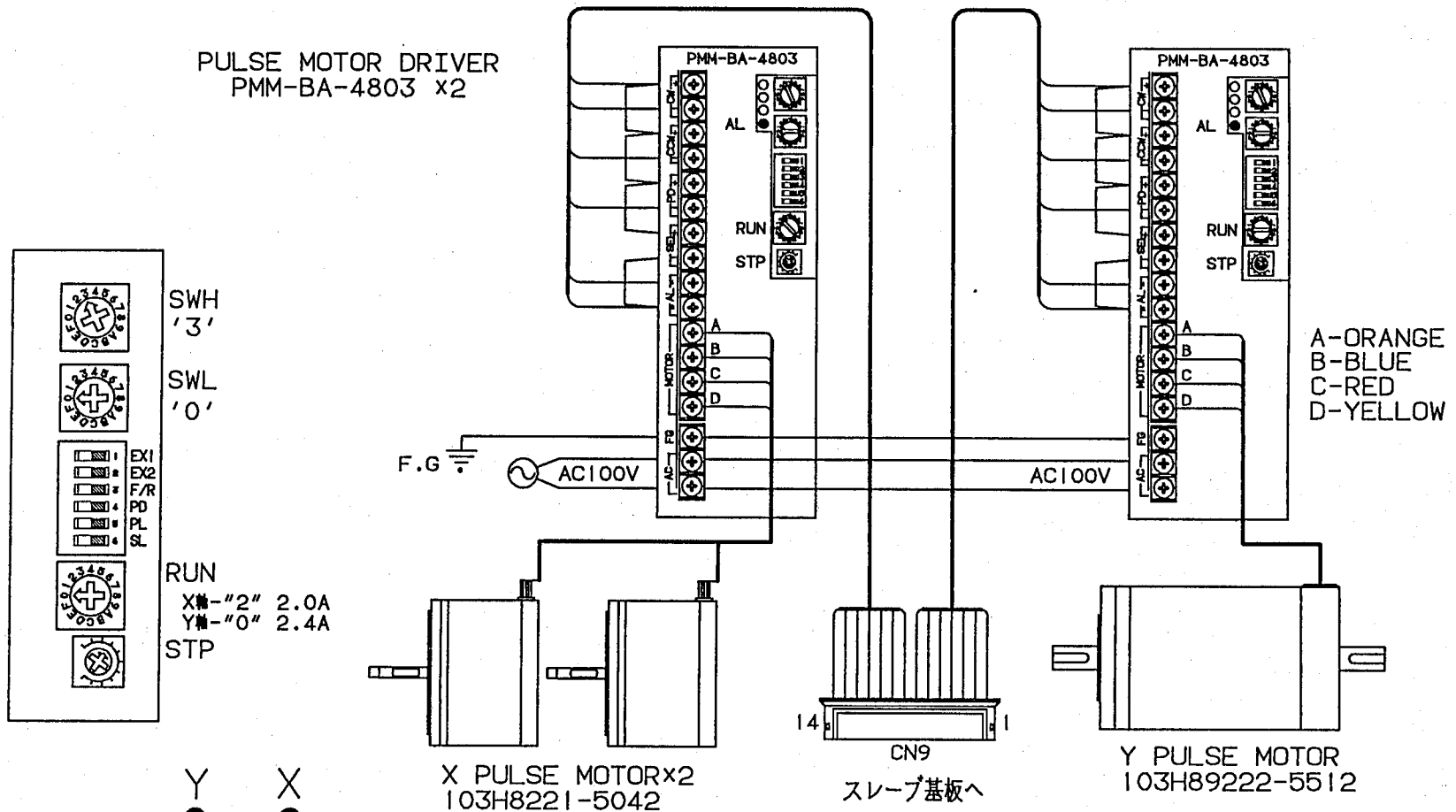
パラメーター設定表

番号	パラメーター名		設定値	
*16	運転指令選択		TER	
*18	運転モード選択		JOG	
19	トルクブースト		80	
20	ジョギング周波数		2.0 Hz	位置決め速度設定 (0-10rpm)
21	加速時間		0.5 秒	
25	直流ブレーキ量		100	
26	直流ブレーキ時間		0.5 秒	
27	直流ブレーキ選択		POS	
29	制動開始周波数		10 Hz	
30	キャリア周波数		0	
31	減速時間		0.0 秒	
35	基底周波数		60 Hz	
*73	5V入力時周波数	1002	118 Hz	最高速度(1200rpm) (/1000rpm) を設定する。
		1004	118 Hz	
75	上限周波数		120 Hz	

*印のパラメーターは変更・記憶するとトリップ(機能停止)します。
▼▲を同時に押し、トリップを解除します。

グループ名	機種 HCG-1002 1004
品名	INVERTER WIRE CONNECTION インバーター結線図
図番	ES-HCG-8100-A
HAPPY INDUSTRIAL CO. ハッピー工業(株) メカトロ事業部	A4

PULSE MOTOR DRIVER
PMM-BA-4803 x2



Y X

RUN

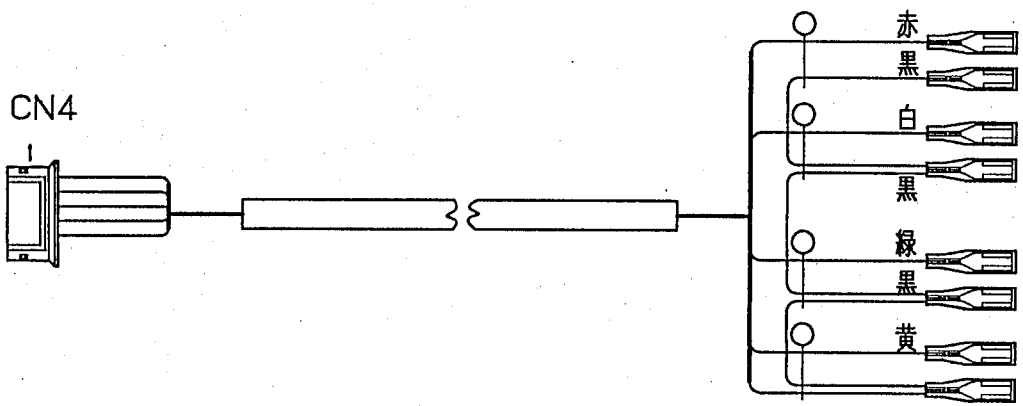
RUN	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
CURRENT	2.4	2.2	2.0	1.9	1.7	1.5	1.4	1.2	1.0	0.9	0.7	0.6	0.4	0.2	0.1	0

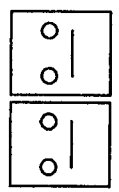
SETTING OF SWITCHES

グループ名	ドライバー ユニット	機種 HCG-1002 1004
品名	PULSE MOTOR WIRE CONNECTION	
	ﾊﾟﾙｽﾓｰﾀｰ 結線図	
図番	ES-HCG-8101-△0	
HAPPY INDUSTRIAL CO.		A4

ハッピー工業(株) メカトロ 事業部

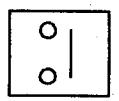
記号	品名	個数	型番	メーカー
S1	ストップ SW	1	HA1B-M1C1W	和泉
S2	スタート SW	1	HA1B-M2C1B	和泉
S3	糸切り SW	1	HA1B-M1C1S	和泉
S4	フォワード SW	1	HA1B-M2C1Y	和泉



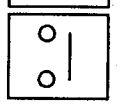


S1
STOP SW

S2
START SW



S3
CUT SW



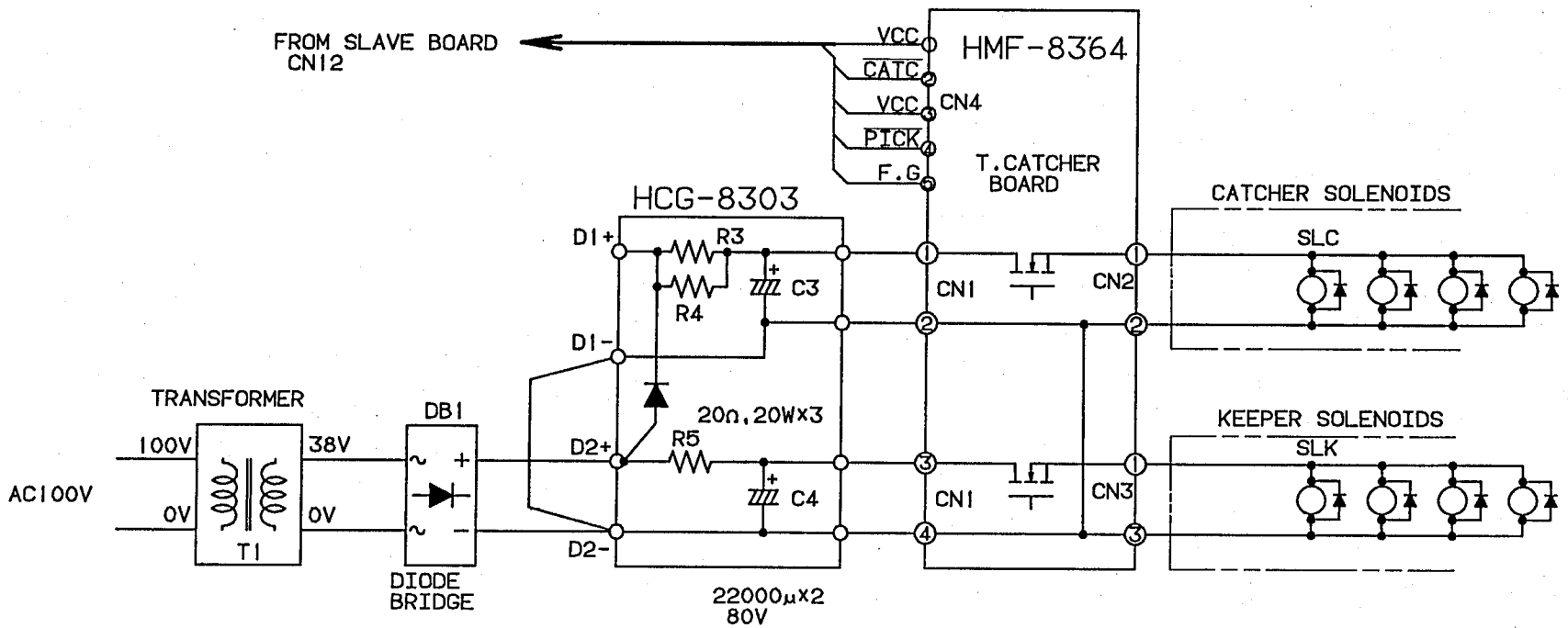
S4
FOWARD SW

グループ名	機種 HCG-1002 1004
品名 INVERTER WIRE CONNECTION	
スタート スイッチ 接続図	
図番 ES-HCG-8104-△	
HAPPY INDUSTRIAL CO. ハッピー工業(株)メカトロ事業部	A4

HAPPY HCG-1002/1004 ハードウェア資料

TE 17.0

記号	品名	個数	型番	メーカー
DB1	DIODE BRIDGE	1	S15VB10	新電元
C3, 4	CAPACITER	2	BWP1J223M2-L24	マルコン
SLC	糸つかみソレノイド	2/4	4EL-67.5×30	新電元
SLK	キーパーソレノイド	2/4	DS-06EJ102-009	CKD
P1	糸つかみ基板	1	HMF-8364	
P2	コンデンサ接続基板	1	HCG-8303	



グループ名	糸つかみユニット	機種	HCG-1002 1004
品名	T.CATCHER BOX CIRCUIT		
	糸つかみ部 回路図		
図番	ES-HCG-8103-0		
HAPPY INDUSTRIAL CO.		A4	

ハッピー工業（株）メカトロ 事業部

HAPPY HCG-1002/1004 ハードウェア資料

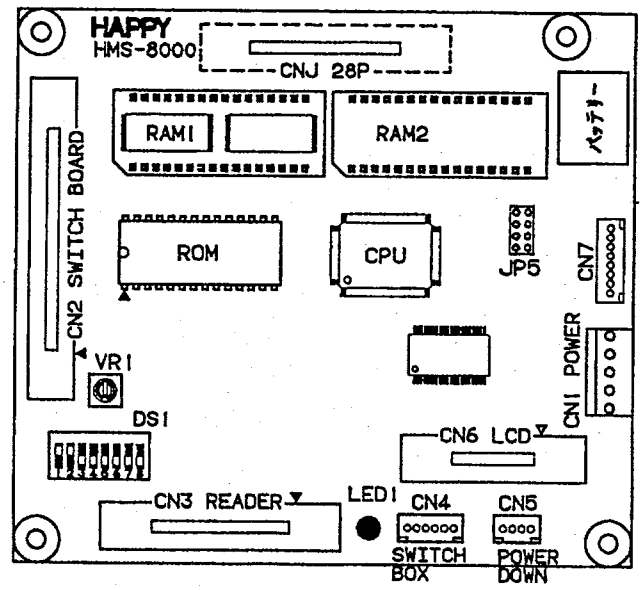
TE 18.0

1. Master circuit board HCG-8300 (in main box)

	Connector No.	Connection to	Function
A	CNJ	HCG-8301 CNJ	Send out of instruction code of machine drive to slave circuit board and read information on running condition
B	CN2	SF4-2910 CN1	Read operation switch from control box and put out data for display
C	CN3	M3E-108 CN5	Read pattern data from tape reader unit or disk drive
D	CN10	Switches	Read switches from switch box (Start/Stop/Forward/Thread cutting)
E	CN5	HCG-8302 CN6	Surveillance of abnormality of power source voltage, send out of break signal of main switch
F	CN6	LCD	Send out of indication signal of LCD
G	CN7		External communication (RS-232C)
H	RAM1, 2		Back up of pattern data (memory circuit board)

	Code	Name	Remarks
1	ROM	ROM (HCG-MSA-1. **)	Control software for master circuit board
2	DS1	DIP switch	*Refer to page of TE 3 "DIP switch setting"
3	LED1	LED for power source monitor	Always ON
4	B1	Back up battery for memory circuit board	
5	VR1	Knob for setting power suspension detecting voltage	*1
6	JP5	Setting baud rate for RS-232C	Factory set 4800(1200-9600) "2"

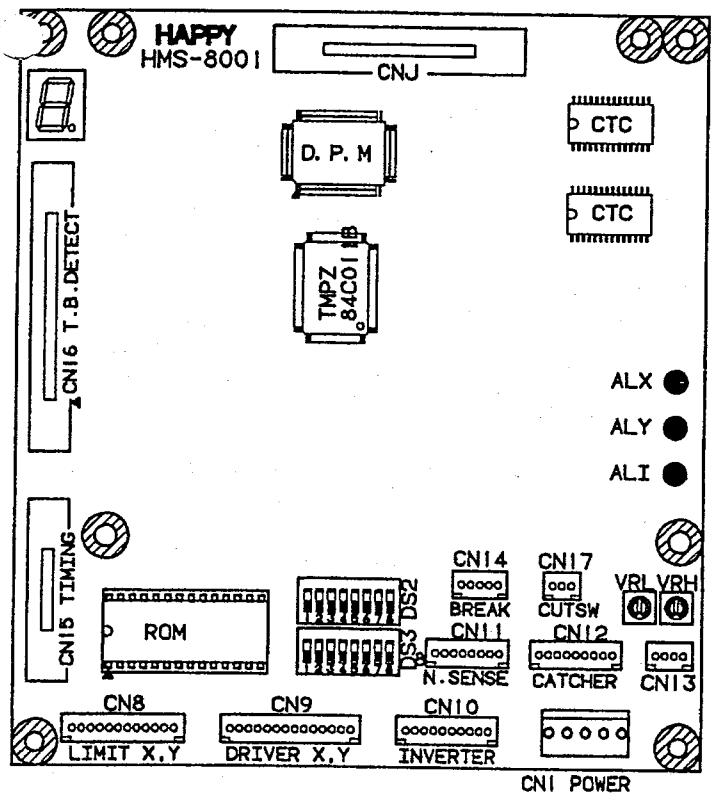
*1. Voltage to detect power failure is set to break main switch when voltage drops to 85% of nominal input voltage. When adjustment got out of order, please adjust with VR1 so that voltage between TPGND and TP1 indicates 2.2V with DC range of tester.
When the machine detects power suspension oftentimes while it is running, turn VR1 slightly to the right.



2. Slave circuit board HCG-8301 (in main unit)

	Connector No.	Connection to	Function
A	CNJ	Master circuit board CNJ	Read drive instruction code from master circuit board, send out information on running condition of the machine
B	CN8	Limit switches in X and Y	Detection of X and Y in possible sewing area
C	CN9	Pulse motor driver	Control of pulse motor in X and Y
D	CN10	Inverter unit	Control of inverter (number of main shaft revolution)
E	CN11	Needle bar selection detecting circuit board CN1	Detection of needle number, stop position of needle bar selection
F	CN12	Thread catch circuit board CN4 Power source circuit board CN7	Control of ON/OFF for thread cut, thread catch, keeper solenoid, needle bar selection motor
G	CN13	VR for control box	Speed control for main shaft motor
H	(CN14)	(Brake solenoid for main shaft motor)	Control of ON/OFF for brake solenoid
I	CN15	Timing circuit board CN1	Read main shaft angle
J	CN16	Thread break detecting circuit board CN1	Control of ON/OFF for thread break detecting and jump solenoid

	Code	Name	Remarks
1	IC3	ROM (HCG-SLA-1.**)	Control software for machine
2	DS2, 3	DIP switch	Described in page 3.0
3	ALX, Y, I	Alarm LED	Lighting at time of abnormality
4	VRL, H	Speed setting knob	Described in page 9.0

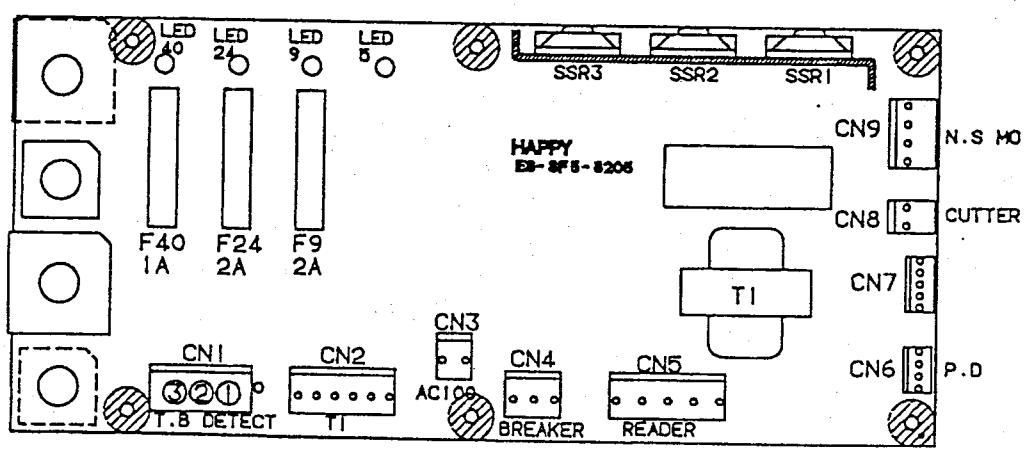


Note: When you exchanged circuit boards, be sure to set speed as set forth on TE 6.0 with maintenance mode. Otherwise you may not be able to make exact speed control.

3. Power source circuit board HCG-8302 (in main box)

	Connector No.	Connection to	Function
A	CN1	Thread break detecting circuit board for each head CN4	Supply of power source for jump solenoid (DC45V, DC7~10V)
B	CN2	Transformer T1	Power source input. AC38V, AC7.3V, AC20V
C	CN3	Terminal base	AC100V power source
D	CN4	Main switch	Drive of solenoid to cut off breaker.
E	CN5	Disk drive unit	DC5V, 24V power source
F	CN6	Master circuit board	AC9V for power suspension detection and main switch break signal.
G	CN7	Slave circuit board CN12	Control input signal for thread cut solenoid and needle bar selection motor.
H	CN8	Thread cut solenoid	Drive of thread cut solenoid.
I	CN9	Needle bar selection motor	Drive of needle bar selection motor

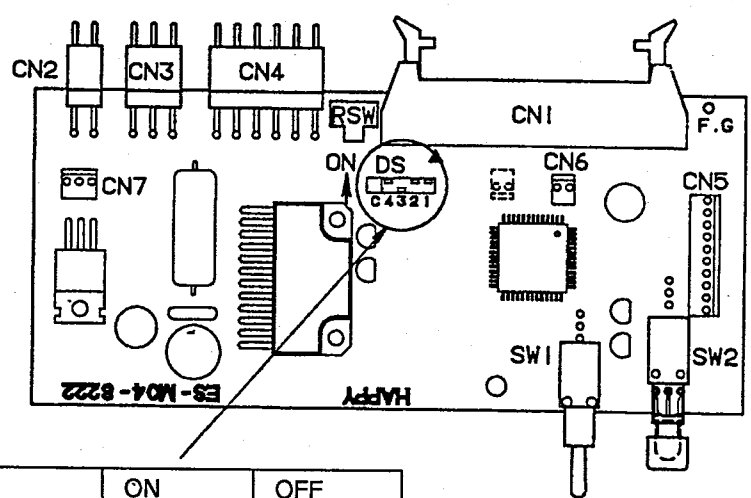
	Code	Name	Remarks
1	F24	Fuse 2A (24V)	Protection of over current for 24V for tape reader
2	F9	Fuse 2A (9V)	Current limit of jump solenoid.
3	F40	Fuse 1A (40V)	Current limit of jump solenoid.
4	T1	Transformer (9V)	For power suspension detection
5	SSR1,2	SSR	Control element for needle bar selection motor and positive and negative revolution.
6	SSR3	SSR	Control element for thread cut solenoid.



5. Thread break detecting circuit board (in thread tension bracket for each head)

	Connector No.	Connection to	Function
A	CN1	W-CPU circuit board, CN16	Control signal, +5V power source
B	CN2	Jump solenoid	
C	CN3	Holder solenoid (optional)	
D	CN4	Power source circuit board, CN1	+45V, +9V, solenoid for power source
E	CN5	Thread break detecting sensor	

	Code	Name	Remarks
1	SW1	Jump stitch	
2	SW2	Mending switch	
3	RSW	Rotary switch	Setting switch to sense number of stitches when thread breaks, *note 1
4	DS	DIP switch	Setting switch according to table below



	ON	OFF
DS-1	Rotary type	Spring type
DS-2	UTC	
DS-3		
DS-4	ALT no	ALT yes

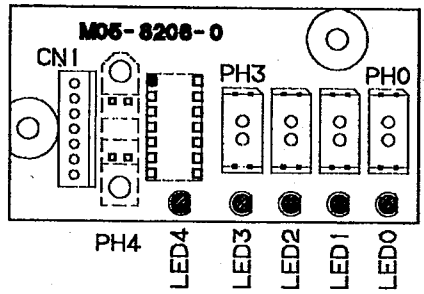
Note 1 : RSW is switch to set number of stitches that is judged as "Thread break", but this switch is effective only when detection method is rotary type. (when DS-1 is ON)

When large number is set, sensitivity will get dull. This switch is set to "4" when the machine left our factory.

6. Needle bar selection detecting circuit board HMF-8362 (in needle bar selection unit)

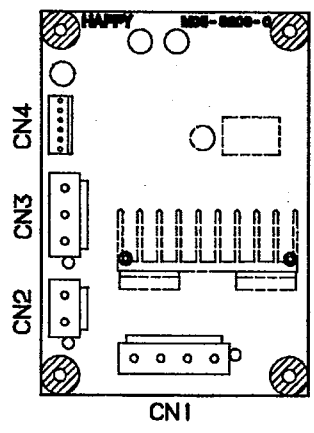
	Connector No.	Connection to	Function
A	CN1	Slave circuit board CN11	Needle No., Detection signal

	Code	Name	Remarks
1	PH4	Photo-sensor to detect regular position of needle bar selection	LED4 lights at regular position.
2	PH0~PH3	Needle No., detecting photo-sensor	LED0~LED3 light when there is reflective signal



7. Thread catch circuit board HMF-8364 (in main box)

	Connector No.	Connection to	Function
A	CN1	Condensor connecting circuit board	Input power source of +55V. (direct current power source for thread catch, keeper solenoid)
B	CN2	Thread catch solenoid	Output power source of +55V.
C	CN3	Keeper solenoid	Output power source of +55V.
D	CN4	Slave circuit board, CN2	Control signal for thread catch, keeper solenoid.



Code No.	Contents of error detected
1	Abnormality in master circuit board, CPU gets out of order.
2	Power suspension or abnormal drop of power source voltage.
3	Abnormality in master unit. (Calculation error)
4	Abnormality in master unit and system memory.
5	Abnormality in slave circuit board, CPU gets out of order.
6	Abnormality in slave circuit board. (RAM)
7	Abnormality in slave circuit board. (RAM check error)
8	Improper communication memory.
15	Alarm signal in inverter unit.
16	Alarm signal in driver in X axis.
17	Alarm signal in driver in Y axis.
18	Abnormality in signal for main shaft revolution. (encoder signal)
20	Abnormality in needle number detection. (needle bar selection circuit board)
21	Improper running of needle bar selection motor. (signal for sensor input is left detected)
22	Improper running of needle bar selection motor. (signal for sensor input doesn't detect)
24	position of needle bar is off its center.
30	Improper adjustment of low speed revolution, revolution doesn't reduce below 100 revolutions.
50	Improper stop position of main shaft, C point sensor doesn't detect.
51	Abnormality in timing detection, sensor of the lowest needle point doesn't detect.
52	Abnormality in timing detection, "C" point sensor doesn't detect.
60	Frame moves beyond sewing area in X axis.
61	Frame moves beyond sewing area in Y axis.
80 & 190	Wrong position of original point for knife.
81 & 191	Improper action of thread cut device, detecting sensor is left detected.
82 & 192	Improper action of thread cut device, detecting sensor doesn't detect.
83 & 193	Hooks don't return
102	Paper tape of reader unit is placed improperly.
103	Tape format is not properly read. (unable to judge)
104	Timing to read stitch holes doesn't conform.
105	One character frame has over 2 stitch holes.
106	The machine doesn't read stitch holes. (20 holes at time of tape operation, 500 holes at time of reader reading)
108	Pattern data in memory was destroyed.
110	No space in memory.
111	Frequency of color change exceeded its limit allowed in one pattern.
112	Error in memory check.
113	〃
114	Number of patterns exceeded limit.
115	〃
116	Unregistered pattern number was designated.
120	Improper back-up of memory of master portion.
121	Improper back-up of memory of slave portion.
127 & 200	Slave portion is not set to monitor mode.

A. Note when handling circuit boards

a. Prevention of electric discharge for backup battery

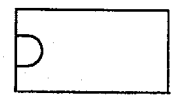
As master circuit board (HCG-8300) are with battery to back up data, don't place soldered side of circuit board on metals or don't pack them in aluminum foil or electric conductive vinyl etc. For packing, please use electric charge preventive vinyl bags that wrap parts when they leave our factory.

b. Protection from static electricity

Static electricity emitted from human body may destroy internal circuit on IC. Please refrain from touching pins on IC as much as possible.

c. Note when exchanging ROM

When you fix and remove ROM, there is a fear that you bend pins on ROM. Please pay enough care. There is a rule in fixing ROM. Each ROM has a dent on tip. Please place ROM with its dent on same shaped mark on circuit board as illustrated.



Also there is a case that you cut wires on circuit board by putting drivers etc. into ROM socket when you exchange ROM. Please pay care.

d. Attention when exchanging memory circuit board

Please remove circuit board applying pressure vertically against CPU circuit board.

Otherwise pins on connector might get bent. In case memory circuit board was once removed, please check to see if memory is sytill stored or not.

e. Note when exchanging timing circuit board.

By backlash produced in exchanging this board, slit plate may rub sensor or the lowest needle point and position of "C" point may be out of their places. Please be sure to check after exchange.

B. Checking of setting of DIP switch and adjusting knob etc.

Master circuit board / Slave circuit board

- Please check that ROM is equipped. In case ROM is found not equipped on a new circuit board, please remove from the old circuit board and use it.
- When you removed master circuit board or when you exchanged slave circuit board, speed control data will die away. Therefore reset it in accordance with "Adjustment of main shaft revolution speed" on TE 6.0.
- Check that setting of DIP switch is same as before exchange.

Diagnosis by monitor mode

A. Following individual action will be checked by operation of monitor mode.
Carry out individual action according to contents supposed to be in trouble and check if there is no malfunction (for example, loosening of screw, catch and break of parts etc.) in mechanical power transmission.

Individual action	How to check
Frame move	Control box
Needle bar selection	"
Thread cut / Thread catch	Thread cut switch
Speed to determine position of main shaft (JOG)	Monitor mode regarding slave circuit board (refer to page TE 9.0)
Main shaft revolution	
Jump solenoid ON/OFF	
Thread catch solenoid ON/OFF	
Consecutive action of thread cut	
Keeper solenoid ON/OFF	
Thread cut solenoid ON/OFF	
Holder solenoid ON/OFF	
Holder solenoid OFF/OFF	
Checking of memory circuit board	Refer to monitor mode <memory check mode>

B. When there is no mechanical trouble, it will be taken that circuit boards or drive units (inverter, pulse motor driver etc.) may be in trouble.
Please refer to pages for "Explanation of function of circuit board" or "Diagnosis and Measures of Troubles" and exchange circuit boards or units supposed to be in trouble.

Power source related troubles

Troubles	Causes	Remarks (Measures)
Breaker on the side of power source drops	Current capacity of breaker is short	Exchange to breaker of over 15A of rated current
Leak breaker on the side of power source drops	(1) Leak sensitivity current of leak breaker is short. (2) Leak current of embroidery machine is over its capacity (usually in case leak current of embroidery machine is 200V, about 10mA.)	(1) Exchange to leak breaker of sensitivity current of about 100 mA (2) Check if there in no clogging of wires
Main switch of machine doesn't turn on	(1) power source plug not inserted properly (2) Loosened screw in power source plug (3) Power source voltage is short (4) Rachet in main unit is out of order (5) Trouble in TR1 on power circuit board in main unit (6) Signal (0~0.6A) of power source break is input in 3nd pin of CN6 on power source circuit board (7) Short in AC100V wiring of embroidery machine	(1) Check power source plug (3) Switch tap on transformer in main unit (5) Exchange power source circuit board (7) Check if there in no clogging of wires
Main switch drops often times	(1) Improper adjustment of power failure detecting voltage (VR1) of master circuit board or trouble in circuit board (2) Error code 1 appears when power source is turned on again (3) Error code 2 appears when power source is turned on again (4) Error codes 3,4 & 10 appears when power source is turned on again (5) Error codes 5,6,7,8 & 11 appears when power source is turned on again	(1) Turn VR1 to the right little by little and check if condition recovered. 2 ~11 Check display of error code and contact us

Going off of fuse

Troubles	Causes	Remarks (Measures)
Fuse F24 (2A) on power source circuit board goes off.	(1) Trouble in tape reader unit (2) Short in thread cut solenoid (3) Short in AC100V wiring	Exchange of tape reader unit
Fuse F9 (2A) & F40 (1A) on power source circuit board go off. Over current of DC 9 V, DC 40 V	(1) Trouble in thread break detecting circuit board (M04-8322) (2) Rare short in jump solenoid (3) Rated input voltage is over +10%	(1) Exchange of circuit board (2) Exchange of jump solenoid (3) Switch tap on transformer in main unit

Master circuit board related troubles

Troubles	Causes	Remarks (Measures)
When main switch is turned on, display on control box is not normal and the machine doesn't actuate.	(1) Improper connection of connector CNJ on master circuit board (2) Improper connection of connector CN2 on master circuit board and connector CN1 on switch circuit board for control box (3) Improper connection of connector CN6 on master circuit board and LCD for control box Trouble in LCD (4) Trouble in master circuit board	Check connection of connector on main box and control box (3) Exchange LCD (4) Exchange master circuit board

Main shaft revolution related troubles

Troubles	Causes	Remarks (Measures)
Even if you started machine, main shaft motor doesn't run	(1) Trouble in bar switch (2) Disconnection of cord for bar switch or improper connection (bar switch-master circuit board CN 4) (3) Trouble in switch input circuit on master circuit board (4) Trouble in slave circuit board (even if machine started, RUN signal and REF signal are not output against inverter (5) Trouble in inverter, alarm appears (6) Trouble in main shaft motor, loosened wires, disconnection	If main shaft turns normally with monitor mode, malfunction in other parts than inverter, slave circuit board. (5) Check parameter of inverts. Check/exchange power source voltage.
Machine starts, but speed doesn't increase	(1) Trouble in rotary encoder (2) Trouble in timing circuit board (3) Trouble in slave circuit board (trouble in input portion of encoder and output portion of inverter) (4) Disconnection of cord from speed adjustment knob on control box and improper connection (5) Improper adjustment of inverter, trouble in inverter	Check speed of each setting with monitor mole and see at this moment if speed is exactly displayed. If revolution is normal but display is not normal, trouble in encoder or timing circuit board. (5) Check/exchange parameter of inverter.
When machine stops, stop position is irregular and it doesn't stop at C point (Error code "E-50" appears)	(1) Bad rotary encoder (2) Bad timing circuit board (3) Improper adjustment of inverter (4) Improper adjustment of speed to determine position when machine stops (JOG) (5)	Check speed of each setting with monitor mole and see at this moment if speed is exactly displayed. If revolution is normal but display is not normal, trouble in encoder or timing circuit board. (3) Check torque boost of inverter and JOG

Frame move related trouble

Troubles	Causes	Remarks (Measures)
Frame doesn't move even if you press frame move key on control box	(1) Improper connection of connector CN5, CN6 on slave circuit board, disconnection of signal cord for pulse motor driver (2) Loosening of screw on pulse motor driver (3) Trouble in pulse motor driver (4) Trouble in slave circuit board	(3) Exchange of pulse motor driver (4) Exchange of slave circuit board
Frame doesn't move smoothly	(1) Loosening of screw on pulse motor driver (2) Loosening of screw on terminal in pulse motor (3) Trouble in pulse motor driver (4) Backlash in carriage related portion, get caught on etc.	(3) Exchange of pulse motor driver
Error code 16 or 17 appears while machine is running	Protection function for pulse motor driver works and alarm light O.C-over current, is pulse motor not locked? P.E-Drop of power source voltage, fluctuation (drop) of power source voltage is big O.H-over heat, driver fan doesn't turn, mesh of air filter is stuffed.	Check power source voltage Cleaning of air filter

Pattern deformity related troubles

When pattern deformity is supposed to occur, have the frame return to original point and check if the frame returns to start point of pattern. This is important to analyze causes of pattern deformity.

Troubles	Causes	Remarks (Measures)
Pattern deformity by mechanical cause	● Carriage related trouble (1) Loosening of screw, clogged foreign substance in transmission structure from pulse motor to frame (2) Extreme loosening of belt on X carriage (3) Extreme imbalance of tension of belts on X carriage and Y carriage	Adjust according to respective cause.
	● Frame related trouble (1) Heavy and specific frame is used (2) Felts on frame wore and hit table directly (3) Wooden screw that holds carriage cover protrudes and hits frame (4) Clips to hold fabrics came off	If drive frame is heavier than specified, pulse motor will be unable to drive and go out of order with a big noise.
	● Needle bar selection related trouble (1) When needle drops off its place at time of color change, its cause is backlash in needle bar selection unit.	Adjust needle bar selection unit
Pattern deformity by electric cause	● In case pattern deforms at first sewing after reading pattern (1) Machine read specific tape format (2) Reader mistook in reading paper tape	Read again.
	● power source (1) Power suspended while machine is in operation and it stopped	Make setting of power failure return.
	● Pulse motor driver (1) loosened screw on wiring cords, improper connection of connector	
	● Circuit board (1) Trouble in master circuit board (2) Trouble in slave circuit board (3) Trouble in memory circuit board, improper connection	Check memory with monitor mode.
	● Noise interference (1) In case error codes No.1,3,6,11 etc. appears, there may be noise interference	Please contact a disarlouter you bought from.

Jump related trouble

Troubles	Causes	Measures
Machine starts and main shaft turns, but needles on all heads don't drop	(1) Fuses F9 and F40 on power circuit board in main unit went off (2) Is drive voltage 40 V, 9 V of jump solenoid properly on ? (3) Trouble in thread break detecting circuit board	(1) Exchange of fuses (2) Check voltage of transformer (T2)
All heads don't jump	(1) Trouble in slave circuit board (2) trouble in input portion of thread break detecting circuit board for any of heads	Firstly connect flat cable (34P) to one head to see if needle drops in mormal way. fhen connect one by one ~0 see which bead is abnormal. If abnormal head is found, exchange it.
Needles on some heads don't drop or some heads don't jump	(1) Trouble in thread break detecting circuit board (2) Jump structure don't work smoothly, mechanical trouble (3) trouble in jump solenoid	(1) Exchange of thread break detecting circuit board (3) Exchange of jump solenoid