AC SERVO MOTOR

INSTRUCTION MANUAL FOR DUERKOPP ADLER-251 MACHINE

HVP-20-4-25 FOR DA- 251

MINI-MOTOR

C-60

ENGLISH

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HSVP20U06 - 1
2008. 07

Model : HVP - 20 Series

Contents

1. Safety Precaution

When install and operate HVP-20 MINI Servo Motor, precaution must be taken as the following.
This product is designed for the industrial sewing machines and must not be used for other purposes.

(1). Work environment :

(a). Power voltage:

Only use Power Voltage indicated on the name plate of the HVP-20 in ±10 % ranges.

(b). Electromagnetic pulse interference:

To avoid the abnormal running, please keep the product away from the high electromagnetic machine or electro pulse generator.

(c). Temperature:

1. Please don't operate in room temperature is above 45°C or under 5°C
2. Avoid operating in direct sun light or outdoors area.
3. Avoid operating near the heater.
4. Avoid operating in the area which humidity is 30% less and 95% more, also keeps away from dew area.

(d). Atmosphere:

1. Avoid operating in dusty area, and keeps away from corrosive material.
2. Avoid operating in evaporative or combustible gas area.

(2). Safety in installation :

(a). Control box: Follow the instruction in this manual for proper installation.

(b). Accessories: Turn off the power and unplug the cord before mounting any accessories.

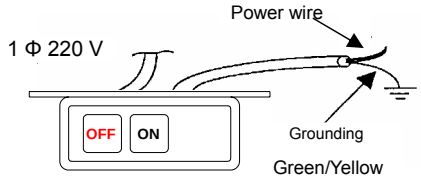
(c). Power cord:

1. Avoid power cord being applied by heavy objects or excessive force, or over bend.
2. Power cord must not set to be near the V-belt and the pulley, keep 3 cm space or above.
3. Check the outlet voltage before plugging the cord, make sure it match the voltage shown on the name plate of the HVP-20 in ±10 % ranges.

※ Attention : If the control box is AC 220V system, please don't connect to the AC 380V power outlet, otherwise the error code [E-0. 4] will occur. If that happened, please turn off the power switch immediately and check the power voltage. Continue supply the 380V power over 5 minutes might damage the fuses (F1,F2) of EMI board and burst the electrolytic capacitors (C4,C5) of power board and even might endanger the person safety.

(d). Grounding:

1. To avoid the static interference and current leakage, all grounding must be done.



Ground Wire (Green/Yellow) must be grounding.

2. Use the correct connector and extension wire when connecting ground wire to Earth and secure it tightly.

(3). Safety in operating :

(a). When turn on the machine in the first time, use low speed to operate and check the correct rotation direction.

(b). During machine operation, don't touch any moving parts.

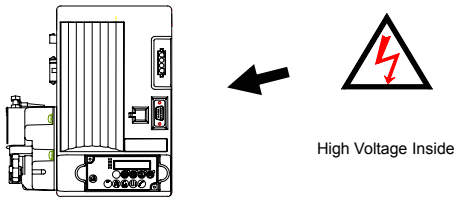
(c). All moving parts must use the protective device to avoid the body contact and objects insertion.

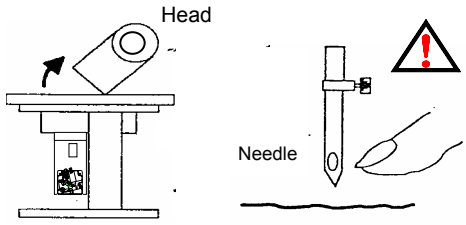
(4). Safety in maintenance and repairs :

Power must be turned off first, when:

(a). Uninstall the motor or the control box, or plug and unplug any connector.

(b). Turn off the power and wait 5 minutes before opening box cover.





(c). Raising the machine arms or changing needle, or threading needle. (Shown as above)

(d). Repairing or doing any mechanical adjustment.

(e). Machines rest.

(5). Regulation in maintenance and repairs :

(a). Maintenance and repairs must be done by trained personnel.

(b). Don't cover up motor's ventilation, it can cause motor over heated.

(c). Don't use any objects or force to hit the product.

(d). All spare parts for repair must be approved or supplied by the manufacturer.

(6). Danger and Caution Signs :

Risks that may cause personal injury or risk to the machine are marked with this symbol in the instruction manual.

This symbol indicates electrical risks and warnings.

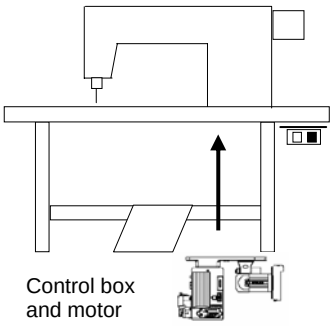
(7). Warranty information :

Manufacturer provides a limited warranty in respect of the products covered for a period of 18 months for any defects arising in the normal course.

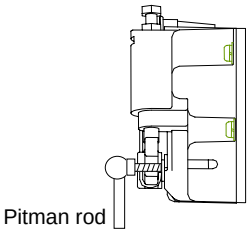
2. Installation and Adjustment

(1).Control box installation :

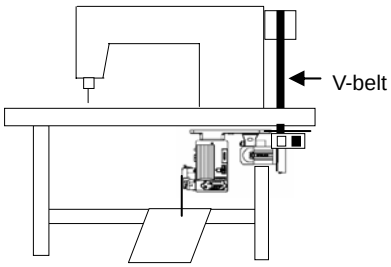
a). Install the motor and control box under the table



b). Install the pedal with speed control unit

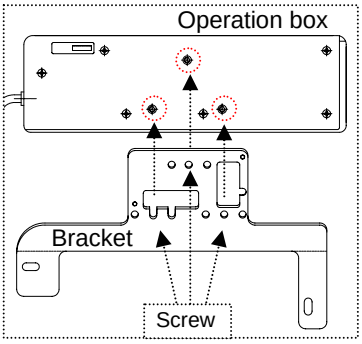


c).Finished diagram

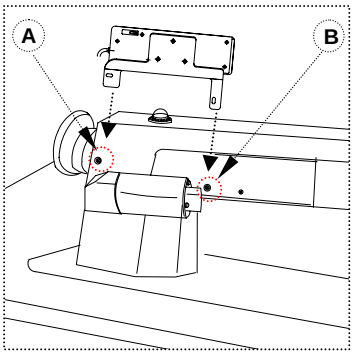


(2).Operation box installation :

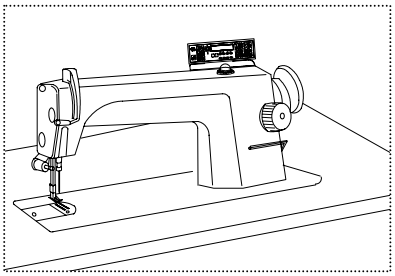
a). Assembling the operation box on the bracket and secure screws.



b). Unscrew screw **A**, **B** and mounting the bracket on the machine head.



c). Remember to secure the screw **A**, **B** and plug the operation box connector to control box.



(3). Speed control unit adjustment :

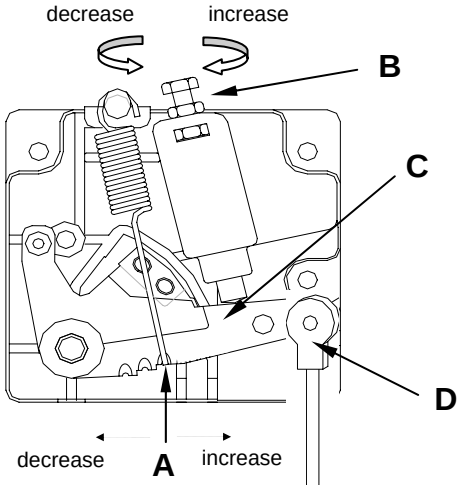
Components of speed control unit : see figure

A： Spring for toeing forward force adjustment

B： Bolt for heeling backward force adjustment

C： Treadle / Pedal arm

D： Pitman rod



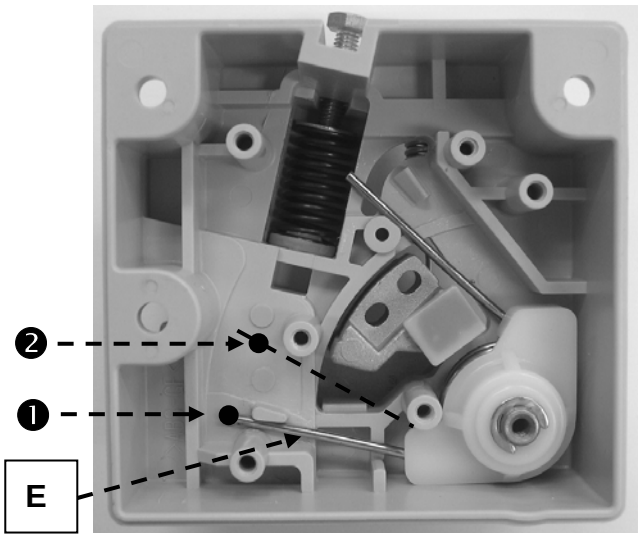
Term of adjustment		Adjustment result
1	Toeing forward force adjustment	Spring A moved to right = force increased Spring A moved to left = force decreased
2	Heeling backward force adjustment	Bolt B turned ⟲ = force decreased Bolt B turned ⟳ = force increased
3	Treadle stroke adjustment	Rod D secured at right = stroke is longer Rod D secured at left = stroke is shorter

(4). Speed control unit Forward / Backward function & force adjustment :

Delivery condition the inside torsion spring “E” is in position „1“.

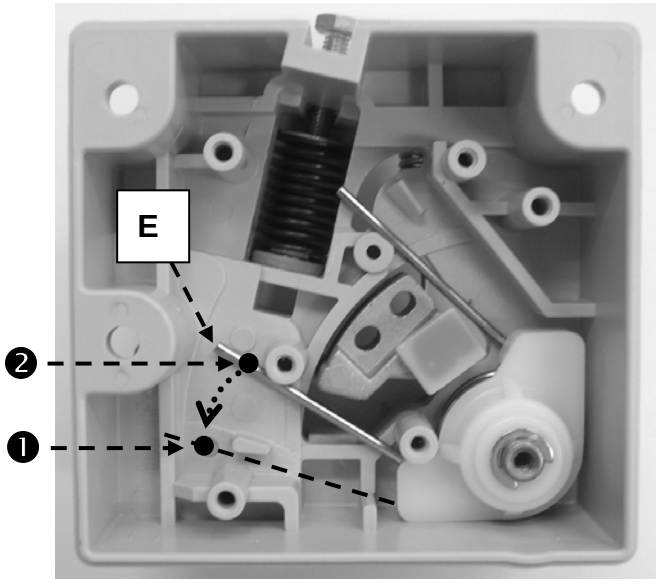
After the adjustment of the outside springs (chap.3) the inside torsion spring (E) can be adjusted additionally.

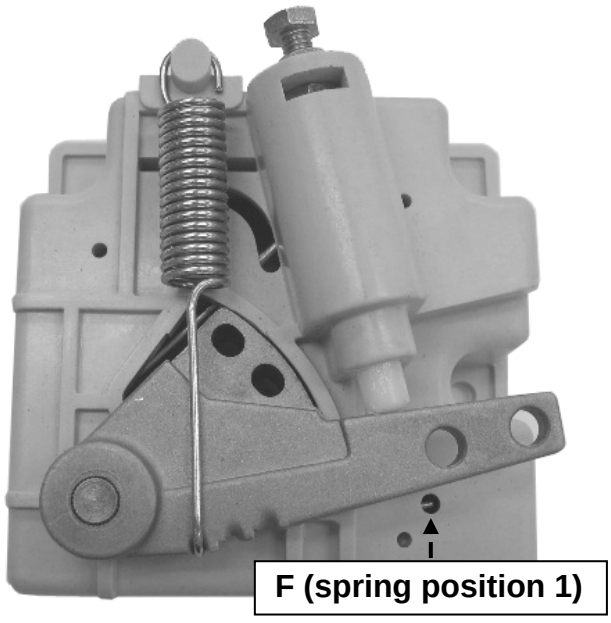
a). Machine with foot lifter:



For machines **with** foot lifter solenoid, the lower blade of the spring must be placed in position1.
This causes a clear position for pedal half heeling position for sewing foot lifting without thread trimming.
The thread trimming will follow with pedal full heeling.
In this position of the spring blade the pedal force forward is lower than in position 2.
Attention: The parameter 70 has to be set onto OFF for machines with foot lifter solenoid.

b). Machine without foot lifter:



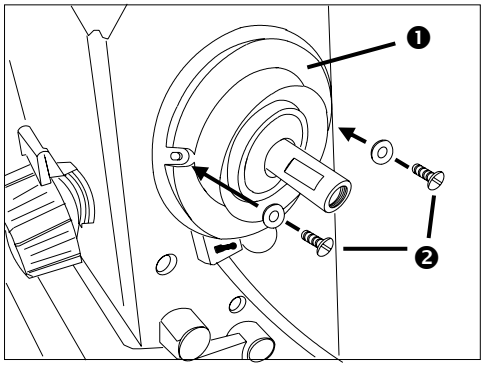


For machines **without** foot lifter solenoid the spring blade can be brought from position 1 to position 2.
Push with a small screw driver through the hole (F) and the blade will jump from position 1 to position 2.
The pedal forward force is higher in position 2 than in position 1.

Attention:

1. For machines without foot lifter solenoid the parameter 70 has to be set onto **ON**, that the thread trimming happens in half heeling position of the foot pedal.
2. The reverse positioning of the springs blade (E) from position 2 to 1 can only be made after opening of the speed control unit housing from inside.

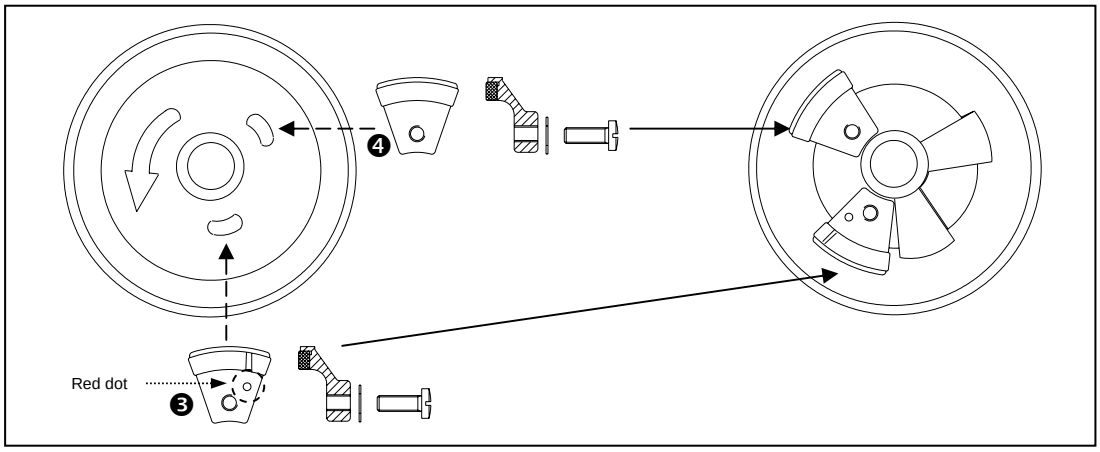
(5). Installation of the synchronizer :



(a). Install the synchronizer ❶ with the copper screws ❷ on the machine head.

WARNING:
The screws ❷ must be copper, if using iron, it will cause the needle positioning abnormal and also cause the 2 magnets in the hand wheel to be demagnetized.

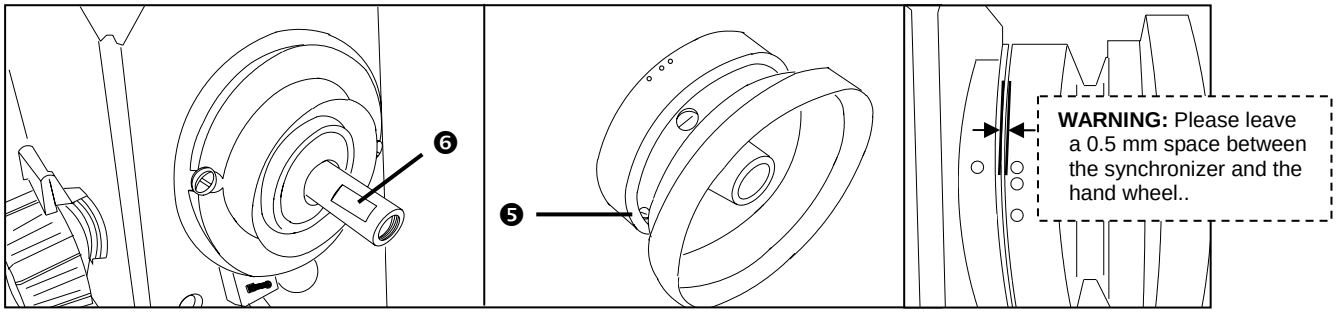
(6). Assembly of hand wheel :



(a). Install the N pole ❸ and S pole ❹ magnets inside the hand wheel.

WARNING:
The N pole magnet has a red dot on the magnet.
If the N pole and S pole magnets installed incorrectly, it will cause the up and down position to be opposite.

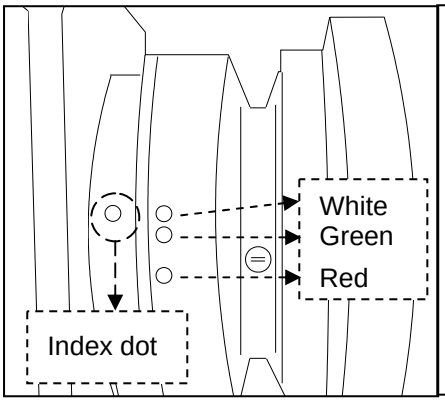
(7). Installation of hand wheel :



(a). Install the hand wheel on the machine head shaft, align the screw ❺ of the hand wheel on the flat area ❻ of the machine head shaft and secure all related screws.

WARNING:
Make sure that the hand wheel don't touch the synchronizer (leave a 0.5 mm space), or else the synchronizer will be damaged by the friction during sewing.

(8). Needle position adjustment :



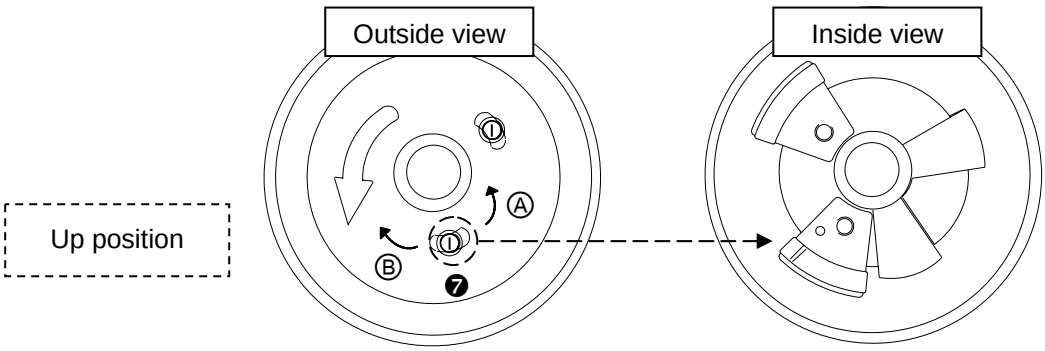
(a). After installing the synchronizer, toe down the pedal and let the machine running few stitches, then check the needle position.

(b). If motor stop at up position, the top white dot on hand wheel should be aligned with the index dot on the sewing machine.

Note : The dots in some machine head's hand wheel have different colors or different locations.

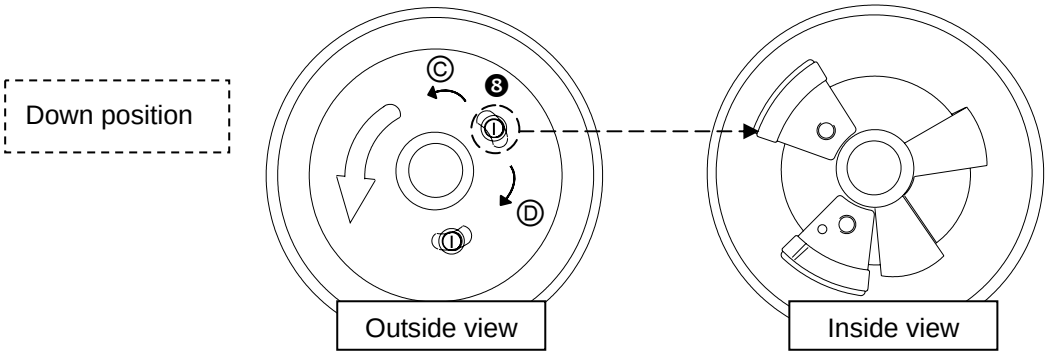
(c). Up position (or position after trimming) adjustment :
Stop the needle in its highest position, loosen screw ❼ to perform adjustment within the slot of the screw.

1. The needle stop timing is advanced if you adjust the screw in direction Ⓐ.
2. The needle stop timing is delayed if you adjust the screw in direction Ⓑ.



(d). Down position adjustment :
Stop the needle in its lowest position, loosen screw ❽ to perform adjustment within the slot of the screw.

1. The needle stop timing is advanced if you adjust the screw in direction Ⓒ.
2. The needle stop timing is delayed if you adjust the screw in direction Ⓓ.



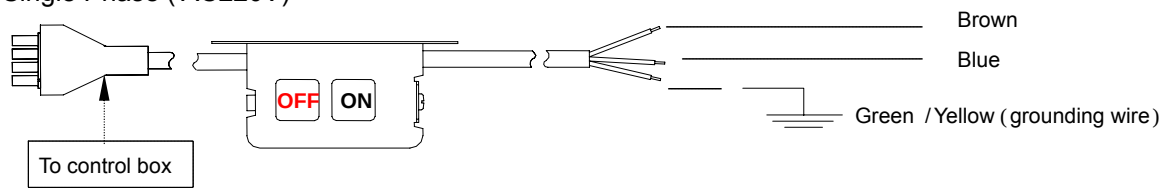
Note :
If you have any question about needle position adjustment, please consult with the sewing machine distributor or sewing machine mechanician.

3. Power Connection and Grounding

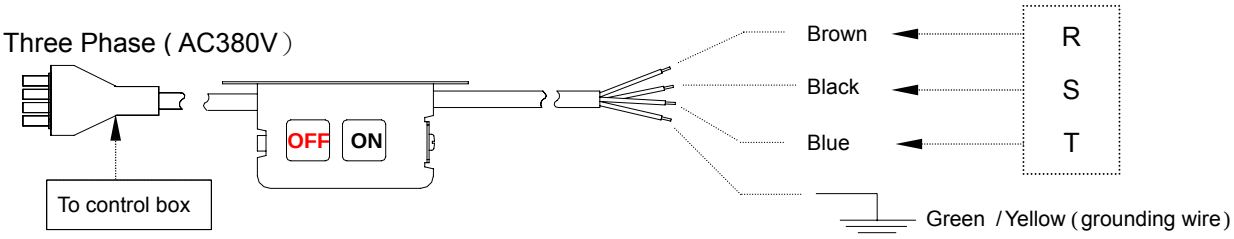
(1). Single phase and three phase connection :

Green/yellow wire is the ground wire.

Single Phase (AC220V)



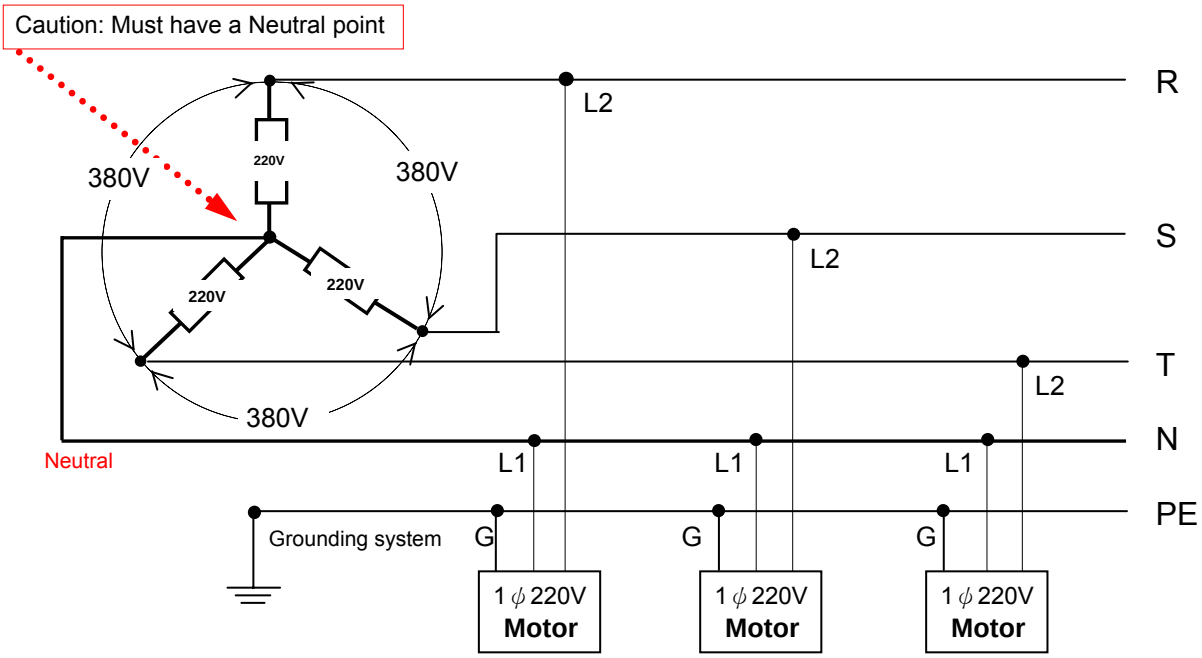
Three Phase (AC380V)



Caution : Green / Yellow wire must be grounded.

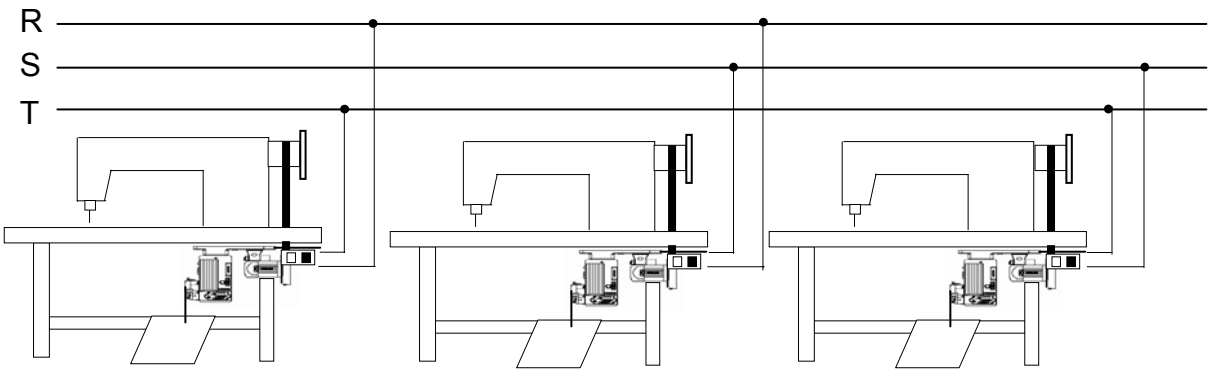
(2). How to connect a 1Φ / 220 V power from a 3 Φ / 380 V power source :

Caution : If the power source does not have the neutral point, then this 1Φ / 220 V servo motor is not suitable for this connection. Please ask supplier to offer our 3Φ / 380 V servo motor.



(3). The load balance when using 1Φ / 220V motors in 3Φ / 220V power system :

Please install the power connections as the following diagrams for the load balance.



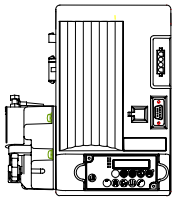
(4) How to change solenoid supply voltage : (DC: 24 V OR 30 V)

When changing the solenoid voltage to 24V or 30V, use the JP1 and JP2 on the power board to do the jumper switch.

Caution （1）： Before making the switch, check the machine head solenoid specification.

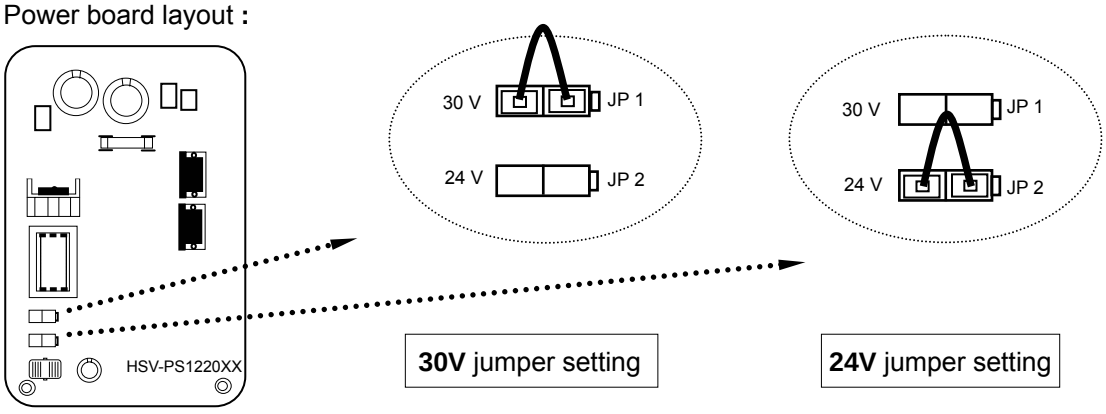
Caution （2）：

Turn off the power and wait for 5 min. before opening the cover, then make the change.



High voltage inside

Power board layout :



Factory setting

4. Part Name of the Control Box

(1). Use the following numbers cross reference with the control box picture :

1 : Mounting bracket for under table motor.

2 : Motor power socket

3 : Standing operation panel socket

4 : Motor encoder socket

5 : Safety switch socket

6 : Speed control unit

7 : Operation panel / box socket

8 : Motor encoder cable

9 : Motor power cable

10 : Motor body

11 : Belt guard

12 : External lamp socket

13 : Main power socket

14 : 7P synchronizer socket

15 : Presser foot signal output socket

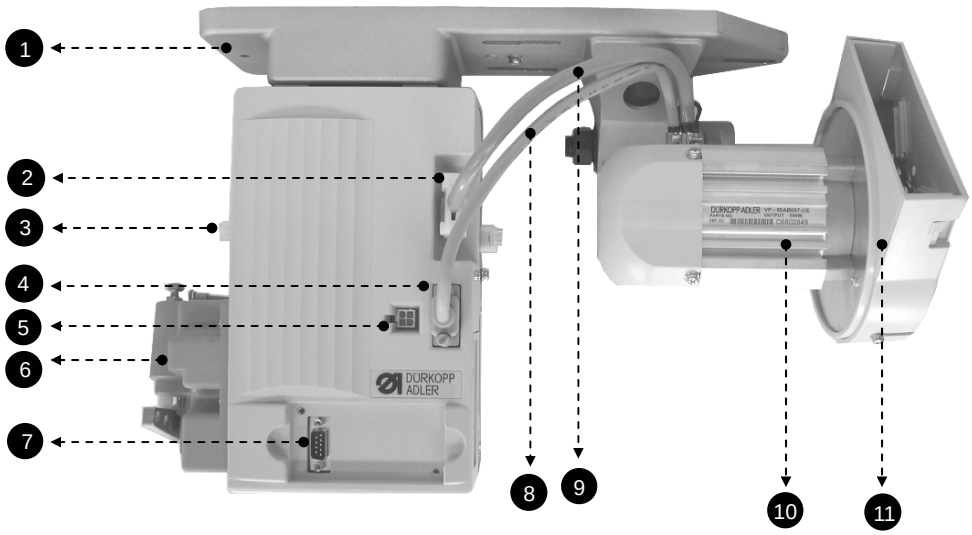
16 : Sewing machine signal output socket

17 : Sewing machine signal output terminal panel

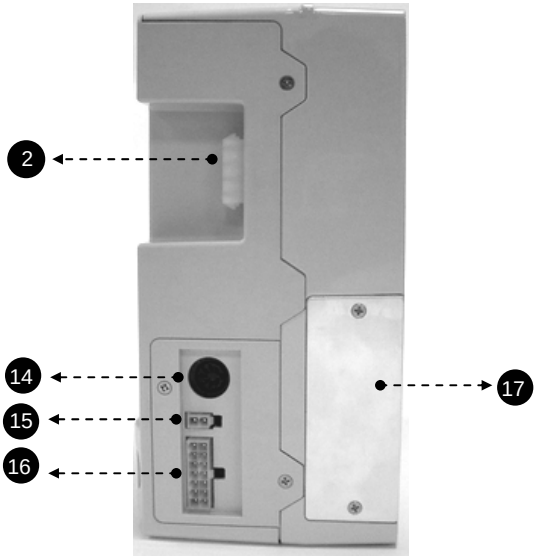
Be careful for all the connector shape and plugging direction. All connectors must be plugged and secured well.

(2). Exterior of the control box :

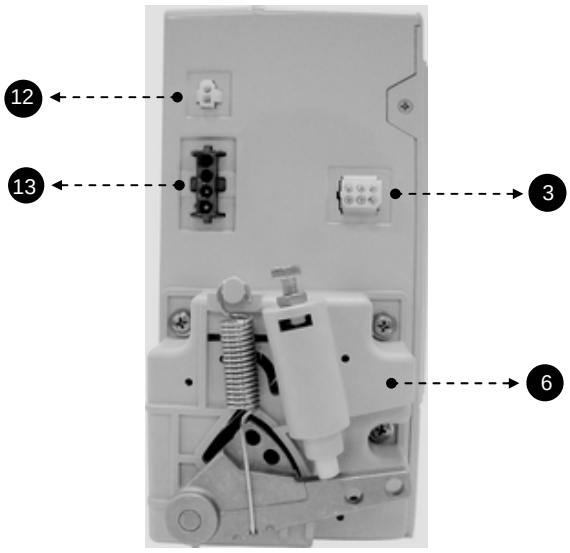
Control box front side



Control box right side

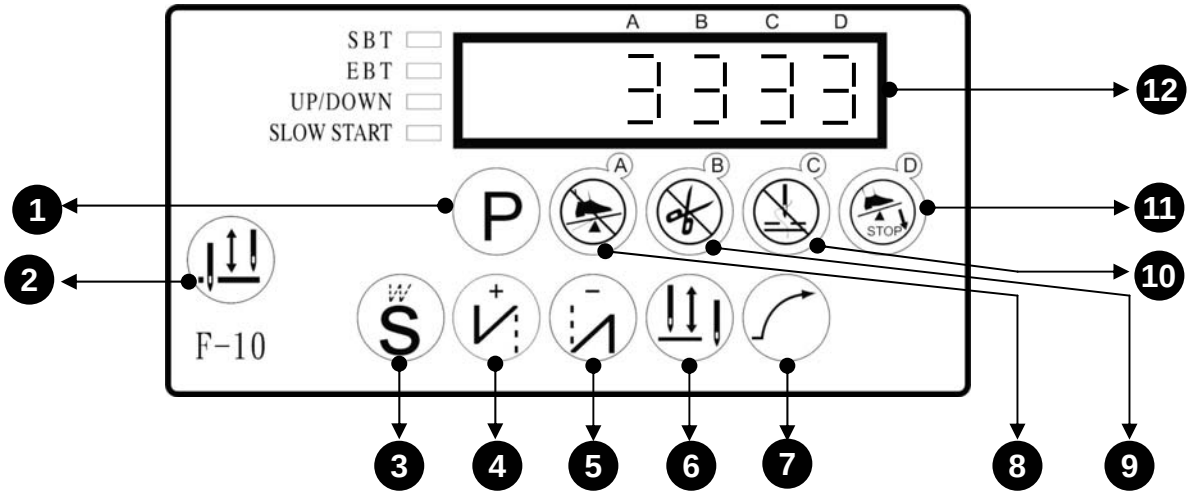


Control box left side



5. Key Functions on Operation Panel / Box

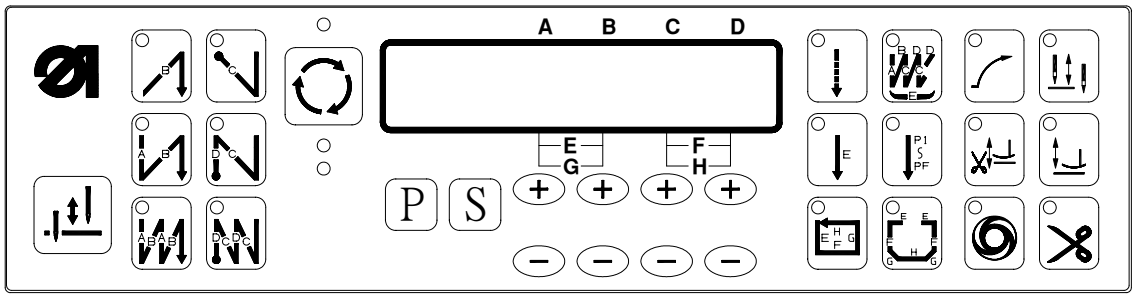
(1). When use with F – 10 mini panel / operation box :



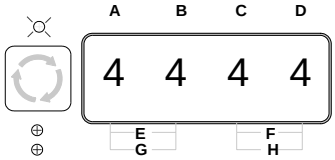
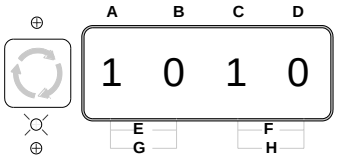
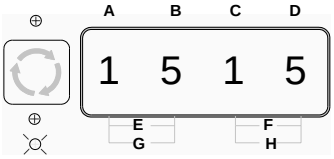
NO.	Function keys for the lock-stitch machine	Function keys for the interlock stitch machine	Function keys under parameter mode
1	Enter the parameter area	Enter the parameter area	Also act as parameter increment key
2	Needle up	Needle up	Invalid
3	Free sewing / Bar tacking / Constant stitch sewing	Invalid	Enter parameter value area / parameter value saving key
4	Start back tacking ON / OFF	Invalid	Parameter increment key
5	End back tacking ON / OFF	Invalid	Parameter decrement key
6	Needle up / down when motor stop	Needle up / down When motor stop	Invalid
7	Slow start ON / OFF	Slow start ON / OFF	Invalid
8	Number of stitches of A section (ranged in 0 ~ 15 stitch)	Cancel half heeling back ○ : means half heeling back invalid	Parameter / value selection key
9	Number of stitches of B section (ranged in 0 ~ 15 stitch)	Cancel trimmer ○ : means trimmer function invalid	Parameter / value selection key
10	Number of stitches of C section (ranged in 0 ~ 15 stitch)	Cancel wiper ○ : means wiper function invalid	Parameter / value selection key
11	Number of stitches of D section (ranged in 0 ~ 15 stitch)	Start constant stitch sewing ○ : mean start constant stitch function valid.	Parameter / value selection key
12	Motor rotation icon / Number of stitches display	Motor rotation icon / Special function display	Parameter display

NOTE : When #8~#11 define as special function key, the parameter [134. KLK] must set at ON.

(2). When use with C-60 operation box :



Function	KEY	Operation of Sewing Machine
Start / End back tacking selection		Double start back tacking (A,B sections)
		Single start back tacking (A,B sections)
		Half start back tacking (B section)
		Double end back tacking (C,D sections)
		Single end back tacking (C,D sections)
		Half end back tacking (C section)
Constant stitch sewing	   	1). As the treadle is toed down, constant-stitch sewing E、F、G or H performed section by section. 2).Once the treadle returns to neutral intermediately in any one section, the machine will stop immediately. When the treadle toeing down again, the balanced stitches of E、F、G or H goes on. 3).If the parameter【010. ACD】is set ON, the machine will not stop and automatically start trimming cycle and end back tacking at the end of the last section E or H. 4).When using P1~PF function, P1~P4 default setting is 15 stitches, other unused sections must set 0 stitch.
Free sewing		1).As the treadle is toed down, machine will start sewing. Once the treadle returns to neutral, machine will stop immediately. 2).As the treadle heeled back, the trimming cycle will be finished automatically.

Bar tacking		As the treadle is toed down, all the seams of bar tacking, A、B、C、D sections will be completed with E times, and the trimming cycle will be finished automatically Note：When the bar tack sewing start, it will not stop until the trimming cycle finished, except for the treadle heeling back to cancel the action.
Stitch setting selection		A、B、C、D -- stitch setting range in 0 ~ F **(Note)** E、F、G、H -- stitch setting range in 0 ~ 99  ---- A=B=C=D=4 stitches  ---- E = F = 10 stitches  ---- G = H = 15 stitches ∴ Press  key to select： Top A、B、C、D Middle E、F Bottom G、H
Needle up / Forward stitch correction		1).In free sewing: One touch of this key act as stitch correction. (half stitch forward) 2).In constant-stitch sewing：(In Bar-tack sewing, it act as needle up) a. If sewing stops intermediately in one section, one touch of this key will raise the needle to up position. b. If sewing stops at the end of section, one touch of this key will correct one stitch forward.
One-shot sewing (AUTO)		1). In free sewing and bar-tack sewing： One touch of this key makes beep sound but no function; also LED does not light up. 2). In Constant-stitch sewing： a. One shot to the pedal, automatic performed number of stitches of E、F、G、H sections. b. Toeing down the pedal again to finish the rest sections until it finish pattern.
Trimming cycle selection		Enable or disable the trimming cycle.

Slow start		1).When function is turned ON, slow start activated at first run of motor start. After trimming, it will activate again on next motor start. 2). Speed of the slow start can be set by parameter [007. S]. 3). Number of stitches can be set by parameter [008.SLS].
Needle up / down when motor stop		Needle stop setting LED ON= Stop at UP position LED OFF=Stop at DOWN position
Presser foot up / down after trimming cycle		Presser Foot action after trimming LED ON= Automatic lift the presser foot after trimming LED OFF=Presser foot not active after trimming..
Presser foot up / down when motor stop		Presser foot action when motor stop LED ON=Motor stop, presser foot goes up automatically. LED OFF=Presser Foot not active when motor stop.
Value / Parameter increment key		A、B、C、D section value increment key, range in 0~ F.**(Note)** E、F、G、H section value increment key, range in 0~99.
Value / Parameter decrement key		A、B、C、D section value decrement key, range in 0~ F.**(Note)** E、F、G、H section value decrement key, range in 0~99.
Enter parameter area / Parameter increment		Press and hold this key for 2 second to enter parameter area. Also act as parameter increment key
Enter parameter value / Saving		Press this key in parameter area to enter parameter value area. Also act as the parameter value saving key.

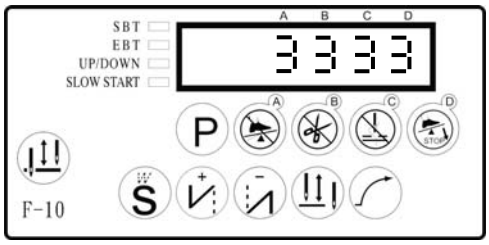
Note：Stitches setting of A、B、C、D sections correspond to the alphabet.
A=10、B=11、C=12、D=13、E=14、F=15 stitches

6. Parameter Adjustment

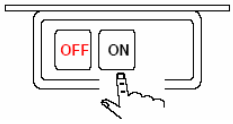
(1). How to enter【Normal Mode】:

Just turn ON the power to enter【Normal Mode】

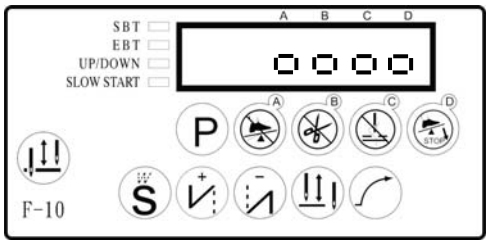
Display for lockstitch Machine

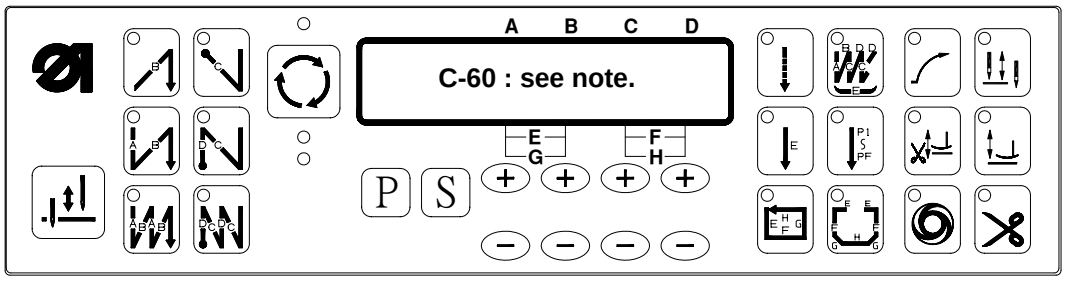


Turn ON power



Display for interlock Machine / or when parameter 134 KLK =ON





(2). How to enter 【Parameter Mode】level：

Parameter Mode		Operation	First display	Range for Parameter
Level **1**	Parameter Mode **A**	At【Normal Mode】 press (P) key.	001. H	Parameter ＃1 ~ 46
Level **2**	Parameter Mode **B**	(P) + **POWER ON**	047.AAC	Parameter ＃1 ~ 122
RESET		+ **POWER ON**	rESEt	Return to factory setting
Note		※ When use C-60 operation box, the key for each mode is same as above.		

(3). How to set the【Parameter Value】with F-10 operation panel :

Confirm the parameter you want to adjust. (See the parameter list) and follow the below steps to adjust the parameter value.

Step 1 : Enter one of the【 Parameter Mode **A** or **B** 】.

Step 2 : Press (+) or (−) key to select the target parameter number.

Step 3 : Press (S) key to enter the parameter value.

Step 4 : Press **A** **B** **C** **D** key to adjust the value.

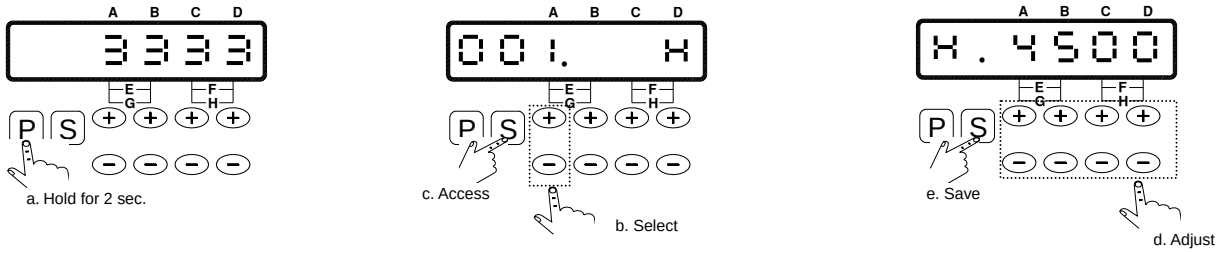
Step 5 : Press (S) key to save the value and return to【Normal Mode】automatically.

(4). How to set the【Parameter Value】with C-60 operation box :

a. Enter one of the 【 Parameter Mode **A** to **B** 】

b. Use ⊕ or ⊖ key to select the target parameter number.
c. Use [S] key to access【value area】

d. Use the ⊕ ⊖ key under the A、B、C、D area to set the value.
e. press [S] key to save the value.



Caution：

1. When motor running, the parameter area is locked and prohibited for access. The parameter only can be adjusted when motor stop.
2. Wrong setting of the parameter might cause the abnormal operating and damage the sewing machine. You must fully understand the function usage and the setting effects to make adjustment. Don't try to adjust the parameter gropingly

(5). Value setting for A、B、C、D key in the【Parameter Value】:

KEY / SCALE / TERMS	A	B	C	D
IN TERMS OF SPEED	1000 spm	100 spm	10 spm	1 spm
IN TERMS OF ANGLE	--------	100 °	10 °	1 °
IN TERMS OF TIMING	1000 ms	100 ms	10 ms	10 ms
IN TERMS OF FUNCTION				FUNCTION SWAP

※ 1. Other than the function selection, each press of the key will start change the value from 0 to 9 。

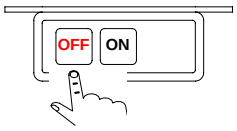
2. IF use with F-10, When【 134. KLK 】set『 ON 』, it acts as special function『 ON / OFF 』key.
See the chapter 5 (Page.10) for detail 。

Note ：After value change, press key (S) to save the value, otherwise the new value will be lost when turning power off.

7.How to Use Reset Function

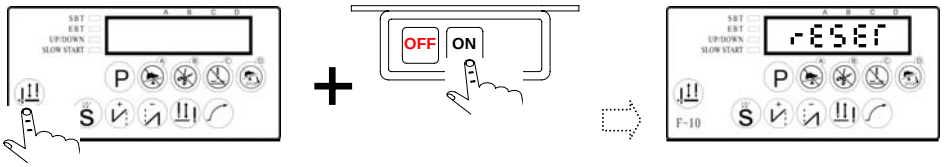
1. Before【Reset】, please confirm the current machine code and any special setting for the parameter. Once reset and all the setting will return to the factory default.
2. After【Reset】, If the machine code is not match with the machine head. It could damage the machine head or cause machine not working properly.

a. Turn off the power first.

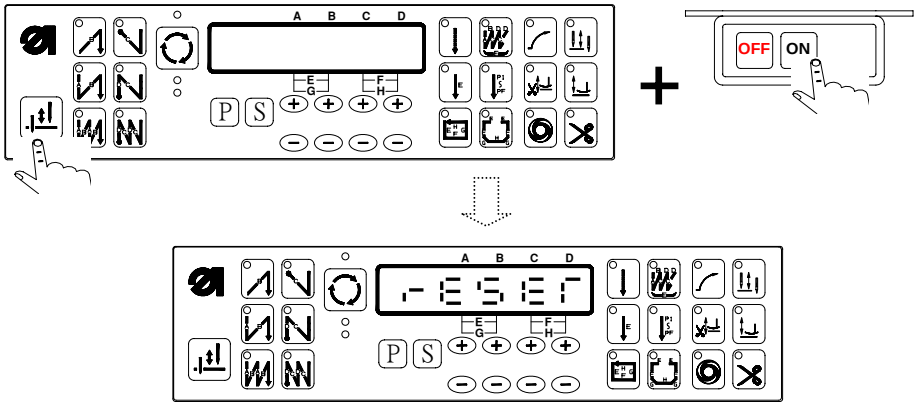


b. Press and hold key for F-10 or key for C-60 and turn on the power. The LCD will show【RESET】and blink twice.

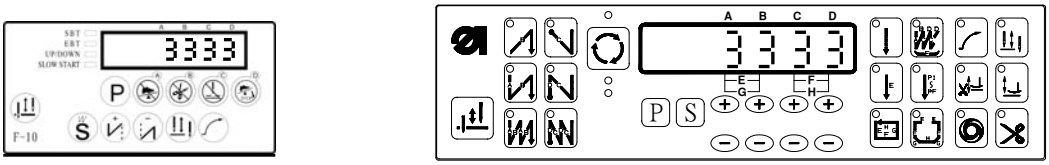
F-10



C-60



c. Blinking means the data been【Reset】and LCD will return to【Normal mode】area.



8. Basic Troubleshooting

(1). Error Code and Measurement：

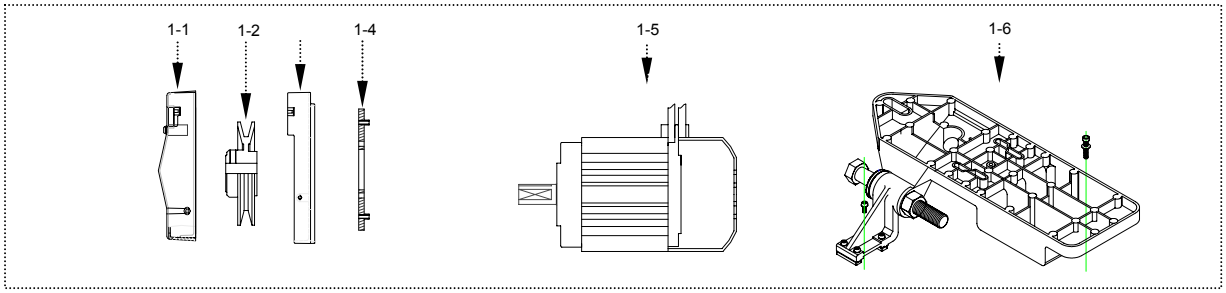
Error Code	Cause of The Problem	Status and Measurement
ER0. 1	1. Power module detected error. 2. Abnormal over current or voltage occurred..	Motor will be shut down. Please check the power module. Please check the power board over current circuitry.
ER0. 2	E^2PROM (IC3) r/w malfunction.	Motor will be shut down. Replace the IC3 memory unit.
ER0. 4	1. When power on, detected high voltage 2. Connect the wrong voltage or supply power is too high. 3. F1 fuse open	Motor and machine will be shutting down. Please check the AC power. (Too high) Please check the power board. Please check the F1 fuse.
ER0. 5	1. When power on, detected low voltage 2. Connect the wrong voltage or supply power is too low..	Motor and machine will be shutting down.. Please check the AC power. (Too low) Please check the power board.
ER0. 7	1. Bad connection at the motor connector. 2. Synchronizer (sensor) signal error. 3. Machine locked or object stuck in the motor pulley. 4. Sewing material is too thick.	Motor and machine will be shutting down. Please check the motor or motor connection. Please check the synchronizer (sensor) and its signal. Please check the machine head to see if objects stuck in the motor pulley, or rotate not smoothly.
ER0. 8	Operation box linked to CPU interface had communication error	Motor and machine will be shutting down. Please check the operation box.

Error Code	Cause of The Problem	Status and Measurement
ER0. 9	1. Machine solenoid shorted. 2. Main board power transistor is faulty.	Motor still can run, but all output signals and operation box pattern sewing function will be invalid.. Please check the machine solenoids; or the solenoid resistance value is 2 Ω less. Please check all the power transistors, which related to solenoid.
ER0. 11	If parameter 【121.ANU】 is set ON, but auto needle up is malfunction when the power turned on.	Motor and machine will be shutting down. Please check the synchronizer up position signal. Please check the control box. Please check the machine head to see if objects stuck in the motor pulley, or rotate not smoothly.
ER0. 12	Power on, no synchronizer signal or not connected.	Automatic starts the clutch mode. Please check the synchronizer. (also check the connection and model)
ER0. 14	Using PSU signal without sewing material when【106. PSN】= OFF	Motor stops. Please check the「PSU」sensor circuitry and its signal.
ER0. 15	Using PSD signal without sewing material when【106. PSN】= OFF	Motor stops. Please check the「PSD」sensor circuitry and its signal.
ER0. 16	1. Safety switch is either faulty or bad connection. 2. Parameter【075. SFM】setting not match the machine head model.	Motor stops. Please check the safety switch. Please check the parameter【075. SFM】setting, make sure it match machine head safety switch
ER0. 51	1. Motor overloads for more than 20 seconds during one sewing. 2. Motor's coil is defective. 3. Machine head is too crude to rotate smoothly.	Motor stops. Please check to see if the machine head is too heavy to sew. Please check to see if the sewing material is too thick to sew. Please check the motor coils to see if it is defective. Please check the machine head to see if it is too crude to rotate smoothly.

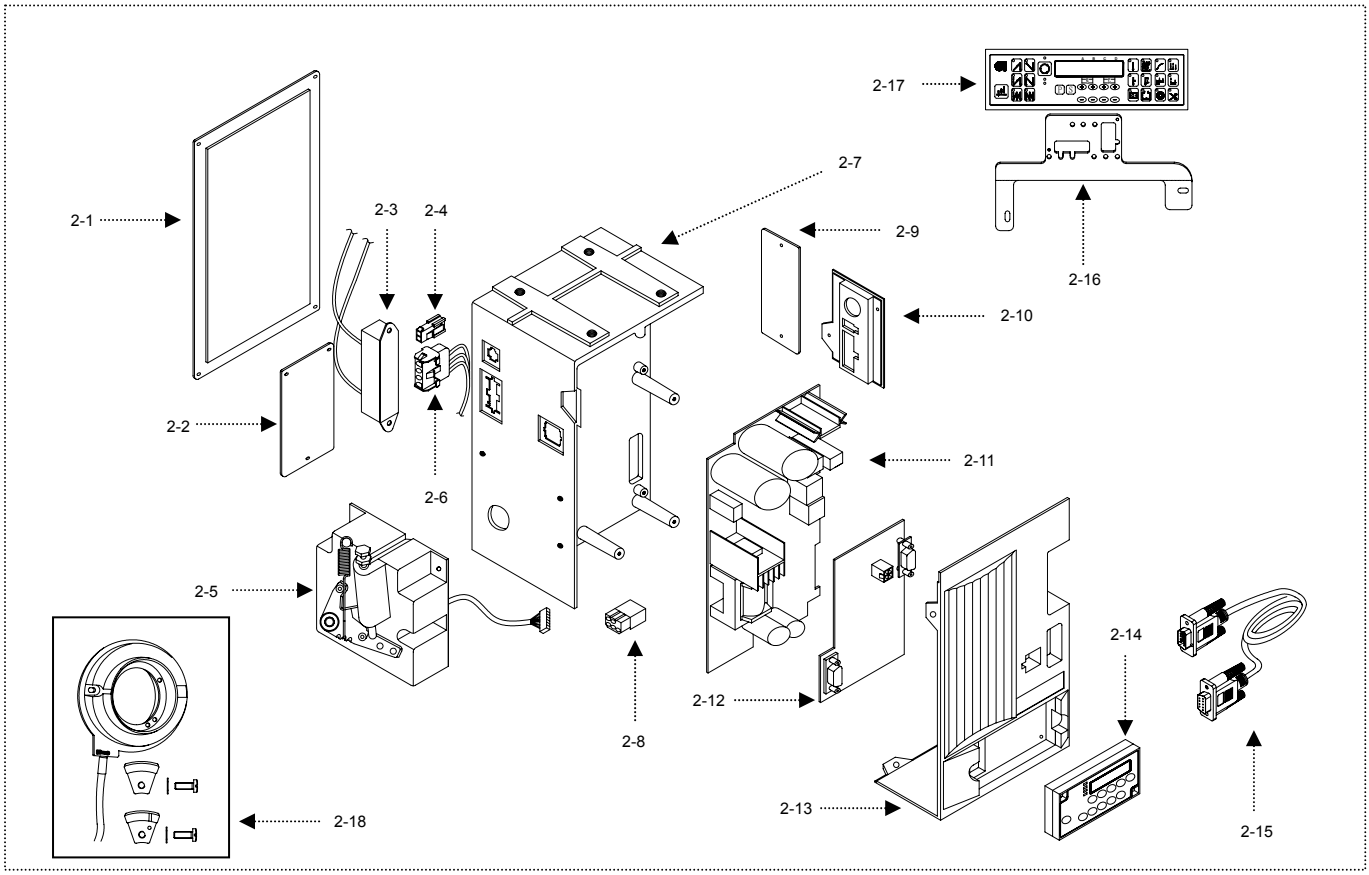
Digital Alphabet	English Alphabet	Cause of The Problem	Status and Measurement
PoWoFF	POWER OFF	1. AC power shut down or bad connection. 2. Power board OI 1 sensor circuitry faulty.	Motor stops Please check the AC power and connection. Please check the power board OI 1 circuitry.
EnSroP	EM STOP	An emergency stop signal activated when Parameter【149. IND】= ES.	Motor emergent stop. Restart the power to return normal operation.

(2). HVP-20 Parts List :

1. Motor Parts :



2. Control Box Parts :

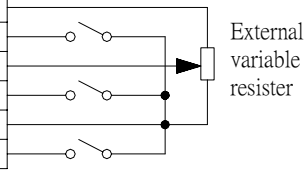


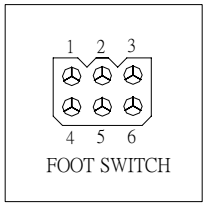
NO.	Order Code	Parts Name	Description
1	2VP3432209AXL	Motor with bracket	VP-50AB007-CE 9800 170028
1-1	315BGV150	Belt Cover Top	For V-Belt Type
1-2	2VP2PY4041D	Pulley (65 mm)	(14 ∮ hole)
	2VP2PY4061D	Pulley (75 mm)	(14 ∮ hole)
	2VP2PY4081D	Pulley (85 mm)	(14 ∮ hole)
1-3	315BGV140	Belt Cover Base	For V-Belt Type
1-4	313BGE030	Cover Bracket	For V-Belt Type
1-5	2VPFRR432X8	Motor body	500W
1-6	2VPBTV030	Motor bracket	For under table
2	2VP2040025201	Control Box	9800 370002
2-1	313MPB190	Rear Cover	For HVP-20
2-2	2VPPCB380	EMI Board	For HVP-20
2-3	2VP20104202	Cement Resistor	220Ω 30W
2-4	32QRCH270	2P Connector	5559-02P

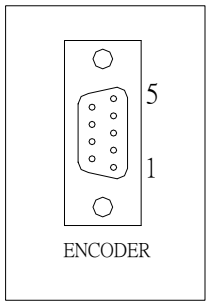
NO.	Order Code	Parts Name	Description
2-5	2VP20106003	Speed Control Unit	9800 370003
2-6	2VPPPW0220	Power Cable	For HVP-20
2-7	2VPMPB207	Control Box Casing	For HVP-20
2-8	32QRCH080	6P Connector	For HVP-20
2-9	32ZVPB700	Connector Panel	For HVP-20-4-25
2-10	315MPB600	Connector Panel (A)	For HVP-20-4-25
2-11	2VP20103209	Power Board	For 1 ∮ 200-240V 15A
2-12	2VP20402001	Main Board	For HVP-20-4-25
2-13	315MPB580	Front Cover	For HVP-20
2-14	2VPOPBF01005	F-10 Operation panel	9800 360102
2-15	322PWG340	F-10 EXT. cable	1 m.
2-16	2VPOPBPT0P	Operation box bracket	D type
2-17	2VPOPBC06008	C-60 Operation box	9800 360103
2-18	2VP11800025	Synchronizer	800-2H / 9800 367102

9. HVP-20-4-25 Pin Assignment

FOOT SWITCH	
1	+12V
2	START
3	VC
4	KNEE SW.
5	0V
6	TRIMMER

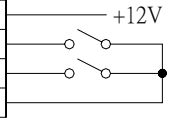


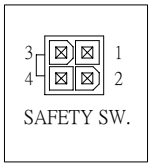


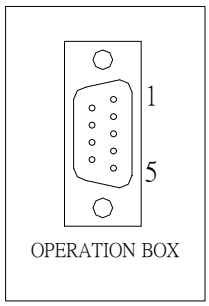


ENCODER	
1	+5V
2	UP
3	DOWN
4	A PHASE
5	B PHASE
6	R
7	S
8	T
9	0V

SAFETY SW.		
1	+12V	+12V
2	INL	SAFETY SW.
3	INB	PSD
4	0V	0V



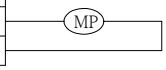




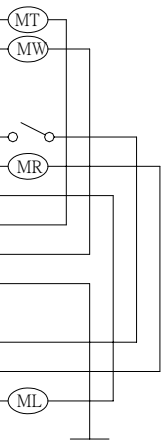
OPERATION BOX	
1	+12V
2	CKU
3	T1out
4	R1in
5	---
6	U SW.
7	---
8	---
9	0V

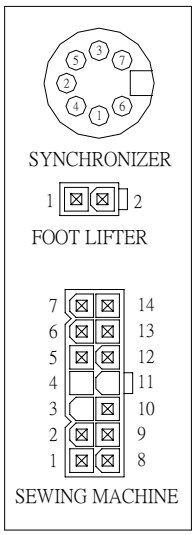
SYNCHRONIZER	
1	DOWN
2	NO SYNC.
3	0V
4	0V
5	+5V
6	UP
7	---

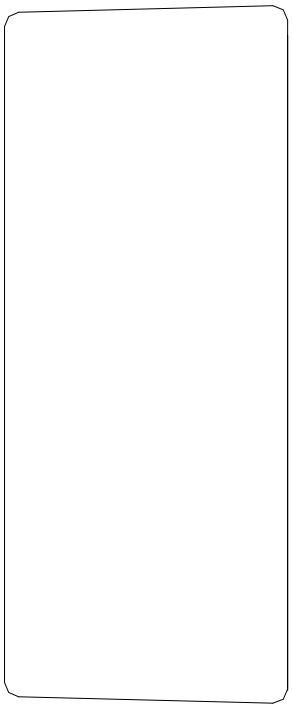
FOOT LIFTER		
1	OF	A.F.L. SOL.
2	+24V	+24V(SWITCHING)



SEWING MACHINE		
1	OA	TRIMMER SOL.
2	OB	WIPER SOL.
3		---
4		---
5	INE	REV. SW.
6	OC	REV. SOL.
7	+24V	+24V
8	+24V	+24V
9	+24V	+24V
10	EARTH	EARTH
11		---
12	0V	0V
13	+24V	+24V(SWITCHING)
14	OD	TENSION







HVP -20 Parameters List for DA-251 (MAC. 35)

Key	Parameters Code		Parameters Function	Range	Pre.setting	Description
POWER..ON	1	H	Maximum sewing speed	50 - 9999 spm	4000	Maximum speed adjustments
	2	SLM	Slow start operation mode	T/A	T	The slow start operation mode is selected. This is valid when the panel [SL] key is ON in the normal mode. T：Slow start operation will begin when the power is turned ON or when the first toe down after thread trimming, or the first external run signal (S0,S1) is turned ON. A：Slow start operation will begin when the pedal is toed down or when the external run signal (S0,S1) is turned ON.
	3	CNR	Counter ratio selection	1 - 100	1	Setting the multiple to the value of 【042. CUD】 Connection：【042. CUD】,【159. O4】,【097. TK3】
	4	N	Start back-tacking speed	50 - 8000 spm	1900	Start back-tacking speed adjustments
	5	V	End back-tacking speed	50 - 8000 spm	1900	End back-tacking speed adjustments
	6	B	Bar-Tacking Speed	50 - 8000 spm	1800	Repeat bar-tacking speed adjustments
	7	S	Slow start speed	50 - 2000 spm	400	Slow start speed adjustments
	8	SLS	Stitch numbers for slow start	0 - 99 stitches	2	Slow start stitches setting
	9	A	Automatic constant-stitch sewing speed	50 - 8000 spm	4000	Valid only at the auto pattern sewing or one shot signal （SH）active
	10	ACD	Automatic sewing End back-tacking	ON/OFF	ON	Only at the last seam of pattern sewing ON：Valid. OFF：Invalid.
	11	RVM	Back-tacking mode selection	J/B	J	J = JUKI mode , B = BROTHER mode. J：Active when motor stop or running B：Active only when motor running
	12	SMS	Mode selection for Start back-tacking	A/M/SU/SD	A	Start back-tacking mode selection A：One shot sewing M：Pedal control and motor can stop at middle way. SU：One shot sewing but motor stops at needle up by [027.CT] timer at end of each seam. SD：One shot sewing but motor stops at needle down by [027.CT] timer at end of each seam.
	13	TYS	Mode selection at the end of Start back-tacking	CON/STP/TRM	CON	Mode selection at the end of Start back-tacking CON：At the end of Start back-tacking ,machine continues sewing if pedal pressed or START signal on (standing operation) STP：At the end of Start Back-Tacking, machine stops and must re-start by pedal command. TRM： Making the trimming cycle once the Start Back-Tacking finished. (Mini Bar tacking)
	14	SBT	Start back-tacking function selection	ON/OFF	ON	Valid only when the operation panel disconnected. ON：Perform OFF：Not perform
	15	SBA	Setting stitches A of Start back-tacking	0 - 15 stitches	3	Start back-tacking stitches setting , 【014. SBT】= ON valid
	16	SBB	Setting stitches B of Start back-tacking		3	
	17	SBN	Setting turns of Start Back-tacking	0 - 4 times	2	Setting the seam times of Start back-tacking , 【014. SBT】= ON valid
	18	BT1	Stitch balance for Start Back-tacking	0 - F	4	BT1=0:Invalid,1-8:Increase stitches of reverse seam,9-F:Increase stitches of forward seam .
	19	BT2	Stitch balance for Start Back-tacking		3	BT2=0:Invalid,1-8:Increase stitches of forward seam,9-F:Increase stitches of reverse seam .
	20	SME	Mode selection for End back-tacking	A/SU/SD	A	End back-tacking mode selection. A：One shot sewing. SU：One shot sewing but machine stops up position by 【027. CT】 timer at the end of each seam. SD：One shot sewing but machine stops down position by 【027. CT】 timer at the end of each seam.
	21	EBT	End back-tacking selection	ON/OFF	ON	Valid only when the operation panel disconnected. ON：Perform OFF：Not perform
	22	EBC	Setting stitches C of End back-tacking	0 - 15 stitches	3	End back-tacking stitches setting , 【021. EBT】 = ON valid
	23	EBD	Setting stitches D of End back-tacking		3	
	24	EBN	Setting turns of End back-tacking	0 - 4 times	2	Setting the seam times of End back-tacking , 【021. EBT】 = ON valid
	25	BT3	Stitch balance for End Back-tacking 3	0 - F	3	BT3=0:Invalid,1-8:Increase stitches of reverse seam,9-F:Increase stitches of forward seam .
	26	BT4	Stitch balance for End Back-tacking 4		3	BT4=0:Invalid,1-8:Increase stitches of forward seam,9-F:Increase stitches of reverse seam .
	27	CT	Setting time interruption at each section end of Back-Tacking.	0 - 990 ms	50	【012. SMS】,【020. SME】, 【031. SMB】= SU,SD setting valid. Conner stop timer, valid only at 【012. SMS】,【020. SME】,【031. SMB】setting SU/SD.

HVP -20 Parameters List for DA-251 (MAC. 35)

Key	Parameters Code		Parameters Function	Range	Pre.setting	Description
POWER..ON	28	SB5	15 stitches plus on Start/End back-tacking (with C60)	ON/OFF	OFF	Additional 15 stitches are added to the Start and End back-tacking stitches function selection.
						ON：Valid.
						OFF：Invalid.
		AFM	Mode selection for foot lifting . (with F-10)	0/1/2/3	0	0. Depends on the pedal.
						1. At motor stop.
						2. At trimming after .
						3. At trimming after & at motor stop.
	29	SB9	0-99 stitches plus on Start/End back-tacking	0 - 99 stitches	0	Additional setting stitches are added to the Start and End back-tacking stitches.
	30	BCC	Added 1 stitch to the C segment of End back-tacking	ON/OFF	ON	Added 1 stitch to the C segment of End back-tacking function selection.
						ON：Valid
						OFF：Invalid
	31	SMB	Mode selection for Bar-tacking	A/M/SU/SD	A	Bar-tacking mode selection.
						A：One shot sewing.
						M：Pedal control and motor can stop at middle way.
						SU：One shot sewing but motor stops at needle up by 【027. CT】 timer at end of each seam.
						SD：One shot sewing but motor stops at needle down by 【027. CT】 timer at end of each seam.
	32	BAR	Bar-tacking selection	ON/OFF	OFF	Valid only when the operation panel disconnected.
						ON：Perform
						OFF：Not perform.
	33	BRC	Setting stitches of Bar-tacking	0 - 99 stitches	4	One setting for all seams , 【032. BAR】 = ON valid.
	34	BRN	Setting turns of Bar-tacking	0 - 15 times	4	Setting the seam times of Bar-tacking , 【032. BAR】= ON valid.
	35	BT5	Stitch balance for Bar-tacking 5	0 - F	4	BT5=0 : Invalid,1-8 : Increase stitches of reverse seam; 9-F : Increase stitches of forward seam.
	36	BT6	Stitch balance for Bar-tacking 6		3	BT6=0 : Invalid,1-8 : Increase stitches of forward seam; 9-F : Increase stitches of reverse seam.
	37	SMP	Mode selection for Constant-stitch sewing	A/M	M	Constant-stitch sewing mode selection.
						A：One shot sewing.
						M：Pedal control and motor can stop at middle way.
	38	PM	Constant-stitch sewing selection	ON/OFF	OFF	Valid only when the operation panel disconnected.
						ON：Perform.
						OFF：Not perform.
	39	PS	Setting stitches for section 1 ～4 of Constant-stitch sewing	0 - 250 stitches	15	Stitches setting of seam P1-P4. 【038. PM】 =ON valid.
			Setting stitches for section 5 ～D of Constant-stitch sewing		0	Stitches setting of seam P5-PD. 【038. PM】 = ON valid.

HVP -20 Parameters List for DA-251 (MAC. 35)

Key	Parameters Code		Parameters Function	Range	Pre.setting	Description
POWER..ON	40	WON	Wiper function selection	ON/OFF	ON	Wiper function selection. ON：Enable. OFF：Disable.
	41	TM	Trimmer function selection	ON/OFF	ON	Trimmer function selection. ON：Enable. OFF：Disable.
	42	CUD	Count mode selection (For Bobbin Thread or Sewing Piece)	NOP/U/D/US/DS/ UT/DT/UTS/DTS	NOP	Counter function mode selection. NOP ： The counter is invalid. U ： Count up by stitches. When count over , counter will be auto- reset. D ： Count down by stitches. When count over , counter will be auto- reset. US ： Count up by stitches. When count over, motor stops and the counter must be reset by the external switch S4 【152.INI】=CRS or the A key on the front panel.. DS ： Count down by stitches. When count over, motor stops and the counter must be reset by the external switch S4 【152.INI】=CRS or the A key on the front panel.. UT ： Count up by trimming. When count over , counter will be auto- reset. DT ： Count down by trimming. When count over , counter will be auto- reset. UTS ： Count up by trimming. When count over, motor stops and the counter must be reset by the external switch S4 【152.INI】=CRS or the A key on the front panel. DTS ： Count down by trimming. When count over, motor stops and the counter must be reset by the external switch S4 【152.INI】=CRS or the A key on the front panel.
	43	UD	Setting the count	1 - 9999	99	Count setting . (Note: The real number = the value of 【003.CNR】X【043.UD】, when 【042.CUD】= U,D,US,UD valid only.)
	44	PN	Display the current count	0 - 9999	0	Display the current count of 【043.UD】
	45	SP	Sewing speed	0 - 8000	0	Showing the current sewing speed.
	46	DIR	Direction of motor rotation	CW/CCW	CCW	Motor rotation direction adjustments. (Viewed from the motor shaft side) Connection : 【119, DD】 CCW ：counterclockwise. CW ： clockwise.

HVP -20 Parameters List for DA-251 (MAC. 35)

Key	Parameters Code		Parameters Function	Range	Pre.setting	Description
P + POWER..ON	47	MAC	Machine Code	0 - 101	35	Machine code switchover
	48	N12	Positioning Mode selection （ON=UP ONLY, OFF=UP/DOWN）	ON/OFF	OFF	Positioning Mode selection. ON：One position UP only. OFF：Two positions Up / DOWN.
	49	SPD	Machine's pulley dimension.	1 - 250 mm	75	Setting machine pulley size when 【051. PL】 = ON valid.
	50	MPD	Motor's pulley dimension.	1 - 250 mm	75	Setting motor pulley size when 【051. PL】 = ON valid.
	51	PL	Pulley's ratio setting mode selection	ON/OFF	OFF	Selecting the mode of setting pulley ratio. ON： Manually setting the pulley sizes by 【049, SPD】,【050, MPD】 . OFF：Automatically setting the pulley sizes by the CPU.
	52	BT	Braking time of motor	50 - 500 ms	200	Braking time of motor
	53	POL	Slow start at the first cycle of power ON	ON/OFF	ON	Slow start at the first cycle of power ON function selection. ON：Enable and speed is set by 【007. S 】. OFF：Disable.
	54	BK	Motor braked at normal stop	ON/OFF	OFF	Motor stops with brake function. ON：Enable. OFF：Disable.
	55	SRM	Motor start running with a reverse angle	ON/OFF	OFF	Valid only when needle stops at up position. ON：Enable. When the needle stops at up position, the first stitching will be done with a reverse angle which is set by the 【056.SRA】. OFF：Disable. Exception: If【147. INA】= BCR, an external switch may be used as a selection of ON / OFF to this function.
	56	SRA	Setting the angles of 【055. SRM】	1 - 360 degrees	60	Valid only when【055. SRM】= ON.
	57	TRU	Motor stops with a reverse angle after trimming	ON/OFF	OFF	ON：Enable. OFF：Disable.
	58	TR8	Setting the angles of 【057. TRU】	1 - 360 degrees	40	Valid only when【057.TRU 】= ON .
	59	M	Middle speed	L speed - 8000 spm	800	Setting the middle speed.
	60	L	Low speed	50 - 500 spm	200	Low speed adjustments
	61	T	Thread trimming speed	50 - 500 spm	200	Thread trimming speed adjustments
	62	HPM	Mode for foot lifting stroke change at special compound feed machine.	ALT/MON	MON	For machines have HP function only. 【 ALT 】mode : Presser foot lifting stroke changed by each time of the HP switch pushed on. 【 MON 】mode : Presser foot lifting stroke must be remained by the HP switch kept on.
	63	FTP	Type selection for foot lifting solenoid	M/A	M	M : Magnetic type. A : Air type. Note : When set at A type, 【064. FO 】and【065. FC 】setting will be invalid. It will be full on.
	64	FO	Full-On time setting for foot lifting solenoid	0 - 990 ms	250	Only valid when【063. FTP】set at『 M 』mode. For solenoid pulling torque adjustment.
	65	FC	Duty cycle time setting for foot lifting solenoid	10 - 90%	35	Only valid when【063. FTP】set at「M」mode. For solenoid's switching power adjustment. Note : Wrongly adjustment will cause the solenoid unable to lift or over-heating.
	66	FD	Running-Delay time setting	0 - 990 ms	0	If foot lifter is installed, set 100 ms min. to ensure the presser foot will come down first.
	67	FPM	Protection for foot lifter solenoid.	ON/OFF	ON	Selection of solenoid protection. ON: The foot lifting solenoid activated time will be controlled by 【068. FP】. OFF : The foot lifting solenoid will be always active unless heeling back the pedal.
	68	FP	Working time limit for foot lifter solenoid.	(0 - 9990) x 0.01s	3000	Setting the lifting solenoid activated time. Valid only when the【067. FPM】 = ON.
	69	HD	Sensitivity adjustment for half-heeling pedal	0 - 990	100	Use this setting as foot lifter delay time at half heeling the pedal. If foot lifter is installed, set 100 ms min. 1.If timing set to short, it will cause foot lifter started once before trimming at full heeling the pedal. 2.If timing set to long, it will cause foot lifter started too slow or laggard at half heeling the pedal.
	70	HHC	Cancel foot lifting at half-heeling pedal	ON/OFF	OFF	ON : No foot lifting at half-heeling. (but full-heeling can operate foot lifter) OFF : Operate foot lifting at half-heeling. Note : When【134.RLK】= ON for interlock-stitch machine, this function can be controlled by "A" key on the control box panel.

HVP -20 Parameters List for DA-251 (MAC. 35)

Key	Parameters Code		Parameters Function	Range	Pre.setting	Description
P + POWER..ON	71	FL	Cancel foot lifting at full- heeling pedal	ON/OFF	OFF	ON : No foot lifting at heeling pedal. OFF : Has foot lifting at heeling pedal.
	72	FHC	Cancel trimming at full-heeling pedal	ON/OFF	OFF	ON : No function at heeling pedal. (foot lifter and need up function are also invalid) OFF : Trimmer is functioned at heeling pedal.
	73	NTC	Trimming works at neutral pedal	ON/OFF	OFF	When the pedal is returned to neutral position, trimming works automatically. O N : Enable. Only valid when 【072.FHC】= OFF OFF：Disable.
	74	FRV	Converter for foot lifter signal output	ON/OFF	OFF	Foot lifter output signal converted. ON : The foot lifter goes up during sewing. OFF: Function invalid.
	75	SFM	Safety switch protection mode	NC/NO	NO	Trimming device protection for Cover-Stitch machine. NC：Normal close. When signal at open , motor immediately stops and rotation symbol will stop. NO：Normal open. When signal at close , motor immediately stops and rotation symbol will stop.
	76	TCL	Thread trimmer cancel	ON/OFF	OFF	With TCL trigger signal input, the next trimming will be cancelled as full heeling the pedal. ON：Valid. OFF：Invalid.
	77	ILC	Cancel of interlock timing after full heeling pedal	ON/OFF	OFF	Canceling the interlock timer for quick restarting. For machine without trimmer device only. ON：Valid. OFF：Invalid.
	78	TRM	Motor running mode at trimming sequence	LK/RK/KA/KB/KC	LK	Motor running mode at trimming sequence selection. LK：For general Lock-Stitch machines .Trimming from needle down to up. RK：For Chain-Stitch machine easy pull out cycle. Needle stops with a reverse angle set by 【116.DRU】. KA：For general Cover-Stitch machines with under trimmer only. KB：For special Cover-Stitch machines with upper trimmer . KC：Valid only when 【079. LTM】=TK and 【081. TS】＞0, otherwise function same as LK mode.
	79	LTM	Mode selection for trimming sequence. (For TM output signal)	T1/T2/T3/T4/TK/TS/T7	TS	Reference the timing chart. T1：At down position delayed 【081. TS】 angles on, at up position delayed 【083. T2】 time off. T2：At down position delayed 【081. TS】 angles on, extended 【084. TE】 angles off. T3：At down position delayed 【081. TS】 angles on, extended 【083. T2】time off. T4：At down position delayed 【082. T1】 time on, extended 【083. T2】 time off. TK：At up position delayed 【082. T1】 time on, extended 【083. T2】 time off. TS：At down position always on, at up position delayed 【082. T1】 time on, extended 【083. T2】 time. T7：At down position delayed 【081. TS】angles on, at up position off, and delayed 【082. T1】time on, extended【083. T2】time off.
	80	LLM	Mode selection for tension-release sequence. For ML output signal	L1/L2/L3/L4/LK/LS/L7	LS	Reference the timing chart. L1：At down position delayed【085. LS】 angles on, at up position delayed 【087. L2】time off. L2：At down position delayed 【085. LS】angles on, extended【088. LE】angles off. L3：At down position delayed 【085. LS】 angles on, extended 【087. L2】time off. L4：At down position delayed 【086. L1】 time on, extended 【087. L2】 time off. LK：At up position delayed【086. L1】 time on, extended【087. L2】 time off. LS：At down position always on, at up position delayed 【086. L1】 time on, extended 【087. L2】 time off. L7：At down position delayed 【085. LS】 angles on, at up position off, and delayed 【086. L1】 time on, extended【087. L2】 time off.
	81	TS	Delayed angles prior to trimmer engaged	0 - 360 degrees	0	Valid for【079. LTM】= T1/T2/T3/T7 .
	82	T1	Delayed timing prior to trimmer engaged	0 - 990 ms	0	Valid for【079. LTM】= T4/TK/TS/T7.
	83	T2	Trimming time	0 - 990 ms	20	Valid for【079. LTM】= T1/T3/T4/TK/TS/T7.
	84	TE	Setting angles of trimming	0 - 360 degrees	0	Valid for【079. LTM】 = T2 .
	85	LS	Delayed angles prior to tension release engaged	0 - 360 degrees	0	Valid for 【080. LLM】 = L1/L2/L3/L7 .
	86	L1	Delayed timing prior to tension release engaged	0 - 990 ms	0	Valid for【080. LLM】= L4/LK/LS/L7.
	87	L2	Timing of tension release	0 - 1500 ms	30	Valid for【080. LLM】 = L1/L3/L4/LK/LS/L7.
	88	LE	Setting angles of tension release	0 - 360 degrees	0	Valid for【080. LLM】= L2 .

HVP -20 Parameters List for DA-251 (MAC. 35)

Key	Parameters Code		Parameters Function	Range	Pre.setting	Description
P + POWER..ON	89	D1	Delayed timing prior to upper trimmer engaged at down-stop	0 - 990 ms	30	Only valid when【078. TRM】set at「 KB 」mode. Signal output from the wiper MW. See the KB timing chart.
	90	D2	Setting timing of upper trimming at down-stop	0 - 2500 ms	90	
	91	D3	Timing recall of upper trimming at down-stop	0 - 990 ms	120	
	92	W1	Delayed timing prior to wiper engaged	0 - 980 ms	0	Time setting between needle up to wiper active.
	93	W2	Setting timing of wiping	0 - 9990 ms	40	Wiper ON timer setting.
	94	WF	Delayed timing prior to foot lifter engaged	0 - 990 ms	50	Timer setting between wiper OFF to presses foot ON.
	95	CSF	Condense-Stitch function selection	ON/OFF	OFF	Condense-Stitch function by【027. CT 】timer for needle up & motor stop. ON：Enable. Note :【021. EBT 】=ON,【022. EBC】=8,【023.EBD】=3 and 【024.EBN】=2 and【027. CT】=100 must be adjusted. OFF：Disable.
	96	WN3	WEDA cutter delay stitch count	0 - 99 stitches	10	WEDA cutter delay stitch count setting.
			Setting stitches of Condense-Stitch sewing		8	Valid only when the [095. CSF] = ON.
	97	TK3	Tape cutter on timer	0 - 2500 ms	10	Tape cutter on timer setting x10 = 100 ms.
			Bobbin counter alarm preaction value	0 - 250 stitches		When【042.CUD】= US,DS the value is bobbin counter alarm preaction value.
			Setting stitches prior to stop beyong Condense-Stitch	0 - 250 stitches	0	Valid only when the [095. CSF] = ON.
	98	SLU	Stitch length selection for backtack	ON/OFF	OFF	ON ： Normal stitch length. OFF： Long stitch length.
	99	SEN	Edge sensor function selection	ON/OFF	OFF	Edge sensor function selection.. ON：Enable. OFF：Disable.
	100	SRS	Edge sensor signal check 1	0 - 99 stitches	1	Only valid when【099. SEN】set at ON. To avoid photo interference.
	101	CMS	Edge sensor signal check 2	0 - 99 stitches	3	Only valid when【099. SEN】set at ON. To avoid photo interference.
	102	SE	Setting stitches from edge sensing to stop	1 - 999 stitches	6	Setting Stitches to stop., when edge signal detected. Only valid when 【099. SEN】set at ON
	103	SET	Trimming mode at sensory stop	ON/OFF	OFF	When edge signal detected out. Motor will do the trimming cycle automatically. ON : After the stitches of【102. SE】finished, trimming works. OFF : After the stitches of【102. SE】finished, trimming doesn't work.
	104	PSU	Stitches for emergency up-stop	1 - 99 stitches	6	When【PSU】signal detected, running the stitches then stop at UP position. The speed of setting stitches is set by 【009. A 】.
	105	PSD	Stitches for emergency down-stop	1 - 99 stitches	6	When【PSD】signal detected, running the stitches then stop at DOWN position. The speed of setting stitches is set by 【009. A 】.
	106	PSN	Re-start function at emergency stop	ON/OFF	ON	When the pedal on and the edge signal detected, the motor can start running. ON：Enable. OFF：Disable.
	107	S7U	Manual Back-Tacking engaged at needle-up position	ON/OFF	OFF	When motor running, manually push the Touch Back switch , reverse solenoid engaged on at needle up. ON：Valid. OFF：Invalid.
	108	S7D	Manual Back-Tacking engaged at needle-down position	ON/OFF	ON	When motor running, manually push the Touch Back switch , reverse solenoid engaged on at needle down. ON：Valid. OFF：Invalid.
	109	ROF	Mode for de-engaging Back-Tacking	ON/OFF	OFF	During sewing, reverse output will be OFF at needle UP or DOWN position . ON：At「 needle UP 」position. OFF：At「 needle DOWN 」position.
	110	TB	Mode for Back-Tacking at trimming cycle	ON/OFF	OFF	The trimming and reverse solenoid activated on the same time. ON：Valid. OFF：Invalid.
	111	COR	Correction Mode of Touch-Back Switch	1/2	2	Correction mode selection for Touch-Back Switch. Note : 【010. ACD】= OFF and【011. RVM】= B 1: Doing correction with one touch the Touch-Back switch . 2: Doing correction with double touch the Touch-Back switch.

HVP -20 Parameters List for DA-251 (MAC. 35)

Key	Parameters Code		Parameters Function	Range	Pre.setting	Description
P + POWER..ON	112	WMD	Wiper function related to full-heeling pedal	W/O/A	W	W : Regular wiper function (active 1 time when full heeling back after sewing) O : Wiper works at each full heeling back (unlimited) A : Wiper works only the pedal is kept full heeling back . Wiper turn off when the pedal return to neutral. Note : Wiper on time controlled by the 【093. W2】.
	113	DEG	Needle DOWN position stop angle	5 - 180 degrees	12	Adjust the needle down stop position.
	114	UEG	Needle UP position stop angle	5 - 180 degrees	12	Adjust the needle up stop position.
	115	PMD	Power on display condition	ON/OFF	OFF	Power on display condition selection. ON：When power switch turned on, the panel displays previous condition. (Keep previous condition). OFF：When power switch turned on, the panel displays normal mode.
	116	DRU	Reverse angles through Needle down and up	1 - 360 degrees	180	Valid only when 【078. TRM】=『RK』mode Motor reverses from needle down, and stops at the needle upper dead point.
	117	ER	Error code display	10 SETS	-	Error code history display , total 10 events can be memorized.
	118	NOS	Converting to a clutch motor selection	ON/OFF	OFF	ON：Without the synchronizer , motor is running as a clutch motor and stops at random position. OFF：With synchronizer .
	119	DD	Direct drive or belt drive	ON/OFF	OFF	ON：Direct drive. OFF：Belt drive.
	120	FHM	Mode selection for full-heeling after power on or trimming	FU/NU/NO/NUF/EFF	FU	F U : Regular operation -- full heeling for trimming and foot lifting. N U : Full heeling for up needle. N O : No foot lifting function. NUF : Full heeling for foot lifting and up needle. EFF : Full heeling for foot lifting and running at low speed.
	121	ANU	Needle goes up as power turned ON	ON/OFF	OFF	O N : Automatic needle UP at power on. OFF : Function invalid.
	122	HL	Upper limit of maximum speed	50 - 9999 spm	4500	The motor's maximum speed setting.

7-Segment Display Characters Compare Chart :

Arabic Numerals

Actual Numbers	0	1	2	3	4	5	6	7	8	9
Display Numbers										

English Alphabet

Actual Alphabet	A	B	C	D	E	F	G	H	I	J
Display Alphabet										
Actual Alphabet	K	L	M	N	O	P	Q	R	S	T
Display Alphabet										
Actual Alphabet	U	V	W	X	Y	Z				
Display Alphabet