



BECS-C19

(For Chenille/Looping Embroidery)

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OWNER'S MANUAL

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1 Introduction of Functions

- ◇ Looping Functions: Compared with the ordinary embroidery type, looping is a new embroidery type, which uses each single loop as a unit. Each independent loop combines together to form the stitch form. This kind of embroidery features the strong 3D effect.
- ◇ Chain-stitch Functions: Using a single loop as a unit, chain-stitch embroidery creates the stitch form with the loops linking like a chain.
- ◇ Functions of thread-breakage detection for looping, automatic mending and head-locking.
- ◇ Automatic or manual shift between lockstitch head and looping head.
- ◇ Automatic shift between the looping and chain-stitch embroidery
- ◇ Auto adjustment on height of needle at looping head
- ◇ Automatic trimming in looping embroidery
- ◇ Before moving the frame manually, the looping head will lift needle to the escaping position; just before the embroidery, the looping head will release the needle
- ◇ Automatic shift of hooks to change color in looping embroidery.
- ◇ Manual functions of each mechanical part of looping

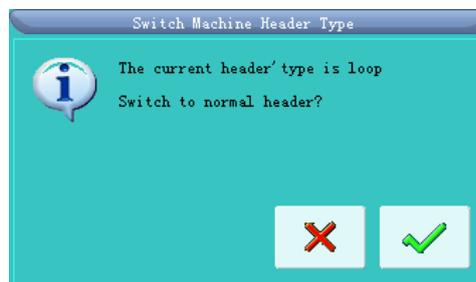
2 Shift between Looping Head & Lockstitch Head

2.1 Shift of Head

According to the specific requirement on the embroidery, user can shift between the looping head and lockstitch head freely; therefore the user could perform the operations after having selected the proper head.

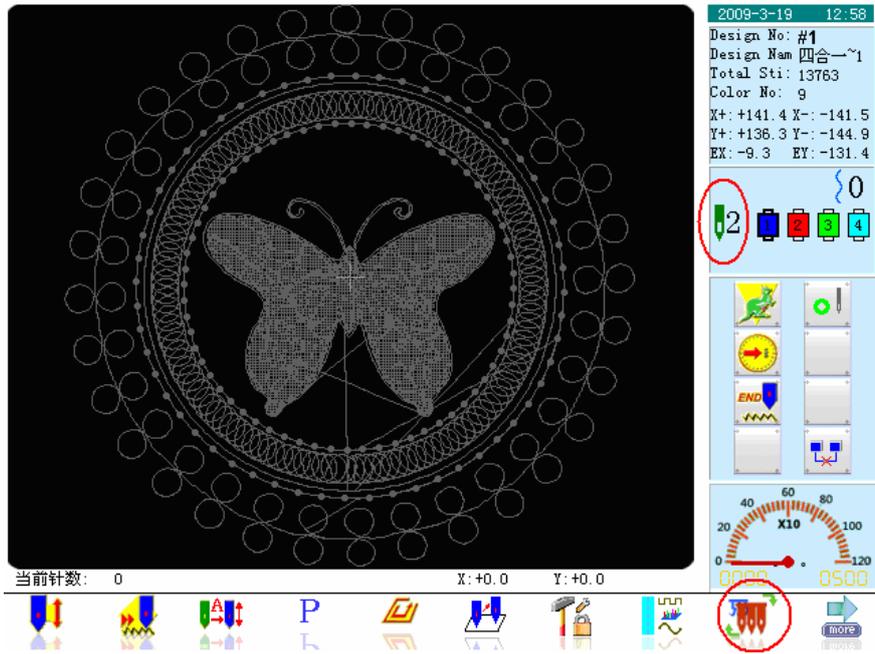
◆ Operational Procedures:

- (1) At the stop status in the main interface, press  (when the existing head is looping head) or  (when the existing head is lockstitch head) to have access to the interface for changing color and switching head manually, as shown in the picture:

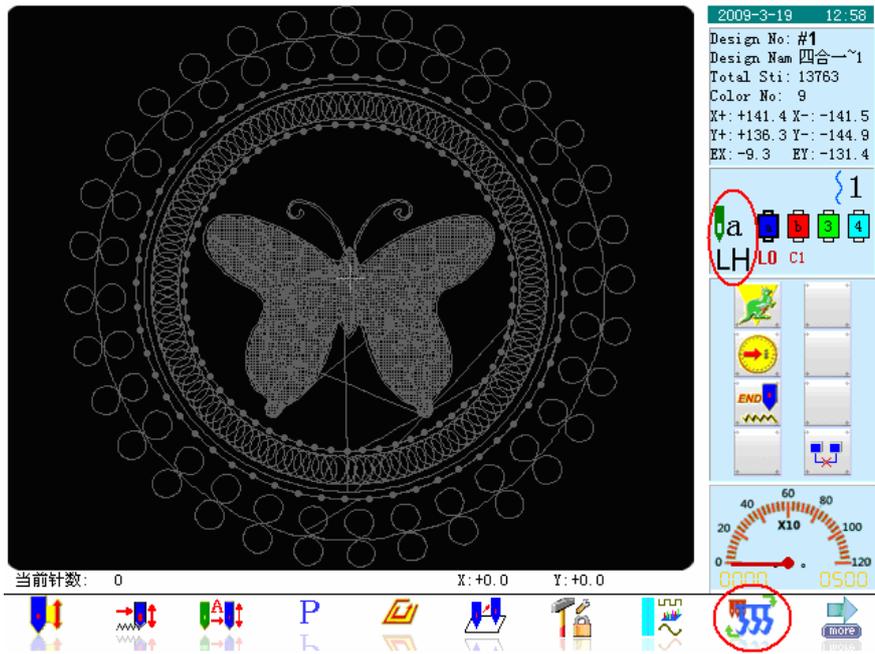


- (2) According to the type of the existing head, the system will ask the user whether to shift from lockstitch head to looping head or to shift from looping head to lockstitch head.
- (3) Press “Enter” to let machine shift the head. At last, on the main interface, if the head shift button is displayed as  and the looping indicator is on, it means the looping head is the working head now; if the head shift button is displayed as , that means the system has shifted to lockstitch head.
- (4) Use number keys to change color manually. When the existing head is looping head, “1” is hook position a; “2” is hook position b, “3” is hook position c....
- (5) When the existing head is looping head, pressing the “number” keys will activate the window for selecting the looping mode and needle rod height. Use the “Left” and “Right” keys on keyboard to shift between the looping stitch form and chain-stitch sewing form. Use the “Up” and “Down” to change the height of needle, thus to adjust the effect of embroidery. The figures from 0~9 are representing the different needle heights for 10 levels, H is the escaping position, which is able to realize the function of turning off the entire heads.
- (6) After pressing “Enter” for quit, the embroidery will make corresponding adjustments according to the selected values of hook position, stitch form type and looping needle height.

2.2 Introduce to Main Interface in Looping Status



The above figure is the main interface after shifting to lockstitch head.



The above figure is the main interface after shifting to looping head.

There are some difference between the main interface of looping head and the interface of lockstitch head:

- (1) **a** is the existing hook position, a means the existing hook position is “a”;
- (2) **1** is the thread-loosing position: 1 is the thread-tightening at upper position of hook. For the meaning of numbers, please refer to “Thread-loosing Position Adjustment” in “Manual Debugging”;
- (3) **LH** is the type of stitch from. The “L” is looping; “H” means the needle is at the escaping position



“H”;

- (4)  is color-changing sequence table, and there are three items in each group, which are hook position: a; Stitch form type: L and needle height: 0.

3 Embroidery Procedure for Looping

- (1) Input the looping pattern, and then perform the selection, changes and edition of the pattern according to needs;
- (2) Modify the relating parameter and select the color-changing sequence to set the type of looping stitch form and the needle height; in manual color-changing, please manually select the hook position, stitch form type (looping or chain-stitch embroidery) and needle height;
- (3) Check the looping head, and make sure it is working;
- (4) Pull the bar for embroidery.

4 Relevant Parameters & Their Setting Methods

Press  in the main interface for setting parameter. Then press the icon at right down corner to select the type of parameters. When the icon displays  select parameters type Chain/Loop, the system will be ready for setting the looping parameters.

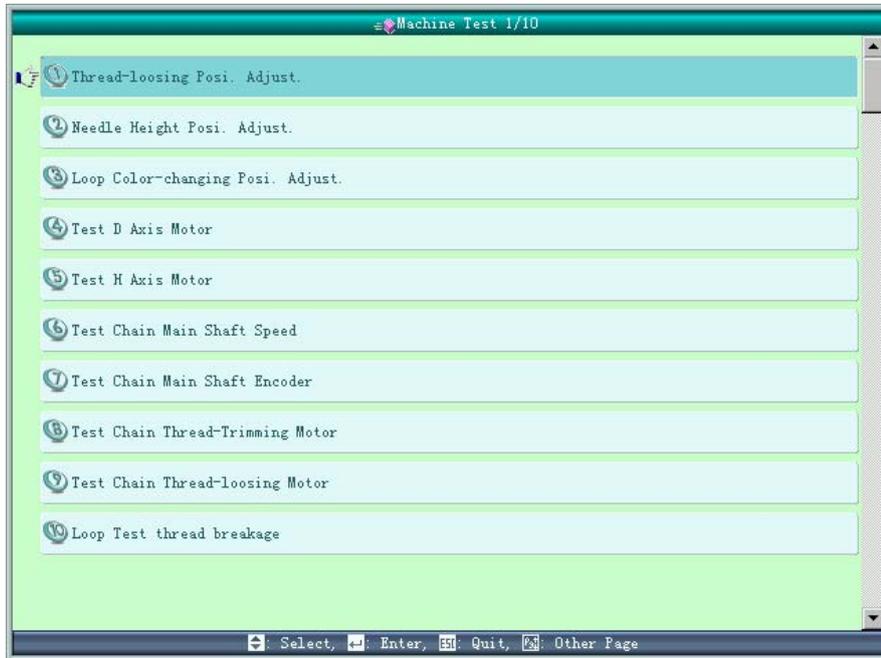
- (1) F21 Looping head hook number: select the number of hooks on each single head according to the mechanical configuration. The position of hook is displayed with a, b, c, d....
- (2) F01 Jump Trimming: it could be set as: No, 1~7. For “No”, the jumping code will be handled as skipping stitch, which is the combination of the following actions: automatic stop, thread-loosing, frame-moving and re-starting. For “Yes”, if the continuous skipping stitch number in pattern is below the set value, the system will make the head jump without trimming the thread; if that stitch number is no less than the set value, the system will handle the jumping code as over-frame, which is the combination of the following actions: automatic stop, thread-trimming, frame-moving and re-starting.
- (3) F08 set stitch number of looping: Range of it is from 0 to 7. At looping embroidery, in order to avoid the thread dropping, the system transfers the last several stitches from looping to chain-stitch. This parameter is set the number of the stitches transferred.
- (4) F07 Thrum Management after Trimming: this kind management contains: Simple management, management at fabric obverse side and management at fabric reverse side. The management at fabric obverse side is to prevent the thrum from dropping.
- (5) Types of thread-loosing: They include the md02 Type, 2003 Type and E937 Type. Users can select it according to the types of the thread-loosing driver.
- (6) Thrum Management at Trimming and Color-changing: this parameter shall be cooperated with the “Thrum Management after Trimming”. If this parameter is set as “Yes”, the system will treat this parameter in the way of the previous one, say F07.
- (7) F48 Heads Interval between Lockstitch and Looping: The range of it is -600~600; and the unit is mm. It shall be set according to the actual head distance of mechanism. If the looping head locates at the left side of the lockstitch head, the system will deem it as negative figure; if the looping head is at the right of the lockstitch head, the system will deem its figure at positive.
- (8) F19 Stop Position Compensation: The looping main-shaft, a main-shaft system independent from the lockstitch main-shaft, stops at 35°. User can slightly adjust the stop position of the main-shaft by adjusting this parameter so that it could remove the improper stop position caused by the mechanical inertia. When enlarging the compensation value, the system will move the stop angle backwardly. User can select the value from 0 to 6 according to the actual stop position of each machine. 0 is the initial stop position.
- (9) F25 Looping thread-trimming:

The selectable value: Manual, Automatic, Off. At color-changing, over-frame or other operation at embroidery or upon the end of embroidery, the system will determinate the thread-trimming method for looping according to the setting of user.

◆ **Remarks: For more, please refer to Appendix 2**

5 Machine Test

In the stop statues, press (when the existing head is looping head) or (when existing head is lockstitch head) at main interface to have access to the interface for shifting the heads and switch the head to looping head. When the “Head Shift” is displayed as , please return to main interface and press . Click the “Relating mechanical test” in the “other assistant management” to activate the items for manual looping debugging, as shown in the picture:



5.1 Thread-loosing Position Adjustment

In this item, user can manually adjust the position of thread-loosing motor, as well as thread-loosing speed. When the thread-loosing position is abnormal, user can move the red icon with the “Left” & “Right” on the keyboard. After “ ” is displayed, user can use the “Up” and “Down” keys to adjust the motor slightly so as to meet the requirements of system. This system uses the changes on resistor value of single-round precise rheostat to judge whether the existing thread-loosing position is correct. User needs to adjust the rheostat value to make the thread-loosing motor go down at the right position.



The thread-loosing position divides into 4 levels (0,1,2,3); respectively, they are corresponding to 4 status which are hook down thread-tightening, hook down thread-loosing, hook upper thread-tightening and hook

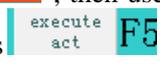
upper thread-loosing. Level 3 is for looping embroidery; level 2 is for chain-stitch; level 0 is for releasing knife at thread-trimming. For color-changing, both level 1 and level 0 will do.

5.2 Needle Height Position Adjustment



Users can use this function to adjust the height of needle according to the standard of embroidery products, while repairmen can use this function to have aging operation on the needle raise mechanism.

◆ Operation:

- (1) Use the “Left” and “Right” to move the red icon to the left down corner “”, then use the “Up” and “Down” button to select the wanted needle height position, press  for performance;
- (2) The repair person can use “” to start the aging operation of needle raise mechanism; press “ESC” for quit.

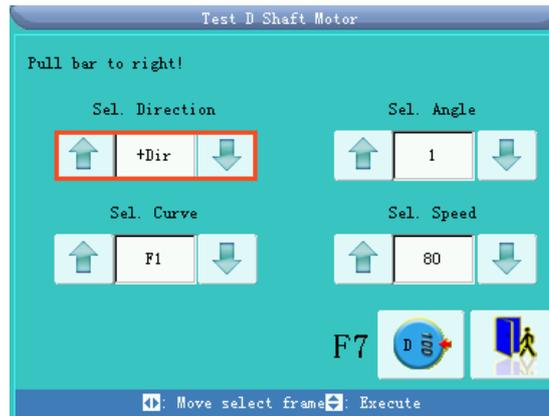
5.3 Adjustment of Color Position

According to the changes on the resister value of the single-round precise rheostat, this system is able to judge whether the existing color-changing position is proper. Use “Left” and “Right” button to move the red icon to , then use the “Up” and “Down” buttons on keyboard to realize the switch among this three function:

- (1) Select the expected hook position in the pull-down menu of “Position” to change the color manually;
- (2) Adjust the color-changing speed;
- (3) Adjust the value of rheostat so as to make the hook return to the correct position;
- (4) Adjust the rheostat value corresponding to different hook positions.



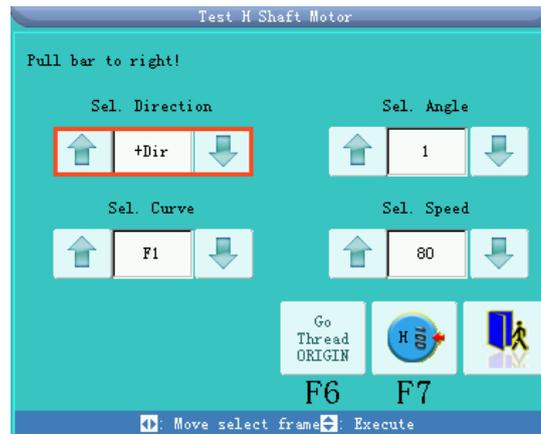
5.4 Test D Shaft Motor



◆ Operation:

- (1) Press “Left” & “Right” to move the red icon to the , then use “Up” and “Down” buttons to adjust the following values, such as direction, angle, curve and speed. After that, pull the bar to right for testing;
- (2) Press  to return to origin;
- (3) Press “ESC” on keyboard for quit.

5.5 Test H shaft Motor



◆ Operation:

- (1) Press “Left” & “Right” to move the red icon to the , then use “Up” and “Down” buttons to adjust the following values, such as direction, angle, curve and speed. After that, pull the bar to right for testing;

- (2) Press  to return to origin; press  to enable H axis return to threading point;
- (3) Press “ESC” on keyboard for quit.

5.6 Test Chain Main-shaft

It is same to that in Lockstitch part.

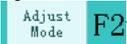
5.7 Test Chain Main-shaft Encoder

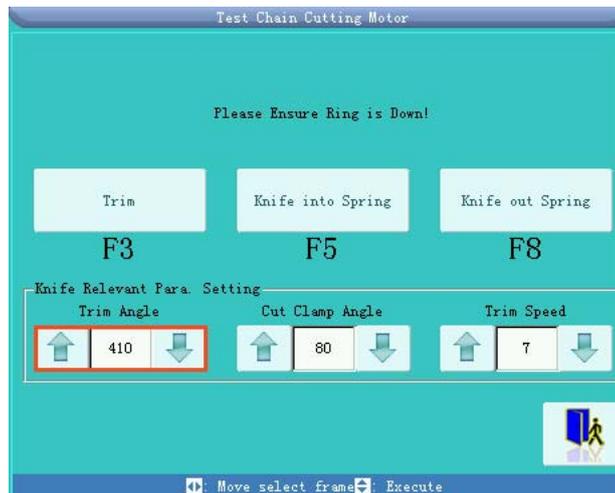
It is same to that in Lockstitch part.

5.8 Test Chain Cutting Motor



Operation: Press “Left” & “Right” to move the red icon to the , then use “Up” and “Down” buttons to adjust the Trim Angle and Trim Speed. After that, pull the bar to right for trimming action

Press  F2 to activate the following interface:



◆ Operation:

- (1) Lower the hook to down position;
- (2) Press the corresponding figures to test the actions of Trim, Knife into Spring and Knife out Spring;
- (3) Press “Left” & “Right” to move the red icon to the , then use “Up” and “Down” buttons to adjust the Trim Angle, Cut Clamp Angle and Trim Speed.

5.9 Test Thread Breakage

This function is to test whether the thread-breakage detection device for looping head is correctly installed and sensitive.



◆ Operation:

- (1) In manual operation interface, click “ Loop Test thread breakage ” to activate the interface for testing thread-breakage detection as shown in above.
- (2) At this time, looping head indicator shall shift between “Red” and “Green” in certain frequency, or it means that the installations of head thread-breakage detection proximity switch and spring are wrong. The adjustment is required in that circumstance.

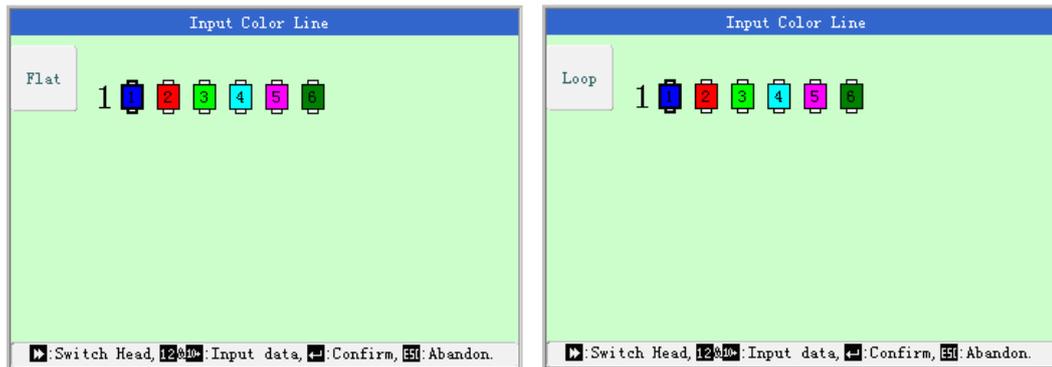
6 Loop Manual Operation



Shift the existing head to looping head, that is to say to make the figure of “Head Shift” become  . Press  to select the corresponding items for manual operation in the interface of “Assistan Emb Operation”. It is easy for user to adjust the mechanical position of looping head during the embroidery and to turn off the troubled heads.

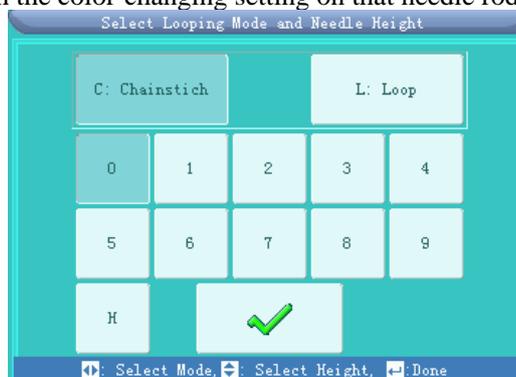
7 Modification Color-changing Sequence

When setting color-changing sequence before embroidery, users can make automatic shift with the function of color-changing needle position setting. Press  in the main interface, select “Input and repeat color line” or “Modify color line” to have access to the interface of “Input Color Line”:

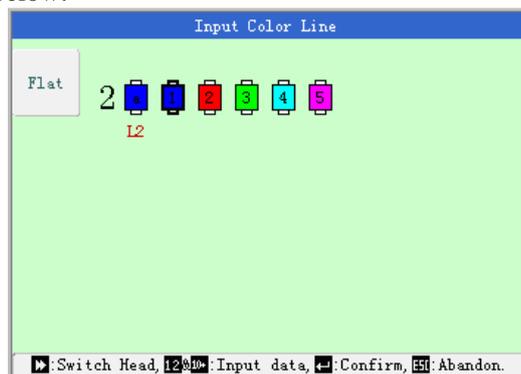


Use “Frame-moving” button on keyboard to shift the heads between looping head and lockstitch head corresponding to the existing needle rod. When it is set as lockstitch head (left upper corner displays Flat), the setting of color-changing is same to that of lockstitch machine. When it is set as looping head (the upper left corner displays Loop), button “1” on keyboard is for hook position a; button “2” on keyboard is for hook position b; button “3” on keyboard is for hook position c.....

For Loop head, after the setting of the hook position needed in the embroidery, the interface of “Select Looping Mode and Needle Height” is activated so as to select the type of stitch form and needle height. After that setting, press “OK” to finish the color-changing setting on that needle rod.



After setting the color-changing sequence and finishing the looping embroidery mode, the made setting will be displayed, as shown in below:



The automatic color-changing of looping consists of 3 parts: hook position, type of stitch form and needle height. In the above picture, the letter “a” is position of hook; letter “C” is for chain-stitch while “L” is for looping, and the number “2” is the needle height

During the embroidery, system will shift between lockstitch head and looping head according to the setting of Color Line. At the shifting, the system will automatically adjust the head distance, the needed head will be automatically shifted to continue the working.

8 Manual Operation of Looping Head Switch

- ◆ Manual operation looping head switch:



- (1) Pull the head switch to the middle position, and then the green head indicator is on. At this time, the looping head is in the status of normal embroidery;
- (2) Pull the head switch to the down position, and then the head indicator is off. At this time, the needle is rising to the escaping position, and the head is off.
- (3) Pull the head upwardly, and then the red head indicator is on. At this time, the looping head is in the status of mending.

After the thread-breakage or turning on the red indicator manually, the looping devices at entire heads will be lifted when user pulls the bar to let machine return for mending; then the machine will stop falling back at the mending point. When user pulls the bar again, the looping device of the head for mending will go down firstly and begins to patch until it reaches the thread-breakage point. At this time, other looping devices on idle heads (those are not working in mending) will automatically go down and work normally. The stitch number of auto-return at thread-breakage can be set in the parameter setting menu of looping.

9 Mechanical Action Devices & Their Driving Methods of Looping Models

Except the motors controlling the main-shaft and frame, the looping system also includes various kinds of mechanisms in performing the looping embroidery together, such as Z axis motor for controlling the needle height, thread-trimming motor, H axis motor for looping, D axis motor for controlling the directions of crochet and the thread-loosing motor controlling the position of loosing thread. Among them, except that the thread-loosing motor is collectively controlled by the transfer board, others are independently controlled by the looping drive board. The setting methods of the looping drive board EF297 are shown in the table below:

Definitions of DIP Switch on Looping Drive Board EF297:

Table 1:

DIP1~DIP4	Have no influence on the looping address, please put them at OFF
DIP9~DIP5	Binary System Code, Set Value: N=00001~11111. The control address is 2N-1, 2N is two looping heads. OFF is high electrical level 1; ON is low electrical level 0

Table 2:

DIP10	The definitions are different between upper head board and down head board.
OFF	Upper head board: control needle height position, D axis motor, head indicator and switches.
ON	Down head board: control thread-trimming motor, H axis motor, thread-breakage detection.

Semi-independent models are divided into two types:

1、 Except that the H axis motor and trimmer motor are collectively controlled by the transfer board, the D axis and the needle height adjustment devices are controlled by the looping drive board independently. For the setting method of the looping drive board EF297A, please refer to the above table.

2、 Except the H axis motor that is controlled by the transfer board collectively, the D axis and needle height adjustment devices are independently controlled by the looping drive board. The method for setting looping drive board EF297 is shown in the above table. And the trimmer part is independently controlled by the board EF298, whose setting method is shown in the following table:

Table 1:

DIP1~DIP4	They have no effect to the address of looping and are set at "OFF".
DIP9~DIP5	Binary Code Setting: The set value: N = 00001~11111; control address: 2N-1; 2N means two looping head. The "OFF" means high electrical level 1; "ON" means the low electrical level 0.

Table 2:

DIP10	Activate the Upper/ Down head board
OFF	Upper head board, control the needle height position, head light and switches
ON	Down head board, control thread-trimming motor and thread-breakage detection function



Appendix 1 Parameters at Looping Embroidery

Emb. asset. Para				
F08	Lock Sti.Num. at Loop	3	0 Stitch~7 Stitches	At looping embroidery, in order to prevent the thread from falling, the user can turn the last several stitches into the chain-stitch stitch form. This parameter is to set the number of stitches turned.
F11	Long Sti. Divide	0	0 Stitch~11 Stitches	At embroidery, if the stitch step is too long, the main speed of embroidery machine will be lowered. The larger the stitch length is, the lower the speed will be. With the Long Stitch Divide, user can divide the long stitch which is longer than or as long as the set value into 2 stitches or multi-stitches according to this parameter.
F12	H Axis To Origin at Stop	Yes	Yes,No	This parameter is used to determine the system to return the ring to the original when user pulls the bar for stop at embroidery.
F24	Shaft Agl. in H.Spd Loop	3	0~9	Adjust the order of motion; it will have the influence on the quality of embroidery.
F34	OutLine Emb. Mode	No.	Yes,No	This function is to create the outline to the normal pattern. Users can select this outline pattern to perform the embroidery which is easy for eyeleting and embroidering the boundary. If user activates this function, the system will not perform the thread-breakage detecting during the embroidery (the thread-breaking detection will be covered by the upper machine.)
F43	Shaft Agl. in Low Spd Loop	0	0~9	This parameter is to adjust the quality of low speed embroidery product.
F49	D Shaft Start Angle	5	0~15	This parameter is used to determine to start angle of the D axis.
F50	H Shaft Initial Offset Agl.	50	0~90	This parameter is used to adjust the original angle of looping.
F60	Shake Angle	2	0~5	Change the shake loop angle value
F61	Shake Speed	1	0~10	During the color-changing of looping, in order to allow the ring to fall smoothly, the H axis motor will shake within a small swing. This parameter is used to adjust the swing.
Break detect Para				
F02	T. B. Detect	Yes	No, Yes	When it is set at "Yes", the machine is able to detect the thread breakage at the working heads. If detecting, the system will let the head indicator for thread breakage on and stop the machine.
F03	Patch Permit	Yes	No, Yes	If it is at "NO", the parameter "T. Broken



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				Back Sti” will be deemed invalid with remark: Back Not Permitted.
F04	Back Sti. At T.B	0	0 stitches ~8 stitches	Easy for patching
F05	All Head Patch	No	No, Yes	When it is set at “NO”, only the head with thread-breakage begin to patch; when it is set at “Yes”, the entire working heads will begin to patch at mending.
F06	Patch Sti. Num.	0 Stitches	0 Stitch ~7 Stitch	At the beginning of patch, only the pointed head will perform the patching. When the head works to the position with the set stitches from the thread-breakage point, the entire head will begin to work, thus to avoid the influence on the quality of embroidery caused by thread breakage.
F09	Thread Posi. Af. T.B	Thread Pos	No, Yes	The threading position is to set for providing convenient at re-threading after thread-breakage. This parameter allows the threading hole on ring to align the thread hole on the needle sheet, thus it is able to thread quickly.
F15	Sti. not T.B.D at Start	3	0 stitch ~15 stitches	This parameter is used to set the stitch number before start-up of the thread breakage detecting.
F41	T.B.D Mode in Looping	Up header	Upper head board, Down head board, EF196,EF102	It is used to set the thread-breakage detection mode for the looping.
Frame Para				
F14	Frame 1 Sti. at start	Never	No Over Frame, After Pull Bar, All Over Frame, After Over Frame	
F23	Chain. Frame Moving Angle	3	0~10	Adjust the order of action, improve the quality of embroidery
F80	M.Shift Agl. At Frm Move	2	0~10	Adjustment on this parameter will reduce the happening of cloth-holding in stitch form of looping
F47	Frame Moving Speed Curve	0	0、1、2	Select the curve of frame-moving in looping
Main shaft Para				
F17	Slow Emb.Sti.Num.	3	1~9 Stitches	Set the number of stitch moving in the “M. Shaft Slow Speed” at the start of embroidery
F18	Max. Speed	500rpm	500~650rpm	Set the maximum speed of main shaft at embroidery. Unit for Adjusting: 50rpm
F19	Stop Posi. Adj.	0	0~6	The parameter “0” represents the earliest stop position. By changing this parameter, user can slightly adjust the stop position of the main shaft and eliminate the error in stop position which is usually caused by the mechanical inertia. As this compensation value is increasing, the angle of stop is becoming backward correspondingly. The user can select the



				value between 0~6 in accordance with whether the stop position is over the angle of stop.
F20	Speed Comp Ratio of Shaft	0%	-15%~15%	Adjustment on this parameter can keep the actual speed same to the set one via the adjustment of software. This parameter is only effective to the Dahao Servo Driver.
F35	Shaft Low Speed	80	80~150	Adjustment on this parameter can determine the slow speed of the main shaft at pulling bar for main shaft operation. Unit for Adjusting: 10rpm
F39	Start Acceleration Sti	5	1~10	The acceleration of main shaft after the startup. The larger the parameter is, the faster the speed increases.
F40	Main Motor Para	0	0~30	For each one added at the parameter, the time for break increases 50ms.
F42	Prebrake Angle	0	0~150	Applicable to the model whose looping device using the general position servo. The default parameter for angle of main shaft for pre-brake is 0, corresponding angle at 335°; For each adding at 1 to the parameter, the pre-break angle will become 0.18° smaller. The smaller angle of pre-break angle is, the more reliable the break of the main shaft will be, but the efficiency will be lower as well.
F62	Adj. Ring Rotation Agl.	2	0~10	Increasing this parameter will improve the quality of stitch form, but it will also increase the risk of over-current on H axis motor.
F63	H Shaft Wind Action adj.	3	0~10	
F64	H Shaft Thread Return Adj.	3	0~10	
F65	Spd Down At Turn	5	1~9,No	
Sequin para (reserved for chain sequin)				
F79	Seq. Mode	Roller	Roller,Lever	Select the mode of chain sequin
F80	Seq.Emb.Auto start	No	Yes,No	Set the chain sequin emb auto start or not
F81	Seq.Agl.	13.5	5.4~36	Set the angle of drive sequin
Thread trimming Para1				
F01	Jump & Trim	7 Jump	1~7 Stitches Trim, Not Trim	1. If it is set at No: when encountering needle jumping code at embroidery, the system will send the order for needle jumping, which is to perform the following actions: automatic stop, thread losing, frame moving and start again; 2. When it is set at Yes: a. if the number of continuous needle jumping is less than the set value, the system will only give the order for jumping and the thread will not be trimmed; b. if that number is larger than or same to the set value, when encountering the needle jumping code, the system will treat as over-frame, which will lead to the following actions: automatic stop, thread



				trimming, frame moving and start again.
F07	Action Af. Trim	Cloth Uper	Cloth Upper, Cloth Down, Simple	Keep the thrum at the upper surface of cloth so as to prevent the thread from loosing
F13	Action Af. Change Color	yes	NO, Yes	This parameter is cooperated with the "Thrum Af Trimming". If this parameter is set as "Yes", the treatment will be done as the setting of previous parameter.
F25	Do Trim in Looping	Auto	Auto, Manual, Close	When encountering the operations like color-changing and over-frame, as well as at the stop of the embroidery, the machine can decide the trimming mode of looping embroidery according to the setting from user.
Machine Mainten Para 1				
F21	Hook Num.Color Num.per Head	6	1~12	Select the number of rings on each single head according to the mechanical package
F22	Hook Head Num.	10	1~24	Decide he number of head in system according to the mechanical package
F26	Chain Head Board	XXX1	XXX1, XXX2	
F36	Head Adj. Value	100	0~250	Mainly used in assembling or debugging machine, this parameter is the basic value to determine whether the needle height is right.
F37	Rheo. Value at Head Off	138	138~250	This parameter is used for the head with the needs to set the head safe position.
F38	Thread Loosing Mode	MD02	MD02, E937, 2003	This parameter is relating to the input signal of the thread-loosing driver. The signal for BBQ2003 is the double-pulse input while the signal for E937 is the single-pulse input.
F48	Head Dist.(Loop to Flat)	-330.0	-600.0~600.0	This parameter determines the distance of frame for moving at the shift between the flat embroidery head and looping embroidery head. The parameter is decided by the actual status of machine.
F90	Loop DIP1			Reserved
F91	Loop DIP2			Reserved
F92	Loop DIP3			Reserved
Machine Mainten Para 2				
F93	Loop DIP4			Reserved
F94	Lock Loop Shaft	Yes	Yes, No	lock the shaft at stop state or not (for dahao servo)
F95	Loop AC change color box position	Left	Left, Right	Set the Loop AC change color box position
Relating Para. of Blowing Action				
F66	Looping Stop Lap Number	3	1~6	
F67	Valve Blow Interval Time	15	0~200	
F68	Looping Valve Blow Lasting Time	15	1~50	



Appendix 2 Table of Error

Code of Error	Content of Error
500	D motor action overtime
501	D motor over current
502	H motor action overtime
503	H motor over current
504	Cut motor action Overtime
505	Head height motor action overtime
506	Head height motor action over permit span
507	Cut not in original
508	D motor no message back
541	H motor no message back
542	Cut motor no message back
543	Head height motor no message back
544	Up head board no message back
545	Down head board no message back
546	Shake h motor no message back
547	Get Color position value over time
548	Get loose thread position value over time
549	Head height position value over time
551	Knife Return to Origin Overtime
552	Shuttle is not in correct color position
553	Loose thread motor not in correct position
554	Needle Height Differ
555	Loop change color motor timeout
556	Loop half rotation abnormal
557	The Current Needle position is not Loop
558	D motor action overtime
559	D motor over current
600	H motor action overtime