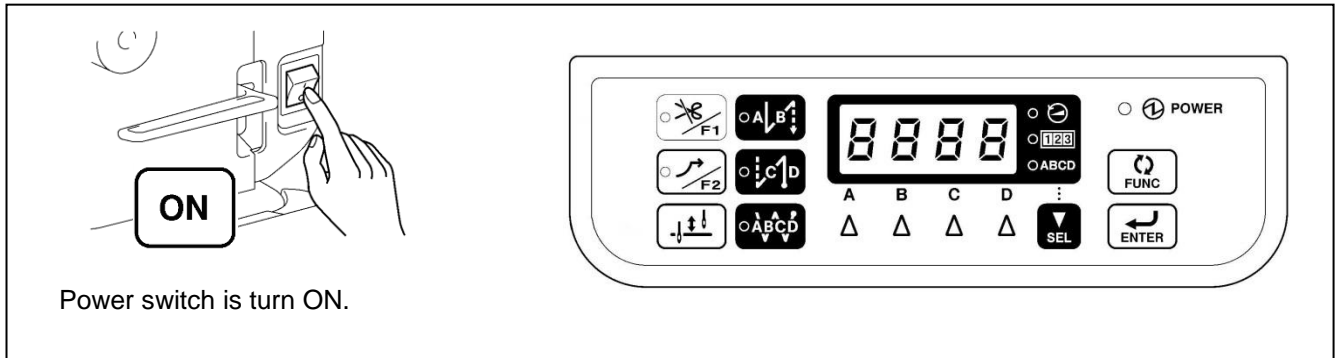
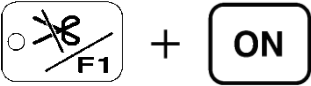
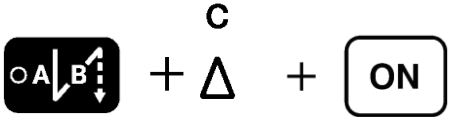

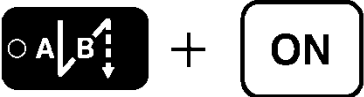

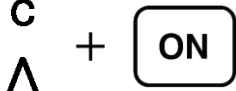

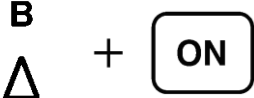
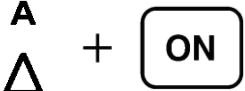




# 1. List of special function when power is turned on

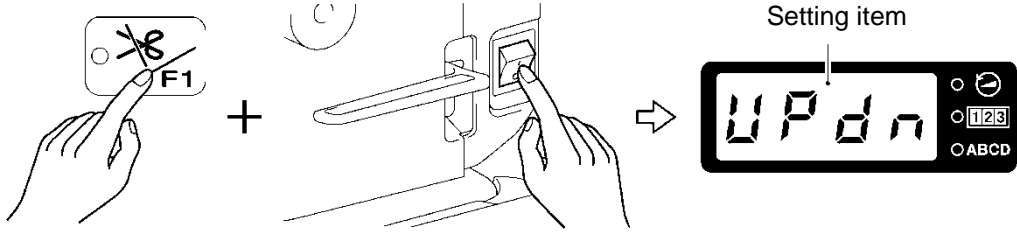
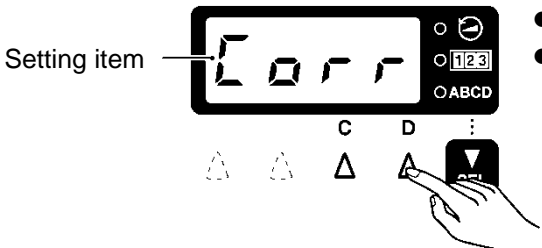
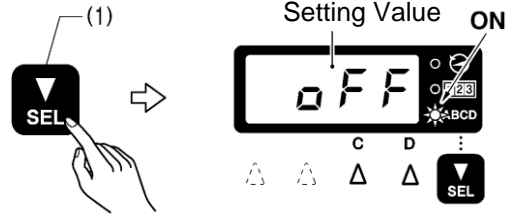
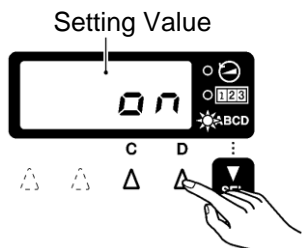
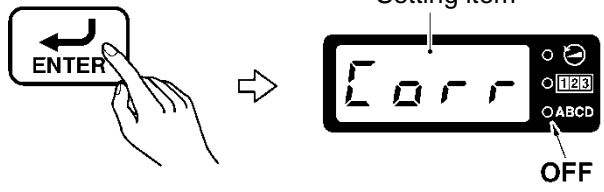

This section contains a list of functions and setting method for entering each function.



<p><b>1</b> Standard function setting mode</p>  <p>(Refer to 2-1 standard function setting.)</p>	<p><b>7</b> Protect setting mode [SW1: center position]</p>  <p>(Refer to 2-7 protect setting)</p>
<p><b>2</b> Memory switch setting mode</p>  <p>(Refer to 2-2 memory switch setting.)</p>	<p><b>8</b> Software version display function</p>  <p>(Refer to 2-8 software version display)</p>
<p><b>3</b> Data initialization function</p>  <p>(Refer to 2-3 data initialization.)</p>	<p><b>9</b> Treadle position adjusting mode [SW1: center position]</p>  <p>(Refer to 4 treadle stroke adjustment)</p>
<p><b>4</b> Error log display function</p>  <p>(Refer 2-4 error log display)</p>	<p><b>10</b> Motor reference position adjustment</p>  <p>(Refer to 2-10 motor reference position adjustment)</p>
<p><b>5</b> Input checking function</p>  <p>(Refer to 2-5 input checking)</p>	<p><b>11</b> Maintenance information viewing mode</p>  <p>(Refer to viewing of maintenance information)</p>
<p><b>6</b> Output checking function</p>  <p>(Refer to 2-6 output checking)</p>	

## 2. Setting for each function (Operation panel)

### 2-1. Standard function setting

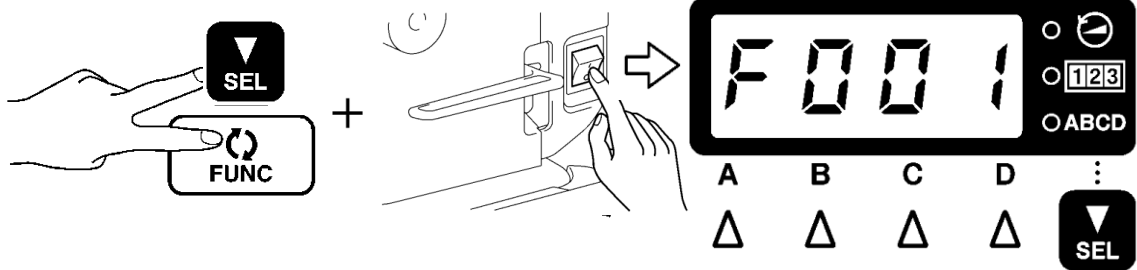
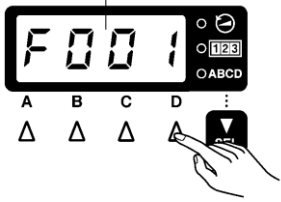
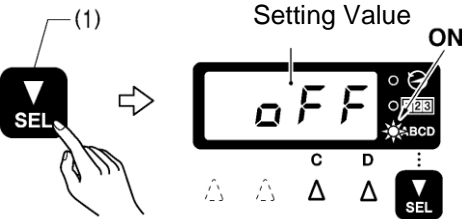
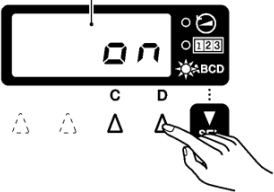

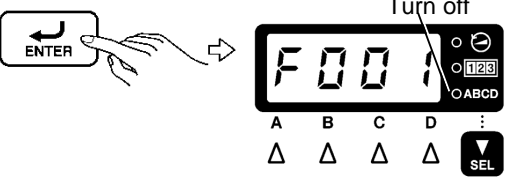

1	<p><b>Entering to standard function setting mode</b></p>  <p>(Pressing thread trimmer disable/F1 key, turn power on.)</p>
2	<p><b>Select setting item</b> (Refer to setting item list on next page)</p>  <ul style="list-style-type: none"> <li>● Press D△ key appear following setting item.</li> <li>● Press C△ key appear previous setting item.</li> </ul>
3	<p><b>Change to setting value display</b></p> 
4	<p><b>Change setting value</b></p>  <ul style="list-style-type: none"> <li>● When setting value is different with previous one, setting value will be blinking.</li> </ul> <p><b>[NOTE]</b> When SEL key (1) press again, display return back to setting item.</p>
5	<p><b>Confirm of setting value</b></p> 
6	<p>To set other items, repeat above procedures 2 to 5 and change the settings.</p>
7	 <p>Standard function setting mode will be ending, return to normal sewing condition.</p>

## 2. Setting for each function (Operation panel)

### <Setting Item List>

Setting item	Display		Setting value or function for setting was changed.	Default setting
	Setting item display	Setting value display		
Needle up/down stop	[UPDN]	[ UP]	Needle up stop	[ DN]
		[ DN]	Needle down stop	
Correction sewing	[CORR]	[ ON]	Correction sewing	[ OFF]
		[ OFF]	Disable of correction sewing	
Slow start	[SLOW]	[ ON]	With slow start	[ OFF]
		[ OFF]	No slow start	
Thread trimming disable	[TRDI]	[ ON]	Thread trimming disabled	[ OFF]
		[ OFF]	Thread trimming enabled	
Thread wiper	[ WIP]	[ ON]	Thread wiper enabled	[ ON]
		[ OFF]	No thread wiper function	
Brightness of LED lamp	[LAMP]	[ OFF]/ [ 1] - [ 6]	OFF : Not use 1 (Dark) ←→ 6 (Bright)	[ 6]

## 2-2 Memory switch setting method

<p><b>1</b></p>	<p><b>Entering memory switch setting mode</b></p>  <p>(Pressing "SEL" &amp; "FUNC" key together, turn power on.)</p> <p>Memory switch number automatically appears the last memory switch has been changed.</p>
<p><b>2</b></p>	<p><b>Select memory switch number</b></p> <p>Memory switch number</p>  <ul style="list-style-type: none"> <li>● Press D△ key appear following setting item.</li> <li>● Press C△ key appear previous setting item.</li> <li>● Press A△ or B△ key search memory switch number different one from default setting.</li> </ul> <p>When Press B△ key number appear forward one and press A△ key will be backward one.</p>
<p><b>3</b></p>	<p><b>Change to setting value display</b></p>  <p>[NOTE]</p> <p>When SEL key (1) press again, ABCD indicator lit off and display return back to memory switch number.</p>
<p><b>4</b></p>	<p><b>Change setting value</b></p> <p>Setting Value</p>  <ul style="list-style-type: none"> <li>● Press D△ key setting value will be increased.</li> <li>● Press C△ key setting value will be decreased.</li> <li>● When setting value is different with previous one, setting value will be blinking.</li> <li>● If you want to back default value, press  key.</li> </ul>
<p><b>5</b></p>	<p><b>Confirming of setting change</b></p>  <p>ABCD indicator turned off and display change to memory switch number appearance.</p> <p>[NOTE]</p> <p>The changed setting will be enabled after memory switch setting mode has been exited.</p>
<p><b>6</b></p>	<p>To set other items, repeat above procedures 2 to 5 and change the settings.</p>
<p><b>7</b></p>	 <p>Return back to normal sewing condition</p>

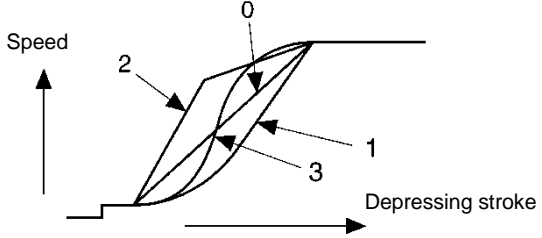
## 2. Setting for each function (Operation panel)

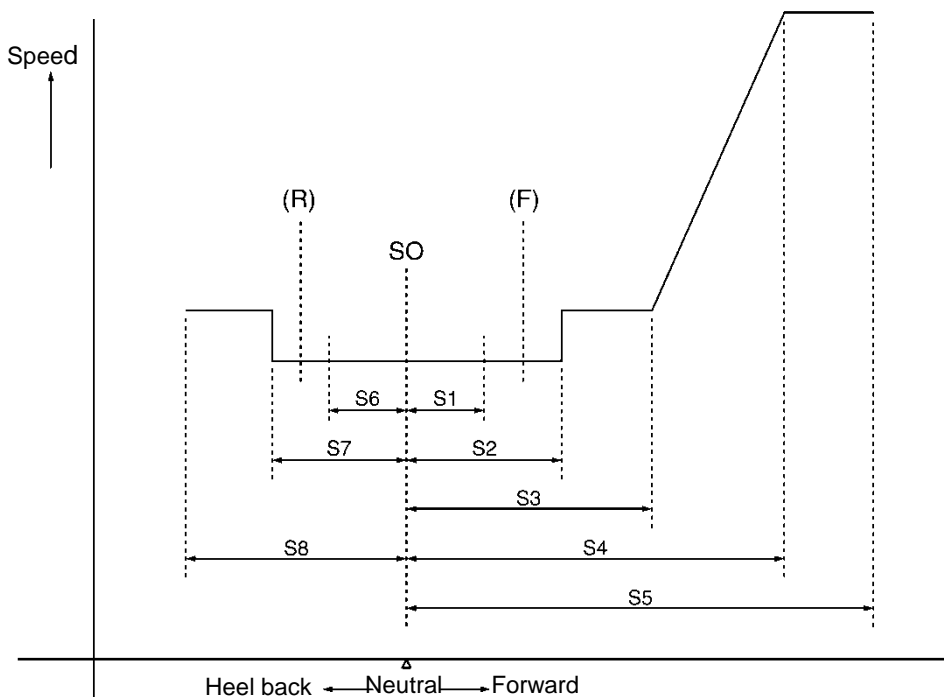
### 2-2-1. List of memory switch

#### Presser foot lifter and treadle settings (001 - )

No.	Setting range	Initial value	Setting units	Setting details
F001	ON/OFF	OFF	-	Presser foot status when treadle return to neutral after thread trimming ON : Presser foot does not drop OFF: Presser foot drops. (Presser foot won't drop if No. F851 set to OFF)
F002	ON/OFF	OFF	-	Presser foot status after treadle return to neutral. ON : Presser foot lifts OFF: Presser foot won't lift.
F003	ON/OFF	ON	-	Presser foot lifting when treadle heel back 1 <sup>st</sup> step after retuning to neutral *If No. F004 is "OFF", this function will operate as "OFF". ON : Enable OFF: Disable
F004	ON/OFF	ON	-	Operation when treadle is fully heel backed. ON : Thread trimming and end backtack function are enabled. (If thread trimming function set to disabled, only needle up stop function is activated ) OFF: Thread trimming and end backtack function are disabled. (Presser foot is raised after treadle heel backed.)
F010	ON/OFF	OFF	-	Alternate standing operation pedal and standard treadle pedal. ON: Both pedals can be operated alternately. (If both pedals are operates at same time, standing operation pedal will have priority.) OFF: treadle function will be disabled, after standing operation pedal is used.
F011	0 - 2	0	1	Operation when variable speed pedal is used on standing operation pedal. 0: Speed corresponds to depressing amount of pedal. 1: Speed corresponds to setting speed on panel. (Fixed speed) 2: Speed corresponds to end backtack speed.
F012	0 - 500 (ms)	80 (ms)	10 (ms)	Delay time for motor stating form standing operation pedal activation.
F013	ON/OFF	ON	-	Pause function during standing operation when foot pedal is activated. (When "AUTO" function is activated) ON : Sewing operation pauses when foot pedal is activated. OFF: No operation
F014	ON/OFF	ON	-	Pause function during standing operation when start pedal is activated. (When "AUTO" function is activated) ON : Sewing operation pauses when start pedal is activated. Start pedal is activated again. Sewing operation will be resumed. OFF: No operation
F015	ON/OFF	ON	-	Presser foot lift operation by trimming pedal after thread trimming operation on standing operation pedal. ON : Presser foot can be lifted or lowered. (If No. F051 is "OFF", thread trimming pedal is disabled after foot pedal is activated) OFF: No Operation (Only possible by foot pedal.)

**Presser foot lifter and treadle settings (001 - )**

No.	Setting range	Initial value	Setting units	Setting details
F050	ON/OFF	ON	-	Forward treadle operation interlock during thread trimming. ON : Depressing treadle forward during thread trimming is disabled. (After treadle is returned to neutral position, this function is enabled.) OFF: Depressing treadle forward during thread trimming is enabled.
F051	ON/OFF	OFF	-	Presser foot operation after knee switch has been activated. ON : Presser foot can be raised or lowered by heeling back of treadle. OFF: Disable for this function.
F055	ON/OFF	OFF	-	Presser foot operation after foot is raised by heeling back of treadle or knee switch is operated. *This setting is only enabled No. F851 and F001 are on. ON : Presser foot won't lift when treadle is neutral position. OFF: Presser foot lifts when treadle is neutral position.
F057	ON/OFF	OFF	-	Presser foot lowering when treadle depressed forward to 1 <sup>st</sup> step. *This is disabled when No. F852 is set to OFF. ON : Presser foot is lowered. OFF: Presser foot won't be lowered.
F080	-7 - 7	0	1	Treadle heel back on timing (thread trimming) point : S7
F081	-5 - 5	0	1	Treadle heel back 1 <sup>st</sup> step on timing (presser foot lift) point: S6
F082	-5 - 5	0	1	Treadle depress 1 <sup>st</sup> step on timing (presser foot lower) point: S1
F083	-5 - 5	0	1	Treadle depress forward on timing (start) point: S2
F084	-5 - 7	0	1	Treadle variable speed range starting point: S3
F085	-7 - 7	0	1	Treadle high speed range reaching point: S4
F086	-2 - 2	0	1	Variable speed range starting point for standing operation pedal: S3
F087	-2 - 2	0	1	High speed range reaching point for standing operation pedal: S4
F088	0 - 3	0	1	Speed accelerating curve by depressing treadle 0: Constant 1: Curves downward 2: Curves upward 3: S line curve 



## 2. Setting for each function (Operation panel)

### Sewing Machine motor setting (100 - )

No.	Setting range	Initial value	Setting units	Setting details
F100	1 - 99 needles	2 needles	1	Number of slow start stitches
F101	OFF/ 1 - 3	OFF	1	Treadle response switching settings immediately after sewing has started. OFF: No switching 1: Slow start only when sewing starts after thread trimming. 2: Slow start only when sewing starts after sewing has been paused. 3: Slow start always when sewing starts.
F102	1 - 5	1	1	Treadle response immediately after sewing has started. *The greater value, slower speed when sewing starts. *If No. F101 is set to "OFF", This setting is disabled.

### Sewing Machine motor setting (150 - )

No.	Setting range	Initial value	Setting units	Setting details
F150	ON/OFF	ON	-	Decelerations stop control when treadle is returned to neutral position. ON : Decelerations stop control without stitch forward operation. (Low speed operation time before machine stops is almost constant.) OFF: No control of above setting. (Low speed operation time before machine stops is not constant.)
F151	ON/OFF	OFF	-	Effective vibration operation if required stronger needle penetration. ON : Effective vibration operation (Hammer operation) OFF: No effective vibration operation (Hammer operation)
F152	ON/OFF	OFF	-	Highest needle position stop operation *If No. F156 is set to "ON", this setting is disabled. ON : Used OFF: Not used
F153	10 - 500 (ms)	150 (ms)	10 (ms)	Delay time until reverse up operation starts during highest needle position stop function. *This setting is enabled when No. F152 or F156 set to "ON".
F154	-20~20 degrees	0 degrees	1	Highest needle stop position setting *This setting is enabled when No. F156 is set to "OFF" and No. F152 set to "ON". *Reverse up angle range is from 40 to 80 degrees after stopped position.  <div style="text-align: center;"> </div>
F155	0 - 1	1	1	Thread wiper and foot lifter function during highest needle position stop operation. *This setting is only enabled when No. F152 set to "ON". 0: After needle reverse up, thread wiper activate then foot lifter activate. 1: When machine stops thread wiper activate then needle reverse up and foot lifter function.
F156	ON/OFF	OFF	-	Highest needle position stop operation 2 *This setting is priority than No. F152 and reverse angle is greater. ON : Enabled OFF: Disabled
F157	-20~20 degrees	0 degrees	1	Highest needle stop position setting 2 *This setting is enabled when No. F156 set to "ON". *Reverse up angle is from 80 to 120 degrees after stopped position.  <div style="text-align: center;"> </div>

## 2. Setting for each function (Operation panel)

No.	Setting range	Initial value	Setting units	Setting details
F170	5 - 12 (A)	9 (A)	1	Current limit value during acceleration *The value is greater, motor acceleration is faster, value set smaller it becomes slower. (Setting small value may be effective in preventing florescent light flickering.)
F171	5 - 12 (A)	10 (A)	1	Current limit value during deceleration *The value is greater, motor deceleration is faster, value set to smaller it becomes slower.
F172	-3 - 9	3	1	Gain during high-speed operation [Do not change this setting]
F173	-3 - 9	3	1	Gain during low-speed operation [Do not change this setting]
F174	-3 - 9	6	1	Gain during thread trimming [Do not change this setting]
F175	OFF/1	OFF	1	Servo lock operation OFF: None 1 : Servo lock operation occurs when motor is stopped.
F176	OFF/ 1 - 120 seconds	OFF	1	Timer setting for servo lock *When No. F175 set to "OFF", this is disabled. OFF: No timer operation 1 - 120: Timer operation (from 1 to 120 seconds)
F177	30~89 degrees	45 degrees	1	Servo lock angle setting [Do not change this setting]] *Disable when No. F175 is set to "OFF"
F180	150 - 300 (sti/min)	220 (sti/min)	10	Thread trimming speed (TRIM) (*1)
F181	150~ 300 (sti/min)	220 (sti/min)	10	Inching speed (INCH)
F182	500 - 2500 (sti/min)	1400 (sti/min)	100	Stop improvement speed (POS) [Do not change this setting]
F183	150~ 1000 (sti/min)	700 (sti/min)	10	Slow speed (SLOW) (*2)
F184	150~ 3000 (sti/min)	3,000 (sti/min)	100	Limit speed setting for start backtack (SBL) (*2)
F186	150~ 3000 (sti/min)	1800 (sti/min)	100	End backtack speed (EBT) (*2)
F188	150~ 4000 (sti/min)	4000 (sti/min)	100	Automatic sewing speed (AUTO) (*2)、(*3)
F189	150~ 4000 (sti/min)	4000 (sti/min)	100	Maximum sewing speed (HIL) (*3)

(\*1) The actual upper limit speed will be decided by setting of No. F181.

(\*2) The actual lower limit speed will be decided by setting of No. F181.

(\*3) The upper limit speed will vary depending on machine specification.



## 2. Setting for each function (Operation panel)

### Operation panel setting (300 - )

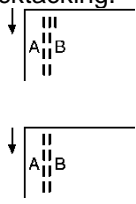
No.	Setting range	Initial value	Setting units	Setting details
F300	1 - 3	1	1	<p>Display of counter</p> <p>*The first appearance of counter display when "SEL" key has been pressed.</p> <p>When "FUNC" key has been pressed display will change each time 1→2→3→1→ in order.</p> <p>1: Lower thread counter (Counting unit is set by Mo. F301.)</p> <p>2: Thread trimming counter (incremented by 1 each time of a thread trimming operation occurs)</p> <p>*The counter is incremented even if thread trimming is set to disabled.)</p> <p>3: Needle replacement counter (Counting unit is set by No. F303)</p>
F301	0 - 100 stitches	10 stitches	1	<p>Lower thread counter units</p> <p>0: No counting</p> <p>1 – 100: Count down by set number of stitches</p>
F302	0 - 2	1	1	<p>Operation for counter warning</p> <p>0: Always allows for sewing by treadle</p> <p>1: Machines stopped after thread trimming, sewing by treadle is disabled.(enabled until treadle is heel backed)</p> <p>2: Machine stopped at treadle neutral position, sewing by treadle is totally disabled.</p>
F303	0 - 1000 stitches	100 stitches	10	<p>Needle replacement counter counting units</p> <p>0: No counting</p> <p>10 – 1000: Counts down by set number on stitches</p>
F305	ON/OFF	ON	-	<p>Changing counter display when sewing stats</p> <p>ON: Stay counter display</p> <p>*Change display except counter press "SEL" key.</p> <p>OFF: Switch stitches display from counter display.</p> <p>(When No. F470 is set to "OFF")</p> <p>Return back to pattern display (When No. F470 is set to "ON")</p>
F310	1 - 2	1	1	<p>4 digits display changing by pressing "SEL" key</p> <p>1: No display→No. of stitches→Counter→Speed</p> <p>2: No display→Speed→Counter→No. of stitches</p>
F311	1 - 5	4	1	<p>Function setting for F1</p> <p>*Can't be set same function of F312.</p> <p>1: Needle up/down</p> <p>2: Correction</p> <p>3: Slow start</p> <p>4: Thread trimming function disabled</p> <p>5: Thread wiper</p>
F312	1 - 5	3	1	<p>Function setting for F2</p> <p>*Can't be set same function of F311.</p> <p>1: Needle up/down</p> <p>2: Correction</p> <p>3: Slow start</p> <p>4: Thread trimming function disabled</p> <p>5: Thread wiper</p>
F313	ON/OFF	OFF	-	<p>Automatic sewing functions for continuous backtack</p> <p>(In case of No. F470 is set to "OFF".)</p> <p>ON : Automatic sewing operation</p> <p>OFF: No automatic sewing operation</p>

## Operation panel setting (350 - )

No.	Setting range	Initial value	Setting units	Setting details
F350	ON/OFF	ON	-	Buzzer during panel operation ON : Used OFF* Not used *Buzzer will keep beeping when warning or error occurred.
F351	0 - 10 seconds	0 seconds	1	Additional display time for model name when power switch is turned on. 0 : Not displayed 1 – 10: Display time of model name when power switch is turned on. Subclass X03: "7030" X03A: "703A" X05: "7050"
F352	ON/OFF	ON	-	Start and end backtack speed setting restricted by maximum speed setting. ON : Restricted by maximum speed setting OFF: No restriction However speed setting restricted by setting of No. F184.
F353	ON/OFF	ON	-	End backtack sewing speed ON : Can be set individualized from start backtack sewing speed OFF: Set by start backtack sewing speed setting
F354	0 - 3	1	1	Correction sewing function *This is only enabled when No. F500 is set to "1". *When the [CORR] icon at left side is turned off, the operation will be what is illuminated at the right side. 0: Half stitch correction sewing / Full stitch correction sewing 1: No correction sewing / Full stitch correction sewing 2: Reverse stitch correction sewing / Full stitch correction sewing 3: Single stitch sewing after thread trimming (only once) / Full stitch correction sewing

## 2. Setting for each function (Operation panel)

### Sewing Program setting (400 - )

No.	Setting range	Initial value	Setting units	Setting details
F400	2 - 6	2	1	<p>Start backtack sewing pattern</p> <p>*If A=0, there is no A operation, and if B=0, there is no B operation.</p> <p>2: A-B            3: B-A-B            4: A-B-A-B            5: B-A-B-A-B            6: A-B-A-B-A-B</p>
F401	2 - 6	2	1	<p>End backtack sewing pattern</p> <p>*If C=0, there is no C operation, and if D=0, there is no D operation.</p> <p>2: C-D            3: C-D-C            4: C-D-C-D            5: C-D-C-D-C            6: C-D-C-D-C-D</p>
F402	1 - 2	1	1	<p>Continuous backtack sewing pattern</p> <p>1: A-B-C-D</p> <p>*If A=0, there is no A operation, and if B=0, there is no B operation.            If C=0, there is no C operation, and if D=0, there is no D operation.</p> <p>2: A-B x D times</p> <p>*If A=0, there is no A operation, and if B=0, there is no B operation.            If A≠0, B≠0 and D=4, operation is in the order A-B-A-B.</p>
F403	ON/OFF	OFF	-	<p>Stopping while start backtacking is in progress and speed during startbacktacking</p> <p>ON : When the treadle is returned to neutral position, start backtacking can be stopped before it is finished, and speed during start backtacking becomes the speed corresponding to the treadle depression amount.            (In between low speed to start backtacking speed)</p> <p>OFF: When the treadle is returned to neutral position, machine stops the end of start backtacking and sewing speed become constant start backtack speed.</p>
F404	ON/OFF	OFF	-	<p>Feed direction when machine is stopped right after start backtacking.</p> <p>ON : Reverse solenoid turns OFF after machine stopped</p> <p>*If No. F403 is set to "OFF", operation occurs when treadle is depressed slightly.</p> <p>OFF: Reverse solenoid turns OFF, feed returns to normal direction then stops.</p> <p>*If No. F452 is set to "ON", this operation will be disabled.</p> 
F405	1 - 2	1	1	<p>Stitch control sewing calling function</p> <p>*This function is available when No. F470 is set to "ON" and pattern no. is 4.</p> <p>1: Reverse stitch operation when actuator switch is pressed.            2: Stitch control sewing operation when actuator switch is pressed.</p>

## Sewing program setting (450 - )

No.	Setting range	Initial value	Setting units	Setting details
F450	ON/OFF	OFF	-	Correction sewing by actuator switch after thread trimming *This is only enabled when No. F500 is set to "1". ON : Enabled OFF Disabled (Switch operation disabled)
F451	ON/OFF	OFF	-	Speed for transferring to end backtack (Set to "ON" if you want sewing cycle time to be shorter.) OFF: Decelerates to low speed, then end backtack starts. ON : Decelerates to end backtack speed, then end backtack starts.始 *If No. F452 has been set to "ON", when No. F451 is set to "ON" will be disabled.
F452	ON/OFF	OFF	-	Stitches matching function during automatic backtacking. (Set to "ON" if you want to match stitches for forward and backward feeding accurately during automatic backtacking.) ON : Momentarily stops at needle down position when feed direction is changed. OFF: No stopping when feed direction is changed. *Can be set changing time before restarting using No. F454.
F454	10 - 500 (ms)	100 (ms)	10 (ms)	Momentary stopping time when feed direction is changed (The reverse mechanism switched at the stopped position, and then after the stopping time has elapsed, sewing automatically restarts) *This is only enabled when No. F452 is set to "ON".
F455	OFF/ 1 - 2	2	1	Synchronization function when reverse mechanism has been activated by actuator switch. OFF: Disabled (Reverse mechanism is synchronized with switch.) 1 : Reverse mechanism synchronization without motor deceleration. 2 : Reverse mechanism synchronization when motor decelerates automatically to the speed set by No. F456 deceleration.
F456	300 - 4000 (sti/min)	4000 (sti/min)	100	Automatic deceleration speed when reverse mechanism has been activated by actuator switch. *This is only enabled when No. F455 is set to "1" or "2".
F457	0 - 355 degrees	0 degrees	1	Reverse mechanism activation angle at low speed. (less than 1000 sti./min.) *This is only enabled when No. F455 is set to "1" or "2".
F458	0 - 355 degrees	150 degrees	1	Reverse mechanism activation angle at high speed. (1000 sti./min. or more) *This is only enabled when No. F455 is set to "1" or "2".
F470	ON/OFF	OFF	-	Changing operation panel function OFF: Standard functions ON : Pattern sewing expanded function Can be selected the following program pattern 1 to 9. ● Pattern 1: Normal sewing/continuous backtack ● Pattern 2: Fixed stitches (1 direction stitch counting) ● Pattern 3: Label sewing (2 directions stitch counting) ● Pattern 4: Reverse stitch counting sewing ● Pattern 5-9: Programmed sewing (up to 20 steps) *Refer to "2-2-2 Pattern sewing expanded function (F470="ON") for detail of setting.

## 2. Setting for each function (Operation panel)

### Standard device setting (500 - )

No.	Setting range	Initial value	Setting units	Setting details
F500	OFF/ 1 - 5	1	1	Actuator switch function when machine is stopped. (*1) OFF: No operation 1 : Correction sewing switch (*2) 2 : Thread trimming switch (*3) 3 : Reverse sewing switch (*4) 4 : Foot lifter switch (Alternated mode) 5 : Foot lifter Switch (Momently mode)
F501	OFF/ 1 - 2	1	1	Actuator switch function during sewing (*1) OFF: No operation 1 : Manual backtack switch (*2) 2 : Thread trimming switch (*2)
F502	OFF/ 1 - 3	1	1	Foot lifter switch function OFF: No operation 1 : Foot lifter switch 2 : Puller lifter switch (Alternated mode) (*5) 3 : Puller lifter switch (Momently mode) (*5)

(\*1) When No. F470 is set to "ON" and sewing pattern "4" (Reverse stitch counting sewing), reverse stitch counting sewing function is priority function but this switch is set to "2", Thread trimming function become priority operation.

(\*2) F When No. F470 is set to "ON" and sewing pattern "4" (Reverse stitch counting sewing), Correction sewing function won't be operated.

(\*3) To make function as a thread trimming switch when sewing in progress No. F501 must be set to "2".

(\*4) To make function as a reverse switch when sewing in progress No. F501 must be set to "1".

(\*5) This function will be activated when No.F960 is set to "1". Also foot lifter switch function will be disabled when No. F960 is set to "1".

Standard device setting (550 - )

No.	Setting range	Initial value	Setting units	Setting details
F550	0 - 1	0 (*1)	1	Setting of Auto presser foot lifter type 0: Solenoid type (Duty of chopper control setting can be changed No. F565.) 1: Pneumatic type (Duty of chopper control setting can be changed No. F566.)
F551	0 - 500 (ms)	150 (ms)	10 (ms)	Sewing machine motor start delay time when foot is raised.
F555	-345 - 345 degrees	0 degrees	1	Reverse solenoid on timing during start or continuous backtacking.
F556	-345 - 345 degrees	0 degrees	1	Reverse solenoid off timing during start or continuous backtacking.
F557	-345 - 345 degrees	0 degrees	1	Reverse solenoid off timing during end backtacking.
F558	-345 - 345 degrees	0 degrees	1	Reverse solenoid on timing during end backtacking. *This is only enabled when No. F451 is set to "ON".
F560	10 - 200 (ms)	20 (ms)	10 (ms)	
F561	10 - 200 (ms)	50 (ms)	10 (ms)	
F562	10 - 200 (ms)	50 (ms)	10 (ms)	
F563	10 - 500 (ms)	300 (ms)	10 (ms)	Foot lifter solenoid fully "ON" time
F564	0 - 240 seconds	180 seconds	1	Foot lifting time 0: No timer function (Foot won't be lowered) 1 - 240: Foot will be lowered after this setting time.
F565	10 - 60 (%)	25 (%)	1	On duty of chopper control for solenoid type foot lifter *This is only enabled when No. F550 is set to "0".
F566	10 - 60 (%)	50 (%)	1	On duty of chopper control for pneumatic type foot lifter * *This is only enabled when No. F550 is set to "1".
F567	0 - 1	0	1	Presser foot soft down mode 0: Automatic mode (This can be adjusted using No. F569.) 1: Manual mode (This must be adjusted using No. F568.)
F568	20 - 120 (ms)	40 (ms)	5 (ms)	Delay time foot lifter solenoid to turn on after foot lowered command. *This is only enabled when No. F567 is set to "1".
F569	10 - 15	12	1	Voltage detection constant for foot lifter solenoid to turn on after foot lowered command. *This is only enabled when F567 is set to "0". If it is set to "10", response time will be fastest and its operating sound will be loudest.
F573	40 - 100 (ms)	85 (ms)	5 (ms)	Fully on time for reverse solenoid
F574	10 - 60 (%)	60 (%)	1	On duty when reverse solenoid is chopper control.

(\*1) This is not initialized during initialization mode.

## 2. Setting for each function (Operation panel)

### Error processing settings (650 - )

No.	Setting range	Initial value	Setting units	Setting details
650	OFF/ 2 - 30 seconds	OFF	1	Time until buzzer stops (seconds) OFF: Buzzer won't stop 2 – 30: Buzzer stops after the specified time
651	1 - 30 minutes	3 minutes	1	Overtime error display 1 – 30: After continuous sewing operation for set length of time, operation stops and error code "E-190" is displayed.
652	ON/OFF	ON	-	Needle up stop error display *If thread wiper [ WP] setting is "OFF", this error code won't appear on the display. OFF: None ON : If needle does not stop at the up position after thread trimming, error code "E-111" is displayed.

### Specifications and destination setting (850 - )

No.	Setting range	Initial value	Setting units	Setting details
F851	ON/OFF	OFF (*1)	-	Treadle function specifications ON: For Europe and the Americas specification <ul style="list-style-type: none"> <li>If No. F001 is "OFF" When treadle returns to neutral position after thread trimming, presser foot is lowered. If treadle returns to neutral position during thread trimming, presser foot won't be lifted.</li> <li>If No. F001 is "ON" Presser foot will be lifted after thread trimming. Presser foot won't be lowered when treadle returns to neutral position.</li> <li>If No. F001 or No. F002 is "ON" Even after treadle has been depressed to 1<sup>st</sup> step and presser foot lowered, presser foot rises when treadle is returned to neutral position.</li> </ul> <p><b>[NOTE]</b> *If No. F852 and No. F057 are not both "ON" at the same time, presser foot lowering function at treadle 1<sup>st</sup> step will be disabled.</p> <p>OFF: For other market <ul style="list-style-type: none"> <li>Presser foot won't be lowered even when treadle is returned to neutral position after thread trimming.</li> <li>When heel back treadle again or knee switch changes from ON to OFF, presser foot will be lowered.</li> </ul> <p><b>[NOTE]</b> Presser foot won't be lifted at treadle neutral position regardless of settings for No.F001 and No. F002.</p> </p>
F852	ON/OFF	OFF (*1)	-	Presser foot lowering at treadle forward 1 <sup>st</sup> step ON : Enabled OFF: Disabled
F890 (*2)	0~1	0	1	[Do not change this setting]

(\*1) This is not initialized during initialization mode

(\*2) This is not appeared –[ ]05 specification.

## Specifications and destination setting (950 - )

No.	Setting range	Initial value	Setting units	Setting details
F950	OFF/ 1 - 9	OFF	1	Function of optional input 1 (Additional actuator switch) OFF : No function 1: Reset switch for bobbin thread counter *Optional output 1 will be bobbin thread counter warning signal. 2: Cancel switch for end backtacking (One time) *Optional output 1 will be end backtacking cancel signal. 3: High speed selection switch 4: Half stitch correction switch 5: Regular correction switch 6: Reverse correction switch 7: Thread trimming switch 8: Foot lifter switch (Alternated mode) 9: Foot lifter switch (Momently mode)
F951	OFF/ 1 - 2	OFF	1	Function of optional input 2 OFF: No function *When No. F950 is set to "3", this will be high speed selection function. 1: Sewing disabled input (Sewing will be disabled by treadle when signal is "LOW".) 2: Input for optional solenoid *This is enabled when No. F960 is set to "7".
F952	OFF/1	OFF	1	Function of optional input 3 *When No. F950 is set to "3", this setting is disabled. OFF: No function (If setting of F950 is except set to "3". High speed selection switch (When No. F950 is set to "3".) 1 : Slow speed sewing input (Restriction for slow speed sewing when signal is LOW.)
F953	OFF/1	OFF	1	Optional output 1 setting *If No. F950 is set to "1" or "2" this setting will be disabled. OFF: No function (Except No. F950 is set to "1" or "2".) Bobbin thread counter warning signal output (No. F950 is set to "1".) End backtacking cancel signal output (No, F950 is set to "2".) 1 : Error signal output (When error occurs signal turn "ON".)
F954	OFF/ 1 - 4	OFF	1	Optional output 2 setting OFF: No Function 1: Thread trimming solenoid signal (When thread trimming solenoid is activated signal turn "ON".) 2: Reverse solenoid signal (When reverse solenoid is activated signal turn "ON".) 3: Presser foot lifter solenoid signal (When presser foot lifter solenoid is activated signal turn "ON".) 4: Auto backtacking signal (During auto backtacking signal turn "ON".)
F955	300 - 4500 (sti/min)	1000 (sti/min)	100	Setting low speed when low speed sewing switch is activated *This is only enabled when No. F950 is set to "3". <b>[NOTE]</b> Actual sewing speed will be restricted by setting of Maximum sewing speed.
F956	300 - 4500 (sti/min)	3000 (sti/min)	100	Setting middle speed when middle speed sewing switch is activated *This is only enabled when No. F950 is set to "3". <b>[NOTE]</b> Actual sewing speed will be restricted by setting of Maximum sewing speed.





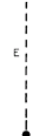
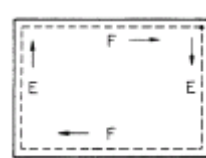
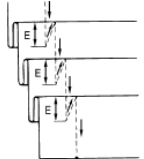
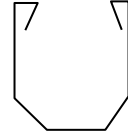
## 2. Setting for each function (Operation panel)

No.	Setting range	Initial value	Setting units	Setting details
F960	OFF, 1 - 7	OFF	1	Optional solenoid output OFF: No output 1: Puller device 2: Motor running synchronization output (Needle cooler) 3: Air saving 4: condense stitch 5: trimming signal after needle up stop 6: Pneumatic wiper 7: Output signal by setting memory switch
F961	0 - 99 needles	0	1	Stitch count control for puller is lowered after sewing has been started. (C0) *This setting will be enabled when No. F960 is set to "1". 0: No regulation by stitch control 1 - 99: Stitch count control of setting number
F962	5 - 30 seconds	10 seconds	1	Puller continuous running time *This is only No. F960 is set to "1".
F963	0 - 99 stitches	10 stitches	1	Optional output for stitches *This is only enabled when No. F960 is set to "3".
F964	0 - 990 (ms)	10 (ms)	10	Delay time setting for optional output *This is only enabled when No. F960 is set to "5".
F965	0 - 990 (ms)	0 (ms)	10	On time of optional output *This is only enabled when No. F960 is set to "5".
F966	0 - 990 (ms)	10 (ms)	10	Delay time setting for optional output *This is only enabled when No. F960 is set to "6".
F967	0.000 - 9.900 seconds	2.000 seconds	0.1	On time of optional output *This is only enabled when No. F960 is set to "3" or "6".
F968	0 - 99 stitches	0 stitches	1	Optional output for stitches *This is only enabled when No. F960 is set to "7".
F969	0 - 99 stitches	0 stitches	1	Optional output for stitches *This is only enabled when No. F960 is set to "7".

**2-2-2 Pattern sewing expanded function (F470="ON")**

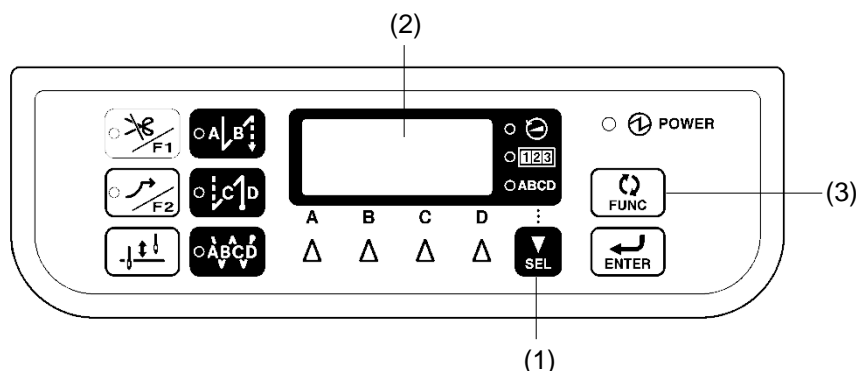
- The following pattern sewing will be available when No. F470 set to "ON".
- Sewing pattern can be selected from pattern No. 1 to 9.
- Pattern No. 5-9 can be program stitch counting up to 20 steps.

\*Regarding the memory switch setting refer to "2-2 Memory switch setting method" on previous page.

Pattern	Sewing pattern	Display pattern	Setting item
1	Normal sewing 	[1- ]	Start backtacking enabled/disabled A,B: stitches End backtacking enabled/disabled C,D: stitches
	Continuous backtacking 	[1- ]	A,B,C,D: stitches AUTO: enabled/disabled
2	Fixed sewing 	[2-E ]	Start backtacking enabled/disabled A,B: stitches End backtacking enabled/disabled C,D: stitches E: stitches AUTO: enabled/disabled Auto thread trimming: enabled/disabled
3	Name label sewing 	[3-E ] [3-F ]	Start backtacking enabled/disabled A,B: stitches End backtacking enabled/disabled C,D: stitches E,F: stitches AUTO: enabled/disabled Auto thread trimming: enabled/disabled
4	Reverse stitch counting 	[4-E ]	Start backtacking enabled/disabled A,B: stitches End backtacking enabled/disabled C,D: stitches E: stitches AUTO: enabled/disabled Auto thread trimming: enabled/disabled *This function will be enabled when No. 405 is set to "1".
5-9	Program sewing 	[5-SS] SS: Step (1 - 20)	Start backtacking enabled/disabled A,B: stitches End backtacking enabled/disabled C,D: stitches Each step: stitches AUTO: enabled/disabled Auto thread trimming: enabled/disabled  * Stitches can be set for each step. * Stitches setting for ABCD cannot set each step.

## 2. Setting for each function (Operation panel)

### 2-2-3 Changing for 4 digits display (470="ON")



- 4 digits display can be changed by pressing SEL key (1) each time for three kind of condition.

Pattern display → Speed display → Counter display

- Display can be changed other one by pressing FUNC key (3).
- Setting for speed and counter is same as when No. F-470 is set to "OFF".  
(Please refer to "4-2 Setting speed" and "4-3 Setting counter" on instruction manual.)

Display mode				4 digits display
Pattern				Pattern or step
Stitches for backtacking			ON	Stitches for ABCD
Stitches for step			Blinking	Stitches for step
Speed	ON			Maximum sewing speed
	ON		ON	Start backtacking speed
Counter		ON		Bobbin thread counter
		Blinking		Bobbin thread counter warning
	ON	ON		Thread trimming counter
		ON	ON	Needle change counter
	Blinking	Blinking	Needle change counter warning	

### 2-2-4 Changing display backtacking stitches and step stitches (F470="ON")

- When power turned ON, display appears pattern.
- Pressing FUNC key (3) display changes as follows information.

Pattern display → Backtacking stitches display → Step stitches display

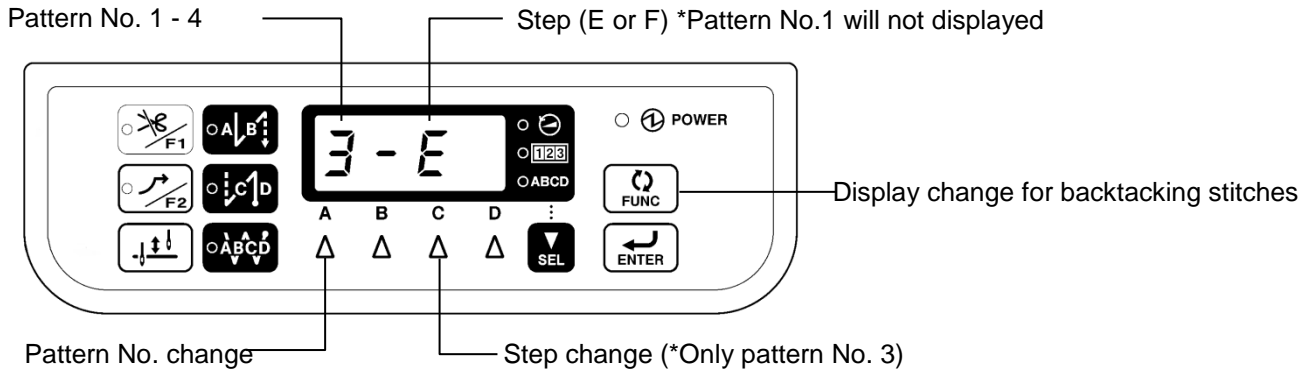
\* Step display won't appear when pattern 1.

\* Backtacking stitches display will be available when one of indicator is lit for start backtacking, end backtacking or continuous backtacking All indicator are off will skip this display.

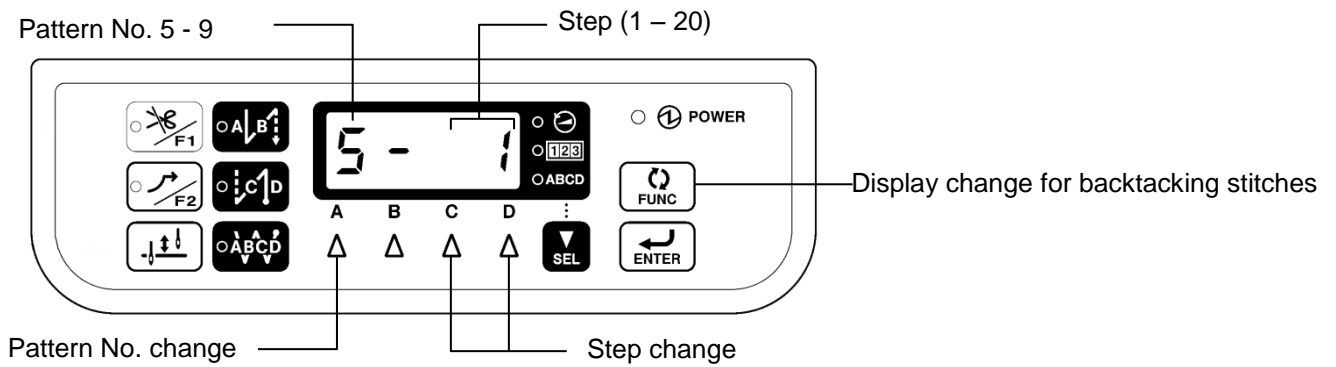
### 2-2-5 Pattern display mode (F470="ON")

- When Power is turned on sewing pattern number and sewing step is displayed.  
Pattern number and sewing step are able to be changed.

#### [Pattern 1- 4]



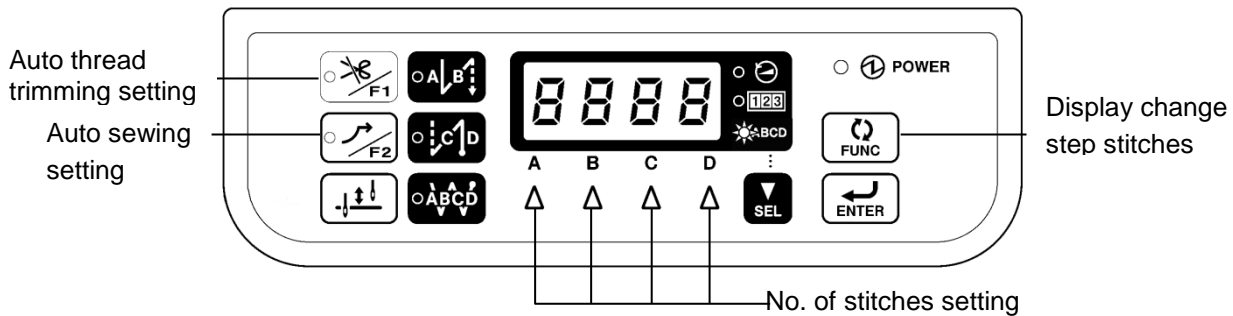
#### [Pattern 5 - 9]



## 2. Setting for each function (Operation panel)

### 2-2-6 Backtacking stitches display mode (F470="ON")

- When start backtacking: AB stitches, end backtacking: CD stitches and continuous backtacking: ABCD stitches required for changing, using this mode.
  - Backtacking stitches appear when press start (AB), end (CD) or continuous backtacking (ABCD) key and their indicator lit.
- \*If continuous backtacking key (ABCD) pressed and its indicator lit except pattern No.1, pattern display appear [1- ].
- Start backtacking (AB) key or end backtacking (CD) key pressed and its indicator lit off , display will change to pattern display node.



- Auto thread trimming function can be set by pressing thread trimming disabled/F1 key. (pattern 2 – 9)  
When indicator lit by pressing key, auto thread trimming function will be enabled.  
After programmed sewing (start & end backtacking and fixed stitches sewing) is completed, thread trimming function will be activated,
  - \* In case of pattern No. 1, indicator of continuous backtacking key lit, auto sewing mode can be set.
  - \* In case of pattern No. 4, when No. 405 set to “2” this setting is enabled.
  - \* In case of pattern No. 5 – 9, this setting is enabled for each step.
- Auto sewing function can be set by pressing slow start/F2 key. (In case of pattern No. 1, when indicator of continuous backtacking key lit can be enabled.)  
When indicator lit by pressing key, auto sewing function will be enabled.  
Once depress treadle sewing start automatically until completed end backtacking.
  - \* This setting is disabled with pattern No.1.
  - \* In case of pattern No. 4, this is enabled when No. F405 is set to “2”.
  - \* In case of pattern No. 5 – 9, this setting is enabled for each step.

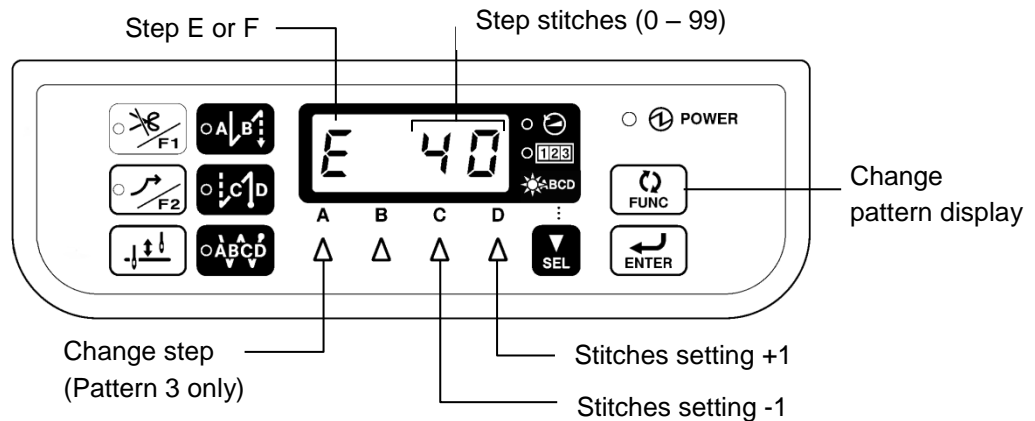
#### [NOTE]

This display mode can't be set thread trimming disabled and slow start settings.  
Press FUNC key to change pattern display mode.

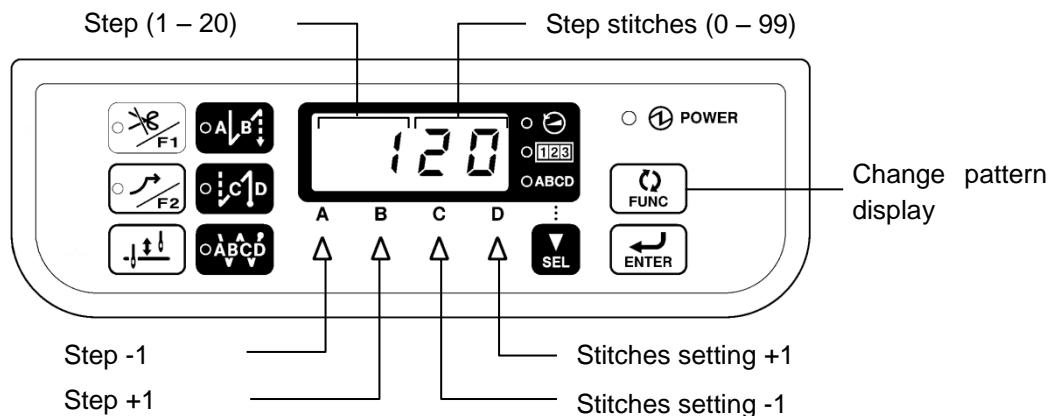
**2-2-7 Step stitches display mode (F470="ON")**

- When number of stitches on step is required, need to change this display mode.
- Backtacking stitches appear when press start (AB), end (CD) or continuous backtacking (ABCD) key and their indicator lit.
- \*If continuous backtacking key (ABCD) pressed and its indicator lit except pattern No.1, pattern display appear [1- ].
- Start backtacking (AB) key or end backtacking (CD) key pressed and its indicator lit off , display will change to pattern display node.

**[Pattern No. 2 – 4]**



**[Pattern 5 – 9]**



- Auto thread trimming function can be set by pressing thread trimming disabled/F1 key. (pattern 2 – 9) When indicator lit by pressing key, auto thread trimming function will be enabled. After programmed sewing (start & end backtacking and fixed stitches sewing) is completed, thread trimming function will be activated,
    - \* In case of pattern No, 1, indicator of continuous backtacking key lit, auto sewing mode can be set.
    - \* In case of pattern No. 4, when No. 405 set to “2” this setting is enabled.
    - \* In case of pattern No. 5 – 9, this setting is enabled for each step.
      - Auto sewing function can be set by pressing slow start/F2 key. (In case of pattern No. 1, when indicator of continuous backtacking key lit can be enabled.)
- When indicator lit by pressing key, auto sewing function will be enabled.  
Once depress treadle sewing start automatically until completed end backtacking.
- \* This setting is disabled with pattern No.1.
  - \* In case of pattern No. 4, this is enabled when No. F405 is set to “2”.
  - \* In case of pattern No. 5 – 9, this setting is enabled for each step.

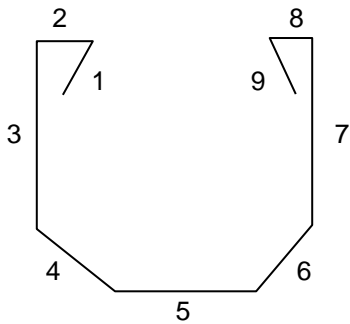
**[NOTE]**

This display mode can't be set thread trimming disabled and slow start settings.  
Press FUNC key to change pattern display mode.


## 2. Setting for each function (Operation panel)

### 2-2-8 Setting procedures for programmed sewing (Pattern 5 – 9)

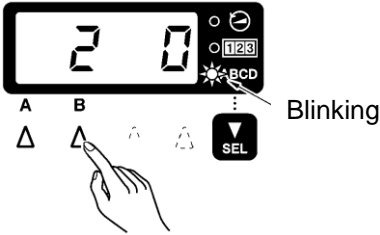


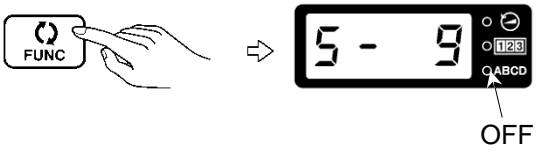
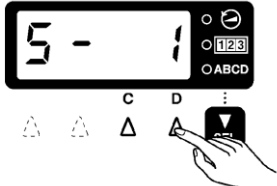

[Example: In case of programming the following 9 step pattern on to pattern No. 5]



- STEP1: Start backtacking A=4,B=4、 Step stitches=5, AUTO mode
- STEP2: Step stitches=10, AUTO mode
- STEP3: Step stitches=40, AUTO mode
- STEP4: Step stitches=20, AUTO mode
- STEP5: Step stitches=30, AUTO mode
- STEP6: Step stitches=20, AUTO mode
- STEP7: Step stitches=40, AUTO mode
- STEP8: Step stitches=10, AUTO mode
- STEP9: Step stitches=5, End backtacking C=4, D=4, AUTO mode, Auto thread trimming

<b>1</b>	<p><b>Select pattern No. 5</b></p> <p>Select pattern No. 5 by pressing A <math>\Delta</math> key.</p>
<b>2</b>	<p><b>Setting of start backtacking on step 1</b></p> <ul style="list-style-type: none"> <li>• Set A stitches to 4 by pressing A <math>\Delta</math>key.</li> <li>• Set B stitches to 4 by pressing B <math>\Delta</math>key.</li> </ul>
<b>3</b>	<p><b>Change to step stitches display (Step 1)</b></p> <p>• Change to step stitches display mode by pressing FUNC key.</p> <p>Blinking</p>
<b>4</b>	<p><b>Setting for step 1</b></p> <ul style="list-style-type: none"> <li>• Set step stitches to 5 by pressing D <math>\Delta</math> key.</li> <li>• Press  key for setting of AUTO mode.( Indicator will lit)</li> </ul>

(to be continued to next page)

<p><b>5</b></p>	<p><b>Change to next step</b></p>  <p>• Change to next step by pressing B <math>\Delta</math> key,</p> <p><b>[NOTE]</b> When return back to previous step, press A <math>\Delta</math> key.</p>
<p><b>6</b></p>	<p>Repeat procedure 4 &amp; 5, set step 2 to 9. (Set auto thread trimming function to “ON” by pressing  key.)</p>
<p><b>7</b></p>	<p><b>Setting end backtacking (Step 9)</b></p>  <p>• Set C stitches to 4 by pressing C <math>\Delta</math> key. • Set D stitches to 4 by pressing D <math>\Delta</math> key.</p>
<p><b>8</b></p>	<p><b>Change to pattern display mode</b></p>  <p>• Change back to pattern display mode by pressing FUNC key.</p>
<p><b>9</b></p>	<p><b>Back to sewing mode (Step 1)</b></p>  <p>• Bring back Step 1 by pressing D <math>\Delta</math> key.</p> <p><b>[NOTE]</b> When return back to previous step, press C <math>\Delta</math></p>
<p><b>10</b></p>	 <p>When treadle depress once on each step, it automatically sews until the end. After sewing is completed step 1, automatically step returns 1.</p>

**[Modification for step]**

- Step can be modified after sewing is completed to the end of step or thread trimming is activated.
- After step setting has been modified, the first step will start for next sewing.

**[Restriction of setting]**

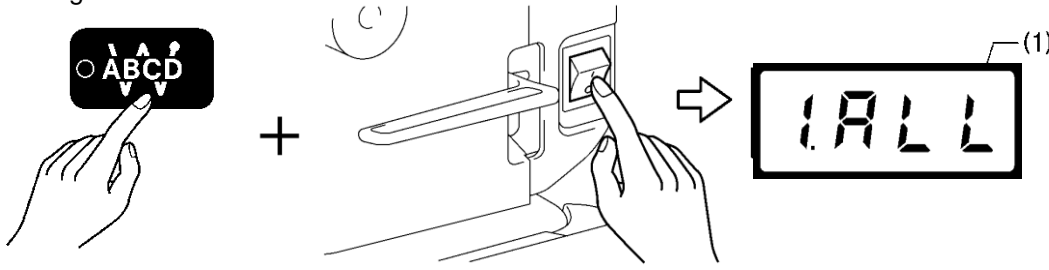
- When step stitches set to “0”, these setting won't stored (Start & end backtacking, AUTO mode, automatic thread trimming) (This setting will be cleared by modification of step or pattern)
- When start backtacking set after step 2, Automatic thread trimming setting is required on previous step. (It will not store of start backtacksetting without automatic thread trimming setting on previous step.)
- In order to activate end backtacking setting, automatic thread trimming setting is required otherwise it won't stored.



### 2-3 Data initialization function

**[NOTE]** If position of slide switch on main circuit board is not in center position, initialization will be disabled.  
 The following procedure should be enabled when slide switch (SW1) set to center position. (factory initial setting position)  
 (Regarding the slide switch, refer to “3, Setting of slide switch (SW1)”.

**1** Entering to initialization mode

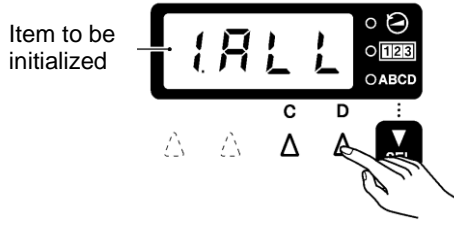


(While pressing ABCD key, turn power on.)

“1.ALL” will appear in display (1).

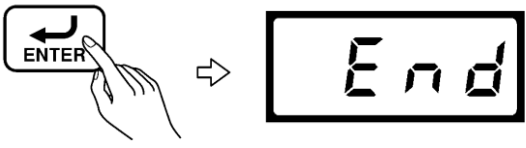
No.	Display	Details to be initialized
1	[1.ALL]	Clears all settings (Item 2, 3 and 4 will be initialized)
2	[2.MEM]	Memory switche
3	[3.SPD]	Speed setting (Max. speed and start backtacking speed) Settings of memory switch No. F180 to F189
4	[4.SEW]	Sewing program Backtacking, stitches, Counter and standard function setting

**2** Select the item to be initialized



- When press D  $\Delta$  key item will shift to next item.
- When press C  $\Delta$  key item will back to previous one.

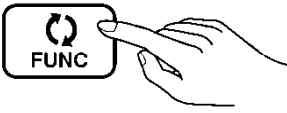
**3** Activation for initialization



(Press 2 seconds or more)

**[NOTE]**  
 When C  $\Delta$  or D  $\Delta$  key after [ END] is appeared, display menu return back to selection of item.

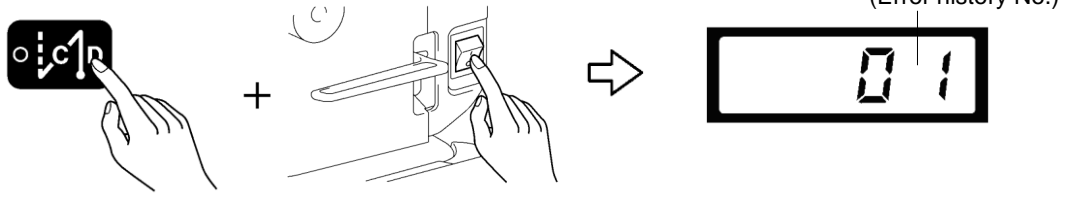
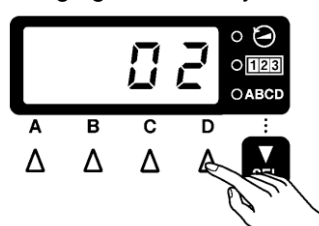
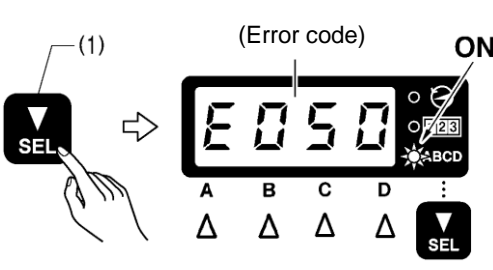
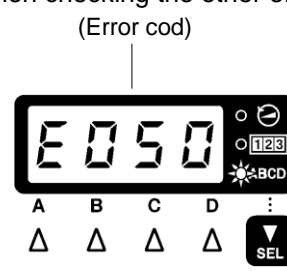
**4**



Initialization mode will be exited and normal sewing operation will be available.  
 (Cancellation of initialization, turn power off before pressing FUNC key.)

## 2-4 Error history checking method

The past error history can be checked by the following procedure.

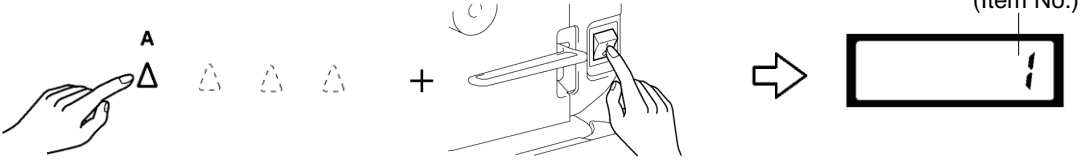
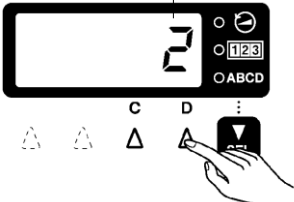
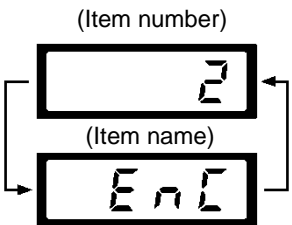
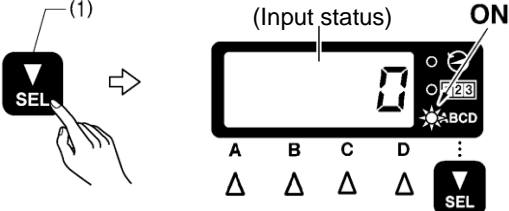
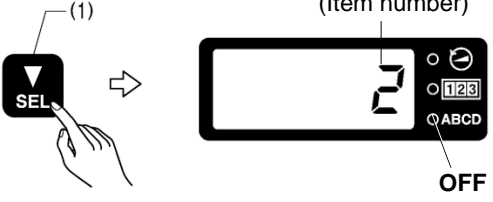
<p><b>1</b></p>	<p>Entering to error history checking mode</p>  <p>(While pressing CD key turn power on.)</p>
<p><b>2</b></p>	<p>Changing error history number</p>  <p>Up to 99 histories (01 – 99) are stored in order starting from the newest. (01 represents the newest error.)</p> <ul style="list-style-type: none"> <li>• When press D <math>\Delta</math> key number shift to forward.</li> <li>• When press C <math>\Delta</math> key number shift back.</li> </ul>
<p><b>3</b></p>	<p>Checking the error code</p>  <p>If there is no error code for a history number [E---] will be displayed as the error code.</p> <p>*While pressing A or B <math>\Delta</math> key display will change to displaying the tin that error occurred.</p> <ul style="list-style-type: none"> <li>• While pressing B <math>\Delta</math> key display will be appear last 4 digits [****]. (Units hours)</li> <li>• While pressing A <math>\Delta</math> key display will appear the first 3 digits [T***]. (Units 10,000 hours) If time that error occurred is less than 10,000 hours the first 3 digits won't be appeared.</li> <li>• When key is released display return to error code display mode.</li> </ul> <p>*When SEL key (1) is pressed again indicator of ABCD key will be disappeared and return back to error history number display.</p> <p><b>[NOTE]</b> The following error code do not stored in the history, and so <math>\nabla</math> they won't be displayed. [E065, E066, E095, E440, E441, E705]</p>
<p><b>4</b></p>	<p>[When checking the other error history numbers]</p>  <ul style="list-style-type: none"> <li>• When press D <math>\Delta</math> key error code shift to forward.</li> <li>• When press C <math>\Delta</math> key error code shift back.</li> </ul>
<p><b>5</b></p>	<p>[Ending of error history checking mode]</p> <p>Turn power off</p>

## 2-5 Input checking method

This is used at the following cases.

- When there is a problem with operation panel key, circuit board or sensors.
- When you would like to check for connection status of harness or code.
- When you would like to adjust a sensor position.

This let you check if the CPU on the main board is reading signals from the keys and sensors correctly.

<p><b>1</b></p>	<p>Entering input checking</p>  <p>(While pressing A <math>\Delta</math> key turn power on.)</p>
<p><b>2</b></p>	<p>Select the item number</p> <p>(Item No.)</p>  <ul style="list-style-type: none"> <li>• When press D <math>\Delta</math> key number shift to forward.</li> <li>• When press C <math>\Delta</math> key number shift back.</li> </ul> <p>*If 1 second without any operation or action, display will alternately switch item number and item name.</p>  <p>(Item number)</p> <p>(Item name)</p>
<p><b>3</b></p>	<p>Changing input status display mode</p>  <p>(Input status)</p> <p>ON</p> <p>*When SEL is pressed indicator of ABCD will lit off and change display to input status mode.</p>
<p><b>4</b></p>	<p>Check the response from keys and switches, etc. while referring &lt;Input check list&gt; on following pages.</p>
<p><b>5</b></p>	<p>[When checking the other item] 1) Press SEL key (1).</p>  <p>(Item number)</p> <p>OFF</p> <p>*When SEL key (1) is pressed indicator of ABCD will lit off display change to item number/item name.</p> <p>2) Repeat above procedure 2 to 4 for other checking.</p>
<p><b>6</b></p>	<p>Turn off power and power on for resuming sewing condition.</p>

<Input check list>

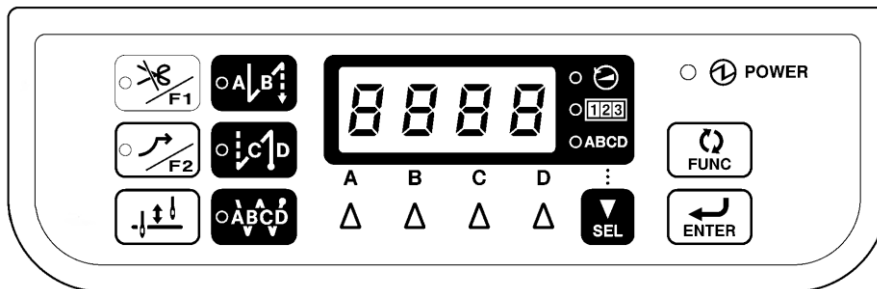
The four characters on the display show item number/item name and input status.



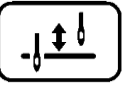

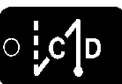

Item No.	Item name	Input status	Check item and checking method
[ 1]	[ PDL]	[0.000] - [5.000] [V]	Treadle pedal activating voltage Depress treadle forward/backward
[ 2]	[ ENC]	[ 0] - [ 359] [degrees]	Motor position signal (Needle highest position signal is 0 degrees.) Turn machine pulley by hand. *Input signal will be unstable until reference signal of resolver is detected.
[ 3]	[NLUP]	[ ON] - [ OFF]	Needle up signal Turn machine pulley by hand. *Input signal will be unstable until reference signal of resolver is detected.
[ 4]	[NLDN]	[ ON] - [ OFF]	Needle down signal Turn machine pulley by hand. *Input signal will be unstable until reference signal of resolver is detected.
[ 5]	[UPOG]	[ ON] / [ OFF]	Needle up sensor signal Turn machine pulley by hand.
[ 7]	[VOLT]	[ ***][%]	Power supply voltage Measure actual voltage against rated voltage and display percentage.
[ 8]	[HEAD]	[ ON] - [ OFF]	Safety switch input When machine is tilted back become "OFF".
[ 9]	[ BT]	[ ON] - [ OFF]	Actuator switch input "ON" when switch is pressed, and "OFF" when it is released.
[ 10]	[ PRE]	[ ON] - [ OFF]	Knee switch or standing pedal presser foot lifter switch signal. "ON" when switch is pressed, and "OFF" when it is released.
[ 11]	[OPDL]	[0.000] - [5.000] [V]	Standing pedal speed signal Depress the variable pedal for standing pedal.
[ 12]	[HIGH]	[ ON] - [ OFF]	Standing pedal high speed switch input "ON" when switch is pressed, and "OFF" when it is released.
[ 13]	[TRIM]	[ ON] - [ OFF]	Standing pedal thread trimming signal input "ON" when switch is pressed, and "OFF" when it is released.
[ 14]	[INCH]	[ ON] - [ OFF]	Standing pedal low speed signal input "ON" when switch is pressed, and "OFF" when it is released.
[ 15]	[ PNL]	[****] / [ OFF]	Operation panel key input Press any key on the panel except "SEL" key. Name of key pressed will be displayed at the right four digits. If no key is pressed, "OFF" will be displayed. (Refer to <Operation panel key input> on next page.)
[ 16]	[ OH]	[0.000]~[5.000] [V]	Motor overheating protection sensor input Display voltage of thermistor on resolver circuit board.
[ 17]	[ IN1]	[ ON] - [ OFF]	Optional input 1 "ON" when input signal is LOW, and "OFF" when is HIGH.
[ 18]	[ IN2]	[ ON]~[ OFF]	Optional input 2 "ON" when input signal is LOW, and "OFF" when is HIGH.
[ 19]	[ IN3]	[ ON]~[ OFF]	Optional input 3 "ON" when input signal is LOW, and "OFF" when is HIGH.
[ 20]	[DIP1]	[ ON]~[ OFF]	Slide switch on the main PCB rear position input (*1) "ON" when slide switch is rear, and "OFF" when is other position.
[ 21]	[DIP2]	[ ON]~[ OFF]	Slide switch on the main PCB front position input (*1) "ON" when slide switch is front, and "OFF" when is other position.
[ 22]	[DIP4]	[ ON]~[ OFF]	Slide switch on the main PCB center position input (*1) "ON" when slide switch is center, and "OFF" when is other position.








(\*1) Detail information for slide switch, refer to "3 Slide switch (SW1) setting method" in the following pages.

## 2. Setting for each function (Operation panel)

<Operation panel key input>



Key name	Display
	[ F1]
	[ F2]
	[ HUD]
	[ SBT]
	[ EBT]
	[ RBT]

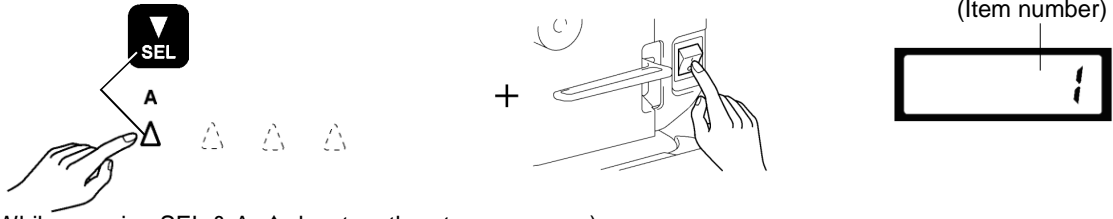
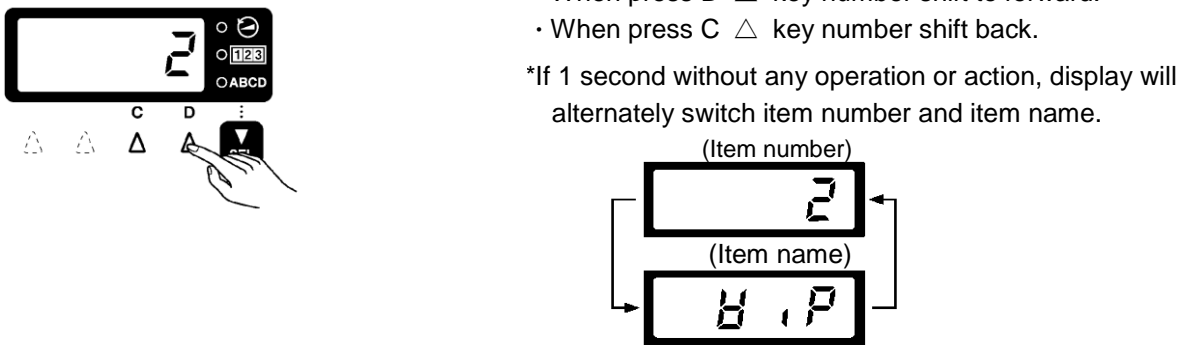
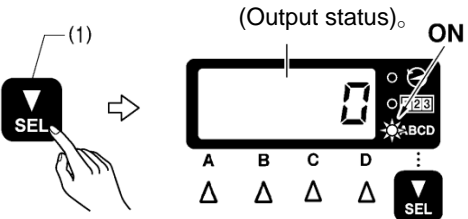
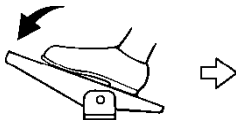
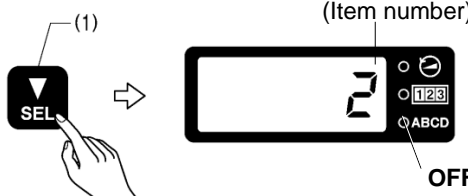
Key name	Display
A 	[A-UP]
B 	[B-DN]
C 	[C-UP]
D 	[D-DN]
	
	[FUNC]
	[ ENT]

## 2-6 Output checking method

This is used for the following items.

- When there is a problem with operation panel or circuit board.
- When there is a problem with the driving mechanism.
- When you would like to check connection status of harness or cord.

You can check whether the signals being output by CPU on the main PCB are driving mechanism correctly.

<p><b>1</b></p>	<p>Entering to output check mode</p>  <p>(While pressing SEL &amp; A <math>\Delta</math> key together, turn power on)</p>
<p><b>2</b></p>	<p>Select item number</p>  <ul style="list-style-type: none"> <li>• When press D <math>\Delta</math> key number shift to forward.</li> <li>• When press C <math>\Delta</math> key number shift back.</li> </ul> <p>*If 1 second without any operation or action, display will alternately switch item number and item name.</p>
<p><b>3</b></p>	<p>Change to output status display</p>  <p>(1)</p> <p>(Output status).</p> <p>ON</p> <p>OFF</p> <p>A B C D</p> <p><math>\Delta</math> <math>\Delta</math> <math>\Delta</math> <math>\Delta</math></p> <p>SEL</p> <p>* When SEL is pressed indicator of ABCD will lit off and change display to output status mode.</p>
<p><b>4</b></p>	 <p>The operation corresponding to the item number being checked will be carried out.</p> <p style="text-align: right;">2159M</p>
<p><b>5</b></p>	<p>[To check another item]</p> <ol style="list-style-type: none"> <li>1) Return treadle to neutral position.</li> <li>2) Press SEL key (1).</li> </ol>  <p>(1)</p> <p>(Item number)</p> <p>OFF</p> <p>A B C D</p> <p><math>\Delta</math> <math>\Delta</math> <math>\Delta</math> <math>\Delta</math></p> <p>SEL</p> <p>*When SEL key (1) is pressed indicator of ABCD will lit off display change to item number/item name.</p> <p>3) Repeat above procedure 2 to 4 for other output checking.</p>
<p><b>6</b></p>	<p>Turn off power and power on for resuming sewing condition.</p>

## 2. Setting for each function (Operation panel)

<Output check list>

The four characters on the display show item number/item name and output status.

Item No.	Item name	Output status	Check item and checking method	
[ 1]	[ TRM]	OFF	Thread trimming solenoid When treadle is depressed, thread trimming solenoid activates for 0.5 seconds. When treadle is returned to neutral position, it turns off.	
[ 2]	[ WIP]	OFF	Thread wiper solenoid When treadle is depressed, thread wiper solenoid activates. When treadle is returned to neutral position, it turns off.	
[ 3]	[ REV]	OFF	Reverse solenoid When treadle is depressed, reverse solenoid activates for 0.5 seconds. When treadle is returned to neutral position, it turns off.	
[ 4]	[ PRE]	OFF	Presser foot lifter solenoid When treadle is depressed, presser foot lifter solenoid activates for 0.5 seconds. When treadle is returned to neutral position, it turns off.	
[ 5]	[ OPT]	OFF	Optional solenoid signal When treadle is depressed, optional solenoid signal turns on for 0.5 seconds. When treadle is returned to neutral position, it turns off.	
[ 6]	[INCH]	Shows the actual sewing machine speed	Inching speed operation When treadle is depressed, motor rotates at inching speed. When treadle is returned to neutral position, motor stops.	
[ 7]	[TRIM]		Thread trimming speed operation When treadle is depressed, motor rotates at thread trimming speed. When treadle is returned to neutral position, motor stops.	
[ 8]	[SLOW]		Slow speed operation When treadle is depressed, motor rotates at slow speed. When treadle is returned to neutral position, motor stops.	
[ 9]	[ SBT]		[****] [sti/min] Start backtacking speed operation When treadle is depressed, motor rotates at start backtacking speed. When treadle is returned to neutral position, motor stops.	
[ 10]	[ EBT]		End backtacking speed operation When treadle is depressed, motor rotates at end backtacking speed. When treadle is returned to neutral position, motor stops.	
[ 11]	[HIGH]		High speed operation When treadle is depressed, motor rotates at speed corresponding to treadle depression amount. (inching speed to maximum speed) When treadle is returned to neutral position, motor stops.	
[ 12]	[AUTO]		Automatic sewing speed operation When treadle is depressed, motor rotates at automatic sewing speed. When treadle is returned to neutral position, motor stops.	
[ 13]	[ POS]		Stop preparation speed operation When treadle is depressed, motor rotates at stop preparation speed. When treadle is returned to neutral position, motor stops.	
[ 14]	[BUZZ]		OFF	Buzzer When treadle is depressed, buzzer beeps for 1 second.
[ 15]	[ PNL]		[****]	Panel display When treadle is depressed, checking of operation panel indicators. When treadle is returned to neutral position, returned back previous condition after all indicators will lit.

(次ページに続く)

## 2. Setting for each function (Operation panel)

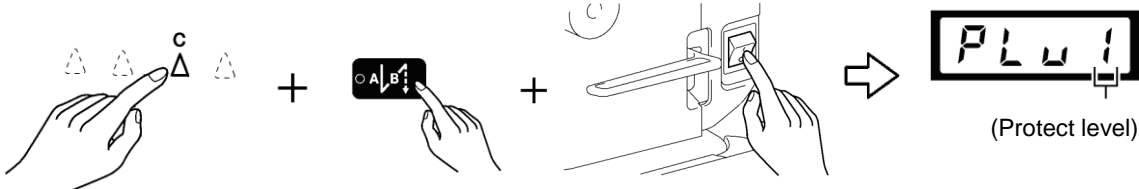
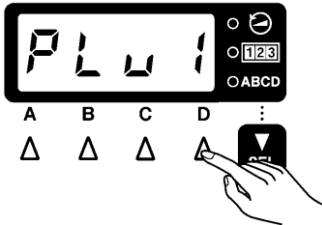
Item No.	Item name	Output status	Check item and checking method
[ 16]	[MOVE]	OFF	Operation synchronization signal When treadle is depressed, operation synchronization signal turn on. When treadle is returned to neutral position, signal turns off.
[ 17]	[OUT1]	OFF	Optional output signal 1 When treadle is depressed, Optional output signal 1 turn on. When treadle is returned to neutral position, signal turns off.
[ 18]	[OUT2]	OFF	Optional output signal 2 When treadle is depressed, Optional output signal 2 turn on. When treadle is returned to neutral position, signal turns off.



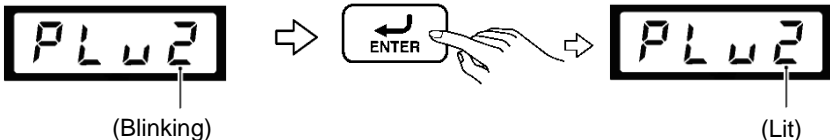

## 2. Setting for each function (Operation panel)

### 2-7 Protection setting

**[NOTE]** If slide switch (SW1) is not set to center position, protect setting will be disabled.  
 After slide switch (SW1) set to center position, process the following procedures.  
 (Please refer to “3. Slide switch (SW1) setting method” .)


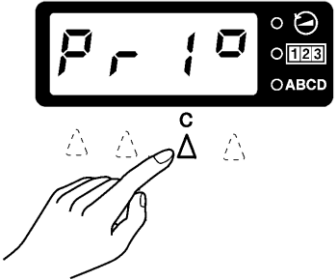
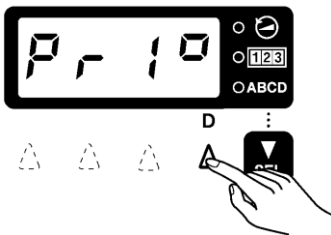
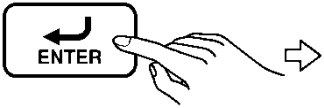

<p><b>1</b></p>	<p>Entering the protect setting mode</p>  <p>(While pressing C <math>\Delta</math> key &amp; start backtacking (AB) key, turn power on)</p> <ul style="list-style-type: none"> <li>• [PLv] and protection level will appear in the display. (*At the time of shipment from the factory, the protection level is set to “1”.)</li> </ul>
<p><b>2</b></p>	<p>Setting of protection lever (1 to 3)</p>  <p>The protect level (1 to 3) can be set by pressing D <math>\Delta</math> key.</p> <p><b>[NOTE]</b>      The range for disabling operation varies depending on the position of SW1.      For details, refer to “Protection setting list” on page36.      *If the protection level is different from original value, the protection level will blink in the display.</p>

**[In case of setting level 1 or 2]**

<p><b>3</b></p>	<p>Confirm the protection level (for example: set to level 2)</p>  <p>(Blinking)                      (Lit)</p>
<p><b>4</b></p>	 <p>Protect setting mode will be exited and normal operation will be possible.</p>

[In case of setting level 3]

To make individual settings, select level 3.

<p><b>3</b></p>	<p>Confirm the protection level</p>  <p>(Individual setting number)      Protection setting value [-]:OFF、[□]:ON</p> <p><b>[NOTE]</b> When the “SEL” key is pressed the display will return to protection setting display [PLV 3].</p>														
<p><b>4</b></p>	<p>Select the individual setting number (1 to 6)</p>  <p>To select individual setting number (1 to 6) by pressing C <math>\Delta</math> key.</p> <p><b>[NOTE]</b> The range for disabling operation varies depending on the position of SW1. For details, refer to “Protection setting list” on the following page.</p> <table border="1" data-bbox="619 927 1398 1187"> <thead> <tr> <th>Individual setting number</th> <th>Details of main operation disabled</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Max. and start backtacking speed setting</td> </tr> <tr> <td>2</td> <td>Memory switch setting</td> </tr> <tr> <td>3</td> <td>Not assigned (Invalid for setting)</td> </tr> <tr> <td>4</td> <td>Mainly key with indicator</td> </tr> <tr> <td>5</td> <td>Stitch number setting (ABCD)</td> </tr> <tr> <td>6</td> <td>Initialnization</td> </tr> </tbody> </table>	Individual setting number	Details of main operation disabled	1	Max. and start backtacking speed setting	2	Memory switch setting	3	Not assigned (Invalid for setting)	4	Mainly key with indicator	5	Stitch number setting (ABCD)	6	Initialnization
Individual setting number	Details of main operation disabled														
1	Max. and start backtacking speed setting														
2	Memory switch setting														
3	Not assigned (Invalid for setting)														
4	Mainly key with indicator														
5	Stitch number setting (ABCD)														
6	Initialnization														
<p><b>5</b></p>	<p>Make the individual protection (ON/OFF) setting</p>  <p>To set ON or OFF by pressing D <math>\Delta</math> key. *If the individual protection setting value is different from the original value, the protection setting value will blink.</p>														
<p><b>6</b></p>	<p>Confirm the protection setting value</p>  <p>The protection setting value will return to lit.</p>														
<p><b>7</b></p>	<p>Protect setting mode will be exited and normal operation will be possible.</p> 														

## 2. Setting for each function (Operation panel)

### <Protect setting list>

○ : Enabled

× : Disabled

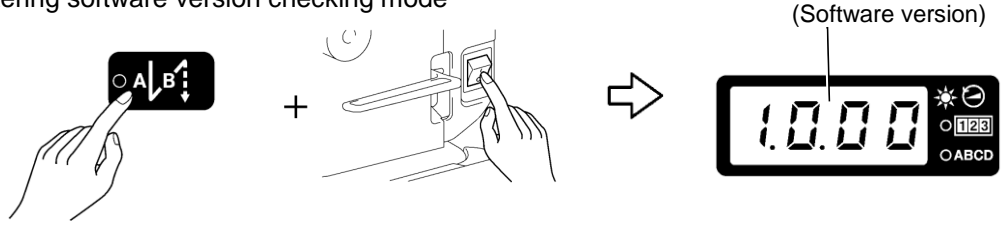
Setting function	Level		3 (Individual setting)						
	1	2	All OFF	1 =ON	2 =ON	3 =ON	4 =ON	5 =ON	6 =ON
Sewing speed (Setting by "SEL" key)	○ (×)	× (×)	○ (×)	× (×)	× (×)	× (×)	× (×)	× (×)	× (×)
Memory switch setting	○ (×)	× (×)	○ (×)	× (×)	× (×)	× (×)	× (×)	× (×)	× (×)
Standard function setting	○ (○)	× (×)	○ (○)	( )	× (×)	( )	( )	( )	( )
[Half stitch] key	○ (○)	○ (○)	○ (○)	( )	( )	( )	( )	( )	( )
[Thread trimming disabled/F1] key setting	○ (○)	× (×)	○ (○)	( )	( )	( )	× (×)	( )	( )
[Slow start/F2] key setting	○ (○)	× (×)	○ (○)	( )	( )	( )	× (×)	( )	( )
[Start backtack] setting	○ (○)	× (×)	○ (○)	( )	( )	( )	× (×)	( )	( )
[End backtack] setting	○ (○)	× (×)	○ (○)	( )	( )	( )	× (×)	( )	( )
[Continuous backtack] setting	○ (○)	× (×)	○ (○)	( )	( )	( )	× (×)	( )	( )
A to D stitch number setting	○ (○)	× (×)	○ (○)	( )	( )	( )	( )	× (×)	( )
Stitch number setting for program sewing *It is abled when No. set to "ON".	○ (○)	× (×)	○ (○)	( )	( )	( )	( )	× (×)	( )
For program sewing (Pattern or step modification) *It is abled when No. set to "ON".	○ (○)	× (×)	○ (○)	( )	( )	( )	( )	× (×)	( )
Counter initial setting (Thread trimming counter modification)	○ (○)	× (×)	○ (○)	( )	( )	( )	( )	× (×)	( )
Initialization	○ (×)	○ (×)	○ (×)	× (×)	× (×)	× (×)	× (×)	× (×)	× (×)
Protection setting	○ (×)	○ (×)	○ (×)	× (×)	× (×)	× (×)	× (×)	× (×)	× (×)

\* Values of inside ( ) are when slide switch (SW1) is set to backside position. (Refer to "3. Slide switch (SW1) setting method")

\* Individual settings are disabled if even one of 1 to 6 is X, if all columns are blank, the setting is enabled.

## 2-8 Software version setting method

**1** Entering software version checking mode






While pressing "AB" key and turn power on.

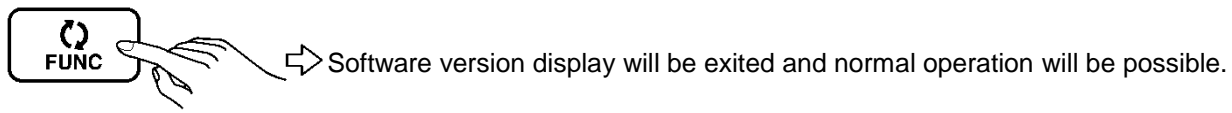
**2** Select software type

When "SEL" key is pressed, software type will change as following chart.

\*While pressing D  $\Delta$  key, appear software type on the display.

	Indicator	Software	Version	Type of software (During pressing D $\Delta$ key)
1		Main CPU	[1.0.00]	[1. MN]
2		Panel CPU	[1.000]	[2. PL]
3		Main IPL	[1.000]	[3.IPL]

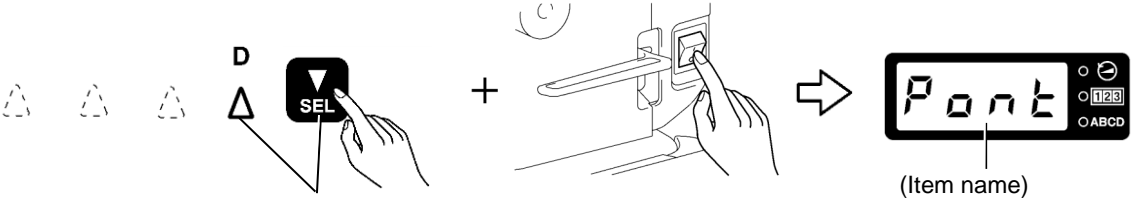
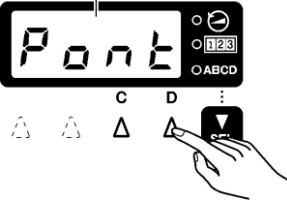
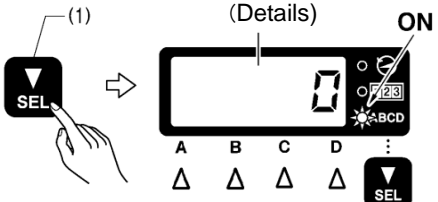
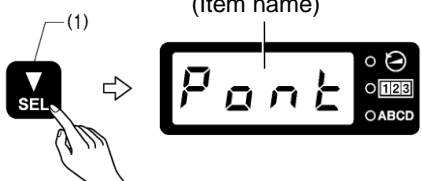
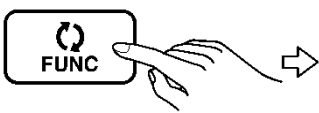
**3**



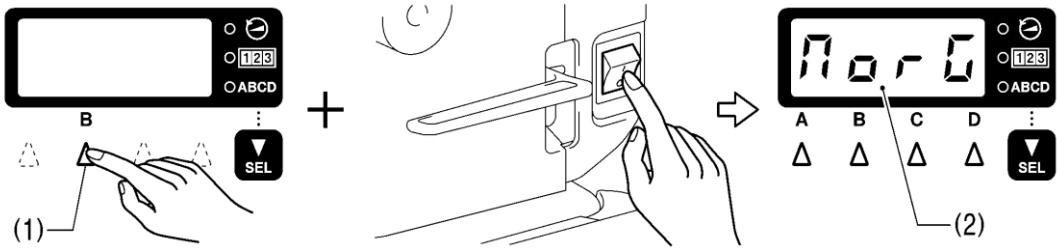
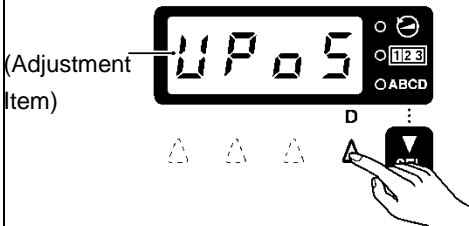
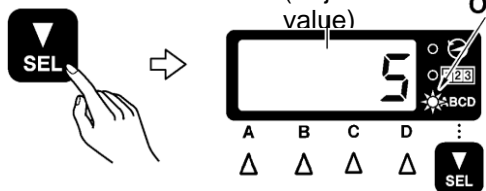
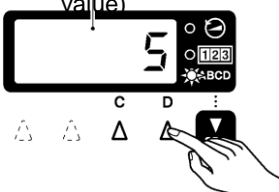
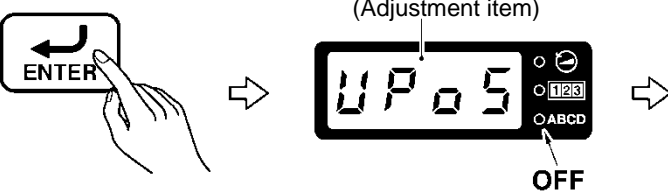
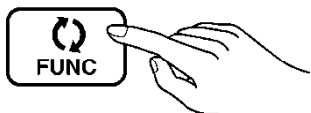
Software version display will be exited and normal operation will be possible.

## 2-9 Viewing maintenance information

This allows you to check the information which is stored in main circuit board.

<p><b>1</b></p>	<p>Entering maintenance display mode</p>  <p>(While "SEL" and D <math>\Delta</math> key, turn power on.)</p>												
<p><b>2</b></p>	<p>Select maintenance information item (Item name)</p>  <ul style="list-style-type: none"> <li>• When press D <math>\Delta</math> key number shift to forward.</li> <li>• When press C <math>\Delta</math> key number shift back.</li> </ul> <table border="1" data-bbox="715 824 1353 967"> <thead> <tr> <th>No.</th> <th>Information item</th> <th>Item display</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Cumulative power on time</td> <td>[PONT]</td> </tr> <tr> <td>2</td> <td>Cumulative operation time</td> <td>[MONT]</td> </tr> <tr> <td>3</td> <td>Maximum speed record</td> <td>[HHST]</td> </tr> </tbody> </table>	No.	Information item	Item display	1	Cumulative power on time	[PONT]	2	Cumulative operation time	[MONT]	3	Maximum speed record	[HHST]
No.	Information item	Item display											
1	Cumulative power on time	[PONT]											
2	Cumulative operation time	[MONT]											
3	Maximum speed record	[HHST]											
<p><b>3</b></p>	<p>Changing display for detail information</p>  <p>When "SEL" key (1) is pressed "ABCD" indicator will lit and display detail information.</p> <table border="1" data-bbox="715 1171 1460 1361"> <thead> <tr> <th>No.</th> <th>Information item</th> <th>Contents display</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Cumulative power on time (7 digits)</td> <td>[****](Unit: hours) *1</td> </tr> <tr> <td>2</td> <td>Cumulative operation time (7 digits)</td> <td>[****](Unit: hours) *1</td> </tr> <tr> <td>3</td> <td>Maximum speed record</td> <td>[****]</td> </tr> </tbody> </table> <p>*1 Normally the last 4 digits of counter are displayed, but if you press D <math>\Delta</math> key, the first 3 digits will be displayed.</p>	No.	Information item	Contents display	1	Cumulative power on time (7 digits)	[****](Unit: hours) *1	2	Cumulative operation time (7 digits)	[****](Unit: hours) *1	3	Maximum speed record	[****]
No.	Information item	Contents display											
1	Cumulative power on time (7 digits)	[****](Unit: hours) *1											
2	Cumulative operation time (7 digits)	[****](Unit: hours) *1											
3	Maximum speed record	[****]											
<p><b>4</b></p>	<p>For checking other information</p> <p>1. Press "SEL" key (1).</p>  <p>When "SEL" key (1) is pressed, "ABCD" indicator disappeared and display will be changed to "Item name" display.</p> <p>2. Repeat above procedure 2 to 3.</p>												
<p><b>5</b></p>	 <p>Maintenance information display will be exited and normal operation will be possible.</p>												

## 2-10 Adjusting motor reference position

<p><b>1</b></p>	<p>Entering motor reference position adjustment mode</p>  <p>(While pressing B <math>\Delta</math> key (1), turn power on.) "MORG" appears on the display.</p>																		
<p><b>2</b></p>	<p>Select adjustment item.</p>  <table border="1" data-bbox="694 600 1458 913"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Adjustment item</th> <th colspan="2">Main display</th> </tr> <tr> <th>Adjustment item</th> <th>Adjustment value</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Motor reference position (Required when motor is replaced)</td> <td>[MORG]</td> <td>-20 to 20 degrees</td> </tr> <tr> <td>2</td> <td>Needle up stop position (during individual adjustment)</td> <td>[UPOS]</td> <td>-5 to 10 degrees</td> </tr> <tr> <td>3</td> <td>Needle down stop position (during individual adjustment)</td> <td>[DPOS]</td> <td>-5 to 10 degrees</td> </tr> </tbody> </table> <p>1. Motor reference position is adjusted at the time of assembling in factory.          • If you would like to change only stop position, make adjustment at "2" Needle up stop position or "3" Needle down stop position.</p> <p><b>[NOTE]</b>          When this value is adjusted, needle up/down signal position will be changed. Other setting such as solenoid activating timing and needle up/down stop position will change in line with this.</p>		Adjustment item	Main display		Adjustment item	Adjustment value	1	Motor reference position (Required when motor is replaced)	[MORG]	-20 to 20 degrees	2	Needle up stop position (during individual adjustment)	[UPOS]	-5 to 10 degrees	3	Needle down stop position (during individual adjustment)	[DPOS]	-5 to 10 degrees
	Adjustment item			Main display															
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3	Needle down stop position (during individual adjustment)	[DPOS]	-5 to 10 degrees																
<p><b>3</b></p>	<p>Changing display to adjustment value</p>  <p>*When "SEL" key is pressed again, display will return back to adjustment item display.</p>																		
<p><b>4</b></p>	<p>Changing adjustment value</p>  <ul style="list-style-type: none"> <li>• When press D <math>\Delta</math> key adjustment value will increase.</li> <li>• When press C <math>\Delta</math> key adjustment value will decrease.</li> </ul> <p>* Setting value is different from default value, display will blink.          * Setting value "10" means 10 degrees rotation of motor.</p>																		
<p><b>5</b></p>	<p>Confirming of setting value</p>  <p>Value will be stored and display changes to adjustment item.</p> <p><b>[NOTE]</b>          Changed value will be effective when motor reference position adjustment mode is finished.</p>																		
<p><b>6</b></p>	 <p>Motor reference position adjustment mode will be exited and normal operation will be possible.</p>																		