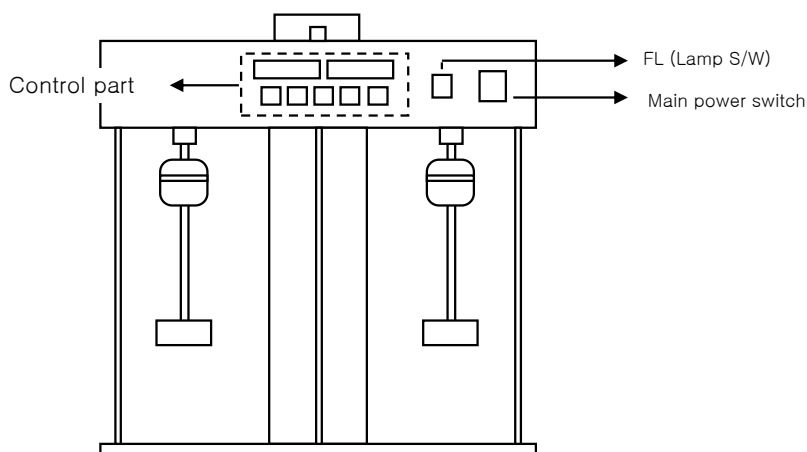


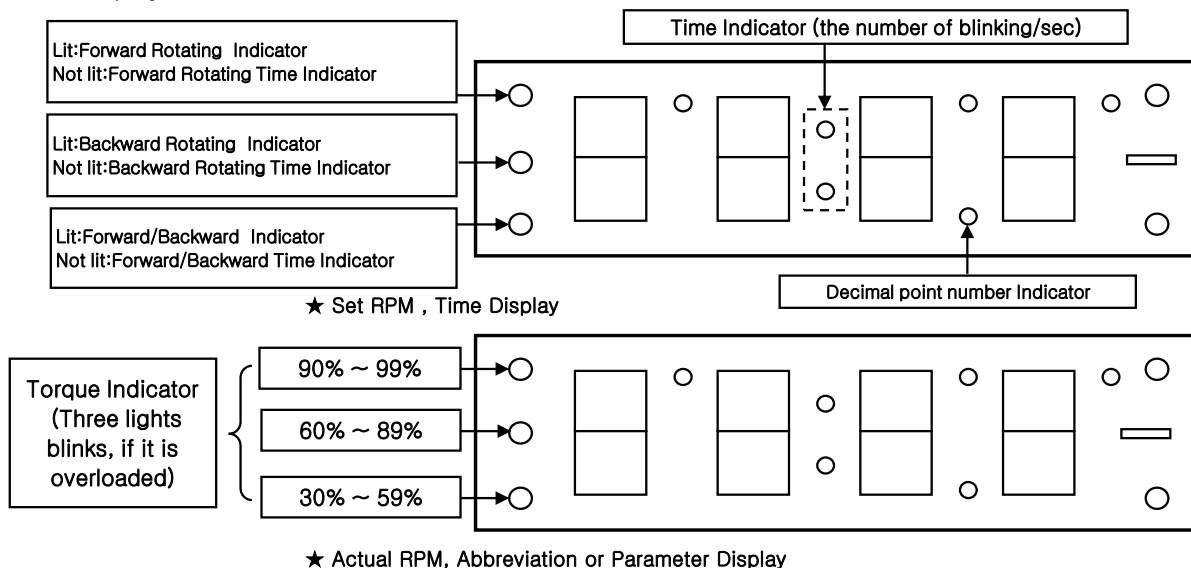
## 2. Functional Description



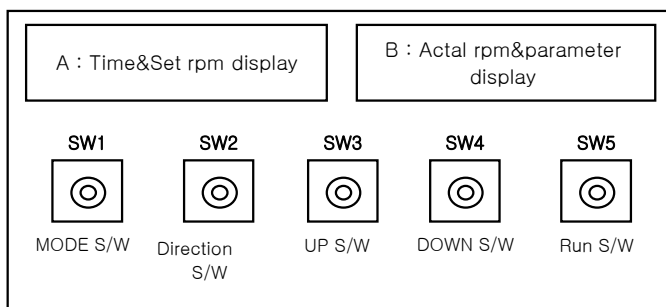
## 3. Technical Specifications

Model	JAR-TESTER	JAR-TESTER
No. of places	6	4
Stirring	Motor	Brushless DC motor 60W
	Capacity	up to 2000ml
	Speed	20 ~ 300rpm
Speed controller	Feed-back control	
Speed accuracy	20~49rpm( $\pm 5$ rpm), 50~300rpm( $\pm 1$ rpm)	
Speed display	Digital	
Stirring motion	1.Right 2.Left : operation 3.Auto-reverse : reverse time setting or timer operated	
Timer	99hr 59min	
Dimensions (WxDxH)	900 x 250 x 450	320 x 320 x 390
Electrical supply	AC220V 50/60Hz	

## 4. FND Display



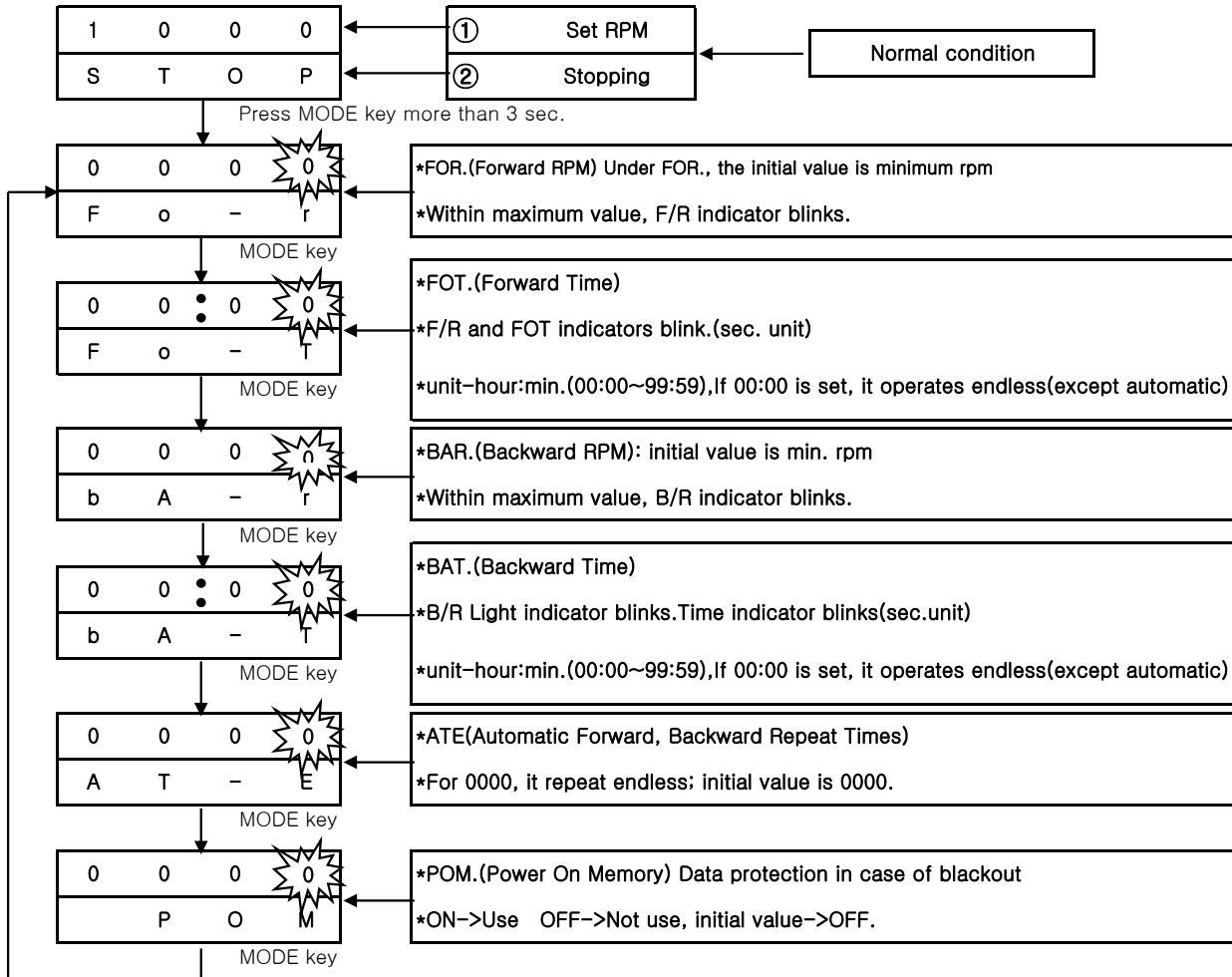
## 5. Function of each S/W TYPE(It could be changed by A-Type or B-Type as per each product)



- 'Mode' key : This key can be applicable to every mode. Under normal phase, at stop mode, this key allows to change the mode from forward, backward, automatic operation systematically.
- 'Direction' key : This key alters numerical line changes at the setting phase. Under normal motor phase, the 'Direction' key alters the display from remaining time to set RPM in turns. (vise versa)
- 'UP' key : Set mode can be increased.
- 'Down' key : Set mode can be decreased.
- Start/Stop key : This key can operate or stop the motor.

## 6. Description of each parameter

\* Turn on power, then last set RPM will be displayed on forward rotation.



- \* Direction key 4, Up key 5 and Down key 6 can alter the mode.
- \* To return to normal phase, press MODE Key more than 3 sec.(memory function)

## 7. Operation

### 1. Forward Rotating Mode(F/R Mode)

- 1)To execute F/R mode, press Mode S/W, F/R and Operating S/W orderly.
- 2)By pressing UP/DOWN S/W, you can modulate rpm under operation(to maximum rpm).
- 3)Under operation, it is possible to see remaining time by pressing direction S/W.
- 4)If set time is 00:00, there is no time limitation for consecutive operation.
- 5)Under a pause phase, you can see operating time by pressing direction S/W right.(a min unit)

### 2. Backward Rotating Mode(B/R Mode)

- 1)In order to execute B/R mode, after pressing mode S/W, chose B/R, then press Operating S/W.
- 2)By pressing UP/DOWN S/W, you can modulate rpm under operation(to maximum rpm).
- 3)Under operation, it is possible to see remaining time by pressing direction S/W.
- 4)If set time is 00:00, there is no time limitation for consecutive operation.
- 5)Under a pause phase, you can see operating time direction S/W right.(a min unit)

### 3. Automatic Operating Mode

- 1)To execute this mode, press mode S/W, automatic operating, operating S/W in order.
- 2)If FOT, BAT is not set, Error-1 occurs.
- 3)Under automatic operation, you cannot modulate rpm.
- 4)Under operation, it is possible to see remaining time and repeating times(F/B rotating) by pressing direction S/W.
- 5)If set time is 00:00, there is no time limitation for consecutive operation.
- 6)Under a pause phase, you can see operating time and repeating times by pressing direction S/W.(min/times)

## 8. Description of Operation

\*Turn on power, then last set RPM will be displayed on forward rotation.

In forward rotating operation

Ex) FOR 900 , FOT 00:01 setting  
BAR 500 , BAT 00:05 setting

Normal Action(Forward rotation)

Display	F/R Indicator is lit.
Time executed	The number of blinking/sec (display)
Press Direction key: remaining time → set RPM (in truns)	
Motor → Forward rotating with 900RPM(1 min.later, the motor stops).	

In automatic rotating operation -1

Ex) FOR 900 , FOT 00:01 setting  
BAR 500 , BAT 00:05 setting  
ATE 0000 setting

Normal Action

Display	A/R indicator is lit.(For F/R, F/R Indicator is lit. For B/R, B/R Indicator is lit.)
Press 'Direction' key: remaining time → set RPM (in truns)	
Motor → F/R for 1 min. with 900RPM: 5 sec later, 1 min of B/R 900rpm: 5 sec.later F/R again.. Unlimited repeat	

In backward rotating operation

Ex) FOR 900 , FOT 00:01 setting  
BAR 500 , BAT 00:05 setting

Normal Action(Backward rotation)

Display	B/R Indicator is lit.
Time executed	The number of blinking/sec(display)
Press Direction key: remaining time → set RPM (in truns)	
Motor → Backward rotating with 500RPM(5 min.later, the motor stops).	

In automatic rotating operation -2

Ex) FOR 900 , FOT 00:01 setting  
BAR 500 , BAT 00:05 setting  
ATE 0005 setting

Normal Action

Display	A/R Indicator is lit(For F/R, F/R Indicator is lit. For B/R, B/R Indicator is lit.)
Time 작동시	F/B Rotating time blinks(when motor executed)
Press 'Direction' key: remaining time → set RPM (in truns)	
Motor → F/R for 1 min. with 900RPM: 5 sec later, 1 min of B/R 900rpm: 5 sec.later F/R again.5 times of F/R puls B/R, it pauses.	

RAT(Ratio)	rA7
RPM(MAX.RPM)	rPn7
FOR(Forward Operating RPM)	FO-r
BAR(Backward Rotating RPM)	bA-r
ATE(Automatic Total Times)	A7-E
POW(Motor Power)	POW
M-R(Max.RPM of motor)	n7-r
Error-1	Er-1
ON	on

PAU (Pause)	PAU
SAT(Soft start time)	SA7
FOT(Forward Operating Time)	FO-7
BAT(Backward RotatingTime)	bA-7
Power failure compensation	Pon7
STOP	Stop
PERCENT(%)	Pro
Error-2	Er-2
OFF	oFF

## 9. Miscellaneous [Key explanation in details and other operating sets]

### 1. Description of each S/W

#### 1) S/W1 : Direction S/W

Condition	Operation mode	Description of operation	Remark
Operation	Forward rotating	Display of remaining time==>Display of setting RPM (Repeat)	
	Backward rotating	Display of remaining time==>Display of setting RPM (Repeat)	
	Automatic Mode	Remaining Time for Forward(Backward) Rotating==>Repeated Remaining Time for Forward(Backward) Rotating==>Remaining Time for Forward(Backward) Rotating (Repeat)	
Stop	Forward rotating	Forward rotating==>Forward rotating Set rpm indicator (repeat)	It indicates operating time and F(B)/R repeating times before pausing.
	Backward rotating	Forward rotating==>Forward rotating Set rpm indicator (repeat)	
	Automatic Mode	F/R==>B/R rpm==>B/R Time ==>F/B Repeat Times==>B/R rpm Indicator (repeat)	

#### 2) S/W2 : MODE S/W

- ① When S/W2 is pressed under a pause mode: backward => automatic => forward rotating will be displayed in turns.

#### 3) S/W3,S/W4 : UP/DOWN S/W

- ① There is no function under pause mode.
- ② Under F/B rotating (but automatic), this key allows to increase/decrease set rpm.
- ③ Rpm modulation limit is from min.rpm to max.rpm.
- ④ Even if rpm was modulated under operation, a stop mode alters it to previously set rpm.

#### 4) S/W5 : Operating/Stop S/W

- ① When the motor executes, this key stops it. (vice versa)
- ② Under automatic mode, if F/B rotating time is not set, it causes Error-1. (see Error)
- ③ In case of every error, it does not allow operation.

## 10. Explanation for error message and solution

### 1. Error-1: Set-time Error

- 1) It occurs when F/B rotating time (under automatic operation) is not set.
- 2) To solve the problem, set operation time.

### 2. Error-2 : MOTOR Over-current Error (PROGRAM Sensing)

- 1) It occurs when motor executes more than 91% over its capacity, consecutively 10 seconds.
- 2) The output is different from motor to motor (or from RPM to RPM).
- 3) To solve the problem, turn off the motor first, then turn on again.

### 3. Error-3 : Reach out of Minimum RPM

- 1) It occurs when minimum RPM cannot be achieved within 10 sec. of operation.
- 2) Stirrer=100RPM (Output RPM=100/gear rates)
- 3) To solve the problem, turn the motor off/on again.

### 4. Error-4 : If motor stops during the operation, Error-4 will be displayed.

- 1) Sense works only under rotating process.
- 2) Sense delay time: before set RPM- within 10 sec. after set time- 0.2s.  
Set RPM is less than 500 (Motor)- after 5sec. after Set RPM executed.
- 3) If rotating is not occurs from beginning of operation, it can categorize in Error-3.
- 4) To solve the problem, turn the motor off/on again.

### 5. Error-5 : Motor sensor error

- 1) Motor sense output problem
- 2) To solve the problem, turn the motor off/on again.

### 6. Error-6 : MOTOR Over-current Error (HARDWARE Sensing)

- 1) FET (MOTOR output device) Error or MOTOR Interior Problems
- 2) Soon after sensing problems, error occurs.
- 3) To solve the problem, turn the motor off/on again.
- 4) For consecutive errors, check motor or PCB.

## 11. Miscellaneous

1. If there is no input for more than 60 sec. at MODE or PARAMETER level, then the display will return to the standard phase.
2. Under normal operation, RPM changes are available by pressing Up/Down Key (Maximum RPM Setting).  
--> This function is not available under automatic operation. Set-time is not changed.
3. Under automatic operation, by pressing 'Direction' Key, the display will be turned AUTT time to Set RPM.
4. For PARAMETER setting, press MODE Key more than 3 sec.
5. At the beginning of setting, by pressing MODE Key, the display will be changed for the following turns:  
Forward Rotating-> Backward Rotating-> Automating Operation.
6. When over-loaded, 3EA of torch (more than 90%) will blink at the same time. After 5 sec. it pauses.  
--> Within 5 sec (less than 90%), it executes normally. In order to reset, turn off/on the motor.
7. Numerical value changes; for upward, 0->1->2->3...8->9->0->1. for downward, reverse turns.