

Operation Details

1. LED display of indoor unit

Operation Indicator

- On while in appliance operation, off while in appliance pause.
- Blinking(3sec off/0.5sec on) according to Error Code as long as the system malfunctions.

Sleep Timer Indicator

- On while in sleep timer mode, off when sleep timer cancel or appliance operation pause.

Timer Indicator

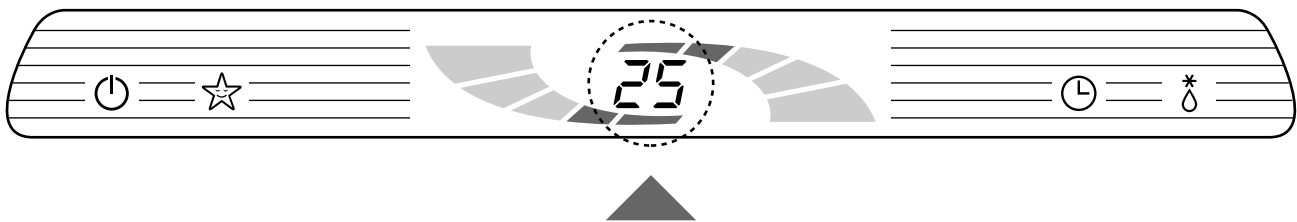
- On while in timer mode(on/off), off when timer mode is completed or canceled.

Defrost Indicator

- Off except when hot start during heating mode operation or while in defrost control.

Setting Temp.

- Cooling/heating/dehumidification mode : setting temperature from remote control
- Fuzzy operation mode : fuzzy key data(5sec on) → AI



Operation Indicator	Cooling heating dehumidification	A.I operation mode						Jet cool
		Standard	Too hot	Hot	Comfor-table	Cold	Too cold	
Shape of display	Setting temp.	A1	-2	-1	0	1	2	P0

■ How to operate the power display

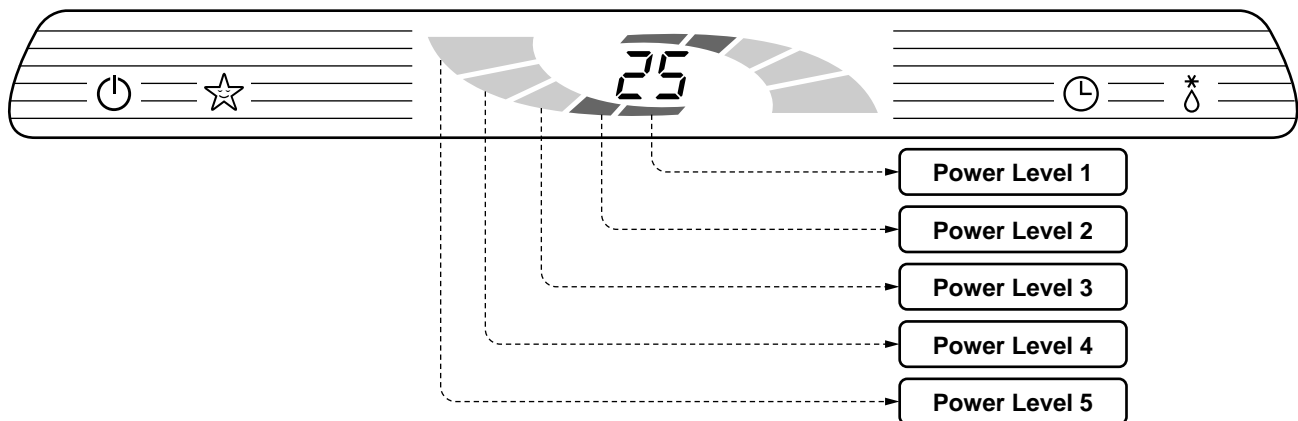
- It must be displayed the power level that will be operating frequency of compressor.
- It indicates power levels that compressor operating frequency is controlled to depend on indoor and outdoor conditions.
- It is displayed as below.

□ Heat mode operation

- Power level 1: below \varnothing of COMP. operating frequency
- Power level 2: below \varnothing of COMP. operating frequency
- Power level 3: below \varnothing of COMP. operating frequency
- Power level 4: below \varnothing of COMP. operating frequency
- Power level 5: over \varnothing of COMP. operating frequency

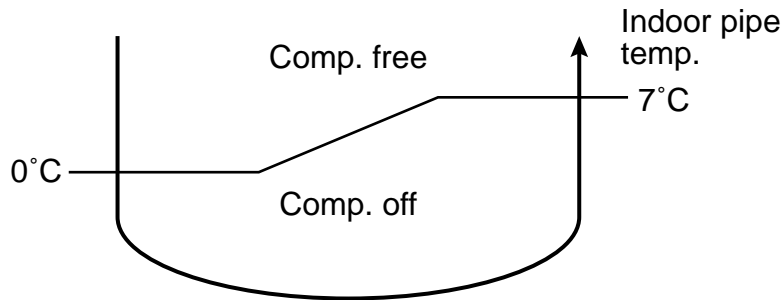
□ Operation mode except heat mode operation

- Power level 1: below \varnothing of COMP. operating frequency
- Power level 2: below \varnothing of COMP. operating frequency
- Power level 3: below \varnothing of COMP. operating frequency
- Power level 4: below \varnothing of COMP. operating frequency
- Power level 5: over \varnothing of COMP. operating frequency



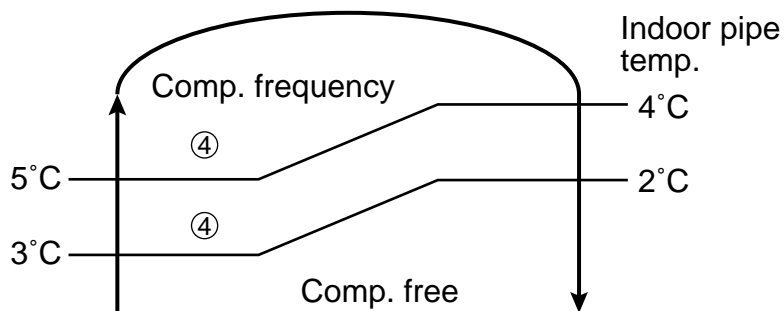
2. Protection of the evaporator pipe from frosting

- If the indoor pipe temperature is below 0°C in 7 min. after the compressor operates without pause while in cooling cycle operation mode,
 - compressor, outdoor fan are turned off.
- When indoor pipe temp. is 7°C or higher after 2 min pause of compressor
 - compressor, outdoor fan is turned on according to the condition of the room temperature.



3. Protection of the indoor fan from droplet formation (Enclosure sweat and condensed disposal test)

- **Control condition** : The system operates standard operation without this condition as follows.
 - Setting temperature <25°C
 - Indoor fan speed ≤ low speed
 - Outdoor temperature < 31°C
- **Control method**
 - Operation frequency of compressor must be below ④ (refer to the comp. Freq. table)
 - The indoor fan operates at medium speed.



4. Cooling mode operation

- Operating frequency of compressor depend on the difference of the temperature.
(= intake air Temp.- Compressor off Temp.)
- Compressor off temp.= setting temp. -0.5°C
on temp. = setting temp. $+0.5^{\circ}\text{C}$
- If compressor operates at some operating frequency, the operating frequency of compressor cannot be changed within 30 seconds.
- Condition of compressor turned off
 - When intake air temperature stay at the temperature between setting temp. -0.5°C and setting temp. -1.0°C for 3 minutes continuously.
 - When intake air temperature reaches below the temperature of setting temp. -1.0°C .
- Compressor 2 minutes delay
 - The compressor can restart minimum 2 minutes later after compressor off.

[The operating freq. step of comp.]

Temp. differences	Comp. Operating frequency
over 2.5°C	□
$2.0\sim 2.49^{\circ}\text{C}$	□
$1.5\sim 1.99^{\circ}\text{C}$	□
$1.0\sim 1.49^{\circ}\text{C}$	□ \oplus
$0.5\sim 0.99^{\circ}\text{C}$	□ \oplus
$0.0\sim 0.49^{\circ}\text{C}$	□

[The targeting operating freq. of comp. each model]

Model	Comp. Operating frequency					
	□	□ \oplus	□ \oplus	□ (Fc)	□	□
LS-J0760NL	35	38	47	56	66	73
LS-J0961NL/NT	41	53	64	73	80	86
LS-L1260NL/NT	35	38	47	58	66	73

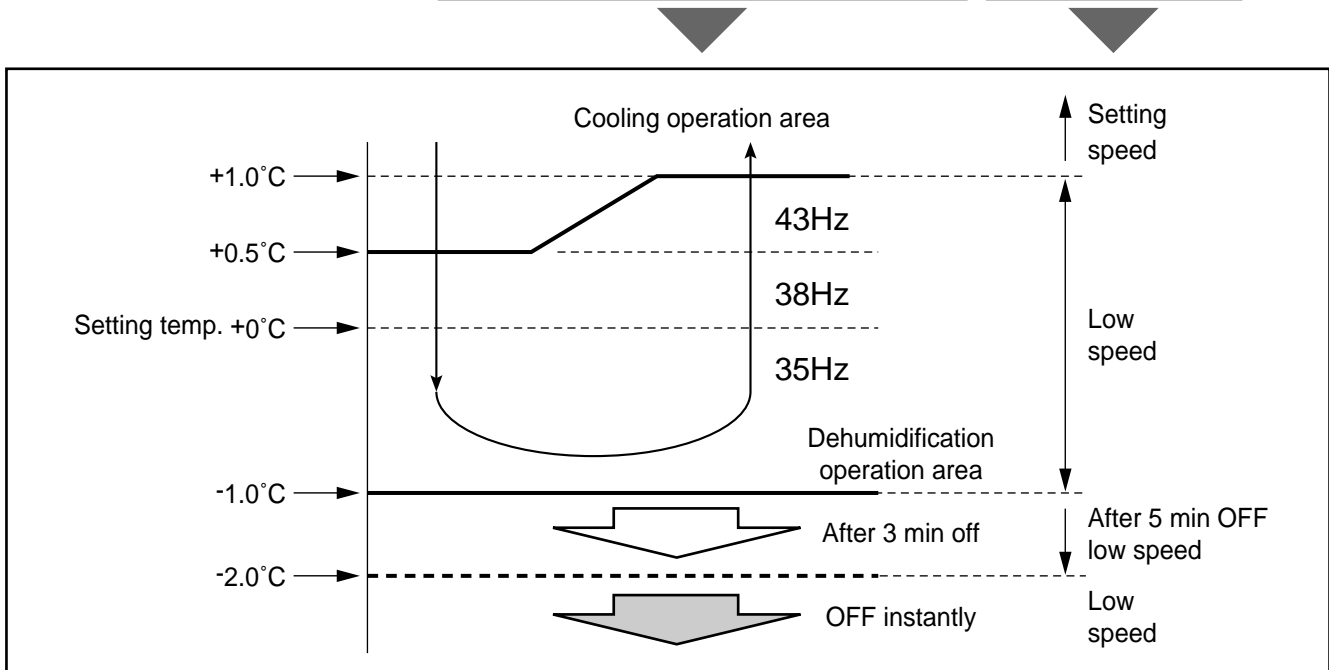
5. Healthy Dehumidification mode operation

- When the dehumidification operation is set by the remote controller the intake air temperature is detected and the setting temp. is automatically set according to the intake air temperature.

Temp. differences	Comp. Operating frequency
$32^{\circ}\text{C} \leq \text{intake air temp.}$	25°C
$26^{\circ}\text{C} \leq \text{intake air temp.} < 32^{\circ}\text{C}$	25°C
$24^{\circ}\text{C} \leq \text{intake air temp.} < 26^{\circ}\text{C}$	intake air temp. -1°C
$18^{\circ}\text{C} < \text{intake air temp.} < 24^{\circ}\text{C}$	intake air temp. -0.5°C
intake air temp. $\leq 18^{\circ}\text{C}$	18°C

- Operating frequency of compressor and indoor fan speed.

Operating frequency of compressor Indoor fan speed



6. Heating mode operation

- Operating frequency of compressor depend on the difference of the temperature
(= compressor off temp. - intake air temp.)
- Compressor off temp. = setting temp.+3.0°C
on temp. = setting temp.
- If compressor operates at some operation frequency, the operating frequency of compressor cannot be changed within 30 seconds.
- Condition of compressor turned off
 - When intake air temperature reaches +3°C above the setting temperature.
- Condition of indoor fan turned off
 - While in compressor on: indoor pipe temp. < 26°C
 - off: indoor pipe temp. < 37°C
- While in defrost control, between the indoor and outdoor fans are turned off.
- Compressor 2minutes delay
 - After compressor off, the compressor can restart minimum 2 minutes later.

[The operating freq. step of comp]

Temp. differences	Comp. Operating frequency
over 3.0°C	§
2.5~3.0°C	□ ₁
2.0~2.49°C	□
1.5~1.99°C	□
1.0~1.49°C	□°
0.5~0.99°C	□∅
0.0~0.49°C	□

[The targeting operating freq. of comp. each model]

Model	Comp. Operating frequency						
	□	□∅	□°	□	□ (Fh)	□ ₁	§
LS-J0760NL	35	43	53	66	78	83	92
LS-J0961NL/NT	40	56	68	78	90	96	105
LS-L1260NL/NT	43	47	53	64	73	83	90

7. Fuzzy mode operation

- When any of operation mode is not selected like the moment of the power on or when the unit turned off, the operation mode is selected.
- When determining the operation mode, the compressor, outdoor fan are off and only the indoor fan is operated for 15seconds, then an operation mode is selected according to.

Basis of determining operating mode

Outdoor temp.	Operating Mode
over 24°C	Cooling
21~24°C	Healthy Dehumidification
18~21°C	intake air temp. $\geq 25^{\circ}\text{C}$... Dehumidification intake air temp. $< 25^{\circ}\text{C}$... Heating
below 18°C	Heating

7.1 Fuzzy operation for cooling

- According to the setting temperature selected by Fuzzy rule, the operating frequency of compressor is determined like cooling mode operation.
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temperature at that time.
- When the Fuzzy key(=setting temp. key) is input after the initial setting temperature is selected, the Fuzzy key value and intake air temperature at that time are compared to select the setting temperature automatically according to the fuzzy rule.
- While in Fuzzy operation, the air flow speed of the indoor fan is automatically operated by chaos logic.

	Intake air temp.	Setting temp.	Fan speed
at beginning	over 26°C	25°C	CHAOS airflow
	18~26°C	intake air temp. -05°C	
	below 18°C	18°C	
during operation	18~30°C	Fuzzy rule	
	below 18°C	18°C Fuzzy rule	
	over 30°C	30°C Fuzzy rule	

7.2 Fuzzy operation for Heating

- According to the setting temperature selected by Fuzzy rule, the operating frequency of compressor is determined like heating mode operation.
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temperature at that time.
- When the Fuzzy key(=setting temp. key) is input after the initial setting temperature is selected, the Fuzzy key value and intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically operated by CHAOS logic.

	Outdoor temp.	Setting temp.	Fan speed
at beginning	over 26°C	intake air temp. +0.5°C	CHAOS airflow
	0~5°C	intake air temp. +1.0°C	
	-5~0°C	intake air temp. +1.5°C	
	below -5°C	intake air temp. +2.0°C	
during operation	16~30°C	Fuzzy rule	
	below 16°C	18°C Fuzzy rule	
	over 30°C	30°C Fuzzy rule	

7.3 Fuzzy operation for dehumidification

- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temperature at that time.
- According to the setting temperature selected by Fuzzy rule, the operating frequency of compressor is determined like dehumidification mode operation.

	Outdoor temp.	Setting temp.	Fan speed
at beginning	over 26°C	25°C	CHAOS airflow
	18~26°C	intake air temp. -0.5°C	
	below 18°C	18°C	
during operation	same as dehumidification mode		

8. Jet cool mode operation

- While in heating mode or Fuzzy operation, the Jet Cool key cannot be input. When it is input while in the other mode operation (cooling, dehumidification, ventilation), the Jet Cool mode is operated.
- In the Jet Cool mode, the indoor fan is operated super-high speed for 30 min. at cooling mode operation.
- In the Jet Cool mode, the room temperature is controlled to the setting temperature, 18°C.
- When the sleep timer mode input while the Jet Cool mode operation, the Jet Cool mode has the priority.
- When the Jet Cool key is input, the upper/lower vane is reset to those of the initial cooling mode and then operated in order that the air outflow could reach further.

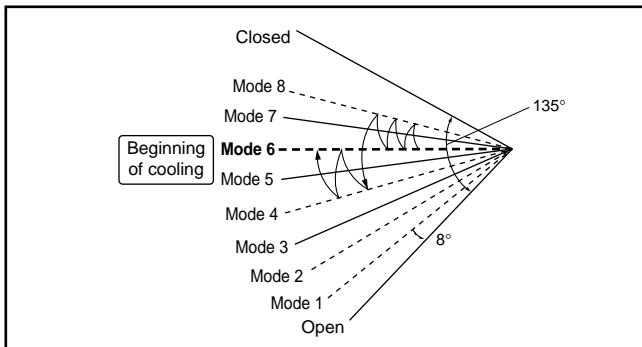
9. Swing mode

9.1 Chaos swing mode of not fuzzy mode operation

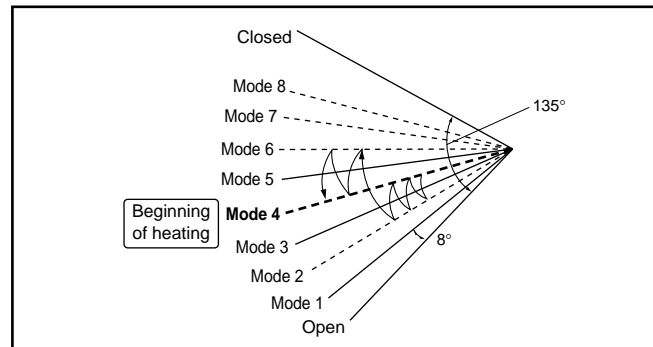
- By the Chaos swing key input, the upper/lower vane automatically operates with the Chaos swing or it is fixed to the desired direction.

Chaos swing of LS-J0760NL/LS-J0901NL/NT

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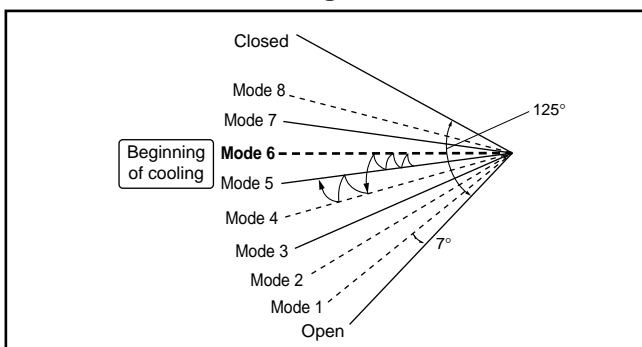


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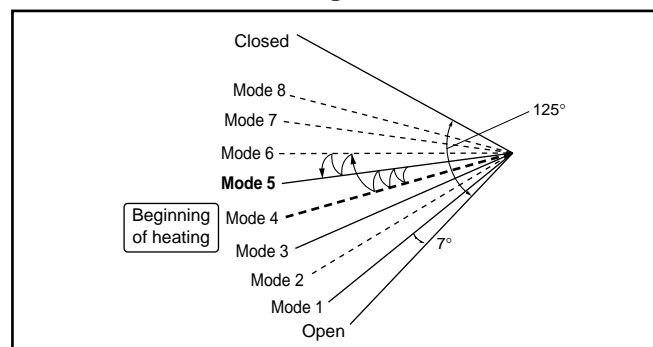


Chaos swing of SL-L1260NL/NT

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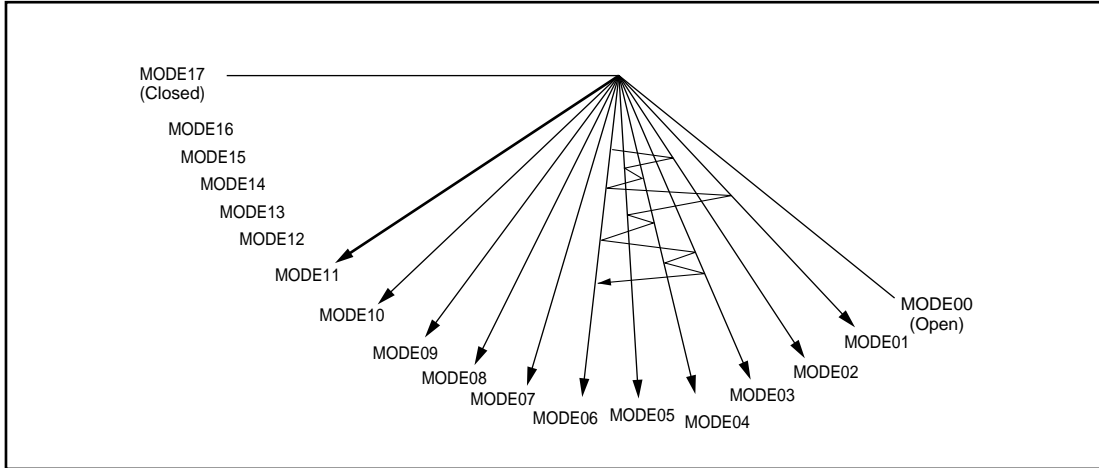
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9.2 Auto swing of Fuzzy mode operation

- While in Fuzzy mode operation, Chaos swing is operated according to $1/f$ fluctuation.

1/f fluctuation

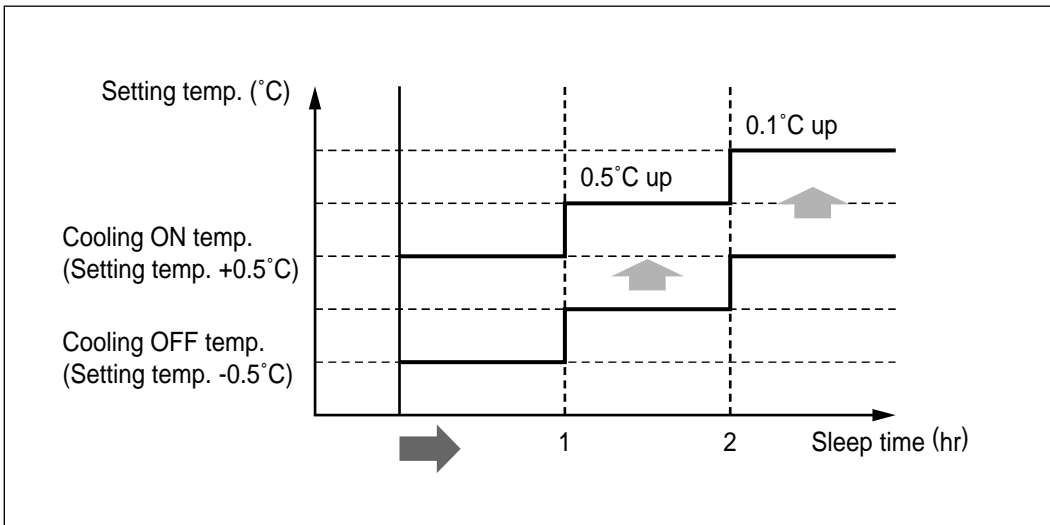


10. Sleep timer operation

- When the sleep time is reached after [1,2,3,4,5,6,7hr] is input by the remote control during the operation, the operation of the appliance stops.
- When the appliance is on pause, the sleep timer mode cannot be input.

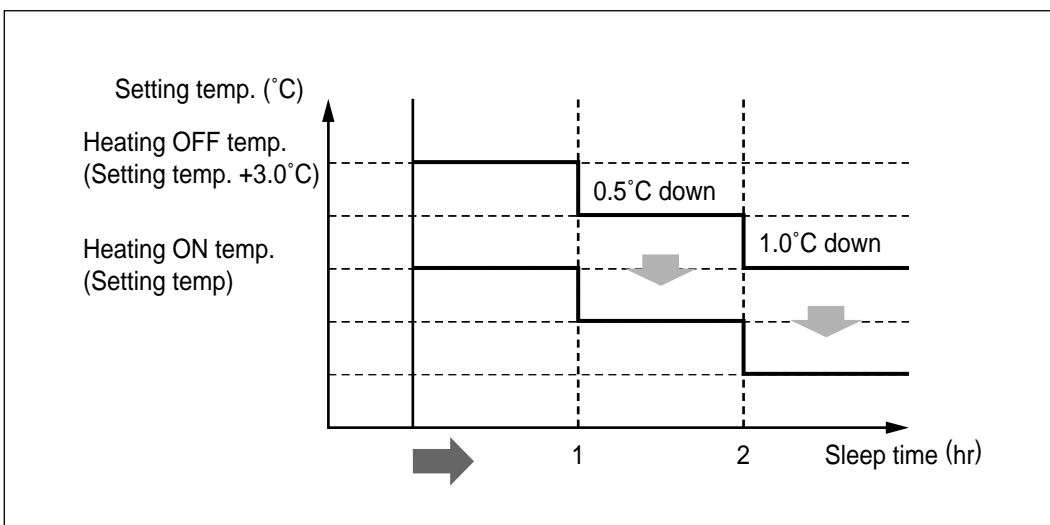
10.1 Sleep timer operation for cooling cycle

- While in cooling mode operation, 60 min. later since the start of the sleep timer, the setting temperature increase by 0.5°C. After another 60min. elapse, it increases by 1°C again.



10.2 Sleep timer operation for heating cycle

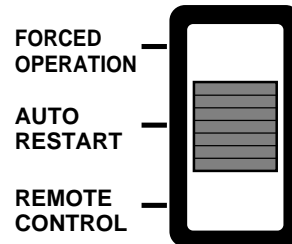
- While in heating mode operation, 60 min. later since the start of the sleep timer, the setting temperature decrease by 0.5°C. After another 60min. elapse, it decreases by 1°C again.



11. Auto restarting operation

- When the power is restarted after a sudden power failure while in appliance operation, the mode before the power failure is kept on the memory and the appliance automatically operates in the mode on the memory.
- The slide switch on the indoor unit of the appliance should be on the AUTO RESTART position in order that the Auto restarting operation is available.
- Operation mode that is kept on the memory
 - State of operation ON/OFF
 - Operation mode/setting temp./selected airflow speed
 - Sleep timer mode/remaining time of sleep timer
- If no input by the remote control or no switching of the slide switch within 7 hours after the appliance operates by the Auto restarting operation, the appliance is forced to stop at the moment of 7-hr elapse.

Slide Switch of indoor unit



12. Forced operation

- To operate the appliance by force in case that the remote control is lost, the forced operation selection switch is on the main unit of the appliance to operate the appliance in the standard conditions.
- The operation condition is set according to the outdoor temp. and intake air temperature as follows.

Outdoor temp.	Operating Mode	Setting temp.	Setting speed of indoor fan
over 24°C	Cooling	22°C	High speed
21~24°C	Healthy Dehumidification	23°C	
18~21°C	Intake air temp. $\geq 25^{\circ}\text{C}$ \rightarrow Dehumidification	23°C	
	Intake air temp. $< 25^{\circ}\text{C}$ \rightarrow Heating	24°C	
below 18°C	Heating	24°C	

13. Power relay control

- Power relay turns on 1 second later after the power is input to the outdoor unit.
- Control sequence : power on → PTC operating → power relay on

14. Protection from total current control

■ CT1 control

- If the operating current reaches I1, the operating frequency of the compressor decrease.
- After decreasing the operating frequency by 1step, if operating current is below I1 for 24 seconds continuously, the operating frequency of compressor increase by 1step.

■ CT2 control

- If the operating current of the appliance reaches I2, the compressor stop instantly and 2 minutes later the compressor restart again.
- If CT2 occurs twice within 1hour, the appliance turn off and display ERROR CODE 7.

Control table		* I1:Current of operating frequency down I2: Current of compressor cut off					
Condition \ Model		LS-J0760NL		LS-J0961NL/NT		LS-L1260NL/NT	
Operating mode		Cooling	Heating	Cooling	Heating	Cooling	Heating
below 38°C (outdoor temp.)	I1	7.5A	8.0A	8.5A	10A	10.5A	12A
	I2	11.5A		13.5A		13.5A	
over 38°C (outdoor temp.)	I1	7.5A	8.0A	8.5A	10A	10A	11.5A
	I2	11.5A		13.5A		13.5A	

cf. I1 is set the lowest level between initial value and in case detection of dc peak current.

15. Protection from DC Peak Current

■ DC Peak Current Error by a fault signal of IPM

- If the operating current of IPM reaches 35A ±3A, the compressor stop instantly.
- If DC PEAK occurs 3 times within 1 hour, the appliance turns off and display ERROR CODE 6.

■ DC Peak Current Error by the compressor lock

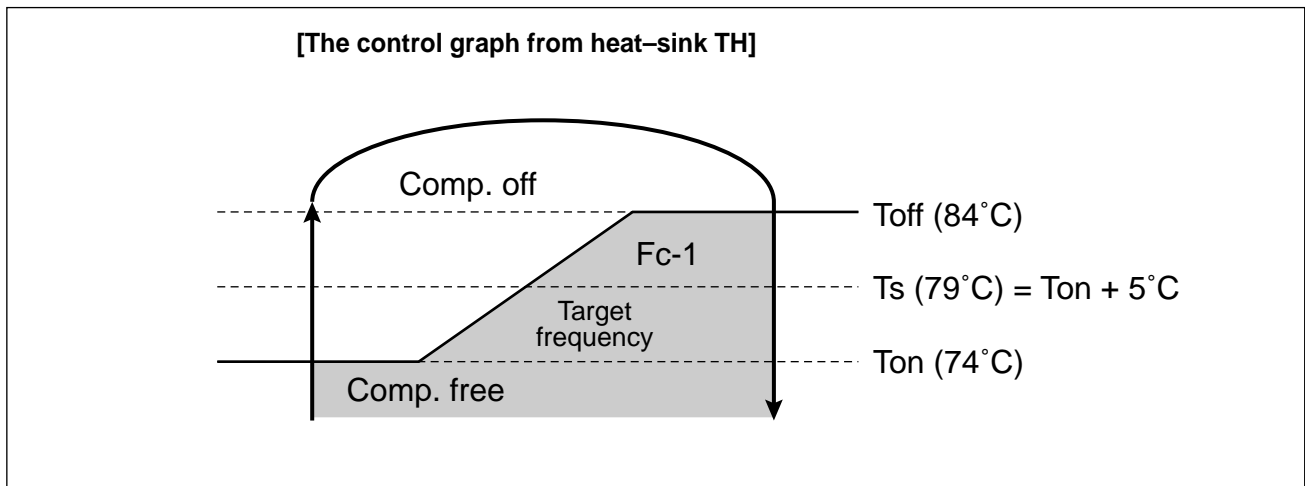
- If the DC LINK voltage below DC 350V occurs 5 times within 1 hour while the compressor is operating, the appliance turns off and display ERROR CODE 6

■ DC Peak Current Error by the Outdoor Fan Lock

- If it's 5 times within 1 hour in case of the temperature of outdoor pipe TH is over 65°C while the compressor is operating, the appliance turns off and display ERROR CODE 6

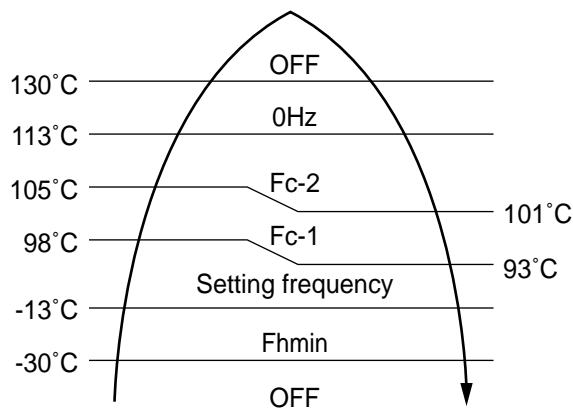
16. Protection from overheating of power module

- If the temperature of the heat sink TH. reaches over T_{off} , the Compressor stop instantly.
- It will be limited the compressor operating frequency according to the heat sink TH.(refer to below FIG.)
- It will be blink 4 times, when the thermistor is open or short, also the temperature is over T_{off} .



17. Protection from overheating of compressor

- If the temperature of the discharge pipe of compressor reaches over 130°C or below -30°C the compressor stop instantly.
- It will be limited the compressor operating frequency according to the compressor dome TH.(Refer to below Fig.)



18 . Defrosting control

- While in heating mode operation in order to protect the evaporator pipe of the outdoor unit from freezing, reversed to cooling cycle to defrost the evaporator pipe of the outdoor unit.
- Defrosting control is available 45 minutes later since heating cycle started and the pipe temperature of outdoor unit reaches below -6°C .

