DIN size W48×H48mm, Digital LCD Timer(Back Light type)

▣Features

- ●Built in battery allows program change with power off
- ●Power supply : 100−240VAC 50/60Hz / 24−240VDC
- ●Wide range of time settings(0.01sec. ~ 9999hour)
- ●Lock function for saving data
- ●Various output modes
- ●Soft touch setting type
- ●High visibility LCD display with backlight
- ●Independent ON/OFF times can be programmed in flicker output mode

⚠ **Please read "Caution for your safety" in operation manual before using.**

CE

▣Ordering information

L E 4 S □

	Time limit 1c
A	Time limit 2c, Instantaneous 1c+Time limit 1c(Selectable)
S	DIN Size W48mm×H48mm
4	9999(Digit)
E□	Timer
L	LCD Display

▣Specifications

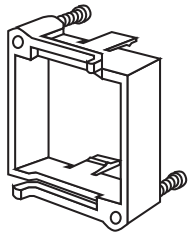
Model		LE4S	LE4SA
Function		Multi operation, Multi time range	
Display method		Backlight LCD type(Character size ☞ Processing part:W6.3×H10mm, setting part:W4×H7.6mm)	
Power supply		100−240VAC 50/60Hz / 24−240VDC	
Allowable voltage range		90 ~ 110% of rated voltage	
Power consumption		Approx. 3VA(240VAC 60Hz), Approx. 1W(240VDC)	
Return time		Min. 200ms	
Min. input signal	START input	Min. 200ms	————
	INHIBIT input		
	RESET input		
Input	START input	●No−voltage input Short−circuit impedance : Max. 1kΩ Residual voltage : Max. 1V Open−circuit impedance : Min. 100kΩ	POWER ON START type
	INHIBIT input		
	RESET input		
Control output	Contact type	Time limit SPDT(1c)	Time limit DPDT(2c), Time limit SPDT(1c) + Instantaneous SPDT(1c):Selectable
	Contact capacity	NO : 250VAC 3A resistive load, NC : 250VAC 2A resistive load	
Relay life cycle	Mechanical	Min. 10,000,000 operations	
	Electrical	Min. 100,000 operations at 250VAC 2A resistive load	
Memory retention		10 years at 25℃ and when LCD and input key turns OFF, 40 days at 25℃ and when LCD and input key turns ON continually	
Output mode		10 kinds of operating mode	7 kinds of operating mode
Ambient temperature		−10 ~ +55℃(at non−freezing status)	
Storage temperature		−25 ~ +65℃(at non−freezing status)	
Ambient humidity		35 ~ 85%RH	

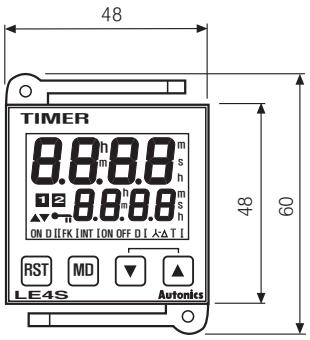
▣Specifications

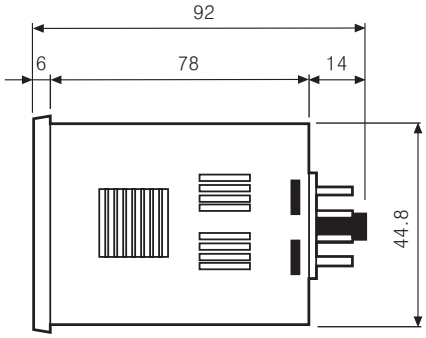
Repeat error		Max. ±0.01% ±0.05sec(Power Start) Max. ±0.005% ±0.03sec(Signal Start)	
Setting error			
Voltage error			
Temperature error			
Insulation resistance		Min. 100MΩ (at 500VDC)	
Dielectric strength		2000VAC 50/60Hz for 1 minute	
Noise strength		±2kV the square wave noise(pulse width:1㎲) by the noise simulator	
Vibration	Mechanical	0.75mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 1hour	
	Malfunction	0.5mm amplitude at frequency of 10 ~ 55Hz in each of X, Y, Z directions for 10 minutes	
Shock	Mechanical	300m/s² (30G) in X, Y, Z directions for 3 times	
	Malfunction	100m/s² (10G) in X, Y, Z directions for 3 times	
Approval		CE	
Weight		Approx. 126g	Approx. 130g

▣Dimensions

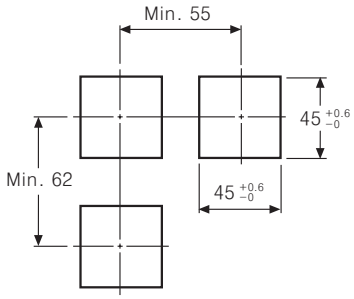
●Bracket

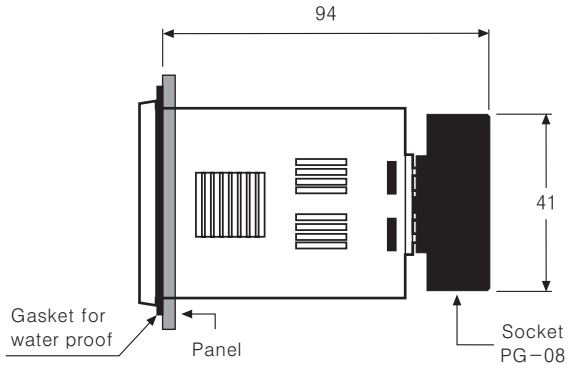






●Panel cut-out

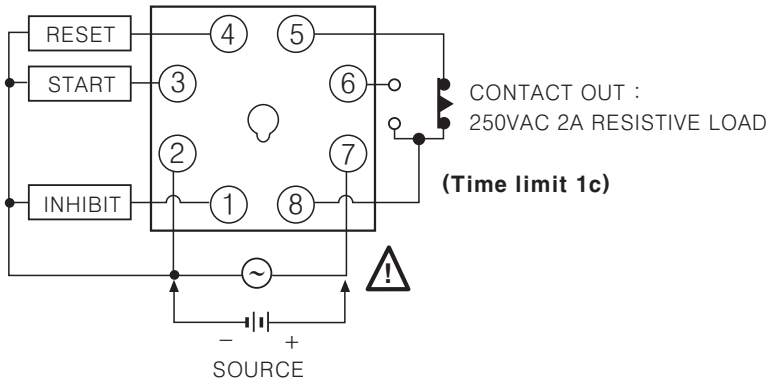




Unit:mm

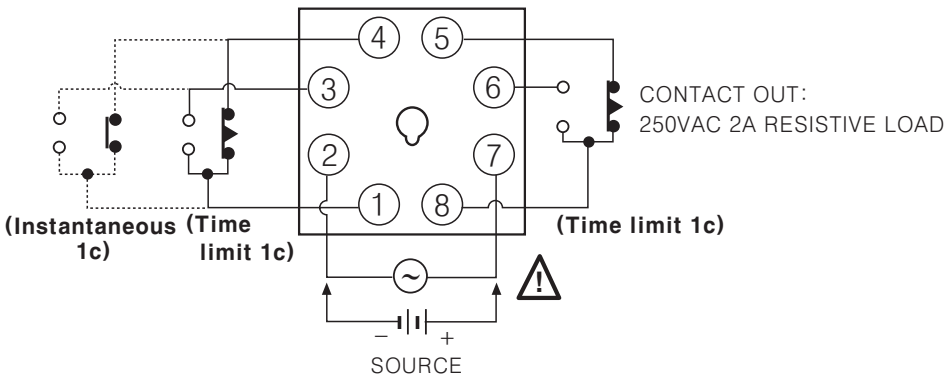
▣Connections

◎LE4S



◎LE4SA

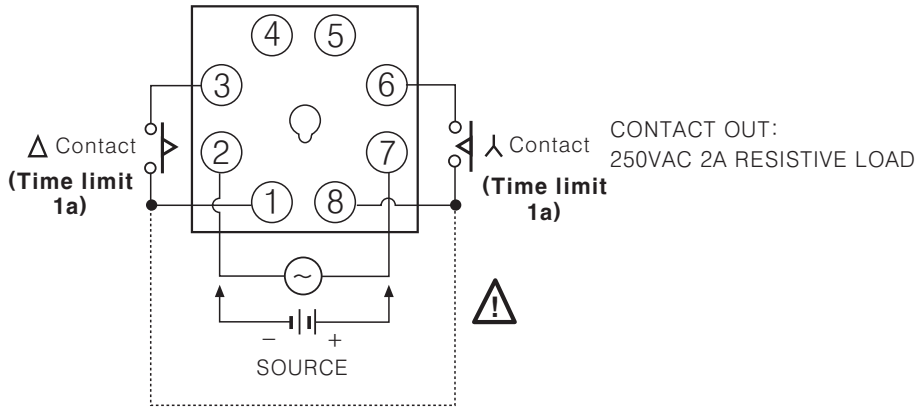
●[**ON.D**] [**ON.D.II**] [**FK**] [**INT**] [**T**] [**T.I**] mode



※[**ON.D**] [**ON.D.II**] [**FK**] [**INT**] mode : Instantaneous 1c + Time limit 1c, Time limit 2c(Selectable)
(See B-24 for selecting the output contact)

※[**T**] [**T.I**] mode : Fixed Time limit 2c

● [人-△] mode

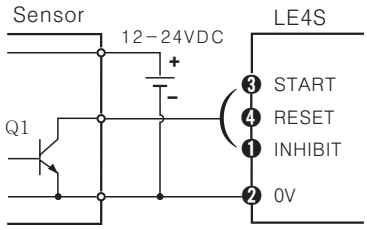


※Please connect ①, ⑧ from external.

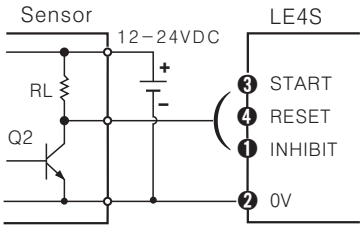
▣Input connections

LE4S is No-voltage input(Short-circuit and open) type.

◎Solid-state input

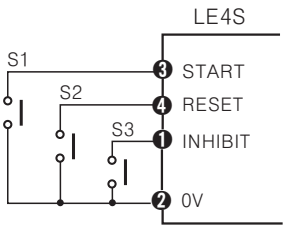


●Q1 is ON : Operating
●Sensor : NPN open collector output
●Short-circuit level(Transistor:ON)
Residual voltage : Max. 1V,
Impedance : Max. 1kΩ
●Open-circuit level(Transistor OFF)
Impedance : Min. 100kΩ



●Q2 is ON : Operating
●Sensor : NPN universal output

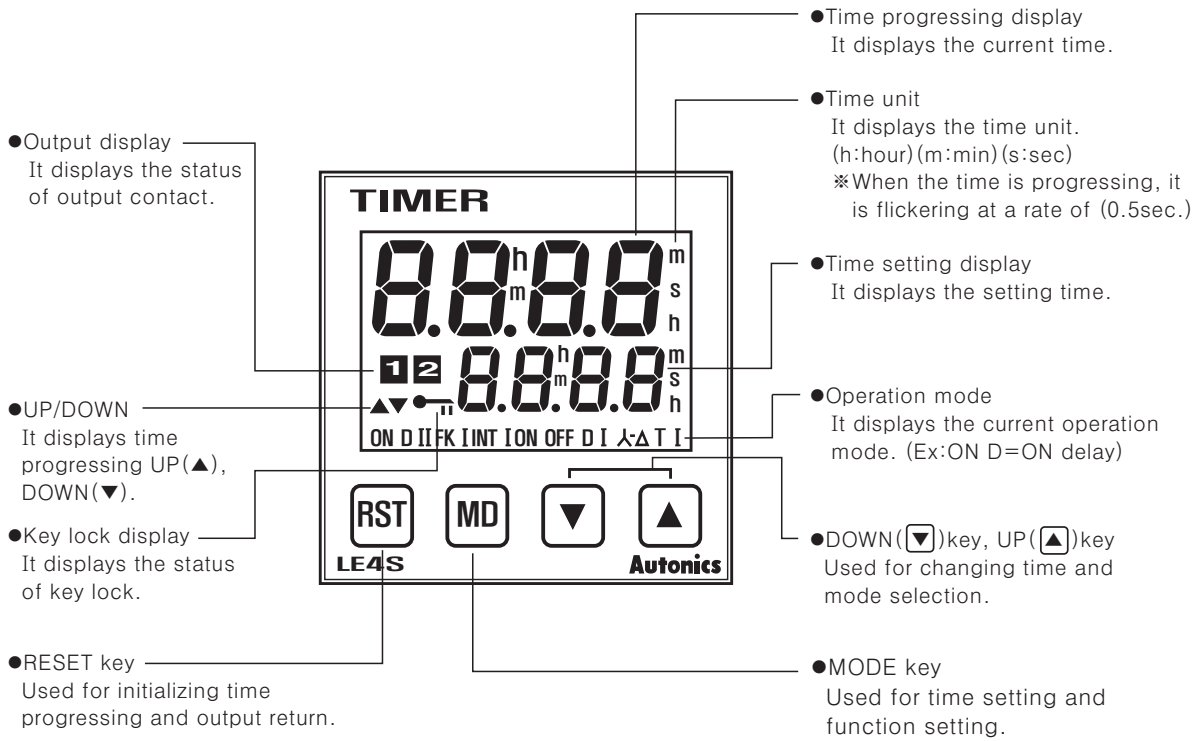
◎Contact input



●S1, S2, S3 are ON : Operating
●Please use a contacts that can function reliably at 5VDC 1mA.

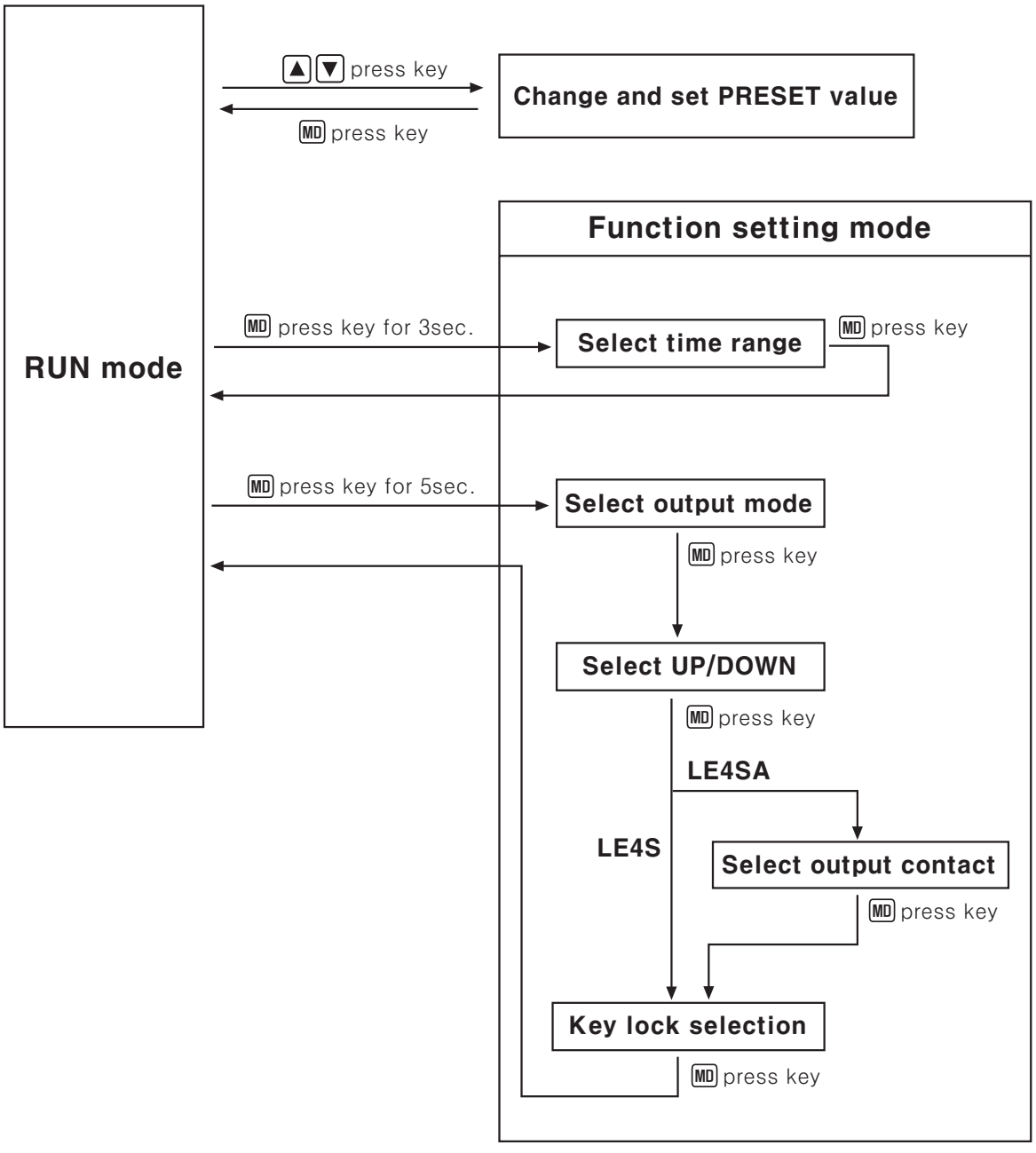
※Be cautions about the connecting since power terminal and signal input terminal are not insulated.

▣Front panel identification



▣Operation flow chart

This is the operation flowchart of **LE4S and LE4SA**. (See B-23~27 for the specific description)
Always program the Timer range, the output operation mode and the setting value in that sequence.
Note) If changing the previous output operation mode, the setting value might be deleted.

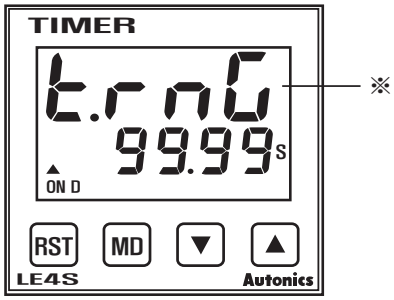


◎Factory Default setting

Model	Output mode	Up/Down mode	Output contact	Time range	Key lock
LE4S	ON DELAY	UP	Time limit 1c	99.99sec	LoFF(Lock off)
LE4SA	ON DELAY	UP fixed	Time limit 1c + Instantaneous 1c	99.99sec	Lock1(RST key inhibited)

▣Time range (MD press key for 3sec)

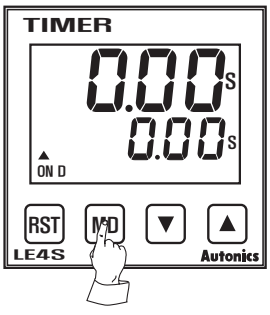
●Time range specification



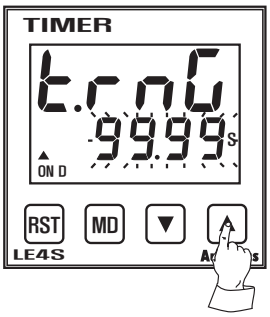
※t.rnG is displayed characteristic in LCD of Time range. It will be displayed continuously until the time range selection is completed.

Time range	Time range specification
99.99s	0.01sec ~ 99.99sec
999.9s	0.1sec ~ 999.9sec
9999s	1sec ~ 9999sec
99m59s	1m01sec ~ 99min 59sec
999.9m	0.1min ~ 999.9min
9999m	1min ~ 9999min
99h59m	1h01min ~ 99hour 59min
99.99h	0.01hour ~ 99.99hour
999.9h	0.1hour ~ 999.9hour
9999h	1hour ~ 9999hour

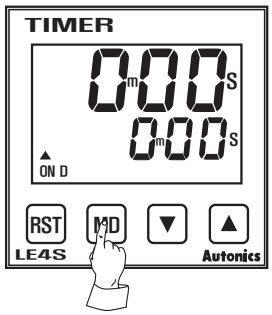
●Time range selection method(**99m 59sec**)



(Picture 1)



(Picture 2)

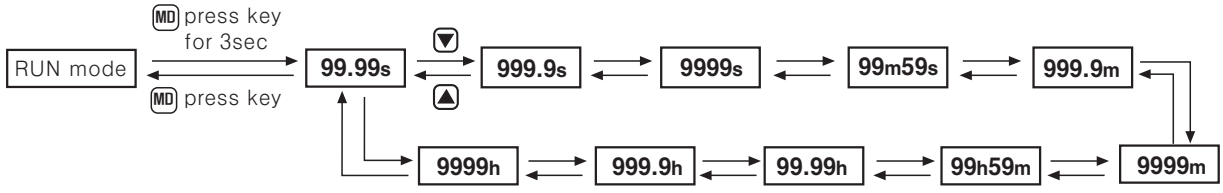


(Picture 3)

1) Pressing MD key for 3sec.in RUN mode, it will enter into Time range selection mode. (Picture 1)
2) After entering into the time range mode, "**99.99s**" will be displayed as factory default setting. (Picture 2)
3) Select time range as **99m59s** by pressing ▼ and ▲ keys (Press ▲ key 3times)
4) Press MD key and Time range selection will be completed and return to RUN mode. (Picture 3)

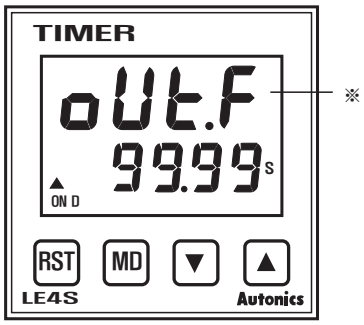
※If no keys touched for 30sec., it will return to RUN mode.
※Pressing MD key, output contact(1c.1c) of factory default setting(**LE4SA**) will be displayed before entering into setting mode.

※Time range flow chart



▣Output operation mode and function selection(MD press key for 5sec)

●Output operation mode by each model



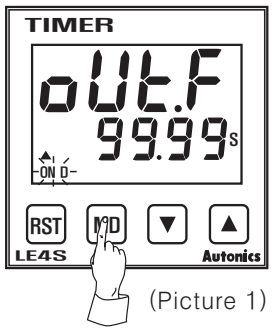
※"oUt.F" is a displayed characteristic in LCD display. It will be displayed continuously until the output operation selection is completed.

NO	Display	LE4S	LE4SA	Note
1	ON D	ON DELAY	ON DELAY	
2	ON D I	ON DELAY1	Non function	
3	ON D II	ON DELAY2(One-shot out)	ON DELAY2	※1
4	F K	FLICKER	FLICKER	※2
5	F K I	FLICKER1	Non function	
6	INT	INTERVAL-DELAY	INTERVAL-DELAY	
7	INT I	INTERVAL-DELAY1	Non function	
8	ON OFF D	ON-OFF DELAY	Non function	
9	ON OFF D I	ON-OFF DELAY1	Non function	
10	OFF D	OFF DELAY	Non function	
11	人-Δ	Non function	人-Δ TIMER	
12	T	Non function	TWIN TIMER	
13	T I	Non function	TWIN TIMER 1	

(※1) Output of **ON D II** mode is One-shot output and output operation time is fixed as 0.5sec.

(※2) Able to set Ton and Toff time differently in "FK, FK 1".

●Output operation selection



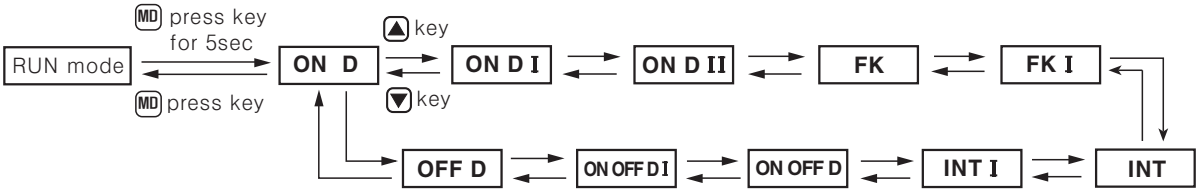
(Picture 1)

1) Pressing MD key for 5sec.in RUN mode, it will enter into output operation selection mode then "ON D"will flicker. (Picture1)
2) After selecting output operation mode by pressing ▼, ▲ key then press MD key.
※▲ key : Shift to CW
※▼ key : Shift to CCW
3) Pressing MD key to complete output operation then will move to UP/DOWN selection mode.

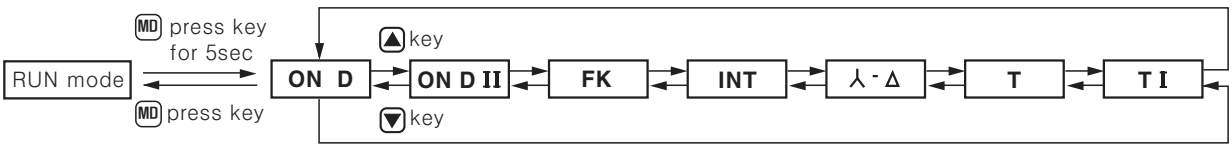
※If no key touched for 30sec. it will return to RUN mode
※Pressing MD key, output contact(1c.1c) of factory default setting(**LE4SA**) will be displayed before entering into setting mode.

※Output operation mode flow chart

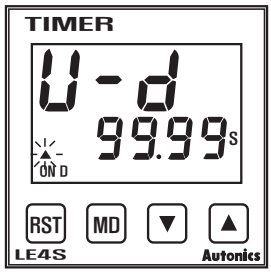
〈**LE4S** 〉



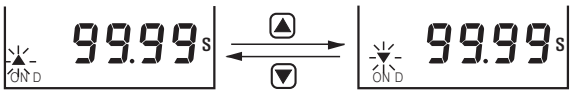
〈**LE4SA** 〉



●UP/DOWN selection



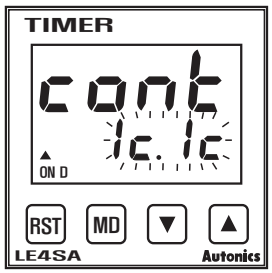
1) After entering into this mode, "U-d"will be displayed then "▲" will flicker.
2) After selecting UP(▲), DOWN(▼) by pressing ▼, ▲ then press MD key.



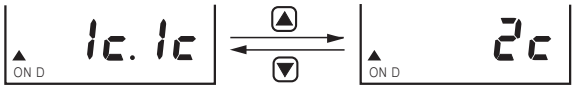
3) Press MD key, UP/DOWN will be completed then move to key lock(LE4S) mode or move to output contact selection mode(LE4SA).

※"U-d " is a display of UP-DOWN in LCD display.It will be displayed continuously until the selection is completed.
※If no key touched for 30sec., it will return to RUN mode.

●Output contact selection(Available in **LE4SA** only)



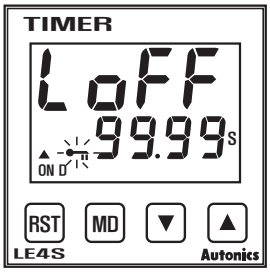
1) Factory default setting is Instantaneous 1c + Time limit 1c.
2) Select proper output contact for output operation mode by ▼ and ▲key.



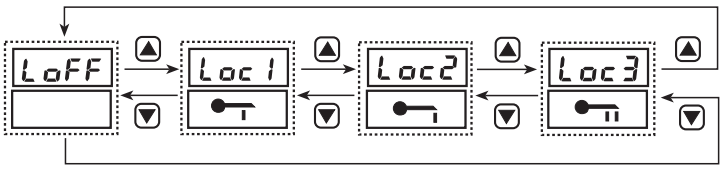
3) After selecting output contact then press MD key.
4) Pressing MD key will complete output contact selection then move to key lock selection mode.

※Pressing MD key in RUN mode, will enable you to check the output contact.
Be sure not to press MD more than 3 sec. (It will enter into another mode)
※"cont" is a displayed characteristic of output contact in LCD display.It will be displayed continuously until the selection is completed.
※If no key touched for 30sec., it will return to RUN mode.

●Key Lock selection

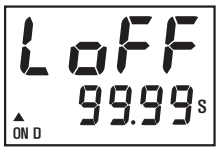


1) Factory default setting is Lock OFF.
2) Please select Key Lock by pressing ▼, ▲.

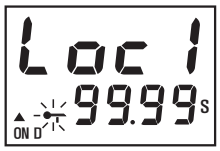


3) Press MD key to complete key lock selection and then return to RUN mode.
※If no key touched for 30sec., it will return to RUN mode.

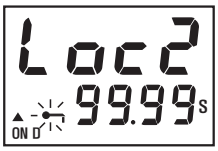
※Key Lock function



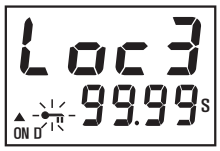
Lock mode turns off



RST key cannot use



▼, ▲key cannot use at setting time range and mode.

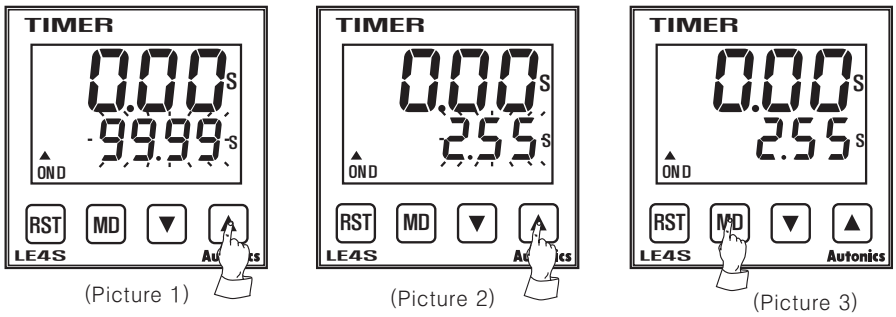


RST key, ▼, ▲key cannot use

▣The time setting

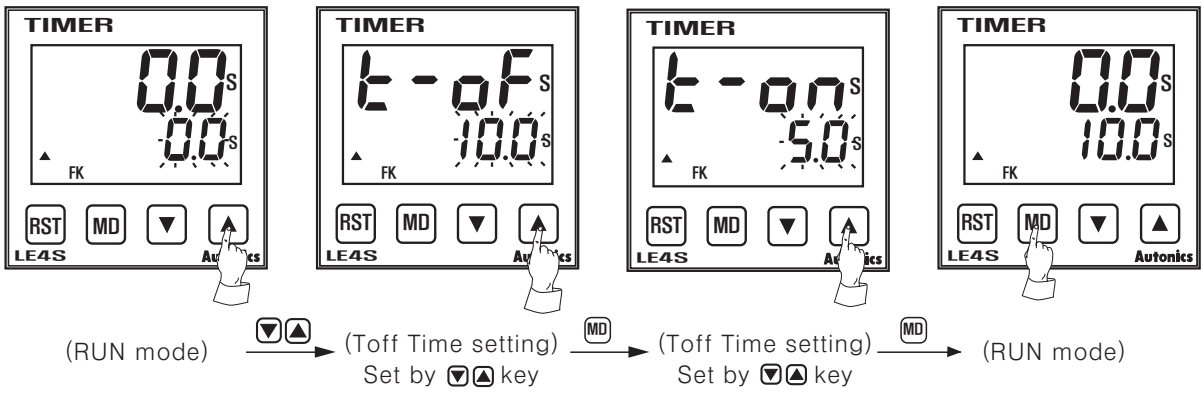
Please set operation time according to following instruction as the setting is different depending on the output operation mode.

●Output operation mode : **ON D, OND I, OND II, INT, INT I, ON OFF D, ON OFF D I, OFF D**



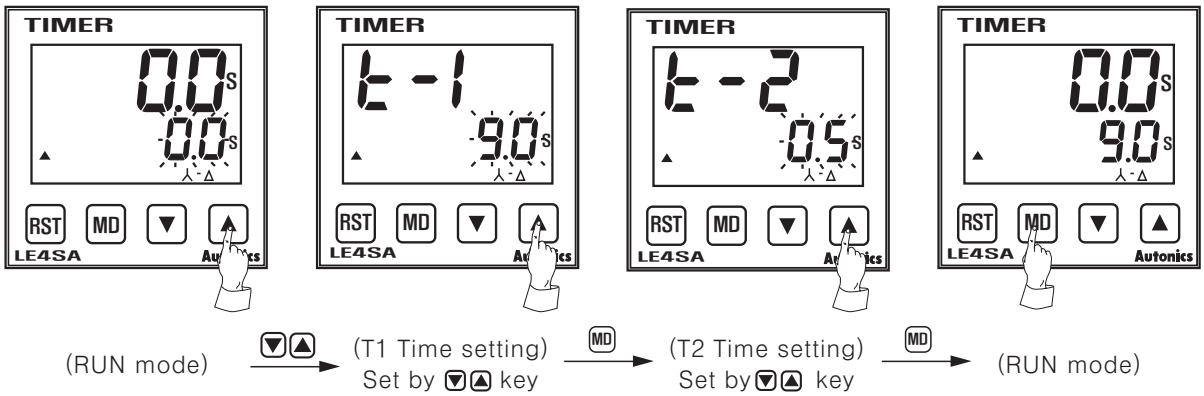
1) Display of setting time will be flickering when you press ▼ or ▲ key at RUN mode. (Picture 1)
2) And then set the setting time with ▼ or ▲ key. If you press ▲ key once, it will increase by 1 digit. If you keep it pressed, the number will continually increase. Pressing the key longer than 2sec, will cause the number to increase faster. (Picture 2)
If you press ▼ key once, the number will decrease in the same manner. (Picture 3)
3) When the setting is complete, it will be saved and return to RUN mode by pressing MD key. (Picture 4)
※You change the setting time while the unit is timing.
※If the set value is 0, "Err" will be displayed. ("Err" will be removed by pressing ▼ , ▲ key)
※If no key touched for 30sec., it will return to RUN mode.

●Output operation mode : **FK, FK I** (There is no **[FK I]** in **LE4SA)**



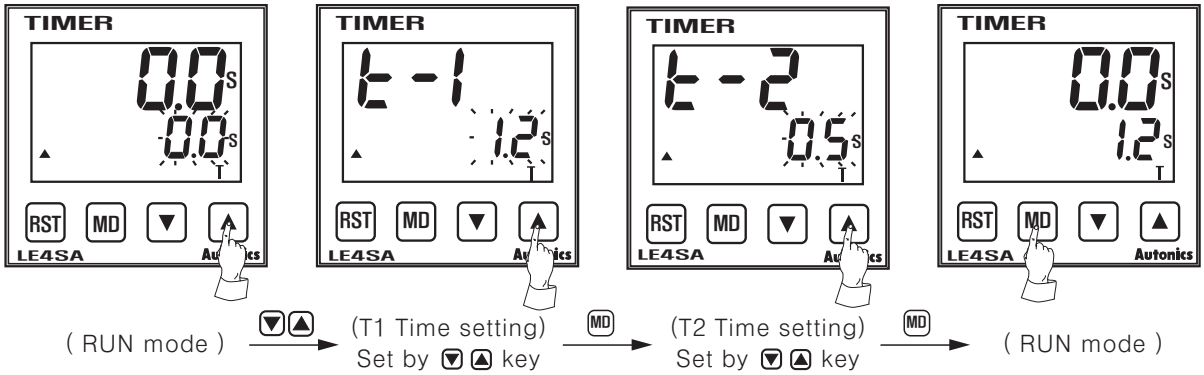
※Ton and Toff can be set differently.

●Output operation mode : START – DELTA (⅄-Δ) (**LE4SA only.**)



※T1 : Setting time, T2 : ⅄-Δ switching time
※ T1 setting time range : 0.1s~9999h, T2 setting time range : 0.05s~9999h
☞ If T2 is longer than 0.05sec, "Err" will be displayed.

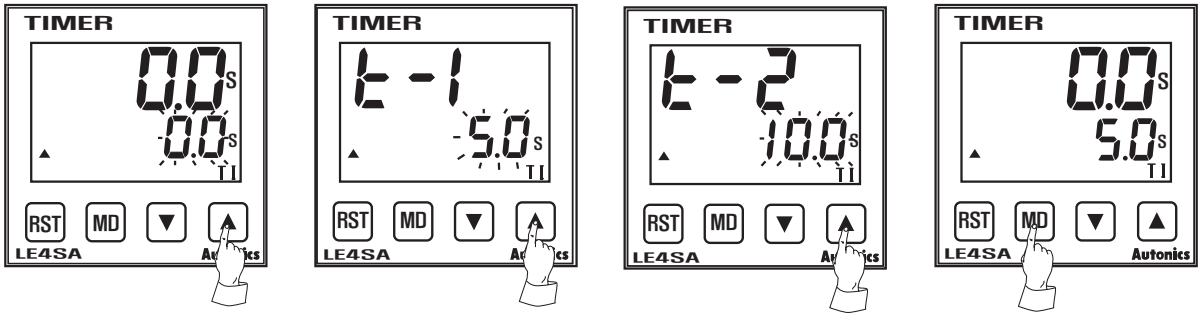
●Output operation mode : TWIN TIMER [**T**] (**LE4SA** only)



(RUN mode) ▼▲ (T1 Time setting) Set by ▼▲ key MD (T2 Time setting) Set by ▼▲ key MD (RUN mode)

※T1 and T2 can be set differently.

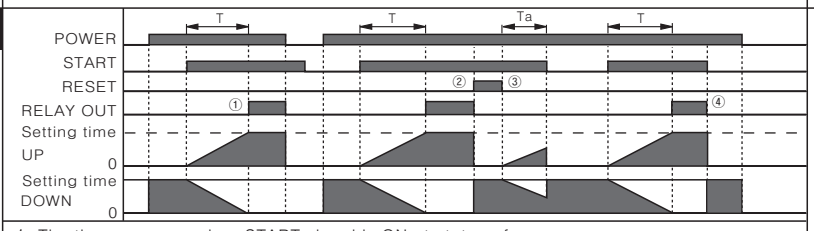
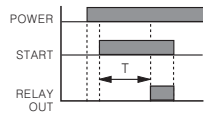
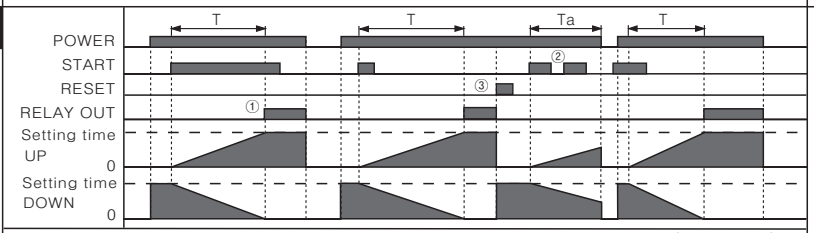
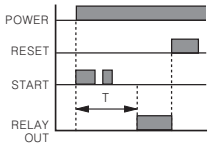
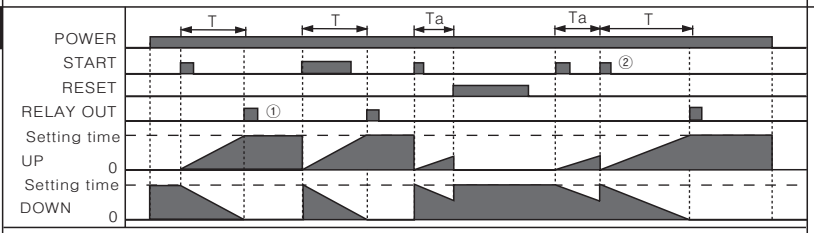
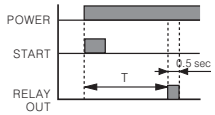
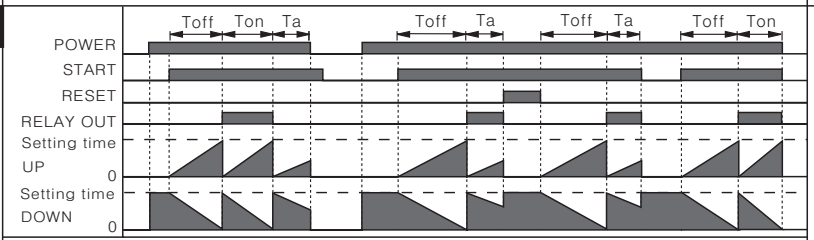
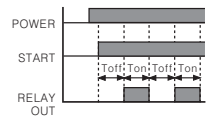
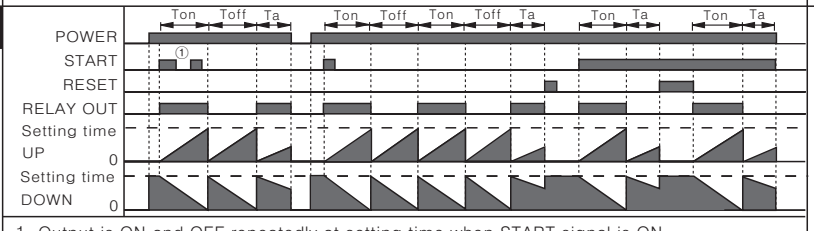
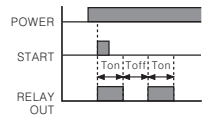
●Output operation mode : TWIN TIMER(**T Ⅱ**) (**LE4SA** only)



(RUN mode) ▼▲ (T1 Time setting) Set by ▼▲ key MD (T2 Time setting) Set by ▼▲ key MD (RUN mode)

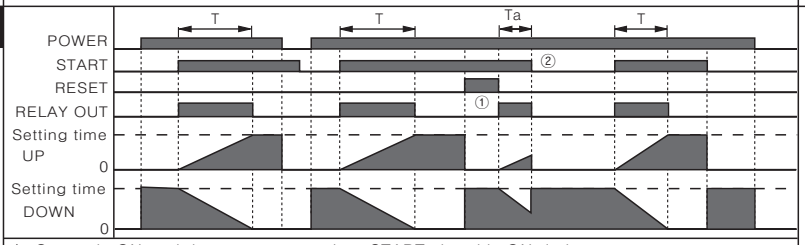
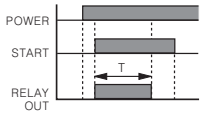
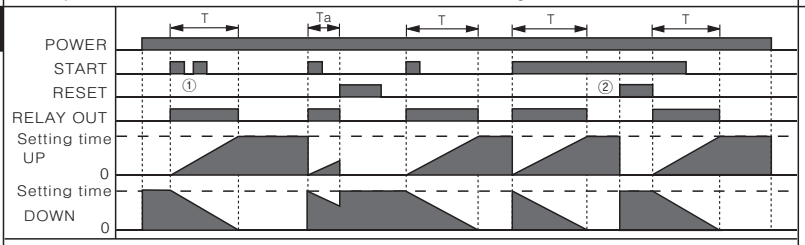
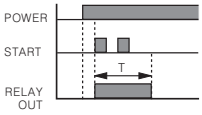
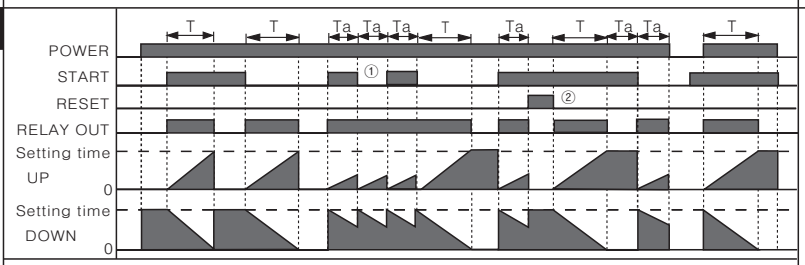
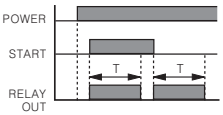
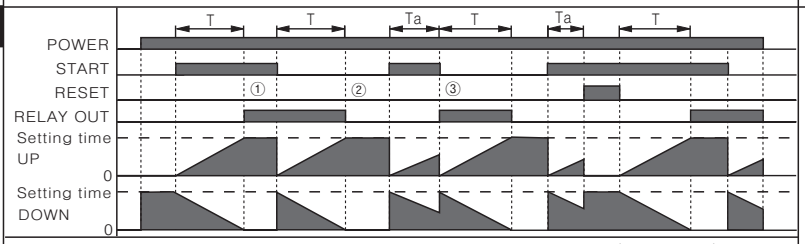
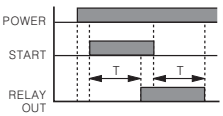
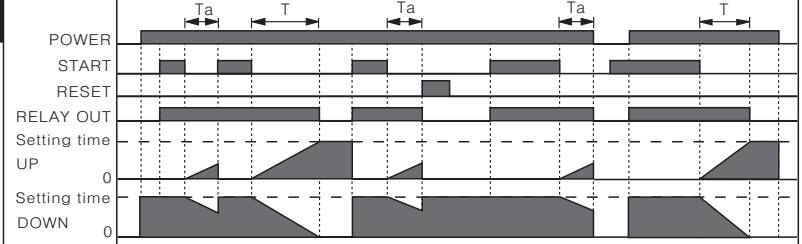
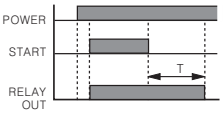
※T1 and T2 can be set differently.

▣LE4S Time charts(Output mode)

Mode	Time chart	Operation
[ON.D] **ON-Delay** T >Ta	 1. The time progress when START signal is ON at status of power on. 2. Output(Relay output) turns on at setting time. (Position ①) 3. Output and display value will be initialized when RESET signal is ON.(Position ②) 4. The time will progress when RESET signal is OFF.(Position ③) 5. When START signal is OFF, time progressing will be initialized and output is returned. (Position ④)□	 T = Setting time
[ON.D.I] **ON-Delay 1** T >Ta	 1. Time progress when START signal is ON, output will be ON at setting time. (Position ①) 2. Even though the START signal is applied repeatedly, only the initial signal is recognized. (Position ②) 3. Output and display value will be initialized when RESET signal is ON. (Position ③) 4. When power ON again after power off, then it will be operating as "STEP1".	 T = Setting time
[ON.D.II] **ON-Delay 2** **(One-shot output)** T >Ta	 1. The time progress when START signal is ON at status of power on. 2. Output will be ON for 0.5sec(one-shot output) at setting time and then OFF. (Position ①) 3. If START signal is ON again while time is progressing, the time progressing will be initialized then progress again. (Position ②)	 T = Setting time
[F K] **Flicker** **(Ton=Toff)** Ton, Toff >Ta	 1. Output will be OFF for T-OFF time when START signal is ON and then ON status will be held for T-ON time and then OFF again. 2. T-ON is the time while output is ON, T-OFF is the time while output is OFF. 3. T-ON & T-OFF can be set individually. 4. T-OFF time start in [FK] mode first.	 Ton, Toff = Setting time Able to set T-ON and T-OFF time differently.
[FK.I] **Flicker 1** **(Ton=Toff)** Ton, Toff >Ta	 1. Output is ON and OFF repeatedly at setting time when START signal is ON. 2. Even though the START signal is applied repeatedly, only the initial signal is recognized. (Position ①) 3. Output and display value return to initial status when RESET signal is applied. 4. T-ON time start in [FK. I] mode first.	 Ton, Toff = Setting time Able to set T-ON and T-OFF time differently.

※Initial status : UP mode-display value is "0", output is "OFF".
DOWN mdoe-display value is "setting time", output is "OFF".

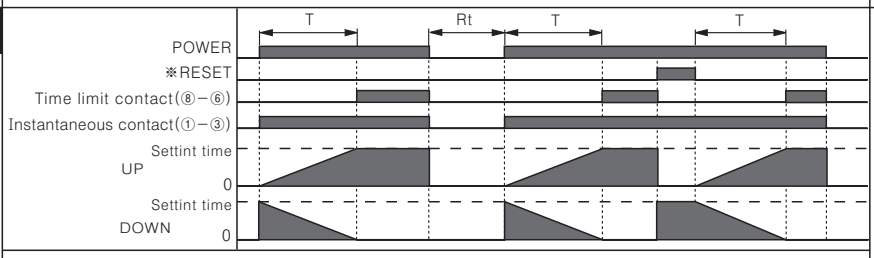
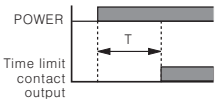
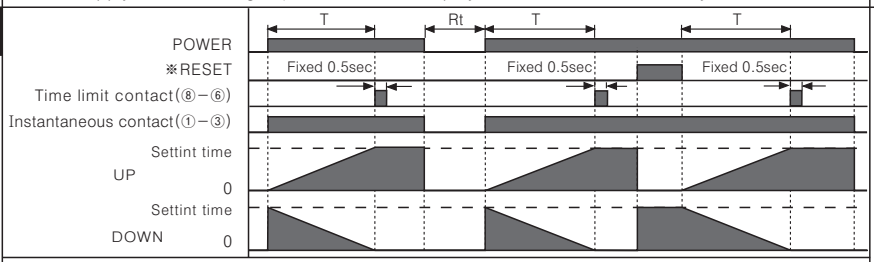
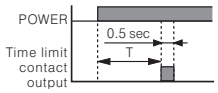
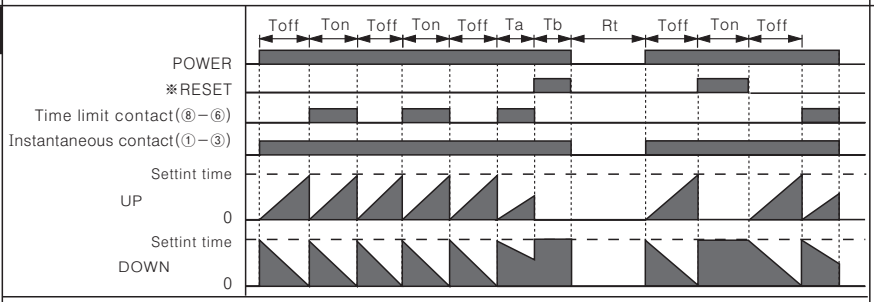
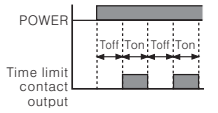
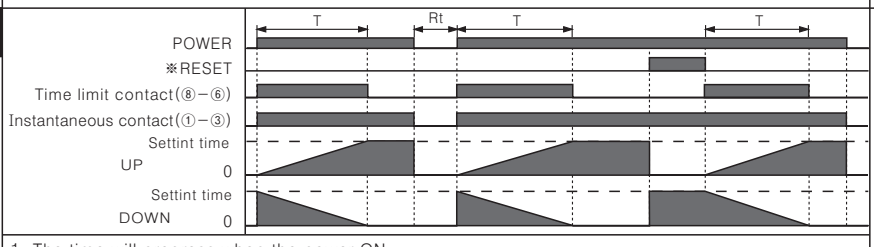
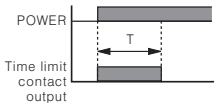
▣LE4S Time charts(Output mode)

Mode	Time chart	Operation
[INT] **Interval-Delay** T >Ta	 1. Output is ON and time processes when START signal is ON during power. 2. When processing time reaches to setting time, the output will be OFF and the display value will be held. 3. Applying reset signal, display value will return to "0" and then start again from number 1. (Position ①) 4. Output and the time return to initial status when START signal is OFF. (② Position)	 T = Setting time
[INT. I] **Interval-Delay 1** T >Ta	 1. Output is ON and time processes when START signal is ON during power. 2. When processing time reaches to setting time, the output will be OFF and the display value will be held. 3. Applying reset signal, display value will return to "0" and it is operated when start signal is appled. (Position ②) 4. Output and the time return to initial status when START signal is OFF. (② Position)	 T = Setting time
[ON.OFF.D] **ON-OFF-Delay** T >Ta	 1. During power is applied following operations are repeated. When start signal is ON, output is OFF. When start signal is OFF, output is ON, and when processing time is equal to setting time is OFF. 2. If the START signal is applied repeatedly, the output keeps ON status, progressing time will return to initial status. (① Position) 3. When the START signal turn on, the output is on for the setting time. When the START signal turns off, the output is again on for the setting time.	 T = Setting time
[ON.OFF.D. I] **ON-OFF-Delay 1** T >Ta	 1. After the START signal is ON, the output will be ON after setting time(① Position). When the START signal becomes OFF, the output will be OFF after setting time. (Position ②) 2. When the START signal shorter than the setting time, the output will be ON when START signal becomes OFF then the output will be OFF after the setting time. (Position ③) 3. RESET signal is ON, the progressing time and output will return to the initial status.	 T = Setting time
[OFF.D] **OFF-Delay** T >Ta	 1. Output is ON when START signal is applied.Timing begins when START signal is off. The output will be OFF after the setting time. 2. RESET signal is ON, the progressing time and output will return to the initial status.	 T = Setting time

※Initial status : UP mode−display value is "0", output is "OFF".
DOWN mode−display value is "setting time", output is "OFF".

▣LE4SA Time charts(Output mode)

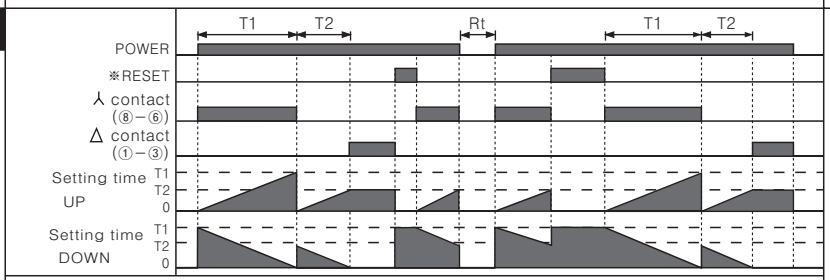
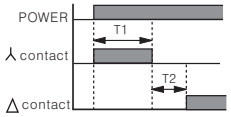
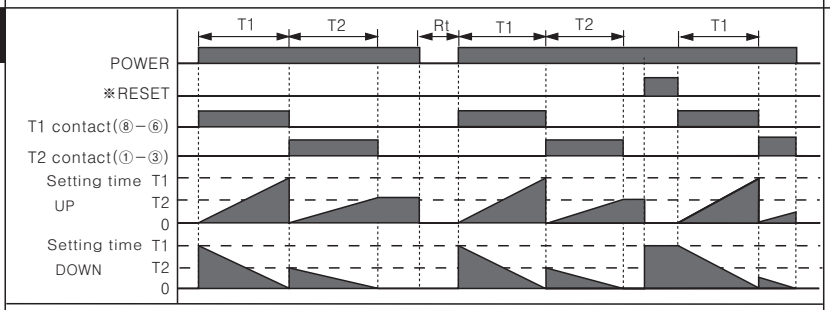
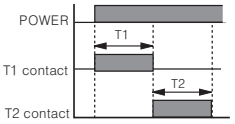
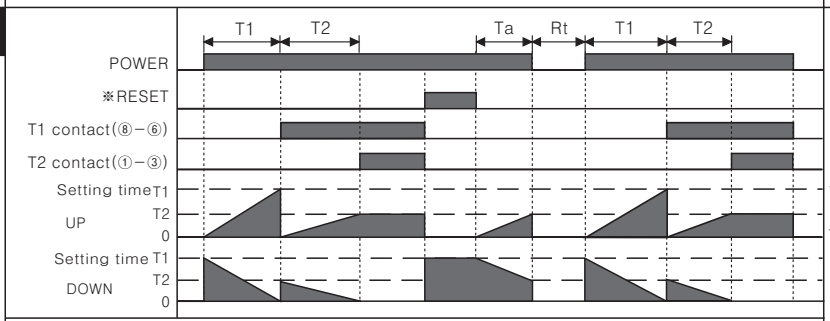
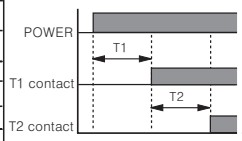
Rt : Return time(Min. 200ms)

Mode	Time chart	Operation
[ON.D] **ON-Delay**	 1. The time will progress when the power ON. 2. Time limit contact will be ON, when the progressing time reaches to the setting time at the Time limit 2c output mode. 3. When set Time limit contact 1c + Instantaneous contact 1c output mode, Time limit will be ON at the setting time, instantaneous contact will be ON and OFF by power on and off. 4. When the power is cut off, Time limit contact, Instantaneous contact, display value will be initialized. When apply the RESET signal, Time limit and display value will be initialized only.	 T = Setting time
[ON.D. II] **ON-Delay 2 (One-shot output)**	 1. The time will progress when the power ON. 2. When set Time limit contact 2c output mode, Time-limit contact will be ON at the setting time, then OFF after one-shot output(Fixed 0.5sec) 3. When set Time limit contact 1c + instantaneous contact 1c output mode, Time limit will be ON at the setting time then OFF after One-shot output(Fixed 0.5sec.). The instantaneous contact will be ON and OFF by power on and off. 4. When the power is cut off, Instantaneous contact, display value will be initialized. When apply the RESET signal, display value will be initialized only.	 T = Setting time
[F K] **Flicker (Ton=Toff)** Ton, Toff >Ta, Tb	 1. The time will progress when the power ON. 2. When set Time limit contact 2c, Time limit contact will be OFF for T-OFF setting time then ON for T-ON setting time after T-OFF time. It will be OFF/ON for the setting time(T-OFF/T-ON) before applying RESET or removing power. 3. When set Time limit contact 1c+Instantaneous contact 1c output mode, Time limit will be OFF/ON repeatedly for T-OFF/T-ON setting time.	 Ton, Toff = Setting time Able to set T-ON and T-OFF time differently.
[INT] **Interval -Delay**	 1. The time will progress when the power ON. 2. When set Time limit contact 2c, Time limit contact will be ON at the power on. Then it will be OFF after the setting time. 3. When the power is cut off, Time limit contact, Instantaneous contact, display value will be initialized. When apply RESET signal, Time limit and display value will be initialized.	 T = Setting time

※Initial status : UP mode-display value is "0", output is "OFF".
DOWN mode-display value is "setting time", output is "OFF" .
※Instantaneous contact will be returned when power is off.
※RESET Key can be used at Loff or Loc2 setting only.

▣LE4SA Time charts(Output mode)

Rt : Return time(Min. 200ms)

Mode	Time chart	Operation
人-△ **STAR-DELTA** **(Output will be set automatically to Time limit 2c)**	 1. When the power on, 人 contact will be ON then OFF after the setting time(T1). And △ contact will be ON after switching time(T2). 2. When cut the power off or apply the RESET signal, 人-△ contact will be OFF then display value will be initialized. And it will be run again when the power on or RESET signal is OFF. 3. If set T2(人-△ changeover time) less than 0.05sec., "Err" will be displayed. ※T1:Setting time, T2: 人-△ switching time T1 Setting time: 0.01s ~ 9999h; T2(人-△) Switching time: 0.05s ~ 9999h	 ※T1 : Setting time T2 : Return time (人 - △ Return time)
[T] **TWIN TIMER** **(Output will be set automatically to Time limit 2c)**	 1. T1 contact will be ON at the power on, then OFF after T1 setting time. T2 contact will be ON at T1 contact is OFF, then T2 contact will be OFF after T2 setting time. 2. T1 contact ,T2 contact and the progressing time will be initialized during apply power again or RESET signal is ON to OFF.	 T1, T2 = Setting time Able to set T1 and T2 time differently.
[T. I] **TWIN TIMER 1** **(Output will be set automatically to Time limit 2c)** T1, T2 >Ta	 1.The time will progress when the power is on when progressing time reaches T1setting time. T1 contact will be ON and T2 setting time begin, when progressing time reaches T2 settting time. T2 contact will be ON 2. T1 contact ,T2 contact and the progressing time will be initialized during apply power again or RESET signal is ON to OFF.	 T1, T2 = Setting time Able to set T1 and T2 time differently.

※Initial status : UP mode-display value is "0", output is "OFF".
DOWN mode-display value is "setting time", output is "OFF" .
※Inatantaneous contact will be returned when power is off.
※RESET key is locked by factory default setting, so please use it after cancel the lock.

▣Proper usage

⚠ Caution

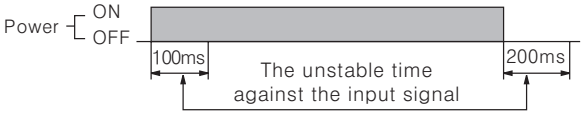
It may give an electric shock if touch the input signal terminal(Between START, RESET, INHIBIT and ② terminal) when the power is supplied.

◎Power connection

- ●Connect AC power line between (②−⑦) for LE4S, LE4SA AC power type. But be aware of power connection for DC power type. (② ← ⊖ , ⑦ ← ⊕)
- ●LE4S, LE4SA work stably within range of rated power. (If using power line with another high voltage line or energy line in the same conduit, it may cause inductive voltage. Therefore please use seperate conduit for power line)

◎Power start

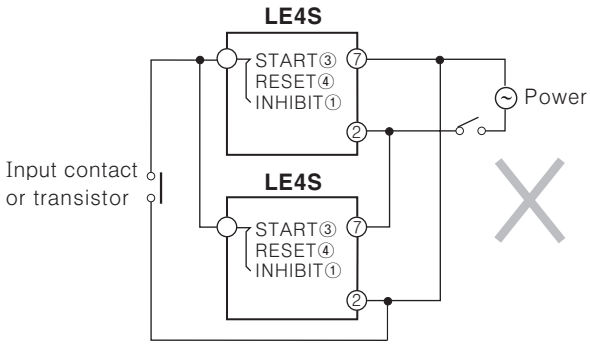
- ●Caution for power rising time(100ms) after power on and power falling time(200ms) after power off.



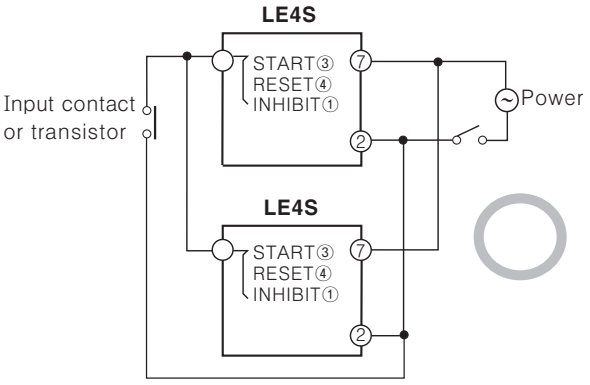
- ●Power start
  LE4SA model is starting after 100ms of applying power(Above picture)
  (Pleaes use over 100ms setting)
  When you need under 100ms setting, please use Signal start type LE4S.
- ●Please supply power quickly as using switch or Relay contact.
  Otherwise it may cause timing error.

◎Input/Output

- ●Power terminal and Input terminal have not been insulated because there is no power transformer in this Timer.
  ①When using the sensor of SSR output type with input terminal of timer, please check whether Double insulated or not.
  ②Please use double insulated relay when connecting relay output with input terminal.
- ●Please use 8pin socket when connecting this Timer with other equipment and do not touch the socket when power on.
- ●Please use Power supply with over current protection circuit.(250V 1A fuse)
- ●When using relay contact as input signal, please use a contact that can function reliable at 5VDC, 1mA.
- ●In case of connectiing START terminal (③) and power terminal(②) of LE4S, do not use it to start at the same time applying power.
  Please use relay contact or transistor to start.
  (It will occur time error under 100ms setting because of rising time of Timer).
- ●LE4S is Transformer Less type, therefore please check following for connecting relay contact for input signal and transistor.
  ①When connecting more than 2 Timers with 1 relay contact for input or transistor, please wire following <Picture 2 >.

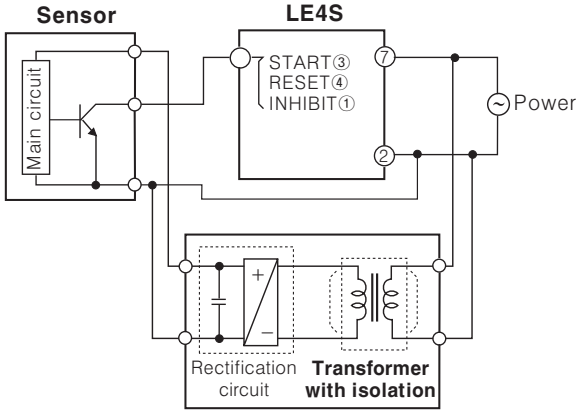


<Picture 1>



<Picture 2>

②Please use transfomer with primary and secondary isolated for input.

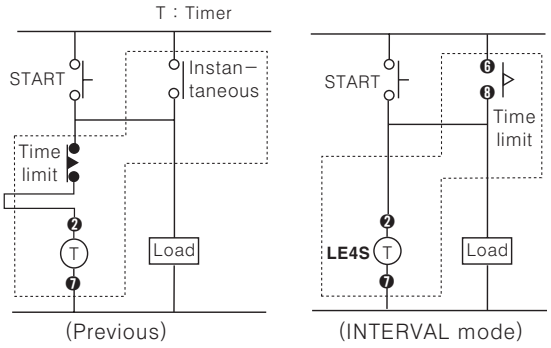


<External sensor power supply>

●Please supply power to LE4SA after checking operation specification.
●If setting 「0000」 for operation time, output may not work.

◎Interval mode

Able to make Instantaneous ON and Time limit OFF (Holding device) with using interval mode.



◎Change output operation mode and Timer range

If changing output operation mode or Time range, previous PRESET value will be deleted.
But, Up/Down selection mode and Lock mode are exception.

◎Each mode and time setting by internal battery

●You are able to set or change the time setting and function without external power supply because there is a lithium battery built in LE4S, LE4SA.
●If pressing any keys on front after purchasing this product, factory specification will be displayed in LCD window. (But, LCD Backlight and output are OFF) Time range mode, output operation mode, Up/ Down mode, Setting time are set in sequence. LCD backlight will be on after setting complete.
●When turning off
①LCD and output are OFF
②If pressing any key on front, time progressing will be "0".
※LCD Backlight, input signal and output do not work.
※If no keys are touched for 30sec after LCD is ON, LCD will be OFF.
③At this time, it is able to set or change values of each mode and setting time.
④When supplying power again, setting will be saved and time progressing and output will be intialized.

◎Preset value change

●If changing setting value while time progressing, new preset value should be higher than previous preset value. Otherwise output may work while changing setting value.
●If changing setting value while it is running, it will work as changed setting value. Please use LOCK function in order to avoid malfunction.

◎Internal battery

●Data will not be lost when power failure because of internal battery.
●Battery life cycle is about 10years(No key operation). This product can work for 40days without external power supply.(25℃)
●Do not use this product near by fire, there is Lithium battery built in.

◎Noise

We test 2kV, Pulse width 1㎲ against IMPULSE voltage between power terminals and 1kV, Pulse width 1㎲ at noise simulator against external noise voltage. Please install MP condensor(0.1~1㎌) or Oil condensor between power teminals when over IMPULSE noise voltage occurs.

◎Environment

Please avoid the following places;
●Where this product may be damaged by strong impact or vibration.
●Where there are corrosive gas or flammable gas and water,oil, dust exist.
●Where magnetic and electrical noise occurs.
●Where there are high temperature and humidity beyond rated specification.
●Where there are strong alkalis and acids.
●Where there are direct rays of sun.

◎Mounting

1) Insert LE4S, LE4SA into hole on the panel
2) Fix the body by pushing the bracket against the panel
3) Tighten 2 screws in the bracket.