LCD Digital Timers

LE4S Series

PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Safety Precautions

- 'Safety Precautions' are provided to ensure safe and proper use of the product and to prevent accidents or hazards. Please make sure to follow them carefully.
- ⚠ symbol indicates a caution, warning of potential hazards under certain conditions.

⚠ Warning Failure to follow instructions may result in serious injury or death.

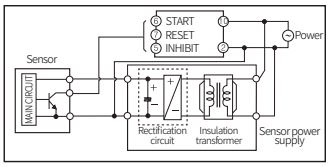
01. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
    Failure to follow this instruction may result in personal injury, economic loss or fire.
02. **Do not use or store the unit in the place where flammable/explosive/ corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
    Failure to follow this instruction may result in explosion or fire.
03. **Install on a device panel to use.**
    Failure to follow this instruction may result in fire or electric shock.
04. **Do not connect, repair, or inspect the unit while connected to a power source.**
    Failure to follow this instruction may result in fire or electric shock.
05. **Check 'Connections' before wiring.**
    Failure to follow this instruction may result in fire.
06. **Do not disassemble or modify the unit.**
    Failure to follow this instruction may result in fire or electric shock.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. **When connecting the power/sensor input and relay output, use AWG 20 (0.50 mm^2) cable or over, and tighten the terminal screw with a tightening torque of 0.74 to 0.90 N m.**
    Failure to follow this instruction may result in malfunction due to contact failure.
02. **Use the unit within the rated specifications.**
    Failure to follow this instruction may result in fire or product damage.
03. **Use a dry cloth to clean the unit, and do not use water or organic solvent.**
    Failure to follow this instruction may result in fire or electric shock.
04. **Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
    Failure to follow this instruction may result in fire or product damage.

Cautions During Use

- Follow instructions in 'Cautions during Use'.
  Otherwise, it may cause unexpected accidents.
- When supplying or turning off the power, use a switch or etc. to avoid chattering.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- In order to block peripheral current, use isolation transformer which of secondary part is not grounded to supply power to the external input device.



- Do not connect two or more timers with only one input contact or transistor simultaneously.

- Keep away from high voltage lines or power lines to prevent inductive noise. In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
  Do not use near the equipment which generates strong magnetic force or high frequency noise.
- LCD performance may vary depending on the usage environment. Check the environmental conditions, and do not install the device in places where direct sunlight or high temperatures may be present.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

LE4S ❶

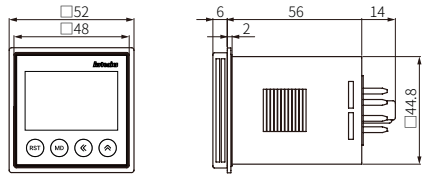
❶ Output
No mark: Time limit 1c
A: Time limit 2c, Time limit 1c + Instantaneous 1c

Product Components

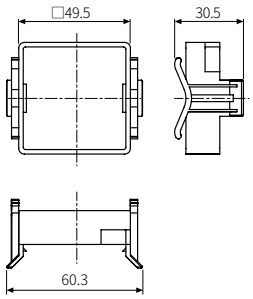
- Product (+ bracket)
- Instruction manual

Dimensions

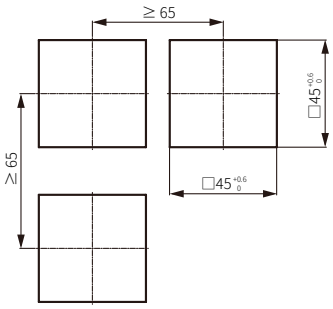
- Unit: mm, For the detailed drawings, follow the Autonics website.



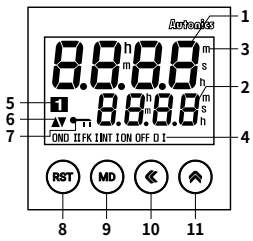
■ Bracket



■ Panel cut-out



Unit Descriptions



No.	Name	Function
1	Time progressing display part	Shows progressing time
2	Time setting display part	Shows the setting time
3	Time unit	Shows time unit (h: hour / m: min / s: sec) Flashing: time progressing
4	Operation mode	Shows current output operation mode • INTG: no mark
5	Output contact	Shows the status of current output contact
6	UP / DOWN	Shows UP / DOWN mode of time progressing
7	Key lock	Shows key lock status
8	[RST] key	Initializes progressing time and output return
9	[MD] key	Enter RUN mode ↔ Parameter setting Shift to next parameter in parameter setting
10	[◀] key	Enter RUN mode ↔ setting time change mode Move the digit when changing the setting value.
11	[▲] key	Change the parameter setting value

Mode Setting

RUN	[MD] 3 sec	→	**Parameter setting**	[MD] 3 sec	→	RUN
	[◀]	→	**Time setting** 01)	[MD]	→	
	While pressing [MD]	→	**Check output contact status** 02)	Release [MD]	→	
	[RST]	→	**Initialization**	Auto	→	

01) If no key is pressed over 60 sec, returning to RUN mode and not storing the setting value.
02) Only for the LE4SA model

Output Operation Mode

For the detailed timing chart for operation output mode, refer to the manual.
The output operation mode differs depending on each model.

Group	Output operation mode		LE4S	LE4SA	Time setting
Group 1	**OND**	ON Delay	○	○	Time
	OND.1	ON Delay 1		-	
	OND.2	ON Delay 2		○	
	INT	Interval			
	INT.1	Interval 1		-	
	OFD	OFF Delay			
	INTG	Integration time			
Group 2	**FLK**	Flicker	○	○	t.oFF, t.on
	FLK.1	Flicker 1			
	NFD	ON - OFF Delay		-	on.d, oFF.d
	NFD.1	ON - OFF Delay 1			
Group 3	**S-D**	Star - Delta	-	○	t - 1, t - 2
	TWN	Twin			
	TWN.1	Twin 1			

Parameter Setting

- Some parameters are activated / deactivated depending on the model or setting of other parameters. Refer to the description of each parameter.
- In the parameter setting, the time and output control continue.
- If the settings are changed, all outputs to be OFF and reset the current values when returning to RUN mode.
- [MD] key: saves current setting value and moves to the next parameter.

Parameter		Display	Defaults	Setting range	Model	Display condition
1-1	Output operation mode	oUt.M	ond	• Refer to the output operation mode.	Comm.	-
1-2	Time range	t.rnG	99.99	• Refer to the table below.		1-1. Output operation mode: Group 1
1-3	One-shot output time	oUtt.	00.50	0.01 to 99.99 sec		1-1. Output operation mode: OND.2
1-4	T.off time range	oF.rG	99.99	• Refer to the table below.		1-1. Output operation mode: Group 2
1-5	T.on time range	on.rG	99.99			
1-6	T1 time range	t 1.rG	99.99		[LE4SA]	1-1. Output operation mode: Group 3
1-7	T2 time range	t2.rG	99.99		[LE4SA]	
1-8	Time UP / DOWN	U-d	UP	UP: 0 → setting time DN: setting time → 0	Comm.	-
1-9	Min. input signal width	1 n.t	20	1, 20 ms • Set the min. width of RESET, START, INHIBIT input signals	[LE4S]	-
1-10	Output contact 01)	Cont	1C.1C	1C.1C: Time limit 1c + Instantaneous 1c 2C: Time limit 2c	[LE4SA]	-
1-11	Backlight	bLU	on	ON, OFF	Comm.	-
1-12	Key lock	LoCt	L.oFF	L.OFF: release key lock LOC.1: lock [RST] key LOC.2: lock [◀], [▲] key LOC.3: lock [RST], [◀], [▲] key	[LE4S]	-
			LoC.1		[LE4SA]	

01) 1-1. Output operation mode of group 3: 2C fixed

• [Table]

Unit	SEC	SEC	SEC	SEC	M S	M	M
Display	9.999	99.99	999.9	9999	99m59s	999.9m	9999m
Range	0.001s to 9.999s	0.01s to 99.99s	0.1s to 999.9s	1s to 9999s	0m1s to 99m99s	0.1m to 999.9m	1m to 9999m

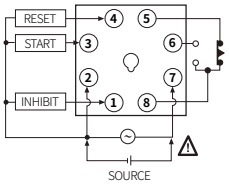
Unit	H M	H	H	H
Display	99h59m	99.99h	999.9h	9999h
Range	0h1m to 99h59m	0.01h to 99.99h	0.1h to 999.9h	1h to 9999h

Connections

⚠ Caution

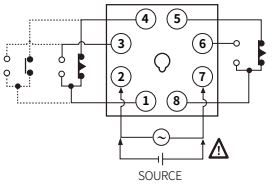
- Refer to the 'specifications' for checking the power supply and control output.
- The LE4S model: Be sure to use terminal No. 2 as the common terminal to connect terminals No. 1, 3, and 4.
  Failure to follow this instruction may result in product malfunction.

■ LE4S

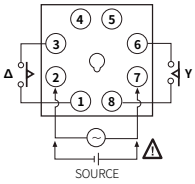


■ LE4SA

- Output operation mode
  : OND / OND.2 / FLK / FLK.1 / INT / TWN / TWN.1
  (TWN, TWN.1 mode: time limit 2c fixed)



- Output operation mode
  : Y - Δ (Time limit 2c fixed)
- Use the A contact.



Specifications

Model		LE4S	LE4SA
Function		MULTI time, MULTI operation	
Display method		LCD (Backlight)	
Return time		≤ 100 ms	
Time operation		Signal ON Start	Power ON Start
Input signal		START, INHIBIT, RESET	
Min. signal width		≈ 1, 20 ms	-
No-voltage input		Short-circuit impedance: ≤ 1 kΩ Short-circuit residual voltage : ≤ 0.5 VDC⎓ Open-circuit impedance : ≥ 100 kΩ	-
Control output		Relay	
Contact type		Time limit SPDT (1c)	Time limit DPDT (2c), Time limit SPDT (1c) + Instantaneous SPDT (1c) (depends on operation mode)
Contact capacity		250 VAC~ 5 A, 30 VDC⎓ 5 A resistive load	250 VAC~ 3 A, 30 VDC⎓ 3 A resistive load
Error	Repeat	Power ON Start : ≤ ± 0.01% ± 0.05 sec Signal ON Start : ≤ ± 0.005% ±0.03 sec	≤ ± 0.01% ± 0.05 sec
	SET		
	Voltage		
	Temp.		
Certification		cULus, EAC	
Unit weight		≈ 98 g	

Model	LE4S	LE4SA
Power supply	24 - 240 VAC~ 50 / 60 Hz, 24 - 240 VDC⎓	
Permissible voltage range	90 to 110 % of rated voltage	
Power consumption	AC: ≤ 4.5 VA, DC: ≤ 2 W	AC: ≤ 4 VA, DC: ≤ 1.6 W
Insulation resistive	100 MΩ (500 VDC⎓ megger)	
Dielectric strength	Between the charging part and the case: 3000 VAC~ at 50 / 60 Hz for 1 min	
Noise immunity	± 2 kV square-wave noise by noise simulator (pulse width 1 μs)	
Vibration	0.75 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 1 hour	
Vibration (malfunction)	0.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 10 min	
Shock	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times	
Shock (malfunction)	100 m/s² (≈ 10 G) In each X, Y, Z direction for 3 times	
Relay life cycle	Mechanical: ≥ 10,000,000 operations Electrical: ≥ 100,000 operations	
Ambient temperature	-10 to 55 °C, storage: -25 to 65 °C (no freezing or condensation)	
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)	

■ Contact capacity

- IEC (EN60947-5-1)

Model		LE4S		LE4SA	
Rated current		5 A		3 A	
Rated voltage		30 V	250 V	30 V	250 V
AC	Resistive load (AC-12)	-	5 A	-	3 A
DC	Resistive load (DC-12)	5 A	-	3 A	-

Time Setting

■ Setting method

- Be aware that the time is progressing when you set the time.
- If no key is pressed over 60 sec, returning to RUN mode and not storing the setting value.

1. In the parameter setting, set the output operation mode.
2. In RUN mode, press [◀] key to enter the time setting mode.
3. The last digit flashes at the time setting display part.
4. Set the time.
   [◀] key: shift the setting digit, [▲] key: shift the flashing position, increasing time
5. Press [MD] key to complete the setting and return to RUN mode.

■ Setting example

• Output operation mode FK, FK1

Mode	Time progressing display part	Time setting display part	Description
RUN mode	-	-	Press [◀] key to enter the time setting
Setting mode	t.oFF	00m01s	Flashing: the last number
	t.oFF	01m20s	Set the time via [◀], [▲] key Press [MD] key to complete the setting and progress the next time setting
	t.on	00m01s	Flashing: the last number
	t.on	03m57s	Press [MD] key to complete the setting and return to RUN mode

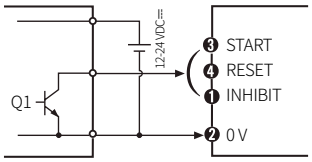
Input Connections (LE4S)

When wiring, note that the power and signal input terminals are non-isolated. Take care during connections.

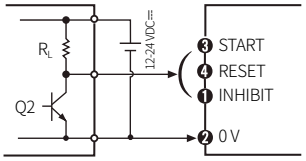
■ No-voltage (NPN) input

• Solid-state input

Sensor
(NPN open collector output)

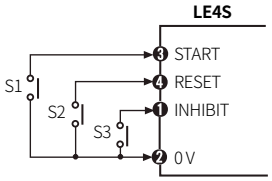


Sensor
(NPN output)



Q1-2: operates when it is ON.

• Contact input



Use a contact capable of switching 5 VDC⎓ at 1 mA
Q1-2, S1-3: operates when it is ON.

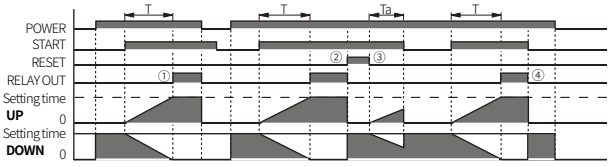
Output Operation Mode

■ LE4S

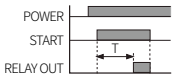
The timing charts are under the supplying power.
Initial status: UP mode - display value 0, output OFF
DOWN mode - displays the setting time, output OFF

- T, T.on, T.off : setting time / T.out : One-shot output time (range: 0.01 to 99.99 sec)
- T.on, T.off : individual setting available
- T, T.on, T.off > Ta
- T = T1 + T2 / T = Ta + Tb + Tc

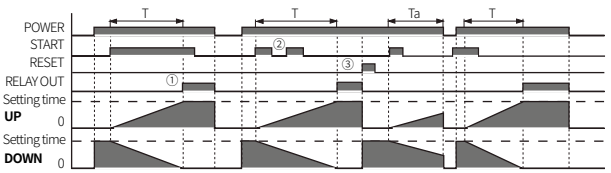
OND



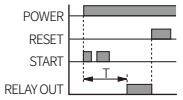
1. START signal: time starts during ON state
2. Position ① - progressing time = setting time → Output: ON, display value: Hold
3. Position ② - RESET signal: ON → Display value and output: return to the initial status
4. Position ③ - START signal: ON → RESET signal: OFF, starting the operation of no. 1
5. Position ④ - START signal: OFF → Display value and output: return to the initial status



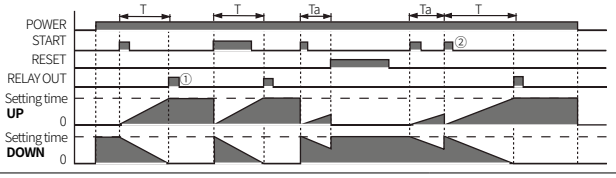
OND.1



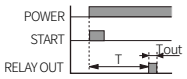
1. START signal: ON → Time starts
2. Position ① - progressing time = setting time → Output: ON, display value: Hold
3. Position ② - Recognizes the first START signal
4. Position ③ - RESET signal: ON → Display value and output: return to the initial status



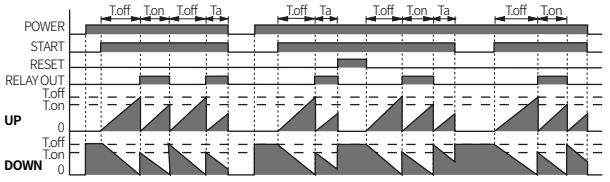
OND.2



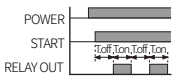
1. START signal: ON → Time starts
2. Position ① - progressing time = setting time → Output: ON (during T.out) and OFF, display value: Hold
3. RESET signal: ON → Display value and output: return to the initial status
4. Position ② - START signal: ON during progressing the time, Progressing time: return to the initial status and progress again.



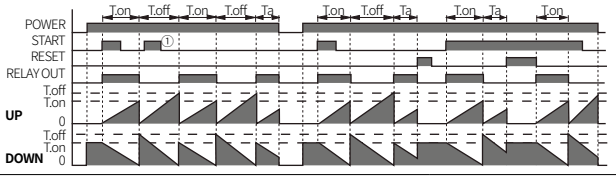
FLK



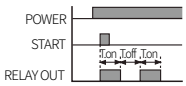
1. START signal: ON during the output: repeating OFF (during T.off), ON (during T.on)
2. RESET signal: ON → Display value and output: return to the initial status
3. START signal: ON status, RESET signal: OFF → Starts the operation of no. 1
4. START signal: OFF → Display value and output: return to the initial status



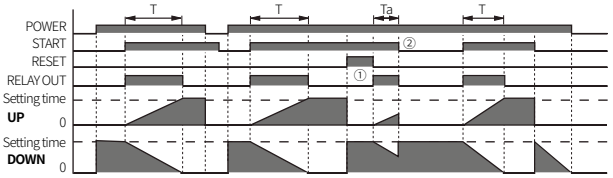
FLK.1



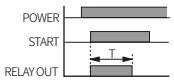
1. START signal: ON → Output: repeating ON (during T.on), OFF (during T.off)
2. Position ① - Recognizes the first START signal
3. RESET signal: ON → Display value and output: return to the initial status. But, when the START signal is ON, progress again.



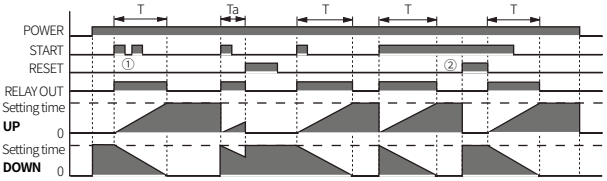
INT



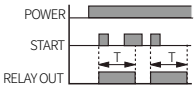
1. START signal: ON, instantly output: ON and time starts
2. Progressing time = setting time → Output: OFF, display value: Hold
3. Position ① - RESET signal: ON → Display value and output: return to the initial status
4. START signal: ON status, RESET signal: OFF → Starts the operation of no. 1
5. Position ② - START signal: OFF → Display value and output: return to the initial status



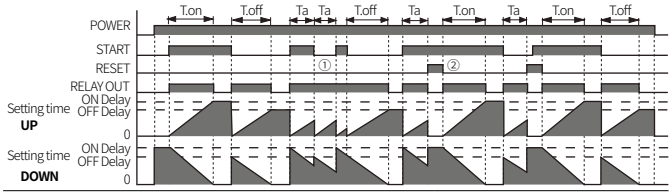
INT.1



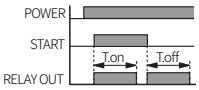
1. START signal: ON, instantly output: ON and time starts
2. Progressing time = setting time → Output: OFF, display value: Hold
3. Position ① - Recognizes the first START signal
4. Progressing time = setting time → START signal: ON, instantly output: ON, initializing time and progress
5. Position ② - RESET signal: ON → Display value and output: return to the initial status



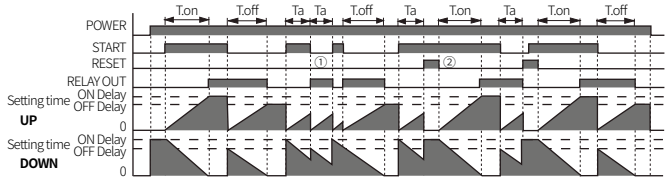
NFD



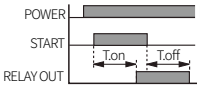
1. START signal: ON → Output: ON (during T.on) - ON Delay, START signal: OFF → Output: OFF (during T.off) - OFF Delay
2. Position ① - START signal: repeatedly input (within the setting time) → Output: ON, display value: return to initial status
3. Position ② - RESET signal: ON → Display value and output: return to the initial status
START signal: ON status, RESET signal: OFF → ON Delay



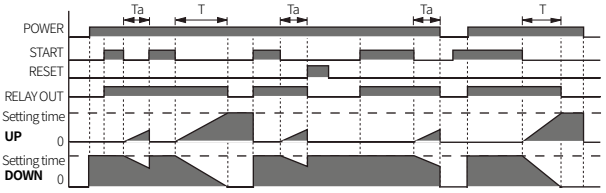
NFD.1



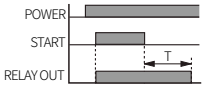
1. START signal: ON → Time starts, Progressing time = T.on → Output: ON (ON Delay), START signal: OFF → T.off: output ON (OFF Delay)
2. Position ① - START signal: ON → OFF (within the setting time) → Output: ON, display value: return to initial status
START signal: OFF → ON (within the setting time) → Output: OFF, display value: return to initial status
3. Position ②: RESET signal: ON → Display value and output: return to the initial status
START signal: ON status, RESET signal: OFF → ON Delay



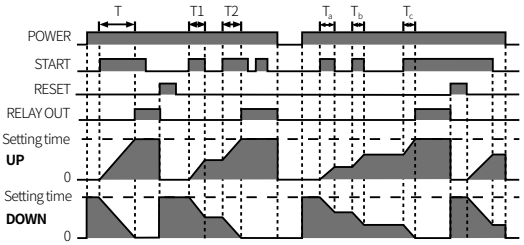
OFD



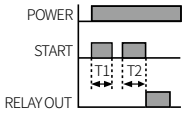
1. START signal: ON → Output: maintains ON state
2. START signal: OFF → Time starts
Progressing time = setting time → Output: OFF, display value: Hold
3. RESET signal: ON → Display value and output: return to the initial status



INTG



1. Time starts only when START signal: ON
2. START signal: OFF (output: OFF status) → Time: Hold
3. Progressing time = setting time → Output: ON, display value: Hold
4. RESET signal: ON → Display value and output: return to the initial status

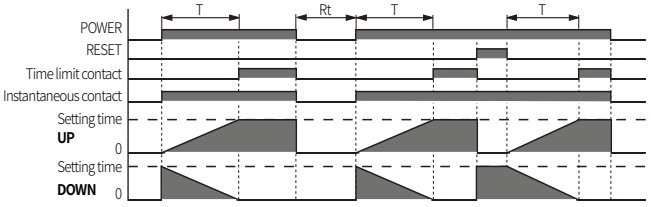


■ LE4SA

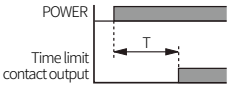
Initial status: UP mode - display value 0, output OFF
DOWN mode - displays the setting time, output OFF
Instantaneous contact (OUT2) return: it is available when the power is OFF.
Release the key lock to use [RESET] key.

- T, T.on, T.off, T1 : setting time / T.out : One-shot output time (range: 0.01 to 99.99 sec) / Rt: return time
- T2: S-D mode - switching time, TWN, TWN.1 mode - setting time
- T.on, T.off / T1, T2 (TWN, TWN.1 mode): individual setting available
- T, T.on, T.off > Ta

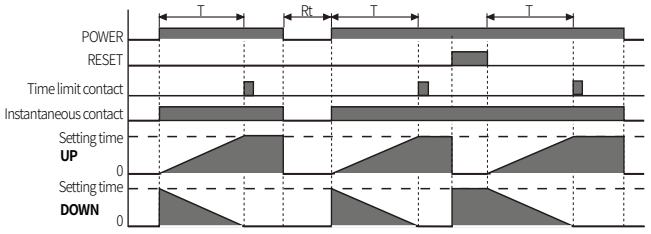
OND



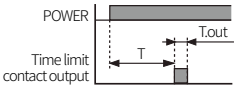
1. Power: ON, simultaneously time starts
2. Progressing time = setting time → Time limit output: ON, display value: Hold
3. Time limit 1c + Instantaneous 1c mode
   : power ON → Instantaneous output ON
   power OFF → Instantaneous output OFF
4. RESET signal: ON → Display value and output: return to the initial status



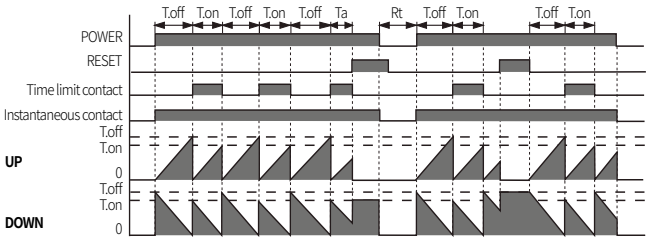
OND.2



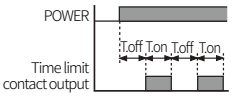
1. Power: ON, simultaneously time starts
2. Progressing time = setting time → Time limit output: ON (during T.out) and OFF, display value: Hold
3. Time limit 1c + Instantaneous 1c mode
   : power ON → Instantaneous output ON
   power OFF → Instantaneous output OFF
4. RESET signal: ON → Display value and time limit output: return to the initial status



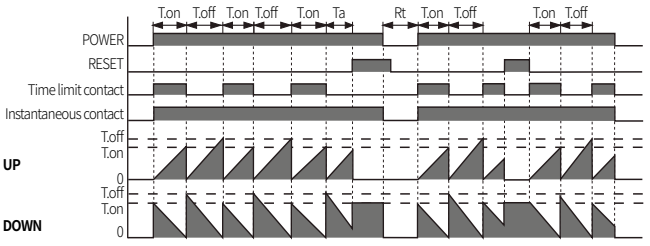
FLK



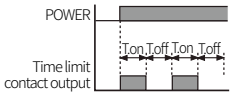
1. Power: ON, simultaneously output: repeating OFF (during T.off), ON (during T.on)
2. Time limit 1c + Instantaneous 1c mode
   : power ON → Instantaneous output ON
   power OFF → Instantaneous output OFF
3. RESET signal: ON → Display value and time limit output: return to the initial status



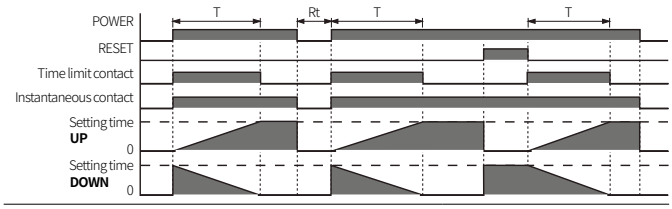
FLK.1



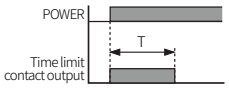
1. Power: ON, simultaneously output
   : repeating ON (during T.on), OFF (during T.off)
2. Time limit 1c + Instantaneous 1c mode
   : power ON → Instantaneous output ON
   power OFF → Instantaneous output OFF
3. RESET signal: ON → Display value and time limit output: return to the initial status



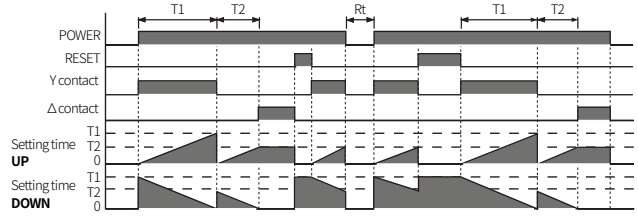
INT



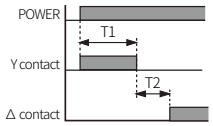
1. Power: ON, simultaneously time limit output ON and time starts
2. Progressing time = setting time → Time limit output: OFF, display value: Hold
3. Time limit 1c + Instantaneous 1c mode
   : power ON → Instantaneous output ON
   power OFF → Instantaneous output OFF
4. RESET signal: ON → Display value and time limit output: return to the initial status



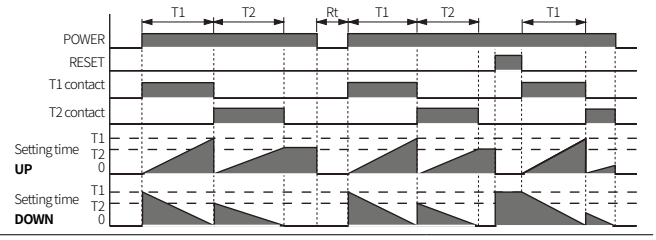
S-D (Y - Δ)



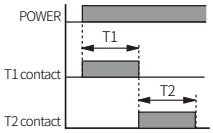
1. Power: ON, simultaneously Y contact: ON and time starts
2. Progressing time = Setting time T1 → Y contact: OFF, initializing progressing time and progress again
3. Progressing time = Switching time T2 → Δ contact: ON, display value: Hold
4. RESET signal: ON → Display value and Y - Δ contact: return to the initial status



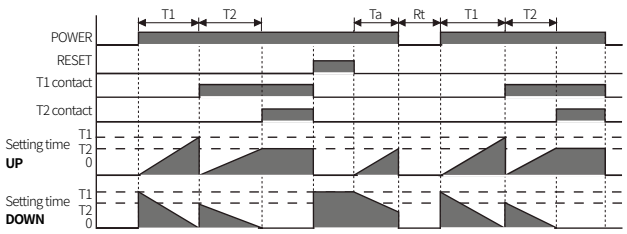
TWN



1. Power: ON, simultaneously T1 contact: ON and time starts
2. Progressing time = Setting time T1 → T1 contact: OFF, T2 contact: ON, initializing progressing time and progressing again
3. Progressing time = Setting time T2 → T1 contact: ON, T2 contact: OFF, display value: Hold
4. RESET signal: ON → Display value and T1, T2 contact : return to the initial status



TWN.1



1. Power: ON, simultaneously time starts
2. Progressing time = Setting time T1 → T1 contact: ON,
   T2 contact: OFF, initializing progressing time and progressing again
3. Progressing time = Setting time T2 → T1 contact: OFF,
   T2 contact: ON,
   display value: Hold
4. RESET signal: ON → Display value and T1, T2 contact
   : return to the initial status