

Safety information

Please read the safety information carefully before the use, and use the product correctly. The alerts declared in the manual are classified into **Danger**, **Warning** and **Caution** according to their importance

- ⚠ DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
- ⚠ WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
- ⚠ CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or property damage

- ⚠ DANGER**
 - The input/output terminals are subject to electric shock risk. Never let the input/output terminals come in contact with your body or conductive substances.
- ⚠ WARNING**
 - Any use of the product other than those specified by the manufacturer may result in personal injury or property damage.
 - If there is a possibility that a malfunction or abnormality of this product may lead to a serious accident to the system, install an appropriate protection circuit on the outside.
 - Since this product is not equipped with a power switch and fuse, install them separately on the outside (fuse rating: 250 V a.c. 0.5 A).
 - Please supply the rated power voltage, in order to prevent product breakdowns or malfunctions.
 - To prevent electric shocks and malfunctions, do not supply the power until the wiring is completed.
 - The product does not have an explosion-proof structure, so avoid using it in places with flammable or explosive gases.
 - Never disassemble, modify, process, improve or repair this product, as it may cause abnormal operations, electric shocks or fires.
 - Please disassemble the product after turning OFF the power. Failure to do so may result in electric shocks, product abnormal operations or malfunctions.
 - Please use this product after installing it to a panel, because there is a risk of electric shock.
- ⚠ CAUTION**
 - The contents of this manual may be changed without prior notification.
 - Please make sure that the product specifications are the same as you ordered.
 - Please make sure that there are no damages or product abnormalities occurred during shipment.
 - Please use the product in places where corrosive gases (especially harmful gases, ammonia, etc.) and flammable gases are not generated.
 - Please use the product in places where vibrations and impacts are not applied directly.
 - Please use the product in places without liquids, oils, chemicals, steam, dust, salt, iron, etc.
 - Please do not wipe the product with organic solvents such as alcohol, benzene, etc. (use neutral detergents).
 - Please avoid places where large inductive interference, static electricity, magnetic noise are generated.
 - Please avoid places with heat accumulation caused by direct sunlight, radiations, etc.
 - Please use the product in places with elevation below 2000 m.
 - When water enters, short circuit or fire may occur, so please inspect the product carefully.
 - When there is a lot of noise from the power, we recommend to use insulation transformer and noise filter. Please install the noise filter to a grounded panel, etc. and make the wiring of noise filter output and power supply terminal as short as possible.
 - Tightly twisting the power cables is effective against noise.
 - Do not wire anything to unused terminals.
 - Please wire correctly, after checking the polarity of the terminals.
 - When you install this product to a panel, please use switches or circuit breakers compliant with IEC60947-1 or IEC60947-3.
 - Please install switches or circuit breakers at close distance for user convenience.
 - We recommend regular maintenance for the continuous safe use of this product.
 - Some components of this product may have a lifespan or deteriorate over time.
 - The warranty period of this product, is 1 year, including its accessories, under normal conditions of use.
 - The preparation period of the contact output is required during power supply.
 - If it is used as a signal for an external interlock circuit, use a delay relay together.
 - This device is intended for installation in industrial equipment as a timer and counter, for operations such as time control and count measurement.

Model code

Model	Code	Content
LC	□-□□□□□□□□	LCD Counter / Timer
Dimensions	1	48(W) × 24(H) mm
	3	96(W) × 48(H) mm
	4	48(W) × 48(H) mm
	6	72(W) × 36(H) mm
Settings	P	Presets Counter / Timer
		4 digits (9999) ※LC1/LC4 only 6 digits (999999)
Display digits	4	1-stage output
	6	2-stage output ※LC1 except
Control output	1	No sub output
	2	2-stage output ※LC1 except
Sub output	N	RS-485 (MODBUS-RTU)
	C	100 ~ 240 V a.c. 50/60 Hz
Power voltage	A	24 ~ 48 V a.c. 50/60 Hz or 24 ~ 48 V d.c. ※LC1 except
	D	

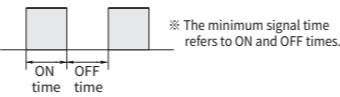
Specifications

Model	LC1	LC3	LC4	LC6	LC7	
Power voltage	AC	100 ~ 240 V a.c. 50/60 Hz (Voltage fluctuation rate: ±10%)				
Power consumption	AC	1-stage setting type: max. 7.4 VA				
	DC	2-stage setting type : max. 12 VA • 1-stage setting type : max. 11 VA				
Character height	Counting unit (10.2 mm), Setting unit (3.5 mm)		Counting unit (10.8 mm), Setting unit (10 mm)	Counting unit (10.5 mm), Setting unit (6.7 mm)	Counting unit (17.2 mm), Setting unit (12.5 mm)	
	Max counting speed		1 cps / 30 cps / 1 Kcps / 10 Kcps			
Power outage compensation	10 years (using non-volatile memory)					
Input	Select input method by external switch (voltage input / non-voltage input)					
	Counter: composed of CP1, CP2, RESET, BATCH-RESET Timer: composed of START, INHIBIT, RESET Voltage input: HIGH level (5 ~ 30 V d.c.), LOW level (0 ~ 2 V d.c.), input resistance (about 4.5 KΩ) Non-voltage input: impedance during short-circuit (max. 1 KΩ), residual voltage during short-circuit (max. 2 V d.c.)					
Minimum input signal time	1 ms / 20 ms (START, INHIBIT, RESET inputs)					
External power supply	Max. 12 V d.c. 100 mA					
ONE SHOT output	0.01 ~ 99.99 sec					
Control output	1-stage	OUT (SPST, 1a)	OUT (SPDT, 1c)	OUT (SPST, 1a)	OUT (SPDT, 1c)	
	2-stage	-	OUT1 (SPST, 1a), OUT2 (SPDT, 1c) * OUT2 of LC6-P62C: SPST configuration	-	-	
	Capacity	250 V a.c. 5 A, resistive load	SPDT: NC (250 V a.c. 2 A), NO (250 V a.c. 5 A), resistive load	SPST: 250 V a.c. 5 A, resistive load	-	
	1-stage	NPN 1 circuits (OUT)	NPN 2 circuits (OUT, BAT.O)	NPN 1 circuit configuration		
2-stage	-	NPN 2 circuits (OUT1,OUT2)	NPN 2 circuits (OUT1,OUT2)			
Capacity	Open collector, max. 30 V d.c. 100 mA	Open collector, max. 30 V d.c. 100 mA				
Timer operation error	Power start: max. ±0.01 % ±0.05 sec Reset start: max. ±0.01 % ±0.03 sec					
Communication	Protocol	Modbus RTU				
	Method	RS485 (2-wire half-duplex)				
	Synchronism	Asynchronous				
	Speed	2,400 / 4,800 / 9,600 / 19,200 / 38,400 bps				
	Effective distance	Max. within 800 m				
	Max. connections	31 (address: 1 ~ 127)				
	Response waiting time	5 ~ 99 ms				
	START BIT	1 bit (fixed)				
	STOP BIT	1 bit (fixed)				
	DATA BIT	8 bit				
PARITY BIT	None / Odd / Even					
Insulation resistance	Min. 100 MΩ (500 V d.c.) conductive part terminal - unfilled metal					
Dielectric strength	2000 V a.c. 60 Hz for 1 minute (different live part terminals)					
Noise immunity	Square-wave noise by noise simulator ±2000 V (pulse width 1 μs)					
Shock resistance	300 m/s ² (30G), 3 times each in X, Y and Z direction					
Vibration durability	10 ~ 55 Hz, single amplitude 0.5 mm, 3-axis each direction, 2 h					
Relay life	electrical	Min. 50,000 times				
	mechanical	Min. 10,000,000 times				
Degree of protection	IP66 (product front)					
Storage temperature	-25 ~ 65 °C (without condensation)					
Ambient temperature & humidity	-10 ~ 55 °C, 35 ~ 85 % RH (without condensation)					
Weight	78g	196g	140g	143g	222g	

Maximum counting speed

The maximum counting speed is the maximum response speed when you input the duty ratio (ON / OFF ratio) of the count input signal as 1 : 1.
 ① Even when the input signal is below the maximum counting speed, it may not be counted if the ON and OFF times are less than the specified minimum signal width.
 ② Minimum signal time.

Counting speed	Minimum signal time
1 cps	500 ms
30 cps	16.7 ms
1 Kcps	0.5 ms
10 Kcps	0.05 ms



Part names and functions

LC3

① PV display: displays count value, time value, batch count value, setting item
 ② SV display: displays counter / timer / batch set value
 ③ MODE KEY: enters and quits function mode (auto save function set value during termination) : used to switch the SV display in operation mode (1-stage/2-stage set values/batch set value)
 ④ SHIFT KEY : enters set value change mode and shifts the set value digits : enters communication setting mode in function mode
 ⑤ DOWN KEY: reduces set value in function mode and set value change mode
 ⑥ UP KEY: increases set value in function mode and set value change mode
 ⑦ RESET KEY: resets count value, time value and output status
 ⑧ START input indicator: illuminates when external START signal is applied in timer operation mode

LC7

⑨ INHIBIT input indicator: illuminates when external INHIBIT signal is applied in timer operation mode
 ⑩ RESET input indicator: illuminates when external RESET signal is applied in timer operation mode
 ⑪ LOCK set indicator: illuminates when LOCK is set
 ⑫ Communication write inhibit indicator: illuminates when communication write inhibit is set
 ⑬ Timer setting indicator: illuminates when TIM/TIM/BT/M operation mode is set, flashes during timing operation
 ⑭ BATCH output indicator: illuminates during BATCH output operation
 ⑮ OUT1 output indicator: illuminates during OUT1 output operation
 ⑯ OUT2 output indicator: illuminates during OUT2 output operation For LC1, illuminates when the OUT output is active
 ⑰ BATCH setting indicator: illuminates when switching SV display to BATCH set value
 ⑱ SV1 setting indicator: illuminates when switching SV display to 1-stage set value
 ⑳ SV2 setting indicator: illuminates when switching SV display to 2-stage set value

Operation modes

Display	Operation mode	Description
Crk	Presets counter	According to input mode, adds, subtracts, add/subtracts and counts the pulses applied to external input CP1/CP2. When the count value reaches the 1- and 2-stage set values, the OUT1 and OUT2 are operated according to the selected output mode.
bCrk	Batch counter	Batch output activated when batch count value reaches the batch set value, after counting the count-ups of the counter.
tIn	Timer	When a signal is applied to external input START / INHIBIT / RESET, operation time is displayed according to time range. OUT1 and OUT2 outputs operated according to selected output mode when the time value reaches the 1- and 2- stage set values.
tkIn	Twin timer	OUT1 and OUT2 outputs are turned ON / OFF according to ON and OFF set times (OUT output is operated in 1-stage model, OUT1 and OUT2 outputs are operated in 2-stage model simultaneously).
bkIn	Batch timer	Batch output activated when the batch count value reaches batch set value, after counting the time-ups of the timer.

* The batch count value can be initialized by pressing front reset button in batch count value display mode or by applying a signal to batch reset terminal.

Input/output connection

Input logic selection (voltage / non-voltage)

• Non-voltage input (NPN)

Default setting

• Voltage input (PNP)

1. After turning off the power, check the NPN / PNP display on case top and operate the transfer switch.
 2. You can check the input logic setting status in the function setting mode.

Input connection

• When non-voltage input (NPN) is selected

Sensor Counter

NPN voltage input

Sensor Counter

NPN open collector input

• When voltage input (PNP) is selected

Sensor Counter

PNP voltage input

Sensor Counter

PNP open collector input

• Example of contactless (transistor) output

• Since internal circuit and contactless output are isolated, please use same as GND. For the contactless output, select the power supply for the load that does not exceed the maximum of 30 V 100 mA.

• Example of contact output

• Because the contact capacity is 250 V a.c. NO 5 A, NC 2 A (load resistance) make sure that the transient current does not flow at the contact. The wiring follows the normal wiring method.

• Surge absorber Resistance: 22 Ω, condenser: 0.1 μF, voltage: 630 V a.c.

Counter function modes

Display	Name	Settings	Display condition	Initial value
Crk	Operation mode	•LC3/4/5/7 Crk → bCrk → tIn → tkIn → bkIn Presets counter Batch counter Timer Twin timer Batch timer •LC1 Crk → tIn → tkIn Presets counter Timer Twin timer	Counter	Crk
tIn	Input mode	U-R → U-b → U-Rb → d-R → d-b → d-Rb UP-A UP-B UP-AB DOWN-A DOWN-B DOWN-AB UP/DOWN UP/DOWN UP/DOWN UP/DOWN UP/DOWN UP/DOWN -A -B -C -D -E -F	Counter	U-R
oIn	Output mode	n-F → r → c → k → P → q → R N F C R K P Q A	Counter	F
oUt2	OUT2/OUT output time	• Sets OUT2 or OUT output time • You cannot set to 00.00 in some output modes 0000 ~ 9999 00.00 99.99	2-stage setting 1-stage setting	0000
oUt1	OUT1 output time	• Sets OUT1 output time HoLd ~ 9999 HoLD 99.99	2-stage setting	HoLd
CP5	Counting speed	• Sets max counting speed (when duty ratio is 1:1) 1 → 30 → 1K → 10K 1 30 1K 10K	Counter	30
Pdct	Pre-scale decimal point	• Up to 5 decimal places can be set 00000 ~ 000000 ~ 0000000 ~ 00000000 ~ 000000000 0.00000 00.00000 000.00000 0000.00000 00000.0	Counter	000000
PrEs	Pre-scale	00000 1 ~ 999999 0.00001 999999	Counter	00 1000
dct	Decimal point	※ Decimal point display cannot be more than pre-scale one 000000 ~ 0000000 ~ 00000000 ~ 000000000 ~ 0000000000 0.00000 00.00000 000.00000 0000.00000 00000.0 000000.0	Counter	000000
rStk	Reset time	1ms → 20ms 1 ms 20 ms	Counter	20ms
PaUr	Power outage memory	•SAVE (saves count value), CLEAR (resets count value) SAvE → CLER SAVE CLEAR	Counter	CLER
SIn	Input logic display	•Shows NPN/PNP input selection status of side dip switch nPN PNP	Counter	nPN
LoLk	Key lock	LoFF → LoN → LSEt → LrSt LoCK LoCK LoCK LoCK oFF oN oN oN LoFF LoN LSEt LrSt	Counter	LoFF
oFSt	Offset	•Available only in UP mode, it counts from the set offset value • It cannot be used with the twin timer. 000000 ~ 999999 000000 999999	Counter	000000

Dimensions and panel cutouts

• Dimensions [Unit : mm]

• Panel cutout

Classification	Product dimensions (Includes protective cover)						Panel cutout				
Type	W	H	D	D1	D2	L	H2	W1	H1	A	B
LC1	48.0	24.0	75.0	4.0	19.0	94.0	24.0	45.0	22.4	65.0	41.0
LC3	96.0	48.0	53.0	3.5	18.1	71.1	44.8	91.0	45.0	121.0	70.0
LC4	48.0	48.0	62.8	3.5	16.7	84.5	44.8	45.0	45.0	60.0	60.0
LC6	72.0	36.0	66.0	4.2	18.1	84.1	30.5	66.5	32.0	96.5	57.0
LC7	72.0	72.0	72.3	3.7	20.6	97.8	67.0	68.0	68.0	82.0	82.0

Connection diagrams

~: Alternating Current (AC) ==: Direct Current (DC)

• LC1-P41N

• LC1-P41C

• LC3-P62N

• LC3-P61N

• LC3-P62C

• LC3-P61C

Timer function modes

Display	Name	Settings	Display condition	Initial value
Crk	Operation mode	•LC3/4/6/7 Crk → bCrk → tIn → tkIn → bkIn Presets counter Batch counter Timer Twin timer Batch timer •LC1 Crk → tIn → tkIn Presets counter Timer Twin timer	Counter/Timer	Crk
SEAL	Decimal/sexagesimal	10 → 60 10 60	Timer/TwinTimer	60
tIn	Time range	10 15 → U 15 → U 15 → U 1h → U 1h U.01s U.1s U.1s U.1m U.1h d 1H → d 1h → d 15 → d 15 → d 15 D1h D1m D1s D.1s D.01s	Timer/TwinTimer	10 15
oIn	Output mode	•Pond → Pond → SoFd → S InL → SAdd → SOND POND SOND SOFD SINT SADD S.OND •LC1 Pond → PoFd → PoFt → SOND → SoFd POND POFD POFT S.OND S.OFD •LC1 Pond → PoFd → SOND → SoFd POND POFD S.OND S.OFD	Timer	Pond
oUt	Output time	•Not displayed in some twin timer operation modes HoLd ~ 9999 HoLD 99.99	Timer	HoLd
in	Minimum input signal time	•Select input terminal min input time (START, INHIBIT, RESET) 1ms → 20ms 1 ms 20 ms	Timer/TwinTimer	20ms
PaUr	Power outage memory	•SAVE (save time value), CLEAR (reset time value) SAvE → CLER SAVE CLEAR	Timer	CLER
SIn	Input logic display	nPN → PNP NPN PNP	Timer/TwinTimer	nPN
LoLk	Key lock	LoFF → LoN → LSEt → LrSt LoCK LoCK LoCK LoCK oFF oN oN oN LoFF LoN LSEt LrSt	Timer/TwinTimer	LoFF
oFSt	Offset	• Only in UP mode, display from set offset value 000000 ~ 999999 000000 999999	Timer	000000

Note) Can not be used with twin timer.

Time ranges

Range selection display		4-digit time range		6-digit time range	
UP	DOWN	Decimal notation	Sexagesimal notation	Decimal notation	Sexagesimal notation
10 15	d 15	99.99 s	59.99 s	9999.99 s	59 m 59.99 s
U 15	d 15	999.9 s	9 m 59.9 s	99999.9 s	9 h 59 m 59.9 s
U 15	d 15	9999 s	59 m 59 s	999999 s	99 h 59 m 59 s
U 1h	d 1h	9999 m	99 h 59 m	999999 m	9999 h 59 m
U 1h	d 1h	9999 h	99 d 23 h	999999 h	9999 d 23 h

Connection diagrams

• LC4-P62N/P42N

• LC4-P61N/P41N

• LC4-P62C/P42C

• LC4-P61C/P41C

• LC6-P62N

• LC6-P61N

• LC6-P62C

• LC6-P61C

• LC7-P62N

• LC7-P61N

• LC7-P62C

• LC7-P61C

※ For further information, please refer to the user manual on our website (www.hanyoungnux.com)