Digital counter & timer

GF series

INSTRUCTION MANUAL

instruction manual carefully before using this product, and use the product orrectly. Also, please keep this manual where you can view it any time.

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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** and **Warning** according to their importance.

<u>∠!</u> \ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
A CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or properties damage

♠ DANGER

• The electric shock may occur in the input/output terminal so please never let your body and/or conductive substance to be contacted by the input/output terminal.

- Use other than the method specified by the manufacturer may result in personal injury or property damage.
 If there is a risk that a breakdown or abnormality of this product may lead to a serious accident in the system, install an
- It there is a risk that a breakdown or abnormality of this product may lead to a serious accident in the system, install an appropriate external protection circuit.

 Since the power switch and fuse are not attached to this unit, install them separately outside. (Fuse rating: 250 V 0.5 A)

 To prevent electric shock and malfunction of the device, do not supply power until all wiring is completed.

 Never disassemble, process, improve or repair this device. there is a risk of abnormal operation or electric shock.

 Turn off the power before attaching or detaching this device. It may cause electric shock, malfunction or failure.

 To prevent damage and breakdown of this device, supply the power voltage appropriate to the rating.

 Since it is not of explosion-proof structure, do not use it in a place with flammable or explosive gas.

 There is a risk of electric shock, so please use this product while it is installed on a panel.

⚠ CAUTION

- The contents of this manual are subject to change without prior notice or notice.

 •Please check if it matches the specifications you ordered.

 •Check whether there is any damage or abnormality in the product during transportation.

 •Use in a place where corrosive gas (especially harmful gas, ammonia, etc.) and combustible gas are not generated.

 •Use in a place where vibration or impact is not applied directly to the body.

 •Use in a place free from water, oil, chemicals, steam, dust, salt, iron, etc.

- OSe III a place nee infill water, on, thermody, seeing dot, ast, ast, ast,
 Do not use outdoors
 Do not wipe this unit with organic solvents such as alcohol or benzene. (Wipe with a neutral detergent.)
 Avoid places where inductive obstacles are large and static electricity and magnetic noise are generated.
 Avoid places where heat accumulation occurs due to direct sunlight or radiant heat.

- Avoid places where inductive obstacles are large and static electricity and magnetic noise are generated.
 Avoid places where heat accumulation occurs due to direct sunlight or radiant heat.
 Use it at an altitude of 2,000 m or less.
 When water enters, there is a risk of a short circuit or fire, so be sure to inspect it.
 If there is a lot of noise from the power supply, it is recommended to use an insulation transformer and a noise filter. The noise filter must be attached to a panel that is grounded, and the wiring between the noise filter output side and the power supply terminal of the instrument must be short.
 If the instrument power cable is twisted closely, it is effective against noise.
 Do not wire anything to unused terminals.
 Connect the wiring correctly after checking the polarity of the terminal.
 Install a switch or circuit breaker at a close distance for easy operator operation.
 Since a switch or breaker is installed, please state on the panel that the power will be cut off when the switch or breaker is operated.
 Regular maintenance is recommended in order to continue to use this device safely.
 Some mounting parts of this instrument have a life span and some that change over time.
 The warranty period of this device including accessories is 1 year under normal use.
 When the power is turned on, a preparation operiod for contact output is required. When used as a signal for an external interlock circuit, etc., use a delay relay together.
 Power input and relay output wires are at least 75 °C of heat resistance and, use copper wires from 18 AWG to 24 AWG.
 Product usage: This device is a timer/counter that is installed and used in industrial equipment for time control and counting.
 Overvoltage category II (OVC II)

- Suffix code

Model	Code			Description				
GF	GF					Digital counter/timer		
A	4A					48(W) X 48(H) mm		
Appearance	7A					72(W) X 72(H) mm		
Model	P				Preset counter/timer			
Model	Т					Total counter/timer		
Diamlass diaita	4				4 Digit-display (9999)			
Display digits			6			6 Digit-display (999999) ※ GF7A model only		
				0		No output (Display only)		
Control output	t	1			1-Stage output			
				2		2-Stage output % GF7A model only		
Terminal struc	turo	T		T	Terminal			
reminal struc	ture			S		8 Pin plug ※ GF4A model only		

■ Product composition

Terminal structure	GF4A Terminal	GF4A 8 Pin plug	GF7A Terminal
Model	GF4A- P41T / T40T	GF4A- P41S / T40S	GF7A- P41T / P42T / P61T / P62T / T607

Input wiring method

■ When selected as non-voltage input (NPN)

NPN Voltage in	put	NPN Open c	ollector input	Contact input
Sensor CP2 CP2 RSSET INHIBIT	0 V	Sensor	Counter 12 V CP1 4.7 kΩ CP2 NHIBIT 0 V	Counter 12V CP1 ≥ 4.7 kΩ CP1 NNIBIT

※ Note) When using a contact point, set the counting speed to 30 cps or 1 cps to prevent chattering.

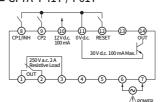
■ When selected by voltage input (PNP)

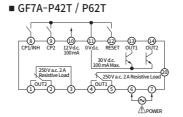
PNP Voltage input	PNP Open collector input	Contact input	
Sensor Counter 12 V CP1 CP2 RESET 4.7 kΩ NHIBIT 4.7 kΩ OV OV	Counter 12 V	12V d.c. Counter O CP1 O CP2 RESET NHIBIT 4.7 kΩ	

 $\,$ % Note) When using a contact point, set the counting speed to 30 cps or 1 cps to prevent chattering.

■ Connection diagram

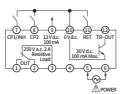
■ GF7A-P41T / P61T

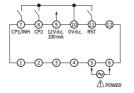


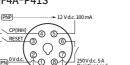


■ GF7A-T60T

■ GF4A-P41T









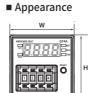
■ GF4A-T40T

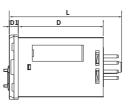


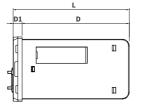
Specification

	Model		GF7A	GF4A	GF4A-□□□S				
Pov	ver supply v	oltage	100 - 240 V a.	c. 50/60 Hz (Voltage fluctuation	rate: ± 10 %)				
Power supply voltage Power Consumption			• P41T (6.6 VA), P42T (7.3 VA) • P61T (6.6 VA), P62T (7.6 VA) • T60T (5.6 VA)	• P41T (6.4 VA) • T40T (5.6 VA)	• P41S (5.9 VA) • T40S (5.4 VA)				
	Display meth	ıod		White 7 segment LED					
	Character si	ze	• P62T/P61T/T60T (11.5 X 5.2 mm) 8.5 X 5.0 mm • P42T/P41T (13.6 X 7.8 mm)						
(Counting spe	ed	1 / 30 / 1k / 5k cps	30 / 5	ik cps				
Black	kout comper	nsation	10	Years (nonvolatile memory use	d)				
	Return time	e		500 ms or less					
Tim	er operation	error	Power start: ± 0.0	01 % \pm 0.05 seconds or less (rati	io to setting value)				
	Input		Counter (composed of CP1, Ci Voltage input : HIGH level (5 V – No-voltage input : Impedance	 Input method selection by external switch (voltage input / no-voltage input) Counter (composed of CP1, CP2, RESET), timer (composed of INHIBIT, RESET) Voltage input: HIGH level (5 V – 30 V d.c.), LOW level (0 V – 2 V d.c.), input resistance (about 4.7 kΩ) No-voltage input: Impedance in case of short circuit (1 kΩ or less), residual voltage in case of short-circuit (2 V d.c. or less) 					
Min	. input signa	l time	20	ms or more (RESET, INHIBIT inp	ut)				
One-shot Output time 1st stage 2st stage			0.5 seconds fixed	-					
				0.05 to 5.8 seconds					
Exte	rnal power s	supply	12 V d.c. 100 mA max.						
Exte		1st stage	OUT (SF	PDT, 1c)	OUT (SPST, 1a)				
	Contact	2st stage	OUT1 (SPDT, 1c), OUT2 (SPDT, 1c)		-				
Control		Capacity	SPDT : NC (250 V a.c. 2 NO (250 V a.c. 5 A), Res		250 V a.c. 5 A Resistance load				
output		1st stage	OUT (NPN OF	oen collector)	-				
	Non- contact	2st stage	OUT1, OUT2 (NPN 2 open collector circuits)		-				
		Capacity		30 V d.c. 100 mA max.					
	Relay life		Electrical (more than 50,000 times), Mechanical (more than 10 million times)						
Inst	ulation Resis	tance	100 MΩ or more (based on 500 V d.c. mega)						
Di	electric stre	ngth	2,000 V a.c. 60 Hz 1 minute (between the conductive part terminal and the case)						
N	loise resista	nce	Square wave noise by noise simulator ±2,000 V (Pulse width 1 μs)						
	Vibration		Durability: 10 — 55 Hz (1 minute cycle), Double amplitude 0.75 mm, X · Y · Z 2 hours each direction Malfunction : 10 — 55 Hz (1 minute cycle), Double amplitude 0.5 mm, X · Y · Z 10 minutes each direction						
Ambient	temperature	& humidity		-10 ~ 55 °C, 35 ~ 85 % R.H.					
Sto	rage temper	ature		-20 ~ 65 °C					
	Approval			CE					
	Weight (g)		• P41T : 184 g • P42T : 190 g • P61T : 180 g • P62T : 198 g • T60T : 150 g	• P41T: 108 g • T40T: 100 g	• P41S : 92 g • T40S : 84 g				

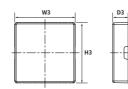
Appearance and panel processing dimensions







■ Front Protective Cover



■ Panel cutout

Order code

W-SAFETY COVER 48 W-SAFETY COVER 48

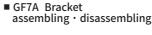
W-SAFETY COVER 72

■ Termii	nal P	rotecti	ve co	over				
W2		<u>_</u>	- D2	_				
	\ ⁻			٦!	(Orde	er code	
1 1	, i			li i	GF4A		TC4A-CO	V
					GF7A		TC7A-CO	V
			<u></u>					
Classification	Туре	GF4	A	GF4A	-S		GF7A	

		W	48.0	48.0	72.0
		Н	48.0	48.0	72.0
	Product dimensions	D	79.8	63.3	75.0
	diffictions	D1	6.7	6.7	8.2
		L	86.5	83.7	83.2
		W1	45.0(±0.5)	45.0(±0.5)	68.0(±0.7)
	Panel cutout	H1	45.0(±0.5)	45.0(±0.5)	68.0(±0.7)
		Α	60.0	60.0	82.0
		В	60.0	60.0	100.0
	Terminal	W2	48.0	Х	71.8
	Protective cover	H2	48.1	Х	71.8
	(%Option)	D2	24.0	Х	26.9
	Front	W3	50.8	50.8	75.2
	Protective Cover	Н3	50.8	50.8	75.2
	(%Option)	D3	12.9	12.9	16.7

■ GF7A Bracket assembling · disassembling





■ GF7A-T60T

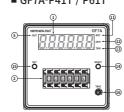
■GF4A-T40S

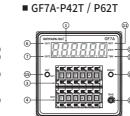
TOTAL



I Function and name of each part









■ GF4A-P41T / P41S



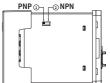


	© @ (1914)
Name	Function
PV display	Time value and counting value display
SV setting switch	Time value and counting value setting switch, prescale value setting switch (%
SV 1-stage setting switch	P42T / P62T Switch for setting time value and counting value of 1st output in the
SV 2-stage setting switch	P42T / P62T Switch for setting time value and counting value of 2-stage output P42T / P62T Switch for setting prescale value in model (* GF7A only)

	NO.	Name	Function
d	1	PV display	Time value and counting value display
4	2	SV setting switch	Time value and counting value setting switch, prescale value setting switch (* GF7A only)
4	3	SV 1-stage setting switch	P42T / P62T Switch for setting time value and counting value of 1st output in the model
	4	SV 2-stage setting switch	P42T / P62T Switch for setting time value and counting value of 2-stage output in the model, P42T / P62T Switch for setting prescale value in model (% GF7A only)
	5	Output indicator	Light on when output operates in P41T / P61T model
٦	6	Output 1 indicator	Light on when output 1 operates in P42T / P62T model
┪	7	Output 2 indicator	Light on when output 2 operates in P42T / P62T model
┥	8	CP Input indicator	Lights up when CP signal is applied in counter mode (% GF4A-T40S only)
\dashv	9	CP1 Input indicator	Lights up when CP 1 signal is applied in counter mode
4	10	CP2 Input indicator	Light on when CP 2 signal is applied in counter mode
n	11	Reset input indicator	Light on when external RESET signal is applied in timer/counter mode
-	12	Prohibited input indicator	Light on when external INHIBIT signal is applied in timer mode
4	13	Timekeeping indicator	Light on when selecting the timer mode, blinks when timer timing is running
4	14	Reset-key	Used for time value and count value initialization, output state initialization, and function switch setting value change
1	15	Set-key	Used when setting prescale in counter mode (** GF7A only, when function switch SW1-8 is set to 'PRE')
	16	Volume for setting output time	Set the output time using a (+)-shaped screwdriver (setting range 0.05 seconds to 5.8 seconds)

Function

■ Input logic selection



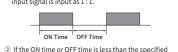
- 1) Turn off the product.
- 2) Select the input switch attached to the side of the case according to the input logic voltage (PNP) or non voltage (NPN) you want to use.
- If power is supplied after selection, timer/counter operates according to input status. After turning off the power, change the voltage input and no-voltage input

■ ERROR indication

indiciation	Explanation
Err.0	When the SV setting switch is set to '0000' or '000000' in the P41T / P61T models. When the SV 2-stage setting switch is set to '0000' or '000000' in the P42T / P62T models.
Err.1	When the prescale setting value is in error in the GF7A model

■ Counting speed

① The maximum counting speed is the maximum response speed when the duty ratio (ON/OFF ratio) of the counting input signal is input as 1 : 1.



Counting speed Minimum signal time 500 ms or more 1 cps 1k cps 0.5 ms or more 5k cps 0.1 ms or more

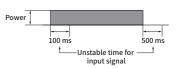
value of the minimum signal time, the counter may not be performed.

③ For contact input, use a contact with excellent contact reliability.

■ Power on/off

• During 100ms after power-on or 500ms after power-off, the internal power, and external output power rise and fall. To prevent malfunction due to the unsafe output operation of the external sensor, please do not operate it during unstable times.

• Apply the signal 100 ms after turning on the power • Apply the signal 500 ms after turning on the power



■ Sensor power supply

• Since it has a built-in power supply (12 V d.c. 100 mA Max.) that can be supplied to the sensor, it can be used within the rated current value. (Proximity switch: about 10 mA, Rotary encoder: about 30 mA)

■ Output time setting

• Set the output time (One-shot time) using the (+) driver on the front TIME volume.
• The time setting range can be set from 0.05 seconds to 5.8 seconds.

How to set the prescale ■ What is prescale?

 $\bullet \mbox{ This function counts the number of input signals and converts them into arbitrary values. } \mbox{ This function is only supported on the GF7A model.}$

How to use prescale

• When winding the wire around the drum, refer to the example below to display the winding length or to control the actual length



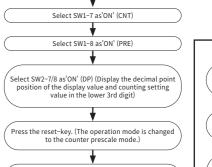
 Diameter of the roller through which the electric wire is drawn (D): 600 mm • Encoder used: 1 rotation / 20 pulses · Unit of display value: meter (m)

► Front digital switch

Operation mode

 Front digital switch
 Circumference = D x π = 600 x 3.1416 = 1884.96 mm under the above conditions (1 Length of winding per turn)
 The winding length per pulse is (1884.96 ÷ 20) = 94.248 mm
 Converting the unit to meters (M) is '0.094248 m'. (94.248 ÷ 1000)
 Since it is possible to set up to 5 digits after the decimal point, in the case of the P61T / P62T model, it is rounded and '0.09425' is the prescale value.
 To select as a counter, set the side 'SW1-7' switch to 'ON'.
 To select the prescale mode, set the 'SW1-8' switch to the ide to 'ON'.
 To make the decimal point of the displayed value and the decimal point of the count setting value into the lower 3 digits, set the 'SW2-7' and 'SW2-8' switches to the 'ON' direction and press the reset-key.
 Since the decimal point moves each time the set-key is pressed the decimal point of the prescale. 4 Since the decimal point moves each time the set-key is pressed, the decimal point position of the prescale

(a) Since the decimal point moves each time the set-key is pressed, the decimal point position of the prescal value is set to the 5th lower digit using the set-key.
(a) After setting the front SV setting switch (SV 2-stage setting switch in the case of P42T / P62T models) to '0.09425', press the reset key to complete the prescale value setting.
(a) If the prescale value exceeds the setting range, 'Err.1' is displayed on the PV display, so please reset the prescale value to within the setting range.



Press Set-key to enter the prescale setting mode. (The preset prescale value is displayed on the PV display.)

Press the Set-key to select the decimal point position of the prescale value. (Select the decimal point of the prescale value in the lower 5th digit) Prescale value setting with front SV 2—stage setting switch (Set the SV 2nd stage setting switch to '0.09425')

Press the reset-key. (After saving prescale value and prescale decimal point position return to operation mode

Operation mode

■ GF4A-P41S

Function setting method ■ GF7A Function switch configuration 8 7 6 5 4 3 2 1 1=||=||=||=||=||=||=| SW1 SW2 → OUT1 One-shot Output mode Decimal point position 8 7 6 5 4 3 2 1 Input mode/RANGE ■ GF7A-SW1 Function chart

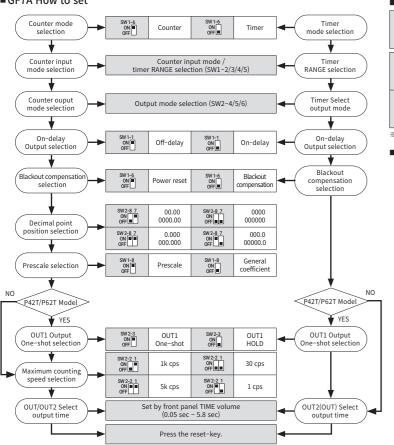
	Function	On-o	delay	Addition / Su	btraction mod	de Blackout co	mpensation	Timer /	Counter	Prescale	
		On-delay	Off-delay	Addition mode	Subtractio mode	n Blackout compensation	Power reset	Timer	Counter	General coefficien	t Prescale
		ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	7 ON OFF	7 ON ■ OFF	ON OFF	ON S
		99999.9s	99999	99s 99ı	m59.99s	999m59.9s	99999.9m	99h59n	n59s 999	99h59m	99999.9h
	P62/P61/T6	5 4 3 ON OFF	ON ■		5 4 3	5 4 3 ON OFF	5 4 3 ON OFF			5 4 3	5 4 3 ON
		99.99s	999.	9s 9	9999s	99m59s	999.9m	99h59	9m 9	199.9h	9999h
	P42/P41	5 4 3 ON OFF	ON ■		5 4 3	5 4 3 ON	5 4 3 ON OFF			5 4 3	5 4 3 ON
			U-A		U-	В	UD-A	UD-	В	UD-	·C
	COUNTER (Input)	ON OFF	ON ■		5 4 3	0N	5 4 3 ON OFF			5 4 3	5 4 3 ON TOPE

■ GF7A-SW2 Function chart

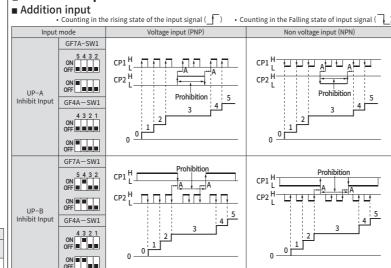
	30	1	1k	5k		OUT1 HO	LD OU	OUT1 One-shot	
CPS	ON OFF	ON TOTAL	ON TOTAL ON	ON TOTAL	Function	ON OFF		ON OFF	
	F	N	С	R	K	Р	Q	A	
(Output)	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON	6 5 4 ON OFF	6 5 4 ON III	6 5 4 ON TOTAL	6 5 4 ON OFF	
	F	N	С	R	K	Р	Q	S	
(Output)	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON	6 5 4 ON OFF	
	4 digit	6 digit	4 digit	6 digit	4 digit	6 digit	4 digit	6 digit	
Decimal	0000	000000	0.000	0.0000.0	00.00	0000.00	0.000	000.000	
point position	ON OFF		ON OFF		ON OFF	8 7	ON OFF	8 7	

* Note) When selecting the decimal point position, the selected decimal point position is equally applied to the SV setting value. Note) When OUT1 output is selected as One-shot, OUT1 output time is fixed for 0.5 seconds

■ GF7A How to set



Counter input mode



■ GF4A Function switch configuration 6 5 4 3 2 1 Counting speed Decimal point position → On-delay Output mode 6 5 4 3 2 1 Input mode/RANGE Blackout compensation

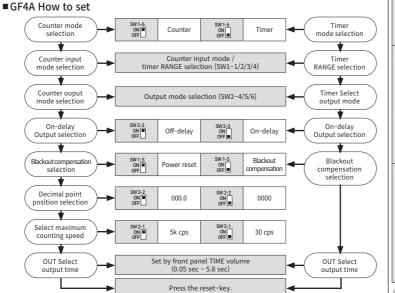
■ GF4A-SW1 Function chart

	Function	Addition / Subtraction mode				Blackout compensation				Timer / Counter			
1		Addition mode Subtrac		ion mode	Black	out compensation	Power reset		Timer		Counter		
		ON OFF	OF OF	ON OFF		ON OFF	ON TO OFF		6 ON OFF ■		ON III		
		99.99s	999.9s	99999	5	99m59s	999.9m	9	9h59m	999.91	h	9999h	
	TIME RANGE	0N 4 3 2 OFF	0N 2 OFF	4 3 2 ON		0N 2 0N 0FF	4 3 2 ON OFF	4 3 2 ON		4 3 2 ON III		4 3 2 ON	
	COUNTER (Input) GF4A	U-A			U-B UD-A UD-B				UD-C				
		0N 0FF	0N 2 0N 0FF	ON OFF	П	0N 0FF	4 3 2 ON OFF		4 3 2	ON OFF	2	ON 4 3 2 OFF	
	COUNTER	U-A											
	(Input) GF4A—S	4 3 2 ON OFF	4 3 2 ON 1 1										

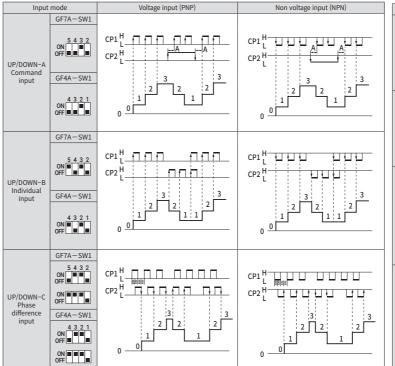
■ GF4A-SW2 Function chart

	30	5k	Decimal point position	0000	0.000		On-delay	Off-delay
CPS	ON OFF	ON OFF		ON OFF	ON OFF	Function	ON OFF	ON OFF
	F	N	С	R	K	Р	Q	A
TIMER (Output)	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON	6 5 4 ON III	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF
	F	N	С	R	K	Р	Q	S
(Output)	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	0N	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON OFF	6 5 4 ON TOPE

※ Note) When selecting the decimal point position, the selected decimal point position is applied equally to the SV setting value



■ Addition input



• Counting in the rising state of the input signal () • Counting in the Falling state of input signal ()

■ Subtraction input

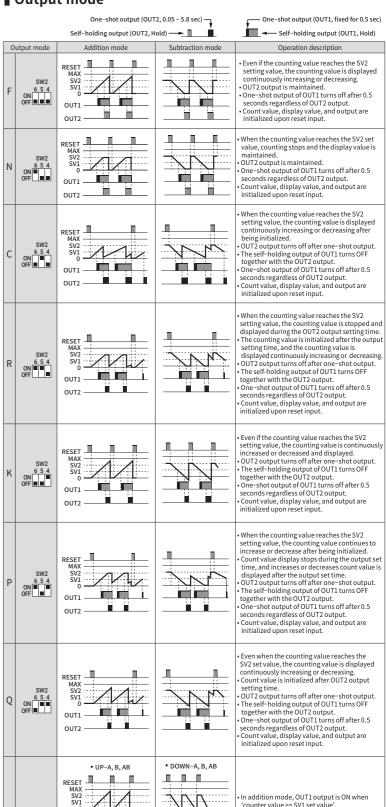
Timer/Counter

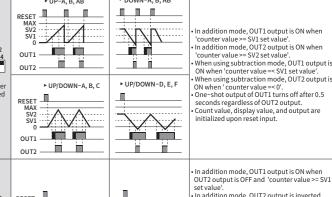
• Counting in the rising state of the input signal (_____) • Counting in the Falling state of input signal (_____ Voltage input (PNP) Non voltage input (NPN) GF7A-SW1 5 4 3 2 ON **SECONT** CP1 H H H H A H H A H H -A CP2 ON UNITED IN n-1 n-2 DOWN-A Prohibition Prohibition GF4A-SW1 n-3 n-3 4 3 2 1 ON OFF n-4 n-5 n-4 n-5 ON OFF GF7A-SW1 -- A --- A <u>n</u> DOWN-B GF4A-SW1 n-3 n-4 n-5 7<u>n-4</u> n-5 ON OFF GF7A-SW1 CP1 H AAA AA AA 5 4 3 2 ON OFF CP1 H I I I I I I I I CP2 GF4A-SW1 n-3 n-3 n-2 n-2 GF7A-SW1 \overline{U} กกก n-1 n-1 GF4A-SW1 n-1 n-1 n-2 n-2 n-2 n-3 n-3 GF7A-SW1 RESIDENCE OF THE SECOND ON WWW W n-1 GF4A-SW1 n-2 1

RESET OUT1 mode OUT2 -

n-3

Output mode One-shot output (OUT2, 0.05 ~ 5.8 sec)





in addition mode, OUT2 output is inverted when 'counter value' >= SV2 set value', and the display value is initialized.

When using subtraction mode, OUT1 output is ON when OUT2 output is OFF and 'counter value < SV1 set value'. hen using subtraction mode, OUT2 output is

inverted when'count value =< 0' and the displa alue is initialized One-shot output of OUT1 turns off after 0.5

For P41T/P61T models, SV and OUT operate as SV2 and OUT2. ** Apply reset signal to the front reset key or external RESET terminal