LINE SEIKI

INSTRUCTION MANUAL

G21 SERIES PRESET COUNTER

G21 － 0□□□ 4□□□
        1□□□ 5□□□
        2□□□ 6□□□
        3□□□

* Befoure you use G21 series, please read this manual to use this counter correctly.

* Keep this manual carefully.

* Contents of this manual are subject to change without notice.

NOTICE ON SAFETY

With reading this instruction manual, use correctly before fixing, operating, maintaining and examining.

Keep the following notices not to cause electric shock, injury and danage of device.

⚠ WARNING

To prevent from the dangerous condition of user's death or heavy injury, look through the following warnings.

! ◇Supply the voltage between the terminal No. 29 & No. 30 of unit in the range of 85-264VAC. Be sure to confirm the voltage not to cause destruction of the unit by supplying the voltage out of applicable range.

! ◇Be sure to confirm if there is problem such like looseness of screw, wrong wiring..etc., after wiring.

⊘ ◇Do not take the unit apart or modify.

<REQUESTS>

◇Do not use the unit under the following evnironment.
 · Explosive gas, Inflammable gas, Corrosive gas.
 · High humidity, Dewdrop.
 · Intensive temperature difference
                · Intensive vibration.

◇Do not drop or give the high shock to the counter.

◇Be sure to use load current within nominal.

◇Keep away the wiring from the high voltage or current lines.

◇Do not use the blank terminals as relay terminal.

◇Keep the input signal source, counter itselfe or it's wiring away from the noise source when the counter is used in the noise. It is effective to make the wireleads for input to be shielded.

◇In case there are surge and noise on power supply, connect the line noise filter with counter.
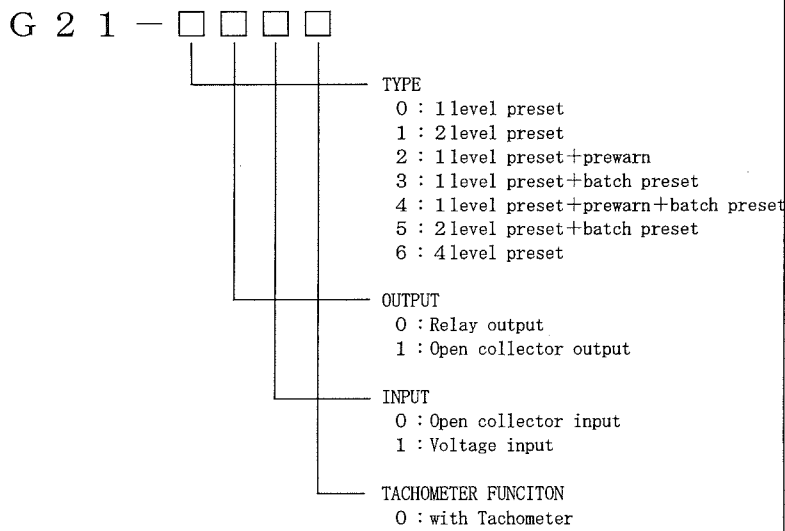
◇In case of wiring for the communication cable outside, equip the baristor to prevent the counter from the lightning shock.

◇Pay attention to the excessive fastening for the screw of terminal and panel clamper.

FEATURES

· Easy operaiton by digit keys

· Power supply, 100－240VAC

· Prescale function

· Tachometer function

· Communcation function (RS－485)

· Programmable count start value

· DIN72×72 mm.

· Depth, 77mm. Compact size

· Dust & Splash proof

MODEL

G21－□□□□

TYPE
 0 : 1 level preset
 1 : 2 level preset
 2 : 1 level preset＋prewarn
 3 : 1 level preset＋batch preset
 4 : 1 level preset＋prewarn＋batch preset
 5 : 2 level preset＋batch preset
 6 : 4 level preset

OUTPUT
 0 : Relay output
 1 : Open collector output

INPUT
 0 : Open collector input
 1 : Voltage input

TACHOMETER FUNCITON
 0 : with Tachometer

## SPECIFICATIONS

1) DISPLAY
   Upper display : Red LED   10.0 (H) x 5.5(W)
   Lower display : Green LED   8.0 (H) x 4.0(W)
2) NUMBER OF DIGITS
   Upper display : Preset counter   6 digits
                   Totalizer   6 digits
                   Tachometer   6 digits
                   Batch counter   6 digits
   Lower display : Preset value   6 digits
3) INDICATOR
   Yellow LED : It turns on when the display is totalizer & tachometer.
   Green LED : It turns on when the display shows preset value.
   Red LED : It turns on when the unit let out the output signal.
4) SETTING WAY
   10 keys (numerical keys) operation
5) SETTING RANGE
   Preset value (P1～P4) :－99999～999999
   Prewarn value (PW)   :   0～999999
   Batch preset value (PB) :   0～999999
6) PRESCALE
   Multiplying : 0.00001～999.999 Dividing : 1～9999
7) DECIMAL POINT POSITION
   0.0～0.00000
8) COUNT START VALUE
   －99999～999999
9) INPUT
   · Open collector input
        Sink current : 10mA   L : 0～6V
   · Voltage input
        L : 0～4V   H : 6～30V (Input impedance 7kΩ)
10) COUNT SPEED
   30Hz (Pulse width   16ms   Duty 1:1)
   1kHz (Pulse width 500μs   Duty 1:1)
   5kHz (Pulse width 100μs   Duty 1:1)
   8kHz (Pulse width 62.5μs Duty 1:1)
11) TYPE OF INPUT SIGNAL
   Add/Subtract/Indivisual add, subtract/Quadrature
12) OPERATION
   Overrun/Auto-reset/Equal/Upper-lower limit
     Model with prewarn function, not include Upper-lower limit
     Model with batch function, not include Upper-lower limit/Equal
13) OUTPUT
   One shot pulse/Latch
14) OUTPUT TIME
   10ms～9990ms (Available to set with 10ms in one unit)
15) TYPE OF OUTPUT
   · Relay output
      1c (250VAC 3A/30VDC 3A resistance load)
   · Open collector output
      (30VDC 100mA max.)
16) OUTPUT DELAY TIME
   6ms max.
17) RESET
   Front reset
   Remote reset
18) KEY LOCK
   Prohibition for front key reset, preset value editing, count start value editing or editing data in program mode.
19) TACHOMETER
   1/TAU, Standard sampling (Measuring accuracy :±0.1%)
   What is 1/TAU?
   The 1/TAU method of rate calculation is based on accurately measuring the time period between consecutive input pulses. This time period is called "TAU".
20) COMMUNICATION
   RS－485 Serial interface
   Read count value, preset value or count start value.
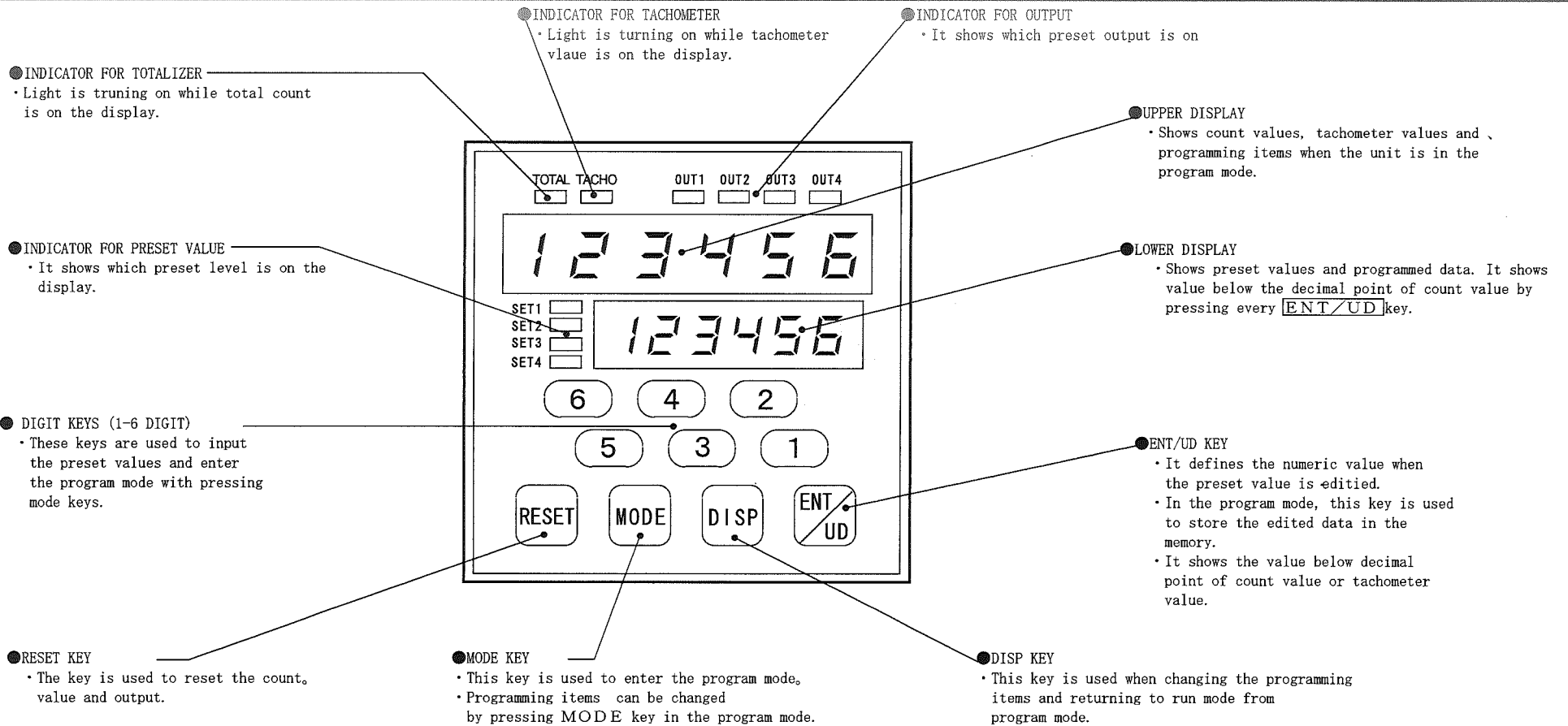   Read the condition of reset and preset output condition.

FRONT PANEL FEATURES
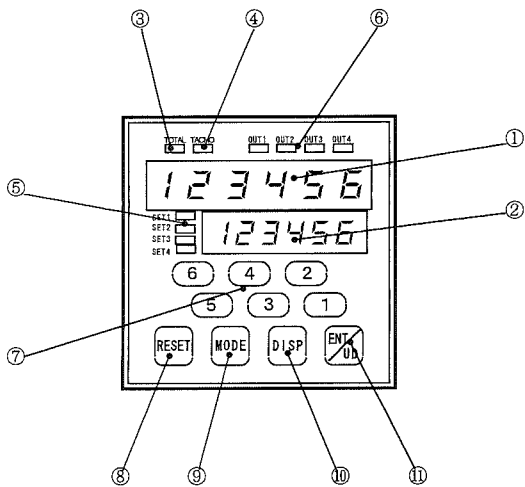
① Display for count value, tachometer value, and programming items
② Display for preset value and programmed data
③ Indicator for total counter
④ Indicator for tachometer
⑤ Indicator for   SET 1 － 1 level preset
   preset value: SET 2 － 2 level preset
                    SET 3 － 3 level preset
                    SET 4 － 4 level preset
                    PW   － Prewarn
                    BP   － Batch preset
⑥ Indicator for   OUT 1 － 1 level preset output
   output: OUT 2 － 2 level preset output
                    OUT 3 － 3 level preset output
                    OUT 4 － 4 level preset output
                    PW   － Prewarn output
                    BP   － Batch output
⑦ Digit keys
⑧ Reset Key
⑨ －/WR key
⑩ DISP key
⑪ ENT/UD key

※The design of front membrane is different according to each models.
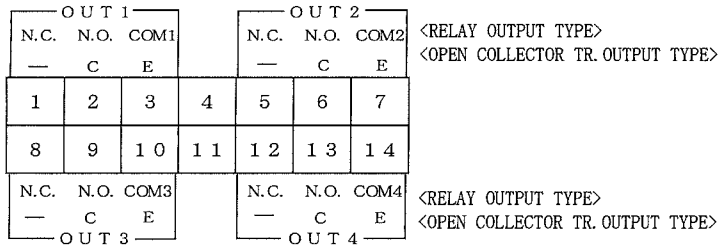
ELECTRIC SPECIFICATIONS

1) POWER SUPPLY
   100～240VAC －15%、＋10%
2) POWER CONSUMPTION
   approx. 7VA
3) SENSOR POWER SOURCE
   12VDC ±10% 100mA max.
4) MEMORY
   EEPROM (10 years : can be used 100,000 times)
5) OPERATING TEMPERATURE
   －10～50℃ (NON FREEZING)
6) OPERATING HUMIDITY
   45～85%RH (NON CONDENSING)
7) INSULATION RESISTANCE
   100MΩ (at 500VDC) minimum
8) TEST VOLTAGE
   1500VAC for one (1) minute
9) TEST NOISE
   Between the terminal on power supply :±2000V
   Between the terminal on signal input :± 500V
10) TEST OSCILLATION
   Endurance : 10～55Hz, amplitude 1.5mm, 3 hours(1 cycle 3 minutes) to X,Y,Z 3 directions
   Operation: 10～55Hz, amplitude 1.5mm, 3 hours(1 cycle 3 minutes) to X,Y,Z 3 directions
11) TEST SHOCK
   Endurance : 300m/s² (approx 30G) 10 times to X,Y,Z 3 directions
   Operation: 100m/s² (aprox 10G) 10 times to X,Y,Z 3 directions

12) SIZE
   DIN72×77mm.
13) WEIGHT
   approx. 280g

●INDICATOR FOR TACHOMETER
· Light is turning on while tachometer vlaue is on the display.

●INDICATOR FOR OUTPUT
· It shows which preset output is on

●INDICATOR FOR TOTALIZER
· Light is truning on while total count is on the display.

●UPPER DISPLAY
· Shows count values, tachometer values and programming items when the unit is in the program mode.

●INDICATOR FOR PRESET VALUE
· It shows which preset level is on the display.

●LOWER DISPLAY
· Shows preset values and programmed data. It shows value below the decimal point of count value by pressing every ENT/UD key.

TOTAL TACHO   OUT1 OUT2 OUT3 OUT4

`123456`

SET1
SET2
SET3 `123456`
SET4

● DIGIT KEYS (1-6 DIGIT)
· These keys are used to input the preset values and enter the program mode with pressing mode keys.

(6) (4) (2)
(5) (3) (1)

RESET   MODE   DISP   ENT/UD

●ENT/UD KEY
· It defines the numeric value when the preset value is editied.
· In the program mode, this key is used to store the edited data in the memory.
· It shows the value below decimal point of count value or tachometer value.

●RESET KEY
· The key is used to reset the count value and output.

●MODE KEY
· This key is used to enter the program mode.
· Programming items can be changed by pressing MODE key in the program mode.

●DISP KEY
· This key is used when changing the programming items and returning to run mode from program mode.

W I R I N G   A N D   R E A R   T E R M I N A L S

●REAR TERMINALS

— OUT 1 —				— OUT 2 —		
N.C.	N.O.	COM1		N.C.	N.O.	COM2
—	C	E		—	C	E
1	2	3	4	5	6	7
8	9	10	11	12	13	14
N.C.	N.O.	COM3		N.C.	N.O.	COM4
—	C	E		—	C	E
— OUT 3 —				— OUT 4 —		

<RELAY OUTPUT TYPE>
<OPEN COLLECTOR TR. OUTPUT TYPE>

<RELAY OUTPUT TYPE>
<OPEN COLLECTOR TR. OUTPUT TYPE>

●LIST FOR OUTPUT TERMINALS

MODEL	OUT1	OUT2	OUT3	OUT4
G21 − 0□□□	OUT	—	—	—
1□□□	OUT1	OUT2	—	—
2□□□	PREWARN	OUT	—	—
3□□□	OUT	BATCH	—	—
4□□□	PREWARN	OUT	BATCH	—
5□□□	OUT1	OUT2	BATCH	—
6□□□	OUT1	OUT2	OUT3	OUT4

(−：NOT AVAILABLE)

	IN B	RESET	GND			
IN A		GND	KEY/P	RESET	GND	12V
15	16	17	18	19	20	21
22	23	24	25	26	27	28

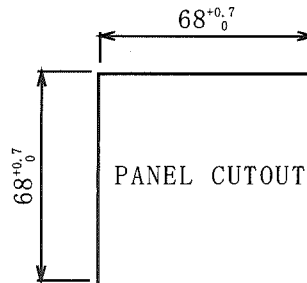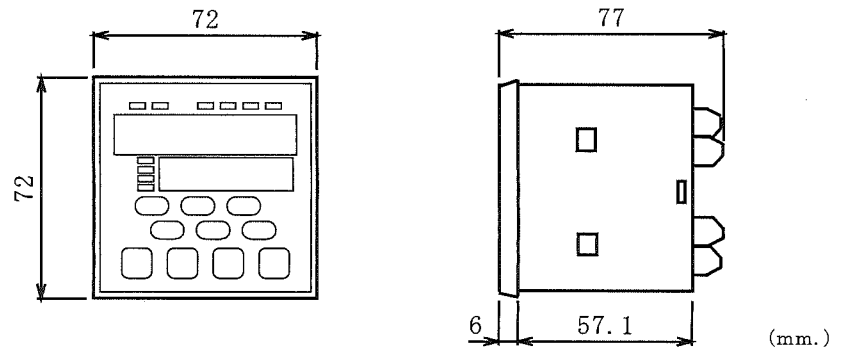AC100~240V
+ − REQ
RS−485   GND
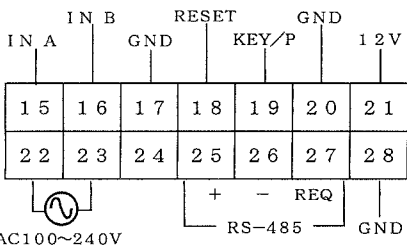
─ ※CAUTION ─
· Do not use the blank terminal as relay terminal.

※OUT 1～4 are different according to each models.
Refer to the LIST FOR OUTPUT TERMINALS shown in the light.

●POWER SUPPLY
Supply the voltage of 100-240VAC with terminals between terminal No. 22 and 23.

●INPUT
<Open collector input type>
· Contact input   · Open collector input

15	16	17
IN A IN B GND

15	16	17
IN A IN B GND

INPUT MODE	IN A	IN B
UP	ADD	—
DO	SUB	—
UPDO	ADD	SUB
QUAD	90°	QUAD

In case input mode is UP(add) or DO(sub.),
IN A is validity, but IN B is invalid.

<Voltage input type >
· Contact input   · Voltage input

15	16	21
IN A IN B 12V

15	16	17
IN A IN B GND

─ NOTE ─
· Be sure to turn the power supply off in case of doing the wiring.
· Supply the voltage at the range of 85-264VAC between the terminal 22&23.
· Confirm the looseness of screw, wrong wiring..etc., after wiring.
· Avoid the excessive fastening for terminal of the unit.

●OUTPUT
Refer to the REAR TERMINALS and the LIST FOR OUTPUT TERMINALS.

●REMOTE RESET
By shorting the terminals between "No. 18" and "GND", count vlaue and output will be reset. (Under shorting, counter does not accept for any input pulse)

17	18
GND RESET

●KEY LOCK
By shorting the terminals between "No. 19" and "GND", programming or editing selected in KEY LOCK MODE is invalid.

17	19
GND KEY/P

●SERIAL COMMUNICATION (RS−485)
Use the termainal "No.25 and 26" in case communication is required.

●COMMUNICATION REQUEST
By shorting the terminals between "No. 19" and "GND", it will be available to read the data easily.

27

●SENSOR POWER SOURCE
Terminal "No.21" is used as the sensor power source. (12VDC ± 10% 100mA max.)

D I M E N S I O N S   A N D   M O U N T I N G

●EXTERNAL DIMENSIONS

72   77

72

6   57.1   (mm.)

68 +0.7 0

68 +0.7 0   PANEL CUTOUT

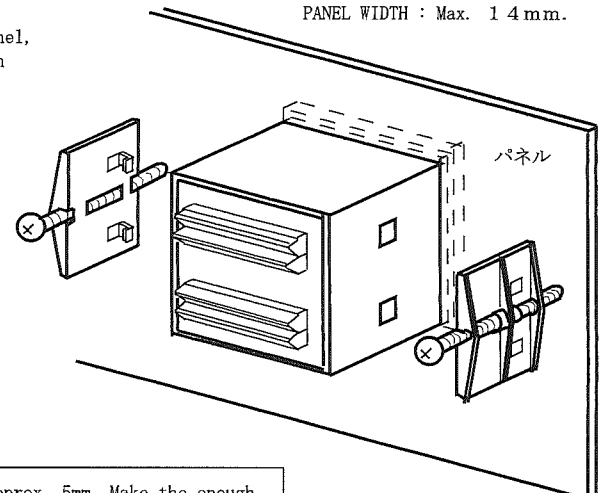PANEL CUTOUT :   68 +0.7 0 × 138 +0.7 0 mm

●MOUNTING
Insert the unit from front side of panel, and hang the nails of panel clamper on both side or upper-lower side of the unit, and fix the unit by fastening the screw.

PANEL WIDTH : Max. 14mm.

パネル

《NOTE》
· The tickness of panel clamper is approx. 5mm. Make the enough space to arrange other unit on this panel.
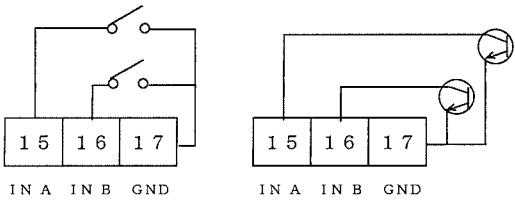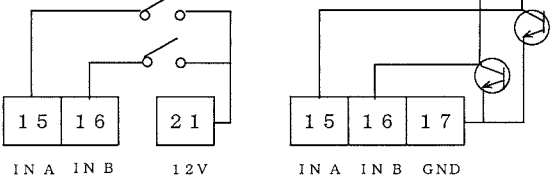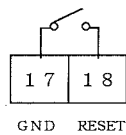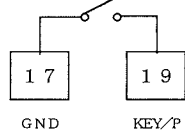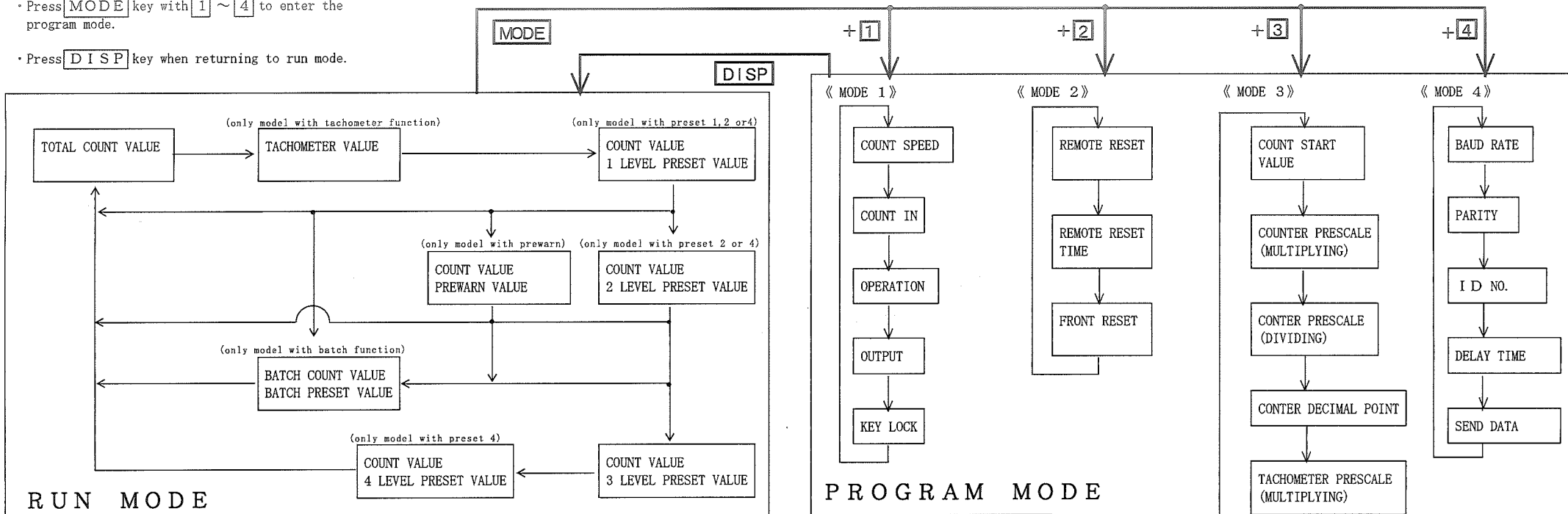· Avoid the excesive fastening for the screw of panel clamper.

- Press MODE key with 1 ~ 4 to enter the program mode.
- Press DISP key when returning to run mode.

MODE

+1   +2   +3   +4

DISP

RUN MODE

| TOTAL COUNT VALUE | (only model with tachometer function) TACHOMETER VALUE | (only model with preset 1,2 or4) COUNT VALUE 1 LEVEL PRESET VALUE |

(only model with prewarn) COUNT VALUE PREWARN VALUE — (only model with preset 2 or 4) COUNT VALUE 2 LEVEL PRESET VALUE

(only model with batch function) BATCH COUNT VALUE BATCH PRESET VALUE

(only model with preset 4) COUNT VALUE 4 LEVEL PRESET VALUE ← COUNT VALUE 3 LEVEL PRESET VALUE

PROGRAM MODE

《 MODE 1 》
COUNT SPEED → COUNT IN → OPERATION → OUTPUT → KEY LOCK

《 MODE 2 》
REMOTE RESET → REMOTE RESET TIME → FRONT RESET

《 MODE 3 》
COUNT START VALUE → COUNTER PRESCALE (MULTIPLYING) → CONTER PRESCALE (DIVIDING) → CONTER DECIMAL POINT → TACHOMETER PRESCALE (MULTIPLYING) → TACHOMETER DECIMAL POINT

《 MODE 4 》
BAUD RATE → PARITY → I D NO. → DELAY TIME → SEND DATA

DETAILS OF PROGRAM MODE

NOTE : Depending on the models, programming items marked "※" do not apply to all models.

《 MODE 1 》

●COUNT SPEED (C.SPd)MODE
Count speed can be selected from below.

30Hz	Lo.30
1kHz	Hi.1
5kHz	Hi.5
8kHz	Hi.8

●COUNT IN (C.in) MODE
Count input method can be selected from below.

ADD INPUT (UP) ···IN A : ADD	
(6 digits)write value→0→999999→error message (O-Er)	
SUBTRACT INPUT (do) ···IN A : SUB.	
(6 digits)write value→0→-99999→error message (U-Er)	
ADD/SUBTRACT INPUT (UPdo) ···IN A : ADD, IN B : SUB.	
Error message(U-Er)←-99999←0→999999→(O-Er)	
QUADRATURE INPUT (9uAd)	
Error message(U-Er)←-99999←0→999999→(O-Er)	

IN A / IN B timing diagram
count value 0 1 2 1
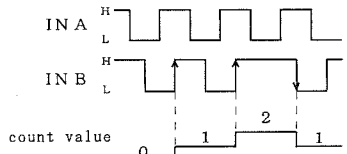
●OPERATION (C.Act) MODE ※
Operation mthod can be selected from below.

OVER RUN	O.run
AUTO-RESET	A.rES
EQUAL ※	E9u.
UPPER/LOWER ※	UL.LL

UPPER/LOWER limit is not equipped for the model with prewarn. EQUAL and UPPER/LOWER limit are not equipped for the model with batch.

●OUTPUT (Out1~Out4) MODE ※
When OPERATION MODE is set to OVERRUN or AUTO-RESET, HOLD or ONE SHOT can be selected in OUTPUT MODE. When OPERATION MODE is EQUAL or UPPER/LOWER, HOLD is automatically set. Programming of OUTPUT MODE on each preset level is available.

| HOLD | HoLd | Hold at the preset value | Overrun Auto-reset |
| ONE SHOT | OnE.S | Programming is available at 10ms each in 10~9990ms | Overrun Auto-reset |

- Refer to the following list of output corresponding to each model for the setting.

MODEL	OUT1	OUT2	OUT3	OUT4
G20-0□□□	OUT	—	—	—
1□□□	OUT1	—	—	—
2□□□	PREWARN	OUT	—	—
3□□□	OUT	BATCH	—	—
4□□□	PREWARN	OUT	BATCH	—
5□□□	OUT1	OUT2	BATCH	—
6□□□	OUT1	OUT2	OUT3	OUT4

●KEY LOCK (OPEr : KEY OPERATION LOCK) MODE
Key operation to be abled or disabled can be selected.

	OPERATION, YES	OPERATION, NO
FRONT RESET	rES.y	rES.n
CHANGE ON PRESET VALUE	PrE.y	PrE.n
CHANGE ON CNT. ST. VAL. *	C.SE.y	C.SE.n
CHANGE ON MODE 1	PG1.y	PG1.n
CHANGE ON MODE 2	PG2.y	PG2.n
CHANGE ON MODE 3	PG3.y	PG3.n
CHANGE ON MODE 4	PG4.y	PG4.n

* CNT. ST. VAL. = COUNT START VALUE

《 MODE 2 》

●REMOTE RESET (E.rES) MODE ※
Remote reset to be abled or disabled can be selected.

	RESET, YES	RESET, NO
PRESET COUNTER	PC y	PC n
BATCH COUNTER ※	bC y	bC n
TOTAL COUNTER	tC y	tC n

●REMOTE RESET TIME (rES.t)
Either can be selected.

| 1ms | 1 |
| 20ms | 20 |

This time means minimum pulse time required for remote reset pulse.

●FRONT RESET (F.rES) MODE ※
Front reset to be abled or disabled can be selected.

	RESET YES	RESET, NO
PRESET COUNTER	PC y	PC n
BATCH COUNTER ※	bC y	bC n
TOTAL COUNTER	tC y	tC n

《 MODE 3 》

●COUNT START VALUE (C.SEt) * See the right for setting.
Count start value can be set between -99999~999999.

●COUNTER PRESCALE(multiplying) (C.PS) MODE
Counter prescale can be selected from the 3 ranges as below.

0.001~999.999	
0.0001~99.9999	Select the range by ENT/UD key.
0.00001~9.99999	

●COUNTER PRESCALE(dividing) (C.diu) MODE
Counter prescale can be set in following range.
1 ~ 9999

●COUNTER DECIMAL POINT POSITIONING (C.dP) MODE
Decimal point position for count values can be selected from below.

0.00000	0.00000
0.0000	0.0000
0.000	0.000
0.00	0.00
0.0	0.0
None	0

《NOTE》
- If decimal position is changed, the present preset value, count value, etc. are cleared.

●TACHOMETER PRESCALE(only multiplying) (t.PS) MODE ※
Only the model with tachometer is available to be set tachometer prescale as counter prescale.

●TACHOMETER DECIMAL POINT POSITIONING (t.dP) MODE ※
Decimal point position for tachometer value can be set as counter decimal point position.

《 MODE 4 》

●BAUD RATE (bPS) MODE
Transmit speed can be selected from the below.

9600bps	9600
4800bps	4800
2400bps	2400
1200bps	1200
600bps	600
300bps	300

● PARITY BIT (P.bit) MODE
Parity bit can be selected from the below.

non parity	nonE
even no. parity	EuEn
odd no. parity	Odd

● ID NUMBER (id) MODE
ID number can be selected in the range of 00 ~ 99.

● DELAY TIME (dEL.t) MODE
Transmit delay time can be set from the below.

| 2ms | 0.002 |
| 100ms | 0.100 |

● SEND DATA (SEnd) MODE ※
Transmit data can be programmed on the following items.

|	SEND	NOT SEND
PRESET COUNTER	PC y	PC n
BATCH COUNTER ※	bC y	bC n
TOTAL COUNTER	tC y	tC n
1 LEVEL PRESET VALUE	P1 y	P1 n
2 LEVEL PRESET VALUE ※	P2 y	P2 n
3 LEVEL PRESET VALUE ※	P3 y	P3 n
4 LEVEL PRESET VALUE ※	P4 y	P4 n
PREWARN VALUE ※	Pn y	Pn n
BATCH PRESET VALUE ※	bP y	bP n

HOW TO PROGRAM PRESET VALUE

In case that 1 level preset value is changed from 100 to 2500:

1. Press DISP key to make the lower display show 1 level preset value. (Indicator "SET 1" turns on.)
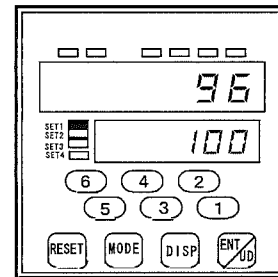
2. Use digit key 1 ~ 6 to edit preset value. (all digits of the lower display turn on, and the digit to be editing is brinking.

* Edit preset value by using digit keys of 1 - 6 and the numerical value is shifted as below by presing digit key.
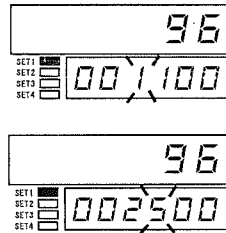
0→1→2→⋯⋯→8→9

As to the 6 key, the numerical value is shifted as below and the final - is used to edit minus (-) preset value.

0→1→2→⋯⋯→8→9→-

3. Edited numerical values are memorized automatically when 3 seconds have passed since the last key is presed. Also, the values are programmed by pressing ENT/UD key (The blinking of digit is finished and the program of preset value.)
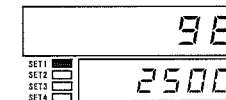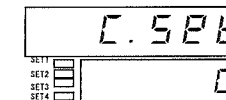
※How to set or change the preset value is all the same in any models.

HOW TO PROGRAM COUNT START VALUE

The count start value can be edited in PROGRAM MODE 3.

1. Press 3 key with pressing MODE key to enter COUNT SET in PROGRAM MODE 3. (The upper display shows C.SEt, and the lower display shows the count start value.

2. Edit the count start value by using digit keys. (same as the program of preset value.)

3. Edited numerical values are memorized automatically when 3 seconds have passed since the last key is presed. Also, the above values are programmed by pressing ENT/UD key (The blinking of digit is finished and the count start value.)

4. The above programmed count start value can be shown on the upper display by pressing front key reset or remote reset on.

BATCH FUNCTION

MODEL G21-3□□□, 4□□□, 5□□□ have batch function.
G21-3□□□, 4□□□: One count is added when the counts reached to the 1 level preset value.
G21-5□□□: One count is added when the counts reached to the 2 level preset value.

NOTE: Depending on the models, program items marked ※ do not apply to all models.
See the programming details of program mode and list of output.

MODE + 1

PROGRAM ITEM	UPPER DISPLAY	LOWER DISPLAY (PROGRAMMING DETAILS)	OPERATION
COUNT SPEED	C.SPd	Lo.30 Hi.1 Hi.5 Hi.8	1 key to change the programming details.
COUNT IN	C.in	UP do UPdo Quad	1 key to change the programming details.
OPERATION ※	C.Act	O.run → A.rES → EQu. → UL.LL	1 key to chagne the programming details.
OUTPUT ※	Out1 ~ Out4 ※	◆When O.run or A.rES selected Hold → OnE.5 (Range of one shot output time, when (OnE.5) is selected) 10～9990 (ms) ◆When UL.LL selected UL → LL	1 key to change the programming details. (program on each level) Set one shot time by numerical keys. 1 key to select (UL) or (LL).
KEY LOCK	OPEr	rES.Y → rES.n (Reset key) PrE.Y → PrE.n (Preset value change) C.SE.Y → C.SE.n (Count start value change) PG1.Y → PG1.n (Program mode 1 change) PG2.Y → PG2.n (Program mode 2 change) PG3.Y → PG3.n (Program mode 3 change) PG4.Y → PG4.n (Program mode 4 change)	1 key to select yes(Y) or no(n).

MODE + 2

PROGRAM ITEM	UPPER DISPLAY	LOWER DISPLAY (PROGRAMMING DETAILS)	OPERAITON
REMOTE RESET ※	E.rES	PC Y → PC n (Preset counter) bC Y → bC n (Batch counter) tC Y → tC n (Total counter)	1 key to select yes(Y) or no(n).
REMOTE RESET TIME	rES.t	1 → 20	1 key to change the programming details.
FRONT RESET ※	F.rES	PC Y → PC n (Preset counter) bC Y → bC n (Batch counter) tC Y → tC n (Total counter)	1 key to select yes(Y) or no(n).

MODE + 3

| PROGRAM ITEM	UPPER DISPLAY	LOWER DISPLAY (PROGRAMMING DETAILS)	OPERATION
COUNT START VALUE	C.SEt	-99999~0~999999	Enter count start value by digit keys.
COUNTER PRESCALE (MULTIPLYING)	C.PS	0.001 ~ 999.999 0.0001 ~ 99.9999 0.00001 ~ 9.99999	ENT/UD key to change decimal point position. Enter prescale value by digit keys.
COUNTER PRESCALE (DIVIDING)	C.diu	1 ~ 9999	Enter prescale value by digit keys.
COUNTER DECIMAL POINT	C.dP	0 0.0 0.00 0.000 0.00000 0.0000	1 key to chango programming details.
TACHO. PRESCALE (MULTIPLYING) ※	t.PS	0.001 ~ 999.999 0.0001 ~ 99.9999 0.00001 ~ 9.99999	ENT/UD key to change decimal point position. Enter prescale value by numerical keys.
TACHOMETER DECIMAL POINT ※	t.dP	0 0.0 0.00 0.000 0.00000 0.0000	1 key to change programing details.

MODE + 4

| PROGRAM ITEM	UPPER DISPLAY	LOWER DISPLAY (PROGRAMMING DETIALS)	OPERATION
BAUD RATE	bPS	9600 → 4800 → 2400 300 ← 600 ← 1200	1 key to change the programming details.
PARITY BIT	P.bit	nonE → EuEn → Odd	1 key to change the programming details.
ID No.	Id	00 ~ 99	Enter ID No. by numericak keys.
DELAY TIME	dEL.t	0.002 → 0.100	1 key to change the programming details.
SEND DATA ※	SEnd	PC Y → PC n (Preset counter) bC Y → bC n (Batch counter) tC Y → tC n (Total counter) P1 Y → P1 n (Preset value 1) P2 Y → P2 n (Preset value 2) P3 Y → P3 n (Preset value 3) P4 Y → P4 n (Preset value 4) Pn Y → Pn n (Prewarn value) bP Y → bP n (Batch preset value)	1 key to select yes(Y) or no(n).

COUNT AND OUTPUT (1)

● G21 － 0□□□、1□□□、3□□□、5□□□、6□□□ (MODEL FOR 1 LEVEL, 2 LEVEL, 4 LEVEL or WITHOUT PREWARN)
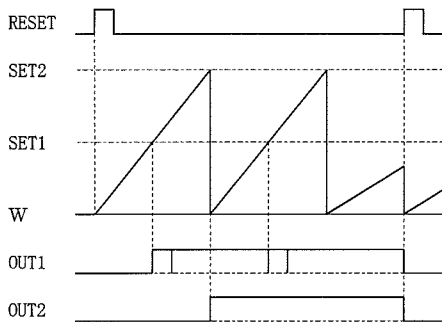
・OVER RUN

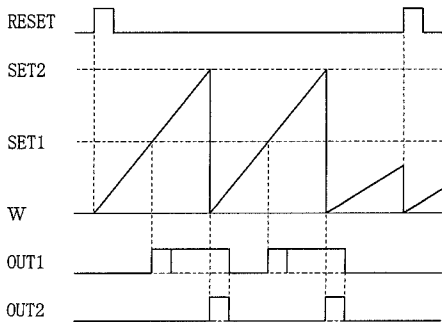OUT1 : ONE SHOT or HOLD
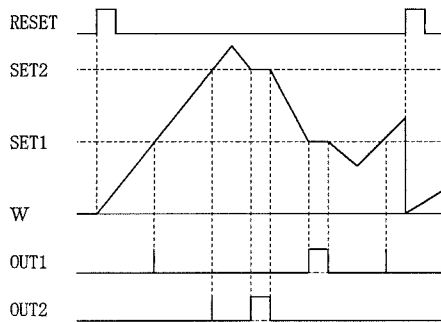OUT2 : HOLD
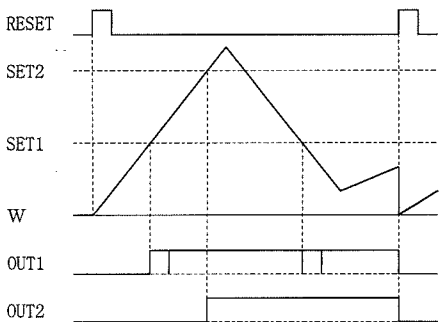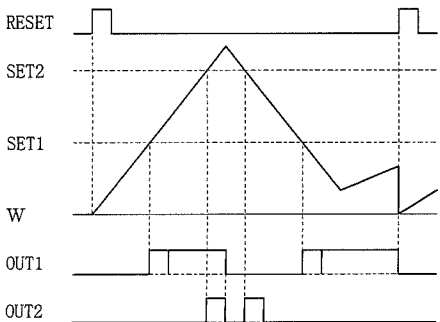
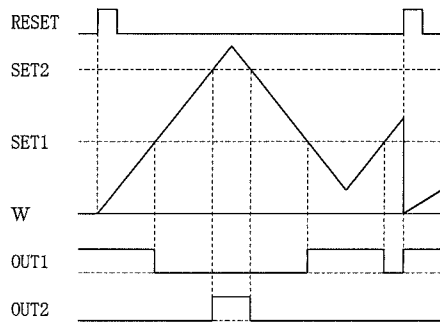・AUTO-RESET

OUT1 : ONE SHOT or HOLD
OUT2 : HOLD

・EQUAL

Output is on while the count value is equal to the counter preset value.

・UPPER/LOWER LIMIT

OUT1 : LL (LOWER LIMIT)
OUT2 : UL (UPPER LIMIT)

OUT1 : ONE SHOT or HOLD
OUT2 : ONE SHOT

OUT1 : ONE SHOT or HOLD
OUT2 : ONE SHOT

・Output of each preset levels is individual each other. Refer the above drawings.
EQUAL and UPPER/LOWER limit are not selectable on the model with Batch function.

● BATCH FUNCTION
G21 － 3□□□、5□□□ have Batch function.
Batch counter counts 1 when the count value reaches to the preset value of the last level.

Example: When OPERATION MODE is set to AUTO-RESET.
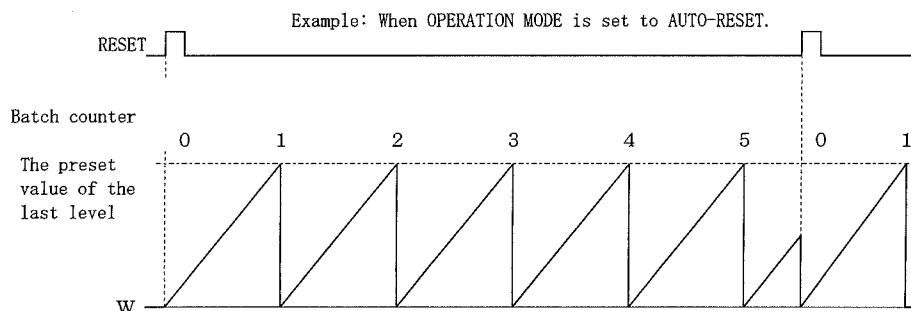
・For 2 level or 4 level preset type, when output of the last preset level is set at ONE SHOT, all outputs are turned to off by the falling edge of ONE SHOT pulse.

● G21−2□□□、4□□□ (1 level with prewarn)
Model with prewarn has no UPPER/LOWER output in OPERATION MODE. For G20−4□□□, the model with batch function, EQUAL output is not available and only OVERRUN or AUTO-RESET is available in OPERATION MODE. OUT1 is prewarn output, OUT2 is preset output. On the model with batch function, OUT3 is batch output.

· OVER RUN

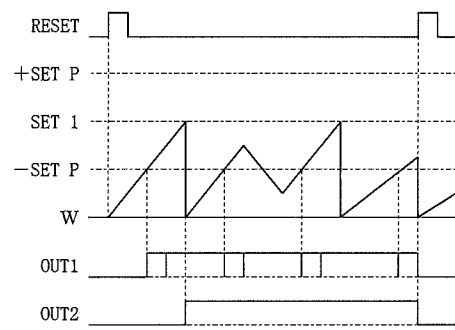OUT1 (Prewarn output) : ONE SHOT or HOLD
OUT2 (Preset output) : HOLD
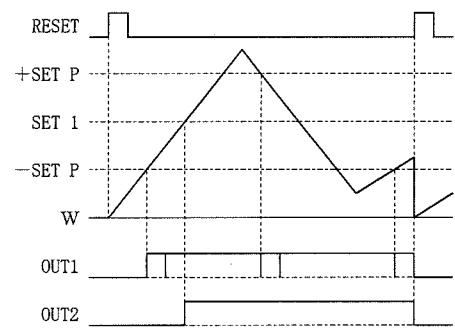
OUT1 (Prewarn output) : ONE SHOT or HOLD
OUT2 (Preset output) : HOLD
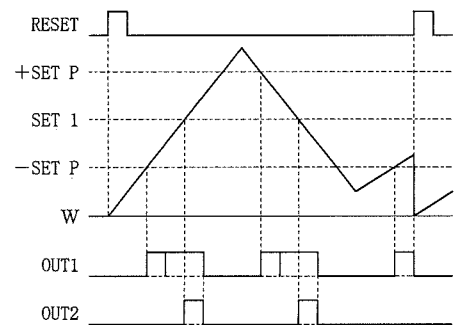
· When OUT2 (Preset output) is set to ONE SHOT, OUT1 (Prewarn Output) turns to be off by the falling edge of that ONE SHOT pulse.
· Prewarn output is on only when the count value is near to SET1 (1 level preset value).
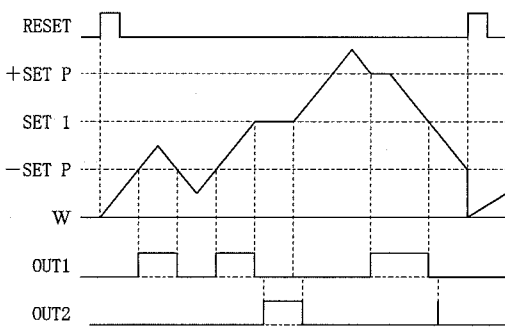
· AUTO RESET

OUT1 (PREWARN OUTPUT) : ONE SHOT or HOLD
OUT2 (PRESET OUTPUT) : HOLD

OUT1 (PREWARN OUTPUT) : ONE SHOT or HOLD
OUT2 (PRESET OUTPUT) : ONE SHOT
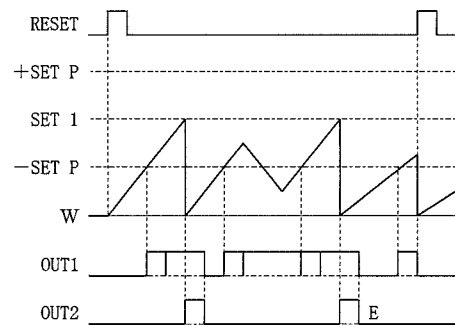
· EQUAL (Only for the model without batch function)
OUT1 (Prewarn output)
On only when the count value is near to SET1 1 level preset value).
OUT2 (Preset output)
On only when the count value is equal to SET1.

● BATCH OUTPUT
G21−4□□□ has Batch function.
Batch counter counts 1 when the preset counter reaches 1 level preset value. The batch output turns on when the batch count reaches the batch preset value.
For the batch output, ONE SHOT or HOLD can be selected.

Example : OPERATION MODE is set to AUTO-RESET.

RESET

● Type of reset :
· Front reset
· Remote reset *
· Reset by serial communication command

* Does not count during shorting.

● Subject to be reset :
· Count value (Preset count value) and output
· Total count value
· Batch count value
· Error (Overflow , Underflow)

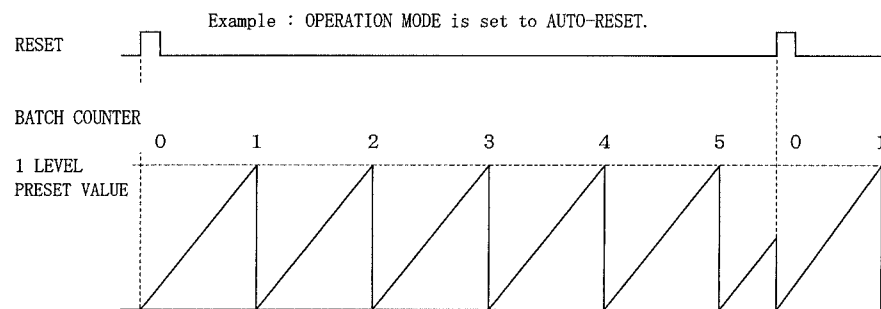Reset able or disable are can be selected in the PROGRAM MODE.

Reset of count value (Preset count value) enables all preset outputs to be off.

● The determined count start value can be shown on the upper display by reset on.
The count start value at ex-fact is set to 0.

● The control uses ASCII code with the RS-485 serial specification.
● This allows bi-directional communications and addressing of multiple controls on a single two-wire communication bus.
● Each unit is individually addressed via a user programmable ID number. Up to 32 G20 counters can be connected directly to the bus.

※ SERIAL COMMAND SUMMARY

RDD : Read count value/preset value. (display only)
RDI : 〃 (value of integral number)
RDU : 〃 (value of under decimal point)
WRD : Write preset value.
RES : Reset for count value and condition of over/under flow error.
RDO : Read output condition.
STP : Count prohibition.
RSM : Cancellation for count prohibition.
LTD : Store count value/preset value in memory of counter.
RLD : Read stored data by LTD command.

《NOTE》
· It can not be to communicate if the count input pulse speed goes over the max. count speed.
· Use only the character of capital letter in communication.

◆ TRANSMISSION FORMAT

The general command is shown below. Spaces are used for clarify only and must not be transmitted.

> ID# COMMAND (numerical data) CHECKSUM (cr)

Example: To cause the unit #10 to transmit the value of main counter, send the RDD command as follows.

>	10	RDD	PC	CE	(cr)
①	②	③	④	⑤	⑥

① Message start character (ASCII 62). Required for all transmission to the control.

② Two digits serial port ID# in decimal. Required for all transmission to the control.
Unit ID#10 (decimal) is unit ID#0A (hexadecimal) , capital letters must be used.

③ RDD command. All serial commands consist of three characters.

④ Sub command decides the details for serial command. This command means the read of preset count value by PC.

⑤ Checksum.

CHECK SUM CALCULATION

1	0	R	D	D	P	C

$49+48+82+68+68+80+67$ = 462 (Dec.)
= 1CE (Hex.)

Check sum is the last two hexadecimal charring.
The > start character and carriage return (cr) are not used in calculation.

⑥ ASCII carriage return (13 decimal). Required at the end of all commands.

◆ RESPONSE FORMAT

RESPONSE RECOGNITION FORMAT
The counter does not respond to a command unless the transmitted ID number matches its programmed ID number.
If the ID numbers match and the command and checksum are valid, the control executes the command and transmits a response as shown below.

[A] [DATA] [CHECK SUM] (cr)

[A] is the acknowledge character sent when any valid command is received and executed.

[DATA] is sent in response to request data.

[CHECK SUM] is sent only when data is requested (RDD, RDI or RDU commands).
The checksum is calculated by adding the ASCII values of all preceding characters (including the "A" and spaces). The checksum is the two least significant digits of this sum in hexadecimal.
(cr) is the ASCII carriage return (13 decimal). Transmitted at the end of all responses

Ex1 : A (cr) = No data requested.
Ex2 : A PC 123456 48 (cr) = Count data requested.

ERROR RESPONSE FORMAT

If the ID numbers match but the command is not valid or cannot be executed, the counter ignores the command and responds by sending an ASCII "N" (not acknowledged), followed by one character and carriage return.

※ ERROR CODES

N02 : CHECKSUM ERROR
Received checksum does not match the calculated check sum.

N05 : INVALID DATA
Incorrect number of digit or illegal characters received in data field.

N11 : RESET EDIT IN PROGRESS ON KEY BOARD
Serial preset cannot be sent if the preset is being changed on the key board.

N13 : KEY BOARD PROGRAM MODE IS ACTIVE
Cannot enter serial program mode if in the key board program mode.

NFF : UNDER OVERFLOW or UNDERFLOW FOR COUNT VALUE
It is impossible to communicate under displaying for overflow error or underflow error.
It is possible to communicate by reset command for error cancellation as the exception.

EX1 : N05 (cr) = Invalid data

◆ RS-485 SERIAL INTERFACE

WAY OF COMMUNICATION   Half duplex, Asynchronous

FORMAT   ASCII code
                        Start bit   1 bit
                        Data bit   8 bit (including parity bit) ↗ *parity bit : 1 bit*
                        Stop bit   1 bit

BAUD RATE   300/600/1200/2400/4800/9600 bps (Selection)

PARITY   NON/ODD/EVEN (Selection)

◆EXPLATION FOR COMMUNICATION COMMAND

1. RDD (XX) : Reading Count value / Preset value

●This requires sub command with two(2)figures(XX). In accordance with required data, sub command is decided.
●The responce are shown as [sub command] [data] [check sum] [Cr] in order.
●The decimal point positioning is also shown the same as the display of counter in this responce.
●The zero [0] in needless is read as a space.

        Example for read : ＞01RDDPCCE(cr) = Read preset count value in unit No. 01.

        Example for answer: APC -123.45   4D(cr) = preset count value -123.45.

        Communication sub command. (XX)   Contents of command

          PC   Preset count vlaue
          BC   Batch count vlaue   ※Communication sub command is different
          TC   Total count value   according to each models
          TM   Tachometer value
          P1   1 level preset value
          P2   2 level preset value
          P3   3 level preset value
          P4   4 level preset value
          PW   Prewarn value
          BP   Batch preset vlaue
          SO   Items selected for SEND DATA in the PROGRAM MODE

2. RDI (XX) : Read Count value/Tachometer value(the value of integral)

3. RDU (XX) : Read Count value/Tachometer value(the value of under decimal) point)

●This command works the same as RDD command. Only 3 kind of sub command as shown below are available.
●RDI is the command to read the value of integral part in count value or tachometer value.
●RDU is the command to read the value under the decimal point in count value or tachometer value.

        Example for send : ＞10RDUPCDF(cr) = Read the preset count value in unit No. 10.

        Example for responce : APC. 12000000 64(cr) = Preset count value(under the decimal point): 12.

        Communication sub command. (XX)   Contents of command

          PC   Preset count value
          TC   Total count value
          TM   Tachometer value

4. WRD (XX) : Set the preset value.

●This requires sub command with 2(two)figures (XX). In accordance with the contents of command, sub command is decided as shown below.
●The responce is [A] (cr) only.
●The decimal point position can not be set by WRD command. The decimal point is shown at the the position set by the program mode.

        Exmple for send : ＞10WRDP1001234F9(cr) = set 1 level preset value in the unit No. (ID No.)10.

        Communication sub command. (XX)   Contents of command

          P1   1 level preset value
          P2   2 level preset value   ※Communication sub command is different
          P3   3 level preset value   according to each models.
          P4   4 level preset value
          PW   Prewarn value
          BP   Batch preset value

5. RES (XX) : Reset

●This requires sub command with two(2) figures (XX). In accordance with the contents of command the sub command is decided as shown below.
●The responce are [A] (cr) only.
●This command works same as front reset key operation or reset input.

        Example for send:＞00RESPCDD(cr) = Reset preset count value in unit No. (ID No.)00.

        Communication sub command. (XX)   Contents of command

          PC   Preset count value   ※Communication sub command is different
          BC   Batch preset value   according to each models.
          TC   Total count value
          ER   Cancelling for error condition(over, under flow)

6. RDO : Read output condition (respective condition in out 1 – out 4)

●The responce are shown [A] [OUT 1 (HorL)] – [OUT 4 (HorL)] [Check sum)] (cr) in order.

        Example for send : ＞00RDO45(cr) = Read output condition in unit No. 00.

        Example for responce: A1L2H3L4LF6(cr) = The output condition are as shown below in this example
                                                for responce.

        ※OUT 1～OUT 4 is different

1 L	OUT1	→ Low
2 H	OUT2	→ Hi
3 L	OUT3	→ Low
4 L	OUT4	→ Low

          according to each models.

7. STP : Count prohibition
8. RSM : Cancellation for count prohibition

●When STP command is sent to the counter, counter does not enter any count input pulse until the the counter received RSM command.
●Count prohibition will be cancelled when the power supply of counter is cut off. When the power supply of counter turns on, counter begins to accept the input pulse.
●The responce is [A] (cr) only.

        Example for send : ＞00STP57(cr) = Count prohibition in unit No. 00.
                           ＞00RSM52(cr) = Cancellation for count prohibition in unit No. 00.

9. LTD (XX) : Store count value, tachometer value or preset value in the memory

●This requires sub cmmand with two(2) figures. In accordance with the contents of command, sub command is decided as shown below.
●The data which can be memorized by this command is only one (1)item per once. In case this command is carried out newly, new data will be memorized instead of previous data.
●The responce is [A] (cr) only.
●When the power supply of counter is cut off, the memorised data will be deleted.

Example for send: ＞00LTDPCD7(cr) = Store preset count value of unit No. 00.in its memory

        Communication sub command (XX)   Contents of command

          PC   Preset count value
          BC   Batch count vlaue   ※Communication command is different
          TC   Total count value   according to each models.
          TM   Tachometer vlaue
          P1   1 level preset value
          P2   2 level preset value
          P3   3 level preset value
          P4   4 level preset value
          PW   Prewarn vlaue
          BP   Batch preset value

10. RLD : Read the data stored by LTD command

●The responce is shown as [sub command][data][check sum][cr] in order.
●In this responce, the decimal point position showed on the dispaly is also sent.
●The zero [0] in needless are sent as a space.
●If the RLD command is carried out before the data is stored by LTD command, the responce will be error code.

        Example for send: ＞00RLD42(cr) = Read the stored data of unit No(ID No.) 00 in its memory.

        Example for responce: APC -123.45   4D(cr) = Preset count value -123.45.

◆EASY COMMUNICATION (COMMUNICATION REQUEST)

●Easy communication (Communication request)
  For the way of easy communication, there is the function named communication request in this counter.
  By shorting the terminal"of communication request" and "GND", it reads the data set for SEND DATA in the PROGRAM MODE

        Example for set : When the data of the preset count value and 1 level preset value are set for
                          SEND DATA in the PROGRAM MODE.

        Example for responce: APC   123.00 P1   200.00 58(cr)
                               The above example shows : Preset count value is 123.00
                                                         1 level preset value is 200.00