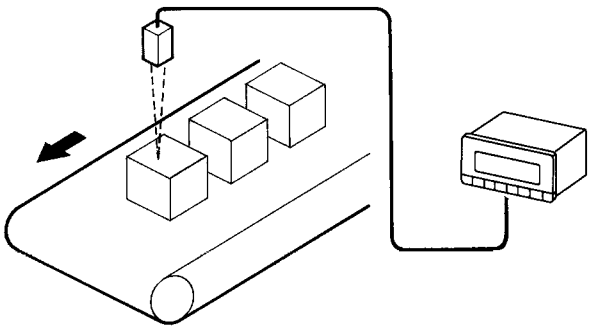
## 3-7 Pulse Counting: f7

**FUNCTION**

Application example



Counts the number of objects.

**Basic Operation**
Counts the number of pulses of INA and displays the result. Obtain display value D as follows:

D (pulse count) = C x α

C: Pulse count of INA
α: Prescale value

**Hold Displayed Value**
By turning the HOLD input ON, the displayed value can be put on HOLD. While the HOLD input is ON, the pulse counting operation continues, as does comparative output and BCD output. In this case, using the HOLD input is similar to checking a lap time with a stopwatch.

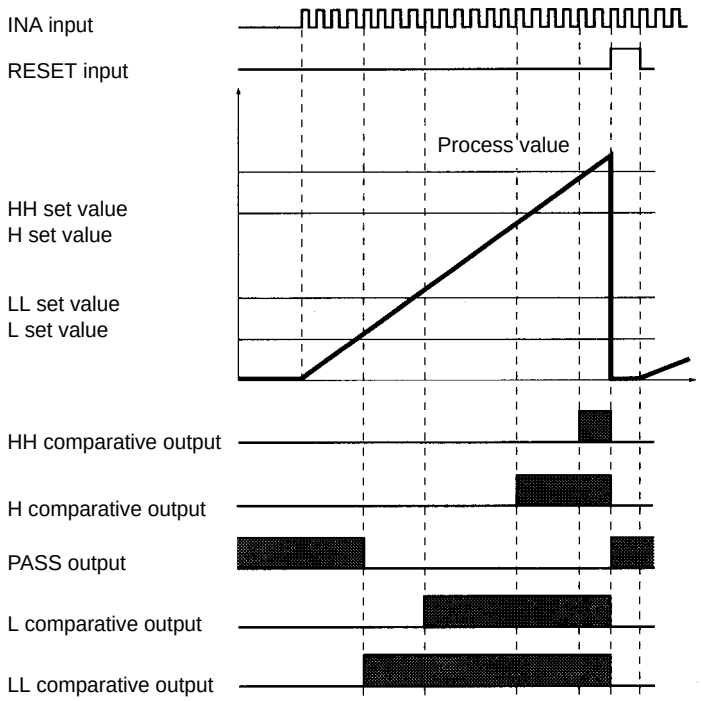
**Interruption of Pulse Counting**
With INB input ON, the pulse counting operation is interrupted and the measured value, comparative outputs, and BCD output are on HOLD. Pulse counting will not begin while INB input is ON.

**Clearing Accumulated Value**
When the RESET input turns ON, the accumulated value is cleared to zero. Pulse counting will not start while the RESET input is ON.
The accumulated value will be stored or cleared to zero when the K3NR is turned off, and depends on the setting of the power failure memory (memo) at option menu.

**Note** By connecting comparative output with the RESET input terminal, the K3NR can be used as a single-mode preset counter.

**Comparative Output**
With operating mode 7, comparative output L, LL, H, or HH turns ON

when the measured value exceeds the set value. Refer to following chart for details.




**SETTING**

| Mode | Unit of display value | Prescale value |
|---|---|---|
| 1 pulse = n counts | Count | n |
| n pulses = 1 count | Count | 1/n |

Example:
Counting four pulses as a single unit to be displayed.
Prescaling value ($\alpha$) = 1/4 = 0.25 = 0.25 x $10^0$
Prescale value = X x $10^Y$ (X: mantissa, Y: exponent)
X (mantissa) of input A = 0.25
Y (exponent) of input A = 0

**REFERENCE**

*4-2 Setting Mode*.

### Performance Characteristics

| | |
|---|---|
| **Maximum counting speed** | Sensor with transistor output: 50 kcps<br>Sensor with relay output: 30 cps |
| **Counting range** | 0 to 4 G (with 32-bit counter) |
| **Response time of HOLD or RESET input** | 20 ms max. |
| **ON/OFF pulse width** | Sensor with transistor output: 9 µs min.<br>Sensor with relay output: 15 ms min. |

| Response time | Output configuration | | | | |
|---|---|---|---|---|---|
| | Relay output | Transistor output | BCD and transistor output | Linear and transistor output | Communication and transistor output |
| **Comparative output** | 10 ms max. | 1 ms max. | 20 ms max. | 20 ms max. | 1 ms max. |
| **BCD output** | --- | --- | Refer to page 139. | --- | --- |
| **Linear output** | --- | --- | --- | 20 ms max. | --- |

### Maximum Pulse Counting Speed

Maximum pulse counting speed is the maximum speed at which the K3NR can count INA input pulses accurately. If comparative output is used as control output, the maximum pulse counting speed can be obtained as follows:

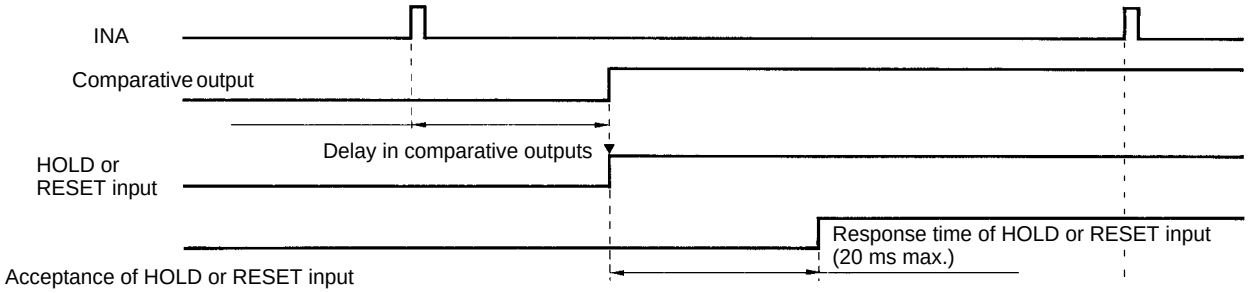
Maximum counting speed (cps) = 1/Delay in comparative outputs (sec)

If comparative output is directly connected to RESET input, the maximum pulse counting speed can be obtained as follows:

Maximum counting speed (cps) = 1/Delay in comparative outputs (sec) + Response time of RESET input (sec)

### Response Time of HOLD or RESET Input

The response time of the HOLD or RESET input is the time required for the K3TR to accept HOLD or RESET input after the HOLD or RESET input turns ON. This is illustrated in the following diagram.



**Available Functions**

Available functions in this mode are indicated as “Yes” in the following table.

| Menu | Function | Displayed Character | Availability | Reference page |
|---|---|---|---|---|
| --- | Max./Min. value display and reset | --- | Yes | 121 |
| | Estimated frequency calculation | --- | No | 153 |
| sUset (See note 2) | Set value bank no. of set values | s.bank | Yes | 60 |
| | HH set value | sU*.hh | | |
| | H set value | sU*. h | | |
| | L set value | sU*. l | | |
| | LL set value | sU*.ll | | |
| pscl | Select bank no. of prescale value | p.bank | Yes | 65 |
| | Prescaling value of input A<br>X (mantissa)<br>Y (exponent) | <br>ps*.ax<br>ps*.ay | Yes | |
| | Prescaling value of input B<br>X (mantissa)<br>Y (exponent) | <br>ps*.bx<br>ps*.by | No | |
| | Decimal point position | decp.* | Yes | |
| setup | Operating mode | func | Yes | 70 |
| | Input A sensor type | ina | Yes | 72 |
| | Input B sensor type | inb | Yes | |
| | Auto zero time of input A<br>X (mantissa)<br>Y (exponent) | <br>=ro.ax<br>=ro.ay | No | 74 |
| | Auto zero time of input B<br>X (mantissa)<br>Y (exponent) | <br>=ro.bx<br>=ro.by | No | |
| | Display time unit | time | No | 77 |
| | Communications unit no. (See note 1) | u-no | Yes | 79 |
| | Baud rate (See note 1) | bps | Yes | |
| | Word length (See note 1) | len | Yes | 82 |
| | Stop bits (See note 1) | sbit | Yes | |
| | Parity bits (See note 1) | prty | Yes | |
| opt | Process time for averaging measured value | aUg | No | 85 |
| | Startup compensation time | stime | No | 88 |
| | Power failure memory | memo | Yes | 90 |
| | Hysteresis (See note 1) | hys | No | 92 |
| | Comparative output pattern (See note 1) | c-out | No | 94 |
| | H linear output range (See note 1) | lset.h | Yes | 98 |
| | L Linear output range (See note 1) | lset.l | Yes | |
| | Remote/Local programming (See note 1) | r-l | Yes | 101 |

**Note**

1. The availability of the parameters depends on the type of selected Output Board.
2. The selected bank number will be displayed where an asterisk (*) appears.