



NITTO SEIKO

Scaler Specification

ES 1

■ General

This scaler scales unitless pulse signals proportional to flow rate into unit pulse signals by means of rate multiplier and frequency divider and outputs those unit pulse signals.

■ Features

- Easy modification of multiplication rate and dividing value.
- Easy change of signal width of unit pulse output.
- Power supply with either AC100, 110, 200 or 220V.
- Possibility of outputting various pulse signals.
- Possibility of mounting on DIN rail (35mm in width).

■ Specifications

Pulse input

- No-contact input
 - Frequency: 10kHz or under (ON-OFF ratio 1:1)
 - Voltage input
 - Signal level: H: 5 ~ 30V, L: 0 ~ 2V
 - Input resistance: Approx. 15k Ω
 - Open collector input
 - Voltage & current: Approx. 10V, Approx. 3.6mA
 - ON level: 0 ~ 2V

- Contact input
 - Frequency: 30Hz or under (ON-OFF ratio 1:1)
 - Input resistance: Approx. 4.7k Ω

Inhibit input

- No-contact input
 - Delay of action: 35 μ s or under
 - Voltage input
 - Signal level: H: 5 ~ 30V, L: 0 ~ 2V
 - Input resistance: Approx. 15k Ω
 - Signal logic
 - Positive logic: Inhibit at H
 - Negative logic: Inhibit at L
 - Open collector input
 - Voltage & current: Approx. 10V, Approx. 3.6mA
 - ON level: 0 ~ 2V
 - Signal logic
 - Positive logic: Inhibit at H (Transistor: OFF)
 - Negative logic: Inhibit at L (Transistor: ON)

- Contact input
 - Delay of action: 12ms or under
 - Input resistance: Approx. 4.7k Ω
 - Signal logic
 - Positive logic: Inhibit at H (Contact: ON)
 - Negative logic: Inhibit at L (Contact: OFF)

Reset input

- No-contact input
 - Delay of action: 20ms or under
 - Voltage input
 - Signal level: H: 5 ~ 30V, L: 0 ~ 2V
 - Input resistance: Approx. 4.7k Ω
 - Signal logic
 - Positive logic: Reset at H
 - Negative logic: Reset at L
 - Open collector input
 - Voltage & current: Approx. 7V, Approx. 3.6mA
 - ON level: 0 ~ 2V
 - Signal logic
 - Positive logic: Reset at H (Transistor: OFF)
 - Negative logic: Reset at L (Transistor: ON)
- Contact input
 - Input resistance: Approx. 4.7k Ω
 - Signal logic
 - Positive logic: Reset at H (Contact: ON)
 - Negative logic: Reset at L (Contact: OFF)

Rate multiplication

- Regulator: Small rotary switch, 4-digit
- Range of setting: 0.1000 ~ 0.9999, in steps of 0.0001



Dividing

- Regulator: Small rotary switch — 1-digit
- Range of setting: 1/(1 ~ 9, in steps of 1)
1/(10 ~ 90, in steps of 10)
1/(100 ~ 900, in steps of 100)
1/(1000 ~ 9000, in steps of 1000)
1/10000

Storage in case of power failure (Option):
Memorizes totalized value of dividing counter at the time of a power failure.

- Storage system: Ni-Cd battery
- Storage time: Approx. 5 days

Display

- Display of power source: Red LED 3 ϕ
- Display of pulse input: Red LED 3 ϕ

Output of unit pulse

- Signal width: Common to no-contact output and contact output
- Range of setting: Approx. 0.5 ~ 20ms or approx. 20 ~ 1000ms (changed by selector switch)
- Standard setting: Approx. 0.5, 5, 50, 500, 1000 ms (Varies depending on pulse input frequency, dividing, presence or not of contact output)

• No-contact output

- Number of output points: 2
- Voltage output
- Kind of signal: 12V or 5V no-contact signal
- Signal level: H: Approx. 12V, or Approx. 5V (at no-load time)
L: 0.5V or under (at no-load time)

Output resistance: Approx. 1.1k Ω (Protective resistance against short-circuit: Approx. 100 Ω)

- Signal logic
- Positive logic: One-shot signal of H
- Negative logic: One-shot signal of L

Open collector output
Voltage & current: DC27V, 30mA
Voltage at ON time: 0.5V or under

- Signal logic
- Positive logic: One-shot signal of H (Transistor: OFF)
- Negative logic: One-shot signal of L (Transistor: ON)

- Contact output
 - Kind of signal: No-voltage contact signal
 - Lead relay output
 - Contact capacity: AC100V, 0.02A
 - DC24V, 0.1A (cosφ=1)
- Minimum applicable load:
 - DC1V, 100μA
- Opening-closing frequency:
 - 5 times/sec. or under
- Mini relay output
 - Contact capacity: AC220V, 0.2A
 - DC24V, 0.5A
- Opening-closing frequency:
 - One time/sec. or under

Distribution pulse output:
 Kind of signal: 12V no-contact signal
 Signal level: H: Approx. 12V (at no-load time)
 L: 0.5V or under (at no-load time)
 Output resistance: Approx. 1.1kΩ (protective resistance against short-circuit, Approx. 100Ω)

Power source for transmitter:
 DC12V ±10%, 50mA

Insulation resistance:
 DC500V, 20MΩ or over, between exposed metals, supply terminals, contact output terminals

Withstand voltage:
 AC1500V, 1 minute. Test points are the same as those of insulation resistance test.

Noise resistance:
 Square wave noise by noise simulator 1000V (Noise width 1μs, Polarity ±, Synchronized power application, Phase 0 ~ 360°)

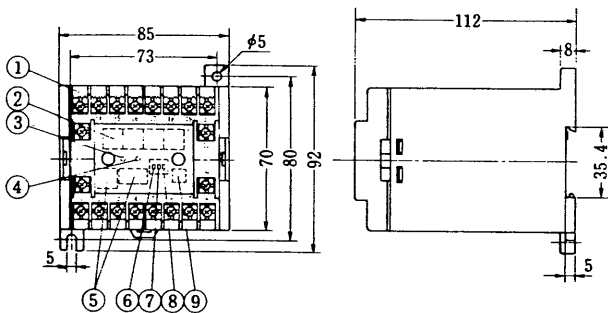
Power supply: AC100/110/200/220V ±10%, 50/60Hz

Power consumption:
 Approx. 6VA

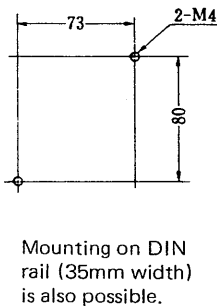
Ambient temperature:
 0 ~ 45°C

Weight: Approx. 0.6kg
Casing: ABS resin

■ Configuration and mounting dimensions



No.	Designation
1	Terminal board
2	Multiplication rate regulator
3	Display of power source
4	Display of pulse input
5	Regulator of dividing
6	Pulse input signal selector switch
7	Inhibit input signal selector switch
8	Unit pulse output signal width selector switch
9	Unit pulse output signal width regulator



■ Operation

- Scales unitless pulse signals into unit pulse signals by means of rate multiplier and frequency divider and outputs those unit pulse signals.
- The number of unit pulses is expressed by the following formula:
 Number of unit pulses ÷ Number of unitless pulses × Rate of multiplication × Dividing value
 The pulse unit of unit pulse output is expressed by the following formula:
 Unit of unit pulse ÷ $\frac{\text{Unitless pulse unit}}{\text{Rate of multiplication} \times \text{Dividing value}}$
- Sets the rate of multiplication of the rate multiplier on the multiplication rate regulator.
- Sets the dividing value of the frequency divider on the dividing regulator.
- Acts when the pulse input signal passes from L level to H level (when the signal passes from ON to OFF in the case of open collector signal and when the signal passes from OFF to ON in the case of contact signal), since the pulse input is of rise acting system.
- The pulse input display lights when pulse signal is inputted in the pulse input.
- The input signal selector switch is used for selection between no-contact input and contact input.
- No unit pulse signal is outputted since pulse input into the rate multiplier is inhibited by inhibit input signal. Distribution pulse signal is outputted.
- Rate multiplier and frequency divider are reset by the reset input signal, and no unit pulse signal is outputted. Distribution pulse signal is outputted.
- Outputs pulse signal synchronizing with the pulse signal inputted in pulse input terminal at the distribution pulse output.
- Sets the signal width of unit pulse output at the unit pulse output signal width selector switch and the regulator.
 The standard signal widths set at the time of delivery are approximately as indicate in the following table:

Dividing value	Standard signal width of unit pulse output ms					
	Maximum frequency of pulse input					
	10000	1000	100	10	1	0.1 Hz
1/1~1/9		0.5	5	50	500	1000
1/10~1/90	0.5	5	50	500	1000	1000
1/100~1/900	5	50	500	1000	1000	1000
1/1000~1/9000	50	500	1000	1000	1000	1000
1/10000	500	1000	1000	1000	1000	1000

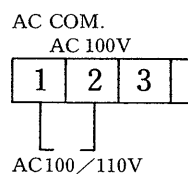
■ Terminal arrangement

No.	Signal name	No.	Signal name
1	AC COMMON	11	
2	AC100V	12	
3	AC200V	13	SIG pulse input
4	Unit no-contact pulse output 1	14	+12V
		15	0V
5	Unit no-contact pulse output 2	16	+12V
		17	Inhibit signal input
6	0V	18	Reset signal input
7	Unit contact pulse output	19	Distribution pulse output
8		20	0V
9			
10			

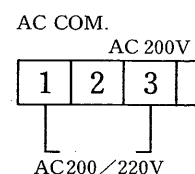
■ Connections

■ Connection of power source

Case of AC100/110V



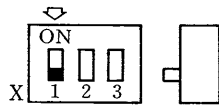
Case of AC200/220V



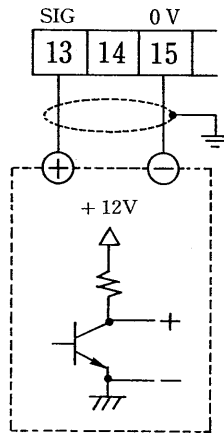
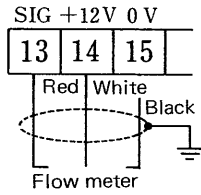
■ Connection of pulse input signal:

Use shielded cable.

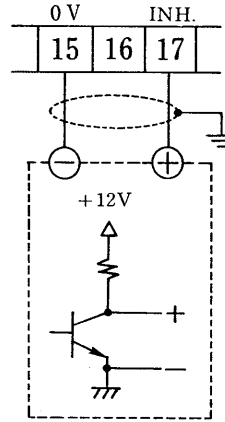
- No-contact input:
Turn off the pulse input signal selector switch. "X"
- Voltage input:
Case of 12V no-contact signal transmitting flow meter



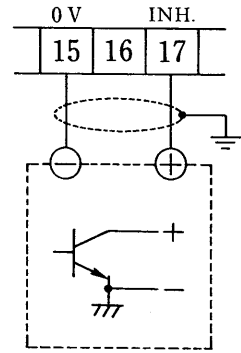
Case of 12V no-contact signal



• Voltage input

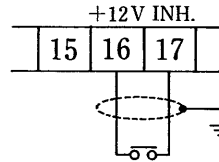
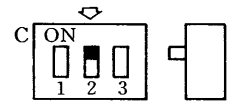


• Open collector input

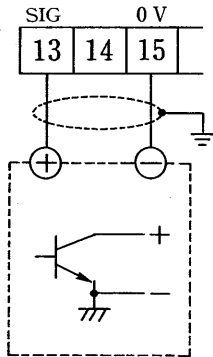


• Contact input:

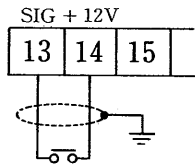
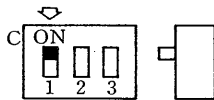
Turn on the inhibit input signal selector switch. "C"



• Open collector input



- Contact input:
Turn on the pulse input signal selector switch. "C"

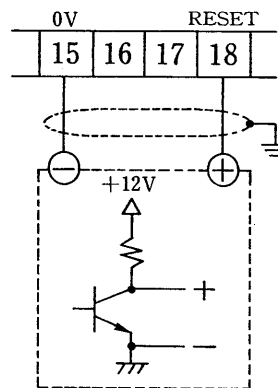


■ Connection of reset input signal:

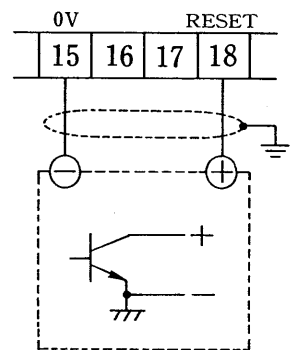
Use shielded cable.

- No-contact input

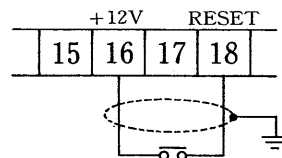
Voltage input



Open collector input



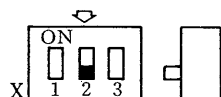
• Contact input



■ Connection of inhibit input signal:

Use shielded cable.

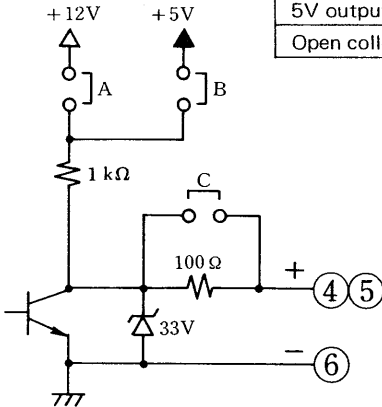
- No-contact input:
Turn off the inhibit input signal selector switch. "X"



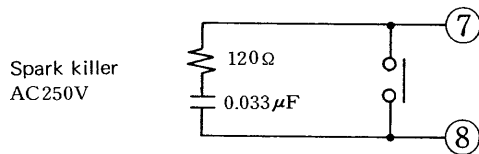
- Output circuit
 - Unit pulse output
 - No-contact output

Kind of output signal	A	B	C
12V output	ON	-	-
5V output	-	ON	-
Open collector output	-	-	ON

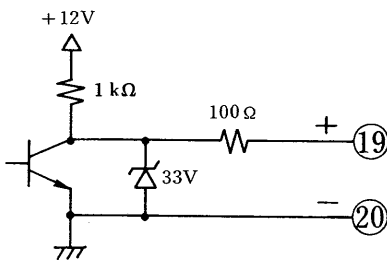
- indicates "OFF"



- Contact output:



- Distribution pulse output



- Model

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- Pulse input

1	Voltage input, contact input
2	Open collector input

- Inhibit input

1	Voltage input, contact input, positive logic
2	Open collector input, positive logic
3	Voltage input, contact input, negative logic
4	Open collector input, negative logic

- Reset input

1	Voltage input, contact input, positive logic
2	Open collector input, positive logic
3	Voltage input, contact input, negative logic
4	Open collector input, negative logic

- Unit no-contact pulse output 1

1	12V output, positive logic
2	5V output, positive logic
3	Open collector output, positive logic
4	12V output, negative logic
5	5V output, negative logic
6	Open collector output, negative logic

- Unit no-contact pulse output 2

1	12V output, positive logic
2	5V output, positive logic
3	Open collector output, positive logic
4	12V output, negative logic
5	5V output, negative logic
6	Open collector output, negative logic

- Unit contact pulse output

0	None
1	Lead relay output
2	Mini relay output

- Option

No entry	None
1	Storage in case of power failure

* The specifications are subject to change without notice.



NITTO SEIKO CO., LTD.