

# Digital Devices



- Shift Register
- ANP-5D/6D (comparator)
- ANP1F (comparator)

# Shift register

## Shift register Signal transfer device

A shift register is a kind of signal transfer device integrating storage elements (memory devices). When an object is detected inline for sorting, ejecting, processing, etc., it is often impractical to use the signals for immediate control. In a coating line, for example, coating at the moment of detection may have an adverse effect such as splashing the paint on the sensor, which requires some distance between the position of detection and control.

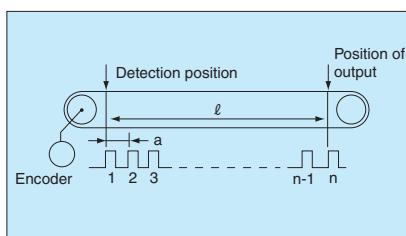
Shift registers are convenient for use in these situations. The data signals generated at the moment of detection are stored and sent to the point of control in the order they are required.

### Applications

- Ejection of defective products in an inspection line
- Sorting of products after the detection of register marks
- Spray gun control after detecting products in a coating line
- Control after the detection of flaws and seams in sheet materials

### Ideal for these situations

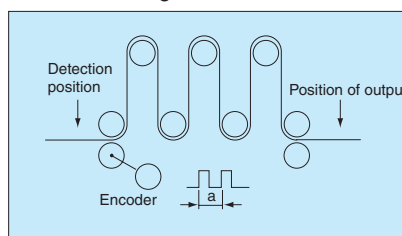
- Positions of output distant from the detection of an object moving on a conveyor line



Pulses synchronized with the moving speed of a conveyor line are fed as shift signals and distance between positions of detection and output are used as the set-point

$$\text{Setting } n = \frac{l \left( \text{Distance between positions of detection and output} \right)}{a \left( \text{Line movement per pulse} \right)}$$

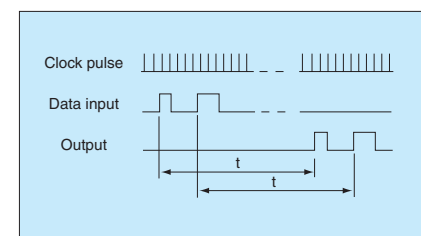
- Output signals required at location distant from position of detection of flaw, (leading/trailing) end, seam, etc. of moving sheet material



Pulses synchronized with moving speed of sheet material fed as shift signals and length of sheet material between positions of detection and output used as the set-point

$$\text{Setting } n = \frac{l \left( \text{Length of sheet between positions of detection and output} \right)}{a \left( \text{Sheet movement per pulse} \right)}$$

- Output signals required for randomly input signals delayed by a certain duration






Clock pulses of pulse generator fed as shift signals and intended delay time used as the set-point

$$\text{Setting } n = t \left( \text{Duration} \right) \times f \left( \text{Clock pulse frequency} \right)$$

where t: in seconds  
f: in Hz

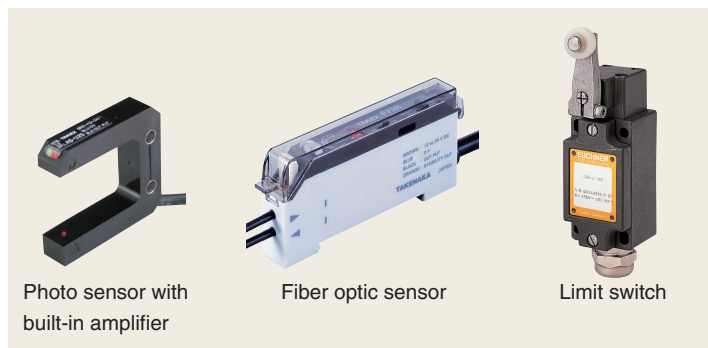
## List of models

Type	Shape/appearance (typical example)	Model	Bit count	Operation mode	Output mode	Power supply	See page
2-channel plug-in type		<b>SRB20</b>	20bit $\left( \begin{matrix} 10\text{bit} \\ \times \\ 2 \end{matrix} \right)$	ON-OFF operation	Relay	AC 100-120V 200-240V $\pm 10\%$ 50/60Hz  (Sensor power supply integrated)	574
Card type		<b>SRS16</b>	16bit	ON-OFF operation	Open collector	DC 12-24V $\pm 10\%$	578
Head terminal type		<b>SRB-7448</b>	800bit	ON-OFF operation	Photo-MOS relay	DC 100-240V $\pm 10\%$ 50/60Hz	582

## Various types of input signals accepted

- Three modes of input (shift, data, reset) are used and contact or non-contact inputs for each of the three modes are accepted.

This allows use of photo sensors, limit switches, rotary encoders, etc.

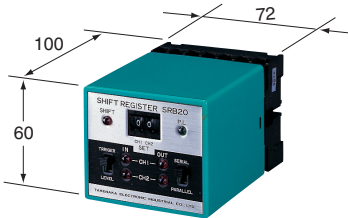




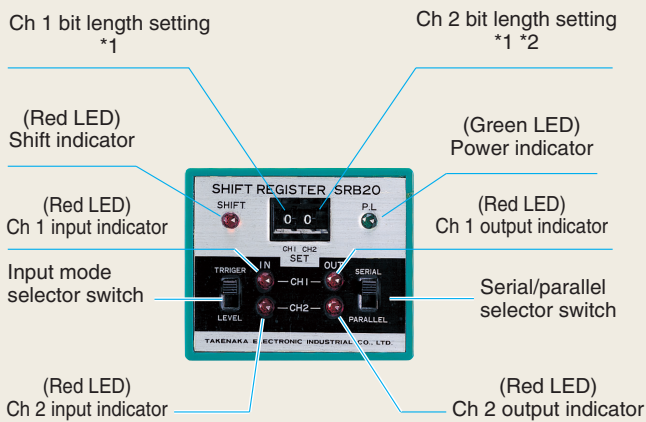
- 2-channel (10-bit x 2)
- Unaffected by power failure
- Parallel/serial mode selectable
- Sensor power supply integrated (12 VDC 100 mA)

## Type

Type	Model	Bit count	Operation mode	Output mode	Power supply
2-channel plug-in type	SRB20	20bit (10bit x 2)	ON-OFF operation	Relay	AC 100-120V 200-240V ±10% 50/60Hz



## Panel Description



\*1 10 bits with "0" setting  
\*2 (10 + n) bits for serial operation

**Digital switch setting**  
For parallel mode, the left and right sides are respectively for Ch 1 and Ch 2 and the setting range is between 1 and 0. "0" stands for 10 bits. For serial mode, the right side is the setting for 10 + n bits and "0" for n means 20 bits.

## Rating/Performance/Specification

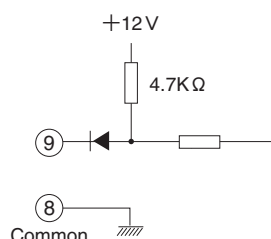
Rating/performance	Type	Plug-in (2-channel)
	Model	SRB20
	Bit count	20bit (10bit x 2)
	Power supply	100-120V, 200-240VAC $\pm 10\%$ 50/60Hz
	Power consumption	3VA max.
	Input signal (common to all inputs)	Open collector: L level: ON; H level: OFF Voltage: L level: 0-2 V; H level: 6-30 V Contact: L level: ON; H level: OFF
	Data output	TRIGGER (T) mode: temporarily stored at H -> L (fall) LEVEL (L) mode: active at L level Minimum input pulse width: 25 ms
	Shift input	Shift at H -> L (fall) Minimum input pulse width: 25 ms
	Reset input	Reset at L level Minimum input pulse width: 25 ms
	Position of output	<ul style="list-style-type: none"> <li>Parallel mode               <ul style="list-style-type: none"> <li>Ch 1 data input <math>\rightarrow</math> Ch 1 output variable between 1-10 bits</li> <li>Ch 2 data input <math>\rightarrow</math> Ch 2 output variable between 11-20 bits</li> </ul> </li> <li>Serial mode               <ul style="list-style-type: none"> <li>Ch 1: data input <math>\rightarrow</math> Ch 1: variable between 1-10 bits</li> <li>Ch 2: variable between 1-10 bits</li> </ul> </li> </ul>
	Operation mode	ON-OFF operation
	Output mode	Relay output 1a, 2 channels Rating: 1 A (250 VAC) resistance load
	Power supply to sensor	12V DC 100mA
	Power failure compensation	Ni-Cd storage battery backup
	Power failure compensation time	80 hours after supplying power for 8 hours
Specification	Connection	Terminal block (with M3.5 screws)
	Case material	Polycarbonate
	Mass	440g max.
	Notes	See Panel Description for indicators, switches, etc.

## Environmental Specification

Environment	Ambient temperature	-10 - +50 °C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Protective structure	IP20
	Vibration	10-55 Hz / 1.5 mm amplitude / 1 hour each in 3 directions
	Dielectric withstanding	1500 VAC for 1 minute
	Insulation resistance	500 VDC, 20 M $\Omega$ or higher.

## Input Circuit

- All inputs are activated by current supply. The input impedance is 4.7 kΩ.



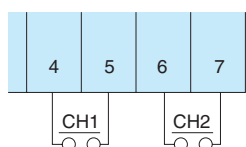
Contact signal	Open collector signal		Voltage signal	
○ Both accepted	○ Accepted	× Not accepted	○ Accepted; R is irrelevant	△ Accepted only with R of 1 kΩ or lower

Notes on use of contact input

- Use small-capacity contacts for input.
- Power switching with a contact in the same relay may cause faulty operation due to induction noise. Be sure to use a relay to input with an independent contact.

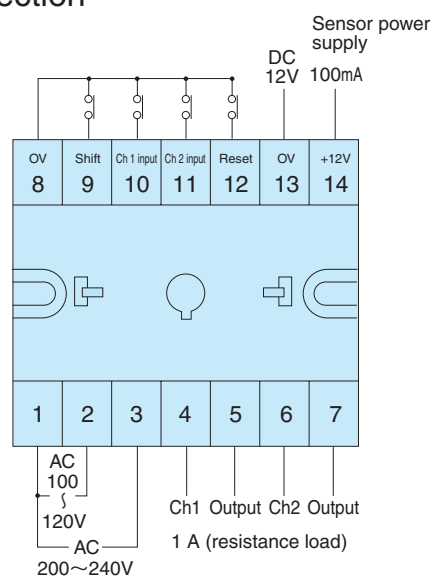
## Output Circuit

- Relay “a” (normally-open) contact output is available with each of Ch 1 and Ch 2.



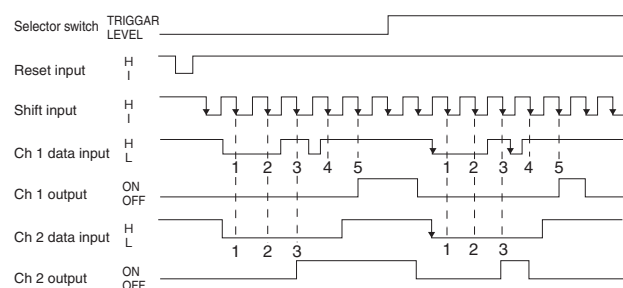
250 VAC 5 A (resistance load)

## Connection

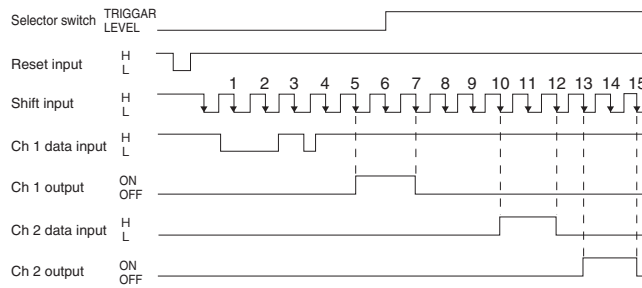


## Timing Chart

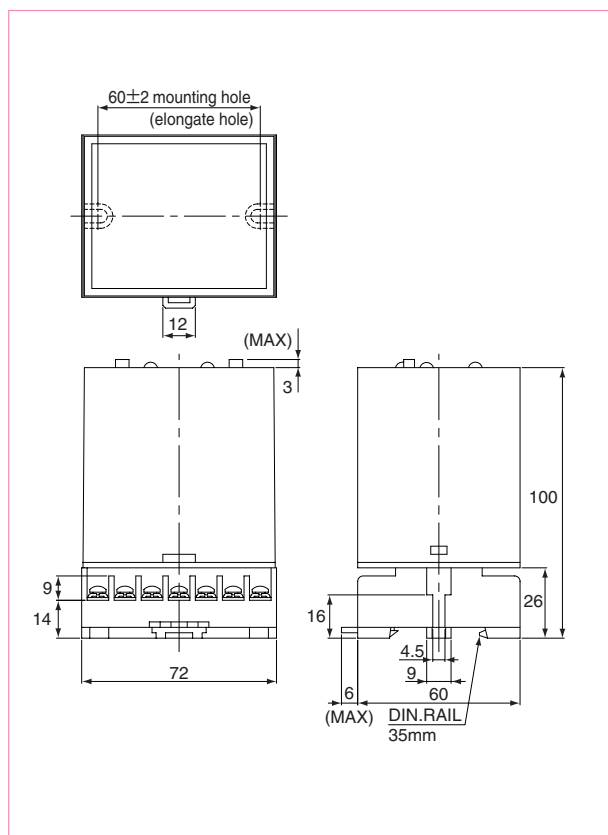
### Parallel mode



### Serial mode

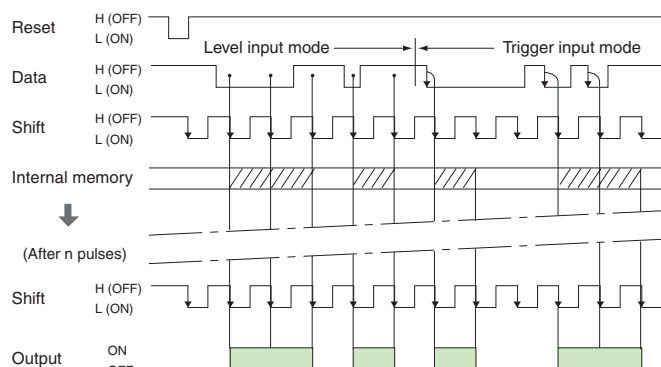


## Dimensions (in mm)



## Operation Mode

- Output is activated at the fall of a shift pulse and stays activated until the next fall. When continuous data signal is input, output stays activated.



## Power Failure Compensation

For protection from possible power failure, a backup measure with Ni-Cd (nickel-cadmium) battery is provided. The battery is recharged while power is supplied and the battery holds the internal circuitry operation while the power supply is cut off.

### Power failure compensation time

For the battery capacity of 50 mA h, average charging current is 200  $\mu$ A and current consumption during compensation is 20  $\mu$ A or less, which means that the compensation time is more than ten times as much as the duration of power supply (up to about 3 months when fully charged).

If the battery is used after a long time of non-use, the battery capacity may not be achieved. The capacity is recovered by repetitive use. To ensure full compensation time, supply power continuously for about 24 hours before use.

### Life

100% of the capacity can be achieved for at least 500 cycles of recharging and discharging (power ON/OFF) for the battery capacity of 50 mA.

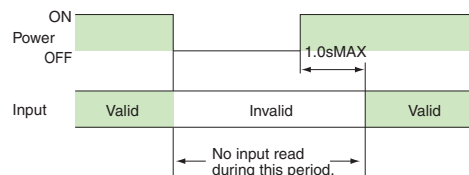
### Ambient temperature

The compensation time and life may vary to some extent depending on the ambient temperature. Repeated sudden temperature changes may cause battery liquid leakage. Use in a constant temperature environment as close to normal temperature as possible.

### Input/output at power-off

When power supply is cut off, the indicators and outputs are turned off until the power supply is restored. This means reading of signals from the inputs are also prohibited. Pressing the reset button does not reset the operation (changing digital switches leaves the internal setting undetermined).

Inputs remain prohibited for 1.5 seconds after the restoration of power. During this period, restore the states of the individual inputs prior to the power-off.



### Battery replacement

The battery is soldered onto the internal board. Send in any product requiring battery replacement to Takex.

The battery used in this product contains cadmium. Send in any used battery to Takex and do not throw away the battery.



- Slim card type of only 16 mm in width
- Space-saving design  
Small footprint even with more than one unit adjacently installed

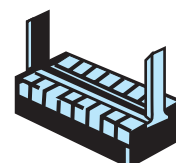


### Type

Type	Model	Bit count	Operation mode	Output mode	Power supply
Card type	<b>SRS-16</b>	16bit	ON-OFF operation	Open collector	12-24V DC ±10%

### Optional Parts

Type	Model	Description
Terminal block	<b>TB10</b>	Mountable on DIN rail (35 mm)



Terminal block (TB10)

### Panel Description

① Digital switch for setting bit length  
16-bit with "0" setting

② Output operation indicator

③ Data indicator

④ Shift indicator

⑤ Mode selector switch  
Response time switch  
Input mode switch

Bit length setting and bit count

Setting	Bit count (bits)
A	10
B	11
C	12
D	13
E	14
F	15
0	16



## Rating/Performance/Specification

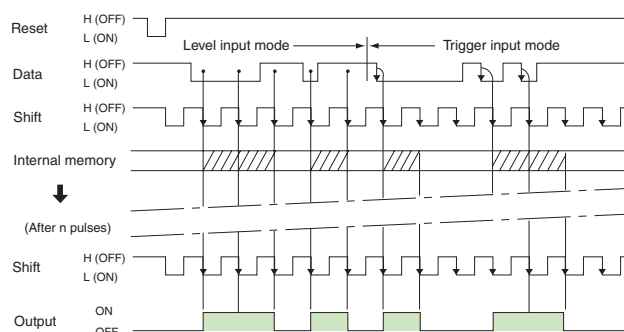
Rating/performance	Type	Card type
	Model	SRS-16
	Bit count	16bit
	Power supply	12-24VDC $\pm 10\%$
	Current consumption	25mA max.
	Input signal (common to all inputs)	Open collector: L level: ON; H level: OFF Voltage: L level: 0-1 V; H level: 6-24 V Contact: L level: ON; H level: OFF
	Data input	TRIGGER (T) mode: temporarily stored at H $\rightarrow$ L (fall) LEVEL (L) mode: active at L level
	Minimum input pulse width	SW2: ON $\rightarrow$ 30 ms / OFF $\rightarrow$ 500 $\mu$ s
	Shift input	Shift at H $\rightarrow$ L (fall)
	Minimum input pulse width	SW1: ON $\rightarrow$ 30 ms / OFF $\rightarrow$ 500 $\mu$ s
	Reset input	Reset at L level Minimum input pulse width: 30 ms
	Position of output	Variable between 1 and 16 bits
	Operation mode	ON-OFF operation
	Output mode	Open collector output Rating: 100 mA (30 VDC) max.
Specification	Connection	Insert; 10-pin 4-mm pitch
	Case material	Resin
	Mass	60g max.
	Notes	<ul style="list-style-type: none"> <li>Terminal block (TB10) mountable on DIN rail (35 mm) is optionally available.</li> <li>See Panel Description for indicators, switches, etc.</li> </ul>

## Environmental Specification

Environment	Ambient temperature	-10 - +50 °C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Protective structure	IP40
	Vibration	10-55 Hz / 1.5 mm amplitude / 2 hour each in 3 directions
	Dielectric withstanding	1500 VAC for 1 minute
	Insulation resistance	500 VDC, 20 M $\Omega$ or higher.

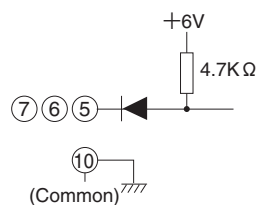
### Operation mode

Output is activated at the rise of a shift pulse and stays activated until the next rise. When continuous data signal is input, output stays activated.



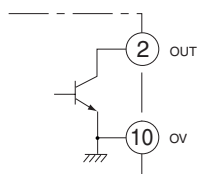
Input Circuit

- All inputs are activated by current supply. The input impedance is 4.7 kΩ.



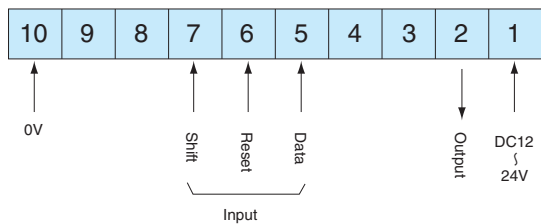
Contact signal	Open collector signal		Voltage signal	
○ Both accepted	○ Accepted	× Not accepted	○ Accepted; R is irrelevant	△ Accepted only with R of 1 kΩ or lower

Output Circuit



- Output: open collector
- For relay or current output, apply the rating for output transistor: 30 VDC 100 mA max.

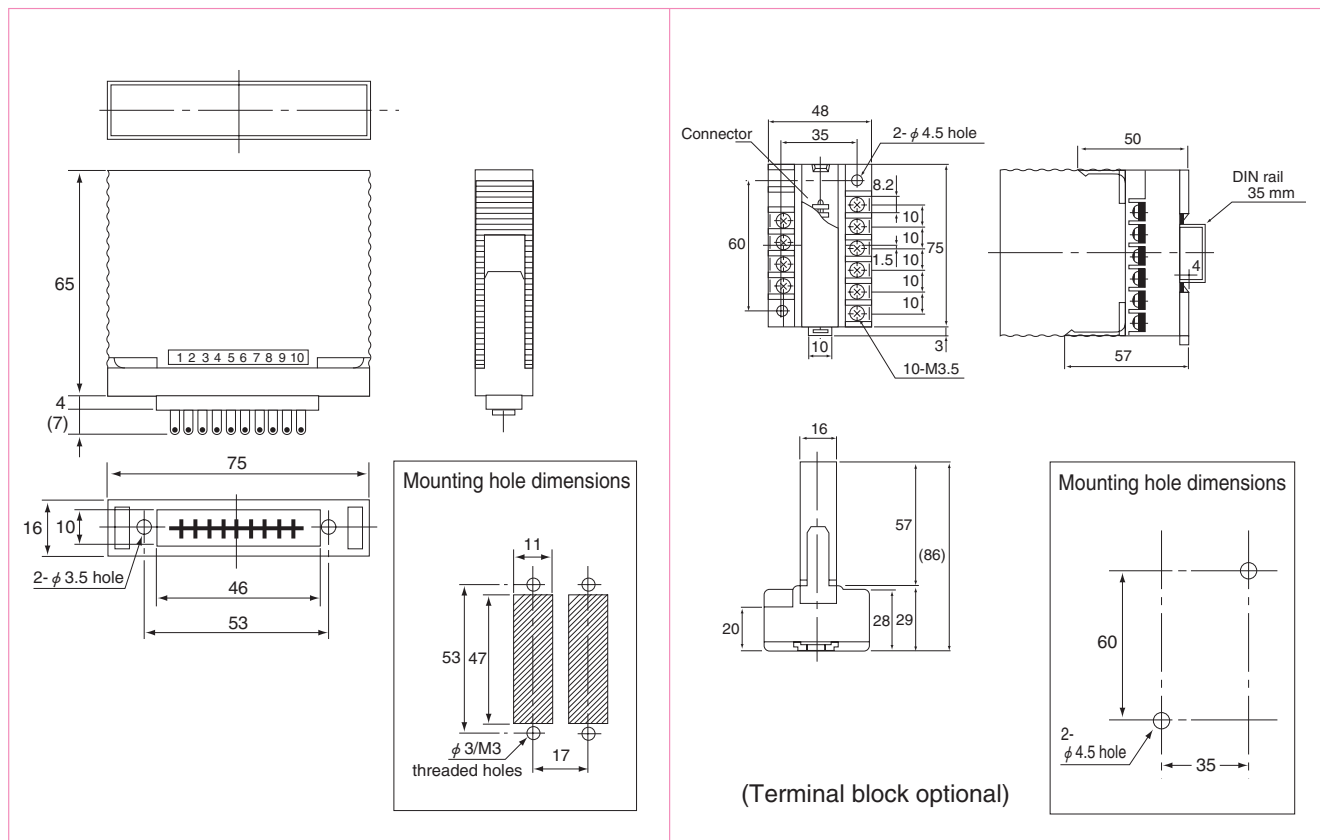
Connection



(Wires soldered)

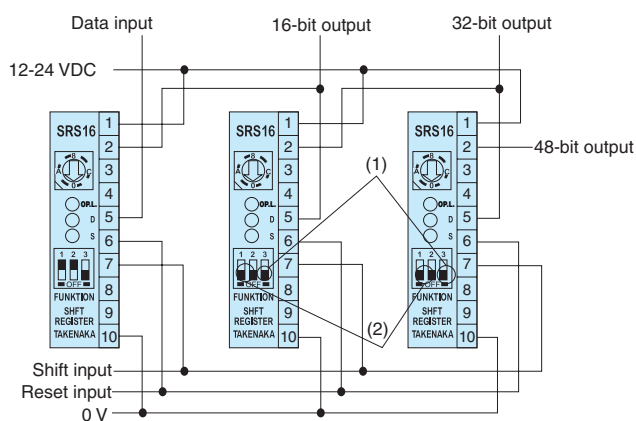
For relay output	For voltage output
For the output resistor, find a resistance value that limits the supply current I <sub>o</sub> up to 100 mA.	

## Dimensions (in mm)



## Bit Count Extension

- Up to 3 units can be serially connected for increasing the bit count.



- Same mode (L input mode for OFF) as the first unit
- OFF for the second and subsequent units

- Input of the individual unit may be used as interrupt input as well as extension of bit length.

# SRB7448

Shift register

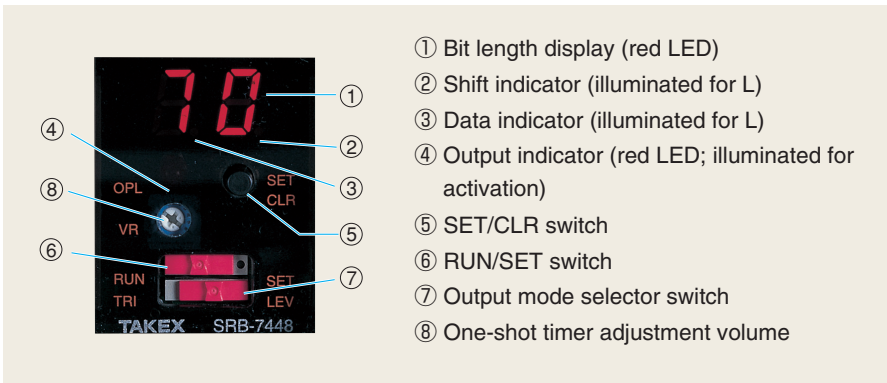


- Compact
  - 800-bit support
  - Sensor power supply integrated
- (12 VDC 150 mA max.)  
More than one sensor may be directly connected

## Type

Type	Model	Bit count	Operation mode	Output mode	Power supply
Head terminal type	SRB-7448	800bit	ON-OFF operation	Photo-MOS relay 1a	12-24V DC ±10% 50-60Hz

## Panel Description



## Rating/Performance/Specification

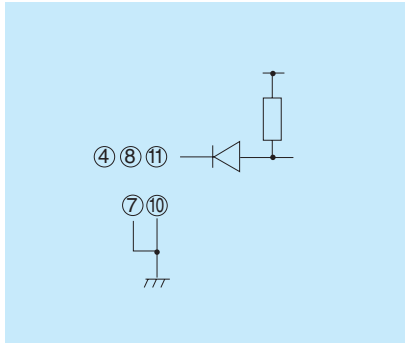
Rating/performance	Type	Head terminal type
	Model	<b>SRB-7448 (-H) *</b>
	Power supply	100-240VAC $\pm 10\%$ 50/60Hz
	Power consumption	10W max.
	Input signal (common to all inputs)	Open collector: L level: ON; H level: OFF Voltage: L level: 0-1 V; H level: 6-30 V
	Data input	LEV: activated at L level (minimum input pulse width: 25 ms) * TRI: activated at trigger level (minimum input pulse width: 25 ms) *
	Shift input	Shift at H $\rightarrow$ L (fall) Minimum input pulse width: 25 ms
	Reset input	Reset at L level Minimum input pulse width: 25 ms
	Bit count	Variable between 1 and 800 bits
	Operation mode	LEV: ON-OFF operation (shift input synchronized) TRI: one-shot operation (variable between 0.1-3 seconds)
	Output mode	Photo-MOS relay 1a 220 VAC/DC 50 mA
	Power supply to sensor	12VDC 150mA
Specification	Connection	Terminal block (with M3.5 screws; terminal block width: 8.1 mm)
	Case material	ABS resin
	Mass	150g max.
	Notes	<ul style="list-style-type: none"> <li>• **"-H"</li> at the end of the model No. indicates high-speed model with the minimum input pulse width of 1.5 ms. <li>• DIN rail (35 mm) mounting or screw mounting.</li> </ul>

## Environmental Specification

Environment	Ambient temperature	-10 - +55 °C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Protective structure	IP40
	Vibration	10-55 Hz / 1.5 mm amplitude / 1 hour each in 3 directions
	Dielectric withstanding	1500 VAC for 1 minute
	Insulation resistance	500 VDC, 20 M $\Omega$ or higher

## Input/Output Circuit

a) Input circuit



b) Output circuit

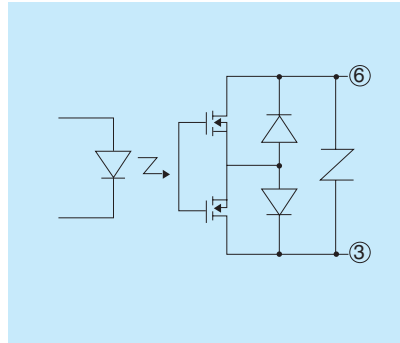
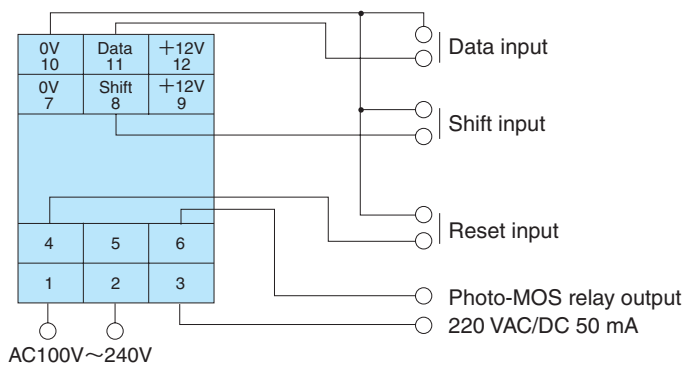


Photo-MOS relay output 1a  
220 VAC/DC 50 mA

Output resistance at photo-MOS relay  
activation (ON resistance): 50  $\Omega$

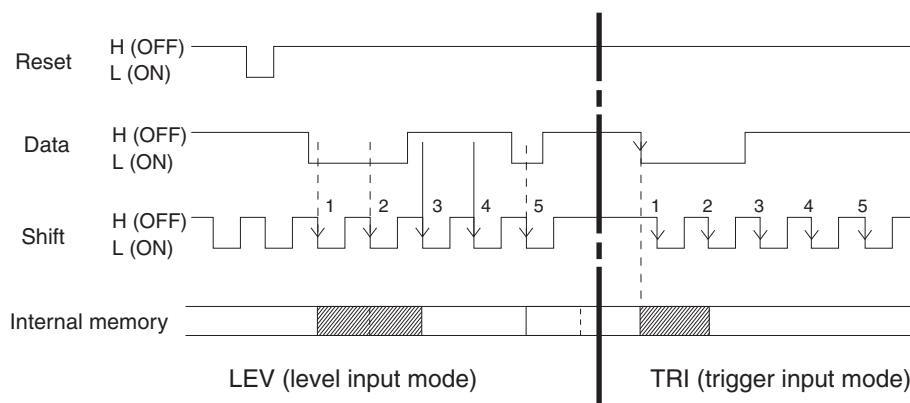
## Connection (Typical example)



## Basic Operation

### 1) Input mode

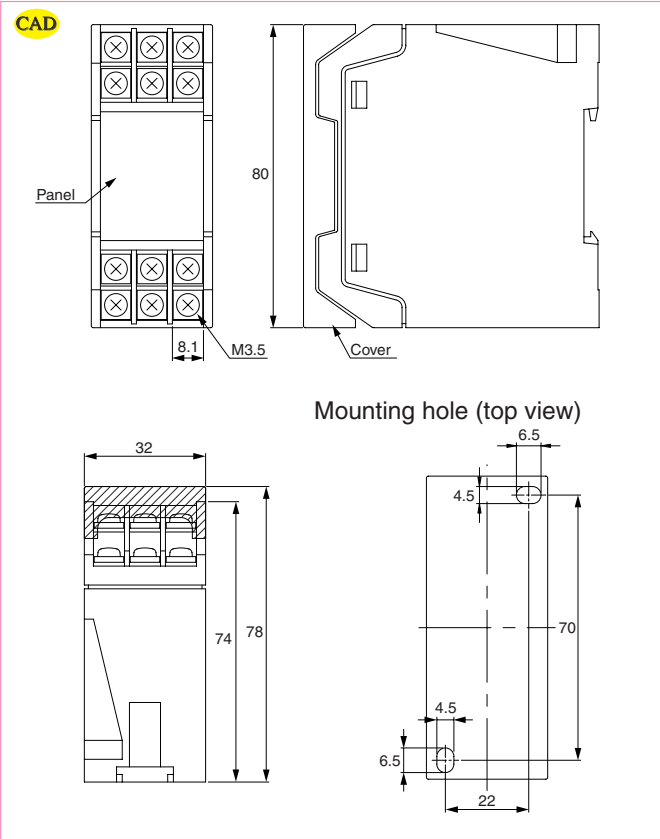
- LEV (level input mode): data read at fall of shift input and shifted in order.
- TRI (trigger input mode): data input fall temporarily stored, read at fall of shift input and shifted in order.



### 2) Operation mode

- LEV (level input mode): ON-OFF operation  
Output is activated at the fall of a shift pulse and stays activated until the next fall. When continuous data signal is input, output stays activated.
- TRI (trigger input mode): one-shot operation  
Output is activated at the fall of a shift pulse and stays activated for a certain period of time. The output time can be adjusted between 0.1 and 3 seconds with the volume on the panel. Use this mode when long output signals are required for a short shift cycle or short output signals for a long shift cycle.

■ Dimensions (in mm)





### ● Capable of high-accuracy analog control

#### ● High-speed sampling

With one-line input, input signals are captured at a sampling frequency of 2,000/sec as close to real time as possible (frequency at 1,000/sec each for two-line input).

#### ● Averaging

Averaging feature is selectable between six cycle settings: 1, 10, 30, 50, 100 and 200. One-cycle averaging allows judgment in 0.5 ms, which outputs a signal in response to an instantaneous variation. 200-cycle averaging is suitable for slow and smooth control.

#### ● Analog delay

The amplifier frequency characteristic is selectable between high speed (about 1 MHz) and low speed (about 1 kHz).

#### ● Operation

For two-line input, addition/subtraction selection is available between "Ch 1 + Ch 2" and "Ch 1 – Ch 2."

### ■ Type

Type	Model	Power supply	Input	Output
Digital comparator	ANP-5D	24V DC	Analog input	3
	ANP-6D			4

### ■ Typical Applications

#### ● Thickness matching

Two sets of sensors used for "Ch 1 + Ch 2" operation for matching.

#### ● Height difference matching

Two sets of sensors used for "Ch 1 – Ch 2" operation for matching.

#### ● Position matching

Two sets of sensors used for "Ch 1 – Ch 2" operation for matching.



## Rating/Performance/Specification

Model		ANP-5D	ANP-6D
Rating/performance/specification	Power supply	24V DC $\pm 10\%$ max.	
	Current consumption	150mA max.	
	A/D conversion	Successive approximation; 12-bit (4096 division)	
	Measuring range	0-5/0-10 VDC (selectable with switch)	
	Resolution	Analog input with 5 V setting: 1.221 mV (calculated value) Analog input with 10 V setting: 2.442 mV (calculated value)	
	Analog input	1-line input for Ch 1/2-line input; addition or subtraction available	
	Display	5-digit: 20.000 V (max.) - -10.000 V (min.)	
		7-segment red LED; character size: 8 x 4 mm	
		20 times/s	
	Sampling frequency	1-line input: 2,000/s; 2-line input: 1,000/s	
	Averaging	1/10/30/50/100/200 times (selectable)	
	Output mode	No. of outputs	3 (L/M/S)      4 (HH/HI/LO/LL)
		Rating	NPN open collector output / Rating: sink current 100 mA (30 VDC) max.
		Indicator	3 indicators (L: Red / M: Orange / S: Yellow)      4 indicators (HH: Red / HI: Orange / LO: Yellow / LL: Green)
	Gating input	Activation level	Closed or 1.0 VDC or lower
		Deactivation level	Open or 2.8 VDC or higher
		Response time	Activation: 35 ms max.; deactivation: 70 ms max.
		Indicator	Green (front panel)
	Reference setting	2 5-digit settings: ① P/L (large), ② P/S (small)	4 5-digit settings: ① HH ② HI ③ LO ④ LL
	Analog delay	Amplifier frequency characteristic: H: high frequency/L: low frequency (selectable with switch)	
	Case material	Resin	
	Connection	Terminal block/DIN panel mounting	
	Mass	350g max.	

## Environmental Specification

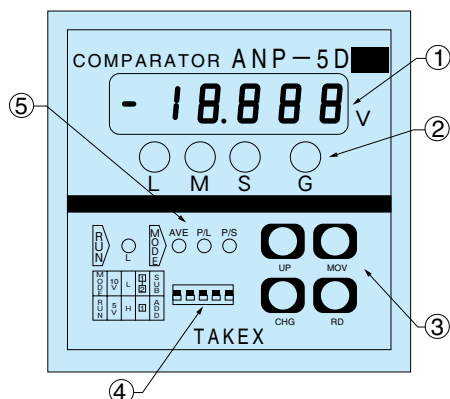
Environment	Ambient temperature	0 - +55 °C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Protective structure	IP40
	Vibration	10-55 Hz / 1.5 mm amplitude / 2 hours each in 3 directions
	Shock	1000m/s <sup>2</sup> 2 times each in 3 directions
	Dielectric withstanding	1500 VAC for 1 minute
	Insulation resistance	500 VDC, 20 MΩ or higher.

## Applicable Sensor

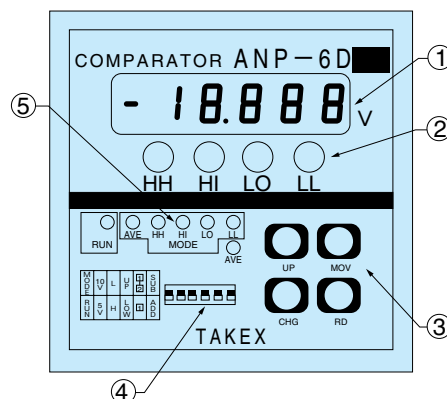
Sensor type	Model
Fiber optic sensor	F71RAN
Ultrasonic sensor	US-1AH, US-S25AN, US-S300 series USA-S1AN, USA-S3AN

## Panel Layout and Functions

Model ANP-5D



Model ANP-6D



### Functions

- ① **Input/data value display**  
5-digit value display. For negative values, “-” symbol precedes the value.  
The display indication depends on the setting of 4. function selector switch MODE/RUN.
- (1) **RUN setting**  
Input displayed in mV according to the function selector switch setting.
- (2) **MODE setting**  
Set data displayed according to the mode selection between AVE, P/L and P/S.
- ② **Operation indicator**  
Indicators for L (large: red), M (medium: orange), S (small: yellow) and G (gate: green) of the matching output.
- ③ **Pushbutton switches for setting data**  
Switches for setting data including data value selection, data read, digit switching, etc. Four switches are provided: **UP**, **MOV**, **CHG** and **RD**.
- ④ **Function selector switches**  
Settings of the following five functions can be configured. The table on the left of the switches shows the functions.
  - (1) **MODE/RUN**  
Select MODE for setting data. Select RUN for matching operation.
  - (2) **10 V/5 V**  
Set at 10 V for input of up to 10 V and at 5 V for input of up to 5 V.
  - (3) **L/H**  
The amplifier frequency characteristic is selectable between L (about 1 kHz) and H (about 1 MHz).
  - (4) **1 · 2 / 1**  
Selects between the numbers of input lines. Select “1·2” for 2-line input for addition/subtraction matching and “1” for 1-line input (only Ch 1 is valid).
  - (5) **SUB/ADD**  
Enabled only for 2-line input. Select between subtraction (SUB) and addition (ADD).  
SUB setting performs “Ch 1 – Ch 2” operation.  
ADD setting performs “Ch 1 + Ch 2” operation.
- ⑤ **RUN/MODE indicators**  
RUN indicator (red)  
AVE, P/L, P/S (green)

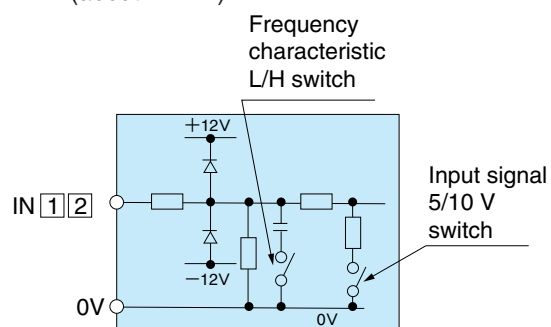
### Functions

- ① **Input/data value display**  
5-digit value display. For negative values, “-” symbol precedes the value.  
The display indication depends on the setting of 4. function selector switch MODE/RUN.
- (1) **RUN setting**  
Input displayed in mV according to the function selector switch setting.
- (2) **MODE setting**  
Set data displayed according to the mode selection between AVE, HH, HI, LO and LL.
- ② **Operation indicator**  
Indicators for HH (red), HI (orange), LO (yellow) and LL (green) of the matching output.
- ③ **Pushbutton switches for setting data**  
Switches for setting data including data value selection, data read, digit switching, etc. Four switches are provided: **UP**, **MOV**, **CHG** and **RD**.
- ④ **Function selector switches**  
Settings of the following five functions can be configured. The table on the left of the switches shows the functions.
  - (1) **MODE/RUN**  
Select MODE for setting data. Select RUN for matching operation.
  - (2) **10 V/5 V**  
Set at 10 V for input of up to 10 V and at 5 V for input of up to 5 V.
  - (3) **L/H**  
The amplifier frequency characteristic is selectable between L (about 1 kHz) and H (about 1 MHz).
  - (4) **UP/LOW**  
Selects between output logics. Select UP for activation for a value larger than the setting and LOW for activation for a value smaller than the setting (see Figure 12).
  - (5) **1 · 2 / 1**  
Selects between the numbers of input lines. Select “1·2” for 2-line input for addition/subtraction matching and “1” for 1-line input (only Ch 1 is valid).
  - (6) **SUB/ADD**  
Enabled only for 2-line input. Select between subtraction (SUB) and addition (ADD).  
SUB setting performs “Ch 1 – Ch 2” operation.  
ADD setting performs “Ch 1 + Ch 2” operation.
- ⑤ **RUN/MODE indicators**  
RUN indicator (red)  
AVE, HH, HI, LO, LL indicator (green)

## Input Circuit (Common)

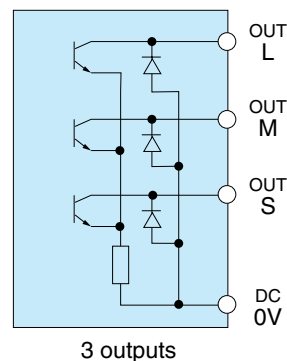
Input signal selection

- Input signal switch (5/10)  
5: up to 5 V; 10: up to 10 V
- Signal waveform analog delay switch (L/H)  
L: low frequency (about 1 kHz); H: high frequency (about 1 MHz)

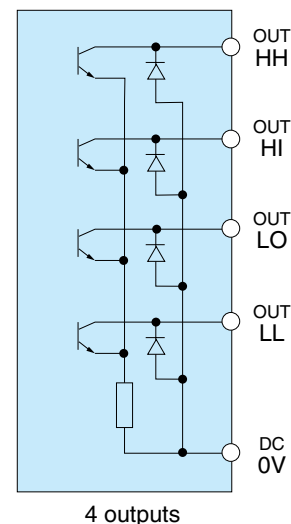


## Output Circuit

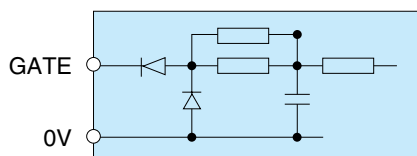
Model: ANP-5D



Model: ANP-6D



## External Gating



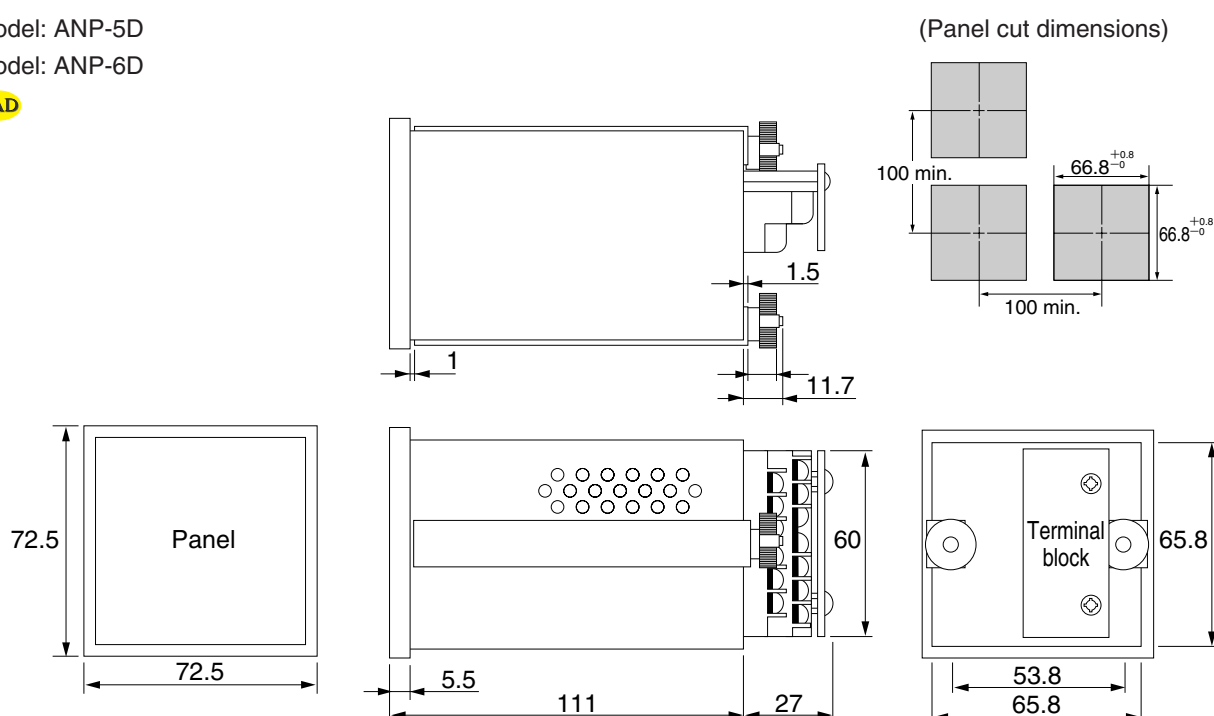
- Switch: activated with open  
Open collector: ON at 2.8 VDC or higher, OFF at 1 VDC or lower
- Output  
NPN open collector  
Rating: 100 mA (30 VDC) max.
- All output transistors turn off when load short circuit or overload occurs.  
Check the load and turn the power back on.

## Dimensions (in mm)

Model: ANP-5D

Model: ANP-6D

CAD





- Input level readily viewable
- Basic model for analog control
  - 12-level indicator for checking light reception level at a glance
  - 4-turn adjustment volume for fine-tuning
  - Relay output for 3-stage switching between HIGH, MID and LOW and 2 NPN open collector outputs for HIGH and LOW, covering a wide range of applications
  - Remote controlled-setting available with external volume
  - Hysteresis adjustable for fine differentiation
  - Sensor power supply (12 VDC 80 mA) integrated to allow connection of 2 ordinary analog sensors

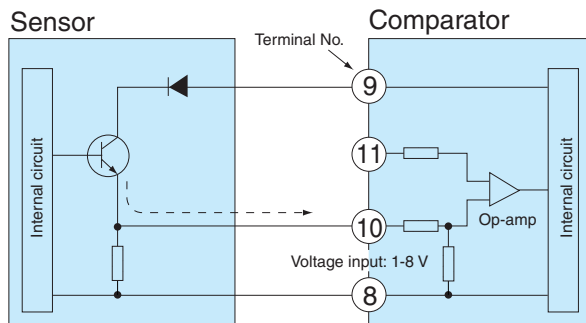
### Rating/Performance/Specification

	Model	ANP1F	
	Power supply	100,110 V / 200, 220VAC $\pm 10\%$ 50/60Hz	
Rating/performance	Power consumption	5VA max.	
	Output mode	(1) Relay output (with timer): Rating: 5 A (250 VAC) resistance load 1c (2) 2 NPN open collector outputs: Rating: 50 mA (30 VDC) max.	
	Input mode	Voltage input: 1-8 V	Input impedance 47 K $\Omega$ Input resolution: 0.1 V min.
	Power supply to sensor	12V DC $\pm 5\%$ 80mA max.	
	External gating	Contact or NPN transistor input for output mode (1) only	L : 1V max. H : 6V max.
	Response time	Sensor input: relay contact output : NPN open collector output : External gating input: 25 ms max.	25 ms max. 0.1 ms max.
Specification	Indicator	P.L(G): power indicator (green LED; turns red at activation of relay). OP.L: operation indicator (2 red LEDs for HIGH and LOW outputs) LEVEL: light reception level indicator (12 red LEDs)	
	Volume	POS.L: Position volume: 4-turn, 1 each for HIGH and LOW HYS.: Hysteresis volume (variable between 0 and 1 V), 1 each for HIGH and LOW TIME: Timer volume (selectable between 0.1-1 and 1-10 s), relay output only	
	Switch	: EXT.POSI switch (pushbutton) MODE : Output mode/level selector switch : Operation mode and timer selector switch	
	Case material	Resin	
	Connection	Plug-in terminal block	
	Mass	450g max.	
	Applicable sensor	Analog voltage output sensor	

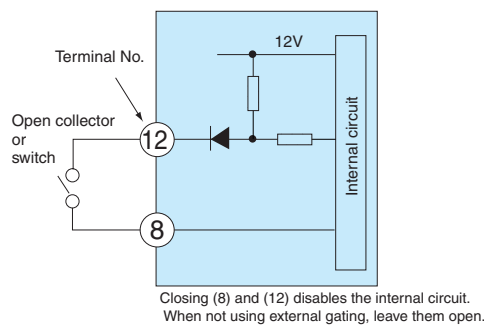
### Environmental Specification

Environment	Ambient temperature	-10 - +55 °C (non-freezing)
	Ambient humidity	35-85%RH (non-condensing)
	Protective structure	IP40
	Vibration	10-55 Hz / 1.5 mm amplitude / 2 hour each in 3 directions
	Shock	1000m/s <sup>2</sup> 2 times each in 3 directions
	Dielectric withstanding	1500 VAC for 1 minute
	Insulation resistance	500 VDC, 20 M $\Omega$ or higher.

## Input Circuit

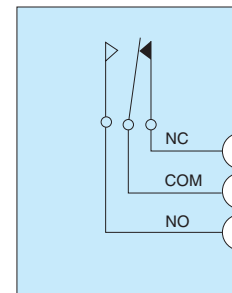


## External Gating



## Output Circuit

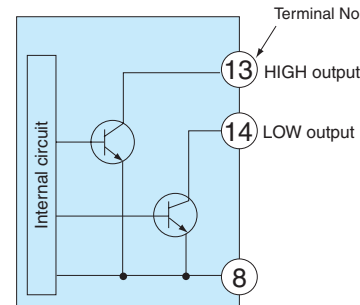
### - Relay output



3 outputs (relay output and 2 open collector outputs) can be made available at the same time.

Select between HIGH, MID and LOW with the output mode selector switch.

### - Open collector output



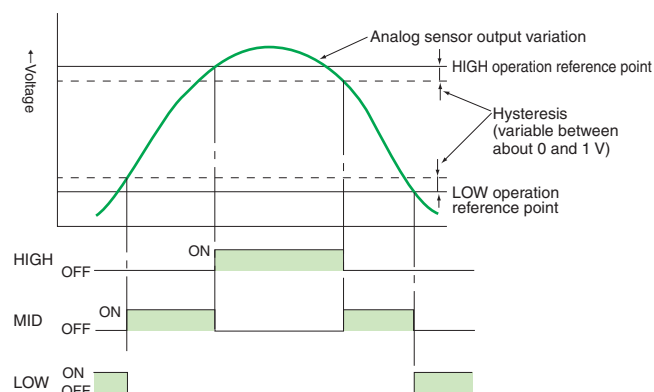
2 outputs (HIGH and LOW) can be made available at the same time.

## Connection Examples for Different Applications

Differential output with 2 sensors	Use of 1 sensor only	Setting of point of operation with external volume
<p>(Panel switch) Set the EXT.POSI switch at NORMAL and level selector switch at DIF.L.</p> <p>(Connection) - Connect Ch 1 sensor output to Terminal 10. - Connect Ch 2 sensor output to Terminal 11. The output will be 0 if the input levels for Ch 1 and Ch 2 are the same (output approximately 0 when 6 level indicators are illuminated) Ch 1 represents positive and Ch 2 negative direction.</p>	<p>(Panel switch) Set the EXT.POSI switch at NORMAL and level selector switch at Ch1L.</p> <p>(Connection) - Connect sensor output to Terminal 10. - Connect Terminals 11 and 9 (with +12 V).</p>	<p>(Panel switch) Set the EXT.POSI switch at EXT.POSI and level selector switch at DIF.L.</p> <p>(Connection) - Connect sensor output to Terminal 10. - Connect Terminal 11 to external volume.</p>

# ANP1F

## HIGH/MID/LOW Operation



## Dimensions (in mm)

